

R-TEC

Radio Test Environment Creation

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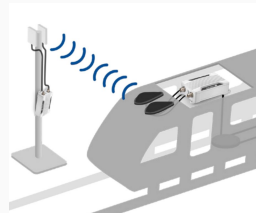


The Problem

You want to test an (embedded) device whose behaviour depends on wireless signals.

Examples

- ship tracking device using GPS
- a payment terminal using GSM



Proposed solution

A small, embedded device able to create a specific radio environment.

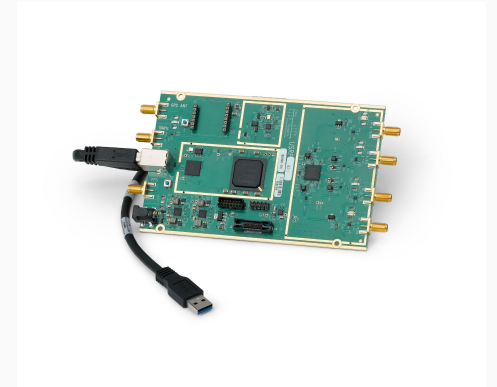
Two settings

- Send specific data (e.g. GPS location)
- Send noise (e.g. high volume of GSM traffic)
 - Possibly even recorded real world data

Step 1: SDR and Laptop

- Test whether such simulations are even feasible
- Find out which signals we can emulate
 - And which ones we can't!

Doing it
right
now!



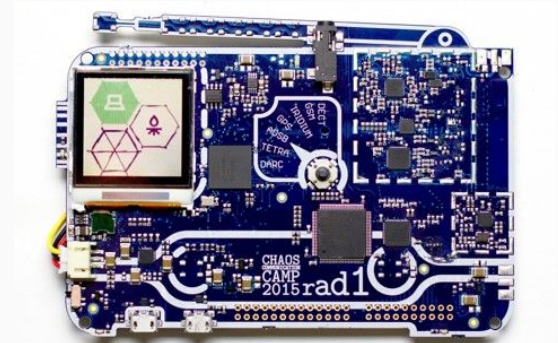
Step 2: Embed It!

Create a small device able create test environments.

Possible features

- Press and play buttons for pre-specified settings
- Play any signal recording from an SD card
 - Provide interoperability with known formats

Possible target: CCCamp 2015 rad1o Badge



Step 3: Make Device Standalone

Generate signal files on the device

- GPS signals for a specific location based on user input directly into the device
- Provide dynamic levels of noise (e. g. for GSM) based on user input
- Record and playback mode

Fun Excursion: Legality and Faraday Cage

- Sending noise or data at specific frequencies can be illegal
- Can we build a shield limiting the effects to a small-area testbed?



Stretch Goal: Build complete wireless signal toolbox

- Routed GPS signals
- Valid GSM communication
- Control device via bluetooth
- Act as WiFi base station with specific properties
- Record and analyze wireless traffic