CERTIFICATION TEST REPORT

FOR

CLEVELAND MEDICAL DEVICES, INC.

BioRadio 100/110 TRANSMITTER

FCC ID NO. N9Y0007

November 12, 1998

Prepared for: Cleveland Medical Devices, Inc.
11000 Cedar Ave. Suite 130
Cleveland, OH 44106

Measurements made
and report prepared by: James R. Pollock

SMITH ELECTRONICS, INC.
8200 SNOWVILLE RD.
CLEVELAND, OH 44141
440/526-4386

CERTIFICATE OF COMPLIANCE

1.	Manufacturer:	Cleveland Medical Devices, Inc. 11000 Cedar Ave. Suite 130 Cleveland, OH 44106
2.	Contact:	Brian Smith Cleveland Medical Devices, Inc. 216/791-6720
3.	Regulation:	CFR47-Part 15 15.249
4.	Measurement Method:	ANSI C63.4-1992
5.	EUT	BioRadio 100/110 FCC ID: N9Y0007
6.	Type:	Biomedical Transmitter
7.	Tuned Frequency:	905.1648 MHz - 924.7488 MHz
8.	Date of Test:	Oct. 21,26,28 & Nov. 6,9, 1998
9.	Place of Test:	Smith Electronics, Inc. Test Lab, 8200 Snowville Rd., Brecksville, OH. Open Field Site at 8200 Snowville Rd., Brecksville, OH

10. Statement of Compliance:

I hereby certify that measurements of radio frequency emissions from the Cleveland Medical Devices BioRadio 100/110 transmitter were performed by me between Oct. 21 and Nov. 9, 1998, and that the results of the measurements confirmed that the unit tested is capable of compliance with the above regulations.

11-12-98
Date

James R. Pollock, Pres.
Signature, Title

TEST INFORMATION

SUMMARY

The prototype model of the Cleveland Medical Devices, BioRadio 110/100 transmitter has been shown to be capable of complying with those requirements of the Federal Communications Commission for a certified intentional radiator under Part 15.249.

The measured value closest to the appropriate limit was found at the 5th harmonic of the low test frequency. The margin was 0.8 dB below the limit as seen in Table 1 A.

The transmitter, with its associated accessories, has also been tested as a digital device, and, as covered in a separate report, been shown to meet the requirements of a Class B digital device under 15.107 and 15.109.

EQUIPMENT UNDER TEST	BioRadio 110/100 Transmitter FCC ID: N9Y007
MANUFACTURER	Cleveland Medical Devices, Inc. 11000 Cedar Ave. Suite 130 Cleveland, OH 44106
TEST DATES	Oct. 21 - Nov. 9, 1998
TEST LABORATORY	Smith Electronics, Inc. 8200 Snowville Road Cleveland, OH 44141 (440) 526-4386
MEASUREMENT EQUIPMENT	Hewlett-Packard Spectrum Analyzer Type 8568B with 8560A RF Section S/N 2216A02120 85662A Display Section S/N 2152A03686 85650A Quasi-Peak Adapter S/N 2043A00350 Calibrated 5/98

Singer Stoddart EMI Field Intensity Meter Model NM 37/57
S/N 0234-04233
Calibrated 5/98

Hewlett-Packard Spectrum Analyzer
Model 8593EM, S/N 3536A00147
Calibrated 8/98

ANTENNAS

EMCO Biconical Antenna
Model 3104
Freq. Range 20 - 200 MHz

EMCO Log-Periodic Antenna
Model 3146
Freq. Range 200 - 1000 MHz

Stoddart Tuned Dipole Antenna
Model 91598-2
Freq. Range 400 - 1000 MHz

EMCO Double Ridged Guide Horn
Model 3115
Freq. Range 1 - 18 GHz

MISCELLANEOUS

Hewlett-Packard Preamplifier
Model 8447D S/N 1725A01282

12.2 m RG-214/U coaxial cable

0.6 m RG-214/U coaxial cable

TEST REPORT

INTRODUCTION

The BioRadio 100/110 transmitter, manufactured by Cleveland Medical Devices, (CMD) is part of a system specifically designed for the performance of sleep studies. Subject data (low frequency analog) is frequency modulated onto the transmitted signal, picked up by the companion receiver and transferred to the receivers host computer for later analysis.

The BioRadio is to be certified as an intentional radiator under part 15.249. Its transmission frequency can be programmed in 256 steps between 905.1648 MHz and 924.7488 MHz by using the Program Pack and a computer. The Model 110 will be field programmable, the Model 100 will not. A Test Pack (Model 100) or the combined Program & Test Pack (Model 110) provides a low frequency sine wave oscillator to provide an input signal for system testing.

The BioRadio 100/110 is also a digital device/computer peripheral, that although it would appear to be exempt as a medical device under 15.103 (e), has had measurements performed to verify compliance to 15.109 as a Class B digital device.

MEASUREMENTS PERFORMED

RADIATED EMISSIONS

Field strength measurements were performed on the prototype transmitter to assure that the radiated emissions were capable of compliance with the requirements of 15.249.

Measurement of the fundamental frequency was performed on the Smith Electronics, Inc. open field test site located at 8200 Snowville Road, Brecksville, OH using the procedures of ANSI C63.4-1992. Site attenuation data pertinent to this site is on file with the FCC. A tuned dipole antenna was used with a receiver having quasi-peak, peak and average detectors.

The harmonic frequencies were measured in an area of the facility free of reflecting surfaces at a test distance of either 1 meter or 0.5 meters. A double ridged wave guide antenna and a spectrum analyzer were used for these measurements.

Measurements were made on the transmitter with test leads (normal operating condition) and with the Test Pack and Program/Test Pack installed. Final set up of the system would disable the output amplifier during the program mode but not the test mode.

Measurements were made at three frequencies; one at the low end of the tuning range, one at the high end and one in the middle of the range. Test on the transmitter were performed with the transmitter in three orthogonal orientations with the test lead bundle positioned alongside

the transmitter. For the measurements with the Test Pack and Program/Test Pack, the devices were placed on their backs in a position typical of their usage. Results of the measurements are found in Tables 1 A through 3 C.

Tables 1 A - 1 C are the data with the transmitter and test leads at the three test frequencies. Tables 2 A - 2 C are with the Program/Test Pack connected while Tables 3 A - 3 C are with the Test Pack connected. To save space in the Tables, nominal test frequencies were used to the nearest MHz. Table 4 lists each of the actual test frequencies and the nominal frequency used to designate the test frequency.

CONCLUSIONS

Based upon the measurements made and reported herein, the Cleveland Medical Devices, Inc. BioRadio 100/110 radio transmitter is found to be capable of complying with the requirements of Part 15.249 of the FCC Rules and Regulations when operated in a manner consistent with its intended use and purpose.

METHOD OF CALCULATION

Signal strenth readings were made in units of dBuV from either the EMI meter or the spectrum analyzer. To these values an antenna factor in dB and a coax loss factor in dB was added to arrive at a field strength in dBuV/m at the measurement distance. This value is converted to field strength in uV/m and compared to the limit corrected for distance. An inverse distance correction was used to convert limit values from one distance to another.

SAMPLE CALCULATION

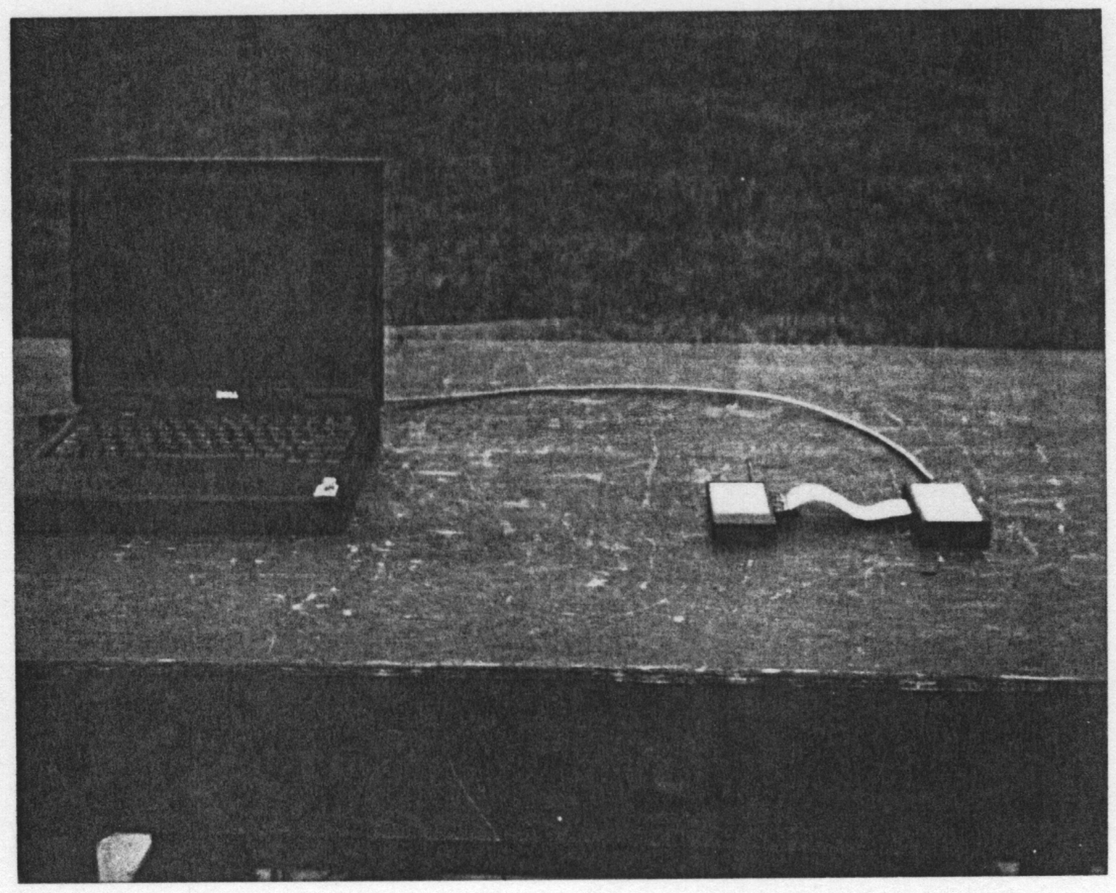
From Table 1 A, a measured value of 25.8 dBuV is added to the antenna factor (27.5 dB) and coax factor (0.3 dB) to arrive at a field strength of 53.6 dBuV/m.

$$25.8 + 27.5 + 0.3 = 53.6 \text{ dBuV/m}$$

To convert dBuV/m to uV/m use the following equation:

$$\text{uV/m} = 10^{(53.6/20)} = 478 \text{ uV/m at 1 meter}$$

As the test limit is 500 uV/m at 3 meters, the field strength could be divided by three to adjust for the distance, or conversely, the limit can be multiplied by three for the adjustment. For the purposes of this report, the limit values have been multiplied to account for the different distances. For the one meter measurement distance, the limit was multiplied by three. For the 0.5 meter distance, the limit was multiplied by six to adjust to the equivalent 3 meter distance.



BioRadio 100/110
TRANSMITTER WITH TEST PACK
(Computer removed for transmitter test)

PICTORIAL 1
CLEVELAND MEDICAL DEVICES, INC.
BioRadio 100/110
TYPICAL TRANSMITTER SET UP

TABLE 1 A

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST LEADS

TUNED TO 905.1648 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
905	62 @3m	29.1	1.7	92.8	43,652	50,000	- 1.2
1810	25.8 @1m	27.5	0.3	53.6	478	1,500	- 9.9
2715	29.8 @1m	30.0	0.4	60.2	1,023	1,500	- 3.3
3621	24.9 @1m	32.5	0.4	57.8	776	1,500	- 5.7
4526	29.2 @1m	33.0	0.5	62.7	1,365	1,500	- 0.8
5431	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6336	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7241	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8146	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9052	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 1 B

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST LEADS

TUNED TO 914.9952 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
915	61.5 @3m	29.1	1.7	92.3	41,210	50,000	- 1.7
1830	25.3 @1m	27.5	0.3	53.1	452	1,500	-10.4
2745	30.4 @1m	30.0	0.4	60.8	1,096	1,500	- 2.7
3660	26.9 @1m	32.5	0.4	59.8	977	1,500	- 3.7
4575	27.5 @1m	33.0	0.5	61.0	1,122	1,500	- 2.5
5490	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6405	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7320	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8235	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9150	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 1 C

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST LEADS

TUNED TO 924.7488 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
925	60 @3m	29.1	1.7	90.8	34,674	50,000	- 3.2
1849	28.1 @1m	28.0	0.3	56.4	661	1,500	- 7.1
2774	29.9 @1m	30.0	0.4	60.3	1,035	1,500	- 3.2
3699	27.7 @1m	32.8	0.4	60.9	1,109	1,500	- 2.6
4624	27.5 @1m	33.0	0.5	61.0	1,122	1,500	- 2.5
5548	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6473	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7398	<27 @0.5m	37.3	0.7	<65.0	<1,778	3,000	>- 4.5
8323	<27 @0.5m	38.2	0.8	<66.0	<1,995	3,000	>- 3.5
9247	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 2 A

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH PROGRAM/TEST PACK

TUNED TO 905.1648 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
905	60 @3m	29.1	1.7	90.8	34,674	50,000	- 3.2
1810	27.9 @1m	27.5	0.3	55.7	610	1,500	- 7.8
2715	28.7 @1m	30.0	0.4	59.1	902	1,500	- 4.4
3621	25.8 @1m	32.5	0.4	58.7	861	1,500	- 4.8
4526	27.7 @1m	33.0	0.5	61.2	1,148	1,500	- 2.3
5431	20.6 @1m	36.0	0.6	57.2	724	1,500	>- 6.3
6336	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7241	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8146	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9052	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

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TABLE 2 B

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH PROGRAM/TEST PACK

TUNED TO 914.9952 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
915	60.0 @3m	29.1	1.7	90.8	34,674	50,000	- 3.2
1830	27.6 @1m	27.5	0.3	55.4	589	1,500	- 8.1
2745	29.4 @1m	30.0	0.4	59.8	977	1,500	- 3.7
3660	27.3 @1m	32.5	0.4	60.2	1,023	1,500	- 3.3
4575	28.1 @1m	33.0	0.5	61.6	1,202	1,500	- 1.9
5490	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6405	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7320	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8235	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9150	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

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CL = Coax Loss Factor

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Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 2 C

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH PROGRAM/TEST PACK

TUNED TO 924.7488 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
925	58 @3m	29.1	1.7	88.8	27,542	50,000	- 5.2
1849	28.3 @1m	28.0	0.3	56.6	676	1,500	- 6.9
2774	29.2 @1m	30.0	0.4	59.6	955	1,500	- 3.9
3699	28.0 @1m	32.8	0.4	61.2	1,148	1,500	- 2.3
4624	27.5 @1m	33.0	0.5	61.0	1,122	1,500	- 2.5
5548	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6473	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7398	<27 @0.5m	37.3	0.7	<65.0	<1,778	3,000	>- 4.5
8323	<27 @0.5m	38.2	0.8	<66.0	<1,995	3,000	>- 3.5
9247	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 3 A

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST PACK

TUNED TO 905.1648 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
905	61 @3m	29.1	1.7	91.8	38,905	50,000	- 2.2
1810	27.8 @1m	27.5	0.3	55.6	603	1,500	- 7.9
2715	27.7 @1m	30.0	0.4	58.1	804	1,500	- 5.4
3621	26.8 @1m	32.5	0.4	59.7	966	1,500	- 3.8
4526	28.1 @1m	33.0	0.5	61.6	1,202	1,500	- 1.9
5431	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6336	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7241	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8146	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9052	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

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AF = Antenna Factor
CL = Coax Loss Factor

The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 3 B

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST PACK

TUNED TO 914.9952 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
915	60.0 @3m	29.1	1.7	90.8	34,674	50,000	- 3.2
1830	27.4 @1m	27.5	0.3	55.2	575	1,500	- 8.3
2745	28.0 @1m	30.0	0.4	58.4	832	1,500	- 5.1
3660	25.7 @1m	32.5	0.4	58.6	851	1,500	- 4.9
4575	25.5 @1m	33.0	0.5	59.0	891	1,500	- 4.5
5490	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6405	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7320	<27 @0.5m	37.0	0.7	<64.7	<1,718	3,000	>- 4.8
8235	<27 @0.5m	38.0	0.8	<65.8	<1,950	3,000	>- 3.7
9150	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

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The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 3 C

FUNDAMENTAL AND SPURIOUS EMISSIONS

BIORADIO TRANSMITTER WITH TEST PACK

TUNED TO 924.7488 MHz

Nom. Freq. (MHz)*	Value (dBuV) @ Dist.	AF (dB)	CL (db)	Field Strength (dBuV/m)	(uV/m)	Limit (uV/m)	dB / Lim.
925	60.0 @3m	29.1	1.7	90.8	34,674	50,000	- 3.2
1849	27.1 @1m	28.0	0.3	55.4	589	1,500	- 8.1
2774	26.1 @1m	30.0	0.4	56.5	668	1,500	- 7.0
3699	25.4 @1m	32.8	0.4	58.6	851	1,500	- 4.9
4624	28.3 @1m	33.0	0.5	61.8	1,230	1,500	- 1.7
5548	<20 @1m	36.0	0.6	<56.6	< 676	1,500	>- 6.9
6473	<20 @1m	35.5	0.7	<56.2	< 646	1,500	>- 7.3
7398	<27 @0.5m	37.3	0.7	<65.0	<1,778	3,000	>- 4.5
8323	<27 @0.5m	38.2	0.8	<66.0	<1,995	3,000	>- 3.5
9247	<27 @0.5m	38.5	1.0	<66.5	<2 113	3,000	>- 3.0

* = Nominal Frequency, For actual frequency see Table 4
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The operating transmitter produced either an unmodulated signal (with test leads) or an FM signal (with Test Packs). For these signals, peak, quasi-peak and average measurements will produce the same readings on the meter. This was verified with both the receiver and the spectrum analyzer used.

Peak measurements were made using a 1 MHz resolution bandwidth and a 10 kHz video bandwidth to reduce the instrument noise level to permit the low level signals to be observed. As previously noted, the reduced video bandwidth has no effect on the measurement of a CW or FM signal other than to reduce the effects of instrument noise.

TABLE 4

NOMINAL FREQUENCY VS. ACTUAL FREQUENCY

LOW RANGE

NOMINAL (MHz)	ACTUAL (MHz)
905	905.1648
1810	1810.3296
2715	2715.4944
3621	3620.6592
4526	4525.8240
5431	5430.9888
6336	6336.1536
7241	7241.3184
8146	8146.4832
9052	9051.6480

MID RANGE

915	914.9952
1830	1829.9914
2745	2744.9856
3660	3659.9808
4575	4574.9760
5490	5489.9712
6405	6404.9664
7320	7319.9616
8235	8234.9568
9150	9149.9520

HIGH RANGE

925	924.7488
1849	1849.4976
2774	2774.2464
3699	3698.9952
4624	4623.7440
5548	5548.4928
6473	6473.2416
7398	7397.9904
8323	8322.7392
9247	9247.4880