

# TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: A3LCCBP730Q

Equipment Under Test : WiFi/BT Combo Module  
Model Name : CCBP730Q  
Applicant : Samsung Electronics Co., Ltd.  
Manufacturer : Samsung Electronics Co., Ltd.  
Date of Receipt : 2019.01.24  
Date of Test(s) : 2019.01.25 ~ 2019.04.12  
Date of Issue : 2019.04.30

In the configuration tested, the EUT complied with the standards specified above.

Tested By:

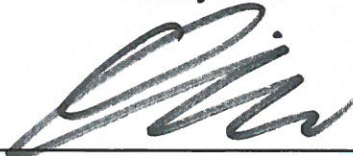


Nancy Park

Date:

2019.04.30

Technical  
Manager:



Hyunchoe You

Date:

2019.04.30

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SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2019.04.24)(1)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

Phone No. : +82 31 688 0901

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### 1.2. Details of Applicant

Applicant : Samsung Electronics Co., Ltd.

Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, United States, 07058

Contact Person : Chun, Jenni

Phone No. : +1 973 808 6375

### 1.3. Details of Manufacturer

Company : Same as above

Address : Same as above

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## 1.4. Description of EUT

|                             |  |  |
|-----------------------------|--|--|
| <b>Kind of Product</b>      | WiFi/BT Combo Module   |  |
| <b>Model Name</b>           | CCBP730Q   |  |
| <b>Power Supply</b>         | DC 5 V   |  |
| <b>Frequency Range</b>      | 2 402 MHz ~ 2 480 MHz (Bluetooth, Bluetooth Low Energy),<br>2 412 MHz ~ 2 462 MHz (11b/g/n_HT20),<br>2 422 MHz ~ 2 452 MHz (11n_HT40)<br>5 745 MHz ~ 5 825 MHz (Band 3: 11a/n_HT20, 11ac_VHT20),<br>5 755 MHz ~ 5 795 MHz (Band 3: 11n_HT40, 11ac_VHT40),<br>5 775 MHz (Band 3: 11ac_VHT80),<br>5 180 MHz ~ 5 240 MHz (Band 1: 11a/n_HT20, 11ac_VHT20),<br>5 190 MHz ~ 5 230 MHz (Band 1: 11n_HT40, 11ac_VHT40),<br>5 210 MHz (Band 1: 11ac_VHT80),<br>5 260 MHz ~ 5 320 MHz (Band 2A: 11a/n_HT20, 11ac_VHT20),<br>5 270 MHz ~ 5 310 MHz (Band 2A: 11n_HT40, 11ac_VHT40),<br>5 290 MHz (Band 2A: 11ac_VHT80),<br>5 500 MHz ~ 5 720 MHz (Band 2C: 11a/n_HT20, 11ac_VHT20),<br>5 510 MHz ~ 5 710 MHz (Band 2C: 11n_HT40, 11ac_VHT40),<br>5 530 MHz ~ 5 690 MHz (Band 2C: 11ac_VHT80) |  |
| <b>Modulation Technique</b> | DSSS, OFDM, GFSK, $\pi/4$ DQPSK, 8DPSK   |  |
| <b>Number of Channels</b>   | 79 channel (Bluetooth), 40 channel (Bluetooth Low Energy),<br>11 channel (11b/g/n_HT20), 7 channel (11n_HT40)<br>5 channel (Band 3: 11a/n_HT20, 11ac_VHT20),<br>2 channel (Band 3: 11n_HT40, 11ac_VHT40), 1 channel (Band 3: 11ac_VHT80),<br>4 channel (Band 1: 11a/n_HT20, 11ac_VHT20),<br>2 channel (Band 1: 11n_HT40, 11ac_VHT40), 1 channel (Band 1: 11ac_VHT80),<br>4 channel (Band 2A: 11a/n_HT20, 11ac_VHT20),<br>2 channel (Band 2A: 11n_HT40, 11ac_VHT40), 1 channel (Band 2A: 11ac_VHT80),<br>9 channel (Band 2C: 11a/n_HT20, 11ac_VHT20),<br>4 channel (Band 2C: 11n_HT40, 11ac_VHT40), 2 channel (Band 2C: 11ac_VHT80)   |  |
| <b>Antenna Type</b>         | PIFA antenna   |  |
| <b>Antenna Gain</b>         | <b>ANT1 (WIFI_R)</b>   | 2 400 MHz ~ 2 483.5 MHz: 1.8 dB i,<br>5 150 MHz ~ 5 250 MHz: 1.1 dB i,<br>5 250 MHz ~ 5 350 MHz: 1.6 dB i,<br>5 470 MHz ~ 5 725 MHz: 1.1 dB i,<br>5 725 MHz ~ 5 850 MHz: 0.6 dB i  |
|                             | <b>ANT2 (WIFI_L)</b>   | 2 400 MHz ~ 2 483.5 MHz: 2.8 dB i,<br>5 150 MHz ~ 5 250 MHz: -0.1 dB i,<br>5 250 MHz ~ 5 350 MHz: 1.9 dB i,<br>5 470 MHz ~ 5 725 MHz: 2.4 dB i,<br>5 725 MHz ~ 5 850 MHz: 3.0 dB i |
|                             | <b>ANT3</b>  | 2 400 MHz ~ 2 483.5 MHz: -0.1 dB i (Bluetooth, Bluetooth Low Energy)   |

## 1.5. Declaration by the Manufacturer

- Bluetooth, WiFi can transmit simultaneously.

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### 1.6. Test report revision

| Revision | Report number          | Date of Issue | Description                                      |
|----------|------------------------|---------------|--|
| 0        | F690501/RF-RTL013709   | 2019.04.18    | Initial  |
| 1        | F690501/RF-RTL013709-1 | 2019.04.30    | Corrected Test Result of RF Exposure Evaluation. |

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## 2. RF Exposure Evaluation

### 2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz)                                   | Electric Field Strength(V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Average Time |
|---|------------------------------|-------------------------------|-------------------------------------|--------------|
| (A) Limits for Occupational/Controlled Exposure         |                              |                               |                                     |              |
| 0.3-3.0   | 614                          | 1.63                          | *100                                | 6            |
| 3.0-30  | 1842/f                       | 4.89/f                        | *900/f <sup>2</sup>                 | 6            |
| 30-300  | 61.4                         | 0.163                         | 1.0                                 | 6            |
| 300-1 500   | -                            | -                             | f/300                               | 6            |
| 1 500-100 000   | -                            | -                             | 5                                   | 6            |
| (B) Limits for General Population/Uncontrolled Exposure |                              |                               |                                     |              |
| 0.3-1.34  | 614                          | 1.63                          | *100                                | 30           |
| 1.34-30   | 824/f                        | 2.19/f                        | *180/f <sup>2</sup>                 | 30           |
| 30-300  | 27.5                         | 0.073                         | 0.2                                 | 30           |
| 300-1 500   | -                            | -                             | f/1500                              | 30           |
| <b>1 500-100 000</b>                                    | -                            | -                             | <b>1.0</b>                          | <b>30</b>    |

#### 2.1.1. Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where  $P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

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### 2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

### 2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

#### Bluetooth

##### - Maximum tune up tolerance

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|--|---------------------|--|------------------------------|
| 2 402 ~ 2 480         | 12                                     | -0.10               | 0.003 081                                    | 1                            |

#### Bluetooth Low Energy

##### - Maximum tune up tolerance

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|--|---------------------|--|------------------------------|
| 2 402 ~ 2 480         | 3                                      | -0.10               | 0.000 388                                    | 1                            |

#### WLAN (2.4G)

##### - Maximum tune up tolerance

| Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------|--|---------------------|--|------------------------------|
| 2 412 ~ 2 462   | 19                                     | 5.32                | 0.053 794                                    | 1                            |

#### WLAN (5G)

##### - Maximum tune up tolerance

| Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------|--|---------------------|--|------------------------------|
| 5 180 ~ 5 240   | 19                                     | 3.53                | 0.035 623                                    | 1                            |
| 5 260 ~ 5 320   | 19                                     | 4.76                | 0.047 286                                    | 1                            |
| 5 500 ~ 5 720   | 19                                     | 4.78                | 0.047 504                                    | 1                            |
| 5 745 ~ 5 825   | 19                                     | 4.89                | 0.048 723                                    | 1                            |

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**Note;**

- The power density Pd (5th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm<sup>2</sup>.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dBi and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.

**Simultaneous transmission of MPE test exclusion for worst case configuration.**

Bluetooth: the ratio is 0.003 081 / 1

WLAN: the ratio is 0.053 794 / 1

Confirm the sum result of individual MPEs ratio is  $\leq 1.0$ ;

Bluetooth + WLAN

= (0.003 081 / 1) + (0.053 794 / 1)

= 0.056 875  $\leq 1.0$

So this device meets the KDB447498 D01 v06 section 7.2 requirement of "Simultaneous transmission MPE test exclusion"

**- End of the Test Report -**

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