



Test Report: 4W08258, Issue 2

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

**Equipment Under Test:
(EUT)** AT&T E2135, 2.4GHz FHSS Cordless Telephone

FCC ID: EW780-5312-00

In Accordance With: **FCC Part 15, Subpart C, Class II Permissive Change**
Frequency Hopping Transmitters
2400 - 2483.5 MHz

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

Authorized By: Glen Westwell, Senior Wireless Technologist

Date: 21 August 2004

Total Number of Pages: 45

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EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

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 C63.4-2001. 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: _____
Daxesh Thakker, Wireless Test Engineer

DATE: 17 August 2004



TESTED BY: _____
Kevin Carr, EMC/EMI/Wireless Specialist

DATE: 17 August 2004

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This report applies only to the items tested.

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Section 2. General Equipment Specification

Manufacturer: VTech (Dongguan) Electronics and Communications Ltd.
Xia Ling Bei Management Zone,
Liaobu, Dongguan, guangdong,
China 523411

Model No.: AT&T E2135

Serial No.: None

Date Received In Laboratory: June 16, 2004

Nemko Identification No.: 3, 4, 5, 9, 11

Frequency Range: BS TX-RX 2401.056 - 2482.272 MHz
HS TX-RX 2401.056 - 2482.272 MHz

Modulation GFSK

Tunable Bands: 1

Number of Channels: 17

Min. Channel Spacing:

Base	870 KHz
Handset	867 KHz

Emissions Designator:

Base	660KF1D
Handset	630KF1D

User Frequency Adjustment: None

Rated Output Power:

Base	20.67 dBm (0.116W)
Handset	20.57 dBm (0.114W)

Section 3. Power line Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: Daxesh Thakker	Date of Test: July 6, 2004
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Minimum Standard

Limits For Conducted Disturbance At The Mains Ports Of Class B

Frequency Range MHz	Limits dB(μV)		Result
	Quasi-Peak	Average	
0.15 to 0.50	66 to 56	56 to 46	Complies
0.5 to 5	56	46	
5 to 30	60	50	

Note:

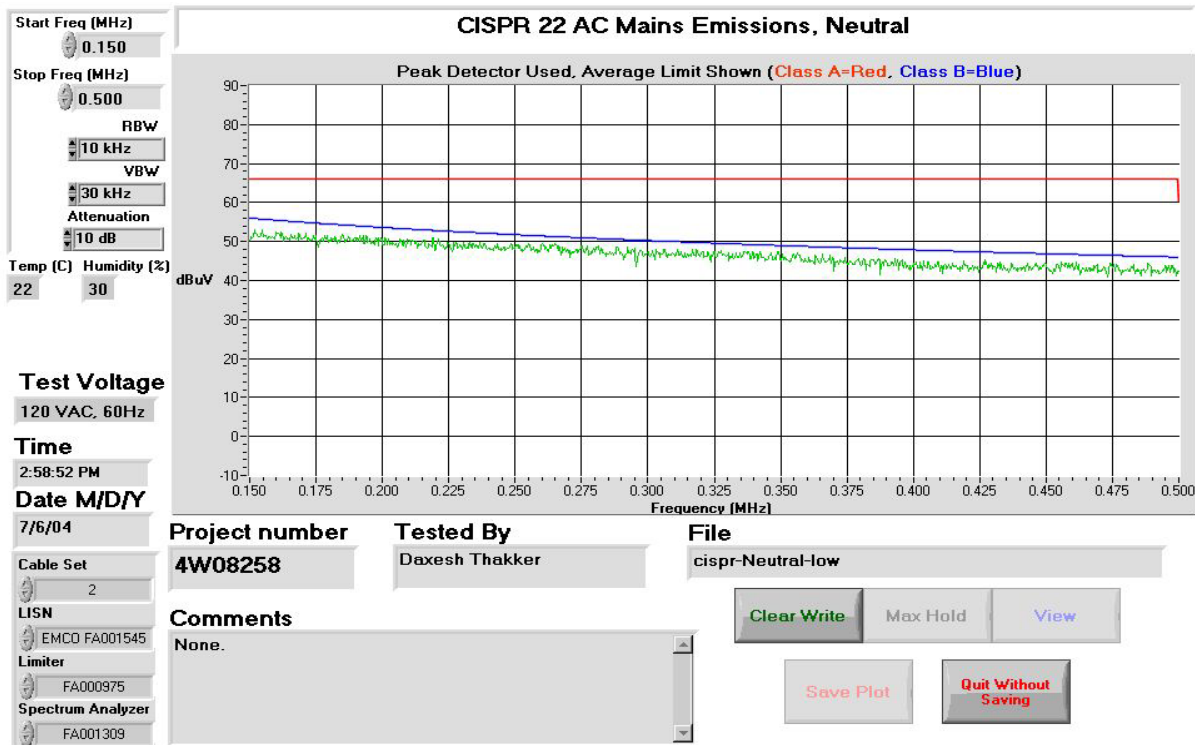
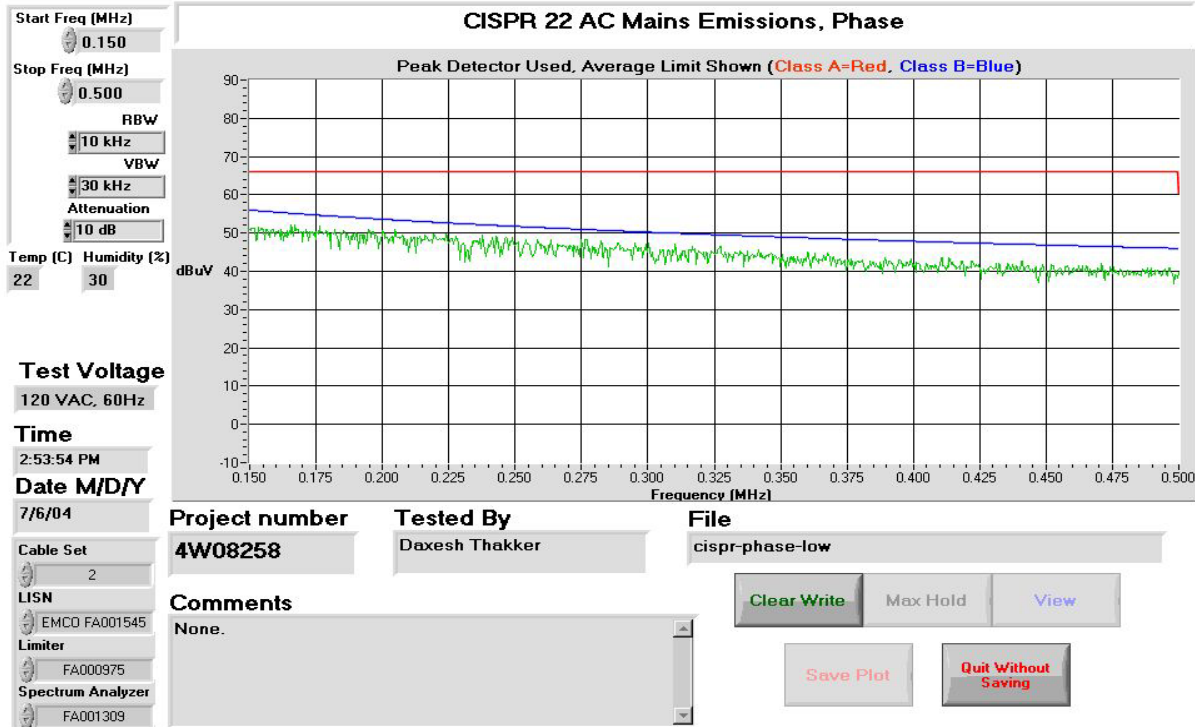
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.

Test Results: Complied

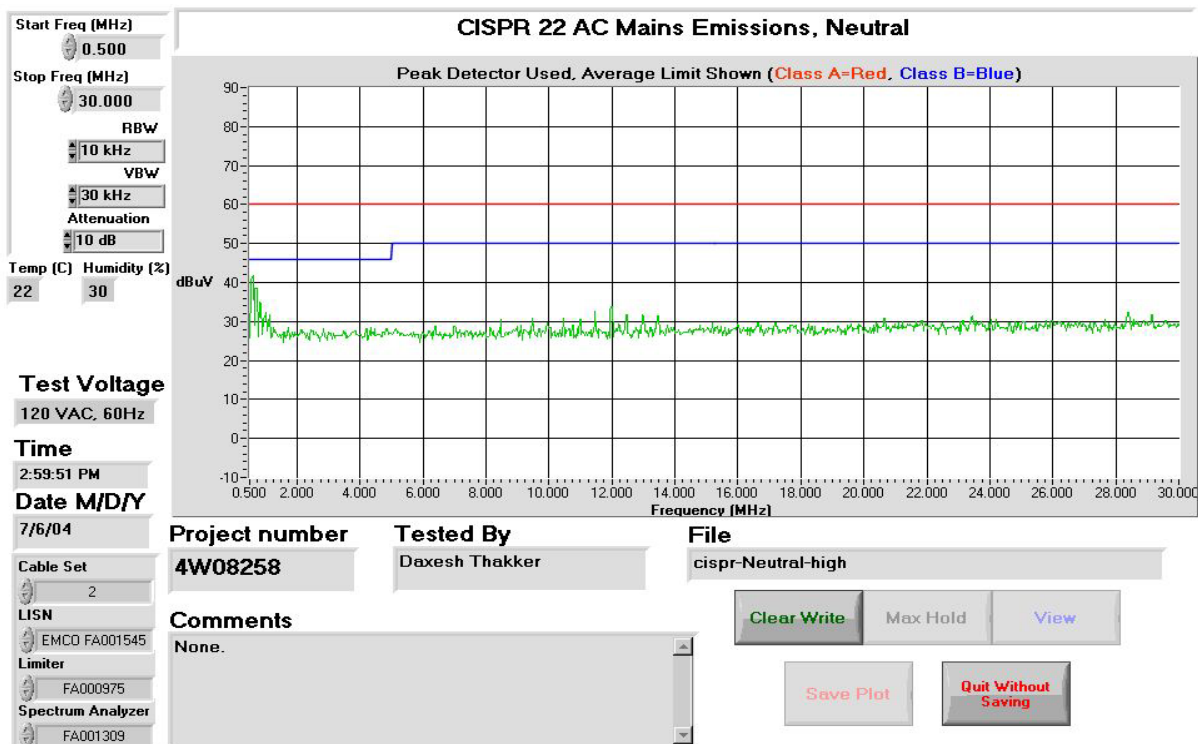
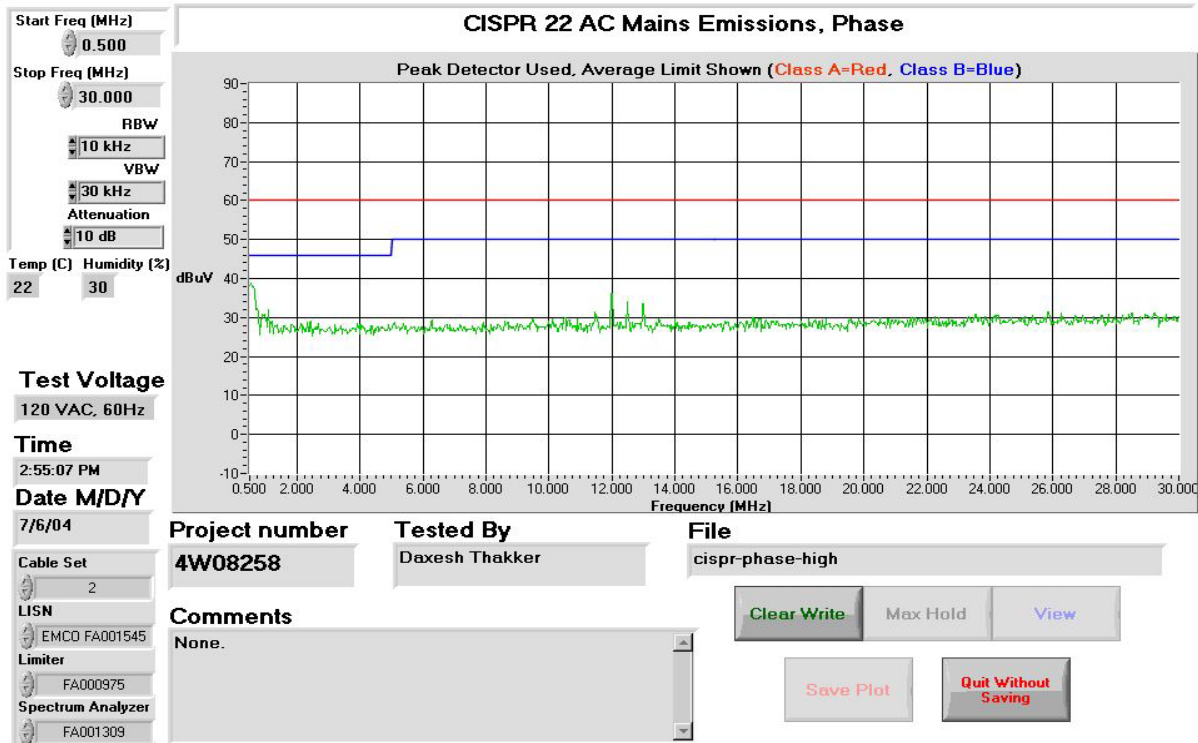
Measurement Data: See attached graph(s).

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Powerline Conducted Emission Plots



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

**Set-up
Photo:**



Section 4. Channel Separation

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

Test Performed By: Daxesh Thakker	Date of Test: July 5, 2004
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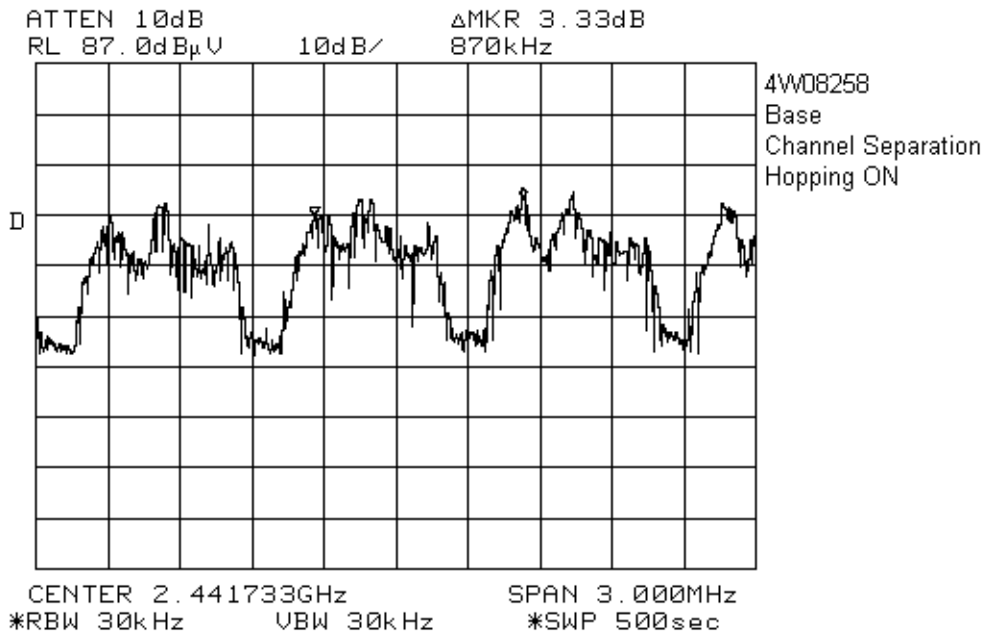
Test Results: Complied

Measurement Data: Channel Separation:
Base: 870kHz
Handset: 867 kHz

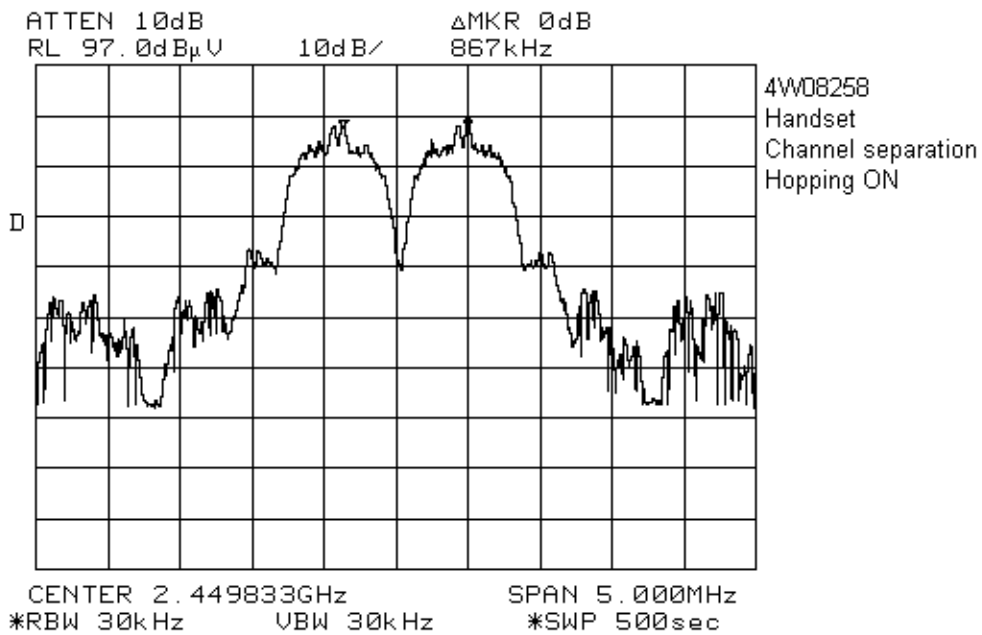
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Channel Separation Plots:

Base



Handset



Section 5. Number of Hopping Channels

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

Test Performed By: Daxesh Thakker	Date of Test: July 8, 2004
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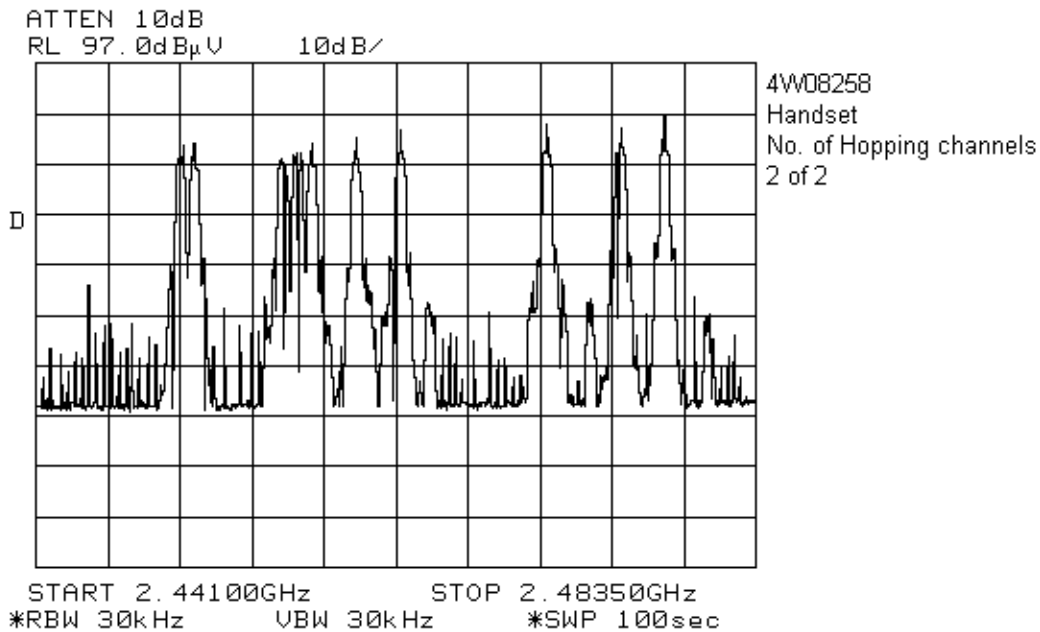
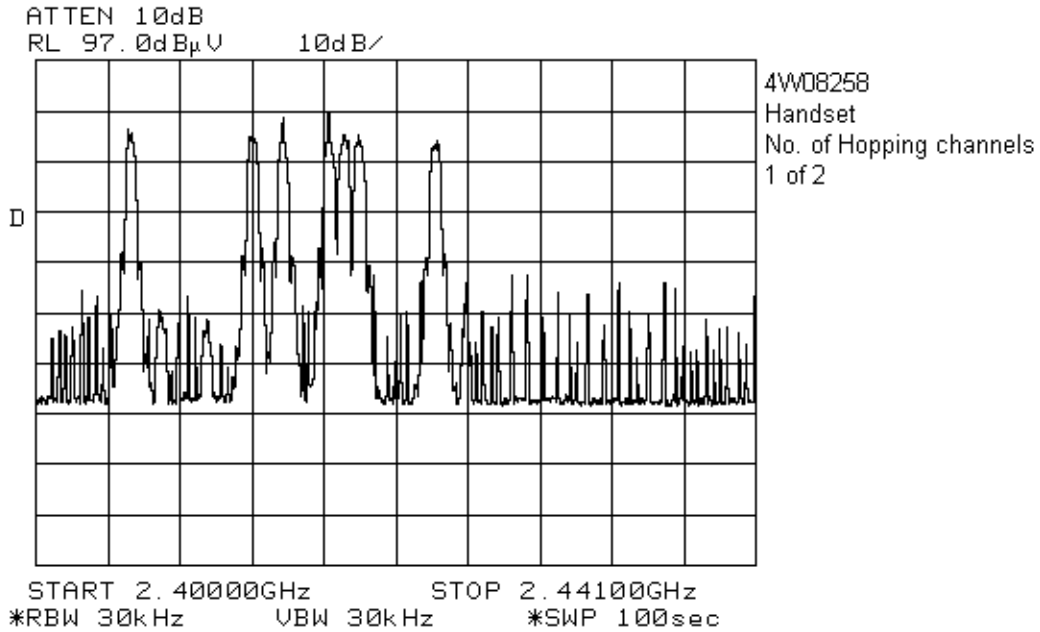
Test Results: Complied

Measurement Data: Number of Hopping Frequencies:

Base: 17
Handset:17

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset



Total Hopping channels = 7 + 10 = 17

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Section 6. Time of Occupancy

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

Test Performed By: Daxesh Thakker	Date of Test: July 5, 2004
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Test Results: Complied

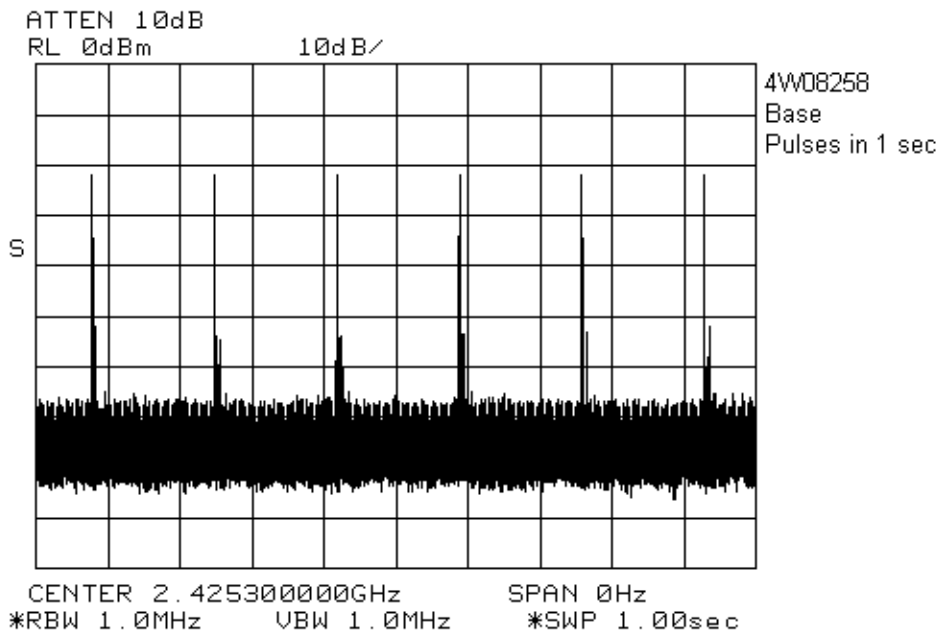
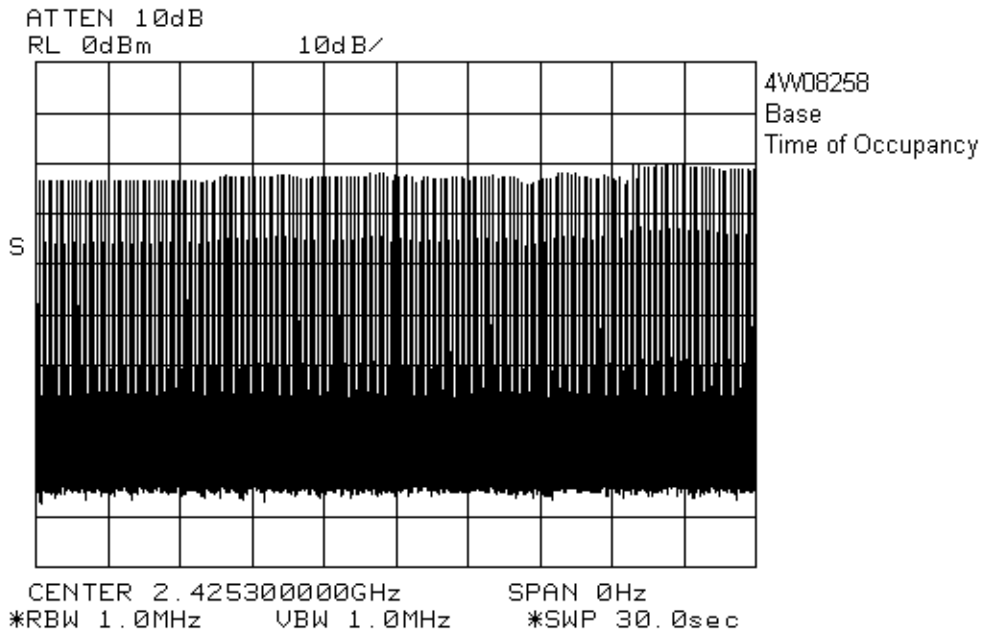
Measurement Data: Maximum Dwell Time On Any Channel:
See Plots.

Base: 146.88 mS
Handset: 148.32mS:

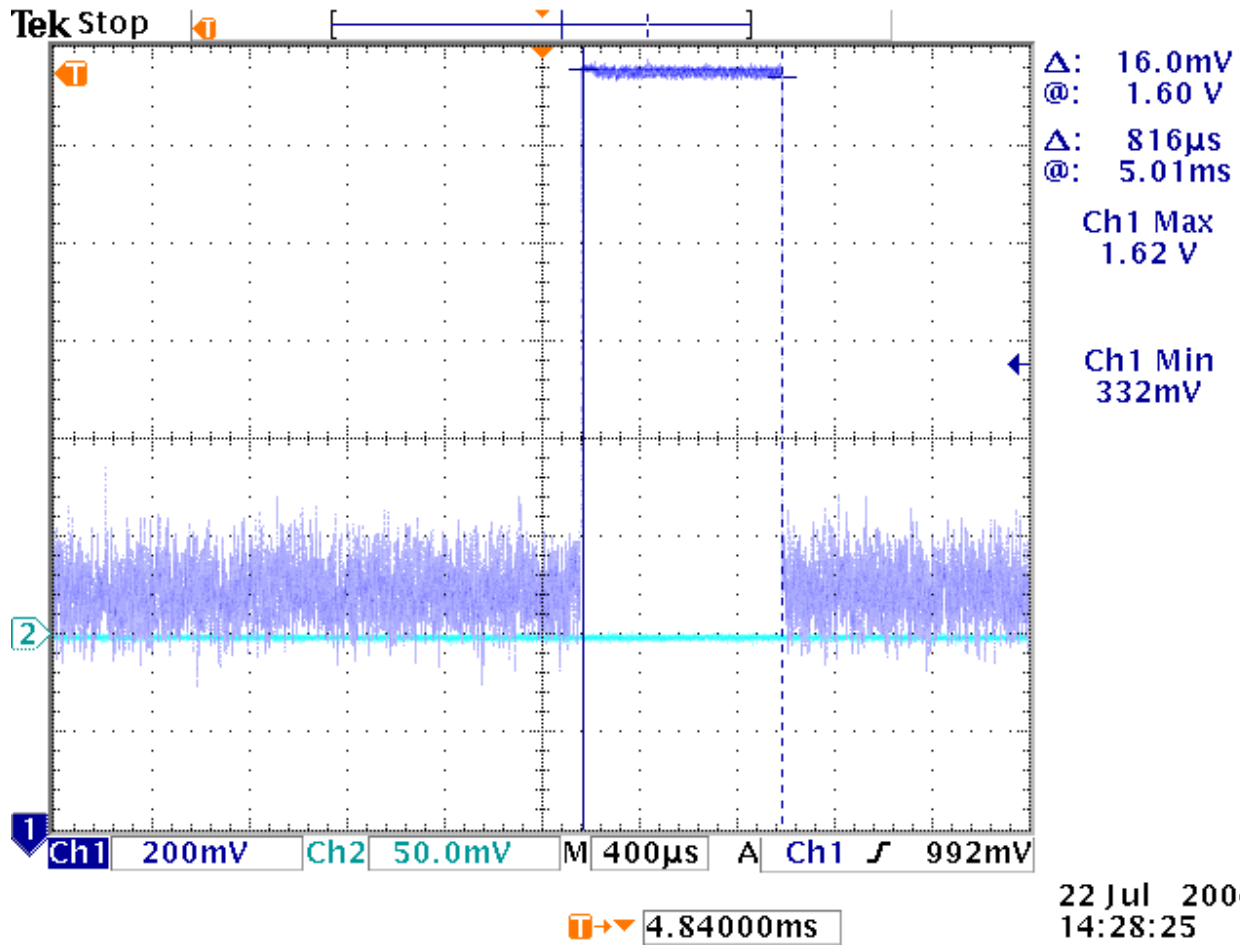
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Time Of Occupancy Plots.

Base



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone



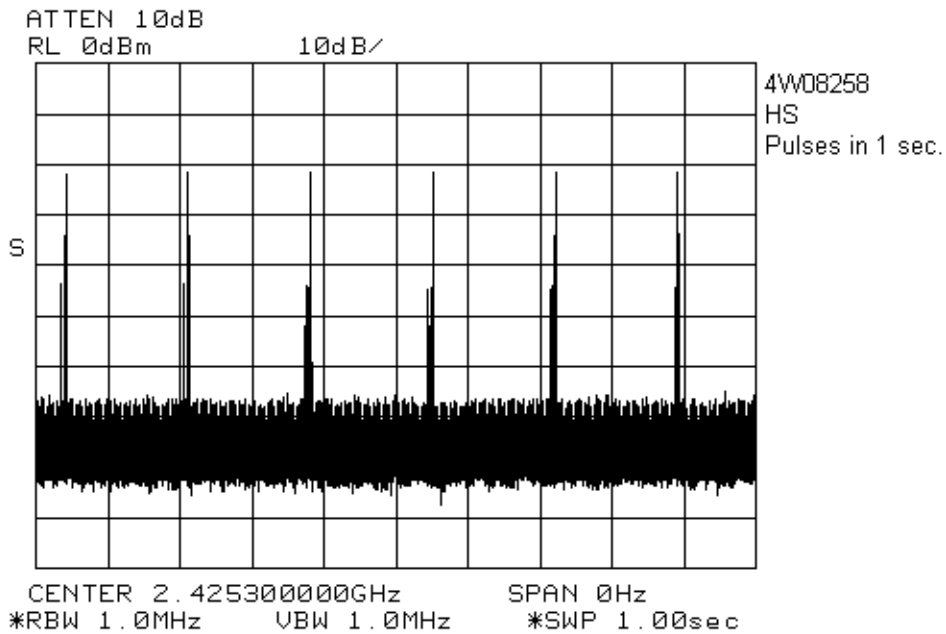
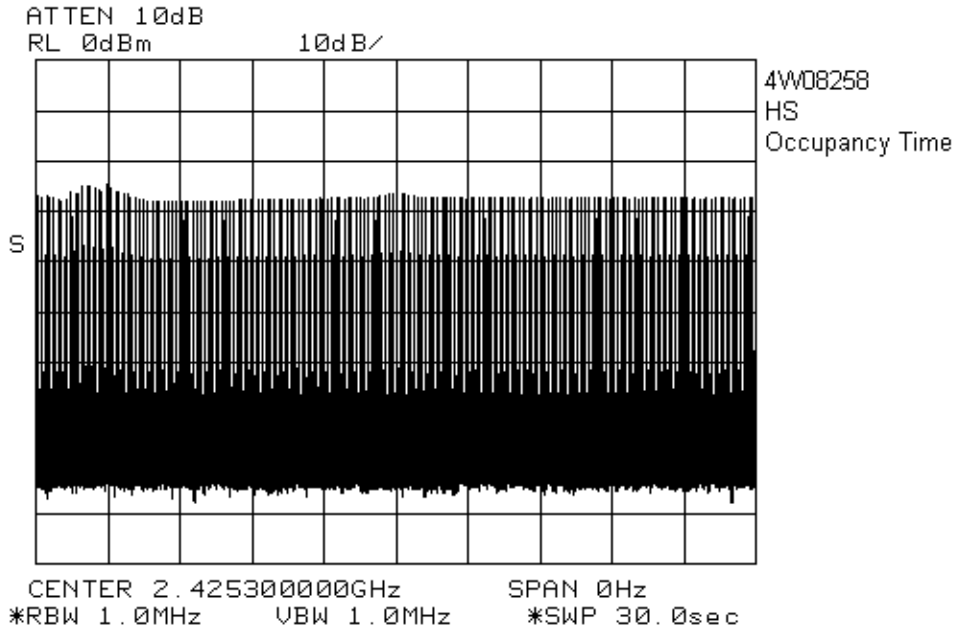
Active Slot showing 816us On-Time

Time of Occupancy Showing 180 hits per 30 sec

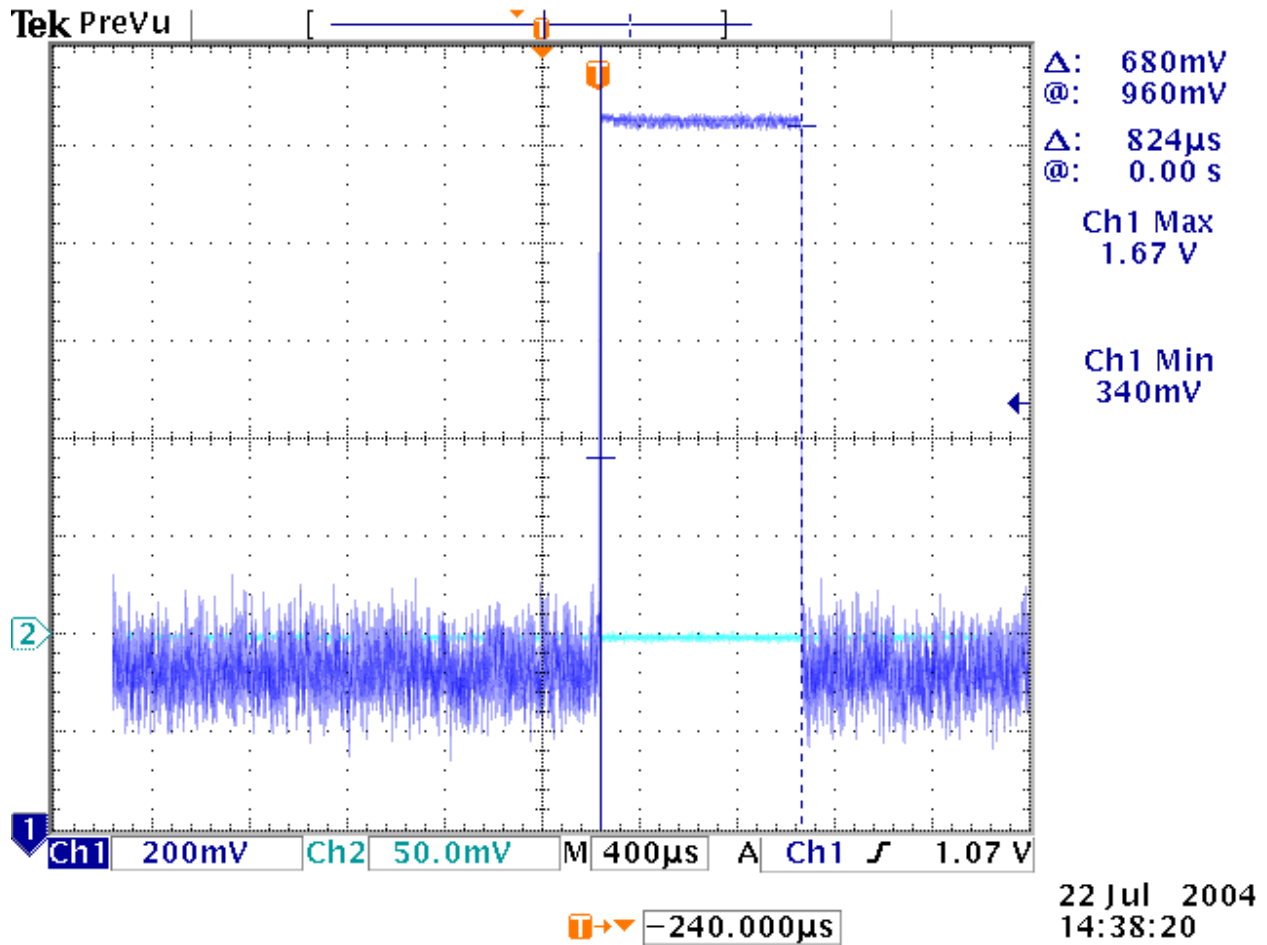
$$180 * 0.816 = 146.88ms$$

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone



Active Slot showing 824us On-Time

Time of Occupancy Showing 180 hits per 30 sec

$$180 * 0.824 = 148.32\text{ms}$$

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Section 7. Occupied Bandwidth

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

Test Performed By: Daxesh Thakker	Date of Test: July 5, 2004
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Test Results: Complied

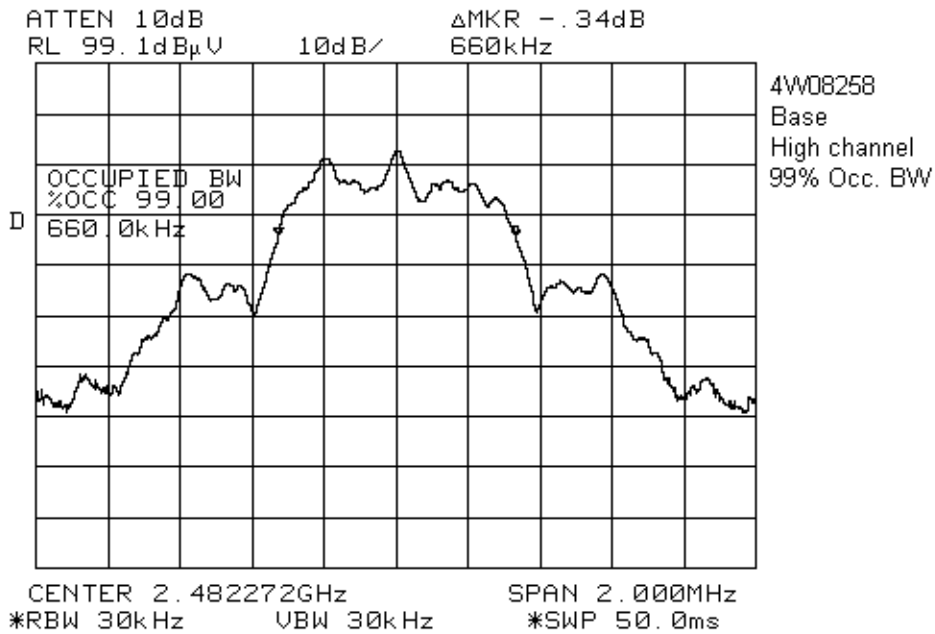
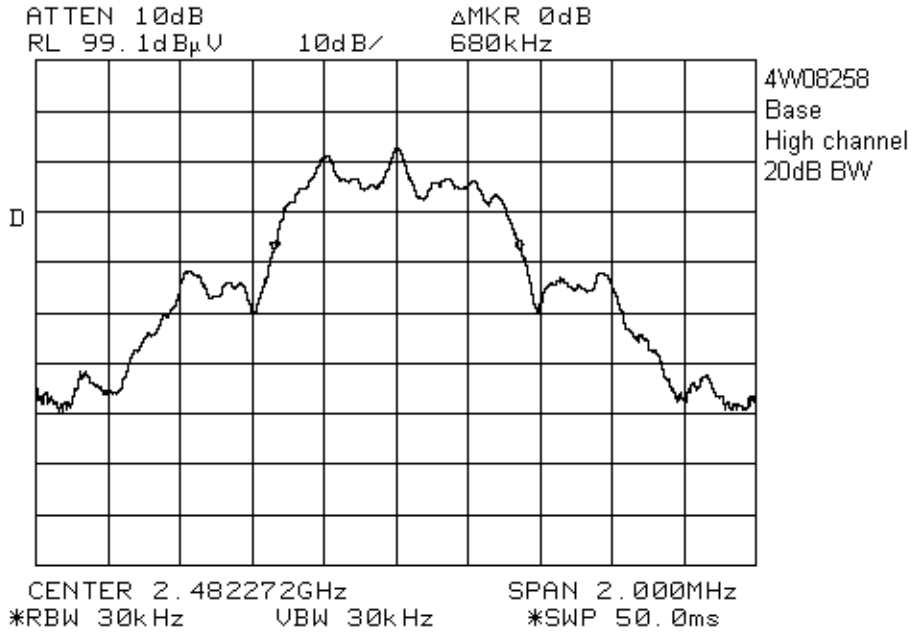
Measurement Data: See attached plots.

Base:
99%: 660 KHz
20 dB: 687 KHz

Handset
99%: 630 KHz
20 dB: 667 KHz

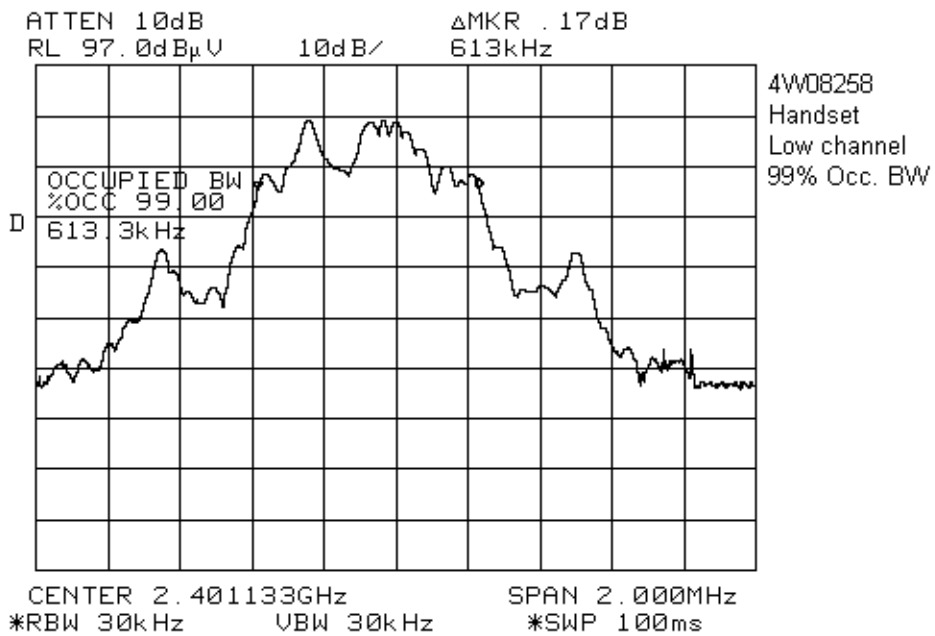
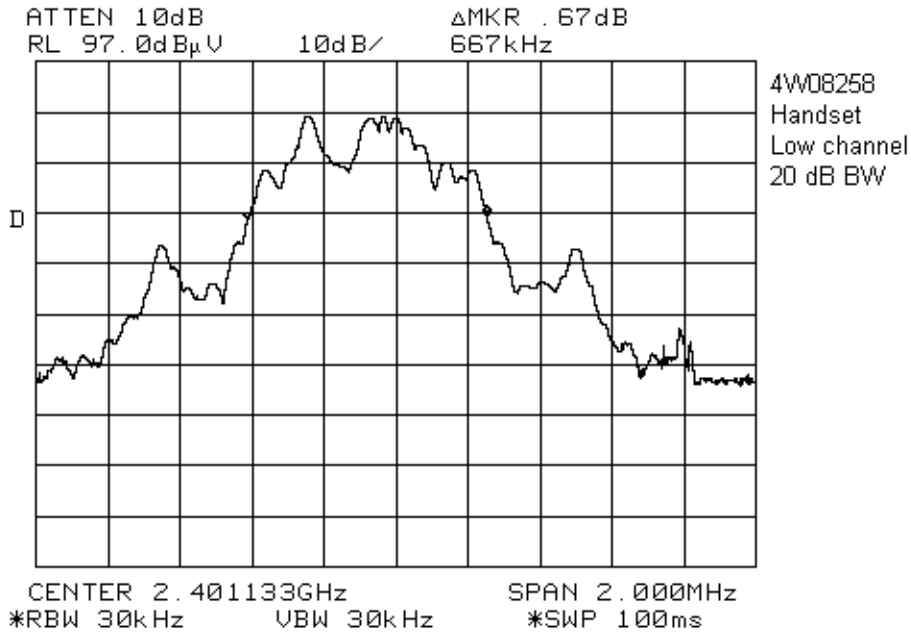
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Base – High Channel



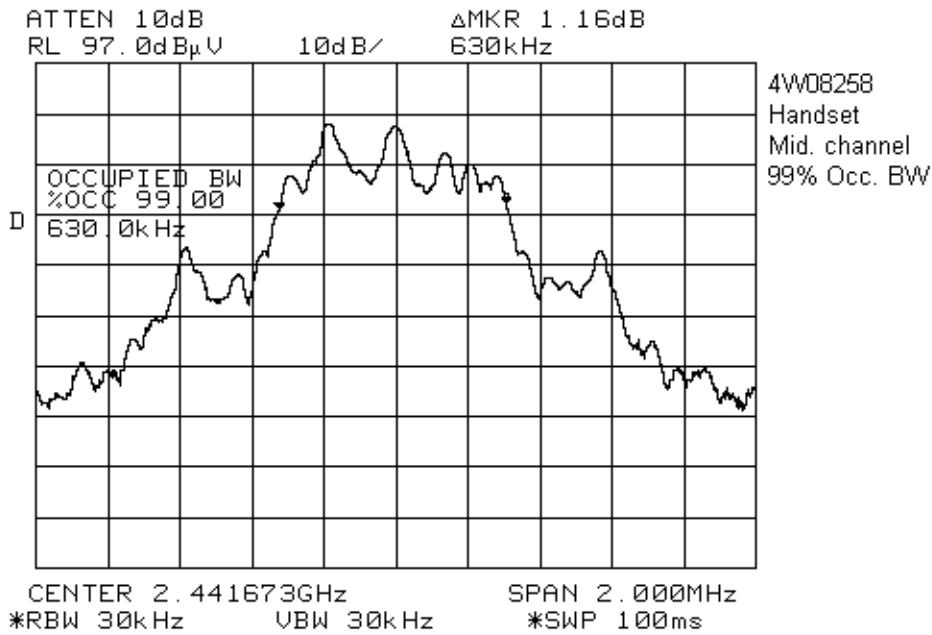
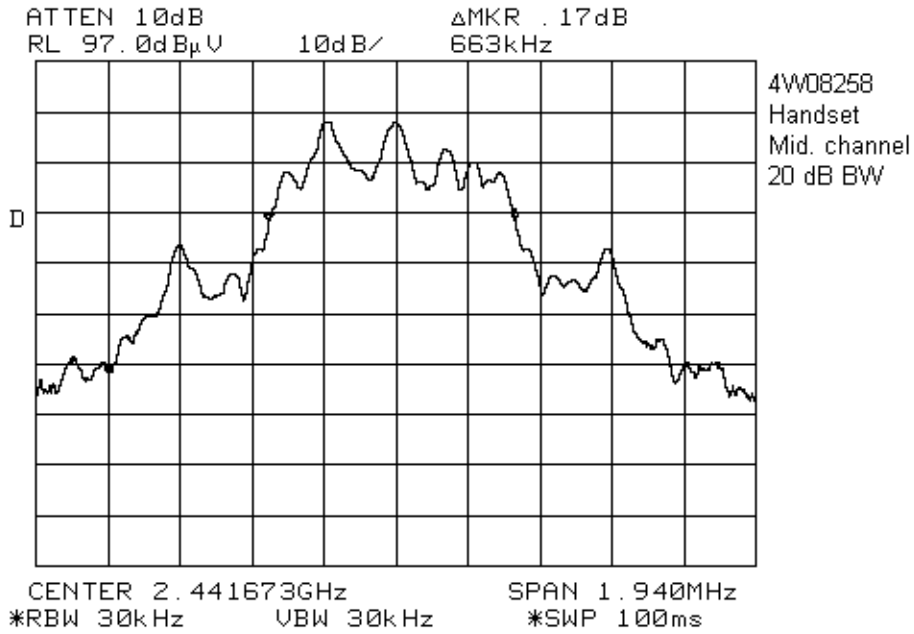
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset – Low Channel



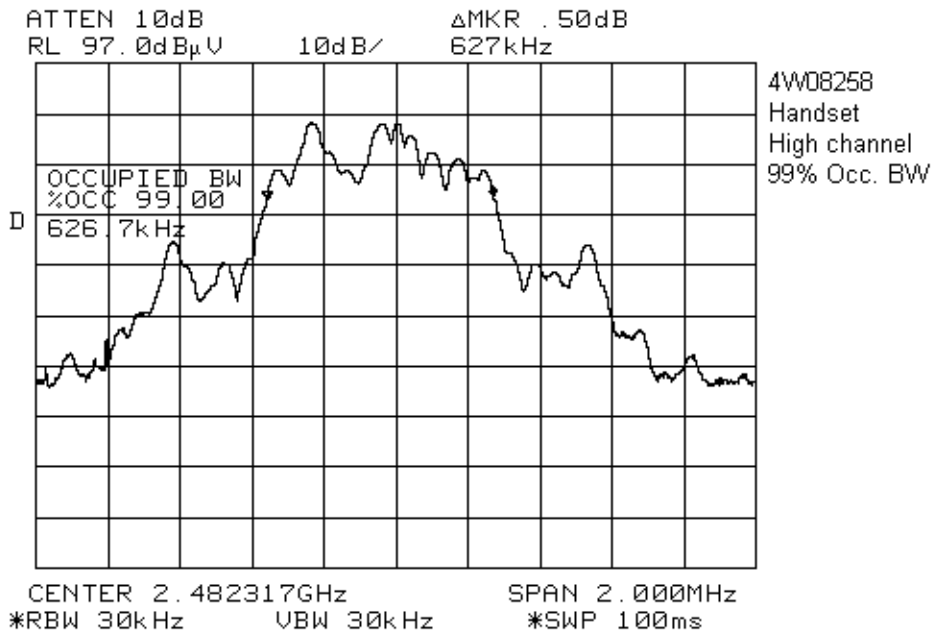
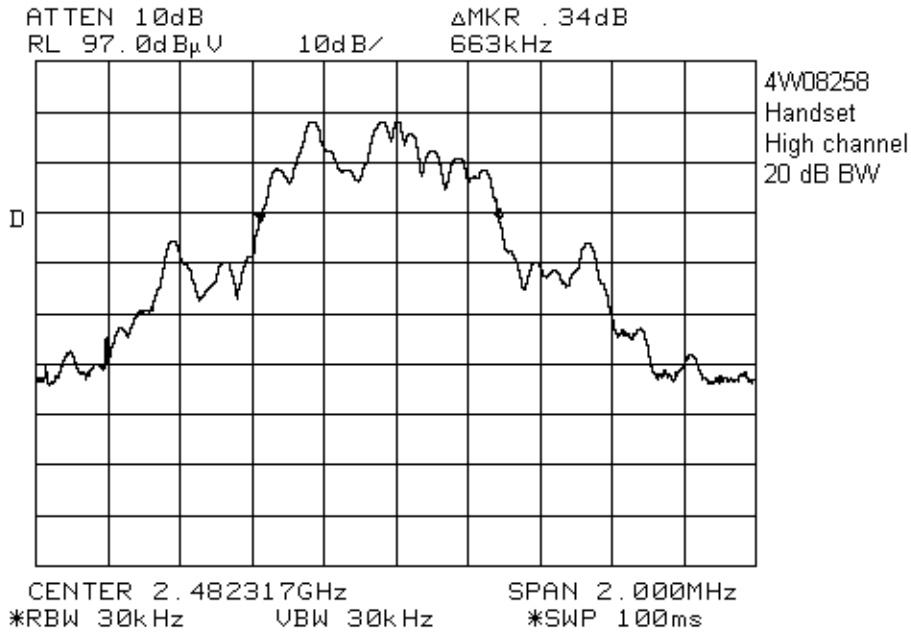
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset – Mid. Channel



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset – High Channel



Section 8. Peak Power Output

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

Test Performed By: Daxesh Thakker Kevin Carr	Date of Test: July 7, 2004, Aug. 9, 2004
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Test Results: Complies. The maximum peak power output of the transmitter is

$$P = \{E^2R^2/30G\} \text{ where}$$

	E, V/mtr @ 3m	R, mtr	G
Base	0.623	3	1
Handset	0.616	3	1

Base = 0.1167W, 20.67dBm
 Handset = 0.114W, 20.57dBm

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

The Handset was tested with a fresh battery. The handset was also tested with and without the headset attached. Worst case results have been reported.

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

Measurement Data: Detachable antenna? Yes No

If yes, state the type of non-standard connector used at the antenna port:

Directional Gain of Antenna: 0 dBi or 1 Numeric.
 Base (worst Case)
 Field Strength: 115.9 dBµV/m @ 3m or 0.623 V/m @ 3m.

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

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Radiated Disturbance Test Data:

Test Date: July 7, 2004							
Engineer's Name: Daxesh Thakker							
Base Station fundamental							
Tested as per (Table Top/Floor Standing): Table Top							
Test Distance (meters): 3				Range: 1			
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)
2441.6200	Horn2	V	81.7	28.9	N/A	5.3	115.9
2441.6200	Horn2	H	75.5	28.9	N/A	5.3	109.7
2401.1500	Horn2	V	79.0	28.9	N/A	4.8	112.7
2401.1500	Horn2	H	74.5	28.9	N/A	4.8	108.2
2482.2720	Horn2	V	79.8	28.9	N/A	5.9	114.6
2482.2720	Horn2	H	74.3	28.9	N/A	5.9	109.1
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.8565E, RBW = 1MHz					

Test Date: July 7, 2004, Aug. 9, 2004							
Engineer's Name: Daxesh Thakker, Kevin Carr							
Handset fundamental							
Tested as per (Table Top/Floor Standing): Table Top							
Test Distance (meters): 3				Range: 1			
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)
2441.6200	Horn2	V	81.6	28.9	N/A	5.3	115.8
2441.6200	Horn2	H	78.3	28.9	N/A	5.3	112.6
2401.1500	Horn2	V	81.6	28.9	N/A	4.8	115.3
2401.1500	Horn2	H	79.7	28.9	N/A	4.8	113.4
2482.2720	Horn2	V	80.7	28.9	N/A	5.9	115.5
2482.2720	Horn2	H	79.5	28.9	N/A	5.9	114.3
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.8565E, RBW = 1MHz					
		Aug. 9, 2004 environmental conditions see pg.4					

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Section 9. Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: Daxesh Thakker Kevin Carr	Date of Test: July 8, 9, 15 & 16 2004 Aug. 9, 2004
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Test Results: Complied.
The worst-case emission level is 41.9 dB μ V/m @ 3m at 179.713MHz. This is 1.6 dB below the specification limit.

Measurement Data: See attached table.

This EUT was searched in 3 orthogonal axes to determine worst-case emissions. The Handset was tested with a fresh battery. The handset was also tested with and without the headset attached. Worst case results have been reported.

Duty Cycle Calculation:
Base: $20\text{Log}\{(10 \times 0.805\text{mS})/100\} = -21.93\text{dB}$, max. allowed -20 dB.
Handset: $20\text{Log}\{(10 \times 0.761)/100\} = -22.38\text{dB}$, max. allowed -20 dB.

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Radiated Disturbance Test Data: Digital Emissions

Test Date: Aug. 10, 2004											
Engineer's Name: Kevin Carr											
Temperature (C°): 23						Humidity %: 85					
Tested as per (Table Top/Floor Standing): Table Top											
Test Distance (meters): 3						Range: Dome 1					
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Amp.
30.0000	BC1	V	8.3	12.1	N/A	0.7	21.1	40.0	18.9	Q-Peak	None
30.0000	BC1	H	5.1	13.1	N/A	0.7	18.9	40.0	21.1	Q-Peak	None
33.9986	BC1	V	14.2	11.2	N/A	0.7	26.2	40.0	13.8	Q-Peak	None
33.9986	BC1	H	5.9	12.4	N/A	0.7	19.0	40.0	21.0	Q-Peak	None
37.0000	BC1	V	9.1	10.7	N/A	0.8	20.6	40.0	19.5	Q-Peak	None
37.0000	BC1	H	4.7	11.9	N/A	0.8	17.4	40.0	22.6	Q-Peak	None
36.0000	BC1	V	16.4	10.8	N/A	0.8	28.0	40.0	12.0	Q-Peak	None
36.0000	BC1	H	8.0	12.1	N/A	0.8	20.8	40.0	19.2	Q-Peak	None
77.2500	BC1	V	15.6	7.0	N/A	1.0	23.6	40.0	16.4	Q-Peak	None
77.2500	BC1	H	20.9	7.1	N/A	1.0	29.0	40.0	11.0	Q-Peak	None
179.7130	BC1	V	21.2	12.9	N/A	1.7	35.8	43.5	7.7	Q-Peak	None
179.7130	BC1	H	28.3	11.9	N/A	1.7	41.9	43.5	1.6	Q-Peak	None
114.6010	BC1	V	16.0	10.6	N/A	1.3	28.0	43.5	15.5	Q-Peak	None
114.6010	BC1	H	9.2	10.3	N/A	1.3	20.8	43.5	22.7	Q-Peak	None
511.5000	LP1	V	9.3	17.9	N/A	2.8	30.0	46.0	16.0	Q-Peak	None
511.4890	LP1	H	12.3	18.4	N/A	2.8	33.5	46.0	12.5	Q-Peak	None
525.3130	LP1	V	9.5	18.4	N/A	2.9	30.8	46.0	15.2	Q-Peak	None
525.3130	LP1	H	7.5	18.9	N/A	2.9	29.3	46.0	16.7	Q-Peak	None
539.1400	LP1	V	8.7	18.1	N/A	3.1	29.9	46.0	16.1	Q-Peak	None
539.1400	LP1	H	12.9	18.6	N/A	3.1	34.6	46.0	11.4	Q-Peak	None
235.0000	LP1	V	17.0	11.5	N/A	2.0	30.5	46.0	15.6	Q-Peak	None
235.0000	LP1	H	18.3	11.8	N/A	2.0	32.1	46.0	14.0	Q-Peak	None
207.3620	LP1	V	17.3	11.6	N/A	1.8	30.6	43.5	12.9	Q-Peak	None
207.3620	LP1	H	22.5	11.9	N/A	1.8	36.2	43.5	7.3	Q-Peak	None
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, Peak = 1.0 MHz RBW											
Notes:		The EUT was searched to the 5 th Harmonic of the highest frequency generated or used by the device.									

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Radiated Disturbance Test Data: Base station Harmonics, Average

Test Date: July 8, 2004											
Engineer's Name: Daxesh Thakker											
Tested as per (Table Top/Floor Standing): Table Top											
Test Distance (meters): 3							Range: 1				
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. Factor (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Amp.
Ch. 00											
4802.3300	Horn2	V	70.7	34.1	53.2	-20.0	8.1	39.7	54.0	14.3	4-8GHz
4802.3300	Horn2	H	69.2	34.3	53.2	-20.0	8.1	38.4	54.0	15.6	4-8GHz
7202.5700	Horn2	V	66.5	36.8	53.7	-20.0	11.3	40.9	54.0	13.1	4-8GHz
7202.5700	Horn2	H	66.8	37.0	53.7	-20.0	11.3	41.4	54.0	12.6	4-8GHz
Ch. 47											
4882.8600	Horn2	V	67.7	34.2	52.6	-20.0	8.9	38.1	54.0	15.9	4-8GHz
4882.8600	Horn2	H	65.2	34.4	52.6	-20.0	8.9	35.8	54.0	18.2	4-8GHz
7324.1600	Horn2	V	68.5	36.8	53.7	-20.0	10.1	41.8	54.0	12.2	4-8GHz
7324.1600	Horn2	H	67.8	37.0	53.7	-20.0	10.1	41.3	54.0	12.7	4-8GHz
Ch. 94											
4964.9300	Horn2	V	68.9	34.2	52.3	-20.0	9.5	40.3	54.0	13.7	4-8GHz
4964.9300	Horn2	H	67.3	34.4	52.3	-20.0	9.5	38.9	54.0	15.1	4-8GHz
7446.8200	Horn2	V	68.5	36.8	53.2	-20.0	11.1	43.3	54.0	10.7	4-8GHz
7446.8200	Horn2	H	67.8	37.0	53.2	-20.0	11.1	42.8	54.0	11.2	4-8GHz
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 Note 3: The EUT was searched up to 10th harmonics of the fundamental.											
Notes:		Measurement Receiver = H.P.8565E, RBW = 1MHz									

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

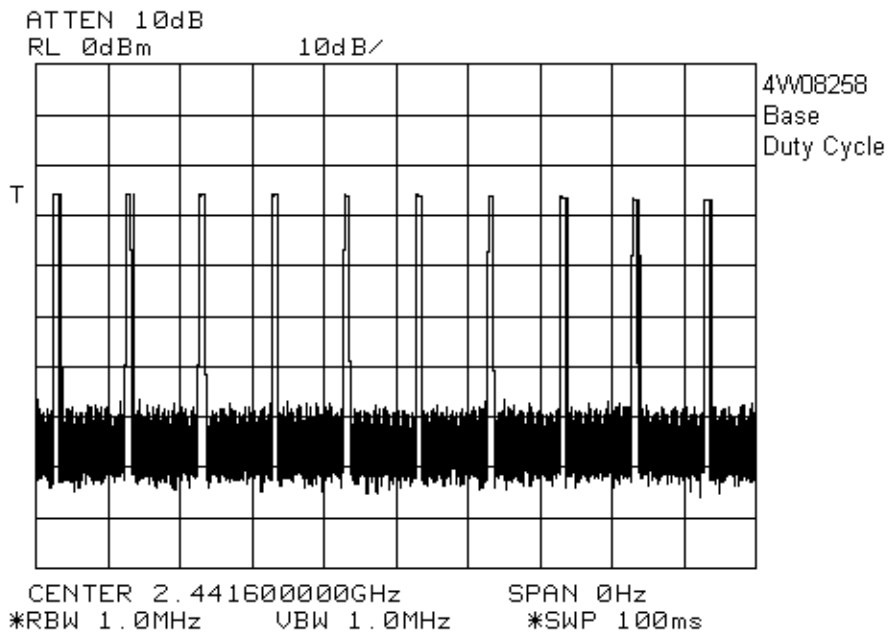
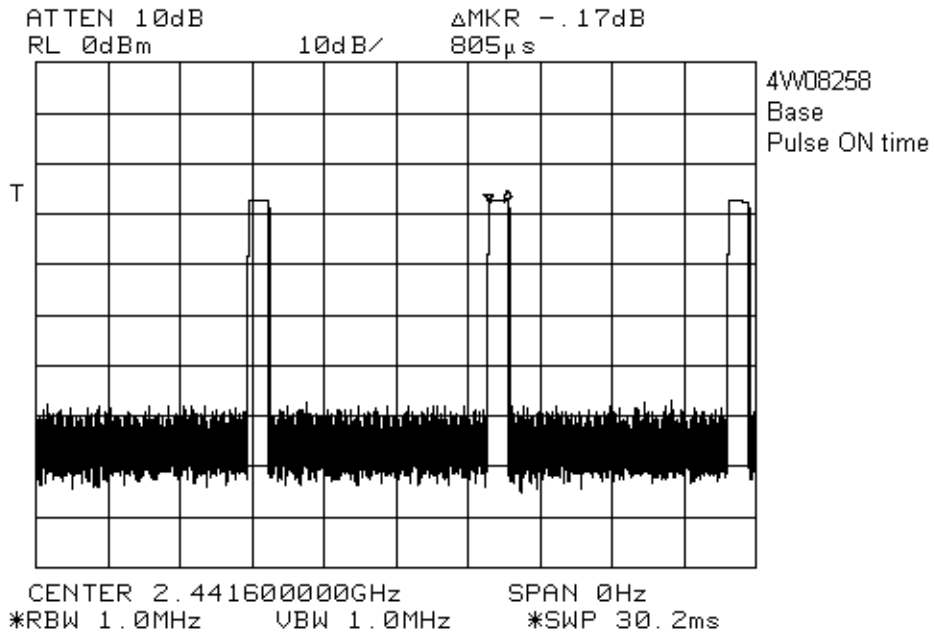
Radiated Disturbance Test Data: Handset Harmonics, Average

Test Date: Aug. 9, 2004											
Engineer's Name: Kevin Carr											
Tested as per (Table Top/Floor Standing): Table Top											
Test Distance (meters): 3						Range: 1					
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. Factor (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Amp.
Ch. 00											
4802.3300	Horn2	V	72.0	34.1	53.2	-20.0	8.1	41.0	54.0	13.0	4-8GHz
4802.7800	Horn2	H	68.0	34.3	53.2	-20.0	8.1	37.2	54.0	16.8	4-8GHz
7202.8900	Horn2	V	60.0	36.8	53.7	-20.0	11.3	34.4	54.0	19.6	4-8GHz
7202.5700	Horn2	H	66.3	37.0	53.7	-20.0	11.3	40.9	54.0	13.1	4-8GHz
Ch. 47											
4882.8600	Horn2	V	72.0	34.2	52.6	-20.0	8.9	42.4	54.0	11.6	4-8GHz
4882.8600	Horn2	H	67.0	34.4	52.6	-20.0	8.9	37.6	54.0	16.4	4-8GHz
7324.1600	Horn2	V	62.2	36.8	53.7	-20.0	10.1	35.5	54.0	18.5	4-8GHz
7324.9000	Horn2	H	67.0	37.0	53.7	-20.0	10.1	40.5	54.0	13.5	4-8GHz
Ch. 94											
4964.9300	Horn2	V	72.0	34.2	52.3	-20.0	9.5	43.4	54.0	10.6	4-8GHz
4964.9300	Horn2	H	68.5	34.4	52.3	-20.0	9.5	40.1	54.0	13.9	4-8GHz
7446.8200	Horn2	V	62.0	36.8	53.2	-20.0	11.1	36.8	54.0	17.2	4-8GHz
7446.8200	Horn2	H	66.0	37.0	53.2	-20.0	11.1	41.0	54.0	13.0	4-8GHz
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 Note 3: The EUT was searched up to 10th harmonics of the fundamental.											
Notes:		Measurement Receiver = H.P.8565E, RBW = 1MHz									
		Aug. 9, 2004 environmental conditions see pg.4									

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

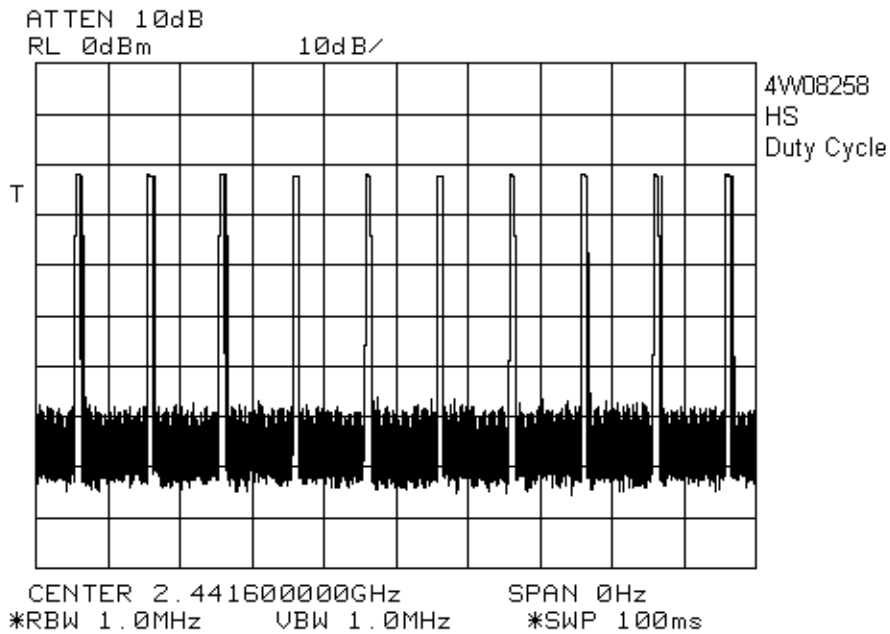
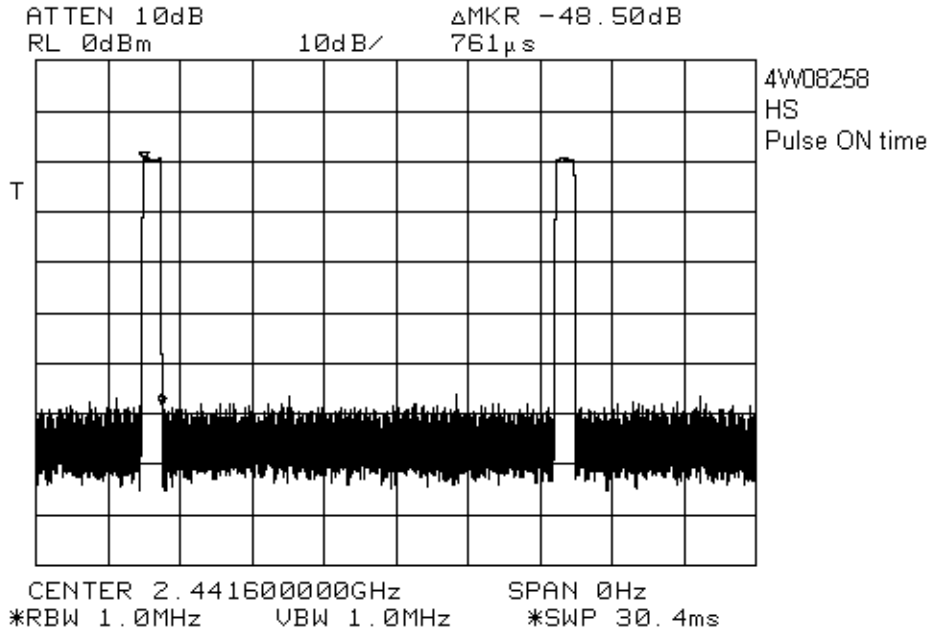
Duty Cycle Plots:

Base

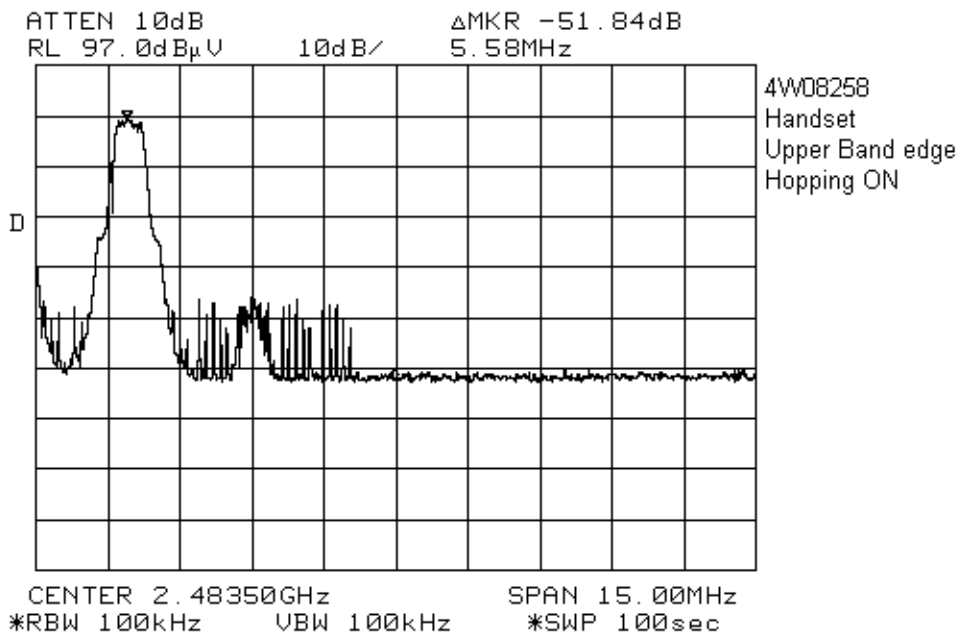
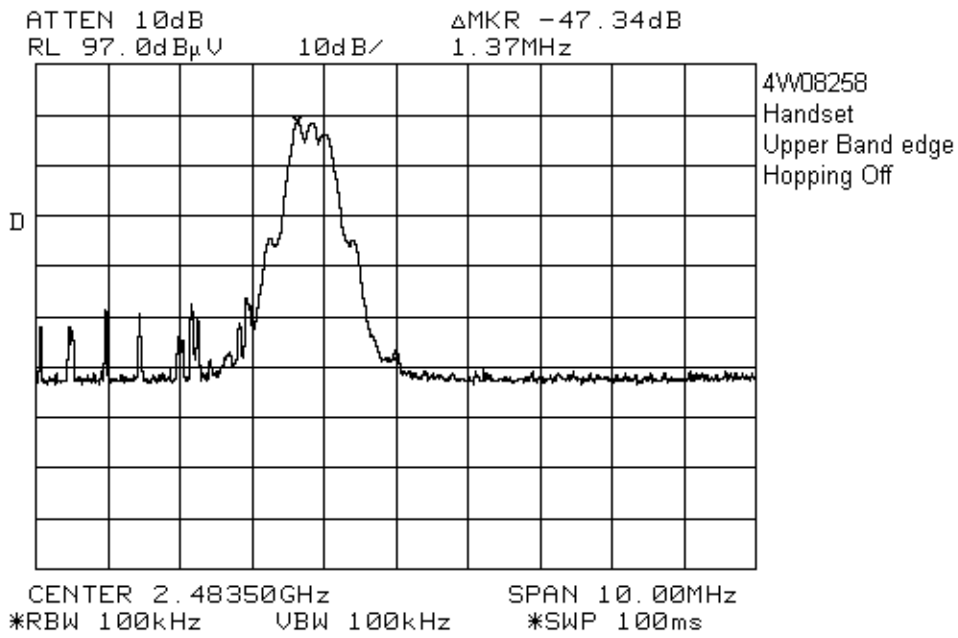


EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset

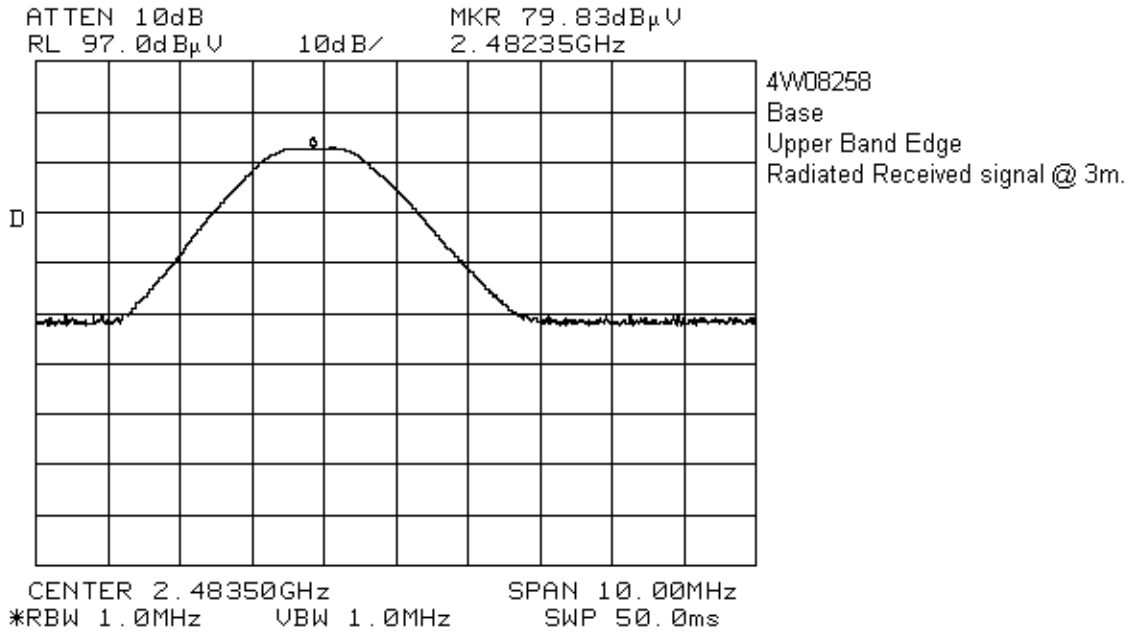


EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

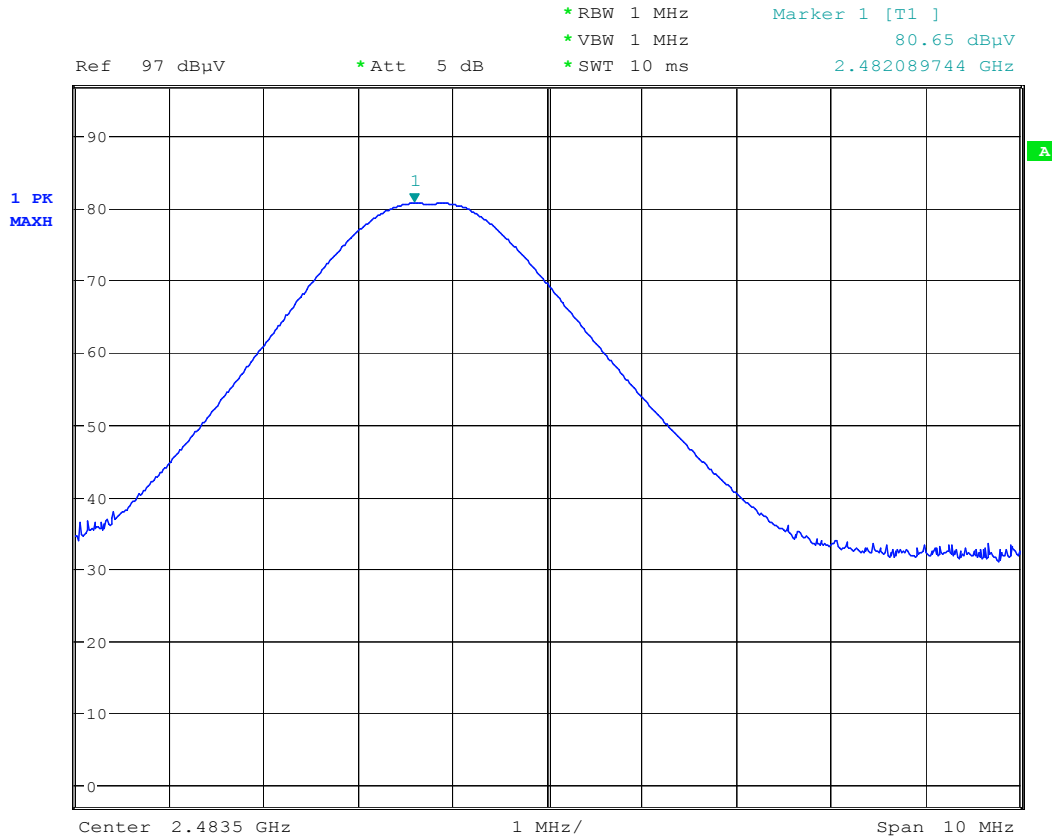
**Band Edge (Restricted Band)
 Marker Delta Method calculation
 Base**



Peak Level, Band Edge = 79.83 dBuV + 28.9dB + 5.9 = 114.63 dBuV @ 3m.
Peak Band Edge Level (Marker Delta): = 114.63 – 46 = 68.63dBuV/m at 3 m.
Average = 68.63 – 20 = 48.63 dBuV/m @ 3m.
Limit is 54 dBuV/m @ 3m.

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Handset



Date: 14.JUL.2004 03:32:52

Peak Level, Band Edge = 80.63 dBuV + 28.9dB + 5.9 = 115.43 dBuV @ 3m.
Peak Band Edge Level (Marker Delta): = 115.43 – 47.34 = 68.09dBuV/m at 3 m.
Average = 68.09 – 20 = 48.09 dBuV/m @ 3m.
Limit is 54 dBuV/m @ 3m.

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Set-up Photo:

Base – Front view



Rear view



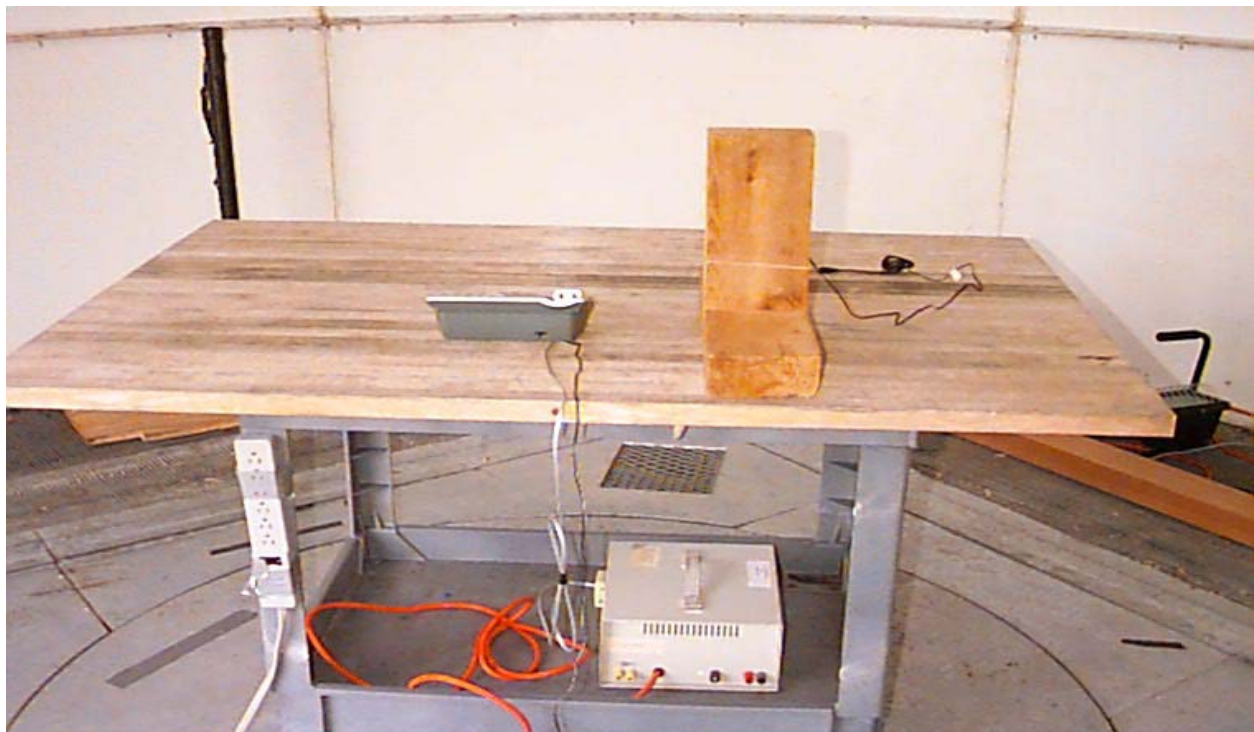
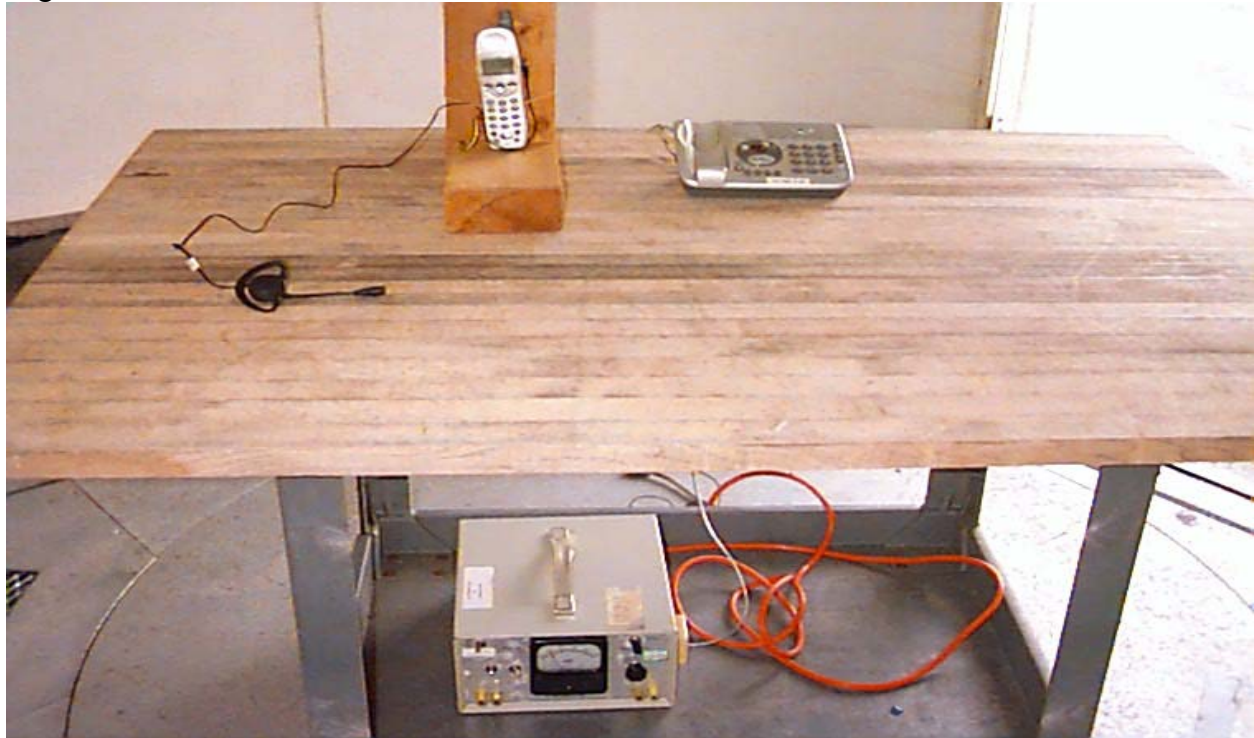
Handset

EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone



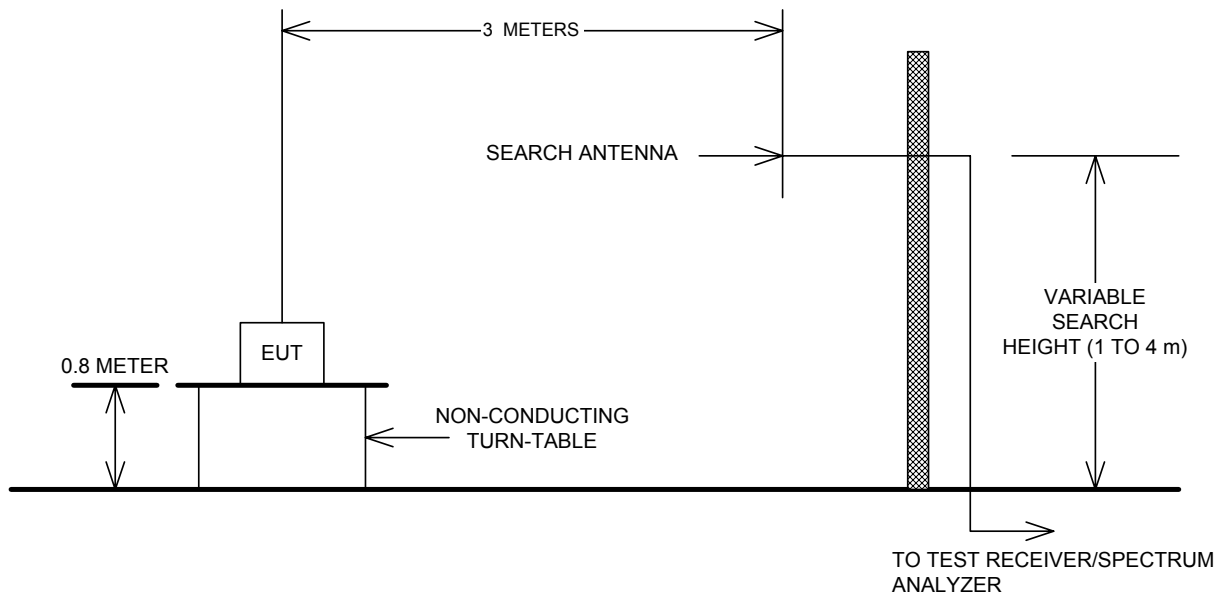
EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Digital emissions – Off Hook.

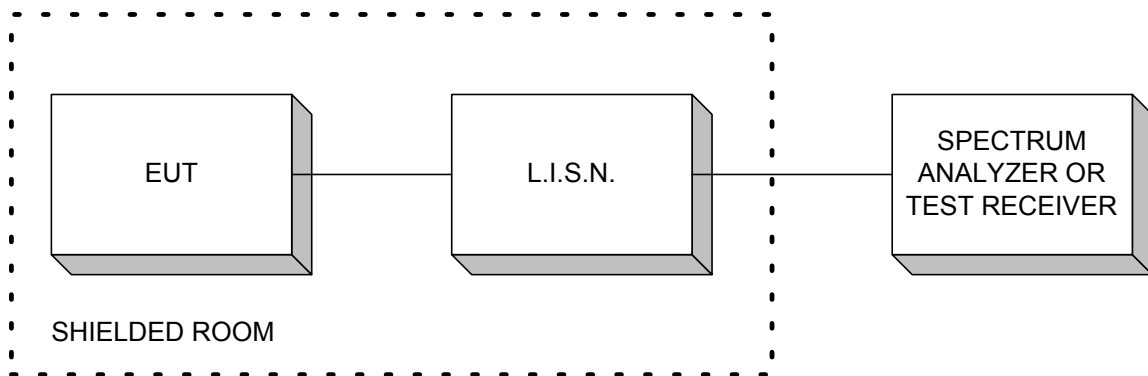


Section 10. Block Diagrams

Test Site For Radiated Emissions



AC Wire line Conducted Emissions



EQUIPMENT: AT&T E2135, 2.4GHz FHSS Cordless Telephone

Section 11. Test Equipment List

Conducted Disturbance at Mains Test Equipment Used:

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	LISN	EMCO	4825/2	FA001545	Oct. 30/03	Oct. 30/04
Extended	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 26/04	May. 26/05
Extended	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 26/04	May. 26/05
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10, 04	June 10, 05

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001437	July. 24/03	July. 24/04
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	May 31/04	May 31/05
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	Apr. 23/04	Apr. 23/05
1 Year	Horn Antenna #1	EMCO	3115	FA000649	Dec. 18/03	Dec. 18/04
1 Year	Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 2/03	Sept. 2/04
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June 18, 04	June 18, 05
1 Year	2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June 18, 04	June 18, 05
1 Year	4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June 18, 04	June 18, 05
1 Year	18-40 GHz Horn Antenna #5	ETS	3116	FA001847	Jan. 19/04	Jan. 19/05
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 10/03	Dec. 10/04
COU	5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU	COU
COU	HP filter	u wave inc.	11SH10-4000	FA001340	COU	COU
COU	18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU	COU

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair