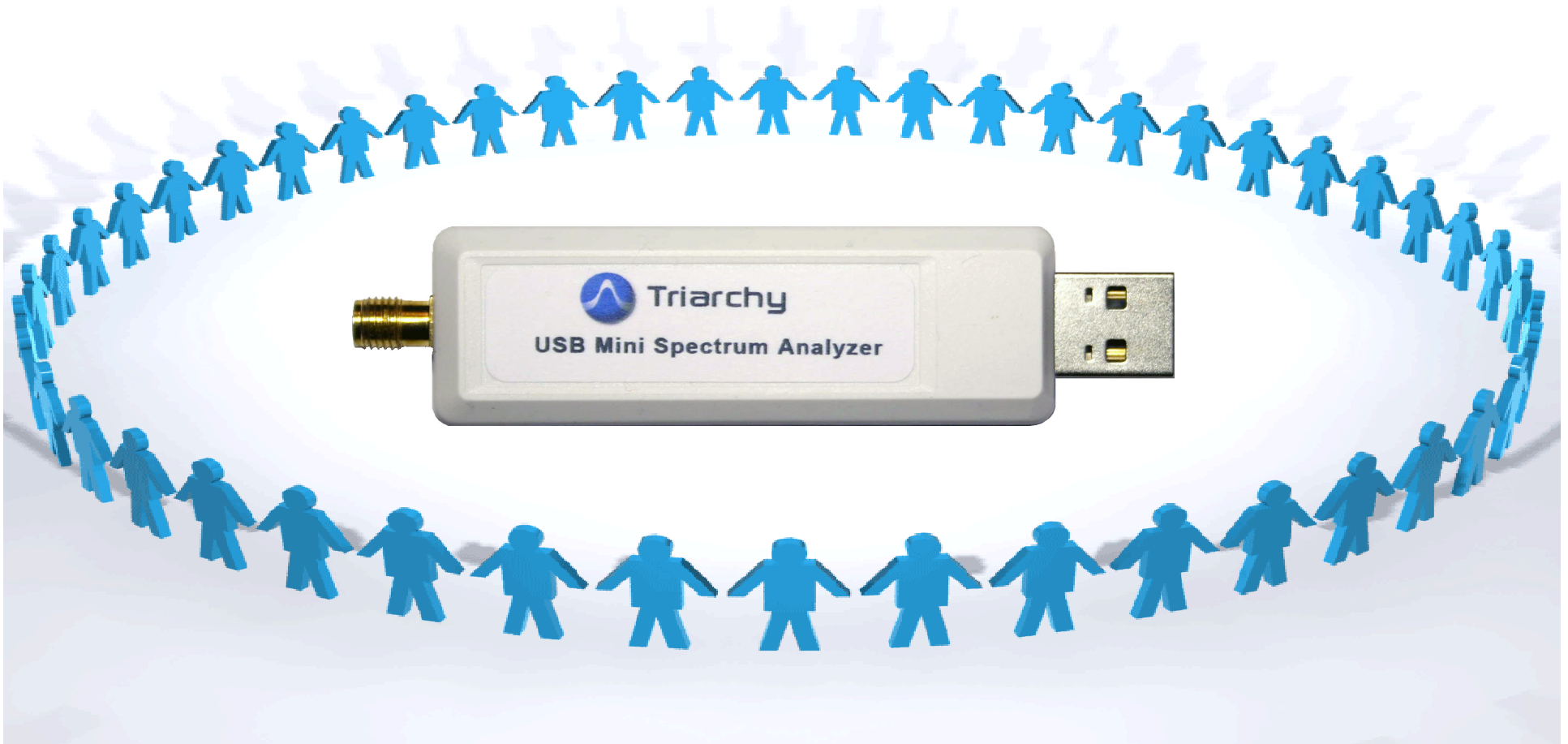




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## Zigbee signal testing with TSA5G35

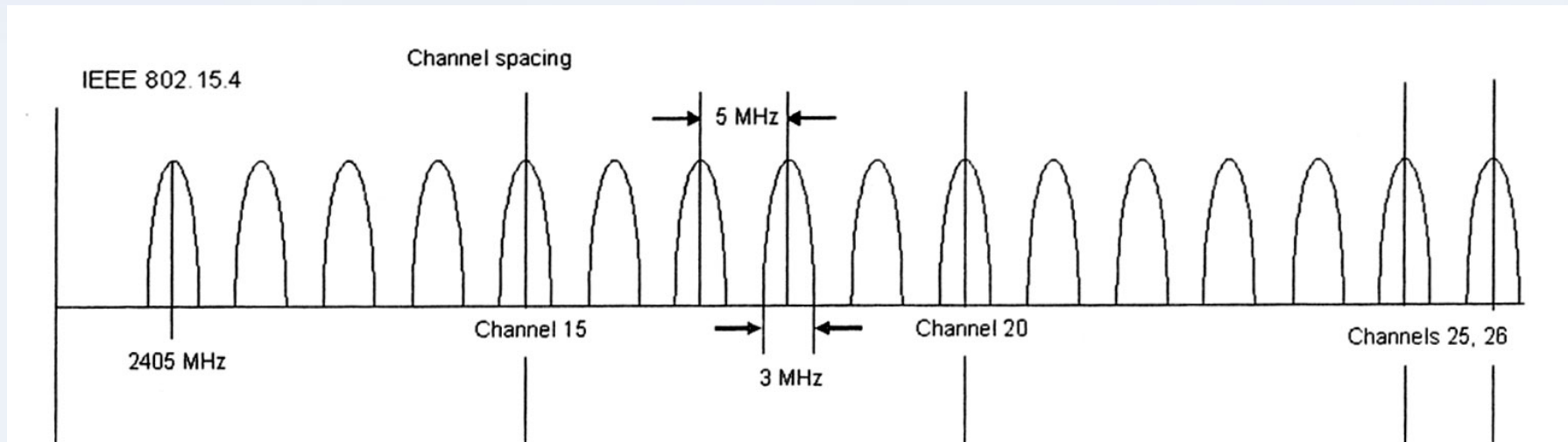




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## Zigbee channel frequencies



First channel in 2.4G ISM band is ch11, last channel is ch 26, total 16 channels.

Channel space is 5MHz

Zigbee signal bandwidth is 3MHz

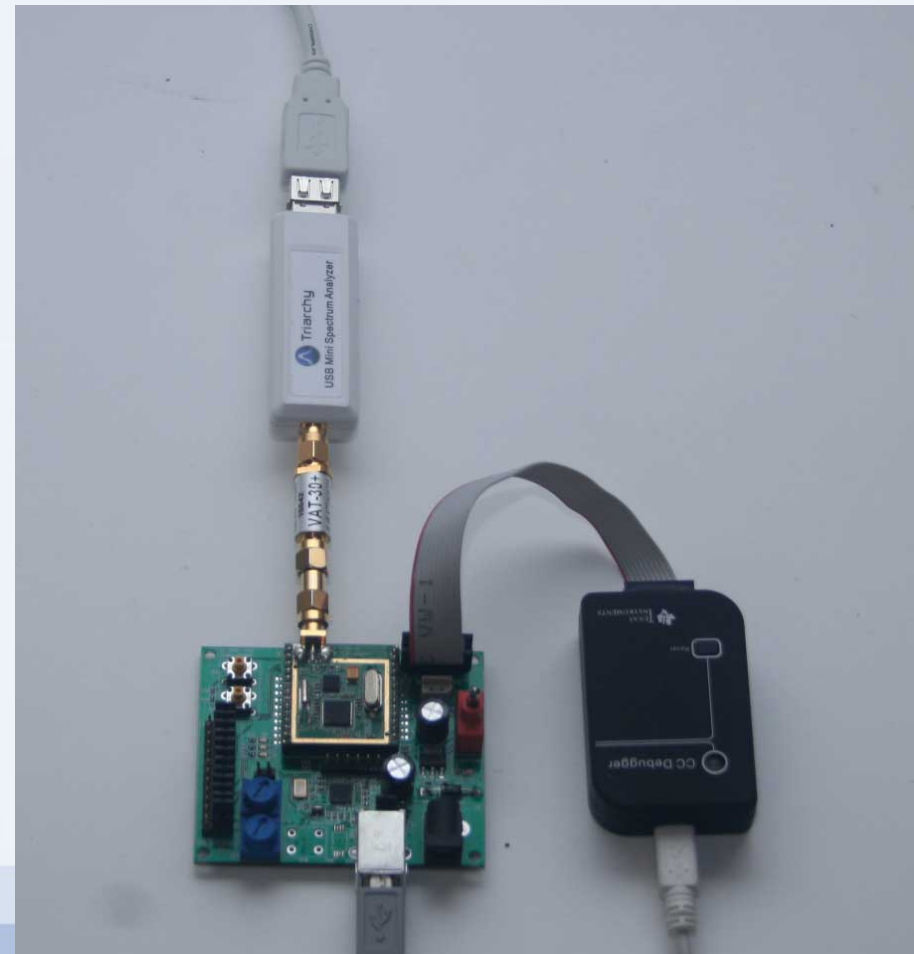


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## Zigbee module conductive testing

- 1: TSA5G35 will be connected Zigbee module through 30 dB external attenuator.
- 2: Zigbee module is TR2401, it install on the demo board, CC debugger will connect to the demo board.
- 3: SmartRF Studio tool from TI will be used to control the Zigbee module.





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# Zigbee module conductive testing

TSA5G35 parameter setting:

Parameter Setting

Center-Freq(MHz)

Span(MHz)

Amplitude(dBm)   External ATT(30dB)

Sweep Time

6286 - CC2430 - Device Control Panel

File Settings View Evaluation Board Help

Easy Mode **Expert Mode** Register View  RF Parameters Device reset

**RF Parameters**

Frequency: 2405 MHz IEEE 802.15.4 channel 0x0B TX power: 0.6 dBm

Range Extender: None  High Gain Mode(RX)

Continuous TX Continuous RX Packet TX Packet RX RF Device Commands

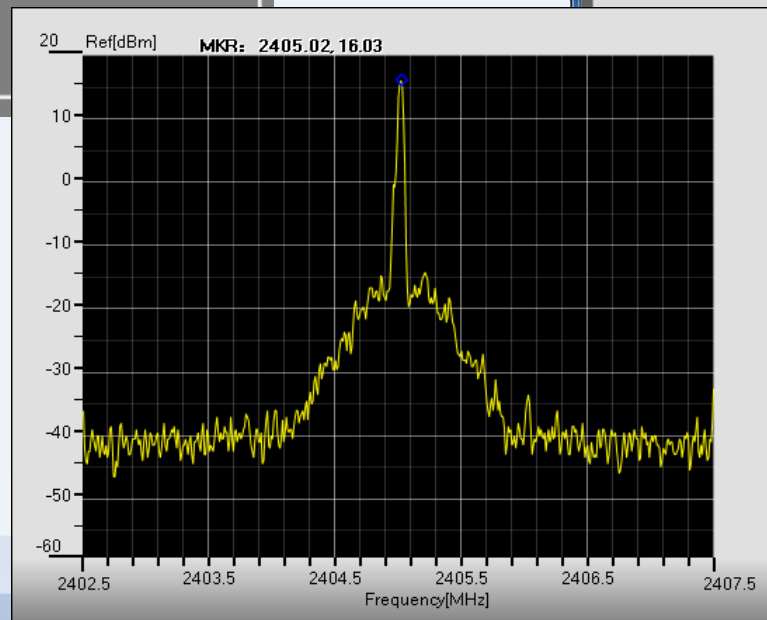
Modulated  Unmodulated

MHz  
MHz  
MHz  
ms

FIFO  
FIFOP  
CCA  
 LOCK\_STATUS

Output power: 0.6 dBm  
Channel: 0x0B

CC Debugger Radio state: (63)



Zigbee module  
Carrier signal  
measurement

Smart RF studio  
setting



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# Zigbee module conductive testing

TSA5G35 parameter setting:

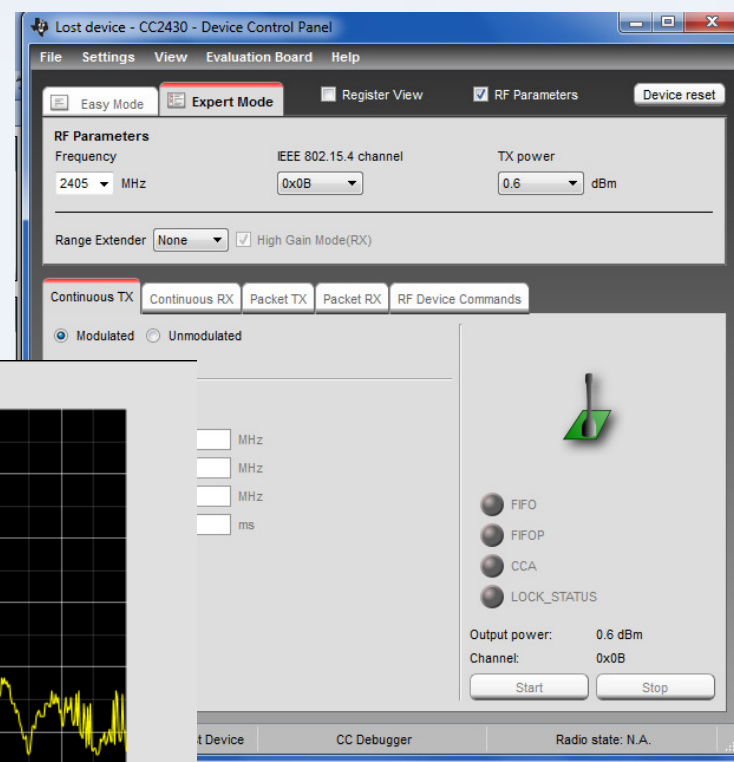
Parameter Setting

Center-Freq(MHz)

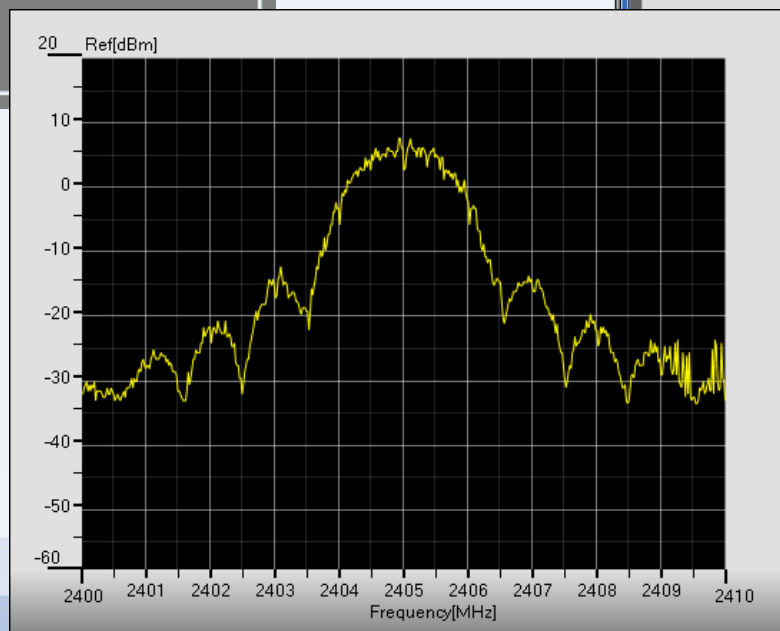
Span(MHz)

Amplitude(dBm)   External ATT(30dB)

Sweep Time



Zigbee module modulated signal measurement



Smart RF studio setting



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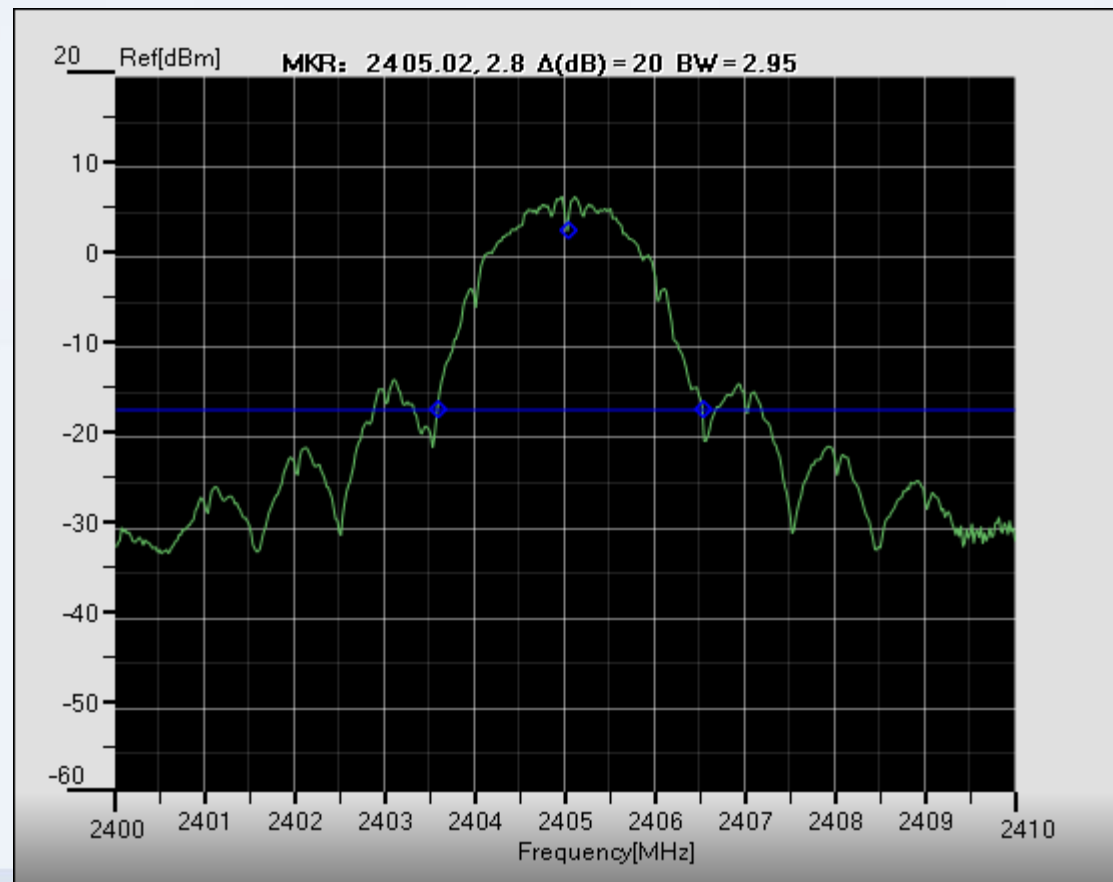
## Zigbee module conductive testing

The average curve will be more smooth and easy to measurement.

Use “mark to notch” to pick up center frequency.  
Frequency=2405.02MHz

Signal level after modulation is 7dBm.

The signal bandwidth is 2.95MHz





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## Zigbee module conductive testing

Parameter Setting

Center-Freq(MHz)

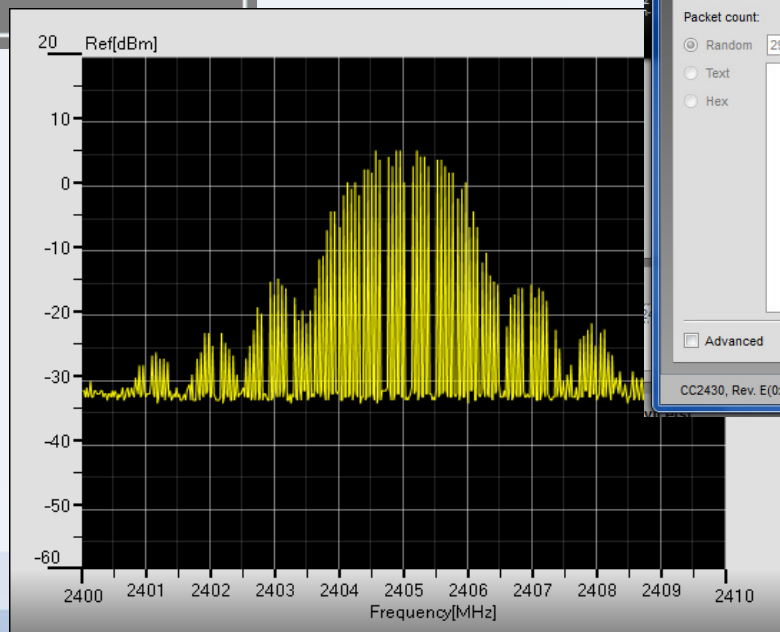
Span(MHz)

Amplitude(dBm)   External ATT(30dB)

Sweep Time

TSA5G35  
parameter  
setting:

Packet signal is not continuous waveform, it shall reduce the sweep time to pick up more signal within each frame measurement



6286 - CC2430 - Device Control Panel

File Settings View Evaluation Board Help

Easy Mode Expert Mode Register View RF Parameters Device reset

RF Parameters

Frequency 2405 MHz IEEE 802.15.4 channel TX power 0.6 dBm

Range Extender None High Gain Mode(RX)

Continuous TX Continuous RX Packet TX Packet RX RF Device Commands

Packet payload size: 30 Add seq. number

Packet count: 100 Infinite

Random 29 23 be 84 e1 6c d6 ae 52 90 49 f1 f1 bb e9 eb b3 a5

Text

Hex

TX TX

Sent packets: 1081

Channel: 0x0B

Output power: 0.6 dBm

Advanced Start Stop

CC2430, Rev. E(0x04), DID=6286 CC Debugger Radio state: N.A.

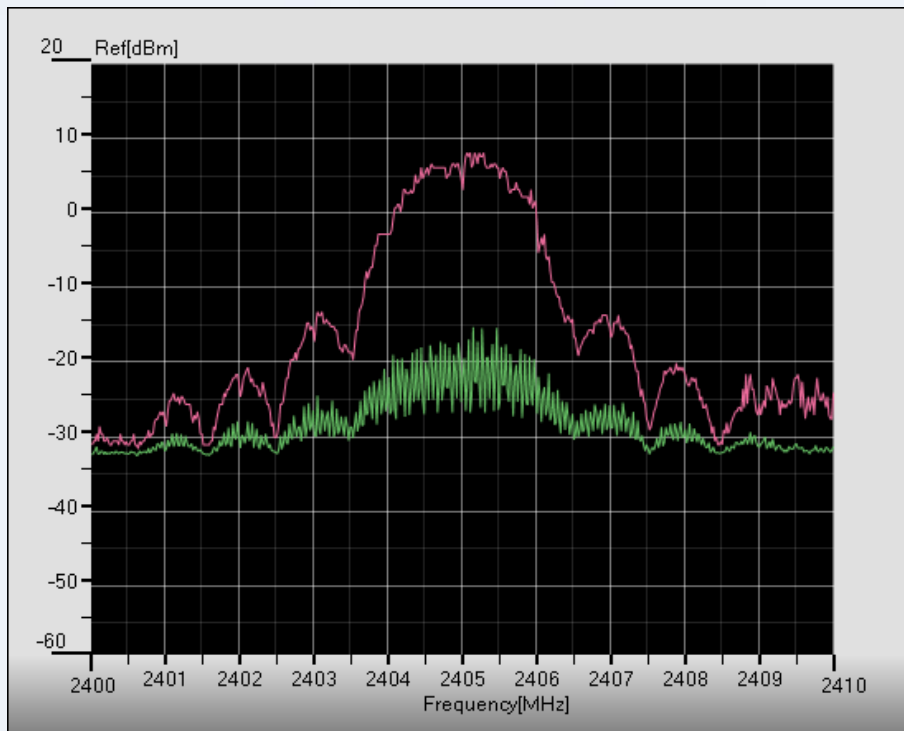
Set Zigbee into the packet Tx mode



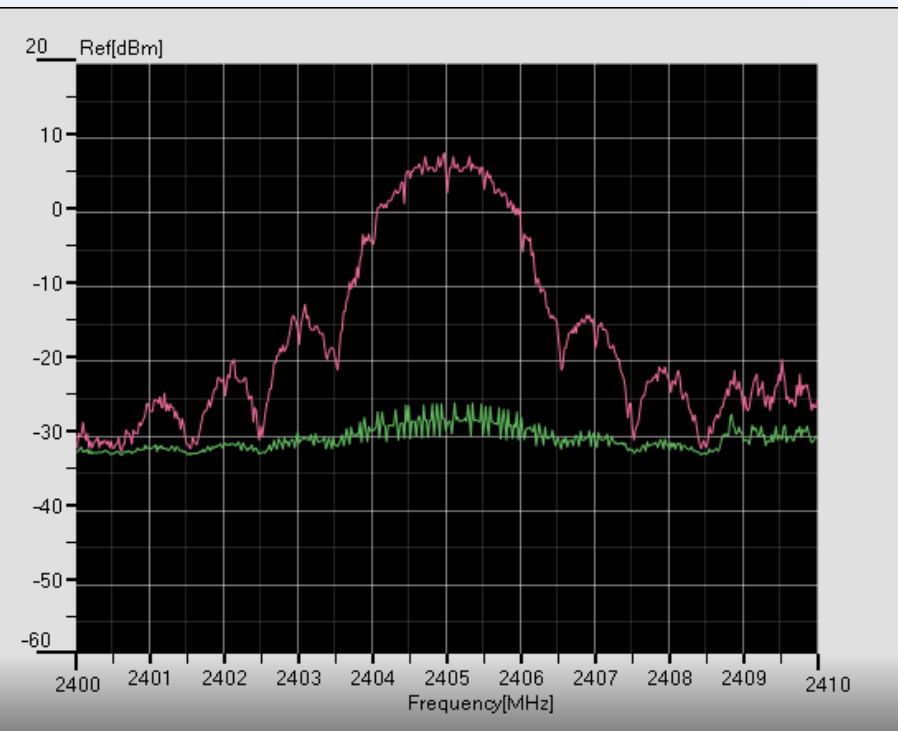
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## Zigbee module conductive testing



Payload data is 30, frame repeat rate will be fast, average curve will be high



Payload data is 120, frame repeat rate will be slow, average curve will be low





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## Zigbee module radiation testing

1: TSA5G35 will be connected with 2.4G whip antenna.

2: Zigbee module connect with 2.4G antenna too, two antenna distance will be 10mm

3: SmartRF Studio tool from TI will be used to control the Zigbee module.





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## Zigbee module radiation testing

TSA5G35 parameter setting:

Parameter Setting

Center-Freq(MHz)	2405	Start	
Span(MHz)	10		
Amplitude(dBm)	0		<input checked="" type="checkbox"/> External ATT(30dB)
Sweep Time	x8 (Burst Mode)		

The signal level drop to 0dBm, if the antenna move far away, the signal level will drop a lot.

