



CMP40x0 (Model: CEL8721D)
Hostless Dual-Band Wi-Fi + BLE Module
Datasheet

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TRANSCEIVER IC

The CMP40x0, utilizing the Realtek RTL8721x SoC, is a WiFi+Bluetooth combo device with dual-integrated MCU cores. This module supports WiFi- and Bluetooth communications while hosting the end-user application. The architecture is optimized for low-power consumption. Customers can select from several supported RTOS implementations and interface to a variety of peripherals or external MCUs.

The CMP4010 uses the RTL8721C and supports 2.4 GHz WiFi.

The CMP4020 uses the RTL8721D and supports 2.4 / 5 GHz WiFi.

INTEGRATED FLASH

The CMP40x0 incorporates additional SPI flash for storing program code and Over-The-Air code updates. The flash is managed by the core SoC SPI Flash Controller (SPIC) and is accessible by both MCU cores in the CMP40x0.

CMP4010-1(C) 2 MB flash

CMP4020-1(C) 2 MB flash

CMP4020-2(C) 8 MB flash

CMP4020-3(C) 16 MB flash

ABSOLUTE MAXIMUM RATINGS

Description	Min	Max	Unit
Storage temperature range	-40	125	°C
Power supply voltage (VDD)	3.0	3.6	V
I/O supply voltage	0.99	3.6	V

* VDD = Terminal Supply Domain

RECOMMENDED OPERATING CONDITIONS

Description	Min	Typ	Max	Unit
Operating temperature range	-40	-	85	°C
Power supply voltage (VDD)	3.0	-	3.6	V

POWER CONSUMPTION

(@25°C unless otherwise specified)

Operation Mode	Scenario	Min	Typical	Max	Unit
Deep Sleep	RTC Timer; 1 kB RAM retention	7	7.5	8	uA
Sleep	KM4 Power Gate; KM0 Clock Gate All RAM retained; WiFi retained	30	40	50	uA
Active	HT20 MCS0~7 Normal Mode KM4 Active Mode Rx Idle	-	52	-	mA
	HT20 MCS0~7 ULP Mode KM4 Active Mode Rx Idle	-	35	-	
	HT20 MCS0~7 ULP Mode KM4 Active Mode UDP Rx @ 8 Mbps	-	39	-	
WoWLAN Beacon	Rx Beacon Normal Mode KM4 Sleep Mode	-	28	-	mA
	Rx Beacon ULP Mode KM4 Sleep Mode	-	23	-	
WoWLAN DTIM=1	KM4 Sleep Mode; SRAM Retained WiFi Retained	700	750	800	uA

Transmit Mode	Typical (2.4 GHz)	Typical (5 GHz)	Unit
MCS7/HT20 – 18 dBm Tx	248	308	mA
MCS7/HT40 – 18 dBm (2.4 GHz) / 17 dBm (5 GHz)	247	310	mA
OFDM 54 Mbps – 19 dBm (2.4 GHz) / 18 dBm (5 GHz)	262	323	mA
CCK 11 Mbps – 18 dBm	257	n/a	mA

Bluetooth Operation Mode	Condition	Typical	Units
TX – KM4 and M0 ON	4.5 dBm TX	100	mA
RX – KM4 and M0 ON	Central Mode	56.1	mA
ADV – KM4 and M0 ON	Peripheral Mode	56.2	mA
Connection	Central Mode	56.3	mA

Wi-Fi 2.4 GHz Band RF Receiver Specifications

(@25°C unless otherwise specified)

Parameter	Description	Min	Typ	Max	Unit
Frequency Range	Center Channel Frequency	2412	-	2484	MHz
RX Sensitivity	1 Mbps CCK	-99.1	-98.6	-97.5	dBm
	2 Mbps CCK	-97	-95.9	-95.5	
	5.5 Mbps CCK	-94.5	-94.2	-93.5	
	11 Mbps CCK	-91.5	-91.1	-90.6	
RX Sensitivity	BPSK rate 1/2, 6 Mbps OFDM	-96	-95.4	-94.3	dBm
	BPSK rate 3/4, 9 Mbps OFDM	-94.5	-94.3	-93.9	
	QPSK rate 1/2, 12 Mbps OFDM	-93	-92.9	-92.5	
	QPSK rate 3/4, 18 Mbps OFDM	-91	-90.4	-90	
	16QAM rate 1/2, 24 Mbps OFDM	-87	-86.8	-86.4	
	16QAM rate 3/4, 36 Mbps OFDM	-84	-83.8	-83.4	
	64QAM rate 1/2, 48 Mbps OFDM	-79.5	-79.2	-78.9	
	64QAM rate 3/4, 54 Mbps OFDM	-78.1	-77.8	-77	
RX Sensitivity BW = 20 MHz Mixed Mode 800 ns Guard Interval Non-STBC	MCS 0, BPSK rate 1/2	-95.5	-95.1	-94.1	dBm
	MCS 1, QPSK rate 1/2	-92.2	-92	-91.7	
	MCS 2, QPSK rate 3/4	-90	-89.4	-89	
	MCS 3, 16QAM rate 1/2	-86.5	-85.8	-84	
	MCS 4, 16QAM rate 3/4	-83.2	-82.9	-82.5	
	MCS 5, 64QAM rate 2/3	-78.5	-78.4	-78	
	MCS 6, 64QAM rate 3/4	-77	-76.7	-76.4	
	MCS 7, 64QAM rate 5/6	-75.7	-75.4	-75	
RX Sensitivity BW = 40 MHz Mixed Mode 800 ns Guard Interval Non-STBC	MCS 0, BPSK rate 1/2	-93	-92.5	-92.2	dBm
	MCS 1, QPSK rate 1/2	-89.5	-88.7	-87	
	MCS 2, QPSK rate 3/4	-87	-86.5	-86.4	
	MCS 3, 16QAM rate 1/2	-83.5	-83.3	-83	
	MCS 4, 16QAM rate 3/4	-80	-79.9	-79	
	MCS 5, 64QAM rate 2/3	-75.5	-75.4	-75	
	MCS 6, 64QAM rate 3/4	-74.5	-74	-73.9	
	MCS 7, 64QAM rate 5/6	-73	-72.5	-72.3	
Maximum Receive Level	6 Mbps OFDM	-	0	-	dBm
	54 Mbps OFDM	-	0	-	
	MCS 0	-	0	-	
	MCS 7	-	0	-	
Receive Adjacent Channel Rejection	1 Mbps CCK	42	43	44	dBm
	11 Mbps CCK	39	41	42	
	BPSK rate 1/2, 6 Mbps OFDM	39	40	41	
	64QAM rate 3/4, 54 Mbps OFDM	20	22	24	
	HT20, MCS 0, BPSK rate 1/2	39	39	40	
	HT20, MCS 7, 64QAM rate 5/6	19	20	21	
	HT40, MCS 0, BPSK rate 1/2	27	29	32	
	HT40, MCS 7, 64QAM rate 5/6	9	10	11	

Wi-Fi 2.4 GHz Band RF Transmitter Specifications

(@25°C unless otherwise specified)

Parameter	Description	Min	Typ	Max	Unit
Frequency Range	Center Channel Frequency	2412	-	2484	MHz
Output power with spectral mask and EVM compliance	1 Mbps CCK	-	18	-	dBm
	11 Mbps CCK	-	18	-	
	BPSK rate 1/2, 6 Mbps OFDM	-	17	-	
	64QAM rate 3/4, 54 Mbps OFDM	-	17	-	
	HT20, MCS 0, BPSK rate 1/2	-	16	-	
	HT20, MCS 7, 64QAM rate 5/6	-	16	-	
	HT40, MCS 0, BPSK rate 1/2	-	16	-	
TX EVM	BPSK rate 1/2, 6 Mbps OFDM	-	-	-5	dBm
	64QAM rate 3/4, 54 Mbps OFDM	-	-	-25	
	HT20, MCS 0, BPSK rate 1/2	-	-	-5	
	HT20, MCS 7, 64QAM rate 5/6	-	-	-28	
	HT40, MCS 0, BPSK rate 1/2	-	-	-5	
	HT40, MCS 7, 64QAM rate 5/6	-	-	-28	
Output Power Variation	After Power Trim	-1.5	-	1.5	dBm
Carrier Suppression Harmonic Output Power	1 st Harmonic	-	-	-30	dBm
	2 nd Harmonic	-	-23	-21.9	
	3 rd Harmonic	-	-15	-14	

Wi-Fi 5 GHz Band RF Receiver Specifications

(@25°C unless otherwise specified)

Parameter	Description	Min	Typ	Max	Unit
Frequency Range	Center Channel Frequency	5180	-	5825	MHz
RX Sensitivity	BPSK rate 1/2, 6 Mbps OFDM	-94.5	-93.6	-92	dBm
	BPSK rate 3/4, 9 Mbps OFDM	-93.5	-92.8	-91	
	QPSK rate 1/2, 12 Mbps OFDM	-92	-91.5	-90.5	
	QPSK rate 3/4, 18 Mbps OFDM	-90	-89.1	-88	
	16QAM rate 1/2, 24 Mbps OFDM	-86.5	-85.6	-84.5	
	16QAM rate 3/4, 36 Mbps OFDM	-83.5	-82.8	-82	
	64QAM rate 1/2, 48 Mbps OFDM	-79	-78.3	-77.5	
	64QAM rate 3/4, 54 Mbps OFDM	-77.5	-76.7	-76	
RX Sensitivity BW = 20 MHz Mixed Mode 800 ns Guard Interval Non-STBC	MCS 0, BPSK rate 1/2	-94	-93.3	-91.5	dBm
	MCS 1, QPSK rate 1/2	-91.5	-90.7	-89.5	
	MCS 2, QPSK rate 3/4	-89	-88.2	-87	
	MCS 3, 16QAM rate 1/2	-86	-85	-84	
	MCS 4, 16QAM rate 3/4	-82.6	-81.9	-80.5	
	MCS 5, 64QAM rate 2/3	-78	-77.1	-76	
	MCS 6, 64QAM rate 3/4	-76.5	-75.4	-74	
	MCS 7, 64QAM rate 5/6	-74.8	-73.7	-72.5	
RX Sensitivity BW = 40 MHz Mixed Mode 800 ns Guard Interval Non-STBC	MCS 0, BPSK rate 1/2	-91.5	-90.6	-88.5	dBm
	MCS 1, QPSK rate 1/2	-88.5	-87.8	-86.5	
	MCS 2, QPSK rate 3/4	-85.5	-85.2	-83.5	
	MCS 3, 16QAM rate 1/2	-82.5	-82.1	-81	
	MCS 4, 16QAM rate 3/4	-79	-78.7	-78	
	MCS 5, 64QAM rate 2/3	-74.5	-74	-73	
	MCS 6, 64QAM rate 3/4	-73.5	-72.8	-72	
	MCS 7, 64QAM rate 5/6	-72	-71.3	-70.5	
Maximum Receive Level	6 Mbps OFDM	-	0	-	dBm
	54 Mbps OFDM	-	0	-	
	MCS 0	-	0	-	
	MCS 7	-	0	-	
	BPSK rate 1/2, 6 Mbps OFDM	19	21	23	
	64QAM rate 3/4, 54 Mbps OFDM	10	11	12	
	HT20, MCS 0, BPSK rate 1/2	19	19	20	
	HT20, MCS 7, 64QAM rate 5/6	7	7	9	
	HT40, MCS 0, BPSK rate 1/2	29	30	31	
	HT40, MCS 7, 64QAM rate 5/6	11	13	14	

Wi-Fi 5 GHz Band RF Transmitter Specifications

(@25°C unless otherwise specified)

Parameter	Description	Min	Typ	Max	Unit
Frequency Range	Center Channel Frequency	5180	-	5825	MHz
	BPSK rate 1/2, 6 Mbps OFDM	-	17	-	
	64QAM rate 3/4, 54 Mbps OFDM	-	16	-	
	HT20, MCS 0, BPSK rate 1/2	-	16	-	
	HT20, MCS 7, 64QAM rate 5/6	-	15	-	
	HT40, MCS 0, BPSK rate 1/2	-	16	-	
	HT40, MCS 7, 64QAM rate 5/6	-	15	-	
TX EVM	BPSK rate 1/2, 6 Mbps OFDM	-	-	-5	dBm
	64QAM rate 3/4, 54 Mbps OFDM	-	-	-25	
	HT20, MCS 0, BPSK rate 1/2	-	-	-5	
	HT20, MCS 7, 64QAM rate 5/6	-	-	-28	
	HT40, MCS 0, BPSK rate 1/2	-	-	-5	
	HT40, MCS 7, 64QAM rate 5/6	-	-	-28	
Output Power Variation	After Power Trim	-1.5	-	1.5	dBm
Carrier Suppression		-	-	-30	dBm

Bluetooth 2.4 GHz Band RF Tx/Rx Specifications

(@25°C unless otherwise specified)

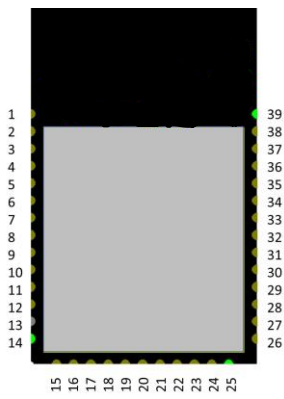
Parameter	Min	Typ	Max	Unit
Frequency Range	2402	-	2480	MHz
TX Power	-	4.5	-	dBm
RX Sensitivity (LE 1M PHY)	-100.9	-	-	dBm
RX Sensitivity (LE 2M PHY)	-96.8	-	-	dBm

I/O PIN ASSIGNMENTS

Refer to the RTL8721 datasheet for pin functionality details.

Module Pin Number	Pin Name	Notes
1	PA27	
2	PA30	
3	RREF/PA28	Adding a 12K pull down resistor enables HSUSB
4	HSDP/PA26	Either HSDP or GPIO PA26 depending on 12K pull down present or not
5	HSDM/PA25	Either HSDP or GPIO PA26 depending on 12K pull down present or not
6	PB1	
7	PB2	
8	PB3	
9	PB4	
10	PB5	
11	PB6	
12	PB7	
13	VCC	
14	GND	
15	FLASH SPI Data In	Pin not available as GPIO: Dedicated to Flash
16	NC	Pin isolated from Flash CLK
17	FLASH_SPI_CS	Pin not available as GPIO: Dedicated to FLASH
18	FLASH_SPI_Data Out	Pin not available as GPIO: Dedicated to FLASH
19	PB22	
20	PB23	
21	PB26	
22	PB29	
23	PB31	
24	PA0	
25	GND	
26	PA4	
27	PA2	
28	CHIP_ENABLE	
29	UART_LOG_TXD / PA7	This Pin pulled low with Reset applied placed device in Download Mode
30	UART_LOG_RXD / PA8	
31	PA19	
32	PA18	
33	PA17	
34	PA16	
35	PA15	
36	PA14	
37	PA12	
38	PA13	
39	GND	

MODULE PINOUT

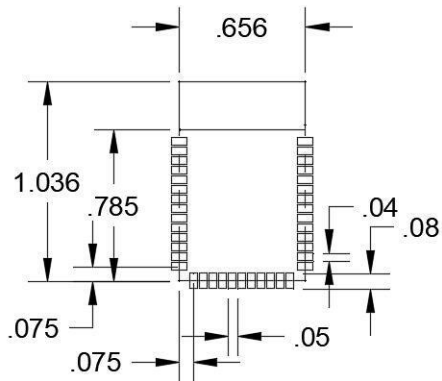


MODULE DIMENSIONS

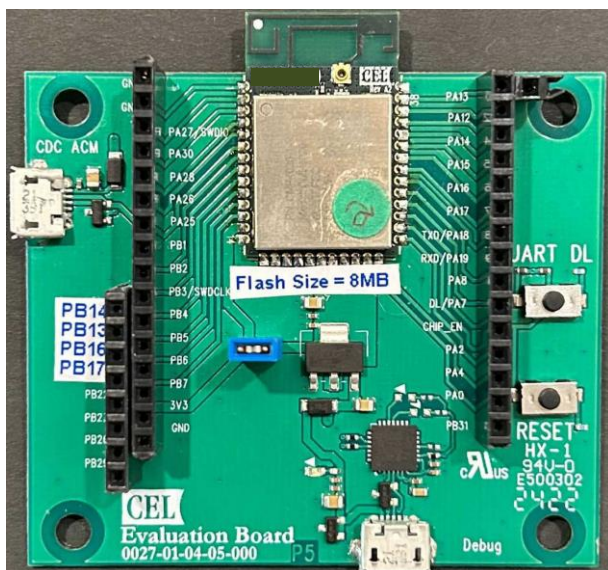
1.036 x 0.656 x 0.142 in (16.7 x 26.3 x 3.6 mm)

MODULE LAND FOOTPRINT

Dimensions in inches.



EVALUATION BOARDS



PROCESSING

Recommended Reflow Profile

Parameter Values	
Ramp Up Rate (from T_{soakmax} to T_{peak})	3°/sec max
Minimum Soak Temperature	150°C
Maximum Soak Temperature	200°C
Soak Time	60-120 sec
T_{Liquidus}	217°C
Time above TL	60-150 sec
T_{peak}	250°C
Time within 5° of T_{peak}	20-30 sec
Time from 25° to T_{peak}	8 min max
Ramp Down Rate	6°C/sec max

Pb-Free Solder Paste

Use of “No Clean” soldering paste is strongly recommended, as it does not require cleaning after the soldering process.

Note: *The quality of solder joints on the castellations (“half vias”) where they contact the host board should meet the appropriate IPC Specification. See the Castellated Terminations Section in the latest IPC-A-610 Acceptability of Electronic Assemblies document.*

Cleaning

In general, cleaning the populated module is strongly discouraged. Residuals under the module cannot be easily removed with any cleaning process.

- Cleaning with water can lead to capillary effects where water is absorbed into the gap between the host board and the module. The combination of soldering flux residuals and encapsulated water could lead to short circuits between neighboring pads. Water could also damage any stickers or labels.
- Cleaning with alcohol or a similar organic solvent will likely flood soldering flux residuals into the two housings, which is not accessible for post-washing inspection. The solvent could also damage any stickers or labels.
- Ultrasonic cleaning could damage the module permanently.

The best approach is to consider using a “No Clean” solder paste and eliminate the post-soldering cleaning step.

Optical Inspection

After soldering the module to the host board, consider optical inspection to check the following:

- Proper alignment and centering of the module over the pads
- Proper solder joints on all pads
- Excessive solder or contacts to neighboring pads or vias

Repeating Reflow Soldering

Only a single reflow soldering process is encouraged for host boards.

Wave Soldering

If a wave soldering process is required on the host boards due to the presence of leaded components, only a single wave soldering process is encouraged.

Hand Soldering

Hand soldering is possible. When using a soldering iron, follow IPC recommendations (reference document *IPC-7711*).

Rework

The CMP4010 can be unsoldered from the host board. Use of a hot air rework tool should be programmable and the solder joint and module should not exceed the maximum peak reflow temperature of 250°C.

Caution

If temperature ramps exceed the reflow temperature profile, module and component damage may occur due to thermal shock. Avoid overheating.

Warning

Never attempt a rework on the module itself (i.e., replacing individual components); such actions will terminate warranty coverage.

Additional Grounding

Attempts to improve the module or the system grounding by soldering braids, wires or cables onto the module RF shield cover is done at the customer's own risk. The ground pins at the module perimeter should be sufficient for optimum immunity to external RF interference.

AGENCY CERTIFICATIONS for CMP40x0

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC 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 undesired operation.

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 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.

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable.

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas (CMP4020 only)

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	*Cable Length
1	0	MAG.LAYERS	MSA-4008-25GC1-A2	2.98	2.4~2.5GHz	PIFA	ipex(MHF)	150mm
				5.16	5.15~5.85G Hz			
2	0	CEL	0027-02-07-00-001	2.1	2.4~2.5GHz	PIFA	none	none
				3.5	5.15~5.85G Hz			

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following:

- CMP4010 - "Contains FCC ID: W7Z-WB242102".
- CMP4020 - "Contains FCC ID: W7Z-WB220501".

The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all 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 required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

Industry Canada statement:

This device complies with ISED's licence-exempt RSSs. 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 undesired operation.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 1 condition above is 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 required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

1) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

IMPORTANTE:**End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following:

- CMP4010 - "Contains IC: 8254A-WB242102".
- CMP4020 - "Contains IC: 8254A-WB220501".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 8254A-WB242102 (CMP4010) 8254A-WB220501 (CMP4020)".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module. Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Caution :

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

(iii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate;

(iv) where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

(i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5 250 à 5 350 MHz et de 5 470 à 5 725 MHz doit être conforme à la limite de la p.i.r.e.;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée, selon le cas;

(iv) lorsqu'il y a lieu, les types d'antennes (s'il y en a plusieurs), les numéros de modèle de l'antenne et les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, énoncée à la section 6.2.2.3, doivent être clairement indiqués

DETACHABLE ANTENNA USAGE (CMP4020)

This radio transmitter [IC: 8254A-WB220501] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC: 8254A-WB220501] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connect or Type	Cable Length	Impedance (Ω)
1	0	MAG.LAYERS	MSA-4008-25GC1-A2	2.98	2.4~2.5GHz	PIFA	ipex(MHF)	150mm	50
				5.16	5.15~5.85GHz				50
2	0	CEL	0027-02-07-00-001	2.1	2.4~2.5GHz	PIFA	none	none	50
				3.5	5.15~5.85GHz				50

European Standards Testing Completed

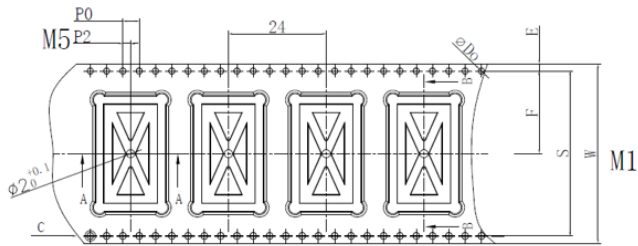
Contact CEL for details and test reports.

- EN 62311
- EN 301893
- EN 300328-WLAN
- EN 300328-BT

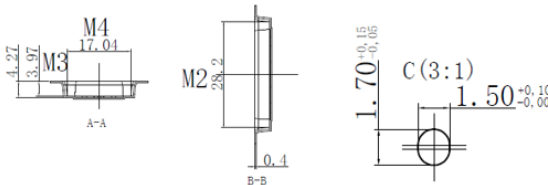
SHIPMENT, HANDLING AND STORAGE

Tape and Reel

The CMP4010 modules are delivered in tape and reel. Each reel contains 600 modules.



E	1.75 ± 0.10
F	20.20 ± 0.15
S	40.40 ± 0.10
P2	2.00 ± 0.15
ϕD_o	$1.50 \pm \begin{smallmatrix} 0.10 \\ 0.00 \end{smallmatrix}$
$\phi D1$	$2.00 \pm \begin{smallmatrix} 0.10 \\ 0.00 \end{smallmatrix}$
Po	4.00 ± 0.10
10Po	40.00 ± 0.20
W	44.00 ± 0.30
P	24.00 ± 0.10
AO	17.04 ± 0.10
BO	28.20 ± 0.10
KO	4.27 ± 0.10
T	0.40 ± 0.05



Handling

The CMP4010 modules are designed and packaged to be processed in an automated assembly line.

Warning

The CMP4010 modules contain highly sensitive electronic circuitry. Handling without proper ESD protection may destroy or damage the module permanently.

Warning

The CMP4010 modules are moisture-sensitive devices. Appropriate handling instructions and precautions are summarized in J-STD-033. Read carefully to prevent permanent damage due to moisture intake.

Moisture Sensitivity Level (MSL)

MSL 3, per J-STD-033

Storage

Storage/shelf life in sealed bags is 12 months at <math><40^{\circ}\text{C}</math> and <math><90\%</math> relative humidity.

QUALITY

CEL Modules offer the highest quality at competitive prices. Our modules are manufactured in compliance with the IPC-A-610 specification, Class II. Our modules go through JESD22 qualification processes which includes high temperature operating life tests, mechanical shock, temperature cycling, humidity and reflow testing. CEL conducts RF and DC factory testing on 100% of all production parts.

CEL builds the quality into our products, giving our customers confidence when integrating our products into their systems.

ORDERABLE PART NUMBERS

Orderable Part Number	Description	Min/Mult
CMP4010-1-R	RTL8721C IC, Wi-Fi + BT combo, 2 MB, PCB antenna	600/600
CMP4010-1C-R	RTL8721C IC, Wi-Fi + BT combo, 2 MB, u.FI connector	600/600
CMP4010-1-EVB	Evaluation Board, RTL8721C IC, Wi-Fi + BT combo, 2 MB	1/1
CMP4020-1-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 2 MB, PCB antenna	600/600
CMP4020-1C-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 2 MB, u.FI connector	600/600
CMP4020-1-EVB	Evaluation Board, RTL8721D IC, Dual Band Wi-Fi + BT combo, 2 MB	1/1
CMP4020-2-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 8 MB, PCB antenna	600/600
CMP4020-2C-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 8 MB, u.FI connector	600/600
CMP4020-3-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 16 MB, PCB antenna	600/600
CMP4020-3C-R	RTL8721D IC, Dual Band Wi-Fi + BT combo, 16 MB, u.FI connector	600/600

NOTE: THE '-R' IN THE ORDERABLE PARTNUMBER SHOULD BE REPLACED WITH '-B' FOR BULK QTYS.

REFERENCES

Reference Documents	Download
Health Canada Safety Code 6	Link

REVISION HISTORY

Revision	Changes to Current Version	Page(s)
0027-00-07-00-000 (Issue A) July 17, 2020	Initial Preliminary Data Sheet	N/A
0027-00-07-00-000 (Issue B) Sept 25, 2020	Add 'Reference Code Available' section. Add BLE Mesh capability.	1
0027-00-07-00-000 (Issue C) Oct 30, 2020	Update operational temperature range	4
0027-00-07-00-000 (Issue D) Apr 26, 2021	Add FCC/IC certification information. Update Orderable PN Table	12 15
0027-00-07-00-000 (Issue E) June 1, 2021	Change BLE Tx power. Correct PN in references to core SoC.	7
0027-00-07-00-000 (ISSUE F) May 23, 2022	Convert to CMP40x0; Add 5 GHz data for CMP4020	--
0027-00-07-00-000 (ISSUE G) JUNE, 2022	Clarify SPI FLASH Pin Assignments; Add Orderable PNs for higher flash densities	10
0027-00-07-00-000 (ISSUE H) JAN, 2023	Add certification details for CMP4020	
0027-00-07-00-000 (ISSUE J) FEB, 2023	Add CE test data list.	17

DISCLAIMER

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FOR MORE INFORMATION

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TECHNICAL ASSISTANCE

For Technical Assistance, please contact us at wirelessmodules@cel.com