



FCC COMPLIANCE TEST REPORT

Technical Statement of Conformity
in accordance with FCC Part 15 Subpart B

The Product

Equipment Under Test	: DC-DC Converter
Model Number	: TEQ200-7218WIR
Product Series	: please refer to Appendix 1 (Page 21)
Report Number	: HA140602-SAFD
Issue Date	: 31-OCT-2014
Test Result	: Compliance

is produced by

TRACO ELECTRONIC AG

Sihlbruggstrasse 111 CH-6340 Baar Switzerland



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G-696



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Verification

Applicant :	TRACO ELECTRONIC AG
Manufacturer :	POWER MATE TECHNOLOGY CO., LTD.
Equipment Under Test :	DC-DC Converter
Model Number :	TEQ200-7218WIR
Product Series :	please refer to Appendix 1 (Page 21)
Sample Received Date :	03-SEP-2014
Test Standards :	<input checked="" type="checkbox"/> FCC Part 15 Subpart B and CISPR 22 Class A

Remark

This report is a copy of test report No. HA140602-FD. The original report details the results of the test carried out on one sample. The test results are contained in this test report and HongAn Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these tests. This report shows the EUT is technically compliant with FCC Part 15 Subpart B and CISPR 22 Class A official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd..

Documented by: _____ **Date:** 2014-10-31
Zoe Chen / ADM. Dept. Staff

Tested by: _____ **Date:** 2014-09-16
Ben Chen / ENG. Dept. Staff

Approved by: _____ **Date:** 2014-10-31
Adam Yang / SEC. Manager



Summary of Test Result

Emission			
Test Standard	Test Item	Test Result	Remark
FCC Part15 Subpart B CISPR22 Class A	Conducted Emission	Pass	Highest Emission L: 1.01MHz, A.V. 45.93dBuV, Margin -14.07dB N: 20.76MHz, A.V. 48.84dBuV, Margin -11.16dB
FCC Part15 Subpart B CISPR22 Class A	Radiated Emission (Below 1GHz)	Pass	Highest Emission H: 101.22MHz, 33.40dBuV, Margin -6.60dB Antenna Height 400cm, Turntable Angle 85° V: 56.62MHz, 30.85dBuV, Margin -9.15dB Antenna Height 100cm, Turntable Angle 183°
FCC Part15 Subpart B CISPR22	Radiated Emission (1 ~ 6 GHz)	N/A	The highest frequency of the internal sources of the EUT is less than 108MHz, the measurement shall only be made up to 1GHz. Hence, the test item is not required.

Measurement Uncertainty – Emission

The following measurement uncertainty has been calculated for Emission Tests performed on the EUT as specified in CISPR 16-4-2:

Test Item		Uncertainty
Conducted Emission		$\pm 3.67\text{dB}$
Radiated Emission	Below 1GHz	$\pm 4.84\text{dB}$
	1 ~ 6 GHz	$\pm 4.96\text{dB}$

This reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k = 2$, providing a level of confidence of approximately 95%.



1 General Description

1.1 Description of Equipment Under Test (EUT)

Equipment Under Test	:	DC-DC Converter
Model Number	:	TEQ200-7218WIR
Product Series	:	please refer to Appendix 1 (Page 21)
Applicant	:	TRACO ELECTRONIC AG
Address of Applicant	:	Sihlbruggstrasse 111 CH-6340 Baar Switzerland
Manufacturer	:	POWER MATE TECHNOLOGY CO., LTD.
Address of Manufacturer	:	NO.36, ROAD 22ND, TAICHUNG INDUSTRIAL PARK, TAICHUNG, TAIWAN, R.O.C.
Power Supply	:	DC 72 V <input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Non-Shielded <input checked="" type="checkbox"/> Detachable, 0.5m <input type="checkbox"/> Un-Detachable <input type="checkbox"/> w Ferrite Core <input checked="" type="checkbox"/> w/o Ferrite Core
I/O Port	:	N/A
Data Cable	:	N/A
Description of EUT	:	Dimensions : 10cm (L) X 9cm (W) X 9cm (H) Highest Frequency of the Internal Source : 250kHz Position : <input checked="" type="checkbox"/> Table-top / <input type="checkbox"/> Floor-standing Intended Function : The EUT is a DC-DC Converter. Product Variance : The manufacturer declares that the main test sample is the most advanced product in the series. The other series products have less function than the main test sample. Note: Reference details accompanying user manual.



1.2 Test Facility

All the Conducted and Radiated Emission Tests are performed at No. 15-1, Cweishuh Keng, Cweipin Village, Linkou, New Taipei City, Taiwan, R.O.C.

1.3 Test Instruments

Instruments Used for Emission Measurement

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date	Test Item
LISN	EMCO	3810/2NM	9702-1818	04-Mar-2014	04-Mar-2015	Conducted Emission
LISN	EMCO	3810/2NM	9702-1821	18-Aug-2014	18-Aug-2015	Conducted Emission
LISN	Rolf Heine Hochfrequenztechnik	NNB-4/32T	00001	04-Mar-2014	04-Mar-2015	Conducted Emission
RF Current Probe	FCC	F-33-4	53	17-May-2014	17-May-2015	Conducted Emission
Impedance Stabilization Network (ISN)	TESEQGMBH	ISN T800	30838	16-Jun-2014	16-Jun-2015	Conducted Emission
EMI Receiver	R&S	ESCI	100931	17-Jul-2014	17-Jul-2015	Conducted Emission, Radiation Emission
Spectrum Analyzer	ADVANTEST	R3172	101202158	08-Aug-2014	08-Aug-2015	Radiated Emission
Preamplifier	CHASE	CPA 9231A	0405	23-Aug-2014	23-Aug-2015	Radiated Emission
Preamplifier	HD	HD17187	004	26-May-2014	26-May-2015	Radiated Emission
Bilog Antenna	TESEQ	CBL6111D	25769	25-Feb-2014	25-Feb-2015	Radiated Emission
Bilog Antenna	TESEQ	CBL6111D	38521	01-Jul-2014	01-Jul-2015	Radiated Emission
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	22-May-2014	22-May-2015	Radiated Emission
Harmonics /Flicker Module	EMC PARTNER	Harmonics-1000	HAR1000-38	20-Mar-2014	20-Mar-2015	Harmonics

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.



1.4 Test Methodology

All Conducted and Radiated Emission Tests were performed according to the procedures stated in FCC Part 15 Subpart B Sec. 15.31.

1.5 Auxiliary Equipments

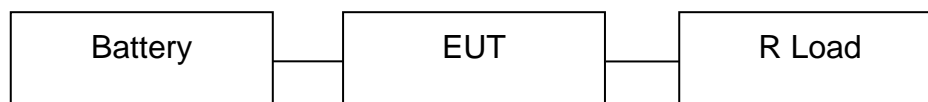
1.5.1 Provided by HongAn Technology Co., Ltd. for Emission Test.

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Description	
						Data Cable	Power Cable
O1	Battery	WP12-12	N/A	CE Mark	KUNG LONG	N/A	N/A

1.5.2 Provided by the Manufacturer

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Description	
						Data Cable	Power Cable
01	R Load	N/A	N/A	N/A	N/A	N/A	N/A

1.6 Block Diagram



1.7 Identifying the Final Test Mode (Worst Case)

Pretest Mode of EUT:

1. Model No. TEQ75-2416WIR
2. Model No. TEQ100-2415WIR
3. Model No. TEQ200-4815WIR
4. Model No. TEQ200-7218WIR

Note: After pre-test, we identified that Model No. TEQ200-7218WIR (the worst case) was most likely to cause maximum disturbance and most likely to be susceptible to disturbance. Therefore, the Final EMC Assessment was performed for the worst case.

1.8 Final Test Mode

Operation Mode on Model No. TEQ200-7218WIR

1.9 Condition of Power Supply

DC 72 V

1.10 EUT Configuration

1. Setup the EUT and peripheral as shown in Section 1.6.
2. Turn on the power of all equipments.
3. Activate the selected Final Test Mode shown in Sec. 1.7.

2 Conducted Emission Test

2.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

2.2 Test Configuration and Procedure

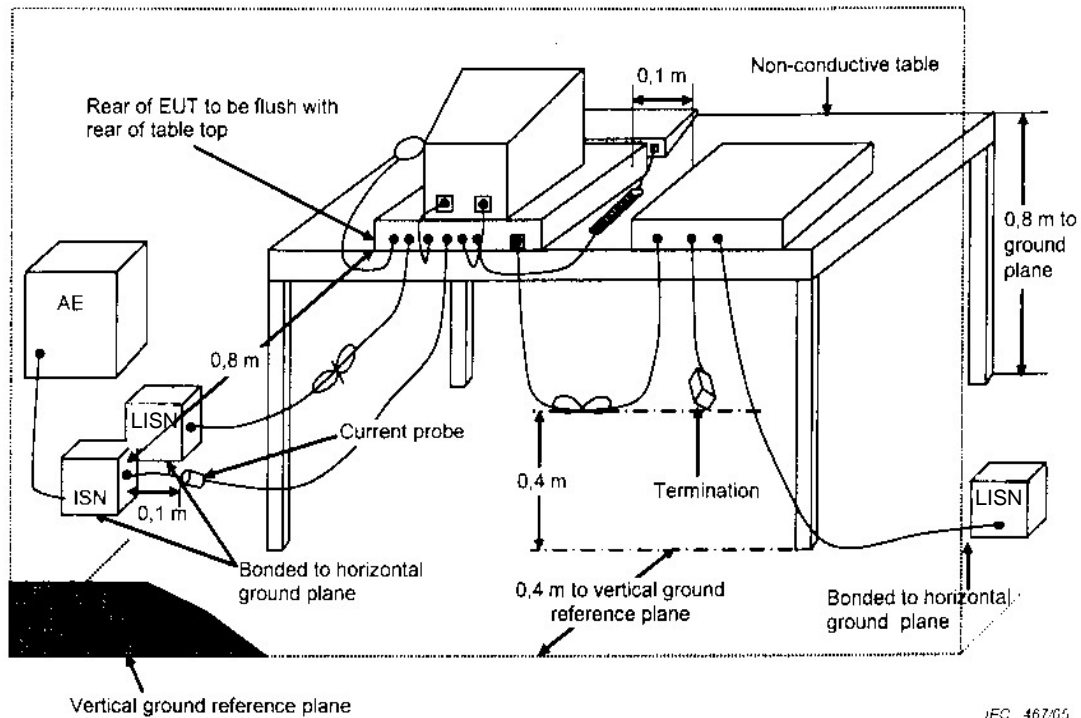


Table-top Equipment

- The EUT was placed on a non-conductive table which was 80 cm above the horizontal coupling plane. The rear of the EUT was 40 cm from the vertical coupling plane.
- The excess interface cables were folded at the cable center into a bundle no longer than 40 cm, so that the bundles were on the table.
- The EUT was connected to the main power through a L.I.S.N. This set up provided 50 ohm / 50 μ H coupling impedance for the measuring equipment.
- All auxiliary equipment received power from a second L.I.S.N.
- The conducted emissions were measured between the Line Phase and the PE ground and between the Neutral Phase and the PE ground using an EMI Receiver.
- The values were recorded.



2.3 Conducted Limit

☒ CISPR 22 / FCC Part 15 B

Frequency (MHz)	<input checked="" type="checkbox"/> Class A		<input type="checkbox"/> Class B	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

2.4 Test Result

PASS

The final tests data are shown on the following page(s).



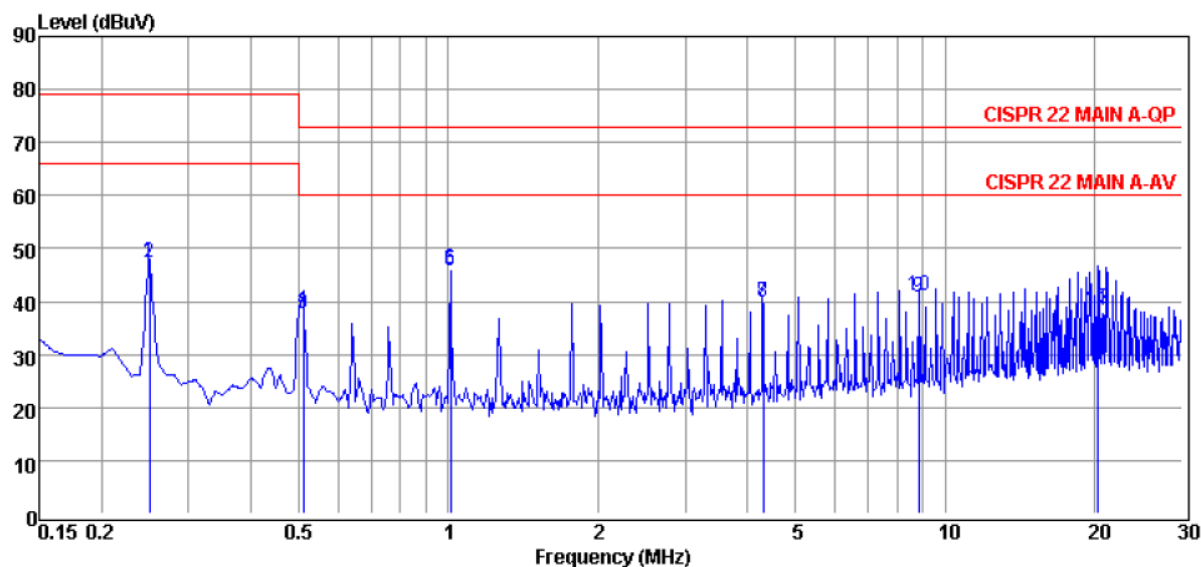
Conducted Emission Test Data

Test Date : 2014-09-16

Power Line : Line

Temperature : 24°C

Humidity : 55%



No.	Freq MHz	Reading dBμV	C.F dB	Result dBμV	Limit dBμV	Margin dB	Power Line	Remark
1	0.25	47.30	0.09	47.39	66.00	-18.61	LINE	Average
2	0.25	47.40	0.09	47.49	79.00	-31.51	LINE	QP
3	0.51	37.60	0.10	37.70	60.00	-22.30	LINE	Average
4	0.51	38.10	0.10	38.20	73.00	-34.80	LINE	QP
5	1.01	45.80	0.13	45.93	60.00	-14.07	LINE	Average
6	1.01	45.90	0.13	46.03	73.00	-26.97	LINE	QP
7	4.30	39.40	0.35	39.75	60.00	-20.25	LINE	Average
8	4.30	39.50	0.35	39.85	73.00	-33.15	LINE	QP
9	8.86	40.20	0.66	40.86	60.00	-19.14	LINE	Average
10	8.86	40.30	0.66	40.96	73.00	-32.04	LINE	QP
11	20.25	37.10	1.29	38.39	60.00	-21.61	LINE	Average
12	20.25	37.20	1.29	38.49	73.00	-34.51	LINE	QP

Remark : All readings are Quasi-Peak and Average values.



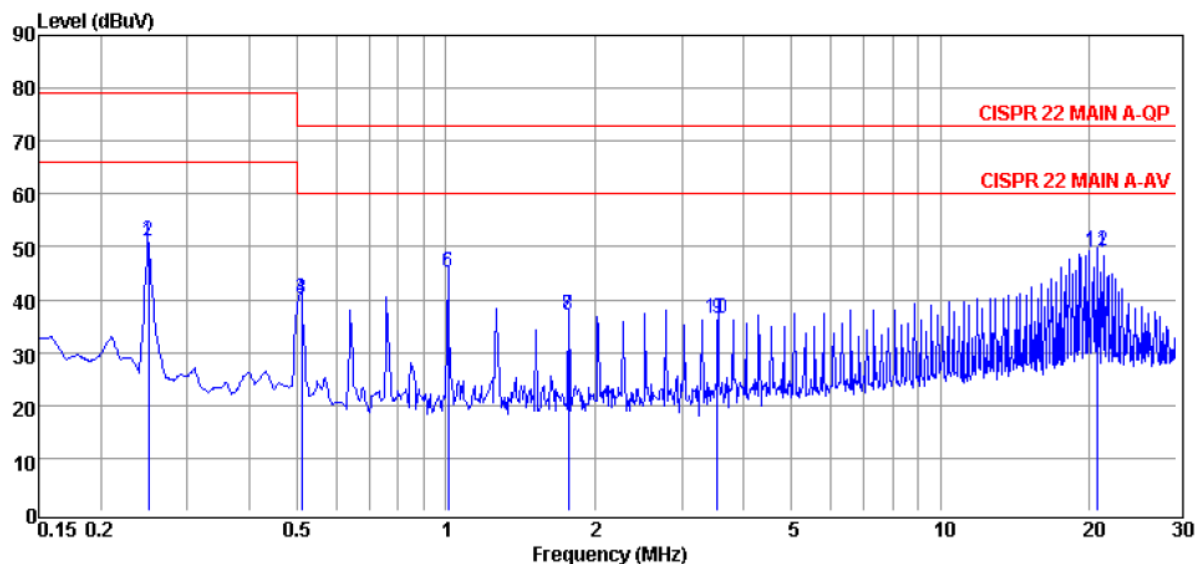
Conducted Emission Test Data

Test Date : 2014-09-16

Power Line : Neutral

Temperature : 24°C

Humidity : 55%



No.	Freq MHz	Reading dBμV	C.F dB	Result dBμV	Limit dBμV	Margin dB	Power Line	Remark
1	0.25	50.80	0.06	50.86	66.00	-15.14	NEUTRAL	Average
2	0.25	50.90	0.06	50.96	79.00	-28.04	NEUTRAL	QP
3	0.51	40.00	0.07	40.07	60.00	-19.93	NEUTRAL	Average
4	0.51	40.20	0.07	40.27	73.00	-32.73	NEUTRAL	QP
5	1.01	45.00	0.11	45.11	60.00	-14.89	NEUTRAL	Average
6	1.01	45.10	0.11	45.21	73.00	-27.79	NEUTRAL	QP
7	1.77	36.80	0.17	36.97	60.00	-23.03	NEUTRAL	Average
8	1.77	36.90	0.17	37.07	73.00	-35.93	NEUTRAL	QP
9	3.54	36.00	0.29	36.29	60.00	-23.71	NEUTRAL	Average
10	3.54	36.30	0.29	36.59	73.00	-36.41	NEUTRAL	QP
11	20.76	47.40	1.44	48.84	60.00	-11.16	NEUTRAL	Average
12	20.76	47.80	1.44	49.24	73.00	-23.76	NEUTRAL	QP

Remark : All readings are Quasi-Peak and Average values.

3 Radiated Emission Test – Below 1 GHz

3.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

3.2 Test Configuration and Procedure

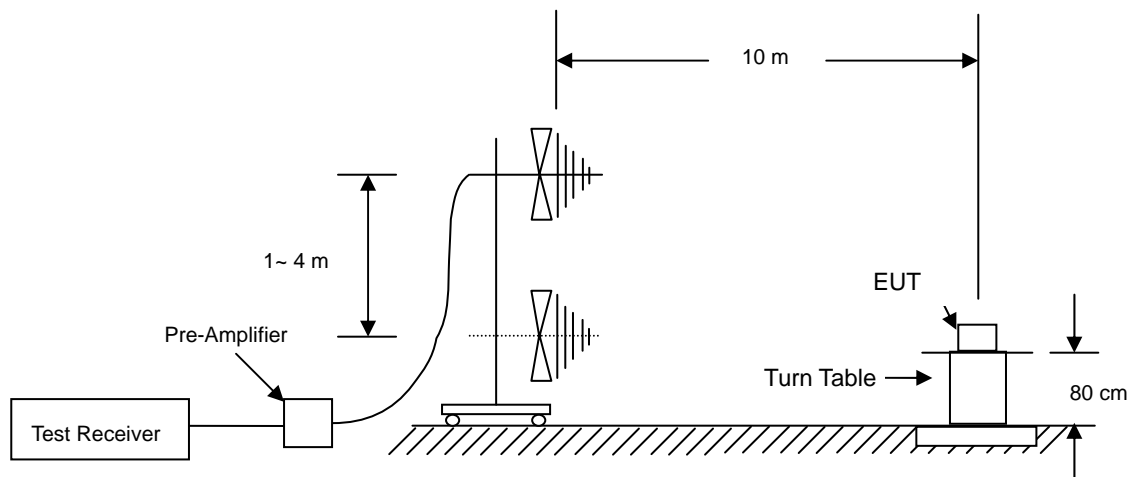


Table-top Equipment

- The EUT was placed on a non-conductive turntable which was 80cm above the horizontal ground plane. The EUT was set 10m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1m and 4m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 3.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.



3.3 Radiated Limit

☐ FCC Part 15 B

	<input type="checkbox"/> Class A (10m)		<input type="checkbox"/> Class B (3m)	
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak ($\text{dB}\mu\text{V/m}$)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak ($\text{dB}\mu\text{V/m}$)
30 ~ 88	90	39.08	100	40.00
88 ~ 216	150	43.52	150	43.52
216 ~ 960	210	46.44	200	46.02

Emission Level ($\text{dB}\mu\text{V/m}$) = 20 Log Emission Level ($\mu\text{V/m}$)

☒ CISPR 22

	<input checked="" type="checkbox"/> Class A (10m)	<input type="checkbox"/> Class B (10m)
Frequency (MHz)	Quasi-Peak ($\text{dB}\mu\text{V/m}$)	Quasi-Peak ($\text{dB}\mu\text{V/m}$)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

3.4 Test Result

PASS

The final tests data are shown on the following page(s).

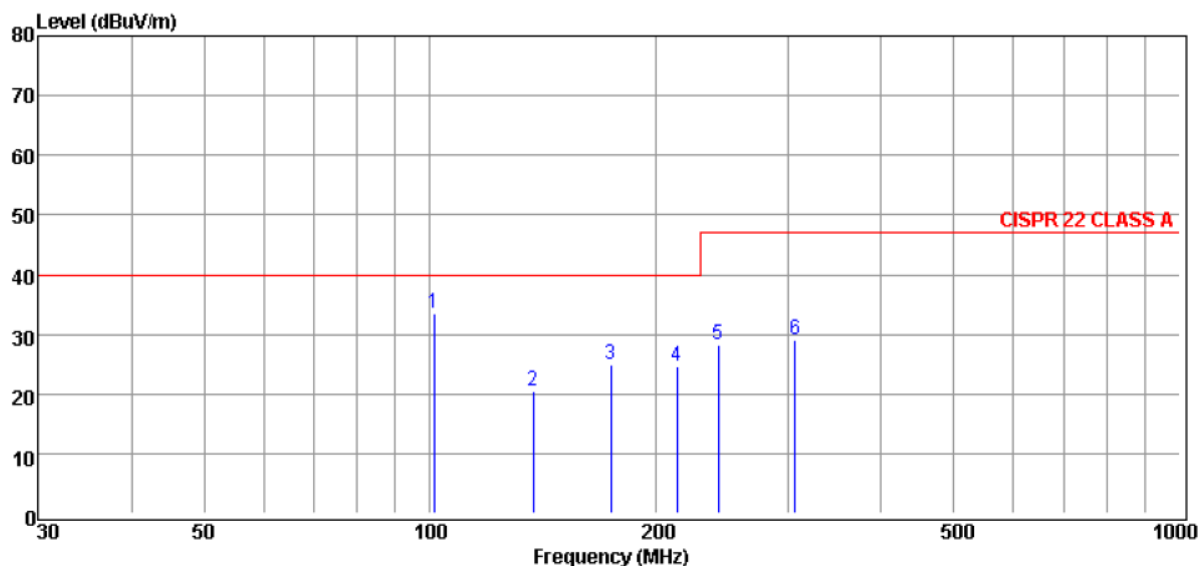
**Radiated Emission Test Data**

Test Date : 2014-09-16

Polarization : Horizontal

Temperature : 26°C

Humidity : 50%



No.	Freq MHz	Reading dB μ V	C.F dB	Result dB μ V/m	Limit dB μ V/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	101.22	52.41	-19.01	33.40	40.00	-6.60	400	85	HORIZONTAL	QP
2	137.16	37.14	-16.79	20.35	40.00	-19.65	396	197	HORIZONTAL	QP
3	174.42	44.34	-19.29	25.05	40.00	-14.95	394	212	HORIZONTAL	QP
4	213.80	44.23	-19.70	24.53	40.00	-15.47	390	63	HORIZONTAL	QP
5	242.20	45.84	-17.54	28.30	47.00	-18.70	360	108	HORIZONTAL	QP
6	307.20	44.15	-14.96	29.19	47.00	-17.81	270	169	HORIZONTAL	QP

Remark : All readings are Quasi-Peak values.

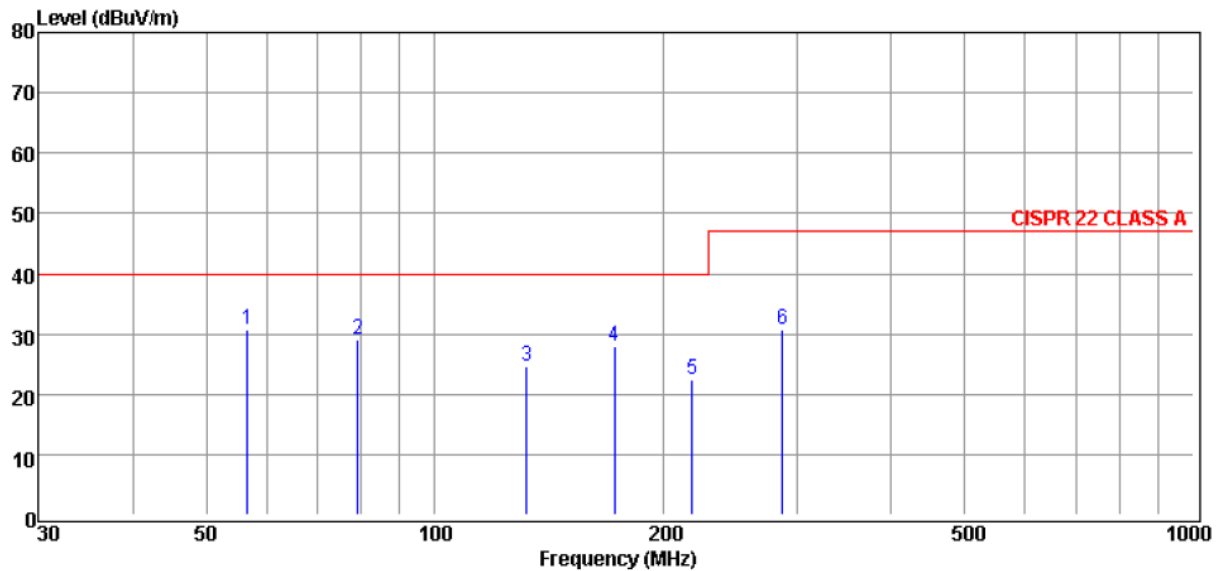
**Radiated Emission Test Data**

Test Date : 2014-09-16

Polarization : Vertical

Temperature : 26°C

Humidity : 50%



No.	Freq MHz	Reading dBμV	C.F dB	Result dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	56.62	53.76	-22.91	30.85	40.00	-9.15	100	183	VERTICAL	QP
2	79.18	51.12	-22.02	29.10	40.00	-10.90	102	45	VERTICAL	QP
3	132.20	41.62	-16.85	24.77	40.00	-15.23	106	224	VERTICAL	QP
4	172.49	47.30	-19.24	28.06	40.00	-11.94	108	131	VERTICAL	QP
5	218.40	41.80	-19.26	22.54	40.00	-17.46	110	157	VERTICAL	QP
6	287.40	46.20	-15.55	30.65	47.00	-16.35	200	96	VERTICAL	QP

Remark : All readings are Quasi-Peak values.



4 Radiated Emission Test – 1 ~ 6 GHz

4.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

4.2 Test Configuration and Procedure

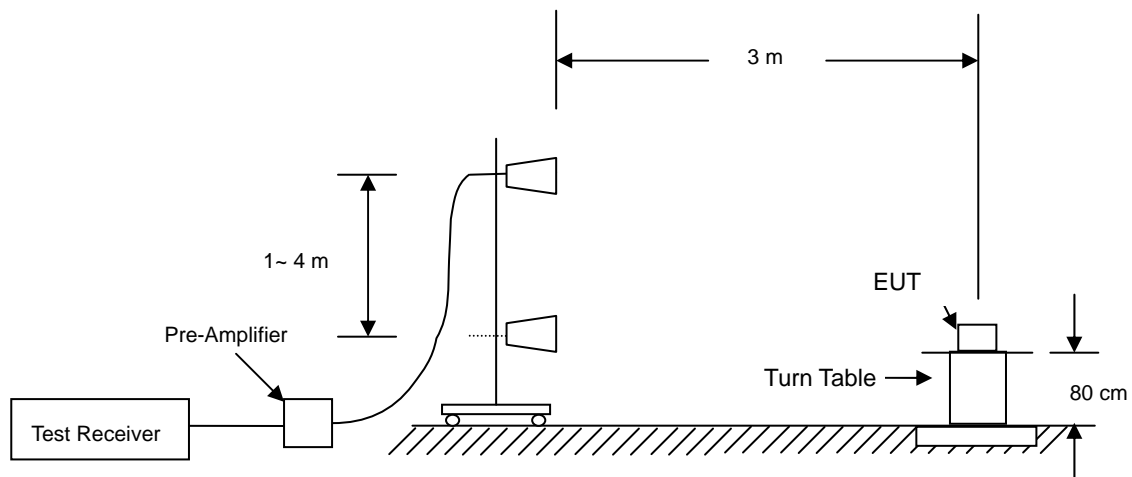


Table-top Equipment

- The EUT was placed on a non-conductive turntable which was 80cm above the horizontal ground plane. The EUT was set 3m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1m and 4m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 4.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.



4.3 Test Limit

☐ CISPR22 Class A ITE at a measurement distance of 3m

Frequency GHz	Average limit dB(μ V/m)	Peak limit dB(μ V/m)
1 to 3	56	76
3 to 6	60	80
NOTE The lower limit applies at the transition frequency.		

☐ CISPR22 Class B ITE at a measurement distance of 3m

Frequency GHz	Average limit dB(μ V/m)	Peak limit dB(μ V/m)
1 to 3	50	70
3 to 6	54	74
NOTE The lower limit applies at the transition frequency.		

4.4 Test Result

Not applicable

※The highest frequency of the internal sources of the EUT is less than 108MHz. Hence, above 1GHz Radiated Measurement shall not be made.



5 Photographs of Test

5.1 Conducted Emission Test



Front View



Rear View



5.2 Radiated Emission Test – Below 1 GHz



Front View



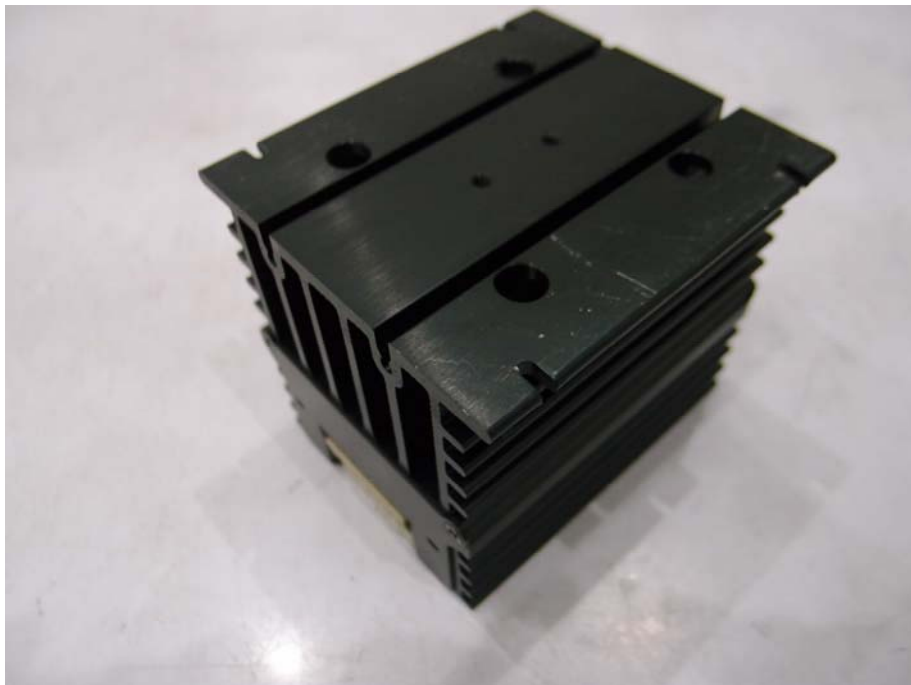
Rear View



6 Photographs of EUT



Front View of EUT



Rear View of EUT



7 Appendix 1

7.1 Product Series

TEQ75-2412WIR, TEQ75-2415WIR, TEQ75-2416WIR, TEQ75-2418WIR,
TEQ75-4812WIR, TEQ75-4815WIR, TEQ75-4816WIR, TEQ75-4818WIR,
TEQ75-7212WIR, TEQ75-7215WIR, TEQ75-7216WIR, TEQ75-7218WIR,
TEQ100-2412WIR, TEQ100-2415WIR, TEQ100-2416WIR, TEQ100-2418WIR,
TEQ100-4812WIR, TEQ100-4815WIR, TEQ100-4816WIR, TEQ100-4818WIR,
TEQ100-7212WIR, TEQ100-7215WIR, TEQ100-7216WIR, TEQ100-7218WIR,
TEQ160-4812WIR, TEQ160-4815WIR, TEQ160-4816WIR, TEQ160-4818WIR,
TEQ160-7212WIR, TEQ160-7215WIR, TEQ160-7216WIR, TEQ160-7218WIR,
TEQ200-4812WIR, TEQ200-4815WIR, TEQ200-4816WIR, TEQ200-4818WIR,
TEQ200-7212WIR, TEQ200-7215WIR, TEQ200-7216WIR