

Johnson Controls, Inc.
Automotive Systems Group
One Prince Center
Holland, MI 49423



August 5, 2004

Federal Communication Commission
Equipment Approval Services, P.O. Box 358315
Pittsburgh, PA 15251-5315
Attention: Authorization & Evaluation Division

RE: Application for Certification of Johnson Controls Transmitter under 47 CFR 15.231.
Model: SJAAHL3
FCC ID: CB2SJAAHL3
Form 731 Confirmation #EA345899

To whom it may concern,

Submitted here are materials for your consideration in determining the grant of certification for a Johnson Controls Interior, LLC, Universal Garage Door Opener product. The FCC ID for this product is CBSJAAHL3. Please issue a grant without delay upon adequate evaluation of our report.

The JCI Model SJAAHL3 is part of the Homelink ® III series. Homelink ® III devices are capable of learning garage door opener frequencies and codes from the user's original transmitter. The device is capable of learning in the range between 288MHz and 420MHz excluding forbidden frequency regions.

Johnson Controls Interiors has invested considerable resources into developing our Homelink ® products. For this reason we respectfully request that the following items be held as confidential.

- Circuit Block Diagrams
- Theory of Operation
- Schematics

The Federal Communications Commission will be notified, in writing of any changes in the software/programming of this device that could affect its RF characteristics.

A table of contents for all submitted materials can be found at the end of this letter.
Please do not hesitate to contact me with any questions you may have regarding this report. As
always we look forward to your timely response.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeremy P. Bos". The signature is fluid and cursive, with the first name "Jeremy" being the most prominent part.

Jeremy P. Bos

Lead Test Engineer (EMC/RF)

Johnson Controls Interiors, LLC.

Tel: (616)394-6076/Fax: (616)394-6100

Email: Jeremy.bos@jci.com

Table of Contents

1. General Information.....	2
1.1. Product Description.....	2
1.2. Related Grants.....	2
1.3. Test Methodology.....	2
1.4. Test Facility.....	3
2. Product Labeling.....	3
2.1. Label Drawing and Location on Product.....	3
3. Test Configuration.....	3
4. Block Diagram.....	3
5. Test Setup Photographs.....	4
6. Conducted Emissions Measurements.....	4
7. Radiated Emissions Data.....	4
7.1. Summary of Results.....	4
7.2. Test Equipment Used.....	4
7.3. Test Equipment Setup and Procedure.....	5
7.4. Measured Data.....	5
7.4.1. Measurements of Fundamentals and Harmonics.....	5
7.4.1.1. (Table) DUT Tuned to 288MHz (Fundamental).....	5
7.4.1.2. (Table) DUT Tuned to 310MHz (Fundamental).....	6
7.4.1.3. (Table) DUT Tuned to 418MHz (Fundamental).....	6
7.4.1.4. (Table) 288MHz (Harmonics).....	6
7.4.1.5. (Table) 310MHz (Harmonics).....	7
7.4.1.6. (Table) 418MHz (Harmonics).....	8
7.4.2. Pulsed Operation.....	8
7.4.2.1. (Figure) 30% Duty Cycle.....	9
7.4.2.2. (Figure) 50% Duty Cycle.....	9
7.4.2.3. (Figure) 80% Duty Cycle.....	10
7.4.3. Occupied Bandwidth.....	10
7.4.3.1. (Table) Occupied Bandwidth Measurements.....	10
7.4.3.2. (Figure) Example of Occupied Bandwidth measurement.....	11
7.4.4. Emission Spectrum.....	11
7.4.4.1. (Figure) 288 MHz.....	12
7.4.4.2. (Figure) 310 MHz.....	12
7.4.4.3. (Figure) 418 MHz.....	13
7.4.4.4. Summary of Emissions Measurements Taken on OATS.....	13
7.4.5. Variation of Supply Voltage.....	14
7.4.5.1. (Figure) Plot of output power over supply voltage.....	14
7.4.5.2. (Table) Output power as a function of supply voltage.....	14
7.4.6. Verification of Non-Operation in Restricted Bands.....	15
7.4.7. Verification of De-activation after 5 seconds.....	15
7.4.8. Tuning Pulse Measurements.....	15
7.4.8.1. (Figure) Coarse Tuning Pulse (288MHz).....	15
7.4.8.2. (Figure) Fine Tuning Pulse (288MHz).....	16
7.4.8.3. (Figure) Coarse Tuning Pulse (310MHz).....	16
7.4.8.4. (Figure) Fine Tuning Pulse (310MHz).....	17
7.4.8.5. (Figure) Coarse Tuning Pulse (418 MHz).....	17
7.4.8.6. (Figure) Fine Tuning Pulse (418MHz).....	18
7.4.8.7. (Figure) Summary of Tuning Pulse Measurements.....	18
7.5. Formulas and Sample Calculations.....	18
7.5.1. Adjustment to account for duty cycle.....	18
7.5.2. Calculation of FCC limits from 15.231.....	19
8. Photos of Product Tested.....	19
8.1. Front View	
Please refer to attachment named "front_view.jpg"	

8.2. Rear View

Please refer to attachment named "rear_view.jpg"

8.3. Unit Disassembled

Please refer to attachment named "d_assym.jpg"

8.4. Homelink Board

Please refer to attachment named "rl_front.jpg"

Please refer to attachment named "rl_back.jpg"

Please refer to attachment name "hl3.jpg" (Close-up of Homelink section of device).

9. Other Attachments and Description.....20

9.1. User Manual

Please refer to attachment "user_manual.pdf"

9.2. Schematics/ Tuning Information

For schematics please refer to attachment "schematics.pdf"

For tuning information please refer to attachment "tuning.pdf"

9.3. Theory of Operation

For schematics please refer to attachment "theory_op.pdf"