Wireless Audio Link – Datasheet

By Tim Faughn and Jeff Chesney
Advisors – Dr. Huggins and Dr. S. N. Prasad

Specifications

• Input to transmitter – Left and Right Channel Audio Signal (see Fig. 1)

  **Line Input (RCA Jack)**
  - Max Voltage = 0.7 V rms
  - Impedance = 50 KΩ
  - Frequency Response = 20 – 20000 Hz

• Output of receiver – Left and Right Channel Audio Signal (see Fig. 1)

  **Line Output (RCA Jack)**
  - Max Voltage = 0.7 V rms (into 10KΩ load or greater)
  - Frequency Response = 100 – 18000 Hz

![Fig. 1 – Input and Output of System](image)

• Transmission Characteristics

  **FCC Regulations, Title 47; Part 15; Sec 245**
  **Single Channel**
  - Transmission Bandwidth = 902 – 928 MHz
  - The field strength of the fundamental transmitted signal must be less than 500mV / m. This is specified at a distance of 3m.
  - The field strength of the transmitted harmonic signals must be less than 1.6mV / m. This is specified at a distance of 3m.

• Range
  - The device will have an effective range of approximately 10m.

• General Power Requirements
  - Either an AC or DC power adapter (undecided)
User Interface

The user interface required for this system is very simple. The transmitter is attached to an audio source with a line out using RCA cable, and the receiver is attached to a stereo system with a line-in using RCA cable (refer to Fig. 1). The audio source and stereo system are now used the same way as they would be without the radio link.

Senior Project Demonstration

To verify the correct operation of the FM radio link, the demonstration will show that the pair does work by transmitting the signal from the audio source across the wireless link. The qualities that will be measured are:

- Sound Quality
- Transmission Range
- Sensitivity
- Bandwidth Power

After it is received the signal will be sent to a stereo receiver and played on two speakers. The quality of the signal from the speaker will determine if our sound quality goal has been met. To meet this goal the quality of the audio signal from the speaker will be comparable to the original audio signal if it was played on a regular system using an audio cable.

The sound quality will also be measured by transmitting a single tone and a two-tone signal, and after they have been received, a spectrum analyzer will be used to verify that the signal did not experience a significant loss. The spectrum analyzer should show that the signal did experience a small loss due to the transmission and the loss should be linear. This means that all components of the signal will experience a loss of the same magnitude.

The transmission range will be verified by separating the transmitter and receiver in the hallway and showing that the distance does not affect the sound quality of the signal up to our specified range of 10 meters.

Sensitivity will be determined by adding an attenuator to reduce the power of the signal and determine the minimum power the transmitter must transmit for the receiver to be able to receive the signal.

The bandwidth power will be measured by placing the FM radio link at a distance specified by the FCC and measuring both the transmitted and received power. The power levels will be measured by using a calibrated antenna. The FCC regulations manual details the bandwidth power at various distances and the power levels measured will meet these specifications.