

<u>APPLICANT</u>	<u>Manufacturer</u>
Knogo North America 350 Wireless Boulevard Hauppauge, NY 11788	North American Technical Services 30 Northport Road Sound Beach, NY 11789-1734

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C

TEST SAMPLE DESCRIPTION

BRANDNAME: Knogo
MODEL: 8MWDD FCC ID:
TYPE: Swept RF Transmitter
FREQUENCY RANGE: 7.9 - 8.9 MHz
POWER REQUIREMENTS: 18VAC derived from 115VAC, 60 Hz AC Adapter

TESTS PERFORMED

- 15.207(a) Conducted Emissions
- 15.223(a) Radiated Emissions, Fundamental
- 15.223(a) Occupied Bandwidth
- 15.223(b) Radiated Emissions, Spurious

REPORT OF MEASUREMENTS

Applicant: Knogo North America

Device: Swept RF Transmitter

FCC ID:

Power Requirements: 18VAC derived from 115VAC, 60Hz AC Adapter

Applicable Rule Section: Part 15, Subpart C, Section 15.223

TEST RESULTS

- 15.207(a): The radio frequency voltage that was conducted back on to the AC power line on any frequency/frequencies within the bandwidth of 450kHz to 30MHz did not exceed 250 microvolts.
- 15.223(a): Field strength of emissions from the intentional radiator operating in the 1.705 - 10 MHz frequency band did not exceed 100 uV/m average for the fundamental. The 6dB bandwidth of the emission was greater than 10% of the center frequency.
- 15.223(b): Field strength of emissions outside of the band 1.705 - 10 MHz did not exceed the general radiated emissions limits of 15.209.

GENERAL NOTES

1. All user accessible controls were adjusted to produce maximum emissions.
2. Measurements of conducted emissions were performed utilizing a 50 ohm/50µhenry Line Impedance Stabilization Network (LISN).
3. The unit sweeps between 7.9 - 8.9 MHz.
4. The frequency range was scanned from 1.705 MHz to 1 GHz. All emissions not reported were more than 20dB below the specified limit.

MODIFICATIONS

Customer added Fair Rite brand Ferrite to the EUT, Model Number 0431164281, between the transmitter and the antenna, closest to transmitter.

DETERMINATION OF DUTY CYCLE

The unit's RF output was directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 0Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and compared to the time for one full cycle in order to obtain the duty cycle.(See plots for additional information)

Transmitter On Time	=	56 microseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	16.67 milliseconds
Transmitter Duty Cycle	=	0.336 %

SPECTRUM ANALYZER DESENSITIZATION CONSIDERATIONS

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. The following formula was utilized:

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 7.0 μ s yields a minimum required bandwidth of 104,657 Hz. FCC specified bandwidths of 10 kHz below 30 MHz and 100kHz and 1MHz were utilized below and above 1GHz, respectively. For measurements below 30 MHz a pulsewidth desensitization factor of -19.6 dB was applied, derived from the following formula:

$$P[\text{dB}] = 20 \log (\text{pulse width} \times \text{bandwidth} \times 1.5)$$

Where pulse width = 7.0 microseconds and bandwidth = 10 kHz

$$P[\text{dB}] = - 19.6 \text{ dB}$$

EXHIBIT 4

Radiated Emissions

Para. 15.223(a)

Para. 15.223(b)

(Please see separate e-file attachment named ReFund.pdf and RESpur.pdf)

EXHIBIT 4

Occupied Bandwidth

Para. 15.223(b)

(Please see separate e-file attachment named OccBw.pdf)

EXHIBIT 4

Conducted Emissions

Para. 15.107(a)

(Please see separate e-file attachment named CeData.pdf)

EQUIPMENT LISTS

FCC 15.207(a) Conducted Emissions, 450kHz-30MHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
078	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	04/27/2000	04/27/2001
202	Transient Limiter	Hewlett Packard	.009 MHz - 200 MHz	11947A	07/24/2000	07/24/2001
231A	Graphics Plotter	Hewlett Packard	N/A	7440A	08/03/2000	08/03/2001
513	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	04/27/2000	04/27/2001
544	EMC Analyzer	Hewlett Packard	9.0 kHz - 1.8 GHz	8591EM	08/25/1999	09/25/2000

FCC 15.223(a) Fundamental Frequency, 1.705-10MHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
012	Loop Antenna, Active	EMCO	9 kHz - 30 MHz	6502	10/04/1999	10/04/2000
067	Open Area Test Site	Retlif	3 Meter	RNY	10/15/1997	10/15/2000
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	08/03/2000	02/03/2001
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/08/2000	03/08/2001
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	08/02/2000	02/02/2001

FCC15.209(a) Spurious Radiated Emissions, 1.705-1000MHz

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
012	Loop Antenna, Active	EMCO	9 kHz - 30 MHz	6502	10/04/1999	10/04/2000
067	Open Area Test Site	Retlif	3 Meter	RNY	10/15/1997	10/15/2000
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	06/13/2000	06/13/2001
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/08/2000	03/08/2001
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	06/13/2000	06/13/2001
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	06/08/2000	06/08/2001
544	EMC Analyzer	Hewlett Packard	9.0 kHz - 1.8 GHz	8591EM	08/25/1999	09/25/2000
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	01/17/2000	01/17/2001