



## Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640

Fax: +86-755-26648637

Website: [www.cqa-cert.com](http://www.cqa-cert.com)

Report Template Version: V03

Report Template Revision Date: Mar.1st, 2017

# RF Exposure Evaluation Report

**Report No. :** CQASZ20200200089E-03  
**Applicant:** MOKO TECHNOLOGY LIMITED  
**Address of Applicant:** 2F, Building1, No.37 Xiaxintang Xintang village, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, China  
**Manufacturer:** MOKO TECHNOLOGY LIMITED  
**Address of Manufacturer:** 2F, Building1, No.37 Xiaxintang Xintang village, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, China  
**Factory:** MOKO TECHNOLOGY LIMITED  
**Address of Factory:** 2F, Building1, No.37 Xiaxintang Xintang village, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, China

### Equipment Under Test (EUT):

**Product:** Bluetooth Gateway Plug Mini  
**Model No.:** MK110  
**Brand Name:** N/A  
**FCC ID:** 2AO94-MK110  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 1.1310  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Test:** 2020-02-17 to 2020-02-28  
**Date of Issue:** 2020-03-02  
**Test Result :** **PASS\***

**Tested By:**

*Tom Chen*

(Tom chen)

**Reviewed By:**

*Aaron Ma*

(Aaron Ma)

**Approved By:**

*Jack Ai*  
(Jack Ai)



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

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

## 1 Version

### Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200200089E-03	Rev.01	Initial report	2020-03-02

## 2 Contents

	Page
1 VERSION .....	2
2 CONTENTS .....	3
3 GENERAL INFORMATION.....	4
3.1 CLIENT INFORMATION.....	4
3.2 GENERAL DESCRIPTION OF EUT .....	4
4 SAR EVALUATION .....	6
4.1 RF EXPOSURE COMPLIANCE REQUIREMENT .....	6
4.1.1 <i>Limits</i> .....	6
4.1.2 <i>Test Procedure</i> .....	6
4.1.3 <i>EUT RF Exposure</i> .....	7

### 3 General Information

#### 3.1 Client Information

Applicant:	MOKO TECHNOLOGY LIMITED
Address of Applicant:	2F, Building1,No.37 Xiaxintang Xintang village, Fucheng Street, Longhua District , Shenzhen,Guangdong Province, China
Manufacturer:	MOKO TECHNOLOGY LIMITED
Address of Manufacturer:	2F, Building1,No.37 Xiaxintang Xintang village, Fucheng Street, Longhua District , Shenzhen,Guangdong Province, China

#### 3.2 General Description of EUT

Product Name:	Bluetooth Gateway Plug Mini					
Model No.:	MK110					
Trade Mark:	N/A					
Type of Modulation:	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) BLE(GFSK)					
Channel Spacing:	IEEE 802.11b/g/n(HT20):20MHz IEEE 802.11n(HT40):40MHz BLE:2MHz					
Operation Frequency:	IEEE 802.11b;IEEE 802.11g;IEEE 802.11n HT20					
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
	1	2412	6	2437	11	2462
	2	2417	7	2442		
	3	2422	8	2447		
	4	2427	9	2452		
	5	2432	10	2457		
	IEEE 802.11n HT40					
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
	1	2422	4	2437	7	2452
	2	2427	5	2442		
	3	2432	6	2447		
	BLE					

	<table border="1"> <thead> <tr> <th>Channel No.</th> <th>Frequency (MHz)</th> <th>Channel No.</th> <th>Frequency (MHz)</th> </tr> </thead> <tbody> <tr><td>1</td><td>2402</td><td>2</td><td>2404</td></tr> <tr><td>3</td><td>2406</td><td>4</td><td>2408</td></tr> <tr><td>5</td><td>2410</td><td>6</td><td>2412</td></tr> <tr><td>7</td><td>2414</td><td>8</td><td>2416</td></tr> <tr><td>9</td><td>2418</td><td>10</td><td>2420</td></tr> <tr><td>11</td><td>2422</td><td>12</td><td>2424</td></tr> <tr><td>13</td><td>2426</td><td>14</td><td>2428</td></tr> <tr><td>15</td><td>2430</td><td>16</td><td>2432</td></tr> <tr><td>17</td><td>2434</td><td>18</td><td>2436</td></tr> <tr><td>19</td><td>2438</td><td>20</td><td>2440</td></tr> <tr><td>21</td><td>2442</td><td>22</td><td>2444</td></tr> <tr><td>23</td><td>2446</td><td>24</td><td>2448</td></tr> <tr><td>25</td><td>2450</td><td>26</td><td>2452</td></tr> <tr><td>27</td><td>2454</td><td>28</td><td>2456</td></tr> <tr><td>29</td><td>2458</td><td>30</td><td>2460</td></tr> <tr><td>31</td><td>2462</td><td>32</td><td>2464</td></tr> <tr><td>33</td><td>2466</td><td>34</td><td>2468</td></tr> <tr><td>35</td><td>2470</td><td>36</td><td>2472</td></tr> <tr><td>37</td><td>2474</td><td>38</td><td>2476</td></tr> <tr><td>39</td><td>2478</td><td>40</td><td>2480</td></tr> </tbody> </table>				Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	1	2402	2	2404	3	2406	4	2408	5	2410	6	2412	7	2414	8	2416	9	2418	10	2420	11	2422	12	2424	13	2426	14	2428	15	2430	16	2432	17	2434	18	2436	19	2438	20	2440	21	2442	22	2444	23	2446	24	2448	25	2450	26	2452	27	2454	28	2456	29	2458	30	2460	31	2462	32	2464	33	2466	34	2468	35	2470	36	2472	37	2474	38	2476	39	2478	40	2480
	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)																																																																																				
1	2402	2	2404																																																																																					
3	2406	4	2408																																																																																					
5	2410	6	2412																																																																																					
7	2414	8	2416																																																																																					
9	2418	10	2420																																																																																					
11	2422	12	2424																																																																																					
13	2426	14	2428																																																																																					
15	2430	16	2432																																																																																					
17	2434	18	2436																																																																																					
19	2438	20	2440																																																																																					
21	2442	22	2444																																																																																					
23	2446	24	2448																																																																																					
25	2450	26	2452																																																																																					
27	2454	28	2456																																																																																					
29	2458	30	2460																																																																																					
31	2462	32	2464																																																																																					
33	2466	34	2468																																																																																					
35	2470	36	2472																																																																																					
37	2474	38	2476																																																																																					
39	2478	40	2480																																																																																					
Antenna Type:	PCB antenna																																																																																							
Antenna:	0 dBi gain																																																																																							
Power Supply:	AC 120V/60Hz																																																																																							

## 4 SAR Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—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> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
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>(B) Limits for General Population/Uncontrolled Exposure</b>				
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

Friis Formula

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

$P_d$  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.

#### 4.1.2 Test Procedure

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

### 4.1.3 EUT RF Exposure

#### 1) For BLE

#### Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.04	2.0±1	3	1.995
Middle(2440MHz)	3.01	3.0±1	4	2.512
Highest(2480MHz)	4.52	4.0±1	5	3.162

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
3.162	0	0.00063	1.0	PASS

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20200200089E-02

2) For WIFI

Measurement Data

IEEE for 802.11b mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	13.72	13.5±1	14.5	28.184
Middle(2437MHz)	13.85	13.5±1	14.5	28.184
Highest(2462MHz)	13.16	13.5±1	14.5	28.184
IEEE for 802.11g mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	10.81	10.5±1	11.5	14.125
Middle(2437MHz)	10.12	10.5±1	11.5	14.125
Highest(2462MHz)	10.46	10.5±1	11.5	14.125
IEEE for 802.11n(HT20) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	9.63	10.0±1	11	12.589
Middle(2437MHz)	9.83	10.0±1	11	12.589
Highest(2462MHz)	9.76	10.0±1	11	12.589
IEEE for 802.11n(HT40) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	6.71	7.0±1	8	6.310
Middle(2437MHz)	7.42	7.0±1	8	6.310
Highest(2452MHz)	7.60	7.0±1	8	6.310

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
28.184	0	0.006	1.0	PASS

Remark: The Max Conducted Average Output Power data refer to report Report No.: CQASZ20200200089E-01

WIFI and BLE can not simultaneous transmitting at same time.