

# User Manual DA16200 AT GUI Tool

**UM-WI-004** 



### Contents

Contents 2						
Fig	jures.			3		
Те	rms ai	nd Defini	tions	1		
Re	ferenc	es		1		
1	Intro	duction		5		
	1.1	Certifica	tion Mode	5		
	1.2	Network	Mode	5		
	1.3	OTP Mo	ode	3		
2	How	to Conne	ect	5		
	2.1	USB to	Serial Driver	3		
3	DA16	200 SDK	Cor Firmware Selection	3		
4	How	to Run G	GUI with DA16200 EVK	7		
	4.1	Connec	tion and Running	7		
	4.2	COM Po	ort and Baud Rate Configuration	9		
	4.3	RF Cert	ification Mode10	)		
	4.4	TX Test	Mode1	I		
	4.5	RX Test	Mode	3		
5	Netw	ork Mod	e14	ł		
	5.1	Station	Node	5		
	5.2	AP Mod	e	7		
	5.3	Data Tra	ansfer (TCP/UDP)	)		
		5.3.1	TCP Server	)		
		5.3.2	TCP Client	)		
		5.3.3	UDP Session			
		5.3.4	Data Exchange			
	- 4	5.3.5	Data Transfer on DPM Mode	2		
	5.4	MQTIC		ł		
		5.4.1	Conliguration	ł		
		5.4.2	MOTT on DPM Mode	) 5		
	55	J.4.3 TI S Sof	יאפרד טו ברא אטעפ	י ה		
6	0.0	Mode Se	tung	,		
0	5 OTF Mode Setup					
Re	vision	History		3		

**User Manual** 



# **Figures**

Figure 1: DA16200 EVK GUI	. 5
Figure 2: Development Kit Connections	7
Figure 3: AT GUI	8
Figure 4: RS232 Setup - Disconnected	. 9
Figure 5: RS232 Setup - Connected	. 9
Figure 6: Debug Console - Connected	. 9
Figure 7: Certification Mode Configuration	10
Figure 8: Tx Test Mode Configuration	11
Figure 9: Debug Console - TX Mode	11
Figure 10: Start and Stop TX	12
Figure 11: Debug Console - Start TX	12
Figure 12: Debug Console - Stop TX	12
Figure 13: Rx Configuration	13
Figure 14: Network Mode Configuration	14
Figure 15: Setup Window - Station Mode	15
Figure 16: Station Mode - SCAN	15
Figure 17: Station Mode - Choose AP and Connect	16
Figure 18: Debug Console - Connect to AP	16
Figure 19: Setup Window - AP Mode	17
Figure 20: AP Configuration	18
Figure 21: Debug Console - AP Configuration	18
Figure 22: DHCP Configuration	18
Figure 23: Debug Console - DHCP Configuration	19
Figure 24: Data Transfer Tab	19
Figure 25: TCP Server Open	19
Figure 26: TCP Server Connection with a Client	20
Figure 27: TCP Client Connection to a Server	20
Figure 28: UDP Session Open	21
Figure 29: TCP Server Data Transfer	21
Figure 30: TCP Client Data Transfer	22
Figure 31: UDP Session Data Transfer	22
Figure 32: TCP/UDP Data Reception	22
Figure 33: DPM Mode Setting	22
Figure 34: MQTT Client Tab	24
Figure 35: MQTT PUBLISH Transfer	25
Figure 36: MQTT PUBLISH Reception	25
Figure 37: TLS Setting Tab	26
Figure 38: OTP Mode	27



### **Terms and Definitions**

AP	Access Point			
AT	AT Command Interpreter Software Subsystem, or Attention			
CoAP	Constrained Application Protocol			
DHCP	Dynamic Host Configuration Protocol			
EVK	Evaluation Kit			
GUI	Graphical User Interface			
HTTP	Hyper Text Transfer Protocol			
MFC	Microsoft Foundation Class			
MQTT	Message Queuing Telemetry Transport			
OTP	One Time Programmable			
PC	Personal Computer			
QFN	Quad Flat No-lead			
SDK	Software Development Kit			
SSID	Service Set IDentifier			
STA	STAtion			
TCP	Transmission Control Protocol			
TLS	Transport Layer Security			
UART	Universal Asynchronous Receiver Transmitter			
UDP	User Datagram Protocol			
USB	Universal Serial Bus			

### References

- [1] DA16200, Datasheet, Dialog Semiconductor
- [2] DA16200, SDK Programmer Guide, User Manual, Dialog Semiconductor
- [3] DA16200, EVK User Guide, Dialog Semiconductor
- [4] DA16200, AT Command User Guide, Dialog Semiconductor



### **1** Introduction

The DA16200 GUI tool lets users control the DA16200 EVK in a GUI environment. There are three modes of operation: Certification mode, Network mode and OTP mode (see Figure 1).

🏧 Dialog AT GUI v0.0.4.0	- 🗆 🗙
Settings Certification OTP Network Data Transfer MQTT	Client TLS
RS232	RF Mode
COM port : COM3 ~ Open	State : Certification Mode
Baud Rate : 115200 ~	Certification Mode
Status : Refresh	O Network Mode
Software Version	
Chip Name	
Main OS	
Syslib	

Figure 1: DA16200 EVK GUI

### **1.1 Certification Mode**

This mode is for Wi-Fi RF test (Tx power, Rx sensitivity, etc.) also known as "TEST Mode".

### 1.2 Network Mode

With Network mode, the Station or AP mode of the DA16200 is tested.

- AP mode: Soft-AP test with configurable parameters like SSID, security, DHCP Server, etc.
- **Station mode**: STA test to search and connect to an Access Point and check/test the STA function

After the network mode is set, the user can test the TCP/UDP or the MQTT and manage the TLS certificates.

- Data Transfer: message exchange through the TCP Server/Client, and UDP session
- MQTT Client: message exchange through the MQTT protocol
- **TLS Setting**: management of TLS certificate that is set (e.g. Root CA, Client Certificate, Client Private Key)

User Manual	Revision 1.5	06-Jan-2021



### 1.3 OTP Mode

This mode is for **power calibration** and **temperature calibration with OTP memory location**.

### 2 How to Connect

### 2.1 USB to Serial Driver

The DA16200 evaluation board supports USB to serial interface. The user connects to DA16200 EVK with the PC through a micro-USB cable and then two COM ports will be detected automatically.

One (UART0) is for console command and the other (UART1) is for AT command. Normally, the higher number COM port is for AT commands and the lower number COM port is for the console.

- Required the FT232 Driver installation for Windows
  - In most cases, it will be installed automatically

The FTDI driver for the FT2232 FTDI chip used on DA16200 EVK is available for download at the following link: http://www.ftdichip.com/Drivers/CDM/CDM21224\_Setup.zip

- See the EVK User Guide [3] to find information about the UART1 port. AT GUI tool uses UART1 port.
- To update with a new DA16200 firmware, see the DA16200 EVK User Guide [3].

### 3 DA16200 SDK or Firmware Selection

There are a number of types of SDK and firmware for DA16200 such as Generic and Manufacture that can be found in DA16200 SDK/Image packages. Consider the kinds of tests you plan to determine which SDK or firmware should be picked up.

- Certification or OTP Mode:
  - SDK: DA16200\_SDK\_Manufacture\_QFN\_xxx.zip
  - Firmware: DA16200\_IMG\_Manufacture\_QFN
- Network Mode:
  - SDK: DA16200\_SDK\_Generic\_QFN xxx.zip
    - The \_\_SUPPORT\_ATCMD\_\_ where can be found in config\_generic\_sdk.h file should be enabled.

[\src\customer\config_generic_sdk.h]				
// AT-CMD	features			
#define	SUPPORT_ATCMD	// Support AT-CMD		

 Firmware: ATCMD firmware should be picked such as DA16200\_IMG\_Generic\_QFN\_ATCMD, DA16200\_IMG\_Generic\_FcCSP\_LP\_ATCMD or DA16200\_IMG\_Generic\_FcCSP\_NP\_ATCMD depending on SoC package type.



### 4 How to Run GUI with DA16200 EVK

### 4.1 Connection and Running

DA16200 AT GUI program is a single executable file.

#### NOTE

If there is an error with the message "*a DLL file (e.g. vcruntime140.dll or mfc1400u.dll) is missing*", then install Microsoft Visual Studio redistributable package (https://www.microsoft.com/en-us/download/details.aspx?id=48145) or copy the .dll file into the Windows system folder (C:\Windows\System32 or C:\Windows\SysWOW64).

The program setup sequence is:

- 1. Connect the DA16200 Development Kit to the host PC as shown in
- 2.
- 3. Figure 2.



#### Figure 2: Development Kit Connections

#### NOTE

See the EVK User Guide [3] to know which port to use.



### DA16200 AT GUI Tool

### 4. Start the AT GUI program.

Figure 3: AT GUI



### 4.2 COM Port and Baud Rate Configuration

1. When the AT GUI program runs, the connection status is red (not connected). If the program does not detect any COM port, click the **Refresh** button to refresh the COM Port. See Figure 4.

RS232			
COM port :	COM3	~	0
Baud Rate :	115200	~	Open
Status :	Disconnected		Refresh

Figure 4: RS232 Setup - Disconnected

- 2. Select a COM port and click the **OPEN** button and wait for a few seconds. See Figure 5 and Figure 6.
  - The connection status will soon change to a green color and the Connection Status field shows "Connected" in a green color. This means that communication is OK.

RS232			
COM port :	COM12	~	Class
Baud Rate :	115200	~	Close
Status :	Conneted		Refresh

Figure 5: RS232 Setup - Connected

• In the Debug Console window (in the black box), the message "Echo on" is shown.

Console
ATE ^ Echo on OK AT+CHIPNAME AT+CHIPNAME +CHIPNAME:DA16200 OK AT+VER AT+VER +VER:RTOS-GEN01-01-12627-000000,SLIB-GEN01-01-12283-000000 OK ATF ATF +INIT:DONE,0 AT+TMRFNOINIT=1 OK
Clear Send

#### Figure 6: Debug Console - Connected

User Manual	Revision 1.5	06-Jan-2021



### DA16200 AT GUI Tool

### 4.3 **RF Certification Mode**

To enable certification mode:

- 1. Open the **Settings** tab. See Figure 7.
- 2. In the RF Mode area, select the Certification Mode check box.

RS232				RF Mode
COM port :	COM12	$\sim$	Class	State : Certification Mode
Baud Rate :	115200	$\sim$	Close	Certification Mode
Status :	Conneted		Refresh	O Network Mode

Figure 7: Certification Mode Configuration

### 4.4 TX Test Mode

#### 1. Open the Certification Mode tab. See Figure 8.

🚥 Dialog AT GUI v0.0.4.0	-		- TX Setting	
Settings Certification OTP Network Data Transfe	er MQTT Client TLS		Packet	
Country: KOREA Select	RX Setting Channel : CH1 (2412MHz) V	Start RX	Data Rate	Channel
NET Mode     TEST Mode     (Wi-Fi Test)     (TX_RX_Test)	(0 for infinite)	Clear Stat	B_1Mbps	CH1 (2412MHz)
TX Setting	lime : 7 s	Packets	Data Pattern	Power
Packet      Cont      CW     Data Rate     Channel	FCS Error	Packets Packets	ALL_0	~ 0 ~
B_1Mbps V CH1 (2412MHz) V Data Pattern Power	Overflow Error	Packets	Preamble	Packet Amount
ALL_0 V 0 V Preamble Packet Amount	Total Packet Emr. Pace	Packets %	11B_LONG	∨ 0≑
11B_LONG         0 ↓           Size(1~1000 Bytes)         (0→ Infinity mode)	Wi-Fi Configuration Wi-Fi List	Search	Size(1~1000 Bytes)	(0→ Infinity mode)
200 🜩	Password :	Connect	200	<u>▲</u> ▼
Override CCA Stop TX	SSID :		short GI	Start TX
	Security :MAC :		Override CCA	Stop TX

Figure 8: Tx Test Mode Configuration

2. Click the **Mode Select** button (Figure 8). A confirmation message is shown as in Figure 9. This is a normal state.

Console	
AT+TMRFNOINIT=1 OK AT+RESTART OK ATE	^
+INIT:DONE,0 AT+RFTESTSTART OK	~
Clear Send	

Figure 9: Debug Console - TX Mode

- 3. Select the Data Rate, Channel, and Power for the purpose of the test.
  - **Packet mode**: this is the normal test mode with packet generation mode. Offers the possibility to adjust duty of RF Burst at time domain
  - Cont mode: Continuous TX out mode. This mode is for TX power test etc. In this mode, TX packet is generated continuously over 95% duty cycle
  - CW mode: Only single sinewave tone out mode. This mode is for freq err check
  - Data Rate: Choose modulation type to test
  - **Power**: Select or tune the power level. ("0" step is Maximum). The difference between power steps is about 0.8~1 dB/1step
  - **Size**: You can adjust the duty rate with this number. However, the size is not linear as the number, so to set the exact number you need equipment like a spectrum analyzer to check the value. (Equipment setting is set to zero span setting or burst mode setting)

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**Revision 1.5** 



### DA16200 AT GUI Tool

To do TX packet generation:

• To start and stop TX packet generation, use the **Start TX** button and the **Stop TX** button. If you want to make changes for another condition, click **Stop TX** before a new test is started.

Dialog IoT WiFi GUI v0.0.1.0	- 🗆 X	Dialog IoT WiFi GUI v0.0.1.0	- 🗆 X
		Image: Select of the select	− □ ×      MOTT Clent TLS      RX Setting     Channel: CH1 (2412MHz) Stat RX     Test Time: 0 Seconds Clear Stat     (0for infinite)     Time: 0 Seconds Clear Stat     (0for infinite)     Time: 0 Seconds     Clear Stat     (0for infinite)     Time: 0 Seconds     Clear Stat     (0for infinite)     Seconds     Clear Stat     (0for infinite)     Seconds     Clear Stat     (0for infinite)     Seconds     Seconds     SSID     Seconds     Seconds
Console OK ATE +INIT:DONE0 AT-RFTESTSTART AT-RFTX 2412.0.0.0b1.0.12:34:56:78:90:10.10:20:30:40 OK Clear	50.60.0 Jong.on Jong.off. NO.0.1.0	Console INIT-DOME 0 AT-RFTESTSTART OK AT-RFTX 2412,0.0,0b 1,0,12 34:56:78:90:10,10 20:30:40 AT-RFTX STOP OK Clear	150:60.0Jong.on Jong.off.NO.0.1.0

Start TX

Stop TX

#### Figure 10: Start and Stop TX

For example: there is a test setting with 802.11n MCS7, channel 1, 100 bytes packet and power grade 0.

• When the **Start TX** button is clicked, messages as shown in Figure 11 will be shown.



#### Figure 11: Debug Console - Start TX

• When you click the **Stop TX** button, messages as shown in Figure 12 will be shown.

AT+RFTX 2412,0,0,100,n65,0,12:34:56:78:90:10,10:20:30:40:50:60,0,long,off,short,off,NO,0,1,0	
OK	
AT+RFTXSTOP	
OK	

Figure 12: Debug Console - Stop TX

**User Manual** 

**Revision 1.5** 



### 4.5 RX Test Mode

The settings are made in the **RX Setting** area. See Figure 13.

- **Channel**: Support CH1 ~ CH13
- Test Time: Maximum 3600 s (Duration is 1 second fixed)

RX Setting		
Channel : CH1 (2	412MHz) ~	Start RX
Test Time : (0 for infinite) Time : /	0 🔹 Seconds	Clear Stat
Vaild FCS Error		Packets Packets
PHY Error		Packets
Overflow Error		Packets
Total Packet		Packets
Error Rate		%

Figure 13: Rx Configuration

- RX Packet Rate
  - FCS + PHY + Overflow packet / Total packet = Error rate



### DA16200 AT GUI Tool

### 5 Network Mode

To enable network mode:

- 1. Open the Settings tab.
- 2. Select the Network Mode checkbox. See Figure 14.

Settings	Certifi	cation	OTP	Network	Data Transfer	MQTT	Client	TLS		
RS232							RF	Mode		
COM	port :	COM3		$\sim$	a		Sta	te :	Network Mode	
Baud	Rate :	11520	0	$\sim$	Close		0	Certificat	tion Mode	
Status	:	Conne	ted		Refr	esh	۲	Network	Mode	

Figure 14: Network Mode Configuration



### 5.1 Station Mode

- 1. In the Mode Select: field, select Station Mode. See Error! Reference source not found..
  - The network mode is changed. Next, DA16200 reboots and the station mode setup window opens. See Figure 15.

🚥 Dialog AT GUI v0.0.4.0			_		×
Settings Certification OTP Network Data Transfe	r MQTT Client	TLS			
Mode : Station Mode V		Factory F	Reset	Reboot	
Scan AP Mode	Wi-Fi Connect SSID :				
	Security :				
	Password :			Index :	
				Connect	t
	IP Address IP Addr :				
	Netmask :				
Scan	Gateway :				
SNTP	DNS #1 :		· · ·		_
Server :	DNS #2 :				
R C Enable Confirm	DHCP : O	nable 🔾	Disable	Confirm	
PING Test Ping! Count : 4	Recv / Send :	/			
Destination IP: 172601	Min/Max/Avr :	/		/ r	ns

Figure 15: Setup Window - Station Mode

2. Click the Scan button to scan APs. See Figure 16.



Figure 16: Station Mode - SCAN

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**Revision 1.5** 



### DA16200 AT GUI Tool

- 3. When scanning is finished, choose one AP in the list. See Figure 17.
- 4. Click the **Connect** button.
- 5. If required by the security mode of the AP, fill in a password or key index.

Scan	Wi-Fi Connect					
AD 10 1201	SSID : KT_GiGA_2G_9417					
KT_GIGA_2G_9417	Security : WPAPSK/WPA2PSK Password : N12345678	( + TKIP/AES				
	88:3c:1c:94:29:4b	Connect				

#### Figure 17: Station Mode - Choose AP and Connect

AT+WFJAP=N604R_MIKE,4,2,N12345678 OK	^
+WFJAP:1,N604R_MIKE,192,168,0,9 AT+NWIP=? +NWIP:0,192,168,0,9,255,255,255,0,192,168,0,1 OK	





### 5.2 AP Mode

- 1. In the Mode Select field, select AP Mode. See Error! Reference source not found..
  - The network mode changes, DA16200 reboots and the AP Mode setup window opens. See Figure 19.

🚥 Dialog AT G	UI v0.0.4.0					_		×
Settings Cert	ification OTP	Network	Data Transfer	MQTT Client	TLS			
Mode : AF	<sup>o</sup> Mode	$\sim$			Factory Res	et	Reboot	
AP Configura	ation			IP Address				
SSID :				IP Addr :	_10	)00.	_1	
Password :				Netmask :	255	5.255.255	0	
Country :	KOREA 🗸 CI	nannel : /	Auto ~					
Security :	WPA2PSK + AE	S (recomme	ended) 🗸			[	Confirm	
			Confirm	DHCP Server				
Connected	STA			Start IP:	_10	)00.	_2	
				End IP :	_10	)00.	_11	
				DNS IP :	_8	888.	8	
				⊖ Enable	Disable	[	Confirm	
			Check					
		ſ	Disconnect					
			noonnoor					
PING Test					, _			
Ping!		Count	: <u>4</u> 1	Recv / Send :				
Destination	IP: 172	60	_1 1	Min/Max/Avr :	/	/	m	IS

Figure 19: Setup Window - AP Mode

2. Set the fields SSID, Password, Country, Channel, and Security mode. See Figure 20.



3. Click the **Confirm** button.

AP Configura	ation				
SSID :	DA16200_AP1				
Password :	N123456789				
Country :	KOREA V Channel : CH11 (24 V				
Security :	WPA2PSK + AES (recommended) ~				
	Confirm				

Figure 20: AP Configuration

• The Debug Console window messages appears as shown in Figure 21.

Console	
AT+WFSAP=DA16200_AP1.3.1.N123456789.11.KR +WFSAP:DA16200_AP1 OK	^
AT+RESTART OK ATE	
+INIT:DONE,1 ATE Echo on OK	~
Clear Send	

Figure 21: Debug Console - AP Configuration

- 4. In the **DHCP Server** area, make the required settings for the IP addresses and click the **Confirm** button. See Figure 22.
  - When a client is connected, the MAC address will be shown as in Figure 23.

DHCP Server	
Start IP:	_1002
End IP :	_10011
DNS IP :	888
Enable	O Disable Confirm
Enable	O Disable Confirm
Enable	O Disable Confirm

Figure 22: DHCP Configuration

**Revision 1.5** 



AT+NWDHR=10,0,0,2,10,0,0, OK AT+NWDHDNS=8,8,8,8 OK AT+NWDHS=1 OK	10	^
+WFCST:34:f3:9a:0a:d4:3f		
		$\sim$

#### Figure 23: Debug Console - DHCP Configuration

### 5.3 Data Transfer (TCP/UDP)

The DA16200 GUI tool provides data transfer functions with TCP/UDP. Before messages are sent with this tool, connect the DA16200 to an access point as shown in Section 5.1. Then click the **Data Transfer** tab. If DA16200 succeeds to connect to an AP, the IP address will be filled in. See Figure 24.

Settings Certification OTP	Network Data Transfer MQTT Client TLS		
TCP Server	172. 30. 1. 33	Connect	X
C TCP Client	000	Connect	X
O UDP Session	0. 0. 0. 0	Start	X

#### Figure 24: Data Transfer Tab

The DA16200 provides three kinds of sessions: TCP server, TCP client, and UDP session. The user can use these three simultaneously.

### 5.3.1 TCP Server

To use TCP server, fill in a port number and click the **Connect** button on the **TCP Server** line. When a server is opened, the **X** will change to **O**. See Figure 25.

TCP Server	172. 30. 1. 33	1505_	Disconnect	0
O TCP Client	000		Connect	Х
O UDP Session	0. 0. 0. 0		Start	X
*** [TCP Server] Open ***				^

Figure 25: TCP Server Open

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### DA16200 AT GUI Tool

The user can connect to the DA16200 TCP server with tools for data exchange like the IO Ninja. When a client connects successfully, its information will be shown as in Figure 26. The DA16200 TCP server can accept up to eight client sessions.

TCP Server	172. 30. 1. 33	1505_	Disconnect	0
TCP Client	000		Connect	Х
O UDP Session	0. 0. 0. 0		Start	Х
*** [TCP Server] Open *** *** [TCP Server] Client connecte	ed from 172.30.1.45:58688 ***			^

Figure 26: TCP Server Connection with a Client

#### 5.3.2 TCP Client

To connect to a TCP server, fill in the IP address and port number of the server and click the **Connect** button on the **TCP Client** line. When the DA16200 TCP client succeeds to connect, the **X** will change to **O**. See Figure 27.

TCP Server	172. 30. 1. 33	1505_	Connect	Х		
TCP Client	17230145	_4000	Disconnect	þ		
O UDP Session	0. 0. 0. 0		Start	Х		
**** [TCP Server] Client connected from 172.30.1.45:58688 *** **** [TCP Server] Client 172.30.1.45:58688 disconnected ***						
*** [TCP Server] Close ***						
*** [TCP Client] Connecting to TCP Server (172.30.1.45:4000) OK ***						

Figure 27: TCP Client Connection to a Server



### 5.3.3 UDP Session

To open a UDP session, fill in a port number and click the **Start** button. When the DA16200 TCP client succeeds to connect, the **X** will change to **O**. See Figure 28. TODO:

○ TCP Server	172. 30. 1. 14	1505_	Disconnect	0
O TCP Client	17230124	1500_	Connect	Х
UDP Session	172. 30. 1. 14	12001	Stop	þ
•••• [TCP Server] Open •••				^
*** [UDP Session] Open ***				

#### Figure 28: UDP Session Open

#### 5.3.4 Data Exchange

To send a message to a peer, first select a session. Each session is slightly different in method.

• **TCP Server**: Select the **TCP Server** checkbox → Select the destination IP in the drop-down list → Type a message → Click the **Send** button (see Figure 29)

*** [TCP Server] Client connected from	172.30.1.54:57510	)		
[172.30.1.54:57510 -> TCP Server] Hi. [UDP Session -> 172.30.1.54:57510] Hi.				
				$\sim$
Hi.				^
				~
172.30.1.54:57510	V Dest.:	17230154	57510	Send
172.30.1.54:57510 DPM	Sleep			

Figure 29: TCP Server Data Transfer



• **TCP Client**: Select the **TCP Client** checkbox → Type a message → Click the **Send** button (see Figure 30)

[TCP Client -> 172.30.1.54:1500] Hi. by the TCP Client					
					¥
Hi. by the TCP Client					~
					~
	✓ Dest. :	1	723015	54 1500_	Send

Figure 30: TCP Client Data Transfer

 UDP Session: Select the UDP Session checkbox → Enter the destination IP and port number → Type a message → Click the Send button (see Figure 31)

[UDP Session -> 172.30.1.54:45200] Hi. by the UDP		
		¥
Hi. by the UDP		^
		~
	Dert : 172 20 1 54 45	200 Seed
~	Dest. : 17230154 45	200 Send

Figure 31: UDP Session Data Transfer

When a session receives a message from a peer, the message is shown in the message window. See Figure 32.

```
[172.30.1.54:49890 -> TCP Server]
from your guest.
```

#### Figure 32: TCP/UDP Data Reception

#### 5.3.5 Data Transfer on DPM Mode

The DA16200 GUI provides TCP/UDP sockets operation in DPM (DA16200 power-save) mode. See Figure 33.



#### Figure 33: DPM Mode Setting

- DPM Button: DPM mode Start / End
- **DPM\_STATUS**: DPM state (Disabled / DPM init... / DPM Sleep / DPM wake-up)
- Sleep Button: DA16200 returns to DPM sleep state (only available DPM wake-up state)

To initiate TCP/UDP sockets in DPM mode:

- 1. Open sockets user wants to.
- 2. Click the **DPM** button to start DPM mode.

### User Manual Revision 1.5 06-Jan-2021



### DA16200 AT GUI Tool

3. After all sockets are ready in DPM mode, the DPM\_STATUS will change to "DPM sleep".

When DA16200 in DPM sleep state receives a TCP or UDP messages from a peer, it is shown in the message window like in Figure 32.

To send a message in DPM Sleep status:

- 1. Wake up DA16200 with the switch. The **DPM\_STATUS** will change to "DPM wake-up".
- 2. Select the session to send, type a message, and click the **Send** button.
- 3. After sending messages, click the Sleep button. The DPM\_STATUS will change to "DPM sleep".

To exit DPM mode:

- 1. Wake up DA16200 with the switch. The **DPM\_STATUS** will change to "DPM Wake-up".
- 2. Click the Sleep button. The DPM\_STATUS will change to "Disabled".



#### 5.4 **MQTT Client**

The DA16200 GUI tool provides data transfer functions with MQTT protocol. Before messages are sent with this tool, connect the DA16200 to an access point as shown in Section 5.1. Click the MQTT Client tab.

#### Configuration 5.4.1

Before a connection is made to an MQTT broker, set the required fields for the connection information. See Figure 34.

Settings Certification OTP Network Data Transfer MQTT Client TLS	
MQTT Client     Connect     X       Broker         Keep-Alive Period    3600     Sec.	+ -
Login <sup>®</sup> Save       O     Save       Qo S <sup>®</sup> 0 ∨ TL <sup>®</sup> 0 ∨ <sup>®</sup> Reset All	àave
	^
	*
DPM Sleep PU	IBLISH

Figure 34: MQTT Client Tab

- 1 Broker IP address
- ② Broker port number
- 3 Subscriber topics (up to 4)
- ④ Publisher topic
- 5 Sending PINGREQ cycle (second)
- 6 Login ID

User Manual	Revision 1.5	06-Jan-2021
CFR0012	24 of 29	© 2021 Dialog Semiconductor



### DA16200 AT GUI Tool

- ⑦ Login password
- ⑧ MQTT QoS (0~2)
- 9 TLS use (0 or 1)
- 1 Reset all configuration to default

When the DA16200 MQTT client succeeds to connect, the letter **X** will change to **O**. Moreover, the user can send a PUBLISH message to the broker or receive a message.

### 5.4.2 Data Exchange

To exchange a message with the broker, connect the MQTT Client.

To send a PUBLISH, type the message and click the **PUBLISH** button. See Figure 35.

*** [SUB] Connected ***	
[PUB:da16k_pub] abc	
	*
abc	^
	~
	PUBLISH

#### Figure 35: MQTT PUBLISH Transfer

When the client receives a message from the broker, the message is displayed in the message window. See Figure 36.

[	[PUB : da16k_pub] abc [SUB : da16k] def		
		¥	

#### Figure 36: MQTT PUBLISH Reception

### 5.4.3 MQTT on DPM Mode

The DA16200 GUI provides MQTT client operation in DPM mode. There is the DPM mode setting as shown in Figure 33 in MQTT Client tab.

To initiate MQTT client in DPM mode:

- 1. After setting up, connect to a MQTT Broker.
- 2. Click the **DPM** button to start DPM mode.
- After the MQTT client session is ready in DPM mode, the DPM\_STATUS will change to "DPM sleep".

When DA16200 in DPM sleep state receives a PUBLISH from the broker, it is shown in the message window like Figure 36.

User Manual	Revision 1.5	06-Jan-2021



### DA16200 AT GUI Tool

To send a message in DPM Sleep status:

- 1. Wake up DA16200 with the switch. The DPM\_STATUS will change to "DPM wake-up".
- 2. Type a message and click the **PUBLISH** button.
- 3. After sending messages, click the **Sleep** button. The DPM\_STATUS will change to "DPM sleep".

And to exit DPM mode:

- 1. Wake up DA16200 with the switch. The **DPM\_STATUS** will change to "DPM Wake-up".
- 2. Click the Sleep button. The DPM\_STATUS will change to "Disabled".

### 5.5 TLS Setting

The user can store a TLS certificate that is set with this tool for MQTT, HTTPs, CoAPs, and so on. There are three kinds of items: Root CA, Client Certificate, and Private Key.

DA16200 can only process Privacy Enhanced Mail type(.pem). To enter the certificates directly, input the text and click the **Upload** button with the TLS item selection. If this is done successfully, <<Content exists> will appear in the window. See Figure 37.

If the user has TLS certificate files with PEM type, click **File Search** and select the file. The text will be loaded in the window.

● Root CA ○ Cer	rtificate 🔿 Private Key	,	Upload	
BEGIN CERTIFICA MIID+TCCAuGgAWIB VQQGEwJVUzETMBE cmExFzAVBgNVBAOM ZXJ0aWZpY2F0ZTEg MTMwMzExMTkwMjI BgNVBAgMCkNhbGim DA5XaS1GaSBBbGxp IDAeBgkqhkiG9w0BC AQEFAAOCAQ8AMIII YUS/N3HG2QAQ4GK PqRPiW9/wgQch8Aw ixDFcAeVqHb74mAcc FLHwKpy62KCoK301 cGPpINRsr4vgoltm4B HQ4EFgQUCwPCPISit	ATE AgIJANqqHCazDkkOMA0 GA1UECAwKQ2FsaWZvo IDldpLUZpIEFsbGlhbmNli IMB4GCSqGSIb3DQEJAR 2WhcNMjMwMzA5MTkw b3JuaWExFDASBgNVBA YW5jZTEdMBsGA1UEAw CQEWEXN1cHBvcnRAd2k BCgKCAQEA6TOCu20m+ Dh7DPDI13zhdc0yOUE1 v7g/0rXmg1zewPJ36zKn del1kdagHvaL56fpUExm 6HIWUlbpg8YGpLDt2BB4 h1eIW57h+gXoFfHCJLM KL0+Sd5y8V+Oqw6XZ4I	GCSqGSIb3DQEBCwUAMIGS m5pYTEUMBIGA1UEBwwLU 4R0wGwYDVQQDDBRXRkEg YRc3VwcG9ydEB3aS1maS5v MjI2WjCBkjELMAkGA1UEBhN cMC1NhbnRhIENsYXJhMRcw rwUV0ZBIFJvb3QgQ2VydGlr tZmkub3JnMIIBIJANBgkqhkii •9zLZITYAhGmtxwyJQ/1xyt2 CIOXa1ETKbHIU9xABrL7KfX q5/5Q1uyd8YfaXBzhxm1IYh 7GyMGXYd+Q2vYa/o1UwCM LzxmPfyH2x+Xj75mAcllOxx2 G66uhU/2QIDAQABo1AwTj wHwYDVR0jBBgwFoAUCwP	MQswCQYD J2FudGEgQ2xh Um9vdCBD vcmcwHhcN MCVVMxEzAR vFQYDVQQK naWNhdGUx S9w0B KSQJYX8LN 2HCQ1nC wTKMIC IGfMOj6 7GK0r AdBgNV CPISiKL0+	

Figure 37: TLS Setting Tab

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### 6 OTP Mode Setup

To enable OTP mode:

- 1. Open the **OTP Mode** tab.
- 2. Click the OPT Enable checkbox
  - The current OTP data is as shown in Figure 38.

Settings Certification OTP Netwo	vork Data Transfer MQTT Client	TLS
OTP Enable		Read XTAL
Power cal (0.2 Step)	Temp cal	Freq Offset cal
1st Test	1st	1st 66
2nd	2nd	2nd
Write	Write	Write
MAC Address setup		
1st D4:3D:39:10:DF:32	3rd	1M-1 -
2nd 00:00:00:01:00:00	4th	vvnte
EX) AA:BB:CC:DD:EE:FF		
OTP READ/WRITE		
ADDR : 0x LENGTH	: 1 🛓	Read First !!!
DATA : 0x	Read VViite	(Uneck UTP address available )

#### Figure 38: OTP Mode

**Power calibration** and **temperature calibration** has been completed for the chipset by Dialog and it may not need to be done by the customer.

Freq Offset cal: the range of frequency offset calibration is 0x0 ~ 0x7F.

#### MAC Address setup

DA16200 has 4 slots to store MAC addresses. The 1st slot is written by Dialog. The user can use 3 slots to write their own MAC address. The MAC address written in the OTP must be an even number. it is used for WLAN0 MAC address (for STA interface), and the next number is automatically used for WLAN1 MAC address (for Soft-AP interface).

To write the MAC address, give a MAC address in the first empty slot and click the **Write** button, then the new address substitutes for the previous address.

User Manual	Revision 1.5	06-Jan-2021



## **Revision History**

Revision	Date	Description
1.5	06-Jan-2021	Revised as the user interface changes of the tool.
1.4	21-Aug-2020	<ul><li>4.3.5 Data Transfer on DPM Mode Modification</li><li>4.4.3 MQTT on DPM Mode Modification</li><li>Figure 36: MQTT Client Tab Change</li><li>Figure 45: Solution Explorer Tab</li></ul>
1.3	06-Apr-2020	TCP/UDP, MQTT, and TLS added, GUI Build added
1.2	31-Oct-2019	Finalized for publication
1.1	15-Oct-2019	Editorial review
1.0	03-Jul-2019	Preliminary DRAFT Release

**User Manual** 

**Revision 1.5** 

#### **Status Definitions**

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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#### **User Manual**

#### **Revision 1.5**

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