

ESA-QCA0010T-C

SH	TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002	Issue: 1 Rev.: Date: 20/4/98 Page: 1/41
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SCC Component No 5962-8863003VVA		Component Designation: AMP01AX	Irradiation Spec. No.: SCC 22900 iss.4
Gen. Spec.: MIL-PRF-38535 Det. Spec.: SMD 5962-99630 Amend.:		Evaluation: - Acceptance Diffusion: - Acceptance Lot: X	Project/Programme: SH
Family: 08	Group: 09	Functional Assignment: LOW NOISE PRECIS. INSTRUMENTATION AMPLIFIER	Package: DIL-18
Manuf.Name: ANALOG DEVICES Address: CALIFORNIA (USA)		Test House: TECNOLOGICA Address: MADRID (SPAIN)	Orig.house: TECNOLOGICA Address: SEVILLA (SPAIN)
Radiation Test Plan No.: SH-TL-RP-8002		Sample Size: 5 Irradiation Devices: 6 Control Devices: 1	Date Code: 9736A Diffusion LOT: Wafer No.: F28628.6
Radiation Source: Cobalt-60 Facility Name: CIEMAT Address: MADRID (SPAIN)		Energy: 1.33/1.17 MeV Dose Rate: 0,2996 Krad(Si)/h	Date of Test: 30/03/98
Irradiation Conditions: Biased: X Unbiased: - Test Circuit: Figure 1		Irradiation Measurements Interval: Remote test: - In situ Test: X	Annealing Tests: 24h / 25°C 220h / 125°C Biased: X Unbiased: - Test Circuit: Figure 1

Electrical Measurements. Parameters Tested:

$I_B, I_{IO}, PSRR+, PSRR-, CMR, GE, G, I_{OS+}, I_{OS-}, I_O, V_{IOS}, V_{OOS}, V_O, SR+, SR-$

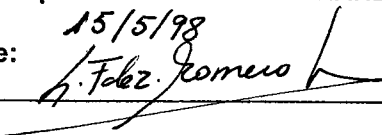
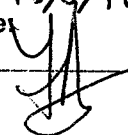
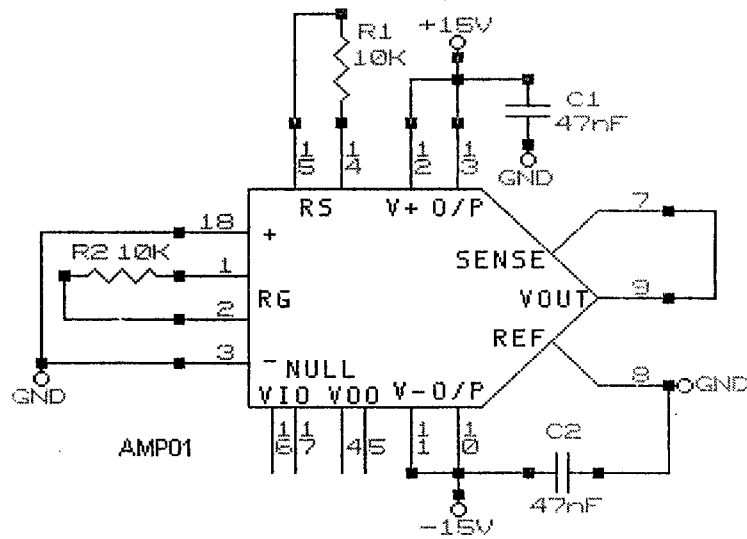
Irradiat. Respons.: GONZALO FERNANDEZ Date: 15/5/98 Signature: 	Electr. Test Resp.: J.Mª VALVERDE Date: 15/5/98 Signature: 
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FIGURE 1.-TEST CIRCUIT



SH	TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002	Issue: 1 Rev.: Date: 20/4/98 Page: 3/41
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SUMMARY

Total dose steady-state irradiation test has been carried out on LOW NOISE PRECISION INSTRUMENTATION AMPLIFIER from ANALOG DEVICES with date code 9736A. The irradiated parts were labelled as follows: irradiated devices R2,...,R6= S/N 256, 257, 260, 261, 263 and R1= S/N 254 as control device.

SH

**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

Issue: 1 Rev.:
Date: 20/4/98
Page: 4/41

RESULTS

The next table shows a results resume of the irradiation test:

	0 KRAD	2 KRAD	8 KRAD	13.5 KRAD	21.5 KRAD	ANN 24	ANN 220
VOOS	PASS	PASS	PASS	PASS 2 FAIL 3	FAIL	FAIL	PASS
VIOS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
IIO	PASS	PASS	PASS 4 FAIL 1	PASS 4 FAIL 1	PASS	PASS	PASS
IIB+	PASS	FAIL	FAIL	PASS	FAIL	FAIL	PASS 1 FAIL 4
IIB-	PASS	PASS 1 FAIL 4	FAIL	PASS	FAIL	FAIL	PASS 2 FAIL 3
CMRR 1	PASS	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
CMRR 10	PASS	PASS 3 FAIL 2	FAIL 2	FAIL	FAIL	FAIL	FAIL
CMRR 100	PASS	PASS	PASS 3 FAIL 2	FAIL	FAIL	FAIL	FAIL
CMRR 1000	PASS	PASS	FAIL	FAIL	PASS 3 FAIL 2	PASS 1 FAIL 4	PASS
PSRR+ 1	PASS	PASS	PASS 3 FAIL 2	FAIL	FAIL	FAIL	FAIL
PSRR+ 10	PASS	PASS	PASS 3 FAIL 2	FAIL	FAIL	FAIL	FAIL
PSRR+ 100	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS
PSRR+ 1000	FAIL	PASS	PASS 4 FAIL 1	PASS 4 FAIL 1	PASS 4 FAIL 1	PASS 3 FAIL 2	PASS
PSRR- 1	PASS	PASS	PASS	PASS	PASS	PASS	PASS
PSRR- 10	PASS	PASS	PASS	PASS	PASS	PASS	PASS
PSRR- 100	PASS	PASS	PASS	PASS	PASS	PASS	PASS
PSRR- 1000	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ICC+	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ICC-	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP+ 500R	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP- 500R	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP+ 2K	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP- 2K	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP+ 50R	PASS	PASS	PASS	PASS	PASS	PASS	PASS
VOP- 50R	PASS	PASS	PASS	PASS	PASS	PASS	PASS
GE 1	PASS	PASS	PASS	PASS	PASS	PASS	PASS
GE 10	PASS	PASS	PASS	PASS	PASS	PASS	PASS
GE 100	PASS	PASS	PASS	PASS	PASS	PASS	PASS
GE 1000	PASS	PASS	PASS	PASS	PASS	PASS	PASS
IOS+	PASS	PASS	PASS	PASS	PASS	PASS	PASS
IOS-	PASS	PASS	PASS	PASS	PASS	PASS	PASS

SH

**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

Issue: 1 Rev.:
Date: 20/4/98
Page: 5/41

CONCLUSION

The failed parameters during the irradiated test are: IIB \pm , IIO, PSRR+, CMRR, VOOS.

At interest level of 8 Krad, failed IIO, IIB \pm , CMRR, PSRR.

The rest of parameters pass according irradiated plan.

The margin gain G (G= 1 to 1000) has not been measured but is guaranteed by the error gain at G= 1 to 1000.

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**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

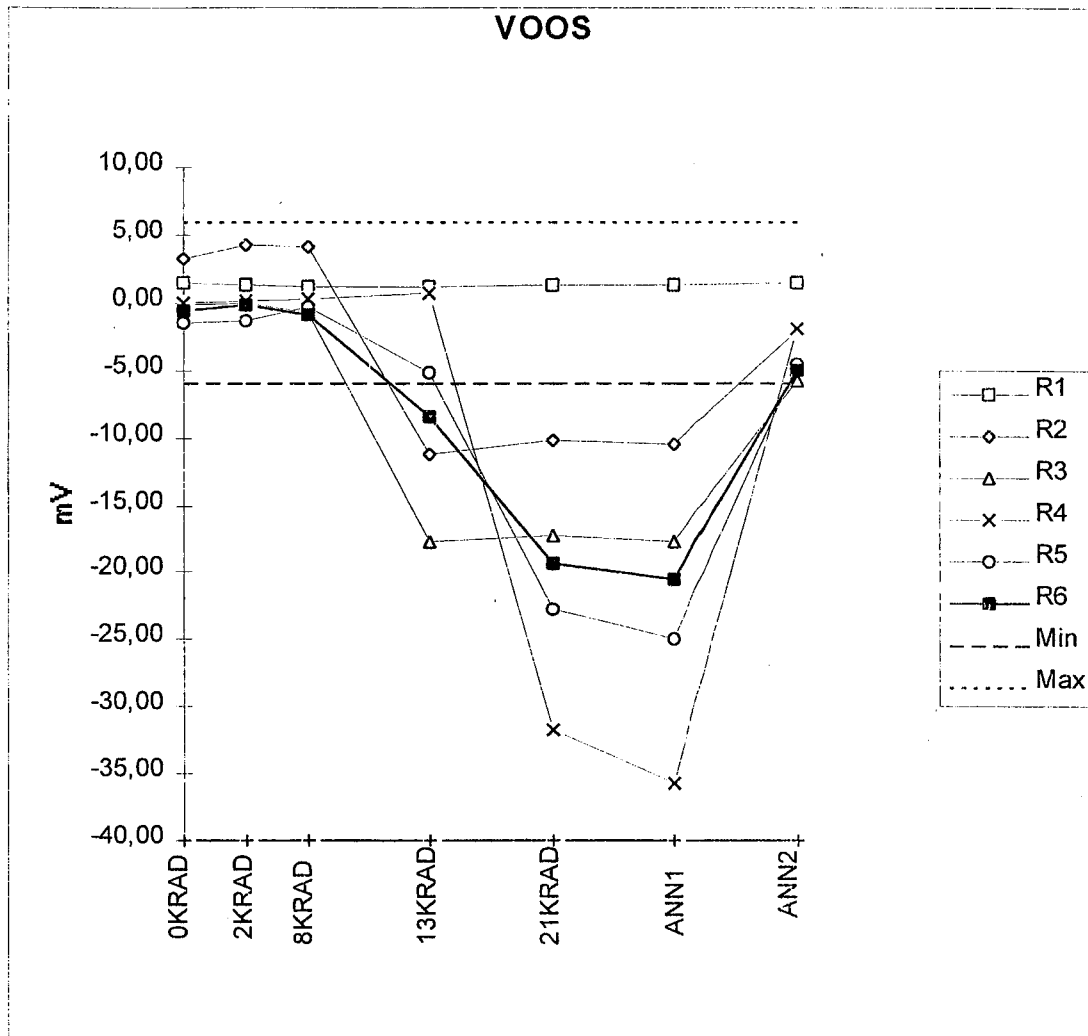
Issue: 1 Rev.:
Date: 20/4/98
Page: 6/41

SCHEDULE

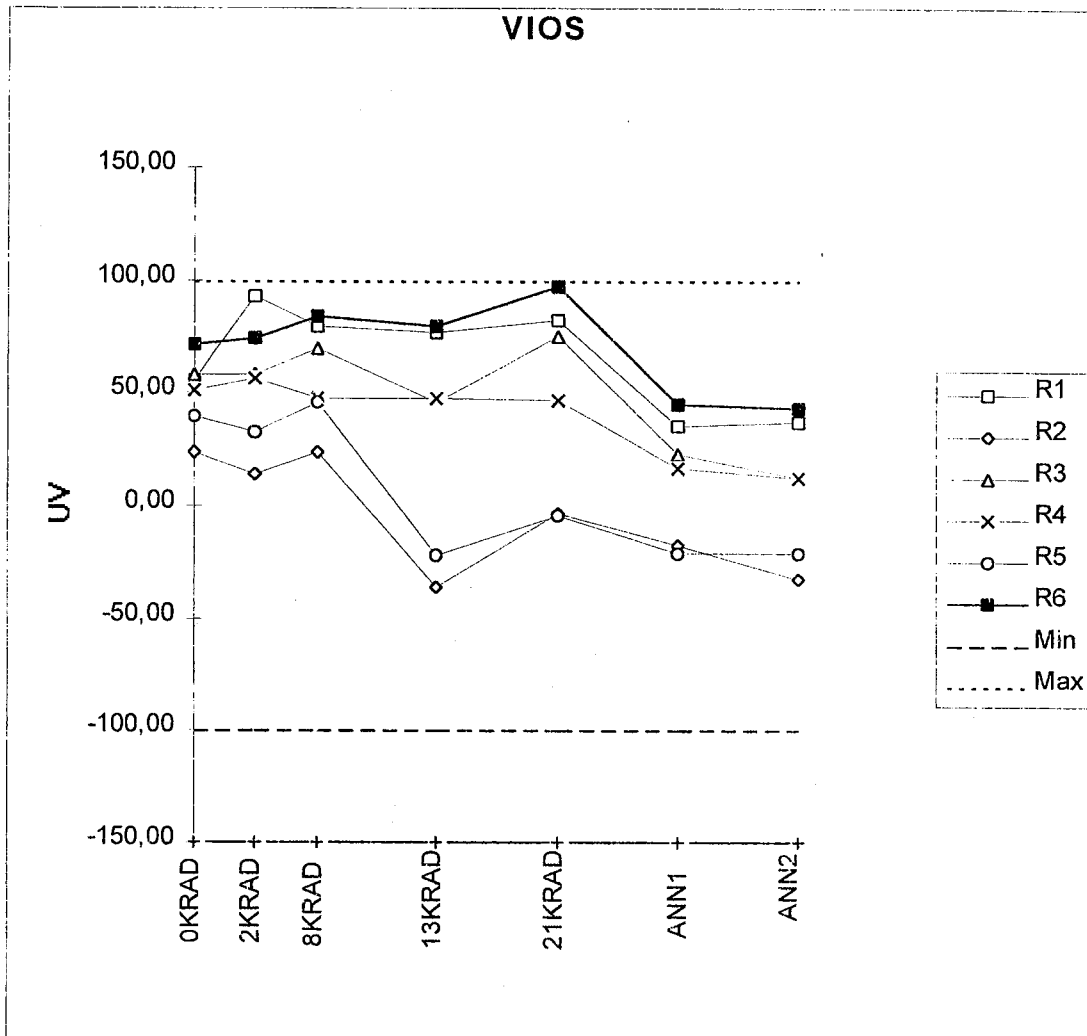
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
1	Sample serialization	CONTROL R1 IRR. DEVICES R2, R3, R4, R5,R6.			
2	Initial Electrical Measurements	See 0 krad(Si) values in respective Parameter Data Tables Temperature: 23,2°C (average)	08:00 30/3	09:34 30/3	94 min.
3	Set-up of Test	Bias circuit verified according to Fig. 1			
4	Irradiation Exposure	Total Dose: 1,5 Krad(Si) Cumulative Dose: 1,5 Krad(Si) Dose Rate: 300 Rad(Si)/h Temperature: 17.5 °C (average)	10:00 30/3	15:00 30/3	5 H
5	Intermediate Electrical Measurements	See 2 krad(Si) values in respective Parameter Data Tables Temperature: 24,65 °C (average)	15:05 30/3	16:00 30/3	55 min.
6	Set-up of Test	Bias circuit verified according to Fig. 1			
7	Irradiation Exposure	Total Dose: 6,6 Krad(Si) Cumulative Dose: 8,1 Krad(Si) Dose Rate: 300 Krad(Si)/h Temperature: 18°C (average)	13:05 30/3	14:05 31/3	22 H
8	Intermediate Electrical Measurements	See 8 krad(Si) values in respective Parameter Data Tables Temperature: 23.8 °C (average)	14:10 31/3	15:45 31/3	35 min.
9	Set-up of Test	Bias circuit verified according to Fig. 1			
10	Irradiation Exposure	Total Dose: 5,49 Krad(Si) Cumulative Dose: 13,5 Krad(Si) Dose Rate: 300 Rad(Si)/h Temperature: 18.7°C (average)	16:00 31/3	10:20 1/4	18,33H.
11	Intermediate Electrical Measurements	See 13,5 krad(Si) values in respective Parameter Data Tables Temperature: 22.2 °C (average)	30:30 1/4	12:00 1/4	90 min.
12	Set-up of Test	Bias circuit verified according to Fig. 1			

SH**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**Issue: 1 Rev.:
Date: 20/4/98
Page: 7/41

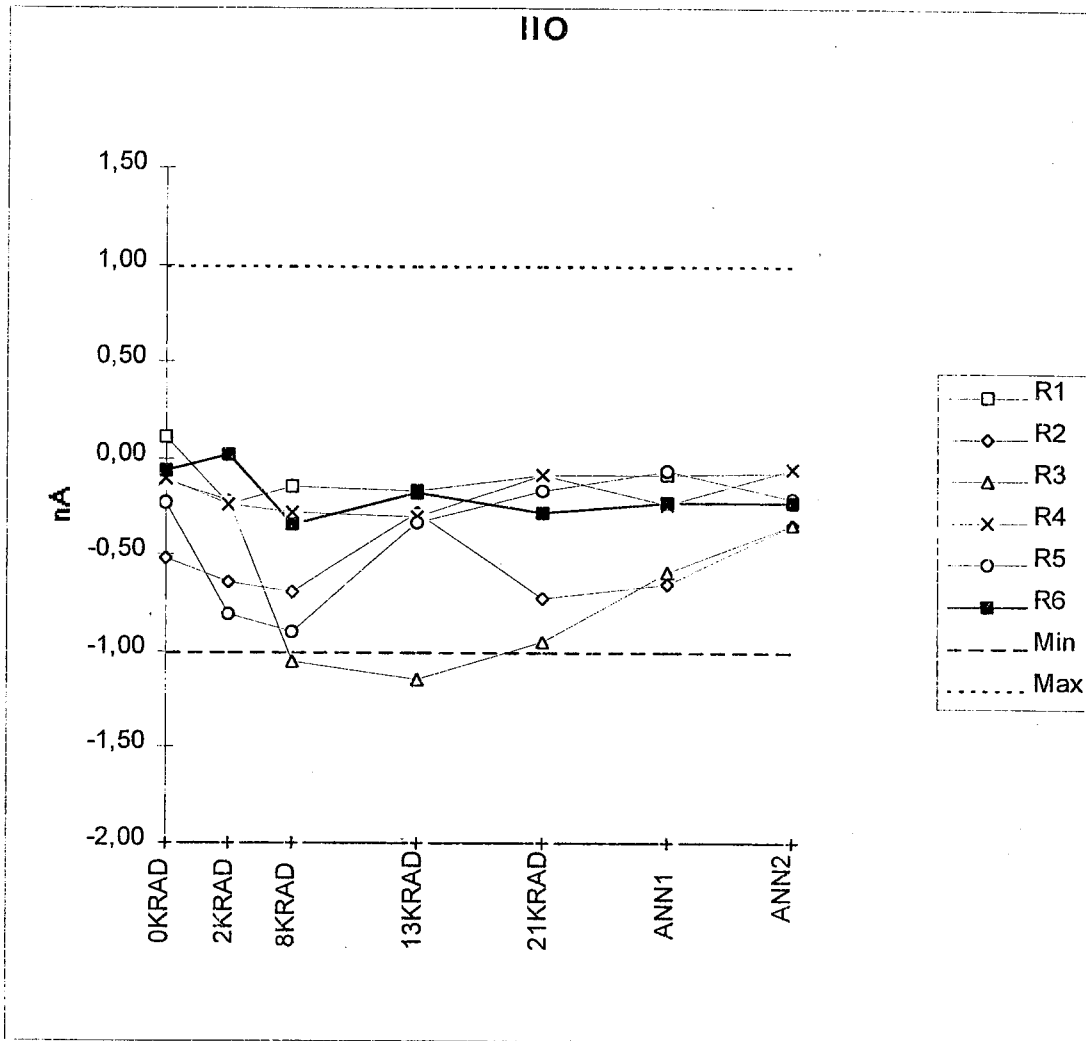
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
13	Irradiation Exposure	Total Dose: 7,8 Krad(Si) Cumulative Dose: 21.3 Krad(Si) Dose Rate: 300 Rad(Si)/h Temperature: 19°C (average)	12:15 1/4	14:15 2/4	26 H.
14	Intermediate Electrical Measurements	See 21,5 krad(Si) values in respective Parameter Data Tables Temperature: 24.7 °C (average)	14:15 2/4	14:45 2/4	30 min.
15	Annealing 24h	Bias circuit verified according to Fig. 1 Temperature: 25 °C (average)	15:00 2/4	15:00 3/4	24 H
16	Electrical Measurements	See ANN24h values in respective parameter Data Tables Temperature: 25 °C	15:15 3/4	15:45 3/4	30 min.
17	Annealing 220 H	Bias circuit verified according to Fig. 1 Temperature: 125 °C	16:00 3/4	16:30 13/4	220 H
18	Final Electrical Measurements	See ANN168h values in respective parameter Data Tables Temperature: 25.8	16:30 13/4	17:00 13/4	30 min.



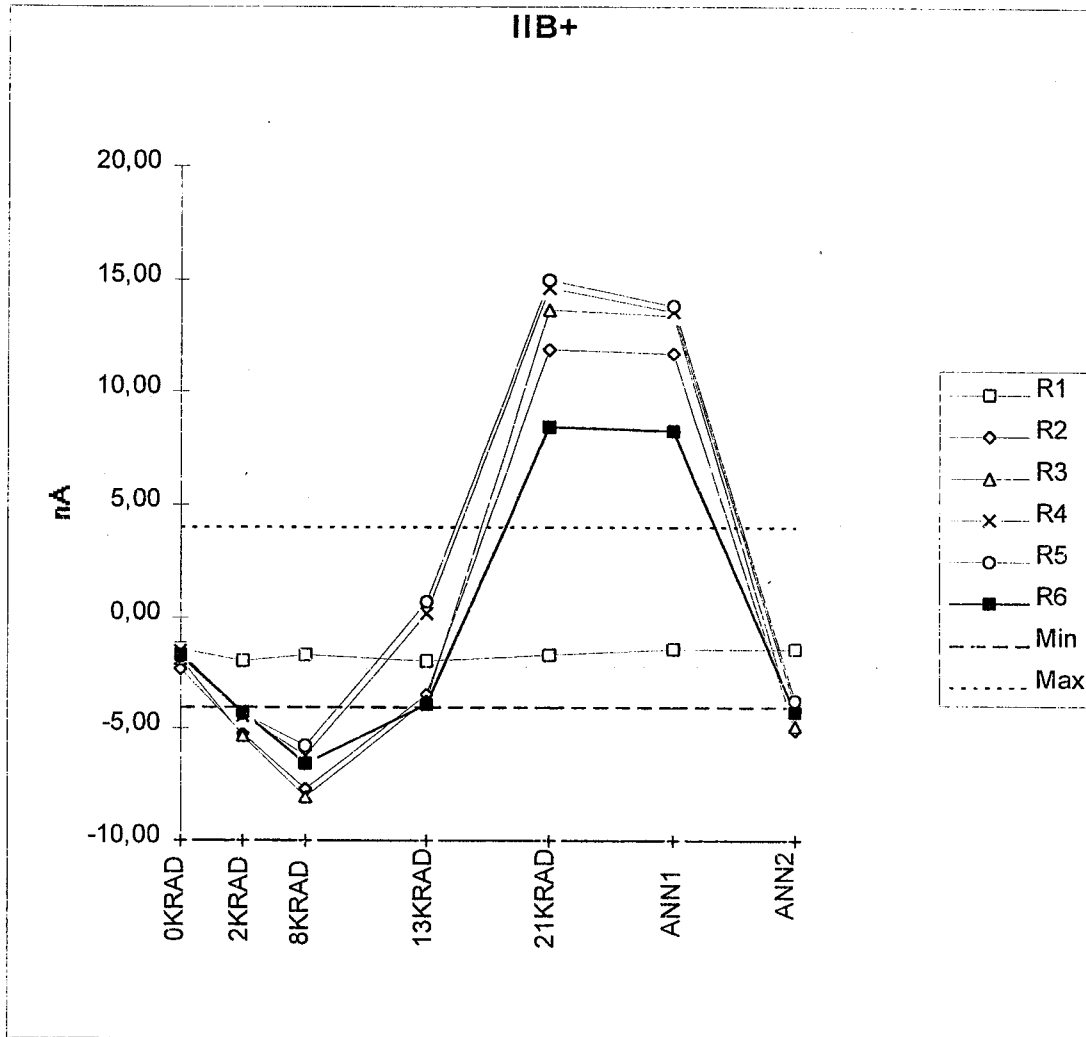
VOOS	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	1,49	1,35	1,17	1,17	1,30	1,34	1,45
R2	3,25	4,29	4,08	-11,24	-10,20	-10,43	-2,16
R3	-0,23	-0,06	-0,82	-17,66	-17,24	-17,79	-5,81
R4	-0,05	0,10	0,20	0,64	-31,70	-35,77	-1,88
R5	-1,50	-1,37	-0,39	-5,12	-22,75	-24,92	-4,58
R6	-0,67	-0,21	-0,92	-8,48	-19,39	-20,59	-5,04
Min	-6,00	-6,00	-6,00	-6,00	-6,00	-6,00	-6,00
Max	6,00	6,00	6,00	6,00	6,00	6,00	6,00



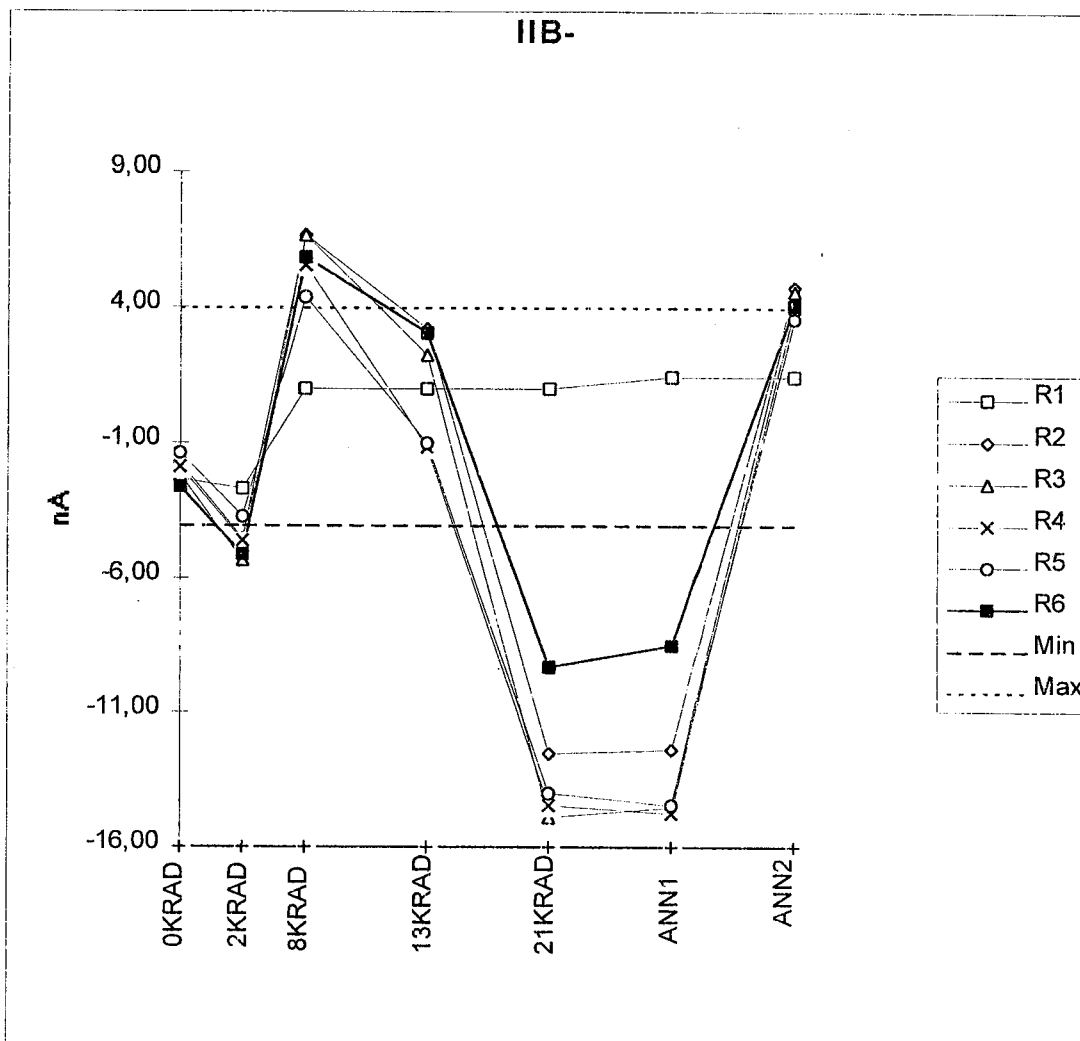
VIOS	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	55,70	92,37	79,51	77,11	82,29	34,86	36,91
R2	23,75	13,85	24,09	-35,79	-3,30	-17,68	-32,29
R3	58,14	58,46	69,64	46,23	75,17	23,05	12,71
R4	51,19	56,35	47,59	47,53	47,10	16,40	12,05
R5	40,02	32,44	45,76	-22,44	-4,16	-21,17	-21,22
R6	71,26	73,85	83,49	79,41	96,64	44,91	42,85
Min	-100,00	-100,00	-100,00	-100,00	-100,00	-100,00	-100,00
Max	100,00	100,00	100,00	100,00	100,00	100,00	100,00



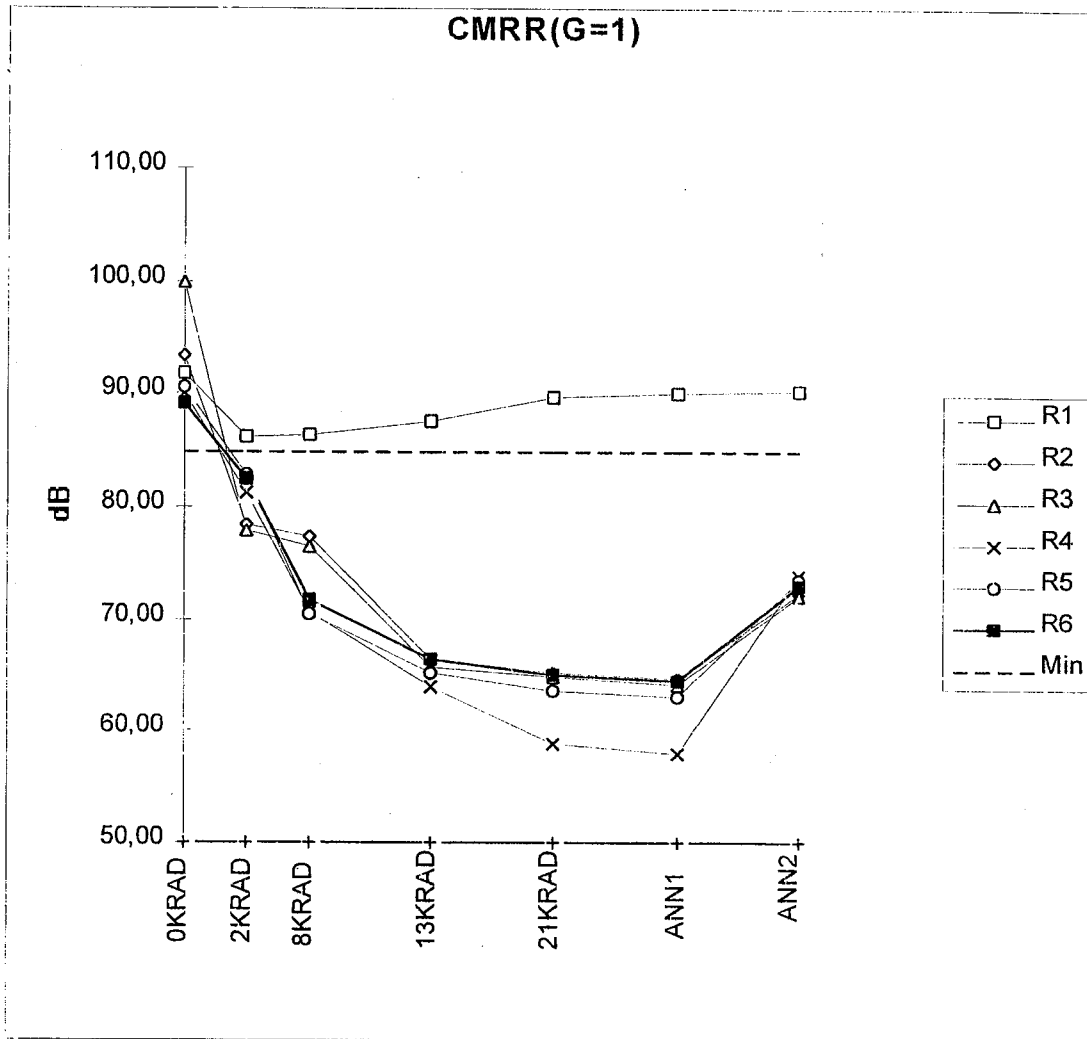
IIO	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	0,11	-0,24	-0,15	-0,16	-0,09	-0,09	-0,08
R2	-0,52	-0,64	-0,70	-0,28	-0,73	-0,65	-0,34
R3	-0,11	-0,22	-1,05	-1,14	-0,95	-0,59	-0,35
R4	-0,11	-0,24	-0,29	-0,30	-0,08	-0,24	-0,06
R5	-0,23	-0,80	-0,89	-0,34	-0,16	-0,07	-0,21
R6	-0,06	0,01	-0,34	-0,18	-0,28	-0,23	-0,23
Min	-1,00	-1,00	-1,00	-1,00	-1,00	-1,00	-1,00
Max	1,00	1,00	1,00	1,00	1,00	1,00	1,00



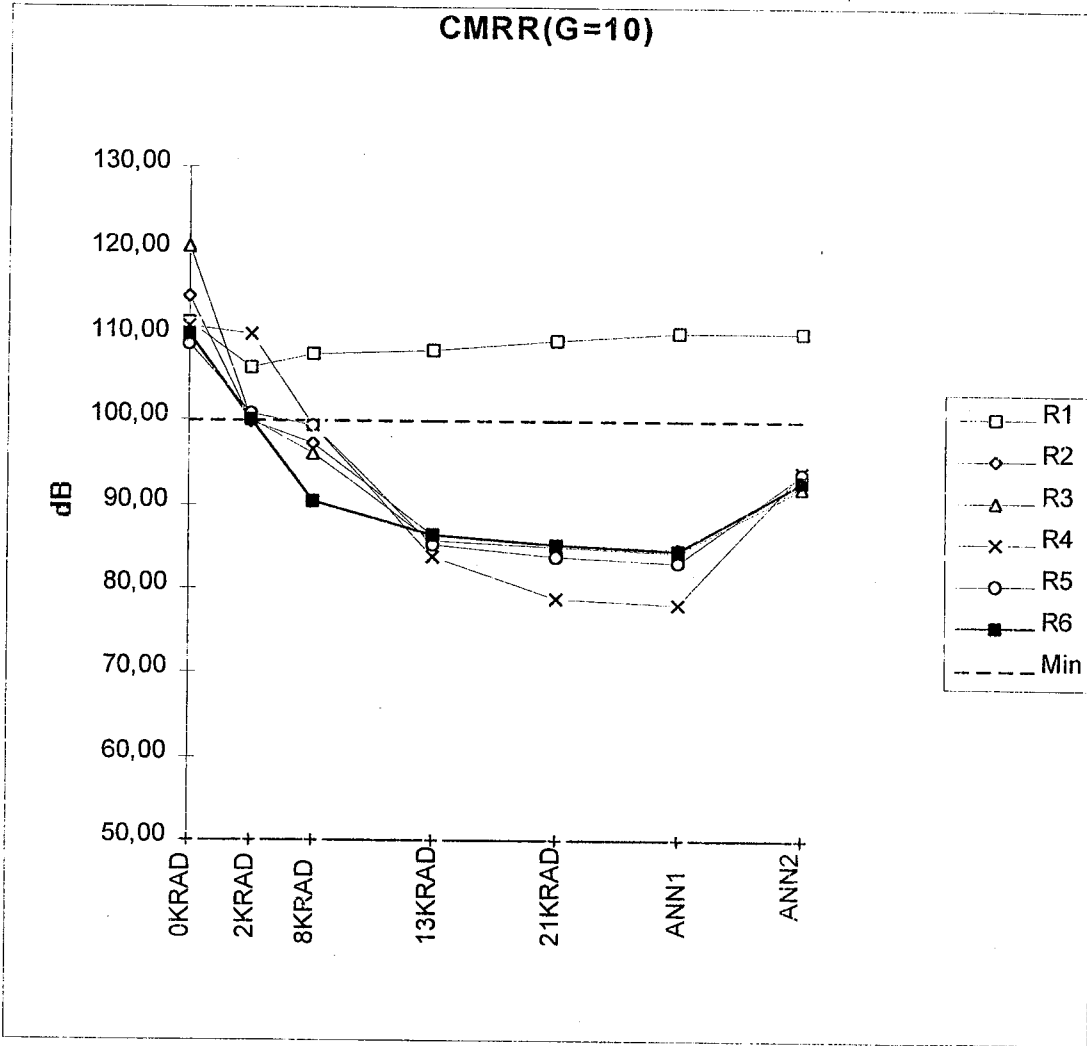
IIB+	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-1,43	-2,01	-1,72	-1,93	-1,71	-1,48	-1,47
R2	-2,32	-5,26	-7,70	-3,43	11,89	11,73	-5,10
R3	-1,89	-5,29	-8,05	-3,73	13,62	13,35	-4,89
R4	-1,57	-4,47	-6,22	0,14	14,62	13,60	-4,01
R5	-1,82	-4,36	-5,81	0,68	14,98	13,86	-3,75
R6	-1,66	-4,29	-6,60	-3,94	8,42	8,25	-4,25
Min	-4,00	-4,00	-4,00	-4,00	-4,00	-4,00	-4,00
Max	4,00	4,00	4,00	4,00	4,00	4,00	4,00



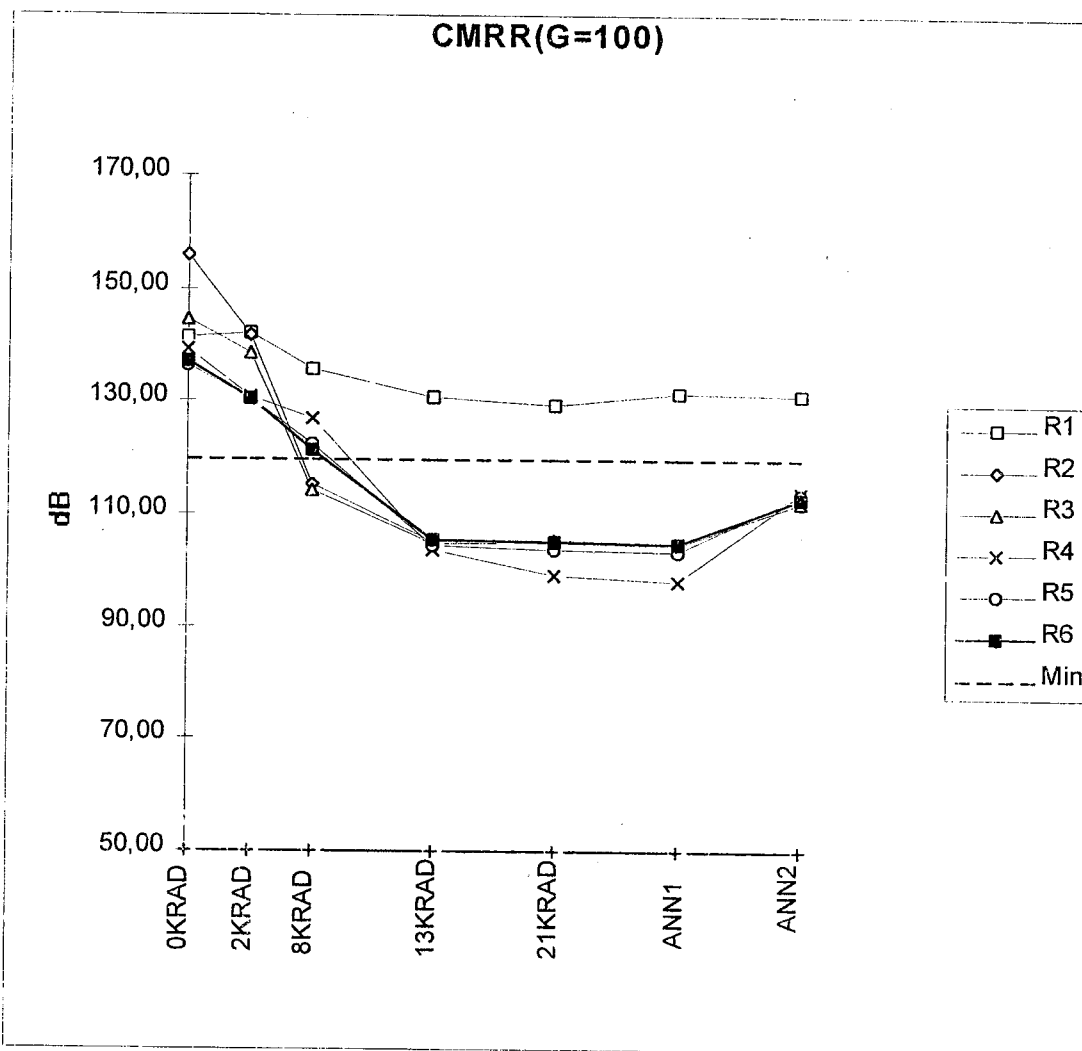
IIB-	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-2,32	-2,66	0,98	0,96	0,96	1,42	1,41
R2	-1,70	-4,55	6,68	3,19	-12,56	-12,36	4,77
R3	-2,17	-5,32	6,62	2,23	-14,92	-14,54	4,56
R4	-1,89	-4,60	5,53	-1,18	-14,46	-14,72	3,98
R5	-1,38	-3,69	4,40	-1,02	-14,04	-14,46	3,56
R6	-2,64	-5,15	5,85	3,04	-9,28	-8,48	4,05
Min	-4,00	-4,00	-4,00	-4,00	-4,00	-4,00	-4,00
Max	4,00	4,00	4,00	4,00	4,00	4,00	4,00



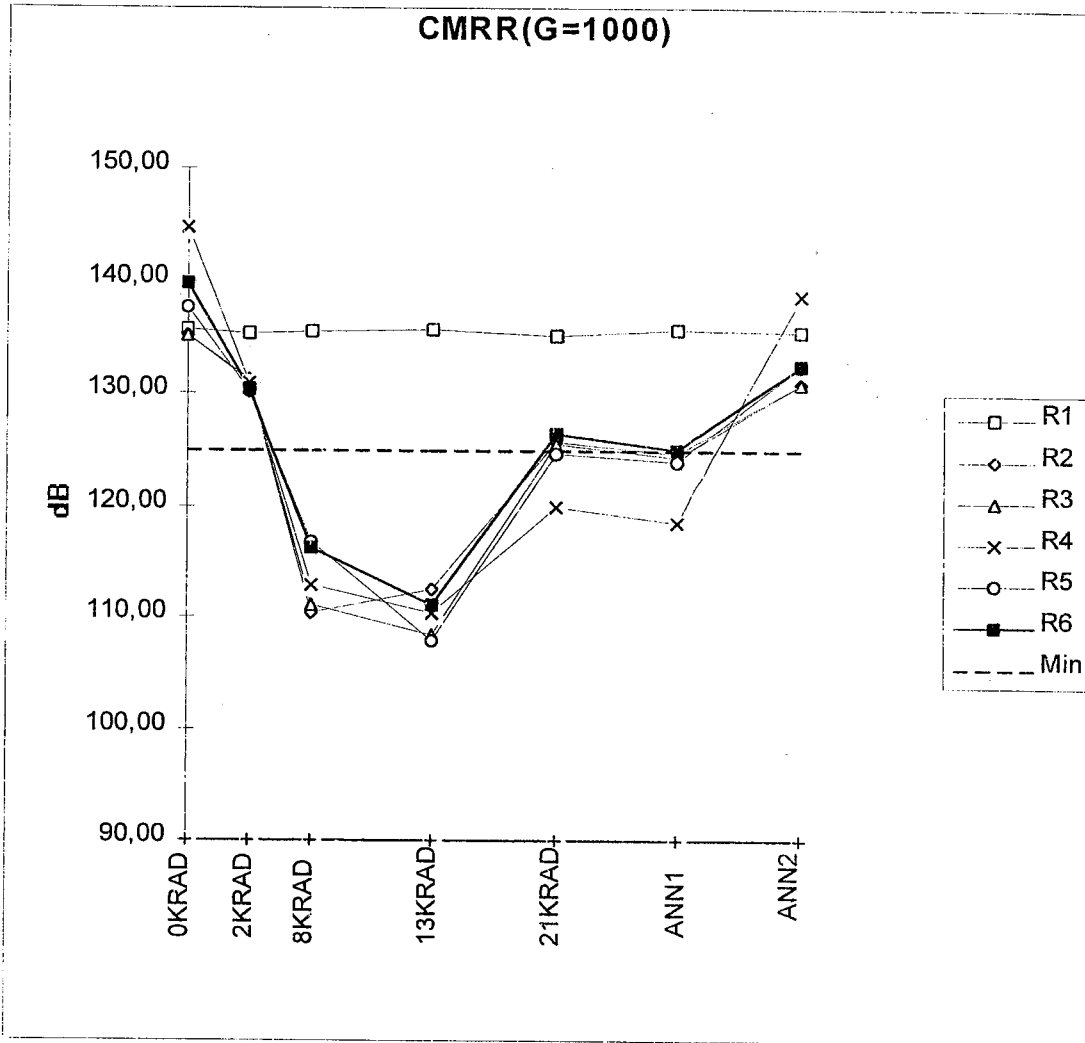
CMRR(G=1)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	91,77	86,21	86,28	87,56	89,75	90,07	90,27
R2	93,48	78,43	77,36	66,33	65,24	64,69	72,30
R3	99,90	77,93	76,51	65,77	64,78	64,13	72,01
R4	90,02	81,29	70,64	63,90	58,74	57,89	73,84
R5	90,64	82,79	70,54	65,23	63,66	63,08	73,55
R6	89,15	82,54	71,66	66,49	65,00	64,46	72,92
Min	85,00	85,00	85,00	85,00	85,00	85,00	85,00



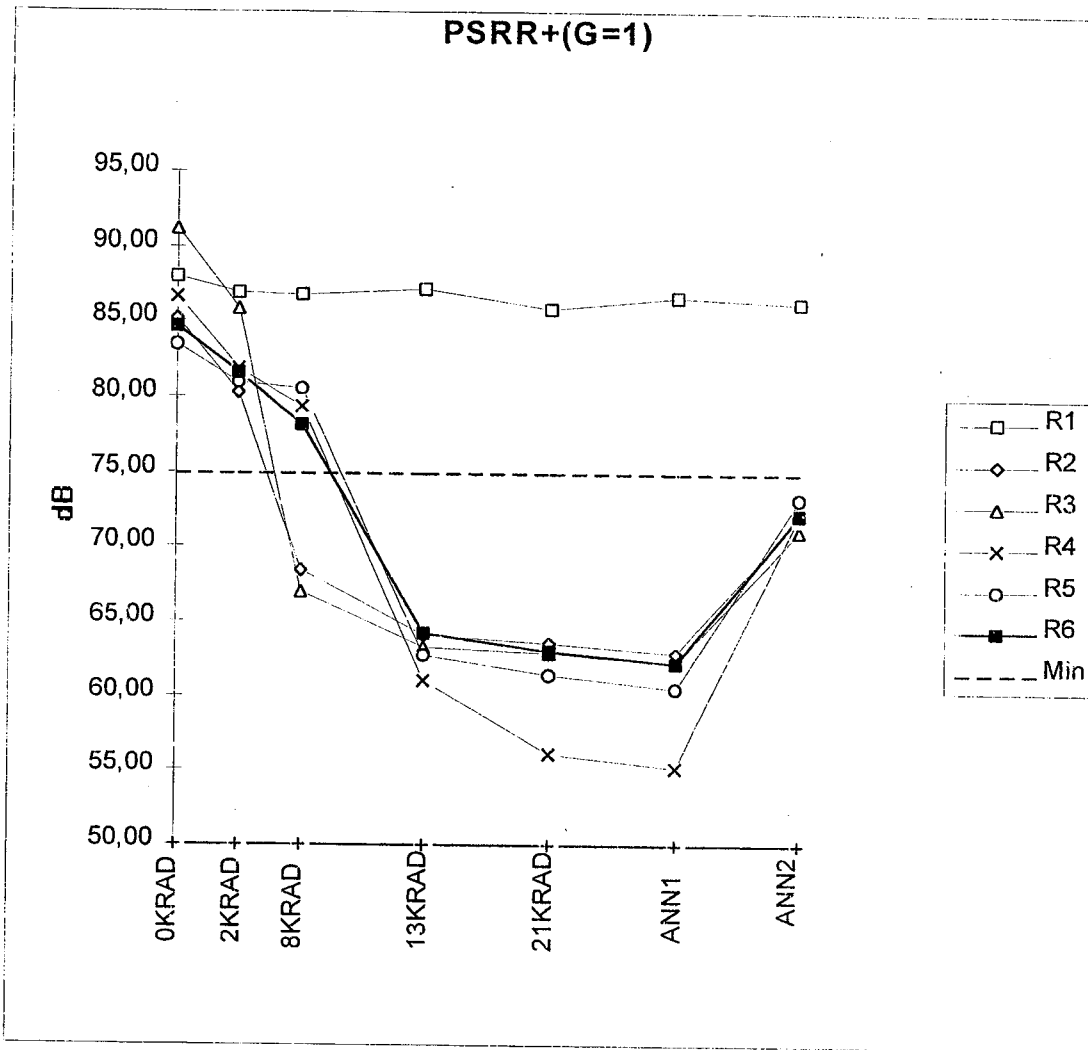
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R1	111,63	106,09	107,87	108,18	109,42	110,52	110,33
R2	114,62	99,84	97,26	86,35	85,26	84,65	92,33
R3	120,67	99,96	96,04	85,62	84,81	84,22	92,03
R4	111,12	110,23	99,40	83,85	78,80	77,98	93,95
R5	109,06	100,62	99,28	85,17	83,71	83,09	93,60
R6	110,07	100,09	90,42	86,34	85,07	84,53	92,82
Min	100,00	100,00	100,00	100,00	100,00	100,00	100,00



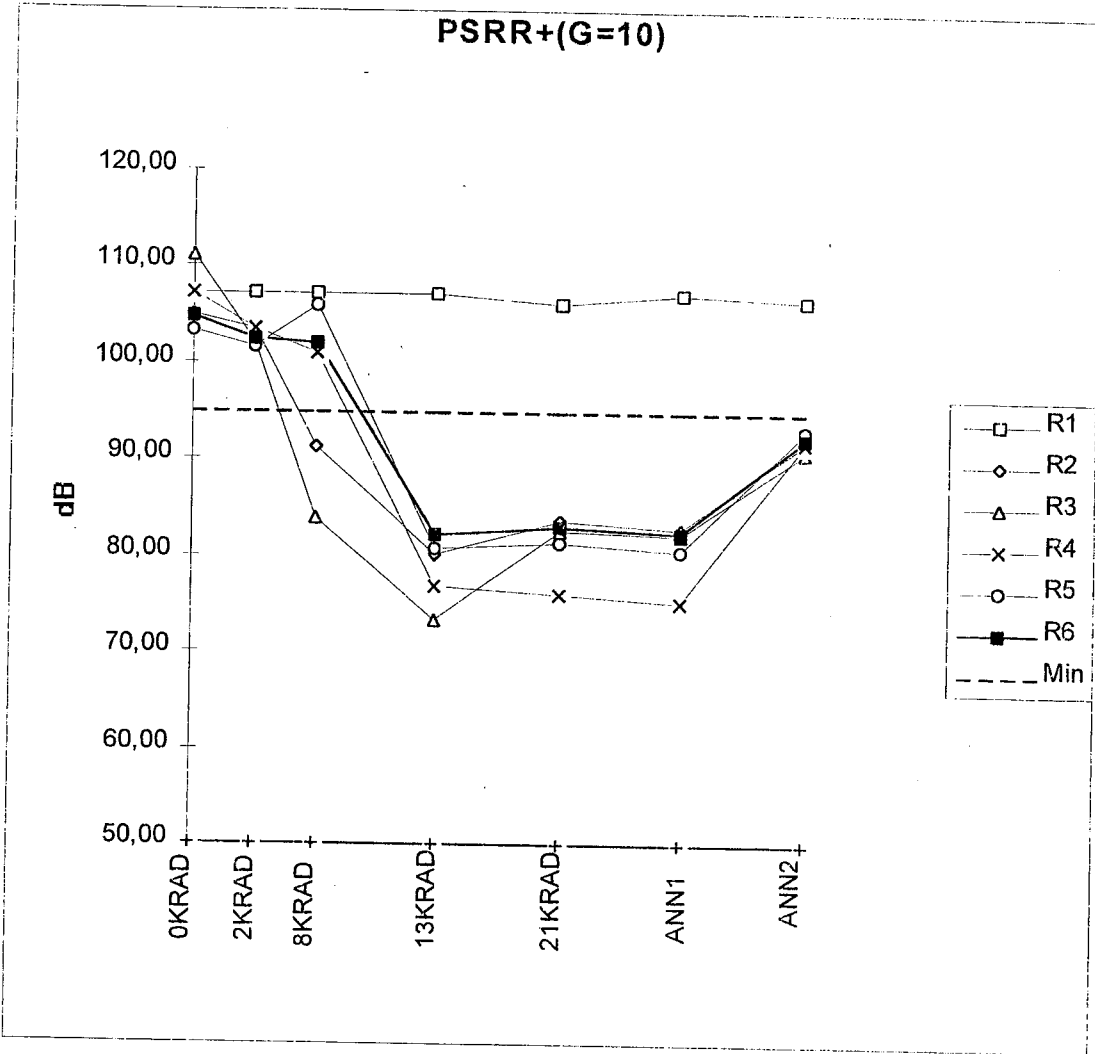
CMRR(G=100)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	141,24	142,06	135,77	130,83	129,25	131,52	131,16
R2	155,81	141,83	115,44	105,18	105,34	104,69	112,25
R3	144,73	138,65	114,33	104,78	104,89	104,28	111,97
R4	139,25	130,70	126,83	103,56	98,90	98,02	114,01
R5	136,51	130,30	122,52	104,36	103,81	103,15	113,53
R6	137,30	130,48	121,31	105,55	105,20	104,60	112,78
Min	120,00	120,00	120,00	120,00	120,00	120,00	120,00



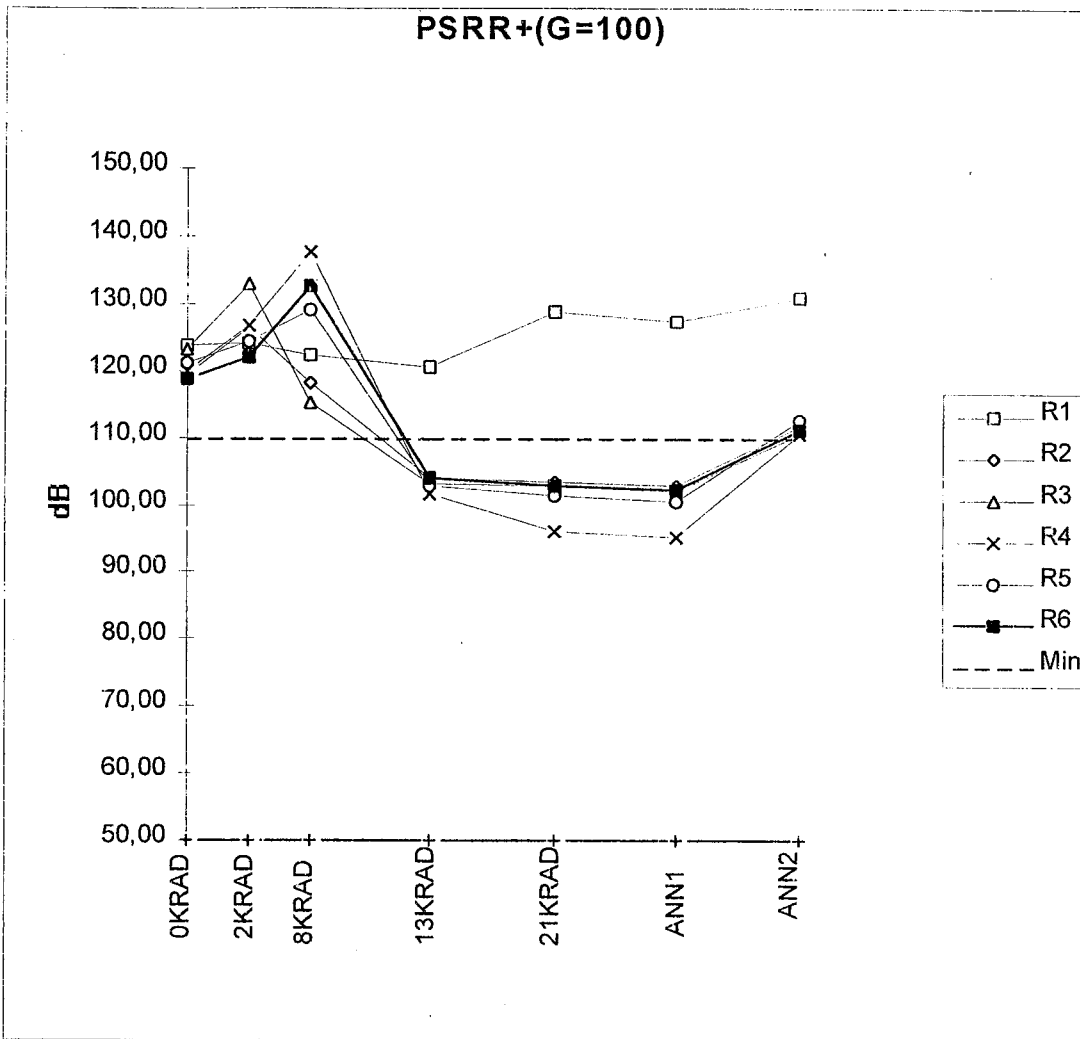
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R1	135,71	135,28	135,55	135,58	135,14	135,69	135,45
R2	135,12	131,06	110,40	112,48	125,81	124,78	130,97
R3	135,17	131,22	111,13	108,48	125,49	124,31	130,81
R4	144,70	130,81	112,75	110,27	119,86	118,56	138,63
R5	137,60	130,23	116,67	107,81	124,65	123,93	132,44
R6	139,81	130,28	116,19	111,09	126,43	125,03	132,40
Min	125,00	125,00	125,00	125,00	125,00	125,00	125,00



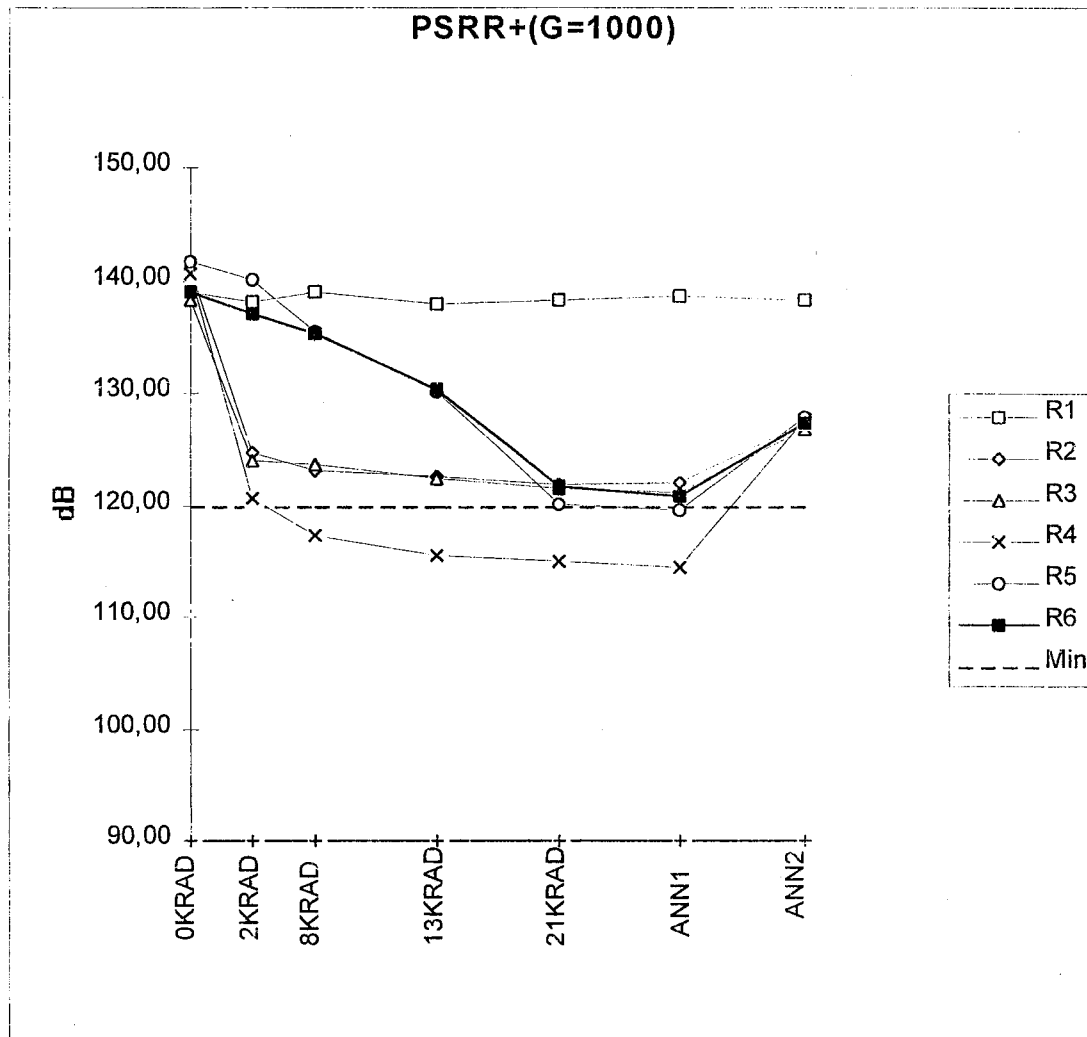
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R1	87,95	86,92	86,78	87,17	85,87	86,64	86,19
R2	85,16	80,24	68,42	64,08	63,60	62,93	72,10
R3	91,16	85,78	66,99	63,26	62,84	62,15	71,08
R4	86,63	81,86	79,29	61,01	56,10	55,19	72,22
R5	83,40	80,96	80,51	62,81	61,41	60,52	73,23
R6	84,60	81,61	78,11	64,17	63,06	62,27	72,12
Min	75,00	75,00	75,00	75,00	75,00	75,00	75,00



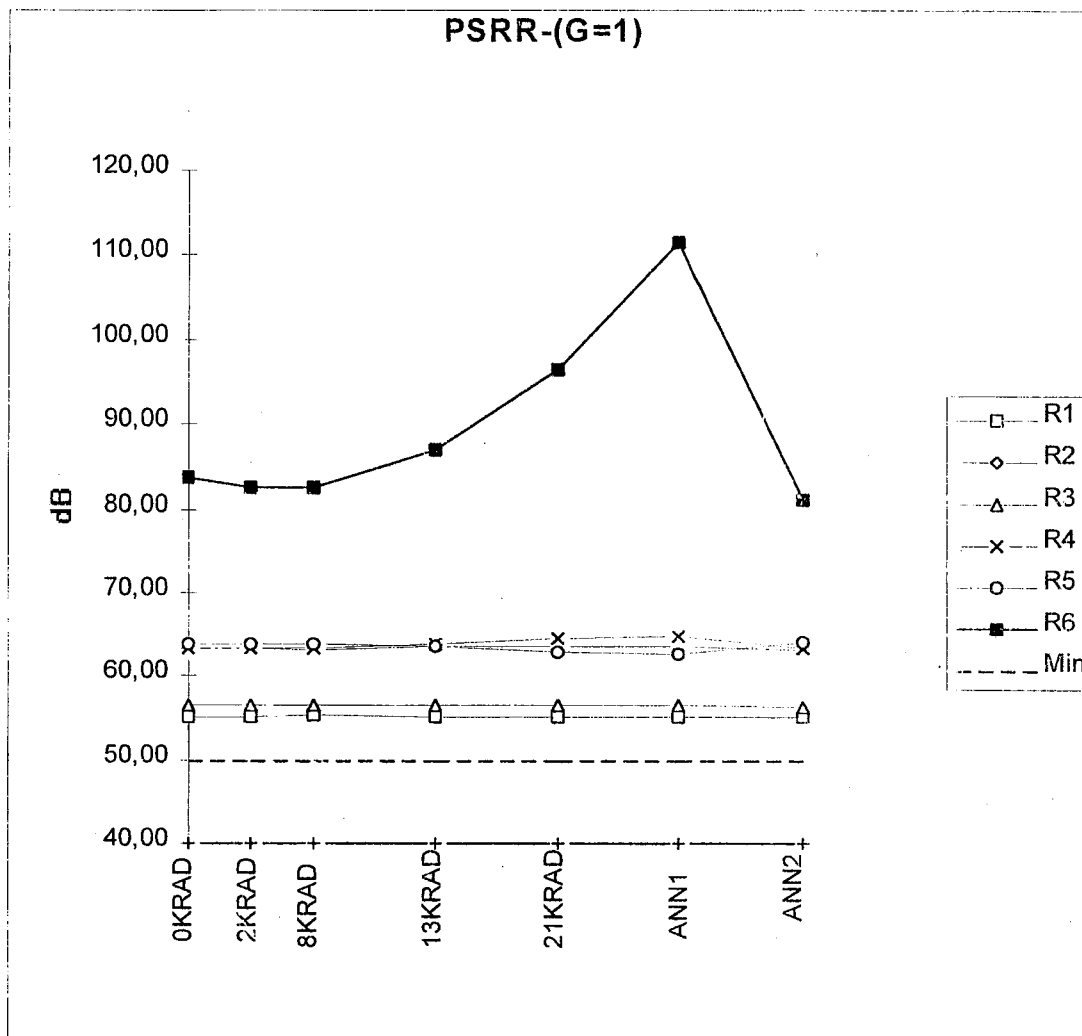
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R1	107,16	107,13	107,16	107,22	106,25	107,15	106,58
R2	105,02	103,41	91,35	80,08	83,68	82,88	91,87
R3	111,17	102,00	83,95	73,27	82,72	82,14	90,92
R4	107,25	103,50	101,00	76,94	76,09	75,17	91,90
R5	103,32	101,59	105,86	80,82	81,33	80,51	93,13
R6	104,64	102,35	102,13	82,14	82,97	82,34	92,28
Min	95,00	95,00	95,00	95,00	95,00	95,00	95,00



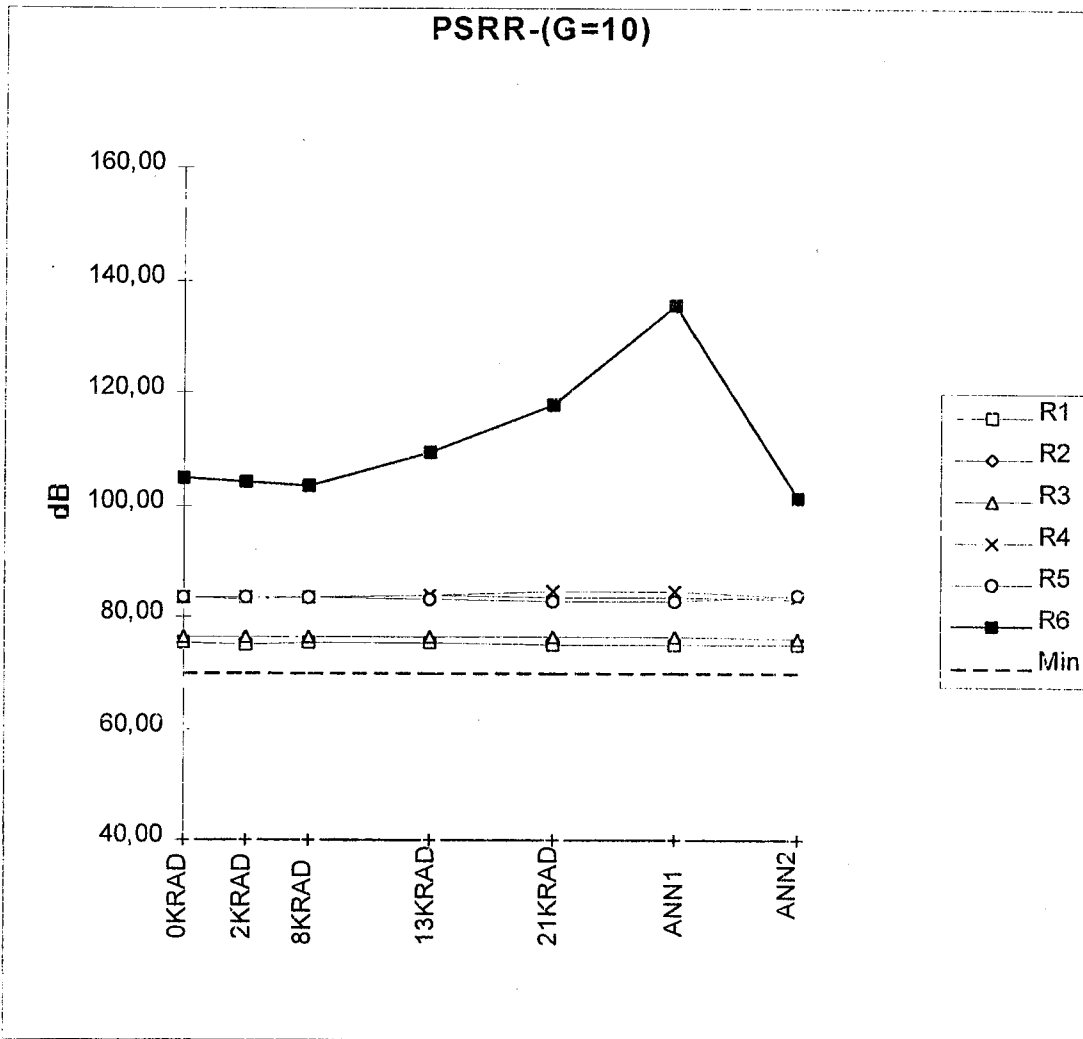
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R1	123,76	124,04	122,38	120,47	128,86	127,40	130,78
R2	119,20	126,35	118,01	104,05	103,46	102,84	111,55
R3	123,28	132,76	115,13	103,20	102,68	102,03	110,58
R4	119,98	126,72	137,66	101,55	96,04	95,09	110,54
R5	121,08	124,45	128,96	102,66	101,25	100,38	112,43
R6	118,72	121,91	132,57	104,10	102,89	102,11	110,97
Min	110,00	110,00	110,00	110,00	110,00	110,00	110,00



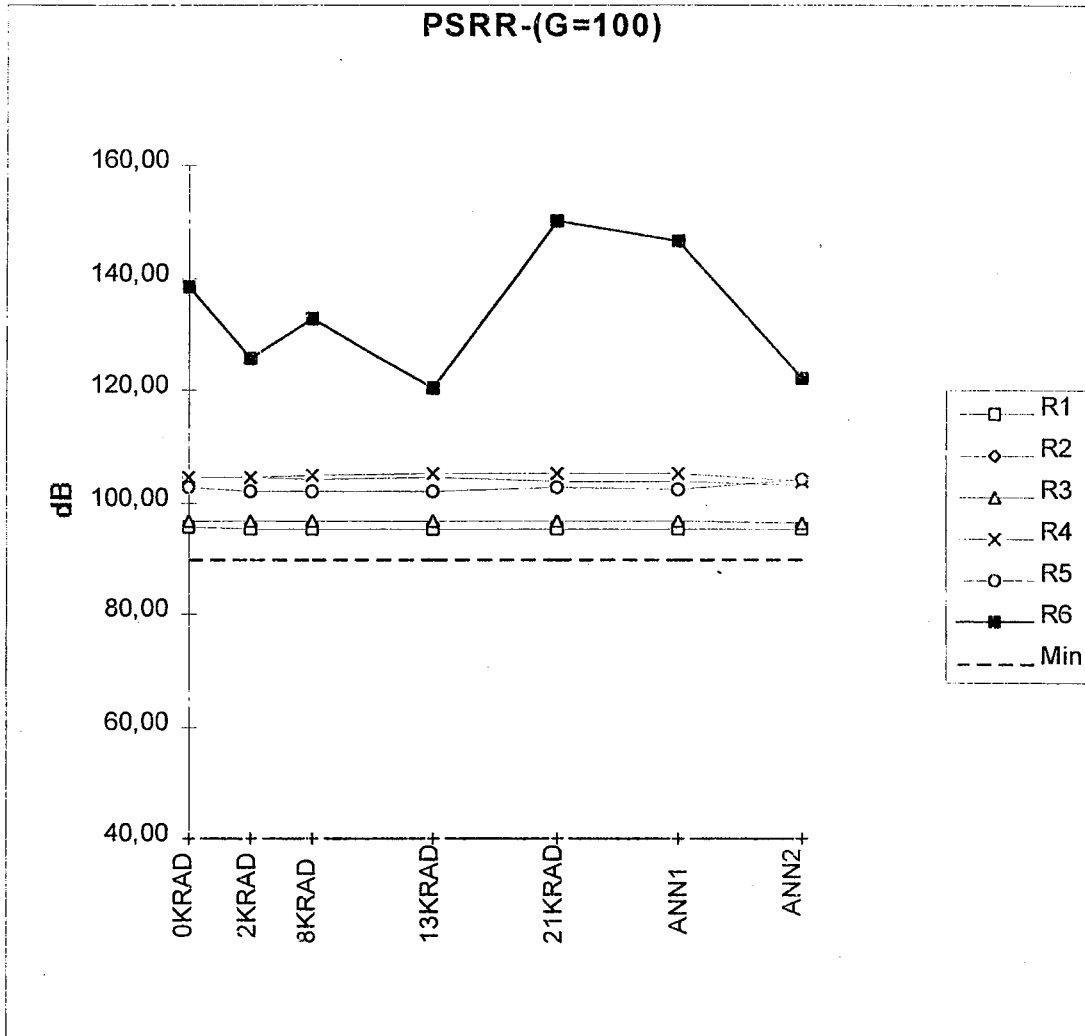
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R1	139,01	138,06	138,99	138,02	138,28	138,59	138,26
R2	140,96	124,64	123,05	122,63	121,81	121,95	127,37
R3	138,25	124,02	123,64	122,47	121,52	121,21	126,84
R4	140,63	120,55	117,34	115,51	114,92	114,47	127,64
R5	141,65	140,02	135,49	130,23	120,04	119,55	127,86
R6	139,11	137,12	135,29	130,40	121,60	120,84	127,40
Min	120,00	120,00	120,00	120,00	120,00	120,00	120,00



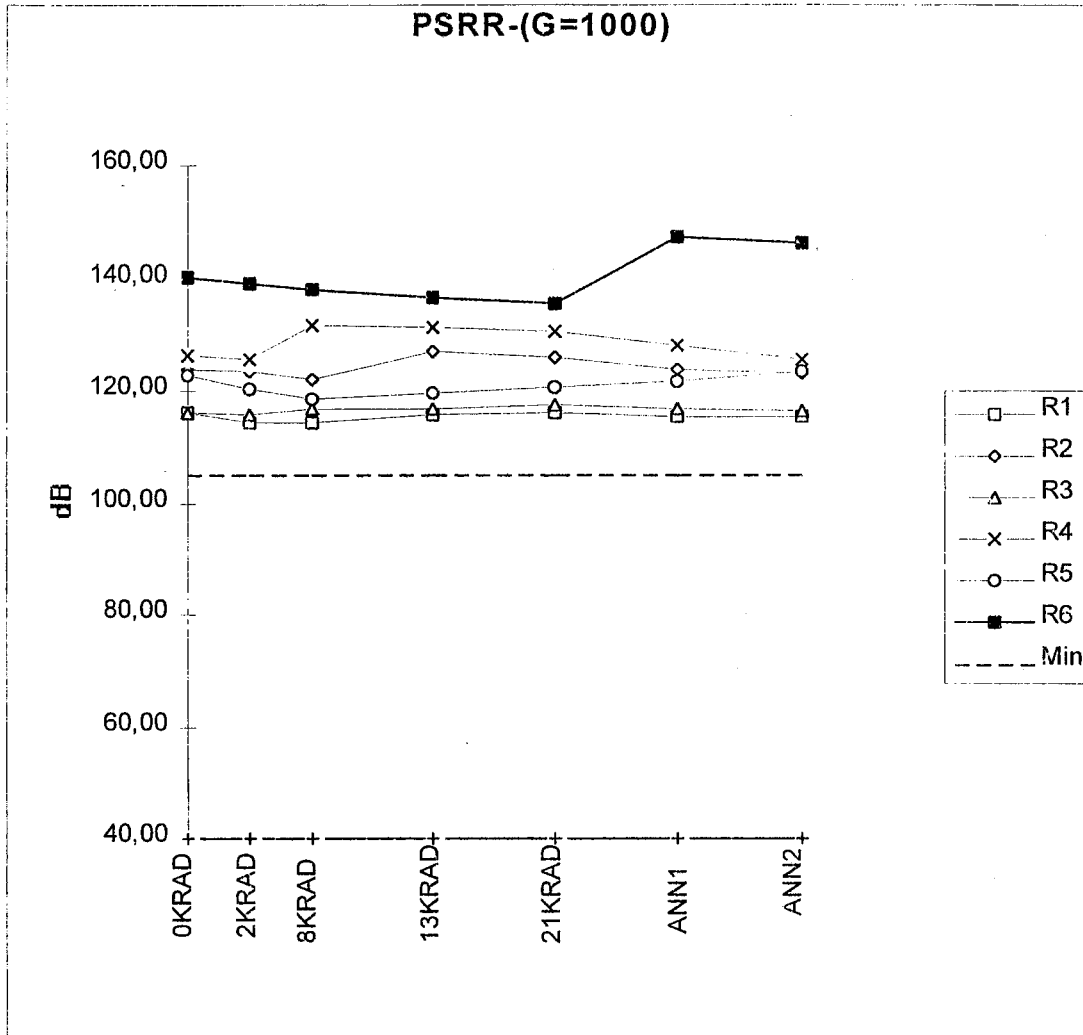
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R1	55,19	55,16	55,24	55,22	55,21	55,18	55,19
R2	63,43	63,30	63,19	63,71	63,49	63,49	63,04
R3	56,42	56,40	56,46	56,61	56,52	56,53	56,26
R4	63,32	63,31	63,46	63,79	64,53	64,86	63,29
R5	63,75	63,83	63,82	63,54	62,83	62,58	63,96
R6	83,60	82,39	82,52	86,85	96,38	111,45	81,17
Min	50,00	50,00	50,00	50,00	50,00	50,00	50,00



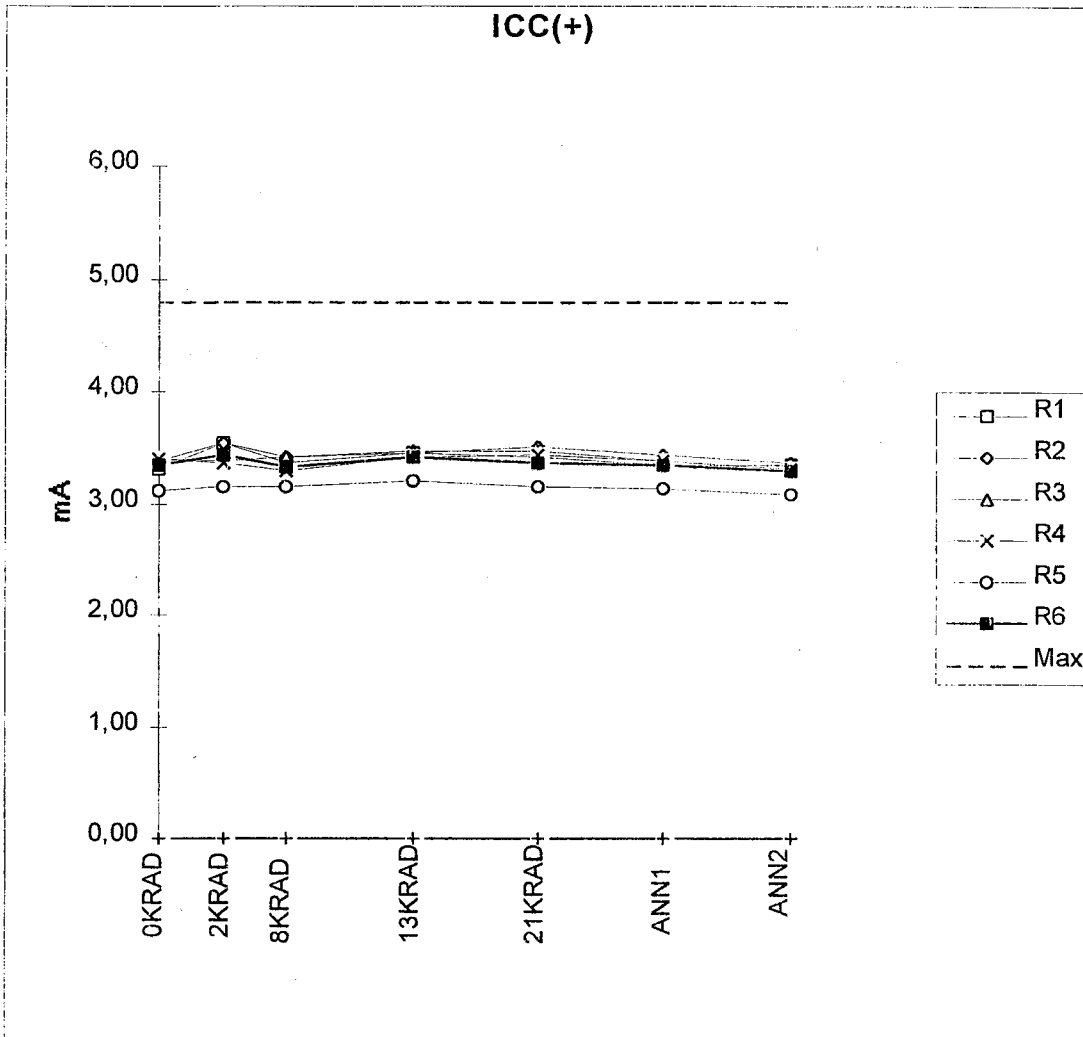
PSRR-(G=10)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	75,23	75,22	75,24	75,27	75,19	75,20	75,20
R2	83,52	83,35	83,40	83,90	83,54	83,60	83,07
R3	76,40	76,42	76,43	76,61	76,54	76,54	76,27
R4	83,44	83,37	83,62	83,87	84,61	84,64	83,37
R5	83,65	83,61	83,55	83,28	82,74	82,66	83,97
R6	104,72	103,95	103,36	109,41	117,97	135,60	101,25
Min	70,00	70,00	70,00	70,00	70,00	70,00	70,00



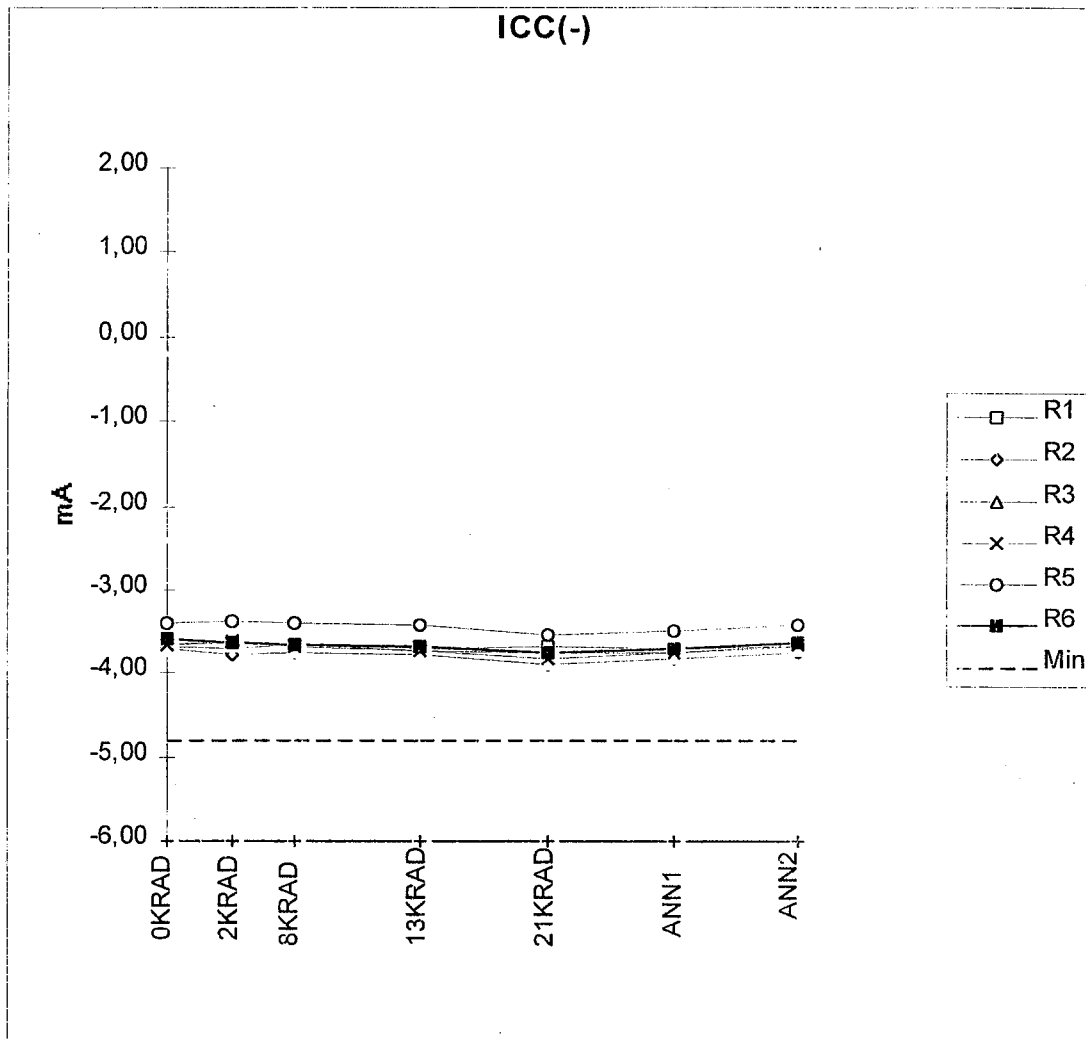
PSRR-(G=100)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	95,44	95,18	95,36	95,21	95,27	95,12	95,11
R2	104,32	104,56	104,24	104,26	103,69	103,62	103,04
R3	96,75	96,48	96,57	96,74	96,62	96,59	96,30
R4	104,27	104,51	104,85	105,10	105,04	105,14	103,67
R5	102,54	101,91	101,96	101,78	102,59	102,47	104,00
R6	138,37	125,73	132,62	120,33	149,99	146,39	121,99
Min	90,00	90,00	90,00	90,00	90,00	90,00	90,00



PSRR-(G=1000)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	115,93	114,49	114,51	115,80	116,00	115,36	115,40
R2	124,07	123,39	121,97	127,18	126,03	123,80	123,24
R3	116,23	115,72	116,70	116,79	117,43	116,98	116,41
R4	126,49	125,51	131,53	131,45	130,69	128,21	125,50
R5	122,89	120,52	118,51	119,59	120,57	121,83	123,42
R6	140,31	139,06	138,13	136,80	135,52	147,34	146,29
Min	105,00	105,00	105,00	105,00	105,00	105,00	105,00



ICC(+)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	3,32	3,54	3,36	3,46	3,41	3,34	3,34
R2	3,38	3,54	3,41	3,46	3,51	3,44	3,37
R3	3,39	3,39	3,42	3,46	3,47	3,39	3,32
R4	3,40	3,37	3,29	3,42	3,43	3,38	3,31
R5	3,12	3,14	3,15	3,21	3,15	3,14	3,08
R6	3,34	3,43	3,32	3,42	3,37	3,35	3,29
Max	4,80	4,80	4,80	4,80	4,80	4,80	4,80

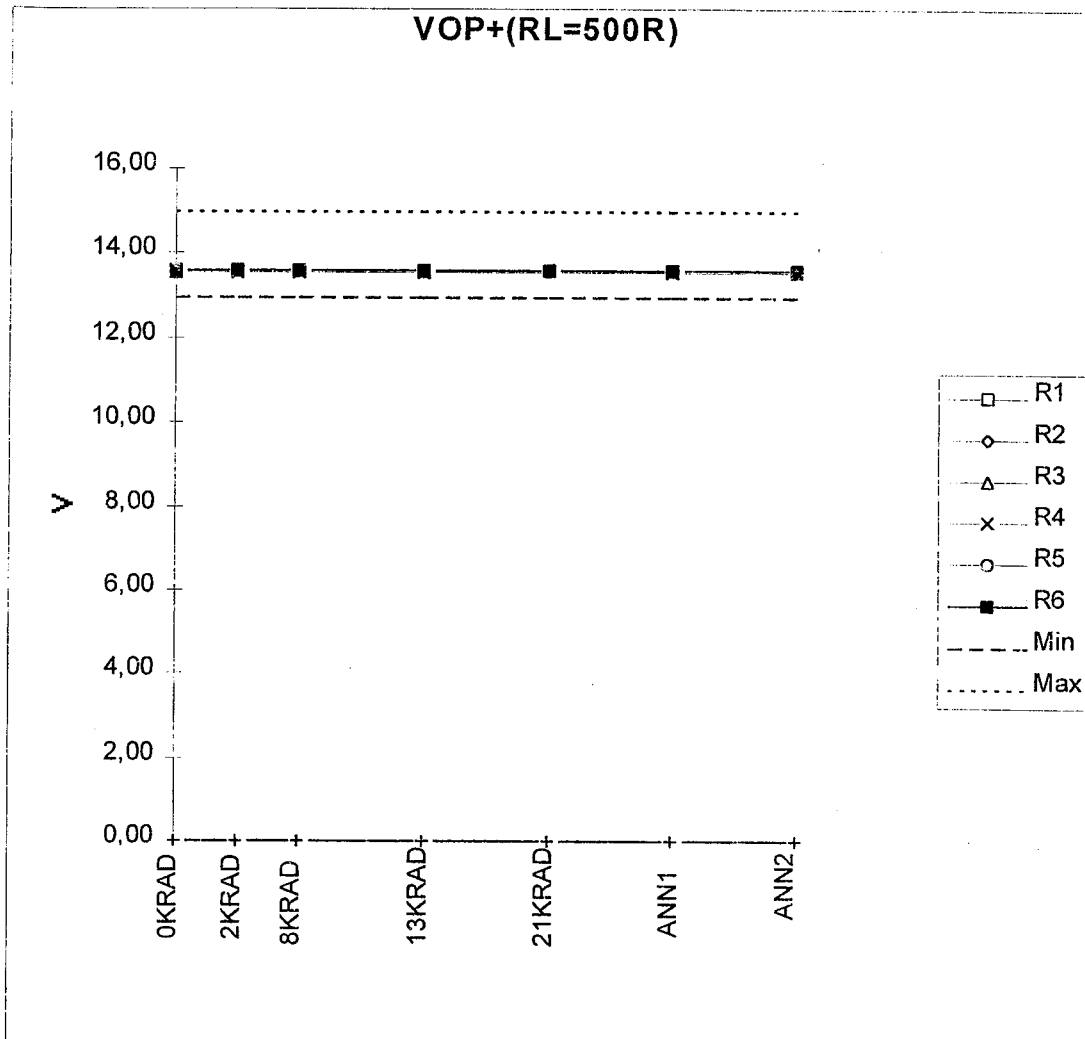


ICC(-)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-3,68	-3,71	-3,67	-3,71	-3,68	-3,70	-3,69
R2	-3,71	-3,77	-3,76	-3,79	-3,90	-3,84	-3,76
R3	-3,65	-3,64	-3,67	-3,74	-3,76	-3,76	-3,68
R4	-3,67	-3,63	-3,69	-3,74	-3,83	-3,76	-3,67
R5	-3,40	-3,39	-3,40	-3,44	-3,55	-3,51	-3,44
R6	-3,60	-3,63	-3,67	-3,70	-3,75	-3,70	-3,63
Min	-4,80	-4,80	-4,80	-4,80	-4,80	-4,80	-4,80

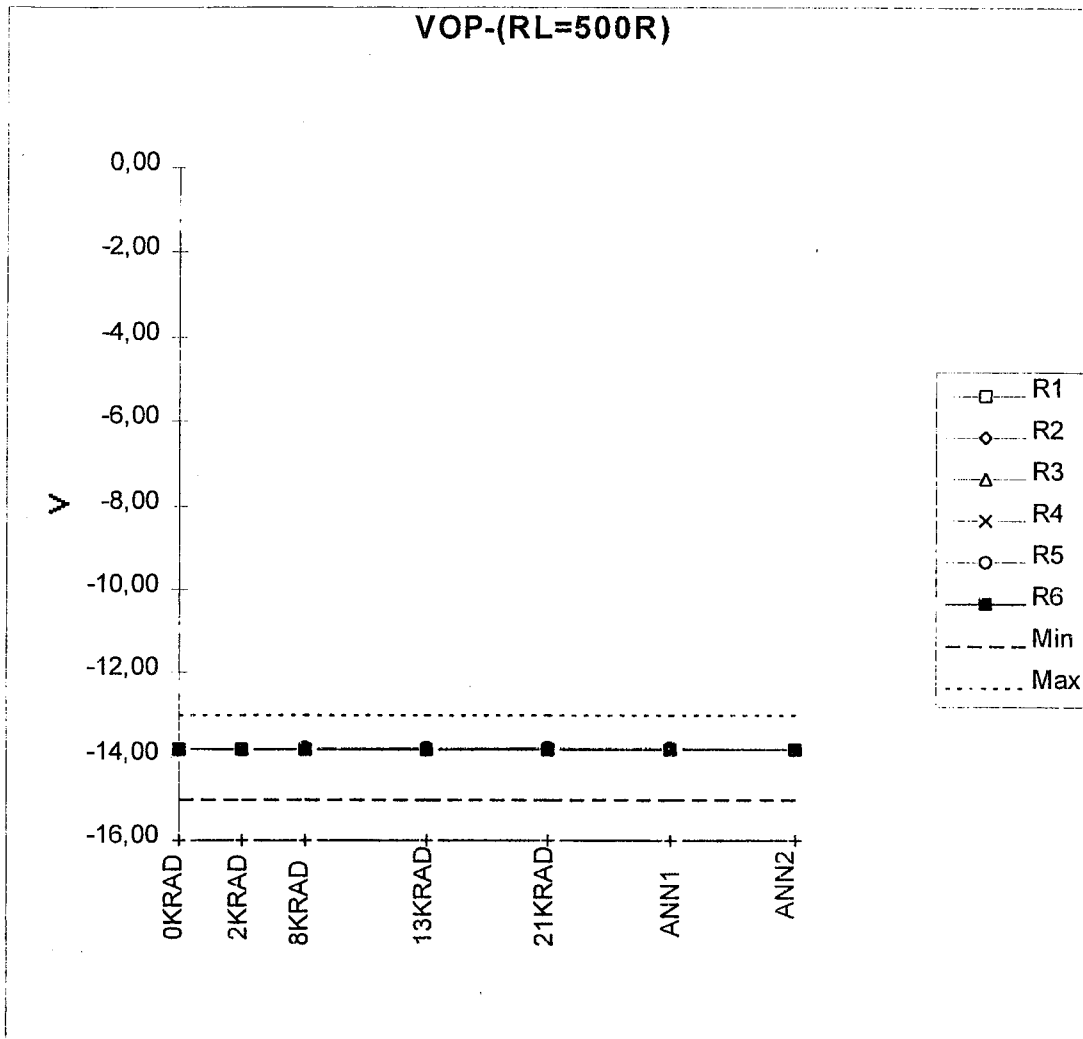
SH

TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002

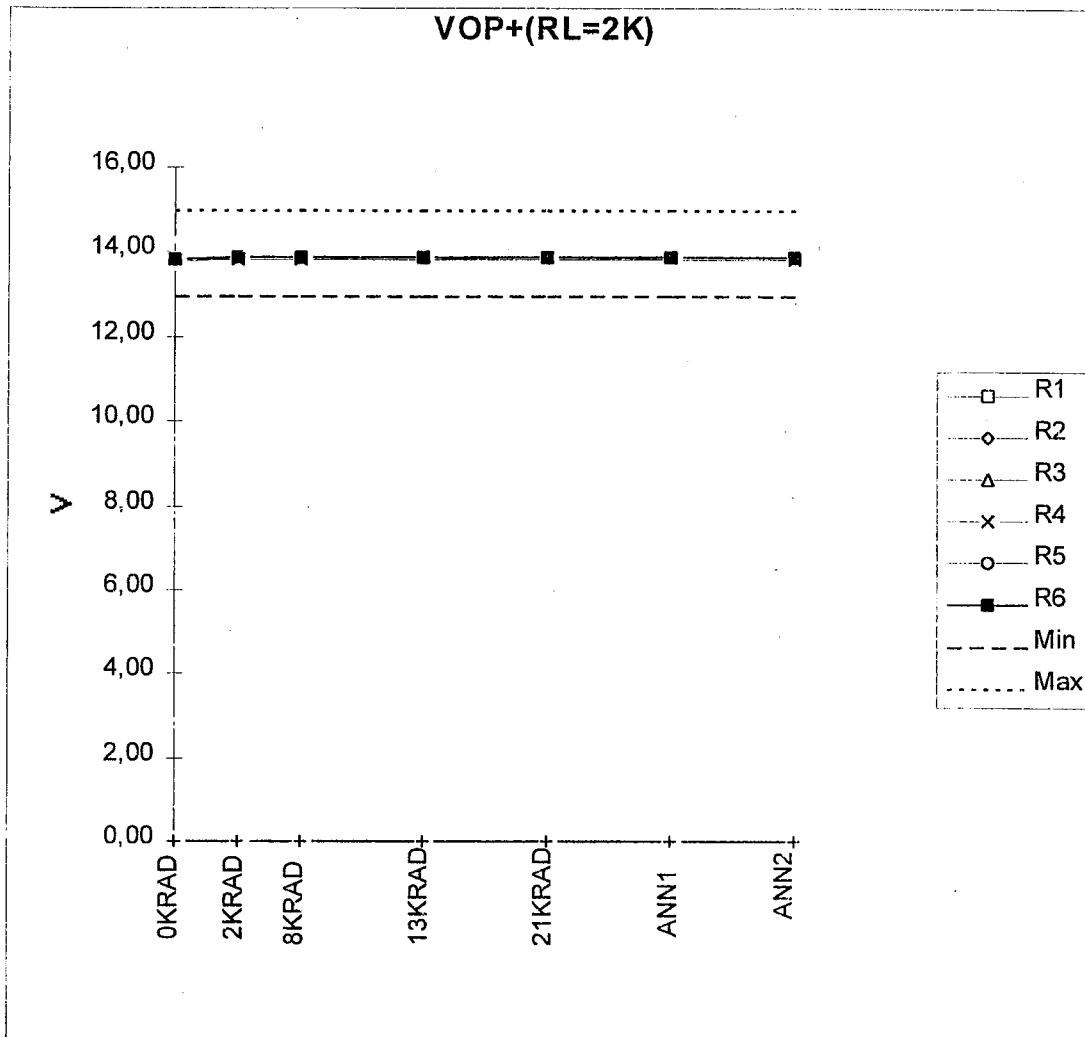
Issue: 1 Rev.:
Date: 20/4/98
Page: 27/41



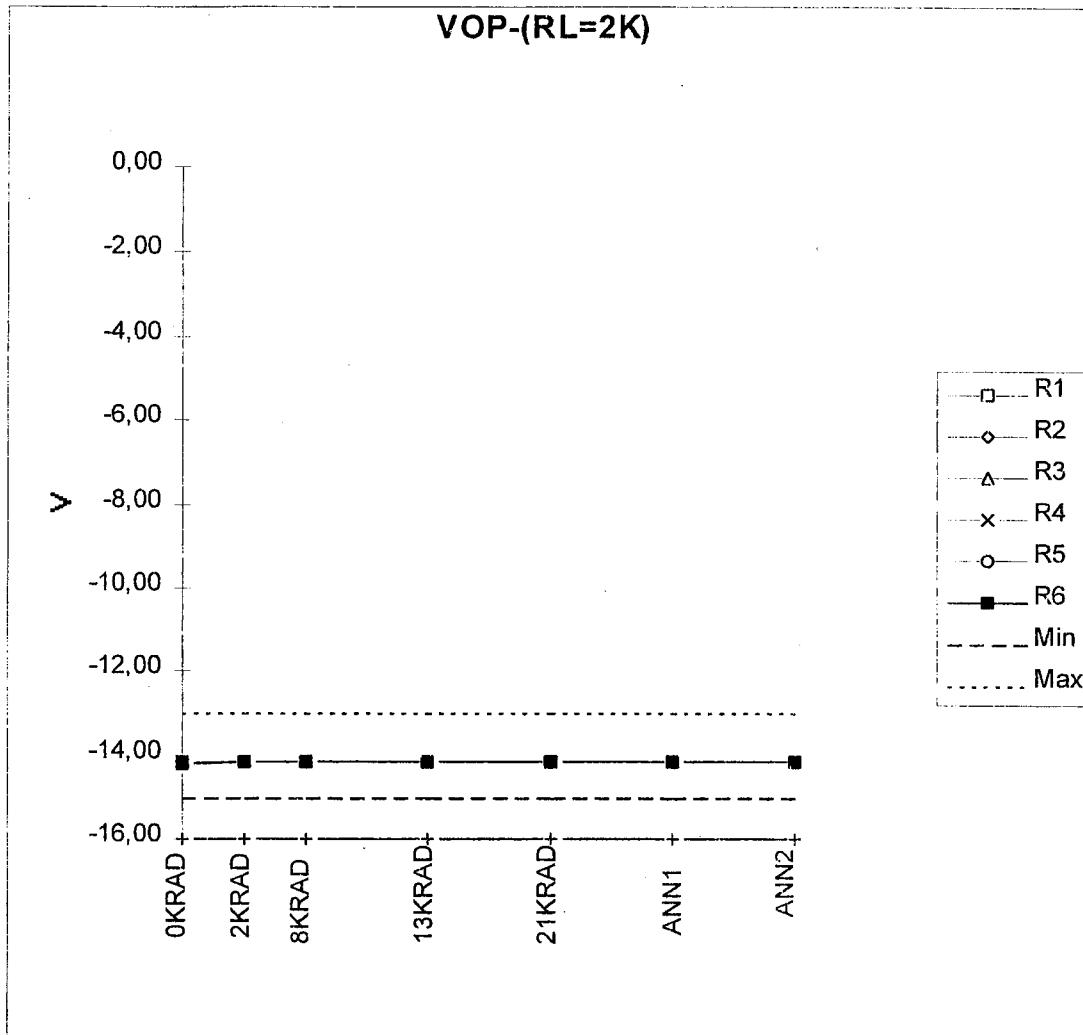
VOP+(RL=500R)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	13,54	13,55	13,54	13,54	13,54	13,54	13,53
R2	13,53	13,54	13,53	13,54	13,55	13,54	13,53
R3	13,54	13,56	13,55	13,55	13,56	13,55	13,54
R4	13,55	13,57	13,56	13,57	13,57	13,57	13,56
R5	13,57	13,58	13,57	13,58	13,58	13,58	13,57
R6	13,57	13,59	13,58	13,58	13,59	13,59	13,58
Min	13,00	13,00	13,00	13,00	13,00	13,00	13,00
Max	15,00	15,00	15,00	15,00	15,00	15,00	15,00



VOP-(RL=500R)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-13,82	-13,82	-13,82	-13,82	-13,82	-13,82	-13,82
R2	-13,83	-13,82	-13,81	-13,80	-13,80	-13,80	-13,82
R3	-13,83	-13,82	-13,81	-13,81	-13,80	-13,81	-13,81
R4	-13,84	-13,83	-13,82	-13,82	-13,81	-13,81	-13,83
R5	-13,82	-13,81	-13,81	-13,80	-13,79	-13,80	-13,81
R6	-13,85	-13,84	-13,83	-13,83	-13,82	-13,83	-13,83
Min	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00
Max	-13,00	-13,00	-13,00	-13,00	-13,00	-13,00	-13,00



VOP+(RL=2K)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	13,82	13,83	13,82	13,82	13,82	13,82	13,81
R2	13,80	13,82	13,83	13,84	13,86	13,85	13,82
R3	13,82	13,84	13,84	13,86	13,87	13,87	13,84
R4	13,83	13,85	13,85	13,87	13,88	13,88	13,85
R5	13,84	13,86	13,86	13,88	13,89	13,89	13,86
R6	13,85	13,86	13,87	13,88	13,89	13,89	13,86
Min	13,00	13,00	13,00	13,00	13,00	13,00	13,00
Max	15,00	15,00	15,00	15,00	15,00	15,00	15,00

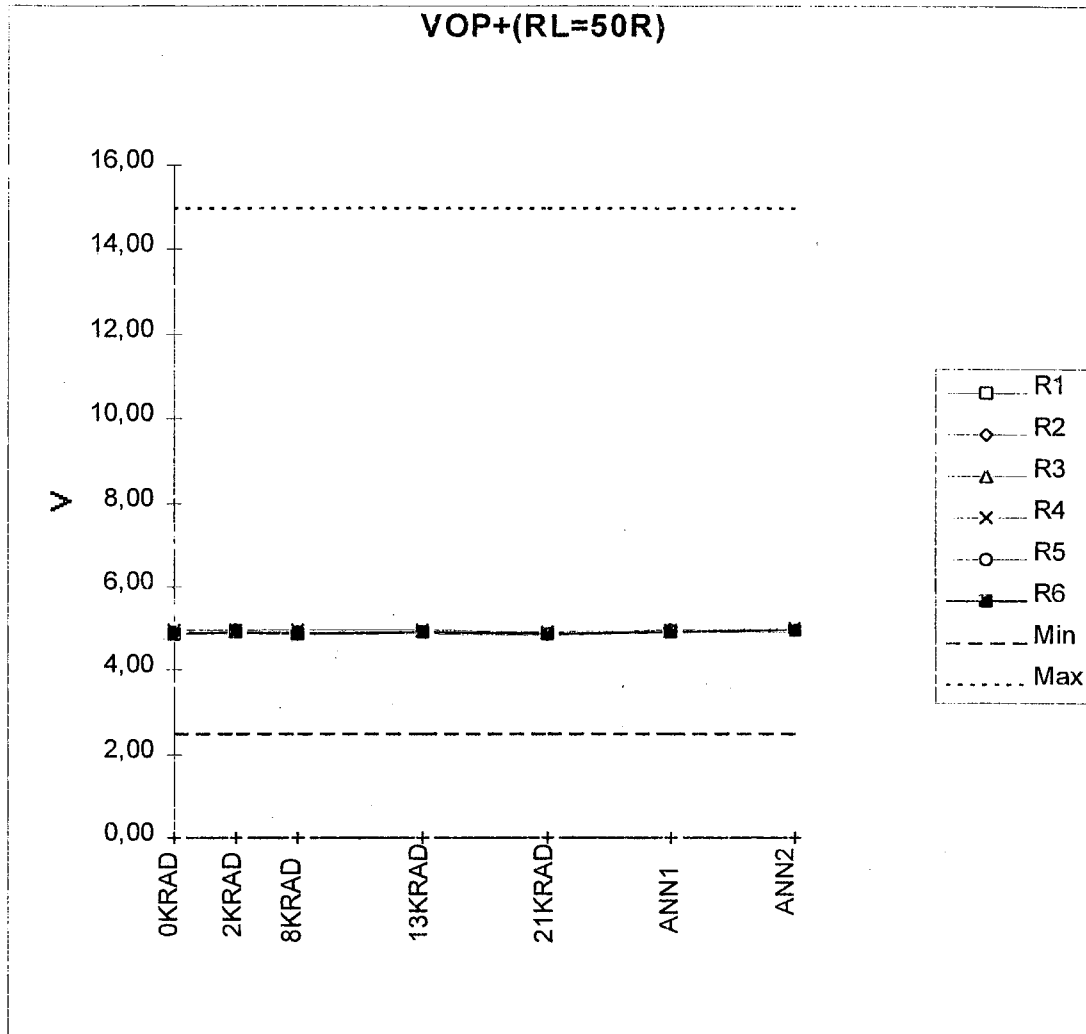


VOP-(RL=2K)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-14,18	-14,17	-14,17	-14,17	-14,17	-14,17	-14,17
R2	-14,18	-14,17	-14,17	-14,17	-14,17	-14,16	-14,17
R3	-14,18	-14,17	-14,17	-14,17	-14,17	-14,16	-14,17
R4	-14,18	-14,17	-14,17	-14,17	-14,17	-14,17	-14,17
R5	-14,18	-14,17	-14,17	-14,17	-14,17	-14,16	-14,17
R6	-14,19	-14,18	-14,18	-14,17	-14,17	-14,17	-14,18
Min	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00
Max	-13,00	-13,00	-13,00	-13,00	-13,00	-13,00	-13,00

SH

TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002

Issue: 1 Rev.:
Date: 20/4/98
Page: 31/41

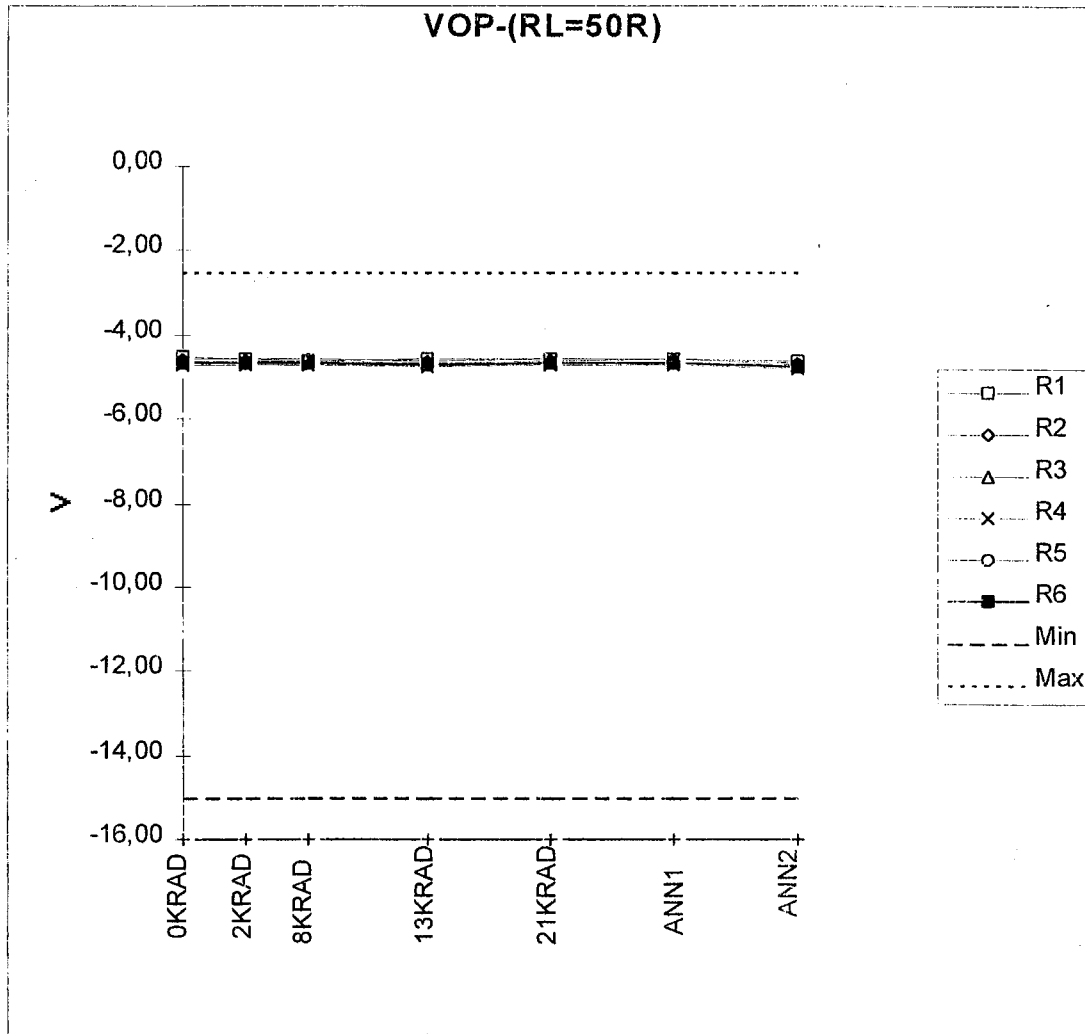


VOP+(RL=50R)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	4,88	4,91	4,93	4,92	4,91	4,95	4,95
R2	4,94	4,96	4,95	4,95	4,89	4,97	5,01
R3	4,85	4,87	4,85	4,87	4,81	4,89	4,92
R4	4,94	4,95	4,94	4,94	4,89	4,97	4,99
R5	4,91	4,93	4,92	4,92	4,87	4,96	4,97
R6	4,87	4,89	4,87	4,90	4,84	4,93	4,95
Min	2,50	2,50	2,50	2,50	2,50	2,50	2,50
Max	15,00	15,00	15,00	15,00	15,00	15,00	15,00

SH

TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002

Issue: 1 Rev.:
Date: 20/4/98
Page: 32/41

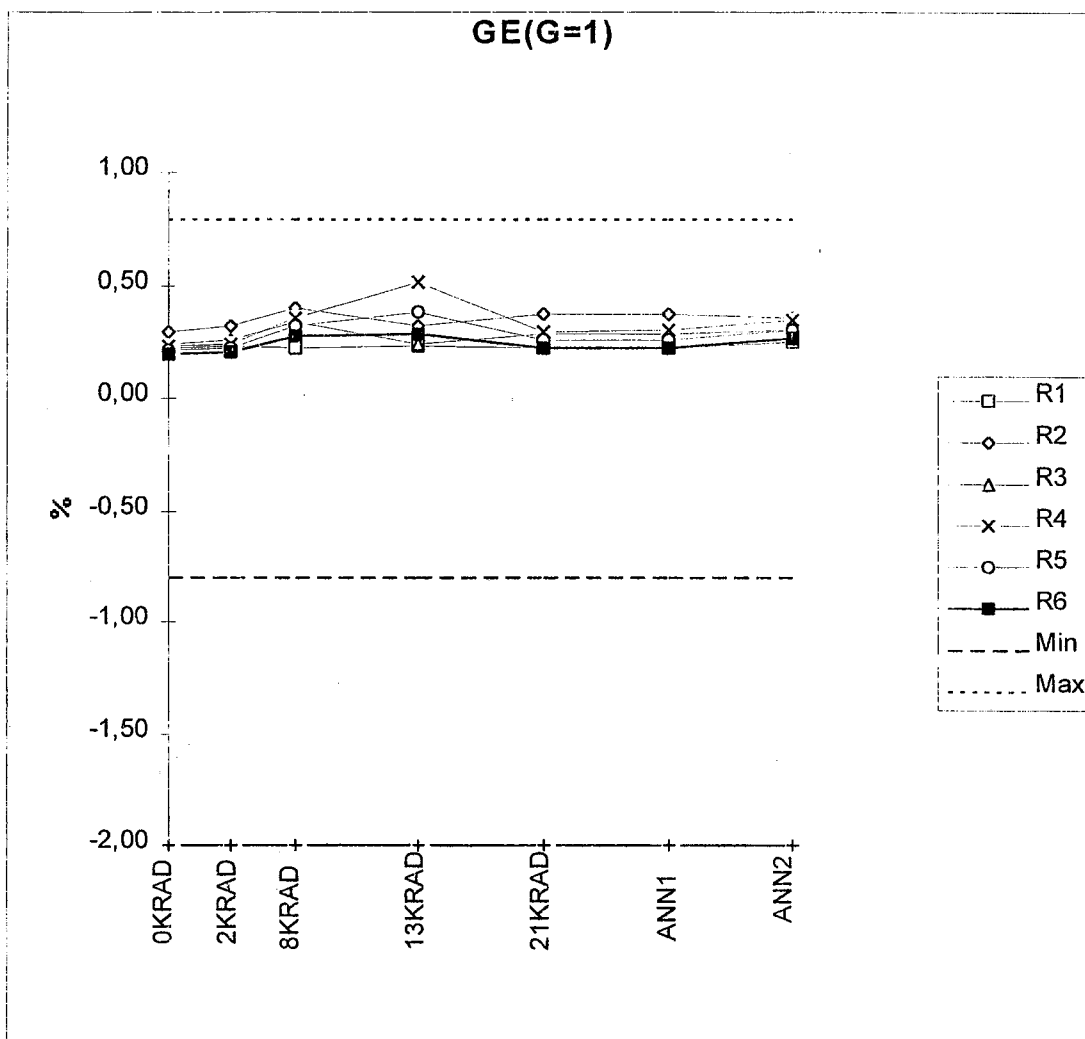


VOP-(RL=50R)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	-4,55	-4,57	-4,61	-4,60	-4,59	-4,58	-4,64
R2	-4,61	-4,61	-4,64	-4,65	-4,60	-4,60	-4,71
R3	-4,57	-4,57	-4,59	-4,61	-4,57	-4,56	-4,67
R4	-4,72	-4,71	-4,74	-4,75	-4,71	-4,70	-4,80
R5	-4,65	-4,66	-4,68	-4,70	-4,65	-4,65	-4,74
R6	-4,68	-4,69	-4,70	-4,74	-4,68	-4,68	-4,79
Min	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00	-15,00
Max	-2,50	-2,50	-2,50	-2,50	-2,50	-2,50	-2,50

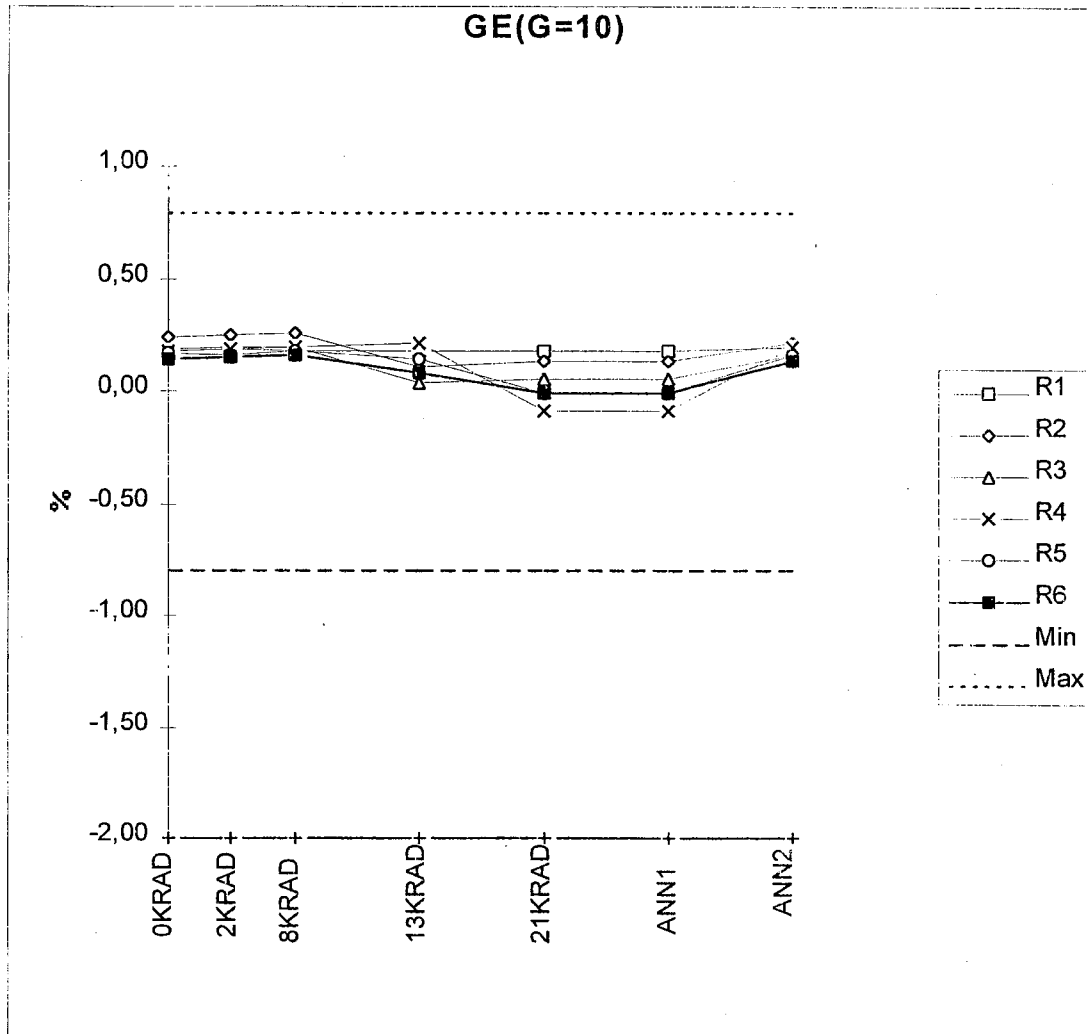
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**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

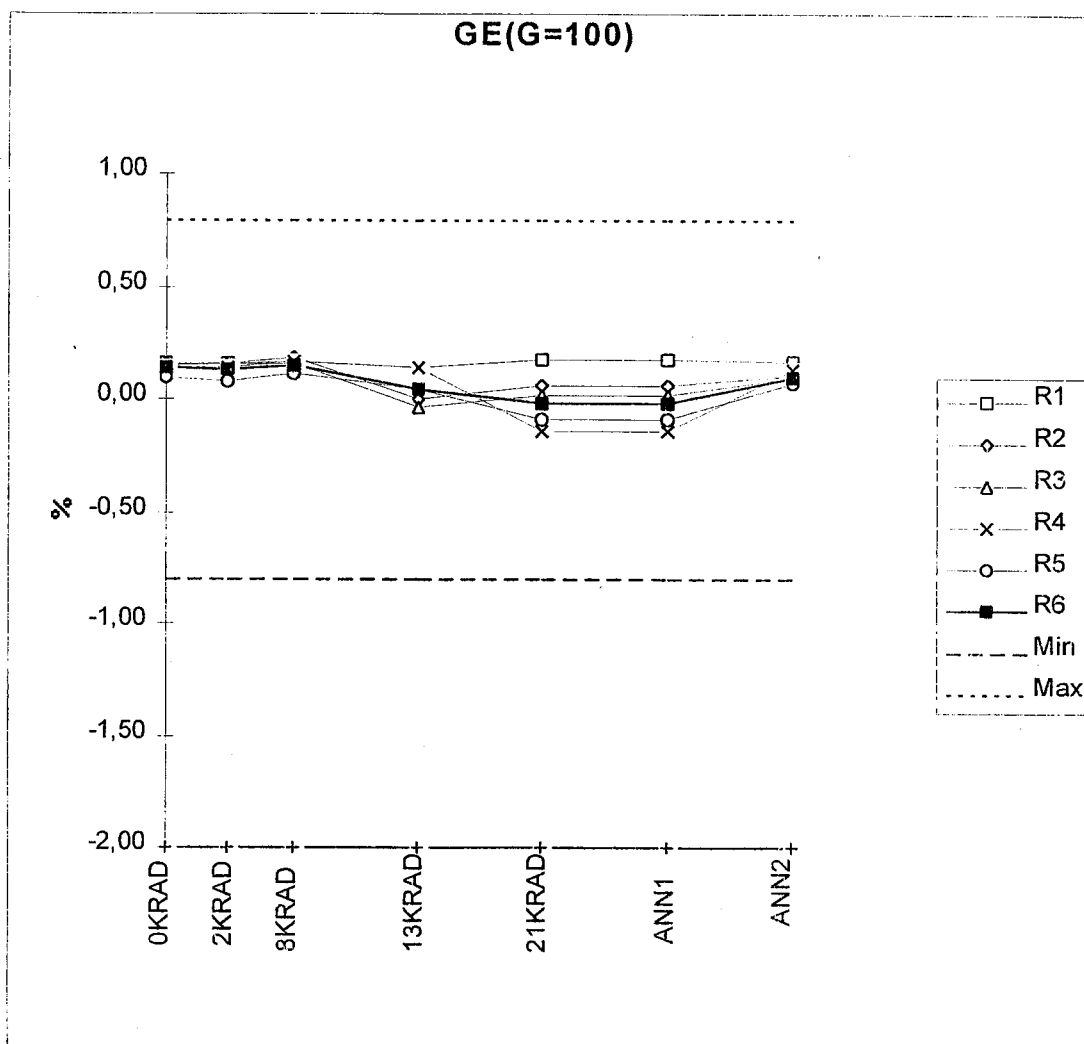
Issue: 1 Rev.:
Date: 20/4/98
Page: 33/41



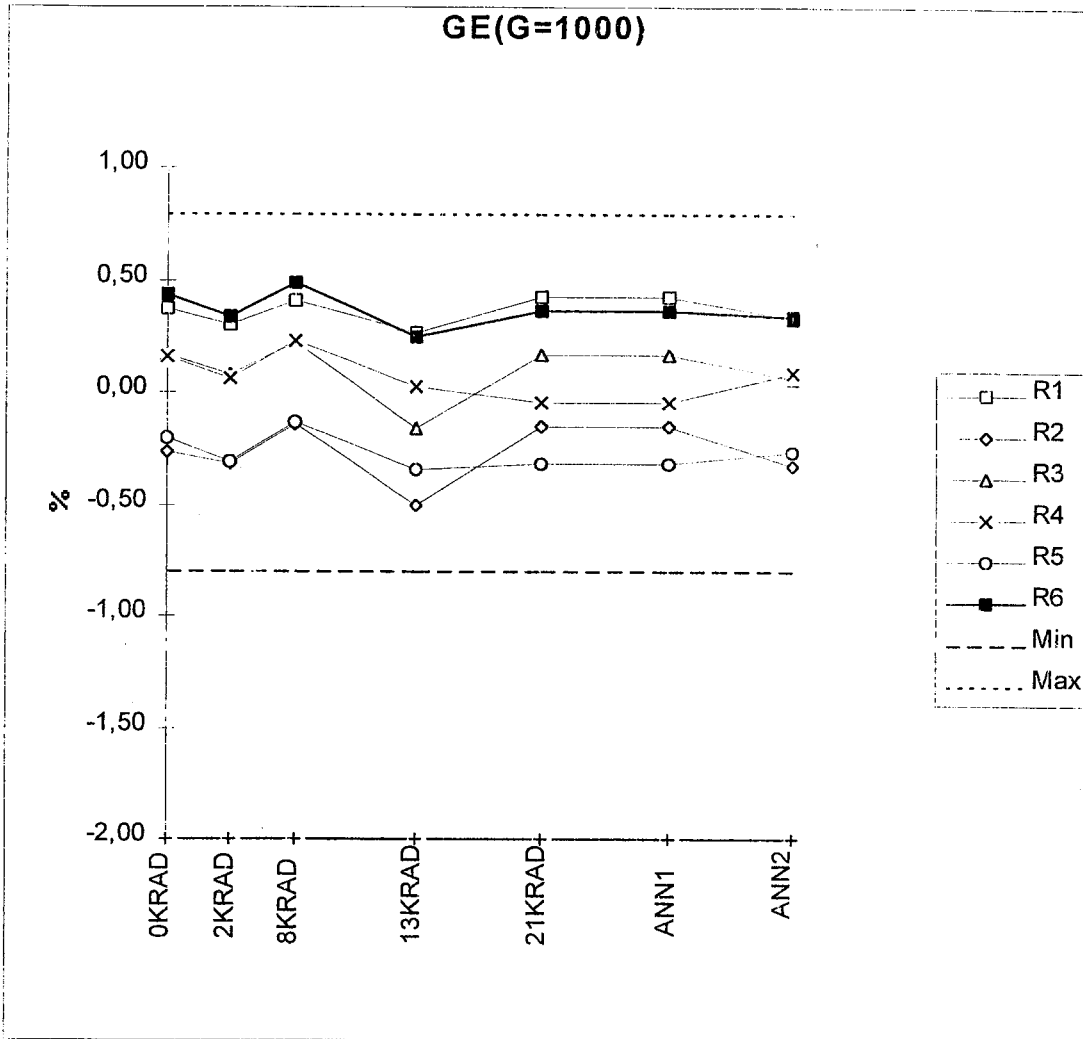
GE(G=1)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	0,23	0,23	0,23	0,23	0,22	0,22	0,25
R2	0,30	0,32	0,40	0,32	0,37	0,37	0,35
R3	0,24	0,26	0,33	0,24	0,29	0,29	0,30
R4	0,23	0,24	0,36	0,51	0,29	0,30	0,35
R5	0,22	0,23	0,32	0,38	0,25	0,25	0,30
R6	0,19	0,21	0,28	0,28	0,22	0,22	0,27
Min	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80
Max	0,80	0,80	0,80	0,80	0,80	0,80	0,80



GE(G=10)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	0,18	0,19	0,18	0,18	0,18	0,18	0,20
R2	0,24	0,25	0,26	0,11	0,14	0,14	0,21
R3	0,19	0,20	0,19	0,03	0,05	0,05	0,16
R4	0,18	0,18	0,20	0,21	-0,09	-0,09	0,19
R5	0,16	0,16	0,18	0,14	-0,01	-0,01	0,16
R6	0,15	0,15	0,16	0,08	-0,01	-0,01	0,13
Min	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80
Max	0,80	0,80	0,80	0,80	0,80	0,80	0,80



GE(G=100)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	0,16	0,16	0,17	0,15	0,17	0,17	0,17
R2	0,16	0,16	0,19	0,00	0,06	0,06	0,11
R3	0,15	0,16	0,16	-0,04	0,02	0,02	0,10
R4	0,15	0,14	0,16	0,14	-0,14	-0,14	0,13
R5	0,10	0,08	0,12	0,05	-0,09	-0,09	0,07
R6	0,14	0,13	0,15	0,05	-0,02	-0,02	0,10
Min	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80
Max	0,80	0,80	0,80	0,80	0,80	0,80	0,80

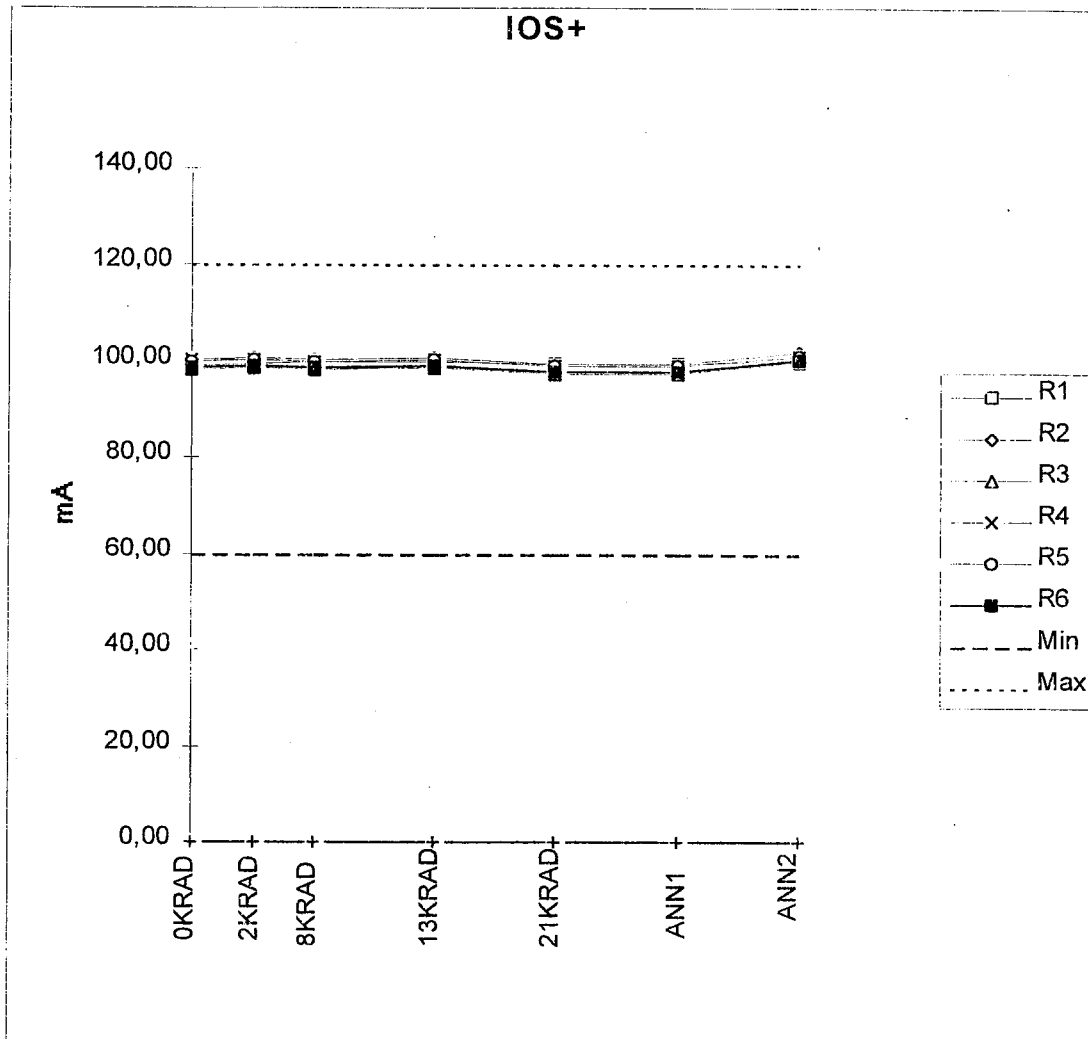


GE(G=1000)	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	0,37	0,30	0,41	0,27	0,43	0,43	0,33
R2	-0,26	-0,32	-0,14	-0,51	-0,15	-0,15	-0,33
R3	0,17	0,08	0,22	-0,16	0,17	0,17	0,06
R4	0,16	0,06	0,23	0,03	-0,04	-0,04	0,09
R5	-0,20	-0,31	-0,13	-0,35	-0,32	-0,32	-0,27
R6	0,44	0,34	0,49	0,25	0,36	0,36	0,34
Min	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80	-0,80
Max	0,80	0,80	0,80	0,80	0,80	0,80	0,80

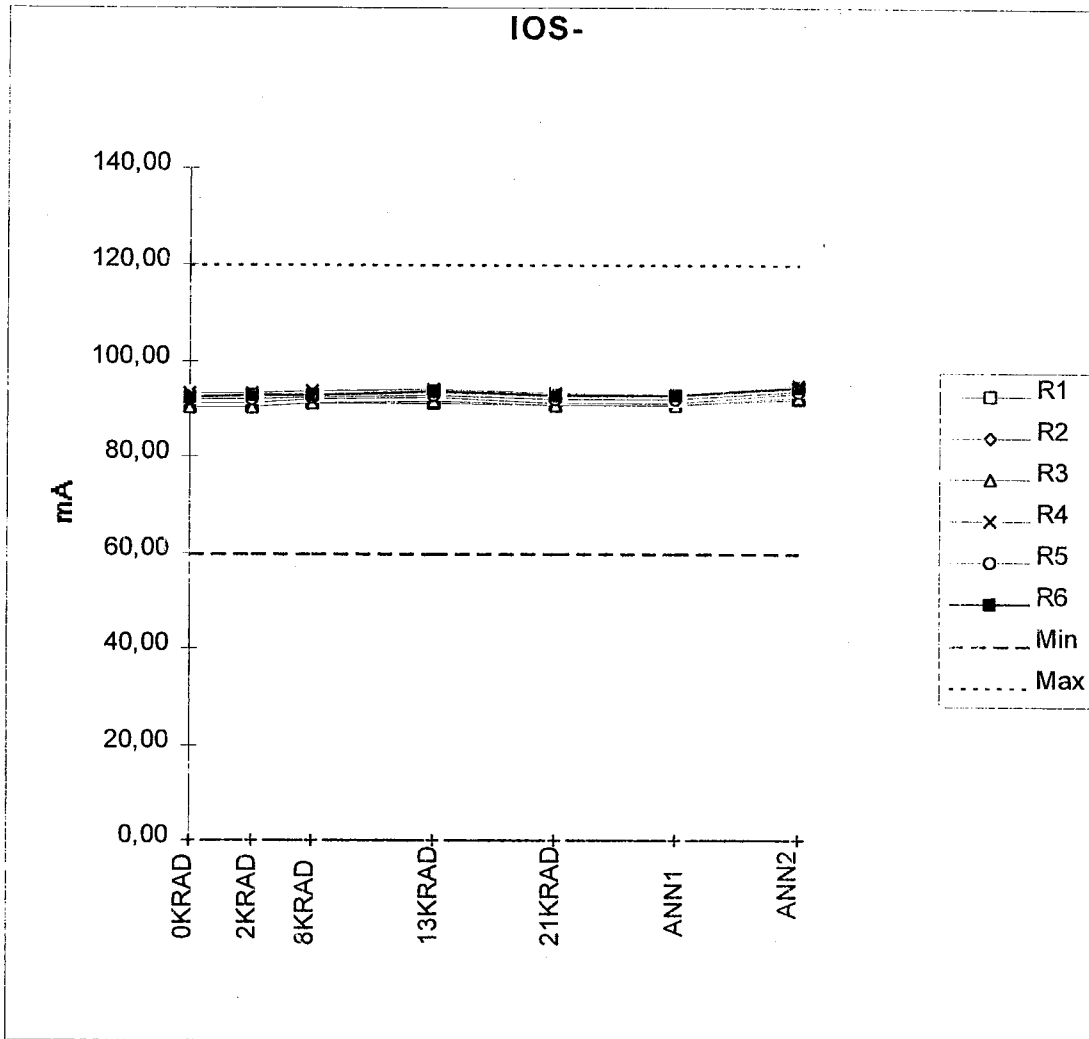
SH

TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002

Issue: 1 Rev.:
Date: 20/4/98
Page: 37/41



IOS+	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	99,01	99,66	100,00	99,85	99,65	99,65	100,49
R2	100,25	100,66	100,47	100,60	99,47	99,47	101,80
R3	98,26	98,60	98,34	98,65	97,58	97,58	99,76
R4	100,20	100,38	100,15	100,24	99,24	99,24	101,34
R5	99,78	100,34	100,00	100,18	99,16	99,16	101,05
R6	98,52	99,05	98,55	99,16	98,01	98,01	100,21
Min	60,00	60,00	60,00	60,00	60,00	60,00	60,00
Max	120,00	120,00	120,00	120,00	120,00	120,00	120,00

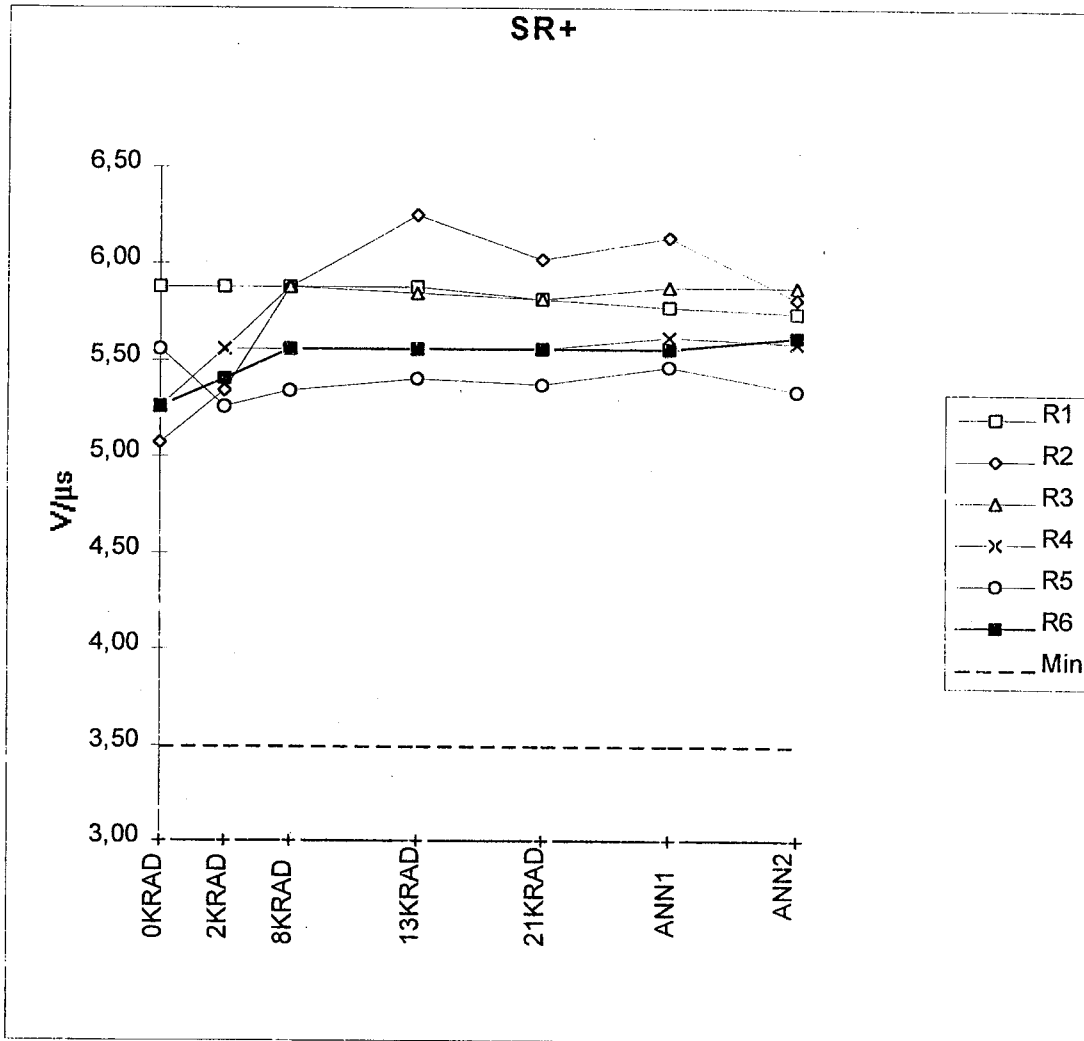


IOS-	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	90,32	90,63	91,37	91,22	91,01	91,01	91,98
R2	91,37	91,47	92,01	92,32	91,34	91,34	93,34
R3	90,63	90,65	91,11	91,61	90,69	90,69	92,53
R4	93,37	93,26	93,79	94,12	93,29	93,00	94,97
R5	92,01	92,25	92,68	93,08	92,23	92,23	93,74
R6	92,50	92,74	92,92	93,75	92,75	92,75	94,64
Min	60,00	60,00	60,00	60,00	60,00	60,00	60,00
Max	120,00	120,00	120,00	120,00	120,00	120,00	120,00

SH

TOTAL DOSE RADIATION TEST REPORT No. SH-TL-RR-8002

Issue: 1 Rev.:
Date: 20/4/98
Page: 39/41

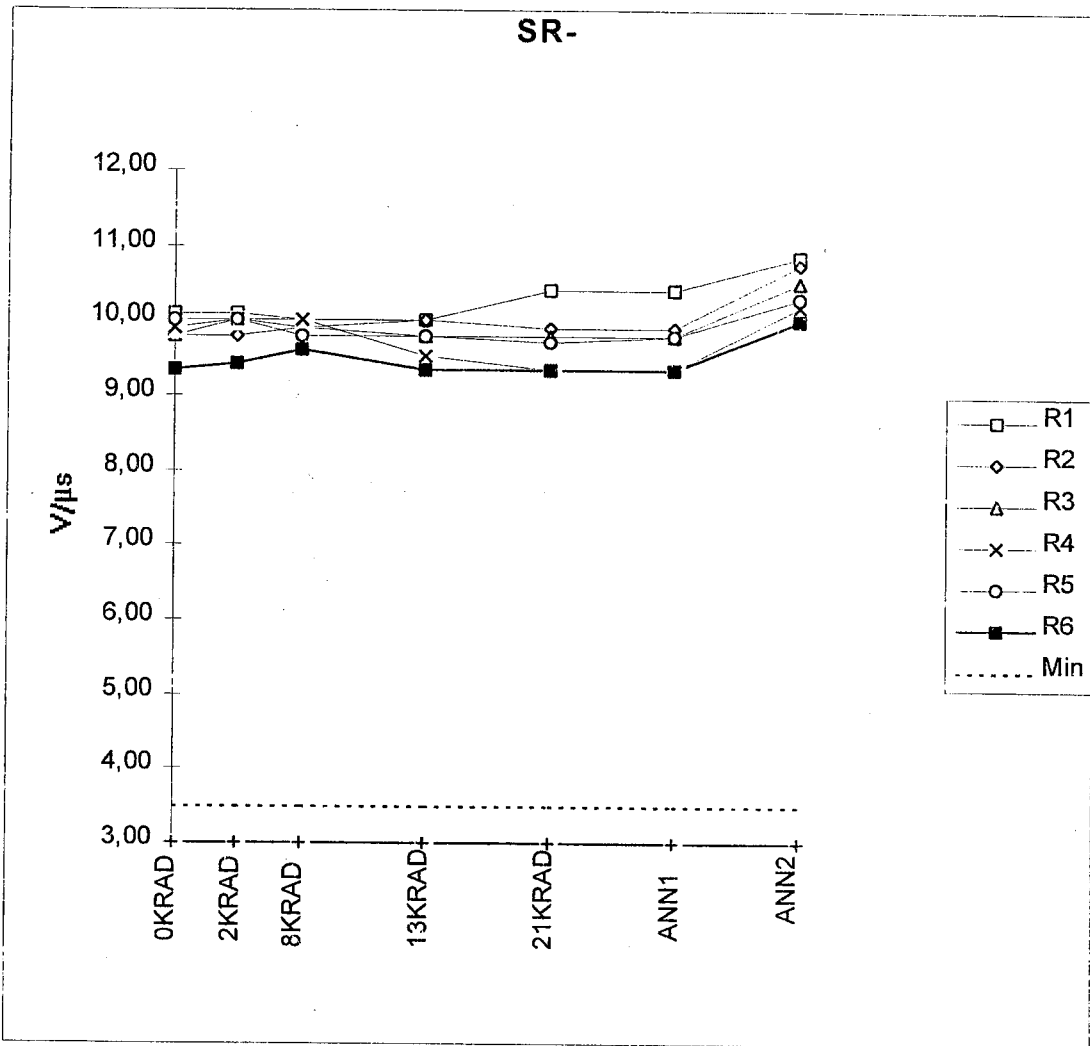


SR+	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	5,88	5,88	5,88	5,88	5,81	5,78	5,75
R2	5,08	5,35	5,88	6,25	6,02	6,13	5,81
R3	5,26	5,56	5,88	5,85	5,81	5,88	5,88
R4	5,26	5,56	5,56	5,56	5,56	5,62	5,59
R5	5,56	5,26	5,35	5,41	5,38	5,46	5,35
R6	5,26	5,41	5,56	5,56	5,56	5,56	5,62
Min	3,50	3,50	3,50	3,50	3,50	3,50	3,50

SH

**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

Issue: 1 Rev.:
Date: 20/4/98
Page: 40/41



SR-	0KRAD	2KRAD	8KRAD	13KRAD	21KRAD	ANN1	ANN2
R1	10,10	10,10	10,00	10,00	10,42	10,42	10,87
R2	9,80	9,80	9,90	10,00	9,90	9,90	10,75
R3	9,80	10,00	9,90	9,80	9,80	9,80	10,53
R4	9,90	10,00	10,00	9,52	9,35	9,35	10,20
R5	10,00	10,00	9,80	9,80	9,71	9,80	10,31
R6	9,35	9,43	9,62	9,35	9,35	9,35	10,00
Min	3,50	3,50	3,50	3,50	3,50	3,50	3,50

SH

**TOTAL DOSE RADIATION
TEST REPORT
No. SH-TL-RR-8002**

Issue: 1 Rev.:
Date: 20/4/98
Page: 41/41

DOSIMETRY

USER: TECNOLÓGICA REF: TECNOLÓGICA 988/b DATE: 26/3/98		
Kras(Si)/h	Rad(Si)/min	R/min
0,3	5	5,78034682

CORRECTIONS

Pression (m)	690
Temperature	25
Position	0,95
Calibration	1,008
Equipm.reading	85,35

DOSIMETRY

Irradiation time (hours):		28,25				
Spect.temperature (°C):		24,20				
Ex.molar.coefficient		2181				
Conversion factor		27709,5518				
Dosimeter	D:O	Rad(F)	Rad(F)/min	R/min	Rad(Si)/min	Krad(Si)/h
D-1	0,327	9061,02343	5,34573654	5,5110686	4,76707434	0,28602446
D-2	0,34	9421,2476	5,55825817	5,73016307	4,95659105	0,29739546
D-3	0,347	9615,21447	5,6726929	5,84813701	5,05863851	0,30351831
PROBE				5,88423223	5,08986088	0,30539165
D-4	0,345	9559,79536	5,63999726	5,81443017	5,0294821	0,30176893
D-5	0,332	9199,57119	5,42747563	5,5953357	4,83996538	0,29039792
D-6	0,321	8894,76612	5,24764963	5,40994807	4,67960508	0,2807763

DOSE RATE MEAN D2 TO D5

Rad(Si)/min	4,99490758
Krad(Si)/hora	0,29969446
Unif.shortage:	5,0030054