QMS, Inc.
One Magnum Pass
Mobile, AL 36618

Product Research & Development
Regulatory Compliance Group

Electromagnetic Interference Test Report

FCC Class B Compliance

of

***magicolor* 6100 DeskLaser/iLaser**

Model: MC6100GDI-1

FCC ID: E7SMC6100GDI-1

Date of Test: **3/22/2000 through 3/26/2000**

Date of Report: **3/29/2000**

Table of Contents

Report of Measurement

This document contains the report and results of emissions testing of the *magicolor* 6100 DeskLaser/iLaser, Model MC6100GDI-1, performed at the test site operated at QMS, Inc.

General Information

DEVICE TESTED:	Computer Peripheral (laser printer)
MANUFACTURER:	QMS, Inc. One Magnum Pass Mobile, AL 36618
TESTED FOR COMPLIANCE WITH:	ANSI C63.4 - 1992
FREQUENCY RANGE TESTED:	450Khz - 30Mhz (conducted) 30Mhz - 1000Mhz (radiated)
TEST DISTANCE:	3 meters
SITE LOCATION:	QMS, Inc. One Magnum Pass Mobile, AL 36618

This site has been found by the Federal Communications Commission to be in compliance with the requirements of Section 2.948 of the Commission's Rules. The description has, therefore, been placed on file with the Federal Communications Commission and QMS, Inc. has been added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. The Commission's list will also indicate that the facility complies with the radiated and AC conducted test site criteria in ANSI C63.4 - 1992.

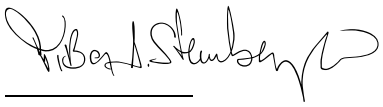
Differences between *magicolor* 6100 DeskLaser and *magicolor* 6100 iLaser

The two printers are identical in hardware, however, the *magicolor* 6100 DeskLaser is sold with software to run under Windows environment while the *magicolor* 6100 iLaser runs under Macintosh OS environment.

Declaration of Conformity

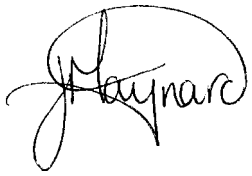
The device described on page 3 was tested to determine the maximum levels emanating from the device. Preliminary tests of each mode of operation were completed for both conducted and radiated emission tests. For each mode of operation the EUT was rotated 360 degrees until the highest level was found and then the antenna height was varied from 1 - 4 meters and the antenna was also configured for horizontal and vertical polarization to determine which height and polarization gave the highest emission reading. Once this reading was established, cables were manipulated and placement was varied to determine which configuration provided the highest emission reading. After determining the mode of operation which gave the highest reading in the preliminary tests, conducted and radiated, this mode or modes and configuration was used for the final emission test for conducted and radiated. The maximum emissions levels were compared to the limits of the Federal Communications Commission Rule Part 15, to determine if the device was compliant. The results shown within this report indicate compliance with the FCC Part 15 limits, for a Class B device.

Tested by:



Tibor A. Steinberger
Senior Compliance Specialist

Report reviewed by:



John A. Maynard
Manager Regulatory Compliance

Instrumentation

EQUIPMENT	NAME/MODEL	CALIBRATION DATE
Spectrum Analyzer	Anritsu MS2601A	April 29, 1999
Antennas	Biconnical by A.H. Systems Model SAS-200/542, S/N 646 Frequency Range 20Mhz - 330Mhz	June 30, 1999
	Log Periodic by A.H. Systems Model SAS-200/512F, S/N 166 Frequency Range 200Mhz - 1.8Ghz	June 30, 1999
Amplifier	Hewlett Packard 8447F Preamplifier/Power amplifier 26db gain, S/N 1937A01333 Frequency Range 100Khz - 1.3Ghz	February 15, 2000
LISN	EMCO Model 3825/2, S/N 1905 Providing 50 ohms from 450Khz - 30Mhz	June 29, 1999
	EMCO Model 3825/2, S/N 2268 Providing 50 ohms from 450Khz - 30 Mhz	June 29, 1999

Note: All of the above test equipment is calibrated on 1 year cycles (annual).

Equipment Units Tested

Type of Product:	Laser Printer
Product Name:	*magicolor* 6100 DeskLaser/iLaser
Product Model Number:	MC6100GDI-1

Identification/Description of Interconnecting Cables: Shielded cables are required to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules.

1: Centronics Parallel	1 meter double shielded parallel cable with molded plastic connector housings.
2: USB to Parallel	2 meter cable with ferrite core molded in the cable at the parallel end. (manufactured by in-system DESIGN Inc.)
3: Ethernet 100BaseTX	1 meter, Category 5 cables with RJ45 connectors.

Personal Computers/Simulators Used

PC Operation Voltage	(X) 115V	( ) 220V
PC Operation Frequency	( ) 50Hz	(X) 60Hz

Computer	Gateway 2000 CPU model: LPMINI-TOWER, S/N: 0009855607,
Monitor	Gateway 2000 model: Gateway 500-069CS, S/N: 150225B052115 FCC ID: BEJCS592
Keyboard	Gateway 2000 model: 2196003-XX-XXX, S/N: 56180851, FCC ID: D7J2196003-XX
Mouse	Microsoft InteliMouse PS, FCC ID: C3KMPS

(**X**) Other Simulator: (explanation required)

Ethernet 10/100BaseTX hub with 5 ports, S/N: 796B00574

Measurement Procedure

The ANSI C63.4-1992, Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz was used to demonstrate compliance to the FCC Part 15 limits for a Class B digital device.

A spectrum analyzer having a memory function and two channels was used to obtain data on the emissions from the EUT and the ambient background noise level. This was used for both radiated and conducted emissions testing. In each band, all peaks that were identified as emissions by comparing scans on channel A of the ambient levels and peaks (EUT OFF) to scans on channel B of the levels peaks with the EUT on. After comparing each scan, all emissions within 20db of the limit were recorded and are represented within this report.

Test Configurations

Conducted Emissions Test

TABLETOP EQUIPMENT

The EUT is placed in the center of a 1.5 X 1 meter non conductive table. The rear of the EUT is flush and aligned with the rear of the table as is all associated NON-EUT components being used. Horizontal spacing between the EUT and NON-EUT on the tabletop shall be 10 cm. The EUT will be connected to one LISN and will be at least 80 cm from the nearest part of the EUT chassis. All remaining NON-EUT equipment will be connected to a second LISN by a multiple outlet power strip. Both LISN's will be bonded to the ground plane which extends at least 0.5 meters beyond the EUT system footprint in all directions. A 2X2 meter vertical conducting plane shall be placed 40 cm from the rear of the tabletop and shall also be bonded to the ground plane. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between the ground plane and the table. I/O cables that are connected to a peripheral shall be bundled in the center with a total length not to exceed 1 meter. Cables for the keyboard and mouse will be placed as close a possible to the host.

FLOOR STANDING EQUIPMENT

EUT and all cables shall be insulated from the ground plane by 3 to 12 mm of insulating material. The EUT will be connected to one LISN and will be at least 80 cm from the nearest part of the EUT chassis. All remaining NON-EUT equipment will be connected to a second LISN by a multiple outlet power strip and will be at least 80 cm to the rear. I/O cables that are connected to a peripheral shall be bundled in the center. Excess power cords shall be bundled in the center or shortened to the appropriate length. The ground plane extends at least 0.5 meters beyond the EUT system footprint in all directions.

Radiated Emissions Test

TABLETOP EQUIPMENT

The EUT is placed in the center of a 1.5 X 1 meter non conductive table. The rear of the EUT is flush and aligned with the rear of the table as is all associated NON-EUT components being used. Horizontal spacing between the EUT and NON-EUT on the tabletop shall be 10 cm. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between the ground plane and the table. I/O cables that are connected to a peripheral shall be bundled in the center with a total length not to exceed 1 meter. Cables for the keyboard and mouse will be placed as close a possible to the host. The ground plane extends at least 0.5 meters beyond the EUT system footprint in all directions.

FLOOR STANDING EQUIPMENT

EUT and all cables shall be insulated from the ground plane by 3 to 12 mm of insulating material. I/O cables that are connected to a peripheral shall be bundled in the center. Excess power cords shall be bundled in the center or shortened to the appropriate length. The ground plane extends at least 0.5 meters beyond the EUT system footprint in all direction

For both tabletop and floor standing the EUT is placed on rotating platform which is capable of rotating 360 degrees. The EUT is rotated 360 degrees to obtain the radial of maximum emission for each peak found to be within 20 db of the limit. With the EUT oriented to give the peak for the emission found the antenna is raised and lowered between one and four meters to find the position giving the highest reading. This is repeated using both vertical and horizontal polarization of the receiving antenna to find which configuration provides the highest reading of each emission found. Once found the placement and manipulation of the interface cables is done to determine the maximum or near maximum emission level.

The above is done for each mode of operation until the mode which provides the highest emission levels is found. When the mode and configuration which provides the highest emissions is determined, this configuration and mode will be used for the final emission measurement and that data is represented within this report.

See Appendix C for photographs of the final conducted and radiated test setup.

Sample Calculations

The reading taken directly from the spectrum analyzer is converted to a true emission value for comparison to the FCC Part 15 Class B limits by obtaining the antenna and cable loss factors and summing these values. This value is then taken and the amplifier gain of 26db subtracted to determine the true emission value of the signal.

Radiated Emission (dbμV)	= meter reading (dbμV)
	+ antenna loss factor
	+ cable loss factor
	- amplifier gain

There are no correction factors needed with the 50 μH LISN that is used. A 12db pad is required on the input of the spectrum analyzer, therefore, all limits are reduced by a value of 12.

Conducted Emissions (dbμV)	= meter reading (dbμV)

Emission Test Bands/Limits

The frequency bands used with their respective bandwidth settings are given below.

Emission Test Bands

Beginning Frequency	Ending Frequency	Bandwidth Setting	Comments
450 KHz	30 MHz	9 KHz	Conducted
30 MHz	1000 MHz	100 KHz	Radiated

Emission Limits

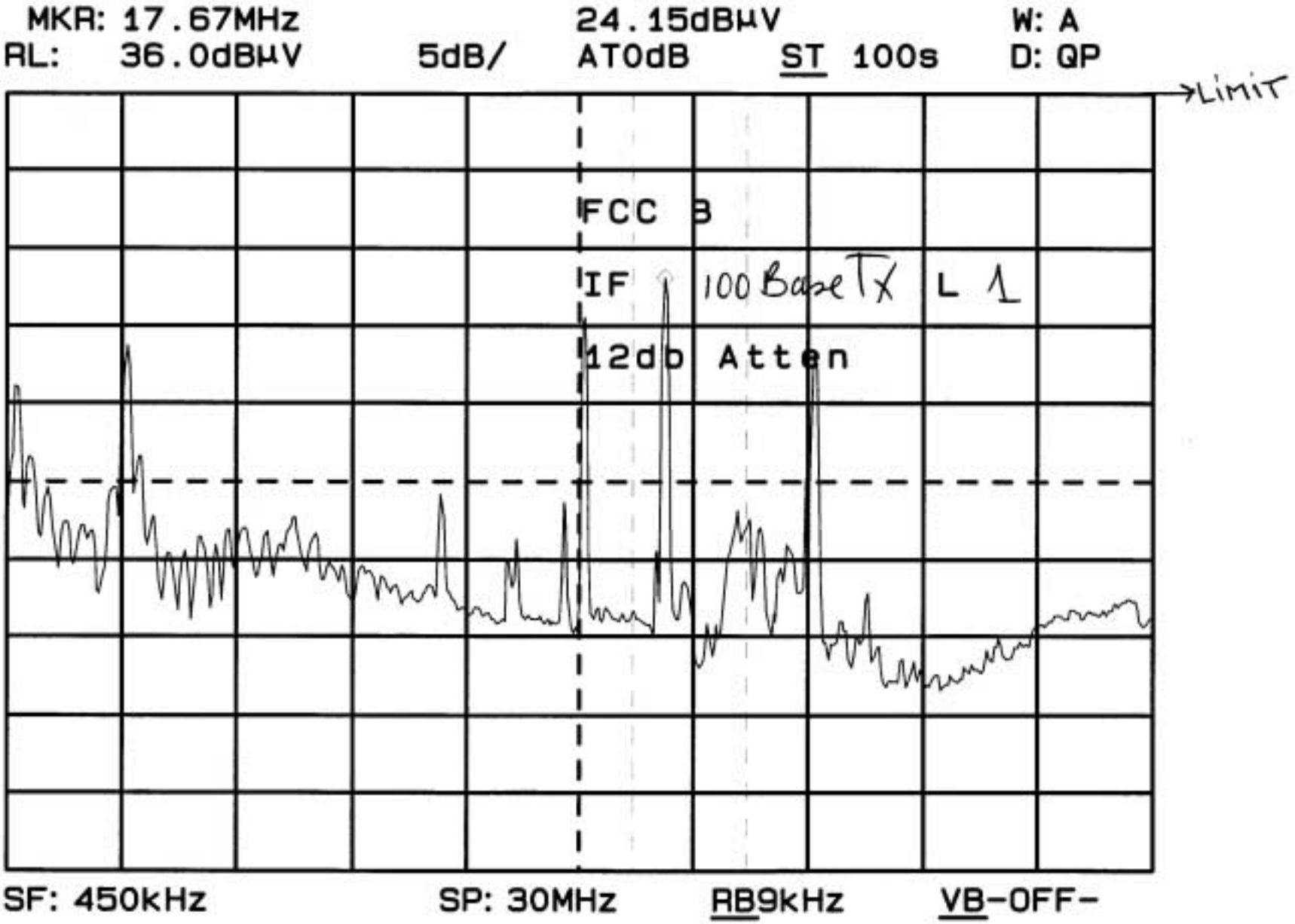
Beginning Frequency	Ending Frequency	Limit 3 Meters	Comments
30 MHz	88 MHz	40 dbµV	Radiated
88 MHz	216 MHz	43.53 dbµV	Radiated
216 MHz	1000 MHz	46.03 dbµV	Radiated
.450 MHz	30 MHz	48 dbµV	Conducted

Appendix A
Radiated & Conducted Test Data

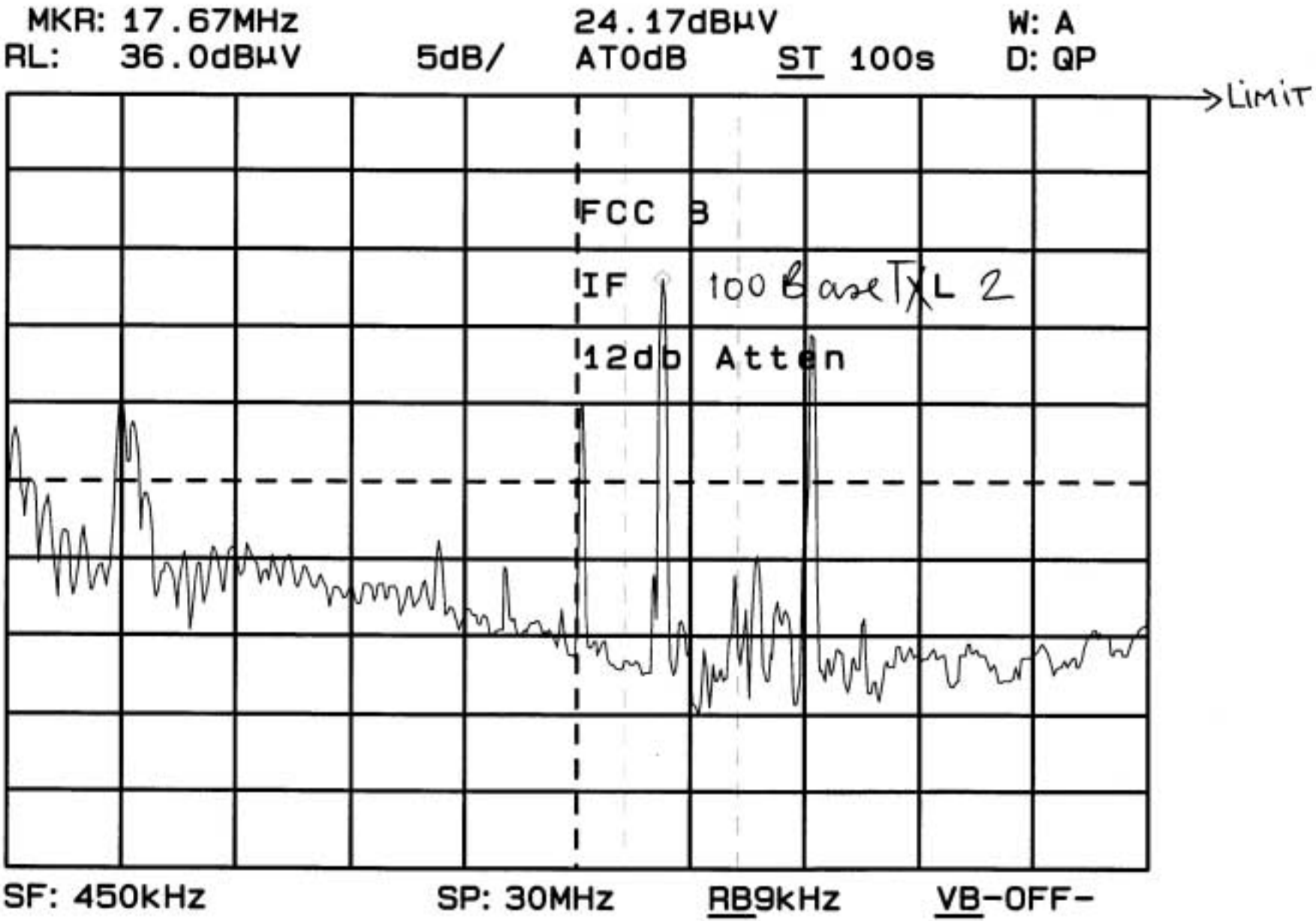
Date: 3/28/2000
Product: *magicolor* 6100 DeskLaser/iLaser
Model # MC6100GDI-1
Test Standard: FCC Class B
Test Distance: 3 m
I/F: 100BaseTX/Parallel
Tested By: Tibor Steinberger
Controller Board Clock Frequencies: 66.66Mhz, 25Mhz, 13.696Mhz

Freq. (Mhz)	Ant. Polarity v/h	Ant. Height (m)	Ant. Type b/lp	Reading (dBuV)	Correction Factor (dB)	Distance Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
54.78	V	1	B	42	-14.43	0	27.57	40	-12.43
125	V	1	B	46	-11.25	0	34.75	43.53	-8.78
164.352	H	1	B	33	-9.7	0	23.3	43.53	-20.23
200	V	1	B	34	-7.07	0	26.93	43.53	-16.6
333.3	V	2	LP	36	-4.35	0	31.65	46.03	-14.38
375	V	1	LP	35	-3.82	0	31.18	46.03	-14.85
400	V	1	LP	36	-1.19	0	34.81	46.03	-11.22
425	V	1	LP	32	-1.94	0	30.06	46.03	-15.97
438.27	V	1	LP	38	-1.7	0	36.3	46.03	-9.73
451.968	H	3.5	LP	31	-1.3	0	29.7	46.03	-16.33
500	H	1	LP	30	0.59	0	30.59	46.03	-15.44
525	V	1	LP	26	0.97	0	26.97	46.03	-19.06
533.4	H	1.25	LP	25	1.75	0	26.75	46.03	-19.28
575	H	1.5	LP	36	3.2	0	39.2	46.03	-6.83
600	H	1	LP	29	4.27	0	33.27	46.03	-12.76
625	V	1	LP	30	5.21	0	35.21	46.03	-10.82
750	V	1	LP	23	7.39	0	30.39	46.03	-15.64
766.68	H	1	LP	24	7.8	0	31.8	46.03	-14.23
775	H	1	LP	24	8.04	0	32.04	46.03	-13.99
800	H	1	LP	31	8.46	0	39.46	46.03	-6.57

Notes:



Magicolor 6100 DeskLaser/iLaser, Model: MC6100GDI-1
Conducted Test Data – FCC Class B ITE 120V



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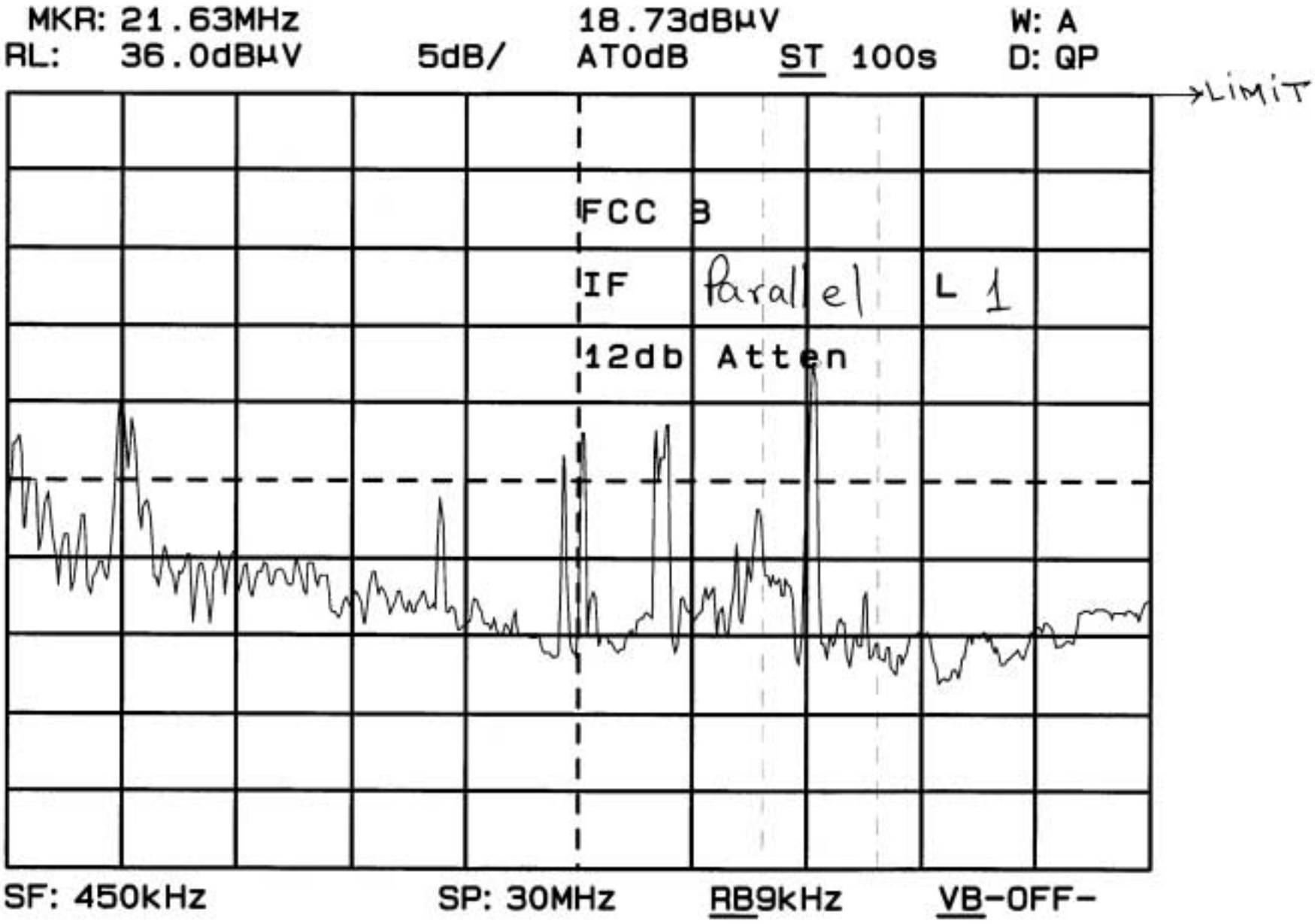
Conducted Test Data – FCC Class B ITE 120V



Magicolor 6100 DeskLaser/iLaser, Model: MC6100GDI-1
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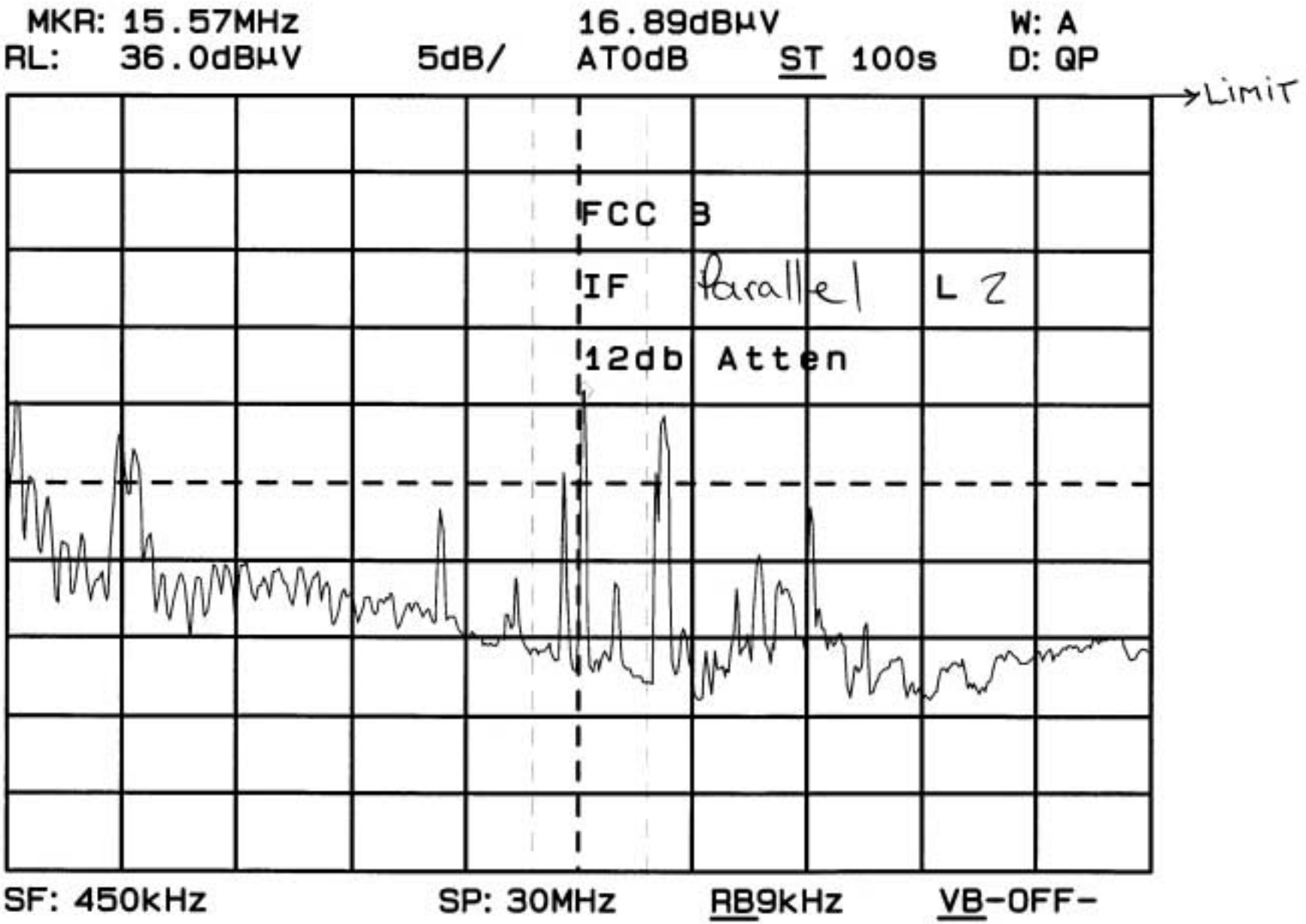


Magicolor 6100 DeskLaser/iLaser, Model: MC6100GDI-1
Conducted Test Data – FCC Class B ITE 120V

Appendix B
Correction Factors

3 Meter Correction Factor for Biconical Antenna
MODEL # SAS-200/542
Serial # 646

Mhz	CF dbmV	AF	AmF	CL
30	-10.32	14.3	-26	1.38
35	-11.07	13.4	-26	1.53
40	-12.35	12	-26	1.65
45	-12.83	11.4	-26	1.77
50	-13.58	10.5	-26	1.92
60	-14.5	9.4	-26	2.1
70	-14.31	9.4	-26	2.29
80	-14.36	9.2	-26	2.44
90	-13.91	9.5	-26	2.59
100	-13.42	9.8	-26	2.78
110	-12.53	10.4	-26	3.07
120	-11.51	11.2	-26	3.29
130	-11.02	11.6	-26	3.38
140	-10.73	11.8	-26	3.47
150	-9.84	12.6	-26	3.56
160	-10.2	12.2	-26	3.6
170	-9.52	12.6	-26	3.88
180	-8.57	13.4	-26	4.03
190	-7.5	14.1	-26	4.4
200	-7.07	14.5	-26	4.43
210	-6.63	14.7	-26	4.67
220	-6.9	14.4	-26	4.7
230	-6.32	14.9	-26	4.78

3 Meter Correction Factor Log Periodic Antenna
MODEL # SAS-200/512
Serial # 166

Mhz	CF dbmV	AF	AmF	CL
200	-8.67	12.9	-26	4.43
225	-5.8	15.4	-26	4.8
250	-5.68	15.3	-26	5.02
275	-6.1	14.5	-26	5.4
300	-5.83	14.6	-26	5.57
325	-4.38	15.6	-26	6.02
350	-4.33	15.5	-26	6.17
375	-3.82	15.7	-26	6.48
400	-1.19	18.1	-26	6.71
425	-1.94	17.1	-26	6.96
450	-1.51	17.2	-26	7.29
475	-0.53	17.8	-26	7.67
500	0.59	18.5	-26	8.09
525	0.97	18.5	-26	8.47
550	2.55	19.7	-26	8.85
575	3.2	20.2	-26	9
600	4.27	20.9	-26	9.37
625	5.21	21.6	-26	9.61
650	6.06	22.2	-26	9.86
675	5.56	21.3	-26	10.26
700	5.64	21.1	-26	10.54
725	5.92	21	-26	10.92
750	7.39	22.5	-26	10.89
775	8.04	22.8	-26	11.24
800	8.46	23	-26	11.46
825	8.18	22.7	-26	11.48
850	8.82	23	-26	11.82
875	10.32	24.1	-26	12.22
900	10.98	24.3	-26	12.68
925	11.77	24.8	-26	12.97
950	13.16	25.7	-26	13.46
975	13.37	25.8	-26	13.57
1000	13.83	25.6	-26	14.23

AF=Antenna Factor AmF=Amplifier Gain CL=Cable Loss CF=Correction Factor/dbuV

Appendix C
Photographs of Test Setup & EUT

Radiated Test Setup - Front View

Radiated Test Setup - Rear View

Conducted Test Setup - Front View

Conducted Test Setup - Left View

Conducted Test Setup - Right View

Full Front View of the *magicolor* 6100 DeskLaser/iLaser

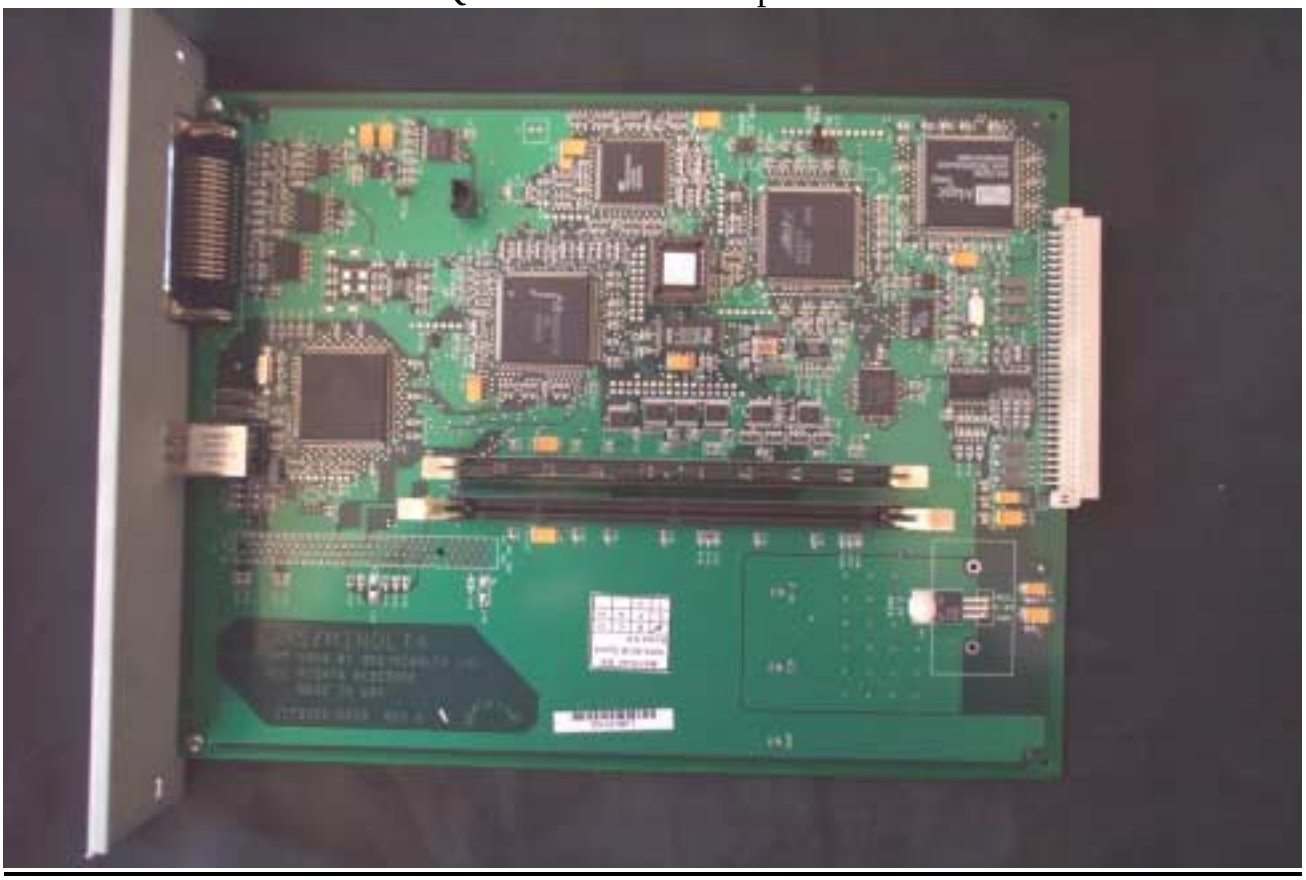
Full Rear View of the *magicolor* 6100 DeskLaser/iLaser

Back View with Duplex Unit Open

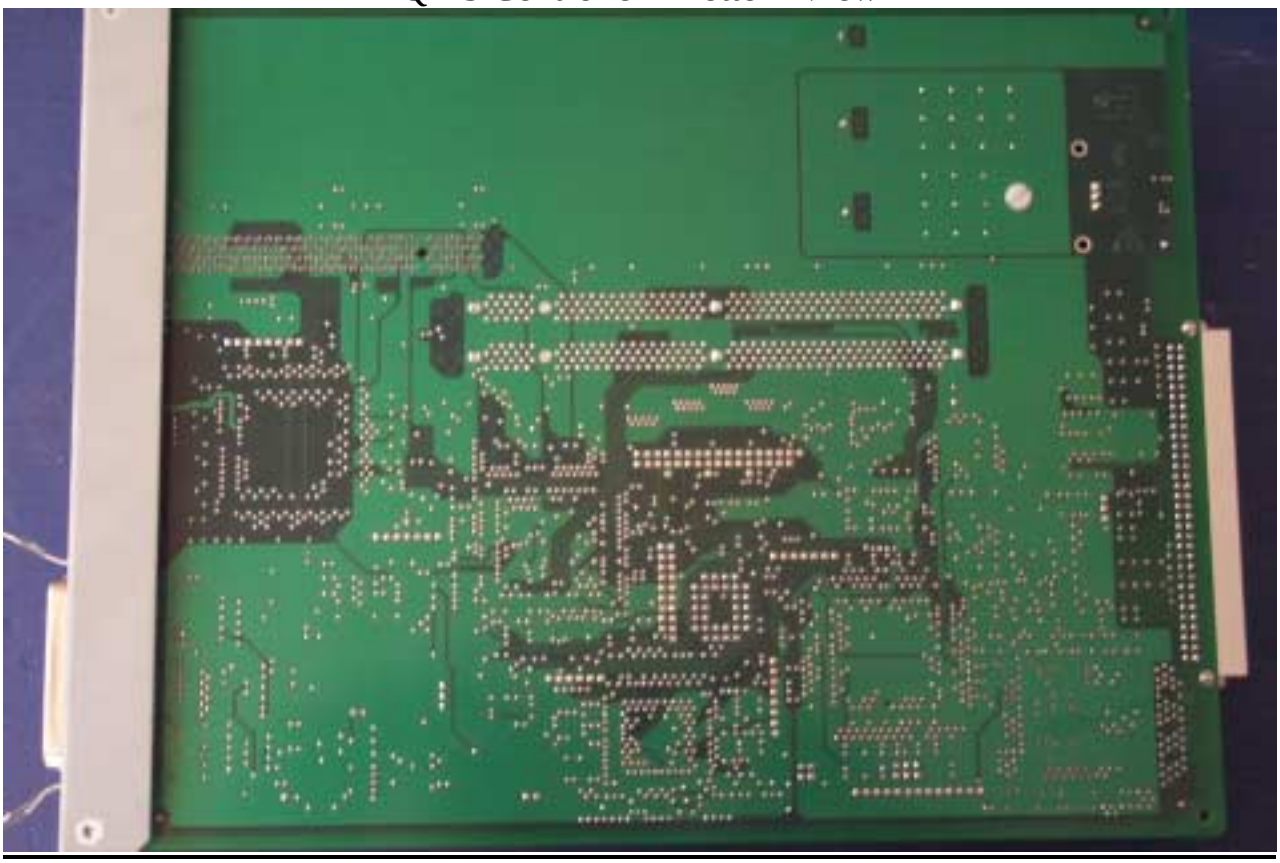
Top View with Cover Open

Controller Shield Case with Covers Removed

QMS Controller - Top View

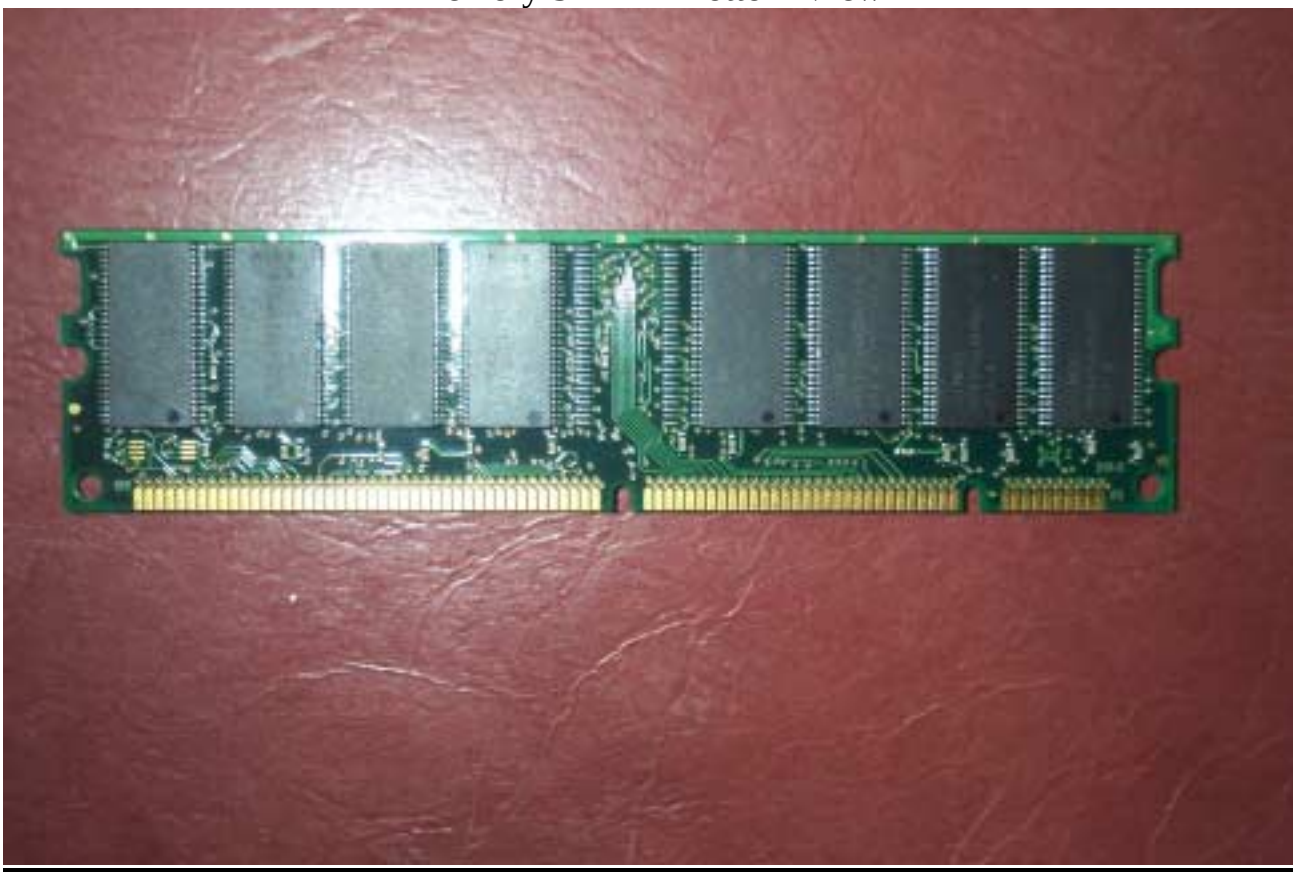


QMS Controller - Bottom View



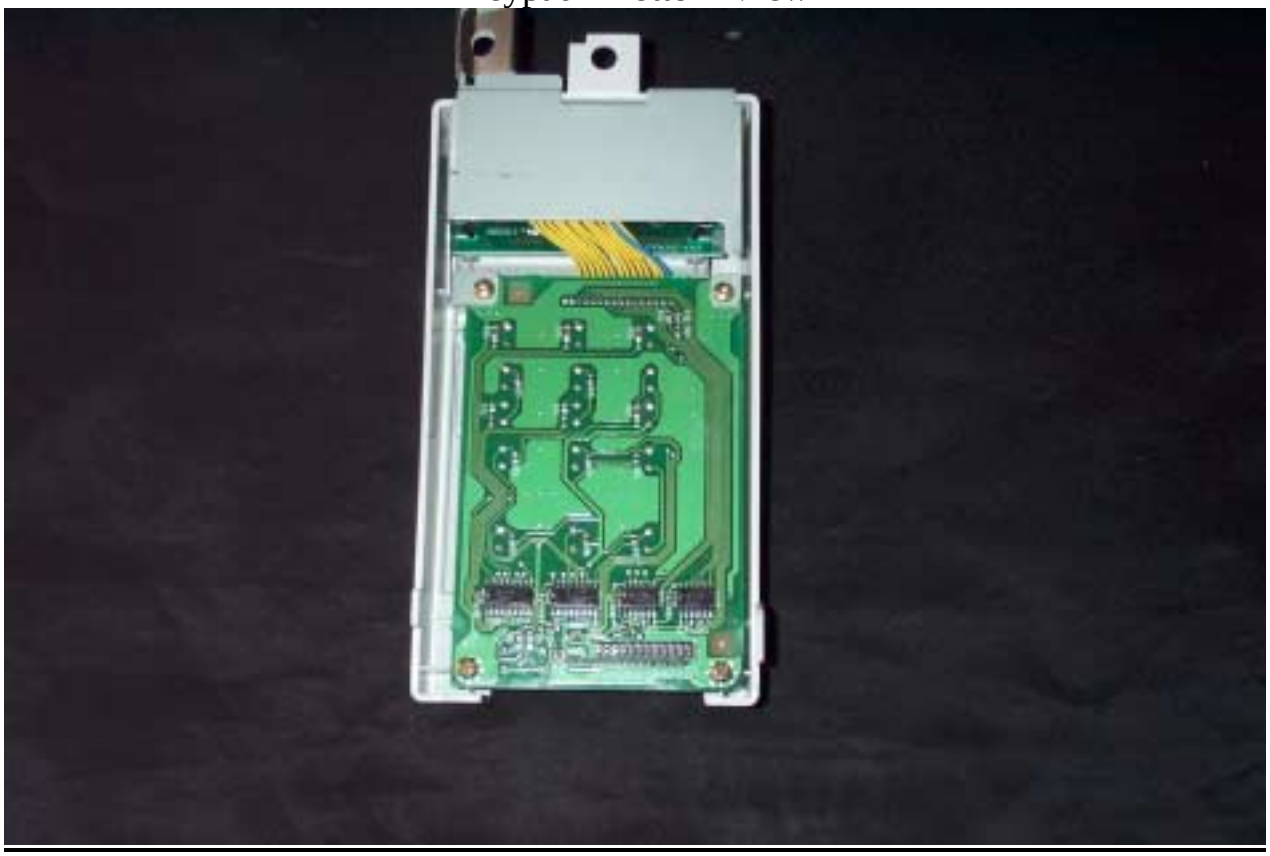
Memory SIMM - Top View

Memory SIMM - Bottom View

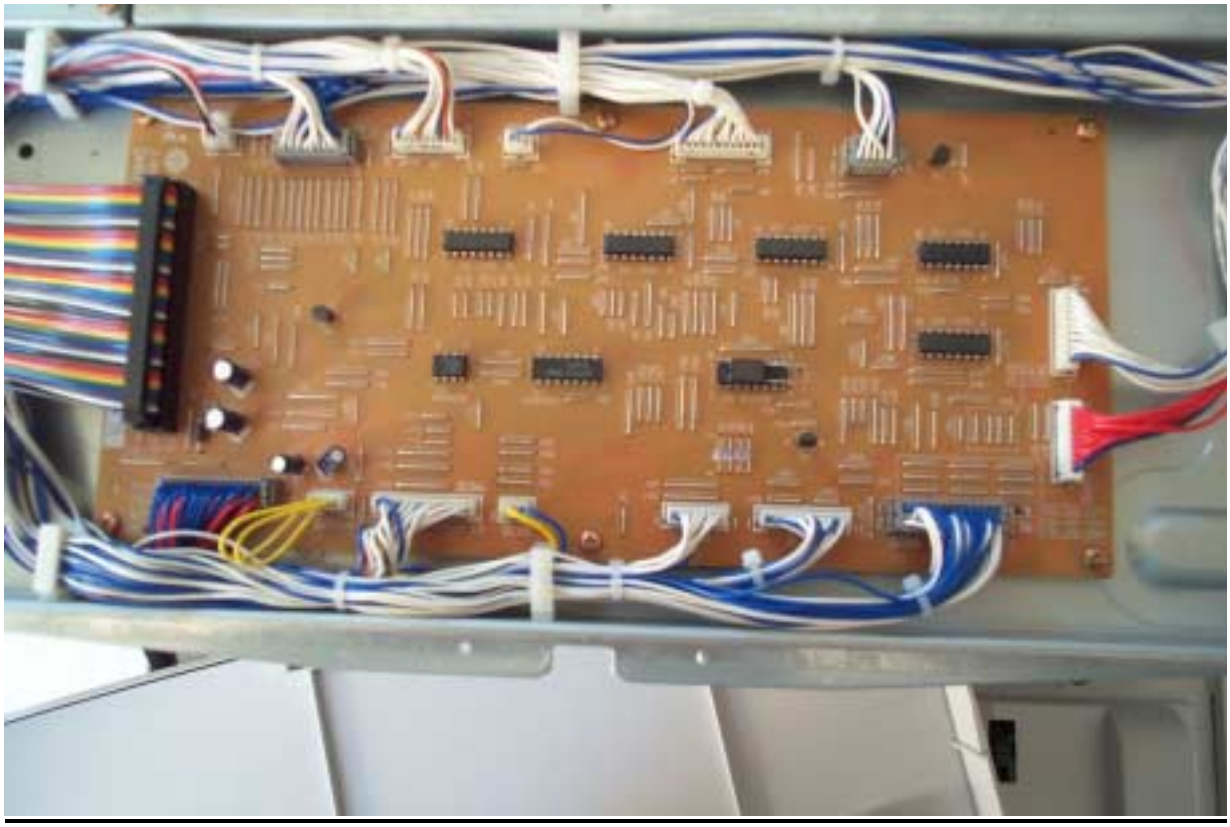


Keypad - Top View

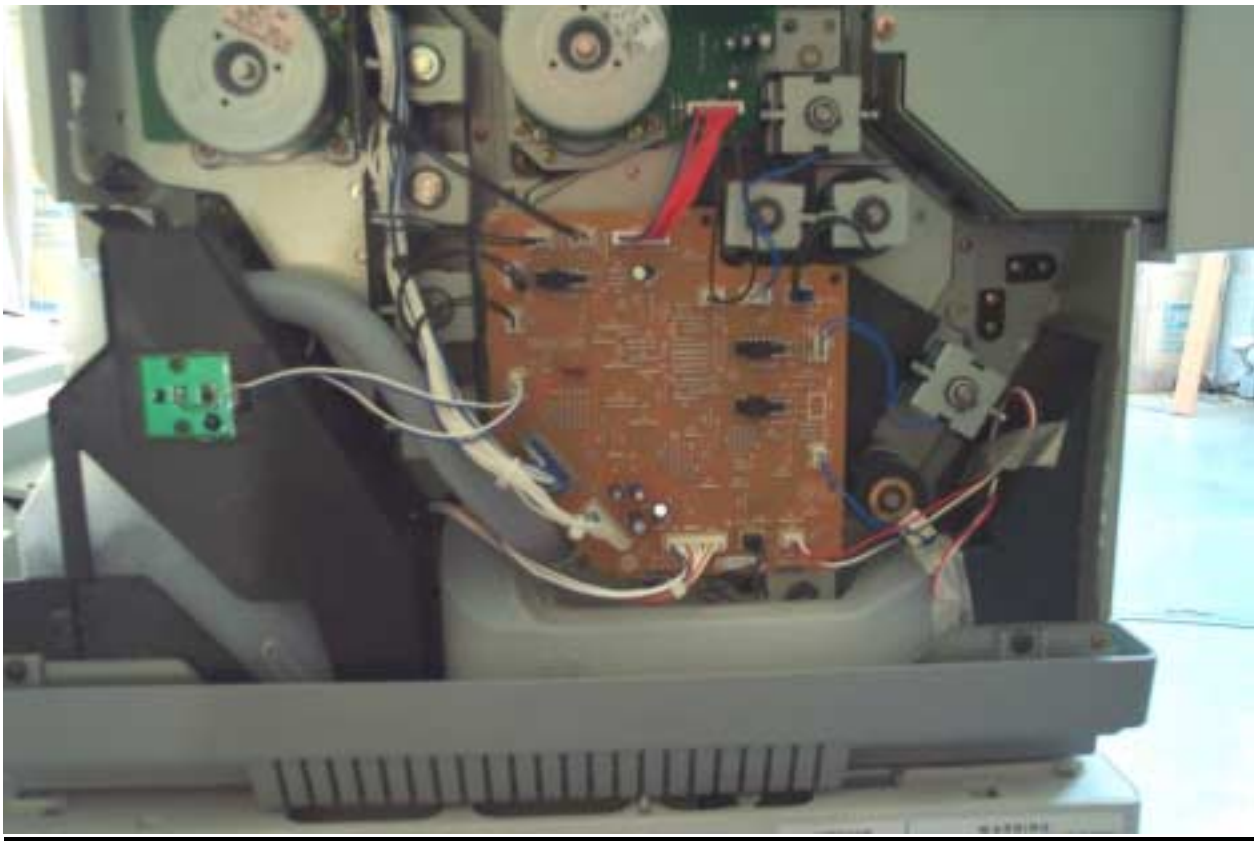
Keypad - Bottom View



IOD1 Sensor PWB

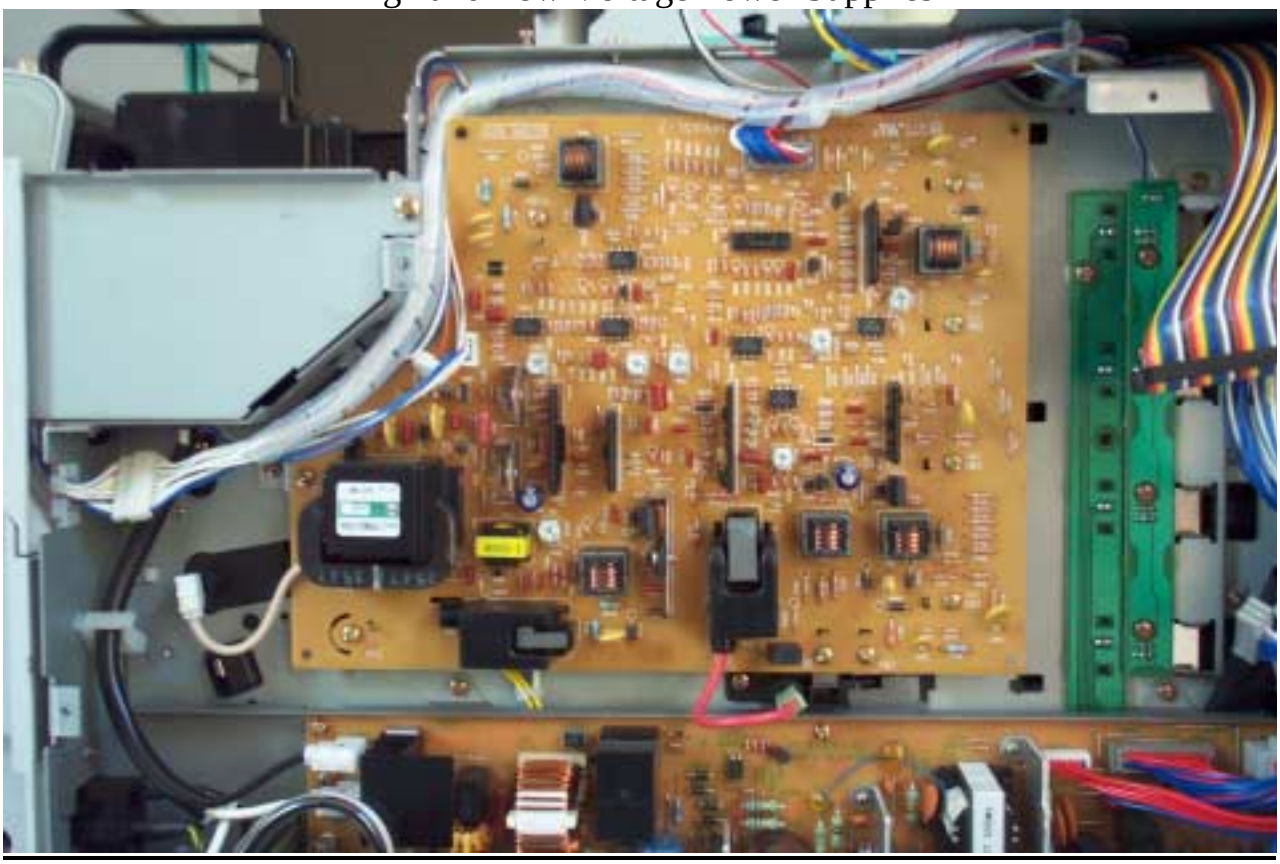


IOD2 Control Board



Main Engine Control Unit

High and Low Voltage Power Supplies



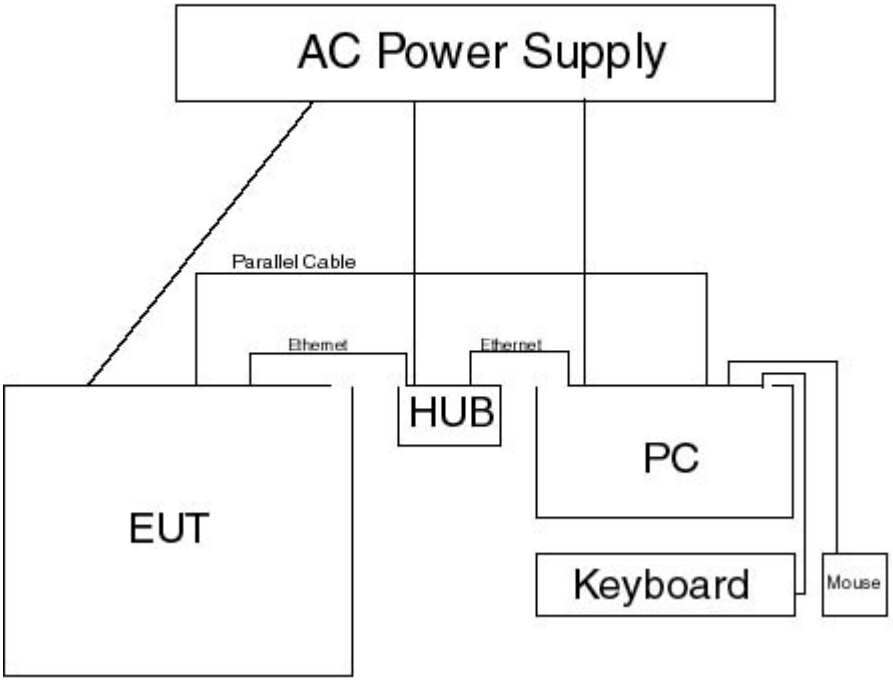
High and Low Voltage Power Supplies

Appendix D
Cable Diagram

Appendix D

Cable Diagram for Both Conducted and Radiated

(during the conducted testing, the EUT and PC were supplied AC from different LISNs)



Appendix E
Label Drawing


FCC ID: E7SMC6100GDI-1
MINOLTA
QMS
Model: MC6100GDI-1
c UL us
LISTED
INFO. TECH. EQUIP. 66F7
Product Of US Goods
Pat. No. 4,942,541
Pat. No. 5,293,466
Rated Voltage Range
Rated Frequency Range
Rated Current
120V ~
50/60 Hz
11A
SN:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Appendix F
User Manual

Manual Notice

QMS, Inc. reserves the right to make changes to this manual and to the equipment described herein without notice. Considerable effort has been made to ensure that this manual is free of inaccuracies and omissions. **However, QMS, Inc. makes no warranty of any kind including, but not limited to, any implied warranties of merchantability and fitness for a particular purpose with regard to this manual.** QMS, Inc. assumes no responsibility for, or liability for, errors contained in this manual or for incidental, special, or consequential damages arising out of the furnishing of this manual, or the use of this manual in operating the equipment, or in connection with the performance of the equipment when so operated.

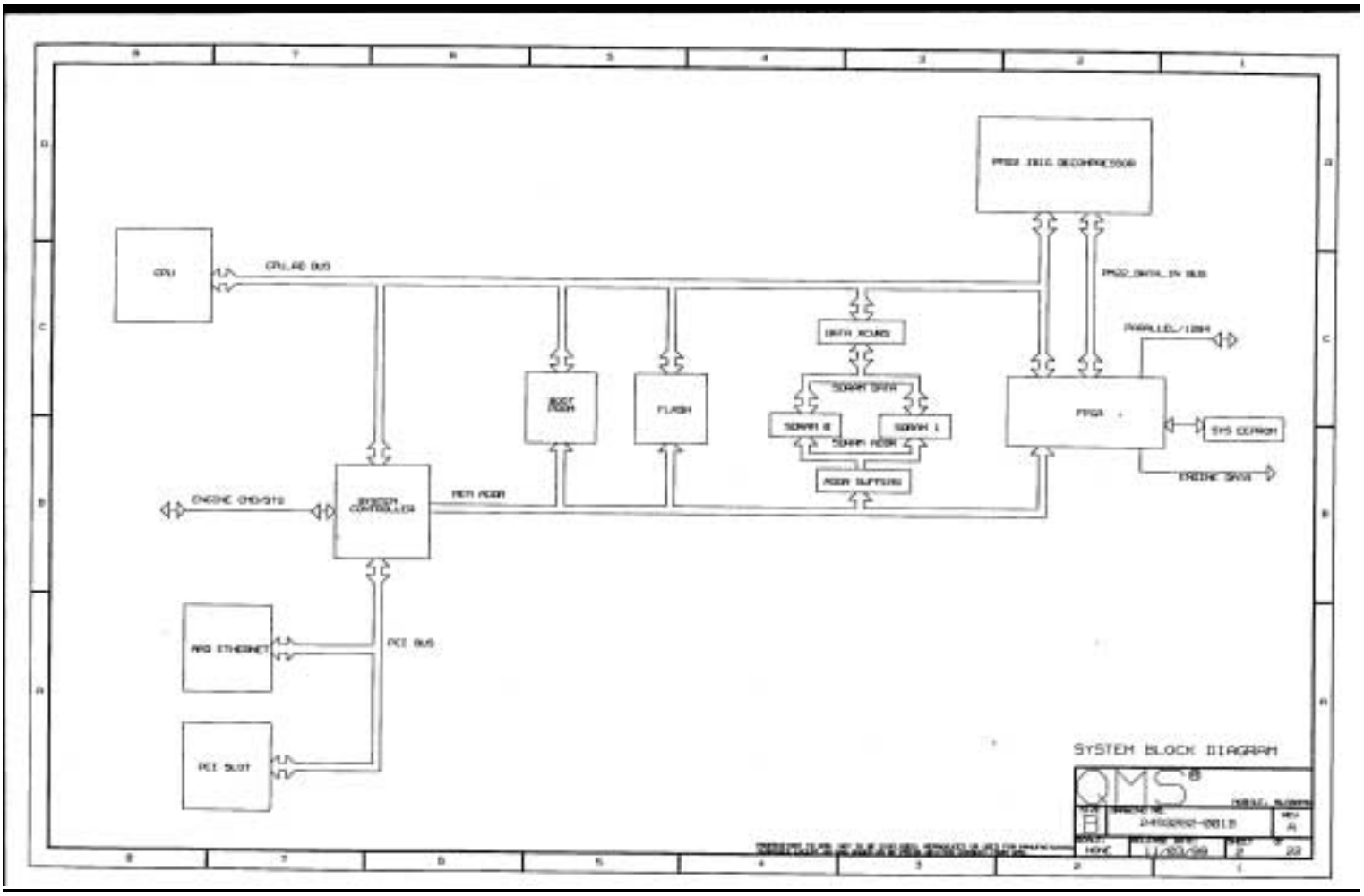
FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

» **Note:** *A shielded cable is required to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules.*

Appendix G
Block Diagram


CPU
FLASH
FPGA
SYSTEM BLOCK DIAGRAM