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Test report

301627-1TRFWL

Date of issue: February 3, 2016

Applicant:

Digital Security Controls, a div. of Tyco Safety Products Canada Ltd.

Product:

3G Cellular Alarm Communicator

Model:

3G4005

FCC ID:

F53163G4005

Specifications:

- ◆ **FCC Part 22 Subpart H**
Cellular radiotelephone service. (Partial testing)
- ◆ **FCC Part 24 Subpart E**
Personal communications services. (Partial testing)

www.nemko.com

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation

FCC 22H and 24 E.docx; Date: Jan 2016



Test location

| | |
|---------------|--|
| Company name: | Nemko Canada Inc. |
| Address: | 303 River Road |
| City: | Ottawa |
| Province: | Ontario |
| Postal code: | K1V 1H2 |
| Country: | Canada |
| Telephone: | +1 613 737 9680 |
| Facsimile: | +1 613 737 9691 |
| Toll free: | +1 800 563 6336 |
| Website: | www.nemko.com |
| Site number: | FCC: 176392; IC: 2040A-4 (3 m semi anechoic chamber) |

| | |
|--------------|---|
| Tested by: | Kevin Rose, Wireless/EMC Specialist |
| Reviewed by: | David Duchesne, Senior EMC/Wireless Specialist |
| Date: | February 3, 2016 |
| Signature: |  |

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant

| | |
|--------------|---|
| Company name | Digital Security Controls, a div. of Tyco Safety Products Canada Ltd. |
| Address | 3301 Langstaff Road, Concord, ON, Canada, L4K 4L2 |

1.2 Manufacturer

| | |
|--------------|--|
| Company name | Bentel S.r.l. |
| Address | Via del Gabbiano, 22, Corropoli (TE), 64013, Italy |

1.3 Test specifications

| | |
|-----------------------|----------------------------------|
| FCC Part 22 Subpart H | Cellular radiotelephone service. |
| FCC Part 24 Subpart E | Personal communications services |

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Exclusions

The EUT was partially tested per customer request. (See quote no.: Q10292850). See Summary of test results section of this report.

1.6 Test report revision history

| Revision # | Details of changes made to test report |
|------------|--|
| TRF | Original report issued |

Section 2. Summary of test results

2.1 FCC Part 22 Subpart H, test results

| Part | Test description | Verdict |
|-----------|---|------------|
| 22.913(a) | Effective Radiated Power | Pass |
| 22.917(a) | Field strength of spurious radiation | Pass |
| 4.7 | Transmitter frequency stability ¹ | Not tested |
| 6.1 | Receiver spurious emissions limits (radiated) ¹ | Not tested |
| 6.2 | Receiver spurious emissions limits (antenna conducted) ¹ | Not tested |

Notes: ¹The EUT was partially tested per customer request. Quote no.: Q10292850 all other measurement are based on Report T130225W02-RP

2.2 FCC Part 24 Subpart E, tests results

| Part | Test description | Verdict |
|-----------|---|------------|
| 24.232(c) | Equivalent Isotropically Radiated Power | Pass |
| 24.238(a) | Field strength of spurious radiation | Pass |
| 6.3 | Frequency stability ¹ | Not tested |
| 6.4 | Transmitter output power ¹ | Not tested |
| 6.5 | Transmitter unwanted emissions ¹ | Not tested |

Notes: ¹The EUT was partially tested per customer request. Quote no.: Q10292850 all other measurement are based on Report T130225W02-RP

Section 3. Equipment under test (EUT) details

3.1 Sample information

| | |
|------------------------|------------------|
| Receipt date | January 14, 2016 |
| Nemko sample ID number | 133-001667 |

3.2 EUT information

| | |
|---------------|--------------------------------|
| Product name | 3G Cellular Alarm Communicator |
| Model | 3G4005 |
| Model variant | None |
| Part number | HW: B084_R01 |

3.3 Technical information

| | |
|---------------------|--|
| Frequency band | 850/1900 MHz (2G/3G) |
| Frequency Min (MHz) | 824.2 MHz/1850.2 MHz |
| Frequency Max (MHz) | 848.8 MHz/1909.8 MHz |
| Modulation type | GFSK |
| Channel bandwidth | 250 kHz |
| Emission designator | GXW |
| Hardware rev. | B084 Rev. 01 |
| Software ver. | Ver. 1.0 |
| Power requirements | 13.8 V _{DC} (Provided by external power supply) |
| Antenna information | <p>3G4005 has the option to use an on-board internal PIFA (Planar Inverted F Antenna; part # ANTPENTGSMCS4919 1.0) or an external whip antenna (part#ANTPENTGSM200MMC) depending on requirements of each installation.</p> <p>Frequency Range and Gain:</p> <ul style="list-style-type: none"> – Internal antenna: Band GSM850: 824-893 MHz/ 0-4 dBi and Band GSM1900: 1850-1990 MHz/2-3.5 dBi – External magnetic antenna: Band GSM850/900: 824-960 MHz/-1-0 dBi and Band GSM1800/1900/2100: 1710-2170 MHz/-5-0 dBi |

3.4 Product description and theory of operation

The 3G4005 Cellular Alarm Communicator can be used for data communication over a cellular voice channel or data network. It is a communication interface (B084_R01) that integrates the Telit GSM/WCDMA radio Model UE910-NAR. Upon phone line loss, when an alarm is generated in the Alarm System, the control panel will pick up the phone line and 3G4005 will simulate a line dial tone. The Panel will dial the number to be called (of the alarm receiver) and the 3G4005 answers with a handshake, the panel then sends alarm data. The 3G4005 forwards the alarm data via cellular data network using IP protocol to a central station receiver, which acknowledges the alarm data. 3G4005 then generates the required kiss-off tone to the panel to confirm the received data as valid, the panel hangs-up, and the simulated call is terminated. The 3G4005 has 6 input/outputs, which can be programmed to send certain data associated with the type of events they are being assigned to. For example, if input 1 is programmed to send a Burglary Alarm type of data when activated, when it is tripped the 3G4005 will send the alarm data to the programmed IP address.

3.5 EUT exercise details

Powered up in TX mode controlled by CMU200

3.6 EUT setup diagram

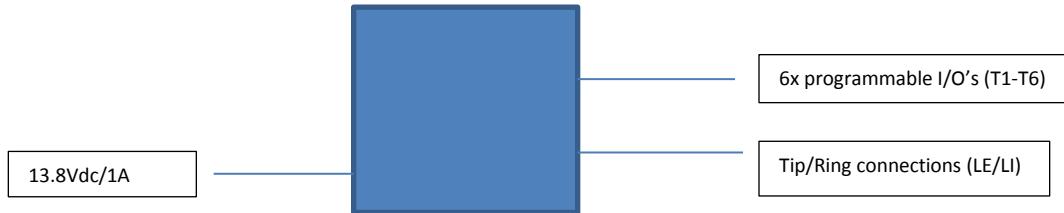


Figure 3.6-1: Setup diagram

3.7 EUT sub assemblies

Table 3.7-1: EUT sub assemblies

| Description | Brand name | Model/Part number | Serial number |
|----------------------------------|------------|-------------------|---------------|
| 13.8Vdc/1A External Power Supply | Uninput | KSAD1380100W1US | N/A |
| GSM/GPRS Base Station simulator | CMU200 | CMU200 | N/A |

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

| | |
|-------------------|---------------|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|-----------------------------|-----------------|--------------|-----------|-----------|------------|
| 3 m EMI test chamber | TDK | SAC-3 | FA002047 | 1 year | Dec. 01/16 |
| Flush mount turntable | Sunol | FM2022 | FA002082 | — | NCR |
| Controller | Sunol | SC104V | FA002060 | — | NCR |
| Antenna mast | Sunol | TLT2 | FA002061 | — | NCR |
| Receiver/spectrum analyzer | Rohde & Schwarz | ESU 26 | FA002043 | 1 year | Jan. 07/17 |
| Bilog antenna (20–3000 MHz) | Sunol | JB3 | FA002108 | 1 year | Apr. 12/16 |
| Pre-amplifier (1–18 GHz) | JCA | JCA118-503 | FA002091 | 1 year | May 05/16 |
| Horn antenna (1–18 GHz) | EMCO | 3115 | FA000825 | 1 year | Apr. 01/16 |
| Spectrum analyzer | Rohde & Schwarz | FSP | FA001920 | 1 year | Aug. 20/16 |
| 18–26 GHz pre-amplifier | Narda | BBS-1826N612 | FA001550 | — | VOU |
| Horn antenna 18–40 GHz | EMCO | 3116 | FA001847 | 1 year | Jan. 09/16 |

Note: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

8.1.1 Definitions and limits

FCC §22.913 Effective radiated power limits.

The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(a) Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 W (57 dBm). However, for those systems operating in areas more than 72 km (45 miles) from international borders that:

- (1) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or,
- (2) Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 W (60 dBm). The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 W (38.45 dBm).

FCC §24.232 Power and antenna height limits.

(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

8.1.2 Test summary

| Verdict | Pass | | |
|---------------|------------------|-------------------|-----------|
| Test date | January 21, 2016 | Temperature | 22 °C |
| Test engineer | Kevin Rose | Air pressure | 1001 mbar |
| Test location | Ottawa | Relative humidity | 34 % |

8.1.3 Observations settings and special notes

None

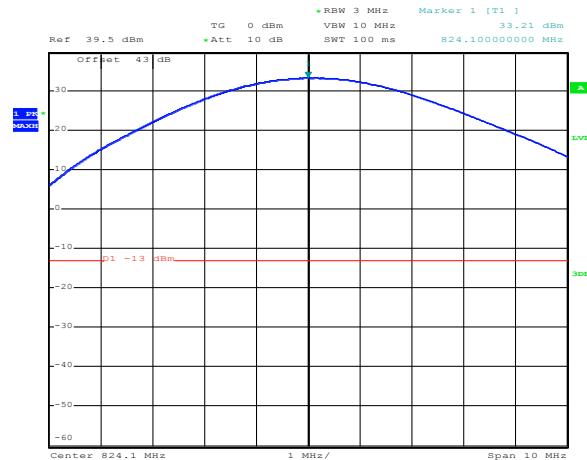
8.1.4 Test data

Table 8.1-1: ERP measurement results for GSM 850 as per FCC Part 22

| Frequency, MHz | Measured level, dBm | Antenna Gain, dBi | ERP, dBm | ERP limit, dBm | Margin, dB |
|----------------|---------------------|-------------------|----------|----------------|------------|
| 824.2 | 33.21 | 2.14 | 35.35 | 38.5 | 3.15 |
| 836.6 | 33.21 | 2.14 | 35.35 | 38.5 | 3.15 |
| 848.8 | 33.21 | 2.14 | 35.35 | 38.5 | 3.15 |

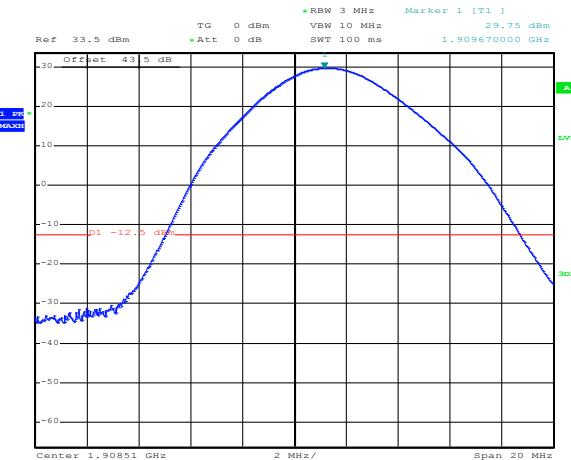
Table 8.1-2: ERP measurement results for PCS 1900 as per FCC Part 24

| Frequency, MHz | Measured level, dBm | Antenna Gain, dBi | EIRP, dBm | EIRP limit, dBm | Margin, dB |
|----------------|---------------------|-------------------|-----------|-----------------|------------|
| 1850.2 | 29.84 | 0 | 29.84 | 33 | 3.16 |
| 1880.0 | 29.72 | 0 | 29.72 | 33 | 3.28 |
| 1909.8 | 29.75 | 0 | 29.75 | 33 | 3.25 |



Date: 21.JAN.2016 17:26:12

Figure 8.1-1: Conducted power Example



Date: 21.JAN.2016 17:19:24

Figure 8.1-2: Conducted power Example

8.2 Field Strength of spurious radiation

8.2.1 Definitions and limits

FCC §22.917 Emission limitations for cellular equipment.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log_{10} (P)$ dB or -13 dBm.

FCC §24.238 Emission limitations for Broadband PCS equipment.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

8.2.2 Test summary

| | | | |
|---------------|------------------|-------------------|-----------|
| Verdict | Pass | | |
| Test date | January 21, 2016 | Temperature | 22 °C |
| Test engineer | Kevin Rose | Air pressure | 1001 mbar |
| Test location | Ottawa | Relative humidity | 34 % |

8.2.3 Observations settings and special notes

The Spectrum was searched from 30 MHz to the 10th Harmonic.

All measurements were performed using a Peak Detector with 100 kHz RBW below 1 GHz and a 1 MHz RBW above 1 GHz at a distance of 3 meters. Low, Middle, and High channels for GSM 850 and PCS 1900 were investigated.

8.2.4 Test data

No spurious emissions were detected within 20 dB of the limit.

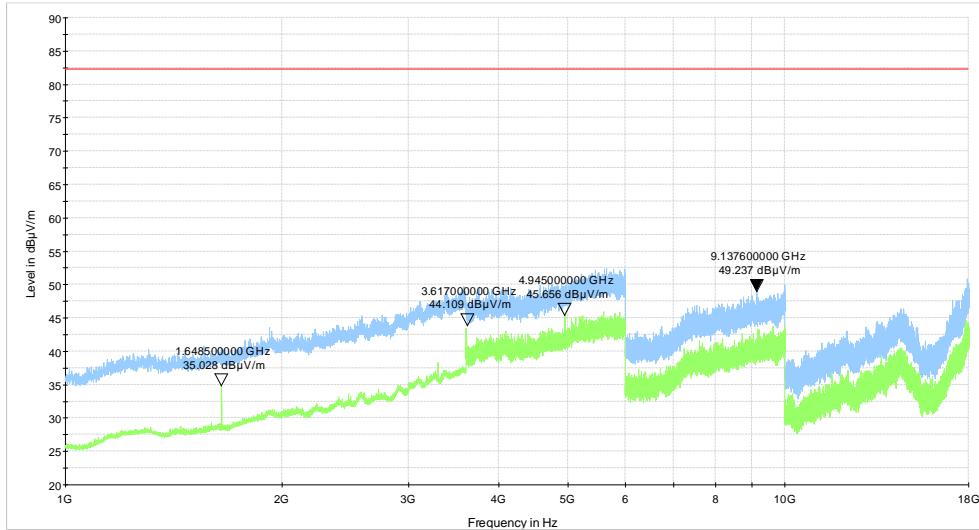


Figure 8.2-1: Radiated Spurious Example – GSM 850

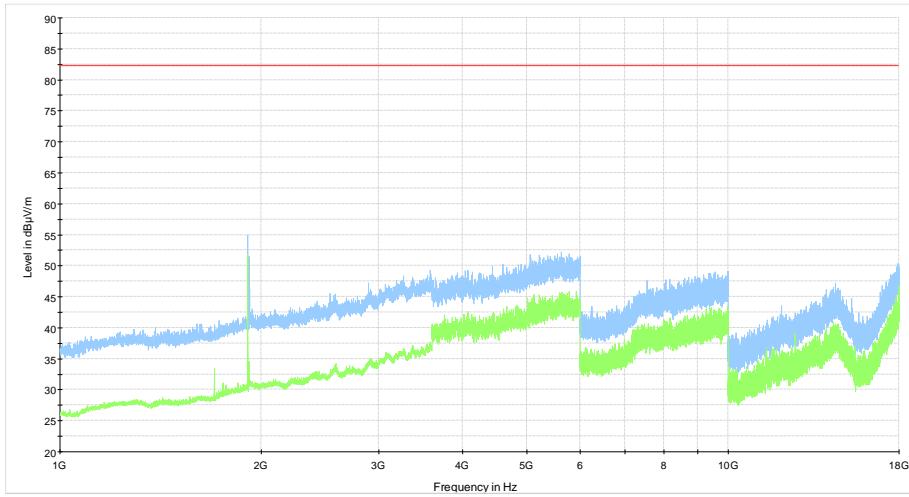


Figure 8.2-2: Radiated Spurious Example – PCS 1900

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up

