Certification of Compliance

CFR 47 Part 15 Subpart B / Class B PC Peripherals

Test Report File No. 03-IST-253 **Date of Issue** Sep. 22. 2003

Model **AP-100**

Kind of Product MP3 Player

Applicant ACHOM EP Co.,LTD.

Address 678-7, Changman-ri, Kwangtan-myun, Paju City, Kyunggi Province, Korea

Manufacturer ACHOM EP Co.,LTD.

Address 678-7, Changman-ri, Kwangtan-myun, Paju City, Kyunggi Province, Korea

Test Result **(*)Positive** **( ) Negative**

Reviewed By

J.H. Lee / General Manager of EMC

Approved By

G. Chung / Chief

- Investigations requested : Measurement to the relevant clauses of F.C.C rules and regulations Part 15 Subpart B - Class B PC Peripherals / FM Broadcast receivers
- The test report with appendix consists of 15 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 1992.

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INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. (Yongin Lab., ***Filed to FCC***)
San 21-8, Goan-Ri, Baekam-Myun, Yongin-City
Kyonggi-Do, 449-860, Korea
TEL : +82 31 333 4093 FAX : +82 31 333 4094

EMC LABORATORY of IST Co., Ltd. (Yangji Lab., ***Filed to FCC***)
80, Jeil-RI, Yangji-Myun, Yongin-City
Kyonggi-Do, 449-825, Korea
TEL : +82 31 323 3012 FAX : +82 31 323 3014

ENVIRONMENTAL CONDITIONS

Temperature	23 ℃
Humidity	50 %
Atmospheric pressure	1002 mbar

POWER SUPPLY SYSTEM USED

Product Information

VOLTAGE	1.5V(1 AAA Size Battery)
MEMORY	Internal Memory 128MB
LCD DISPLAY	Graphic LCD Letter(128 x64 dot)
SIZE / WEIGHT	33 x 77 x 17mm(WxHxD) / 33g (w/o battery)
CASE	Plastic
FILE TRANSFERING SPEED	4.5 Mbps
VOICE RECORDING	MPEG I,II Layer-3,VAD Method
NOISE RATIO	90dB
EAR PHONE OUTPUT	10mW
OUTPUT FREQUENCY RANGE	20Hz ~ 20KHz

Find product information in User's manual.

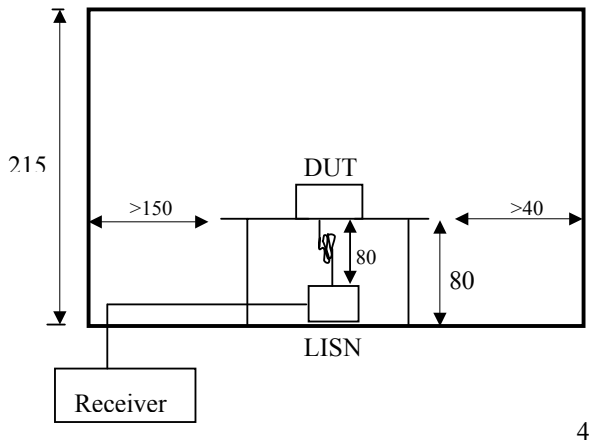
DESCRIPTIONS OF TEST

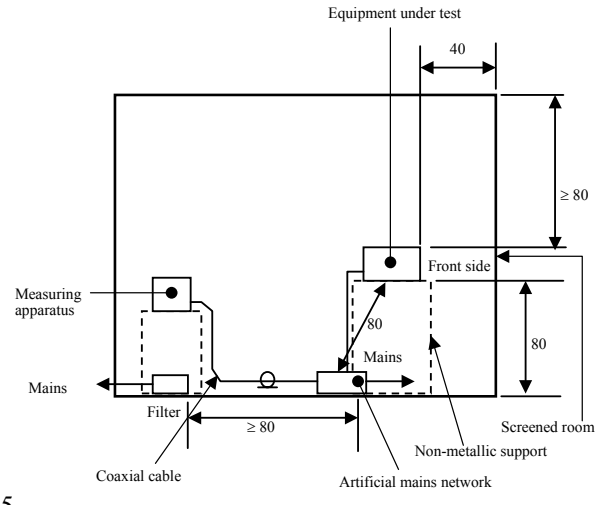
Conducted Emissions:

The measurement were performed over the frequency range of 0.45MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within an bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- Procedure of Test

The line-conducted facility is located in a shielded room. The wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The LISNs are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the powered LISN .The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cutting power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the appropriate LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was re-measured using Quasi-Peak detector and average detector by manual measurement or final measurement program of R&S, after scanned by automatic Peak mode for frequency range from 0.15 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.





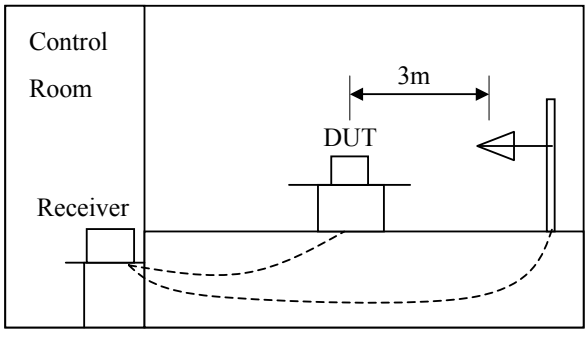
DESCRIPTION OF TEST

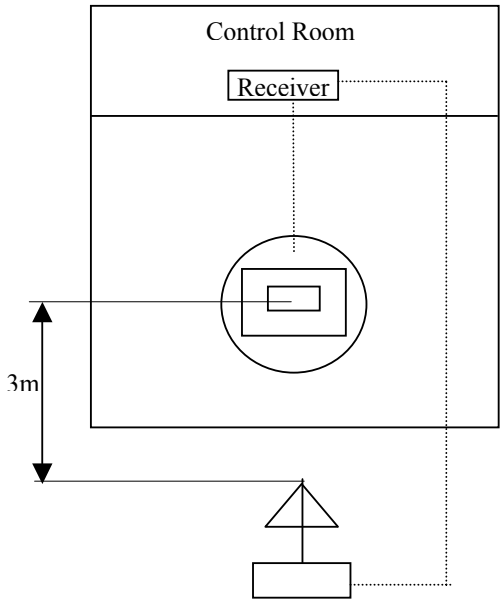
Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120KHz.

- Procedure of Test

Preliminary measurements were made at 3 meter using bi-conical and log-periodic antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 230MHz using bi-conical antenna and 230 to 1000MHz using log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3 or 10 meters test distance using Bi-log antenna, Bi-conical antenna, Log-periodic antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuations. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were configured as same in chamber, were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each 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. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.





SUMMARY

☒ Conducted Emission

The requirements are	● MET ○ Not MET
Minimum limit margin	14.9dB at 0.216MHz
Maximum limit exceeding	

Remarks : With QP detector/Live Phase

☒ Radiated Emission

The requirements are	● MET ○ Not MET
Minimum limit margin	3.0dB at 500.0MHz
Maximum limit exceeding	

Remarks :

Reported By

H.C. Kim / EMC Engineer

Note :

☒ means the test is applicable, ☐ is not applicable.

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

◆ Test Equipment Used

Model Name	Manufacturer	Description	Next Cal. Date
ESH3	Rohde Schwarz	Receiver	Dec. 9, 2003
ESH2-Z5	Rohde Schwarz	LISN	Dec. 9, 2003
NNLK8121	Schwarzbeck	LISN	Dec. 9, 2003
ESH3-Z2	Rohde Schwarz	Pulse Limiter	Dec. 10, 2003

◆ Auxiliary Equipment Used

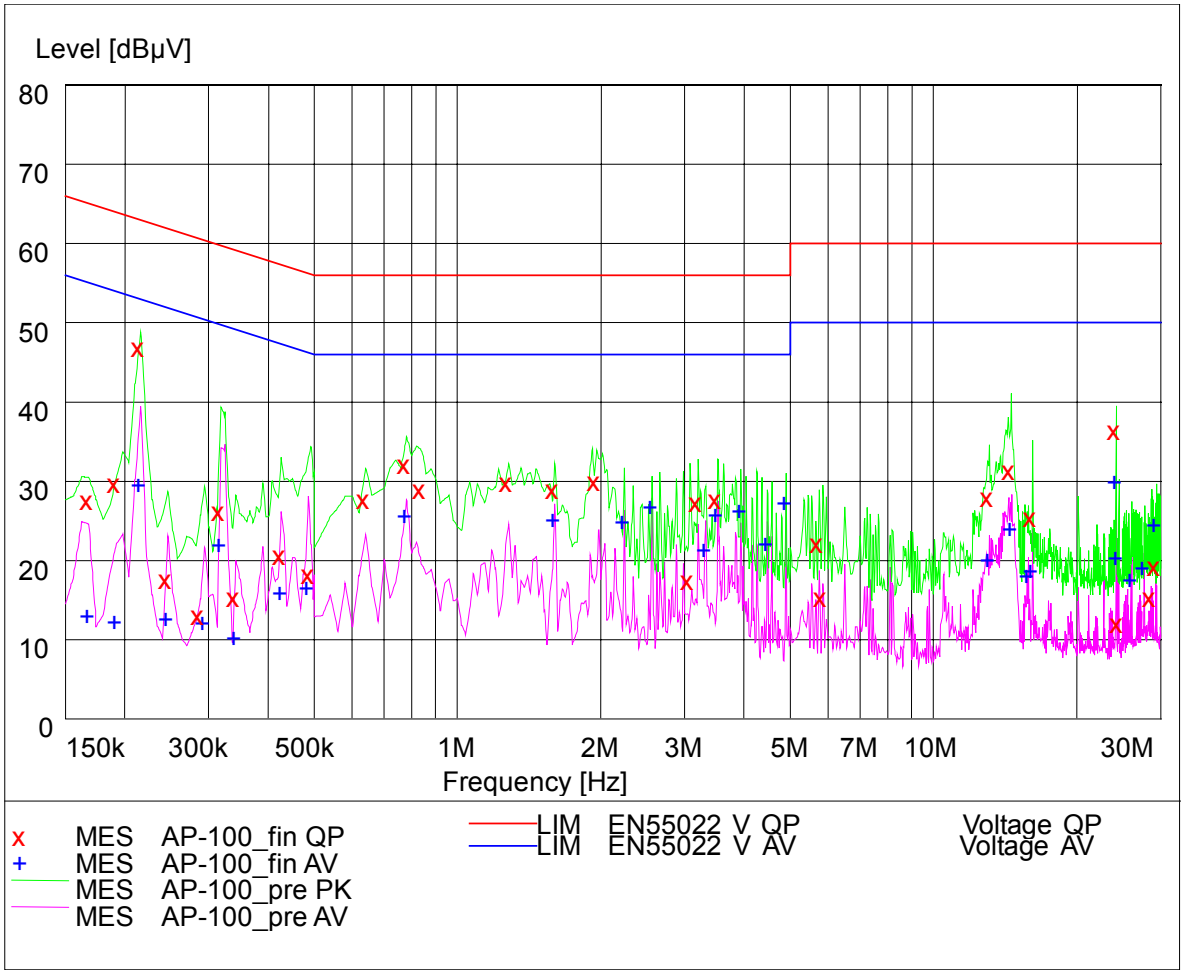
Model Name	Manufacturer	Descriptions	FCC Compliance information
Brio BA600/550	HP	Desktop PC	Doc
SK-2502C	HP	Keyboard (PS/2)	Doc
M-SAS51	HP	Mouse (PS/2)	FCC ID : LZA90401209
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
M-M28	Logitech	Mouse(RS-232C)	FCC ID : DZL210365
AN-2005	Aion Korea	Headphone/MIC	N/A
X03-5740	Microsoft	Joy stick	Doc

◆ Test Program Read and Write

◆ Test Area Shielded Room

Note : It was employed the EN standard in lieu of CFR 47 Part 15 Sec. 15.107.

Conducted Emissions



Live Phase

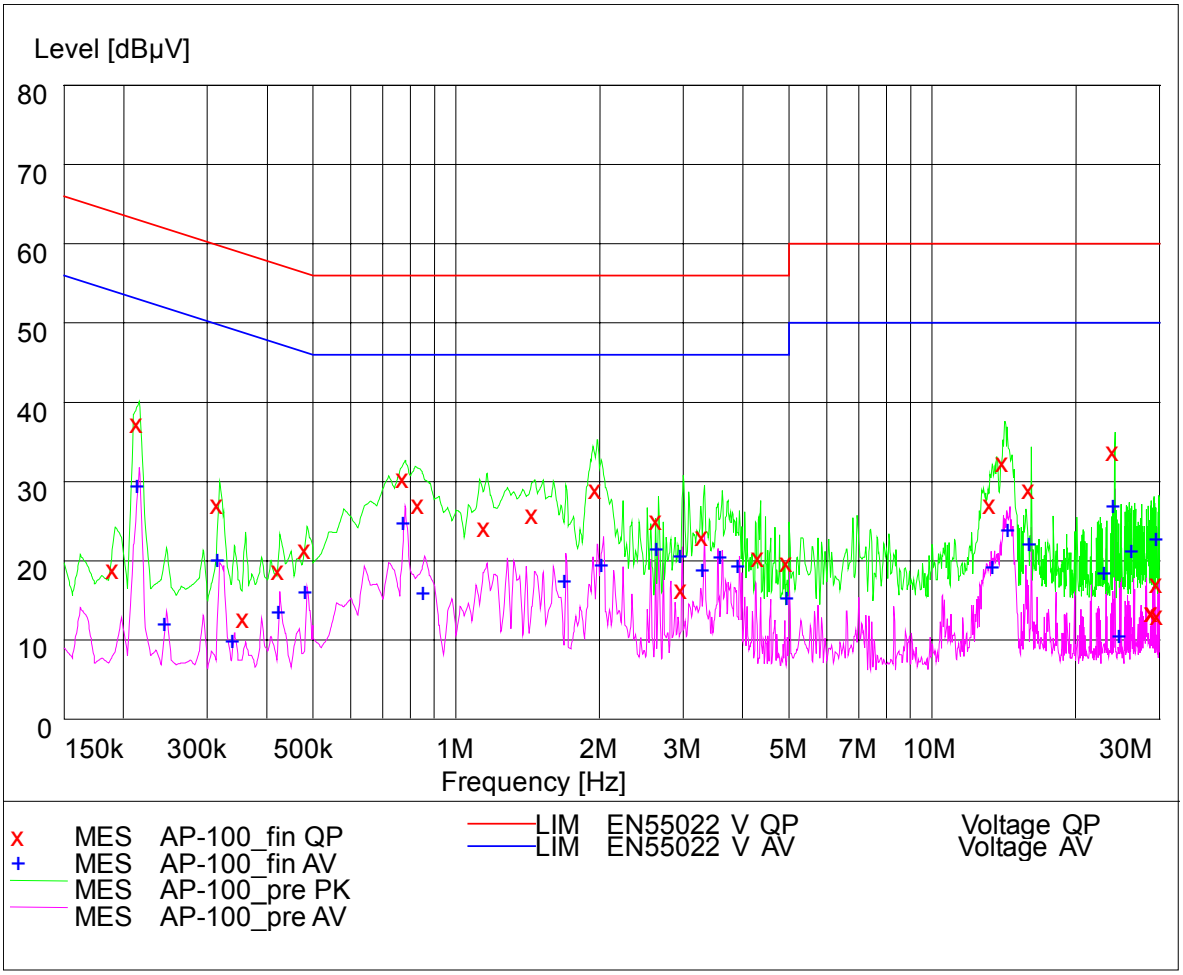
MEASUREMENT RESULT: "AP-100_fin QP" *9*/14/03 4:09PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.168000	28.70	10.1	65	36.4	L1	GND
0.192000	30.90	10.1	64	33.0	L1	GND
0.216000	48.10	10.1	63	14.9	L1	GND
0.246000	18.80	10.1	62	43.1	L1	GND
0.318000	27.40	10.2	60	32.4	L1	GND
0.342000	16.40	10.2	59	42.8	L1	GND
0.426000	21.80	10.2	57	35.6	L1	GND
0.492000	19.30	10.2	56	36.9	L1	GND
0.640000	28.90	10.2	56	27.1	L1	GND
0.780000	33.20	10.2	56	22.8	L1	GND
0.840000	30.20	10.2	56	25.8	L1	GND
1.280000	31.00	10.2	56	25.0	L1	GND
1.600000	30.20	10.2	56	25.8	L1	GND
1.960000	31.10	10.2	56	24.9	L1	GND
3.080000	18.70	10.3	56	37.3	L1	GND
3.200000	28.50	10.3	56	27.5	L1	GND
3.520000	28.90	10.3	56	27.1	L1	GND
5.750000	23.40	10.4	60	36.6	L1	GND
5.850000	16.40	10.4	60	43.6	L1	GND
13.100000	29.10	10.7	60	30.9	L1	GND
14.550000	32.60	10.8	60	27.4	L1	GND
16.150000	26.60	10.9	60	33.4	L1	GND
24.200000	37.60	11.5	60	22.4	L1	GND
28.750000	16.40	12.0	60	43.6	L1	GND
29.400000	20.40	12.0	60	39.6	L1	GND

MEASUREMENT RESULT: "AP-100_fin AV" 9/14/03 4:09PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.216000	30.60	10.1	53	22.4	L1	GND
0.246000	13.70	10.1	52	38.2	L1	GND
0.294000	13.30	10.1	50	37.1	L1	GND
0.318000	23.10	10.2	50	26.7	L1	GND
0.342000	11.40	10.2	49	37.8	L1	GND
0.426000	17.00	10.2	47	30.4	L1	GND
0.486000	17.60	10.2	46	28.7	L1	GND
0.780000	26.70	10.2	46	19.3	L1	GND
1.600000	26.20	10.2	46	19.8	L1	GND
2.240000	26.00	10.3	46	20.0	L1	GND
2.560000	27.80	10.3	46	18.2	L1	GND
3.320000	22.40	10.3	46	23.6	L1	GND
3.520000	26.80	10.3	46	19.2	L1	GND
3.940000	27.40	10.3	46	18.6	L1	GND
4.480000	23.20	10.3	46	22.8	L1	GND
4.900000	28.30	10.4	46	17.7	L1	GND
13.100000	21.20	10.7	50	28.8	L1	GND
14.600000	25.10	10.8	50	24.9	L1	GND
15.800000	19.10	10.9	50	30.9	L1	GND
16.150000	19.80	10.9	50	30.2	L1	GND
24.200000	31.00	11.5	50	19.0	L1	GND
24.400000	21.40	11.5	50	28.6	L1	GND
26.100000	18.70	11.8	50	31.3	L1	GND
27.700000	20.20	11.9	50	29.8	L1	GND
29.300000	25.60	12.0	50	24.4	L1	GND

Conducted Emissions



Neutral

MEASUREMENT RESULT: "AP-100_fin QP" 9/14/03 3:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.192000	20.10	10.1	64	43.8	N	GND
0.216000	38.50	10.1	63	24.5	N	GND
0.318000	28.20	10.2	60	31.6	N	GND
0.360000	13.80	10.2	59	45.0	N	GND
0.426000	20.00	10.2	57	37.4	N	GND
0.486000	22.50	10.2	56	33.8	N	GND
0.780000	31.50	10.2	56	24.5	N	GND
0.840000	28.20	10.2	56	27.8	N	GND
1.160000	25.40	10.2	56	30.6	N	GND
1.460000	27.00	10.2	56	29.0	N	GND
1.980000	30.20	10.2	56	25.8	N	GND
2.660000	26.30	10.3	56	29.7	N	GND
3.000000	17.50	10.3	56	38.5	N	GND
3.320000	24.20	10.3	56	31.8	N	GND
4.360000	21.50	10.3	56	34.5	N	GND
5.000000	20.90	10.4	56	35.1	N	GND
13.350000	28.30	10.7	60	31.7	N	GND
14.200000	33.50	10.8	60	26.5	N	GND
16.150000	30.10	10.9	60	29.9	N	GND
24.200000	35.00	11.5	60	25.0	N	GND
29.150000	14.70	12.0	60	45.3	N	GND
29.250000	14.70	12.0	60	45.3	N	GND
29.900000	18.30	12.1	60	41.7	N	GND
29.999900	14.20	12.1	60	45.8	N	GND

MEASUREMENT RESULT: "AP-100_fin AV" 9/14/03 3:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.216000	30.50	10.1	53	22.5	N	GND
0.246000	13.10	10.1	52	38.8	N	GND
0.318000	21.10	10.2	50	28.7	N	GND
0.342000	11.00	10.2	49	38.2	N	GND
0.426000	14.70	10.2	47	32.7	N	GND
0.486000	17.20	10.2	46	29.1	N	GND
0.780000	25.90	10.2	46	20.1	N	GND
0.860000	17.00	10.2	46	29.0	N	GND
1.700000	18.60	10.2	46	27.4	N	GND
2.040000	20.50	10.2	46	25.5	N	GND
2.660000	22.60	10.3	46	23.4	N	GND
2.980000	21.70	10.3	46	24.3	N	GND
3.320000	19.90	10.3	46	26.1	N	GND
3.620000	21.60	10.3	46	24.4	N	GND
3.940000	20.40	10.3	46	25.6	N	GND
5.000000	16.40	10.4	46	29.6	N	GND
13.500000	20.30	10.7	50	29.7	N	GND
14.550000	25.00	10.8	50	25.0	N	GND
16.150000	23.30	10.9	50	26.7	N	GND
23.200000	19.50	11.4	50	30.5	N	GND
24.200000	28.00	11.5	50	22.0	N	GND
24.900000	11.60	11.6	50	38.4	N	GND
26.500000	22.30	11.9	50	27.7	N	GND
29.800000	23.90	12.1	50	26.1	N	GND

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

◆ Test Equipment Used

Model Name	Manufacturer	Description	Next Cal. Date
ESVS10	Rohde & Schwarz	Receiver	Dec. 09, 2003
HUF Z3	Rohde & Schwarz	Log-periodic Antenna	Jun. 21, 2004
VHA9103	SCHWARZBECK	Bi-conical Antenna	Jun. 20, 2004

◆ Auxiliary Equipment Used

Model Name	Manufacturer	Descriptions	FCC Compliance information
Brio BA600/550	HP	Desktop PC	Doc
SK-2502C	HP	Keyboard (PS/2)	Doc
M-SAS51	HP	Mouse (PS/2)	FCC ID : LZA90401209
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
M-M28	Logitech	Mouse(RS-232C)	FCC ID : DZL210365
AN-2005	Aion Korea	Headphone/MIC	N/A
X03-5740	Microsoft	Joy stick	Doc

◆ Test Program Read and Write / FM Receiving

◆ Test Area Open Area Test Site #1

Note :

Radiated Emissions

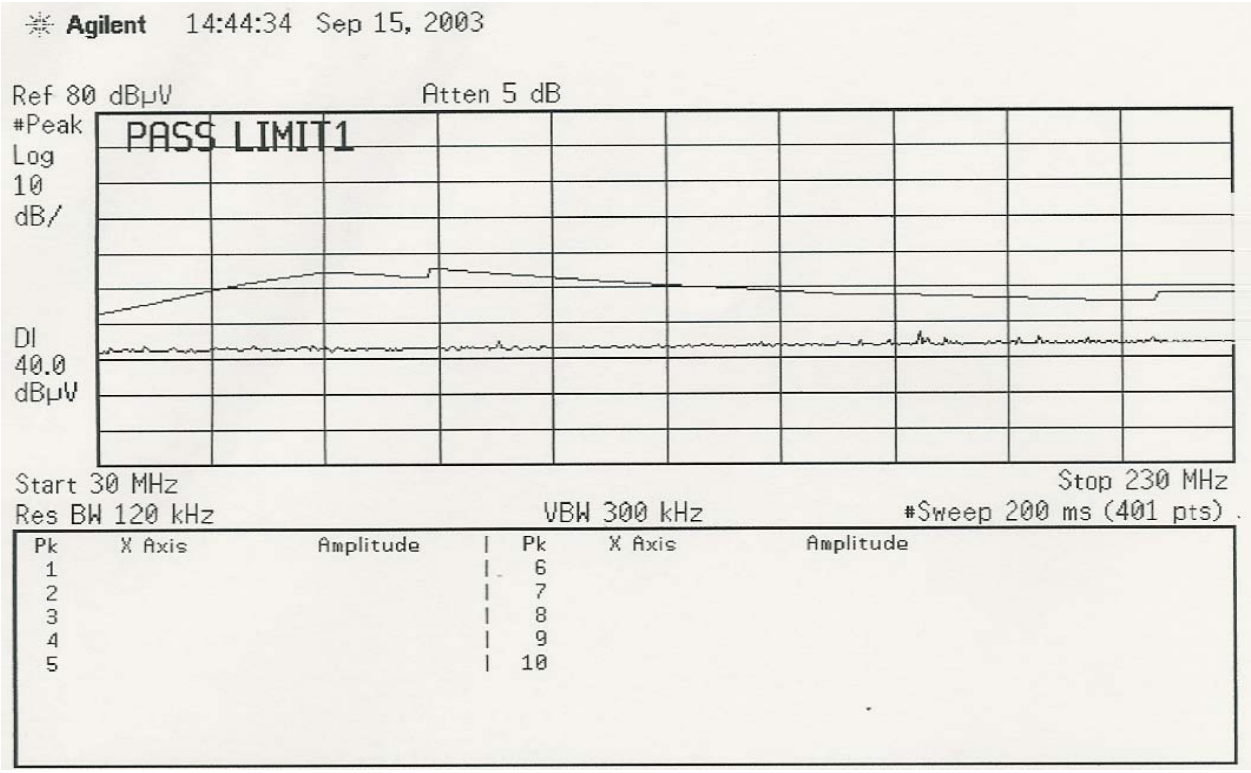
(Disturbance Radiation)

- The measured values are as following

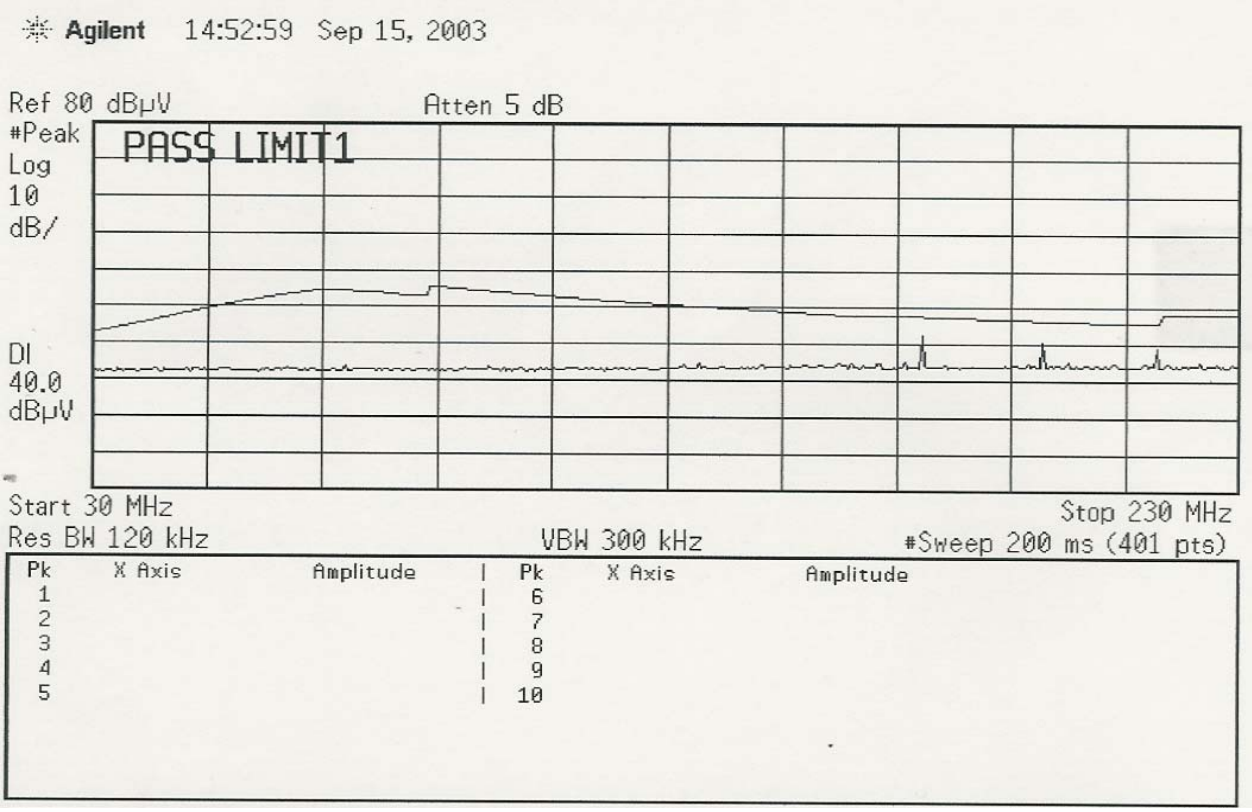
Freq. (MHz)	Reading (dBuV/m)	C.Loss (dB)	Ant. Factor (dBuV/m)	Azimuth (°)	Ant. Height (cm)	Pol. (H/V)	Limits (dBuV/m)	Result (dB)	Margin [dB]
81.5	20.6	1.7	6.7	196	150	V	39.0	29.0	10.0
83.7	19.3	1.7	7.2	270	400	H	39.0	28.2	10.8
100.4	18.7	2.0	10.4	84	400	H	43.5	31.1	12.4
147.0	19.6	2.8	14.6	260	400	H	43.5	37.0	6.5
169.6	18.0	3.1	15.4	276	400	H	43.5	36.5	7.0
189.9	18.0	3.3	15.6	276	400	H	43.5	36.9	6.6
267.0	21.3	4.1	12.2	76	380	H	46.4	37.6	8.8
305.0	17.5	4.4	14.6	280	390	H	46.4	36.5	9.9
328.0	22.4	4.6	13.8	97	400	H	46.4	40.8	5.6
340.0	19.7	4.7	14.0	81	395	H	46.4	38.4	8.0
500.0	19.3	6.2	17.9	260	360	H	46.4	43.4	3.0
503.4	18.9	6.2	17.8	175	100	V	46.4	42.9	3.5

End of data

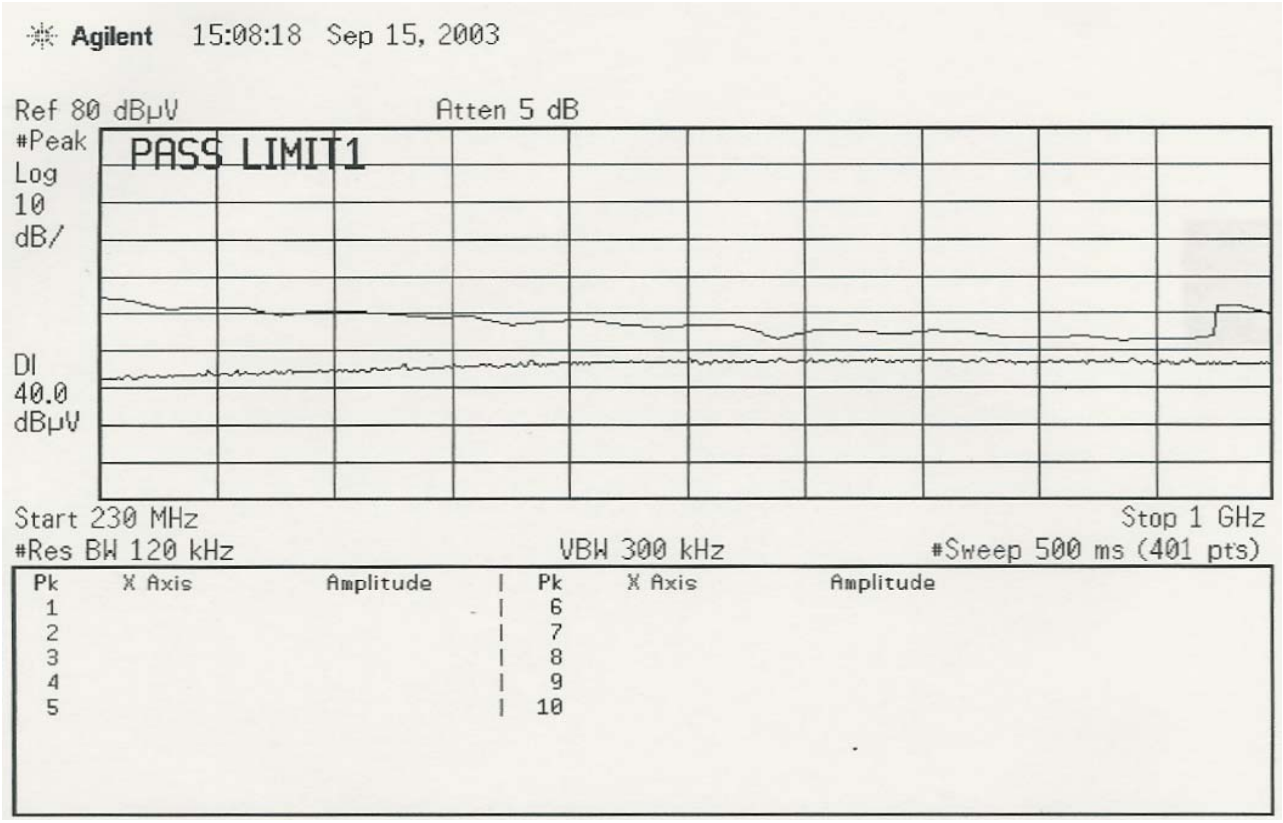
Note : Please refer to following pages for FM receiving mode test result.
It couldn't be measured at open area test site for FM mode. The preliminary test results of FM mode are attached in following pages.



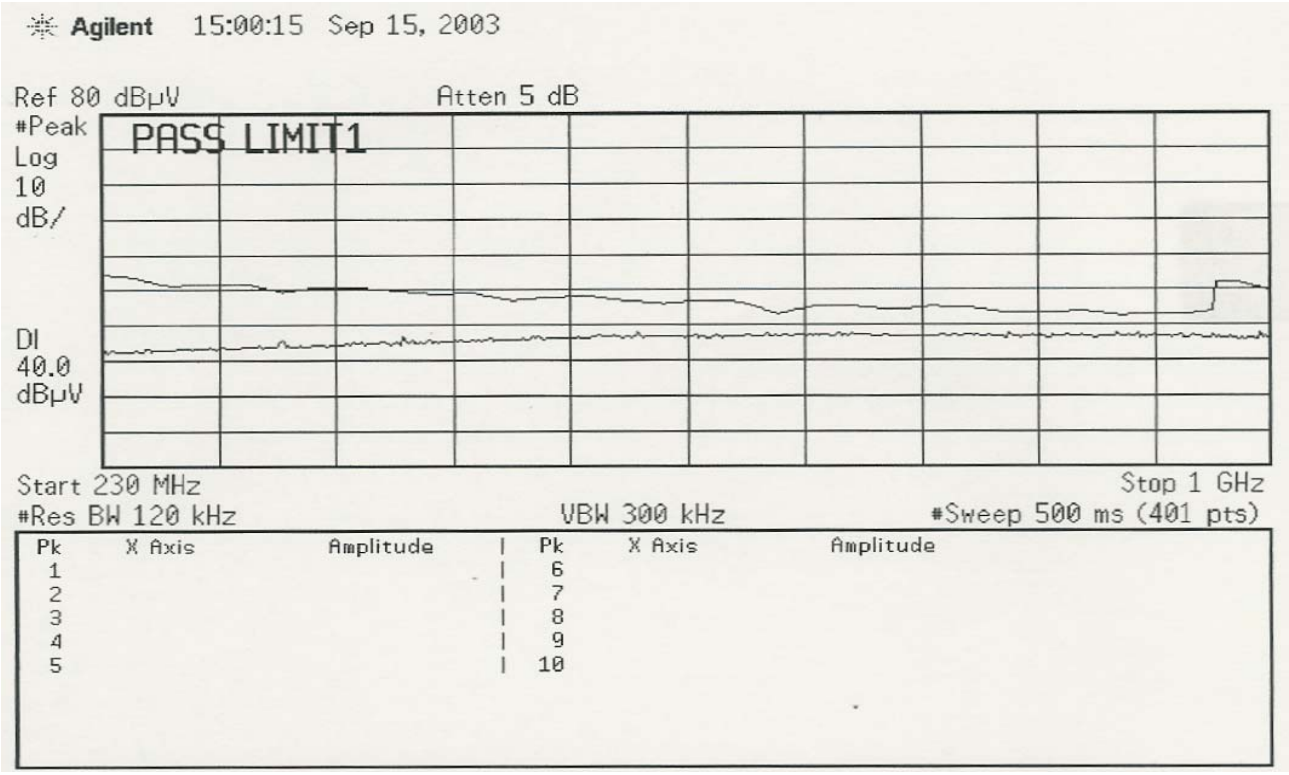
LOW(Vertical)



LOW(Horizontal)



HIGH(Vertical)



HIGH(Horizontal)