Demo Board Test Report for LD7591

--- 24V/4A LED Power Supply

Tested by	Reviewed by	Approved by
John	Henry	Jerry

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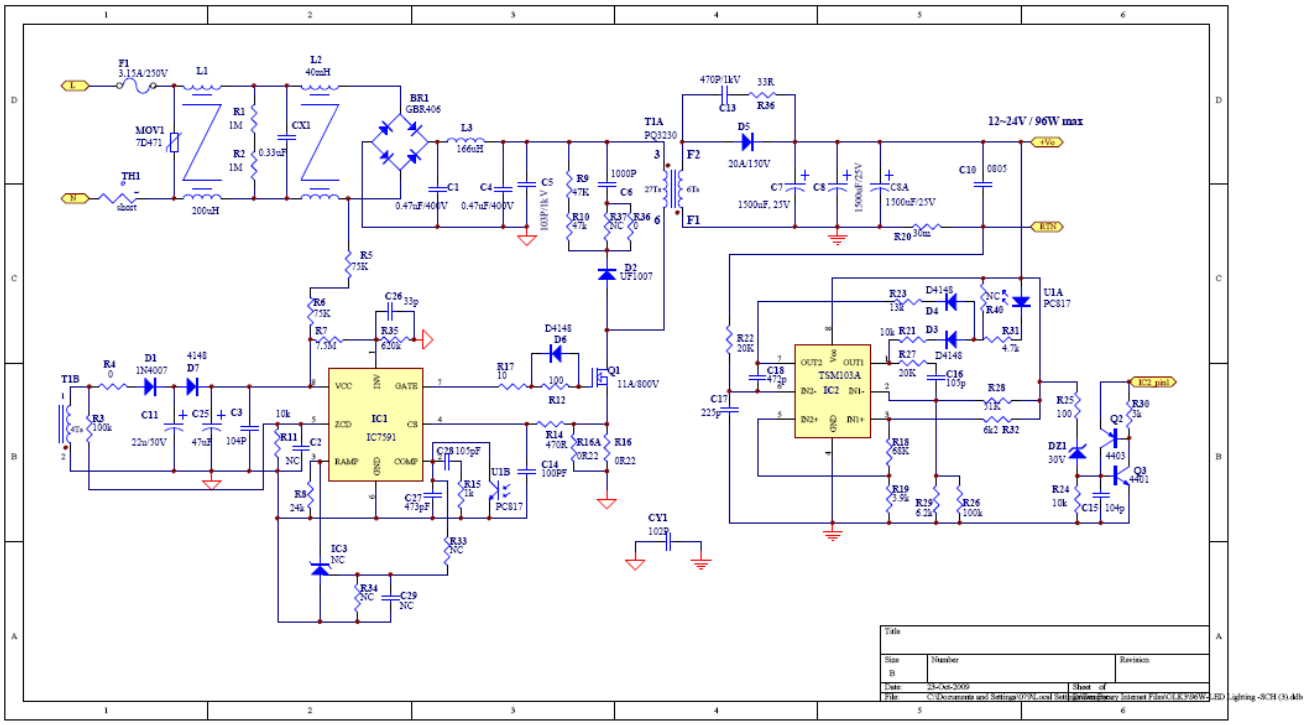
I. SCHEMATIC


F1
3.15A/250V
L1
L2
40mH
BR1
GBR406
L3
166uH
T1A
PQ3230
470P/1kV
33R
D5
20A/150V
12~24V / 96W max
+Vo
RTN
MOV1
7D471
TH1
short
200uH
CX1
0.33uF
R1
1M
R2
1M
C1
0.47uF/400V
C4
0.47uF/400V
C5
103P/1kV
R9
47K
R10
47k
1000P
C6
R37
NC
R36
0
F2
F1
1500uF, 25V
C7
C8
1500uF/25V
C8A
1500uF/25V
C10
0805
R20
30m
R5
75K
D2
UF1007
R6
75K
R7
7.5M
C26
33p
R35
620k
D4148
D6
R17
10
Q1
11A/800V
R12
100
T1B
R4
0
D1
1N4007
4148
D7
C11
22n/50V
C25
47uF
C3
104P
R3
100k
IC1
IC7591
VCC
INV
GATE
ZCD
CS
RAMP
COMP
GND
10k
R11
NC
C2
R8
24k
C28
105pF
C27
473pF
R15
1k
U1B
PC817
R14
470R
R16A
0R22
R16
0R22
C14
100PF
IC3
NC
R33
NC
R34
NC
C29
NC
CY1
102P
R23
13k
D4148
D4
NC
R40
U1A
PC817
10k
R21
D3
R31
4.7k
R22
20K
C18
472p
TSM103A
IC2
C17
225p
R27
20K
D4148
C16
105p
R28
51k
6k2
R32
R18
68K
R19
5k
R29
6.2k
R26
100k
R25
100
IC2_pin1
R30
2k
Q2
4403
Q3
4401
DZ1
30V
R24
10k
C15
104p
Title
Size
B
Number
Revision
Date
25-Oct-2009
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Ⅱ. BOM

P/N	Component Value	
Fuse	2A/250V	
NTC	0Ω,	
V1	Varisitor	471
R1	1MΩ, 1206	
R2	1MΩ, 1206	
R3	100kΩ, 0805	
R4	0Ω, 1206	
R5	75KΩ, 1206	
R6	75kΩ, 1206	
R7	7.5MΩ, 0805	
R8	24KΩ, 0805	
R9	47KΩ,	1W
R10	47KΩ,	1W
R11	10KΩ, 0805	
R12	100Ω,0805	
R14	470Ω, 0805	
R15	1KΩ, 0805	
R16	0.18Ω	2W
R16A	0.18Ω	2W
R17	10Ω, 0603	
R18	68kΩ, 1206	
R19	3.9kΩ, 1206	
R20	30m	
R21	10KΩ, 0805	
R22	20KΩ, 0805	
R23	13kΩ, 0805	
R24	10kΩ, 0805	
R25	100Ω, 0805	
R26	100kΩ, 0805	
R27	20kΩ, 0805	
R28	51kΩ, 0805	
R29	6.2kΩ, 0805	
R30	3kΩ,0805	
R31	4.7kΩ, 0805	
R32	6.2kΩ, 0805	
R33	NC	
R34	NC	
R35	620KΩ, 0805	
R40	0Ω, 0805	
C1	0.47μF / 400VAC	MPF 塑膠電容
CX1	0.47uF/250V	X-cap

P/N	Component Value	Note
CY1	222P/250V	Y-cap
C2	NC	
C3	104pF/25V/0805	Electrolytic Capacitor
C4	0.47μF / 400VAC	MPF 塑膠電容
C5	103pF/1KV/0805	
C6	102Pf/1KV, 1206	
C7	1500μF, 25V	Electrolytic Capacitor
C8	1500μF, 25V	Electrolytic Capacitor
C11	22uF/50V	Electrolytic Capacitor
C13	470pF/ 1kV/1206	
C14	100pF/0805,	
C15	104pF/0805	
C16	105pF/0805	
C17	225pF/0805	
C18	472pF/0805	
C25	47μF/25V	
C26	33pF/0805	
C27	473pF/0805	
C28	474pF/0805	
C29	105pF/0805	
D1	1N4007	
D2	PR1007	
D3	D4148	
D4	D4148	
D5	20A/150V	
D6	D4148	
D7	D4148	
Q1	11A/800V	
Q2	4403	
Q3	4401	
IC1	LD7591	
IC2	TSM103	
L1	20mH	
L2	2.2mH	
L3	1mH	
BR1	GBR406	

III. EXECUTIVE SUMMARY

Office	Taipei
Model Name	LD7591-DemoBoard
Version	01
IC	LD7591(D/C:)

TEST	Result	Comments
3. Load Regulation	**PASS**	
4. Efficiency , PF Test	**PASS**	
5. Stress Voltage Test	**PASS**	

1. Input Voltage & Frequency

The unit shall be capable of operating as a universal AC input power supply accepting AC inputs. The power supply shall operate between the following voltages (from 90V to 264V). The supply will be designed to operate for a Table 1.

	Minimum	Normal	Maximum
Input Voltage	90Vac	110Vac	264Vac
Frequency	47HZ	60HZ	63HZ

Table 1.

2. Output Loads

The line and load regulation for each of the outputs are shown in Table. 2.

Parameter	Output Voltage			Output Current	
	Minimum	Typical	Maximum	Minimum	Maximum
+42V		24V		1A	4A
Line Regulation	-5%	/	+5%	/	4A
Load Regulation	-5%	/	+5%	1A	4A

Table 2.

3. Load Regulation

Test Conditions:
Input: 90Vac/115Vac/230Vac/264Vac(60Hz)
Output: Electronic Load Setup:
CV mode (no load、13.5V、15V、18V、21V、24V)
CC mode(Io=1A、2A、3A、4A)

Ambient Temperature : 25℃
CV mode:

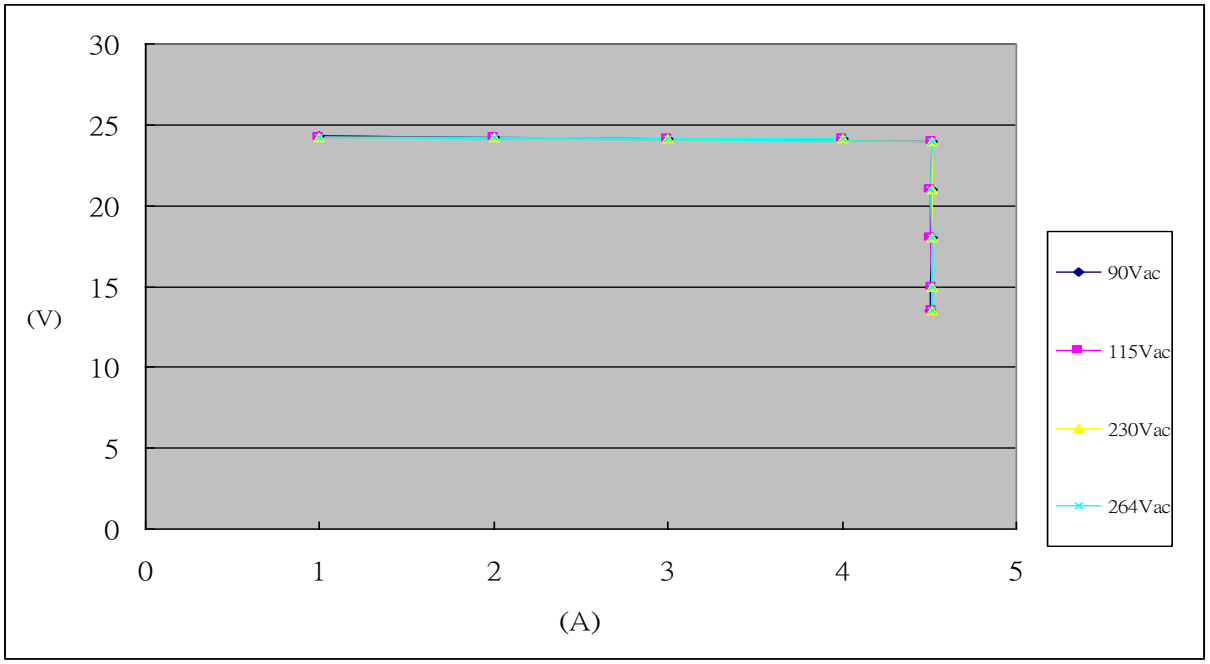
$Vin(V_{AC})$	90Vac				
$Vout(V_{DC})$	13.5	15	18	21	24
Iout(A)	4.51	4.51	4.52	4.52	4.52
$Vin(V_{AC})$	115Vac				
$Vout(V_{DC})$	13.5	15	18	21	24
Iout(A)	4.52	4.52	4.51	4.51	4.52
$Vin(V_{AC})$	230Vac				
$Vout(V_{DC})$	13.5	15	18	21	24
Iout(A)	4.52	4.52	4.52	4.52	4.52
$Vin(V_{AC})$	264Vac				
$Vout(V_{DC})$	13.5	15	18	21	24
Iout(A)	4.52	4.52	4.52	4.51	4.52

Table 3-1

CC mode:

$Vin(V_{AC})$	90Vac			
Iout(A)	1	2	3	4
$Vout(V_{DC})$	24.27	24.2	24.15	24.13
$Vin(V_{AC})$	115Vac			
Iout(A)	1	2	3	4
$Vout(V_{DC})$	24.24	24.19	24.14	24.11
$Vin(V_{AC})$	230Vac			
Iout(A)	1	2	3	4
$Vout(V_{DC})$	24.24	24.19	24.14	24.13
$Vin(V_{AC})$	264Vac			
Iout(A)	1	2	3	4
$Vout(V_{DC})$	24.24	24.196	24.176	24.12

Table 3-2



4.Efficiency and PF Test

The efficiency of power supply shall be measured throughout its specified operating input range and at output maximum load conditions. It should remain **85% minimum**. PF > 0.85 .

Test Condition:
Input: 90Vac/115Vac/230Vac/264Vac(60Hz)
Output: 24V/4A (Electronic Load Setup:CV mode)
Ambient Temperature: 25℃

	90V	115V	230V	264V
PF	**0.984**	**0.994**	**0.961**	**0.94**
Efficiency	85.77%	87.78%	89.154%	89.08%

Table 4 Efficiency, PF TEST.

5. Power Component Stress Voltage

Test Condition:
- Set the output loads at full load and ambient 25 ℃.
- The PSU test on everyone voltage and frequency.

Check:
- Under Steady state the derating shall be below **100%.**
- Under Transient state the derating shall be below **100%**.
- Input line bulk capacitors limits are **100%** (continuous).

Result:
Input Voltage: 264Vac (63Hz)
Output Power: 24V/4A

No.	Location	Max. Rating(V)	Steady State(264V / 63HZ)	
			Measurement	Derating(%)
			V	V
1	Q1	800	680	85.00%
2	D2	150	110	73.33%

No.	Location	Max. Rating(V)	Transient State(264V / 63HZ)	
			Measurement	Derating(%)
			V	V
1	Q1	800	760	95.00%
2	D2	150	133	88.67%

Table 5

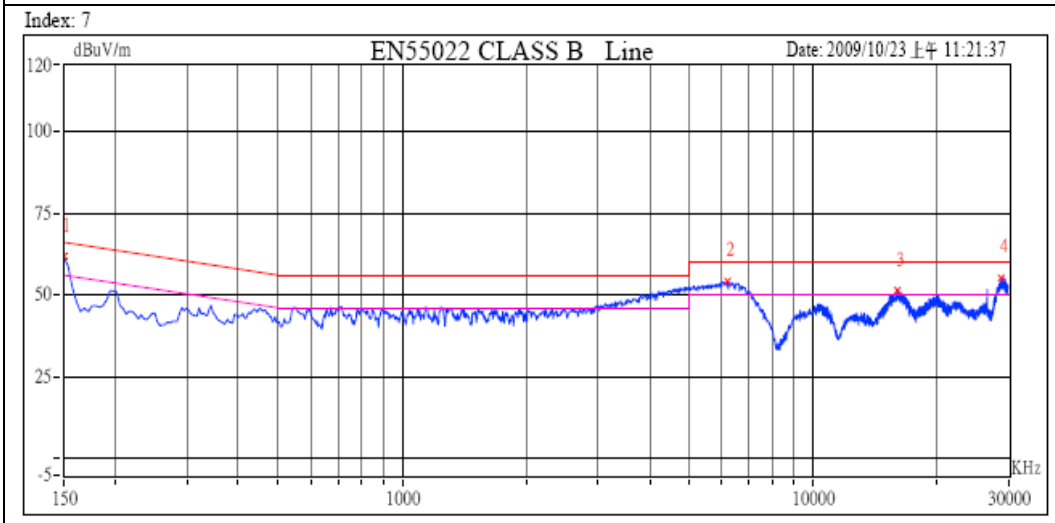
6. EMI

Test Condition:

The power supply should comply with FCC part15,EN 55022 and CISPR22 meeting Class B for conducted emissions with a 3dB margin. Tested unit should be connected to a pure resistor load (rated loding). The test condition shall be followed as:110 VAC(L and N),220VAC(L and N)

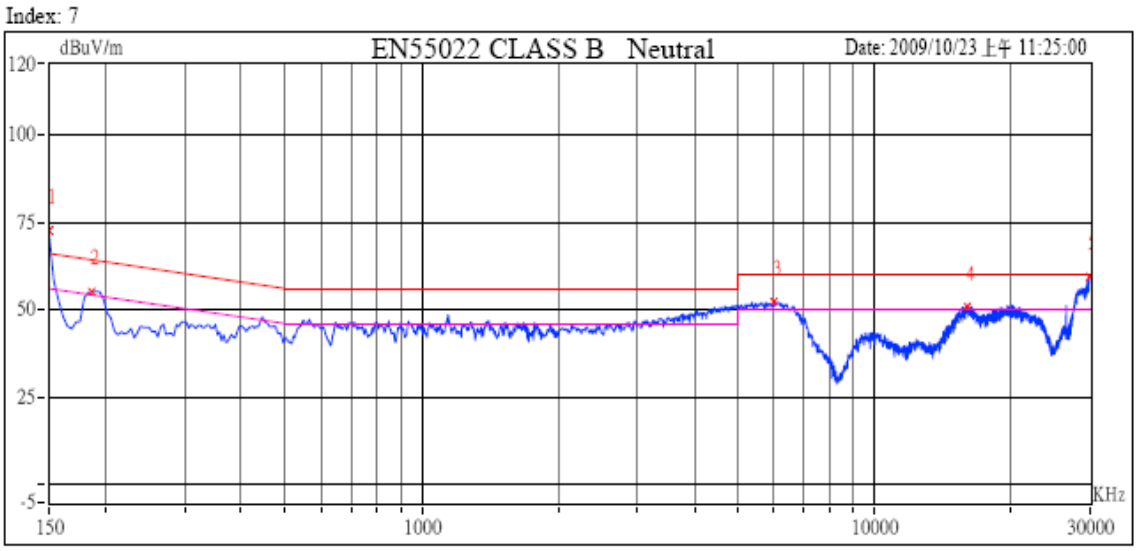
Test Result: PASS

Vin=110Vac、Line、Vo=24V、Io=4A (96W)



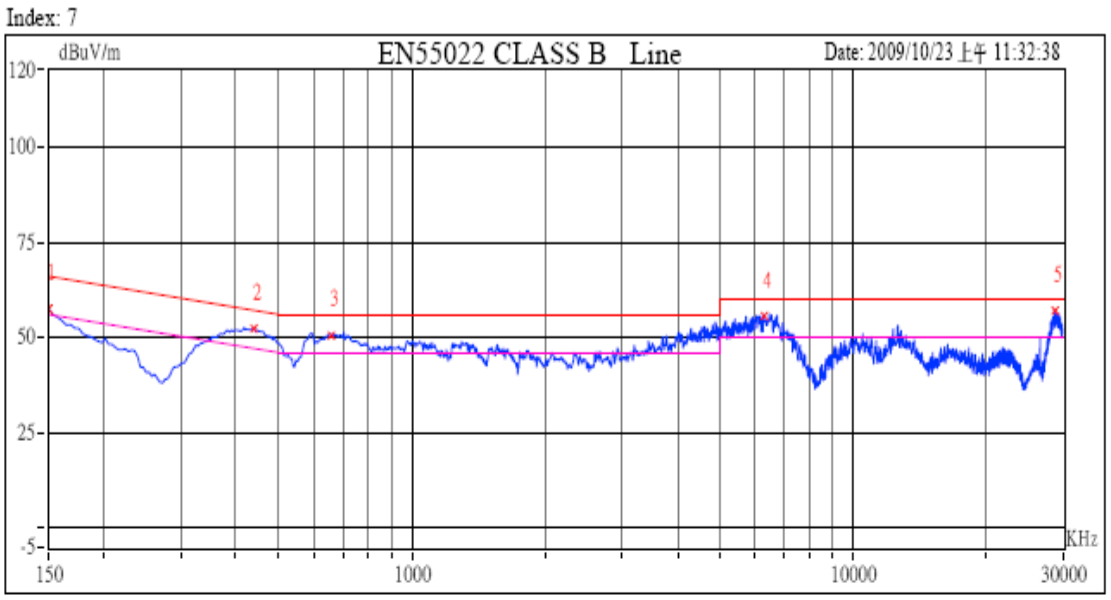
	Freq(KHz)	Peak Amptd(dBuV)	QP Amptd(dBuV)	Avg Amptd(dBuV)	QP Limit(dBuV)	Avg Limit(dBuV)	Margin(dB)	Factor(dB)
1	150.0000	61.59	20.48	17.83	66.00	56.00	-38.17	10.38
2	6208.4168	54.15	50.11	39.13	60.00	50.00	-9.89	10.82
3	16164.3287	51.37	42.95	35.07	60.00	50.00	-14.93	11.86
4	28909.8196	54.95	47.93	40.09	60.00	50.00	-9.91	13.27

Vin=110Vac、Neutral、Vo=24V、Io=4A (96W)



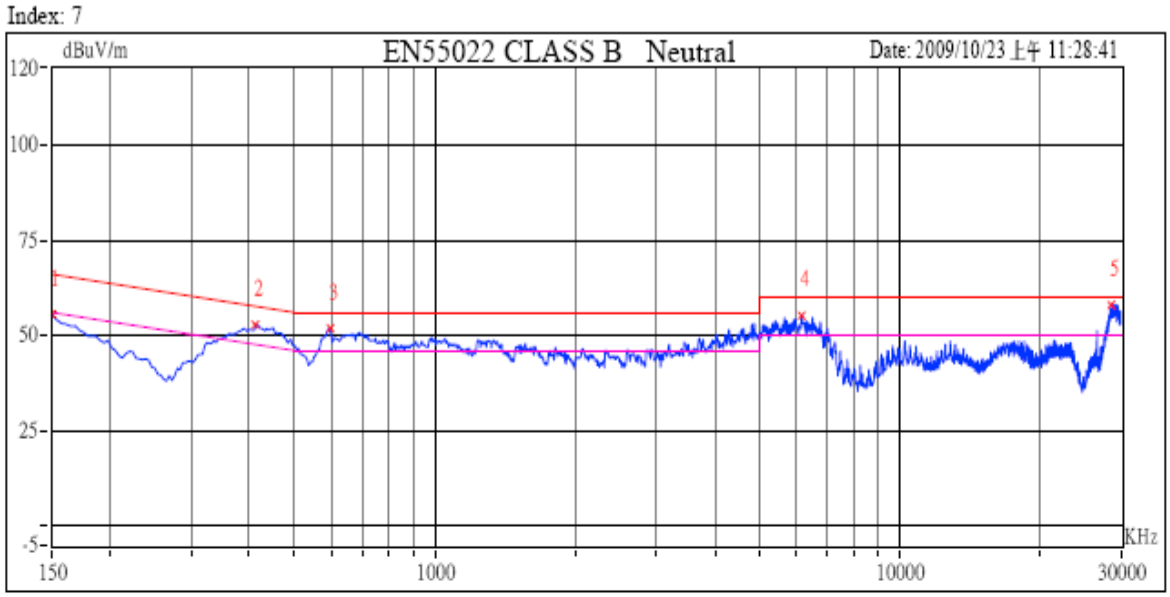
	Freq(KHz)	Peak Amptd(dBuV)	QP Amptd(dBuV)	Avg Amptd(dBuV)	QP Limit(dBuV)	Avg Limit(dBuV)	Margin(dB)	Factor(dB)
1	150.0000	72.41	42.99	38.78	66.00	56.00	-17.22	10.42
2	187.0741	55.15	47.38	36.50	64.94	54.94	-17.56	10.40
3	6032.0641	52.34	46.98	36.70	60.00	50.00	-13.02	10.84
4	16068.1363	51.04	43.67	34.84	60.00	50.00	-15.16	12.10
5	29983.9679	59.47	52.67	43.34	60.00	50.00	-6.66	14.00

Vin=220Vac、Line、Vo=24V、Io=4A (96W)



	Freq(KHz)	Peak Amptd(dBuV)	QP Amptd(dBuV)	Avg Amptd(dBuV)	QP Limit(dBuV)	Avg Limit(dBuV)	Margin(dB)	Factor(dB)
1	150.0000	57.47	27.27	24.03	66.00	56.00	-31.97	10.38
2	439.1784	52.33	47.71	33.53	57.74	47.74	-10.03	10.41
3	657.9158	50.67	48.42	36.22	56.00	46.00	-7.58	10.41
4	6288.5772	55.79	48.65	40.33	60.00	50.00	-9.67	10.83
5	28733.4669	57.13	48.42	41.72	60.00	50.00	-8.28	13.25

Vin=220Vac、Neutral、Vo=42V、Io=0.35A (14.7W)



	Freq(KHz)	Peak Amptd(dBuV)	QP Amptd(dBuV)	Avg Amptd(dBuV)	QP Limit(dBuV)	Avg Limit(dBuV)	Margin(dB)	Factor(dB)
1	150.0000	55.43	30.25	24.91	66.00	56.00	-31.09	10.42
2	413.2265	52.83	47.53	33.74	58.48	48.48	-10.95	10.40
3	594.8898	51.84	48.08	35.28	56.00	46.00	-7.92	10.40
4	6160.3206	55.38	45.44	39.16	60.00	50.00	-10.84	10.86
5	28685.3707	58.13	50.46	43.04	60.00	50.00	-6.96	13.82