

## FCC RF Exposure

EUT Description: Wireless CarPlay Adapter

ModelNo.:WL01-C-White, WL01-C-Sierra Blue, WL01-C-Purple, WL01-C-Gun, WL01-C-Titanium, WL01-C-Navy, YYYY1-Black, YYYY1-Gunmetal Gray, YKCAA-Black, YKCAA-Blue, L-PP01-Black, L-PP01-Rose Gold, MYC-C-Black, MYC-C-Titanium, TK-XTT-Black, TK-XTT-Navy, CXX-00-Black, CXX-00-Gunmetal Gray

Equipment type: mobile device

Test procedures according to the technical standards: KDB 447498 D01 V06 and FCC 2.1091.

### 1. Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### Limits for Maximum Permissible Exposure (MPE)

| Frequency range<br>(MHz)                                | Electric field<br>strength<br>(V/m) | Magnetic field strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|---------------------------------------------------------|-------------------------------------|----------------------------------|----------------------------------------|-----------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                                     |                                  |                                        |                             |
| 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                           |
| 300–1500                                                |                                     |                                  | f/300                                  | 6                           |
| 1500–100,000                                            |                                     |                                  | 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                          |
| 300–1500                                                |                                     |                                  | f/1500                                 | 30                          |
| 1500–100,000                                            |                                     |                                  | 1.0                                    | 30                          |

F = frequency in MHz

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,

$\pi = 3.14$ ;

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

$P_d$  is 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 r where the MPE limit is reached.

### 2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 3. Test Result of RF Exposure Evaluation

#### WIFI

|                           | Output power<br>(dBm/ mW) | Antenna<br>Gain(dBi) | Power Density<br>at R=20cm<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|---------------------------|---------------------------|----------------------|-----------------------------------------------------|--------------------------------|--------|
| U-NII 1 802.11a           | 6.39/4.36                 | 2.53                 | 0.00155                                             | 1.0                            | Pass   |
| U-NII 1<br>802.11n(HT20)  | 6.26/4.23                 | 2.53                 | 0.00151                                             | 1.0                            | Pass   |
| U-NII 1<br>802.11n(HT40)  | 7.34/5.42                 | 2.53                 | 0.00193                                             | 1.0                            | Pass   |
| U-NII 1<br>802.11ac(HT20) | 6.56/4.53                 | 2.53                 | 0.00161                                             | 1.0                            | Pass   |
| U-NII 1<br>802.11ac(HT40) | 7.38/5.47                 | 2.53                 | 0.00195                                             | 1.0                            | Pass   |
| U-NII 1<br>802.11ac(HT80) | 2.18/1.65                 | 2.53                 | 0.00059                                             | 1.0                            | Pass   |
| U-NII 3 802.11a           | 13.11/20.46               | 3.67                 | 0.00945                                             | 1.0                            | Pass   |
| U-NII 3<br>802.11n(HT20)  | 13.02/20.04               | 3.67                 | 0.00929                                             | 1.0                            | Pass   |
| U-NII 3<br>802.11n(HT40)  | 7.58/5.73                 | 3.67                 | 0.00266                                             | 1.0                            | Pass   |
| U-NII 3<br>802.11ac(HT20) | 13.13/20.56               | 3.67                 | 0.00954                                             | 1.0                            | Pass   |
| U-NII 3<br>802.11ac(HT40) | 7.39/5.48                 | 3.67                 | 0.00254                                             | 1.0                            | Pass   |
| U-NII 3<br>802.11ac(HT80) | 10.88/12.25               | 3.67                 | 0.00562                                             | 1.0                            | Pass   |
| 802.11b                   | 3.24/2.11                 | 0.62                 | 0.00048                                             | 1.0                            | Pass   |
| 802.11g                   | 4.29/2.69                 | 0.62                 | 0.00062                                             | 1.0                            | Pass   |
| 802.11n20                 | 3.91/2.46                 | 0.62                 | 0.00056                                             | 1.0                            | Pass   |
| 802.11n40                 | 3.58/2.28                 | 0.62                 | 0.00052                                             | 1.0                            | Pass   |

$$EIRP = E_{Meas} + 20 \log(d_{meas}) - 104.7$$

EIRP is the equivalent isotropically radiated power,

$E_{Meas}$  in dBm is the field strength of the emission at the measurement distance, in dB u V/m

$d_{meas}$  is the measurement distance, in m

| Field strength(dBuV/m) | EIRP(dBm) | Max tune-up(mW) | Antenna Gain(dBi) | Power Density at R=20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Result |
|------------------------|-----------|-----------------|-------------------|-----------------------------------------------|-----------------------------|--------|
| 89.61                  | -5.5476   | 0.2788          | 0.62              | 0.00006                                       | 1.0                         | Pass   |
| 88.53                  | -6.6276   | 0.2174          | 0.62              | 0.00005                                       | 1.0                         | Pass   |
| 90.66                  | -4.4976   | 0.3550          | 0.62              | 0.00008                                       | 1.0                         | Pass   |

BT

| Mode           | Frequency(MHz) | EIRP(dBm) | Max tune-up(mW) | Antenna Gain(dBi) | Power Density at R=20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Result |
|----------------|----------------|-----------|-----------------|-------------------|-----------------------------------------------|-----------------------------|--------|
| GFSK           | 2402           | -14.250   | 0.0376          | 0.62              | 0.000008                                      | 1.0                         | Pass   |
|                | 2441           | -12.460   | 0.0568          | 0.62              | 0.000013                                      | 1.0                         | Pass   |
|                | 2480           | -10.153   | 0.0965          | 0.62              | 0.000022                                      | 1.0                         | Pass   |
| $\pi/4$ -DQPSK | 2402           | -13.084   | 0.0492          | 0.62              | 0.000010                                      | 1.0                         | Pass   |
|                | 2441           | -11.784   | 0.0663          | 0.62              | 0.000015                                      | 1.0                         | Pass   |
|                | 2480           | -11.361   | 0.0731          | 0.62              | 0.000017                                      | 1.0                         | Pass   |
| 8-DPSK         | 2402           | -12.526   | 0.0559          | 0.62              | 0.000013                                      | 1.0                         | Pass   |
|                | 2441           | -11.324   | 0.0737          | 0.62              | 0.000017                                      | 1.0                         | Pass   |
|                | 2480           | -10.983   | 0.0797          | 0.62              | 0.000018                                      | 1.0                         | Pass   |

$$BT+WIFI: 0.00008 + 0.00982 = 0.00990 < 1$$

Conclusion: No SAR is required