Cellular Specialties, Inc.

Model *PCS2000* Miniature In-Building Amplifier

Operation and Users Manual

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1. Product Description

Background

The performance of a wireless phone can be easily degraded when in enclosed structures where signals from a local cell site are not sufficient for reliable phone operation. The Model PCS2000 Miniature In-Building Amplifier (Mini-IBA) was developed by Cellular Specialties, Inc. (CSI) to enhance performance within these enclosed structures. Specifically, the Mini-IBA is designed to cover small areas such as home offices, small workshops, etc.

Functional Description

The Mini-IBA boosts the cellular performance by providing amplification of both transmit and receive signals. The unit receives the portable phone's signal through an interior antenna, amplifies it and then sends it to an outside antenna. This signal is referred to as the "Uplink". The Mini-IBA also receives signals from the Cell Site base station through the outside antenna. This signal is amplified and re-radiated to the portable phone and is referred to as the "Downlink". It is necessary that sufficient signal be available at the external antenna.

The external antenna is usually a directional type such as a "Yagi", however an Omni-directional antenna may be used when the structure is located in close proximity to one or more cell sites. Internal antennas are usually Omni-directional although other types, such as low profile wall or ceiling mount, may be used for special installations.

As shown in Figure 1, there are three stages of gain in both the Downlink and Uplink for a typical gain of 40 dB in each link. The maximum linear output power for the Uplink is 100 milliwatts and 30 milliwatts for the Downlink.

An LED on the unit indicates the application of power.

Circuit Description

Uplink

The uplink RF circuit consists of three (3) stages of gain. Each gain stage is a monolithic integrated circuit (mmic) mounted to a printed circuit board (PCB). The signal received by the inside antenna is directed to the 1st mmic stage by a frequency diplexer, which separates the uplink frequency (1850-1910 MHz) from the downlink frequency (1930-1995 MHz). This signal is amplified by the mmic stages and directed to an identical diplexer at the output of the 2nd stage. A total of four (4) band-pass Surface Acoustic Wave (SAW) filters are used between active stages to provide adequate isolation of the downlink chain. All stages are biased for linear operation. The overall gain from the inside antenna terminal to the outside antenna terminal is a maximum 40 dB. Each diplexer / filter combination provides 50 dB of rejection between the uplink amplifier chain and the downlink.

Downlink

The downlink circuit is identical in operation to the uplink. The only differences are the downlink frequency (1930-1945 MHz) and signal flow in the opposite direction.

Power Supply

All the mmic amplification stages, in both the uplink and downlink, operate from a single supply voltage of +5 Vdc. A "Wall" power supply and dc-dc converter is used to provide a regulated 5 volts from an input of 110 Vac. All internal dc circuits are filtered and de-coupled from the RF circuits. The overall current at 5 Vdc is less than 1.0 Amp.

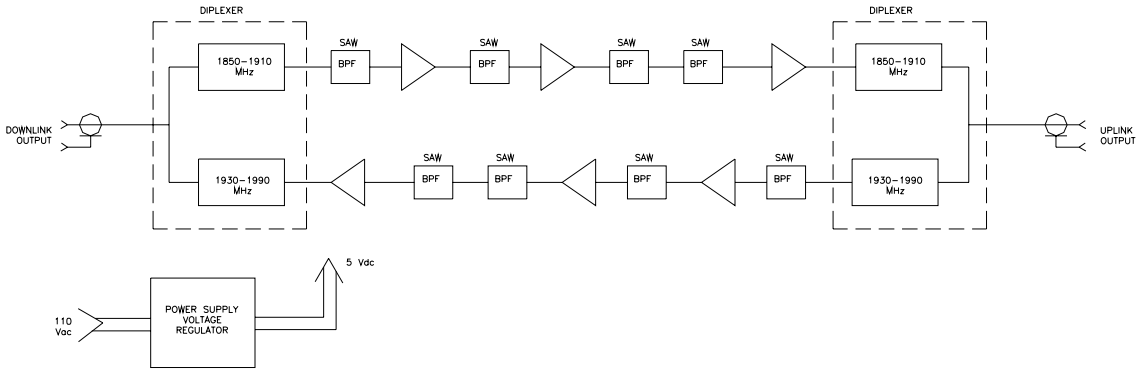

FIGURE 1 Functional Block Diagram

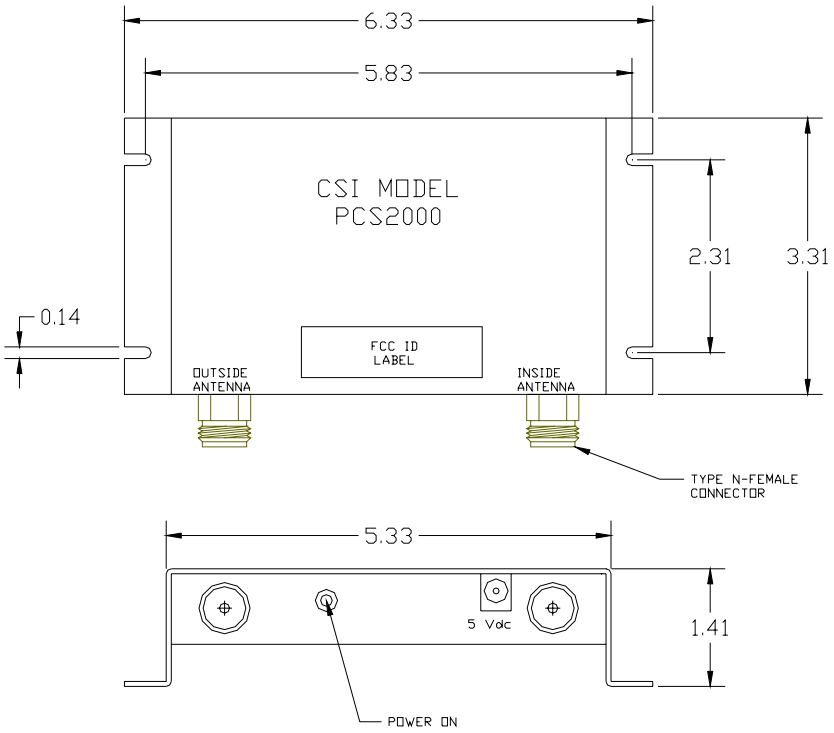

FIGURE 2 Outline Drawing

2. General Specifications

All specifications stated as typical unless otherwise noted.

	Uplink	Downlink
Frequency Bands (MHz)		
PCS	1850-1910	1930-1990
Linear Gain (dB)	40	40
Typical Power Out (max)		
1 dB Compression	+23 dBm	+17 dBm
Linear	+20 dBm	+15 dBm
Noise Figure	6 dB	6 dB
Propagation Delay	<1 microsecond	<1 microsecond
VSWR	<2:1	<2:1
Passband Ripple	5 dB pk-pk	5 dB pk-pk
Connectors	Type-N	
Power Requirements	+5 Vdc, 1.0 A	
Dimensions	3.5”x6.5”x1.5” max	
Weight	1 lbs.	
Indicator LED	“Power-On”	

Cellular Specialties, Inc. reserves the right to change these specifications at any time without prior notice.