

## EMISSION TEST REPORT

**Report Number:** 100187107BOX-001

**Project Number:** G100187107

**Report Issue Date:** 09/09/2010

**Product Designation:** Pendant

**Standards:** FCC Part 15 Subpart C Section 15.249

Tested by:  
Intertek Testing Services NA, Inc.  
70 Codman Hill Road  
Boxborough, MA 01719

Client:  
Tyco Safety Products  
100 Simplex Drive  
Westminster, 01441

Report prepared by

A handwritten signature in black ink, appearing to read "Vathana F. Ven".

Vathana F. Ven, Senior Project Engineer

Report reviewed by

A handwritten signature in black ink, appearing to read "Michael F. Murphy".

Michael F. Murphy/EMC Staff Engineer

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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

## 2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test	
5	System Setup and Method	
6	15.249(a) – Fundamental Field Strength	Pass
7	15.249(a) – Harmonics Field Strength	Pass
8	15.249(d) – Spurious Field Strength	Pass
9	20 dB Bandwidth	No limit
10	Revision History	

### 3 Client Information

This EUT was tested at the request of:

**Company:** Tyco Safety Products  
100 Simplex Drive  
Westminster, 01441  
**Contact:** Mike Potvin  
**Telephone:** (978) 731-8483  
**Fax:** (978) 731-8881  
**Email:** mpotvin@tycoint.com

### 4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Transmitter	Tyco Safety Products	Pendant	BOX1008161631-007

Receive Date:	08/16/2010
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The EUT is a transmitter. It runs on 3VDC battery.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3VDC	N/A	N/A	N/A

#### Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The EUT was programmed to transmit continuously.
2	

## 5 System Setup and Method

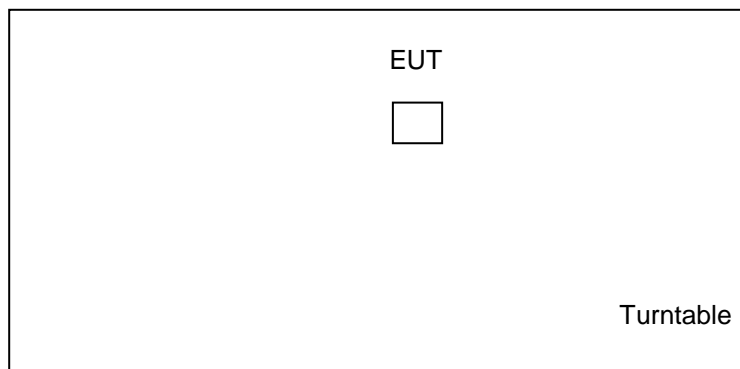
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
	None				

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

### 5.1 Method:

Configuration as required by Section (a) and (d) of Standard taking Precedence.

### 5.2 EUT Block Diagram:



## 6 Fundamental Field Strength

### 6.1 Method

Tests are performed in accordance with 15.249(a).

**TEST SITE:** 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

#### **Measurement Uncertainty**

For radiated emissions,  $U_{lab}$  (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) <  $U_{CISPR}$  (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

### Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
AF = 7.4 dB/m  
CF = 1.6 dB  
AG = 29.0 dB  
FS = 32 dB $\mu$ V/m

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB $\mu$ V

#### Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

**6.2 Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145 106	Bilog Antenna	Sunol Sciences	JB5	A111003	07/20/2010	07/20/2011
145 003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	09/16/2010	09/16/2011
145 128	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESI	837771/027	08/10/2010	08/10/2011
145-410	Cables 145-400 145-406 145-407 145-405 145-403	Huber + Suhner	10m Track A Cables	multiple PE80529A39 A	08/31/2010	08/31/2011
DAV 003	Weather Station	Davis Instruments	7400		06/11/2010	06/11/2011

**Software Utilized:**

Name	Manufacturer	Version
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	4/17/09

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

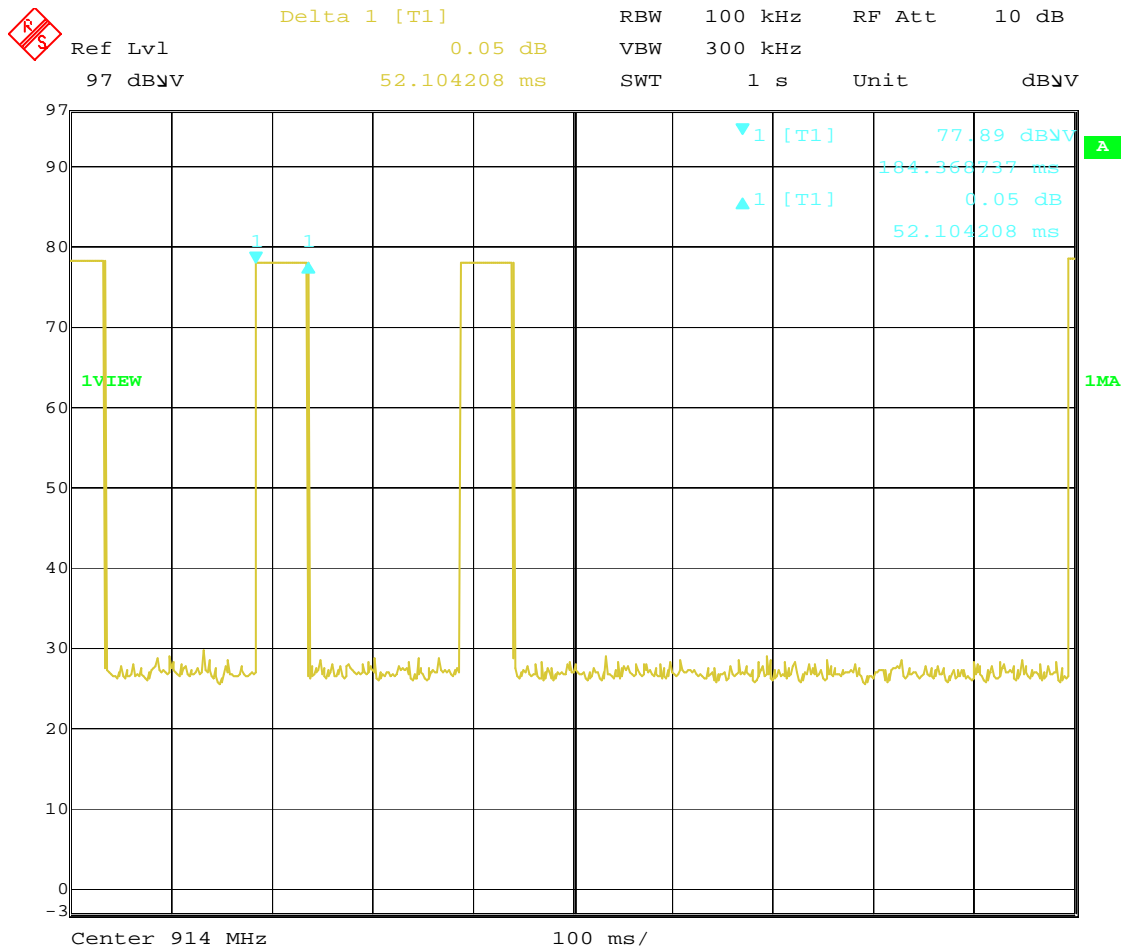
**6.3 Results:**

The sample tested was found to Comply.

**6.4 Setup Photographs:**



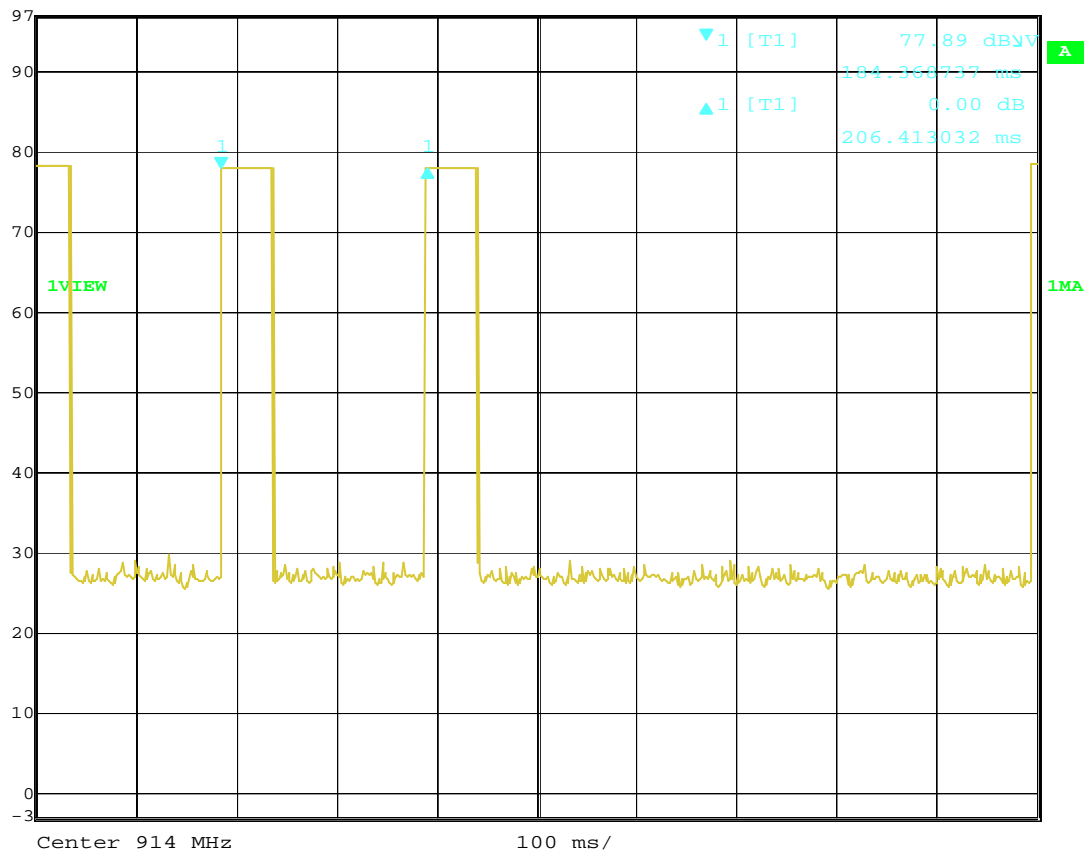
## 6.5 Plots and data:



Date: 3.SEP.2010 20:43:55



	Delta 1 [T1]	RBW	100 kHz	RF Att	10 dB
Ref Lvl	0.00 dB	VBW	300 kHz		
97 dBμV	206.413032 ms	SWT	1 s	Unit	dBμV



Date: 3.SEP.2010 20:44:43

$$\text{Average factor} = 20 * \text{LOG}(\text{Ton}/100) = 20 * \text{LOG} (52.04/100) = 5.7 \text{ dB}$$

## Radiated Emissions

Company: Tyco Safety Products  
 Model #: Pendant  
 Serial #: BOX1008161631-007  
 Engineers: Vathana Ven  
 Project #: G100187107  
 Standard: FCC Part 15 Subpart C 15.249  
 Receiver: R&S ESCI (ROS002) 03-26-2011  
 PreAmp: 145-003  
 Antenna & Cables: N  
 Antenna: 145-106  
 Cable(s): 145-410  
 Barometer: DAV003  
 Bands: N, LF, HF, SHF  
 HORN2  
 145-416  
 Filter: NONE  
 Location: 10M  
 Date(s): 09/03/10  
 Limit Distance (m): 3  
 Test Distance (m): 3 & 10  
 Temp/Humidity/Pressure: 23 deg C 51% 994mB  
 Voltage/Frequency: Battery  
 Frequency Range: 914 MHz  
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC	Harmonic?
PK	H	913.986	89.40	22.20	5.20	28.00	-10.46	99.26	114.00	-14.74	120/300 kHz			
AVG	H	913.986	83.70	22.20	5.20	28.00	-10.46	93.56	94.00	-0.44	120/300 kHz			

Average factor =  $20 \cdot \log(52.04/100) = 5.7$  dB, testing was performed at 3m above 1GHz, average readings were determined by subtracting 5.7 dB (average factor) from the peak readings.

Test Personnel: Vathana Ven  
 Product Standard: 15.249(a)  
 Input Voltage: 3VDC

Pretest Verification w/  
 BB Source: No

Test Date: 09/03/2010  
 Test Levels: N/A

Ambient Temperature: 23 °C  
 Relative Humidity: 51 %  
 Atmospheric Pressure: 994 mbars

Deviations, Additions, or Exclusions: None

## 7 Harmonics Field Strength

### 7.1 Method

Tests are performed in accordance with 15.249(a).

**TEST SITE:** 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

#### **Measurement Uncertainty**

For radiated emissions,  $U_{lab}$  (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) <  $U_{CISPR}$  (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

### Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
AF = 7.4 dB/m  
CF = 1.6 dB  
AG = 29.0 dB  
FS = 32 dB $\mu$ V/m

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB $\mu$ V

#### Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

**7.2 Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145 106	Bilog Antenna	Sunol Sciences	JB5	A111003	07/20/2010	07/20/2011
145 003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	09/16/2010	09/16/2011
145 128	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESI	837771/027	08/10/2010	08/10/2011
145-410	Cables 145-400 145-406 145-407 145-405 145-403	Huber + Suhner	10m Track A Cables	multiple	08/31/2010	08/31/2011
145-416	Cables 145-400 145-408 145-402 145-404	Huber + Suhner	3m Track B cables	multiple	08/31/2010	08/31/2011
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	03/22/2010	03/22/2011
145 014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	01/05/2010	01/05/2011
DAV 003	Weather Station	Davis Instruments	7400	PE80529A39 A	06/11/2010	06/11/2011

**Software Utilized:**

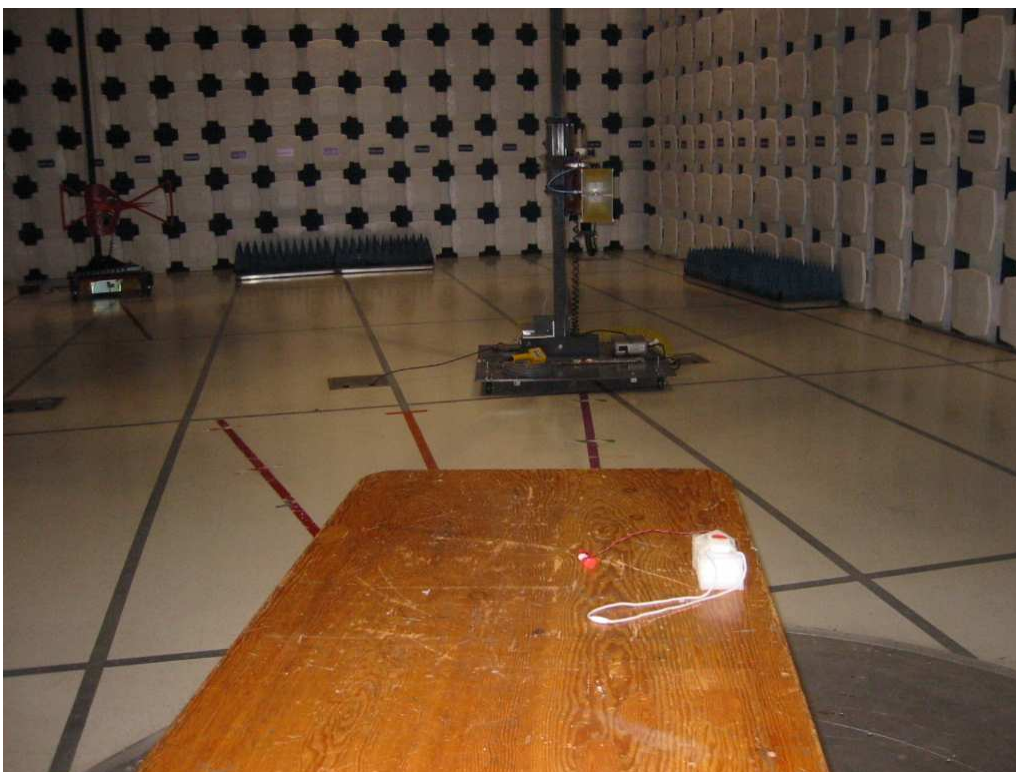
Name	Manufacturer	Version
Excel 2003	Microsoft	(11.8231.8221) SP3
EMI Boxborough.xls	Intertek	4/17/09

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

**7.3 Results:**

The sample tested was found to Comply.

#### 7.4 Setup Photographs:



## 7.5 Plots and data:

### Radiated Emissions

Company: Tyco Safety Products  
 Model #: Pendant  
 Serial #: BOX1008161631-007  
 Engineers: Vathana Ven  
 Project #: G100187107  
 Standard: FCC Part 15 Subpart C 15.249  
 Receiver: R&S ESCI (ROS002) 03-26-2011  
 PreAmp: 145-003, 145-014  
 Antenna & Cables: N  
 Antenna: 145-106  
 Cable(s): 145-410  
 Barometer: DAV003  
 Bands: N, LF, HF, SHF  
 HORN2  
 145-416  
 Filter: NONE  
 Location: 10M  
 Date(s): 09/03/10  
 Temp/Humidity/Pressure: 23 deg C 51% 994mB  
 Limit Distance (m): 3  
 Test Distance (m): 3 & 10  
 Voltage/Frequency: Battery  
 Frequency Range: 30 MHz-9.14 GHz  
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC	Harmonic?
PK	H	1827.981	20.56	26.90	5.10	0.00	0.00	52.56	74.00	-21.44	1/3 MHz			
AVG	H	1827.981	14.86	26.90	5.10	0.00	0.00	46.86	54.00	-7.14	1/3 MHz			
PK	H	2742.000	18.50	28.30	6.20	0.00	0.00	53.00	74.00	-21.00	1/3 MHz	RB	RB	
AVG	H	2742.000	12.90	28.30	6.20	0.00	0.00	47.40	54.00	-6.60	1/3 MHz	RB	RB	
PK	H	3656.000	16.00	31.00	7.10	0.00	0.00	54.10	74.00	-19.90	1/3 MHz	RB	RB	
AVG	H	3656.000	10.30	31.00	7.10	0.00	0.00	48.40	54.00	-5.60	1/3 MHz	RB	RB	
PK	H	4570.000	16.00	32.30	8.50	0.00	0.00	56.80	74.00	-17.20	1/3 MHz	RB	RB	
AVG	H	4570.000	10.30	32.30	8.50	0.00	0.00	51.10	54.00	-2.90	1/3 MHz	RB	RB	
PK	H	5484.000	49.00	33.60	8.90	35.08	0.00	56.42	74.00	-17.58	1/3 MHz		Noise Floor	Pre-Amp
AVG	H	5484.000	29.00	33.60	8.90	35.08	0.00	36.42	54.00	-17.58	1/3 MHz		Noise Floor	Pre-Amp
PK	H	6398.000	38.80	33.80	10.20	34.98	0.00	47.82	74.00	-26.18	1/3 MHz		Noise Floor	Pre-Amp
AVG	H	6398.000	28.00	33.80	10.20	34.98	0.00	37.02	54.00	-16.98	1/3 MHz		Noise Floor	Pre-Amp
PK	H	7312.000	40.00	35.90	10.40	35.77	0.00	50.53	74.00	-23.47	1/3 MHz	RB	Noise Floor	Pre-Amp
AVG	H	7312.000	28.00	35.90	10.40	35.77	0.00	38.53	54.00	-15.47	1/3 MHz	RB	Noise Floor	Pre-Amp
PK	H	8226.000	39.00	37.30	11.65	35.77	0.00	52.18	74.00	-21.82	1/3 MHz	RB	Noise Floor	Pre-Amp
AVG	H	8226.000	28.00	37.30	11.65	35.77	0.00	41.18	54.00	-12.82	1/3 MHz	RB	Noise Floor	Pre-Amp
PK	H	9140.000	39.60	37.30	12.05	35.94	0.00	53.01	74.00	-20.99	1/3 MHz	RB	Noise Floor	Pre-Amp
AVG	H	9140.000	27.60	37.30	12.05	35.94	0.00	41.01	54.00	-12.99	1/3 MHz	RB	Noise Floor	Pre-Amp

Average factor = 20\*LOG (52.04/100) = 5.7 dB, testing was performed at 3m above 1GHz, average readings were determined by subtracting 5.7 dB (average factor) from the peak readings.

Test Personnel: Vathana Ven  
 Product Standard: 15.249(a)  
 Input Voltage: 3VDC

Pretest Verification w/  
 BB Source: No

Test Date: 09/03/2010  
 Test Levels: N/A

Ambient Temperature: 23 °C  
 Relative Humidity: 51 %  
 Atmospheric Pressure: 994 mbars

Deviations, Additions, or Exclusions: None



## 8 Spurious Field Strength

### 8.1 Method

Tests are performed in accordance with 15.249(d).

**TEST SITE:** 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

#### **Measurement Uncertainty**

For radiated emissions,  $U_{lab}$  (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) <  $U_{CISPR}$  (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

### Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
AF = 7.4 dB/m  
CF = 1.6 dB  
AG = 29.0 dB  
FS = 32 dB $\mu$ V/m

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB $\mu$ V

#### Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

**8.2 Test Equipment Used:**

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
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145 003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	09/16/2010	09/16/2011
145 128	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESI	837771/027	08/10/2010	08/10/2011
145-410	Cables 145-400 145-406 145-407 145-405 145-403	Huber + Suhner	10m Track A Cables	multiple	08/31/2010	08/31/2011
145-416	Cables 145-400 145-408 145-402 145-404	Huber + Suhner	3m Track B cables	multiple	08/31/2010	08/31/2011
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	03/22/2010	03/22/2011
145 014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	01/05/2010	01/05/2011
DAV 003	Weather Station	Davis Instruments	7400	PE80529A39 A	06/11/2010	06/11/2011

**Software Utilized:**

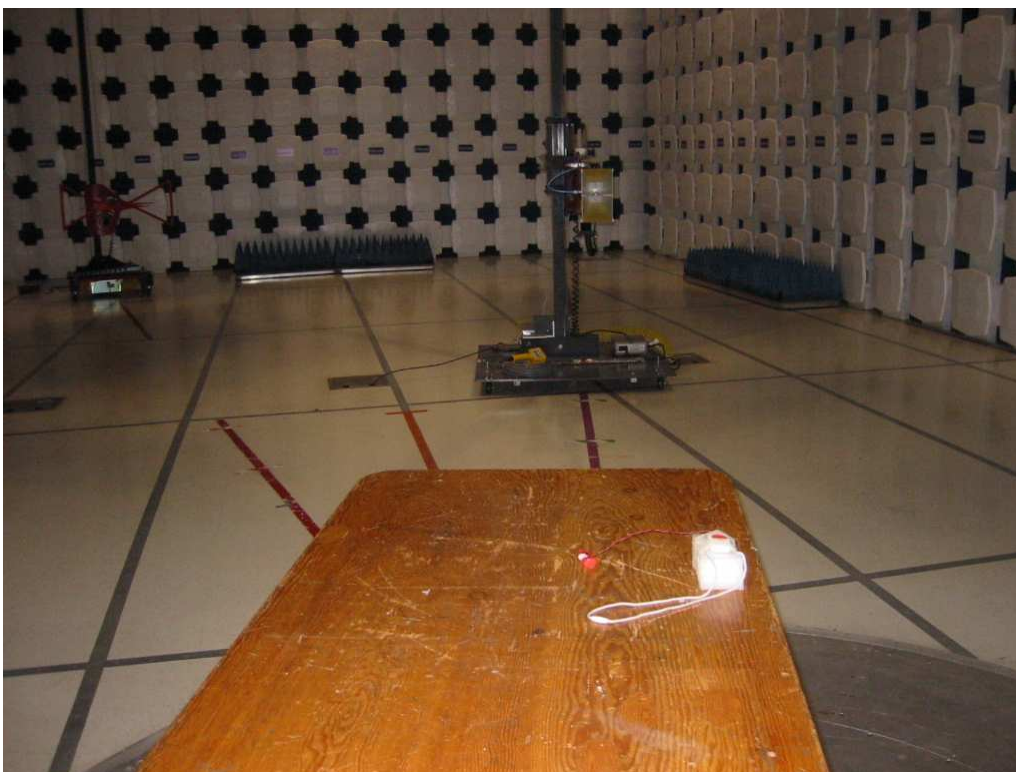
Name	Manufacturer	Version
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EMI Boxborough.xls	Intertek	4/17/09

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

**8.3 Results:**

The sample tested was found to Comply.

#### 8.4 Setup Photographs:



## 8.5 Plots and data:

### Radiated Emissions

Company: Tyco Safety Products  
 Model #: Pendant  
 Serial #: BOX1008161631-007  
 Engineers: Vathana Ven  
 Project #: G100187107  
 Standard: FCC Part 15 Subpart C 15.249  
 Receiver: R&S ESCI (ROS002) 03-26-2011  
 PreAmp: 145-003, 145-014  
 Antenna & Cables: N  
 Antenna: 145-106  
 Cable(s): 145-410  
 Barometer: DAV003  
 Bands: N, LF, HF, SHF  
 HORN2  
 145-416  
 Filter: NONE  
 Location: 10M  
 Date(s): 09/03/10  
 Temp/Humidity/Pressure: 23 deg C 51% 994mB  
 Limit Distance (m): 3  
 Test Distance (m): 3 & 10  
 PreAmp Used? (Y or N): N  
 Voltage/Frequency: Battery  
 Frequency Range: 30 MHz-9.14 GHz  
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/I)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
QP	H	732.265	23.20	20.60	4.30	28.00	-10.46	30.56	46.00	-15.44	120/300 kHz
QP	H	744.977	28.20	20.60	4.40	28.00	-10.46	35.66	46.00	-10.34	120/300 kHz
QP	H	761.250	30.30	20.60	4.40	28.00	-10.46	37.76	46.00	-8.24	120/300 kHz
QP	H	770.989	28.50	20.60	4.80	28.00	-10.46	36.36	46.00	-9.64	120/300 kHz
QP	H	809.979	32.80	21.20	4.80	28.00	-10.46	41.26	46.00	-4.74	120/300 kHz
QP	H	835.987	34.60	21.70	4.80	28.00	-10.46	43.56	46.00	-2.44	120/300 kHz
QP	H	991.986	39.60	22.70	5.20	28.00	-10.46	49.96	54.00	-4.04	120/300 kHz

FCC IC Harmonic?

RB RB

Test Personnel: Vathana Ven  
 Product Standard: 15.249(a)  
 Input Voltage: 3VDC

Pretest Verification w/  
 BB Source: No

Test Date: 09/03/2010  
 Test Levels: N/A

Ambient Temperature: 23 °C  
 Relative Humidity: 51 %  
 Atmospheric Pressure: 994 mbars

Deviations, Additions, or Exclusions: None

## 9 20 dB Bandwidth

### 9.1 Method

Tests are performed in accordance with 15.249.

**TEST SITE:** EMC

**The EMC Lab** has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	12/04/2009	12/04/2010
HORN2	HORN ANTENNA	EMCO	3115	9602-4675	03/22/2010	03/22/2011
DAV001	Weather Station	Davis Instruments	7400	PE80519A61	06/11/2010	06/11/2011

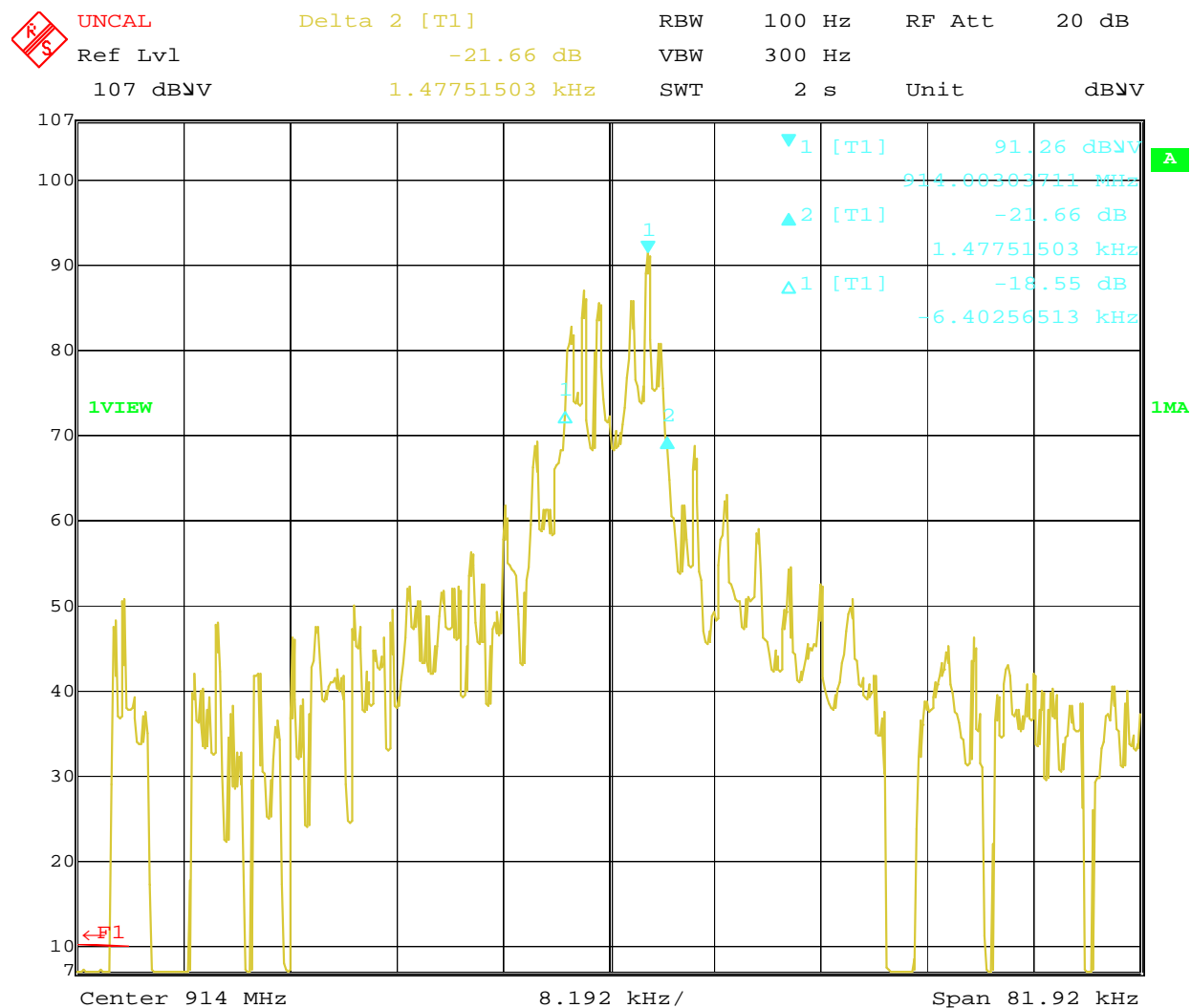
#### Software Utilized:

Name	Manufacturer	Version
None		

### 9.3 Results:

The sample tested was found to Comply.

## 9.4 Data:



Date: 9.SEP.2010 17:59:49

**20 dB Bandwidth is 6.880 kHz**

Test Personnel: Vathana Ven  
Product Standard: 15.249(a)  
Input Voltage: 3VDC  
Pretest Verification w/  
BB Source: No

Test Date: 09/09/2010  
Test Levels: N/A  
Ambient Temperature: 21 °C  
Relative Humidity: 58 %  
Atmospheric Pressure: 995 mbars

Deviations, Additions, or Exclusions: None

**10 Revision History**

Revision Level	Date	Report Number	Notes
0	09/09/2010	10018710BOX-001	Original Issue