Test Report

FCC ID: HLHBISS300

EUT: Balluff Identification Systems BIS S series.

Manufactured by:

Balluff Inc.
8125 Holton Dr.
Florence, KY. 41042

Measurements According to: ANSI C63.4 (1992)

Measurement Date: February 9, 2001

Testing Performed at:

Lexmark International, Inc.
Registered Open Field Test Site
Development Lab.
740 New Circle Road, NW.
Lexington, KY. 40511-1876

Accreditation Status of Test Facility:

The Lexmark site was recognized by the Commission as meeting the requirements of section 2.948 of the FCC Rules via a letter dated August 20, 1998 and is presently on file with the Commission.

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Testing Results:

Open field Measurements of 1 MHz. source

Freq. MHz.	Distance Meters	Cable Loss dB	Ant. Factor dB/uV/m	Meas. dB/uV	3 m Total QP dB/uV/m	30 m Limit dB/uV/m	Correction Factor dB/uV/m	3 m Limit dB/uV/m
1	3.0	Note 1	20	Note 2	73.6	27.6	56	83.6
1	6.0	Note 1	20	Note 2	56.3			
2	3.0	Note 1	20	Note 2	34.7	29.5	40	69.5
3	3.0	Note 1	20	Note 2	29.7*	29.5	40	69.5
4	3.0	Note 1	20	Note 2	28.3*	29.5	40	69.5
5	3.0	Note 1	20	Note 2	34.0*	29.5	40	69.5
6	3.0	Note 1	20	Note 2	28.0*	29.5	40	69.5
7	3.0	Note 1	20	Note 2	27.8*	29.5	40	69.5
8	3.0	Note 1	20	Note 2	28.0*	29.5	40	69.5
9	3.0	Note 1	20	Note 2	28.8*	29.5	40	69.5
10	3.0	Note 1	20	Note 2	50.7*	29.5	40	69.5

Open field Measurements of 3.58 MHz. source

Freq. MHz.	Distance Meters	Cable Loss dB	Ant. Factor dB/uV/m	Meas. dB/uV	3 m Total QP dB/uV/m	30 m Limit dB/uV/m	Correction Factor dB/uV/m	3 m Limit dB/uV/m
3.6	3.0	Note 1	20	Note 2	30.7*	29.5	40	69.5
7.2	3.0	Note 1	20	Note 2	26.3*	29.5	40	69.5
10.8	3.0	Note 1	20	Note 2	26.0	29.5	40	69.5
14.4	3.0	Note 1	20	Note 2	25.8	29.5	40	69.5
18.0	3.0	Note 1	20	Note 2	27.2*	29.5	40	69.5
21.6	3.0	Note 1	20	Note 2	28.5*	29.5	40	69.5
25.2	3.0	Note 1	20	Note 2	28.3*	29.5	40	69.5
28.8	3.0	Note 1	20	Note 2	29.1*	29.5	40	69.5
32.4	3.0	Note 1	20	Note 2	27.9*	29.5	40	69.5
36.0	3.0	Note 1	20	Note 2	28.8*	29.5	40	69.5

Note 1: The cable loss is very small and insignificant and the antenna factor listed in the manual is for reference only.

Note 2: The Rhode and Schwarz ESH-3 receiver, when attached to the HFH-2-Z2 antenna, automatically adds the cable loss and antenna factor to the reading.

***** ambient, no signal attributable to EUT: 5 and 10 MHz. measurements are WWV from Fort Collins, CO.

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Determining falloff with distance per 47CFR 15.31(f)(2)

Amplitude measured at 3 m = 73.6 dB re 1 uV/m
Amplitude measured at 6 m = 56.3 dB re 1 uV/m
Difference = 17.3 dB/octave

Note: A falloff of 18 dB/octave would be equivalent to 60 dB/decade or $1/R^3$, which implies a dominant magnetic field that was measured with a loop antenna. Therefore these data appear reasonable.

There are 20/6 or 3.33 octaves per decade. Therefore the distance factor for these measurements is (3.33)X(17.3), or approximately 56 dB difference between 3 m and 30 m.

Note that the FCC allows a 40 dB/decade extrapolation factor with no verification measurement, and all harmonics of 1 MHz. and 3.58 MHz. comply with the limits of 15.209(a) when using this factor.

The 30 m limit at 1 MHz. is (24000)/(1000) = 24 uV/m or 27.6 dB/uV/m.

The reading at 3m minus 56 dB = extrapolated data at 30 m.

@ 1 MHz reading is 73.6 - 56 dB = 17.6 dB/uV/m, limit is 27.6 dB/uV/m