

# Imperial College SDR Array Testbed Dataset

## Setup Number: 2

### Introduction

The purpose of this dataset is to allow an analysis of the operation of the Imperial College SDR Array Testbed. Two large aperture array geometries of N=4 sensors are employed within an anechoic chamber to operate in the 2.4GHz band in the presence of a single sensor source transmitting a single frequency tone in the radiating near field of the array from a number of locations. A USRP2 board is connected via a splitter to the RF2 port of each of the boards in the array receiver. This transmits only a carrier and can be used to synchronise the array.

### Experimental Setup

Host Computer: Dell XPS

#### Array Receiver

USRP2 Board Numbers: 1, 2, 3 and 4 connected via a switch to Eth 1

Rx Frequency: 2.43GHz

Gain: 26

Sample Rate: 1,562,500 samples/sec

Array Geometry 1 Nominal Sensor Locations in cm:

Sensor	x	y	z
0	0	0	0
1	210	0	0
2	72.926	259.892	0
3	268.926	239.746	0

Array Geometry 2 Nominal Sensor Locations in cm:

Sensor	x	y	z
0	0	0	0
1	236	0	0
2	44.178	293.578	0
3	251.372	273.304	0

#### Synchronisation Source

USRP2 Board Number: 5 connected directly to Eth2 with IP 192.168.20.50

Tx Frequency: 2.43GHz

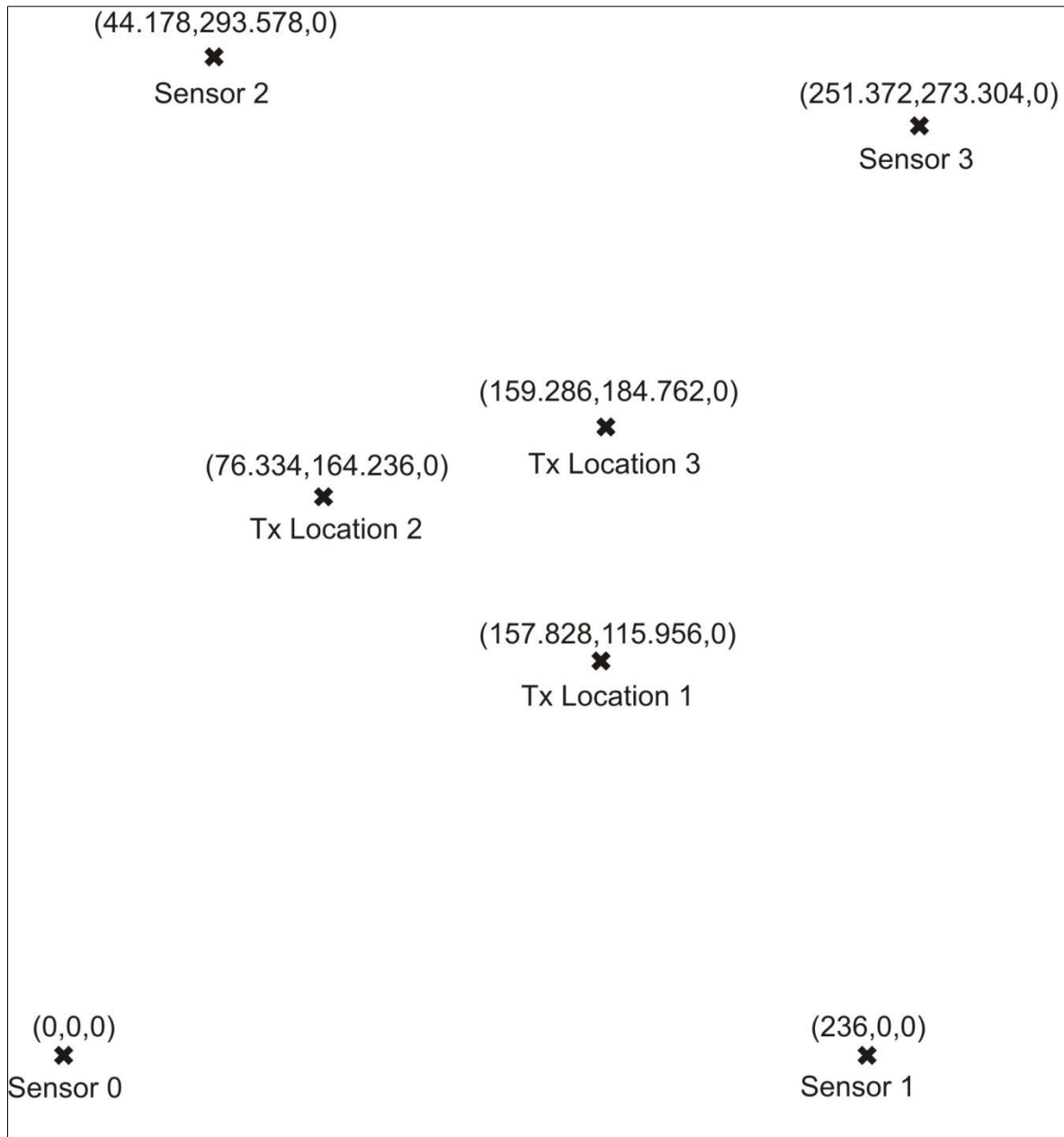
Tx Power: 7.4dBm (5.495mW)

Message: Constant (carrier only) of digital amplitude 0.01



Array 2 Transmitter Locations:

(cm)	x	y	z
Location 1	157.828	115.956	0
Location 2	76.334	164.236	0
Location 3	159.286	184.762	0



# Experiments

For each of the tests detailed below there are 3 associated matlab data files. Each contains 1,000,000 snapshots of I and Q data collected from the 4 sensors at different observation intervals (for sample rate and other specifics refer to the figure and sections above). These can be found in the variables “X\_I” and “X\_Q” respectively as 4x1000000 matrices of floating point numbers. The 3 observation intervals follow one another in the time when they were collected. The data recorded is labelled with the format:

**<DD.MM.YYYY>-<HH.MM.SS>-<Setup Number>-<Test Number>-<Observation Number>**

Note that this document details **Setup Number 2**. In each data file, the variables “array” and “source” define the array and source locations in cm respectively. The tests performed are detailed below:

**Test 1:** Array Geometry 1 Transmitter Location 1

**Test 2:** Array Geometry 1 Transmitter Location 2

**Test 3:** Array Geometry 1 Transmitter Location 3

**Test 4:** Array Geometry 2 Transmitter Location 1

**Test 5:** Array Geometry 2 Transmitter Location 2

**Test 6:** Array Geometry 2 Transmitter Location 3