INNER ANTENNA NODE
Test Manual

2017. 05. 02.

● Document Revision History

No	Description	Author	Page	REV. NO	Revised Date
1	-. initial	BJ KIM		A0	2017. 05. 02

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1. INT NODE TEST AND Test Program D/L Using the Power Supply

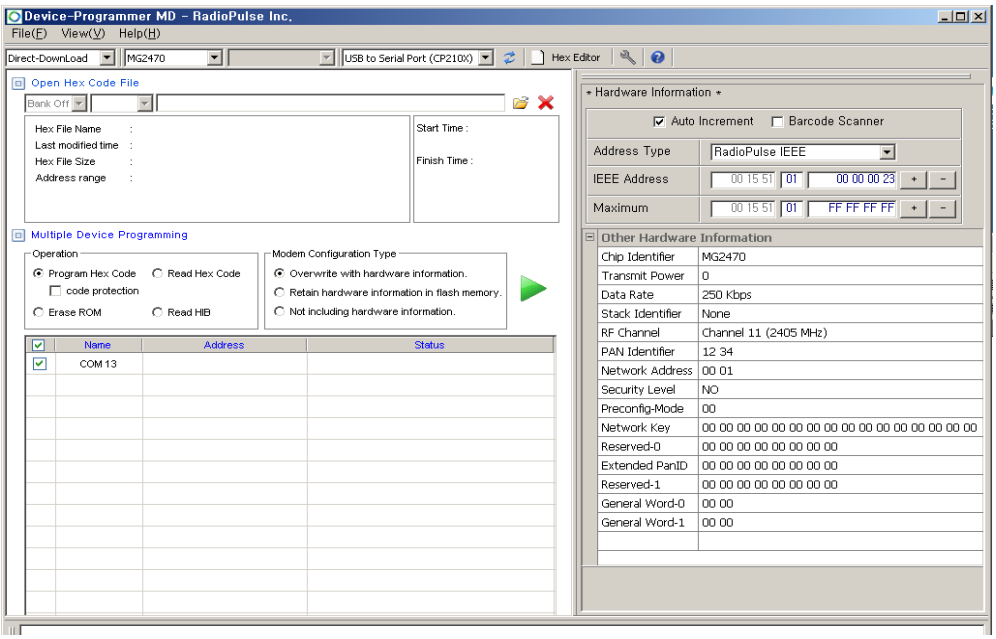
1-1. INPUT Power

- INT NODE is powered by a Power Supply. current consumption check using the Power Supply
- Power Supply settings DC15V, 0.5A
- INT NODE's average power consumption is under 0.45W. Current consumption 3mA±1mA @ 15V

1-2. Change into ISP mode.

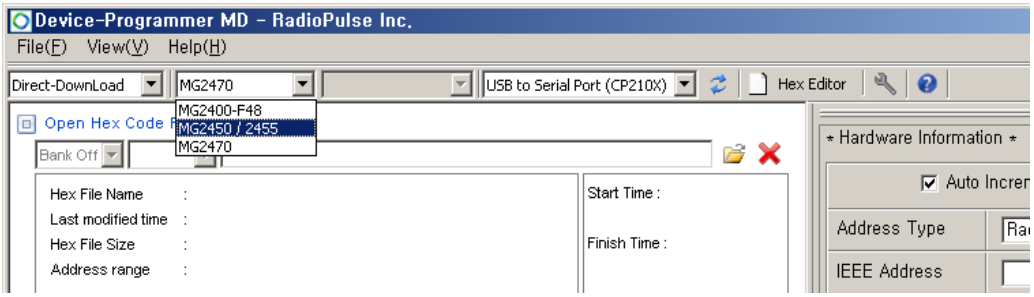
1-3. Connect Debug Cable to Z_Deg port(J2). (Use Pogo Pin)

1-4. Execute Device-Programmer MD 2.60 Program.



< Device-Programmer MD 2.60 Execution screen >

1-5. Select the MG2450/2455.



< Device-Programmer의 Device Setting>

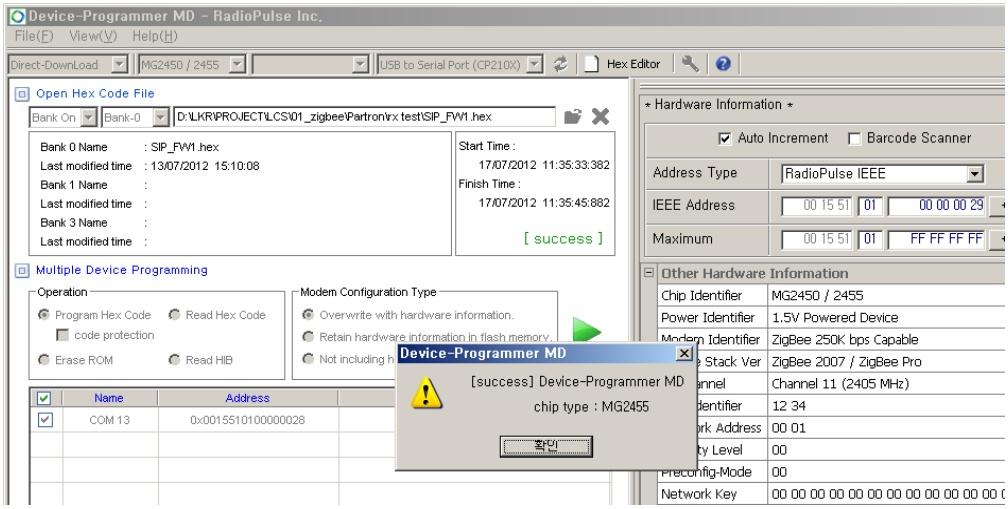
1-6. Open the RF Test Program to download INT

MG245X-KMW_IQVIEWER_V22_PA_Rev02.H00

MG245X-KMW_IQVIEWER_V22_PA_Rev02.H01

- Download only choose H00 file extension.

1-7. Download



< Download complete message >

1-8. Change into Operating Mode

2. IQ NxN Test Setting

Setting test environment as under figure

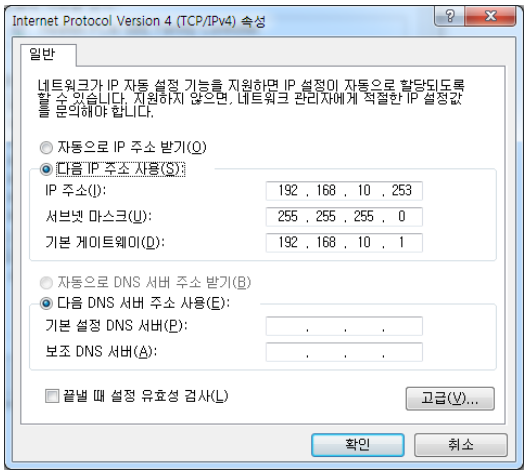
Block Diagram

< Test environment image>

2-1. Connect Ethernet cable to Ethernet socket at IQ NXN device rear. Then Check communication to PC to IQ NXN

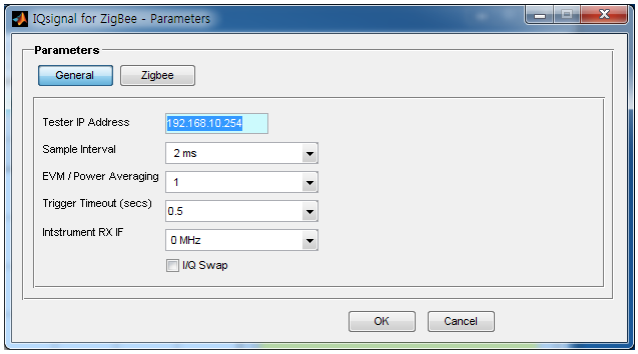
< IQ NXN rear >

2-1. Setting PC's IP as under figure.



< PC의 IP Setting >

2-2. Execute IQ signal for Zigbee. And Setting Parameter as under figure.

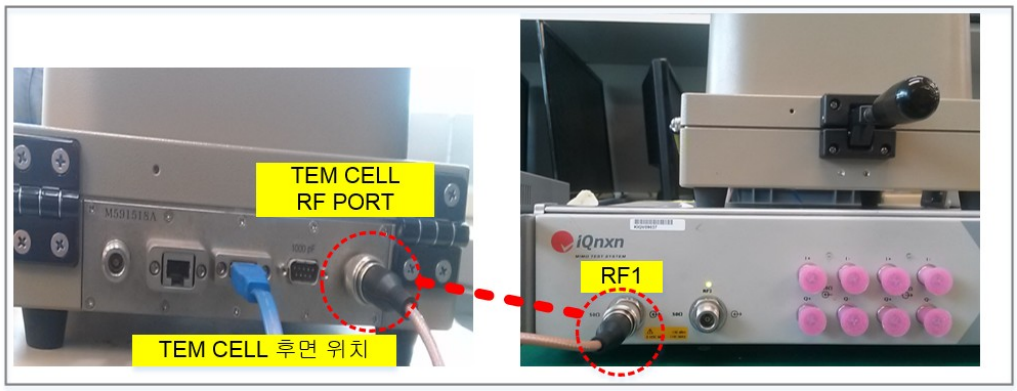


< IQsignal for Zigbee Program Parameter Setting >

A. Connect USB to Serial Cable to Z_Deg port(J2).

3. TX Test

3-1. Connect IQ NXN's RF1 channel to RF output(TEM CELL) using the RF Cable.

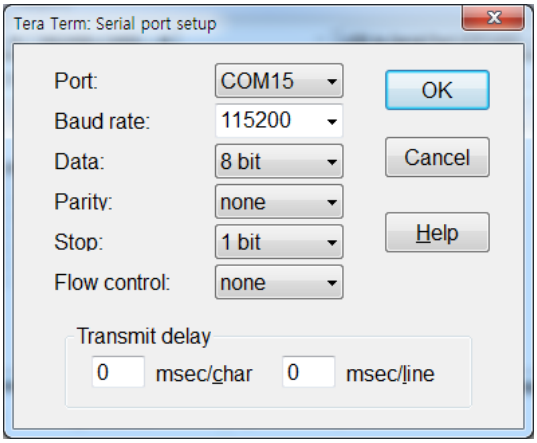


<Connection IQ nxn RF1 PORT and TEM CELL rear RF PORT RF cable>

3-2. Execute Tera Term

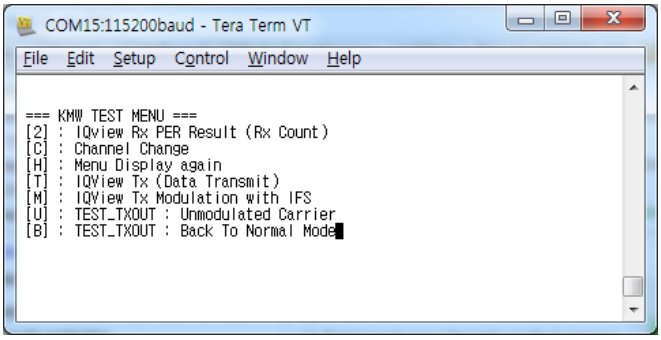
- serial port as under figure.

  : The Top bar 'Setup' -> 'Serial Port ...' selection



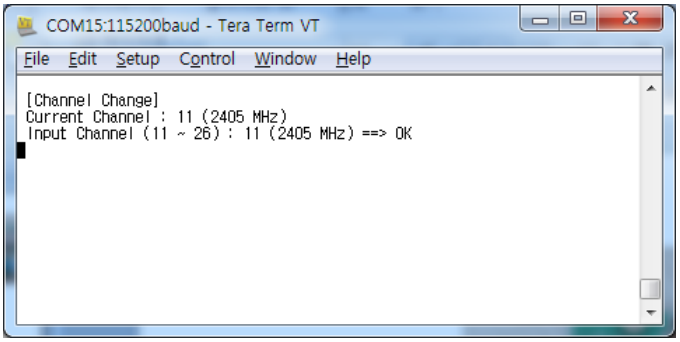
< Tera Term's Serial Port Setting>

- Press 'H' key on the keyboard to display the test menu as below..



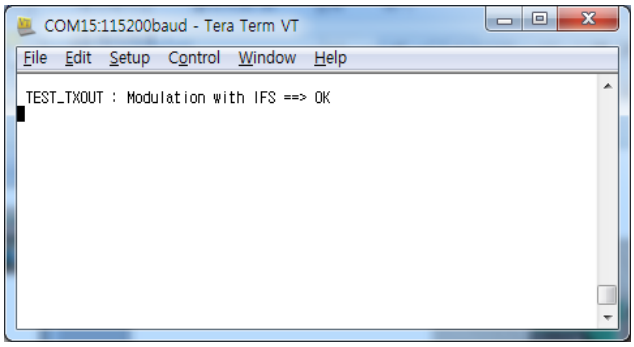
< KMW TEST MENU >

- Press 'C' key on the keyboard and select channel.



< For example selected 11 channel.>

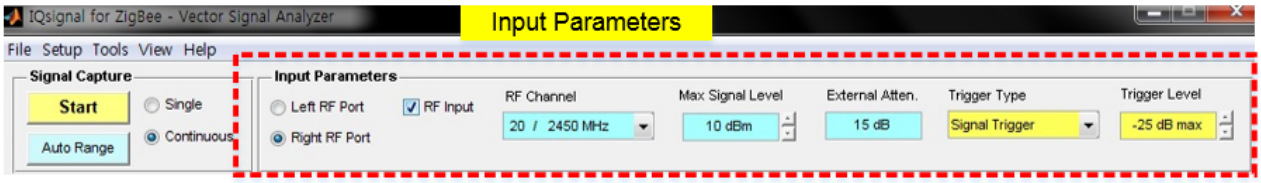
- If press 'M' on the keyboard, Tx will be sent Modulation with IFS.



<Modulation Tx Out>

3-3. Execute Tx test using the 'IQ signal for Zigbee' PC Program

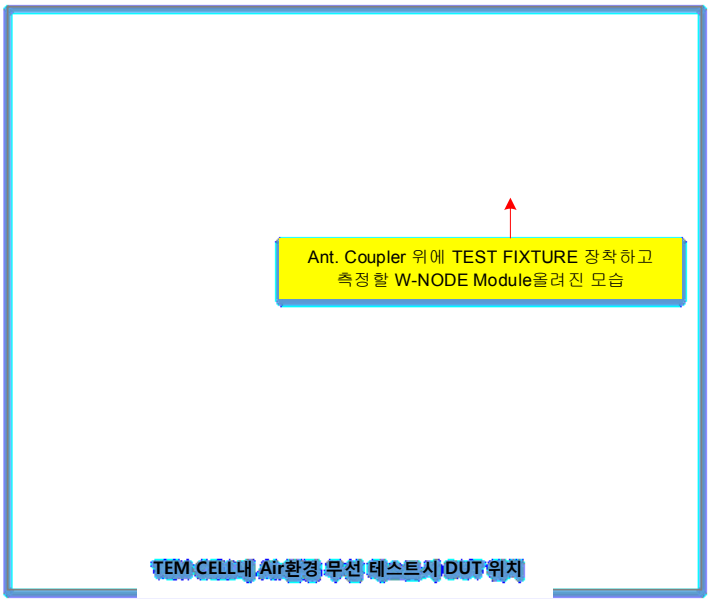
Setting Input Parameters as under figure.

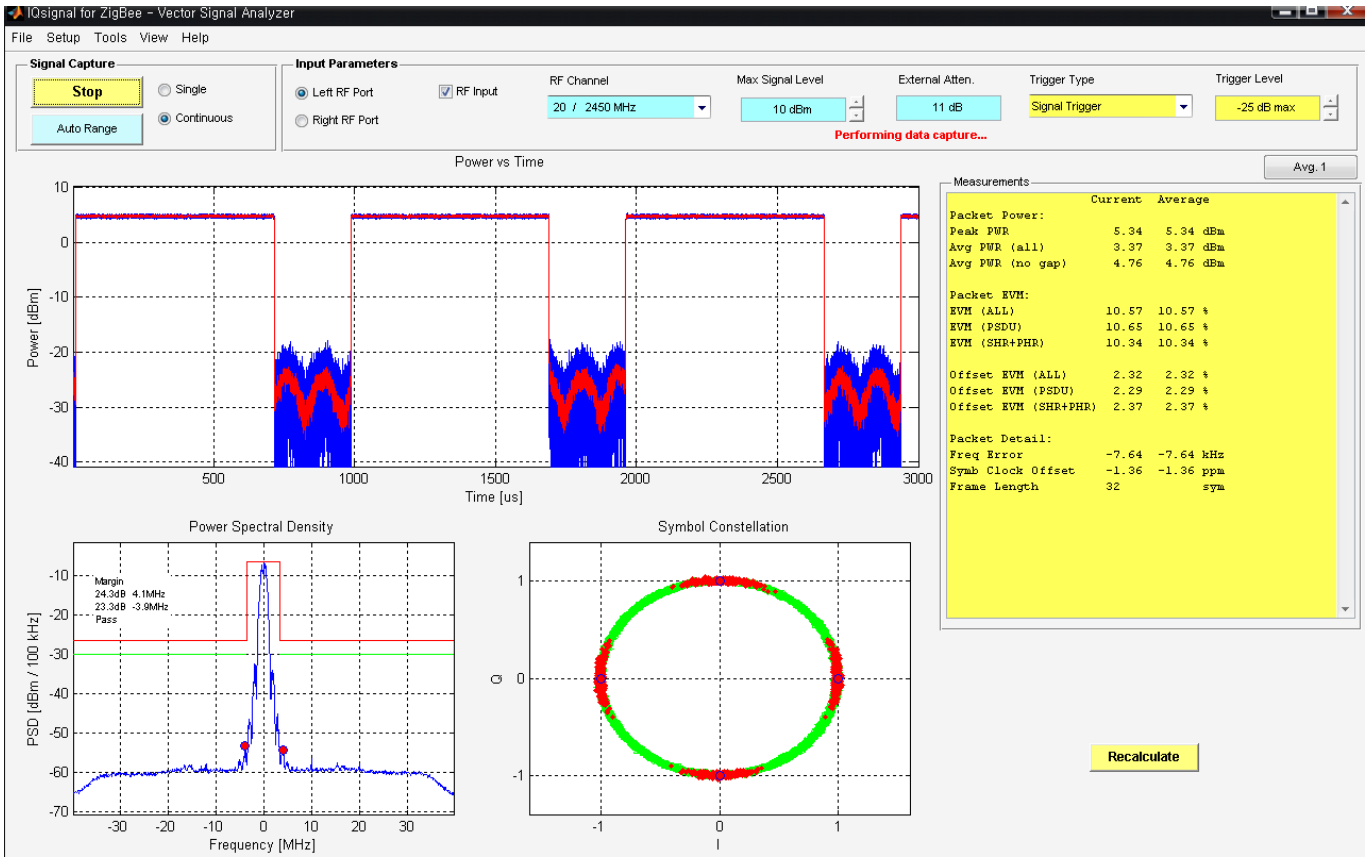


- RF Input : Left RF PORT
- RF Channel : 20/2450MHz (@ Test Ch. 20CH)
- Max Signal Level : 10dBm
- Trigger type : signal trigger
- .Trigger level : -25dBm
- External Atten : 16dB

Measurement Antenna : Flat Type Antenna Coupler (TC-93026A, Maker : TESCOM)

DUT position





< Tx test measure >

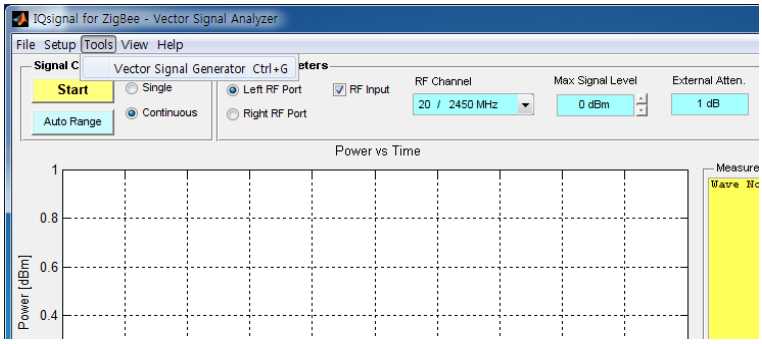
- Compare with the following items to check for defects

Items	Req'd Spec	Remark
Transmit Power (Peak Power)	≥5dBm	[6.9.5]IEEE802.15.4-2006
Spectrum PSD mask	Check	[6.5.3.1]IEEE802.15.4-2006
Transmit Center Frequency Tolerance	±40ppm	[6.9.4]IEEE802.15.4-2006
Error Vector Magnitude	≤35%	[6.9.3]IEEE802.15.4-2006

< Zigbee Rx Test CheckK List>

– RX Test

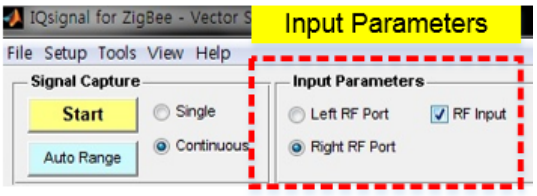
4-1. Execute 'vector signal analyzer' as under figure.



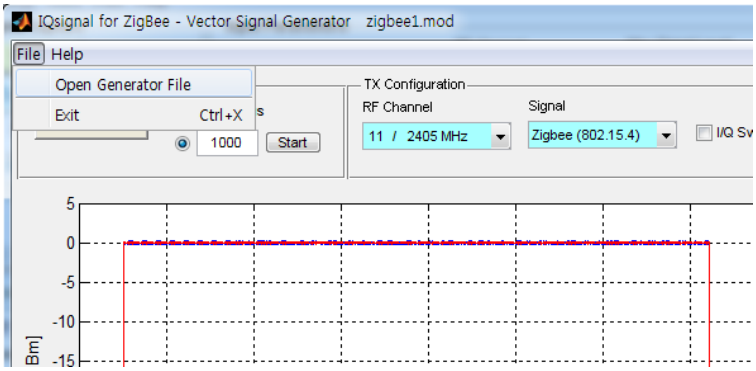
< Execute Vector signal analyzer >

4-2. Connect IQnxn's RF2 Channel to device's output.

Or Change input parameters(Left RF Port-> Right RF Port)

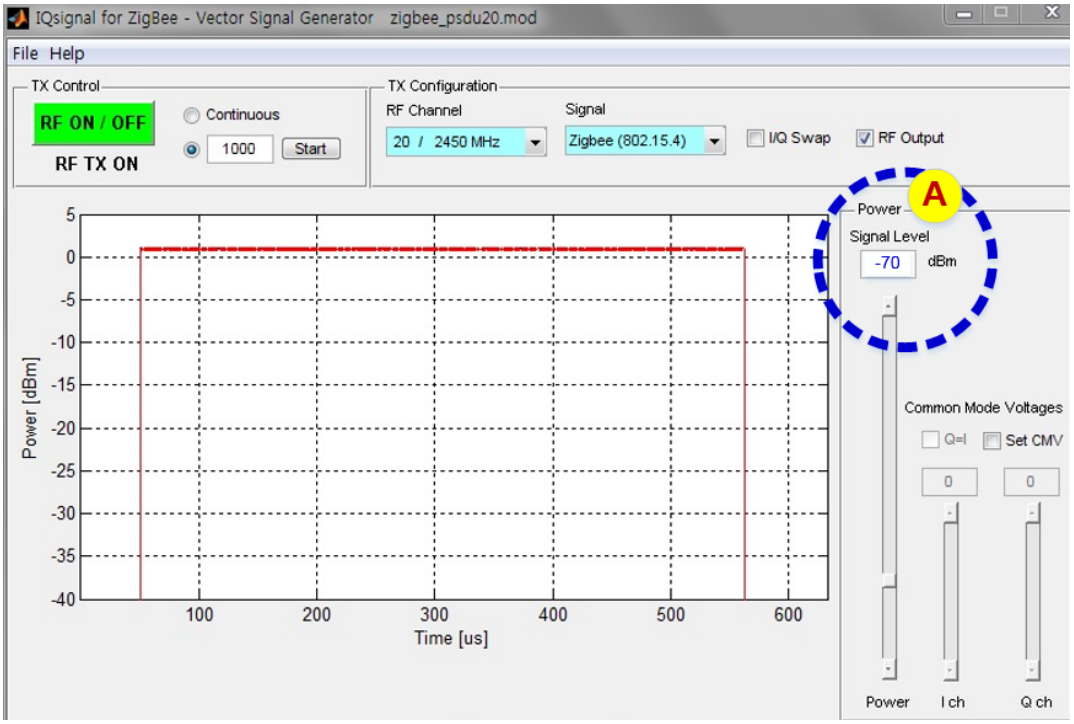


4-3. Open the 'zigbee_psdu20.mod' file



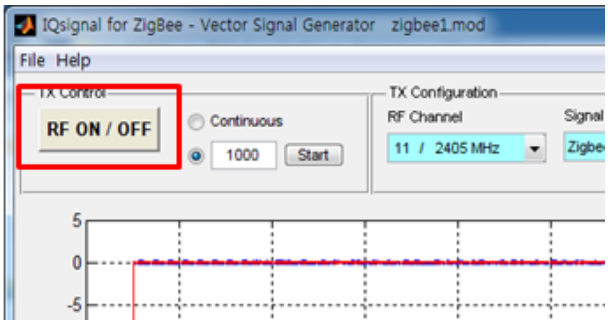
Setting 'A' section as under figure.

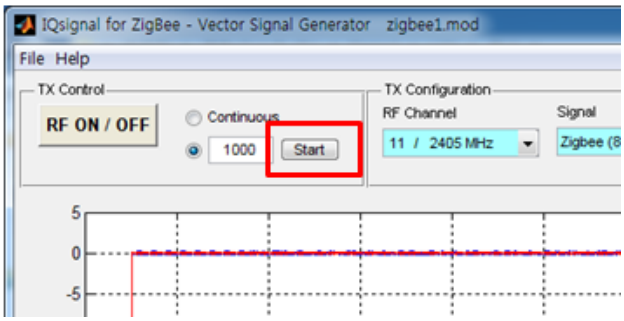
(IEEE802.15.4-2006 ≥-85dBm reference : test environment condiction, External Atten 16dB(Loss offset) -70dBm



4-4. Execute 'Tera Term' And then Setting port. (3-2. Reference setting Teraterm)

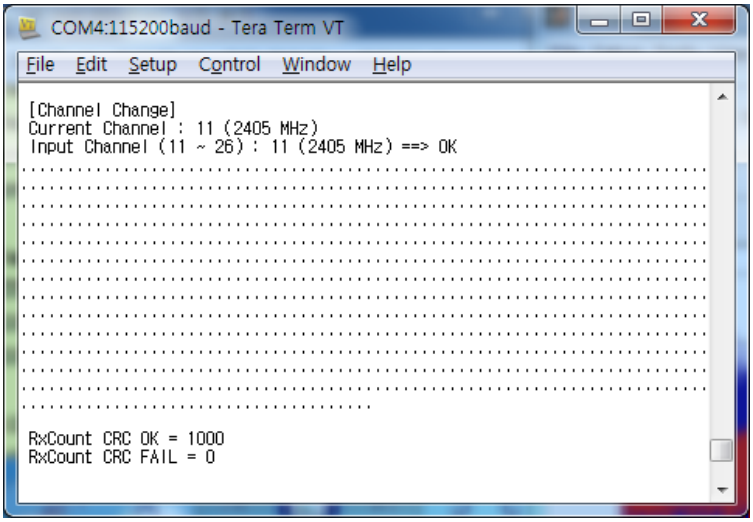
4-5. Select RF ON/OFF button as under figure, select 'Start' button. then number 1000's Tx data is transmitted to the INT NODE Board..





<RF ON/OFF, Start Button>

4-2. If press '2' on the keyboard, can be check transmitted result.



< Tera Term Rx count Output Screen >

- Compare with the following items to check for defects

Items	Req'd Spec	Remark
Receiver Sensitivity	≥-70dBm	[6.5.3.3]IEEE802.15.4-2006 (≥-85dBm)
Packet Error Rate(1000)	≤1%	[6.5.3.3]IEEE802.15.4-2006
Receiver maximum input level	-20dBm	[6.9.6]IEEE802.15.4-2006

<I IEEE802.15.4 standardize Zigbee Rx Test Check List >

- Specified as ≥-85dBm on IEEE802.15.4-2006, Changed to ≥-75dBm considering that the test environment is wireless.

FCC compliance Information

FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information : This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation
Including interference that may cause undesired operation. Modifications not expressly approved by the manufacturer could void the user's authority To operated the equipment under FCC rules. To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

Contains Transmitter Module FCC ID : ORIINTNODEHPV03

CAUTION : This device and its antenna(s) must not be co-located or operated in conjunction with any other antenna or transmitter. End users cannot modify this transmitter device. Any unauthorized modification could void the user's authority to operate this device.

This module is limited to installation in fixed applications, and only installed Lighting Fixture. This module can not be attached to other device without Lighting device.

IMPORTANT NOTE:

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

1)The transmitter module may not be co-located with any other transmitter or antenna,

2)OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Manual Information To the End User The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.