Electromagnetic Compatibility Test Report

Test Report No. :	TE-09-0901-EF0021
Applicant :	Diasonic Technology Co., Ltd. #321-43, Suksu-dong, Manan-ku, Anyang-city, Kyungki-do, Korea.
Manufacturer :	Diasonic Technology Co., Ltd. #321-43, Suksu-dong, Manan-ku, Anyang-city, Kyungki-do, Korea.
Product name :	Digital Voice Recorder
Model name. :	DDR-7000R(Basic), DDR-7000
Serial number :	Prototype
Standard :	ANSI C 63.4:2003 FCC Part 15 subpart B
FCC Classification :	Class B Personal Computer and Peripherals
FCC Procedure :	Certification
FCC ID :	P7KDDR7000R
Test Lab :	SGS TESCO KOREA CO., LTD(FCC Registration No. : 656853)
Date issue :	November 10, 2009
Date of Receipt :	October 28, 2009
Test Period :	October 28 ~ November 3, 2009

This report applies only to the product named in the title of this report manufactured at the location indicated. Test results apply only to the particular equipment and functionality described in this test report.

Tested by : Won-haeng Jo /EMC Engineer

Approved by: Dong-kyun Kim /Chief Engineer

SGS Tesco Korea Co., Ltd.

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1. General Description of EUT

1.1 Applicant

Company Name	:	Diasonic Technology Co., Ltd.
Address	:	#321-43, Suksu-dong, Manan-ku, Anyang-city, Kyungki-do, Korea.
Contact Person	:	Byung-Hoon Lee
E-mail	:	rnd7@diasonic.com
Phone/Fax	:	Phone : +82-31-474-0852 Fax : +82-31-474-0861

1.2 Manufacturer

Company Name	:	Diasonic Technology Co., Ltd.
Address	:	#321-43, Suksu-dong, Manan-ku, Anyang-city, Kyungki-do, Korea.

1.3 Basic Description of EUT

Product Name	:	Digital Voice Recorder
Model Name	:	DDR-7000R(Basic)
Brand Name	:	VOICE BANK
Add Model Name	:	DDR-7000
Serial Number	:	Prototype
Used Adapter	:	Manufacture :Ktec M/N : KSAA500120W1UV-1 AC INPUT :100 ~ 240 V, 50/60Hz, 180 mA DC OUTPUT : 5.0 V, 1200 mA
Internal Clock Freq		32.768 Hz, 12 MHz

2. General Information of Test

2.1 Test Facility

This test was carried out by SGS Tesco Korea.
Test Site Location : 413-15, Gomae-dong, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
TEL : 82-31-8005-6020, FAX : 82-31-8005-6025

2.2 Standard for Methods of Measurement

Basic Standard	Description	Test Result
FCC Part 15 Subpart B	15.107(a) Conducted Emission	☒ Pass ☐ Fail
	15.109(g) Radiated Emission	☒ Pass ☐ Fail

The sample was tested according to the following specification: ANSI C 63.4:2003

2.3 Description of EUT modification

The device tested is not modified anything, mechanical or circuits to improve EMI status during a test. No EMI suppression device(s) was added and/or modified during testing.

2.4 Variations covered by this report

Model Difference: DDR-7000R(Basic), DDR-7000

The model DDR-4500 is basic model that was tested. The other models are identical to basic model except DDR-7000 has no radio reception capability.

2.5 Additional information related to Testing

Test results apply only to the particular tested sample and functionality is described in this test report. This report may be reproduced in full. Partial reproduction may only be made with the written permission of the SGS Tesco Korea.

2.6 Test Conditions

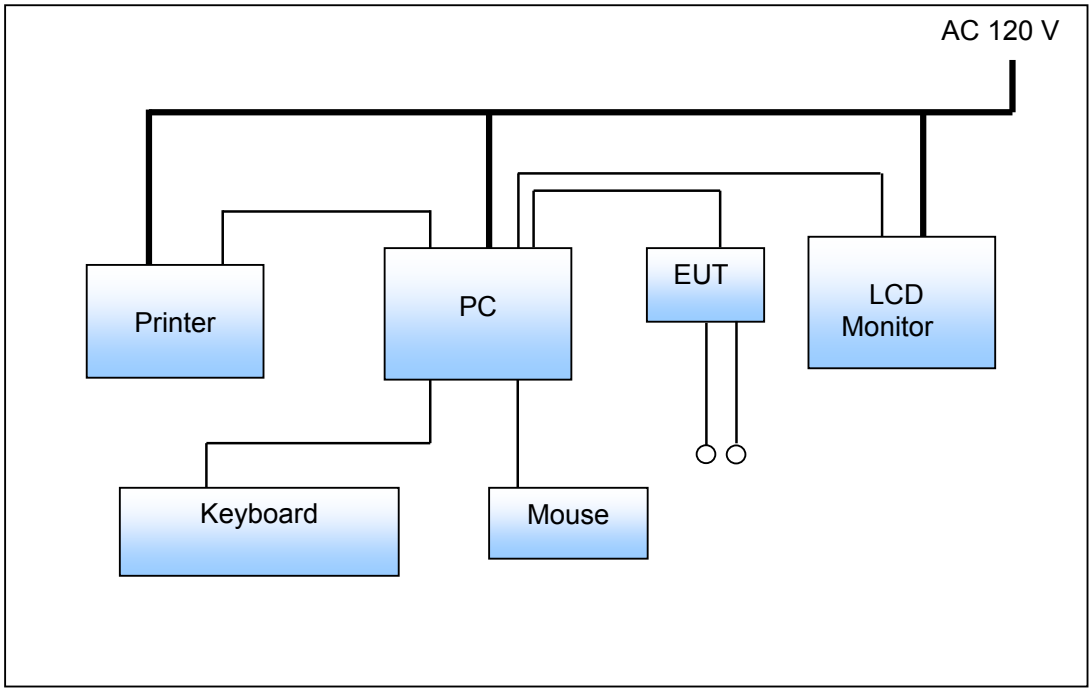
EUT Operating Mode

EUT was tested according to the following operation modes provided by the specifications given by the manufacturer and reported the worst emissions.'

Operation Modes	Worst Case Mode
PC Communication mode	☒

Test System layout on EUT and peripherals

Power cable ——— Signal cable



2.7 Description of Test System

Type of Peripheral Equipment Used:

Description	Model Name	Serial No.	Manufacturer
PC	DM-V70	CA129WAQ600518B	SAMSUNG ELECTRONICS
LCD Monitor	GH17PS	N810HVKQ306785T	SAMSUNG ELECTRONICS
Printer	CB634A	TH85431201	HP
Mouse	SML-210PB	M2PBTAKLB35030B	MONTEREY INTERNATIONAL
Keyboard	K6712MB	82L1326	MONTEREY INTERNATIONAL

Type of Cables Used:

Device from	Device to	Type of Cable	Length (m)	Type of shield
PC	AC POWER	POWER	1.8	Unshield
LCD Monitor	AC POWER	POWER	1.8	Unshield
Printer	AC POWER	POWER	1.8	Unshield
EUT	PC	USB	1.0	Shield
EUT	Microphone	Audio	1.0	Unshield
EUT	Earphone	Audio	1.0	Unshield
PC	Printer	USB	1.5	Shield
PC	LCD Monitor	DSUB	1.6	Shield

3.1 Conducted Emission Test

Disturbance voltages at the mains terminal were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz on the 120 V AC power input terminal. The EUT was placed on the un-metallic stand in a shielded room 0.8 meters above the ground plane as shown in photograph of test setup. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

3.1.1 Test Condition

Frequency Range of Test	:	150 kHz to 30 MHz
Test Standard	:	FCC Part 15 Subpart B (Section : 15.107a)
Test Date	:	November 3, 2009
Temperature/Humidity	:	(22 ± 1) °C / (38 ± 2) % R.H.
Input Voltage	:	AC 120 V / 60 Hz

3.1.2 Test Standard.

Frequency Range (MHz)	Limit at Mains Terminal dB(uV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66.0	56.0
0.5 ~ 5	56.0	46.0
5 ~ 30	60.0	50.0

3.1.3 Test Equipment List.

Equipment Type	Model	Manufacture	Serial No	Cal Due Date	Use
LISN	ENV216	R&S	100415	2010.06.22	☒
LISN	ESH2-Z5	R&S	1000195	2010.07.08	☒
EMI TEST RECEIVER	ESU8	R&S	100128	2010.01.19	☒
PULSE LIMITER	ESH3-Z2	R&S	100850	2010.09.10	☒

3.1.4 Test Result of Conducted Emission

Test Mode : PC Communication mode

Test Results : **PASS**

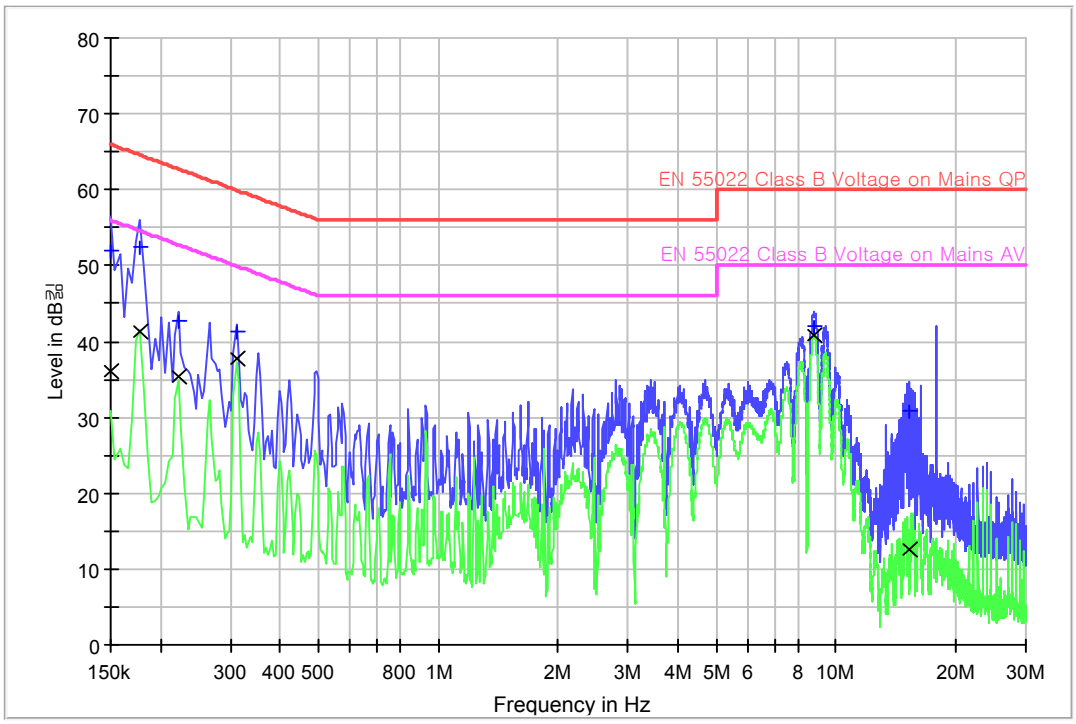
Test data sheets follow.

Frequency	C.F.	Phase	Quasi-Peak Mode			Average Mode		
			Limit	Result	Margin	Limit	Result	Margin
[MHz]	[dB]	[N/L1]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]
0.150	19.4	N	66.0	52.0	14.0	56.0	-	-
0.158	19.4	L1	65.6	50.6	15.0	55.6	-	-
0.178	19.4	L1	64.6	52.7	11.9	54.6	-	-
0.178	19.4	N	64.6	52.4	12.2	54.6	-	-
0.222	19.4	N	62.7	42.7	20.0	52.7	-	-
0.266	19.4	L1	61.2	41.5	19.7	51.2	-	-
0.310	19.4	N	59.9	41.4	18.5	49.9	-	-
0.314	19.4	L1	59.8	36.2	23.6	49.8	-	-
0.494	19.4	L1	56.1	34.4	21.7	46.1	-	-
1.114	19.5	L1	56.0	20.0	36.0	46.0	-	-
8.830	19.6	N	60.0	42.1	17.9	50.0	-	-
9.226	19.6	L1	60.0	34.8	25.2	50.0	-	-
15.190	19.8	N	60.0	31.0	29.0	50.0	-	-
15.226	19.7	L1	60.0	21.2	38.8	50.0	-	-

* AV value have not been measured since QP value meets with the AV limit

Notes :
1. C.F = LISN Factor + Cable Loss + Pulse Limiter Loss / Result = Reading Level + C.F
2. All modes of operation were investigated and the worst-case emissions are reported.
3. Measurement uncertainty estimated at ± 3.76 dB.
   The measurement uncertainty is given with a confidence of 95.45 % with the coverage factor, k=2.
4. See next page for measurement graph.

Tested by Won-haeng Jo



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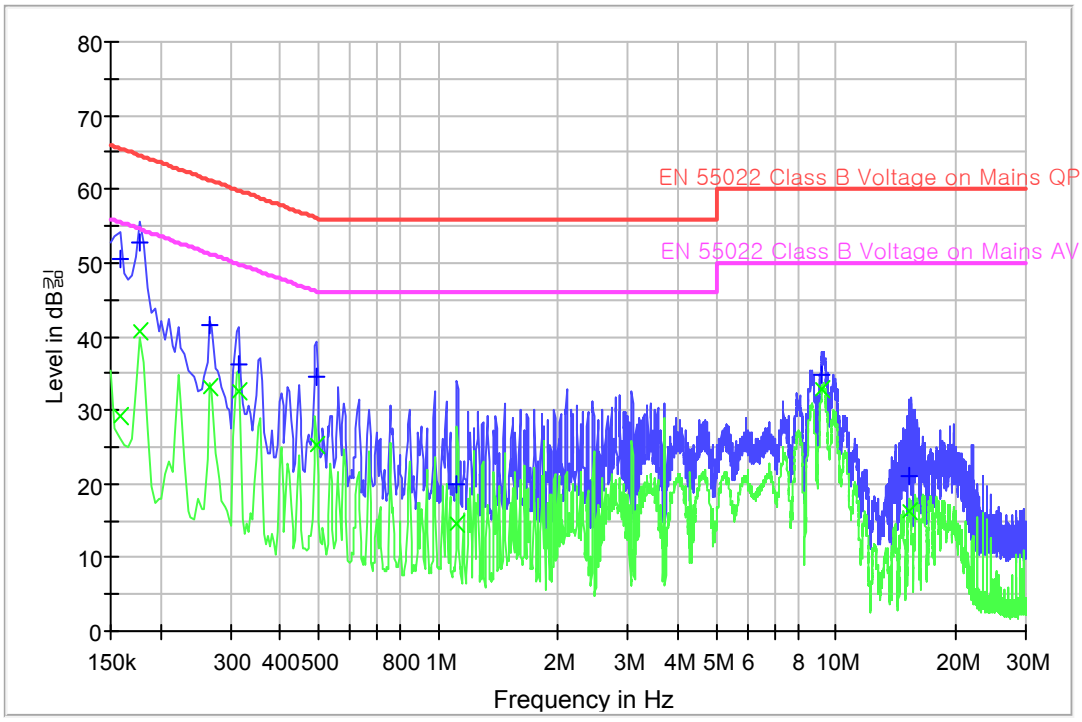

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3.2 Radiated Emission Test

Radiated emission from 30 MHz to above 1 000 MHz were measured with a bandwidth of 120 kHz for both vertical and horizontal polarization of the measuring antenna according to the methods defines in ANSI C 63.4:2003.The EUT was placed on a non-metallic table in the open area test site, 0.8 meter above the ground plane, and the measurement distance from the measuring antenna to the center of the EUT was set to 10m distance as shown in Test setup photograph. The measuring antenna was adjusted in height of 1m to 4m range for the maximum emission. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

3.2.1 Test Condition

Frequency Range of Test	:	30 MHz ~ above1 000 MHz
Test Standard	:	FCC Part 15 Subpart B (Section : 15.109g)
Test Date	:	October 29, 2009
Temperature/Humidity	:	(19 ± 1) °C / (31 ± 2) % R.H.

3.2.2 Test Standard(according to CISPR 22)

Frequency Range (MHz)	Limit
	Quasi-Peak dB(uV/m)
30 ~ 230	30
230 ~ 1 000	37

3.2.3 Test Equipment List

Equipment Type	Model	Manufacture	Serial No	Cal Due Date	Use
EMI TEST RECEIVER	ESU8	R&S	100128	2010.01.19	☒
Antenna Mast	ANTENNA MAST AM4.0	MATURO GMBH	N/A	N/A	☒
Antenna Turntable Controller	Turntable TT1.2 SI-0	MATURO GMBH	N/A	N/A	☒
BILOG ANTENNA	CBL6112D	TESQ	25233	2010.06.02	☒
PREAMPLIFIER	AM-1431	MITEQ	1336160	2010.07.07	☒

3.2.4 Test Result of Radiated Emission

Antenna : **Horizontal / Vertical**

Distance : **10 m**

Test Mode : **PC Communication mode**

Test Results : **PASS**
Test data sheets follow.

Frequency (MHz)	QuasiPeak dB(uV/m)	Antenna height (cm)	Pol	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit dB(uV/m)
30.00	21.2	215	V	357	-17.7	8.8	30.0
30.48	18.2	120	H	284	-18.0	11.8	30.0
66.86	20.5	100	V	202	-29.0	9.5	30.0
80.92	20.2	143	V	229	-27.8	9.8	30.0
112.93	18.8	208	H	280	-23.3	11.2	30.0
187.62	19.6	155	H	193	-23.8	10.4	30.0
207.99	23.1	114	H	151	-22.9	6.9	30.0
240.00	22.2	110	H	280	-21.1	14.8	37.0
240.00	21.1	150	V	95	-21.1	15.9	37.0
271.04	24.2	195	H	138	-19.9	12.8	37.0
299.66	24.0	148	V	235	-19.0	13.0	37.0
720.15	30.7	102	H	265	-11.5	6.3	37.0
966.05	28.5	150	V	229	-9.2	8.5	37.0

Notes
1. H : Horizontal polarization , V : Vertical polarization
2. QuasiPeak Level = Reading + Corr.(Antenna factor + Cable loss)
3. Margin value = Limit – QuasiPeak Level
4. Measurement uncertainty estimated at ± 4.86 dB.
   The measurement uncertainty is given with a confidence of 95.45 % with the coverage factor, k = 2.

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