Intel Government Affairs
1634 I Street, NW #300
Washington, DC 20006
(202) 628-3838
Fax (202) 628-2525

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
Room 222
1919 M Street, NW
Washington, DC 20554

Re: Ex Parte Presentation
ET Docket No. 95-19

Dear Mr. Caton:

Representatives of the Intel Corporation ("Intel") met by telephone with Mr. John Reed of the Office of Engineering and Technology, and members of his staff, on matters relating to Intel's pending petition for reconsideration in the above-captioned proceeding. Intel was represented by Doug Probstfeld and Paul Misener. In addition, copies of the attached documents were provided to Mr. Reed and his staff.

Pursuant to Section 1.1206 of the Commission's rules, an original and one copy of this notice is enclosed. Please address any questions on this matter to the undersigned.

Sincerely yours,

Paul E. Misener
Manager, Telecommunications and
Computer Technology Policy

Attachment

cc (w/o Attachment) Mr. John Reed

No. of Copies rec'd 0+1
List A B C D E

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System Emission Profiles

Cover On vs. Cover Off

March 10, 1997

Ghery S. Pettit, NCE
Intel Corporation
2800 Center Drive
DuPont, Washington 98327
(206) 371-5515

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Appendix A

1. Executive Summary

Data is presented which shows that typical computer CPU boards emit emissions in excess of that allowed under the revised FCC Rules and that typical computer chassis provide more than the 3 dB of shielding anticipated in the Rules.

2. Introduction

The Report and Order on FCC Docket OET 95-19 which went into effect on August 19, 1996 made a number of changes to Parts 2 and 15 of the FCC Rules (47 CFR Parts 2 and 15). The major impact of these changes was to allow manufacturers of personal computers the option of self declaring compliance with the FCC rules subject to certain conditions. One of the options for this self declaration was to declare compliance based on the use of previously approved components with no test of the finished system. As motherboards and primary processor boards used in PCs (or CPU Boards as they are called in §15.3(bb) of the FCC Rules) and power supplies had not been allowed to obtain separate approvals in the past, test methods for them were created and added to the Rules in §15.32. In order for a CPU board to receive authorization (either Certification or Declaration of Conformity) it must be tested under the provisions of §15.32(a) of the Rules, i.e., it must pass with the cover installed on the chassis and fail by no more than 3 dB with the cover removed, exposing the top and at least two sides. This document presents data on 4 different systems to show that typical systems will not meet the 3 dB relaxed limits with the cover removed, although they meet the stated limits in §15.109 with the cover in place. In addition, peak detector data taken on 7 other motherboards is provided in Appendix A.

3. Test Procedure

CPU boards are subject to a special test procedure, unlike any other component part used in a PC which will be sold based on a Declaration of Conformity without further testing. All other parts of the system (power supply, video card, CD-ROM drive, etc.) are tested in a representative system with the cover installed as would be done in a typical installation. CPU boards which must have a separate authorization have been singled out for a special test procedure, detailed in §15.32(a) of the rules:

§15.32 Test procedures for CPU boards and computer power supplies. - Power supplies and CPU boards used with personal computers and for which separate authorizations are required to be obtained shall be tested as follows:

(a) CPU boards shall be tested as follows:

(1) Testing for radiated emissions shall be performed with the CPU board installed in a typical enclosure but with the enclosure's cover removed so that the internal circuitry is exposed at the top and on at least two sides. Additional components, including a power supply, peripheral devices, and subassemblies, shall be added, as needed, to result in a complete personal computer system. If the oscillator and the microprocessor circuits are contained on separate circuit boards, both boards, typical of the combination that would normally be employed, must be used in the test. Testing shall be in accordance with the procedures specified in §15.31 of this

part. Under these test conditions, the system under test shall not exceed the radiated emission limits specified in §15.109 by more than 3 dB;

(2) Unless the test in paragraph (a)(1) of this section demonstrates compliance with the limits in §15.109, a second test shall be performed using the same configuration described in paragraph (a)(1) but with the cover installed on the enclosure. Testing shall be in accordance with the procedures specified in §15.31. Under these test conditions, the system under test shall not exceed the radiated emission limits specified in §15.10; and

(3) The test demonstrating compliance with the AC power line conducted limits specified in §15.107 shall be performed in accordance with the procedures specified in §15.31 using a enclosure, peripherals, power supply and subassemblies that are typical of the type with which the CPU board under test would normally be employed.

The first three systems in this report were tested as complete systems, both with the cover in place and removed. Printers were connected, but not powered for these tests. All three systems had a 3.5" floppy drive, a hard drive and a CD-ROM drive installed. The fourth system is reported with only the CPU board powered. Disc drives are connected to the controllers, but have their power connectors disconnected and the video card is removed. All peripherals are unpowered. The fourth system is only reported with the cover removed.

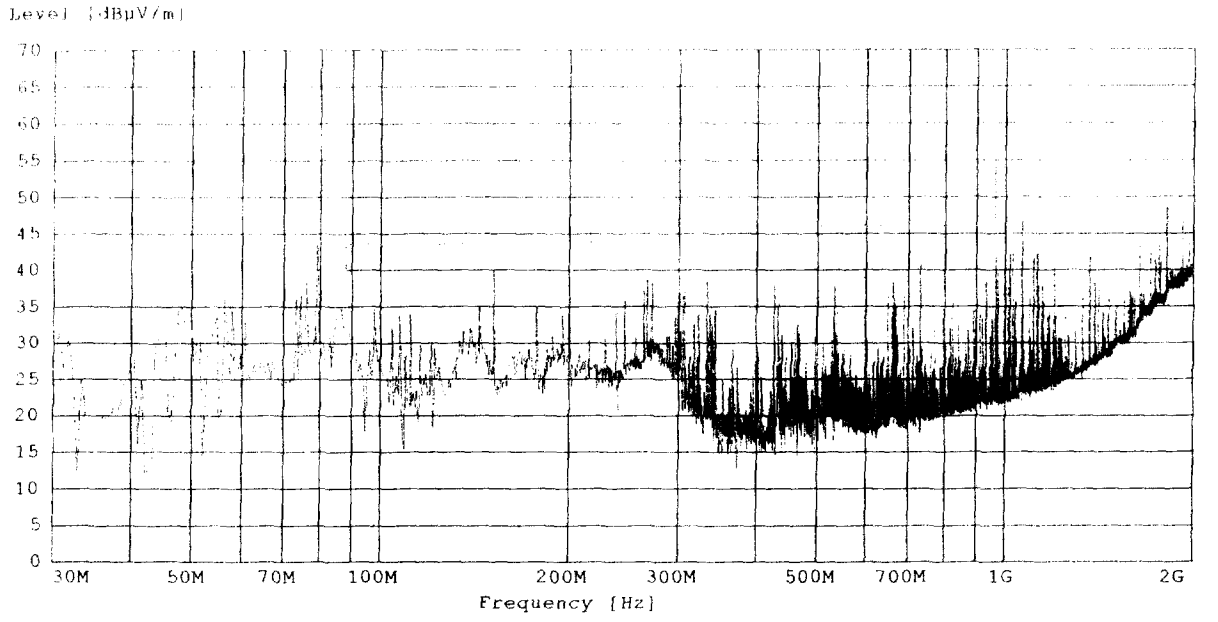
All tests reported in the main part of this document were performed in Intel's 3 meter RF semi-anechoic chamber in DuPont, Washington. Tests were performed by Ghery S. Pettit, NCE and Nicholas Garinger. While this chamber is not yet listed with the FCC, preliminary site attenuation data indicates that it will meet the requirements of ANSI C63.4-1992 for an alternate test site, and it will be listed with the Commission in the near future. All data was taken utilizing a Rohde & Schwarz ESBI receiver and Chase CBL6112A BiLog antenna under the automatic control of a routine running under the Rohde & Schwarz ES-K1 software package. Limits shown are the limits called out in §15.109(a) of the rules and negative margins show signals over the limit. No adjustment of the limits was made for cover off tests, so signals showing a failing margin of less than 3 dB are compliant with the requirements in §15.32(a)(1) of the Rules.

Attempts were made to identify the source of a few key frequencies during the testing process, and other signals have their harmonic relationship to motherboard clocks noted in the data below.

4. Test Results

4.1 System #1

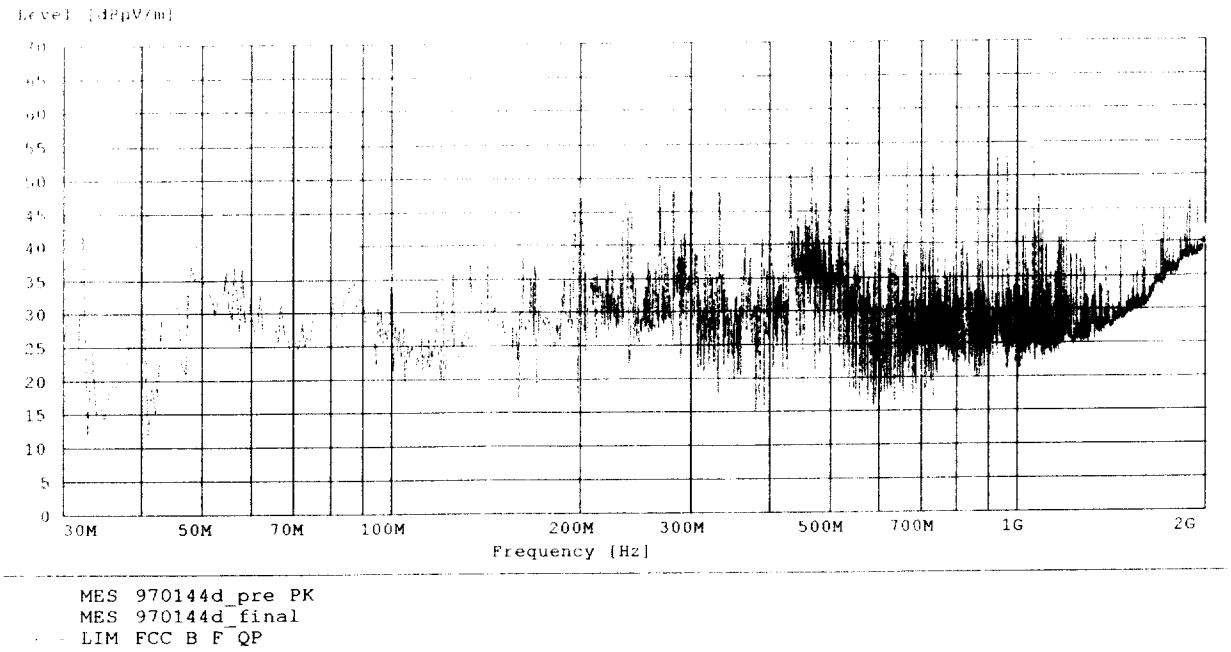
The first system is a tower system which utilizes Intel's new Pentium® II processor running at 266 MHz. A separate video card is utilized in this product. Due to the design of the chassis, only one side cover and the top cover of the chassis are removable. The first data below is for the unit with the covers in place on the chassis.



MES 970144c_pre PK
MES 970144c_final
LIM FCC B F QP

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization
48.00	32.83	40.00	7.17		100.0	1.00	VERTICAL
56.25	36.61	40.00	3.39		240.0	43.00	VERTICAL
57.90	34.81	40.00	5.19		250.0	54.00	VERTICAL
85.35	30.22	40.00	9.78		400.0	95.00	HORIZONTAL
299.15	42.09	46.02	3.93		231.0	1.00	VERTICAL
531.80	36.43	46.02	9.59		199.0	248.00	VERTICAL
598.25	39.21	46.02	6.81		100.0	22.00	VERTICAL
664.75	36.54	46.02	9.48		200.0	326.00	VERTICAL
731.20	42.49	46.02	3.53		216.0	359.00	VERTICAL
797.70	38.72	46.02	7.30		100.0	146.00	HORIZONTAL
930.65	38.30	46.02	7.72		100.0	171.00	HORIZONTAL
1063.60	47.41	53.98	6.57		150.0	201.00	VERTICAL
1196.55	42.32	53.98	11.66		120.0	145.00	HORIZONTAL

The next data is for the same system with the side and top covers removed:



Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization	Source
194.90	24.42	43.52	19.10		150.0	99.00	HORIZONTAL	
199.40	49.44	43.52	-5.92	*	114.0	101.00	HORIZONTAL	
200.20	46.65	43.52	-3.13	*	100.0	106.00	HORIZONTAL	
265.90	47.30	46.02	-1.28	*	100.0	101.00	HORIZONTAL	MB[1]
280.30	47.19	46.02	-1.17	*	100.0	94.00	HORIZONTAL	MB[2]
299.10	48.25	46.02	-2.23	*	100.0	179.00	HORIZONTAL	
332.35	47.39	46.02	-1.37	*	100.0	156.00	HORIZONTAL	
432.05	52.32	46.02	-6.30	*	196.0	68.00	VERTICAL	MB
467.85	41.86	46.02	4.16		305.0	140.00	HORIZONTAL	
498.55	52.23	46.02	-6.21	*	150.0	82.00	VERTICAL	
528.05	46.47	46.02	-0.45	*	100.0	267.00	VERTICAL	MB[3]
531.80	63.56	46.02	-17.54	*	142.0	68.00	VERTICAL	MB
534.70	48.01	46.02	-1.99	*	296.0	184.00	HORIZONTAL	
565.05	47.69	46.02	-1.67	*	150.0	84.00	VERTICAL	
598.25	48.91	46.02	-2.89	*	356.0	147.00	HORIZONTAL	
664.75	51.24	46.02	-5.22	*	312.0	181.00	HORIZONTAL	MB[4]
731.20	52.14	46.02	-6.12	*	394.0	137.00	HORIZONTAL	Video card
797.70	47.36	46.02	-1.34	*	212.0	47.00	HORIZONTAL	MB[5]
864.15	47.39	46.02	-1.37	*	100.0	88.00	VERTICAL	
930.65	53.18	46.02	-7.16	*	215.0	277.00	VERTICAL	MB[6]

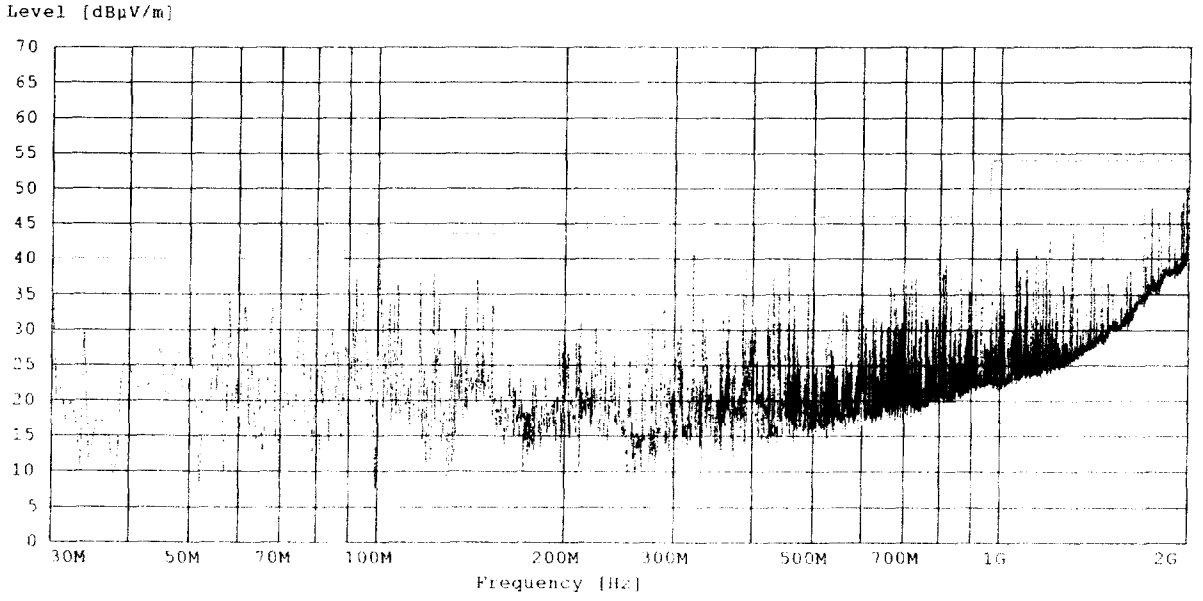
[1] 19th harmonic of 14 MHz clock
[2] 20th harmonic of 14 MHz clock
[3] Harmonic of multiple clocks
[4] 5th harmonic of processor cache memory clock
[5] 6th harmonic of processor cache memory clock or 3rd harmonic of processor clock
[6] 7th harmonic of processor cache memory clock

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization	Source
1030.35	45.54	53.98	8.44		250.0	93.00	VERTICAL	
1063.60	54.57	53.98	-0.59	*	100.0	177.00	VERTICAL	MB[7]
1196.55	49.68	53.98	4.30		100.0	144.00	HORIZONTAL	MB[8]
1329.50	40.91	53.98	13.07		204.0	145.00	VERTICAL	MB[9]
1462.45	40.04	53.98	13.94		100.0	94.00	VERTICAL	MB[10]

4.2 System #2

The second system is a desk top system in a low profile chassis utilizing a 200 MHz Pentium® Pro processor. The motherboard in this system includes the video circuits and a separate video card was not included. Removal of the cover of this chassis results in the top and two sides being exposed. The cover on and cover off tests for this product were both performed with the monitor placed to one side of the chassis to make the only difference between the test setups be the presence or lack of the chassis cover.

The first data is with the chassis cover in place.

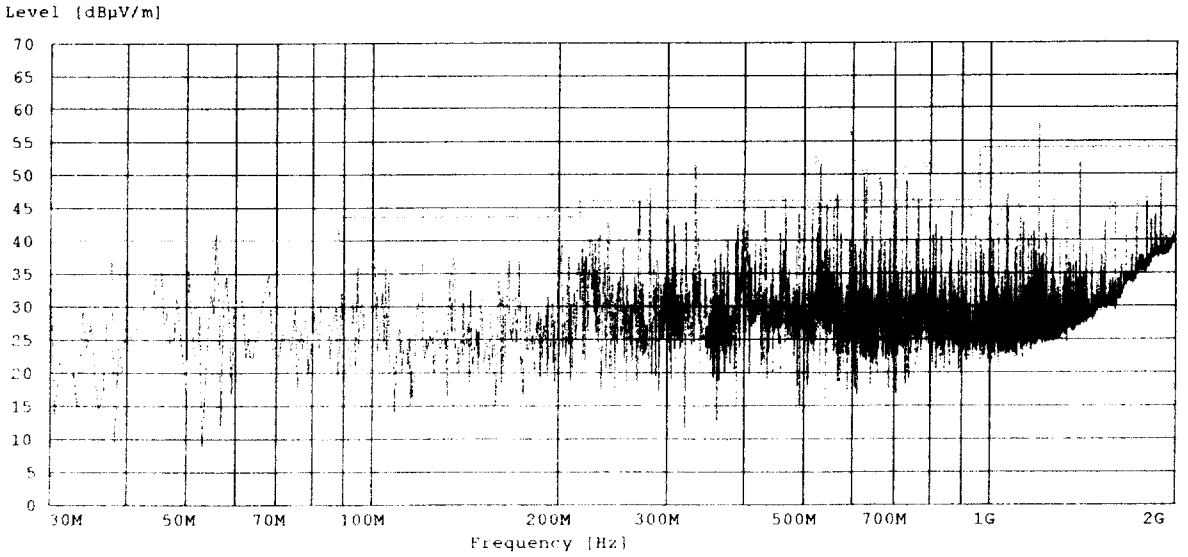


MES krak-on pre PK
MES krak-on final
LIM FCC B F QP

[7] 8th harmonic of processor cache memory clock or 4th harmonic of processor clock
[8] 9th harmonic of processor cache memory clock
[9] 10th harmonic of processor cache memory clock or 5th harmonic of processor clock
[10] 11th harmonic of processor cache memory clock

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization
30.00	30.46	40.00	9.54		100.0	113.00	VERTICAL
57.90	34.52	40.00	5.48		391.0	113.00	HORIZONTAL
61.20	30.19	40.00	9.81		370.0	126.00	HORIZONTAL
100.20	39.20	43.52	4.32		100.0	50.00	VERTICAL
321.50	41.25	46.02	4.77		100.0	156.00	HORIZONTAL
456.90	39.13	46.02	6.89		100.0	191.00	HORIZONTAL
698.00	39.50	46.02	6.52		100.0	342.00	VERTICAL
704.10	35.61	46.02	10.41		100.0	90.00	HORIZONTAL
720.10	35.86	46.02	10.16		123.0	210.00	HORIZONTAL
731.25	34.77	46.02	11.25		225.0	228.00	HORIZONTAL
797.70	38.09	46.02	7.93		100.0	144.00	HORIZONTAL
808.95	37.20	46.02	8.82		100.0	141.00	HORIZONTAL
816.10	37.46	46.02	8.56		100.0	1.00	VERTICAL
864.20	35.40	46.02	10.62		99.0	185.00	HORIZONTAL
930.65	37.66	46.02	8.36		105.0	308.00	VERTICAL
1063.60	40.35	53.98	13.63		105.0	235.00	VERTICAL
1196.55	49.05	53.98	4.93		188.0	181.00	VERTICAL
1396.00	40.93	53.98	13.05		118.0	173.00	VERTICAL

The second set of data is with the cover removed.



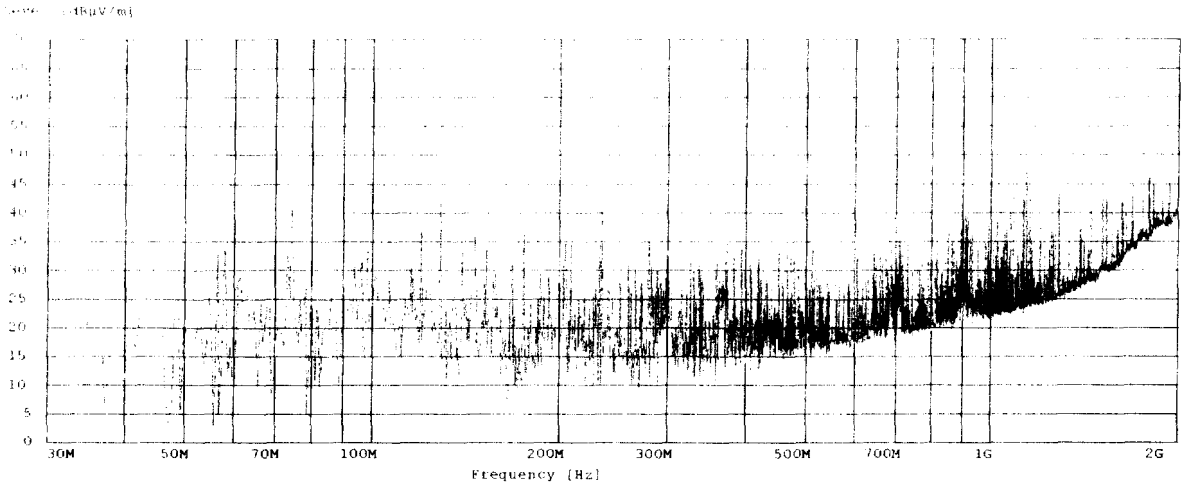
MES krak-off_pre PK
MES krak-off_final
LIM FCC B F QP

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization	Source
55.70	39.18	40.00	0.82		100.0	235.00	VERTICAL	
200.25	44.84	43.52	-1.32	*	168.0	260.00	HORIZONTAL	MB
269.65	46.45	46.02	-0.43	*	100.0	192.00	HORIZONTAL	
280.35	46.18	46.02	-0.16	*	100.0	266.00	HORIZONTAL	MB[11]
299.15	43.51	46.02	2.51		123.0	158.00	HORIZONTAL	
332.35	51.64	46.02	-5.62	*	104.0	288.00	HORIZONTAL	
398.90	46.43	46.02	-0.41	*	300.0	157.00	HORIZONTAL	
432.10	47.67	46.02	-1.65	*	150.0	280.00	VERTICAL	MB
465.30	46.63	46.02	-0.61	*	168.0	95.00	VERTICAL	
515.45	45.68	46.02	0.34		113.0	266.00	VERTICAL	
528.10	46.44	46.02	-0.42	*	113.0	265.00	VERTICAL	
531.80	52.28	46.02	-6.26	*	100.0	269.00	VERTICAL	
565.05	47.01	46.02	-0.99	*	100.0	170.00	VERTICAL	
598.30	56.71	46.02	-10.69	*	100.0	260.00	VERTICAL	MB
624.10	50.08	46.02	-4.06	*	100.0	283.00	VERTICAL	
631.50	51.27	46.02	-5.25	*	100.0	272.00	VERTICAL	
664.75	49.06	46.02	-3.04	*	100.0	287.00	VERTICAL	
731.25	50.69	46.02	-4.67	*	179.0	234.00	VERTICAL	MB
764.45	46.69	46.02	-0.67	*	168.0	286.00	VERTICAL	
797.70	51.22	46.02	-5.20	*	114.0	279.00	HORIZONTAL	MB
1030.35	42.01	53.98	11.97		100.0	247.00	VERTICAL	
1063.60	44.18	53.98	9.80		223.0	241.00	VERTICAL	
1130.10	45.00	53.98	8.98		217.0	227.00	VERTICAL	
1196.55	58.90	53.98	-4.92	*	206.0	228.00	VERTICAL	
1263.10	44.17	53.98	9.81		100.0	274.00	VERTICAL	
1329.50	47.90	53.98	6.08		190.0	231.00	VERTICAL	
1396.00	54.34	53.98	-0.36	*	178.0	234.00	VERTICAL	
1595.40	45.24	53.98	8.74		100.0	247.00	VERTICAL	
1728.35	42.10	53.98	11.88		221.0	247.00	VERTICAL	
1794.85	41.54	53.98	12.44		100.0	235.00	VERTICAL	
1994.30	41.37	53.98	12.61		197.0	274.00	HORIZONTAL	

4.3 System #3

The third system utilizes the same low profile desktop chassis as system #2, but was equipped with a different CPU board with a 200 MHz Pentium® processor with MMX™ technology. Again, the video circuits are included on the motherboard and a separate video card was not utilized in the system. The emissions from this system, with the cover on, are shown on the next page.

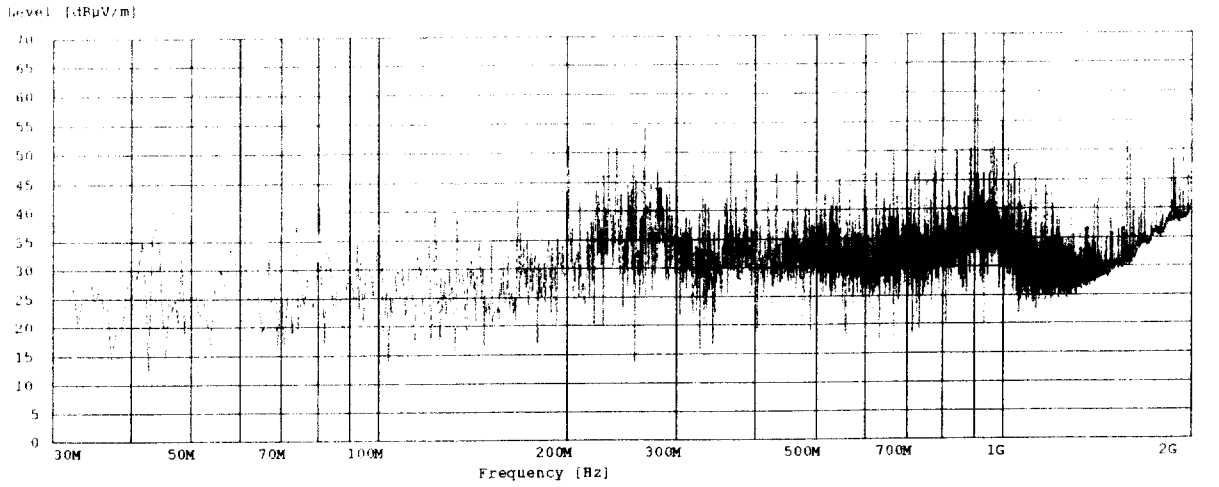
[11] 20th harmonic of 14 MHz clock



MES rhine-on_pre PK
MES rhine-on_final
LIM FCC B F QP

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization
57.90	34.13	40.00	5.87		365.0	102.00	HORIZONTAL
73.25	32.96	40.00	7.04		150.0	283.00	VERTICAL
119.65	33.59	43.52	9.93		104.0	248.00	VERTICAL
598.15	36.11	46.02	9.91		113.0	157.00	VERTICAL
687.25	38.22	46.02	7.80		177.0	193.00	VERTICAL
698.00	39.48	46.02	6.54		100.0	202.00	HORIZONTAL
908.50	32.30	46.02	13.72		108.0	230.00	VERTICAL
912.15	37.25	46.02	8.77		113.0	91.00	HORIZONTAL
930.65	34.74	46.02	11.28		100.0	334.00	VERTICAL
1130.10	42.08	53.98	11.90		113.0	137.00	VERTICAL

The data on the next page shows the same system with the cover removed.



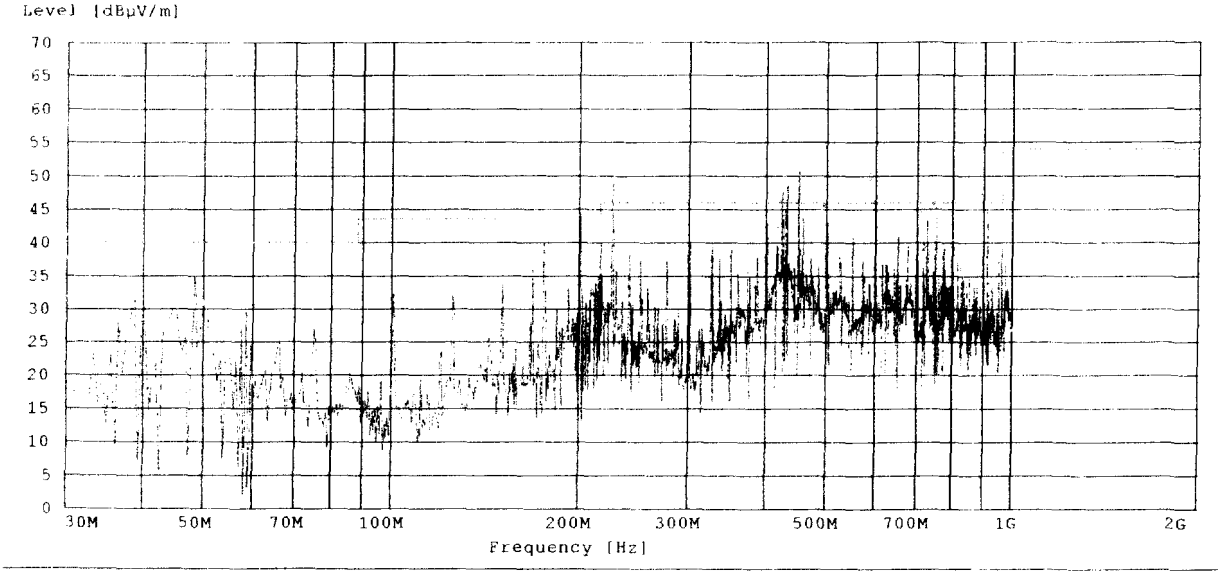
MES rhine-off_pre PK
MES rhine-off_final
LIM FCC B F QP

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization	Source
200.45	51.57	43.52	-8.05	*	168.0	260.00	HORIZONTAL	MB[12]
232.65	54.59	46.02	-8.57	*	142.0	260.00	HORIZONTAL	MB
240.00	51.31	46.02	-5.29	*	123.0	260.00	HORIZONTAL	
255.30	42.64	46.02	3.38		100.0	248.00	HORIZONTAL	
265.95	43.78	46.02	2.24		100.0	93.00	HORIZONTAL	
279.20	44.48	46.02	1.54		150.0	157.00	HORIZONTAL	
365.60	48.50	46.02	-2.48	*	99.0	312.00	HORIZONTAL	
432.10	44.94	46.02	1.08		200.0	93.00	VERTICAL	
465.30	46.66	46.02	-0.64	*	120.0	197.00	VERTICAL	
664.75	50.38	46.02	-4.36	*	100.0	261.00	VERTICAL	
731.20	51.09	46.02	-5.07	*	150.0	248.00	VERTICAL	MB
774.45	45.52	46.02	0.50		150.0	247.00	VERTICAL	
797.70	55.96	46.02	-9.94	*	150.0	247.00	VERTICAL	MB
840.85	42.65	46.02	3.37		222.0	230.00	HORIZONTAL	
842.05	39.92	46.02	6.10		227.0	234.00	HORIZONTAL	
887.55	48.02	46.02	-2.00	*	217.0	241.00	VERTICAL	
908.85	48.52	46.02	-2.50	*	210.0	247.00	VERTICAL	
953.95	49.27	46.02	-3.25	*	196.0	247.00	VERTICAL	
1020.50	45.92	53.98	8.06		117.0	247.00	VERTICAL	
1030.35	43.71	53.98	10.27		124.0	268.00	VERTICAL	
1041.40	40.51	53.98	13.47		250.0	240.00	VERTICAL	
1063.60	47.87	53.98	6.11		113.0	261.00	VERTICAL	
1130.10	43.96	53.98	10.02		100.0	240.00	VERTICAL	
1196.55	47.57	53.98	6.41		289.0	227.00	VERTICAL	
1595.40	48.57	53.98	5.41		233.0	229.00	VERTICAL	
1994.25	44.84	53.98	9.14		204.0	236.00	HORIZONTAL	

[12] This, and the following signal, were shown to radiate from the DC power harness

4.4 System #4

The fourth system was tested as a comparison with results claimed by the manufacturer. The board is equipped with a 75 MHz Pentium® processor and is marked with a manufacturer's Declaration of Conformity label. The system was tested a number of times with more and more parts removed or depowered until the results shown were obtained with only the CPU board powered and no external peripheral devices connected. Thus, all frequencies shown originate from the motherboard. The chassis cover was removed, exposing the top and two sides.



MES 970147d_pre PK
MES 970147e_final
LIM FCC B F QP

Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization
200.45	44.71	43.52	-1.19	*	162.0	261.00	HORIZONTAL
225.50	49.44	46.02	-3.42	*	125.0	253.00	HORIZONTAL
400.90	44.10	46.02	1.92		145.0	248.00	VERTICAL
425.95	42.87	46.02	3.15		125.0	203.00	VERTICAL
429.55	46.79	46.02	-0.77	*	125.0	248.00	VERTICAL
432.05	49.85	46.02	-3.83	*	125.0	280.00	VERTICAL
451.00	52.71	46.02	-6.69	*	123.0	236.00	VERTICAL
458.15	46.59	46.02	-0.57	*	125.0	264.00	VERTICAL
501.10	45.64	46.02	0.38		100.0	290.00	VERTICAL
551.25	41.45	46.02	4.57		105.0	220.00	VERTICAL
601.35	50.04	46.02	-4.02	*	100.0	267.00	VERTICAL
651.45	42.47	46.02	3.55		100.0	265.00	VERTICAL
676.50	39.04	46.02	6.98		100.0	267.00	VERTICAL
726.65	44.30	46.02	1.72		159.0	268.00	VERTICAL
730.20	39.54	46.02	6.48		163.0	268.00	VERTICAL
751.70	45.77	46.02	0.25		154.0	261.00	VERTICAL

Frequency MHz	Level dBμV/m	Limit dBμV/m	Margin dB	Exceed	Height cm	Azimuth deg	Polarization
773.15	40.61	46.02	5.41		145.0	265.00	VERTICAL
802.00	40.08	46.02	5.94		153.0	273.00	VERTICAL
912.15	47.94	46.02	-1.92	*	125.0	242.00	VERTICAL

5. Summary

All three systems tested with the cover in place passed the limits in §15.109(a) of the Rules. None of the systems passed the 3 dB relaxed limits with the cover removed, including one CPU board claimed by its manufacturer as being compliant. Failing signals with the cover removed were as much as 17.54 dB over the §15.109(a) limit. That particular signal, coming from the tower system at 531.80 MHz, was 9.5 dB under the limit when the cover was in place.

6. Conclusion

The requirement that a CPU board meet a cover off test only 3 dB less stringent than the cover on limits is not reasonable. The fact that electrically similar devices in the system, such as video cards, must only pass with the cover in place makes the requirement unreasonable. The fact that compliant systems do not meet the 3 dB relaxed limit with the cover removed shows the requirement to be "over kill".

7. Recommendation

Intel recommends that the FCC delete §15.32(a)(1) of its Rules and allow CPU boards to be qualified in the same manner as other parts of a personal computer which require separate approvals.

Peak Detector Data - Additional Systems

Data taken since September, 1996 on 7 different product is presented for further information. All data was taken in a 3 meter RF semi-anechoic chamber owned and operated by Northwest EMC of Newburg, Oregon. Northwest EMC is an FCC listed laboratory and is also accredited through NIST NVLAP. The chamber used does not have sufficient ceiling height to allow antenna height scans. It is used for preliminary scans and results have an empirically derived correction factor applied to correlate them to an open field test site. Only a peak detector was used for the scans presented below. The data is provided by Michael Haines, Senior EMC Technician in Intel's OPSD board development group in Hillsboro, Oregon.

The seven board products presented are:

Manufacturer	Model
DEC	Venturis GL 6200
Intel	Anchorage (200 MHz Pentium® processor w/ MMX™ technology)
Intel	Dublin (233 MHz Pentium® II processor)
Intel	San Juan (233 MHz Pentium® II processor
Intel	Providence fab (dual 200 MHz Pentium® Pro processors)
Intel	Venus II (200 MHz Pentium® processor)
Intel	Cumberland (200 MHz Pentium® processor w/ MMX™ technology)

Notations were made on a number of the measured signals as to their suspected origin. Also, unlike the data presented in the main body of this document, the limits shown on these boards are adjusted for the 3 dB cover off test and reflect the margin of failure for that test with no adjustment required.

Northwest EMC

Ver. 4.6, April 1996

EUT Name: Digital Venturis GL 6200 S/N: 11011996

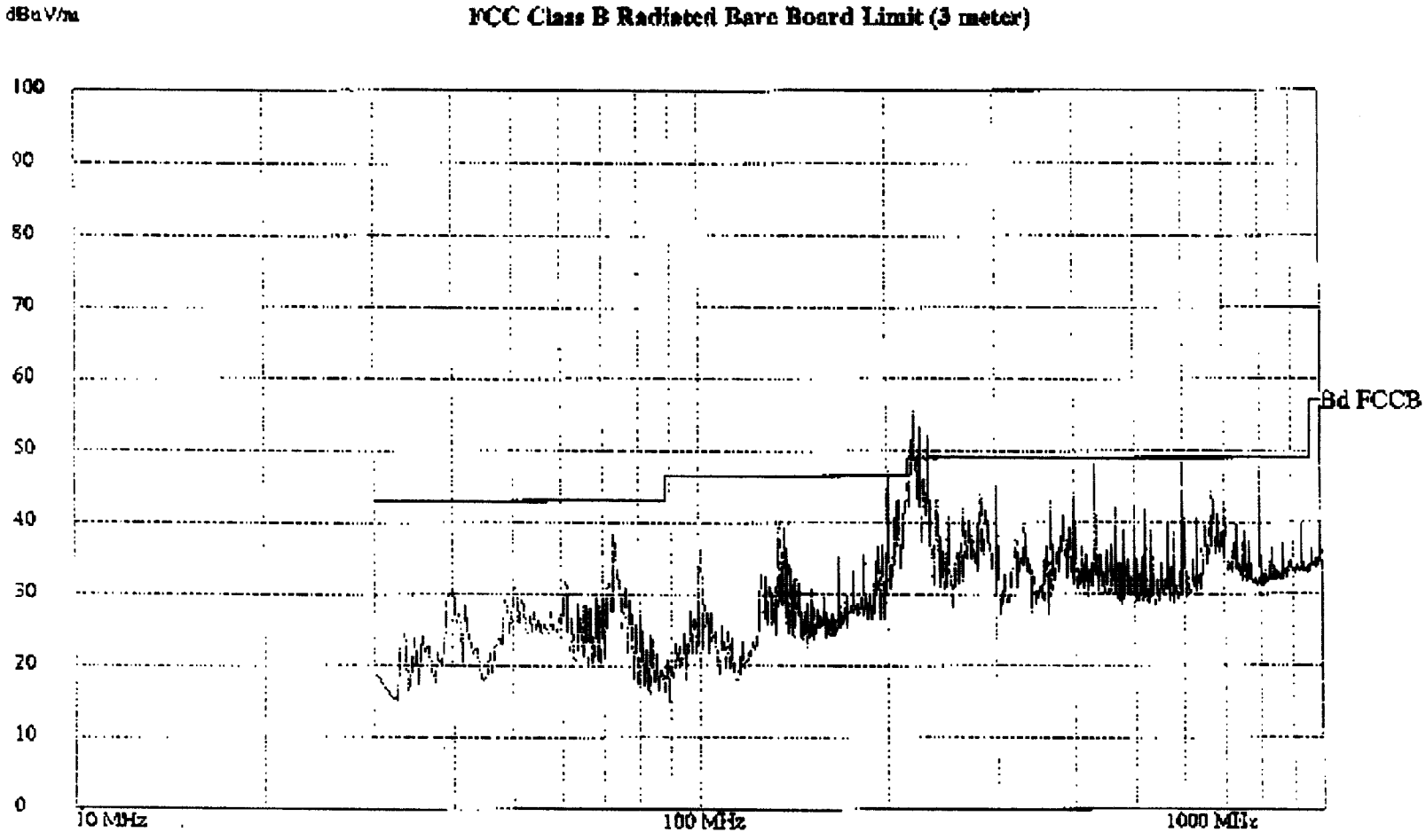
Peak data.

Manufacturer: [redacted] DEC

Date/Job Number: 11-01-1996 11:15:12 11:21:52 11:33:11 INTE0726

Tested By: Michael Haines, Newberg

Comments: 200 MHz CPU, VGA Video Mode, Keyboard, Mouse, Two Printers and Monitor Attached
Run #2, Removed Top Cover



Northwest EMC

Ver. 4.6. April 1996

EUT Name: Digital Venturis GL 6200 S/N: 11011996

Peak data margin sort.

Manufacturer: [redacted]. DEC

Date/Job Number: 11-01-1996 11:15:12 11:21:52 11:34:50 INTE0726

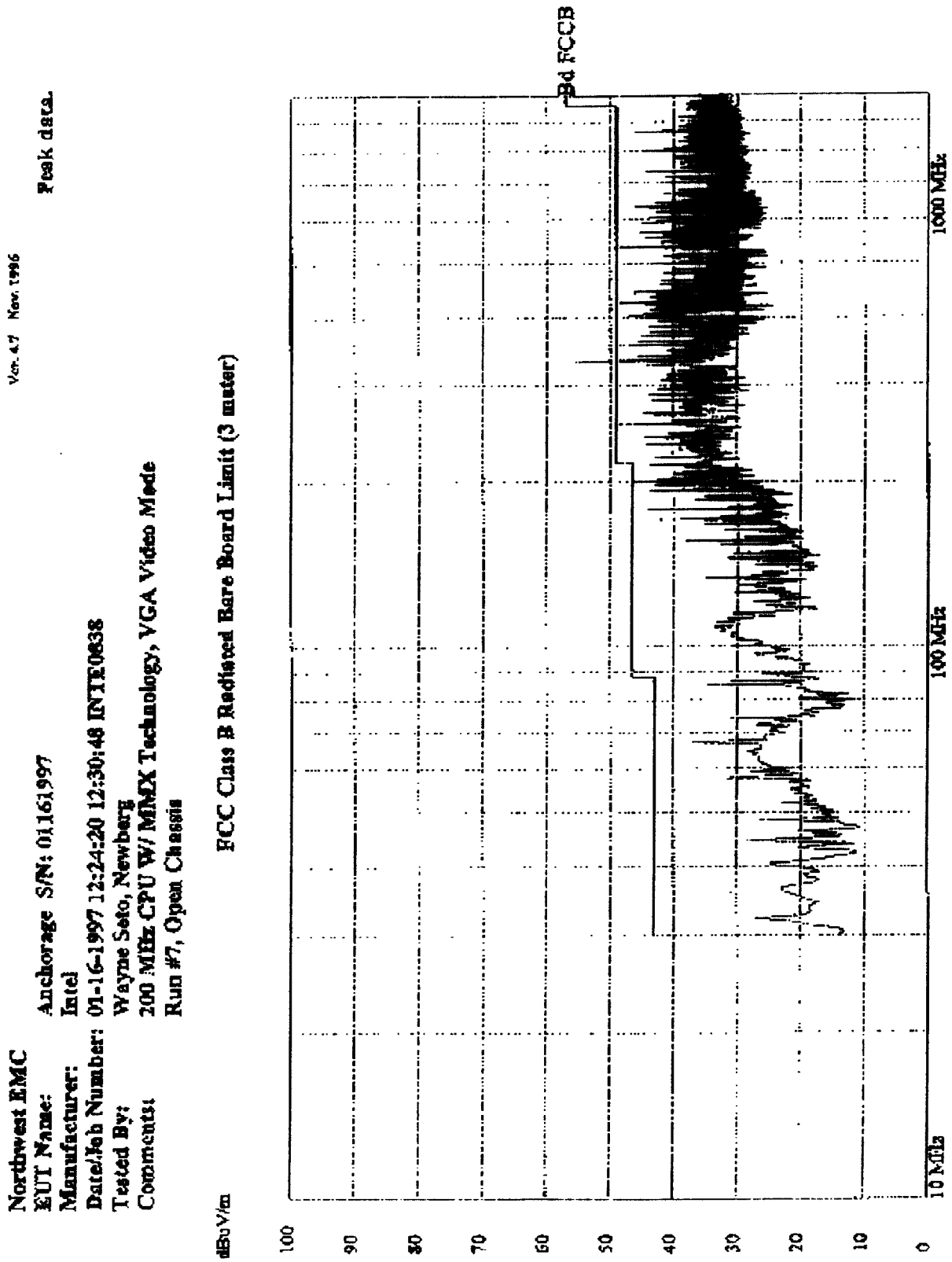
Tested By: Michael Haines, Newberg

Comments: 200 MHz CPU, VGA Video Mode, Keyboard, Mouse, Two Printers and Monitor Attached
Run #2, Removed Top Cover

FCC Class B Radiated Bare Board Limit (3 meter)

Frequency (MHz)	Ampl. (dBuV)	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cab.+Atten Loss	Chamber (dB)	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)
221.262	63.4	11.4	Hor.	25.8	2.2	4.5	55.7	49.0	-6.7 - ?
226.325	61.1	11.4	Hor.	25.8	2.3	4.4	53.4	49.0	-4.4 - ?
233.412	59.8	11.7	Hor.	25.8	2.3	4.2	52.2	49.0	-3.2 - Clock
219.237	59.5	11.4	Hor.	25.8	2.2	4.5	51.8	49.0	-2.8 - ?
201.500	48.4	17.7	Hor.	25.8	2.1	5.0	47.4	46.5	-0.9 - Clock
300.238	55.1	14.9	Hor.	25.8	2.7	3.0	49.9	49.0	-0.9 - Clock
598.929	48.8	18.9	Hor.	25.6	4.1	3.0	49.2	49.0	-0.2 - clock
201.012	53.1	11.7	Hor.	25.8	2.1	5.0	46.1	46.5	0.4
432.877	51.0	16.7	Hor.	25.8	3.5	3.0	48.4	49.0	0.6
799.000	43.8	21.7	Ver.	25.9	5.0	3.0	47.6	49.0	1.4
200.188	45.4	17.6	Hor.	25.8	2.1	5.0	44.3	46.5	2.2
284.038	51.7	14.0	Hor.	25.8	2.6	3.3	45.8	49.0	3.2
209.113	50.5	11.5	Hor.	25.8	2.2	4.8	43.2	46.5	3.3
666.000	42.1	20.6	Hor.	24.9	4.4	3.0	45.2	49.0	3.8
72.875	53.1	6.4	Ver.	26.1	0.8	4.2	38.4	43.0	4.6
401.489	47.2	16.2	Hor.	25.9	3.3	3.0	43.8	49.0	5.2
241.512	50.4	12.1	Hor.	25.8	2.4	4.1	43.2	49.0	5.8
367.064	47.6	15.3	Ver.	25.9	3.2	3.0	43.2	49.0	5.8
672.000	39.7	20.9	Hor.	24.9	4.4	3.0	43.1	49.0	5.9
499.703	42.9	18.1	Hor.	25.5	4.0	3.0	42.5	49.0	6.5

Signature


Northwest EMC
EUT Name: Anchorage S/N: 01161997
Manufacturer: Intel
Date/Job Number: 01-16-1997 12:24:20 12:30:48 INTE0838
Tested By: Wayne Seto, Newberg
Comments: 200 MHz CPU W/ MMX Technology, VGA Video Mode
Run #7, Open Chassis
Ver. 4.7 Nov. 1996
Peak data.
FCC Class B Radiated Bare Board Limit (3 meter)
dBuV/m
100
90
80
70
60
50
40
30
20
10
0
10 MHz
100 MHz
1000 MHz
Bd FCCB

Northwest EMC

Ver. 4.2 Nov. 1996

Peak data margin sort.

EUT Name: Anchorage S/N: 01161997
Manufacturer: Intel
Date/Job Number: 01-16-1997 12:24:20 12:31:39 INTE0838
Tested By: Wayne Sato, Newberg
Comments: 200 MHz CPU W/ MMX Technology, VGA Video Mode
Run #7, Open Chassis

FCC Class B Radiated Bare Board Limit (3 meter)

Frequency (MHz)	Ampl. (dBuV)	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cab.+Atten Loss	Chamber (dB)	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)
332.638	66.8	14.8	Hor.	32.2	3.0	3.0	55.4	49.0	-6.4 – Clock
354.914	62.0	15.0	Hor.	32.1	3.1	3.0	51.0	49.0	-2.0 – ?
424.777	58.2	16.5	Ver.	32.0	3.5	3.0	49.2	49.0	-0.2 – ?
533.116	56.3	18.2	Ver.	32.3	4.0	3.0	49.2	49.0	-0.2 – Clock
199.750	54.2	17.6	Hor.	32.3	2.1	5.0	46.6	46.5	-0.1 – Clock
254.675	62.0	12.7	Hor.	32.4	2.4	3.8	48.5	49.0	0.5
404.527	56.5	16.3	Hor.	31.9	3.3	3.0	47.2	49.0	1.8
177.875	51.1	16.3	Hor.	32.3	1.9	7.0	44.0	46.5	2.5
866.000	48.0	22.7	Ver.	32.8	5.3	3.0	46.2	49.0	2.8
192.750	52.8	17.2	Hor.	32.3	2.0	4.0	43.7	46.5	2.8
443.002	54.7	16.9	Ver.	32.0	3.6	3.0	46.2	49.0	2.8
635.000	52.0	19.5	Ver.	32.5	4.2	3.0	46.2	49.0	2.8
214.175	57.5	11.5	Hor.	32.3	2.2	4.7	43.6	46.5	2.9
362.001	56.4	15.2	Hor.	32.1	3.2	3.0	45.7	49.0	3.3
340.738	57.1	14.8	Hor.	32.2	3.0	3.0	45.7	49.0	3.3
197.125	51.3	17.4	Hor.	32.3	2.1	4.4	42.9	46.5	3.6
399.464	54.7	16.2	Hor.	31.9	3.3	3.0	45.3	49.0	3.7
566.529	51.8	18.6	Ver.	32.3	4.1	3.0	45.2	49.0	3.8
370.101	55.5	15.4	Hor.	32.0	3.2	3.0	45.1	49.0	3.9
202.025	56.0	11.7	Hor.	32.3	2.1	5.0	42.5	46.5	4.0

Signature

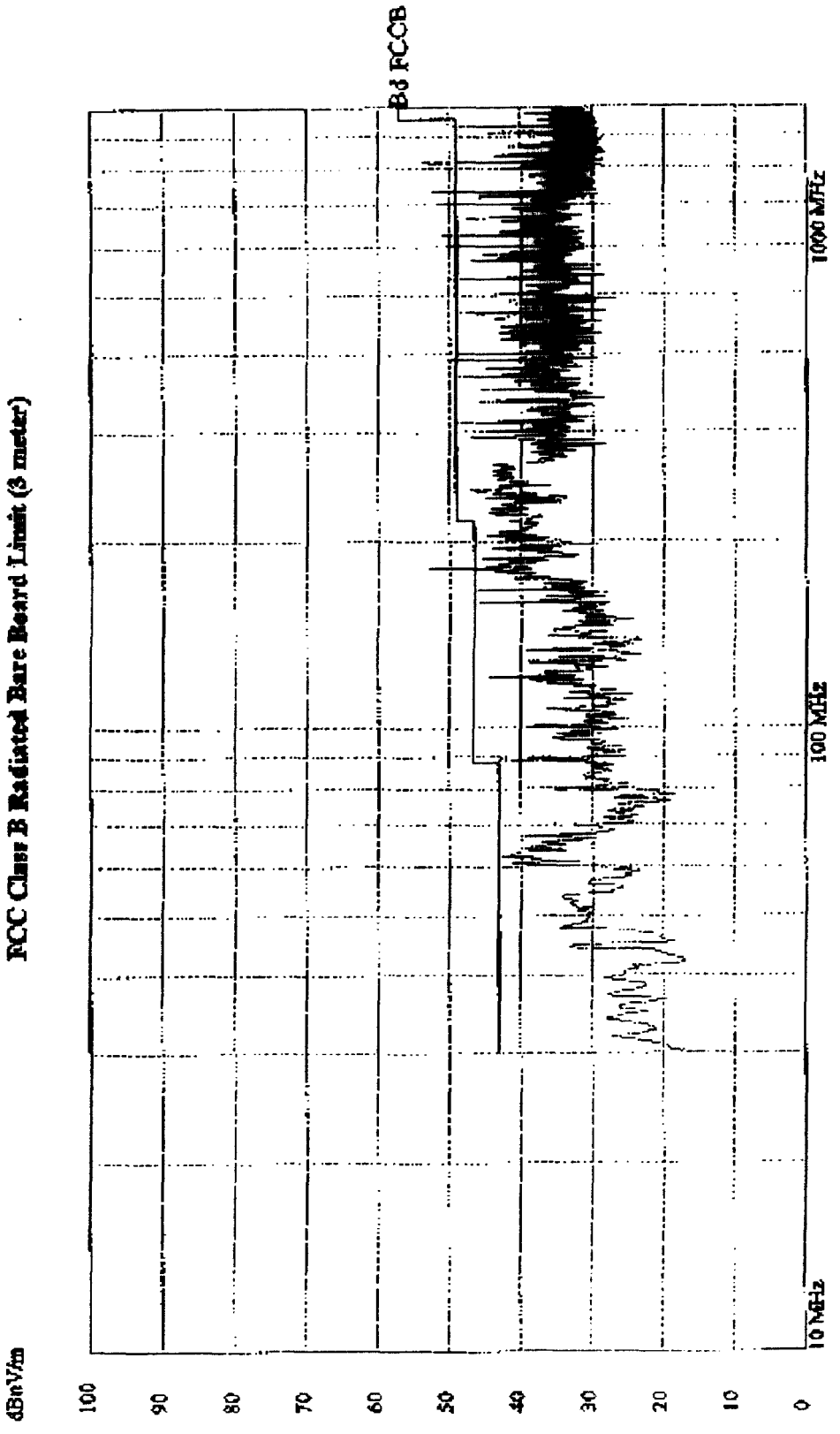
Temperature 71F 32% Humidity

Northwest EMC
EUT Name: Dublin S/N: 01081997
Manufacturer: Intel Corp
Date/Job Number: 01-08-1997 11:24:09 INTE0810
Tested By: Jennifer Bowitt, Newberg
Comments: Rev "C" Motherboard, 233 MHz CPU, 1600x1200@85Hz Video
Run #12. Removed top cover, Running Network, Terminated shielded USB Cables

Ver. 4.7 Nov. 1996

Peak data.

FCC Class B Radiated Bare Board Limit (3 meter)



Northwest EMC
EUT Name: Dublin S/N: 01081997
Manufacturer: Intel Corp
Date/Job Number: 01-08-1997 11:25:06 INTE0810
Tested By: Jennifer Hewitt, Newberg
Comments: Rev "C" Motherboard, 233 MHz CPU, 1600x1200@85Hz Video
Run #12. Removed top cover, Running Network, Terminated shielded USB Cables

Ver. 4.7 Nov. 1996
Peak data margin sort.

FCC Class B Radiated Bart Board Limit (3 meter)

Frequency (MHz)	Ampl. (dBuV)	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cab.+Atten Loss	Chamber (dB)	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)
180.938	60.3	16.4	Hor.	32.3	1.9	6.6	52.9	46.5	-6.4 - Video?
817.000	56.7	22.0	Ver.	32.9	5.1	3.0	53.9	49.0	-4.9 - ?
734.000	55.8	21.8	Hor.	32.9	4.7	3.0	52.4	49.0	-3.4 - ?
700.000	55.8	21.3	Hor.	32.8	4.5	3.0	51.8	49.0	-2.8 - ?
625.000	57.0	19.3	Ver.	32.5	4.2	3.0	51.0	49.0	-2.0 - ?
600.954	56.8	18.9	Ver.	32.4	4.1	3.0	50.4	49.0	-1.4 - Clock
529.066	57.4	18.2	Ver.	32.3	4.0	3.0	50.3	49.0	-1.3
391.364	59.8	16.0	Hor.	31.9	3.3	3.0	50.2	49.0	-1.2
311.375	61.5	14.8	Hor.	32.3	2.8	3.0	49.8	49.0	-0.8
600.000	56.2	18.9	Ver.	32.4	4.1	3.0	49.8	49.0	-0.8
933.000	50.1	23.3	Hor.	32.4	5.5	3.0	49.5	49.0	-0.5
62.375	60.5	7.5	Ver.	32.5	1.5	6.0	43.0	43.0	0.0
401.489	58.3	16.2	Ver.	31.9	3.3	3.0	48.9	49.0	0.1
368.076	59.2	15.3	Hor.	32.0	3.2	3.0	48.7	49.0	0.3
167.375	55.5	16.0	Hor.	32.3	1.9	5.0	46.1	46.5	0.4
467.302	56.6	17.3	Ver.	32.1	3.7	3.0	48.5	49.0	0.5
159.938	58.4	15.7	Hor.	32.3	1.9	2.0	45.7	46.5	0.8
187.500	54.4	16.8	Hor.	32.3	2.0	4.5	45.4	46.5	1.1
667.000	52.0	20.6	Ver.	32.7	4.4	3.0	47.3	49.0	1.7
204.050	58.4	11.6	Hor.	32.3	2.1	4.9	44.7	46.5	1.8

Signature

Temperature 72F 45% Humidity

Northwest EMC

Ver. 4.6, April 1996

EUT Name: San Juan in HP S/N:

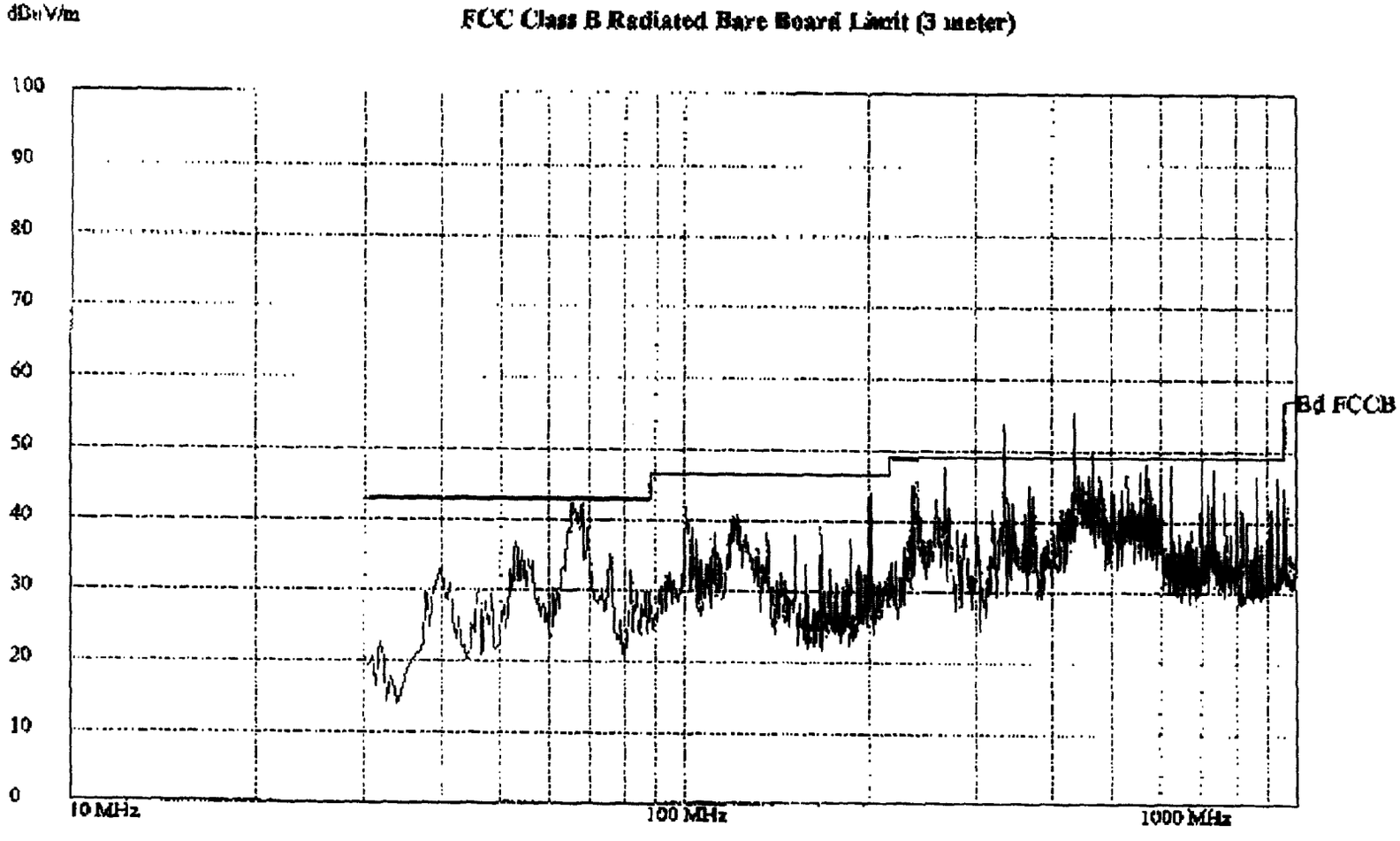
Peak data.

Manufacturer: Intel Corp

Date/Job Number: 12-04-1996 10:01:11 INTE0774

Tested By: Jennifer Hewitt, Newberg

Comments: 233 MHz CPU, Rev C Module, VGA mode, All peripherals, Audio and joystick
Run #9, Removed Cover



Northwest EMC
Ver. 4.6, April 1996

EUT Name: San Juan in HP S/N:
Peak data margin sort.
Manufacturer: Intel Corp
Date/Job Number: 12-04-1996 10:02:06 INTE0774
Tested By: Jennifer Hewitt, Newberg
Comments: 233 MHz CPU, Rev C Module, VGA mode, All peripherals, Audio and joystick
Run #9, Removed Cover

FCC Class B Radiated Bare Board Limit (3 meter)

Frequency (MHz)	Ampl. (dBuV)	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cab.+Atten Loss	Chamber (dB)	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)
433.889	60.1	16.7	Ver.	27.9	3.5	3.0	55.4	49.0	-6.4 - clock
333.651	60.3	14.8	Hor.	27.3	3.0	3.0	53.8	49.0	-4.8 - clock
700.000	50.5	21.3	Ver.	28.8	4.5	3.0	50.5	49.0	-1.5 - ?
467.302	54.2	17.3	Ver.	28.1	3.7	3.0	50.1	49.0	-1.1 - clock
65.438	56.1	6.9	Ver.	27.9	1.2	6.9	43.2	43.0	-0.2
68.063	56.6	6.4	Ver.	27.9	1.0	6.4	42.5	43.0	0.5
567.541	51.0	18.6	Ver.	28.3	4.1	3.0	48.4	49.0	0.6
624.000	49.9	19.3	Ver.	28.4	4.2	3.0	48.0	49.0	1.0
266.825	55.3	13.2	Hor.	26.9	2.5	3.6	47.7	49.0	1.3
734.000	46.6	21.8	Hor.	28.6	4.7	3.0	47.5	49.0	1.5
555.391	49.8	18.5	Ver.	28.3	4.1	3.0	47.1	49.0	1.9
600.954	49.3	18.9	Ver.	28.3	4.1	3.0	47.0	49.0	2.0
868.000	43.8	22.7	Hor.	28.1	5.3	3.0	46.7	49.0	2.3
479.453	50.5	17.6	Ver.	28.2	3.8	3.0	46.7	49.0	2.3
530.078	49.8	18.2	Ver.	28.4	4.0	3.0	46.6	49.0	2.4
201.938	46.5	17.7	Hor.	27.3	2.1	5.0	44.0	46.5	2.5
574.629	48.9	18.7	Ver.	28.3	4.1	3.0	46.4	49.0	2.6
441.990	50.9	16.8	Ver.	27.9	3.6	3.0	46.4	49.0	2.6
459.202	50.5	17.2	Ver.	28.0	3.7	3.0	46.4	49.0	2.6
934.000	42.6	23.3	Ver.	28.0	5.5	3.0	46.4	49.0	2.6

Signature

Northwest EMC

Ver. 4.6, April 1996

EUT Name: Providence fab S/N: 657002-500 N02772090

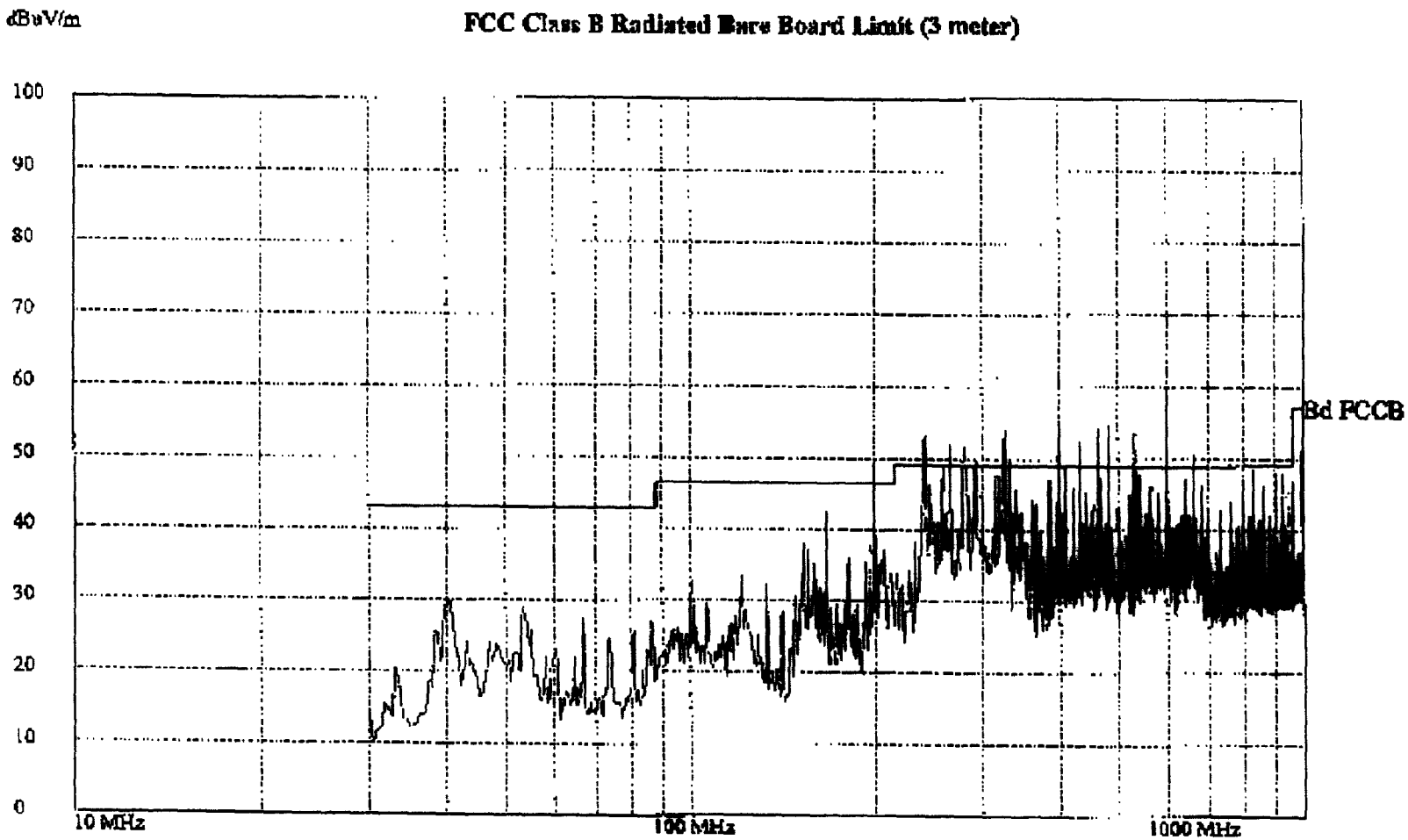
Peak data.

Manufacturer: Intel Corp.

Date/Job Number: 10-17-1996 09:50:29 INTE0709

Tested By: Jennifer Hewitt, Newberg

Comments: Dual PPro 200, 16Meg ram, S3 trio 32 video, No perfs, No net, IBM monitor, Noshield com 2
Run #2. Top and side covers off



Northwest EMC

Ver. 4.6, April 1996

EUT Name: Providence fab S/N: 657002-500 N02772090

Peak data margin sort.

Manufacturer: Intel Corp.

Date/Job Number: 10-17-1996 09:51:23 INTE0709

Tested By: Jennifer Hewitt, Newberg

Comments: Dual PPro 200, 16Meg ram, S3 trio 32 video, No perfs, No net, IBM monitor, Noshield com 2
Run #2. Top and side covers off

FCC Class B Radiated Bare Board Limit (3 meter)

Frequency (MHz)	Ampl. (dBuV)	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cab.+Attcn Loss	Chamber (dB)	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)
597.916	64.8	18.9	Ver.	31.3	4.1	3.0	59.5	49.0	-10.5 - clock
399.464	63.7	16.2	Ver.	31.5	3.3	3.0	54.7	49.0	-5.7 - clock
482.490	61.3	17.7	Ver.	31.2	3.9	3.0	54.7	49.0	-5.7 . ?
465.277	61.3	17.3	Ver.	31.2	3.7	3.0	54.1	49.0	-5.1 - clock
326.563	64.8	14.7	Hor.	31.5	2.9	3.0	53.9	49.0	-4.9 - ?
532.103	59.7	18.2	Ver.	31.2	4.0	3.0	53.7	49.0	-4.7 - clock
241.512	65.9	12.1	Hor.	31.3	2.4	4.1	53.2	49.0	-4.2 - ?
433.889	60.9	16.7	Ver.	31.4	3.5	3.0	52.7	49.0	-3.7 - clock
431.864	60.4	16.6	Ver.	31.4	3.5	3.0	52.1	49.0	-3.1
265.812	64.1	13.1	Hor.	31.3	2.5	3.6	52.0	49.0	-3.0
199.750	56.1	17.6	Hor.	31.4	2.1	5.0	49.4	46.5	-2.9
279.988	63.3	13.8	Hor.	31.4	2.6	3.3	51.6	49.0	-2.6
664.000	54.2	20.5	Hor.	31.5	4.4	3.0	50.6	49.0	-1.6
332.638	60.4	14.8	Hor.	31.5	3.0	3.0	49.7	49.0	-0.7
601.000	55.0	18.9	Ver.	31.3	4.1	3.0	49.7	49.0	-0.7
293.150	60.8	14.5	Hor.	31.4	2.7	3.1	49.7	49.0	-0.7
258.725	61.5	12.9	Hor.	31.3	2.5	3.7	49.3	49.0	-0.3
409.589	58.1	16.3	Ver.	31.5	3.4	3.0	49.3	49.0	-0.3
601.966	54.3	18.9	Ver.	31.3	4.1	3.0	49.0	49.0	0.0
829.000	50.1	22.3	Hor.	31.8	5.1	3.0	48.7	49.0	0.3

Signature