Murata UWB module Type2BP Multi DUT connection DEMO guide -Multicast -Multi Session

v04.04.03

Jun. 28th, 2023 RevB
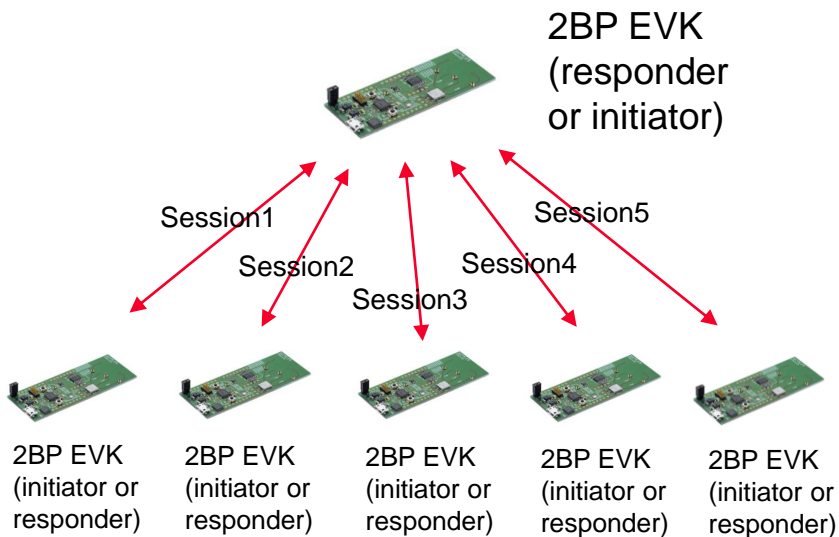
28 June 2023

Multi DUT connection method

Multi session

2BP EVK
(responder
or initiator)

Session1

Session2

Session3

Session4

Session5

2BP EVK
(initiator or
responder)

2BP EVK
(initiator or
responder)

2BP EVK
(initiator or
responder)
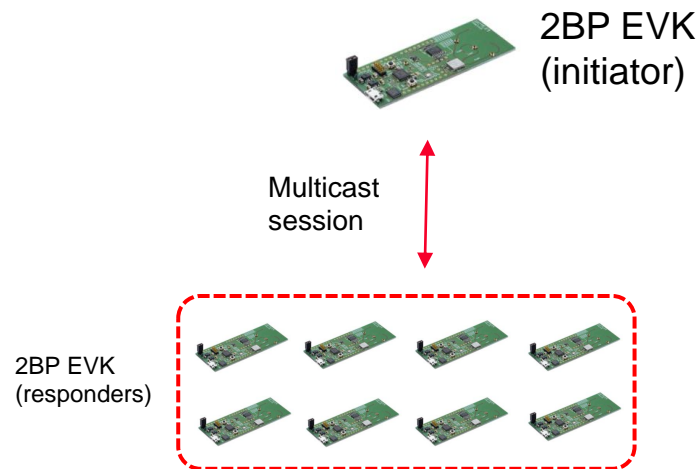
2BP EVK
(initiator or
responder)

2BP EVK
(initiator or
responder)

*One responder(or initiator) can open multiple sessions
with initiators(or responders) (**MAX 5 unit)**

*This guide shows "1 responder vs 5 initiators" case.

Multicast

2BP EVK
(initiator)

Multicast
session

2BP EVK
(responders)

*One initiator can communicate with multiple responders
(**MAX 8 responders**) using multicast packet.

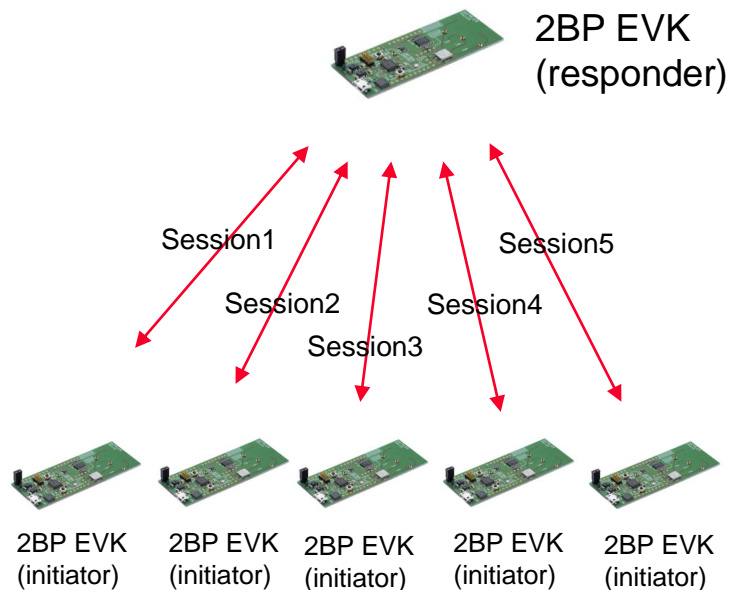CONFIDENTIAL

28 June 2023   **2**

Before trying demo

*Sample script (Python script) works with PnP mode binary.
Please refer to PnP test guide (MTD-APN-007) and install PnP binary on Type2BP EVK

*Sample script is designed to work with
 Multisession : 1 responder vs 5 initiator
 Multicast : 1 initiator vs 8 responder

To run the demo with less Q'ty for Multisession (example, 1 responder vs 2 initiator for Multisession), Python script need to be modified.

Multi Session

2BP EVK
(responder)

Session1

Session2

Session3

Session4

Session5

2BP EVK
(initiator)

2BP EVK
(initiator)

2BP EVK
(initiator)

2BP EVK
(initiator)

2BP EVK
(initiator)

Responder : During ranging, if one of the initiators lost connection, responder will wait the initiator's signal and other session will stop, all of sessions must be alive to run the demo script.

Session ID : Need to assign unique session ID for each sessions.

Initiator : The same with single session.

Transmit timing is not synchronized between initiators, to minimize connection lost by packet confliction, "hopping" mode can be used.

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28 June 2023 4

Multi Session : DEMO

1. Check COM port numbers for each EVKs

2. Start responder by running command below

    – python DS-TWR_SR150_Multisession_v04.04.03.py COM10

3. Start initiator 1 ~ 5 by running command below

    – python DS-TWR_SR150_session1_v04.04.03.py COM11

    – python DS-TWR_SR150_session2_v04.04.03.py COM12

    – python DS-TWR_SR150_session3_v04.04.03.py COM13

    – python DS-TWR_SR150_session4_v04.04.03.py COM14

    – python DS-TWR_SR150_session5_v04.04.03.py COM15

Note :
*Need to run all of 5 initiators at the same time, or modify responder script to reduce number of initiators.
*COM port number may different based on environment, please assign proper COM port for devices.
 [In this demo script, COM10 assigned for responder, COM11~15 assigned for initiators]

Code modification example

LNE 121~ of DS-TWR_SR150_Multisession_v04.04.03.py

1 vs 5 code example (default)

```
# Session ID
SESSION_ID = [0x01, 0x00, 0x00, 0x00]
SESSION_ID2 = [0x02, 0x00, 0x00, 0x00]
SESSION_ID3 = [0x03, 0x00, 0x00, 0x00]
SESSION_ID4 = [0x04, 0x00, 0x00, 0x00]
SESSION_ID5 = [0x05, 0x00, 0x00, 0x00]
sessionID = [SESSION_ID, SESSION_ID2, SESSION_ID3, SESSION_ID4, SESSION_ID5]
#sessionID = [SESSION_ID, SESSION_ID2]
```

1 vs 2 code example

```
# Session ID
SESSION_ID = [0x01, 0x00, 0x00, 0x00]
SESSION_ID2 = [0x02, 0x00, 0x00, 0x00]
SESSION_ID3 = [0x03, 0x00, 0x00, 0x00]
SESSION_ID4 = [0x04, 0x00, 0x00, 0x00]
SESSION_ID5 = [0x05, 0x00, 0x00, 0x00]
#sessionID = [SESSION_ID, SESSION_ID2, SESSION_ID3, SESSION_ID4, SESSION_ID5]
sessionID = [SESSION_ID, SESSION_ID2]
```

Multi Session, Responder

Multi Session File Output

- Responder script 5 csv files to store measurement result.

  log_20230622-131407_[1, 0, 0, 0].csv
  log_20230622-131407_[2, 0, 0, 0].csv
  log_20230622-131407_[3, 0, 0, 0].csv
  log_20230622-131407_[4, 0, 0, 0].csv
  log_20230622-131407_[5, 0, 0, 0].csv

- This output happens very frequently (5 times per ranging interval).
  - PC may miss some measurement results because of the load to output.
  - Set data_log False if some measurements are missing, and parse the log on the command prompt instead.
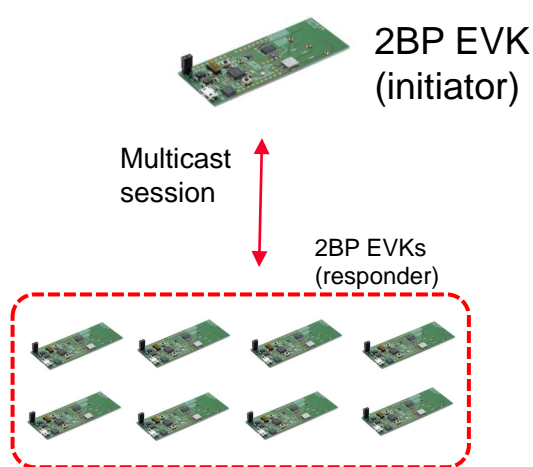
  data_log = False

Enabling Hopping Mode

- Hopping mode is disabled (0x00)

| 0x2C, 0x01, 0x00,   # HOPPING_MODE |

- Change from 0x00 to 0x01 to enable hopping mode.

Multicast

2BP EVK
(initiator)

Initiator : Need to set number of devices and DST MAC address of responders before starting UWB session. UWB stack assign when the responder send reply packet.

See below parameters in python script*
NUMBER_OF_CONTROLEES
DST_MAC_ADDRESS

Multicast session

2BP EVKs
(responder)

Responder : Must have different DEVICE MAC address to distinguish the devices.

See below parameters in python script*
*# DEVICE_MAC_ADDRESS

After session start, initiator send multicast packet and responder will reply according to the direction from initiator, so packet confliction will not happen. Even some of connection lost, initiator will keep sending multicast packet and keep multicast session.

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28 June 2023   **10**

Multicast : DEMO

1. Check COM port numbers for each EVKs
2. Start responder 1 ~ 8 by running command below
   - python DS-TWR_SR150_multicast_responder0_v04.04.03.py COM11
   - python DS-TWR_SR150_multicast_responder1_v04.04.03.py COM12
   - python DS-TWR_SR150_multicast_responder2_v04.04.03.py COM13
   - python DS-TWR_SR150_multicast_responder3_v04.04.03.py COM14
   - python DS-TWR_SR150_multicast_responder4_v04.04.03.py COM15
   - python DS-TWR_SR150_multicast_responder5_v04.04.03.py COM16
   - python DS-TWR_SR150_multicast_responder6_v04.04.03.py COM17
   - python DS-TWR_SR150_multicast_responder7_v04.04.03.py COM18
3. Start initiator by running command below
   - python DS-TWR_SR150_multicast_initiator_v04.04.03.py COM10

Note :
*No need to run all of 8 responders at the same time.
*COM port number may different based on environment, please assign proper COM port for devices.
 [In this demo script, COM10 assigned for initiator, COM11~18 assigned for responders]
*Please confirm next page.

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28 June 2023

Multicast : Explanation for Script files

Default setting for Multicast

DS-TWR_SR150_multicast_initiator_v04.04.03.py

-**NUMBER_OF_CONTROLEES** is set in
UWB_SESSION_SET_UP_CONFIG
 Default is 8.

```
127  UWB_SESSION_SET_APP_CONFIG = [0x21, 0x03, 0x00, 0x75] + SESSION_ID + [
128      0x22,                                # Number of parameters
129  #   0x00, 0x01, 0x00,                    # DEVICE_TYPE
130      0x01, 0x01, 0x02,                    # RANGING_ROUND_USAGE
131      0x02, 0x01, 0x00,                    # STS_CONFIG
132      0x03, 0x01, 0x01,                    # MULTI_NODE_MODE --> multi mode
133      0x04, 0x01] + channel_ID + [         # CHANNEL_NUMBER
134      0x05, 0x01, 0x08,                    # NUMBER_OF_CONTROLEES --> 8
135  #   0x06, 0x02, 0x00, 0x00,              # DEVICE_MAC_ADDRESS
```

-**DST_MAC_ADDRESS** is set in
UWB_SESSION_SET_INITIATOR_CONFIG
 Set 8 Destination MAC address.
 0x1000/0x1001/0x1002/0x1003/0x1004/0x1005/0x1006/0x1007

```
203  UWB_SESSION_SET_INITIATOR_CONFIG = [0x21, 0x03, 0x00, 0x21] + SESSION_ID + [
204      0x04,                                # Number of parameters
205      0x00, 0x01, 0x01,                    # DEVICE_TYPE: Controller
206      0x06, 0x02, 0x11, 0x11,              # DEVICE_MAC_ADDRESS: 0x1111
207      0x07, 0x10, 0x00, 0x10, 0x01, 0x10,
208          0x02, 0x10, 0x03, 0x10,
209          0x04, 0x10, 0x05, 0x10,
210          0x06, 0x10, 0x07, 0x10,          # DST_MAC_ADDRESS: 0x1000-0x1007
211      0x11, 0x01, 0x01                     # DEVICE_ROLE: Initiator
212  ]
```

DS-TWR_SR150_multicast_responderX_v04.04.03.py

-**DEVICE_MAC_ADDRESS** is set in
UWB_SESSION_SET_RESPONDER_CONFIG

Responder0:

```
213  UWB_SESSION_SET_RESPONDER_CONFIG = [0x21, 0x03, 0x00, 0x13] + SESSION_ID + [
214      0x04,                                # Number of parameters
215      0x00, 0x01, 0x00,                    # DEVICE_TYPE: Controlee
216      0x06, 0x02, 0x00, 0x10,              # DEVICE_MAC_ADDRESS: 0x1000
217      0x07, 0x02, 0x11, 0x11,              # DST_MAC_ADDRESS: 0x1111
218      0x11, 0x01, 0x00                     # DEVICE_ROLE: Responder
219  ]
```

Responder7:

```
213  UWB_SESSION_SET_RESPONDER_CONFIG = [0x21, 0x03, 0x00, 0x13] + SESSION_ID + [
214      0x04,                                # Number of parameters
215      0x00, 0x01, 0x00,                    # DEVICE_TYPE: Controlee
216      0x06, 0x02, 0x07, 0x10,              # DEVICE_MAC_ADDRESS: 0x1007
217      0x07, 0x02, 0x11, 0x11,              # DST_MAC_ADDRESS: 0x1111
218      0x11, 0x01, 0x00                     # DEVICE_ROLE: Responder
219  ]
```

Multicast, Initiator

Multicast File Output

- Initiator script creates csv file to store measurement result.

  log_20230622-142531.csv

- This output happens frequently (per ranging interval).
  - PC may miss some measurement results because of the load to output.
  - Set data_log False if some measurements are missing, and parse the log on the command prompt instead.

  data_log = False

Revision History

Revision	Release Date	Comments
A	Jun. 22th, 2023	Initial revision for SDK 04.04.03
B	Jun. 28th, 2023	Add Explanation for script files