Certification of Compliance

CFR 47 Part 15 Subpart B / Class B PC Peripherals

Test Report File No.	03-IST-219	**Date of Issue**	Jul. 24. 2003
Model	**CA-S10MT**		

Kind of Product	Digital Audio Player
Applicant	CM Tech Co., Ltd.
Address	4F Samil B/D, 362-5, Wonchun Dong, Paldal-Gu, Suwon-City, Kyungki-Do, 442-380 South Korea
Manufacturer	CM Tech CO.,Ltd.
Address	4F Samil B/D, 362-5, Wonchun Dong, Paldal-Gu, Suwon-City, Kyungki-Do, 442-380 South 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 19 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
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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	26 ℃
Humidity	52 %
Atmospheric pressure	1002 mbar

POWER SUPPLY SYSTEM USED

Product Information

Main Function	MP3/WMA Player / FM Tuner / Voice Recorder / Removable Disc
Memory	128MB Flash Memory
Interface	USB USB Port
File Transmission Speed	7Mbps
Display	dot FSTN LCD (EL backlight)
Voice Recording Time	8 hours
Battery	AAA Type 1EA
Operating Time	12-hour consecutive play (Alkaline battery used)
Output Power	5mW×2 (16Ω)
S/N (Noise Ratio)	90dB (20KHz LPF)
Case	Aluminum

Find product information in User's manual.

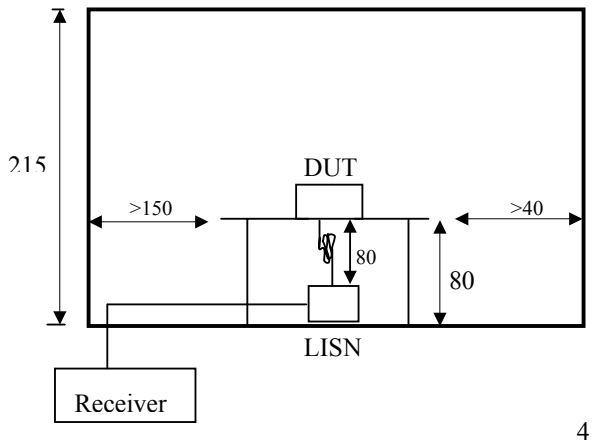
DESCRIPTIONS OF TEST

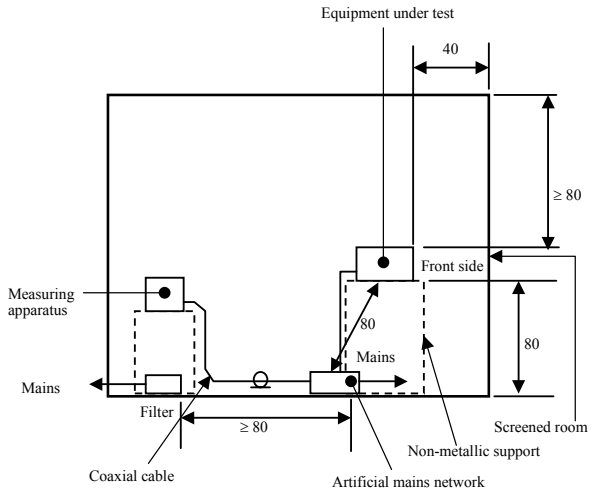
Conducted Emissions:

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.





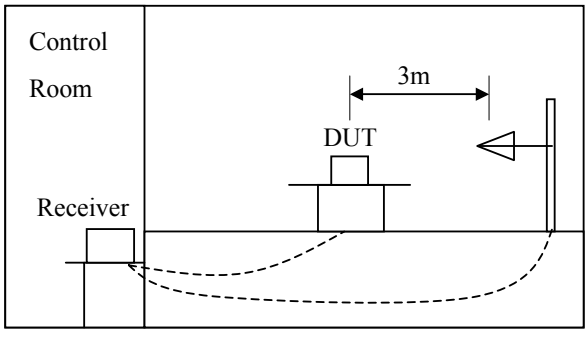
DESCRIPTION OF TEST

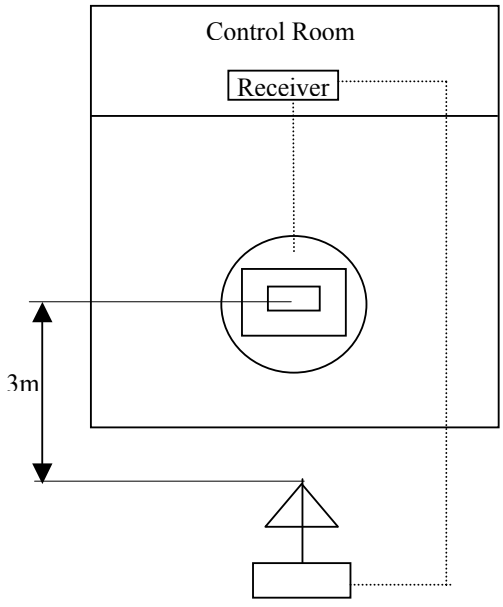
Radiated Emissions:

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	5.1dB at 3.08MHz
Maximum limit exceeding	

Remarks : With average detector/Live Phase

☒ Radiated Emission

The requirements are	● MET ○ Not MET
Minimum limit margin	4.8dB at 501.2MHz
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
NMLK8121	Schwarzbeck	LISN	Dec. 9, 2003
ESH3-Z2	Rohde Schwarz	Pulse Limiter	Dec. 10, 2003

◆ Auxiliary Equipment Used

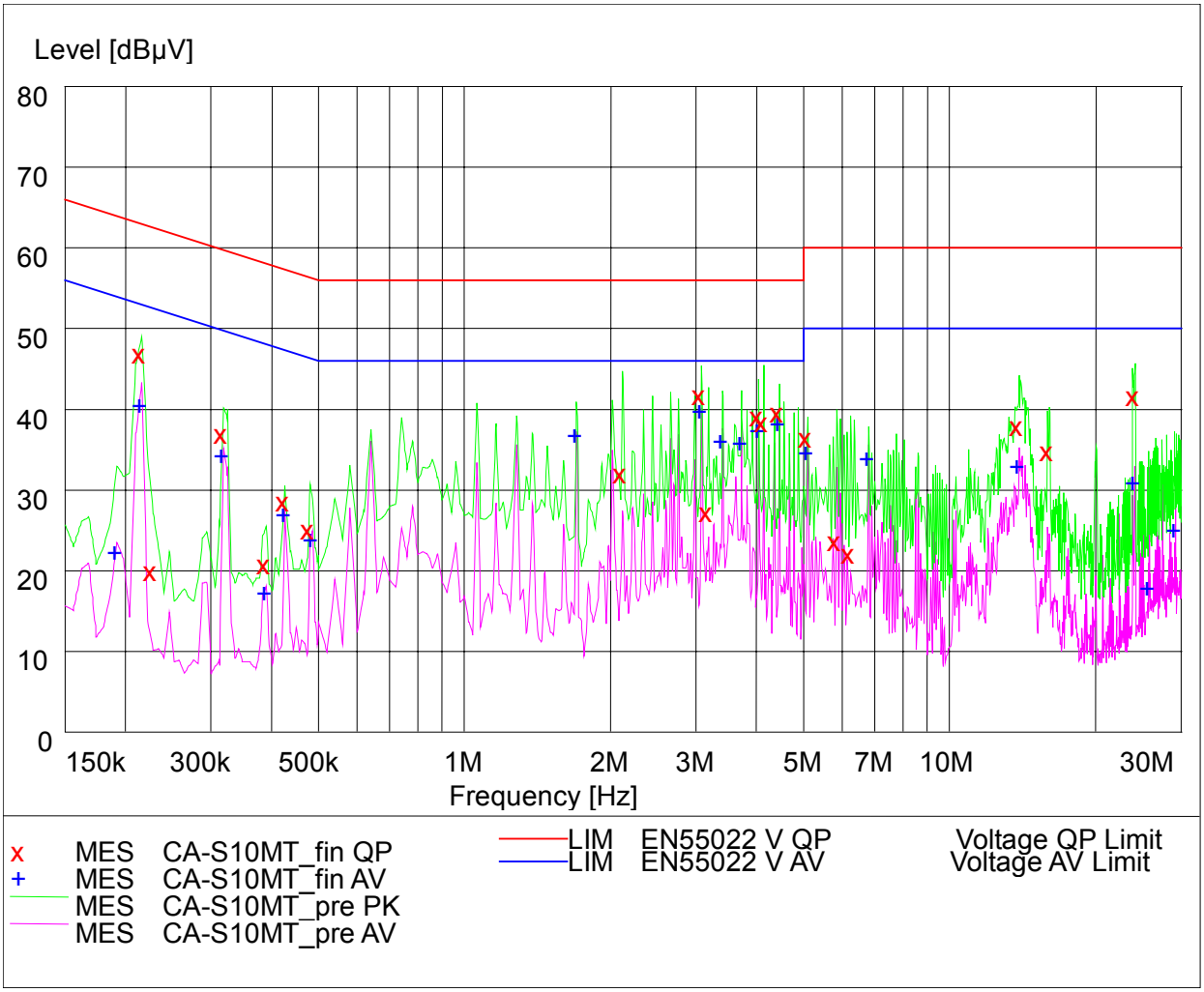
Model Name	Manufacturer	Descriptions	FCC Compliance information
Brio BA600/550	HP	Desktop PC	Doc
SK-2502C	HP	Keyboard (PS/2)	Doc
M-SAS51	HP	Mouse (PS/2)	FCC ID : LZA90401209
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
M-M28	Logitech	Mouse(RS-232C)	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: "CA-S10MT_fin QP"

7/11/03 11:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.216000	48.00	10.0	63	15.0	L1	GND
0.228000	21.10	10.0	63	41.4	L1	GND
0.318000	38.10	10.0	60	21.7	L1	GND
0.390000	22.00	10.0	58	36.1	L1	GND
0.426000	29.70	10.0	57	27.6	L1	GND
0.480000	26.20	10.0	56	30.1	L1	GND
2.120000	33.20	10.0	56	22.8	L1	GND
3.080000	42.90	10.0	56	13.1	L1	GND
3.180000	28.40	10.0	56	27.6	L1	GND
4.040000	40.30	10.0	56	15.7	L1	GND
4.140000	39.50	10.0	56	16.5	L1	GND
4.460000	40.70	10.0	56	15.3	L1	GND
5.100000	37.60	10.0	60	22.4	L1	GND
5.850000	24.80	10.0	60	35.2	L1	GND
6.250000	23.30	10.0	60	36.7	L1	GND
13.900000	39.10	10.0	60	20.9	L1	GND
16.050000	36.00	10.0	60	24.0	L1	GND
24.150000	42.80	10.0	60	17.2	L1	GND

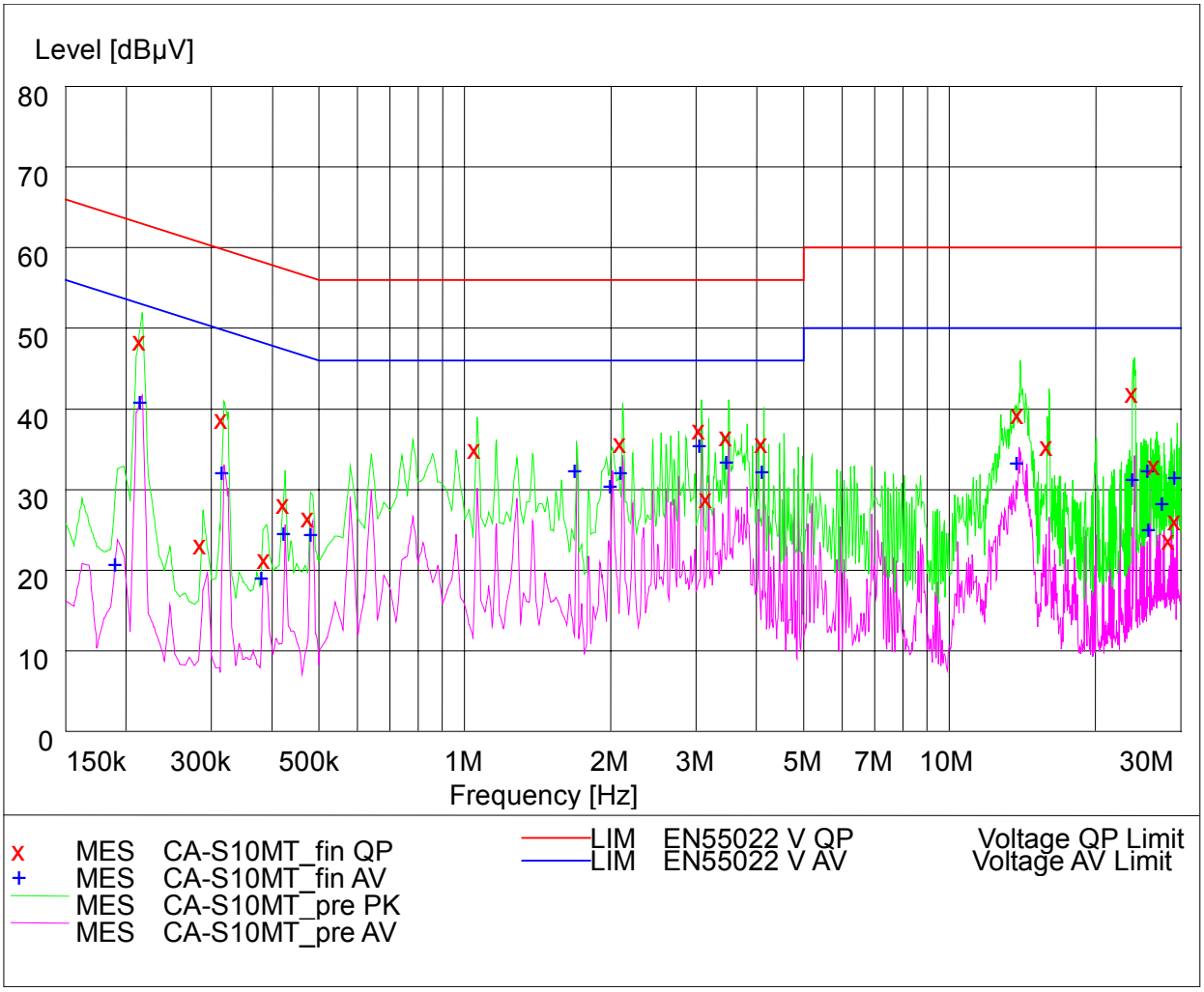
MEASUREMENT RESULT: "CA-S10MT_fin AV"

7/11/03 11:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.192000	23.40	10.0	54	30.5	L1	GND
0.216000	41.60	10.0	53	11.4	L1	GND
0.318000	35.30	10.0	50	14.5	L1	GND
0.390000	18.40	10.0	48	29.7	L1	GND
0.426000	28.10	10.0	47	19.2	L1	GND
0.486000	24.90	10.0	46	21.3	L1	GND
1.700000	37.90	10.0	46	8.1	L1	GND
3.080000	40.90	10.0	46	5.1	L1	GND
3.400000	37.10	10.0	46	8.9	L1	GND
3.720000	36.90	10.0	46	9.1	L1	GND
4.040000	38.40	10.0	46	7.6	L1	GND
4.460000	39.20	10.0	46	6.8	L1	GND
5.100000	35.70	10.0	50	14.3	L1	GND
6.800000	35.00	10.0	50	15.0	L1	GND
13.900000	34.00	10.0	50	16.0	L1	GND
24.100000	32.00	10.0	50	18.0	L1	GND
25.800000	19.00	10.0	50	31.0	L1	GND
29.200000	26.10	10.0	50	23.9	L1	GND

Note : The insertion loss of LISN is enough small compare with test result.
The maximum insertion loss is 2.07dB at phase L1.

Conducted Emissions



Neutral

MEASUREMENT RESULT: "CA-S10MT_fin QP"

7/11/03 11:42AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.216000	49.60	10.0	63	13.4	N	GND
0.288000	24.30	10.0	61	36.3	N	GND
0.318000	39.80	10.0	60	20.0	N	GND
0.390000	22.50	10.0	58	35.6	N	GND
0.426000	29.40	10.0	57	27.9	N	GND
0.480000	27.60	10.0	56	28.7	N	GND
1.060000	36.20	10.0	56	19.8	N	GND
2.120000	36.90	10.0	56	19.1	N	GND
3.080000	38.60	10.0	56	17.4	N	GND
3.180000	30.10	10.0	56	25.9	N	GND
3.500000	37.70	10.0	56	18.3	N	GND
4.140000	36.90	10.0	56	19.1	N	GND
14.000000	40.50	10.0	60	19.5	N	GND
16.050000	36.50	10.0	60	23.5	N	GND
24.100000	43.10	10.0	60	16.9	N	GND
26.750000	34.20	10.0	60	25.8	N	GND
28.650000	24.90	10.0	60	35.1	N	GND
29.500000	27.30	10.0	60	32.7	N	GND

MEASUREMENT RESULT: "CA-S10MT_fin AV"

7/11/03 11:42AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.192000	21.80	10.0	54	32.1	N	GND
0.216000	42.00	10.0	53	11.0	N	GND
0.318000	33.10	10.0	50	16.7	N	GND
0.384000	20.10	10.0	48	28.1	N	GND
0.426000	25.60	10.0	47	21.7	N	GND
0.486000	25.50	10.0	46	20.7	N	GND
1.700000	33.40	10.0	46	12.6	N	GND
2.020000	31.50	10.0	46	14.5	N	GND
2.120000	33.10	10.0	46	12.9	N	GND
3.080000	36.50	10.0	46	9.5	N	GND
3.500000	34.50	10.0	46	11.5	N	GND
4.140000	33.30	10.0	46	12.7	N	GND
13.900000	34.40	10.0	50	15.6	N	GND
24.100000	32.40	10.0	50	17.6	N	GND
25.900000	33.40	10.0	50	16.6	N	GND
26.000000	26.10	10.0	50	23.9	N	GND
27.700000	29.40	10.0	50	20.6	N	GND
29.400000	32.60	10.0	50	17.4	N	GND

Note : The insertion loss of LISN is enough small compare with test result.
The maximum insertion loss is 2.07dB at phase L1.

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

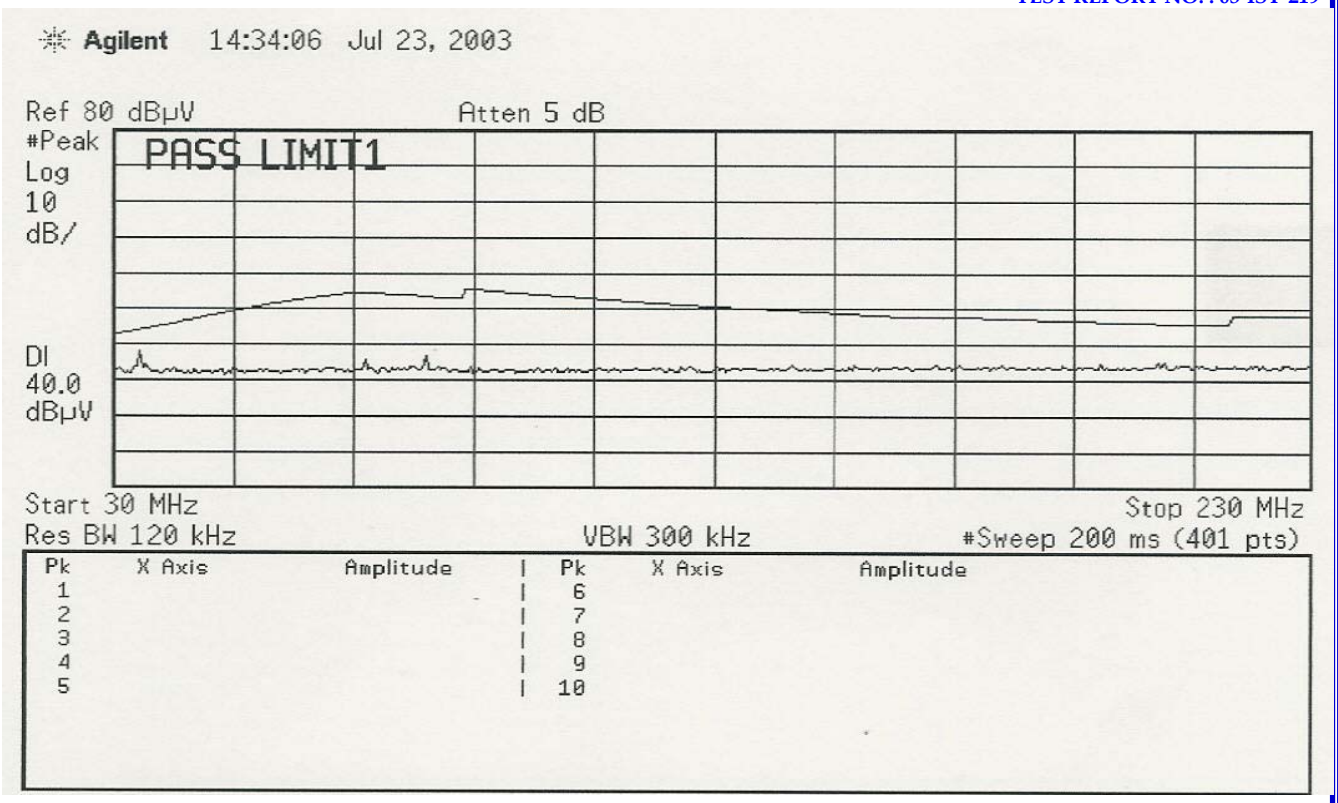
(Disturbance Radiation)

- The measured values are as following

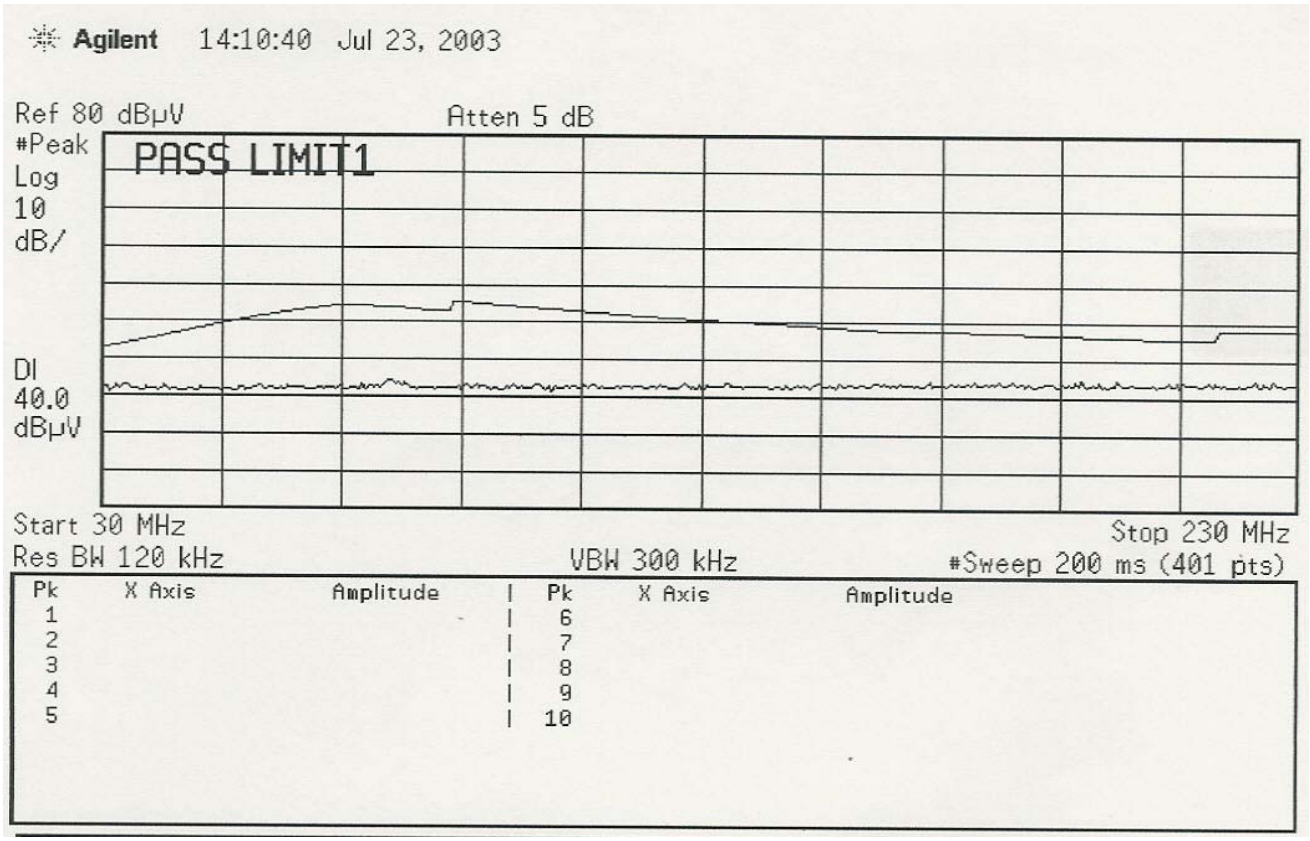
Freq. (MHz)	Reading (dBuV/m)	C.Loss (dB)	Ant. Factor (dBuV/m)	Azimuth (°)	Ant. Height (cm)	Pol. (H/V)	Limits (dBuV/m)	Result (dB)	Margin [dB]
86.0	14.3	1.8	7.6	321	155	V	40.0	23.7	16.3
86.0	17.7	1.8	7.6	95	200	H	40.0	27.1	12.9
108.5	9.4	2.2	11.4	83	100	V	43.5	23.0	20.5
110.6	11.2	2.2	11.7	267	139	H	43.5	25.1	18.4
184.3	10.3	3.3	15.4	254	140	H	43.5	29.0	14.5
189.9	19.3	3.3	15.6	300	100	H	43.5	38.2	5.3
211.3	9.7	3.6	16.9	100	338	H	43.5	30.2	13.3
256.9	9.2	4.0	11.8	0	100	H	46.0	25.0	21.0
310.5	16.9	4.4	14.3	75	120	V	46.0	35.6	10.4
501.2	17.2	6.2	17.8	139	236	H	46.0	41.2	4.8
699.4	9.2	7.6	21.0	350	150	V	46.0	37.8	8.2

End of data

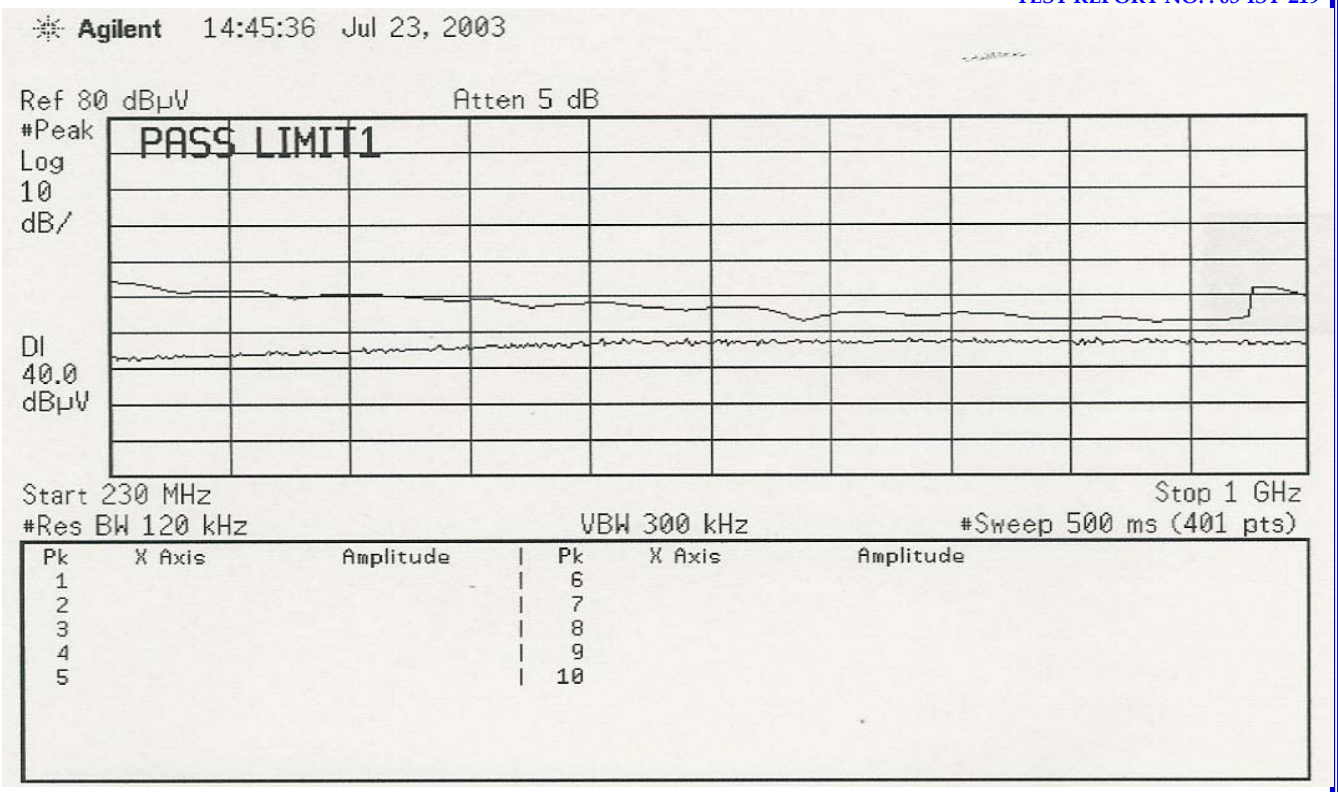
Note : Please refer to following pages for FM receiving mode test result.
It couldn't be measured at open area test site for FM mode. The preliminary test results of FM mode are attached in following pages.



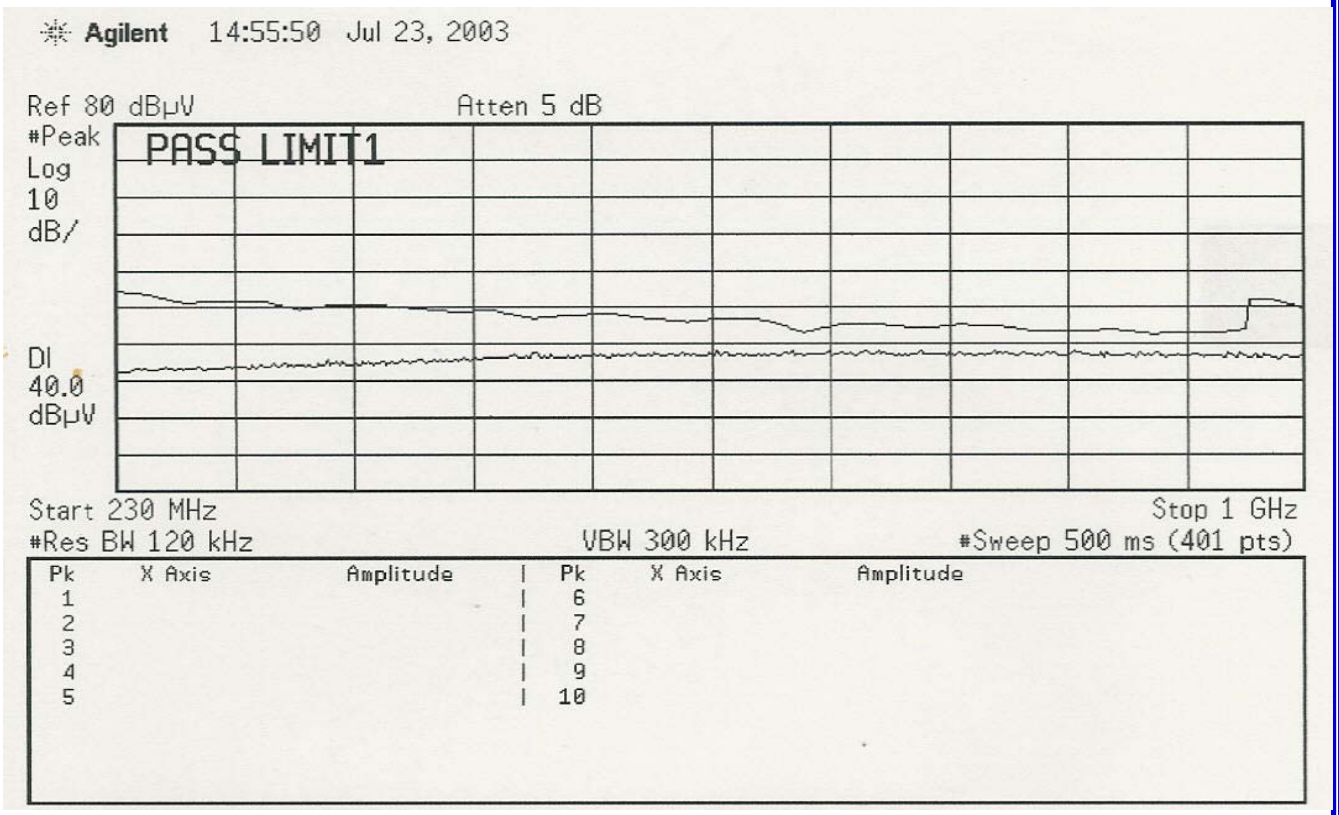
LOW(Vertical)



LOW(Horizontal)



HIGH(Vertical)



HIGH(Horizontal)