



FCC ID: O3H-418-220K-M1

June 28, 2000

Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road Columbia, MD 21046

Attention: Applications Examiner

Applicant: Melstars, LLC  
8725 Falkstone Lane  
Alexandria, VA 22309

Equipment Classification: Low Power Transmitters Operating Periodically in the band 40.66 - 40.77 MHz and above 70 MHz

FCC ID: O3H-418-220K-M1

Specification: 47 CFR 15 Subpart C Unlicenced Certification

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Dear Examiner:

The following application in support of the Grant of Equipment Authorization is presented on behalf of Melstars LLC for the Unlicenced Certification of their Model: 418-220K-M1.

Enclosed, please find a complete data and documentation package demonstrating that this device complies with the technical requirements of 47 CFR 15 Subpart C.

If you have any questions, please contact the undersigned, who is authorized to act as Agent.

Sincerely,

Chris Harvey  
Director, EMC Laboratory

**MET Laboratories, Inc.** *Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313

# ENGINEERING TEST REPORT

in support of the  
Application for Grant of Equipment Authorization

**Equipment Classification:** Low Power Transmitters Operating Periodically in the band 40.66 - 40.77 MHz and above 70 MHz

**FCC ID::** O3H-418-220K-M1

**Specification:** 47 CFR 15 Subpart C

**On Behalf of the Applicant:** Melstars, LLC  
8725 Falkstone Lane  
Alexandria, VA 22309

**Manufacturer:** Melstars, LLC  
8725 Falkstone Lane  
Alexandria, VA 22309

**Manufacturer's Representative:** Mr. Melvin Yuhas

**Test Date(s):** May 31, 2000

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## ENGINEERING STATEMENT

**I ATTEST:** the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements. On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 24 of the FCC Rules under normal use and maintenance.

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Liming Xu  
Project Engineer, MET Laboratories

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## 1.0 INTRODUCTION

The following data is presented on behalf of the Applicant, Melstars LLC, as verification of the compliance of the Wireless Light Activated Monitoring System to the requirements of 47CFR 15

## 2.0 TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3493. Radiated emissions measurements were performed on a three-meter open area test site (OATS). A complete site description is on file with the FCC Laboratory Division as 31040/SIT/MET.

## 3.0 TEST EQUIPMENT USED

Manufacturer	Equipment	Calibration Due	Cal. Interval
Hewlett Packard	8563A Spectrum Analyzer	5/26/01	annual
EMCO	Biconical Antenna 3104	09/28/00	annual
EMCO	EMCO Log Periodic Antenna	04/04/01	annual
EMCO	Double Ridge Guided Horn	2/27/01	annual
Hewlett Packard	8594EM Analyzer	11/20/00	annual
Rhode & Swartz (X3)	SMIQ 03 Digital Signal Gen.	7/30/00	N/A
Solar	LISN	7/27/00	annual

## 4.0 EQUIPMENT UNDER TEST CONFIGURATION

This product consists of two small units: (1) a light triggered transmitter unit for a room to be monitored, which sends an On or Off signal a minimum of 100 feet and (2) a receiver unit for a different room (or rooms) which in response to the signal from the transmitter instantly turns On or Off a LED in the face of the receiver unit. The optical sensor on the face of the transmitter is not sensitive to fluorescent light, only to incandescent light. The transmitter and the receiver are each powered by a wall transformer 120VAC/5.0VDC. The wall transformers are existing products of another company.

## 5.0 TEST TYPE(S)

Report Section	Rule Part	Descriptive	Compliance Status
6.1	47CFR15.231(a)	Transmission Requirements	Complies
6.2	47CFR2.1053, 15.231(b)	Radiated Emissions	Complies
6.3	47CFR2.1049, 15.231(c)	Occupied Bandwidth	Complies
6.4	47CFR 15.107	AC Line Conducted Emissions	Complies



## 6.0 TEST RESULTS

### 6.1 TEST TYPE: Transmission Requirements

#### 6.1.1 TECHNICAL SPECIFICATION: 47 CFR 15.231(a)

#### 6.1.2 TEST DATE(S): 31 May 2000

#### 6.1.3 MEASUREMENT PROCEDURES:

The EUT was evaluated against the

requirements of 47 CFR 15.231. The requirements and the justifications for determining compliance are outlined in the table below.

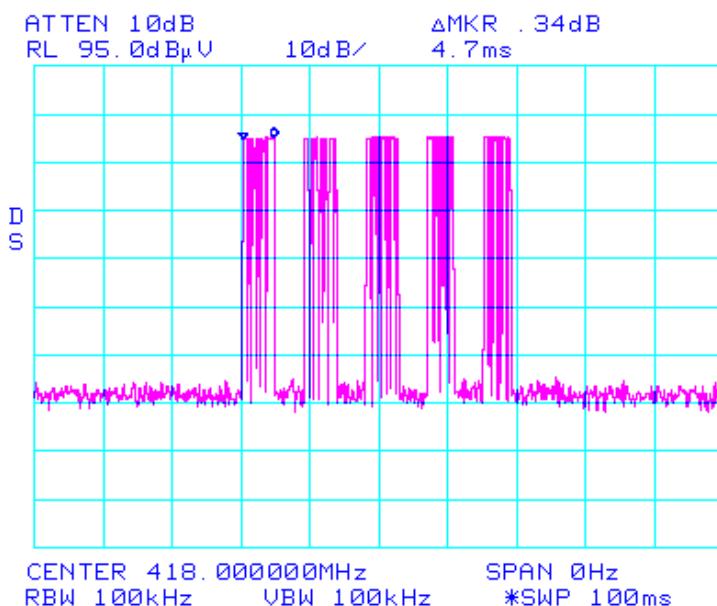
Rule Part	Requirement	Justification
15.231(a)	The device must operate within 40.66-40.70 MHz or above 70 MHz	The device operates at 417.88 MHz
15.231(a)	The device is restricted to the transmission of control signals, no voice or data transmissions	The device transmitted an uncoded single pulse transmission
15.231(a)(1)	The device must meet the requirements for manual transmissions devices	The device is not a manual transmissions device
15.231(a)(2)	The transmission of automatically activated devices must cease within 5 seconds	The device's single transmission pulse lasts less than 100 milliseconds
15.231(a)(3)	The device may not be any more periodic than one second per four hours, and only if a security function is being fulfilled	The device does not transmit with any periodicity. The device is not a security device
15.231(a)(4)	Emergency Service transmitters may transmit while the alarming condition exists	The device is not an emergency device

**6.2 TEST TYPE:** Radiated Emissions**6.2.1 TECHNICAL SPECIFICATION:** 15.231(b)**6.2.2 TEST DATE(S):** 31 May 2000**6.2.3 MEASUREMENT PROCEDURES:**

As required by 47 CFR 2.1053, *radiation emissions measurements* were made in accordance with the general procedures of ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz". Preliminary radiated emission measurements were performed inside a shielded chamber with all digital signal generators on and terminated. The frequency list from the preliminary measurements was used as a guide for making final measurements on a 10 meter open area test site. Testing was performed on 3 orthogonal axis.

The limit for spurious emissions, determined according to 47CFR15.231 for a device with a transmission frequency of 417.88 MHz is 60.28 dB<sub>uV/m</sub> @ 3m. The limit for the Fundamental is 80.28 dB<sub>uV/m</sub> @ 3m.

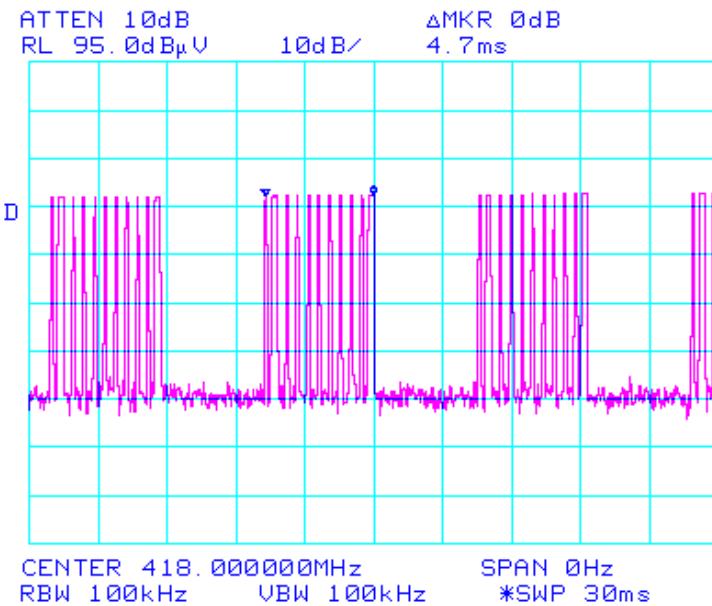
Using a linear extrapolation, the limit for spurious and fundamental emissions according to 15.231(b) determined in microvolts. The limits were then converted to dB<sub>uV/m</sub>.

**Duty Cycle emi1345**

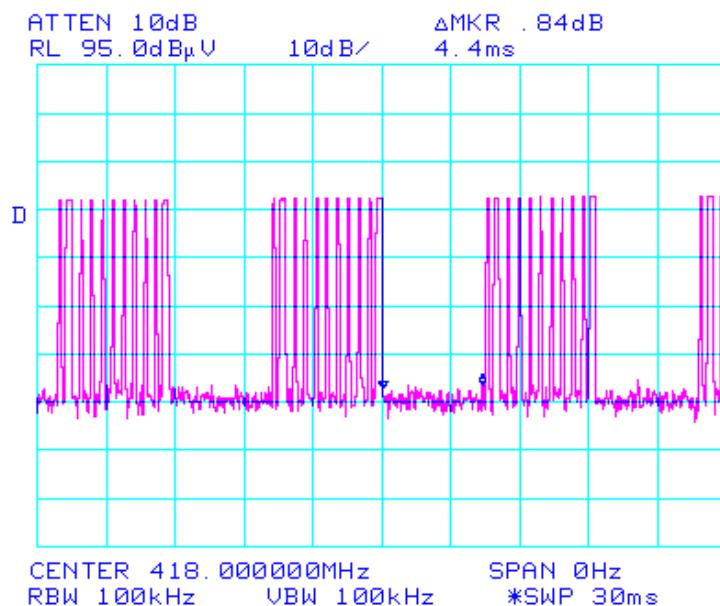


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**Duty Cycle emi1345**



**Off duty cycle emi1345**





The limit for spurious emissions, determined according to 47CFR15.231 for a device with a transmission frequency of 417.88 MHz is 60.28 dBuV/m. The limit for the Fundamental is 80.28 dBuV/m.

Frequency (MHz)	Azimuth (Degrees)	Polarity	Height (m)	Raw Amplitude (dBuV)	A.C.F. (dB)	Cable loss (dB)	Duty Cycle Corr. Factor (dB)	Corrected Amplitude (dBuV/m) @ 3m	Limit (dBuV/m) @ 3m
75.000	0	H	1.2	14.16	7.2	1.605	0	23.0	60.28
75.000	0	V	1.2	20.87	7.4	1.605	0	29.9	60.28
189.180	0	H	1.2	13.31	17.17	2.593	0	33.1	60.28
189.180	0	V	1.2	13.56	17.75	2.593	0	33.9	60.28
266.000	0	H	1.2	13.47	18.66	3.165	0	35.3	60.28
266.000	0	V	1.2	14.7	18.4	3.165	0	36.3	60.28
366.000	0	H	1.2	13.48	15.72	3.719	0	32.9	60.28
366.000	0	V	1.25	13.45	15.64	3.719	0	32.8	60.28
433.000	0	H	1	13.37	17.53	4.07	0	35.0	60.28
433.000	0	V	1	13.42	17.55	4.07	0	35.0	60.28
599.000	0	H	1	13.61	19.59	5.029	0	38.2	60.28
599.000	0	V	1.15	13.57	19.18	5.029	0	37.8	60.28
836.000	0	H	1.2	13.94	22.68	6.087	5.8	36.9	60.28
836.000	0	V	1.2	14.01	22.54	6.087	5.8	36.8	60.28
* 417.880	0	H	1.2	63.11	17.36	4.01	5.8	78.7	80.28

\* = the Fundamental Frequency highest level emission was found at the horizontal polarity.

The Duty Cycle Correction Factor was ascertained by dividing the pulse 'ontime' (4.7 ms) by the pulse 'period' (9.1 ms). The resultant dividend is the percentage of the corrected value that must be factored into the device's fundamental and harmonic frequency levels.

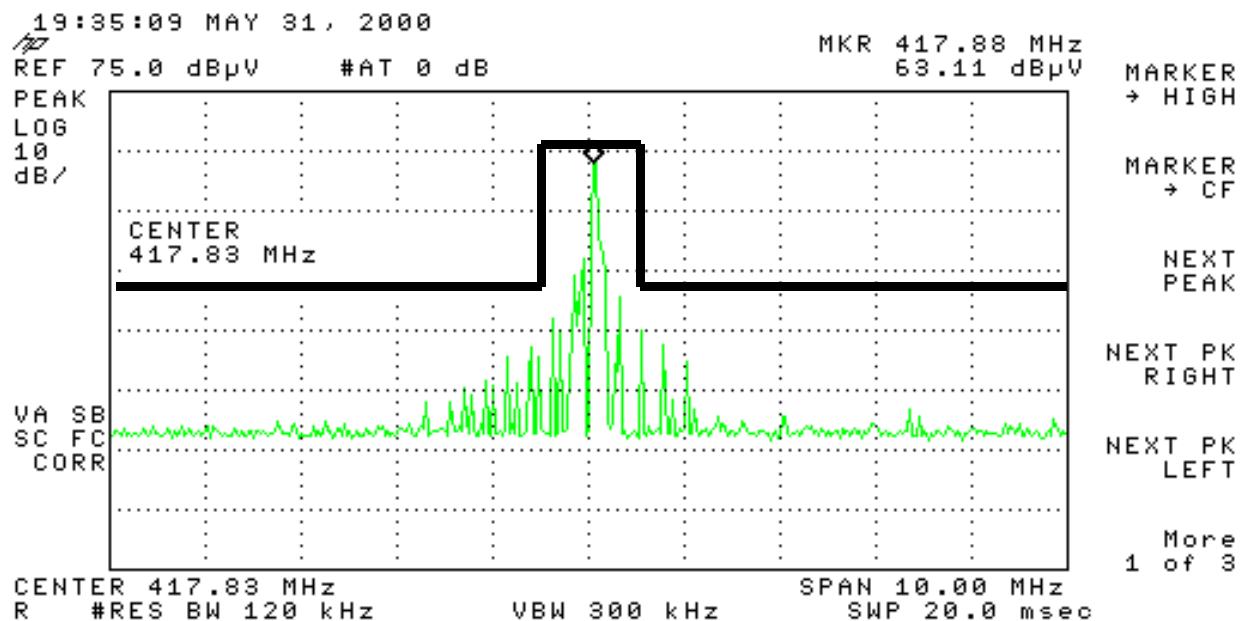
## Radiated Emissions Setup Photograph



**6.3 TEST TYPE:** Occupied Bandwidth**6.3.1 TECHNICAL SPECIFICATION:** 15.231(c)**6.3.2 TEST DATE(S):** 31 May 2000**6.3.3 MEASUREMENT PROCEDURES:**

As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made on the Wireless Light Activated Monitoring System. Using a VBW bandwidth of 300 kHz, we determined the occupied bandwidth of the fundamental emission.

The limit on the emission bandwidth 0.25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is to be determined as the distance between the -20 dB points. The center frequency is 417.88 MHz, therefore the limit is 1.045 MHz. As the following plot displays the occupied bandwidth is 400 kHz.

**Field strength of fundamental at 3 meter on OATS  
emi1345**



**6.4 TEST TYPE:** Line Conducted Emissions

**6.4.1 TECHNICAL SPECIFICATION:** 15.107(b)

**6.4.2 TEST DATE(S):** 31 May 2000

**6.4.3 MEASUREMENT PROCEDURES:**

The measurements were performed over the frequency range of 0.45 MHZ to 30 MHZ using a 50  $\Omega$ /50  $\mu$ H LISN as the input transducer to an EMI/Field Intensity Meter. The measurements were made with the detector set for "peak" amplitude within an IF bandwidth of 10 kHz or for "quasi-peak" within a bandwidth of 9 kHz. The tests were conducted in a RF-shielded enclosure.

**6.4.4 RESULTS:**

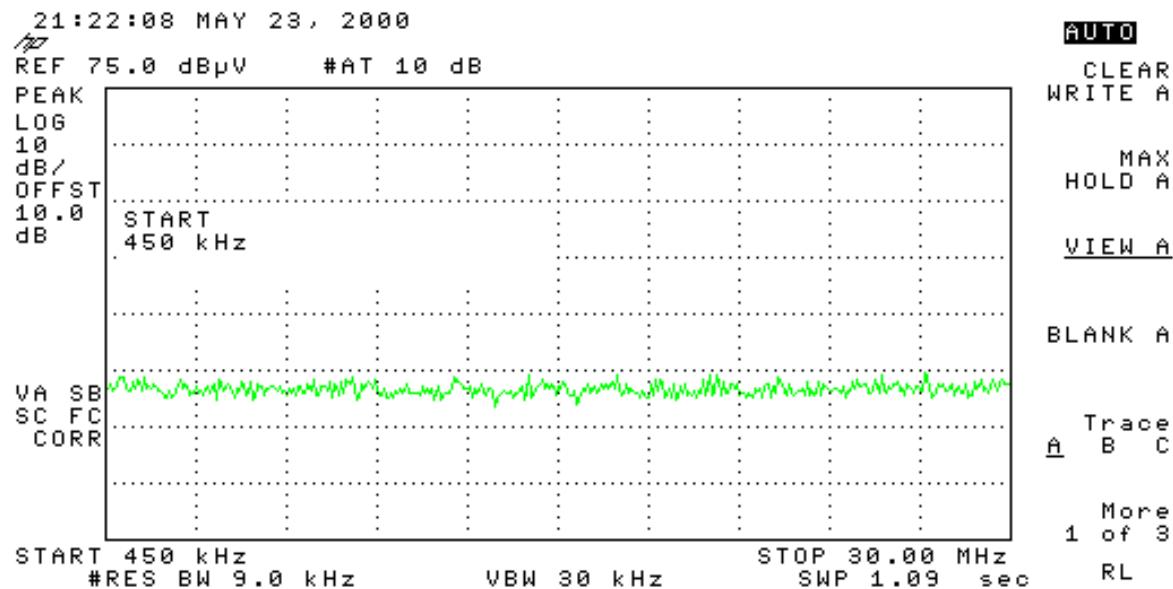
Equipment complies with Section 15.107(b)

The following plots illustrate compliance with the applicable specification



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**Melstars Phase**



**Neutral Melstars****TEST SETUP OF LINE CONDUCTED EMISSIONS**