EMC EMISSION - TEST REPORT

Test Report No.	**B950001**	Issue Date	20 December 1999

Model / Serial No.	EasyProx Proximity Reader / AC-RASK-1
Product Type	Access Control Proximity Reader
Client	TELSOR Corporation
Manufacturer	TELSOR Corporation
License holder	TELSOR Corporation
Address	P.O. Box 4423 Englewood, CO 80144-4423
Test Criteria Applied	FCC Part 15 15.209C
Test Start Date:	07 December 1999
Test End Date:	07 December 1999
Test Result	■ **PASS** ☐ **FAIL**
Test Report Project No.	**BC1G950001**
Total Pages including Appendices	35

Reviewed By : Shawn Singh

Reviewed By : Jeffrey V. Doolittle

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DIRECTORY - EMISSIONS

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error of ±4 dB. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

EMISSIONS TEST REGULATIONS :

The tests were performed according to following regulations :

■ - Federal Communication Commission part 15	☐ - Class A	■ - Class B
■ - Federal Communication Commission part 15, Subpart C	■ - 15.207	■ - 15.209

All tests performed according to ANSI C63.4.

Emission Test Results:

Conducted emissions 150 kHz - 30 MHz

Test Result ■ - PASS ☐ - FAIL ☐ - Not Applicable

Passing Margin 11 dB at 0.450 MHz

Failing Margin _____ dB at _____ MHz

Remarks: _____

Radiated emissions (electric field) 30 MHz - 1000 MHz (Unintentional Radiator)

Test Result ■ - PASS ☐ - FAIL ☐ - Not Applicable

Passing Margin 11.2 dB at 38.1 MHz

Failing Margin _____ dB at _____ MHz

Remarks: _____

Radiated emissions (Magnetic field) 0.125 MHz - 1.250 MHz (Intentional Radiator)

Test Result ■ - PASS ☐ - FAIL ☐ - Not Applicable

Passing Margin 25.7 dB at 0.125 MHz

Failing Margin _____ dB at _____ MHz

Remarks: _____

GENERAL REMARKS:

Modifications required to pass: None

Test Specification Deviations: Additions to or Exclusions from: None

TÜV PRODUCT SERVICE INC 40 Meadow Road Pinewood Springs, Lyons, CO 80540 Tel: 303 786 7999 Fax: 303 449 3004 Rev.No 1.0

Test Equipment Used

TÜV PRODUCT SERVICE INC 40 Meadow Road Pinewood Springs, Lyons, CO 80540 Tel: 303 786 7999 Fax: 303 449 3004 Rev.No 1.0

Equipment Report

21-Dec-1999

Project Number: B950001 **Project Date:** 07-Dec-1999

Company Name: TELSOR Corporation

Equip ID	Manufacturer	Model Number	Serial Number	Description	Calibration Date	Interval	Due	Cal Code
Test Performed C		Conducted Emissions						
2679	HEWLETT-PACKARD	85650A	2430A00550	Quasi Peak Adapter	07-Jun-1999	12	06-Jun-2000	G
8004	Rhode & Schwarz	ESH3	872318/036	Low Frequency Receiver (9 kHz - 30 MHz)	13-Sep-1999	12	12-Sep-2000	G
8038	HEWLETT PACKARD	11947A	3107A01975	Transient Limiter	18-Jun-1999	12	17-Jun-2000	G
8184	RHODE & SCHWARZ	ESH2-Z5	830364/002	LISN 50 ohm/50uH 3 line (1kHz - 30 MHz)	22-Mar-1999	12	21-Mar-2000	G
8213	HEWLETT PACKARD	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	15-Apr-1999	12	14-Apr-2000	G
8214	HEWLETT PACKARD	85662A	2403A08749	Display Section	15-Apr-1999	12	14-Apr-2000	G
8258	Polorad Electronics	ESH3-Z2	357.881J.32	Transient Limiter		12		Y
Test Performed R		Radiated Emissions						
2679	HEWLETT-PACKARD	85650A	2430A00550	Quasi Peak Adapter	07-Jun-1999	12	06-Jun-2000	G
7514	A.H.SYSTEMS	SAS-200/512	104	Log Periodic Antenna (200-1500 MHz)	28-Jul-1999	12	27-Jul-2000	G
8004	Rhode & Schwarz	ESH3	872318/036	Low Frequency Receiver (9 kHz - 30 MHz)	13-Sep-1999	12	12-Sep-2000	G
8137	RADIO SHACK	63-867	005	Temperature / Humidity Indicator		12		G
8164	GISHARD	600-1040 mb	002	Altimeter		12		G
8169	EMCO	6502	9205-2738	Magnetic loop	30-Oct-1997	36	29-Oct-2000	G
8179	EMCO	3108	2149	Biconical Dipole Antenna (30-300 MHz)	28-Jun-1999	12	27-Jun-2000	G
8212	MINI CIRCUITS	ZHL-1042J-SMA	D020499-5	Amplifier	12-Feb-1999	12	12-Feb-2000	Y
8213	HEWLETT PACKARD	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	15-Apr-1999	12	14-Apr-2000	G
8214	HEWLETT PACKARD	85662A	2403A08749	Display Section	15-Apr-1999	12	14-Apr-2000	G

Cal Code Legend: G=Out Source, Y=No Cal required, R=Out of Service, B=In-House Verification Required

Appendix A

Intentional and Unintentional
Data Sheets

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 01**	Test Area:	Pinewood Site 1 (10m)		
Test Method:	15.209C	Test Date:	07-Dec-1999		
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC		
EUT Serial #:	AC-RASK-1			Temperature:	22.5 °C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader			Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK			Page:	1 of 2
	RFID Reader reading access control badge				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 15.209C	DELTA2 None
Vertical = X Axis, Horizontal = Y Axis						
All readings are maximized.						
Rotated loop antenna for maximum emissions.						
0.125	49.0Pk	0.0 / 10.0 / 0.0	59.0	V / 1.0 / 0.0	-25.7	N/A
No higher emissions found above the receiver's noise floor to 10th harmonic.						

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 01**	Test Area:	Pinewood Site 1 (10m)			
Test Method:	15.209C	Test Date:	07-Dec-1999			
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC			
EUT Serial #:	AC-RASK-1			Temperature:	22.5	°C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18%	%
EUT Description:	Access Control Proximity Reader			Air Pressure:	79	kPa
Notes:	FCC ID: EVCACRASK			Page:	2 of 2	
	RFID Reader reading access control badge					

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 15.209C	DELTA2 None
********** MEASUREMENT SUMMARY **********						
0.125	49.0Pk	0.0 / 10.0 / 0.0	59.0	V / 1.0 / 0.0	-25.7	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 02**	Test Area:	Pinewood Site 1 (30m)		
Test Method:	15.209C	Test Date:	07-Dec-1999		
EUT Model #:	EsayProx Proximity Reader	EUT Power:	13.6 VDC		
EUT Serial #:	AC-RASK-1			Temperature:	22.5 °C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader			Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK			Page:	1 of 2
	RFID Reader reading access control badge				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 15.209C	DELTA2 None
Vertical = X Axis, Horizontal = Y Axis						
All readings are maximized.						
Rotated loop antenna for maximum emissions.						
No emissions found above the receiver's noise floor from fundamental to 10 th harmonic.						

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 02**	Test Area:	Pinewood Site 1 (30m)		
Test Method:	15.209C	Test Date:	07-Dec-1999		
EUT Model #:	EsayProx Proximity Reader	EUT Power:	13.6 VDC		
EUT Serial #:	AC-RASK-1			Temperature:	22.5 °C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader			Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK			Page:	2 of 2
	RFID Reader reading access control badge				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 15.209C	DELTA2 None
********** MEASUREMENT SUMMARY **********						

Tested by: Daniel M. Dillon — Printed — Signature

Reviewed by: Shawn Singh — Printed — Signature

Radiated Electromagnetic Emissions

TÜV PRODUCT SERVICE

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC B	Test Date:	07-Dec-1999
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC
EUT Serial #:	AC-RASK-1	Temperature:	22.5 °C
Manufacturer:	Telsor Corporation	Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader	Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK	Page:	1 of 8
	RFID Reader reading access control badge		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
Bicon antenna, vertical						
34.15	38.4Qp	0.4 / 12.9 / 30.0	21.7	V / 1.0 / 0.0	-18.3	N/A
38.18	44.6Qp	0.4 / 12.3 / 30.0	27.3	V / 1.0 / 0.0	-12.7	N/A
30.14	38.7Qp	0.4 / 13.4 / 30.0	22.5	V / 1.0 / 0.0	-17.5	N/A
42.19	40.6Qp	0.4 / 11.8 / 30.0	22.8	V / 1.0 / 0.0	-17.2	N/A
46.17	40.4Qp	0.4 / 11.3 / 30.0	22.2	V / 1.0 / 0.0	-17.8	N/A
50.22	38.6Qp	0.4 / 10.8 / 30.0	19.9	V / 1.0 / 0.0	-20.1	N/A
54.24	39.6Qp	0.5 / 10.2 / 30.0	20.3	V / 1.0 / 0.0	-19.7	N/A
58.25	41.3Qp	0.5 / 9.7 / 30.0	21.5	V / 1.0 / 0.0	-18.5	N/A
62.28	41.8Qp	0.5 / 9.2 / 30.0	21.4	V / 1.0 / 0.0	-18.6	N/A
66.16	36.9Qp	0.5 / 8.9 / 30.0	16.3	V / 1.0 / 0.0	-23.7	N/A
146.19	30.9Qp	0.7 / 12.0 / 30.0	13.6	V / 1.0 / 0.0	-29.9	N/A
32.14	37.4Qp	0.4 / 13.1 / 30.0	20.9	V / 1.0 / 0.0	-19.1	N/A
38.84	38.4Qp	0.4 / 12.2 / 30.0	21.0	V / 1.0 / 0.0	-19.0	N/A
40.50	43.1Qp	0.4 / 12.0 / 30.0	25.5	V / 1.0 / 0.0	-14.5	N/A
48.21	42.5Qp	0.4 / 11.1 / 30.0	24.0	V / 1.0 / 0.0	-16.0	N/A
56.25	44.6Qp	0.5 / 10.0 / 30.0	25.0	V / 1.0 / 0.0	-15.0	N/A
58.26	41.8Qp	0.5 / 9.7 / 30.0	22.0	V / 1.0 / 0.0	-18.0	N/A
58.93	40.9Qp	0.5 / 9.7 / 30.0	21.0	V / 1.0 / 0.0	-19.0	N/A
60.27	42.4Qp	0.5 / 9.4 / 30.0	22.2	V / 1.0 / 0.0	-17.8	N/A
62.95	39.7Qp	0.5 / 9.1 / 30.0	19.3	V / 1.0 / 0.0	-20.7	N/A
64.28	38.9Qp	0.5 / 9.0 / 30.0	18.3	V / 1.0 / 0.0	-21.7	N/A
74.33	37.5Qp	0.5 / 8.2 / 30.0	16.2	V / 1.0 / 0.0	-23.8	N/A
75.01	35.3Qp	0.5 / 8.2 / 30.0	14.0	V / 1.0 / 0.0	-26.0	N/A
76.35	37.5Qp	0.5 / 8.1 / 30.0	16.1	V / 1.0 / 0.0	-23.9	N/A
78.36	39.9Qp	0.5 / 8.0 / 30.0	18.4	V / 1.0 / 0.0	-21.6	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

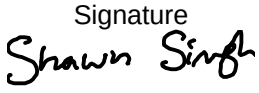
Radiated Electromagnetic Emissions

TÜV PRODUCT SERVICE

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC B	Test Date:	07-Dec-1999
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC
EUT Serial #:	AC-RASK-1	Temperature:	22.5 °C
Manufacturer:	Telsor Corporation	Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader	Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK	Page:	2 of 8
	RFID Reader reading access control badge		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
80.35	42.4Qp	0.5 / 7.9 / 30.0	20.8	V / 1.0 / 0.0	-19.2	N/A
82.35	40.4Qp	0.5 / 7.9 / 30.0	18.7	V / 1.0 / 0.0	-21.3	N/A
84.38	40.2Qp	0.5 / 7.9 / 30.0	18.6	V / 1.0 / 0.0	-21.4	N/A
86.39	39.9Qp	0.5 / 7.8 / 30.0	18.1	V / 1.0 / 0.0	-21.9	N/A
88.39	37.5Pk	0.5 / 7.9 / 30.0	15.8	V / 1.0 / 0.0	-27.7	N/A
132.60	31.8Qp	0.7 / 11.9 / 30.0	14.3	V / 1.0 / 0.0	-29.2	N/A
136.61	31.3Qp	0.7 / 12.1 / 30.0	14.0	V / 1.0 / 0.0	-29.5	N/A
138.62	32.5Qp	0.7 / 12.1 / 30.0	15.2	V / 1.0 / 0.0	-28.3	N/A
140.64	31.8Qp	0.7 / 12.0 / 30.0	14.5	V / 1.0 / 0.0	-29.0	N/A
34.15	40.1Qp	0.4 / 12.9 / 30.0	23.4	V / 1.0 / 90.0	-16.6	N/A
38.18	44.6Qp	0.4 / 12.3 / 30.0	27.4	V / 1.0 / 90.0	-12.6	N/A
48.02	45.1Qp	0.4 / 11.1 / 30.0	26.6	V / 1.0 / 90.0	-13.4	N/A
49.86	40.5Qp	0.4 / 10.8 / 30.0	21.8	V / 1.0 / 90.0	-18.2	N/A
54.24	41.0Qp	0.5 / 10.2 / 30.0	21.6	V / 1.0 / 90.0	-18.4	N/A
74.33	41.6Pk	0.5 / 8.2 / 30.0	20.3	V / 1.0 / 90.0	-19.7	N/A
76.35	41.5Pk	0.5 / 8.1 / 30.0	20.1	V / 1.0 / 90.0	-19.9	N/A
78.36	43.9Qp	0.5 / 8.0 / 30.0	22.4	V / 1.0 / 90.0	-17.6	N/A
132.60	32.6Qp	0.7 / 11.9 / 30.0	15.2	V / 1.0 / 90.0	-28.3	N/A
36.16	40.5Qp	0.4 / 12.6 / 30.0	23.4	V / 1.0 / 90.0	-16.6	N/A
66.28	36.4Qp	0.5 / 8.9 / 30.0	15.7	V / 1.0 / 90.0	-24.3	N/A
68.30	37.1Qp	0.5 / 8.8 / 30.0	16.4	V / 1.0 / 90.0	-23.6	N/A
70.32	36.0Qp	0.5 / 8.4 / 30.0	14.9	V / 1.0 / 90.0	-25.1	N/A
72.34	33.2Qp	0.5 / 8.3 / 30.0	12.0	V / 1.0 / 90.0	-28.0	N/A
94.41	39.6Pk	0.5 / 8.2 / 30.0	18.3	V / 1.0 / 90.0	-25.2	N/A
130.58	33.7Pk	0.7 / 11.9 / 30.0	16.3	V / 1.0 / 90.0	-27.2	N/A
160.67	29.0Qp	0.7 / 12.4 / 30.0	12.1	V / 1.0 / 90.0	-31.4	N/A

Tested by: Daniel M. Dillon (Printed)  (Signature)

Reviewed by: Shawn Singh (Printed)  (Signature)

Radiated Electromagnetic Emissions

TÜV PRODUCT SERVICE

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC B	Test Date:	07-Dec-1999
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC
EUT Serial #:	AC-RASK-1	Temperature:	22.5 °C
Manufacturer:	Telsor Corporation	Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader	Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK	Page:	3 of 8
	RFID Reader reading access control badge		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
34.15	40.1Qp	0.4 / 12.9 / 30.0	23.3	V / 1.0 / 180.0	-16.7	N/A
48.21	44.1Qp	0.4 / 11.1 / 30.0	25.6	V / 1.0 / 180.0	-14.4	N/A
49.86	42.9Qp	0.4 / 10.8 / 30.0	24.1	V / 1.0 / 180.0	-15.9	N/A
50.22	39.8Qp	0.4 / 10.8 / 30.0	21.0	V / 1.0 / 180.0	-19.0	N/A
54.24	40.5Qp	0.5 / 10.2 / 30.0	21.2	V / 1.0 / 180.0	-18.8	N/A
70.32	37.8Qp	0.5 / 8.4 / 30.0	16.7	V / 1.0 / 180.0	-23.3	N/A
72.34	36.2Qp	0.5 / 8.3 / 30.0	15.0	V / 1.0 / 180.0	-25.0	N/A
74.33	42.6Qp	0.5 / 8.2 / 30.0	21.2	V / 1.0 / 180.0	-18.8	N/A
75.01	38.4Qp	0.5 / 8.2 / 30.0	17.0	V / 1.0 / 180.0	-23.0	N/A
94.42	41.8Pk	0.5 / 8.2 / 30.0	20.5	V / 1.0 / 180.0	-23.0	N/A
76.35	42.1Qp	0.5 / 8.1 / 30.0	20.7	V / 1.0 / 270.0	-19.3	N/A
The following were maximized between 30 and 200 MHz.						
38.18	46.1Qp	0.4 / 12.3 / 30.0	28.8	V / 1.0 / 8.0	-11.2	N/A
Cables were maximized.						
Bicon, horizontal						
No higher emissions found: 0 Deg, horizontal						
No higher emissions found: 90 Deg, horizontal						
No higher emissions found: 180 Deg, horizontal						
No higher emissions found: 270 Deg, horizontal						

Tested by: Daniel M. Dillon — Printed — Signature

Reviewed by: Shawn Singh — Printed — Signature

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC B	Test Date:	07-Dec-1999
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC
EUT Serial #:	AC-RASK-1	Temperature:	22.5 °C
Manufacturer:	Telsor Corporation	Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader	Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK	Page:	4 of 8
	RFID Reader reading access control badge		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
Log antenna, vertical						
200.89	27.9Qp	0.8 / 12.3 / 30.0	11.0	V / 1.0 / 0.0	-32.5	N/A
208.92	31.1Qp	0.8 / 13.0 / 30.0	14.8	V / 1.0 / 0.0	-28.7	N/A
212.93	28.8Qp	0.8 / 12.9 / 30.0	12.5	V / 1.0 / 0.0	-31.0	N/A
202.91	27.5Qp	0.8 / 12.4 / 30.0	10.7	V / 1.0 / 0.0	-32.8	N/A
204.91	30.9Qp	0.8 / 12.6 / 30.0	14.3	V / 1.0 / 0.0	-29.2	N/A
206.91	28.1Qp	0.8 / 12.8 / 30.0	11.7	V / 1.0 / 0.0	-31.8	N/A
210.93	28.0Qp	0.8 / 12.7 / 30.0	11.5	V / 1.0 / 0.0	-32.0	N/A
212.94	28.7Qp	0.8 / 12.9 / 30.0	12.4	V / 1.0 / 0.0	-31.1	N/A
216.95	28.8Qp	0.8 / 13.3 / 30.0	12.9	V / 1.0 / 0.0	-33.1	N/A
218.96	27.5Pk	0.8 / 13.5 / 30.0	11.9	V / 1.0 / 0.0	-34.1	N/A
220.97	27.1Pk	0.8 / 13.9 / 30.0	11.8	V / 1.0 / 0.0	-34.2	N/A
224.99	27.1Pk	0.8 / 14.0 / 30.0	11.9	V / 1.0 / 0.0	-34.1	N/A
233.03	29.0Pk	0.8 / 14.6 / 30.0	14.5	V / 1.0 / 0.0	-31.5	N/A
200.89	27.9Qp	0.8 / 12.3 / 30.0	10.9	V / 1.0 / 0.0	-32.6	N/A
202.91	27.5Qp	0.8 / 12.4 / 30.0	10.7	V / 1.0 / 0.0	-32.8	N/A
216.28	29.5Qp	0.8 / 13.3 / 30.0	13.6	V / 1.0 / 0.0	-32.4	N/A
250.35	28.0Qp	0.9 / 14.3 / 30.0	13.2	V / 1.0 / 0.0	-32.8	N/A
250.35	28.6Qp	0.9 / 14.3 / 30.0	13.8	V / 1.0 / 90.0	-32.2	N/A
224.99	29.9Qp	0.8 / 14.0 / 30.0	14.7	V / 1.0 / 180.0	-31.3	N/A
No higher emissions found: 180 Deg, vertical						
No higher emissions found: 270 Deg, vertical						

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)		
Test Method:	FCC B	Test Date:	07-Dec-1999		
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC		
EUT Serial #:	AC-RASK-1			Temperature:	22.5 °C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader			Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK			Page:	5 of 8
	RFID Reader reading access control badge				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
The following were maximized between 200 and 1000 MHz.						
208.92	30.9Qp	0.8 / 13.0 / 30.0	14.7	V / 1.0 / 16.0	-28.8	N/A
Log antenna, horizontal						
No emissions found: Log antenna, horizontal						
Raised and lowered antenna, 1 - 4m, rotated table 360 Deg.						

Tested by: Daniel M. Dillon
Printed

Daniel M. Dillon
Signature

Reviewed by: Shawn Singh
Printed

Shawn Singh
Signature

Radiated Electromagnetic Emissions

TÜV PRODUCT SERVICE

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)		
Test Method:	FCC B	Test Date:	07-Dec-1999		
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC		
EUT Serial #:	AC-RASK-1			Temperature:	22.5 °C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader			Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK			Page:	6 of 8
	RFID Reader reading access control badge				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
********** **MEASUREMENT SUMMARY** **********						
38.18	46.1Qp	0.4 / 12.3 / 30.0	28.8	V / 1.0 / 8.0	-11.2	N/A
48.02	45.1Qp	0.4 / 11.1 / 30.0	26.6	V / 1.0 / 90.0	-13.4	N/A
48.21	44.1Qp	0.4 / 11.1 / 30.0	25.6	V / 1.0 / 180.0	-14.4	N/A
40.50	43.1Qp	0.4 / 12.0 / 30.0	25.5	V / 1.0 / 0.0	-14.5	N/A
56.25	44.6Qp	0.5 / 10.0 / 30.0	25.0	V / 1.0 / 0.0	-15.0	N/A
49.86	42.9Qp	0.4 / 10.8 / 30.0	24.1	V / 1.0 / 180.0	-15.9	N/A
34.15	40.1Qp	0.4 / 12.9 / 30.0	23.4	V / 1.0 / 90.0	-16.6	N/A
36.16	40.5Qp	0.4 / 12.6 / 30.0	23.4	V / 1.0 / 90.0	-16.6	N/A
42.19	40.6Qp	0.4 / 11.8 / 30.0	22.8	V / 1.0 / 0.0	-17.2	N/A
30.14	38.7Qp	0.4 / 13.4 / 30.0	22.5	V / 1.0 / 0.0	-17.5	N/A
78.36	43.9Qp	0.5 / 8.0 / 30.0	22.4	V / 1.0 / 90.0	-17.6	N/A
46.17	40.4Qp	0.4 / 11.3 / 30.0	22.2	V / 1.0 / 0.0	-17.8	N/A
60.27	42.4Qp	0.5 / 9.4 / 30.0	22.2	V / 1.0 / 0.0	-17.8	N/A
58.26	41.8Qp	0.5 / 9.7 / 30.0	22.0	V / 1.0 / 0.0	-18.0	N/A
54.24	41.0Qp	0.5 / 10.2 / 30.0	21.6	V / 1.0 / 90.0	-18.4	N/A
62.28	41.8Qp	0.5 / 9.2 / 30.0	21.4	V / 1.0 / 0.0	-18.6	N/A
74.33	42.6Qp	0.5 / 8.2 / 30.0	21.2	V / 1.0 / 180.0	-18.8	N/A
38.84	38.4Qp	0.4 / 12.2 / 30.0	21.0	V / 1.0 / 0.0	-19.0	N/A
50.22	39.8Qp	0.4 / 10.8 / 30.0	21.0	V / 1.0 / 180.0	-19.0	N/A
58.93	40.9Qp	0.5 / 9.7 / 30.0	21.0	V / 1.0 / 0.0	-19.0	N/A
32.14	37.4Qp	0.4 / 13.1 / 30.0	20.9	V / 1.0 / 0.0	-19.1	N/A
80.35	42.4Qp	0.5 / 7.9 / 30.0	20.8	V / 1.0 / 0.0	-19.2	N/A
76.35	42.1Qp	0.5 / 8.1 / 30.0	20.7	V / 1.0 / 270.0	-19.3	N/A
62.95	39.7Qp	0.5 / 9.1 / 30.0	19.3	V / 1.0 / 0.0	-20.7	N/A
82.35	40.4Qp	0.5 / 7.9 / 30.0	18.7	V / 1.0 / 0.0	-21.3	N/A
84.38	40.2Qp	0.5 / 7.9 / 30.0	18.6	V / 1.0 / 0.0	-21.4	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

TÜV PRODUCT SERVICE

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)
Test Method:	FCC B	Test Date:	07-Dec-1999
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC
EUT Serial #:	AC-RASK-1	Temperature:	22.5 °C
Manufacturer:	Telsor Corporation	Relative Humidity:	<18% %
EUT Description:	Access Control Proximity Reader	Air Pressure:	79 kPa
Notes:	FCC ID: EVCACRASK	Page:	7 of 8
	RFID Reader reading access control badge		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
64.28	38.9Qp	0.5 / 9.0 / 30.0	18.3	V / 1.0 / 0.0	-21.7	N/A
86.39	39.9Qp	0.5 / 7.8 / 30.0	18.1	V / 1.0 / 0.0	-21.9	N/A
75.01	38.4Qp	0.5 / 8.2 / 30.0	17.0	V / 1.0 / 180.0	-23.0	N/A
94.42	41.8Pk	0.5 / 8.2 / 30.0	20.5	V / 1.0 / 180.0	-23.0	N/A
70.32	37.8Qp	0.5 / 8.4 / 30.0	16.7	V / 1.0 / 180.0	-23.3	N/A
68.30	37.1Qp	0.5 / 8.8 / 30.0	16.4	V / 1.0 / 90.0	-23.6	N/A
66.16	36.9Qp	0.5 / 8.9 / 30.0	16.3	V / 1.0 / 0.0	-23.7	N/A
66.28	36.4Qp	0.5 / 8.9 / 30.0	15.7	V / 1.0 / 90.0	-24.3	N/A
72.34	36.2Qp	0.5 / 8.3 / 30.0	15.0	V / 1.0 / 180.0	-25.0	N/A
130.58	33.7Pk	0.7 / 11.9 / 30.0	16.3	V / 1.0 / 90.0	-27.2	N/A
88.39	37.5Pk	0.5 / 7.9 / 30.0	15.8	V / 1.0 / 0.0	-27.7	N/A
132.60	32.6Qp	0.7 / 11.9 / 30.0	15.2	V / 1.0 / 90.0	-28.3	N/A
138.62	32.5Qp	0.7 / 12.1 / 30.0	15.2	V / 1.0 / 0.0	-28.3	N/A
208.92	31.1Qp	0.8 / 13.0 / 30.0	14.8	V / 1.0 / 0.0	-28.7	N/A
140.64	31.8Qp	0.7 / 12.0 / 30.0	14.5	V / 1.0 / 0.0	-29.0	N/A
204.91	30.9Qp	0.8 / 12.6 / 30.0	14.3	V / 1.0 / 0.0	-29.2	N/A
136.61	31.3Qp	0.7 / 12.1 / 30.0	14.0	V / 1.0 / 0.0	-29.5	N/A
146.19	30.9Qp	0.7 / 12.0 / 30.0	13.6	V / 1.0 / 0.0	-29.9	N/A
212.93	28.8Qp	0.8 / 12.9 / 30.0	12.5	V / 1.0 / 0.0	-31.0	N/A
224.99	29.9Qp	0.8 / 14.0 / 30.0	14.7	V / 1.0 / 180.0	-31.3	N/A
160.67	29.0Qp	0.7 / 12.4 / 30.0	12.1	V / 1.0 / 90.0	-31.4	N/A
233.03	29.0Pk	0.8 / 14.6 / 30.0	14.5	V / 1.0 / 0.0	-31.5	N/A
206.91	28.1Qp	0.8 / 12.8 / 30.0	11.7	V / 1.0 / 0.0	-31.8	N/A
210.93	28.0Qp	0.8 / 12.7 / 30.0	11.5	V / 1.0 / 0.0	-32.0	N/A
250.35	28.6Qp	0.9 / 14.3 / 30.0	13.8	V / 1.0 / 90.0	-32.2	N/A
216.28	29.5Qp	0.8 / 13.3 / 30.0	13.6	V / 1.0 / 0.0	-32.4	N/A
200.89	27.9Qp	0.8 / 12.3 / 30.0	11.0	V / 1.0 / 0.0	-32.5	N/A
202.91	27.5Qp	0.8 / 12.4 / 30.0	10.7	V / 1.0 / 0.0	-32.8	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Radiated Electromagnetic Emissions

Test Report #:	**B9500 Run 03**	Test Area:	Pinewood Site 1 (3m)			
Test Method:	FCC B	Test Date:	07-Dec-1999			
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC			
EUT Serial #:	AC-RASK-1			Temperature:	22.5	°C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18%	%
EUT Description:	Access Control Proximity Reader			Air Pressure:	79	kPa
Notes:	FCC ID: EVCACRASK			Page:	8 of 8	
	RFID Reader reading access control badge					

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m)/(deg)	DELTA 1 FCC B (< 1GHz)	DELTA2 None
216.95	28.8Qp	0.8 / 13.3 / 30.0	12.9	V / 1.0 / 0.0	-33.1	N/A
218.96	27.5Pk	0.8 / 13.5 / 30.0	11.9	V / 1.0 / 0.0	-34.1	N/A
220.97	27.1Pk	0.8 / 13.9 / 30.0	11.8	V / 1.0 / 0.0	-34.2	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Conducted Electromagnetic Emissions

Test Report #:	**B9500 Run 1**	Test Area:	Pinewood Site 1 Cond			
Test Method:	FCC B	Test Date:	12-07-1999			
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC			
EUT Serial #:	AC-RASK-1			Temperature:	22.5	°C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18	%
EUT Description:	Access Control Proximity Reader			Air Pressure:	79	kPa
Notes:	Conducted emissions testing performed on DC source.			Page:	1 of 2	

FREQ (MHz)	LEVEL (dBuV)	FACTOR (dB)	FINAL (dBuV/m)	LINE	DELTA 1 FCC B	DELTA2 None
0.450	37.0Qp	0.0	37.0	Neutral	-11.0	N/A
0.520	32.0Qp	0.0	32.0	Neutral	-16.0	N/A
0.580	29.0Qp	0.0	29.0	Neutral	-19.0	N/A
0.770	22.0Qp	0.0	22.0	Neutral	-26.0	N/A
0.860	14.0Qp	0.0	14.0	Neutral	-34.0	N/A
1.00	11.0Qp	0.0	11.0	Neutral	-37.0	N/A
0.450	36.0Qp	0.0	36.0	Line 1	-12.0	N/A
0.520	33.0Qp	0.0	33.0	Line 1	-15.0	N/A
0.580	30.0Qp	0.0	30.0	Line 1	-18.0	N/A
0.770	24.0Qp	0.0	24.0	Line 1	-24.0	N/A
0.860	16.0Qp	0.0	16.0	Line 1	-32.0	N/A
1.00	12.0Qp	0.0	12.0	Line 1	-36.0	N/A

Tested by: Daniel M. Dillon (Printed) — Daniel M. Dillon (Signature)

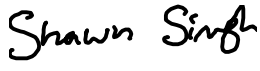
Reviewed by: Shawn Singh (Printed) — Shawn Singh (Signature)

Conducted Electromagnetic Emissions

Test Report #:	**B9500 Run 1**	Test Area:	Pinewood Site 1 Cond			
Test Method:	FCC B	Test Date:	12-07-1999			
EUT Model #:	EasyProx Proximity Reader	EUT Power:	13.6 VDC			
EUT Serial #:	AC-RASK-1			Temperature:	22.5	°C
Manufacturer:	Telsor Corporation			Relative Humidity:	<18	%
EUT Description:	Access Control Proximity Reader			Air Pressure:	79	kPa
Notes:	Conducted emissions testing performed on DC source.			Page:	2 of 2	

FREQ (MHz)	LEVEL (dBuV)	FACTOR (dB)	FINAL (dBuV/m)	LINE	DELTA 1 FCC B	DELTA2 None
********** **MEASUREMENT SUMMARY** **********						
0.450	37.0Qp	0.0	37.0	Neutral	-11.0	N/A
0.520	33.0Qp	0.0	33.0	Line 1	-15.0	N/A
0.580	30.0Qp	0.0	30.0	Line 1	-18.0	N/A
0.770	24.0Qp	0.0	24.0	Line 1	-24.0	N/A
0.860	16.0Qp	0.0	16.0	Line 1	-32.0	N/A
1.00	12.0Qp	0.0	12.0	Line 1	-36.0	N/A

Tested by: Daniel M. Dillon (Printed)  (Signature)

Reviewed by: Shawn Singh (Printed)  (Signature)

Appendix B

Test Plan

and

Constructional Data Form

Form

EMC Test Plan and Constructional Data Form

PRODUCT SERVICE

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- ***NOTE: This information will be input into your test report as shown below.***
Press the F1 key at any time to get HELP for the current field selected.

Company: TELSOR Corporation

Address: P.O. Box 4423

Englewood, CO 80144-4423

Contact: Michael Andrew Position: Vice President

Phone: (303) 522-8877 Fax: (303)727-7683

E-mail Address: proximity@telsor.com

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description: Access Control Proximity Reader

EUT Name: RFID Reader

Model No.: EasyProx Proximity Reader Serial No.: AC-RASK-1

Product Options: Outputs Wiegand Data

Configurations to be tested: as above

Test Objective

☐	EMC Directive 89/336/EEC (EMC) Std:	☒	FCC:	Class	☐ A	☒ B	Part 15
☐	Machinery Directive 89/392/EEC (EMC Std:	☐	VCCI:	Class	☐ A	☐ B	
☐	Medical Device Directive 93/42/EEC (EMC) Std:	☐	BCIQ:	Class	☐ A	☐ B	
☐	Vehicle Directive 72/245/EEC (EMC) Std:	☐	Canada:	Class	☐ A	☐ B	
☐	FDA Reviewers Guidance for Premarket Notification Submissions (EMC)	☐	Australia:	Class	☐ A	☐ B	
		☒	Other:	15.209			

TÜV Product Service Certification Requested

☐ Attestation of Conformity (AoC) ☐ International EMC Mark (IEM)

☐ Certificate of Conformity (CoC) ☐ Compliance Document

Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

(Press **F1** when field is selected to show additional information on Protection Class.)

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Failure ***- Complete this section if testing will not be attended by the customer.***

If a failure occurs, TUV Product Service should:

☒ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: 5.0" Width: 1.6" Height: 1.0" Weight: 5 oz.

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 5-18 VDC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): 40mA Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): .15

☐ Shielded OR ☒ Unshielded

☐ Not Applicable

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

EUT Interface Ports and Cables

Interface				Shielding								
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
Power	☒	☐	2	☐	☒	18 AWG strand	none			.15	☒	☐
LED Control	☒	☐	1	☐	☒	18 AWG strand	none			.15	☒	☐
Wiegand Data	☐	☒	2	☐	☒	18 AWG strand	none			.15	☒	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

EUT Software.

Revision Level: Firware version 1.1

Description: Process 125Khz data from access card and transmit Wiegand data to a control system and control local LED

EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing.
Consult with your TÜV Product Service Representative if additional assistance is required.

1. Read Mode

2.

3.

EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

Description	Model #	Serial #	FCC ID #
RFID tag	Key Fob	AC-CFOB	n/a

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)

Description	*Model #*	*Serial #*	*FCC ID #*
Door Access Controller	23-107		n/a
Samlex Linear Supply	RPS	1204	

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
125Khz		Microprox Reader Chip	Radiate Signal and detect return
4 MHz			uP Clock

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***
n/a				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

n/a

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures

12/6/99

Customer authorization to perform tests according to this test plan. — Date

Michael Andrew — 12/6/99

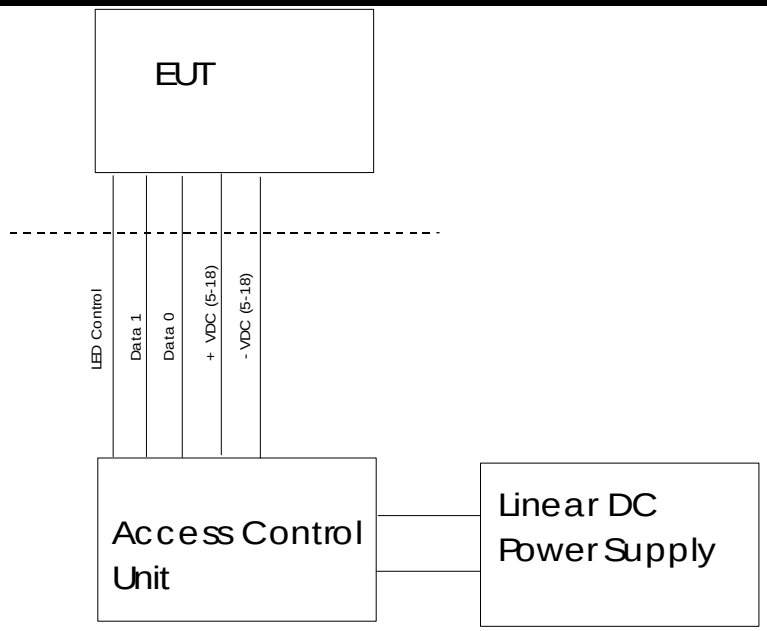
Test Plan/CDF Prepared By (please print) — Date

12/7/99

Reviewed by TÜV Product Service Associate — Date

EMC Block Diagram Form

System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



Authorization Signatures

Customer authorization to perform tests according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Shawn Singh

Date

12/7/99

Reviewed by TÜV Product Service Associate

Date

Appendix C

Measurement of Protocol

MEASUREMENT PROTOCOL FOR FCC

GENERAL INFORMATION

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBµV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit.

To convert between dBµV and µV, the following conversions apply:

dBµV = 20(log µV)

µV = Inverse log(dBµV/20)

RADIATED EMISSIONS

The final level, expressed in dBµV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBµV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the FCC limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example:

Frequency (MHz)		Level (dBµV)		Factor & Cable (dB)		Final (dBµV/m)		FCC B Limit (dBµV/m)		Delta FCC B (dB)
32.21		13.9	+	16.3	=	30.2	-	40.0	=	-9.8

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 60 Hz power interface of the EUT are measured in the frequency range of 450 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Magnetic Field Radiated Emissions

Magnetic field radiated emissions from the EUT are measured in the frequency range of 125 kHz to 1.25 MHz using a spectrum analyzer and loop antenna. Measurements between 125 kHz and 150 kHz are made with 200 Hz/6 dB bandwidth and peak or quasi-peak detection and measurements above 150 kHz are made with 9 kHz/6dB bandwidth and peak or quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, and the EUT are rotated 360 degrees.

Electric Field Radiated Emissions

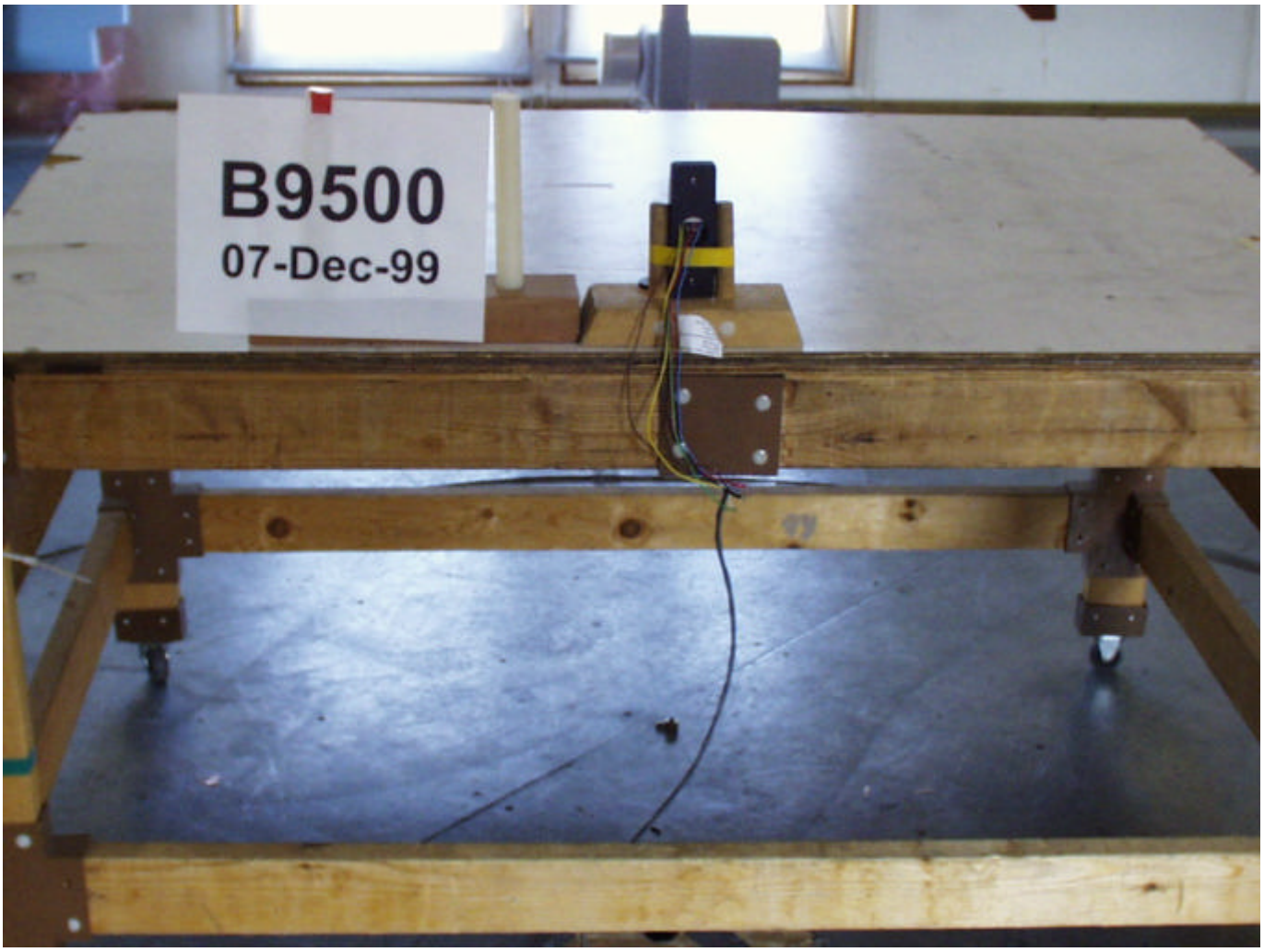
Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT . To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. Intentional radiators are rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

Appendix D

Test Setup Photographs
(see attached photos)

Test Setup Photo(s)
Conducted Emissions

Test Setup Photo(s)
Radiated Emissions



Test Setup Photo(s)
Radiated Emissions