ECE 662 Midterm Exam
Fall 2019

(*__Individually done__ - NOT a team assignment*)

Student _____

Specifications and Demonstration

Demonstrating your transmitter will consist of actual "on-the-air" tests showing that you can transmit analog audio signals (inclucing speech) and FSK data (from a provided Arduino-based packet generator) to a nearby portable FM radio. In the demonstration, you must show that you meet the following specifications:

- Output power of ≥ 4 dBm into 50 Ohms at 98 MHz,
- Harmonic suppression of at least 40 dB when operating at 98 MHz,
- Tuning range of at least 77 MHz to 98 MHz *(**To to avoid violating FCC rules, do not transmit on-the-air below 88 MHz (or above 108 MHz), and if you do hook up an antenna, use a 50dB attenuator !**)*
- Onboard microphone with good volume and fidelity when listened to on an FM radio receiver (not over-modulated) Leave the leads on the mic a little long so you can clip a signal-gen to them (see below).
- Deviation of +/- 75 kHz for audio input level of 100 mVpp from function generator connected across your microphone to over-ride it. [1]
- Audio frequency response of 20 Hz to 15 kHz (+0, -3 dB) as measured by checking the frequency deviation at these audio frequencies when driven from the audio function generator. [1]
- Deviation of +/- 75 kHz when connected to the Arduino board generated 1 kbps PRBS sequence (5V logic).
- Good data waveform as observed on the new Spectrum Analyzer's audio-out headphone jack.

Test your transmitter early to see if it meets these requirements.
If needed, modify or fix it __before__ the demo !

Grading

Your Midterm grade will be based on the correct operation of your circuit (10%) ...

Demo Notes:

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[1] Frequency deviation may be estimated from the spectrum width using *__Carson's rule__*:
       Bandwidth = $2(\Delta f_{pk} + f_{mod})$, where Δf_{pk} is the peak frequency deviation and f_{mod} is the frequency of the modulating sinusoid.