JN5169 EVM and PER validation with Non Signaling Test Using IQxel-MW

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SECURE CONNECTIONS FOR A SMARTER WORLD

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Purpose

Customer, Azurewave is designing JN5169 module for IoT application. They have IQxel non-signaling equipment. Azurewave would like to know the measurement of JN5169 PER using IQxel-MW instrument. We co-work with ACE Solution Taiwan to integrate JN5169 and IQxel-MW to perform EVM and Packet error rate test.

This document will address the JN5169 setup and JN5169 connection setup with IQxel-MW. Finally we show the EVM and packet error rate results.

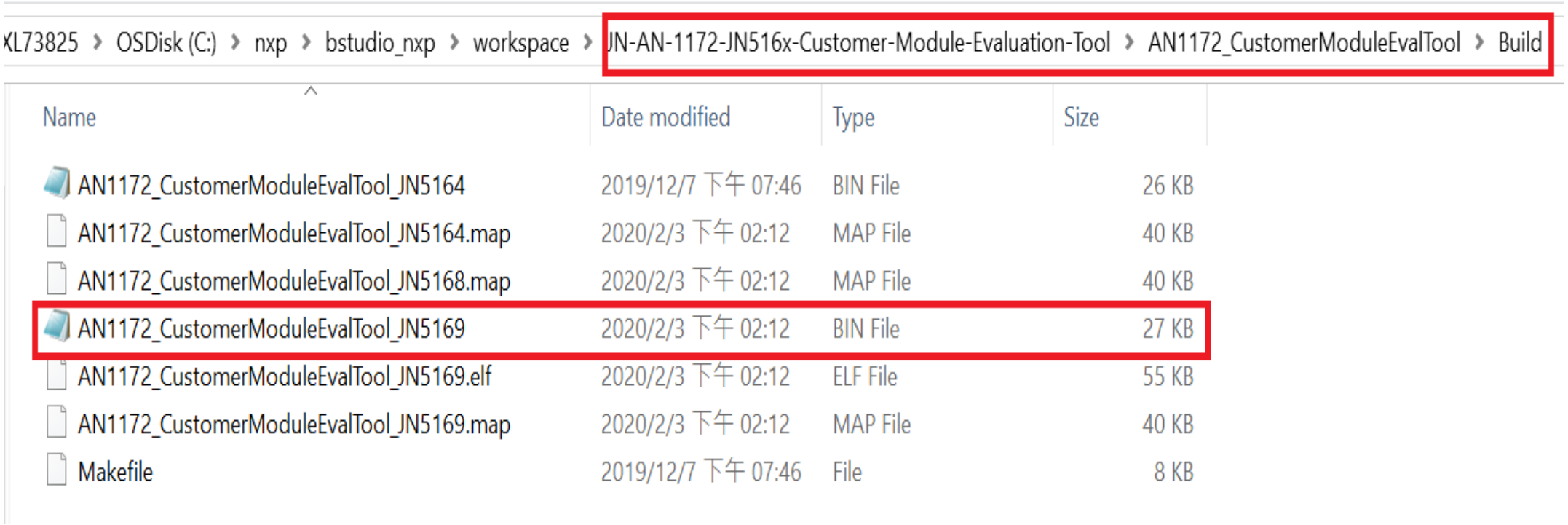
JN5169 Setup

1. **Download the latest JN5169 CMET tool example code from NXP website. The latest version is 1.6 and load it into JN5169 target board.**

JN-AN-1059	Wireless Network Deployment Guidelines	Provides RF guidelines for the deployment of an IEEE 802.15.4-based wireless network.	1.2
JN-AN-1069	IEEE 802.15.4 Serial Cable Replacement	Describes and provides software for creating a wireless IEEE 802.15.4 link between the UARTs on two JN516x/7x devices.	4.0
JN-AN-1079	Co-existence of IEEE 802.15.4 at 2.4 GHz	Highlights the issues affecting the co-existence of an IEEE 802.15.4-based system with other systems in the 2.4GHz radio band.	1.1
JN-AN-1172	JN516x Customer Module Evaluation Tool	Provides and describes a tool which can be used to place the JN516x microcontroller into a number of test modes that enable measurement of module performance.	1.6
JN-AN-1174	IEEE 802.15.4 Application Template for JN516x	Provides a template which can be used as a basis for IEEE 802.15.4 application coding. The use and structure of the template are described in the User Guide JN-UG-3024.	1.4
JN-AN-1175	Packet Error Rate Testing for JN516x	Provides and describes Packet Error Rate (PER) testing software that can be used on boards from a JN516x evaluation kit.	1.3

JN5169 Setup (Continued)

3. Or You can flash existing binary image file into JN5169 target board through JN516x Production Flash Programmer Tool. Production Flash programmer tool captured to next page.



JN5169 Setup (Continued)

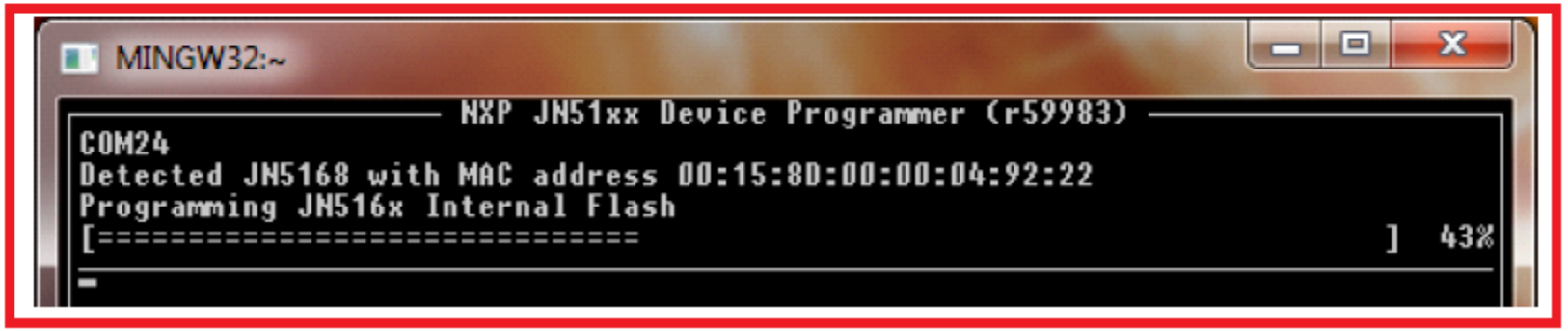
4. Production flash programmer Tool usage.

3.2 Load Binary File into Flash Memory

The following command uses the `-f` option to load the specified binary file into the Flash memory of the JN51xx device on the serial connection specified using the `-s` option:

```
$ JN51xxProgrammer.exe -s COM24
                       -f AN1180_154_HomeSensorCoord_JN5168.bin
```

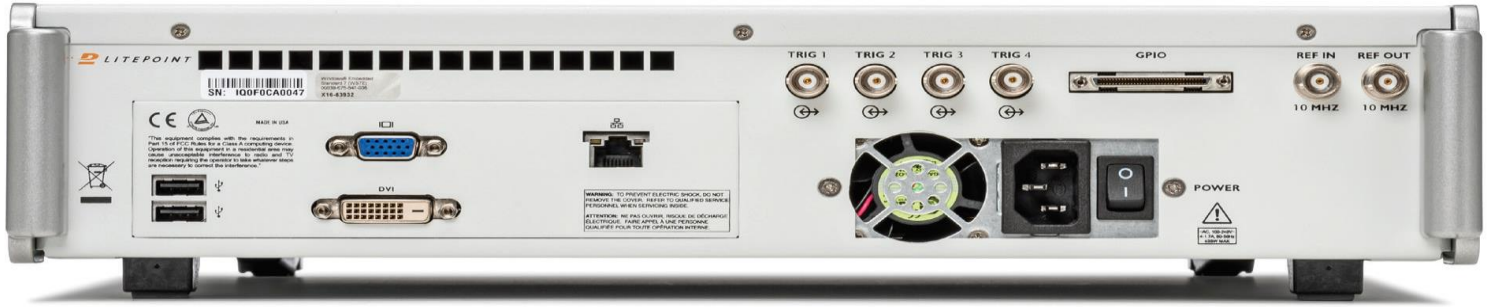
This results in the following output in the command window:



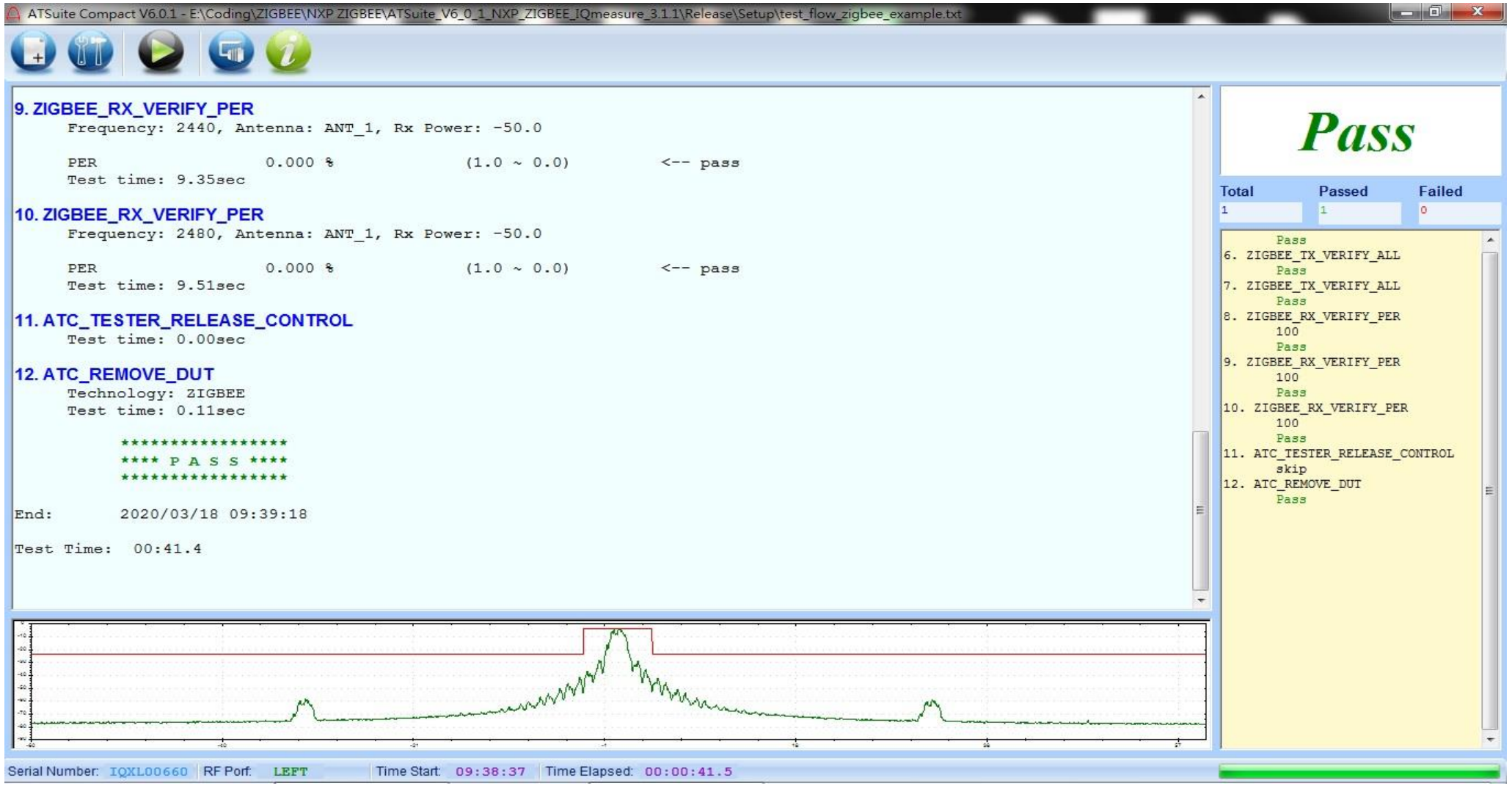
IQxel-MW Overview

Front Panel :

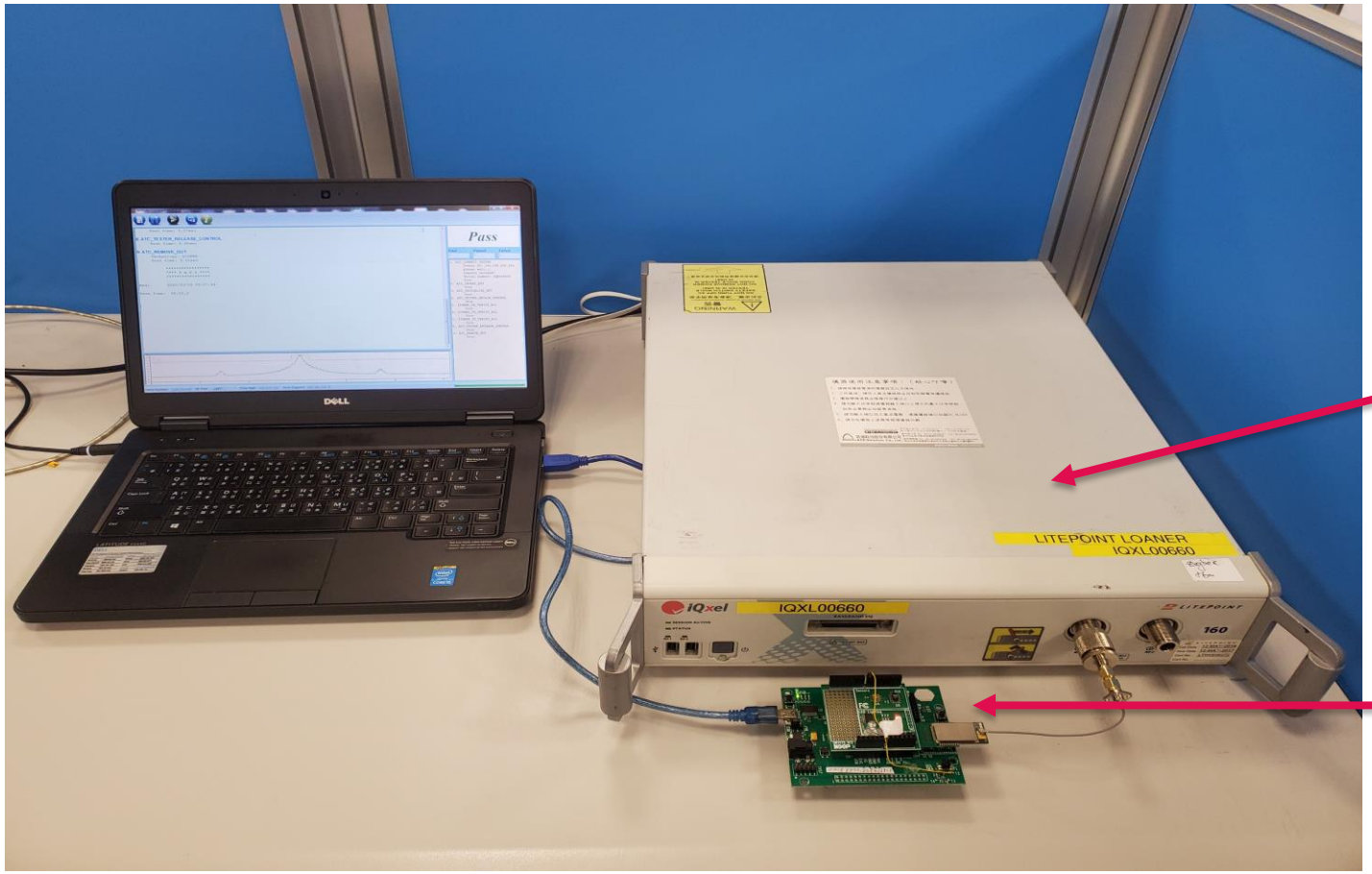
Rear Panel :



IQxel-MW PC Console Menu



JN5169 target board connection Setup with IQxel-MW



IQxel-MW

JN5169 Test Target

JN5169 target board connection Setup with IQxel-MW

Test Results items list :

This Test results shows EVM and RX PER below.

1. EVM measurement at 2405MHz@0dBm, 2440MHz@ 10dBm and 2480 MHz@ 0dBm

2. RX Packet error rate at 2405MHz@-90 dBm, 2440MHz@ -95dBm and 2480 MHz@ -85dBm

Test Results at EVM

```
Start:  2020/01/15 11:02:29

1. ATC_CONNECT_TESTER
        Serial number: IQ1211A0711
        Test time: 0.42sec

2. ATC_INSERT_DUT
        Technology: ZIGBEE
        DUT DLL: NXP_ZIGBEE.dll
        DUT_VERSION=1.0.0 (2015-12-25)

        Test time: 0.01sec

3. ATC_INITIALIZE_DUT
        Technology: ZIGBEE
        DUT_NAME=EMBER_EM35X_ZIGBEE
        Test time: 0.28sec

4. ZIGBEE_TX_VERIFY_ALL
        Frequency: 2405, Antenna: ANT_1, Tx Power: 0.0

        EVM                 16.364 %          (35.0 ~ 0.0)       <-- pass
        EVM-OFFSET          4.498 %           (35.0 ~ 0.0)       <-- pass
        Freq Error          -12.087 ppm       (40.0 ~ -40.0)     <-- pass
        Sym Clk Error       15.395 ppm        (40.0 ~ -40.0)     <-- pass
        Power               -1.745 dBm        (30.0 ~ -4.0)      <-- pass
        Spectrum Mask       0.000 %           (2.0 ~ 0.0)        <-- pass
        Test time: 4.42sec
```

Test Results at EVM and PER

```
5. ZIGBEE_TX_VERIFY_ALL
        Frequency: 2440, Antenna: ANT_1, Tx Power: 10.0

        EVM                 13.272 %            (35.0 ~ 0.0)        <-- pass
        EVM-OFFSET          3.100 %             (35.0 ~ 0.0)        <-- pass
        Freq Error          -12.090 ppm         (40.0 ~ -40.0)      <-- pass
        Sym Clk Error       10.129 ppm          (40.0 ~ -40.0)      <-- pass
        Power               10.788 dBm          (40.0 ~ 6.0)        <-- pass
        Spectrum Mask       0.000 %             (2.0 ~ 0.0)         <-- pass
        Test time: 3.29sec

6. ZIGBEE_TX_VERIFY_ALL
        Frequency: 2480, Antenna: ANT_1, Tx Power: 0.0

        EVM                 9.252 %             (35.0 ~ 0.0)        <-- pass
        EVM-OFFSET          1.662 %             (35.0 ~ 0.0)        <-- pass
        Freq Error          -12.093 ppm         (40.0 ~ -40.0)      <-- pass
        Sym Clk Error       12.579 ppm          (40.0 ~ -40.0)      <-- pass
        Power               -1.895 dBm          (30.0 ~ -4.0)       <-- pass
        Spectrum Mask       0.000 %             (2.0 ~ 0.0)         <-- pass
        Test time: 3.42sec

7. ZIGBEE_RX_VERIFY_PER
        Frequency: 2405, Antenna: ANT_1, Rx Power: -90.0

        PER                 0.000 %             (1.0 ~ 0.0)         <-- pass
        Test time: 15.65sec
```

Test Results at PER

```
8. ZIGBEE_RX_VERIFY_PER
        Frequency: 2440, Antenna: ANT_1, Rx Power: -95.0

        PER                 1.000 %             (1.0 ~ 0.0)         <-- pass
        Test time: 15.40sec

9. ZIGBEE_RX_VERIFY_PER
        Frequency: 2480, Antenna: ANT_1, Rx Power: -85.0

        PER                 1.000 %             (1.0 ~ 0.0)         <-- pass
        Test time: 15.55sec

10. ATC_REMOVE_DUT
        Technology: ZIGBEE
        Test time: 0.12sec

                ******************
                **** P A S S ****
                ******************

End:            2020/01/15 11:03:28

Test Time:  00:58.7
```

THANK YOU!