FCC PART 15, SUBPART B
CLASS B TEST REPORT
TEST METHOD: ANSI C63.4
LIMITS: CISPR 22 CLASS B

For
CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240

Prepared for

CHILICON POWER
1563 CALLE PATRICIA
PACIFIC PALISADES, CA 90272

Prepared by:___

EUGENE ADAMS

Approved by:_____

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DATE: February 13, 2013

	REPORT BODY	APPENDICES					TOTAL
		A	***B***	***C***	***D***	***E***	
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GENERAL REPORT SUMMARY

This electromagnetic emission report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form except in full, without the written permission of Compatible Electronics.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested: CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240
S/N: 02169F4E

Product Description: The EUT is a grid interactive inverter that converts energy from a single 60-cell solar panel to a standard AC grid.

Modifications: The EUT was not modified during the testing.

Manufacturer: Chilicon Power
1563 Calle Patricia
Pacific Palisades, CA 90272

Test Date: January 28 and 29, 2013

Test Specifications: EMI requirements
FCC CFR Title 47, Part 15 Subpart B, Class B per CISPR 22 Limits
Test Procedure: ANSI C63.4.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the **Class B** limits of FCC CFR Title 47, Part 15 Subpart B. Highest Reading in Relation to Spec. limit: = 48.12 dBuV @ 17.38 MHz
2	Radiated RF Emissions, 30 MHz - 1000 MHz.	Complies with the **Class B** limits of FCC CFR Title 47, Part 15 Subpart B. Highest Reading in relation to spec. limit =39..88 dBuV/m @ 112.40 MHz

*u_c = Combined Standard Uncertainty

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the CP-220 208/240 MICRO INVERTER Model: CP-220 208/240. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by C.I.S.P.R. Publication 22 for Information Technology Equipment from 150 kHz to 1 GHz. Under paragraph G of Section 15.109 of the Code of Federal Regulations Title 47, part 15 of the FCC rules, the FCC accepts the international standards set forth in C.I.S.P.R. Publication 22.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way, Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Chilicon Power

Christopher R. Jones	Co-Founder

Compatible Electronics, Inc.

Eugene Adams	Test Technician
Josh Hansen	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on January 28, 2013.

2.5 Disposition of the Test Sample

The test sample was returned to Chilicon Power.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CISPR 22 2008	Limits and methods of measurement of radio interference characteristics of information technology equipment.
CISPR 16 2008	Specification for radio disturbance and immunity measuring apparatus and methods.
FCC CFR Title 47, Subpart B.	FCC Rules - Radio frequency devices (including digital devices).
ANSI C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The EUT was set up in a tabletop configuration. The EUT was connected to the DC Power switch via power cable. The DC Power switch was connected to the negative lead of the battery bank and the positive lead of the 1.5Ohm power resistor via power cable. The power resistor was connected to the positive lead of the battery bank via power cable.

The highest emissions were found when the EUT was running in the above configuration. The cables were moved to maximize the emissions. The final radiated and conducted data was taken in this mode of operation. All initial investigations were performed with the spectrum analyzer in manual mode scanning the frequency range continuously. The cables were and routed as shown in the photographs in Appendix D.

4.1.1 Photograph of Test Configuration - EMI

4.1.2 Cable Construction and Termination

Cables 1 and 2

These are 1 meter, unshielded, round cables that connects the EUT to the DC Power Switch. The cables are hardwired to both ends of the cables.

Cable 3

This is a 50 cm, unshielded, round cable that connects the DC Power Switch to the Battery bank. The cable is hardwired to both ends of the cable.

Cable 4

This is a 50 cm, unshielded, round cable that connects the DC Power Switch to the 1.5 Ohm power resistor. The cable is hardwired to both ends of the cable.

Cable 5

This is a 50 cm, unshielded, round cable that connects the 1.5 Ohm power resistor to the Battery bank. The cable is hardwired to both ends of the cable.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
1	CP-220 208/240 MICRO INVERTER (EUT)	CHILICON POWER	CP-220 208/240	S/N: 02169F4E
2	DC POWER SWITCH	CHILICON POWER	N/A	N/A
3	1.5 OHM POWER RESISTOR	OHMITE	N/A	N/A
4	12V CD AUTO BATTERY	SUPERSTART	24EXTT	N/A

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Computer	Compatible Electronics	NONE	NONE	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100219	9/26/2012	9/26/2013
Antenna, CombiLog	Com Power	AC-220	003	5/25/2012	5/25/2013
LISN	Com Power	LI-215	12076	3/2/2012	3/2/2013
Mast, Antenna Positioner	Sunol Science Corporation	SC104V	020808-1	N/A	N/A
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Turntable	Sunol Science Corporation	FM202169F4E	NONE	N/A	N/A

5.3 Test Software

LAB(S)	SOFTWARE TITLE	MANUFACTURER	VERSION	RELEASE DATE
P, R	Measurement and Automation Software	TDK TestLab	5.53	

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1.2 of this report.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was grounded through the AC power cord.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature and barometric pressure.

6.4 Measurement Uncertainty

"Compatible Electronics' U_{lab} value is less than U_{cispr}, thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2\,uc\,(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3,6 dB	2.88
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	5,2 dB	3.53

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A 10 dB attenuation pad was used for the protection of the EMI Receiver input stage. All factors associated with attenuator and cables were recorded into the EMI Software Program accordingly to display the actual corrected measured level. The LISN output was connected to the input of the EMI Receiver. The output of the second LISN was terminated with 50-ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the computer in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The six highest emissions are listed in Table 1.

7.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. The EMI Receiver was used in the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss and antenna factors, so that a true reading is compared to the corrected limit extrapolated for the test distance. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured (120 kHz for 30 MHz to 1 GHz).

Broadband Combilog Antenna was used as the transducer during the measurement. The Combilog Antenna was used from 30 MHz to 1000 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is set up according to CISPR 16. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The EUT was tested at a 3 meter test distance from 30 MHz to 1 GHz. The six highest emissions are listed in Table 2.

7.1.3 RF Emissions Test Results

Table 1.0 CONDUCTED EMISSION RESULTS (120V)
CP-220 208/240 MICRO INVERTER MODEL: CP-220 208/240

Frequency MHz	Emission Level* dBuV	Specification Limit dBuV	Delta dB
17.38 L	50.00 #	48.12	-1.88
0.15 L	62.23 A	66.00	-3.77
0.16 L	60.58 A	65.36	-4.78
0.18 L	56.63 A	64.58	-7.95
0.15 N	54.82 A	66.00	-11.18
0.19 L	52.49 A	64.04	-11.55

Table 2.0 RADIATED EMISSION RESULTS
CP-220 208/240 MICRO INVERTER MODEL: CP-220 208/240

Frequency MHz	Emission Level* dBuV	Quasi-Peak Specification Limit dBuV	Delta dB
112.40	39.88 #	40.45	-0.57
113.80	38.10 #	40.45	-2.35
120.30	37.43 #	40.45	-3.02
105.30	36.81 #	40.45	-3.64
39.30	30.82 #	40.45	-9.63
180.80	30.37 #	40.45	-10.08

Notes: * The complete emissions data is given in Appendix E of this report.

** The antenna factors are attached in Appendix D of this report.

Quasi-Peak Reading

A Average Reading

8. TEST PROCEDURE DEVIATIONS

There were no deviations from the test procedures.

9. CONCLUSIONS

The CP-220 208/240 MICRO INVERTER Model: CP-220 208/240 meets all of the **Class B** specification limits defined by C.I.S.P.R. Publication 22 for Information Technology Equipment from 150 kHz to 1 GHz. Under paragraph G of section 15.109 of the Code of Federal Regulations Title 47, Part 15, of the FCC Rules, the FCC accepts the international standards set forth in C.I.S.P.R. Publication 22.

APPENDIX A

LABORATORY ACCREDITATIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP CODES 200063-0, 200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

Silverado/Lake Forest Division: http://ts.nist.gov/ts/htdocs/210/214/scopes/2005270.htm
Brea Division: http://ts.nist.gov/ts/htdocs/210/214/scopes/2005280.htm
Agoura Division: http://ts.nist.gov/ts/htdocs/210/214/scopes/2000630.htm

Compatible Electronics has been accredited by ANSI and appointed by the FCC to serve as a Telecommunications Certification Body (TCB). Compatible Electronics ANSI TCB listing can be found at: http://www.ansi.org/public/ca/ansi_cp.html

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA). Compatible Electronics NIST US/EU CAB listing can be found at: http://ts.nist.gov/ts/htdocs/210/gsig/emc-cabs-mar02.pdf

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA). Compatible Electronics NIST US/APEC CAB listing can be found at: http://ts.nist.gov/ts/htdocs/210/gsig/apec/bsmi-cabs-may02.pdf

World Wide Market Access with Nemko

Compatible Electronics has been validated by NEMKO against ISO/IEC 17025 under the NEMKO EMC Laboratory Authorization (ELA) program to all EN standards required by the European Union (EU) EMC Directive 89/336/EEC. Please follow the link to the Compatible Electronics' web site for each of our facilities NEMKO ELA certificate and scope of accreditation. http://www.celectronics.com/certs.htm

We are also certified/listed for IT products by the following country/agency:

Compatible Electronics VCCI listing can be found at:
http://www.vcci.or.jp/vcci_e/member/tekigo/setsubi_index_id.html

Just type "Compatible Electronics" into the Keyword search box.

Compatible Electronics FCC listing can be found at:
https://gullfoss2.fcc.gov/prod/oet/index_ie.html

Just type "Compatible Electronics" into the Test Firms search box.

Industry Canada Industrie Canada

Compatible Electronics IC listing can be found at:
http://spectrum.ic.gc.ca/~cert/labs/oats_lab_c_e.html

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

There were no modifications made to the EUT during the test.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	CP-220 208/240 MICRO INVERTER Model: CP-220 208/240 S/N: 02169F4E

There were no additional models covered under this report.

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APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

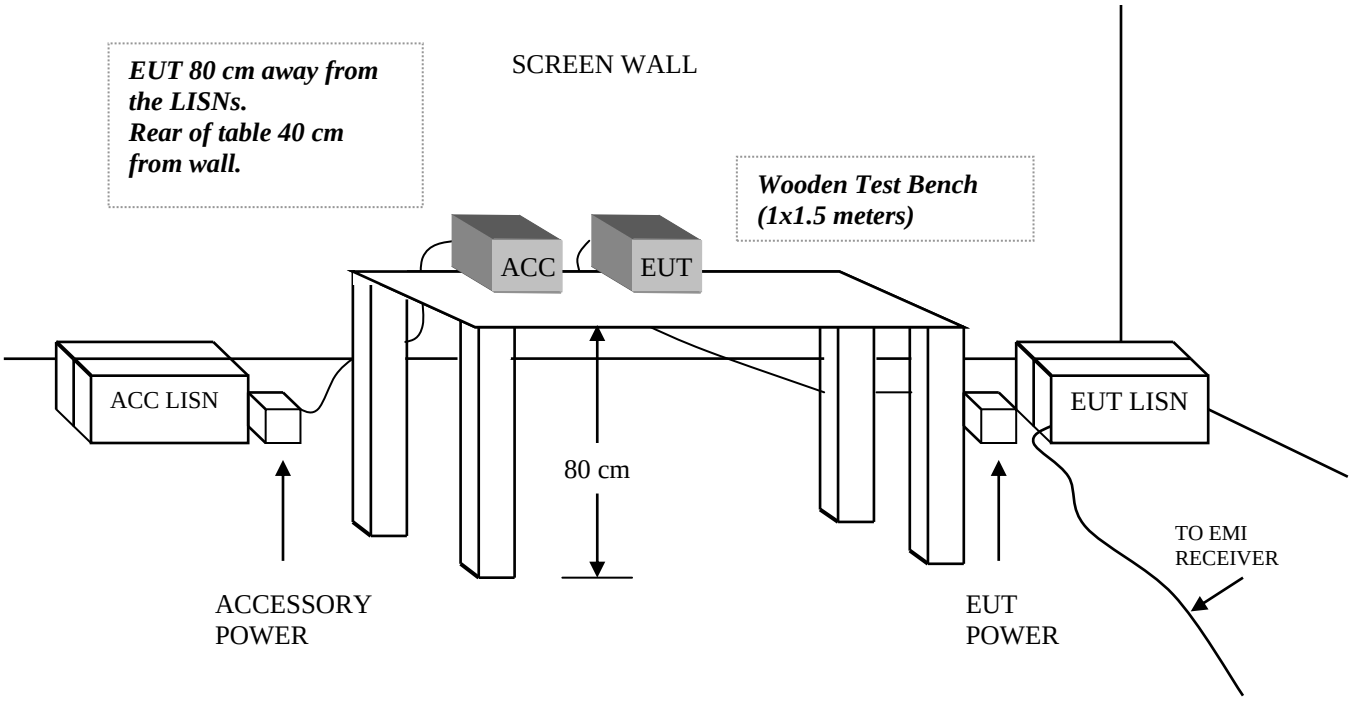
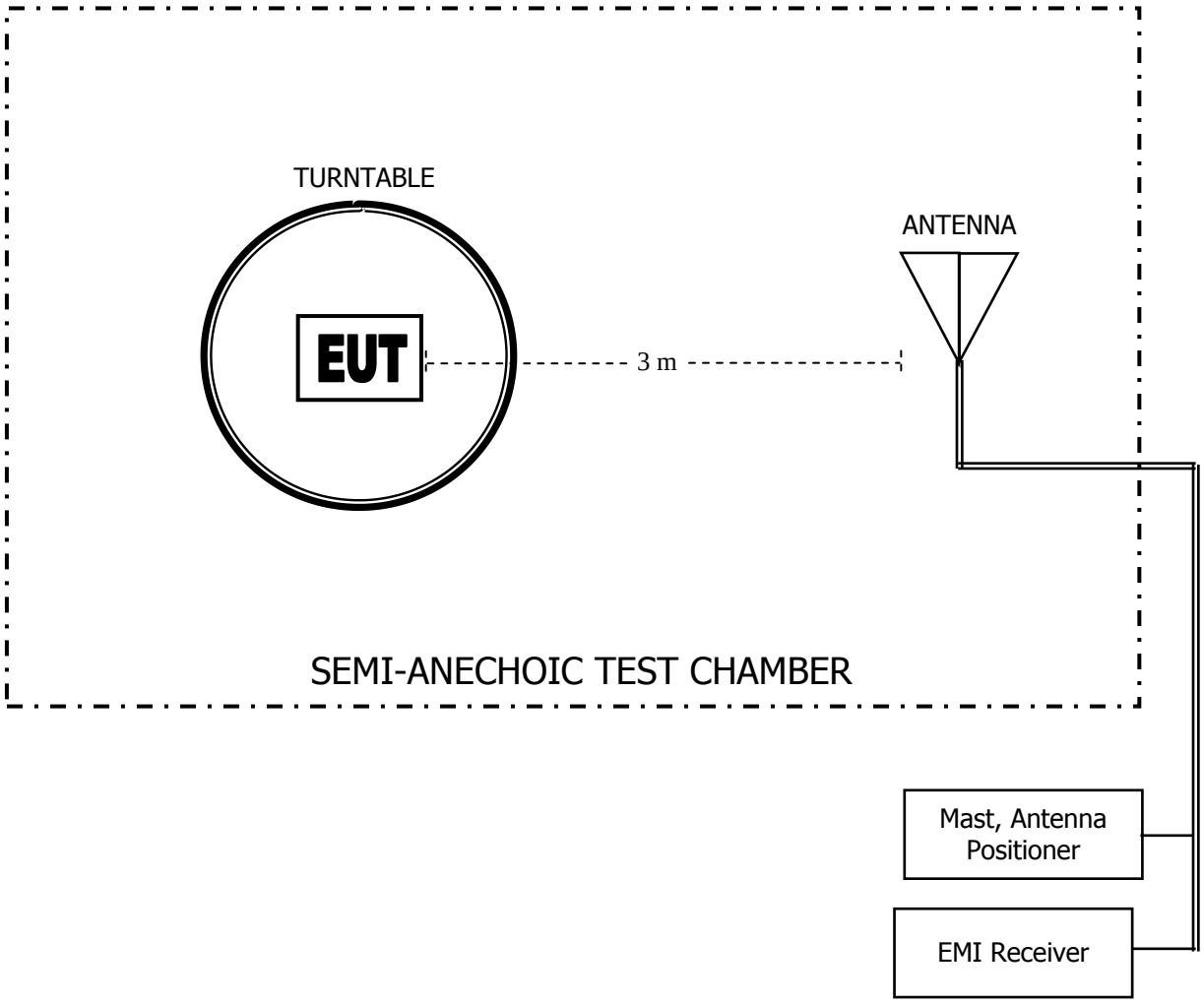


FIGURE 2: RADIATED EMISSIONS 3-METER SEMI-ANECHOIC TEST CHAMBER



COM-POWER AC-220

LAB P - COMBILOG ANTENNA

S/N: 003

CALIBRATION DUE: MAY 25, 2013

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	19.20	**180**	9.20
35	19.30	**200**	9.30
40	20.00	**250**	12.10
45	17.80	**300**	13.80
50	17.80	**300**	13.80
60	13.20	**400**	15.00
70	7.90	**500**	17.50
80	6.90	**600**	17.90
90	8.10	**700**	20.70
100	8.10	**800**	20.30
120	9.60	**900**	21.30
140	9.70	**1000**	22.40
160	8.60		

FRONT VIEW

CHILICON POWER
CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240
FCC CLASS B USING CISPR LIMITS - RADIATED EMISSIONS – 1/28/2013

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

CHILICON POWER
CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240
FCC CLASS B USING CISPR LIMITS - RADIATED EMISSIONS – 1/28/2012

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

CHILICON POWER
CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240
FCC CLASS B USING CISPR LIMITS - CONDUCTED EMISSIONS –1/29/2013

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

CHILICON POWER
CP-220 208/240 MICRO INVERTER
Model: CP-220 208/240
FCC CLASS B USING CISPR LIMITS - CONDUCTED EMISSIONS –1/29/2013

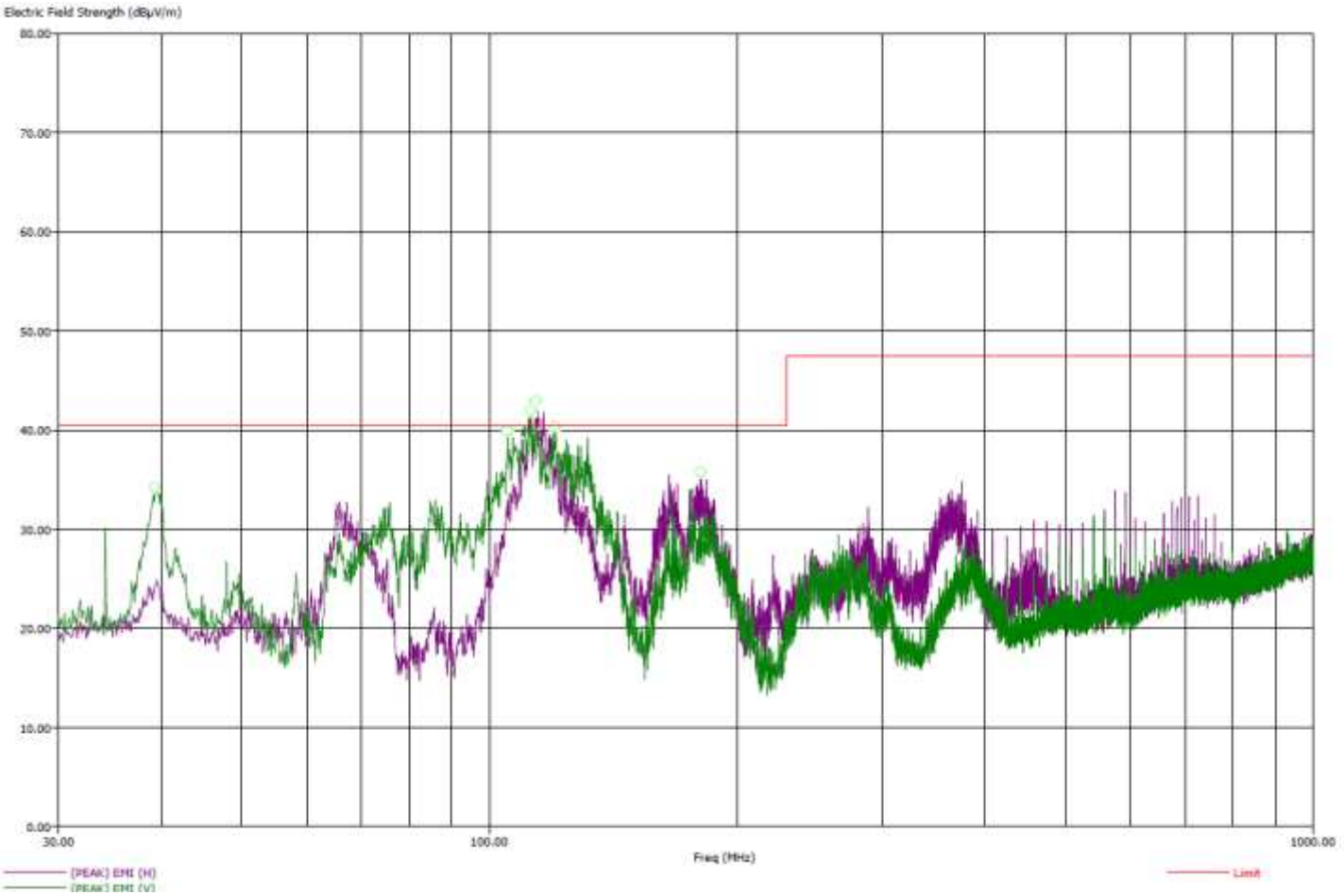
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

Title: EN55022 Class B 1/29/2013 12:26:07 PM
File: Radiated Pre-Scan 30-1000Mhz.set Sequence: Preliminary Scan
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_200 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)



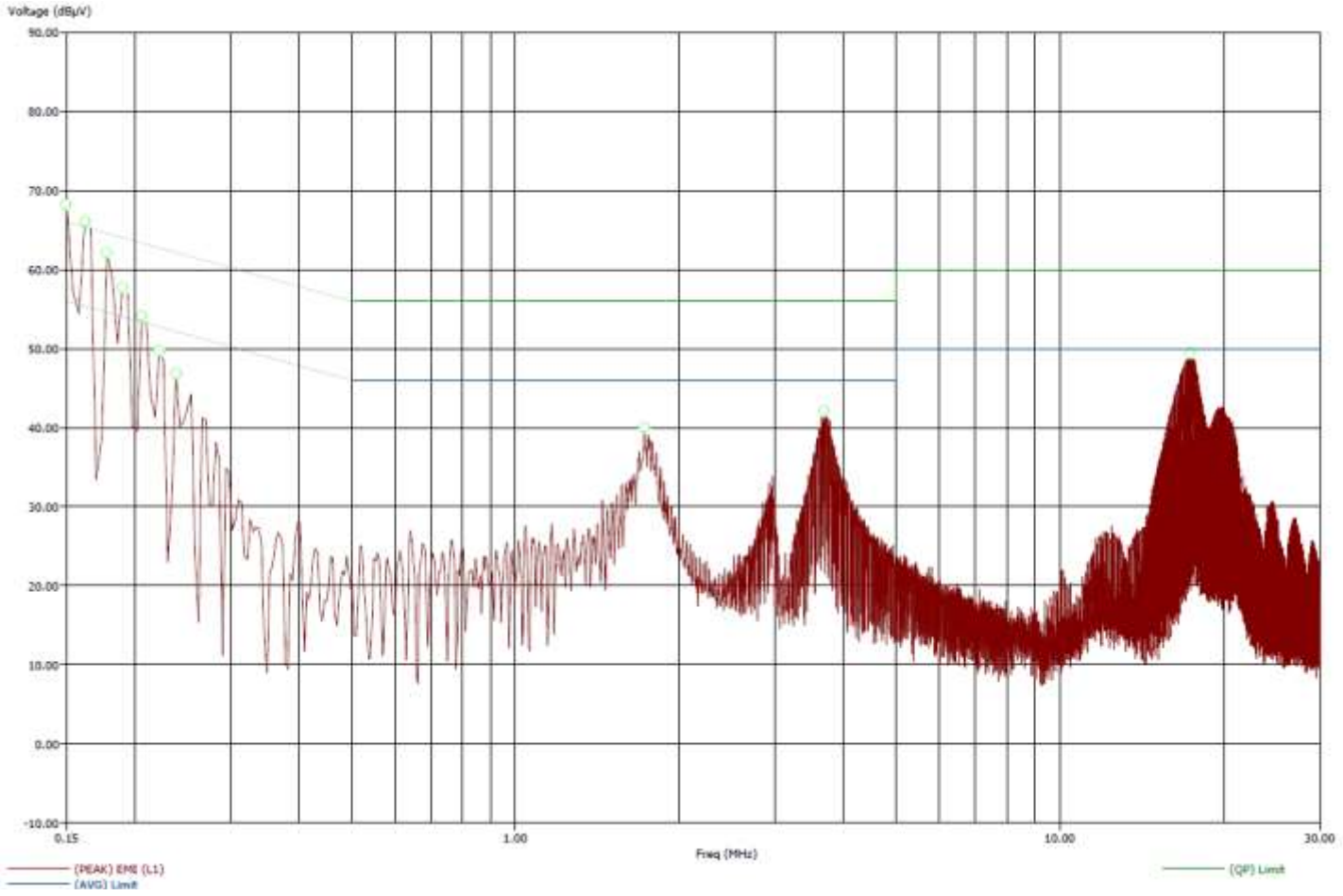
Title: EN55022 Class B 1/29/2013 12:46:33 PM
File: Radiated Final 30-1000Mhz.set Sequence: Final Measurements
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_220 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)

Freq(MHz)	(QP) Margin(dB)	(QP)EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer (dB)	Cable (dB)
39.30	-9.63	30.82	35.68	40.45	V	231.50	106.52	19.89	0.55
105.30	-3.64	36.81	40.90	40.45	V	311.25	99.64	8.52	0.88
112.40	-0.57	39.88	45.11	40.45	V	337.25	111.00	9.05	0.91
113.80	-2.35	38.10	43.60	40.45	H	177.50	225.35	9.16	0.92
120.30	-3.02	37.43	42.29	40.45	V	0.75	108.41	9.60	0.94
180.80	-10.08	30.37	36.43	40.45	H	146.50	152.11	9.20	1.16

Title: EN55022 Class B 1/28/2013 9:44:47 PM
File: Conducted Pre-Line18.set Sequence: Preliminary Scan
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_200 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)



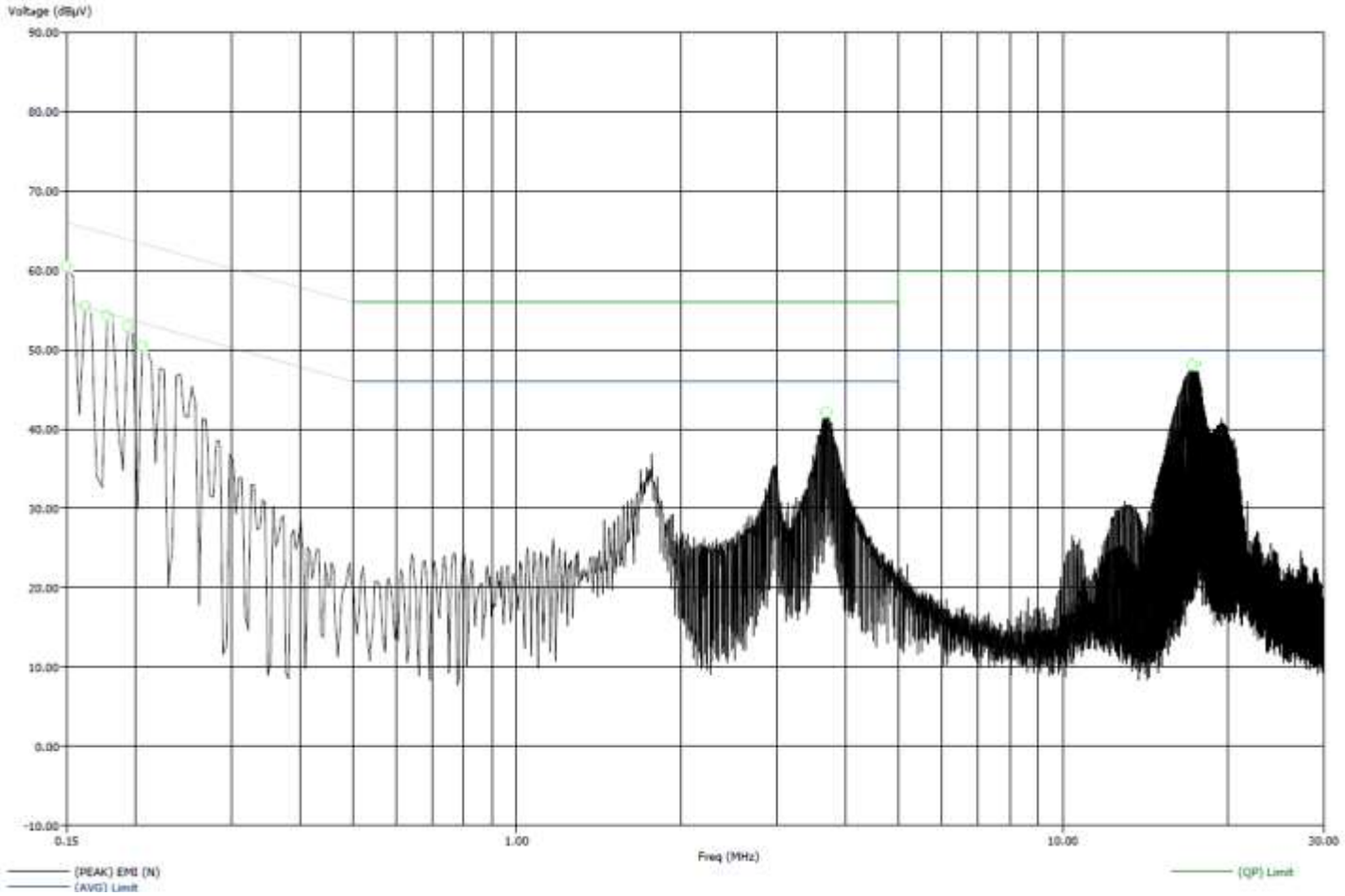
Title: EN55022 Class B 1/28/2013 9:48:07 PM
File: Conducted Final-Line18.set Sequence: Final Measurements
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_200 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.15	-4.71	-3.77	51.29	62.23	68.50	56.00	66.00	0.09	0.02
0.16	-10.00	-4.78	45.36	60.58	67.22	55.36	65.36	0.09	0.02
0.18	-14.53	-7.95	40.05	56.63	62.71	54.58	64.58	0.08	0.02
0.19	-13.47	-11.55	40.57	52.49	58.87	54.04	64.04	0.08	0.02
0.21	-21.06	-14.72	32.31	48.65	55.59	53.37	63.37	0.08	0.02
0.22	-23.65	-18.94	29.09	43.80	50.45	52.74	62.74	0.08	0.02
0.24	-22.60	-22.28	29.56	39.89	47.59	52.17	62.17	0.08	0.02
1.73	-15.40	-18.98	30.60	37.02	41.67	46.00	56.00	0.07	0.05
3.70	-26.66	-21.25	19.34	34.75	42.59	46.00	56.00	0.08	0.07
17.38	-1.88	-11.77	48.12	48.23	48.60	50.00	60.00	0.27	0.29

Title: EN55022 Class B 1/28/2013 9:53:58 PM
File: Conducted Pre-Neutral.set Sequence: Preliminary Scan
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_200 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)



Title: EN55022 Class B 1/28/2013 9:57:34 PM
File: Conducted Final-Neutral.set Sequence: Final Measurements
Operator: Eugene Adams
EUT Type: Grid Tie Inverter
EUT Condition: Connected to simulated solar panel and delivering power to grid
Comments: Sample 1_200 1M AC connector Run C_Warm
Temp: 72f
Hum: 48%
240V 60Hz

Compatible Electronics, Inc. FAC-3 (LAB P)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.15	-17.80	-11.18	38.20	54.82	61.25	56.00	66.00	0.10	0.02
0.16	-20.54	-14.53	34.82	50.83	57.60	55.36	65.36	0.09	0.02
0.18	-23.44	-15.48	31.14	49.10	55.26	54.58	64.58	0.09	0.02
0.19	-28.42	-16.76	25.44	47.11	53.57	53.86	63.86	0.09	0.02
0.21	-28.78	-18.53	24.58	44.84	51.57	53.37	63.37	0.09	0.02
3.69	-23.69	-20.47	22.31	35.53	43.58	46.00	56.00	0.09	0.07
17.30	-31.61	-40.36	18.39	19.64	27.41	50.00	60.00	0.27	0.29
17.54	-31.04	-38.88	18.96	21.12	28.62	50.00	60.00	0.27	0.29