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Conducted Emission Test

according EN 62040-2:2006

ActivePower UPS CleanSource – 250-kVA-Module

Content

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(µV)	
	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 -6dBµV).

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

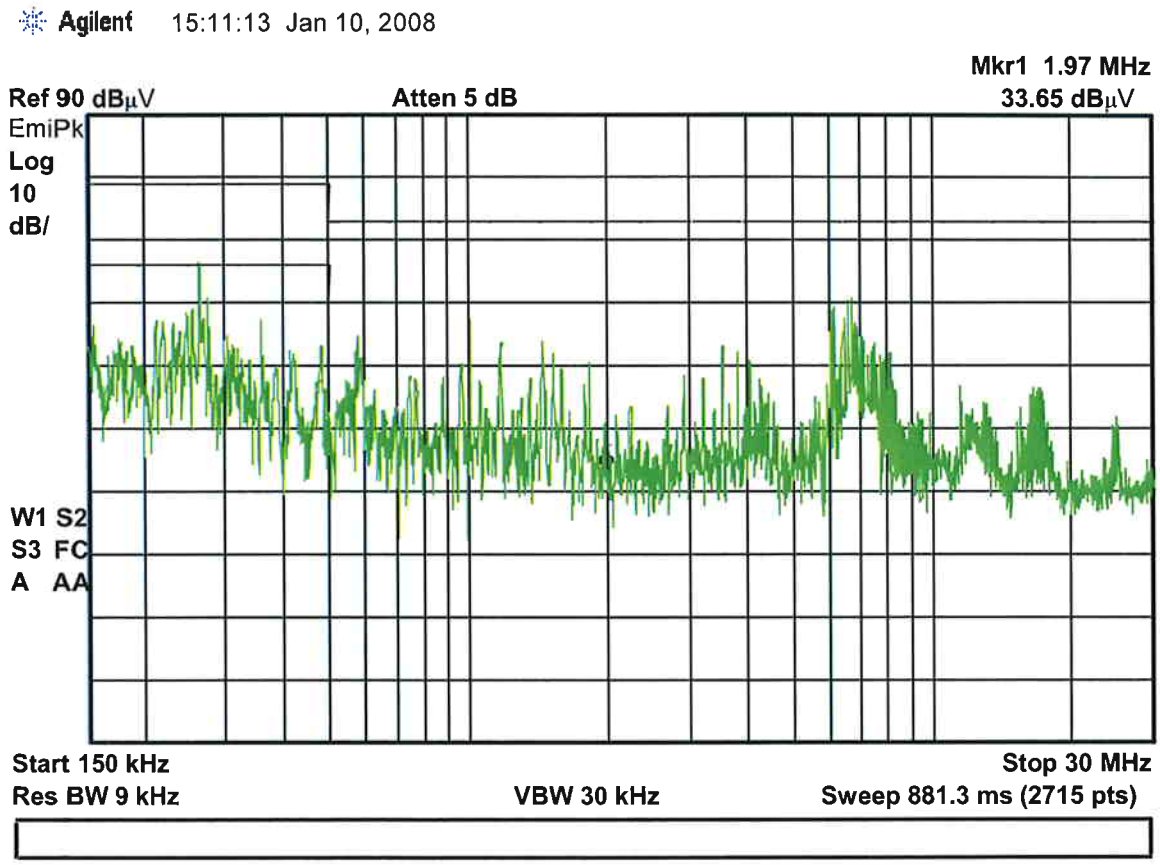
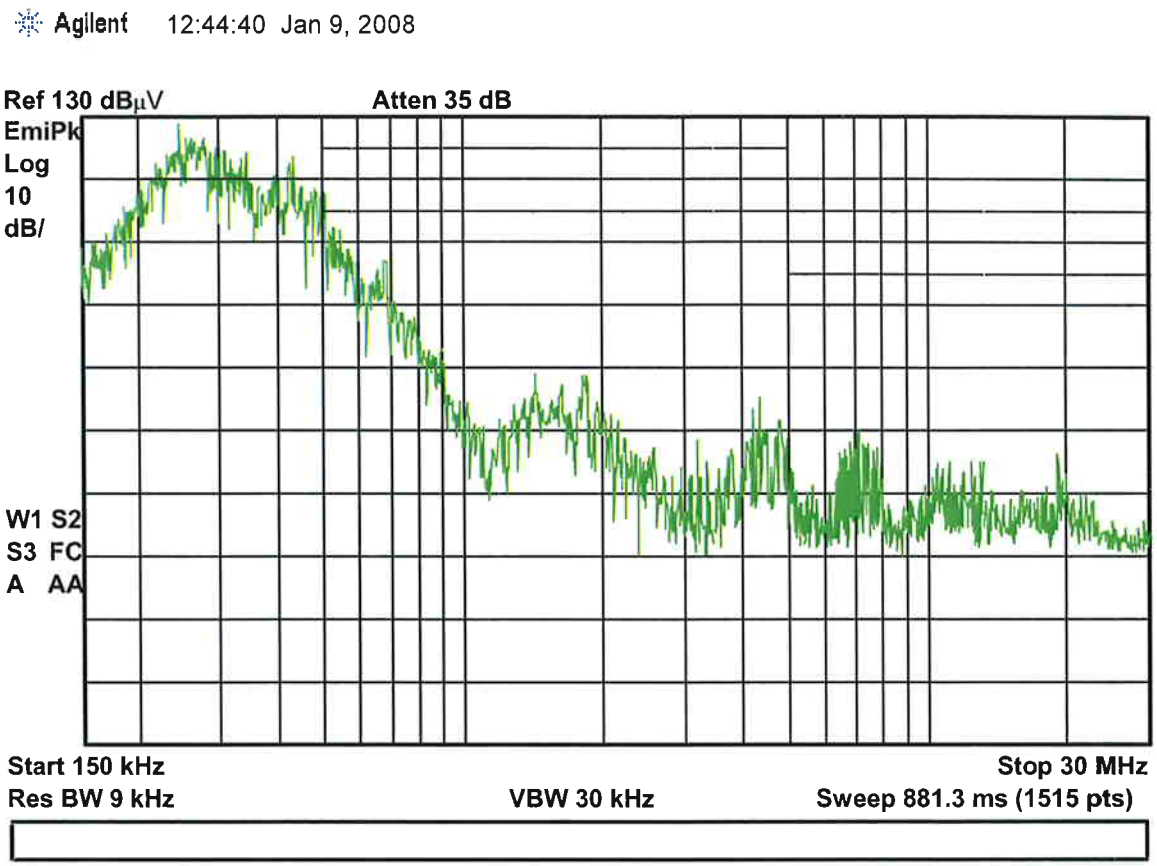


Figure 3 EMC test at UPS input terminals, base level

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



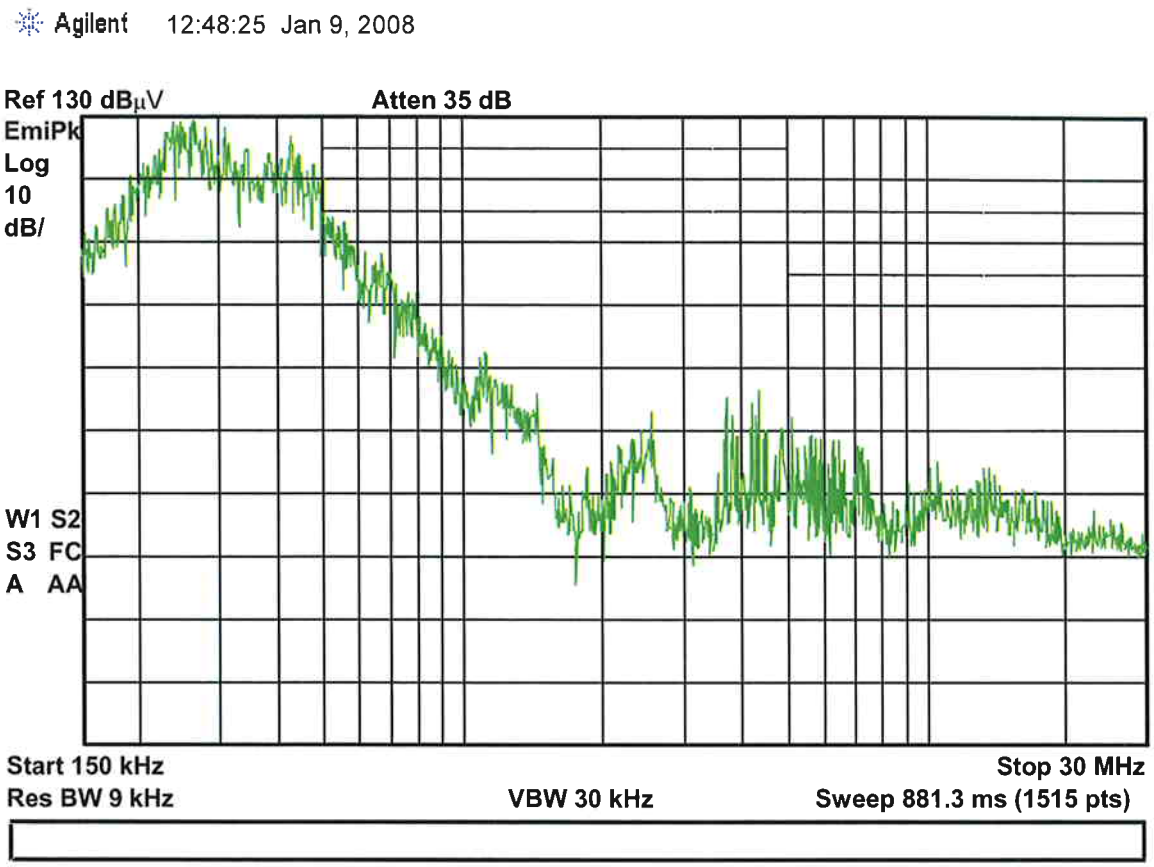
Sig. #	Freq. (MHz)	Peak (dBuV)	QP (dBuV)	Avg (dBuV)	Uncert. (MHz)	Corr. (dB)	Limit1 (dBuV)	Limit2 (dBuV)	QP Delta L1 (dB)	Avg Delta L2 (dB)
1	0.348544	126.69	120.64	115.78	0.001503	30.00	130.00	120.00	-9.36	-4.22
2	0.508565	119.24	113.49	108.31	0.001501	30.00	125.00	115.00	-11.51	-6.69

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(µV). 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



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.

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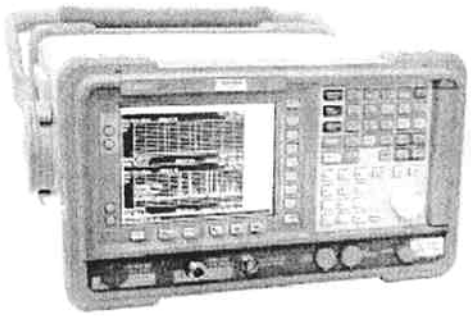
Liste des accessoires
(Accessories list)

A l'attention de
L'UTILISATEUR FINAL
(To the attention of the
END USER)

7 avenue du Hoggar – 91966 Les ULIS
tél : 01.64.46.44.22 – fax : 01.64.46.17.16

21/11/2007 15:32:00

AGILENT	E7404A	N° US41160151



Accessoires standards (standard accessories) :

☑❑	1x	Cordon secteur	Ref.
☑❑	1x	Adaptateur N(m)/BNC(f)	
☑❑	1x	Cordon BNC	Ref.
☑❑	1x	Document papier « User Guide »	
☑❑	1x	Document papier « Measurement Guide »	Ref.
☑❑	1x	Constat de vérification	Ref.
☑❑	1x	Sacoche Leasametric rouge	

Accessoires Additionnels (Supplemental accessories)

☑❑	1x	Adaptateur N(m)/SMA(f)	Ref.

conditions de retour des accessoires → voir au verso

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**		
Options :		**Numéro de série :**	**US41160151**

Date de vérification : **21/11/07** **Date de validité :** **21/11/08**

Document délivré à : **LEASAMETRIC**

Etat de l'instrument

A la réception :	[X]	**Conforme**	[ ]	**Non conforme**	[ ]	**Indéfini**
En sortie :	[X]	**Conforme**	[ ]	**Non conforme**	[ ]	**Indéfini**

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

Opération réalisée : VERIFICATION DES SPECIFICATIONS

Opérateur : HA **Responsable technique :** C. C

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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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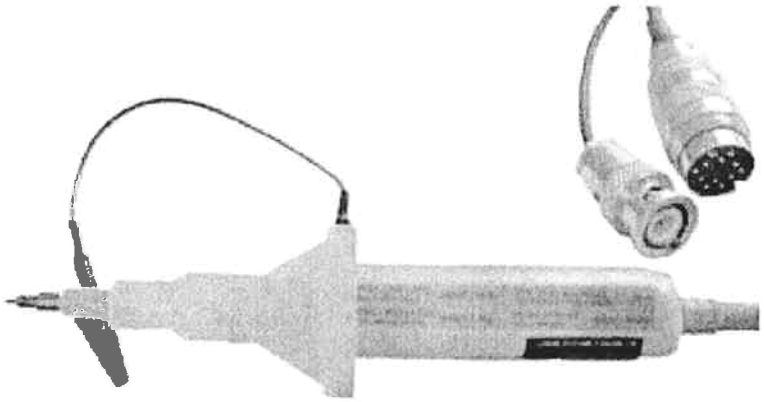
7 avenue du Hoggar – 91966 Les ULIS
tél : 01.64.46.44.22 – fax : 01.64.46.17.16

Liste des accessoires
(Accessories list)

A l'attention de
L'UTILISATEUR FINAL
(To the attention of the END USER)

04/01/2008 14:45:00

Rohde & Schwarz	ESH2-Z3	Opt. .	N° 100067



Accessoires standards (standard accessories) :

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

conditions de retour des accessoires → voir au verso

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/CV R&S=ESH2-Z3100067

Placed in service: 4-janv-2008

Due date: 4-janv-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 Werteintervall (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.
Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.
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
Cal. Customized Cert Date
2007-11-16

Ausstellungsdatum *Date of issue*	**Laborleitung** *Head of laboratory*	**Bearbeiter** *Person responsible*
2007-11-16	Konrad Bakr	Tomáš Liška

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