
N32WB03x常用参数配置使用指南

简介

此文档的目的在于让使用者能够快速熟悉N32WB03x系列蓝牙SOC芯片的常用蓝牙参数配置,笔记讲解基于蓝牙透传rtdss例程进行讲解。

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2.2 使用用户自定义MAC地址

```

142 * @return
143 * @note
144 */
145 void app_ble_params_init(void)
146 {
147     struct ns_gap_params_t dev_info = {0};
148     dev_info.nac = SystemGetMacAddrO;
149     dev_info.nac = 0;
150     //set UUID from user stored
151     if(p_nac != NULL)
152     {
153         //set the uuid as nac address
154         memcpy(dev_info.nac_addr.addr, p_nac, BD_ADDR_LEN);
155     }
156     memcpy(dev_info.nac_addr.addr, "\x01\x02\x03\x04\x05\x06", BD_ADDR_LEN);
157 }
158
159
160
161 /* init params*/
162 dev_info.nac_addr_type = GAPM_STATIC_ADDR;
163 dev_info.appearance = 0;
164 dev_info.dev_role = GAP_ROLE_PERIPHERAL;
165
166 dev_info.dev_name_len = sizeof(CUSTOM_DEVICE_NAME);
167 memcpy(dev_info.dev_name, CUSTOM_DEVICE_NAME, dev_info.dev_name_len);
168
169 dev_info.dev_conn_param.intv_min = NSEC_TO_UNIT(MIN_CONN_INTERVAL, NSEC_UNIT_1_25_MS);
170 dev_info.dev_conn_param.intv_max = NSEC_TO_UNIT(MAX_CONN_INTERVAL, NSEC_UNIT_1_25_MS);
171 dev_info.dev_conn_param.latency = SLAVE_LATENCY;
172 dev_info.dev_conn_param.time_out = NSEC_TO_UNIT(CONN_SUP_TIMEOUT, NSEC_UNIT_10_MS);
173 dev_info.dev_conn_param.update_delay = FIRST_CONN_PARAMS_UPDATE_DELAY;
174
175 ns_ble_gap_init(&dev_info);
176
177 }
178
179
180
    
```

2、把选择标志赋0，选择使用用户自定义的MAC地址

3、把MAC地址修改为自己需要的地址

3. 配置服务和特征值的UUID

```

50
51 #include "rwip_config.h" // SW configuration
52 #include "BLE_PROFILE"
53 #if (BLE_PROFILE)
54 #include "pfc"
55 //Manufacturer Name Value
56 #define APP_BTSSS_MANUFACTURER_NAME ("Nation")
57 #define APP_BTSSS_MANUFACTURER_NAME_LEN (7)
58
59 #define ATT_SERVICE_AM_SPEED_128 {0x01,0x10,0x2E,0x07,0x0A,0x0E, 0x73,0x90, 0x01,0x11, 0x02,0x06, 0x00,0x27,0x00,0x00} /* Service UUID */
60 #define ATT_CHAR_AM_SPEED_WRITE_128 {0x01,0x00,0x2E,0x07,0x0A,0x0E, 0x73,0x90, 0x01,0x11, 0x02,0x06, 0x00,0x27,0x00,0x00} /* Characteristic value UUID */
61 #define ATT_CHAR_AM_SPEED_MTF_128 {0x02,0x00,0x2E,0x07,0x0A,0x0E, 0x73,0x90, 0x01,0x11, 0x03,0x06, 0x00,0x27,0x00,0x00} /* Characteristic value UUID */
62
63 // rdtss Service Attributes Indexes
64 enum
65 {
66     RTDSS_IDX_SVC,
67     RTDSS_IDX_WRITE_CFG,
68     RTDSS_IDX_MTF_CFG,
69     RTDSS_IDX_MTF_CHAR,
70     RTDSS_IDX_MTF_VAL,
71     RTDSS_IDX_MTF_CFG,
72     RTDSS_IDX_NB,
73 };
74
75 //Brief Initialize Device Information Service Application
76 void app_rdtss_init(void);
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
    
```

蓝牙服务UUID

蓝牙通知特征值UUID，即主机可以给从机发数据

蓝牙通知特征值UUID，即从机可以给主机发送数据

4. 配置广播时间间隔范围

广播时间间隔范围：20ms-10.24s

```

32
33 * @copyright Copyright (c) 2019, Nations Technologies Inc. All rights reserved.
34 */
35 #ifndef APP_USER_CONFIG_H
36 #define APP_USER_CONFIG_H
37 #include "ns_adv_data_def.h"
38
39 // Device name */
40 #define CUSTOM_DEVICE_NAME "NS_JOTSS"
41
42 /* adv config*/
43 #define CUSTOM_ADV_FAST_INTERVAL 160 /*< Fast advertising interval (in units of 0.625 ms. This value corresponds to 100 ms.). */
44 #define CUSTOM_ADV_SLOW_INTERVAL 3200 /*< Slow advertising interval (in units of 0.625 ms. This value corresponds to 2 seconds.). */
45 #define CUSTOM_ADV_FAST_DURATION 0/30 /*< The advertising duration of fast advertising in units of 1 seconds. maximum is 655 seconds */
46 #define CUSTOM_ADV_SLOW_DURATION 180 /*< The advertising duration of slow advertising in units of 1 seconds. maximum is 655 seconds */
47
48 // Advertise data
49 #define CUSTOM_USER_ADVERTISE_DATA \
50     { \
51         ADV_TYPE_SERVICE_DATA_INIT_UUID, \
52         ADV_UUID_DEVICE_INFORMATION_SERVICE \
53     }
54 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
55
56 // Scan responses data
57 #define CUSTOM_USER_ADV_SCANSP_DATA \
58     { \
59         ADV_TYPE_MANUFACTURER_SPECIFIC_DATA \
60     }
61 #define CUSTOM_USER_ADV_SCANSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCANSP_DATA)-1)
62
63 // Scan responses data length-maximum 81 bytes
64 #define CUSTOM_USER_ADV_SCANSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCANSP_DATA)-1)
65
66 connection config */
67 #define MIN_CONN_INTERVAL 30 /*< Minimum connection interval (15 ms) */
68 #define MAX_CONN_INTERVAL 30 /*< Maximum connection interval (30 ms). */
69
70
71
72
73
74
    
```

广播时间间隔 = 160 * 0.625 = 100ms

最小时间单元为：0.625ms

1、打开头文件

5. 配置连接参数

5.1 连接时间

连接时间的时间范围为：7.5ms-4s (ble 协议规定的范围)

```

56 ADV_UUID_DEVICE_INFORMATION_SERVICE\
57
58 #STARTUP
59 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
60
61 // Scan response data
62 #define CUSTOM_USER_ADV_SCSRSP_DATA \
63     "0000"
64     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA
65     "\xff\xff\xff\xff"
66
67 // Scan response data length- maximum 31 bytes
68 #define CUSTOM_USER_ADV_SCSRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCSRSP_DATA)-1)
69
70
71 /* connection config */
72 #define MIN_CONN_INTERVAL 15 /**< Minimum connection interval (15 ms) */
73 #define MAX_CONN_INTERVAL 30 /**< Maximum connection interval (30 ms) */
74
75 #define SLAVE_LATENCY 0 /**< Slave latency. */
76
77 #define CONN_SUP_TIMEOUT 5000 /**< Connection supervisory timeout (5000ms). */
78
79
80 #define FIRST_CONN_PARAMS_UPDATE_DELAY (5000) /**< Time of initiating event to update connection params (5 seconds). */
81
82
83 //sec config
84 #define SEC_PARAM_IO_CAPABILITIES GAP_IO_CAP_NO_INPUT_NO_OUTPUT /**< No I/O capabilities. (@num gap_io_cap) */
85 #define SEC_PARAM_OOB 0 /**< Out Of Band data not available. */
86 #define SEC_PARAM_KEY_SIZE 16 /**< Minimum encryption key size. 7 to 16 */
87 #define SEC_PARAM_BOND 1 /**< Perform bonding. */
88 #define SEC_PARAM_MITM 1 /**< Man In The Middle protection not required. */
89 #define SEC_PARAM_LESC 0 /**< LE Secure Connections not enabled. */
90 #define SEC_PARAM_KEYPRESS 0 /**< Keypress notifications not enabled. */
91 #define SEC_PARAM_IKEY GAP_KDIST_NONE /**< Initiator Key Distribution. (@num gap_kdist) */
92 #define SEC_PARAM_PKEY GAP_KDIST_ENCKEY /**< Responder Key Distribution. (@num gap_kdist) */
93 #define SEC_PARAM_SEC_MODE_LEVEL GAP_NO_SEC /**< Device security requirements (minimum security level). (@num see gap_sec_req) */
94
95 //bond config
96 #define MAX_BOND_PERR 5
97 #define BOND_STORE_ENABLE 0
98 #define BOND_DATA_BASE_ADDR 0x01020000
    
```

5.2 从设备延时

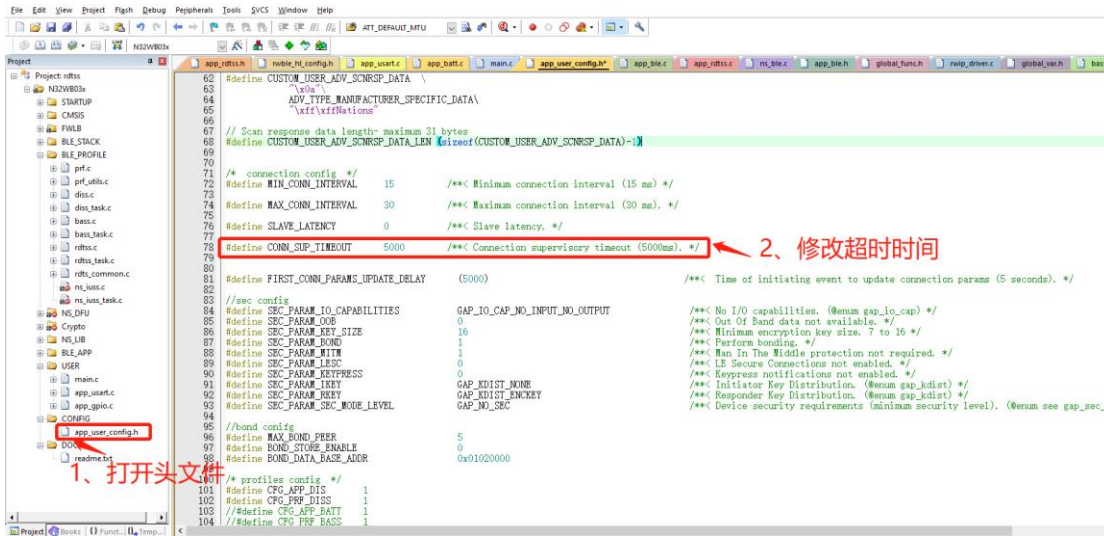
SLAVE_LATENCY—允许从机在没有数据要发送的情况下，跳过一定数目的主机连接事件，在这些被跳过的连接事件中，从机不必回复主机的数据包，这样可以降低功耗，SLAVE_LATENCY = 0 表示从机对于每一个来自主机的连接事件都进行回复，如果不回复，主机就会认为从机接收不正常。从设备延迟必须短于监控超时时间，且至少在超时时间内给从设备留出 6 次侦听的机会。从设备延迟 $\leq (\text{超时时间} / 6 / \text{连接间隔}) - 1$ ，SLAVE_LATENCY 的范围可以是 0-499。

```

56 ADV_UUID_DEVICE_INFORMATION_SERVICE\
57
58 #STARTUP
59 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
60
61 // Scan response data
62 #define CUSTOM_USER_ADV_SCSRSP_DATA \
63     "0000"
64     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA
65     "\xff\xff\xff\xff"
66
67 // Scan response data length- maximum 31 bytes
68 #define CUSTOM_USER_ADV_SCSRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCSRSP_DATA)-1)
69
70
71 /* connection config */
72 #define MIN_CONN_INTERVAL 15 /**< Minimum connection interval (15 ms) */
73 #define MAX_CONN_INTERVAL 30 /**< Maximum connection interval (30 ms) */
74
75 #define SLAVE_LATENCY 0 /**< Slave latency. */
76
77 #define CONN_SUP_TIMEOUT 5000 /**< Connection supervisory timeout (5000ms). */
78
79
80 #define FIRST_CONN_PARAMS_UPDATE_DELAY (5000) /**< Time of initiating event to update connection params (5 seconds). */
81
82
83 //sec config
84 #define SEC_PARAM_IO_CAPABILITIES GAP_IO_CAP_NO_INPUT_NO_OUTPUT /**< No I/O capabilities. (@num gap_io_cap) */
85 #define SEC_PARAM_OOB 0 /**< Out Of Band data not available. */
86 #define SEC_PARAM_KEY_SIZE 16 /**< Minimum encryption key size. 7 to 16 */
87 #define SEC_PARAM_BOND 1 /**< Perform bonding. */
88 #define SEC_PARAM_MITM 1 /**< Man In The Middle protection not required. */
89 #define SEC_PARAM_LESC 0 /**< LE Secure Connections not enabled. */
90 #define SEC_PARAM_KEYPRESS 0 /**< Keypress notifications not enabled. */
91 #define SEC_PARAM_IKEY GAP_KDIST_NONE /**< Initiator Key Distribution. (@num gap_kdist) */
92 #define SEC_PARAM_PKEY GAP_KDIST_ENCKEY /**< Responder Key Distribution. (@num gap_kdist) */
93 #define SEC_PARAM_SEC_MODE_LEVEL GAP_NO_SEC /**< Device security requirements (minimum security level). (@num see gap_sec_req) */
94
95 //bond config
96 #define MAX_BOND_PERR 5
97 #define BOND_STORE_ENABLE 0
98 #define BOND_DATA_BASE_ADDR 0x01020000
    
```

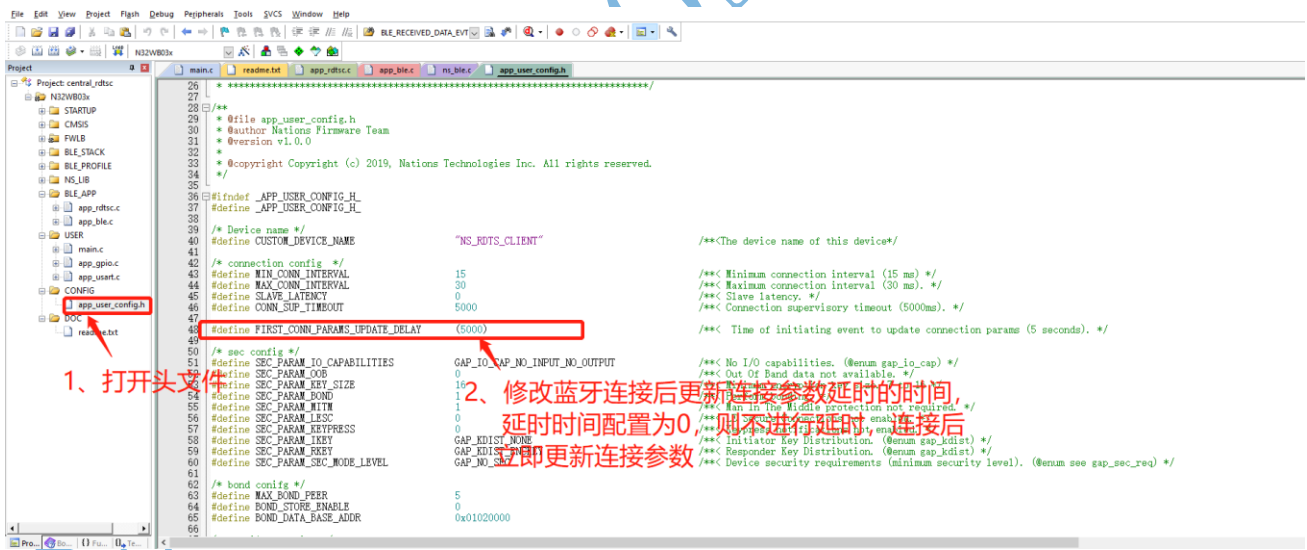
5.3 超时时间

超时时间范围：10ms-32s，其必须要满足：超时时间应 \geq 连接间隔 \times (从设备延迟 + 1) \times 6，不管从设备延迟是多少，都应该保证至少 6 次数据发送机会。



5.4 连接参数更新时间

在主从机建立连接之后会进行连接参数的更新，从连接到参数更新有一段延时，这段延时就是连接参数更新时间。



6. 配置广播数据

6.1 默认广播模式—普通发现模式

最大数据长度为 31，由于蓝牙在默认情况下，蓝牙会占用 3 个字节的广播数据广播设备信息，所以用户数据只能使用 31-3=28 个字节。

```

34 /*
35 #ifndef APP_USER_CONFIG_H
36 #define APP_USER_CONFIG_H
37 #include "ns_adv_data_def.h"
38
39 /* Device name */
40 #define CUSTOM_DEVICE_NAME "NS_RDTSS"
41
42 /* adv config */
43 #define CUSTOM_ADV_FAST_INTERVAL 180 /* Fast advertising interval (in units of 0.625 ms. This value corresponds to 180 ms). */
44 #define CUSTOM_ADV_SLOW_INTERVAL 180 /* Slow advertising interval (in units of 0.625 ms. This value corresponds to 180 ms). */
45 #define CUSTOM_ADV_FAST_DURATION 0//30 /* The advertising duration of fast advertising in units of 1 second, maximum is 655 seconds */
46 #define CUSTOM_ADV_SLOW_DURATION 180 /* The advertising duration of slow advertising in units of 1 second, maximum is 655 seconds */
47
48 // Advertise data
49 #define CUSTOM_USER_ADVERTISE_DATA \
50     ADV_TYPE_SERVICE_DATA_16BIT_UUID \
51     ADV_UUID_SERVICE_INFORMATION_SERVICE \
52     "\x04" \
53     "\x11\x22\x33"
54
55 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
56
57 // response data
58 #define CUSTOM_USER_ADV_SCSRSP_DATA \
59     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA \
60     "Manufacturer"
61
62 // Scan response data length, maximum 31 bytes
63 #define CUSTOM_USER_ADV_SCSRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCSRSP_DATA)-1)
64
65 /* connection config */
66 #define MIN_CONN_INTERVAL 30 /* Minimum connection interval (15 ms) */
67 #define MAX_CONN_INTERVAL 30 /* Maximum connection interval (30 ms) */
68 #define SLAVE_LATENCY 0 /* Slave latency */
69 #define CONN_SUP_TIMEOUT 5000 /* Connection supervisory timeout (5000ms) */
70 #define FIRST_CONN_PARAMS_UPDATE_DELAY (5000) /* Time of initiating event to update connection params (5 seconds) */
71
72 //end
    
```

1、打开头文件

2、修改广播数据的长度、数据类型和用户数据

广播数据CUSTOM_USER_ADVERTISE_DATA的总长度要小于等于28。

```

27 #define APP_USER_CONFIG_H
28 #include "ns_adv_data_def.h"
29
30 /* Device name */
31 #define CUSTOM_DEVICE_NAME "NS_RDTSS"
32
33 /* adv config */
34 #define CUSTOM_ADV_FAST_INTERVAL 180 /* Fast advertising interval (in units of 0.625 ms. This value corr
35 #define CUSTOM_ADV_SLOW_INTERVAL 3200 /* Slow advertising interval (in units of 0.625 ms. This value corr
36 #define CUSTOM_ADV_FAST_DURATION 0//30 /* The advertising duration of fast advertising in units of 1 se
37 #define CUSTOM_ADV_SLOW_DURATION 180 /* The advertising duration of slow advertising in units of 1 secon
38
39 // Advertise data
40 #define CUSTOM_USER_ADVERTISE_DATA \
41     ADV_TYPE_SERVICE_DATA_16BIT_UUID \
42     ADV_UUID_SERVICE_INFORMATION_SERVICE \
43     "\x04" \
44     "\x11\x22\x33"
45
46 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
47
48 // response data
49 #define CUSTOM_USER_ADV_SCSRSP_DATA \
50     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA \
51     "Manufacturer"
52
53 // Scan response data length, maximum 31 bytes
54 #define CUSTOM_USER_ADV_SCSRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCSRSP_DATA)-1)
55
56 /* connection config */
57 #define MIN_CONN_INTERVAL 30 /* Minimum connection interval (15 ms) */
58 #define MAX_CONN_INTERVAL 30 /* Maximum connection interval (30 ms) */
59 #define SLAVE_LATENCY 0 /* Slave latency */
60 #define CONN_SUP_TIMEOUT 5000 /* Connection supervisory timeout (5000ms) */
61 #define FIRST_CONN_PARAMS_UPDATE_DELAY (5000) /* Time of initiating event to update connection params (5 seconds) */
62
63 //end
    
```

1、打开头文件

2、添加需要广播的数据长度、数据类型、用户数据

6.2 beacon模式

可以去掉广播数据中被占用的02 01 06三个字节的固定广播数据，从而使广播数据可以达到31个字节

```

114 static void app_create_advertising(void)
115 {
116     NS_LOG_DEBUG("Nale\n", __func__);
117     if (app_adv_state == APP_ADV_STATE_IDLE && app_adv_mode != APP_ADV_MODE_STOP)
118     {
119         // Prepare the GAPM_ACTIVITY_CREATE_CMD message
120         struct gapm_activity_create_adv_cmd *p_cmd = EX_MSG_ALLOC(GAPM_ACTIVITY_CREATE_CMD,
121             TASK_GAPM, TASK_APP,
122             gapm_activity_create_adv_cmd);
123
124         // Set operation code
125         p_cmd->operation = GAPM_CREATE_ADV_ACTIVITY;
126
127         // Fill the allocated kernel message
128         p_cmd->adv_type = GAPM_ADV_TYPE_STATIC; // GAPM_STATIC_ADDR;
129         p_cmd->adv_param_type = GAPM_ADV_PARAM_PROP;
130         p_cmd->adv_param_prop = GAPM_ADV_PARAM_PROP_INDIR_CONN_MASK;
131         p_cmd->adv_param_filter_pol = ADV_FILTER_POLICY_ALLOW;
132         p_cmd->adv_param_disc_mode = GAPM_ADV_PARAM_DISC_MODE_ALLOW;
133         p_cmd->adv_param_disc_mode = ADV_ALLOW_SCAN_INVD;
134         p_cmd->adv_param_prim_cfg_phy = ADV_ALLOW_SCAN_INVD; //修改为beacon 模式可以去掉广播数据中被占用的02 01 06三个字节的固定广播数据，从而使广播数据可以达到31个字节
135         p_cmd->adv_param_prim_cfg_phy = ADV_ALLOW_SCAN_INVD;
136         p_cmd->adv_param_sec_cfg_phy = ADV_ALLOW_SCAN_INVD;
137         p_cmd->adv_param_sec_cfg_phy = ADV_ALLOW_SCAN_INVD;
138
139         if (adv_err_ex_adv_enable)
140         {
141             p_cmd->adv_param_type = GAPM_ADV_TYPE_EXTENDABLE;
142             p_cmd->adv_param_prop = ADV_CONN;
143             p_cmd->adv_param_second_cfg_phy = ADV_ALLOW_SCAN_INVD; //PHY_INDEPS_VALUE, GAPM_PHY_TYPE_LE_1M;
144             p_cmd->adv_param_second_cfg_adv_sid = 1;
145             p_cmd->adv_param_second_cfg_max_skip = 0;
146         }
147
148         switch (app_adv_mode)
149         {
150             case APP_ADV_MODE_DIRECTED:
151                 /* If the peripheral is already bonded with a central device, use the direct advertising
152                 * procedure (D) Address of the peer device is stored in INVD.
153                 */
154                 if (NS_APP_SEC)
155                 {
156                     if (ns_sec_get_bond_status()
157                         {
158                             p_cmd->adv_param_prop = GAPM_ADV_PARAM_PROP_INDIR_CONN_MASK;
159                             p_cmd->adv_param_prop = GAPM_ADV_PARAM_PROP_INDIR_CONN_MASK;
160                         }
161                     }
162                 }
163             }
164         }
165     }
166 }
    
```

1、打开文件

2、修改广播模式为beacon模式

7. 扫描应答数据

最大数据长度为 31 个字节，用户可以使用数据长度为 31 个字节。

```

46 #define CUSTOM_ADV_SLOW_INTERVAL 160 /**< Slow advertising interval (in units of 0.625 ms. This value corresponds to 2 seconds). */
47 #define CUSTOM_ADV_FAST_INTERVAL 0 /**< The advertising duration of fast advertising in units of 1 seconds. maximum is 655 seconds */
48 #define CUSTOM_ADV_FAST_DURATION 0 /**< The advertising duration of fast advertising in units of 1 seconds. maximum is 655 seconds */
49 #define CUSTOM_ADV_SLOW_DURATION 180 /**< The advertising duration of slow advertising in units of 1 seconds. maximum is 655 seconds */
50
51 // Advertising data
52 #define CUSTOM_USER_ADVERTISE_DATA \
53     "\x03"
54     ADV_TYPE_SERVICE_DATA_16BIT_UUID,
55     ADV_UUID_DEVICE_INFORMATION_SERVICE
56
57
58 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
59
60 // Scan response data
61 #define CUSTOM_USER_ADV_SCNRSP_DATA \
62     "\x04"
63     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA,
64     "\xff\xff\xff\xff"
65
66 // Scan response data length- maximum 31 bytes
67 #define CUSTOM_USER_ADV_SCNRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCNRSP_DATA)-1)
68
69
70 /* connection config */
71 #define MIN_CONN_INTERVAL 30 /**< Minimum connection interval (15 ms) */
72 #define MAX_CONN_INTERVAL 30 /**< Maximum connection interval (30 ms). */
73
74 #define SLAVE_LATENCY 0 /**< Slave latency. */
75
76 #define CONN_SUP_TIMEOUT 5000 /**< Connection supervisory timeout (5000ms). */
77
78 #define FIRST_CONN_PARAMS_UPDATE_DELAY (5000) /**< Time of initiating event to update connection params (5 seconds). */
79
80
81 //see config
82 #define SEC_PARAM_IO_CAPABILITIES GAP_IO_CAP_NO_INPUT_NO_OUTPUT /**< No I/O capabilities. (@enum gap_io_cap) */
83 #define SEC_PARAM_OOB 0 /**< Out Of Band data not available. */
84 #define SEC_PARAM_KEY_SIZE 16 /**< Minimum encryption key size. 7 to 16 */
85 #define SEC_PARAM_BONDING 1 /**< Perform bonding. */
86 #define SEC_PARAM_MITM 1 /**< Man In The Middle protection not required. */
87 #define SEC_PARAM_LESC 0 /**< LE Secure Connections not enabled. */
88 #define SEC_PARAM_REPRESSED 0 /**< Repress notifications not enabled. */
89 #define SEC_PARAM_KEYD GAP_KEYD_NONE /**< Initiator Key Distribution. (@enum gap_keydist) */
90 #define SEC_PARAM_KEYR GAP_KEYD_ENCKEY /**< Responder Key Distribution. (@enum gap_keydist) */
91 #define SEC_PARAM_SEC_MODE_LEVEL GAP_SEC_MODE_1 /**< Device security requirements (minimum security level). (@enum see gap_sec_req) */
92
93 #endif
    
```

1、打开头文件

2、修改扫描应答数据的长度、数据类型和用户数据

扫描应答数据CUSTOM_USER_ADV_SCNRSP_DATA长度要小于等于31个，用户可以使用31个字节长度。

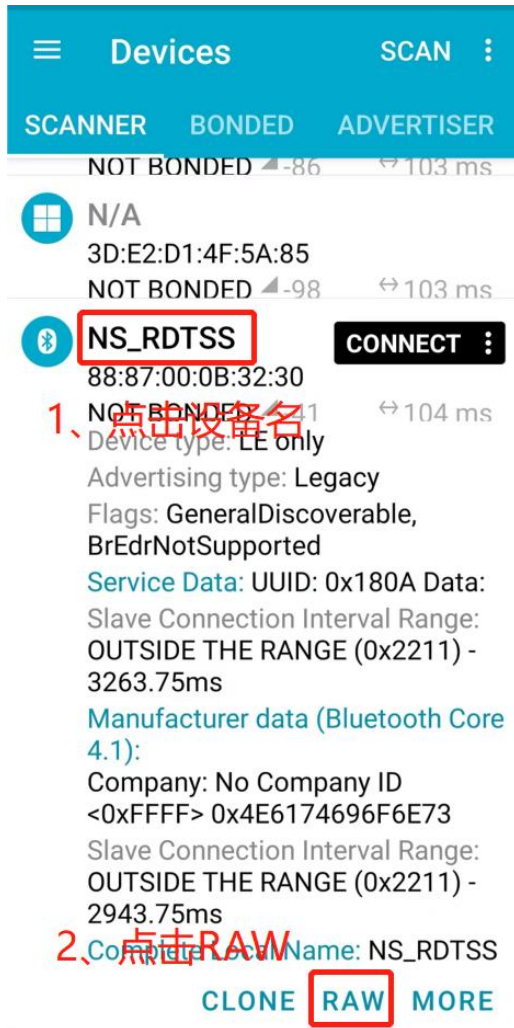
```

55     ADV_UUID_DEVICE_INFORMATION_SERVICE \
56     "\x04"
57     "\x07"
58     "\x11\x22\x33"
59
60 #define CUSTOM_USER_ADVERTISE_DATA_LEN (sizeof(CUSTOM_USER_ADVERTISE_DATA)-1)
61
62 // Scan response data
63 #define CUSTOM_USER_ADV_SCNRSP_DATA \
64     "\x04"
65     ADV_TYPE_MANUFACTURER_SPECIFIC_DATA,
66     "\xff\xff\xff\xff"
67
68 // Scan response data length- maximum 31 bytes
69 #define CUSTOM_USER_ADV_SCNRSP_DATA_LEN (sizeof(CUSTOM_USER_ADV_SCNRSP_DATA)-1)
70
71
72 /* connection config */
73 #define MIN_CONN_INTERVAL 15 /**< Minimum connection interval (15 ms) */
74 #define MAX_CONN_INTERVAL 30 /**< Maximum connection interval (30 ms). */
75
76 #endif
    
```

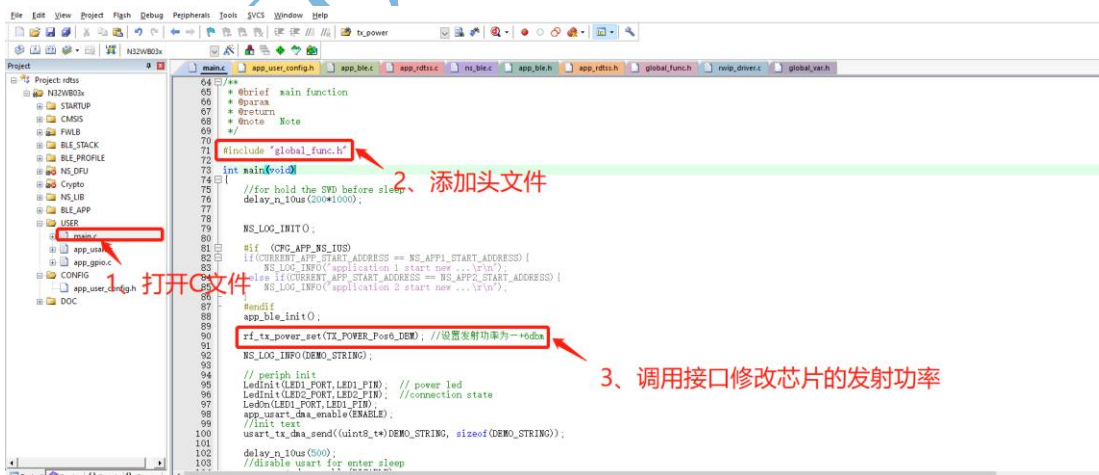
1、打开头文件

2、添加扫描应答数据的长度、数据类型、用户数据

添加广播数据和扫描应答数据之后，可在APP扫描到的设备名字下看到具体数据



8. 发射功率配置



9. MUT变更

从机修改ATT_DEFAULT_MTU值，主机也需要修改MTU值，主从协商取两者中最小的值为通信的MTU值。

9.1 从机MTU修改

从机最大支持MTU值，有效数据为MTU-3个字节，ATT的opcode占用一个字节以及ATT的handle占用 2个字节，所以客户能使用的有效数据为MTU-3个字节。

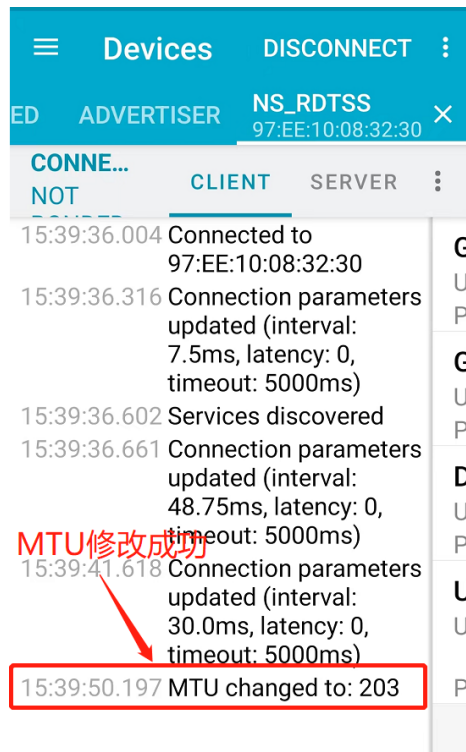
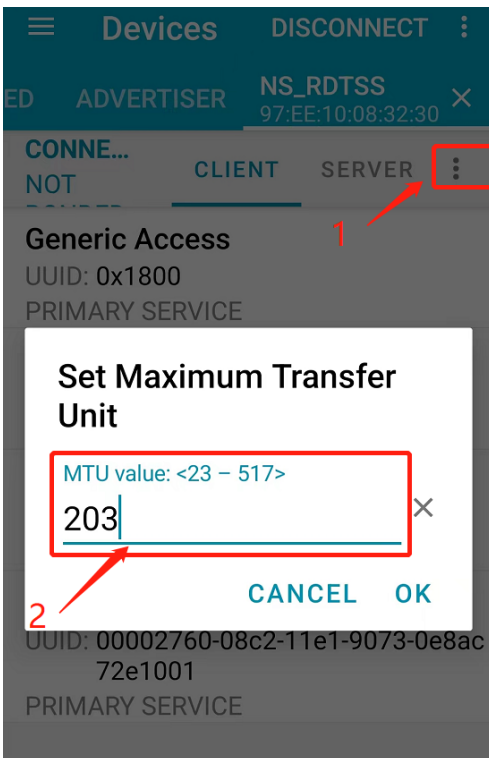
```

71 // recommended value: 30 s; (2000 for ke timer) 0x00B8
72 #define GAP_MAX_TX_POWER_INTERVAL (2000)
73 // Maximal authorized MTU value - Implementation supports up to (2^12 - 1) = 4096 bytes
74 #define GAP_MAX_LE_MTU (2048)
75 // Maximum GAP device name size
76 #define GAP_MAX_NAME_SIZE (0x20)
77 // Maximum Transmission Unit
78 #define ATT_DEFAULT_MTU 203 //修改MTU值为203字节，用户为200字节，与主机协商选择两者中最小值为最终MTU值
79
80 // 30 seconds transaction timer
81 #define ATT_TRANS_RTX (0x00B8)
82 // Acceptable encryption key size - strict access (0x10)
83 #define ATT_SEC_ENC_KEY_SIZE
84 // Maximum attribute value length (GAP_MAX_LE_MTU)
85 #define ATT_MAX_VALUE
86
87 // =====
88 // ----- BLE PARTITIONING -----
89 // =====
90
91 // =====
92 // ----- INTERFACES -----
93 // =====
94
95 #if BLE_APP_PRESENT
96 #define APP_MAIN_TASK TASK_APP
97 #else // BLE_APP_PRESENT
98 #define APP_MAIN_TASK TASK_APP
99 #endif
100
101 #endif
102
103 #endif
104
105 #endif
106
107 #endif
108
109 #endif

```

9.2 主机MTU值修改

主从协商选择两者中最小值作为通信的MTU值



历史版本

日期	版本	修改
2022.09.07	V1.0.0	初始版本

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