Cert. No. 1152.01
Electrical (EMC)

DATE: 13 June 2006

I.T.L. (PRODUCT TESTING) LTD.

FCC EMC/Radio Test Report

for

Hi-G-Tek Ltd.

Equipment under test:

Lock DataSeal With Tilt and Motion Sensors

IG-LK-41-916*

* See customer's declaration on page 6.

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
E. Pitt, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Cert. No. 1152.01
Electrical (EMC)

Measurement/Technical Report for
Hi-G-Tek Ltd.

Equipment under test:

Lock DataSeal With Tilt and Motion Sensors

FCC ID: OB6-IGRS41916

DATE: 12 June 2006

This report concerns: Original Grant _x_ Class II change ___

Class B verification ___ Class A verification__ Class I change ____

Equipment type: Radio Transmitter
Request Issue of Grant:
__**x**__Immediately upon completion of review

Limits used:
CISPR 22 _____ Part 15 _x_

Measurement procedure used is ANSI C63.4-2003.

Application for Certification
prepared by:
Ishaiahou Raz
ITL (Product Testing) Ltd.
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Lod 71100
Israel
Tel: +972-8-915-3100
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Email: sraz@itl.co.il

Applicant for this device:
(different from "prepared by")
Roni Cohen
Hi-G-Tek Ltd.
16 Hacharoshet St.
Or Yehuda 60375
Israel
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Fax: +972-4-690-2727
Email:

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1. General Information

1.1 Administrative Information

Manufacturer:	Hi-G-Tek Ltd.
Manufacturer's Address:	16 Hacharoshet St. Or-Yehuda 60375 Israel Tel: +972-3-533-9359 Fax: +972-3-533-9225
Manufacturer's Representative:	Roni Cohen Arkady Genin
Equipment Under Test (E.U.T):	Lock DataSeal With Tilt and Motion Sensors
Equipment Model No.:	IG-LK-41-916 (See customer's declaration on following page).
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	09.08.05
Start of Test:	09.08.05
End of Test:	09.08.05
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15, Subpart C

Hi-G-Tek Ltd.
16 Hacharoshet Street
Or-Yehuda 60375, ISRAEL
Tel: +972-3-5339359
Fax: +972-3-5339225

Microelectronics & Asse
Tracking Technology

7.11.05

DECLARATION

I hereby declare that the name and model number of the E.U.T.

tested at the I.T.L. EMC laboratory on 09 August 2005 is as

follows:

E.U.T.:	**Lock DataSeal With Tilt and Motion Sensors**
Model Name:	**IG-LK-41-916**

The label on the tested unit is incorrect.

Please use the above names in the test report and certificate.

Thank you,

Hi-G-Tek Ltd.
Wireless Monitoring
Platform

Kamin Jacob
Operation Manager

HI-G-TEK Ltd.

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

DataSeal Family of Products

The DataSeal is a portable, reusable electronic seal that provides automatic processing and real-time monitoring of secured cargoes in transit and in storage. The Dataseal uses active wireless monitoring technology and includes a transmitter/receiver unit, read/write capability, real-time clock, memory and sensing circuitry for sealing verification.

The DataSeal together with various sensing capabilities, form a complete assembly uses in most applications. The sealing wire prevents any undetected attempt at opening, bypassing or tampering with the DataSeal. The Lock DataSeal and others which includes a pin, provide physical protection together with electronic sensing. The system detects any attempt to open or tamper the wile loop or the lock, sends alert and records the event.

In low-frequency short-range mode, the DataSeal logs and communicates data through a handheld data terminal and can be inspected by a MicroReader. The data terminal writes the electronic manifest of the sealed cargo into the electronic seal's memory. The information could include vehicle Ids, container and invoice numbers, cargo descriptions, quantities and destinations. The high frequency long range mode provides full two way read/write data communication channel at a distance of 50m. The DataSeal transmits the information in reply to an interrogation by the DataReader. Many DataSeals can be monitored simultaneously by one DataReader. This long-range capability makes the DataSeal ideal for applications such as tracking and sealing verification of containers in transit, protection of containers in transit, protection of containers in storage and remote automatic Data collection of cargoes as they pass through checkpoints. As mentioned, the DataSeal has two RF channels, short range and long range. The short range channel is 125KHz, OOK modulated and the long range channel is 916.5MHz, FSK modulated.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing December 12, 2003).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling

Figure 1. FCC Label

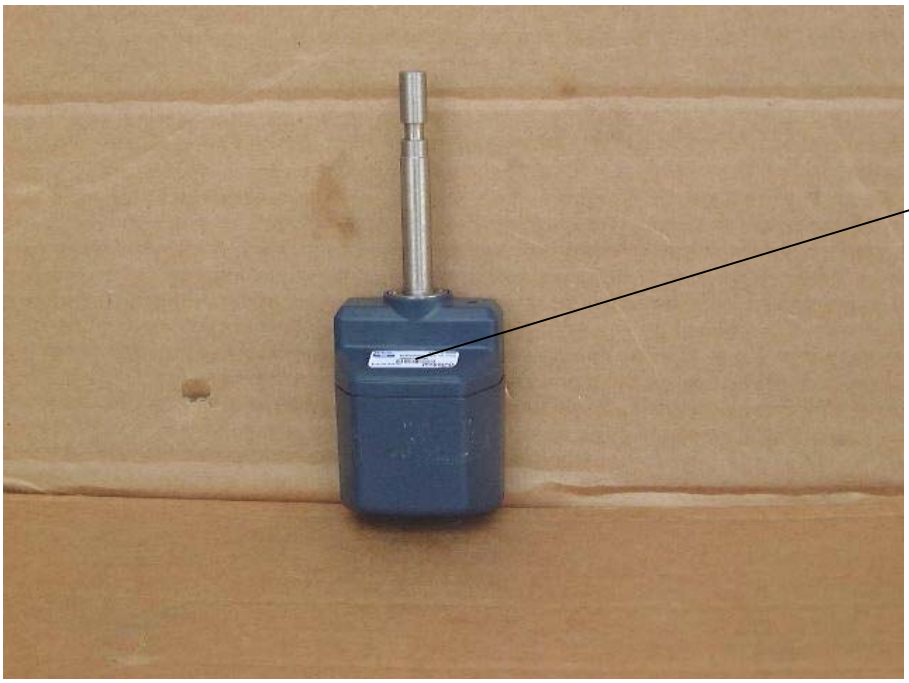

Figure 2. Label Location on EUT

3. System Test Configuration

3.1 Justification

The typical installation of the E.U.T. is either in the vertical or horizontal position.

To determine the E.U.T. antenna orientation for the spurious radiated emissions tests, the product carrier field level was measured with the E.U.T. antenna in various directions/positions. The vertical position of the E.U.T. antenna was selected as the worst case final orientation position.

FCC Screening Tests

a. To select the worst case model, a radiated emission test, in the frequency range of 30-1000MHz, was performed on all models.

b. The test was performed in a semi-anechoic chamber.

c. This screening test is coordinated with the TCB (See correspondence in Appendix B).

d. See additional information in Appendix C for product names, description, and photos.

e. The results of the screening tests are:

Product Name	Model	Result (dBμV/m)
Lock Data Seal	IGLK41916	95.2
Lock Data Seal	IGLK42916	93.4
Lock Data Seal	IGLK40916	93.8
Hatch Seal With Motion Sensor	IGFLH41916	93.1
Hatch Seal	IGFLH40916	93.9
Data Seal Wire With Motion Sensor	IGRS40T916	84.1
Data Seal Wire	IGRS40916	89.4
Barrier Data Seal	IGBR41916	88.3
Barrier Data Seal	IGBR42916	91.3
Barrier Data Seal	IGBR40916	90.9
Motion Magnetic Data Seal	IGRS40MT916	88.1
Magnetic Data Seal	IGRS40M916	87.4
Valve Seal	IGFL40916	92.0
Valve Seal	IGFL41916	91.6
Snap Data Seal	IGBLT40916	82.3
Motion Data Seal	IGDT43916	88.1

Based on the above results, the model IGLK41916 was selected as the worst case unit.

3.2 EUT Exercise Software

The DataSeal usually transmits short messages, for the test, the DataSeal was setup by software to transmit long periods of carrier or random data to enable measurements of the transmitted signals.

3.3 Special Accessories

No special accessories were needed to achieve compliance.

3.4 Equipment Modifications

No special modifications were needed to achieve compliance.

3.5 Configuration of Tested System

The configuration of the tested system is described below.

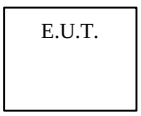

Figure 3. Configuration of Tested System

4. Block Diagram

4.1 Schematic Block/Connection Diagram

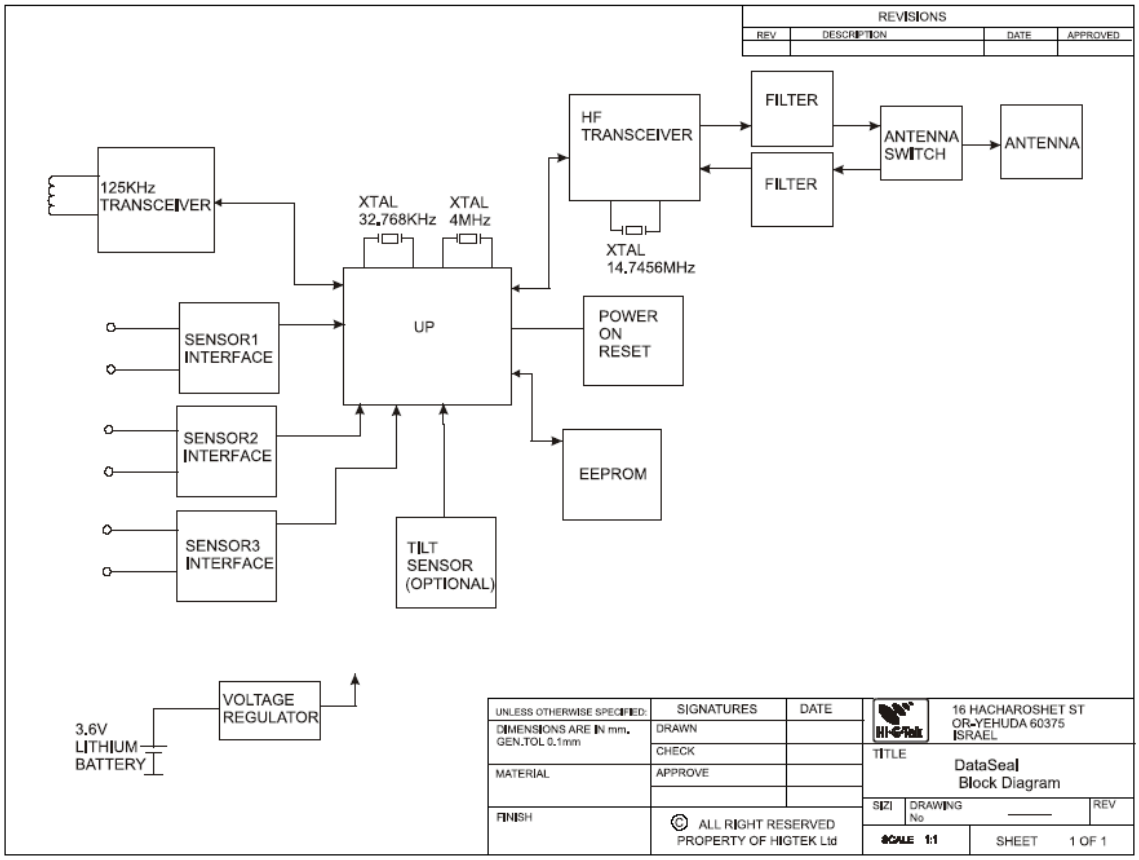

Figure 4. Block Diagram

4.2 Theory of Operation

The DataSeal has two RF channels, high frequency (HF) and low frequency (LF). The HF is 916.5MHz carrier with FSK modulated data by 40KHz deviation. The LF is 125KHz carrier with OOK modulated data.

The DataSeal opens its HF receiver once every 3 seconds to look for an interrogator. If an interrogator is not found, the DataSeal goes to sleep for another 3 s. If an interrogator is found, the DataSeal receives the command and transmits a message, 50 msec., according to the command received. During the DataSeal wake up, it performs seal wire test and integrity test of its stored data. The LF receiver is always opened for data. The LF channel is used to interrogate the DataSeal by short range link for set-up or manual verification.

5. Field Strength of Fundamental

5.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.249(a)

5.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.
The EMI receiver was set to the E.U.T. Fundamental Frequency (916.500MHz) and Peak Detection.
The turntable and antenna mast were adjusted for maximum level reading on the EMI receiver.
The measurement was performed for vertical and horizontal polarizations of the test antenna.

The final result is:

Peak Level(dBμV/m) + E.U.T. Duty Cycle Factor, in 100msec time window (dB)

5.3 Measured Data

JUDGEMENT: Passed by 6.88 dB

The EUT met the FCC Part 15, Subpart C, Section 15.249(a) specification requirements.

The details of the highest emissions are given in *Figure 5*.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.06.06

Typed/Printed Name: E. Pitt

Field Strength of Fundamental

E.U.T Description	Lock DataSeal With Tilt and Motion Sensors
Model Number	IG-LK-41-916
Serial Number:	Not designated

Specification: F.C.C., Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters Detector: Peak

Freq. (MHz)	Pol. V/H	Peak Reading (1) (dBµV/m)	D.C.F. (2) (dB)	Final Result (3) (dBµV/m)	AVG. Specification (dBµV/m)	Margin (dB)
916.50	H	88.00	-6.0	82.0	94.0	-12.0
916.50	V	93.18	-6.0	87.12	94.0	-6.88

Figure 5. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

(1) "Peak Amp." includes "Correction Factors.

"Correction Factors" = Antenna Correction Factor + Cable Loss.

(2) "Duty Cycle Factor (D.C.F.)= $20\log\frac{50}{100} = -6.0dB$ (See Section 4.2 of this report).

(3) "Final Result" = "Peak Reading" +D.C.F. (dB).

5.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	February 26, 2005	1 year
RF Section	HP	85420E	3427A00103	February 26, 2005	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	October 20, 2004	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A

6. Radiated Measurement Photos

Figure 6. Radiated Emission Test 9kHz-30MHz

Figure 7. Radiated Emission Test 30MHz-9.2GHz

7. Radiated Emission, For Low Frequency Transmitter (125 kHz)

7.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Section 15.209

7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and loop antenna. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in *Figure 6. Radiated Emission Test 9kHz-30MHz*.

The frequency range 9 kHz-30 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequency of 125 kHz

7.3 Test Data

JUDGEMENT: Passed by 33.4 dB

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, specification.

The margin between the carrier level (125 kHz) and the specification limit was 33.4 dB.

See details in *Figure 8*.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.06.06

Typed/Printed Name: E. Pitt

Radiated Emission,
Low Frequency Transmitter

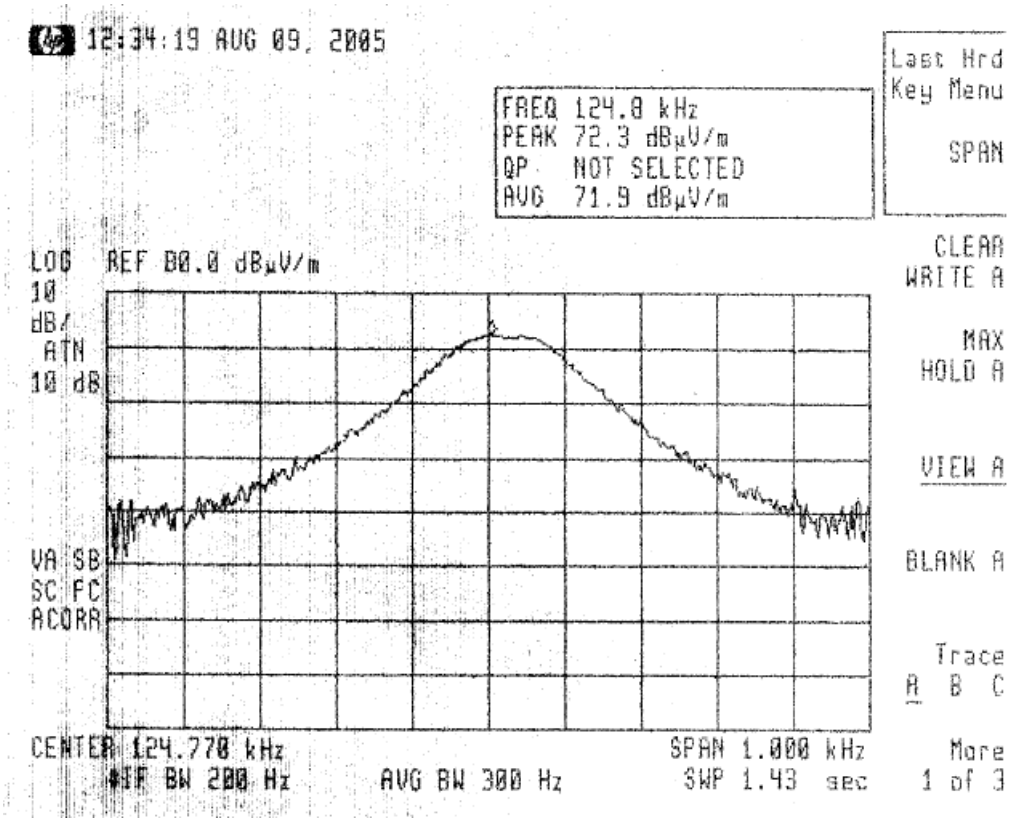

Figure 8 Spurious Radiated Emissions 9 kHz – 30 MHz

$$\text{Limit}_{3m} = 20\log\frac{2400}{125} + 40\log\frac{300}{3} = 105.7 db\mu V/m$$

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	February 26, 2005	1 year
RF Section	HP	85420E	3427A00103	February 26, 2005	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 14, 2004	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A

8. Spurious Radiated Emission 9kHz-1000 MHz

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in *Figure 3*.

The frequency range 9kHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.
In the frequency range 9 kHz-30 MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.
In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

During this test the E.U.T. was operated in continuous transmission to enable better detection of signals.

8.1 Measured Data

JUDGEMENT: Passed

The signals in the band 9 kHz – 1000 MHz were 20dB below the specification limit.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 15.249 specification.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.06.06

Typed/Printed Name: E. Pitt

8.2 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	February 26, 2005	1 year
RF Section	HP	85420E	3427A00103	February 26, 2005	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 14, 2005	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	October 20, 2004	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 14, 2004	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A

8.3 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

9. Spurious Radiated Emission Above 1 GHz

9.1 Spurious Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.

The emission levels were compared to the requirement of Section 15.249.

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used. The test distance was 3 meters.

In the frequency range 2.9-9.2 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.).

9.2 Test Data

JUDGEMENT: Passed by 10.6 dB

The margin between the emission level and the specification limit is 10.6 dB in the worst case at the frequency of 2749.40 MHz, vertical polarization.

The EUT met the requirements of the F.C.C. Part 15, Subpart C Section 15.249, specification.

The details of the highest emissions are given in *Figure 9* to *Figure 10*.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.06.06

Typed/Printed Name: E. Pitt

Spurious Radiated Emission Above 1 GHz

E.U.T Description	Lock DataSeal With Tilt and Motion Sensors
Model Number	IG-LK-41-916
Serial Number:	Not designated

Specification: F.C.C., Part 15, Subpart C, 15.249

Antenna Polarization: Horizontal/Vertical

Frequency range: 1.0 GHz to 9.2 GHz

Test Distance: 3 meters

Detector: Peak

Freq. (MHz)	Peak Result (dBµV/m)	Polarization (H/L)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
1833.00	49.5*	H	74.0	-24.5
2749.40	57.3*	H	74.0	-16.7
1833.00	50.2*	V	74.0	-23.8
2749.40	56.2*	V	74.0	-17.8

Figure 9. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL/Vertical. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss

Spurious Radiated Emission Above 1 GHz

E.U.T Description	Lock DataSeal With Tilt and Motion Sensors
Model Number	IG-LK-41-916
Serial Number:	Not designated

Specification: F.C.C., Part 15, Subpart C, 15.249

Antenna Polarization: Horizontal/Vertical

Frequency range: 1.0 GHz to 9.2 GHz

Test Distance: 3 meters

Detector: Average

Freq. (MHz)	Average Result (dBµV/m)	Polarization (H/L)	Average Specification (dB µV/m)	Average Margin (dB)
1833.00	37.7*	H	54.0	-16.3
2749.40	43.3*	H	54.0	-10.7
1833.00	38.8*	V	54.0	-15.2
2749.40	43.4*	V	54.0	-10.6

Figure 10. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Average

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Result" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss

9.3 Test Instrumentation Used, Spurious Radiated Measurements Above 1 GHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3411A00102	February 26, 2005	1 year
RF Section	HP	85420E	3427A00103	February 26, 2005	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet2225	2738508357	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 24, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 17, 2004	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 17, 2004	1 year
Spectrum Analyzer	HP	8592L	3926A01204	February 01, 2005	1 year

10. Photographs of Tested E.U.T.

Figure 11 Front View

Figure 12 Rear View

Figure 13 Top View

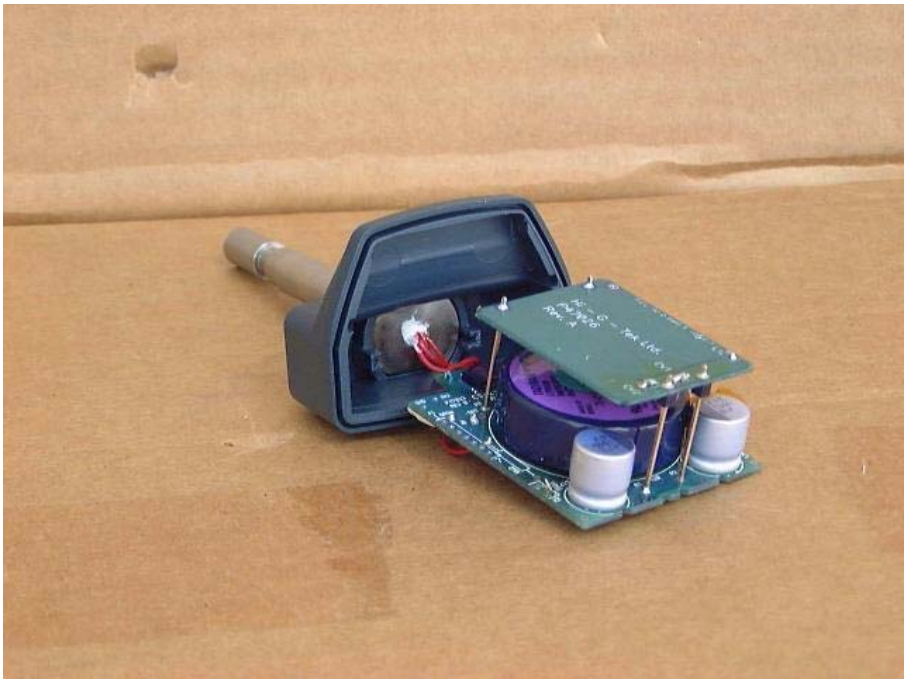

Figure 14 Internal View

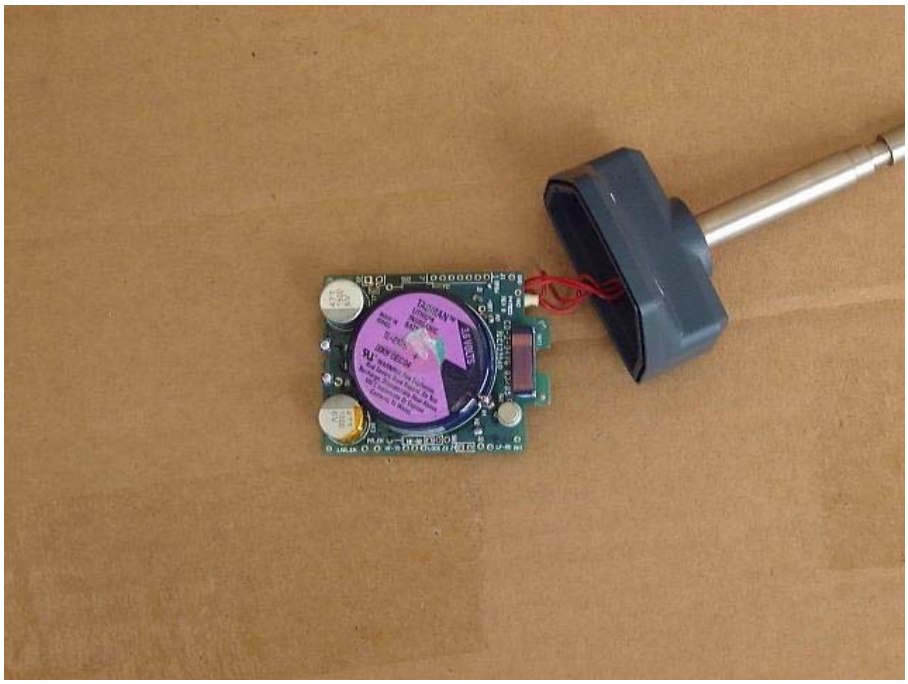

Figure 15 PCB Side 1

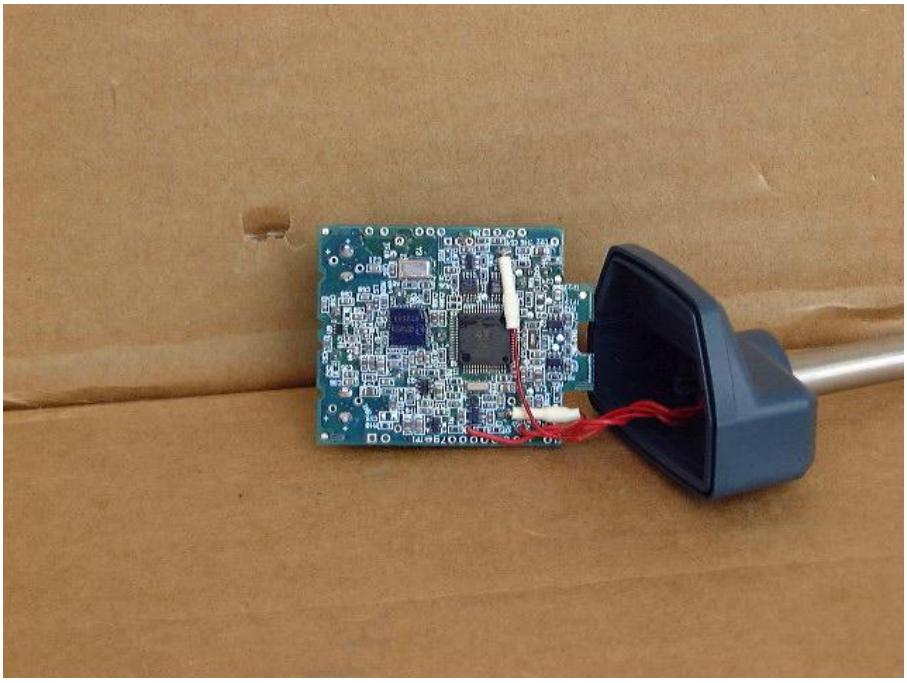

Figure 16 PCB 1 Side 2

11. APPENDIX A - CORRECTION FACTORS

11.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.5
20.0	0.7
30.0	1.0
40.0	1.2
50.0	1.3
60.0	1.5
70.0	1.6
80.0	1.7
90.0	1.8
100.0	1.9
150.0	2.4
200.0	2.7
250.0	3.0
300.0	3.3
350.0	3.7
400.0	4.0
450.0	4.3
500.0	4.7
600.0	4.9
700.0	5.4
800.0	5.8
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.5
1400.0	8.2
1600.0	9.0
1800.0	9.6
2000.0	10.7
2300.0	11.1
2600.0	11.8
2900.0	12.8

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

11.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

11.3 Correction factors for CABLE

from EMI receiver to test antenna

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.1
20.0	0.1
30.0	0.2
40.0	0.2
50.0	0.2
60.0	0.2
70.0	0.3
80.0	0.3
90.0	0.3
100.0	0.3
150.0	0.4
200.0	0.4
250.0	0.4
300.0	0.5
350.0	0.6
400.0	0.6
450.0	0.6
500.0	0.7
600.0	0.8
700.0	0.8
800.0	1.0
900.0	1.1
1000.0	1.1

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	1.4
1400.0	1.5
1600.0	1.5
1800.0	1.7
2000.0	1.7
2300.0	2.0
2600.0	2.1
2900.0	2.2

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 5.5 meters.

11.4 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

11.5 Correction factors for CABLE

from EMI receiver to test antenna at 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.6
20.0	1.1
30.0	1.3
40.0	1.6
50.0	1.7
60.0	1.9
70.0	2.0
80.0	2.2
90.0	2.3
100.0	2.4
150.0	3.1
200.0	3.6
250.0	4.2
300.0	4.5
350.0	4.8
400.0	5.2
450.0	5.5
500.0	6.2
600.0	6.4
700.0	7.0
800.0	7.5
900.0	8.1
1000.0	8.6

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	9.7
1400.0	10.5
1600.0	11.5
1800.0	12.6
2000.0	13.5
2300.0	14.3
2600.0	15.5
2900.0	16.4

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 34 meters.

3. The above data is located in file 34M10MO.CBL on the disk marked "Radiated Emissions Tests EMI Receiver".

11.6 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	11.4
400.0	14.5
500.0	15.2
600.0	17.3
700.0	19.0
850.0	20.1
1000.0	22.2

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.2
400.0	14.4
500.0	15.2
600.0	17.2
700.0	19.0
850.0	20.1
1000.0	22.1

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

11.7 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.

2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.

3. The files mentioned above are located on the disk marked "Antenna Factors".

11.8 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

11.9 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, 10 meter range

FREQUENCY (MHz)	AFE (dB/m)
30.0	12.1
40.0	10.6
50.0	10.6
60.0	8.9
70.0	8.5
80.0	9.6
90.0	9.4
100.0	9.6
110.0	10.3
120.0	10.7
130.0	12.6
140.0	12.7
150.0	12.7
160.0	13.8
170.0	13.7
180.0	14.9
190.0	13.4
200.0	13.1
210.0	14.0
220.0	14.5
230.0	15.8
240.0	16.0
250.0	16.6
260.0	16.7
270.0	18.3
280.0	18.5
290.0	19.3
300.0	20.9

NOTES:

1. *Antenna serial number is 1041.*
2. *The above list is located in file 41BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".*

11.10 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2

17.12 Correction factors for Double-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

17.14 Correction factors for BICONICAL ANTENNA

Type 3109,
1.0 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	11.1
30.0	12.0
40.0	12.0
50.0	11.4
60.0	10.3
70.0	10.7
80.0	8.3
90.0	9.0
100.0	10.0
110.0	11.6
120.0	13.6
130.0	14.2
140.0	13.5
150.0	12.7
160.0	12.7
170.0	13.6
180.0	15.3
190.0	14.6
200.0	14.7
210.0	15.3
220.0	15.8
230.0	17.0
240.0	18.0
250.0	18.1
260.0	18.0
270.0	17.5
280.0	18.2
290.0	19.7
300.0	21.8

NOTES:

1. Antenna serial number is 3244.

2. The above list is located in file 44BIC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"

17.15. Correction factors for BICONICAL ANTENNA

Type 3109,

3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	18.4
30.0	14.0
40.0	12.3
50.0	10.6
60.0	8.3
70.0	8.7
80.0	7.2
90.0	8.6
100.0	10.1
110.0	11.2
120.0	11.8
130.0	12.3
140.0	12.7
150.0	12.5
160.0	12.4
170.0	12.1
180.0	12.2
190.0	12.8
200.0	13.7
210.0	14.5
220.0	15.4
230.0	15.9
240.0	16.3
250.0	16.7
260.0	17.1
270.0	17.2
280.0	17.5
290.0	18.1
300.0	18.9

NOTES:

1. Antenna serial number is 3244.

2. The above list is located in file 44BIC3M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver"

12. APPENDIX B - CORRESPONDENCE

Date: 28.06.05

From: Sid Sanders

To: Emc

Subject: RE: FCC ID Application/Tests for Data Seal Products-Hi-G-Tek Ltd.

28 June 2005

Shaike,

Yes that sounds like a good plan.

Regards,

Sid

-----Original Message-----
From: Emc [mailto:emc@itl.co.il]
Sent: Tuesday, June 28, 2005 3:33 AM
To: Sid Sanders (E-mail)
Cc: Roni Cohen (E-mail)
Subject: FW: FCC ID Application/Tests for Data seal Products-Hi-G-Tek Ltd.

Hi Sid;

1) According your June 14, 2005 email it was agreed that a worse case unit may represent the other units of this family of products.

2) To identify the worse case unit and verify that other units are ok, I suggest:

2.1) The worse case unit will be determined based on a exploratory radiated emission test inside a shielded room, under the same test conditions of all units. The unit having maximum carrier level will be regarded worse case.

2.2) In any case that a non-worse case unit will have a radiated spurious/ harmoic greater than the worse case, that unit and the applicable signals will be tested in the OATS.

3) Please verify acceptability of the above, so we will be able to start.

Best Regards;

Shaike Raz
EMC Laboratory Manager
EMC Laboratory
ITL (Product Testing) Ltd.
Kfar Bin Nun
Israel
Tel: +972-8-979-7799
Fax: +972-8-979-7702
Email: sraz@itl.co.il/emc@itl.co.il
http://www.itl.co.il

-----Original Message-----
From: Sid Sanders [mailto:sid@timco.cc]
Sent: Tuesday, June 14, 2005 2:13 PM
To: Emc
Subject: RE: FCC ID Application/Tests for Data seal Products-Hi-G-Tek Ltd.

14 June 2005

David,

I am not sure what I am supposed to be responding to, but I would remind you that the manufacturer is responsible for insuring that all variation of the product meet the regulations. If the worse case is truly is that then I agree with that conclusion.

Regards,

Sid

-----Original Message-----
From: Emc [mailto:emc@itl.co.il]
Sent: Tuesday, June 14, 2005 2:29 AM
To: Sid Sanders (E-mail)
Subject: FW: FCC ID Application/Tests for Data seal Products-Hi-G-Tek Ltd.
Importance: High

Hi Sid,

We urgently need a response to the following email.

Our customer is pressing us for an answer.

Regards

David Shidlowsky
Technical Writer
EMC Laboratory
ITL (Product Testing) Ltd.
Kfar Bin Nun
Israel
Tel: +972-8-9797799
Fax: +972-8-9797702
Email: davids@itl.co.il/emc@itl.co.il

http://www.itl.co.il
http://www.i-spec.com

-----Original Message-----
From: Emc
Sent: Monday, June 06, 2005 2:30 PM
To: Sid Sanders (E-mail)
Subject: FW: FCC ID Application/Tests for Data seal Products-Hi-G-Tek Ltd.

Hi Sid;

1) Following is Hi-G-Tek response to your June, 2005 email.

2) According Hi-G-Tek response, their group of products is under Timco's category of "product where the PCB assembly is exactly the same but variation of the products are made by varying the case". Another applicable category is "products where the RF portion--- are exactly the same" + "analog devices (except the RF portion)".

3) Therefore my conclusion is that testing a worse case configuration only, is applicable for this case.

4)Please comment/verify.

Shaike Raz

EMC Laboratory Manager

EMC Laboratory

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Email: sraz@itl.co.il/emc@itl.co.il

http://www.itl.co.il

-----Original Message-----
From: Cohen Roni [mailto:roni@higtek.com]
Sent: Wednesday, June 01, 2005 4:35 PM
To: Emc
Subject: Re: FCC ID Application/Tests for Data seal Products

pls see my notes marked red below

roni

----- Original Message -----

From: Emc

To: Roni Cohen (E-mail)

Sent: Wednesday, June 01, 2005 1:48 PM

Subject: FCC ID Application/Tests for Data seal Products

Shalom Roni,

1. Below is our correspondence with one of our TCB service providers.

2. I still need to review the TCB response to get the "bottom line" picture (i.e. compliance to Section 2.9xx of FCC Part 2).

3. I'll return to you concerning this matter shortly.

Regards

Shaike Raz

EMC Laboratory Manager

EMC Laboratory

ITL (Product Testing) Ltd.

Kfar Bin Nun

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Email: sraz@itl.co.il/emc@itl.co.il

http://www.itl.co.il

19 May 2005

David,

SUBJECT: SIMILAR PRODUCTS TESTING REQUIREMENTS

David,

Here is more on the subject.

Products where the PCB assembly is exactly the same but variations of the product are made by varying the case; i.e. a security device where the maximum versions has 6 buttons and the minimum version only has one button. This would require only the maximum version to be tested in its worse case configuration. This products could be approved under a single FCC Identifier, photographs of each product must be supplied. **Variation in the mechanical pin may be referenced as case change.**

Products where the RF portion (schematic & PCB layout) of the PCB assembly are exactly the same; **(Our case)**

For analog devices (except the RF portion) no need to do any additional other than that for the intentional radiator, that is only the worse case of the Transmitter.**(items which may or may not be populated in the assembly are analog)**

For digital devices, in addition to the worse case of the Transmitter the digital assemblies must be tested (15.109/15.107) in sufficient variations to insure compliance with all variations.**(digital circuitry is identical)**

* (Provided no changes to the basic frequency determining circuitry, or clock and data rates, frequency multiplying states, or modulating circuitry.) **(no such change)**

Products where the RF schematic is the same but the PCB layout is different, **(not our case)** either analog or digital; All variation of the PCB assembly must be tested for radiated emissions to show compliance to the intentional radiator requirements & the digital requirements as applicable and the worse case reported in the test report with a statement that all variations were tested. In this case the products could be approved under a single FCC Identifier, photographs of each product must be supplied.

Products where the RF schematic is different **(not our case)** require a separate FCCID for each model. Part 2.908, 2.907, and 2.924 define a product as "electrically identical".

Regards,

Sid

-----Original Message-----
From: Emc [mailto:emc@itl.co.il]
Sent: Sunday, May 29, 2005 3:42 AM
To: Sid Sanders (E-mail)
Subject: FW: FCC ID Application/Tests for Data Seal Products -Hi-G-Tek Ltd.-Urgent

Hi Sid,
We have not as yet received a response to the following email.
This is puuting us in a problematic situation with our customer.
We need a faster response time for these kinds of inquiries.
Please respond A.S.A.P.
Thank you for your assistance.
Regards

David Shidlowsky
Technical Writer
EMC Laboratory
ITL (Product Testing) Ltd.
Kfar Bin Nun
Israel
Tel: +972-8-9797799
Fax: +972-8-9797702
Email: davids@itl.co.il/emc@itl.co.il

<http://www.itl.co.il>
<http://www.i-spec.com>

-----Original Message-----

From: Emc

Sent: Thursday, May 19, 2005 4:48 PM

To: Sid Sanders (E-mail)

Subject: FCC ID Application/Tests for Data Seal Products -Hi-G-Tek Ltd.

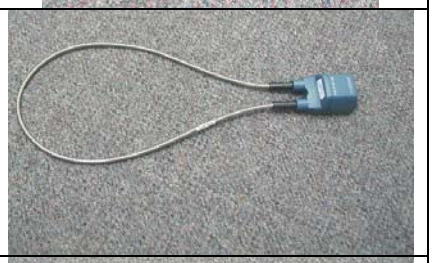
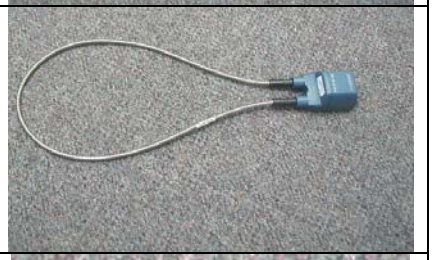
Hi Sid,

1. Attached is Hi-G-Tek's description of his product variants including similarity and differences.
<<Seal products description 433MHz.pdf>> <<Seal products description 916MHz.pdf>>
2. All variants use the same RF circuitry/Antenna.
3. The customer would like to minimize testing and FCC ID application to a minimum.
4. Would you accept testing of a "worst case" unit (T.B.D.)using a single FCC ID application?
Please comment/verify.

Regards
Shaike Raz
EMC Laboratory Manager
EMC Laboratory
ITL (Product Testing) Ltd.
Kfar Bin Nun
Israel
Tel: +972-8-979-7799
Fax: +972-8-979-7702
Email: sraz@itl.co.il/emc@itl.co.il
<http://www.itl.co.il>

13. APPENDIX C – Table of Products

1	*Lock DataSeal*	*IGLK40916*	*Shaped mechanical pin. Two reed switches in pin*	
2	*Lock DataSeal*	*IGLK41916*	*Shaped mechanical pin. Two reed switches in pin. Motion sensor included*	
3	*Lock DataSeal*	*IGLK42916*	*Shaped mechanical pin. Two reed switches in pin Motion and tilt sensor included*	
4	*Barrier DataSeal*	*IGBR40916*	*Shaped mechanical pin. Two reed switches in pin*	

5	*Barrier DataSeal*	*IGBR41916*	*Shaped mechanical pin. Two reed switches in pin. Motion sensor included*	
6	*Barrier DataSeal*	*IGBR42916*	*Shaped mechanical pin. Two reed switches in pin Motion and tilt sensor included*	
7	*Wire DataSeal*	*IGRS40916*	*Has seal wire*	
8	*Motion Wire DataSeal*	*IGRS40T916*	*Has seal wire, Motion sensor included.*	
9	*Magnetic DataSeal*	*IGRS40M916*	*No pin, No seal-wire, two internal reed switches included.*	

10	*Motion-Magnetic DataSeal*	*IGRS40MT916*	*No pin, No seal-wire, two internal reed switches included. Motion sensor included*	
11	*Snap DataSeal*	*IGBLT40916*	*Shaped mechanical pin. Wire connected in pin.*	
12	*Hatch Seal*	*IGFLH40916*	*Shaped mechanical pin. Two reed switches in pin.*	

13	*Hatch Seal with tilt*	*IGFLH41916*	*Shaped mechanical pin. Two reed switches in pin. Motion sensor included.*	
14	*Valve Seal*	*IGFL40916*	*Shaped mechanical pin. Two reed switches in pin.*	
15	*Valve Seal*	*IGFL41916*	*Shaped mechanical pin. Two reed switches in pin. Motion sensor included*	
16	*Motion DataTag*	*IGDT43916*	*No pin, no Seal wire, Motion sensor included*