



# WCP732M

## 1. Introduction

WCP732M is a Wi-Fi / Bluetooth Combo module compliant with IEEE802.11 a.b.g.n.ac MAC/baseband/radio and Bluetooth 5.0 optimized for low-power applications.

## 2. Hardware Architecture:

### 2.1 Main Chipset Information

Item
IEEE802.11 a.b.g.n.ac mac/baseband/radio Bluetooth 5.0

WCP732M is the 802.11a/b/g/n /ac +Bluetooth 5.0 COMBO Module that acts as a communication controller for users of a wireless device to connect to SMART TV

### - Features

- >IEEE 802.11ac Draft compliant.
- >Dual-band 2.4GHz /5 GHz
- >Dual-stream spatial multiplexing up to 867Mbps data rate
- >Support 20, 40, 80MHz channel with optional SGI (256QAM modulation)
- >On-chip power amplifiers and low –noise amplifiers for both bands
- >Complies with Bluetooth Core Specification Version 5.0
- >Bluetooth Class 1 or 2 transmitter operation.
- >Supports BT-WLAN coexistence.
- >Adaptive frequency hopping (AFH) for reducing radio frequency interference

### - WIFI Transmission

Baseband data is modulated and upconverted to the 2.4GHz ISM and 5-GHz U-NII bands, respectively. Linear on chip power amplifier are included, which are capable of delivering high output powers while Meeting IEEE802.11ac and IEEE802.a/b/g/n specifications without the need for external Pas. When using the internal Pas, closed-loop output power control is completely integrated.

### - WIFI Receiver

The chip has a wide dynamic range, direct conversion receiver that employs high-order on-chip channel filtering to ensure reliable operation in the noisy 2.4GHz ISM band or the entire 5GHz U-NII band. Control signals are available that can support the use of optional LNAs for each band, which can increase the receive sensitivity by several decibels.

Reverse direction isolation of LNA inside Transceiver IC suppresses unwanted radiation. Then RF signal will be directly down to IF signal (RX IQ) and high frequency spurious emissions are suppressed by



LPF. At last RX IQ signal will be demodulated digital data.

**- Bluetooth Low Energy**

The WCP732M support the Bluetooth Low Energy operating mode.

**- Adaptive Frequency Hopping**

The WCP732M gathers link quality statistics on a channel by basis to facilitate channel assessment and Channel map selection. The link quality is determined using both RF and baseband signal processing to Provide a more accurate frequency-hop map.

**- Product Details**

**> Data Modulation**

DSSS:CCK,BPSK,QPSK for 802.11b

OFDM:BPSK,QPSK,16QAM,64QAM,256QAM for 802.11a,g,n,ac

FHSS:GFSK,OQPSK, 8DPSK,  $\pi/4$ DPSK for Bluetooth

- 802.11n+HT20 spec

MCS Index	Modulation	R	$N_{BPSCS}(t_{SS})$	$N_{SD}$	$N_{SP}$	$N_{CBPS}$	$N_{DBPS}$	Data rate (Mb/s)	
								800 ns GI	400 ns GI (see NOTE)
0	BPSK	1/2	1	52	4	52	26	6.5	7.2
1	QPSK	1/2	2	52	4	104	52	13.0	14.4
2	QPSK	3/4	2	52	4	104	78	19.5	21.7
3	16-QAM	1/2	4	52	4	208	104	26.0	28.9
4	16-QAM	3/4	4	52	4	208	156	39.0	43.3
5	64-QAM	2/3	6	52	4	312	208	52.0	57.8
6	64-QAM	3/4	6	52	4	312	234	58.5	65.0
7	64-QAM	5/6	6	52	4	312	260	65.0	72.2



802.11n+HT40 spec

MCS Index	Modulation	R	$N_{BPSCS(iSS)}$	$N_{SD}$	$N_{SP}$	$N_{CBPS}$	$N_{DBPS}$	Data rate (Mb/s)	
								800 ns GI	400 ns GI
8	BPSK	1/2	1	108	6	216	108	27.0	30.0
9	QPSK	1/2	2	108	6	432	216	54.0	60.0
10	QPSK	3/4	2	108	6	432	324	81.0	90.0
11	16-QAM	1/2	4	108	6	864	432	108.0	120.0
12	16-QAM	3/4	4	108	6	864	648	162.0	180.0
13	64-QAM	2/3	6	108	6	1296	864	216.0	240.0
14	64-QAM	3/4	6	108	6	1296	972	243.0	270.0
15	64-QAM	5/6	6	108	6	1296	1080	270.0	300.0

802.11ac spec

MCS	Modulation & Rate	20 MHz 1x SS	20 MHz 2x SS	20 MHz 4x SS	20 MHz 8x SS	40 MHz 1x SS	40 MHz 2x SS	40 MHz 4x SS	40 MHz 8x SS	80 MHz 1x SS	80 MHz 2x SS	80 MHz 4x SS	80 MHz 8x SS	160 MHz 1x SS	160 MHz 2x SS	160 MHz 4x SS	160 MHz 8x SS
0	BPSK 1/2	7.2	14.4	28.9	57.8	15.0	30.0	60.0	120.0	32.5	65.0	130.0	260.0	65.0	130.0	260.0	520.0
1	QPSK 1/2	14.4	28.9	57.8	115.6	30.0	60.0	120.0	240.0	65.0	130.0	260.0	520.0	130.0	260.0	520.0	1040.0
2	QPSK 3/4	21.7	43.3	86.7	173.3	45.0	90.0	180.0	360.0	97.5	195.0	390.0	780.0	195.0	390.0	780.0	1560.0
3	16-QAM 1/2	28.9	57.8	115.6	231.1	60.0	120.0	240.0	480.0	130.0	260.0	520.0	1040.0	260.0	520.0	1040.0	2080.0
4	16-QAM 3/4	43.3	86.7	173.3	346.7	90.0	180.0	360.0	720.0	195.0	390.0	780.0	1560.0	390.0	780.0	1560.0	3120.0
5	64-QAM 2/3	57.8	115.6	231.1	462.2	120.0	240.0	480.0	960.0	260.0	520.0	1040.0	2080.0	520.0	1040.0	2080.0	4160.0
6	64-QAM 3/4	65.0	130.0	260.0	520.0	135.0	270.0	540.0	1080.0	292.5	585.0	1170.0	2340.0	585.0	1170.0	2340.0	4680.0
7	64-QAM 5/6	72.2	144.4	288.9	577.8	150.0	300.0	600.0	1200.0	325.0	650.0	1300.0	2600.0	650.0	1300.0	2600.0	5200.0
8	256-QAM 3/4	86.7	173.3	346.7	693.3	180.0	360.0	720.0	1440.0	390.0	780.0	1560.0	3120.0	780.0	1560.0	3120.0	6240.0
9	256-QAM 5/6	-	-	-	-	200.0	400.0	800.0	1600.0	433.3	866.7	1733.3	3466.7	866.7	1733.3	3466.7	6933.3

### 3. Notice

## Approval Statement

### **FCC approval**

This device complies with Part 15 of the FCC's Rules. Operation is subject to the following two Conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesirable operation.

To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

**Contains Transmitter module FCC ID: A3LWCP732M**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.
- The OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.
- The module is limited to installation in mobile or fixed applications.

### **IC approval**

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The host device must be labeled to display the Industry Canada certification number of the module.

**Contains transmitter module IC:649E-WCP732M**

*Le dispositif d'accueil doivent être étiquetés pour afficher le numéro de certification d'Industrie Canada du module.*

***Contient module émetteur IC :649E-WCP732M***

### **IMPORTANT NOTE**

This device complies with FCC & IC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

- 1) This module may not be co-located with any other transmitters or antennas.
- 2) The antenna must be installed such that 20cm is maintained between the antenna and users.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is



still responsible for testing their end-product for any additional compliance requirements with this module installed. In the event that these conditions cannot be met, then the FCC & IC authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product including this module and obtaining separate FCC & IC authorizations.

*Cet appareil est conforme aux limites de la FCC et IC exposition aux radiations dans un environnement non contrôlé. Cet appareil doit être installé et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou un autre émetteur.*

*Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes :*

- 1 ) L' antenne doit être installée de telle sorte que 20 cm est maintenue entre l'antenne et les utilisateurs .*
- 2 ) Ce module ne peut pas être co-localisé avec d'autres émetteurs ou des antennes .*

*Aussi longtemps que deux conditions précitées sont remplies, le test du transmetteur supplémentaires ne seront pas tenus. Toutefois, l'intégrateur OEM est toujours responsable de tester leurs produits finis pour toutes les exigences de conformité supplémentaires avec ce module installé.*

*Dans le cas où ces conditions ne peuvent pas être remplies, alors la FCC et IC autorisations ne sont plus considérés comme valides et l'ID de la FCC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera responsable de réévaluer le produit final, y compris l'obtention de ce module et séparée de la FCC et IC Autorisations*

## **User Information**

**Caution:** Any changed or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**Attention:** *Toute changé ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'utilisateur `autorité de faire fonctionner cet équipement.*

-This device is restricted to indoor use only within the 5.15 ~ 5.25GHz Band.

-User should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

*-Cet appareil est restreint à l'utilisation à l'intérieur seulement dans la bande 5.15 ~ 5.25GHz.*