



Nemko

Test Report: 3W07081, Issue 2


Applicant: VTech Engineering Canada Ltd.
Suite 200 – 7671 Alderbridge Way
Richmond, B.C., Canada
V6X 1Z9

**Equipment Under Test:
(EUT)** VTECH 2625
2.4GHz FHSS Cordless Telephone

FCC ID: EW780-5312-00

In Accordance With: **FCC Part 15, Subpart C**
Frequency Hopping Transmitters

Tested By: Nemko Canada Inc.
303 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By: 
Russell Grant, Senior Technical Assessor

Date: 24 July 2003

Total Number of Pages: 52

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

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EQUIPMENT: VTECH 2625, 2.4 GHz
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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 15.247 for Frequency Hopping 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.

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".



TESTED BY: _____
Glen Westwell, Wireless Technologist

DATE: 17 July 2003

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This report applies only to the items tested.

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Summary Of Test Data

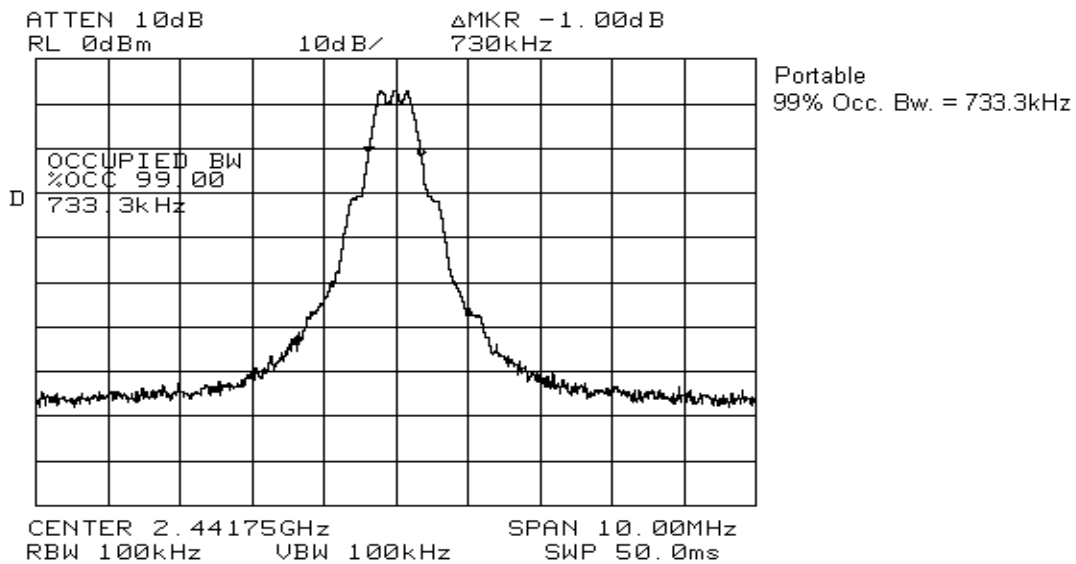
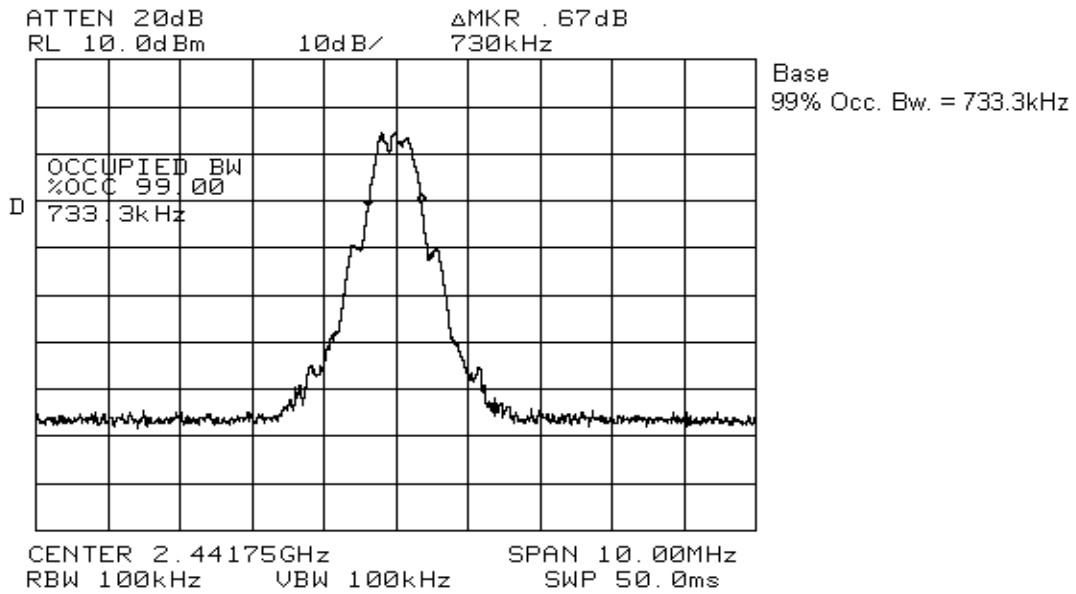
Name Of Test	Para. No.	Result
Powerline Conducted Emissions	15.207(a)	Complied
Channel Separation	15.247(a)(1)	Complied
Time of Occupancy	15.247(a)(1)(iii)	Complied
20 dB Occupied Bandwidth	15.247(a)(1)	Complied
Number of Hopping Channels	15.247(a)(1)(iii)	Complied
Peak Power Output	15.247(b)(1)	Complied
Spurious Emissions	15.247(c)	Complied

Test Conditions:

Indoor Temperature: 22°C
 Humidity: 52%

Outdoor Temperature: 27°C
 Humidity: 53%

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone



EQUIPMENT: VTECH 2625, 2.4 GHz
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Section 3. Powerline Conducted Emissions

Para. No.: 15.207 (a)

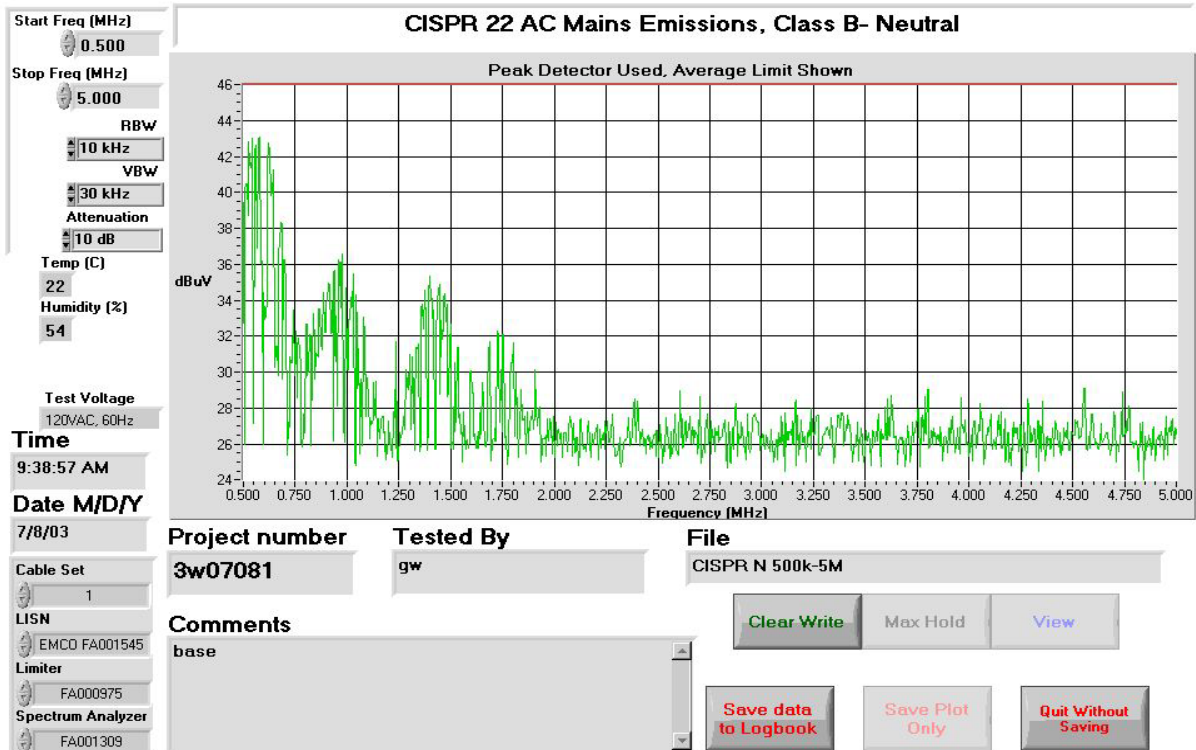
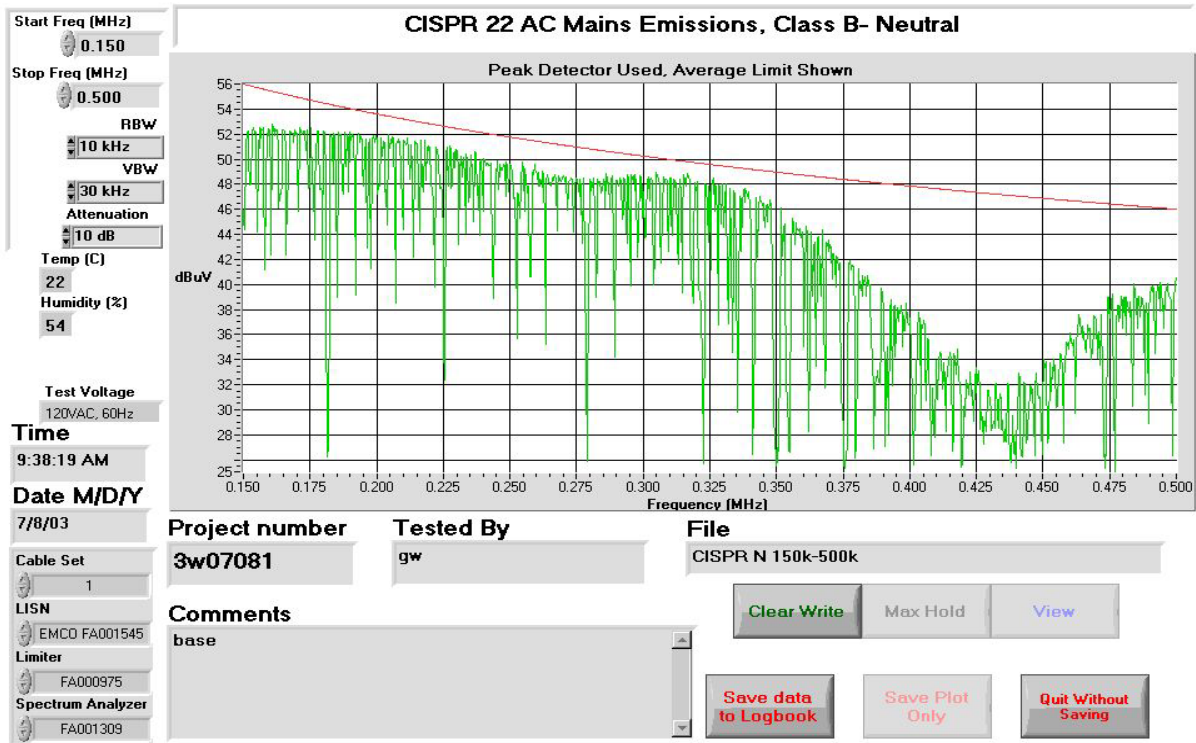
Test Performed By: Glen Westwell	Date of Test: 9 July 2003
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Test Results: Complied

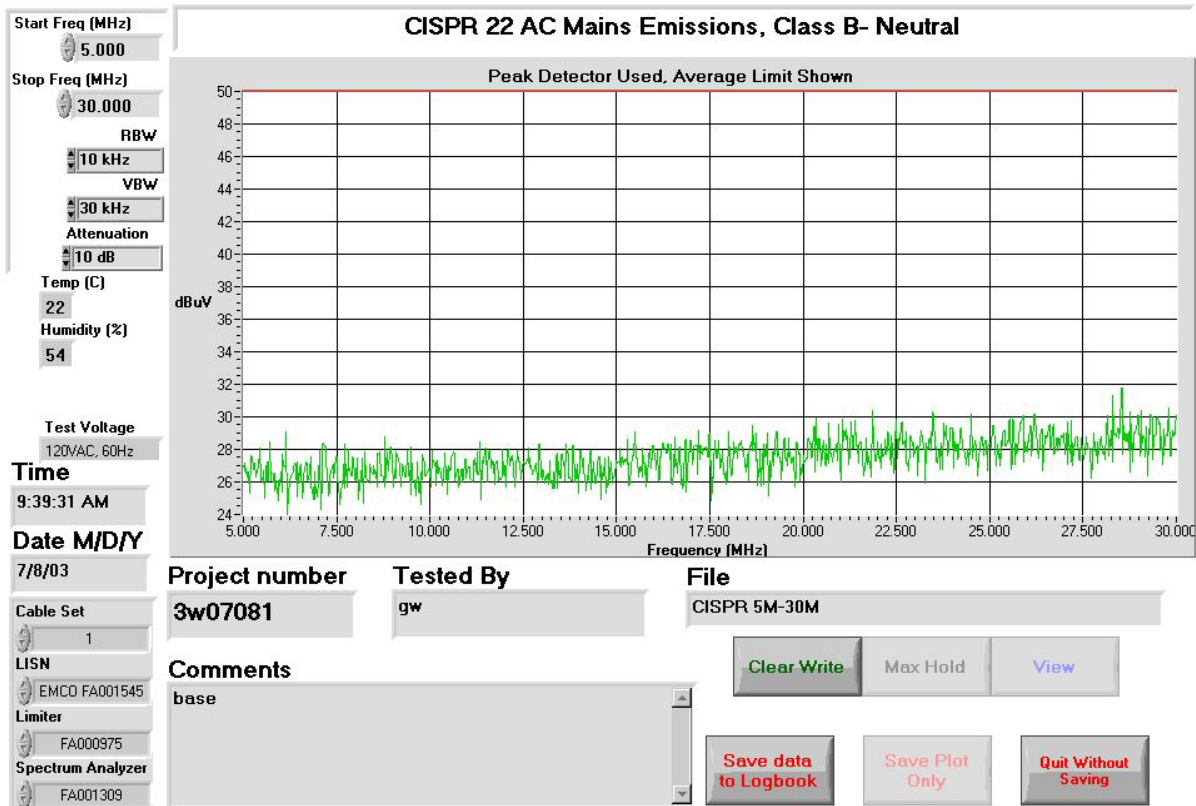
Measurement Data: See attached plots(s).

EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

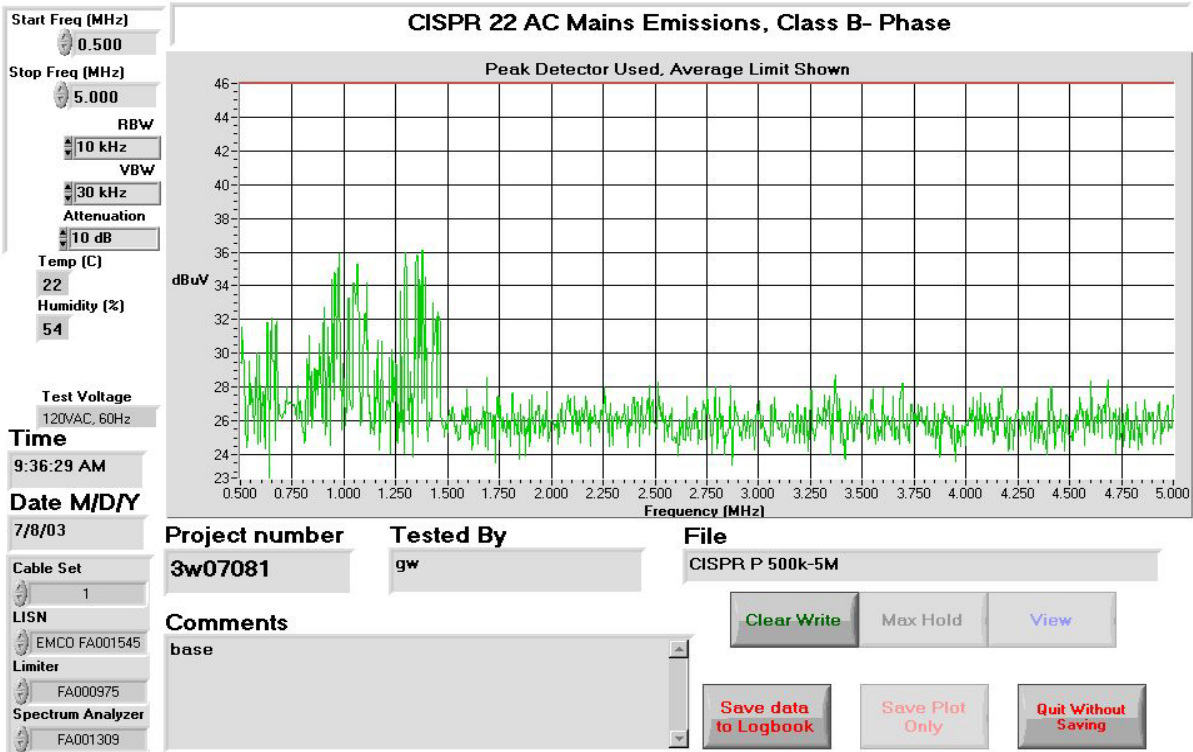
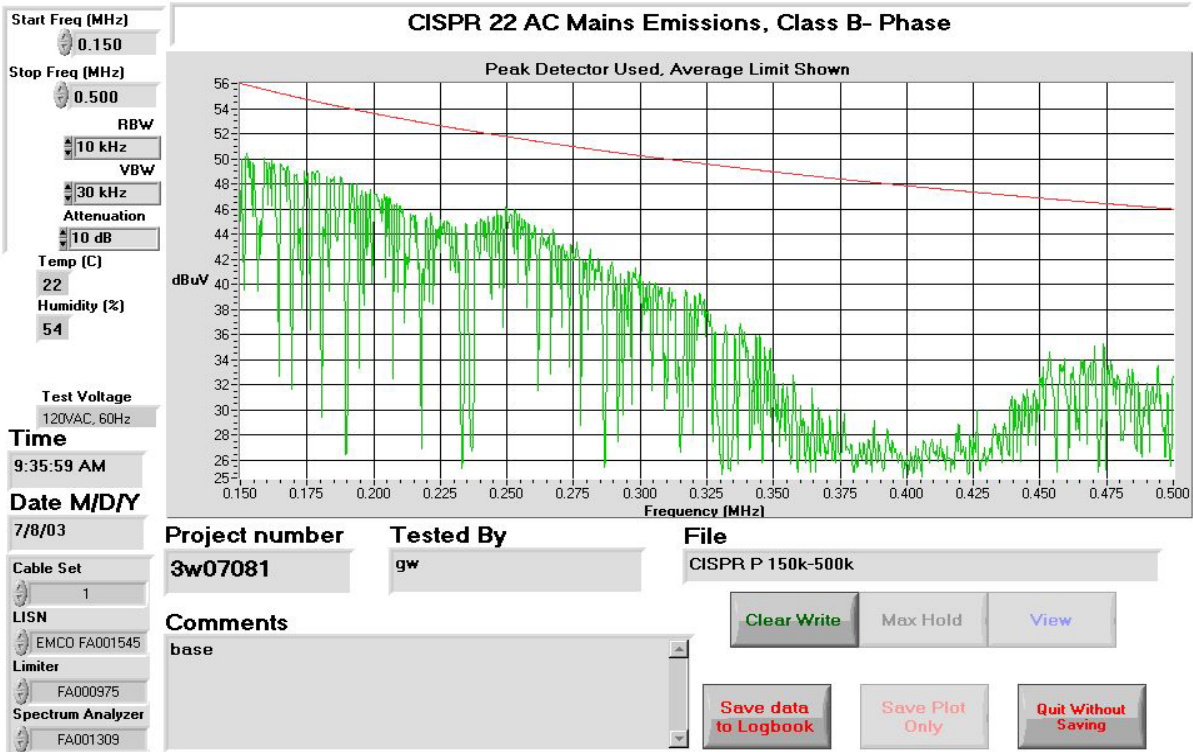
Powerline Conducted Emission Plots - BASE



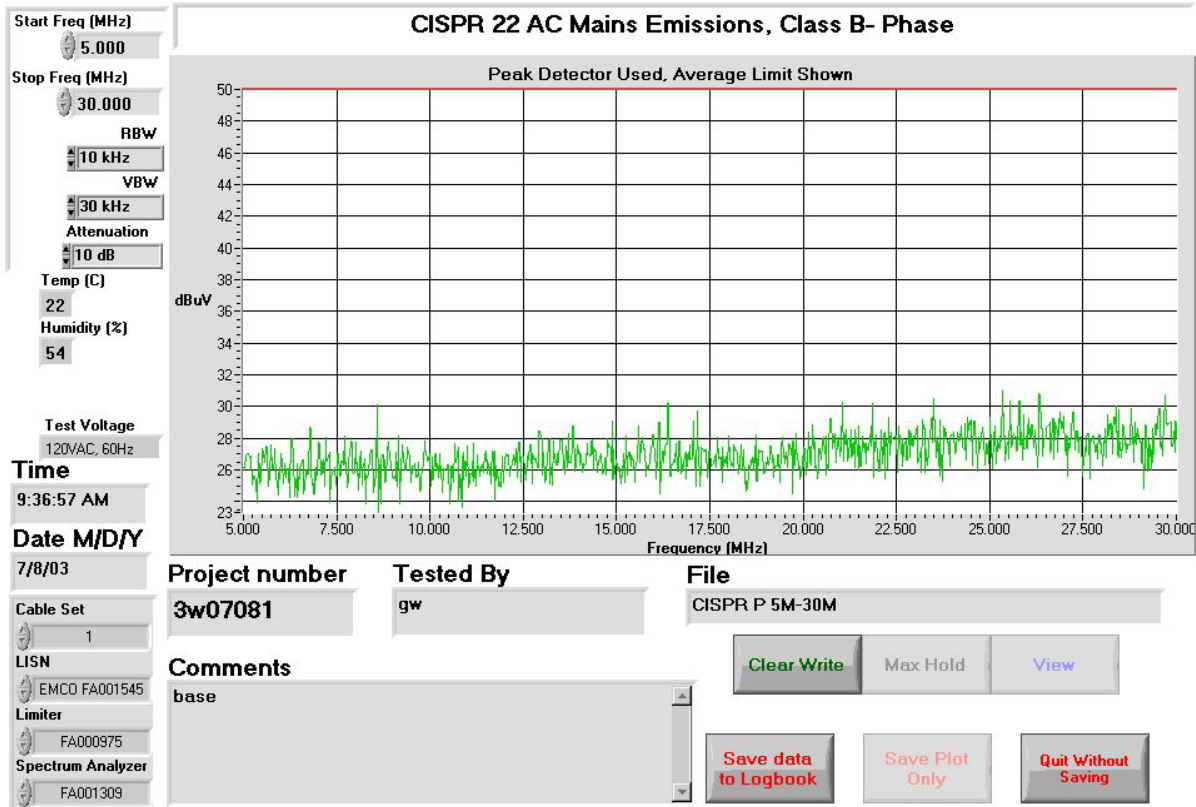
EQUIPMENT: VTECH 2625, 2.4 GHz
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EQUIPMENT: VTECH 2625, 2.4 GHz
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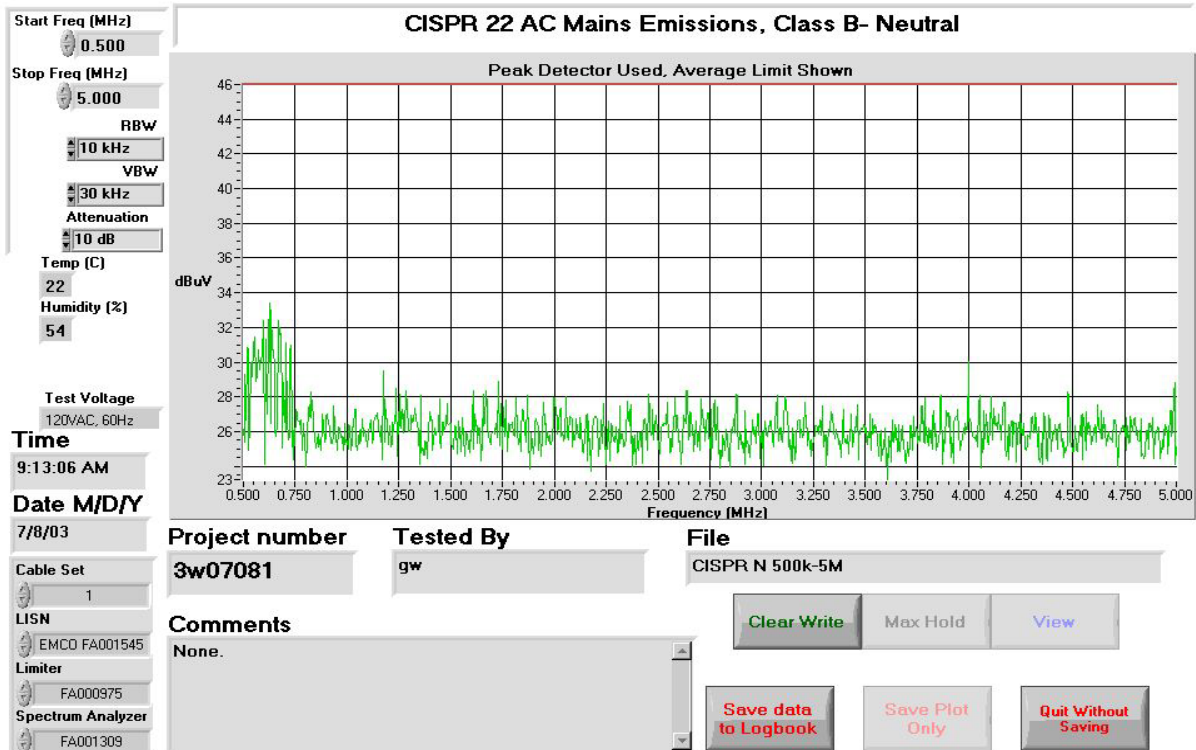
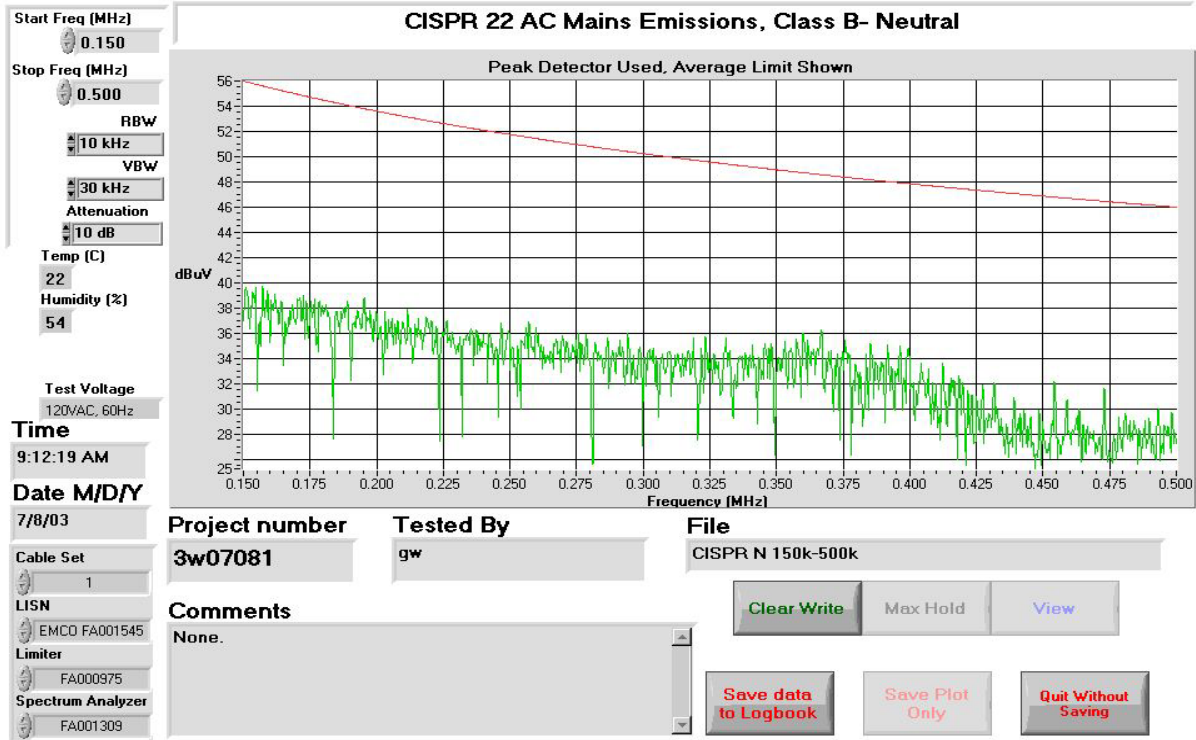


EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

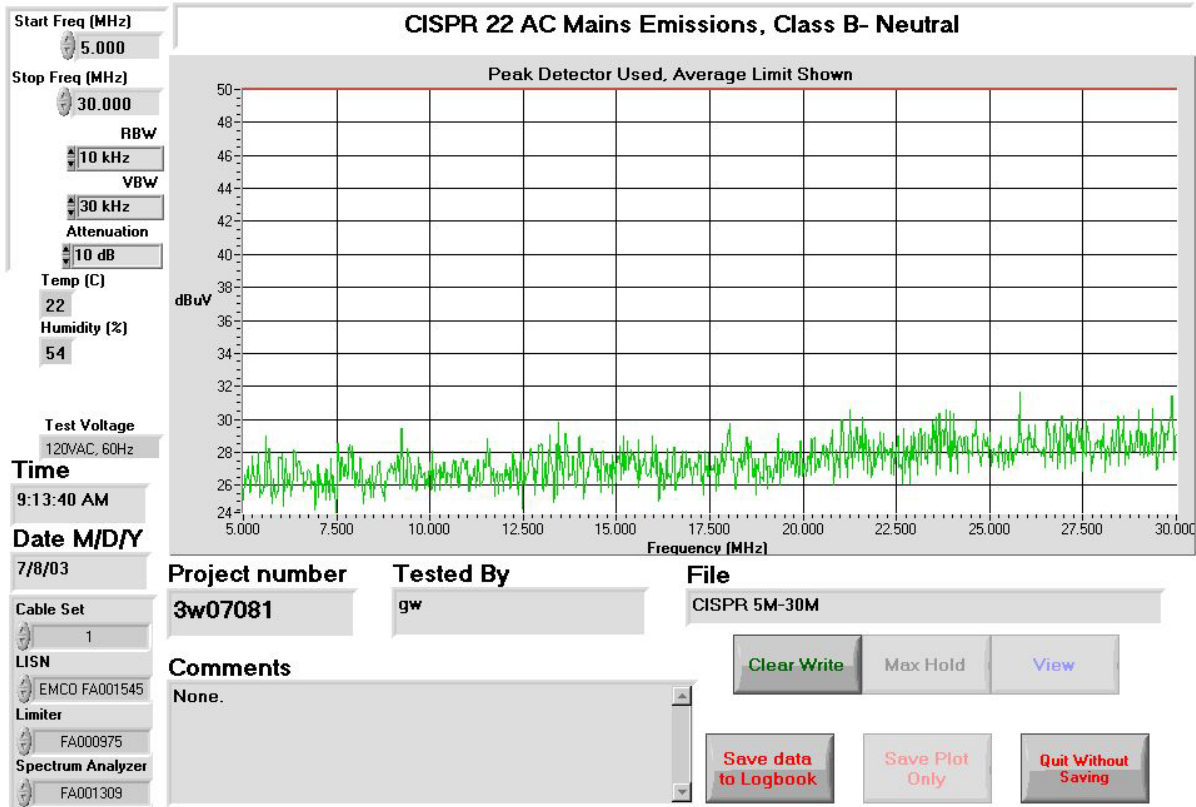


EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

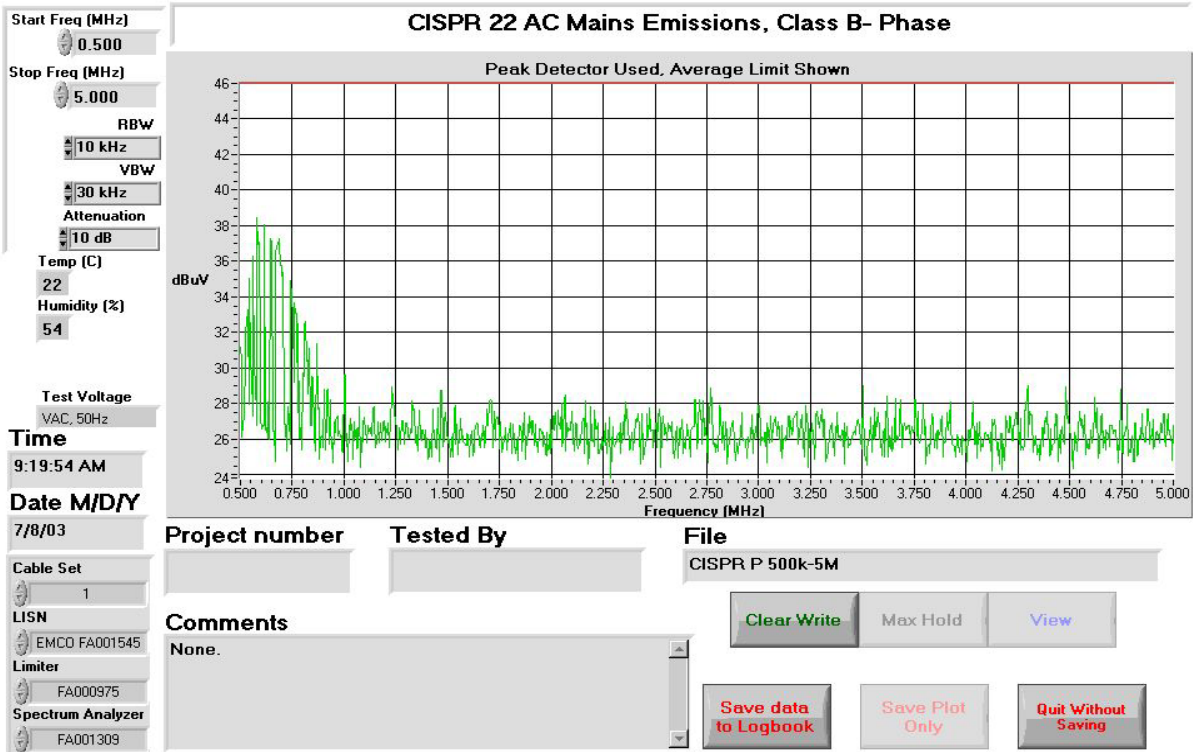
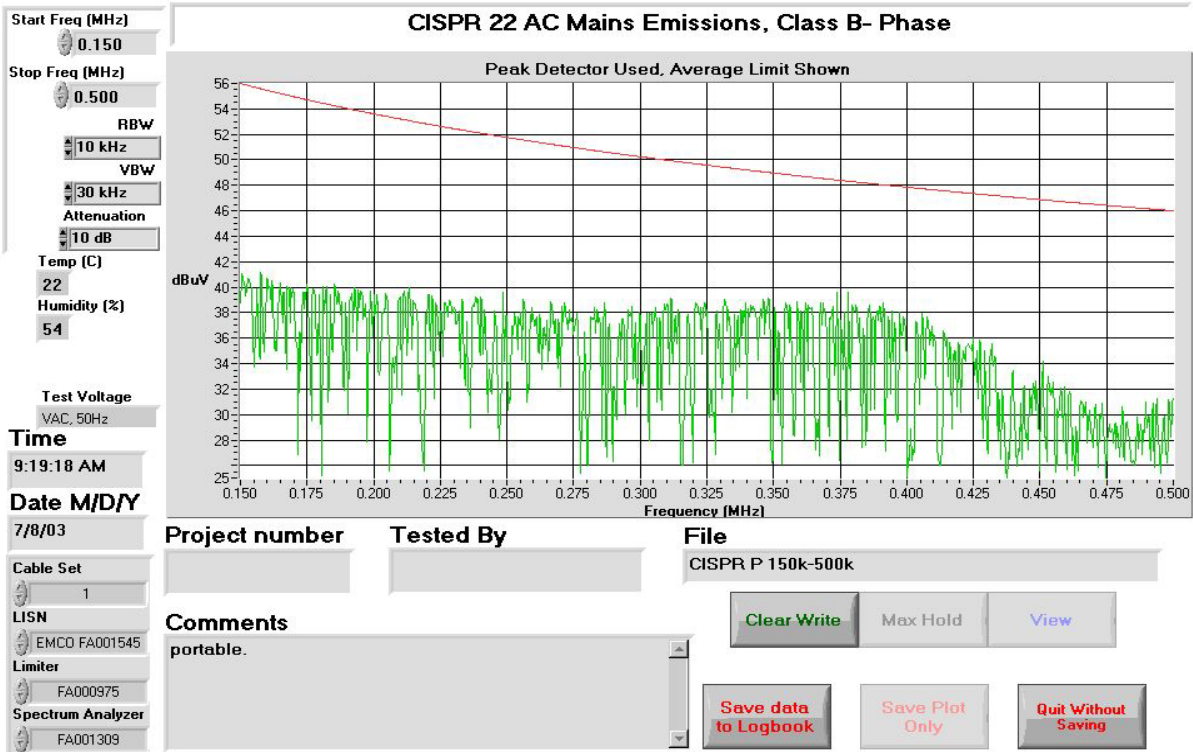
Powerline Conducted Emission Plots – Portable w/Charger



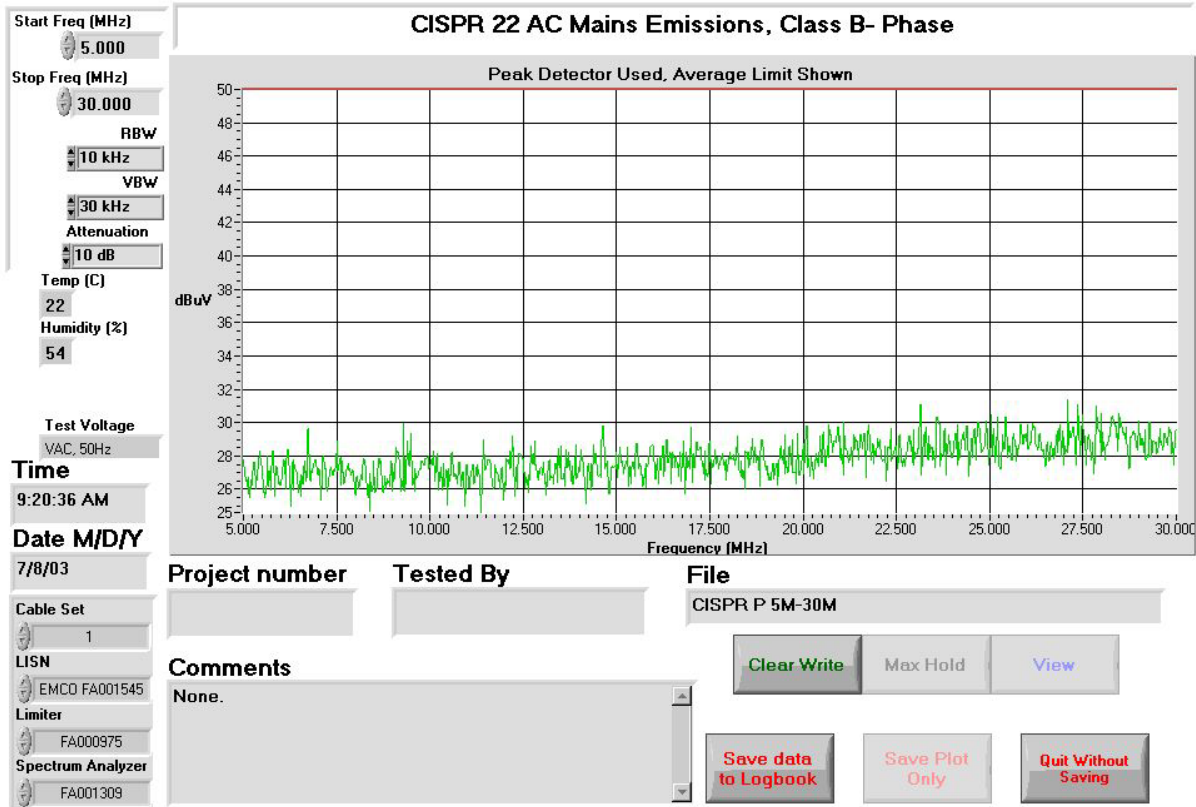
EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone



EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

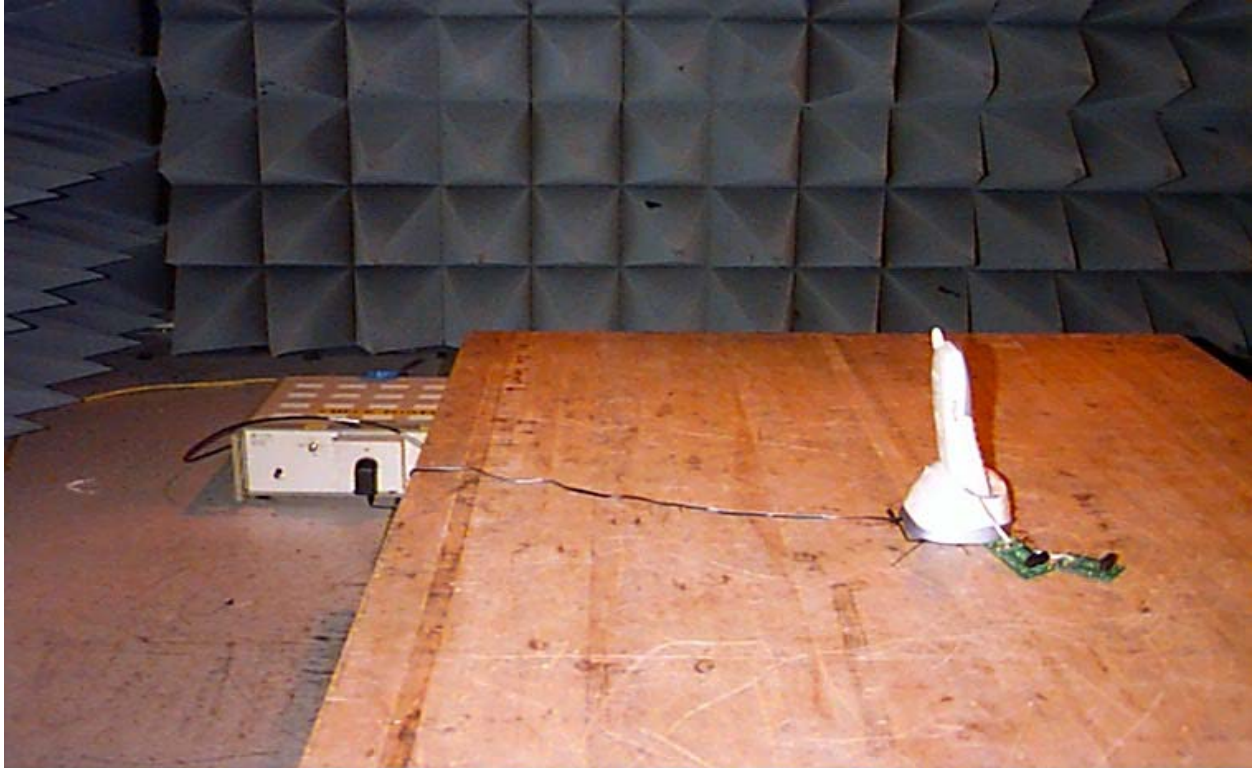


EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

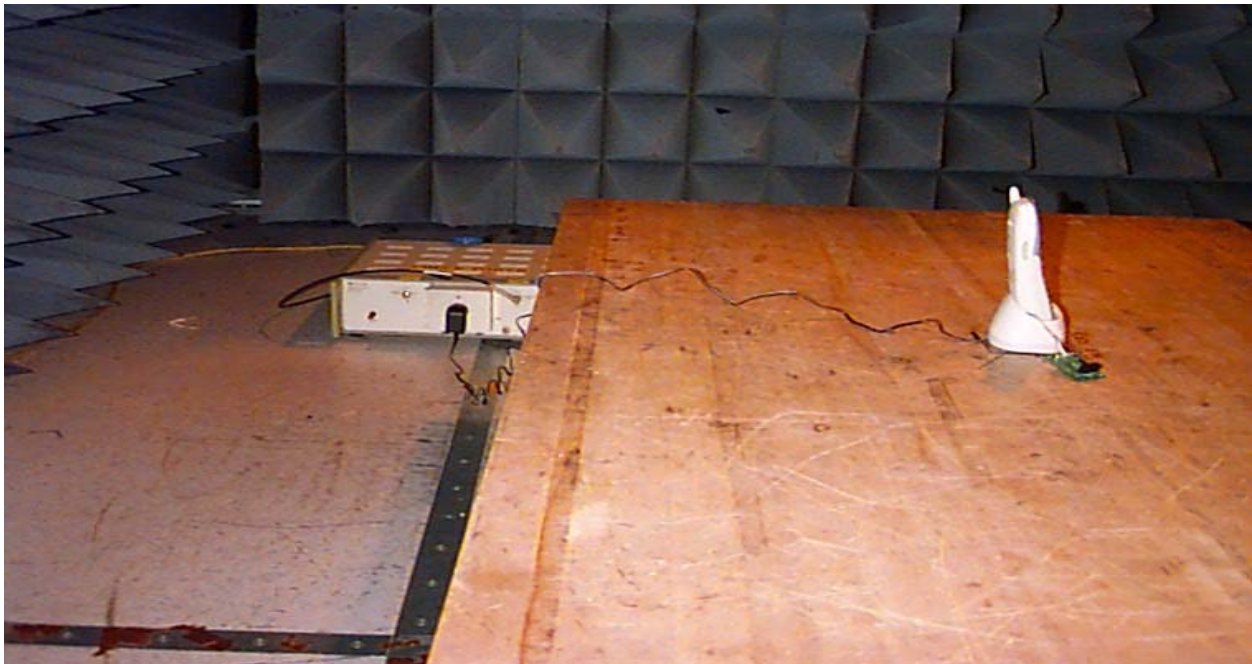


EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Set-up Photo: Base



Portable



EQUIPMENT: VTECH 2625, 2.4 GHz
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Section 4. Channel Separation

Para. No.: 15.247 (a)(1)

Test Performed By: Glen Westwell	Date of Test: 9 July 2003
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Test Results: Complied

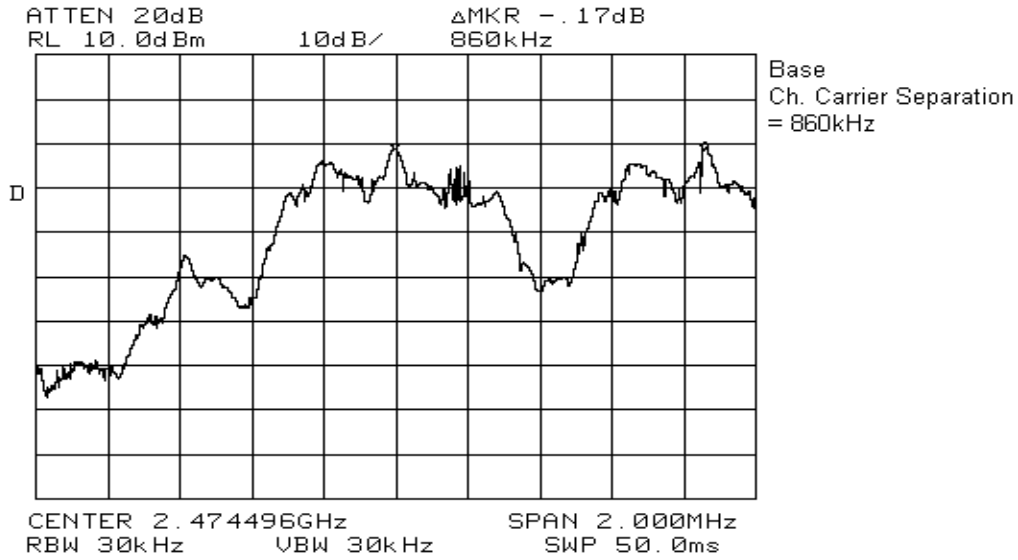
Measurement Data: See attached plots.

Channel Separation:
Base: 860kHz
Handset: 860 kHz

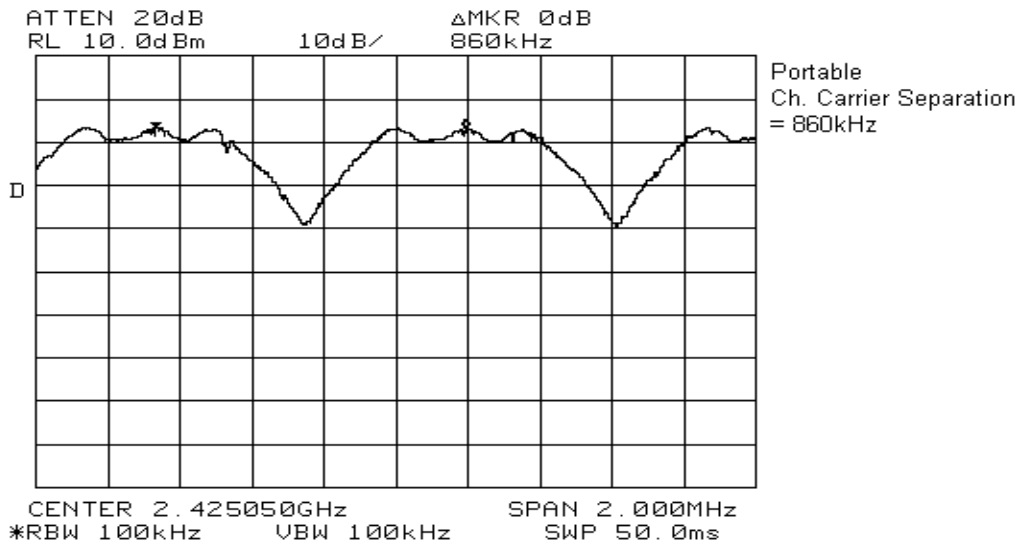
EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Channel Separation Plots:

Base



Handset



EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Section 5. Number of Hopping Channels

Para. No.: 15.247(a)(1)(ii)(iii)

Test Performed By: Glen Westwell	Date of Test: 10 July 2003
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Test Results: Complied

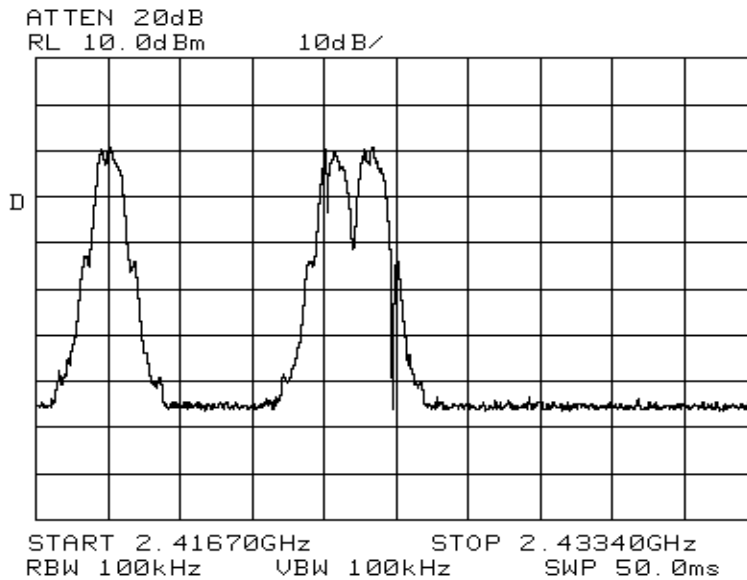
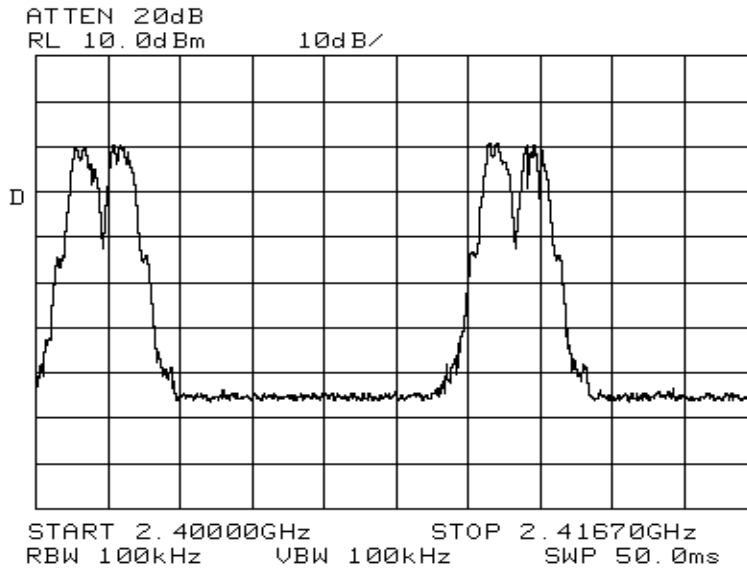
Measurement Data: See Attached Plots

Base
Number of Hopping Frequencies: 17

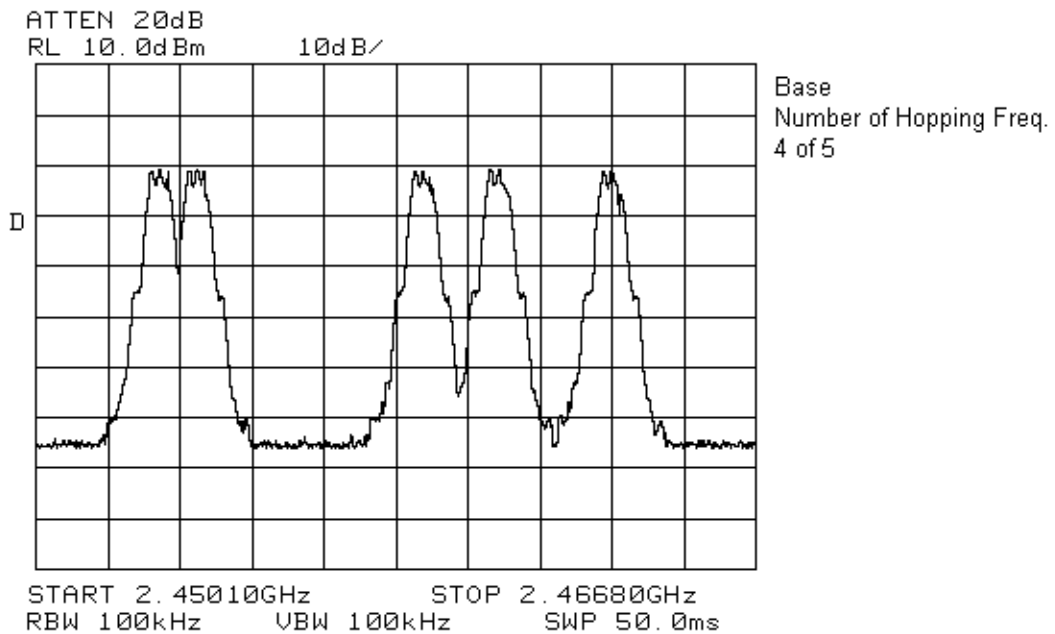
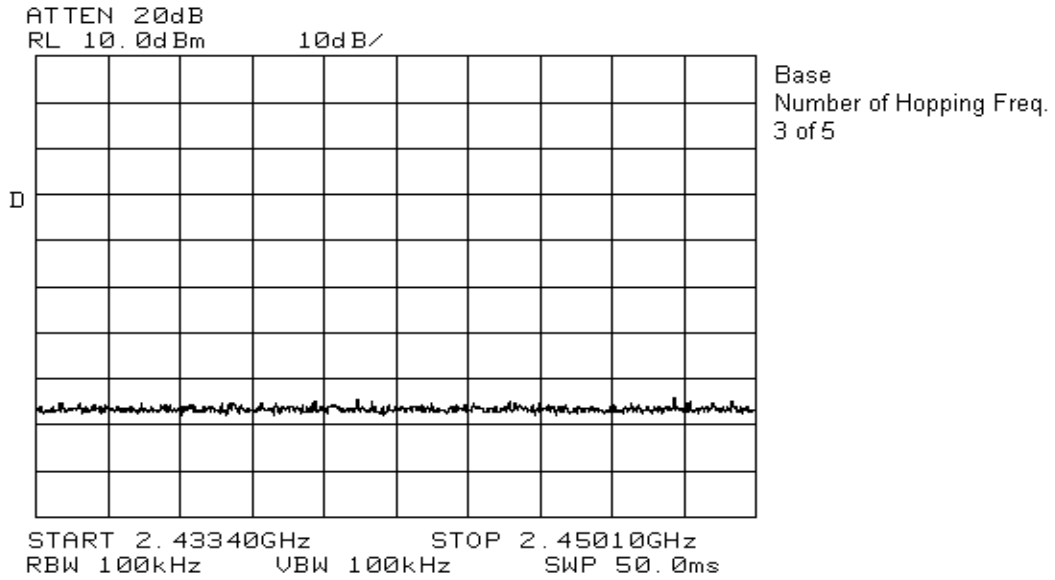
Handset
Number of Hopping Frequencies: 17

EQUIPMENT: VTECH 2625, 2.4 GHz
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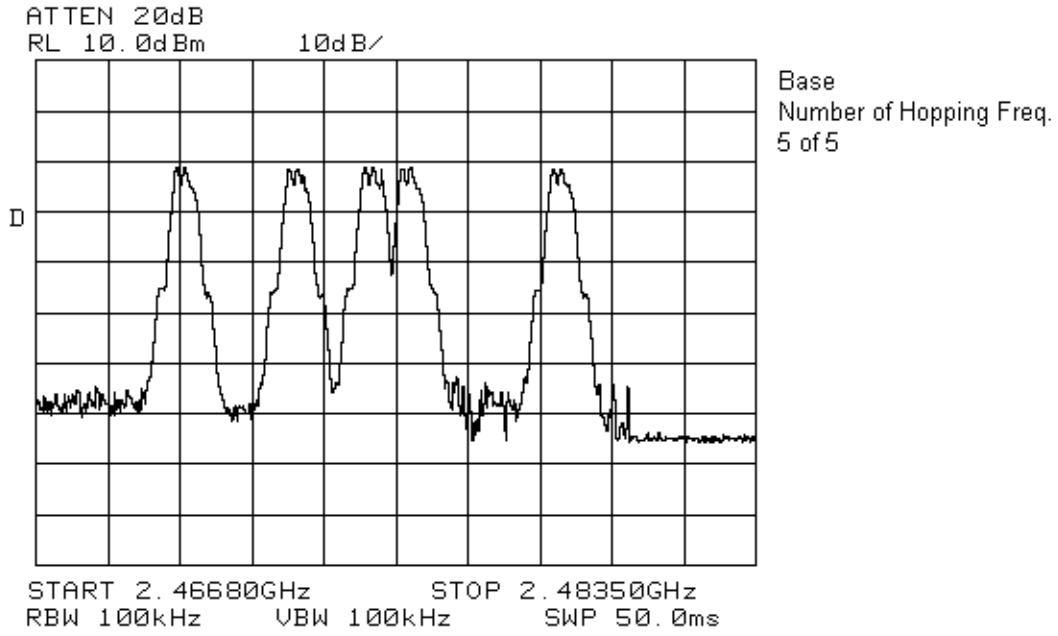
Base



EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

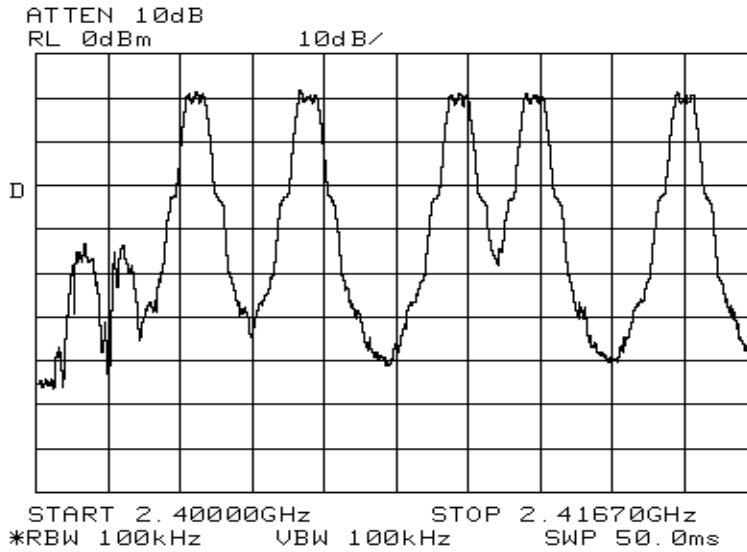


EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

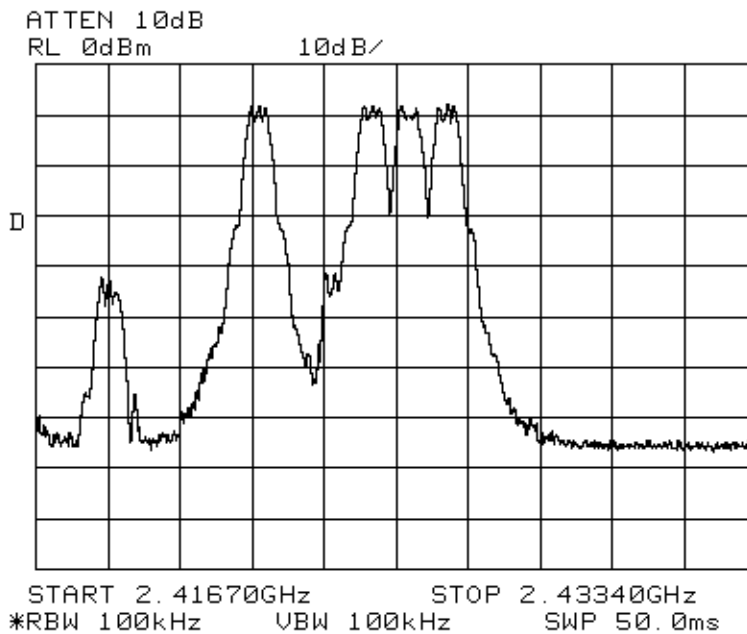


EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Handset

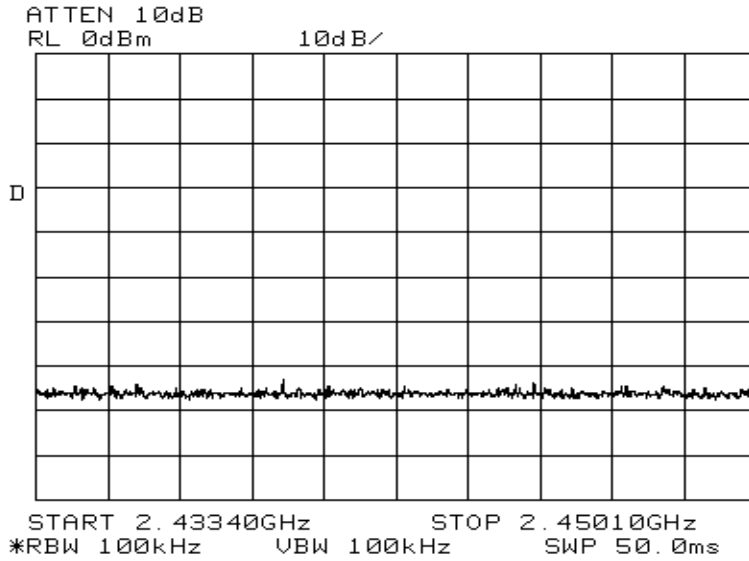


Portable
Number of Hopping Freq.
1 of 5

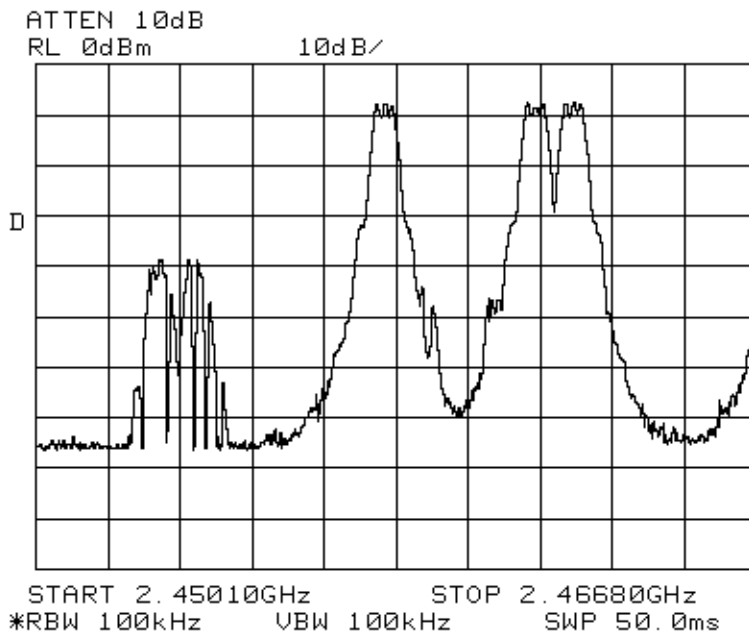


Portable
Number of Hopping Freq.
2 of 5

EQUIPMENT: VTECH 2625, 2.4 GHz
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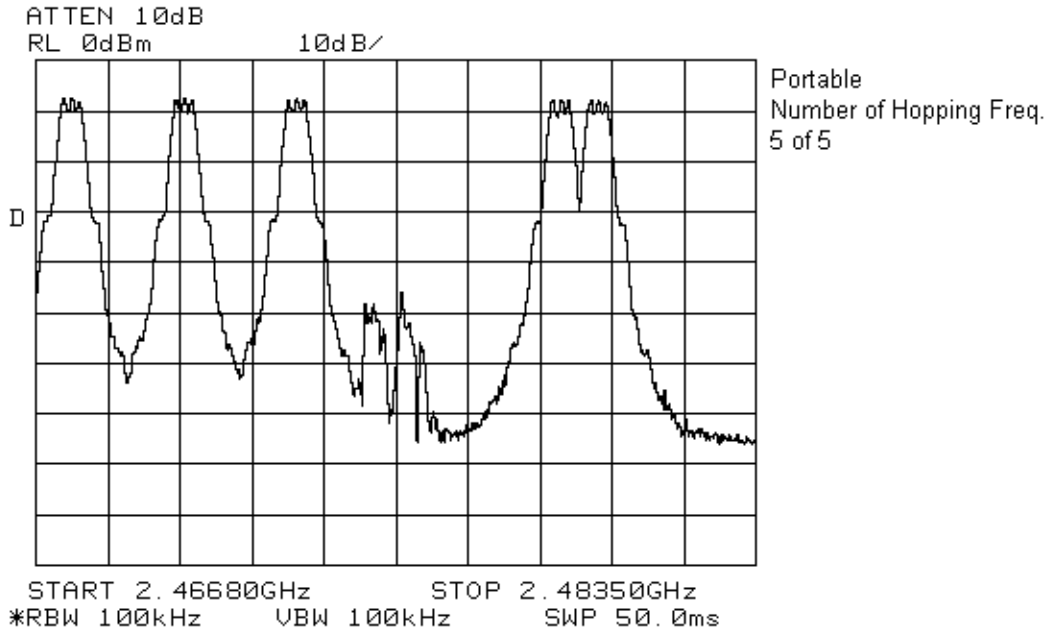


Portable
Number of Hopping Freq.
3 of 5



Portable
Number of Hopping Freq.
4 of 5

EQUIPMENT: VTECH 2625, 2.4 GHz
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EQUIPMENT: VTECH 2625, 2.4 GHz
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Section 6. Time of Occupancy

Para. No.: 15.247 (a)(1)(ii)(iii)

Test Performed By: Glen Westwell	Date of Test: 10 July 2003
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Test Results: Complied

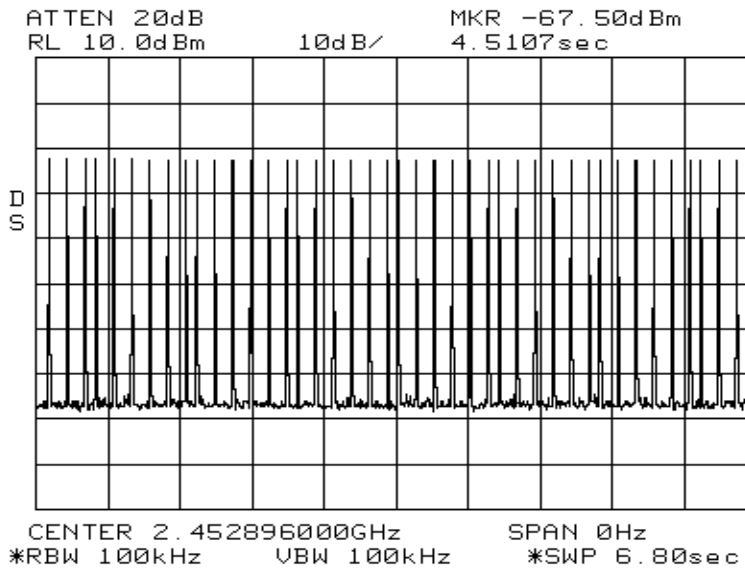
Measurement Data: Maximum Dwell Time On Any Channel:
See Plots.

Base: 10.8mS
Portable: 31mS

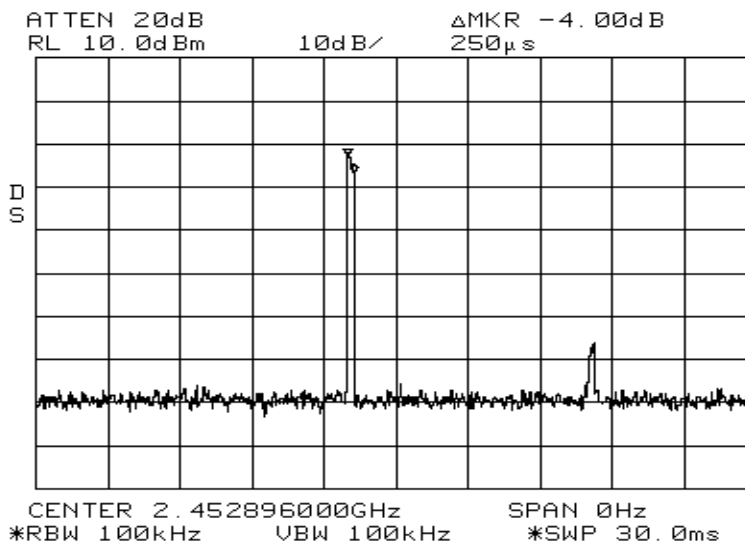
EQUIPMENT: VTECH 2625, 2.4 GHz
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Time Of Occupancy Plots.

Base



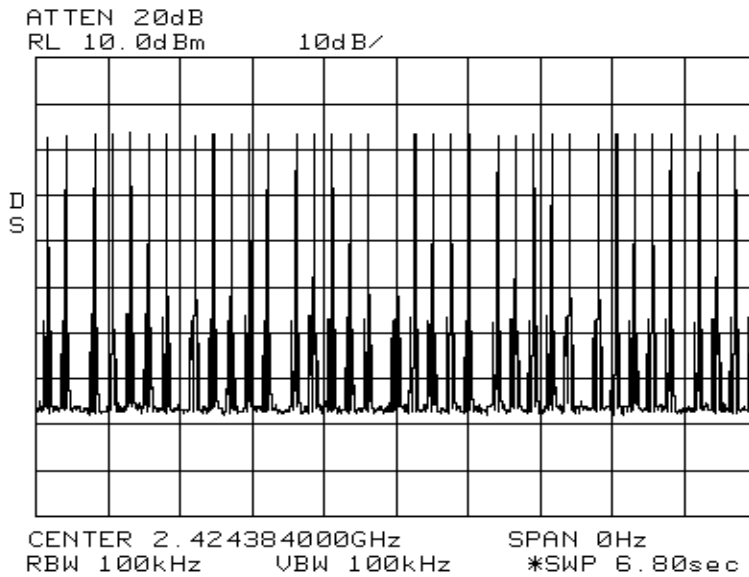
Base
Time of Occupancy
17 Hopping Ch. x 0.4S = 6.8S
Times Occupied/6.8S = 43
Therefore, 43 x 250uS
=10.8mS
Limit = 0.4S (400mS)



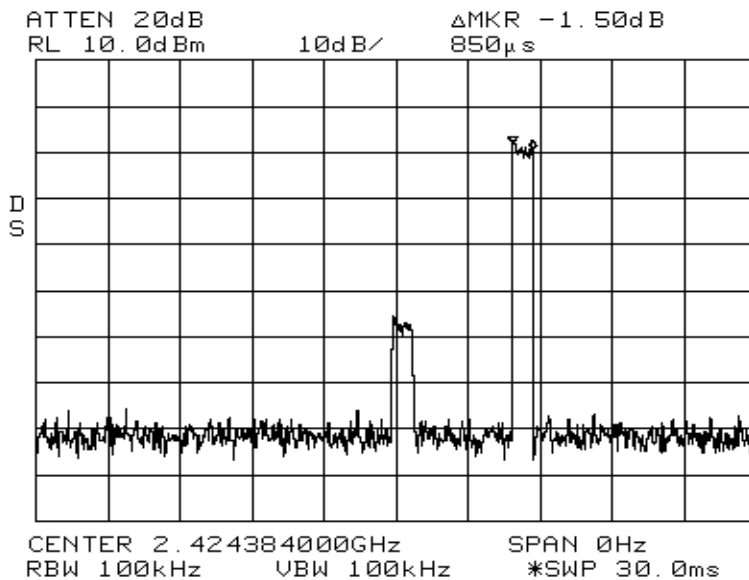
Base
Time of Occupancy

EQUIPMENT: VTECH 2625, 2.4 GHz
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Portable



Portable
Time of Occupancy
17 Hopping Ch. x 0.4S = 6.8S
Times Occupied/6.8S = 36
Therefore 36 x 850uS = 31mS
Limit = 0.4S (400ms)



Portable
Time of Occupancy

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Section 7. Occupied Bandwidth

Para. No.: 15.247 (a)(1)(ii)

Test Performed By: Glen Westwell	Date of Test: 10 July 2003
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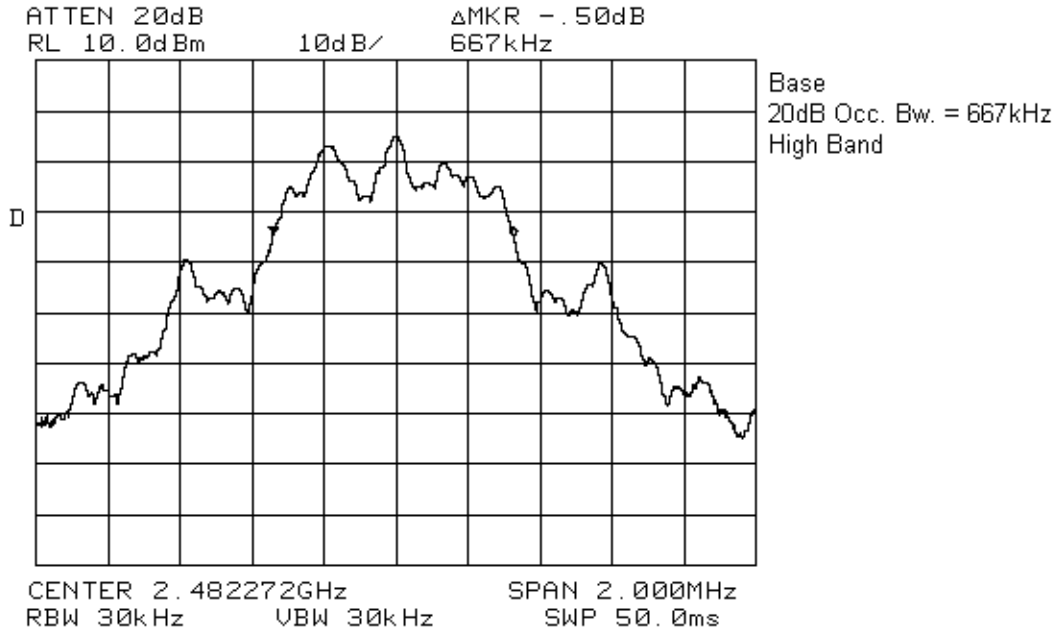
Test Results: Complied

Measurement Data: See Plots

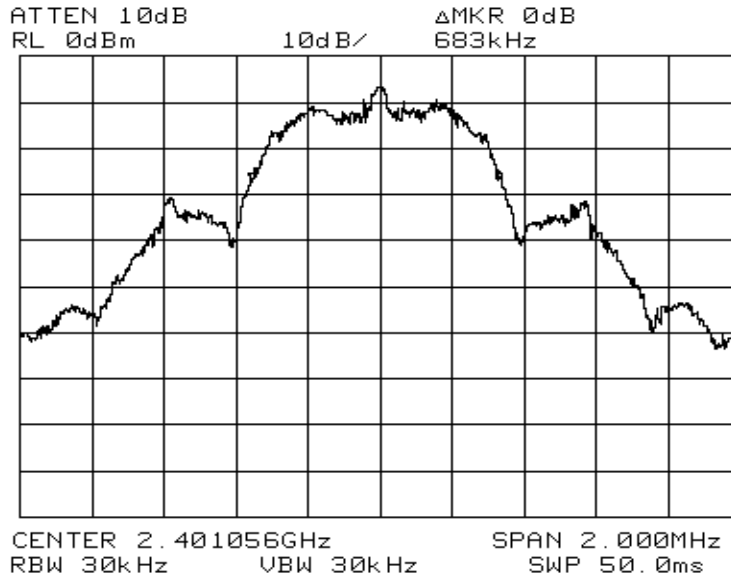
Base:
20 dB: 670kHz

Handset
20 dB: 700kHz

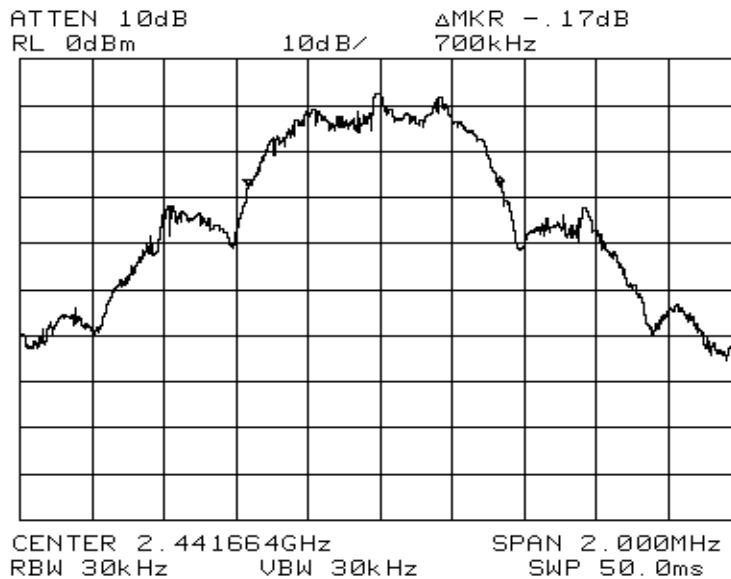
EQUIPMENT: VTECH 2625, 2.4 GHz
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EQUIPMENT: VTECH 2625, 2.4 GHz
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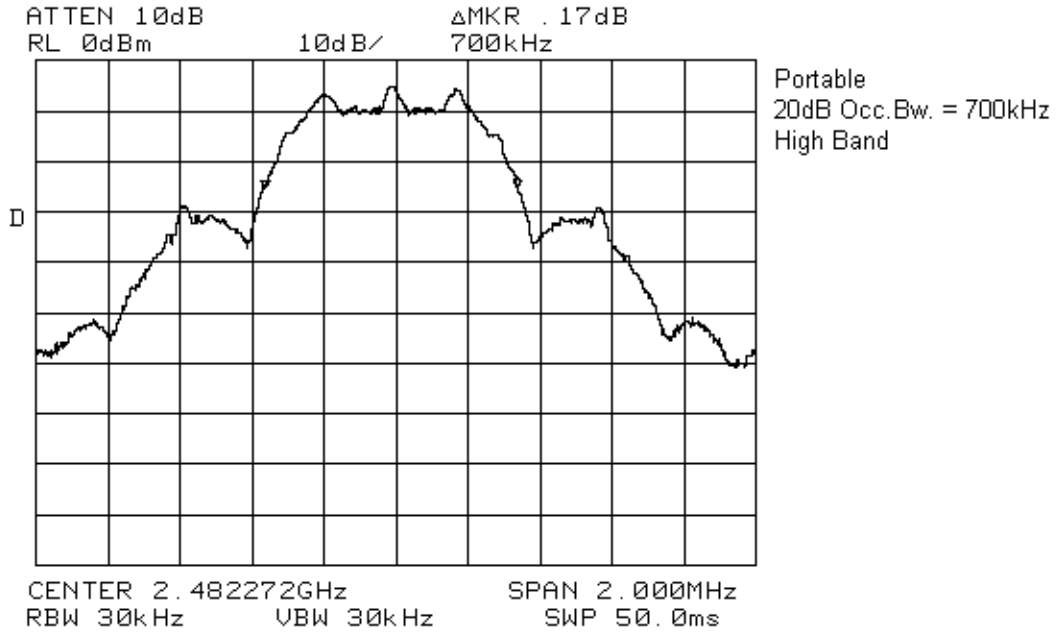


Portable
20dB Occ.Bw. = 683kHz
Low Band



Portable
20dB Occ.Bw. = 700kHz
Mid Band

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone



EQUIPMENT: VTECH 2625, 2.4 GHz
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Section 8. Peak Power Output

Para. No.: 15.247 (b)(1)

Test Performed By: Glen Westwell	Date of Test: 10 July 2003
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Test Results: Complies. The maximum peak power output of the transmitter is 21.5dBm. This is within +/- 1dB of the rated power.

	Measured	Rated (Max.)
Base	20.6dBm	21dBm (125mW)
Portable	20.1dBm	21dBm (125mW)

The Base Station was tested at +/- 15% of AC line voltage. The received level did not change
 The Handset was tested with a fresh battey.

This EUT was searched in 3 orthogonal axis to determine worst case emissions.

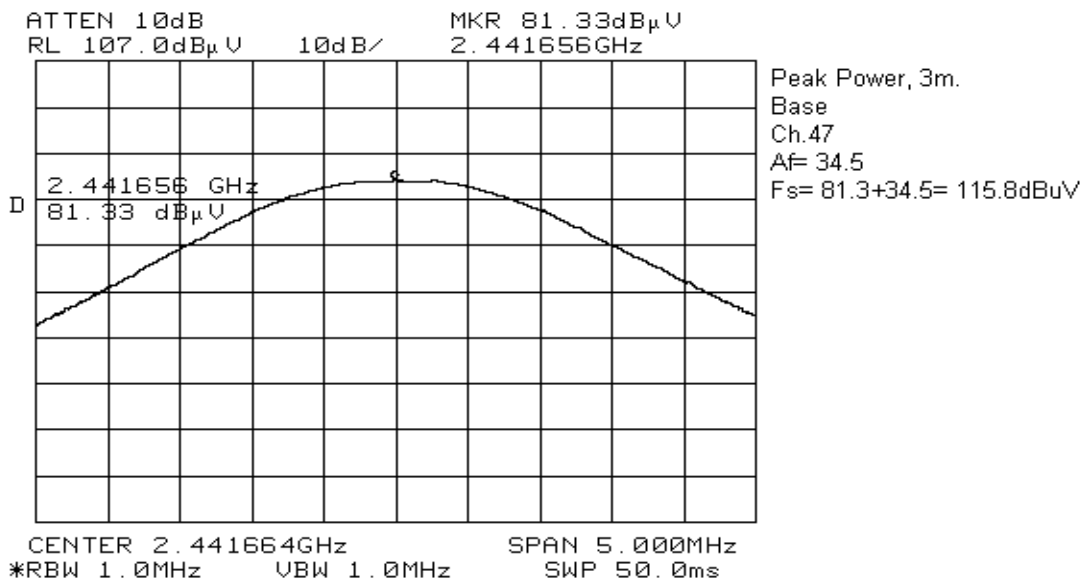
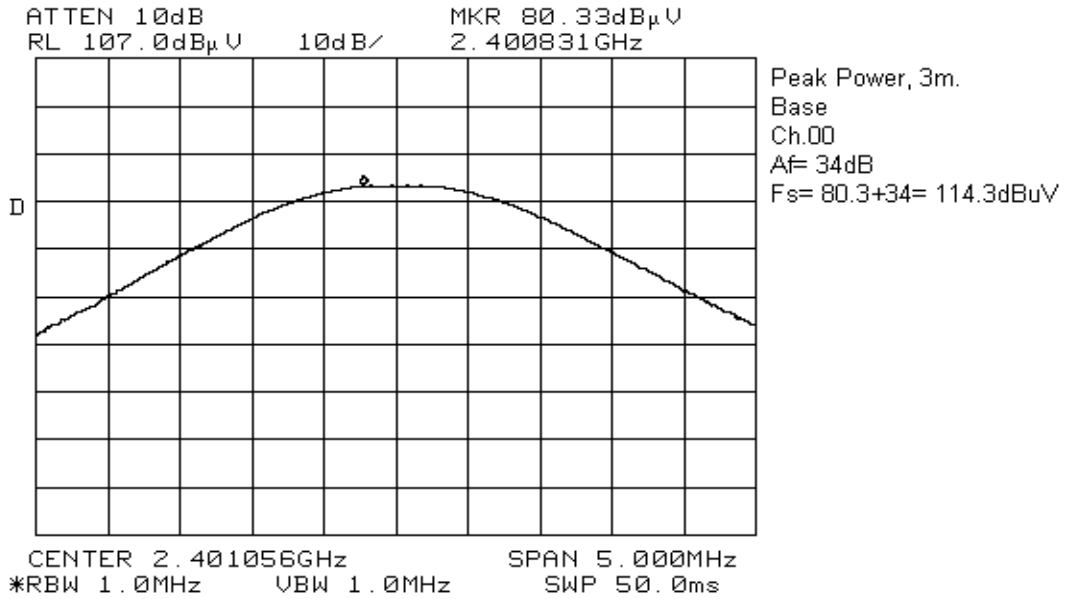
Measurement Data: Detachable antenna? Yes No

Directional Gain of Antenna:
 Base: 0dBi or 1 Numeric
 Portable: 0dBi or 1 Numeric.

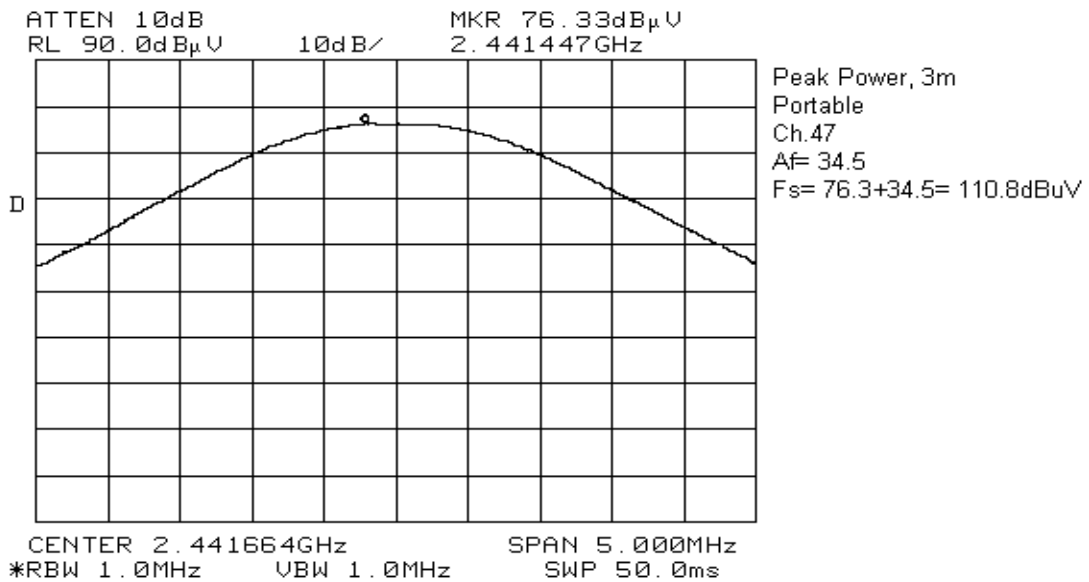
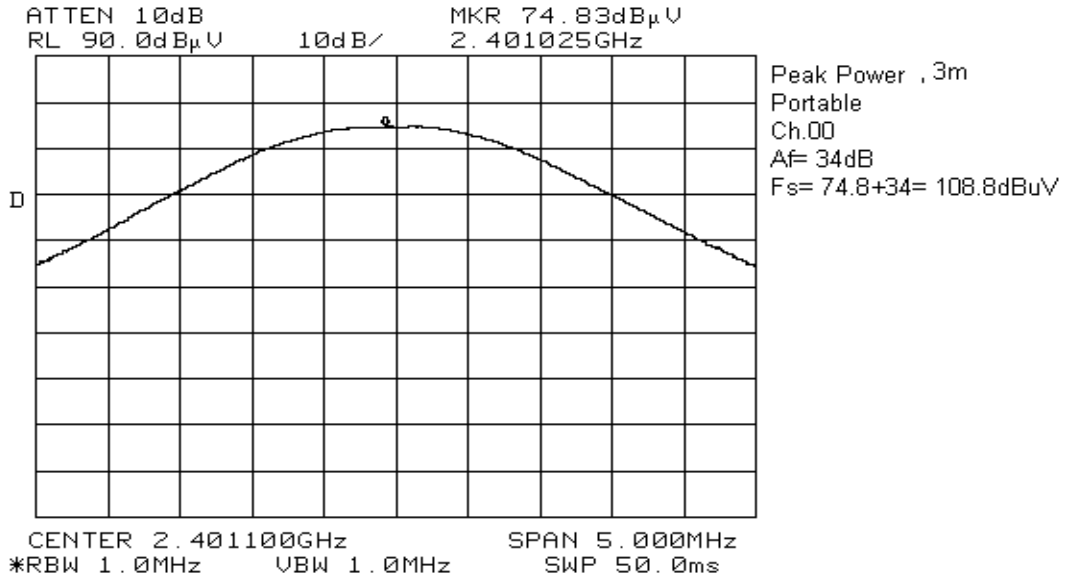
Base (worst Case)
 Field Strength: 115.8 dBµV/m @ 3m or 0.616 V/m @ 3m.

Portable (worst Case)
 Field Strength: 115.3 dBµV/m @ 3m or 0.582 V/m @ 3m.

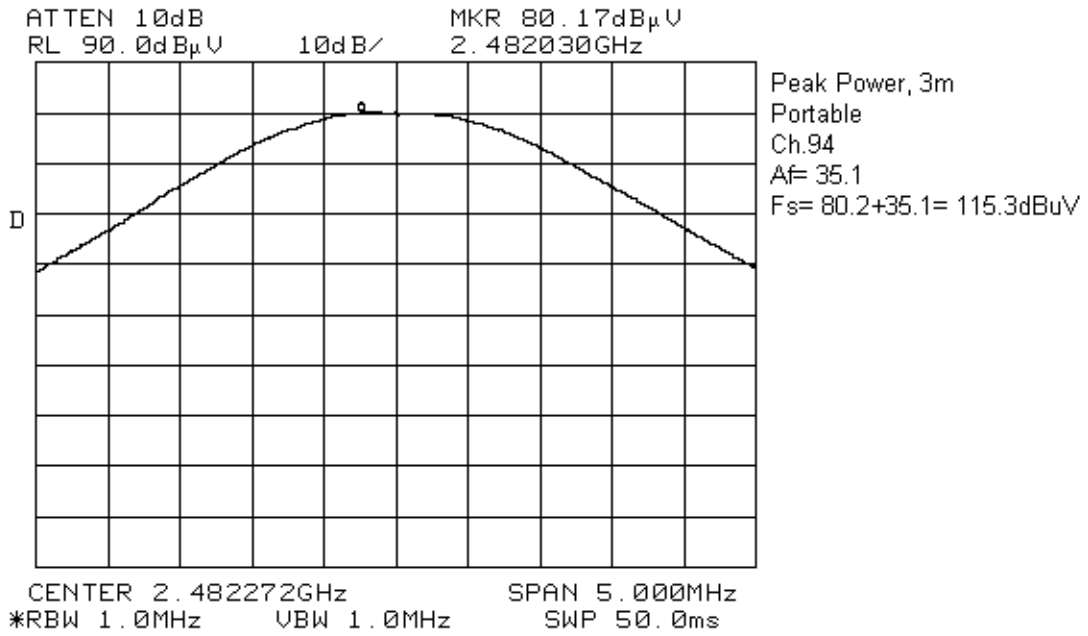
EQUIPMENT: VTECH 2625, 2.4 GHz
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EQUIPMENT: VTECH 2625, 2.4 GHz
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Section 9. Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: Glen Westwell	Date of Test: 11 July 2003
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Test Results: Complied.

Measurement Data: See attached table(s).

This EUT was searched in 3 orthogonal axis to determine worst case emissions.
The portable unit was tested with fresh batteries.
The Base AC mains was varied +/- 15% for worst case emissions.
All detectable emissions within 20dB of the limit were reported.
All emissions were searched up to the 10th harmonic.

Duty Cycle Correction Calculation:

Base: $20\text{Log}\{(40 \times 800\mu\text{S})/100\} = -9.9\text{dB}$
Handset: $20\text{Log}\{(10 \times 850\mu\text{S})/100\} = -21.4\text{dB}$, therefore, -20.0dB

EQUIPMENT: VTECH 2625, 2.4 GHz
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Radiated Emissions Test Data: Base Station

Test Date: 11 July 2003											
Engineer's Name: G.W.											
Tested as per (Table Top/Floor Standing): Table Top											
Test Distance (meters): 3						Range: A					
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (-dB)	Passband filter Loss (dB)	Duty Cycle Corr. (-dB)	Cable Loss (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
Base											
4964.5000	Horn1	H	61.3	34.2	52.3		-10.0	9.5	42.6	54.0	11.4
4964.5000	Horn1	V	60.7	34.4	52.3		-10.0	9.5	42.2	54.0	11.8
7446.8200	Horn1	H	62.3	36.5	53.2		-10.0	11.1	46.8	54.0	7.2
4883.3300	Horn1	V	60.2	34.4	52.6		-10.0	8.9	40.8	54.0	13.2
4883.3000	Horn1	H	61.8	34.2	52.6		-10.0	8.9	42.2	54.0	11.8
7324.9900	Horn1	H	63.3	36.5	53.7		-10.0	10.1	46.3	54.0	7.7
4802.1100	Horn1	H	62.5	34.1	53.2		-10.0	8.1	41.5	54.0	12.5
4802.0000	Horn1	V	62.7	34.3	53.2		-10.0	8.1	41.9	54.0	12.1
7203.1600	Horn1	H	62.8	36.5	53.7		-10.0	11.3	46.9	54.0	7.1
7203.1600	Horn1	V	62.3	36.5	53.7		-10.0	11.3	46.4	54.0	7.6
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole											
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW											
Notes:		Measurement Receiver = H.P.8564E, RBW = 1MHz									

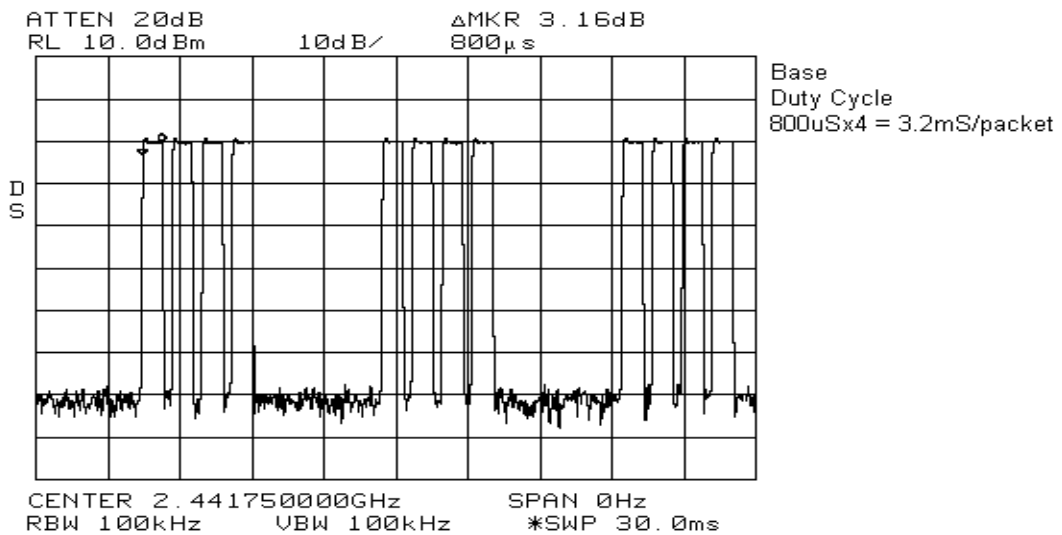
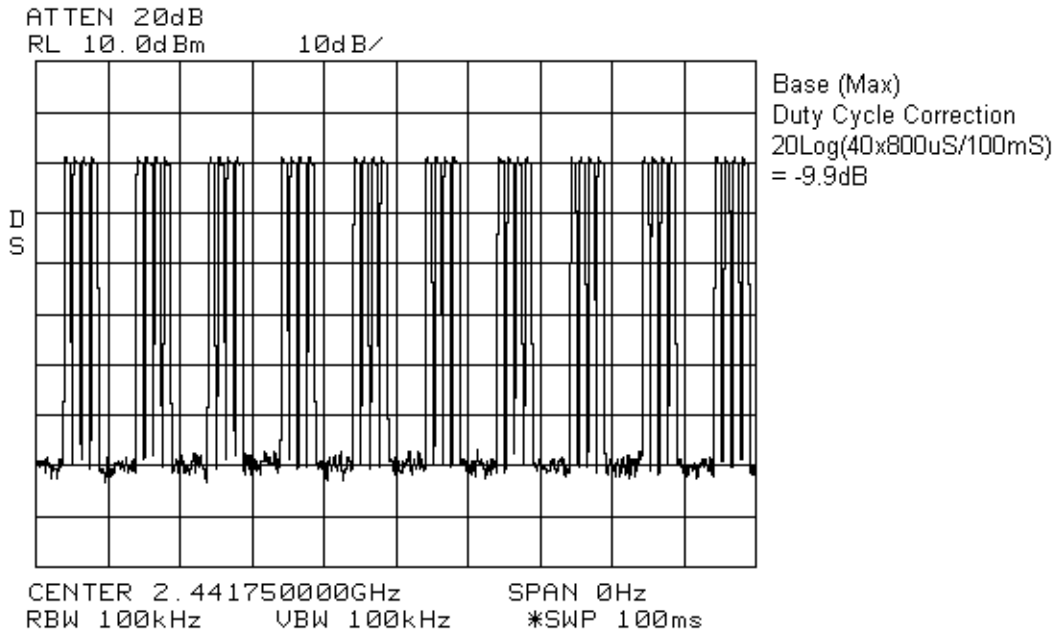
EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

Radiated Emissions Test Data: Portable

Test Date: 11 July 2003											
Engineer's Name: G.W.											
Tested as per (Table Top/Floor Standing): Table Top											
Test Distance (meters): 3						Range: A					
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (-dB)	Passband filter Loss (dB)	Duty Cycle Corr. (-dB)	Cable Loss (dB)	Level (dBµV)	Limit (dBµV)	Margin (dB)
Portable											
4964.5000	Horn1	V	60.7	34.4		52.3	-20.0	9.5	32.2	54.0	21.8
7446.8100	Horn1	H	64.8	36.5		53.2	-20.0	11.1	39.3	54.0	14.7
7324.9900	Horn1	H	65.2	36.5		53.7	-20.0	10.1	38.2	54.0	15.8
7324.9900	Horn1	V	63.2	36.5		53.7	-20.0	10.1	36.2	54.0	17.8
4883.3200	Horn1	V	62.8	34.4		52.6	-20.0	8.9	33.4	54.0	20.6
4802.1100	Horn1	V	68.7	34.3		53.2	-20.0	8.1	37.9	54.0	16.1
4802.1100	Horn1	H	65.7	34.1		53.2	-20.0	8.1	34.7	54.0	19.3
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole											
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW											
Notes:		Measurement Receiver = H.P.8564E, RBW = 1MHz									

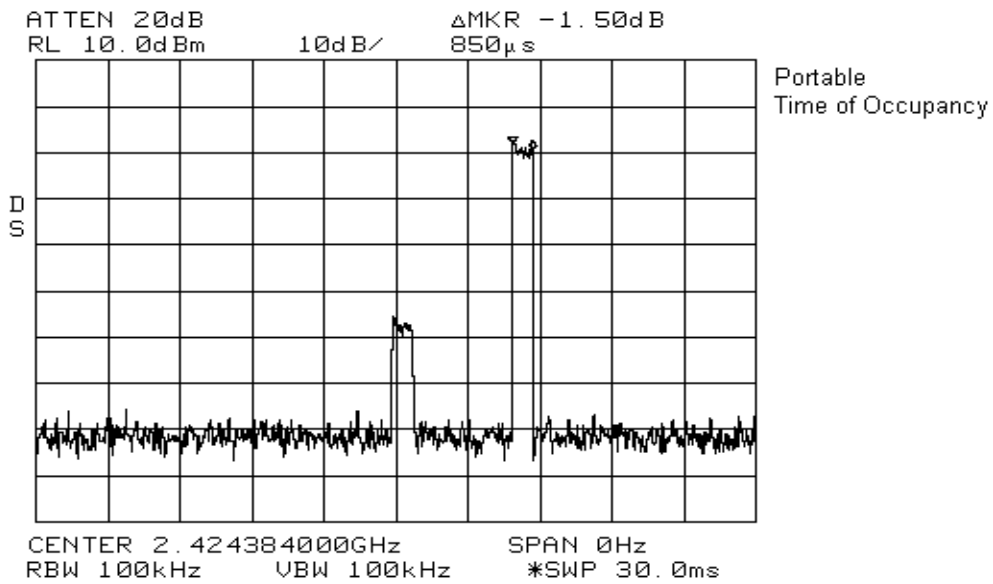
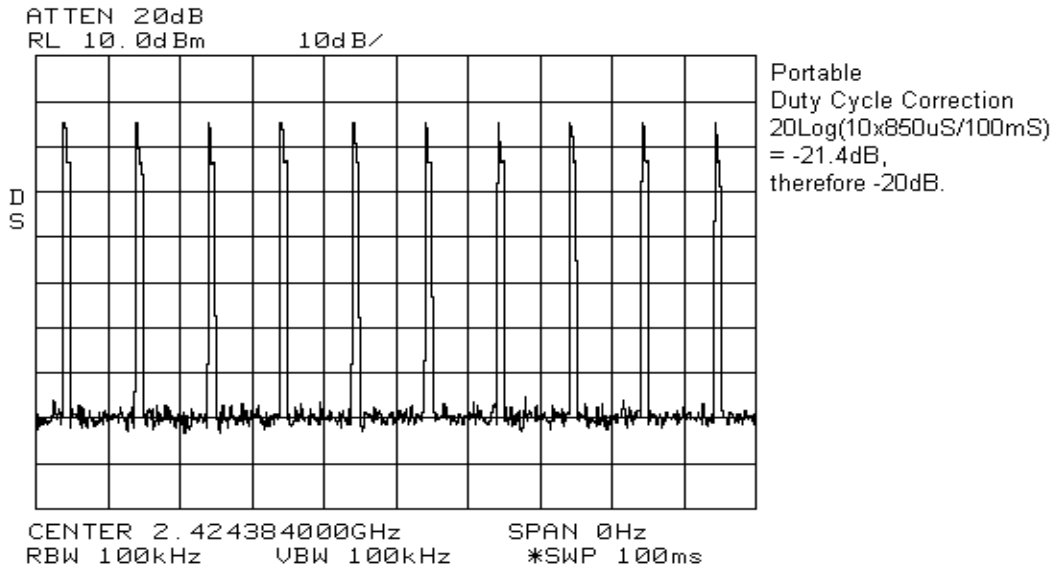
EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Duty Cycle Plots



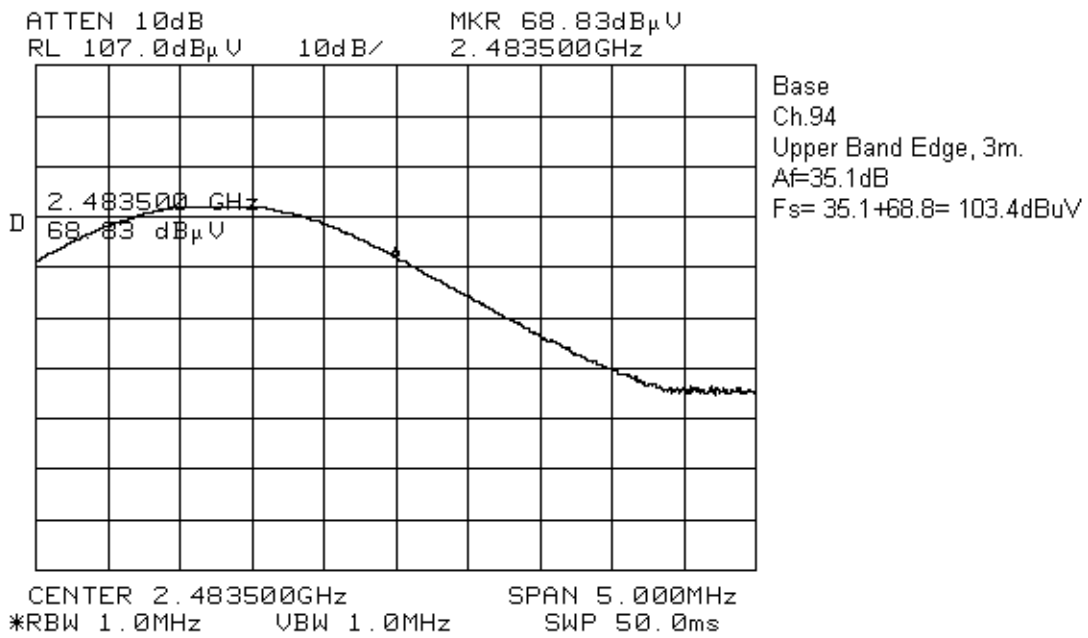
EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Handset



EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

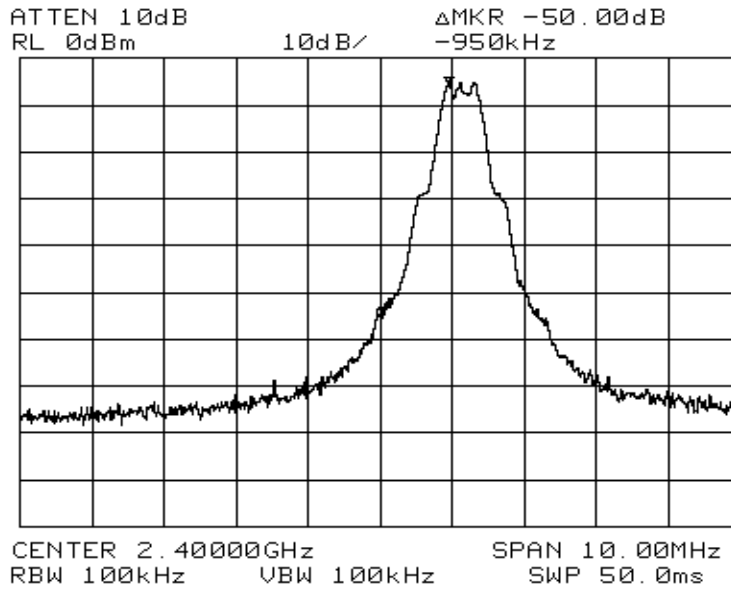
**Band Edge (Restricted Band)
 Marker Delta Method**



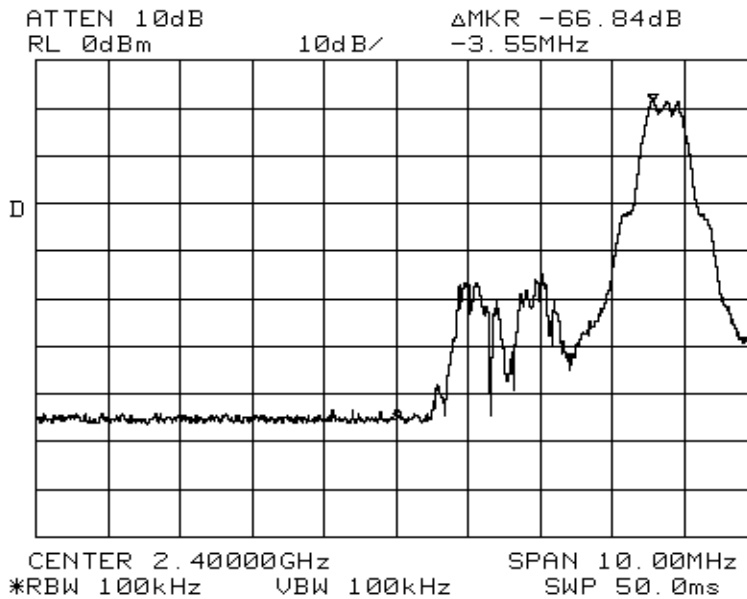
Peak Level, Band Edge = 78dBuV + 35.1 = 113.1 @ 3m.
Peak Band Edge Level (Marker Delta): = 113.1dBuV – 51.7dB =61.4dBuV/m at 3 m.
Average = 61.4 – 10 = 51.4dBuV/m @ 3m.

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Portable, 20dB Band Edge

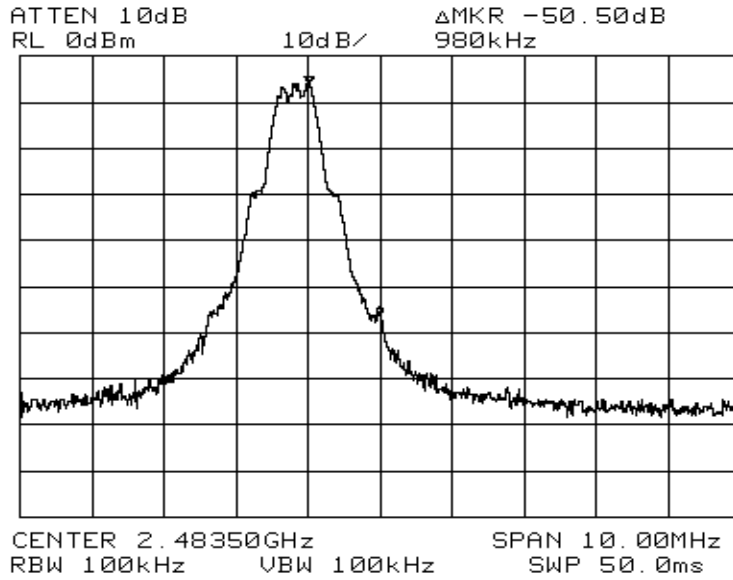


Portable
Lower Band Edge
Ch.00

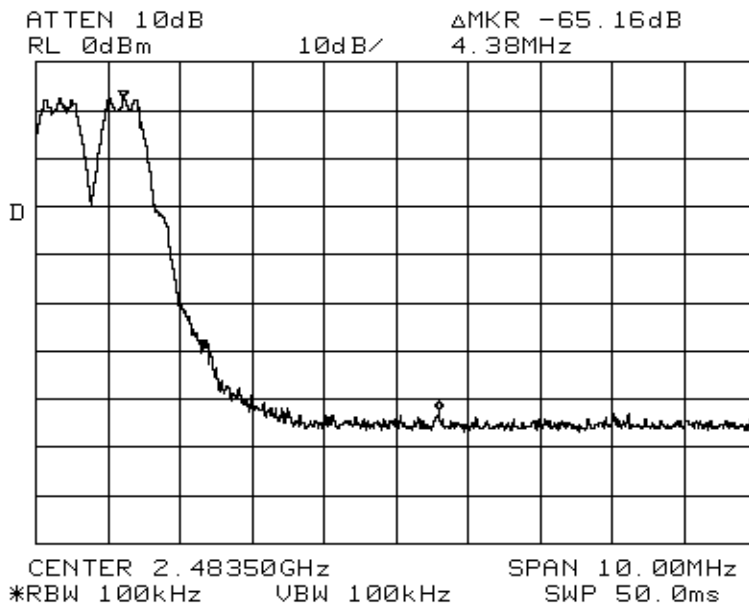


Portable
Lower band Edge
Hopping On

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone



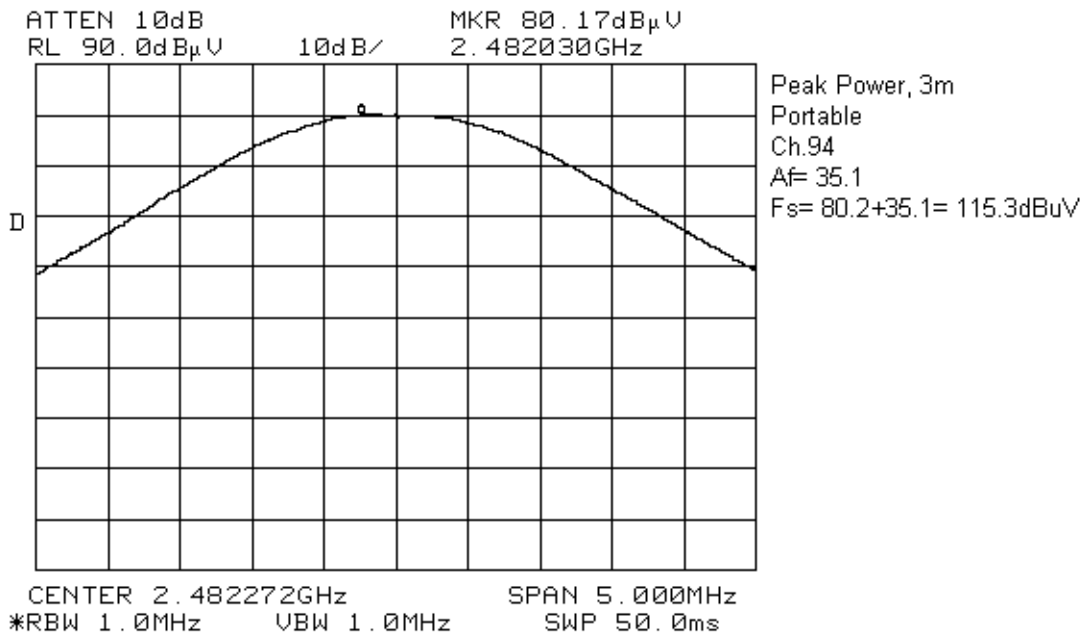
Portable
Upper Band Edge
Ch.94



Portable
Upper Band Edge
Hopping On

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

**Band Edge (Restricted Band)
Marker Delta Method**



Peak Level, Band Edge = 115.3dBuV @ 3m.

Peak Band Edge Level (Marker Delta): = 115.3dBuV – 50.5dB =64.8dBuV/m at 3 m.

Average = 64.8 – 20 = 44.8dBuV/m @ 3m.

EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

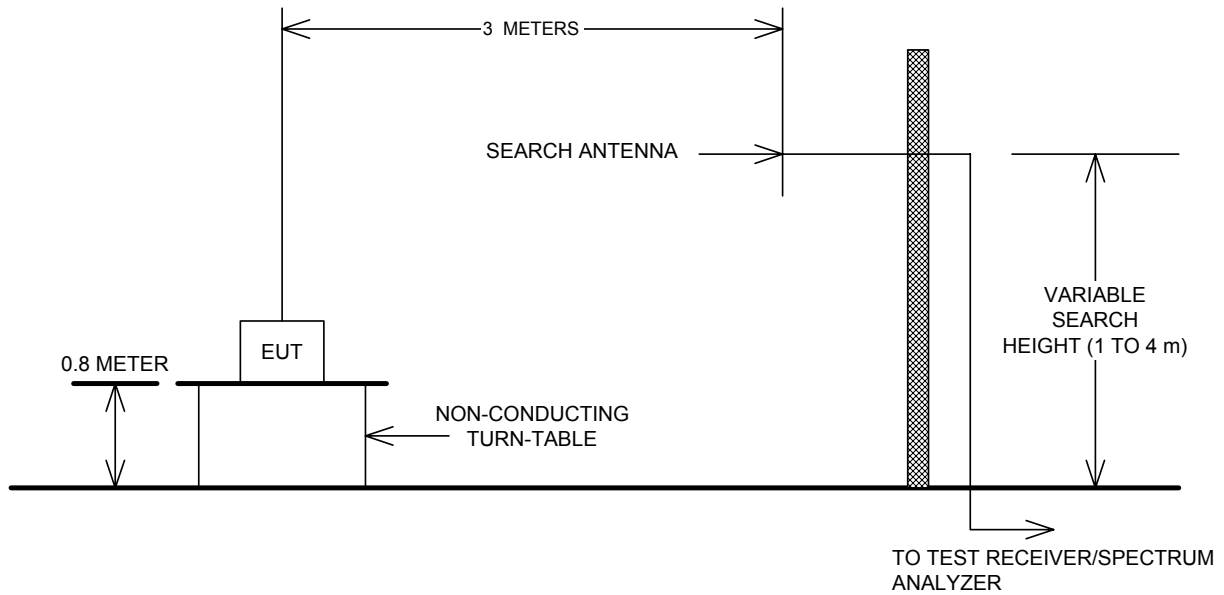
Set-up Photo:



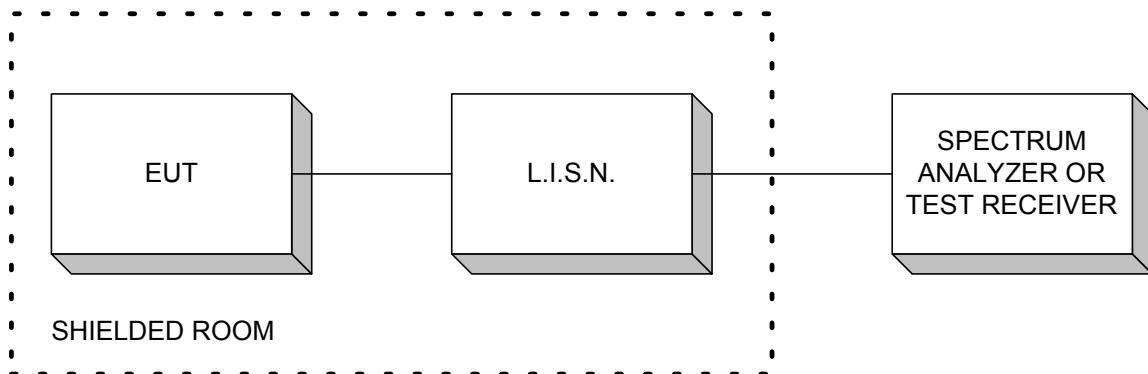
EQUIPMENT: VTECH 2625, 2.4 GHz
FHSS Cordless Telephone

Section 10. Block Diagrams

Test Site For Radiated Emissions



Conducted Emissions



EQUIPMENT: VTECH 2625, 2.4 GHz
 FHSS Cordless Telephone

Section 11. Test Equipment List

RADIO TEST EQUIPMENT LIST

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8564E	FA01367	13 May 03	13 May 04
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	03 Jul 03	03 Jul 04
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	June. 05/03	June. 05/04
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	June. 05/03	June. 05/04
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001437	July. 04/02	July. 04/03
1 Year	LISN	EMCO	4825/2	FA001545	Oct. 25/02	Oct. 25/03
1 Year	Horn Antenna	EMCO #1	3115	FA000649	23 Dec 02	23 Dec 03
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	April. 15/03	April. 15/04
1 Year	RF AMP	JCA	4-8 GHz	FA001497	18 June 03	18 June 04
	RF AMP	Narda	5 - 18GHz	FA001409	COU	COU
1 Year	High Pass Filter (3.9GHz)	K&L	11SH10-4000	FA001340	COU	COU
NCR	Bilog	Schaffner	CBL6112B	FA001504	NCR	NCR