

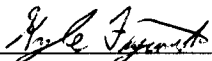
*FCC PART 15, SUBPART C  
TEST METHOD: ANSI C63.4-1992*

*for*  
**MICRO ID CONTACTLESS  
PROGRAMMER**

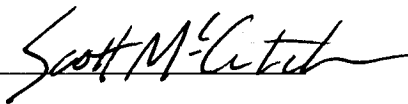
Model: DV103001

Prepared for

MICROCHIP TECHNOLOGY, INC.  
2355 WEST CHANDLER BOULEVARD  
CHANDLER, ARIZONA 85224-6199

Prepared by: 

KYLE FUJIMOTO

Approved by: 

SCOTT McCUTCHAN

COMPATIBLE ELECTRONICS INC.  
114 OLINDA DRIVE  
BREA, CALIFORNIA 92823  
(714) 579-0500

DATE: NOVEMBER 5, 1998

|       | REPORT<br>BODY | APPENDICES |          |          |          | TOTAL |
|-------|----------------|------------|----------|----------|----------|-------|
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| PAGES | 15             | 2          | 2        | 13       | 11       | 43    |

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**LIST OF APPENDICES**

| <b>APPENDIX</b> | <b>TITLE</b>                                                                                                                                                                                         |
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| A               | Modifications to the EUT                                                                                                                                                                             |
| B               | Additional Models Covered Under This Report                                                                                                                                                          |
| C               | Diagrams, Charts and Photos <ul style="list-style-type: none"> <li>• Test Setup Diagrams</li> <li>• Radiated and Conducted Emissions Photos</li> <li>• Antenna and Effective Gain Factors</li> </ul> |
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| 1             | Conducted Emissions Test Setup   |
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## GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: Micro ID Contactless Programmer  
Model: DV103001  
S/N: N/A

Modifications: No modifications were made to the EUT during testing.

Manufacturer: Microchip Technology, Inc.  
2355 West Chandler Boulevard  
Chandler, Arizona 85224-6199

Test Date: November 5, 1998

Test Specifications: EMI requirements  
FCC Title 47, Part 15 Subpart B; and Subpart C, sections 15.205, 15.207  
and 15.209

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.

## SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION                              | RESULTS                                                                                                               |
|------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1    | Conducted RF Emissions, 450 kHz - 30 MHz | Complies with the <b>Class B</b> limits of FCC Title 47, Part 15 Subpart B; and Subpart C, section 15.207             |
| 2    | Radiated RF Emissions, 10 kHz – 1000 MHz | Complies with the <b>Class B</b> limits of FCC Title 47, Part 15 Subpart B; and Subpart C, sections 15.205 and 15.209 |



## 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Micro ID Contactless Programmer Model: DV103001. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, and 15.209.



## 2. ADMINISTRATIVE DATA

### 2.1 Location of Testing

The EMI/EMC tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

### 2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

### 2.3 Cognizant Personnel

Microchip Technology, Inc.

Youbok Lee Engineer

Compatible Electronics Inc.

Kyle Fujimoto Test Engineer

Scott McCutchan Lab Manager

### 2.4 Date Test Sample was Received

The test sample was received on November 5, 1998

### 2.5 Disposition of the Test Sample

The test sample was returned to Microchip Technology, Inc. on November 9, 1998.

### 2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

|      |                                      |
|------|--------------------------------------|
| RF   | Radio Frequency                      |
| EMI  | Electromagnetic Interference         |
| EUT  | Equipment Under Test                 |
| P/N  | Part Number                          |
| S/N  | Serial Number                        |
| HP   | Hewlett Packard                      |
| ITE  | Information Technology Equipment     |
| CML  | Corrected Meter Limit                |
| LISN | Line Impedance Stabilization Network |



### 3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

| SPEC                                   | TITLE                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| FCC Title 47,<br>Part 15<br>Subpart C. | FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators.                                              |
| ANSI C63.4<br>1992                     | Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz. |
| FCC Title 47,<br>Part 15<br>Subpart B  | FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators.                                            |



#### **4. DESCRIPTION OF TEST CONFIGURATION**

##### **4.1 Description of Test Configuration - EMI**

###### **Setup and operation of the equipment under test.**

The Micro ID Contactless Programmer Model: DV103001 (EUT) was connected to the computer and AC Adapter via its serial and power ports, respectively. The computer was connected to a printer, monitor, keyboard, and mouse via its parallel, video, keyboard, and mouse ports, respectively. The antenna is a loop hardwired to the PCB.

###### **Modes the EUT was operated in**

1. The EUT was continuously transmitting the programming signal at maximum RF signal at 125 kHz.
2. The EUT was transmitting a “blank check” signal when a command was sent from the computer via the RFLab program.

It was determined that the emissions were at their highest level when the EUT was operating in mode #1 for both spurious emissions and harmonics. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix A.



#### 4.1.1 Cable Construction and Termination

- Cable 1 This is a 5 foot braid and foil shielded cable connecting the printer to the computer. It has a Centronics metallic type connector at the printer end and a D-25 pin metallic connector at the computer end. The shield of the cable was grounded to the chassis via the connectors.
- Cable 2 This is a 6 foot braid and foil shielded cable connecting the monitor to the computer. It has a high density D-15 pin metallic connector at the computer end and is hard wired into the monitor. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connector.
- Cable 3 This is a 6 foot braid and foil shielded cable connecting the EUT to the computer. It has a D-9 metallic connector at each end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.
- Cable 4 This is a 6 foot unshielded cable connecting the EUT to the AC Adapter. It has a 1/8 inch power connector at the EUT end and is hard wired into the AC Adapter.
- Cable 5 This is a 4 foot foil shielded cable connecting the keyboard to the computer. It has a 6 pin mini DIN connector at the computer end and is hard wired into the keyboard. The shield of the cable was grounded to the chassis via the connector.
- Cable 6 This is a 6 foot foil shielded cable connecting the mouse to the computer. It has a 6 pin mini DIN connector at the computer end and is hard wired into the mouse. The shield of the cable was grounded to the chassis via the connector.



## 5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

### 5.1 EUT and Accessory List

| EQUIPMENT                             | MANUFACTURER               | MODEL NUMBER   | SERIAL NUMBER | FCC ID         |
|---------------------------------------|----------------------------|----------------|---------------|----------------|
| MICRO ID CONTACTLESS PROGRAMMER (EUT) | MICROCHIP TECHNOLOGY, INC. | DV103001       | N/A           | OA3PG103001A   |
| POWER ADAPTER                         | MICROCHIP TECHNOLOGY, INC. | PTF09075I      | N/A           | N/A            |
| PRINTER                               | CITIZEN                    | LSP-10         | 1130060-73    | DLK66TLSP-10   |
| KEYBOARD                              | GATEWAY 2000               | 219600X-XX-XXX | 06320284      | D7J2196001-XX  |
| MONITOR                               | PANASONIC                  | C1395          | KB2530261     | ACJ928KMX-F408 |
| COMPUTER                              | DELL                       | MMP            | CT4KZ         | DoC            |
| MOUSE                                 | MICROSOFT                  | 2.1A           | 00335870      | C3KKMP1        |



## 5.2 EMI Test Equipment

| EQUIPMENT TYPE       | MANUFACTURER    | MODEL NUMBER | SERIAL NUMBER | CAL. DATE     | CAL. DUE DATE |
|----------------------|-----------------|--------------|---------------|---------------|---------------|
| Spectrum Analyzer    | Hewlett Packard | 8566B        | 3701A22262    | Dec. 9, 1997  | Dec. 9, 1998  |
| Preamplifier         | Com Power       | PA-102       | 1017          | Feb. 16, 1998 | Feb. 16, 1999 |
| Quasi-Peak Adapter   | Hewlett Packard | 85650A       | 3303A01688    | June 23, 1998 | June 23, 1999 |
| RF Attenuator        | Com-Power       | A-410        | 1602          | Nov. 25, 1997 | Nov. 25, 1998 |
| LISN                 | Com Power       | LI-200       | 1764          | Jan. 3, 1998  | Jan. 3, 1999  |
| LISN                 | Com Power       | LI-200       | 1771          | Jan. 3, 1998  | Jan. 3, 1999  |
| LISN                 | Com Power       | LI-200       | 1775          | Jan. 3, 1998  | Jan. 3, 1999  |
| LISN                 | Com Power       | LI-200       | 1780          | Jan. 3, 1998  | Jan. 3, 1999  |
| Biconical Antenna    | Com Power       | AB-100       | 1548          | Oct. 15, 1998 | Oct. 15, 1999 |
| Log Periodic Antenna | Com Power       | AL-100       | 1117          | Oct. 15, 1998 | Oct. 15, 1999 |
| Antenna Mast         | Com Power       | AM-100       | N/A           | N/A           | N/A           |
| Turntable            | Com Power       | TT-100       | N/A           | N/A           | N/A           |
| Computer             | Hewlett Packard | D5251A 888   | US74458128    | N/A           | N/A           |
| Printer              | Hewlett Packard | C5886A       | SG7CM1P090    | N/A           | N/A           |
| Monitor              | Hewlett Packard | D5258A       | DK74889705    | N/A           | N/A           |
| Loop Antenna         | Com-Power       | AL-130       | 25309         | Feb. 5, 1998  | Feb. 5, 1999  |



## **6. TEST SITE DESCRIPTION**

### **6.1 Test Facility Description**

Please refer to section 2.1 and 7.1.2 of this report for EMI test location.

### **6.2 EUT Mounting, Bonding and Grounding**

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.



## 7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

### 7.1 RF Emissions

#### 7.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.45 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 9000/300 in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.



### 7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. The Com Power Preamplifier Model: PA-102 was used to increase the sensitivity of the instrument between 30 MHz and 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets. The measurement bandwidths and transducers used for the radiated emissions test were:

| FREQUENCY RANGE   | EFFECTIVE MEASUREMENT BANDWIDTH | TRANSDUCER           |
|-------------------|---------------------------------|----------------------|
| 10 kHz to 150 kHz | 200 Hz                          | Active Loop Antenna  |
| 150 kHz to 30 MHz | 9 kHz                           | Active Loop Antenna  |
| 30 MHz to 300 MHz | 120 kHz                         | Biconical Antenna    |
| 300 MHz to 1 GHz  | 120 kHz                         | Log Periodic Antenna |

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. Click on the link below to see the radiated data sheets.



## 8. CONCLUSIONS

The Micro ID Contactless Programmer Model: DV103001 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, and 15.209.





**APPENDIX A**

***MODIFICATIONS TO THE EUT***



## MODIFICATIONS TO THE EUT

The modification listed below were made to the EUT to pass FCC Subpart B and C specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

Modifications:

No modifications were made to the EUT.





**APPENDIX B**

***ADDITIONAL MODELS COVERED  
UNDER THIS REPORT***

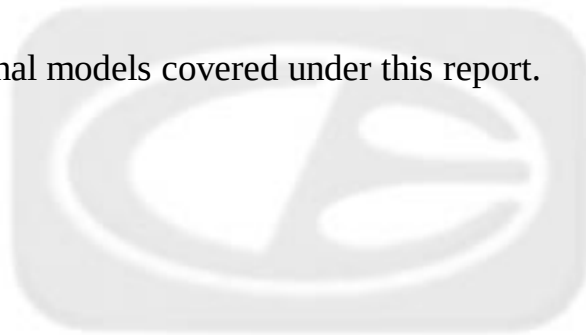


## **ADDITIONAL MODELS COVERED UNDER THIS REPORT**

USED FOR THE PRIMARY TEST

Micro ID Contactless Programmer  
Model: DV103001  
S/N: N/A

There were no additional models covered under this report.

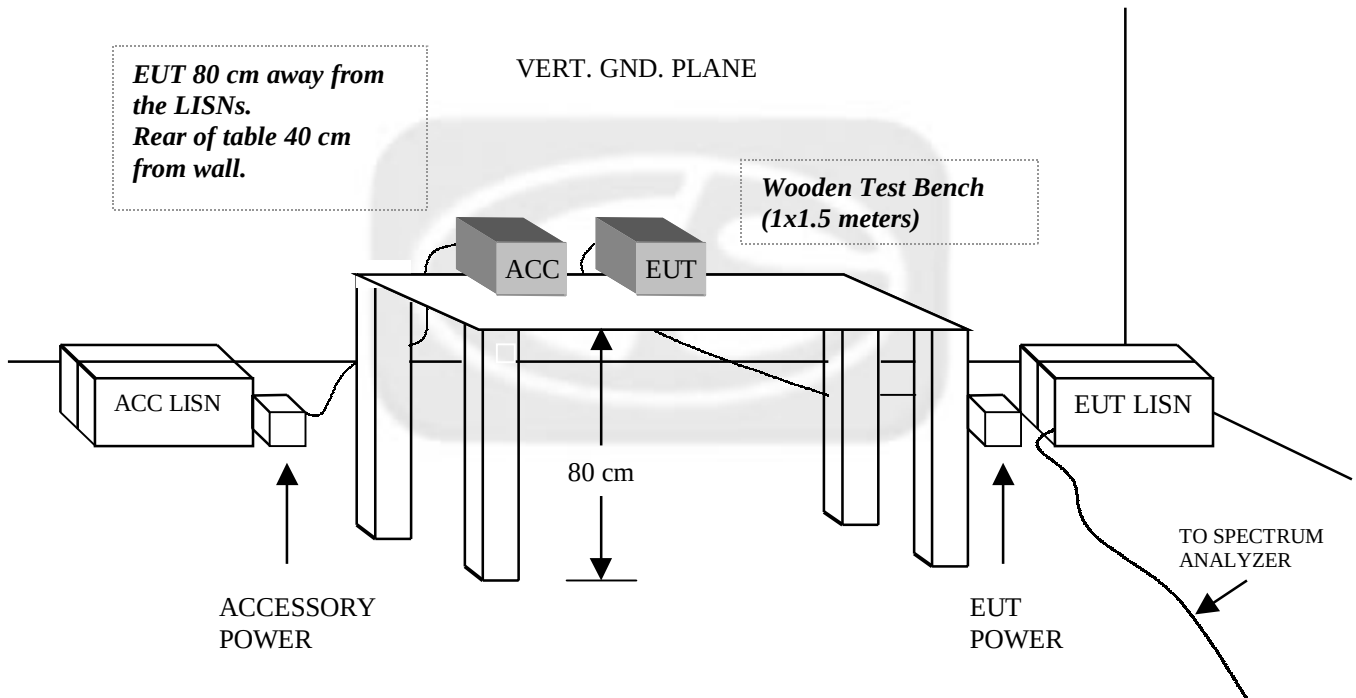




**APPENDIX C**

***DIAGRAMS, CHARTS AND PHOTOS***



**FIGURE 1: CONDUCTED EMISSIONS TEST SETUP**

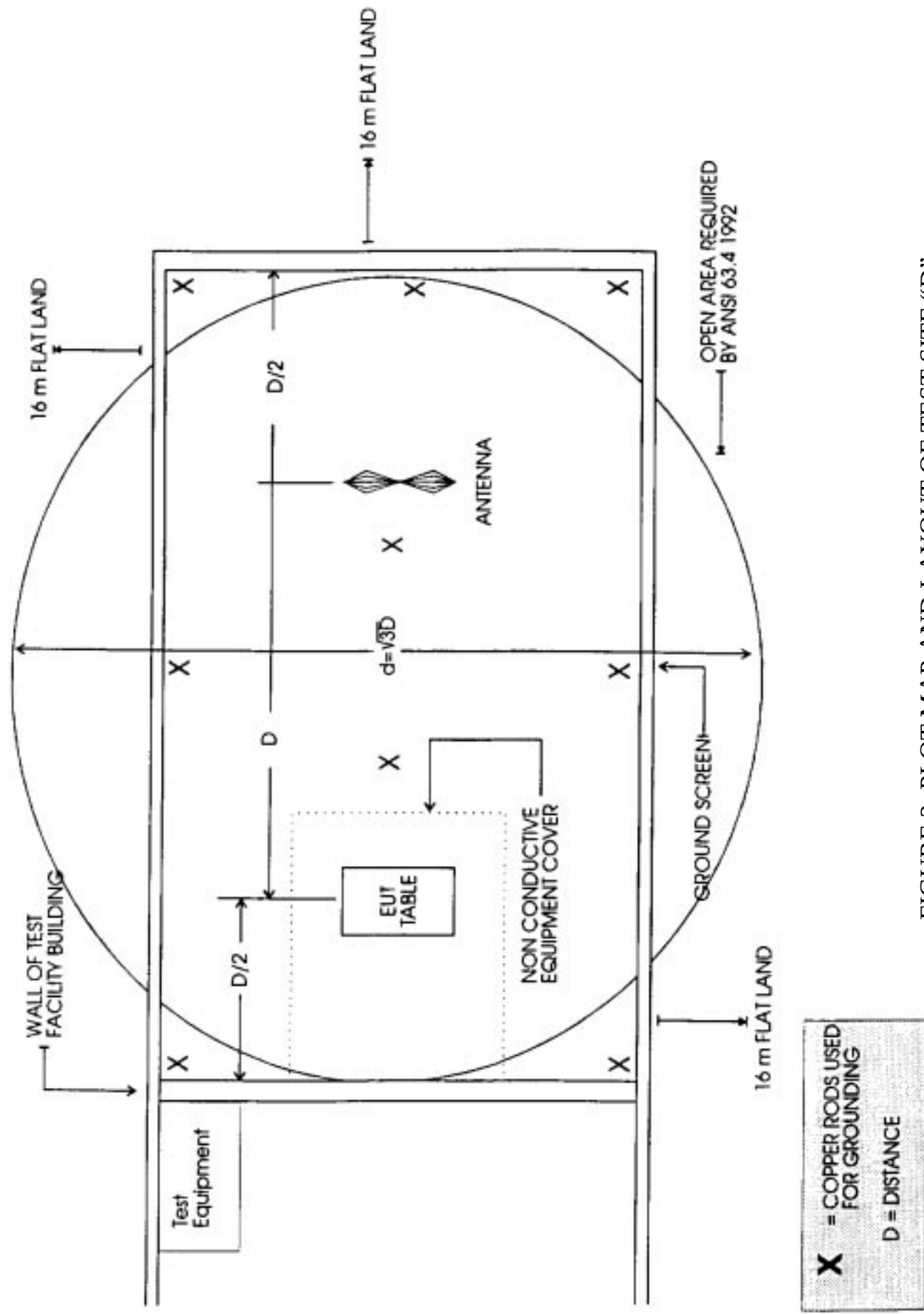


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE "D"



**FRONT VIEW**

MICROCHIP TECHNOLOGY, INC.  
MICRO ID CONTACTLESS PROGRAMMER  
Model: DV103001

FCC SUBPART B and C - RADIATED EMISSIONS – 11-05-98

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**





**REAR VIEW**

MICROCHIP TECHNOLOGY, INC.  
MICRO ID CONTACTLESS PROGRAMMER  
Model: DV103001

FCC SUBPART B and C - RADIATED EMISSIONS – 11-05-98

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**





**FRONT VIEW**

MICROCHIP TECHNOLOGY, INC.  
MICRO ID CONTACTLESS PROGRAMMER  
Model: DV103001

FCC SUBPART B and C - CONDUCTED EMISSIONS – 11-05-98

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**





**REAR VIEW**

MICROCHIP TECHNOLOGY, INC.  
MICRO ID CONTACTLESS PROGRAMMER  
Model: DV103001

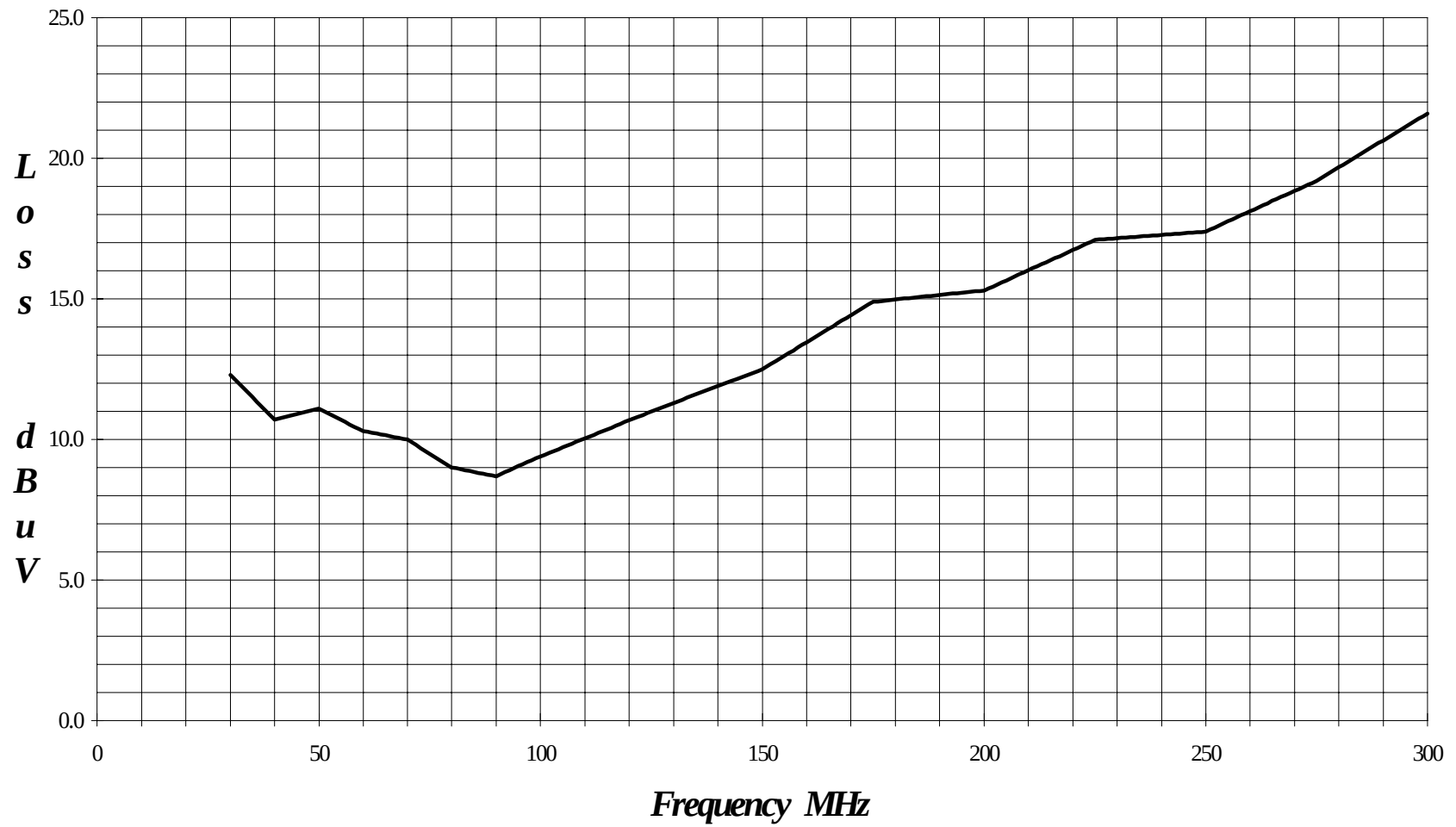
FCC SUBPART B and C - CONDUCTED EMISSIONS – 11-05-98

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



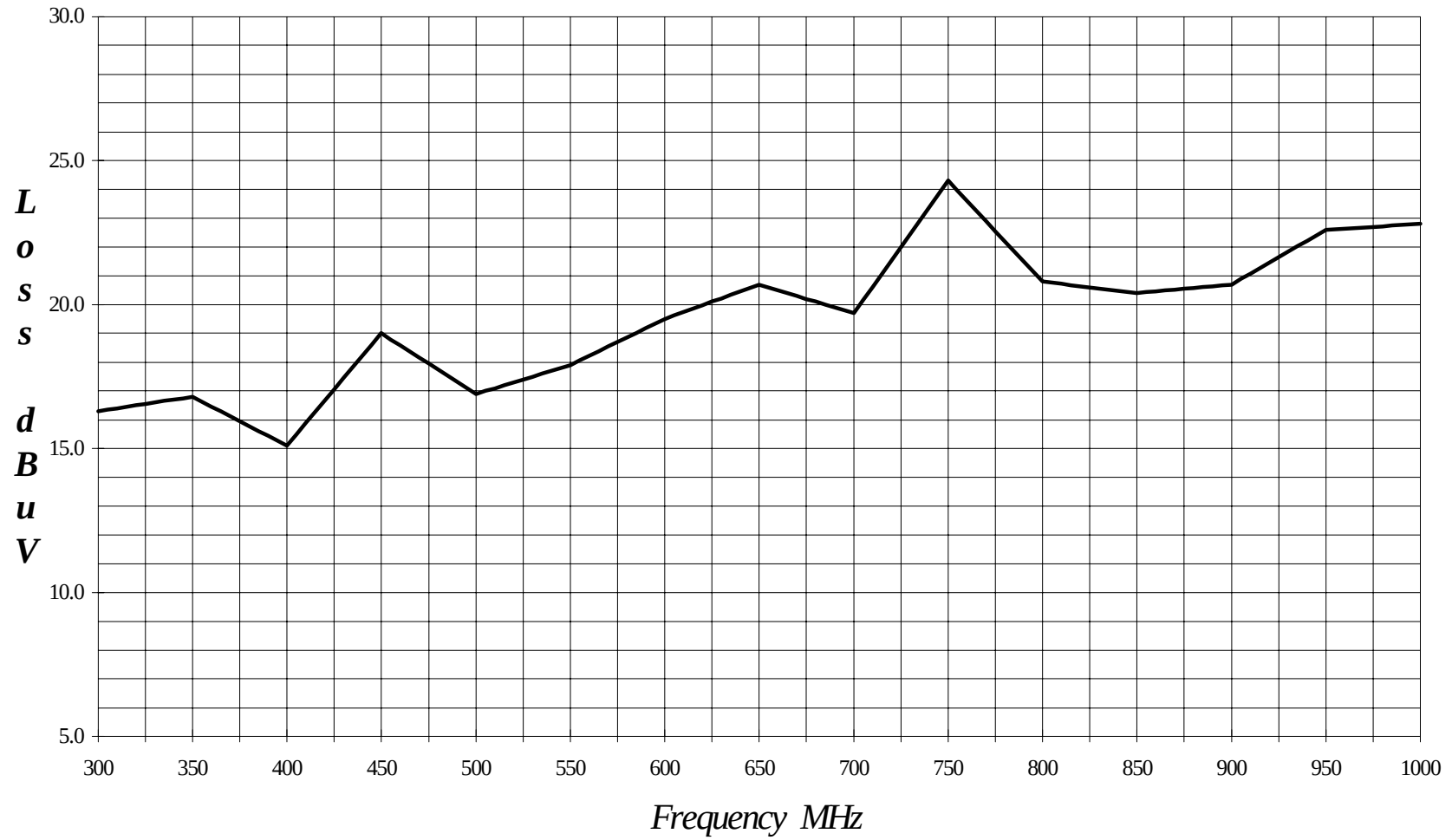
Cal: 10/15/98

**LAB "D" BICONICAL ANTENNA AB-100 S/N 01548**

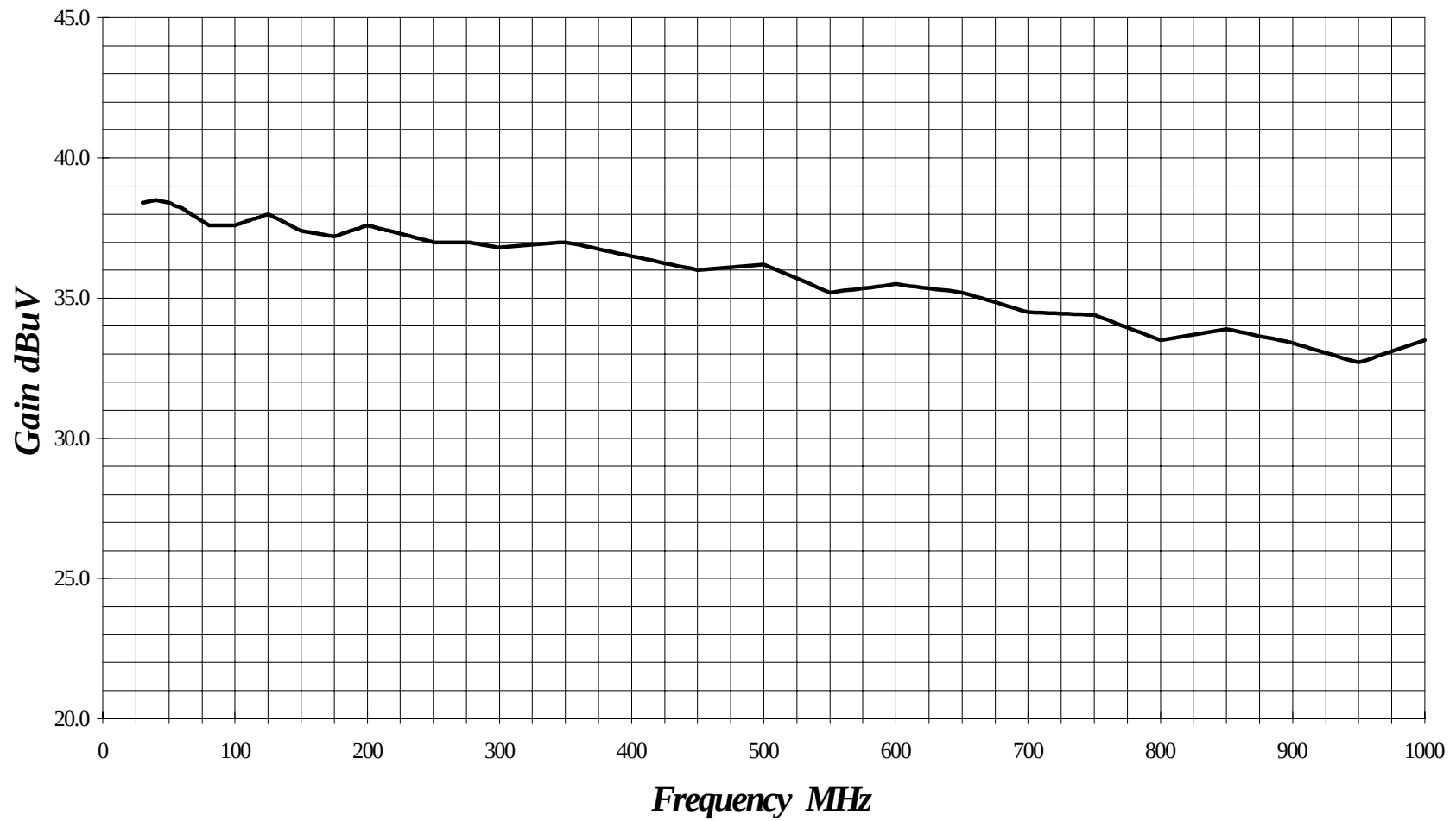


*Cal: 10/15/98*

***LAB "D" LOG PERIODIC ANTENNA AL-100 S/N 01117***



***PREAMPLIFIER EFFECTIVE GAIN AT 3 METERS PA-102 S/N: 1017***



COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25132

CALIBRATION DATE: OCTOBER 13, 1998

| FREQUENCY<br>(GHz) | FACTOR<br>(dB) | FREQUENCY<br>(GHz) | FACTOR<br>(dB) |
|--------------------|----------------|--------------------|----------------|
| 1.0                | 33.7           | 8.0                | 32.9           |
| 1.1                | 33.5           | 8.5                | 32.7           |
| 1.2                | 33.5           | 9.0                | 33.2           |
| 1.3                | 33.6           | 9.5                | 33.7           |
| 1.4                | 33.5           | 10.0               | 34.6           |
| 1.5                | 33.0           | 10.5               | 32.7           |
| 1.6                | 33.4           | 11.0               | 30.8           |
| 1.7                | 33.5           | 11.5               | 32.1           |
| 1.8                | 33.6           | 12.0               | 31.7           |
| 1.9                | 33.5           | 12.5               | 32.9           |
| 2.0                | 33.9           | 13.0               | 27.8           |
| 2.5                | 33.9           | 13.5               | 30.7           |
| 3.0                | 33.6           | 14.0               | 30.4           |
| 3.5                | 33.5           | 14.5               | 31.7           |
| 4.0                | 33.4           | 15.0               | 32.2           |
| 4.5                | 32.9           | 15.5               | 34.0           |
| 5.0                | 32.4           | 16.0               | 31.6           |
| 5.5                | 32.7           | 16.5               | 32.7           |
| 6.0                | 33.6           | 17.0               | 31.7           |
| 6.5                | 32.5           | 17.5               | 31.2           |
| 7.0                | 33.0           | 18.0               | 30.2           |
| 7.5                | 33.7           |                    |                |



# E-FIELD ANTENNA FACTOR CALIBRATION

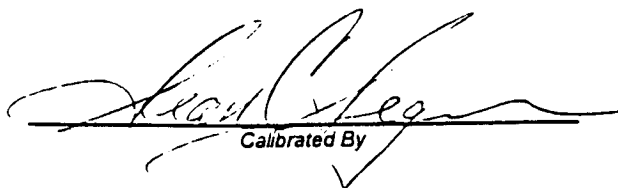
$$E(\text{dB V/m}) = V_o(\text{dB V}) + AFE(\text{dB/m})$$

Model number : DRG-118/A

| Frequency<br>GHz | AFE<br>dB/m | Gain<br>dBi |
|------------------|-------------|-------------|
| 1                | 22.3        | 8.0         |
| 2                | 26.7        | 9.5         |
| 3                | 29.7        | 10.1        |
| 4                | 29.5        | 12.8        |
| 5                | 32.3        | 12.0        |
| 6                | 32.4        | 13.4        |
| 7                | 36.1        | 11.0        |
| 8                | 37.4        | 10.9        |
| 9                | 36.8        | 12.5        |
| 10               | 39.5        | 10.7        |
| 11               | 39.6        | 11.5        |
| 12               | 39.8        | 12.0        |
| 13               | 39.7        | 12.8        |
| 14               | 41.8        | 11.3        |
| 15               | 41.9        | 11.9        |
| 16               | 38.1        | 16.3        |
| 17               | 41.0        | 13.9        |
| 18               | 46.5        | 8.9         |

Serial number : 1053  
Job number : 96-092  
Remarks : 3 meter calibration  
Standards : LPD-118/A, TE-1000

Temperature : 72° F  
Humidity : 56 %  
Traceability : A01887  
Date : December 08, 1995

  
Calibrated By



## Com-Power Corporation

(714) 587-9800

### Antenna Calibration

Antenna Type: Loop Antenna  
Model: AL-130  
Serial Number: 25309  
Calibration Date: 2/5/98

| Frequency<br>MHz         | Magnetic<br>(dB/m) | Electric<br>dB/m |
|--------------------------|--------------------|------------------|
| 0.01                     | -40.5              | 11.0             |
| 0.02                     | -41.6              | 9.9              |
| 0.03                     | -40.0              | 11.5             |
| 0.04                     | -40.3              | 11.2             |
| 0.05                     | -41.6              | 9.9              |
| 0.06                     | -41.1              | 10.4             |
| 0.07                     | -41.3              | 10.2             |
| 0.08                     | -41.6              | 9.9              |
| 0.09                     | -41.7              | 9.8              |
| 0.1                      | -41.8              | 9.7              |
| 0.2                      | -44.0              | 7.5              |
| 0.3                      | -41.6              | 9.9              |
| 0.4                      | -41.7              | 9.8              |
| 0.5                      | -41.7              | 9.8              |
| 0.6                      | -41.5              | 10.0             |
| 0.7                      | -41.5              | 10.0             |
| 0.8                      | -41.6              | 9.9              |
| 0.9                      | -41.6              | 9.9              |
| 1                        | -41.1              | 10.4             |
| 2                        | -40.7              | 10.8             |
| 3                        | -40.7              | 10.8             |
| 4                        | -40.9              | 10.6             |
| 5                        | -40.1              | 11.4             |
| 6                        | -40.0              | 11.5             |
| 7                        | -40.3              | 11.2             |
| 8                        | -39.8              | 11.7             |
| 9                        | -38.8              | 12.7             |
| 10                       | -40.8              | 10.7             |
| 12                       | -41.4              | 10.1             |
| 14                       | -41.4              | 10.1             |
| 15                       | -40.9              | 10.6             |
| 16                       | -40.8              | 10.7             |
| 18                       | -41.5              | 10.0             |
| 20                       | -41.5              | 10.0             |
| 25                       | -41.2              | 10.3             |
| 30                       | -41.4              | 10.1             |
| Trans. Antenna Height    |                    | 2 meter          |
| Receiving Antenna Height |                    | 2 meter          |



**APPENDIX D**

***DATA SHEETS***





## RADIATED EMISSIONS

COMPANY NAME: MICROCHIP TECHNOLOGY INC. DATE: 11-5-98EUT: MICRO ID<sup>TM</sup> CONTACTLESS PROGRAMMER EUT SIN: PROTOTYPEEUT MODEL: DV103001 LOCATION: ☒ BREA ☐ SILVERADO ☐ AGOURASPECIFICATION: FCC SUBPART C CLASS:        TEST DISTANCE: 3 M LAB: DANTENNA: ☒ LOOP ☐ BICONICAL ☐ LOG ☐ HORN POLARIZATION: ☒ VERT ☐ HORIZ☒ QUALIFICATION ☐ ENGINEERING ☐ MFG. AUDIT ENGINEER: KYLE F.NOTES: DISTANCE FACTOR  $40 \log \frac{300}{3} = 80 \text{ dB (0.009 - 0.490 MHz)}$   
 $40 \log \frac{30}{3} = 40 \text{ dB (0.490 - 30 MHz)}$ 

| Frequency<br>(kHz) | Peak<br>Reading<br>(dBuV) | Avg. <input type="checkbox"/><br>Q.P. <input type="checkbox"/><br>(dBuV) | Antenna<br>Height<br>(meters)     | Azimuth<br>(degrees) | Distance<br>Factor<br>(dB) | Antenna<br>Gain<br>(dB) | * Corrected<br>Reading<br>(dBuV) | Delta<br>**<br>(dB) | Spec<br>Limit<br>(dBuV) |
|--------------------|---------------------------|--------------------------------------------------------------------------|-----------------------------------|----------------------|----------------------------|-------------------------|----------------------------------|---------------------|-------------------------|
| 125.213            | 68.3                      | -                                                                        | 1.0                               | 270                  | 80.0                       | -9.7                    | -2.0                             | -27.6               | 25.6                    |
| 162.44             | 59.8                      | -                                                                        | 1.0                               | 90                   | 80.0                       | -7.5                    | -12.7                            | -36.0               | 23.3                    |
| 192.83             | 63.7                      | -                                                                        | 1.0                               | 270                  | 80.0                       | -7.5                    | -8.8                             | -30.7               | 21.9                    |
| 228.23             | 61.7                      | -                                                                        | 1.0                               | 270                  | 80.0                       | -7.5                    | -10.8                            | -31.2               | 20.4                    |
| 250.46             | 52.2                      | -                                                                        | 1.0                               | 0                    | 80.0                       | -9.9                    | -17.9                            | -37.5               | 19.6                    |
| 375.64             | 51.4                      | -                                                                        | 1.0                               | 270                  | 80.0                       | -9.8                    | -18.8                            | -34.9               | 16.1                    |
|                    |                           |                                                                          | NO OTHER EMISSIONS NDR            |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          | HARMONICS FOUND BEYOND THIS POINT |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |
|                    |                           |                                                                          |                                   |                      |                            |                         |                                  |                     |                         |

\* CORRECTED READING = METER READING - DISTANCE FACTOR - ANTENNA GAIN

\*\* DELTA = CORRECTED READING - SPECIFICATION LIMIT

## RADIATED EMISSIONS

COMPANY NAME: MICROCHIP TECHNOLOGY INC. DATE: 11-5-98

EUT: MICRO I/O™ CONTACTLESS PROGRAMMER EUT SIN: PROTOTYPE

EUT MODEL: DV103001 LOCATION: ☒ BREA ☐ SILVERADO ☐ AGOURA

SPECIFICATION: FCC SUBPART C CLASS: \_\_\_\_\_ TEST DISTANCE: 3M LAB: D

ANTENNA: ☒ LOOP ☐ BICONICAL ☐ LOG ☐ HORN POLARIZATION: ☐ VERT ☒ HORIZ

☒ QUALIFICATION ☐ ENGINEERING ☐ MFG. AUDIT ENGINEER: KYLE F.

NOTES: DISTANCE FACTOR  $40 \log \frac{300}{3} = 80\text{dB} (0.009 - 0.490 \text{ MHz})$   
 $40 \log \frac{30}{3} = 40\text{dB} (0.490 - 30 \text{ MHz})$

| Frequency<br>(kHz)                | Peak<br>Reading<br>(dBuV) | Avg. <input type="checkbox"/><br>Q.P. <input type="checkbox"/><br>(dBuV) | Antenna<br>Height<br>(meters) | Azimuth<br>(degrees) | Distance<br>Factor<br>(dB) | Antenna<br>Gain<br>(dB) | * Corrected<br>Reading<br>(dBuV) | Delta<br>**<br>(dB) | Spec<br>Limit<br>(dBuV) |
|-----------------------------------|---------------------------|--------------------------------------------------------------------------|-------------------------------|----------------------|----------------------------|-------------------------|----------------------------------|---------------------|-------------------------|
| 125.213                           | 58.7                      | -                                                                        | 1.0                           | 180                  | 80.0                       | -9.7                    | -11.6                            | -37.2               | 25.6                    |
| 162.44                            | 52.7                      | -                                                                        | 1.0                           | 180                  | 80.0                       | -7.5                    | -19.8                            | -43.1               | 23.3                    |
| 192.83                            | 52.7                      | -                                                                        | 1.0                           | 180                  | 80.0                       | -7.5                    | -19.8                            | -41.7               | 21.9                    |
| 228.08                            | 50.8                      | -                                                                        | 1.0                           | 180                  | 80.0                       | -7.5                    | -21.7                            | -42.1               | 20.4                    |
| 250.46                            | 50.8                      | -                                                                        | 1.0                           | 270                  | 80.0                       | -9.9                    | -19.3                            | -38.9               | 19.6                    |
| 375.64                            | 43.7                      | -                                                                        | 1.0                           | 180                  | 80.0                       | -9.8                    | -26.5                            | -42.6               | 16.1                    |
| NO OTHER EMISSIONS NOR            |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
| HARMONICS FOUND BEYOND THIS POINT |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |
|                                   |                           |                                                                          |                               |                      |                            |                         |                                  |                     |                         |

\* CORRECTED READING = METER READING - DISTANCE FACTOR - ANTENNA GAIN

\*\* DELTA = CORRECTED READING - SPECIFICATION LIMIT

BREA (714) 579-0500

SILVERADO (714) 589-0700

AGOURA (818) 597-0600

Test location: Compatible Electronics  
 Customer : MICROCHIP TECHNOLOGY, INC.  
 Manufacturer : SAME  
 EUT name : MICRO ID CONTACTLESS PROGRAM  
 Specification: Fcc\_B Test distance: 3.0 mtrs Lab: D  
 Distance correction factor( $20 \cdot \log(\text{test}/\text{spec})$ ) : 0.00  
 Test Mode :  
 SPURIOUS EMISSIONS  
 TEMPERATURE 70 DEGREES F.  
 RELATIVE HUMIDITY 65%  
 TESTED BY: Kyle Fujimoto  
 KYLE FUJIMOTO

| Pol | Freq<br>MHz | Rdng<br>dBuV | Cable<br>loss<br>dB | Ant<br>factor<br>dB | Amp<br>gain<br>dB | Cor'd<br>rdg = R<br>dBuV | limit<br>= L<br>dBuV/m | Delta<br>R-L<br>dB |
|-----|-------------|--------------|---------------------|---------------------|-------------------|--------------------------|------------------------|--------------------|
| 1V  | 33.13       | 60.10        | 0.50                | 11.80               | 38.93             | 33.47                    | 40.00                  | -6.53              |
| 2V  | 37.38       | 58.00        | 0.50                | 11.12               | 38.97             | 30.65                    | 40.00                  | -9.35              |
| 3V  | 49.38       | 56.80        | 0.59                | 11.08               | 39.00             | 29.47                    | 40.00                  | -10.53             |
| 4V  | 61.25       | 59.50        | 0.70                | 10.26               | 38.86             | 31.60                    | 40.00                  | -8.40              |
| 5V  | 65.25       | 56.00        | 0.70                | 10.14               | 38.74             | 28.10                    | 40.00                  | -11.90             |
| 6V  | 80.05       | 51.80        | 0.70                | 9.00                | 38.30             | 23.20                    | 40.00                  | -16.80             |
| 7V  | 86.78       | 62.20        | 0.77                | 8.80                | 38.37             | 33.40                    | 40.00                  | -6.60              |
| 8V  | 93.79       | 58.00        | 0.84                | 8.97                | 38.44             | 29.37                    | 43.50                  | -14.13             |
| 9V  | 109.26      | 53.40        | 0.94                | 9.99                | 38.69             | 25.64                    | 43.50                  | -17.86             |
| 10V | 115.06      | 60.40        | 0.96                | 10.36               | 38.80             | 32.92                    | 43.50                  | -10.58             |
| 11V | 116.56      | 54.70        | 0.97                | 10.46               | 38.83             | 27.29                    | 43.50                  | -16.21             |
| 12V | 120.04      | 58.00        | 0.98                | 10.68               | 38.90             | 30.76                    | 43.50                  | -12.74             |
| 13V | 127.82      | 62.30        | 1.02                | 11.17               | 38.95             | 35.54                    | 43.50                  | -7.96              |
| 14V | 136.53      | 53.20        | 1.09                | 11.69               | 38.82             | 27.17                    | 43.50                  | -16.33             |
| 15V | 163.40      | 41.80        | 1.31                | 13.79               | 38.60             | 18.29                    | 43.50                  | -25.21             |
| 16V | 197.74      | 54.00        | 1.40                | 15.26               | 38.96             | 31.70                    | 43.50                  | -11.80             |
| 17V | 199.76      | 56.50        | 1.40                | 15.30               | 39.00             | 34.20                    | 43.50                  | -9.30              |
| 18V | 299.38      | 41.60        | 1.80                | 21.54               | 38.60             | 26.34                    | 46.00                  | -19.66             |
| 19V | 325.09      | 50.40        | 1.85                | 16.55               | 38.75             | 30.05                    | 46.00                  | -15.95             |
| 20V | 332.87      | 50.20        | 1.87                | 16.63               | 38.80             | 29.90                    | 46.00                  | -16.10             |
| 21V | 350.09      | 47.00        | 1.90                | 16.80               | 38.90             | 26.80                    | 46.00                  | -19.20             |
| 22V | 366.24      | 53.80        | 1.93                | 16.25               | 38.71             | 33.28                    | 46.00                  | -12.72             |
| 23V | 399.32      | 44.70        | 2.00                | 15.12               | 38.50             | 23.32                    | 46.00                  | -22.68             |
| 24V | 463.00      | 60.00        | 2.28                | 18.45               | 38.33             | 42.40                    | 46.00                  | -3.60              |
| 25V | 575.25      | 51.50        | 2.95                | 18.71               | 38.30             | 34.86                    | 46.00                  | -11.14             |
| 26V | 602.89      | 49.90        | 3.02                | 19.57               | 38.51             | 33.99                    | 46.00                  | -12.01             |
| 27V | 705.30      | 50.10        | 3.53                | 20.19               | 38.02             | 35.80                    | 46.00                  | -10.20             |

Test location: Compatible Electronics  
 Customer : MICROCHIP TECHNOLOGY, INC  
 Manufacturer : SAME  
 EUT name : MICRO ID CONTACTLESS PROGRAMMER  
 Specification: Fcc\_B Test distance: 3.0 mtrs  
 Distance correction factor( $20 \cdot \log(\text{test}/\text{spec})$ ) : 0.00  
 Test Mode :  
 SPURIOUS EMISSIONS  
 TEMPERATURE 70 DEGREES F.  
 RELATIVE HUMIDITY 65%  
 TESTED BY: Kyle Fujimoto  
 KYLE FUJIMOTO

| Pol | Freq<br>MHz | Rdng<br>dBuV | Cable<br>loss<br>dB | Ant<br>factor<br>dB | Amp<br>gain<br>dB | Cor'd<br>rdg = R<br>dBuV | limit<br>= L<br>dBuV/m | Delta<br>R-L<br>dB |
|-----|-------------|--------------|---------------------|---------------------|-------------------|--------------------------|------------------------|--------------------|
| 1H  | 33.16       | 52.10        | 0.50                | 11.80               | 38.93             | 25.46                    | 40.00                  | -14.54             |
| 2H  | 37.96       | 54.30        | 0.50                | 11.03               | 38.98             | 26.85                    | 40.00                  | -13.15             |
| 3H  | 49.02       | 52.20        | 0.59                | 11.06               | 39.00             | 24.85                    | 40.00                  | -15.15             |
| 4H  | 57.02       | 54.40        | 0.67                | 10.54               | 38.93             | 26.68                    | 40.00                  | -13.32             |
| 5H  | 61.26       | 56.90        | 0.70                | 10.26               | 38.86             | 29.00                    | 40.00                  | -11.00             |
| 6H  | 65.28       | 55.50        | 0.70                | 10.14               | 38.74             | 27.60                    | 40.00                  | -12.40             |
| 7H  | 73.28       | 63.00        | 0.70                | 9.67                | 38.50             | 34.87                    | 40.00                  | -5.13              |
| 8H  | 78.62       | 57.00        | 0.70                | 9.14                | 38.34             | 28.50                    | 40.00                  | -11.50             |
| 9H  | 81.40       | 52.30        | 0.71                | 8.96                | 38.31             | 23.66                    | 40.00                  | -16.34             |
| 10H | 82.77       | 60.40        | 0.73                | 8.92                | 38.33             | 31.72                    | 40.00                  | -8.28              |
| 11H | 85.51       | 58.70        | 0.76                | 8.83                | 38.36             | 29.93                    | 40.00                  | -10.07             |
| 12H | 101.80      | 53.30        | 0.91                | 9.52                | 38.54             | 25.19                    | 43.50                  | -18.31             |
| 13H | 127.71      | 57.80        | 1.02                | 11.16               | 38.96             | 31.03                    | 43.50                  | -12.47             |
| 14H | 144.09      | 55.80        | 1.15                | 12.15               | 38.69             | 30.40                    | 43.50                  | -13.10             |
| 15H | 197.77      | 54.60        | 1.40                | 15.26               | 38.96             | 32.30                    | 43.50                  | -11.20             |
| 16H | 199.80      | 50.00        | 1.40                | 15.30               | 39.00             | 27.70                    | 43.50                  | -15.80             |
| 17H | 346.61      | 41.20        | 1.89                | 16.77               | 38.88             | 20.98                    | 46.00                  | -25.02             |
| 18H | 362.38      | 52.40        | 1.92                | 16.38               | 38.75             | 31.95                    | 46.00                  | -14.05             |
| 19H | 432.39      | 48.10        | 2.13                | 17.63               | 38.31             | 29.55                    | 46.00                  | -16.45             |
| 20H | 463.05      | 54.10        | 2.28                | 18.45               | 38.33             | 36.50                    | 46.00                  | -9.50              |
| 21H | 707.28      | 48.30        | 3.54                | 20.37               | 38.03             | 34.18                    | 46.00                  | -11.82             |
| 22H | 952.50      | 40.70        | 4.30                | 22.61               | 37.03             | 30.57                    | 46.00                  | -15.43             |



COMPATIBLE  
ELECTRONICS

11/5/1998

14:05:23

MICROCHIP TECHNOLOGY, INC.

MICRO ID CONTACTLESS PROGRAM

DV103001

FCC B - BLACK LEAD

TEST ENGINEER : *Kyle Fujimoto*

KYLE FUJIMOTO

20 highest peaks above -50.00 dB of CLASS B limit line

Peak criteria : 0.10 dB, Curve : Peak

Peak# Freq(Mhz) Amp(dBuV) Limit(dB) Delta(dB)

|    |        |       |       |       |
|----|--------|-------|-------|-------|
| 1  | 24.850 | 45.58 | 48.00 | -2.42 |
| 2  | 0.652  | 43.37 | 48.00 | -4.63 |
| 3  | 0.485  | 43.07 | 48.00 | -4.93 |
| 4  | 1.298  | 42.17 | 48.00 | -5.83 |
| 5  | 0.462  | 41.87 | 48.00 | -6.13 |
| 6  | 1.309  | 41.67 | 48.00 | -6.33 |
| 7  | 0.458  | 41.37 | 48.00 | -6.63 |
| 8  | 0.468  | 40.97 | 48.00 | -7.03 |
| 9  | 0.567  | 40.47 | 48.00 | -7.53 |
| 10 | 0.551  | 40.47 | 48.00 | -7.53 |
| 11 | 0.560  | 40.37 | 48.00 | -7.63 |
| 12 | 0.519  | 40.37 | 48.00 | -7.63 |
| 13 | 0.532  | 40.27 | 48.00 | -7.73 |
| 14 | 0.509  | 40.27 | 48.00 | -7.73 |
| 15 | 0.500  | 40.27 | 48.00 | -7.73 |
| 16 | 0.688  | 40.17 | 48.00 | -7.83 |
| 17 | 0.492  | 40.07 | 48.00 | -7.93 |
| 18 | 0.594  | 39.77 | 48.00 | -8.23 |
| 19 | 0.526  | 39.77 | 48.00 | -8.23 |
| 20 | 0.612  | 39.57 | 48.00 | -8.43 |

SEE QUASI-PEAK READING ON NEXT PAGE  
AND ON PLOT



COMPATIBLE  
ELECTRONICS

11/5/1998 14:05:23

MICROCHIP TECHNOLOGY, INC.

MICRO ID CONTACTLESS PROGRAM

DV103001

FCC B - BLACK LEAD

TEST ENGINEER : Kyle Fujimoto  
KYLE FUJIMOTO

-----  
1 highest peaks above -50.00 dB of CLASS B limit line

Peak criteria : 0.10 dB, Curve : Quasi-peak

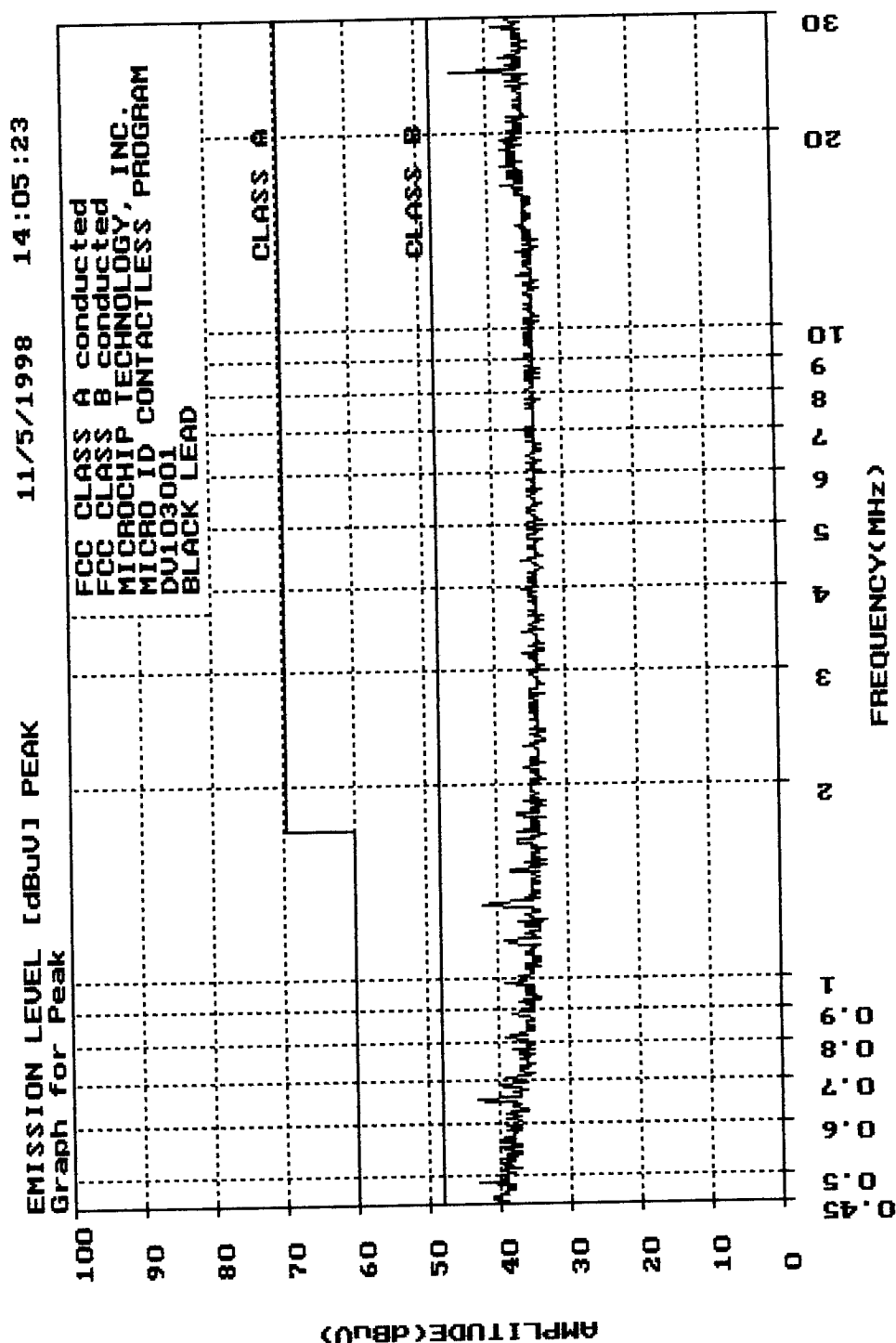
Peak# Freq(Mhz) Amp(dBuV) Limit(dB) Delta(dB)

|   |        |       |       |       |
|---|--------|-------|-------|-------|
| 1 | 24.850 | 43.41 | 48.00 | -4.59 |
|---|--------|-------|-------|-------|

-----

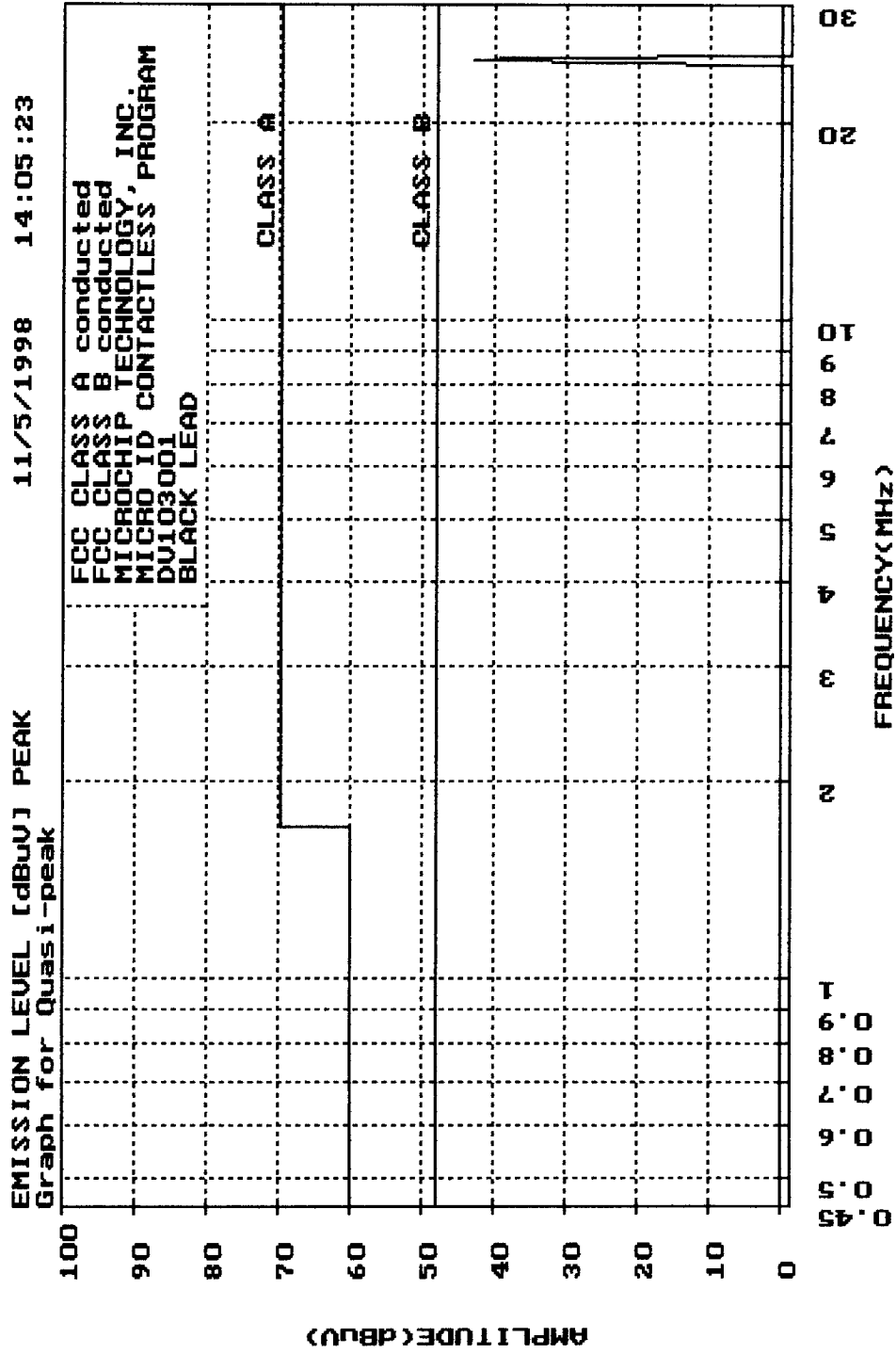


COMPATIBLE  
ELECTRONICS





COMPATIBLE  
ELECTRONICS





COMPATIBLE  
ELECTRONICS

11/5/1998

14:14:46

MICROCHIP TECHNOLOGY, INC.

MICRO ID CONTACTLESS PROGRAM

DV103001

FCC B - WHITE LEAD

TEST ENGINEER : Kyle Fujimoto  
KYLE FUJIMOTO

-----  
20 highest peaks above -50.00 dB of CLASS B limit line

Peak criteria : 0.10 dB, Curve : Peak

Peak# Freq(Mhz) Amp(dBuV) Limit(dB) Delta(dB)

|    |        |       |       |        |
|----|--------|-------|-------|--------|
| 1  | 24.850 | 44.84 | 48.00 | -3.16  |
| 2  | 0.652  | 44.38 | 48.00 | -3.62  |
| 3  | 1.319  | 40.58 | 48.00 | -7.42  |
| 4  | 1.484  | 38.98 | 48.00 | -9.02  |
| 5  | 29.033 | 38.34 | 48.00 | -9.66  |
| 6  | 20.748 | 38.20 | 48.00 | -9.80  |
| 7  | 16.597 | 38.02 | 48.00 | -9.98  |
| 8  | 19.394 | 37.77 | 48.00 | -10.23 |
| 9  | 17.978 | 37.59 | 48.00 | -10.41 |
| 10 | 17.467 | 37.47 | 48.00 | -10.53 |
| 11 | 25.259 | 37.35 | 48.00 | -10.65 |
| 12 | 18.839 | 37.34 | 48.00 | -10.66 |
| 13 | 19.798 | 37.29 | 48.00 | -10.71 |
| 14 | 1.144  | 37.28 | 48.00 | -10.72 |
| 15 | 26.028 | 37.27 | 48.00 | -10.73 |
| 16 | 28.550 | 37.23 | 48.00 | -10.77 |
| 17 | 18.442 | 37.12 | 48.00 | -10.88 |
| 18 | 18.283 | 37.11 | 48.00 | -10.89 |
| 19 | 4.727  | 37.08 | 48.00 | -10.92 |
| 20 | 0.817  | 37.08 | 48.00 | -10.92 |

-----



COMPATIBLE  
ELECTRONICS

11/5/1998 14:14:46

EMISSION LEVEL [dBuV] PEAK

Graph for Peak

