Select the MPD tab on the Demo tool GUI to automatically load the signed firmware image for MPD application.

**Note**: For all the modes, the Keep Alive Wake time is fixed as 2 in the application. This time is the time window in milliseconds during which Talaria TWO will wait in receive mode before going to sleep.

Select the appropriate mode and enter the values specific to the mode selected. Failure to pass any value will result in an error. Click on either PROG RAM/Flash as per requirement.

## Base Mode

**Expected Result**: Spike should be observed as per the Beacon listen interval configured. If beacon listen interval is configured as 10, then radio wakes up to listen beacon for every 1 second.

**Otii log**: Shows an average current consumption of 56.7µA for 30s.

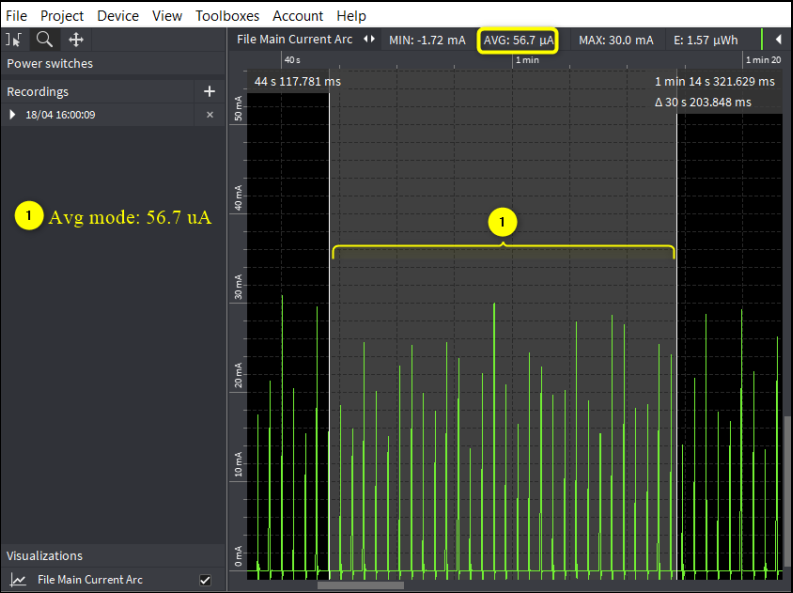


Figure : Base mode: Otii log

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.018,216] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-44 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [2.837,656] MYIP 192.168.0.104  [2.837,819] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.498,504] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  Application Exited..  Going for indefinite sleep... |

## Keep Alive Mode

**Note**:

To reduce power consumption, the Keep Alive messages are aligned to the next beacon reception period. The actual Keepalive Interval can therefore be longer than specified, especially if the wifi.listen\_interval is set to a high value.

**Wireshark log**:

**Expected Result**:

Based on the configured keepalive interval (10s), QoS Null function packet is observed.

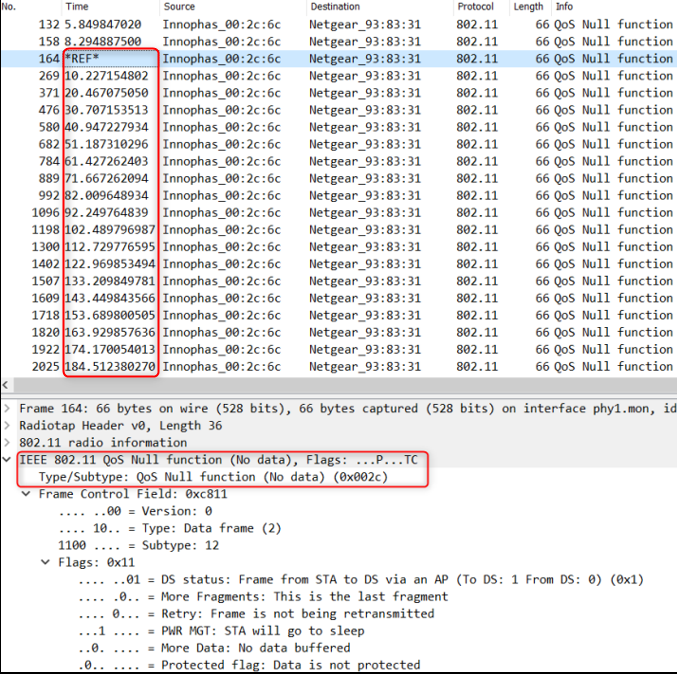


Figure : Keep alive: Wireshark log

**Otii log**: Shows an average current consumption of 64.4µA for 30s. In idle cases, the average current consumption is 55.3µA.

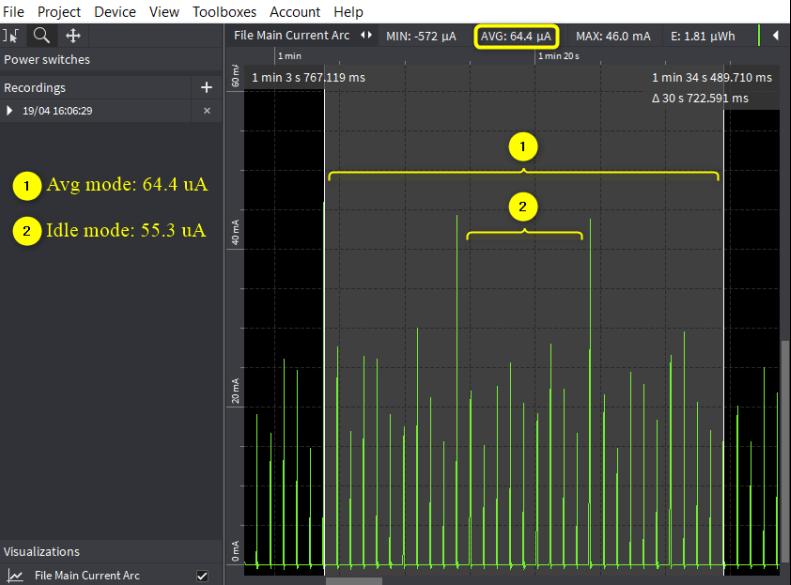


Figure : Keep alive - Otii logs

Console output:

|  |
| --- |
| Y-BOOT 208ef13 2019-07-22 12:26:54 -0500 790da1-b-7  ROM yoda-h0-rom-16-0-gd5a8e586  FLASH:PNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 mpd.proto=none wifi.max\_idle\_period=10 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[0.893,908] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-49 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [1.865,748] MYIP 192.168.0.104  [1.865,795] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [2.200,625] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  Application Exited..  Going for indefinite sleep... |

## TCP

**Note**: Both the Host and Talaria TWO are connected to the same network.

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 mpd.proto=tcp mpd.tcp.msginterval=10 mpd.tcp.msglen=100 mpd.port=80 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.070,557] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-56 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [2.805,664] MYIP 192.168.0.104  [2.805,711] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.563,103] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  listening socket success.. sd=0  Binding to port: 80  bind success..  listen success...  Config:  Proto :tcp  Port :80  Interval:10  msg len :100  Waiting for incoming connections..  Calling accept()  msg=Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100.  msg=Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  send returned 100. |

TCP client windows console output:

|  |
| --- |
| C:\Program Files (x86)\Nmap>ncat.exe 192.168.0.104 80  Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM |

To start ncat in the host computer, follow the following steps:

1. Download and Install ncat using the following link: <https://nmap.org/ncat/>.
2. Open command prompt and pass command.
3. Ncat.exe IP-address (from console) and port\_number (from console).

**Expected Result**: When client connects to the TCP server (server port configured with port boot argument), the TCP server sends a message to client after every <interval> seconds which is configured in Message\_Send Interval.

**Wireshark log**:

1. The [SYN], [SYN,ACK] and [ACK] is observed for the TCP three-way handshake during the connection establishment.
2. [PSH,ACK] is observed for the TCP data sent from Talaria TWO.
3. [FIN,ACK] is observed for the TCP disconnection done from the application end point (TCP client).

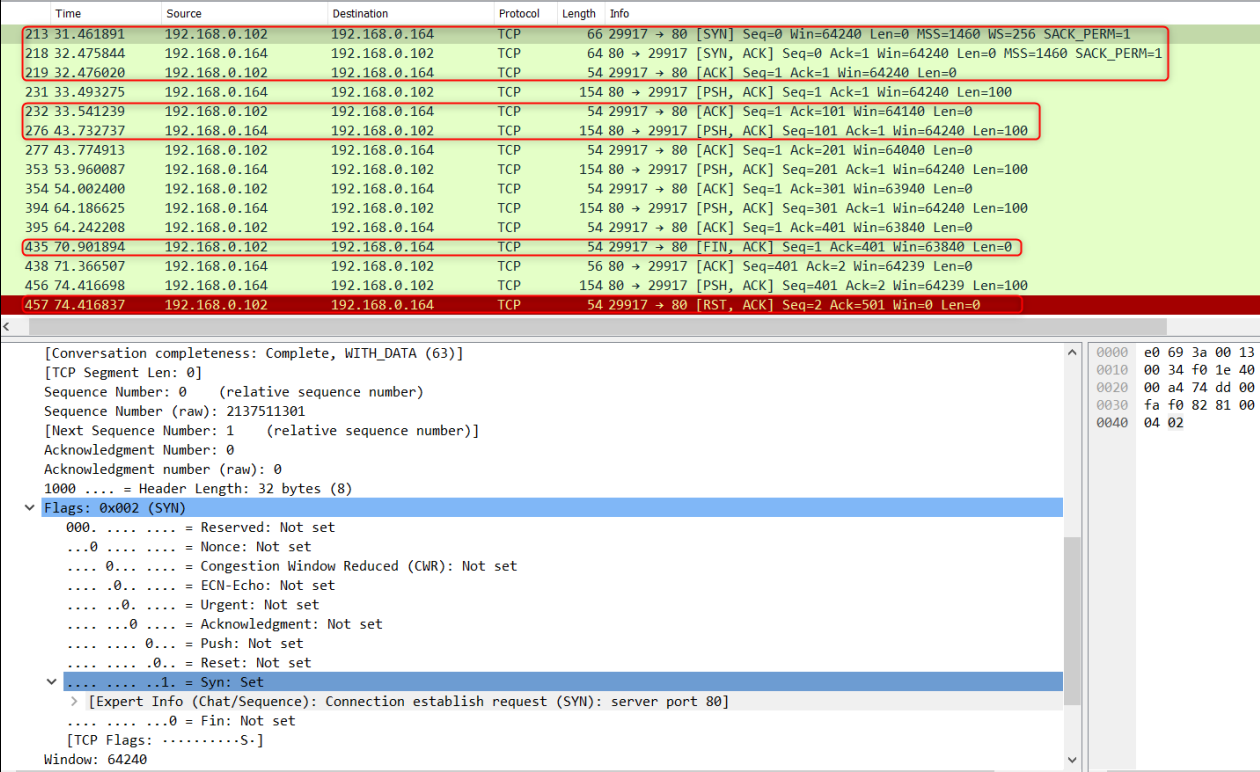


Figure : TCP - Wireshark log

**Otii log**: Shows an average current consumption of 109µA for 30s. In idle cases, the average current consumption is 58.1µA.

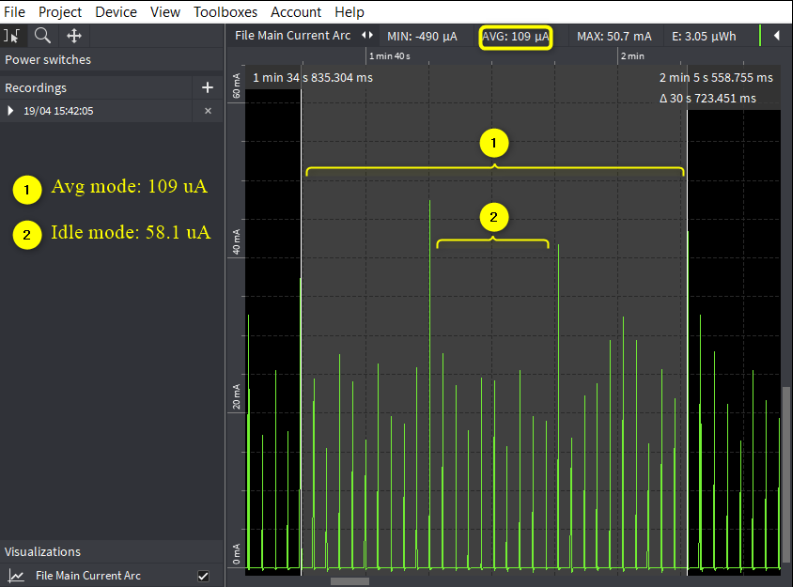


Figure : TCP - Otii log

## UDP

**Note**: Both the Host and Talaria TWO are connected to the same network.

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 mpd.proto=udp mpd.udp.msginterval=10 mpd.udp.msglen=100 mpd.port=6009 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.083,508] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-44 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [3.027,081] MYIP 192.168.0.104  [3.027,130] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.567,973] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  UDP socket success  Config:  Proto :udp  Port :6009  Interval:10  msg len :100  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100.  sendto returned 100. |

UDP client windows console output:

|  |
| --- |
| C:\Program Files (x86)\Nmap>ncat.exe -u -l 6009  Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=8:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=9:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Times=10:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=11:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=12:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=13:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=14:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=15:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Times=16:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL |

To start ncat in the host computer, follow the following steps:

1. Download and install ncat using the following link: <https://nmap.org/ncat/>..
2. Open command prompt and pass the following command (from console):

|  |
| --- |
| ncat.exe -u -l port\_number |

**Wireshark log**:

**Expected Result**: Talaria TWO sends broadcast UDP message to the configured port number in MPD tool, every configured interval (10s).

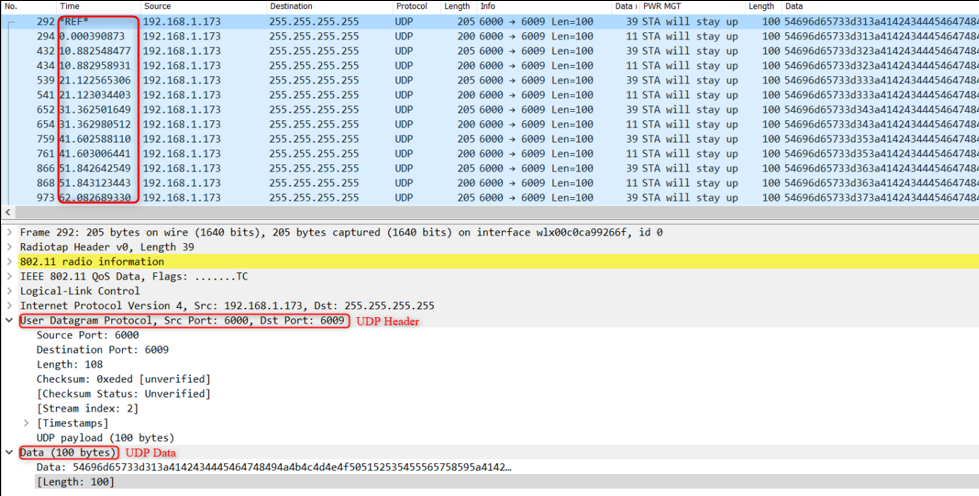


Figure : UDP - Wireshark log

**Otii log**: Shows an average current consumption of 107µA for 30s. In idle cases, the average current consumption is 59.1µA.

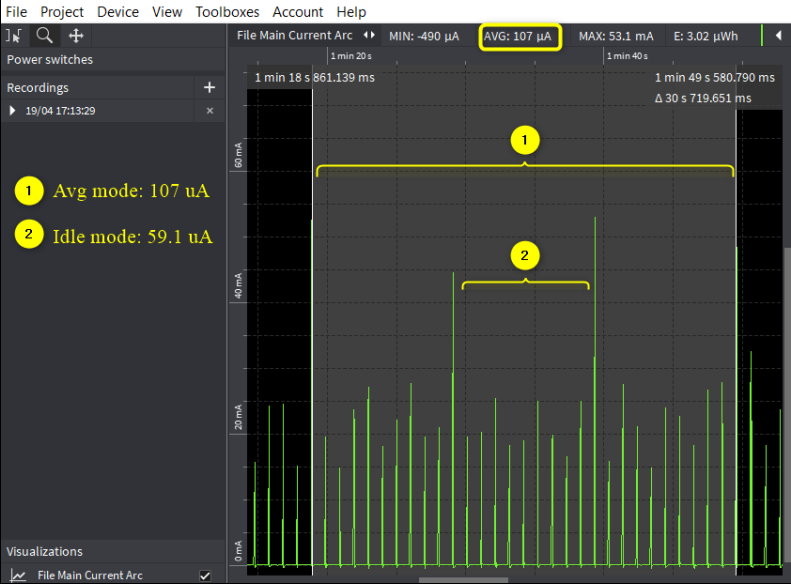


Figure : UDP - Otii log

## HTTP

**Wireshark log**:

**Expected Result**: At configured interval (10s), application connects to URL, performs HTTP Get and hexdumps the page.

1. The first three packets (SYN, SYN/ACK, ACK) are the TCP three-way handshake.
2. HTTP GET message is observed for the GET operation.
3. HTTP/1.1 200 OK is the response from the server for the successful HTTP connection.

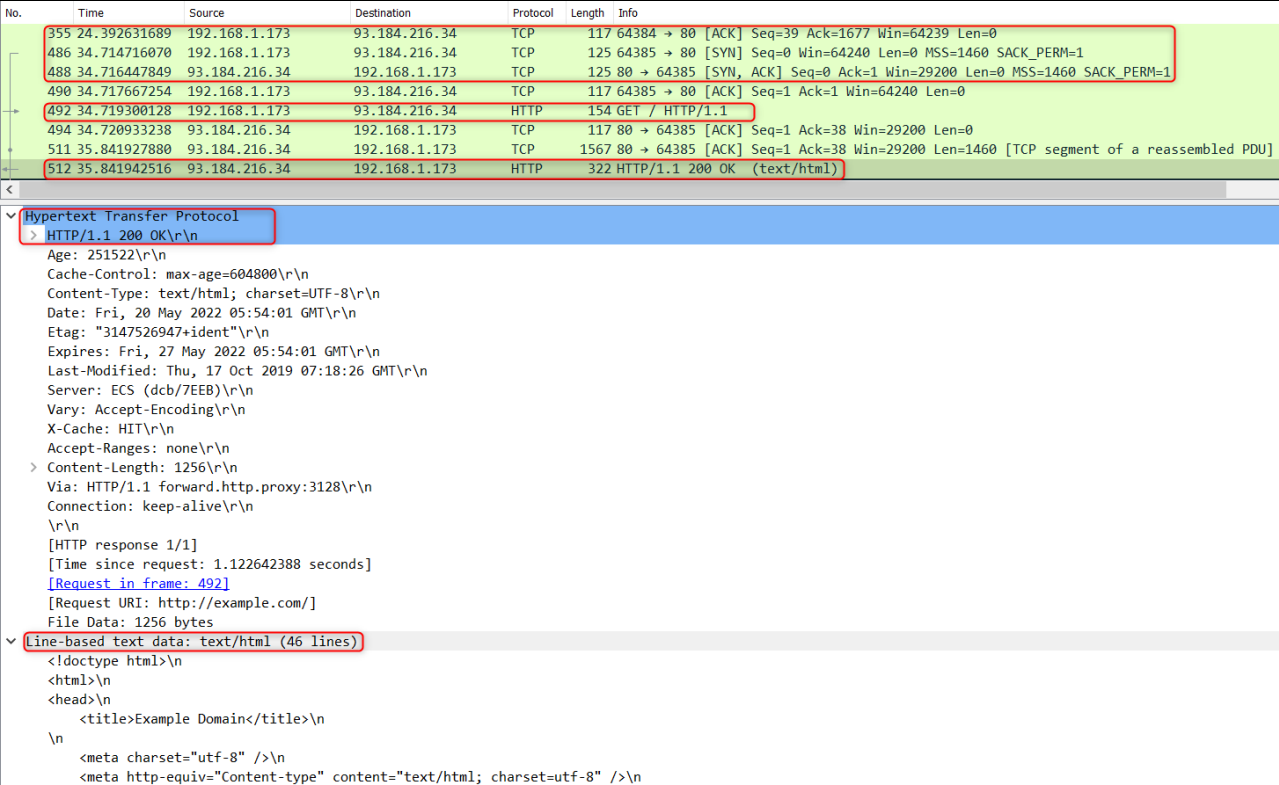


Figure : HTTP - Wireshark log

**Otii log:** Shows an average current consumption of 171µA for 30s. In idle cases, the average current consumption is 58.4µA.

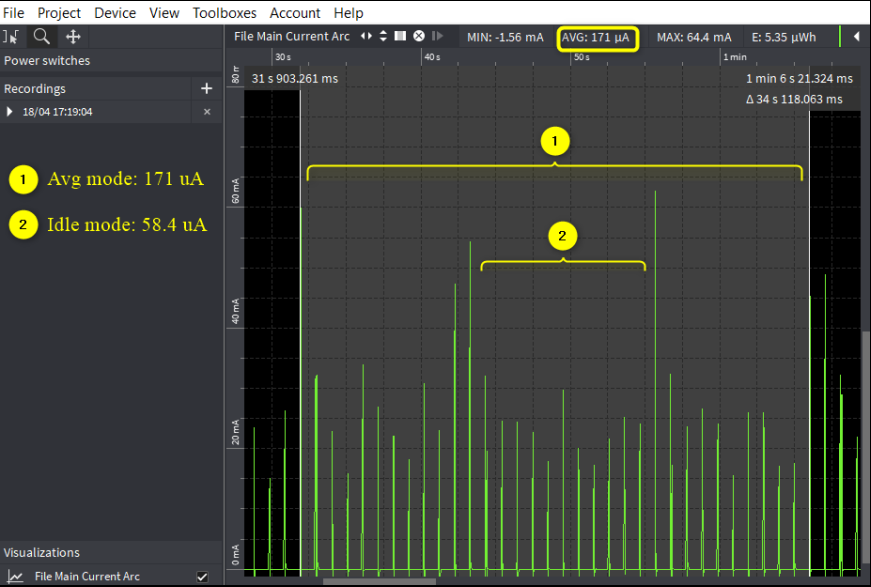


Figure : HTTP - Otii log

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 mpd.proto=http mpd.http.httpgetinterval=10 mpd.url=http://example.com wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  url=http://example.com  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.049,462] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-49 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [2.733,731] MYIP 192.168.0.104  [2.733,779] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.541,272] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  after parsing. port=80  Config:  Proto :http  Port :0  Interval:10  msg len :0  http\_send\_keepalive: times=1  [APP]Calling http\_client\_open(). cfg.port=80  [APP]HTTP Get. path=/callback entry  [APP]Response:  1120 ----------------------  200  Age: 471654  Cache-Control: max-age=604800  Content-Type: text/html; charset=UTF-8  Date: Thu, 07 Jul 2022 10:23:01 GMT  Etag: "3147526947+gzip+ident"  Expires: Thu, 14 Jul 2022 10:23:01 GMT  Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT  Server: ECS (dcb/7EA2)  Vary: Accept-Encoding  X-Cache: HIT  Accept-Ranges: none  Content-Length: 1256  [APP]Body:  Hexdump of http data, len=1120  3C 21 64 6F 63 74 79 70 65 20 68 74 6D 6C 3E 0A | <!doctype html>.  3C 68 74 6D 6C 3E 0A 3C 68 65 61 64 3E 0A 20 20 | <html>.<head>.  20 20 3C 74 69 74 6C 65 3E 45 78 61 6D 70 6C 65 | <title>Example  20 44 6F 6D 61 69 6E 3C 2F 74 69 74 6C 65 3E 0A | Domain</title>.  0A 20 20 20 20 3C 6D 65 74 61 20 63 68 61 72 73 | . <meta chars  65 74 3D 22 75 74 66 2D 38 22 20 2F 3E 0A 20 20 | et="utf-8" />.  20 20 3C 6D 65 74 61 20 68 74 74 70 2D 65 71 75 | <meta http-equ  69 76 3D 22 43 6F 6E 74 65 6E 74 2D 74 79 70 65 | iv="Content-type  22 20 63 6F 6E 74 65 6E 74 3D 22 74 65 78 74 2F | " content="text/  68 74 6D 6C 3B 20 63 68 61 72 73 65 74 3D 75 74 | html; charset=ut  66 2D 38 22 20 2F 3E 0A 20 20 20 20 3C 6D 65 74 | f-8" />. <met  61 20 6E 61 6D 65 3D 22 76 69 65 77 70 6F 72 74 | a name="viewport  22 20 63 6F 6E 74 65 6E 74 3D 22 77 69 64 74 68 | " content="width  3D 64 65 76 69 63 65 2D 77 69 64 74 68 2C 20 69 | =device-width, i  6E 69 74 69 61 6C 2D 73 63 61 6C 65 3D 31 22 20 | nitial-scale=1"  2F 3E 0A 20 20 20 20 3C 73 74 79 6C 65 20 74 79 | />. <style ty  70 65 3D 22 74 65 78 74 2F 63 73 73 22 3E 0A 20 | pe="text/css">.  20 20 20 62 6F 64 79 20 7B 0A 20 20 20 20 20 20 | body {.  20 20 62 61 63 6B 67 72 6F 75 6E 64 2D 63 6F 6C | background-col  6F 72 3A 20 23 66 30 66 30 66 32 3B 0A 20 20 20 | or: #f0f0f2;.  20 20 20 20 20 6D 61 72 67 69 6E 3A 20 30 3B 0A | margin: 0;.  20 20 20 20 20 20 20 20 70 61 64 64 69 6E 67 3A | padding:  20 30 3B 0A 20 20 20 20 20 20 20 20 66 6F 6E 74 | 0;. font  2D 66 61 6D 69 6C 79 3A 20 2D 61 70 70 6C 65 2D | -family: -apple-  73 79 73 74 65 6D 2C 20 73 79 73 74 65 6D 2D 75 | system, system-u  69 2C 20 42 6C 69 6E 6B 4D 61 63 53 79 73 74 65 | i, BlinkMacSyste  6D 46 6F 6E 74 2C 20 22 53 65 67 6F 65 20 55 49 | mFont, "Segoe UI  22 2C 20 22 4F 70 65 6E 20 53 61 6E 73 22 2C 20 | ", "Open Sans",  22 48 65 6C 76 65 74 69 63 61 20 4E 65 75 65 22 | "Helvetica Neue"  2C 20 48 65 6C 76 65 74 69 63 61 2C 20 41 72 69 | , Helvetica, Ari  61 6C 2C 20 73 61 6E 73 2D 73 65 72 69 66 3B 0A | al, sans-serif;.  20 20 20 20 20 20 20 20 0A 20 20 20 20 7D 0A 20 | . }.  20 20 20 64 69 76 20 7B 0A 20 20 20 20 20 20 20 | div {.  20 77 69 64 74 68 3A 20 36 30 30 70 78 3B 0A 20 | width: 600px;.  20 20 20 20 20 20 20 6D 61 72 67 69 6E 3A 20 35 | margin: 5  65 6D 20 61 75 74 6F 3B 0A 20 20 20 20 20 20 20 | em auto;.  20 70 61 64 64 69 6E 67 3A 20 32 65 6D 3B 0A 20 | padding: 2em;.  20 20 20 20 20 20 20 62 61 63 6B 67 72 6F 75 6E | backgroun  64 2D 63 6F 6C 6F 72 3A 20 23 66 64 66 64 66 66 | d-color: #fdfdff  3B 0A 20 20 20 20 20 20 20 20 62 6F 72 64 65 72 | ;. border  2D 72 61 64 69 75 73 3A 20 30 2E 35 65 6D 3B 0A | -radius: 0.5em;.  20 20 20 20 20 20 20 20 62 6F 78 2D 73 68 61 64 | box-shad  6F 77 3A 20 32 70 78 20 33 70 78 20 37 70 78 20 | ow: 2px 3px 7px  32 70 78 20 72 67 62 61 28 30 2C 30 2C 30 2C 30 | 2px rgba(0,0,0,0  2E 30 32 29 3B 0A 20 20 20 20head>..<b  6F 64 79 3E 0A 3C 64 69 76 3E 0A 20 20 20 20 3C | ody>.<div>. <  68 31 3E 45 78 61 6D 70 6C 65 20 44 6F 6D 61 69 | h1>Example Domai  6E 3C 2F 68 31 3E 0A 20 20 20 20 3C 70 3E 54 68 | n</h1>. <p>Th  69 73 20 64 6F 6D 61 69 6E 20 69 73 20 66 6F 72 | is domain is for  20 75 73 65 20 69 6E 20 69 6C 6C 75 73 74 72 61 | use in illustra  74 69 76 65 20 65 78 61 6D 70 6C 65 73 20 69 6E | tive examples in  20 64 6F 63 75 6D 65 6E 74 73 2E 20 59 6F 75 20 | documents. You  6D 61 79 20 75 73 65 20 74 68 69 73 0A 20 20 20 | may use this.  20 64 6F 6D 61 69 6E 20 69 6E 20 6C 69 74 65 72 | domain in liter  61 74 75 72 65 20 77 69 74 68 6F 75 74 20 70 72 | ature without pr  69 6F 72 20 63 6F 6F 72 64 69 6E 61 74 69 6F 6E | ior coordination  callback exit  callback entry  Hexdump of http data, len=136  20 6F 72 20 61 73 6B 69 6E 67 20 66 6F 72 20 70 | or asking for p  65 72 6D 69 73 73 69 6F 6E 2E 3C 2F 70 3E 0A 20 | ermission.</p>.  20 20 20 3C 70 3E 3C 61 20 68 72 65 66 3D 22 68 | <p><a href="h  74 74 70 73 3A 2F 2F 77 77 77 2E 69 61 6E 61 2E | ttps://www.iana.  6F 72 67 2F 64 6F 6D 61 69 6E 73 2F 65 78 61 6D | org/domains/exam  70 6C 65 22 3E 4D 6F 72 65 20 69 6E 66 6F 72 6D | ple">More inform  61 74 69 6F 6E 2E 2E 2E 3C 2F 61 3E 3C 2F 70 3E | ation...</a></p>  0A 3C 2F 64 69 76 3E 0A 3C 2F 62 6F 64 79 3E 0A | .</div>.</body>.  3C 2F 68 74 6D 6C 3E 0A | </html>.  callback exit |

## HTTPS

**Wireshark log**:

**Expected Result**: At the configured interval, Message\_Send Interval, application connects to URL, performs HTTPs Get and hexdumps the page.

1. The first three packets (SYN, SYN/ACK, ACK) are the TCP three-way handshake.
2. [Client hello], [Server hello], [Certificate, Server Key Exchange, Server Hello Done], [Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message], [New Session ticket] are the SSL/TLS handshake, which indicates successful TLS connection.
3. All the data packets over TLS connection are observed as Application data which is encrypted.

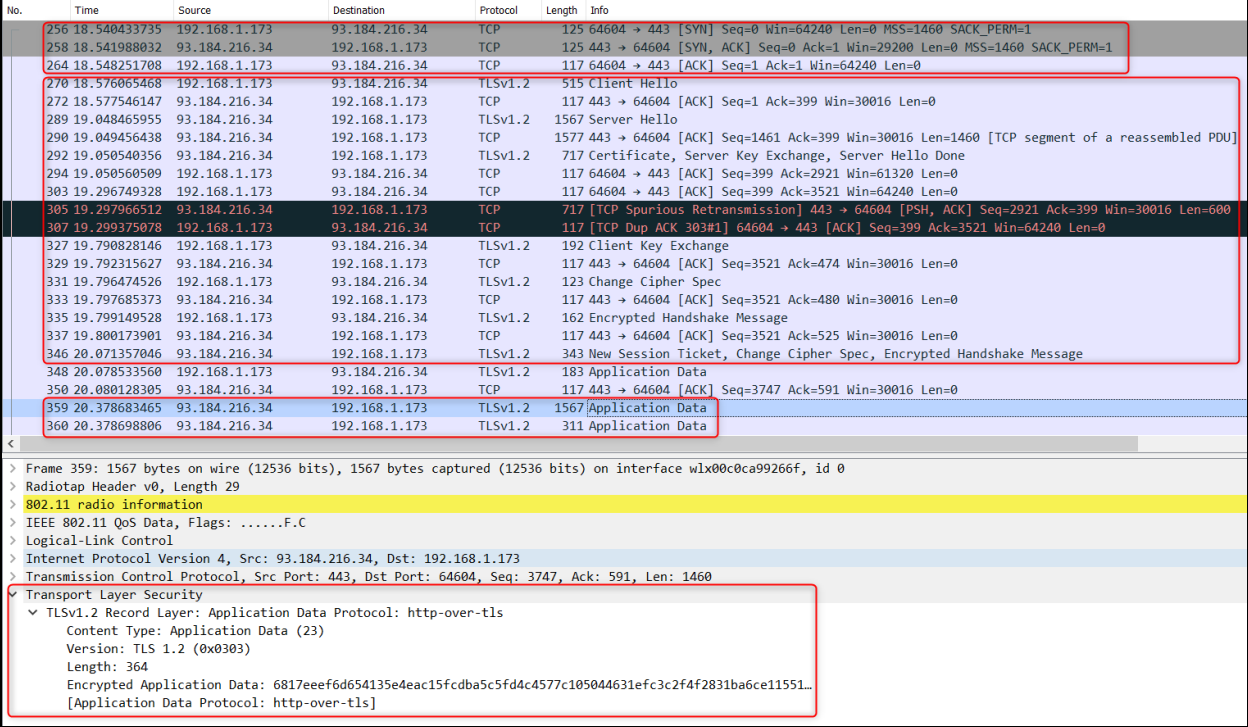


Figure : HTTPS - Wireshark log

**Otii log**: Shows an average current consumption of 640µA for 30s. In idle cases, the average current consumption is 58.1µA.

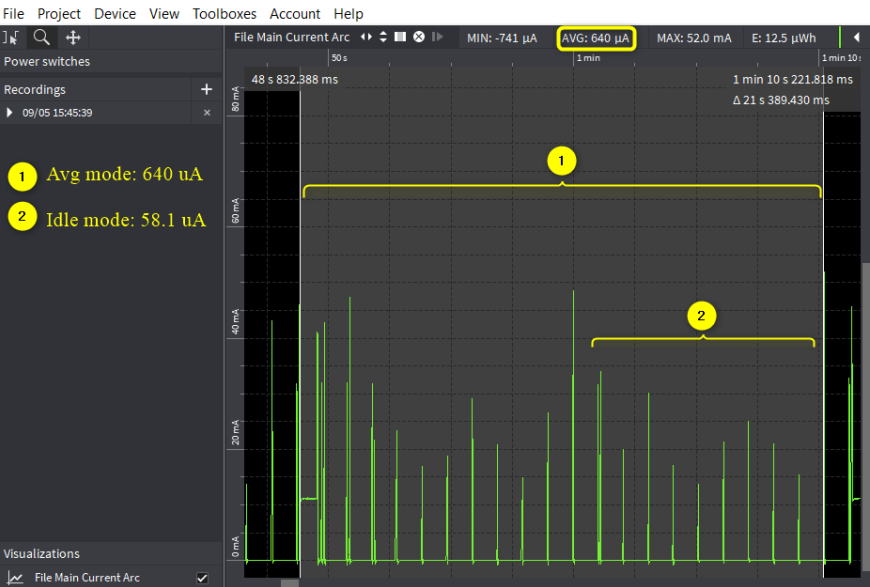


Figure : HTTPS - Otii log

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.mcast\_rx=1 mpd.proto=https mpd.https.httpsgetinterval=10 mpd.url=https://example.com wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  url=https://example.com  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.171,820] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-57 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [2.917,496] MYIP 192.168.0.104  [2.917,543] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.543,978] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  after parsing. port=443  Config:  Proto :https  Port :0  Interval:10  msg len :0  http\_send\_keepalive: times=1  [APP]Calling http\_client\_open(). http\_cmn\_ctx.cfg.port=443  . [SSL\_WRAP]Checking input configurations...  . [SSL\_WRAP]Seeding the random number generator...  . [SSL\_WRAP]Connecting to tcp example.com:443...  . [SSL\_WRAP]Setting up the SSL/TLS structure...  . [SSL\_WRAP]setting configurations..  >auth mode = 0 (0- skip, 1- optional, 2- required  >max fragment len = 0  >Handshake timeout = 30 Sec  . [SSL\_WRAP]Performing the SSL/TLS handshake...  . [SSL\_WRAP] Handshake done. ok  . [SSL\_WRAP]Verifying peer X.509 certificate.  [APP]HTTP Get. path=/  [APP]Response:  0 ----------------------  200  Age: 378199  Cache-Control: max-age=604800  Content-Type: text/html; charset=UTF-8  Date: Thu, 07 Jul 2022 11:04:16 GMT  Etag: "3147526947+ident"  Expires: Thu, 14 Jul 2022 11:04:16 GMT  Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT  Server: ECS (dcb/7F80)  Vary: Accept-Encoding  X-Cache: HIT  Content-Length: 1256  [APP]Body:  Hexdump of http data, len=0  Hexdump of http data, len=1256  3C 21 64 6F 63 74 79 70 65 20 68 74 6D 6C 3E 0A | <!doctype html>.  3C 68 74 6D 6C 3E 0A 3C 68 65 61 64 3E 0A 20 20 | <html>.<head>.  20 20 3C 74 69 74 6C 65 3E 45 78 61 6D 70 6C 65 | <title>Example  20 44 6F 6D 61 69 6E 3C 2F 74 69 74 6C 65 3E 0A | Domain</title>.  0A 20 20 20 20 3C 6D 65 74 61 20 63 68 61 72 73 | . <meta chars  65 74 3D 22 75 74 66 2D 38 22 20 2F 3E 0A 20 20 | et="utf-8" />.  20 20 3C 6D 65 74 61 20 68 74 74 70 2D 65 71 75 | <meta http-equ  69 76 3D 22 43 6F 6E 74 65 6E 74 2D 74 79 70 65 | iv="Content-type  22 20 63 6F 6E 74 65 6E 74 3D 22 74 65 78 74 2F | " content="text/  68 74 6D 6C 3B 20 63 68 61 72 73 65 74 3D 75 74 | html; charset=ut  66 2D 38 22 20 2F 3E 0A 20 20 20 20 3C 6D 65 74 | f-8" />. <met  61 20 6E 61 6D 65 3D 22 76 69 65 77 70 6F 72 74 | a name="viewport  22 20 63 6F 6E 74 65 6E 74 3D 22 77 69 64 74 68 | " content="width  3D 64 65 76 69 63 65 2D 77 69 64 74 68 2C 20 69 | =device-width, i  6E 69 74 69 61 6C 2D 73 63 61 6C 65 3D 31 22 20 | nitial-scale=1"  2F 3E 0A 20 20 20 20 3C 73 74 79 6C 65 20 74 79 | />. <style ty  70 65 3D 22 74 65 78 74 2F 63 73 73 22 3E 0A 20 | pe="text/css">.  20 20 20 62 6F 64 79 20 7B 0A 20 20 20 20 20 20 | body {.  20 20 62 61 63 6B 67 72 6F 75 6E 64 2D 63 6F 6C | background-col  6F 72 3A 20 23 66 30 66 30 66 32 3B 0A 20 20 20 | or: #f0f0f2;.  20 20 20 20 20 6D 61 72 67 69 6E 3A 20 30 3B 0A | margin: 0;.  20 20 20 20 20 20 20 20 70 61 64 64 69 6E 67 3A | padding:  20 30 3B 0A 20 20 20 20 20 20 20 20 66 6F 6E 74 | 0;. font  2D 66 61 6D 69 6C 79 3A 20 2D 61 70 70 6C 65 2D | -family: -apple-  73 79 73 74 65 6D 2C 20 73 79 73 74 65 6D 2D 75 | system, system-u  69 2C 20 42 6C 69 6E 6B 4D 61 63 53 79 73 74 65 | i, BlinkMacSyste  6D 46 6F 6E 74 2C 20 22 53 65 67 6F 65 20 55 49 | mFont, "Segoe UI  22 2C 20 22 4F 70 65 6E 20 53 61 6E 73 22 2C 20 | ", "Open Sans",  22 48 65 6C 76 65 74 69 63 61 20 4E 65 75 65 22 | "Helvetica Neue"  2C 20 48 65 6C 76 65 74 69 63 61 2C 20 41 72 69 | , Helvetica, Ari  61 6C 2C 20 73 61 6E 73 2D 73 65 72 69 66 3B 0A | al, sans-serif;.  20 20 20 20 20 20 20 20 0A 20 20 20 20 7D 0A 20 | . }.  20 20 20 64 69 76 20 7B 0A 20 20 20 20 20 20 20 | div {.  20 77 69 64 74 68 3A 20 36 30 30 70 78 3B 0A 20 | width: 600px;.  20 20 20 20 20 20 20 6D 61 72 67 69 6E 3A 20 35 | margin: 5  65 6D 20 61 75 74 6F 3B 0A 20 20 20 20 20 20 20 | em auto;.  20 70 61 64 64 69 6E 67 3A 20 32 65 6D 3B 0A 20 | padding: 2em;.  20 20 20 20 20 20 20 62 61 63 6B 67 72 6F 75 6E | backgroun  64 2D 63 6F 6C 6F 72 3A 20 23 66 64 66 64 66 66 | d-color: #fdfdff  3B 0A 20 20 20 20 20 20 20 20 62 6F 72 64 65 72 | ;. border  2D 72 61 64 69 75 73 3A 20 30 2E 35 65 6D 3B 0A | -radius: 0.5em;.  20 20 20 20 20 20 20 20 62 6F 78 2D 73 68 61 64 | box-shad  6F 77 3A 20 32 70 78 20 33 70 78 }.  20 20 7D 0A 20 20 20 20 3C 2F 73 74 79 6C 65 3E | }. </style>  20 20 20 20 0A 3C 2F 68 65 61 64 3E 0A 0A 3C 62 | .</head>..<b  6F 64 79 3E 0A 3C 64 69 76 3E 0A 20 20 20 20 3C | ody>.<div>. <  68 31 3E 45 78 61 6D 70 6C 65 20 44 6F 6D 61 69 | h1>Example Domai  6E 3C 2F 68 31 3E 0A 20 20 20 20 3C 70 3E 54 68 | n</h1>. <p>Th  69 73 20 64 6F 6D 61 69 6E 20 69 73 20 66 6F 72 | is domain is for  20 75 73 65 20 69 6E 20 69 6C 6C 75 73 74 72 61 | use in illustra  74 69 76 65 20 65 78 61 6D 70 6C 65 73 20 69 6E | tive examples in  20 64 6F 63 75 6D 65 6E 74 73 2E 20 59 6F 75 20 | documents. You  6D 61 79 20 75 73 65 20 74 68 69 73 0A 20 20 20 | may use this.  20 64 6F 6D 61 69 6E 20 69 6E 20 6C 69 74 65 72 | domain in liter  61 74 75 72 65 20 77 69 74 68 6F 75 74 20 70 72 | ature without pr  69 6F 72 20 63 6F 6F 72 64 69 6E 61 74 69 6F 6E | ior coordination  20 6F 72 20 61 73 6B 69 6E 67 20 66 6F 72 20 70 | or asking for p  65 72 6D 69 73 73 69 6F 6E 2E 3C 2F 70 3E 0A 20 | ermission.</p>.  20 20 20 3C 70 3E 3C 61 20 68 72 65 66 3D 22 68 | <p><a href="h  74 74 70 73 3A 2F 2F 77 77 77 2E 69 61 6E 61 2E | ttps://www.iana.  6F 72 67 2F 64 6F 6D 61 69 6E 73 2F 65 78 61 6D | org/domains/exam  70 6C 65 22 3E 4D 6F 72 65 20 69 6E 66 6F 72 6D | ple">More inform  61 74 69 6F 6E 2E 2E 2E 3C 2F 61 3E 3C 2F 70 3E | ation...</a></p>  0A 3C 2F 64 69 76 3E 0A 3C 2F 62 6F 64 79 3E 0A | .</div>.</body>.  3C 2F 68 74 6D 6C 3E 0A | </html>.  [APP]Success: http\_client\_get(), rval = 2  http\_send\_keepalive: times=2  [APP]Calling http\_client\_open(). http\_cmn\_ctx.cfg.port=443  . [SSL\_WRAP]Checking input configurations...  . [SSL\_WRAP]Seeding the random number generator...  . [SSL\_WRAP]Connecting to tcp example.com:443...  . [SSL\_WRAP]Setting up the SSL/TLS structure...  . [SSL\_WRAP]setting configurations..  >auth mode = 0 (0- skip, 1- optional, 2- required  >max fragment len = 0  >Handshake timeout = 30 Sec  . [SSL\_WRAP]Performing the SSL/TLS handshake...  . [SSL\_WRAP] Handshake done. ok  . [SSL\_WRAP]Verifying peer X.509 certificate.  [APP]HTTP Get. path=/ |

## MQTT

To observe Publish messages and to Subscribe any message run the following commands:

1. To Publish:

**mosquitto\_sub -d -v -h mqtt-dashboard.com -t PUBMSG**

1. To Subscribe:

**mosquitto\_pub -d -h mqtt-dashboard.com -t SUBMSG1 -m "msg1"**

**Note**: Mosquitto.exe can be downloaded from the following link: <http://mosquitto.org/download/>.

MQTT - Command Prompt Output (Subscribe message):

|  |
| --- |
| synergic@synergic-vostro-3470:~/Downloads$ mosquitto\_pub -d -h mqtt-dashboard.com -t SUBMSG1 -m "msg1"  Client mosq-7XNzxTypruvc9Bkybj sending CONNECT  Client mosq-7XNzxTypruvc9Bkybj received CONNACK (0)  Client mosq-7XNzxTypruvc9Bkybj sending PUBLISH (d0, q0, r0, m1, 'SUBMSG1', ... (4 bytes))  Client mosq-7XNzxTypruvc9Bkybj sending DISCONNECT |

MQTT - Command Prompt Output (Publish message):

|  |
| --- |
| synergic@synergic-vostro-3470:~/Downloads$ mosquitto\_sub -d -v -h mqtt-dashboard.com -t PUBMSG  Client mosq-3SHpQMGOLvcW97fbtH sending CONNECT  Client mosq-3SHpQMGOLvcW97fbtH received CONNACK (0)  Client mosq-3SHpQMGOLvcW97fbtH sending SUBSCRIBE (Mid: 1, Topic: PUBMSG, QoS: 0, Options: 0x00)  Client mosq-3SHpQMGOLvcW97fbtH received SUBACK  Subscribed (mid: 1): 0  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=8:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=9:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=10:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=11:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=0:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH sending PINGREQ  Client mosq-3SHpQMGOLvcW97fbtH received PINGRESP  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))  PUBMSG Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLM  Client mosq-3SHpQMGOLvcW97fbtH received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes)) |

Console output:

|  |
| --- |
| Y-BOOT 208ef13 2019-07-22 12:26:54 -0500 790da1-b-7  ROM yoda-h0-rom-16-0-gd5a8e586  FLASH:PNWWWWWAEBuild $Id: git-d198c0771 $  mpd.mcast\_rx=1 mpd.proto=mqtt mpd.port=8883 mpd.mqtt.publishinterval=10 mpd.url=mqtt-dashboard.com mpd.mqtt.clientid=T2\_TALARIA mpd.mqtt.username=t2\_user mpd.mqtt.password=t2\_pass mpd.mqtt.pub\_msg=PUBMSG mpd.mqtt.sub\_msg1=SUBMSG1 mpd.mqtt.sub\_msg2=SUBMSG2 mpd.mqtt.ping\_interval=60 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 wifi.arp\_grat\_period=1800 wifi.max\_idle\_period=0 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=low\_rssi mpd.passphrase=12345678  $App:git-fdceeca3  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Enabled.  url=mqtt-dashboard.com  Regdomain=FCC  addr e0:69:3a:00:01:24  Applying reg domain: 1-11@20  Connecting to network  .[0.900,792] CONNECT:74:da:88:a6:9c:ea Channel:11 rssi:-4 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [1.612,858] MYIP 192.168.1.100  [1.613,022] IPv6 [fe80::e269:3aff:fe00:124]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [2.214,225] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  url=mqtt-dashboard.com hostname=mqtt-dashboard.com, port=8883, page=/  starting mqtt.. Ping interval=60 Secs  . Seeding the random number generator... ok  . Loading the CA root certificate ... ok (0 skipped)  Connect success. Returning :0  ok  . Setting up the SSL/TLS structure... ok  . Performing the SSL/TLS handshake... ok  init\_ssl\_and\_connect success... proceeding..on retry (1)  \_mqtt\_cycle : packet\_type = 2  \_mqtt\_cycle : packet\_type = 9Subscribed to "SUBMSG1"  \_mqtt\_cycle : packet\_type = 9Subscribed to "SUBMSG2"  MQTT init: returning 0  Config:  Proto :mqtt  Port :1883  Interval:10  msg len :100  mqtt\_loop entry  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=8, interval=10Secs  publish\_data, value=9, interval=10Secs  publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=2, interval=10Secs  \_mqtt\_cycle : packet\_type = 3messageArrived: SUBMSG1 msg1  publish\_data, value=3, interval=10Secs  publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  publish\_data, value=8, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=9, interval=10Secs  publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  publish\_data, value=8, interval=10Secs  publish\_data, value=9, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  publish\_data, value=8, interval=10Secs  publish\_data, value=9, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  publish\_data, value=8, interval=10Secs  publish\_data, value=9, interval=10Secs  publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=6, interval=10Secs  publish\_data, value=7, interval=10Secs  publish\_data, value=8, interval=10Secs  publish\_data, value=9, interval=10Secs  publish\_data, value=10, interval=10Secs  publish\_data, value=11, interval=10Secs  \_mqtt\_cycle : packet\_type = 13publish\_data, value=0, interval=10Secs  publish\_data, value=1, interval=10Secs  publish\_data, value=2, interval=10Secs  publish\_data, value=3, interval=10Secs  publish\_data, value=4, interval=10Secs  publish\_data, value=5, interval=10Secs |

**Wireshark log**:

1. The connection sequence of the MQTT is as shown in Figure 12.

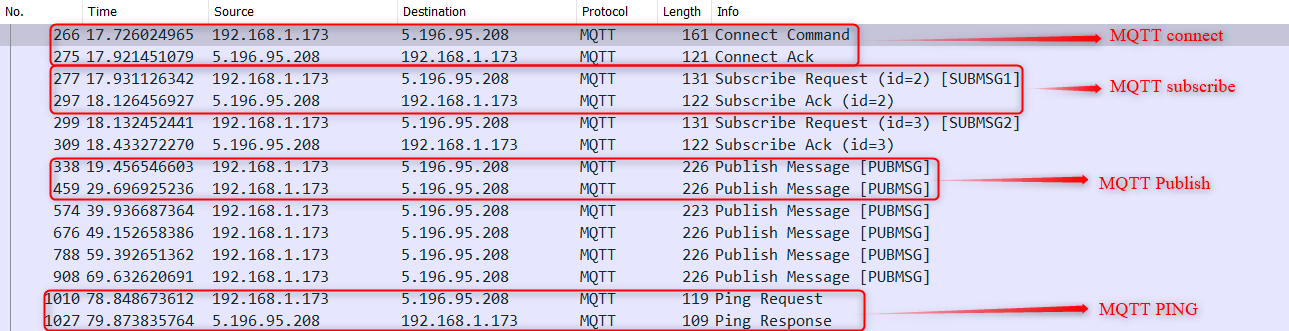


Figure : MQTT connection flow - Wireshark log

1. The Connect command is sent from Talaria TWO to MQTT broker, connection is established when the connect acknowledgement is received by Talaria TWO from broker.

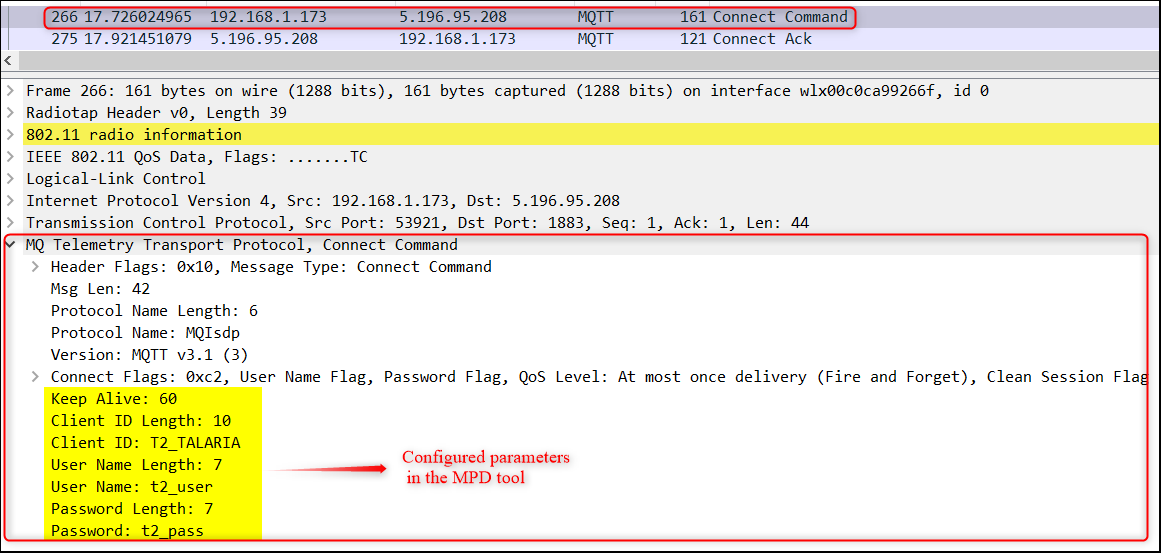


Figure : MQTT connection packet - Wireshark log

1. SUBMSG1 and SUBMSG2 are the two configured topic to subscribe, Talaria TWO gets registered to the topics from the subscription request.

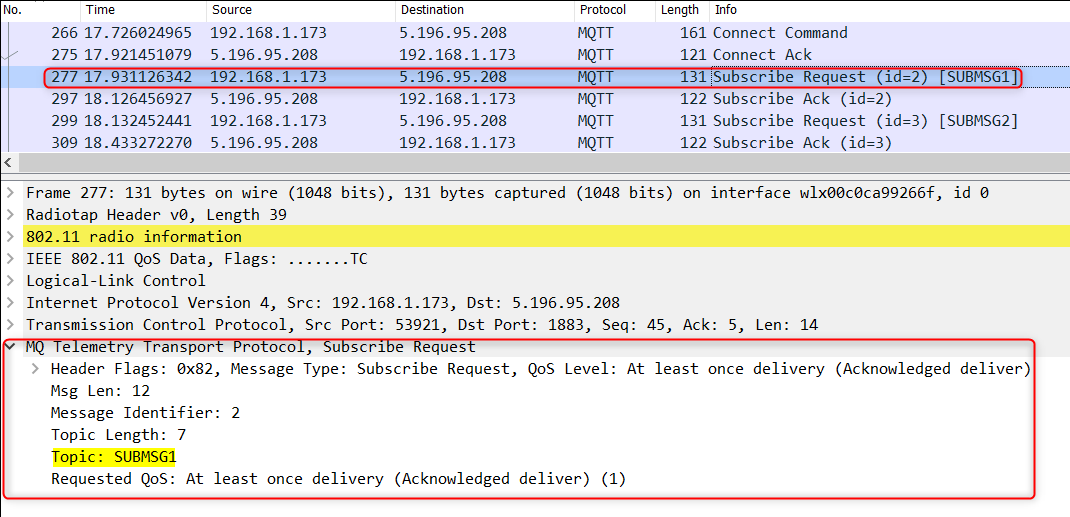


Figure : MQTT subscribe package - Wireshark log

1. Publish message is observed from Talaria TWO for the configured interval of seconds (10s) with the topic PUBMSG.

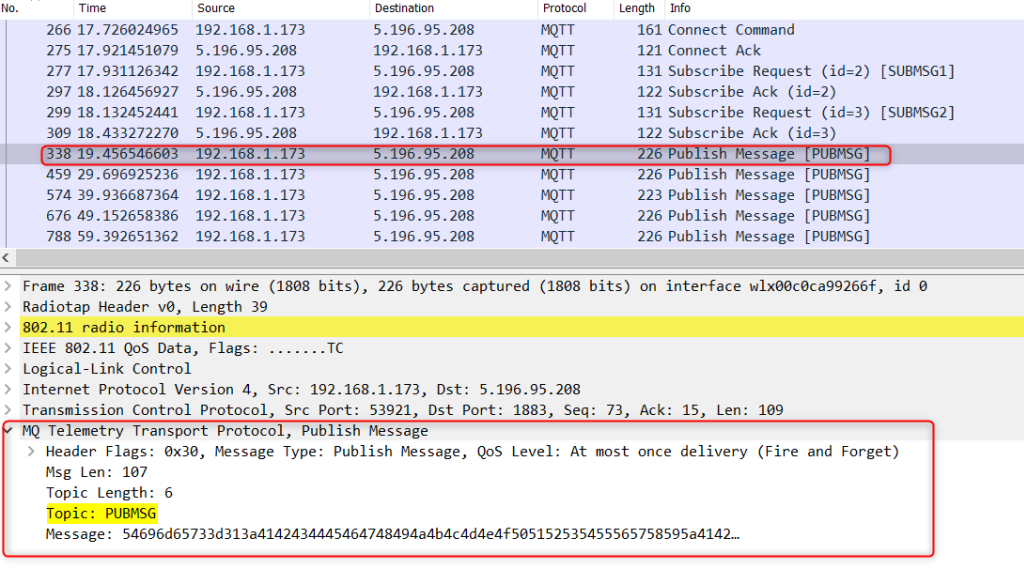


Figure : MQTT publish packet - Wireshark log

1. At configured interval of seconds (60s) a ping request and response is observed from Talaria TWO.

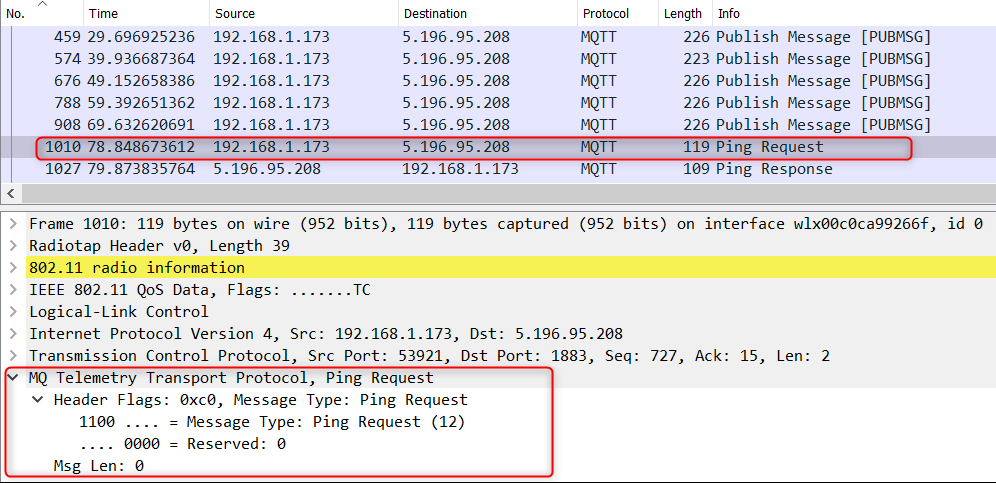


Figure : MQTT ping - Wireshark log

1. Data is sent from MQTT broker to Talaria TWO with the subscribed topic SUBMSG1.

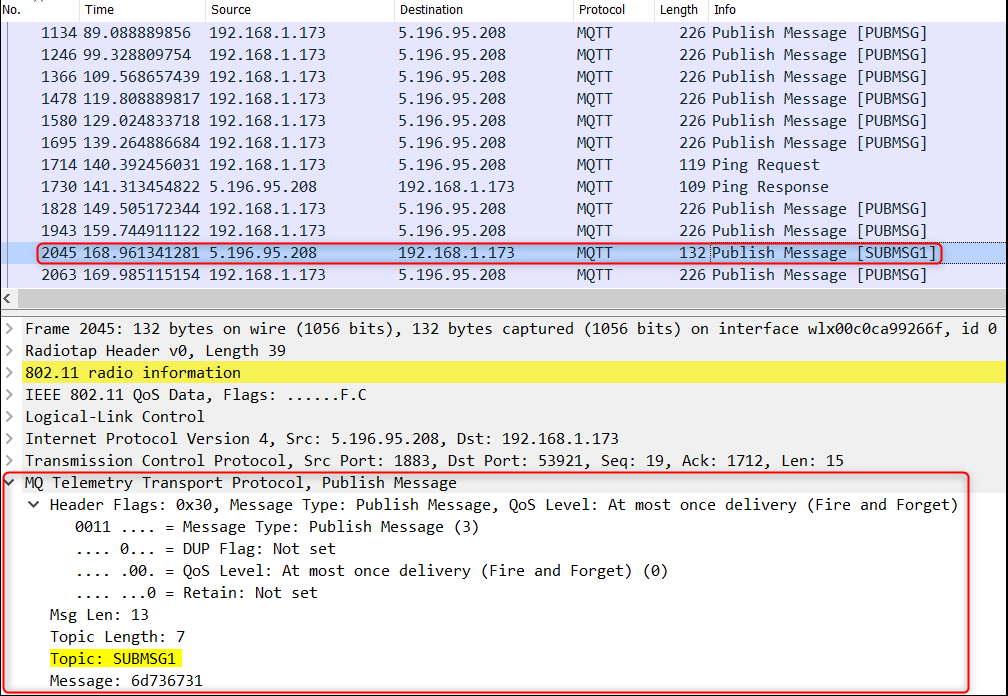


Figure : MQTT subscribe packet - Wireshark log

**Otii log**:

**Case 1**: Shows an average current consumption of 200µA for 30s for MQTT subscribe. In idle cases, the average current consumption is 57.6µA.

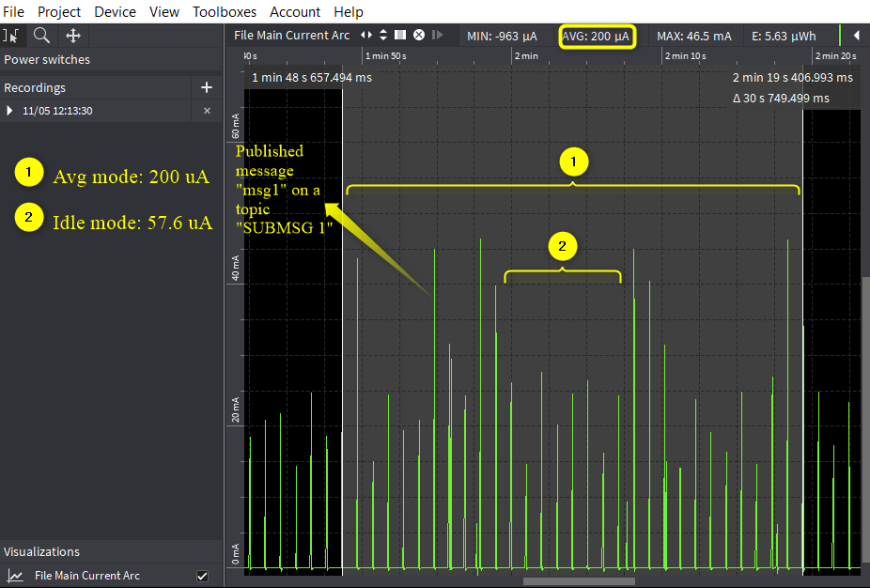


Figure : MQTT subscribe - Otii log

**Case 2**: Shows an average current consumption of 173µA for 30s for MQTT publish. In idle cases, the average current consumption is 59.3µA.

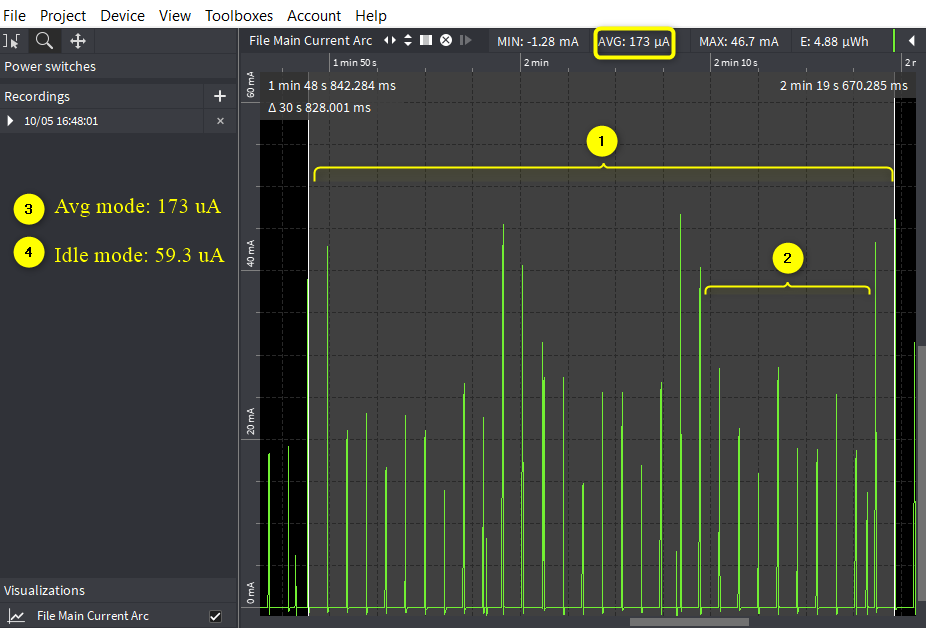


Figure : MQTT publish - Otii log

## Multicast Reception OFF GRAT ARP ON

Console output:

|  |
| --- |
| UART:SNWWWWWAEBuild $Id: git-ba65998b7 $  mpd.proto=none --flash=vm --reset=evk42 mpd.mcast\_rx=0 wifi.arp\_grat\_period=10 wifi.max\_idle\_period=0 wifi.listen\_interval=10 krn.gpio=--K wifi.keep\_alive\_wake\_time=2 mpd.regdomain=FCC mpd.suspend=1 np\_conf\_path=/data/nprofile.json mpd.ssid=InnoPhase mpd.passphrase=43083191  $App:git-73e7f910  SDK Ver: FREERTOS\_SDK\_1.0  T2 Multipurpose Demp App Version 0.12  network profile parse success.  Suspend Enabled.  Multicast reception Disabled.  Regdomain=FCC  addr e0:69:3a:00:13:90  Applying reg domain: 1-11@20  Connecting to network  .[2.062,636] CONNECT:00:5f:67:cd:c5:a6 Channel:11 rssi:-53 dBm  WCM\_NOTIFY\_MSG\_LINK\_UP  .WCM\_NOTIFY\_MSG\_ADDRESS  [2.770,812] MYIP 192.168.0.104  [2.770,975] IPv6 [fe80::e269:3aff:fe00:1390]-link  WCM\_NOTIFY\_MSG\_CONNECTED  Listen interval=10  Traffic Timeout=12  pm\_flags=0x0  [3.543,107] WARNING! wcm\_pm\_config may overwrite the supplied power management boot arguments!  WiFi Connection success. proceeding to app..  Timeout not specified.!  Application Exited..  Going for indefinite sleep... |

**Expected output**:

1. To verify if the GRAT ARP and multicast reception is disabled, connect the PC to the same AP to which the Talaria TWO is connected and flash the application using tool.
2. Further, the ARP table needs be cleared from the PC. This ensures that the ARP table does not contain entries of Talaria TWO IP address.
3. When the PC tries to ping, ARP does not pass as the mcast rx at Talaria TWO is turned off. However, Talaria TWO keeps sending the GRAT ARPs at configured intervals. The PC receives the GRAT ARP and the ARP table at the laptop gets updated, and the ping is executed.

Windows console output:

|  |
| --- |
| C:\WINDOWS\system32>ping 192.168.1.173  PING 192.168.1.173 (192.168.1.173) 56(84) bytes of data.  From 192.168.1.173 icmp\_seq=1 Destination Host unreachable  From 192.168.1.173 icmp\_seq=2 Destination Host unreachable  From 192.168.1.173 icmp\_seq=3 Destination Host unreachable  64 bytes from 192.168.1.173: icmp\_seq=6 ttl=255 time=676 ms  64 bytes from 192.168.1.173: icmp\_seq=7 ttl=255 time=676 ms  64 bytes from 192.168.1.173: icmp\_seq=8 ttl=255 time=676 ms  64 bytes from 192.168.1.173: icmp\_seq=9 ttl=255 time=676 ms  64 bytes from 192.168.1.173: icmp\_seq=10 ttl=255 time=676 ms  64 bytes from 192.168.1.173: icmp\_seq=11 ttl=255 time=676 ms |

**Wireshark log**:

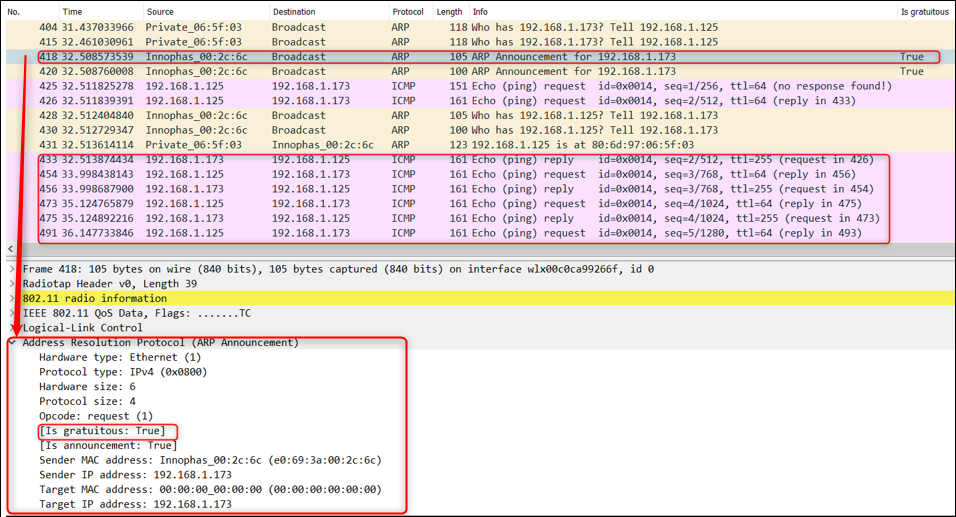


Figure : Multicast Reception OFF GRAT ARP ON - Wireshark log

**Multicast OFF**:

Multicast reception disabled flag can be checked from the beacon frame if the Multicast flag is set to false as shown in Figure 21.

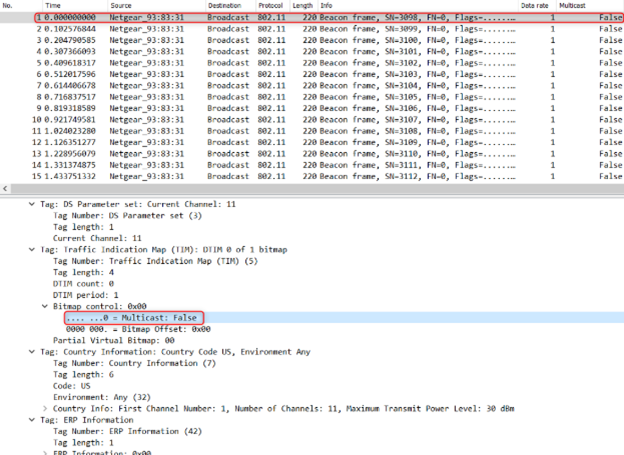


Figure : Multicast Reception OFF GRAT ARP ON - Multicast disabled Wireshark log

**Otii log**: Shows an average current consumption of 116µA for 30s. In idle cases, the average current consumption is 58.5µA.

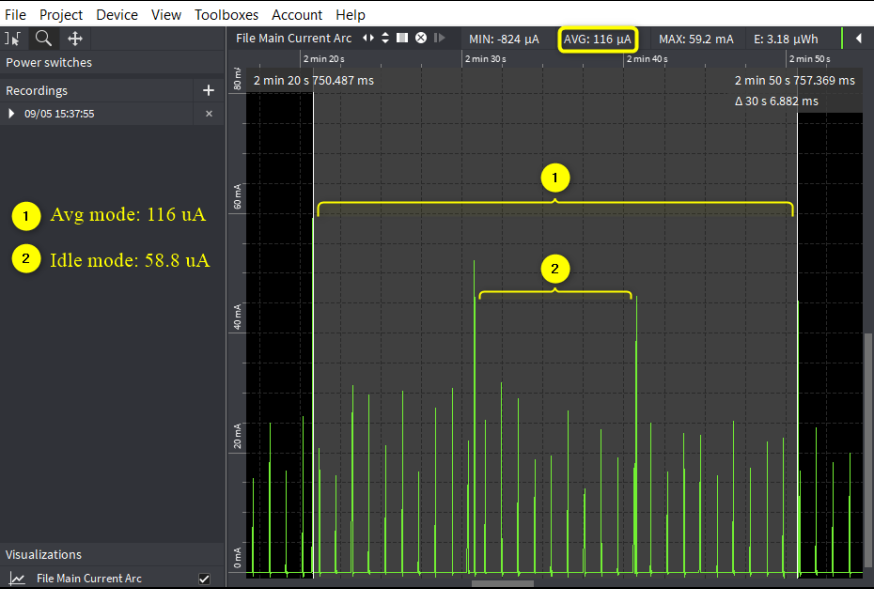


Figure : Multicast Reception OFF GRAT ARP ON - Otii log