EMC EMISSIONS - TEST REPORT (Full)

Test Report No.	**BC300175-1**	Issue Date:	**Wed 24/Sep/2003**
Model / Serial No.	**TX-002 / SN: EMC1**		
Product Type	**Button Push Transmitter & AC Switch Reciever**		
Client	**Silverton**		
Manufacturer	**Python Perfect Cutter Inc.**		
License Holder	**Python Perfect Cutter Inc.**		
Address	**224 E. Douglas**		
	Wichita, KS 67202		
Test Criteria Applied	**FCC CFR47 Part 15 Class B**		
Test Result	**PASS**		
Test Project Number	**BC300175-1**		
References	Title 47 CFR 15: RADIO FREQUENCY DEVICES		
Total Pages Including Appendices:	**20**		

Reviewed By : Todd Seeley

Approved By : Robert Cresswell

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NVLAP
Lab Code: 200624-0

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STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be ±2.30dB and for Radiated Emissions is calculated to be ±3.60dB in the frequency range of 30MHz – 200MHz and ±3.38dB in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 6-Aug-2003

Testing Start Date: 6-Aug-2003

Testing End Date: 24-Sep-2003

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The tests were performed according to following regulations :

1. FCC CFR47 Part 15.205
2. FCC CFR47 Part 15.207
3. FCC CFR47 Part 15.209
4. FCC CFR47 Part 15.231
5. ICES-003

Emission Test Results:

Conducted Emissions, Powerline -

Test Result

Minimum limit margin 28.4 dB at 30.000 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (15.209) -

Test Result

Minimum limit margin 15.9 dB at 75.390 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (15.205) -

Test Result

Minimum limit margin 2.92 dB at 1735.75 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (15.231) -

Test Result

Minimum limit margin 3.66 dB at 867.90 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

GENERAL REMARKS:

Modifications required to pass:

Test Specification Deviations: Additions to or Exclusions from

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Test-setup photo(s):
Conducted Emissions

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Test-setup photo(s):
Radiated Emissions

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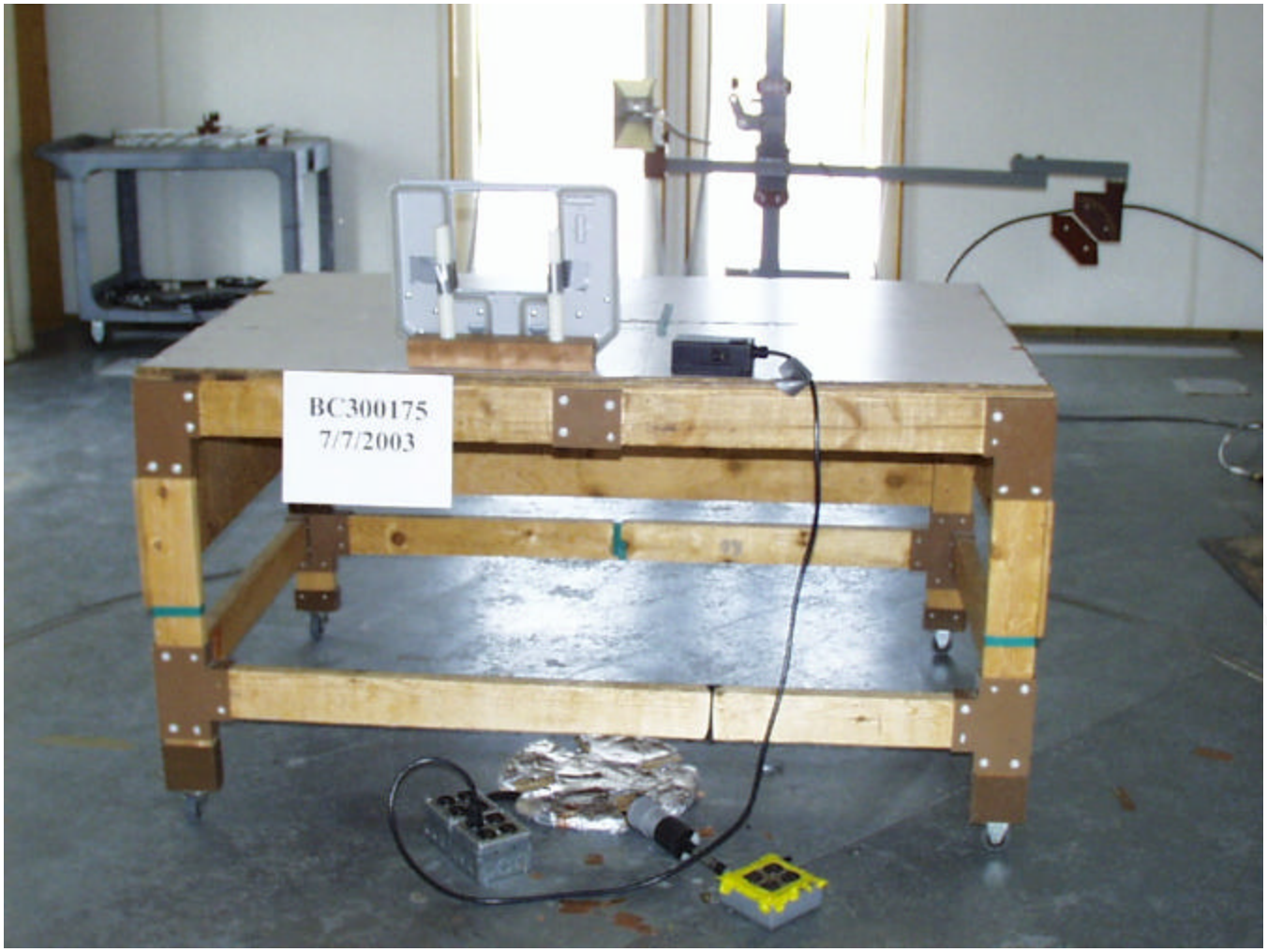
Test-setup photo(s):
Radiated Emissions



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Appendix A

Test Data Sheets

and

Test Equipment Used

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Conducted Electromagnetic Emissions

Test Report #:	**BC300175 Run 01**	Test Area:	Pinewood Site 1 Cond	Temperature:	23.1	°C
Test Method:	FCC CFR47 Part 15.207	Test Date:	07-Jul-2003	Relative Humidity:	34	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	1 of 2	
Manufacturer:	Python Tools					
EUT Description:	AC Switch Reciever					

Notes: Conducted emissions was not tested on the transmitter for the fact that it does not Have an AC mains port.

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC B	N/A
No emissions found: .45 to 30 MHz, Line						
Noise floor.						
0.450	0.5 Qp	0.1 / 0.0 / -10.0	10.6	Neutral	-37.4	N/A
1.00	0.4 Qp	0.2 / 0.0 / -10.0	10.6	Neutral	-37.4	N/A
5.00	0.6 Qp	0.4 / 0.2 / -10.0	11.2	Neutral	-36.8	N/A
10.00	0.9 Qp	0.7 / 0.5 / -10.0	12.1	Neutral	-35.9	N/A
20.00	1.6 Qp	1.0 / 1.4 / -10.0	13.9	Neutral	-34.1	N/A
30.00	6.2 Qp	1.2 / 2.2 / -10.0	19.6	Neutral	-28.4	N/A
No emissions found: .45 to 30 MHz, Neutral.						
Noise floor.						
0.450	0.4 Qp	0.1 / 0.0 / -10.0	10.5	Neutral	-37.5	N/A
1.00	0.4 Qp	0.2 / 0.0 / -10.0	10.6	Neutral	-37.4	N/A
5.00	0.6 Qp	0.4 / 0.2 / -10.0	11.2	Neutral	-36.8	N/A
10.00	0.9 Qp	0.7 / 0.5 / -10.0	12.1	Neutral	-35.9	N/A
20.00	1.6 Qp	1.0 / 1.4 / -10.0	13.9	Neutral	-34.1	N/A
30.00	6.1 Qp	1.2 / 2.2 / -10.0	19.5	Neutral	-28.5	N/A

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Conducted Electromagnetic Emissions

Test Report #:	**BC300175 Run 01**	Test Area:	Pinewood Site 1 Cond	Temperature:	23.1	°C
Test Method:	FCC CFR47 Part 15.207	Test Date:	07-Jul-2003	Relative Humidity:	34	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	2 of 2	
Manufacturer:	Python Tools					
EUT Description:	AC Switch Reciever					

Notes: Conducted emissions was not tested on the transmitter for the fact that it does not Have an AC mains port.

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC B	N/A
********** **Measurement Summary** **********						
30.00	6.2 Qp	1.2 / 2.2 / -10.0	19.6	Neutral	-28.4	N/A
20.00	1.6 Qp	1.0 / 1.4 / -10.0	13.9	Neutral	-34.1	N/A
10.00	0.9 Qp	0.7 / 0.5 / -10.0	12.1	Neutral	-35.9	N/A
5.00	0.6 Qp	0.4 / 0.2 / -10.0	11.2	Neutral	-36.8	N/A
0.450	0.5 Qp	0.1 / 0.0 / -10.0	10.6	Neutral	-37.4	N/A
1.00	0.4 Qp	0.2 / 0.0 / -10.0	10.6	Neutral	-37.4	N/A

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Radiated Electromagnetic Emissions

Test Report #:	**BC300175 Run 02**	Test Area:	Pinewood Site 1 (3m)	Temperature:	25.5	°C
Test Method:	FCC CFR47 Part 15.209	Test Date:	07-Jul-2003	Relative Humidity:	31	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	1 of 3	
Manufacturer:	Silverton					
EUT Description:	Button Push Transmitter & AC Switch Receiver					
Notes:	Both the transmitter and receiver were in the field for this testing.					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <1GHz	DELTA2 (dB) 15.209 >1GHz
No emissions were observed between 10MHz and 30MHz on the device.						
48.07	37.0 Qp	0.8 / 10.6 / 28.3	20.1	V / 1.0 / 0.0	-19.9	N/A
71.41	42.3 Qp	0.9 / 8.3 / 28.2	23.3	V / 1.0 / 0.0	-16.7	N/A
74.39	38.3 Qp	0.9 / 7.5 / 28.2	18.5	V / 1.0 / 0.0	-21.5	N/A
79.34	40.4 Qp	0.9 / 7.1 / 28.2	20.2	V / 1.0 / 0.0	-19.8	N/A
84.94	34.8 Qp	0.9 / 7.4 / 28.2	15.0	V / 1.0 / 0.0	-25.0	N/A
48.07	37.0 Qp	0.8 / 10.6 / 28.3	20.0	V / 1.0 / 90.0	-20.0	N/A
75.39	43.1 Qp	0.9 / 7.3 / 28.2	23.1	V / 1.0 / 90.0	-16.9	N/A
75.39	43.9 Qp	0.9 / 7.3 / 28.2	23.9	V / 1.0 / 180.0	-16.1	N/A
48.07	37.5 Qp	0.8 / 10.6 / 28.3	20.5	V / 1.0 / 270.0	-19.5	N/A
71.41	42.6 Qp	0.9 / 8.3 / 28.2	23.5	V / 1.0 / 270.0	-16.5	N/A
The following were maximized between 30 and 200 MHz.						
75.39	44.1 Qp	0.9 / 7.3 / 28.2	24.1	V / 1.0 / 355.0	-15.9	N/A
71.43	42.7 Qp	0.9 / 8.3 / 28.2	23.7	V / 1.0 / 355.0	-16.3	N/A
No higher emissions found: 0Deg, Horizontal.						
No higher emissions found: 90Deg, Horizontal.						
No higher emissions found: 180Deg, Horizontal.						
No higher emissions found: 270Deg, Horizontal.						
Noise floor.						
30.00	23.8 Qp	0.6 / 13.1 / 28.3	9.2	H / 1.4 / 270.0	-30.8	N/A
80.00	30.9 Qp	0.9 / 7.1 / 28.2	10.8	H / 1.4 / 270.0	-29.2	N/A
195.00	30.1 Qp	1.4 / 13.5 / 27.6	17.5	H / 1.4 / 270.0	-26.0	N/A

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Radiated Electromagnetic Emissions

Test Report #:	**BC300175 Run 02**	Test Area:	Pinewood Site 1 (3m)	Temperature:	25.5	°C
Test Method:	FCC CFR47 Part 15.209	Test Date:	07-Jul-2003	Relative Humidity:	31	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	2 of 3	
Manufacturer:	Silverton					
EUT Description:	Button Push Transmitter & AC Switch Receiver					
Notes:	Both the transmitter and receiver were in the field for this testing.					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <1GHz	DELTA2 (dB) 15.209 >1GHz
No emissions found: 200 to 1000 MHz Vertical.						
Noise floor.						
200.00	30.1 Qp	1.4 / 11.3 / 27.6	15.2	V / 1.0 / 270.0	-28.3	N/A
500.00	25.4 Qp	2.4 / 18.2 / 28.4	17.5	V / 1.0 / 270.0	-28.5	N/A
995.00	21.1 Qp	3.2 / 24.2 / 27.5	21.0	V / 1.0 / 270.0	-33.0	N/A
No emissions found: 200 to 1000 MHz Horizontal.						
205.00	29.4 Qp	1.5 / 11.1 / 27.5	14.5	H / 1.0 / 0.0	-29.0	N/A
505.00	22.7 Qp	2.4 / 18.1 / 28.4	14.8	H / 1.0 / 0.0	-31.2	N/A
990.00	21.2 Qp	3.2 / 23.9 / 27.6	20.8	H / 1.0 / 0.0	-33.2	N/A
No emissions found: 1 to 2 GHz Vertical.						
Noise floor.						
1000.00	34.9 Av	3.2 / 25.0 / 37.1	26.0	V / 1.0 / 270.0	N/A	-28
1500.00	34.8 Av	3.0 / 26.9 / 37.2	27.4	V / 1.0 / 270.0	N/A	-26.6
2000.00	35.0 Av	3.6 / 29.1 / 37.6	30.0	V / 1.0 / 270.0	N/A	-24
No emissions found: 1 to 2 GHz Horizontal.						
Noise floor.						
1050.00	35.4 Av	3.2 / 25.2 / 37.8	26.0	H / 1.0 / 270.0	N/A	-28
1450.00	34.6 Av	3.0 / 26.7 / 36.8	27.5	H / 1.0 / 270.0	N/A	-26.5
1990.00	34.8 Av	3.5 / 29.1 / 37.6	29.7	H / 1.0 / 270.0	N/A	-24.3

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Radiated Electromagnetic Emissions

Test Report #:	**BC300175 Run 02**	Test Area:	Pinewood Site 1 (3m)	Temperature:	25.5	°C
Test Method:	FCC CFR47 Part 15.209	Test Date:	07-Jul-2003	Relative Humidity:	31	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	3 of 3	
Manufacturer:	Silverton					
EUT Description:	Button Push Transmitter & AC Switch Receiver					
Notes:	Both the transmitter and receiver were in the field for this testing.					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <1GHz	DELTA2 (dB) 15.209 >1GHz
********** **Measurement Summary** **********						
75.39	44.1 Qp	0.9 / 7.3 / 28.2	24.1	V / 1.0 / 355.0	-15.9	N/A
71.43	42.7 Qp	0.9 / 8.3 / 28.2	23.7	V / 1.0 / 355.0	-16.3	N/A
48.07	37.5 Qp	0.8 / 10.6 / 28.3	20.5	V / 1.0 / 270.0	-19.5	N/A
79.34	40.4 Qp	0.9 / 7.1 / 28.2	20.2	V / 1.0 / 0.0	-19.8	N/A
74.39	38.3 Qp	0.9 / 7.5 / 28.2	18.5	V / 1.0 / 0.0	-21.5	N/A
84.94	34.8 Qp	0.9 / 7.4 / 28.2	15.0	V / 1.0 / 0.0	-25.0	N/A
195.00	30.1 Qp	1.4 / 13.5 / 27.6	17.5	H / 1.4 / 270.0	-26.0	N/A
200.00	30.1 Qp	1.4 / 11.3 / 27.6	15.2	V / 1.0 / 270.0	-28.3	N/A
500.00	25.4 Qp	2.4 / 18.2 / 28.4	17.5	V / 1.0 / 270.0	-28.5	N/A
205.00	29.4 Qp	1.5 / 11.1 / 27.5	14.5	H / 1.0 / 0.0	-29.0	N/A
80.00	30.9 Qp	0.9 / 7.1 / 28.2	10.8	H / 1.4 / 270.0	-29.2	N/A
30.00	23.8 Qp	0.6 / 13.1 / 28.3	9.2	H / 1.4 / 270.0	-30.8	N/A
505.00	22.7 Qp	2.4 / 18.1 / 28.4	14.8	H / 1.0 / 0.0	-31.2	N/A
995.00	21.1 Qp	3.2 / 24.2 / 27.5	21.0	V / 1.0 / 270.0	-33.0	N/A
990.00	21.2 Qp	3.2 / 23.9 / 27.6	20.8	H / 1.0 / 0.0	-33.2	N/A
2000.00	35.0 Av	3.6 / 29.1 / 37.6	30.0	V / 1.0 / 270.0	N/A	-24
1990.00	34.8 Av	3.5 / 29.1 / 37.6	29.7	H / 1.0 / 270.0	N/A	-24.3
1450.00	34.6 Av	3.0 / 26.7 / 36.8	27.5	H / 1.0 / 270.0	N/A	-26.5
1500.00	34.8 Av	3.0 / 26.9 / 37.2	27.4	V / 1.0 / 270.0	N/A	-26.6
1000.00	34.9 Av	3.2 / 25.0 / 37.1	26.0	V / 1.0 / 270.0	N/A	-28
1050.00	35.4 Av	3.2 / 25.2 / 37.8	26.0	H / 1.0 / 270.0	N/A	-28

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Radiated Electromagnetic Emissions

Test Report #:	**BC300175 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	22	°C
Test Method:	FCC CFR47 Part 15.231/205	Test Date:	06-Aug-2003	Relative Humidity:	48	%
EUT Model #:	TX-002	EUT Power:	3 VDC	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	1 of 1	
Manufacturer:	Python Tools					
EUT Description:	Push Button Transmitter					

Notes: Only the transmitter was in the field for this testing.

The worst case Duty Cycle for this device within a 100mS window is 42%.

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.231 emissions and delta limits were calculated as follows: Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission. The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.231 and the emission/limit delta was calculated. * the DTCF is calculated as follows $20*\log_{10}$(duty cycle in 100mS) "not to exceed 20dB"								
433.98	79.4 Pk	2.2 / 16.0 / 28.1	69.5	V / 1.2 / 260.0	-7.54	61.96	80.83	-18.86
867.90	67.9 Pk	3.0 / 22.0 / 28.2	64.7	V / 1.2 / 223.0	-7.54	57.16	60.83	-3.66
433.97	75.9 Pk	2.2 / 16.0 / 28.1	66.0	H / 3.1 / 166.0	-7.54	58.46	80.83	-22.36
867.90	57.1 Pk	3.0 / 22.0 / 28.2	53.8	H / 1.1 / 51.0	-7.54	46.26	60.83	-14.57
1301.83	63.0 Pk	3.1 / 25.8 / 37.4	54.6	V / 1.2 / 224.0	-7.54	47.06	53.98	-6.91
1735.75	65.0 Pk	3.3 / 27.5 / 37.1	58.6	V / 1.1 / 7.0	-7.54	51.06	53.98	-2.92
2169.68	62.1 Pk	3.8 / 29.1 / 37.2	57.8	V / 1.1 / 306.0	-7.54	50.26	60.83	-10.56
3471.44	39.9 Pk	4.3 / 32.5 / 37.0	39.7	V / 1.1 / 13.0	-7.54	32.16	60.83	-28.66
3905.35	41.1 Pk	4.8 / 33.9 / 36.6	43.3	V / 1.5 / 11.0	-7.54	35.76	53.98	-18.22
1301.82	57.4 Pk	3.1 / 25.8 / 37.4	48.9	H / 1.4 / 351.0	-7.54	41.36	53.98	-12.61
1735.75	56.6 Pk	3.3 / 27.5 / 37.1	50.2	H / 1.5 / 50.0	-7.54	42.66	53.98	-11.31
2169.67	56.1 Pk	3.8 / 29.1 / 37.2	51.8	H / 1.2 / 308.0	-7.54	44.26	60.83	-16.56
2603.60	43.6 Pk	4.2 / 30.4 / 36.7	41.5	H / 1.1 / 56.0	-7.54	33.96	60.83	-26.86
3037.52	49.1 Pk	3.8 / 31.6 / 36.9	47.5	H / 1.2 / 73.0	-7.54	39.96	60.83	-20.86

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Radiated Electromagnetic Emissions

Test Report #:	**BC300175 Run 02**	Test Area:	Pinewood Site 1 (3m)	Temperature:	25.5	°C
Test Method:	FCC CFR47 Part 15.231(c)	Test Date:	24-Sep-2003	Relative Humidity:	31	%
EUT Model #:	TX-002	EUT Power:	120 VAC / 60 Hz	Air Pressure:	80	kPa
EUT Serial #:	EMC1			Page:	1 of 1	
Manufacturer:	Silverton					
EUT Description:	Button Push Transmitter & AC Switch Receiver					
Notes:	Measurements were taken in accordance to FCC CFR47 Part 15.231(c).					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ of Fundamental	LEVEL Low Edge	LEVEL High Edge	Bandwidth Measured	Bandwidth Limit 0.25% Fc	DELTA2 (dB)
(MHz)	(-20dBuV)	(-20dBuV)	(MHz)	(MHz)	(MHz)
433.98	433.92825	434.03175	0.104	1.084	0.98

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Project Report

Begin Date: **End Date:** 8/6/2003 8/6/2003

Technician Todd Seeley **Project:** BC300175

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Cal Date	Cal Due
192	RHODE & SCHWARZ	ESH2-Z5	830364/002	LISN 50 ohm/50uH 3 line (1kHz - 30 MHz)	C Conducted Emissions	3/4/2003	3/4/2004
198	Hewlett-Packard	11947A	3107A01984	Transient Limiter	C Conducted Emissions	9/18/2002	9/18/2003
199	RHODE & SCHWARZ	ESH3	872318/036	Low Frequency Receiver (9 kHz - 30 MHz)	C Conducted Emissions	10/31/2002	10/31/2003
189	EMCO	3109	9801-3142	Bicon Antenna 30 - 300 MHz	R Radiated Emissions	9/30/2002	9/30/2003
209	Hewlett-Packard	85662A	2403A08749	Display Section	R Radiated Emissions	10/21/2002	10/21/2003
210	Hewlett-Packard	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	R Radiated Emissions	10/21/2002	10/21/2003
211	Hewlett-Packard	85650A	2043A00256	Quasi Peak Adapter (set 1)	R Radiated Emissions	9/17/2003	9/17/2004
217	EMCO	3146	9203-3376	Log Periodic Antenna	R Radiated Emissions	9/11/2002	9/11/2003
248	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	6/5/2003	6/5/2004
248	EMCO	6502	9205-2738	Magnetic loop	R Radiated Emissions	9/29/2002	9/29/2003

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Appendix B

Test Plan

and

Constructional Data Form

To be supplied by Customer

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Appendix C

Measurement Protocol

And

Test Procedures

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MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

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 applicable 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 applicable 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: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dBmV:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

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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 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 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.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz 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, 10 or 30 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.

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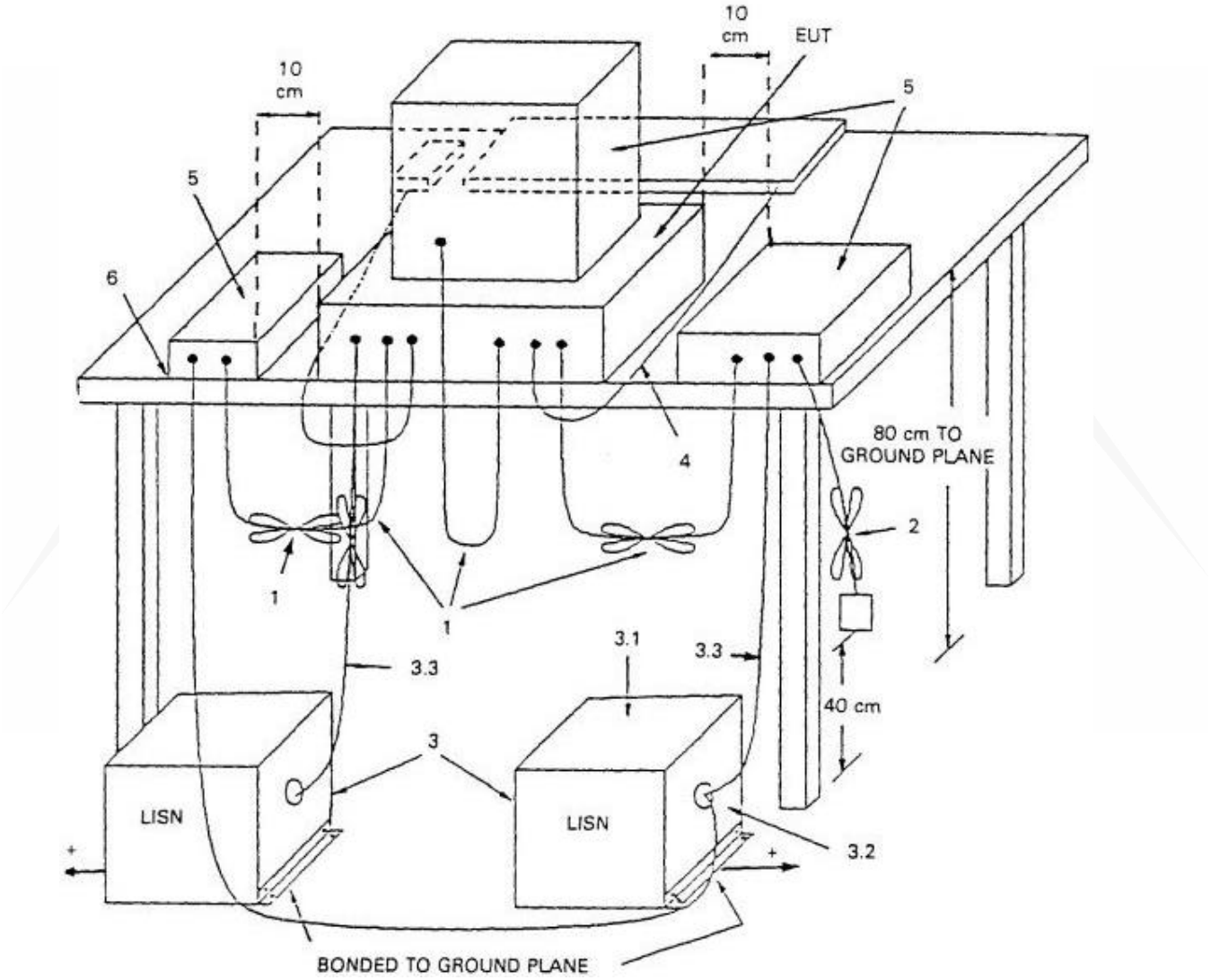
Conducted Emissions Diagram:



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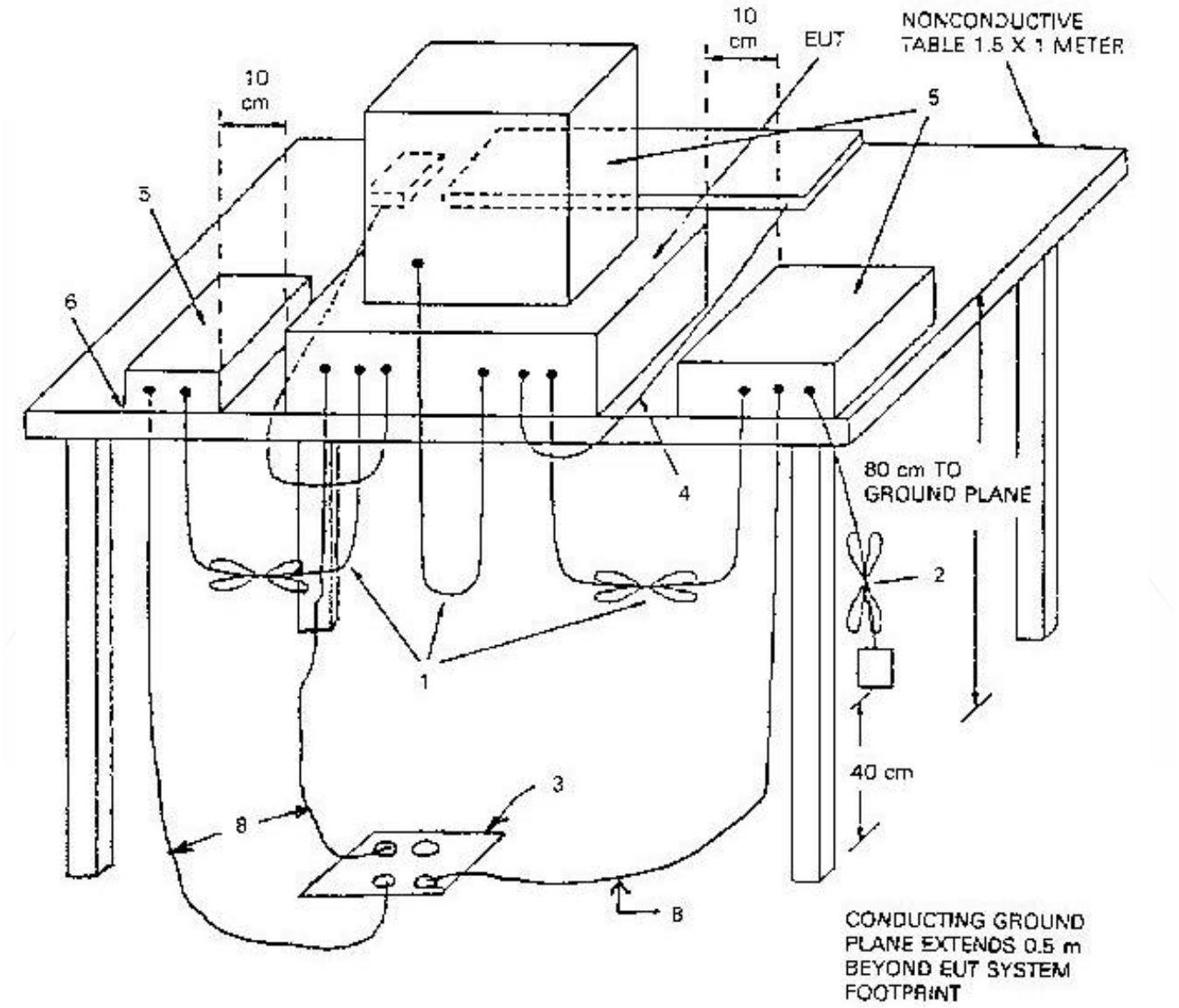
Radiated Emissions Diagram:



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