

TEST REPORT
of the accredited test laboratory

TÜV Nr.: M/EMV-06/231

about
the following EMC - test/- research

Division Medical
Technology/
Communication
Technology/ EMC

Testing Body for
Communication
Technology/ EMC

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Applicant: FREQUENTIS GmbH
Innovationsstrasse 1
A-1100 Vienna

Product: Operator Positions: EPOSA 04.40; EPOSA 04.50
(HCR1179 implemented for IVSR)

Serial Number: 30-0400204-PT
30-0400205-PT

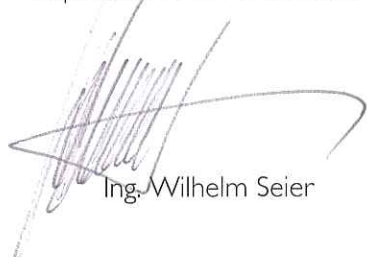
Accredited Testing
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Calibration Body

Notified Body 0408

Standard: EN 55022:1998+ A1:2000+ A2:2003;
IEC/CISPR 22:1997+ A1:2000+ A2:2002;
FCC Part 15 February 1, 2006 Edition;
ICES-003 Issue 4 Feb. 2004; EN 55024:1998+ A1:2001+ A2:2003;
EN 61000-6-2:2001; EN 61000-6-3:2001

TÜV Österreich
Test laboratory for EMC

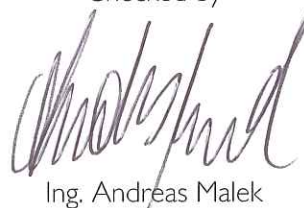
Supervisor of EMC-laboratory


Ing. Wilhelm Seier



16.10.2006

Checked by


Ing. Andreas Malek

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The results of this test report only refer to the provided equipment.

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1. Applicant

Company	FREQUENTIS GmbH
Department	
Address	A-1100 Vienna; Innovationsstrasse 1
Contact person	Dipl.-Ing. FH Gerald Herndl

EUT received on 4.9.2006

Tests were performed on 4. to 5.9.2006

2. Description of EUT

EUT	FREQUENTIS Operator Positions Model: EPOSA 04.40; EPOSA 04.50 (HCR1179 implemented for IVSR)
Serial Number	30-0400204-PT; 30-0400205-PT
Manufacturer	FREQUENTIS GmbH A-1100 Vienna; Innovationsstrasse 1
Description	<p>FREQUENTIS GmbH provided the following configuration for the measurements:</p> <p>FREQUENTIS Operator Positions for Voice Communication System (VCS).</p> <p>For a detailed description refer to Appendix 4</p>
Operating mode	<p>The measurements were carried out at the following running states:</p> <p>Normal operation with the following active connections made:</p> <ul style="list-style-type: none">-) EPOSA 04.40 – Digital Switch (Gate-X) (active voice and data connection)-) EPOSA 04.50 – Digital Switch (Gate-X) (active voice and data connection)-) TMCS PC – Digital Switch (Gate-X) <p>During testing active connections (voice and data) were established and monitored. Via the TMCS (technical monitoring and control system) the system status was monitored.</p> <p>For further details refer to Appendix 4</p>

3. Standards / Final result

Name	Title	Deviation	Result
EN 55022:1998 + A1:2000 + A2:2003	Information technology equipment Radio disturbance characteristics Limits and methods of measurement	none	OK
IEC/CISPR 22:1997 + A1:2000 + A2:2002	Information technology equipment Radio disturbance characteristics Limits and methods of measurement	none	OK
FCC Part 15 February 1, 2006 Edition	Radio Frequency Devices	none	OK
ICES-003 Issue 4 Feb. 2004	Digital Apparatus	none	OK
EN 55024 :1998 + A1 :2001 + A2 :2003	Information technology equipment Immunity characteristics Limits and methods of measurement	Some tests were performed with higher levels, so that the equipment shows a better immunity level.	OK
EN 61000-6-2 :2001	Electromagnetic compatibility (EMC) Part 6-2: Generic Standards Immunity for industrial environments	none	OK
EN 61000-6-3 :2001	Electromagnetic compatibility (EMC) Part 6-3: Generic Standards Emission standard for residential, commercial and light-industrial environments	none	OK
OK EUT passed NOK EUT failed			

4. Test results

4. 1.) Conducted emission on the power-supply-line of EPOSA 04.40

Class B Limits

Frequency range	Limit Class B	
Detector	Quasi Peak	Average
0,150 – 0,5 MHz	66 – 56 dB μ V decreasing with the logarithm of frequency	56 – 46 dB μ V decreasing with the logarithm of frequency
0,5 – 5 MHz	56 dB μ V	46 dB μ V
5 – 30 MHz	60 dB μ V	50 dB μ V
Remark: Quasi Peak and Average limits must be both met		

Measuring apparatus parameters

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	150 kHz	150 kHz	Detector	MP/AV	QP/AV
Stop frequency	30 MHz	30 MHz	Measuring time	10 ms	1 s
Stepsize	5 kHz	5 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	9 kHz	9 kHz	Preamplifier	0 dB	0 dB

Operating mode	Measuring result
Normal operation	Measurement diagram 1

Test result

4. 1.1.) Measurement with QP-Detector

Frequency MHz	Level dB μ V	Limit dB μ V	Margin dB	Exceed- Mark	Phase	PE
24,025	54,1	60,0	5,9		L1	GND
24,035	56,0	60,0	4,0		L1	GND
24,185	54,6	60,0	5,4		L1	GND
24,435	54,3	60,0	5,7		L1	GND
24,520	56,0	60,0	4,0		L1	GND
24,595	55,7	60,0	4,3		L1	GND

4. 1.2.) Measurement with AV-Detector

Frequency MHz	Level dB μ V	Limit dB μ V	Margin dB	Exceed- Mark	Phase	PE
12,785	46,9	50,0	3,1		L1	GND
24,375	47,2	50,0	2,8		L1	GND
24,455	47,2	50,0	2,8		L1	GND
24,530	45,5	50,0	4,5		L1	GND

4. 2.) Conducted emission on the power-supply-line of EPOSA 04.50

Class B Limits

Frequency range	Limit Class B	
Detector	Quasi Peak	Average
0,150 – 0,5 MHz	66 – 56 dB μ V decreasing with the logarithm of frequency	56 – 46 dB μ V decreasing with the logarithm of frequency
0,5 – 5 MHz	56 dB μ V	46 dB μ V
5 – 30 MHz	60 dB μ V	50 dB μ V
Remark: Quasi Peak and Average limits must be both met		

Measuring apparatus parameters

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	150 kHz	150 kHz	Detector	MP/AV	QP/AV
Stop frequency	30 MHz	30 MHz	Measuring time	10 ms	1 s
Stepsize	5 kHz	5 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	9 kHz	9 kHz	Preamplifier	0 dB	0 dB

Operating mode	Measuring result
Normal operation	Measurement diagram 2

Test result

4. 2.1.) Measurement with QP-Detector

Frequency MHz	Level dB μ V	Limit dB μ V	Margin dB	Exceed- Mark	Phase	PE
12,740	54,1	60,0	5,9		L1	GND
12,745	54,2	60,0	5,8		L1	GND
12,825	54,5	60,0	5,5		L1	GND
12,895	54,3	60,0	5,7		L1	GND
24,070	55,3	60,0	4,7		L1	GND

4. 2.2.) Measurement with AV-Detector

Frequency	Level	Limit	Margin	Exceed-	Phase	PE
0,240	44,0	52,1	8,1		L1	GND
12,375	45,9	50,0	4,1		L1	GND
12,740	45,8	50,0	4,2		L1	GND
12,815	46,3	50,0	3,7		L1	GND
24,265	46,5	50,0	3,5		N	GND

4. 3.) Radiated emissions

Class B Limits

Frequency range	Limit (quasi peak) *
30 – 230 MHz	39,6 dB μ V/m
230 – 1000 MHz	46,6 dB μ V/m

*) Because the measurements were done at a measurement distance of 3m the limit was increased by a factor of 9,6 dB. This is still class B limit.

Measuring apparatus parameters

Parameter	Preview measurement	Final measurement	Parameter	Preview measurement	Final measurement
Start frequency	30 MHz	30 MHz	Detector	Max Peak	Quasi Peak
Stop frequency	1000 MHz	1000 MHz	Measuring time	10 ms	1 s
Stepsize	50 kHz	50 kHz	RF-attenuation	0dB	0dB
IF- Bandwidth	120 kHz	120 kHz	Preamplifier	20 dB	20 dB

Operating mode	Measuring result
Normal operation	Measurement diagram 3-4

Test result

4. 3.1.) Measurement with QP-Detector (30 MHz – 200 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
33,30	33,4	39,6	6,2		100	96	VERTICAL
36,30	30,2	39,6	9,4		101	45	VERTICAL
46,75	28,8	39,6	10,8		100	322	VERTICAL
53,50	25,9	39,6	13,7		155	16	VERTICAL
136,65	29,8	39,6	9,8		101	174	VERTICAL
142,60	32,2	39,6	7,4		101	121	VERTICAL
200,00	34,2	39,6	5,4		176	97	HORIZONTAL

4. 3.2.) Measurement with QP-Detector (200 MHz – 1000 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
200,00	31,7	39,6	7,9		193	132	HORIZONTAL
333,35	34,0	46,6	12,6		100	247	HORIZONTAL
491,55	39,1	46,6	7,5		118	35	VERTICAL
614,40	41,6	46,6	5,0		101	33	VERTICAL
655,40	34,6	46,6	12,0		118	282	VERTICAL

4. 4. Radiated emission

Limits according to FCC Part 15

$\leq 1 \text{ GHz} \rightarrow$ Quasi Peak Limit $> 1 \text{ GHz} \rightarrow$ Average Limit (Peak Limit 20 dB above average Limit)			
Frequency range	Limit	Bandwidth	Measurement distance
30 – 88 MHz	100 $\mu\text{V/m}$	120 kHz	3 m
88 – 216 MHz	150 $\mu\text{V/m}$	120 kHz	3 m
216 – 960 MHz	200 $\mu\text{V/m}$	120 kHz	3 m
960 MHz - 1000 MHz	500 $\mu\text{V/m}$	120 kHz	3 m
Above 1000 MHz	500 $\mu\text{V/m}$	1 MHz	3 m

Operating mode	Measuring result
Normal operation	Measurement diagram 3-5

Test result

4. 4.1.) Measurement with QP-Detector (30 MHz – 200 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
33,30	33,4	40,0	6,6		100	96	VERTICAL
36,30	30,2	40,0	9,8		101	45	VERTICAL
46,75	28,8	40,0	11,2		100	322	VERTICAL
53,50	25,9	40,0	14,1		155	16	VERTICAL
136,65	29,8	43,5	13,7		101	174	VERTICAL
142,60	32,2	43,5	11,3		101	121	VERTICAL
200,00	34,2	43,5	9,3		176	97	HORIZONTAL

4. 4.2.) Measurement with QP-Detector (200 MHz – 1000 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
200,00	31,7	43,5	11,8		193	132	HORIZONTAL
333,35	34,0	46,0	12,0		100	247	HORIZONTAL
491,55	39,1	46,0	6,9		118	35	VERTICAL
614,40	41,6	46,0	4,4		101	33	VERTICAL
655,40	34,6	46,0	11,4		118	282	VERTICAL

4. 4.3.) Measurement with AV-Detector (1000 MHz – 2000 MHz)

Frequency MHz	Level dB μ V/m	Limit dB μ V/m	Margin dB	Exceed- Mark	Height cm	Azimuth deg	Polarization
1000,0	27,6	54,0	26,4		100	164	VERTICAL
1147,0	36,2	54,0	19,8		108	0	VERTICAL
1188,0	29,4	54,0	24,6		160	22	VERTICAL
1270,0	26,3	54,0	27,7		235	9	HORIZONTAL
1351,5	30,6	54,0	23,4		141	256	VERTICAL
1474,5	26,2	54,0	27,8		117	181	VERTICAL
1556,5	26,8	54,0	27,2		125	182	VERTICAL
1720,5	28,3	54,0	25,7		145	182	VERTICAL
1761,5	27,4	54,0	26,6		141	12	VERTICAL
1966,0	26,9	54,0	27,1		100	249	VERTICAL

4. 5.) Electrostatic discharge requirements (ESD) EPOSA 04.40

Type of test	charging voltage	Basic standard	Test set-up	Comment	Performance criteria
Electrostatic discharge Air discharge	20 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B
Electrostatic discharge Contact discharge	8 kV charging voltage	EN 61000-4-2	EN 61000-4-2		B

Operating mode	Test positions	Criteria of compliance
Normal operation	The 17 test positions are shown in the following graphic.	Before, during and after the test the equipment shall operate as intended, no loss of function or loss of voice or data links shall occur. Short disturbances on the voice link during the test are allowed. After the test there shall be no degradation of performance.

Test positions for ESD on the EPOSA 04.40



Test result for the EPOSA 04.40

Test position	Charging voltage	Type of discharge	Positive discharge	Negative discharge
1	8 kV	contact	OK	OK
2	20 kV	air	OK	OK
3	20 kV	air	OK	OK
4	20 kV	air	OK	OK
5	20 kV	air	OK	OK
6	20 kV	air	OK	OK
7	20 kV	air	OK	OK
8	20 kV	air	OK	OK
9	20 kV	air	OK	OK
10	20 kV	air	OK	OK
11	20 kV	air	OK	OK
12	20 kV	air	OK	OK
13	20 kV	air	OK	OK
14	20 kV	air	OK	OK
15	20 kV	air	OK	OK
16	20 kV	air	OK	OK
17	20 kV	air	OK	OK
<div>OK</div> <div>NOK</div> <div>EUT passed</div> <div>EUT failed</div>				