APPLICATION FOR FCC CERTIFICATION

BZ5MX1VX
HETERODYNE PROCESSOR INPUT
1 WATT VHF TRANSLATOR

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1W VHF TRANSLATOR

This application requests authorization for video/audio input to our 1 Watt VHF Translator, BZ5MX1VX (Certification applied for). The amplifier will be driven directly by a color television heterodyne processor.

The intended use of the BZ5MX1VX is to rebroadcast a television translator relay station or other legal source of video and audio.

A paragraph by paragraph reference is given herein, presenting the required additional data to that called for on FCC Form 731 for FCC Certification of BZ5MX1VX 1 Watt VHF Translator. Exhibits are attached to authenticate this application. If further data is required, it will be furnished on request.

The unit tested specifically for this application was operated on Channel 8. This channel was chosen to provide protection to and from existing radio services, and to facillitate the measurement of possible spurious products conducted or radiated from the 1 Watt VHF Translator.

The results stated here are "worse case" unless otherwise noted. The input signals used in the tests were generated by a color bar generator driving a Blonder Tongue Heterodyne Processor which is typically the processor used. However, due to varying customer requirements, other heterodyne processors are available on customer request. The published specification on any heterodyne processor used in this equipment will meet or exceed FCC specifications. The output of the 1 Watt VHF Translator was properly terminated with a resistive type RF load.

2.1033(b)(1): Applicant is the manufacturer of the equipment. See FCC Form 731
2.1033(b)(2): See FCC Form 731
2.1033(b)(3): Exhibit 2 (1W VHF Instruction Manual, SAIP-60-750 Instruction Manual)
2.1033(b)(4): Exhibit 7 (Active Devices and Function List).
2.1033(b)(5,6,7):See also, the paragraph by paragraph summary of compliance with Part 74, Sub-part G of the FCC Commission Rules that follow.

PART 74.750(c)(1):
The frequency stability of this equipment as measured per Part 2.1055 of the rules is much better than required over the specified range of input voltage and temperature.

The test equipment was set up as shown in Exhibit 3. The translator was swept with a CW signal equivalent to 1 watt peak sync. The AGC circuit was defeated to facillitate the measurement. Three different input signal levels, (1000uV +15dB, 1000uV, 1000uV -15dB), were introduced. The gain of the AGC amplifier was adjusted to 1 watt to demonstrate the output bandpass under different input signal conditions. Exhibits 6a, 6b, and 6c are photos of the frequency response displayed on the oscilloscope. They show the bandpass to be flat $\pm$1.5dB with no substantial change due to the input signal levels.

PART 74.761(a):
The frequency stability of the visual carrier is totally dependent upon the heterodyne processor. Exhibits 4a and 4b document the measurements made, including method and equipment. Processor output frequency can be, and is normally set to zero deviation at the output channel. As shown in Exhibit 4a, the typical characteristic variation due to temperature is less than $\pm$.02%. This is true for all heterodyne processor channels.

PART 74.750(c)(2):
With the translator set up as in Exhibit 3 with a normal Channel 56 input signal, the following products, more than 2MHz from the channel edges, were measured at the output terminal relative to 1 watt peak sync.

FREQUENCY(MHz)	SOURCE	LEVEL MEASURED(dB)
362.50	2ND HARMONIC	66
194.75	Aural +9.0MHz	>70
190.25	Aural +4.5MHz	66
176.75	Visual -4.5MHz	58
172.25	Visual -9.0MHz	>70

Observations were made on a properly operating translator Channel 56 to Channel 8 using a Hewlett-Packard 8558B Spectrum Analyzer with a cut to frequency dipole antenna at 10 meters from the translator and rotated to detect maximum radiation. The following signals were present:

FREQUENCY(MHz)	SOURCE	SPECIFICATION LIMIT uV	MEASURED uV
362.50	2nd Harmonic	293	100
227.00	LO	238133	10

Radiation from the heterodyne processor was nil. No spurious products could be detected at 10 meters that were less than 90dB down.

Antenna terminal measurements with the 8591E Spectrum Analyzer showed no change due to the heterodyne processor since the power amplifier stages are not affected by this modification.

The above tests were perfomed using the same equipment hook up and methods descibed in Exhibit 3. The translator test data compiled for this application was Channel 56 to Channel 8. Translator operating with a standard video test signal input (modulated stair step and color burst) and a modulated carrier at -10dB of peak visual. Results were typical of performance on all channels.

PART 74.750(c)(3)(i):
Variation of input voltage $\pm$ 15% (reference +24 VDC or 120VAC) during the temperature tests resulted in no discernible frequency variation traceable to the power supply. This is reasonable due to the heterodyne processor's internal regulation.

PART 74.750(c)(4):
With the equipment set as described in Exhibit 3, a CW signal at the visual carrier frequency was substituted for the normal input signal. After setting the translator output to 1 watt, the input

signal was varied. Refer to Exhibits 6a, 6b, and 6c. The output power may be set at 100% for any average input signal (500uV to 5000uV recommended) without fear that the input signal change would result in the output power exceeding 100% at some point. The output will always track, even when the input level is far above or below the recommended levels.

PART 74.750(c)(5):
This equipment meets all the requirements for unattended operation. A description of the automatic control circuitry can be found in Exhibit 2a.

PART 74.750(c)(6):
Measurements can be taken while the equipment is in operation. Normal operating constants of the power output stage average +24 volts at 500mA.

PART 74.750(c)(7) AND PART 74.783(a)(2):
Station identification requirements will be supplied by the originating station.

PART 74.750(c)(8):
Wiring, shielding and construction are in accordance with accepted principles of good engineering practice. Apparatus is constructed on an aluminum chassis suitably protected to resist corrosion. Circuits are properly by-passed and RF shielded as appropriate. Power circuits are fused and overload protected by automatic shutdown.

PART 74.750(d)(1):
This equipment meets the requirements of Part 73.687(a)(1) and Part 73.687(b)(3) at the final RF output terminal.

It is anticipated that the translator will be driven directly by the demodulator output of an FM microwave repeater. No provision is made for tampering with or adjusting the composite video or audio signal, except depth of video modulation. Therefore, all aspects of the input video signal (Transmission Standards 73.682 and 73.687) are determined solely by the originating television station. This performance data has been obtained with an NTSC signal generator that produces standard video test signals. See Exhibits 10a, 10b, 10c, and 10d.

Exhibit 10 shows photographs of various video test waveforms as seen on the translator, demonstrating that the transmitted waveform is substantially identical to the input. The typical envelope delay response of the modulator as required in Part 73.687(a)(5) will be made on each unit manufactured to ensure that readings meet the FCC specifications. The additional group delay in the translator is negligible. The test equipment and set-up used is described in Exhibit 3. Tabulated data is shown in Exhibit 11a and graphed in Exhibit 11b.

The graphs of Exhibit 10 show linearity of the translator between reference black and white levels.

Part 74.750(d)(2):
The heterodyne processor of this translator will accept audio from the television translator relay station. Frequency spacing, deviation and other characteristics including distortion are therefore determined solely by the originating television station.

The sound carrier deviation was monitored while the frequency vs. temperature measurements were taken, see Exhibit 4a. The equipment meets the ±1kHz requirement.