

Straubing, October 14, 2003

**TEST - REPORT**

**No. 51966-30486-1**

**for**

**MDAV5**

**DATA Transceiver**

**Applicant:** Siemens AG, Nürnberg

**Test Specifications:** FCC Code of Federal Regulations,  
CFR 47, Part 15,  
Sections 15.207 and 15.249

Industry Canada (IC) Radio Standards  
Specification RSS-210, Issue 5,  
Sections 6.2.2 (m2) and 6.6

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**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

<b>Test item (EUT)</b>	
Type designation	MDAV5
Version of EUT:	with ceramic antenna
Serial number(s):	SRIF2002 x 4 module No.01298
Type of equipment:	DATA Transceiver <sup>1</sup>
Parts/accessories:	with ceramic antenna
FCC-ID:	LDS-SRIF2002
<b>Technical data</b>	
Frequency range:	5,726.0866 MHz - 5,873.9134 MHz
Operational frequencies:	Channel 01 (hex): 5,726.0866 MHz Channel 40 (hex): 5,800.0000 MHz Channel 79 (hex): 5,866.8740 MHz Channel 7F (hex): 5,873.9134 MHz (for band edges only)
Type of modulation:	FSK
TX-cycle-time:	≥ 157 ms for long data telegram 14 ms for fast poll telegram
TX-on-time:	≤ 24.6 ms for long data telegram 3.9 ms for fast poll telegram
Class of emission:	680KF1D
Antenna:	Integrated antenna, ceramic type
Power supply:	DC 12 V via external power supply
<b>Applicant:</b> (full address)	Siemens AG - Nürnberg PAMEC-Gebäude 2. STOCK, 2B Gleiwitzer Strasse 555 D-94475 Nürnberg Germany
Contract identification:	---
Contact person:	Mr. Peter Steinmill Dipl.-Ing. (FH) A&D PT34
Manufacturer:	Siemens AG
<b>Application details</b>	
Receipt of EUT:	08/11/2003
Date of test:	08/11/2003 through 09/11/2003, 10/07/2003
Note:	---


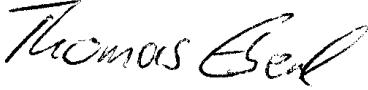
<sup>1</sup> Receiver part is subject to Senton test report no. 51966-30486-2.

## 2. Identification of Test Laboratory

<b>Details of the Test Laboratory</b>	
Company name:	Senton GmbH EMI/EMC Test Center
Address:	Aeussere Fruehlingstrasse 45 D-94315 Straubing Germany
Laboratory Accreditation:	DAR-Registration No. TTI-P-G 062/94-01
FCC Test Site registration number	90926
Industry Canada Test site registration:	IC 3050
Name for contact purposes:	Mr. Johann Roidt
	Phone: (+49) (0)9421 5522-0 Fax: (+49) (0)9421 5522-99

### 3. Summary

Summary of test results	
The tested sample complies with the requirements set forth in the <b>Code of Regulations CFR 47, Part 15, Sections 15.207 and 15.249</b> of the Federal Communication Commission (FCC) and the <b>Radio Standards Specification RSS-210 Issue 5, Sections 6.2.2 (m2) and 6.6</b> of Industry Canada (IC).	

Personnel involved in this report	
Laboratory Manager:	 Mr. Johann Roidt
Responsible for testing:	 Mr. Thomas Eberl
Responsible for test report:	Mr. Thomas Eberl

#### 4. Operation Mode and Configuration of EUT

Operation Mode
<ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz</li> <li>- EUT powered by 12 V DC</li> </ul>

Configuration of EUT
EUT was tested in three orthogonal positions and connected to a notebook via RS232.

List of ports and cables				
<i>Port</i>	<i>Description</i>	<i>Classification<sup>2</sup></i>	<i>Cable type</i>	<i>Cable length</i>
1	DC supply line	dc power	Non-shielded (2 wires)	2 m
2	Serial data cable	signal/control port	Shielded	3 m
3	Parallel data cable	signal/control port	Shielded	2 m
4	AC supply line note book	signal/control port	Non-shielded (2 wires)	2 m

List of devices connected to EUT				
<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
1	Notebook	HP Omni Book 4150	FR92648140	Hewlett Packard
2	Power supply	HP F1454A	---	Hewlett Packard
3	Printer parallel	HP 2225C	3106591193	Hewlett Packard
4	Printer power supply	HAYES 52-00008	---	HAYES

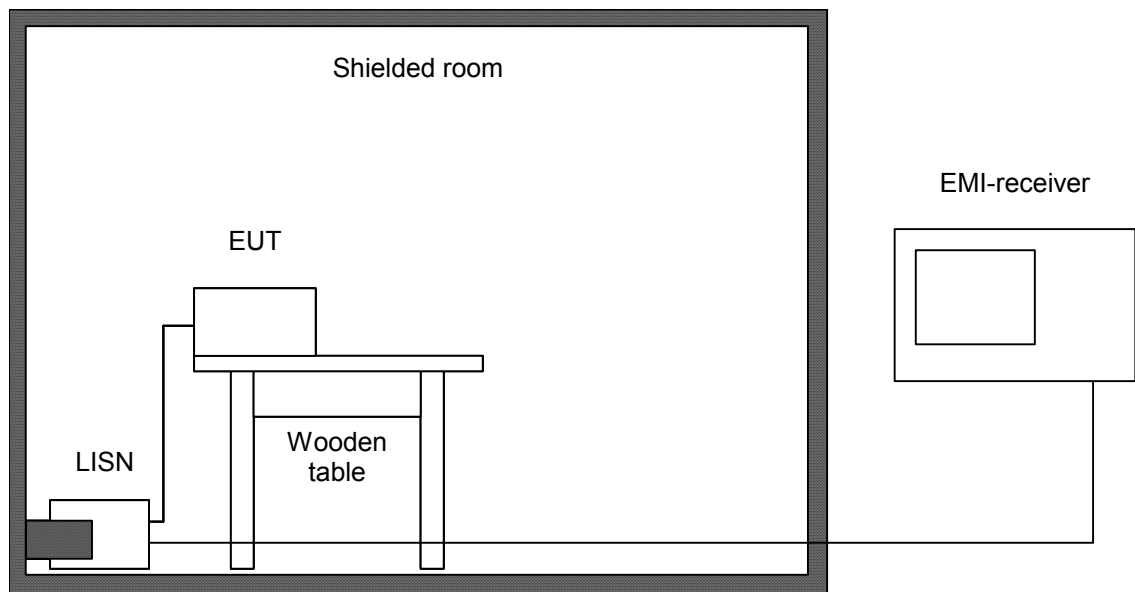
<sup>2</sup> Ports shall be classified as ac power, dc power or signal/control port

## 5. Measuring Methods

### 5.1. Conducted AC powerline emissions

Rules and Specifications:	CFR 47 Part 15 section 15.207 IC RSS-210 Issue 5 section 6.6
Guide:	ANSI C63.4 (CISPR 22)

Measurement Procedure:
<p>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:</p> <p>First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak using CISPR bandwidth of 10 kHz. After that all emission levels having less margin than 10 dB to or exceeding the average 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 is performed.</p>



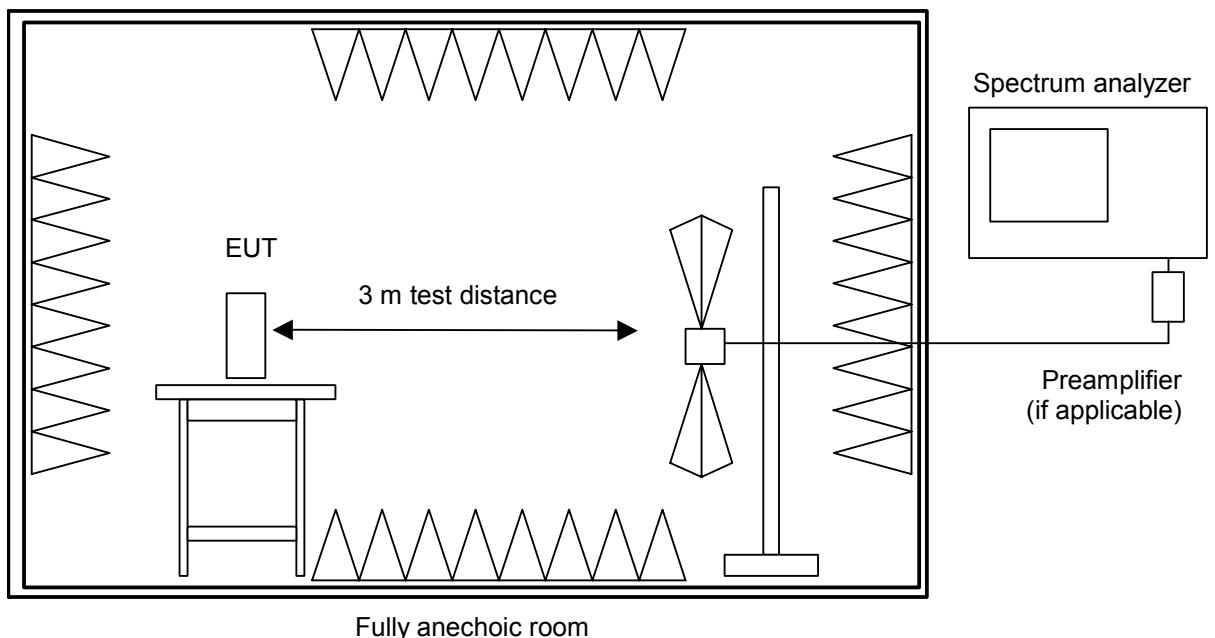
Test instruments used:

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	ESH3-Z5	830952/025	Rohde & Schwarz
04	Shielded Room No. 4	---	3FD-100 544	Euroshield

## 5.2. Radiated spurious emissions in fully-anechoic room

Rules and Specifications:	CFR 47 Part 15 section 15.209, 15.249 IC RSS-210 Issue 5 section 6.2.1, 6.2.2(m2)
Guide:	ANSI C63.4

Measurement Procedure:
<p>Radiated emissions are measured over the frequency range from 30 MHz to the maximum frequency as specified in section 15.33.</p> <p>Measurements are 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 as well as video bandwidth set to 100 kHz (below 1 GHz) or 1 MHz (above 1 GHz).</p> <p>All tests are performed preferably at a test-distance of 3 meters. If other distances have to be used this is stated on the appropriate test records and the reading values are calculated according to 15.31(f)(1).</p> <p>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 below 1 GHz an open-area test-site is used and the plots recorded in the fully-anechoic room are indicated as prescans.</p> <p>During the tests the EUT is rotated all around to find the maximum levels of emissions. The cables and equipment are placed and moved within the range of position likely to find their maximum emissions.</p> <p>If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload (using appropriate attenuators and filters if necessary).</p>





Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
02	Preamplifier	CPA9231A	3393	Schaffner
03	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
04	Log. periodic antenna	3147	9112-1054	EMCO
05	Horn antenna	3115	9508-4553	EMCO
06	Horn antenna	3160-03	9112-1003	Emco
07	Horn antenna	3160-04	9112-1001	Emco
08	Horn antenna	3160-05	9112-1001	Emco
09	Horn antenna	3160-06	9112-1001	Emco
10	Horn antenna	3160-07	9112-1008	Emco
11	Horn antenna	3160-08	9112-1002	Emco
12	Horn antenna	3160-09	9403-1025	Emco
13	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
14	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
15	Fully anechoic room	No. 2	1452	Albatross Projects

### 5.3. Radiated spurious emissions at Open Area Test Site

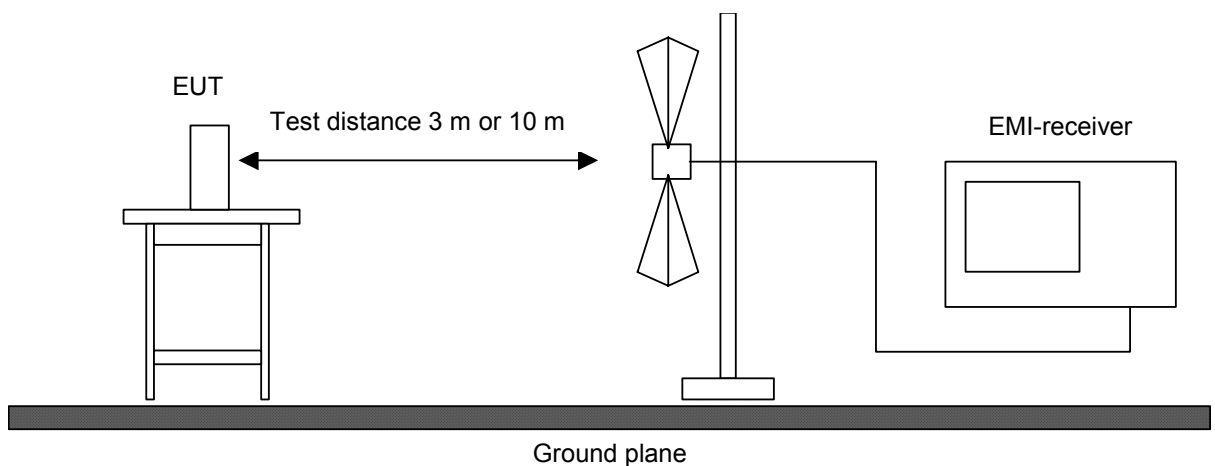
Rules and Specifications:	CFR 47 Part 15 section 15.209, 15.249 IC RSS-210 Issue 5 section 6.2.1, 6.2.2(m2)
Guide:	ANSI C63.4

**Measurement Procedure:**

Radiated emissions at open area test site are measured in the frequency range 30 MHz to 1 GHz. The measurement bandwidth of the test receiver is set to 120 kHz with detector set to quasi-peak. Hand-held or body-worn devices are tested in the position producing the highest emission relative to the limit as verified by prescans in the fully-anechoic room. 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.

In general a test-distance of 3 meters is selected. If a test-distance of 10 meters is used the limits are calculated according to 15.31 (d) and (f)(1).

If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload (using appropriate attenuators and filters if necessary).



Test instruments used:

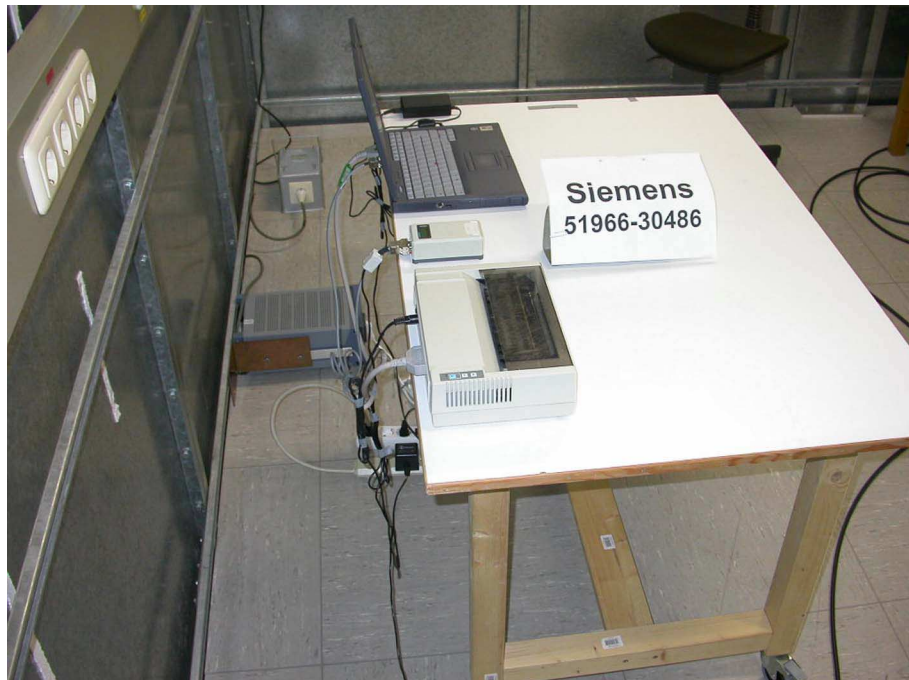
No.	Type	Model	Serial Number	Manufacturer
01	EMI Receiver	ESVP	881414/009	Rohde & Schwarz
02	Biconical antenna	HK 116	842204/001	Rohde & Schwarz
03	Log. periodic antenna	HL 223	841516/023	Rohde & Schwarz
08	Open Field Test Site	No. 1	N/A	Senton

## 6. Photographs Taken During Testing

**Test setup for conducted AC powerline emissions test**



**Test setup for conducted AC powerline emissions test - continued -**



**Test setup for radiated emissions test  
(fully anechoic room)**

EUT in horizontal position - right side on table



EUT in horizontal position- bottom side on table



**Test setup for radiated emissions test  
(fully anechoic room) - continued -**

EUT in vertical position

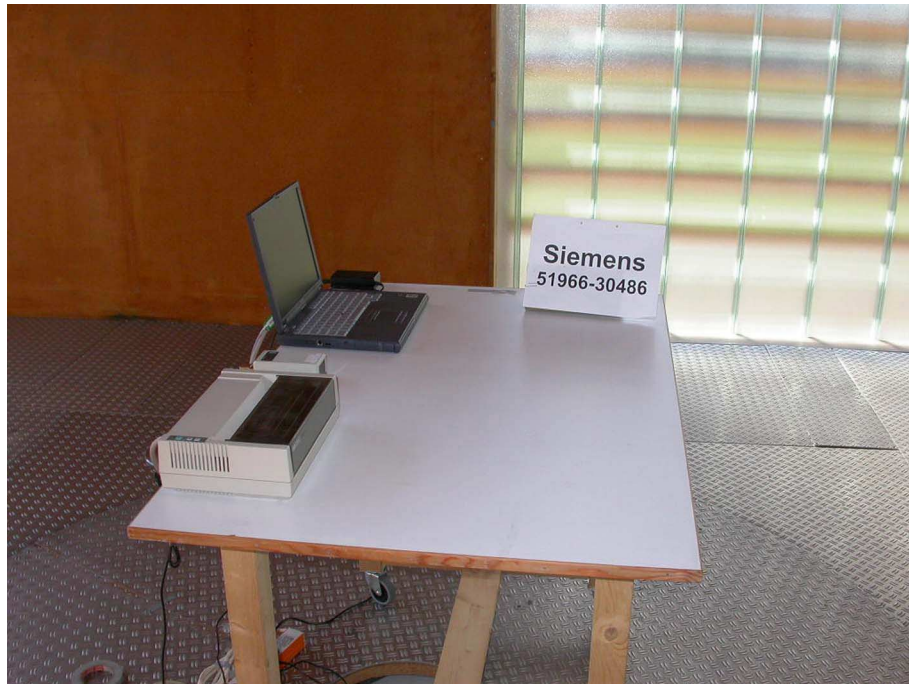


**Test setup for radiated emissions test  
(open area test site)**





**Test setup for radiated emissions test  
(open area test site) - continued -**



**7. List of Measurements**

<b>FCC Part 15 Subpart C</b>			
<b>Section(s):</b>	<b>Test</b>	<b>Page(s)</b>	<b>Result</b>
<b>15.205</b>	Restricted Bands	23, 37 - 50	Passed
<b>15.207</b>	AC Powerline Emissions	19 - 20, 29 - 36	Passed
<b>15.249 (a)</b>	Field Strength of Emissions (Fundamental & Harmonics)	21, 37 - 44	Passed
<b>15.249 (d)</b>	Radiated Spurious Emissions (except for fundamental & harmonics)	23	Passed

<b>IC RSS-210 Issue 5</b>			
<b>Section(s):</b>	<b>Test</b>	<b>Page(s)</b>	<b>Result</b>
<b>6.3</b>	Restricted Bands and Unwanted Emission Frequencies	23, 37 - 50	Passed
<b>6.6</b>	Transmitter AC Wireline Conducted Emissions	19 - 20, 29 - 36	Passed
<b>6.2.2 (m2) (1)</b>	Field Strength of Emissions (fundamental & harmonics)	21, 37 - 44	Passed
<b>6.2.2. (m2) (3)</b>	Radiated Spurious Emissions (except for fundamental & harmonics)	23	Passed

**Conducted Powerline Emission Measurement**

Rules and Specifications:	CFR 47 Part 15 section 15.207 IC RSS-210 Issue 5 section 6.6				
Guide:	ANSI C63.4 / CISPR 22			IC RSS-210 Issue 5	
Limit:	Frequency of Emission (MHz)	Conducted Limit (dBuV)		Frequency of Emission (MHz)	Conducted Limit (dBuV)
		Quasi-peak	Average		
	0.15 - 0.5	66 to 56	56 to 46	0.45 - 30	48
	0.5 - 5	56	46		
	5 - 30	60	50		

Operation mode:	TX mode
Test Site:	Shielded Room, cabin no. 4
Tested on:	Conducted Measurement - EUT
Date of Test:	08/18/2003

Frequency (MHz)	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Final Value (dBµV)	CFR 47 Part 15		RSS-210	
					Limit (dBµV)	Margin (dB)	Limit (dBµV)	Margin (dB)
Phase L1								
0.15 - 30	Peak				56	> 20.0		
0.45 - 30	Peak						48	> 10.0
Phase N								
0.6700	Quasi-Peak	34.3	0.0	34.3	56	21.7	48	13.7

**Sample calculation of final values:**

$$\text{Final Value (dB}\mu\text{V)} = \text{Receiver Reading (dB}\mu\text{V)} + \text{Correction Factor (dB)}$$

<b>Test Result:</b>	Passed
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**Conducted Powerline Emission Measurement**

Rules and Specifications:	CFR 47 Part 15 section 15.207 IC RSS-210 Issue 5 section 6.6				
Guide:	ANSI C63.4 / CISPR 22			IC RSS-210 Issue 5	
Limit:	Frequency of Emission (MHz)	Conducted Limit (dBuV)		Frequency of Emission (MHz)	Conducted Limit (dBuV)
		Quasi-peak	Average		
	0.15 - 0.5	66 to 56	56 to 46	0.45 - 30	48
	0.5 - 5	56	46		
	5 - 30	60	50		

Operation mode:	TX mode
Test Site:	Shielded Room, cabin no. 4
Tested on:	Conducted Measurement - AE
Date of Test:	08/18/2003

Frequency (MHz)	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Final Value (dBµV)	CFR 47 Part 15		RSS-210	
					Limit (dBµV)	Margin (dB)	Limit (dBµV)	Margin (dB)
Phase L1								
0.520	Quasi-Peak	36.5	0.0	36.5	56	19.5	48.0	11.5
Phase N								
0.430	Quasi-Peak	37.5	0.0	37.5	57.3	19.8		
0.435	Quasi-Peak	37.2	0.0	37.2	57.2	20.0		
0.605	Quasi-Peak	38.5	0.0	38.5	56.0	17.5	48.0	9.5
0.690	Quasi-Peak	36.6	0.0	36.6	56.0	19.4	48.0	11.4
0.950	Quasi-Peak	37.1	0.0	37.1	56.0	18.9	48.0	10.9
1.210	Quasi-Peak	33.5	0.0	33.5	56.0	22.5	48.0	14.5
1.385	Quasi-Peak	36.4	0.0	36.4	56.0	19.6	48.0	11.6

**Sample calculation of final values:**

$$\text{Final Value (dBµV)} = \text{Receiver Reading (dBµV)} + \text{Correction Factor (dB)}$$

<b>Test Result:</b>	Passed
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### Field Strength of Emissions

Rules and Specifications:	CFR 47 Part 15 section 15.249 IC RSS-210 Issue 5 section 6.2.2(m2)		
Guide:	ANSI C63.4 (duty cycle correction according to appendix I4(10))		
Limit:	The field strength of emissions from intentional radiators operated in these frequency band shall comply with the following:		
	Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
	902-928 MHz	50	500
	2400-2483.5 MHz	50	500
	5725-5875 MHz	50	500
	24-24.25 GHz	250	2500

Operation mode:	TX mode (maximum rating of 3 positions)		
Test Site:	Fully anechoic chamber		
Distance:	1 GHz to 8.2 GHz:	3 meters	
	8.2 GHz to 18 GHz:	1 meter	
	18 GHz to 40 GHz:	0.5 meter	
Duty cycle correction:	Duty cycle ≤ 28 %, equivalent to duty cycle correction of -11.1 dB		
Date of Test:	11/08/2003		

Frequency (MHz)	Detector	Antenna Polarization	Reading Value (dBμV)	Correction Factor (dB/m)	Duty Cycle Correction (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Channel 01								
5726.070	Peak	vertical	70.49	32.64	0.0	103.1	114.0	10.9
5726.070	Average	vertical	70.49	32.64	-11.1	92.0	94.0	2.0
11452.200	Peak	horizontal	2.74	41.46	0.0	44.2	74.0	29.8
11452.200	Average	horizontal	2.74	41.46	-11.1	33.1	54.0	20.9
Channel 40								
5800.000	Peak	vertical	68.33	32.69	0.0	101.0	114.0	13.0
5800.000	Average	vertical	68.33	32.69	-11.1	89.9	94.0	4.1
Channel 79								
5866.860	Peak	vertical	69.3	35.14	0.0	104.4	114.0	9.6
5866.860	Average	vertical	69.3	35.14	-11.1	93.3	94.0	0.7

**Sample calculation of field strength values:**

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

Calculation of the reading value for testing at distances d (m) other than 3 meters is performed according to 15.31f(1):

$$\text{Reading Value (dB}\mu\text{V)} = \text{Reading Value @ d (dB}\mu\text{V)} + 20 \cdot \log_{10}(d/(3 \text{ m})) \text{ (dB)}$$

<b>Test Results:</b>	Passed
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**Radiated Spurious Emissions Measurement (up to 1 GHz)**

Rules and Specifications:	CFR 47 Part 15 section 15.209, 15.249 IC RSS-210 Issue 5 section 6.2.1, 6.2.2(m2)	
Guide:	ANSI C63.4 (duty cycle correction according to appendix I4(10))	
Limit:	The emissions from an intentional radiator shall not exceed the following field strength levels at a distance of 3 meters:	
	Frequency of Emission (MHz)	Field Strength (microvolts/meter)
	30 - 88	100
	88 - 216	150
	216 - 960	200
	Above 960	500

Operation mode:	TX mode (maximum rating of 3 positions)
Test Site:	Open Area Test Site
Distance:	30 MHz to 1 GHz: 3 meters
Duty cycle correction:	None
Date of Test:	11/08/2003

Frequency (MHz)	Detector	Antenna Polarization	Reading Value (dBµV)	Correction Factor (dB/m)	Duty Cycle Correction (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
73.300	Quasi-Peak	horizontal	21.5	9.6	0.0	31.1	40.0	8.9
73.700	Quasi-Peak	horizontal	21.5	9.6	0.0	31.1	40.0	8.9
120.000	Quasi-Peak	horizontal	28.5	12.3	0.0	40.8	43.5	2.7
123.400	Quasi-Peak	vertical	16.8	12.6	0.0	29.4	43.5	14.1
126.600	Quasi-Peak	horizontal	26.8	12.8	0.0	39.6	43.5	3.9
133.300	Quasi-Peak	horizontal	20.0	13.3	0.0	33.3	43.5	10.2
140.000	Quasi-Peak	horizontal	16.5	13.6	0.0	30.1	43.5	13.4
146.600	Quasi-Peak	horizontal	18.5	13.9	0.0	32.4	43.5	11.1
177.100	Quasi-Peak	horizontal	16.5	15.2	0.0	31.7	43.5	11.8
180.000	Quasi-Peak	horizontal	20.5	15.4	0.0	35.9	43.5	7.6
193.400	Quasi-Peak	horizontal	19.5	16.2	0.0	35.7	43.5	7.8
200.000	Quasi-Peak	horizontal	19.5	16.6	0.0	36.1	43.5	7.4
220.000	Quasi-Peak	horizontal	11.5	16.8	0.0	28.3	46.0	17.7
313.300	Quasi-Peak	horizontal	10.8	15.7	0.0	26.5	46.0	19.5
324.400	Quasi-Peak	horizontal	7.0	16.2	0.0	23.2	46.0	22.8
339.100	Quasi-Peak	horizontal	10.3	16.7	0.0	27.0	46.0	19.0
400.000	Quasi-Peak	horizontal	5.2	18.7	0.0	23.9	46.0	22.1
484.700	Quasi-Peak	horizontal	3.8	20.5	0.0	24.3	46.0	21.7

**Sample calculation of field strength values:**

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

<b>Test Results:</b>	Passed
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**Radiated Spurious Emissions Measurement (above 1 GHz)**

Rules and Specifications:	CFR 47 Part 15 section 15.209, 15.249 IC RSS-210 Issue 5 section 6.2.1, 6.2.2(m2)	
Guide:	ANSI C63.4 (duty cycle correction according to appendix I4(10))	
Limit:	The emissions from an intentional radiator shall not exceed the following field strength levels at a distance of 3 meters:	
	Frequency of Emission (MHz)	Field Strength (microvolts/meter)
	30 - 88 88 - 216 216 - 960 Above 960	100 150 200 500

Operation mode:	TX mode (maximum rating of 3 positions)	
Test Site:	Fully anechoic room	
Distance:	1 GHz to 8.2 GHz:	3 meters
	8.2 GHz to 18 GHz:	1 meter
	18 GHz to 40 GHz:	0.5 meter
Duty cycle correction:	Duty cycle ≤ 28 %, equivalent to duty cycle correction of -11.1 dB	
Date of Test:	11/08/2003	

Frequency (MHz)	Detector	Antenna Polarization	Reading Value (dBµV)	Correction Factor (dB/m)	Duty Cycle Correction (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Channel 01								
5400.36	Peak	horizontal	26.0	32.4	0.0	58.4	74.0	15.6
5400.36	Average	horizontal	26.0	32.4	-11.1	47.3	54.0	6.7
10880.70	Peak	horizontal	5.2	41.2	0.0	46.4	74.0	27.6
10880.70	Average	horizontal	5.2	41.2	-11.1	35.3	54.0	18.7
Channel 40								
5474.30	Peak	horizontal	21.5	32.5	0.0	54.0	74.0	20.0
5474.30	Average	horizontal	21.5	32.5	-11.1	42.9	54.0	11.1
10949.00	Peak	horizontal	7.4	41.3	0.0	48.6	74.0	25.4
10949.00	Average	horizontal	7.4	41.3	-11.1	37.5	54.0	16.5
Channel 79								
5541.20	Peak	horizontal	28.7	32.5	0.0	61.3	74.0	12.7
5541.20	Average	horizontal	28.7	32.5	-11.1	50.2	54.0	3.8
11082.30	Peak	horizontal	5.5	41.3	0.0	46.8	74.0	27.2
11082.30	Average	horizontal	5.5	41.3	-11.1	35.7	54.0	18.3

**Sample calculation of field strength values:**

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

Calculation of the reading value for testing at distances d (m) other than 3 meters is performed according to 15.31f(1):

$$\text{Reading Value (dB}\mu\text{V)} = \text{Reading Value @ d (dB}\mu\text{V)} + 20 \cdot \log_{10}(d/(3 \text{ m})) \text{ (dB)}$$

<b>Test Results:</b>	Passed
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## 8. Referenced Regulations

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

<input checked="" 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 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 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 checked="" 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 checked="" 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

## 9. Charts taken during testing

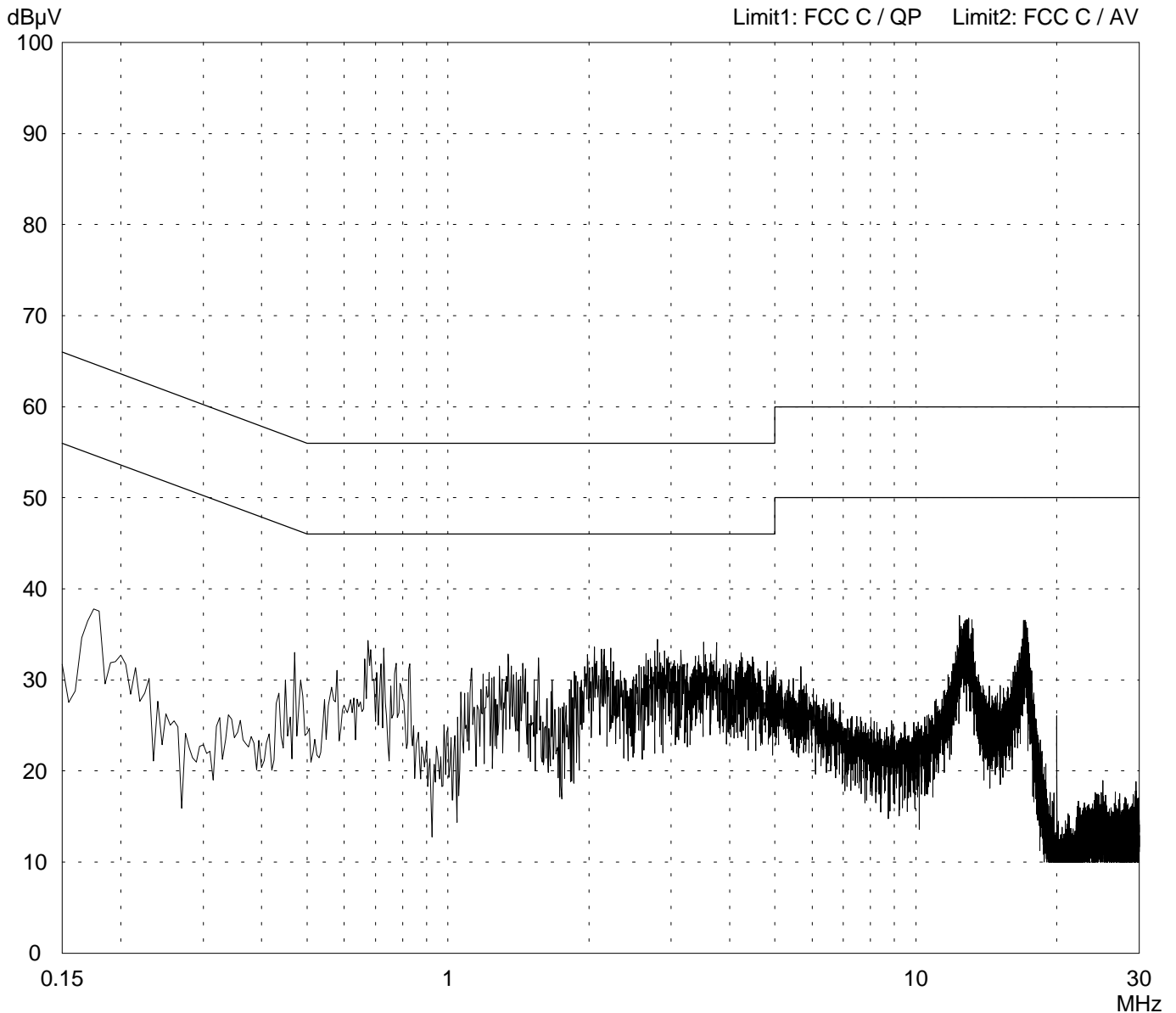
# Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

Model: MDAV5 Ceramic antenna	
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord EUT Power supply Phase L1	
Date of test: 08/18/2003	Operator: T. Eberl
Test performed: automatically	File name:

Mode: - TX mode	
- f = 5.8 GHz	
- EUT DC powered 12 V	
- EUT in horizontal position bottom side on table	

Detector: Peak / Final Results: QP	
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Final results: 20 dB Margin		25 Subranges
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Result: Limit kept
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Project file: 51966-30486-1	Page 29 of 50 Pages
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## Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Shielded room, cabin no. 2</p> <p>Tested on: Linecord EUT Power supply Phase L1</p> <p>Date of test: 08/18/2003      Operator: T. Eberl</p> <p>Test performed: automatically      File name:</p>	<p>Mode: - TX mode</p> <p>- f = 5.8 GHz</p> <p>- EUT DC powered 12 V</p> <p>- EUT in horizontal position bottom side on table</p>
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<p>Detector: Peak / Final Results: QP</p>	<p>Final results: 20 dB Margin                      25 Subranges</p>
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Frequency MHz	Reading dBµV	Correction factor dB	Value dBµV	Limit dBµV	Limit exceeded
no results					

<p>Result: Limit kept</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 30 of 50 Pages</p>
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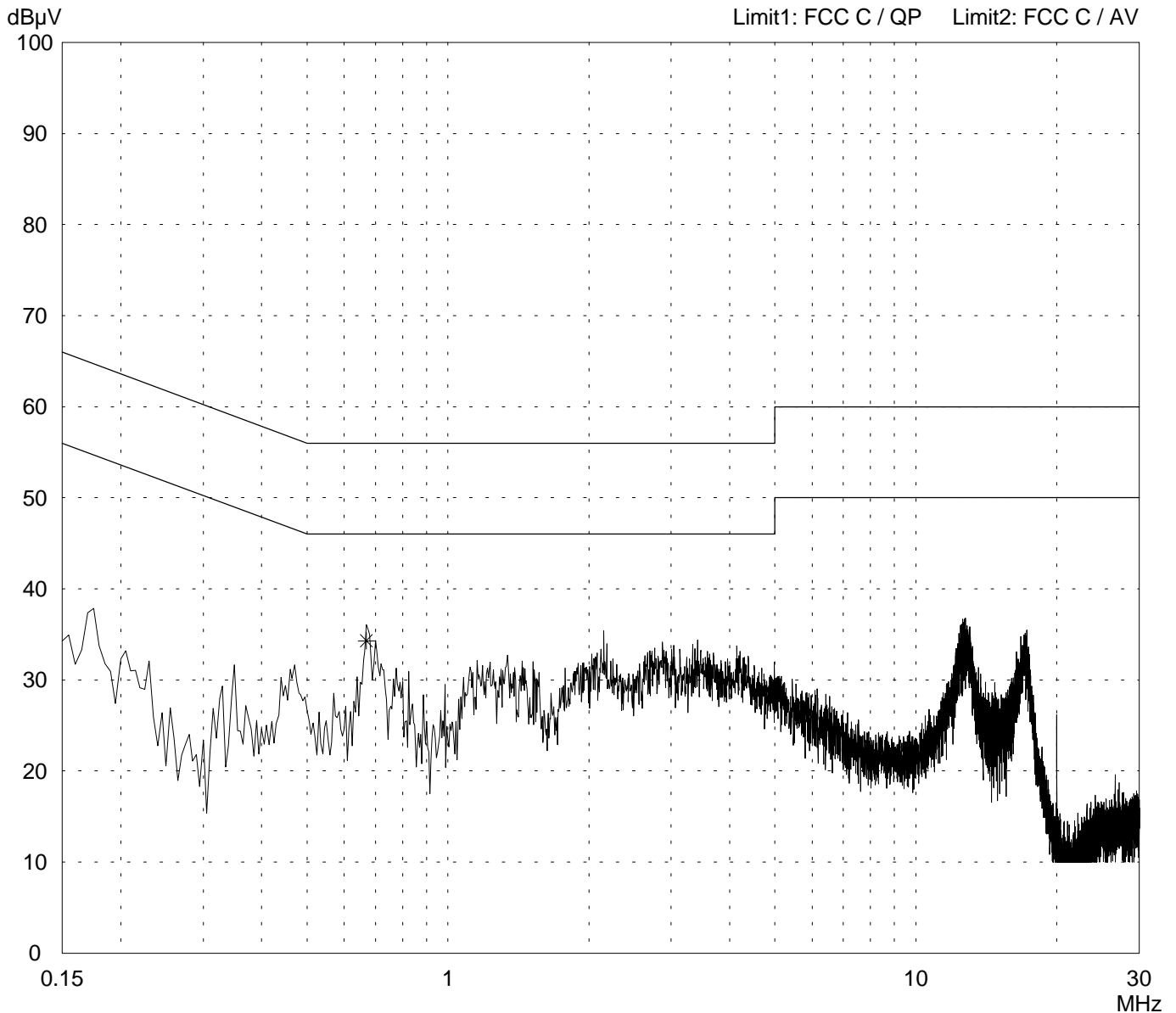
# Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

Model: MDAV5 Ceramic antenna	
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord EUT Power supply Phase N	
Date of test: 08/18/2003	Operator: T. Eberl
Test performed: automatically	File name:

Mode: - TX mode	
- f = 5.8 GHz	
- EUT DC powered 12 V	
- EUT in horizontal position bottom side on table	

Detector: Peak / Final Results: QP	
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Final results: 20 dB Margin		25 Subranges
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Result: Limit kept
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Project file: 51966-30486-1	Page 31 of 50 Pages
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**Conducted Emission Test 150 kHz - 30 MHz  
according to FCC Part 15 Subpart C**

Model: MDAV5 Ceramic antenna	Mode: - TX mode  - f = 5.8 GHz  - EUT DC powered 12 V  - EUT in horizontal position bottom side on table
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord EUT Power supply Phase N	
Date of test: 08/18/2003      Operator: T. Eberl	
Test performed: automatically      File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin      25 Subranges
---------------------------------------	--

<i>Frequency MHz</i>	<i>Reading dBµV</i>	<i>Correction factor dB</i>	<i>Value dBµV</i>	<i>Limit dBµV</i>	<i>Limit exceeded</i>
0.67	34.3		34.3	56.0	

Result: Limit kept	Project file: 51966-30486-1	Page 32 of 50 Pages
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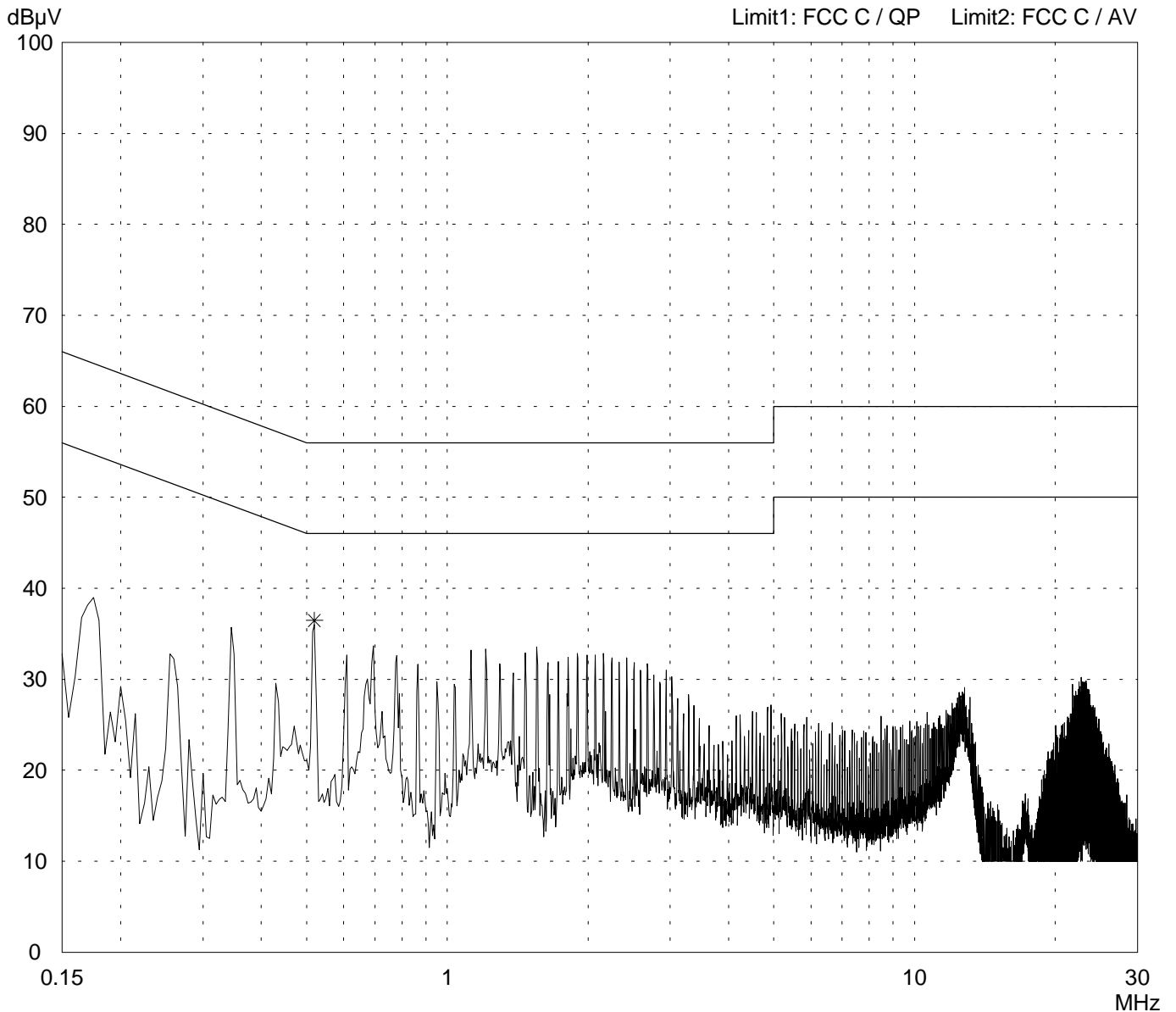
# Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

Model: MDAV5 Ceramic antenna	
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord AE Phase L1	
Date of test: 08/18/2003	Operator: T. Eberl
Test performed: automatically	File name:

Mode: - TX mode	
- f = 5.8 GHz	
- EUT DC powered 12 V	
- EUT in horizontal position bottom side on table	

Detector: Peak / Final Results: QP
---------------------------------------

Final results: 20 dB Margin	25 Subranges
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Result: Limit kept
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Project file: 51966-30486-1	Page 33 of 50 Pages
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**Conducted Emission Test 150 kHz - 30 MHz  
according to FCC Part 15 Subpart C**

Model: MDAV5 Ceramic antenna	Mode: - TX mode  - f = 5.8 GHz  - EUT DC powered 12 V  - EUT in horizontal position bottom side on table
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord AE Phase L1	
Date of test: 08/18/2003      Operator: T. Eberl	
Test performed: automatically      File name:	

Detector: Peak / Final Results: QP	Final results: 20 dB Margin      25 Subranges
---------------------------------------	--

<i>Frequency MHz</i>	<i>Reading dBµV</i>	<i>Correction factor dB</i>	<i>Value dBµV</i>	<i>Limit dBµV</i>	<i>Limit exceeded</i>
0.52	36.5		36.5	56.0	

Result: Limit kept	Project file: 51966-30486-1	Page 34 of 50 Pages
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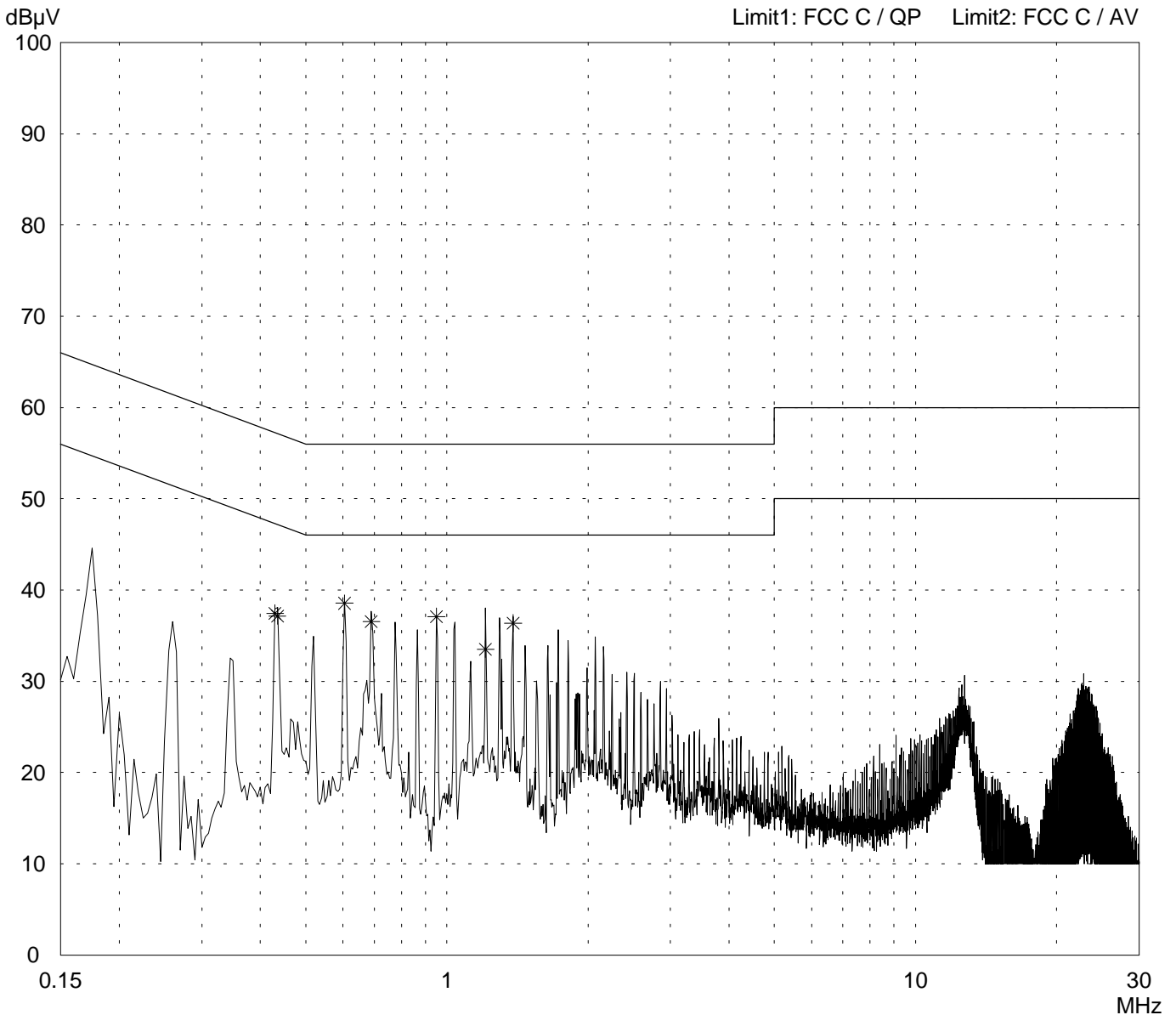
# Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

Model: MDAV5 Ceramic antenna	
Serial no.: SRIF 2002 X4 module No.01298	
Applicant: Siemens AG, Nürnberg	
Test site: Shielded room, cabin no. 2	
Tested on: Linecord AE Phase N	
Date of test: 08/18/2003	Operator: T. Eberl
Test performed: automatically	File name:

Mode: - TX mode	
- f = 5.8 GHz	
- EUT DC powered 12 V	
- EUT in horizontal position bottom side on table	

Detector: Peak / Final Results: QP
---------------------------------------

Final results: 20 dB Margin	25 Subranges
--------------------------------	--------------



Result: Limit kept
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Project file: 51966-30486-1	Page 35 of 50 Pages
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## Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart C

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Shielded room, cabin no. 2</p> <p>Tested on: Linecord AE Phase N</p> <p>Date of test: 08/18/2003      Operator: T. Eberl</p> <p>Test performed: automatically      File name:</p>	<p>Mode: - TX mode</p> <p>- f = 5.8 GHz</p> <p>- EUT DC powered 12 V</p> <p>- EUT in horizontal position bottom side on table</p>
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<p>Detector: Peak / Final Results: QP</p>	<p>Final results: 20 dB Margin                      25 Subranges</p>
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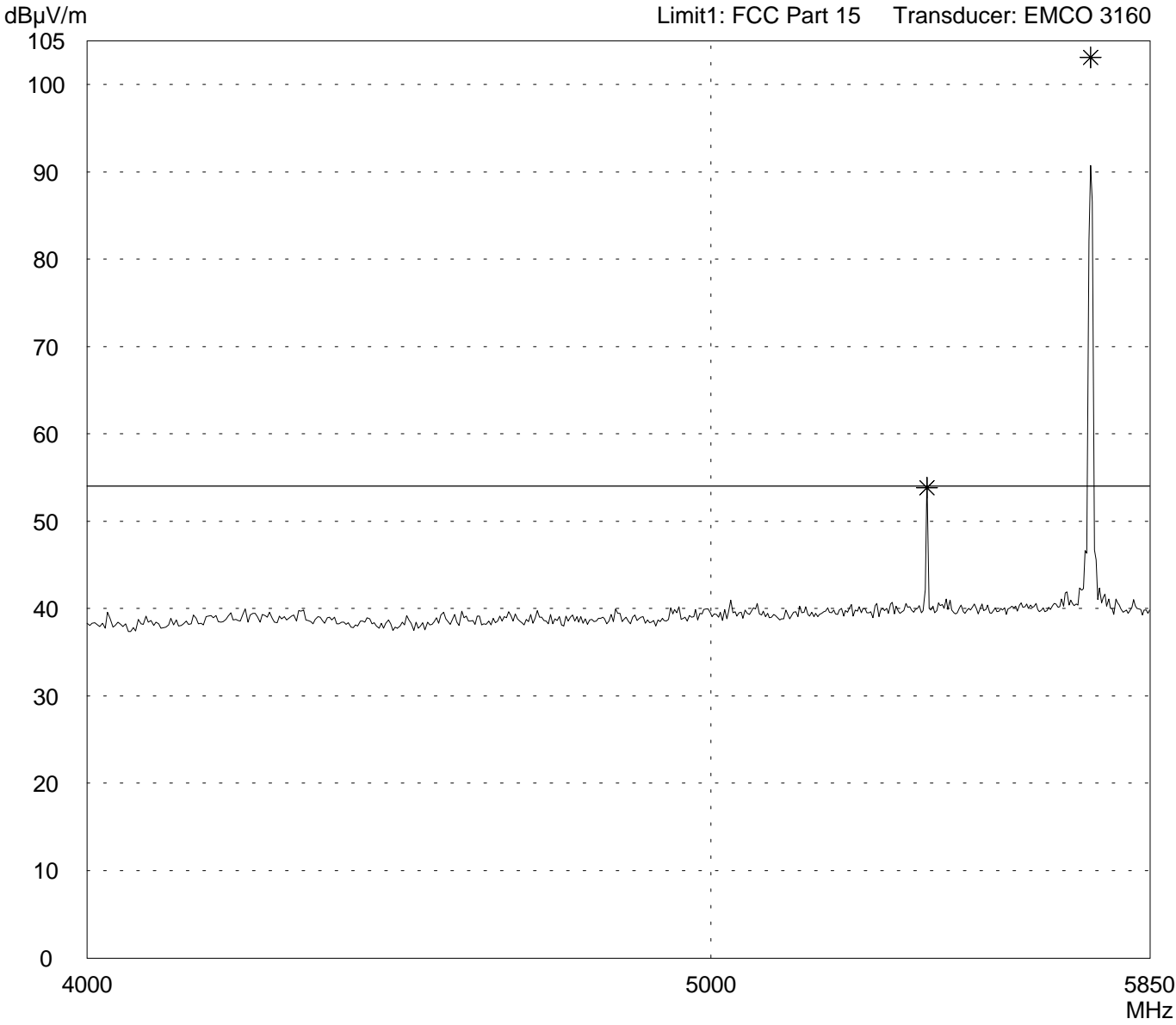
<i>Frequency MHz</i>	<i>Reading dB<math>\mu</math>V</i>	<i>Correction factor dB</i>	<i>Value dB<math>\mu</math>V</i>	<i>Limit dB<math>\mu</math>V</i>	<i>Limit exceeded</i>
0.430	37.5		37.5	57.3	
0.435	37.2		37.2	57.2	
0.605	38.5		38.5	56.0	
0.690	36.6		36.6	56.0	
0.950	37.1		37.1	56.0	
1.210	33.5		33.5	56.0	
1.385	36.4		36.4	56.0	

<p>Result: Limit kept</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 36 of 50 Pages</p>
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# Radiated Emission Test (Maximum Carrier) acc. to FCC Part 15 (EMCO 3160)

<p><b>Model:</b> MDAV5 Ceramic antenna</p> <p><b>Serial no.:</b> SRIF 2002 X4 module No.01298</p> <p><b>Applicant:</b> Siemens AG, Nürnberg</p> <p><b>Test site:</b> Fully anechoic room, cabin no. 2</p> <p><b>Tested on:</b> Test distance 3 metres Vertical Polarization</p> <p><b>Date of test:</b> 08/11/2003      <b>Operator:</b> T. Eberl</p> <p><b>Test performed:</b> automatically      <b>File name:</b> default.emi</p>	<p><b>Comment:</b></p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 01 low )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
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<p><b>Detector:</b> Peak</p>	<p><b>List of values:</b> Selected by hand</p>
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<p><b>Result:</b> Limit kept (with duty cycle correction)</p>	<p><b>Project file:</b> 51966-30486-1</p> <p style="text-align: right;">Page 37 of 50 Pages</p>
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**Radiated Emission Test (Maximum Carrier)  
acc. to FCC Part 15 (EMCO 3160)**

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Fully anechoic room, cabin no. 2</p> <p>Tested on: Test distance 3 metres Vertical Polarization</p> <p>Date of test:                      Operator: 08/11/2003                      T. Eberl</p> <p>Test performed:                  File name: automatically                  default.emi</p>	<p>Comment:</p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 01 low )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
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<p>Detector: Peak</p>	<p>List of values: Selected by hand</p>
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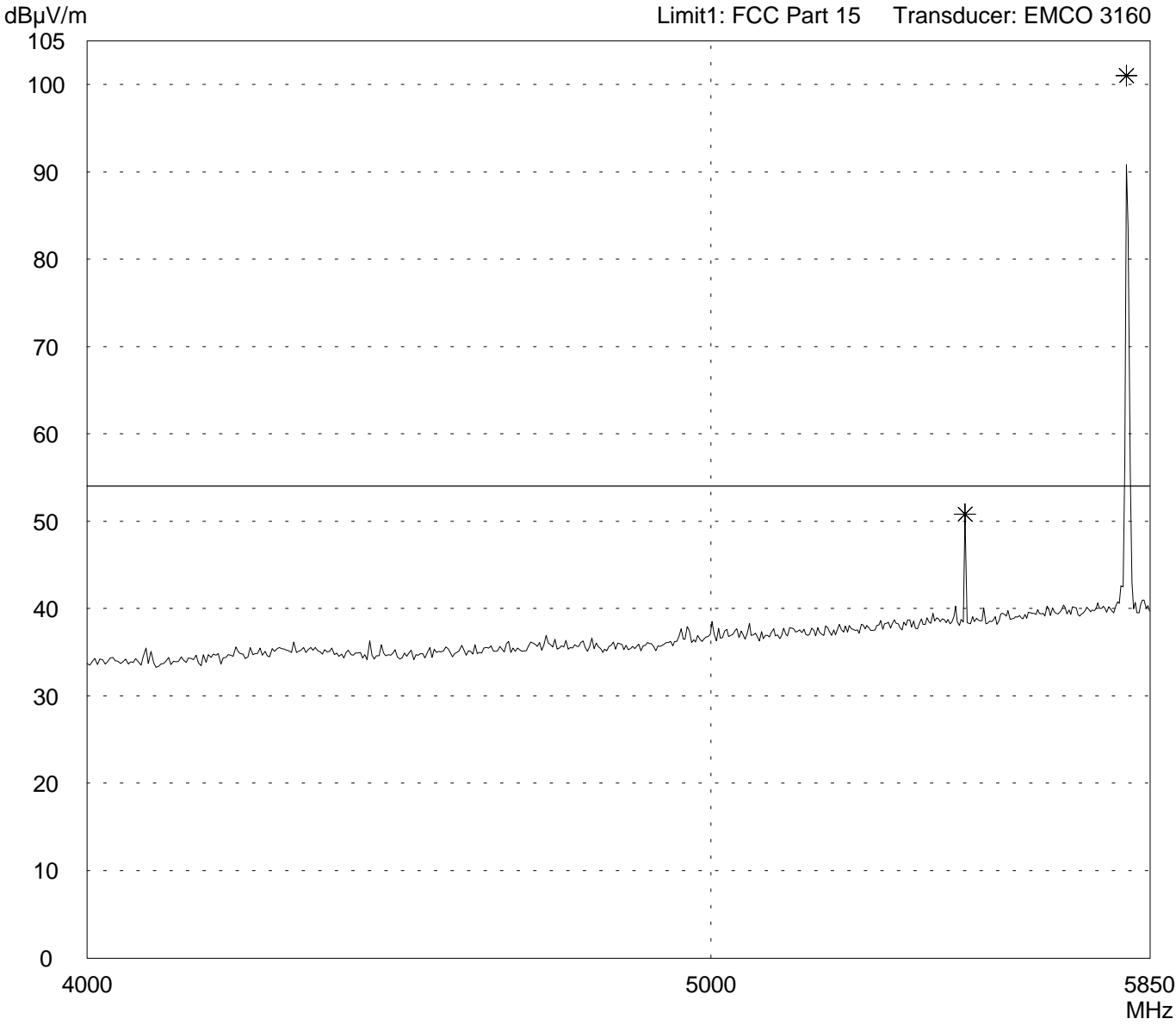
Frequency [MHz]	Reading [dBµV]	Correction factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded
5400.360000	21.38	32.43	53.81	54.00	
5726.070000	70.49	32.64	103.13	94.00	*

<p>Result: Limit kept (with duty cycle correction)</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 38 of 50 Pages</p>
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# Radiated Emission Test (Maximum Carrier) acc. to FCC Part 15 (EMCO 3160)

<p><b>Model:</b> MDAV5 Ceramic antenna</p> <p><b>Serial no.:</b> SRIF 2002 X4 module No.01298</p> <p><b>Applicant:</b> Siemens AG, Nürnberg</p> <p><b>Test site:</b> Fully anechoic room, cabin no. 2</p> <p><b>Tested on:</b> Test distance 3 metres Vertical Polarization</p> <p><b>Date of test:</b> 08/05/2003      <b>Operator:</b> T. Eberl</p> <p><b>Test performed:</b> automatically      <b>File name:</b> default.emi</p>	<p><b>Comment:</b></p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 40 middle)</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
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<p><b>Detector:</b> Peak</p>	<p><b>List of values:</b> Selected by hand</p>
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<p><b>Result:</b> Limit kept (with duty cycle correction)</p>	<p><b>Project file:</b> 51966-30486-1</p> <p style="text-align: right;">Page 39 of 50 Pages</p>
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**Radiated Emission Test (Maximum Carrier)  
acc. to FCC Part 15 (EMCO 3160)**

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Fully anechoic room, cabin no. 2</p> <p>Tested on: Test distance 3 metres Vertical Polarization</p> <p>Date of test:                      Operator: 08/05/2003                      T. Eberl</p> <p>Test performed:                  File name: automatically                      default.emi</p>	<p>Comment:</p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 40 middle)</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
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<p>Detector: Peak</p>	<p>List of values: Selected by hand</p>
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Frequency [MHz]	Reading [dBµV]	Correction factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded
5474.300000	18.34	32.48	50.81	54.00	
5800.000000	68.33	32.69	101.02	94.00	*

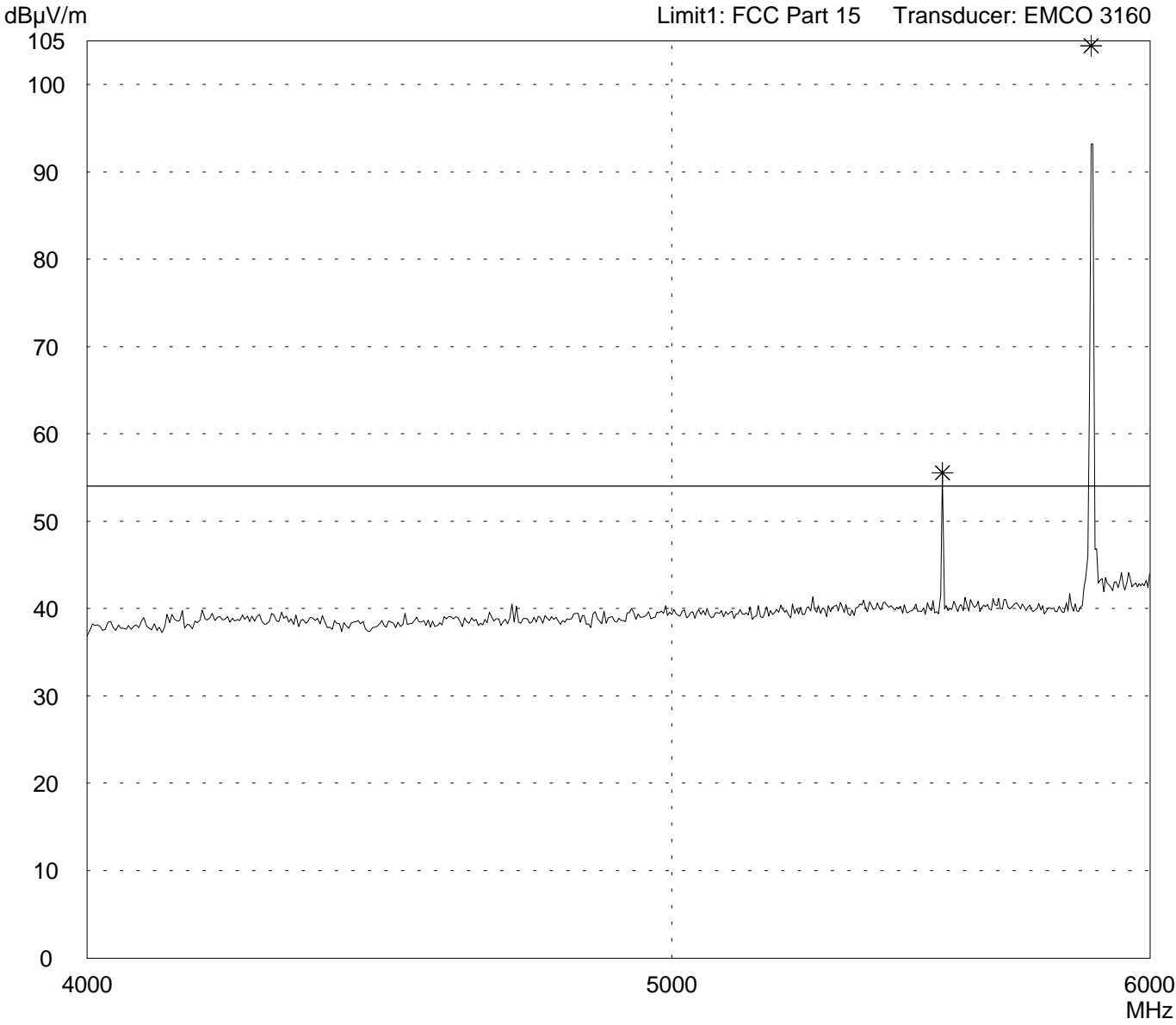
<p>Result: Limit kept (with duty cycle correction)</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 40 of 50 Pages</p>
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# Radiated Emission Test (Maximum Carrier) acc. to FCC Part 15 (EMCO 3160)

<p><b>Model:</b> MDAV5 Ceramic antenna</p> <p><b>Serial no.:</b> SRIF 2002 X4 module No.01298</p> <p><b>Applicant:</b> Siemens AG, Nürnberg</p> <p><b>Test site:</b> Fully anechoic room, cabin no. 2</p> <p><b>Tested on:</b> Test distance 3 metres Vertical Polarization</p> <p><b>Date of test:</b> 08/11/2003      <b>Operator:</b> T. Eberl</p> <p><b>Test performed:</b> automatically      <b>File name:</b> default.emi</p>	<p><b>Comment:</b></p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 79 high )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
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<p><b>Detector:</b> Peak</p>	<p><b>List of values:</b> Selected by hand</p>
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<p><b>Result:</b> Limit kept (with duty cycle correction)</p>	<p><b>Project file:</b> 51966-30486-1</p> <p style="text-align: right;">Page 41 of 50 Pages</p>
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**Radiated Emission Test (Maximum Carrier)  
acc. to FCC Part 15 (EMCO 3160)**

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Fully anechoic room, cabin no. 2</p> <p>Tested on: Test distance 3 metres Vertical Polarization</p> <p>Date of test:                      Operator: 08/11/2003                      T. Eberl</p> <p>Test performed:                  File name: automatically                  default.emi</p>	<p>Comment:</p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 79 high )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
---	--

<p>Detector: Peak</p>	<p>List of values: Selected by hand</p>
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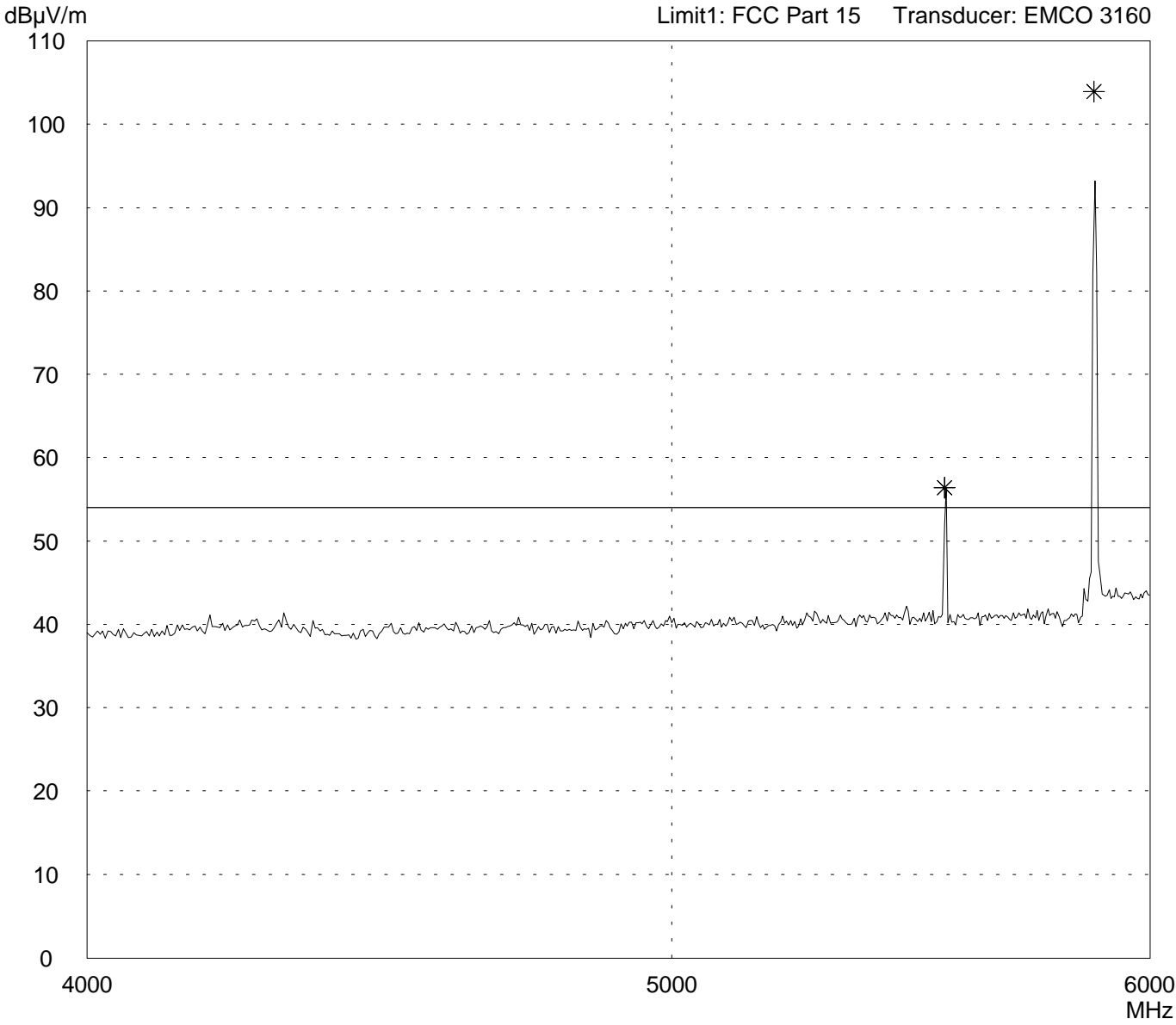
Frequency [MHz]	Reading [dBµV]	Correction factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded
5541.200000	23.01	32.52	55.53	54.00	*
5866.860000	69.30	35.14	104.44	94.00	*

<p>Result: Limit kept (with duty cycle correction)</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 42 of 50 Pages</p>
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# Radiated Emission Test (Maximum Carrier) acc. to FCC Part 15 (EMCO 3160)

<p><b>Model:</b> MDAV5 Ceramic antenna</p> <p><b>Serial no.:</b> SRIF 2002 X4 module No.01298</p> <p><b>Applicant:</b> Siemens AG, Nürnberg</p> <p><b>Test site:</b> Fully anechoic room, cabin no. 2</p> <p><b>Tested on:</b> Test distance 3 metres Vertical Polarization</p> <p><b>Date of test:</b> 08/11/2003      <b>Operator:</b> T. Eberl</p> <p><b>Test performed:</b> automatically      <b>File name:</b> default.emi</p>	<p><b>Comment:</b></p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 7F maximum )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
--	--

<b>Detector:</b> Peak	<b>List of values:</b> Selected by hand
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<b>Result:</b> Limit kept (with duty cycle correction)	<b>Project file:</b> 51966-30486-1
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**Radiated Emission Test (Maximum Carrier)  
acc. to FCC Part 15 (EMCO 3160)**

<p>Model: MDAV5 Ceramic antenna</p> <p>Serial no.: SRIF 2002 X4 module No.01298</p> <p>Applicant: Siemens AG, Nürnberg</p> <p>Test site: Fully anechoic room, cabin no. 2</p> <p>Tested on: Test distance 3 metres Vertical Polarization</p> <p>Date of test: 08/11/2003      Operator: T. Eberl</p> <p>Test performed: automatically      File name: default.emi</p>	<p>Comment:</p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 7F maximum )</li> <li>- EUT DC powered 12 V</li> <li>- EUT in vertical position</li> </ul>
---	---

<p>Detector: Peak</p>	<p>List of values: Selected by hand</p>
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Frequency [MHz]	Reading [dBµV]	Correction factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded
5548.188290	23.83	32.52	56.36	54.00	*
5873.897030	68.79	35.14	103.93	94.00	*

<p>Result: Limit kept (with duty cycle correction)</p>	<p>Project file: 51966-30486-1</p> <p style="text-align: right;">Page 44 of 50 Pages</p>
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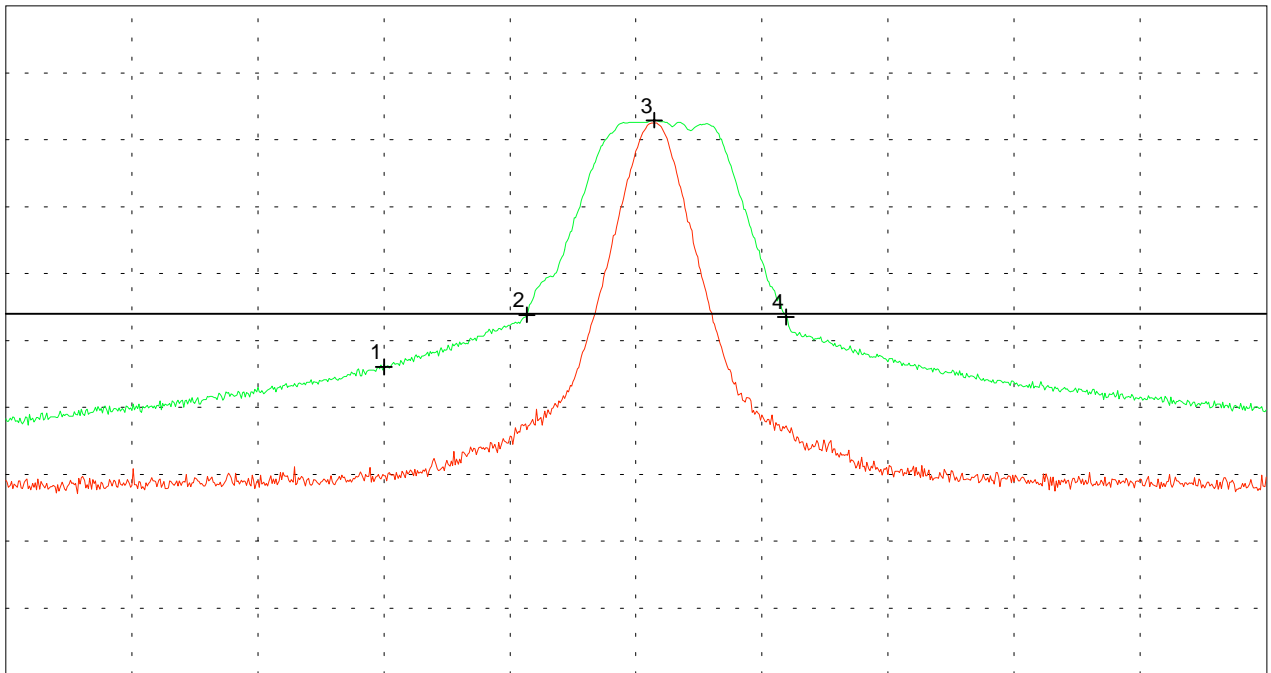
# Emission at Band Edges acc to. FCC Part 15, sec. 15.249

Model: MDAV5 Ceramic antenna	Mode: - TX mode - f = 5.8 GHz ( CH 01 low ) - EUT DC powered 12 V (RF module by 5 V DC)
Serial No.: SRIF 2002 X4 module No.01298	Channel A (red) = continuous wave Channel B (green) = with modulation (test mode)
Applicant: Siemens AG, Nürnberg	

Ref.Level 120 dB $\mu$ V  
10 dB/Div.

ATT 15 dB

Ref. Offset -2.1 dB



Start 5.7235 GHz  
RBW 100 kHz

VBW 100 kHz

Stop 5.7285 GHz  
SWP 740 ms

Multi Marker List				
No. 1	5.725000 GHz	66.04 dB $\mu$ V	(B)	
No. 2	5.725567 GHz	73.83 dB $\mu$ V	(B)	
No. 3	5.726072 GHz	102.91 dB $\mu$ V	(B)	
No. 4	5.726594 GHz	73.50 dB $\mu$ V	(B)	

Tested by: Thomas Eberl
Date: 10/07/2003

Project-No.: 51966-30486-1
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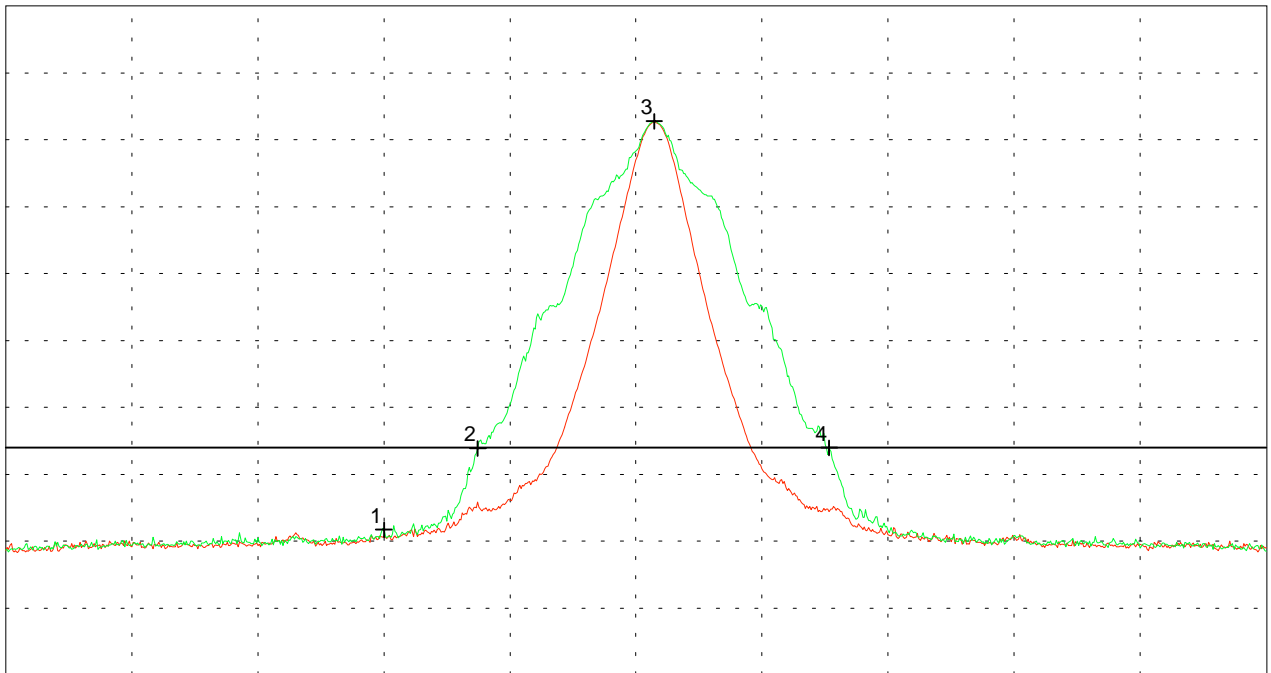
# Emission at Band Edges acc to. FCC Part 15, sec. 15.249

Model: MDAV5 Ceramic antenna	Mode: - TX mode - f = 5.8 GHz ( CH 01 low ) - EUT DC powered 12 V (RF module by 5 V DC) Note: averaging by video bandwidth
Serial No.: SRIF 2002 X4 module No.01298	Channel A (red) = continuous wave Channel B (green) = with modulation (test mode)
Applicant: Siemens AG, Nürnberg	

Ref.Level 120 dB $\mu$ V  
10 dB/Div.

ATT 15 dB

Ref. Offset -2.1 dB



Start 5.7235 GHz  
RBW 100 kHz

VBW 1 kHz

Stop 5.7285 GHz  
SWP 160 ms

### Multi Marker List

No. 1	5.725000 GHz	41.71 dB $\mu$ V	(B)
No. 2	5.725372 GHz	53.85 dB $\mu$ V	(B)
No. 3	5.726072 GHz	102.76 dB $\mu$ V	(B)
No. 4	5.726767 GHz	53.95 dB $\mu$ V	(B)

Tested by: Thomas Eberl	Project-No.: 51966-30486-1
Date: 10/07/2003	Page 46 of 50 Pages



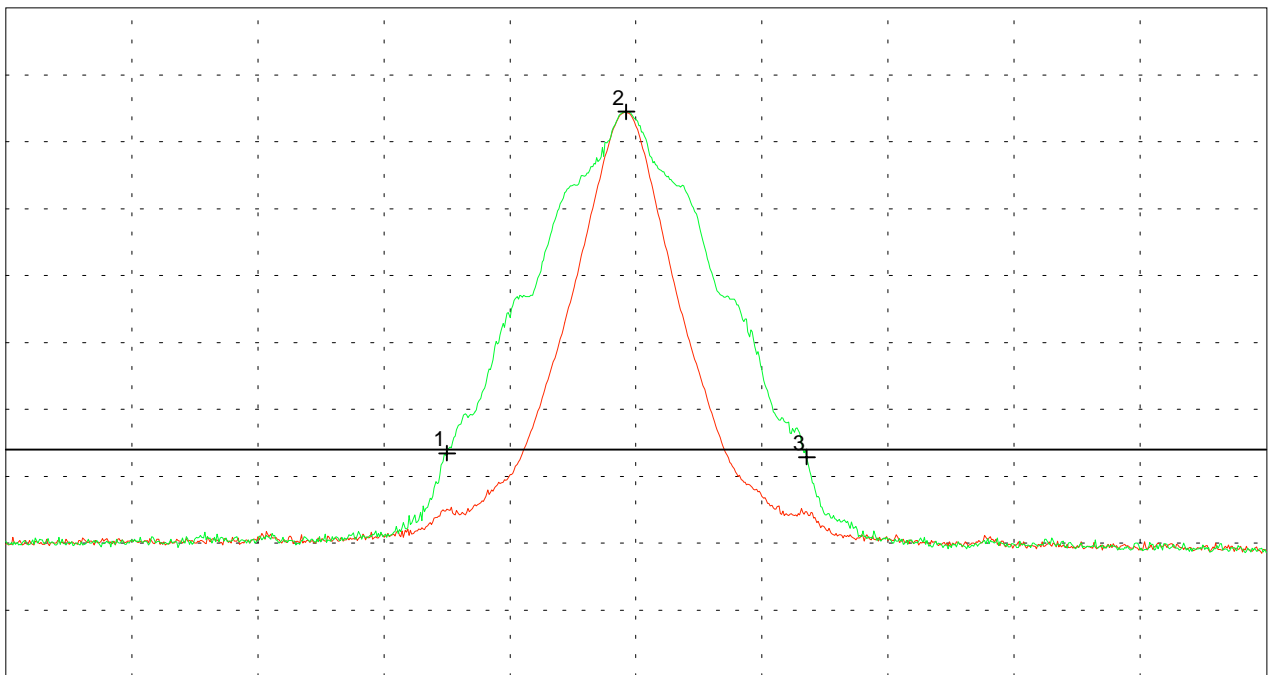
# Emission at Band Edges acc to. FCC Part 15, sec. 15.249

<p>Model: MDAV5 Ceramic antenna</p> <hr/> <p>Serial No.: SRIF 2002 X4 module No.01298</p> <hr/> <p>Applicant: Siemens AG, Nürnberg</p> <hr/> <hr/> <hr/> <hr/>	<p>Mode:</p> <ul style="list-style-type: none"> <li>- TX mode</li> <li>- f = 5.8 GHz ( CH 79 high )</li> <li>- EUT DC powered 12 V (RF module by 5 V DC)</li> </ul> <p>Note: averaging by video bandwidth</p> <p>Channel A (red) = continuous wave Channel B (green) = with modulation (test mode)</p>
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Ref.Level 120 dB $\mu$ V  
10 dB/Div.

ATT 15 dB

Ref. Offset 1.3 dB



Start 5.8644 GHz  
RBW 100 kHz

VBW 1 kHz

Stop 5.8694 GHz  
SWP 760 ms

Multi Marker List			
No. 1	5.866150 GHz	53.44 dB $\mu$ V	
No. 2	5.866861 GHz	104.48 dB $\mu$ V	
No. 3	5.867578 GHz	52.86 dB $\mu$ V	

<p>Tested by: Thomas Eberl</p>
<p>Date: 10/07/2003</p>

<p>Project-No.: 51966-30486-1</p>
<p>Page 48 of 50 Pages</p>





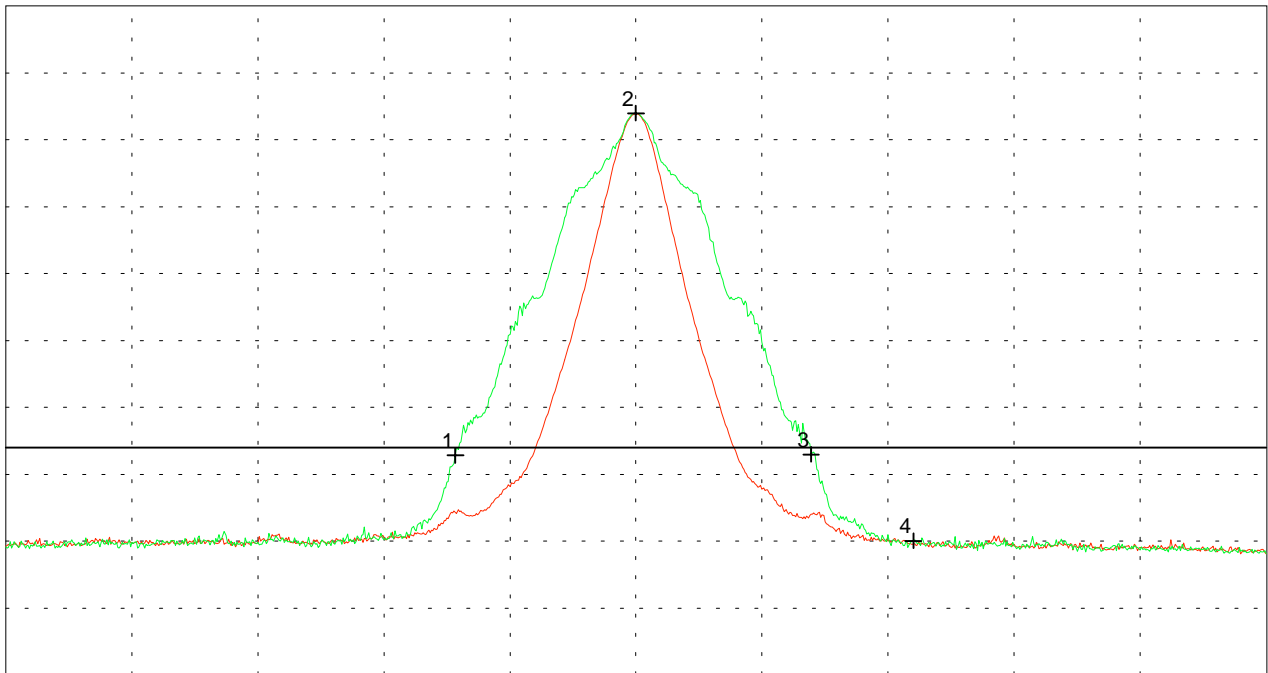
# Emission at Band Edges acc to. FCC Part 15, sec. 15.249

Model: MDAV5 Ceramic antenna	Mode: - TX mode  - f = 5.8 GHz ( CH 7F maximum )  - EUT DC powered 12 V (RF module by 5 V DC)
Serial No.: SRIF 2002 X4 module No.01298	Note: averaging by video bandwidth  Channel A (red) = continuous wave Channel B (green) = with modulation (test mode)
Applicant: Siemens AG, Nürnberg	

Ref.Level 120 dB $\mu$ V  
10 dB/Div.

ATT 15 dB

Ref. Offset .5 dB



Start 5.8714 GHz  
RBW 100 kHz

VBW 1 kHz

Stop 5.8764 GHz  
SWP 760 ms

Multi Marker List				
No. 1	5.873183 GHz	52.83 dB $\mu$ V	(B)	
No. 2	5.873900 GHz	103.97 dB $\mu$ V	(B)	
No. 3	5.874594 GHz	52.98 dB $\mu$ V	(B)	
No. 4	5.875000 GHz	40.06 dB $\mu$ V	(B)	

Tested by: Thomas Eberl
Date: 10/07/2003

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