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How to control Ovi-bovi tags via NFC on your smartphone

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Ovi-bovi activity detection tags have exceptionally rich and flexible functionality. They can work in basically two distinct regimes: **normal** cow activity aggregation for further detection of heat and rumination on server's level, and **datalogger** regime for raw acceleration data collection and its immediate on-air transmission for further processing and research. You can switch between normal (default) and datalogging regimes via NFC on your smartphone; and you can tweak many subtler things within each of these regimes.

Data processing algorithm on tag's level is coded in C and has a bunch of user-editable parameters:

```
uint32_t sensorId;           // json: sid
uint32_t cyclePeriod;        // json: rate
uint32_t rumSamplesPerSquare; // json: rsps
uint32_t rumSquaresPerMetric; // json: rspm
uint32_t rumThreshold;       // json: rth
uint32_t rumFinalShift;      // json: rshift
uint32_t actSamplesPerMetric; // json: aspm
uint32_t actMetricsPerGroup; // json: ampg
uint32_t actFinalShift;      // json: ashift
uint32_t radioPLLFrac;       // json: pll
bool dataLogMode;            // json: dlog
bool ruminationMode;         // json: rumi
```

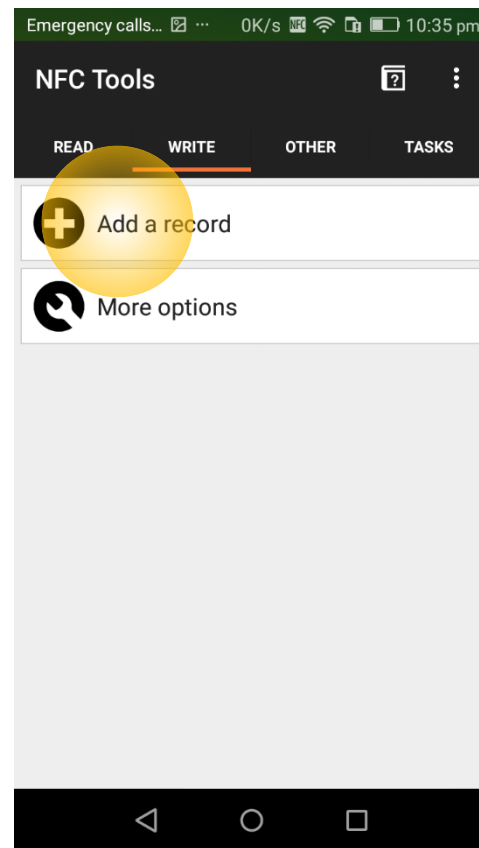
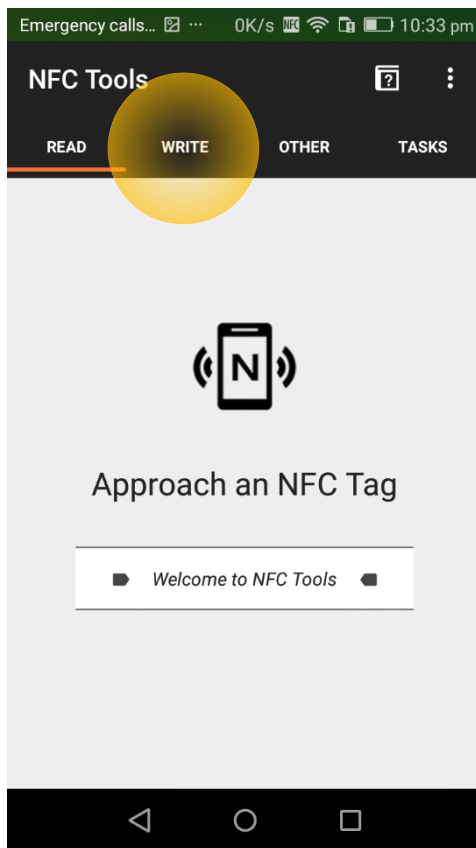
Their default settings are something like:

```
#define CYCLE_PERIOD_MS      500    // 500 msec between measurements
#define RUM_SAMPLES_PER_SQUARE 30    // 15 seconds correlation length
#define RUM_SQUARES_PER_METRIC 40    // 10 minutes aggregation length
#define RUM_THRESHOLD       1       // lower dX dY dZ limit
#define RUM_FINAL_SHIFT     2       // right-shift accumulated value by
#define ACT_SAMPLES_PER_METRIC RUM_SAMPLES_PER_SQUARE * RUM_SQUARES_PER_METRIC
#define ACT_GROUP_SIZE      2       // packet per 20 minutes
#define ACT_FINAL_SHIFT     12      // right-shift accumulated value by
#define RADIO_PLL_FRAC      0       // in PLL units
#define DATALOG_MODE        false
#define RUMINATION_MODE     true
```

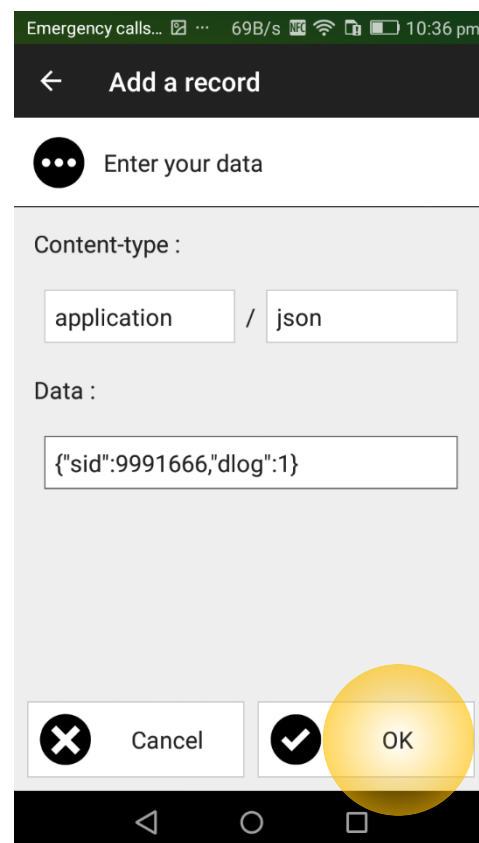
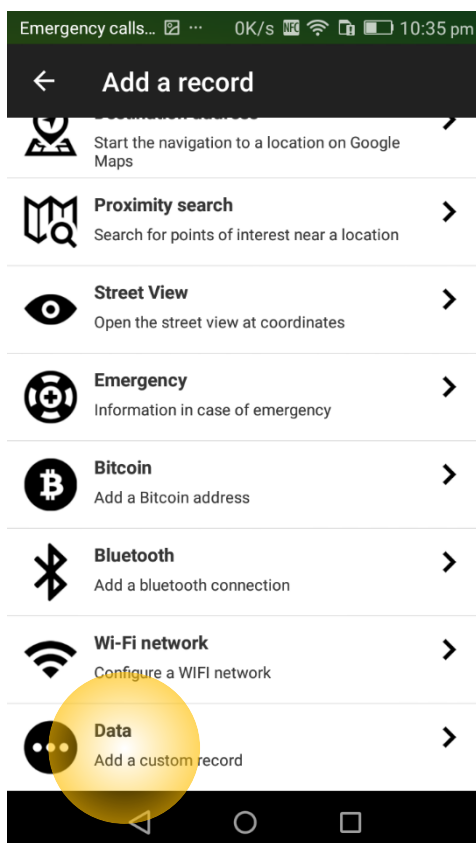
If we want to use tags as dataloggers, we should set `dlog` to 1 (1 means logical true). It is also highly recommended to modify tag's number `sid` as `ABC0XYZ` -> `ABC1XYZ` (ABC stands for your client's numerical code, XYZ is your tag's number which is laser-engraved on its casing) not to mix new accelerometer data with regular activity data obtained in normal regime with this same tag.

To change `sid` and `dlog`, use a mobile phone with NFC functionality. You can download any of the freely available NFC editors – this can be *ST25* from *STMicroelectronics*, or *NFC Tools*, or whatever else. Assume you have *NFC Tools* installed, and your tag's full ID is 9990666 (of which you would see 666 on the casing).

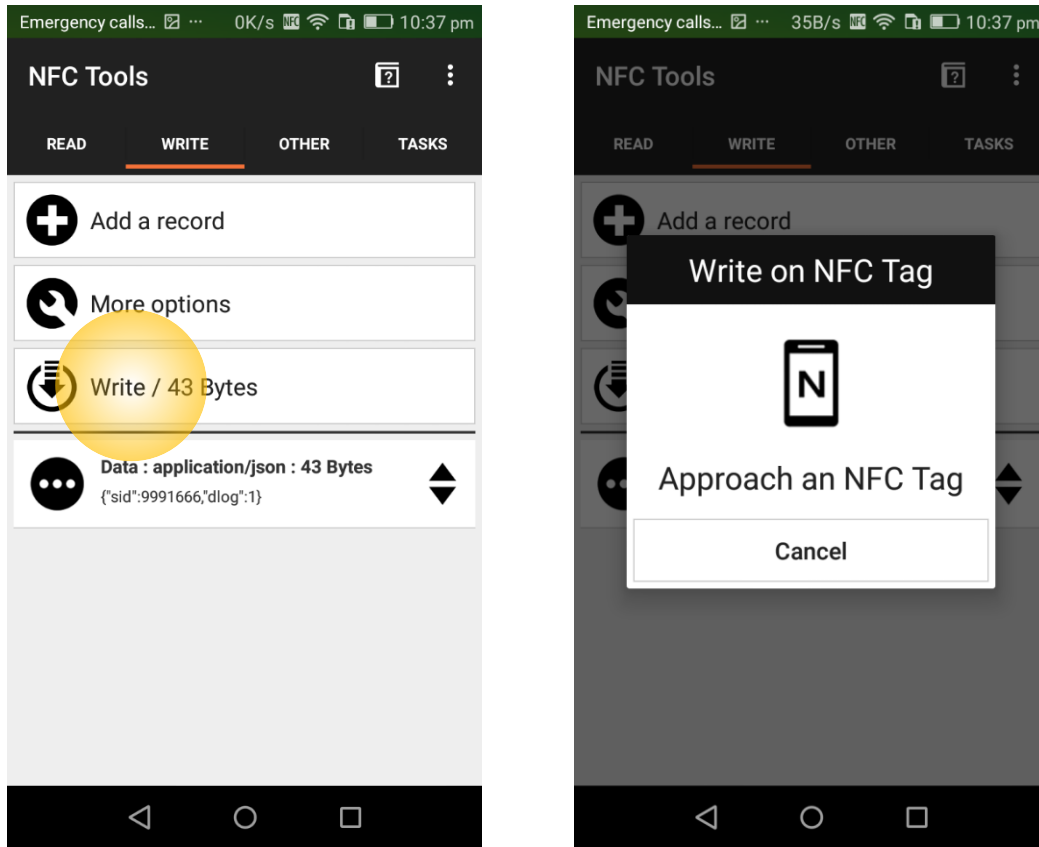
In *NFC Tools*, tap on **Write** -> **Add a record**:



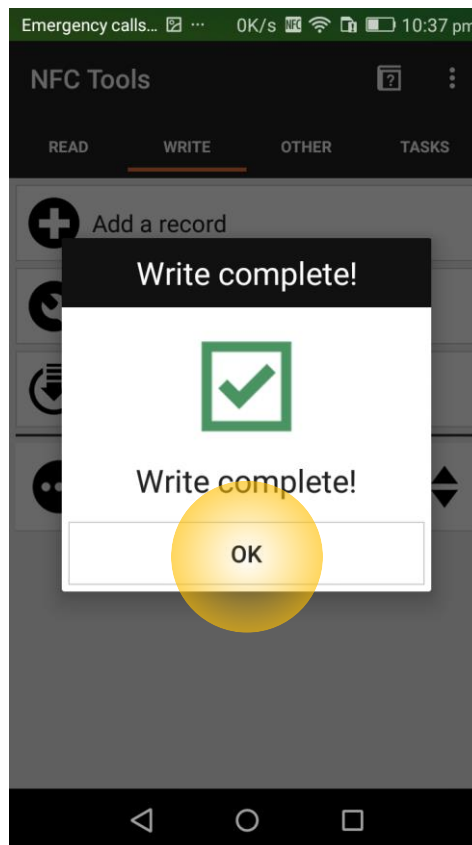
You will see a long list of options; choose **Data** at the end of. Your **Content-type** is application/json, so type this in. Then type your actual **Data** as `{"sid":9991666,"dlog":1}` and confirm it by clicking **OK**:



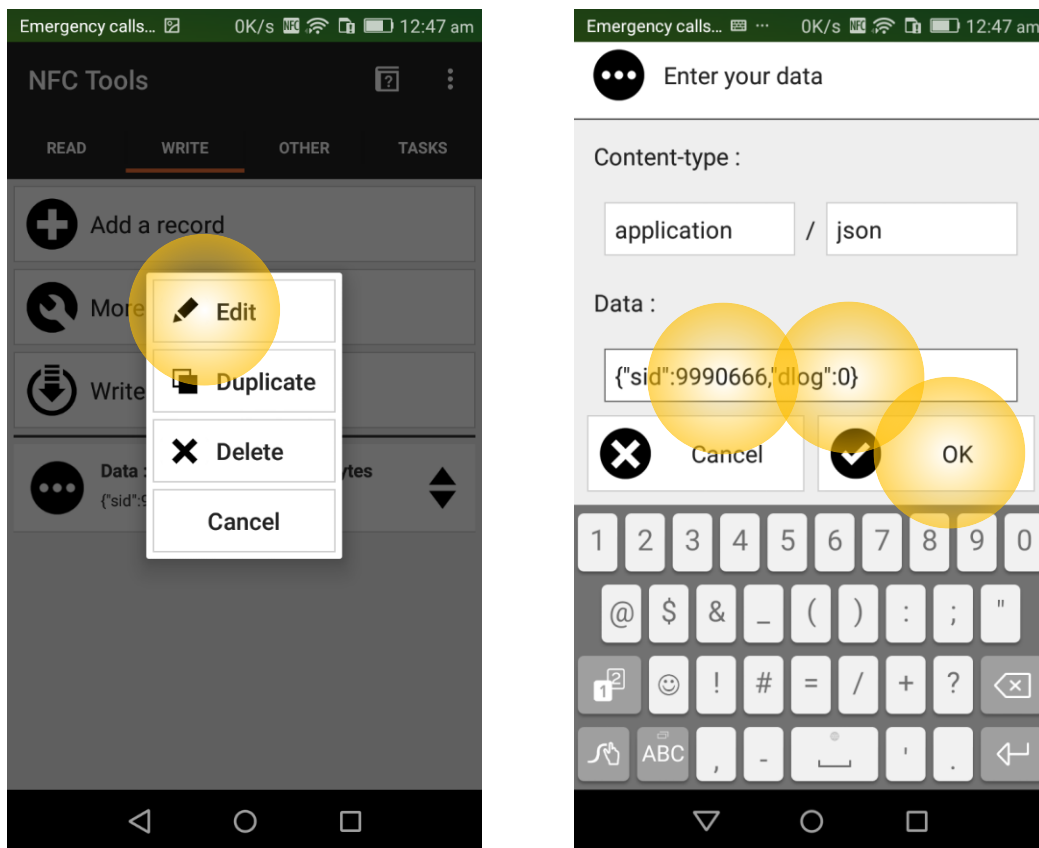
Click **Write** on the page you will see next moment, and approach your phone to the tag:



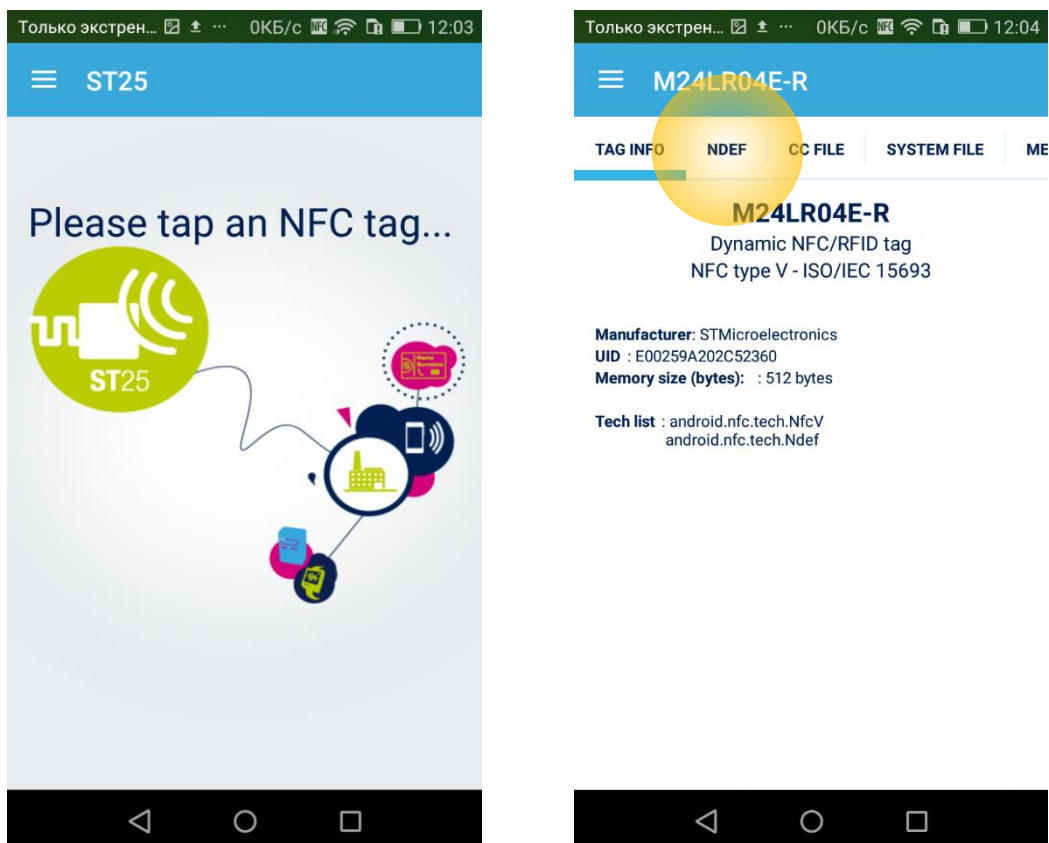
Done!




Now suppose you are to switch your tag back to normal, energy sparing regime. This is achieved by setting tag's sid from 9991666 to 9990666 and dlog from 1 to 0; in *NFC Tools* this is done through not typing the data from scratch, but editing the data still stored in app's memory:




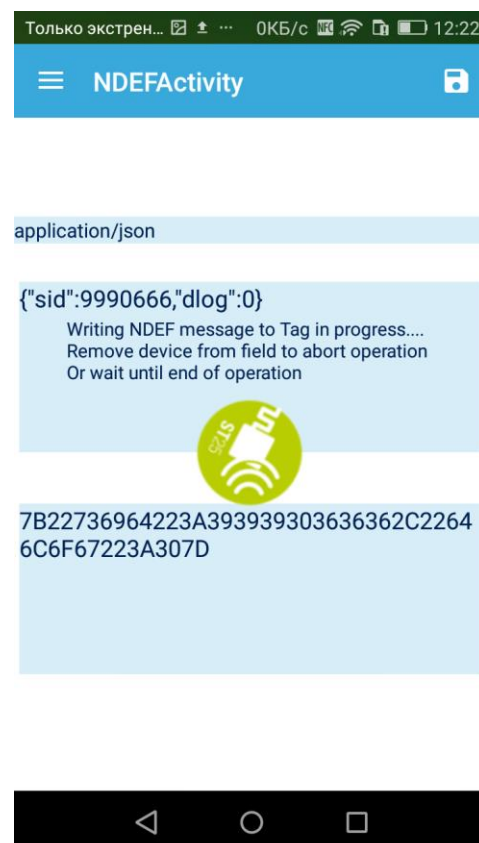
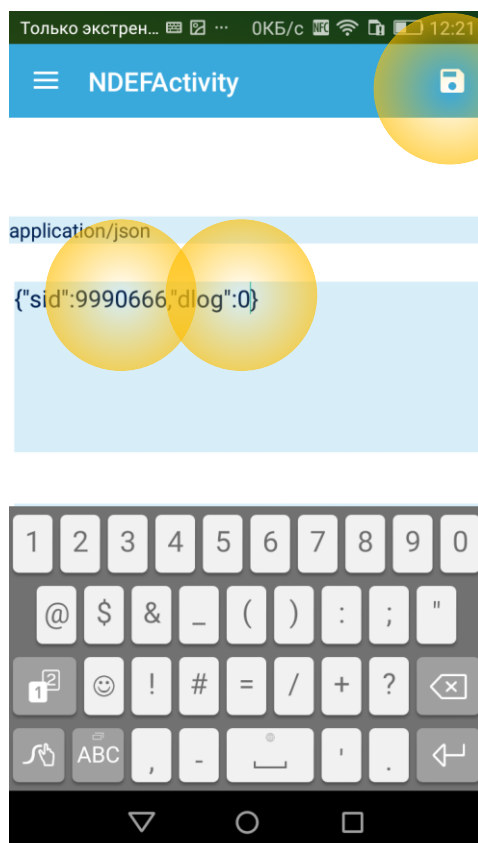
Alternatively, you may edit the data with *ST25*. First open it, read your tag, and tap **NDEF**:



Now tap **Edit this MIME NDEF record**, and then the  button on the top-right to start editing:



Now you are able to change 1's to 0's in sid and dlog; after that, approach the tag with the phone until it beeps and press the  button on the top-right:



Success!



Note that after writing MIME NDEF record to Ovi-bovi tag (no matter which tool on your phone you use), it takes up to **one minute** until this record is read and executed by microcontroller.