CONDUCTED AND RADIATED EMISSIONS MEASUREMENTS

FOR

CERTIFICATION FILING UNDER SECTION 15

GRANTEE: SIERRA WIRELESS, INC.

FCC ID: N7NACRD2

November 11, 1998

Prepared By:

Spectrum Technology, Inc.
209 Dayton Street
Edmonds, WA 98020
425 771-4482

MEASUREMENT DATA

UNDER SECTION 15.107 and 15.109

TABLE OF CONTENTS

SPECTRUM
technology inc.

209 Dayton Street, Suite 205
Edmonds, WA 98020-3581

425 771-4482

425 771-9283 *Fax*

November 11, 1998

Federal Communications Commission
Authorization and Standards Division
7435 Oakland Mills Rd.
Columbia, M.D. 21046

Re: **N7NACRD2**

Gentlemen:

Spectrum Technology Incorporated has tested this digital device in accordance with the requirements contained in Section 15 applicable to Certification. To the best of my knowledge, these tests were performed using measurement procedures consistent with Industry or Commission standards and that when tested demonstrated that the equipment complies with the published standard. The applicable rules are listed in the following test report.

The Open Area Test Site used for these measurements is located at Fluke Park II, Everett, Washington. Site information required by Title 47 CFR, Part 2.948 -Description of measurement facilities, and measurements in accordance with ANSI C63.4-1992 were filed with the FCC, Authorization and Evaluation Division, Sampling and Measurements Branch in July 1994. The submission was most recently updated during January 1998 and confirmed in a letter of acknowledgement received from Mr. Thomas W. Phillips.

Sincerely,

Rod Munro
President

RM/af

TEST: **CONDUCTED EMISSIONS**

Grantee: Sierra Wireless, Inc.

FCC ID: **N7NACRD2**

Setup:

The equipment under test (EUT) was configured and operated in accordance with the provisions of ANSI C63.4-1992, Section 6 and 7. The EUT was placed on a 1 X 1.5 meter non-conductive test table 80 cm in height at our Edmonds, Washington facility. The table sits on centered on a 2.5 x 2 meter horizontal ground plane and 40 cm forward from a 2.25 X 2.4 meter vertical ground plane. The two ground planes are continuously grounded along the common seam. Two 50 ohm/50 uHy Line Impedance Stabilization Networks (LISN) are grounded to the horizontal ground plane. The EUT was placed in a typical operational arrangement. The 10 cm spacing as detailed in Section 6.2 was not applicable. The power cord of the EUT was plugged into the first LISN. The signal output of this LISN was fed to a HP 8562A Spectrum Analyzer using a 10 kHz bandwidth, which served as the peak measuring instrument.

Discussion:

A Type Acceptance application has previously been filed under Part 22, utilizing the identical FCC Identifier. No modifications were required prior to the final conducted emissions measurements reported herein.

The EUT is the Model: Aircard 2 PCMCIA card muli-mode wireless modem designed for use when installed in a PCMCIA slot of a hand held portable computer (HPC). The card was installed in the PCMCIA slot of a Casio, Casiopia HPC bearing the DoC logo. Measurements of the conducted spurious emission were made with the AC adapter sold with the Casio HPC, a Casio Computer Co., AC adapter Model:AD-C50150U which supplied 5 VDC, 1.6 A for either the HPC or the "battery bump". The external AC power adapter maybe plugged into the computer or into the "battery bump" to charge either the HPC or "battery bump" batteries or to power the HPC and Aircard2. The "battery bump" is intended to provide additional power reserve when operating on battery stand alone without connection to AC power.

The Aircard 2 consists of a logic board, a cellular radio transceiver designed for operation on the North American cellular allocations from 824 to 894 MHz and a power supply and amplifier. The unit is provided with an external antenna and optional "battery bump" which both plug into the Aircard 2 directly. The card is powered from the PCMCIA socket and also from the optional "battery bump" when used.

A PC a user can access Cellular Digital Packet Data (CDPD) or Circuit Switched Cellular modes of operation with the Aircard and appropriate software. The EUT is only operational in a receive or transmit data mode when installed in a PCMCIA slot and under apprpriate software control by it's host HPC.

A test software program ACEGUI3 allowed complete control of all the transmitter, receiver, channel selection, power output, and other modes of operation.

The Casio Casiopia HPC had only one PCMCIA I/O port, no serial port or parallel port are present on the HPC. This combination was tested as a representative minimum system configuration following the guidelines of Section 11.2.

Preliminary measurements were made as described in section 7.2.3 while the system was investigated operating in the following modes:

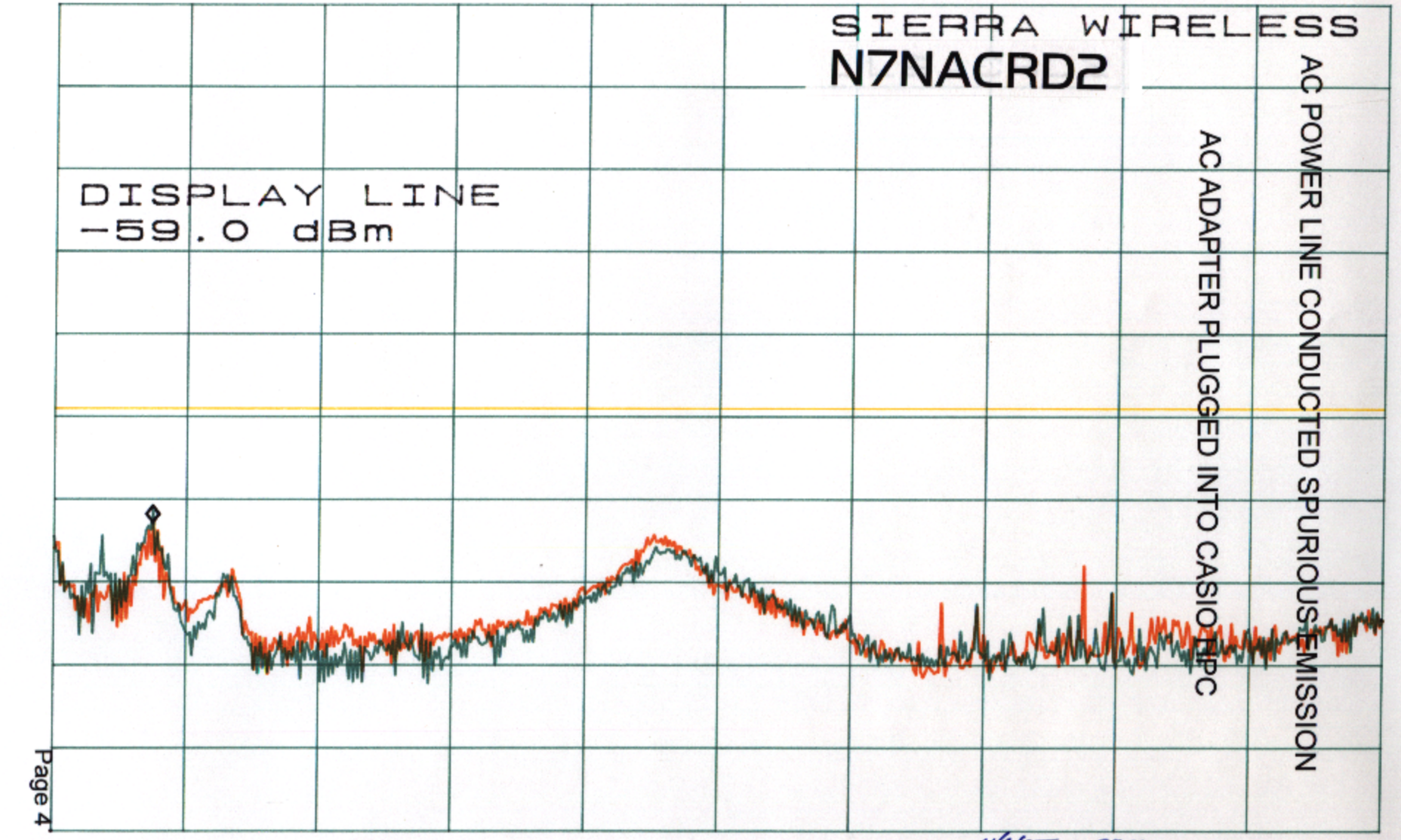
1) EUT operating in Casio Casiopia, receiver on
2) EUT operating in Casio Casiopia, PCMCIA slot transmitter on with maximum data modulation rate (19.2) and carrier only

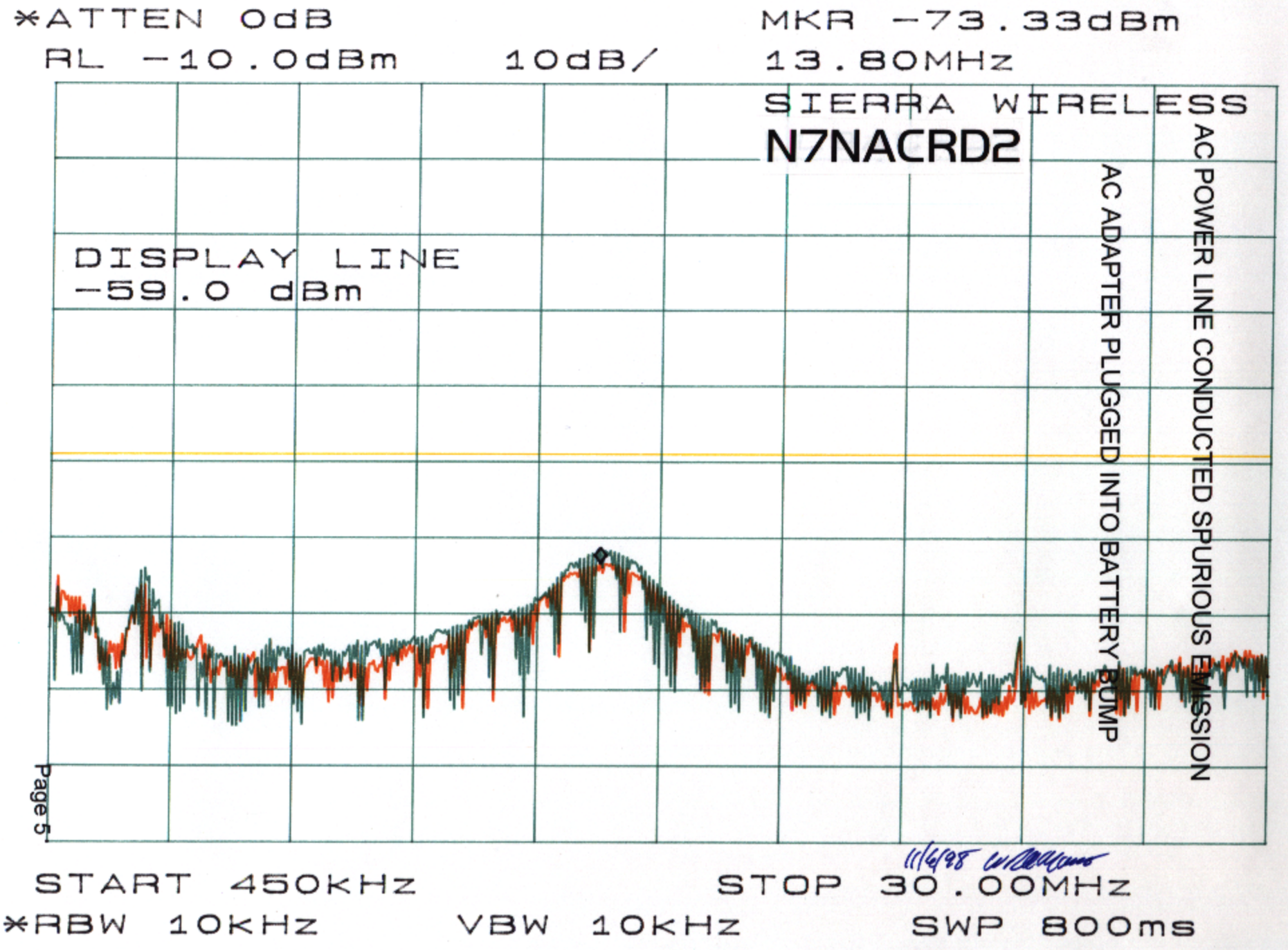
During the preliminary measurements the AC power cord was tuned within the range of likely configurations for worst case physical position and exercised with the above operating modes looking for the highest emission levels. The final configuration is detailed in photographs of the test set up included in this report. Tuning of the power cables and hardware yielded minimal variation in levels. In modes 1 and 2 the emissions appeared comparable in level. Therefore, it was decided that a cumulative Max-hold measurement including all modes would be used for the final measurements.

Final measurements were documented from .450 - 30 MHz as specified in Section 7.2.4, for the EUT previously described. The plots on the following pages detail the peak levels of the worst case emissions observed for the input to the Casio HPC and again for the "battery bump". The orange trace details the "hot " conductor and the green details the "neutral" conductor each with respect to ground. The detail line at -59 dBm indicates the Class B limit. Levels observed were moderately low across the range tested with all of the highest levels related to the HPC and it's power supply.

Conclusion:

The Sierra Wireless, Inc. the Aircard 2, FCC ID: **N7NACRD2** when connected and operated as discussed above, meets the Conducted Emissions requirements for a Class B digital device under Title 47 CFR, Section 15.107(a).


*ATTEN 0dB
RL -10.0dBm
10dB/
MKR -72.83dBm
2.67MHz
SIERRA WIRELESS
N7NACRD2
AC POWER LINE CONDUCTED SPURIOUS EMISSION
AC ADAPTER PLUGGED INTO CASIO EIPC
DISPLAY LINE
-59.0 dBm
Page 4
11/6/98
START 450kHz
STOP 30.00MHz
*RBW 10kHz
VBW 10kHz
SWP 800ms


*ATTEN 0dB
RL -10.0dBm
10dB/
MKR -73.33dBm
13.80MHz
SIERRA WIRELESS
N7NACRD2
AC POWER LINE CONDUCTED SPURIOUS EMISSION
AC ADAPTER PLUGGED INTO BATTERY BUMP
DISPLAY LINE
-59.0 dBm
START 450kHz
STOP 30.00MHz
*RBW 10kHz
VBW 10kHz
SWP 800ms

Page 5

11/6/98

TEST: **FIELD STRENGTH OF RADIATED EMISSIONS**

Grantee: Sierra Wireless, Inc.

FCC ID: **N7NACRD2**

Setup:

The equipment under test (EUT) was configured and operated in accordance with the applicable provisions of ANSI C63.4-1992, Section 6 and 8. The EUT was placed on a 80 cm height, 1 X 1.5 m non-metallic turntable that sits above the 15 X 30 meter ground plane at Spectrum's Open Area Test Site. The system was connected in a typical operational arrangement following the 10 cm spacing as detailed in Section 6.2. Power feed cords were draped to the lower turntable surface 40 cm above the ground plane. The antennas (dipoles, bi-conical or log-periodic) were mounted on a tower spaced at a 3 meters distance, and arranged for adjustment in height (1-4 meters) and V/H orientation to maximize the emissions levels when combined with turntable rotation of the EUT. An HP 8562A spectrum analyzer, using 100 kHz bandwidth and a HP 8447F OPT H64 Amplifier were used for the peak measuring instrumentation.

Discussion:

A Type Acceptance application has previously been filed under Part 22, utilizing the identical FCC Identifier. No modifications were required for compliance with the radiated emissions limits prior to the final measurements reported herein.

The EUT is the Model: Aircard 2 PCMCIA card muli-mode wireless modem designed for use when installed in a PCMCIA slot of a hand held portable computer (HPC). The card was installed in the PCMCIA slot of a Casio, Casiopia HPC bearing the DoC logo. Measurements of the radiated spurious emission were made with the standard AC adapter sold with the Casio HPC, a Casio Computer Co., AC adapter Model:AD-C50150U which supplied 5 VDC, 1.6 A for either the HPC or the "battery bump". The external AC power adapter maybe plugged into the computer or into the "battery bump" to charge either the HPC batteries or "battery bump" batteries or to power the HPC and Aircard2. The "battery bump" is an option intended to provide additional power reserve when operating on battery stand alone without connection to AC power. During preliminary measurements, no significant difference was observed in levels between the two locations the AC adapter could be connected.

The Aircard 2 consists of a logic board, a cellular radio transceiver designed for operation on the North American cellular allocations from 824 to 894 MHz and a power supply and amplifier. The unit is provided with an external antenna and optional "battery bump" which both plug into the Aircard 2 directly. The card is powered from the PCMCIA socket and also from the optional "battery bump" when used.

The HPC user can access Cellular Digital Packet Data (CDPD) or Circuit Switched Cellular modes of operation with the Aircard 2 and the appropriate software. The EUT is only operational in a receive or transmit data mode when installed in a PCMCIA slot and under appropriate software control by it's host HPC. A test software program ACEGUI3 allowed complete control of all the transmitter, receiver, channel selection, power output, and other modes of operation.

The Casio, Casiopia HPC, has a single PCMCIA I/O port, no external keyboard, serial port or parallel port are present on the Casio HPC. This combination was tested as a representative minimum system configuration following the guidelines of Section 11.2.

Preliminary measurements were made as described in section 8.3.1.1 while the system was investigated operating in the following modes:

1) EUT operating in Casio Casiopia, receiver on
2) EUT operating in Casio Casiopia, PCMCIA slot transmitter on with maximum data modulation rate (19.2) and carrier only

During the preliminary measurements, the AC power cord for the EUT was tuned within the range of likely configurations for worst case physical position and exercised with the above operating modes looking for the highest emission levels. The final physical configuration is detailed in photographs of the test set up included in this report. Tuning of the AC adapter cord yielded minimal variation in levels. In Modes 1 and 2 the emissions appeared comparable in level. It was decided that Mode 1 would be used for the final measurements as representative of worst case. However, the second mode was specifically re-examined on all emissions observed within 10 dB of the limit to insure a maximum measured value.

Final measurements from 30 - 1000 MHz as specified in Section 8.3.1.2 were made and peak levels of the radiated emissions observed from 212 to 981 MHz are reported on the following pages. The test results are presented in a tabular format detailing all significant emissions observed. The list is sorted in order of the emission frequency. The level of the emission observed in dB below the Class B limit is noted under the column dB+/- Limit. The highest level was found at 597.33 MHz with horizontal polarization and was 72.44 uV/m or 8.82 dB below the Class B limit. The emissions observed were low in level with only 6 emissions observed within 10 dB of the limit.

Conclusion:

The Sierra Wireless, Inc. the Aircard 2, FCC ID: **N7NACRD2** when connected and operated as discussed above, meets the Radiated Emissions requirements for a Class B digital device under Title 47 CFR, Section 15.109(a).

Spectrum Technology Incorporated

FCC Part 15.109(b) - Final Data - Ref. _SIERRA.R5

Grantee: Sierra Wireless, Inc.

09-17-1998

FCC ID: N7NACRD2

14:24:42

Class B Radiated Emissions Sorted In Order Of Frequency

Freq MHz	Vert dBm	Horz dBm	Ant-F	dBuV/m	uV/m	dB +/- Limit	Limit
212.42	--	-87.00	14.6	34.60	53.70	-8.92	150
222.58	-102.17	-89.00	14.6	32.55	42.41	-13.47	200
232.75	-104.50	-93.67	14.5	27.83	24.63	-18.19	--
242.92	-104.33	-89.83	15.1	32.27	41.07	-13.75	--
252.92	-104.83	-97.00	16.0	26.00	19.95	-20.02	--
263.08	-102.83	-93.33	16.4	30.07	31.88	-15.95	--
273.17	-103.50	--	16.8	20.30	10.35	-25.72	--
273.25	--	-97.17	16.8	26.63	21.45	-19.39	--
283.25	-104.67	--	17.6	19.93	9.92	-26.09	--
283.33	--	-90.67	17.6	33.93	49.72	-12.09	--
293.42	-103.67	-93.33	15.8	29.47	29.75	-16.55	--
298.83	-101.17	--	18.6	24.43	16.65	-21.59	--
300.25	--	-91.00	18.6	34.60	53.70	-11.42	--
306.83	-98.33	-96.00	18.4	29.40	29.51	-16.62	--
313.75	--	-98.17	17.9	26.73	21.70	-19.29	--
318.83	--	-97.50	17.9	27.40	23.44	-18.62	--
323.92	--	-100.50	17.9	24.40	16.60	-21.62	--
328.92	--	-96.50	17.9	28.40	26.30	-17.62	--
334.00	--	-99.17	17.9	25.73	19.34	-20.29	--
339.08	--	-96.17	17.9	28.73	27.32	-17.29	--
339.92	-92.17	--	17.9	32.73	43.30	-13.29	--
344.25	--	-94.17	18.2	31.03	35.60	-14.99	--
349.25	--	-96.50	18.2	28.70	27.23	-17.32	--
354.17	--	-101.17	18.3	24.13	16.09	-21.89	--
364.33	--	-101.67	18.6	23.93	15.72	-22.09	--
374.50	--	-102.00	18.7	23.70	15.31	-22.32	--
384.58	--	-103.00	19.3	23.30	14.62	-22.72	--
394.67	-104.83	--	19.9	22.07	12.69	-23.95	--
394.75	--	-100.50	19.9	26.40	20.89	-19.62	--
404.75	--	-101.67	20.2	25.53	18.90	-20.49	--
414.92	-101.50	-98.33	20.4	29.07	28.41	-16.95	--
425.00	--	-101.00	21.0	27.00	22.39	-19.02	--
425.08	-104.33	--	21.0	23.67	15.26	-22.35	--
430.08	--	-100.17	21.2	28.03	25.21	-17.99	--
435.17	-102.33	-97.50	21.3	30.80	34.67	-15.22	--
445.33	--	-100.50	21.5	28.00	25.12	-18.02	--

Spectrum Technology Incorporated

FCC Part 15.109(b) - Final Data - Ref. _SIERRA.R5

Grantee: Sierra Wireless, Inc.

09-17-1998

FCC ID: N7NACRD2

14:24:42

Class B Radiated Emissions Sorted In Order Of Frequency

Freq MHz	Vert dBm	Horz dBm	Ant-F	dBuV/m	uV/m	dB +/- Limit	Limit
475.50	-99.67	-100.50	22.4	29.73	30.65	-16.29	--
486.58	-94.50	--	22.9	35.40	58.88	-10.62	--
495.67	-96.67	--	23.1	33.43	46.94	-12.59	--
495.75	--	-99.00	23.1	31.10	35.89	-14.92	--
536.42	-95.67	-93.33	23.3	36.97	70.55	-9.05	--
556.58	-96.17	-93.50	23.6	37.10	71.61	-8.92	--
556.67	-95.50	-99.17	23.6	35.10	56.89	-10.92	--
566.75	-103.33	-98.50	23.7	32.20	40.74	-13.82	--
576.92	-98.67	-94.33	23.9	36.57	67.38	-9.45	--
587.08	--	-97.33	24.0	33.67	48.25	-12.35	--
587.17	-103.67	--	24.0	27.33	23.25	-18.69	--
597.33	-101.00	-94.00	24.2	37.20	72.44	-8.82	--
607.17	--	-99.67	24.2	31.53	37.71	-14.49	--
627.50	--	-101.83	24.8	29.97	31.51	-16.05	--
758.67	--	-102.00	26.8	31.80	38.90	-14.22	--
778.83	--	-100.17	27.0	33.83	49.15	-12.19	--
784.00	--	-100.83	27.0	33.17	45.55	-12.85	--
794.83	--	-101.17	27.0	32.83	43.80	-13.19	--
799.17	--	-100.17	27.0	33.83	49.15	-12.19	--
971.58	--	-103.67	30.8	34.13	50.87	-11.89	--
981.75	--	-101.67	31.1	36.43	66.30	-9.59	--

Note: No receiver Local ocsilator emissions note above.

OPEN-FIELD TEST SITE

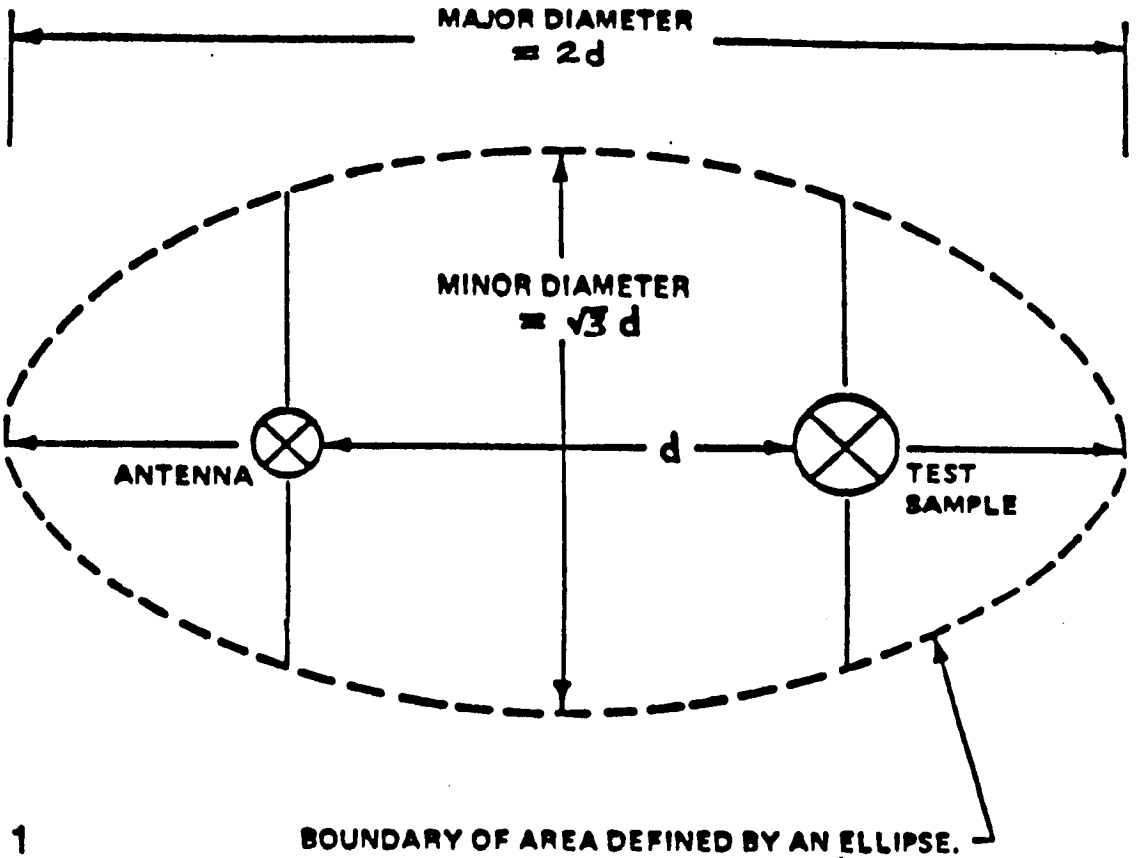


Figure 1

ANTENNA/EQUIPMENT ORIENTATION

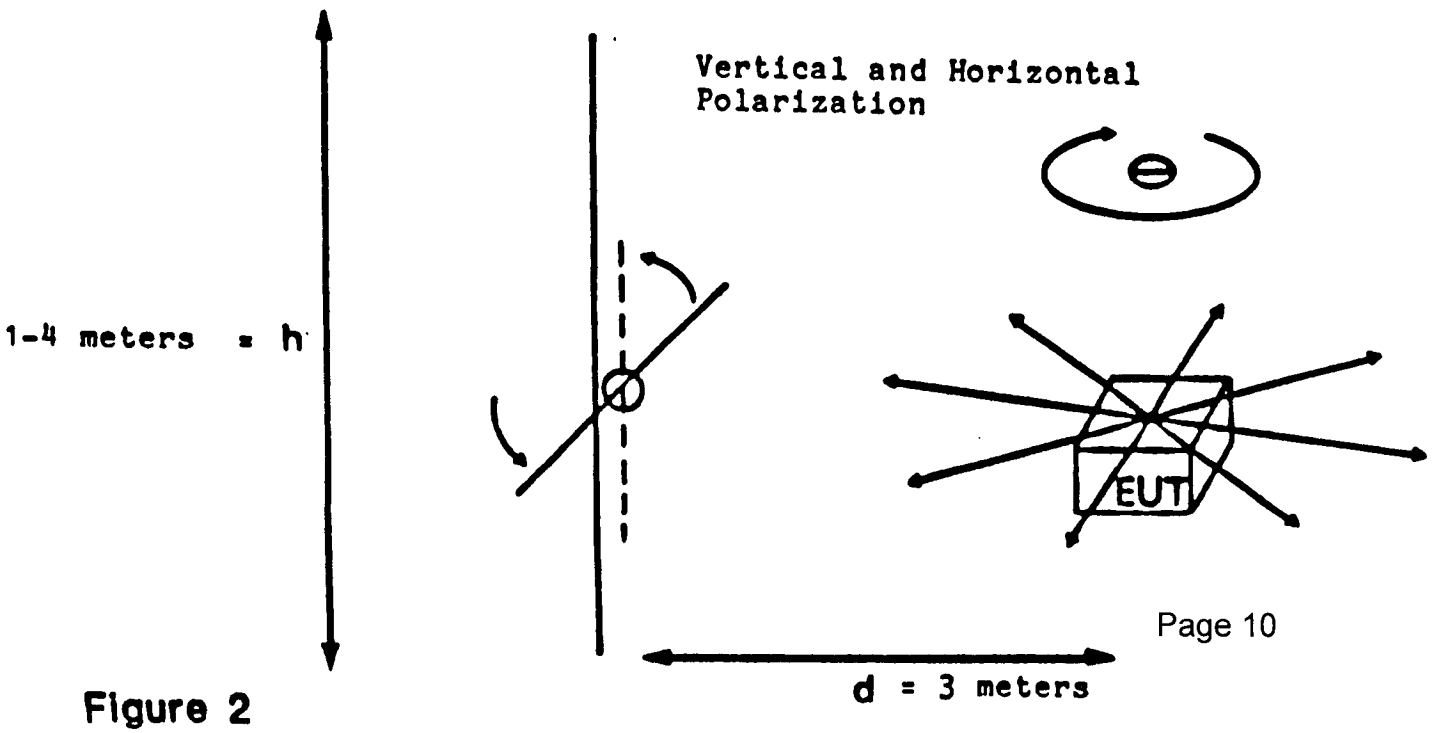
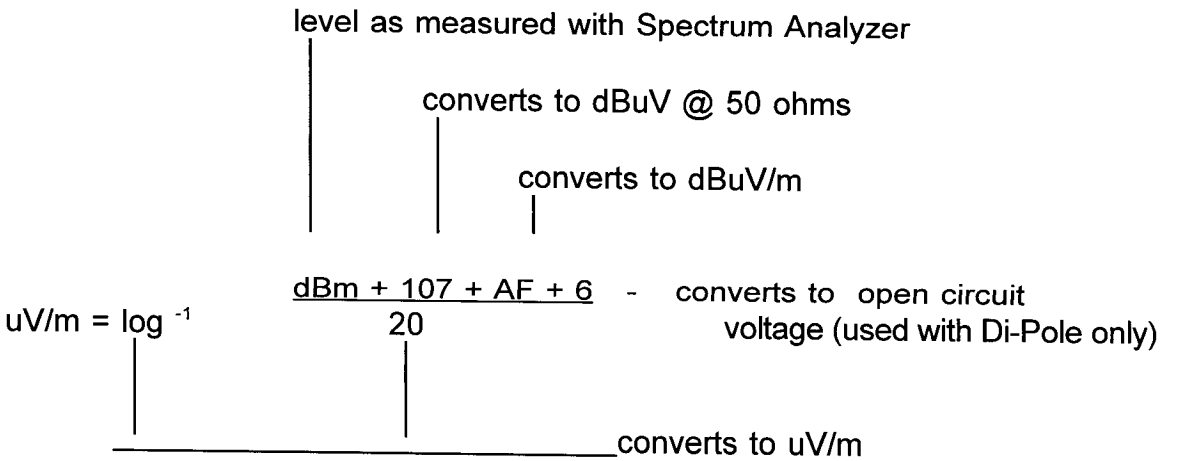


Figure 2

ANTENNA FACTORS FOR EMCO 3104 BICONICAL ANTENNA AND EMCO 3146 LOG PERIODIC ANTENNA INCLUDING CONVERSION TO OPEN CIRCUIT VOLTAGE.

Antenna Factor and Field Strength Formula



IF FREQ => 20	AND	FREQ =< 26.5	THEN ANTF = 12.5
IF FREQ => 26.5	AND	FREQ =< 28	THEN ANTF = 13.5
IF FREQ => 28.0	AND	FREQ =< 33	THEN ANTF = 14.5
IF FREQ => 33.0	AND	FREQ =< 35	THEN ANTF = 13.5
IF FREQ => 35.0	AND	FREQ =< 45	THEN ANTF = 13
IF FREQ => 45.	AND	FREQ =< 57	THEN ANTF = 12
IF FREQ => 57.0	AND	FREQ =< 63	THEN ANTF = 11
IF FREQ => 63.0	AND	FREQ =< 66	THEN ANTF = 10
IF FREQ => 66.0	AND	FREQ =< 75	THEN ANTF = 9
IF FREQ => 75.0	AND	FREQ =< 83	THEN ANTF = 8
IF FREQ => 83.0	AND	FREQ =< 86	THEN ANTF = 9
IF FREQ => 86.0	AND	FREQ =< 90	THEN ANTF = 10
IF FREQ => 90.0	AND	FREQ =< 95	THEN ANTF = 11
IF FREQ => 95.0	AND	FREQ =< 97.5	THEN ANTF = 12.5
IF FREQ => 97.5	AND	FREQ =< 101	THEN ANTF = 13.5
IF FREQ => 101.0	AND	FREQ =< 105	THEN ANTF = 14.5
IF FREQ => 105.0	AND	FREQ =< 108	THEN ANTF = 15.5
IF FREQ => 108.0	AND	FREQ =< 115	THEN ANTF = 16.5
IF FREQ => 115.0	AND	FREQ =< 123	THEN ANTF = 15.5
IF FREQ => 123.0	AND	FREQ =< 148	THEN ANTF = 14.5
IF FREQ => 148.0	AND	FREQ =< 151.5	THEN ANTF = 15.5
IF FREQ => 151.5	AND	FREQ =< 167.5	THEN ANTF = 17
IF FREQ => 167.5	AND	FREQ =< 182.5	THEN ANTF = 18
IF FREQ => 182.5	AND	FREQ =< 200	THEN ANTF = 19
IF FREQ => 200.0	AND	FREQ =< 202	THEN ANTF = 14.7
IF FREQ => 202	AND	FREQ =< 205	THEN ANTF = 14.5
IF FREQ => 205	AND	FREQ =< 215	THEN ANTF = 14.6
IF FREQ => 215	AND	FREQ =< 230	THEN ANTF = 14.55
IF FREQ => 230	AND	FREQ =< 235	THEN ANTF = 14.5
IF FREQ => 235	AND	FREQ =< 240	THEN ANTF = 14.8
IF FREQ => 240	AND	FREQ =< 242.5	THEN ANTF = 14.9

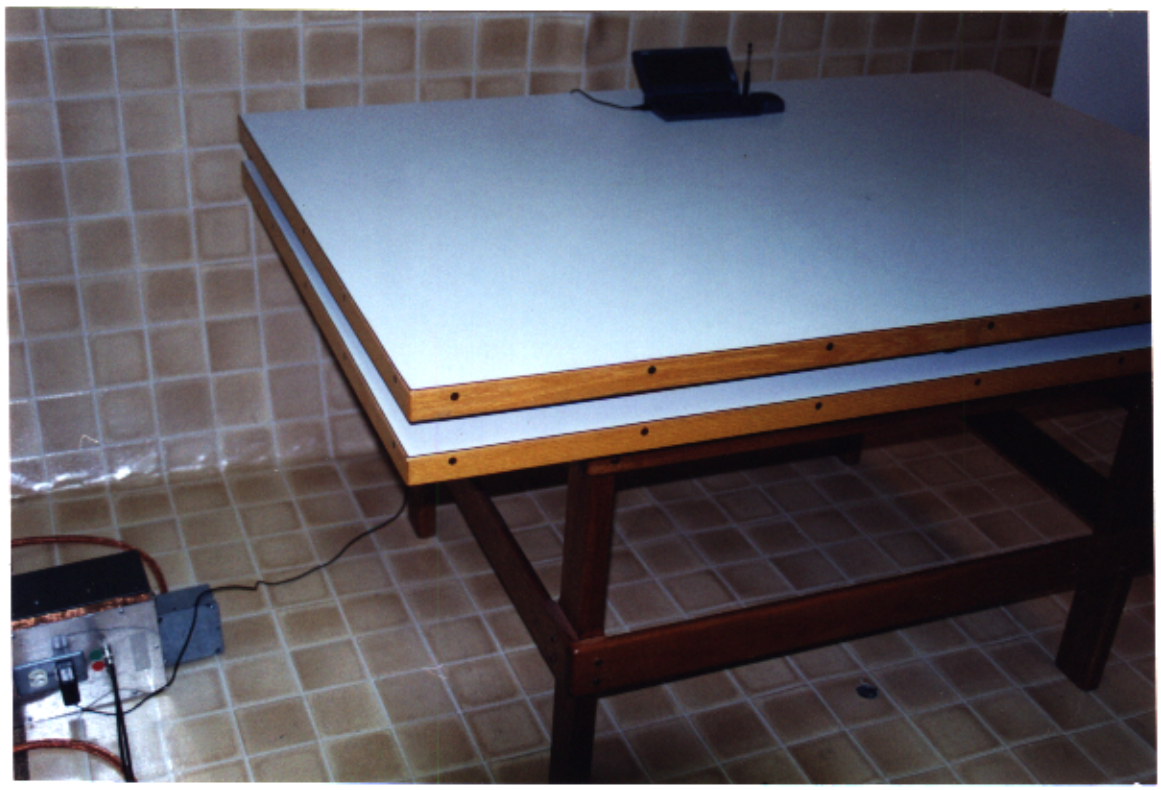
IF FREQ => 242.5	AND	FREQ =< 245	THEN ANTF = 15.1
IF FREQ => 245	AND	FREQ =< 247.5	THEN ANTF = 15.5
IF FREQ => 247.5	AND	FREQ =< 250	THEN ANTF = 15.7
IF FREQ => 250	AND	FREQ =< 252	THEN ANTF = 15.9
IF FREQ => 252	AND	FREQ =< 254	THEN ANTF = 16
IF FREQ => 254	AND	FREQ =< 256	THEN ANTF = 16.1
IF FREQ => 256	AND	FREQ =< 258	THEN ANTF = 16.2
IF FREQ => 258	AND	FREQ =< 260	THEN ANTF = 16.3
IF FREQ => 260	AND	FREQ =< 263.5	THEN ANTF = 16.4
IF FREQ => 263.5	AND	FREQ =< 265	THEN ANTF = 16.4
IF FREQ => 265	AND	FREQ =< 267.5	THEN ANTF = 16.6
IF FREQ => 267.5	AND	FREQ =< 271	THEN ANTF = 16.7
IF FREQ => 271	AND	FREQ =< 274	THEN ANTF = 16.8
IF FREQ => 274	AND	FREQ =< 276	THEN ANTF = 16.9
IF FREQ => 276	AND	FREQ =< 278	THEN ANTF = 17
IF FREQ => 278	AND	FREQ =< 280	THEN ANTF = 17.1
IF FREQ => 280	AND	FREQ =< 282	THEN ANTF = 17.3
IF FREQ => 282	AND	FREQ =< 284	THEN ANTF = 17.6
IF FREQ => 284	AND	FREQ =< 286	THEN ANTF = 18
IF FREQ => 286	AND	FREQ =< 288	THEN ANTF = 18.2
IF FREQ => 288	AND	FREQ =< 295	THEN ANTF = 18.4
IF FREQ => 290	AND	FREQ =< 295	THEN ANTF = 15.8
IF FREQ => 295	AND	FREQ =< 305	THEN ANTF = 18.6
IF FREQ => 305	AND	FREQ =< 310	THEN ANTF = 18.4
IF FREQ => 310	AND	FREQ =< 311	THEN ANTF = 18.3
IF FREQ => 311	AND	FREQ =< 312	THEN ANTF = 18.1
IF FREQ => 312	AND	FREQ =< 313	THEN ANTF = 18
IF FREQ => 313	AND	FREQ =< 340	THEN ANTF = 17.9
IF FREQ => 340	AND	FREQ =< 343	THEN ANTF = 18.1
IF FREQ => 343	AND	FREQ =< 350	THEN ANTF = 18.2
IF FREQ => 350	AND	FREQ =< 357	THEN ANTF = 18.3
IF FREQ => 357	AND	FREQ =< 360	THEN ANTF = 18.5
IF FREQ => 360	AND	FREQ =< 365	THEN ANTF = 18.6
IF FREQ => 365	AND	FREQ =< 375	THEN ANTF = 18.7
IF FREQ => 375	AND	FREQ =< 378	THEN ANTF = 19
IF FREQ => 378	AND	FREQ =< 381	THEN ANTF = 19.1
IF FREQ => 381	AND	FREQ =< 383	THEN ANTF = 19.2
IF FREQ => 383	AND	FREQ =< 385	THEN ANTF = 19.3
IF FREQ => 385	AND	FREQ =< 387.5	THEN ANTF = 19.4
IF FREQ => 387.5	AND	FREQ =< 390	THEN ANTF = 19.5
IF FREQ => 390	AND	FREQ =< 392	THEN ANTF = 19.7
IF FREQ => 392	AND	FREQ =< 394	THEN ANTF = 18.8
IF FREQ => 394	AND	FREQ =< 396	THEN ANTF = 19.9
IF FREQ => 396	AND	FREQ =< 398	THEN ANTF = 20
IF FREQ => 398	AND	FREQ =< 402	THEN ANTF = 20.1
IF FREQ => 402	AND	FREQ =< 405	THEN ANTF = 20.2
IF FREQ => 405	AND	FREQ =< 410	THEN ANTF = 20.3
IF FREQ => 410	AND	FREQ =< 415	THEN ANTF = 20.4
IF FREQ => 415	AND	FREQ =< 420	THEN ANTF = 20.6
IF FREQ => 420	AND	FREQ =< 425	THEN ANTF = 20.8
IF FREQ => 425	AND	FREQ =< 430	THEN ANTF = 21
IF FREQ => 430	AND	FREQ =< 435	THEN ANTF = 21.2
IF FREQ => 435	AND	FREQ =< 440	THEN ANTF = 21.3
IF FREQ => 440	AND	FREQ =< 445	THEN ANTF = 21.4
IF FREQ => 445	AND	FREQ =< 450	THEN ANTF = 21.5
IF FREQ => 450	AND	FREQ =< 455	THEN ANTF = 21.6
IF FREQ => 455	AND	FREQ =< 460	THEN ANTF = 21.8
IF FREQ => 460	AND	FREQ =< 465	THEN ANTF = 21.9
IF FREQ => 465	AND	FREQ =< 470	THEN ANTF = 22
IF FREQ => 470	AND	FREQ =< 472.5	THEN ANTF = 22.1
IF FREQ => 472.5	AND	FREQ =< 475	THEN ANTF = 22.2
IF FREQ => 475	AND	FREQ =< 477	THEN ANTF = 22.4
IF FREQ => 477	AND	FREQ =< 478	THEN ANTF = 22.5
IF FREQ => 478	AND	FREQ =< 481	THEN ANTF = 22.6

IF FREQ => 481	AND	FREQ =< 482.5	THEN ANTF = 22.7
IF FREQ => 482.5	AND	FREQ =< 485	THEN ANTF = 22.8
IF FREQ => 485	AND	FREQ =< 488	THEN ANTF = 22.9
IF FREQ => 488	AND	FREQ =< 515	THEN ANTF = 23.1
IF FREQ => 515	AND	FREQ =< 540	THEN ANTF = 23.3
IF FREQ => 540	AND	FREQ =< 560	THEN ANTF = 23.6
IF FREQ => 560	AND	FREQ =< 570	THEN ANTF = 23.7
IF FREQ => 570	AND	FREQ =< 580	THEN ANTF = 23.9
IF FREQ => 580	AND	FREQ =< 590	THEN ANTF = 24
IF FREQ => 590	AND	FREQ =< 610	THEN ANTF = 24.2
IF FREQ => 610	AND	FREQ =< 615	THEN ANTF = 24.4
IF FREQ => 615	AND	FREQ =< 620	THEN ANTF = 24.5
IF FREQ => 620	AND	FREQ =< 625	THEN ANTF = 24.6
IF FREQ => 625	AND	FREQ =< 630	THEN ANTF = 24.8
IF FREQ => 630	AND	FREQ =< 635	THEN ANTF = 24.9
IF FREQ => 635	AND	FREQ =< 640	THEN ANTF = 25
IF FREQ => 640	AND	FREQ =< 645	THEN ANTF = 25.1
IF FREQ => 645	AND	FREQ =< 647.5	THEN ANTF = 25.3
IF FREQ => 647.5	AND	FREQ =< 650	THEN ANTF = 25.4
IF FREQ => 650	AND	FREQ =< 652.5	THEN ANTF = 25.6
IF FREQ => 652.5	AND	FREQ =< 655	THEN ANTF = 25.7
IF FREQ => 655	AND	FREQ =< 660	THEN ANTF = 25.8
IF FREQ => 660	AND	FREQ =< 665	THEN ANTF = 26.1
IF FREQ => 665	AND	FREQ =< 670	THEN ANTF = 26.3
IF FREQ => 670	AND	FREQ =< 680	THEN ANTF = 26.6
IF FREQ => 680	AND	FREQ =< 690	THEN ANTF = 26.7
IF FREQ => 690	AND	FREQ =< 720	THEN ANTF = 26.9
IF FREQ => 720	AND	FREQ =< 760	THEN ANTF = 26.8
IF FREQ => 760	AND	FREQ =< 800	THEN ANTF = 27
IF FREQ => 800	AND	FREQ =< 802.5	THEN ANTF = 27.3
IF FREQ => 802.5	AND	FREQ =< 805	THEN ANTF = 27.5
IF FREQ => 805	AND	FREQ =< 807.5	THEN ANTF = 27.6
IF FREQ => 807.5	AND	FREQ =< 810	THEN ANTF = 27.7
IF FREQ => 810	AND	FREQ =< 815	THEN ANTF = 27.8
IF FREQ => 815	AND	FREQ =< 820	THEN ANTF = 27.9
IF FREQ => 820	AND	FREQ =< 840	THEN ANTF = 28.2
IF FREQ => 840	AND	FREQ =< 860	THEN ANTF = 28.4
IF FREQ => 860	AND	FREQ =< 870	THEN ANTF = 28.8
IF FREQ => 870	AND	FREQ =< 880	THEN ANTF = 29.3
IF FREQ => 880	AND	FREQ =< 890	THEN ANTF = 29.4
IF FREQ => 890	AND	FREQ =< 910	THEN ANTF = 29.6
IF FREQ => 910	AND	FREQ =< 920	THEN ANTF = 29.7
IF FREQ => 920	AND	FREQ =< 930	THEN ANTF = 29.9
IF FREQ => 930	AND	FREQ =< 940	THEN ANTF = 30
IF FREQ => 940	AND	FREQ =< 960	THEN ANTF = 30.2
IF FREQ => 960	AND	FREQ =< 970	THEN ANTF = 30.6
IF FREQ => 970	AND	FREQ =< 975	THEN ANTF = 30.8
IF FREQ => 975	AND	FREQ =< 980	THEN ANTF = 31
IF FREQ => 980	AND	FREQ =< 985	THEN ANTF = 31.1
IF FREQ => 985	AND	FREQ =< 990	THEN ANTF = 31.3
IF FREQ => 990	AND	FREQ =< 1000	THEN ANTF = 31.4

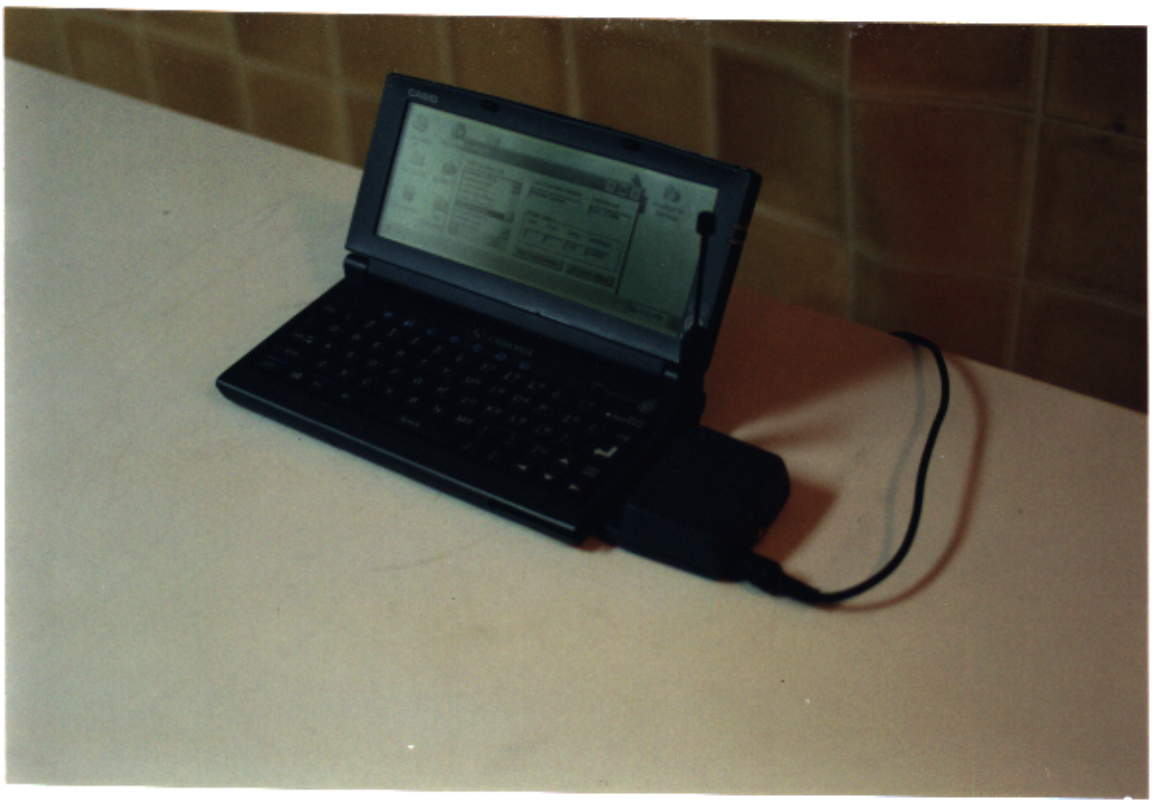
TEST EQUIPMENT LIST A
SPECTRUM TECHNOLOGY, INC.

Equipment	Manufacturer	Serial Number	Cal Date/Due Date
Spectrum Analyzer	Hewlett-Packard 8562A	08562-60062	9/14/98 9/14/99
Amplifier 9 kHz-1300 MHz	Hewlett-Packard 8447F OPT H64	2727A02208	9/14/98 9/14/99
RF Signal Gen.	Fluke 6071A	2915016	8/11/98 5/11/99
Service Monitor	IFR FM/AM 500A	4103	---
Oscilloscope	Kikusui C055060	6132295	---
Power Supply	Astron VS35	8601266	---
Voltmeter	Fluke 8020A	N2420658	---
Multimeter	Fluke 25	3710310	---
Wattmeter	Bird 43	56227	---
RF Termination	Bird 8135	10004	---
Dual Phase LISN 50 ohm/50 uH	STI per MP-4	02	1/9/98 1/9/99
Dual Phase LISN 50 ohm/50 uH	Compliance Design	8012-50R-24-BNC	1/9/98 1/9/99
Audio Generator	Hewlett-Packard 205-AG	8689	---
Attenuators:	Texscan FP45-20 Texscan FP45-10 Weinshel 40-10-33 Mini-Circuits CAT30 Pomona 4108-10	 CZ682 8419 01 	
Thermometer	Fluke 52	3965185	---
Test Line Simulator	Teltone TLS-2	none	---
Turn Table, RC	EMCO 1060-2M	8912-1415	---
Antenna Mast, RC	Compliance Design, Inc.	M100	---
Antennas: DiPole Set Diploe Set	 EMCO Model: 3121C EMCO Model: 3121C	 1335 1336	 9/18/97 3/18/99 9/18/97 3/18/99
Bi-Conical Bi-Conical Log-Periodic Active Loop	EMCO 3104 EMCO 3104C EMCO 3146 EMCO 6502	3763 9401-4635 1754 9107-2645	reference only 6/20/97 1/20/99 6/15/98 6/15/99 reference only

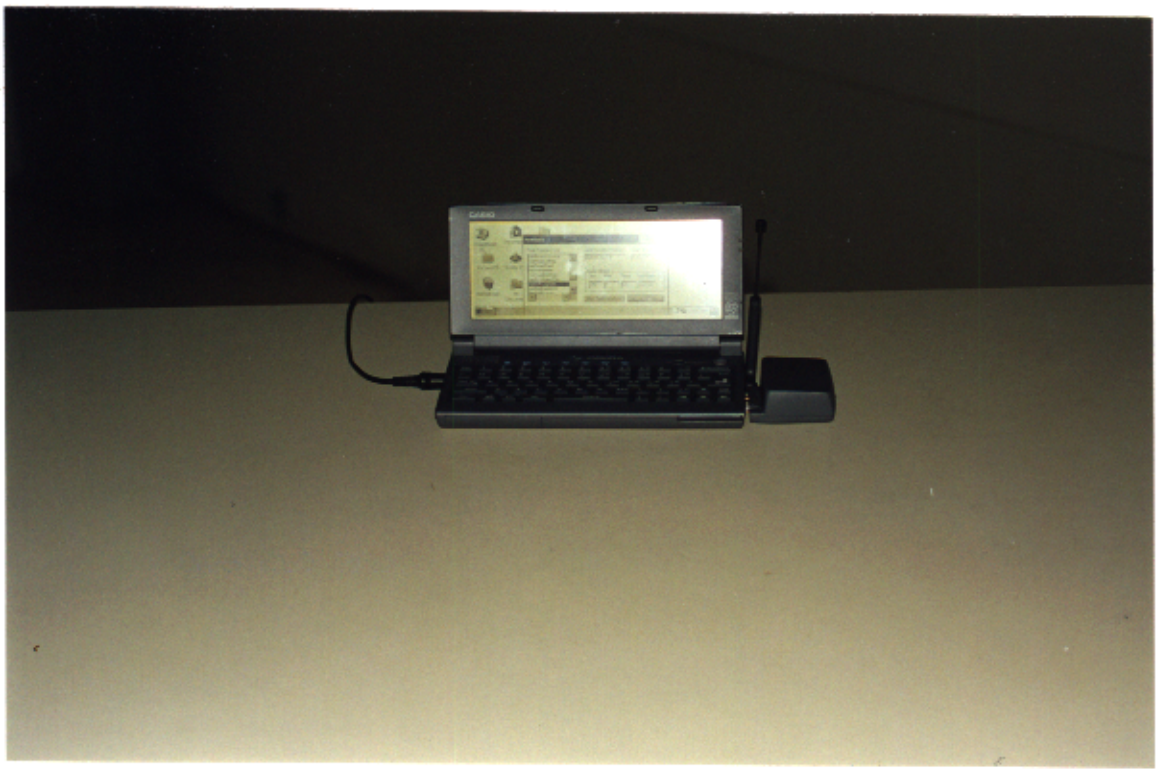
CONDUCTED EUT SET UP



CONDUCTED EUT SET UP



RADIATED EUT SET UP



RADIATED EUT SET UP