SOLECTEK

CLASS II PERMISSIVE CHANGE

of

TRANSCEIVER MODEL AB400
FCC ID: KA324WAN2

to

FEDERAL COMMUNICATIONS COMMISSION

Part 15.247
Part 2.1031

DATE OF REPORT: June 15, 1998

AT THE DIRECTION OF:

Solectek Corporation
6370 Nancy Ridge Drive, Suite 109
San Diego, CA 92121

ATTENTION OF:

Duane Buddrius, Director of Product Development
(800) 437-1518; (619) 450-1220; FAX: (619) 457-2681

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TESTIMONIAL AND STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY:

1. Radio Frequency Interference testing data used in this report was gathered by the independent laboratory EESI (11696 Sorrento Valley Road, San Diego, CA 92121).
2. That the application was prepared either by, or under the direct supervision of, the undersigned.
3. That the technical data supplied with the application was taken under my direction and supervision.
4. That the data was obtained on representative units, randomly selected.
5. That the testing and data collection was accomplished under the requirements of ANSI, C63-1992 standard and the applicable sections of FCC Part 15C for intentional radiating equipment.
6. That, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Duane Buddrius 6/24/98

Signature & Date
Duane Buddrius
Director of Product Development

APPLICANT: Solectek Corporation

EQUIPMENT: KA324WAN2

BY APPLICANT:

1. PHOTOGRAPHS
2. TESTIMONIAL & STATEMENT OF CERTIFICATION
3. STATEMENT OF QUALIFICATIONS
4. LIST OF TEST INSTRUMENTATION

GENERAL INFORMATION

DESCRIPTION OF MEASUREMENT FACILITIES:

A description of the measurement facilities was filed with the Commission and was found to be in compliance with requirements of Section 2.948, by letter dated October 21, 1996. All pertinent changes will be reported to the Commission by an up-date.

TECHNICAL REPORT

NAME OF VENDOR:

Solectek Corporation
6370 Nancy Ridge Drive, Suite 109
San Diego, CA 92121

TRADE NAME:

Solectek Corporation

FCC ID:

KA324WAN2

MODEL NO:

AB400

PHOTOGRAPHS:

SEE LIST OF EXHIBITS

MEASUREMENT STANDARD & PROCEDURE:

F.C.C. RULE PART 15

EMISSION DESIGNATION

44 MOX 7D

EXPOSITORY STATEMENT

1. NUMBER OF BANDS = 1
2. NUMBER OF CHANNELS = 5
3. TUNING RANGE, MHz = 2423 to 2451
4. OSCILLATOR RANGE, MHz = 2143 to 2171
5. I.F., MHz = 280
6. SPREAD SPECTRUM METHOD = DIRECT SEQUENCE

PERMISSIVE CHANGE REQUEST

Description of Change

Both the Transceiver and Outdoor Unit (ODU) remain unchanged from the original submissions.

This Permissive Change is requested due to the obsolescence and manufacturers cessation of production of the Seavey ANT-DIR-21 antenna.

We now intend to configure the Conifer QD-2400 [Solectek Ref. ANT-PNL-16] with the AB400 series.

2.1033

Test and Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub Part J, sections 2.1033, 2.1035, 2.1041, 2.1043, 2.1045 and the following individual Parts:

15.247: Operation within the bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz (Spread Spectrum)

TEST EQUIPMENT

DEVICE	MODEL	SERIAL NUMBER	CALIBRATION DUE
HP Analyzer and Display	8566B	2747A04729	20-Sept-98
Quasi-Peak Adapter	85650A	2043A00211	20-Sept-98
Preselector	85685A	2648A00410	14-Oct-98
HP Peak Power Meter	8900D	9607U00511	12-Dec-98
HP Peak Power Sensor	84811A	3318A04705	1-Sept-98

EESI'S TEST EQUIPMENT & TEST FACILITIES CALIBRATION PROGRAM

EESI operates a comprehensive equipment calibration program in order to ensure the validity of all test data. EESI's calibration program is fully compliant to the requirements of ANSI/NCSL Z540-1 (1994) and of ISO 10012-1 (1993-05-01). EESI's calibration program therefore meets or exceeds the US national commercial and military requirements (N.B. ANSI/NCSL Z540-1 (1994) replaces MIL-STD-45662A) and meets the requirements of ISO-9000. Specifically, all of EESI's *primary reference standard devices* (e.g., resistor and capacitor decade boxes, vector voltmeters, multimeters, attenuators and terminations, RF power meters (and their detector heads), oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, etc.) and certain *secondary standard devices* (e.g., RF preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are calibrated by EESI-approved independent (third party) metrology laboratories, using NIST-traceable standards. In all cases, the metrology laboratory furnishes EESI with Certificates oOf Calibration on each item of equipment that has been successfully recalibrated.

Calibration intervals are normally one year, except when the manufacturer advises a shorter interval (e.g., the HP 8568B Spectrum Analyzer is recalibrated every 6 months) or if US Government directives demand a shorter interval (e.g., the Eaton 533X-11 Impulse Generator is required to be recalibrated every six months for use in TEMPEST testing). Items of equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either by the EESI-approved independent (third party) metrology laboratories, or by the manufacturer of the equipment.

EESI typically determines the Antenna Factors in its test antennas in-house. Antennas used for CISPR 11, CISPR 22 and FCC Part 15 and Part 18 Radiated Emissions testing (and for testing to the European Norms) aare calibrated against NIST-traceable, FCC-approved Roberts™ Dipoles, using the methods specified in both Annex G.5 of CISPR 16-1 (1993) and ANSI C63.5 (1991), including the "Three-Antenna Method." Certain other antennas (e.g., log-conic spirals) are calibrated using the procedures specified in SAE ARP-958A. In accordance with FCC regulations, EESI recalibrates its suite of antennas used for FCC tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the *Normalized Site Attenuation* properties of EESI's Open Area Test Site[1]. In those instances where antennas are acquired directly fromt eh manufacturer, EESI will purchase and Antenna Factor Calibration Data Package. Finally, EESI may send antennas out to NIST-traceable/military-approved independent antenna range laboratories, or to the original equipment manufacturer.

NAME OF TEST Maximum Peak Output Power

PARAGRAPH 15.247(b)

SPECIFICATION LIMIT ≤ 1 Watt (Peak)

Data

Antenna Net Gain dBi
Flat Panel Array (Conifer QD-2400) = 15.2 (ANT-PNL-16)

- If a non-Solectek antenna is attached typically a DC open or short, then the ODU will not transmit. This antenna sensing circuitry satisfies the intent of the FCC requirement for a unique connector described in 15.203.

15.247(b) Maximum Calculated Peak Output Power

1. Calculated Peak output of the ANT-PNL-16 = 34.7dBm

Results

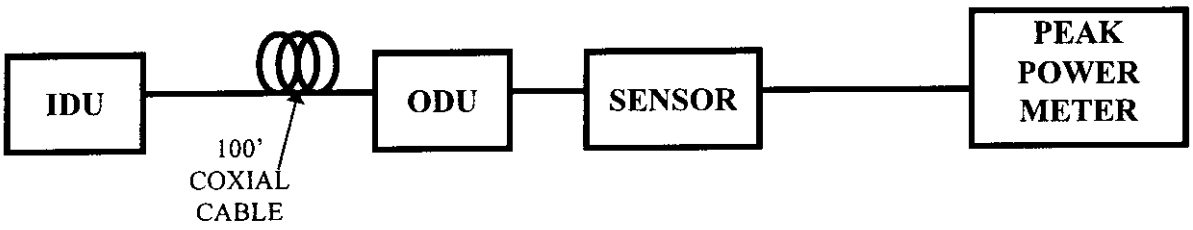
	Power	Antenna Gain	EIRP
1. EUT (Peak Power) =	19.5dBm	+15.2dBi	= 34.7dBm*

* Highest Emission Used

PEAK POWER INTERCONNECTION CABLE

CONNECTION	I/O CABLE
EUT AB400	Coaxial TNC LMR 400 (100 feet)

TEST DIAGRAM



TEST EQUIPMENT USED

UNIT	SPECTRUM ANALYSER
MODEL NUMBER	8566B
SERIAL NUMBER	2747A04729
UNIT	PEAK POWER METER
MODEL NUMBER	HP 9800D
SERIAL NUMBER	3607400511
UNIT	POWER SENSOR
MODEL NUMBER	HP 84811A
SERIAL NUMBER	3318A04705

OUT OF BAND EMISSIONS

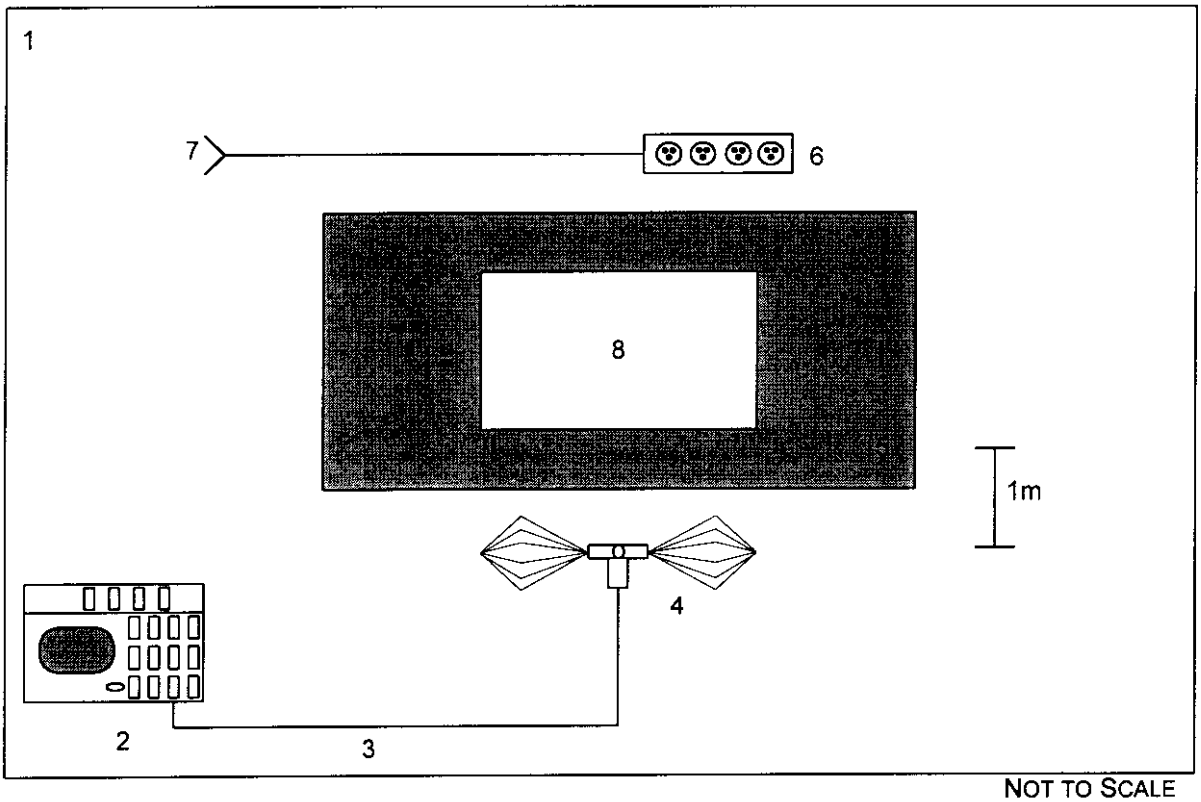
MEASUREMENT PROCEDURE:

At first, bench tests were performed to locate the emissions at the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The E.U.T. was also adjusted for maximum response.

Test Configuration, Frequency Identification of Radiated Emissions

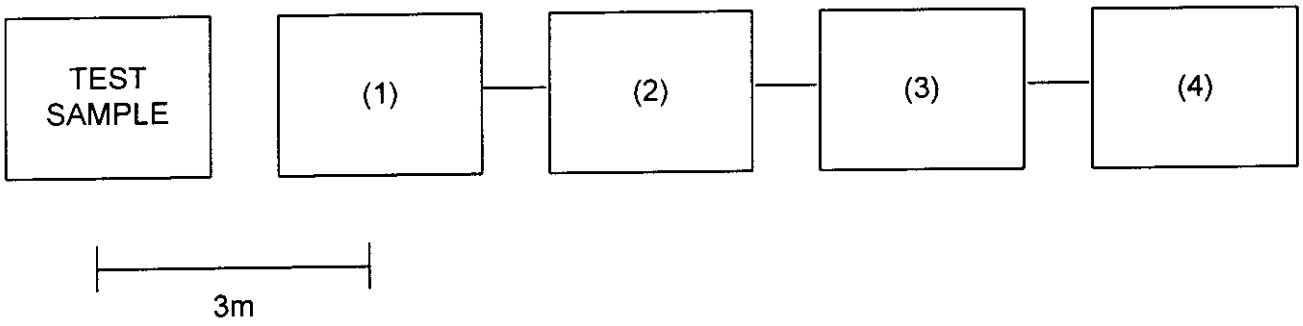


NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Antenna to Spectrum Analyzer
4. Receive Antenna (basic relative position)
5. Non-Conducting table 80 cm above ground plane
6. Power strip for EUT and peripherals
7. AC power for devices (120/230 VAC, 50/60 cycles, single phase)
8. EUT and Associated System

Transmitter Radiated Measurements



1. Transducer
   EMCO 3115
   EMCO 1412 Log Periodic

2. High Pass Filter
   Trilithic Filter 23042

3. Preamp
   HP 8449 (+30dB)
   (Out-of-band only)

4. Spectrum Analyzer
   HP8566B

15.247(c)(2)

Electromagnetic Engineering Services, Incorporated
FCC, Part 15C, Radiated Emissions Data Sheet
(3m Open Area Test Site)

Client: **Solectek**
EUT: **Wireless LAN Tranceiver**
Model #: **AB400**

Conducted by: [signature]
Date of Test: **06-11-98**
Test Distance, Amp. gain: **3m, 0dB**

Frequency (MHz)	Spectrum Analyzer Reading at 3m (dBµV)	CH	Antenna Polorization (vertical or horizontal)	Amp. Gain & Cable Loss, Distance & Antenna Factor Correction for 3m (dBuV/m)	Total Interference Level at 3m (dBµV/m)	Emission Spec. Limit at 3m (dBµV/m)	Difference Margin (dB)
4286.000	40.8	1	v	5.0	45.8	54.0	-8.2
4316.000	44.3	3	v	5.0	49.3	54.0	-4.7
4340.000	44.7	5	v	5.0	49.7	54.0	-4.3
8680.000	31.8	5	v	15.4	47.2	54.0	-6.8

No additional emissions were observed up to 22 GHz.

NOTE: All test data conforms with the requirements of CRF47, Part 15.35(b) in that average detection was used for all measurements over 1GHz, and that in no case did the Peak detected signal ever exceed the average detected signal by more than 20dB.

The low, mid, and high channels were tested for this Antenna (ANT-PNL-16). Only the worst case data is shown in the table above.
[2]

[2] ***Test Conditions:*** Standard radiated emissions test set up on FCC registered open field site. The highest emissions for all antenna heights, polarities, and table orientations are the only emissions recorded.

Name of Test: Emissions at Band Edges

Test Equipment: As for "Out of Band Emissions"

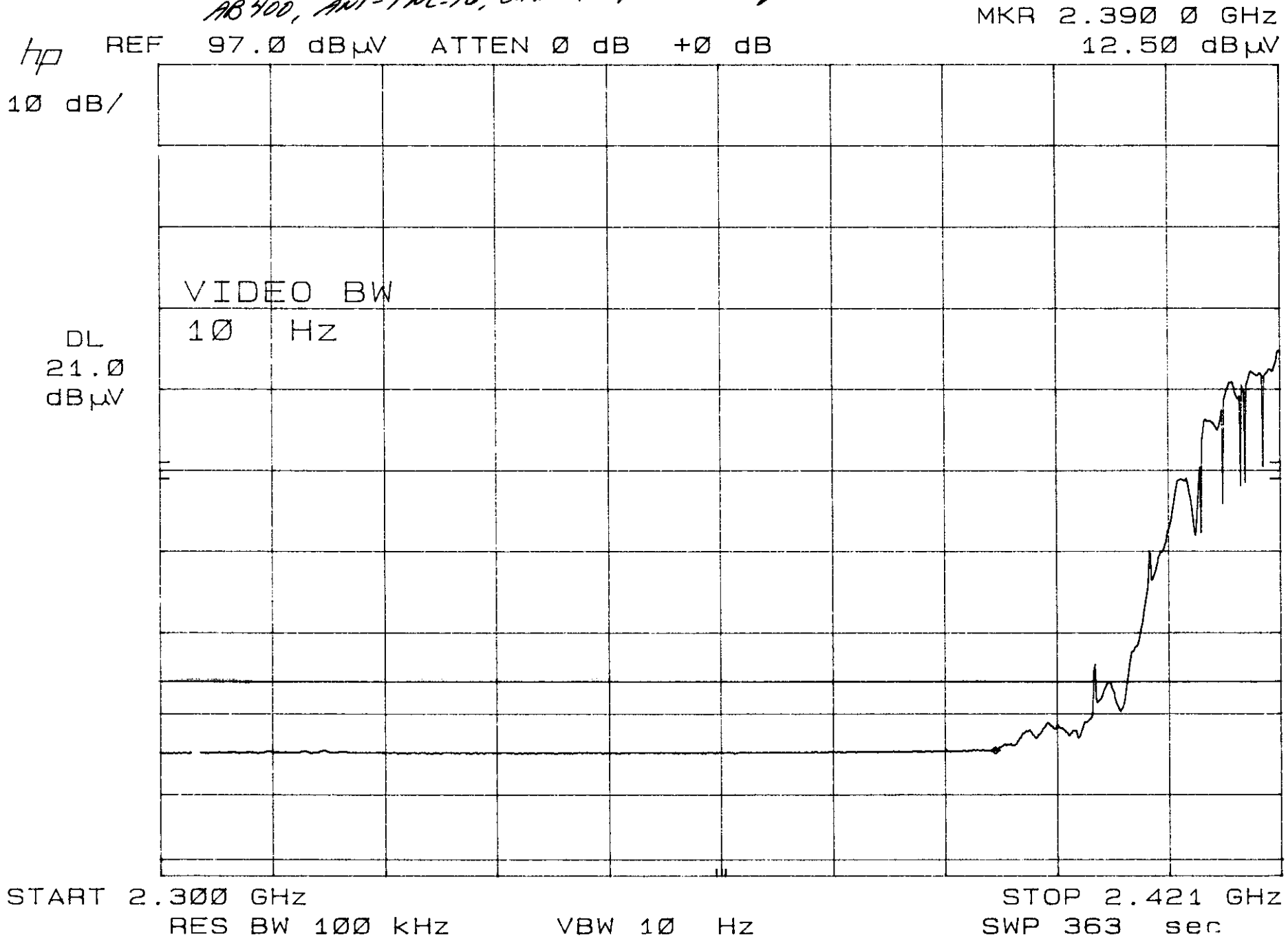
Procedure: As for "Out of Band Emissions"

Measurement Results

Attached

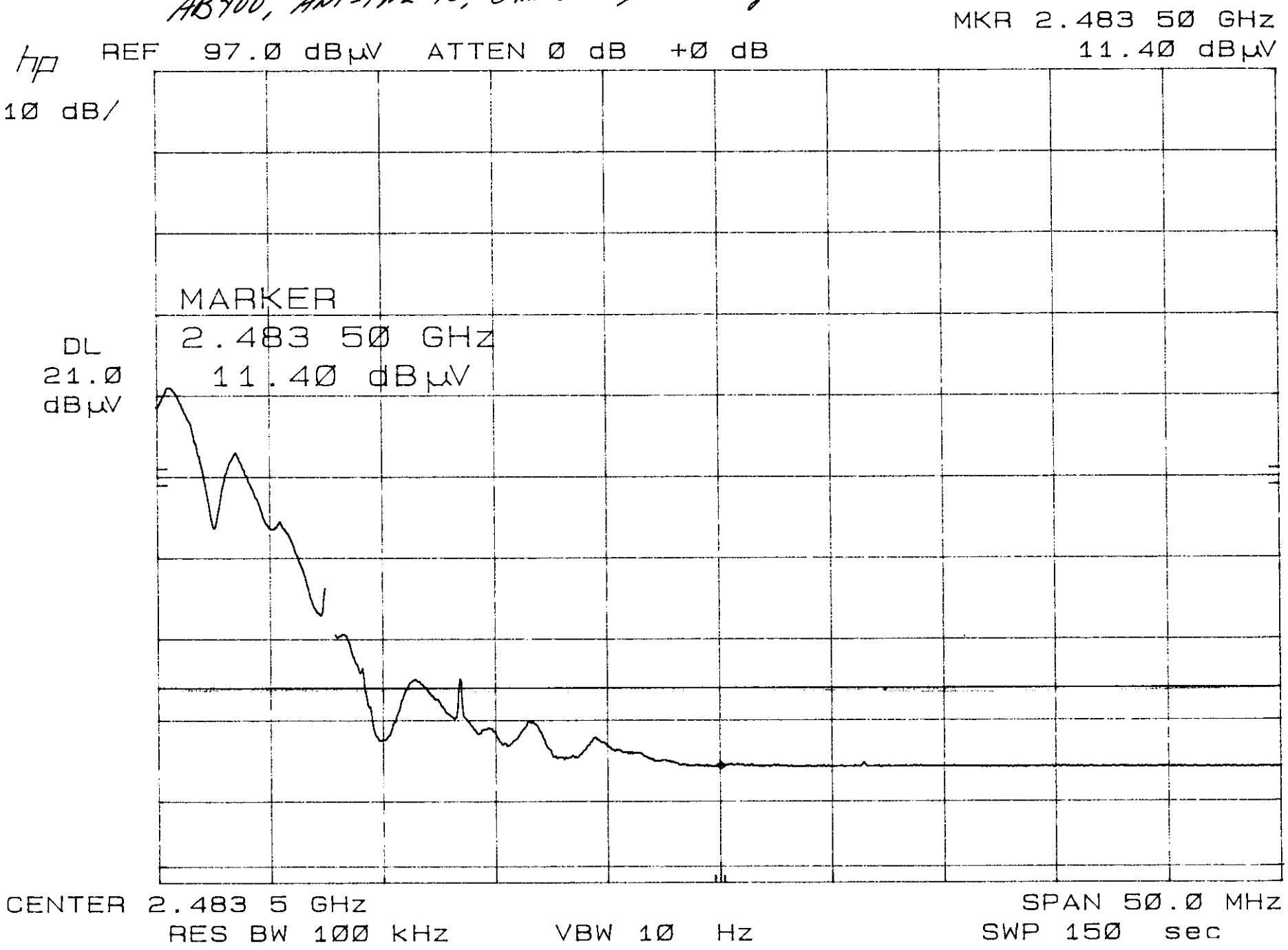
6-11-98

AB400, ANT-PNL-16, channel 1, Band-edge



6-11-98

AB400, ANT-PNL-16, channel 5, Band-Edge



Name of Test: Out of Band Emissions
Paragraph: 15.109, 15.205
Spec. Limit: See Below
Test Equipment: As per previous page

Search Antennas:

30 KHz - 200 MHz:	EMCO 3146
200 MHz - 1 GHz	EMCO 1412
1 GHz - 10 GHz	EMCO 3115

Limit

In any 100kHz bandwidth outside these frequency bands, radio frequency power that is produced by the modulation products of the spreading sequence, information sequence, and the carrier frequency shall be either

at least 20dB below that in any 100kHz bandwidth within the band that contains the highest level of the desired power

or

shall not exceed the general levels specified in 15.209(a),

whichever results in the lesser attenuation.
All other emissions outside these bands shall not exceed the general radiated emission limits specified in 15.209(a).

Measurement Procedure:

At first, bench tests were performed to locate the emissions at the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

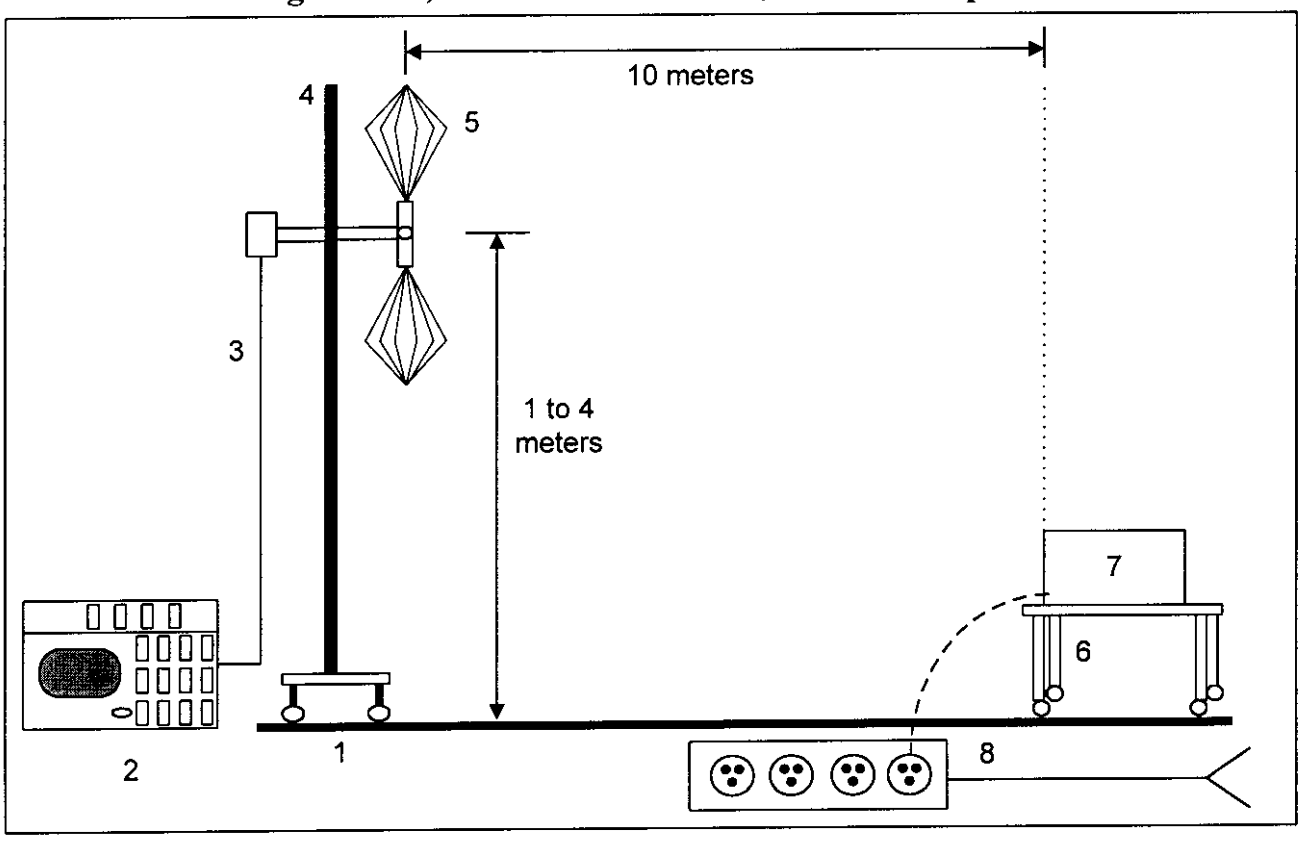
In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The E.U.T. was also adjusted for maximum response.

The field strength was calculated from:

$$E\ \mu V/m\ @\ 3m = LOG_{10}^{-1}\ \frac{(dBm + 107 + A.F. + C.L.)}{20}$$

The following results are worst case conditions. Tests were conducted in Horizontal & Vertical polarization modes. Measurement Results: Attached

Test Configuration, Radiated Emissions, 10-Meter Open Field Site



NOT TO SCALE

1. Ground Plane (11 x 17 meters)
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Antenna to Spectrum Analyzer
4. Antenna Mast with motorized mounting assembly
5. Receive Antenna (basic relative position)
6. Non-Conducting table 80 cm above ground plane
7. EUT and Associated System
8. AC Power for devices

15.247(c)(2)

Electromagnetic Engineering Services, Incorporated
FCC, Part 15B, Class 'A' Radiated Emissions Data Sheet
(10m Open Area Test Site)

Client: **Solectek**
EUT: **Wireless LAN**
Model #: **AB400 (Receive Mode)**

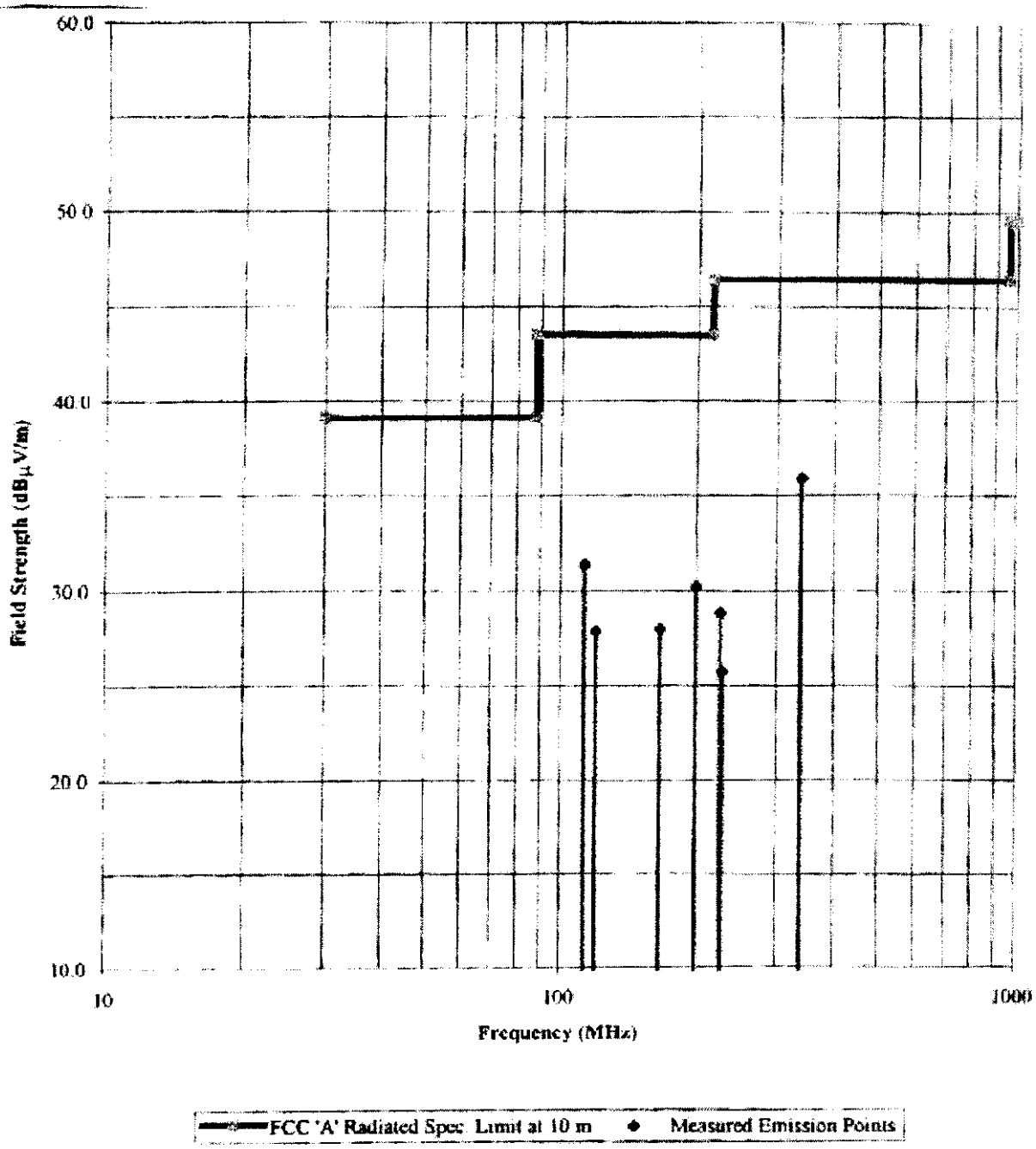
Conducted by:
Date of Test: **06-11-98**
Test Distance, Amp. gain: **10 m, 0dB**

Frequency (MHz)	Spectrum Analyzer Reading (dBμV)	Antenna Polorization (vertical or horizontal)	Amp. Gain & Cable Loss, Distance & Antenna Factor Correction for 10m (dBuV/m)	Total Interference Level Corrected for 10m (dBμV/m)	Emission Spec. Limit at 10m (dBμV/m)	Difference Margin (dB)
113.350	13.4	v	17.9	31.3	43.5	-12.2
120.000	9.6	v	18.3	27.9	43.5	-15.6
166.730	8.2	v	19.8	28.0	43.5	-15.5
200.020	13.9	h	16.3	30.2	43.5	-13.3
226.680	13.0	h	15.8	28.8	46.4	-17.6
229.140	9.7	v	16.0	25.7	46.4	-20.7
340.000	14.7	h	21.2	35.9	46.4	-10.6

[3]

[3] ***Test Condition:*** Standard radiated emissions test set up on FCC registered open field site. The highest emissions for all antenna heights, polarities, and table orientations are the only emissions recorded.

Solectek - Wireless LAN: AB400 (Receive Mode)
FCC 'A' Radiated Emissions Profile (6-11-98) - EESI



NAME OF TEST: AC POWER-LINE CONDUCTED INTERFERENCE

PARAGRAPH: 15.207

TEST CONDITIONS: STANDARD TEMPERATURE AND HUMIDITY

SPEC. LIMIT: $\leq$ 250 μV

TEST EQUIPMENT: AS PER ATTACHED PAGE

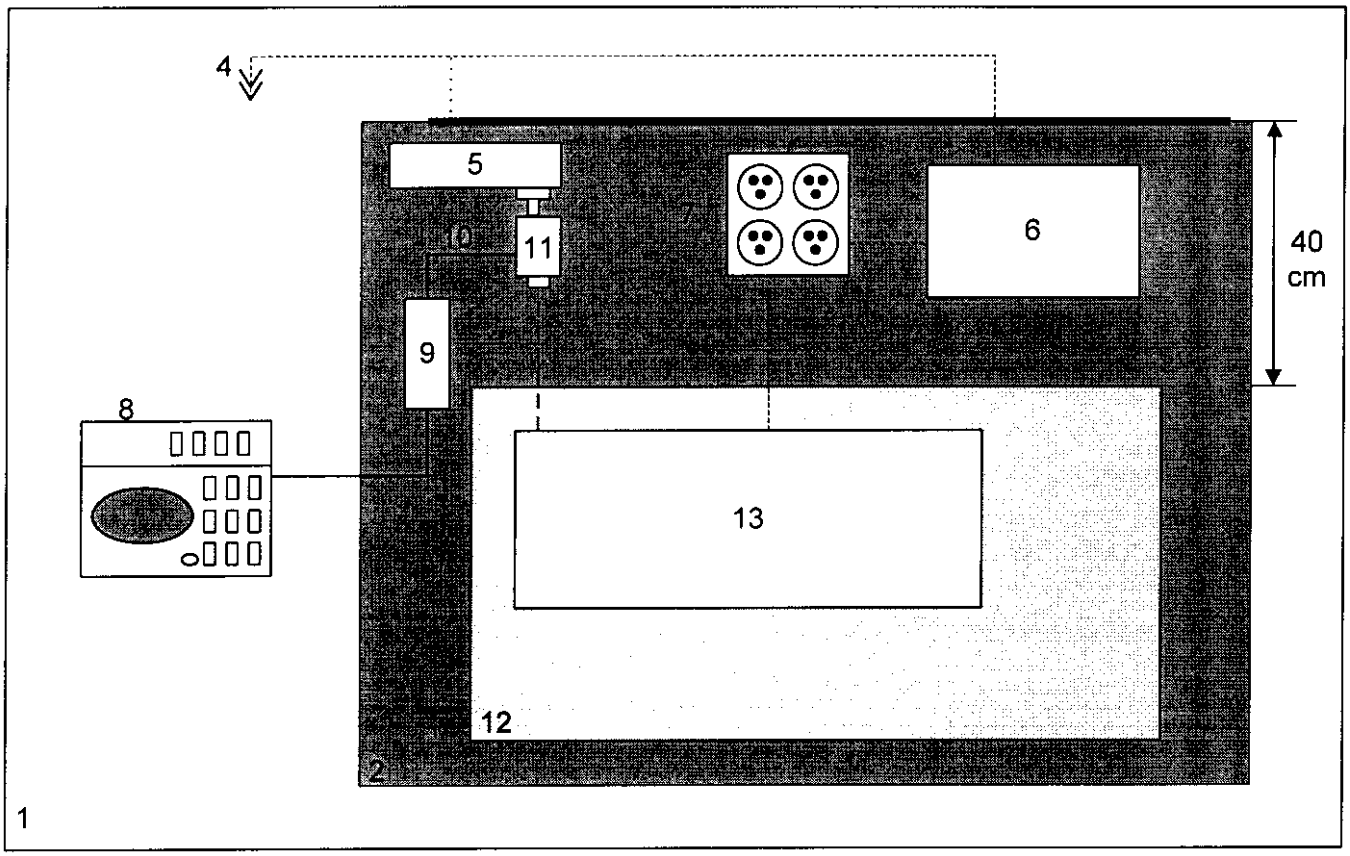
REFERENCE STANDARDS

1. American National Standard Specifications for Electromagnetic Interference and Field Strength Instrumentations 10kHz to 10GHz, ANSI C 63.2 (1980)
2. American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage and Electronic Equipment in the range of 10kHz to 1GHz, ANSI C63.4 (1992)
3. Part 15 of FCC Rules and Regulations (47 CFR Part 15)

MEASUREMENT PROCEDURE

1. Table mounted or hand-held E.U.T.'s were placed on a non-conducting 1.0 x 1.5m table at a height of 0.8m above an earth-grounded conducting surface of 2.5 x 3.0m.
2. Floor mounted E.U.T.'s were placed directly on insulating material covering the ground plane and arranged as specified in ANSI C63.4 (1992).
3. The test sample was connected to the Public Utility lines through a LISN Ailtech Model 94641-1(50 μh).
4. A reference level of 250 μV was set on the Spectrum Analyzer. The spectrum searched was over the range of 450kHz to 30MHz.
5. All other emissions were 20dB or more below limit.
6. MEASUREMENT RESULTS: ATTACHED

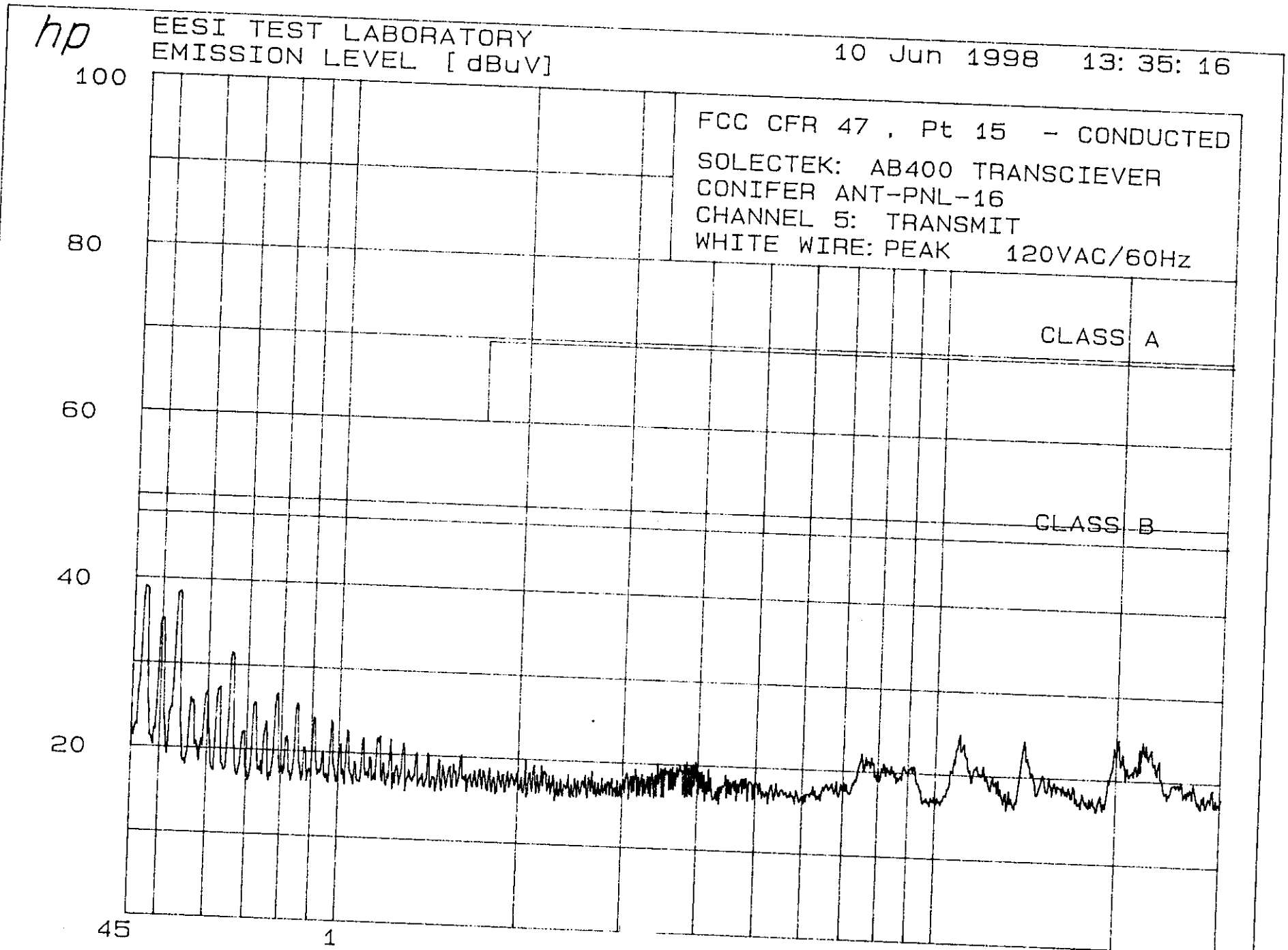
EUT and Associated System, General Configuration



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory (6 x 6 meters)
2. Ground Plane (15 square meters)
3. Vertical Conducting Wall (Grounded through Ground Plane via 10' ground rod)
4. AC Power for Devices (120V, 60 cycles, single phase)
5. Power Line Filter, Lindgren, 120 dB, 30 amp
6. Line Impedance Stabilization Network (LISN) for peripheral devices
7. Power Distribution Box for peripheral devices Coax input from EUT
8. Spectrum Analyzer with Quasi-Peak Adapter
9. High Pass Filter
10. Coax input from EUT LISN to Spectrum Analyzer
11. LISN for EUT
12. Non-Conducting table 80cm above ground plane
13. EUT and associated system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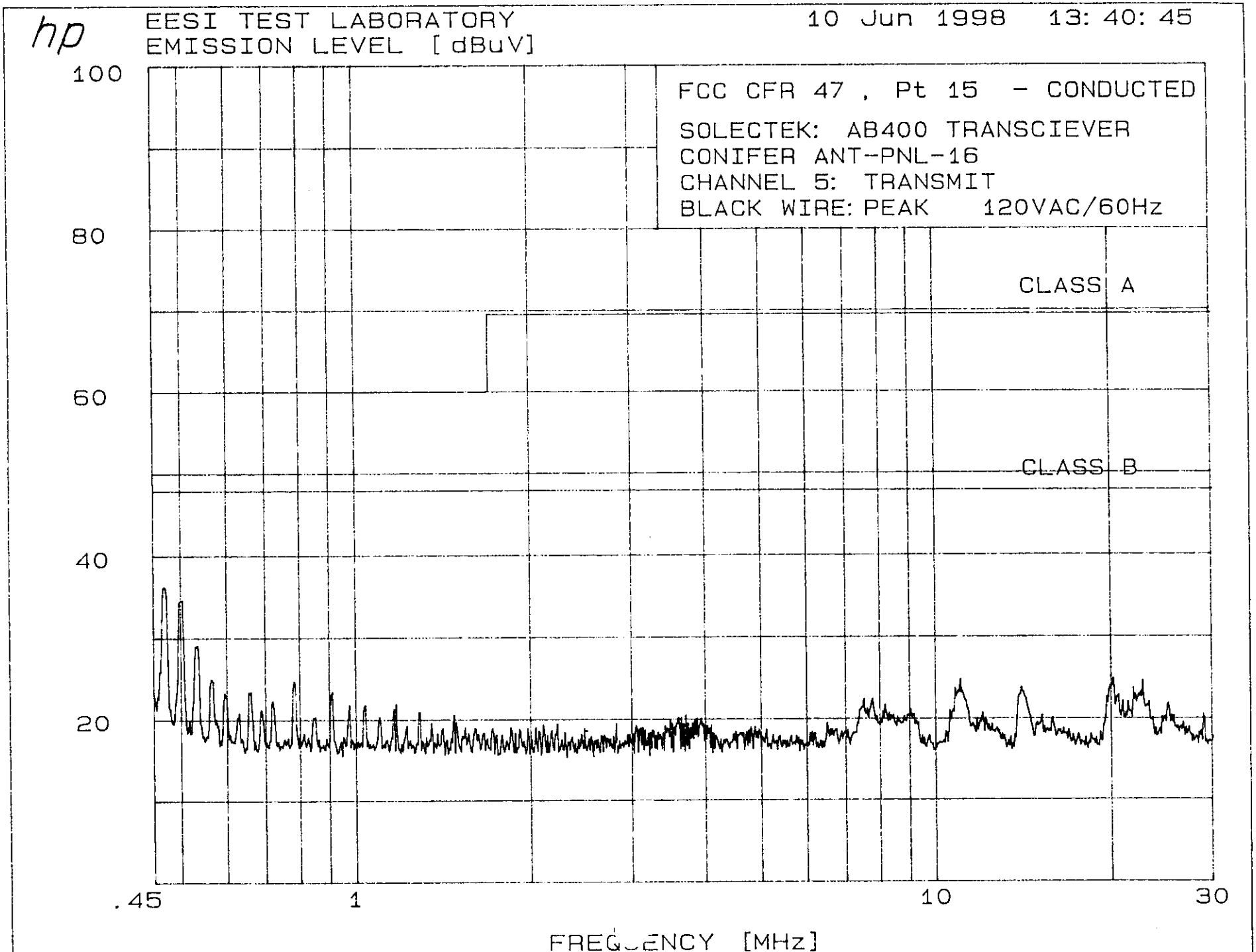
EMISSION LEVEL [dBuV]
10 Jun 1998 13:35:16
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 5: TRANSMIT
WHITE WIRE: PEAK 120VAC/60Hz
CLASS A
CLASS B
100
80
60
40
20
45
1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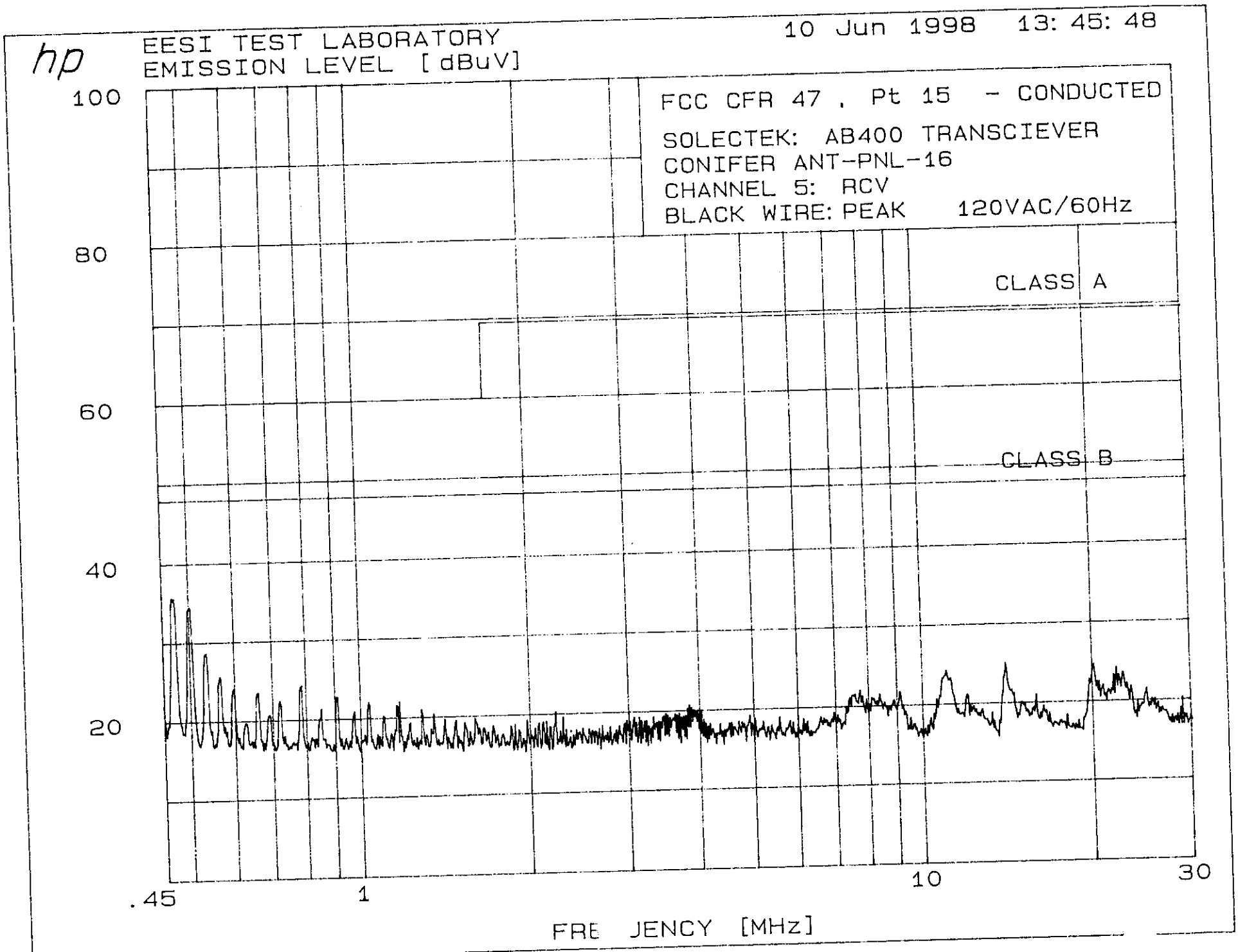
EMISSION LEVEL [dBuV]
10 Jun 1998 13:40:45
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 5: TRANSMIT
BLACK WIRE: PEAK 120VAC/60Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]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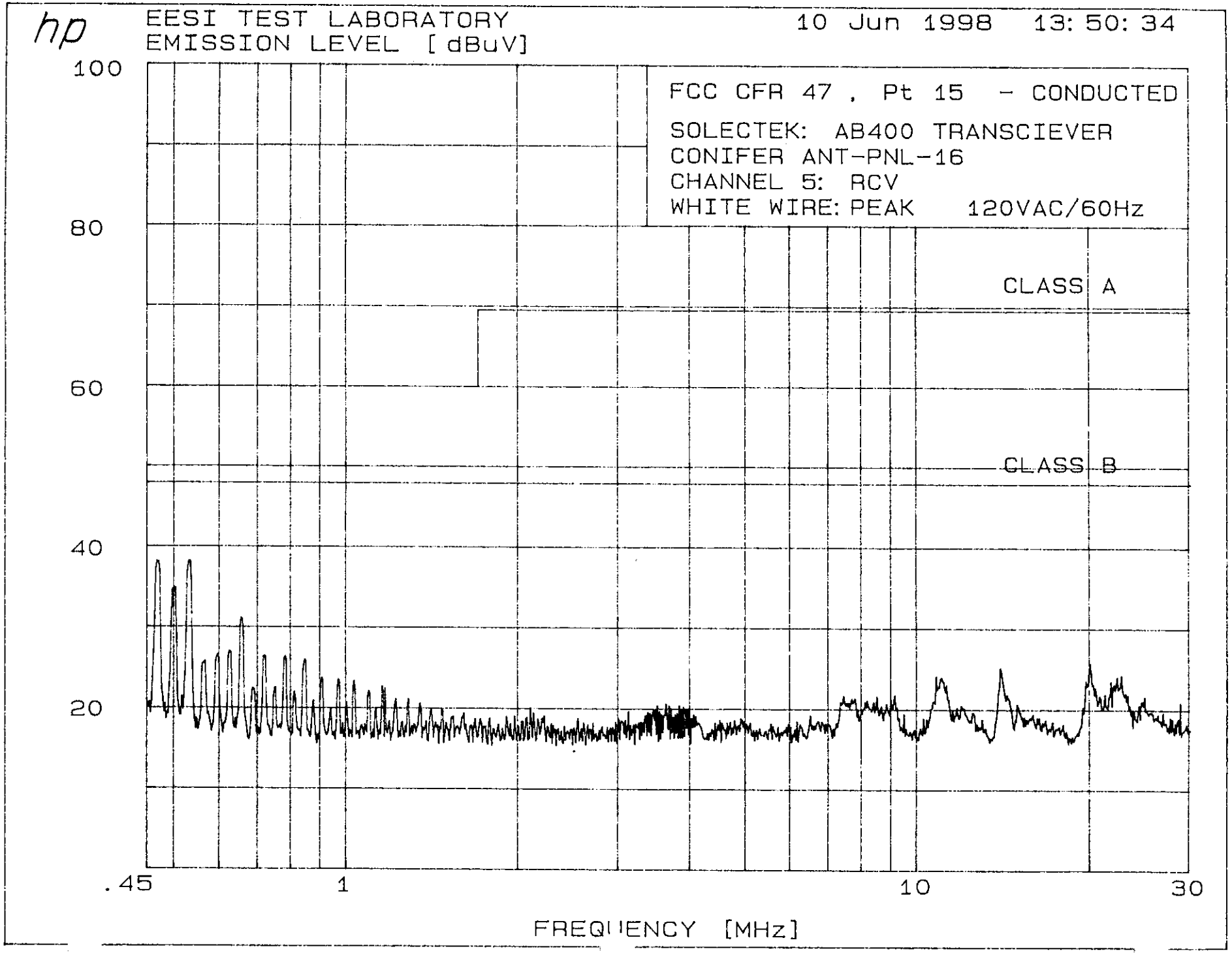
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 5: RCV
BLACK WIRE: PEAK 120VAC/60Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]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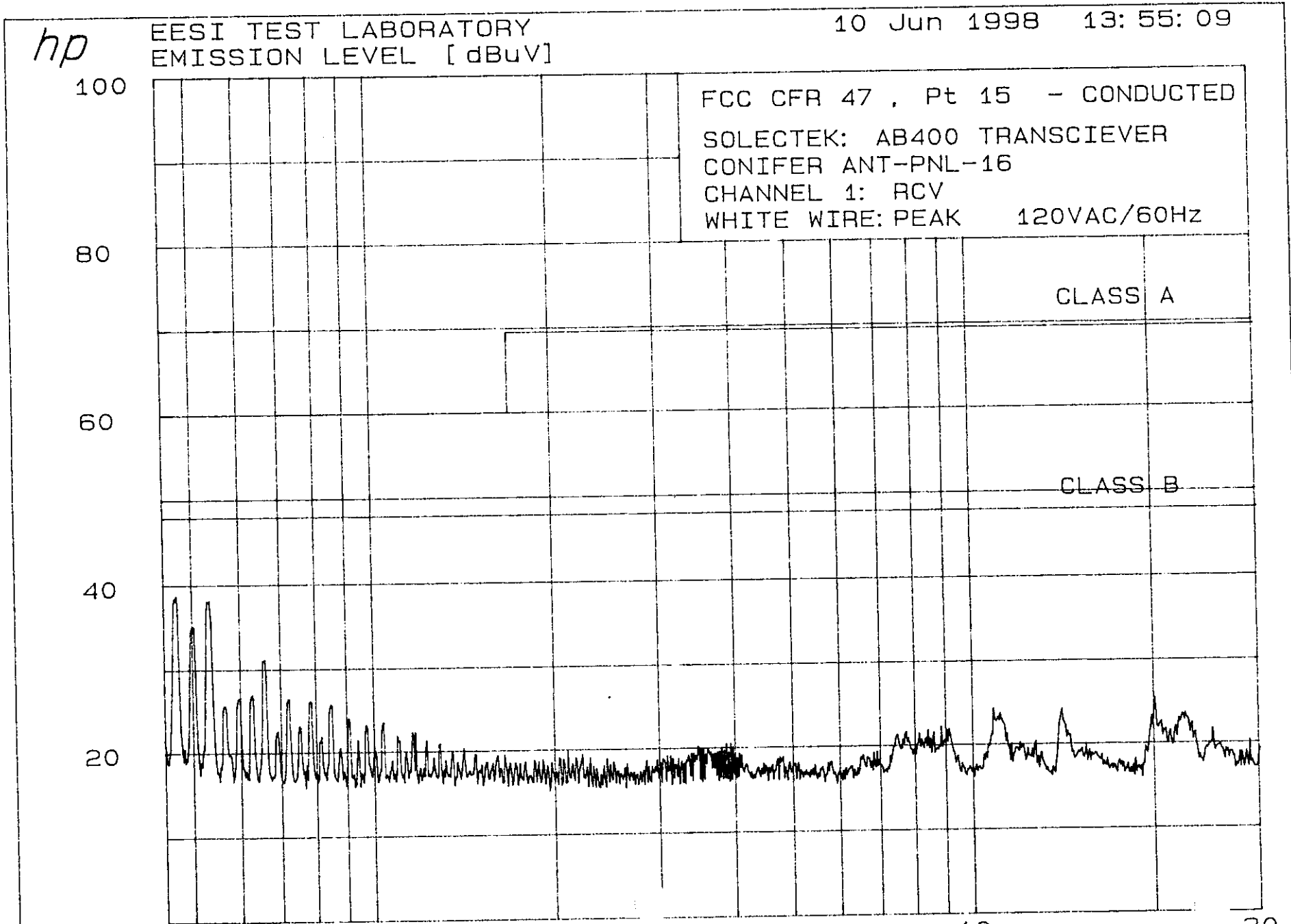
EESI TEST LABORATORY
EMISSION LEVEL [dBuV]
10 Jun 1998 13:50:34
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 5: RCV
WHITE WIRE: PEAK 120VAC/60Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]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EMISSION LEVEL [dBuV]
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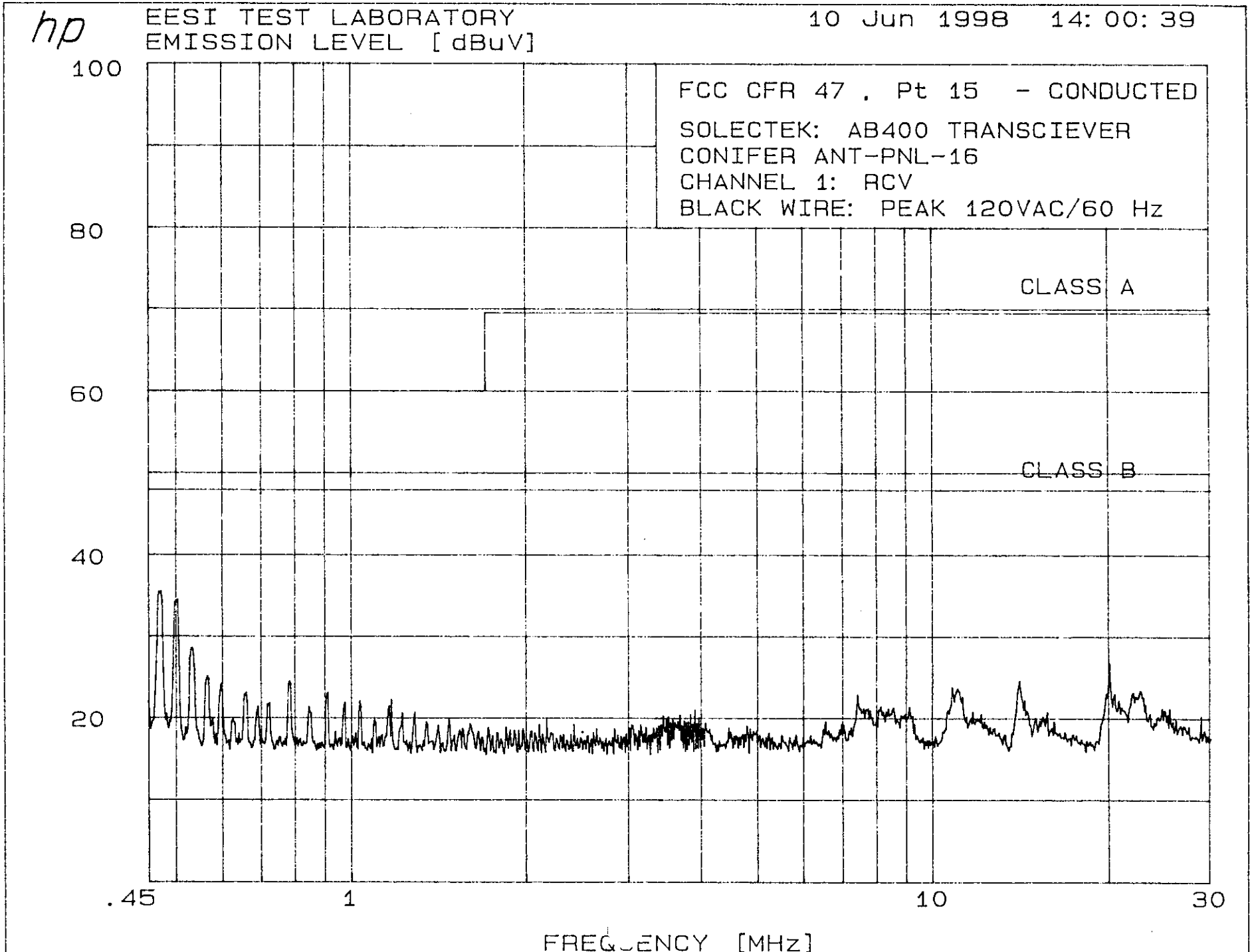
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 1: RCV
WHITE WIRE: PEAK 120VAC/60Hz
CLASS A
CLASS B
100
80
60
40
20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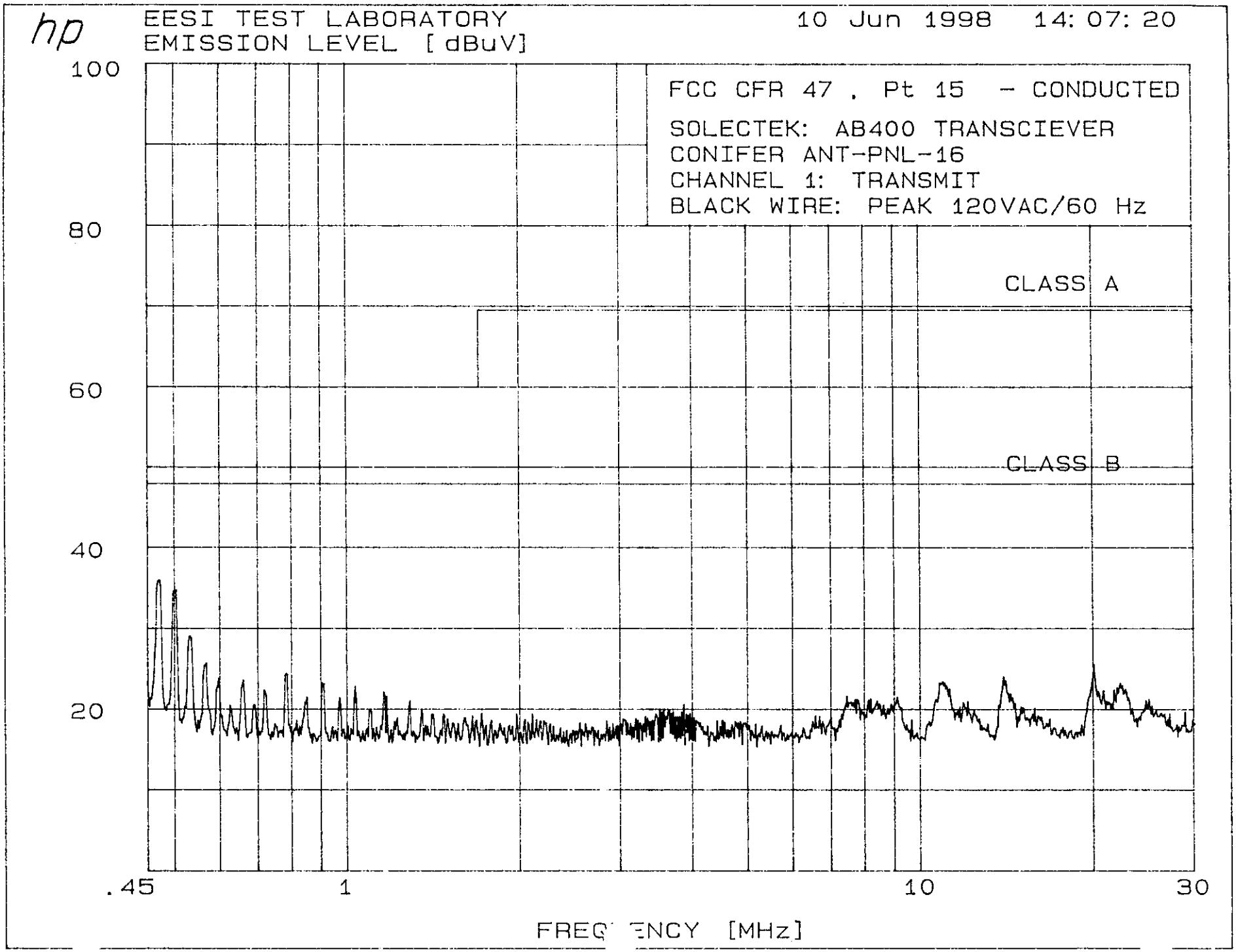
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 1: RCV
BLACK WIRE: PEAK 120VAC/60 Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]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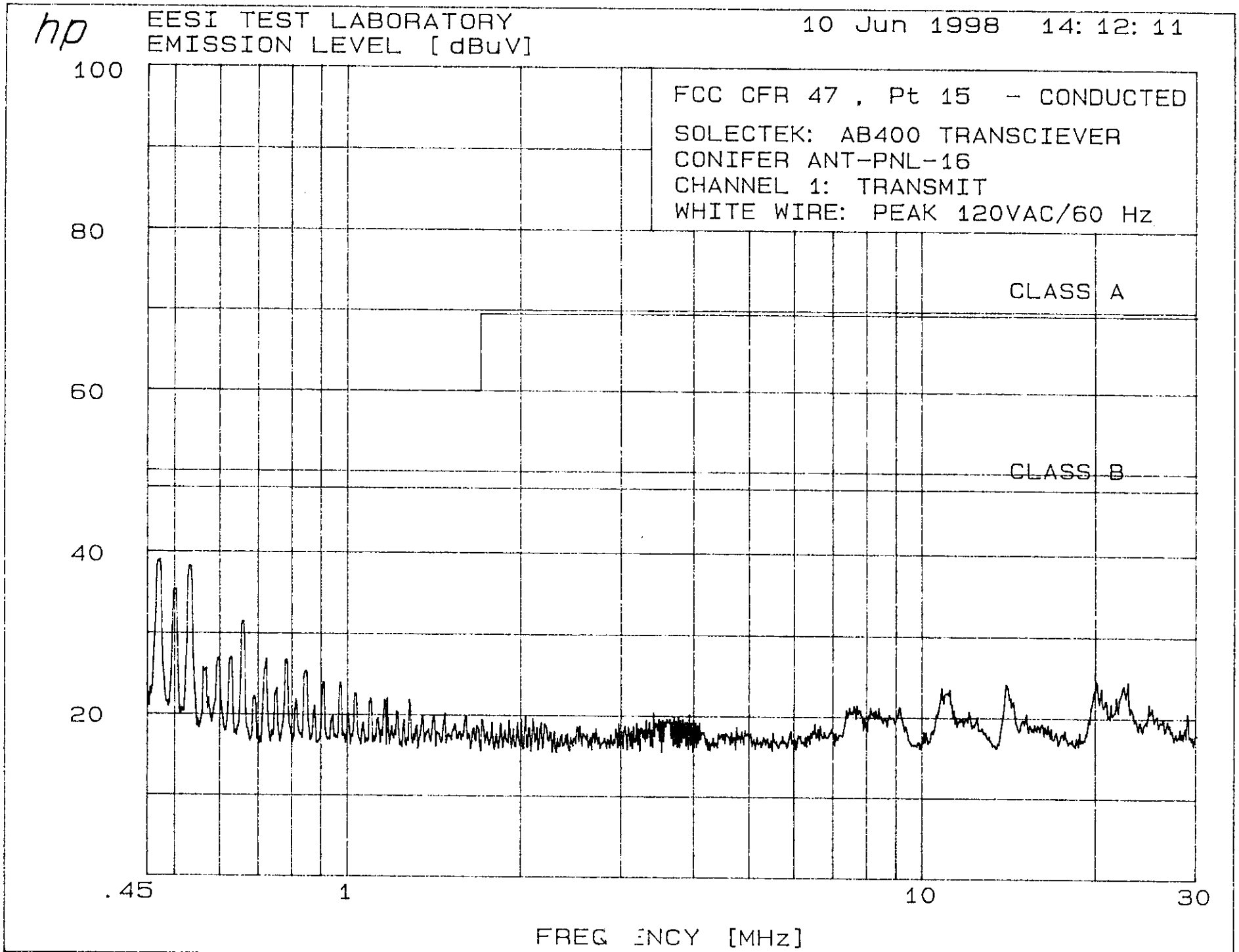
FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 1: TRANSMIT
BLACK WIRE: PEAK 120VAC/60 Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]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EESI TEST LABORATORY
EMISSION LEVEL [dBuV]
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FCC CFR 47 , Pt 15 - CONDUCTED
SOLECTEK: AB400 TRANSCIEVER
CONIFER ANT-PNL-16
CHANNEL 1: TRANSMIT
WHITE WIRE: PEAK 120VAC/60 Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

ANTENNA SPECIFICATION SHEETS

ANT-PNL-16

SPECIFICATIONS	QD-2400
Input Frequency	2400 - 2500 GHz
Net Gain (Coxial Lead and Connector)	15.2 dBi
3 dB Bead Width (Typical)	28°
Front to Back Ratio (Typical)	>40 dB
Cross Pole	>30 dB
VSWR	1.5:1
Impedance	50 ohms
15Kohm Resistor (Integral)	Sensing Resistor
Wind Loading	
@100 MPH	25.0 lbs.
@140 MPH	49.4 lbs.
Polarity	Dual
Size	
Inches	10.75 x 11
Millimeters	.42 x .43
Weight	
Pound	2.0
Kilograms	.91
Reflector Material	Stamped Aluminum
Backplate Bracket Material	Zinc-plated Steel
Housing Material	High Impact ABS Plastic
Mounting	1 - 2 inch O.D. Pipe
Micro-mount (optional mounting) Material	Stainless Steel/Aluminum
EX-1000 Extension Tube	
Size	12 inches
Material	Aluminum