



ACCREDITED TESTING LABORATORY (NR. 32) for Electromagnetic Compatibility

Competent Body according to EU-Directive 89/336
FCC listed laboratory (Registration Number: 285819)

TEST REPORT No. EMV-E 26/03

On: FCC: 47 CFR Part 15, Edition 20-8-02

Ordered by: Seidel Elektronik GmbH

Address: Frauentalerstrasse 100
A-8530 Deutschlandsberg

Manufacturer: Seidel Elektronik GmbH

Subject: Avalanche Beacon

Type: **Pieps DSP**

S/No.: 1 & 6

Internal Order No.: E-783

Technical responsibility:

Test performed by:

Dipl.-Ing. Kurt Lamedschwandner, M.B.A

Thomas Nakovits

Date: 11th of February 2004

Number of Pages: 19

Comments:

The test results refers exclusively to the test subject.

The production or transmission of extracts of the present report is subject to authorisation by the testing laboratory

LIST OF MEASUREMENTS

Measurements list according to FCC: 47 CFR Part 15, Edition 20-8-02

<u>Paragraph</u>		<u>Page Nr. of this test report</u>	<u>Passed</u>
INTENTIONAL RADIATORS			
§ 15.207	Conducted emissions	-	n.a.
§ 15.209	Radiated emission limits, general requirements		
a	Field strength	3	Y
ADDITIONAL INFORMATION			
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ANNEXES			
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Abbreviations:

Y	Yes
N	No
n. a.	Not applicable

Ambient temperature 22 °C

Relative humidity 50 %

Radiated Emissions (Intentional Radiator)**§ 15.209 / a**

Measurement of the radiated carrier power						
f (MHz)	BW (kHz)	Limit (µV/m) at 300m	Limit (dBµV/m) at 300m	Limit (dBµV/m) at 30m	Limit (dBµV/m) at 10m	Field strength (dBµV/m)
0.457	0.2	5.2	14.32	54.32	73.41	57.84
Measurement uncertainty ± 3 dB						

Test Site: Open area, 10m

Due to the margin of 15dB between the limit and the radiated carrier power the radiated spurious emissions were performed at a distance of 3m.

Radiated Emissions, 9kHz to 30MHz				
f (MHz)	BW (kHz)	Limit (µV/m) at 300m	Limit (dBµV/m) at 3m*	Field strength (dBµV/m)
0.0321	0.2	74.7	117.5	40.5
0.0609	0.2	39.4	111.9	49.6
0.1213	0.2	19.7	105.9	42.5
0.1805	9	13.3	102.5	41.9
0.457	9	5.2	94.3	65.2
Measurement uncertainty ± 6 dB				

* Measurements were performed at a distance of 3m so we had to approach the limits to a distance of 3m.

Radiated Emissions at a distance of 3 m, 30MHz to 1000MHz				
f (MHz)	BW (kHz)	Limit (µV/m)	Field strength (dBµV/m)	Field strength (µV/m)
77.25	120	100	25.3 (Peak)	18.4
211.85	120	150	29.8 (Peak)	30.9
353.31	120	200	34.7 (Peak)	54.3
612.36	120	200	38.4 (Peak)	83.2
Measurement uncertainty ± 6 dB				

Bandwidth; this refers to the bandwidth of measurement receiver.

LIMITS**§ 15.209 / a**

f (MHz)	BW (kHz)	Meas. distance (m)	Field strength (µV/m)
0.009-0.150	0.2	300	2400/F (kHz)
0.150-0.490	9	300	2400/F (kHz)
0.490-1.705	9	30	24000/F (kHz)
1.705-30.0	9	30	30
30-88	120	3	100**
88-216	120	3	150**
216-960	120	3	200**
Above 960	120	3	500

** Except as provided in § 15.209 / g

The above standing field strength limits in the frequency bands 9-90 kHz, 110-490 kHz and above 1 GHz are based on **average limits**.

All other above standing field strength limits are based on **quasi peak limits**.

Reference numbers of test equipment used:

01 – 04, 36, 45, 68, 70, 74, 81

ADDITIONAL INFORMATION**Emission measurements overview**

Page No.	Plot No.	Remarks				Clause
12	01	30 MHz - 1000 MHz	transmit	pol H/0°		§ 15.209
12	02	30 MHz - 1000 MHz	transmit	pol V/0°		§ 15.209
13	03	30 MHz - 1000 MHz	transmit	pol V/90°		§ 15.209
13	04	30 MHz - 1000 MHz	transmit	pol H/90°		§ 15.209
14	15	0.009 MHz - 30 MHz	transmit	pol 0°/0°		§ 15.209
14	16	0.009 MHz - 30 MHz	transmit	pol 0°/90°		§ 15.209

The above mentioned plots can be found in **Annex C**.

Documentation of the device under test:

EUT: Pieps DSP
Avalanche Beacon

Serial number: 1 & 6

Year of manufacturing: 2003

Test information:

Date: Measurements were performed on the 19th of May in the presence of Mr. Sackl Rudolf, Seidel Elektronik GmbH.

Location: Anechoic chamber and open area test site of the EMC-Test Laboratory Seibersdorf.

Test engineer
(Thomas Nakovits)

Annex A

Test equipment and ancillaries used for tests

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory

Test Equipment and ancillaries used for tests:

Last update:04.06.02

No	Instrument / Ancillary	Type	Manufacturer	Serial No	ID-No
1	Spectrum Analyzer	8566B	HP	2637A03869	E0100
2	Spectr. Analyzer Display	8566B	HP	2648A13827	E0101
3	Quasi - Peak Adapter	85650A	HP	2521A00861	E0102
4	RF Preselector	85685A	HP	2648A00448	E0103
5	Spectrum Analyzer	85680B	HP	3138A05505	E0104
6	Spectr. Analyzer Display	85662A	HP	3144A20395	E0105
7	Quasi-Peak Adapter	85650A	HP	3145A01605	E0106
8	RF Preselector	85685A	HP	3146A01305	E0107
9	Spectrum Analyzer	85422E	HP	3549A0016	E0113
10	RF Preselector	85420E	HP	3427A0014	E0114
11	Power Meter	436A	HP	2515U0351	E0140
12	Power Sensor	8481H	HP	2349A08053	E0141
13	Multimeter	87	FLUKE	493702434	E0161
14	Audio Analyzer	UPA 3	R & S	894027/028	E0170
15	Test Receiver	ESH3	R & S	881364/005	E0171
16	Test Receiver	ESVP	R & S	879962/00	E0172
17	Modulation - Analyzer	FMA	R & S	825630/006	E0173
18	Microwave Counter	EIP 578	EIP	1020	E0181
19	Signal Generator	SMG	R & S	883056/082	E0210
20	Signal Generator	SMH	R & S	862490/013	E0211
21	Signal Generator	SMT 03	R & S	834665/00	E0212
22	Adjustable Transformator				E0240
23	Burst Tester	PB 4	Haefely	080844-28	E0300
24	Coupling Filter	FP 16/3-1	Haefely		E0303
25	Coupling Clamp	IP 4	Haefely		E0304
26	Impulse Tester	PC 6-288	Haefely		E0310
27	Coupling Filter	FP 20/3	Haefely		E0311
28	Plug In	PHV-9.1	Haefely		E0313
29	Test Generator	PHV 1	Haefely		E0314
30	Impulse Tester	PSD 25	Haefely		E0320
31	Test Tip	PSD 25 BMM	Haefely		E0321
32	LISN	6338-5-TS-50N	Solar	950141	E0417
33	LISN	6338-5-TS-50N	Solar	950142	E0418
32	Coupling Clamp	9144-1N	Solar		E0422
34	LISN	ESH3-Z5	R & S	861189/007	E0500
35	CDN	M3	MEB		E0512
36	BILOG Antenne	CBL6112A	Chase	2230	E0517
37	Biconical Antenne	3109	EMCO	2230	E0520
38	Log periodic Antenne	3146	EMCO	1575	E0530
39	Log periodic Antenne	SAS-200/518	R & S	257	E0533

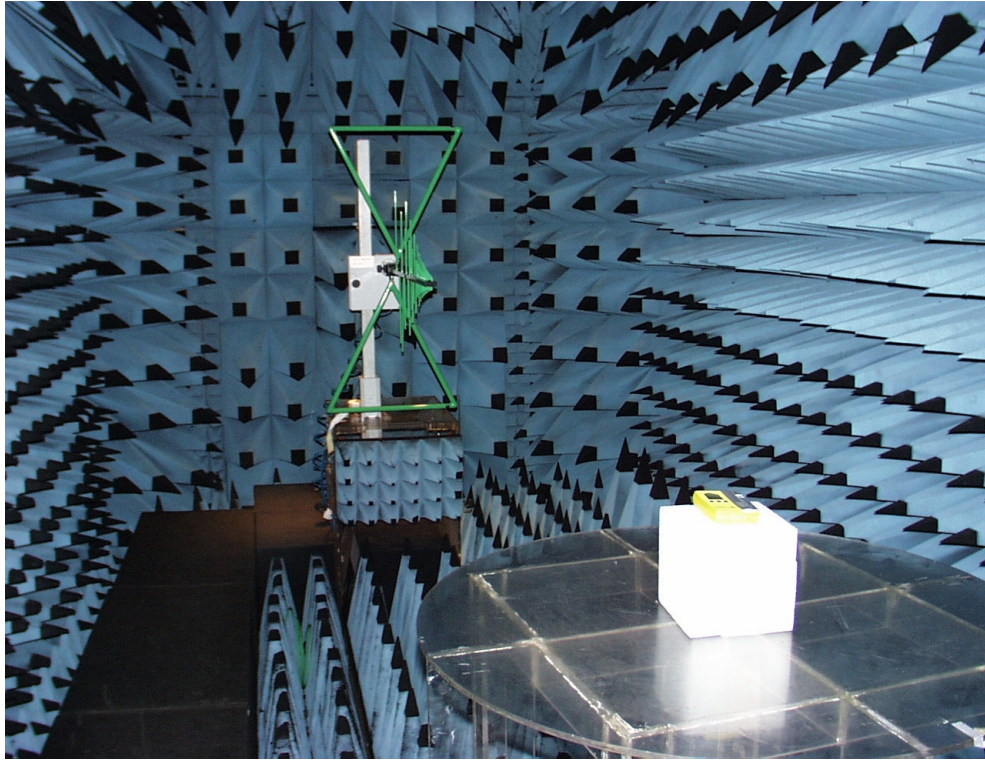
Test Equipment and ancillaries used for tests:

No	Instrument / Ancillary	Type	Manufacturer	Serial No	ID-No
40	Hornantenna	3115	EMCO	9808-5569	E0567
41	Precision-Dipole 25 mm		FZS		E0570
42	Precision-Dipole 6 mm		FZS		E0571
43	UHF-Precision-Dipole	UHAP	Schwarzbeck	605, 606	E0572
44	Active electric fiel antenna	3301	EMCO	2471	E0576
45	Active Loop	HFH2-Z2	R & S	891847/0013	E0578
46	Helmholtz Frame	DC-200Hz	ARCS		E0591
47	Shielded Spool		Seibersdorf		E0691
48	Power Amplifier	2000 LA	AR		E0700
49	Power Amplifier	500W1000M7	AR		E0712
50	Power Amplifier	500A100A	AR	301583	E0718
51	Amplifier	ZHL-1042J	Avantek	NO 21593	E0726
52	Amplifier	ZHL-42	Avantek	010 991-2	E0727
53	Amplifier	AFT-8463	Avantek		E0728
54	Amplifier	AFT-18854	Avantek		E0729
55	Attenuator 10 dB/25 W	33-10-34	L. Weinschel	AY7252	E0757
56	Attenuator 30 dB/25 W	33-30-34	L. Weinschel	AY5840	E0758
57	Attenuator 20 dB/25 W	33-20-34	L. Weinschel	AZ0385	E0759
58	Attenuator: 10 dB	8491A	HP	44138	E0771
59	Attenuator: 20 dB	8491A	HP	40046	E0772
60	Attenuator: 30 dB	11708A	HP	31558	E0773
61	Richtkoppler	DC 2000	AR	9397/1673	E0800
62	Richtkoppler	DC 6280	AR	14627	E0816
63	Splitter A (180°,BNC, 1W)	ZFSCJ-2-1	Mini Circuits	8617 02	E0840
64	Splitter B (180°,BNC, 1W)	ZFSCJ-2-1	Mini Circuits	8632 04	E0841
65	Splitter	ZFSC-3-4	Mini Circuits	9424 02	E0844
66	Puls Shaper	ESH3-Z2	R & S	375.8810.52	E0885
67	Terminator	R 404522	Radiall		E0886
68	Emi Software		HP		E0900
69	RS-Test Software		FZS		E0911
70	Anechoic Chamber		FZS		E1000
71	Comp.contr.meas.system	EMCE5000/PAS	Spitz.&Spies		E1040
72	Impuls Limiter	R&S	ESH3-Z2	34418	E1150
73	PC Pentium „Dell1“	XMT 575	Dell		E2117
74	PC Pentium „Dell2“	GN	Dell		E2119
75	Temp.-probe	80T-150	Fluke	3551083	C0003
76	Digital Oszilloscope	TDS 520A	Tektronix	H700324	C0048
77	Power Supply	EA-3025	El.-Auto.	34418	
78	Power Supply	6112A	HP	1139A01125	
79	Temp. Chamber	300/40D	Weiß	512	
80	Cable Set	SET 4	FZS	80	
81	Cable Set	SET 7	FZS		E0866

Annex B

Photos

of the EUT and the configuration



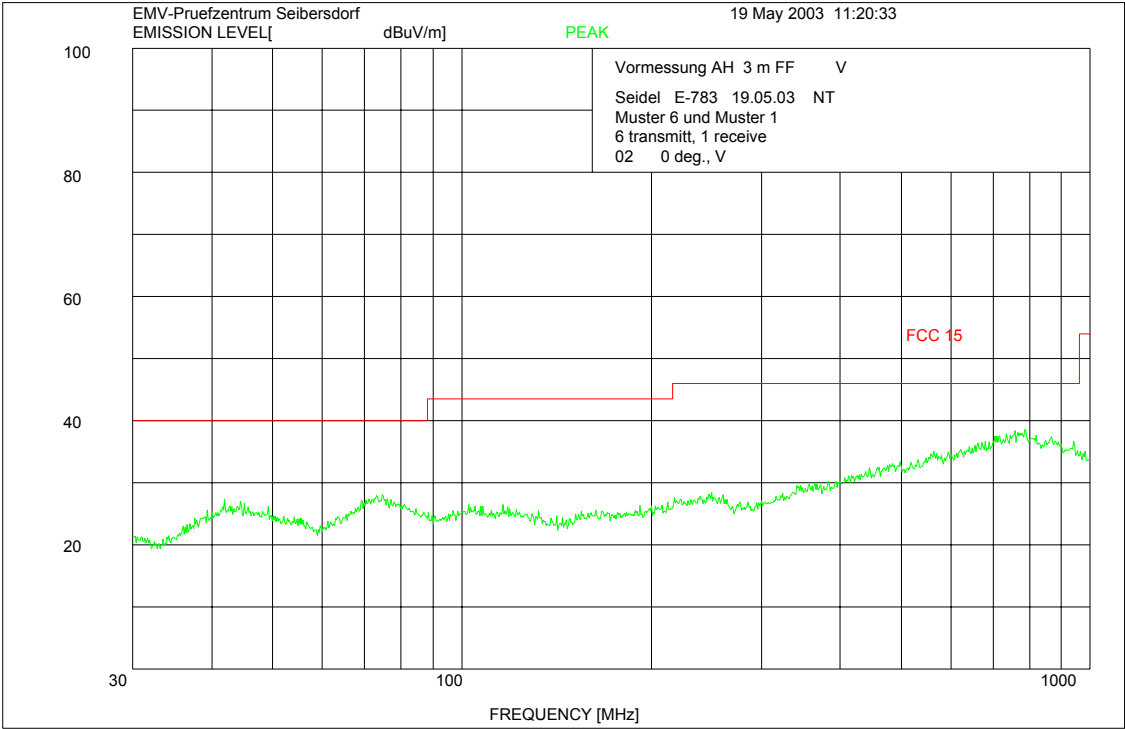
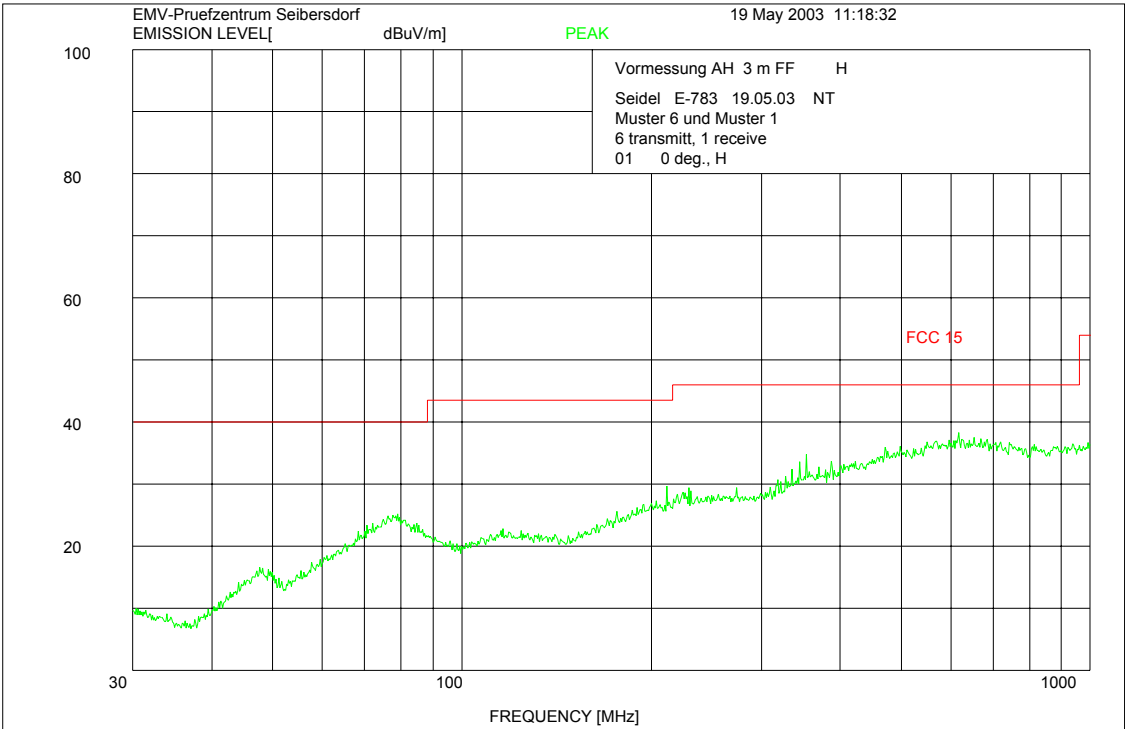
Pieps DSP, setup in the anechoic chamber
Radiated emission measurement

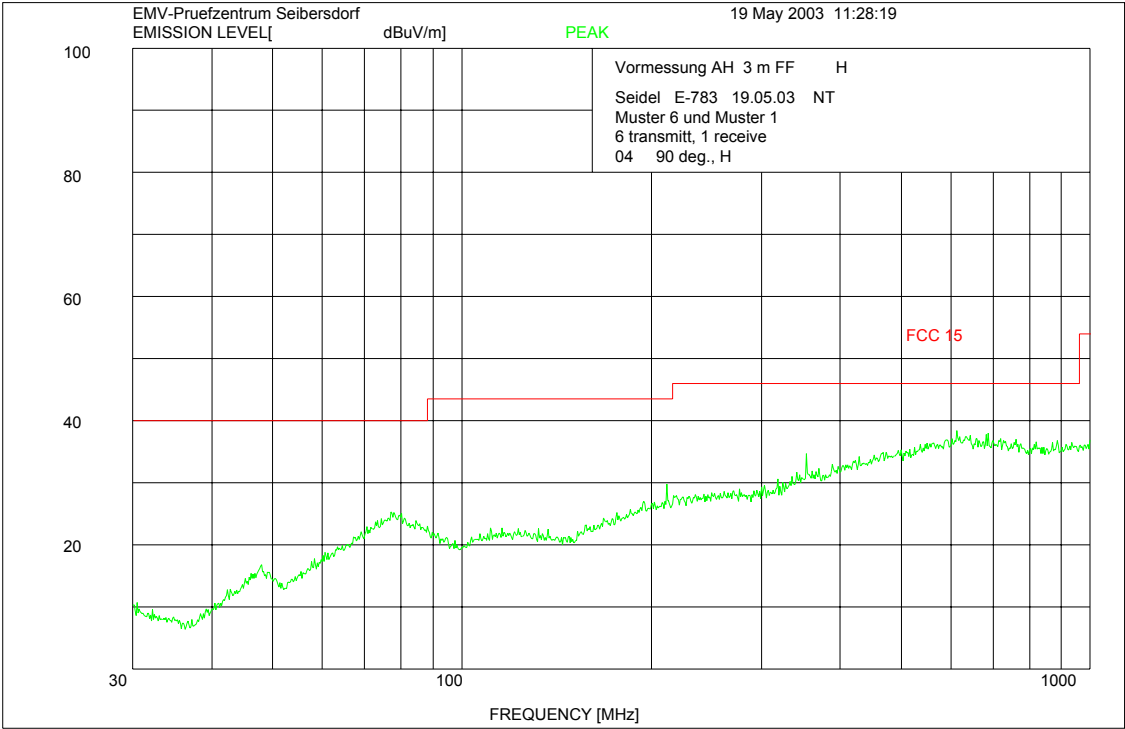
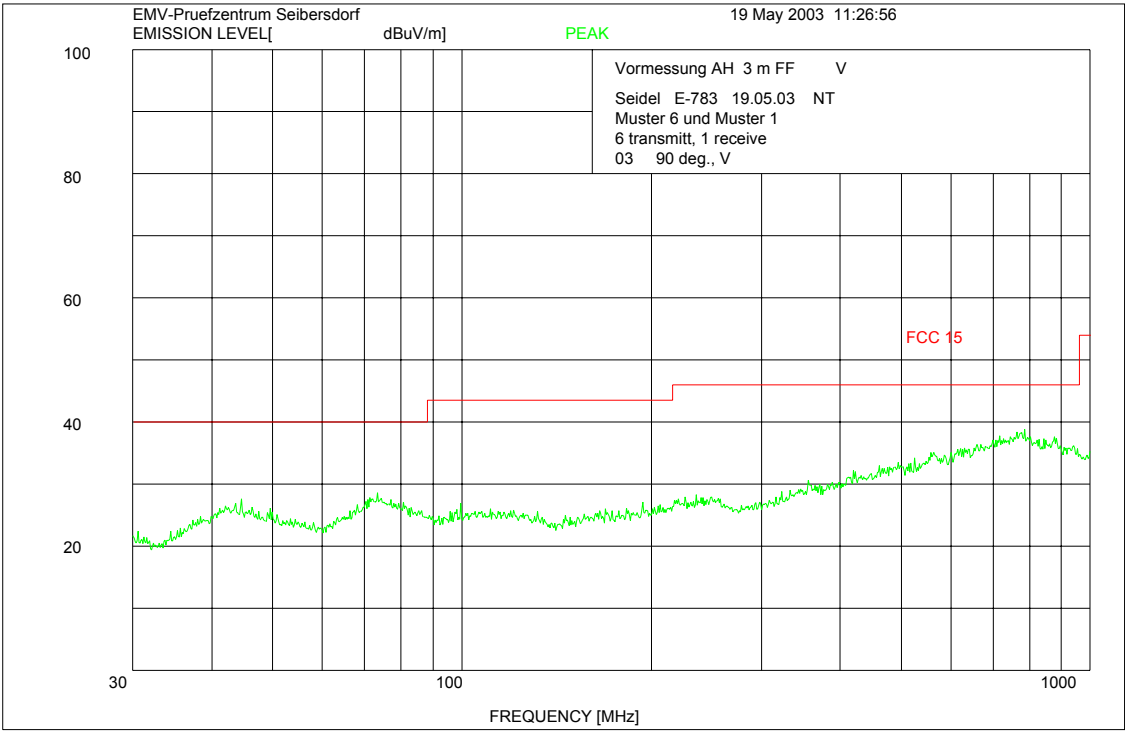


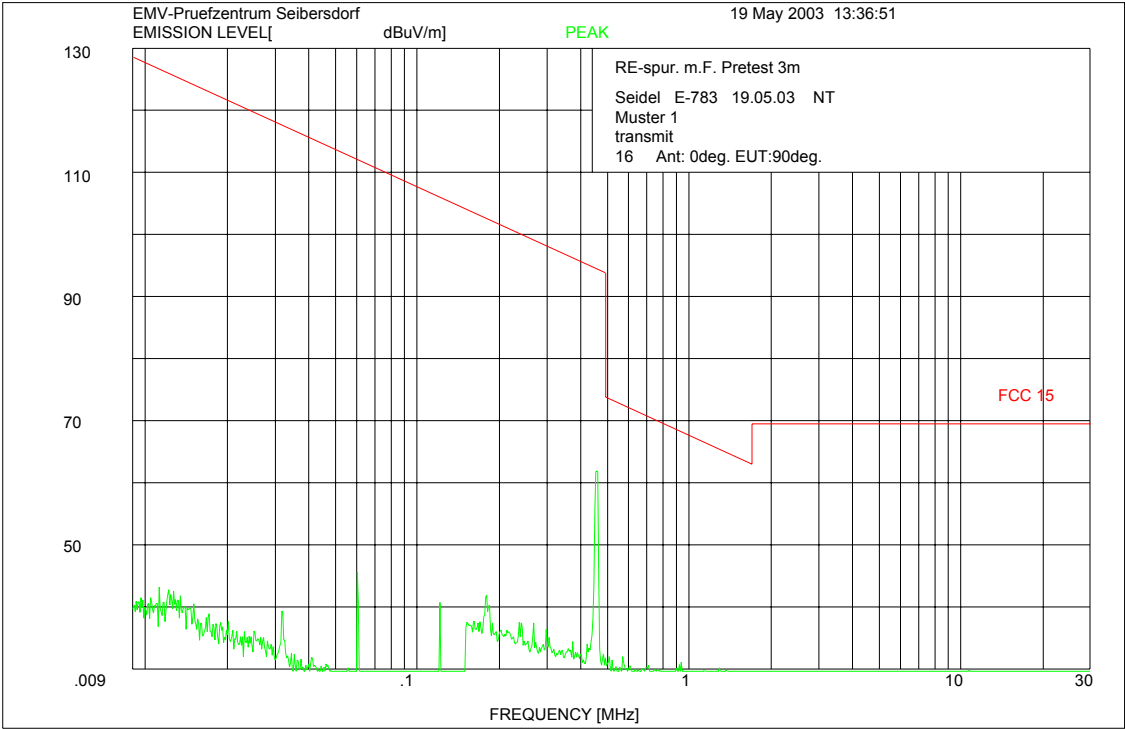
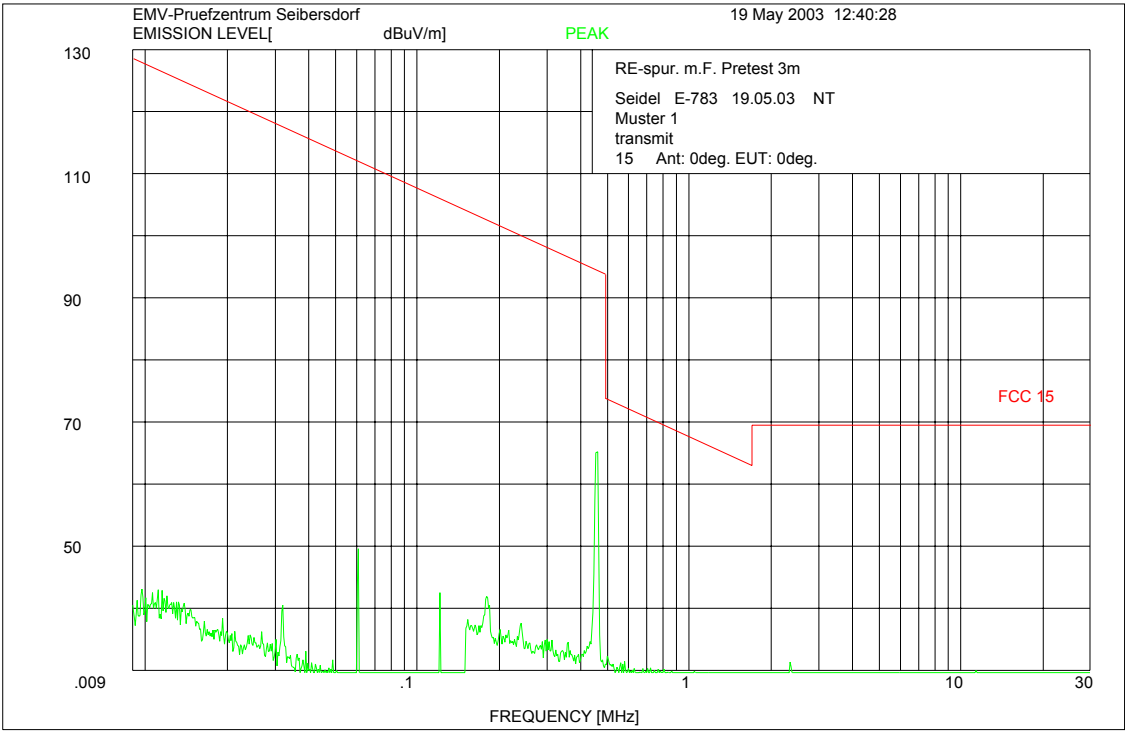
Pieps DSP, detailed

Annex C

Plots of the emission measurements







Annex D

Detailed data

of the used measurement equipment

D.1 Antenna factors of the active loop antenna, E0578

f [kHz]	AFH [dB/m]	AFE [dB/m]
10	-28.36	23.16
20	-30.36	21.16
30	-31.26	20.26
40	-31.66	19.86
50	-31.86	19.66
60	-31.96	19.56
70	-32.06	19.46
80	-32.06	19.46
90	-32.16	19.36
100	-32.26	19.26
200	-32.16	19.36
300	-32.16	19.36
400	-32.16	19.36
500	-32.16	19.36
600	-32.16	19.36
700	-32.26	19.26
800	-32.16	19.36
900	-32.26	19.26
1000	-32.26	19.26
2000	-31.96	19.56
3000	-32.16	19.36
4000	-32.26	19.26
5000	-32.26	19.26
6000	-32.36	19.16
7000	-32.56	18.96
8000	-32.46	19.06
9000	-32.36	19.16
10000	-32.46	19.06
11000	-32.56	18.96
12000	-32.46	19.06
13000	-32.56	18.96
14000	-32.36	19.16
15000	-32.26	19.26
16000	-32.06	19.46
17000	-31.86	19.66
18000	-31.76	19.76
19000	-31.46	20.06
20000	-31.36	20.16
21000	-31.16	20.36
22000	-30.96	20.56
23000	-30.96	20.56
24000	-30.66	20.86
25000	-30.66	20.86
26000	-30.36	21.16
27000	-30.56	20.96
28000	-30.36	21.16
29000	-30.56	20.96
30000	-30.56	20.96

D.2 Antenna factor of the BILOG Antenna, E0517

f [MHz]	AF [dB/m]	Gain [dBi]
30	20	-20.21
31	19.39	-19.32
32	18.83	-18.48
33	18.32	-17.7
34	17.7	-16.82
35	17.07	-15.94
36	16.58	-15.2
37	15.85	-14.24
38	15.21	-13.37
39	14.58	-12.51
40	14.01	-11.72
41	13.44	-10.94
42	12.9	-10.19
43	12.33	-9.41
44	11.83	-8.72
45	11.38	-8.07
46	10.89	-7.39
47	10.56	-6.87
48	10.14	-6.27
49	9.72	-5.67
50	9.28	-5.05
51	8.92	-4.52
52	8.56	-3.99
53	8.18	-3.45
54	7.84	-2.95
55	7.57	-2.51
56	7.28	-2.07
57	7.19	-1.83
58	6.94	-1.43
59	6.75	-1.09
60	6.59	-0.78
61	6.56	-0.61
62	6.45	-0.35
63	6.51	-0.27
64	6.56	-0.19
65	6.61	-0.1
66	6.67	-0.04
67	6.91	-0.14
68	6.89	0.01
69	6.93	0.09
70	6.99	0.16
71	7.21	0.06
72	7.3	0.1
73	7.42	0.09
74	7.56	0.07
75	7.64	0.11
76	7.77	0.09
77	7.96	0.02
78	8.22	-0.13

79	8.32	-0.12
80	8.59	-0.28
81	8.79	-0.37
82	8.97	-0.44
83	9.18	-0.55
84	9.3	-0.57
85	9.44	-0.61
86	9.55	-0.61
87	9.83	-0.8
88	9.99	-0.86
89	10.1	-0.87
90	10.31	-0.98
91	10.45	-1.02
92	10.46	-0.94
93	10.56	-0.94
94	10.85	-1.14
95	10.93	-1.13
96	11.02	-1.13
97	11.34	-1.36
98	11.44	-1.37
99	11.43	-1.27
100	11.63	-1.39
105	12.11	-1.44
110	12.53	-1.46
115	12.83	-1.37
120	12.92	-1.09
125	12.88	-0.69
130	12.79	-0.27
135	12.43	0.43
140	12.18	0.99
145	11.85	1.62
150	11.36	2.41
155	11.15	2.9
160	10.96	3.37
165	10.7	3.9
170	10.52	4.33
175	10.3	4.81
180	9.96	5.39
185	9.8	5.79
190	9.63	6.19
195	9.57	6.47
200	9.71	6.56
205	9.81	6.67
210	9.61	7.08
215	9.46	7.43
220	9.78	7.32
225	10.06	7.23
230	10.56	6.92
235	11.09	6.58

240	11.55	6.3
245	12.04	5.99
250	12.47	5.73
255	12.94	5.43
260	13.5	5.05
265	13.36	5.35
270	12.91	5.97
275	12.94	6.1
280	12.99	6.2
285	13	6.35
290	13.08	6.42
295	13.19	6.45
300	13.31	6.48
305	13.43	6.5
310	13.56	6.52
315	13.64	6.58
320	13.68	6.67
325	13.74	6.75
330	13.81	6.81
335	13.98	6.76
340	14.15	6.73
345	14.32	6.69
350	14.51	6.62
355	14.71	6.54
360	14.85	6.52
365	14.89	6.6
370	14.92	6.69
375	14.95	6.77
380	15	6.84
385	15.12	6.83
390	15.3	6.77
395	15.45	6.73
400	15.66	6.63
405	15.88	6.51
410	16.1	6.4
415	16.32	6.29
420	16.52	6.19
425	16.6	6.22
430	16.52	6.4
435	16.49	6.52
440	16.46	6.65
445	16.5	6.71
450	16.57	6.74
455	16.63	6.77
460	16.72	6.78
465	16.82	6.78
470	16.9	6.79
475	16.97	6.81
480	17.01	6.86
485	17.07	6.89
490	17.12	6.93
495	17.13	7.01
500	17.14	7.09

510	17.16	7.24
520	17.24	7.33
530	17.37	7.36
540	17.61	7.28
550	18.43	6.62
560	18.94	6.27
570	18.78	6.58
580	18.61	6.91
590	18.51	7.16
600	18.46	7.35
610	18.37	7.59
620	18.49	7.6
630	18.7	7.53
640	18.77	7.6
650	18.72	7.78
660	18.67	7.96
670	18.72	8.05
680	18.7	8.19
690	18.68	8.35
700	18.63	8.52
710	18.72	8.55
720	18.94	8.45
730	19.2	8.31
740	19.33	8.3
750	19.36	8.39
760	19.39	8.47
770	19.43	8.55
780	19.5	8.59
790	19.51	8.69
800	19.45	8.86
810	19.33	9.09
820	19.42	9.11
830	19.55	9.08
840	19.7	9.03
850	19.77	9.07
860	19.88	9.06
870	19.91	9.13
880	19.95	9.19
890	19.98	9.25
900	20.01	9.32
910	19.95	9.48
920	19.92	9.6
930	19.98	9.63
940	20.09	9.62
950	20.21	9.59
960	20.29	9.6
970	20.42	9.56
980	20.48	9.59
990	20.54	9.62
1000	20.53	9.72

D.3 Cable loss of SET 7

f [MHz]	CL [dB]
30	0.16
36	0.16
41	0.18
46	0.18
51	0.19
56	0.2
61	0.19
66	0.21
71	0.22
76	0.22
81	0.24
86	0.22
91	0.24
96	0.23
101	0.24
106	0.23
111	0.23
116	0.27
121	0.27
126	0.29
131	0.29
136	0.29
141	0.28
146	0.28
151	0.28
156	0.28
161	0.28
166	0.29
171	0.29
176	0.31
181	0.33
186	0.35
191	0.35
196	0.35
201	0.35
211	0.35
221	0.34
231	0.31
241	0.36
251	0.44
261	0.43
271	0.39
281	0.4
291	0.46
301	0.47
311	0.36
321	0.34
331	0.52
341	0.58
351	0.47

361	0.42
371	0.46
381	0.48
391	0.5
401	0.57
411	0.64
421	0.53
431	0.37
441	0.44
451	0.64
461	0.64
471	0.55
481	0.55
491	0.57
501	0.59
521	0.59
541	0.59
561	0.61
581	0.65
601	0.66
621	0.61
641	0.66
661	0.66
681	0.68
701	0.7
721	0.72
741	0.66
761	0.79
781	0.69
801	0.7
821	0.78
841	0.73
861	0.83
881	0.78
901	0.73
921	0.74
941	0.81
961	0.82
981	0.96
1000	0.82