



EMI -- TEST REPORT

Test Report No. :	T25828-00-02XF	June 17, 2005 Date of issue
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Type / Model Name : Footswitch / Wireless XRay FSW
 Versions: Mono, P/N: 47 87 797
 Biplane, P/N: 47 87 805
 Mono-MP, P/N: 47 87 813

Product Description : Family of footswitches for remote-control of medical xray-systems

Applicant : Siemens AG, Medical Solutions

Address : Allee am Röthelheimpark 2
 91052 Erlangen

Manufacturer : Siemens AG, Medical Solutions

Address : Allee am Röthelheimpark 2
 91052 Erlangen

Licence holder : Siemens AG, Medical Solutions

Address : Allee am Röthelheimpark 2
 91052 Erlangen

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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The test report merely corresponds to the test sample.
 It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart C - Intentional Radiators (October 01, 2003)

Part 15, Subpart C, Section 15.35(c)	Correction for Pulse Operation (Duty Cycle)
Part 15, Subpart C, Section 15.207(a)	AC Line conducted emissions
Part 15, Subpart C, Section 15.209(a)	Radiated emissions, general requirements
Part 15, Subpart C, Section 15.247(c)	Radiated emissions, outside the used frequency band
Part 15, Subpart C, Section 15.247(1)(iii)	Bandwidth requirement
Part 15, Subpart C, Section 15.247(b)(1)	Maximum Peak output Power of intentional radiator

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (October 01, 2003)

Part 15, Subpart B, Section 15.107(a)	AC Line conducted emissions
Part 15, Subpart B, Section 15.109(a)	Radiated emissions, general requirements

2 SUMMARY

GENERAL REMARKS:

None

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records of MBPS

Testing commenced on : 25. April 2005

Testing concluded on : 26. April 2005

Checked by:

Tested by:

Harald Buchwald
Dipl. Ing.(FH)

Xaver Fischer

3.2 Power supply system utilised

Power supply voltage Mobile Unit : Internal: 4,8 V / DC External: 115 V / 60 Hz / 1φ
 Fixed Unit : 24 V / DC

3.3 Short description of the Equipment under Test (EuT)

The wireless footswitches which works with standard RF technology (Bluetooth) in the ISM-band (2400-2483.5 MHz) are for release of xray and control of some additional functions on a xray system.
 The operating manuals for AXIOM Artis remain valid. This addendum describes all the additional operating possibilities and special features.

Number of tested samples: 1
 Serial number: Prototype

EuT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Standby-mode _____
- TX- and RX-mode _____
- _____

EuT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

MIKES BABT Product Service GmbH
Ohmstrasse 2-4
94342 Strasskirchen
Germany

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the MIKES BABT Product Service GmbH quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Measurement Protocol for FCC, VCCI and AUSTEL

4.4.1 GENERAL INFORMATION

4.4.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1997), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1997). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-2003 procedures and using the CISPR 22 Limits.

4.4.1.2 Measurement Error

The data and results referenced in this document are true and accurate. The reader is cautioned that there is some measurement variability due to the tolerances of the test equipment that can contribute to a nominal product measurement uncertainty. The measurement uncertainty was calculated for all measurements listed in this test report according to NIS 81/5.1994 "The treatment of uncertainty in EMC measurements" and is documented in the MIKES BABT Product Service GmbH quality system according to DIN EN ISO/IEC 17025. Furthermore, component differences and manufacturing process variability of production units similar to that tested may result in additional product uncertainty. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests. The manufacturer has the sole responsibility of continued compliance of the device.

4.4.1.3 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum disturbances from the unit.

4.4.2 DETAILS OF TEST PROCEDURES

4.4.2.1 General Standard Information

The test methods used comply with CISPR Publication 22 (1997), EN 55022 (2001) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-2003 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

4.4.2.2 Conducted disturbance

Conducted disturbance on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi peak detection, and a Line Impedance Stabilization Network (LISN), with 50Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi peak and average detection and recorded on the data sheets.

4.4.2.3 Radiated disturbance

Radiated disturbance from the EUT are measured in the frequency range of 30 to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and average detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

4.5 Discovery of worst case measurement conditions

All tests were performed at model "Biplane, P/N: 47 87 805" because it exist no technical differences between the other two variants "Mono, P/N 47 87 797" and "Mono-MP, P/N: 47 87 813".

The only differences of the variants are following:

The footswitch model "Mono" has four pedals for release of xray and control of some functions on a xray system.

The model variant "Mono-MP" is same as the model "Mono", but with additional switchable roll-over bar for detecting collision with xray system.

The model "Biplane" has only more pedals (8 pedals instead of 4 pedals) for controlling a system with two independent xray-tubes.

Therefore all the necessary tests have been carried out at the "worst case" model, the variant "Biplane".



5 TEST CONDITIONS AND RESULTS

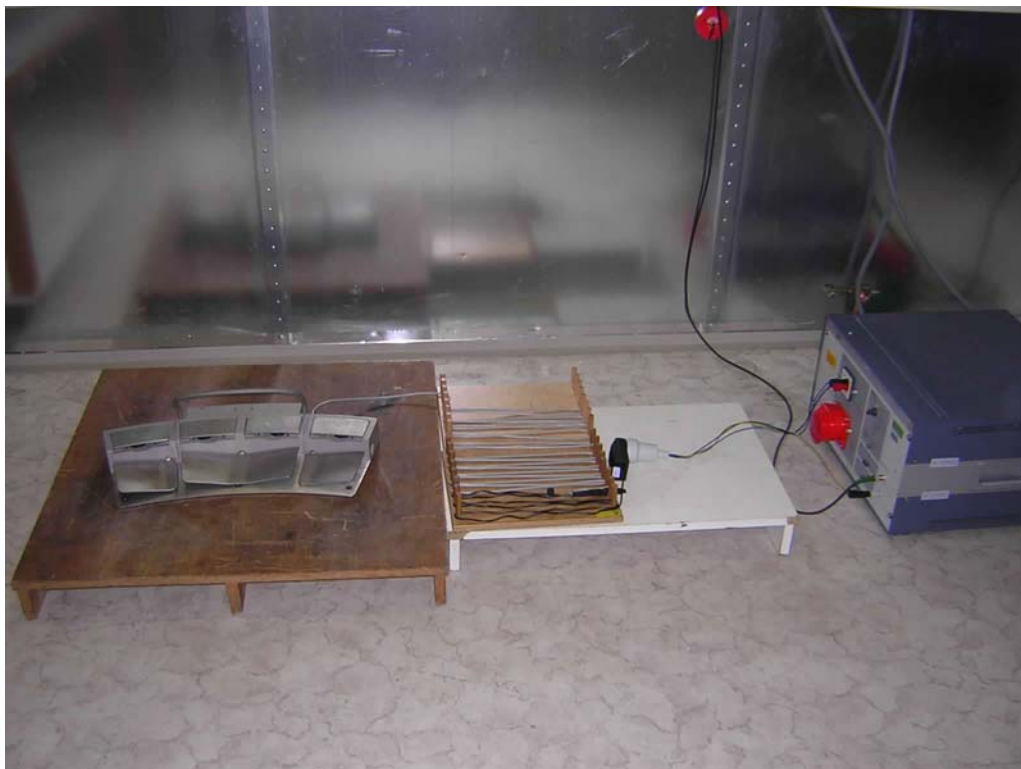
5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Description of Measurement

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit, which is equivalent to the Australian AS 3548 limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EuT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeter's above the floor and is positioned 40 centimeter's from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

FCC ID: S5H-WFSW

5.1.4 Test result

Frequency range: 0.15 MHz - 30 MHz
Min. limit margin 14.8 dB at 2.895 MHz

The requirements are **FULFILLED**.

Remarks:

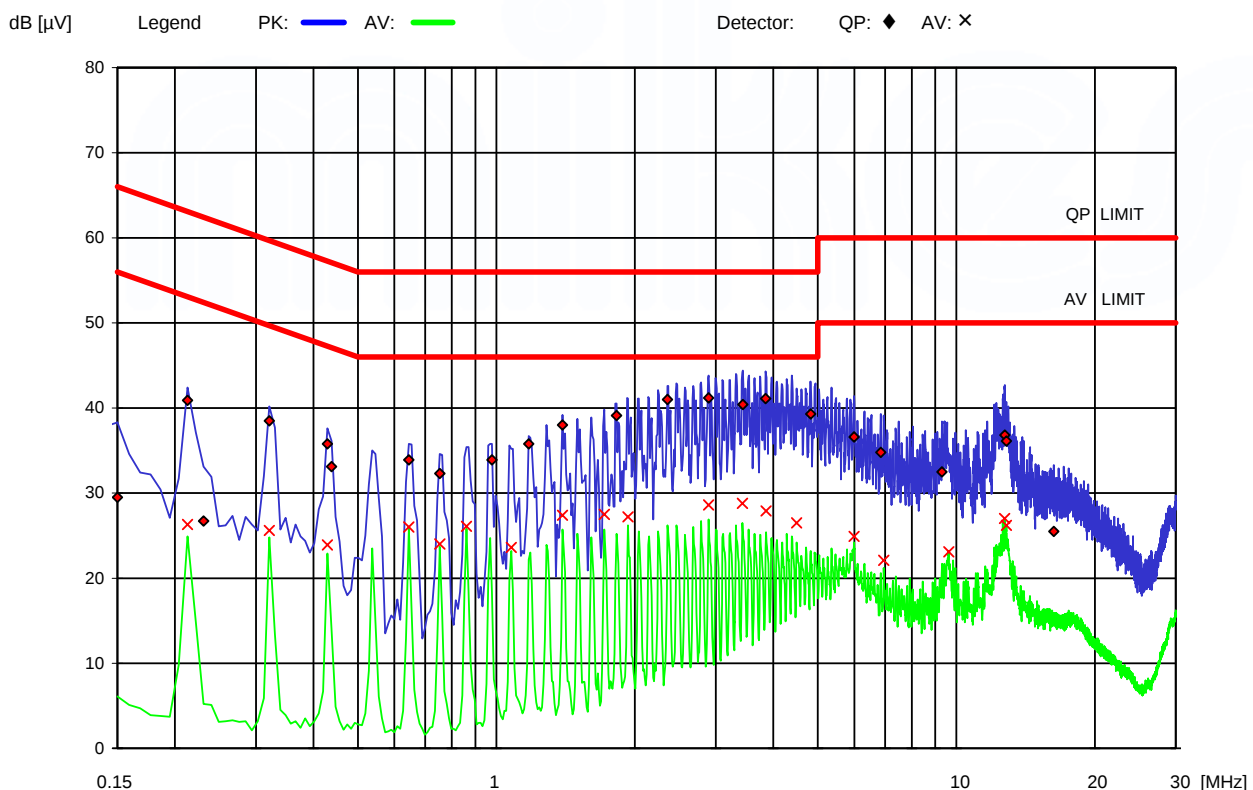


5.1.5 Test protocol

Test point: L1
 Operation mode: Charging and transmit mode
 Remarks:
 Date:
 Tested by: Xavier Fischer

Result: Passed

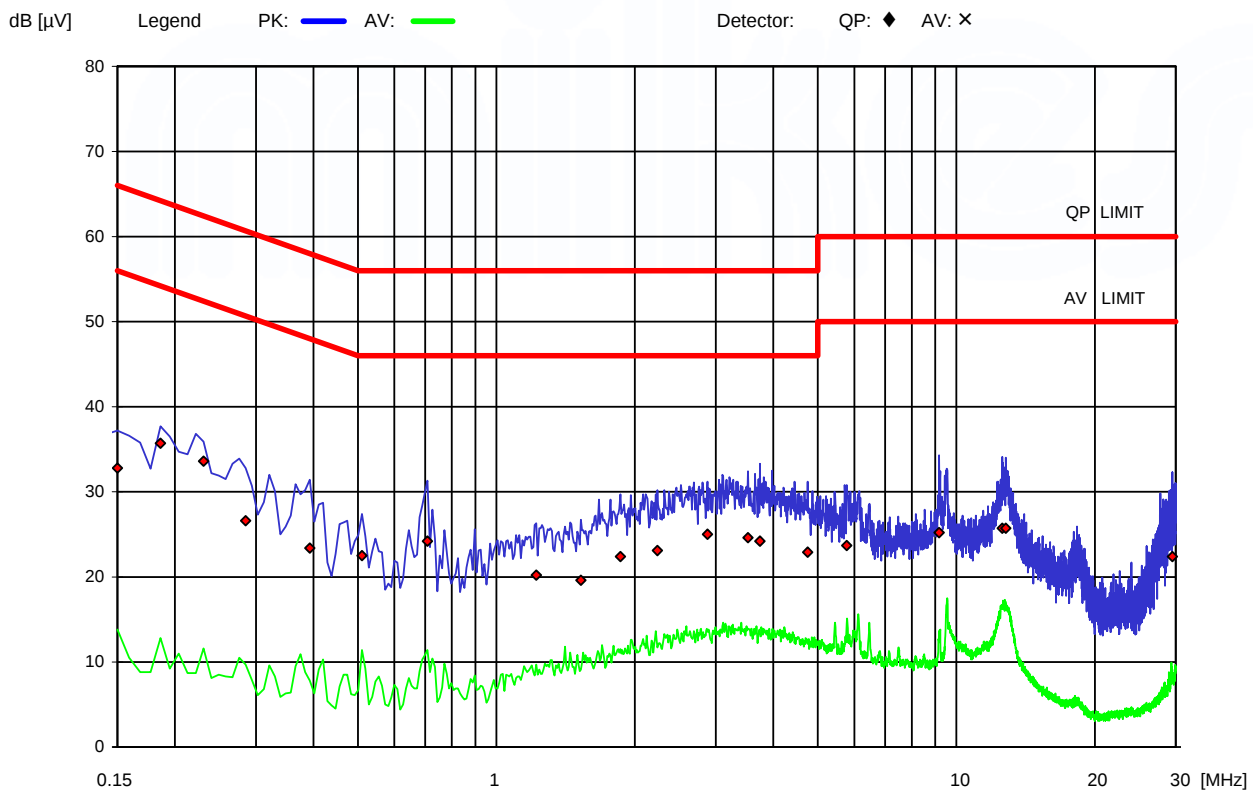
Freq kHz	QP- L dB[μV]	D -Limit QP [dB]	Freq kHz	AV-L dB[μV]	D -Limit AV [dB]
150	29,5	36,5	213	26,3	26,8
213	40,9	22,2	321	25,6	24,1
231	26,7	35,7	429	23,9	23,4
321	38,5	21,2	645	26	20,0
429	35,8	21,5	753	24	22,0
438	33,1	24,0	861	26,1	19,9
645	33,9	22,1	1077	23,6	22,4
753	32,3	23,7	1392	27,4	18,6
978	33,9	22,1	1716	27,5	18,5
1176	35,8	20,2	1932	27,2	18,8
1392	38	18,0	2895	28,6	17,4
1824	39,1	16,9	3426	28,8	17,2
2355	41	15,0	3858	27,9	18,1
2895	41,2	14,8	4497	26,5	19,5
3435	40,4	15,6	5991	24,9	25,1

[illegible]

Test point: N
Operation mode: Charging and transmit mode
Remarks:
Date:
Tested by: Xavier Fischer

Result: Passed

Freq kHz	QP- L dB[μV]	D -Limit QP [dB]	Freq kHz	AV-L dB[μV]	D -Limit AV [dB]
150	32,8	33,2	no Result		
186	35,7	28,5			
231	33,6	28,8			
285	26,6	34,1			
393	23,4	34,6			
510	22,5	33,5			
708	24,2	31,8			
1221	20,2	35,8			
1527	19,6	36,4			
1860	22,4	33,6			
2238	23,1	32,9			
2877	25	31,0			
3525	24,6	31,4			
3741	24,2	31,8			
4749	22,9	33,1			

[illegible]

5.2 Maximum Peak Output Power

For test instruments and accessories used see section 6 Part CPC 3.

5.2.1 Description of the test location

Test location: AREA4

5.2.2 Photo documentation of the test set-up



5.2.3 Test result

Channel No.	Frequency [MHz]	Peak Power Output (dBm)	Peak Power Limit (dBm)	Delta [dB]
1	2402	-1.7	30	31.7
40	2441	-2.0	30	32.0
79	2480	-2.0	30	32.0

Peak Power Limit according to FCC Subpart 15.247(b)(1)

Frequency (MHz)	Peak Power Limit	
	(dBm)	(Watt)
902-928	30	1,0
2400-2483.5	30	1,0
5725-5850	30	1,0

FCC ID: S5H-WFSW

The requirements are **FULFILLED**.

Remarks:



5.3 Band edge test

For test instruments and accessories used see section 6 Part MB.

5.3.1 Description of the test location

Test location: Area 4

5.3.2 Photo documentation of the test set-up



5.3.3 Test result

Frequency [MHz]	Peak Power Output [dBm]	Spurious emission read value [dBm]	Result of Band edge [dBc]	Band edge LIMIT [dBc]
< 2400	-13,53	< -60	> 46,47	> 20
> 2483,5	-13,55	< -58	> 44,45	> 20

Peak-Limit according to FCC Subpart 15.247(c)

In any 100 kHz bandwidth outside the frequency band 2400 – 2483.50 MHz, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limit specified in §15.209(a) (see §15.205(c)).

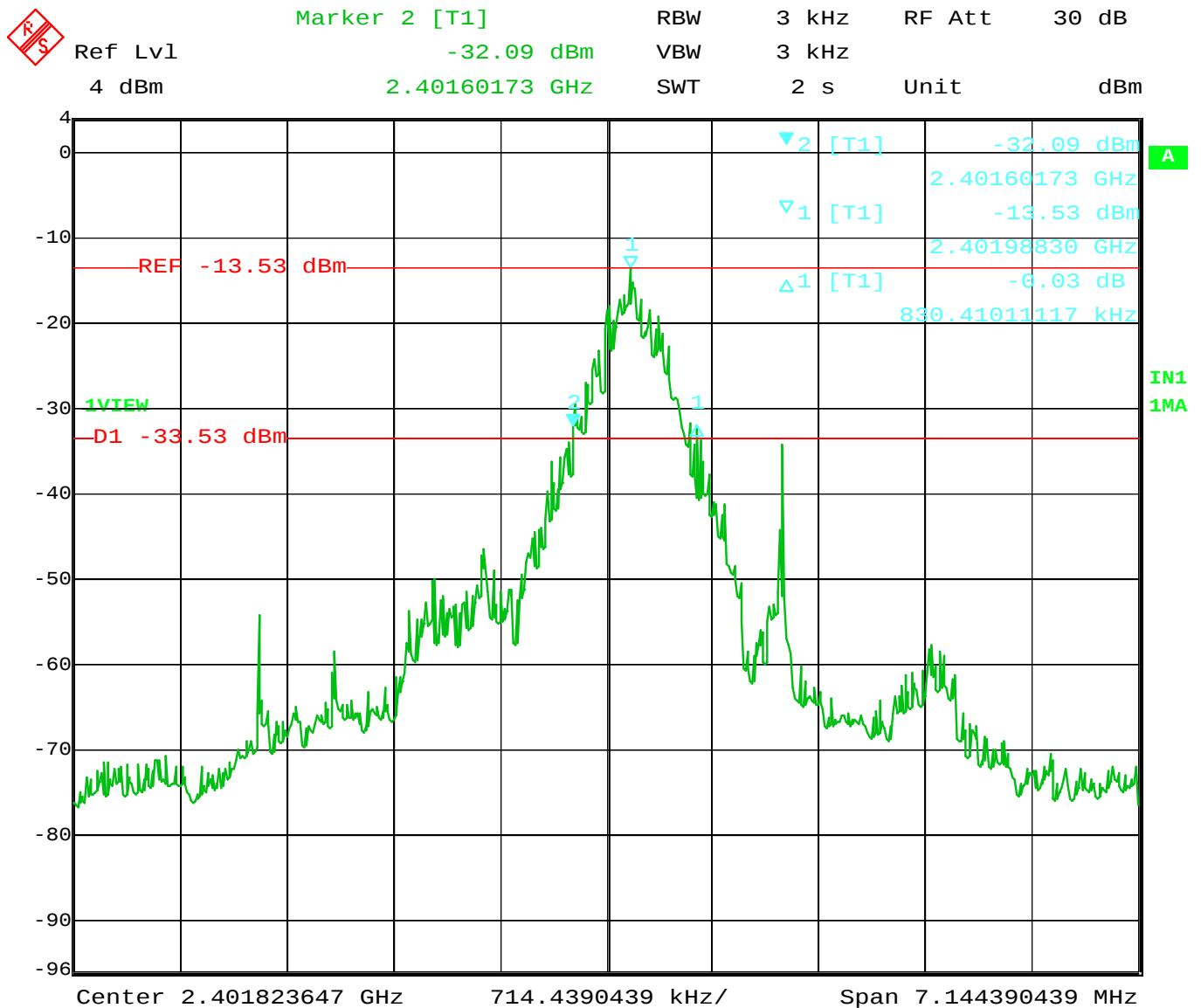
FCC ID: S5H-WFSW

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.



5.3.4 Test protocol

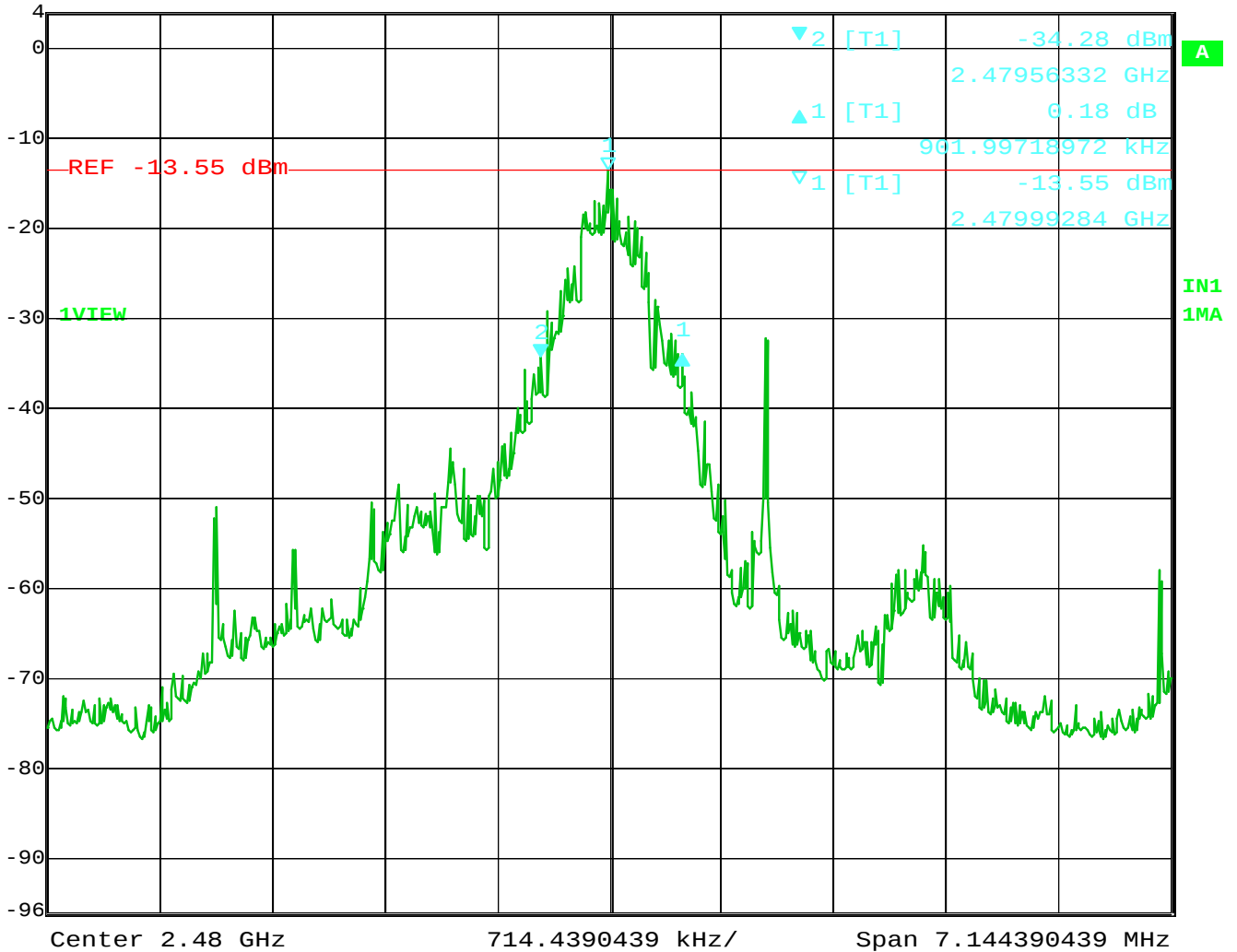


Date: 25.APR.2005 13:49:34

FCC ID: S5H-WFSW



Ref Lvl 4 dBm
Delta 1 [T1] 0.18 dB
901.99718972 kHz
RBW 3 kHz
VBW 3 kHz
SWT 2 s
RF Att 30 dB
Unit dBm



Date: 25.APR.2005 13:58:10

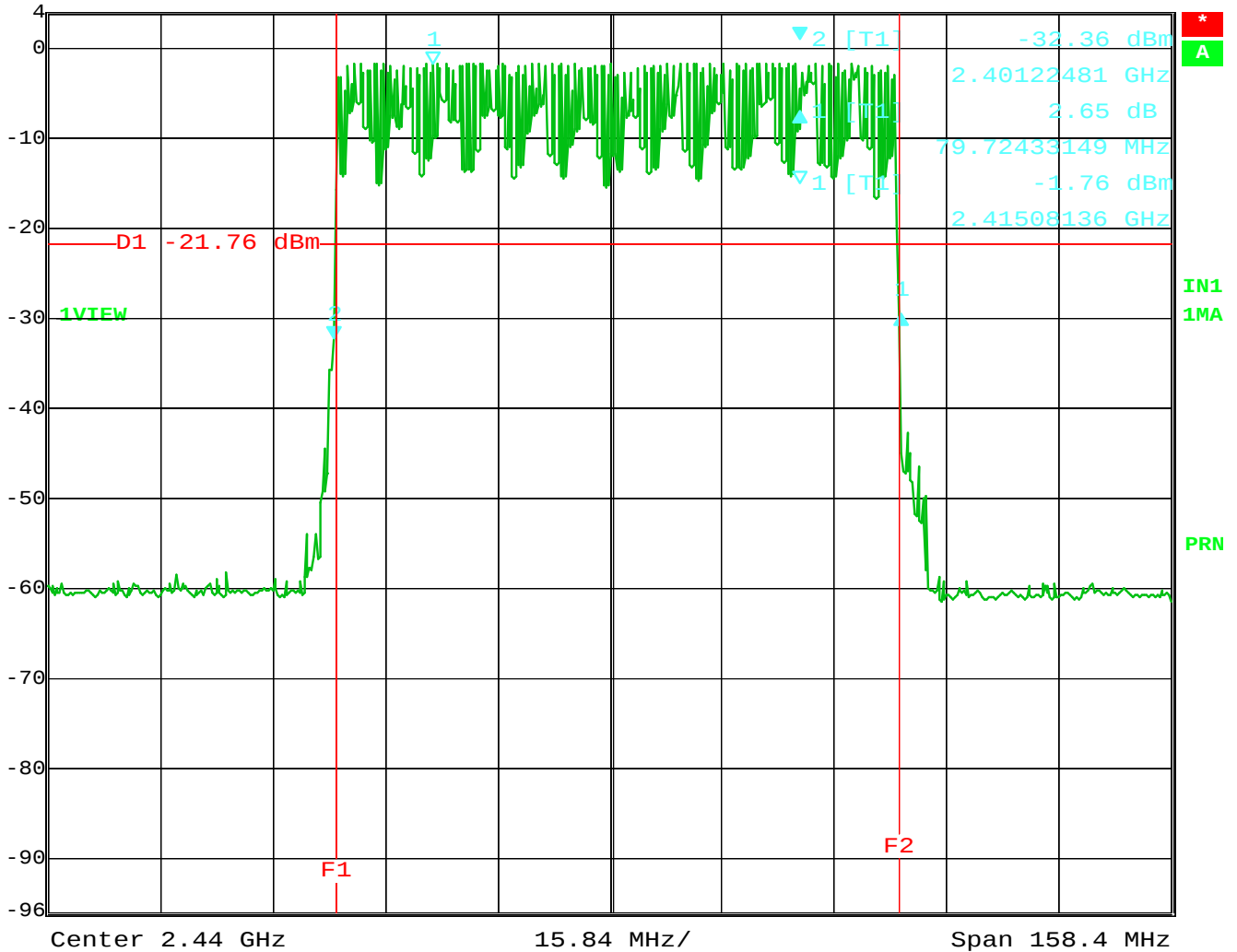
FCC ID: S5H-WFSW



Ref Lvl
4 dBm

Delta 1 [T1]
2.65 dB
79.72433149 MHz

RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 40 ms Unit dBm



Date: 25.APR.2005 14:16:47

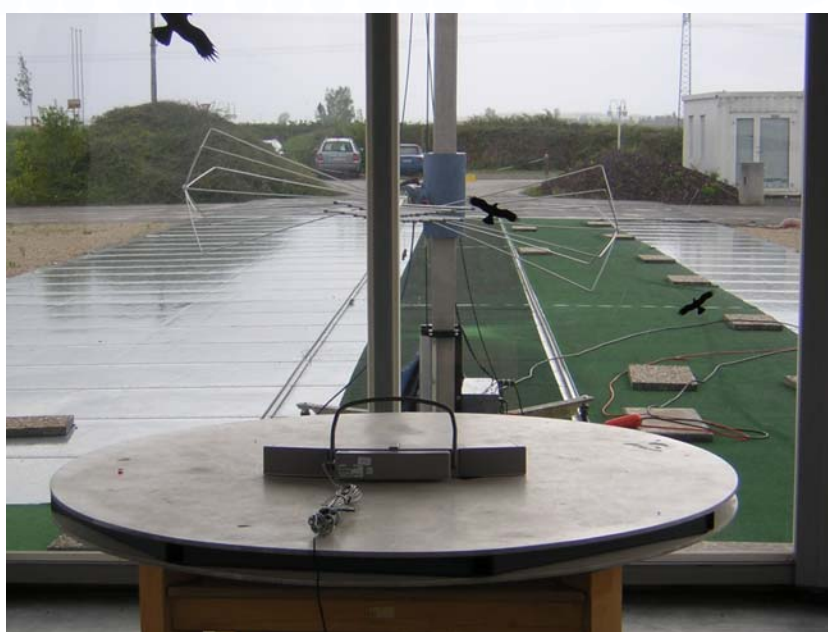
5.4 Radiated emissions (electric field) 30 MHz – 40 GHz

For test instruments and accessories used see section 6 Part SER 2, SER 3.

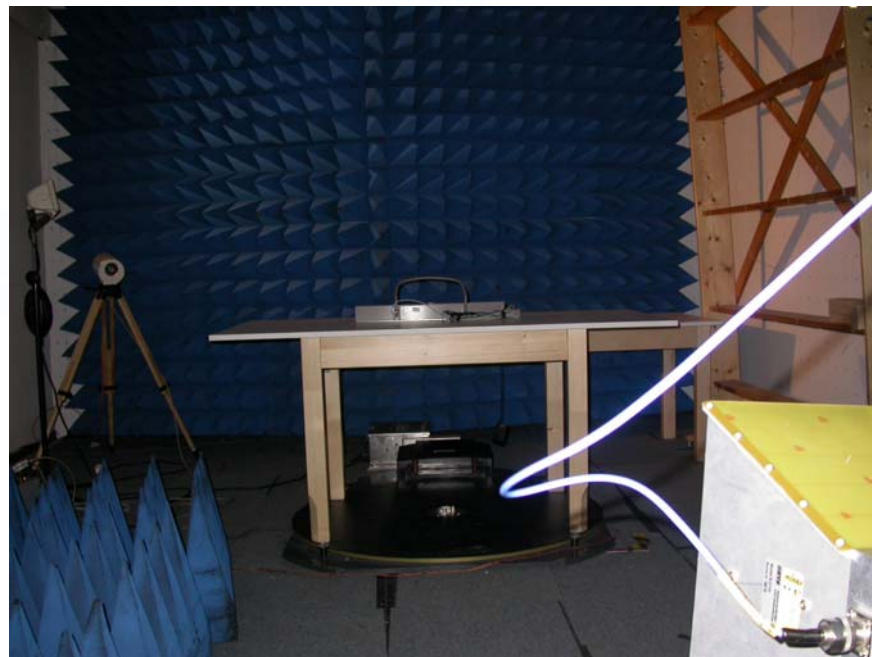
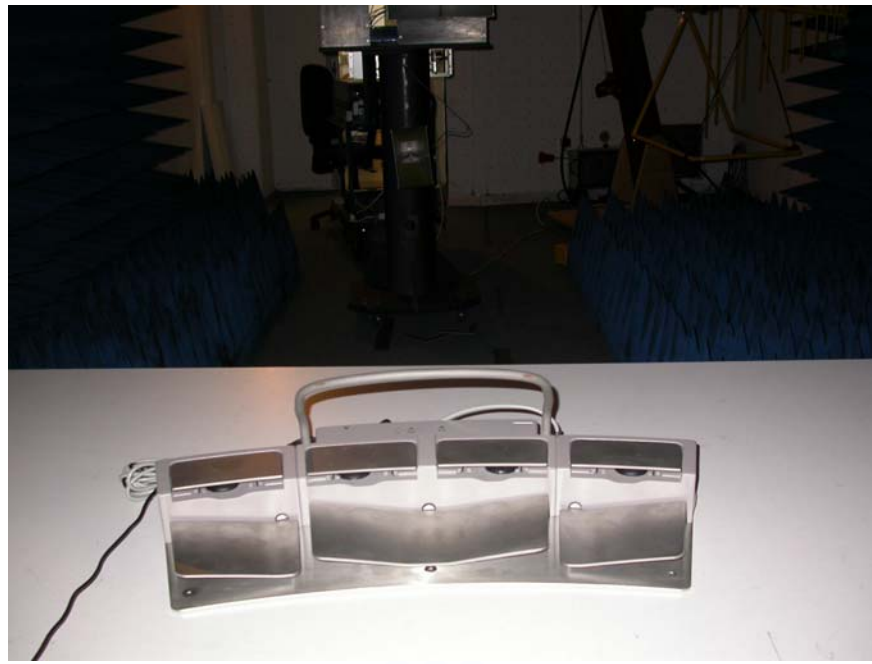
5.4.1 Description of the test location

Test location: OATS1
Test location: Anechoic Chamber A2
Test distance: 3 metres

5.4.2 Photo documentation of the test set-up



FCC ID: S5H-WFSW



5.4.3 Test result

Testresult in detail:(<1GHz)

Transmission on Channel No.1, 40 and 79

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
25-1000	<30		120					

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Testresult in detail:(>1GHz)

Transmission on Channel No.1: 2402 MHz

Field strength of fundamental wave as reference for radiated emissions: 96.6 dBμV/m

Frequency [MHz]	L: PK [dBμV]	Corr. Duty Cycle [dB]	L: AV [dBμV]	Band-width [kHz]	Correct. [dB]	L: PK [dBμV/m]	L: AV [dBμV/m]	Limit PK [dBμV/m]	Delta [dB]
1260.52	58.7			1000	-14.6	44.1		76.6	-32.5
1891.78	55.3			1000	-12.4	42.9		76.6	-33.7
4807.61	64.1			1000	-3.8	60.3		74.0	-13.7

Transmission on Channel No.40: 2441 MHz

Field strength of fundamental wave as reference for radiated emissions: 97.9 dBμV/m

Frequency [MHz]	L: PK [dBμV]	Corr. Duty Cycle [dB]	L: AV [dBμV]	Band-width [kHz]	Correct. [dB]	L: PK [dBμV/m]	L: AV [dBμV/m]	Limit PK [dBμV/m]	Delta [dB]
1260.52	59.5			1000	-14.6	44.9		77.9	-33.0
1891.78	57.1			1000	-12.4	44.7		77.9	-33.2
4887.77	66.3			1000	-3.1	63.2		74.0	-10.8

Transmission on Channel No.79: 2480 MHz

Field strength of fundamental wave as reference for radiated emissions: 96.6 dBμV/m

Frequency [MHz]	L: PK [dBμV]	Corr. Duty Cycle [dB]	L: AV [dBμV]	Band-width [kHz]	Correct. [dB]	L: PK [dBμV/m]	L: AV [dBμV/m]	Limit PK [dBμV/m]	Delta [dB]
1260.52	58.1			1000	-14.6	43.5		76.6	-33.0
1891.78	55.1			1000	-12.4	42.6		76.6	-33.9
4967.93	63.7			1000	-2.8	60.9		74.0	-13.1

Peak-Limit according to FCC Subpart 15.247(c)

In any 100 kHz bandwidth outside the frequency band 2400 – 2483.50 MHz, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limit specified in §15.209(a) (see §15.205(c)).

Limit according to FCC Subpart 15.209

Frequency [MHz]	PK- Limits acc. 15.209 [dBµV/m]	PK-Limits acc. 15.247(c) [dBµV/m]			Final Radiated Limits [dBµV/m]		
		Ch 1	Ch 40	Ch 79	Ch 1	Ch 40	Ch 79
30-88	60.0	76.6	77.9	76.6	60.0	60.0	60.0
88-216	63.5	76.6	77.9	76.6	63.5	63.5	63.5
216-960	66.0	76.6	77.9	76.6	66.0	66.0	66.0
Above 960	74.0	76.6	77.9	76.6	74.0	74.0	74.0

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209

MHz	MHz	GHz
25.5 – 25.67	960 – 1240	4.5 – 5.15
37.5 – 38.25	1300 – 1427	5.35 – 5.46
73 – 74.6	1435 – 1626.5	7.25 – 7.75
74.8 – 75.2	1645.5 – 1646.5	8.025 – 8.5
108 – 121.94	1660 – 1710	9.0 – 9.2
123 – 138	1718.8 – 1722.2	9.3 – 9.5
149.9 – 150.05	2200 – 2300	10.6 – 12.7
156.52475 – 156.52525	2310 – 2390	13.25 – 13.4
156.7 – 156.9	2483.5 – 2500	14.47 – 14.5
162.0125 – 167.17	2655 – 2900	15.35 – 16.2
167.72 – 173.2	3260 – 3267	17.7 – 21.4
240 – 285	3332 – 3339	22.01 – 23.12
322 – 335.4	3345.8 – 3358	23.6 – 24.0
399.9 – 410	3600 – 4400	31.2 – 31.8
608 – 614		36.43 – 36.5

The requirements are **FULFILLED**.

Remarks: During the test, the Eut was set into normal modulation mode as intended for use.

The measurement was performed up to the 10th harmonic (25000MHz).

5.5 Time of occupancy (Dwell Time)

For test instruments and accessories used see section 6 Part DC.

5.5.1 Description of the test location

Test location: AREA4

5.5.2 Photo documentation of the test set-up



5.5.3 Test result

Channel frequency [MHz]	Pulse Time [μs]	Bursts (in 1 second)	Time of occupancy (Dwell time) [ms]	Average time of Occupancy LIMIT [ms]
2441	125,85	100	397,69	400

Limit according to FCC Subpart 15.247 (1)(iii)

Frequency hopping systems shall be used at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

The requirements are **FULFILLED**.

Remarks: The values of this test are taken from test report 4_MITSU_0104_BTT_FCCc from 7Layer for the already tested technical identical Module WML-C29 series. According to the Statement of "Siemens AG, Medical Solutions" the installation of the module does not have any influence to this test result neither from software point of view nor from hardware point of view.

5.6 Bandwidth Measurement

For test instruments and accessories used see section 6 Part MB.

5.6.1 Description of the test location

Test location: AREA4

5.6.2 Photo documentation of the test set-up



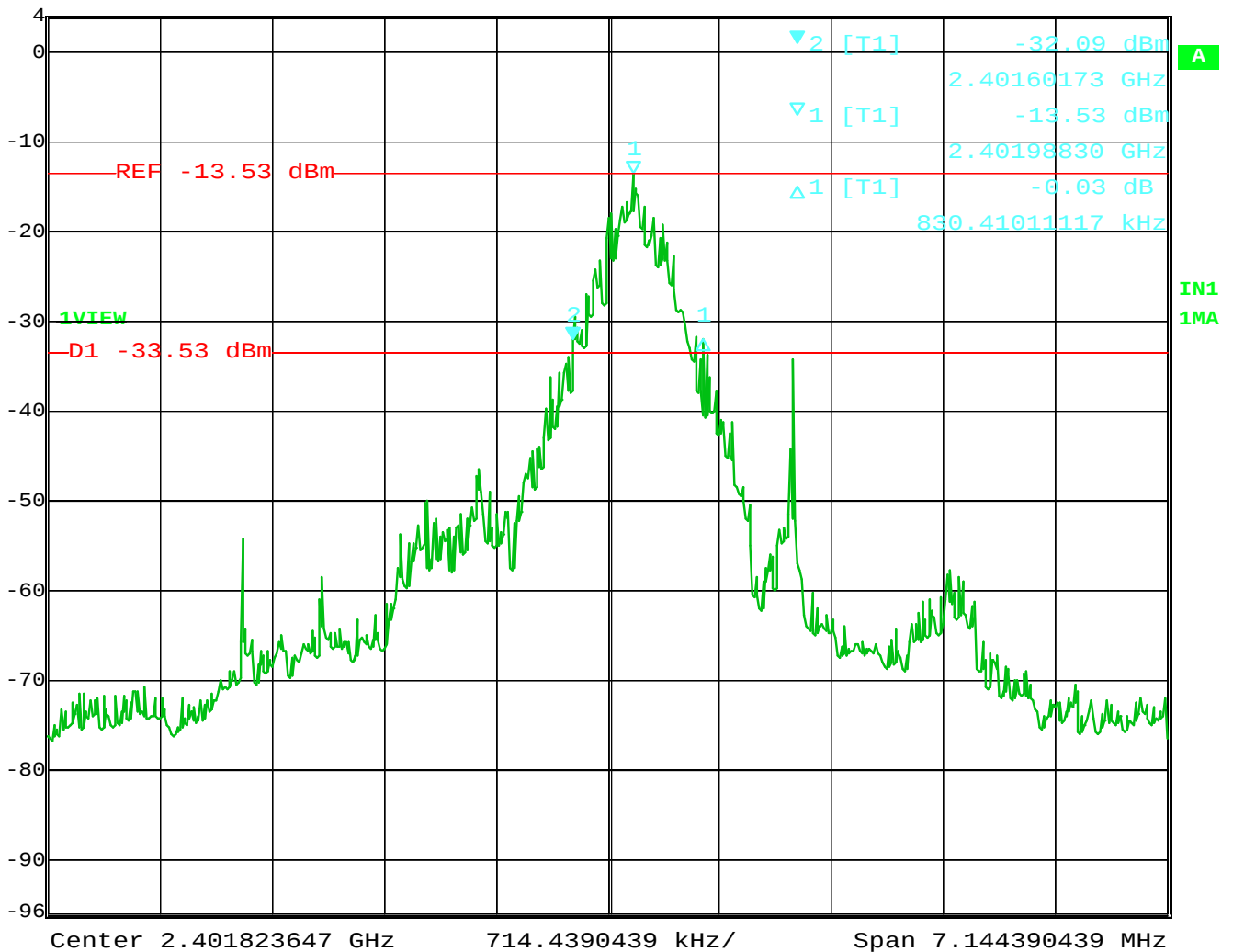
5.6.3 Test result

Channel Number	Channel Frequency [MHz]	20 dB Bandwidth [kHz]
1	2402	830,41
40	2441	859,04
79	2480	902,00

Remarks: The EuT is a FHSS system and it is not required to measured the 20dB Bandwidth, therefore exists no limits in the table above.



	Marker 2 [T1]	RBW	3 kHz	RF Att	30 dB
Ref Lvl	-32.09 dBm	VBW	3 kHz		
4 dBm	2.40160173 GHz	SWT	2 s	Unit	dBm



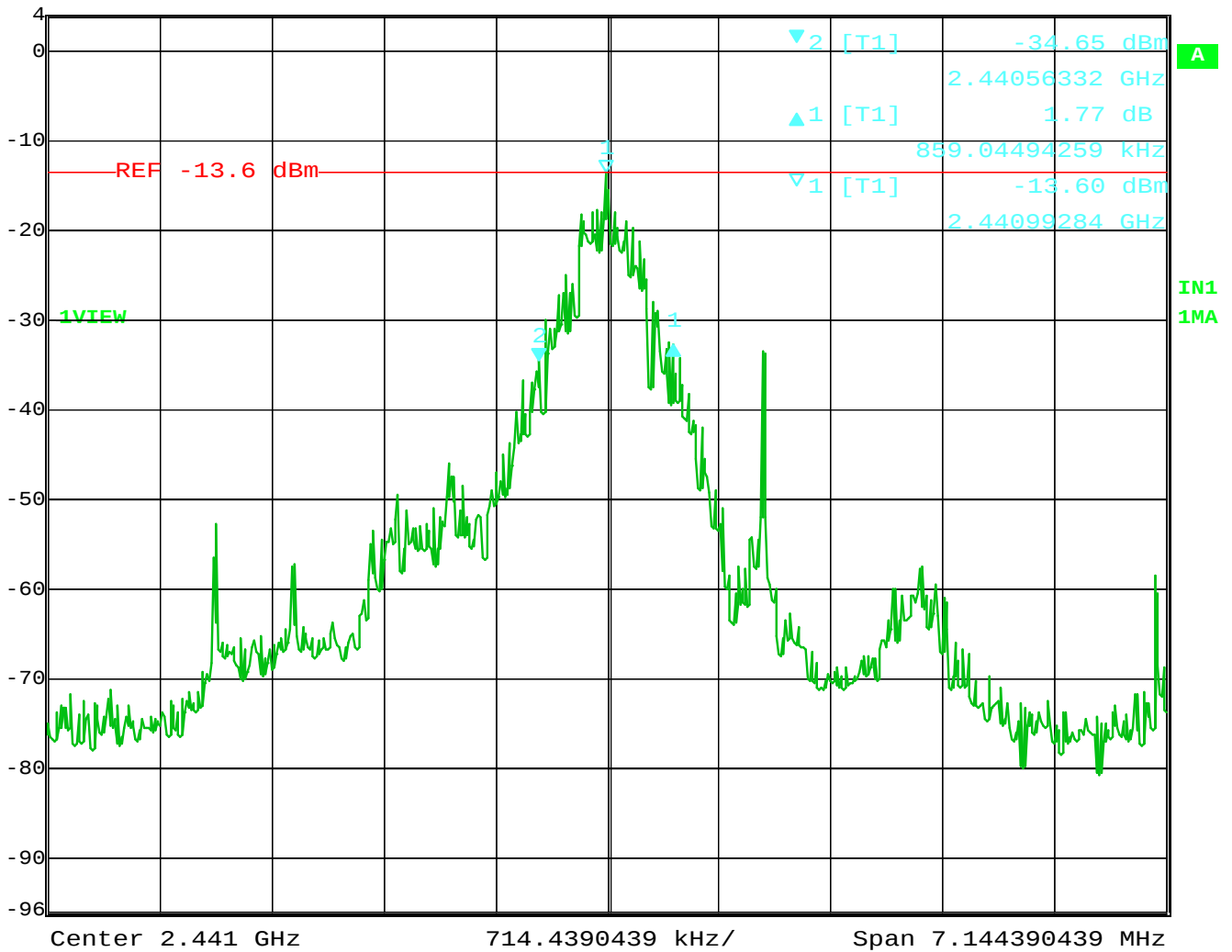
Date: 25.APR.2005 13:49:34

FCC ID: S5H-WFSW

Bandwidth Measurement
Channel 40 (2441 MHz)



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
4 dBm	1.77 dB	VBW	3 kHz		
	859.04494259 kHz	SWT	2 s	Unit	dBm



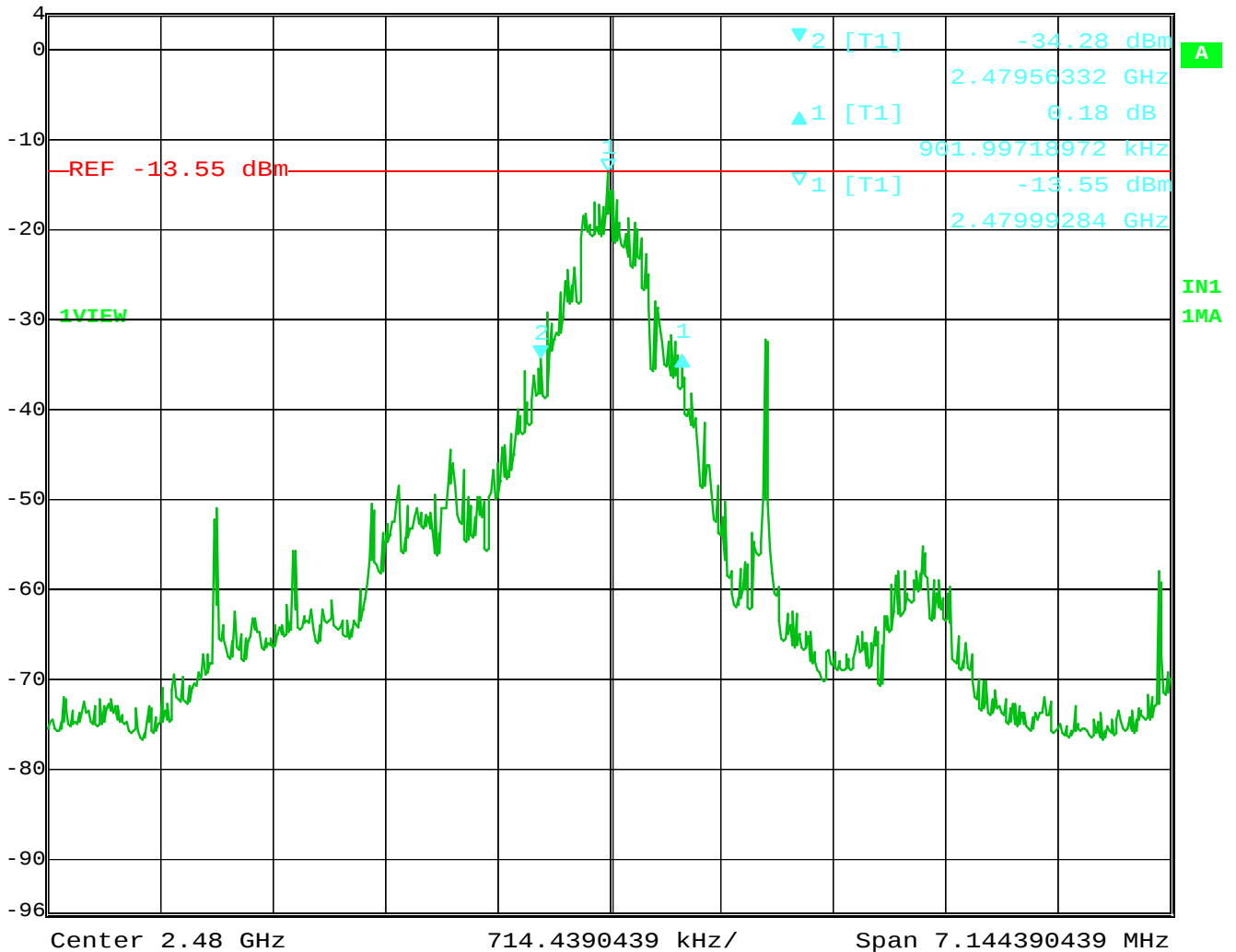
Date: 25.APR.2005 13:55:07

FCC ID: S5H-WFSW

Bandwidth Measurement
Channel 79 (2480 MHz)



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
4 dBm	0.18 dB	VBW	3 kHz		
	901.99718972 kHz	SWT	2 s	Unit	dBm



Date: 25.APR.2005 13:58:10

5.7 Channel separation test

For test instruments and accessories used see section 6 Part MB.

5.7.1 Description of the test location

Test location: AREA4

5.7.2 Photo documentation of the test set-up



5.7.3 Test result

Channel Number	Channel Frequency [MHz]	Separation Value [kHz]	Separation LIMIT [kHz]
1	2402	1000	>25
40	2441	1000	>25
79	2480	1000	>25

Limit according to FCC Subpart 15.247 (1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

The requirements are **FULFILLED**.

Remarks: The values of this test are taken from test report 4_MITSU_0104_BTT_FCCc from
7Layer for the already tested technical identical Module WML-C29 series. According to the
Statement of "Siemens AG, Medical Solutions" the installation of the module does not have
any influence to this test result neither from software point of view nor from hardware point of
view.



5.8 Quantity of Hopping Channel test

For test instruments and accessories used see section 6 Part MB.

5.8.1 Description of the test location

Test location: AREA4

5.8.2 Photo documentation of the test set-up



5.8.3 Test result

Hopping Channel Frequency range	Quantitiy of hopping Channel value	Quantitiy of hopping Channel MINIMUM LIMIT
2402 - 2480	79	75

Limit according to FCC Subpart 15.247 (1)(iii)

Frequency range [MHz]	LIMIT (Quantity of Hopping Channel)			
	20dB Bandwidth < 250kHz	20dB Bandwidth > 250kHz	20dB Bandwidth < 1 MHz	20dB Bandwidth > 1MHz
902 - 928	50	25	n.A	n.A
2400 – 2483,5	n.A	n.A	75	15
5725 - 5850	n.A	n.A	75	n.A

The requirements are **FULFILLED**.

Remarks: The values of this test are taken from test report 4_MITSU_0104_BTT_FCCc from
7Layer for the already tested technical identical Module WML-C29 series. According to the
Statement of "Siemens AG, Medical Solutions" the installation of the module does not have
any influence to this test result neither from software point of view nor from hardware point of
view.



5.9 Antenna Applications

5.9.1 Antenna requirement

The EuT's antenna is met the requirement of FCC part 15C section 15.203 and 15.204.

FCC part 15C section 15.247 requirement:

Systems operating in the 2400-2483,5 MHz band that are used exclusively for fixed, point to point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.9.2 Result

The EuT's antenna used a patch antenna and integrated on an own PCB. The antenna's gain is -2,2 dBi and therefore the requirement are met.

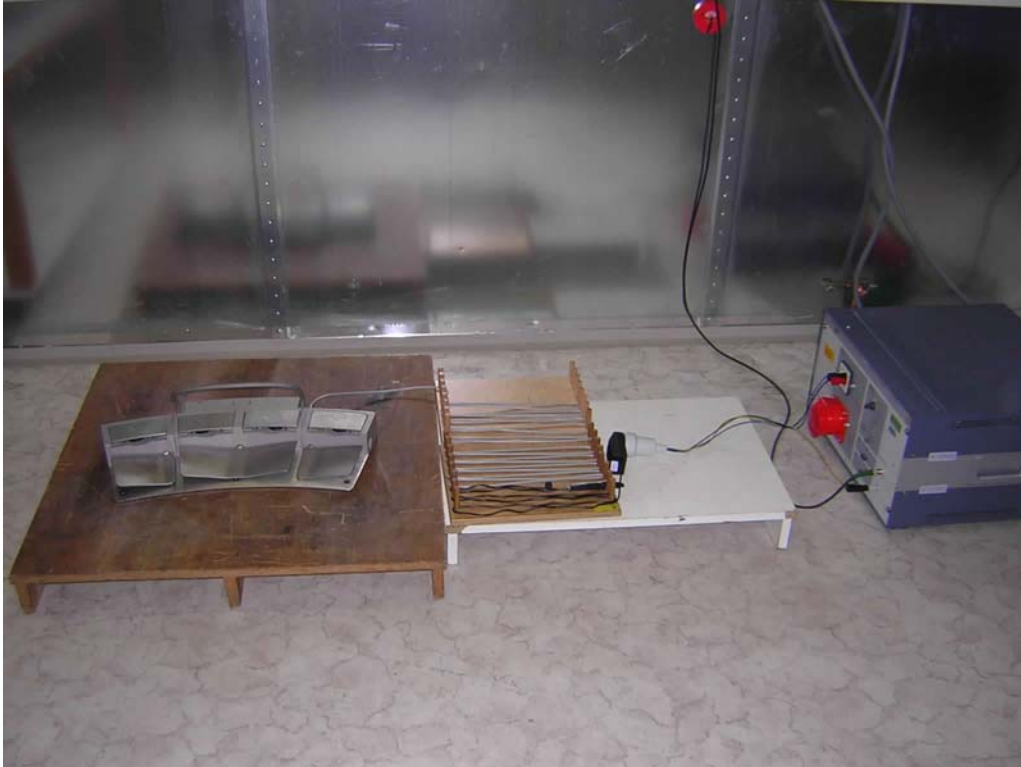
5.10 Receiver conducted disturbances 0.15 - 30 MHz

For test instruments and accessories used see section 6 Part A 4.

5.10.1 Description of the test location

Test location: Shielded Room S2

5.10.2 Photo documentation of the test set-up



5.10.3 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 15.1 dB at 3.381 MHz

The requirements are **FULFILLED**.

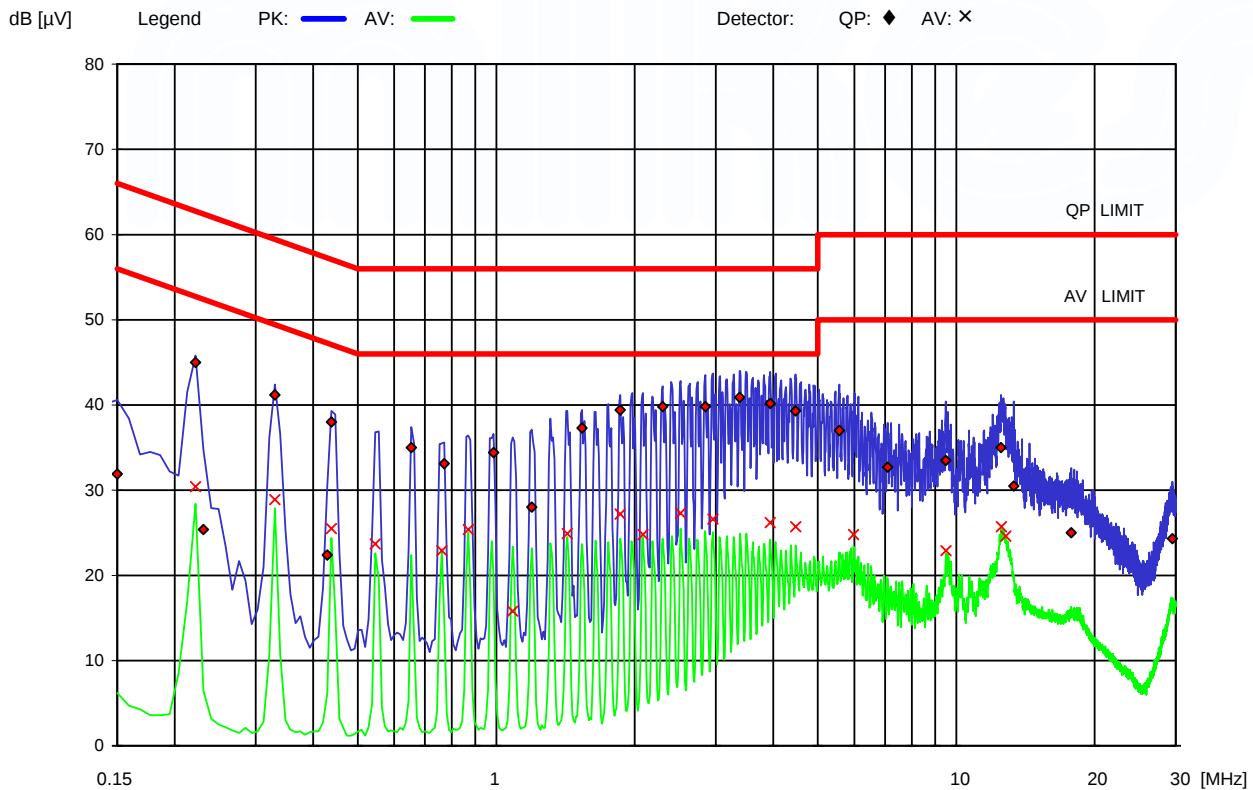
Remarks:

5.10.4 Test protocol

Test point	L1
Operation mode:	Receive Mode
Remarks:	
Date:	
Tested by:	Xaver Fischer

Result: Passed

Freq kHz	QP- L dB[μV]	D -Limit QP [dB]	Freq kHz	AV-L dB[μV]	D -Limit AV [dB]
150	31,9	34,1	222	30,4	22,3
222	45	17,7	330	28,9	20,6
231	25,4	37,0	438	25,5	21,6
330	41,2	18,3	546	23,7	22,3
429	22,4	34,9	762	22,9	23,1
438	38	19,1	870	25,4	20,6
654	35	21,0	1086	15,8	30,2
771	33,1	22,9	1428	24,9	21,1
987	34,4	21,6	1860	27,2	18,8
1194	28	28,0	2085	24,8	21,2
1536	37,3	18,7	2517	27,3	18,7
1860	39,4	16,6	2958	26,6	19,4
2301	39,8	16,2	3939	26,2	19,8
2850	39,8	16,2	4479	25,7	20,3
3381	40,9	15,1	5982	24,8	25,2

[illegible]

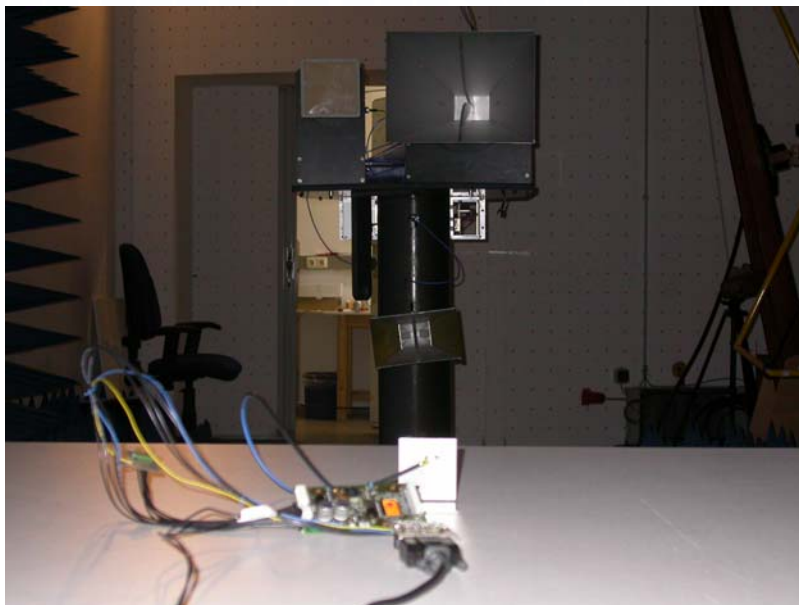
5.11 Receiver radiated emissions (electric field) 30 MHz - 40 GHz

For test instruments and accessories used see section 6 Part SER2 and SER3.

5.11.1 Description of the test location

Test location: OATS1
Test location: Anechoic Chamber A2
Test distance: 3 metres

5.11.2 Photo documentation of the test set-up



5.11.3 Test result

Test result <1GHz

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
25-1000	<30		120					

5.11.4 Test result >1GHz

Frequency [MHz]	L: PK [dBμV]	Corr. Duty Cycle [dB]	L: AV [dBμV] *)	Bandwidth [kHz]	Correct. [dB]	L: PK [dBμV/m]	L: AV [dBμV/m]	Limit PK [dBμV/m]	Delta [dB]
1000-18000	<45			1000				54	

Limit according to FCC Subpart 15.109(a)

Frequency of emission [MHz]	Field strength Limits [μV/m]	Field strength Limits [dBμV/m]
30-88	100	40
88-216	150	44
216-960	200	46
Above 960	500	54

The requirements are **FULFILLED**.

Remarks:

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test ID	Model / Type	Kind of Equipment	Manufacturer	Equipment No.
A4	ESH 2 - Z 5	LISN	Rohde & Schwarz GmbH & Co	04-07/60-03-078
	ESH 3 - Z 2	Pulse Limiter	Rohde & Schwarz GmbH & Co	04-07/60-03-079
	N2000N	RF Cable	Huber + Suhner	04-07/60-04-004
	N4000BNC	RF Cable	Huber + Suhner	04-07/60-04-005
	ESHS 30	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-04-002
CPC3	Tektronix THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	3231-T25/E	Power Supply	Conrad Elektronik GmbH	04-07/49-95-279
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-219
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002
DC	Tektronix THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	3231-T25/E	Power Supply	Conrad Elektronik GmbH	04-07/49-95-279
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-219
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002
MB	Tektronix THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	3231-T25/E	Power Supply	Conrad Elektronik GmbH	04-07/49-95-279
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-219
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002
SEC2	Tektronix THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	Peaktech 6015 A	DC Power Supply	BÜRKLIN	04-07/49-03-003
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-219
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002
SEC3	Tektronix THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	3231-T25/E	Power Supply	Conrad Elektronik GmbH	04-07/49-95-279
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-219
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002
SER2	Sucofeed 7/8	RF Cable	Huber + Suhner	04-07/60-04-089
	NW-2000-NB	RF Cable	MBPS GmbH	04-07/60-04-205
	EF393-21N-15m	RF Cable	Huber + Suhner	04-07/60-04-258
	VULB 9165	Super Broadband Antenn	Schwarzbeck Mess-Elektronik	04-07/62-00-001
	ESVS 30	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-04-001
SER3	SM 01	Switchmatrix 1-18 GHz	MBPS GmbH	04-07/60-04-215
	N2000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-222
	N1000SMA	RF Cable 18 GHz	Huber + Suhner	04-07/60-04-225
	Model 3115	Horn Antenna	EMCO Elektronik GmbH	04-07/62-03-003
	ESIB 40	Test Receiver	Rohde & Schwarz GmbH & Co	04-07/63-03-002