

APPLICANT: ARTCHIEF INDUSTRIES LTD.

FCC ID: NZT-1119

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.231

REQUIREMENTS:

Fundamental Frequency MHz	Field Strength of Fundamental dBuV	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48	41.94 to 51.48
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94	51.48 to 61.94
470 and above	81.94	61.94

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE FUNDAMENTAL FREQUENCY= 75.55 dBuV/m. NO FUNDAMENTAL IS ALLOWED IN THE RESTRICTED BANDS.

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE HARMONICS AND SPURIOUS FREQUENCIES = 55.55 dBuV/m. SPURIOUS IN THE RESTRICTED BANDS MUST BE LESS THAN 54dBuV/m OR 15.209.

TEST DATA:

EMISSION FREQ. MHz	METER READING @ 3m dBuV	COAX LOSS dB	PEAK FIELD STRNGTH dBuV/m	AVERAGE FIELD STRNGTH dBuV/m	MARGIN dB	ANT.
315.51	59.30	1.40	15.14	75.84	69.13	V
631.00	29.00	1.60	20.78	51.38	44.67	V
946.53	18.50	2.90	24.27	45.67	38.97	V
1262.04	19.20	1.00	25.05	45.25	38.54	V
1577.00R	11.10	1.00	26.31	38.41	31.70	V

SAMPLE CALCULATION OF LIMIT @ 303 MHz:

$$(470 - 260) \text{MHz} = 210 \text{ MHz}$$

$$(12500 - 3750) \mu\text{V/m} = 8750 \mu\text{V/m}$$

$$8750 \mu\text{V/m} / 210 \text{MHz} = 41.67 \mu\text{V/m/MHz}$$

$$(303 - 260) \text{MHz} = 43 \text{ MHz}$$

$$43 \text{ MHz} * 41.67 \mu\text{V/m/MHz} = 1791.81 \mu\text{V/m}$$

$$(1791.81 + 3750) \mu\text{V/m} = 5541.81 \mu\text{V/m limit @ 303 MHz}$$

The transmitter ceases transmitting when the button is released.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS DATE TESTED: NOVEMBER 1, 1999

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CALCULATION OF DUTY CYCLE:

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero(0) frequency span. A plot is then made of the pulse train with a sweep time of 100milliseconds. This sweep determines the duration of the pulse train, which in this case is milliseconds. This sweep allows the determination of the number of and type of pulses, i.e. long & short. Plots are then made showing the duration of each type of pulse and its duration. From the 100millisecond Plot the number of a given type of pulse is then multiplied by the duration of that type pulse. This allows the calculation of the amount of time the UUT is on within 100milliseconds. If the pulse train is longer than 100milliseconds then this number is multiplied by 100 to determine the percentage ON TIME. If the pulse train is less than 100milliseconds the total on-time is divided by the length of the pulse train and then multiplied by 100 to determine the percentage ON TIME. In this case there were 21 pulses 2.2milliseconds long and 21pulses 2.55milliseconds long for a total of 100milliseconds on time within either the 100milliseconds or the pulse train. The average field strength is determined by multiplying the peak field strength by the percent on time. In this case the percentage ON time was 46.2%percent.

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NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.231(C)

REQUIREMENTS: The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

$$315.51 \text{ MHz} * .0025 = .788775 \text{ MHz}$$
$$.788775 \text{ MHz}/2 = +/- 394.39$$

THE GRAPH IN EXHIBIT 11 REPRESENTS THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the above photo was taken. The vertical scale is set to 10 dB per division: the horizontal scale is set to 100 kHz per division.

TEST RESULTS: The unit meets the FCC requirements.

PERFORMED BY: DATE: NOVEMBER 1, 1999

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