EMC TEST REPORT

Report Number: 100982333BOX-002
Project Number: G100982333

Report Issue Date: 05/09/2013

Product Designation: Safe-T-timer

Standards: CFR47 part 15 subpart B:2013
CFR47 part 15 subpart C 15.231:2013
Industry Canada RSS-210 Issue 8 December 2010
Industry Canada RSS-Gen Issue 3 December 2010+Notice DRS 2012-DRS0126
ICES-003 Issue 5 August 2012

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

Client:
Pioneering Technology Inc.
220 Britannia Road East
Mississauga, ON L4Z1S6
Canada

Report prepared by

Vathana Ven / Senior Project Engineer

Report reviewed by

Nicholas Abbondante / Transmitter Staff Engineer

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. 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	Fundamental Field Strength (CFR47 Part 15 Subpart C Section 15.231(b) IC RSS-210 Annex 1.1.2 and Table A)	Pass
7	Occupied Bandwidth (CFR47 Part 15 Subpart C Sections 15.215, 15.231(c) IC RSS-Gen Section 4.6, IC RSS-Gen A1.1.3)	Pass
8	Radiated Spurious Emissions (CFR47 Part 15 Subpart C Sections 15.205, 15.209, and 15.231(b)(1-3), IC RSS-Gen Section 7.2.2 Table 3 and Section 7.2.5 Table 5, IC RSS-210 Annex 1.1.2 and Table A)	Pass
9	Duty Cycle (CFR47 Part 15 Section 15.35 and Subpart C Section 15.231(b)(2) IC RSS-Gen Section 4.5)	Pass
10	5 Second Shut Off Time (CFR47 Part 15 Subpart C Section 15.231(a)(1) IC RSS-210 Section A1.1.1(a))	Pass
11	AC Line-Conducted Emissions (CFR47 FCC Part 15 Subpart C 15.207; IC RSS-Gen Section 7.2.4)	N/A, Battery
12	Revision History	

3 Client Information

This EUT was tested at the request of:

Company: Pioneering Technology Inc.
220 Britannia Road East
Mississauga, ON L4Z1S6
Canada
Contact: Mr. Tom Stilo
Telephone: 905-712-2061 ext. 226
Fax: 905-712-3833
Email: tstilo@pioneeringtech.com

4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Knob module	Pioneering technology Inc.	PTI-STTZ	BOX1304301632-001
Knob module	Pioneering technology Inc.	PTI-STTZ	BOX1304301632-004*

*Number issued by Intertek

Receive Date:	05/01/2013
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The EUT is a timer system designed to replace the existing knob on a typical cook range. It is a device intended to reduce fires by pulling the users attention back to the stove at regular intervals.

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

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	BOX1304301632-004 is configured as a normal operating device
2	BOX1304301632-001 is configured to transmit nearly continuously

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Version A

5 System Setup and Method

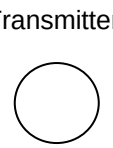
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
	None				

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.1 Method:

Configuration as required by ANSI C63.4:2009.

5.2 EUT Block Diagram:



6 Fundamental Field Strength

6.1 Method

Tests are performed in accordance with FCC 47CFR Part 15 Subpart C Section 15.231 and RSS 210

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	09/28/2012	09/28/2013
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2012	10/04/2013
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/04/2012	09/04/2013
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2012	10/04/2013
Dav001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014

Software Utilized:

Name	Manufacturer	Version
Compliance 5	Teseq	5.26.46.46

6.3 Results:

The sample tested was found to Comply. The Fundamental field strength must meet the following limits:

Fundamental Frequency (MHz), excluding restricted band frequencies of RSS-Gen	Field Strength of the Fundamental (Note 1) (microvolts/m at 3 metres)	Field Strength of Unwanted Emissions (Note 1) (microvolts/m at 3 metres)
40.66-40.70	See Section A2.7	
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (Note 2)	3,750	375
260-470 (Note 2)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

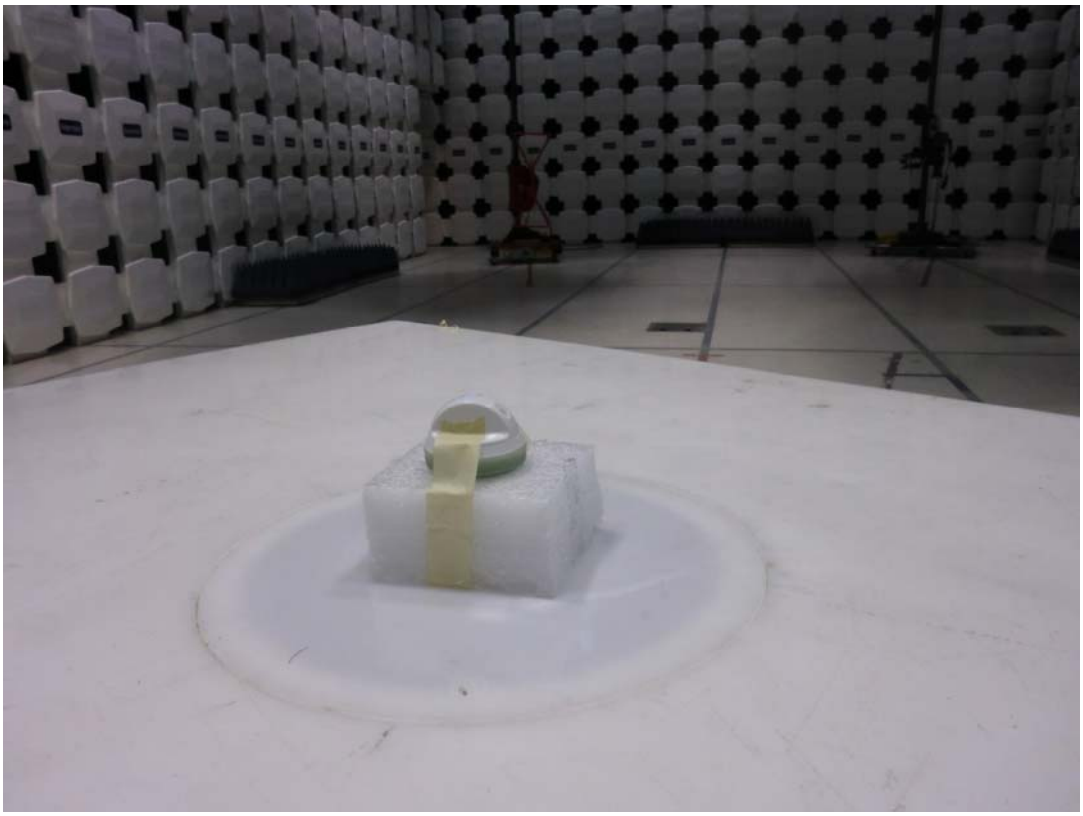
Note 1: Limits on the field strength of emissions, as shown in this table, are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

* Linear interpolation with frequency F in MHz:
For 130-174 MHz: FS (microvolts/m) = (56.82 x F)-6136
For 260-470 MHz: FS (microvolts/m) = (41.67 x F)-7083

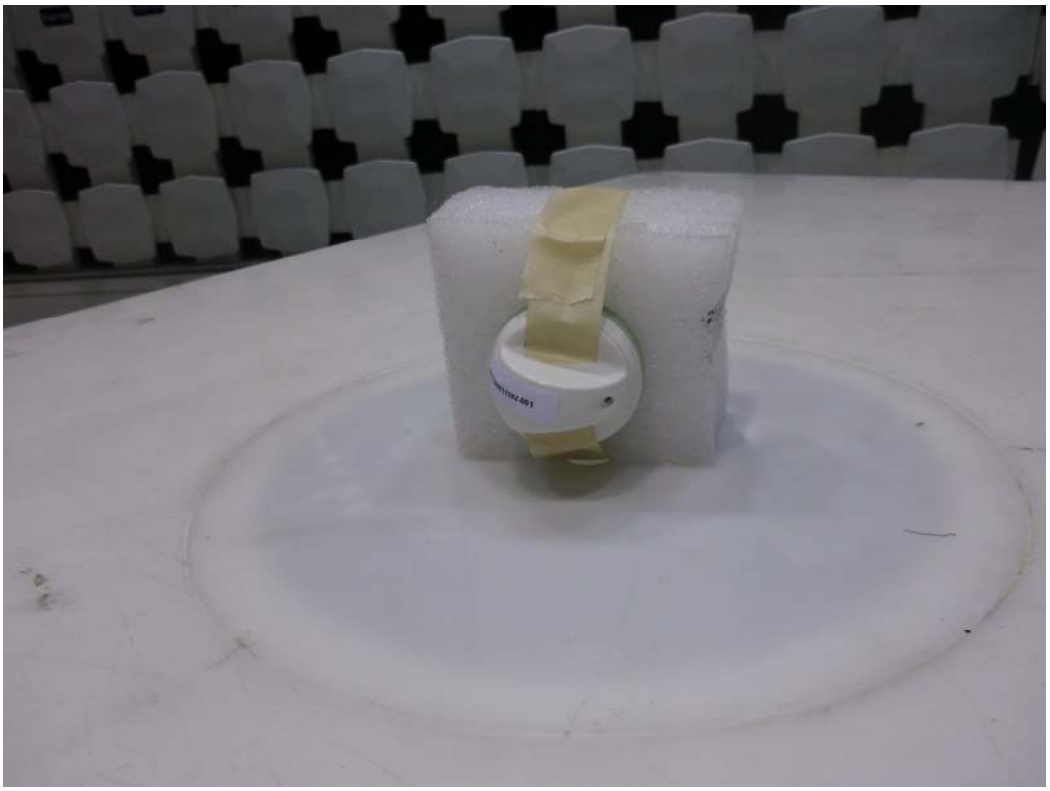
For a fundamental frequency of 433.92 MHz, this corresponds to a limit of 100.83 dBuV/m peak and 80.83 dBuV/m average at a 3 meter test distance.

6.4 Setup Photographs:

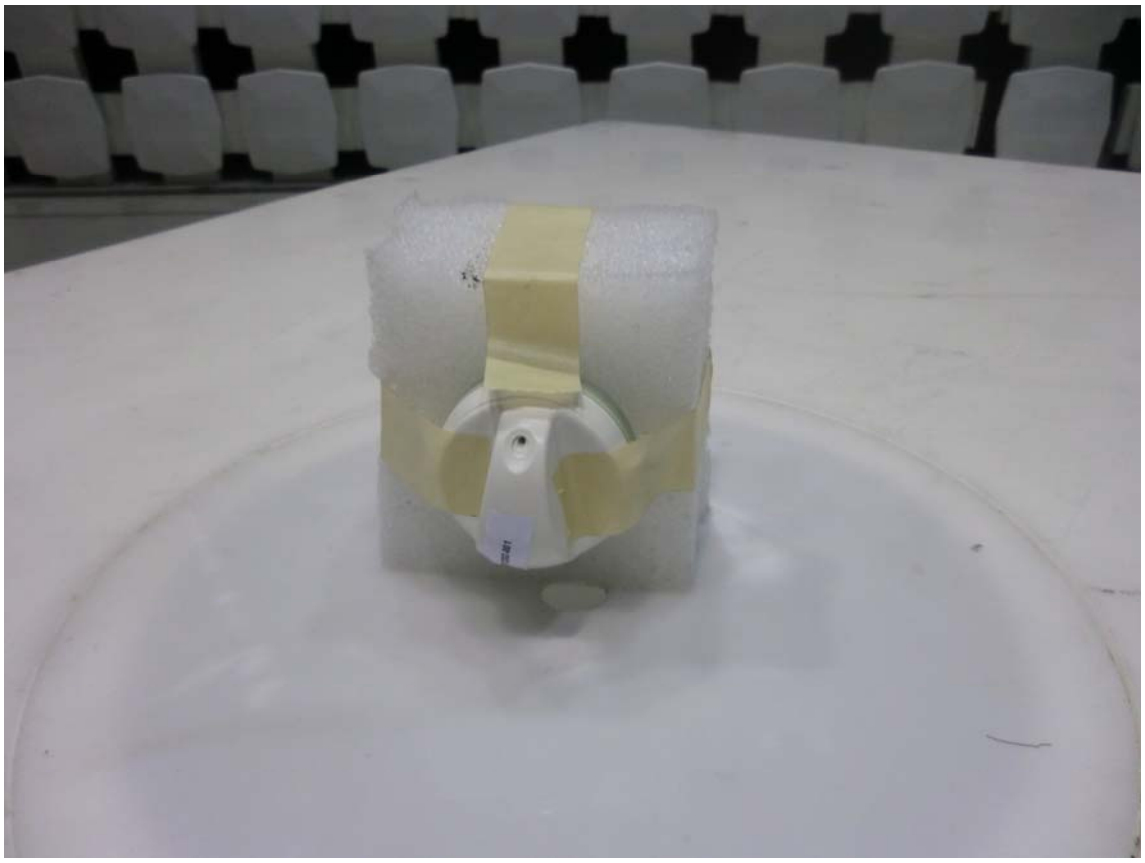
X-Axis



Y-Axis



Z-Axis



6.5 Plots/Data:

Special Radiated Emissions

Company: Pioneering technology Inc. Antenna & Cables: N Bands: N, LF, HF, SHF
Model #: Safe-T-timer Antenna: 145106 V10m 09-04-2013.txt 145106 H10m 09-04-2013.txt
Serial #: BOX1305011202-001 (Intertek Assigned) Cable(s): 145-410 10mTrkA 10-04-2013.txt NONE.
Engineers: Vathana Ven Location: 10M Barometer: DAV001 Filter: NONE
Project #: G100982333 Date(s): 05/01/13
Standard: FCC Part 15 Subpart B Class B Temp/Humidity/Pressure: 22 22% 1021
Receiver: ESI (145-128) 09-28-2013 Limit Distance (m): 3
PreAmp: PRE145003 10-04-2013.txt Test Distance (m): 10
PreAmp Used? (Y or N): Y Voltage/Frequency: 3V battery Frequency Range: 30-1000MHz
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?
X-Axis														
PEAK	H	433.920	60.88	16.60	3.54	27.84	-10.46	63.64	100.83	-37.19	120/300 kHz			
AVG	H	433.920	52.48	16.60	3.54	27.84	-10.46	55.24	80.83	-25.59	120/300 kHz			
PEAK	V	433.920	47.75	16.78	3.54	27.84	-10.46	50.69	100.83	-50.14	120/300 kHz			
AVG	V	433.920	39.35	16.78	3.54	27.84	-10.46	42.29	80.83	-38.54	120/300 kHz			
Y-Axis														
PEAK	H	433.920	51.02	16.60	3.54	27.84	-10.46	53.78	100.83	-47.05	120/300 kHz			
AVG	H	433.920	42.62	16.60	3.54	27.84	-10.46	45.38	80.83	-35.45	120/300 kHz			
PEAK	V	433.920	59.18	16.78	3.54	27.84	-10.46	62.12	100.83	-38.71	120/300 kHz			
AVG	V	433.920	50.78	16.78	3.54	27.84	-10.46	53.72	80.83	-27.11	120/300 kHz			
Z-Axis														
PEAK	H	433.920	56.78	16.60	3.54	27.84	-10.46	59.54	100.83	-41.29	120/300 kHz			
AVG	H	433.920	48.38	16.60	3.54	27.84	-10.46	51.14	80.83	-29.69	120/300 kHz			
PEAK	V	433.920	58.27	16.78	3.54	27.84	-10.46	61.21	100.83	-39.62	120/300 kHz			
AVG	V	433.920	49.87	16.78	3.54	27.84	-10.46	52.81	80.83	-28.02	120/300 kHz			

Average factor = 20*LOG((390.782*16)+(300.6*27)+(801.603*13)/(65.35*1000)) = -8.4dB
Average readings were obtained by subtracting average factor from peak readings

Test Personnel: Vathana Ven VJV
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: FCC CFR 47 Part 15 Subpart C and IC RSS-210
Input Voltage: 3VDC battery
Pretest Verification w/ Ambient Signals: **Yes**

Test Date: 05/01/2013
Limit Applied: See data
Ambient Temperature: 22 ºC
Relative Humidity: 24 %
Atmospheric Pressure: 1020 mbars

Deviations, Additions, or Exclusions: None

7 Occupied Bandwidth

7.1 Method

Tests are performed in accordance with FCC 47CFR Part 15 Subpart C Section 15.231 and RSS 210

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.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	09/28/2012	09/28/2013
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2012	10/04/2013
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/04/2012	09/04/2013
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2012	10/04/2013
Dav001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014

Software Utilized:

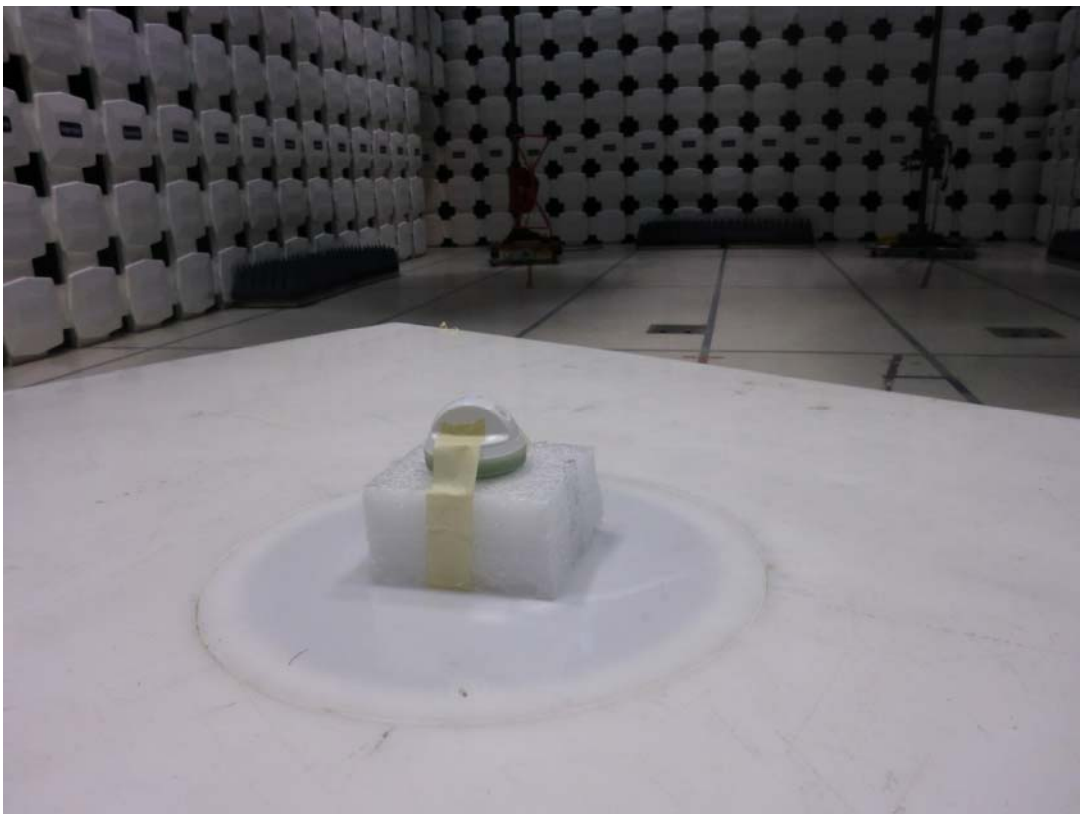
Name	Manufacturer	Version
None		

7.3 Results:

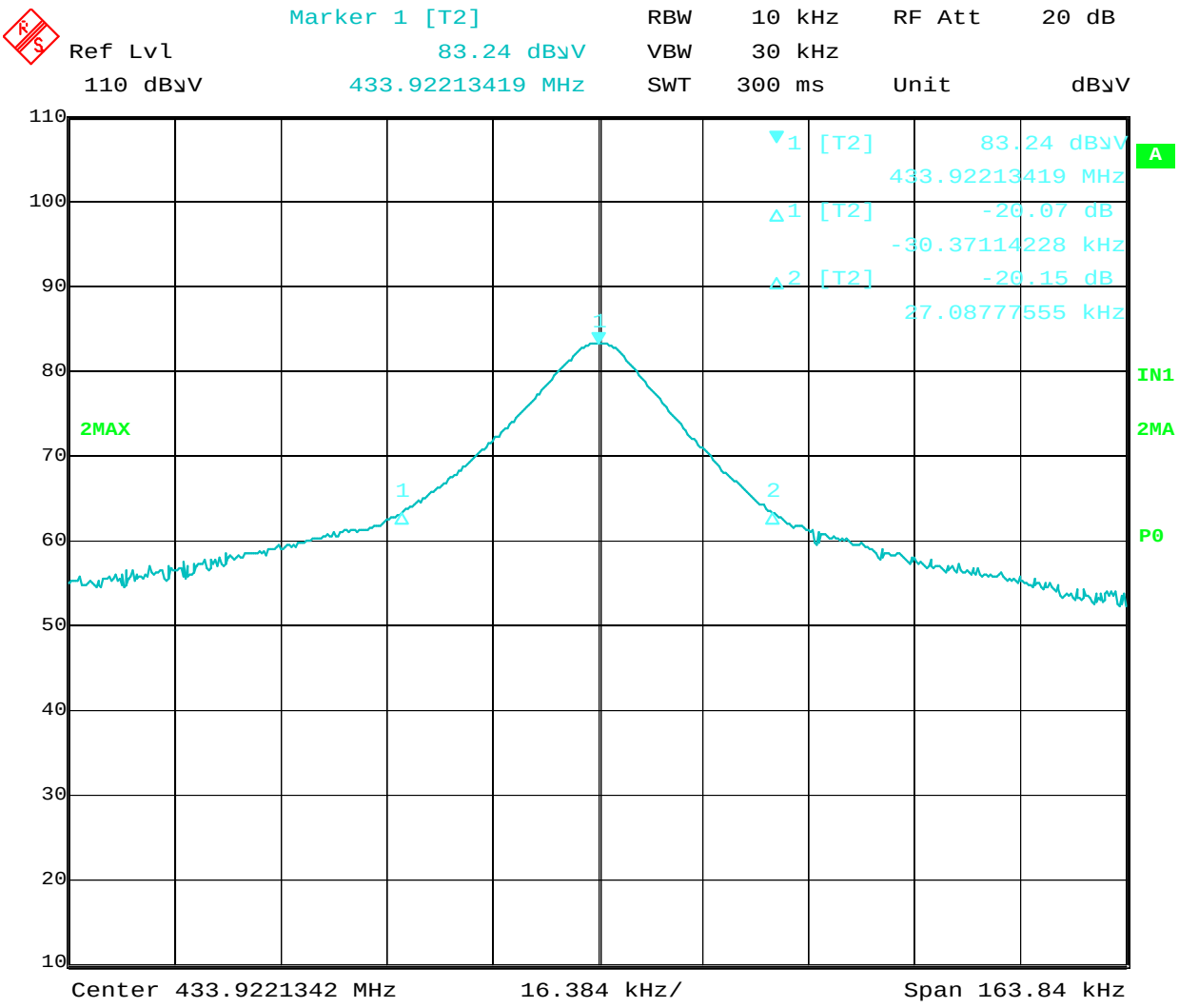
The sample tested was found to Comply. The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier. Therefore the bandwidth must not exceed 798.8 kHz.

7.4 Setup Photographs:

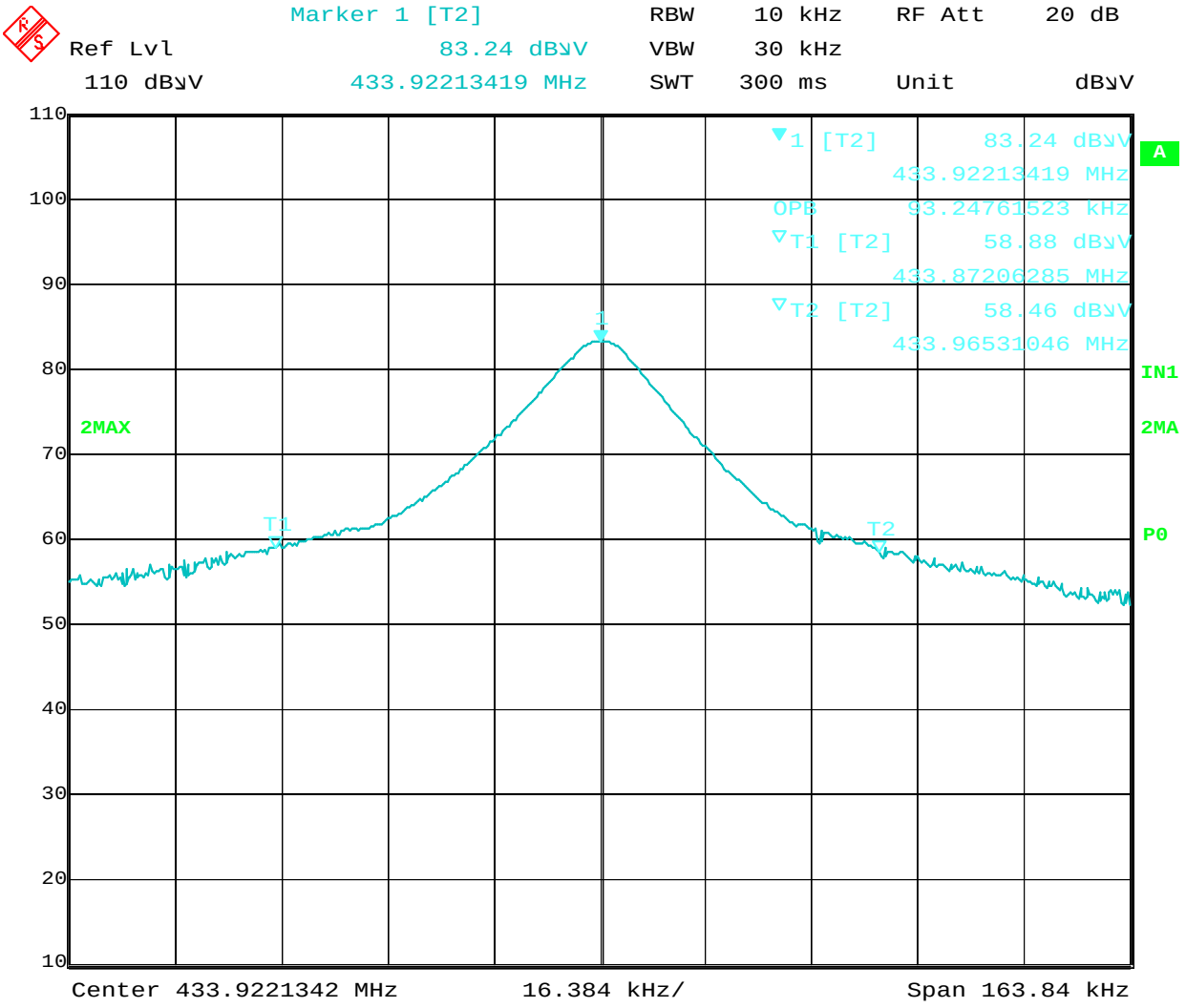
X-Axis



7.5 Plots/Data:



20 dB Bandwidth



99% Power Bandwidth

Test Personnel:	Vathana Ven VV	05/07/2013	05-07-2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC CFR 47 Part 15 Subpart C and IC RSS-210	Test Levels:	See Data
Input Voltage:	3.6V Battery		
Pretest Verification w/ Ambient Signals or BB Source:	**YES**	Ambient Temperature:	21 ºC
		Relative Humidity:	53 %
		Atmospheric Pressure:	995 mbars

Deviations, Additions, or Exclusions: None

8 Radiated and Spurious Emissions

8.1 Method

Tests are performed in accordance with FCC 47CFR Part 15 Subpart C Section 15.231 and RSS 210
.

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

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

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	09/28/2012	09/28/2013
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2012	10/04/2013
145106	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/04/2012	09/04/2013
145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2012	10/04/2013
145-416	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2012	10/04/2013
145014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/13/2012	12/13/2013
ETS001	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	12/17/2012	12/17/2013
Dav001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014

Software Utilized:

Name	Manufacturer	Version
EMI Boxborough	Intertek	8/27/2010

8.3 Results:

The sample tested was found to Comply. The spurious emissions must meet the following limits:

Fundamental Frequency (MHz), excluding restricted band frequencies of RSS-Gen	Field Strength of the Fundamental (Note 1) (microvolts/m at 3 metres)	Field Strength of Unwanted Emissions (Note 1) (microvolts/m at 3 metres)
40.66-40.70	See Section A2.7	
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (Note 2)	3,750	375
260-470 (Note 2)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

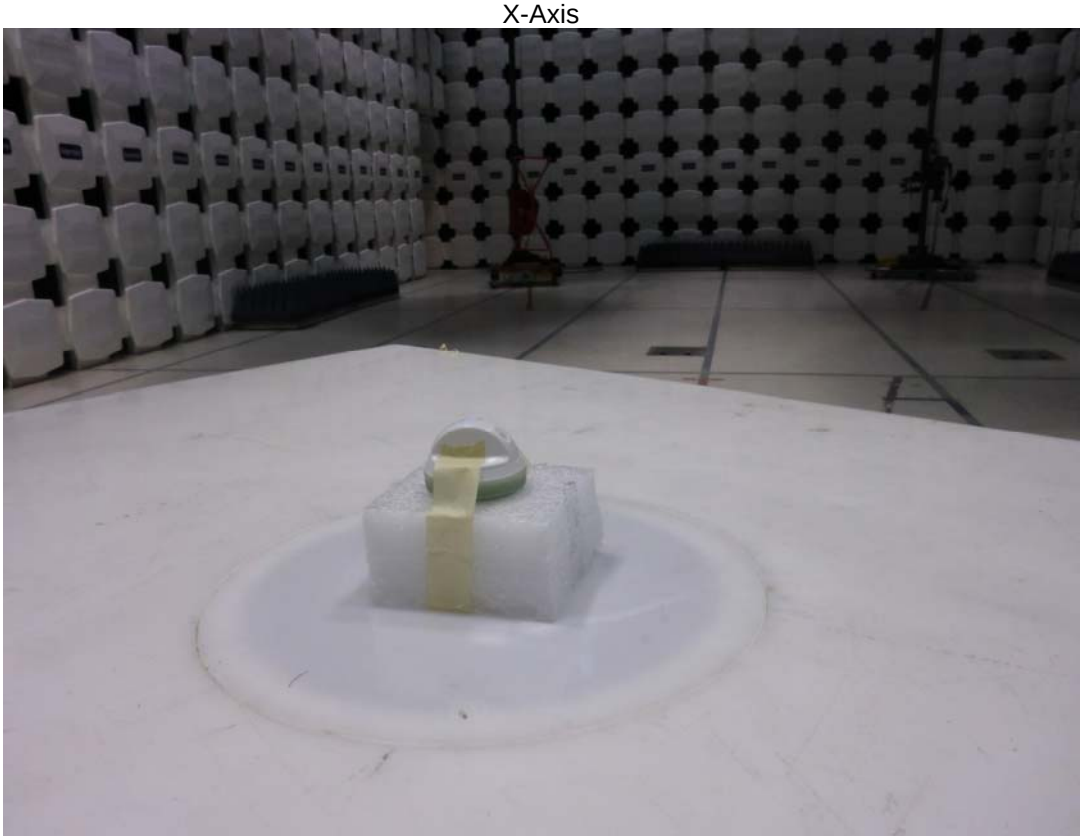
Note 1: Limits on the field strength of emissions, as shown in this table, are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

* Linear interpolation with frequency F in MHz:
For 130-174 MHz: FS (microvolts/m) = (56.82 x F)-6136
For 260-470 MHz: FS (microvolts/m) = (41.67 x F)-7083

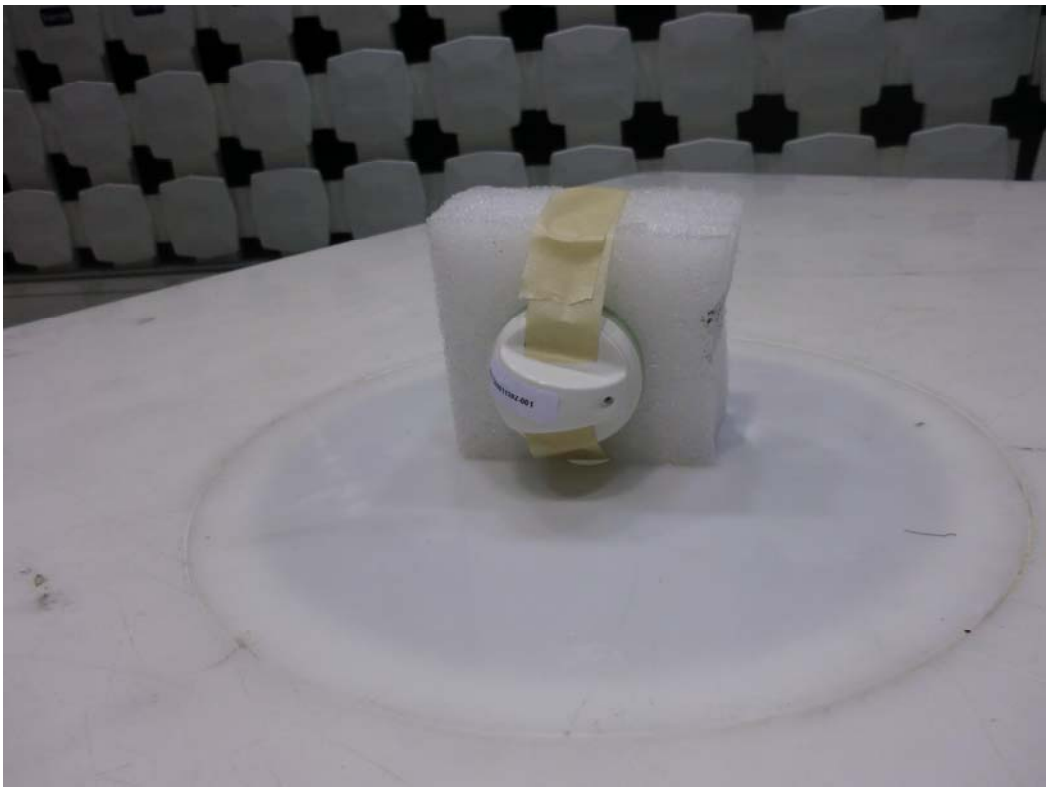
For a fundamental frequency of 433.92 MHz, this corresponds to a limit of 80.83 dBuV/m peak and 60.83 dBuV/m average at a 3 meter test distance.

8.4 Setup Photographs:

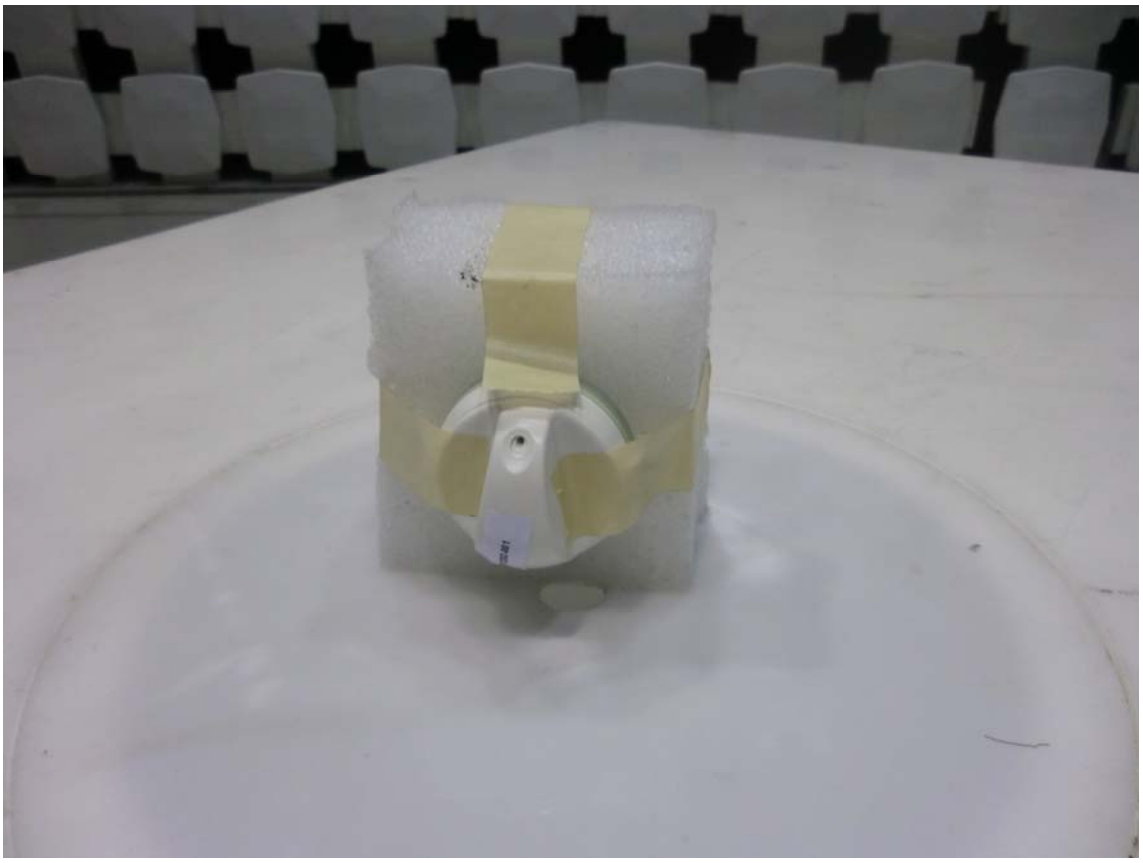
X-Axis



Y-Axis



Z-Axis



8.5 Plots/Data:

Special Radiated Emissions

Company: Pioneering technology Inc. Antenna & Cables: N Bands: N, LF, HF, SHF
Model #: Safe-T-timer Antenna: 145106 V10m 09-04-2013.txt 145106 H10m 09-04-2013.txt
Serial #: BOX1305011202-001 (Intertek Assigned) Cable(s): 145-410 10mTrkA 10-04-2013.txt NONE.
Engineers: Vathana Ven Location: 10M Barometer: DAV001 Filter: NONE
Project #: G100982333 Date(s): 05/01/13
Standard: FCC Part 15 Subpart B Class B Temp/Humidity/Pressure: 22 22% 1021
Receiver: ESI (145-128) 09-28-2013 Limit Distance (m): 3
PreAmp: PRE145003 10-04-2013.txt Test Distance (m): 10
PreAmp Used? (Y or N): Y Voltage/Frequency: 3V battery Frequency Range: 30-1000MHz
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	Harm
X-Axis														
PEAK	H	867.840	55.92	21.84	4.90	27.95	-10.46	65.17	80.83	-15.66	120/300 kHz			
AVG	H	867.840	47.52	21.84	4.90	27.95	-10.46	56.77	60.83	-4.06	120/300 kHz			
PEAK	V	867.840	49.38	22.26	4.90	27.95	-10.46	59.04	80.83	-21.79	120/300 kHz			
AVG	V	867.840	40.98	22.26	4.90	27.95	-10.46	50.64	60.83	-10.19	120/300 kHz			
Y-Axis														
PEAK	H	867.840	51.36	21.84	4.90	27.95	-10.46	60.61	80.83	-20.22	120/300 kHz			
AVG	H	867.840	42.96	21.84	4.90	27.95	-10.46	52.21	60.83	-8.62	120/300 kHz			
PEAK	V	867.840	55.41	22.26	4.90	27.95	-10.46	65.07	80.83	-15.76	120/300 kHz			
AVG	V	867.840	47.01	22.26	4.90	27.95	-10.46	56.67	60.83	-4.16	120/300 kHz			
Z-Axis														
PEAK	H	867.840	52.71	21.84	4.90	27.95	-10.46	61.96	80.83	-18.87	120/300 kHz			
AVG	H	867.840	44.31	21.84	4.90	27.95	-10.46	53.56	60.83	-7.27	120/300 kHz			
PEAK	V	867.840	53.83	22.26	4.90	27.95	-10.46	63.49	80.83	-17.34	120/300 kHz			
AVG	V	867.840	45.43	22.26	4.90	27.95	-10.46	55.09	60.83	-5.74	120/300 kHz			

Average factor = 20*LOG((390.782*16)+(300.6*27)+(801.603*13)/(65.35*1000)) = -8.4dB
Average readings were obtained by subtracting average factor from peak readings

Radiated Emissions

Company: Pioneering technology Inc. | Antenna & Cables: HF | Bands: N, LF, HF, SHF
Model #: Safe-T-timer | Antenna: ETS001 12-17-2013.txt | ETS001 12-17-2013.txt
Serial #: BOX1305011202-001 (Intertek Assigned) | Cable(s): 145-416 3mTrkB 10-04-2013.txt | NONE.
Engineers: Vathana Ven | Location: 10M | Barometer: DAV001 | Filter: NONE
Project #: G100982333 | Date(s): 05/01/13
Standard: FCC Part 15 Subpart B Class B | Temp/Humidity/Pressure: 22 | 22% | 1021 mB
Receiver: ESI (145-128) 09-28-2013 | Limit Distance (m): 3
PreAmp: PRE145014 12-13-2013.txt | Test Distance (m): 3
PreAmp Used? (Y or N): Y | Voltage/Frequency: 3V battery | Frequency Range: 1-5GHz

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	1301.770	57.30	28.66	4.27	33.08	0.00	57.14	74.00	-16.86	1/3MHz	RB	RB	
AVG	H	1301.770	48.90	28.66	4.27	33.08	0.00	48.74	54.00	-5.26	1/3MHz	RB	RB	
PK	H	1735.693	56.20	30.01	4.91	33.05	0.00	58.06	80.83	-22.77	1/3MHz			
AVG	H	1735.693	47.80	30.01	4.91	33.05	0.00	49.66	60.83	-11.17	1/3MHz			
PK	H	2169.616	46.10	32.00	5.50	33.25	0.00	50.35	80.83	-30.48	1/3MHz			
AVG	H	2169.616	37.70	32.00	5.50	33.25	0.00	41.95	60.83	-18.88	1/3MHz			
PK	V	2603.539	56.70	32.67	6.13	33.55	0.00	61.94	80.83	-18.89	1/3MHz			
AVG	V	2603.539	48.30	32.67	6.13	33.55	0.00	53.54	60.83	-7.29	1/3MHz			
PK	H	3037.462	54.10	33.23	6.68	34.03	0.00	59.99	80.83	-20.84	1/3MHz			
AVG	H	3037.462	45.70	33.23	6.68	34.03	0.00	51.59	60.83	-9.24	1/3MHz			
PK	H	3471.385	48.10	33.31	7.20	34.44	0.00	54.17	80.83	-26.66	1/3MHz			
AVG	H	3471.385	39.70	33.31	7.20	34.44	0.00	45.77	60.83	-15.06	1/3MHz			
PK	H	3905.308	42.70	33.80	7.64	34.39	0.00	49.75	74.00	-24.25	1/3MHz	RB	RB	
AVG	H	3905.308	34.30	33.80	7.64	34.39	0.00	41.35	54.00	-12.65	1/3MHz	RB	RB	
PK	V	4339.231	45.50	34.14	8.08	34.61	0.00	53.10	74.00	-20.90	1/3MHz	RB	RB	
AVG	V	4339.231	37.10	34.14	8.08	34.61	0.00	44.70	54.00	-9.30	1/3MHz	RB	RB	
PK	H	4773.154	41.70	34.59	8.55	34.69	0.00	50.15	74.00	-23.85	1/3MHz	RB	RB	
AVG	H	4773.154	33.30	34.59	8.55	34.69	0.00	41.75	54.00	-12.25	1/3MHz	RB	RB	

Average factor = 20*LOG((390.782*16)+(300.6*27)+(801.603*13)/(65.35*1000)) = -8.4dB
Average readings were obtained by subtracting average factor from peak readings

Test Personnel: Vathana Ven VJV
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: FCC CFR 47 Part 15 Subpart C and IC RSS-210
Input Voltage: 3VDC battery
Pretest Verification w/ Ambient Signals: **Yes**

Test Date: 05/01/2013
Limit Applied: See data
Ambient Temperature: 22 ºC
Relative Humidity: 24 %
Atmospheric Pressure: 1020 mbars

Deviations, Additions, or Exclusions: None

9 Duty Cycle

9.1 Method

Tests are performed in accordance with FCC 47CFR Part 15 Subpart C Section 15.231 and RSS 210

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.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	09/28/2012	09/28/2013
Dav001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014

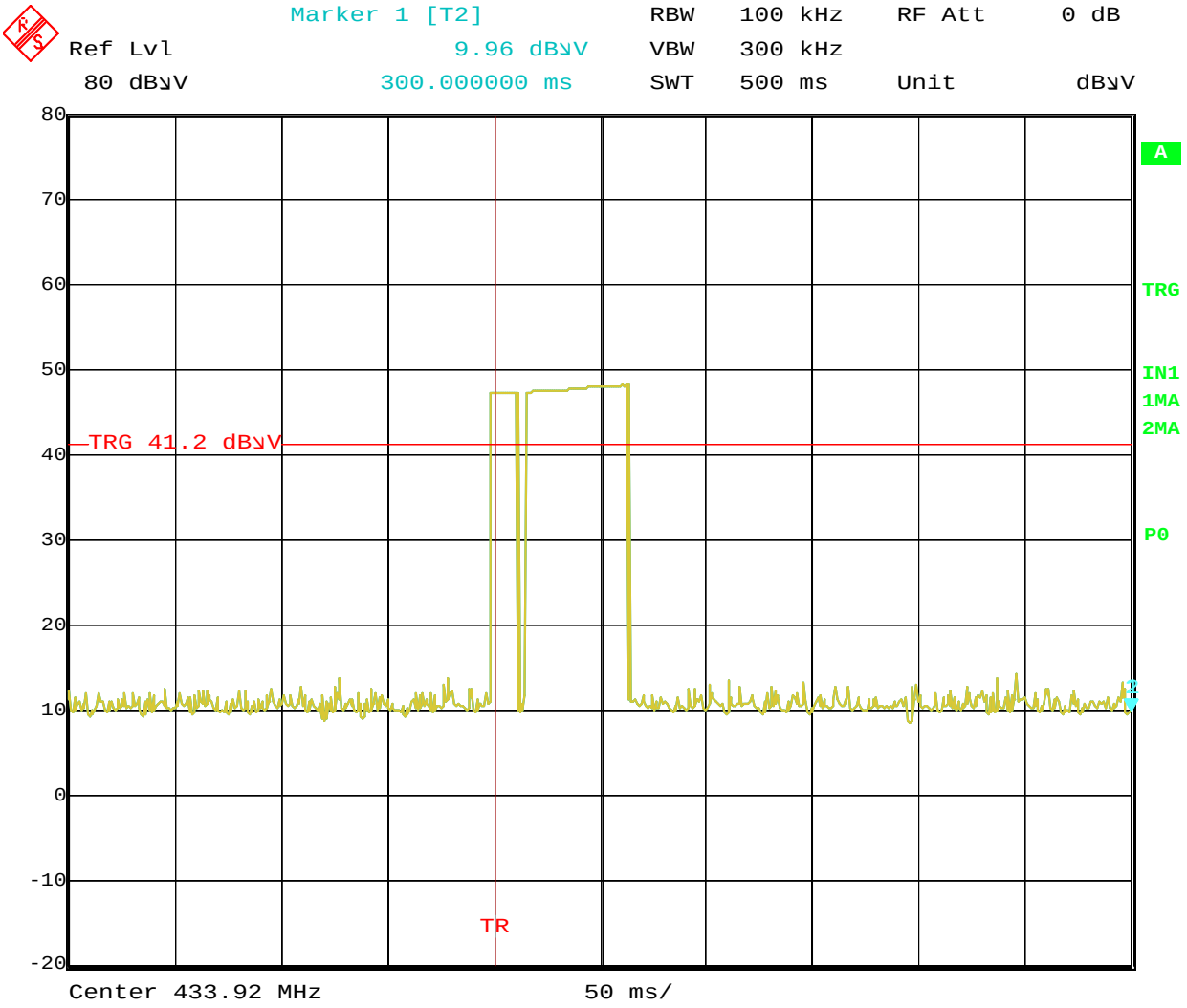
Software Utilized:

Name	Manufacturer	Version
None		

9.3 Results:

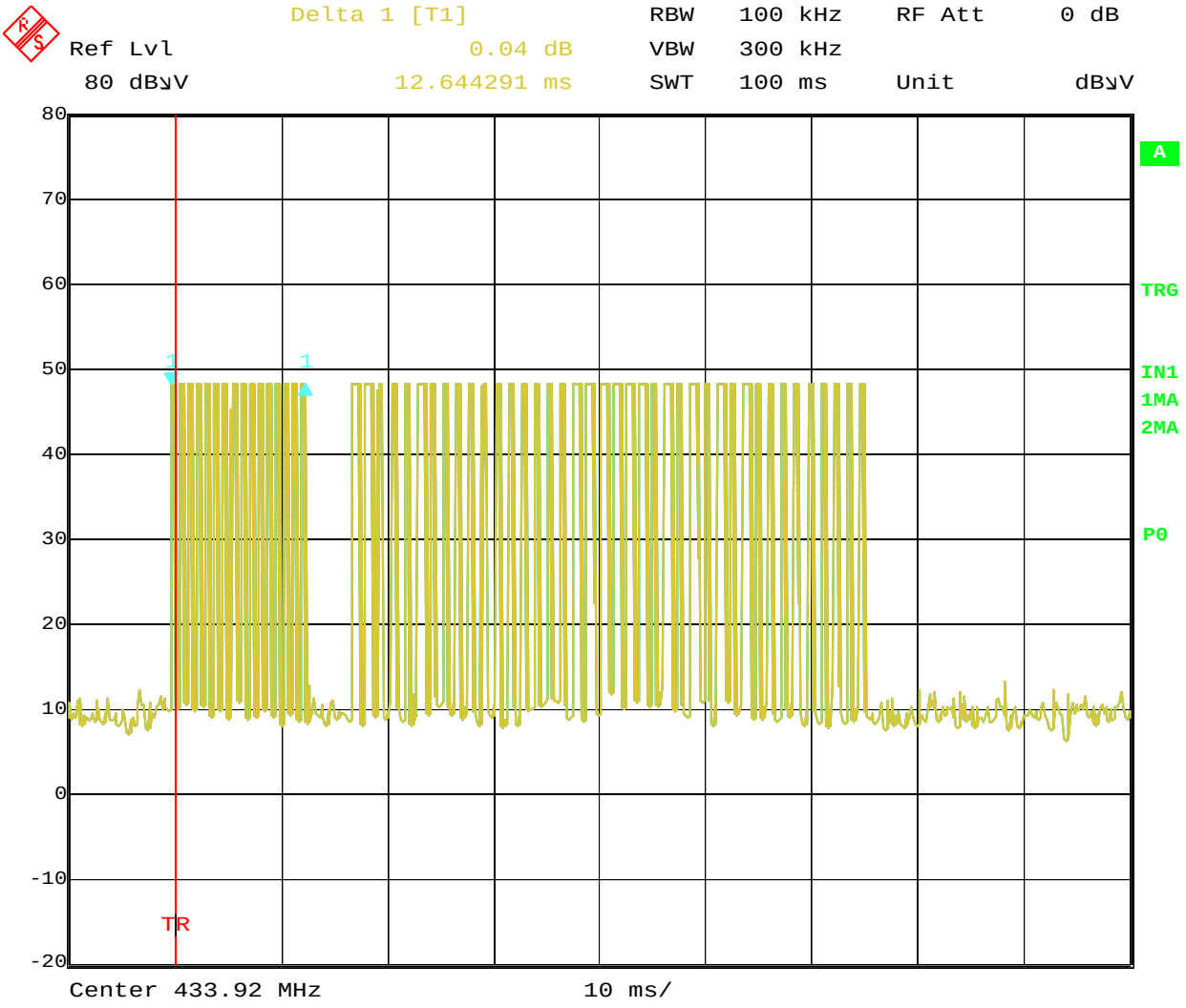
There is no limit on duty cycle, it is used to obtain the average value of emissions. The duty cycle average factor was determined to be 8.4 dB.

9.4 Plots/Data:



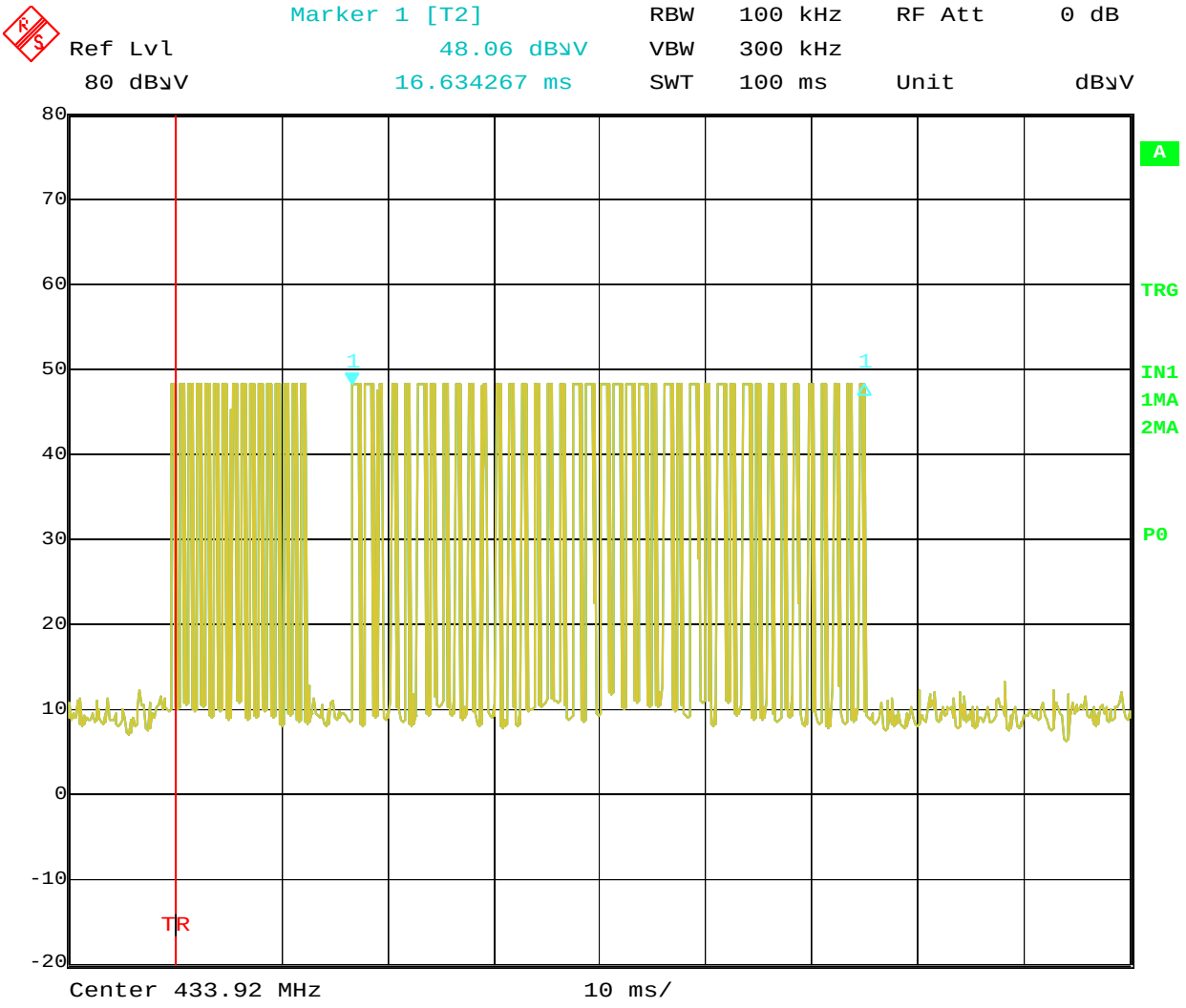
Date: 1.MAY.2013 21:10:36

Typical burst interval – long time domain snapshot. At 50ms/division, the pulse train extended within100ms period.



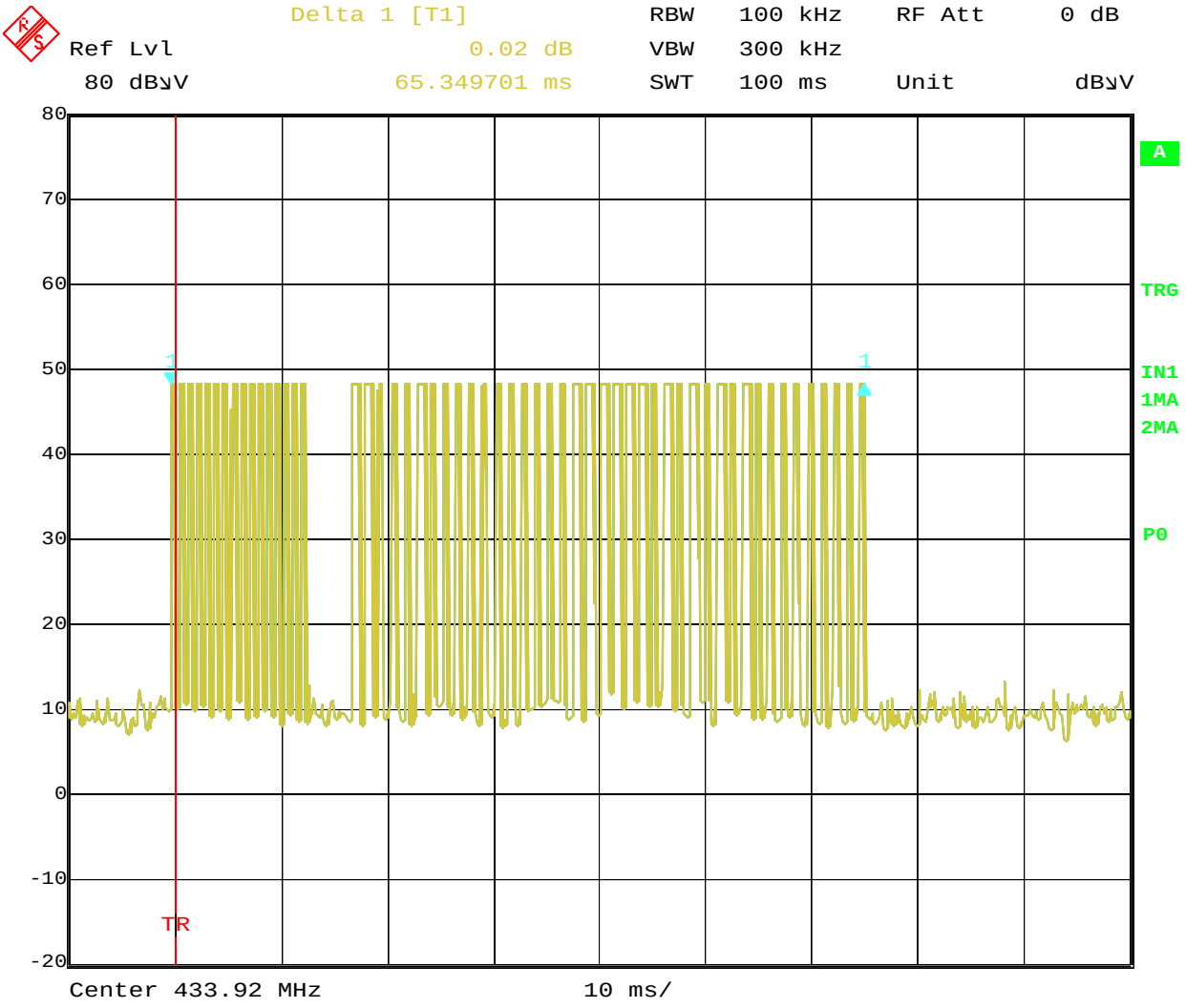
Date: 1.MAY.2013 21:17:10

12.6442ms Short burst length

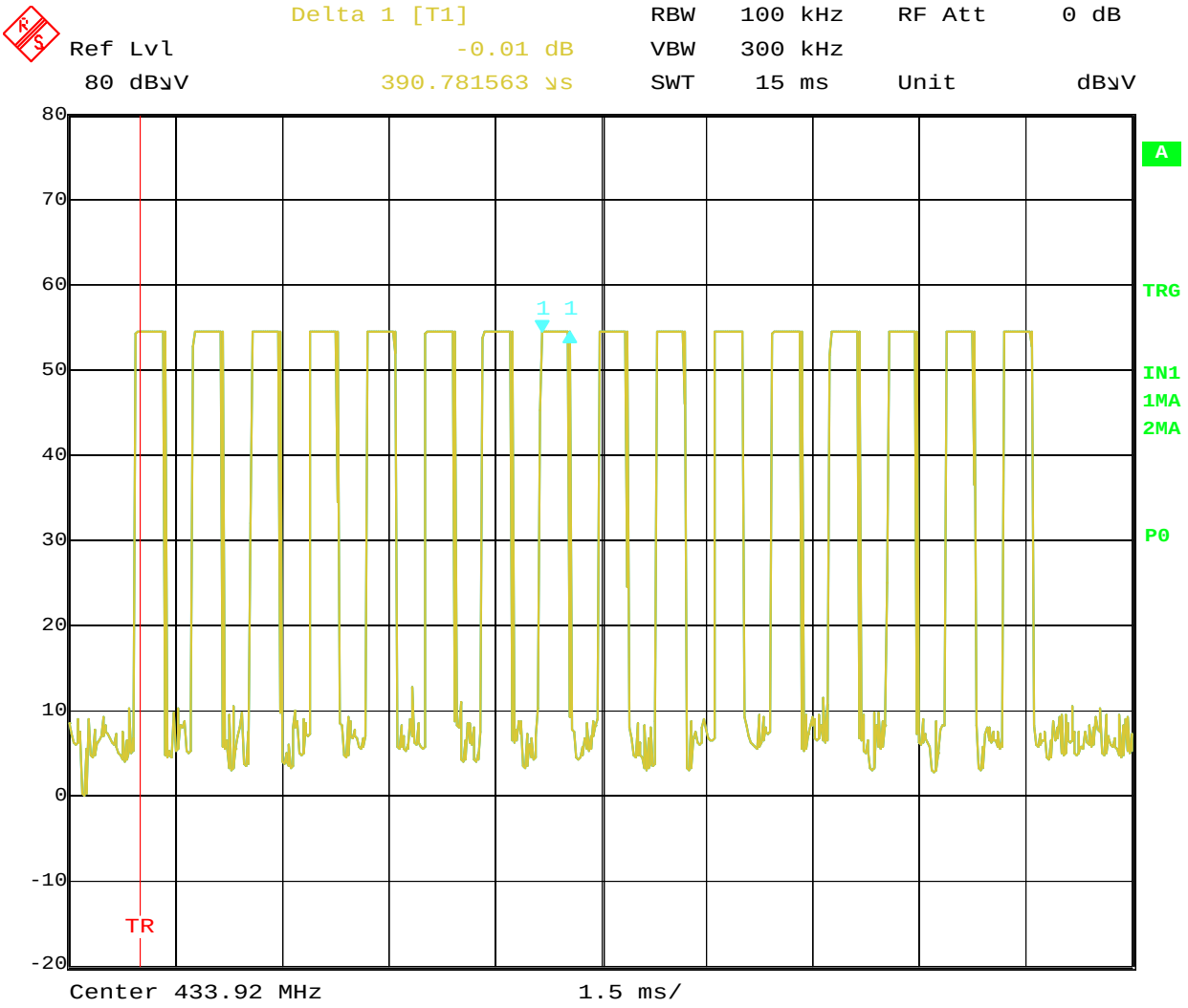


Date: 1.MAY.2013 21:18:13

16.6343ms Long burst length

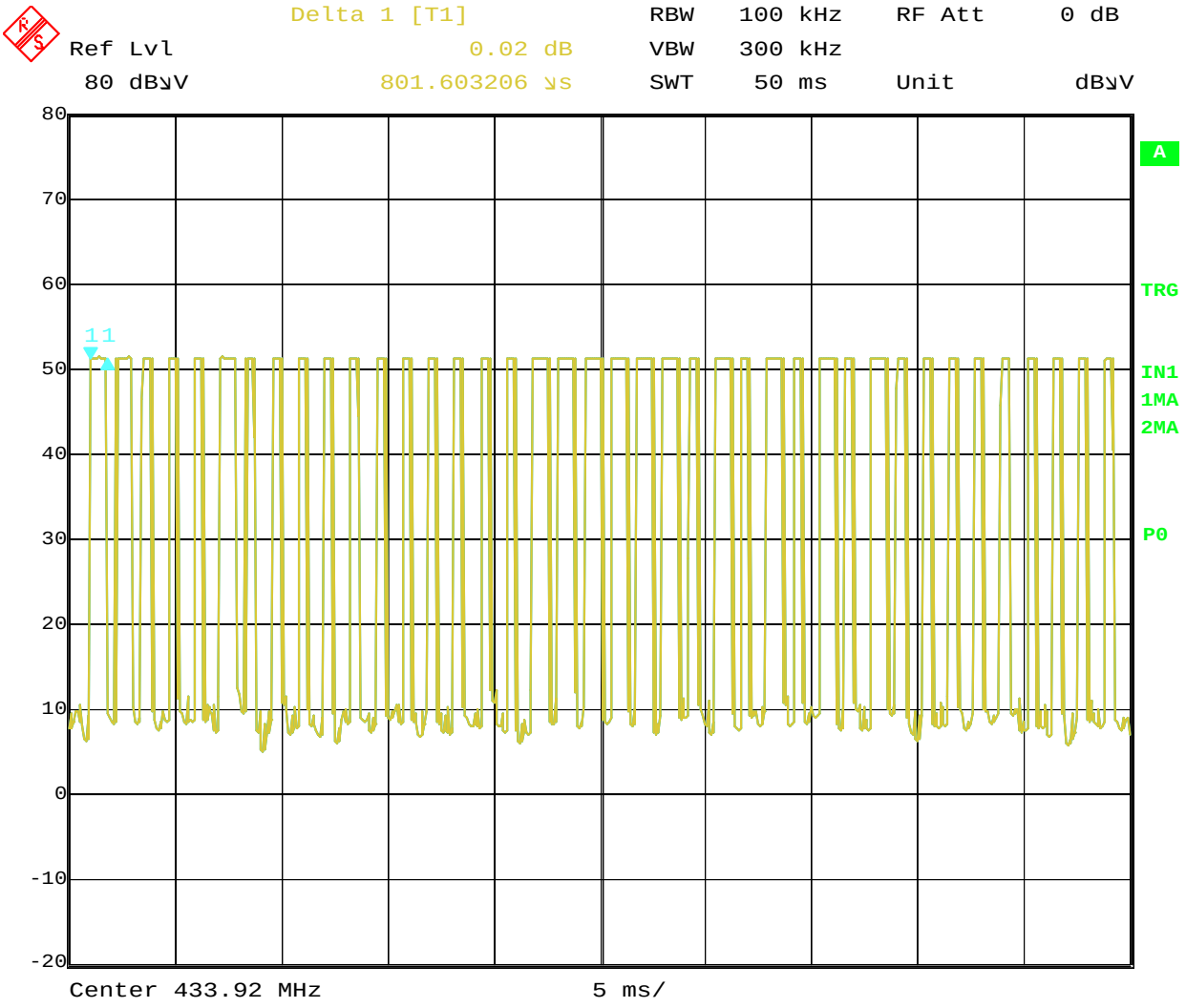


65.3497ms pulse train duration



Date: 1.MAY.2013 21:24:26

There are 16 pulses in the short burst. Each pulse has length of 390.7815us.



Date: 1.MAY.2013 21:34:26

There 13 of 801.603us and 27 of 300.6us pulses in the long word

Total on time in burst =(390.782 us*16)+300.6 us*27+801.603 us *13 = 24.79 ms on time in burst
Pulse Train length = 65.35 ms
Duty cycle percentage 24.79/65.35= 0.3793 = 37.93%

The duty cycle correction factor is therefore 20*LOG(0.3793) = 8.4 dB

Test Personnel:	Vathana Ven VJV	Test Date:	05/01/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC CFR 47 Part 15 Subpart C and IC RSS-210	Limit Applied:	See data
Input Voltage:	3VDC battery	Ambient Temperature:	22 ºC
Pretest Verification w/ Ambient Signals:	**Yes**	Relative Humidity:	24 %
		Atmospheric Pressure:	1020 mbars

Deviations, Additions, or Exclusions: None

10 5 Second Shut Off

10.1 Method

Tests are performed in accordance with FCC 47CFR Part 15 Subpart C Section 15.231 and RSS 210
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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.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	09/28/2012	09/28/2013
Dav001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014

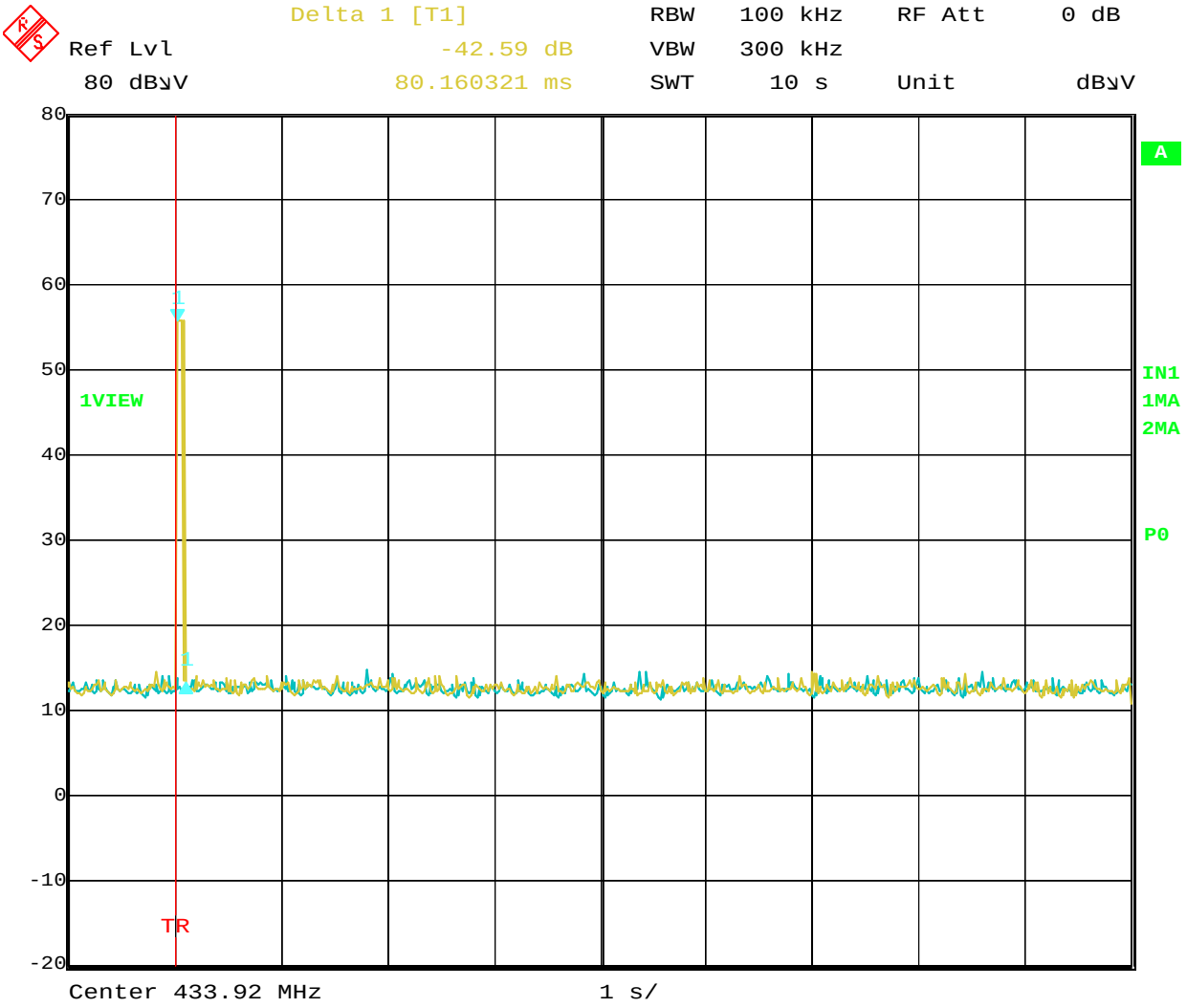
Software Utilized:

Name	Manufacturer	Version
None		

10.3 Results:

The sample tested was found to Comply. A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being activated, and a transmitter activated automatically shall cease transmission within 5 seconds after activation

10.4 Plots/Data:



Date: 1.MAY.2013 21:42:47

Upon activation, no transmissions occurred after the initial burst, which shut off in less than 5 seconds.

Test Personnel:	Vathana Ven VV	Test Date:	05/01/2013
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC CFR 47 Part 15 Subpart C and IC RSS-210	Test Levels:	See Data
Input Voltage:	3.6V Battery		
Pretest Verification w/ Ambient Signals or BB Source:	**YES**	Ambient Temperature:	22 ºC
		Relative Humidity:	24 %
		Atmospheric Pressure:	1020 mbars

Deviations, Additions, or Exclusions: None

11 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	05/09/2013	100982333BOX-002	VJV	JNA	Original Issue