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Application Note Number107....

Product : MP4 series
Application Overview: Compatibility with the EMC directive

Originator: G. Fry

Location: Merry Hill

Date: 12/8/99

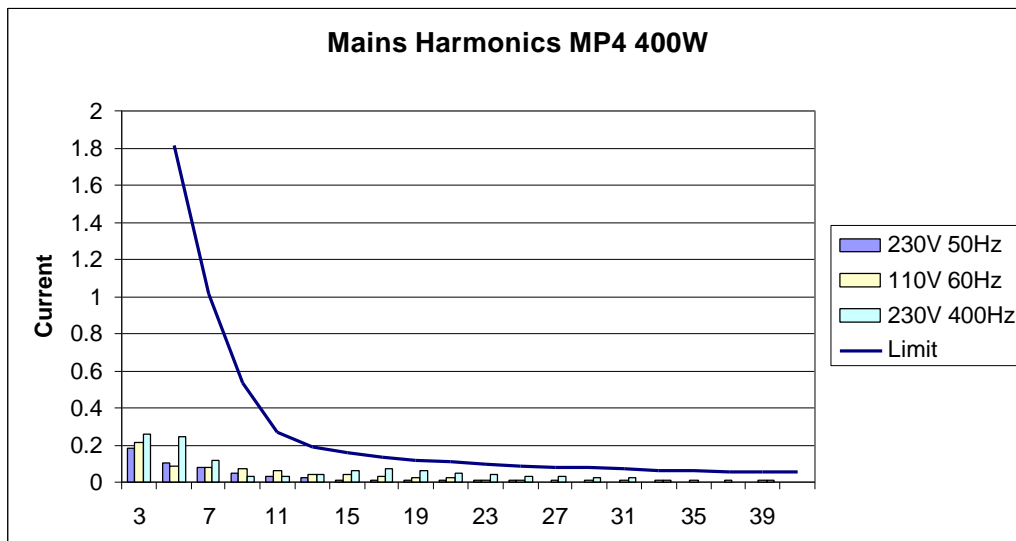
Description

The MP4 series of power supplies has been designed to excel at EMC. It has been designed to pass the following standards in the EMC directive contained in EN50081-1 and EN50082-1. The following standards are covered.

- 1) EN61000-3-2 - Mains Harmonics Requirements
- 2) EN61000-4-2 – Electrostatic Discharge
- 3) EN61000-4-3 – Radiated Electromagnetic Field Immunity
- 4) EN61000-4-4 – Electrical Fast Transient/ Burst Immunity
- 5) EN61000-4-5 – Surge Immunity Test
- 6) EN55022 – Radio Frequency Interference – conducted and radiated

- 1) EN61000-3-2 - Mains Harmonics Requirements

The MP4 has an active power factor correction circuit. This ensures a power factor of 0.9 for most of the specified input voltage and frequency range. This ensures that all mains harmonics are below the limit line specified in EN61000-3-2



- 2) EN61000-4-2 – Electrostatic Discharge

The power supply has been tested to Level 3 of the standard and passes the following discharge voltages.

- 8KV air discharge
- 6kV contact discharge

- 3) EN61000-4-3 – Radiated Electromagnetic Field Immunity

The power supply has been designed to pass the radiated susceptibility test to Level 3
- 3V/m, 27-500MHz, plane wave, unmodulated.

Description (continued)

4) EN61000-4-4 – Electrical Fast Transient/ Burst Immunity

The power supply has been tested to Level 3 and passes the 2kV fast transient burst test.
(Tester does not produce result log)

5) EN61000-4-5 – Surge Immunity Test

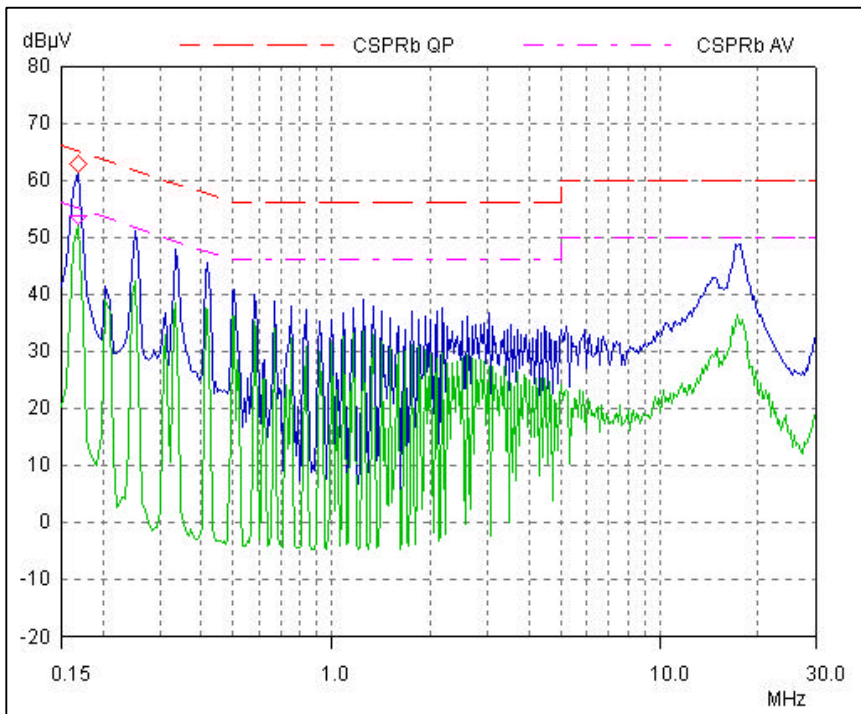
The power supply has been tested to Level 3 and passes the following

- differential mode 1KV
- common mode 2KV

see appendix 1 for tester log file for common mode test

6) EN55022 – Radio Frequency Interference – conducted and radiated

The power supply has been designed to meet EN55022 Level B for both conducted and radiated emissions
This scan is typical for an MP4 chassis



Test at 230Vac full load

Limit line :
CISPR PUB.22 CLASS B.

Remark:
Red Line : Quasi Peak limit line
Pink Line : Average limit line
Blue Line : Quasi Peak result
Green Line : Average result

Radiated emissions have been tested and shown to pass with resistive loads in an open field site.

Appendix 1 – EN61000-4-5 Test result print out

KeyTek Instrument Co. ECAT Log File
 Software:E500 SurgeWare V4.15 (c) 1996
 Firmware:: 5.11.n
 Modules:
 Row 1 Right:E504A SN:6484
 Row 2 Right:E503 SN:1657
 Row 2 Left :E501A SN:1652
 Row 4 Right:E4553 SN:-30377
 Test Started at 10:23.42 on NOV 12,1997
 Test File:C:\KEYTEK\ECAT\5LV3COM.SRG
 Operator :WS TSANG
 EUT:MP4 (4-LAYER MAIN PCB)
 Comments: 230Vac INPUT, COMMON MODE
 E500:Name:
 Waveform:Fixed E501A:1.2/50, 8/20 Comb 12 Ohm
 Coupling:Coupler:AC
 Coupling:List
 Coupling:Step: L1+,PE-
 Coupling:Step: N+,PE-
 Voltage:Fixed 2000 V
 Repeat:1
 Polarity:Alternate 1 each
 Measurements:At:E4553
 Measurements:V At:Auto
 Measurements:I At:Auto
 Phase:Linear 0 to 315 dg stepping 45 dg
 Phase:REF: L1
 E500:Wait time 1 Minute
 E500:EUT power:ON

E500:Order:Coupling.Phase.Polarity

Time	Action	Volts	Phase	Source	Waveform	At	Cpl	Hi	Low	Pk+V	Pk-V	Pk+	Pk-I
10:23.6	Surge	2000	0	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	1999	-323	18	-32	
10:24.6	Surge	-2000	0	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	367	-1970	8	-36	
10:25.6	Surge	2000	45	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	2266	-320	21	-27	
10:26.6	Surge	-2000	45	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	558	-1758	15	-35	
10:27.6	Surge	2000	90	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	2342	-322	26	-28	
10:28.6	Surge	-2000	90	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	572	-1714	17	-35	
10:29.6	Surge	2000	135	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	2135	-331	20	-28	
10:30.6	Surge	-2000	135	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	427	-1844	10	-36	
10:31.6	Surge	2000	180	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	2000	-348	17	-30	
10:32.6	Surge	-2000	180	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	317	-2131	9	-39	
10:33.6	Surge	2000	225	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	1795	-528	16	-34	
10:34.6	Surge	-2000	225	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	318	-2291	10	-45	
10:35.6	Surge	2000	270	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	1737	-558	16	-30	
10:36.6	Surge	-2000	270	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	315	-2362	12	-42	
10:37.6	Surge	2000	315	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	1820	-431	16	-36	
10:38.6	Surge	-2000	315	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	L1	PE	310	-2178	10	-35	
10:39.6	Surge	2000	0	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2044	-290	19	-33	
10:40.6	Surge	-2000	0	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	363	-2057	11	-39	
10:41.6	Surge	2000	45	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2064	-288	16	-35	
10:42.6	Surge	-2000	45	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	435	-2066	10	-43	
10:43.6	Surge	2000	90	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2067	-295	17	-37	
10:44.6	Surge	-2000	90	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	421	-2080	13	-42	
10:45.6	Surge	2000	135	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2051	-298	21	-35	
10:46.6	Surge	-2000	135	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	359	-2067	9	-40	
10:47.6	Surge	2000	180	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2028	-361	19	-31	
10:48.6	Surge	-2000	180	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	269	-2062	10	-34	
10:49.6	Surge	2000	225	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2072	-453	26	-29	
10:50.6	Surge	-2000	225	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	277	-2052	17	-35	
10:51.6	Surge	2000	270	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2062	-449	26	-26	
10:52.6	Surge	-2000	270	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	270	-2064	13	-35	
10:53.6	Surge	2000	315	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	2046	-350	22	-28	
10:54.6	Surge	-2000	315	E501A	1.2/50, 8/20 Comb 12 Ohm	E4553	N	PE	298	-2061	11	-37	

10:55.0 Test Complete
 10:55.0 Log Closed