



ELECTROMAGNETIC RESEARCH INSTITUTE



EMI TEST REPORT

Emission of electromagnetic disturbance

Test Report No. : ERI-FCC03-0065
Equipment : Digital Audio Player
Name of basic model : ORC-250
Family model : None
Manufacturer : ORACOM Co., Ltd.
Applicant : ORACOM Co., Ltd.
Tested date : 2003. 10. 7
Issued date : 2003. 10. 15
Test results : PASS
Test Standards : FCC Part 15 Subpart B (Class B)
/digital devices & peripherals

Test Procedure and Items:

- AC Power line Conducted emissions measurement : ANSI C63.4-1992
- Radiated emissions measurement : ANSI C63.4-1992

Tested by: GWEON, HUR

Approved by: UK-CHO, RIM

The results in this report apply only to the sample tested.

This test report shall not be reproduced except in full, without the written approval of **ERI Laboratory**.

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(None)

1. CLIENT INFORMATION

The EUT has been tested by request of :

Company : ORACOM Co.,Ltd.
Address : #720, Osan-Dong, Osan, Kyungki-Do, Korea, 447-802
Name of contact : -
Telephone : +82-31-379-5008
Facsimile : +82-31-375-8978

2. LABORATORY INFORMATION

The 10m full-anechoic chamber and/or EMC facilities are used for these testing.
These facilities were accredited by KOLAS, EK, MIC of Korea and FCC of USA.

Address

ELECTROMAGNETIC RESEARCH INSTITUTE.

66-6, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGKI-DO, KOREA

Telephone No. : +82-31-336-1186 ~ 7

Facsimile No. : +82-31-336-1184

Registered No.

KOLAS : 111

EK : J

MIC : KR0030

FCC Filing No. : 302567

3. EQUIPMENT UNDER TEST INFORMATION(EUT)

3.1 Identification of the EUT

Type of equipment : MP3 Player
Model name : ORC-250
Used clock : 11,2898MHz
Brand name : -
Manufacturer : ORACOM Co.,Ltd.
Address : #720, Osan-Dong, Osan, Kyungki-Do, Korea, 447-802
Telephone : +82-31-379-5008
Facsimile : +82-31-375-8978
Country of origin : KOREA
Rating : DC 1.5V

3.2 Additional information about the EUT

Class B, Family Models List: None

3.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT.

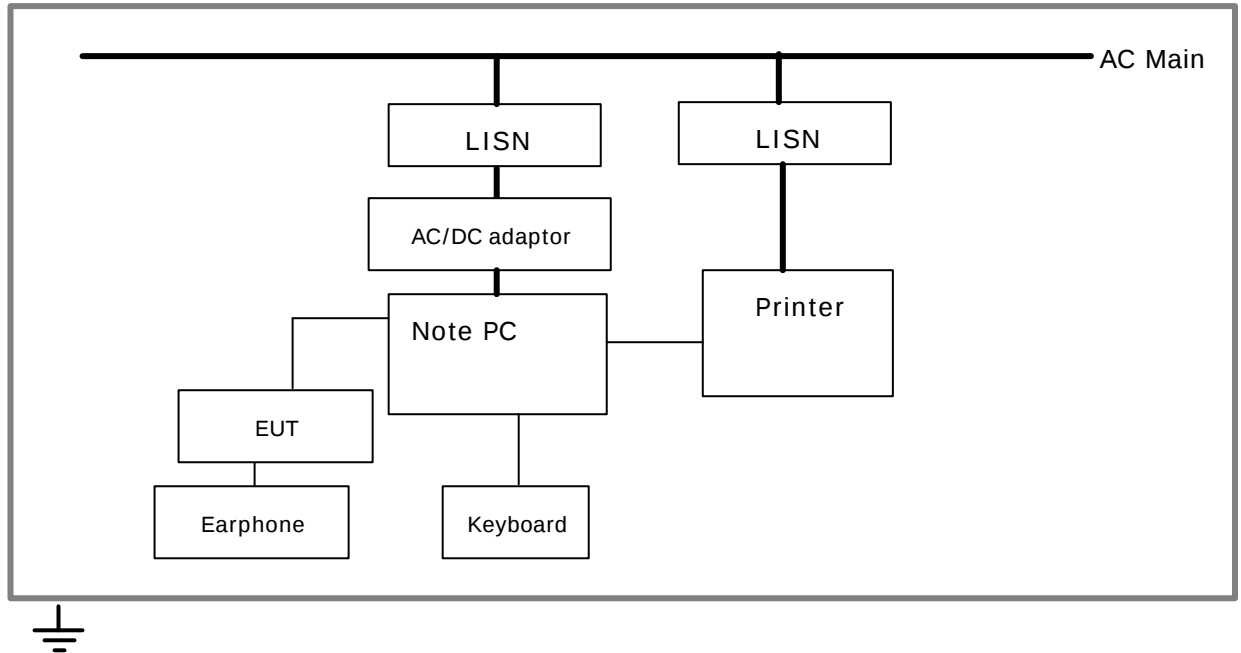
Description	Model No.	Serial No.	Manufacture
Printer	C6427A	CN13V1B1SZ	HP
Note pc	CM2080	5Y17JNZ9R892	LG
AC/DC adaptor	ADP-60DB	MJD012400851 6	DELTA ELECTRONICS Co., Ltd.
Keyboard	SDM4510UH	4M020619	SAMSUNG
Earphone	-	-	-

4. CONTINUOUS DISTURBANCE VOLTAGE, MAIN TERMINAL : Frequency range 0.15 MHz to 30 MHz

4.1 Operating environment

Temperature : 19.0
Relative Humidity : 58.0 %

4.2 Test set-up and test procedures



The mains terminal disturbance voltage was measured with the equipment under test(EUT) in a shield room. The EUT was connected to an artificial mains network(LISN) placed on the floor. The EUT was placed on non-metallic table 0.4m above the metallic, grounded floor. The distance to other metallic surface was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

4.3 Operation Conditions

Up & download mode, play mode

4.4 Test instrument

Instrument	Model No	Serial No.	Makers	Next cal.date	Used
Test receiver	ESCS30	100021	R&S	2004. 1. 24	
L.I.S.N.	ESH3-Z5	827246/008	R&S	2004. 3. 19	
	ESH3-Z5	831887/018	R&S	2004. 3. 19	
Shield room	8 × 6 × 3.3m/H	-	-	-	

4.5 Test results

Date of test: Oct 7, 2003

An overview sweep performed with peak detector & average detector are included in the report **as test reports.**

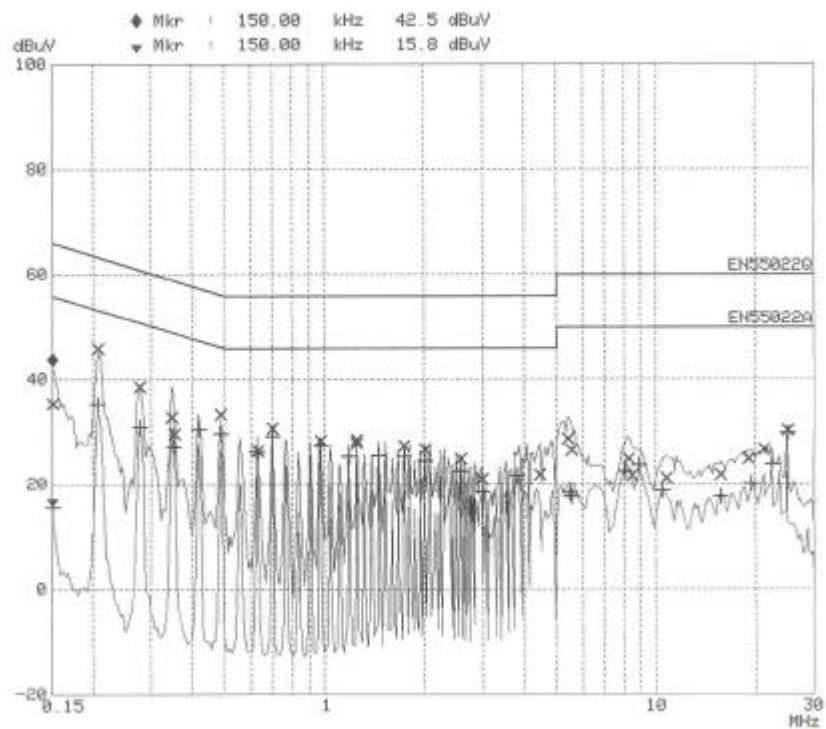
Frequency	Tested	LISN	Meter		Limits	
Range	Freq.		Reading			
			QP	AV	QP	AV
[MHz]	[MHz]		[dBuV]		[dBuV]	
0.15 - 30(MHz)	0.150	H	36.6	16.6	66.0	56.0
	0.207	N	45.9	35.3	63.2	53.2
	0.276	N	38.6	30.9	60.8	50.8
	0.345	N	32.8	27.1	59.0	49.0
	0.348	H	34.2	29.2	59.0	49.0
	0.486	N	33.3	29.7	56.3	46.3
	0.693	N	30.6	29.2	56.0	46.0
	5.700	H	31.0	22.3	60.0	50.0
	16.210	H	31.3	22.1	60.0	50.0
	25.000	N	30.3	30.0	60.0	50.0

<5 : mean less than 5dB

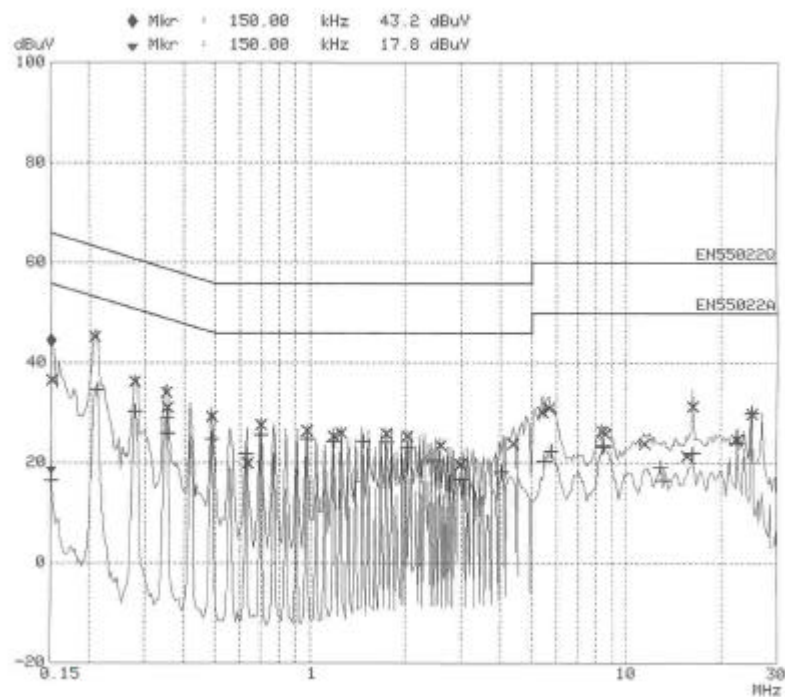
Other frequency keep over 20dB margin.

Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.



PAGE 1
[Live line]



PAGE 1
[Neutral line]

5. RADIATED DISTURBANCE : 30MHz – 1000MHz

5.1 Operating environment

Temperature : 19.0
Relative Humidity : 58.0 %

5.2 Test set-up

The frequency range investigated was 30 MHz to 1000 MHz.

All readings are quasi-peak unless stated otherwise.

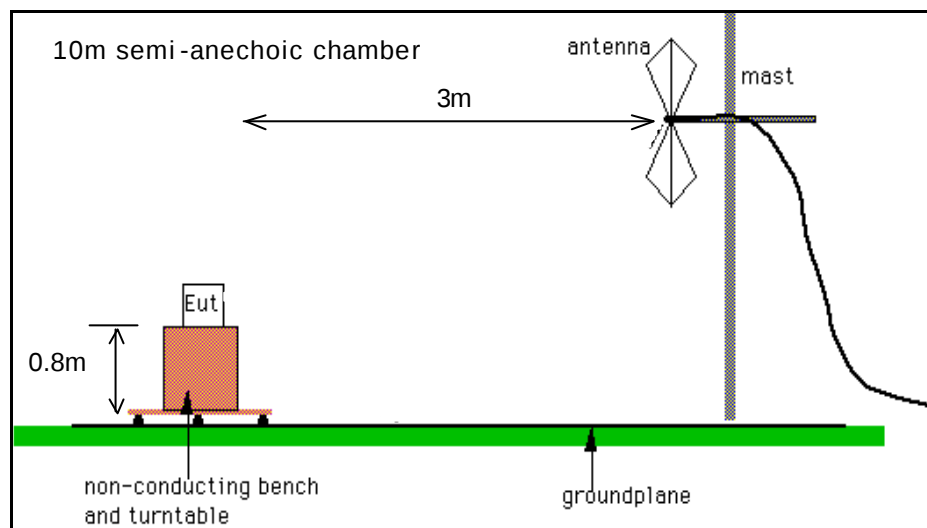
The half-wave dipole antenna was tuned to the frequency found during Preliminary radiated measurements. The EUT, support equipment and Interconnecting cables were re-configured to the set-up to the producing the Maximum emission for the frequency and were placed on top of a 0.8 meter High non-metallic 1 X 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission.

The turntable containing the system was rotated the antenna height was varied 1 to 4 meters

and stopped at the azimuth or height producing the maximum emission.

And this device(EUT) was tested in 3 orthogonal planes.

The antenna measured both horizontal and vertical polarization.



<General test set-up for radiated emissions>

5.3 Operation Conditions

Up & download mode, play mode

5.4 Test instrument

Instrument	Model No.	Serial No.	Makers	Next cal.date	Used
Test receiver	ESCS30	100021	R&S	2004. 1. 24	
L.I.S.N.	ESH3-Z5	827246/008	R&S	2004. 3. 19	
	ESH3-Z5	831887/018	R&S	2004. 3. 19	
Biconical Antenna	VHA9103	91031950	Schwarzbeck	2004.01.24	
Log-Periodic Antenna	UHALP9108A	0392	Schwarzbeck	2004.01.23	
Antenna Mast	MA240	N/A	HD	-	
Turn Table	DT430S	N/A	HD	-	

5.5 Test results(Test mode: Up & download mode)

Date of test: Oct 7, 2003

Freq (MHz)	Reading (dBuV / m)	Ant	AF (dB)	CL (dB)	Result (dBuV / m)	Limit (dB)	Margin (dB)
82.00	13.75	H	7.60	2.10	23.45	40.00	16.55
133.30	5.15	V	13.86	2.60	21.61	43.50	21.89
175.10	2.99	H	15.90	3.00	21.89	43.50	21.61
195.40	2.90	H	16.35	3.10	22.35	43.50	21.15
210.20	3.58	V	16.50	3.20	23.28	43.50	20.22
228.50	5.11	H	16.70	3.50	25.31	46.00	20.69
233.20	1.28	H	16.90	3.50	21.68	46.00	24.32
248.70	0.79	H	17.10	3.50	21.39	46.00	24.61
260.20	1.97	H	17.70	3.50	23.17	46.00	22.83
264.90	2.71	H	17.70	3.50	23.91	46.00	22.09
325.00	5.13	V	13.85	0.90	19.88	46.00	26.12
400.00	4.28	V	15.87	4.10	24.25	46.00	21.75

* Receiving Antenna Mode : **Horizontal, Vertical**

* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization $\angle$ POL H = Horizontal POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result = Field Strength(AF + CL+ Reading)

Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

5.6 Test results(Test mode: Play mode)

Date of test: Oct 7, 2003.

Freq (MHz)	Reading (dBuV / m)	Ant	AF (dB)	CL (dB)	Result (dBuV / m)	Limit (dB)	Margin (dB)
90.10	8.78	H	8.62	2.20	19.60	43.50	23.90
279.80	0.04	V	18.00	3.60	21.64	46.00	24.36
283.10	7.00	H	18.45	3.70	29.15	46.00	16.85
300.50	22.49	H	13.69	3.90	40.08	46.00	5.92

* Receiving Antenna Mode : **Horizontal, Vertical**

* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization $\nearrow$ POL H = Horizontal POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result = Field Strength(AF + CL+ Reading)

Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

5.7 Test results < Test mode: FM tuner >

Date of test: Oct 7, 2003.

T.	Tested	Meter Reading (quasi-peak)		Limits	Total Loss	Margins	
Frequency	Frequency	H	V			H	V
[MHz]	[MHz]	[dBuV/m]	[dBuV/m]			[dBuV/m]	[dBuV/m]
87.5	98.2	6.2	-	43.5	11.9	25.4	-
	196.4	10.1	-	43.5	17.8	15.6	-
	294.6	-	-	46.0	24.3	-	-
	392.8	-	-	46.0	21.4	-	-
	491.0	-	-	46.0	23.9	-	-
	589.2	-	-	46.0	26.2	-	-
	687.4	-	-	46.0	28.7	-	-
	785.6	-	-	46.0	30.0	-	-
	883.8	-	-	46.0	31.9	-	-
	982.0	-	-	54.0	33.1	-	-
98.0	108.7	-	-	43.5	12.7	-	-
	217.4	10.1	-	46.0	18.9	17.0	-
	326.1	-	-	46.0	18.9	-	-
	434.8	-	-	46.0	22.4	-	-
	543.5	-	-	46.0	25.2	-	-
	652.2	-	-	46.0	27.5	-	-
	760.9	-	-	46.0	29.7	-	-
	869.6	-	-	46.0	31.8	-	-
	978.3	-	-	54.0	33.0	-	-
108.0	118.7	-	9.8	43.5	13.7	-	20.0
	237.4	-	6.7	46.0	19.0	-	20.3
	356.1	-	-	46.0	20.1	-	-
	474.8	-	-	46.0	23.4	-	-
	593.5	-	-	46.0	26.3	-	-
	712.2	-	-	46.0	29.1	-	-
	830.9	-	-	46.0	30.7	-	-
	949.6	-	-	46.0	32.1	-	-
* Meter reading: Loss exclude * Margins : [Limits] - meter reading * Receiving Antenna Mode: Horizontal, Vertical * 10m chamber * <5 : mean less than 5dB * Measurement uncertainty (K=2) 30-300MHz : +3.96dB / -4.04dB 300-1000MHz : +3.04dB / -3.00dB							

Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

Others

Date of test: Oct 7, 2003.

Tested Frequency	ANT Pol.	Meter Reading	Antenna Factor	Cable Loss	Results	Limits
[MHz]		[A] [dBuV/m]	[B] [dB]	[C] [dB]	[A+B+C] [dBuV/m]	[dBuV/m]
90.80	H	9.99	8.62	2.20	20.81	43.50
92.00	H	9.98	8.62	2.20	20.80	43.50
285.20	H	0.84	18.45	3.70	22.99	46.00
344.00	H	4.99	13.85	0.90	19.74	46.00

* Receiving Antenna Mode : **Horizontal, Vertical**

* Test distance: **3m** (10m Anechoic Chamber)

* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization $\neq$ POL H = Horizontal
POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result =
Field Strength(AF + CL+ Reading)