



FCC VERIFICATION TEST REPORT

for

30A DC Motor Driver

MD30C

Prepared for : Cytron Technologies Sdn Bhd
No 1, Lorong Industri Impian 1, Taman Industri Impian,
14000 Bukit Mertajam, Penang, Malaysia.

Prepared by: Shenzhen HOT Testing Technology Co., Ltd.
2Fool B Block, Hongwan business center Gushu town, Baoan district
Shenzhen City China

TEL: +86-755-23220336

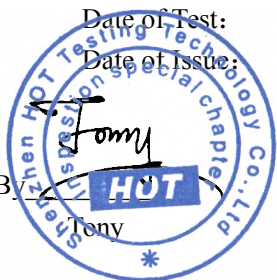
FAX: +86-755-23220336

Report Number: HOT-170723001E-7

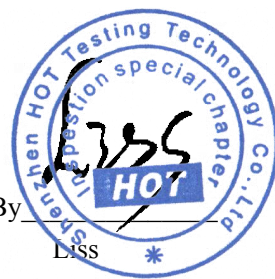
Date of Test: Feb. 17~Feb. 23,2017

Date of Issue: Feb. 23,2017

Tested By



Reviewed By



The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from HOT Testing Technology



Table of contents

1.0	General Details	3
1.1	Test Lab Details.....	3
1.2	Applicant Details.....	3
1.3	Description of EUT	3
1.4	Submitted Sample.....	3
1.5	Test Duration.....	3
2.0	List of Measurement Equipment.....	4
3.0	Technical Details.....	5
3.1	Summary of Test Results.....	5
3.2	Test Standards.....	5
3.3	Measurement Uncertainty.....	5
4.0	Power Line Conducted Emission Test.....	6
4.1	Schematics of the test.....	6
4.2	Test Method and test Procedure.....	6
4.3	EUT Operating Condition.....	7
4.4	Test Equipment.....	7
4.5	Power line conducted Emission Limit.....	7
4.6	Photo documentation of the test set-up.....	7
4.7	Test specification.....	7
4.8	Test result.....	7
5.0	Radiated Emission test.....	10
5.1	Test Method and Test Procedure.....	10
5.2	EUT Operating Condition.....	11
5.3	Radiated Emission Limit.....	11
5.4	Photo documentation of the test set-up.....	11
5.5	Test Equipment.....	11
5.6	Test specification.....	11
5.7	Test result.....	11
6.0	FCC label.....	14
7.0	Photos of testing.....	14
8.0	Photos for the EUT.....	15



1.0 General Details

1.1 Test Lab Details

Name : Shenzhen HOT Testing Technology Co., LTD
Address: 2Fool B Block, Hongwan business center Gushu town, Baoan districtShenzhen City China
Telephone: +86-755-23220336
Fax: +86-755-23220336

1.2 Applicant Details

Applicant: Cytron Technologies Sdn Bhd
Address: No 1, Lorong Industri Impian 1, Taman Industri Impian, 14000
Bukit Mertajam, Penang, Malaysia.
Telephone: +60123650069
Fax: +6045040138

Manufacturer: Cytron Technologies Sdn Bhd
Address: No 1, Lorong Industri Impian 1, Taman Industri Impian, 14000
Bukit Mertajam, Penang, Malaysia.
Telephone: +60123650069
Fax: +6045040138

1.3 Description of EUT

Product: 30A DC Motor Driver
Model No.: MD30C
Additional Model No.: N/A
Brand Name: Cytron
Additional Trade Name: --

1.4 Submitted Sample

1 Sample

1.5 Test Duration

2017-02-17 to 2017-02-23



2.0 List Test Equipments					
Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
Conducted emission					
EMI Test Receiver	ESCS30	100139	R&S	2017-02-05	2018-02-04
LISN	LS16C	16010222119	AFJ	2017-02-05	2018-02-04
loop antenna	LLA-2	N/A	EVERFINE	2017-02-05	2018-02-04
Absorption power clamp	ZN23201	0811	Da Ze technology	2017-02-05	2018-02-04
Radiated emission					
EMI Test Receiver	ESCS30	100139	R&S	2017-02-05	2018-02-04
Spectrum Analyzer	FSEM	1079.8500.30	R&S	2017-02-05	2018-02-04
Amplifier	8447D	2727A05017	H.P.	2017-02-05	2018-02-04
Antenna	VULB9163	N/A	SCHWARZBECK	2017-02-05	2018-02-04
Amplifier	EM30265	07032613	EM Electronics Corporation	2017-02-05	2018-02-04
Positioning Controller	CC-C-1F	MF7802140	C & C LAB	2017-02-05	2018-02-04



3.0 Technical Details

3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] tests for FCC Requirement.

3.2 Test Standards

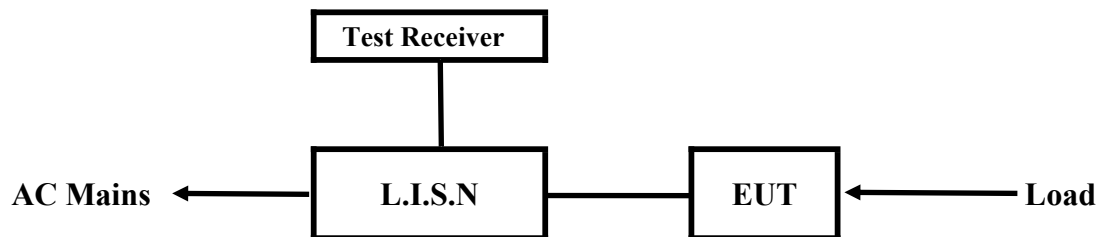
FCC Part 15 Subpart B:2011

3.3 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU
1.	Temperature	$\pm 0.1^{\circ}\text{C}$
2.	Humidity	$\pm 1.0\%$
3.	Spurious emissions, conducted	$\pm 3.70\text{dB}$
4.	All emissions, radiated	$\pm 4.50\text{dB}$

4.0 Power Line Conducted Emission Test

4.1 Schematics of the test



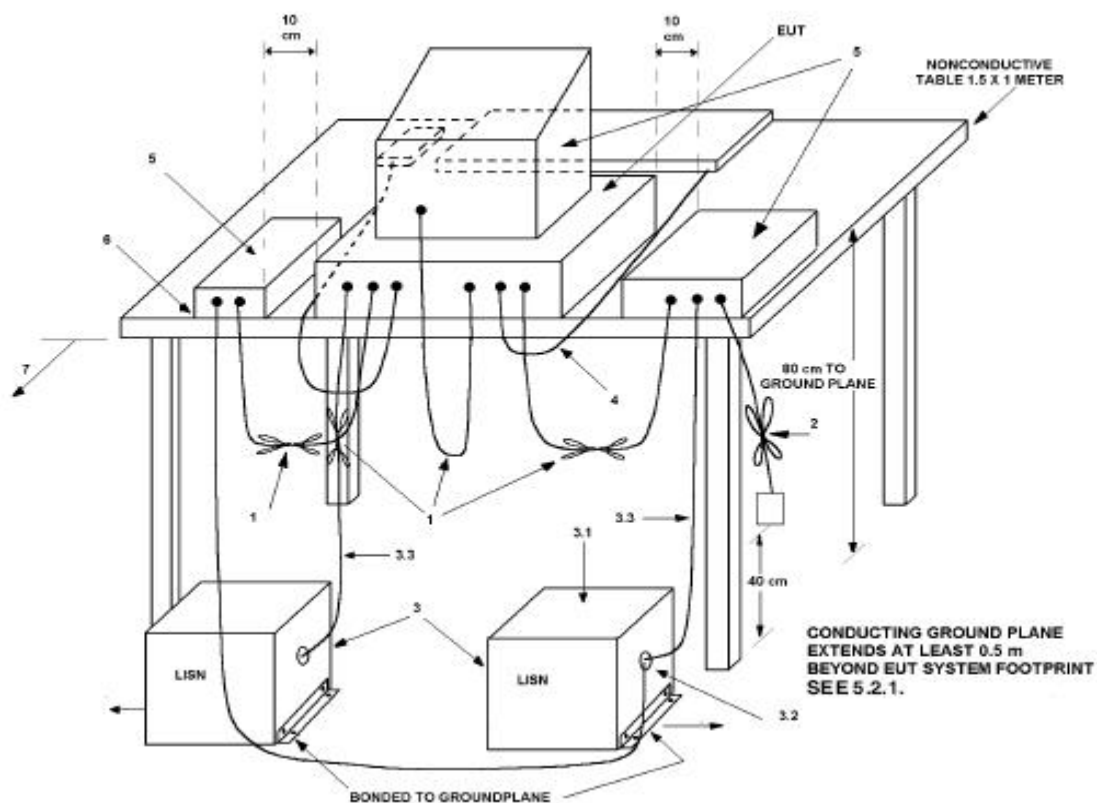
EUT: Equipment Under Test

4.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2009.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup





4.3 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2009

- 1) Setup the EUT and simulators as shown on the following
- 2) Enable AF signal and confirm EUT active to normal condition

4.4 Test Equipment

Please refer to the Section 2

4.5 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes:
1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

4.6 Photo documentation of the test set-up

Please refer to the Section 7

4.7 Test specification:

Environmental conditions: Temperature: 24° C Humidity: 47% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.8 Test result

Min. limit margin 4.88dB at 1.384 MHz

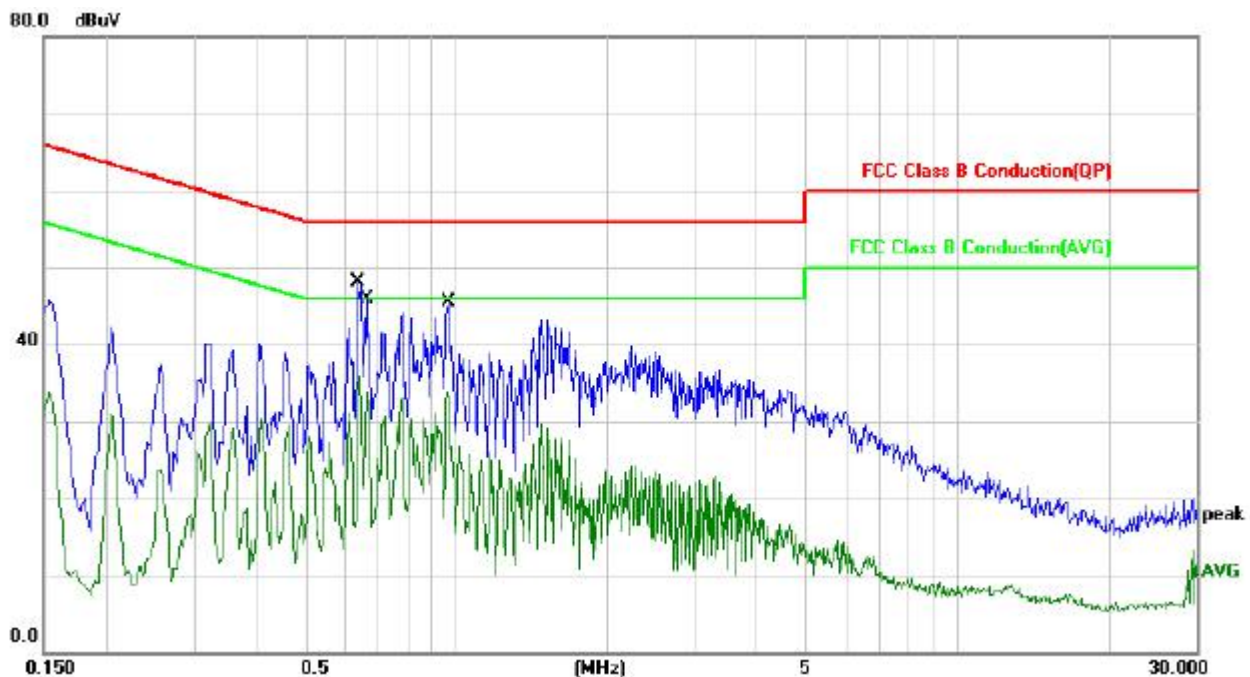
The requirements are FULFILLED

Remarks: According to the FCC part 15 Subpart B:2011

**A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)**

EUT Description: 30A DC Motor Driver
Operation Mode: Full Load
Tested By: Tony
Test date: 2017-02-23

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.6465	41.71	0.00	41.71	56.00	-14.29	QP	
2		0.6465	28.39	0.00	28.39	46.00	-17.61	AVG	
3		0.6611	38.40	0.00	38.40	56.00	-17.60	QP	
4		0.6611	32.49	0.00	32.49	46.00	-13.51	AVG	
5		0.9586	41.61	0.00	41.61	56.00	-14.39	QP	
6	*	0.9586	33.44	0.00	33.44	46.00	-12.56	AVG	

**B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)**

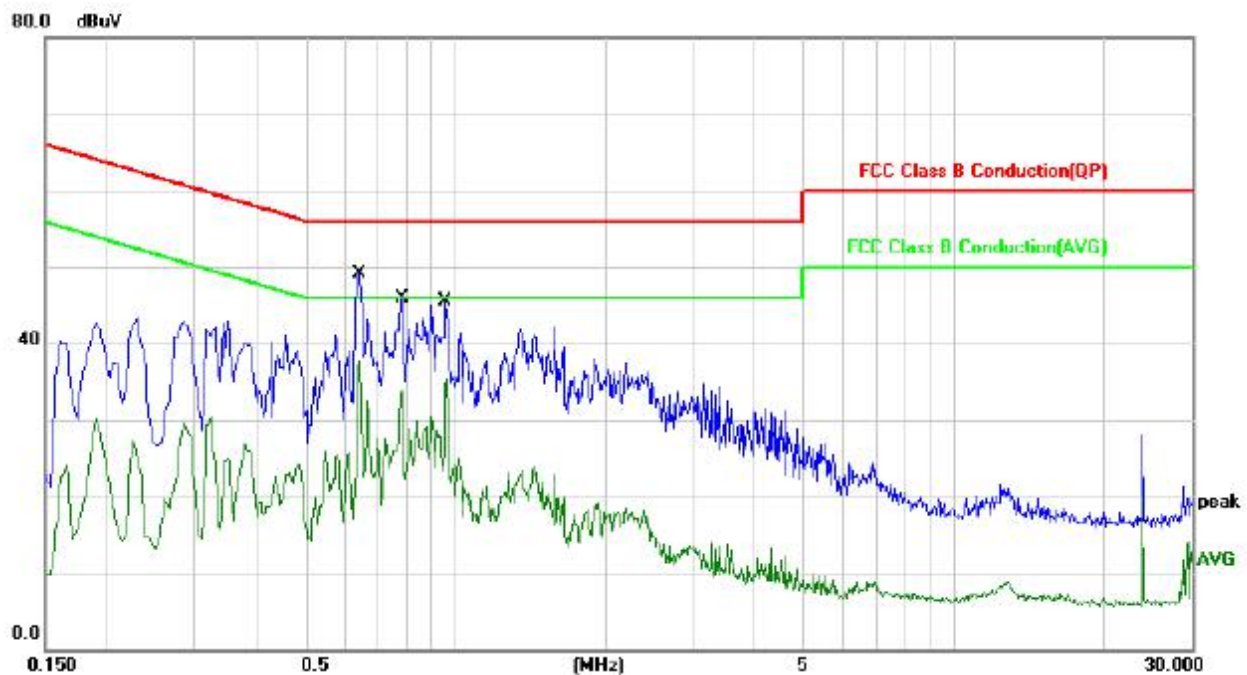
EUT Description: 10Amp DC Motor Driver

Operation Mode: Full Load

Tested By: Tony

Test Date: 2017-02-23

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AVG	1s



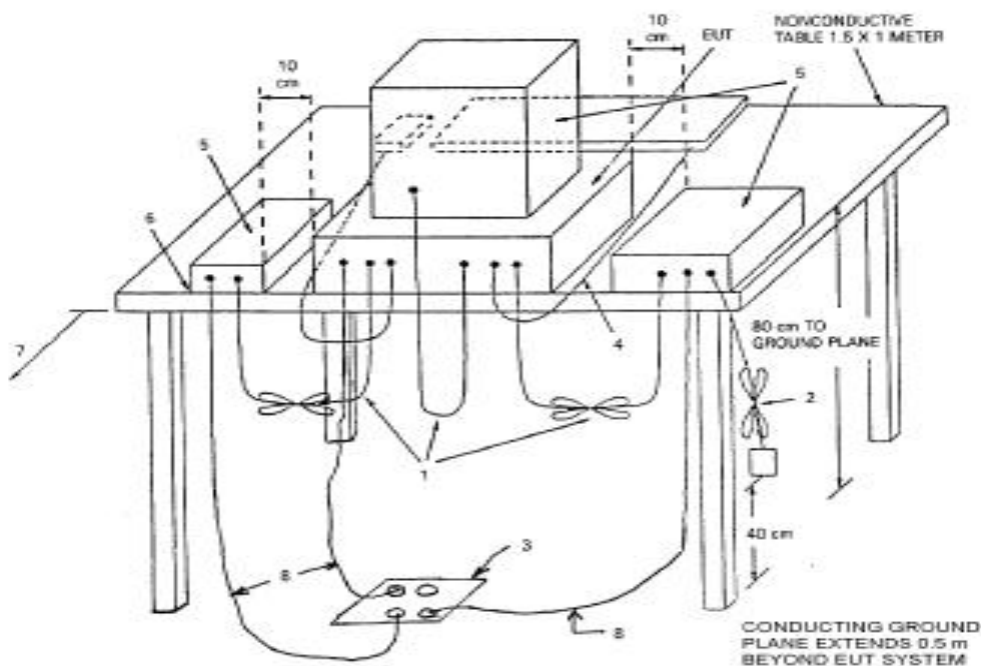
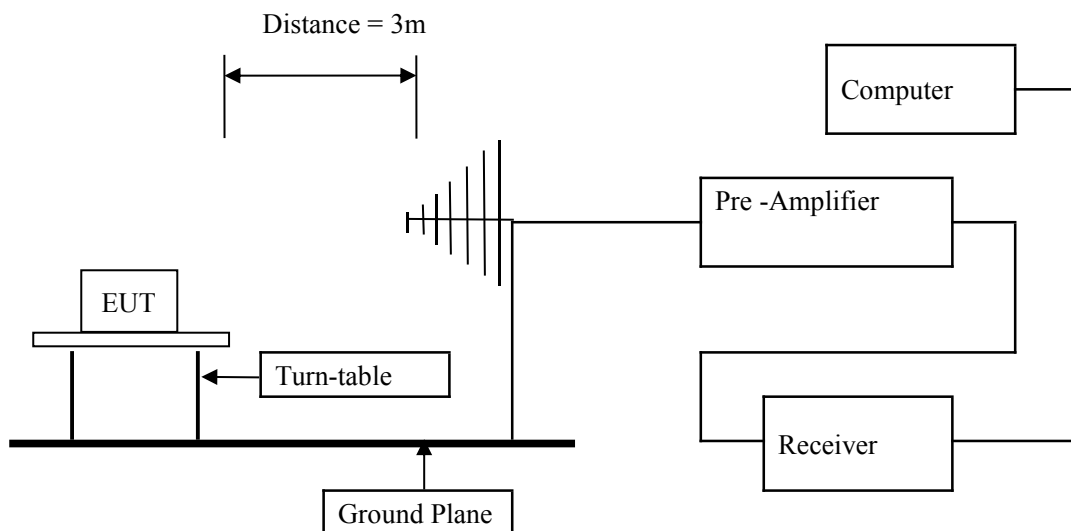
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.6407	46.76	0.00	46.76	56.00	-9.24	QP	
2		0.6407	36.14	0.00	36.14	46.00	-9.86	AVG	
3		0.7805	43.90	0.00	43.90	56.00	-12.10	QP	
4		0.7805	34.06	0.00	34.06	46.00	-11.94	AVG	
5		0.9579	41.12	0.00	41.12	56.00	-14.88	QP	
6		0.9579	33.44	0.00	33.44	46.00	-12.56	AVG	

5 Radiated Emission Test

5.1 Test Method and test Procedure:

- 1) The EUT was tested according to ANSI C63.4 –2009.
- 2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2009.
- 3) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- 4) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup



5.2 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2009

5.3 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequency Range (MHz)	Distance (m)	Field strength (dBμV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
- 1) The frequency spectrum from 30MHz to 8GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120KHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK.
 - 2) Measurements were made at 3 meters.
 - 3) If measurement is not made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula $Ld1 = Ld2 * (d2/d1)$

5.4 Photo documentation of the test set-up

Please refer to the Section 7

5.5 Test Equipment:

Please refer to the Section 2

5.6 Test specification:

Environmental conditions: Temperature 26° C Humidity: 56% Atmospheric pressure: 103kPa

5.7 Test result

Min. limit margin > 10dB from 30 MHz to 1000 MHz

The requirements are FULFILLED

Remarks: According to the FCC part 15 Subpart B:2011

**A. Radiated Emission In Horizontal (30MHz----1000MHz)****EUT Description:** 30A DC Motor Driver**Operation Mode:** Full Load**Tested By:** Tony**Test Date:** 2017-02-23

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		185.7880	49.58	-16.57	33.01	40.00	-6.99	QP		
2		222.9500	48.55	-16.38	32.17	40.00	-7.83	QP		
3		260.1444	54.49	-14.69	39.80	47.00	-7.20	QP		
4	*	334.8589	53.48	-13.10	40.38	47.00	-6.62	QP		
5		408.9460	51.57	-11.52	40.05	47.00	-6.95	QP		
6		483.9094	49.81	-10.00	39.81	47.00	-7.19	QP		

**B. Radiated Emission In Vertical (30MHz----1000MHz)****EUT Description:** 30A DC Motor Driver**Operation Mode:** Full Load**Tested By:** Tony**Test Date:** 2017-02-23

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	56.3948	53.33	-20.70	32.63	40.00	-7.37	QP		
2		104.9033	41.38	-15.82	25.56	43.50	-17.94	peak		
3		200.6881	42.41	-15.14	27.27	43.50	-16.23	peak		



6.0 FCC Label

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

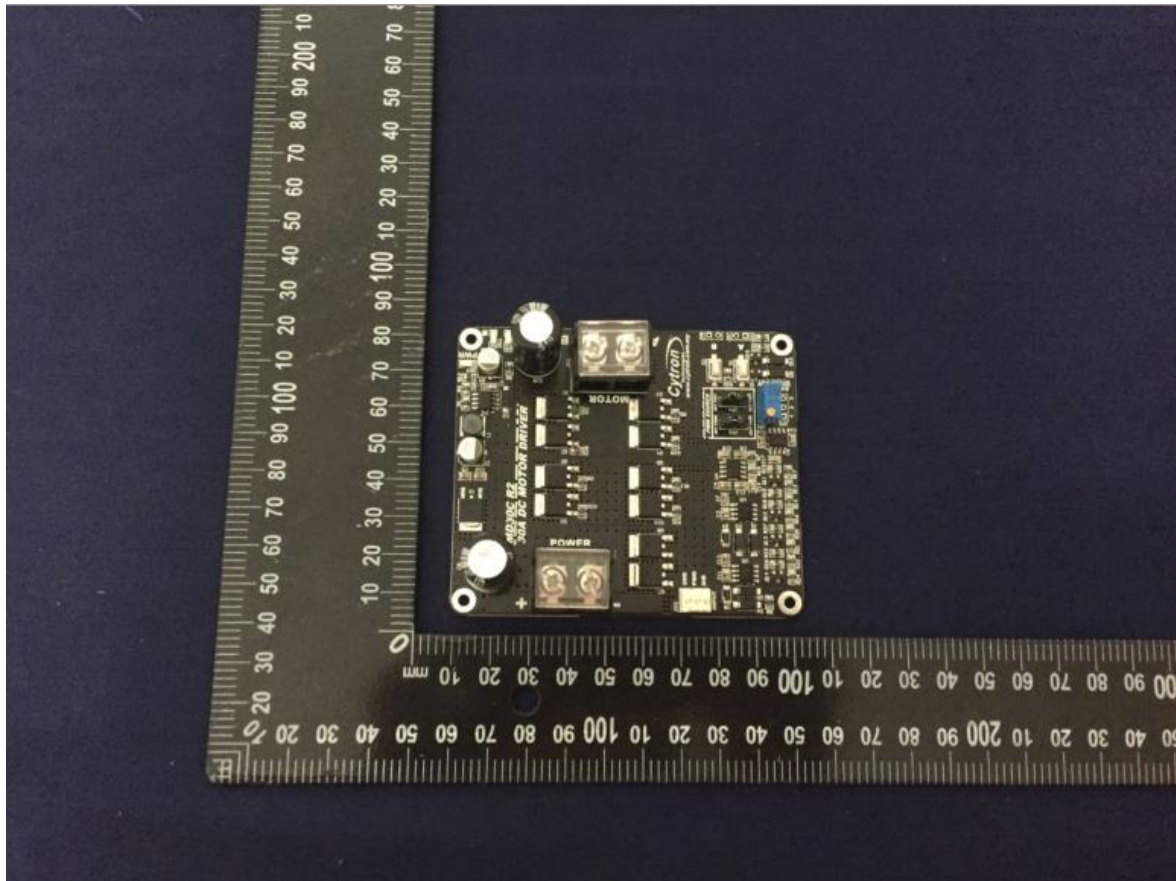
The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location: On the product body



7.0 Photos of testing

Photo 1



--End of the report--