

Conducted Emission Test

according EN 62040-2:2006

ActivePower UPS CleanSource – 250-kVA-Module

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Appendix

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| Version | Date | Revised by | Description of Revision |
|---------|----------|------------|-------------------------|
| 1.0 | 08-01-17 | BRI | |

1 Introduction

This test is part of the total electromagnetic compatibility requirements and describes the results of the conducted emission at the relevant power terminals. Radiated emission and immunity have not been tested during these measurement works.

2 Equipment under test (EUT)

The ActivePower UPS CleanSource is an Uninterruptible Power System (UPS) to which product standard EN 62040 describes all relevant requirements and tests. Part 2 of this standard describes the electromagnetic compatibility requirements (EMC). CleanSource 250-kVA-Modules are designed to work in commercial and industrial environment (second environment). The modules have a rated current of 361 Amps.

2.1 Interference voltage limits

The EUT is tested according to class C3 for equipment with a rated current greater than 100 Amps (Table 2 in EN 62040-2:2006) in a frequency range between 0.15 MHz and 30 MHz to the following limits in Table 1.

| Frequency range MHz | Limits db(μ V) | |
|------------------------|------------------------|---------------|
| | Quasi peak value | Average value |
| 0.15 to 0.5 | 130 | 120 |
| 0.5 to 5.0 | 125 | 115 |
| 5.0 to 30.0 | 115 | 105 |

Table 1 Limits of conducted emission for UPS class C3

3 Measurement device

The measurements are made with an EMC spectrum analyser Agilent E7404A which is able to measure the specified frequency range between 0.15 MHz and 30 MHz and a required bandwidth of 9 kHz with quasi peak and average detector.

Together with the analyser a passive probe Rohde&Schwarz ESH2-Z3 is utilized as described in EN 62040-2. A line impedance stabilization network (LISN) has not been used due to the high rated current of 361 Amps and because the base level is sufficiently below the average limit (at least -6dB μ V).

The test and measurement arrangement is shown in Figure 1 and Figure 2.



Figure 1 Arrangement during measurement work

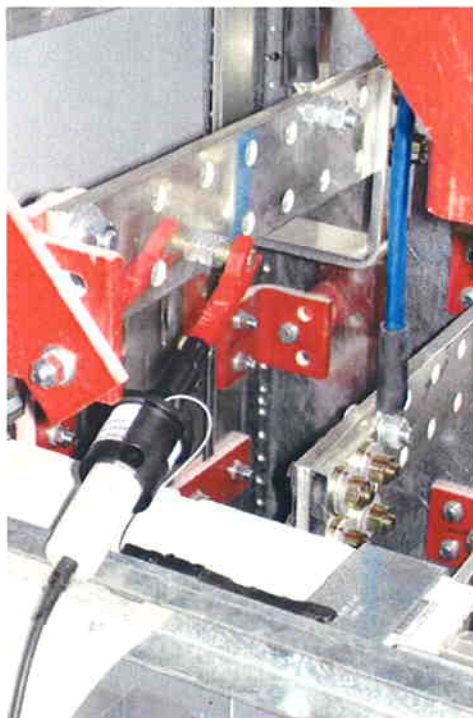


Figure 2 Passive Probe, here connected to the output terminals

4 Test results

4.1 Base level

Agilent 15:11:13 Jan 10, 2008

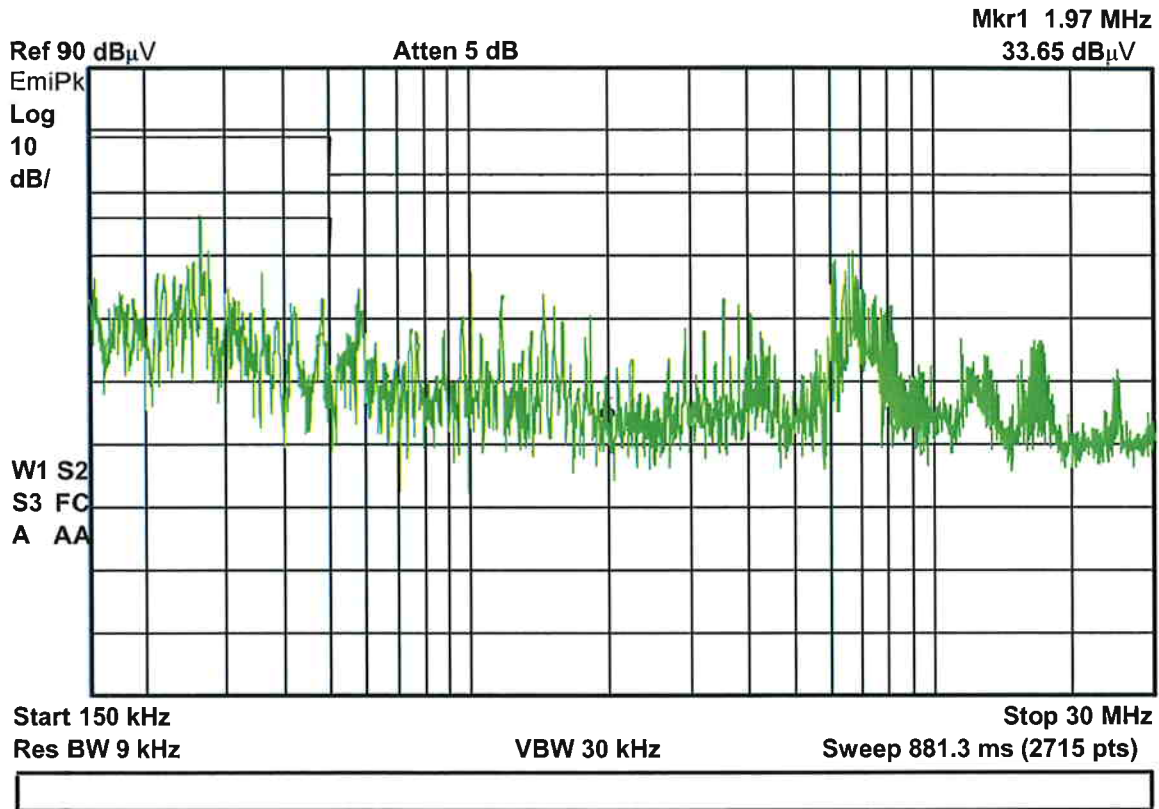
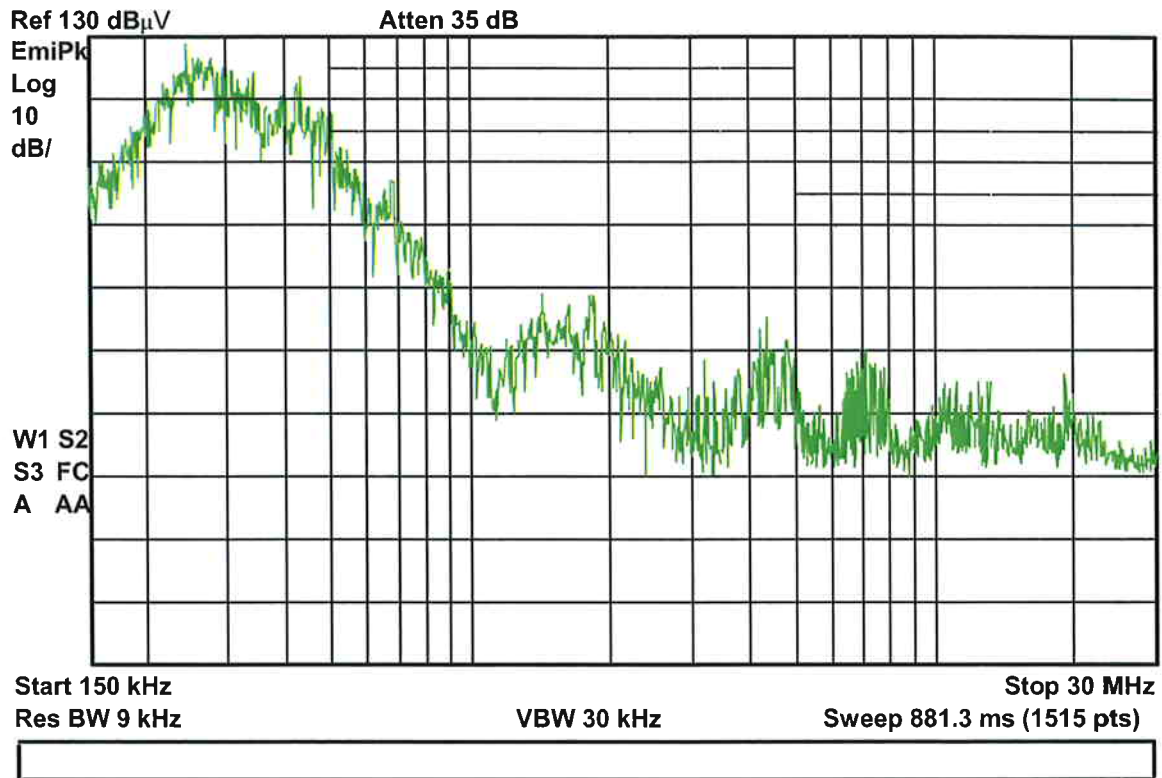


Figure 3 EMC test at UPS input terminals, base level

Figure 3 shows the disturbance at the input terminal phase 3 with the utility present and the UPS switched off completely. The chart also indicates the quasi-peak and average limits of class C2. The base level is more than 6 dB below the limits. The measurements at the phases 1 and 2 are similar to phase 3 and therefore not shown in the documentation. The same applies for the cases below with the UPS running.

4.2 UPS Input

Agilent 12:44:40 Jan 9, 2008



| Sig. # | Freq. (MHz) | Peak (dBuV) | QP (dBuV) | Avg (dBuV) | Uncert. (MHz) | Corr. (dB) | Limit1 (dBuV) | Limit2 (dBuV) | QP Delta L1 (dB) | Avg Delta L2 (dB) |
|--------|-------------|-------------|-----------|------------|---------------|------------|---------------|---------------|------------------|-------------------|
| 1 | 0.348544 | 126.69 | 120.64 | 115.78 | 0.001503 | 30.00 | 130.00 | 120.00 | -9.36 | -4.22 |
| 2 | 0.508565 | 119.24 | 113.49 | 108.31 | 0.001501 | 30.00 | 125.00 | 115.00 | -11.51 | -6.69 |

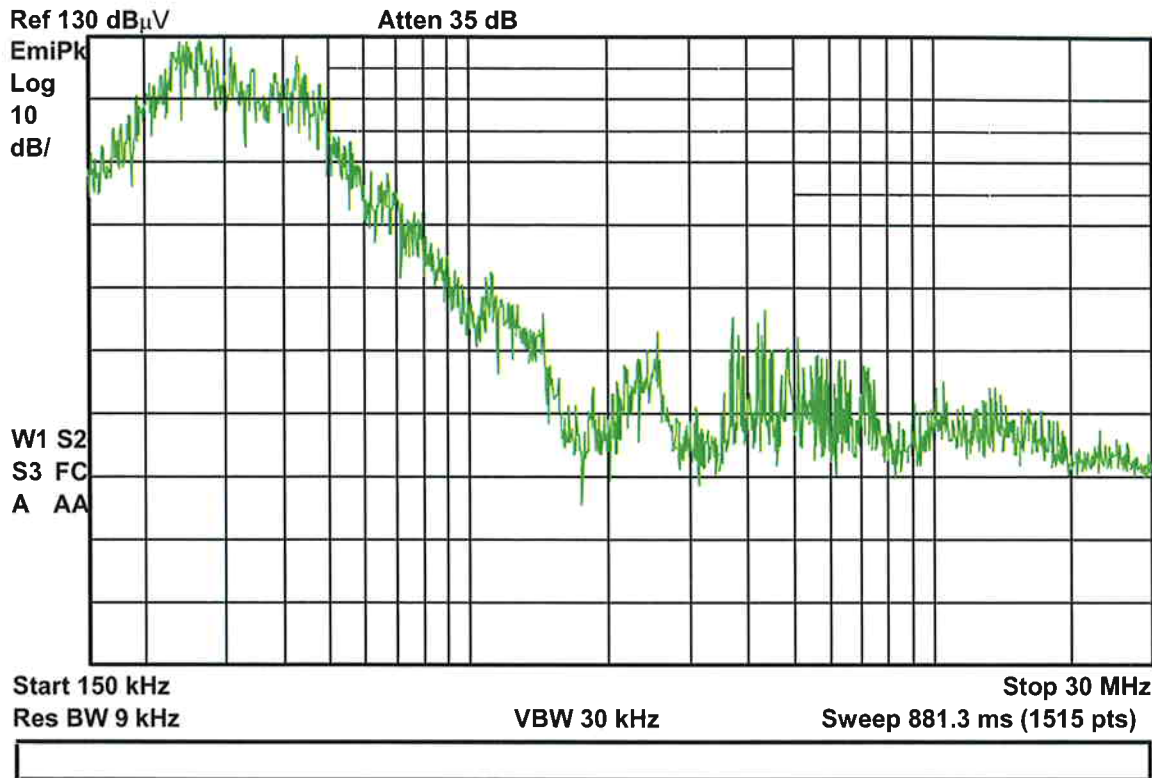
Figure 4 EMC test at UPS input terminals, no load condition

Figure 4 shows the trace at the UPS input with the UPS running at no load. Different to Figure 3 the limits indicate class C3 and the range of the Y-axis last to 130 dB(μ V). The table below the chart lists those frequencies where the measured peak value exceeds the C3 average limit. In both cases the quasi peak and average are below the corresponding limits. The Delta values are negative.

Remark additional: The graph shows measured peak values with a bandwidth of 30 kHz (VBW) for fast display and overview of the behavior. The measurement values in the table and give the standard relevant values. Therefore the curve in the graph can slightly differ from the values in the table.

4.3 UPS Output

Agilent 12:48:25 Jan 9, 2008



| Sig. # | Freq. (MHz) | Peak (dBuV) | QP (dBuV) | Avg (dBuV) | Uncert. (MHz) | Corr. (dB) | Limit1 (dBuV) | Limit2 (dBuV) | QP Delta L1 (dB) | Avg Delta L2 (dB) |
|--------|-------------|-------------|-----------|------------|---------------|------------|---------------|---------------|------------------|-------------------|
| 1 | 0.249308 | 130.12 | 124.24 | 119.52 | 0.001507 | 30.00 | 130.00 | 120.00 | -5.76 | -0.48 |
| 2 | 0.502432 | 121.88 | 115.32 | 110.09 | 0.001501 | 30.00 | 125.00 | 115.00 | -9.68 | -4.91 |

Figure 5 EMC test at UPS output terminals, no load condition

Figure 5 shows the trace at the UPS output with the UPS running at no load.

Reference is made to the description below Figure 4.

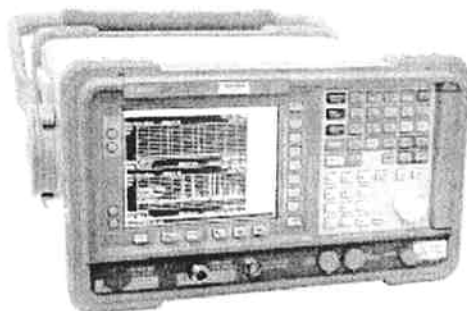
4.4 Result

The UPS passes the test for EN 62040-2:2006, class C3.

AGILENT

E7404A

N° US41160151



Accessoires standards (standard accessories) :

- | | | | |
|-------------------------------------|----|---------------------------------------|------|
| <input checked="" type="checkbox"/> | 1x | Cordon secteur | Ref. |
| <input checked="" type="checkbox"/> | 1x | Adaptateur N(m)/BNC(f) | |
| <input checked="" type="checkbox"/> | 1x | Cordon BNC | Ref. |
| <input checked="" type="checkbox"/> | 1x | Document papier « User Guide » | |
| <input checked="" type="checkbox"/> | 1x | Document papier « Measurement Guide » | Ref. |
| <input checked="" type="checkbox"/> | 1x | Constat de vérification | Ref. |
| <input checked="" type="checkbox"/> | 1x | Sacoche Leasametric rouge | |

Accessoires Additionnels (Supplemental accessories)

- | | | | |
|-------------------------------------|----|------------------------|------|
| <input checked="" type="checkbox"/> | 1x | Adaptateur N(m)/SMA(f) | Ref. |
|-------------------------------------|----|------------------------|------|



Leasametric

S.A.S. au capital de 155.000€
 7 avenue du Hoggar
 91969 Les Ulis
 Tel : 01 64 46 44 22

CONSTAT DE VERIFICATION

N° CV0711898/01

| | | | |
|-----------------------|----------------------|--------------------------|-------------------|
| Constructeur : | Agilent | Modèle : | E7404A |
| Désignation : | 100Hz-13.2GHz | Numéro de série : | US41160151 |
| Options : | | | |

Date de vérification : 21/11/07

Date de validité : 21/11/08

Document délivré à : LEASAMETRIC

Etat de l'instrument

| | | | |
|-------------------------|--|---------------------------------------|-----------------------------------|
| A la réception : | <input checked="" type="checkbox"/> Conforme | <input type="checkbox"/> Non conforme | <input type="checkbox"/> Indéfini |
| En sortie : | <input checked="" type="checkbox"/> Conforme | <input type="checkbox"/> Non conforme | <input type="checkbox"/> Indéfini |

Suivant les conditions d'acceptation définies dans la procédure : HPE4405B_VC1.

Opération réalisée : VERIFICATION DES SPECIFICATIONS

Opérateur : HA

Responsable technique : C.C.

Leasametric


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Constat de vérification N° CV0711898/01

Conditions de vérification

Date de vérification : 21/11/07

Température : (23 ±2)°C

Humidité : (50 ±20)%Rel

Procédure : HPE4405B_VC1.

La vérification est effectuée suivant la procédure ci-dessus.

Les étalons utilisés sont traçables et raccordés aux étalons nationaux ou internationaux.

Liste des équipements

| Modèle | Constructeur | N° de série | Désignation |
|-----------|--------------|-------------|-------------------------|
| - 8902A | HP | 2742A01679 | Analyseur de Modulation |
| - 83640L | AGILENT | 3844A00558 | Générateur HF |
| - 3325B | HP | 2847A08655 | Générateur de Fonctions |
| - 53132A | HP | 3710A03608 | Compteur |
| - 437B | HP | 3125U22314 | Bolomètre |
| - 909F-12 | HP | 08925 | Charge coaxiale 50 Ohm |
| - 11792A | HP | 3528A01895 | Sonde Bolométrique |
| - 8482A | HP | 2652A17689 | Sonde Bolométrique |
| - 11667B | HP | 08962 | Diviseur HF 26,5GHz |
| - 8663A | HP | 2716A01091 | Générateur RF |
| - | | | |
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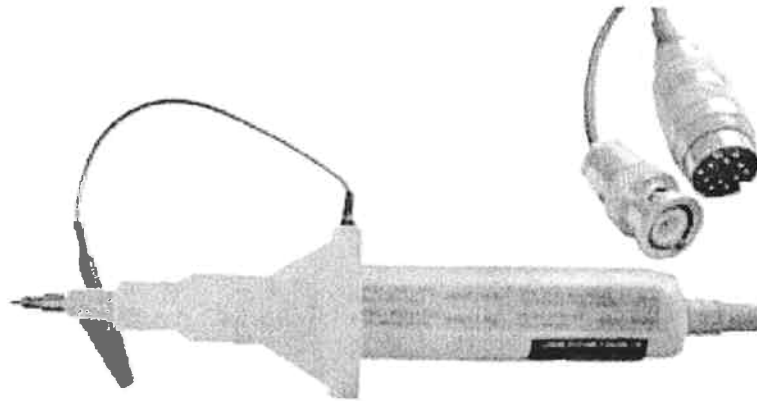
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| | | | |
|----------------------------|----------------|--------|------------------|
| Rohde & Schwarz | ESH2-Z3 | Opt. . | N° 100067 |
|----------------------------|----------------|--------|------------------|



Accessoires standards (standard accessories) :

| | | | | |
|-------------------------------------|-------------------------------------|----|---|-----------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1x | Jeux d'accessoires | |
| | <input checked="" type="checkbox"/> | | Raccord de masse banane intégré | Ref. |
| | <input checked="" type="checkbox"/> | | Pointe de touche concentrique | Ref. 0017.3389.00 |
| | <input checked="" type="checkbox"/> | | Pointe de touche grippe-fil | Ref. 0241.0913.00 |
| | <input checked="" type="checkbox"/> | | Pointe de touche crocodile | Ref. 0241.0771.00 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | Attenuateur | Ref. : ESH2Z31 N° 100024 |
| <input type="checkbox"/> | <input type="checkbox"/> | 1x | Documentation papier « Manuel Utilisateur » | Ref. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1x | Paper Documentation « Operator Manual » | Ref. 299.7810.54 & 827.6513.02 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | Constat de vérification | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | Sacoche Leasametric rouge | |
| <input type="checkbox"/> | <input type="checkbox"/> | | Sacoche ou Valise de transport constructeur | Ref. |
| <input type="checkbox"/> | <input type="checkbox"/> | | Caisse ou valise d'emballage | |



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/CV R&S=ESH2-Z3100067

Placed in service: **4janv-2008**

Due date: **4ianv-2009**



ROHDE & SCHWARZ

závod Vimperk, s.r.o.

Kalibrierschein

Calibration Certificate

Nummer

17-222760

Number

Gegenstand
Item ESH2-Z3 PASSIVE PROBE

Hersteller
Manufacturer ROHDE & SCHWARZ

Typ
Type ESH2-Z3

Material Nr.
Material No. 0299.7810.56

Serial Nr.
Serial No. 100067

Auftraggeber
Customer

Bestellung Nr.
Order No.

Ort u. Datum d. Kalibrierung
Place and date of calibration Vimperk, 2007-11-16

Umfang der Kalibrierung
Scope of calibration Standard Calibration

Eingangsprüfung
Performance on receipt New device

Kalibrierergebnis
Result of calibration Measurement results within specifications

Umfang des Kalibrierscheins
Extent of the certificate 2 pages incl. this

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Wertintervall (Erweiterte Messunsicherheit mit $k = 2$).

Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S-Laboratorien.

Grundsätze und Verfahren der Kalibrierung entsprechen EN ISO/IEC 17025.

Das angewandte Qualitätsmanagement-System ist zertifiziert nach EN ISO 9001.

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Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents, that the named item is tested and measured against defined specifications.

Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor $k = 2$).

Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national / international standards, which realize the physical units of measurement according to the International System of Units (SI).

In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories.

Principles and methods of calibration correspond with EN ISO/IEC 17025. The applied quality system is certified to EN ISO 9001.

This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

ROHDE & SCHWARZ

RefNo. 17-222760
Ca Customized Due Date
2007-11-16

Ausstellungsdatum
Date of issue

2007-11-16

Laborleitung
Head of laboratory

Konrad Baht

Bearbeiter
Person responsible

Tomáš Liska

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Tel: 00420 388 452 111, fax: 00420 388 452 113
Obchodní vedení Dipl. Betriebswirt Johann Kraus
Danové identifikační číslo (DIC): 102-26034441 Identifikační číslo (ICO): 26 03 44 41
Krajský soud v Českých Budějovicích oddíl C, vložka 9587

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