

**FCC CFR47 PART 15 SUBPART C
CERTIFICATION**



TEST REPORT

FOR

NABCO ENTRANCES, INC.

24.15 GHz SLIDING DOOR OPENER

MODEL NUMBER: ND-600

FCC ID: O82-ACUMOTION

REPORT NUMBER: 02U1492-1

ISSUE DATE: SEPTEMBER 12, 2002

Prepared for
NABCO
S82 W18717 GEMINI DRIVE (P.O. BOX 906)
MUSKEGO, WI 53150
USA

Prepared by
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1. TEST RESULT CERTIFICATION

COMPANY NAME: NABCO ENTRANCES, INC.
S82 W18717 GEMINI DRIVE (P.O. BOX 906)
MUSKEGO, WI 53150 USA

EUT DESCRIPTION: SLIDING DOOR OPENER

MODEL NUMBER: ND-600

DATE TESTED: SEPTEMBER 3 – SEPTEMBER 11, 2002

| | |
|-----------------------|--|
| TYPE OF EQUIPMENT | INTENTIONAL RADIATOR |
| EQUIPMENT TYPE | 24075 - 24175 MHz FIELD DISTURBANCE SENSOR |
| MEASUREMENT PROCEDURE | ANSI 63.4 / 1992, TIA/EIA 603 |
| PROCEDURE | CERTIFICATION |
| FCC RULE | CFR 47 PART 15.C |

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirements set forth in CFR 47, PART 15, Subpart C. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

m#

Tested By:

Thanh Nguyen

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

THANH NGUYEN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is a Field Disturbance Sensor that functions as a Sliding Door Opener.

The operating frequency is 24.125 GHz. The EUT requires 12 VDC for power and utilizes one of two available antennas. The Narrow Antenna is a 3 element antenna and has a gain of 12.5 dBi. The Wide Antenna is a 6 element antenna and has a gain of 11.8 dBi.

The Narrow Antenna covers a field 8.2 feet wide. The Wide Antenna covers a field 13 feet wide.

3. TEST METHODOLOGY

Conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for “Radio Interference Measuring Apparatus and Measurement Methods,” Publication 16.

4.2. LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

4.3. TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency | Scope of Accreditation | Logo |
|---------|-----------------|---|--|
| USA | NVLAP* | FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438 |  200065-0 |
| USA | FCC | 3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements |  1300 |
| Japan | VCCI | CISPR 22 Two OATS and one conducted Site |  R-1014, R-619, C-640 |
| Norway | NEMKO | EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1 |  ELA 117 |
| Norway | NEMKO | EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC |  ELA-171 |
| Taiwan | BSMI | CNS 13438 |  SL2-IN-E-1012 |
| Canada | Industry Canada | RSS210 Low Power Transmitter and Receiver |  IC2324 A,B,C, and F |

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Radiated Emission | |
|--------------------------------------|-------------|
| 30MHz – 200 MHz | +/- 3.3dB |
| 200MHz – 1000MHz | +4.5/-2.9dB |
| 1000MHz – 2000MHz | +4.6/-2.2dB |
| Power Line Conducted Emission | |
| 150kHz – 30MHz | +/-2.9 |

Any results falling within the above values are deemed to be marginal.

5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST AND MEASUREMENT EQUIPMENT LIST | | | | |
|-------------------------------------|-----------------|------------------|---------------|----------------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due Date |
| Spectrum Analyzer | HP | 8566B | 3014A06685 | 6/1/03 |
| Spectrum Display | HP | 85662A | 2152A03066 | 6/1/03 |
| Quasi-Peak Detector | HP | 85650A | 3145A01654 | 6/1/03 |
| Preamplifier | HP | 8447D | 2944A06833 | 8/22/03 |
| Log Periodic Antenna | EMCO | 3146 | 9107-3163 | 3/30/03 |
| Biconical Antenna | Eaton | 94455-1 | 1197 | 3/30/03 |
| LISN | F.C.C. | LISN-50/250-25-2 | 2023 | 9/6/03 |
| EMI Test Receiver | Rohde & Schwarz | ESHS 20 | 827129/006 | 4/17/03 |
| Spectrum Analyzer | HP | 8564E | 3943A01643 | 7/22/03 |
| Preamplifier (1 - 26.5GHz) | HP | NSP2600-44 | 646456 | 4/26/03 |
| Horn Antenna (1 - 18GHz) | EMCO | 3115 | 6717 | 1/31/03 |
| Horn Antenna (18 - 26.5 GHz) | ARA | MWH 1826/B | 1013 | 10/26/02 |
| Harmonic Mixer (26.5 - 40 GHz) | HP | 11970A | 3003A04190 | 9/22/02 |
| Horn Antenna (26.5 - 40 GHz) | DICO | 1149 | 2 | N.C.R. |
| Harmonic Mixer (33 - 50 GHz) | HP | 11970A | 3003A03363 | 6/26/03 |
| Horn Antenna (33 - 50 GHz) | ATM | 22-442-6 | 7046005 | N.C.R. |
| Harmonic Mixer (50 - 75 GHz) | HP | 11970A | 2521A01163 | 6/16/03 |
| Horn Antenna (50 - 75 GHz) | ATM | 15-442-6 | 7046105 | N.C.R. |
| Harmonic Mixer (75 - 110 GHz) | HP | 11970A | 2521A01314 | 6/16/03 |
| Horn Antenna (75 - 110 GHz) | ATM | 10-442-6 | 7046205 | N.C.R. |

6. SETUP OF EQUIPMENT UNDER TEST

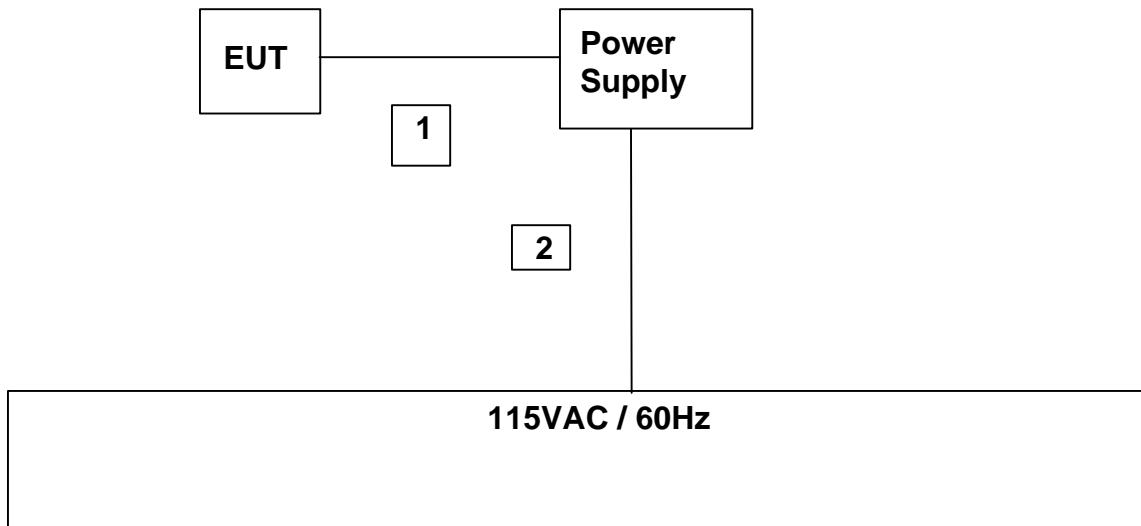
SUPPORT EQUIPMENT

| Device Type | Manufacturer | Model | Serial Number | FCC ID |
|-----------------|--------------|--------------|---------------|--------|
| DC Power Supply | Kenwood | KRM AEEC-350 | 9712154746 | N/A |

I/O CABLES

| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
|-----------|------|----------------------|----------------|------------|--------------|---------|
| 1 | DC | 1 | Molex | Unshielded | 2 m | |
| 2 | AC | 1 | US115 | Unshielded | 1 m | |

SETUP DIAGRAM



6.1. APPLICABLE RULES

§15.245 (a)- DEVICE TYPE LIMITATIONS

(a) Operation under the provisions of this Section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

§15.245 (b)- FIELD STRENGTH

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (millivolts/meter) |
|-----------------------------|--|--|
| 902 – 928 | 500 | 1.6 |
| 2435 – 2465 | 500 | 1.6 |
| 5785 – 5815 | 500 | 1.6 |
| 10500 – 10550 | 2500 | 25.0 |
| 24075 – 24175 | 2500 | 25.0 |

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in § 15.205, shall not exceed the field strength limits shown in § 15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

(i) For field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

(2) Field strength limits are specified at a distance of 3 meters.

(3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

(4) The emission limits shown in the above table are based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

Specification Limit:

| Frequency Range | Average Limit (mV/m at 3 m) | Average Limit (dBuV/m at 3 m) | Peak Limit (dBuV/m at 3 m) |
|---|--------------------------------|----------------------------------|-------------------------------|
| 24.075 to 24.175 GHz (Fundamental is at 24.12 GHz) | 2500 | 128 | 148 |
| Harmonics at 48.24, 72.36, and 96.48 GHz | 25 | 88 | 108 |
| Other Emissions from 0.96 to 100.0 GHz | | 54 or -50 dBc | 74 or -50 dBc |
| Emissions from 30 to 960 MHz | | § 15.209 or -50 dBc | § 15.209 or -50 dBc |

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 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 |
| 6.215 - 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 | (²) |
| 13.36 - 13.41 | | | |

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§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 μ H/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 Range (MHz) | Quasi-Peak Limit (dBuV) | Average Limit (dBuV) |
|-----------------------|-------------------------|----------------------|
| 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.

§15.209- RADIATED EMISSION LIMITS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 30 - 88 | 100 ** | 3 |
| 88 - 216 | 150 ** | 3 |
| 216 - 960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

| Frequency Range (MHz) | Field Strength (uV/m at 3 m) | Field Strength (dBuV/m at 3 m) |
|-----------------------|------------------------------|--------------------------------|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

7. TEST SETUP, PROCEDURE AND RESULT

7.1. FIELD STRENGTH OF EMISSIONS

7.1.1. SETUP AND PROCEDURE

TEST SETUP

The EUT is placed on the 0.8 m high tabletop and the power supply is placed on the turntable base. The EUT is continuously transmitting.

TEST PROCEDURE

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 100 GHz is investigated.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the signal. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For spurious measurements above 26.5 GHz, the maximum distance from the EUT that yields a minimum system noise floor at least 6 dB below the 15.209 limit is calculated for each separate harmonic mixer band. This distance is shown in the noise floor calculations below. The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations. During this perimeter scan, the antenna is kept no further from the EUT than the maximum distance calculated for each mixer band.

For harmonic measurements above 26.5 GHz, the above scanning procedure is used to detect harmonic emissions. For all emissions detected, the antenna is moved away from the EUT in a 1/3/10 sequence, as far as possible to maintain a 10 dB signal to noise ratio. Each emission is then maximized by rotating the EUT and varying the antenna height.

SYSTEM NOISE FLOOR FROM 1 TO 26.5 GHz

Compliance Certification Services

Worst Case Radiated Emissions System Noise Floor

Each band below corresponds to each horn antenna band

Uses the lowest gain preamplifier; actual preamp used may have higher gain

Uses the longest typical cable configuration; actual cables used may have less loss

Noise floor field strength results are compared to the FCC 15.205 Restricted Band limit

Specification Distance: 3 meters

| Freq GHz | SA dBuV | AF dB/m | Distance m | Distance dB | Preamp dB | Cable dB | Field dBuV/m | Limit dBuV/m | Margin dB |
|--------------------------------|------------|------------|---------------|----------------|--------------|-------------|-----------------|-----------------|--------------|
| 1 to 18 GHz band | | | | | | | | | |
| RBW = 1 MHz, peak detection | | | | | | | | | |
| 18 | 41.9 | 47.8 | 1 | -9.5 | 32.6 | 13.5 | 61.06 | 74 | -12.94 |
| RBW = 1 MHz, average detection | | | | | | | | | |
| 18 | 28.7 | 47.8 | 1 | -9.5 | 32.6 | 13.5 | 47.86 | 54 | -6.14 |
| 18 to 26.5 GHz band | | | | | | | | | |
| RBW = 1 MHz, peak detection | | | | | | | | | |
| 26.5 | 44.6 | 33.4 | 1 | -9.5 | 35.0 | 19.5 | 52.96 | 74 | -21.04 |
| RBW = 1 MHz, average detection | | | | | | | | | |
| 26.5 | 32.4 | 33.4 | 1 | -9.5 | 35.0 | 19.5 | 40.76 | 54 | -13.24 |

SYSTEM NOISE FLOOR FROM 26.5 TO 110 GHz

Compliance Certification Services

System Noise Floor, 26.5 to 110 GHz

External Harmonic Mixers are used for this frequency range

The preamplifier is internal to Spectrum Analyzer, with the gain factor built into firmware
The antenna is mounted directly on the harmonic mixer, therefore there is no cable loss

Each band below corresponds to each harmonic mixer band

Noise floor field strength results are compared to the FCC 15.209 limit

Noise floor measurements are taken at low and high frequencies of each band,

For the 26.5 to 40 band, also at 38.5 GHz, the frequency of highest mixer conversion loss.

For the 75 to 110 band, also at 100 GHz, the highest frequency to be investigated.

| Specification Distance: 3 meters | | | | | | | | |
|----------------------------------|------|---------|---------|------------|-------------|--------------|--------------|-----------|
| Freq GHz | Det | SA dBuV | AF dB/m | Distance m | Distance dB | Field dBuV/m | Limit dBuV/m | Margin dB |
| 26.5 to 40 GHz | | | | | | | | |
| 26.5 | Peak | 43.3 | 38.7 | 0.1 | -29.5 | 52.46 | 74 | -21.54 |
| 26.5 | Avg | 30.8 | 38.7 | 0.1 | -29.5 | 39.96 | 54 | -14.04 |
| 38.5 | Peak | 40.9 | 41.9 | 0.1 | -29.5 | 53.26 | 74 | -20.74 |
| 38.5 | Avg | 28.5 | 41.9 | 0.1 | -29.5 | 40.86 | 54 | -13.14 |
| 40 | Peak | 40.9 | 42.3 | 0.1 | -29.5 | 53.66 | 74 | -20.34 |
| 40 | Avg | 27.5 | 42.3 | 0.1 | -29.5 | 40.26 | 54 | -13.74 |
| | | | | | | | | |
| 33 to 50 GHz | | | | | | | | |
| 33 | Peak | 42.4 | 40.6 | 0.1 | -29.5 | 53.46 | 74 | -20.54 |
| 33 | Avg | 30.1 | 40.6 | 0.1 | -29.5 | 41.16 | 54 | -12.84 |
| 50 | Peak | 38.7 | 44.2 | 0.1 | -29.5 | 53.36 | 74 | -20.64 |
| 50 | Avg | 26.4 | 44.2 | 0.1 | -29.5 | 41.06 | 54 | -12.94 |
| | | | | | | | | |
| 50 to 75 GHz | | | | | | | | |
| 50 | Peak | 52 | 44.2 | 0.03 | -40.0 | 56.20 | 74 | -17.80 |
| 50 | Avg | 40 | 44.2 | 0.03 | -40.0 | 44.20 | 54 | -9.80 |
| 75 | Peak | 52.6 | 47.7 | 0.03 | -40.0 | 60.30 | 74 | -13.70 |
| 75 | Avg | 40 | 47.7 | 0.03 | -40.0 | 47.70 | 54 | -6.30 |
| | | | | | | | | |
| 75 to 110 GHz | | | | | | | | |
| 75 | Peak | 59.7 | 44.7 | 0.01 | -49.5 | 54.86 | 74 | -19.14 |
| 75 | Avg | 47.3 | 44.7 | 0.01 | -49.5 | 42.46 | 54 | -11.54 |
| 100 | Peak | 58.5 | 47.2 | 0.01 | -49.5 | 56.16 | 74 | -17.84 |
| 100 | Avg | 46.4 | 47.2 | 0.01 | -49.5 | 44.06 | 54 | -9.94 |
| 110 | Peak | 60.9 | 48.1 | 0.01 | -49.5 | 59.46 | 74 | -14.54 |
| 110 | Avg | 49.1 | 48.1 | 0.01 | -49.5 | 47.66 | 54 | -6.34 |

7.1.2. TEST RESULTS

FIELD STRENGTH OF FUNDAMENTAL EMISSION

Fundamental Radiated Emissions

02U1492
NABCO Door Opener with 11.8 dBi antenna
Mode: Transmitting

A-Site
9/11/02
Warren Wilson

Specification Distance: 3 meters

| Freq GHz | Pol V/H | Det | SA dBuV | AF dB/m | Dist m | Dist dB | Cable dB | Field dBuV/m | Limit dBuV/m | Margin dB |
|-------------|------------|------|------------|------------|-----------|------------|-------------|-----------------|-----------------|--------------|
| 24.12 | V | Peak | 84.5 | 32.9 | 1 | -9.5 | 2.2 | 107.86 | 148 | -40.14 |
| 24.12 | V | Avg | 84.2 | 32.9 | 1 | -9.5 | 2.2 | 107.56 | 128 | -20.44 |
| 24.12 | H | Peak | 68.3 | 32.9 | 1 | -9.5 | 2.2 | 91.66 | 148 | -56.34 |
| 24.12 | H | Avg | 67.9 | 32.9 | 1 | -9.5 | 2.2 | 91.26 | 128 | -36.74 |

Fundamental Radiated Emissions

02U1492
NABCO Door Opener with 12.5 dBi antenna
Mode: Transmitting

A-Site
9/3/02
Chin Pang

Specification Distance: 3 meters

| Freq GHz | Pol V/H | Det | SA dBuV | AF dB/m | Dist m | Dist dB | Cable dB | Field dBuV/m | Limit dBuV/m | Margin dB |
|-------------|------------|------|------------|------------|-----------|------------|-------------|-----------------|-----------------|--------------|
| 24.12 | V | Peak | 87 | 32.9 | 1 | -9.5 | 2.2 | 110.36 | 148 | -37.64 |
| 24.12 | V | Avg | 86.8 | 32.9 | 1 | -9.5 | 2.2 | 110.16 | 128 | -17.84 |
| 24.12 | H | Peak | 71.3 | 32.9 | 1 | -9.5 | 2.2 | 94.66 | 148 | -53.34 |
| 24.12 | H | Avg | 71 | 32.9 | 1 | -9.5 | 2.2 | 94.36 | 128 | -33.64 |

FIELD STRENGTH OF HARMONIC AND SPURIOUS EMISSIONS FROM 24.175 TO 100 GHz

Harmonic and Spurious Radiated Emissions

02U1492
NABCO Door Opener with 11.8 dBi antenna
Mode: Transmitting

A-Site
9/11/02
Warren Wilson

Specification Distance: 3 meters

| Freq GHz | Pol V/H | Det | SA dBuV | AF dB/m | Dist m | Dist dB | Field dBuV/m | Limit dBuV/m | Margin dB |
|-------------|------------|------|------------|------------|-----------|------------|-----------------|-----------------|--------------|
| 48.24 | V | Peak | 52.9 | 43.9 | 0.3 | -20.0 | 76.80 | 108 | -31.20 |
| 48.24 | V | Avg | 51.87 | 43.9 | 0.3 | -20.0 | 75.77 | 88 | -12.23 |
| 48.24 | H | Peak | 49.23 | 43.9 | 0.3 | -20.0 | 73.13 | 108 | -34.87 |
| 48.24 | H | Avg | 48.9 | 43.9 | 0.3 | -20.0 | 72.80 | 88 | -15.20 |

Note: No other emissions were detected from 24.175 to 100 GHz.

Harmonic and Spurious Radiated Emissions

02U1492
NABCO Door Opener with 12.5 dBi antenna
Mode: Transmitting

A-Site
9/4/02
Chin Pang

Specification Distance: 3 meters

| Freq GHz | Pol V/H | Det | SA dBuV | AF dB/m | Dist m | Dist dB | Field dBuV/m | Limit dBuV/m | Margin dB |
|-------------|------------|------|------------|------------|-----------|------------|-----------------|-----------------|--------------|
| 48.24 | V | Peak | 56.73 | 43.9 | 0.3 | -20.0 | 80.63 | 108 | -27.37 |
| 48.24 | V | Avg | 55.9 | 43.9 | 0.3 | -20.0 | 79.80 | 88 | -8.20 |
| 48.24 | H | Peak | 52.4 | 43.9 | 0.3 | -20.0 | 76.30 | 108 | -31.70 |
| 48.24 | H | Avg | 51.4 | 43.9 | 0.3 | -20.0 | 75.30 | 88 | -12.70 |

Note: No other emissions were detected from 24.175 to 100 GHz.

FIELD STRENGTH OF SPURIOUS EMISSIONS FROM 1 TO 24.075 GHz

No emissions were detected in this frequency range.

FIELD STRENGTH OF SPURIOUS EMISSIONS BELOW 1 GHz

|  FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP | | Project #: 02U1492-1 Report #: 020904A1 Date & Time: 09/05/02 10:30 AM Test Engr: Thanh Nguyen | | | | | | | | | |
|--|-------------------|---|---------------|-----------------|-------------------|----------------|----------------|--------------|-------------|-------------------|-----------------|
| 561F MONTEREY ROAD, SAN JOSE, CA 95037-9001 PHONE: (408) 463-0885 FAX: (408) 463-0888 | | | | | | | | | | | |
| Company: NABCO EUT Description: Sliding Door Sensor Test Configuration : EUT only Type of Test: FCC Class B Mode of Operation: Standard | | | | | | | | | | | |
| | | << Main Sheet | | | | | | | | | |
| Freq. (MHz) | Reading (dBuV) | AF (dB) | Closs (dB) | Pre-amp (dB) | Level (dBuV/m) | Limit FCC B | Margin (dB) | Pol (H/V) | Az (Deg) | Height (Meter) | Mark (P/Q/A) |
| 128.48 | 54.40 | 11.92 | 1.76 | 26.91 | 41.17 | 43.50 | -2.33 | 3mV | 180.00 | 1.50 | P |
| 192.70 | 45.30 | 15.92 | 2.19 | 26.69 | 36.72 | 43.50 | -6.78 | 3mV | 180.00 | 1.50 | P |
| 126.46 | 45.00 | 11.43 | 1.75 | 26.91 | 31.27 | 43.50 | -12.24 | 3mV | 90.00 | 1.00 | P |
| 123.12 | 45.00 | 10.83 | 1.73 | 26.92 | 30.64 | 43.50 | -12.86 | 3mV | 90.00 | 1.00 | P |
| 33.29 | 40.20 | 12.70 | 0.91 | 27.03 | 26.78 | 40.00 | -13.22 | 3mV | 0.00 | 1.00 | P |
| 39.95 | 38.80 | 12.88 | 0.95 | 27.02 | 25.61 | 40.00 | -14.39 | 3mV | 0.00 | 1.00 | P |
| 6 Worst Data | | | | | | | | | | | |

7.2. POWER LINE CONDUCTED EMISSIONS

TEST SETUP

The EUT and the power supply are placed on a wooden table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane on the floor. The EUT is continuously transmitting.

TEST PROCEDURE

The resolution bandwidth is set to 10 kHz for peak detection, quasi-peak detection and average detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

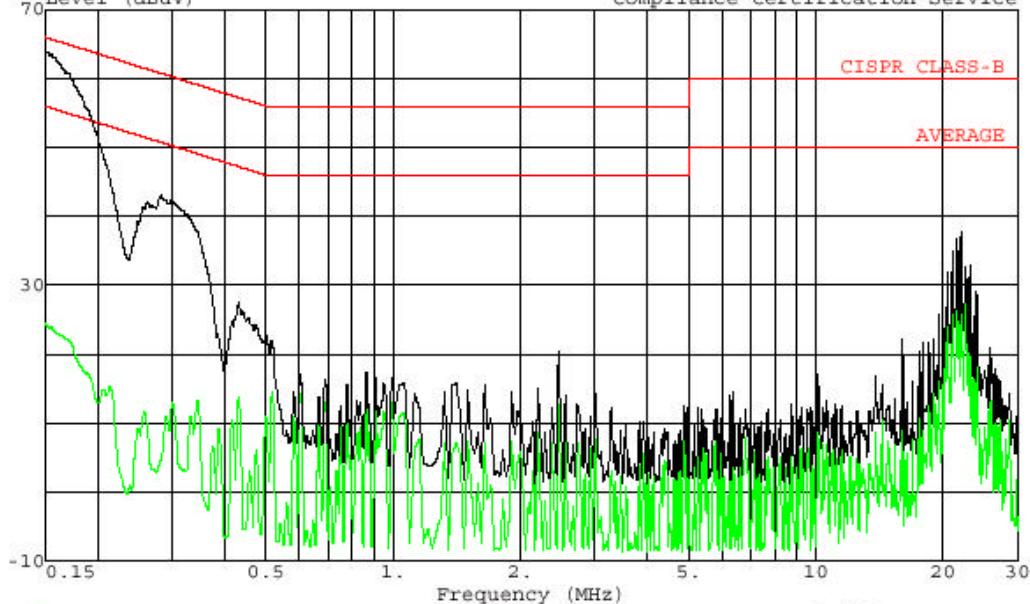
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|--|-----------|-----------|-----------|---------------|-------------|------------|---------|---------|--------|
| Freq. (MHz) | Reading | | | Closs (dB) | Limit OP | EN B AV | Margin | | Remark |
| | PK (dBuV) | OP (dBuV) | AV (dBuV) | | | | OP (dB) | AV (dB) | |
| 0.15 | 63.88 | -- | 24.07 | 0.00 | 65.94 | 55.94 | -2.06 | -31.87 | L1 |
| 0.28 | 42.96 | -- | 10.90 | 0.00 | 62.29 | 52.29 | -19.33 | -41.39 | L1 |
| 22.06 | 37.80 | -- | 33.66 | 0.00 | 60.00 | 50.00 | -22.20 | -16.34 | L1 |
| 0.15 | 62.86 | -- | 23.49 | 0.00 | 66.00 | 56.00 | -3.14 | -32.51 | L2 |
| 0.31 | 40.52 | -- | 4.79 | 0.00 | 61.57 | 51.57 | -21.05 | -46.78 | L2 |
| 21.49 | 34.28 | -- | 28.94 | 0.00 | 60.00 | 50.00 | -25.72 | -21.06 | L2 |
| 6 Worst Data | | | | | | | | | |



561F Monterey Road,
San José, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 14 File#: 02U1492.EMI
Level (dBuV)

Date: 09-09-2002 Time: 10:22:19
Compliance Certification Service

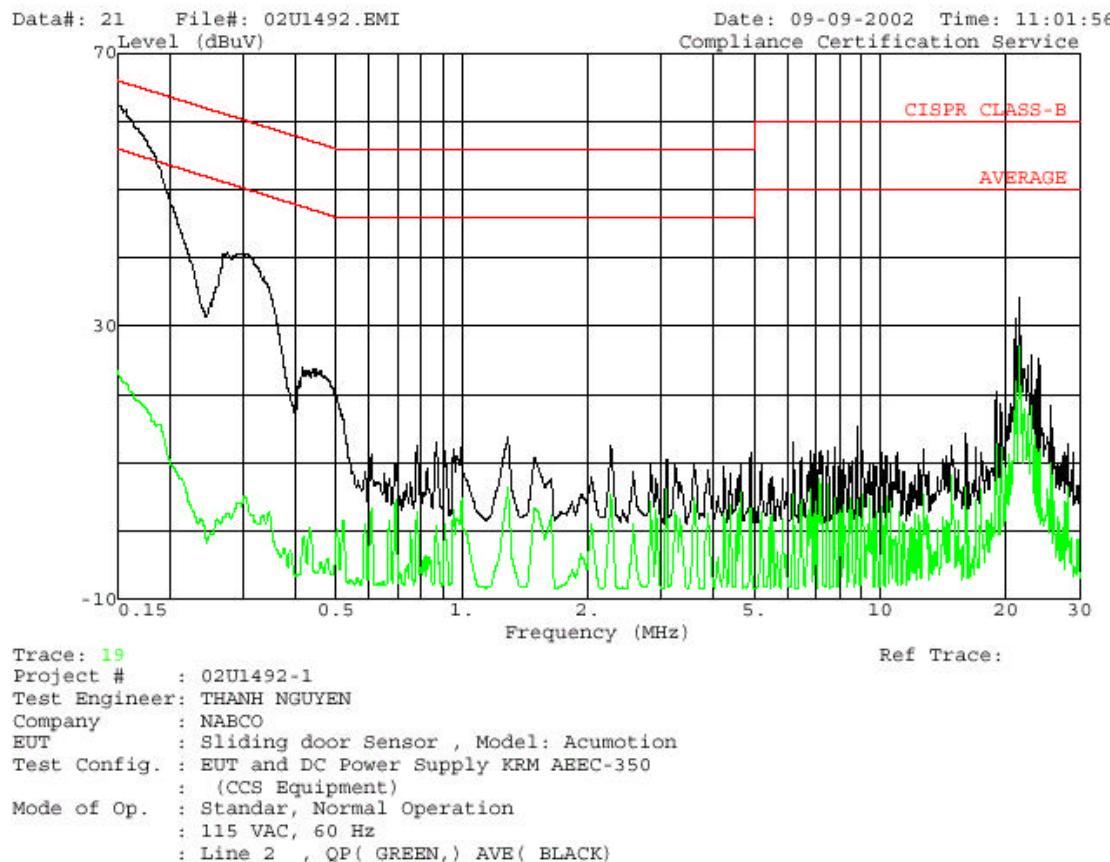


Trace: 12
Project # : 02U1492-1
Test Engineer: THANH NGUYEN
Company : NABCO
EUT : Sliding door Sensor, Model: Acumotion
Test Config. : EUT and DC Power Supply KRM AEEC-350
: (CCS Equipment)
Mode of Op. : Standar, Normal Operation
: 115 VAC, 60 Hz
: Line 1 , Peak(BLACK,) AVE(GREEN)

Ref Trace:



561F Monterey Road,
San Jose, CA 95037 USA
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7.3. SETUP PHOTOS

RADIATED EMISSIONS MEASUREMENT SETUP



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT

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COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA

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