

EXHIBIT A

[FCC Ref. 2.1033(b)(6)]

"Report of Measurements"

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PRODUCT DESCRIPTION

The ATLINKS USA, Inc. Model 21018XXX-A is a 2.4GHz single-line, frequency hopping spread spectrum, cordless telephone with caller ID, speakerphone, dual handsets and recharge cradle that operates from 2401.808203 MHz to 2479.398926 MHz.

The above model is similar to previously registered Model 21008XXX-B having the same RF modules and antennae except for addition of speakerphone and some minor circuitry changes.

This also covers optional handset Model 21009XXX-A which is identical to the handset of Model 21018XXX-A except for model designation.

Refer to Exhibit A(6) for complete frequency list.

NOTE: The base uses from **75 to 88** channels. The handset uses **75** channels.

MARSTECH LIMITED

15.107 (a) POWER LINE CONDUCTED INTERFERENCE

[MODEL 21008XXX-B]

Requirements:

Frequency of Emission (MHZ)	Conducted Limit (dB μ V)	
	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.

Test Procedure:

ANSI STANDARD C63.4-1992. using a 50uH LISN. Both lines were observed with the EUT transmitting. The bandwidth of the spectrum analyzer was 9KHz QP with an appropriate sweep speed. The ambient temperature of the EUT was 24°C with a humidity of 60%.

The spectrum was scanned from 0.15 to 30MHz.

Test Data: **[MODEL 21008XXX-B]**

The highest emission read for PHASE was 36.83 dB μ V@ 0.15 MHz.

The highest emission read for NEUTRAL was 35.87 dB μ V@ 0.15 MHz.

The graphs on Appendix 1 and 2 represent the emissions taken for this device.

Test Results:

Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

15.205(c)/15.209

SPURIOUS RADIATED EMISSIONS IN RESTRICTED BANDS

[MODEL 21008XXX-B]

Procedure

The test procedure used was ANSI STANDARD C63.4-1992 and DA-00-705 using an appropriate spectrum analyzer, as listed in the Test Equipment List. The bandwidth (RBW) of the spectrum analyzer was 100KHz/120KHz up to 1GHz with an appropriate sweep speed. The RBW above 1.0GHz was = 1.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the EUT was 24°C with a humidity of 60%.

Requirements:

Emissions that fall in the restricted bands (15.205) must be less than 54dB μ V/m

Test Data: **[MODEL 21008XXX-B]**

Refer to Exhibits A(3)-3 to A(3)-5

15.205(c)/15.209

FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS

BASE UNIT (ANT0) -

[MODEL 21008XXX-B]

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S. dBμV/M	Average FCC Limit	Margin dB
Low Channel								
2401.808	84.00	—	Horn V	33.08	117.08	—	—	—
4803.616	22.00	7.00	Horn V	38.53	60.53	45.53	54	-8.47
7205.424	17.00	5.00	Horn V	43.84	60.84	48.84	54	-5.16
Mid Channel								
2440.156	83.00	—	Horn V	33.20	116.20	—	—	—
4880.312	20.00	6.00	Horn V	38.61	58.61	44.61	54	-9.39
7320.468	17.00	5.00	Horn V	44.06	61.06	49.06	54	-4.94
High Channel								
2479.398	83.00	—	Horn V	33.23	116.23	—	—	—
2483.5	31.00	8.00	Horn V	33.89	64.89	41.89	54	-12.11
4958.796	20.00	6.00	Horn V	38.85	58.85	44.85	54	-9.15
7438.194	17.00	3.00	Horn V	44.28	61.28	47.28	54	-6.72

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.205(c)/15.209

FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS**BASE UNIT (ANT1) - [MODEL 21008XXX-B]**

Frequency Band MHz	Meter Reading (Peak) @3m dBuV/M	Meter Reading (Average) @3m dBuV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBuV/M	Average F. S. dBuV/M	Average FCC Limit	Margin dB
Low Channel								
2401.808	83.00	—	Horn V	33.08	116.08	—	—	—
4803.616	19.00	6.00	Horn V	38.53	57.53	44.53	54	-9.47
7205.424	17.00	5.00	Horn V	43.84	60.84	48.84	54	-5.16
Mid Channel								
2440.156	83.00	—	Horn V	33.20	116.20	—	—	—
4880.312	20.00	6.00	Horn V	38.61	58.61	44.61	54	-9.39
7320.468	17.00	5.00	Horn V	44.06	61.06	49.06	54	-4.94
High Channel								
2479.398	83.00	—	Horn V	33.23	116.23	—	—	—
2483.5	30.00	8.00	Horn V	33.89	63.89	41.89	54	-12.11
4958.796	20.00	6.00	Horn V	38.85	58.85	44.85	54	-9.15
7438.194	17.00	3.00	Horn V	44.28	61.28	47.28	54	-6.72

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.205(c)/15.209

FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS**HANDSET UNIT - [MODEL 21008XXX-B]**

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S. dBμV/M	Average FCC Limit	Margin dB
Low Channel								
2401.808	83.00	—	Horn V	33.08	116.08	—	—	—
4803.616	21.00	3.00	Horn H	38.28	59.28	41.28	54	-12.72
7205.424	20.00	1.00	Horn H	43.94	63.94	44.94	54	-9.06
Mid Channel								
2440.156	83.00	—	Horn V	33.20	116.20	—	—	—
4880.312	19.00	2.00	Horn H	38.47	57.47	40.47	54	-13.53
7320.468	18.00	1.00	Horn H	44.06	62.06	45.06	54	-8.94
High Channel								
2479.398	83.00	—	Horn V	33.23	116.23	—	—	—
2483.5	29.00	6.00	Horn H	33.89	62.89	39.89	54	-14.11
4958.796	20.00	2.00	Horn H	40.30	60.30	42.30	54	-11.70
7438.194	16.00	0.00	Horn H	44.38	60.38	44.38	54	-9.62

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.247(a)(1) HOPPING CHANNEL SEPARATION

[MODEL 21008XXX-B]

Requirements:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Frequency hopping systems in the 2.4GHz band may have hopping channel carrier frequencies separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems employ fewer than 75 hopping channels and operate with an output power no greater than 125 mW.

Measurement Procedure

1. Position the EUT without connection to the Spectrum Analyzer (SA). Turn on the EUT and connect it to the SA. Then set it to any one convenient frequency within its operating range.
2. By using the Max Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by SA MARK function and then plot the result on the SA screen.
4. Repeat above procedures until all frequencies measured were complete.

Measurement Data - Refer Appendix 3 to 11 for plotted data

[MODEL 21008XXX-B]

Base (ANT0)

Low Channel:	Adjacent Hopping Channel Separation is 890 kHz.
Mid Channel:	Adjacent Hopping Channel Separation is 894 kHz.
High Channel:	Adjacent Hopping Channel Separation is 889 kHz.

Base (ANT1)

Low Channel:	Adjacent Hopping Channel Separation is 890 kHz.
Mid Channel:	Adjacent Hopping Channel Separation is 894 kHz.
High Channel:	Adjacent Hopping Channel Separation is 889 kHz.

Handset Unit

Low Channel:	Adjacent Hopping Channel Separation is 890 kHz.
Mid Channel:	Adjacent Hopping Channel Separation is 894 kHz.
High Channel:	Adjacent Hopping Channel Separation is 889 kHz.

15.247(a)(1) FREQUENCY HOPPING SYSTEMS

[MODEL 21008XXX-B]

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NUMBER OF HOPPING FREQUENCIES USED

Requirements:

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.
2. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all of the signals from each channel until each one has been recorded.
3. Set the SA on View mode and plot the results on SA screen.
4. Repeat the above procedures until all frequencies measured are complete.

Measurement Data

[MODEL 21008XXX-B]

The base has from 75 to 88 hopping frequencies and the handset has 75 hopping frequencies. Refer Appendix 12 to 15 for plotted data.

CHANNEL BANDWIDTH [15.247(a)]

Requirements:

The 20dB bandwidth of the hopping channel is less than 1 MHz.

Measurement Procedure

1. Position the EUT without connection to the Spectrum Analyzer (SA). Turn on the EUT and connect it to the SA. Then set it to any one convenient frequency within its operating range. Set a reference level on the SA equal to the highest peak value.
2. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

Measurement Data - Refer Appendix 16 to 24 for plotted data

<u>Base (ANT0)</u>	Low Channel:	Channel Bandwidth is 686 kHz.
	Mid Channel:	Channel Bandwidth is 692 kHz.
	High Channel:	Channel Bandwidth is 713 kHz.
<u>Base (ANT1)</u>	Low Channel:	Channel Bandwidth is 666 kHz.
	Mid Channel:	Channel Bandwidth is 685 kHz.
	High Channel:	Channel Bandwidth is 693 kHz.
<u>Handset Unit</u>	Low Channel:	Channel Bandwidth is 674 kHz.
	Mid Channel:	Channel Bandwidth is 705 kHz
	High Channel:	Channel Bandwidth is 717 kHz

15.247(a)(1) FREQUENCY HOPPING SYSTEMS (continued)

[MODEL 21008XXX-B]

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DWELL TIME ON EACH CHANNEL

Requirements:

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a (0.4 x 75) 30 second period.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.
2. Adjust the centre frequency of SA on any frequency to be measured and set SA to zero span mode. Set RBW and VBW of SA to proper value.
3. Measure the time duration of one transmission on the measured frequency and then plot the result with the time difference of this time duration.
4. Repeat the above procedures until all frequencies measured were complete.

Measurement Data - Refer Appendix 25 to 29 for plotted data. **[MODEL 21008XXX-B]**

Base (ANT0)

The dwell time is $(1.06 \text{ mS} \times 4) \times 40 = 169.6 \text{ mS}$

The maximum time of occupancy for a particular channel is **169.6 mS** in any 30 second period.

Base (ANT1)

The dwell time is $(1.06 \text{ mS} \times 4) \times 40 = 169.6 \text{ mS}$

The maximum time of occupancy for a particular channel is **169.6 mS** in any 30 second period.

Handset Unit

The dwell time is $(1.05 \text{ mS} \times 1) \times 40 = 42 \text{ mS}$

The maximum time of occupancy for a particular channel is **42 mS** in any 30 second period.

15.247(b) (1) MAXIMUM PEAK OUTPUT POWER [ERP]

[MODEL 21008XXX-B]

Requirements:

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 Watt. For all other frequency hopping systems in the 2400-2483.5 band: 0.125 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.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.
2. Set RBW of SA to 5MHz and VBW to NONE.
3. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
4. Repeat the above procedures until all frequencies measured were complete.

Measurement Data -

[MODEL 21008XXX-B]

Base (ANT0)

Low Channel:	Output Peak Power is 93.4 mW [ERP] .
Mid Channel:	Output Peak Power is 76.2 mW [ERP] .
High Channel:	Output Peak Power is 77.1 mW [ERP] .

Base (ANT1)

Low Channel:	Output Peak Power is 74.1 mW [ERP] .
Mid Channel:	Output Peak Power is 76.2 mW [ERP] .
High Channel:	Output Peak Power is 76.8 mW [ERP] .

Handset Unit

Low Channel:	Output Peak Power is 74.1 mW [ERP] .
Mid Channel:	Output Peak Power is 76.2 mW [ERP] .
High Channel:	Output Peak Power is 76.6 mW [ERP] .

15.247(c) BANDWIDTH OF BAND EDGE MEASUREMENT

[MODEL 21008XXX-B]

Requirements:

In any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.
2. Set RBW to 120 kHz and suitable frequency span 500 KHz or 1000 kHz; VBW = none.
3. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat the above procedures until all frequencies measured were complete.
5. Note: Measurements made with hopping and modulation.

Measurement Data - Refer Appendix 30 to 35 for plotted data

[MODEL 21008XXX-B]

Base (ANT0)

Channel 1: All emissions in this 100 kHz bandwidth are attenuated more than **50.30 dB**.
Channel 88: All emissions in this 100 kHz bandwidth are attenuated more than **50.31 dB**.

Base (ANT1)

Channel 1: All emissions in this 100 kHz bandwidth are attenuated more than **49.37 dB**.
Channel 88: All emissions in this 100 kHz bandwidth are attenuated more than **49.36 dB**.

Handset Unit

Channel 1: All emissions in this 100 kHz bandwidth are attenuated more than **51.55 dB**.
Channel 75: All emissions in this 100 kHz bandwidth are attenuated more than **50.62 dB**.

Part 15.247(g):

Exhibit C(3)-17 to -18 provides information on how the system is designed while the transmitter is presented with a continuous voice stream and a description of the system transmitting short bursts.

Part 15.247(h):

Exhibit C(3)-18 provides information concerning the avoidance of simultaneous occupancy of hopping frequencies by multiple transmitters, system synchronization procedure, frequency hopping algorithm, hopping tables, and dual slot diversity.

TEST FACILITY AND EQUIPMENT LIST

FACILITIES:

- Radiated ANSI C63.4 (FCC OET/55) open field 3 metre test range. This test range is protected from the cold and moisture by a non-conductive enclosure.
- Conducted 2.5m Anechoic Chamber

EQUIPMENT:

Anritsu 2601A Spectrum Analyzer
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
A.H. Systems biconical antenna; 20 MHz to 330 MHz
A.H. Systems log periodic antenna; 300 MHz to 1.8 GHz
Compliance Design P950 Preamp (16 dB) ... 25 MHz to 1.0 GHz

NOTE:

The Anritsu 2601A Spectrum Analyzer and the Advantest R3261A Spectrum Analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada. (NRC)
This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three metre test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

ADDITIONAL TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8591EM, S/N 3639A00995, (9KHz - 1.8GHz), Calibration Due June 2005
2. Spectrum Analyzer: ANRITSU 2601A, S/N MT64544, (10KHz - 2.2GHz), Calibration Due June 2005
3. Spectrum Analyzer: IFR AN940, S/N 635001039, (9KHz - 26.5GHz), Calibration Due April 2005
4. Preamp: HP 8449B, S/N 3008A00378, (1 - 26.5GHz), Calibration Due August 2004
5. Horn Antenna: Q-PAR 6878/24, S/N 1721, (1.5-18GHz)
6. Horn Antenna: A. H. Systems SAS 572, S/N 164 (18 - 26.5GHz)
7. Line Impedance Stabilization Network.: Marstech, Calibration Due July 2004
8. Horn Antenna: Radar System (Flange 3/4" Square) MIL F 3922/68 (26.5 - 40GHz)
9. OML Mixer: M28HWD, S/N Ka31114-1 (26.5 - 40GHz), Calibration Due Nov. 10, 2004
10. OML Diplexer: DPL.313A (Unit plugs into M28HWD)
11. Semflex Cable: Used with M28HWD and DPL.313A

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

August 22, 2003

Electrohome Electronics Ltd.
809 Wellington St. N.
Kitchener, Ontario, N2G 4J6
Canada

Registration Number: 90578

Attention: Tuat Huynh

Re: Measurement facility located at Roseville
3 meter site
Date of Renewal: August 22, 2003

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,



Ms. Phyllis Parrish
Information Technician

21018A Frequency Table

Channel Number	Center Frequency (MHz)	Channel Number	Center Frequency (MHz)	Channel Number	Center Frequency (MHz)
12	2401.808203	42	2428.564307	71	2455.320410
13	2402.698096	43	2429.454199	72	2456.210303
14	2403.591943	44	2430.348047	73	2457.104150
15	2404.481836	45	2431.237939	74	2457.994043
16	2405.375684	46	2432.131787	75	2458.887891
17	2406.265576	47	2433.021680	76	2459.777783
18	2407.159424	48	2433.915527	77	2460.671631
19	2408.050000	49	2434.805420	78	2461.561523
20	2408.943164	50	2435.699268	79	2462.455371
21	2409.833057	51	2436.589160	80	2463.345264
22	2410.726904	52	2437.483008		
23	2411.616797	53	2438.372900	82	2465.129004
24	2412.510645	54	2439.266748	83	2466.022852
25	2413.400537	55	2440.156641	84	2466.912744
26	2414.294385	56	2441.050488	85	2467.806592
27	2415.184277	57	2441.940381	86	2468.696484
28	2416.078125	58	2442.834229	87	2469.590332
29	2416.968018	59	2443.724121	88	2470.480225
30	2417.861865	60	2444.617969	89	2471.374072
31	2418.751758	61	2445.507861	90	2472.263965
32	2419.645605	62	2446.401709	91	2473.157813
33	2420.535498	63	2447.291602	92	2474.047705
34	2421.429346	64	2448.185449	93	2474.941553
35	2422.319238	65	2449.075342	94	2475.831445
36	2423.213086	66	2449.969189	95	2476.725293
37	2424.102979	67	2450.859082	96	2477.615186
38	2424.996826	68	2451.752930	97	2478.509033
39	2425.886719	69	2452.642822	98	2479.398926
40	2426.780566	70	2453.536670		
41	2427.670459	71	2454.426563		