

**KTL Test Report:** 0R03011.3

**Applicant:** Nortel Networks  
2351 Blvd. Alfred Nobel  
St. Laurent, Quebec  
H4S 2A9

**Equipment Under Test:  
(E.U.T.)** Portable Wireless Unit

**In Accordance With:** **FCC Part 15, Subpart C**  
For Low Power Transmitters Operating Periodically  
In The Band 40.66 - 40.77 MHz And Above 70 MHz

**Tested By:** KTL Ottawa Inc.  
3325 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:**



G. Westwell, Technologist

**Date:** November 7, 2000

**Total Number of Pages:** 18

**Authorized Copy:** Soft Copy

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## **Section 1. Summary of Test Results**

### **General**

**All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.231. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



New Submission



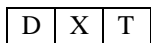
Production Unit



Class II Permissive Change



Pre-Production Unit



Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



**NVLAP LAB CODE: 100351-0**

TESTED BY:

Russell Grant, Wireless Group Manager

DATE: November 7, 2000

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This report applies only to the items tested.

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**Summary Of Test Data**

<b>Name of Test</b>	<b>Para. Number</b>	<b>Results</b>
Transmission Requirements	15.231(a)	Complies
Radiated Emissions	15.231(b)	Complies
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	Not Applicable
Periodic Alternate Field Strength Requirements	15.231(e)	Not Applicable
Powerline Conducted Emissions	15.207	Not Applicable

**Footnotes For N/A's:**

Battery Powered

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## **Section 2. Equipment Under Test (E.U.T.)**

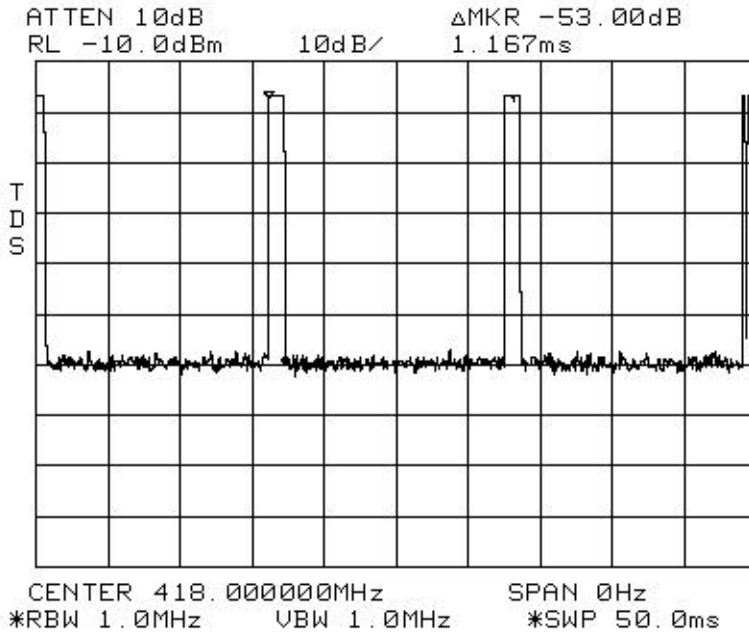
### **General Equipment Information**

<b>Manufacturer:</b>	Nortel Networks
<b>Date Received In Laboratory:</b>	October 2, 2000
<b>KTL Identification No.:</b>	Item #1
<b>Frequency Range:</b>	418 MHz
<b>Operating Frequency(ies) of Sample:</b>	418 MHz
<b>Emission Designator:</b>	83K0K1D
<b>Supply Power Requirement:</b>	Batteries
<b>Duty Cycle Calculation:</b>	$20 \text{ Log } \left( \frac{7 \times 1.167}{100} \right) = -21.8 \text{ dB}$



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### **Section 3.       Transmission Requirements**

**Para. No.: 15.231(a)**

<b>Test Performed By:</b> Russell Grant	<b>Date of Test:</b> October 27, 2000
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- Minimum Standard:**       15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.
- 15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.
- 15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.
- 15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.
- 15.231(a)(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

**Test Results:**               Complies.

**Test Data:**                 Compliance was determined by verification of technical specifications and a functional test on the equipment.

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**Rationale for Compliance with Transmission Requirements**

- 15.231(a)(1) :** The transmitter is automatically deactivated 128 ms after turn on.  
This is the maximum transmit time.
- 15.231(a)(2) :** No automatic time activation.
- 15.231(a)(3) :** No periodic transmissions.
- 15.231(a)(4) :** Not applicable.

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**Section 4. Radiated Emissions**

Para. No.: 15.231(b)

<b>Test Performed By:</b> Russell Grant	<b>Date of Test:</b> October 27, 2000
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**Minimum Standard:**

**Permissible Field Strength Limits (Momentarily Operated Devices)**

Fundamental Frequency (MHz)	Field Strength of Fundamental Microvolts/Meter at 3 meters; (watts)	Field Strength of Unwanted Emissions Microvolts/Meter at 3 meters; (watts)
40.66 - 40.70	2,250	225
70-130	1, 250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

**Notes:**

# Use quasi-peak or averaging meter.	For 130 - 174 MHz: $FS \text{ (microvolts/m)} = (56.82 \times F) - 6136$
* Linear interpolation with frequency F in MHz	For 260 - 470 MHz: $FS \text{ (microvolts/m)} = (41.67 \times F) - 7083$

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

**Test Results:** Complies. The worst-case emission level is 61.6 dB $\mu\text{V/m}$  @ 3m at 418.06 MHz. This is 18.7 dB below the specification limit.

**Test Data:** See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 3 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

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**Test Data - Radiated Emissions**

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP		RBW(kHz): 100		Detector: Peak	
Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
418.06	E/D4	V	57.0	24.6		-20.0	61.6	80.3	18.7
418.06	E/D4	H	55.8	24.6		-20.0	60.4	80.3	19.9
<b>No transmitter spurious emissions were detected within 20dB of the specification limit.                      The spectrum was searched up to the 10<sup>th</sup> harmonic of the fundamental frequency of operation.</b>									
<b>Notes:</b> B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole * Re-measured using dipole antenna. ** Includes cable loss when amplifier is not used. *** Includes cable loss. ( ) Denotes failing emission level. N.D. = Not Detected									

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**Radiated Photographs (Worst Case Configuration)**

**Front View**



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**Section 5. Occupied Bandwidth**

**Para. No.: 15.231(c)**

<b>Test Performed By:</b> Russell Grant	<b>Date of Test:</b> October 27, 2000
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**Minimum Standard:** 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

**Test Results:** Complies. See attached graph.

The 20dB bandwidth is 50 kHz. This is 0.0120% of the centre frequency.

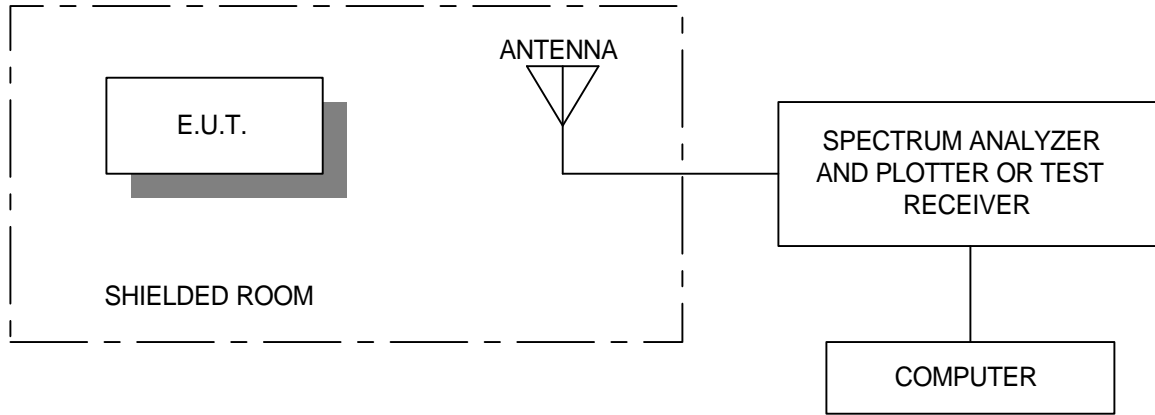
**Test Data:** See attached graph.



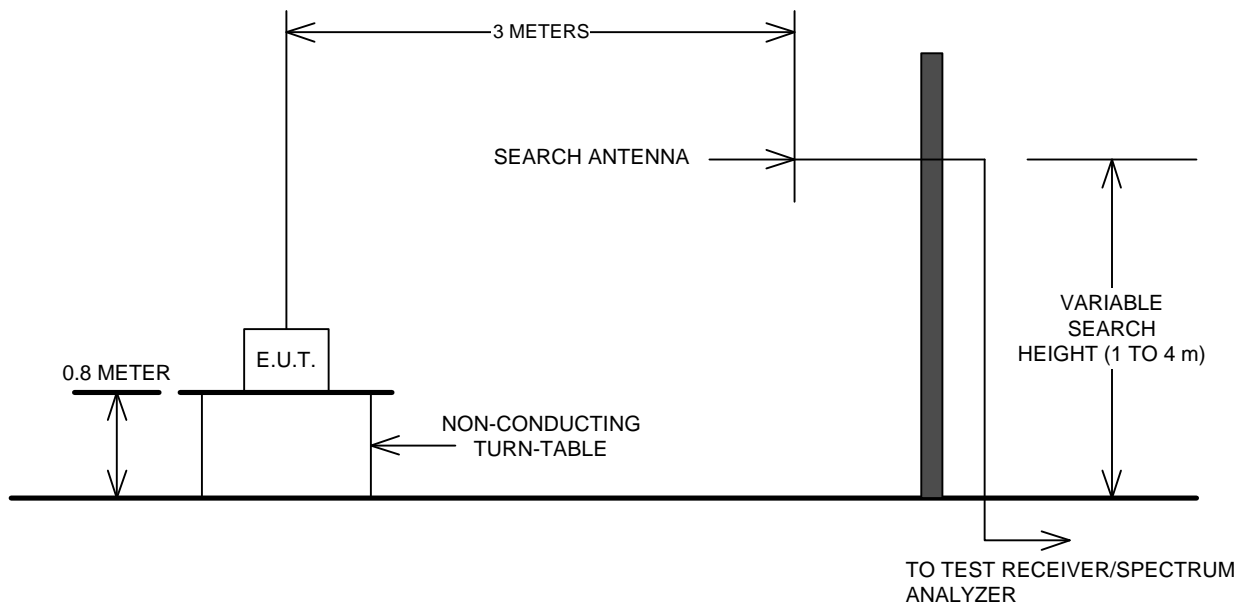
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## Section 6. Block Diagrams

### Radiated Prescan



### Outdoor Test Site For Radiated Emissions



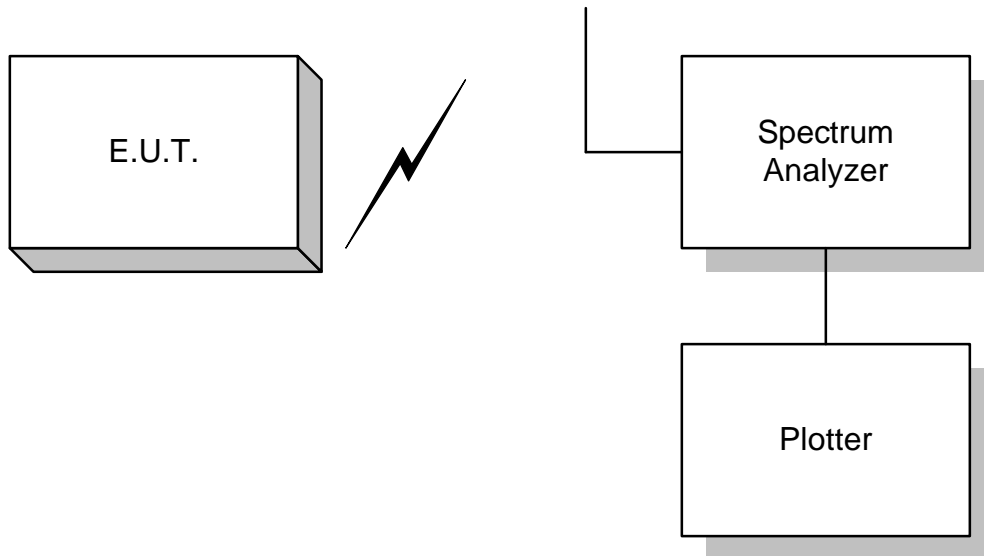
The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.



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**Occupied Bandwidth**



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**Section 7. Test Equipment List**

<b>CAL CYCLE</b>	<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	<b>MODEL</b>	<b>SERIAL</b>	<b>LAST CAL.</b>	<b>NEXT CAL.</b>
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	June 16/00	June 16/01
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
1 Year	Receiver	Rohde & Schwarz	ESVP	892661/014	April 5/00	April 5/01
	Biconilog Antenna	EMCO	3143	1038	NCR	NCR
1 Year	Horn Antenna	EMCO #2	3115	4336	Nov. 11/99	Nov. 11/00
1 Year	Horn Antenna	EMCO #1	3115	3132	Dec. 21/99	Dec. 21/00
1 Year	Log Periodic Antenna 2	EMCO	3148	9904-1054	Apr. 30/99	Oct. 30/00
1 Year	Dipole Antenna Set	EMCO #2	3121C	FA001349	June 27/00	June 27/01
1 Year	RF AMP	JCA	2-4 GHz	FA001496	May 31/00	May 31/01
1 Year	RF AMP	JCA	1-2 GHz	FA001498	May 31/00	May 31/01
1 Year	RF AMP	JCA	4-8 GHz	FA001497	May 31/00	May 31/01

NA: Not Applicable  
 NCR: No Cal Required  
 COU: CAL On Use