Certification of Compliance

CFR 47 Part 15 Subpart B / Class B PC Peripherals

Test Report File No. 04-IST-0120 **Date of Issue** May 29. 2004

Model **CA-C90**

Kind of Product Digital Audio Player

Applicant CM Tech Co., Ltd.

Address No. 303, 3F., SamsungTechnoPark Bldg., 471 Woncheon-Dong, Yeongtong-Gu, Suwon-City, Gyungki-Do, Korea

Manufacturer CM Tech Co., Ltd.

Address No. 303, 3F., SamsungTechnoPark Bldg., 471 Woncheon-Dong, Yeongtong-Gu, Suwon-City, Gyungki-Do, 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 13 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 2001.

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INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. (Yongin Lab., ***Filed to FCC***)
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TEL : +82 31 323 3012 FAX : +82 31 323 3014

ENVIRONMENTAL CONDITIONS

Temperature	21 ℃
Humidity	43 %
Atmospheric pressure	1001 mbar

POWER SUPPLY SYSTEM USED

Product Information

Main Uses	MP3 Player/Voice Recorder/Removable Disk/Game
Memory Capacity	256MB Flash Memory
Data Transfer Rate	4Mbps
Display Type	CSTN LCD (WHITE LED)
Signal-to-Noise Ratio	90dB (20KHz LPF)
Case Material	Aluminum/Plastic
Computer Interface	USB port

Find product information in User's manual.

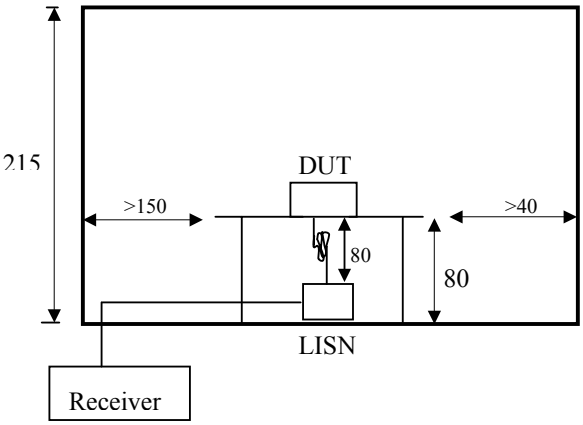
DESCRIPTIONS OF TEST

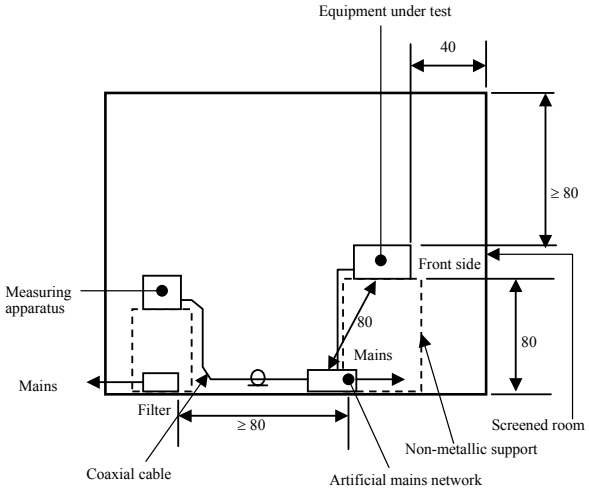
Conducted Emissions:

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.





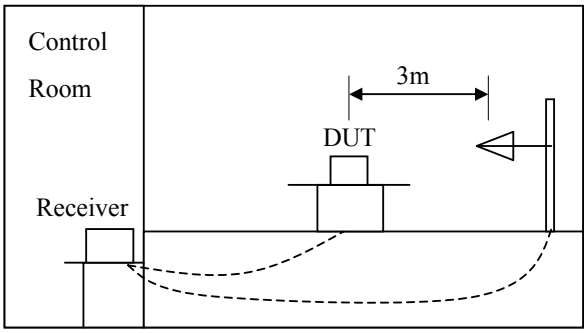
DESCRIPTION OF TEST

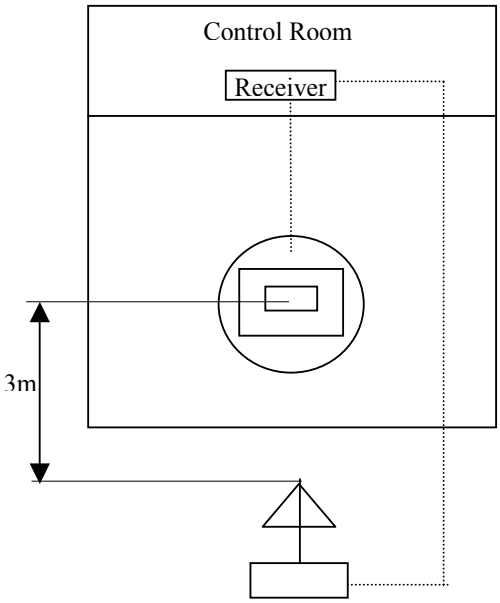
Radiated Emissions:

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 9.6dB at 0.176MHz

Maximum limit exceeding

Remarks : With A-V detector/Neutral Phase

☒ Radiated Emission

The requirements are ● MET ○ Not MET

Minimum limit margin 3.5dB at 517.3MHz

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	Jul. 23, 2004
ESH3-Z5	Rohde Schwarz	LISN	Jul. 23, 2004
EZM	Rohde Schwarz	Monitor	-
PDN	Rohde Schwarz	Printer	-
ESH3-Z2	Rohde Schwarz	Pulse Limiter	Jul. 23, 2004

◆ Auxiliary Equipment Used

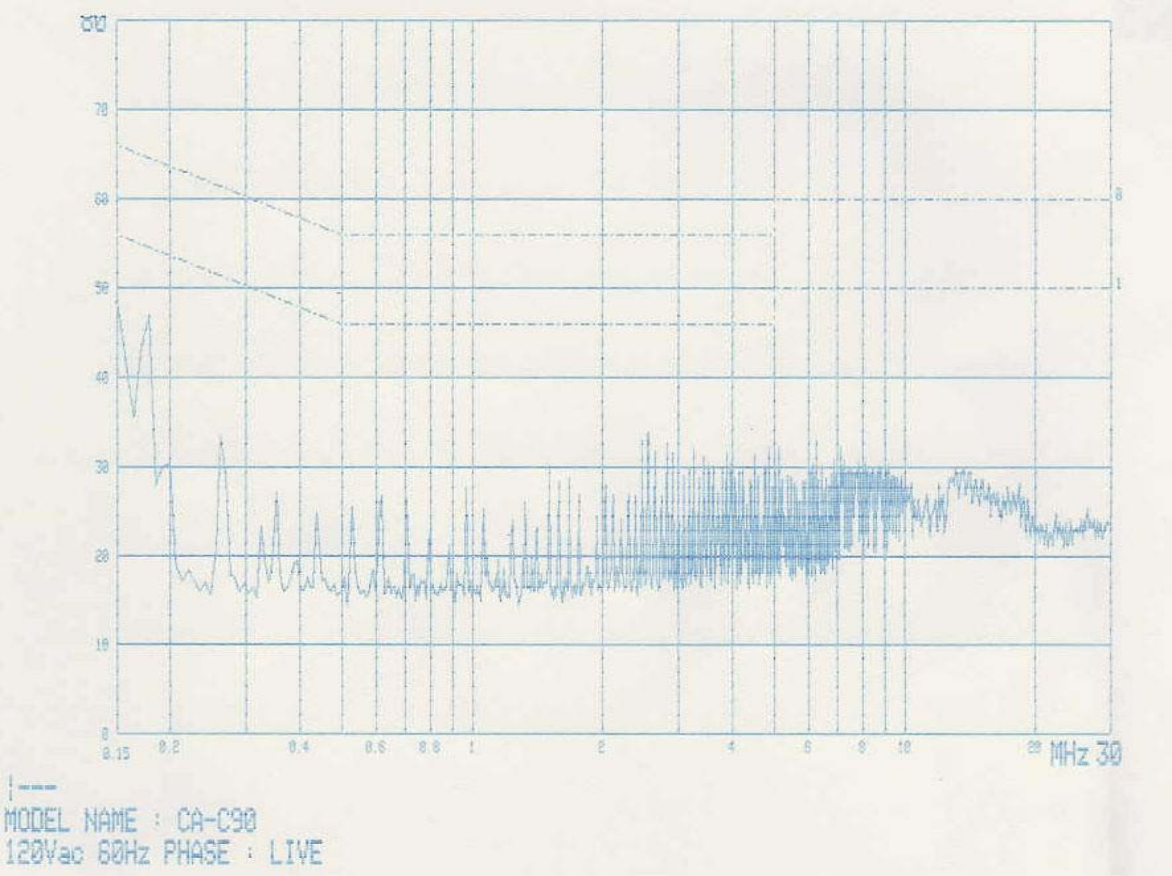
Model Name	Manufacturer	Descriptions	FCC Compliance information
t328k	HP	Desktop PC	Doc
5219	HP	Keyboard (PS/2)	FCC ID : E5XKB5209
M042K0	HP	Mouse (PS/2)	Doc
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
M-M28	Logitech Inc	Mouse(Serial)	FCC ID : DZL210365
NM-V33	TOCO	Headphone/MIC	N/A

◆ 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.

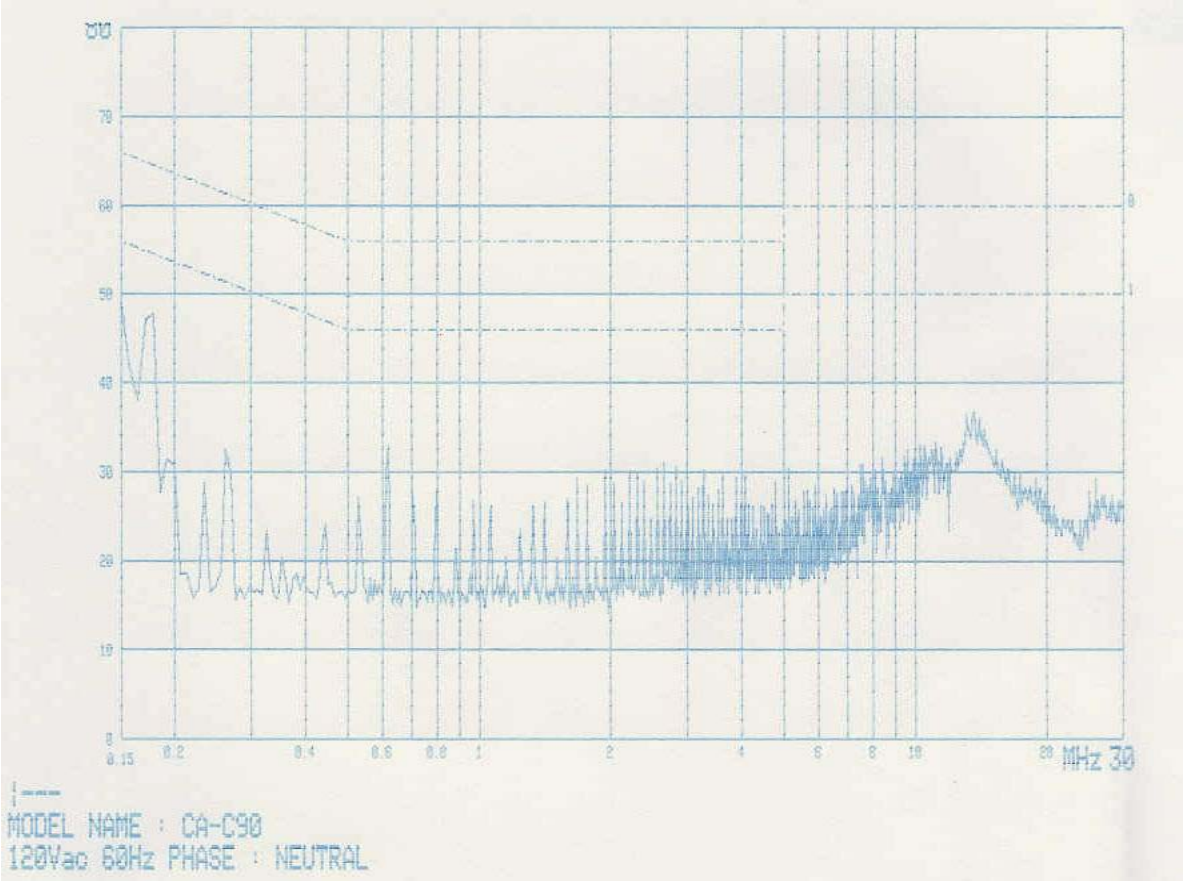
Conducted Emissions



Live Phase

Quasi-Peak				Average			
Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]	Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]
0.150	42.0	66.0	23.4	0.150	13.1	56.0	42.3
0.176	45.7	64.7	18.4	0.176	43.6	54.7	10.5
0.260	32.3	61.4	28.6	0.260	30.0	51.4	20.9
2.550	29.1	56.0	26.4	2.550	28.4	46.0	17.1
6.250	27.0	60.0	32.4	6.250	24.8	50.0	24.6
13.630	27.6	60.0	31.7	13.630	23.0	50.0	26.3

Conducted Emissions



Neutral Phase

Quasi-Peak				Average			
Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]	Freq [MHz]	Reading [dBuV]	Limit [dBuV]	Margin [dBuV]
0.150	41.9	66.0	23.5	0.150	10.7	56.0	44.7
0.176	46.0	64.7	18.1	0.176	44.5	54.7	9.6
0.260	31.6	61.4	29.3	0.260	29.5	51.4	21.4
0.620	26.8	56.0	28.8	0.620	23.2	46.0	22.4
2.640	31.0	56.0	24.5	2.640	29.7	46.0	15.8
13.630	35.1	60.0	24.1	13.630	31.5	50.0	17.7

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

◆ Test Equipment Used

Model Name	Manufacturer	Description	Next Cal. Date
ESVP	Rohde & Schwarz	Receiver	Jul. 22, 2004
VULB9160	SCHWARZBECK	Antenna	Jul. 09, 2004
IEC127-T5H	Rohde & Schwarz	Turn table	-
NCC	-	Positioning	-
-	SCHAFER	Antenna Mast	-

◆ Auxiliary Equipment Used

Model Name	Manufacturer	Descriptions	FCC Compliance information
t328k	HP	Desktop PC	Doc
5219	HP	Keyboard (PS/2)	FCC ID : E5XKB5209
M042K0	HP	Mouse (PS/2)	Doc
529B	Daewoo	Monitor	FCC ID : C5F7NFFCMC529B
A0302380	Northern Telecom	Printer	FCC ID : DSI6XU22225C-L
M-M28	Logitech Inc	Mouse(Serial)	FCC ID : DZL210365
NM-V33	TOCO	Headphone/MIC	N/A

◆ Test Program Read and Write / FM Receiving

◆ Test Area Open Area Test Site #1

Note :

Radiated Emissions

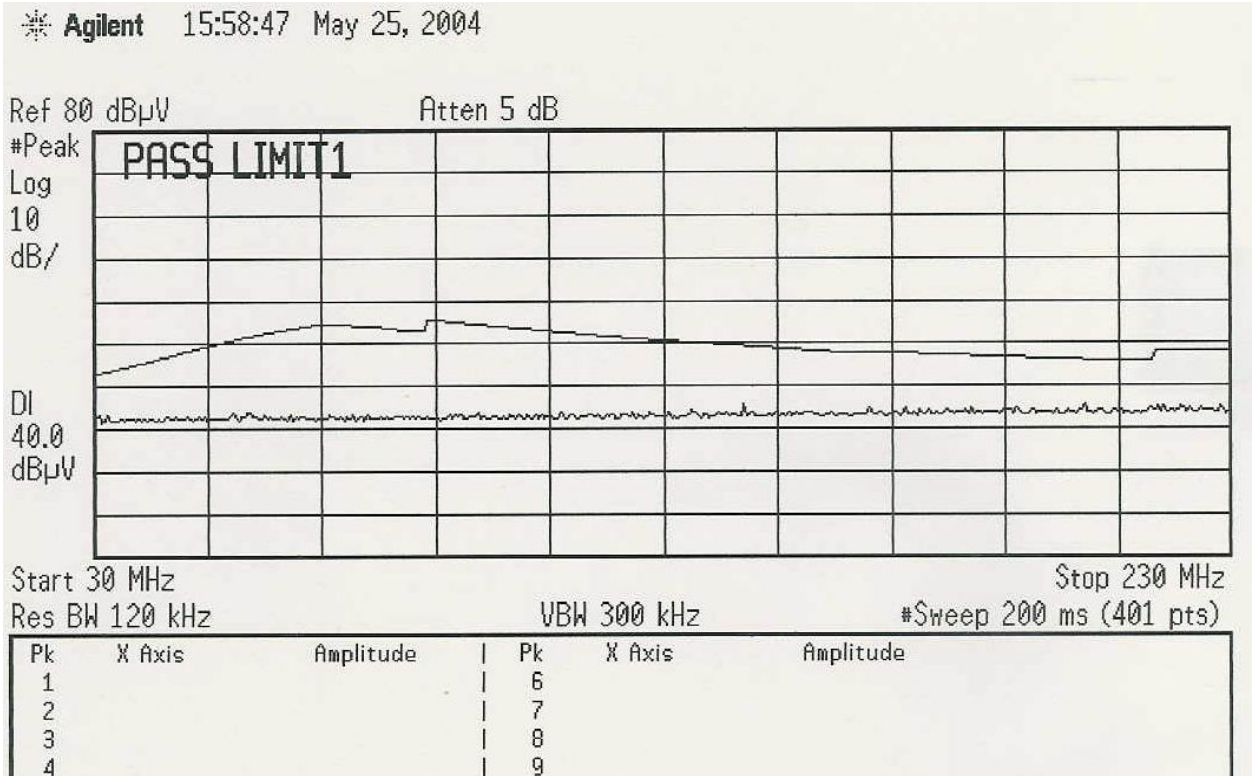
(Disturbance Radiation)

- The measured values are as following

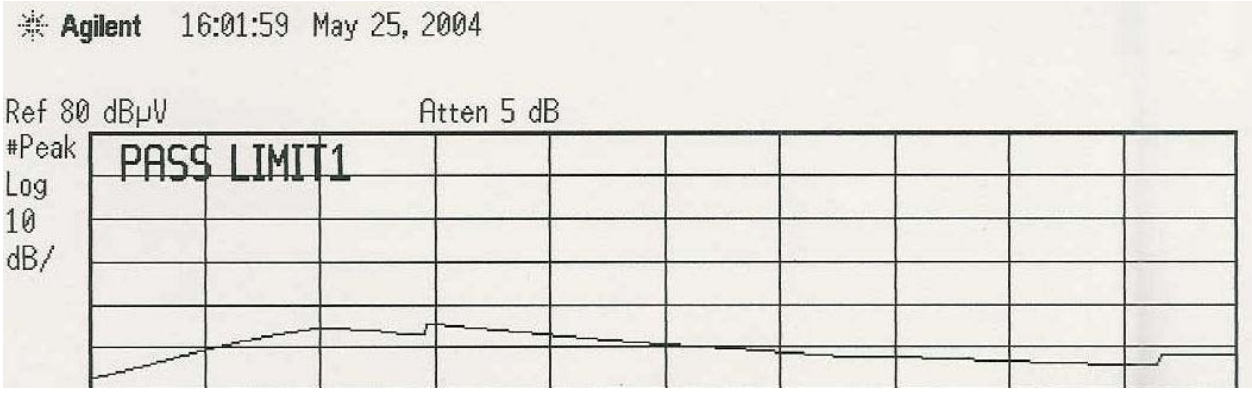
Freq. (MHz)	Reading (dBuV/m)	C.Loss (dB)	Ant. Factor (dBuV/m)	Azimuth (˚)	Ant. Height (cm)	Pol. (H/V)	Limits (dBuV/m)	Result (dB)	Margin [dB]
60.0	20.3	1.4	11.3	240	100	V	40.0	33.0	-7.0
139.5	22.5	2.1	11.5	145	290	H	43.5	36.1	-7.4
156.0	21.9	2.3	12.2	300	250	H	43.5	36.4	-7.1
240.0	24.0	2.9	10.2	65	290	V	46.0	37.1	-8.9
243.5	25.3	2.8	10.4	170	100	V	46.0	38.5	-7.5
244.1	21.8	2.8	10.4	290	300	H	46.0	35.0	-11.0
294.9	25.2	3.1	11.7	245	265	H	46.0	40.0	-6.0
505.3	20.1	4.8	15.1	250	281	H	46.0	40.0	-6.0
517.3	22.5	4.7	15.3	70	310	H	46.0	42.5	-3.5
539.4	19.6	4.6	15.7	0	295	H	46.0	39.9	-6.1
554.8	21.4	4.6	16.0	360	350	H	46.0	42.0	-4.0
565.1	18.7	4.6	16.2	230	100	V	46.0	39.5	-6.5

End of data

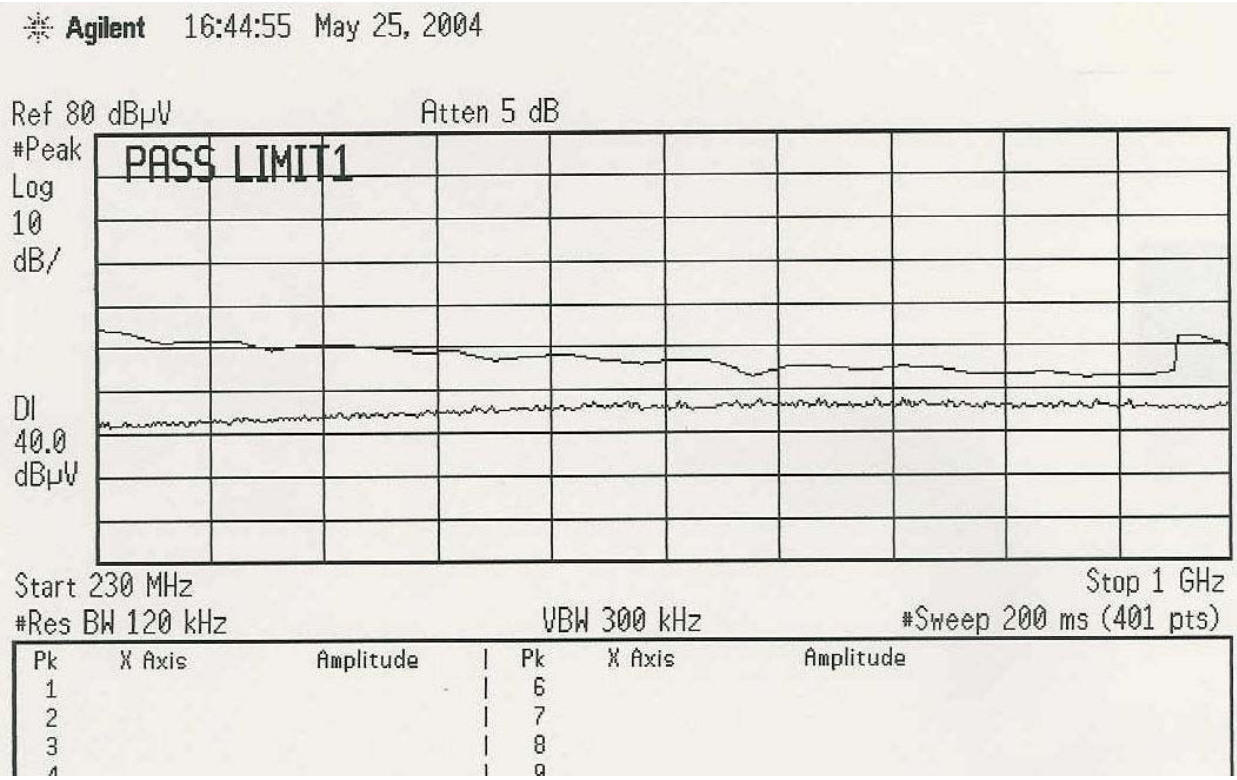
Note : Please refer to following pages for FM receiving mode test result.
It couldn't be measured at open area test site for FM mode. The preliminary test results of FM mode are attached in following pages.



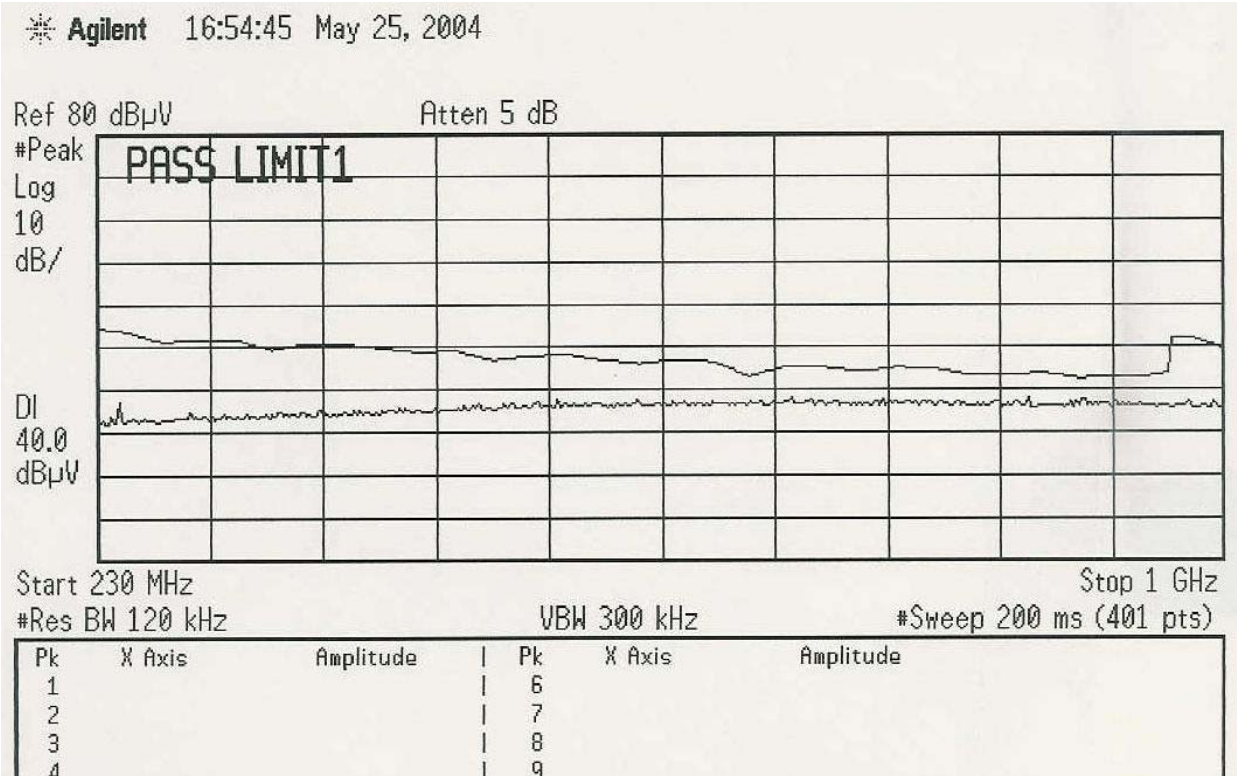
LOW(Vertical)



LOW(Horizontal)



HIGH(Vertical)



HIGH(Horizontal)