Tested Configuration /Setup: [2.1033(b8)]

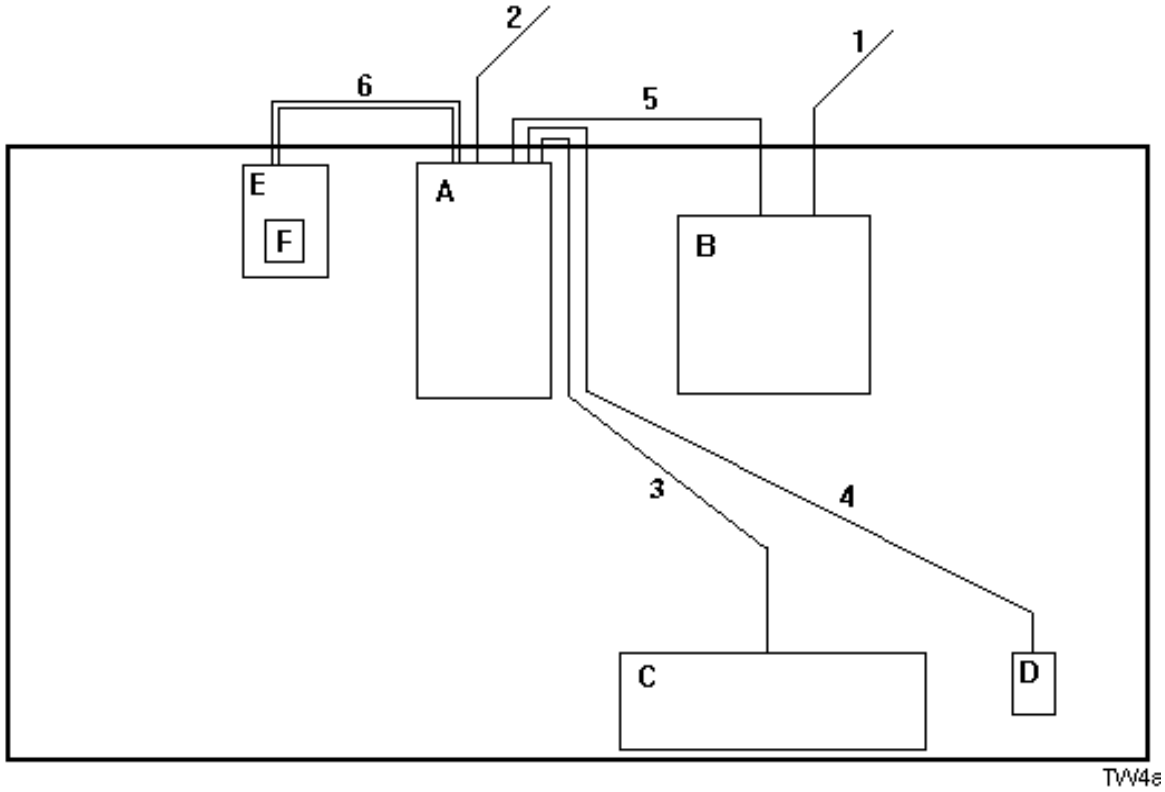
Support Equipment & Cabling

Setup Diagram Legend	Description	Model	Serial No. / Part No.	EMC Consideration
A	Host Computer Tower 366MHz	[Celeron] 366MHz	AOPENAX6BC	--
B	Monitor	[ZDS] ZCM-1492-1	1190062ROD	FCC ID: ATO90CZCM1492
C	Keyboard	[Gateway] 2196003	51182835	FCC ID: D7J2196003-xx
D	Mouse	[Microsoft] Intellimouse	1.1APS/2	FCC ID: C3KKMPS
E	Radio Module Fixture	[Aironet] Engineering	Assembly #410-004599	Foil shielded for the EUT testing.
F	[EUT] mounted in Aironet Radio Module Test Fixture	[Aironet] MI-4800B	510-884741 Rev.AA	FCC ID: LDK102039

	Device	Description	Length	EMC Consideration
1	monitor line cord	US plug to IEC	1.5 meters	Unshielded
2	Computer line cord	US plug to IEC	1.5 meters	Unshielded
3	Keyboard I/O cable	Captive to keyboard to PS2 connector	2 meters	Foil shield.
4	PS2 Mouse cable	Captive to mouse to PS2 connector	2 meters	Foil shield.
5	Video I/O cable	Captive to monitor to 15p male 'D'	1.5 meters	Coax shield. One ferrite core molded into jacket. Bundled during testing
6	ISA Ribbon cable	--	2 meters	Bundled during testing. Foil shielded for the EUT testing.

Setup Diagram

Note: Setup photographs are located in Attached Electronic File, Exhibit L.



BASIC EUT SETUP
(Legend designation is on previous page)

Summary of Results:

1. This test series evaluated the Equipment Under Test, MI-4800B, to FCC Part 15, SubPart C.
2. The system tested is compliant to the requirement of CFR 47, FCC Part 15, SubPart C for Spread Spectrum, 2.4GHz, Intentional Radiators.
3. The equipment under test was received on January 27, 2000 and this test series commenced on January 30, 2000.
4. The EUT is for portable operation only. It does not utilize the 120vac power mains. Therefore, no line conducted emission tests were performed on the unit.
5. The spectral density measurement with highest peak reading occurred with the transmitter tuned to 2.442GHz and a 2MBit data rate. It was recorded to be 17.5dB below the 15.247(d) limit of 8dBm.
6. The minimum 6dB bandwidth recorded occurred while measuring with the transmitter tuned to 2.442GHz. It was recorded as 10.5MHz. The minimum limit is 500KHz.
7. The transmitter maximum power was measured at 2.412GHGz, 2.442GHz, and 2.462GHz. The highest level occurred at 2.462GHZ and measured to be 17.8dBm which is 12.2dB below the limit of 30dBm.

2.2dBi Dipole Antenna

8. The radiated emission level nearest the limit, when measuring at the band edges only, occurred at 2.390GHz with the EUT in 11Mbut/Sec operation, vertically polarized. This signal was measured to be 471uV/m which is 0.5dB below the 500uV/m limit.
9. When measuring the transmitter harmonic emissions, the radiated emission level nearest the limit, and above the instrument floor noise, occurred at 4.924Ghz. The signal was measured to be 260.0uV/m which is 5.7dB below the 500uV/m limit.
10. The radiated level of spurious emissions nearest the limit, with the EUT in 'Receive Mode', occurred at 456MHz, horizontally polarized. This signal was measured to be 159uV/m which is 2.0dB below the 200uV/m limit.
11. The spurious emissions of the Local Oscillator, when in the receive mode, were below the noise floor of the measurement instrumentation. Three LO frequencies, 1) 2.037GHz, 2) 2.067GHz, and 2.087GHz which tune in 2.412GHz, 2.442GHz, and 2.462GHz respectively were searched and no detectable emissions were observed.

-1dBi Fujitsu Patch Antenna

12. The radiated emission level nearest the limit, when measuring at the band edges only, occurred at 2.390GHz with the EUT in 11Mbut/Sec operation, vertically polarized. This signal was measured to be 207uV/m which is 7.6dB below the 500uV/m limit.
13. When measuring the transmitter harmonic emissions, the radiated emission level nearest the limit, and above the instrument floor noise, occurred at 4.824Ghz. The signal was measured to be 312.6uV/m which is 4.1dB below the 500uV/m limit.

Changes made to achieve compliance

1. NONE

Standards Applied to Test: [2.1033(b6)]

ANSI C63.4 - 1992, Appendix I
CFR47 FCC Part 2, Part 15, SubPart C, 15.247

Test Methodology: [2.947(a), 2.1033(b6)]

For the testing, the placement of the EUT and the support equipment was selected to represent a configuration which would operate the equipment within the setup constraints of ANSI C63.4.

Because the unit is only for portable operation and does not utilize the power mains, there was no line conducted testing performed. The radiated testing, performed at a 3 meter open field test site, was completed according to the procedures outlined in the standards.

The cables of the EUT were manipulated to produced the highest signal level relative to the limit. The pictures, in this submittal, show the position of the equipment and cabling that produced the maximum signal level.

For radiated evaluations the EUT radio module was tested stand alone with the exception of a support computer to generate the program to exercise the EUT for testing.

In addition to evaluating the fundamentals and their harmonics, a test scan from 30MHz to 2GHz was performed to record levels of digital and associated emissions. This data included signals associated with the support computer and I/O cabling.

The EUT module was mounted on a manufacturer supplied test fixture. This fixture and associated I/O cable were isolated from the EUT RF by applying aluminum foil around the test fixture and cable. The aluminum foil was bonded to the rear of the support computer.

The EUT was positioned above the test fixture on standoffs outside the area of any shielding. This arrangement allowed the EUT emitted signals to be measured at their maximum while suppressing emissions from the engineering prototype test fixture. Signal and power connections were made via a tall header of pins which mated with the connector of the EUT.

The antenna was connected to the module. Data was collected with the antenna arranged in a vertical and horizontal position.

The EUT was exercised using a program which allowed the tester to turn the transmitter on and set the bit rate of modulation.

During the measurements of the transmitter, the EUT was continuously transmitting. Tests at different bit rates of 1Mbit, 2Mbit, 5.5Mbit, and 11Mbit were made to assure that the highest possible RF profile was being captured.

Radiated

The system was placed upon a 1 x 1.5 meter non-metallic table 80cm from the open field site ground plane in the prescribed setup per ANSI C63.4, Figure 9(c).

The table sits upon a remote controlled turntable. The receiving antenna, located at the appropriate standards distance of 3 or 10 meters from the table center, is also remote controlled.

Preliminary tests were done at the 3 meter open field test site. The final tests are done at the appropriate standards distance of 3 or 10 meters. The "Biconical/Log Periodic" broadband antenna connected to an EMI Receiver, meeting CISPR 16, is used throughout the testing.

The turntable was rotated 360 degrees and the receiving antenna height varied from 1 to 4 meters to search out the highest emissions. Both Vertical and Horizontal RF profiles were evaluated.

The principal settings of the EMI Receiver for radiated testing include:

Bandwidth:	120KHz for frequencies less than 1Ghz.
	1MHz for frequencies greater than 1GHz.
Detector Function:	scanning and signal search = Peak Mode
	measurements = Quasi Peak Mode for frequencies less than 1Ghz.
	Average mode for frequencies greater than 1GHz.

The cable loss of the coax used in radiated scanning is charted in this report.

The resultant Field Strength (FS) is a summation in decibels (dB) of the Indicated Receiver Level (RF), the Antenna Correction Factor (AF), and the Cable Loss Factor (CF). If a PreAmplifier (PA) is used, its gain (dB) is subtracted from the above sum.

Formula 1: $FS(dBuV/m) = RF(dBuV) + AF(dB/m) + CF(dB) - PA(dB)$

To convert the Field Strength dBuV/m term to uV/m, the dBuV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in uV/m terms.

Formula 2: $FS(uV/m) = AntiLog[(FS(dBuV/m))/20]$