EMC Automation

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Supply Voltage is 3.44Vdc

Time	Frequency	Amplitude
Startup	13.56114MHz	74.47dBuv
2 min.	13.56114MHz	74.47dBuv
5 min.	13.56114MHz	74.47dBuv
10 min.	13.56114MHz	74.47dBuv

Supply Voltage is 30.4Vdc

5. Please confirm that the measuring loop antenna was rotated about its vertical axis during testing to maximize the received signal per ANSI c63.4 8.2.1.

The measuring loop antenna was rotated about it's vertical axis during the test in order to maximize the received signal.

6. Please request the applicant to complete the attached certification agreement.

The customer has received/reviewed and signed the Curtis-Straus Certification Agreement. It was sent via email to Curtis-Straus.

7. Please specify the label material.

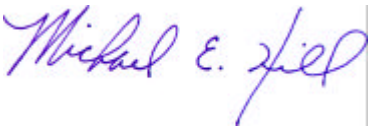
The label will be made of a plastic film and affixed to the product using a permanent adhesive.

8. The users manual does not include the modification warning statement as required by Part 15.21.

The customer has updated the users manual per the requirements of CFR47 Part 15.21. The corrected manual was sent to Curtis-Straus on December 13, 2000 electronically. You have given your approval of the corrections.

If you have any further questions, do not hesitate to contact me.

Best Regards,



Michael E. Hill
Manager Test Facility

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Primary Freq. Harmonics [MHz]	EMI Horizon-tal [uV/m]	EMI Vertical [uV/m]	EMI Limit [uV/m]	Horizontal Margin [uV/m]	Vertical Margin [uV/m]
13.56	5290.54	*	10000	-4709.46	*
27.12	6.30	*	100	-93.70	*
40.68	18.03	42.27	100	-81.97	-57.73
54.24	11.98	13.55	100	-88.02	-86.45
67.8	18.81	21.95	100	-81.18	-78.05
81.36	10.05	19.08	100	-89.95	-80.92
94.92	31.48	19.05	150	-118.52	-130.95
108.48	23.69	26.67	150	-126.31	-123.33
122.04	32.81	35.73	150	-117.19	-114.27
135.6	15.12	22.86	150	-134.88	-127.14
149.16	63.90	49.32	150	-86.100	-100.68

** Loop antenna has only one polarity*.

2. Please clarify in the test report where it states "Testing was performed to determine the exact position and orientation of the badge that maximized emissions" if this determination included manipulation of the cables to maximize the emissions.

The cables were arranged to maximize emissions.

3. Please provide data responsive the requirements of 15.31(e).

See below.

4. Frequency stability testing was performed for voltage variations of 4.25 to 5.75VDC. The manual states that the device can operate from 4.5 to 24 volts +-10%. Please provide data for frequency stability and amplitude stability (15.31(e)) over the range of 3.44-30.4VDC.

Time	Frequency	Amplitude
Startup	13.56114MHz	74.47dBuv
2 min.	13.56114MHz	74.47dBuv
5 min.	13.56114MHz	74.47dBuv
10 min.	13.56114MHz	74.47dBuv

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Clock Freq. Harmonics [MHz]	EMI Horizon-tal [uV/m]	EMI Vertical [uV/m]	EMI Limit [uV/m]	Horizon-Tal Margin [uV/m]	Vertical Margin [uV/m]
11.0592	1.27	*	30	-28.73	*
22.1192	0.174	*	30	-29.83	*
33.1788	25.15	50.76	100	-74.85	-49.24
44.2384	16.11	54.26	100	-83.89	-45.74
55.298	19.36	56.88	100	-80.64	-43.12
66.3576	12.46	25.50	100	-87.54	-74.5
77.4172	9.90	13.61	100	-90.1	-86.39
88.4768	11.42	16.50	150	-138.58	-133.5
99.5364	11.38	10.30	150	-138.62	-139.7
110.596	16.65	18.43	150	-133.35	-131.57
121.6556	9.04	13.26	150	-140.96	-136.74

** Loop antenna has only one polarity*.

The reason for organizing the tables in this fashion was to put our data in exactly the same format as in 15.209 of CFR47. This involved converting the data from dBuV/m to uV/m. Also below 30MHz, we adjusted for distance.

For example, the value measured at 3m for 11.0592MHz was 42.05dBuV. To convert from dBuv to uV, remember:

$$\text{dbuV}=20\ (\text{uV}/1\text{uV})$$

Therefore:

$$(42.05/20)^{10}=126.62\text{uV/m}$$

But remember the limit for this frequency is determined at a 30m distance. Therefore we have to calculate signal strength at 30m. If it is assumed 3m is 1 unit then 30m is 10 units. Using the inverse-square law, the signal strength is 1/100 the amplitude at 30m as it was at 3m. Hence, the signal strength at 30m is:

$$1.266\text{uV/m}$$

Above 30MHz, there was no inverse square correction necessary for distance. Here's the transmitter levels and it's harmonics:

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Barry C. Quinlan
Curtis-Straus LLC
527 Great Road
Littleton, MA

December 15, 2000

Subject: FCC ID: OCQLA-XXWPRXKYMX

Dear Mr. Quinlan:

Here is our response to your request for additional information/clarification made on December 12, 2000 for the Iolan Systems Inc. Badge Reader. Your comments are in italics.

1. We cannot determine compliance from the data presented in the 3.3.3 Harmonics data tables.

For example, the text above the table says that "the data was converted to uV/m with the levels and limits raised to a 30m distance for the 30MHz and below frequencies." If we look at the 11.05 MHz reported emission at a level of 42.05uV/m and we assume from the above text that it has been corrected to the value seen at 30m, then we can compare it to the limit in 15.209 of 30uV/m (not 90 as the table says). By this analysis the reported emission level fails.

Please explain further what the numbers in the table represent. Which limits are you applying? What factors are you using in each case to normalize the data to specific distances? If these emissions are due to the clock oscillator and the digital device portion of the device, why are you measuring them below 30MHz? An example showing all the calculations performed on a specific line item in the table would be helpful to us in understanding these tables.

After review of the section in question, corrections were necessary. I did not convert the data from dbuV/m to uV/m. My only excuse is I finished the report around midnight. EMCA apologizes for the confusion. The limits used are those listed in 15.209.

It is necessary to measure the harmonics of the device. The clock oscillator is below 30MHz. In order to measure the clock and it's harmonics at those frequencies, it was necessary to take data below 30MHz.

The corrected table follows.