



Certelec Laboratories Inc.

Safety - EMI - Telecom - ISO Guide 25

ENGINEERING TEST REPORT

**ON:
THE SIERRA WIRELESS
"800 MHz WIRELESS MODEM"**

**IN ACCORDANCE WITH:
MPE REQUIREMENTS OF THE FCC PART 1**

PROJECT NO.: 7SI135-1H

TESTED FOR:

**SIERRA WIRELESS
13151 VANIER PLACE, SUITE 260
RICHMOND, B.C. V6V 2J2**

TESTED BY:

**CERTELECOM LABORATORIES INC.
3325 RIVER ROAD, R.R. 5
OTTAWA, ONTARIO K1V 1H2**

OCTOBER 1997

This document contains 19 pages including this one.

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This report applies only to the items tested.

EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

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EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

Equipment Under Test

Model No.: MP200

Serial No.: NONE

Test Rationale

This testing was patterned after testing done in FCC/OET document ASD-9601, "Measurements of Environmental Electromagnetic Fields at Amateur Radio Stations" and OET Bulletin 65 Edition 97-01, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields.

Emissions were measured using a standard Roberts type dipole antenna tuned to cellular channel 440. The measured field strength was then converted to Power Density by the following relation:

$$S = E^2/3770$$

where

S = power density (mW/cm²)

E = electric field strength (V/m)

This equation is given on page 9 of OET Bulletin 65.

Measurements were made with the E.U.T. feeding a magnetic roof mount antenna as prescribed by the manufacturer. Measurements were made with the system installed on two different vehicles; a standard passenger vehicle and a pickup truck. Field strengths were measured at distances from 0.5 to 3 metres. The receive antenna height was varied from 1 - 3 metres to determine maximum emission levels.

Measurements were also performed with the vehicle parked adjacent to a panel van in order to investigate "hot spots" that may be caused by reflection from a nearby metallic object.

Test Performed By: _____

Tom Tidwell
Tom Tidwell, Technologist

Date: _____

3 Nov. 1997

Approved By: _____

W. Waterhouse
W. Waterhouse, RF Engineering Lab Manager

Date: _____

3rd November 1997

EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

Test Configuration A

Transmit antenna: LARSEN LM/CM-MM Magnetic Mount

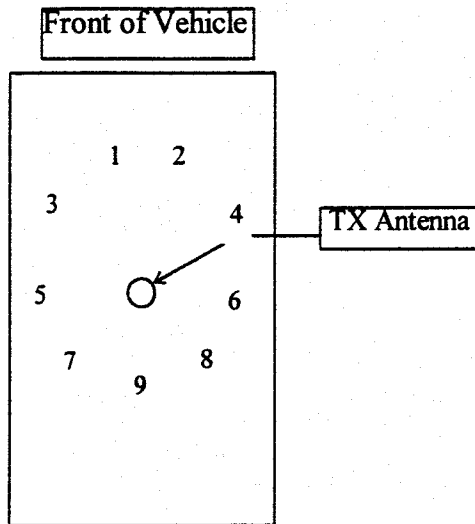
Receive antenna height: 1.5 - 2m

Vehicle: 1992 Pontiac Sunbird, 4 door

Antenna mounted in center of roof

Test #1

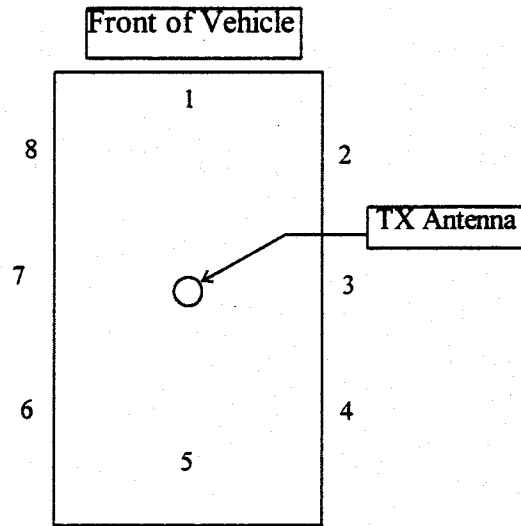
MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	0.5	0.356	0.560
2	0.5	0.317	0.560
3	0.5	0.251	0.560
4	0.5	0.370	0.560
5	0.5	0.264	0.560
6	0.5	0.330	0.560
7	0.5	0.224	0.560
8	0.5	0.356	0.560
9	0.5	0.343	0.560



EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #2

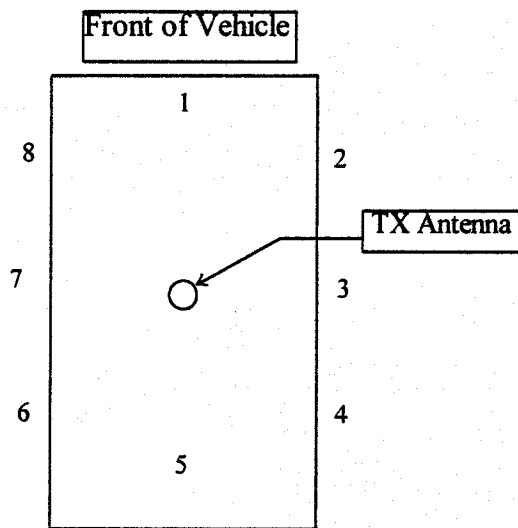
MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	1	0.00284	0.560
2	1	0.00334	0.560
3	1	0.00139	0.560
4	1	0.00250	0.560
5	1	0.00305	0.560
6	1	0.00298	0.560
7	1	0.00221	0.560
8	1	0.00298	0.560



EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #3

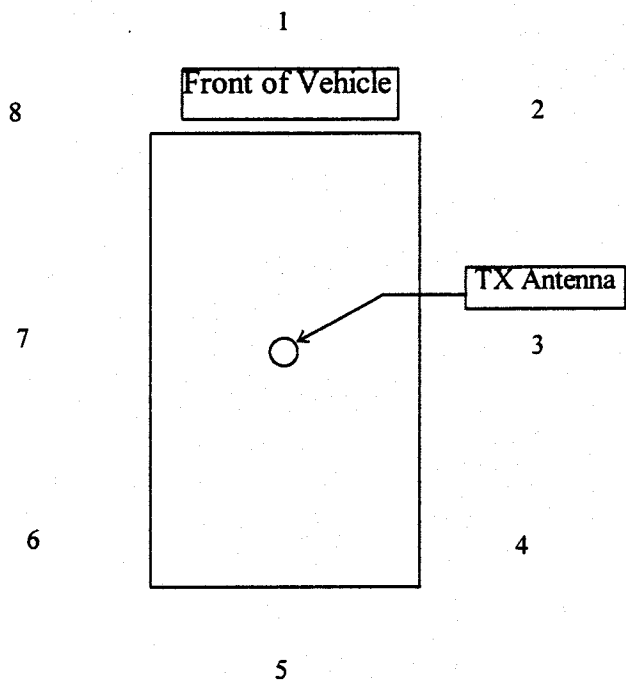
MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	2	0.000188	0.560
2	2	0.000298	0.560
3	2	0.000420	0.560
4	2	0.000472	0.560
5	2	0.001056	0.560
6	2	0.000567	0.560
7	2	0.000383	0.560
8	2	0.000450	0.560



EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #4

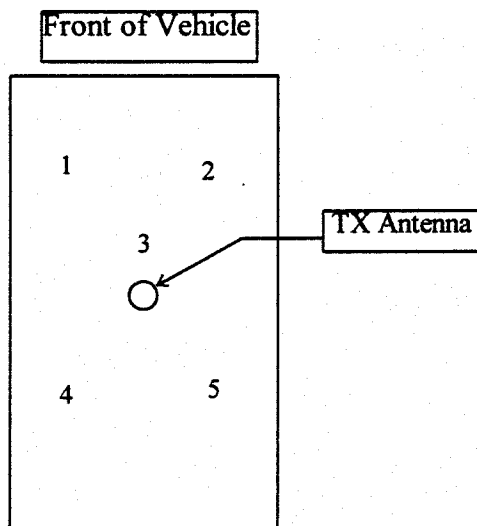
MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	3	0.0000472	0.560
2	3	0.0002258	0.560
3	3	0.0001753	0.560
4	3	0.0002778	0.560
5	3	0.0001674	0.560
6	3	0.0002533	0.560
7	3	0.0001492	0.560
8	3	0.0001132	0.560



EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #5 Measurements Inside Vehicle With Antenna Mounted In Center Of Roof

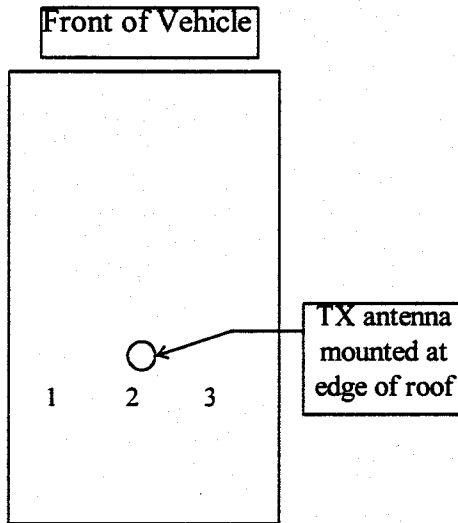
MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	3	0.0000529	0.560
2	3	0.0000420	0.560
3	3	0.0000858	0.560
4	3	0.0000420	0.560
5	3	0.0000423	0.560



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Test #6 - Measurements Inside Car With Antenna Mounted At Rear

MEASUREMENT POSITION			MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	Back seat left		0.132	0.560
2	Back seat center		0.092	0.560
3	Back seat right		0.132	0.560



EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

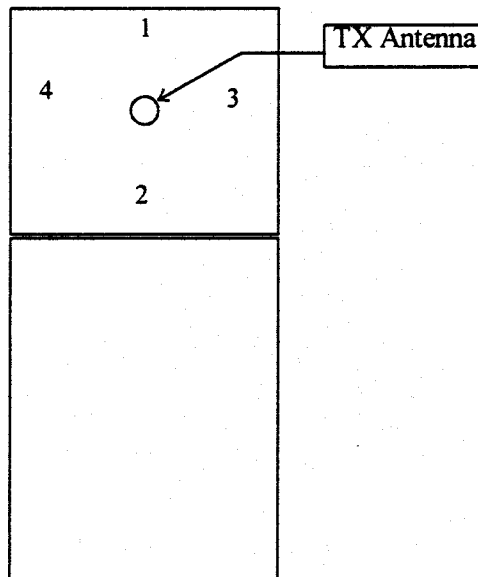
Test Configuration B

Transmit antenna: LARSEN LM/CM-MM Magnetic Mount
 Receive antenna height: 1.5 - 2m
 Vehicle: 1993 Ford Ranger Pickup truck
 Antenna mounted in center of roof

Test #1

MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	0.5	0.00963	0.560
2	0.5	0.00608	0.560
3	0.5	0.00941	0.560
4	0.5	0.00594	0.560

Front of Vehicle

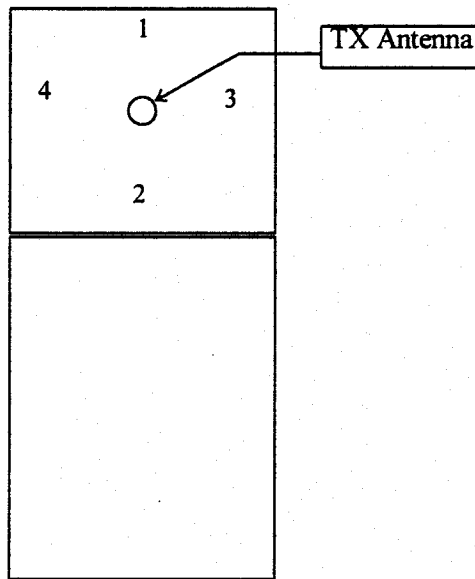


EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

Test #2

MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	1	0.00298	0.560
2	1	0.00106	0.560
3	1	0.00298	0.560
4	1	0.00594	0.560

Front of Vehicle

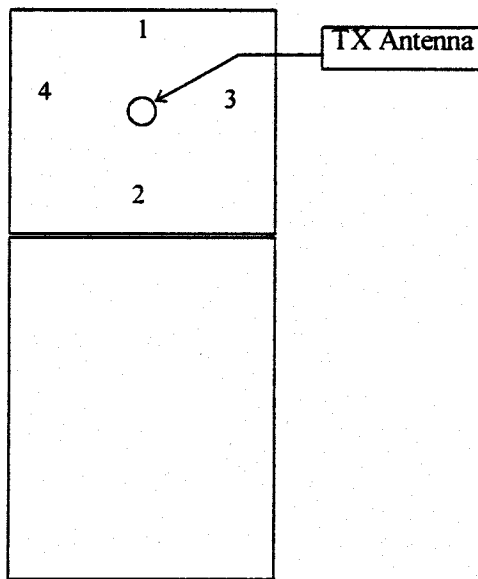


EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #3

MEASUREMENT POSITION		MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1		2	0.000567	0.560
2		2	0.000334	0.560
3		2	0.000450	0.560
4		2	0.000450	0.560

Front of Vehicle

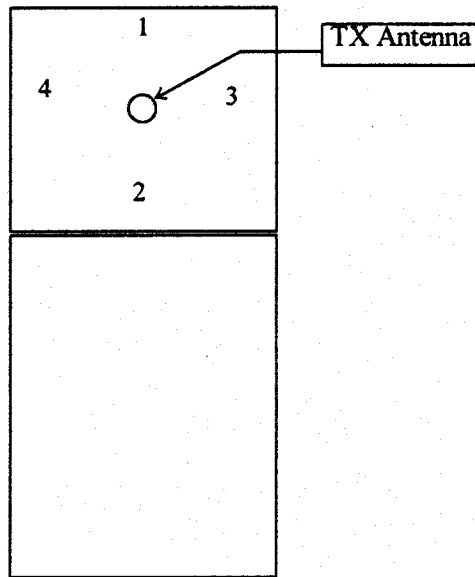


EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #4

MEASUREMENT POSITION		MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1		3	0.000253	0.560
2		3	0.000171	0.560
3		3	0.000175	0.560
4		3	0.000175	0.560

Front of Vehicle

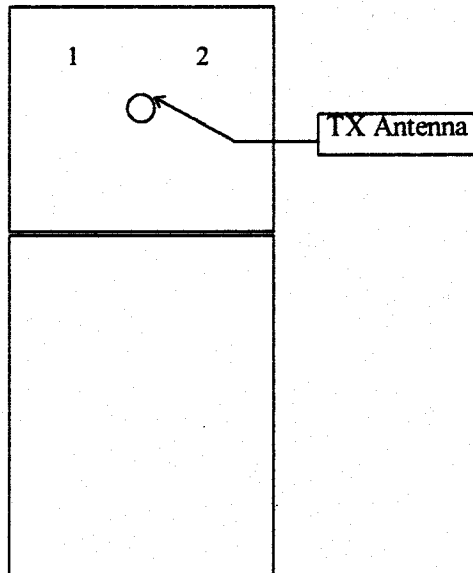


EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #5 - Measurements Inside Vehicle

MEASUREMENT POSITION		MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1	Driver side		0.000192	0.560
2	Passenger side		0.000505	0.560

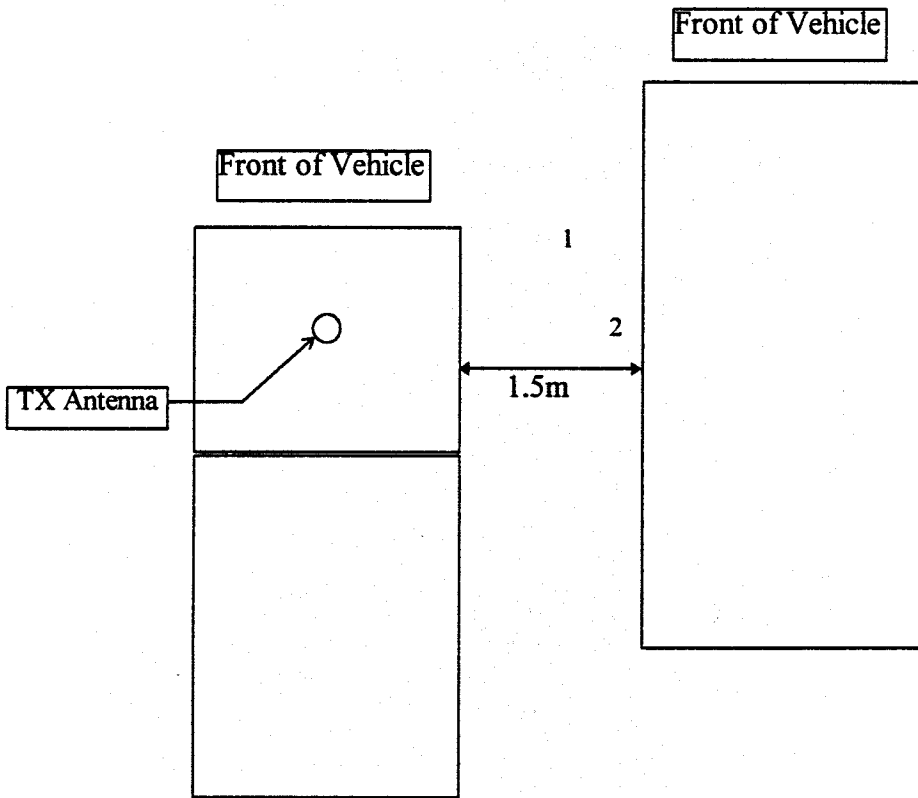
Front of Vehicle



EQUIPMENT: *The Sierra Wireless "800 MHz Wireless Modem"*

Test #6 - Measurements Beside Panel Van

MEASUREMENT POSITION	MEASUREMENT DISTANCE (metres)	MEASURED POWER DENSITY (mW/cm ²)	FCC LIMITS POWER DENSITY (mW/cm ²)
1		0.075	0.560
2		0.300	0.560



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Test Equipment

CAL Cycle	Equipment	Manufacturer	Model #	Serial/Asset #	Last Cal.	Next Cal.
1Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	Jan. 3/97	Jan. 3/98
1Year	Dipole Antenna	Roberts Inst.	N/A	FA000747	Apr. 28/97	Apr.28/98

Note: N/A = Not Applicable
NCR = No Cal Required

EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

PHOTOS

EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

Configuration A



EQUIPMENT: The Sierra Wireless "800 MHz Wireless Modem"

Configuration A: Test 5



Configuration B: Test 6

