

TEST NUMBER - 119-04

TEST REPORT TO

INDUSTRY CANADA RSS 210 SECTION 6.2.2(k)
FEDERAL COMMUNICATIONS COMMISSION CFR47 PART15.239

Low Power License-Exempt Radiocommunication Devices
Intentional Radiators 88-108 MHz Band

for

Arkon Resources, Inc.
20 La Porte St.
Arcadia, CA 91006
626-254-9005

of

88 and 107 MHz FM Modulator

SF 250

FCC ID: ME2-SF250

on

1/23/04

Tested by

Clifton P. Brick

Reviewed by

Larry K. Stillings

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TEST DESCRIPTION

1. TEST OBJECTIVE

To test the 88 and 107 MHz FM Modulator SF 250 to RSS 210 / Part 15 Subpart C Rules and write a report.

2. E.U.T. DESCRIPTION

GENERAL

The 88 and 107 MHz FM Modulator SF 250 is a short range low power transmitter used to allow a portable audio device to be linked with a broadcast band stereo receiver.

SERIAL NUMBERS:

Pre Production Prototype

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TEST RESULTS AND CONCLUSIONS

PRODUCT TESTED - 88 and 107 MHz FM Modulator

MODEL NUMBER - SF 250

RADIATED TEST RESULTS

The test results show that the emissions radiated from this equipment are in compliance with IC Rules RSS 210 / FCC Rules Part 15 Subpart C.

OCCUPIED BANDWIDTH & OUTPUT POWER

The test results show that the occupied bandwidth and output power of this equipment are in compliance with IC Rules RSS 210 / FCC Rules Part 15 Subpart C .

CONDUCTED TEST RESULTS

The test results show that the emissions conducted through the power line from this equipment are in compliance with IC Rules RSS 210 / FCC Rules Part 15 Subpart C.

ANALYSIS AND CONCLUSIONS

Based upon the radiated and conducted measurements we find that this equipment is within the limits of the IC Rules RSS 210 / FCC Rules Part 15 Subpart C. All results are based on a test of one sample, and represent other production units, only in as much as a sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

NOTES (Special conditions unique to this test)

None.

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TEST PROCEDURES

1. TEST EQUIPMENT

- A. HP 8546A (9 kHz - 6.5 GHz) EMI Receiver w/ RF Filter Section, S/N 3704A00323 / 3650A00360. Calibration Date 1-16-2004, calibrated annually.
- B. Com-Power Biconilog Antenna, Model AC220, S/N 25509. Calibration Date 3-11-2003, calibrated annually.
- C. EMCO LISN, Model EM 3825/2, S/N 9109-1860. Calibration Date: 3-9-2003, calibrated annually.

2. FREQUENCY RANGE TO BE SCANNED.

- A. Radiated Test from 30 MHz to 40 GHz (or the 10th harmonic of the highest frequency whichever is lower).
- B. Conducted Test from 150 kHz to 30 MHz.

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3. TEST PROCEDURES.

Radiated test procedure:

The EUT, associated cables and peripheral devices are placed on the supporting table and any support equipment is placed off the site. The EUT is turned on and any necessary operating or test software installed and allowed to warm up. The EUT is pre-scanned in our ferrite tile lined chamber where it is rotated 360 degrees and examined in both horizontal and vertical polarization, all emission frequencies are identified and recorded. The EUT is then moved to the OATS and the frequency band from 30 MHz to 40 GHz is scanned, all frequencies identified in the chamber are investigated, as well as harmonic frequencies of the EUT. When an emission is found the emission is maximized by varying the bundle position of the connecting cables, the antenna height, the antenna polarization (vertical and horizontal) and the table orientation (360 degrees). The maximum reading is recorded and the next signal is searched for.

Conducted test procedure:

The power line of the EUT is connected to the LISN (Line Impedance Stabilization Network). A measurement of the emissions are made from the power line for both phase and neutral on the analyzer in the frequency range from 150 kHz to 30 MHz. The maximum readings are recorded for each phase.

All measurements are made according to the procedures defined in:
"ANSI C63.4-2001 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"

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RSS 210/ FCC Part 15 TEST LIMITS

- FCC Part 15.209, 15.235, 15.239, 15.249 Radiation Limits:
Limits are using a Quasi-Peak detector unless otherwise noted.

Frequency MHz	Distance meters	Limit dBμV/m	Limit μV/m
1.705 - 30	30	29.5*	30*
30 - 88	3	40.0	100
49.82 - 49.90	3	80.0*	10,000*
88-108	3	48.0*	250*
88 - 216	3	43.5	150
216 - 960	3	46.0	200
902 - 928	3	94.0*	50,000*
960 - 1000	3	54.0	500
1000 - 40000	3	54.0*	500*

*NOTE: Average Limits

- RSS 210 Section 6.6a Conduction Limits (Quasi-Peak):

Frequency MHz	Limit dBμV/m	Limit μV/m
0.450 - 30.0	48.0	250

FCC Part 15.207 Conduction Limits

Frequency MHz	Quasi-Peak Limit dBμV	Average Limit dBμV
0.150 - 0.500	66 to 56	56 to 46
0.500 - 5.0	56	46
5.0 - 30.0	60	50

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TEST FACILITY DESCRIPTION

Compliance Worldwide is located on 357 Main Street in Sandown, New Hampshire. The conducted and radiated test sites, located at C.W. are used for Federal Communications Commission (FCC) testing and Industry Canada Testing. A site description is on file with the FCC in Columbia, MD USA. Site information is also on file with Industry Canada, anyone wishing to review this Test Facility Description is referred to file number **IC 3023**. This is currently on file at Industry Canada, 1241 Clyde Avenue, Ottawa, ON K2C 1Y3.

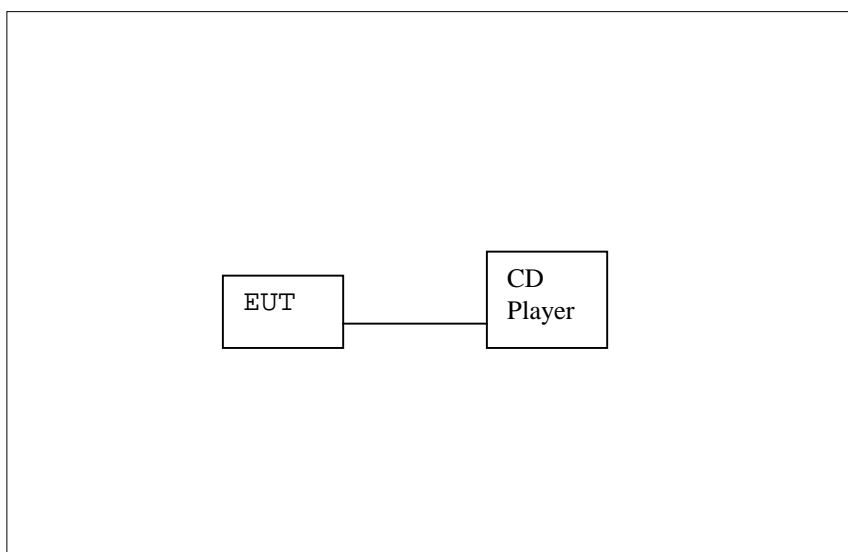
The radiated site is a 3/10 meter indoor site with an enclosure for the product and a basement for the personnel, support equipment and test equipment.

The conducted site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical metal wall required by EN 55022.

Both sites are designed to test products or systems 1.5 meter x 1.0 meter, floor standing or table top.

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**TEST SET UP
AND
PERIPHERAL CONNECTION INFORMATION**



The EUT is battery powered only from 2 AAA batteries, new batteries Duracell batteries were used for testing.

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PLEASE NOTE - EUT (equipment under test) is Arkon SF-250
The cables directly connected to this equipment are listed below.

Connection Descriptions

1. Audio In Cable
(description)

EUT
(from device)

Auxiliary equipment (Sony Walkman D-EJ360)
(to device)

CABLE LENGTH 7 3/8" (S) SHIELDED or (U) UNSHIELDED U

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RADIATED TEST RESULTS

Frequency Range: 30 - 1000 MHz.

Measurement Distance: 3.0 Meters.

Bandwidth: 120 kHz, Per ANSI C63.4-1992.*

Detector Functions: Peak, Quasi Peak, Average

Video Filter: 300 kHz

Table Height: 0.8 meters

Antenna Height Variation: 1 - 4 Meters.

Horizontal and Vertical Polarization Measurements Taken, Worst Case shown.

*Measurement Bandwidth is 1 MHz above 1 GHz

PLEASE SEE NEXT PAGE FOR RADIATED TEST DATA

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Upper Frequency Spurious Tabular Data

Freq (MHz)	Polarization (H/V)	Peak Amp (dBuV)	QP Amp (dBuV)	QP Limit (dBuV)	QP Margin (dB)
215.4408	H	36.89	34.75	43.50	-8.75
323.0350	H	41.67	39.73	46.00	-6.27
430.7254	H	30.20	27.51	46.00	-18.49
538.4088	H	31.62	26.25	46.00	-19.75
All other harmonics through the 10 th greater than 20dB below limit.					

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Mid Frequency Spurious Tabular Data

Freq (MHz)	Polarization (H/V)	Peak Amp (dBuV)	QP Amp (dBuV)	QP Limit (dBuV)	QP Margin (dB)
177.4181	H	41.38	40.38	43.50	-3.12
266.0636	H	34.69	31.80	46.00	-14.20
354.7422	H	36.57	33.58	46.00	-12.42
443.4431	H	26.48	23.31	46.00	-22.69
532.2608	H	25.18	20.47	46.00	-25.53
All other harmonics through the 10 th greater than 20dB below limit.					

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Lowest Frequency Spurious Tabular Data

Freq (MHz)	Polarization (H/V)	Peak Amp (dBuV)	QP Amp (dBuV)	QP Limit (dBuV)	QP Margin (dB)
176.1575	H	41.93	40.46	43.50	-3.04
264.2509	H	31.10	29.30	46.00	-16.70
352.4570	H	34.30	32.39	46.00	-13.61
440.5317	H	25.82	21.81	46.00	-24.19
528.4878	H	33.08	26.43	46.00	-19.57
All other harmonics through the 10 th greater than 20dB below limit.					

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RADIATED OUTPUT POWER & OCCUPIED BANDWIDTH TEST RESULTS

Frequency Range: 88.3-95.5 MHz.

Measurement Distance: 3.0 Meters.

Bandwidth: As Noted, Per ANSI C63.4-1992.

Detector Functions: Peak, Quasi Peak, Average.

Video Filter: 300 kHz

Table Height: 0.8 meters

Antenna Height Variation: 1 - 4 Meters.

Horizontal and Vertical Polarization Measurements Taken, Worst Case Reported.

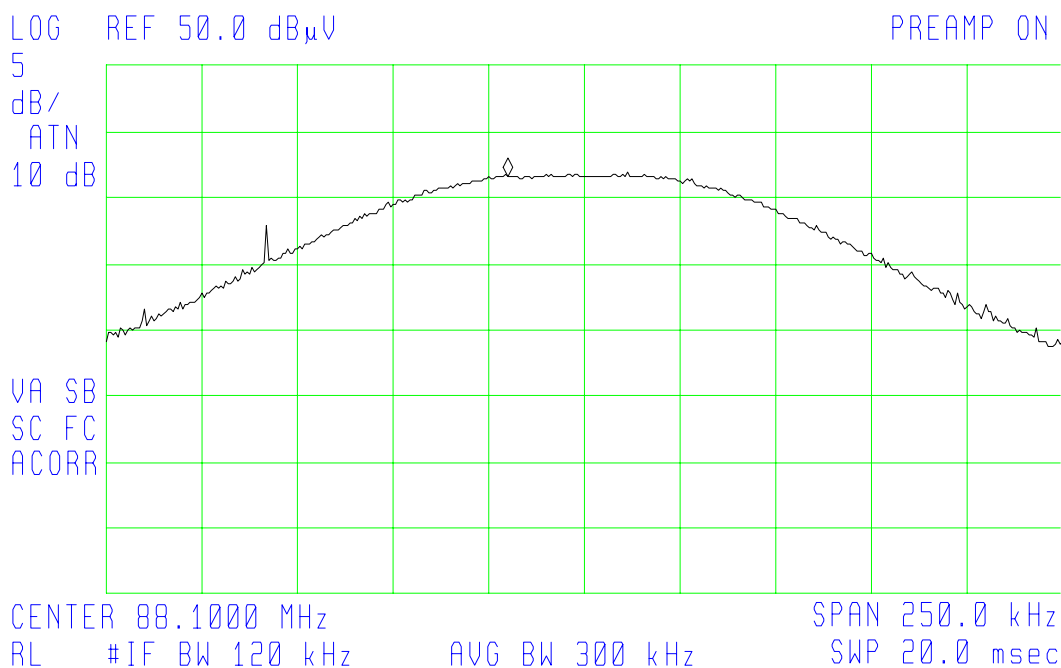
PLEASE SEE NEXT PAGE(S) FOR OCCUPIED BANDWIDTH RADIATED TEST DATA

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Lowest Freq Output Power Plot

11:00:21 JAN 23, 2004 OUTPUT FS CH1
TEST#119-04 ARKON SF 250

FREQ 88.08 MHz
PEAK 41.9 dB μ V
QP 41.0 dB μ V
AVG 40.1 dB μ V



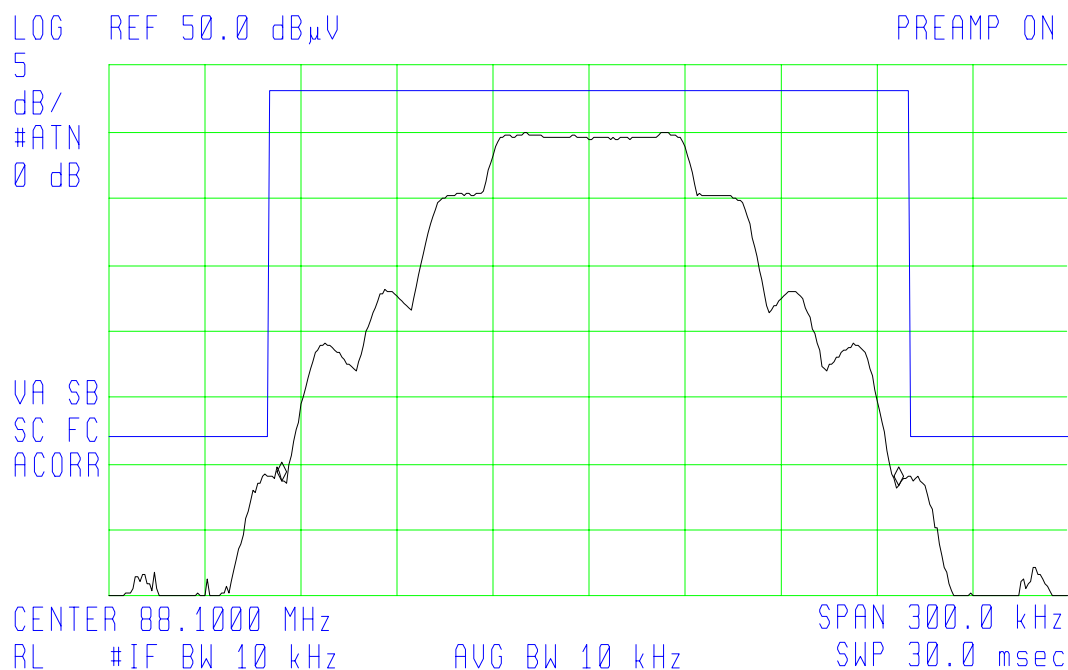
Freq (MHz)	Polarization (H/V)	Peak Amp (dBuV/m)	Avg Amp (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dB)
88.10	H	41.9	40.1	48.0	-7.9

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Channel A Occupied Bandwidth Plot

13:20:31 JAN 23, 2004 OCCUPIED BW CH1
TEST#119-04 ARKON SF 250

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 192.8 kHz
-.49 dB



Display shows a mask with the top limit at 48 dBuV, and the lower flanks 200 kHz wide and 26 dB below the top limit. Also Marker Delta shows bandwidth 26 dB down from the peak measured amplitude.

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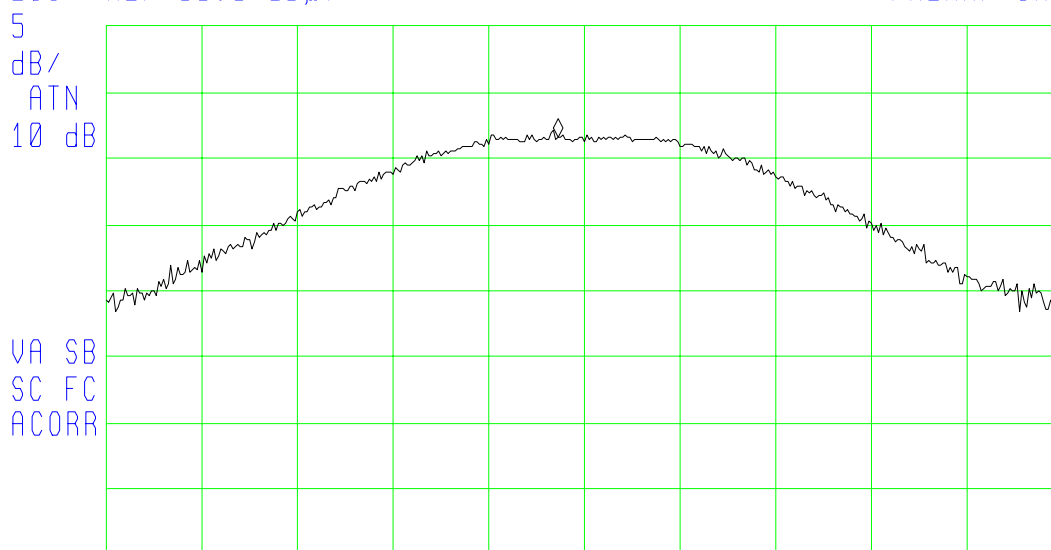
Mid Freq Output Power Plot

11:05:44 JAN 23, 2004 OUTPUT FS CH4
TEST#119-04 ARKON SF 250

FREQ 88.69 MHz
PEAK 42.3 dB μ V
QP 41.6 dB μ V
AVG 41.3 dB μ V

LOG REF 50.0 dB μ V

PREAMP ON



CENTER 88.7000 MHz

SPAN 250.0 kHz

RL #IF BW 120 kHz

AVG BW 300 kHz

SWP 20.0 msec

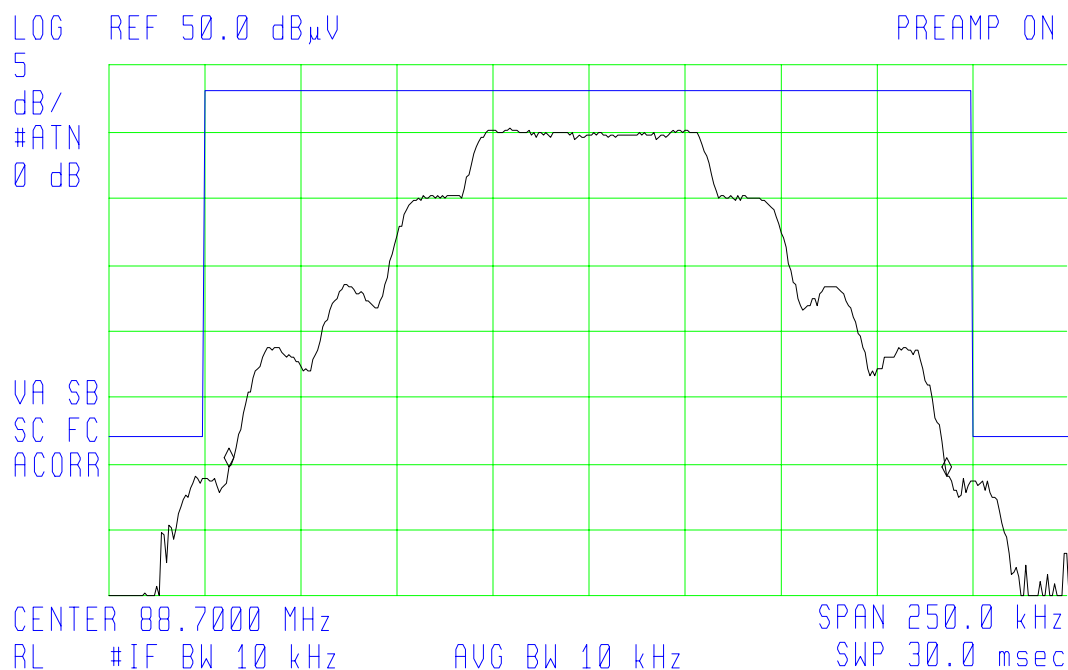
Freq (MHz)	Polarization (H/V)	Peak Amp (dB μ V/m)	Avg Amp (dB μ V/m)	Avg Limit (dB μ V/m)	Avg Margin (dB)
88.70	H	42.3	41.3	48.0	-6.7

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Mid Freq Occupied Bandwidth Plot

13:27:01 JAN 23, 2004 OCCUPIED BW CH4
TEST#119-04 ARKON SF 250

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 186.9 kHz
-.63 dB



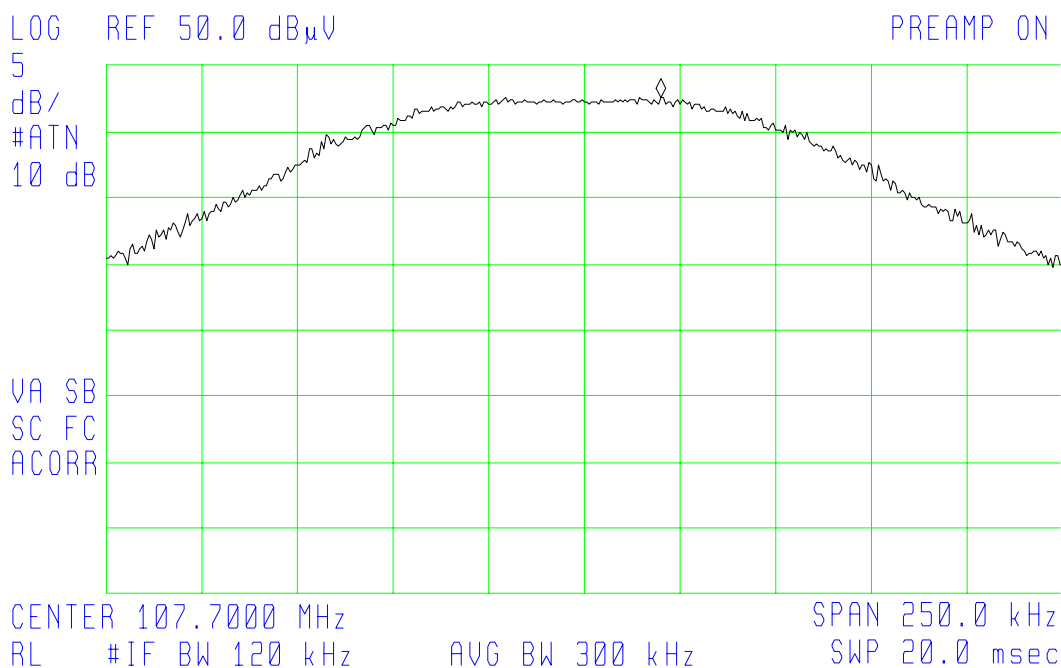
Display shows a mask with the top limit at 48 dBuV, and the lower flanks 200 kHz wide and 26 dB below the top limit. Also Marker Delta shows bandwidth 26 dB down from the peak measured amplitude.

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Upper Freq Output Power Plot

11:34:31 JAN 23, 2004 OUTPUT FS CH8
TEST#119-04 ARKON SF 250

FREQ 107.7 MHz
PEAK 48.0 dBμV
QP 47.1 dBμV
AVG 45.2 dBμV



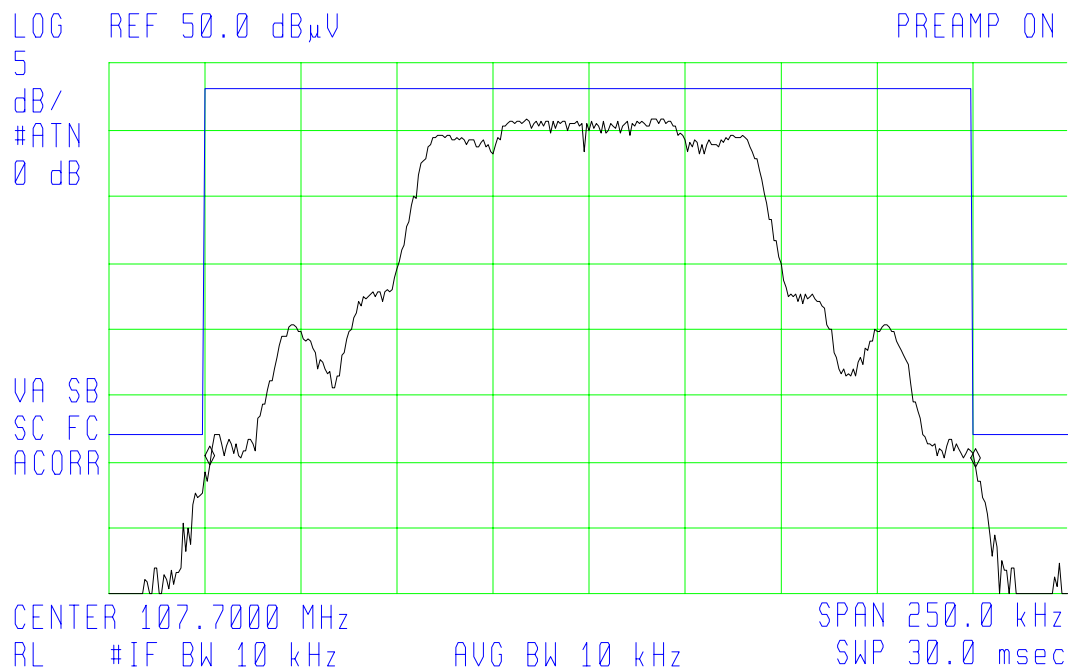
Freq (MHz)	Polarization (H/V)	Peak Amp (dBuV/m)	Avg Amp (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dB)
107.70	H	48.0	45.2	48.0	-2.8

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Upper Freq Occupied Bandwidth Plot

14:52:21 JAN 23, 2004 OCCUPIED BW CH 8
TEST#119-04 ARKON SF 250

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 199.4 kHz
-.16 dB



Display shows a mask with the top limit at 48 dBuV, and the lower flanks 200 kHz wide and 26 dB below the top limit. Also Marker Delta shows bandwidth 26 dB down from the peak measured amplitude.

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CONDUCTED TEST RESULTS

Frequency Range:	450 kHz to 30.0 MHz.
Bandwidth:	9 kHz per ANSI C63.4-1992.
Detector Functions:	Peak, Quasi-Peak, Average
Table Height:	0.8 meters
Video Bandwidth:	30 kHz.

Phase and Neutral Measurements Taken.

EUT HAS NO AC MAINS CONNECTION, BATTERY POWER ONLY

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NOTES AND COMMENTS

(Special conditions unique to this test)

The EUT Bandwidth was measured using a 1kHz tone at 400mVPP.

The EUT was examined in 3 orthogonal planes and the worst case plane and cable configuration is as shown in the setup photos.

A new set of 2 Duracell AAA batteries were used during testing.