Quectel BG95

MQTT(S) Application Note

Confidentiality Level: (Tick the Box ■)		
Top Secret ☐	Confidential ☐	Public ☐

Document Control Records

Revision History			
Date	Revision	Revision Description	Author
2024-2-7	0	Initial	Zoran Romic

Contents

1 Purpose

MQTT (Message Queuing Telemetry Transport) is a broker-based publish/subscribe messaging protocol designed to be open, simple, lightweight and easy to implement. It is designed for connections with remote locations where a "small code footprint" is required or the network bandwidth is limited.
This document introduces how to use the MQTT function on Quectel BG95 module via AT commands.

2 Scope

This document applies to products with MCU mounted with BG95 module.

3 Terms and Definitions

Quectel: Quectel Wireless Solutions Co., Ltd.
MQTT: Message Queuing Telemetry Transport
UE: User Equipment
SSL: Secure Socket Layer
CA: Certificate Authority

4 MQTT AT Commands and corresponding API

AT commands	**API functions**	**Functionality**
AT+QMTCFG="WILL"	bg95_mqtt_config()	**Configuration of the will flag**
AT+QMTCFG="TIMEOUT"	bg95_mqtt_config()	**Configuration of timeout message report**
AT+QMTCFG="SESSION"	bg95_mqtt_config()	**Configuration of storing info about the client**
AT+QMTCFG="KEEPALIVE"	bg95_mqtt_config()	**Time after when server will disconnect a client**
AT+QMTCFG="recv/mode"	bg95_mqtt_config()	**Enabling URC**
AT+QMTCFG="SSL"	bg95_mqtt_config()	**Configuration of the SSL**
AT+QSSLCFG="CACERT"	bg95_mqtt_ssl_config()	**Setting of server certification**
AT+QSSLCFG="CLIENTCERT"	bg95_mqtt_ssl_config()	**Setting of client certification**
AT+QSSLCFG="CLIENTKEY"	bg95_mqtt_ssl_config()	**Setting of client key**
AT+QSSLCFG="SSLVERSION"	bg95_mqtt_ssl_config()	**Configuration of SSL version**
AT+QSSLCFG="CIPHERSUITE"	bg95_mqtt_ssl_config()	**Configuration of SSL chipper suites**
AT+QSSLCFG=" SECLEVEL"	bg95_mqtt_ssl_config()	**Configuration of SSL authentication mode**
AT+QSSLCFG="IGNORELOCALTIME"	bg95_mqtt_ssl_config()	**Ignoring the time of authentication**
AT+QMTOPEN	bg95_mqtt_connect()	**Open network connection for MQTT client**
AT+QMTCONN	bg95_mqtt_connect()	**Request a connection to MQTT server**
AT+QMTSUB	bg95_mqtt_sub()	**Subscription on one or more specific topics**
AT+QMTUNS	bg95_mqtt_unsub()	**Un-subscription from a specific topic**
AT+QMTPUBEX	bg95_mqtt_pub()	**Publish messages to a server for specific topic**
AT+QMTDISC	bg95_mqtt_disconnect()	**Disconnection from MQTT server**
AT+QMTCLOSE	bg95_mqtt_disconnect()	**Close a network for MQTT client**
	bg95_mqtt_set_urc_cb()	**Set user call back function for URC +QMTRECV**

5 MQTT Application Work Flow

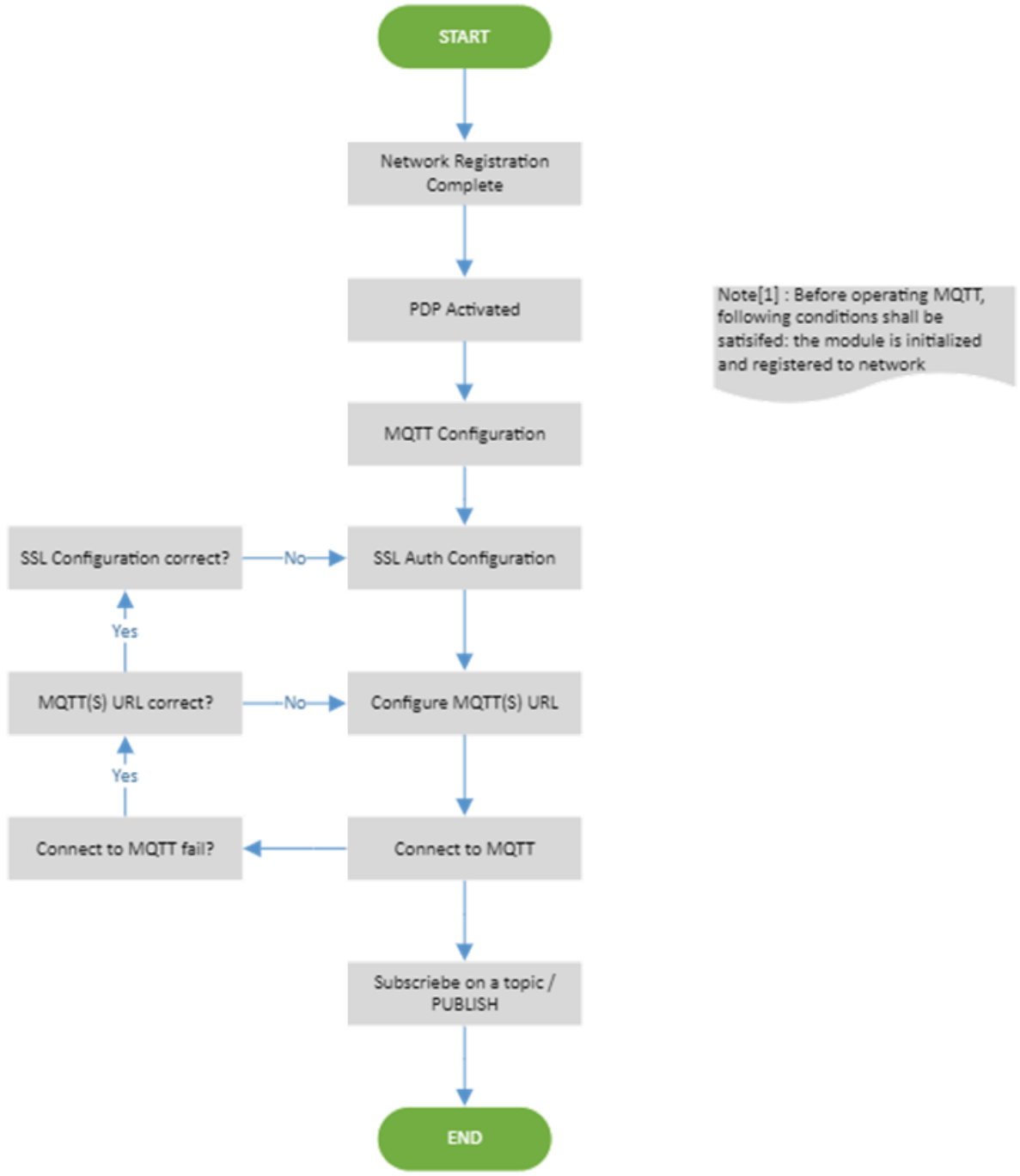


Figure 1: MQTT Application Workflow (1)

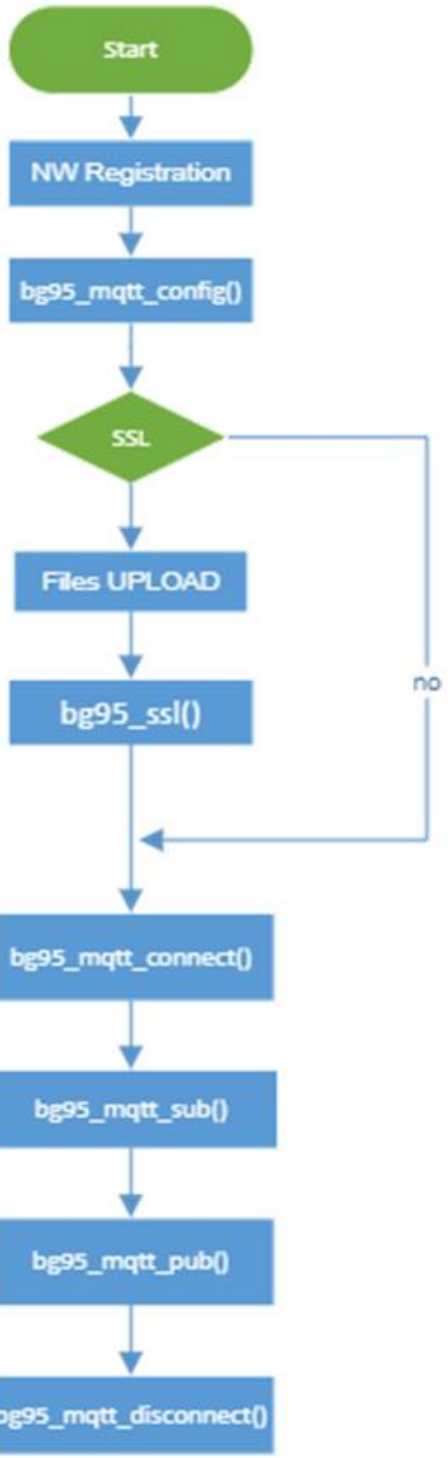


Figure 2: MQTT Application Workflow (2)

Here is description for MQTT workflow:

a) Call bg95_mqtt_config() to configure username, password and other MQTT configuration parameters – will, timeout, session, keepalive.
b) If SSL is needed, for example access to amazon.aws.iot, call bg95_ssl() to configure a correct SSL context ID for SSL encryption, a suitable SSL version which matched with remote server, a suitable cipher suite which matched with remote server, configure no authentication or perform server authentication (one-way authentication) or perform server and client authentication if requested by remote server (mutual authentication).
c) Call bg95_mqtt_connect() to open network connection for MQTT client.
d) Call bg95_mqtt_connect() to request a connection to MQTT server for a client.
e) Call bg95_mqtt_sub() to subscribe on one or more specific topics.
f) Call bg95_mqtt_pub() to publish messages to a server for the specific topic.
g) Call bg95_mqtt_unsub() to unsubscribe from the specific topic.
h) Call bg95_mqtt_disconnect() to disconnect from MQTT server.

6 MQTT Exception Handling

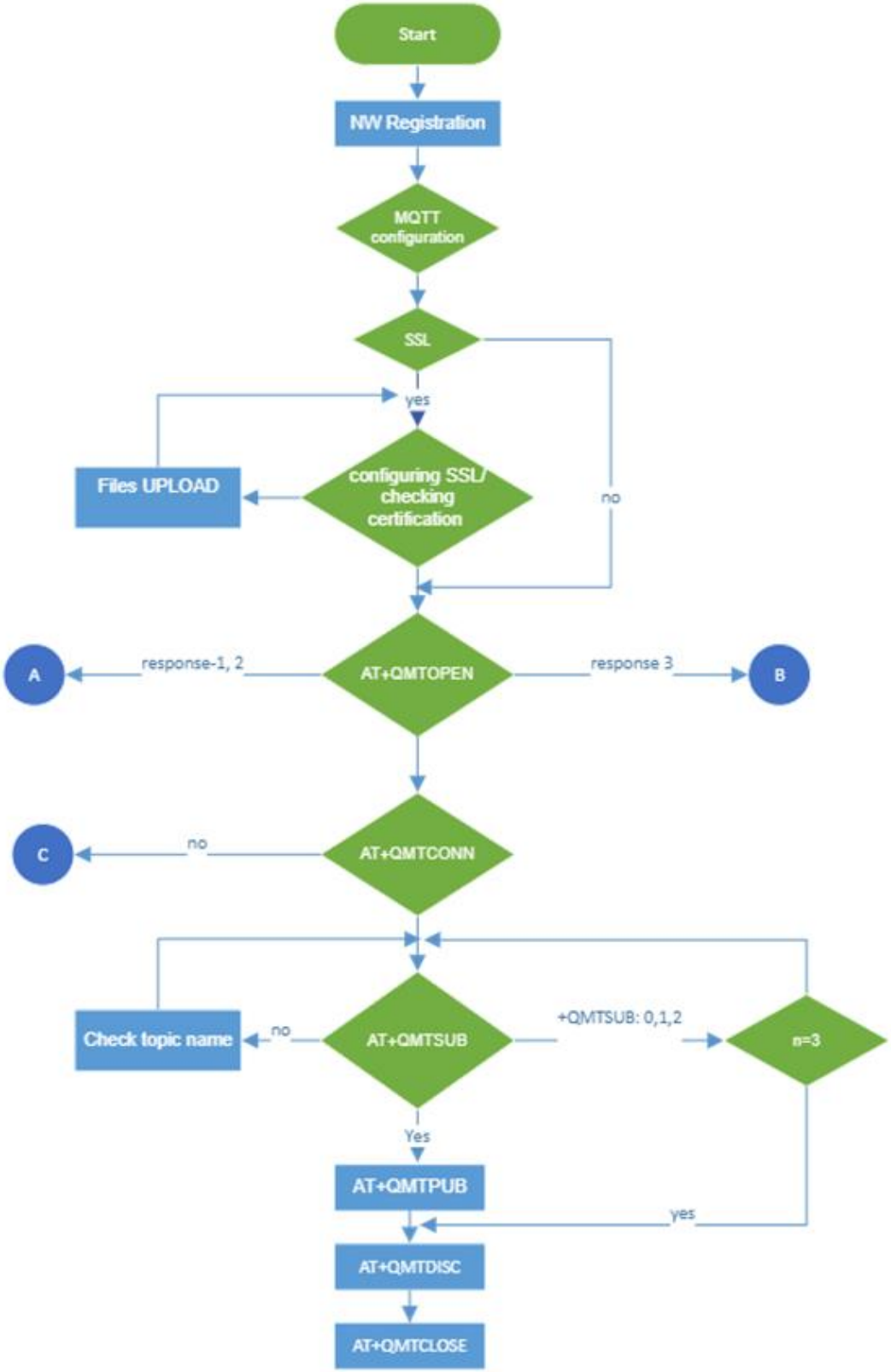
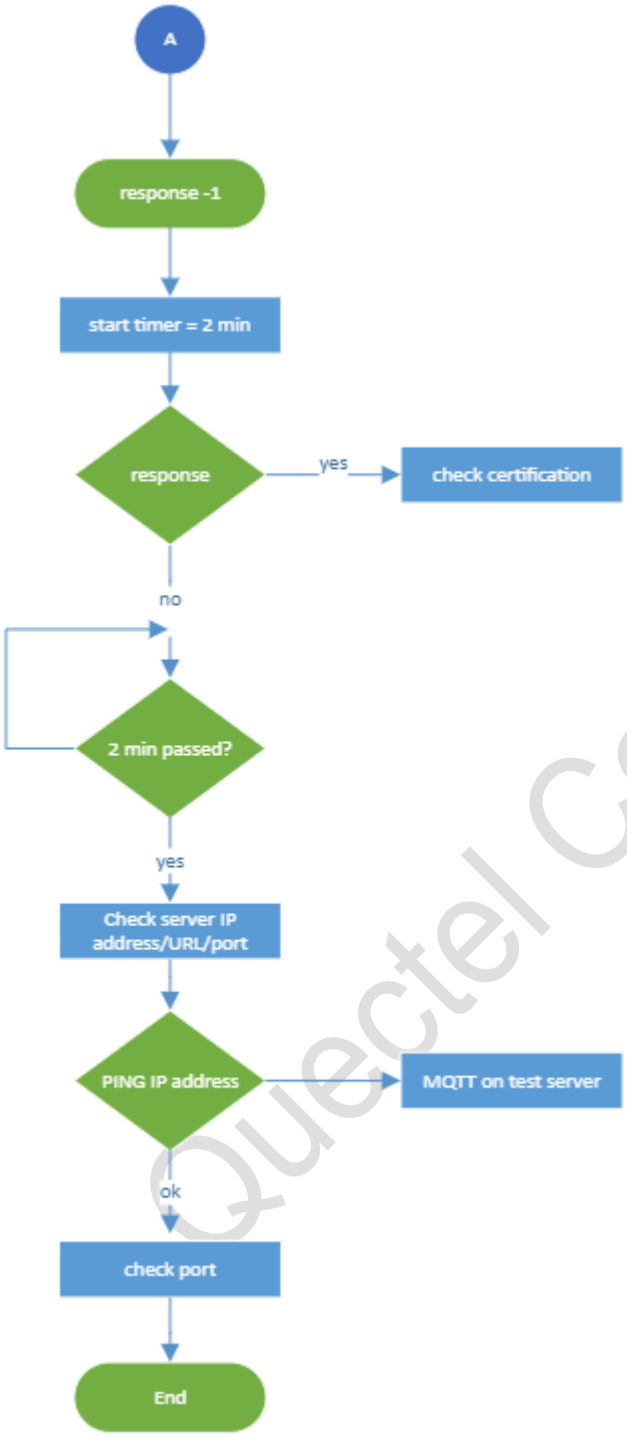
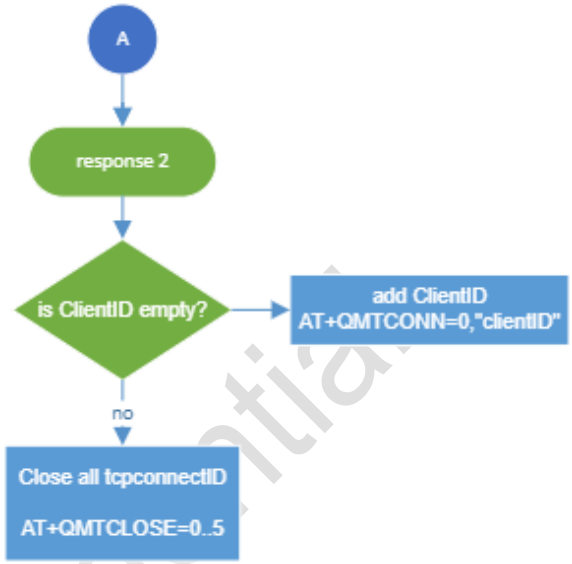


Figure 3: MQTT Exception Handling

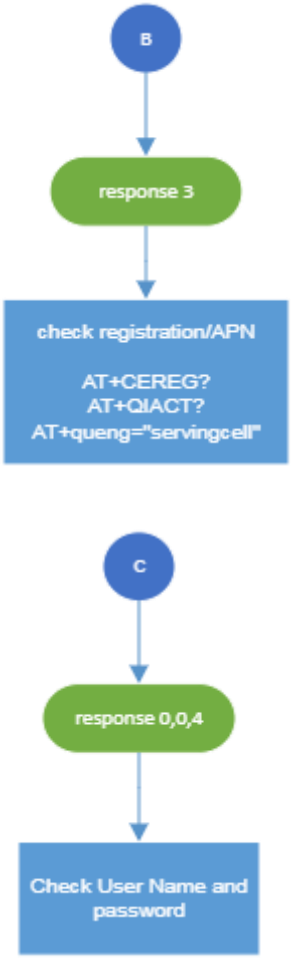
Response: -1



Response: 2



Response: 3



7 MQTT with SSL Configuration Diagram

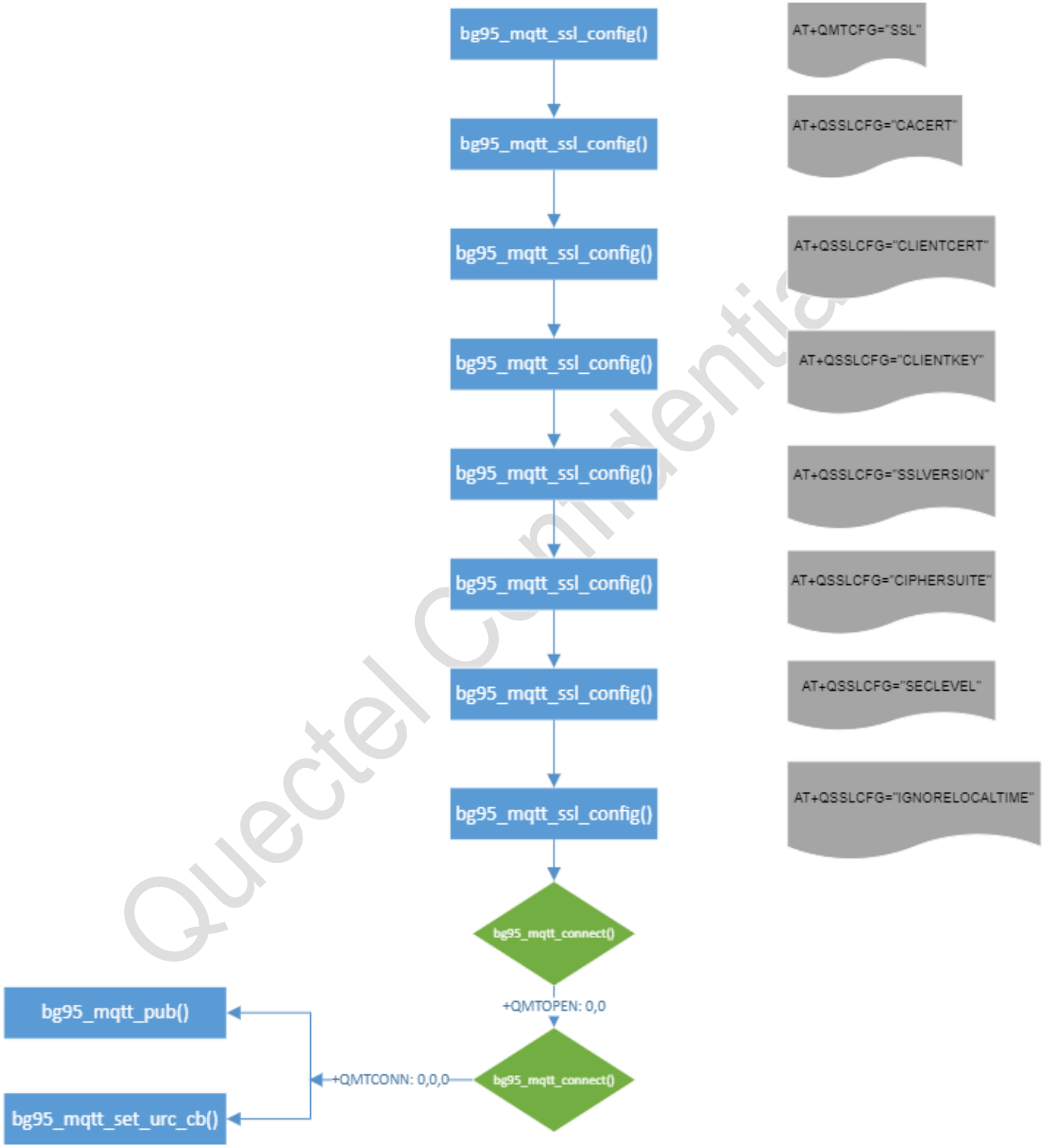


Figure 4: MQTT with SSL Configuration Diagram

8 Appendix A References

[1] BG95&BG77&BG600L Series Network Searching Scheme Introduction
[2] BG95&BG77&BG600L Series MQTT Application Note