

EMI TEST REPORT

Test report No.: EMC-FCC-0175

Type of equipment: Digital Audio Player

Model Name: IMP-6512

Variant Model: IMP-6128, IMP-6256

FCC ID.: P42IMP6512

Applicant: DECKTRON CO.,LTD.

Test standards: FCC part 15 subpart B, Class B

Test Procedure and Items :

AC Power Line Conducted Emissions Measurement: ANSI C63.4:2001
Radiated Emissions Measurement : ANSI C63.4:2001

Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of test: 2004. 06.30-07.01 **Issued date: 2004 . 07. 05**

Tested by : J. S. Kim
KIM, JUNG-SOO

Approved by: M. S. Chung
CHUNG, MIN-SEOK

EMC Compliance Ltd.

82-1, JEIL-RI, YANGJI-MYUN, YONGIN-CITY, KYUNGGI-DO, 449-825 KOREA
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1. Client information

Applicant : DECKTRON CO.,LTD.
Address : Block #102-18, Ochang Scientific Industrial Complex, 643-2,
Kakri, Ochang-myun, Cheongwon-gun, Chungcheongbuk-Do,
Korea 363-883
Telephone Number : +82-2-555-4755
Facsimile Number : +82-2-555-4757
Contact person : LEE, JUNG WON

Factory : DECKTRON CO.,LTD.
Address : Block #102-18, Ochang Scientific Industrial Complex, 643-2,
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Korea 363-883
Telephone Number: +82-43-219-9600
Facsimile Number : +82-43-219-9696

2. Laboratory information

Address

EMC compliance Ltd.

82-1, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

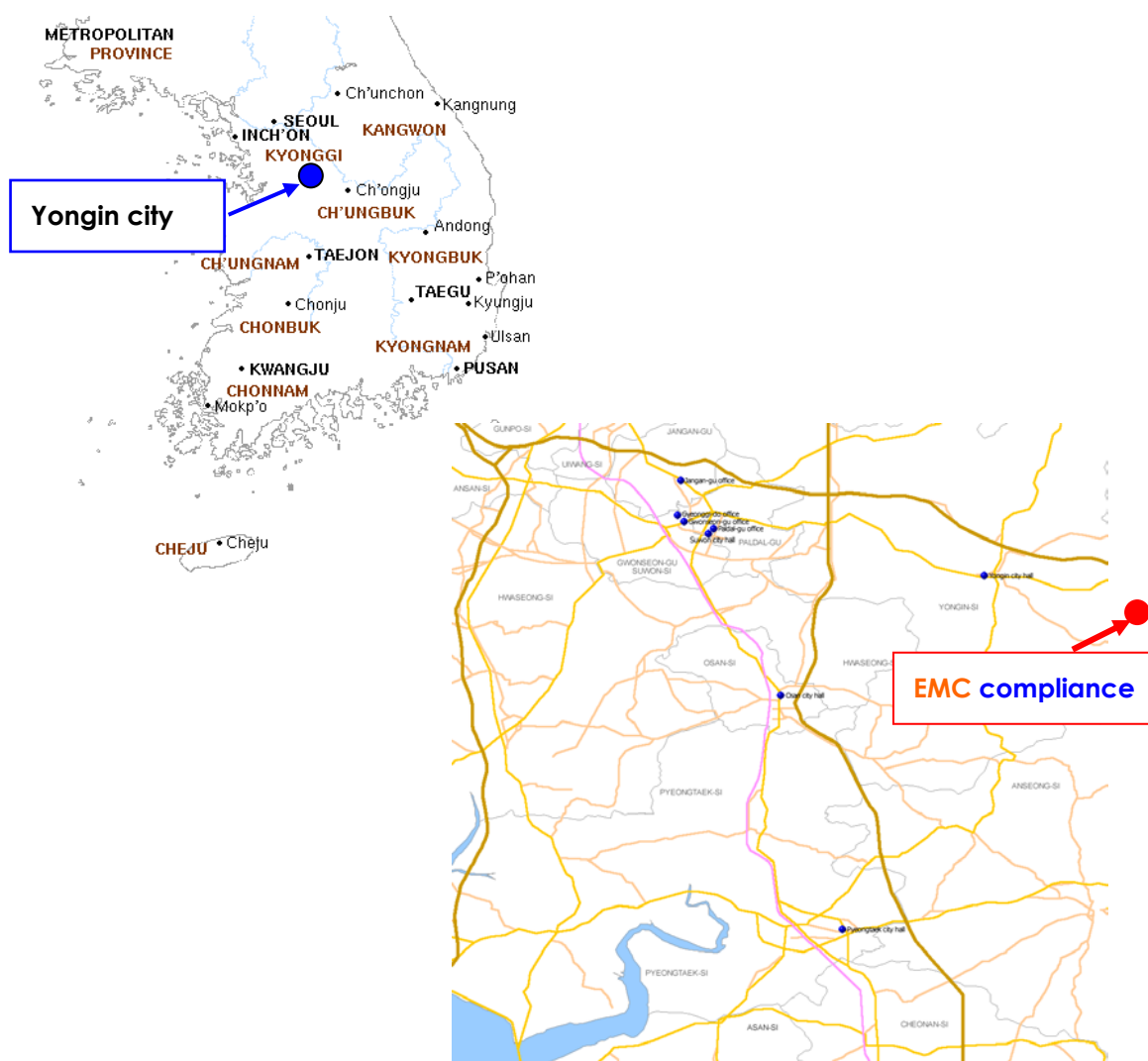
Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

FCC Filing No. : 793334

VCCI Registration No. : C-1713, R-1606

SITE MAP



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3. Test system configuration

3.1 Operation Environment

	Temperature	Humidity	Pressure
OATS :	28 °C	34 %	1009 hPa
Shielded room :	25 °C	30 %	1010 hPa

Test site

These testing were performed following locations;

Shielded room: Conducted emission

OATS (10m) : Radiated emission

OATS (3m) : FM TUNER

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are test receiver, Cable Loss, antenna factor calibration, Antenna directivity, antenna factor Variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, Site imperfection, mismatching, and system repeatability.

Based on NIS 80, 81, the measurement uncertainty level with a 95% confidence level was applied.

3.3 Sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss from the measured reading.

The sample calculation is as follows :

$$\begin{aligned} \text{FS} &= \text{MR} + \text{LF} + \text{CL} & \text{MR} &= \text{Meter Reading} \\ & & \text{LF} &= \text{LISN Factor} \\ & & \text{CL} &= \text{Cable Loss} \end{aligned}$$

If MR is 30dB, LISN Factor 1dB, CL 1dB

The result (MR) is

$$30 + 1 + 1 = 32\text{dBuV}$$

Radiated emission

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follows :

$$\begin{aligned} \text{FS} &= \text{MR} + \text{AF} + \text{CL} + \text{AT} - \text{AG} \\ \text{MR} &= \text{Meter Reading} \\ \text{AF} &= \text{Antenna Factor} \\ \text{CL} &= \text{Cable Loss} \\ \text{AP} &= \text{Antenna Pad} \\ \text{AG} &= \text{Amplifier Gain} \end{aligned}$$

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB

The result (MR) is

$$30 + 12 + 5 + 10 - 35 = 22\text{dBuV/m}$$

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4. Description of EUT

4.1 Product Description

Applicant:	DECKTRON CO.,LTD.
Address of Applicant:	Block #102-18, Ochang Scientific Industrial Complex, 643-2, Kakri, Ochang-myun, Cheongwon-gun, Chungcheongbuk-Do, Korea 363-883
Type of equipment:	Digital Audio Player
Basic Model:	IMP-6512
Variant Model:	IMP-6128, IMP-6256
Serial number:	N/A
Rating:	DC 1.5V (AAA Alkaline battery)

4.2 Peripherals

Description	Model / Part #	Serial number	Manufacture
PC	Presario S6500KR	KRJ41103C7	COMPAQ
Monitor	CE92HM	CCIQT020600975	C&C TECH
Printer	EPSON STYLUS C60	DR5K014977	EPSON
Keyboard	SEM-DT35	3V004174	SEC
PS/2 Mouse	M-S48A	HCA31712974	SEC
SERIAL Mouse	OK-720	N/A	A4Tech
Headset	RP-HM211	N/A	Panasonic

4.3 Operating conditions

- MP3 play mode.
- FM tuner mode.
- Up & down load through the USB cable.
- Recording through the Line cable.

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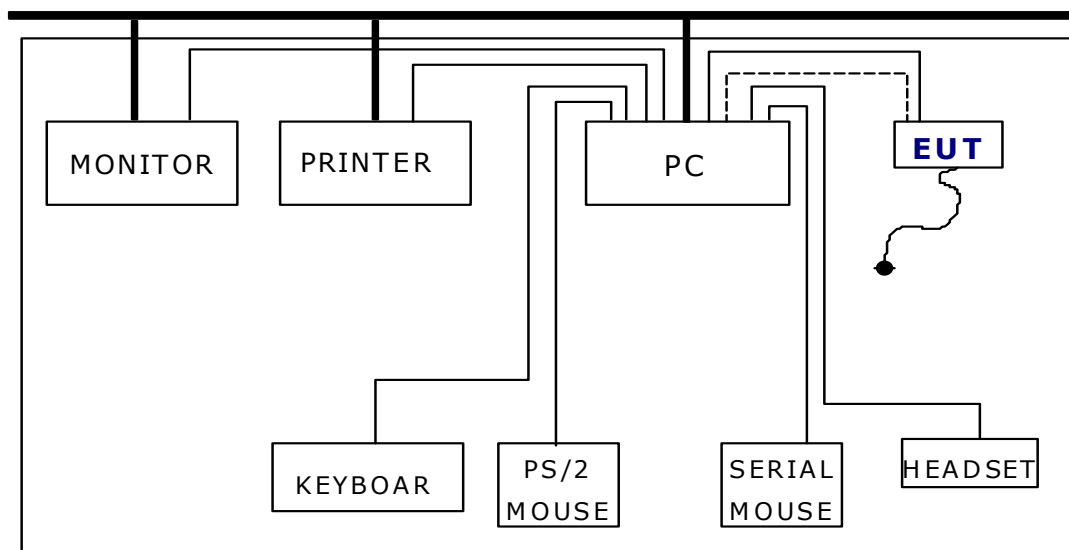
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4.4 Used cables

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
PC	VGA	MONITOR	D-SUB	1.5	Shield
	PARALLEL	PRINTER	PARALLEL	1.8	Shield
	PS/2	KEYBOARD	PS/2	2.0	Shield
	PS/2	PS/2 MOUSE	PS/2	1.8	Shield
	SERIAL	SERIAL MOUSE	SERIAL	1.8	Shield
	SPEAKER,MIC	HEADSET	P-JACK	2.0	Unshield
EUT	USB	PC	USB	1.0	Shield
	LINE IN	PC	-	1.0	Unshield
	EARPHONE	-	Open Cable	1.5	Unshield

4.5 EUT test configuration



5. Summary of test results

5.1 Modification to the E.U.T.

- None

5.2 Standards & results

FCC Part 15 Subpart B (Class B)

ANSI C63.4 – 2001

Test items	Test methods	Result
Conducted emission	ANSI C63.4-2001	Pass
Radiated emission	ANSI C63.4-2001	Pass
FM Tuner	ANSI C63.4-2001	Pass

6. Test results

6.1 Conducted emission

6.1.1 Measurement procedure

Mains

The measurements were performed in a shielded room.

EUT was placed on a non-metallic table height of 0.1m above the reference ground plane.

The rear of tabletop was located 0.4m to the vertical conducted plane.

All other surfaces of tabletop were at least 0.8m away from any other grounded conducting surface.

Cables were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.

Each EUT power lead, except ground (safety) lead, was individually connected through a LISN to input power source.

Both lines of power cord, hot and neutral were measured.

6.1.2 Used equipments

Equipment	Model	Serial no.	Makers	Next Cal. date	Used
Test receiver	ESHS10	843276/003	R&S	05.05.13	<input checked="" type="checkbox"/>
L.I.S.N.	ESH3-Z5	100267	R&S	05.06.14	<input checked="" type="checkbox"/>
	L3-32A	0120J20305	PMM	05.04.03	<input checked="" type="checkbox"/>
Test site	Shield room	-	-	-	<input checked="" type="checkbox"/>

6.1.3 Measurement uncertainty

Conducted emission measurement : (K=2)

9kHz-150 kHz : ± 3.48

150kHz-300 MHz : ± 3.05

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6.1.4 Test data

[Test mode : File Upload/download via USB]

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit	Reading	Result	Limit	Reading	Result
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.177	0.03	0.20	H	64.63	41.23	41.46	54.63	30.99	31.22
0.438	0.03	0.20	H	57.10	23.07	23.30	47.10	21.11	21.34
0.528	0.09	0.30	H	56.00	28.24	28.63	46.00	25.07	25.46
1.980	0.13	0.40	N		25.26	25.79		24.36	24.89
2.904	0.10	0.30	H		31.47	31.87		23.30	23.70
3.520	0.09	0.20	H		34.62	34.91		26.45	26.74
12.000	0.93	0.40	N	60.00	37.46	38.79	50.00	31.88	33.21
15.800	0.12	0.30	H		37.84	38.26		28.86	29.28
16.590	0.93	0.40	N		37.74	39.07		32.80	34.13
16.630	0.12	0.30	H		33.60	34.02		32.69	33.11
18.000	0.94	0.50	N		56.44	57.88		25.47	26.91
19.020	0.13	0.30	H		31.57	32.00		28.60	29.03
24.000	0.13	0.40	H		36.62	37.15		31.72	32.25

- Note. QP = Quasi-Peak, AV= Average
- LINE(N) : Neutral, LINE(H) : Hot
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s

[Test mode : Recording via LINE in]

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]
0.150	0.12	0.30	N	66.00	43.56	43.98	56.00	12.40	12.82
0.177	0.03	0.20	H	64.63	44.50	44.73	54.63	31.80	32.03
0.441	0.03	0.20	H	57.04	26.68	26.91	47.04	23.33	23.56
0.528	0.09	0.30	H	56.00	27.09	27.48	46.00	25.45	25.84
2.640	0.13	0.40	H		28.30	28.83		23.91	24.44
3.260	0.10	0.30	H		29.44	29.84		23.38	23.78
3.430	0.09	0.20	H		29.74	30.03		22.17	22.46
3.520	0.94	0.50	N		31.45	32.89		25.33	26.77
5.370	0.13	0.30	N	60.00	33.07	33.50	50.00	26.02	26.45
12.270	0.13	0.40	N		39.09	39.62		21.08	21.61
12.600	0.93	0.40	H		40.08	41.41		20.13	21.46
12.670	0.61	0.3	N		40.87	41.78		21.43	22.34
12.810	0.12	0.30	H		41.48	41.90		24.42	24.84
12.940	0.93	0.40	H		40.22	41.55		24.05	25.38

- Note. QP = Quasi-Peak, AV= Average
- LINE(N) : Neutral, LINE(H) : Hot
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s

6.1.5. Result

Complied

6.2 Radiated emission

6.2.1 Measurement procedure

A pretest was performed at 3m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 10m open area test site with a quasi-peak detector.

EUT was placed on a non-metallic table height of 0.1m above the reference ground plane.

Cables were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next cal. date	Used
Test receiver	ESVS10	827864/006	R&S	05.05.14	<input checked="" type="checkbox"/>
TRILOG Broadband Antenna	VULB 9160	3138	SCHWARZBECK	05.04.10	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	-	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	-	<input checked="" type="checkbox"/>
10m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

6.2.3 Measurement uncertainty

Radiated Emission measurement : (K=2)
30-300 MHz ; 3 m: ± 3.56 , 10 m: ± 3.50
300-1000 MHz ; 3 m: ± 4.47 , 10 m: ± 2.64

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6.2.4 Test data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
UP/DOWN MODE									
47.54	13.1	V	1.0	67	12.07	1.70	30.0	26.87	3.13
115.43	12.8	V	1.0	234	10.55	2.50	30.0	25.85	4.15
129.84	11.4	V	1.0	321	12.04	2.60	30.0	26.04	3.97
384.15	13.1	H	4.0	205	14.86	4.70	37.0	32.66	4.34
450.07	7.1	V	1.0	186	17.09	5.30	37.0	29.49	7.51
469.84	9.0	V	1.2	261	17.07	5.40	37.0	31.47	5.53
505.17	7.0	H	4.0	202	17.24	5.70	37.0	29.94	7.06
517.34	5.1	H	3.9	292	17.71	5.80	37.0	28.61	8.39
LINE RECORDING									
37.85	12.4	H	4.0	118	11.18	1.60	30.0	25.18	4.82
192.18	13.1	V	1.0	140	10.26	2.90	30.0	26.26	3.74
212.04	12.8	V	1.0	339	9.89	3.20	30.0	25.89	4.11
PLAY									
173.11	10.4	H	4.0	349	12.25	2.80	30.0	25.45	4.55
202.14	13.1	H	3.2	320	9.44	3.10	30.0	25.64	4.36

* Receiving Antenna Mode : *Horizontal, Vertical*

* 10 m OATS

* Note : Reading = Test Receiver meter,

P = Polarization → POL H = Horizontal, POL V = Vertical

* Result = Field Strength (Antenna factor + Cable factor + Reading)

[Test mode : FM Tuner]

Tuner Freq. [MHz]	Local Oscillator	Frequency [MHz]	Reading [dBuV]	Pol.	Height [m]	Angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dBuV/m]
							Ant.	Cable			
87.5	Fundamental	98.20	-	-	-	-	-	-	-	-	-
	Harmonics	294.60	12.1	H	3.8	154	13.14	3.40	46.0	28.64	17.36
		392.80	15.4	H	4.0	211	15.10	4.00	46.0	34.50	11.50
98	Fundamental	108.70	-	-	-	-	-	-	-	-	-
	Harmonics	217.40	18.4	H	3.8	221	10.11	2.80	46.0	31.31	14.69
		326.10	12.1	H	4.0	144	13.59	3.70	46.0	29.39	16.61
108	Fundamental	237.40	-	-	-	-	-	-	-	-	-
	Harmonics	356.10	11.0	V	1.0	255	13.99	3.80	46.0	28.79	17.21
Other Freq.		205.17	12.5	H	4.0	201	9.57	2.60	43.5	24.67	18.83
		408.14	15.0	H	3.9	174	15.63	4.00	46.0	34.63	11.37

* Receiving Antenna Mode : *Horizontal, Vertical*

* 3 m OATS

* IF Bandwidth : 120kHz

* Note : Reading = Test Receiver meter,

P = Polarization → POL H = Horizontal, POL V = Vertical

* Result = Field Strength (Antenna factor + Cable factor + Reading)

6.2.5. Result

Complied

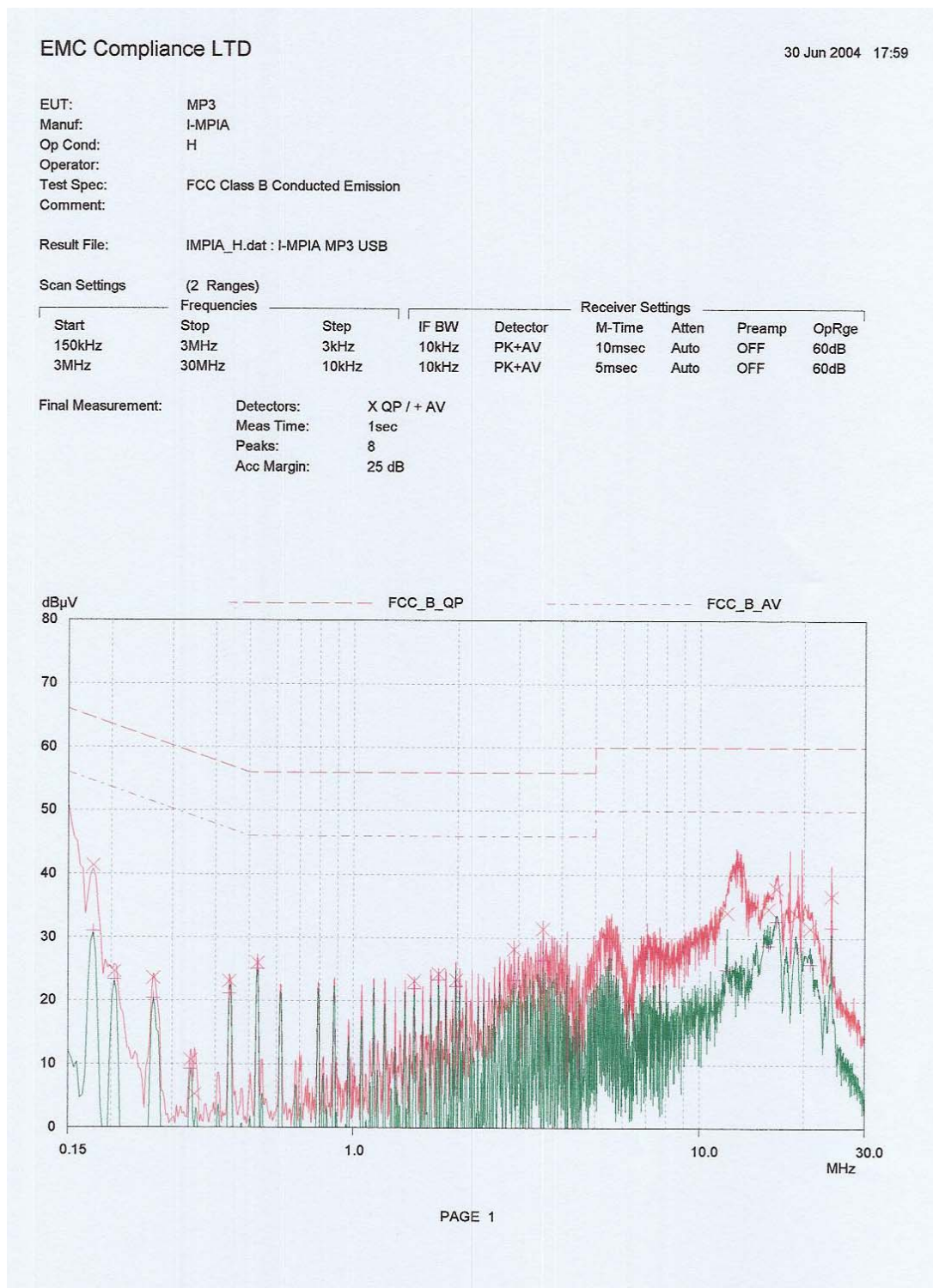
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7. Appendix - Test Graphs

Conducted Emission test graph [USB MODE]



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30 Jun 2004 18:14

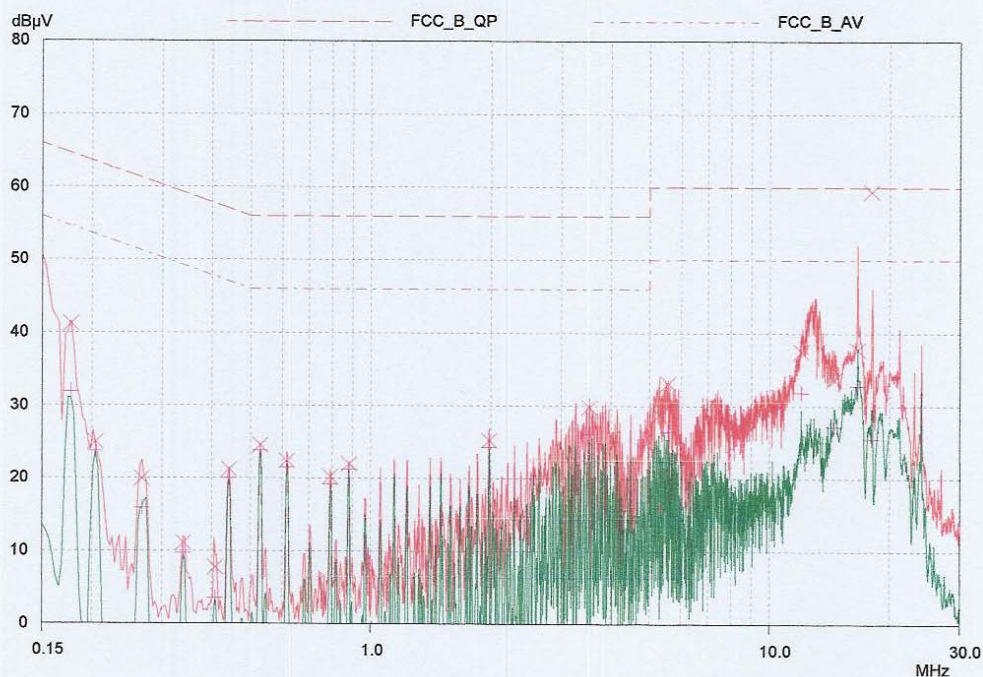
EUT: MP3
Manuf: I-MPIA
Op Cond: N
Operator:
Test Spec: FCC Class B Conducted Emission
Comment:

Result File: IMPIA_N.dat : I-MPIA MP3 USB

Scan Settings (2 Ranges)

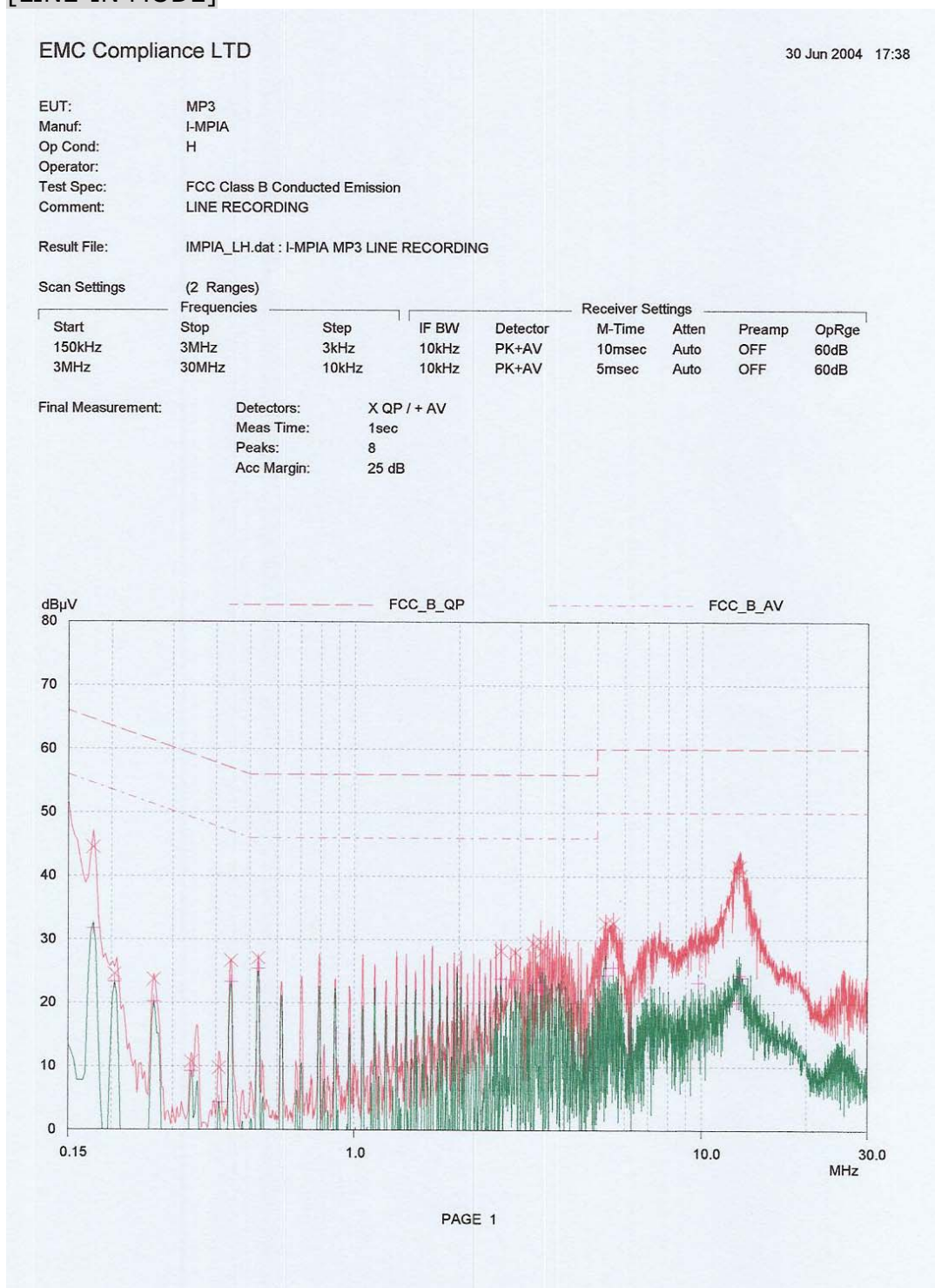
Frequencies				Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



PAGE 1

[LINE-IN MODE]



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30 Jun 2004 17:15

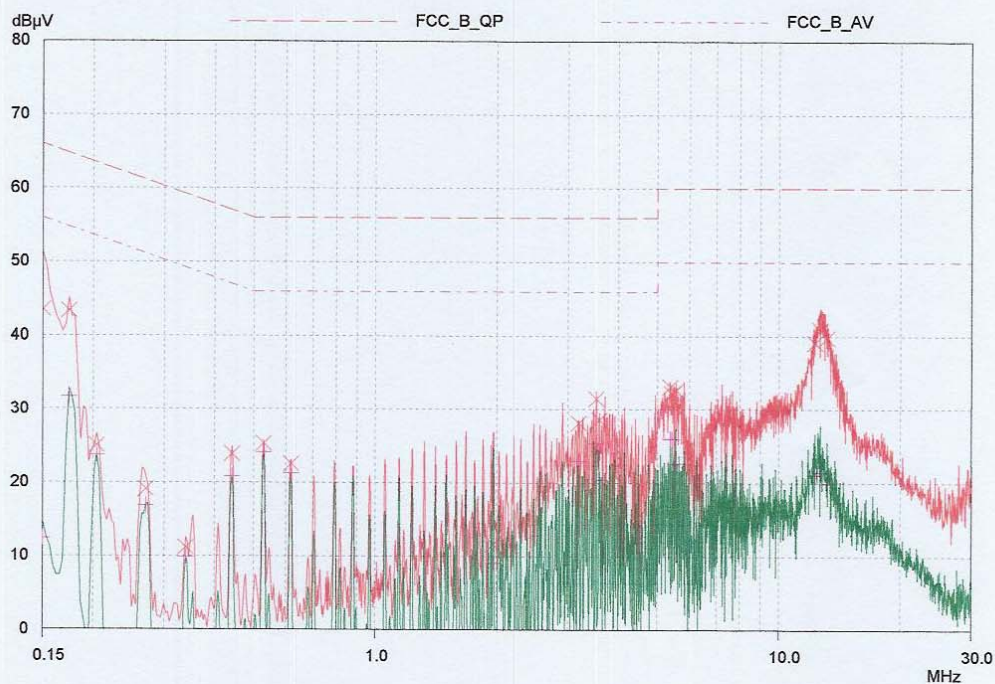
EUT: MP3
Manuf: I-MPIA
Op Cond: N
Operator:
Test Spec: FCC Class B Conducted Emission
Comment: LINE RECORDING

Result File: IMPIA_LN.dat : I-MPIA MP3 LINE RECORDING

Scan Settings (2 Ranges)

Frequencies				Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	10msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



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