



BROCO INC. TEST REPORT

FOR THE

PROFESSIONAL PORTABLE BATTERY WELDER, GOWELD

CKC TEST PLAN, EN55011 (1998 W/A1: 99), EN61000-4-2 (1995), ENV50140 (1993), ENV50204 (1995) & EN61000-4-4 (1995) IN ACCORDANCE WITH EN50199 (1995)

COMPLIANCE

DATE OF ISSUE: FEBRUARY 26, 2002

PREPARED FOR:

Broco Inc.
8690 Red Oak St.
Rancho Cucamonga, CA 91730

P.O. No.: 10701
W.O. No.: 78227

PREPARED BY:

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Date of test: February 13-19, 2002

Report No.: CE02-038

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CKC Laboratories, Inc. has received Certificates of Accreditation from the following agencies:

A2LA (USA); BSMI (Taiwan); Nemko (Norway); and GOST (Russia).

CKC Laboratories, Inc has received test site Registration Acceptance from the following agencies:

FCC (USA); VCCI (Japan); and Industry Canada.

CKC Laboratories, Inc. has received Letters of Acceptance through an MRA for the following agencies:

ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); Radio Communications Agency (RA); HOKLAS (Hong Kong); Bakom (Swiss); BIPT (Belgium); Denmark Telestyrelsen; RvA (Netherlands); SEE (Luxembourg) SITTEL (Bolivia); and UKAS (UK).

ADMINISTRATIVE INFORMATION

DATE OF TEST: February 13-19, 2002

DATE OF RECEIPT: February 13, 2002

PURPOSE OF TEST: To demonstrate the compliance of the Professional Portable Battery Welder, GOWELD with the requirements in the CKC Test Plan.

TEST METHOD: EN55011 (1998 w/A1: 98), EN61000-4-2 (1995), ENV50140 (1993), ENV50204 (1995) and EN61000-4-4 (1995)

MANUFACTURER: Broco Inc.
8690 Red Oak St.
Rancho Cucamonga, CA 91730

REPRESENTATIVE: Richard Ferry

TEST LOCATION: CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92621

SUMMARY OF RESULTS

As received, the Broco Inc. Professional Portable Battery Welder, GOWELD was found to be fully compliant with the following standards and specifications and CKC Test Plan:

European Union

➤ EN55011 (1998 w/A1: 99) Group 2 Class A

In accordance with EN50199 (1995):

➤ EN61000-4-2 (1995)

➤ ENV50140 (1993)

➤ ENV50204 (1995)

➤ EN61000-4-4 (1995)

Note: 89/336/EEC Article 7.1 stipulates that a national standard transposed from the harmonized standard published in the OJ is to be used to show compliance. However, for convenience and to reduce confusion, the date of the CENELEC harmonized standard is used in the report. Should questions arise, the national standard transposed from the harmonized (BS EN) is the official standard used.

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

Conducted emissions not required for this device.

APPROVALS

QUALITY ASSURANCE:



Dennis Ward, Quality Manager



Septimiu Apahidean, EMC/Lab Manager

TEST PERSONNEL:



Stuart Yamamoto, EMC Engineer



Dale Sexton, Test Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit. ARC Welder.

EQUIPMENT UNDER TEST

Professional Portable Battery Welder

Manuf: Broco Inc.
Model: GOWELD
Serial: B R 0027

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

12VDC Car Battery (2)

Manuf: Interstate
Model: NA
Serial: NA

TEST PLAN FOR EN50199

CKC Work Order #:	78227
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Test plan prepared for:

Company Name:	Broco, Inc.
Address:	8690 Red Oak St.
City, State Zip	Rancho Cucamonga, CA 91730

Test plan prepared by:

Chuck Kendall / Dennis Ward

Information About the Equipment Under Test (EUT):

Dates of Test:	Not assigned yet
Manufacturer:	Broco, Inc.
AC Power Cord is:	No AC Power Cord
Equipment configuration	Floor Standing
Description of EUT:	DC Arc Welder Model: GOWELD

Discription of the Equipment Under Test

The equipment is a DC Voltage Arc Welder capable of 360 amps at 24 Volts DC.

Assembly of EUT

If the EUT has the following test configuration:

1. No Load
2. Operating

During operating test configuration at the conventional load the equipment shall be tested under each of the following conditions:

1. At idle, energized and ready to use. (No Load)
2. At the rated minimum welding current.
3. At the rated welding current for 100% duty cycle (duty factor).

Operation Modes and/or Configuration

Operating mode to be tested:	Notes:
No Load	
Operating at the specified Welding Current	Minimum and maximum conditions are to be tested.

Parameters to be Monitored

Monitored Parameters

No Load Voltage

Mean value of welding current

Environmental Conditions

Temperature range for equipment	As specified by manufacturer
Humidity range for equipment	As specified by manufacturer
Atmospheric pressure range for equipment	As specified by manufacturer
Operating voltage range	As specified by manufacturer

TEST DESCRIPTION

TO BE TESTED AT CKC LABORATORIES

IMMUNITY (EN50199)

EMISSIONS (EN55011 Group 2 Class A)

Test in Accordance to:	Level	Performance Criteria	Test Configuration	Test Procedure
Radiated Immunity	(10 V/m ¹ from 80-1000 MHz, 80% AM modulation at 1 kHz & 900 ± 5 MHz at a 50% duty cycle at 200 Hz)	Performance Criteria A	From Operating / configuration Table	ENV50140 1993
Electrostatic Discharge -ESD	± 4 kV contact & ± 8 kV air	Performance Criteria B	From Operating / configuration Table	EN61000-4-2 1995
Electrically Fast Transients-EFTB	± 2 kV Capacitive Clamp	Performance Criteria B	From Operating / configuration Table	EN 61000-4-4:1995
Radiated Emissions	EN55011 Group 2 Class A	Must be compliant to limit requirements	From Operating / configuration Table	EN55011

¹ Except for the ITU broadcast bands of 87 to 108 MHz, 470 to 790 MHz where the level shall be 3 V/m

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the Professional Portable Battery Welder, GOWELD. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: Six Highest Radiated Emission Levels									
FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS				CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN DB	NOTES
		Ant dB	Amp dB	Cable dB					
60.000	68.9	4.6	-27.9	1.8		47.4	50.0	-2.6	V-S
180.000	59.9	8.3	-27.7	3.2		43.7	50.0	-6.3	H-T
180.000	59.9	8.3	-27.7	3.2		43.7	50.0	-6.3	H-L
195.032	65.5	8.2	-27.6	3.4		49.5	50.0	-0.5	V-T
195.032	65.5	8.2	-27.6	3.4		49.5	50.0	-0.5	V-L
195.032	59.6	8.2	-27.6	3.4		43.6	50.0	-6.4	H-T

Test Method: EN55011 (1998 w/A1: 99)
 Spec Limit : EN55011 Group 2 Class A
 Test Distance: 10 Meters

NOTES: V = Vertical Polarization
 H = Horizontal Polarization
 T = No Load - Trigger On
 L = Loaded
 S = No Load - Standby

COMMENTS: The EUT was placed on a wooden tabletop .8 meters high and 10 meters from the Antenna. The EUT is a Wire Feed Welder and is DC powered. EUT Main Clock at 20MHz. EUT Voltage: 24VDC 20°C, 30% relative humidity, 100kPa. This table represents data from three data sheets.

No Load - Trigger On -. The EUT is connected to two 12VDC Car Batteries. Note: EUT On and Wire Spool Motor turning at Max (setting 10) - (No Load).

No Load - Standby - The EUT is connected to two 12VDC Car Batteries. Note: EUT On in Standby Mode – (No Load).

Loaded - The EUT is connected to two 12VDC Car Batteries and a 1 Ohm Load. (24 Amps). Note: EUT On and connected to a 1 Ohm Load with Wire Spool Turning at max speed (setting 10).

Table 2: EN61000-4-2 ESD (Indirect Discharge)

Tested By: Stuart Yamamoto

Location	<u>Indirect Discharge</u> Contact ± 4 kV		Performance Criterion
	VCP pass / fail	HCP pass / fail	
Front Side	Pass	Pass	A
Back Side	Pass	Pass	A
Left Side	Pass	Pass	A
Right Side	Pass	Pass	A

HCP=Horizontal Coupling Plane VCP=Vertical Coupling Plane

Notes: Entire test performed for two different modes of operation: standby and no load trigger on mode.

Table 3: EN61000-4-2 ESD (Direct Discharge)

Tested By: Stuart Yamamoto

Location	<u>Direct Discharge</u> Contact ± 4 kV		Performance Criterion
	pass / fail	Air ± 8 kV pass / fail	
Front	Pass	Pass	A
Back	Pass	Pass	A
Left Side	Pass	Pass	A
Right Side	Pass	Pass	A
Top	Pass	Pass	A

HCP=Horizontal Coupling Plane VCP=Vertical Coupling Plane NA=Not Applicable

Notes: Entire test performed for two different modes of operation: standby and no load trigger on mode.

Temperature: 19 °C

Relative Humidity: 45 %

Atmospheric Pressure: 101 kPa

Failure Criteria: Any change or degradation in the nominal mode of operation during or after the test.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
ESD Simulator	01650	KeyTek	MZ-15ec	9503235	090501	090502

Table 4: ENV50140 Radiated Immunity

Tested By: Stuart Yamamoto

Frequency Range MHz	Test Distance	Front V/H	Back V/H	Left Side V/H	Right Side V/H	Performance Criterion
80-1000	3m	Pass	Pass	Pass	Pass	A

V=Vertical H=Horizontal Test Level: 10V/m, 80% 1 kHz Amplitude Modulated (AM)

Notes: Entire test performed for two different modes of operation: standby and no load trigger on mode.

Table 5: ENV50204 Keyed Carrier at 10V/m 50% Duty Cycle PM at 200 Hz

Tested By: S. Yamamoto

Frequency Range MHz	Test Distance	Front V/H	Back V/H	Left Side V/H	Right Side V/H	Performance Criterion
900 ₊₅	3 meters	Pass/Pass	Pass/Pass	Pass/Pass	Pass/Pass	A

Notes: Entire test performed for two different modes of operation: standby and no load trigger on mode.

Failure Criteria: Any change or degradation in the nominal mode of operation during or after the test.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
BiLog Antenna	01249	EMCO	3143	9608-1265	091001	091002
Amplifier	00627	AR	50W1000A	14335	010402	010403
Directional Coupler	00714	Werlatone	C2630	3806	010402	010403
Spectrum Analyzer	00312	HP	8568A	2106A02109	061301	061302
Signal Generator	02351	Marconi	2022D	119158/054	050901	050902
Signal Generator	00089	HP	8656A	2245A04166	090601	090602
Cable	N/A	Andrew	Hardline	Cable#3	090501	090502
Cable	N/A	Andrew	Hardline	Cable#4	090501	090502
Anechoic Chamber	N/A	NA	N/A	N/A	040601	040602
Function Generator	N/A	BK Precision	3011B	147-35235	080901	080902

Table 6: EN61000-4-4 EFTB (I/O Cables)

Tested By: Stuart Yamamoto

Cable tested	+ 2 kV pass / fail	- 2 kV pass / fail	Performance Criterion
DC Power Lines	Pass	Pass	A

Notes: Entire test performed for two different modes of operation: standby and no load trigger on mode.

Temperature: 19 °C
 Relative Humidity: 45 %
 Atmospheric Pressure: 101 kPa

Failure Criteria: Any change or degradation in the nominal mode of operation during or after the test.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
EFT Generator	01691	Velonex	V3300	16692	010302	010303
Capacitive Coupling Clamp	01692	Velonex	V3334	16701	010302	010303

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 2.94 dB measurement uncertainty.

TESTING

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions and susceptibility. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions and susceptibility was selected. The interval between different pieces of equipment was approximately 10 centimeters. All excessive interconnecting cable was bundled.

EMISSIONS

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The radiated emissions data of the Professional Portable Battery Welder, GOWELD, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A. The corrected data was then compared to the applicable emission limits to determine compliance.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect the radiated emissions data for the Professional Portable Battery Welder, GOWELD. For radiated measurements from 30 to 1000 MHz, the biconilog antenna was used.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Professional Portable Battery Welder, GOWELD.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual was followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

RADIATED EMISSIONS

During the preliminary radiated scan, the EUT was powered up and operating in its defined test mode. The frequency range of 30 MHz - 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 - 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

IMMUNITY

The EUT was set up in a manner that represented its normal use, as shown in the setup photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the immunity tables.

MONITORING OF OPERATING PARAMETERS

The device was monitored during the tests by means of a visual check whereby the essential parameters were displayed.

ELECTROSTATIC DISCHARGE

During Electrostatic Discharge testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. A horizontal coupling plane, 1.6 meters by 0.8 meters, was placed on top of the table. The EUT was then placed on a 0.5 mm thick insulating material. A 0.1 meter separation from the coupling plane was obtained. A vertical coupling plane, 0.5 m by 0.5 m, was placed parallel to, and positioned 0.1 m from, the EUT. The coupling plane was electrically bonded through two 470 k Ω series resistors to the earth reference plane on the floor, which was attached to the ground on the electrical outlet service. The ESD generator (ESD gun) was grounded to the metal ground reference plane on the floor. The ESD generator power supply was located on the ground reference plane. The ESD generator was positioned at least 0.1 meter from the EUT, with the discharge electrode touching the coupling plane.

The EUT was exposed to at least 100 (contact) discharges each at negative and positive polarity (50 discharges at each point), at a minimum of four test points, one being the horizontal coupling plane. At least 50 indirect discharges were applied to the center front edge of the horizontal coupling plane. The remaining test points received at least 50 direct contact discharges. If no direct contact test points were available, then at least 200 indirect discharges were applied to the vertical coupling plane. These tests were performed at a maximum repetition rate of one discharge per second. On the parts of the EUT where it was not possible to perform contact discharge testing, user accessible points were investigated using the air discharge method. A minimum of 10 single discharges were applied to the selected test points. The Professional Portable Battery Welder, GOWELD, was tested in accordance with EN50199 and EN61000-4-2 and meets Performance Criterion A.

RADIATED IMMUNITY

A field strength of 10V/m was established from 80MHz to 1000MHz. This frequency range was modulated with a 1kHz sine wave at 80%. A field strength of 10V/m was also established at 900 \pm 5MHz, 50% Duty Cycle, 200Hz. The signal generators provided the modulated frequency at a sweep rate of .0015 decades/second to the RF amplifiers. The RF amplifiers provided the necessary power to the antenna to establish the field levels. The antenna was positioned 1 meter from all four faces of the EUT. A biconilog antenna was used to cover the range of 80 to 1000 MHz in both polarizations. The Professional Portable Battery Welder, GOWELD, was tested in accordance with EN50199, ENV50140 and ENV50204 and meets Performance Criterion A at a field strength of 10V/m.

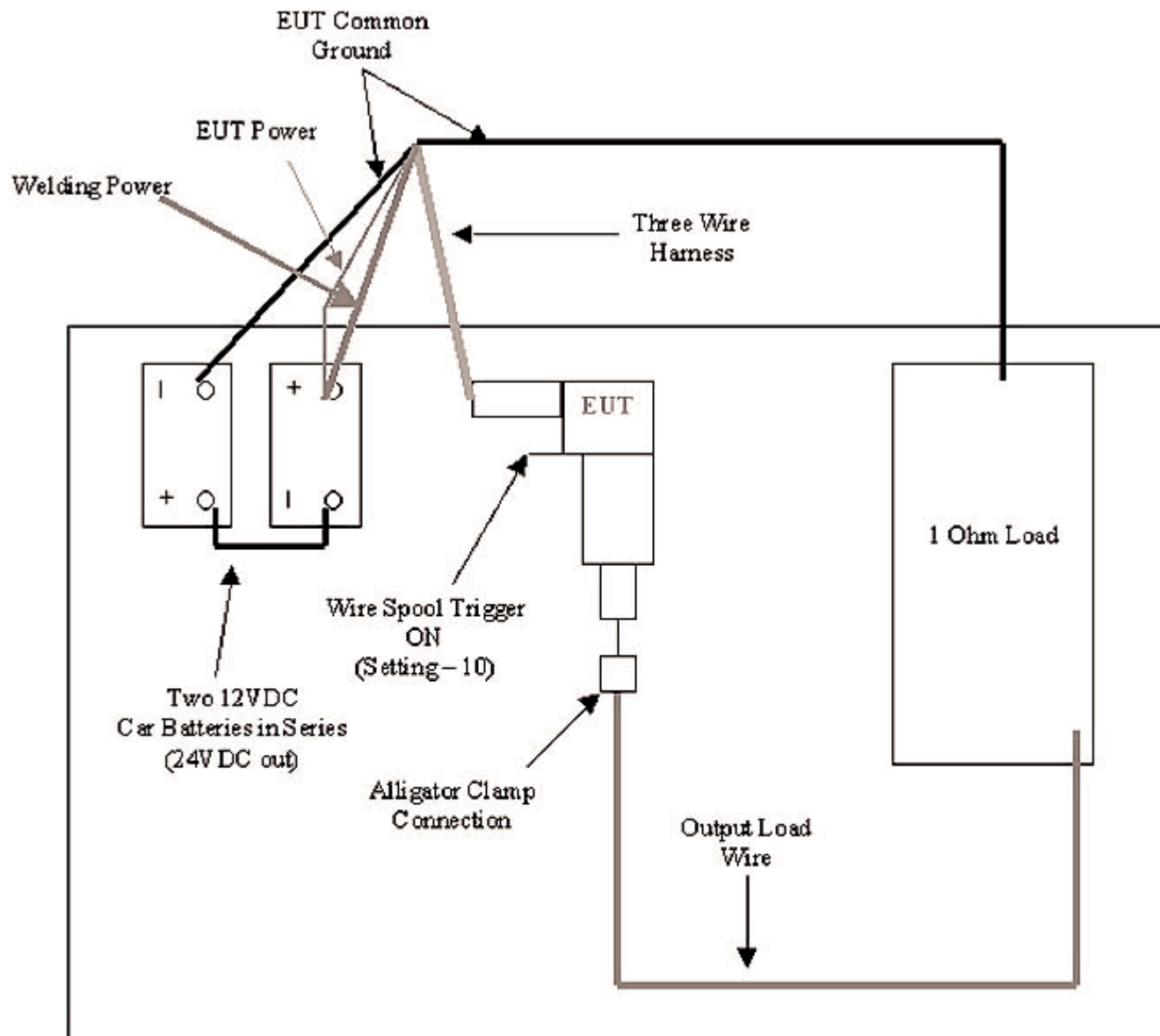
ELECTRICAL FAST TRANSIENT BURST

Test voltages of up to 2 kV was applied to the DC power lines. The test voltages were at a 5 kHz pulse repetition frequency and were applied for 60 seconds between ground and each power supply terminal and between ground and protective earth. The coupling clamp was used to apply 2 kV to the DC power lines. The Professional Portable Battery Welder, GOWELD, was tested in accordance with EN50199 and EN61000-4-4 and meets Performance Criterion A.

APPENDIX A

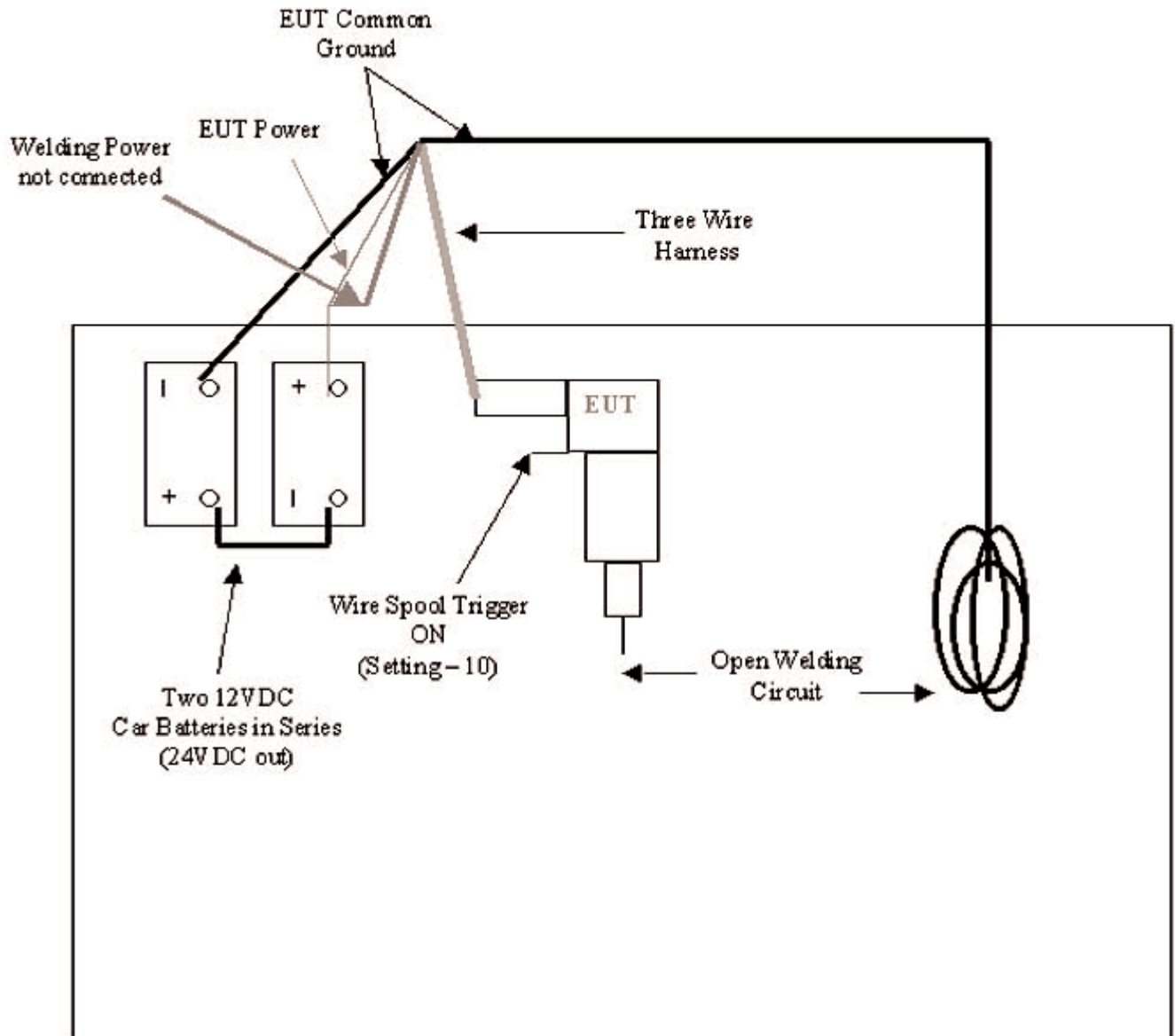
TEST SETUP DIAGRAM AND PHOTOGRAPHS

EQUIPMENT TEST SETUP DIAGRAM



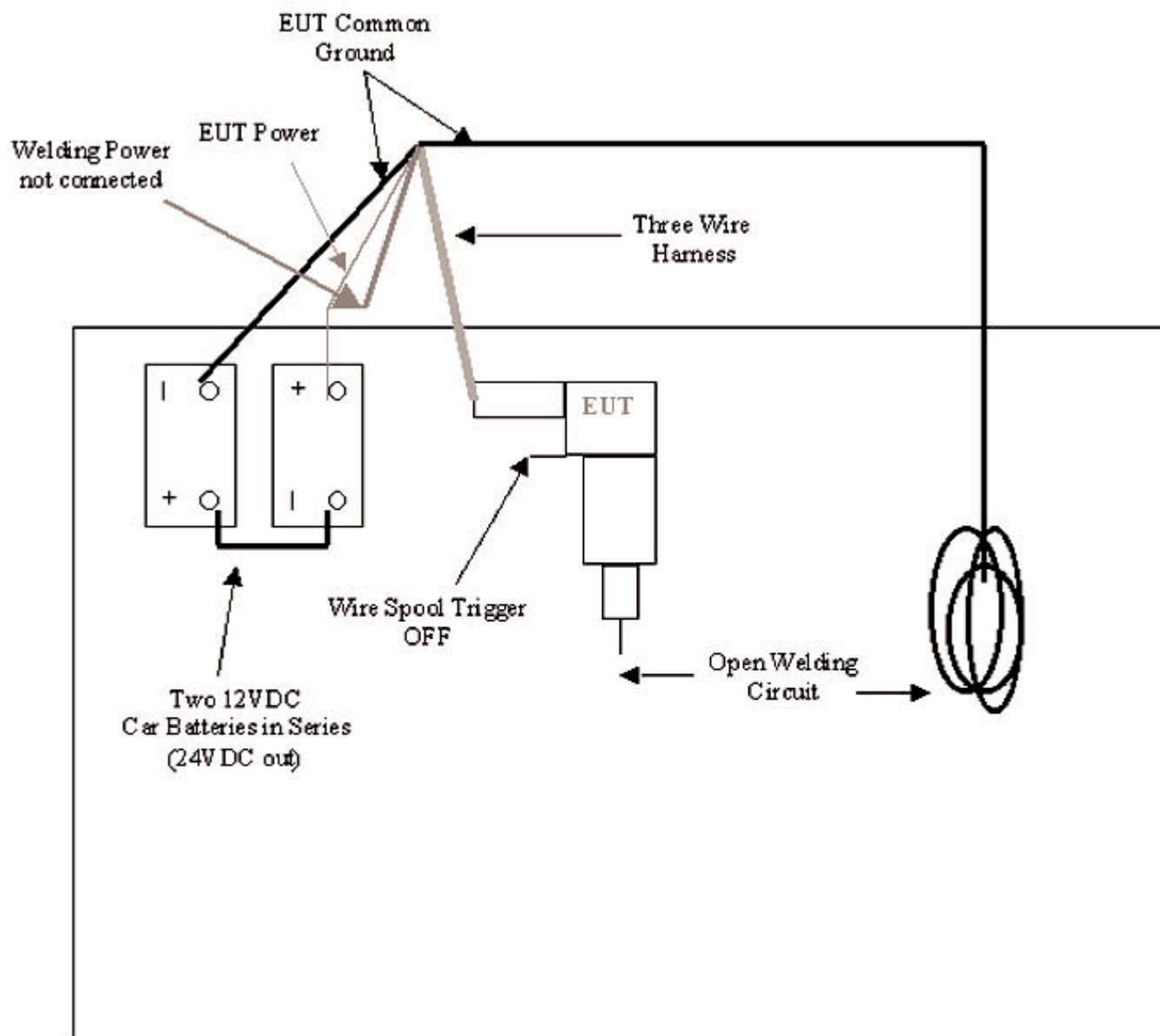
OATS setup - Loaded

EQUIPMENT TEST SETUP DIAGRAM



OATS setup - NO Load - Trigger On

EQUIPMENT TEST SETUP DIAGRAM



OATS setup - NO Load - Standby

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View - No Load

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View - No Load

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View - Load

:

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE



Electrostatic Discharge

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



Electrostatic Discharge Points

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



Electrostatic Discharge Points

PHOTOGRAPH SHOWING RADIATED IMMUNITY



Radiated Immunity

PHOTOGRAPH SHOWING ELECTRICAL FAST TRANSIENT BURST



Electrical Fast Transient Burst - Power Lines

APPENDIX B

TEST EQUIPMENT LIST - EMISSIONS

The following list of test equipment was used during emissions testing. For equipment used during immunity testing, refer to the individual immunity tables.

Radiated Emissions

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer (Site D)	02462	HP	8568B	2928A04874	032901	032902
QP Adapter (Site D)	02325	HP	85650A	2521A00932	032901	032902
Bilog Antenna	00851	Schaffner-Chase EMC	CBL6111C	2629	062001	062002
Pre-amp	02320	HP	8447D	2443A03665	010302	010303
Antenna cable from bulkhead to antenna	N/A	Belden	9268	Cable #6	050701	050702
Antenna cable (10 meter site D)	NA	Andrew	LDF1-50	Cable#17	091101	091102
Preamp to SA Cable (3 feet)	NA	Pasternack	E100316-I	Cable #22	100501	100502

APPENDIX C

MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **Broco Inc.**
 Specification: **EN55011A GROUP-2**
 Work Order #: **78227** Date: 2/13/02
 Test Type: **Maximized Emissions** Time: 16:52:23
 Equipment: **Professional Portable Battery Welder** Sequence#: 1
 Manufacturer: Broco Inc. Tested By: Dale Sexton
 Model: GOWELD
 S/N: B R 0027

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Professional Portable Battery Welder*	Broco Inc.	GOWELD	B R 0027

Support Devices:

Function	Manufacturer	Model #	S/N
12VDC Car Battery	Interstate	n/a	n/a
12VDC Car Battery	Interstate	n/a	n/a

Test Conditions / Notes:

The EUT was placed on a wooden tabletop .8 meters high and 10 meters from the Antenna. The EUT is a Wire Feed Welder and is DC powered. The EUT is connected to two 12VDC Car Batteries. Note: EUT On and Wire Spool Motor turning at Max (setting 10) - (No Load). EUT Main Clock at 20MHz EUT Voltage: 24VDC 20°C, 30% relative humidity, 100kPa.

Transducer Legend:

T1=Bilog - 2629 090501	T2=Cable Heliac 84ft(10 meter) 050700
T3=Cable #22 (3' BNC)	T4=Cable #6 050701 ant to junc box
T5=Preamp 8447D (Site D) 010302	

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	195.032M	65.5	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	49.5	50.0	-0.5	Vert
2	180.000M	59.9	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	43.7	50.0	-6.3	Horiz
3	195.032M	59.6	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	43.6	50.0	-6.4	Horiz
4	60.027M	64.3	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	42.8	50.0	-7.2	Vert
5	185.032M	58.9	+8.0 -27.7	+1.4	+0.2	+1.6	+0.0	42.4	50.0	-7.6	Vert
6	220.214M	57.9	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	42.2	50.0	-7.8	Vert
7	60.027M	62.9	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	41.4	50.0	-8.6	Horiz
8	185.032M	57.7	+8.0 -27.7	+1.4	+0.2	+1.6	+0.0	41.2	50.0	-8.8	Horiz

9	75.000M	73.4	+6.3 -27.7	+0.9	+0.1	+0.7	+0.0	53.7	63.0	-9.3	Vert
10	180.000M	56.8	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	40.6	50.0	-9.4	Vert
11	200.032M	56.4	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	40.4	50.0	-9.6	Vert
12	125.424M	64.4	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	50.2	60.0	-9.8	Vert
13	200.032M	55.9	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	39.9	50.0	-10.1	Horiz
14	130.278M	60.0	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	45.8	60.0	-14.2	Vert
15	144.848M	59.9	+10.7 -27.8	+1.3	+0.2	+1.3	+0.0	45.6	60.0	-14.4	Vert
16	110.193M	60.5	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	45.5	60.0	-14.5	Vert
17	114.876M	59.6	+10.6 -27.7	+1.1	+0.1	+1.1	+0.0	44.8	60.0	-15.2	Vert
18	190.032M	60.7	+8.1 -27.6	+1.5	+0.2	+1.6	+0.0	44.5	60.0	-15.5	Vert
19	205.000M	49.8	+8.5 -27.6	+1.5	+0.2	+1.7	+0.0	34.1	50.0	-15.9	Vert
20	110.193M	58.8	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	43.8	60.0	-16.2	Horiz
21	75.000M	65.8	+6.3 -27.7	+0.9	+0.1	+0.7	+0.0	46.1	63.0	-16.9	Horiz
22	230.448M	57.8	+9.3 -27.5	+1.5	+0.2	+1.6	+0.0	42.9	60.0	-17.1	Vert
23	220.214M	48.3	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	32.6	50.0	-17.4	Horiz
24	150.164M	56.8	+10.7 -27.8	+1.3	+0.2	+1.4	+0.0	42.6	60.0	-17.4	Horiz
25	140.220M	56.6	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	42.6	60.0	-17.4	Vert
26	114.876M	57.1	+10.6 -27.7	+1.1	+0.1	+1.1	+0.0	42.3	60.0	-17.7	Horiz
27	120.200M	56.2	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	41.6	60.0	-18.4	Vert
28	85.098M	62.3	+7.9 -27.7	+1.0	+0.1	+0.9	+0.0	44.5	63.0	-18.5	Vert
29	150.164M	55.6	+10.7 -27.8	+1.3	+0.2	+1.4	+0.0	41.4	60.0	-18.6	Vert
30	190.032M	56.8	+8.1 -27.6	+1.5	+0.2	+1.6	+0.0	40.6	60.0	-19.4	Horiz
31	205.000M	46.2	+8.5 -27.6	+1.5	+0.2	+1.7	+0.0	30.5	50.0	-19.5	Horiz
32	339.586M	49.8	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	40.3	60.0	-19.7	Horiz
33	144.848M	54.6	+10.7 -27.8	+1.3	+0.2	+1.3	+0.0	40.3	60.0	-19.7	Horiz

34	154.864M	54.7	+10.4 -27.8	+1.3	+0.2	+1.4	+0.0	40.2	60.0	-19.8	Vert
35	260.448M	50.8	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	39.9	60.0	-20.1	Vert
36	339.586M	49.3	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	39.8	60.0	-20.2	Vert
37	319.782M	48.7	+13.4 -27.5	+1.9	+0.3	+1.8	+0.0	38.6	60.0	-21.4	Horiz
38	300.000M	48.8	+13.1 -27.4	+1.8	+0.3	+1.8	+0.0	38.4	60.0	-21.6	Vert
39	100.098M	53.8	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	37.8	60.0	-22.2	Vert
40	130.278M	51.9	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	37.7	60.0	-22.3	Horiz
41	240.448M	51.0	+10.9 -27.6	+1.6	+0.3	+1.5	+0.0	37.7	60.0	-22.3	Vert
42	154.864M	51.9	+10.4 -27.8	+1.3	+0.2	+1.4	+0.0	37.4	60.0	-22.6	Horiz
43	140.220M	51.4	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	37.4	60.0	-22.6	Horiz
44	230.448M	52.2	+9.3 -27.5	+1.5	+0.2	+1.6	+0.0	37.3	60.0	-22.7	Horiz
45	125.424M	51.1	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	36.9	60.0	-23.1	Horiz
46	319.782M	46.0	+13.4 -27.5	+1.9	+0.3	+1.8	+0.0	35.9	60.0	-24.1	Vert
47	119.959M	50.3	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	35.7	60.0	-24.3	Horiz
48	240.448M	48.9	+10.9 -27.6	+1.6	+0.3	+1.5	+0.0	35.6	60.0	-24.4	Horiz
49	40.017M	57.2	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	43.5	68.0	-24.5	Vert
50	80.024M	55.6	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	37.0	63.0	-26.0	Horiz
51	80.024M	55.5	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	36.9	63.0	-26.1	Vert
52	260.448M	43.8	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	32.9	60.0	-27.1	Horiz
53	300.000M	43.1	+13.1 -27.4	+1.8	+0.3	+1.8	+0.0	32.7	60.0	-27.3	Horiz
54	369.186M	40.9	+14.8 -27.6	+2.0	+0.4	+2.0	+0.0	32.5	60.0	-27.5	Horiz
55	40.017M	53.4	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	39.7	68.0	-28.3	Horiz
56	85.098M	52.4	+7.9 -27.7	+1.0	+0.1	+0.9	+0.0	34.6	63.0	-28.4	Horiz

57	369.186M	39.9	+14.8 -27.6	+2.0	+0.4	+2.0	+0.0	31.5	60.0	-28.5	Vert
58	160.000M	57.8	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	43.2	74.0	-30.8	Horiz
59	100.098M	43.8	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	27.8	60.0	-32.2	Horiz
60	160.000M	53.8	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	39.2	74.0	-34.8	Vert

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **Broco Inc.**
 Specification: **EN55011A GROUP-2**
 Work Order #: **78227** Date: 2/14/02
 Test Type: **Maximized Emissions** Time: 09:16:57
 Equipment: **Professional Portable Battery Welder** Sequence#: 2
 Manufacturer: Broco Inc. Tested By: Dale Sexton
 Model: GOWELD
 S/N: B R 0027

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Professional Portable Battery Welder*	Broco Inc.	GOWELD	B R 0027

Support Devices:

Function	Manufacturer	Model #	S/N
12VDC Car Battery	Interstate	n/a	n/a
12VDC Car Battery	Interstate	n/a	n/a

Test Conditions / Notes:

The EUT was placed on a wooden tabletop .8 meters high and 10 meters from the Antenna. The EUT is a Wire Feed Welder and is DC powered. The EUT is connected to two 12VDC Car Batteries. Note: EUT On in Standby Mode - (No Load). EUT Main Clock at 20MHz EUT Voltage: 24VDC 20°C, 30% relative humidity, 100kPa.

Transducer Legend:

T1=Bilog - 2629 090501	T2=Cable Heliac 84ft(10 meter) 050700
T3=Cable #22 (3' BNC)	T4=Cable #6 050701 ant to junc box
T5=Preamp 8447D (Site D) 010302	

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	60.000M	68.9	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	47.4	50.0	-2.6	Vert
2	60.000M	61.0	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	39.5	50.0	-10.5	Horiz
3	100.000M	63.9	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	47.9	60.0	-12.1	Vert
4	120.000M	61.2	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	46.6	60.0	-13.4	Horiz
5	200.000M	49.1	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	33.1	50.0	-16.9	Horiz
6	220.189M	48.4	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	32.7	50.0	-17.3	Vert
7	210.049M	47.0	+8.3 -27.6	+1.5	+0.2	+1.7	+0.0	31.1	50.0	-18.9	Horiz
8	110.000M	55.4	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	40.4	60.0	-19.6	Horiz
9	140.000M	54.2	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	40.2	60.0	-19.8	Horiz

10	100.000M	55.5	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	39.5	60.0	-20.5	Horiz
11	220.189M	44.9	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	29.2	50.0	-20.8	Horiz
12	200.000M	45.0	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	29.0	50.0	-21.0	Vert
13	210.049M	44.2	+8.3 -27.6	+1.5	+0.2	+1.7	+0.0	28.3	50.0	-21.7	Vert
14	69.640M	61.2	+5.3 -27.8	+0.9	+0.2	+0.6	+0.0	40.4	63.0	-22.6	Horiz
15	120.000M	51.8	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	37.2	60.0	-22.8	Vert
16	80.000M	58.0	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	39.4	63.0	-23.6	Horiz
17	69.640M	59.0	+5.3 -27.8	+0.9	+0.2	+0.6	+0.0	38.2	63.0	-24.8	Vert
18	180.000M	40.1	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	23.9	50.0	-26.1	Vert
19	180.000M	40.1	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	23.9	50.0	-26.1	Horiz
20	80.000M	52.9	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	34.3	63.0	-28.7	Vert
21	40.000M	52.6	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	38.9	68.0	-29.1	Horiz
22	140.000M	42.9	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	28.9	60.0	-31.1	Vert
23	250.415M	40.5	+12.2 -27.7	+1.6	+0.3	+1.5	+0.0	28.4	60.0	-31.6	Horiz
24	40.000M	47.2	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	33.5	68.0	-34.5	Vert
25	260.718M	34.7	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	23.8	60.0	-36.2	Vert
26	260.493M	34.2	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	23.3	60.0	-36.7	Horiz
27	340.293M	32.6	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	23.1	60.0	-36.9	Horiz
28	110.000M	37.6	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	22.6	60.0	-37.4	Vert
29	340.393M	30.4	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	20.9	60.0	-39.1	Vert
30	250.415M	32.3	+12.2 -27.7	+1.6	+0.3	+1.5	+0.0	20.2	60.0	-39.8	Vert
31	240.057M	33.1	+10.8 -27.6	+1.6	+0.3	+1.5	+0.0	19.7	60.0	-40.3	Horiz
32	160.000M	48.1	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	33.5	74.0	-40.5	Horiz
33	240.057M	32.0	+10.8 -27.6	+1.6	+0.3	+1.5	+0.0	18.6	60.0	-41.4	Vert
34	160.000M	31.8	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	17.2	74.0	-56.8	Vert

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **Broco Inc.**
 Specification: **EN55011A GROUP-2**
 Work Order #: **78227** Date: 2/13/02
 Test Type: **Maximized Emissions** Time: 16:52:23
 Equipment: **Professional Portable Battery Welder** Sequence#: 3
 Manufacturer: Broco Inc. Tested By: Dale Sexton
 Model: GOWELD
 S/N: B R 0027

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Professional Portable Battery Welder*	Broco Inc.	GOWELD	B R 0027

Support Devices:

Function	Manufacturer	Model #	S/N
12VDC Car Battery	Interstate	n/a	n/a
12VDC Car Battery	Interstate	n/a	n/a

Test Conditions / Notes:

The EUT was placed on a wooden tabletop .8 meters high and 10 meters from the Antenna. The EUT is a Wire Feed Welder and is DC powered. The EUT is connected to two 12VDC Car Batteries and a 1 Ohm Load. (24 Amps). Note: EUT On and connected to a 1 Ohm Load with Wire Spool Turning at max speed (setting 10) EUT Main Clock at 20MHz. EUT Voltage: 24VDC 20°C, 30% relative humidity, 100kPa.

Transducer Legend:

T1=Bilog - 2629 090501	T2=Cable Heliac 84ft(10 meter) 050700
T3=Cable #22 (3' BNC)	T4=Cable #6 050701 ant to junc box
T5=Preamp 8447D (Site D) 010302	

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	195.032M	65.5	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	49.5	50.0	-0.5	Vert
2	180.000M	59.9	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	43.7	50.0	-6.3	Horiz
3	195.032M	59.6	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	43.6	50.0	-6.4	Horiz
4	60.027M	64.3	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	42.8	50.0	-7.2	Vert
5	185.032M	58.9	+8.0 -27.7	+1.4	+0.2	+1.6	+0.0	42.4	50.0	-7.6	Vert
6	220.214M	57.9	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	42.2	50.0	-7.8	Vert
7	60.027M	62.9	+4.6 -27.9	+0.9	+0.2	+0.7	+0.0	41.4	50.0	-8.6	Horiz
8	185.032M	57.7	+8.0 -27.7	+1.4	+0.2	+1.6	+0.0	41.2	50.0	-8.8	Horiz

9	75.000M	73.4	+6.3 -27.7	+0.9	+0.1	+0.7	+0.0	53.7	63.0	-9.3	Vert
10	180.000M	56.8	+8.3 -27.7	+1.4	+0.2	+1.6	+0.0	40.6	50.0	-9.4	Vert
11	200.032M	56.4	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	40.4	50.0	-9.6	Vert
12	125.424M	64.4	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	50.2	60.0	-9.8	Vert
13	200.032M	55.9	+8.2 -27.6	+1.5	+0.2	+1.7	+0.0	39.9	50.0	-10.1	Horiz
14	130.278M	60.0	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	45.8	60.0	-14.2	Vert
15	144.848M	59.9	+10.7 -27.8	+1.3	+0.2	+1.3	+0.0	45.6	60.0	-14.4	Vert
16	110.193M	60.5	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	45.5	60.0	-14.5	Vert
17	114.876M	59.6	+10.6 -27.7	+1.1	+0.1	+1.1	+0.0	44.8	60.0	-15.2	Vert
18	190.032M	60.7	+8.1 -27.6	+1.5	+0.2	+1.6	+0.0	44.5	60.0	-15.5	Vert
19	205.000M	49.8	+8.5 -27.6	+1.5	+0.2	+1.7	+0.0	34.1	50.0	-15.9	Vert
20	110.193M	58.8	+10.3 -27.6	+1.1	+0.2	+1.0	+0.0	43.8	60.0	-16.2	Horiz
21	75.000M	65.8	+6.3 -27.7	+0.9	+0.1	+0.7	+0.0	46.1	63.0	-16.9	Horiz
22	230.448M	57.8	+9.3 -27.5	+1.5	+0.2	+1.6	+0.0	42.9	60.0	-17.1	Vert
23	220.214M	48.3	+8.5 -27.5	+1.5	+0.2	+1.6	+0.0	32.6	50.0	-17.4	Horiz
24	150.164M	56.8	+10.7 -27.8	+1.3	+0.2	+1.4	+0.0	42.6	60.0	-17.4	Horiz
25	140.220M	56.6	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	42.6	60.0	-17.4	Vert
26	114.876M	57.1	+10.6 -27.7	+1.1	+0.1	+1.1	+0.0	42.3	60.0	-17.7	Horiz
27	120.200M	56.2	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	41.6	60.0	-18.4	Vert
28	85.098M	62.3	+7.9 -27.7	+1.0	+0.1	+0.9	+0.0	44.5	63.0	-18.5	Vert
29	150.164M	55.6	+10.7 -27.8	+1.3	+0.2	+1.4	+0.0	41.4	60.0	-18.6	Vert
30	190.032M	56.8	+8.1 -27.6	+1.5	+0.2	+1.6	+0.0	40.6	60.0	-19.4	Horiz
31	205.000M	46.2	+8.5 -27.6	+1.5	+0.2	+1.7	+0.0	30.5	50.0	-19.5	Horiz
32	339.586M	49.8	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	40.3	60.0	-19.7	Horiz
33	144.848M	54.6	+10.7 -27.8	+1.3	+0.2	+1.3	+0.0	40.3	60.0	-19.7	Horiz

34	154.864M	54.7	+10.4 -27.8	+1.3	+0.2	+1.4	+0.0	40.2	60.0	-19.8	Vert
35	260.448M	50.8	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	39.9	60.0	-20.1	Vert
36	339.586M	49.3	+14.0 -27.6	+1.9	+0.4	+1.8	+0.0	39.8	60.0	-20.2	Vert
37	319.782M	48.7	+13.4 -27.5	+1.9	+0.3	+1.8	+0.0	38.6	60.0	-21.4	Horiz
38	300.000M	48.8	+13.1 -27.4	+1.8	+0.3	+1.8	+0.0	38.4	60.0	-21.6	Vert
39	100.098M	53.8	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	37.8	60.0	-22.2	Vert
40	130.278M	51.9	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	37.7	60.0	-22.3	Horiz
41	240.448M	51.0	+10.9 -27.6	+1.6	+0.3	+1.5	+0.0	37.7	60.0	-22.3	Vert
42	154.864M	51.9	+10.4 -27.8	+1.3	+0.2	+1.4	+0.0	37.4	60.0	-22.6	Horiz
43	140.220M	51.4	+11.0 -27.8	+1.3	+0.2	+1.3	+0.0	37.4	60.0	-22.6	Horiz
44	230.448M	52.2	+9.3 -27.5	+1.5	+0.2	+1.6	+0.0	37.3	60.0	-22.7	Horiz
45	125.424M	51.1	+11.0 -27.7	+1.2	+0.1	+1.2	+0.0	36.9	60.0	-23.1	Horiz
46	319.782M	46.0	+13.4 -27.5	+1.9	+0.3	+1.8	+0.0	35.9	60.0	-24.1	Vert
47	119.959M	50.3	+10.7 -27.7	+1.2	+0.1	+1.1	+0.0	35.7	60.0	-24.3	Horiz
48	240.448M	48.9	+10.9 -27.6	+1.6	+0.3	+1.5	+0.0	35.6	60.0	-24.4	Horiz
49	40.017M	57.2	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	43.5	68.0	-24.5	Vert
50	80.024M	55.6	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	37.0	63.0	-26.0	Horiz
51	80.024M	55.5	+7.2 -27.6	+0.9	+0.1	+0.8	+0.0	36.9	63.0	-26.1	Vert
52	260.448M	43.8	+13.3 -27.7	+1.6	+0.3	+1.6	+0.0	32.9	60.0	-27.1	Horiz
53	300.000M	43.1	+13.1 -27.4	+1.8	+0.3	+1.8	+0.0	32.7	60.0	-27.3	Horiz
54	369.186M	40.9	+14.8 -27.6	+2.0	+0.4	+2.0	+0.0	32.5	60.0	-27.5	Horiz
55	40.017M	53.4	+12.8 -27.9	+0.7	+0.1	+0.6	+0.0	39.7	68.0	-28.3	Horiz
56	85.098M	52.4	+7.9 -27.7	+1.0	+0.1	+0.9	+0.0	34.6	63.0	-28.4	Horiz

57	369.186M	39.9	+14.8 -27.6	+2.0	+0.4	+2.0	+0.0	31.5	60.0	-28.5	Vert
58	160.000M	57.8	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	43.2	74.0	-30.8	Horiz
59	100.098M	43.8	+9.5 -27.6	+1.0	+0.2	+0.9	+0.0	27.8	60.0	-32.2	Horiz
60	160.000M	53.8	+10.3 -27.8	+1.3	+0.2	+1.4	+0.0	39.2	74.0	-34.8	Vert