



Laboratoria De Nayer v.z.w.
Department of Electronics
Section E.M.C.

Jan De Nayerlaan 3
B-2860 Sint-Katelijne-Waver



053-T - ISO17025

TEST REPORT

LDN number : 467
serial number: E0501015
edition number: 01
date of edition:09/02/2005

- The test report may not be reproduced, unless as a complete packet, without written agreement of Laboratoria De Nayer v.z.w.
- The results refer to the described sample or equipment under test only.
- Neither the accredited status of Laboratoria De Nayer v.z.w., nor this test report implies that the sample or equipment under test is approved by BELTEST or any other establishment.
- In case the customer wants to refer to his appeal to our accredited laboratories, he will use the following or equivalent sentence: "Tested by Laboratoria De Nayer, dep. of Electronics, sec. E.M.C., accredited by BELTEST for EMC-immunity and EMC-emission under registration number 053-T".

Customer's references	
Customer :	Agfa Gevaert NV
Address :	Septestraat 27 2640 Mortsel
Contact person :	Mr. Jan Vercammen

EUT's identification
Description and identification of the sample or equipment under test (marks, type number):
Drystar 5302 (type 5365/100)+ RF tag reader SN: 1016 FCC ID : HPL5366

Applied Tests or Technical Standards	
Emission:	
Test or Technical Standard	Title
FCC CFR47 part 15	Code of Federal Regulations , part 15 , Subpart C , Intentional Radiators part 15.225 Operation within the band 13.110-14.010MHz

MRA : between E.C. and USA : CAB (EMC) [designation number BE0002] date of validation 15.01.2002 (refer to p 23)

Equipment Classifications

Class A digital device : A digital device that is marketed for use in a commercial , industrial or business environment , exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Class B digital device : A digital device that is marketed for use in a residential environment , notwithstanding use in commercial , industrial or business environments. Examples of such a devices include , but are not limited to , personal computer , calculators and similar electronic devices that are marketed for use by the general public.

Field Strength Calculation.

The field strength is calculated in the receiver , for conducted emission TDF11 is selected , for spurious radiated emission the TDF21 is selected and for radiated field strength of the fundamental TDF13 is selected.

TDF11 is the Transducer Factor for the LISN (combination of the attenuation of the LISN and cable in the range 150kHz-30MHz)

TDF21 is the Transducer factor for the bilog antenna (combination of the AF of the Chase antenna , pre-amplifier and cables in the range 30MHz-1GHz) .

TDF13 is the Transducer factor for the loop antenna (combination of the AF of the loop antenna and cables in the range 150kHz-30MHz) .

Deviations from the test methods :
none

History of the tests	
identification number of the receipt:	EMC05015
Date of receipt of the sample or equipment under test:	17/01/2005
Date(s) of test:	19 and 20/01/2005

List of measurement equipment used during the tests

Item	model	serial number	
Rohde & Schwarz EMI receiver	ESCS30	SN:826547/027	*
Chase Bilog antenna	CBL6112A	SN:2182	*
Antenne mast + controller	RSM 010 / RSC 02	/	*
Anechoic room	EAC52282	/	*
Rohde & Schwarz signal generator	SMX	SN: 825026/026	
WaveTek signal generator	182A	M6660836	
Amplifier Research amplifier 25-1000 MHz	25W1000M7	SN:12126	
Amplifier Research amplifier 10 kHz – 220 MHz	50A220	SN: 12143	
EM clamp	EM101	SN: 35400	
ESD generator EM-TEST	ESD30	SN:0295-31	
ESD gun	P 18	SN:0295-31	
Compact generator	UCS 500	SN: 0596-42	
Magnetic field source	MFS 100/P	SN: A1888 04/0 0297	
Magnetic loop antenna		SN: A18811/00297	
Magnetic field probe	/	SN: A1888 11/S 0297	
AC power generator(Spitzenberger +Spies)	EMV E2000/Pas	SN: A2780 00/0 0501	*
Vierdraht-T-Netznachbildung	EZ-10	SN: 843074/018	
100 Ohm resistor	CR 100A	/	
R&S ISN 4wire network	ENY41	837032/012	
R&S ISN 2wire network	ENY22	837497/017	
R&S clamp	MDS21	84003/017	
R&S T-network 2wire network	ESH3-Z4	SN: 844390/004	
R&S T-network 4wire network	EZ-10	SN: 843074/018	
CDN 801-M2/3 : LÜTHI	CDN M2/3	930	
CDN 801-M5 : LÜTHI	CDN M5	932	
			*
parallel probe	LDN	LDNLP2	
preamp : 9kHz-1GHz Chase	CPA9231	SN :3078	*
HP Power supply	HP6247B		
HP spectrum Analyzer	HP8546A	SN: 3549A00300	
R&S horn antenna 1-18GHz	HF906	SN: 100008	
R&S horn antenna 1-18GHz	HF906	SN: 100007	
R&S power meter	NRVD	SN : 857.8008.02	
R&S power sensor	URV5-Z4	SN : 095 161955	
Marconi signal generator	2024	SN : 112246/063	
R&S loop antenna 9k-30MHz	HFH2 Z2	SN : 878604/007	*
R&S bilog antenna 30-3000MHz	HL562	SN : 361324/017	
R&S bilog antenna 30-3000MHz	HL562	SN : 361324/018	
HP dynamic signal analyzer	HP3562A	SN : 3005A05241	
Fluke Scopemeter	192B	SN : DM8380360	
Fluke current probe	i200s	SN : 1040036ZBS	
Fluke DVM	73III	SN: 74140243	



De Vos Jan
Test Engineer



Prof. dr. ir. Dirk Van Troyen
Technical Director

1. Description of the EUT.

1.1. General.

The EUT is composed out one unit

1.2. Technical specifications of the EUT's.

rated power supply	100-127 and 220-240Vac (50/60Hz)
maximum internal clock freq.	500.0MHz
Cabling:	1 power cable (L , N , PE) l=2m LAN cable CAT5 : l=3m + l=10m
Test equipment (no part EUT) A.E.	Laptop : Dell Latitude software + version : asgard1.4.0a13
modification	none

1.3. Photographs of the EUT's.

photo 1 : Complete Model .



photo 2 : RFID tag



photo 3 : AE



2. Test conditions and climatic conditions.

2.1. Test conditions.

The equipment under test(EUT's) has been tested as a table top equipment.
For the radiated emission test the distance between antenna and EUT was 3 meter.
All tests have been performed in an anechoic chamber.

2.2. Climatic conditions.

The climatic conditions during these tests were: ambient temperature :21.0/22.6°C
relative humidity: 50/54%
atmospheric pressure:1011/1007mBar

3. The manufacturers'/applicants' role during the tests.

The applicant prepared the EUT and witnessed the test.

4. Tests.

4.1. Emission tests.

The test has been performed according to the standard: CFR 47 part15 .

4.1.2. Conducted emission on EUT(mains).(20/01/05)

The equipment was placed at ± 80 cm above the floor as table top equipment .

The test has been performed in a shielded room.

The conducted emission level was measured with a LISN according to CISPR16/ANSI C36.4 (0.15 MHz - 30 MHz).

Test voltage : 115V /60Hz

Specification reference :C.F.R.47 part 15.207

The upper limit line is the quasi-peak limit line for class A equipments.

The lower limit line is the average limit line for class A equipments.

Measurement results for EUT

Conducted emission L1-PE

table1 : EUT

Freq (MHz)	QP (dB μ V)	AV (dB μ V)
0.21	45.3	40.7
0.28	42.1	39.3
5.05	47.8	38.9

fig1 : plot results L1- PE, peak detector , normal mode.

Conducted emission L2-PE

table2 : EUT

Freq (MHz)	QP (dB μ V)	AV (dB μ V)
0.21	46.5	41.0
0.28	41.9	38.2
9.61	41.0	32.0

fig2 : plot results L2- PE, peak detector , normal mode.

conclusion :The EUT satisfies the class B limits for conducted emission according to part15 .

4.1.3. Radiated emission (30-1000MHz) (20.01.2005).

The equipment was placed as a table top in a semi anechoic room (10x6x6) with metal groundplane on the floor. The chamber complies with the ANSI C63.4/5 and CISPR 16.

The radiated emission level was measured with a bilog antenna (30-1000MHz) .

Test voltage : 115V /50Hz

Specification reference :C.F.R.47 part 15.209

The limit line 1 is the quasi-peak limit line(red) for class B equipments.

Measurement results Radiated emission : Horizontal polarization operation mode

table3

Freq (MHz)	QP (dB μ V/m)	height(m)	side
119.6	34.8	1.75	1
239.6	32.1	1	1
279.5	33.8	1	1
199.5	29.6	1	2
239.6	35.0	1	2
239.7	30.0	1	3

The final measurements with the quasi-peak detector remain everywhere below the limits for the class B limits. (table)

fig3=hor/1 ; fig5=hor/2 ; fig7= hor/3

Vertical polarization operation mode

table4

Freq (MHz)	QP (dB μ V/m)	height(m)	side
134.8	30.1	1	1
802.5	33.5	1	1
160.3	23.5	1	2
239.6	30.7	1	2
481.3	35.3	1	3

The final measurements with the quasi-peak detector remain everywhere below the limits for the class B limits.

fig4=ver/1 ; fig6=ver/2 ; fig8= ver/3

conclusion: The EUT satisfies the class B limits for radiated emission according to part15 .

4.1.4. Fundamental Radiated emission.(20.01.2005)

Measurements were performed to the limits specified in FCC part 15.225 for fundamental frequencies , in the range 13.553 and 13.567MHz , any emission in this frequency band must not exceed 15.848 μ V/m @30m distances (84dB μ V/m @30m).

The test was done at 1m distance , the limit was calculated using the square of an inverse linear distance extrapolation factor of 40dB/dec. (40 log 30/1). section 15.31(f)(2)

table5

Freq (MHz)	QP (dB μ V/m)	limit (dB μ V/m) @1m
13.56	54.8	143.0

fig9: RFID tag : peak value (add 10dB correction factor)

conclusion: The EUT satisfies limit for radiated emission according to part15.225.

4.1.5. Limit lines

table 6: conducted emission limit (class B device)

Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
0.15-0.5	66 to 56	56 to 46
0.5-5.0	56	46
5.0-30	60	50

table7 : radiated emission limit @ 3m distance (class B)

frequency (MHz)	QP (dB μ V/m)
30-88	40.0
88-216	43.5
216-960	46.0
above 960	54.0

5.Summary of the test results.

5.1 Test results of the emission tests.

Test	The EUT complies limits	remark
conducted emissions (0.15 MHz – 30 MHz) part 15.207	yes	1
spurious emissions (30 MHz – 1000 MHz) part15.209	yes	1
radiated field strength of fundamental emissions part15.225	yes	

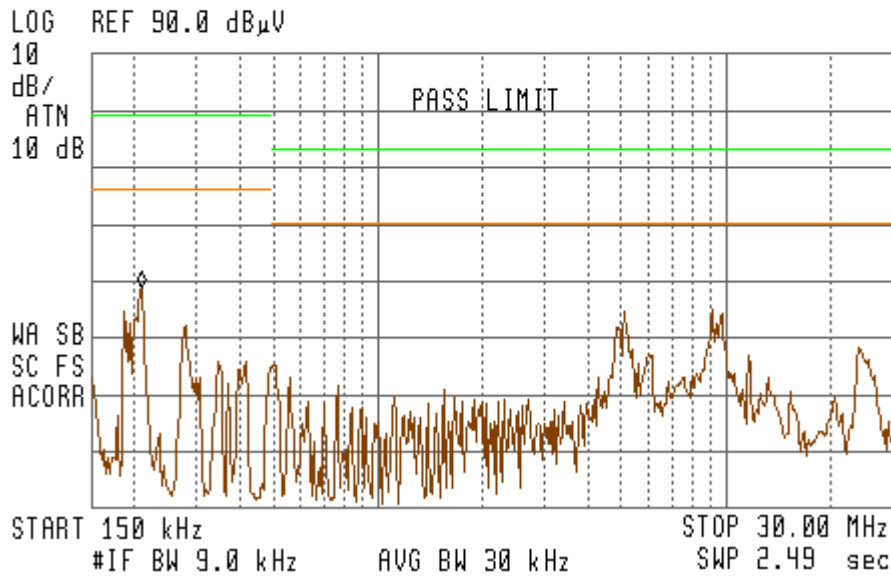
remark1 : complies class B limits .

6. Plotted graphs of the emission measurements.

6.1 fig1 Conducted emission L1-PE (115V/60Hz)

17:13:43 20 JAN 2005

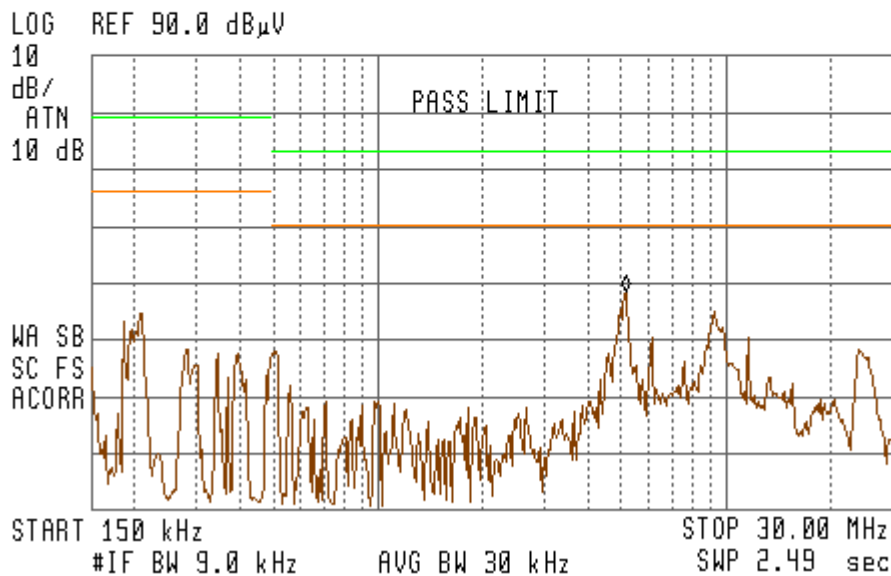
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 210 kHz
48.84 dB μ V



6.2 fig2 Conducted emission L2-PE (115V/60Hz)

17:26:38 20 JAN 2005

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 5.12 MHz
48.27 dB μ V



6.3 fig3 Radiated emission (30...1000MHz) hor. pol , side1

14:53:26 20 JAN 2005

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 199.5 MHz
32.66 dB μ V/m

DEMODO

ON

LOG REF 70.0 dB μ V/m

10

dB/

ATN

10 dB

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

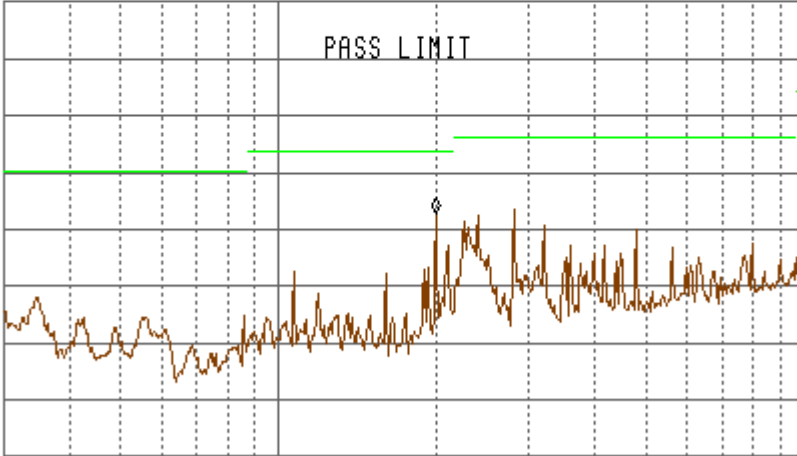
ATN

10

dB/

ATN

10



START 30.0 MHz STOP 1.0000 GHz
#IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.4 fig4 Radiated emission (30...1000MHz) ver. pol , side1

14:24:34 20 JAN 2005

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 795.0 MHz
34.04 dB μ V/m

DEMODO

ON

LOG REF 70.0 dB μ V/m

10

dB/

ATN

10 dB

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

ATN

10

dB/

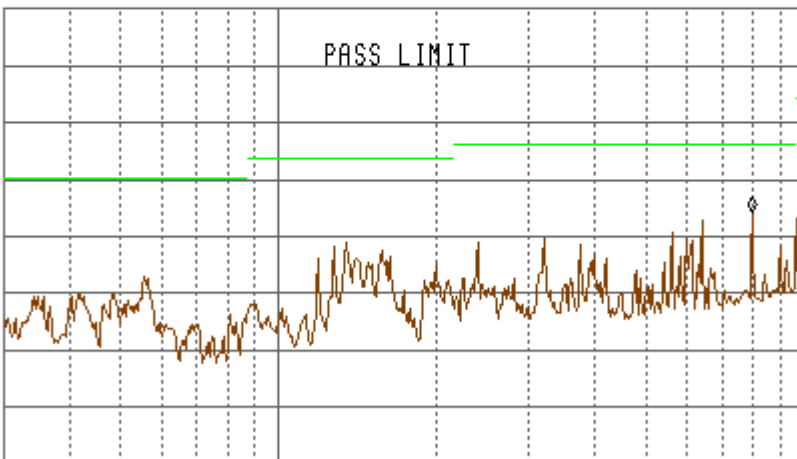
ATN

10

dB/

ATN

10



START 30.0 MHz STOP 1.0000 GHz
#IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.5 fig5 Radiated emission (30...1000MHz) hor. pol , side2

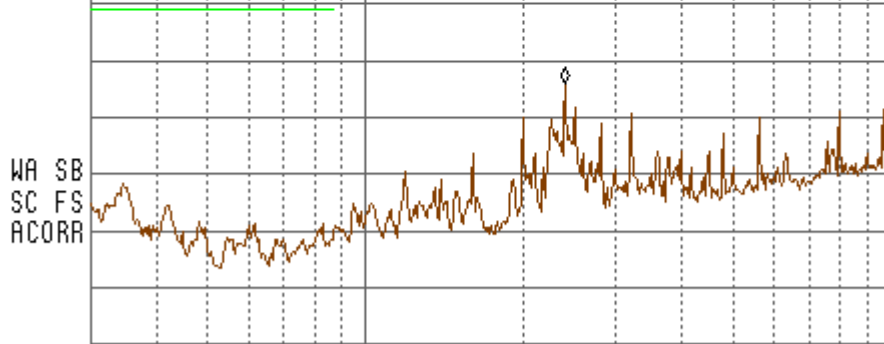
13:15:49 20 JAN 2005

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 239.6 MHz
 35.94 dB μ V/m

DEMODO
 ON

LOG REF 70.0 dB μ V/m

10
 dB/
 ATN
 10 dB



START 30.0 MHz STOP 1.0000 GHz
 #IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.6 fig6 Radiated emission (30...1000MHz) ver. pol side2

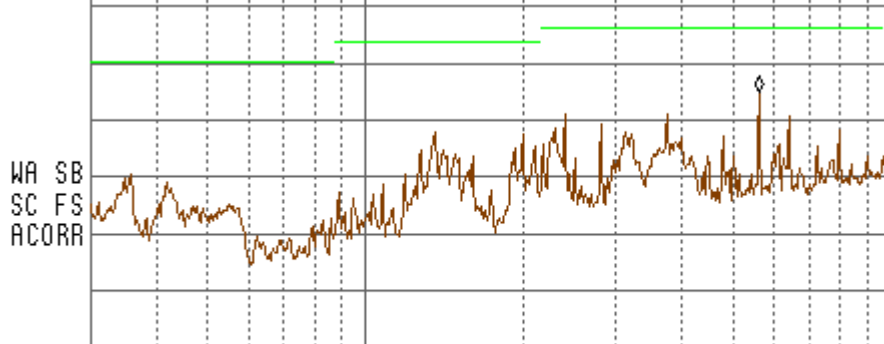
14:09:29 20 JAN 2005

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 558.7 MHz
 34.66 dB μ V/m

DEMODO
 ON

LOG REF 70.0 dB μ V/m

10
 dB/
 ATN
 10 dB



START 30.0 MHz STOP 1.0000 GHz
 #IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.7 fig7 Radiated emission (30...1000MHz) hor. pol side3

15:11:54 20 JAN 2005

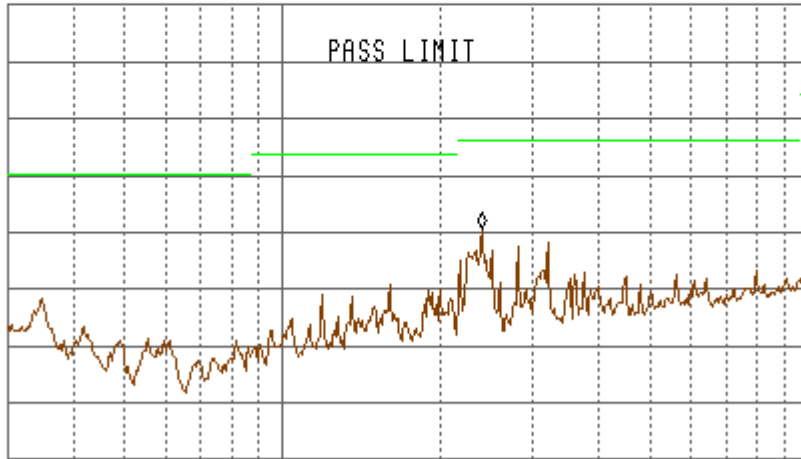
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 239.6 MHz
 30.64 dB μ V/m

DEMOD ON

LOG REF 70.0 dB μ V/m

10 dB/ATN
 10 dB

WA SB
 SC FS
 ACORR



START 30.0 MHz STOP 1.0000 GHz
 #IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.8 fig8 Radiated emission (30...1000MHz) ver. pol side3

15:38:56 20 JAN 2005

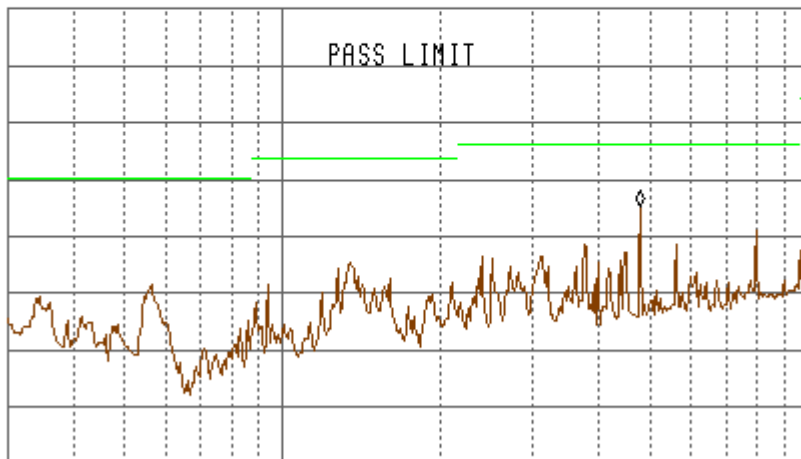
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 478.7 MHz
 35.29 dB μ V/m

DEMOD ON

LOG REF 70.0 dB μ V/m

10 dB/ATN
 10 dB

WA SB
 SC FS
 ACORR

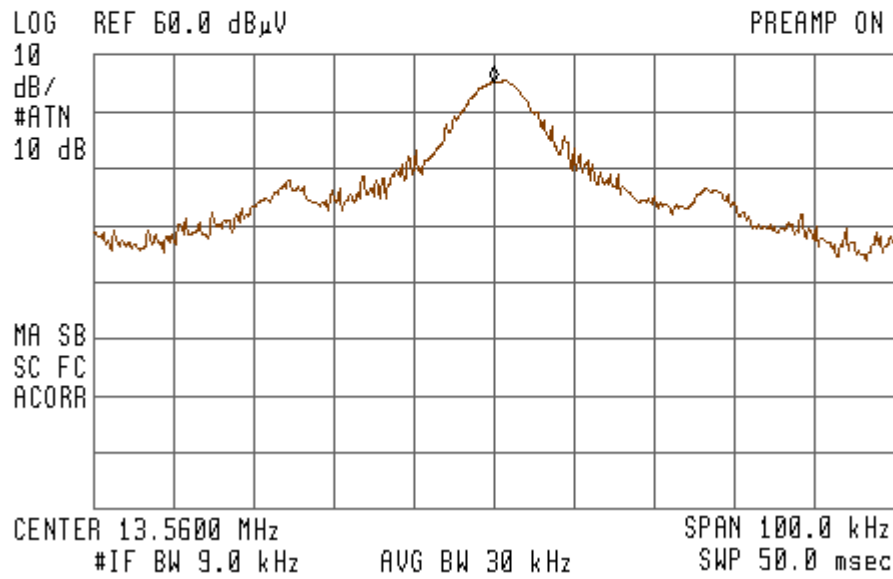


START 30.0 MHz STOP 1.0000 GHz
 #IF BW 120 kHz AVG BW 300 kHz #SWP 3.00 sec

6.9 fig9 : Intentional radiator @13.56MHz

17:42:27 19 JAN 2005

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.5600 MHz
55.05 dB μ V



7. Photo test setup

photo 4: radiated emission set-up (30-1000MHz)

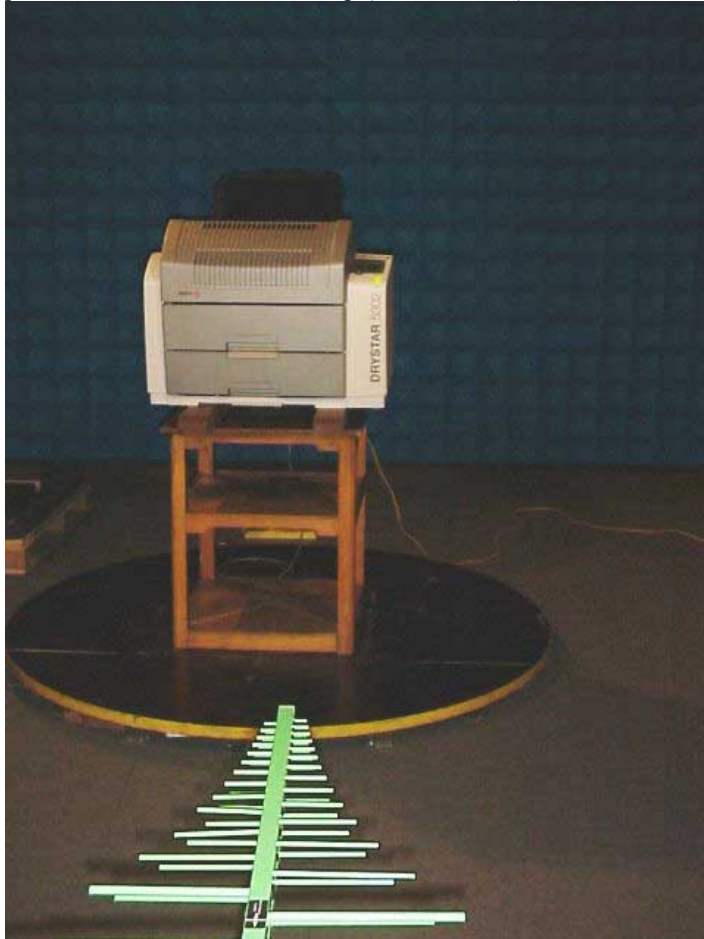


photo 5: conducted emission mains (0.15-30MHz)



photo 6 : radiated emission set-up (band 13.56MHz)



distance 1m en EUT is closed.

7. Modification
none

8. Uncertainty.

measurement	uncertainty	remark
CE with LISN	$\pm 2.42\text{dB}$	
RE 30-1000MHz	$\pm 3.9\text{dB}$	
RE magn. field	$\pm 3.9\text{dB}$	

Système Belge d'Accréditation
Essais et Inspection



Belgisch Accreditatiesysteem
Testen en Keuring

Member of EA and the EA-MLA (testing)
Member of ILAC

ACCREDITATION CERTIFICATE

Nr. 053-T

In compliance with the provisions of the Royal Decree of December 22nd 1992 concerning the setting up of BELTEST, the Minister of Economy, hereby confirms, on advice of the Accreditation Bureau, that the test laboratory

**LABORATORIA DE NAYER v.z.w.
Jan De Nayerlaan, 3
2860 SINT-KATELIJNE-WAVER**

has the competence to perform the tests, mentioned in the attached enclosure, in accordance with the requirements of the standard NBN EN ISO 17025. The present accreditation certificate is granted for a period of 3 years starting from 08.01.2004 and is submitted to an intermediate surveillance.

*The chair of the
Accreditation Bureau,*

The Minister of Economy,

Nicole MEURÉE-VANLAETHEM

Fientje MOERMAN

Original version of this certificate is in Dutch.

EB-0147

FEDERAL COMMUNICATIONS COMMISSION

**Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046**

November 29, 2004

Laboratoria DE NAYER
Jan De Nayerlaan 3
B-2860 Sint-Katelijne-Waver
Belgium

Attention: Dirk Van Troyen

Re: Accreditation of Laboratoria DE NAYER

Dear Sir or Madam:

We have been notified by the European Commission that Laboratoria DE NAYER has been accredited as a Conformity Assessment Body (CAB).

At this time your organization is hereby designated to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Parts 15 and 18 of the Commission's Rules.

This designation will expire upon expiration of the accreditation or notification of withdrawal of designation.

Sincerely,



Thomas W. Phillips
Electronics Engineer