

TEST REPORT # EMCC-990159G, 2008-06-16

EQUIPMENT UNDER TEST:

Household Microwave / Convection Oven

Model: H4082 BM
M.-No.: 0727230
Serial No: 00/9999999999979
Magnetron Type: TOSHIBA 2M282H (ML)
Equipment Category: Industrial, Scientific and Medical (ISM) equipment
Manufacturer: MIELE & CIE. KG
Address: Carl-Miele-Platz 1
59302 Oelde
Germany

Phone: +49-5245-91-4627
Fax: +49-5245-91-4600

RELEVANT STANDARD:

47 CFR Part 18

MEASUREMENT PROCEDURE USED:

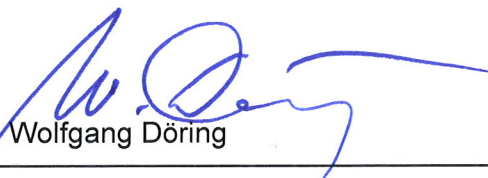
ANSI C63.4-2003 FCC/OET MP-5 (1986) Other

TEST REPORT PREPARED BY:

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FCC Registration # 878769

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1 GENERAL INFORMATION

1.1 Purpose

The purpose of this report is to show compliance to the FCC regulations for industrial scientific and medical equipment operating under section 18 of the Code of Federal Regulations title 47.

1.2 Limits and Reservations

The test results in this report apply only to the particular Equipment Under Test (EUT) as declared in this report. This test report shall not be reproduced except in full without the written permission of EMCCons DR. RAŠEK.

1.3 Test Location

Company Name: EMCCons DR. RAŠEK
Street: Moggast, Boelwiese 8
City: 91320 Ebermannstadt
Country: Germany
Laboratory: EMCCons DR. RAŠEK Test Laboratory IV
located at Stoernhofer Berg 15, 91364 Unterleinleiter, Germany.
This site has been fully described in a report submitted to the FCC, and
accepted in the letter dated January 18, 2008 Registration Number 878769.
Phone: +49-9194-9016
Fax: +49-9194-8125
E-Mail: emc.cons@email.de
Web: www.emcc.de

1.4 Manufacturer

Company Name: MIELE & CIE. KG
Street: Carl-Miele-Platz 1
City: 59302 Oelde
Country: Germany
Name for contact purposes: Mr. Uwe Keller
Phone: +49-5245-91-4627
Fax: +49-5245-91-4600
E-mail: uwe.keller@miele.de

1.5 Dates

Date of receipt of EUT: CW 21/2008
Test date: CW 21/2008

2 PRODUCT DESCRIPTION

2.1 Equipment Under Test (EUT)

Description:	Household Microwave / Convection Oven
Model:	H4082 BM
M.-No.:	0727230
Serial Number:	00/9999999999979
FCC-ID:	SSVMW6051
Equipment Category:	Industrial, Scientific and Medical (ISM) equipment
Power:	2N~220V 60Hz Single Phase AC 240/120V 60Hz Single Phase AC 208/120V 60Hz
Operating frequency:	2450 MHz
Internally used frequencies:	132 kHz (SPS), 4.91 MHz (Display PCB), 8 MHz (Power PCB), 16 MHz (Touch PCB), 24.57 MHz (Control PCB)
Magnetron Type:	TOSHIBA 2M282H (ML)
Rated Power Input:	1850W @ AC 240V/60Hz 1500W @ AC 208V/60Hz
Rated Microwave Power:	950W @ AC 240V/60Hz 850W @ AC 208V/60Hz

2.2 EUT Peripherals

none

2.3 Mode of Operation During Testing

The EUT was tested as an independent unit with pure water as load. All emission tests performed with the upper nominal supply voltage of 240 V/60 Hz applied. Frequency measurements performed with both nominal voltages varied according to the MP-5 requirements.

2.4 Modifications Required for Compliance

None.

3 TEST RESULTS SUMMARY

Summary of Test Results for the following EUT:

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

Requirement	CFR Section	Report Section	Test Result
Radiation Hazard	OET MP-5, OET Bulletin 56		Pass
Power Output	OET MP-5		Pass
Operating frequencies	18.301, 18.303		Pass
Field Strength Limits (Spurious and Harmonics)	18.305		Pass
AC Line Conducted Emissions	18.307		Pass

The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

Consistent with Industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) are factored into the "Correction Factor" documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

The measurements contained in this report were made in accordance with the procedure FCC/OET MP-5 (1986) and all applicable Public Notices received prior to the date of testing. All emissions from the device were found to be within the limits outlined in this report.

The test results in this report apply only to the particular Equipment Under Test (EUT) as declared in this report.

Test Personnel: Wolfgang Döring
Issuance Date: 2008-06-16

4 RADIATION HAZARD

Test Requirement: OET Bulletin 56, OET Bulletin 65

Test Procedure: FCC/OET MP-5 (1986)

4.1 Regulation

OET Bulletin 56

Table 1: FCC Limits for Maximum Permissible Exposure (MPE)

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm ²]	Averaging Time E ² , H ² or S [minutes]
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

The limit for an operating frequency of 2,450MHz is 1mW/ cm².

4.2 Test Equipment

Type	Manufacturer/ Model No.	EMCC Ident. No.	Last Calibration	Next Calibration
Field Probe	PMM 8053A	1433	2008-01	2011-01
Electromagnetic Radiation Meter	PMM EP-408	1435	2007-05	2008-05

4.3 Test Procedure

EUT was supplied with 240V/60Hz and operated with a 1000 ml of water load located in the center of the oven. Radiation leakage was measured on all sides around the EUT using the field probe.



Fig. 1 Radiation leakage test

4.4 Test Result

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

The maximum measured power density was 0.029 mW/cm² and did not exceed the specified limit.
The EUT meets the requirements of this section.

Test Personnel: Wolfgang Döring
Test Date: 2008-05-19

5 POWER OUTPUT

Test Requirement: FCC 47 CFR, Section 18.305

Test Procedure: FCC/OET MP-5 (1986)

5.1 Regulation

The field strength limit according to Section 18.305 depends on the RF power generated by the equipment. The measured value of power is used to determine the allowable out-of-band field strength under the terms specified in Section 18.305 of the Rules. The AC Input Power to the oven is also measured to determine if the EUT is operating in accordance with the manufacturer's specifications.

5.2 Test Equipment

Type	Manufacturer/ Model No.	EMCC Ident. No.	Last Calibration	Next Calibration
AC Power Source	CALIFORNIA INSTRUMENTS HGA with 3 pcs. 5001ih-400	34	-	-
Temperature sensor	Ahlborn	521	2006-06	2008-06
Almemo Datalogger	Ahlborn MA2590-4S	2627	2008-04	2009-04
Scale	Bosch PE615	2700	2008-05	2010-05
Digital Multimeter	Voltcraft	2226	2007-03	2009-03

5.3 Test Procedure

The input power is measured by the measuring capabilities of the AC source and compared with the nominal power as declared by the manufacturer. The power output is measured by the calorimetric method according to IEC/EN 60705 chapter 8, using a load of 1000ml of water in the beaker located in the center of the oven. The power output was computed from the measured temperature rise of the load over a period of time using the following equation:

$$P = [4.187 \times m_w \times (T_2 - T_1) + 0,55 \times m_c (T_2 - T_0)] / t$$

where

- P = Output power in W,
- m_w = Mass of water in g,
- m_c = Mass of beaker in g,
- T_0 = Ambient temperature in °C
- T_1 = Starting temperature in °C,
- T_2 = Final temperature in °C,
- t = Time in sec.

5.4 Test Results

5.4.1 Input Power

Input Power Measurement				
Mode	Input Voltage	Input Current	Power Consumption	Manufacturer Rating
1000ml load	L1-N: 120 V L2-N: 120 V L1-L2: 240 V	L1: 7.7 A L2: 7.1 A	L1: 924 W L2: 852 W L1+L2: 1776 W	1850 W

5.4.2 RF Output Power

RF Output Power Measurement						
Mass of water	Mass of beaker	Ambient temperature	Starting temperature	Final temperature	Elapsed time	Calculated RF power
1007g	416g	20 °C	19 °C	31.2 °C	60 sec	900 W

5.5 Result Summary

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

The EUT power consumption matches with the manufacturer's rating.
The RF output power exceeds 500W. Therefore the field strength limit is calculated according to §18.305 (b) based on the measured power of 900 W.

The EUT meets the requirements of this section.

Test Personnel: Wolfgang Döring
Test Date: 2006-05-19

6 OPERATING FREQUENCIES

Test Requirement: FCC 47 CFR, Sections 18.301 and 303

Test Procedure: FCC/OET MP-5 (1986)

6.1 Regulation

Section 18.301 Operating frequencies

ISM equipment may be operated on any frequency above 9 kHz except as indicated in § 18.303. The following frequency bands, in accordance with §2.106 of the rules, are allocated for use by ISM equipment:

ISM frequency	Tolerance
...	...
2,450 MHz	+/- 50.0MHz
...	...

6.2 Test Procedure

According to OET MP-5 Section 4.5 Frequency measurements.

The frequency was measured using a EMI Receiver and a Horn Antenna placed at a distance of approx. 2 meters from the EUT.

The frequency was measured as a function of

- line voltage variation (from 80% to 125% of both nominal line voltages) and
- load variation (from 1000ml to 200ml).

6.3 Results

6.3.1 Frequency vs Line Voltage Variation Test

a) Nominal Voltage: 208V; Load: 1000ml

Line Voltage [V]	lower -20dBc frequency [MHz]	peak frequency [MHz]	upper -20dBc frequency [MHz]
208 (100%)	2,4132	2,4528	2,4708
187.2 (90%)	2,4108	2,4516	2,4640
166.4 (80%)	2,4248	2,4332	2,4464
228 (110%)	2,4108	2,4516	2,4704
260 (125%)	2,4140	2,4528	2,4704

b) Nominal Voltage: 240V; Load: 1000ml

Line Voltage [V]	lower -20dBc frequency [MHz]	peak frequency [MHz]	upper -20dBc frequency [MHz]
240 (100%)	2,4088	2,4500	2,4676
216 (90%)	2,4104	2,4532	2,4664
192 (80%)	2,4136	2,4540	2,4652
264 (110%)	2,4080	2,4444	2,4664
300 (125%)	2,4128	2,4488	2,4720

6.3.2 Frequency vs Load Variation Test

a) Voltage: 208V, Nominal Load: 1000ml

Load [ml]	lower -20dBc frequency [MHz]	peak frequency [MHz]	upper -20dBc frequency [MHz]
1000 (100%)	2,4132	2,4528	2,4708
800 (80%)	2,4236	2,4516	2,4684
600 (60%)	2,4244	2,4556	2,4644
400 (40%)	2,4220	2,4580	2,4660
200 (20%)	2,4160	2,4564	2,4660

b) Voltage: 240V, Nominal Load: 1000ml

Load [ml]	lower -20dBc frequency [MHz]	peak frequency [MHz]	upper -20dBc frequency [MHz]
1000 (100%)	2,4088	2,4500	2,4676
800 (80%)	2,4172	2,4464	2,4670
600 (60%)	2,4276	2,4596	2,4636
400 (40%)	2,4256	2,4576	2,4652
200 (20%)	2,4264	2,4592	2,4616

6.4 Result Summary

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

Minimum operating frequency: 2,408 MHz

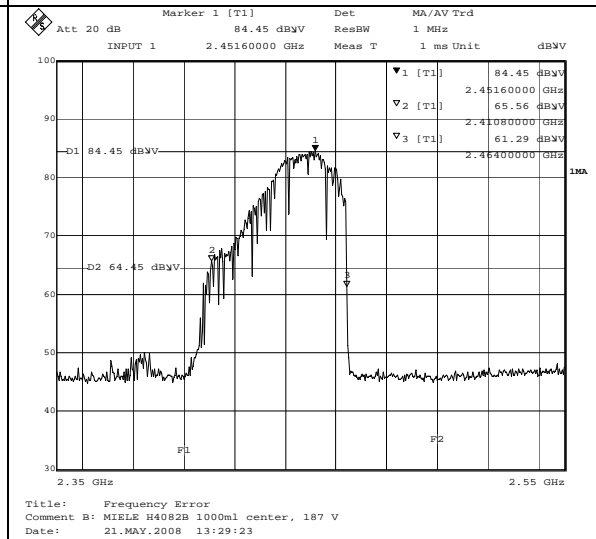
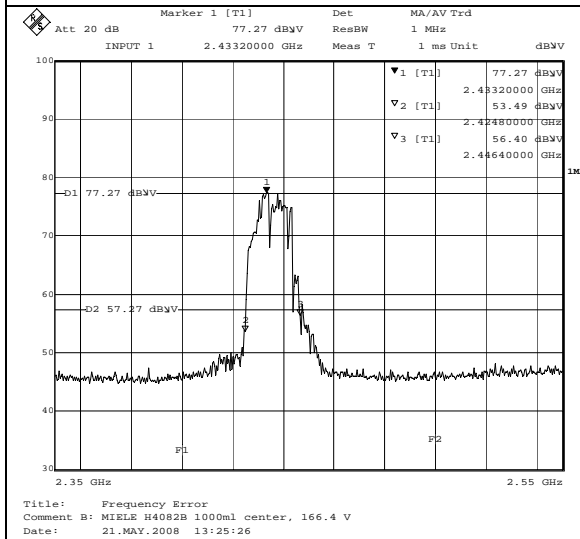
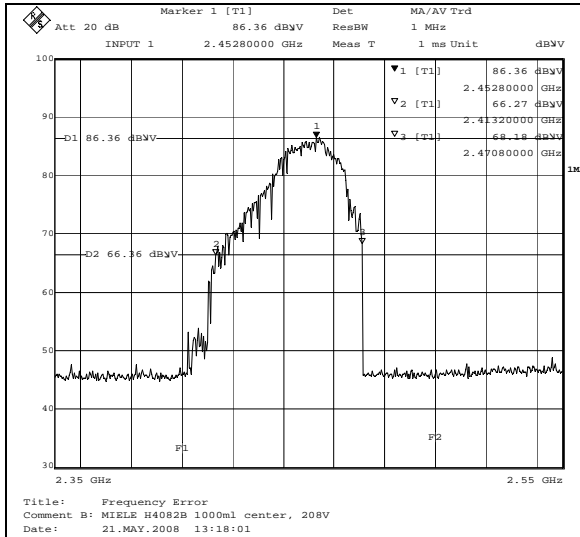
Maximum operating frequency: 2,472 MHz

The EUT meets the requirements of this section.

Test Personnel: Wolfgang Döring
Test Date: 2006-05-21

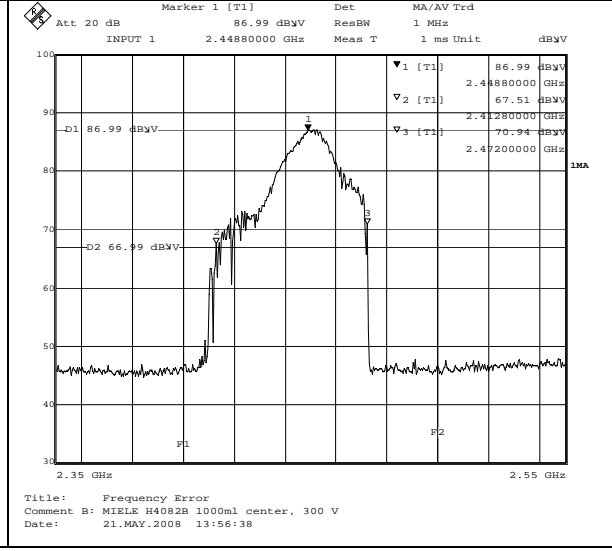
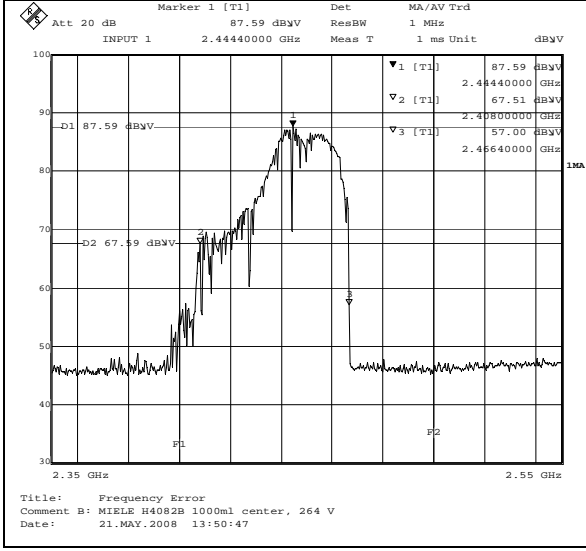
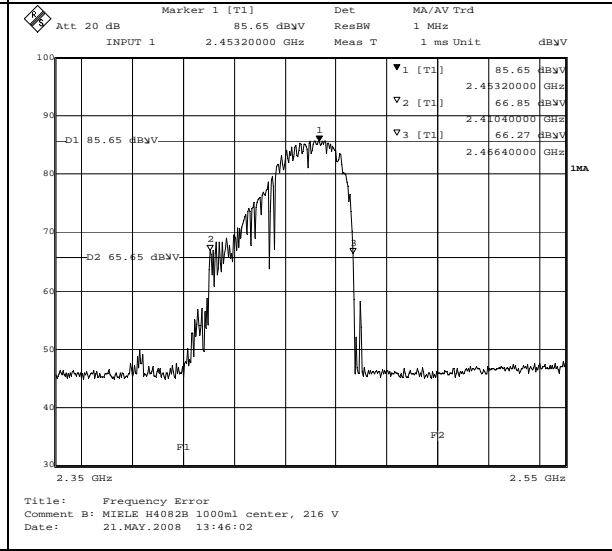
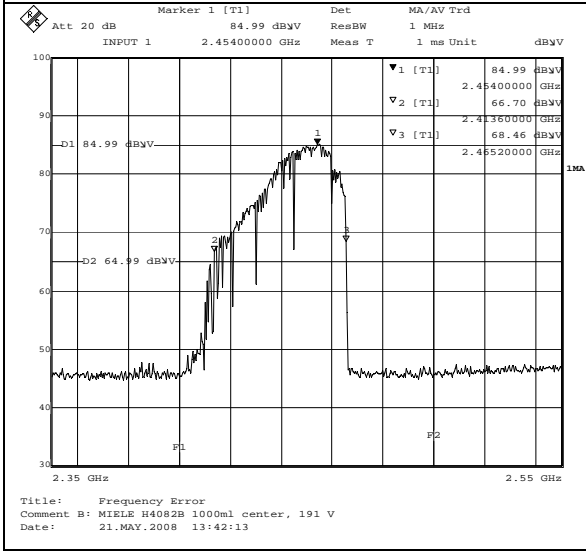
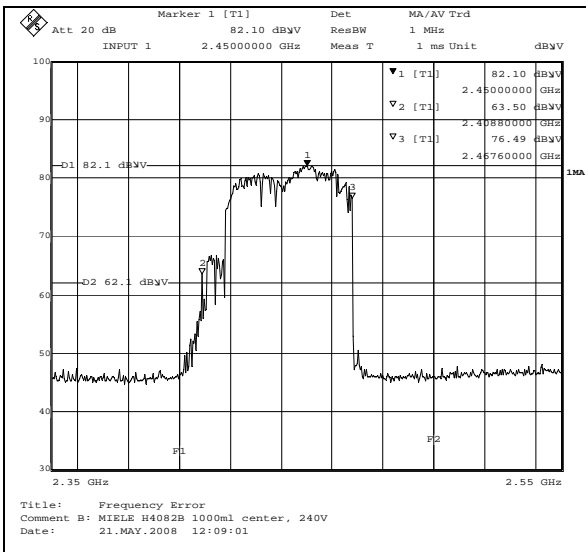
6.5 Measurement Plots

6.5.1 Frequency vs Line Voltage Variation Test (Nominal Voltage = 208 V)



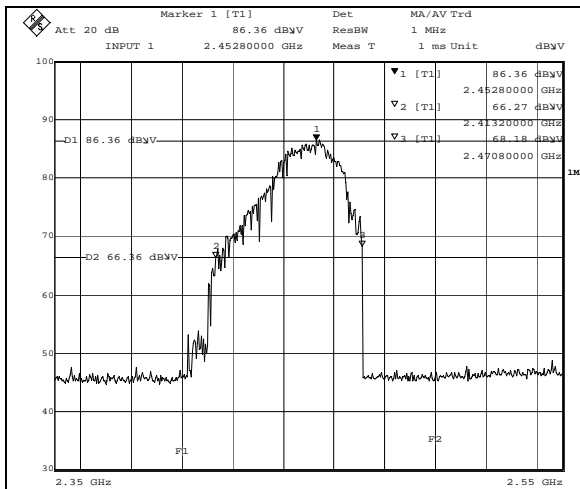
TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

6.5.2 Frequency vs Line Voltage Variation Test (Nominal Voltage = 240 V)



TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

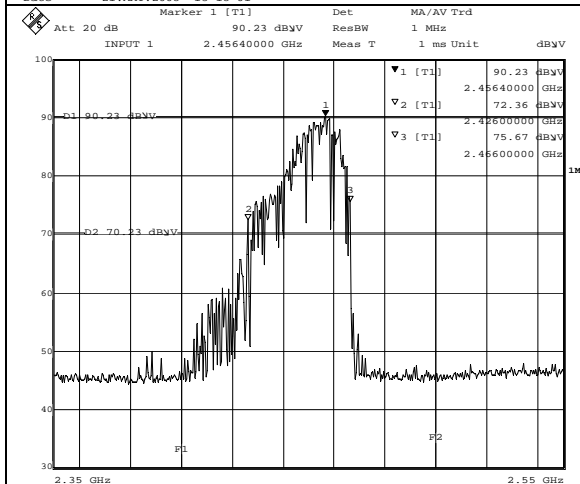
6.5.3 Frequency vs Load Variation Test (Nominal Voltage = 208 V)



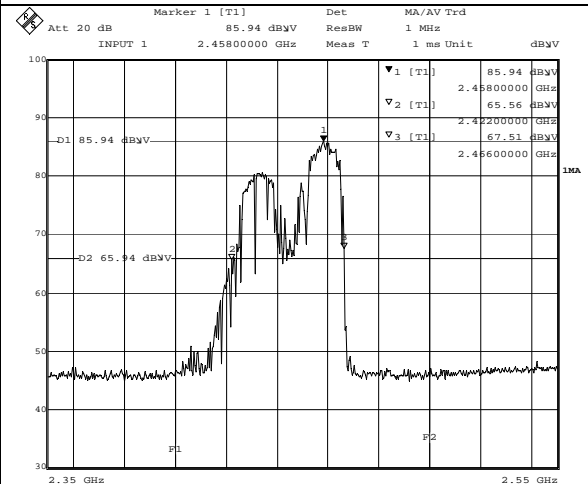
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 Comment B: MIELE H4082B 100ml center, 208V
 Date: 21.MAY.2008 13:18:01



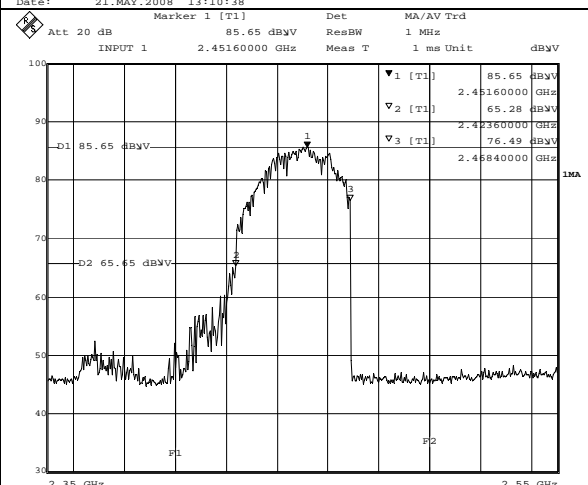
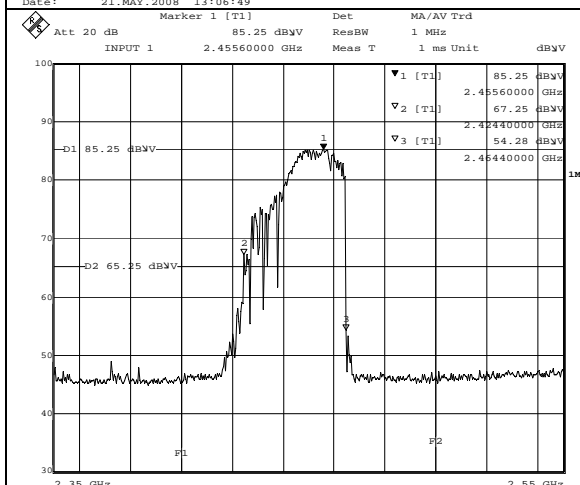
Title: Frequency Error
 Comment B: MIELE H4082B 400ml center, 208V
 Date: 21.MAY.2008 13:10:38



Title: Frequency Error
 Comment B: MIELE H4082B 200ml center, 208V
 Date: 21.MAY.2008 13:08:49



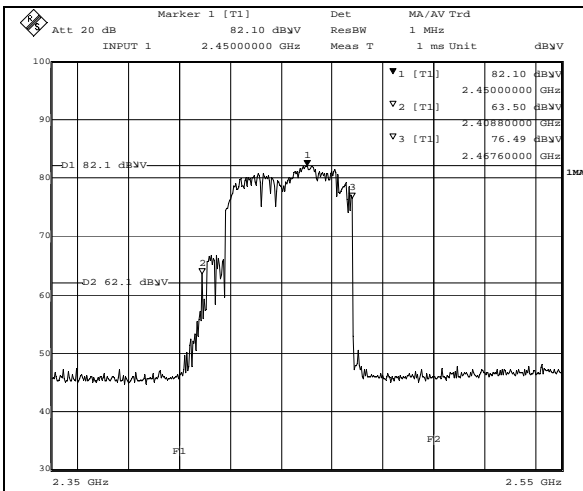
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 Date: 21.MAY.2008 13:12:59



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 Comment B: MIELE H4082B 800ml center, 208V
 Date: 21.MAY.2008 13:15:53

TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

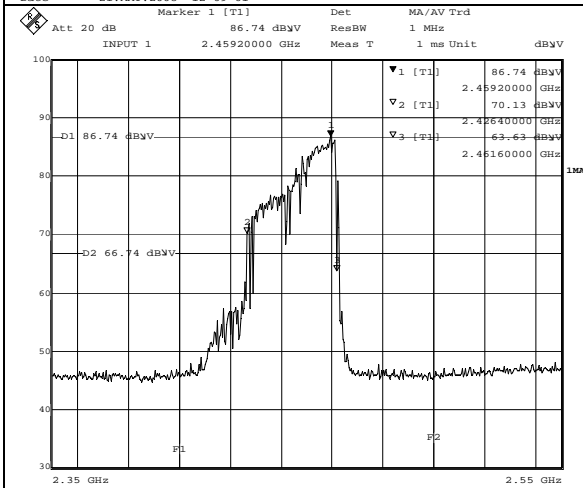
6.5.4 Frequency vs Load Variation Test (Nominal Voltage = 240 V)



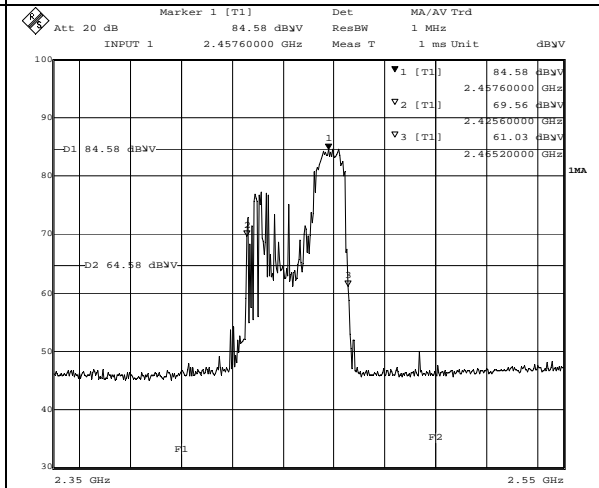
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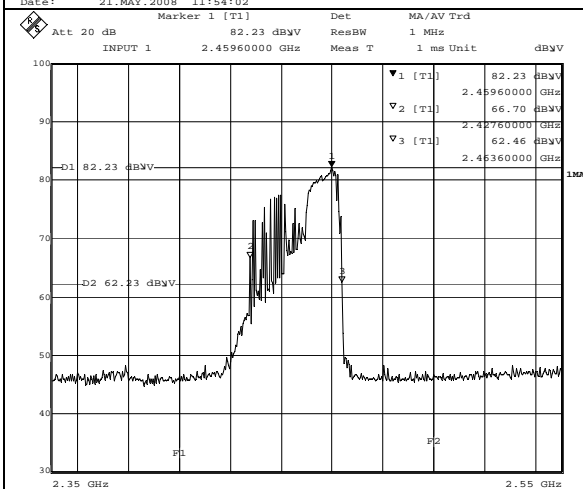
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 Date: 21.MAY.2008 11:59:45



Title: Frequency Error
 Comment B: MIELE H4082B 200ml center, 240V
 Date: 21.MAY.2008 11:54:02



Title: Frequency Error
 Comment B: MIELE H4082B 600ml center, 240V
 Date: 21.MAY.2008 12:02:41



Title: Frequency Error
 Comment B: MIELE H4082B 800ml center, 240V
 Date: 21.MAY.2008 12:06:08

7 RADIATED EMISSIONS

Test Requirement: FCC 47 CFR, Part 18

Test Procedure: FCC/OET MP-5 (1986)

7.1 Regulation

FCC 47 CFR

Section 18.305 Field strength limits

(a) ISM equipment operating on a frequency specified in § 18.301 is permitted unlimited radiated energy in the band specified for that frequency.

(b) The field strength levels of emissions which lie outside the bands specified in § 18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment [watts]	Field strength limit [$\mu\text{V}/\text{m}$]	Distance [meters]
Any type unless otherwise specified (miscellaneous).	Any ISM frequency	Below 500	25	300
		500 or more	$25 \times \text{SQRT}(\text{power}/500)$	300 ⁽¹⁾
	Any non-ISM frequency	Below 500	15	300
		500 or more	$15 \times \text{SQRT}(\text{power}/500)$	300 ⁽¹⁾
Industrial heaters and RF stabilized arc welders.	On or below 5,725 MHz	Any	10	1,600
	Above 5,725 MHz	Any	⁽²⁾	⁽²⁾
Medical diathermy	Any ISM frequency	Any	25	300
	Any non-ISM frequency	Any	15	300
Ultrasonic	Below 490 kHz	Below 500	$2,400/\text{F}(\text{kHz})$	300
		500 or more	$2,400/\text{F}(\text{kHz}) \times \text{SQRT}(\text{power}/500)$.	300 ⁽³⁾
	490 to 1,600 kHz	Any	$24,000/\text{F}(\text{kHz})$	30
	Above 1,600 kHz	Any	15	30
Induction cooking ranges	Below 90 kHz	Any	1,500	30 ⁽⁴⁾
	On or above 90 kHz	Any	300	30 ⁽⁴⁾

¹ Field strength may not exceed 10 $\mu\text{V}/\text{m}$ at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

² Reduced to the greatest extent possible.

³ Field strength may not exceed 10 $\mu\text{V}/\text{m}$ at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

⁴ Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

(c) The field strength limits of RF lighting devices shall be the following:

Equipment	Frequency (MHz)	Field strength limit at 30 meters ($\mu\text{V}/\text{m}$)
Non-consumer equipment	30-88	30
	88-216	50
	216-1000	70
Consumer equipment	30-88	10
	88-216	15
	216-1000	20

NOTES

1. The tighter limit shall apply at the boundary between two frequency ranges.

2. Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine

the expected field strength level at 30, 300, or 1600 meters. Alternatively, if measurements are made at only one closer fixed distance, then the permissible field strength limits shall be adjusted using 1/d as an attenuation factor.

Section 18.311 Methods of measurement

The measurement techniques which will be used by the FCC to determine compliance with the technical requirements of this part are set out in FCC Measurement Procedure MP-5, "Methods of Measurements of Radio Noise Emissions from ISM equipment". Although the procedures in MP-5 are not mandated, manufacturers are encouraged to follow the same techniques which will be used by the FCC.

Section 18.309 Frequency range of radiated measurements:

(a) For field strength measurements:

Frequency band in which device operates (MHz)	Range of frequency measurements	
	Lowest frequency	Highest frequency
Below 1.705	Lowest frequency generated in the device but not lower than 9 kHz.	30 MHz.
1.705 - 30	Lowest frequency generated in the device but not lower than 9 kHz.	400 MHz.
30 - 500	Lowest frequency generated in the device or 25 MHz, whichever is lower.	Tenth harmonic or 1,000 MHz, whichever is higher.
500 - 1000	Lowest frequency generated in the device or 100 MHz, whichever is lower.	Tenth harmonic.
Above 1000	do	Tenth harmonic or highest detectable emission.

FCC/OET MP-5 (1986)

Section 2.2.2 Detector function selection and bandwidths.

For radio noise meters or spectrum analyzers which include weighting circuits, the detector function shall be linear. The detector function selector shall be set to average, unless otherwise specified for a given device. For RF lighting devices, the measuring instrument shall have the detector function set to the CISPR quasi-peak function. The 6 dB bandwidth of the measuring instrument shall not be less than:

- 200 Hz for measurements below 150 kHz
- 9 kHz for measurements from 150 kHz to 30 MHz
- 100 kHz for measurements from 30 MHz to 1000 MHz
- 1 MHz for measurements above 1000 MHz

Post detector video filters, if used, shall be wide enough not to affect the peak detector reading.

Alternatively, field strength meters and spectrum analyzers without weighting circuits may be employed, provided measurements are made on the peak basis and recorded as observed.

Section 2.2.6 Antenna-to-test unit distance

Measurements shall be made at the distance at which the limits are specified, to the extend possible. [...] The Commission as an alternative shall accept measurements at a closer fixed distance, provided 1/d is used as attenuation law factor (where d is the distance measured in appropriate units). [...]

7.2 Test Equipment

Type	Manufacturer/ Model No.	EMCC Ident. No.	Last Calibration	Next Calibration
EMI Receiver / Analyzer (30 MHz – 25 GHz)	Rohde & Schwarz ESIB 40	516	2007-12	2009-12
Antenna (30 MHz - 1 GHz)	EMCO Model 3143	898	2007-09	2009-09
Antenna (1 GHz – 18 GHz)	Schwarzbeck BBHA 9120 D	549	2007-08	2009-08
Standard Gain Horn Antenna (18 GHz – 25 GHz)	Mid Century MC 20/31B	1300	2006-08	2008-08

7.3 Test Procedures

An EUT which is normally operated on a table shall be placed on a nonconductive table having a height of 1 m above test site ground level. [...] Measurements made on a test table of 80 cm height as called for in some international measurement standards will be accepted for proof of compliance. Although the results will probably be only marginally different than with the 1 meter height, the risk for discrepancies lies with the manufacturer. FCC tests will be performed at a height of 1 meter.

The EUT was tested on a 80cm test table.

With the EUT operating in max. power mode with load as specified in FCC/OET MP-5, emissions from the unit are maximized by adjusting the polarization of the receive antenna and rotating the EUT.

Manipulating the system cables also maximizes EUT emissions [*Remark: Not applicable*]. Worst case emissions are listed under chapter 7.6 Test Results.

The following loads were used:

- Second and third harmonics measured with two loads: one of 300 ml of water and the other of 700 ml of water. Each load was tested both with the beaker located in the center of the oven and with it in the right front corner
- All other measurements: 700ml of water, with the beaker located in the center of the oven.

Radiated Emissions Test Characteristics	
Frequency range	30 MHz - 25 GHz
Test distance	10 m (30 MHz – 1000 MHz)* 3m (1 GHz – 25 GHz)*
Test instrumentation resolution bandwidth	120 kHz (30 MHz - 1000 MHz) 1 MHz (1 GHz - 25 GHz)
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/Horizontal

* According to FCC/OET MP-5 (1986) Section 2.2.6 Antenna-to-test unit distance:

[...] The Commission as an alternative shall accept measurements at a closer fixed distance, provided 1/d is used as attenuation law factor (where d is the distance measured in appropriate units). [...]

When performing measurements at a distance other than that specified, the results was extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements).

7.4 Calculation of Field Strength Limits

E.g. radiated spurious emissions field strength limits:

$$\mu\text{V/m at 300 meters} = 25 \times \text{SQRT}(\text{power}/500) = 25 \times \text{SQRT}(900/500) = 33.54$$

33.54 $\mu\text{V/m}$ corresponds with 30.51 dB $\mu\text{V/m}$.

7.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor. The basic equation with a sample calculation is as follows:

$$\text{FS} = \text{RA} + \text{AF} + \text{CF}$$

where

FS = Field Strength in dB $\mu\text{V/m}$

RA = Receiver Amplitude in dB μV

AF = Antenna Factor in dB(1/m)

CF = Cable Attenuation Factor in dB

Assume a receiver reading of 30 dB μV is obtained. The Antenna Factor of 20 dB(1/m) and a Cable Factor of 0.3 dB are added, giving a field strength of 50.3 dB $\mu\text{V/m}$. The 50.3 dB $\mu\text{V/m}$ value can be mathematically converted to its corresponding level in $\mu\text{V/m}$.

$$\text{FS} = 30 + 20 + 0.3 = 50.3 \text{ [dB}\mu\text{V/m]}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm}(50.3/20) = 327.3$$

For test distance other than what is specified, the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements). The basic equation with a sample calculation is as follows:

$$\text{FS} = \text{FST} + \text{DF}$$

where

FS = Field Strength in dB $\mu\text{V/m}$

FST = Field Strength at test distance in dB $\mu\text{V/m}$

DF = Distance Extrapolation Factor in dB,

where $\text{DF} = 20 \log(D_{\text{test}}/D_{\text{spec}})$ where D_{test} = Test Distance and D_{spec} = Specified Distance

Assume the tests performed at a reduced Test Distance of 10 m instead of the Specified Distance of 300 m giving a Distance Extrapolation Factor of $\text{DF} = 20 \log(10\text{m}/300\text{m}) = -29.5 \text{ dB}$.

Assuming a measured field strength level of 50.3 dB $\mu\text{V/m}$ is obtained. The Distance Factor of -29.5 dB is added, giving a field strength of 20.8 dB $\mu\text{V/m}$. The 20.8 dB $\mu\text{V/m}$ value can be mathematically converted to its corresponding level in $\mu\text{V/m}$.

$$\text{FS} = 30 + 20 + 0.3 - 29.5 = 20.8 \text{ [dB}\mu\text{V/m]}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm}(20.8/20) = 10.96$$

7.6 Test Results

PRODUCT SPURIOUS EMISSIONS DATA BELOW 1 GHz; Test Distance = 10m											
No	Emission Frequency*	Receiver Bandwidth and Mode	Receiver Reading RA [dB(μV)]	Load / Load Location	Antenna Factor AF **	Distance Extrapol. Factor DF	Result = Corrected Reading FS	Result	Spec Limit	Polarization	Margin
	[MHz]	[kHz]			[dB]	[dB]	[dB(μV/m)]	[μV/m]	[μV/m]		[dB]
1	96.12	120, AV	10.1	700ml/ center	7.1	-29.5	-12.34	0.24	30.51	v	45.88
2	121.12		21.7		7.1		-0.74	0.92		h	34.28
3	165.76		10		10.1		-9.44	0.34		h	42.98
4	190.24		8		10.7		-10.84	0.29		h	44.38
5	191.3		7		10.8		-11.74	0.26		v	45.28
6	208.4		9		11.7		-8.84	0.36		v	42.38

Remark: * Six max. emissions above noise floor reported.
 ** Cable attenuation already included in antenna factor.

PRODUCT SPURIOUS EMISSIONS DATA ABOVE 1 GHz; Test Distance = 3m												
No	Emission Frequency*	Receiver Bandwidth and Mode	Receiver Reading RA [dB(μV)]	Load/ Load Location*	Cable Attenuation	Antenna Factor AF	Distance Extrapol. Factor DF	Result = Corrected Reading FS	Result	Spec Limit	Polarization	Margin
	[MHz]	[kHz]	[dB(μV)]	[dB]	[dB]	[dB]	[dB]	[dB(μV/m)]	[μV/m]	[μV/m]		[dB]
1	4912	1000, AV	26.4	300ml/ center	2.7	31.3	-40.0	20.4	10.47	30.51	h	10.11
2	7376		23.4	700ml/ center	3.9	36.2		23.5	14.96		v	7.01
3	9841		19.8		3.9	38.3		22	12.59		h	8.51
4	12280		11.7		4.7	38.6		15	5.62		v	15.51
5	14740		4		4.8	41.4		10.2	3.24		v	20.31
6	17217		10.1		5.3	40.4		15.8	6.17		v	14.71
7	19630		5.3		6.3	36.1		7.7	2.43		h	22.81
8	22069		8.3		7	37.2		12.5	4.22		h	18.01

Remark: * Tests performed for loads and load positions as per FCC/OET-MP5.
 Results for max. reading at particular frequencies reported, only.

7.7 Result Summary

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

The EUT meets the requirements of this section.

Test Personnel: Wolfgang Döring

Test Date: 2008-05-20+21

8 CONDUCTED EMISSIONS

Test Requirement: FCC 47 CFR, Part 18

Test Procedure: FCC/OET MP-5 (1986)

8.1 Regulation

Section 18.307 Conduction limits.

For the following equipment, when intended to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables.

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50 μ H/50 ohms line impedance stabilization network (LISN). [...]

(b) All other part 18 consumer devices:

Frequency of Emission [MHz]	Conducted Limit [dBuV]	
	Quasi-peak (QP)	Average (AV)
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this section, additional testing to demonstrate compliance using a average detector is not required.

(e) this conduction limits shall apply only outside of the frequency bands specified in § 18.301.

[...]

(g)The tighter limit applies at the boundary between the frequency ranges.

8.2 Test Procedures

The EUT shall be placed 40 centimeters from an earth grounded conducting surface at least 2 meters square (e.g. the floor of the test chamber) and shall be kept at least 80 centimeters from any other earthed conducting surface. Floor standing equipment may of course be mounted on an earth grounded floor. If the measurement is made in a shielded enclosure, the walls of the enclosure may be substituted for the 2 meters square conducting surface.

If the EUT is supplied with a flexible power lead, the voltage shall be measured at the plug end of the power lead. The length of the power lead in excess 80 centimeters separating the EUT from the LISN shall be folded back and forth so as to form a bundle not exceeding 30 to 40 centimeters in length. [...] The EUT is connected to a dedicated LISN and all peripherals are connected to a second separate LISN circuit. The LISNs are bonded to the groundplane.

Conducted measurements are made on each current carrying conductor with respect to ground.

Test performed in a shielded enclosure. The EUT was placed a non-conductive support 40 centimeters from the floor of the test chamber.

Tests performed at the AC input of the EUT on lines N, L1 and L2. The EUT was powered by both nominal voltages L1-L2 of 208 V 60 Hz and L1-L2 of 240 V 60 Hz, respectively.

Tests performed with a load of 700ml of water with the beaker placed in the center of the oven. The initial step in collecting conducted data is a peak and average scan of the measurement range with an EMI test receiver. The significant peaks are then measured with quasi-peak detector. Worst case conducted emissions are reported.

8.3 Test Equipment

Type	Manufacturer/ Model No.	EMCC Ident. No.	Last Calibration	Next Calibration
EMI Receiver	Rohde & Schwarz ESS	304	2007-04	2008-10
Protector Limiter 10 dB	Rohde & Schwarz ESH3-Z2 357.8810.52	560	2007-08	2008-08
V-LISN 50 ohms//(50 uH + 5 ohms)	Rohde & Schwarz ESH2-Z5	1518	2006-08	2008-08
AC Power Source	CALIFORNIA INSTRUMENTS HGA with 3 pcs. 5001ih-400	34	-	-
Digital Multimeter	Voltcraft VC 840	2105	2007-03	2009-03

8.4 Test Results

8.4.1 Line Voltage (L1-L2) 208 V

EMCCons DR.RASEK Conducted Emissions

21. May 08 17:07

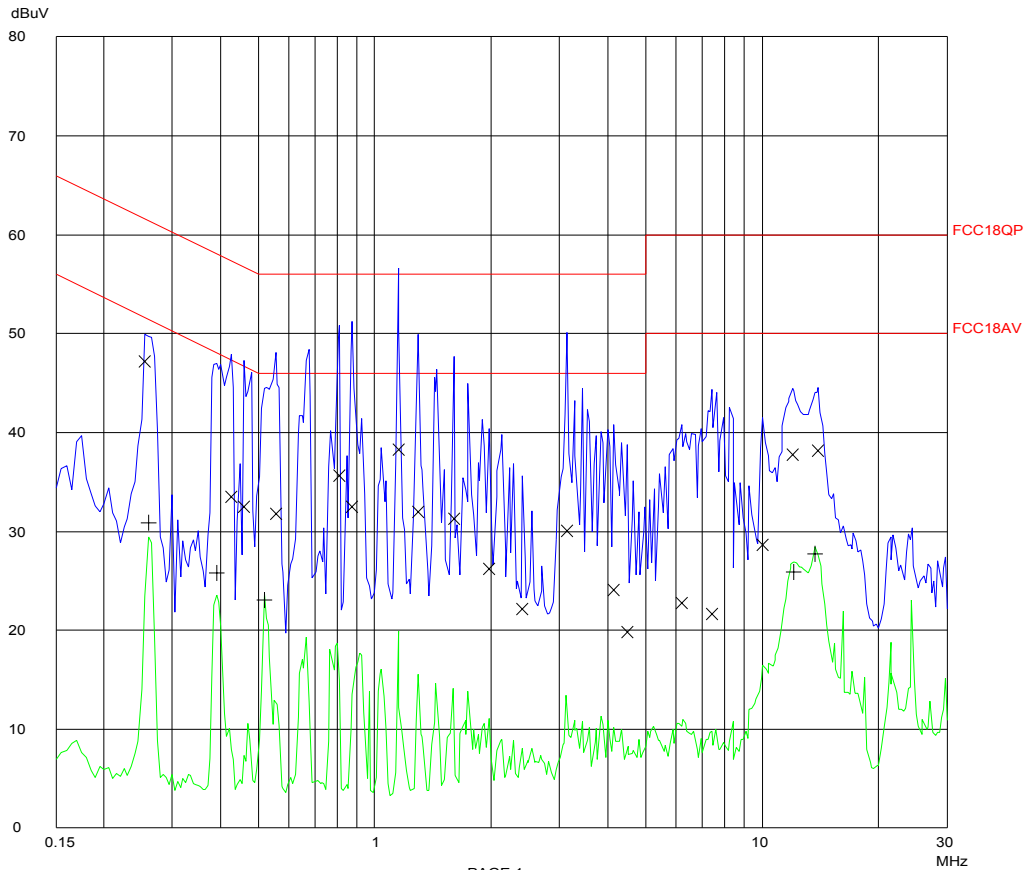
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

EMCCons DR.RASEK
 Conducted Emissions

21. May 08 17:07

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.25500	47.2	61.6
0.42500	33.5	57.4
0.46000	32.4	56.7
0.55500	31.7	56.0
0.81000	35.6	56.0
0.87500	32.4	56.0
1.15000	38.3	56.0
1.29500	32.0	56.0
1.60500	31.3	56.0
1.97500	26.2	56.0
2.40000	22.1	56.0
3.13000	30.0	56.0
4.13500	24.1	56.0
4.49500	19.8	56.0
6.19500	22.7	60.0
7.41500	21.6	60.0
10.05000	28.6	60.0
12.00500	37.8	60.0
13.91500	38.2	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.26000	30.8	51.4
0.39000	25.8	48.0
0.52000	23.1	46.0
12.05000	25.8	50.0
13.74000	27.7	50.0

* limit exceeded

TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

EMCCons DR.RASEK
Conducted Emissions

21. May 08 16:57

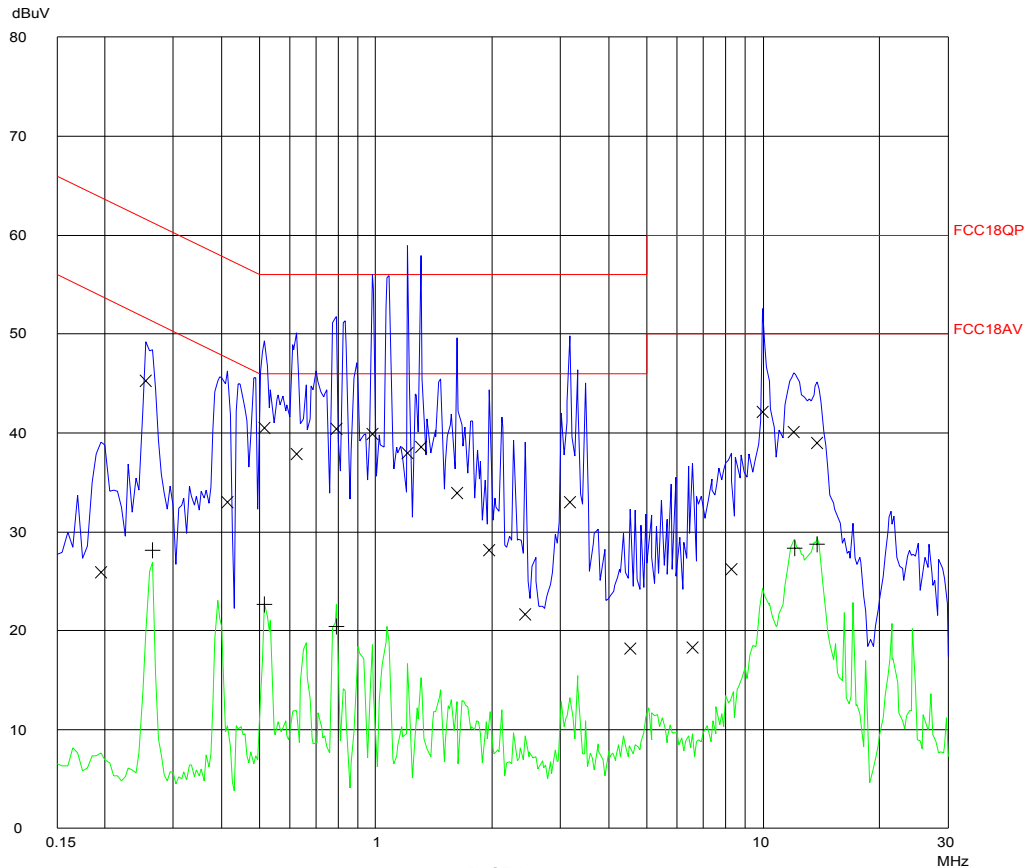
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L2

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO LN	OFF 60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

EMCCons DR.RASEK
 Conducted Emissions

21. May 08 16:57

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L2

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.19500	25.9	63.9
0.25500	45.2	61.6
0.41500	33.0	57.6
0.51500	40.5	56.0
0.62500	37.8	56.0
0.79000	40.3	56.0
0.98000	39.8	56.0
1.21000	37.9	56.0
1.31000	38.5	56.0
1.62000	33.8	56.0
1.96000	28.1	56.0
2.43500	21.6	56.0
3.16500	32.9	56.0
4.53000	18.2	56.0
6.56000	18.3	60.0
8.29500	26.2	60.0
9.95500	42.1	60.0
12.01000	40.1	60.0
13.77500	38.9	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.26500	28.1	51.3
0.51500	22.6	46.0
0.79000	20.4	46.0
12.03000	28.3	50.0
13.80500	28.7	50.0

* limit exceeded

EMCCons DR.RASEK
Conducted Emissions

21. May 08 17:18

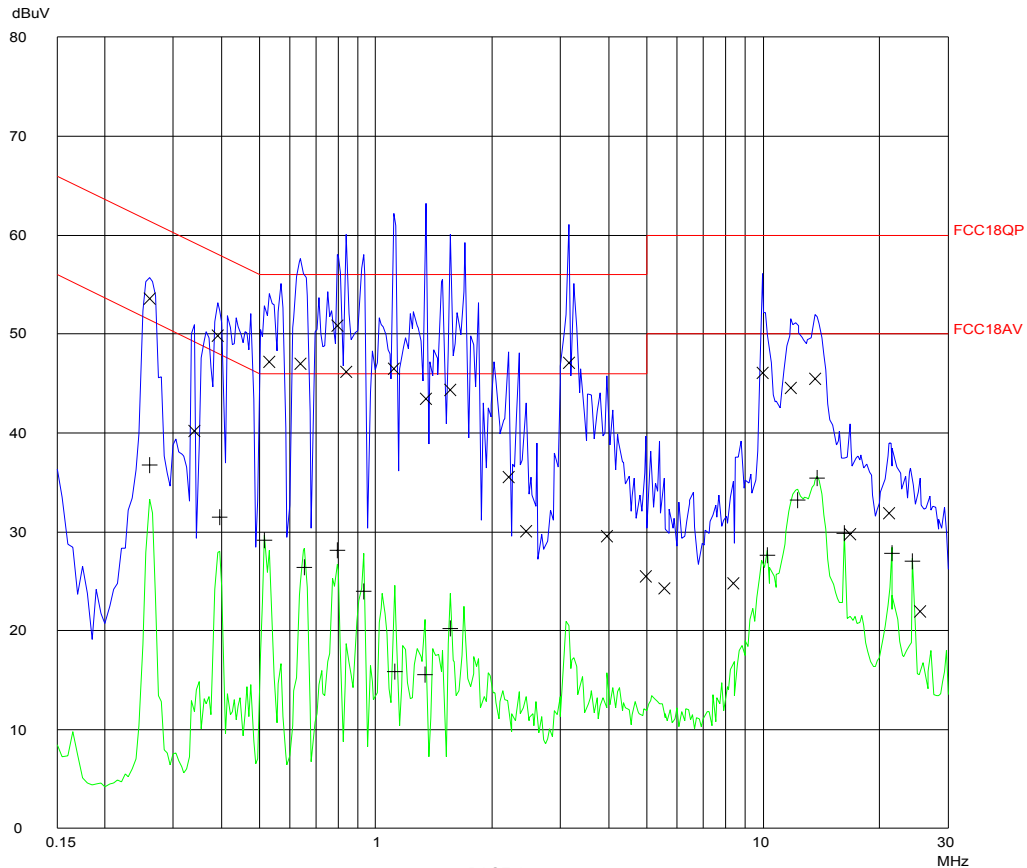
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: N

Scan Settings (1 Range)

Frequencies		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



TEST OF MIELE & CIE. KG HOUSEHOLD MICROWAVE / CONVECTION OVEN MODEL H4082 BM TO 47 CFR PART 18

EMCCons DR.RASEK
 Conducted Emissions

21. May 08 17:18

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 208V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: N

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN OFF	60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.26000	53.5	61.4
0.34000	40.1	59.2
0.39000	49.8	58.0
0.53000	47.2	56.0
0.64000	46.9	56.0
0.79500	50.8	56.0
0.84000	46.2	56.0
1.11500	46.5	56.0
1.34500	43.4	56.0
1.55500	44.3	56.0
2.20000	35.5	56.0
2.44500	30.0	56.0
3.14500	47.1	56.0
3.95500	29.5	56.0
4.96500	25.5	56.0
5.54500	24.3	60.0
8.38000	24.7	60.0
9.97000	46.0	60.0
11.82000	44.6	60.0
13.63500	45.5	60.0
16.74500	29.7	60.0
21.09500	31.8	60.0
25.45000	21.9	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.26000	36.7	51.4
0.39500	31.4	47.9
0.51500	29.1	46.0
0.65500	26.4	46.0
0.79500	28.1	46.0
0.93000	23.9	46.0
1.12000	15.8	46.0
1.34000	15.5	46.0
1.55500	20.2	46.0
10.24000	27.6	50.0
12.27500	33.1	50.0
13.81500	35.3	50.0
16.19500	29.8	50.0
21.50500	27.8	50.0
24.29000	27.0	50.0

* limit exceeded

8.4.2 Line Voltage (L1-L2) 240 V

EMCCons DR.RASEK Conducted Emissions

21. May 08 16:31

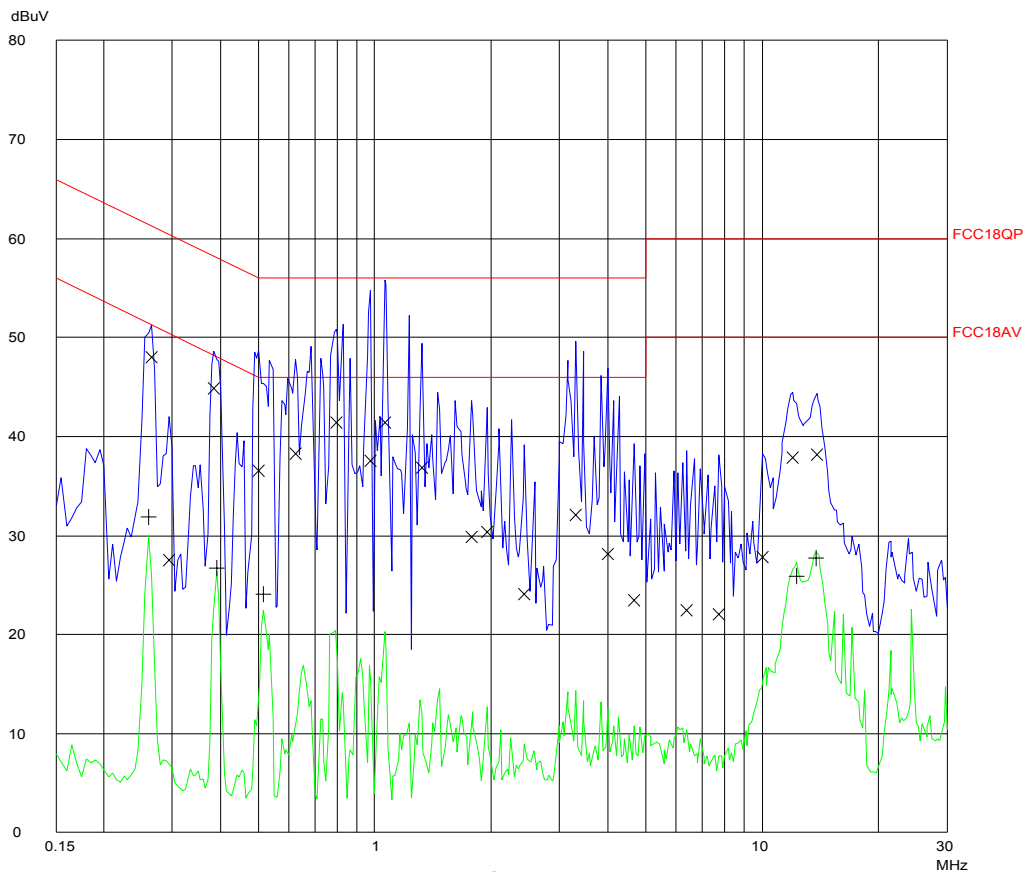
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating: 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L1

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN OFF 60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



EMCCons DR.RASEK
 Conducted Emissions

21. May 08 16:31

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L1

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dB	QP Limit dB
0.26500	47.9	61.3
0.29500	27.5	60.3
0.38500	44.8	58.1
0.50000	36.5	56.0
0.62500	38.2	56.0
0.79500	41.3	56.0
0.97500	37.6	56.0
1.06500	41.3	56.0
1.32500	36.8	56.0
1.78000	29.8	56.0
1.95000	30.3	56.0
2.43000	24.0	56.0
3.30500	32.0	56.0
3.99500	28.1	56.0
4.68000	23.5	56.0
6.39500	22.4	60.0
7.71500	22.0	60.0
10.03500	27.8	60.0
12.01000	37.8	60.0
13.83000	38.1	60.0

Frequency MHz	AV Level dB	AV Limit dB
0.26000	31.9	51.4
0.39000	26.7	48.0
0.51500	24.0	46.0
12.27000	25.9	50.0
13.79000	27.6	50.0

* limit exceeded

EMCCons DR.RASEK
Conducted Emissions

21. May 08 16:43

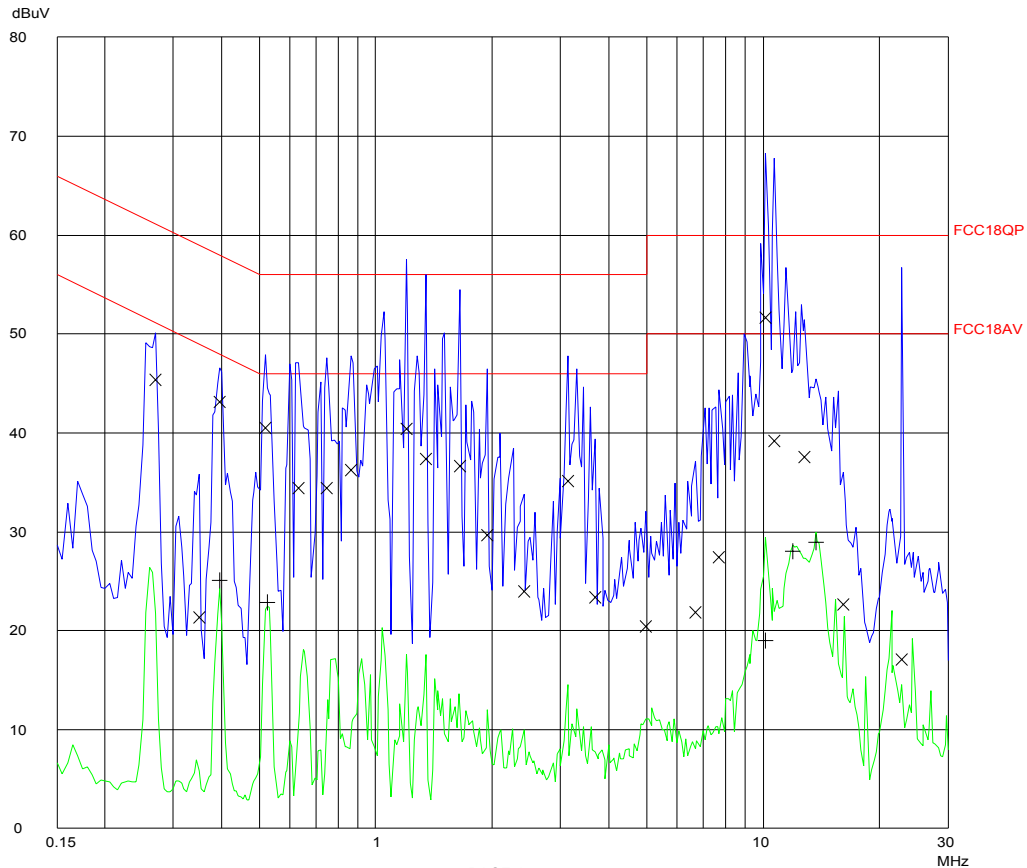
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L2

Scan Settings (1 Range)

Frequencies		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



EMCCons DR.RASEK
 Conducted Emissions

21. May 08 16:43

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: L2

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.27000	45.3	61.1
0.35000	21.3	59.0
0.39500	43.1	57.9
0.52000	40.4	56.0
0.63000	34.3	56.0
0.74500	34.4	56.0
0.86500	36.2	56.0
1.20000	40.4	56.0
1.34500	37.3	56.0
1.64500	36.6	56.0
1.94000	29.6	56.0
2.41500	23.9	56.0
3.14000	35.0	56.0
3.68500	23.4	56.0
4.98000	20.4	56.0
6.70000	21.8	60.0
7.70000	27.4	60.0
10.17000	51.6	60.0
10.70500	39.1	60.0
12.80500	37.5	60.0
16.09000	22.6	60.0
22.83000	17.1	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.39500	25.0	47.9
0.52500	22.8	46.0
10.17000	18.9	50.0
11.95500	28.0	50.0
13.71500	28.9	50.0

* limit exceeded

EMCC DR.RASEK
Conducted Emissions

21. May 08 16:13

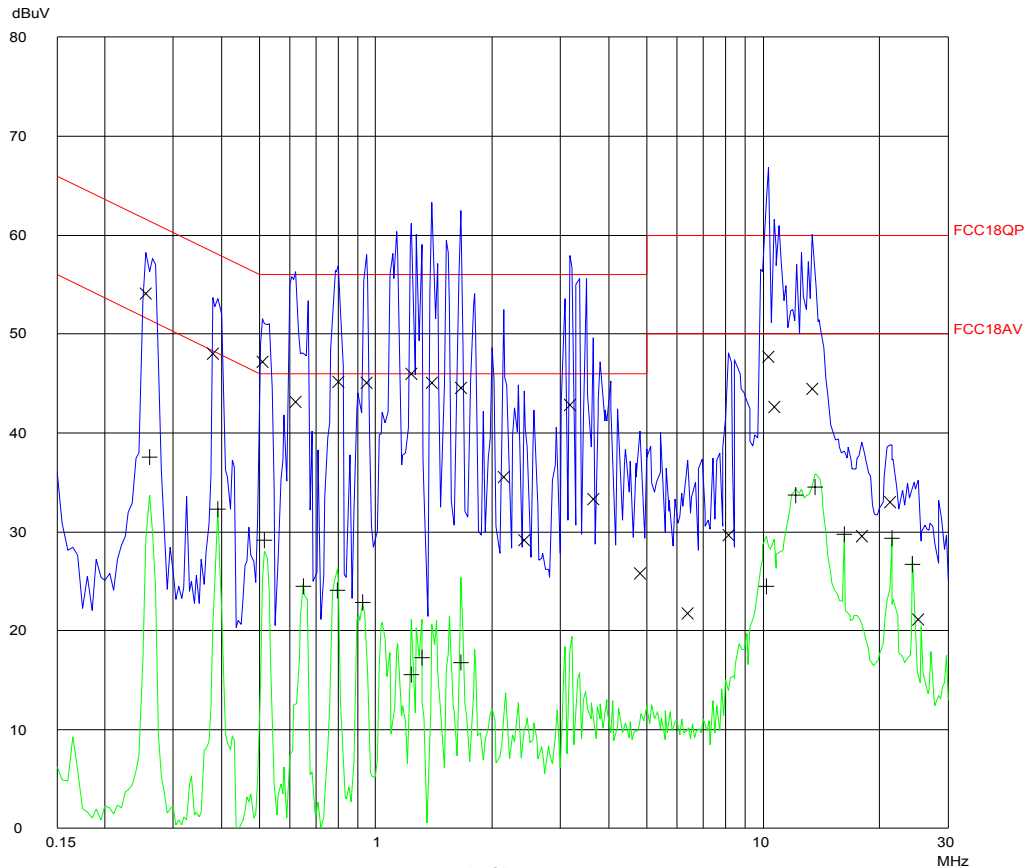
EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: N

Scan Settings (1 Range)

Frequencies		Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN ON	60dB

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 25dB

Transducer No.	Start	Stop	Name
1	10k	30M	Limiter



EMCC DR.RASEK
 Conducted Emissions

21. May 08 16:13

EUT: H4082BM
 Manuf: MIELE
 Op Cond: Operating; 240V
 Operator: Doering
 Test Spec: FCC Part 18
 Comment: N

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	10ms	AUTO	LN ON	60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.25500	54.0	61.6
0.38000	47.9	58.3
0.51000	47.2	56.0
0.62000	43.1	56.0
0.80000	45.1	56.0
0.94500	45.1	56.0
1.23500	45.9	56.0
1.39500	45.0	56.0
1.66000	44.5	56.0
2.13500	35.5	56.0
2.42000	29.1	56.0
3.17000	42.8	56.0
3.64500	33.3	56.0
4.80500	25.8	56.0
6.39500	21.7	60.0
8.13500	29.6	60.0
10.34000	47.6	60.0
10.65500	42.6	60.0
13.38000	44.4	60.0
17.98000	29.6	60.0
21.23000	33.0	60.0
25.19500	21.1	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.26000	37.5	51.4
0.39000	32.3	48.0
0.51500	29.1	46.0
0.65000	24.4	46.0
0.79500	24.0	46.0
0.92500	22.8	46.0
1.23500	15.5	46.0
1.31500	17.2	46.0
1.66000	16.7	46.0
10.20000	24.4	50.0
12.10500	33.6	50.0
13.61000	34.5	50.0
16.19500	29.7	50.0
21.50500	29.3	50.0
24.29000	26.6	50.0

* limit exceeded

8.5 Result Summary

Manufacturer: MIELE & CIE. KG
Model: H4082 BM
Serial Number: 00/999999999979

The EUT meets the requirements of this section.

Test Personnel: Wolfgang Döring

Test Date: 2008-05-21

9 MISCELLANEOUS COMMENTS AND NOTES

None.

10 LIST OF ANNEXES

The following annexes are separated parts to this test report.

Annex	Description	File name	Pages
Annex 0	Label and Label Placement Diagrams	990159G_Annex0.pdf	2
Annex 1	Photographs of test setups	990159G_Annex1.pdf	4
Annex 2	Photographs of equipment under test (EUT) external views	990159G_Annex2.pdf	5
Annex 3	Photographs of equipment under test (EUT) internal views	990159G_Annex3.pdf	5