INTRODUCTION

Procedures of ANSI 63.4 (1992) were followed.

The FF777 cordless telephone is a 25 channel design. Channel frequency chart is included in Appendix 8. Automatic channel selection description is included in Appendix 9.

Hand-set and base stability, occupied bandwidth, and emissions were measured at both upper and lower band edges.

COMPLIANCE WITH SECTION 15.233 OF PART 15

15.233(g) Frequency tolerance was found to be within the 0.01% limit over a temperature variation of -20°C to +50°C at normal supply voltage, and for a variation of primary voltage from 85% to 115% of the rated supply voltage at temperature of 20°C. (See data of Tables 1a and 1b.)

15.233(d) Emission was confined within a 20 kHz band centered on the actual carrier frequency. Modulation products falling within this 20 kHz band were attenuated at least 26 dB below the level of the unmodulated carrier. Tests were made using an appropriate input signal per 2.989. (See data in Figures 1a, 1b and 2a and 2b.)

15.233(c,d) The field strength of the radiation emission was measured and found to comply with the limits established by 15.233(c) and 15.233(d). (See data of Tables 2a, 2b, 3a and 3b.)

15.207(a) AC power line conducted radio frequency voltage did not exceed 250uV (+48 dBuV) from .45 to 30 MHz (see Figures 3 and 4).

DATA

Tables and Figures referenced above follow immediately after this page. Description of measurement procedures and test equipment used in the measurements follow the data pages.

NOTE: For convenience figures are identified with this model number followed by a suffix B for base and H for hand-held; i.e. Figure 1 is labelled FF777 (H) meaning data applies to the hand-held unit.

TABLE 1b

CARRIER FREQUENCY TOLERANCE
(High Channel)

Base-Unit

Temperature, °C	Frequency, MHz
-20.4	46.969390
- 9.8	46.969204
- 0.1	46.969235
9.9	46.969404
19.8	46.969652
30.4	46.969893
39.9	46.970103
49.6	46.970358

Supply Voltage

+15%	10.35 Vac	46.969598
0%	9.00 Vac	46.969652
-15%	7.65 Vac	46.969695

Frequency stability was well within the .01% tolerance of 15.233(a) for operation at 46.990 MHz.

Limit (.01% High)	46.974697
Limit (.01% Low)	46.965303

Hand-Held Unit

Temperature, °C	Frequency, MHz
-19.4	49.989288
-10.0	49.989624
0.4	49.989841
9.8	49.989965
19.7	49.990012
30.0	49.990072
39.8	49.990146
50.4	49.990279

Supply Voltage

+15%	4.14 Vdc	49.990007
0%	3.60 Vdc	49.990012
-15%	3.06 Vdc	49.990013

Frequency stability was well within the .01% tolerance of 15.233(a) for operation at 49.990 MHz.

Limit (.01% High)	49.994999
Limit (.01% Low)	49.985001

TABLE 1a

CARRIER FREQUENCY TOLERANCE
(Low Channel)

Base-Unit

Temperature, °C	Frequency, MHz
-19.3	43.719353
-10.1	43.719217
0.5	43.719262
10.1	43.719435
20.2	43.719676
30.3	43.719898
40.4	43.720094
49.7	43.720332

Supply Voltage

+15%	10.35 Vac	43.719626
0%	9.00 Vac	43.719676
-15%	7.65 Vac	43.719718

Frequency stability was well within the .01% tolerance of 15.233(a) for operation at 43.720 MHz.

Limit (.01% High)	43.724372
Limit (.01% Low)	43.715628

Hand-Held Unit

Temperature, °C	Frequency, MHz
-19.4	48.759294
- 9.4	48.759639
- 0.1	48.759866
9.9	48.759992
19.7	48.760033
30.0	48.760091
39.9	48.760163
50.0	48.760278

Supply Voltage

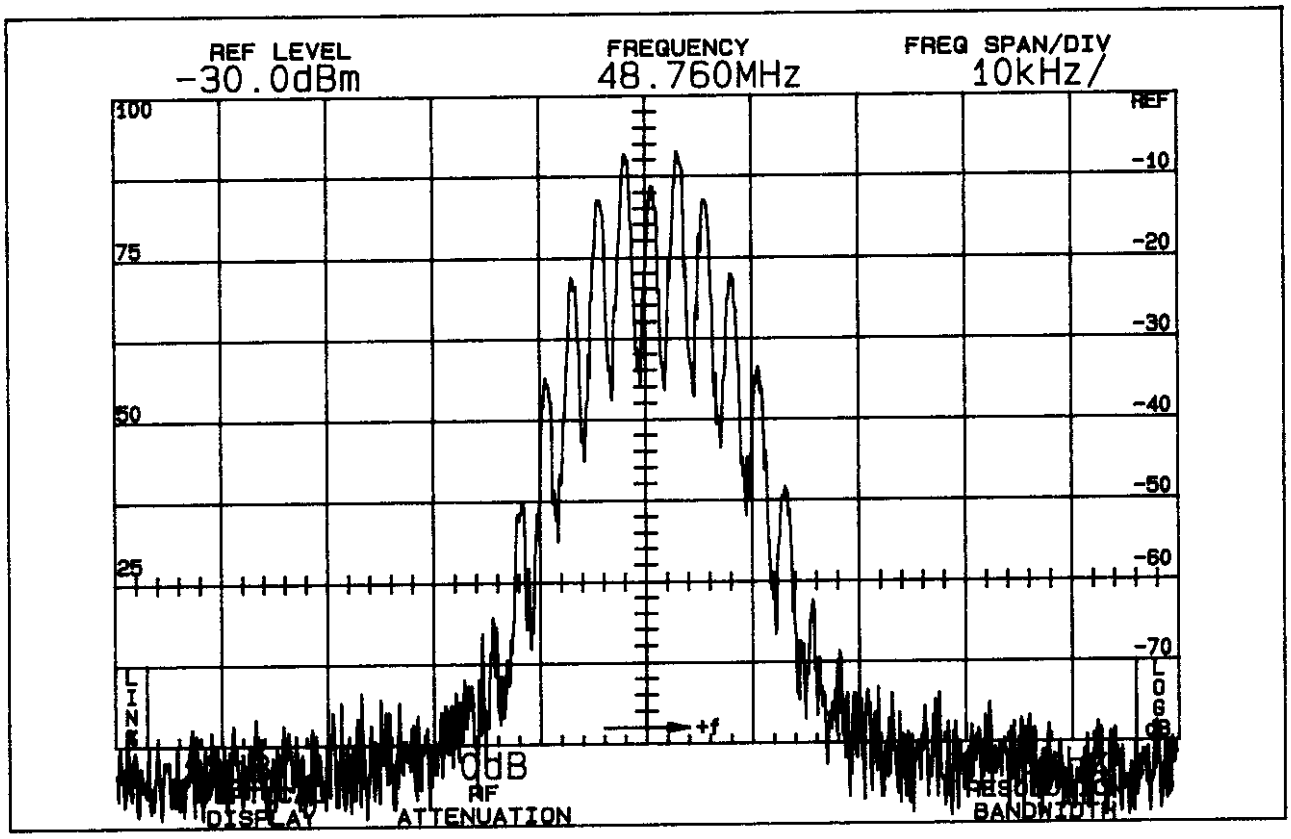
+15%	4.14 Vdc	48.760029
0%	3.60 Vdc	48.760033
-15%	3.06 Vdc	48.760033

Frequency stability was well within the .01% tolerance of 15.233(a) for operation at 48.76 MHz.

Limit (.01% High)	48.764876
Limit (.01% Low)	48.755124

A: \FF777HL.GBW

FIGURE 1a

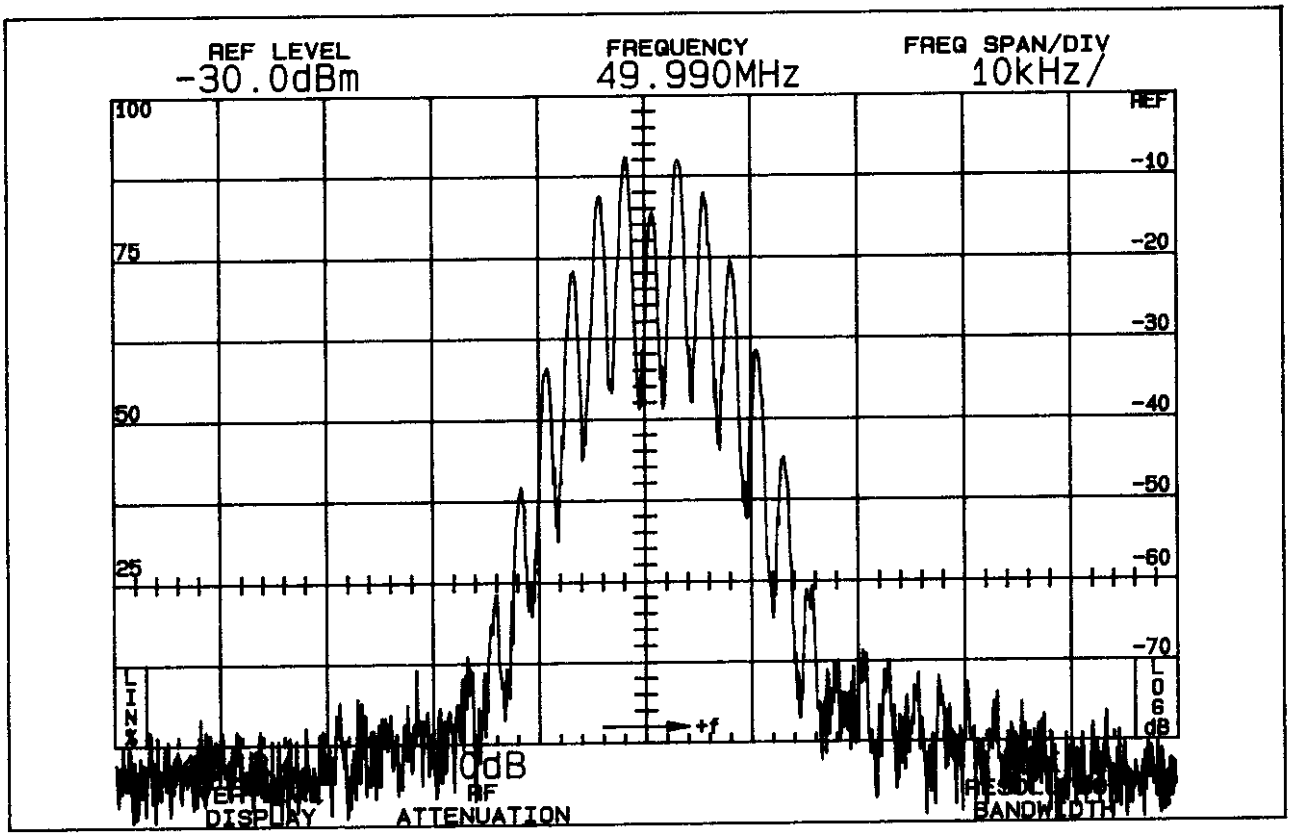


OCCUPIED BANDWIDTH
FF777 (H)
2500 Hz Modulation

FIGURE 1a (48.760 MHz)

A: \FF777HH.CBH

FIGURE 1b

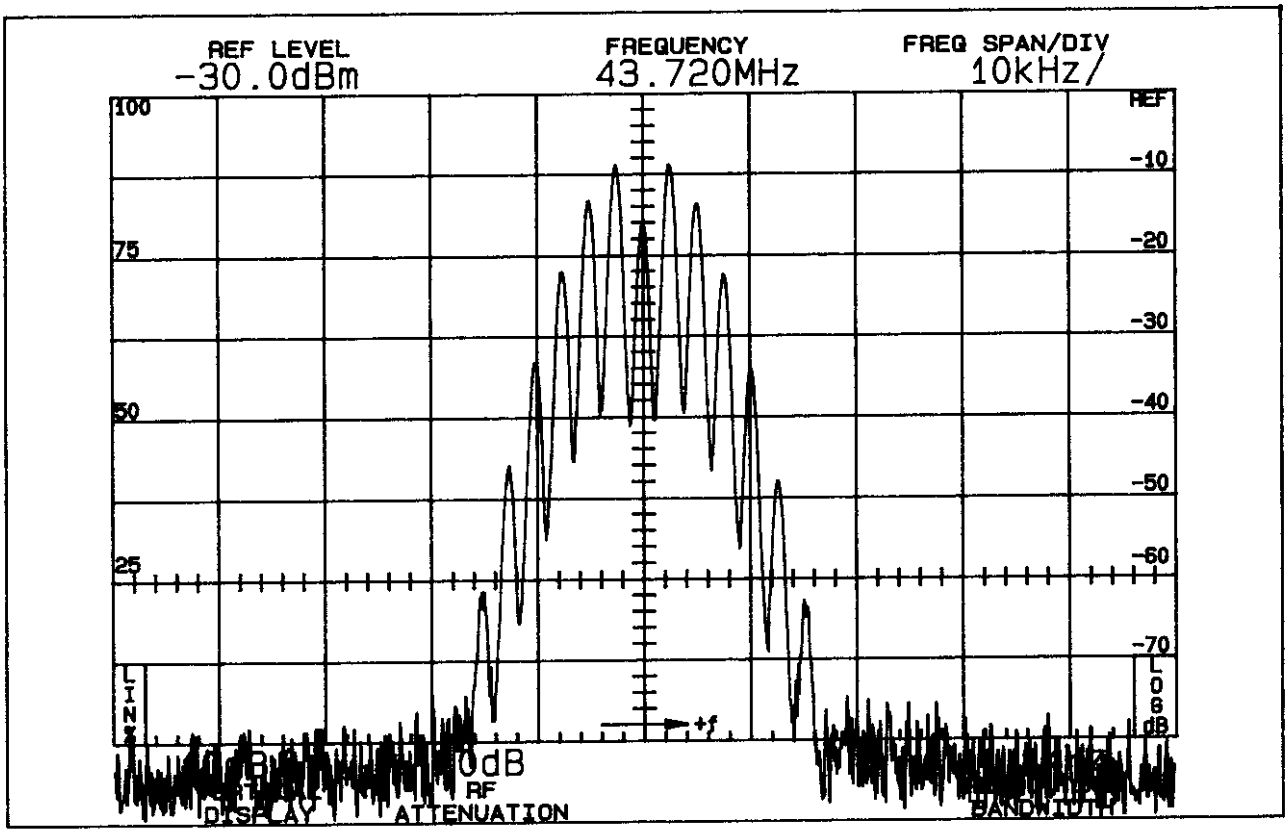


OCCUPIED BANDWIDTH
FF777 (H)
2500 Hz Modulation

FIGURE 1b (49.990 MHz)

A: \FF777BL.GBW

FIGURE 2a

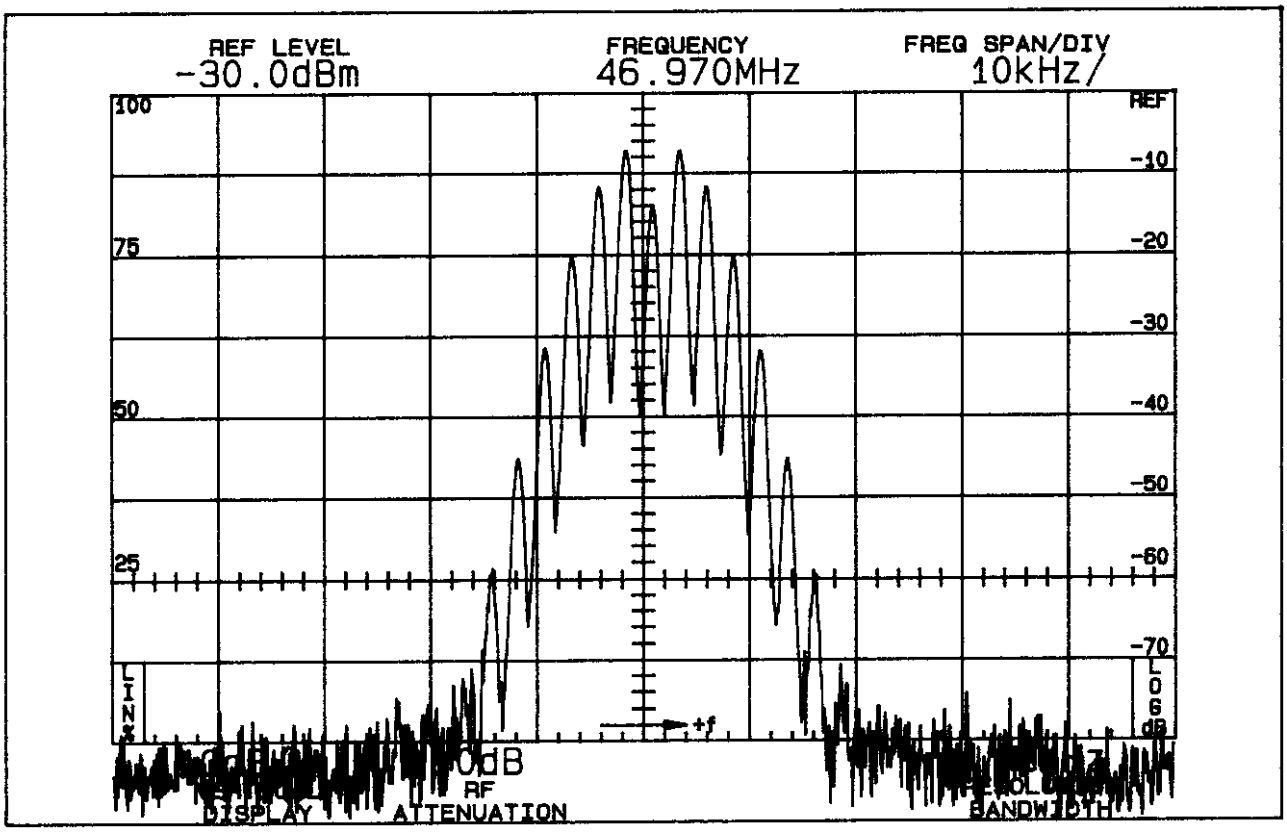


OCCUPIED BANDWIDTH
FF777 (B)
2500 Hz Modulation

FIGURE 2a (43.720 MHz)

A:\FF777BH.GBW

FIGURE 2b



OCCUPIED BANDWIDTH
FF777 (B)
2500 Hz Modulation

FIGURE 2b (46.970 MHz)

TABLE 2a

RADIATED SPURIOUS EMISSIONS
FCC Part 15

Spurious Frequency (MHz)	Meter Reading (dBm)	Antenna Factor (dB)	Field Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
48.762	-44.0	11.0	5011.9	10000	- 6.0
97.512	-112.2	9.4	1.6	150	- 39.4
146.286	-106.4	16.9	7.5	150	- 26.0
195.044	-104.8	13.3	6.0	150	- 28.0
243.805	-106.8	11.8	4.0	200	- 34.0
292.566	-107.2	14.5	5.2	200	- 31.7
341.327	-107.2	15.7	6.0	200	- 30.5
390.088	-105.2	15.2	7.1	200	- 29.0
438.849	-109.6	17.1	5.3	200	- 31.5
487.610	-108.8	17.9	6.4	200	- 29.9

Occupied Bandwidth

48.760	f_C-10 kHz (1)	-35 dB to f_C	89.1	500	-14.9
48.760	f_C+10 kHz (1)	-34 dB to f_C	100.0	500	-13.9

Frequency range of 25 to 1000 MHz was scanned. No signals exceeded FCC limits and all signals greater than 20 uV/m @ 3m are shown above.

(1) From Figure 1a

RADIATED FIELD INTENSITY
FF777 Handheld (48.760 MHz)

TABLE 2a

TABLE 2b

RADIATED SPURIOUS EMISSIONS
FCC Part 15

Spurious Frequency (MHz)	Meter Reading (dBm)	Antenna Factor (dB)	Field Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
49.991	-43.2	11.1	5559.0	10000	- 5.1
99.981	-111.2	8.3	1.6	150	- 39.4
149.973	-106.0	16.9	7.9	150	- 25.6
199.964	-105.2	12.7	5.3	150	- 29.0
249.955	-108.4	12.2	3.5	200	- 35.1
299.946	-108.4	14.4	4.5	200	- 33.0
349.937	-107.2	16.5	6.5	200	- 29.8
399.928	-108.8	15.2	4.7	200	- 32.6
449.919	-108.4	17.1	6.1	200	- 30.3
499.910	-107.2	19.0	8.7	200	- 27.2

Occupied Bandwidth

49.990	f_c-10 kHz	(1)	-34 dB to f_c	110.9	500	-13.1
49.990	f_c+10 kHz	(1)	-32 dB to f_c	139.6	500	-11.7

Frequency range of 25 to 1000 MHz was scanned. No signals exceeded FCC limits and all signals greater than 20 uV/m @ 3m are shown above.

(1) From Figure 1b

RADIATED FIELD INTENSITY
FF777 Hand-Held (49.970 MHz)

TABLE 2b

TABLE 3a

RADIATED SPURIOUS EMISSIONS
FCC Part 15

Spurious Frequency (MHz)	Meter Reading (dBm)	Antenna Factor (dB)	Field Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
43.722	-42.4	10.7	5821.0	10000	- 4.7
87.444	-103.6	12.6	6.3	100	- 24.0
131.166	-106.4	13.5	5.1	150	- 29.4
174.888	-105.2	16.9	8.6	150	- 24.8
218.610	-105.6	11.5	4.4	200	- 33.2
262.332	-108.4	13.5	4.0	200	- 34.0
306.054	-108.0	14.3	4.6	200	- 32.8
349.776	-107.6	16.5	6.2	200	- 30.2
393.498	-106.8	15.2	5.9	200	- 30.6
437.220	-106.0	17.0	7.9	200	- 28.1

Occupied Bandwidth

43.720	f_c-10 kHz	(1)	-32 dB to f_c	146.2	500	-10.7
43.720	f_c+10 kHz	(1)	-35 dB to f_c	110.9	500	-13.7

Frequency range of 25 to 1000 MHz was scanned. No signals exceeded FCC limits and all signals greater than 20 uV/m @ 3m are shown above.

(1) From Figure 2a

RADIATED SPURIOUS EMISSIONS
FF777 (Base) (43.720 MHz)

TABLE 3a

TABLE 3b

RADIATED FIELD INTENSITY
Measured at 3 meters

Spurious Frequency (MHz)	Meter Reading (dBm)	Antenna Factor (dB)	Field Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
46.932	-42.0	10.9	6237.3	10000	- 4.1
93.864	-104.8	11.1	4.6	150	- 30.3
140.796	-107.6	16.9	6.5	150	- 27.3
187.728	-106.8	14.2	5.2	150	- 29.2
234.660	-107.2	11.3	3.6	200	- 34.9
281.592	-109.6	14.8	4.1	200	- 33.8
328.524	-109.2	14.5	4.1	200	- 33.8
375.456	-108.0	15.1	5.1	200	- 31.9
422.388	-107.6	16.8	6.5	200	- 29.8
469.320	-110.0	16.8	4.9	200	- 32.2

Occupied Bandwidth

43.970	f_C-10 kHz	(1)	-31 dB to f_C	175.8	500	-9.1
43.720	f_C+10 kHz	(1)	-31 dB to f_C	175.8	500	-9.1

Frequency range of 25 to 1000 MHz was scanned. No signals exceeded FCC limits and all signals greater than 20 uV/m @ 3m are shown above.

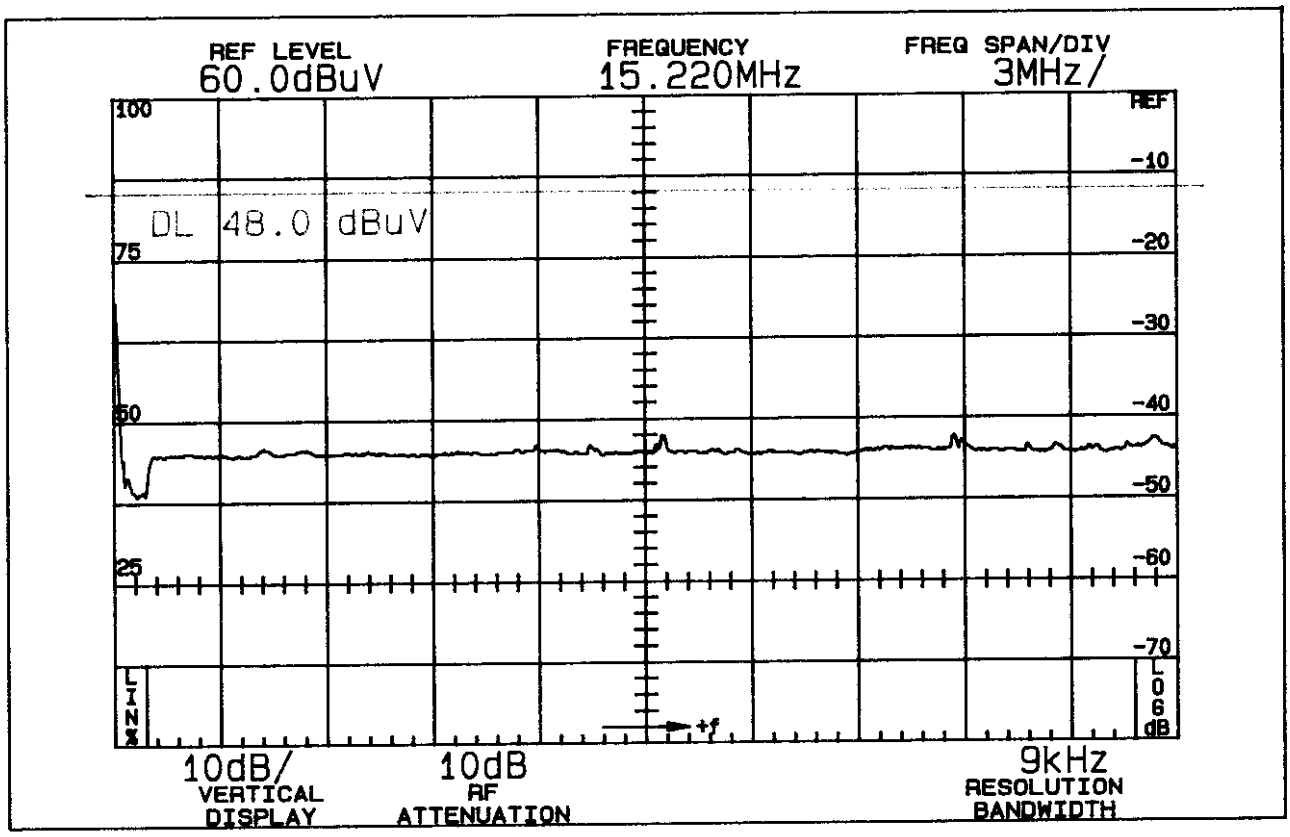
(1) From Figure 2a

RADIATED SPURIOUS EMISSIONS
FF777 (Base) (46.970 MHz)

TABLE 3b

A: \FF777L.GBW

FIGURE 3

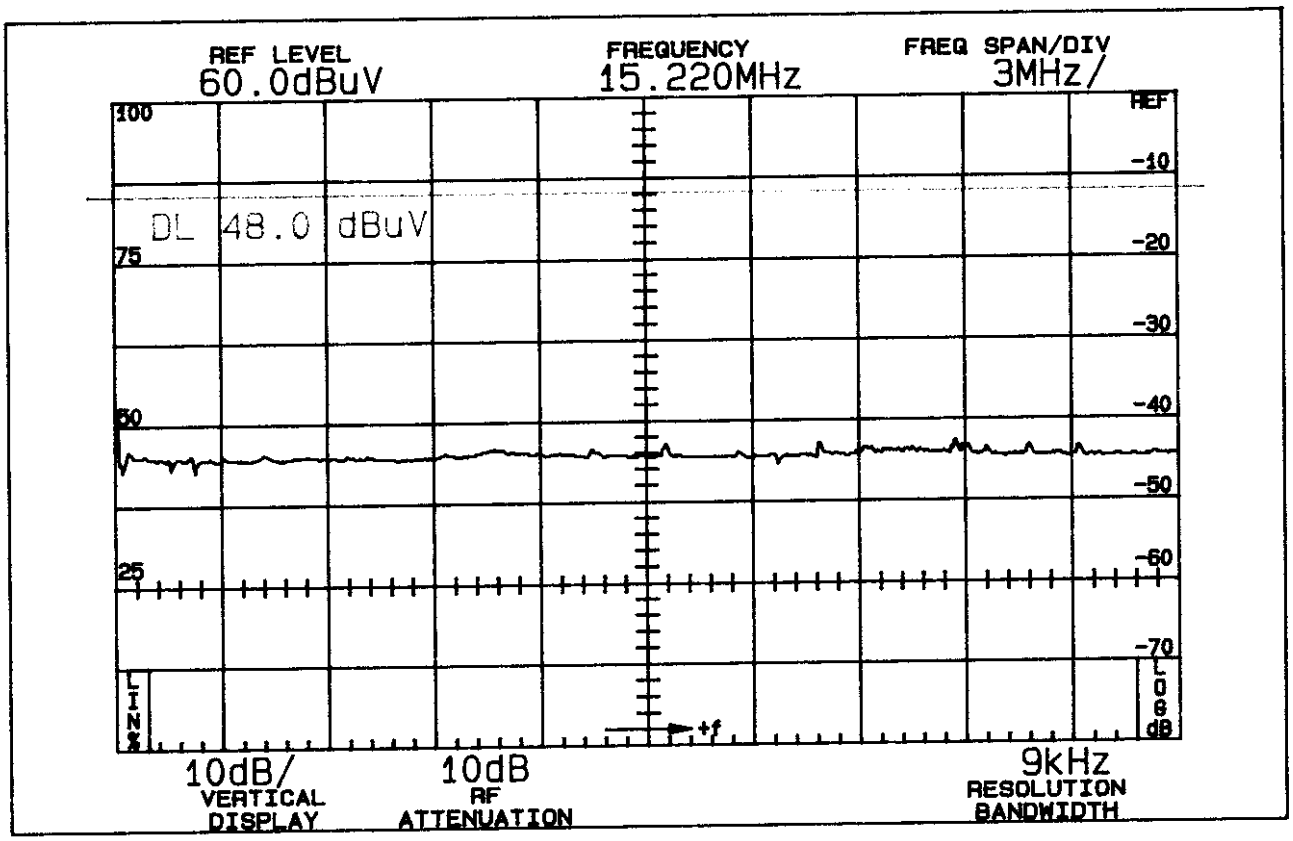


AC LINE CONDUCTED
FCC ID: AWWFF777

FIGURE 3 (LEFT LISN)

A: \FF777R.CSV

FIGURE 4



AC LINE CONDUCTED
FCC ID: AWWFF777

FIGURE 4 (RIGHT LISN)

PROCEDURES, TEMPERATURE STABILITY

Both base and hand-held transmitters were subjected to temperature variations of -20°C to +50°C in 10° increments in a Thermotron S1.2 temperature chamber with more than one-half hour soak at each temperature. The frequency measured with a HP 5385A frequency counter at each temperature is shown in Table 1.

At 20°C the power was varied ±15% from the nominal rated voltage and the transmitter frequency measured as shown in Table 1.

PROCEDURES, EMISSION BANDWIDTH

Measurement of emission bandwidth was made with a 2500 Hz tone at a sufficient level to produce 85 percent of limiting modulation.

The input signal was coupled directly to the audio input stage of the hand-held unit, and through the telephone interface of the base-unit.

A Tektronix 494P spectrum analyzer was used; input audio signal was from a IEC F-47 function generator; audio level was determined with a Fluke 8920A TRMS voltmeter; modulation was measured with a Boonton 8220 modulation monitor.

PROCEDURES, RADIATED SPURIOUS EMISSIONS

Procedures of ANSI 63.4-1992 were followed.

The field strength of the radiated emissions from the FF777 was measured at a distance of 3 meters. The spectrum was scanned from 30 MHz to 1000 MHz using a HP 8596E spectrum analyzer and HP 8447D low-noise preamplifier.

Measurement procedure included recording the worst-case field strength for receiving test antenna polarization, test antenna height variation from 1 meter to 3 meters and test sample rotation.

The test sample was placed on a rotatable 80 cm high wooden stand. The receiving antenna, placed 3 meters from the test sample, was a Singer DM-105A calibrated dipole set.

The base unit was operated from a 120 Vac power line. The associated 1 meter long telephone line was extended vertically upward through the axis of rotation of the test table. Both horizontal and vertical (wall-mount) case orientation was employed and worst-case data reported.

PROCEDURES, RADIATED SPURIOUS EMISSIONS (Continued)

For tests of the hand-held unit, the equipment was placed on the test stand in three planes and worst-case data reported.

Since the hand-held unit was not equipped to accommodate other than a "cradle" type charger, no measurements with an external battery charger were made.

The spectrum was checked from 30 to 1000 MHz. All emissions not reported were less than 20 uV/m @ 3m. Tabulation of the measurements are shown in Tables 2 and 3 for and hand-held and base unit respectively.

PROCEDURES, AC POWER LINE CONDUCTED

Using a 50uH LISN, AC power line conducted radio frequency voltage was measured using an Advantest R3361A spectrum analyzer. Measurements were made from .45 to 30 MHz using CISPR quasi-peak detector with 9 kHz resolution bandwidth and a 120 second scan time.

Data in dBuV, are shown in Figures 3 and 4 for right and left LISN port respectively.

APPENDIX 8

CHANNEL FREQUENCY CHART

CHANNEL FREQUENCY CHART FOLLOWS THIS SHEET

Channel	Base Transmitter (MHz)	Handset Transmitter (MHz)
1	43.720	48.760
2	43.740	48.840
3	43.820	48.860
4	43.840	48.920
5	43.920	49.020
6	43.960	49.080
7	44.120	49.100
8	44.160	49.160
9	44.180	49.200
10	44.200	49.240
11	44.320	49.280
12	44.360	49.360
13	44.400	49.400
14	44.460	49.460
15	44.480	49.500
16	46.610	49.670
17	46.630	49.845
18	46.670	49.860
19	46.710	49.770
20	46.730	49.875
21	46.770	49.830
22	46.830	49.890
23	46.870	49.930
24	46.930	49.990
25	46.970	49.970

4 of 4
JB: 28950

APPENDIX 9

AUTOMATIC CHANNEL SELECTION DESCRIPTION

AUTOMATIC CHANNEL SELECTION STATEMENT FOLLOWS THIS SHEET

25 CHANNEL INTERFERENCE STATEMENT

Statement in accordance with 15.233 (b) which reads as follows:

(2) Cordless telephones operating on channels one through fifteen must: (i) incorporate an automatic channel selection mechanism that will prevent establishment of a link on any occupied frequency and (ii) the box or an instruction manual which is included within the box which the individual cordless telephone is to be marketed shall contain information indicating that some cordless telephones operate at frequencies that may cause interference to nearby TV's or VCR; and, if telephone should not be placed near or on top of a TV or VCR will often reduce or eliminate the interference. A statement describing the means and procedures used to achieve automatic channel selection shall be provided in any application for equipment authorization of a cordless telephone operating on channels one through fifteen.