



 ESTECH Co., Ltd. 3rd Fl., Chungdam Bldg., 119-1 Chungdam-dong, Kangnamgu, Seoul	   	Electromagnetic Interference Test Report
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Compliance Test Report for FCC

Report Number		ESTF150406-002			
Applicant	Company name	DG Lab Co., Ltd.			
	Address	Room 306, Han-Sol B/D # 145-1, GuMi-Dong, BunDang-Gu, SeongNam-City, KyeongGi-Do, Korea			
	Telephone	82-31-711-0534			
Product	Product name	MP PLAYER			
	Model No.	DG-150	Manufacturer	DG Lab Co., Ltd.	
	Serial No.	NONE	Country of origin	Korea	
Test date	2004-06-03 ~ 2004-06-07		Date of issue	2004-06-07	
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 2002 , ANSI C 63.4 2001				
Test item	<input checked="" type="checkbox"/> Conducted Emission	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B	Test result	OK
	<input checked="" type="checkbox"/> Radiated Emission	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B	Test result	OK
Measurement facility registration number		94696			
Tested by	Senior Engineer J.M. Yang		(Signature)		
Reviewed by	Director T.K. Lee		(Signature)		
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable				
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned					

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co. Ltd

Head Office : 3 rd Fl., Chungdam Bldg., 119-1 Chungdam-dong Kangnam-gu , Seoul, Korea
(Safety & Telecom. Test Lab)

EMC Test Lab : 58-1 Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea
97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

1.3 Official Qualification(s)

MIC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Product : MP PLAYER
 Model Number : DG-150
 Serial Number : NONE
 Manufacturer : DG Lab Co., Ltd.
 Country of origin : Korea
 Rating : 120V, 60Hz
 Receipt Date : 2004-05-31

2.2 General descriptions of EUT

Size	28.4 * 94.2 * 26.6mm (W X L X H)	
Weight	38g (without battery)	
Memory	(128MB/256MB/512MB) built in Memory	
Battery	AAA type battery * 1EA	
Main Clock	6Mhz	
Audio Output	Earphones	6.0 mW / 16Ω
	S/N Ratio	90 dB
	Output Frequency	20 Hz ~ 20 KHz
FM	Earphones	6.0 mW / 16Ω
	S/N Ratio	50 dB
	Output Frequency	88 MHz ~ 108 MHz
Voice-Recording	Approx. 17 hrs - (256MB ,ADPCM)	
LCD	Graphic 3 Line with Backlight	
Language	Multi-Languages (Korean, English, Chinese, Japanese)	
Download Speed	4 Mbps (Depending on PC)	
Max. Playing Time	Approx. 10 hrs (128 kbps, MP3, 20 Volume, Normal EQ)	
Operating Temperature	0 ~ 40 °C	
USB	Supporting USB 1.1 (Plug & Play)	
OS	Wind98/SE(with driver) , WindME/2000/XP , Mac 9.0 or above	

3. Test Standards

Test Standard : FCC PART 15 (2002)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2001)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

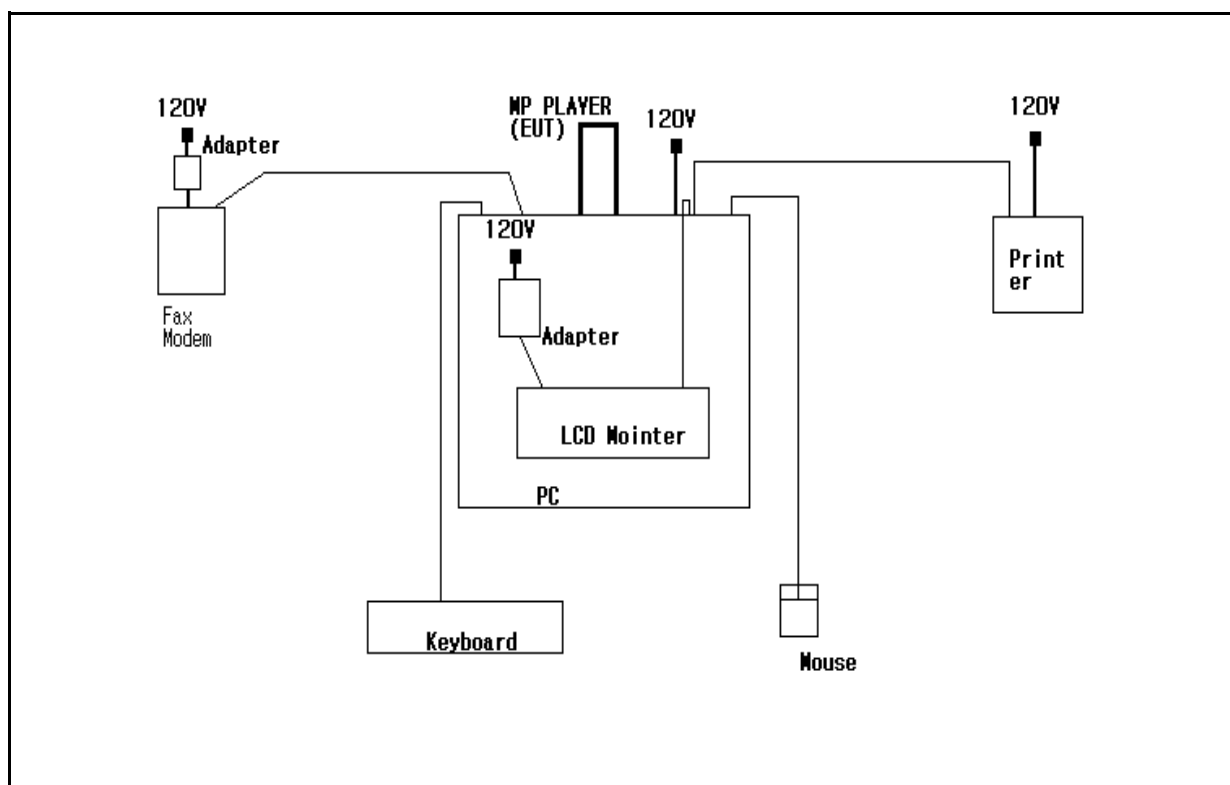
★ Testing EUT Under connecting PC

4. Measurement Condition

4.1 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * After setting as test arrangement diagram, we test EUT under audio out and "H" character display

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
MP PLAYER	DG-150	NONE	DG Lab Co., Ltd.	
Personal Computer	Optical GX 50	NONE	DELL	
Lcd Monitor	KD17NS	N433H4KX300852K	Samsung Electronics., Ltd.	
Adapter	APQ4914-UV	0401011616AC	Anam Instruments Co., Ltd.	
Fax Modem	Modem / 5630	335630-01	NONE	
Adapter	MSE -0930A	NONE	MyangSung	
Printer	LQ-570H+	B1021095782	Trigem Computer Inc.	
Keyboard	SEM-DT35	32006555	Samsung Electro-mechanics Co., Ltd.	
Mouse	M-S48a	HCA31409057	Logitech	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
MP PLAYER	USB	Personal Computer	USB	-	Shielded	
Personal Computer	Serial	Fax Modem	Serial	2	UnShield	
Personal Computer	PS/2 Keyboard	Keyboard	PS/2 Keyboard	2	UnShield	
Personal Computer	PS/2 Mouse	Mouse	PS/2 Mouse	2	UnShield	
Personal Computer	Parallel	Printer	Parallel	2	Shielded	
Personal Computer	Video	Lcd Monitor	Video	2	Shielded	
Lcd Monitor	Adapter	DC Power	Adapter	2	UnShield	
Fax Modem	Adapter	DC Power	Adapter	2	UnShield	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test set-up.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Receiver	ESVS10	Rohde & Schwarz	838562/002	2005.1.12
Spectrum Analyzer	R3261B	ADVANTEST	1720302	2005.2.12
LogBicon Antenna	VULB 9160	S/B	3142	2004.7.11
Turn Table	2087	EMCO	2129	–
Antenna Mast	2070-01	EMCO	9702-203	–
ANT Mast Controller	2090	EMCO	1535	–
Turn Table Controller	2090	EMCO	1535	–

5.2 Environmental Condition

Test Place : Open site(3m)
 Temperature (°C) : 28 °C
 Humidity (%) : 36 %

5.3 Test data

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB μ V/m)
50.00	13.60	V	1.0	12.57	1.03	40.00	27.20	(12.80)
75.00	17.20	V	1.0	9.87	1.28	40.00	28.35	(11.65)
79.19	14.20	H	2.8	8.95	1.31	40.00	24.46	(15.54)
143.99	19.20	H	2.4	13.58	1.86	43.50	34.64	(8.86)
170.81	13.10	H	2.2	13.26	2.05	43.50	28.41	(15.09)
196.01	11.90	H	1.8	10.67	2.18	43.50	24.75	(18.75)
203.44	16.40	H	1.7	10.45	2.20	43.50	29.05	(14.45)
236.59	16.90	H	1.6	11.55	2.38	46.00	30.83	(15.17)
267.67	16.70	H	1.3	12.39	2.49	46.00	31.58	(14.42)
309.77	12.90	H	1.2	13.41	2.72	46.00	29.04	(16.96)
356.89	10.70	H	1.0	14.34	2.97	46.00	28.02	(17.98)
381.25	14.30	H	1.0	14.91	3.06	46.00	32.26	(13.74)
400.62	11.20	H	1.0	15.33	3.15	46.00	29.68	(16.32)
499.41	6.70	V	1.0	17.05	3.55	46.00	27.30	(18.70)
540.01	6.10	H	1.0	17.68	3.65	46.00	27.43	(18.57)
960.00	8.00	H	1.0	23.43	5.07	46.00	36.50	(9.50)
Remark	H : Horizontal, V : Vertical							

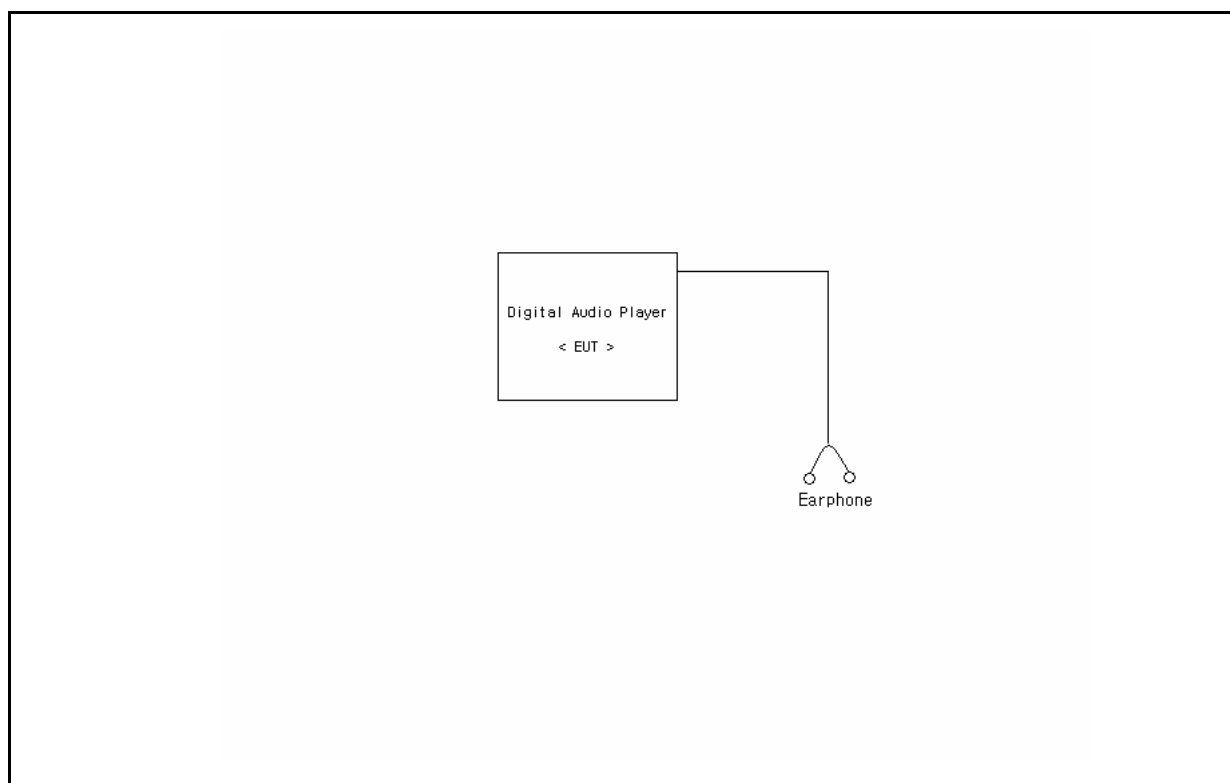
★ We test only EUT

6. Measurement Condition

6.1 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * Only, we test EUT under connecting earphone and audio out.

6.2 Configuration and Peripherals



6.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
MP PLAYER	DG-150	NONE	DG Lab Co., Ltd.	
Earphone	NONE	NONE	NONE	

6.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
MP PLAYER	Headphone	EarPhone	Headphone	1.5	UnShield	

7. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test set-up.

7.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Receiver	ESVS10	Rohde & Schwarz	838562/002	2005.1.12
Spectrum Analyzer	R3261B	ADVANTEST	1720302	2005.2.12
LogBicon Antenna	VULB 9160	S/B	3142	2004.7.11
Turn Table	2087	EMCO	2129	–
Antenna Mast	2070-01	EMCO	9702-203	–
ANT Mast Controller	2090	EMCO	1535	–
Turn Table Controller	2090	EMCO	1535	–

7.2 Environmental Condition

Test Place : Open site(3m)

Temperature (°C) : 28 °C

Humidity (%) : 37 %

7.3 Test data

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μV /m)	Result (dB μV /m)	Margin (dB μV /m)
Low								
90.57(PK)	12.80	H	1.80	9.35	1.47	48.00	23.62	(24.38)
90.57(AV)	9.50	H	1.80	9.35	1.47	48.00	20.32	(27.68)
Middle								
95.86(PK)	13.90	H	1.90	9.85	1.47	48.00	25.22	(22.78)
95.86(AV)	10.50	H	1.90	9.85	1.47	48.00	21.82	(26.18)
High								
106.94(PK)	10.90	H	1.8	10.82	1.6	48.0	23.32	-24.68
106.94(AV)	8.20	H	1.8	10.82	1.6	48.0	20.62	-27.38
79.30	6.20	H	2.8	8.92	1.31	40.00	16.44	(23.56)
128.86	4.80	H	2.3	12.56	1.70	43.50	19.06	(24.44)
169.93	4.10	H	1.8	13.33	2.05	43.50	19.48	(24.02)
192.58	8.40	H	1.7	10.91	2.18	43.50	21.49	(22.01)
195.29	7.40	H	1.6	10.72	2.18	43.50	20.30	(23.20)
198.26	10.40	H	1.6	10.51	2.18	43.50	23.09	(20.41)
215.25	8.40	H	1.5	10.67	2.28	43.50	21.35	(22.15)
220.90	5.10	H	1.4	10.80	2.30	43.50	18.21	(25.29)
294.53	7.40	H	1.2	13.09	2.65	46.00	23.13	(22.87)
314.42	7.80	H	1.1	13.52	2.74	46.00	24.06	(21.94)
373.93	4.80	H	1.0	14.73	3.03	46.00	22.57	(23.43)
385.39	9.10	H	1.0	15.00	3.08	46.00	27.18	(18.82)
Remark	H : Horizontal, V : Vertical *We measured the biggest value from 88 Mhz to 108 Mhz							

8. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) in a shielded. The EUT was placed on a non-conductive table at least 80 above the ground plane. A grounded vertical reference plane was positioned in a distance of 40cm from the EUT. The distance from the EUT to other metal surfaces was at least 0.8m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0m.. The test receiver with Quasi Peak detector complies with CISPR 16.

8.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	2005. 2. 12
LISN	NNLA8120A	Schwarzbeck	NONE	2005. 2. 12
TEST Receive	ESPC	Rohde & Schwarz	838248/001	2005.1.29
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2003.7.4

8.2 Environmental Condition

Test Place : Shield Room
 Temperature (°C) : 21°C
 Humidity (%) : 41%

8.3 Test data

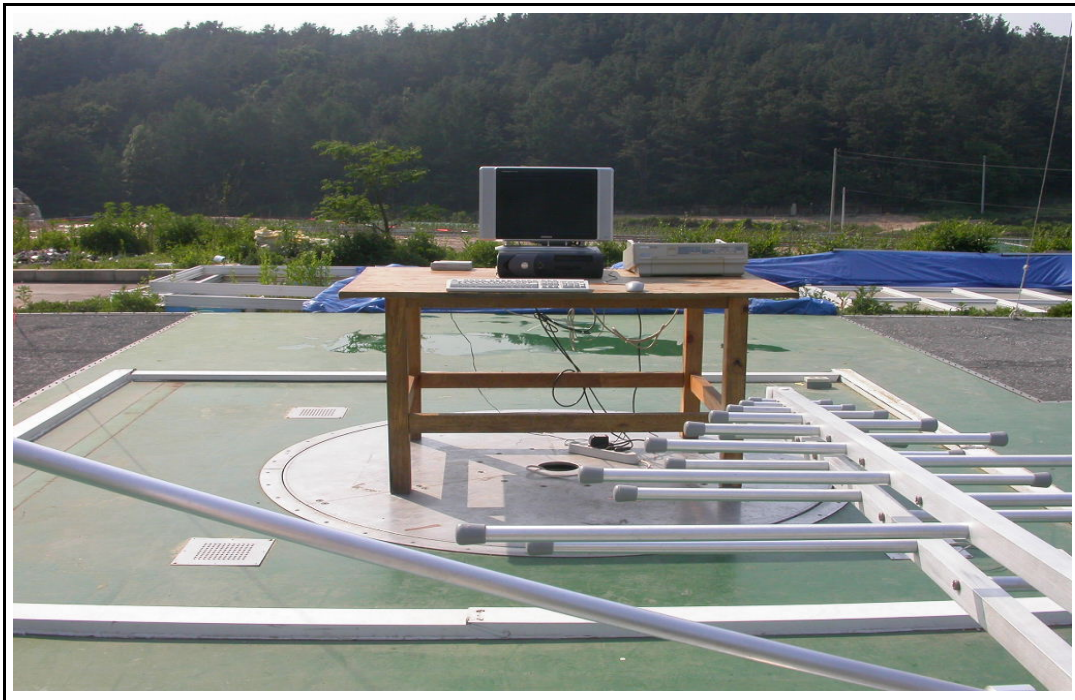
Frequency (MHz)	Correction Factor		Line (H/N)						
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)
0.176	0.07	0.0	H	64.68	50.37	50.46	54.68		
0.211	0.07	0.0	H	63.15	48.97	49.08	53.15		
0.260	0.07	0.1	N	61.43	52.43	52.57	51.43		
0.284	0.07	0.1	H	60.71	46.94	47.10	50.71		
0.288	0.07	0.1	N	60.57	50.83	50.99	50.57		
0.429	0.07	0.2	H	57.26	36.34	36.57	47.26		
0.516	0.07	0.2	N	56.00	43.52	43.79	46.00		
0.595	0.08	0.2	N	56.00	45.17	45.45	46.00		
0.887	0.09	0.2	N	56.00	41.96	42.25	46.00		
1.477	0.10	0.2	H	56.00	41.78	42.13	46.00		
1.846	0.11	0.3	H	56.00	43.63	44.02	46.00	42.72	43.11
2.579	0.13	0.3	N	56.00	41.57	42.00	46.00		
5.861	0.23	0.3	N	60.00	40.34	40.92	50.00		
6.657	0.27	0.4	H	60.00	38.62	39.27	50.00		
7.996	0.31	0.5	N	60.00	39.72	40.49	50.00		
8.125	0.31	0.5	H	60.00	36.72	37.50	50.00		
9.156	0.34	0.5	N	60.00	43.38	44.26	50.00		
20.476	0.71	0.8	H	60.00	36.70	38.22	50.00		
Remark	H : Hot Line, N : Neutral Line								

★ Testing EUT Under connecting PC

9. Photographs of test setup

9.1 Setup for Radiated Test : 30 ~ 1000 MHz

[Front]



[Rear]



★ Testing only EUT

9.2 Setup for Radiated Test : 30 ~ 1000 MHz

[Front]



[Rear]



9.3 Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]



[Rear]



10. Photographs of EUT

[Front]

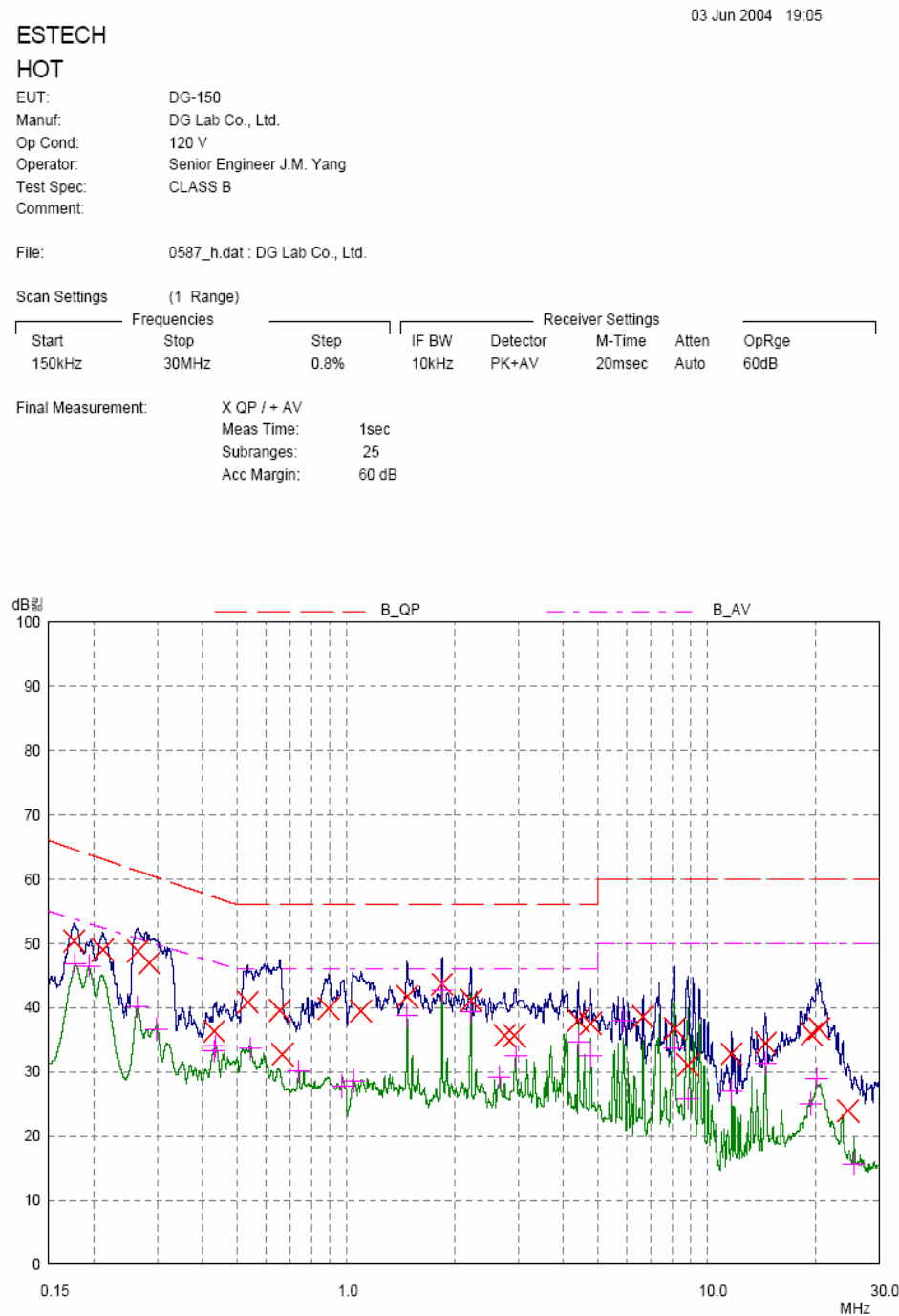


[Rear]



Appendix 1. Spectral diagram

*HOT



*NETRUL

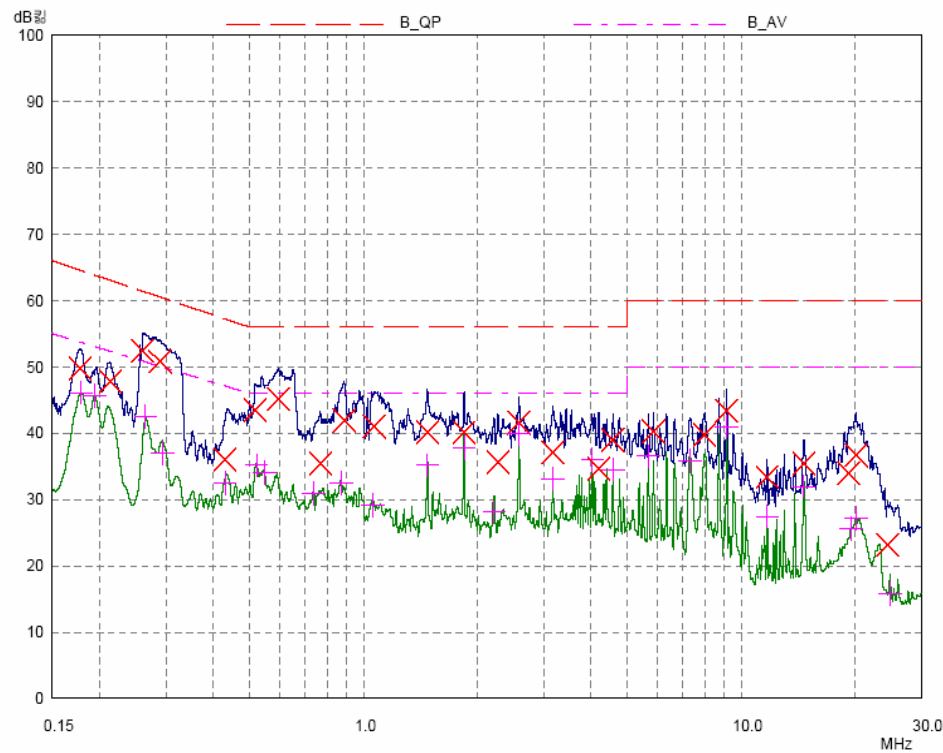
03 Jun 2004 19:12

ESTECH
NEUTRAL

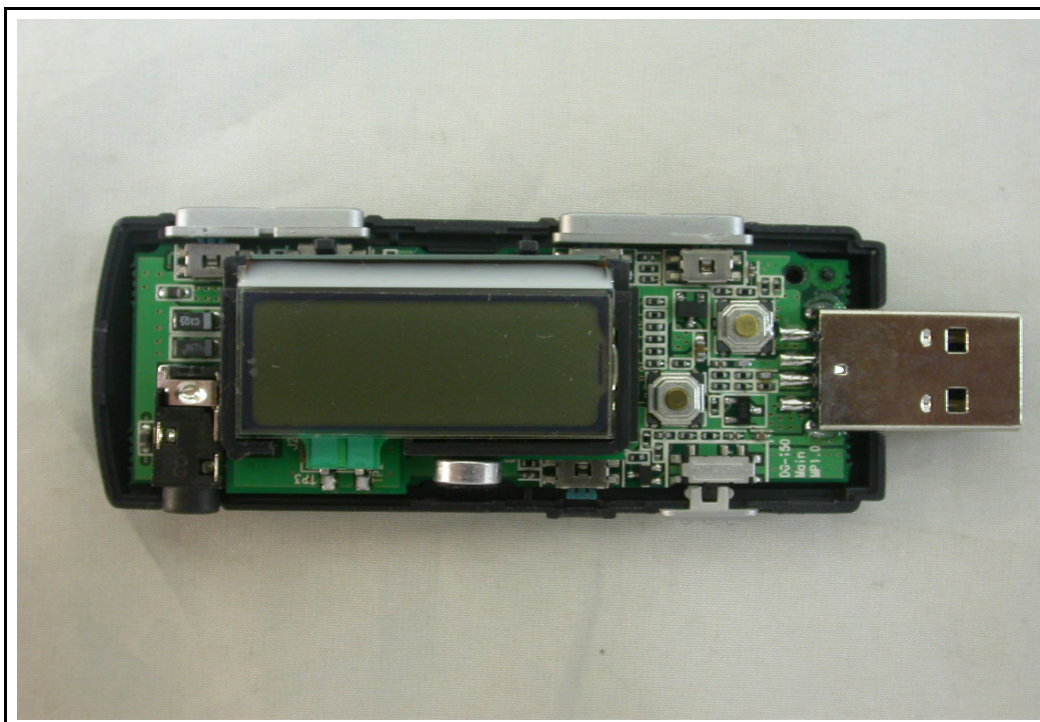
EUT: DG-150
Manuf: DG Lab Co., Ltd.
Op Cond: 120 V
Operator: Senior Engineer J.M. Yang
Test Spec: CLASS B
Comment:

File: 0587_n.dat : DG Lab Co., Ltd.

Scan Settings			(1 Range)									
Frequencies			Receiver Settings									
Start	Stop	Step	IF BW	Detector	M-Time	Atten	OpRge					
150kHz	30MHz	0.8%	10kHz	PK+AV	20msec	Auto	60dB					
Final Measurement:		X QP / + AV										
		Meas Time:	1sec									
		Subranges:	25									
		Acc Margin:	60 dB									

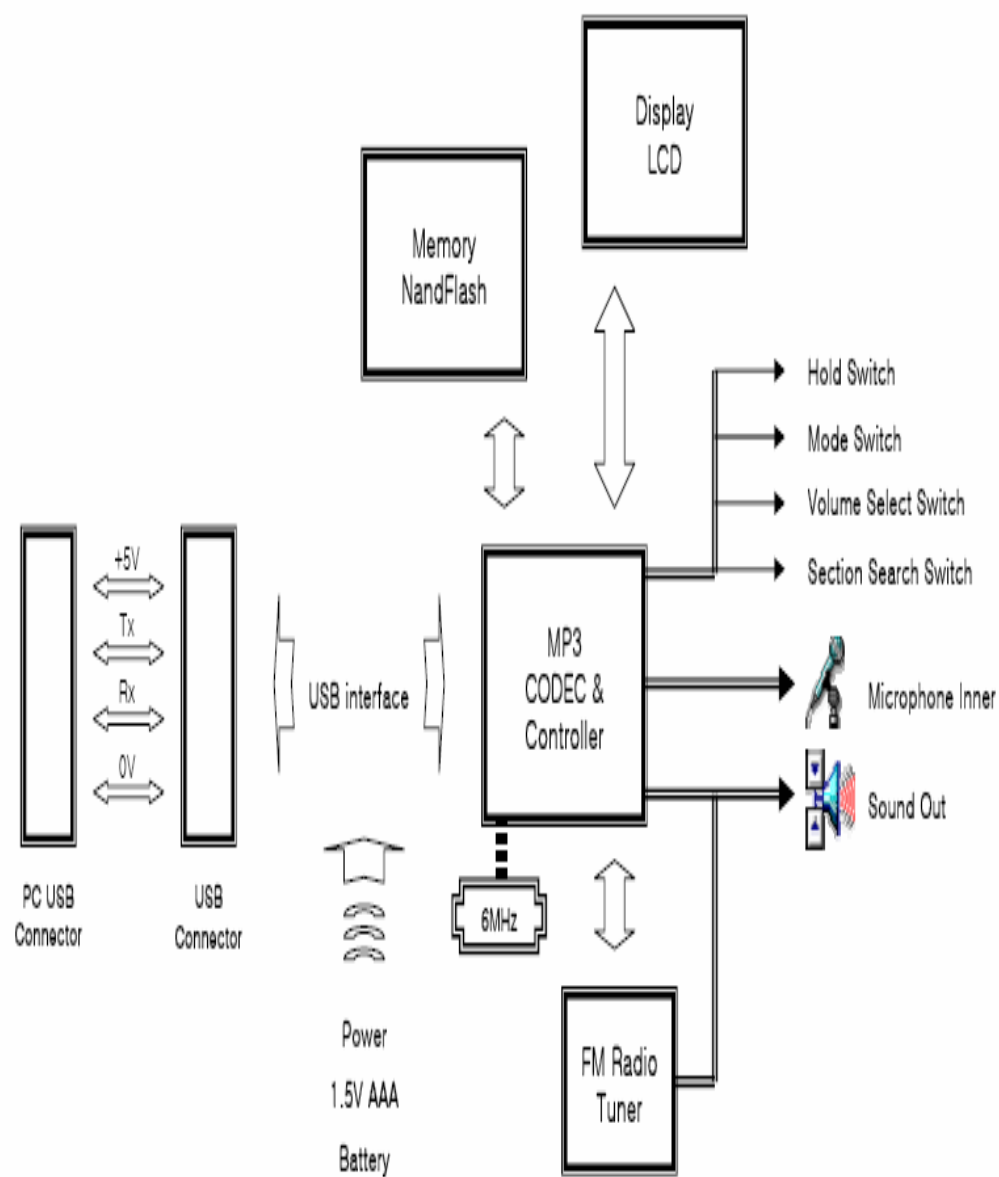


Appendix 2. Photographs of EUT in side PCB



Appendix 3. Block diagram of EUT

MP3 Player (DG-150) Block Diagram



Appendix 4. Circuit Diagram