

ESA-QCA9917T-C

<i>Envisat-1</i>	TOTAL DOSE RADIATION TEST REPORT No. PO-TR-TLG-PL-2011	Issue: 1 Rev.: Date: 19/03/96 Page: 1/11
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SCC Component No.: 930605702B		Component Designation: 54ACT299 FP	Irradiation Spec. No.: PO-PL-TLG-PL-0500 Iss.2
Gen. Spec.: SCC 9000 8D Det. Spec.: SCC 9306/057 Iss.1 Amend.:		Evaluation: - Acceptance Diffusion: - Acceptance Lot: X	Project/Programme: ENVISAT-1
Family: 08	Group: 03	Functional Assignment: OCTAL SHIFT REG. 3-STATE	Package: FP-20
Manuf.Name: MOTOROLA Address: FRANCE		Test House: TECNOLOGICA Address: MADRID (SPAIN)	Orig.house: TECNOLOGICA Address: SEVILLA (SPAIN)
Radiation Test Plan No.: PO-PL-TLG-PL-2011		Sample Size: 5 Irradiation Devices: 4 Control Devices: 1	Date Code: 9517 Diffusion LOT: WPY109531H Wafer No.: 13
Radiation Source: Cobalt-60 Facility Name: CIEMAT Address: MADRID (SPAIN)		Energy: 1.33/1.17 MeV Dose Rate: 402.6 Rad(Si)/h	Date of Test: 03/96
Irradiation Conditions: Biased: Y Unbiased: - Test Circuit: Figure 1		Irradiation Measurements Interval: Remote test: - In situ Test: X	Annealing Tests: 24h / 25°C Ageing: 168h / 100°C Biased: X Unbiased: - Test Circuit: Figure 1

Electrical Measurements. Parameters Tested:

FT₁ , FT₂ , IDD₁ , IDD₂ , VOL₄ , VOH₄ , VIL , VIH .

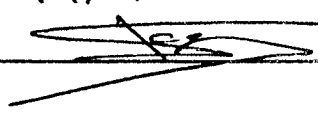

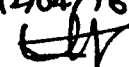
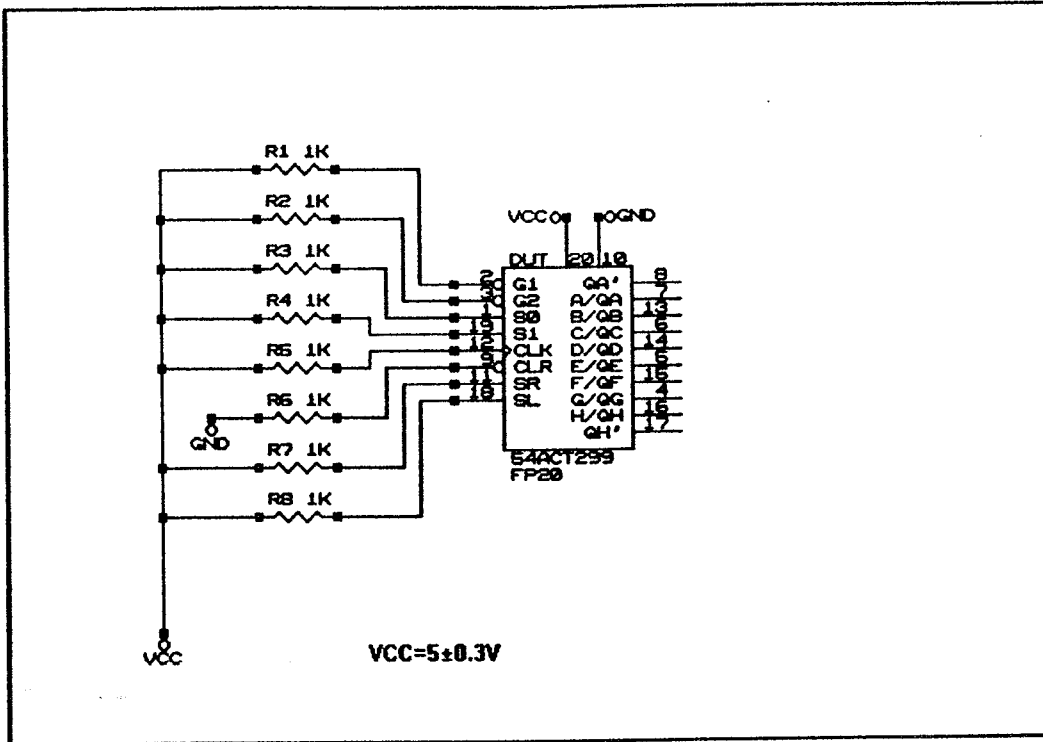
Irradiat. Respons.: J.A. VALERO Date: 19/03/96 Signature: 	Electr. Test Resp.: J.H. VALVERDE Date: 26/03/96 Signature: 	Approved by QA: I DE PAGO Date: 12/04/96 Signature: 
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FIGURE 1.-TEST CIRCUIT



SUMMARY

Total dose steady-state irradiation test has been carried out on OCTAL SHIFT REGISTER 3-STATE from MOTOROLA with date code 9517. The irradiated parts were labelled as follows: R2= S/N 2, R3= S/N 3, R4= S/N 4, R5= S/N 5 irradiation devices and R1= S/N 1 control device.

RESULTS

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

	0 KRAD	10 KRAD	20 KRAD	30 KRAD	ANN 24	ANN 168
FCT₁	PASS	PASS	PASS	PASS	PASS	PASS
FCT₂	PASS	PASS	PASS	PASS	PASS	PASS
IDD₁(Patt.1)	PASS	FAIL	FAIL	FAIL	FAIL	PASS
IDD₁(Patt.2)	PASS	FAIL	FAIL	FAIL	FAIL	PASS
IDD₁(Patt.3)	PASS	FAIL	FAIL	FAIL	FAIL	PASS
IDD₂(Patt.1)	PASS	PASS	PASS	PASS	PASS	PASS
VOL₁	PASS	PASS	PASS	PASS	PASS	PASS
VOH₁	PASS	PASS	PASS	PASS	PASS	PASS

CONCLUSION

- IDD₁ (Patterns 1-3) rises in proportion to cumulative dose until 30 krad, being out of spec at 10 krad. However, it recovers in the annealing steps, remaining under spec at the end of the ageing.
- All the rest parameters remain under specification.

SCHEDULE

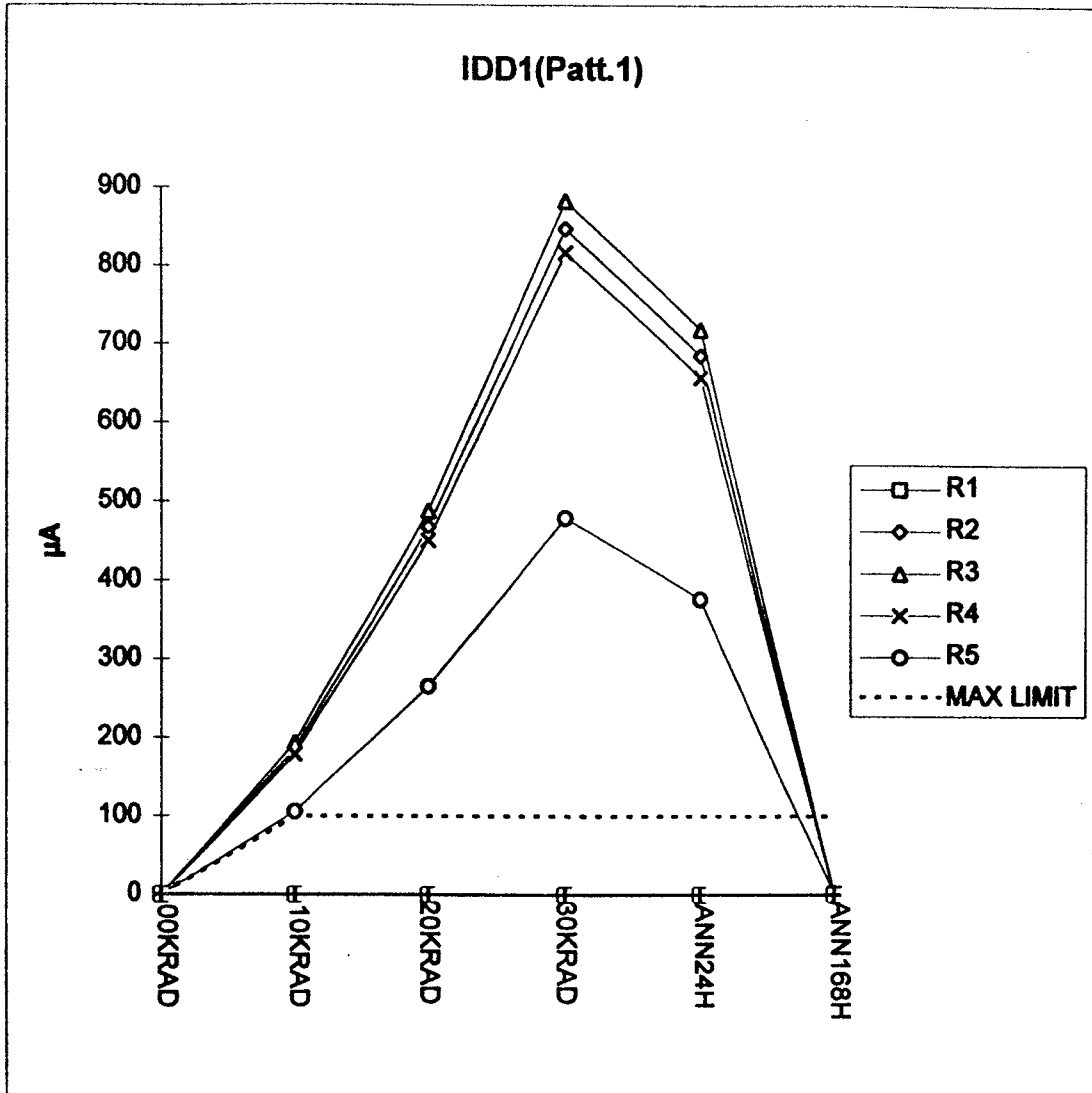
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
1	Sample serialization	CONTROL R1 IRR. DEVICES R2, R3, R4, R5.			
2	Initial Electrical Measurements	See 0 krad(Si) values in respective Parameter Data Tables Temperature: 24.8°C (average)			
3	Set-up of Test	Bias circuit verified according to Fig. 1			
4	Irradiation Exposure	Total Dose: 9,244 rad(Si) Cumulative Dose: 9,244 rad(Si) Dose Rate: 401.9 rad(Si)/h Temperature: 22.5 °C (average)	16:05 04/03	14:20 05/03	23 h
5	Intermediate Electrical Measurements	See 10 krad(Si) values in respective Parameter Data Tables Temperature: 27.0 °C (average)	15:05 05/03	15:45 05/03	40 min
6	Set-up of Test	Bias circuit verified according to Fig. 1			
7	Irradiation Exposure	Total Dose: 9,244 rad(Si) Cumulative Dose: 18,488 rad(Si) Dose Rate: 401.9 rad(Si)/h Temperature: 21.3 °C (average)	16:00 05/03	15:00 06/03	23 h
8	Intermediate Electrical Measurements	See 20 krad(Si) values in respective Parameter Data Tables Temperature: 27.3 °C (average)	15:05 06/03	15:40 06/03	35 min
9	Set-up of Test	Bias circuit verified according to Fig. 1			
10	Irradiation Exposure	Total Dose: 9,209 rad(Si) Cumulative Dose: 27,698 rad(Si) Dose Rate: 400.4 rad(Si)/h Temperature: 23.6 °C (average)	15:45 06/03	14:45 07/03	23 h
11	Intermediate Electrical Measurements	See 30 krad(Si) values in respective Parameter Data Tables Temperature: 26.6°C (average)	14:50 07/03	15:30 07/03	40 min

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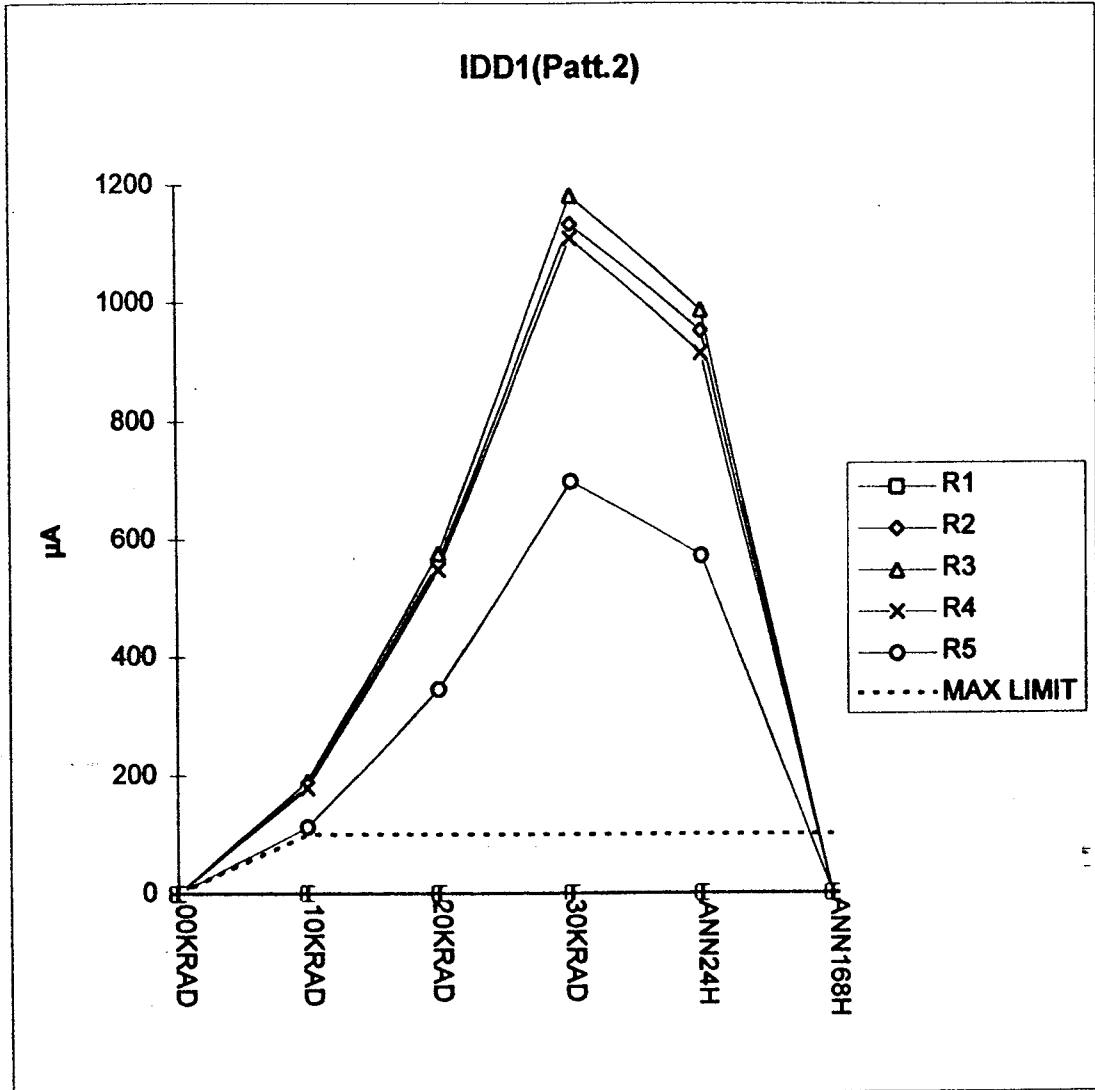
**TOTAL DOSE RADIATION
TEST REPORT
No. PO-TR-TLG-PL-2011**

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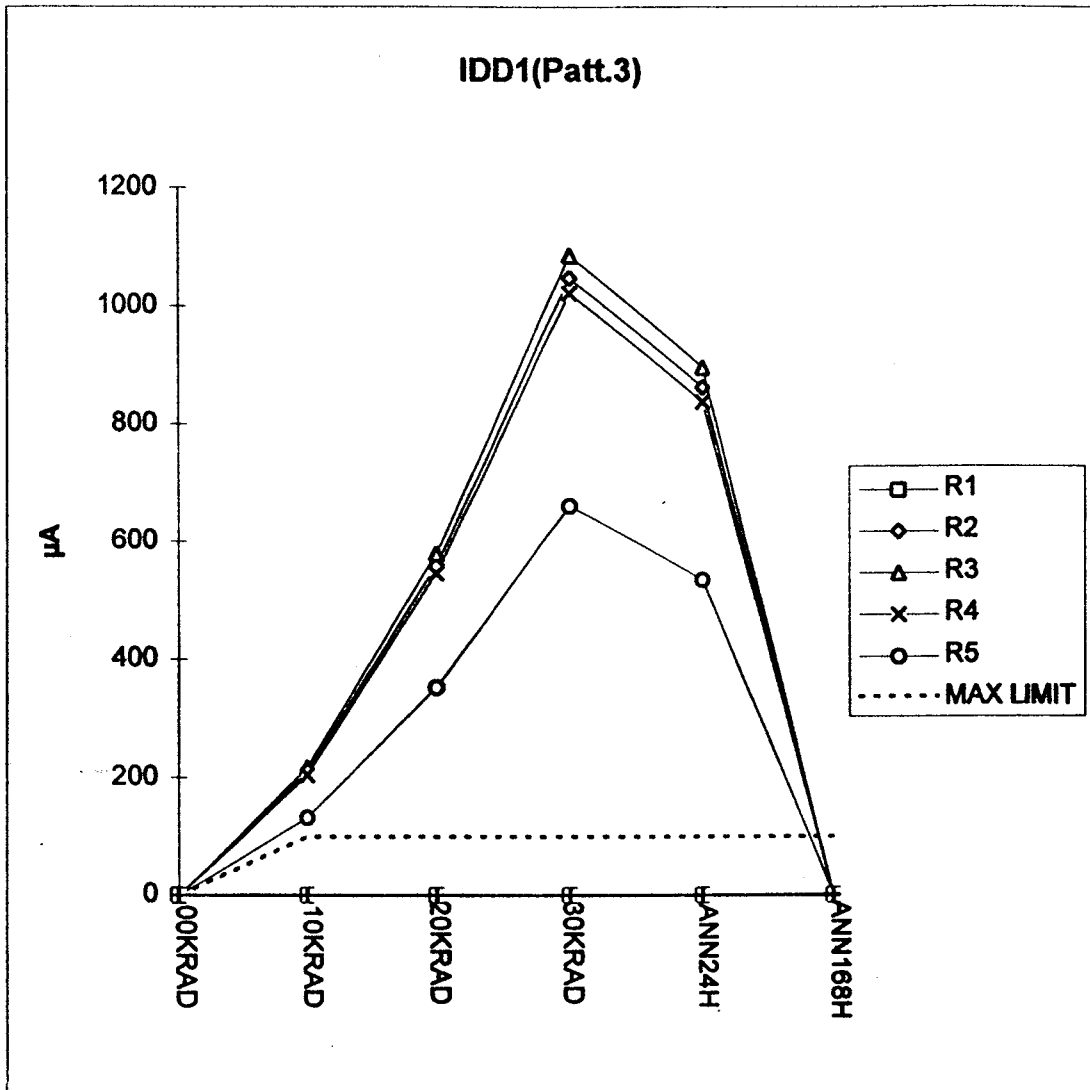
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
12	Annealing	Bias circuit verified according to Fig. 1 Temperature: 15.2°C (average)	15:35 07/03	13:35 08/03	22 h
13	Electrical Measurements	See ANN24h values in respective Parameter Data Tables Temperature: 25.0°C (average)	13:40 08/03	14:15 08/96	35 min
14	Accelerated Ageing	Bias circuit verified according to Fig. 1 Temperature: 100°C	14:20 08/03	13:20 15/03	167 h.
15	Final Electrical Measurements	See ANN168h values in respective parameter Data Tables	13:25 15/03	14:00 15/03	35 min



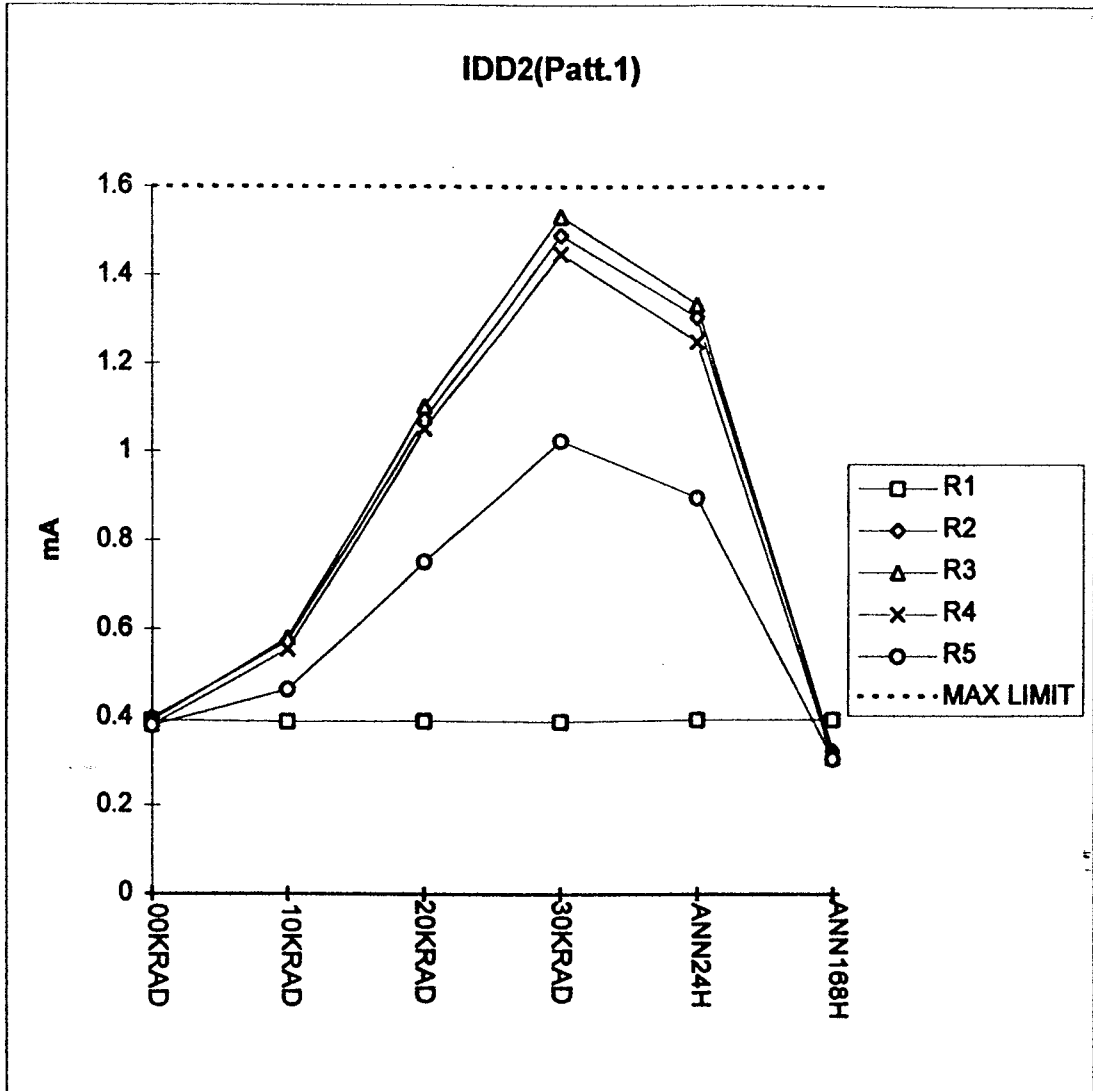
IDD1(Patt.1)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.001	0.075	0.032	0.180	0.000	0.040
R2	0.004	185.281	467.719	847.313	684.533	2.562
R3	0.008	193.801	488.061	882.780	718.300	3.050
R4	0.001	178.718	451.011	816.880	656.767	1.864
R5	0.006	105.473	265.222	479.247	375.833	2.050
MAX LIMIT	1	100	100	100	100	100



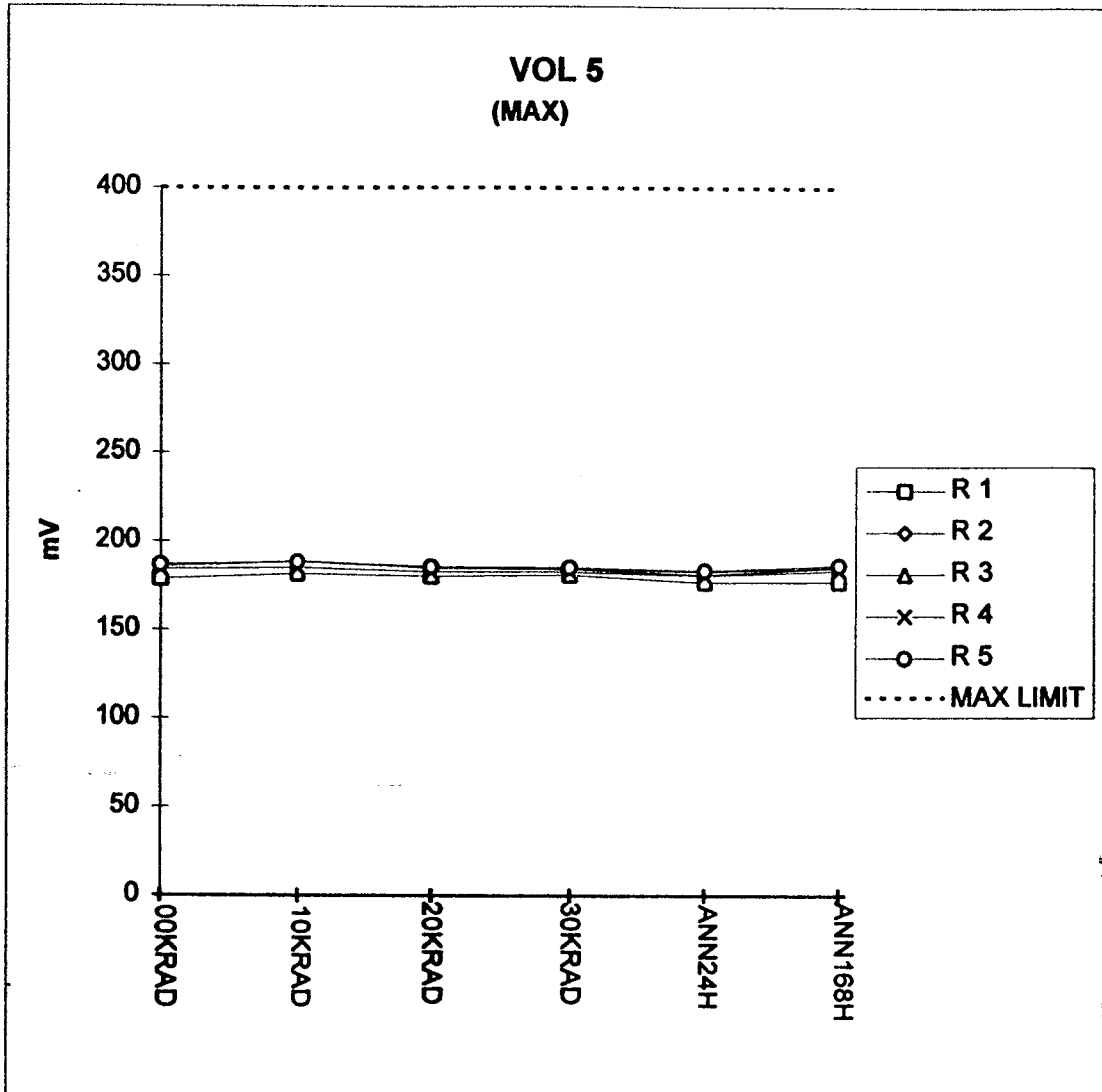
IDD1(Patt.2)	000KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.003	0.015	0.010	0.353	0.007	0.037
R2	0.002	182.138	559.945	1133.420	952.227	0.157
R3	0.004	189.986	576.223	1182.253	987.060	0.192
R4	0.002	178.266	548.039	1109.320	914.027	0.109
R5	0.001	112.224	345.008	698.353	571.493	0.194
MAX LIMIT	1	100	100	100	100	100



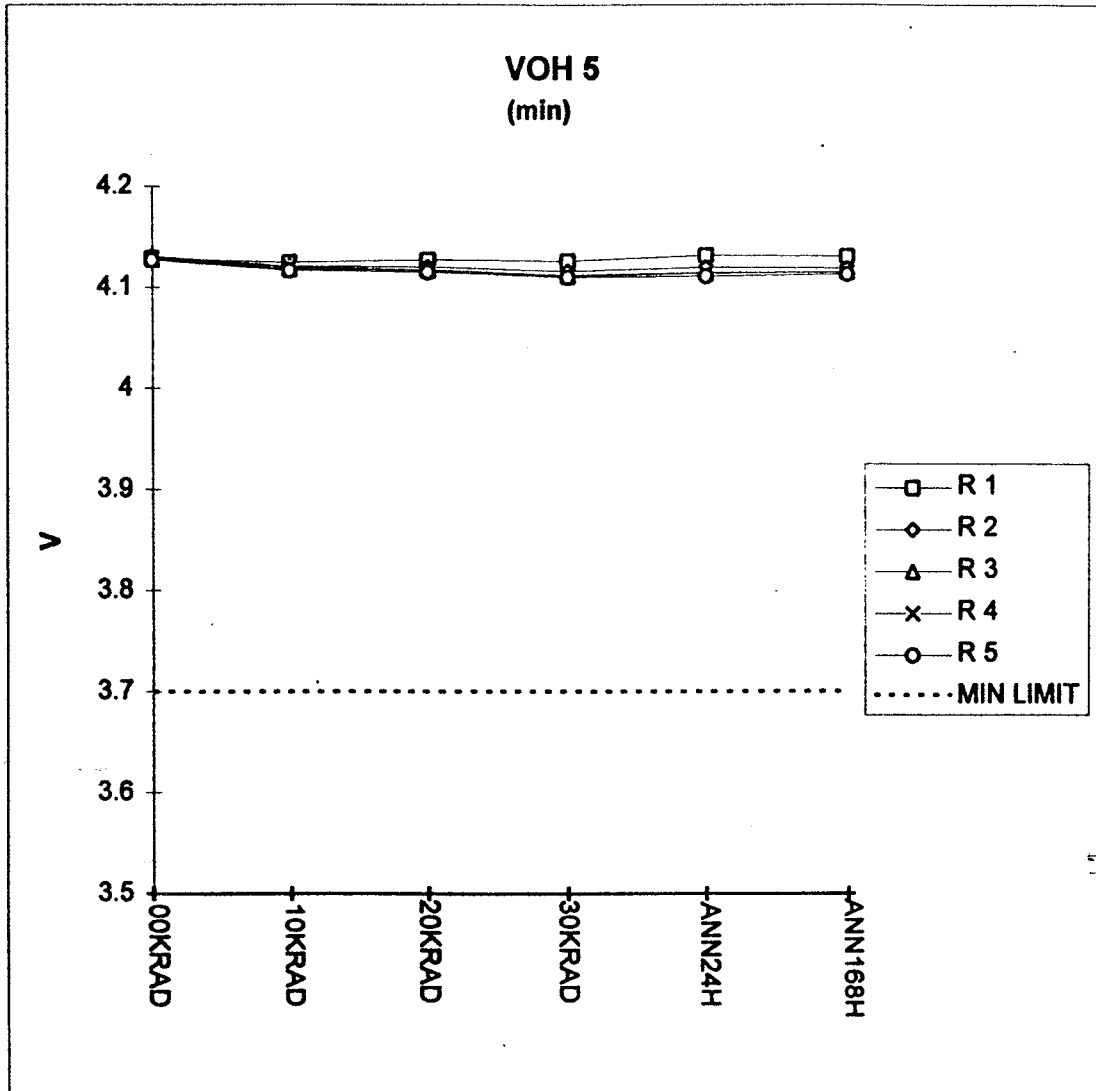
IDD1(Patt.3)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.004	0.081	0.075	0.040	0.127	0.018
R2	0.004	209.405	558.414	1047.027	862.740	0.330
R3	0.000	217.045	578.788	1085.227	896.207	0.483
R4	0.006	204.292	544.779	1021.460	837.373	0.202
R5	0.000	132.012	352.032	660.060	533.673	0.485
MAX LIMIT	1	100	100	100	100	100



IDD2(Patt.1)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.394	0.391	0.392	0.391	0.395	0.395
R2	0.400	0.573	1.074	1.489	1.305	0.324
R3	0.394	0.580	1.103	1.532	1.334	0.320
R4	0.383	0.555	1.052	1.448	1.250	0.308
R5	0.382	0.464	0.752	1.024	0.896	0.306
MAX LIMIT	1.6	1.6	1.6	1.6	1.6	1.6



VOL 5		00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R 1	min	166.415	169.285	167.625	168.725	164.500	165.050
	MAX	178.64	181.660	180.120	180.940	176.750	177.050
R 2	min	177.510	180.185	176.480	175.645	172.750	174.800
	MAX	185.805	188.540	184.795	184.225	181.150	185.000
R 3	min	177.715	180.445	176.590	176.105	174.000	174.650
	MAX	185.735	188.700	185.170	184.660	182.800	185.200
R 4	min	172.470	173.115	170.720	170.695	168.650	169.250
	MAX	184.240	185.085	182.695	182.745	180.550	183.450
R 5	min	177.905	179.560	177.015	176.665	174.750	175.200
	MAX	186.675	188.440	185.535	185.350	183.350	186.300
MAX LIMIT		400	400	400	400	400	400



VOH 5		00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R 1	min	4.129	4.125	4.127	4.126	4.132	4.131
	MAX	4.192	4.188	4.189	4.189	4.193	4.192
R 2	min	4.131	4.121	4.12	4.116	4.12	4.119
	MAX	4.135	4.124	4.123	4.118	4.122	4.121
R 3	min	4.128	4.118	4.117	4.111	4.114	4.115
	MAX	4.135	4.123	4.122	4.116	4.119	4.121
R 4	min	4.129	4.12	4.117	4.112	4.115	4.115
	MAX	4.177	4.169	4.166	4.16	4.163	4.165
R 5	min	4.127	4.117	4.115	4.11	4.111	4.113
	MAX	4.138	4.128	4.125	4.119	4.121	4.125
MIN LIMIT		3.7	3.7	3.7	3.7	3.7	3.7