

Talaria TWO[™] EVB-A (INP3010 & INP3011)

Module Evaluation Boards IEEE 802.11 b/g/n, BLE 5.0

User Guide for Talaria TWO Demo Tool

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Revision History

Version	Date	Comments	
0.6.1	07-21-2020	First release.	
1.0	09-23-2020	Updated for SDK 2.1.1 release & MPD Tool version v1.1.	
2.0	05-13-2021	Updated for SDK 2.2 release & MPD Tool version v2.2.	
2.1	07-05-2021	Added note for PROG RAM functionality.	
3.0	08-12-2021	Updated for SDK 2.3 release.	
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4.0	09-21-2021	Low Power Scan added as part of SDK 2.4 release – still need to be added.	
		Updated with the following:	
4.1	10-13-2021	 One-Click Installation of libusbk driver 	
		- Help option for the Tool	
4.2	11-16-2021	Updated Appendix with steps to assign a new EVK serial number to device.	
4.3	01-25-2022	Updated Demo Tool GUI.	
4.4	02-01-2022	Updated MQTT broker.	



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3 Terms & Definitions

AP	Access Point
ARP	Address Resolution Protocol
СОМ	Composite Device Driver
ELF	Extensible Linking Format
EVK	Evaluation Kit
FTDI	Future Technology Devices International
GARP	Gratuitous Address Resolution Protocol
GUI	Graphical User Interface
НТТР	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
iPerf	Internet Performance Working Group
MPD	Multipurpose Demo
MQTT	Message Queuing Telemetry Transport
SSID	Service Set Identifier
ТСР	Transmission Control Protocol
UDP	User Datagram Protocol
URL	Uniform Resource Locator
USB	Universal Serial Bus



4 Introduction

This document describes the use of Talaria TWO Demo Tool, which is a GUI tool that enables quick evaluation of power consumption and throughput performances of Talaria TWO modules. This tool is bundled with two applications:

- Multipurpose Demo (MPD) primarily intended to verify power consumption under various protocol scenarios (such as TCP, UDP, HTTP etc.)
- iPerf3 application to showcase throughput performance

This GUI is intended for use with the INP3010 and INP3011 Talaria TWO evaluation boards to enable easy programming and accelerated evaluations.

5 Prerequisites

Each release of the Demo Tool is equipped with binaries for Windows and Linux operating systems, and signed firmware images (ELFs) for MPD and iPerf3 applications. Though this document specifically describes the use of the GUI on a Windows platform, the procedure is similar for Linux OS as well. The content of the release is shown in Figure 1

Application INP_T2_Demo_Windows.exe is for Windows platform while INP_T2_Demo_Linux is for the Linux OS.

Name	Туре	Compressed size	Password p Size
10010324.log	Text Document	1 KB	No
INP_T2_Demo_Linux	File	16,133 KB	No
INP_T2_Demo_Windows.exe	Application	19,332 KB	No
iperf3.elf	ELF File	130 KB	No
t2_mpd.elf	ELF File	238 KB	No

Figure 1: Folder Contents

The Demo tool verifies the signature of the ELFs prior to downloading it onto the evaluation board. In case the ELFs are tampered with, an error message as shown in Figure 2 is printed on the console.



Figure 2: Signature failed window



The Talaria TWO evaluation board uses FT4323h, which is a 4-port USB to UART converter with MPSEE support. By default, these ports enumerate as COM ports in Windows OS which does not take advantage of the MPSEE capabilities of the FTDI device. The usage of these ports in the evaluation board is given in Table 1.

Port	Usage		
Α	Connected to JTAG pins, this enables JTAG debugging using OpenOCD		
В	B Connected to EN_CHIP pin, which enables resetting the module		
С	C Connected to UART pins, this is used for programming the module		
D	D Connected to GPIO17 pin which is the default debug log console port		
Table 1. Henry of anything the availantian beaud			

Table 1: Usage of ports in the evaluation board

To utilize these capabilities, on Windows OS, libusbk driver needs to be installed to communicate and control the Talaria TWO module via the FTDI device on the evaluation board. The tools/applications provided by InnoPhase will use this driver.

Talaria TWO Demo Tool comes with an option of One-Click Installation of libusbk driver. In case the driver is not installed, the tool will ask for user confirmation to install this driver. If the user selects yes, various User Account Control authentication screens will appear to complete the driver installation (as shown in Figure 3).



Note: In case of any other unwanted libusbk drivers that are already installed, the tool will automatically uninstall the unwanted drivers. This action needs User Account Control authentication screens shown in Figure 4, in addition to Figure 3. Each unwanted drives will require a separate User Account Control authentication for uninstallation.

Pop-up Message for user confirmation	on	
IbUSBK drive installation	×	
InnoPhase's Windows tools use libUSBK driver for a FTDI devices. LibUSBK driver is not installed in this PC. If you press	ccessing s Yes, you	
will be prompted for authorization to make change require several "Yes"es. Please press Yes to proceed v installation.	s.This may vith this	
Yes	No	
n choosing "Yes", windows authentic Jser Account Control" authenticatio	ation prompt appears on Task bar. Click i n shown below, to complete the driver in	t and press "Yes" for various Istallation.
User Account Centrel X Do you want to allow this app to make changes to your device?	User Account Control × Do you want to allow this app to make changes to your device?	User Account Centrol X Do you want to allow this app to make changes to your device?
Inf catalog and signing tool Verified publisher: Travis Lee Robinson File ongin: Hard drive on this computer	Microsoft PnP Utility - Tool to add, delete, export, and enumerate driver packages. Verified publisher: Microsoft Windows	Microsoft PnP Utility - Tool to add, delete, export, and enumerate driver packages. Verified publisher: Microsoft Windows
Show more details	Show more details	Show more details
Yes No	Ves No	Yes No
op-up Message on Driver installed Su	uccessfully Pop-up Message, in	case of user choose "No"
♣r Installation Status ×	👣 Installation Status	×
Driver installed Successfully.	Driver Installation Faile	d, due to Operation cancelled by the
OK		OK

Figure 3: User Account Control authentication to complete driver installation



Figure 4: User Account Control authentication to delete unwanted Libusbk drivers



In case the driver installation using Talaria TWO Demo Tool is not successful, the user can manually install the driver using instructions in section 5.1. Uninstall instructions for this driver is available in section 12.1.



5.1 Installation instructions for libusbK driver

Download the free software Zadig, available here: - https://zadig.akeo.ie/. Connect your Windows PC or Laptop to the evaluation board using the provided USB cable. Now, open Zadig and click on Options. Select List All Devices and deselect Ignore Hubs or Composite Parents as shown in Figure 5.

🗾 Zadi	g				_		×
Device	Opt	ions Help					
	~	List All Devices		1			
InnoP		Ignore Hubs or Composite Parents				~]Edit
Driver	× ×	Create a Catalog File Sign Catalog & Install Autogenerated Certificate		÷	More I WinUSB	nformati (libusb)	on
USB II		Advanced Mode			libusb-v	vin32	
WCID	_	Log Verbosity	>	J	<u>libusbK</u> <u>WinUSB</u>	(Microsof	t)
Nonewy	ercio	n of Zadig was found				Zadio 2.5	730
NO HEW V	ersio	ii oi zaalg was toullu			4	20019 2.5	130

Figure 5: Listing devices in Zadig

To establish communication with Talaria TWO module via the FTDI device on the InnoPhase Evaluation Board, the Talaria TWO USB driver must be <code>libusbK</code>. In case the current driver is not <code>libusbK</code>, use the drop-down menu to select <code>libusbK</code> and click on <code>Replace Driver</code> which will update the drivers to <code>libusbK</code>.

Zadig	– 🗆 X
Device Options Help	
InnoPhase T2 Evaluation Board (Composite Parent)	∼ □Edit
Driver usbccgp (v10.0.19041.488)	More Information WinUSB (libusb) libusb-win32
WCID ²	<u>libusbK</u> <u>WinUSB (Microsoft)</u>
14 devices found.	Zadig 2.5.730

Figure 6: Updating Talaria TWO USB driver to libusbK



6 Block Diagram



Figure 7: Block Diagram



7 GUI

On launching the application, the GUI window as shown in Figure 8 will come into view. The connected EVKs appear in the EVK serial number drop-down and the appropriate EVK can be selected. The SSID and Passphrase will connect the EVK board to the Access Point. Once connected, as per requirement either the MPD or iPerf3 applications can be loaded by selecting the appropriate tab.

Note: In case of windows display setting "Scale and layout" is more than 125%, GUI window might go out of screen.

Depending on the user's geographical location, any one of the following Regulatory Domains can be selected:

- 1. FCC
- 2. ETSI
- 3. TELEC
- 4. KCC
- 5. SRCC

The Scan tab allows the user to actively scan for nearby access points.

AP Options	Boot Target
Set options for connecting to an access point. SSID: Passphrase: Show	Select an EVK board from the list. EVK serial number: 2021-58 V Refresh
Configure the Application Configure the Setup Parameters : ✓ Turn On deep sleep mode Select Regulatory Domain: MPD Iperf3 Different Mode Options Select Mode and Enter the Parameters Base □ Disable Multicast Beacon Listen Interval: Keepalive Interval (sec): Length: Port Number: URL: MQTT_Ping Interval (sec): MQTT ClientID: MQTT Password: PUB MSG: SUB MSG1: SUB MSG2:	Program and Reset the Device Reset CLEAR Flash PROG Ram & Start Test PROG Flash & Start Test INNOPHASE Help Default Jumper Setting
Device Connected	

Figure 8: Demo Tool GUI



When the processor is idle or is waiting for an event or data to occur or be received, turning ON the Turn On deep sleep mode feature will put Talaria TWO in a power saving mode.

Depending on their region of operation, the user can select the appropriate regulatory domain from the Select Regulatory Domain option to establish a connection between the EVK board and the access point.

Note:

- 1. While loading the MPD/Iperf3/Scan applications using this tool, the existing Partition table is validated as mentioned in section 9.1 of UG_Download_Tool.pdf [1].
- 2. PROG RAM will clear the app from Flash. The user is alerted of the same during PROG RAM through a pop-up message as shown in Figure 9. User can select the Do not show again checkbox to stop this pop-up message from appearing next time.

Set options for connecting to an access point. SSID: Passphrase:		Select an EVK board from the EVK serial number: w 2021-58 ~	list. Refresh
onfigure the Application Configure the Setup Parameters : Turn On deep sleep mode Select Reg MPD Iperf3 Scan Different Mode Options Select Mode and Enter th PROG RAM A	ulatory Domain: FCC	Program and Reset the Device Reset CLEAR Flash PROG Ram & Start T	est
Base — "PROG RAM" w Beacon Listen Interval: Keepalive Interval (sec): Length: Port Number: URL: Message_Send Interval (sec): MQTT_Ping Interval (sec):	ill clear the App from Flash. Press Yes to / again Yes	No No	SE
MQTT ClientID: MQTT Username: MQTT Password: PUB MSG:		Help Default Jumper Setti	ng

Figure 9: PROG RAM alert message



8 MPD

- 1. Enter your APs ssid and passphrase.
- 2. To automatically load the signed firmware image for MPD application, select the MPD tab as shown in Figure 10
- 3. 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.

AP Options	Boot Target
Set options for connecting to an access point.	Select an EVK board from the list.
SSID: ACT02571068294	EVK serial number:
Passphrase: *****	2021-58 ~ Refresh
Configure the Application Configure the Setup Parameters : Turn On deep sleep mode Select Regulatory Domain: FCC — MPD Iperf3 Scan	Program and Reset the Device Reset CLEAR Flash
Different Mode Options	PROG Ram & Start Test

Figure 10: MPD tab

Note: Use the Show checkbox to see the passphrase value.



- 8.1 Base Mode
 - 1. Select Base from the Select Mode and Enter the Parameters.
 - 2. Enter Beacon Listen Interval value. Failure to pass any value will result in an error.
 - 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Pa	rameters
Base 💻	Disable Multicast
Beacon Listen Interval:	10

Figure 11: Selecting Base Mode

Expected Result: Rx current (Receive current) should be observed as per the Beacon listen interval configured. If beacon listen interval is configured as 10, then Rx current should be observed every 1 second.



Console output:

UART:NWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
<pre>np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 wifi.listen_interval=10</pre>
<pre>krn.gpio=K wifi.keep_alive_wake_time=2 wifi.arp_grat_period=1800</pre>
wifi.max_idle_period=0 mpd.regdomain=FCC mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.339,335] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-45 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.444,831] MYIP 192.168.0.102
[11.445,110] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app
Timeout not specified.!
Application Exited



Going for indefinite sleep...



- 8.2 Keep Alive Mode
 - 1. Select Keep Alive from the Select Mode and Enter the Parameters.
 - 2. Enter a value for Beacon Listen Interval and Keepalive Interval (sec). Failure to pass any value will result in an error.
 - 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Pa	arameters
Keep Alive 🛁	Disable Multicast
Beacon Listen Interval:	10
Keepalive Interval (sec):	5

Figure 12: Selecting Keep Alive mode

Note: In order 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.

Expected Result: Null frame should be observed in sniffer after every <secs> seconds configured in Keepalive Interval.



Console output:

UART:NWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 mpd.proto=none
<pre>wifi.max_idle_period=5 wifi.listen_interval=10 krn.gpio=K</pre>
wifi.keep_alive_wake_time=2 wifi.arp_grat_period=0 mpd.regdomain=FCC
mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.371,389] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-52 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.288,225] MYIP 192.168.0.102
[11.288,388] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app
Timeout not specified.!



Application Exited..

Going for indefinite sleep...



8.3 TCP

- 1. Select TCP from the Select Mode and Enter the Parameters.
- 2. Enter values for Beacon Listen Interval, Length, Port Number and Message Send Interval(sec). Failure to pass any value will result in an error.
- 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Pa	rameters
тср 💴	Disable Multicast
Beacon Listen Interval:	10
Keepalive Interval (sec):	
Length:	100
Port Number:	6001
URL:	
Message_Send Interval (sec):	10

Figure 13: Selecting TCP mode

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



Console output:

UART:NWWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
<pre>np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 mpd.proto=tcp</pre>
<pre>mpd.tcp.msginterval=10 mpd.tcp.msglen=100 mpd.port=6001</pre>
<pre>wifi.listen_interval=10 krn.gpio=K wifi.keep_alive_wake_time=2</pre>
<pre>wifi.arp_grat_period=1800 wifi.max_idle_period=0 mpd.regdomain=FCC</pre>
mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.361,816] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-58 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.062,363] MYIP 192.168.0.102
[11.062,526] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app



```
Timeout not specified.!
listening socket success.. sd=0
Binding to port: 6001
bind success..
listen success...
Config:
Proto :tcp
Port :6001
Interval:10
msg len :100
Waiting for incoming connections..
Calling accept()
accept returned. newsd=1
send returned 100.
msg=Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPORSTUVWXYZABCDEFGHIJKLM
send returned 100.
msg=Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLM
send returned 100.
msg=Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLM
send returned 100.
msg=Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLM
```



send returned 100.
msg=Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLM
send returned 100.
msg=Times=6:ABCDEFGHIJKLM
send returned 100.
msg=Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL
MNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL

TCP client CMD output:

C:\Program Files (x86)\Nmap>ncat.exe 192.168.0.102 6001
Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM



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

- 1. Download and Install neat using the following link: <u>https://nmap.org/neat/</u>.
- 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.



8.4 UDP

- 1. Select UDP from the Select Mode and Enter the Parameters.
- 2. Enter values for Beacon Listen Interval, Length, Port Number and message Send Interval (sec). Failure to pass any value will result in an error.
- 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Pa	rameters
UDP 🛁	Disable Multicast
Beacon Listen Interval:	10
Keepalive Interval (sec):	
Length:	100
Port Number:	6009
URL:	
Message_Send Interval (sec):	10

Figure 14: Selecting UDP mode

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



Console output:

UART:NWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 mpd.proto=udp
<pre>mpd.udp.msginterval=10 mpd.udp.msglen=100 mpd.port=6009</pre>
<pre>wifi.listen_interval=10 krn.gpio=K wifi.keep_alive_wake_time=2</pre>
<pre>wifi.arp_grat_period=1800 wifi.max_idle_period=0 mpd.regdomain=FCC</pre>
mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.378,092] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-40 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.268,506] MYIP 192.168.0.102
[11.268,670] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app



Timeout not specified.!
UDP socket success
Conrig:
Proto :udp
Port :6009
Interval:10
msg len :100
sendto returned 100.



UDP client CMD output:

C:\Program Files (x86)\Nmap>ncat.exe -u -1 6009
Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=8:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=9:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Times=10:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Times=11:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Times=12:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Times=13:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Times=14:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Times=15:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL



Times=16:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO PQRSTUVWXYZABCDEFGHIJKL

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

- 1. Download and Install neat using the following link: <u>https://nmap.org/neat/</u>.
- 2. Open command prompt and pass command.
- 3. ncat.exe -u -l port number (from console).

Expected Result: Application sends broadcast UDP message using port number passed in boot arguments after every <interval> seconds configure in Message_Send Interval.



8.5 HTTP

- 1. Select HTTP from the Select Mode and Enter the Parameters.
- Enter Beacon listen Interval, URL, Message_Send Interval(sec).
 Failure to pass any value will result in an error.
- 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Par	rameters
HTTP 🖃	Disable Multicast
Beacon Listen Interval:	10
Keepalive Interval (sec):	
Length:	
Port Number:	
URL:	http://example.com
Message_Send Interval (sec):	10

Figure 15: Selecting HTTP mode

Expected Result: At interval configured in boot arguments in Message_Send Interval, application connects to URL, performs HTTP get and hexdumps the page.



Console output:

UART:NWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 mpd.proto=http
<pre>mpd.http.httpgetinterval=10 mpd.url=http://example.com</pre>
<pre>wifi.listen_interval=10 krn.gpio=K wifi.keep_alive_wake_time=2</pre>
<pre>wifi.arp_grat_period=1800 wifi.max_idle_period=0 mpd.regdomain=FCC</pre>
mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
url=http://example.com
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.354,238] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-41 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.071,562] MYIP 192.168.0.102
[11.071,725] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0



```
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:
1104 -----
200
Accept-Ranges: bytes
Age: 343172
Cache-Control: max-age=604800
Content-Type: text/html; charset=UTF-8
Date: Tue, 07 Sep 2021 06:39:40 GMT
Etag: "3147526947+gzip"
Expires: Tue, 14 Sep 2021 06:39:40 GMT
Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT
Server: ECS (dcb/7EC8)
Vary: Accept-Encoding
```



Х-(Cacł	ne:	HI	Г													
Content-Length: 1256																	
[APP]Body:																	
Hexdump of http data, len=1104																	
3C	21	64	6F	63	74	79	70	65	20	68	74	6D	6C	3E	0A	Ι	html .
3C	68	74	6D	6C	3E	0A	3C	68	65	61	64	3E	0A	20	20	Ι	<html>.<head>.</head></html>
20	20	3C	74	69	74	6C	65	3E	45	78	61	6D	70	6C	65	Ι	<title>Example</title>
20	44	6F	6D	61	69	6E	3C	2F	74	69	74	6C	65	3E	0A	I	Domain.
0A	20	20	20	20	3C	6D	65	74	61	20	63	68	61	72	73	Ι	. <meta chars<="" td=""/>
65	74	3D	22	75	74	66	2D	38	22	20	2F	3E	0A	20	20	Ι	et="utf-8" />.
20	20	3C	6D	65	74	61	20	68	74	74	70	2D	65	71	75	Ι	<meta http-equ<="" td=""/>
69	76	3D	22	43	6F	6E	74	65	6E	74	2D	74	79	70	65	Ι	iv="Content-type
22	20	63	6F	6E	74	65	6E	74	3D	22	74	65	78	74	2F	Ι	" content="text/
68	74	6D	6C	3в	20	63	68	61	72	73	65	74	3D	75	74	Ι	html; charset=ut
66	2D	38	22	20	2F	3E	0A	20	20	20	20	3C	6D	65	74	Ι	f-8" />. <met< td=""></met<>
61	20	6E	61	6D	65	3D	22	76	69	65	77	70	6F	72	74	Ι	a name="viewport
22	20	63	6F	6E	74	65	6E	74	3D	22	77	69	64	74	68	Ι	" content="width
3D	64	65	76	69	63	65	2D	77	69	64	74	68	2C	20	69	Ι	=device-width, i
6E	69	74	69	61	6C	2D	73	63	61	6C	65	3D	31	22	20	Ι	nitial-scale=1"
2F	3E	0A	20	20	20	20	3C	73	74	79	6C	65	20	74	79	I	/>. <style td="" ty<=""></style>



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	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	I	", "Open Sans"3C 61 20
68	72	65	66	3D	22	68	I			> <a< td=""><td>hre</td><td>ef='</td><td>'h</td><td></td><td></td><td></td><td></td></a<>	hre	ef='	' h				
74	74	70	73	ЗA	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	I	org/domains/exam
70	6C	65	22	3E	4D	6F	72	65	20	69	6E	66	6F	72	6D	I	ple">More inform
61	74	69	6F	6E	2E	2E	2E	3C	2F	61	3E	3C	2F	70	3E	I	ation
0A	3C	2F	64	69	76	3E	0A	3C	2F	62	6F	64	79	3E	0A	I	...
3C	2F	68	74	6D	6C	3E	0A									I	.
cal	Llba	ack	exi	Lt													


8.6 HTTPS

- 1. Select HTTPS from the Select Mode and Enter the Parameters.
- 2. Enter Beacon Listen Interval, URL and Message_Send Interval (sec). If no value is passed, GUI will pop-up an error message.
- 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the Pa	rameters
HTTPS 🔟	Disable Multicast
Beacon Listen Interval:	10
Keepalive Interval (sec):	
Length:	
Port Number:	
URL:	https://example.com
Message_Send Interval (sec):	10

Figure 16: Selecting HTTPS mode

Expected Result: At interval configured in Message_Send Interval, application connects to URL, performs HTTPs get and hexdumps the page.



Console output:

UART:NWWWWWAEBuild \$Id: git-ala0c3e62 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
np_conf_path=/sys/nprofile.json mpd.mcast_rx=1 mpd.proto=https
<pre>mpd.https.httpsgetinterval=10 mpd.url=https://example.com</pre>
<pre>wifi.listen_interval=10 krn.gpio=K wifi.keep_alive_wake_time=2</pre>
<pre>wifi.arp_grat_period=1800 wifi.max_idle_period=0 mpd.regdomain=FCC</pre>
mpd.suspend=1
\$App:git-ee80eec
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Enabled.
url=https://example.com
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.371,677] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-47 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.256,329] MYIP 192.168.0.102
[11.256,492] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0



```
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 . Checking input
configurations...
 . Seeding the random number generator...
  . Connecting to tcp example.com:443...
  . Setting up the SSL/TLS structure...
       >setting configurations..
       >auth mode = 0 (0- skip, 1- optional, 2- required
       >max fragment len = 0
  . Performing the SSL/TLS handshake...
ok
 . Verifying peer X.509 certificate...
[APP]HTTP Get. path=/
[APP]Response:
0 -----
```



200
Jace · 307863
Cache-Control: max-age=604800
Content-Type: text/html; charset=UTF-8
Date: Tue, 07 Sep 2021 07:05:45 GMT
Etag: "3147526947+ident"
Expires: Tue, 14 Sep 2021 07:05:45 GMT
Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT
Server: ECS (dcb/7EA3)
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 html .
3C 68 74 6D 6C 3E 0A 3C 68 65 61 64 3E 0A 20 20 <html>.<head>.</head></html>
20 20 3C 74 69 74 6C 65 3E 45 78 61 6D 70 6C 65 <title>Example</title>
20 44 6F 6D 61 69 6E 3C 2F 74 69 74 6C 65 3E 0A Domain.
OA 20 20 20 20 3C 6D 65 74 61 20 63 68 61 72 73 . <meta chars<="" td=""/>
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<="" td=""/>
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< td=""></met<>
61 20 6E 61 6D 65 3D 22 76 69 65 77 70 6F 72 74 a name="viewport



22 20 63 6	GF 6E 74 65 6	E 74 3D 22	77 69 64 74 68	" content="width
3D 64 65 7	6 69 63 65 2	D 77 69 64	74 68 2C 20 69	=device-width, i
6E 69 74 6	59 61 6C 2D 7	3 63 61 6C	65 3D 31 22 20	nitial-scale=1"
2F 3E 0A 2	20 20 20 20 3	C 73 74 79	6C 65 20 74 79	/>. <style td="" ty<=""></style>



2D	72	61	64	69	75	73	3A	20	30	2E	35	65	6D	3в	0A		-radius: 0.5em;.
20	20	20	20	20	20	20	20	62	6F	78	2D	73	68	61	64	Ι	box-shad
6F	77	3A	20	32	70	78	20	33	70	78	20	37	70	78	20	Ι	ow: 2px 3px 7px
32	70	78	20	72	67	62	61	28	30	2C	30	2C	30	2C	30	Ι	2px rgba(0,0,0,0
2E	30	32	29	3в	0A	20	20	20	20	7D	0A	20	20	20	20	Ι	.02);. }.
61	3A	6C	69	6E	6B	2C	20	61	3A	76	69	73	69	74	65	Ι	a:link, a:visite
64	20	7B	0A	20	20	20	20	20	20	20	20	63	6F	6C	6F	Ι	d {. colo
72	ЗA	20	23	33	38	34	38	38	66			>Th					
69	73	20	64	6F	6D	61	69	6E	20	69	73	20	66	6F	72	Ι	is domain is for
20	75	73	65	20	69	6E	20	69	6C	6C	75	73	74	72	61	Ι	use in illustra
74	69	76	65	20	65	78	61	6D	70	6C	65	73	20	69	6E	Ι	tive examples in
20	64	6F	63	75	6D	65	6E	74	73	2E	20	59	6F	75	20	Ι	documents. You
6D	61	79	20	75	73	65	20	74	68	69	73	0A	20	20	20	Ι	may use this.
20	64	6F	6D	61	69	6E	20	69	6E	20	6C	69	74	65	72	Ι	domain in liter
61	74	75	72	65	20	77	69	74	68	6F	75	74	20	70	72	Ι	ature without pr
69	6F	72	20	63	6F	6F	72	64	69	6E	61	74	69	6F	6E	Ι	ior coordination
20	6F	72	20	61	73	6B	69	6E	67	20	66	6F	72	20	70	Ι	or asking for p
65	72	6D	69	73	73	69	6F	6E	2E	3C	2F	70	ЗE	0A	20	Ι	ermission
20	20	20	3C	70	3E	3C	61	20	68	72	65	66	3D	22	68	Ι	<a href="h</td></tr><tr><td>74</td><td>74</td><td>70</td><td>73</td><td>ЗA</td><td>2F</td><td>2F</td><td>77</td><td>77</td><td>77</td><td>2E</td><td>69</td><td>61</td><td>6E</td><td>61</td><td>2E</td><td>Ι</td><td>ttps://www.iana.</td></tr><tr><td>6F</td><td>72</td><td>67</td><td>2F</td><td>64</td><td>6F</td><td>6D</td><td>61</td><td>69</td><td>6E</td><td>73</td><td>2F</td><td>65</td><td>78</td><td>61</td><td>6D</td><td>Ι</td><td>org/domains/exam</td></tr><tr><td>70</td><td>6C</td><td>65</td><td>22</td><td>3E</td><td>4D</td><td>6F</td><td>72</td><td>65</td><td>20</td><td>69</td><td>6E</td><td>66</td><td>6F</td><td>72</td><td>6D</td><td>Ι</td><td>ple">More inform
61	74	69	6F	6E	2E	2E	2E	3C	2F	61	3E	3C	2F	70	3E	Ι	ation
0A	3C	2F	64	69	76	3E	0A	3C	2F	62	6F	64	79	3E	0A	Ι	...
3C	2F	68	74	6D	6C	3E	0A									Ι	.
[A	PP]S	Suco	cess	s: 1	nttp	p_c.	lien	t_ge	et()), 1	rval	L =	2				
ht	tp_s	send	d_ke	eepa	aliv	ve:	time	es=2	2								



```
[APP]Calling http client open(). http cmn ctx.cfg.port=443 . Checking input
configurations...
  . Seeding the random number generator...
  . Connecting to tcp example.com:443...
  . Setting up the SSL/TLS structure...
       >setting configurations..
       >auth mode = 0 (0- skip, 1- optional, 2- required
       >max fragment len = 0
  . Performing the SSL/TLS handshake...
ok
 . Verifying peer X.509 certificate...
[APP]HTTP Get. path=/
[APP]Response:
0 -----
200
Age: 576088
Cache-Control: max-age=604800
Content-Type: text/html; charset=UTF-8
Date: Tue, 07 Sep 2021 07:06:08 GMT
Etag: "3147526947+gzip+ident"
Expires: Tue, 14 Sep 2021 07:06:08 GMT
Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT
Server: ECS (dcb/7F60)
Vary: Accept-Encoding
```



X-Cache: HIT Content-Length: 1256 [APP]Body: Hexdump of http data, len=0 Hexdump of http data, len=1256



8.7 MQTT

- 1. Select MQTT from Select Mode and Enter the Parameters.
- 2. Enter Beacon Listen Interval, Port number, URL, Message_Send Interval(sec), MQTT_Ping Interval(secs), MQTT ClientID, MQTT Username, MQTT Password, PUB MSG, SUB MSG1 and SUB MSG2. Failure to pass any value will result in an error.
- 3. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

ipens sean		
Different Mode Options		1
Select Mode and Enter the Par	rameters	
MQTT 🛁	🗆 Disable Multicast	
Beacon Listen Interval:	10	
Keepalive Interval (sec):		
Length:		
Port Number:	1883	
URL:	http://test.mosquitto.org	
Message_Send Interval (sec):	15	
MQTT_Ping Interval (sec):	25	
MQTT ClientID:	T2_TALARIA	
MQTT Username:	t2_user	
MQTT Password:	t2_pass	
PUB MSG:	PUBMSG	
SUB MSG1:	SUBMSG1	
SUB MSG2:	SUBMSG2	

Figure 17: Selecting MQTT mode

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

1. To Publish:

mosquitto_sub.exe -d -v -h test.mosquitto.org -t PUBMSG

2. To Subscribe:

mosquitto_pub.exe -d -h test.mosquitto.org -t SUBMSG1 -m "msg1"

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



MQTT - Command Prompt Output (Subscribe message):

```
C:\Program Files\Mosquitto>mosquitto_pub.exe -d -h test.mosquitto.org -t

SUBMSG1 -m "msg1"

Client (null) sending CONNECT

Client (null) received CONNACK (0)

Client (null) sending PUBLISH (d0, q0, r0, m1, 'SUBMSG1', ... (4 bytes))

Client (null) sending DISCONNECT
```

MQTT - Command Prompt Output (Publish message):

```
C:\Program Files\Mosquitto>mosquitto sub.exe -d -v -h test.mosquitto.org -t
PUBMSG
Client (null) sending CONNECT
Client (null) received CONNACK (0)
Client (null) sending SUBSCRIBE (Mid: 1, Topic: PUBMSG, QoS: 0, Options:
0x00)
Client (null) received SUBACK
Subscribed (mid: 1): 0
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
```



```
PUBMSG
Times=8:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=9:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=10:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=11:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKL
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=0:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
ORSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=1:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=2:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
```



```
PUBMSG
Times=3:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=4:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=5:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=6:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=7:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
ORSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=8:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
PUBMSG
Times=9:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOP
QRSTUVWXYZABCDEFGHIJKLM
Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes))
```



PUBMSG Times=10:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO PQRSTUVWXYZABCDEFGHIJKL Client (null) received PUBLISH (d0, q0, r0, m0, 'PUBMSG', ... (99 bytes)) PUBMSG Times=11:ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNO PQRSTUVWXYZABCDEFGHIJKL Client (null) 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-b664be2af $
mpd.mcast rx=1 mpd.proto=mqtt mpd.port=1883 mpd.mqtt.publishinterval=15
mpd.url=http://test.mosquitto.org 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=25 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=/sys/nprofile.json
mpd.ssid=innotest mpd.passphrase=innophase123
$App:git-6e423223
SDK Ver: SDK 2.4
T2 Multipurpose Demp App Version 0.12
network profile parse success.
Suspend Enabled.
Multicast reception Enabled.
url=http://test.mosquitto.org
```



```
Regdomain=FCC
addr f0:43:87:b0:1c:46
Applying reg domain: 1-11020
Connecting to network
.[0.890,493] CONNECT:84:d8:1b:b3:6a:92 Channel:7 rssi:-70 dBm
WCM NOTIFY MSG LINK UP
..WCM NOTIFY MSG ADDRESS
[2.685,737] MYIP 192.168.0.33
[2.685,785] IPv6 [fe80::f243:87ff:feb0:1c46]-link
Listen interval=10
Traffic Timeout=12
pm flags=0x0
WiFi Connection success. proceeding to app..
Timeout not specified.!
url=http://test.mosquitto.org/ hostname=test.mosquitto.org, port=1883,
page=/
starting mqtt.. Ping interval=25 Secs
Connect success. Returning :0
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:15
msg len :100
mqtt_loop entry
publish data, value=1, interval=15Secs
publish data, value=2, interval=15Secs
_mqtt_cycle : packet_type = 13publish_data, value=3, interval=15Secs
publish data, value=4, interval=15Secs
mqtt cycle : packet type = 13publish data, value=5, interval=15Secs
publish data, value=6, interval=15Secs
mqtt cycle : packet type = 13publish data, value=7, interval=15Secs
publish data, value=8, interval=15Secs
_mqtt_cycle : packet_type = 13publish_data, value=9, interval=15Secs
publish data, value=10, interval=15Secs
mqtt cycle : packet type = 13publish data, value=11, interval=15Secs
publish data, value=0, interval=15Secs
mqtt cycle : packet type = 13publish data, value=1, interval=15Secs
publish data, value=2, interval=15Secs
_mqtt_cycle : packet_type = 13publish_data, value=3, interval=15Secs
_mqtt_cycle : packet_type = 3messageArrived: SUBMSG1 msg1
```



```
publish_data, value=4, interval=15Secs
publish_data, value=5, interval=15Secs
_mqtt_cycle : packet_type = 13publish_data, value=6, interval=15Secs
publish_data, value=7, interval=15Secs
```

Expected Result: App connects to MQTT broker. At Message_Send Interval configured, application does an MQTT publish with topic <PUBMSG> and subscribe with topic <SUBMSG>



8.8 Multicast Reception OFF GRAT ARP OFF

- 1. Select Base mode from the Select Mode and Enter the Parameters.
- 2. Select the Disable Multicast option.
- 3. Enter Beacon Listen Interval value. Failure to pass any value will result in an error.
- 4. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD Iperf3 Scan	
Different Mode Options	
Select Mode and Enter the P	arameters
Base 😐	✓ Disable Multicast
Beacon Listen Interval:	10

Figure 18: Selecting Multicast Reception OFF GRAT ARP OFF



Console output:

UART:NWWWWWAEBuild \$Id: git-f92bee540 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
<pre>np_conf_path=/sys/nprofile.json mpd.mcast_rx=0 wifi.listen_interval=10</pre>
<pre>krn.gpio=K wifi.keep_alive_wake_time=2 wifi.arp_grat_period=1800</pre>
wifi.max_idle_period=0 mpd.regdomain=FCC mpd.suspend=1
\$App:git-dc89330
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.441,264] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-53 dBm
WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[11.182,218] MYIP 192.168.0.102
[11.182,380] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app
Timeout not specified.!
Application Exited



Going for indefinite sleep...

Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help Normal Help No		File Edit View Go Ca Can Can Can Can Can Can Can Can Can Can				- 0
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endodi [hugdi [hugdi<	Direct Data Destination Protocol Langle Protocol Protocol </th <th>ile Edit View Go Ca</th> <th>pture Analyze Statistics</th> <th>Telephony Wireless Tools</th> <th>Hep</th> <th>60 - 1111</th>	ile Edit View Go Ca	pture Analyze Statistics	Telephony Wireless Tools	Hep	60 - 1111
22.108.4.104 1079 74 Echo (ping) request id=00001, seq=05/1800, tt=128 (req)y in 2000) condicat AMP 42 Hone has 120; 126: 43.104 Fit 112: 21.168.43.66 condicat AMP 42 Hone has 120; 126: 43.104 Fit 112: 21.168.43.66 condicat AMP 42 Hone has 120; 126: 43.104 Fit 112: 21.168.43.66 condicat AMP 42 Hone has 120; 126: 43.104 Fit 112: 21.168.43.66 12.108.43.104 UMP 42 Hone has 120; 126: 43.104 Fit 112: 21.168.43.66 12.108.43.104 UMP 74 Echo (ping) request id=00011, seq=0.5/1800, tt=128 (request in 1988) 12.108.43.104 UMP 74 Echo (ping) request id=00001, seq=0.5/1800, tt=128 (request in 2001) 12.108.43.104 UMP 74 Echo (ping) request id=00001, seq=0.1/4803, tt=255 (request in 2001) 12.108.43.104 UMP 74 Echo (ping) request id=00001, seq=0.1/4803, tt=255 (request in 2001) 12.108.43.104 UMP 74 Echo (ping) request id=00001, seq=0.1/4803, tt=255 (request in 2004) 12.108.43.104 UMP 74 Echo (ping) request id=0.0001, seq=0.1/4803, tt=255 (request in 2004) 12.108.43.104 UMP 74 Echo (ping) request id=0.0001, seq=0.1/4803, tt=255 (request in 2004) 12.108.43.104 UMP 74 Echo (ping) re	1988 222, 289310 192, 168, 43, 104 1079 74 fcho (ping) repust id-00001, seci-1/5480, ftl-128 (reply in 2000) 1988 223, 948833 Aureelwy 0f10773 Immophas, 0012; is deradata AP 42 blo has 212, 168, 43, 104 1192, 168, 43, 104 1998 223, 948833 Aureelwy 0f10773 Immophas, 0012; is deradata AP 42 blo has 212, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 43, 104 1192, 168, 1020 1102, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122, 1122	iarpilionp o. Time	Source	Destination	Protocol Lendh Info	
APP 42 Who has 129_168.43,1044 7 [cll 129_168,43.6 Omphs_002:2:5: APP 42 Juno has 129_168.43,1044 at 776:65:55:F07:73 Description Display Display Display Display 2.108.4.104 IOP 74 Echo (ping) reputs id=00001, seq=15/3480, ttl-255 (request in 1988) 2.108.4.104 IOP 74 Echo (ping) reputs id=00001, seq=16/4966, ttl-255 (request in 2001) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=16/4966, ttl-255 (request in 2001) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=17/4552, ttl-255 (request in 2001) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=17/4552, ttl-255 (request in 2001) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=17/4552, ttl-255 (request in 2014) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=17/4552, ttl-255 (request in 2014) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=17/4552, ttl-255 (request in 2014) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=13/4648, ttl-255 (request in 2014) 2.108.4.104 IOP 74 Echo (ping) reputs id=000001, seq=13/4648, ttl-255 (request in 2014) 2.108.4.104 IOP 74 Ech	1998 223.948809 Innephas_00:2:::: Revaluation AMP 42 Mon has 192.164.3,104 Tell 192.168.4.3,04 1998 223.948809 Innephas_00:2:::: Revaluation Revaluation Revaluation Revaluation 2000 223.954240 102.164.4.104 1079 74 (cbo (ping) reput) 16-00001, secal/3/848, t1-1255 (request in 1988) 2000 223.954240 102.164.4.104 1079 74 (cbo (ping) reput) 16-00001, secal/3/848, t1-1255 (request in 1988) 2000 223.954260 102.164.4.104 1079 74 (cbo (ping) reput) 16-00001, secal/3/848, t1-1255 (request in 1988) 2000 223.95607 103.164.4.3.104 102.166.4.3.104 102.166.4.3.104 102.166.4.3.104 2000 224.956507 102.168.4.3.104 102.166.4.3.104 102.166.4.3.104 1079 74 (cbo (ping) request in 400001, secal/3/483, t1-1255 (request in 2020) 2000 226.001302 102.166.4.3.104 102.166.4.3.104 1079 74 (cbo (ping) request in 400001, secal/3/483, t1-1255 (request in 2020) 2000 226.001302 102.166.4.3.104 102.166.4.3.104 1079 74 (cbo (ping) request in 4000001, secal/3/483, t1-1255 (request in 2020) 2000 226.001302 102.166.4.3.104 102.166.4.3.104 102.166.4.3.104 102.166.4.3.104		192.168.43.104	192.168.43.60	ICMP 74 Echo (ping) request id=0x0001, seq=15/3840, ttl=128 (reply in 2000)	
12.16.8.104 1079 74 Echo (ping) reply 16.4.00001, scq-35/1806, tl-255 (request in 1988) 22.16.8.104 1079 74 Echo (ping) request id-80001, scq-35/1806, tl-255 (request in 2002) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-15/4806, tl-255 (request in 2002) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-15/4806, tl-255 (request in 2001) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-15/4856, tl-1255 (request in 2012) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-17/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-17/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-17/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-11/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-11/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-11/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-11/452, tl-1255 (request in 2014) 12.16.8.104 1079 74 Echo (ping) request id-80001, scq-11/452, tl-1255 (requ	2000 221, 9552.0 Acc. 186, 91, 60 201, 216, 216, 43, 164 100 4124, 100, 101, 101, 101, 101, 102, 104, 104 2000 221, 2552.0 121, 216, 21, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 2001 221, 231, 2550.0 121, 216, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 2001 221, 231, 2550.0 121, 216, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 2001 222, 231, 2550.0 121, 104, 21, 104 122, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 2002 225, 97122 122, 104, 21, 104 122, 104, 21, 104 122, 104, 21, 104 121, 104, 21, 104 121, 104, 21, 104 2002 225, 97122 122, 104, 21, 104 122, 104, 21, 104 120, 104, 21, 104 121, 104, 21, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104 122, 104, 104	1988 222.898319		Broadcast	ARP 42 Who has 192.168.43.104? Tell 192.168.43.60	
22.168.4.36 TOP 74 Echo (ging) request id=00001, seq=16/4056, tl=128 (reql) in 2002) 22.168.4.36 TOP 74 Echo (ging) request id=00001, seq=16/4056, tl=255 (request in 2001) 72.168.4.36 TOP 74 Echo (ging) request id=00001, seq=17/4352, tl=255 (request in 2001) 72.168.4.36 TOP 74 Echo (ging) request id=00001, seq=17/4352, tl=255 (request in 2014) 72.168.4.36 TOP 74 Echo (ging) request id=00001, seq=17/4352, tl=255 (request in 2014) 72.168.4.36 TOP 74 Echo (ging) request id=00001, seq=17/4352, tl=255 (request in 2014) 72.168.4.36 TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2014) 72.168.4.37 TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2019) monbus point: TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2019) monbus point: TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2019) monbus point: TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2019) monbus point: TOP 74 Echo (ging) request id=00001, seq=13/4648, tl=255 (request in 2019) monbus point: TOP 74 Echo (ging) req=100 Ecicit merken pf:07:73	2001 222.357802 102.168.43.104 109.168.43.06 109 77 6 cho (ping) request id-000001, seq-16/4096, ttl-236 (reqly in 2002) 2001 222.357802 102.168.43.104 192.168.43.104 197 74 cho (ping) request id-000001, seq-16/4096, ttl-236 (reqly in 2010) 2001 222.357802 102.168.43.104 197.168.43.104 109 74 cho (ping) request id-000001, seq-16/4096, ttl-236 (reqly in 2010) 2001 222.357802 102.168.43.104 197.168.43.104 109 74 cho (ping) request id-000001, seq-17/4357, ttl-236 (request in 2010) 2002 225.57917 102.168.43.104 197.168.43.104 197.168.43.104 197.168.43.104 2002 225.57917 102.168.43.104 197.168.43.104 197.168.43.104 197.168.400001, seq-17/4357, ttl-236 (request in 2010) 2002 228.040402 10000000, seq-13/458.20 109 74 cho (ping) request id-000001, seq-13/4600001, ttl-236 (reqly in 2030) 2002 228.040402 1000000, seq-13/458.20 1000000000000000000000000000000000000	1988 222.898319 1998 223.948869	Innophas_00:2c:3c	Terreberg 00-22-	ASP 92.192.108.43.109.15 at /0:00:00:01:0/:/3	
22.136.43.04 1009 74 Exbo (simp) (red), seq-77.482, tit.1228 (red), in 2030) 22.136.43.04 1009 74 Exbo (simp) (red), seq-77.482, tit.1228 (red), in 2030) 22.136.43.04 1009 74 Exbo (simp) (red), seq-77.482, tit.1228 (red), in 2030) 22.136.43.04 1009 74 Exbo (simp) (red), seq-77.482, tit.1228 (red), in 2030) 23.136.43.04 1009 74 Exbo (simp) (red), seq-17.482, tit.1228 (red), in 2030) 23.136.43.04 1009 74 Exbo (simp) (red), seq-17.483, tit.252 (red), in 2030) 23.136.43.04 1009 74 Exbo (simp) (red), seq-17.483, tit.252 (red), in 2030) venicus, 96-07.73 ABP 42 Uxb (ss 12).168.43.047 Fill 192.168.43.1 venicus, 96-07.73 ABP 42 Uxb (ss 12).168.43.047 Fill 192.168.43.1 venicus, 96+07.73 ABP 42 Uxb (ss 12).168.43.047 Fill 192.168.47.1	2012 225,00527 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104 102.168.4.104	1988 222.898319 1998 223.948869 1999 223.948883 2000 223.954246	Innophas_00:2c:3c AzureWav_0f:07:73 192.168.43.60	Innophas_00:2c:3c 192.168.43.104	ICMP 74 Echo (ping) reply id=0x0001, seq=15/3840, ttl=255 (request in 1988)	
22.168.1.04 IOP 74 Ecbo (ging) reply id=000001, seq=17/432, tll=255 (request in 2014) 22.168.1.04 IOP 74 Ecbo (ging) reply id=000001, seq=13/468, tll=28 (reply in 2039) 12.168.1.104 IOP 74 Ecbo (ging) reply id=000001, seq=13/468, tll=28 (reply in 2039) 12.168.1.104 IOP 74 Ecbo (ging) reply id=000001, seq=13/468, tll=255 (request in 2029) 12.168.1.104 IOP 74 Ecbo (ging) reply id=000001, seq=13/468, tll=255 (request in 2029) 1000bs_0012:c2:0 APP 42 192.108.1.364 is at e0:09.1:e0002:c2:0 1000bs_0012:c2:0 APP 42 192.108.1.364 is at e0:09.1:e0002:c2:0 1000bs_0012:c2:0 APP 42 100 hos hs 20.1.663,1.040	2028 225:09722 192.168.43.60 10/P 74 Echo (ing) reput id-00001, seq-17/4556, t1L-25 (request in 2014) 2028 225:09722 192.168.43.64 192.168.43.66 10/P 74 Echo (ing) reput id-00001, seq-17/4556, t1L-25 (request in 2014) 2028 225:00123 192.168.43.64 192.168.43.64 10/P 74 Echo (ing) reput id-00001, seq-13/4668, t1L-25 (request in 2014) 2028 225:00123 192.168.43.64 10/P 74 Echo (ing) reput id-00001, seq-13/4668, t1L-25 (request in 2014) 2040 225:00057 192.168.43.104 10/P 74 Echo (ing) reput id-00001, seq-13/4668, t1L-25 (request in 2014) 2040 223:00057 Aurrelaw, 9f:07:73 Imrophas, 90:2:1c 42 Moh has 12:2.168.43.69 (Tel 192.168.43.104 2040 235:00057 Aurrelaw, 9f:07:73 APP 42 Moh has 12:2.168.43.104 24 Moh has 12:2.168.43.104 2052 255:00057 Aurrelaw, 9f:07:73 APP 42 Moh has 12:2.168.43.104 24 Moh has 12:2.168.43.104 2052 255:00057 Aurrelaw, 9f:07:73 APP 42 Moh has 12:2.168.43.104 24 Moh has 12:2.168.43.104 2052 255:00057 Aurrelaw, 9f:07:73 APP 42 Moh has 12:2.168.43.104 24 Moh has 12:2.168.43.104 2052 255:00057 Aurrelaw, 9f:07:73 APP 42 Moh has 12:2.168.43.104 24 Mo	1988 222.898319 1998 223.948869 1999 223.948883 2000 223.954246 2001 223.957082	Innophas_00:2c:3c AzureWav_0f:07:73 192.168.43.60 192.168.43.104	Innophas_00:2c:3c 192.168.43.104 192.168.43.60	ICMP 74 Echo (ping) reply id=0x0001, seq=15/3840, ttl=255 (request in 1988) ICMP 74 Echo (ping) request id=0x0001, seq=16/4006, ttl=128 (reply in 2002) ICMP 74 Echo (ping) request id=0x0001, seq=16/4006, ttl=128 (reply in 2002)	
92.108.43.100 100P 74 EL00 (July Teldes, Linkowski, Stark, Stark	200 225,00057 102.108.41.60 105.108.41.108 1059 74 cbs (bing) resp) 160-0001 served rat/24608 (t1-25) (resp) in 9009) 200 225,00057 Aurosky effort?3 Imonga gen 22:158.43.04 1059 74 cbs (bing) resp) 160-0001 served rat/24608 (t1-25) (resp) in 9009) 200 225,00057 Aurosky effort?3 Imonga gen 22:158.43.04 1059 74 cbs (bing) resp) 160-0001 served rat/24608 (t1-25) (resp)	1988 222.898319 1998 223.948869 1999 223.948883 2000 223.954246 2001 223.957082 2002 223.957082 2002 223.959046 2014 224.965627	Innophas_00:2c:3c AzureWav_0f:07:73 192.168.43.60 192.168.43.104 192.168.43.60 192.168.43.104	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.104 192.168.43.60	1009 74 Echo (ping) reply id=0-00001, seq=1/5/1840, tll=255 (request in 1983) 1009 74 Echo (ping) request id=0-0001, seq=1/6/4006, tll=252 (reqly in 2002) 1009 74 Echo (ping) reply id=0-0001, seq=1/6/4006, tll=255 (request in 2002) 1009 74 Echo (ping) reply id=0-0001, seq=1/6/4006, tll=252 (request in 2002) 1009 74 Echo (ping) reply id=0-0001, seq=1/7432, tll=122 (reply in 2028)	
monphas_00=27:3: APP 42 like hass 192,168.4.3.60? Tell 192,168.4.31 runnelaw_0f=0777 APP 42 like hass 192,168.4.3.60? Tell 192,168.4.31 runnelaw_0f=07773 APP 42 like hass 192,168.4.3.60? Tell 192,168.4.31 runnelaw_0f=07773 APP 42 like hass 192,168.4.3.104	207 227, 208581 Aurrelaw, 9f: 67:73 Immophas, 90:2c:3: Apr 42 Mor bas 120, 168, 43, 60? Tell 129, 108, 108 206 227, 80861 Aurrelaw, 9f: 67:73 Mor bas 120, 168, 43, 60? Tell 129, 126, 43, 104 41 92, 168, 43, 60? Tell 129, 126, 43, 104 206 225, 808052 Mor bas 129, 168, 43, 104 Fell 129, 126, 43, 104 41 92, 168, 43, 104 206 225, 808054 Mor bas 129, 168, 43, 104 Fell 129, 126, 43, 104 41 92, 168, 43, 104 206 225, 808054 Mor bas 129, 168, 43, 104 Fell 129, 126, 126, 126, 126, 126, 126, 126, 126	1988 222.898319 1998 223.948869 1999 223.948883 2000 223.954246 2001 223.957082 2002 223.957082 2002 223.959046 2014 224.965627 2028 225.997122	Innophas_00:2c:3c AzureWay_0f:07:73 192.168.43.60 192.168.43.104 192.168.43.00 192.168.43.00	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.104 192.168.43.104 192.168.43.104	1009 74 Echo (ping) venly id=0.00001, seq=15/1840, ttl=255 (request in 1988) 1009 74 Echo (ping) venly id=0.0001, seq=16/4006, ttl=212 (request in 2002) 1019 74 Echo (ping) venly id=0.0001, seq=16/4006, ttl=255 (request in 2002) 1029 74 Echo (ping) request id=0.0001, seq=16/4006, ttl=255 (request in 2001) 1029 74 Echo (ping) request id=0.0001, seq=16/4056, ttl=225 (request in 2014) 1029 74 Echo (ping) reqly id=0.0001, seq=17/4352, ttl=225 (request in 2014)	
Turneway of 107 / 3 ABP 42 JV2.108.43.000 15 at 1001 / 21.30 TurneWay of 107 / 3 ABP 42 JW2.108.43.000 15 at 1001 / 21.108.43.1 through br 2-dr ad ABP 43 102 108 43 104 5 tr 21 of 105.55 of 407 73	Z000 Z230.00001 Z001 Z230.00001 Z000 Z230.000001 Z000 Z230.00001 Z000 Z230	1988 222.898319 1998 223.948869 1999 223.948869 2000 223.954246 2001 223.957882 2002 223.9559846 2014 224.965627 2028 225.997122 2029 226.004579	Innophas_00:2c:3c AzureWav_0f:07:73 192.168.43.60 192.168.43.60 192.168.43.104 192.168.43.60 192.168.43.60 192.168.43.104 192.168.43.00	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.104 192.168.43.104 192.168.43.104 192.168.43.60 192.168.43.104	10P 74 Echo (ping) reply id=000001, seq=15/1840, ttl=255 (request in 1983) 10P 74 Echo (ping) request id=000001, seq=15/1840, ttl=255 (request in 2001) 10P 74 Echo (ping) request id=000001, seq=15/1840, ttl=255 (request in 2001) 10P 74 Echo (ping) request id=000001, seq=15/1840, ttl=255 (request in 2001) 10P 74 Echo (ping) request id=000001, seq=17/4352, ttl=255 (request in 2001) 10P 74 Echo (ping) request id=000001, seq=17/4352, ttl=255 (request in 2014) 10P 74 Echo (ping) request id=000001, seq=13/4688, ttl=255 (request in 2014) 10P 74 Echo (ping) request id=000001, seq=13/4688, ttl=255 (request in 2014) 10P 74 Echo (ping) request id=000001, seq=13/4688, ttl=255 (request in 2024)	
storola h7-2d-ad ARP 42 192 168 43 104 is at 70-66-55-06-07-73	2002 225,000071 Aureniew, 9f:07:73 Potrocla, D7:26: 44 APP 42 192.168.43.104 1is at 70:66:55:0f:07:73 75:000 75: 42 Mytes on wire (136 bits), 42 Bytes captured (136 bits) April 10:000 75:000074A-44E3-40A3-ADTG-842A06667056), id 0 001 06 00 00 00 00 00 00 00 00 00 00 00 00	1988 222.988319 1998 223.948869 1999 223.948883 2000 223.954246 2001 223.957082 2002 223.959046 2014 224.965627 2028 225.997122 2029 226.001302 2030 226.004579 2047 227.908881	Innophas_00;2c:3c Azureklav @f:07:73 192.168.43.60 192.168.43.104 192.168.43.104 192.168.43.104 192.168.43.60 192.168.43.60 Azureklav_0f:07:73	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.104 Innophas_00:2c:3c	1009 74 Echo (ping) reply id=0-00001, seq=15/1840, tl=255 (request in 1983) 1009 74 Echo (ping) repust id=0-0001, seq=15/4046, tl=226 (reply in 2002) 1009 74 Echo (ping) repust id=0-0001, seq=15/4046, tl=226 (reply in 2002) 1009 74 Echo (ping) repust id=0-0001, seq=15/4046, tl=226 (reply in 2002) 1009 74 Echo (ping) repust id=0-0001, seq=17/4352, tl=226 (reply in 2028) 1009 74 Echo (ping) repust id=0-00001, seq=17/4352, tl=225 (request in 2014) 1009 74 Echo (ping) repust id=0-00001, seq=13/4646, tl=226 (reply in 2030) 1009 74 Echo (ping) repust id=0-00001, seq=13/4646, tl=226 (reply in 2030) 1009 74 Echo (ping) repust id=0-00001, seq=13/4646, tl=226 (reply in 2030) 1009 74 Echo (ping) repust id=0-00001, seq=13/4646, tl=226 (reply in 2030) 1009 74 Echo (ping) repust id=0-00001, seq=13/4646, tl=255 (request in 2029) 200 74 Echo (ping) reply id=0-00001, seq=13/4646, tl=255 (request in 2029) 200 74 Echo (ping) reply id=0-00001, seq=13/4646, tl=255 (request in 2029)	
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Frame 13: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\WPF_(508406EAA-44E3-48A3-A7E6-842406E67856), id 0 00 Fff ff ff ff ff 60 3a 08 2z 3z 08 66 00 01 01 00 60 00 01 et 60 33 a0 02 z3 z 08 66 00 01 02 00 00 00 00 et et 60 3a 00 7z 3z 08 82 b3 z 02 00 00 00 00 00 et et 63 3a 02 z z 00 a8 2b 3z 03 00 00 00 00 00 et et 63 3a 02 z z 00 a8 2b 3z	1988 222.898319 1998 223.948869 1999 223.948869 2001 223.957482 2001 223.957482 2002 223.957482 2014 224.965627 2028 225.997122 2029 226.0401392 2030 226.045379 2047 227.908681 2049 228.044842 2061 235.806524	Innophas_00:2c:3c Azureklav_0f:07:73 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.104 192.168.43.60 192.168.43.60 Azureklav_0f:07:73 Innophas_00:2c:3c	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.104 192.168.43.104 Innophas_00:2c:3c Azurekay_0f:07:73 Azurekay_0f:07:73	1009 74 Echo (ping) reply id-0-00001, seq-15/1840, tl-255 (request in 1883) 1009 74 Echo (ping) reply id-0-00001, seq-15/4064, tl-252 (request in 2002) 1009 74 Echo (ping) reply id-0-00001, seq-15/4064, tl-252 (request in 2002) 1009 74 Echo (ping) reply id-0-00001, seq-15/4064, tl-252 (request in 2002) 1009 74 Echo (ping) reply id-0-00001, seq-17/4352, tl-252 (request in 2013) 1009 74 Echo (ping) reply id-0-00001, seq-17/4352, tl-1252 (request in 2014) 1009 74 Echo (ping) reply id-0-00001, seq-17/4352, tl-1252 (request in 2014) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-1252 (request in 2014) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-1252 (request in 2014) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-00001, seq-13/4664, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-00001, seq-13/4674, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-00001, seq-13/4674, tl-255 (request in 2029) 1009 74 Echo (ping) reply id-0-0000000000000000000000000000000000	
Vts captured (356 bits) on interface \Device\UPF_(SDB/064A-44E)-40A3-A7E6-842A005657056), id 0 06 00 01 :		1988 222.898319 1998 223.948869 1999 223.948869 2001 223.954246 2001 223.957082 2002 223.957082 2002 223.959046 2014 224.965627 2028 225.997122 2029 225.0901302	Innophas_00:2c:3c AzureWav_0f:07:73 192.168.43.60 192.168.43.104 192.168.43.104 192.168.43.104 192.168.43.00 192.168.43.104	Innophas_00:2c:3c 192.168.43.104 192.168.43.60 192.168.43.60 192.168.43.60 192.168.43.104 192.168.43.104	1009 74 Echo (ping) reply id=0-00001, seq=15/1840, tll=255 (request in 1988) 1009 74 Echo (ping) request id=0-0001, seq=0.4(A406, tll=255 (request in 2002) 1019 74 Echo (ping) request id=0-0001, seq=0.4(A406, tll=255 (request in 2002) 1019 74 Echo (ping) request id=0-0001, seq=0.4(A406, tll=255 (request in 2002) 1019 74 Echo (ping) request id=0-0001, seq=0.4(A456, tll=255 (request in 2023) 1019 74 Echo (ping) request id=0-0001, seq=0.4(A455, tll=255 (request in 2024) 1019 74 Echo (ping) request id=0.0001, seq=0.4(A455, tll=255 (request in 2014) 1019 74 Echo (ping) request id=0.0001, seq=0.4(A455, tll=255 (request in 2014) 1019 74 Echo (ping) request id=0.00046, seq=0.4(A455, tll=255 (request in 2014) 1019 74 Echo (ping) request id=0.00046, seq=0.4(A455, tll=256 (request in 2014)	
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Figure 19: Multicast Reception OFF GRAT ARP OFF - Wireshark



CMD output:

```
C:\WINDOWS\system32>ping 192.168.0.104
Pinging 192.168.0.104 with 32 bytes of data:
Reply from 192.168.0.104: bytes=32 time=1546ms TTL=255
Reply from 192.168.0.104: bytes=32 time=7ms TTL=255
Reply from 192.168.0.104: bytes=32 time=16ms TTL=255
Ping statistics for 192.168.0.104:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 7ms, Maximum = 1546ms, Average = 660ms
```

Expected Result: Ping the IP address which can be found from the console window. Talaria TWO connects to the AP. When PC tries to ping, ARP does not pass as the Multicast ARP at Talaria TWO is turned off. However, after some time, ARP goes through and the ping is executed.

Note: Wireshark can be downloaded from the following link: <u>https://www.wireshark.org/.</u>



8.9 Multicast Reception OFF GRAT ARP ON

- 1. Select Multicast OFF Grat. ARP ON from the Select Mode and Enter the Parameters.
- 2. Select the Disable Multicast option.
- 3. Enter Beacon Listen Interval and Message_Send Interval(sec). Failure to pass any value will result in an error.
- 4. Click on either PROG Ram & Start Test or PROG Flash & Start Test as per your requirement.

MPD	lperf3	Scan			
Diff	erent N	1ode O	ptions		
S	elect M	ode an	d Enter the Pa	ramet	ers
Ν	/lulticas	t OFF	Grat. ARP ON	-	Disable Multicast
В	eacon l	isten l	nterval:		10
K	eepaliv	e Inter	val (sec):		
L	ength:				
P	ort Nur	nber:			
U	RL:				
N	lessage	_Send	Interval (sec):		10

Figure 20: Selecting Multicast Reception OFF GRAT ARP ON



Console output:

UART:NWWWWWAEBuild \$Id: git-f92bee540 \$
mpd.ssid=ACT102571068294 mpd.passphrase=43083191
<pre>np_conf_path=/sys/nprofile.json mpd.proto=noneflash=vmreset=evk42</pre>
<pre>mpd.mcast_rx=0 wifi.arp_grat_period=10 wifi.max_idle_period=0</pre>
<pre>wifi.listen_interval=10 krn.gpio=K wifi.keep_alive_wake_time=2</pre>
<pre>mpd.regdomain=FCC mpd.suspend=1</pre>
\$App:git-dc89330
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
SSID 'ACT102571068294'
Suspend Enabled.
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11020
Trying Primary SSID=ACT102571068294
.[10.341,021] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-60 dBm
.WCM_NOTIFY_MSG_LINK_UP
.WCM_NOTIFY_MSG_ADDRESS
[12.120,775] MYIP 192.168.0.102
[12.120,937] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
WiFi Connection Success. SSID=ACT102571068294
Listen interval=10
Traffic Timeout=12
pm_flags=0x0
WiFi Connection success. proceeding to app
Timeout not specified.!



Application Exited..

Going for indefinite sleep...

						- 0 ,
- 5dit View Go C	Analyze Statistics	Talanhony Wireless Tools				
Edit View Go C	apture Analyze Statistics	Telephony Wireless Tools	p			
	S M I S + 7 🗃 S 3					(T) ====
arp	C	Destination	tent tents be			
3 0 221/10	Innonhas 00:2c:3c	Broadcast	D 42 ARD Announcement for 192	168 43 69		
45 10.221306	Innophas 00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168.43.60		
65 18.990563	Motorola_b7:2d:ad	AzureWav_0f:07:73	P 42 Who has 192.168.43.104? 1	ell 192.168.43.1		
66 18.990589	AzureWav_0f:07:73	Motorola_b7:2d:ad	P 42 192.168.43.104 is at 70:6	6:55:0f:07:73		
103 20.222140	Innophas_00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168.43.60		
190 30.222690	Innophas_00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168.43.60		
287 40.224204	Innophas_00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168.43.60		
325 46.511463	Motorola_b/:2d:ad	Azurewav_0t:0/:/3	42 Who has 192.108.43.104/ 1 42 102 169 42 104 is st 70.6	ell 192.108.43.1 6.55.06.07.72		
329 50 221227	Topophas 00:20:30	Broadcast	P 42 152.100.45.104 15 8C 70.0	168 43 60		
355 60,221101	Innophas 00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168,43,60		
498 74.097479	Motorola_b7:2d:ad	AzureWav_0f:07:73	P 42 Who has 192.168.43.104? T	ell 192.168.43.1		
499 74.097502	AzureWav_0f:07:73	Motorola_b7:2d:ad	P 42 192.168.43.104 is at 70:0	6:55:0f:07:73		
549 80.220845	Innophas_00:2c:3c	Broadcast	P 42 ARP Announcement for 192.	168.43.60		
Frame 287: 42 byt	es on wire (336 bits).	42 bytes captured (3)	ts) on interface \Device\NPF (5D8A9E	NA-44E3-4BA3-A7E6-842A06E67056}, id 0		
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*Wi-Fi = Edit View Go C = C C View Go C = C C C C C C C C C C C C C C C C C C C	apture Analyze Statistics Source Innophas, 2007;22:32 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24:34 Motorola, b7:24 Motorola, b	Telephony Wireless Tools Telephony Wireless Tools Proadcast Broadcast Broadcast 192,168,43,60 192,168,43,60 192,168,43,60 192,168,43,60 192,168,43,104 192,168,43,60 192,168,43,104 Broadcast Broadcast Broadcast Demodeast Colored States Colored Colored St	p 42 A&P Announcement for 192. p 42 EAA (Sing) Projunct 164 p 7 EEAA (Sing) Projunct 164	188.43.60 ell 192.168.43.1 655.96f.07.73 686.43.60 90001, seq:11/2816, ttl-128 (reply in 15 00001, seq:12/3072, ttl-126 (reply in 18 00001, seq:12/3072, ttl-25 (request in 00001, seq:12/3123, ttl-255 (request in 00001, seq:14/3284, ttl-255 (request in 166.43.60 14.44.13.48.13.47.16.43.2006(67056), id 0	58) 153) 169) 169) 169) 184) 189)	- 0

Figure 21: Multicast Reception OFF GRAT ARP ON - Wireshark and CMD Output



CMD output:

```
C:\WINDOWS\system32>ping 192.168.0.104
Pinging 192.168.0.104 with 32 bytes of data:
Reply from 192.168.0.104: bytes=32 time=2106ms TTL=255
Request timed out.
Reply from 192.168.0.104: bytes=32 time=841ms TTL=255
Reply from 192.168.0.104: bytes=32 time=380ms TTL=255
Ping statistics for 192.168.0.104:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 380ms, Maximum = 2106ms, Average = 1109ms
```

Expected Result: Talaria TWO connects to the AP. 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 interval. Laptop receives the GRAT ARP and the ARP table at the laptop gets updated, and the ping is executed.



9 iPerf3

You can download the iperf.exe application from the following link: <u>https://iperf.fr/iperf-download.php</u>

- 1. Enter your SSID and passphrase.
- 2. To automatically load the signed firmware image for iPerf3 application, select the iPerf3 tab as shown in Figure 22.
- 3. Recommended to click on PROG Flash & Start Test to start Talaria TWO as a Server.

Note:

- In case the PROG Ram & Start Test option does not load the application, click on PROG Flash & Start Test.
- Work around for the above limitation is to click Reset before clicking on PROG Ram & Start Test again.
- Work around for error with CLEAR Flash option: Click Reset before clicking on CLEAR Flash again.

AP Options	Boot Target
Set options for connecting to an access point.	Select an EVK board from the list.
SSID: ACT02571068294	EVK serial number:
Passphrase: Show	2021-58 V Refresh
Configure the Application	Program and Reset the Device
Configure the Setup Parameters :	
✓ Turn On deep sleep mode Select Regulatory Domain: FCC →	Reset
MPD [perf3] Scan	CLEAR Flash
Click on "PROG Ram & Start Test" or "PROG Flash & Start Test" button to start T2	PROG Ram & Start Test
as a Server	PROG Flash & Start Test
	Help Default Jumper Setting
ice Connected	

Figure 22: Selecting iPerf3



Following sections provide information on the different modes in which the iPerf3 application can be used along with their respective outputs.



9.1 TCP Throughput Test

Console output:

```
UART:NWWWWWWAEBuild $Id: git-f92bee540 $
ssid=ACT102571068294 passphrase=43083191 np conf path=/sys/nprofile.json
krn.gpio=--K suspend=1
addr e0:69:3a:00:2c:3e
[10.573,053] CONNECT:00:5f:67:cd:c5:a6 Channel:6 rssi:-60 dBm
[11.423,832] MYIP 192.168.0.102
[11.423,880] IPv6 [fe80::e269:3aff:fe00:2c3e]-link
IPerf3 server @ 192.168.0.102
  _____
Iperf3 TCP/UDP server listening on 5201
 _____
Accepted connection from 192.168.0.103 port 1032
[ 1] local 192.168.0.102 port 5201 connected to 192.168.0.103 port 1033
_____
              Interval Transfer Bitrate
[ ID]
[ 1] iperf3[S-RX-tcp]: 0.0-10 sec 6.5 MBytes 5.4 Mbits/sec
User: 2213434 (21%)
IRQ: 250215 (2%)
Idle: 7598946 (75%)
 _____
Iperf3 TCP/UDP server listening on 5201
  _____
```



CMD output:

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe					
-c 192.168.0.102					
Conne	ecting to host	192.1	68.0.102, por	t 5201	
[4]	local 192.168	.0.10	3 port 1033 c	onnected to 192.168.0.102 port 5	201
[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-1.00	sec	1.12 MBytes	9.44 Mbits/sec	
[4]	1.00-2.00	sec	640 KBytes	5.24 Mbits/sec	
[4]	2.00-3.00	sec	512 KBytes	4.19 Mbits/sec	
[4]	3.00-4.00	sec	640 KBytes	5.23 Mbits/sec	
[4]	4.00-5.00	sec	512 KBytes	4.20 Mbits/sec	
[4]	5.00-6.00	sec	640 KBytes	5.24 Mbits/sec	
[4]	6.00-7.00	sec	512 KBytes	4.20 Mbits/sec	
[4]	7.00-8.00	sec	1.00 MBytes	8.39 Mbits/sec	
[4]	8.00-9.00	sec	896 KBytes	7.33 Mbits/sec	
[4]	9.00-10.00	sec	256 KBytes	2.10 Mbits/sec	
[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-10.00	sec	6.62 MBytes	5.56 Mbits/sec	sender
[4]	0.00-10.00	sec	6.54 MBytes	5.49 Mbits/sec	
receiver					
iperf Done.					



9.2 UDP Throughput Test

Console output:

CMD output:

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe						
-c	-c 192.168.0.102 -u					
Connecting to host 192.168.0.102, port 5201						
[4] local 192.168.0.103 port 56797 connected to 192.168.0.102 port 5201						
[ID] I	nterval		Transfer	Bandwidth	Total Datagrams
[4]	0.00-1.00	sec	136 KBytes	1.11 Mbits/sec	17
[4]	1.00-2.00	sec	128 KBytes	1.05 Mbits/sec	16
[4]	2.00-3.00	sec	128 KBytes	1.05 Mbits/sec	16
[4]	3.00-4.00	sec	128 KBytes	1.05 Mbits/sec	16
[4]	4.00-5.00	sec	136 KBytes	1.11 Mbits/sec	17
[4]	5.00-6.00	sec	136 KBytes	1.12 Mbits/sec	17
[4]	6.00-7.00	sec	120 KBytes	982 Kbits/sec	15
[4]	7.00-8.00	sec	128 KBytes	1.05 Mbits/sec	16



```
[ 4] 8.00-9.00 sec 128 KBytes 1.05 Mbits/sec 16
[ 4] 9.00-10.00 sec 128 KBytes 1.05 Mbits/sec 16
[ ID] Interval Transfer Bandwidth Jitter Lost/Total
Datagrams
[ 4] 0.00-10.00 sec 1.27 MBytes 1.06 Mbits/sec 0.000 ms 3/162 (1.9%)
[ 4] Sent 162 datagrams
iperf Done.
```



9.3 Bidirectional Test/Reverse Mode

Console output:

```
Accepted connection from 192.168.0.103 port 1030
[ 1] local 192.168.0.102 port 5201 connected to 192.168.0.103 port 1031
------
[ ID] Interval Transfer Bitrate
[ 1] iperf3[S-TX-tcp]: 0.0-10 sec 10.6 MBytes 8.9 Mbits/sec
User: 2870392 (28%)
IRQ: 263801 (2%)
Idle: 6947091 (68%)
------
Iperf3 TCP/UDP server listening on 5201
------
```

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe -					
c 192.168.0.102 -R					
Connecting to host 192.168.0.102, port 5201					
Reverse mode, remote host 192.168.0.102 is sending					
[4] local 192.168.0.103 port 1031 connected to 192.168.0.102 port 5201					
[ID] Interval Transfer Bandwidth					
[4] 0.00-1.00 sec 1.58 MBytes 13.3 Mbits/sec					
[4] 1.00-2.00 sec 1.16 MBytes 9.74 Mbits/sec					
[4] 2.00-3.00 sec 1.33 MBytes 11.1 Mbits/sec					
[4] 3.00-4.00 sec 845 KBytes 6.93 Mbits/sec					
[4] 4.00-5.00 sec 622 KBytes 5.09 Mbits/sec					
[4] 5.00-6.00 sec 231 KBytes 1.89 Mbits/sec					
[4] 6.00-7.00 sec 1.27 MBytes 10.7 Mbits/sec					
[4] 7.00-8.00 sec 1.38 MBytes 11.6 Mbits/sec					





9.4 Specific Duration Test

In the specific duration test, -t = 10 implies that the test will run for a duration of 10 seconds. Console output:

```
Iperf3 TCP/UDP server listening on 5201
-------
Accepted connection from 192.168.0.103 port 1031
[ 1] local 192.168.0.102 port 5201 connected to 192.168.0.103 port 1038
------
[ ID] Interval Transfer Bitrate
[ 1] iperf3[S-RX-tcp]: 0.0-10 sec 14.1 MBytes 11.9 Mbits/sec
User: 4577471 (45%)
IRQ: 539771 (5%)
Idle: 4903631 (48%)
```

CMD output:

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe					
-c 192.168.0.102 -t 10					
Connecting to host 192.168.0.102, port 5201					
[4] local 192.168.0.103 port 1038 connected to 192.168.0.102 port 5201					
[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-1.00	sec	768 KBytes	6.28 Mbits/sec	
[4]	1.00-2.00	sec	896 KBytes	7.35 Mbits/sec	
[4]	2.00-3.00	sec	1.50 MBytes	12.6 Mbits/sec	
[4]	3.00-4.00	sec	1.62 MBytes	13.6 Mbits/sec	
[4]	4.00-5.00	sec	1.50 MBytes	12.6 Mbits/sec	
[4]	5.00-6.00	sec	1.62 MBytes	13.6 Mbits/sec	
[4]	6.00-7.00	sec	1.50 MBytes	12.6 Mbits/sec	





9.5 Specific Data Rate Test

In the specific data rate test, -b 500k implies a data rate of 500kbps.

Console output:

```
------
Iperf3 TCP/UDP server listening on 5201
-------
Accepted connection from 192.168.0.103 port 1030
[ 1] local 192.168.0.102 port 5201 connected to 192.168.0.103 port 1032
------
[ ID] Interval Transfer Bitrate
[ 1] iperf3[S-RX-tcp]: 0.0-10 sec 6.7 MBytes 5.6 Mbits/sec
User: 2311297 (22%)
IRQ: 259311 (2%)
Idle: 7605124 (74%)
```

CMD output:

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe						
-c 19	-c 192.168.0.102 -b 500k					
Connecting to host 192.168.0.102, port 5201						
[4] local 192.168.0.103 port 1032 connected to 192.168.0.102 port 5201						
[ID]	Interval		Transfer	Bandwidth		
[4]	0.00-1.00	sec	256 KBytes	2.09 Mbits/sec		
[4]	1.00-2.00	sec	512 KBytes	4.20 Mbits/sec		
[4]	2.00-3.00	sec	640 KBytes	5.24 Mbits/sec		
[4]	3.00-4.00	sec	256 KBytes	2.10 Mbits/sec		
[4]	4.00-5.00	sec	256 KBytes	2.10 Mbits/sec		
[4]	5.00-6.00	sec	768 KBytes	6.29 Mbits/sec		
[4]	6.00-7.00	sec	1.12 MBytes	9.44 Mbits/sec		




9.6 Specific Transfer Size Test

In the specific transfer size test, -n 5M implies 5 megabytes are transferred.

Console output:

```
------
Iperf3 TCP/UDP server listening on 5201
------
Accepted connection from 192.168.0.103 port 19498
[ 1] local 192.168.0.102 port 5201 connected to 192.168.0.103 port 19500
------
[ ID] Interval Transfer Bitrate
[ 1] iperf3[S-RX-tcp]: 0.0-5 sec 4.8 MBytes 8.0 Mbits/sec
User: 1613392 (27%)
IRQ: 184124 (3%)
Idle: 3997107 (68%)
```

CMD output:

C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe	
-c 192.168.0.102 -n 5M	
Connecting to host 192.168.0.102, port 5201	
[4] local 192.168.0.103 port 19500 connected to 192.168.0.102 port 5201	
[ID] Interval Transfer Bandwidth	
[4] 0.00-1.00 sec 512 KBytes 4.19 Mbits/sec	
[4] 1.00-2.00 sec 512 KBytes 4.19 Mbits/sec	
[4] 2.00-3.00 sec 768 KBytes 6.28 Mbits/sec	
[4] 3.00-4.00 sec 1.25 MBytes 10.5 Mbits/sec	
[4] 4.00-5.00 sec 1.12 MBytes 9.44 Mbits/sec	
[4] 5.00-5.74 sec 896 KBytes 10.0 Mbits/sec	



[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-5.74	sec	5.00 MBytes	7.31 Mbits/sec	sender
[4]	0.00-5.74	sec	4.81 MBytes	7.04 Mbits/sec	
re	eceiv	ver				
iŗ	berf	Done.				



9.7 Multiple Stream Test

In multiple stream test, -P 3 implies 3 simultaneous streams.

Console output:

CMD output:

```
C:\Users\InnoP\Downloads\iperf-3.1.3-win64 (1)\iperf-3.1.3-win64>iperf3.exe
-c 192.168.0.102 -P 3
Connecting to host 192.168.0.102, port 5201
[ 4] local 192.168.0.103 port 1044 connected to 192.168.0.102 port 5201
[ 6] local 192.168.0.103 port 1045 connected to 192.168.0.102 port 5201
[ 8] local 192.168.0.103 port 1046 connected to 192.168.0.102 port 5201
[ ID] Interval Transfer Bandwidth
[ 4] 0.00-1.00 sec 640 KBytes 5.24 Mbits/sec
```



[6]	0.00-1.00	sec	256	KBytes	2.10 Mbits/sec
[8]	0.00-1.00	sec	640	KBytes	5.24 Mbits/sec
[SUM]	0.00-1.00	sec	1.50	MBytes	12.6 Mbits/sec
			·			
[4]	1.00-2.00	sec	512	KBytes	4.19 Mbits/sec
[6]	1.00-2.00	sec	128	KBytes	1.05 Mbits/sec
[8]	1.00-2.00	sec	512	KBytes	4.19 Mbits/sec
[SUM]	1.00-2.00	sec	1.12	MBytes	9.43 Mbits/sec
[4]	2.00-3.00	sec	384	KBytes	3.15 Mbits/sec
[6]	2.00-3.00	sec	128	KBytes	1.05 Mbits/sec
[8]	2.00-3.00	sec	384	KBytes	3.15 Mbits/sec
[SUM]	2.00-3.00	sec	896	KBytes	7.34 Mbits/sec
[4]	3.00-4.00	sec	384	KBytes	3.14 Mbits/sec
[6]	3.00-4.00	sec	128	KBytes	1.05 Mbits/sec
[8]	3.00-4.00	sec	384	KBytes	3.14 Mbits/sec
[SUM]	3.00-4.00	sec	896	KBytes	7.34 Mbits/sec
[4]	4.00-5.00	sec	256	KBytes	2.10 Mbits/sec
[6]	4.00-5.00	sec	128	KBytes	1.05 Mbits/sec
[8]	4.00-5.00	sec	256	KBytes	2.10 Mbits/sec
[SUM]	4.00-5.00	sec	640	KBytes	5.25 Mbits/sec
[4]	5.00-6.00	sec	256	KBytes	2.09 Mbits/sec
[6]	5.00-6.00	sec	256	KBytes	2.09 Mbits/sec
[8]	5.00-6.00	sec	256	KBytes	2.09 Mbits/sec
[SUM]	5.00-6.00	sec	768	KBytes	6.28 Mbits/sec



-					
[4]	6.00-7.00	sec	128 KBytes	1.05 Mbits/sec
[6]	6.00-7.00	sec	256 KBytes	2.10 Mbits/sec
[8]	6.00-7.00	sec	384 KBytes	3.15 Mbits/sec
[SUM]	6.00-7.00	sec	768 KBytes	6.30 Mbits/sec
-					
[4]	7.00-8.00	sec	128 KBytes	1.05 Mbits/sec
[6]	7.00-8.00	sec	256 KBytes	2.10 Mbits/sec
[8]	7.00-8.00	sec	256 KBytes	2.10 Mbits/sec
[:	SUM]	7.00-8.00	sec	640 KBytes	5.24 Mbits/sec
_					
[4]	8.00-9.00	sec	256 KBytes	2.10 Mbits/sec
[6]	8.00-9.00	sec	384 KBytes	3.15 Mbits/sec
[8]	8.00-9.00	sec	512 KBytes	4.20 Mbits/sec
[;	SUM]	8.00-9.00	sec	1.12 MBytes	9.44 Mbits/sec
-					
[4]	9.00-10.00	sec	384 KBytes	3.15 Mbits/sec
[6]	9.00-10.00	sec	512 KBytes	4.19 Mbits/sec
[8]	9.00-10.00	sec	384 KBytes	3.15 Mbits/sec
[;	SUM]	9.00-10.00	sec	1.25 MBytes	10.5 Mbits/sec
-					
[ID]	Interval		Transfer	Bandwidth
[4]	0.00-10.00	sec	3.25 MBytes	2.73 Mbits/sec
[4]	0.00-10.00	sec	3.11 MBytes	2.61 Mbits/sec
r	ecei	ver			
[6]	0.00-10.00	sec	2.38 MBytes	1.99 Mbits/sec
[6]	0.00-10.00	sec	2.21 MBytes	1.85 Mbits/sec
r	ecei	ver			





10 Scan

The Scan tab allows the user to actively scan for nearby access points.

The MPD tool Scan tab allows the user to perform Wi-Fi scan by specifying No_of_Probes, Idle_Slots,Min_Listen_Time(ms),Max_Listen_Time(ms),Wait_time(ms), Scan Interval(s). User can set the Probe Rate and select Required Channels as per requirement.

Further, providing the SSID and BSSID will enable scan for a specific access point.

User can choose Standard Wi-Fi sczn or Low-Power Wi-Fi scan scheme for Scanning. Parameters Nap_Enable and Interval(s) are corresponding the Low Power scheme, disabled during Standard scheme and enabled during Low Power scheme.

set options for con	nnecting to an access point.	Select an EVK board from the list.
SSID: ACT	02571068294	EVK serial number:
Passphrase: *****	*	Show 2021-58 V Refresh
onfigure the Appli	cation	Program and Reset the Device
Configure the Setu	up Parameters :	
Turn On deep	sleep mode Select Regulatory Domain: FCC 💷	Reset
MPD Iperf3 Scar		CLEAR Flash
Enter the Scan F	Parameters	
Channelland	here a	PROG Ram & Start Test
Choose the Se Standard	Wi-Fi Scan 🖉 Low-Power Wi-Fi Smart Scan	PROG Flash & Start Test
SSID(optional	ACT02571068294	
BSSID(optional	al): 00:55:67:cd:c5:a6 Select All Decelect	
boold (option		
Probe Rate:		04
No_of_Probes	s: 2 <u> </u>	08
Idle_Slots:	3 - 09 10 11	
Min_Listen_Ti	me(ms): 8	Usia
Max_Listen_T	ime(ms): 24	Help
Wait_Time(m	s): 0	Default Jumper Setting
Scan Interval((s): 10	

Figure 23: Scanning for access points



Default values of parameters for Standard Wi-Fi and Low-Power Wi-Fi Scan are shown in Table 2. Depending on the user's choice of scanning scheme, respective default values will be set to corresponding parameters.

Default Value				
Parameters	Standard Wi-Fi scan	Low-Power Wi-Fi Scan	Remark	
No_of_Probes	2	1	Configurable	
Ide_Slots	3	3	Configurable	
Select the Required Probe Rate	11b_1Mbps	11b_6Mbps	Configurable	
NAP Enable	No	Yes	Hard coded	

Table 2: Default values for Standard Wi-Fi and Low-Power Wi-Fi Scan

Console output for Standard Scheme:

UART:NWWWWWAE4 DWT comparators, range 0x8000 Build \$Id: git-b0887ef06 \$ mpd.proto=scan wifi.scan num probes=2 wifi.scan idleslots=3 wifi.scan min listen time=8 wifi.scan max listen time=24 wifi.scan wait time=0 wifi.probe rate=0x00 wifi.scan channel mask=0x7ff mpd.regdomain=FCC mpd.suspend=1 \$App:git-3f9b8a0 SDK Ver: SDK 2.4alpha T2 Multipurpose Demp App Version 0.12 Suspend Enabled. Regdomain=FCC addr e0:69:3a:00:06:34 Applying reg domain: 1-11020 MPD scan mode. channel mask=0x7ff Found 1 nets: cc:61:e5:b9:96:4d on channel 1 @ -70 'Moto G' 'WPA2-PSK+PMF' scan completed ------Going for indefinite sleep...



Expected Result: Depending on the Scan specifications, available networks are identified and displayed.

Console output for Low Power Scheme with NAP Enabled:

```
UART:NWWWWWAE4 DWT comparators, range 0x8000
Build $Id: git-b0887ef06 $
mpd.proto=lpscan wifi.scan num probes=2 wifi.scan idleslots=3
wifi.scan min listen time=8 wifi.scan max listen time=24 wifi.nap scan=1
mpd.ap logging=1 mpd.dt iterations=10 wifi.probe rate=0x00
wifi.scan channel mask=0x7ff mpd.regdomain=FCC mpd.suspend=1
$App:git-3f9b8a0
SDK Ver: SDK 2.4alpha
T2 Multipurpose Demp App Version 0.12
Suspend Enabled.
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:06:34
Applying reg domain: 1-11020
MPD lpscan mode.
[0.395,971] Round:1 Found 13 nets:
_____
[0.396,767] 8e:d7:33:e1:0b:3e on channel 1 @ -46 'TPGuest 886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
[0.396,912] fc:d7:33:e1:0b:3e on channel 1 @ -47 'TP-LINK WR886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
[0.397,061] 50:c7:bf:a3:86:4f on channel 1 @ -48 'TP-LINK 864' 'WPA-PSK/WPA2-
PSK+PMF Mixed Mode'
[0.397,210] 56:c7:bf:a3:86:40 on channel 1 @ -48 'TP-LINK Guest 864F' 'WPA-
PSK/WPA2-PSK+PMF Mixed Mode'
```



```
[0.397,358] 50:c7:bf:f4:22:c2 on channel 9 @ -64 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[0.397,503] 50:c7:bf:e2:5e:b1 on channel 9 @ -67 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[0.397,619] f0:72:ea:97:e9:a2 on channel 6 @ -68 'RaniNestHome' 'WPA2-PSK+PMF'
[0.397,732] b0:e4:d5:15:cb:52 on channel 6 @ -69 'RaniNestHome' 'WPA2-PSK+PMF'
[0.397,845] f0:72:ea:57:b1:1a on channel 6 @ -76 'RaniNestHome' 'WPA2-PSK+PMF'
[0.397,960] 2c:30:33:d5:72:a0 on channel 2 @ -78 'Elongated Muskrat' 'WPA2-
PSK+PMF'
[0.398,077] f4:17:b8:a3:be:c9 on channel 1 @ -83 'ATT2VED5x8-5.0' 'WPA2-PSK+PMF'
[0.398,266] 50:c7:bf:f4:41:d0 on channel 9 @ -84 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[0.398,382] f8:2c:18:38:14:b3 on channel 1 @ -87 '' 'WPA2-PSK+PMF'
[10.392,951] Round: 2 Found 11 nets:
_____
[10.393,065] fc:d7:33:e1:0b:3e on channel 1 @ -45 'TP-LINK WR886N' 'WPA-
PSK/WPA2-PSK Mixed Mode'
[10.393,210] 8e:d7:33:e1:0b:3e on channel 1 @ -45 'TPGuest 886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
[10.393,360] 50:c7:bf:a3:86:4f on channel 1 @ -48 'TP-LINK 864' 'WPA-PSK/WPA2-
PSK+PMF Mixed Mode'
[10.393,510] 56:c7:bf:a3:86:40 on channel 1 @ -52 'TP-LINK Guest 864F' 'WPA-
PSK/WPA2-PSK+PMF Mixed Mode'
[10.393,659] 50:c7:bf:f4:22:c2 on channel 9 @ -64 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[10.393,778] 56:c7:bf:f4:22:c2 on channel 9 @ -66 '' 'WPA2-PSK'
[10.393,915] 50:c7:bf:e2:5e:b1 on channel 9 @ -71 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
```



[10.394,032] 0a:a6:bc:8c:b4:e5 on channel 9 @ -71 '' 'WPA2-PSK+PMF' [10.394,143] 2c:30:33:d5:72:a0 on channel 2 @ -79 'Elongated Muskrat' 'WPA2-PSK+PMF' [10.394,258] cc:f4:11:6f:20:38 on channel 11 @ -80 'RaniNestHome' 'WPA2-PSK+PMF' [10.394,374] 56:c7:bf:f4:41:d0 on channel 9 @ -82 '' 'WPA2-PSK'



Console output for Low Power Scheme with NAP not Enabled:

```
UART:NWWWAE
Build $Base: git-7c26d8efa $
hio.baudrate=115200
uuid: 45303830-3528-7512-ffff-ffffffffff
flash: Gordon ready!
UART:NWWWWWAE4 DWT comparators, range 0x8000
Build $Id: git-b0887ef06 $
mpd.proto=lpscan wifi.scan num probes=2 wifi.scan idleslots=3
wifi.scan_min_listen_time=8 wifi.scan_max_listen_time=24 wifi.nap_scan=0
mpd.ap logging=1 mpd.dt iterations=10 wifi.probe rate=0x00
wifi.scan channel mask=0x7ff mpd.regdomain=FCC mpd.suspend=1
$App:git-3f9b8a0
SDK Ver: SDK 2.4alpha
T2 Multipurpose Demp App Version 0.12
Suspend Enabled.
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:06:34
Applying reg domain: 1-11020
MPD lpscan mode.
[0.417,532] Round:1 Found 9 nets:
_____
[0.418,327] fc:d7:33:e1:0b:3e on channel 1 @ -47 'TP-LINK WR886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
[0.418,472] 8e:d7:33:e1:0b:3e on channel 1 @ -47 'TPGuest 886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
```



```
[0.418,621] 50:c7:bf:a3:86:4f on channel 1 @ -48 'TP-LINK 864' 'WPA-PSK/WPA2-
PSK+PMF Mixed Mode'
[0.418,769] 56:c7:bf:a3:86:40 on channel 1 @ -48 'TP-LINK_Guest_864F' 'WPA-
PSK/WPA2-PSK+PMF Mixed Mode'
[0.418,918] 50:c7:bf:f4:22:c2 on channel 9 @ -66 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[0.419,034] f0:72:ea:97:e9:a2 on channel 6 @ -69 'RaniNestHome' 'WPA2-PSK+PMF'
[0.419,176] 50:c7:bf:e2:5e:b1 on channel 9 @ -72 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[0.419,292] e0:22:04:83:72:a7 on channel 11 @ -81 '' 'WPA2-PSK+PMF'
[0.419,402] e0:22:04:83:72:a5 on channel 11 @ -83 'Elongated Muskrat' 'WPA2-
PSK+PMF'
[10.434,620] Round:2 Found 14 nets:
------
[10.434,735] fc:d7:33:e1:0b:3e on channel 1 @ -44 'TP-LINK WR886N' 'WPA-
PSK/WPA2-PSK Mixed Mode'
[10.434,881] 8e:d7:33:e1:0b:3e on channel 1 @ -44 'TPGuest 886N' 'WPA-PSK/WPA2-
PSK Mixed Mode'
[10.435,030] 50:c7:bf:a3:86:4f on channel 1 @ -45 'TP-LINK 864' 'WPA-PSK/WPA2-
PSK+PMF Mixed Mode'
[10.435,180] 56:c7:bf:a3:86:40 on channel 1 @ -46 'TP-LINK Guest 864F' 'WPA-
PSK/WPA2-PSK+PMF Mixed Mode'
[10.435,329] 50:c7:bf:f4:22:c2 on channel 9 @ -64 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[10.435,446] f0:72:ea:97:e9:a2 on channel 6 @ -68 'RaniNestHome' 'WPA2-PSK+PMF'
[10.435,560] b0:e4:d5:15:cb:52 on channel 6 @ -70 'RaniNestHome' 'WPA2-PSK+PMF'
[10.435,673] f0:72:ea:57:b1:1a on channel 6 @ -73 'RaniNestHome' 'WPA2-PSK+PMF'
```



```
[10.435,790] f4:17:b8:a3:be:c9 on channel 1 @ -76 'ATT2VED5x8-5.0' 'WPA2-
PSK+PMF'
[10.435,933] 50:c7:bf:e2:5e:b1 on channel 9 @ -77 'rooftop' 'WPA2-PSK/WPA3-SAE
Mixed Mode'
[10.436,051] 08:02:8e:cc:52:ab on channel 1 @ -78 'NETGEAR00' 'WPA2-PSK'
[10.436,164] 24:05:88:1e:74:c0 on channel 6 @ -80 'LazarusPit' 'WPA2-PSK+PMF'
[10.436,277] 26:05:88:1e:74:c0 on channel 6 @ -80 'LazarusPit-Guest' 'WPA2-
PSK+PMF'
[10.436,394] 2c:30:33:d5:72:a0 on channel 2 @ -81 'Elongated Muskrat' 'WPA2-
PSK+PMF'
```

Cases explained in the following sub sections are explained using scan with standard scheme.



10.1 Case 1

The Scan tab allows the user to actively scan for nearby access points by specifying the parameters.

er the Scan Parameters				
				PROG Ram & Start Test
 Noose the Scheme Standard Wi-Fi Scar 	n C Low-Power Wi-	Fi Smart Scan		PROG Flash & Start Test
SID(optional):		Select the Required Channels:		INNOPHASE
SSID(optional):		Select All Deselect All		
robe Rate:	11b_1Mbps 😐	▼ 01 ▼ 02 ▼ 03 ▼ 04		
lo_of_Probes:	2 🔟	I▼ 05 I▼ 06 I▼ 07 I▼ 08		
lle_Slots:	3 📖	🔽 09 🔽 10 🔽 11		
1in_Listen_Time(ms):	8		Help	
1ax_Listen_Time(ms):	24		Theip	
/ait_Time(ms):	0			Default Jumper Setting
can Interval(s):	10			

Figure 24: Case 1: Demo Tool GUI

Console output:

UART:NWWWAE
Build \$Base: git-7c26d8efa \$
hio.baudrate=115200
uuid: 39483937-3207-00af-0057-ffffffffff
flash: Gordon ready!
UART:NWWWWWAEBuild \$Id: git-f92bee540 \$
<pre>mpd.proto=scan wifi.scan_num_probes=2 wifi.scan_idleslots=3</pre>
<pre>wifi.scan_min_listen_time=8 wifi.scan_max_listen_time=24</pre>
<pre>wifi.scan_wait_time=0 wifi.probe_rate=0x00 wifi.scan_channel_mask=0x7ff</pre>
<pre>mpd.regdomain=FCC mpd.suspend=1</pre>
\$App:git-2f38bc2
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
Suspend Enabled.



```
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11@20
MPD scan mode.
channel mask=0x7ff
Found 6 nets:
00:5f:67:cd:c5:a6 on channel 6 @ -26 'ACT102571068294' 'WPA-PSK'
e0:1c:fc:e6:9d:2e on channel 6 @ -62 'Ashwini' 'WPA-PSK/WPA2-PSK Mixed
Mode'
34:e8:94:be:16:9b on channel 11 @ -78 'InfecteD v2.4' 'WPA2-PSK'
18:0f:76:8c:c7:bc on channel 11 @ -80 'Thirumala 06' 'WPA-PSK/WPA2-PSK Mixed
Mode'
7e:1f:d0:03:b4:f8 on channel 4 @ -90 'POCO M2 Pro' 'WPA2-PSK+PMF'
74:da:88:dd:f1:70 on channel 11 @ -92 'Stephen' 'WPA2-PSK'
scan completed
 -------
Going for indefinite sleep...
```



10.2 Case 2

Running a test by setting the Channel, Regulatory Domain and Prob rate.

Where,

- 1. Regulatory Domain: Depending on the user's geographical location, any one of the listed Regulatory Domains can be selected.
- 2. Channel_list: Set the Wi-Fi channels to use.

For example: set 1-11, 13 to use channels 1 to 11 and 13, depending on the selected Regulatory Domain.

igure the Application			Program and Reset the Device
nfigure the Setup Parame	ters :		D
Turn On deep sleep mod	le Select Regula	tory Domain: FCC 🛁	Reset
PD Iperf3 Scan		ETSI	CLEAR Flash
Enter the Scan Parameters	5	KCC	PROG Ram & Start Test
Choose the Scheme © Standard Wi-Fi Sca	n C Low-Power Wi	-Fi Smart Scan	PROG Flash & Start Test
SSID(optional):		Select the Required Channels:	
BSSID(optional):		Select All Deselect All	I IIIIOF IIASE
Probe Rate:	11b_1Mbps 🛁	I▼ 01 I▼ 02 I▼ 03 I▼ 04	
No_of_Probes:	2 🔟	I▼ 05 I▼ 06 I▼ 07 I▼ 08	
Idle_Slots:	3 📖	▼ 09 ▼ 10 ▼ 11	
Min_Listen_Time(ms):	8		Help
Max_Listen_Time(ms):	24		нер
Wait_Time(ms):	0		Default Jumper Setting

Figure 25: Case 2: Demo Tool GUI



All channels can be selected from Select All tab. Deselect All can be used to deselect all the channels. Channels can also be selected individually using the checkbox as per requirement.

Configure the Application			Program and Reset the Device				
Configure the Setup Parameters	s :						
✓ Turn On deep sleep mode	✓ Turn On deep sleep mode Select Regulatory Domain: FCC →						
MPD Iperf3 Scan	-		CLEAR Flash				
Enter the Scan Parameters			PROG Ram & Start Test				
Choose the Scheme Standard Wi-Fi Scan	C Low-Power Wi-F	Fi Smart Scan	PROG Flash & Start Test				
SSID(optional):		Select the Required Channels:	INNOPHASE				
BSSID(optional):		Select All Deselect All					
Probe Rate: 11	1b_1Mbps 😐	▼ 01 ▼ 02 ▼ 03 ▼ 04					
No_of_Probes: 2		▼ 05 ▼ 06 ▼ 07 ▼ 08					
Idle_Slots: 3	-	V 09 V 10 V 11					
Min_Listen_Time(ms): 8			Help				
Max_Listen_Time(ms): 24	•		nep				
Wait_Time(ms): 0			Default Jumper Setting				
Scan Interval(s): 10							

Figure 26: Channel Selection



3. Prob_rate: The rate as defined by rate_t is used to transmit the probe request. If this field is set to 0xffff, no probes will be sent and the scan will only be passive.

Select the Prob_rate as per requirement from the drop down.

Configure the Application		Program and Reset the Device
Configure the Setup Paramet	ters :	
✓ Turn On deep sleep mod	e Select Regulatory Domain: FCC	Reset
MPD Iperf3 Scan		CLEAR Flash
Enter the Scan Parameters		PROG PLACE IT I
CI U CI		PROG Ram & Start Test
Choose the Scheme	_	DPOG Elach & Start Test
Standard Wi-Fi Scar	n C Low-Power Wi-Fi Smart Scan	PROG Plash & start fest
SSID(optional):	Salast the Bernined Channeler	
BCCID (antional)	Select the Required Channels:	
BSSID(optional):	Select All Deselect All	
Probe Rate:	11b_1Mbps — 01 🔽 02 🔽 03 🔽 04	
No of Probes:	11b_1Mbps	
no_or_noses	11b_2Mbps 100 100 100 100 100 100 100 100 100 10	
Idle_Slots:	11b_5.5Mbps 4 🔽 09 🔽 10 🔽 11	
Min_Listen_Time(ms):	11b_11Mbps	Help
Max_Listen_Time(ms):	11g_bMbps	
Wait_Time(ms):	11g 12Mbps	Default Jumper Setting
Scan Interval(s):	11g 18Mbps	
	11g_24Mbps	
	11g_36Mbps	
	11g_48Mbps	
	11g_54Mbps	

Figure 27: Prob_rate selection

Console output:

UART:NWWWWWAEBuild \$Id: git-f92bee540 \$
mpd.proto=scan wifi.scan_num_probes=2 wifi.scan_idleslots=3
wifi.scan_min_listen_time=8 wifi.scan_max_listen_time=24
wifi.scan_wait_time=0 wifi.probe_rate=0x00
wifi.scan_channel_mask=0x7ff mpd.regdomain=FCC mpd.suspend=1
\$App:git-2f38bc2
SDK Ver: SDK_2.4alpha
T2 Multipurpose Demp App Version 0.12
Suspend Enabled.



```
Multicast reception Disabled.
Regdomain=FCC
addr e0:69:3a:00:2c:3e
Applying reg domain: 1-11@20
MPD scan mode.
channel mask=0x7ff
Found 6 nets:
00:5f:67:cd:c5:a6 on channel 6 @ -33 'ACT102571068294' 'WPA-PSK'
d8:47:32:2e:e1:e0 on channel 1 @ -79 'GPMH' 'WPA2-PSK'
8e:ff:f2:21:92:72 on channel 7 @ -79 'POCO X3' 'WPA2-PSK+PMF'
34:e8:94:be:16:9b on channel 11 @ -79 'InfecteD v2.4' 'WPA2-PSK'
7e:1f:d0:03:b4:f8 on channel 4 @ -89 'POCO M2 Pro' 'WPA2-PSK+PMF'
Oc:d2:b5:3c:0e:88 on channel 10 @ -90 '3th floor' 'WPA-PSK/WPA2-PSK
Mixed Mode'
scan completed
  _____
Going for indefinite sleep...
```



10.3 Case 3

Setting the SSID.

SSID (Service Set Identifier) is the name of the user's wireless network, also known as Network ID. If the SSID of the network is provided and the BSSID field is kept empty, it scans for the network as per the provided SSID and gives the following details:

- 1. BSSID
- 2. Channel
- 3. RSSI Range
- 4. Mode

Configure the Application	Program and Reset the Device
Configure the Setup Parameters :	
✓ Turn On deep sleep mode Select Regulatory Domain: FCC →	Reset
MPD lperf3 Scan	CLEAR Flash
Enter the Scan Parameters	PROG Ram & Start Test
Choose the Scheme Standard Wi-Fi Scan C Low-Power Wi-Fi Smart Scan	PROG Flash & Start Test
SSID(optional): ACT102571068294 Select the Required Channels:	
BSSID(optional): Select All Deselect All	
Probe Rate: 11b_1Mbps -	
No_of_Probes: 2 → 🔽 05 🔽 06 🖾 07 🔽 08	
Idle_Slots: 3 💛 🔽 09 🔽 10 🔽 11	
Min_Listen_Time(ms): 8	Help
Max_Listen_Time(ms): 24	100
Wait_Time(ms): 0	Default Jumper Setting
Scan Interval(s): 10	

Figure 28: Case 3: Demo Tool GUI



Console output:

UART:NWWWWWAEBuild \$Id: git-f92bee540 \$		
<pre>mpd.proto=scan wifi.scan_num_probes=2 wifi.scan_idleslots=3</pre>		
wifi.scan_min_listen_time=8 wifi.scan_max_listen_time=24		
<pre>wifi.scan_wait_time=0 wifi.probe_rate=0x00 wifi.scan_channel_mask=0x7ff</pre>		
mpd.scan.ssid=ACT102571068294 np_conf_path=/sys/nprofile.json		
<pre>mpd.regdomain=FCC mpd.suspend=1</pre>		
\$App:git-2f38bc2		
SDK Ver: SDK_2.4alpha		
T2 Multipurpose Demp App Version 0.12		
Suspend Enabled.		
Multicast reception Disabled.		
Regdomain=FCC		
addr e0:69:3a:00:2c:3e		
Applying reg domain: 1-11020		
MPD scan mode.		
ssid=ACT102571068294		
channel_mask=0x7ff		
Found 1 nets:		
00:5f:67:cd:c5:a6 on channel 6 @ -33 'ACT102571068294' 'WPA-PSK'		
scan completed		
Going for indefinite sleep		



10.4 Case 4

Setting the BSSID.

BSSID recognizes the AP or router as it has a unique address which creates the wireless network. To set the BSSID of a network, enter the BSSID in the provided field and click on Start.

Configure the Application		Program and Reset the Device
Configure the Setup Parameters :		
✓ Turn On deep sleep mode	Select Regulatory Domain: FCC 💷	Reset
MPD Iperf3 Scan		CLEAR Flash
Enter the Scan Parameters		PROG Ram & Start Test
Choose the Scheme © Standard Wi-Fi Scan C Lo	ow-Power Wi-Fi Smart Scan	PROG Flash & Start Test
SSID(optional):	Select the Required Channels:	INNOPHASE
Probe Rate: 11b_1Mt		
No_of_Probes: 2	- 05 🔽 06 🔽 07 🔽 08	
Idle_Slots: 3	- 09 🔽 10 🔽 11	
Min_Listen_Time(ms): 8		Help
Max_Listen_Time(ms): 24		Theip
Wait_Time(ms): 0		Default Jumper Setting
Scan Interval(s): 10		

Figure 29: Case 4: Demo Tool GUI



Console output:

UART:NWWWWWAEBuild \$Id: git-f92bee540 \$		
<pre>mpd.proto=scan wifi.scan_num_probes=2 wifi.scan_idleslots=3</pre>		
<pre>wifi.scan_min_listen_time=8 wifi.scan_max_listen_time=24</pre>		
<pre>wifi.scan_wait_time=0 wifi.probe_rate=0x00 wifi.scan_channel_mask=0x7ff</pre>		
<pre>mpd.scan.bssid=00:5f:67:cd:c5:a6 mpd.regdomain=FCC mpd.suspend=1</pre>		
\$App:git-dc89330		
SDK Ver: SDK_2.4alpha		
T2 Multipurpose Demp App Version 0.12		
Suspend Enabled.		
Regdomain=FCC		
addr e0:69:3a:00:2c:3c		
Applying reg domain: 1-11020		
MPD scan mode.		
bssid str=00:5f:67:cd:c5:a6		
bssid=00:5f:67:cd:c5:a6		
channel_mask=0x7ff		
Found 10 nets:		
00:5f:67:cd:c5:a6 on channel 6 @ -62 'ACT102571068294' 'WPA-PSK'		
scan completed		
Going for indefinite sleep		



11 Help

Help provides information about default Jumper/Switch settings. Clicking on Default Jumper Setting as shown in Figure 30 will pop-up new window with default Jumper/Switch settings information as shown in Figure 31.

AP Options	Boot Target
Set options for connecting to an access point. SSID:	Select an EVK board from the list. EVK serial number:
Passphrase:	2021-38 V Kerresh
Configure the Application Configure the Setup Parameters : Image: Turn On deep sleep mode Select Regulatory Domain: MPD Iperf3 Different Mode Options Select Mode and Enter the Parameters Base Image: Disable Multicast Beacon Listen Interval: Keepalive Interval (sec): Length: Port Number: URL: MQTT_Ping Interval (sec): MQTT Quername: MQTT Password: PUB MSG: SUB MSG1:	Program and Reset the Device Reset CLEAR Flash PROG Ram & Start Test PROG Flash & Start Test INNOPHASE Help Default Jumper Setting
SUB MSG2:	
Device Connected	

Figure 30: Help Frame





Figure 31: Default Jumper/Switch setting Window

Note: Default Jumper/Switch setting window will appear every time when tool is launched, as shown in Figure 32. To turn this feature OFF permanently, check the Do not show again option and close the window.





Figure 32: Default Jumper/Switch setting Window during Tool Launch



12 Appendix

12.1 Uninstall instructions for libusK driver

To uninstall libusbK and retrieve COM ports, follow the following steps:

 Go to Device Manager. Expand the libusbK USB Devices and right click on the InnoPhase T2 Evaluation Board (Composite Parent). Click on Update Driver as shown in Figure 33.



Figure 33: Device Manager

E



2. On the new window, click on Let me pick from a list of available drivers on my computer option and click on Next.

		\times
÷	Update Drivers - InnoPhase T2 Evaluation Board (Composite Parent)	
	Browse for drivers on your computer	
	Search for drivers in this location:	
	C:\Users\Dino\Downloads\CDM v2.12.28 WHQL Certified\amd64 V Browse	
	✓ Include subfolders	
	→ Let me pick from a list of available drivers on my computer This list will show available drivers compatible with the device, and all drivers in the same category as the device.	
	Next Cance	

Figure 34: Update Devices



3. Select USB Composite Device and install the same for reinstalling COM posts.



Figure 35: Select the device driver



12.2 New Serial Number to Device

There might be certain instances when the EVK serial number is absent or appears to be corrupted on a Talaria TWO (T2) device.

The following are the setups needed to create a new serial number created and write it to the Talaria TWO flash using the tool. This process of creating a new serial number and writing it is executed automatically.

- Ensure the device is connected to the PC
 If the connection from Talaria TWO device is not found, unplug and re-plug the cable, to ensure
 the device is recognized by the host machine.
- Run the Zadig Tool to Install the libusbK driver (Windows PC only) The libusbK driver installation is for Windows machine only. The interface provided by libusbK driver is supported natively on Linux machine, hence, no additional installation is required on Linux.

On launching Zadig, the devices that are listed on it might have a slightly different name tag with respect to the Talaria TWO device. This is dependent on the how the user-installed drivers were used the previous time. For example:

- The driver has been uninstalled, or
- The port has been updated to a COM port or
- The way in which the device list has been updated by the machine's Device Manager is different.
 - a. If the InnoPhase T2 Evaluation Board is shown on the list, either InnoPhase T2
 Evaluation Board (Composite Parent), or InnoPhase T2
 Evaluation Board, go ahead to install the driver per standard procedure.
 - b. If the InnoPhase T2 Evaluation Board is not shown on the list, a device by the name Quad RS232-HS should be on the list of instead.

Ensure to check the following:

- a. There should be only one Talaria TWO device that is connected, to which the new serial number will be written to
- b. If there are any other known devices that are probably using the libusbK driver, disconnect them, unplug/re-plug the Talaria TWO device and re-launch Zadig to ensure Quad RS232-HS is actually the device from the Talaria TWO connection.

Select the Quad RS232-HS (Composite Parent) device and select the driver libusbK and click on Replace Driver.



After the installation, the Talaria TWO device with the libusbK driver should be shown as evident in Figure 36:



Figure 36: libusbK driver installed

3. Launch the Tool (Detecting absence of Serial Number and creating a new one in device). On launching, the tool checks if the serial number is present on the device. If it is not found, the tool will automatically generate one and write it to the device as the new serial number.

AP Options	Boot Target
SSID: SsiD: Show	EVK serial number: None V Refresh
Configure the Application Configure the Setup Parameters : Turn On deep sleep mode MPD Jure 2 Serial Number Updated	Program and Reset the Device Display: New serial number updated.
Different Mode Options Select Mode and Enter the Paran Base —	e unplug and plug the est
Beacon Listen Interval: Keepalive Interval (sec): Length: Port Number:	OK SE

Figure 37: Serial number updated

Format of the serial number:

<year_stamp>-<integer>

where,

- <year_stamp>: current year (for example: 2021)
- <integer>: formed from the sum of last 3 octets (in decimal) of the mac address found in the device.

Before relaunching the tool, unplug and re-plug the device to have the connection of the device refreshed by the host machine.



4. Re-Launch of the Tool (Serial Number Detected) Now the device has a new serial number in its flash.

AP Options	Boot Target
Set options for connecting to an access point. SSID: Passphrase: Show	Select an EVK board from the list. EVK serial number: 2021-58 V Refresh
Configure the Application Configure the Setup Parameters : Turn On deep sleep mode Select Regulatory Domain: FCC — MPD Iperf3 Scan	Program and Reset the Device Reset CLEAR Flash
Different Mode Options	PROG Ram & Start Test

Figure 38: New serial number in flash



13 References

 UG_Download_Tool.pdf (sdk_x.y/pc_tools/Download_Tool/doc/UG_Download_Tool.pdf).



14 Support

- 1. Sales Support: Contact an InnoPhase sales representative via email <u>sales@innophaseinc.com</u>
- 2. Technical Support:
 - a. Visit: <u>https://innophaseinc.com/contact/</u>
 - b. Also Visit: https://innophaseinc.com/talaria-two-modules
 - c. Contact: support@innophaseinc.com

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