

Conducted Emission Test

according EN 62040-2:2006

ActivePower UPS CleanSource – 250-kVA-Module

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Appendix

dbr consult ingenieurgesellschaft

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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

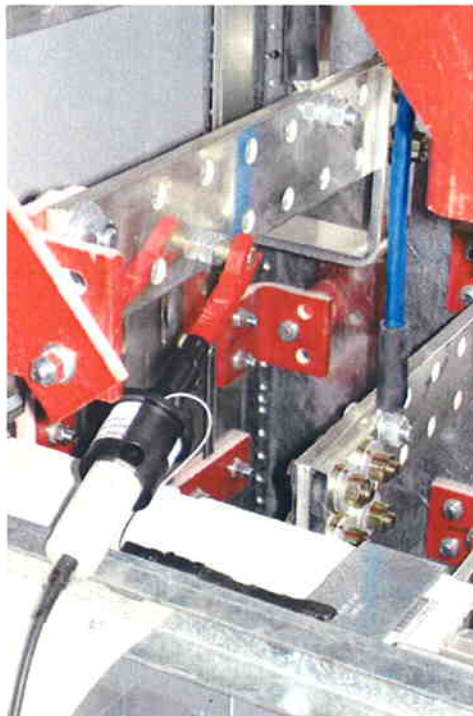


Figure 2 Passive Probe, here connected to the output terminals

4 Test results

4.1 Base level

Agilent 15:11:13 Jan 10, 2008

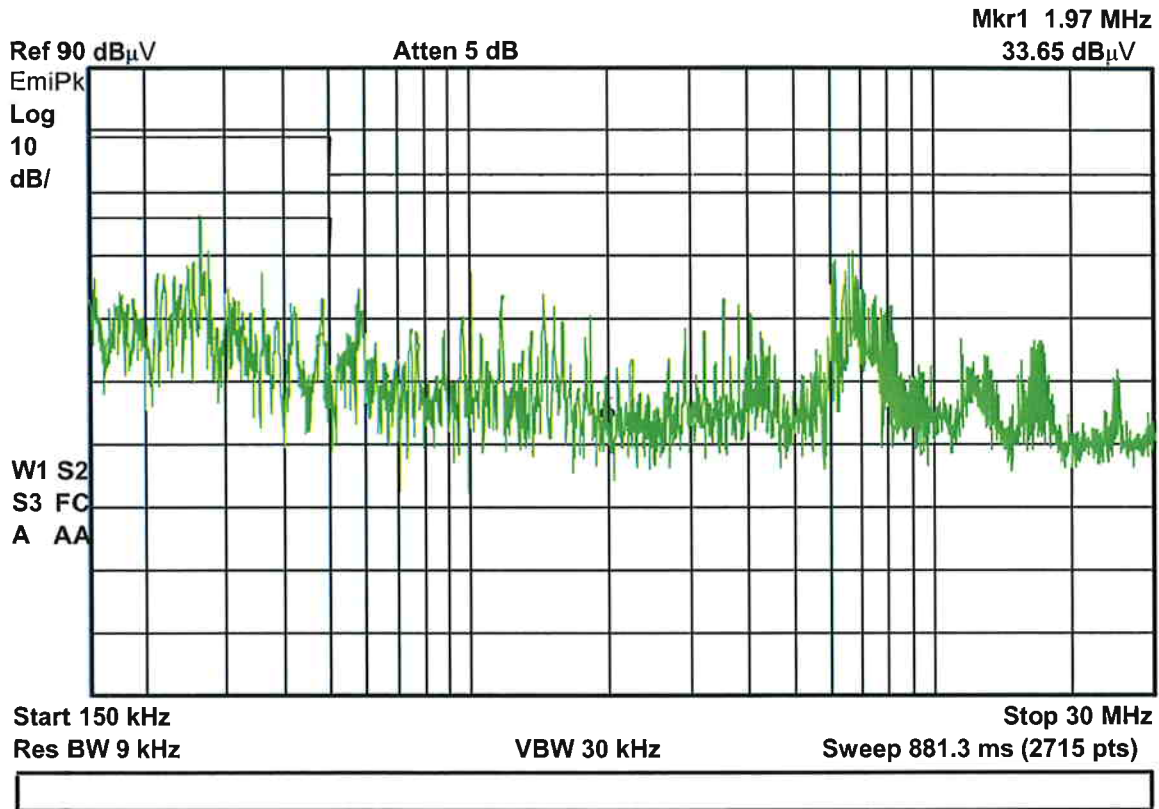
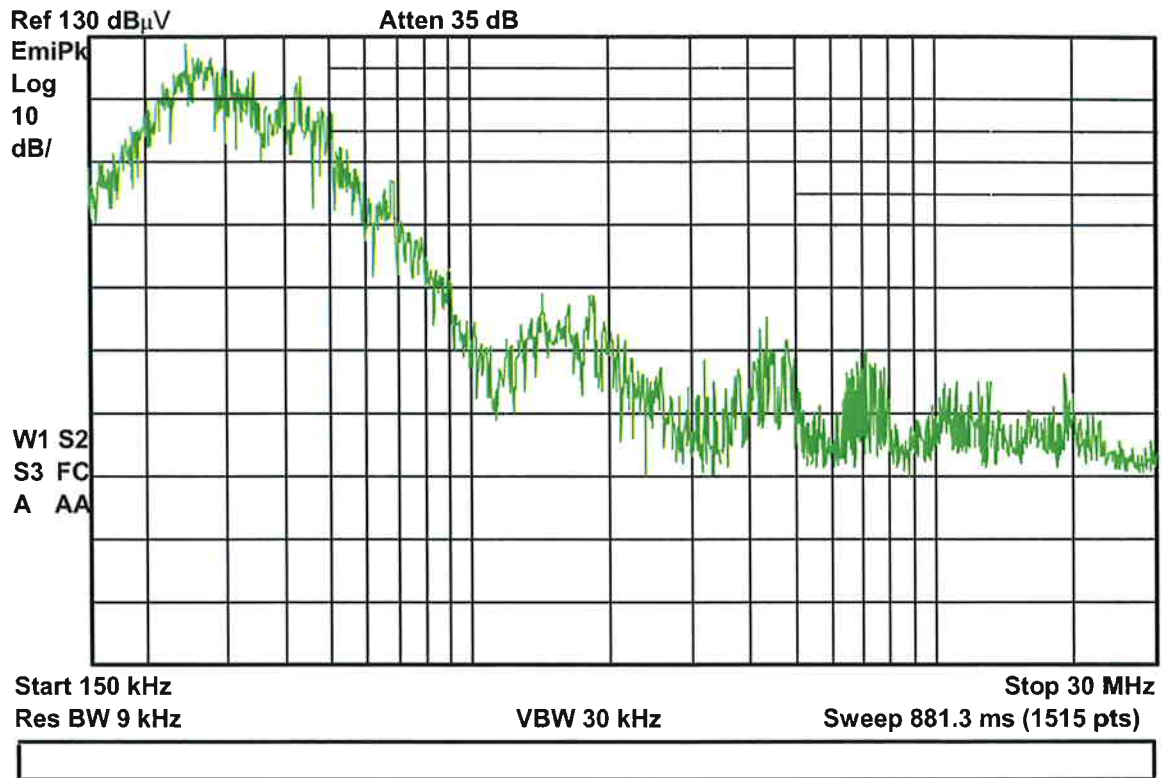


Figure 3 EMC test at UPS input terminals, base level

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

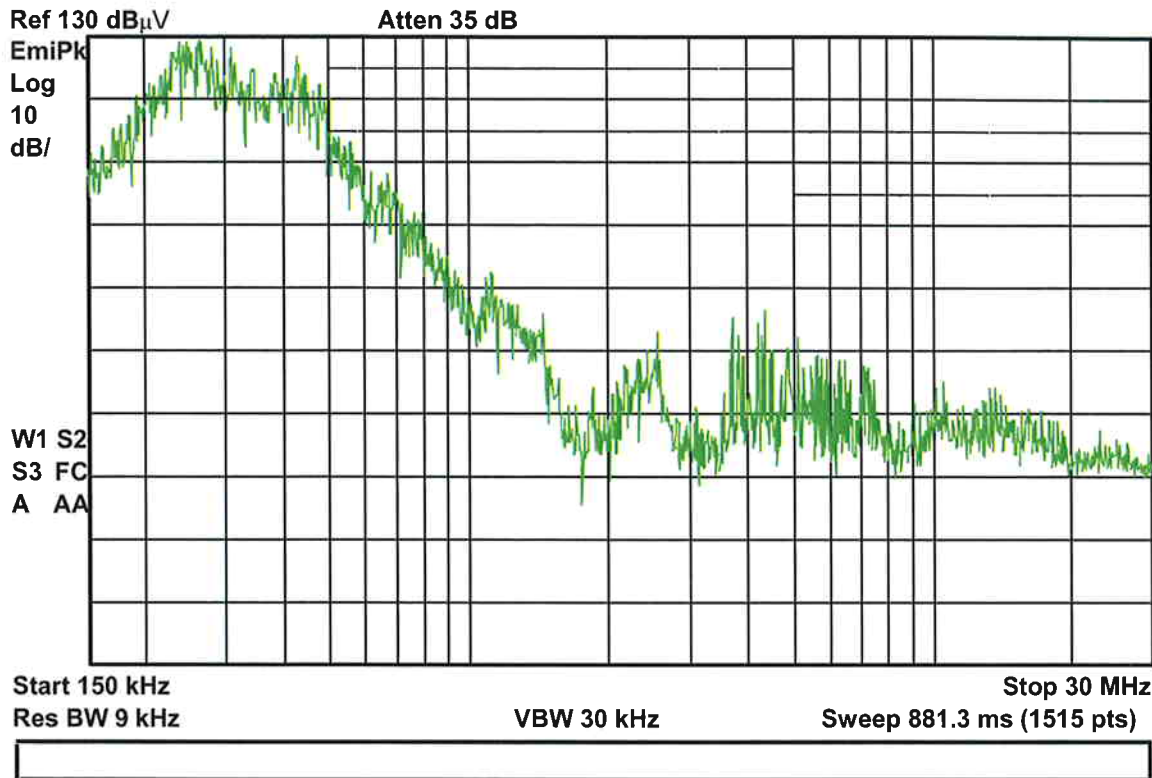
Figure 4 EMC test at UPS input terminals, no load condition

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.

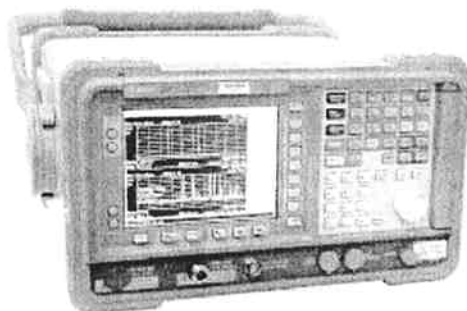
4.4 Result

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.

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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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-			

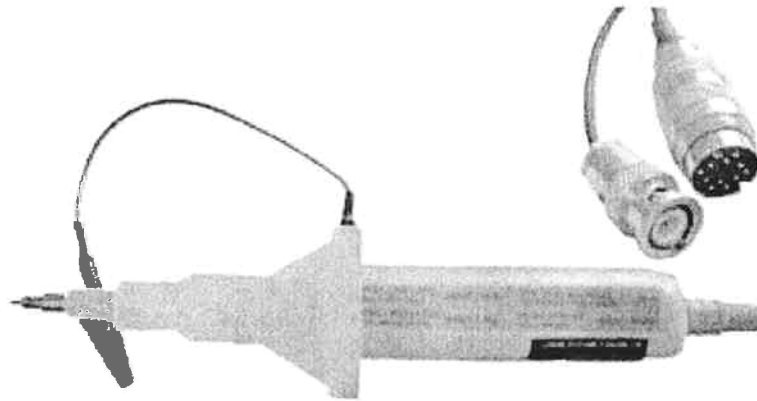
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Rohde & Schwarz	ESH2-Z3	Opt. .	N° 100067
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Accessoires standards (standard accessories) :

<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

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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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