



**Nemko Test Report:** 4L0050RUS1Rev3

**Applicant:** Motion Computing, Inc.  
9433 Bee Caves Road  
Building 1, Suite 250  
Austin, TX 78733

**Equipment Under Test:  
(E.U.T.)** M1400 (T003)

**In Accordance With:** **FCC Part 15, Subpart C, 15.247**  
Digital Transmission System Transceiver

**Tested By:** Nemko Dallas Inc.  
802 N. Kealy  
Lewisville, Texas 75057-3136

**Authorized By:**   
Tom Tidwell, Frontline Group Manager

**Date:** 3 March, 2004



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EQUIPMENT: M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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**Section 1. Summary of Test Results**

Manufacturer: Motion Computing, Inc.

Model No.: M1400 (T003)

Serial No.: None

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 15.247 for Direct Sequence Spread Spectrum devices. Radiated tests were conducted in accordance with 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

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. NONE  
See "Summary of Test Data".

**NVLAP LAB CODE: 100426-0**

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*EQUIPMENT:* M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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**Summary Of Test Data**

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Complies
Minimum 6 dB Bandwidth	15.247(a)(2)	Complies
Channel Separation	15.247(a)(1)	Complies
Pseudorandom Hopping Algorithm	15.247(a)(1)	Complies
Time of Occupancy	15.247(a)(1)(ii)	Complies
20 dB Occupied Bandwidth	15.247(a)(1)	Complies
Maximum Peak Power Output	15.247(b)(1)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	N/A
Spurious Emissions (Restricted Bands)	15.247(c)	Complies
Peak Power Spectral Density	15.247(d)	Complies

**Footnotes:**

The antennas are integral to the radio modules.



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**Section 2. Equipment Under Test (E.U.T.)****General Equipment Information****Frequency Band:**

- ☐ 902 – 928 MHz  
☒ 2400 – 2483.5 MHz  
☐ 5725 – 5850 MHz

**Channel Spacing:**

500 kHz 802.11g  
1 MHz Bluetooth

**User Frequency Adjustment:**

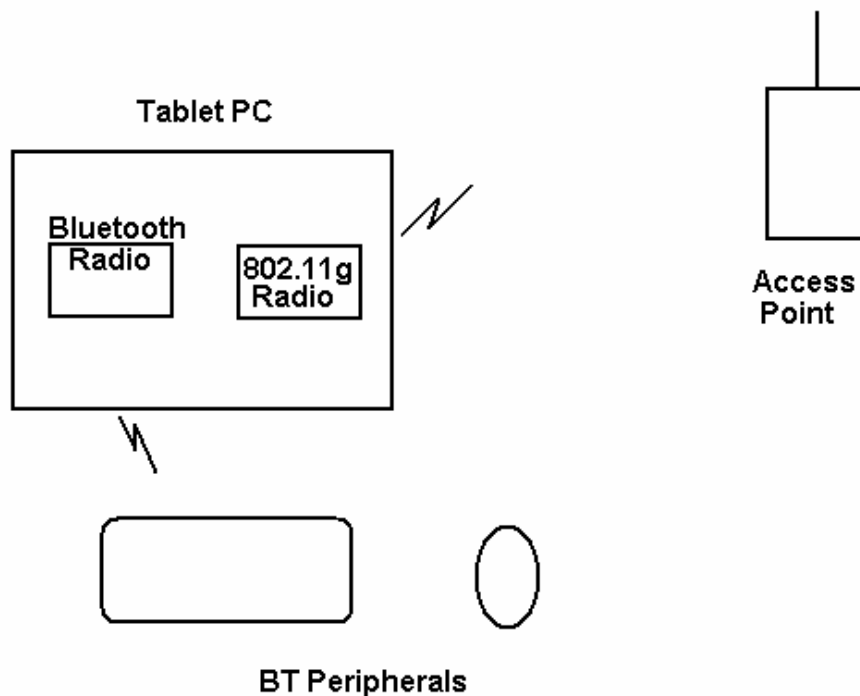
Software controlled

This product contains both an 802.11 module and a Bluetooth module that may operate simultaneously.



**Description of EUT**

The **M1400 (T003)** is a portable computer platform based on ultra-portable notebook PC technology utilizing Microsoft's Tablet version of Windows XP. The system utilizes Intel's 855 GME chip set, including the Banias ULV 1.0 G processor and an Intel 2200BG WLAN card. The M1400 (T003) will fully meet Microsoft's Windows XP tablet OS requirements including; fast resume, surprise undocking, and no external legacy peripheral ports.

**System Diagram**



*EQUIPMENT:* M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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**Section 3. Powerline Conducted Emissions**

NAME OF TEST: Powerline Conducted Emissions

PARA. NO.: 15.207(a)

TESTED BY: Brian Boyea

DATE: 1/25/04

**Test Results:** Complies.**Measurement Data:** See attached plots.**Measurement Uncertainty:** +/- 1.7 dB**NOTE:** The device was tested with both radio modules transmitting simultaneously.



EQUIPMENT: M1400 (T003)

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## Test Data – Powerline Conducted Emissions



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## Dallas Headquarters:

802 N. Kealy  
Lewisville, TX 75057  
Tel: (972) 436-9600  
Fax: (972) 436-2667

### Conducted Emissions

#### Powerline Voltage Measurement

Complete   X   Job # : 4L0050E Test # : CEPV-01  
Preliminary        Page   1   of   1  

Client Name : MOTION COMPUTING INC.  
EUT Name : M1400 TABLET PC  
EUT Model # : M1400 - TRADE NAME IS T003  
EUT Part # : M1400  
EUT Serial # : 0  
EUT Config. : Transmit State

Specification : CFR47 Part 15, Subpart B, Class B Reference :  
Transducer # : 545 Temp. (deg. C) : 23 Date : 01/25/04  
HP Filter # : 704 Humidity (%) : 35 Time : 9:30 A.M.  
Cable 1 # : 1038 EUT Voltage : 120 Vac Staff : Brian Boyea  
Cable 2 # : 1988 EUT Frequency : 60 Hz Location : Lab 5  
Detector 1 # : 1283 Peak Bandwidth: 10kHz Photo ID: 4L0050E CEPV-01  
Detector 2 # : 966 QP Bandwidth 10kHz  
Limiter # : 1193 Avg. Bandwidth 10kHz

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P, QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec. limit (dBuV)		CR/SL Diff. (dB)	Pass Fail Unc.	Comment
								Q.P.	Avg.			
0.15	Neut	P	A	43.2	0	0	43.2	66	56	-12.8	Pass	
0.506	Neut	P	A	40.8	0	0	40.8	56	46	-5.2	Pass	
1.08	Neut	P	A	33.5	0	0	33.5	56	46	-12.5	Pass	
3.51	Neut	P	A	30.6	0	0	30.6	56	46	-15.4	Pass	
12.6	Neut	P	A	31.1	0	0	31.1	60	50	-18.9	Pass	
19.4	Neut	P	A	34.7	0	0	34.7	60	50	-15.3	Pass	
24.6	Neut	P	A	35.9	0	0	35.9	60	50	-14.1	Pass	
0.15	Line	P	A	43.5	0	0	43.5	66	56	-12.5	Pass	
0.431	Line	P	A	37.2	0	0	37.2	57.23	47.234	-10.0	Pass	
0.506	Line	P	A	35.8	0	0	35.8	56	46	-10.2	Pass	
1.86	Line	P	A	30.4	0	0	30.4	56	46	-15.6	Pass	
3.01	Line	P	A	31.5	0	0	31.5	56	46	-14.5	Pass	
12.69	Line	P	A	29.5	0	0	29.5	60	50	-20.5	Pass	
19.5	Line	P	A	32.6	0	0	32.6	60	50	-17.4	Pass	
22.66	Line	P	A	35.5	0	0	35.5	60	50	-14.5	Pass	

..\\EMCShare\\AUTOMATE\\DATASHTS\\CEP\_Voltage Rev C.xl: Document Control #EMC DS EM COND VOLT



**Photos – Powerline Conducted Emissions**

Front



Side





EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Section 4. Occupied Bandwidth**

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)
TESTED BY: David Light	DATE: 1/29/04

**Test Results:** Complies.[802.11g](#)**Measurement Data:** See 6 dB BW plot

Measured 6 dB bandwidth: 16 MHz  
Channel Separation: 500 kHz

[802.11b](#)**Measurement Data:** See 6 dB BW plot

Measured 6 dB bandwidth: 10 MHz  
Channel Separation: 500 kHz

[Bluetooth](#)**Measurement Data:** See 20 dB BW plot

Measured 20 dB bandwidth: 1 MHz  
Channel Separation: 1 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

802.11g



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802 N. Kealy  
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 Tel: (972) 436-9600  
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## Data Plot

Page 1 of 3

Job No.: 4L0050 Date: 1/28/2004  
 Specification: 15.247 (a)(1) Temperature(°C): 22  
 Tested By: David Light Relative Humidity(%) 40  
 E.U.T.: TABLET PC  
 Configuration: TX - 802.11g  
 Sample Number: 1  
 Location: Lab 2 RBW: Refer to plots  
 Detector Type: Peak VBW: Refer to plots

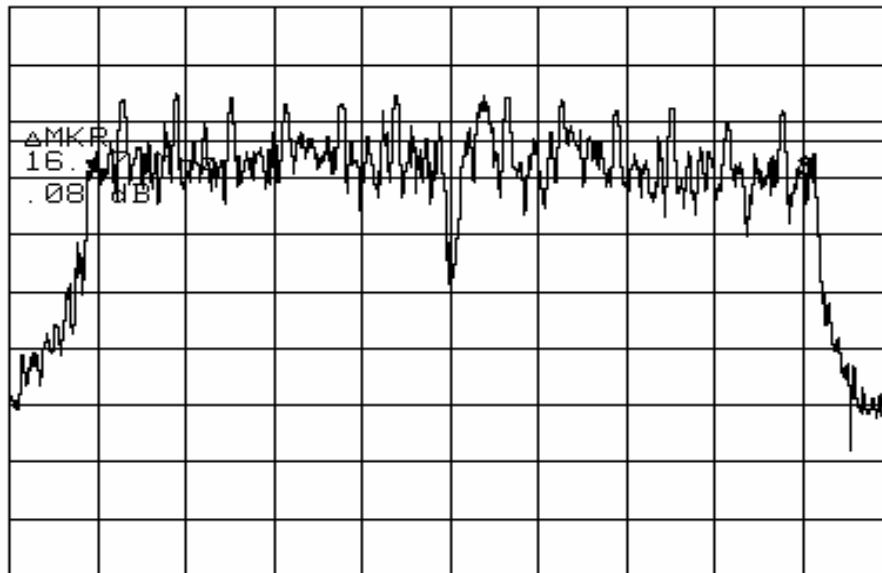
Complete X  
 Preliminary: \_\_\_\_\_

Measurement  
 Distance: NA m

## Test Equipment Used

Antenna: 802 Directional Coupler: \_\_\_\_\_  
 Pre-Amp: \_\_\_\_\_ Cable #1: 1045  
 Filter: \_\_\_\_\_ Cable #2: \_\_\_\_\_  
 Receiver: 1464 Cable #3: \_\_\_\_\_  
 Attenuator #1: \_\_\_\_\_ Cable #4: \_\_\_\_\_  
 Attenuator #2: \_\_\_\_\_ Mixer: \_\_\_\_\_  
 Additional equipment used: \_\_\_\_\_  
 Measurement Uncertainty: +/-1.7 dB

ATTEN 10dB  $\Delta$ MKR .08dB  
 RL -20.0dBm 5dB/ 16.17MHz



CENTER 2.41200GHz SPAN 20.00MHz  
 \*RBW 100kHz VBW 100kHz SWP 50.0ms

Notes: TX 2412 MHz - CH 1



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

802.11g



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**Data Plot**

Page 2 of 3

Job No.: 4L0050

Date: 1/28/2004

15.247

Specification: (a)(1)

Temperature(°C): 22

Tested By: David Light

Relative Humidity(%) 40

E.U.T.: TABLET PC

Configuration: TX - 802.11g

**Occupied Bandwidth**

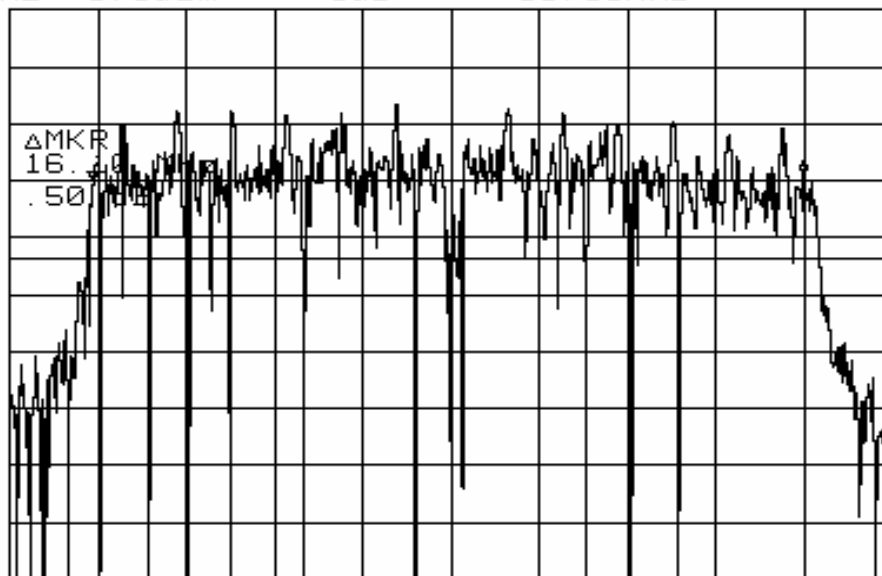
ATTEN 10dB

RL -5.0dBm

5dB/

ΔMKR .50dB

16.10MHz



CENTER 2.43700GHz

SPAN 20.00MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms

Notes: TX 2437 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

802.11g



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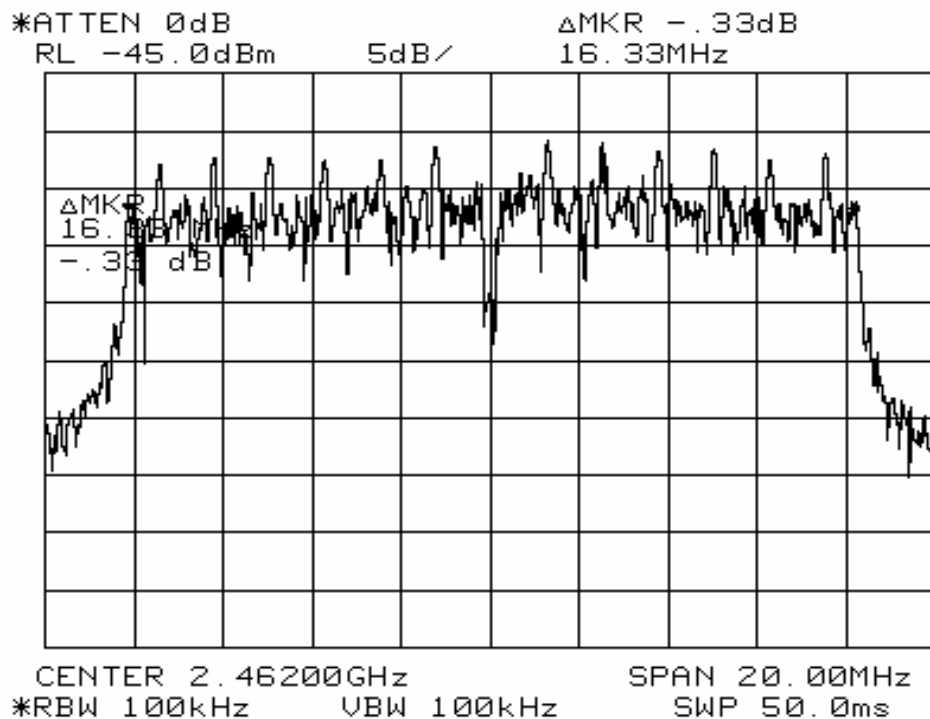
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**Data Plot**

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Job No.:	4L0050	Date:	1/28/2004
Specification:	15.247 (a)(1)	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	TABLET PC		
Configuration:	TX - 802.11g		

**Occupied Bandwidth**

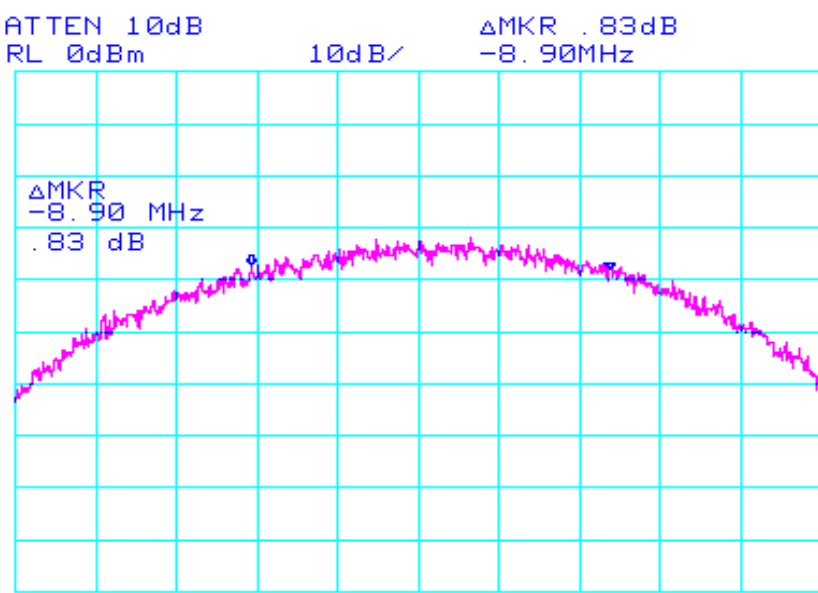
Notes: TX 2462 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## 802.11b

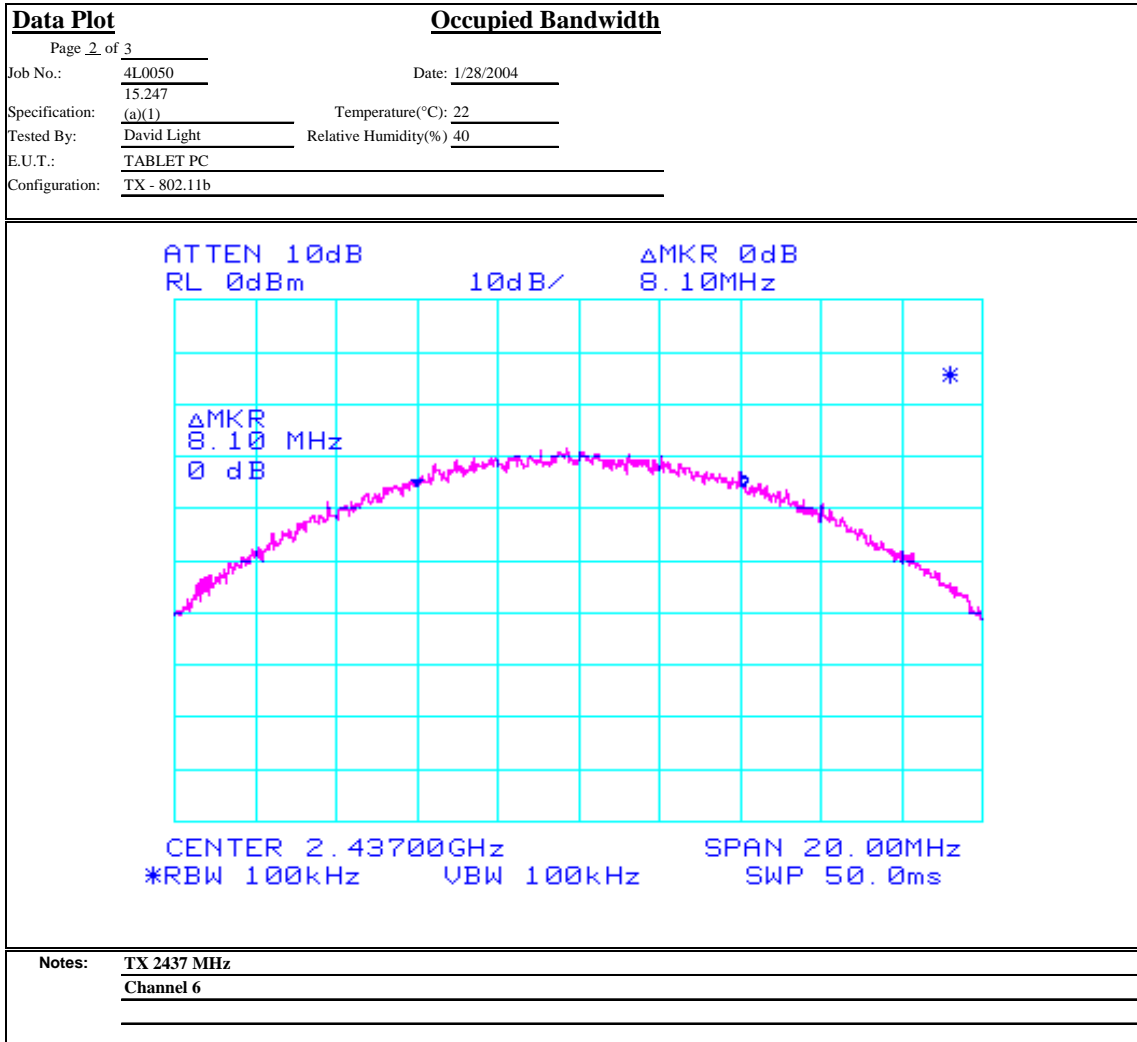
Data Plot		Occupied Bandwidth	
Page <u>1</u> of <u>3</u>		Complete <u>X</u>	
Job No.: 4L0050	Date: 1/28/2004	Preliminary: _____	
Specification: 15.247 (a)(1)	Temperature(°C): 22		
Tested By: David Light	Relative Humidity(%): 40		
E.U.T.: TABLET PC			
Configuration: TX - 802.11b			
Sample Number: 1			
Location: Lab 2	RBW: Refer to plots	Measurement	
Detector Type: Peak	VBW: Refer to plots	Distance: <u>NA</u> m	
<b>Test Equipment Used</b>			
Antenna: 802	Directional Coupler: _____		
Pre-Amp: _____	Cable #1: 1045		
Filter: _____	Cable #2: _____		
Receiver: 1464	Cable #3: _____		
Attenuator #1: _____	Cable #4: _____		
Attenuator #2: _____	Mixer: _____		
Additional equipment used: _____			
Measurement Uncertainty: <u>+/-1.7 dB</u>			
			
ATTEN 10dB RL 0dBm 10dB/ ΔMKR .83dB -8.90MHz			
CENTER 2.41200GHz *RBW 100kHz VBW 100kHz SPAN 20.00MHz SWP 50.0ms			
Notes: TX 2412 MHz			
Channel 1			



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## 802.11b

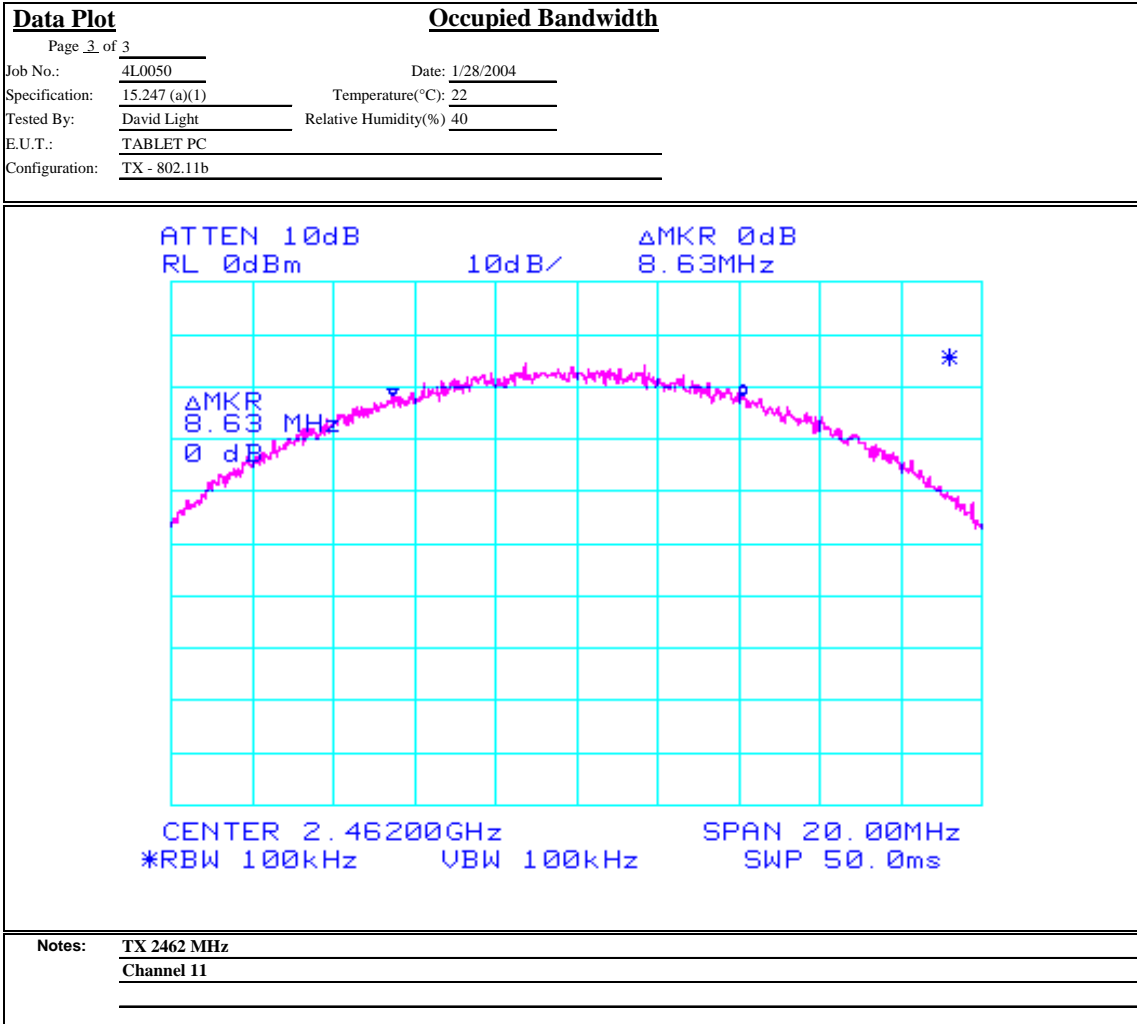




EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## 802.11b





EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth



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## Data Plot

Page 1 of 3

Job No.: 4L0050

Date: 1/28/2004

Specification: 15.247 (a)(1)

Temperature(°C): 22

Tested By: David Light

Relative Humidity(%) 40

E.U.T.: TABLET PC

Configuration: TX - Bluetooth

Sample Number: 1

Location: Lab 2

RBW: Refer to plots

Measurement

Detector Type: Peak

VBW: Refer to plots

Distance: NA m

## Test Equipment Used

Antenna: 802

Directional Coupler:

Pre-Amp:

Cable #1: 1045

Filter:

Cable #2:

Receiver: 1464

Cable #3:

Attenuator #1:

Cable #4:

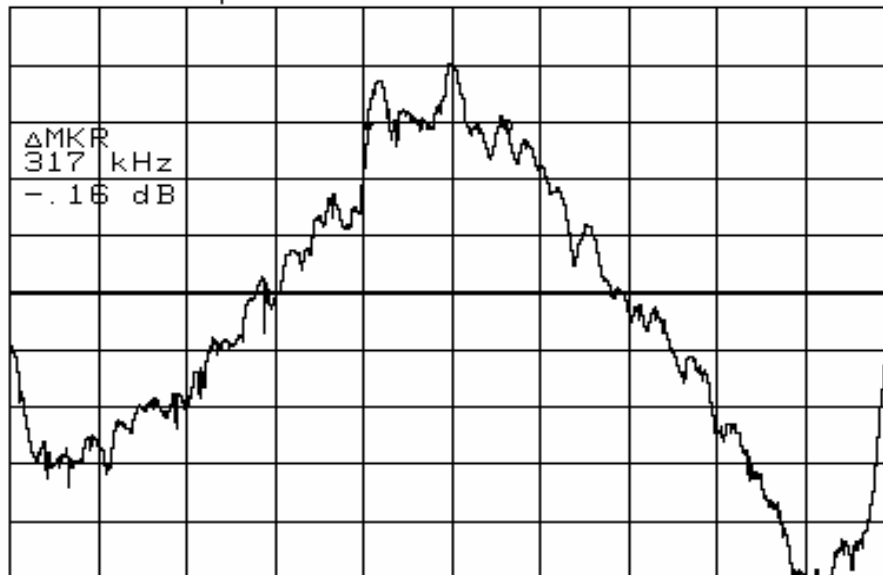
Attenuator #2:

Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB

ATTEN 10dB      ΔMKR - .16dB  
RL 107.0dBμV      5dB/      317kHz



Notes: TX 2480 MHz



EQUIPMENT: M1400 (T003)

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Bluetooth



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Fax: (972) 436-2667

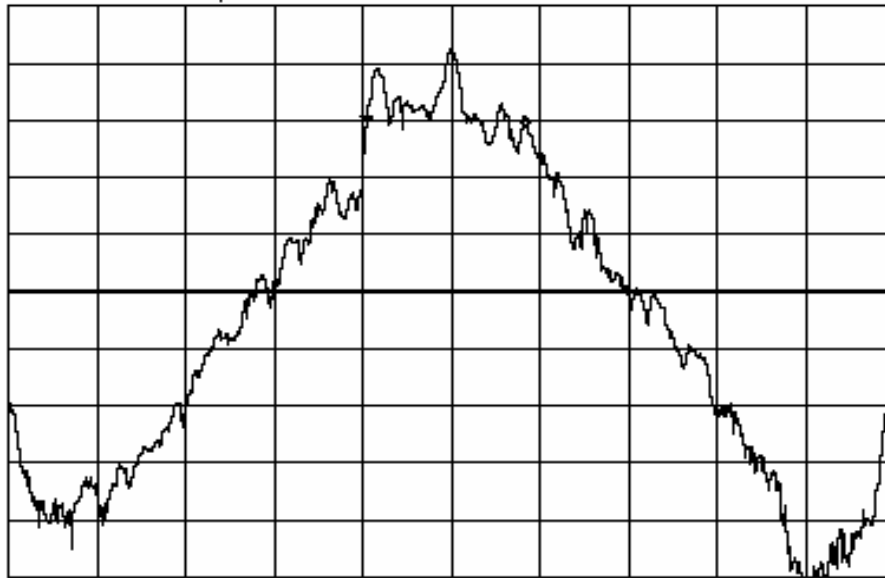
Nemko Dallas, Inc.

**Data Plot**Page 2 of 3Job No.: 4L0050Date: 1/28/2004

15.247

Specification: (a)(1)Temperature(°C): 22Tested By: David LightRelative Humidity(%) 40E.U.T.: TABLET PCConfiguration: TX - Bluetooth**Occupied Bandwidth**

ATTEN 10dB      ΔMKR - .42dB  
RL 107.0dBμV      5dB/      357kHz



CENTER 2.402000GHz      SPAN 2.000MHz  
\*RBW 30kHz      VBW 30kHz      SWP 50.0ms

Notes: TX 2402 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth



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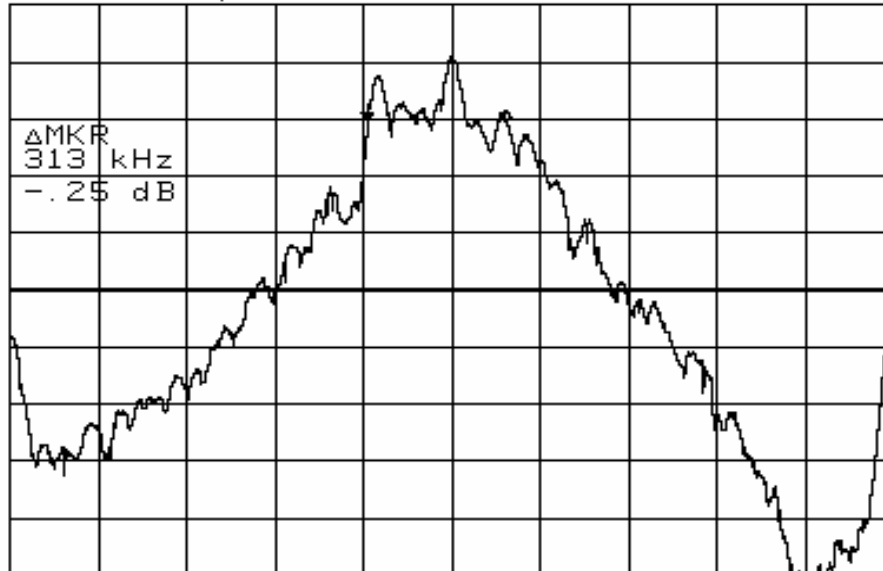
**Data Plot**

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Job No.: 4L0050 Date: 1/28/2004  
Specification: 15.247 (a)(1) Temperature(°C): 22  
Tested By: David Light Relative Humidity(%) 40  
E.U.T.: TABLET PC  
Configuration: TX - Bluetooth

**Occupied Bandwidth**

ATTEN 10dB  $\Delta$ MKR - .25dB  
RL 107.0dB $\mu$ V 5dB/ 313kHz



CENTER 2.440000GHz SPAN 2.000MHz  
\*RBW 30kHz VBW 30kHz SWP 50.0ms

Notes: TX 2440 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth



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## Data Plot

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Job No.: 4L0050 Date: 1/28/2004  
Specification: 15.247 (a)(1) Temperature(°C): 22  
Tested By: David Light Relative Humidity(%) 40  
E.U.T.: TABLET PC  
Configuration: TX - Bluetooth  
Sample Number: 1  
Location: Lab 2  
Detector Type: Peak

## Occupied Bandwidth

Complete X  
Preliminary: \_\_\_\_\_

RBW: Refer to plots  
VBW: Refer to plots

Measurement  
Distance: NA m

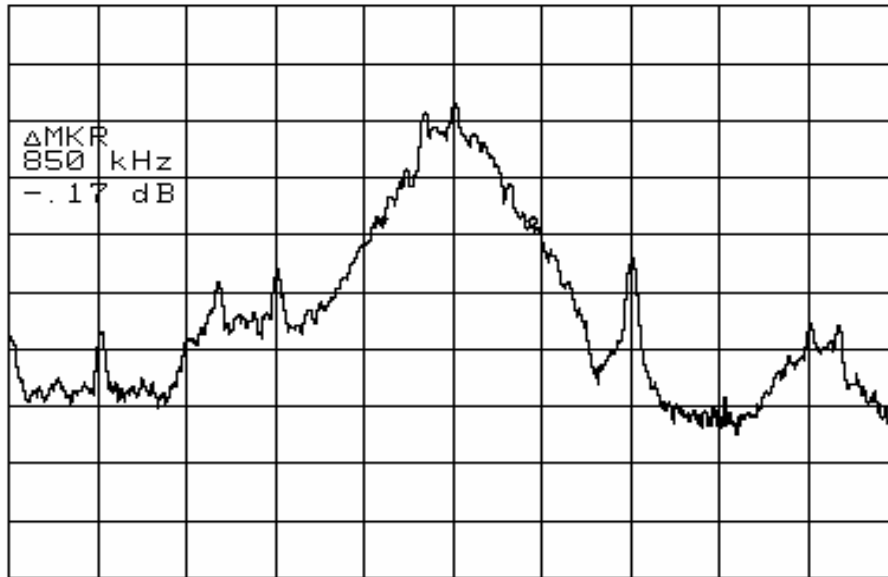
## Test Equipment Used

Antenna: 802 Directional Coupler: \_\_\_\_\_  
Pre-Amp: \_\_\_\_\_ Cable #1: 1045  
Filter: \_\_\_\_\_ Cable #2: \_\_\_\_\_  
Receiver: 1464 Cable #3: \_\_\_\_\_  
Attenuator #1: \_\_\_\_\_ Cable #4: \_\_\_\_\_  
Attenuator #2: \_\_\_\_\_ Mixer: \_\_\_\_\_  
Additional equipment used: \_\_\_\_\_  
Measurement Uncertainty: +/-1.7 dB

ATTEN 30dB  
RL 20.0dBm

10dB/

ΔMKR -.17dB  
850kHz



CENTER 2.480000GHz  
\*RBW 30kHz

VBW 30kHz

SPAN 5.000MHz  
SWP 50.0ms

Notes: TX 2480 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

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**Data Plot**

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Job No.: 4L0050

Date: 1/28/2004

15.247

Specification: (a)(1)

Temperature(°C): 22

Tested By: David Light

Relative Humidity(%) 40

E.U.T.: TABLET PC

Configuration: TX - Bluetooth

**Occupied Bandwidth**

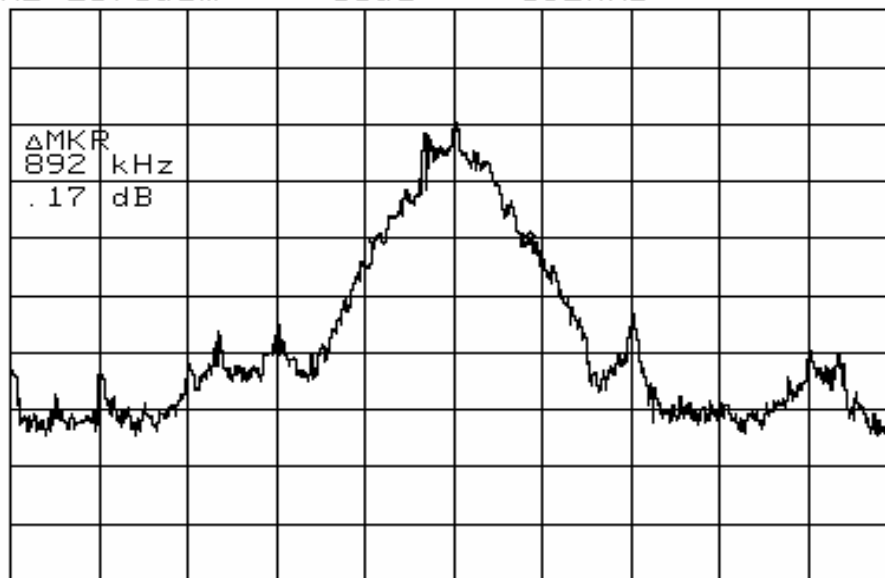
ATTEN 30dB

RL 20.0dBm

10dB/

 $\Delta$ MKR .17dB

892kHz



CENTER 2.402000GHz

SPAN 5.000MHz

\*RBW 30kHz

VBW 30kHz

SWP 50.0ms

Notes: TX 2402 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth



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**Data Plot**

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Job No.: 4L0050 Date: 1/28/2004  
Specification: 15.247 (a)(1) Temperature(°C): 22  
Tested By: David Light Relative Humidity(%) 40  
E.U.T.: TABLET PC  
Configuration: TX - Bluetooth

**Occupied Bandwidth**

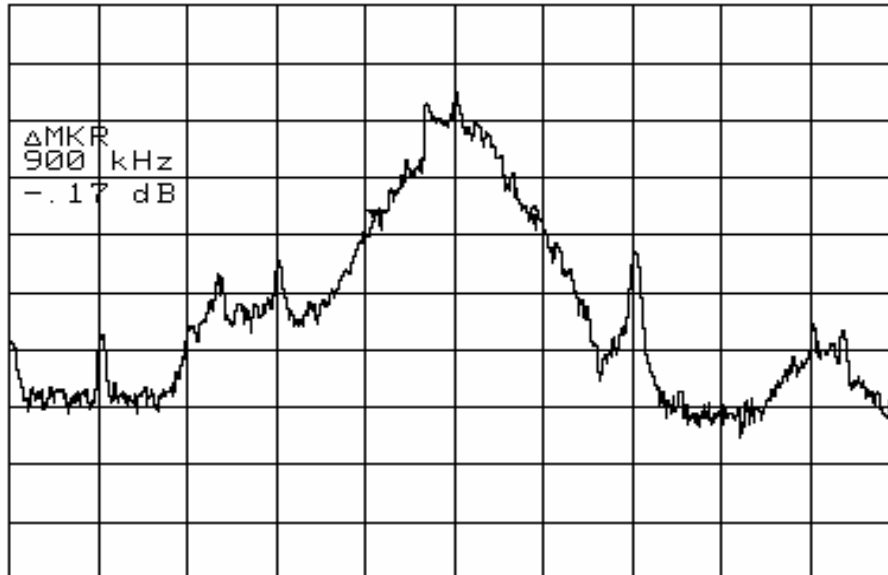
ATTEN 30dB

RL 20.0dBm

10dB/

 $\Delta MKR - .17dB$ 

900kHz



CENTER 2.440000GHz

SPAN 5.000MHz

\*RBW 30kHz

VBW 30kHz

SWP 50.0ms

Notes: TX 2440 MHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth – Channel Separation



## Dallas Headquarters:

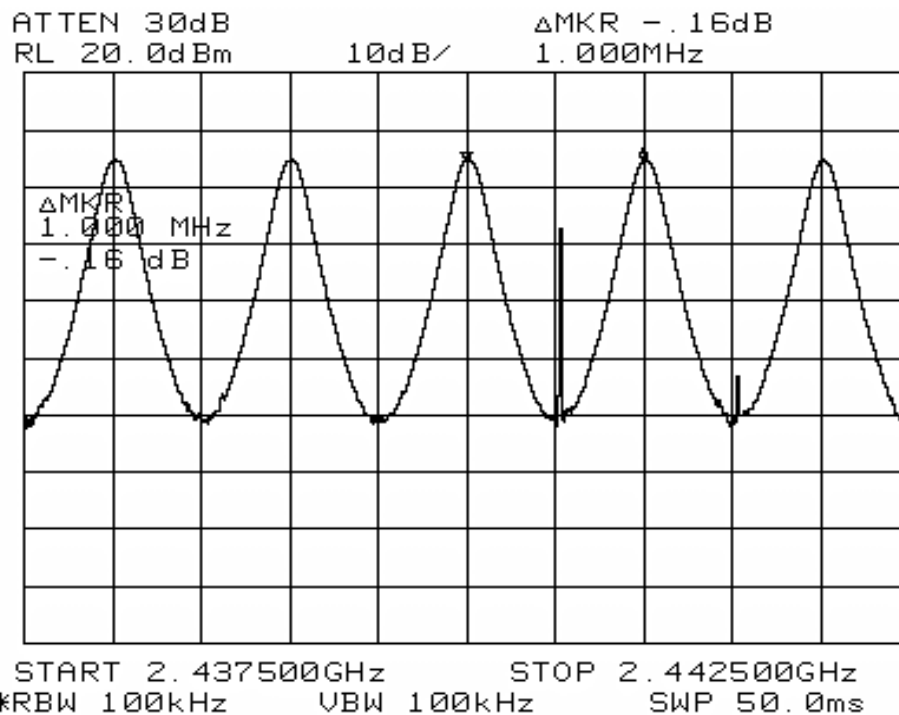
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**Test Plot:**

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Job No.:	4L0050	Date:	1/28/2004
Specification:	15.247 (a)(1)	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	TABLET PC		
Configuration:	TX - Bluetooth		



Notes: CHANNEL SEPARATION 1 MHz



EQUIPMENT: M1400 (T003)

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## Bluetooth – Number of Hopping Channels



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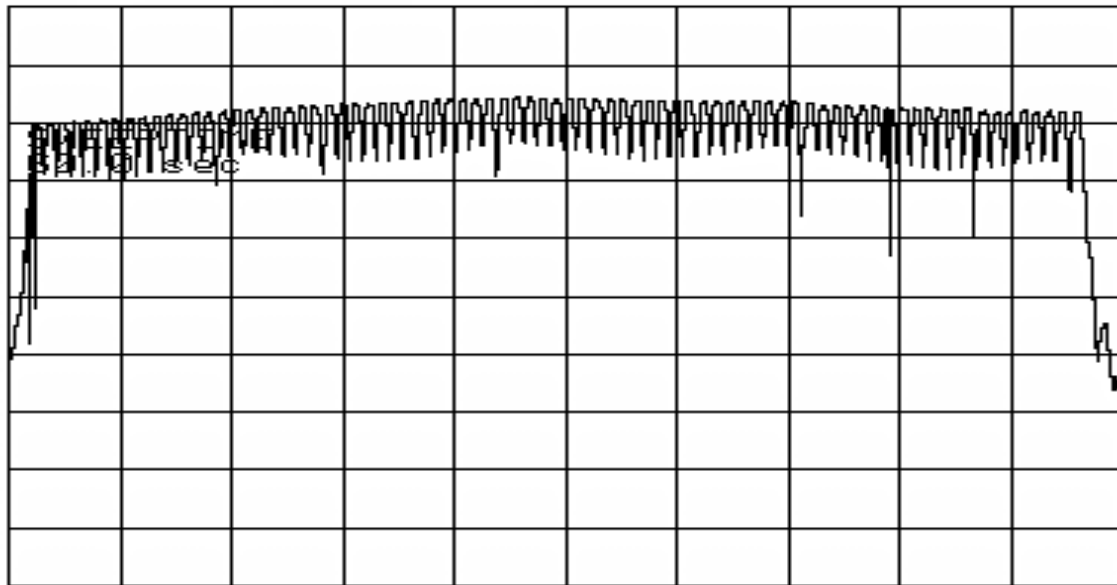
**Test Plot:**

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Job No.:	4L0050	Date:	1/28/2004
Specification:	15.247 (a)(1)	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	TABLET PC		
Configuration:	TX - Bluetooth		

ATTEN 30dB  
RL 20.0dBm

10dB/



START 2.40000GHz STOP 2.48350GHz  
\*RBW 300kHz VBW 300kHz \*SWP 60.0sec

Notes: 79 HOPPING FREQUENCIES



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Bluetooth – Time of Occupancy

**Data Plot**

Page 1 of 2

Job No.: 4L0050

Date: 2/19/2004

Specification: 15.247(a)(1)(iii)

Temperature(°C): 22

Tested By: David Light

Relative Humidity(%) 40

E.U.T.: TABLET PC W/ BLUETOOTH

Configuration: NORMAL HOPPING

Sample Number: 1

Location: Lab 2

RBW: Refer to plots

Complete x

Detector Type: Peak

VBW: Refer to plots

Preliminary: \_\_\_\_\_  
Measurement Distance: NA m**Test Equipment Used**

Antenna: 802

Directional Coupler: \_\_\_\_\_

Pre-Amp: \_\_\_\_\_

Cable #1: \_\_\_\_\_

Filter: \_\_\_\_\_

Cable #2: \_\_\_\_\_

Receiver: 1464

Cable #3: \_\_\_\_\_

Attenuator #1: \_\_\_\_\_

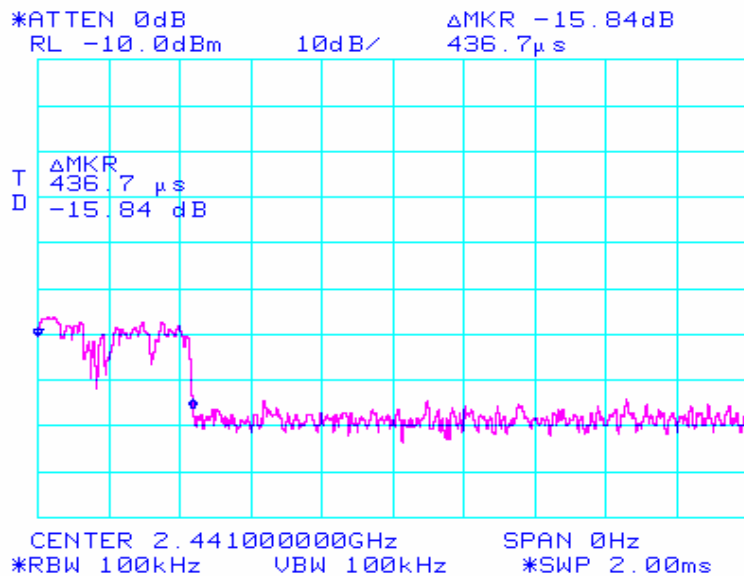
Cable #4: \_\_\_\_\_

Attenuator #2: \_\_\_\_\_

Mixer: \_\_\_\_\_

Additional equipment used: \_\_\_\_\_

Measurement Uncertainty: +/-1.7 dB



EACH PULSE = 436.7 uS

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



TEST REPORT NO.: 4L0050RUS1Rev3

[illegible]



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Section 5. Maximum Peak Output Power**

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(1)
TESTED BY: David Light	DATE: 1/29/04

**Test Results:** Complies.**Measurement Data:** Refer to attached data

Note – This test was done as a radiated measurement since the antennas for both devices are integral and there is no possibility of direct connection to the test equipment.

The measurement was repeated at +/- 15% of nominal supply voltage with no variation noted in rf power output.

Maximum Peak Power(EIRP): 64.57 mW 802.11g  
87.1 mW 802.11b  
1.86 mW Bluetooth

Antenna Gain:

802.11 Main: 3 dBi  
802.11 Aux.: 3 dBi  
Bluetooth: 1 dBi

Maximum Peak Power(Conducted):

802.11g: +18dBm – (-3dB) = **+ 21 dBm (158mW)**  
802.11b: +19.4 dBm – (-3dB) = **+22.3 dBm (170 mW)**  
Bluetooth: +2.7 dBm – (-1dB) = **+3.7 dBm (2.3 mW)**



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Test Data – Peak Power Output – 802.11g

<b>Peak Power</b>										
Page <u>1</u> of <u>2</u>						Complete <u>X</u>				
Job No.: 4L0050		Date: 1/28/04				Preliminary _____				
Specification: 15.247		Temperature(°C): <u>22</u>								
Tested By: <u>David Light</u>		Relative Humidity(%) <u>40</u>								
E.U.T.: <u>TABLET PC</u>										
Configuration: <u>TX - LYING FLAT (WORST CASE)</u>										
Sample No: <u>1</u>										
Location: <u>AC 3</u>		RBW: <u>10 MHz</u>		Measurement						
Detector Type: <u>Peak</u>		VBW: <u>10 MHz</u>		Distance: <u>3 m</u>						
<b>Test Equipment Used</b>										
Antenna: <u>1304</u>		Directional Coupler: _____								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: _____		Cable #2: <u>1485</u>								
Receiver: <u>1464</u>		Cable #3: _____								
Attenuator #1: _____		Cable #4: _____								
Attenuator #2: _____		Mixer: _____								
Additional equipment used: _____										
Measurement Uncertainty: <u>+/-0.7 dB</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
										802.11 w/BT Tx ON
2412	2.0	34.2		33	8.9		12.1	16.09	V	
2412	4.3	37.0		33	8.9		17.2	52.48	H	
2437	3.0	34.2		33	8.9		13.1	20.26	V	
2437	5.2	37.0		33	8.9		18.1	64.57	H	
2462	1.5	34.2		33	8.9		11.6	14.34	V	
2462	3.5	37.0		33	8.9		16.4	43.65	H	
<b>Notes: The device was tested on three axis'</b> The device was tested at +/- 15% supply voltage with no effect on power output										



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Test Data – Peak Power – 802.11b

<b>Peak Power</b>										
Page <u>1</u> of <u>2</u>							Complete <u>X</u>			
Job No.: 4L0050		Date: 1/28/04					Preliminary _____			
Specification: 15.247		Temperature(°C): <u>22</u>								
Tested By: <u>David Light</u>		Relative Humidity(%) <u>40</u>								
E.U.T.: <u>TABLET PC</u>										
Configuration: <u>TX - LYING FLAT (WORST CASE) 802.11b</u>										
Sample No: <u>1</u>										
Location: <u>AC 3</u>		RBW: <u>NA</u>		Measurement Distance: <u>3</u> m						
Detector Type: <u>Peak</u>		VBW: <u>NA</u>								
<b>Test Equipment Used</b>										
Antenna: <u>1304</u>		Directional Coupler: _____								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: _____		Cable #2: <u>1485</u>								
Receiver: <u>1464</u>		Cable #3: _____								
Attenuator #1: _____		Cable #4: _____								
Attenuator #2: _____		Mixer: _____								
Additional equipment used: <u>1029-1030</u> Measurement was made with a peak power meter										
Measurement Uncertainty: <u>+/-0.7 dB</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
										802.11b w/BT Tx On
2412	5.0	34.2		33	8.9		15.1	32.11	V	
2412	6.5	37.0		33	8.9		19.4	87.10	H	
2437	4.0	34.2		33	8.9		14.1	25.51	V	
2437	6.0	37.0		33	8.9		18.9	77.62	H	
2462	4.5	34.2		33	8.9		14.6	28.62	V	
2462	5.9	37.0		33	8.9		18.8	75.86	H	
<b>Notes: The device was tested on three axis'</b> The device was tested at +/- 15% supply voltage with no effect on power output										



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Test Data – Peak Power - Bluetooth



## Dallas Headquarters:

802 N. Kealy  
Lewisville, TX 75057  
Tel: (972) 436-9600  
Fax: (972) 436-2667

**EIRP Substitution Method**

Page 1 of 2

Job No.: 4L0050 Date: 1/28/04  
Specification: 15.247 Temperature(°C): 22  
Tested By: David Light Relative Humidity(%) 40  
E.U.T.: TABLET PC  
Configuration: TX - LYING FLAT (WORST CASE)  
Sample No: 1  
Location: AC 3 RBW: 1 MHz  
Detector Type: Peak VBW: 1 MHz

Complete X  
Preliminary       

Measurement  
Distance: 3 m

**Test Equipment Used**

Antenna: 1304 Directional Coupler:         
Pre-Amp: 1016 Cable #1: 1484  
Filter:        Cable #2: 1485  
Receiver: 1464 Cable #3:         
Attenuator #1:        Cable #4:         
Attenuator #2:        Mixer:         
Additional equipment used:         
Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
										Bluetooth
2402	-15.0	34.2		33	8.9		-4.9	0.32	V	
2402	-14.5	37.0		33	8.9		-1.6	0.69	H	
2441	-13.2	34.2		33	8.9		-3.1	0.49	V	
2441	-10.7	37.0		33	8.9		2.2	1.66	H	
2480	-13.5	34.2		33	8.9		-3.4	0.45	V	
2480	-10.2	37.0		33	8.9		2.7	1.86	H	

Notes: The device was tested on three axis'

The device was tested at +/- 15% supply voltage with no effect on power output



*EQUIPMENT:* M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

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**Section 6. RF Exposure**

NAME OF TEST: RF Exposure	PARA. NO.: 15.247(b)(4)
TESTED BY:	DATE:

**Test Results:** [Please refer to SAR report for body SAR results.](#)

**Measurement Data:**



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*EQUIPMENT:* M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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**Section 7. Spurious Emissions (radiated)**

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247 (c)
TESTED BY: David Light	DATE: 1/29/04

**Test Results:** Complies.**Measurement Data:** See attached table.

Testing in the restricted bands for using the 802.11x devices found that the g modulation was worst case. Only noise floor measurements were taken and the g modulation was worse at the upper band edge due to channel bandwidth.



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Radiated Emissions – 802.11g**

<b>Radiated Emissions</b>								
Page <u>1</u> of <u>2</u>								
Job No.: 4L0050		Date: 1/29/2004						
Specification: 15.247/15.205		Temperature(°C): <u>20</u>						
Tested By: David Light		Relative Humidity(%) <u>50</u>						
E.U.T.: TABLET PC								
Configuration: TX - UPRIGHT ON LONGER EDGE (WORST CASE) 802.11 w/BT Tx ON								
Sample Number: 1								
Location: AC 3		RBW: 1 MHz						
Detector Type: Peak		VBW: 1 MHz						
<b>Test Equipment Used</b>								
Antenna: 1304		Directional Coupler: #N/A						
Pre-Amp: 1016		Cable #1: 1484						
Filter: 1482		Cable #2: 1485						
Receiver: 1464		Cable #3: #N/A						
Attenuator #1: #N/A		Cable #4: #N/A						
Attenuator #2: #N/A		Mixer: #N/A						
Measurement Uncertainty: +/- 3.6 dB								
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
4.824	37.0	33.9	4.1	33.1	41.9	74	54	Peak - NF / Vertical
7.236	38.0	35.8	5.2	32.8	46.2	74	54	Peak - NF / Vertical
9.648	40.0	37.3	5.2	34.5	48.0	74	54	Peak - NF / Vertical
12.060	41.0	40.0	6.8	34.7	53.1	74	54	Peak - NF / Vertical
14.472	35.4	41.8	7.2	33.5	50.9	74	54	Peak - NF / Vertical
4.824	37.0	33.9	4.1	33.1	41.9	74	54	Peak - NF / Horizontal
7.236	38.0	35.8	5.2	32.8	46.2	74	54	Peak - NF / Horizontal
9.648	40.0	37.3	5.2	34.5	48.0	74	54	Peak - NF / Horizontal
12.060	41.0	40.0	6.8	34.7	53.1	74	54	Peak - NF / Horizontal
14.472	35.4	41.8	7.2	33.5	50.9	74	54	Peak - NF / Horizontal
4.874	39.2	33.9	4.1	33.1	44.1	74	54	Peak - NF / Vertical
7.311	38.3	35.8	5.2	32.8	46.5	74	54	Peak - NF / Vertical
9.748	43.7	37.3	5.2	34.5	51.7	74	54	Peak - NF / Vertical
12.185	38.7	40.0	6.8	34.7	50.8	74	54	Peak - NF / Vertical
14.622	38.2	41.8	7.2	33.5	53.7	74	54	Peak - NF / Vertical
4.874	39.2	33.9	4.1	33.1	44.1	74	54	Peak - NF / Horizontal
7.311	38.3	35.8	5.2	32.8	46.5	74	54	Peak - NF / Horizontal
9.748	43.7	37.3	5.2	34.5	51.7	74	54	Peak - NF / Horizontal
12.185	38.7	40.0	6.8	34.7	50.8	74	54	Peak - NF / Horizontal
14.622	38.2	41.8	7.2	33.5	53.7	74	54	Peak - NF / Horizontal



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Radiated Emissions – 802.11g (cont.)**

<div style="display: flex; justify-content: space-between;"> <div> Page <u>2</u> of <u>2</u>  Job No.:  Specification: 15.247/15.205  Tested By: #N/A  E.U.T.: TABLET PC  Configuration: TX - UPRIGHT ON LONGER EDGE (WORST CASE) 802.11 w/BT Tx ON </div> <div> <b><u>Radiated Spurious Emissions</u></b>  <b>Continuation Page</b>  Date: 1/30/2004  Temperature(°C): 22  Relative Humidity(%) 40 </div> </div>								
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
2.4835	34.8	28.2	3.0	0.0	66.0	74	54	Peak / Horizontal
2.4835	17.0	28.2	3.0	0.0	48.2	74	54	Avg / Horizontal
4.924	40.0	33.9	4.1	33.1	44.9	74	54	Peak - NF / Horizontal
7.386	39.5	35.8	5.2	32.8	47.7	74	54	Peak - NF / Horizontal
9.848	39.8	37.3	5.2	34.5	47.8	74	54	Peak - NF / Horizontal
12.310	41	40.0	6.8	34.7	53.1	74	54	Peak - NF / Horizontal
14.772	37.6	41.8	7.2	33.5	53.1	74	54	Peak - NF / Horizontal
2.4835	33.0	28.2	3.0	0.0	64.2	74	54	Peak / Vertical
2.4835	17.4	28.2	3.0	0.0	48.6	74	54	Avg / Horizontal
4.924	40.0	33.9	4.1	33.1	44.9	74	54	Peak - NF / Vertical
7.386	39.5	35.8	5.2	32.8	47.7	74	54	Peak - NF / Vertical
9.848	39.8	37.3	5.2	34.5	47.8	74	54	Peak - NF / Vertical
12.31	41	40.0	6.8	34.7	53.1	74	54	Peak - NF / Vertical
14.772	37.6	41.8	7.2	33.5	53.1	74	54	Peak - NF / Vertical
Notes:	The spectrum was searched to 25 GHz							
	The device was tested on three axis'							
	The device was tested at 2.412, 2.437 and 2.462 MHz							



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Radiated Emissions – Bluetooth**

<b>Radiated Emissions</b>								
Page <u>1</u> of <u>2</u>								
Job No.: 4L0050		Date: 1/28/2004						
Specification: 15.247/15.205		Temperature(°C): <u>22</u>						
Tested By: David Light		Relative Humidity(%) <u>40</u>						
E.U.T.: TABLET PC								
Configuration: TX - LYING FLAT (WORST CASE) Bluetooth								
Sample Number: 1								
Location: AC 3		RBW: 1 MHz						
Detector Type: Peak		VBW: 1 MHz						
<b>Test Equipment Used</b>								
Antenna: 1304		Directional Coupler: #N/A						
Pre-Amp: 1016		Cable #1: 1484						
Filter: 1482		Cable #2: 1485						
Receiver: 1464		Cable #3: #N/A						
Attenuator #1: #N/A		Cable #4: #N/A						
Attenuator #2: #N/A		Mixer: #N/A						
Measurement Uncertainty: +/- 3.6 dB								
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
4.804	38.1	33.9	4.1	33.1	43.0	74	54	Peak - NF / Vertical
7.206	38.7	35.8	5.2	32.8	46.9	74	54	Peak - NF / Vertical
9.608	40.7	37.3	5.2	34.5	48.7	74	54	Peak - NF / Vertical
12.010	41.5	40.0	6.8	34.7	53.6	74	54	Peak - NF / Vertical
14.412	38.1	41.8	7.2	33.5	53.6	74	54	Peak - NF / Vertical
4.804	38.1	33.9	4.1	33.1	43.0	74	54	Peak - NF / Horizontal
7.206	38.7	35.8	5.2	32.8	46.9	74	54	Peak - NF / Horizontal
9.608	40.7	37.3	5.2	34.5	48.7	74	54	Peak - NF / Horizontal
12.010	41.5	40.0	6.8	34.7	53.6	74	54	Peak - NF / Horizontal
14.412	38.1	41.8	7.2	33.5	53.6	74	54	Peak - NF / Horizontal
4.880	38.3	33.9	4.1	33.1	43.2	74	54	Peak - NF / Vertical
7.320	39.1	35.8	5.2	32.8	47.3	74	54	Peak - NF / Vertical
9.760	40.0	37.3	5.2	34.5	48.0	74	54	Peak - NF / Vertical
12.200	42.3	40.0	6.8	34.7	54.4	74	54	Peak - NF / Vertical
12.200	31.0	40.0	6.8	34.7	43.1	74	54	Avg - NF / Vertical
14.640	37.8	41.8	7.2	33.5	53.3	74	54	Peak - NF / Vertical
4.880	38.3	33.9	4.1	33.1	43.2	74	54	Peak - NF / Horizontal
7.320	39.1	35.8	5.2	32.8	47.3	74	54	Peak - NF / Horizontal
9.760	40.0	37.3	5.2	34.5	48.0	74	54	Peak - NF / Horizontal
12.200	42.3	40.0	6.8	34.7	54.4	74	54	Peak - NF / Horizontal
12.200	31.0	40.0	6.8	34.7	43.1	74	54	Avg - NF / Horizontal
14.640	37.8	41.8	7.2	33.5	53.3	74	54	Peak - NF / Horizontal



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

**Radiated Emissions – Bluetooth (cont.)**

<div style="display: flex; justify-content: space-between;"> <div> Page <u>2</u> of <u>2</u>  Job No.:  Specification: 15.247/15.205  Tested By: #N/A  E.U.T.: TABLET PC  Configuration: TX - LYING FLAT (WORST CASE) Bluetooth </div> <div> <b><u>Radiated Spurious Emissions</u></b>  <b>Continuation Page</b>  Date: 1/30/2004  Temperature(°C): <u>22</u>  Relative Humidity(%) <u>40</u> </div> </div>								
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
2.4835	52.8	28.2	3.0	33.0	51.0	74	54	Peak / Horizontal
4.960	37.7	33.9	4.1	33.1	42.6	74	54	Peak - NF / Horizontal
7.440	41.1	35.8	5.2	32.8	49.3	74	54	Peak - NF / Horizontal
9.920	41.5	37.3	5.2	34.5	49.5	74	54	Peak - NF / Horizontal
12.400	39.3	40.0	6.8	34.7	51.4	74	54	Peak - NF / Horizontal
14.880	37.1	41.8	7.2	33.5	52.6	74	54	Peak - NF / Horizontal
2.4835	51.3	28.2	3.0	33.0	49.5	74	54	Peak / Vertical
4.960	37.7	33.9	4.1	33.1	42.6	74	54	Peak - NF / Vertical
7.44	41.1	35.8	5.2	32.8	49.3	74	54	Peak - NF / Vertical
9.920	41.5	37.3	5.2	34.5	49.5	74	54	Peak - NF / Vertical
12.4	39.3	40.0	6.8	34.7	51.4	74	54	Peak - NF / Vertical
14.880	37.1	41.8	7.2	33.5	52.6	74	54	Peak - NF / Vertical
Notes:	The spectrum was searched to 25 GHz							
	The device was tested on three axis'							
	The device was tested at 2.402, 2.440 and 2.480 MHz							



**Radiated Photographs**





**Radiated Photographs**





**Radiated Photographs**





*EQUIPMENT:* M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

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**Section 8. Peak Power Spectral Density**

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(d)
TESTED BY: David Light	DATE: 1/29/04

**Test Results:** Complies.

**Measurement Data:** See attached data. This measurement was made radiated.



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Peak Power Spectral Density

<b>Spectral Density</b>										
Page <u>1</u> of <u>2</u>								Complete <u>X</u>		
Job No.: <u>4L0050</u>		Date: <u>1/28/04</u>						Preliminary <u>          </u>		
Specification: <u>15.247</u>		Temperature(°C): <u>22</u>								
Tested By: <u>David Light</u>		Relative Humidity(%) <u>40</u>								
E.U.T.: <u>TABLET PC</u>								RBW 3 kHz		
Configuration: <u>TX - LYING FLAT (WORST CASE) 802.11</u>								VBW 3 kHz		
Sample No: <u>1</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
										SPECTRAL DENSITY
2412	-31.0	34.2		33	8.9		-20.9	0.01	V	
2412	-26.0	37.0		33	8.9		-13.1	0.048978	H	
2437	-27.0	34.2		33	8.9		-16.9	0.020261	V	
2437	-23.0	37.0		33	8.9		-10.1	0.097724	H	
2462	-19.0	34.2		33	8.9		-8.9	0.13	V	
2462	-25.0	37.0		33	8.9		-12.1	0.061660	H	
Notes: <u>The device was tested on three axis'</u>										



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

## Section 9. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	Cal B4 Use	N/A
545	LISN	Schwarz Beck 8120	8120350	08/01/03	07/31/04
704	FILTER, HIGH PASS, 5 KHz	SOLAR 7930-5.0	933126	02/05/04	02/04/05
1038	CABLE, .5m	KTL RG223	N/A	06/18/03	06/17/04
1988	CABLE, 6.8m	KTL RG223	N/A	07/02/03	07/01/04
1283	Spectrum analyzer display	Hewlett Packard 85662A	1811A00223	12/19/03	12/18/04
966	Receiver	Rohde & Schwartz ESH2	880370/029	09/17/03	09/16/04
1193	LIMITER	FISCHER FCC-450B-1.25N	956	02/24/03	02/24/04
760	Antenna biconical	Electro Metrics MFC-25	477	06/05/03	06/04/04
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	06/09/03	06/08/04
1522	Cable Assy, LAB 5 - D OATS	KTL Site D OATS	N/A	03/28/03	03/27/04
1289	AMPLIFIER, RF	ICC LN1-5	421	09/10/03	09/09/04
1283	Spectrum analyzer display	Hewlett Packard 85662A	1811A00223	12/19/03	12/18/04
991	Horn antenna	EMCO 3160-10	9704-1049	CNR	N/A
983	PRE-AMP, 18-40 GHz	KTL BB1	1	09/18/03	09/17/04



## **ANNEX A - TEST DETAILS**



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Powerline Conducted Emissions

PARA. NO.: 15.207(a)

**Minimum Standard:** §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.



*EQUIPMENT:* M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

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NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)
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**Minimum Standard:** The minimum 6 dB bandwidth shall be at least 500 kHz



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Maximum Peak Output Power

PARA. NO.: 15.247(b)(1)

**Minimum Standard:** The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

**Direct Measurement Method For Detachable Antennas:**

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

**Substitution Antenna Method for Integral Antennas:**

The peak field strength of the carrier is measured in a worst-case configuration with a RBW > 5 times the occupied bandwidth of the transmitted waveform. For cases where the RBW of the test instrument is not sufficient, the power is measured using a peak power meter instead of the spectrum analyzer.

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom



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*EQUIPMENT:* M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)
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**Minimum Standard:**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

NAME OF TEST: Pseudorandom Hopping Algorithm	PARA. NO.: 15.247(a)(1)
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**Minimum Standard:**

The system shall hop to channel frequencies that are selected from a pseudo-randomly ordered list of hopping frequencies. Each frequency must be used equally on average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their transmitters and shall shift frequencies in synchronization with the transmitted signals.



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Time of Occupancy

PARA. NO.: 15.247(a)(1)(ii)

**Minimum Standard:**

Frequency Band (MHz)	20 dB Bandwidth	No. of Hopping Channels	Average Time of Occupancy
902 - 928	<250 kHz	50	=<0.4 sec. in 20 sec.
902 – 928	=>250 kHz	25	=<0.4 sec. in 10 sec.
2400 – 2483.5	-----	75	=<0.4 sec. in 30 sec.
5725 – 5850	-----	75	=<0.4 sec. in 30 sec.

**Method Of Measurement:**

The spectrum analyzer is set as follows:

RBW: 1 MHz

VBW: = RBW

Span: 0 Hz

LOG dB/div.: 10 dB

Sweep: Sufficient to see one hop time sequence.

Trigger: Video

The occupancy time of one hop is measured as above. The average time of occupancy is calculated over the appropriate period of time from above table (10, 20, or 30 seconds).

Avg. time of occupancy = (period from table/duration of one hop)/no. of channels multiplied by the duration of one hop.

For instance:

If a 2.4 GHz system has a measured hop duration time of 1 msec. and uses 75 channels, then the average time of occupancy would be:

$(30 \text{ sec.} / .001 \text{ sec.}) / 75 \text{ chan.} = 400 \times 1 \text{ msec.} = 400 \text{ msec. or } 0.4 \text{ sec. in } 30 \text{ sec.}$



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 15.247(a)(2)

**Minimum Standard:**

Frequency Band (MHz)	Maximum 20 dB Bandwidth
902 - 928	500 kHz
2400 – 2483.5	1 MHz
5725 – 5850	1 MHz

**Method Of Measurement:**

The spectrum analyzer is set as follows:

RBW: At least 1% of span/div.

VBW: >RBW

Span: Sufficient to display 20 dB bandwidth

LOG dB/div.: 10 dB

Sweep: Auto

**Number of channels tested:**

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom



*EQUIPMENT:* M1400 (T003)TEST REPORT NO.: 4L0050RUS1Rev3

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NAME OF TEST: RF Exposure

PARA. NO.: 15.247(b)(4)

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**Minimum Standard:**

Systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines stipulated in 1.1307(b)(1) of CFR 47.



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Spurious Emissions(conducted)

PARA. NO.: 15.247(c)

**Minimum Standard:**

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength 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

**THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.**

**Method Of Measurement:**

30 MHz - 10th harmonic plot

RBW: 100 kHz

VBW: 300 kHz

Sweep: Auto

Display line: -20 dBc

Lower Band Edge

RBW: At least 1% of span/div.

VBW: &gt;RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz

Marker: Peak of fundamental emission

Marker  $\Delta$ : Peak of highest spurious level below center frequency.Upper Band Edge

RBW: At least 1% of span/div.

VBW: &gt;RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz

Marker: Peak of fundamental emission

Marker  $\Delta$ : Peak of highest spurious level above center frequency.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(c)

**Minimum Standard:** In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

**Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength 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

**THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC**

#### **15.205 Restricted Bands**

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom



EQUIPMENT: M1400 (T003)

TEST REPORT NO.: 4L0050RUS1Rev3

NAME OF TEST: Transmitter Power Density

PARA. NO.: 15.247(d)

**Minimum Standard:** The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

**Method Of Measurement:** The spectrum analyzer is set as follows:

RBW: 3 kHz

VBW: &gt;3 kHz

Span: =&gt; measured 6 dB bandwidth

Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is  $1500/3 = 500$  sec.

LOG dB/div.: 2 dB

**Note:** For devices with spectrum line spacing  $\leq 3$  kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

**For Devices With Integral Antenna:**

For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

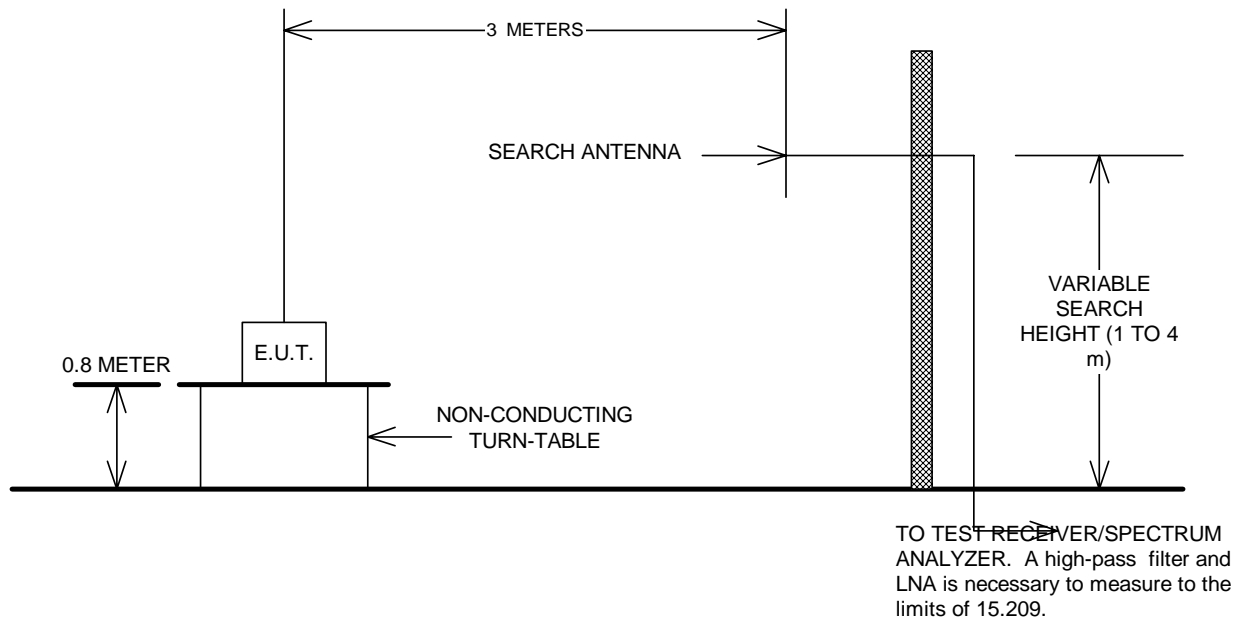
Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom



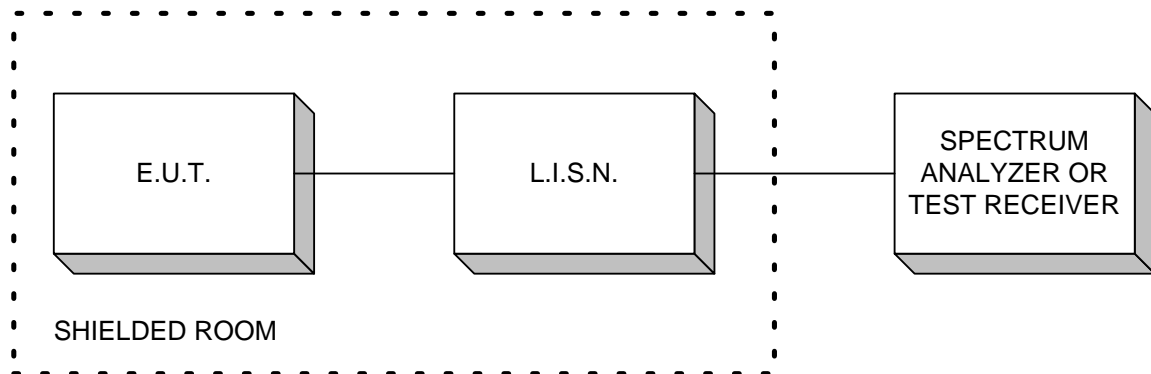
**ANNEX B - TEST DIAGRAMS**



## Test Site For Radiated Emissions

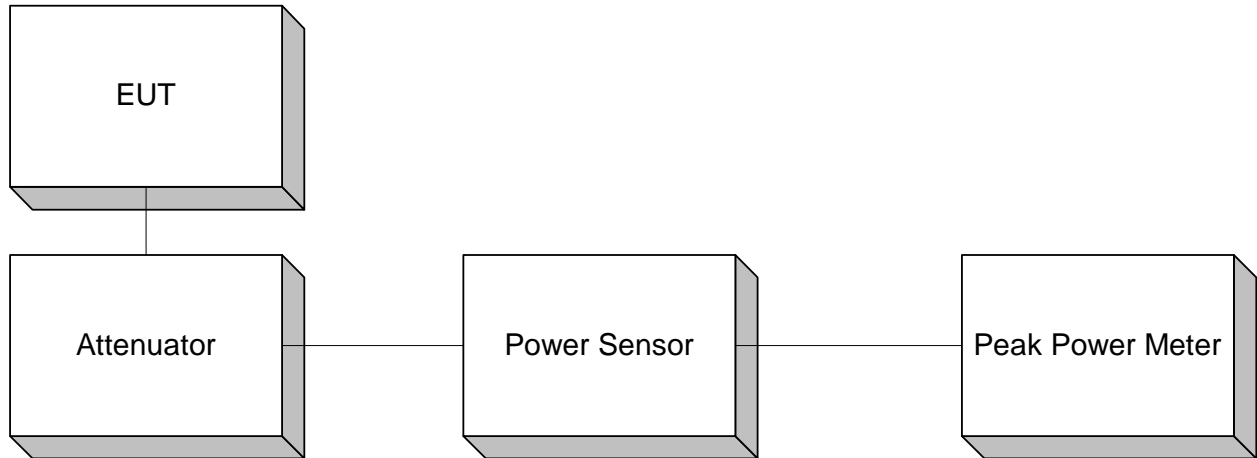


## Conducted Emissions





**Peak Power At Antenna Terminals**



**Minimum 6 dB Bandwidth  
Peak Power Spectral Density  
Spurious Emissions (conducted)**

