1.0 IDENTIFICATION OF APPLICANT AND EQUIPMENT

1.1 Applicant:

Information Transmission Systems Corp.
375 Valley Brook Road
McMurray, PA 15317

The above name and address is printed on a label attached to the rear panel of the equipment.

1.2 Equipment and Model Number: ITS-5765

This information is provided on the front panel of the equipment.

1.3 ITS Corporation shall manufacture this product in quantities necessary to satisfy market demand.

2.0 TECHNICAL DESCRIPTION - MODEL ITS-5765

2.1 Introduction

The ITS-5765 is a Digital Amplifier, designed to operate with an ITS-5722 driver transmitter (FCC ID: CJJ79XITS-7025), with an output power capability of 25 watts (average). The ITS-5765 incorporates Feed Forward distortion cancellation to insure error free signal transmission.

The unit is comprised of a 25 Watt Amplifier tray, which includes all necessary power supplies and control logic.

This tray is a 19-inch rack mount assembly and can be supplied with or without a cabinet. It is supplied complete with cables and cabinet slides.

Parameters and specification for operation of this unit are provided on the following pages, and a complete circuit description and alignment procedure are also included in this report. Refer to the overall system block diagram and the particular referenced schematics in the attached circuit description section of this report.

2.0 TECHNICAL DESCRIPTION

2.2 Technical Specifications

Type of Emissions..... 6M00D7W

Frequency Range .....2150 to 2162 and 2500 to 2686 MHz (any 6 MHz channel)

Output Power Rating .....25 watts average

DC voltage and total current of final amplifier stage ..... 10 volts DC at 32.5 amps
(Class A - Not RF power dependent)

2.3 Performance Specifications (with ITS-5722 Driver Transmitter)

Operating Frequency Range.....2150 to 2162 and 2500 to 2686 MHz
Input Frequency Range.....2150 to 2162 and 2500 to 2686 MHz
Nominal Input Signal Range..... -29 dBm to -32 dBm
RF Output - Nominal:

Power.....12.5 to 25 watts total average (adjustable in the Transmitter)
Impedance .....50 ohms
Connector..... Type N

Input: MDS/MMDS/ITFS Digital Signal (64 QAM) ..... Type N

Out of band Spurious Products .....-38 dB max (at channel edge)
-60 dB max (3.0 MHz above channel edge and 3.0 MHz below channel edge)
Harmonic Products.....-60 dB max

Electrical Requirements

Power Line Voltage ..... 208/240 VAC, ±10%, 50 Hz or 60Hz

Power Consumption.....1243 watts

Environmental

Maximum Altitude..... 12,000 feet (3,660m)
Ambient Temperature .....0° to +50°C

Mechanical

Dimension(WxDxH) ..... 19" x 30" x 10.25" (48.3cm x 76.2cm x 26.0cm)

Weight:..... 85 lbs. (38.6 kgs)

2.0 TECHNICAL DESCRIPTION

2.4 Circuit Description

The ITS-5765 Amplifier can be subdivided further as follows:

25 Watt Amplifier Tray	-RF Input -RF Output -Amplifier Modules -Bias Circuits -Feed Forward Correction -Control Logic -Switching Power Supplies -DC to DC Converter -Peak Detector -Splitters -Combiner -Couplers

2.0 TECHNICAL DESCRIPTION

2.4 Circuit Description

Signal Path

The RF input signal from the driver transmitter enters the tray at J1 and is fed to the input of a 25W Power Amplifier Assembly (1586-3117). The 25W Power Amplifier Assembly consist of an Amplifier Module (1586-3104), 8 Section Bias Board (1586-3109), and DC to DC Converter (ITS-DC380-11).

The amplifier assembly provides both amplification and Feed Forward distortion cancellation. The module is subdivided into 5 functional sections: power amplifier section, feed forward correction signal section, correction signal preamplifier section, correction signal main amplifier section, and feed forward cancellation/RF output section.

The RF input signal enters the power amplifier section of the amplifier assembly at J2 and is phase and amplitude adjusted using a microstrip delay line and resistor pad network. The signal is then applied to a 3 dB Branch Line Coupler which provides a sample of the input signal to the feed forward correction signal section later in the signal path. The main output signal from the coupler is fed to the power amplifier which consist of five GaAs FET amplifiers (MGFS45V2527-1driving four parallel MGFS45V2527-1's) with an overall gain of approximately 24 dB. A 20 dB microstrip coupler provides and uncorrected (distorted) sample of the power amplifier output signal. This sample is used in the feed forward correction signal section of the module which the generates the correction signal that will be amplified and coupled with the RF output signal to cancel the distortion created in the power amplifier.

The input signal (undistorted) sample is phase shifted 180° through a delay line and fed to the feed forward correction signal section of the assembly where it is phase and amplitude adjusted and coupled with the uncorrected signal from the output amplifier. Combining these two signals (the phase shifted (180°) input signal, and the distorted power amplifier output signal) cancels the information carrying component of the signal, leaving only the distortion of the output amplifier.

This correction signal is fed to the correction signal preamplifier section of the module which consist of two cascaded GaAs FET amplifiers (FLl100 driving a FLL200) with an overall gain of approximately 24 dB. The signal is then fed to the feed forward correction signal main amplifier where it is amplified to a sufficient level to cancel the distortion created by the power amplifier. The correction signal main amplifier consist of two parallel GaAs FET amplifiers (both MGFS45V2527-1) with an overall gain of approximately 12 dB.

The amplified correction signal and the phase shifted (180°) output of the power amplifier are applied to a hybrid microstrip coupler in the feed forward distortion cancellation/RF output section of the module where the signals are coupled together using a 6.5 dB Branchline Coupler, effectively canceling the distortion in the output signal. The main output signal connects to the output of the amplifier assembly at J8.

2.0 TECHNICAL DESCRIPTION

2.4 Circuit Description - continued

The DC biasing of the FET amplifiers in each section of the module is controlled and filtered by corresponding daughter boards which are soldered directly to the main board. The DC bias drain to source currents are set by adjusting the negative gate to source voltages which are adjusted by potentiometers on the daughter boards.

The 8 Section Bias Board distributes the -5V bias voltages and +10.4V drain voltages to the Amplifier Module as well as providing protection from an over current condition with board mounted fuses.

The -5V bias voltage is generated on board using a voltage regulator (LM377T). This bias voltage is also used as an interlock which is fed to the Power Detector/Control Board (1586-1118). If the bias voltage is lost, the control circuitry on the Power Detector/Control Board will immediately shut down the switching supply, thereby removing the drain voltages from the amplifier modules and protecting the GaAS FET devices.

Differential amplifier OP Amp circuits are used to monitor the drain currents of the FET devices. The OP Amp outputs drive LED indicators as well as an opto-isolated O/P amplifier status line.

The DC to DC converter inputs +390VDC from the Power Factor Corrected Front End Module (1586-1111) and generates two 10.8 VDC outputs using three DC to DC converter IC's (VI-B61-EU). An Enable signal from the driver transmitter is used to activate the DC to DC converter.

The output signals from the two 25 W Power Amplifier assemblies are combined into a single output signal using a 2-Way Combiner (2111-1008) module. A Reject Load Module (1586-1106) is used to absorb any reflected power. The combined signal is applied to a directional coupler (A13) which provides forward and reflective power samples to the Power Detector/Control Board.

Control

The Power Detector/Control Board (1586-1118) provides the dual function of forward/reflective power detection and operating status control and monitoring capability. The board is designed to protect the amplifier in the event of one of the following faults: over temperature, loss or reduction in output power, and loss of the -5 VDC GaAs FET bias voltage. The Power Detector/Control Board also provides the capability to remotely control and monitor the amplifier status through external remote connections at J3 (25 pin D) on the rear of the tray.

Power Supplies

The amplifier is powered through a standard 220 VAC 60 Hz source. The AC source enters the tray at jack J1, passes through a fuse protected circuit breaker, and is distributed to the Power Factor Corrected (PFC) Front End Module.

The AC source is applied to a to a terminal block (TB2) within the PFC Front End Module and distributed to a 40 W switching power supply (LPS23), a 80 W switching power supply (LPS63) and a AC/DC Power Factor Corrected 2000W supply.

The 40 W switching supply supplies +12 V to the other boards within the tray. The 80 W switching supply supplies -12 V to the other boards within the tray. The 200W AC/DC supply supplies +390 VDC to the DC to DC Converters within the 25W Amplifier Module.

2.0 TECHNICAL DESCRIPTION

2.6 Schematics and Block Diagrams

Detailed Block Diagrams and Schematics are included in Exhibit II.