APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1033(c)**
SUB-PARAGRAPH: **(14)**
PARAGRAPH TITLE: **DATA REQUIRED**

The data required by sections 2.985 through 2.997 inclusive will be found under the appropriate paragraph listings following.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1046**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **RF POWER OUTPUT**

The output power rating of the TRH/1KE is 1000 watts peak of sync visual. The aural carrier power rating is 100 watts.

The following is a list of equipment used to determine output power.

1. Narda 3020A Directional Coupler.

2. Hewlett-Packard model 8753D Network Analyzer

4. Hewlett-Packard model 435A Power Meter with Hewlett-Packard model 8481A Power Sensor.

5. Hewlett-Packard model 8590A Spectrum Analyzer.

The directional coupler coupling value was measured over the frequency band of interest using the network analyzer.

With a sync and blanking only video test signal applied, the visual carrier only power was measured using the power meter. The meter reading, in dBm, is the peak output power rating of the transmitter in dBm minus the directional coupler coupling loss in dB multiplied by the peak-to-average conversion factor of 0.595. The aural carrier is then applied and the spectrum analyzer is used to establish at minus 10dB aural to visual power ratio.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1047**
SUB-PARAGRAPH: **(d)**
PARAGRAPH TITLE: **MODULATION CHARACTERISTICS**

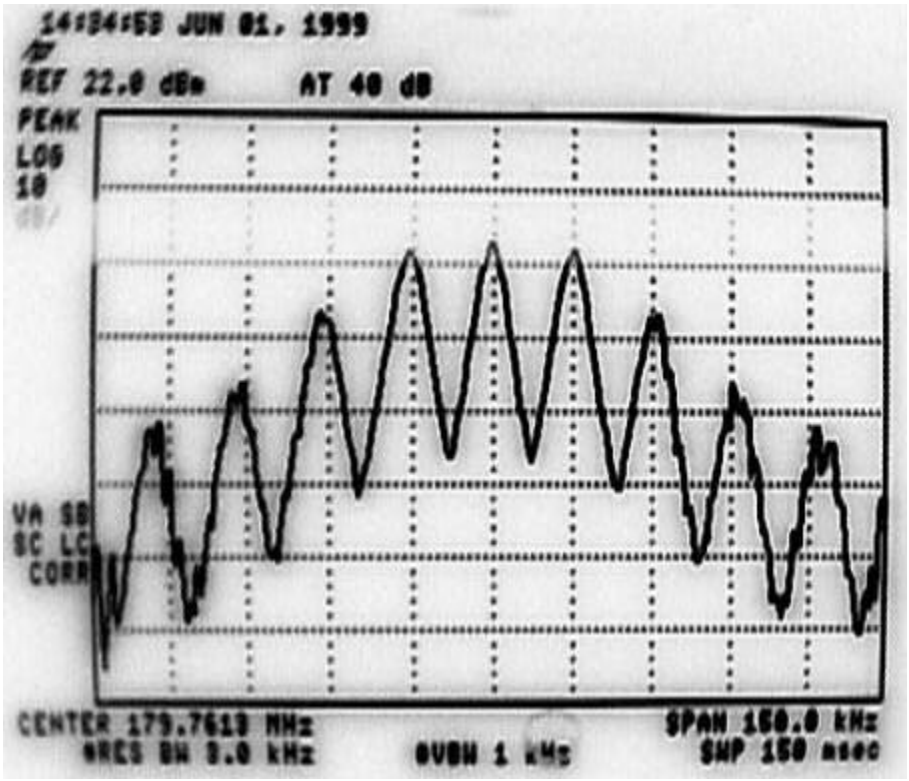
The modulation characteristics are addressed in paragraph 74.750(c)(1) and (d)(1).

Various photographs showing the basic transmitter linearity are provided.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1049**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **OCCUPIED BANDWIDTH**

The photograph shows the occupied bandwidth of the aural carrier modulation at a modulating frequency of 15 kHz at 21.25 kHz deviation.



APPLICATION FOR CERTIFICATION

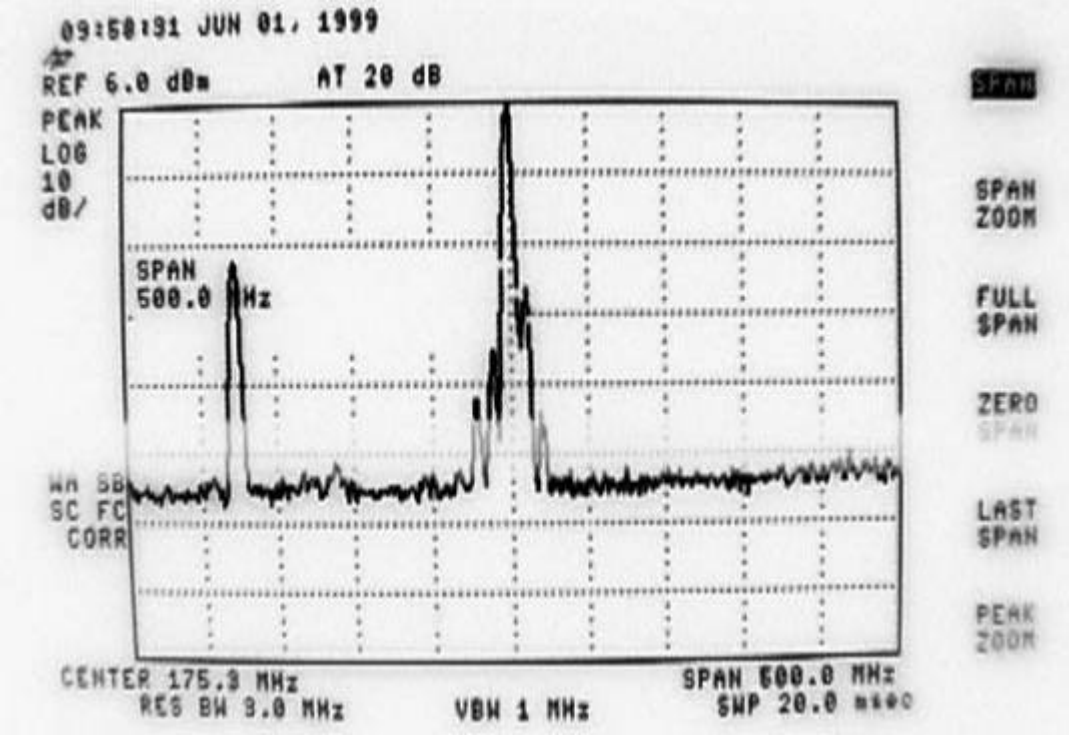
FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1051**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **SPURIOUS EMISSIONS**

The out-of-band spurious signals measured are listed in the table below. The photographs provided display peak visual power at the top graticule line. Vertical scale factor is 10 dB per major division. The values for the spurious signals were obtained with the use of video filtering within the spectrum analyzer to achieve average, versus peak, signals. The reporting of average spurious signal levels is done in accordance with "EIA Electrical Performance Standards for Television Broadcast Transmitters, Out of Channel Intermodulation Distortion". The video filtering was in place when the photographs were taken. A 75% color bar video test signal was used. All other spurious signals were greater than 80 dB below the peak of sync reference.

SPURIOUS EMISSION FREQUENCY MHZ, REL. TO F VISUAL	AMPLITUDE, DB, REL. TO PEAK VISUAL
-4.50	-64
+9.00	-77

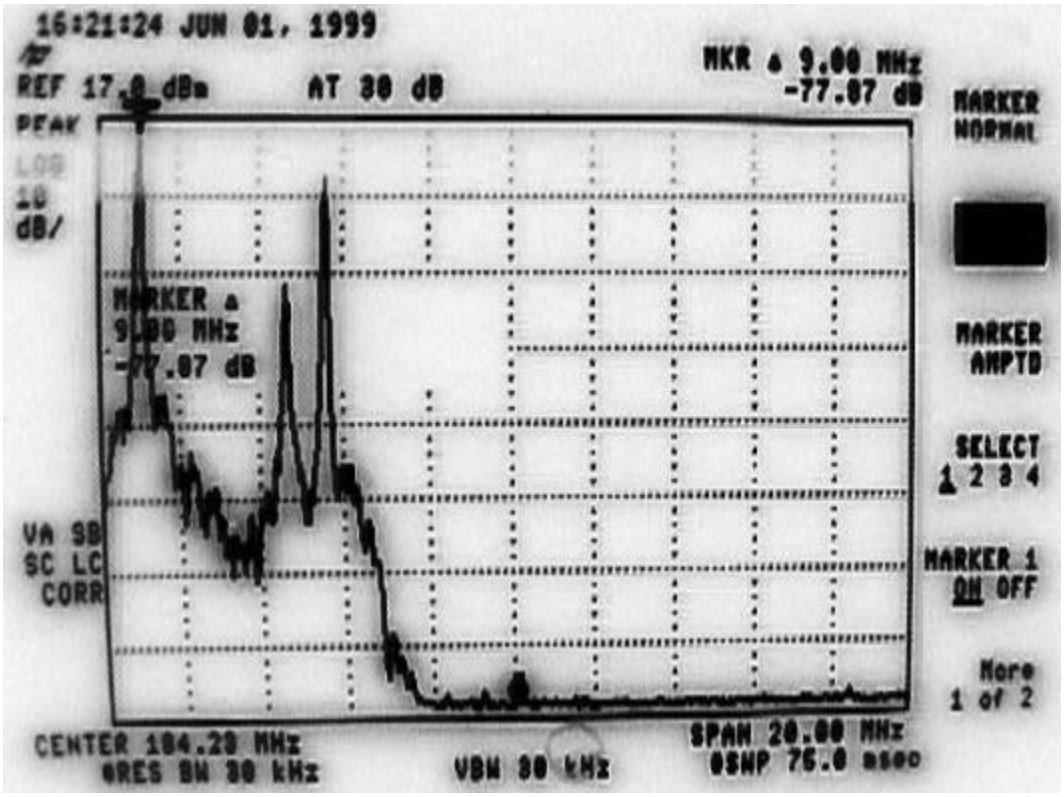
APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1051**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **SPURIOUS EMISSIONS**



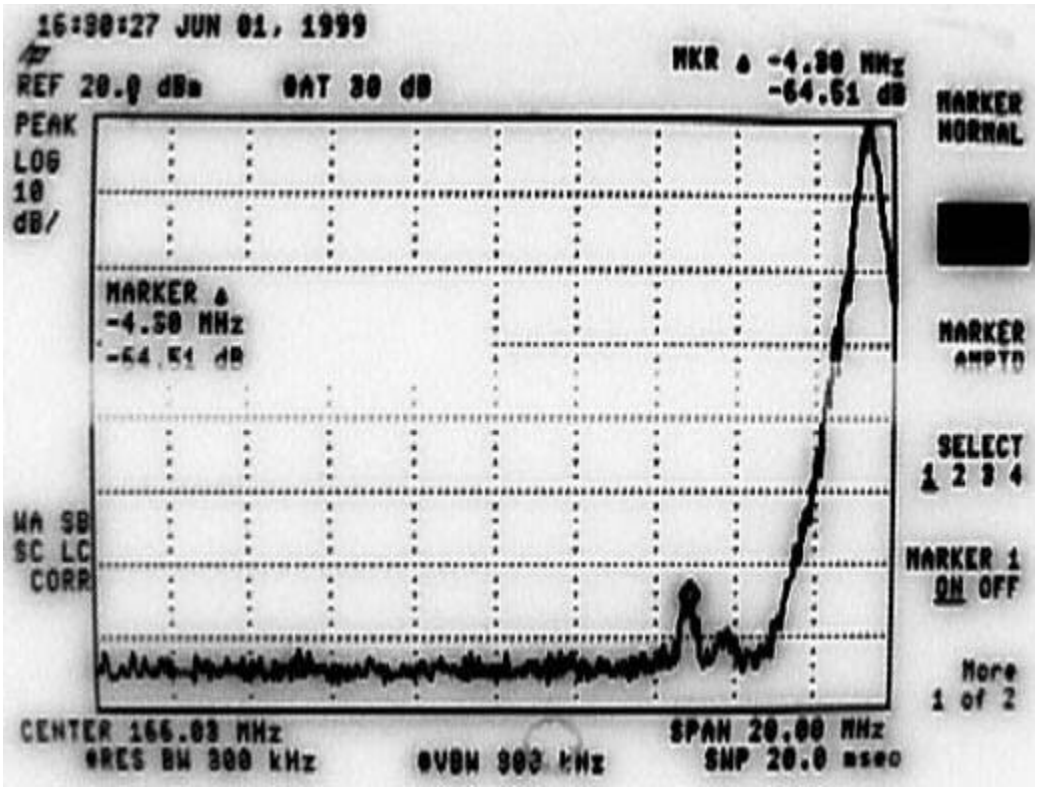
APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1051**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **SPURIOUS EMISSIONS**



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1051**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **SPURIOUS EMISSIONS**



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1053**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **FIELD STRENGTH OF SPURIOUS EMISSIONS**

ÄÄÄ

Cabinet radiation was checked with the transmitter operating at full rated visual and aural power into a dummy load. A calibrated antenna and spectrum analyzer was used to measure the radiation. The receiving antenna was located approximately three meters from the transmitter cabinet. All emissions were greater than 80dB below 1000 watts.

Power line radiation was checked by lightly coupling a spectrum analyzer to the AC line. No spurious signals attributable to the transmitter were observed. The frequency range from 0.01 to 6.5 GHz was investigated during the preceding test.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **2.1055**
SUB-PARAGRAPH:
PARAGRAPH TITLE: **FREQUENCY STABILITY**

Information pertaining to the frequency stability of the TRH/1KE is contained in section 74.750 (c) (3) of this application.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER:	**BQM22802332**
DATE:	**July 30, 1999**
APPLICABLE FCC PARAGRAPH:	**2.1057**
SUB-PARAGRAPH:	
PARAGRAPH TITLE:	**SPECTRUM INVESTIGATION**

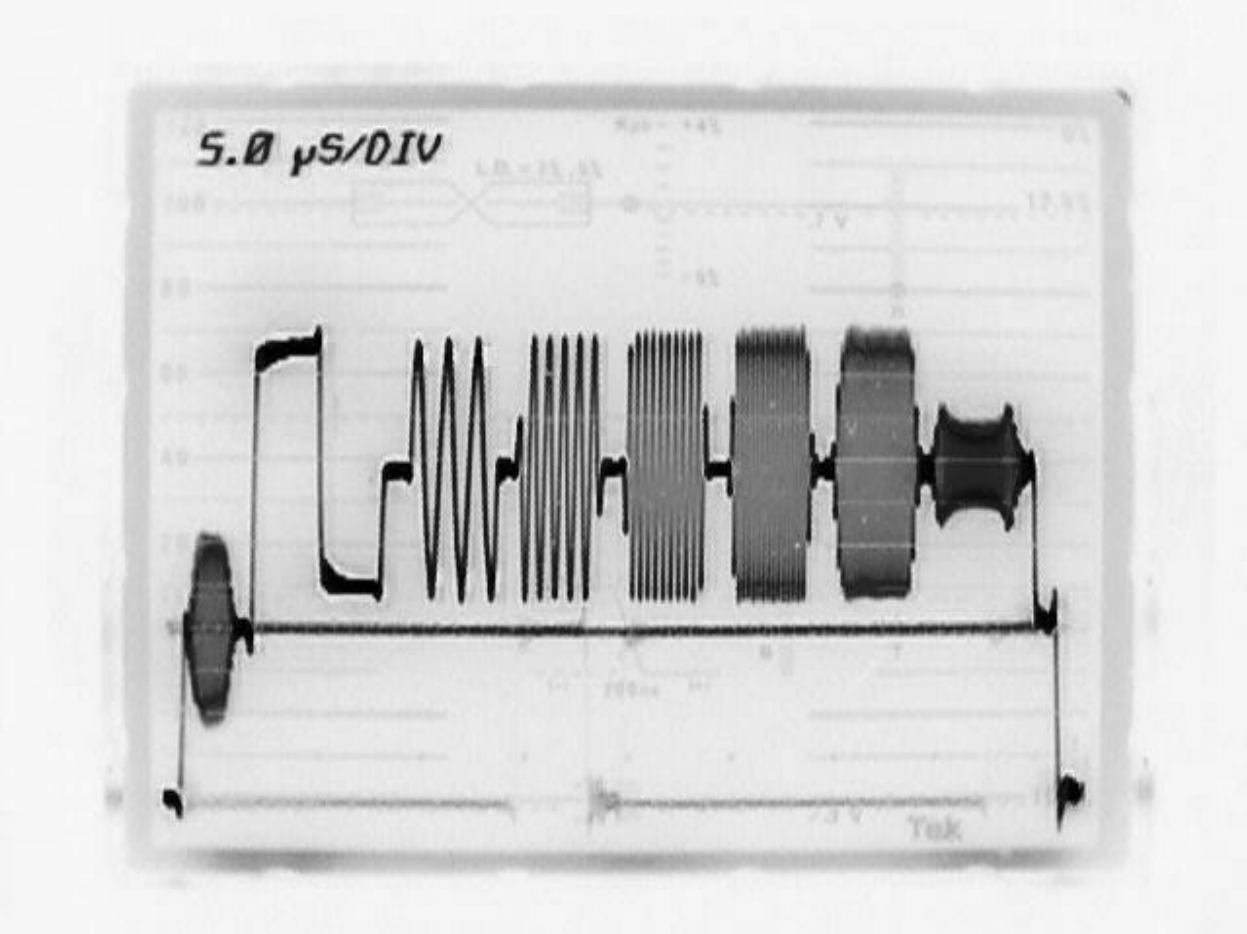
The information required by this paragraph is covered in section 2.991.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(1)**
PARAGRAPH TITLE: **FREQUENCY RESPONSE**

The transmitter for which certification is sought has baseband video as its input. The frequency response of the transmitter is demonstrated in the photographs of section 74.750(d)(1).

The transfer characteristics of the transmitter are demonstrated in the following photographs.



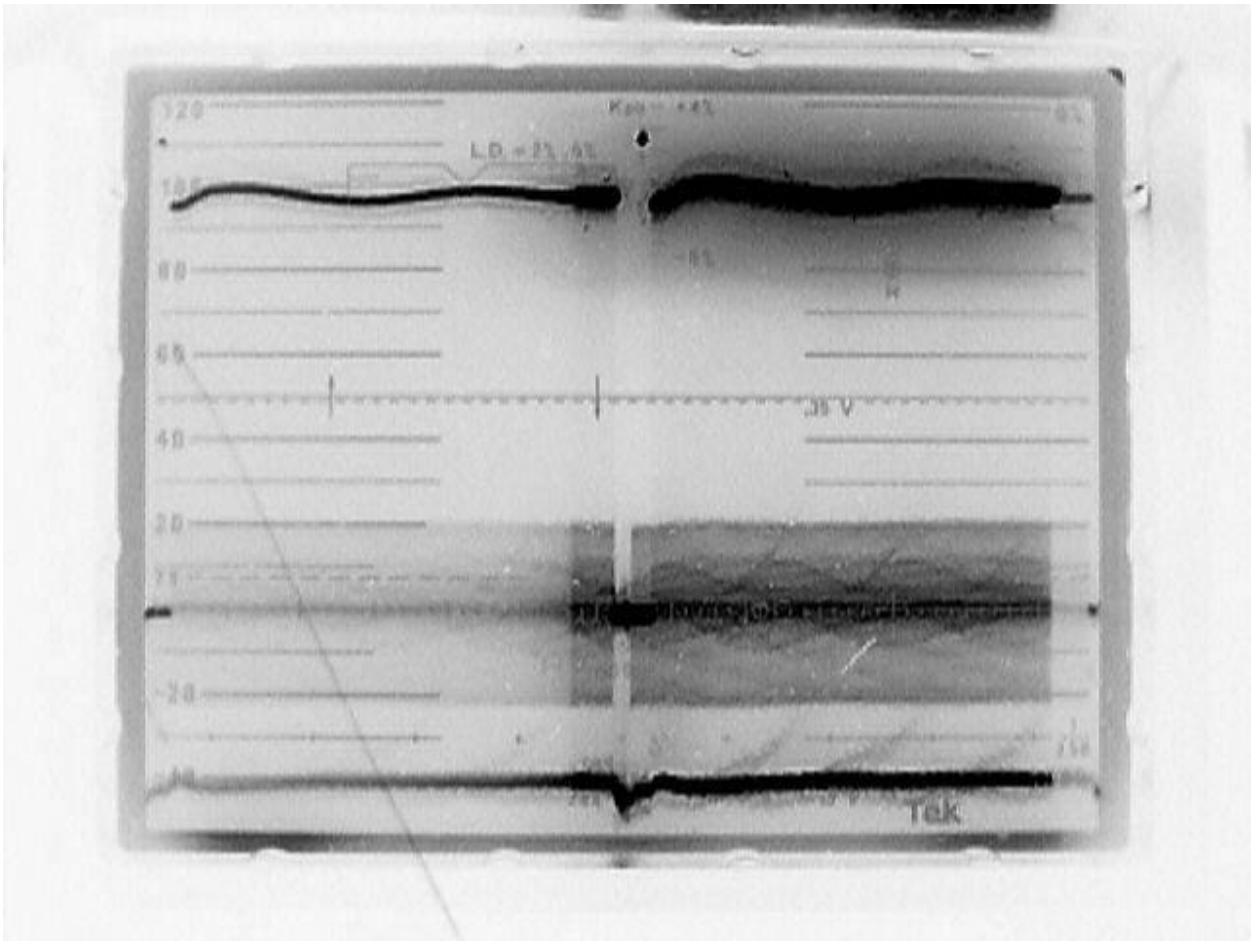
Multiburst-one line

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(1)**
PARAGRAPH TITLE: **FREQUENCY RESPONSE**

The transmitter for which certification is sought has baseband video as its input. The frequency response of the transmitter is demonstrated in the photographs of section 74.750(d)(1).

The transfer characteristics of the transmitter are demonstrated in the following photographs.



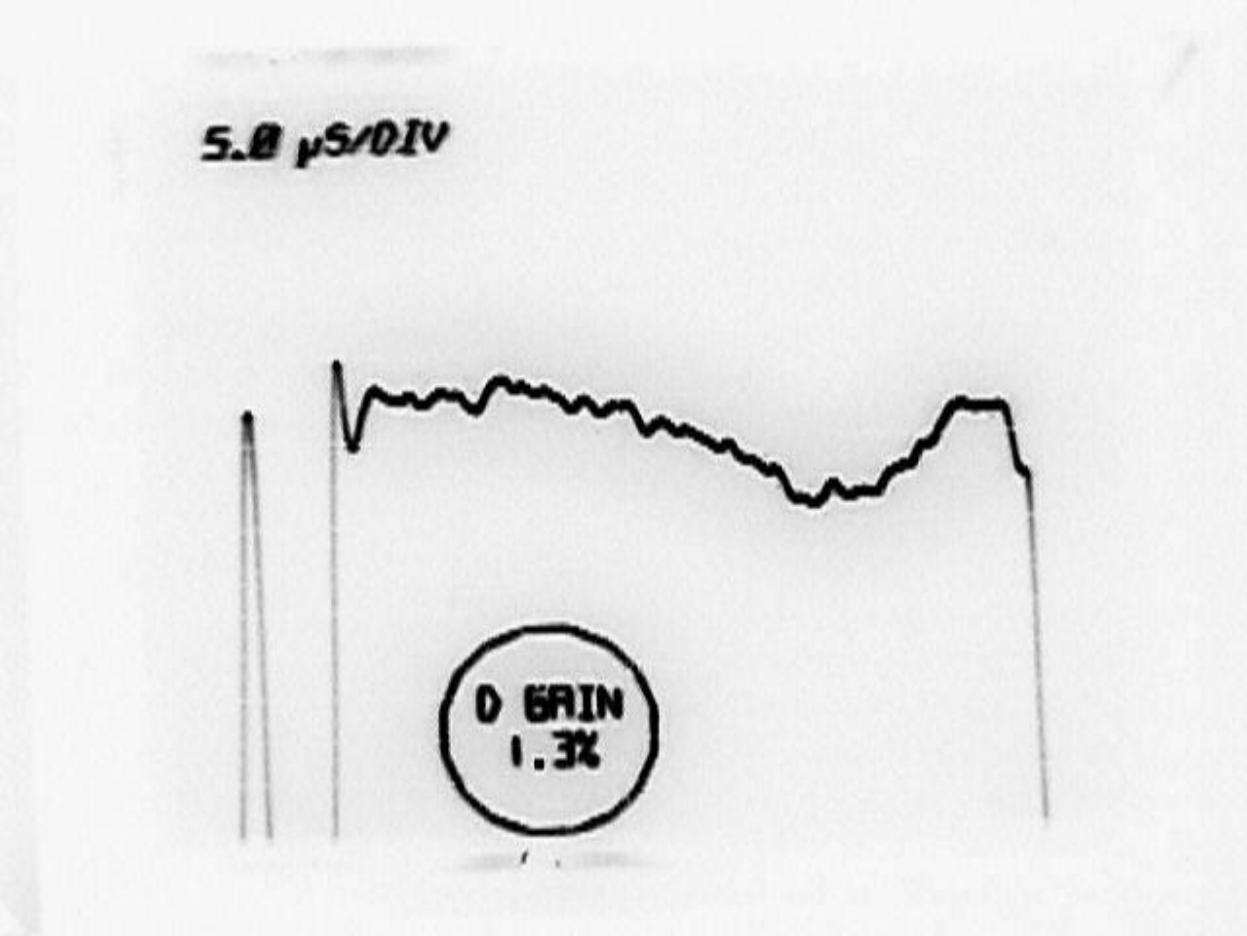
Two Field

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(1)**
PARAGRAPH TITLE: **FREQUENCY RESPONSE**

The transmitter for which certification is sought has baseband video as its input. The frequency response of the transmitter is demonstrated in the photographs of section 74.750(d)(1).

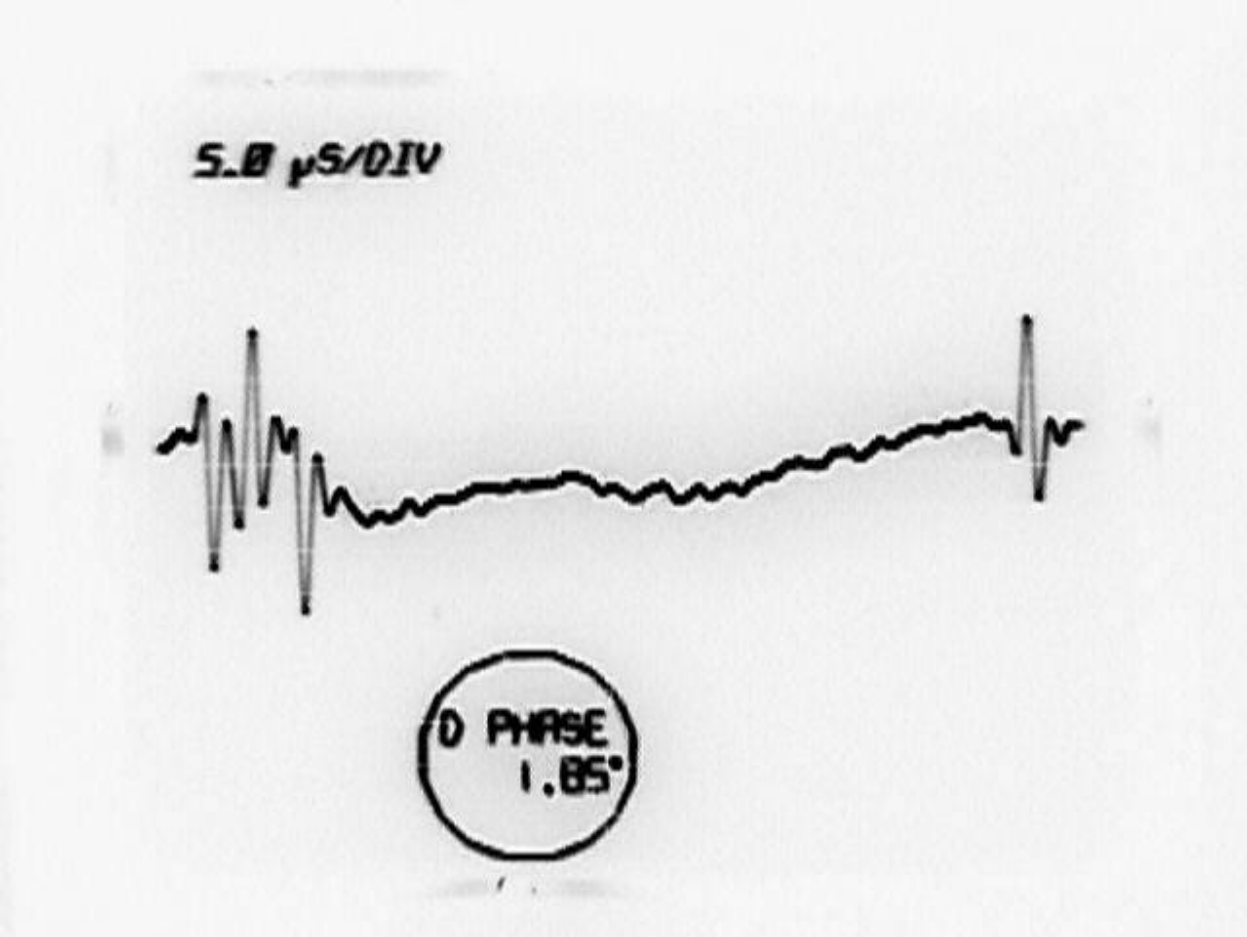
The transfer characteristics of the transmitter are demonstrated in the following photographs.



Differential Gain

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(1)**
PARAGRAPH TITLE: **FREQUENCY RESPONSE**



Differential Phase

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(2)**
PARAGRAPH TITLE: **SPURIOUS AND HARMONICS OUTPUTS**

The information required by this section is covered in section 2.991.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(3)**
PARAGRAPH TITLE: **CARRIER FREQUENCY STABILITY**

The transmitter visual carrier operating frequency is dependent on the stability of both the visual IF 45.75 MHz reference oscillator and the upconversion local oscillator. Oscillator frequency stability data is presented on the following pages. A regulated dc supply provides power to the oscillators and as a result changes in frequency over the 85% to 115% ac input voltage range are immeasurable. Worst case visual carrier operating frequency stability occurs if both oscillators shift in a direction such that the frequency changes add.

45.75 MHz Crystal Maximum Deviation	.15khz
Channel Oscillator Maximum Deviation	+.48kHz
Maximum Visual Carrier Output Frequency Deviation	.63khz

The transmitter aural carrier operating frequency is dependent on the aural IF modulated 4.5 MHz oscillator, the visual IF modulator 45.75 MHz oscillator and the up conversion oscillator. Oscillator frequency stability data is presented on the following pages. Worst case aural carrier operating stability occurs if the three oscillators shift in a direction such that the frequency shifts add.

45.75 MHz Crystal Maximum Deviation	.15khz
4.5 MHz Crystal Maximum Deviation	.25khz
Channel Oscillator Maximum Deviation	+.48khz
Maximum Aural Carrier Output Frequency Deviation	.88khz

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(3)**
PARAGRAPH TITLE: **CARRIER FREQUENCY STABILITY**

CHANNEL LOCAL OSCILLATOR
FREQUENCY VS. TEMPERATURE

fo= 221.00000

TEMP, °C	FREQ, MHz	ΔF, kHz
-30	221.00020	.20
-20	221.00032	.32
-10	221.00028	.28
0	221.00005	.05
+10	221.00042	.42
+20	221.00048	.48
+30	221.00048	.48
+40	221.00047	.47
+50	221.00020	.20

MAXIMUM FREQUENCY DEVIATION: .48kHz

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(3)**
PARAGRAPH TITLE: **CARRIER FREQUENCY STABILITY**

4.5 MHz REFERENCE CRYSTAL
FREQUENCY VS. TEMPERATURE

TEMP, °C	FREQ, MHz	ΔF, kHz
-30	4.50025	.25
-20	4.50025	.25
-10	4.50022	.22
0	4.50017	.17
+10	4.50012	.12
+20	4.50007	.07
+30	4.50003	.03
+40	4.50001	.01
+50	4.49995	.05

MAXIMUM FREQUENCY DEVIATION: .25kHz

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(3)**
PARAGRAPH TITLE: **CARRIER FREQUENCY STABILITY**

45.75 MHz CRYSTAL
FREQUENCY VS. TEMPERATURE

TEMP, °C	FREQ, MHz	ΔF, kHz
-30	45.74999	.04
-20	45.74999	.01
-10	45.74985	.15
0	45.74998	.02
+10	45.75000	---
+20	45.75000	---
+30	45.75005	.05
+40	45.75008	.08
+50	45.75010	.10

MAXIMUM FREQUENCY DEVIATION: .15kHz

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(4)**
PARAGRAPH TITLE: **AGC OPERATION**

The transmitter has as its input signal baseband video. Variation in the amplitude of its input baseband video signal will result a change in the depth of modulation of the visual output signal, but not in peak output power

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(5)**
PARAGRAPH TITLE: **AUTOMATIC ON/OFF OPERATION**

Automatic on/off operation is accomplished in the video input section of the Modulator of the TRH/1KE. The presence of video is detected and is processed to control a relay which turns the final power amplifier power supply on and off. A more detailed description of the circuit is available in the instruction manual.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(6)**
PARAGRAPH TITLE: **POWER TUBE (DEVICE) RATING**

The final output stage of the TRH/1KE consists of two transistors operating in parallel. A copy of the device data sheet is included.

An analog meter located on the front panel of the final amplifier module permits the operator to determine the power supply voltage applied and the current drawn by the four transistors.

APPLICATION FOR CERTIFICATION

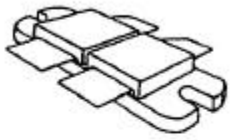
FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**

SGS-THOMSON MICROELECTRONICS

SD1485

RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

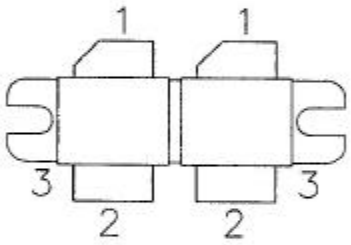
- 170 - 230 MHz
- 32 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHING
- HIGH SATURATED POWER CAPABILITY
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- P_{OUT} = 200 W MIN. WITH 11.0 dB GAIN



2 x .437 x .450 2LFL (M175)
epoxy sealed

ORDER CODE	BRANDING
SD1485	SD1485

PIN CONNECTION



1. Collector
2. Base
3. Emitter

DESCRIPTION

The SD1485 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in VHF and Band III television transmitters and transposers.

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	65	V
V_{CEO}	Collector-Emitter Voltage	35	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_C	Device Current	25	A
P_{DISS}	Power Dissipation	385	W
T_J	Junction Temperature	+200	°C
T_{STG}	Storage Temperature	– 50 to +150	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance	0.45	°C/W

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(7)**
PARAGRAPH TITLE: **AUTOMATIC STATION IDENTIFICATION**

Station identification of the TRH/1KE is accomplished by amplitude modulating the aural FM carrier. A modulating tone frequency of 500 Hz is used. The output from the 500 Hz oscillator is fed to a trap tuned to the aural intermediate frequency which causes 40 % modulation of the carrier. The oscillator is controlled by a solid state encoder which repeats the proper code sequence every 20 minutes. The stations call sign is transmitted twice every time the encoder is activated.

APPLICATION FOR CERTIFICATION

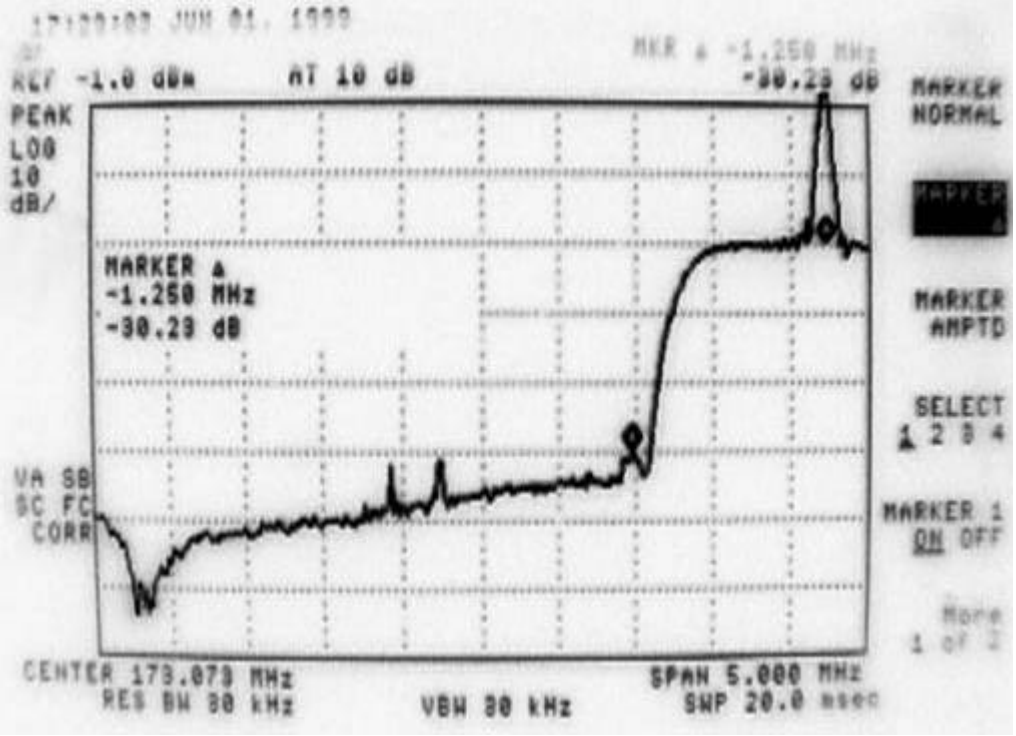
FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(c)(8)**
PARAGRAPH TITLE: **WIRING AND SHIELDING**

The TRH/1KE is wired in accordance with good electrical and mechanical engineering practice. The entire unit is self contained in a cabinet 22 inches that is completely enclosed.

APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

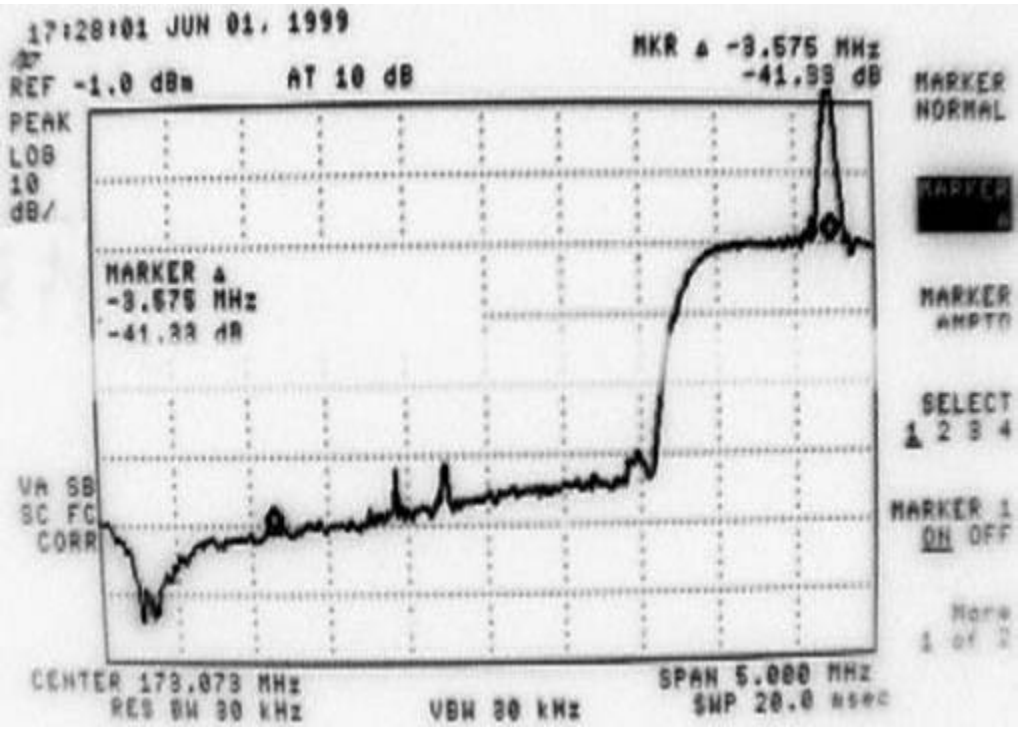
The following photographs show the in-channel visual modulation characteristics as produced at the output of the transmitter operating at 1000 watts peak of sync.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

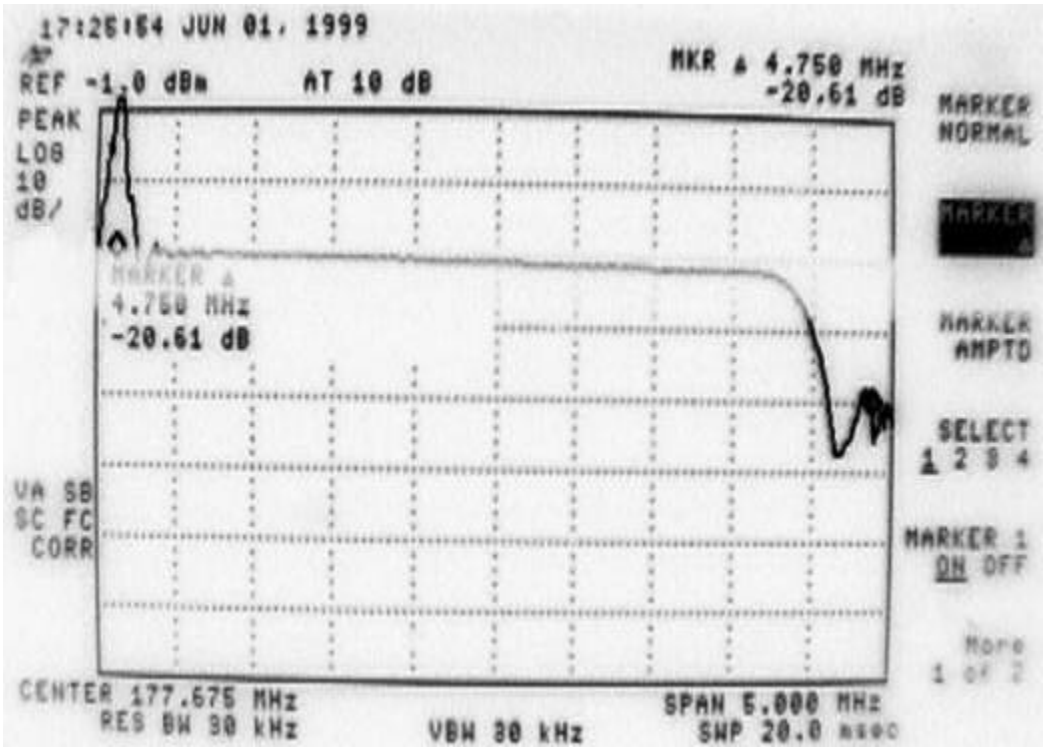
The following photographs show the in-channel visual modulation characteristics as produced at the output of the transmitter operating at 1000 watts peak of sync.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

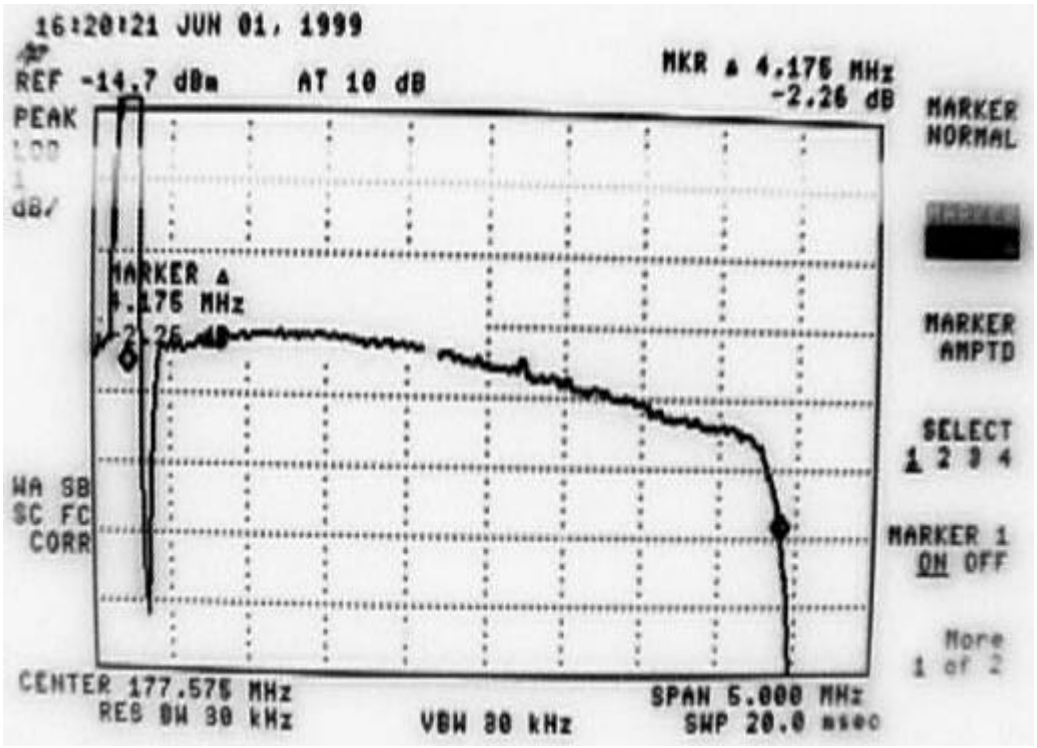
The following photographs show the in-channel visual modulation characteristics as produced at the output of the transmitter operating at 1000 watts peak of sync.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

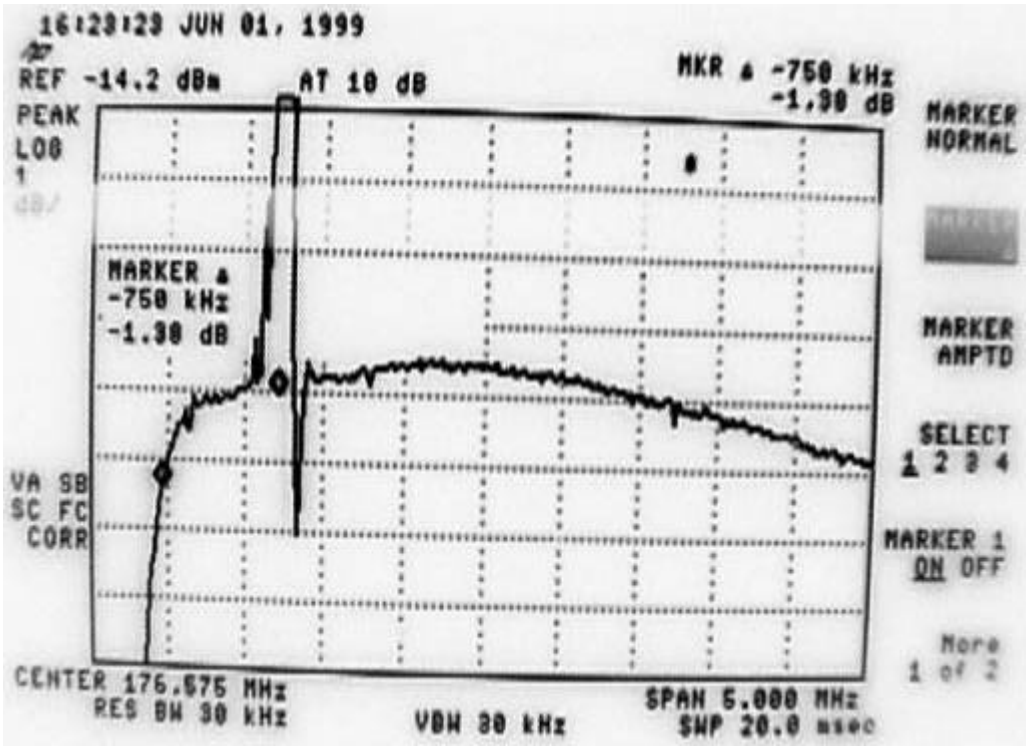
The following photographs show the in-channel visual modulation characteristics as produced at the output of the sync transmitter operating at 1000 watts peak of sync.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

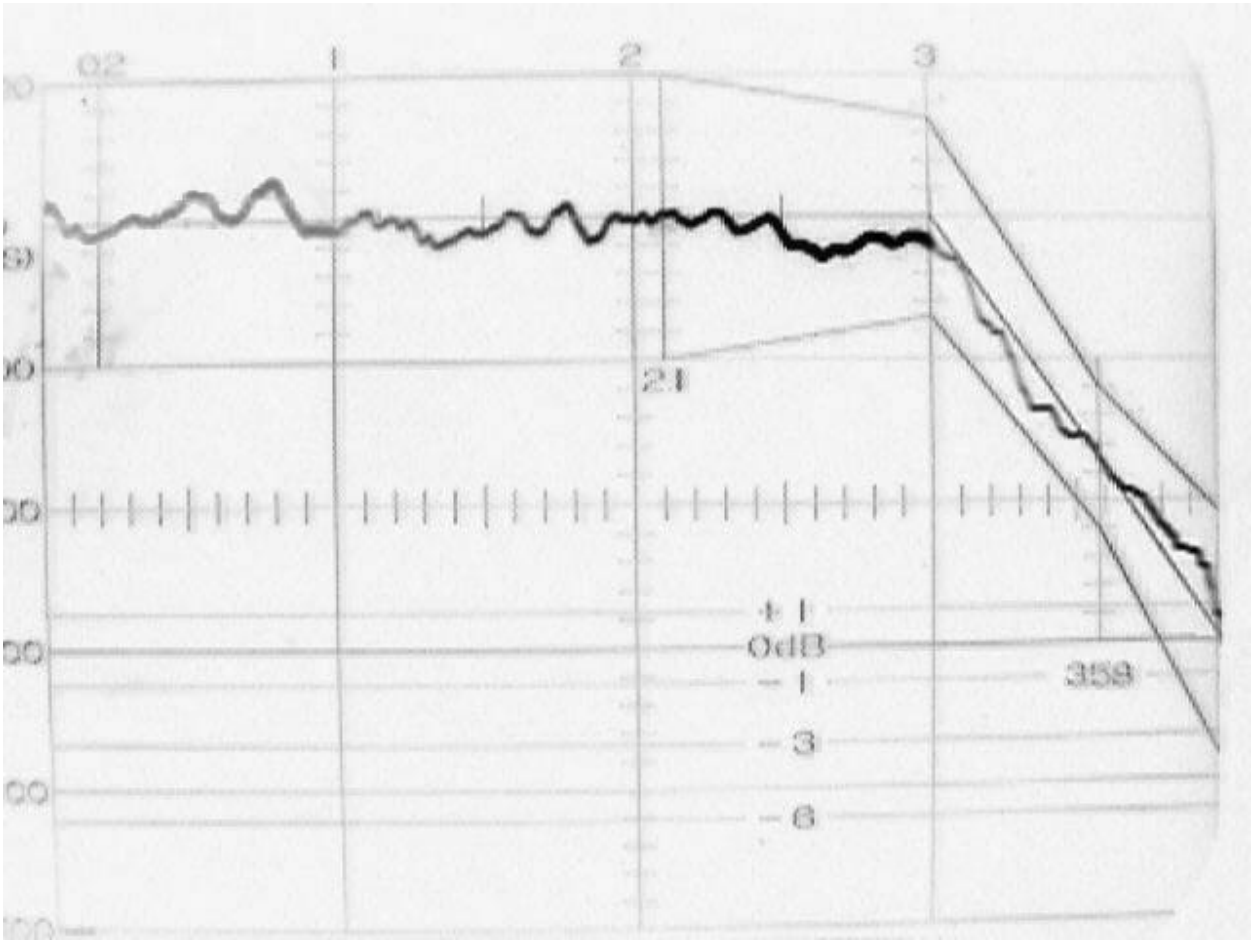
The following photographs show the in-channel visual modulation characteristics as produced at the output of the sync transmitter operating at 1000 watts peak of sync.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(1)**
PARAGRAPH TITLE: **VISUAL TRANSMITTER**

The following photograph shows the envelope delay characteristic of the transmitter.



APPLICATION FOR CERTIFICATION

FCC IDENTIFICATION NUMBER: **BQM22802332**
DATE: **July 30, 1999**
APPLICABLE FCC PARAGRAPH: **74.750**
SUB-PARAGRAPH: **(d)(2)**
PARAGRAPH TITLE: **AURAL TRANSMITTER**

The stability of the aural carrier, relative to the visual carrier, is dependent on the stability of the 45.75 MHz visual IF oscillator and the 4.5 MHz aural IF oscillator. Oscillator frequency versus temperature data is included in paragraph 74.750(c)(3) of this application. Adding the worst case deviation of both oscillators produces a maximum .44 kHz aural to visual carrier deviation. Combined carrier amplification is used therefore the aural to visual carrier separation will remain unchanged through the rest of the transmitter.