

Certification of the
AMP 415882-X Modulator and Channelizer
under
FCC ID: **FUVMULTISYS2**

as a
TV Interface Device
under
Title 47 of the CFR, Part 15, Subpart B

MET REPORT EMI1027
July 17, 2001

PREPARED FOR:

AMP Incorporated
100 Amp Drive, P.O. Box 3608, M.S. 161-060
Harrisburg, PA 17105-3608

PREPARED BY:

MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432

July 17, 2001

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Applications Examiner

Reference: FCC: FUVMULTISYS2
AMP 415882-X Modulator and Channelizer

Dear Examiner:

The following equipment authorization application is presented on behalf of AMP Incorporated for the certification of their Model 415882-X Modulator and Channelizer. Enclosed, please find a complete data and documentation package demonstrating that this device complies with the technical requirements of 47 CFR, Part 15, Subpart B for a TV Interface Device. The manufacturer seeks authorization under the identifier: FUVMULTISYS2.

We look forward to an expeditious review of the report presented and a granting of the certification for AMP Incorporated. If you have any questions or we can be of assistance, in this matter, please call us at (410) 354-3300.

Best regards,

Dale Royston
Project Engineer

Enclosures

APPLICATION FOR EQUIPMENT AUTHORIZATION

Certification of the
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MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432

Test Engineer: _____
Dale Royston

Reviewed by: _____
Christopher Harvey Laboratory

Director

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LEGAL STATEMENT

While use of the National Voluntary Laboratory Accreditation Program (NVLAP) letters or the NVLAP Logo in this report reflects the MET Accreditation under the NVLAP Program, these letters, logo, or Statements do not claim product endorsement by NVLAP or any Agency of the U.S. Government.

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This report contains 18 pages of technical information.

EXHIBIT 1

EQUIPMENT ID LABEL

See label.wpd

EXHIBIT 2

AGENT AUTHORIZATION

P.O. Box 3608
Harrisburg, PA 17105-3608
Phone 717-564-0100
TWX: 510-657-41 1 0

@MPO

AMP Incorporated

Agent Authorization

AMP Incorporated hereby authorizes MET Laboratories, Inc. to act on our behalf before the Federal Communications Commission **in** matters concerning equipment authorizations. Any and all acts carried out by MET Laboratories, Inc. shall have the same effect as acts of our own.

Further, AMP Incorporated certifies that no party to the application is subject to a denial of federal benefits, that includes FCC benefits, pursuant to *Section 5301 (of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a))*. For the definition of a "party" for these purposes, see 47 CFR 1.2002(b).

This authorization expires one year after the date of this letter.

Dated: 3/20/98

James R. Fetterolf
Director Development Engineering,

EXHIBIT 3

PHOTOGRAPHS

see ext_phot.wpd

EXHIBIT 4

**MANUFACTURER & PRODUCT
INFORMATION**

ENGINEERING STATEMENT

COMPANY OFFICIAL SIGNATURE

**MANUFACTURER'S
STATEMENT REGARDING
MODIFICATIONS**

MANUFACTURER & PRODUCT INFORMATION

TYPE OF AUTHORIZATION: Certification of a TV Interface Device

FCC IDENTIFIER: FUVMULTISYS2

APPLICABLE FCC RULES: 2.907; 2.1031 to 2.1045; 15.115(a,b,c & d);

CLIENT: AMP Incorporated
100 Amp Drive
P.O. Box 3608, M.S. 161-060
Harrisburg, PA 17105-3608

EQUIPMENT: 415882-X Modulator and Channelizer

TESTING DATE(S): 14 Jan 1998, 15 Jan 1998, 26 Feb 1998

MANUFACTURER'S REPRESENTATIVE: Mr. Tom Schaedler

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

I FURTHER ATTEST: on the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15 of the FCC Rules under normal use and maintenance.

Dale Royston
Project Engineer

MODIFICATIONS STATEMENT

I ATTEST: that the product will be manufactured with all modifications for Part 15 compliance as submitted in this report. Modifications made during testing appear below.

Tom Schaedler

A Filter Gamco # 619LP13 was added on the RF output port of the 415882-X Modulator and Channelizer

EXHIBIT 5

INTRODUCTION

TEST SITE

REPORT OF MEASUREMENT

INSTRUMENTATION

TEST CONFIGURATION

PHOTOGRAPHS

INTRODUCTION

An EMI evaluation to determine compliance of the AMP 415882-X Modulator and Channelizer with the requirements of Part 15, Subpart B for TV Interface Devices was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect.) In accordance with §2.1033(b), the following test report is presented in support of the application for grant of certification of the AMP 415882-X Modulator and Channelizer. AMP Incorporated should retain a copy of this document for at least one year after the manufacturing of the AMP 415882-X Modulator and Channelizer has been **permanently** discontinued, as per §2.938(c).

TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3432. Radiated emissions measurements were performed on a three-meter open air test site (OATS). In accordance with §2.948, a complete site description is on file with the FCC Laboratory Division as 31040/SIT/MET.

MEASUREMENT PROCEDURES

As required by §15.107(a) of CFR 47, *conducted emissions measurements* were made in accordance with ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurements were performed over the frequency range of 0.45 MHz to 30 MHz using a 50 Ω /50 μ H LISN as the input transducer to an EMI/Field Intensity Meter. The measurements were made with the detector set for "peak" amplitude within an IF bandwidth of 10 kHz or for "quasi-peak" within a bandwidth of 9 kHz. All measurements are made with the "peak" detector unless the peak detector yields an over limit result, in which case the quasi-peak detector is used. This method minimizes testing time. The tests were conducted in a RF-shielded enclosure.

As required by §15.109(a) of CFR 47, *radiated emissions measurements* were made in accordance with the general procedures of §2.947 and §15.31, and ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurements were performed over the frequency range of 30 MHz to 1 GHz using tunable dipole antennas as the input transducer to a spectrum analyzer. The measurements were made with the detector set for "quasi-peak" within a bandwidth of 120 kHz. A preliminary RF scan was performed in an RF-shielded enclosure. Final measurements were made on the OATS, as per §15.31(d). Measurements were conducted with all output terminals of the device terminated by a resistance equal to the rated output impedance, as per §15.115(a).

As required by §15.115(b)(1) of CFR 47, *RF Output Voltage measurements* were made by connecting the RF output through a matching network to a spectrum analyzer. The result was stored.

As required by §15.115(b)(2) of CFR 47, *RF Output conducted spurious emissions* were made by connecting the RF output through a matching network to a spectrum analyzer. The result was stored.

INSTRUMENTATION

Radiated emissions measurements were made using a Hewlett Packard model 8591E Spectrum Analyzer with an Emco Model 3104C biconical antenna for the range 30 MHz - 200 MHz, an EMCO model 3146A log periodic antenna for the range 200 MHz - 1 GHz. If measurements were required above 1 GHz, an EMCO model 3115 double-ridge guided horn antenna was used for the range 1 GHz - 18 GHz, and a Waveline model 899 standard gain horn antenna for the range 18 GHz - 27 GHz.

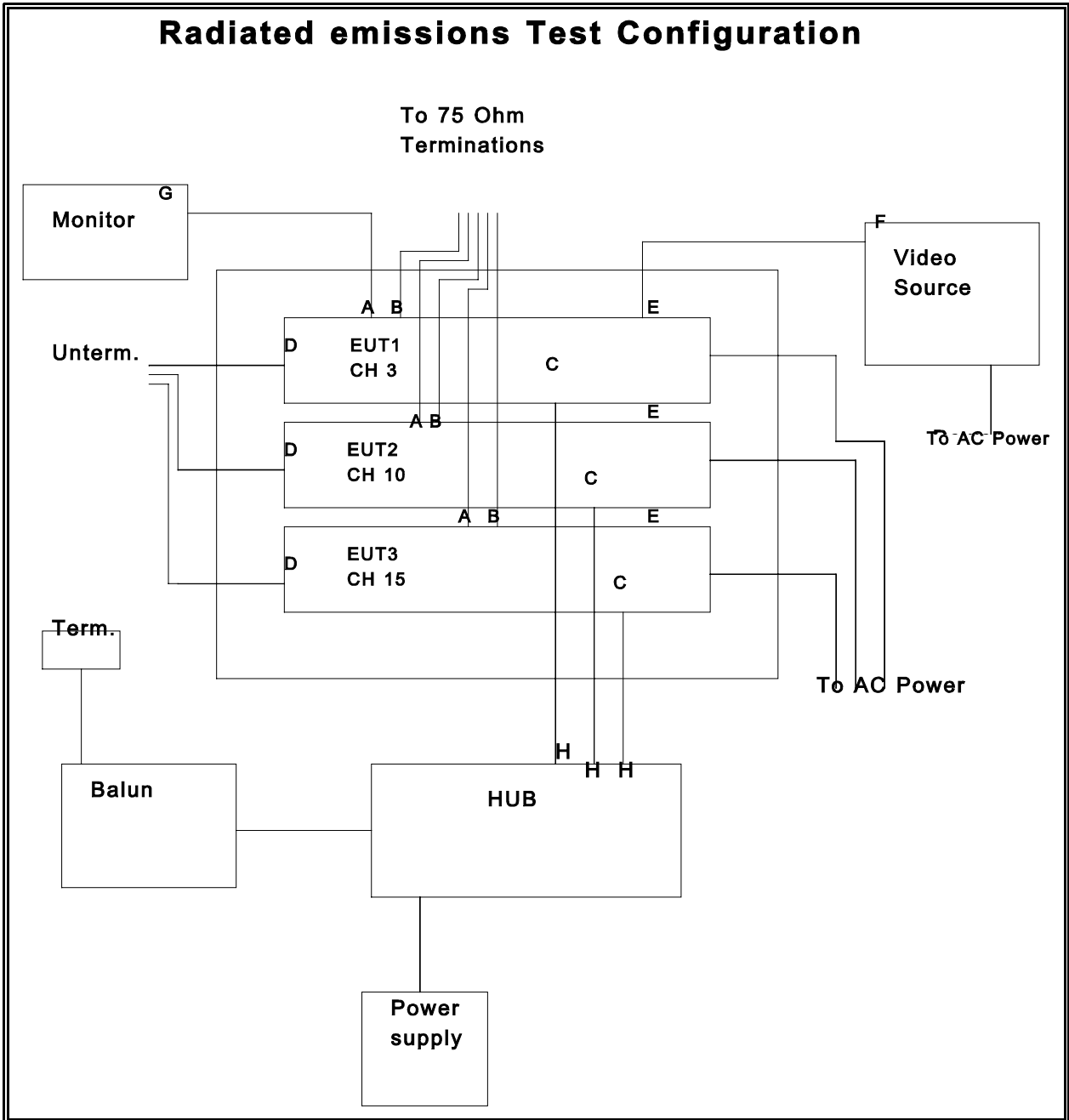
RF Output Voltage and RF Output conducted spurious emissions were made using a Hewlett Packard model 8594EM Spectrum Analyzer

Nomenclature	Manufacturer	Model	Serial	MET #	Calibration Due Date	Cal Interval
Receiver	Hewlett Packard	8591E	3230A005 18	1T4192	01-Jan-98	Annual
Receiver	Hewlett Packard	8591E	3523A045 95	1T4222	02-Feb-99	Annual
Receiver	Hewlett Packard	9594EM	3536A001 30	1T4156	19-Nov-98	Annual
LISN	Solar	8028-50- TS-24- BNC	None	1T4212	16-Jul-98	Annual
Lab #4	N/A	N/A	N/A	1T4214	21-Aug-98	Annual
Biconical Antenna	EMCO	3104C	9011-114 8	1T4167	02-Feb-99	Annual
Log Periodical Antenna	EMCO	3146A	9010- 4344	1T4168	02-Feb-99	Annual
OATS	MET	n/a	n/a	1T4078	27-May-98	Annual

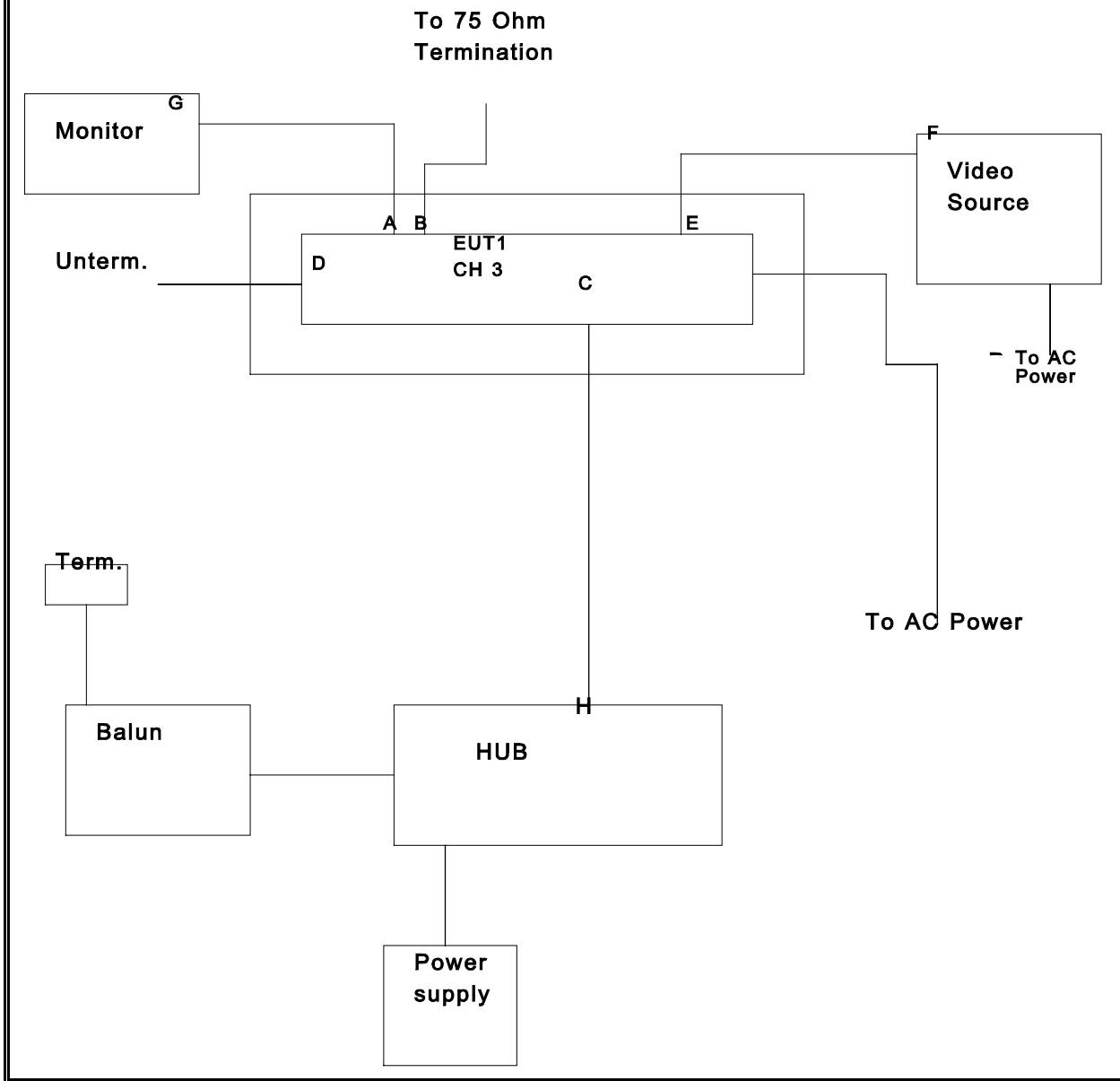
TEST CONFIGURATION

The AMP 415882-X Modulator and Channelizer was operated with three units (channel 3, Channel 10 Channel 15) operating simultaneously for the radiated emission test and units operating on channels 2,5, and 13 for the RMS power tests. The units were fed video and audio signal from an external source and monitored on a video monitor during all testing, system components were manipulated within the confines of typical usage to maximize each emission.

Radiated emissions Test Configuration



Conducted emissions Test Configuration



DEVICE, PERIPHERALS, AND CABLES USED

Equipment	Port Desig.	Port	Length	Shielded	Cable type	Termination
EUT1 Name: Modulator & Channelizer Manufacturer: AMP Model: MAC Serial: none Amp # 415882-3 Note: The (3) denotes the channel of the unit	A	RF OUTPUT	2M	yes	75 Ohm Coax	To Monitor (port desig G)
	B	LOCAL OUTPUT	2M	yes	75 Ohm Coax	To 75 Ohm termination
	C	TO WALL	2M	no	RJ-45 Cat 5 #96-1376-30-1	To Hub (Port designation H)
	D	TO TELEPHONE	0.25m	no	RJ-45 Cat 5 #96-1376-30-1	Unterminated
	E	VIDEO/AUDIO INPUT	1M	yes	RCA type coax	To Video source (port desig F)
EUT 2 Name: Modulator & Channelizer Manufacturer: AMP Model: MAC Serial: none Amp # 415882-10 Note: The (10) denotes the channel of the unit	A	RF OUTPUT	2M	yes	75 Ohm Coax	To 75 Ohm termination
	B	LOCAL OUTPUT	2M	yes	75 Ohm Coax	To 75 Ohm termination
	C	TO WALL	2M	no	RJ-45 Cat 5 #96-1376-30-1	To Hub (Port designation H)
	D	TO TELEPHONE	0.25m	no	RJ-45 Cat 5 #96-1376-30-1	Unterminated
	E	VIDEO/AUDIO INPUT	0.1M	yes	RCA type coax	Unterminated
EUT3 Name: Modulator & Channelizer Manufacturer: AMP Model: MAC Serial: none	A	RF OUTPUT	2M	yes	75 Ohm Coax	To 75 Ohm termination

Equipment	Port Desig.	Port	Length	Shielded	Cable type	Termination
EUT3 Name: Modulator & Channelizer Manufacturer: AMP Model: MAC Serial: none Amp # 415882-15 Note: The (15) denotes the channel of the unit	B	LOCAL OUTPUT	2M	yes	75 Ohm Coax	To 75 Ohm termination
	C	TO WALL	2M	no	RJ-45 Cat 5 #96-1376-30-1	To Hub (Port designation H)
	D	TO TELEPHONE	0.25M	no	RJ-45 Cat 5 #96-1376-30-1	Unterminated
	E	VIDEO/AUDIO INPUT	0.1M	yes	RCA type coax	Unterminated
SUPPORT EQUIPMENT Name: Video Source Manufacturer: Panasonic Model: WJ-MX10 AV Serial: 92A08014 FCC ID: Not applicable	Port		SUPPORT EQUIPMENT			
	Preview out (port designation F)		Name: Monitor Manufacturer: Sharp Model: 13G-M100 Serial: 568302 FCC ID: Not applicable			
SUPPORT EQUIPMENT Name: Balun Manufacturer: AMP Model: 415337-1 Serial: None FCC ID: Not applicable			SUPPORT EQUIPMENT Name: Power Supply Manufacturer: N/A Model: SW113 Serial: None FCC ID: Not applicable			
SUPPORT EQUIPMENT Name: HUB(BUD Unit) Manufacturer: Amp Model: 415338-1 Serial: 10000951 FCC ID: FUVMULTISYS1	Port		SUPPORT EQUIPMENT :Used for RMS Power			
	Distribution port (port designation H)		Name: Video Source Manufacturer: CCTV Corp Model: CCD890CA Serial: 185800 FCC ID: Not applicable			

See Testphto.wpd for test photos

EXHIBIT 6

TEST DATA

SUBJECT: Conducted Emissions
Phase Side
FCC Part 15, Subpart B
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 14 January 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

TECHNICAL SPECIFICATION: 15.107(a)

LIMITS: 0.45 - 1.705 MHz : 250 μ V (47.9 dB μ V)

Plot appears on following page.
Equipment meets the specifications of Part 15.107(a)

SEE PLOT1.BMP

SUBJECT: Conducted Emissions
Phase Side
FCC Part 15, Subpart B
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 14 January 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

SUMMARY — 3 Worst-Case Emissions

Frequency (MHZ)	Level (dB μ V)	Limit (dB μ V)
7.22	34.93	47.9
8.93	32.40	47.9
0.56	31.60	47.9

Note: Multiple channel units were tested and showed no significant deviation in the monitored spectrum.

SUBJECT: Conducted Emissions
Neutral Side
FCC Part 15, Subpart B
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 14 January 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

TECHNICAL SPECIFICATION: 15.107(a)

LIMITS: 0.45 - 1.705 MHz : 250 μ V (47.9 dB μ V)

Plot appears on following page.
Equipment meets the specifications of Part 15.107(a)

SEE PLOT2.BMP

SUBJECT: Conducted Emissions
Neutral Side
FCC Part 15, Subpart B
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 14 January 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

SUMMARY — 3 Worst-Case Emissions

Frequency (MHZ)	Level (dB μ V)	Limit (dB μ V)
7.25	34.34	47.9
8.67	31.97	47.9
5.00	23.34	47.9

Note: Multiple channel units were tested and showed no significant deviation in the monitored spectrum

SUBJECT: Radiated Emissions
 FCC Part 15
 TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Tom Bennington
TEST DATE: 26 February 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

TECHNICAL SPECIFICATION: 15.109(a)

Frequency (MHZ)	Azimuth (°CCW-O°=EUT facing ant.)	Polarity	Height (m)	Raw Amplitude (dBuV)	Ant.Cor. Factor (db)	Cable Loss (db)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m) at 3 meters
48.24	0	H	2.0	16.4	11.4	1.0	28.8	40.0
48.24	0	V	1.0	23.8	11.0	1.0	35.8	40.0
62.2	330	H	1.0	27.5	10.0	1.0	38.5	40.0
62.2	330	V	1.0	24.8	10.0	1.0	35.8	40.0
127.26	0	H	2.2	17.6	13.3	1.0	35.2	43.5
127.26	170	V	1.5	21.5	13.8	1.0	36.3	43.5
193.25	195	H	2.0	22.0	17.0	2.0	41.0	43.5
193.25	270	V	1.5	18.0	17.5	2.0	37.5	43.5
241.68	340	H	1.5	24.2	15.9	2.0	42.1	46.0
241.68	270	V	2.0	20.0	16.6	2.0	38.6	46.0
255.0	0	H	1.0	23.0	17.1	2.0	42.1	46.0
255.0	0	V	1.0	23.0	17.7	2.0	42.7	46.0

Equipment meets the specifications of Part 15.109(a).

SUBJECT: RF Output Voltage
and Bandwidth of Carrier
FCC Part 15
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 15 January 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

TECHNICAL SPECIFICATION: 15.115(b)(1)

Plots appear on following pages.

Equipment meets specifications of 15.115(b)(1)(ii).

- a) Limit = $346.4 \times \sqrt{R}$ = (for the video carrier)
= 346.4×8.66
= $2.999.91 \mu\text{V}$
- b) Limit = $77.5 \times \sqrt{R}$ = (for the audio carrier)
= 77.5×8.66
= $671.17 \mu\text{V}$

SEE FILES " PLOTS 3-8.BMP"

SUBJECT: Antenna Conducted
Spurious Emissions
FCC Part 15
TV Interface Device

MET REPORT: EMI1027
MFG: AMP
TESTED BY: Dale Royston
TEST DATE: 20-Feb- 1998

EUT: Modulator and Channelizer
MODEL: 415882-X

TECHNICAL SPECIFICATION: 15.115

Plots appear on following pages.

Equipment meets specifications of 15.115(b)(2)(ii).

For spurious emissions outside 4.6 MHZ below and 7.4 MHZ above the video carrier, the limit is:

$$\begin{aligned}\text{Limit} &= 10.95 \times \sqrt{R} \text{ (}\mu\text{V)} \\ &= 10.95 \times 8.66 \\ &= 94.83 \mu\text{V}\end{aligned}$$

Note : Unit tested operated on TV channel 10

SEE FILES PLOT9-12.BMP

EXHIBIT 7

CERTIFICATION INFORMATION

LABEL AND USER'S MANUAL
INFORMATION

This Section is Intentionally Left Blank.

In Our Client's Copy of the Report, This Section
Contains Excerpts from CFR 47 which Clarify
Certification Procedures.

For FCC Submittal, This Section has been
Omitted in Order to Conserve Filing Space.

EXHIBIT 8

USER'S MANUAL

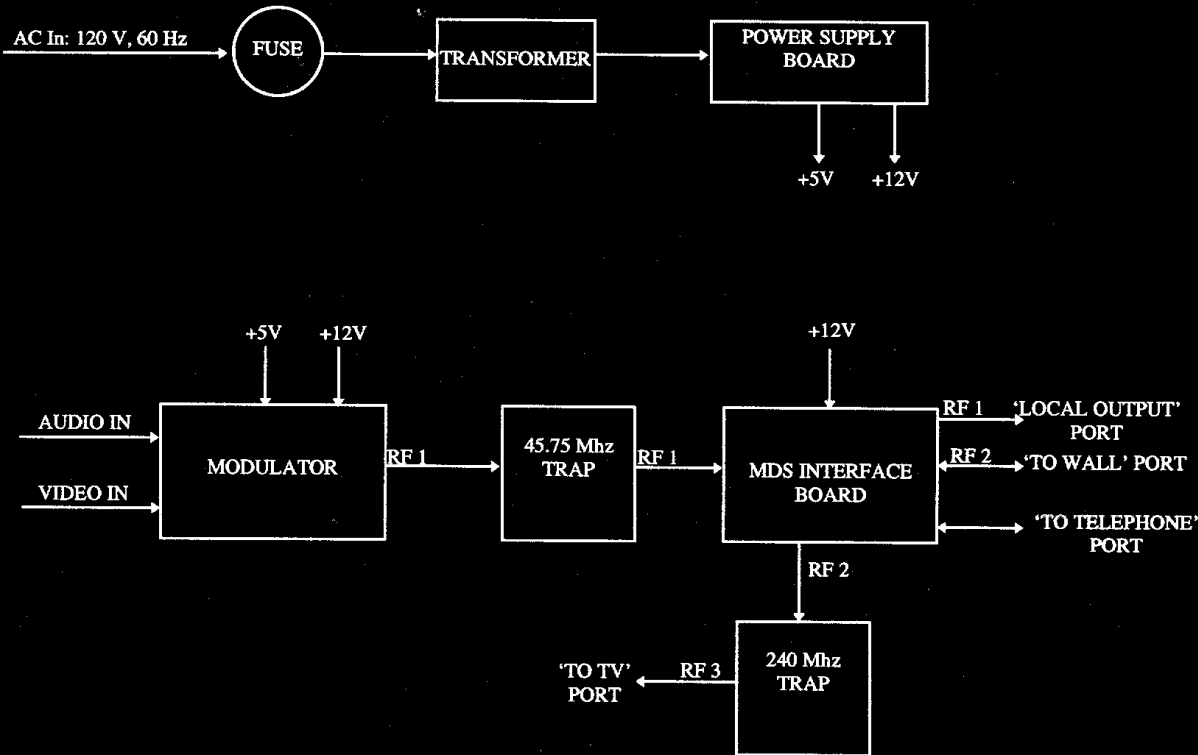
SEE USER.ZIP FILES U1 THROUGH
U12.BMP

EXHIBIT 9

BLOCK DIAGRAM

EQUIPMENT DESCRIPTION

SINGLE FREQUENCY MAC BLOCK DIAGRAM



RF 1 is the output of the modulator board. Its frequency will vary based on the channel of the modulator.

RF 2 is the input to the MDS Interface Board from the system. It will be made of up a various signals depending on system load, with frequencies ranging from 5 to 240 MHz.

RF 3 is the system output of the MAC to a television. It will be make of up various signals depending on system load, with frequencies ranging from 5 to 216 MHz.

EXHIBIT 10

TRANSFER SWITCH

PO. Box 3608
Harrisburg, PA 17105-3608
Phone: 717-564-0100
TWX: 510-657-4110

AMP

AMP Incorporated

Mr. Timothy Maguire
Federal Communications Commission
7435 Oakland Mills Road
Columbia, MD 21046

April 9, 1996

SUBJECT: FCC - R.F. Transfer Switch Issue for the AMP Multimedia System

Dear Tim:

Thank you very much for the time you spent with us on Monday, April 1, 1996. Your kind assistance and guidance in this rather confusing area was much appreciated. In FCC terms, we now internally refer to this system as a form of TVID used with an MATV cable plant (category 5 UTP balanced cable).

Based upon our conversation with you, the AMP Multimedia System will meet all applicable requirements under FCC Rule Sections 15.115, 15.107, 15.109 and the part 68 telephone "ring voltage breakdown". In addition, AMP will obtain all necessary FCC authorizations prior to selling the multimedia system.

During our meeting, you raised the applicability of FCC Rule Section 15.115 (c), which requires provision of an R.F. isolation transfer switch (A/B type) to the AMP Multimedia R.F. Broadband Distribution System. AMP does not believe this requirement is applicable to this product for the following reasons:

1. The AMP system is intended and is engineered for only commercial, institutional, and education uses. We will not endorse or encourage its use in a residential or consumer-oriented manner.
2. The television receivers associated with this system are intended only to be used with the AMP supplied breakout boxes (BOB's) or modulator. No "off air" or other antenna connection will be endorsed, suggested or encouraged when used with the AMP system.
3. The AMP supplied modulator is not to be used in direct connection to the television receiver without the appropriate connection devices/cable. In this use, we further feel that is not a "pure" TVID as described in Part 15.

