

### **TEST REPORT**

Report Number: 3190417ATL-004

March 29, 2010

**Product Designation: FD100** 

Standard: 47 CFR Part 15, Subpart C (15.231 - Periodic operation in the band 40.66-40.70 MHz and above 70 MHz) RSS-210, Issue 7, 2007

Tested by: Intertek Testing Services NA Inc. 1950 Evergreen Blvd., Suite 100 Duluth, GA 30096 Client:
Lifeline Systems, Inc.
111 Lawrence Street
Framingham, MA 01702-8156
Contact: Clyde Dottin

Phone: 508.988.1313 Fax: 240.536.3263

Tests performed by:

Chris D. Capelle Senior Project Engineer MA

Report reviewed by:

Jeremy O. Pickens EMC Department Manager

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### 1.0 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 verbatum 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.

### 2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)		
6.0	Restrictions (FCC 15C - 15.231(a))		
7.0	Duty Cycle Determination (FCC 15A - 15.35(c))	11/02/2009	
8.0	Radiated Emissions (FCC 15C - 15.231(b))	11/02/2009	PASS
9.0	Bandwidth Requirements (FCC 15C - 15.231(c))	10/07/2009	PASS
10.0	Revision History (Revision History)		
NA	Conducted emissions on AC power lines (Conducted Emissions) was waived due to the EUT is battery powered.		
NA	Conducted Emissions for Intentional Radiators (FCC 15C - 15.207) was waived due to the EUT is battery powered.		

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## 3.0 Description of Equipment Under Test

Equipment Under Test							
Description Manufacturer Model Number Serial Number							
Personal Help Button Lifeline Systems, Inc.		FD100	Not Labeled				

EUT receive date:	10/7/09
EUT receive condition:	Good

## Description of EUT provided by Intertek:

The Troy, FD100 is a 312MHz Personal Help Button (PHB) with built in fall detection.

### <u>Description of EUT exercising:</u>

The device was configured to continuously transmit once the internal 3 Volt battery was connected.

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4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

### Method:

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

**Drawing:** 



Block Diagram

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4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

### Data:

	EUT Cabling								
					Connection				
ID	Description	Length	Shielding	Ferrites	From	То			
	None								

Support Equipment							
Description	Manufacturer	Model Number	Serial Number				
None							

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## 5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

#### Method:

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

### Data:

	Lifeline Systems, Inc.				
Applicant	11 Lawrence Street				
	Framingham, MA 01702-8156				
Trade Name & Model No.	Fall Detector, FD100				
FCC Identifier	BDZFD100				
IC Identifier	655C-FD100				
Frequency Range (MHz)	312				
Antenna Type (15.203)	ntegral				
	Lifeline Systems, Inc.				
Manufacturer name & address	111 Lawrence Street				
	Framingham, MA 01702-8156				
Related Submittals and Grants:	This report is for use with an application for certification of a low power transmitter.  One transmitter is included in the application.				
Additions, deviations and					

exclusions from standards

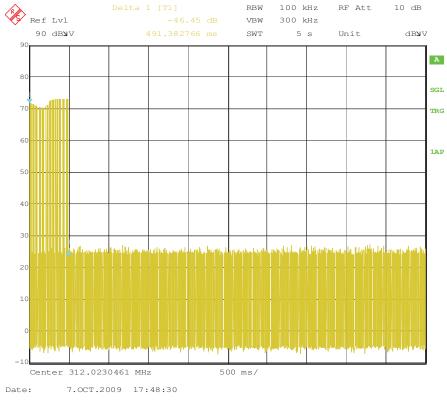
## 6.0 Restrictions (FCC 15C - 15.231(a))

#### Method:

15.231(a) The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition
- (5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

#### Plot:



5 Second Sweep

# 6.0 Restrictions (FCC 15C - 15.231(a))

Data:

15.231(a)	Response	Requirement
Frequency Range (Mhz, max)	312	40.66-40.70 MHz and > 70MHz
Frequency Range (MHz, min)	312	40.66-40.70 MHz and > 70MHz
Transmit only control signal?	Yes	Only control signal allowed
Continuous transmission?	No	No
Voice transmission?	No	No
Video transmission?	No	No
Radio control of toy?	No	No
15.231(a)(1)		
Manually operated?	Yes	
Deactivates within 5 seconds?	Yes	Yes
Show plot (10 second sweep)	Present	
15.231(a)(2)		
Automatically operated?		
Deactivates within 5 seconds?		
Show plot (10 second sweep)	N/A	
15.231(a)(3)		
Periodically transmits at predetermined intervals?	No	Allowed, with restrictions
Polling signals?	No	Allowed, with restrictions
Polling rate and timing	N/A	< 2 seconds per hour
15.231(a)(4)		
For Emergency Use?	Yes	Allowed
15.231(a)(5)		
Exceed 15.231(a)(1) or (a)(2) requirements?	No	Allowed for professional install

## 7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

#### Method:

(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

Count the number of different types of pulses, N and record the results.

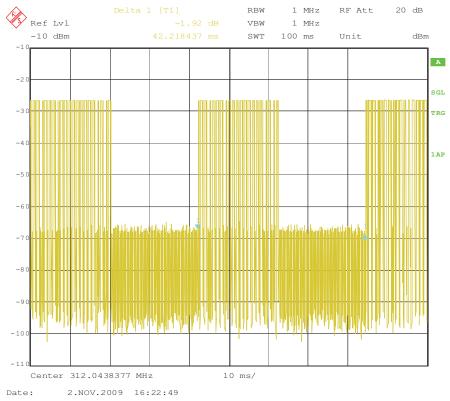
For each of the different types of pulses, count the number of occurrences within one pulse train.

Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

### **Test Equipment Used:**

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/19/2009	10/19/2010

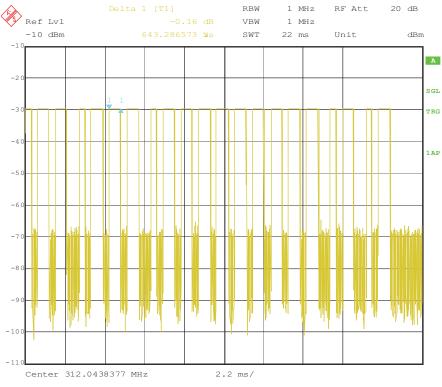
#### Plot:



100ms Plot

## 7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

### Plot:

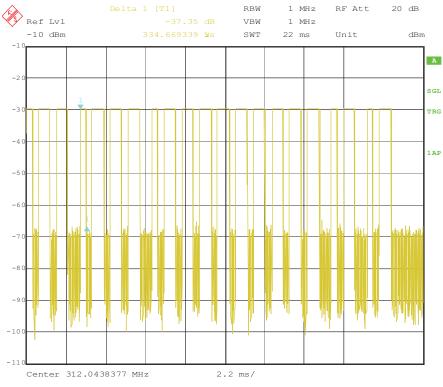


Date: 2.NOV.2009 16:19:31

Large Pulse

## 7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

### Plot:



Date: 2.NOV.2009 16:20:30

Small Pulse

## 7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Data:

Duration of Pulse Train, T (mSec): 42.22

Averaging Interval, A<sub>I</sub> (mSec): 42.22

Number of different Pulses, N: 2

	Number	Pulse Width, mSec	Product
	(#P <sub>x</sub> )	(PW <sub>x</sub> )	$(\#P_x)^*(PW_x)$
Pulse Width 1	5	0.335	1.675
Pulse Width 2	16	0.643	10.288
Pulse Width 3			
Pulse Width 4			
Pulse Width 5			
Pulse Width 6			
Pulse Width 7			
Pulse Width 8			
Pulse Width 9			
Pulse Width 10			

Duty Cycle: 0.283349124

Duty Cycle Correction Factor, dB: -11.0

$$T_{on} = (PW_1*#P)_1 + (PW_2*#P_2) + \dots + (PW_n*#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * Log_{10}(DutyCycle)$$

## 8.0 Radiated Emissions (FCC 15C - 15.231(b))

#### Method:

(b) In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the limits specified in FCC Part 15.231(b).

Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

For radiated emission measurements, the EUT is attached to a styro-foam block and placed on a non-conductive table whose top is 80cm above the ground plane. If the EUT is handheld, the signal shall be aximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at 3 meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent 3-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 10 times the highest frequency generated in the EUT. When provided, emissions plots are taken with a peak detector unless otherwise indicated.

Analyzer resolution is:

- □100 kHz or greater for frequencies 1000 MHz and below,
- □1 MHz for frequencies above 1000 MHz.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

The Peak value of the Field Strength was measured. The Average value was obtained from the Peak by subtracting the Duty Cycle Correction Factor or by using an average detector.

#### **Test Equipment Used:**

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog, 20-2000MHz	Chase	CBL6112A	211518	01/13/2010	01/13/2011
Antenna, Horn, <18 GHz	EMCO	3115	213061	04/30/2009	04/30/2010
Cable E01, <18GHz	Pasternack	RG214/U	E01	05/04/2009	05/04/2010
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	02/02/2010	02/02/2011
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/29/2009	01/29/2010
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2009	05/04/2010
Cable ST1, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/23/2009	01/23/2010
Cable, N-N 3 meters, 18GHz	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
EMI Receiver	Hewlett Packard	8546A	211505	01/12/2009	01/12/2010
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	01/12/2009	01/12/2010
Excel spreadsheet for radiated emissions	Software	Excel - RE Worksh	SW004	12/08/2008	12/08/2009
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	09/17/2009	09/17/2010
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	01/30/2009	01/30/2010
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	04/07/2009	04/07/2010

Results: The sample tested was found to Comply.

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## 8.0 Radiated Emissions (FCC 15C - 15.231(b))

Drawing:

Frequency Range (MHz): 30 to 1000

Input power: Battery

Modifications for compliance (y/n): N

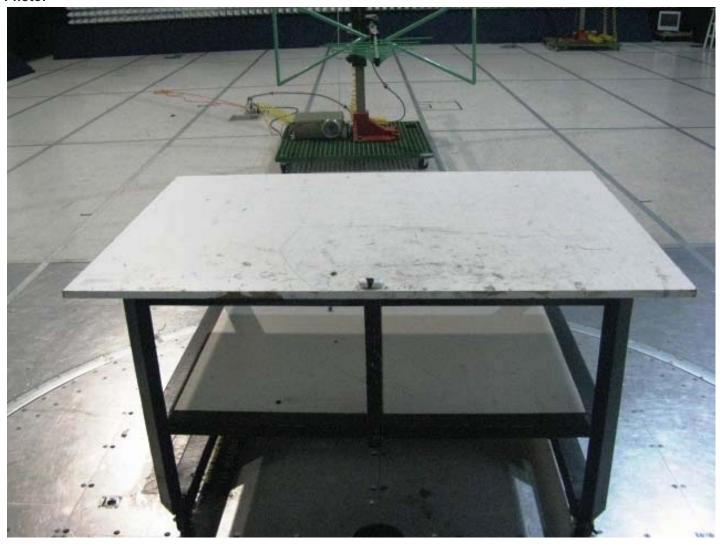
Notes: Continuously Transmitting

A	В	С	D	Е	F	G	Н	I	J	K
Ant.			Antenna	Cable	Pre-amp	<b>Duty Cycle</b>		3m		Axis /
Pol.	Frequency	Reading	Factor	Loss	Factor	Factor	Net	Limit	Margin	Detector
(V/H)	MHz	dB(uV)	dB(1/m)	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB	
Н	624.050	39.8	19.2	5.2	27.6	0.0	36.6	75.4	-38.8	X/ Peak
Н	624.050	39.8	19.2	5.2	27.6	11.0	25.6	55.4	-29.8	X/ Peak
V	624.050	39.6	18.7	5.2	27.6	0.0	35.9	75.4	-39.5	X/ Peak
V	624.050	39.6	18.7	5.2	27.6	11.0	24.9	55.4	-30.5	X/ Peak
Н	936.061	50.0	21.7	6.6	27.4	0.0	50.9	75.4	-24.5	X/ Peak
Н	936.061	50.0	21.7	6.6	27.4	11.0	39.9	55.4	-15.5	X/ Peak
V	936.056	42.9	20.6	6.6	27.4	0.0	42.7	75.4	-32.8	X/ Peak
V	936.056	42.9	20.6	6.6	27.4	11.0	31.7	55.4	-23.8	X/ Peak
Calcu	lations	G=C+	D+E-F	I=0	3-H					

Radiated Emissions Data, 30 MHz - 1000 MHz

# 8.0 Radiated Emissions (FCC 15C - 15.231(b))

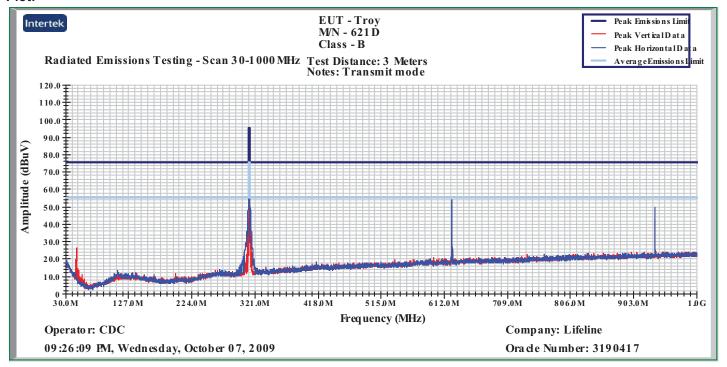
## Photo:



Test Setup

## 8.0 Radiated Emissions (FCC 15C - 15.231(b))

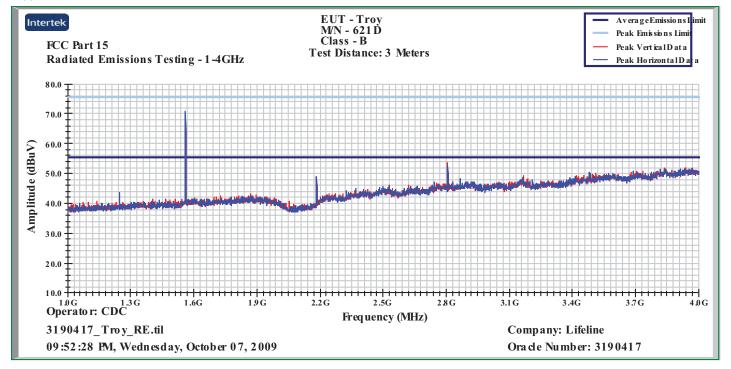
#### Plot:



Peak Plot - 30-1000MHz

## 8.0 Radiated Emissions (FCC 15C - 15.231(b))

### Plot:



Peak Plot - 1000-4000MHz

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# 8.0 Radiated Emissions (FCC 15C - 15.231(b))

Data:

Frequency Range (MHz): 1000 to 4000

Input power: Battery

Modifications for compliance (y/n): N

Notes: Continuously Transmitting

A	В	С	D	Е	F	G	Н	I	J	K
Ant.			Antenna	Cable	Pre-amp	<b>Duty Cycle</b>		3m		Axis /
Pol.	Frequency	Reading	Factor	Loss	Factor	Factor	Net	Limit	Margin	Detector
(V/H)	MHz	dB(uV)	dB(1/m)	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB	
Н	1560.020	69.7	25.1	0.6	40.3	0.0	55.1	74.0	-18.9	X/ Peak
Н	1560.020	69.7	25.1	0.6	40.3	11.0	44.1	54.0	-9.9	X/ Peak
V	1560.020	67.4	25.1	0.6	40.3	0.0	52.9	74.0	-21.1	X/ Peak
V	1560.020	67.4	25.1	0.6	40.3	11.0	41.9	54.0	-12.1	X/ Peak
Н	2184.190	53.6	27.1	0.6	40.5	0.0	40.9	74.0	-33.1	X/ Peak
Н	2184.190	53.6	27.1	0.6	40.5	11.0	29.9	54.0	-24.1	X/ Peak
V	2184.190	49.8	27.1	0.6	40.5	0.0	37.1	74.0	-36.9	X/ Peak
V	2184.190	49.8	27.1	0.6	40.5	11.0	26.1	54.0	-27.9	X/ Peak
Н	2808.210	48.8	28.0	0.6	40.7	0.0	36.8	74.0	-37.3	X/ Peak
Н	2808.210	48.8	28.0	0.6	40.7	11.0	25.8	54.0	-28.3	X/ Peak
V	2808.210	46.9	28.0	0.6	40.7	0.0	34.8	74.0	-39.2	X/ Peak
V	2808.210	46.9	28.0	0.6	40.7	11.0	23.8	54.0	-30.2	X/ Peak
Calcu	lations	G=C+	D+E-F	I=C	G-H					

Radiated Emissions Data, 1000 MHz - 4000 MHz

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## 8.0 Radiated Emissions (FCC 15C - 15.231(b))

Data:

Date: 10/19/2009 Test Distance (m): 3
Frequency Range (MHz): 312MHz
Limit: 15.231

**Input power:** Battery

input power: Dattery									
A	В	С	D	Е	F	G	Н	I	J
Ant.			Antenna	Cable	<b>Duty Cycle</b>				Detectors /
Pol.	Frequency	Reading	Factor	Loss	Factor	Net	Limit	Margin	Bandwidths
(V/H)	MHz	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB	Det/RBW/VBW
Orientation - (X-axis)									
h	312.000	67.2	13.7	3.2	0.0	84.1	95.4	-11.3	Pk/120k/300k
h	312.000	67.2	13.7	3.2	11.0	73.1	75.4	-2.3	Pk/120k/300k
V	312.000	54.9	14.2	3.2	0.0	72.3	95.4	-23.1	Pk/120k/300k
V	312.000	54.9	14.2	3.2	11.0	61.3	75.4	-14.1	Pk/120k/300k
Orientation	n - (Y-axis)								
h	312.000	67.0	13.7	3.2	0.0	83.9	95.4	-11.5	Pk/120k/300k
h	312.000	67.0	13.7	3.2	11.0	72.9	75.4	-2.5	Pk/120k/300k
V	312.000	59.9	14.2	3.2	0.0	77.3	95.4	-18.1	Pk/120k/300k
V	312.000	59.9	14.2	3.2	11.0	66.3	75.4	-9.1	Pk/120k/300k
Orientation	Orientation - (Z-axis)								
h	312.000	53.9	13.7	3.2	0.0	70.8	95.4	-24.6	Pk/120k/300k
h	312.000	53.9	13.7	3.2	11.0	59.8	75.4	-15.6	Pk/120k/300k
V	312.000	63.3	14.2	3.2	0.0	80.7	95.4	-14.7	Pk/120k/300k
V	312.000	63.3	14.2	3.2	11.0	69.7	75.4	-5.7	Pk/120k/300k
Calculations		G=C+	D+E-F	I=0	G-H				

Radiated Emissions Data, Fundamental

## 9.0 Bandwidth Requirements (FCC 15C - 15.231(c))

#### Method:

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.

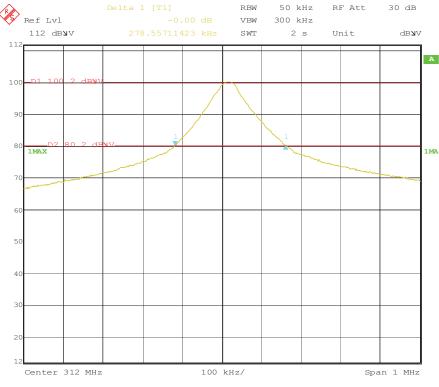
- Center Frequency is set to the fundamental of transmitter.
- Resolution Bandwidth is set to approximately 1% of the emission bandwidth.
- Video Bandwidth is set greater than or equal to the Resolution Bandwidth.

### **Test Equipment Used:**

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

#### Plot:



Date: 7.OCT.2009 18:43:42

20 dB down bandwidth plot

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# 9.0 Bandwidth Requirements (FCC 15C - 15.231(c))

Data:

Fundamental	Measured	Bandwidth		
Frequency	Bandwidth	Limit		
MHz	MHz	MHz		
312	0.278557	0.78		

Suggested Instrument Settings				
RBW (kHz):	8			
VBW (kHz):	23			
Span (MHz):	0.780			

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# 10.0 Revision History (Revision History)

### Method:

Document the history of the report.

### Data:

Revision Level	Date	Report Number	Notes		
Original issue	November 16, 2010	3190417ATL-004			
			Corrected Axis/Detector datasheet column		
1	March 19, 2010	3190417ATL-004	for radiated spurious emissions from XP &		
			XA to X/ Peak		
			Corrected restricted band limits in Radiated		
2	March 29, 2010	3190417ATL-004	Emissions datasheet and amended omitted test		
			equipment for Radiated Emissions		