ESA-QCA9918T-C

Envisat-1	TOTAL DOSE RADIATION TEST REPORT No. PO-TR-TLG-PL-2013	Issue: 1 Rev.: Date: 19/03/96 Page: 1/11

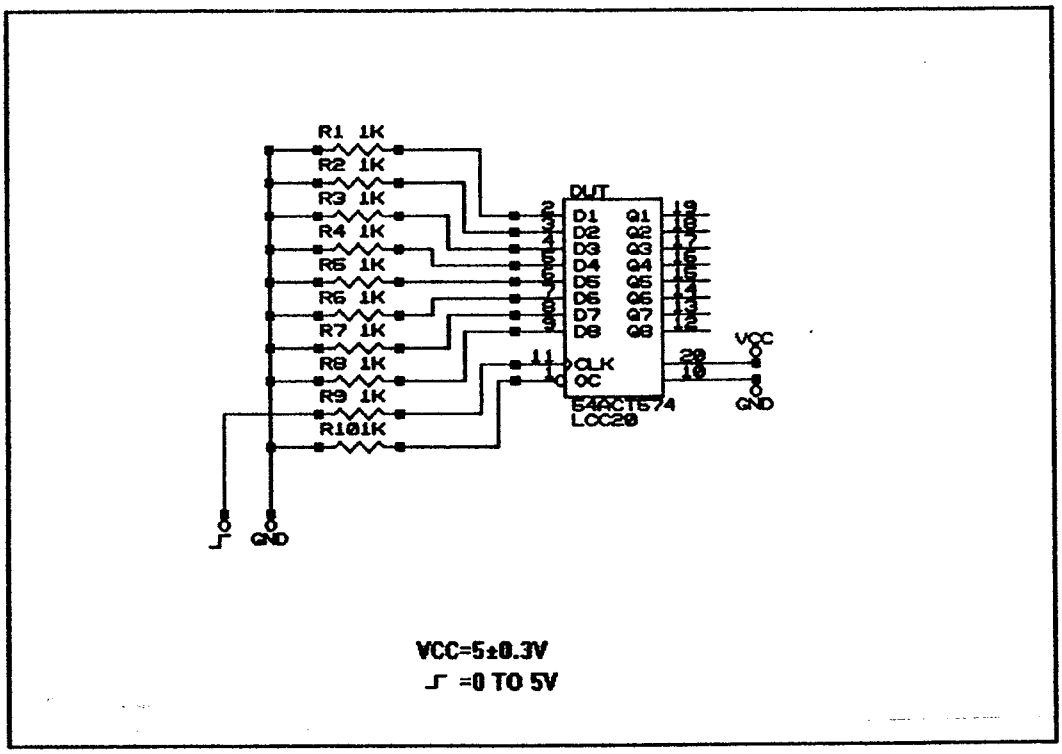
SCC Component No.: 920308404B		Component Designation: 54ACT574 LCC	Irradiation Spec. No.: PO-PL-TLG-PL-0500 Iss.2
Gen. Spec.: SCC 9000 8D Det. Spec.: SCC 9203/084 Iss.1 Amend.:		Evaluation: - Acceptance Difussion: - Acceptance Lot: X	Project/Programme: ENVISAT-1
Family: 08	Group: 03	Functional Assignment: OCTAL D FLIP-FLOPS 3-STATE	Package: LCC-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-2013		Sample Size: 5 Irradiation Devices: 4 Control Devices: 1	Date Code: 9505 Diffusion LOT: AH37526VA Wafer No.: 18
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:

FT_1 , FT_2 , IDD_1 , IDD_2 , VOL_4 , VOH_4 , VIL , VIH .

Irradiat. Respons.: J.M. VALVERDE Date: 19/03/96 Signature:	Electr. Test Resp.: J.A. VALERO Date: 26/03/96 Signature:	Approved by QA: S. MADRIGAL Date: 02-04-96 Signature:

FIGURE 1.-TEST CIRCUIT



SUMMARY

Total dose steady-state irradiation test has been carried out on OCTAL D FLIP-FLOP 3-STATE from MOTOROLA with date code 9505. 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
FCT_1	PASS	PASS	PASS	PASS	PASS	PASS
FCT_2	PASS	PASS	PASS	PASS	PASS	PASS
IDD_1(Patt.1)	PASS	PASS	PASS	PASS	PASS	PASS
IDD_1(Patt.2)	PASS	PASS 2 FAIL 2	PASS	PASS	PASS	PASS
IDD_1(Patt.3)	PASS	PASS	PASS	PASS	PASS	PASS
IDD_2(Patt.1)	PASS	PASS	PASS	PASS	PASS	PASS
VOL_4	PASS	PASS	PASS	PASS	PASS	PASS
VOH_4	PASS	PASS	PASS	PASS	PASS	PASS

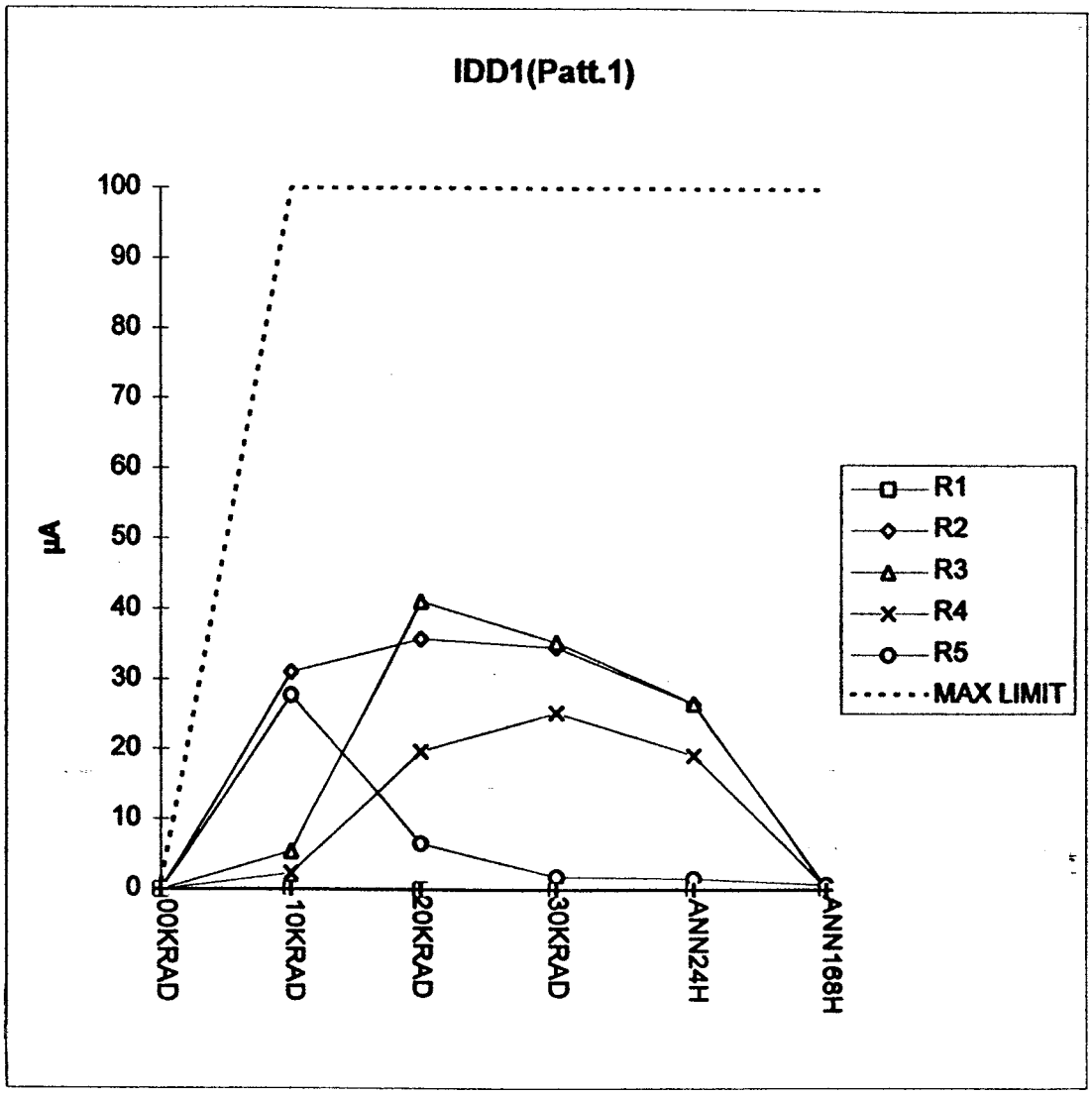
CONCLUSION

All parameters remain under specification except IDD_1 that fails after the 10krad step. Only R3 and R4 fail in this parameter but pass in all of the rest steps.

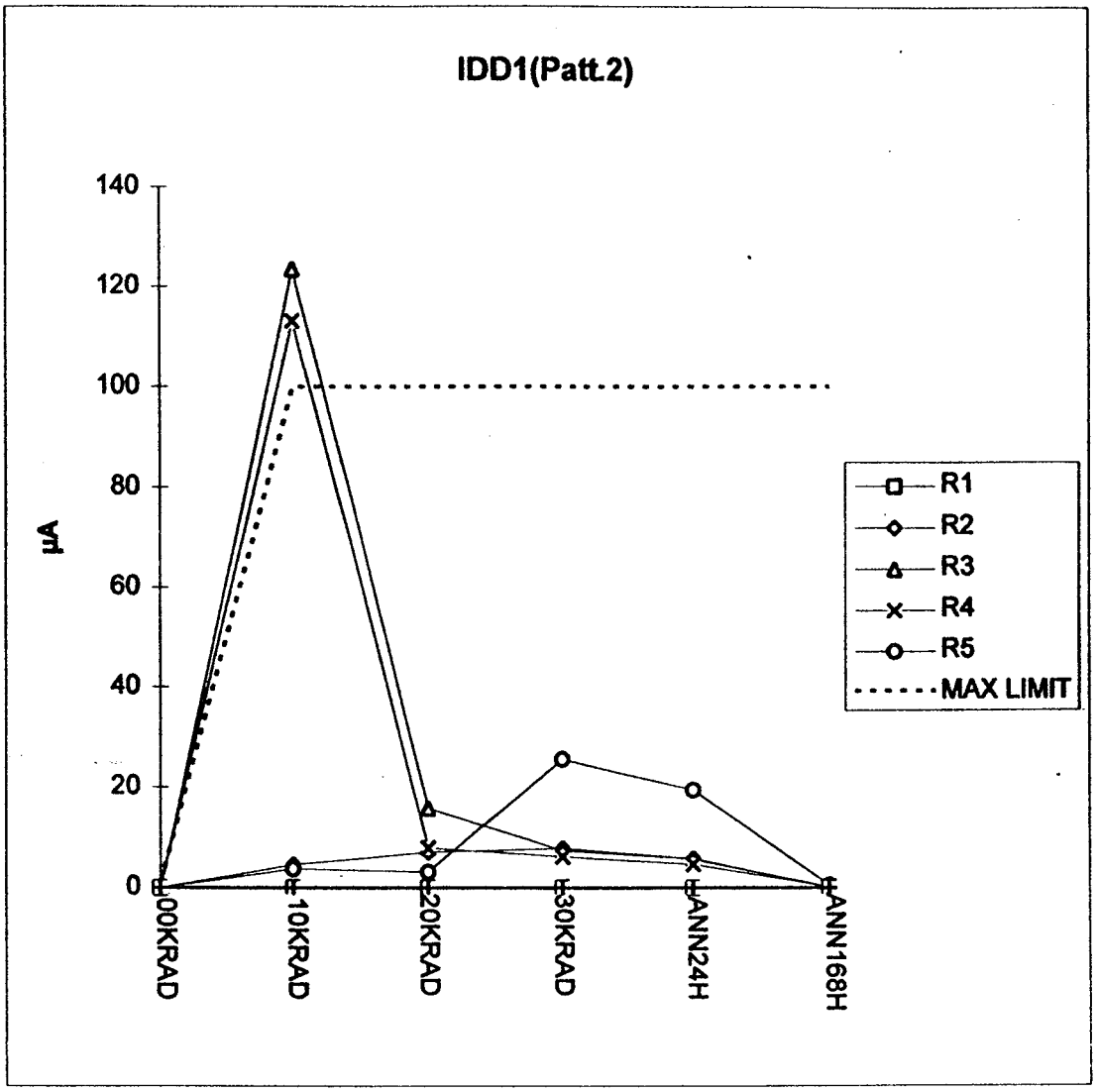
SCHEDULE

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

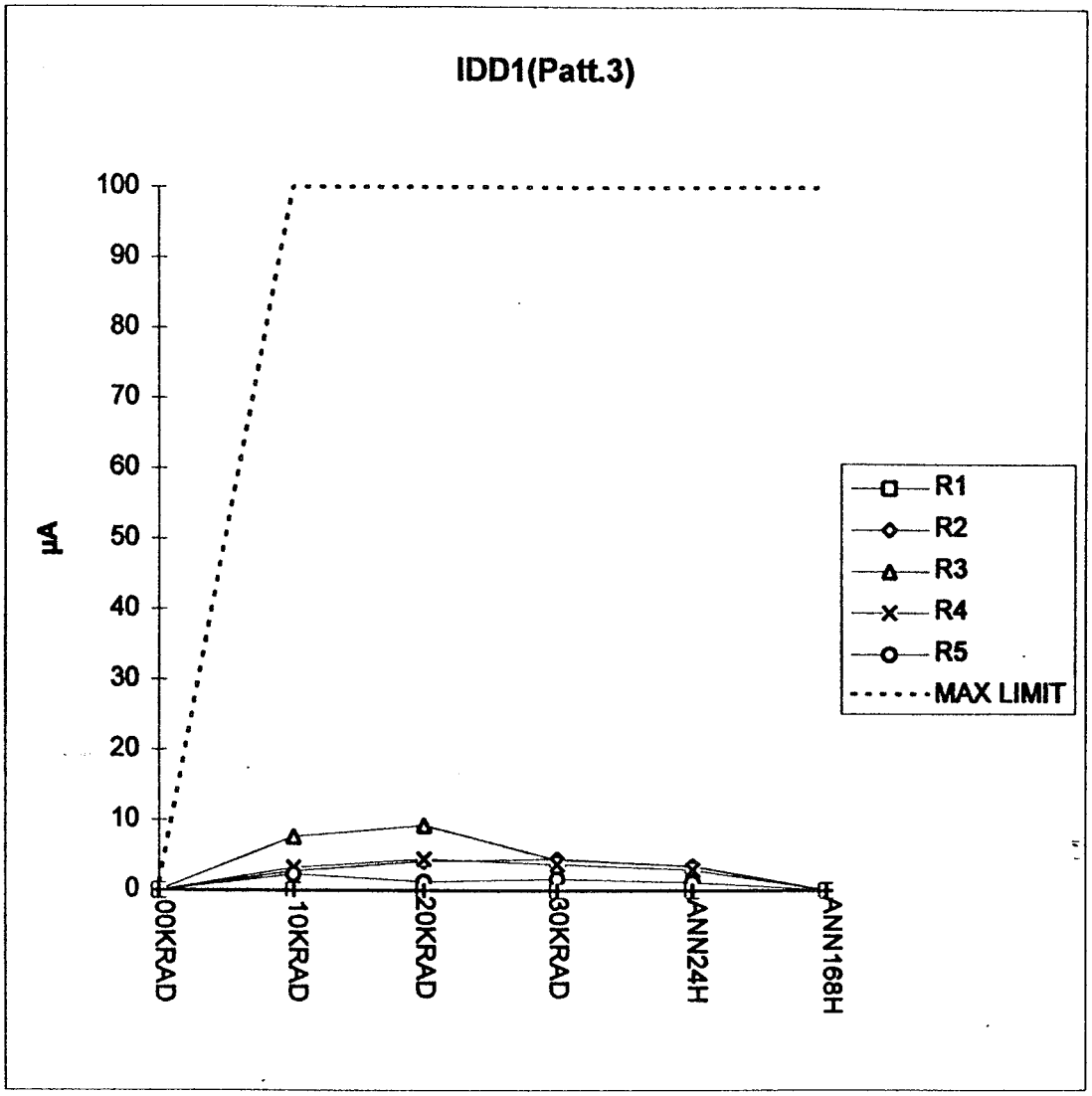
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
12	Annealing	Bias circuit verified according to Fig. 1 Temperature: 15.2°C (average)	15:35 07/03	13:35 08/03	22 h
13	Electrical Measurements	See ANN24h values in respective Parameter Data Tables Temperature: 25.0°C (average)	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



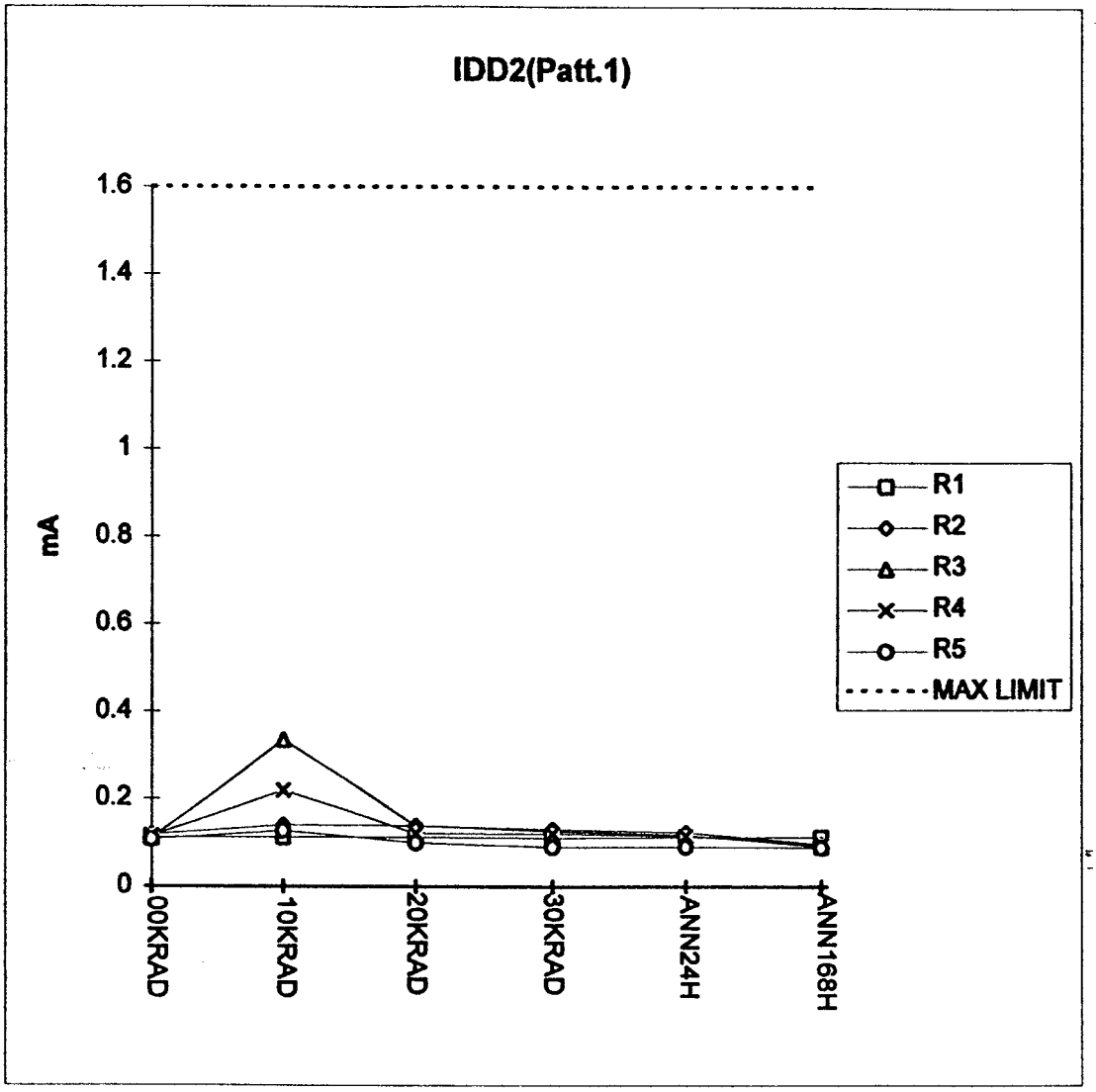
IDD1(Patt.1)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.008	0.098	0.022	0.046	0.044	0.037
R2	0.013	31.050	35.742	34.576	26.439	0.309
R3	0.011	5.405	41.142	35.321	26.564	0.127
R4	0.015	2.295	19.675	25.234	19.092	0.252
R5	0.014	27.700	6.547	1.829	1.562	0.684
MAX LIMIT	1	100	100	100	100	100



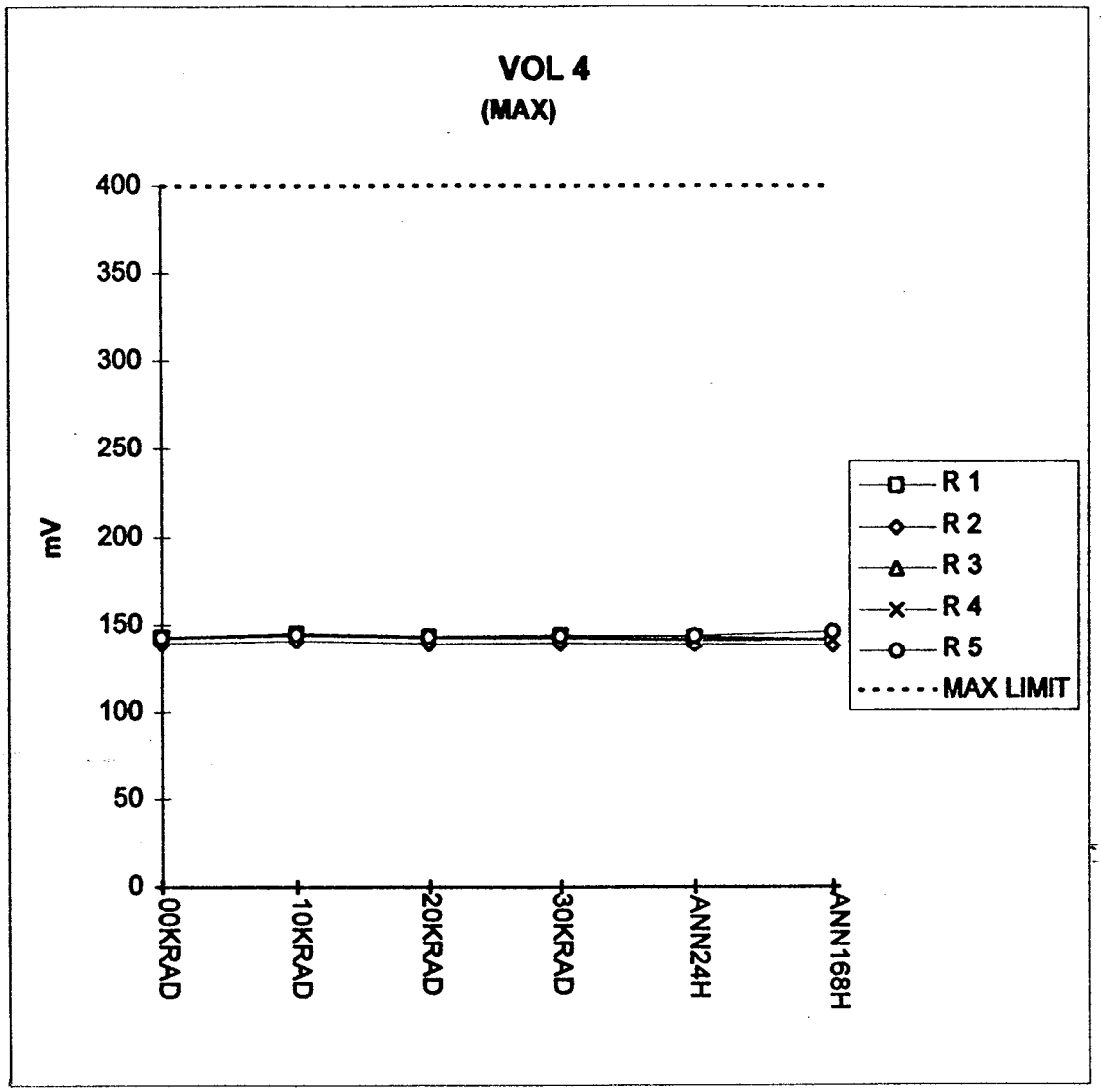
IDD1(Patt.2)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.014	0.050	0.059	0.081	0.006	0.053
R2	0.020	4.567	7.046	7.807	5.786	0.020
R3	0.012	123.587	15.797	7.404	5.639	0.148
R4	0.017	113.142	7.889	6.174	4.654	0.213
R5	0.016	3.762	3.121	25.547	19.407	0.497
MAX LIMIT	1	100	100	100	100	100



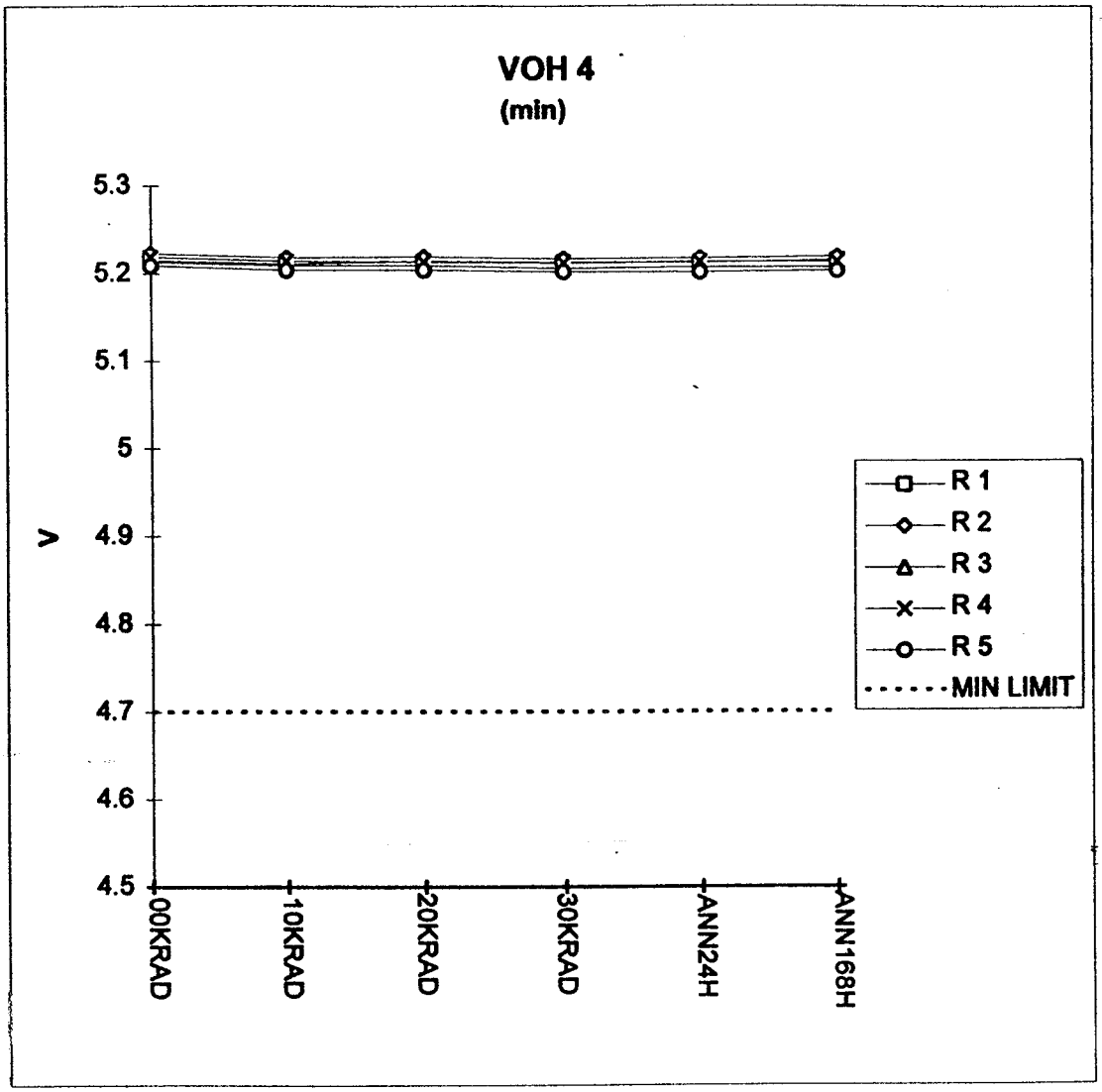
IDD1(Patt.3)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.012	0.042	0.032	0.022	0.000	0.053
R2	0.014	2.747	4.139	4.498	3.457	0.013
R3	0.008	7.662	9.299	4.360	3.428	0.035
R4	0.007	3.238	4.461	3.748	2.910	0.017
R5	0.010	2.267	1.227	1.618	1.143	0.033
MAX LIMIT	1	100	100	100	100	100



IDD2(Patt.1)	00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R1	0.112	0.112	0.112	0.111	0.112	0.112
R2	0.119	0.140	0.138	0.130	0.123	0.097
R3	0.111	0.335	0.138	0.126	0.117	0.091
R4	0.116	0.219	0.121	0.120	0.115	0.096
R5	0.108	0.127	0.100	0.090	0.090	0.089
MAX LIMIT	1.6	1.6	1.6	1.6	1.6	1.6



VOL 4		00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R 1	min	138.220	140.495	138.605	139.215	138.400	136.950
	MAX	142.955	145.175	143.265	143.940	143.050	141.550
R 2	min	134.605	136.040	134.485	134.575	133.850	133.050
	MAX	139.175	140.675	138.850	139.225	138.600	137.900
R 3	min	139.045	140.750	138.710	138.890	138.000	137.600
	MAX	142.775	144.470	142.420	142.650	141.750	141.350
R 4	min	138.165	139.755	138.150	138.070	136.800	136.850
	MAX	141.930	143.610	142.005	141.940	140.750	140.800
R 5	min	139.175	140.640	139.435	139.715	139.550	138.700
	MAX	142.690	144.335	142.930	143.340	143.500	146.000
MAX LIMIT		400	400	400	400	400	400



VOH 4		00KRAD	10KRAD	20KRAD	30KRAD	ANN24H	ANN168H
R 1	min	5.215	5.211	5.214	5.213	5.212	5.215
	MAX	5.218	5.215	5.217	5.217	5.217	5.218
R 2	min	5.223	5.218	5.219	5.217	5.217	5.219
	MAX	5.226	5.222	5.222	5.22	5.22	5.222
R 3	min	5.213	5.209	5.209	5.206	5.207	5.207
	MAX	5.216	5.211	5.212	5.209	5.21	5.21
R 4	min	5.219	5.214	5.213	5.212	5.213	5.213
	MAX	5.222	5.217	5.217	5.215	5.215	5.217
R 5	min	5.209	5.204	5.204	5.202	5.201	5.203
	MAX	5.213	5.208	5.208	5.205	5.205	5.207
MIN LIMIT		4.7	4.7	4.7	4.7	4.7	4.7