

APPLICANT Beyerdynamics 56 Central Avenue Farmingdale, NY 11735	MANUFACTURER Beyerdynamic GmbH & Co. TheresienstraBe 8 D-74072 Heilbronn, Germany
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TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

TEST PROCEDURE: ANSI C63.4:1992

TEST SAMPLE DESCRIPTION

BRANDNAME: Beyerdynamics MODEL: MCW1011

TYPE: Pulsed RF Transmitter

POWER REQUIREMENTS: 7.2 VDC from Rechargeable Lithium Batteries

FREQUENCY OF OPERATION: 433.92 MHz

TESTS PERFORMED

Para. 15.231(a), Radiated Emissions, Fundamental and Harmonics

Para. 15.231(c), Occupied Bandwidth

Duty Cycle Determination

REPORT OF MEASUREMENTS

Applicant: Beyerdynamics

Device: Pulsed RF Transmitter

FCC ID: OSDMCWSTATION-1

Applicable Rule Section: Part 15, Subpart C, Section 15.231

REPORT OF MEASUREMENTS (continued)

TEST RESULTS

- 15.231 (a) - The device is used as a transmitter for remote control purposes.
- 15.231 (a)(1) & - The transmitter is automatically operated and ceases transmission within 5
15.231(2) seconds after activation.
- 15.231 (a)(3) - The transmitter does not perform periodic transmissions.
- 15.231 (a)(4)- Unit employed for RC purposes involving Security.
- 15.231 (b) - The fundamental field strength did not exceed 11,000 FV/M (Average) at a test distance of 3 meters. In addition, the requirements of section 15.35 for averaging pulsed emissions and for limiting peak emissions were met.
- The field strength of harmonic and spurious emissions did not exceed 1,100 FV/M (AVERAGE).
- 15.231 (c) - The device operates at 433.92 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (1.08 MHz).

DETERMINATION OF FIELD STRENGTH LIMITS

The field strength limits shown below are found in Section 15.231.

Frequency			Limit		
F1	=	260	3750	=	L1
Fo	=	433.92			Lo
F2	=	470	12500	=	L2

The formula below was utilized to determine the limits:

$$\text{Limit} = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]$$

Solving yields:

Fundamental Limit	=	11,000 FV/M (AVERAGE) @ 3 Meters
Harmonic Limit	=	1,100 FV/M (AVERAGE) @ 3 Meters

DETERMINATION OF DUTY CYCLE

Through analysis of timing diagrams supplied by BeyerDynamics, it was determined that the worst case duty cycle in any 100 msec period was 50%, yielding a duty cycle correction factor of -6.0 dB.

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 500Fs yields a minimum required bandwidth of 1333 Hz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.

GENERAL NOTES

1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.
2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.
3. The frequency range was scanned from 30 MHz to 4.3 GHz. All emissions not reported were more than 20 dB below the specified limit.

EQUIPMENT LIST

FCC 15.231 (b) Radiated Emissions, 30 MHz to 4.5 GHz

EN	Type	Manufacturer	Frequency Range	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	10/15/97	10/15/00
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	9/16/99	9/16/00
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/22/99	6/22/00
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	9/20/99	3/20/00
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/99	3/5/00
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	9/20/99	3/20/00
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/22/99	6/22/00
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	10/22/98	4/22/00
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	6/16/99	6/16/01

FCC 15.231 (c) Occupied Bandwidth

EN	Type	Manufacturer	Frequency Range	Model No.	Cal Date	Due Date
575	Graphics Plotter	Hewlett Packard	N/A	7470A	4/22/99	4/22/00
7016	EMC Analyzer	Hewlett Packard	9kHz - 1.8GHz	8591EM	5/13/99	5/13/00

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

(Please see separate e-file attachment named REdata.doc)

Test Report No. R-8170-1B
FCC ID: OSDMCWSTATION-1

FCC 15.231(c)

OCCUPIED BANDWIDTH

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