Certification of Compliance

CFR 47 Part 15 Subpart B / Class B PC Peripherals

Test Report File No. 03-IST-279 **Date of Issue** Oct. 24. 2003

Model **CA-H70MT**

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 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.

TABLE OF CONTENTS

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	19 ℃
Humidity	40 %
Atmospheric pressure	1002 mbar

POWER SUPPLY SYSTEM USED

Product Information

Main Uses	MP3/WMA Player / FM Tuner / Voice Recorder / Removable Disc
Memory Capacity	128MB Flash Memory
Data Transfer Rate	7Mbps
Display Type	FSTN LCD (EL backlight)
Signal-to-Noise Ratio	90dB (20KHz LPF)
Battery	1 AAA Battery
Operating Time	12 hours of continuous use
Case Material	Aluminum
Computer Interface	USB port

Find product information in User's manual.

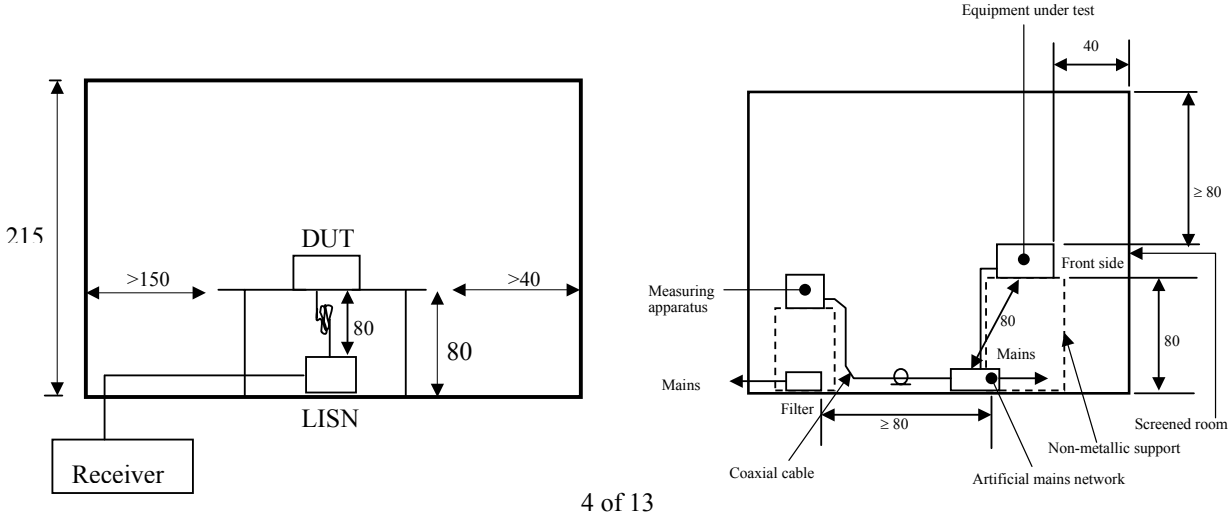
DESCRIPTIONS OF TEST

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.



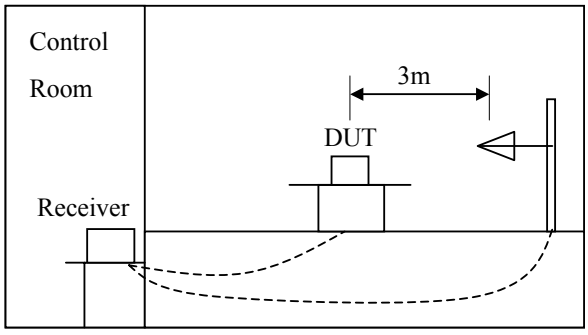
DESCRIPTION OF TEST

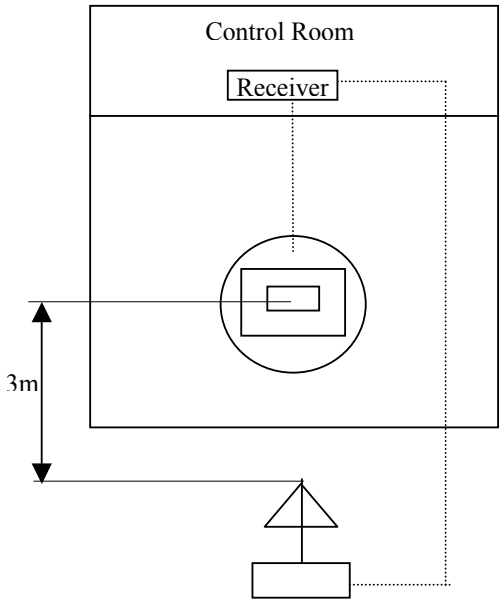
Radiated Emissions:

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	3.1dB at 1.309MHz
Maximum limit exceeding	

Remarks : With A-V detector/Live Phase

☒ Radiated Emission

The requirements are	● MET ○ Not MET
Minimum limit margin	3.3dB at 480MHz
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

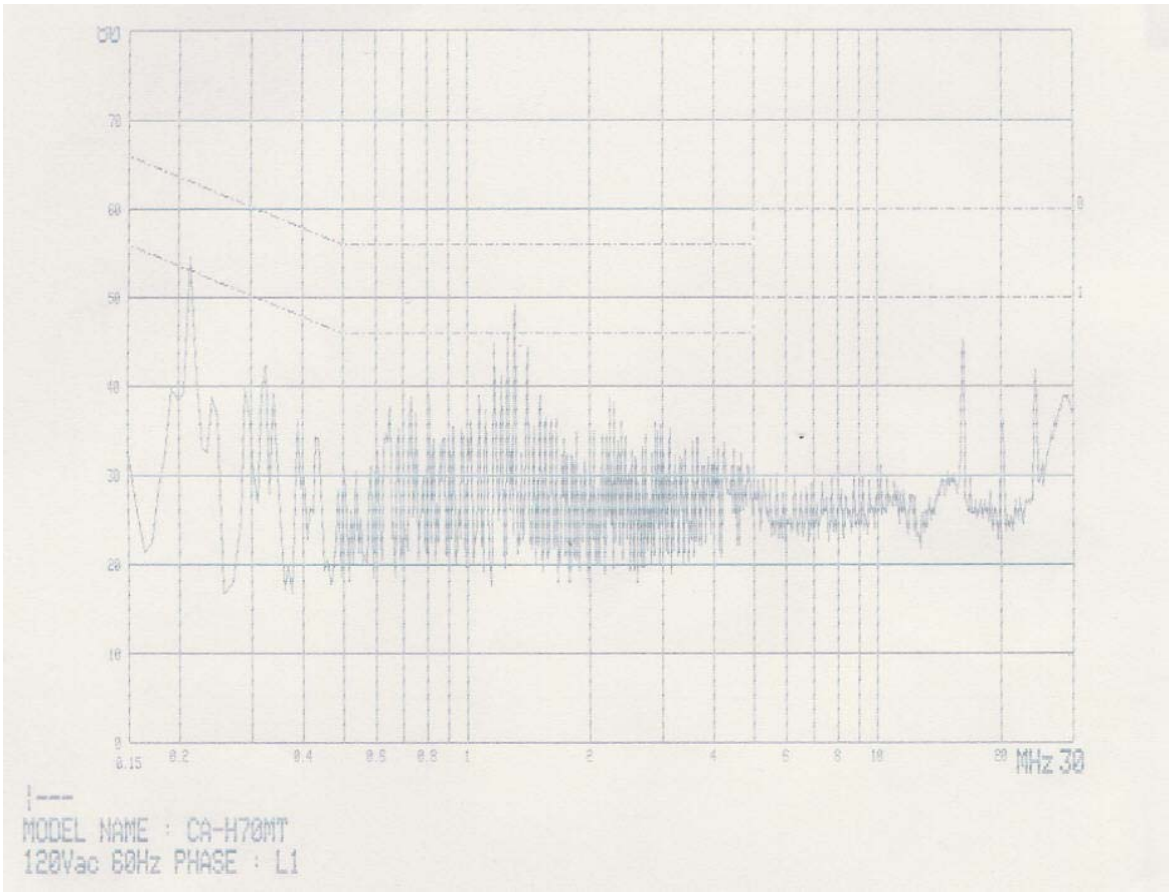
Model Name	Manufacturer	Descriptions	FCC Compliance information
Brio BA600/550	HP	Desktop PC	Doc
SK-2502C	HP	Keyboard (PS/2)	Doc
M-S48a	HP	Mouse (PS/2)	FCC ID : JNZ201213
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
SMB-400	Sejin Electron Inc	Mouse(RS-232C)	FCC ID : GJJS965M3
AN-2005	Aion Korea	Headphone/MIC	N/A
MIDI/GAME	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.

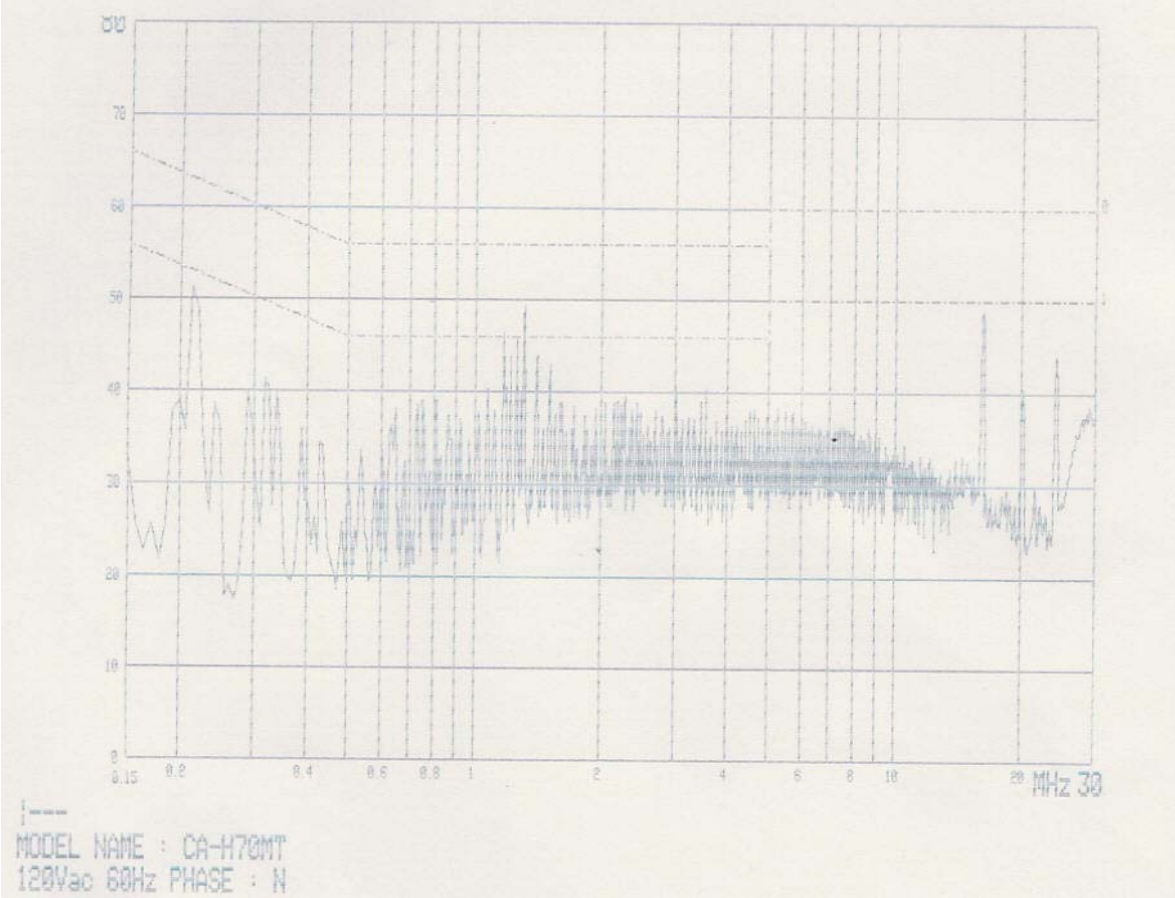
Conducted Emissions



Live Phase

Quasi-Peak				Average			
Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]	Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]
0.212	50.3	63.1	11.4	0.212	40.6	53.1	11.1
0.240	37.8	62.1	22.9	0.240	36.9	52.1	13.8
0.288	36.5	60.6	22.8	0.288	37.4	50.6	11.9
0.324	41.8	59.6	16.7	0.324	33.7	49.6	14.8
0.337	36.5	59.3	21.7	0.337	37.2	49.3	11.0
0.387	34.4	58.1	22.7	0.387	35.0	48.1	12.1
0.800	25.4	56.0	29.9	0.800	20.6	46.0	24.7
1.065	34.4	56.0	20.8	1.065	34.7	46.0	10.5
1.163	42.3	56.0	12.9	1.163	42.0	46.0	3.2
1.256	16.3	56.0	38.9	1.256	11.7	46.0	33.5
1.309	46.1	56.0	9.1	1.309	42.1	46.0	3.1
1.404	30.2	56.0	25.0	1.404	28.5	46.0	16.7
10.155	25.0	60.0	34.1	10.155	18.4	50.0	30.7
14.801	17.5	60.0	41.3	14.801	10.4	50.0	38.4
16.168	38.0	60.0	20.8	16.168	17.5	50.0	31.3
20.222	30.6	60.0	28.3	20.222	14.7	50.0	34.2
24.270	31.7	60.0	27.3	24.270	14.1	50.0	34.9
28.452	22.8	60.0	36.0	28.452	16.4	50.0	32.4

Conducted Emissions



Neutral Phase

Quasi-Peak				Average			
Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]	Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]
.213	48.6	63.1	13.0	0.213	41.7	53.1	9.9
0.240	36.0	62.1	24.7	0.240	36.7	52.1	14.0
0.288	36.5	60.6	22.8	0.288	37.3	50.6	12.0
0.316	20.5	59.8	38.0	0.316	11.2	49.8	37.3
0.337	36.6	59.3	21.6	0.337	37.2	49.3	11.0
0.387	34.3	58.1	23.8	0.387	35.0	48.1	12.1
1.065	35.8	56.0	19.4	1.065	35.1	46.0	10.1
1.163	42.6	56.0	12.6	1.163	41.6	46.0	3.6
1.256	20.4	56.0	34.8	1.256	13.8	46.0	31.4
1.309	46.1	56.0	9.1	1.309	41.9	46.0	3.3
1.404	33.1	56.0	22.1	1.404	28.8	46.0	16.4
1.507	40.6	56.0	14.5	1.507	38.6	46.0	6.5
5.252	25.6	60.0	33.6	5.252	19.2	50.0	30.0
5.473	24.4	60.0	34.7	5.473	17.8	50.0	31.3
16.168	38.1	60.0	20.7	16.168	17.8	50.0	31.0
20.222	30.4	60.0	28.5	20.222	14.9	50.0	34.0
24.128	37.0	60.0	22.0	24.128	19.0	50.0	30.0
28.958	22.3	60.0	36.5	28.958	15.8	50.0	33.0

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-S48a	HP	Mouse (PS/2)	FCC ID : JNZ201213
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
SMB-400	Sejin Electron Inc	Mouse(RS-232C)	FCC ID : GJJS965M3
AN-2005	Aion Korea	Headphone/MIC	N/A
MIDI/GAME	Microsoft	Joy stick	Doc

◆ Test Program Read and Write / FM Receiving

◆ Test Area Open Area Test Site #1

Note :

Radiated Emissions

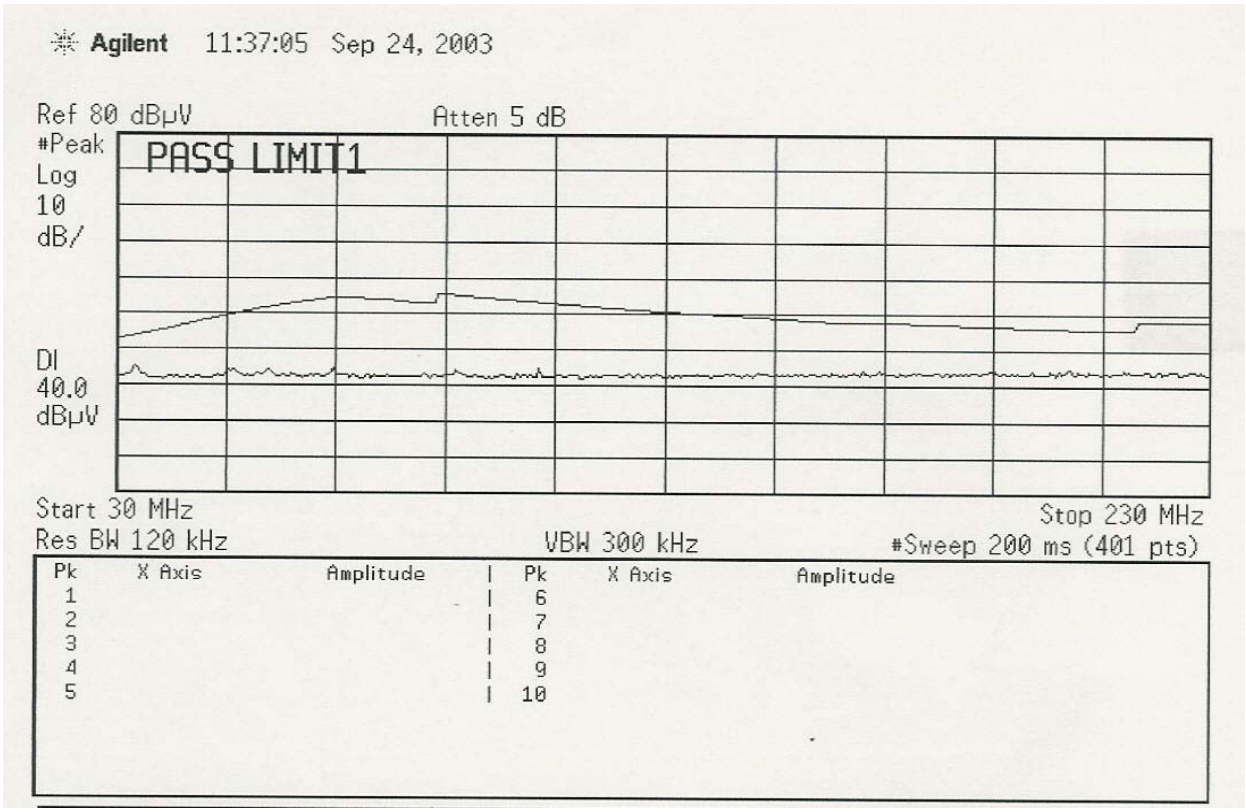
(Disturbance Radiation)

- The measured values are as following

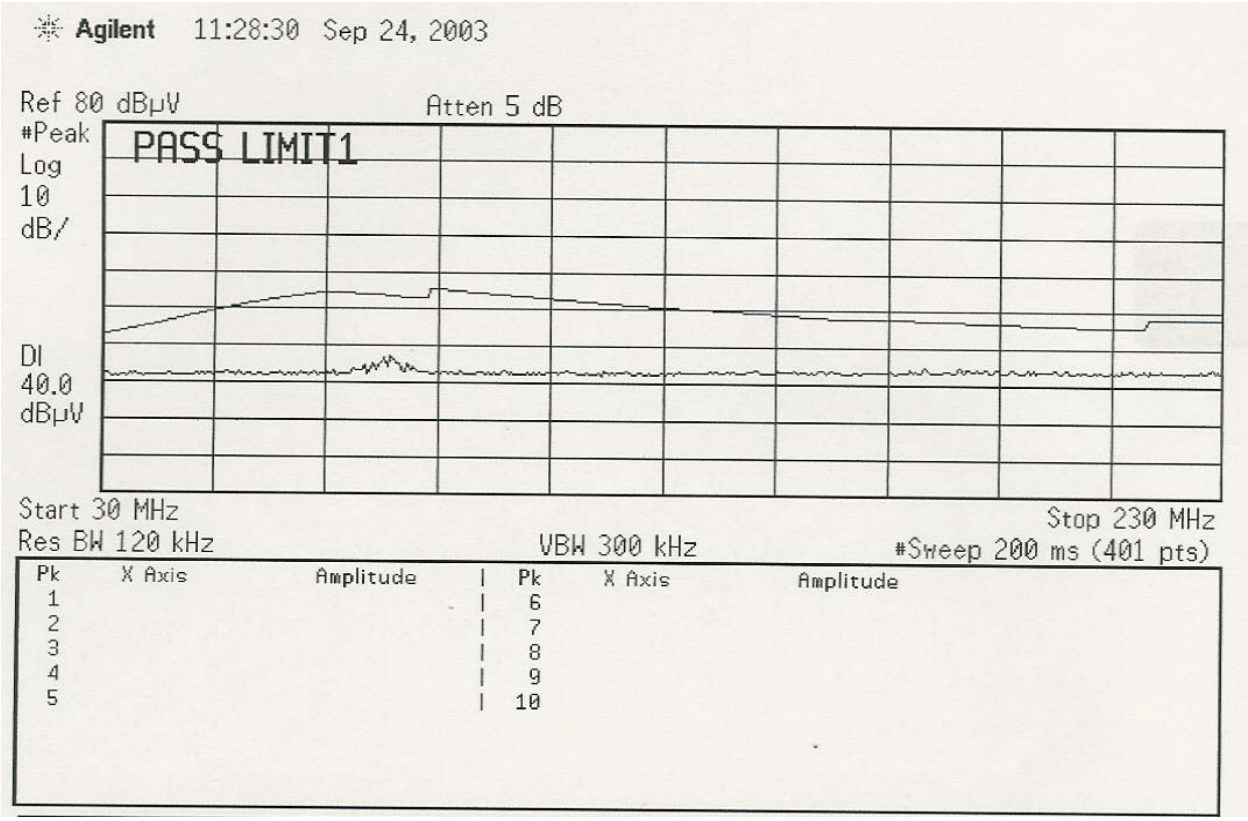
Freq. (MHz)	Reading (dBuV/m)	C.Loss (dB)	Ant. Factor (dBuV/m)	Azimuth (°)	Ant. Height (cm)	Pol. (H/V)	Limits (dBuV/m)	Result (dB)	Margin [dB]
33.4	18.1	0.8	17.6	103	110	V	40.0	36.5	3.5
75.7	21.2	1.6	6.1	79	400	H	40.0	28.9	11.1
78.0	17.3	1.6	6.3	73	400	H	40.0	25.2	14.8
79.6	20.6	1.6	6.4	80	400	H	40.0	28.6	11.4
83.6	20.8	1.7	7.2	265	400	H	40.0	29.7	10.3
120.0	17.1	2.5	12.9	0	100	V	43.5	32.5	11.0
203.3	17.0	3.5	16.3	340	100	V	43.5	36.8	6.7
480.0	20.0	6.0	16.7	49	320	V	46.0	42.7	3.3
481.0	19.1	6.0	16.7	60	400	H	46.0	41.8	4.2
491.4	18.7	6.1	17.3	179	400	H	46.0	42.1	3.9
492.0	19.0	6.1	17.4	195	350	V	46.0	42.5	3.5
504.0	18.3	6.2	17.7	55	345	V	46.0	42.2	3.8

End of data

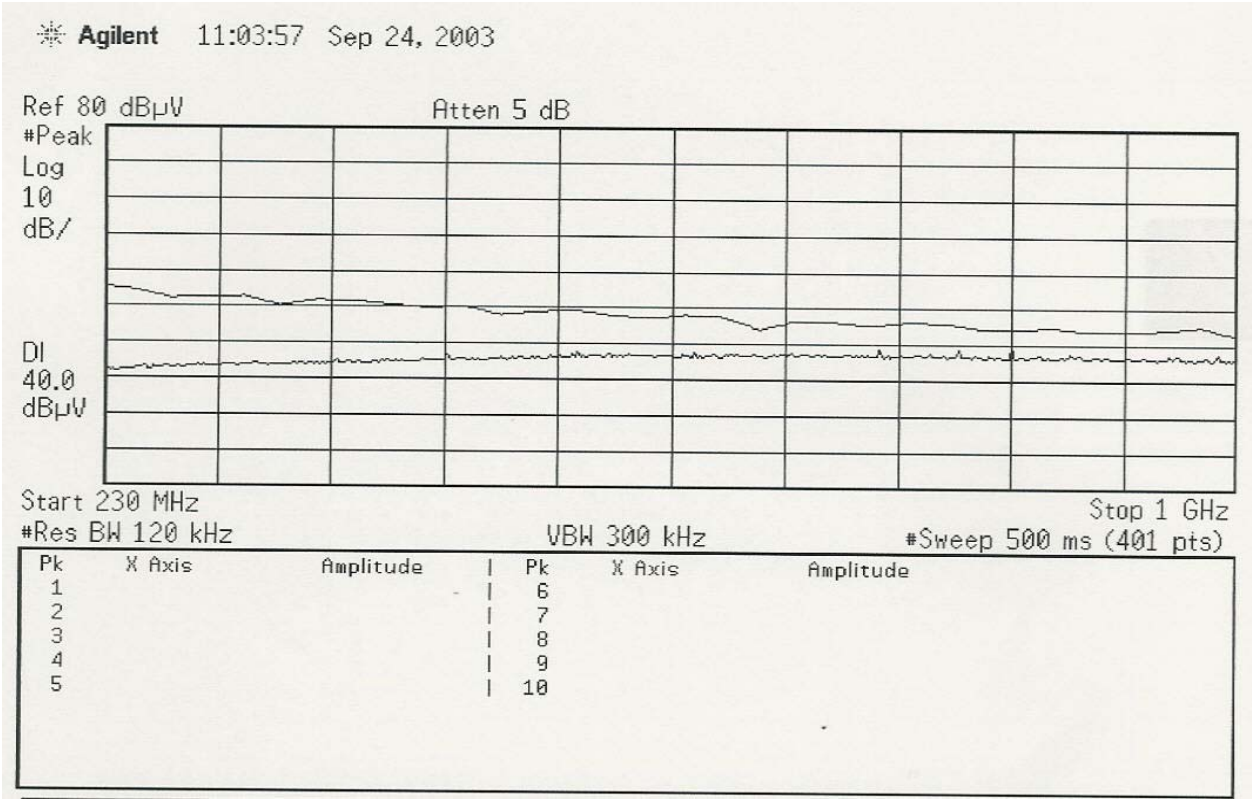
Note : Please refer to following pages for FM receiving mode test result.
It couldn't be measured at open area test site for FM mode. The preliminary test results of FM mode are attached in following pages.



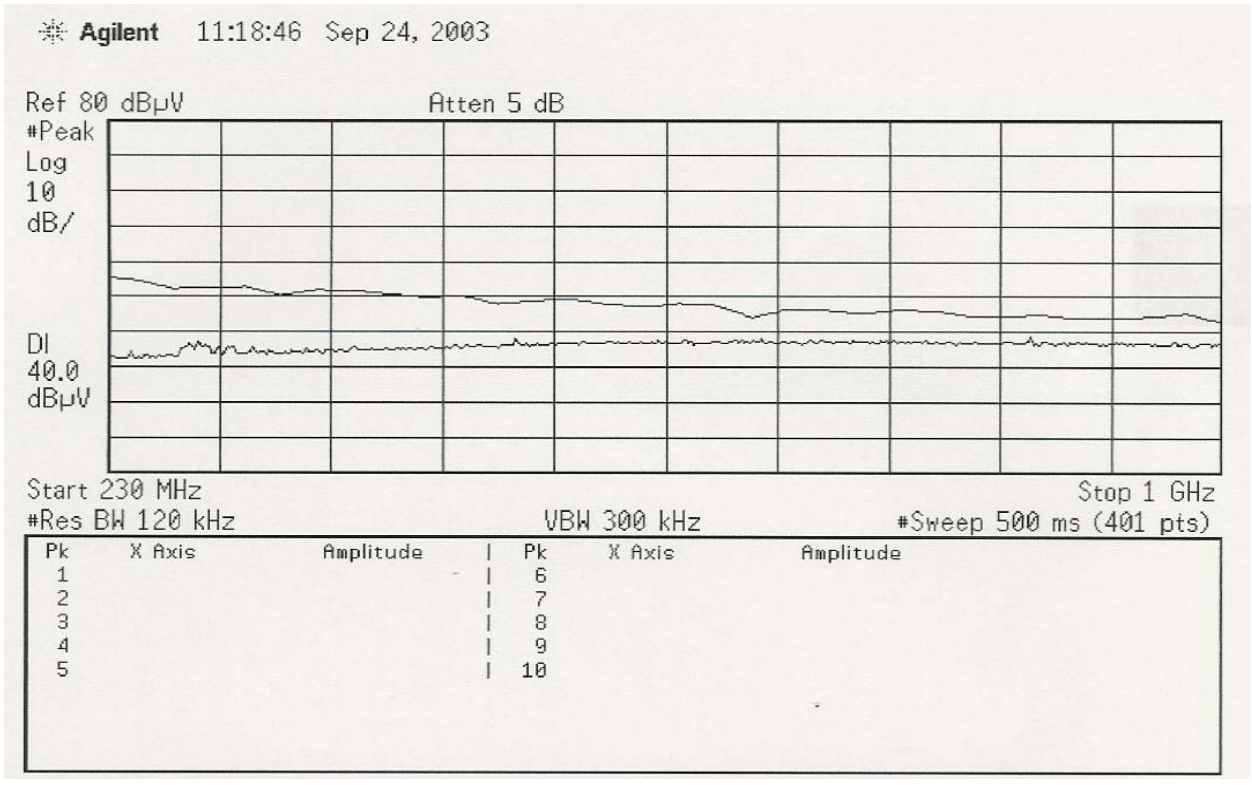
LOW(Vertical)



LOW(Horizontal)



HIGH(Vertical)



HIGH(Horizontal)