THIẾT KẾ VÀ PHÁT TRIỂN ỨNG DỤNG IOT

BÀI TẬP VỀ NHÀ: COLLECT RSSI

LỚP L01 --- HK232

NGÀY NỘP: 03/03/2024

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Thành phố Hồ Chí Minh – 2024

1. Đề bài

Collect RSSI from neighbor nodes and choose the neigbor with strongest RSSI

2. Bài làm

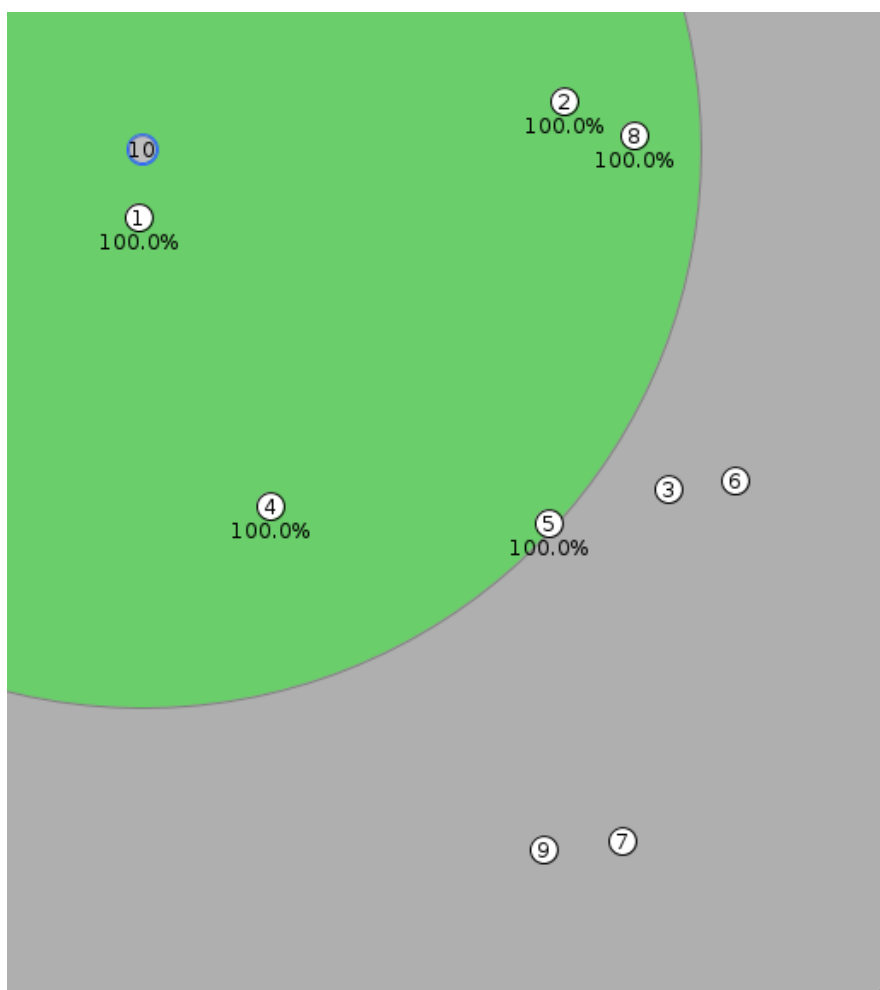Link project: [contiki_wsn/project/rime_broadcast_rssi at develop · Hnit3003/contiki_wsn](#)

2.1. Code

```c
#include "contiki.h"
#include "net/rime/rime.h"
#include "random.h"

#include "dev/button-sensor.h"

#include "dev/leds.h"
#include "cc2420.h"

#include <stdio.h>
#include <string.h>

#define MOTE_NUM  10    /* Number of Motes in Network */

static uint16_t packet_send_count = 1;    /* Number of packets sended */
/* Number of packet receive from all Mote*/
static uint16_t packet_receive_count[MOTE_NUM] = {0};

static signed char rssi_neigbr[MOTE_NUM] = {0};
static signed char rssi_max = -120;
static uint8_t rssi_max_mote = MOTE_NUM + 1;

/*---------------------------------------------------------------------------*/
PROCESS(example_broadcast_process, "Broadcast example");
AUTOSTART_PROCESSES(&example_broadcast_process);
/*---------------------------------------------------------------------------*/
static void
broadcast_recv(struct broadcast_conn *c, const linkaddr_t *from)
{
  packet_receive_count[from->u8[0] - 1]++;
  rssi_neigbr[from->u8[0] - 1] = cc2420_last_rssi;
  if (cc2420_last_rssi > rssi_max)
  {
    rssi_max = rssi_neigbr[from->u8[0] - 1];
    rssi_max_mote = from->u8[0];
  }
  printf("broadcast message received from %d.%d [%d times]: '%s'  RSSI: %d\n",
         from->u8[0], from->u8[1], packet_receive_count[from->u8[0] - 1], (char *)packetbuf_dataptr(), rssi_neigbr[from->u8[0] - 1]);
}
static const struct broadcast_callbacks broadcast_call = {broadcast_recv};
static struct broadcast_conn broadcast;
/*---------------------------------------------------------------------------*/
PROCESS_THREAD(example_broadcast_process, ev, data)
{
  static struct etimer et;

  PROCESS_EXITHANDLER(broadcast_close(&broadcast);)

  PROCESS_BEGIN();

  broadcast_open(&broadcast, 129, &broadcast_call);

  while(1) {

    /* Delay 2-4 seconds */
    etimer_set(&et, CLOCK_SECOND * 4 + random_rand() % (CLOCK_SECOND * 4));

    PROCESS_WAIT_EVENT_UNTIL(etimer_expired(&et));

    char message_send[20];
    sprintf(message_send, "ID:%d packet[%d]", linkaddr_node_addr.u8[0], packet_send_count++);
    packetbuf_copyfrom(message_send, sizeof(message_send));
    broadcast_send(&broadcast);
    printf("broadcast message sent: packet[%d]\n", (packet_send_count-1));

    printf("Max RSSI mote: %d : %d\n", rssi_max_mote, rssi_max);

  }

  PROCESS_END();
}
/*---------------------------------------------------------------------------*/
```

2.2. Kết quả trong mô phỏng bằng tool cooja

2.2.1. Giao diện kết quả khi chạy

```
Time    Mote   Message
00:00.495  ID:2   Rime started with address 2.0
00:00.504  ID:2   MAC 02:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 2.
00:00.513  ID:2   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:00.515  ID:2   Starting 'Broadcast example'
00:05.767  ID:2   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'  RSSI: -74
00:05.892  ID:2   broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]'  RSSI: -74
00:06.014  ID:2   broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]'  RSSI: -77
00:06.143  ID:2   broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'  RSSI: -73
00:06.665  ID:2   broadcast message sent: packet[1]
00:06.667  ID:2   Max RSSI mote: 6 : -73
00:07.641  ID:2   broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'  RSSI: -21
00:08.267  ID:2   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'  RSSI: -70
00:08.516  ID:2   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'  RSSI: -85
00:10.391  ID:2   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'  RSSI: -73
00:11.142  ID:2   broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]'  RSSI: -77
00:11.765  ID:2   broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]'  RSSI: -74
00:12.642  ID:2   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'  RSSI: -74
00:13.236  ID:2   broadcast message sent: packet[2]
00:13.237  ID:2   Max RSSI mote: 8 : -21
00:14.017  ID:2   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'  RSSI: -85
00:14.766  ID:2   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'  RSSI: -21
00:15.142  ID:2   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'  RSSI: -73
00:16.266  ID:2   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'  RSSI: -70
00:16.892  ID:2   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'  RSSI: -74
00:17.640  ID:2   broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]'  RSSI: -77
00:18.392  ID:2   broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]'  RSSI: -74
00:19.892  ID:2   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'  RSSI: -73
00:20.103  ID:2   broadcast message sent: packet[3]
00:20.104  ID:2   Max RSSI mote: 8 : -21
00:20.518  ID:2   broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]'  RSSI: -21
00:21.640  ID:2   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'  RSSI: -74
00:21.892  ID:2   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'  RSSI: -85
00:22.642  ID:2   broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]'  RSSI: -77
00:23.017  ID:2   broadcast message received from 10.0 [4 times]: 'ID:10 packet[4]'  RSSI: -74
00:23.641  ID:2   broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'  RSSI: -70
00:25.071  ID:2   broadcast message sent: packet[4]
00:25.073  ID:2   Max RSSI mote: 8 : -21
00:25.139  ID:2   broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]'  RSSI: -21
00:25.891  ID:2   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'  RSSI: -74
```

Filter: `^ID:[2]$`

```
Time    Mote   Message
00:01.158  ID:3   Rime started with address 3.0
00:01.167  ID:3   MAC 03:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 3.
00:01.176  ID:3   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:01.178  ID:3   Starting 'Broadcast example'
00:05.180  ID:3   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'  RSSI: -68
00:05.805  ID:3   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'  RSSI: -29
00:06.179  ID:3   broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'  RSSI: -20
00:06.804  ID:3   broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'  RSSI: -70
00:07.179  ID:3   broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'  RSSI: -64
00:07.679  ID:3   broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'  RSSI: -63
00:08.180  ID:3   broadcast message sent: packet[1]
00:08.182  ID:3   Max RSSI mote: 6 : -20
00:08.554  ID:3   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'  RSSI: -70
00:09.679  ID:3   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'  RSSI: -68
00:10.429  ID:3   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'  RSSI: -20
00:12.554  ID:3   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'  RSSI: -29
00:12.805  ID:3   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'  RSSI: -64
00:13.303  ID:3   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'  RSSI: -70
00:13.930  ID:3   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'  RSSI: -70
00:14.804  ID:3   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'  RSSI: -63
00:15.180  ID:3   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'  RSSI: -20
00:15.805  ID:3   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'  RSSI: -68
00:16.164  ID:3   broadcast message sent: packet[2]
00:16.166  ID:3   Max RSSI mote: 6 : -20
00:16.930  ID:3   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'  RSSI: -29
00:18.055  ID:3   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'  RSSI: -64
00:19.930  ID:3   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'  RSSI: -20
00:20.178  ID:3   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'  RSSI: -70
00:21.678  ID:3   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'  RSSI: -29
00:21.931  ID:3   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'  RSSI: -70
00:22.805  ID:3   broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'  RSSI: -64
00:23.508  ID:3   broadcast message sent: packet[3]
00:23.510  ID:3   Max RSSI mote: 6 : -20
00:24.805  ID:3   broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]'  RSSI: -68
00:25.177  ID:3   broadcast message received from 8.0 [3 times]: 'ID:8 packet[4]'  RSSI: -63
00:25.428  ID:3   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'  RSSI: -70
00:25.804  ID:3   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'  RSSI: -29
00:26.055  ID:3   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'  RSSI: -20
00:27.055  ID:3   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'  RSSI: -64
```

Filter: `^ID:[3]$`

Time	Mote	Message
00:00.607	ID:4	Rime started with address 4.0
00:00.616	ID:4	MAC 04:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 4.
00:00.625	ID:4	nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:00.627	ID:4	Starting 'Broadcast example'
00:05.131	ID:4	broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]' RSSI: -76
00:05.754	ID:4	broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]' RSSI: -52
00:05.880	ID:4	broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]' RSSI: -67
00:06.003	ID:4	broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]' RSSI: -58
00:06.126	ID:4	broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]' RSSI: -80
00:06.755	ID:4	broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]' RSSI: -85
00:07.129	ID:4	broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]' RSSI: -83
00:07.753	ID:4	broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]' RSSI: -88
00:08.254	ID:4	broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]' RSSI: -70
00:08.481	ID:4	broadcast message sent: packet[1]
00:08.482	ID:4	Max RSSI mote: 5 : -52
00:09.629	ID:4	broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]' RSSI: -76
00:10.377	ID:4	broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]' RSSI: -80
00:11.255	ID:4	broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]' RSSI: -58
00:11.754	ID:4	broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]' RSSI: -67
00:12.628	ID:4	broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]' RSSI: -52
00:12.753	ID:4	broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]' RSSI: -83
00:13.380	ID:4	broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]' RSSI: -85
00:13.879	ID:4	broadcast message sent: packet[2]
00:13.881	ID:4	Max RSSI mote: 5 : -52
00:14.753	ID:4	broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]' RSSI: -88
00:15.129	ID:4	broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]' RSSI: -80
00:15.879	ID:4	broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]' RSSI: -76
00:16.253	ID:4	broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]' RSSI: -70
00:16.878	ID:4	broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]' RSSI: -52
00:17.629	ID:4	broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]' RSSI: -58
00:18.003	ID:4	broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]' RSSI: -83
00:18.505	ID:4	broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]' RSSI: -67
00:19.879	ID:4	broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]' RSSI: -80
00:20.129	ID:4	broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]' RSSI: -85
00:20.507	ID:4	broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]' RSSI: -88
00:21.699	ID:4	broadcast message sent: packet[3]
00:21.701	ID:4	Max RSSI mote: 5 : -52
00:21.752	ID:4	broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]' RSSI: -52
00:22.629	ID:4	broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]' RSSI: -58

Filter: ^ID:[4]$

Time	Mote	Message
00:00.974	ID:5	Rime started with address 5.0
00:00.983	ID:5	MAC 05:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 5.
00:00.992	ID:5	nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:00.994	ID:5	Starting 'Broadcast example'
00:05.245	ID:5	broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]' RSSI: -59
00:05.699	ID:5	broadcast message sent: packet[1]
00:05.701	ID:5	Max RSSI mote: 9 : -59
00:05.995	ID:5	broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]' RSSI: -87
00:06.118	ID:5	broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]' RSSI: -39
00:06.747	ID:5	broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]' RSSI: -74
00:07.121	ID:5	broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]' RSSI: -59
00:07.745	ID:5	broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]' RSSI: -70
00:08.246	ID:5	broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]' RSSI: -29
00:08.620	ID:5	broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]' RSSI: -52
00:09.621	ID:5	broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]' RSSI: -59
00:10.369	ID:5	broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]' RSSI: -39
00:11.247	ID:5	broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]' RSSI: -87
00:12.511	ID:5	broadcast message sent: packet[2]
00:12.513	ID:5	Max RSSI mote: 3 : -29
00:12.871	ID:5	broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]' RSSI: -59
00:13.369	ID:5	broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]' RSSI: -74
00:13.993	ID:5	broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]' RSSI: -52
00:14.744	ID:5	broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]' RSSI: -70
00:15.120	ID:5	broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]' RSSI: -39
00:15.871	ID:5	broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]' RSSI: -59
00:16.244	ID:5	broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]' RSSI: -29
00:16.808	ID:5	broadcast message sent: packet[3]
00:16.810	ID:5	Max RSSI mote: 3 : -29
00:17.621	ID:5	broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]' RSSI: -87
00:18.118	ID:5	broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]' RSSI: -59
00:19.870	ID:5	broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]' RSSI: -39
00:20.247	ID:5	broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]' RSSI: -74
00:21.614	ID:5	broadcast message sent: packet[4]
00:21.616	ID:5	Max RSSI mote: 3 : -29
00:21.868	ID:5	broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]' RSSI: -52
00:22.618	ID:5	broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]' RSSI: -87
00:22.743	ID:5	broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]' RSSI: -59
00:23.619	ID:5	broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]' RSSI: -29
00:24.744	ID:5	broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]' RSSI: -59

Filter: ^ID:[5]$

Time	Mote	Message
00:00.509	ID:6	Rime started with address 6.0
00:00.519	ID:6	MAC 06:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 6.
00:00.528	ID:6	nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:00.530	ID:6	Starting 'Broadcast example'
00:05.155	ID:6	broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]' RSSI: -73
00:05.781	ID:6	broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]' RSSI: -39
00:06.086	ID:6	broadcast message sent: packet[1]
00:06.088	ID:6	Max RSSI mote: 5 : -39
00:06.782	ID:6	broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]' RSSI: -73
00:07.157	ID:6	broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]' RSSI: -67
00:07.657	ID:6	broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]' RSSI: -64
00:08.281	ID:6	broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]' RSSI: -20
00:08.532	ID:6	broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]' RSSI: -80
00:09.656	ID:6	broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]' RSSI: -73
00:10.313	ID:6	broadcast message sent: packet[2]
00:10.314	ID:6	Max RSSI mote: 3 : -20
00:12.655	ID:6	broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]' RSSI: -39
00:12.780	ID:6	broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]' RSSI: -67
00:13.281	ID:6	broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]' RSSI: -73
00:13.905	ID:6	broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]' RSSI: -80
00:14.780	ID:6	broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]' RSSI: -64
00:15.086	ID:6	broadcast message sent: packet[3]
00:15.088	ID:6	Max RSSI mote: 3 : -20
00:15.906	ID:6	broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]' RSSI: -73
00:16.280	ID:6	broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]' RSSI: -20
00:16.906	ID:6	broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]' RSSI: -39
00:18.030	ID:6	broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]' RSSI: -67
00:19.836	ID:6	broadcast message sent: packet[4]
00:19.838	ID:6	Max RSSI mote: 3 : -20
00:20.156	ID:6	broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]' RSSI: -73
00:20.405	ID:6	broadcast message received from 9.0 [4 times]: 'ID:9 packet[4]' RSSI: -73
00:20.531	ID:6	broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]' RSSI: -64
00:21.656	ID:6	broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]' RSSI: -39
00:21.906	ID:6	broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]' RSSI: -80
00:22.781	ID:6	broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]' RSSI: -67
00:23.532	ID:6	broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]' RSSI: -20
00:24.780	ID:6	broadcast message received from 9.0 [5 times]: 'ID:9 packet[5]' RSSI: -73
00:25.155	ID:6	broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]' RSSI: -64
00:25.406	ID:6	broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]' RSSI: -73

Filter: `^ID:[6]$`

Time	Mote	Message
00:00.660	ID:7	Rime started with address 7.0
00:00.670	ID:7	MAC 07:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started. Node id is set to 7.
00:00.679	ID:7	nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26
00:00.681	ID:7	Starting 'Broadcast example'
00:05.182	ID:7	broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]' RSSI: -22
00:05.808	ID:7	broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]' RSSI: -59
00:06.182	ID:7	broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]' RSSI: -67
00:07.089	ID:7	broadcast message sent: packet[1]
00:07.091	ID:7	Max RSSI mote: 9 : -22
00:08.309	ID:7	broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]' RSSI: -64
00:08.557	ID:7	broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]' RSSI: -83
00:09.681	ID:7	broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]' RSSI: -22
00:10.432	ID:7	broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]' RSSI: -67
00:12.557	ID:7	broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]' RSSI: -59
00:12.729	ID:7	broadcast message sent: packet[2]
00:12.731	ID:7	Max RSSI mote: 9 : -22
00:13.933	ID:7	broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]' RSSI: -83
00:15.180	ID:7	broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]' RSSI: -67
00:15.808	ID:7	broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]' RSSI: -22
00:16.307	ID:7	broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]' RSSI: -64
00:16.933	ID:7	broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]' RSSI: -59
00:17.979	ID:7	broadcast message sent: packet[3]
00:17.981	ID:7	Max RSSI mote: 9 : -22
00:19.930	ID:7	broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]' RSSI: -67
00:21.681	ID:7	broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]' RSSI: -59
00:21.931	ID:7	broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]' RSSI: -83
00:22.675	ID:7	broadcast message sent: packet[4]
00:22.677	ID:7	Max RSSI mote: 9 : -22
00:23.556	ID:7	broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]' RSSI: -64
00:24.807	ID:7	broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]' RSSI: -22
00:25.806	ID:7	broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]' RSSI: -59
00:26.058	ID:7	broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]' RSSI: -67
00:26.909	ID:7	broadcast message sent: packet[5]
00:26.911	ID:7	Max RSSI mote: 9 : -22
00:27.183	ID:7	broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]' RSSI: -83

Filter: `^ID:[7]$`

2.2.2. Dữ liệu được in ra từ cửa sổ Mote ouput

```
00:00.331      ID:8   Rime started with address 8.0

00:00.341      ID:8   MAC 08:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 8.

00:00.350      ID:8   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.352      ID:8   Starting 'Broadcast example'

00:00.495      ID:2   Rime started with address 2.0

00:00.504      ID:2   MAC 02:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 2.

00:00.509      ID:6   Rime started with address 6.0

00:00.513      ID:2   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.515      ID:2   Starting 'Broadcast example'

00:00.519      ID:6   MAC 06:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 6.

00:00.528      ID:6   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.530      ID:6   Starting 'Broadcast example'

00:00.607      ID:4   Rime started with address 4.0

00:00.616      ID:4   MAC 04:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 4.

00:00.625      ID:4   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.627      ID:4   Starting 'Broadcast example'

00:00.641      ID:1   Rime started with address 1.0

00:00.650      ID:1   MAC 01:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 1.

00:00.659      ID:1   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.660      ID:7   Rime started with address 7.0

00:00.661      ID:1   Starting 'Broadcast example'

00:00.670      ID:7   MAC 07:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 7.

00:00.679      ID:7   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.681      ID:7   Starting 'Broadcast example'

00:00.815      ID:10  Rime started with address 10.0

00:00.825      ID:10  MAC 0a:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 10.

00:00.834      ID:10  nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

00:00.836      ID:10  Starting 'Broadcast example'

00:00.967      ID:9   Rime started with address 9.0

00:00.974      ID:5   Rime started with address 5.0
```

```
    00:00.976      ID:9   MAC 09:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 9.

    00:00.983      ID:5   MAC 05:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 5.

    00:00.986      ID:9   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

    00:00.988      ID:9   Starting 'Broadcast example'

    00:00.992      ID:5   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

    00:00.994      ID:5   Starting 'Broadcast example'

    00:01.158      ID:3   Rime started with address 3.0

    00:01.167      ID:3   MAC 03:00:00:00:00:00:00:00 Contiki-3.x-3345-g32b5b17f6 started.
Node id is set to 3.

    00:01.176      ID:3   nullsec CSMA ContikiMAC, channel check rate 8 Hz, radio channel 26

    00:01.178      ID:3   Starting 'Broadcast example'

    00:05.099      ID:9   broadcast message sent: packet[1]

    00:05.101      ID:9   Max RSSI mote: 11 : -120

    00:05.131      ID:4   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'
RSSI: -76

    00:05.155      ID:6   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'
RSSI: -73

    00:05.180      ID:3   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'
RSSI: -68

    00:05.182      ID:7   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'
RSSI: -22

    00:05.245      ID:5   broadcast message received from 9.0 [1 times]: 'ID:9 packet[1]'
RSSI: -59

    00:05.699      ID:5   broadcast message sent: packet[1]

    00:05.701      ID:5   Max RSSI mote: 9 : -59

    00:05.726      ID:8   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -70

    00:05.740      ID:9   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -59

    00:05.754      ID:4   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -52

    00:05.767      ID:2   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -74

    00:05.781      ID:6   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -39

    00:05.789      ID:1   broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -87

    00:05.798      ID:10  broadcast message sent: packet[1]
```

```
00:05.800      ID:10 Max RSSI mote: 11 : -120

00:05.805      ID:3  broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -29

00:05.808      ID:7  broadcast message received from 5.0 [1 times]: 'ID:5 packet[1]'
RSSI: -59

00:05.853      ID:8  broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]'
RSSI: -84

00:05.880      ID:4  broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]'
RSSI: -67

00:05.892      ID:2  broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]'
RSSI: -74

00:05.913      ID:1  broadcast message received from 10.0 [1 times]: 'ID:10 packet[1]'
RSSI: -20

00:05.960      ID:1  broadcast message sent: packet[1]

00:05.962      ID:1  Max RSSI mote: 10 : -20

00:05.995      ID:5  broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]'
RSSI: -87

00:06.003      ID:4  broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]'
RSSI: -58

00:06.014      ID:2  broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]'
RSSI: -77

00:06.086      ID:6  broadcast message sent: packet[1]

00:06.088      ID:6  Max RSSI mote: 5 : -39

00:06.088      ID:10 broadcast message received from 1.0 [1 times]: 'ID:1 packet[1]'
RSSI: -20

00:06.113      ID:9  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -73

00:06.118      ID:5  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -39

00:06.126      ID:4  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -80

00:06.143      ID:2  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -73

00:06.179      ID:3  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -20

00:06.182      ID:7  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -67

00:06.228      ID:8  broadcast message received from 6.0 [1 times]: 'ID:6 packet[1]'
RSSI: -64

00:06.665      ID:2  broadcast message sent: packet[1]

00:06.667      ID:2  Max RSSI mote: 6 : -73
```

```
    00:06.711    ID:10 broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -74

    00:06.728    ID:8  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -21

    00:06.747    ID:5  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -74

    00:06.755    ID:4  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -85

    00:06.782    ID:6  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -73

    00:06.788    ID:1  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -77

    00:06.804    ID:3  broadcast message received from 2.0 [1 times]: 'ID:2 packet[1]'
RSSI: -70

    00:07.089    ID:7  broadcast message sent: packet[1]

    00:07.091    ID:7  Max RSSI mote: 9 : -22

    00:07.113    ID:9  broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'
RSSI: -22

    00:07.121    ID:5  broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'
RSSI: -59

    00:07.129    ID:4  broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'
RSSI: -83

    00:07.157    ID:6  broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'
RSSI: -67

    00:07.179    ID:3  broadcast message received from 7.0 [1 times]: 'ID:7 packet[1]'
RSSI: -64

    00:07.611    ID:8  broadcast message sent: packet[1]

    00:07.613    ID:8  Max RSSI mote: 2 : -21

    00:07.641    ID:2  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -21

    00:07.657    ID:6  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -64

    00:07.663    ID:1  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -86

    00:07.679    ID:3  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -63

    00:07.712    ID:10 broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -84

    00:07.745    ID:5  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -70

    00:07.753    ID:4  broadcast message received from 8.0 [1 times]: 'ID:8 packet[1]'
RSSI: -88
```

```
00:08.180      ID:3   broadcast message sent: packet[1]

00:08.182      ID:3   Max RSSI mote: 6 : -20

00:08.229      ID:8   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -63

00:08.240      ID:9   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -68

00:08.246      ID:5   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -29

00:08.254      ID:4   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -70

00:08.267      ID:2   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -70

00:08.281      ID:6   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -20

00:08.309      ID:7   broadcast message received from 3.0 [1 times]: 'ID:3 packet[1]'
RSSI: -64

00:08.481      ID:4   broadcast message sent: packet[1]

00:08.482      ID:4   Max RSSI mote: 5 : -52

00:08.516      ID:2   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -85

00:08.532      ID:6   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -80

00:08.538      ID:1   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -58

00:08.554      ID:3   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -70

00:08.557      ID:7   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -83

00:08.587      ID:10  broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -67

00:08.603      ID:8   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -88

00:08.614      ID:9   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -76

00:08.620      ID:5   broadcast message received from 4.0 [1 times]: 'ID:4 packet[1]'
RSSI: -52

00:09.567      ID:9   broadcast message sent: packet[2]

00:09.569      ID:9   Max RSSI mote: 7 : -22

00:09.621      ID:5   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'
RSSI: -59
```

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```
    00:09.629     ID:4   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'
RSSI: -76

    00:09.656     ID:6   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'
RSSI: -73

    00:09.679     ID:3   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'
RSSI: -68

    00:09.681     ID:7   broadcast message received from 9.0 [2 times]: 'ID:9 packet[2]'
RSSI: -22

    00:10.313     ID:6   broadcast message sent: packet[2]

    00:10.314     ID:6   Max RSSI mote: 3 : -20

    00:10.353     ID:8   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -64

    00:10.363     ID:9   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -73

    00:10.369     ID:5   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -39

    00:10.377     ID:4   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -80

    00:10.391     ID:2   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -73

    00:10.429     ID:3   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -20

    00:10.432     ID:7   broadcast message received from 6.0 [2 times]: 'ID:6 packet[2]'
RSSI: -67

    00:11.116     ID:1   broadcast message sent: packet[2]

    00:11.118     ID:1   Max RSSI mote: 10 : -20

    00:11.142     ID:2   broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]'
RSSI: -77

    00:11.211     ID:10  broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]'
RSSI: -20

    00:11.228     ID:8   broadcast message received from 1.0 [1 times]: 'ID:1 packet[2]'
RSSI: -86

    00:11.247     ID:5   broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]'
RSSI: -87

    00:11.255     ID:4   broadcast message received from 1.0 [2 times]: 'ID:1 packet[2]'
RSSI: -58

    00:11.681     ID:10  broadcast message sent: packet[2]

    00:11.683     ID:10  Max RSSI mote: 1 : -20

    00:11.727     ID:8   broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]'
RSSI: -84
```

```
00:11.754    ID:4   broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]'
RSSI: -67

00:11.765    ID:2   broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]'
RSSI: -74

00:11.787    ID:1   broadcast message received from 10.0 [2 times]: 'ID:10 packet[2]'
RSSI: -20

00:12.511    ID:5   broadcast message sent: packet[2]

00:12.513    ID:5   Max RSSI mote: 3 : -29

00:12.537    ID:1   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -87

00:12.554    ID:3   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -29

00:12.557    ID:7   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -59

00:12.603    ID:8   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -70

00:12.614    ID:9   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -59

00:12.628    ID:4   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -52

00:12.642    ID:2   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -74

00:12.655    ID:6   broadcast message received from 5.0 [2 times]: 'ID:5 packet[2]'
RSSI: -39

00:12.729    ID:7   broadcast message sent: packet[2]

00:12.731    ID:7   Max RSSI mote: 9 : -22

00:12.753    ID:4   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'
RSSI: -83

00:12.780    ID:6   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'
RSSI: -67

00:12.805    ID:3   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'
RSSI: -64

00:12.863    ID:9   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'
RSSI: -22

00:12.871    ID:5   broadcast message received from 7.0 [2 times]: 'ID:7 packet[2]'
RSSI: -59

00:13.236    ID:2   broadcast message sent: packet[2]

00:13.237    ID:2   Max RSSI mote: 8 : -21

00:13.281    ID:6   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -73
```

```
    00:13.287     ID:1   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -77

    00:13.303     ID:3   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -70

    00:13.336     ID:10  broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -74

    00:13.353     ID:8   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -21

    00:13.369     ID:5   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -74

    00:13.380     ID:4   broadcast message received from 2.0 [2 times]: 'ID:2 packet[2]'
RSSI: -85

    00:13.879     ID:4   broadcast message sent: packet[2]

    00:13.881     ID:4   Max RSSI mote: 5 : -52

    00:13.905     ID:6   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -80

    00:13.913     ID:1   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -58

    00:13.930     ID:3   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -70

    00:13.933     ID:7   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -83

    00:13.963     ID:10  broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -67

    00:13.979     ID:8   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -88

    00:13.987     ID:9   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -76

    00:13.993     ID:5   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -52

    00:14.017     ID:2   broadcast message received from 4.0 [2 times]: 'ID:4 packet[2]'
RSSI: -85

    00:14.666     ID:8   broadcast message sent: packet[2]

    00:14.668     ID:8   Max RSSI mote: 2 : -21

    00:14.711     ID:10  broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -84

    00:14.744     ID:5   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -70

    00:14.753     ID:4   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -88

    00:14.766     ID:2   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -21
```

```
    00:14.780    ID:6   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -64

    00:14.788    ID:1   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -86

    00:14.804    ID:3   broadcast message received from 8.0 [2 times]: 'ID:8 packet[2]'
RSSI: -63

    00:15.086    ID:6   broadcast message sent: packet[3]

    00:15.088    ID:6   Max RSSI mote: 3 : -20

    00:15.115    ID:9   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -73

    00:15.120    ID:5   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -39

    00:15.129    ID:4   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -80

    00:15.142    ID:2   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -73

    00:15.180    ID:7   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -67

    00:15.180    ID:3   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -20

    00:15.227    ID:8   broadcast message received from 6.0 [3 times]: 'ID:6 packet[3]'
RSSI: -64

    00:15.770    ID:9   broadcast message sent: packet[3]

    00:15.772    ID:9   Max RSSI mote: 7 : -22

    00:15.805    ID:3   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'
RSSI: -68

    00:15.808    ID:7   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'
RSSI: -22

    00:15.871    ID:5   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'
RSSI: -59

    00:15.879    ID:4   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'
RSSI: -76

    00:15.906    ID:6   broadcast message received from 9.0 [3 times]: 'ID:9 packet[3]'
RSSI: -73

    00:16.164    ID:3   broadcast message sent: packet[2]

    00:16.166    ID:3   Max RSSI mote: 6 : -20

    00:16.228    ID:8   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -63

    00:16.236    ID:9   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -68
```

```
    00:16.244      ID:5   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -29

    00:16.253      ID:4   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -70

    00:16.266      ID:2   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -70

    00:16.280      ID:6   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -20

    00:16.307      ID:7   broadcast message received from 3.0 [2 times]: 'ID:3 packet[2]'
RSSI: -64

    00:16.808      ID:5   broadcast message sent: packet[3]

    00:16.810      ID:5   Max RSSI mote: 3 : -29

    00:16.854      ID:8   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -70

    00:16.864      ID:9   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -59

    00:16.878      ID:4   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -52

    00:16.892      ID:2   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -74

    00:16.906      ID:6   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -39

    00:16.911      ID:1   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -87

    00:16.930      ID:3   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -29

    00:16.933      ID:7   broadcast message received from 5.0 [3 times]: 'ID:5 packet[3]'
RSSI: -59

    00:17.507      ID:1   broadcast message sent: packet[3]

    00:17.509      ID:1   Max RSSI mote: 10 : -20

    00:17.588      ID:10  broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]'
RSSI: -20

    00:17.621      ID:5   broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]'
RSSI: -87

    00:17.629      ID:4   broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]'
RSSI: -58

    00:17.640      ID:2   broadcast message received from 1.0 [3 times]: 'ID:1 packet[3]'
RSSI: -77

    00:17.979      ID:7   broadcast message sent: packet[3]

    00:17.981      ID:7   Max RSSI mote: 9 : -22
```

```
    00:18.003     ID:4   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'
RSSI: -83

    00:18.030     ID:6   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'
RSSI: -67

    00:18.055     ID:3   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'
RSSI: -64

    00:18.115     ID:9   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'
RSSI: -22

    00:18.118     ID:5   broadcast message received from 7.0 [3 times]: 'ID:7 packet[3]'
RSSI: -59

    00:18.361     ID:10  broadcast message sent: packet[3]

    00:18.362     ID:10  Max RSSI mote: 1 : -20

    00:18.392     ID:2   broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]'
RSSI: -74

    00:18.412     ID:1   broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]'
RSSI: -20

    00:18.477     ID:8   broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]'
RSSI: -84

    00:18.505     ID:4   broadcast message received from 10.0 [3 times]: 'ID:10 packet[3]'
RSSI: -67

    00:19.836     ID:6   broadcast message sent: packet[4]

    00:19.838     ID:6   Max RSSI mote: 3 : -20

    00:19.865     ID:9   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -73

    00:19.870     ID:5   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -39

    00:19.879     ID:4   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -80

    00:19.892     ID:2   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -73

    00:19.930     ID:7   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -67

    00:19.930     ID:3   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -20

    00:19.977     ID:8   broadcast message received from 6.0 [4 times]: 'ID:6 packet[4]'
RSSI: -64

    00:20.103     ID:2   broadcast message sent: packet[3]

    00:20.104     ID:2   Max RSSI mote: 8 : -21

    00:20.129     ID:4   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -85
```

```
    00:20.156     ID:6   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -73

    00:20.162     ID:1   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -77

    00:20.178     ID:3   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -70

    00:20.211     ID:10  broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -74

    00:20.227     ID:8   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -21

    00:20.247     ID:5   broadcast message received from 2.0 [3 times]: 'ID:2 packet[3]'
RSSI: -74

    00:20.357     ID:9   broadcast message sent: packet[4]

    00:20.359     ID:9   Max RSSI mote: 7 : -22

    00:20.392     ID:8   broadcast message sent: packet[3]

    00:20.394     ID:8   Max RSSI mote: 2 : -21

    00:20.405     ID:6   broadcast message received from 9.0 [4 times]: 'ID:9 packet[4]'
RSSI: -73

    00:20.507     ID:4   broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]'
RSSI: -88

    00:20.518     ID:2   broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]'
RSSI: -21

    00:20.531     ID:6   broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]'
RSSI: -64

    00:20.537     ID:1   broadcast message received from 8.0 [3 times]: 'ID:8 packet[3]'
RSSI: -86

    00:21.614     ID:5   broadcast message sent: packet[4]

    00:21.616     ID:5   Max RSSI mote: 3 : -29

    00:21.640     ID:2   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -74

    00:21.656     ID:6   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -39

    00:21.662     ID:1   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -87

    00:21.678     ID:3   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -29

    00:21.681     ID:7   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -59

    00:21.699     ID:4   broadcast message sent: packet[3]

    00:21.701     ID:4   Max RSSI mote: 5 : -52
```

```
    00:21.728    ID:8   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -70

    00:21.738    ID:9   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -59

    00:21.752    ID:4   broadcast message received from 5.0 [4 times]: 'ID:5 packet[4]'
RSSI: -52

    00:21.854    ID:8   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -88

    00:21.862    ID:9   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -76

    00:21.868    ID:5   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -52

    00:21.892    ID:2   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -85

    00:21.906    ID:6   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -80

    00:21.911    ID:1   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -58

    00:21.931    ID:7   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -83

    00:21.931    ID:3   broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -70

    00:21.961    ID:10  broadcast message received from 4.0 [3 times]: 'ID:4 packet[3]'
RSSI: -67

    00:22.531    ID:1   broadcast message sent: packet[4]

    00:22.533    ID:1   Max RSSI mote: 10 : -20

    00:22.587    ID:10  broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]'
RSSI: -20

    00:22.604    ID:8   broadcast message received from 1.0 [2 times]: 'ID:1 packet[4]'
RSSI: -86

    00:22.618    ID:5   broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]'
RSSI: -87

    00:22.629    ID:4   broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]'
RSSI: -58

    00:22.642    ID:2   broadcast message received from 1.0 [4 times]: 'ID:1 packet[4]'
RSSI: -77

    00:22.675    ID:7   broadcast message sent: packet[4]

    00:22.677    ID:7   Max RSSI mote: 9 : -22

    00:22.737    ID:9   broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'
RSSI: -22

    00:22.743    ID:5   broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'
RSSI: -59
```

```
    00:22.754    ID:4  broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'
RSSI: -83

    00:22.781    ID:6  broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'
RSSI: -67

    00:22.805    ID:3  broadcast message received from 7.0 [4 times]: 'ID:7 packet[4]'
RSSI: -64

    00:22.892    ID:10 broadcast message sent: packet[4]

    00:22.894    ID:10 Max RSSI mote: 1 : -20

    00:22.978    ID:8  broadcast message received from 10.0 [4 times]: 'ID:10 packet[4]'
RSSI: -84

    00:23.003    ID:4  broadcast message received from 10.0 [4 times]: 'ID:10 packet[4]'
RSSI: -67

    00:23.017    ID:2  broadcast message received from 10.0 [4 times]: 'ID:10 packet[4]'
RSSI: -74

    00:23.038    ID:1  broadcast message received from 10.0 [4 times]: 'ID:10 packet[4]'
RSSI: -20

    00:23.508    ID:3  broadcast message sent: packet[3]

    00:23.510    ID:3  Max RSSI mote: 6 : -20

    00:23.532    ID:6  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -20

    00:23.556    ID:7  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -64

    00:23.603    ID:8  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -63

    00:23.614    ID:9  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -68

    00:23.619    ID:5  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -29

    00:23.628    ID:4  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -70

    00:23.641    ID:2  broadcast message received from 3.0 [3 times]: 'ID:3 packet[3]'
RSSI: -70

    00:24.669    ID:9  broadcast message sent: packet[5]

    00:24.670    ID:9  Max RSSI mote: 7 : -22

    00:24.744    ID:5  broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]'
RSSI: -59

    00:24.753    ID:4  broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]'
RSSI: -76

    00:24.780    ID:6  broadcast message received from 9.0 [5 times]: 'ID:9 packet[5]'
RSSI: -73
```

```
    00:24.805    ID:3   broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]'
RSSI: -68

    00:24.807    ID:7   broadcast message received from 9.0 [4 times]: 'ID:9 packet[5]'
RSSI: -22

    00:25.033    ID:8   broadcast message sent: packet[4]

    00:25.035    ID:8   Max RSSI mote: 2 : -21

    00:25.071    ID:2   broadcast message sent: packet[4]

    00:25.073    ID:2   Max RSSI mote: 8 : -21

    00:25.086    ID:10 broadcast message received from 8.0 [3 times]: 'ID:8 packet[4]'
RSSI: -84

    00:25.120    ID:5   broadcast message received from 8.0 [3 times]: 'ID:8 packet[4]'
RSSI: -70

    00:25.128    ID:4   broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]'
RSSI: -88

    00:25.139    ID:2   broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]'
RSSI: -21

    00:25.155    ID:6   broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]'
RSSI: -64

    00:25.163    ID:1   broadcast message received from 8.0 [4 times]: 'ID:8 packet[4]'
RSSI: -86

    00:25.177    ID:3   broadcast message received from 8.0 [3 times]: 'ID:8 packet[4]'
RSSI: -63

    00:25.406    ID:6   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -73

    00:25.412    ID:1   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -77

    00:25.428    ID:3   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -70

    00:25.461    ID:10 broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -74

    00:25.478    ID:8   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -21

    00:25.497    ID:5   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -74

    00:25.505    ID:4   broadcast message received from 2.0 [4 times]: 'ID:2 packet[4]'
RSSI: -85

    00:25.769    ID:5   broadcast message sent: packet[5]

    00:25.771    ID:5   Max RSSI mote: 3 : -29

    00:25.804    ID:3   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -29
```

```
    00:25.806      ID:7   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -59

    00:25.853      ID:8   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -70

    00:25.861      ID:9   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -59

    00:25.878      ID:4   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -52

    00:25.891      ID:2   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -74

    00:25.905      ID:6   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -39

    00:25.913      ID:1   broadcast message received from 5.0 [5 times]: 'ID:5 packet[5]'
RSSI: -87

    00:26.031      ID:6   broadcast message sent: packet[5]

    00:26.033      ID:6   Max RSSI mote: 3 : -20

    00:26.055      ID:3   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -20

    00:26.058      ID:7   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -67

    00:26.104      ID:8   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -64

    00:26.112      ID:9   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -73

    00:26.118      ID:5   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -39

    00:26.126      ID:4   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -80

    00:26.142      ID:2   broadcast message received from 6.0 [5 times]: 'ID:6 packet[5]'
RSSI: -73

    00:26.531      ID:1   broadcast message sent: packet[5]

    00:26.533      ID:1   Max RSSI mote: 10 : -20

    00:26.559      ID:4   broadcast message sent: packet[4]

    00:26.560      ID:4   Max RSSI mote: 5 : -52

    00:26.587      ID:10  broadcast message received from 1.0 [5 times]: 'ID:1 packet[5]'
RSSI: -20

    00:26.604      ID:8   broadcast message received from 1.0 [3 times]: 'ID:1 packet[5]'
RSSI: -86

    00:26.618      ID:5   broadcast message received from 1.0 [5 times]: 'ID:1 packet[5]'
RSSI: -87
```

```
    00:26.629     ID:4   broadcast message received from 1.0 [5 times]: 'ID:1 packet[5]'
RSSI: -58

    00:26.642     ID:2   broadcast message received from 1.0 [5 times]: 'ID:1 packet[5]'
RSSI: -77

    00:26.909     ID:7   broadcast message sent: packet[5]

    00:26.911     ID:7   Max RSSI mote: 9 : -22

    00:26.990     ID:9   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'
RSSI: -22

    00:26.994     ID:5   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'
RSSI: -59

    00:27.004     ID:4   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'
RSSI: -83

    00:27.028     ID:6   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'
RSSI: -67

    00:27.055     ID:3   broadcast message received from 7.0 [5 times]: 'ID:7 packet[5]'
RSSI: -64

    00:27.161     ID:1   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -58

    00:27.180     ID:3   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -70

    00:27.183     ID:7   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -83

    00:27.213     ID:10  broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -67

    00:27.227     ID:8   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -88

    00:27.238     ID:9   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -76

    00:27.246     ID:5   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -52

    00:27.265     ID:2   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -85

    00:27.282     ID:6   broadcast message received from 4.0 [4 times]: 'ID:4 packet[4]'
RSSI: -80
```