



125 Technology Parkway
Norcross, Georgia, US 30092

Test Report

LXE Model: 480628-4096

Direct Sequence
Spread Spectrum
Transmitter

FCC ID: KDZ480628-4096

Applicant: LXE Inc.
125 Technology Parkway
Norcross, GA 30092

Purpose of Testing: To demonstrate compliance with FCC Part 15 Subpart C

Report Prepared By: 
R. Sam Wismer
RF Approvals Engineer

Issue Date: January 24, 2000

Table of Contents

1.0 General	3
1.1 Introduction	3
1.2 Product Description	3
1.2.1 General	3
1.2.2 Technical Specifications	3
1.2.3 Integrated Terminals	4
1.2.4 Antennas	6
2.0 Location of Test Facility	6
2.1 Description of Test Facility	7
2.2 Radiated Test Site Illustration	7
3.0 Applicable Standards and References	8
4.0 List of Test Equipment	8
5.0 Support Equipment	9
6.0 Block Diagram	9
7.0 Test Setup Photos	10
8.0 Summary of Tests	12
8.1 Section 15.203 - Antenna Requirement	12
8.2 Section 15.207 - Power Line Conducted Emissions	12
8.3 Section 15.209 - Radiated Emissions	12
8.4 Section 15.247(a)(2) - 6dB Bandwidth Requirement	13
8.5 Section 15.247(b) - Peak Output Power	16
8.6 Section 15.247(c) - Spurious Emissions	16
8.6.1 RF Conducted Spurious Emissions	16
8.6.2 Radiated Spurious Emissions(Restricted Bands)	17
8.5 Section 15.247(d) - Power Spectral Density	19
9.0 Section 15.247(e) - Processing Gain	19
10.0 RF Safety	19
11.0 Sample Label	20
12.0 Conclusion	20
<u>Appendices</u>	
A - Conducted Spurious Emissions Plots	
B - Radiated Spurious Emissions Plots	
C - Power Spectral Density Plots	
D - Processing Gain Test Report	
E - Parts List and Schematics	
F - Theory of Operation and System Block Diagram	
G - Operators Guide	
H - Antenna Photographs and Specification Sheets	
I - Photographs of EUT	
1.0 GENERAL	

1.1 Introduction

The purpose of this report is to demonstrate compliance with Part 15, Subpart C of the FCC's Code of Federal Regulations. Testing was performed from December 21st, 1999 - January 5th, 2000.

1.2 Product Description

1.2.1 General

The Equipment Under Test(EUT) is an OEM Direct Sequence Spread Spectrum PCMCIA radio card manufactured by Lucent Technologies. The radio card is IEEE 802.11b compliant and operates in the band of 2400-2483.5 GHz. The radio is capable of 3 data rates and self adjusts to the most appropriate rate depending on the performance required. The data rates are 11, 5.5 and 2 Mbps, where 11 Mbps gives the maximum throughput for data transfer, and 2 Mbps gives the best coverage where only small data packets are sent.

The radio has 2 ports. The main port is TX/RX and the auxiliary port is RX only. The card can be used either with a single antenna scheme in the main port, or a diverse antenna scheme using both ports.

Upon certification, the radio card will be integrated into individual components of the LXE product line, that together, will make up a wireless LAN for various applications. The individual components are LXE PC based mini-computers equipped with PCMCIA slots to accommodate the various radio cards offered, or they can be used as batch terminals with no radio card at all. For batch operations, the PCMCIA slots are utilized as memory or storage space enhancements. Terminals currently targeted for integration of the 480628-4096 radio card are LXE Models: 1380, 1390, 1600, 2325, 2330, 2335, 2381, 6520, 6521, 6522 and the Mobile Clinical Work Station(MCWS). Each terminal is described in detail in section 1.2.3.

1.2.2 Technical Specifications

Table 1: Specifications

Frequency Band	2400-2483.5 MHz
Number of Channels	11
Modulation Technique	Direct Sequence Spread Spectrum (DBPSK, DQPSK, CCK)
Spreading	11-chip sequence (Barker for 1, 2 Mbps)
Bit Error Rate	Better than 10E-5
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Interface	PC Card Type II Size
Dimensions	85.0 mm X 53.95 mm X 5.0 mm (PC Card)
Output power	15 dBm
Power Consumption PC Card	Doze mode – 15 mA Receive mode – 240 mA Transit mode – 280 mA
Temperature Range (operational)	0-55 0C 95% max. humidity (non condensing)
Compatibility	Novel Client 3.x & 4.x Windows 95/98 and Windows NT®(NDIS Miniport driver) Apple Windows/CE
Standards	IEEE 802.11b
Regulations	FCC Part 15 Subpart C RSS 139 & RSS 102 ETS 300 328 & 300 826

1.2.3 Integrated Terminals

The 480628-4096 radio will be integrated into the terminals described below. All terminals have been evaluated to, and found to comply with, FCC Part 15, Subpart B, Class A, and in some cases Class B emission requirements.

1380/90

The LXE Models 1380 and 1390 are similar, however the 1390 has an external keyboard with a full screen display, while the 1380 has an integrated keyboard and half screen display. The LXE Models 1380/90 are vehicle mounted ruggedized computer terminals. A typical application for the 1380/90 is mounted on a fork lift type vehicle. The 1380/90 is equipped with a laser bar-code scanner for tracking inventory as it is moved about. The information gathered is then either downloaded via an RS232 link, or transmitted to an LXE Access Point via an RF link. The Access points are connected to a wired LAN via an Ethernet connection.

1600

The LXE Model 1600 is a hand-held pen terminal used in health care environments. The 1600 is equipped with a PCMCIA slot to accommodate a radio card or other peripheral device. When equipped with a radio card, the 1600 is used to transfer patient information entered by medical professionals. The information is transmitted via an RF Link to an LXE Access Point that is wired to the LAN via an Ethernet connection.

2325

The LXE Model 2325 is low cost, vertical hand-held terminal (VHHT) typically used in industrial, warehouse or retail settings. The 2325 is equipped with a PCMCIA slot, bar-code scanner and optional RS232 port. The 2325 is used by the operators to track smaller quantities of inventory, order entry and other applications of this nature. The information gathered is then either downloaded via an RS232 link, or transmitted to an LXE Access Point via an RF link. The Access Points are connected to a wired LAN via an Ethernet connection.

2326

The LXE Model 2326 is the next generation of low cost vertical hand held terminals(VHHT). Intended operation of the 2335 is similar to that of the 2326 and will ultimately replace the 2325, however the 2325 is still in service. The primary difference between the 2325 and 2326 is that the 2326 is more ergonomically designed and incorporates an integrated antenna.

2330

The LXE Model 2330 is high end vertical hand-held terminal(VHHT) that serves the same functions as the 2325, however with greater performance. The 2330 has more options than that of the 2325.

2335

The LXE Model 2335 is the next generation of vertical hand held terminals(VHHT). Intended operation of the 2335 is similar to that of the 2330 and 2325. The 2335 will ultimately replace the 2330, however the 2330 is still in service.

2381

The LXE Model 2381 is a horizontal hand-held terminal(HHHT) and serves the same functions as the other hand-held terminals with a horizontal form factor. Some customers prefer the HHHT vs. the VHHT.

1.2.3 Integrated Terminals(cont.)

6520

The LXE Model 6520 is a standalone table top or mountable Access Point equipped with 2 PCMCIA slots. The 6520 Access Point is used to receive transmitted information from the various terminals described above and makes the information available to a LAN via an Ethernet connection. The 6520 can be used with the LXE radios listed below:

- 1) 480628-3700 - FCC ID: KDZ480628-3700. This radio and all required antennas are already approved by the commission and is currently in service with all Access Points and terminals above except the 2335 and 2381. These terminals are still in development.
- 2) 480628-4096 - FCC ID: KDZ480628-4096. This radio is the subject of this report and will be released in all Access Points and terminals upon certification by the commission.

6521

The LXE Model 6521 is a UL 50, Type 4 rated weatherproof enclosure equipped with a LXE Model 6520 Access Point. The 6521 Access Point is used in environments where weather conditions can be extreme. Typical environments, include ship yards, ports and any outdoor site that requires a weather resistant solution. Like the 6520, the 6521 is used to receive transmitted information from the various terminals described above and makes the information available to a LAN via an Ethernet connection. The 6521 can be used with the LXE radios listed below:

- 1) 480628-3700 - FCC ID: KDZ480628-3700. This radio and all required antennas are already approved by the commission and is currently in service with all Access Points and terminals above except the 2335 and 2381. These terminals are still in development.
- 2) 480628-4096 - FCC ID: KDZ480628-4096. This radio is the subject of this report and will be released in all Access Points and terminals upon certification by the commission.

6522

The LXE Model 6522 is a Ceiling Enclosure, housing a 6520 Access Point. The enclosure is mounted in buildings that are equipped with standard drop ceilings. The 6522 is designed to look like part of the HVAC system and is aesthetically pleasing. The 6522 can be used either in an office or a healthcare environment. Healthcare customers will use either the 1600 or MCWS as terminals and will communicate to the LAN via the 6522 Access Point. In an office environment, the 6522 offers a wireless option to the existing LAN. Radios can be used in the PCMCIA slots of either desktop or laptop computers.

The 6522 can be used with the LXE radios listed below:

- 1) 480628-3700 - FCC ID: KDZ480628-3700. This radio and all required antennas are already approved by the commission and is currently in service with all Access Points and terminals above except the 2335 and 2381. These terminals are still in development.
- 2) 480628-4096 - FCC ID: KDZ480628-4096. This radio is the subject of this report and will be released in all Access Points and terminals upon certification by the commission.

MCWS

The Mobile Clinical Work Station, or MCWS, is a multi-purpose mobile computer station. It is equipped with its own battery power supply, fully functional computer terminal with LCD display and associated peripherals. Primary user of the MCWS are medical professionals who require the portability of computing equipment for inputting and tracking patient information. The MCWS is equipped with a PCMCIA slot to be used by the radio of choice. The information gathered will be transmitted via the RF link to an LXE Access point, usually a 6522 Ceiling Enclosure and will ultimately be made available to the LAN via an Ethernet connection.

1.2.4 Antennas

Table 1 below identifies all of the antennas to be used with the 480628-4096 radio card. In addition, the table identifies which terminal or Access Point uses which antenna and if a diverse scheme is used for that terminal or Access Point.

Table 2: Antennas

ANTENNAS SUBMITTED FOR REGULATORY APPROVAL WITH THE 11Mbps 802.11 RADIO CARD*						
Manufacturer	Manufacturer Part Number	LXE (P/N)	Antenna Used With	Type	Gain (dBi)	Antenna Scheme
Cushcraft & Maxrad	RTN2400SXR	153180-0001	1380/90	Omni	0	Non-Diverse
	MHWS2400RPC					
Lucent Technologies	None	155520-0001	1600	Patch	0	Diverse
Huber & Suhner	99090.16.0001	990004-0027	2325	Omni	1.8	Non-Diverse
LXE	155522-0001	155522-0001	2330	Omni	0	Diverse
LXE	155814-0001	155814-0001	2330/2335	Patch	0	
LXE	156426-0001	156426-0001	2381	Patch	0	Diverse
Toko	DAC2450CT1	NONE	2326	Omni	2.15	Non-Diverse
Maxrad		480429-0400	MCWS	Omni	2	Non-Diverse
Cushcraft	S2400XXXX**	153179-0001	Access Points 6520, 6521, 6522	Omni	0	Both
		153325-0001		Omni	0	
		480424-0400		Omni	0	
	S2403XXXX**	153599-0001		Omni	3	
		153600-0001		Omni	3	
		480424-3404		Omni	3	
	S2406XXXX**	480424-1702		Directional	6	
		480424-3402		Patch	6	
		481246-2400		Patch	6	
	PC2415XXXX**	460601-3020		Yagi	15	
		460602-3020		Yagi	15	
LXE	Spire	155846-0001		Omni	3	
	Spire	155845-0001		Omni	6	
Mobile Mark	OD9-2400	480424-0411		Omni	9	
Xertex	245BD5W-XXXX**	155311-0001		Patch	4&6	
		480424-3411		Patch	4&6	

*Only highest gain of each type of antenna to be tested.

**Manufacturer Model numbers generalized for convenience. Antennas are electrically and functionally equivalent. Different only in connector types and cable lengths. LXE part numbers given to all variations.

2.0 LOCATION OF TEST FACILITY

The LXE test facility is located at the following address:

LXE, Inc.
An Electromagnetic Sciences Company
125 Technology Parkway
Norcross, GA US 30092-2993

2.1 DESCRIPTION OF OPEN AREA TEST SITE

All tests were conducted at the manufacturer's test facility at a location specifically prepared for this testing. The radiated emissions test site meets the characteristics of ANSI C63.4:1992, CISPR 16 and EN 55022:1994. This site has been fully described and submitted to the FCC, and accepted in their letter marked 31040/SIT, 1300F2.

The open area test site(OATS) is located in the center of the rooftop of the building. The roof is located at a height of approximately 8 meters above the ground. The 3 meter radiated emissions test site is an open, flat area approximately 6.2m x 9.2m in dimension. All reflecting objects including test personnel lie outside the perimeter of the ellipse. The site has a ground plane which extends 2 meters past the mast and equipment under test(EUT). Material of the ground plane, comprised of individual 1/4" metal screen mesh rolls, were soldered at the seams with gaps smaller than 1/10 of the wavelength at 1000MHz. The ground plane is connected to the earth ground by ground rods. All wiring is done at floor level around the test site periphery.

A nonconductive remotely controlled turntable approximately 0.91m x 1.2m x 0.8m was used to measure radiated emissions from all sides of the EUT. The turntable has a center opening that allows cabling to be routed directly down to the conducting ground plane.

The radiated emissions test setup is shown in figure 1.

2.2 Radiated Emissions Testing Facility Drawing

All dimensions are in meters(m)

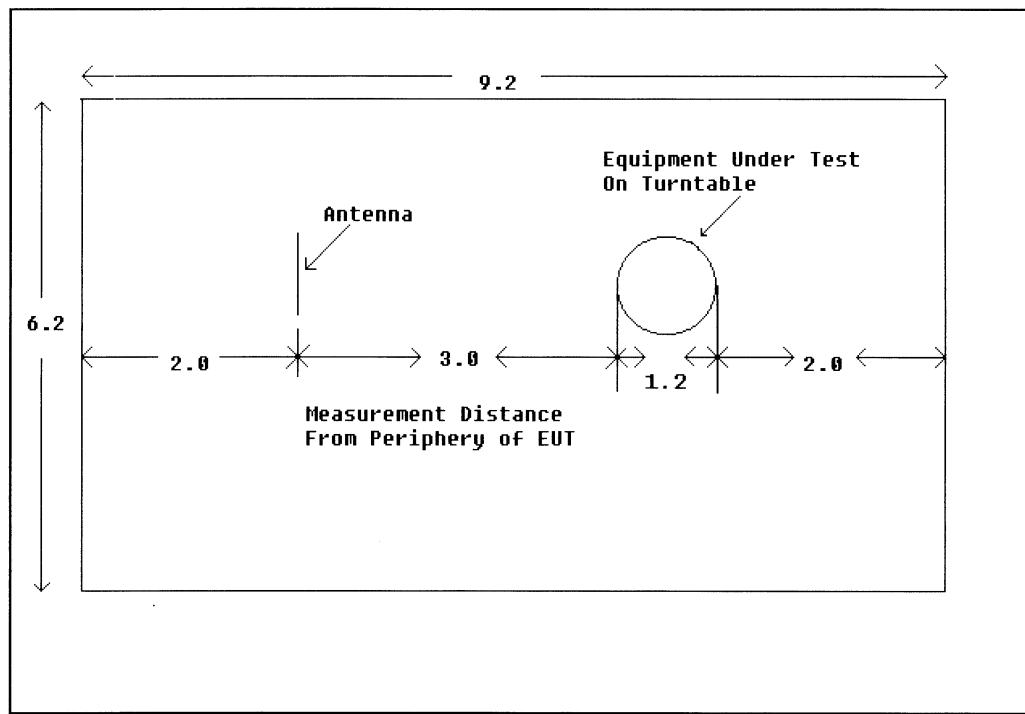


Figure 1: Open Area Test Site(OATS)

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- 1 - ANSI C63.4-1992: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- 2 - US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators (October 1997)
- 3 - FCC Bulletin 97-114 Appendix C - Guidance on Measurements for Direct Sequence Spread Spectrum Systems
- 4 - FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

4.0 LIST OF TEST EQUIPMENT**Table 3: Test and Support Equipment**

Description	Manufacturer	Model/Part #	Serial #	Calibration Due Date
Spectrum Analyzer	Hewlett Packard	HP 8591A	3131A02254	5/10/00
Spectrum Analyzer	Hewlett Packard	HP 8563E	3304A00657	5/5/00
Preamplifier	LXE	20-1000 MHz	001	4/12/00
Preamplifier	Hewlett Packard	83006A	3116A01317	10/5/00
Hi-Pass Filter	MicroWave Circuits	H04G18G2	0001	1/13/01
LISN	EMCO	3810/2NM	9505-1024	5/7/00
Biconical Antenna	EMCO	3104C	9012-4360	5/6/00
Biconical Antenna	Electro-Metric	BIA-25	1165	7/10/00
Log Periodic	EMCO	3146	3011-2946	4/1/00
Horn Antenna	ElectroMetric	RGA-60	6166	8/28/00
Horn Antenna	ElectroMetric	RGA-60	6165	8/28/00
RF Cable			NSN	7/20/00
RF Cable			7015	11/5/00
RF Cable			6986	11/5/00
Power Meter	Hewlett Packard	HP436A		2/10/00
Power Sensor	Hewlett Packard	HP8482H		1/07/01
Antenna Mast	CDI	CDI	N/A	N/A
Turntable	CDI	CDI	N/A	N/A
RF Enclosure	Lindgren Enclosure	14-2/2-0	8147	N/A

5.0 SUPPORT EQUIPMENT

Table 4: Support Equipment

Manufacturer	Equipment Type	Model Number	Serial Number	FCC ID
WinBookxp	LapTop Computer	ANL-4	10AUA01756	JRUANL-4D75

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

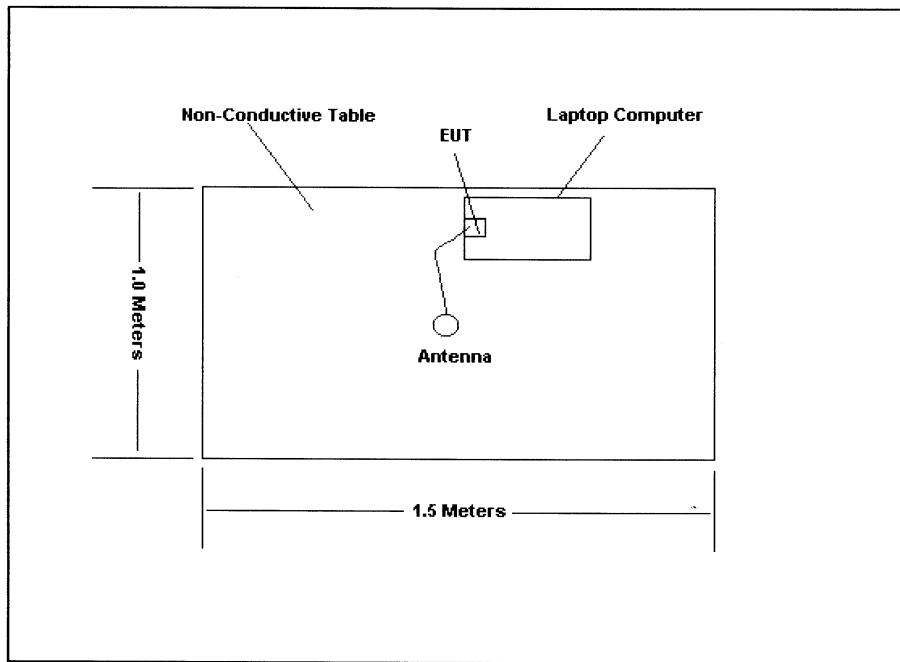


Figure 2: EUT Test Setup

7.0 TEST SETUP PHOTOGRAPHS

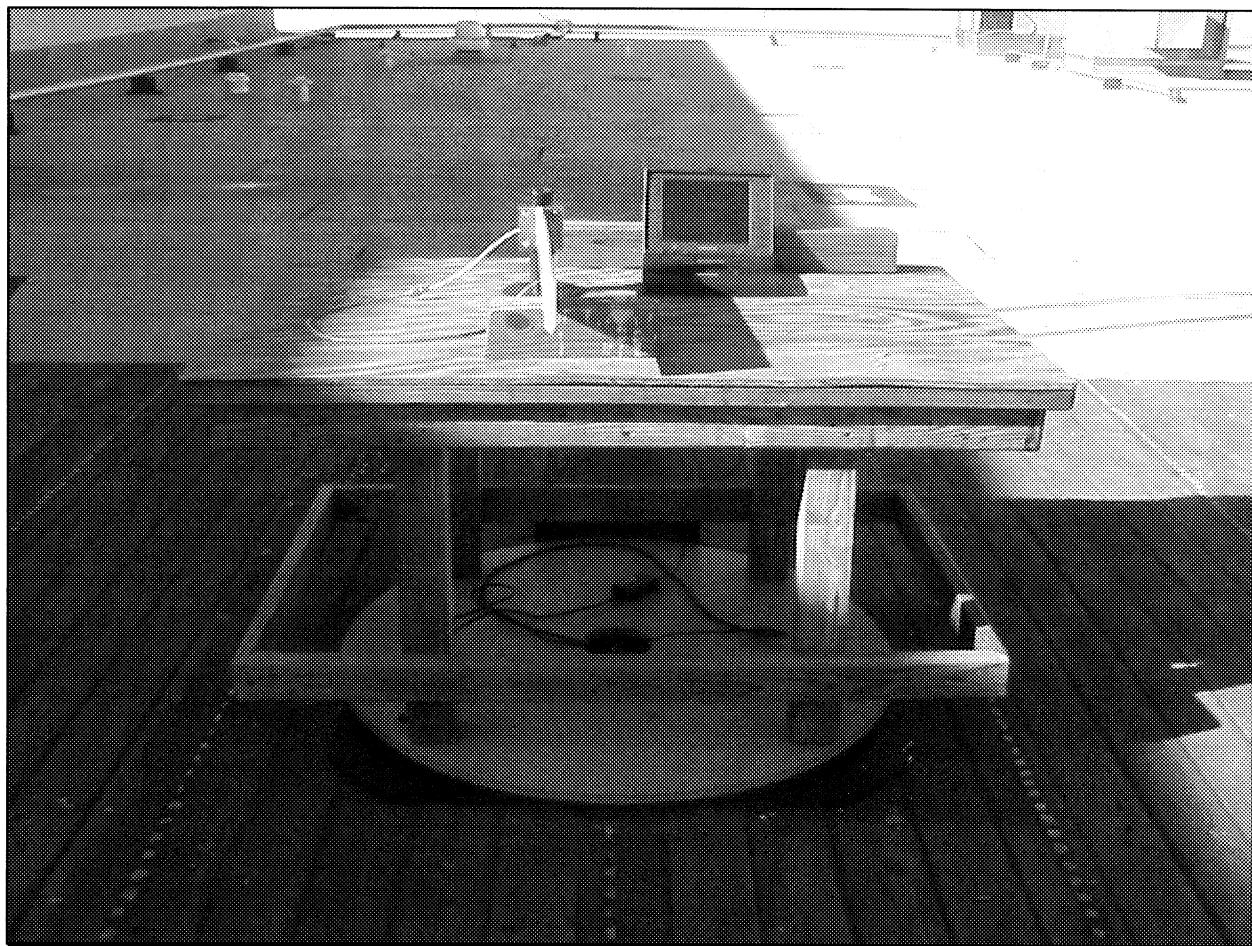


Figure 3: Front View

7.0 TEST SETUP PHOTOGRAPHS(cont.)

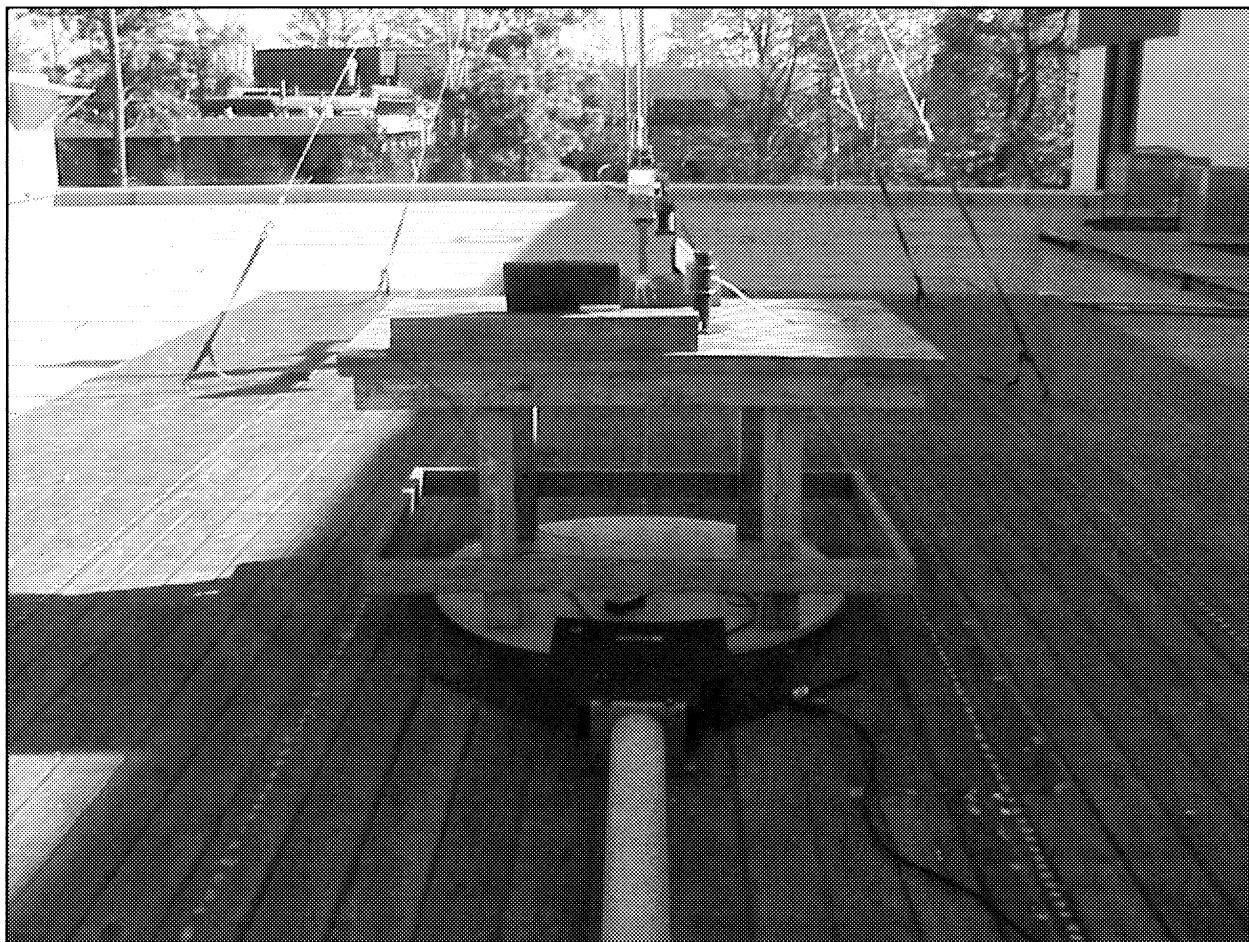


Figure 4: Back View

8.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

8.1 Antenna Requirement - FCC Section 15.203

All equipment is professionally installed by qualified LXE personnel. However, antennas that are accessible to the user are all equipped with unique and/or proprietary connectors and are not interchangeable with standard antennas without electrical and mechanical modification of the radio card or host unit. Antennas that are not accessible to the end user are equipped with standard N-Type connectors. LXE field service personnel prefer these connectors for ease of installation and repair.

8.2 Power Line Conducted Emissions - FCC Section 15.207

The EUT is powered by a PCMCIA bus of host device supplying 3.3 or 5VDC, and has no connection to the AC Mains. Conducted emissions are not required.

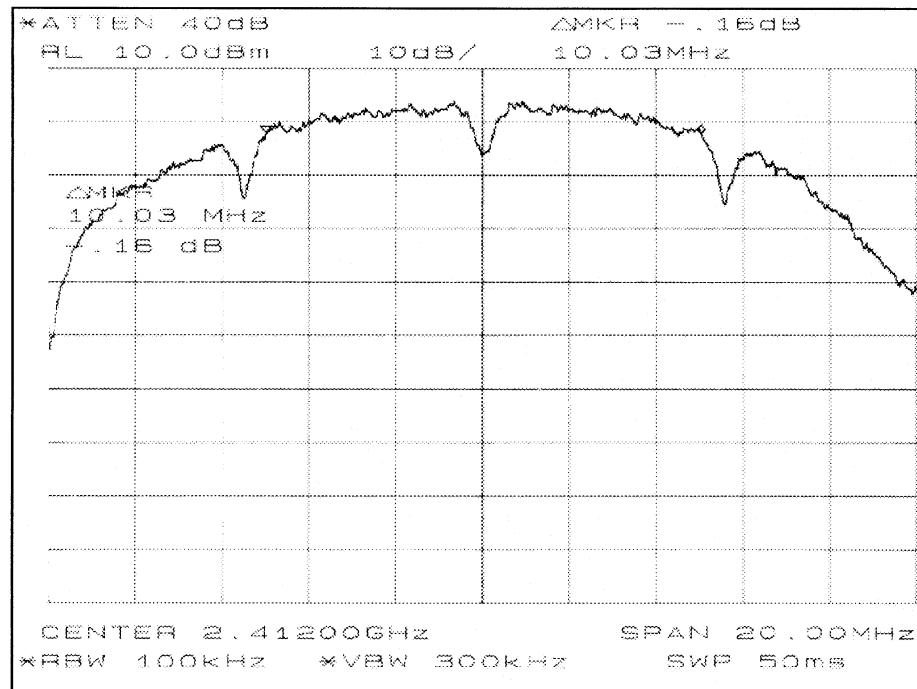
8.3 Radiated Emissions - FCC Section 15.209

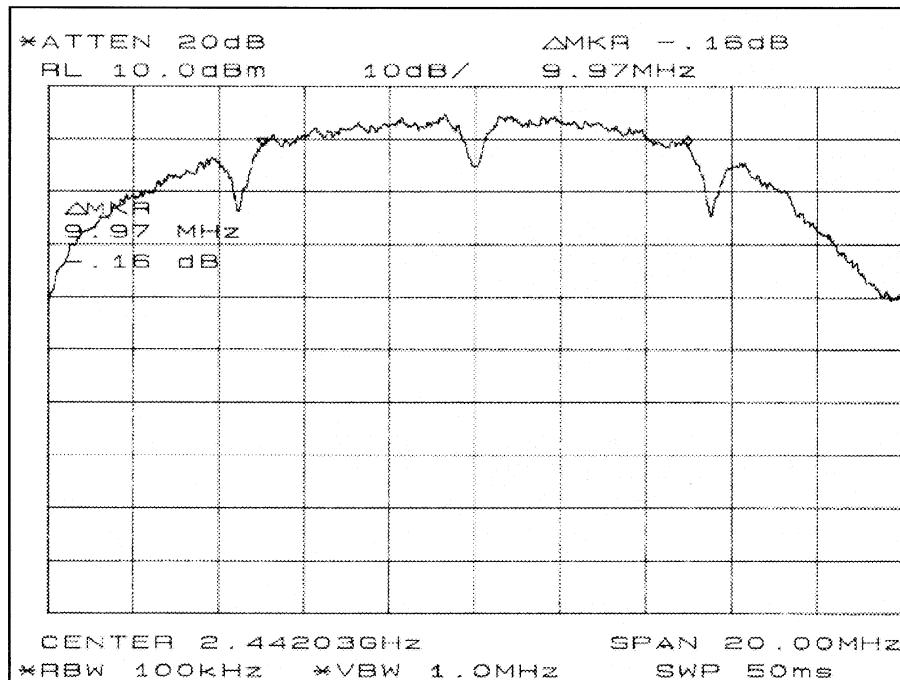
Radiated emissions tests were attempted over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test(EUT)and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120KHz for measurements above 30MHz.

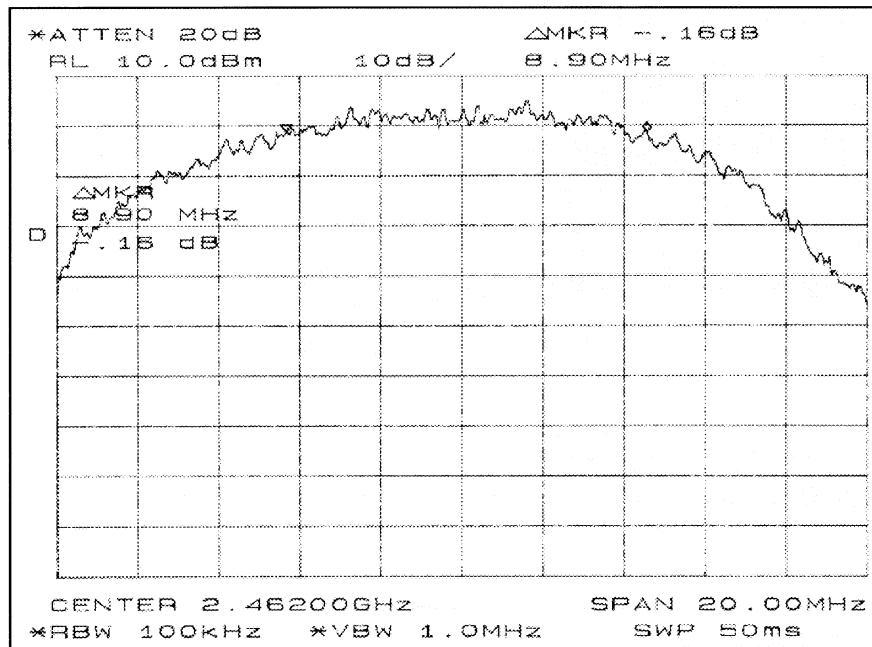
The EUT was caused to go into a "Receive Only" mode of operation for this test. No emissions attributed to the EUT could be detected in the band.

8.4 6dB Bandwidth Requirement - FCC Section 15.247(a)(2)

For the 6dB bandwidth test, the EUT was caused to generate a continuous carrier on the high, middle and low channels. The plots shown below in figures 5, 6 and 7 were taken at a data rate of 2Mbps.

**Figure 5: Channel 1**

8.4 6dB Bandwidth Requirement(cont.)**Figure 6: Channel 7**

8.4 6dB Bandwidth Requirement(cont.)**Figure 7: Channel 11**

8.5 Peak Output Power Requirement - FCC Section 15.247(b)

The peak output power of the EUT was made at the antenna connector using an HP436A power meter and an HP8482H power sensor. The EUT was caused to generate a constant carrier on high, mid and low channels of the device. On each channel the EUT was then cycled through each of its data rates. Table 4 below shows the results of this test.

Table 5: Peak Output Power

Data Rate (Mbps)	Channel 1 - 2412 MHz (dBm)	Channel 7 - 2442 MHz (dBm)	Channel 11 - 2462 MHz (dBm)
2	15.30	15.00	14.30
5.5	15.40	15.20	14.50
11	15.30	15.01	14.40

8.6 Spurious Emissions - FCC Section 15.247(c)

8.6.1 RF Conducted Spurious Emissions

The EUT was investigated for conducted spurious emissions from 30MHz to 25GHz, 10 times the highest fundamental frequency. For each measurement, the spectrum analyzer's VBW was set to 100kHz and the RBW was set to 1MHz.

The RF conducted spurious emissions found in the band of 300MHz to 10GHz are reported in Table 5 below. Each emission was compared to the fundamental reference level, also reported in the table below, to determine if they were at least 20dB below the reference level. Plots of the emissions were also taken and can be found in Appendix A of this report.

Table 6: Conducted Spurious Emissions

Channel	Fundamental Frequency (MHz)	Fundamental Reference Level (dBm)	Frequency of Spurious Emissions (MHz)	Level (dBm)	Margin (dB)	Results Pass/Fail
1	2412	3.67	692	-49.17	52.84	Pass
			2,397	-38.83	42.50	Pass
			4,820	-59.83	63.50	Pass
			8,220	-61.67	65.34	Pass
			14,420	-61.33	65.00	Pass
			21,837	-60.67	64.34	Pass
			23,922	-59.33	63.00	Pass
7	2442	4.83	696	-50.00	54.83	Pass
			4,883	-54.83	59.66	Pass
			8,334	-63.17	68.00	Pass
			13,109	-69.67	74.50	Pass
			20,442	-69.33	74.16	Pass
			24,514	-68.17	73.00	Pass
			691	-49.17	53.49	Pass
11	2462	4.32	2,487	-55.68	60.00	Pass
			4,918	-64.17	68.49	Pass
			8,418	-60.33	64.65	Pass
			12,935	-60.33	64.65	Pass
			21,460	-60.00	64.32	Pass
			24,759	-59.50	63.82	Pass

8.6.2 Radiated Spurious Emissions(Restricted Bands) - FCC Section 15.205

Radiated emissions tests were made over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test(EUT)and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. The spectrum analyzer's video and resolution bandwidths were set to 1MHz.

Due to high ambient noise levels and small EUT size, radiated emission measurements may be made at a distance of 1 meter. An inverse proportionality factor of 20 dB per decade is used to normalize the measured data to the specified distance to determine compliance. The formula used to calculate an inverse proportionality factor is $20 \log (D1/D2)$, where D1 is the distance used and D2 is the specified distance.

Of the antennas listed in section 1.2.4, only the three identified below were tested. These antennas are the highest gain of their respective types and are considered worst case of all the antennas in section 1.2.4. The antennas tested are:

Manufacturer	Model Number	LXE Part Number	Type	Gain(dBi)
Cushcraft	PC2415	460602-3020	Yagi	15
Cushcraft	245BD5W	480424-0411	Patch	4&6
Mobile Mark	OD9-2500	480424-3411	Omnidirectional	9

The EUT was caused to generate a constant carrier on the high, mid and low channels of operation at each of the data rates available. Tables 7, 8 and 9 below, show the results of all recordable points in the band of evaluation. Plots of each significant signal were also taken and can be found in order, in Appendix B of this report.

Table 7: 460602-3020 15dBi Yagi

Channel	Data Rate (Mbps)	Frequency (MHz)	Antenna Distance (m)	Receiver Level (dBm)	Correction Factors (dB)	Corrected Level (dBm)	Corrected Level (uV/m)	Limit (uV/m)	Margin (uV)
1	2	4120	1	-65.50	6.01	-59.49	237.31	5000	4762.69
		4824	1	-63.17	7.48	-55.69	367.67	5000	4632.33
		7237	1	-65.67	11.82	-53.85	454.37	5000	4545.63
	5.5	4119	1	-66.17	6.01	-60.16	219.70	5000	4780.30
		4829	1	-65.17	7.50	-57.67	292.61	5000	4707.39
	11	4120	1	-66.17	6.01	-60.16	219.91	5000	4780.09
		4824	1	-62.67	7.48	-55.19	389.46	5000	4610.54
7	2	4884	1	-66.67	7.68	-58.99	251.40	5000	4748.60
		7328	1	-70.17	12.01	-58.16	276.56	5000	4723.44
	5.5	4889	1	-67.83	7.69	-60.20	218.87	5000	4781.13
		7332	1	-68.33	12.01	-56.32	342.13	5000	4657.87
	11	4884	1	-68.17	7.68	-60.49	211.52	5000	4788.48
		4924	1	-68.83	7.81	-61.02	199.05	5000	4800.95

8.6.2 Radiated Spurious Emissions(cont.)

Table 8: 480424-3411 4/6 dBi Patch

Channel	Data Rate (Mbps)	Frequency (MHz)	Antenna Distance (m)	Receiver Level (dBm)	Correction Factors (dB)	Corrected Level (dBm)	Corrected Level (uV/m)	Limit (uV/m)	Margin (uV)
1	2	4824	1	-65.17	7.48	-57.69	292.05	5000	4707.95
	5.5	4818	1	-66.33	7.46	-58.87	254.96	5000	4745.04
	11	4824	1	-66.67	7.48	-59.19	245.73	5000	4754.27
7	2	4884	1	-68.83	7.68	-61.15	196.05	5000	4803.95
	5.5	4878	1	-70.17	7.66	-62.51	167.64	5000	4832.36
	11	4889	1	-69.67	7.69	-61.98	178.31	5000	4821.69
11	2	4924	1	-66.50	7.81	-58.69	260.29	5000	4739.71
	5.5	4919	1	-67.00	7.79	-59.21	245.26	5000	4754.74
	11	4924	1	-66.50	7.81	-58.69	260.29	5000	4739.71

Table 9: 480424-0411 - 9dBi Omni

Channel	Data Rate (Mbps)	Frequency (MHz)	Antenna Distance (m)	Receiver Level (dBm)	Correction Factor - CF _T (dB)	Corrected Level (dBm)	Corrected Level (uV/m)	Limit (uV/m)	Margin (uV)
1	All	4826	1	-72.33*	7.49	-64.84	128.17	5000	4871.83
		7230	1	-71.50*	11.80	-59.70	231.84	5000	4768.16
		9652	1	-70.58*	14.46	-56.12	349.88	5000	4650.12
7	All	4882	1	-72.25*	7.67	-64.58	132.14	5000	4867.86
		7324	1	-73.08*	12.00	-61.08	197.64	5000	4802.36
		9764	1	-70.58*	14.65	-55.93	357.63	5000	4642.37
11	All	4917	1	-71.50*	7.79	-63.71	145.98	5000	4854.02
		7387	1	-70.92*	12.13	-58.79	257.25	5000	4742.75
		9845	1	-70.83*	14.79	-56.04	353.04	5000	4646.96

*Noise Floor Measurement

Correction Factors

AF = Antenna Factor

CA = Cable Attenuation

AG = Amplifier Gain

RL = Receiver Level

RC = Range Correction = $20\log(D1/D2)$ Where D1 is the specified distance used and D2 is the distance used to make measurements = $[20\log(3/1)] = 9.54$ dB

Therefore:

CF_T = Total Correction Factor = RL+AF+CA-AG-RC

Sample Calculations

Corrected Level(dBm) = RL+ CF_T

Conversion from dBm to uV/m = Antilog(dBm + 107)/20

8.7 Power Spectral Density - FCC Section 15.247(d)

The spectral density was measured in accordance with OET bulletin 97-114, appendix C. The EUT was caused to generate a constant carrier on a high, middle and low channels at all the available data rates. The results are recorded in Table 7 below. Plots were also taken of each of the emissions and can be found in order, in appendix C of this report.

Table 10: Spectral Density

Channel	Data Rate (Mbps)	Receiver Level (dBm)	Limit (dBm)	Margin (dB)
1 (2412 MHz)	2	-9.50	8	17.50
	5.5	-10.17	8	18.17
	11	-8.17	8	16.17
7 (2442 MHz)	2	-3.17	8	11.17
	5.5	-9.33	8	17.33
	11	-8.00	8	16.00
11 (2462 MHz)	2	-3.17	8	11.17
	5.5	-10.50	8	18.50
	11	-8.00	8	16.00

9.0 Processing Gain - FCC Section 15.247(e)

The processing gain for this device is greater than the 10dB requirement. The test report can be found in appendix D of this report.

10.0 RF Safety - FCC Section 15.247(b)(4)

10.1 Portable Devices

The LXE products listed below, when integrated with radio cards, are considered Portable Devices according to the definition found in section 2.1093(b) of the rules. See section 1.2.3 for details of these devices.

- 1600
- 2325
- 2330
- 2335
- 2381

According to section 3 of Supplement C to OET Bulletin 65, part 15 transmitters are categorically excluded from routine environmental evaluation by measurement or precise computations unless otherwise required by the commission.

Due to the low power of the EUT, environmental evaluation is deemed to be unnecessary.

10.2 Mobile Devices

All other LXE products in section 1.2.3 not specified in section 9.1 are considered Mobile Devices. Antennas for these devices are installed such that 20cm is maintained between the radiating element and the general population.

11.0 SAMPLE LABEL

The label shown below will be placed directly on the EUT and also on the exterior of all host devices.



Figure 8.0: Sample Label

12.0 CONCLUSION

The product covered by this report has been tested and found to comply with the requirements as described in Part 15, Subpart C, Section 15.247 of the FCC Code of Federal Regulations.