

## Using the North America MAX Wireless on a PBX line

### Introduction

This document outlines the parameters of the analog line that are required for correct operation of the MAX Wireless on a PBX line in the US/Canada country code settings. Parameters that are outside of the optimal performance range may or may not yield satisfactory operational results depending upon the environment and how the device is used.

The MAX Wireless conference phone is designed to work with analog telephone lines using loop signaling provided from a public switched network provider. This is also referred to as a POTS (Plain Old Telephone Service) line. It is also possible to interface the MAX Wireless to an analog extension provided by a Private Branch Exchange or PBX. The internal line parameters of the PBX are proprietary. This can result in a wide variety of levels and impedances, which may result in less than optimal performance of the MAX Wireless. Some side effects may include low transmit level, distorted receive audio and in extreme cases, intermittent side-tone or ringing (usually at the beginning of every call).

### Description

The table below outlines the limits within which the Max Wireless will operate and range where optimal performance is achieved. All data assumes 48V.

AC Characteristics	Operating limits		Optimal performance	
	Min	Max	Min	Max
Loop Impedance	150 Ohms	2000 Ohms	600 Ohms	900 Ohms
Loop Loss		25 dB		10 dB
Receive signal level		+1 dBu	-10 dBu–20 dBu average speech level	
Maximum transmit level <sup>1</sup>		+1 dBu		
Longitudinal balance <sup>2</sup>			>50 dB	
Crosstalk <sup>2</sup>			>50 dB	
Distortion <sup>2</sup>			>50 dB	
Noise <sup>2</sup>		27 dBnC		15 dBnC
Frequency response			200 Hz–3.5kHz +/- 3dB	
Echo Delay <sup>3</sup>	0 mS	20 mS		5 mS
DC Characteristics	Operating limits		Optimal performance	
	Min	Max	Min	Max
DC Voltage <sup>4</sup>	15 V	120 V		
Polarity	Independent			
On hook current	7 uA			
Off hook current (loop current)	10 mA	120 mA	20 mA	100 mA
Signaling	Operating limits		Optimal performance	
	Min	Max	Min	Max
Ring voltage <sup>5</sup>	24 Vrms	120 Vrms		
Ring frequency <sup>5</sup>	15 Hz	60 Hz		
Dialtone detection window <sup>6</sup>	328 Hz – 466 Hz			
Hook Flash detection tolerance at switch for selected hook flash time <sup>7</sup>	- 12 mS	+12 mS		
Minimum DTMF detection duration		100 mS		
DTMF detection frequency tolerance	+/- 1.5% of nominal frequency			

**Physical characteristics of the RJ-11 connector**

Pin 1	Not Used
Pin 2	Not Used
Pin 3	Tip
Pin 4	Ring
Pin 5	Not Used
Pin 6	Not Used

## Footnotes:

1. Transmit level is measured at RJ-11 interface, 48 VDC supply with 600 Ohm line impedance.
2. Specification applies across in band frequencies.
3. Assumes 6 dB of echo attenuation.
4. Minimum voltage requirement is measured at R-J11 connector while unit is on hook. Minimum voltage required at the switch will vary with loop length.
5. Ring requirements are required in order for the unit to indicate a ring.
6. The frequency of all dial tone signals must be contained within the limits in order for dial tone detection to operate.
7. Hook flash tolerance applies to the current user selection.

All specifications are subject to change without notice.