*FCC PART 15, SUBPART B and C*
*TEST REPORT*

*for*

# UNIVERSAL
# 2-WAY KEYFOB RECEIVER

# MODEL: 2WAY-UNIVKFKIT

Prepared for
NAPCO SECURITY GROUP
333 BAYVIEW AVENUE
AMITYVILLE, NEW YORK 11701

Prepared by:_____

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DATE: SEPTEMBER 12, 2003

| | REPORT BODY | APPENDICES | | | | | TOTAL |
|---|---|---|---|---|---|---|---|
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# GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

| | |
|---|---|
| Device Tested: | Universal 2-Way Keyfob Receiver<br>Model: 2WAY-UNIVKFKIT<br>S/N: N/A |
| Product Description: | See Expository Statement |
| Modifications: | The EUT was not modified in order to meet the specifications. |
| Manufacturer: | NAPCO Security Group<br>333 Bayview Avenue<br>Amityville, New York 11701 |
| Test Date: | May 29, 2003 |
| Test Specifications: | EMI requirements<br>CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205, 15.209, and 15.231 |
| Test Procedure: | ANSI C63.4: 2001 |
| Test Deviations: | The test procedure was not deviated from during the testing. |

# SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION | RESULTS |
|---|---|---|
| 1 | Conducted RF Emissions, 150 kHz - 30 MHz | This test was not performed because the EUT operates on DC power only and cannot be plugged into the AC public mains. |
| 2 | Radiated RF Emissions, 10 kHz - 4400 MHz | Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231. |

## 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Universal 2-Way Keyfob Receiver Model: 2WAY-UNIVKFKIT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2001. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.

# 2. ADMINISTRATIVE DATA

## 2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

## 2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

## 2.3 Cognizant Personnel

NAPCO Security Group

Michael A. Carrieri Senior Vice President Engineering

Compatible Electronics, Inc.

Kyle Fujimoto Test Engineer
Michael Christensen Sr. Test Engineer

## 2.4 Date Test Sample was Received

The test sample was received on May 29, 2003.

## 2.5 Disposition of the Test Sample

The sample has been returned to NAPCO Security Group on May 29, 2003.

## 2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

| | |
|---|---|
| RF | Radio Frequency |
| EMI | Electromagnetic Interference |
| EUT | Equipment Under Test |
| P/N | Part Number |
| S/N | Serial Number |
| HP | Hewlett Packard |
| ITE | Information Technology Equipment |
| CML | Corrected Meter Limit |
| LISN | Line Impedance Stabilization Network |

## 3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

| SPEC | TITLE |
|---|---|
| CFR Title 47, Part 15 | FCC Rules – Radio frequency devices (including digital devices) |
| ANSI C63.4 2001 | Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz |

# 4. DESCRIPTION OF TEST CONFIGURATION

## 4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Universal 2-Way Keyfob Receiver Model: 2WAY-UNIVKFKIT (EUT) was connected to the DC Power Supply. The EUT was continuously transmitting. The antennas are soldered onto the PCB. During normal operation, the EUT will turn off within 5 seconds of activation.

The final radiated data was taken in the mode above. Please see Appendix E for the data sheets.

### 4.1.1 Cable Construction and Termination

**Cable 1** This is a 1 meter cable connecting the EUT to the DC power supply's positive terminal. It is hard wired at each end.

**Cable 2** This is a 1 meter cable connecting the EUT to the DC power supply's negative terminal. It is hard wired at each end.

# 5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

## 5.1 EUT and Accessory List

| EQUIPMENT | MANUFACTURER | MODEL NUMBER | SERIAL NUMBER | FCC ID |
|---|---|---|---|---|
| UNIVERSAL 2-WAY KEYFOB RECEIVER (EUT) | NAPCO SECURITY GROUP | 2WAY-UNIVKFKIT | N/A | **AD82WAYUNIVKF** |

## 5.2 EMI Test Equipment

| EQUIPMENT TYPE | MANU-FACTURER | MODEL NUMBER | SERIAL NUMBER | CAL. DATE | CAL. DUE DATE |
|---|---|---|---|---|---|
| Radiate Emissions Data Capture Program | Compatible Electronics | 2.0 | N/A | N/A | N/A |
| Spectrum Analyzer – Main Section | Hewlett Packard | 8566B | 3638A08784 | June 14, 2002 | June 14, 2003 |
| Spectrum Analyzer – Display Section | Hewlett Packard | 85662A | 3701A22279 | June 14, 2002 | June 14, 2003 |
| Quasi-Peak Adapter | Hewlett Packard | 85650A | 2430A00424 | June 14, 2002 | June 14, 2003 |
| Preamplifier | Com Power | PA-102 | 1017 | January 2, 2003 | Jan. 2, 2004 |
| Biconical Antenna | Com Power | AB-100 | 1548 | September 19, 2002 | Sept. 19, 2003 |
| Log Periodic Antenna | Com Power | AL-100 | 16089 | October 4, 2002 | Oct. 4, 2003 |
| Antenna Mast | Com Power | AM-100 | N/A | N/A | N/A |
| Turntable | Com Power | TT-100 | N/A | N/A | N/A |
| Computer | Hewlett Packard | 4530 | US91912319 | N/A | N/A |
| Monitor | Hewlett Packard | D5258A | TW74500641 | N/A | N/A |
| Loop Antenna | Com-Power | AL-130 | 17070 | June 19, 2002 | June 19, 2003 |
| Horn Antenna | Antenna Research | DRG-119/A | 1053 | January 13, 2002 | Jan. 13, 2004 |
| Microwave Preamplifier | Com-Power | PA-122 | 25195 | January 2, 2003 | Jan. 2, 2004 |

# 6. TEST SITE DESCRIPTION

## 6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

## 6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

# 7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

## 7.1 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

The measurement bandwidths and transducers used for the radiated emissions test were:

| FREQUENCY RANGE | EFFECTIVE MEASUREMENT BANDWIDTH | TRANSDUCER |
|---|---|---|
| 9 kHz to 150 kHz | 200 Hz | Active Loop Antenna |
| 150 kHz to 30 MHz | 9 kHz | Active Loop Antenna |
| 30 MHz to 300 MHz | 120 kHz | Biconical Antenna |
| 300 MHz to 1 GHz | 120 kHz | Log Periodic Antenna |
| 1 GHz to 4.40 GHz | 1 MHz | Horn Antenna |

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2001. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

## Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. The final qualification data sheets are located in Appendix E.

## 7.2 Bandwidth of the Fundamental

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT. Plots of the –20 dB bandwidth are located in Appendix E.

## 8. CONCLUSIONS

The Universal 2-Way Keyfob Receiver Model: 2WAY-UNIVKFKIT meets all of the Class B specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.

# APPENDIX A

# *LABORATORY RECOGNITIONS*

# *LABORATORY RECOGNITIONS*

**Compatible Electronics has the following agency accreditations:**

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

**Compatible Electronics is recognized or on file with the following agencies:**

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

# APPENDIX B

# *MODIFICATIONS TO THE EUT*

# MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.231 or FCC Class B specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT.

**APPENDIX C**

# *ADDITIONAL MODELS COVERED UNDER THIS REPORT*

# ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Universal 2-Way Keyfob Receiver
Model: 2WAY-UNIVKFKIT
S/N: N/A

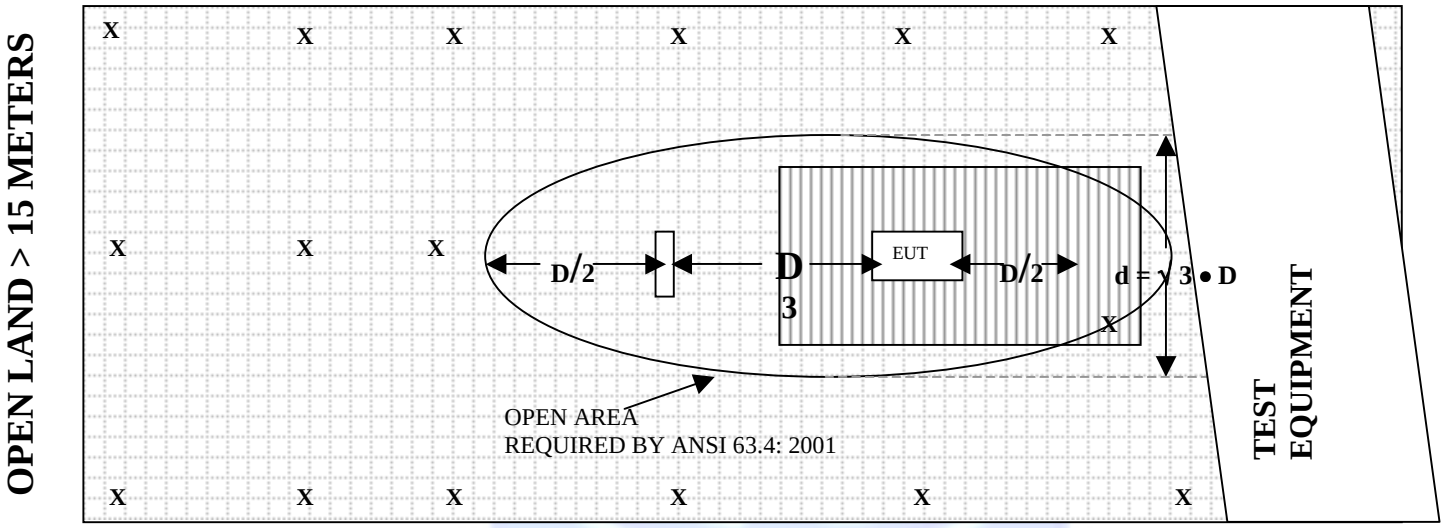
There were no additional models covered under this report.

# APPENDIX D

# *DIAGRAMS, CHARTS, AND PHOTOS*

# *FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE*

**OPEN LAND > 15 METERS**




**OPEN LAND > 15 METERS**

| | | | |
|---|---|---|---|
| **X** | = GROUND RODS | | = GROUND SCREEN |
| **D** | = TEST DISTANCE (meters) | | = WOOD COVER |

# COM-POWER AB-100

# BICONICAL ANTENNA

# S/N: 01548

# CALIBRATION DATE: SEPTEMBER 19, 2002

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|---|---|---|---|
| 30 | 14.30 | 120 | 10.70 |
| 35 | 14.00 | 125 | 11.40 |
| 40 | 13.70 | 140 | 12.70 |
| 45 | 12.00 | 150 | 12.50 |
| 50 | 11.40 | 160 | 12.90 |
| 60 | 9.70 | 175 | 14.10 |
| 70 | 8.30 | 180 | 14.70 |
| 80 | 7.60 | 200 | 15.10 |
| 90 | 7.80 | 250 | 16.90 |
| 100 | 8.60 | 300 | 19.10 |

# COM-POWER AL-100

# LOG PERIODIC ANTENNA

# S/N: 16089

# CALIBRATION DATE: OCTOBER 4, 2002

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|---|---|---|---|
| 300 | 13.10 | 700 | 17.70 |
| 350 | 14.40 | 750 | 19.60 |
| 400 | 14.30 | 800 | 20.50 |
| 450 | 15.70 | 850 | 21.20 |
| 500 | 16.60 | 900 | 21.20 |
| 550 | 16.60 | 950 | 22.50 |
| 600 | 17.30 | 1000 | 24.60 |
| 650 | 18.80 | | |

# COM-POWER PA-102

# PREAMPLIFIER

# S/N: 1017

# CALIBRATION DATE: JANUARY 2, 2003

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|---|---|---|---|
| 30 | 38.4 | 300 | 38.3 |
| 40 | 38.4 | 350 | 38.3 |
| 50 | 38.3 | 400 | 38.3 |
| 60 | 38.4 | 450 | 37.9 |
| 70 | 38.4 | 500 | 38.1 |
| 80 | 38.4 | 550 | 38.2 |
| 90 | 38.4 | 600 | 38.1 |
| 100 | 38.3 | 650 | 37.9 |
| 125 | 38.4 | 700 | 37.9 |
| 150 | 38.4 | 750 | 37.7 |
| 175 | 38.2 | 800 | 37.4 |
| 200 | 38.4 | 850 | 37.6 |
| 225 | 38.2 | 900 | 37.4 |
| 250 | 38.3 | 950 | 36.7 |
| 275 | 38.5 | 1000 | 37.0 |

# COM-POWER PA-122

# MICROWAVE PREAMPLIFIER

## S/N: 25195

## CALIBRATION DATE: JANUARY 2, 2003

| FREQUENCY (GHz) | FACTOR (dB) | FREQUENCY (GHz) | FACTOR (dB) |
|---|---|---|---|
| 1.0 | 33.3 | 6.0 | 32.2 |
| 1.1 | 33.2 | 6.5 | 32.2 |
| 1.2 | 33.4 | 7.0 | 31.8 |
| 1.3 | 32.8 | 7.5 | 32.1 |
| 1.4 | 32.4 | 8.0 | 32.7 |
| 1.5 | 32.7 | 8.5 | 31.5 |
| 1.6 | 32.1 | 9.0 | 30.3 |
| 1.7 | 32.4 | 9.5 | 30.0 |
| 1.8 | 32.3 | 10.0 | 31.9 |
| 1.9 | 32.6 | 11.0 | 29.9 |
| 2.0 | 33.4 | 12.0 | 24.7 |
| 2.5 | 31.2 | 13.0 | 32.0 |
| 3.0 | 31.2 | 14.0 | 30.7 |
| 3.5 | 32.0 | 15.0 | 30.1 |
| 4.0 | 31.3 | 16.0 | 29.2 |
| 4.5 | 31.2 | 17.0 | 28.9 |
| 5.0 | 33.3 | 18.0 | 28.7 |
| 5.5 | 34.0 | | |

# ANTENNA RESEARCH DRG-118/A

# HORN ANTENNA

# S/N: 1053

# CALIBRATION DATE: JANUARY 13, 2002

| FREQUENCY (GHz) | FACTOR (dB) | FREQUENCY (GHz) | FACTOR (dB) |
|---|---|---|---|
| 1.0 | 25.5 | 10.0 | 39.7 |
| 1.5 | 26.6 | 10.5 | 40.9 |
| 2.0 | 29.4 | 11.0 | 40.7 |
| 2.5 | 30.4 | 11.5 | 42.4 |
| 3.0 | 31.2 | 12.0 | 42.6 |
| 3.5 | 32.3 | 12.5 | 42.4 |
| 4.0 | 32.9 | 13.0 | 41.5 |
| 4.5 | 33.0 | 13.5 | 41.0 |
| 5.0 | 34.8 | 14.0 | 40.5 |
| 5.5 | 35.2 | 14.5 | 43.6 |
| 6.0 | 36.4 | 15.0 | 43.7 |
| 6.5 | 36.6 | 15.5 | 43.3 |
| 7.0 | 38.8 | 16.0 | 42.8 |
| 7.5 | 38.8 | 16.5 | 43.0 |
| 8.0 | 38.0 | 17.0 | 42.7 |
| 8.5 | 38.1 | 17.5 | 44.0 |
| 9.0 | 39.9 | 18.0 | 41.8 |
| 9.5 | 39.1 | | |

# COM-POWER AL-130

# LOOP ANTENNA

# S/N: 17070

# CALIBRATION DATE: JUNE 19, 2002

| FREQUENCY (MHz) | MAGNETIC (dB/m) | ELECTRIC (dB/m) |
|---|---|---|
| 0.009 | -40.4 | 11.1 |
| 0.01 | -40.3 | 11.2 |
| 0.02 | -41.2 | 10.3 |
| 0.05 | -41.6 | 9.9 |
| 0.07 | -41.4 | 10.1 |
| 0.1 | -41.7 | 9.8 |
| 0.2 | -44.0 | 7.5 |
| 0.3 | -41.6 | 9.9 |
| 0.5 | -41.3 | 10.2 |
| 0.7 | -41.4 | 10.1 |
| 1 | -40.9 | 10.6 |
| 2 | -40.6 | 10.9 |
| 3 | -40.5 | 11.0 |
| 4 | -40.8 | 10.7 |
| 5 | -40.2 | 11.3 |
| 10 | -40.7 | 10.8 |
| 15 | -41.4 | 10.1 |
| 20 | -41.6 | 9.9 |
| 25 | -41.7 | 9.8 |
| 30 | -42.9 | 8.6 |

**FRONT VIEW**

NAPCO SECURITY GROUP
UNIVERSAL 2-WAY KEYFOB RECEIVER
MODEL: 2WAY-UNIVKFKIT
FCC SUBPART B AND C - RADIATED EMISSIONS – 05-29-03

## PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

**REAR VIEW**

NAPCO SECURITY GROUP
UNIVERSAL 2-WAY KEYFOB RECEIVER
MODEL: 2WAY-UNIVKFKIT
FCC SUBPART B AND C - RADIATED EMISSIONS – 05-29-03

## PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

# APPENDIX E

# *DATA SHEETS*

# *RADIATED EMISSIONS*

# *DATA SHEETS*

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **433.9200** | 64.2 | 54.4 A | H | 1.0 | 0 | | | 15.2 | 3.9 | 0.0 | 0.0 | 0.0 | **73.5** | **-7.3** | **80.8** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| **433.9200** | 69.6 | 59.8 A | V | 2.0 | 270 | | | 15.2 | 3.9 | 0.0 | 0.0 | 0.0 | **78.9** | **-1.9** | **80.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **867.8400** | 40.6 | 30.8 A | H | 1.0 | 0 | | | 21.2 | 5.4 | 37.5 | 0.0 | 0.0 | **19.8** | **-41.0** | **60.8** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| **867.8400** | 58.0 | 48.2 A | V | 1.0 | 0 | | | 21.2 | 5.4 | 37.5 | 0.0 | 0.0 | **37.2** | **-23.6** | **60.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1301.7600** | 43.7 | A | H | 1.0 | 270 | | | 26.2 | 1.9 | 32.8 | 0.0 | 0.0 | **39.0** | **-15.0** | **54.0** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| **1301.7600** | 46.7 | A | V | 1.0 | 180 | | | 26.2 | 1.9 | 32.8 | 0.0 | 0.0 | **42.0** | **-12.0** | **54.0** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1735.6800** | 42.3 | A | H | 2.0 | 0 | | | 27.9 | 2.3 | 32.4 | 0.0 | 0.0 | **40.2** | **-20.6** | **60.8** | |
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| **1735.6800** | 43.9 | A | V | 1.0 | 0 | | | 27.9 | 2.3 | 32.4 | 0.0 | 0.0 | **41.8** | **-19.0** | **60.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2169.6000** | 41.9 | A | H | 1.0 | 180 | | | 29.7 | 3.8 | 32.7 | 0.0 | 0.0 | **42.8** | **-18.0** | **60.8** | |
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| **2169.6000** | 40.8 | A | V | 1.5 | 0 | | | 29.7 | 3.8 | 32.7 | 0.0 | 0.0 | **41.7** | **-19.1** | **60.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2603.5200** | 40.8 | A | H | 1.0 | 180 | | | 30.6 | 3.6 | 31.2 | 0.0 | 0.0 | **43.8** | **-17.0** | **60.8** | |
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| **2603.5200** | 41.8 | A | V | 1.0 | 90 | | | 30.6 | 3.6 | 31.2 | 0.0 | 0.0 | **44.8** | **-16.0** | **60.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

# RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.231)

| | | | |
|---|---|---|---|
| **COMPANY** | **NAPCO SECURITY GROUP** | **DATE** | **5/29/03** |
| **EUT** | **UNIVERSAL 2-WAY KEYFOB RECEIVER** | **DUTY CYCLE** | **32.175 %** |
| **MODEL** | **2WAY-UNIVKFKIT** | **PEAK TO AVG** | **-9.84962889 dB** |
| **S/N** | **N/A** | **TEST DIST.** | **3 Meters** |
| **TEST ENGINEER** | **Kyle Fujimoto** | **LAB** | **D** |

| Frequency MHz | Peak Reading (dBuV) | Average (A) or Quasi-Peak (QP) | Antenna Polar. (V or H) | Antenna Height (meters) | EUT Azimuth (degrees) | EUT Axis (X,Y,Z) | EUT Tx Channel | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | Distance Factor (dB) | Mixer Factor (dB) | *Corrected Reading (dBuV/m) | Delta ** (dB) | Spec Limit (dBuV/m) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3037.4400** | 37.4 | A | H | 1.0 | 270 | | | 31.3 | 4.3 | 31.3 | 0.0 | 0.0 | **41.7** | **-19.1** | **60.8** | **No Emissions Nor** |
| | | | | | | | | | | | | | | | | **Harmonics Found Beyond** |
| | | | | | | | | | | | | | | | | **the 7th Harmonic** |
| **3037.4400** | 40.7 | A | V | 1.0 | 180 | | | 31.3 | 4.3 | 31.3 | 0.0 | 0.0 | **45.0** | **-15.8** | **60.8** | |
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* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

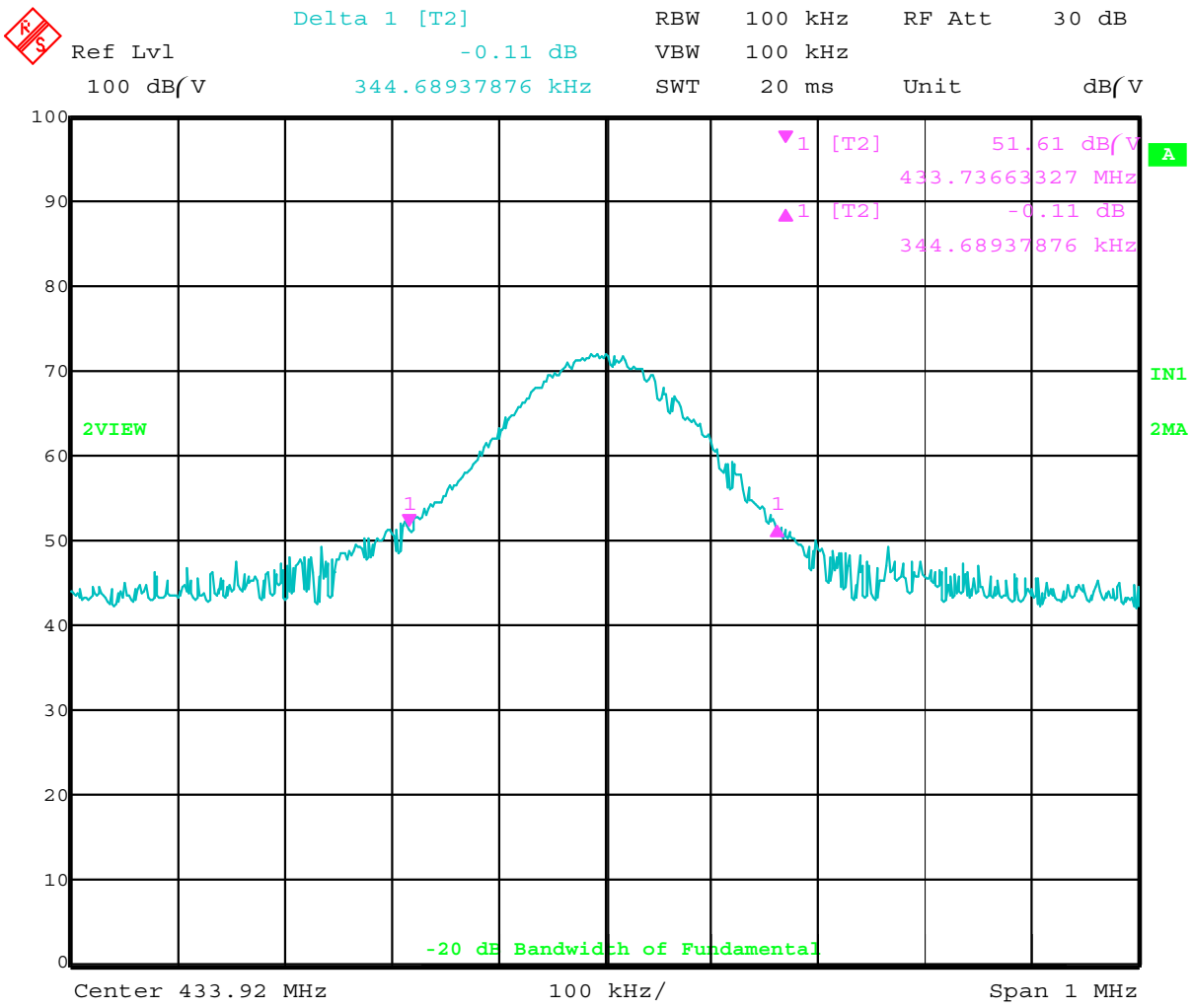
Page: 1 of 1

Test location : Compatible Electronics
Customer : NAPCO Security Group Date : 5/29/2003
Manufacturer : NAPCO Security Group Time : 13.48
EUT name : Universal 2-Way KEYFOB Receiver
Model: 2WAY-UNIVKFKIT
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : Spurious Emissions 10 kHz to 4400 MHz
Horizontal and Vertical Polarizations
Tested By: Kyle Fujimoto

| Pol | Freq | Rdng | Cable | Ant | Amp | Cor'd | limit | Delta |
|---|---|---|---|---|---|---|---|---|
| | | loss | factor | gain | rdg = R | = L | R-L | |
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV/m | dB |
| 1V | 144.07 | 45.90 | 2.15 | 12.62 | 38.40 | 22.27 | 43.50 | -21.23 |
| 2V | 192.07 | 44.80 | 2.53 | 14.94 | 38.34 | 23.94 | 43.50 | -19.56 |
| 3V | 204.04 | 44.50 | 2.53 | 15.25 | 38.37 | 23.91 | 43.50 | -19.59 |
| 4V | 204.04 | 41.40 | 2.53 | 15.25 | 38.37 | 20.81 | 43.50 | -22.69 |
| 5V | 216.04 | 48.20 | 2.63 | 15.68 | 38.27 | 28.23 | 46.00 | -17.77 |
| 6V | 216.04 | 33.90 | 2.63 | 15.68 | 38.27 | 13.93 | 46.00 | -32.07 |
| 7V | 228.04 | 42.30 | 2.74 | 16.11 | 38.21 | 22.93 | 46.00 | -23.07 |
| 8V | 312.04 | 39.80 | 3.37 | 13.41 | 38.30 | 18.29 | 46.00 | -27.71 |
| 9H | 448.18 | 35.80 | 3.99 | 15.65 | 37.91 | 17.53 | 46.00 | -28.47 |

# *-20 dB BANDWIDTH*

# *DATA SHEET*


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-0.11 dB
VBW 100 kHz
100 dBµV
344.68937876 kHz
SWT 20 ms
Unit dBµV
1 [T2] 51.61 dBµV
433.73663327 MHz
1 [T2] -0.11 dB
344.68937876 kHz
A
IN1
2MA
2VIEW
-20 dB Bandwidth of Fundamental
Center 433.92 MHz
100 kHz/
Span 1 MHz
Date: 15.OCT.2003 22:53:39