

Straubing, July 18, 2003

TEST - REPORT

No. 55449-30406-1

for

H102022 CF

PCMCIA Compat Flash Card Reader

Applicant: ACG Identification Technologies AT GmbH

Test Specification: FCC Code of Federal Regulations,
CFR 47, Part 15,
Section 15.225

Note:

The test data of this report relate only to the individual item which has been tested.
This report shall not be reproduced except in full extent without the written approval of
the testing laboratory.

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1. Administrative Data

Test item (EUT)	
Type designation	H102022 CF
Serial number(s):	0001
Type of equipment:	PCMCIA Compat Flash Card Reader
Parts/accessories:	
FCC-ID:	
Technical data	
Frequency range	13.553 – 13.567 MHz
Operational frequencies	13.560 MHz
Type of modulation	10K0A1D
Pulse frequency	N/A
Pulse width	N/A
Antenna	Integrated
Power supply	DC 5 V
Applicant: (full address)	
	ACG Identification Technologies AT GmbH Parkring 1 A-8074 Grambach Austria
Contract identification:	---
Contact person:	Mr. Erich Rohrhofer
Manufacturer:	ACG Identification Technologies AT GmbH
Application details	
Receipt of EUT:	20 th June 2003
Date of test:	July 2003
Note:	
Responsible for testing:	Martin Steindl
Responsible for test report:	Martin Steindl

2. Identification of Test Laboratory

DETAILS OF THE TEST LABORATORY	
COMPANY NAME:	Senton GmbH EMI/EMC Test Center
ADDRESS:	Aeussere Fruehlingsstrasse 45 D-94315 Straubing Germany
LABORATORY ACCREDITATION:	DAR-Registration No. TTI-P-G 062/94-01
FCC TEST SITE LISTING	
INDUSTRY CANADA TEST SITE REGISTRATION	IC 3050
NAME FOR CONTACT PURPOSES:	Mr. Johann Roidt
TELEPHONE: (+49) (0)9421 5522-0	FAX: (+49) (0)9421 5522-99

PERSONNEL INVOLVED IN THIS TEST REPORT	
TECHNICAL DIRECTOR:	 Mr. Johann Roidt
RESPONSIBLE FOR TESTING:	 Mr. Martin Steindl
RESPONSIBLE FOR TEST REPORT:	Mr. Martin Steindl

SUMMARY OF TEST RESULTS
The tested sample complies with the requirements set forth in the Code of Regulations CFR 47, Part 15, Sections 15.225

3. Operation Mode of EUT

Continuously reading a transponder and sending data to host.
The EUT is housed in a Compac iPAC with PCMCIA-interface.

4. Configuration

Configuration of the EUT
Not applicable

Cables connected to the EUT
Not applicable

Peripheral devices connected to the EUT
Not applicable

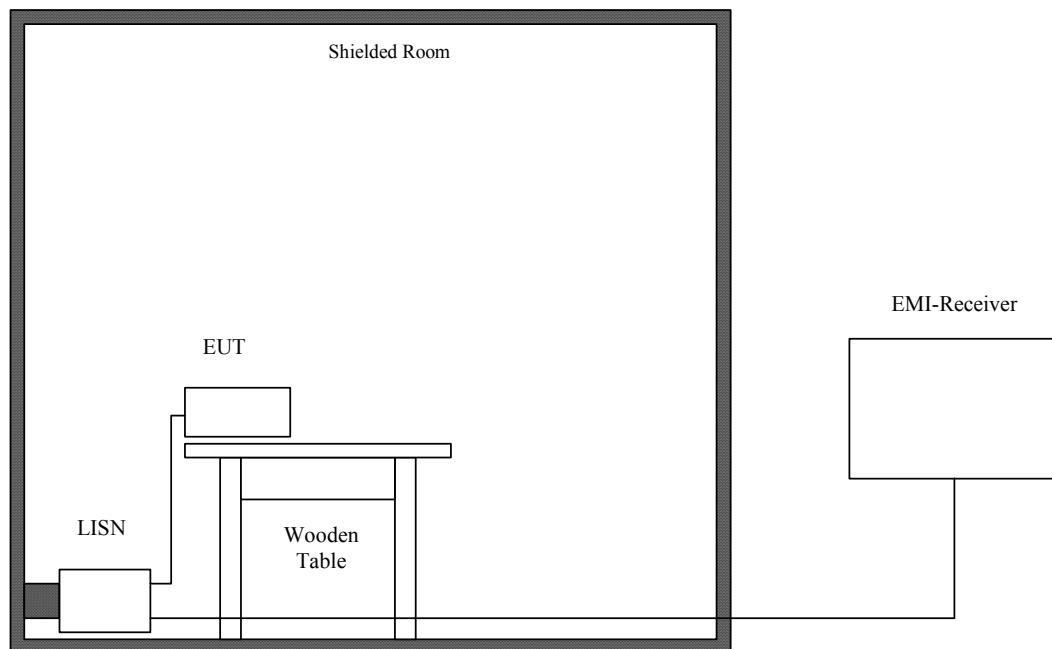
5. Measuring Methods

5.1. Conducted powerline emissions

Rules and Specifications:	Sections 15.107 & 15.207
Guide:	CISPR 22

Measurement Procedure:

In general conducted emission tests in the frequency range 0.15 - 30 MHz are required to be performed with quasi-peak and average detector. To simplify testing the following procedure is used: First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak. After that all emission levels having less margin than 20 dB to or exceeding the appropriate limit (in general average limit is 10 dB lower than quasi-peak limit) are retested with detector set to quasi-peak. If average limit is kept no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average has to be recorded.



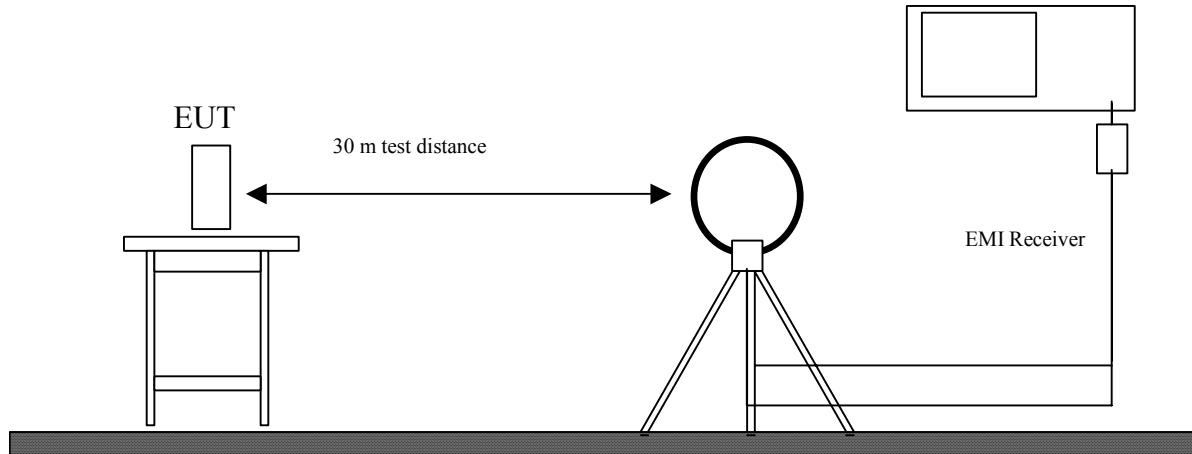
Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	EMI Receiver	ESHS 10	860043/016	Rohde & Schwarz
02	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
03	LISN	ESH-3-Z5	830952/025	Rohde & Schwarz
04	Shielded Room No. 4	---	3FD-100 544	Euroshield

5.2. Radiated Emission Measurement 9 kHz – 30 MHz

Rules and Specifications:	Sections 15.109 & 15.209
Guide:	ANSI C63.4 1997

Measurement Procedure:
<p>Radiated emissions in the frequency range 9 kHz – 30 MHz were measured initially at a distance of 3 meters. A prescan at 3 meter distance were performed in a shielded room with the detector of the spectrum analyzer or EMI Receiver set to peak. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.</p> <p>Final measurement is then performed at 30 meter distance. In case the regulation requires testing at other distances, the result will be extrapolated. The extrapolation factor is determined by making a second measurement at 10 meter distance. In cases of very low emissions measurements are performed at shorter distances and results are extrapolated to the required distance. The provisions of 15.31 (d) apply.</p> <p>According to section 15.209 (d) final measurement is performed with the detector set to Quasi Peak except for the frequency bands 9 – 90 kHz and 110 – 490 kHz where average detector is employed.</p>



Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Test receiver	ESH 3	880112/032	Rohde & Schwarz
02	Loop antenna	HFH2-Z2	882964/1	Rohde & Schwarz
03	Open Field Test Site	No. 1	N/A	Senton

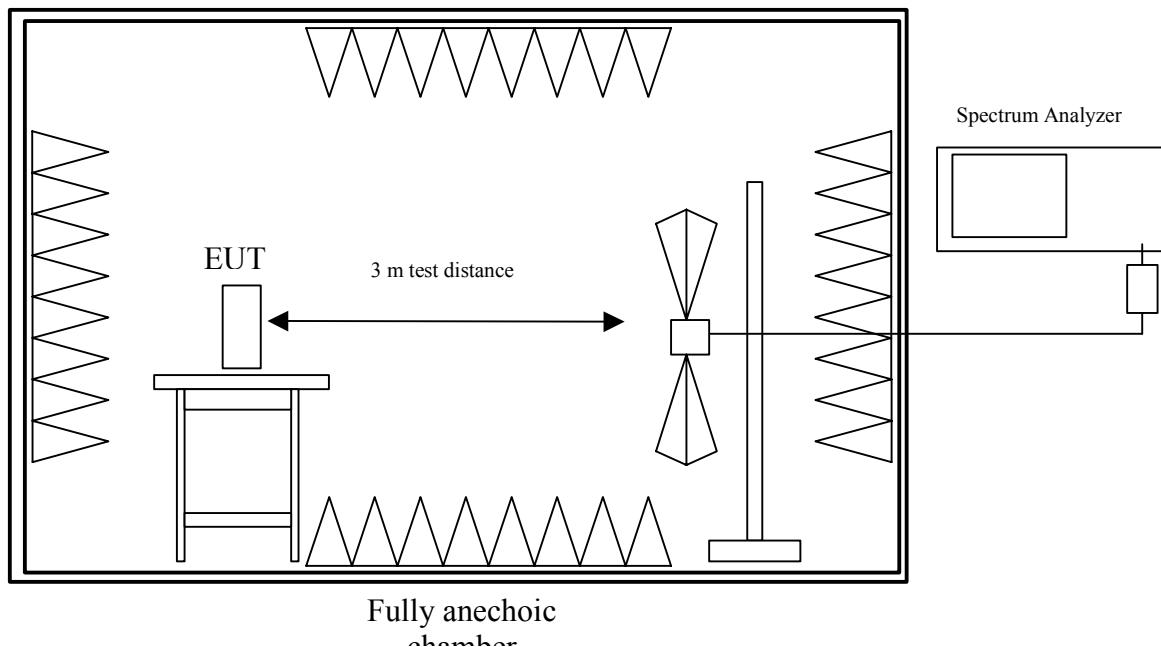
5.3. Field Strength of Emissions, Prescans in a fully-anechoic Room

Rules and Specifications:	Sections 15.109 & 15.209
Guide:	ANSI C63.4 1997

Measurement Procedure:

Radiated emissions are measured over the frequency range from 30 MHz to the 5th harmonic of the maximum frequency of the EUT.

Measurements were made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution bandwidth set to 100 kHz. All tests were performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. For final testing an open-area test-site was used. During the tests the EUT is rotated all around to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions.



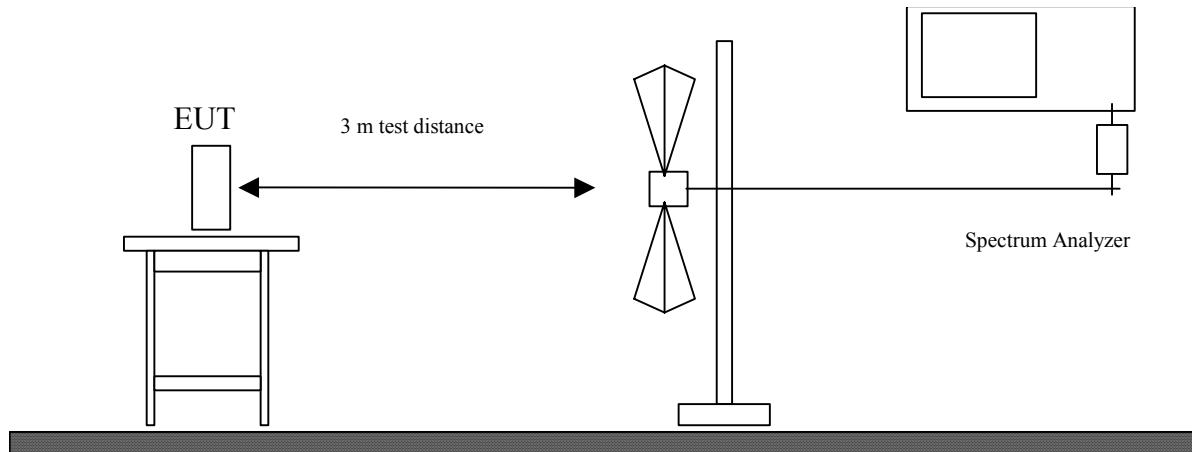
Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
113	Preamplifier	CPA9231A	3393	Schaffner
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
145	Horn antenna	3115	9508-4553	EMCO
146	Horn antenna set	3160-03/-09	9112-1003	EMCO
114	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
115	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
003	Fully anechoic room	No. 2	1452	Albatross Projects

5.4. Radiated Emission Measurement at Open Area Test Site

Rules and Specifications:	Sections 15.109 & 15.209
Guide:	ANSI C63.4 1997

Measurement Procedure:
Radiated emissions are measured in the frequency range 30 MHz to 1 GHz. Resolution and video bandwidth of the spectrum analyzer are set to 100 kHz. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. Additional measurements are performed at critical frequencies with reduced span.
EUT is rotated all around and receiving antenna is raised and lowered to find the maximum levels of emission. The cables and equipment are placed and moved within the range of position likely to find their maximum emissions.
All tests are performed in a fully-anechoic chamber with a test-distance of 3 meters.
If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload in transmit mode (using appropriate attenuators and filters if necessary).



Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	EMI Receiver	ESVP	881414/009	Rohde & Schwarz
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
145	Horn antenna	3115	9508-4553	EMCO
146	Horn antenna set	3160-03-09	9112-1003	EMCO
114	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
115	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
003	Open Field Test Site	No. 1	N/A	Senton

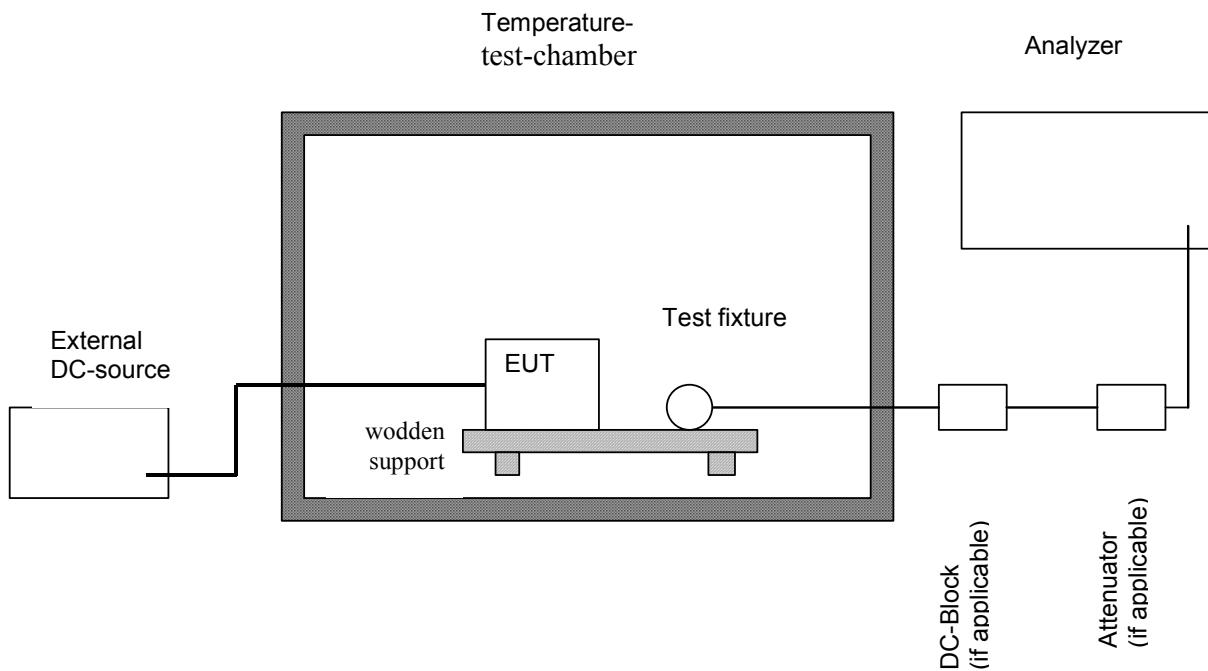
5.5. Frequency tolerance of the carrier signal

Rules and Specifications: Sections 15.225

Guide:

Measurement Procedure:

The frequency tolerance of the carrier signal is maintained over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the test is performed using a new battery.



Test instruments used:

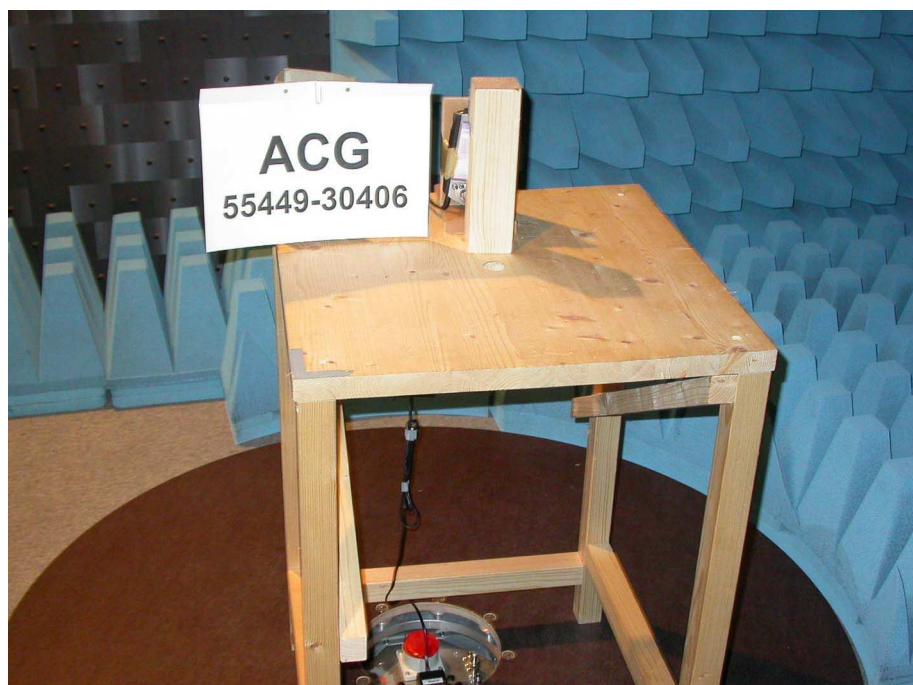
No.	Type	Model	Serial Number	Manufacturer
007	Temperature test chamber	HT4010	07065550	Heraeus
017	DC power supply	NGSM 32/10	203	Rohde & Schwarz
025	DC-block	7006	A2798	Weinschel
101	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
121	Attenuator	4776-10	9412	Narda
166	Test probe	TP01	001	Senton

6. Photographs Taken During Testing

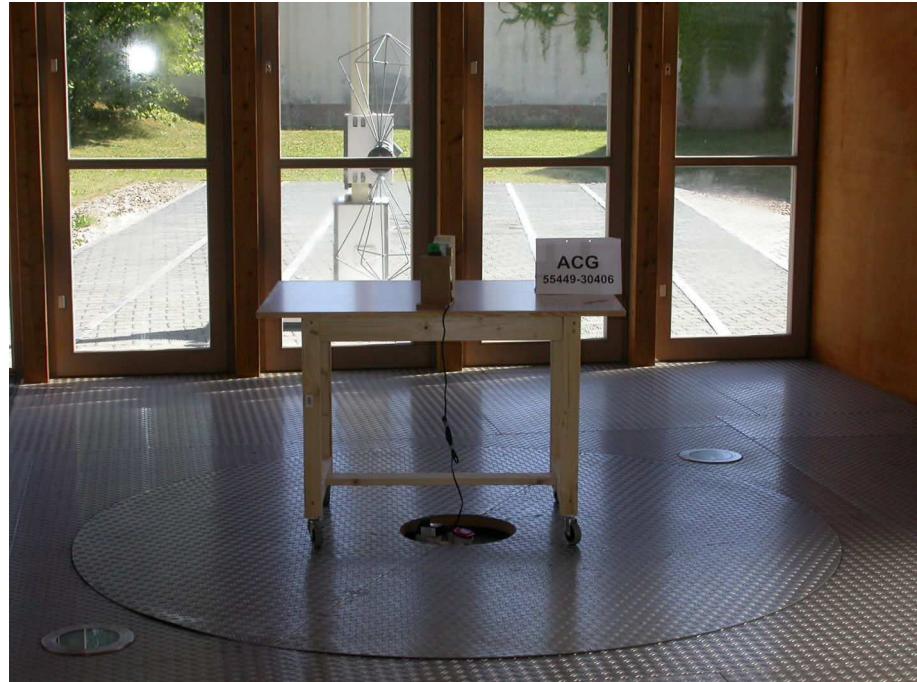
**Test setup for radiated emission measurement
(open area testside)**



**Test setup for radiated emission measurement
(fully anechoic room)**



**Test setup for radiated emission measurement
(open area testside)**



**Test setup for frequency stability
(temperature test chamber)**



7. List of Measurements

FCC Part 15			
Section(s):	Test	Page(s)	Result
15.205	Restricted Bands	---	
15.225 (a)	In-band Field Strength of Emissions		
15.225 (b)	Radiated Spurious Emissions	---	Pass
15.225 (c)	Frequency Tolerance	--	Pass

Field Strength of Emissions

Rules and Specifications:	15.225 (a)
Guide:	ANSI C63.4
Limit:	The field Strength of emissions within the band 13.553 - 13.567 MHz shall not exceed 10.000 microvolts/meter at 30 meters.

Tested Frequency:	---
Test Site:	Open Area Test Site
Distance:	30 Meter

*** = All emissions showed more than 20 dB margin to the limit

Sample calculation of erp values:

Field Strength (dB μ V/m) = Analyzer Reading (dB μ V) + Correction Factor (dB/m)

Test Results:	Pass	
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Spurious Radiation Measurement 9 kHz – 30 MHz

Rules and Specifications:	15.109, 125.209 Radiated Emission Limits		
Guide:	ANSI C63.4		
Limit:	Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:		
Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)	
0.009 - 0.490	2400/F(kHz)	300	
0.490 - 1.705	24000/F(kHz)	30	
1.705 – 30	30	30	

Tested Frequency:	1000 Hz
Test Site:	Open Area Test Site
Distance:	30 Meter

*** = All emissions showed more than 20 dB margin to the limit

Sample calculation of erp values:

Field Strength (dBuV/m) = Analyzer Reading (dBuV) + Correction Factor (dB/m)

Test Results:	Pass	
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FCC-ID:

Test Report No. 55449-30406-1

Spurious Radiation Measurement

Rules and Specifications:	15.109, 125.209 Radiated Emission Limits		
Guide:	ANSI C63.4		
Limit:	Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:		
Frequency of Emission (MHz)		Field Strength (microvolts/meter)	
30 - 88		100	
88 - 216		150	
216 - 960		200	
Above 960		500	

Tested Frequency:	N/A
Test Site:	Open Area Test Site (< 1 GHz), Fully anechoic chamber (> 1 GHz)
Distance:	3 Meter

Frequency (MHz)	Detector	Antenna Polarization	Analyzer Reading (dB μ V)	Correction Factor (dB/m)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
40,600	QP	Ver	22,1	11,8	33,9	40,00	-6,1
135,600	QP	Ver	23	13,4	36,4	43,50	-7,1
149,200	QP	Ver	16,5	14	30,5	43,50	-13,0
360,000	QP	Hor	-0,9	17,3	16,4	46,00	-29,6
368,500	QP	Ver	-3	17,5	14,5	46,0	-31,5
930,000	QP	Ver	0,5	27,4	27,9	54,0	-26,1

Sample calculation of erp values:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Analyzer Reading (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

Test Results:	Pass	
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Frequency stability

Rules and Specifications:	15.225 Frequency tolerance
Guide:	ANSI C63.4
Limit:	The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

Temperature	Voltage	Frequency	Frequency error
-20 °C	5.00 V	13.560560 MHz	0.0002 %
-10 °C	5.00 V	13.560588 MHz	0.0004 %
0 °C	5.00 V	13.560592 MHz	0.0004 %
+10 °C	5.00 V	13.560568 MHz	0.0002 %
+20 °C	4.25 V	13.560535 MHz	0.0000 %
+20 °C	5.00 V	13.560535 MHz	0.0000 %
+20 °C	5.75 V	13.560538 MHz	0.0000 %
+30 °C	5.00 V	13.560490 MHz	-0.0003 %
+40 °C	5.00 V	13.560449 MHz	-0.0003 %
+50 °C	5.00 V	13.560423 MHz	-0.0008 %

Test Results:	Pass	
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8. Referenced Regulations

All tests were performed with reference to the following regulations and standards:

<input type="checkbox"/>	CFR 47 Part 2	Code of Federal Regulations Part 2 (Frequency Allocations And Radio Treaty Matters, General Rules And Regulations) of the Federal Communication Commission (FCC)	October 1, 2001
<input checked="" type="checkbox"/>	CFR 47 Part 15 Subpart A	Code of Federal Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)	March 13, 2003
<input checked="" type="checkbox"/>	CFR 47 Part 15 Subpart B	Code of Federal Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)	March 13, 2003
<input checked="" type="checkbox"/>	CFR 47 Part 15 Subpart C	Code of Federal Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)	March 13, 2003
<input type="checkbox"/>	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz - 40 GHz	October, 1992
<input type="checkbox"/>	RSS-210	Radio Standards Specification RSS-210 Issue 5 for Low Power Licence-Exempt Radiocommunication Devices of Industry Canada	November 2001
<input type="checkbox"/>	TIA/EIA-603	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	February 1993
<input type="checkbox"/>	TIA/EIA-603-1	Addendum to TIA/EIA-603	March 4, 1998

Charts taken during testing

Radiated Emission Test 9 kHz - 30 MHz

according to EN 300 330:1999

Model:
H102022 CF / PCMCIA Compact Flash Reader

Serial no.:
0001

Applicant:
ACG Identification Technologies AT GmbH

Test site:
Shielded room, cabin no. 3

Tested on:
Test distance 3 metres

Date of test: 07/02/2003 Operator: M. Steindl

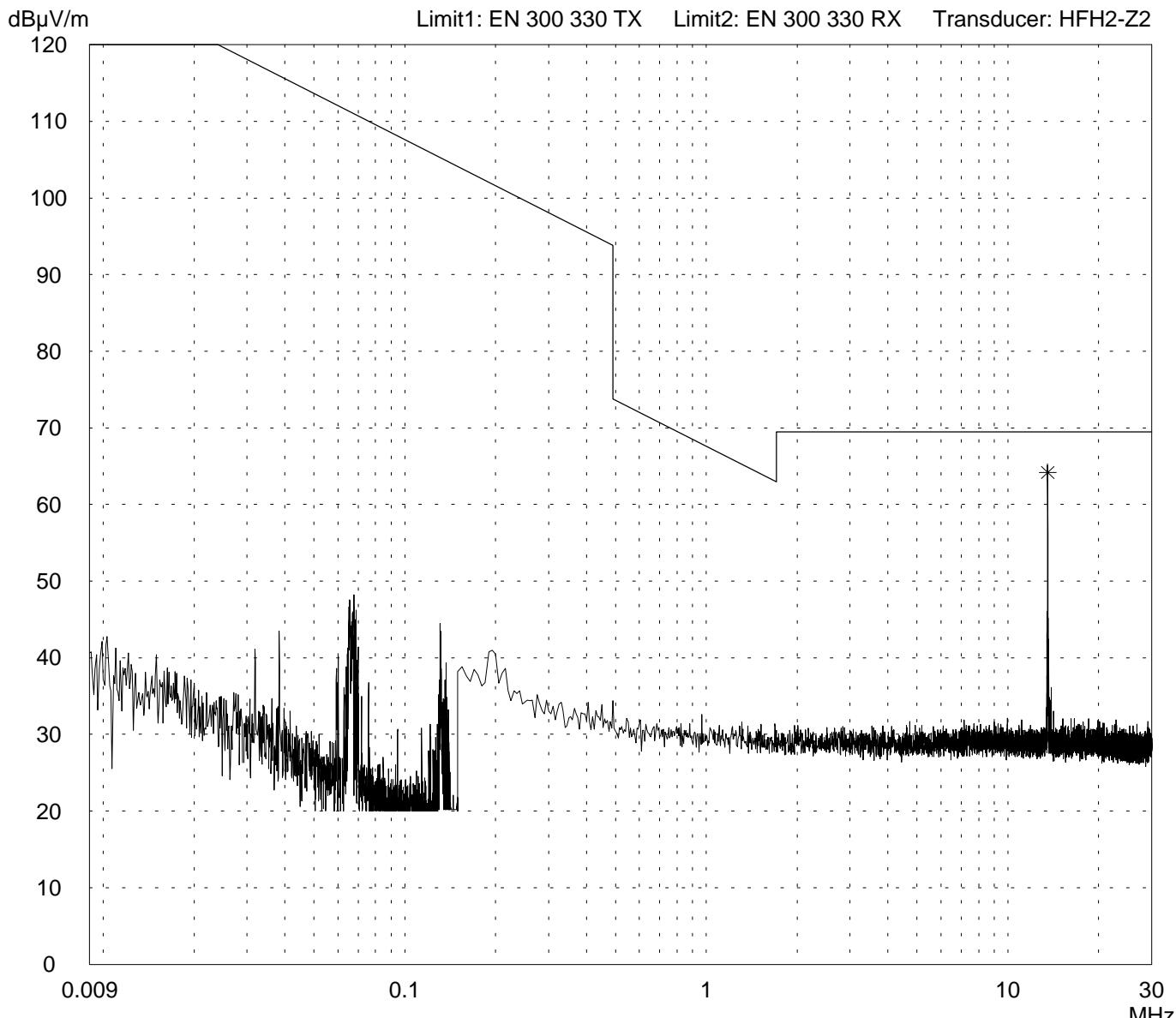
Test performed: automatically File name:

Detector:
Peak / Final Results: QP

Mode:
- In Compac I-Pac

- Sending Continously
- without Tag

Final results:
Selected by hand



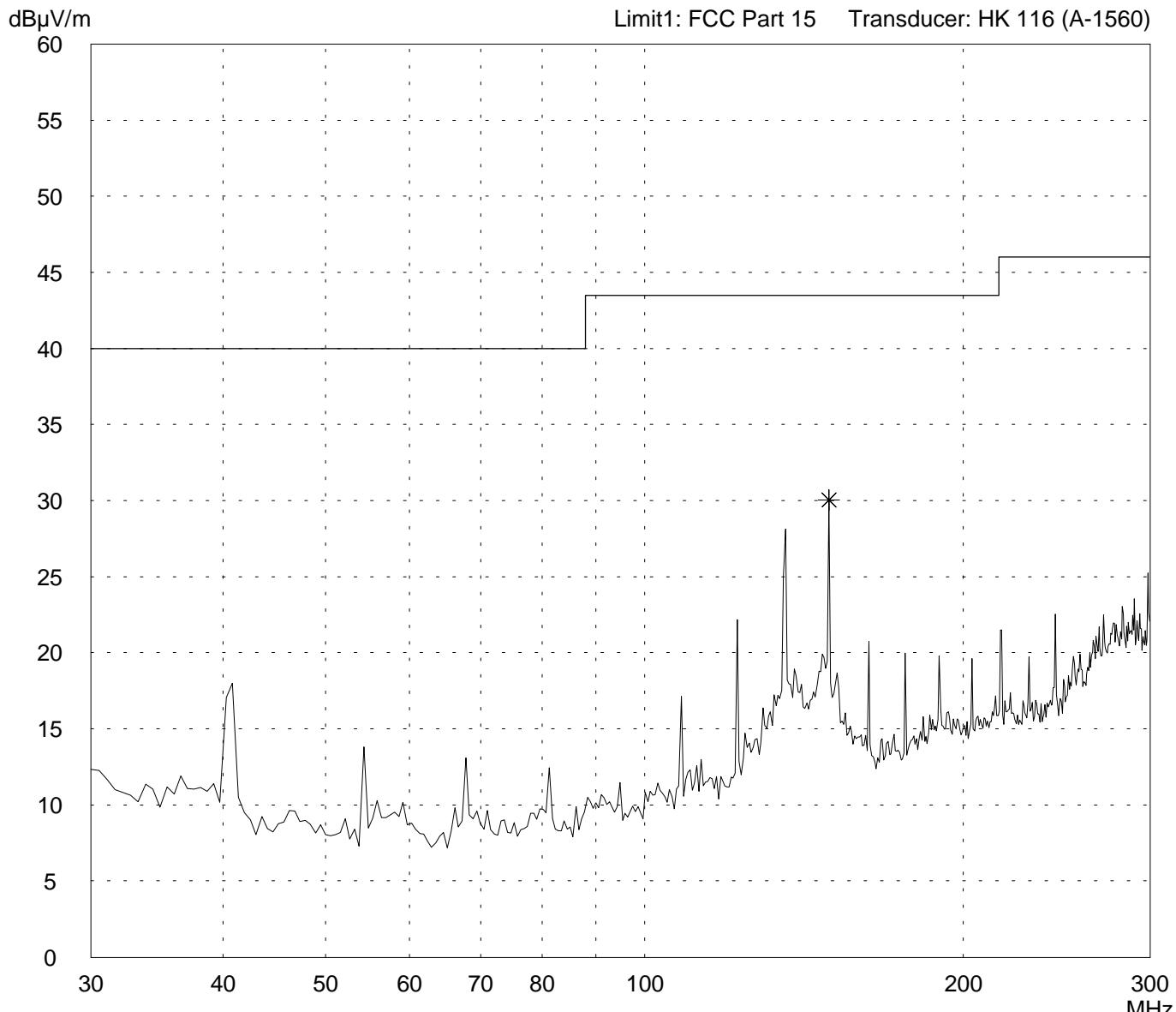
Result:
Limit kept (carrier excluded)

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Radiated Emission Test 30 MHz - 300 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: H102022 CF / PCMCIA Compact Flash Reader		Comment: - DC 5 V power supply for Compac I-PAC
Serial no.: 0001		- EUT in Compac I-Pac - working continuously - no Tag
Applicant: ACG Identification Technologies AT GmbH		
Test site: Fully anechoic room, cabin no. 2		
Tested on: Test distance 3 metres Horizontal Polarization		
Date of test: 07/09/2003	Operator: M. Steindl	
Test performed: automatically	File name: default.emi	
Detector: Peak	List of values: Selected by hand	



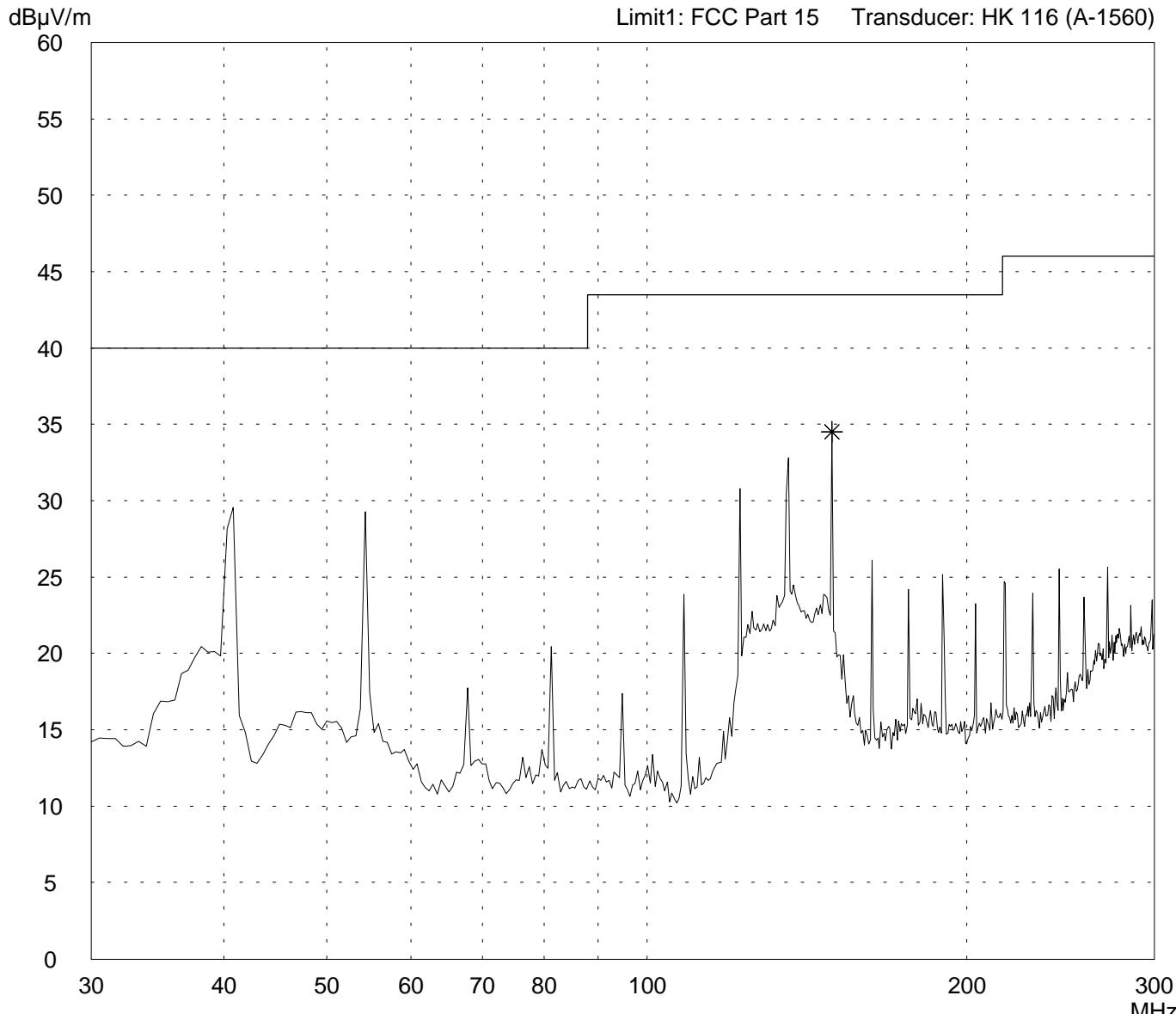
Result: Prescan

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Radiated Emission Test 30 MHz - 300 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: H102022 CF / PCMCIA Compact Flash Reader	Comment: - DC 5 V power supply for Compac I-PAC
Serial no.: 0001	- EUT in Compac I-Pac - working continuously - no Tag
Applicant: ACG Identification Technologies AT GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 07/09/2003	Operator: M. Steindl
Test performed: automatically	File name: default.emi

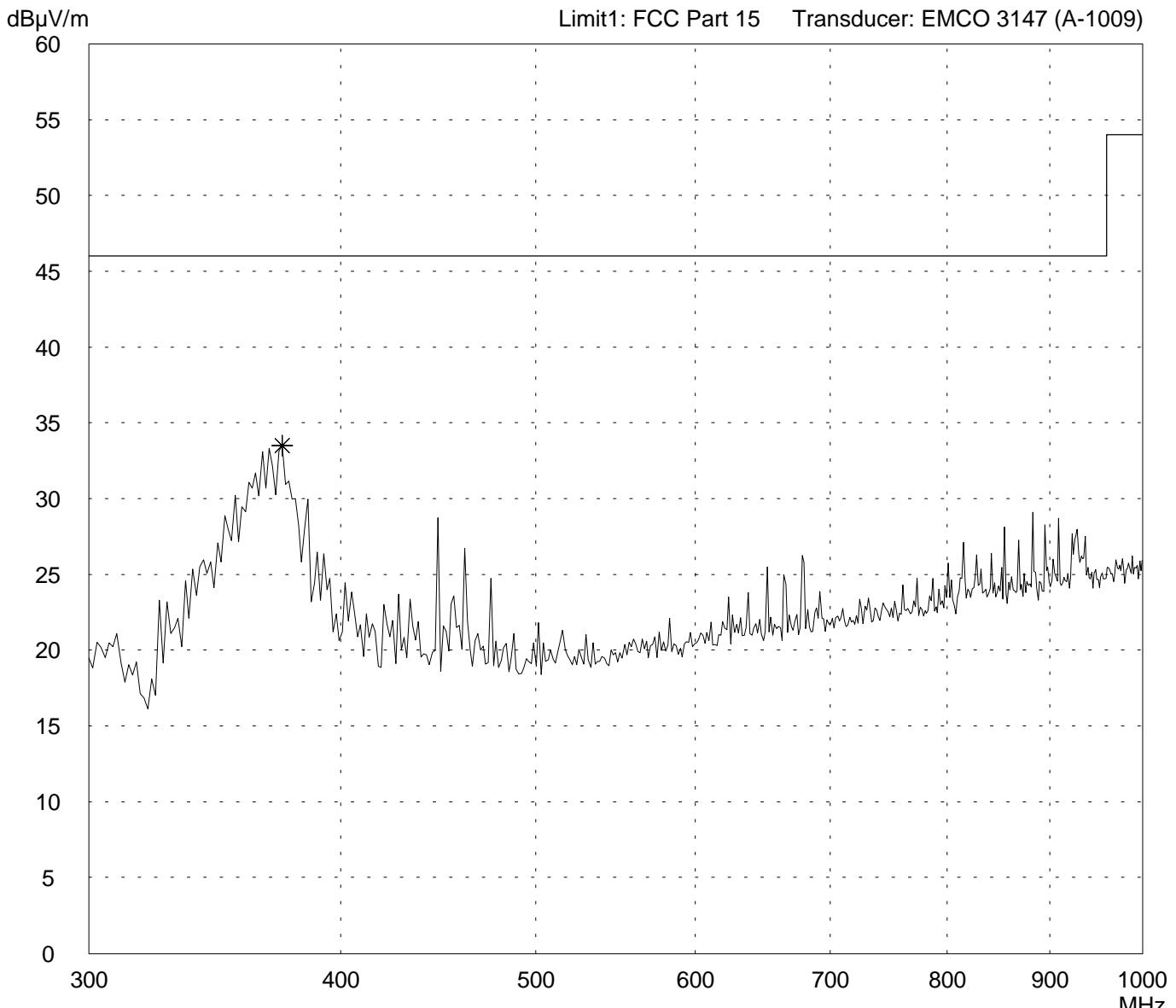
Detector: Peak	List of values: 10 dB Margin	50 Subranges
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Result: Prescan	Project file: 55449-30406	Page 26 of 33 Pages
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Radiated Emission Test 300 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: H102022 CF / PCMCIA Compact Flash Reader	Comment: - DC 5 V power supply for Compac I-PAC
Serial no.: 0001	- EUT in Compac I-Pac - working continuously - no Tag
Applicant: ACG Identification Technologies AT GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Horizontal Polarization	
Date of test: 07/09/2003	Operator: M. Steindl
Test performed: automatically	File name: default.emi
Detector: Peak	List of values: Selected by hand

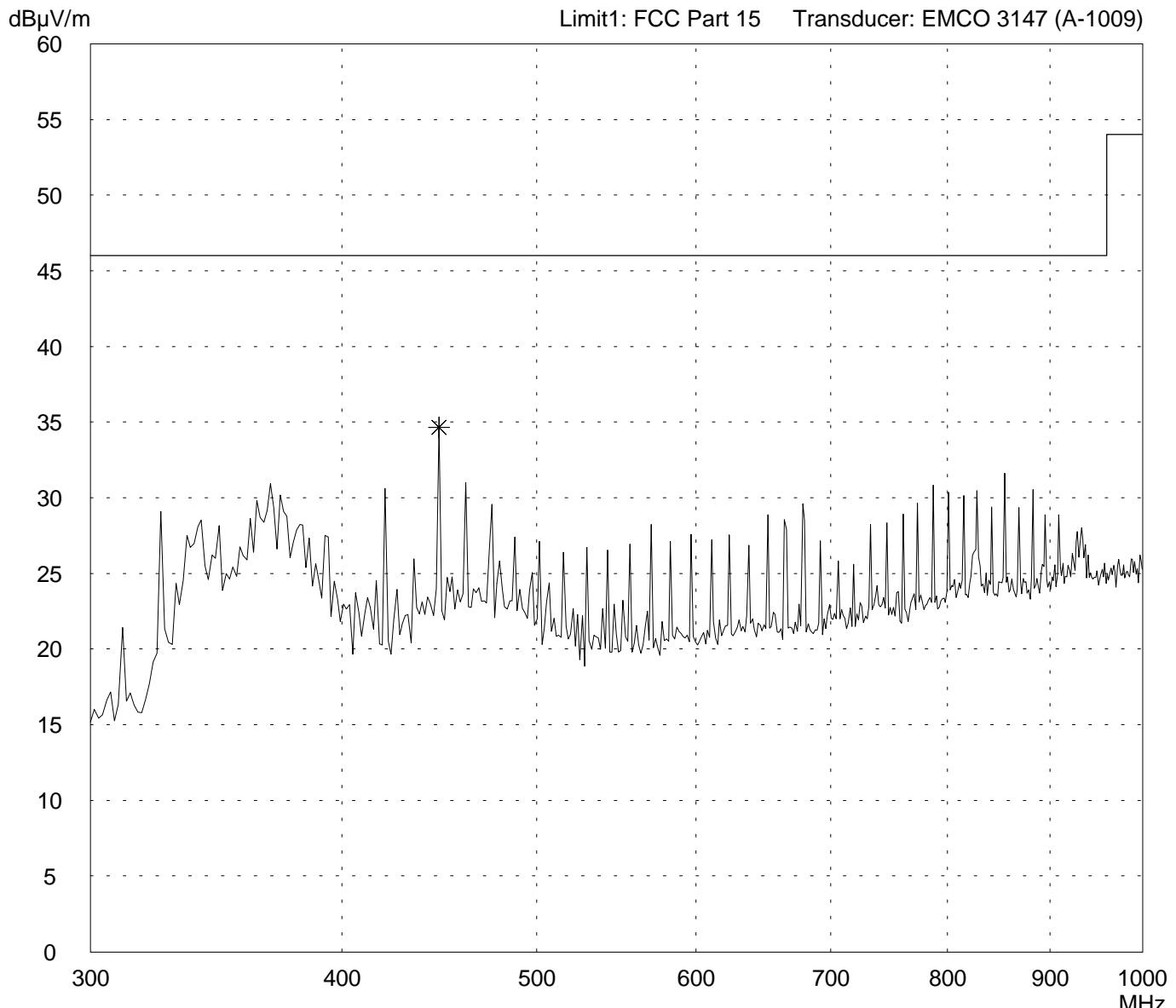


Result:
Prescan

Project file:
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Radiated Emission Test 300 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: H102022 CF / PCMCIA Compact Flash Reader	Comment: - DC 5 V power supply for Compac I-PAC
Serial no.: 0001	- EUT in Compac I-Pac - working continuously - no Tag
Applicant: ACG Identification Technologies AT GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 07/09/2003	Operator: M. Steindl
Test performed: automatically	File name: default.emi
Detector: Peak	List of values: Selected by hand



Result: Prescan

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Radiated Emission Test 9 kHz - 30 MHz

according to EN 300 330:1999

Model:
H102022 CF / PCMCIA Compact Flash Reader

Serial no.:
0001

Applicant:
ACG Identification Technologies AT GmbH

Test site:
Shielded room, cabin no. 3

Tested on:
Test distance 3 metres

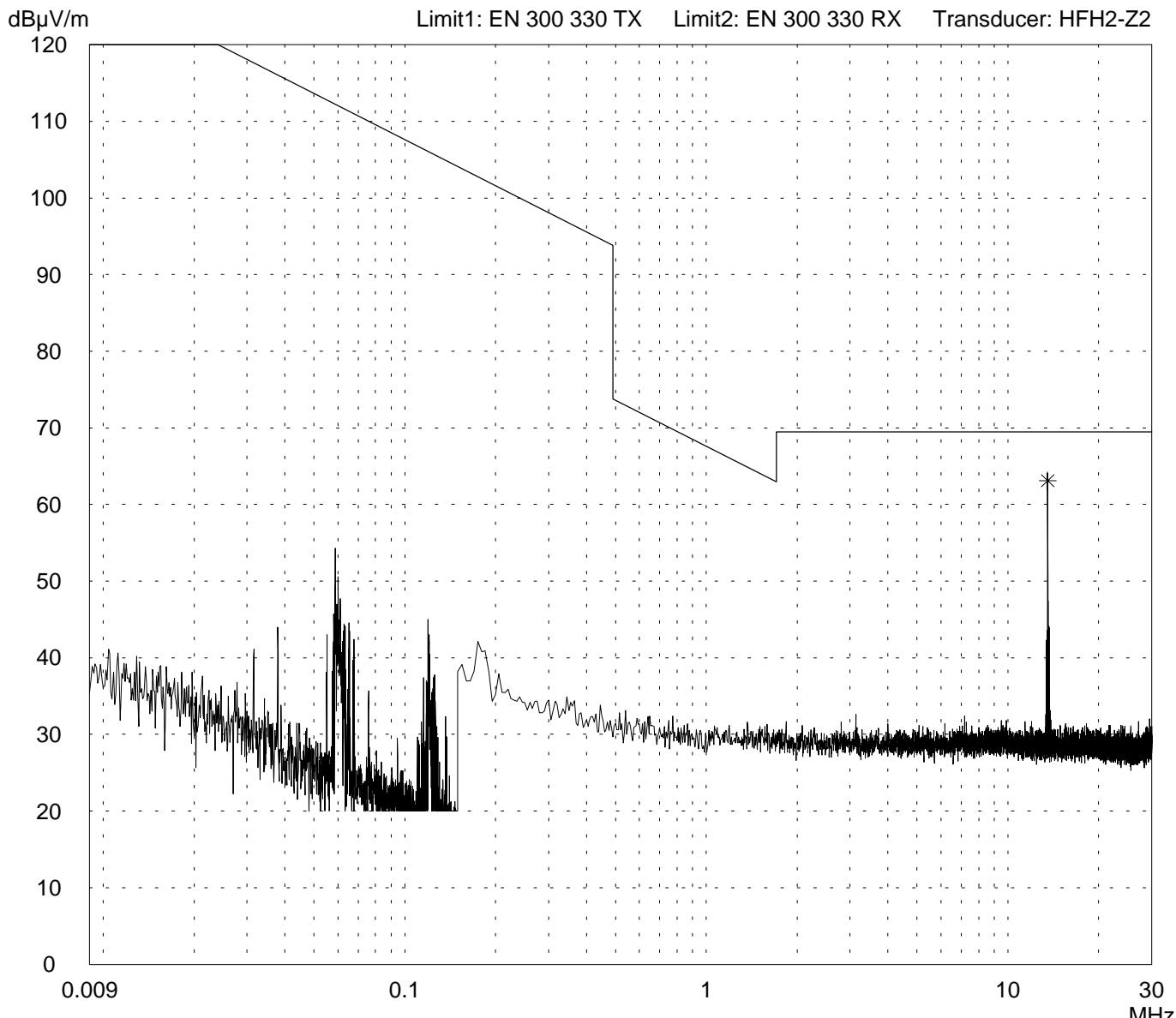
Date of test: 07/02/2003 Operator: M. Steindl

Test performed: automatically File name:

Detector:
Peak / Final Results: QP

Mode:
- In Compac I-Pac
- Sending Continously
- reading Tag continously

Final results:
Selected by hand



Result:
Limit kept (carrier excluded)

Project file:
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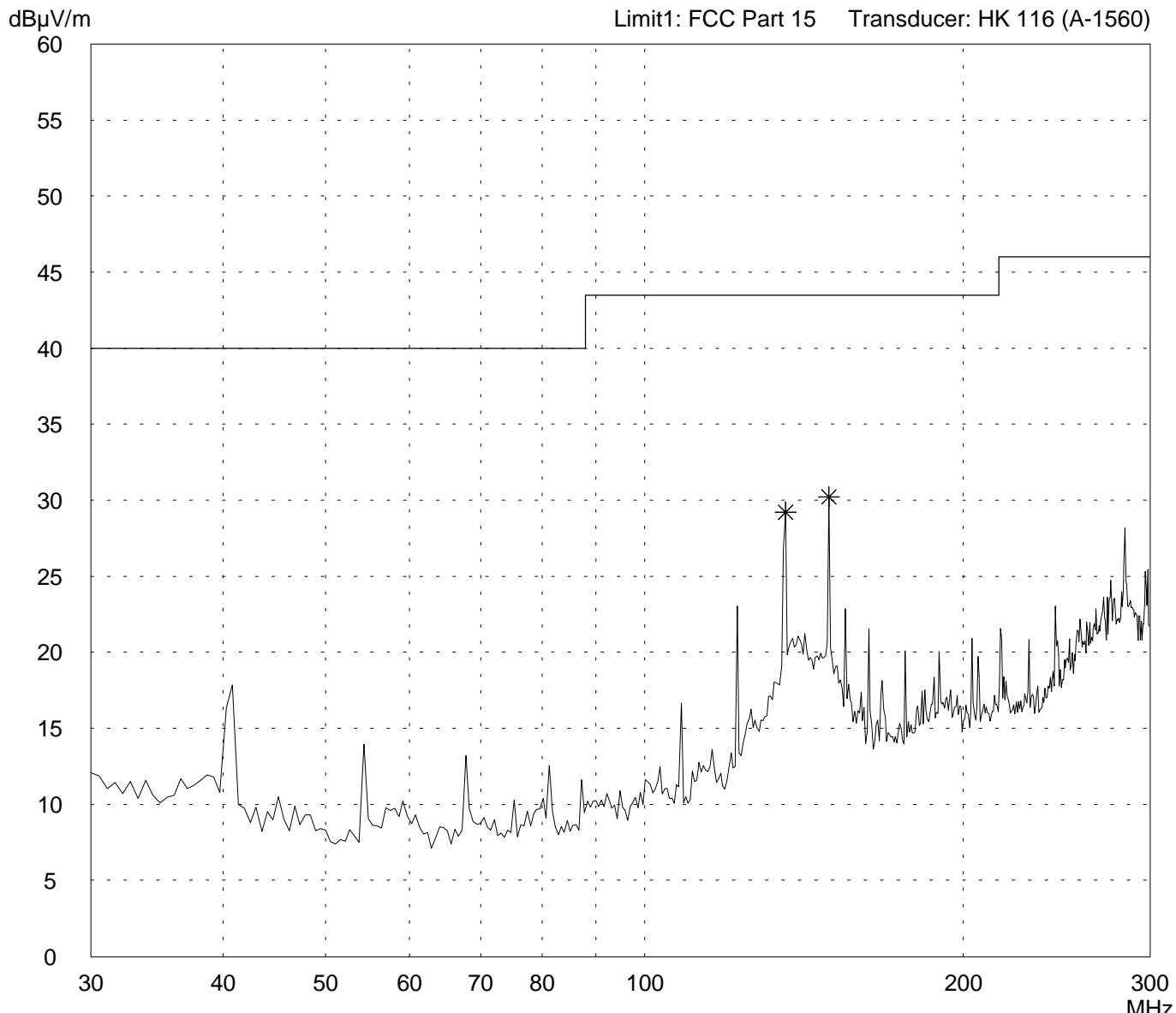
Radiated Emission Test 30 MHz - 300 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:	H102022 CF / PCMCIA Compact Flash Reader	
Serial no.:	0001	
Applicant:	ACG Identification Technologies AT GmbH	
Test site:	Fully anechoic room, cabin no. 2	
Tested on:	Test distance 3 metres Horizontal Polarization	
Date of test:	Operator:	07/09/2003 M. Steindl
Test performed:	File name:	automatically default.emi

Comment:
 - DC 5 V power supply for Compac I-PAC
 - EUT in Compac I-Pac
 - reading Tag continuously

Detector:	Peak
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List of values:
 Selected by hand



Result:	Prescan
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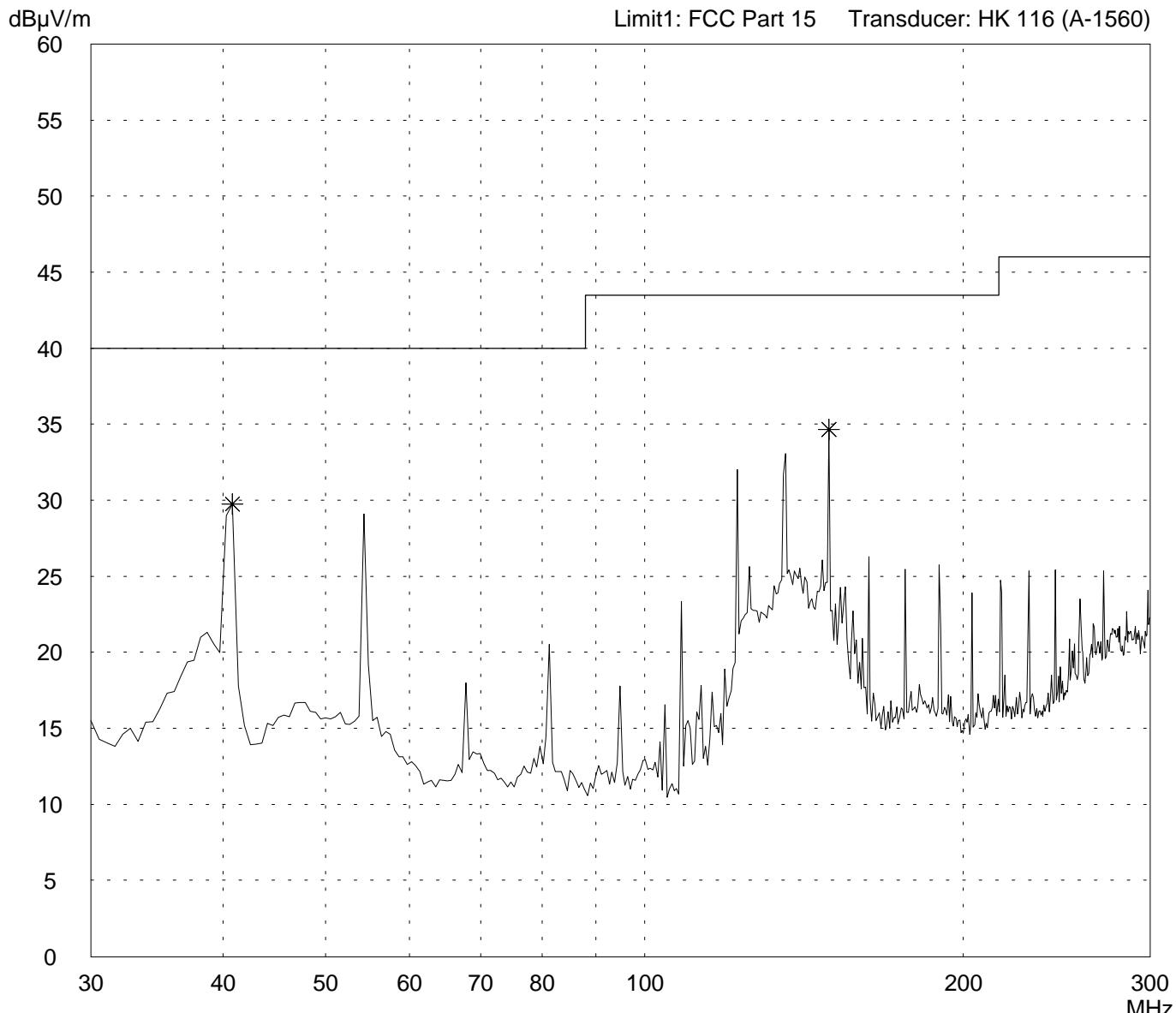
Radiated Emission Test 30 MHz - 300 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:	H102022 CF / PCMCIA Compact Flash Reader	
Serial no.:	0001	
Applicant:	ACG Identification Technologies AT GmbH	
Test site:	Fully anechoic room, cabin no. 2	
Tested on:	Test distance 3 metres Vertical Polarization	
Date of test:	07/09/2003	Operator: M. Steindl
Test performed:	automatically	File name: default.emi

Comment:	
- DC 5 V power supply for Compac I-PAC	
- EUT in Compac I-Pac	
- reading Tag continuously	

Detector:	Peak
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List of values:	
Selected by hand	



Result:	Prescan
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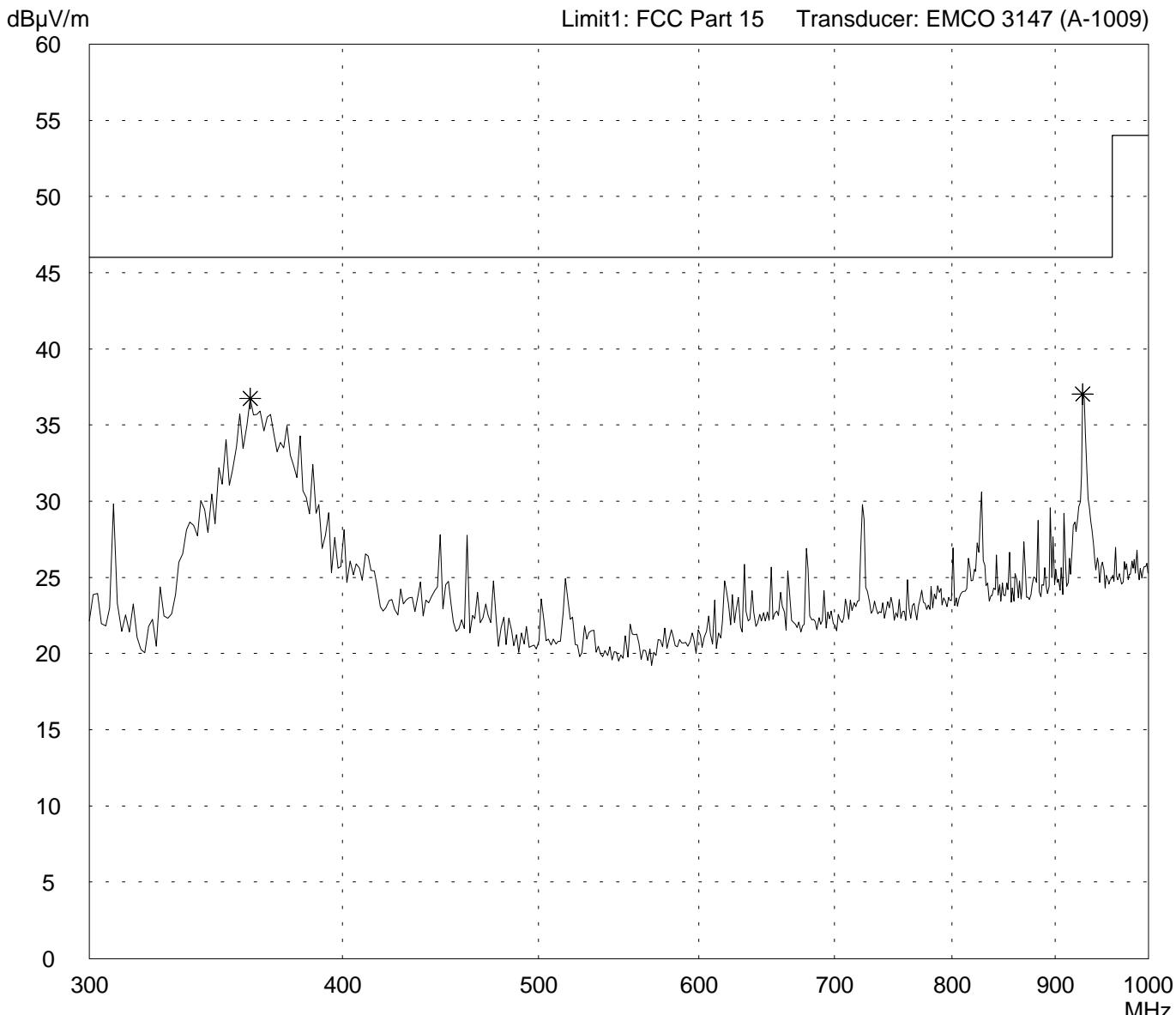
Radiated Emission Test 300 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:	H102022 CF / PCMCIA Compact Flash Reader	
Serial no.:	0001	
Applicant:	ACG Identification Technologies AT GmbH	
Test site:	Fully anechoic room, cabin no. 2	
Tested on:	Test distance 3 metres Horizontal Polarization	
Date of test:	Operator:	07/09/2003 M. Steindl
Test performed:	File name:	automatically default.emi

Comment:
 - DC 5 V power supply for Compac I-PAC
 - EUT in Compac I-Pac
 - reading Tag continuously

Detector:	Peak
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List of values:
 10 dB Margin 50 Subranges



Result:	Prescan
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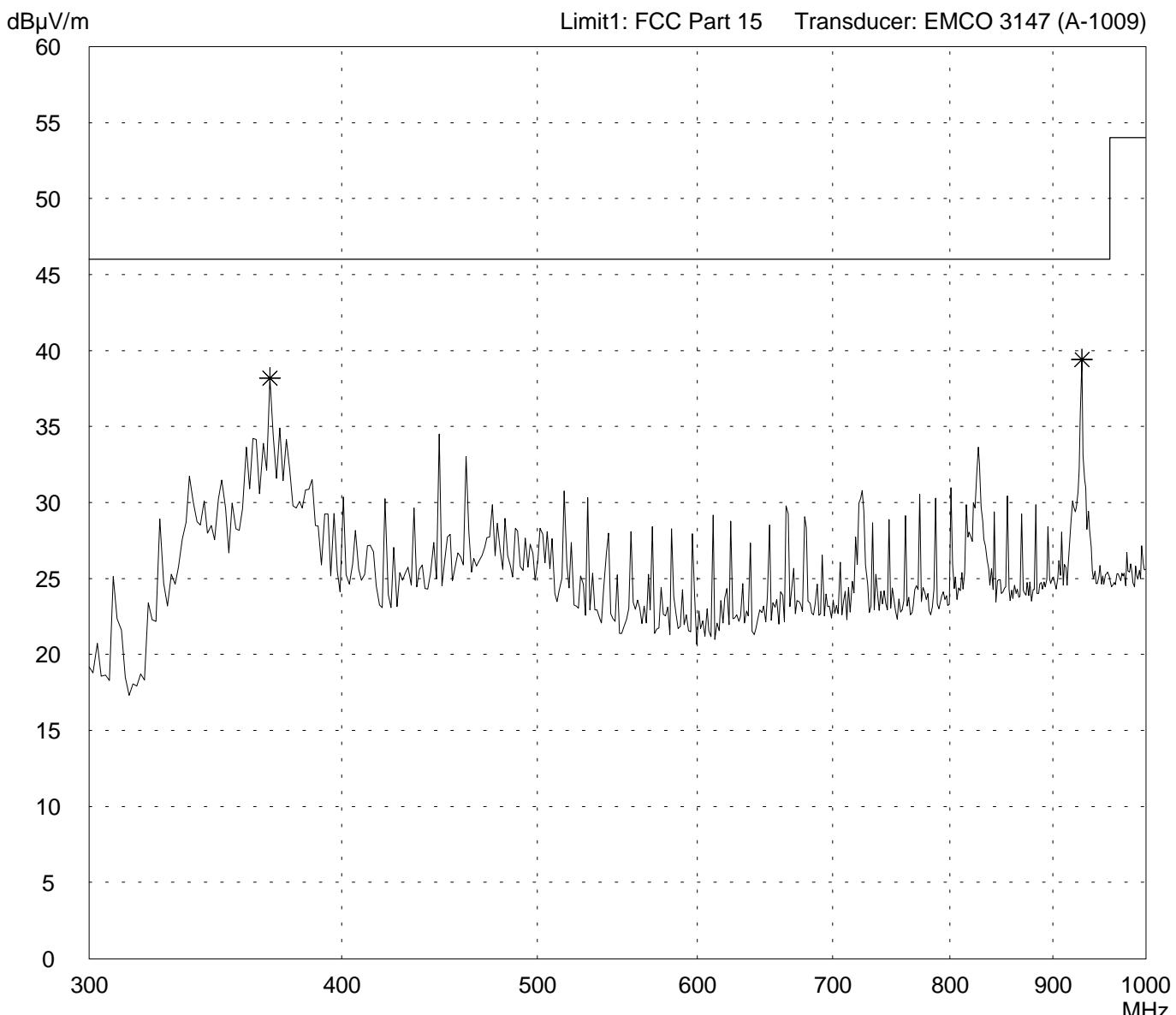
Project file:
 55449-30406 Page 32 of 33 Pages

Radiated Emission Test 300 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:	H102022 CF / PCMCIA Compact Flash Reader	
Serial no.:	0001	
Applicant:	ACG Identification Technologies AT GmbH	
Test site:	Fully anechoic room, cabin no. 2	
Tested on:	Test distance 3 metres Vertical Polarization	
Date of test:	07/09/2003	Operator: M. Steindl
Test performed:	automatically	File name: default.emi

Comment:	<ul style="list-style-type: none"> - DC 5 V power supply for Compac I-PAC - EUT in Compac I-Pac - reading Tag continuously 	
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Detector:	Peak	List of values:	10 dB Margin	50 Subranges
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Result:		
Prescan		

Project file:		
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