Complex Waveform Generator

BEng(Hons) Electronic Engineering **Academic Year 2019-2020**

Background

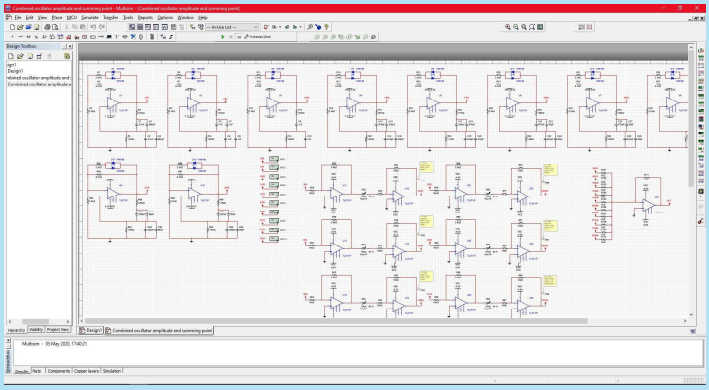
Test signal for speech circuits currently applied at a fixed level across entire frequency range.

Test signal is supposed to mimic human speech characteristics to create a representative test, but speech is not a constant amplitude across all frequencies.

Several measurements (11) required for each test with existing test procedure. This is time consuming and therefore expensive.

This project investigates using a complex tone as alternative test signal to create a more efficient and more representative test.

Design, simulation and analysis of complex waveform generator circuit, to be used in bespoke test equipment.



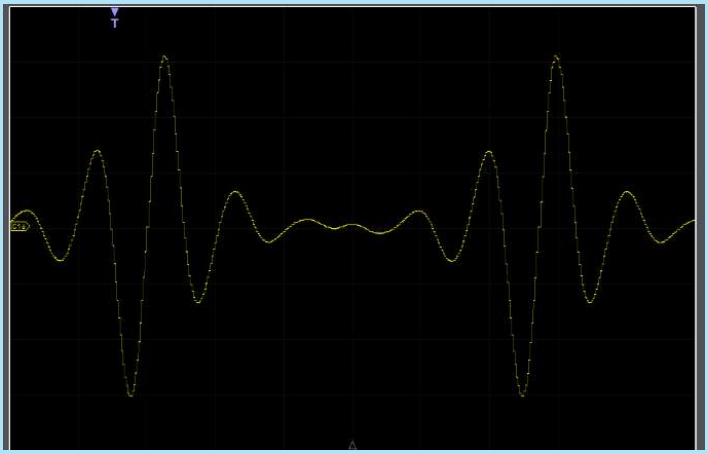
Evaluation

Complex tone demonstrated to be a suitable test signal. Was able to recreate the same results as existing test procedure with only one measurement instead of 11.

Circuits used to combine signals into the complex tone and control amplitudes met my requirements entirely.

Variable frequency oscillator circuit needs further work. Alternative digital approach identified.

Frequency display design was unsuitable. Issues seen during physical prototyping were not detected during simulation.

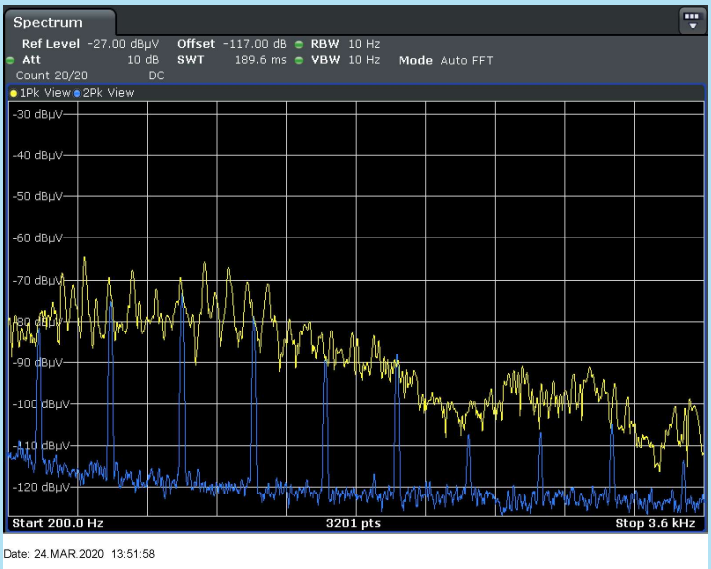


Approach

Complex tone created using programmable waveform generators to prove the concept. Not enough freedom with signal characteristics to be usable in real testing scenario, but able to produce required results data with only a single measurement.

Research into potential circuit topologies. Create designs and simulate performance. Build physical prototypes for evaluation.

Overall system broken down into smaller stages for easier circuit design and analysis.



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