

SAR Evaluation Report

Application No.: SZEM1904012652CR
Applicant: BRYDGE GLOBAL
Address of Applicant: 1912 Sidewinder Dr #104, Park City, Utah United States 84060
Manufacturer: BRYDGE Technologies LLC
Address of Manufacturer: 1912 Sidewinder Dr #104, Park City, Utah United States 84060
Factory: DONGGUAN MAE TAY ELECTRONIC CO., LTD.
Address of Factory: Bei Huan Rd Industrial Area Chang Ping Town Dongguan Guangdong 523560 P.R.C.

Equipment Under Test (EUT):

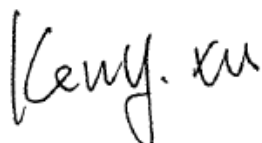
EUT Name: Brydge 12.9 Pro
Model No.: BRY6021, BRY6022, BRY6021G, BRY6022G, BRY6022A ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Trade mark: BRYDGE
FCC ID: 2ADRG-BRY602
Standards: 47 CFR Part 1.1307
 47 CFR Part 2.1093
 KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2019-04-11
Date of Test: 2019-04-13 to 2019-04-22
Date of Issue: 2019-04-25

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.




Keny Xu
 EMC Laboratory Manager



2 Version

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2019-04-25		Original

Authorized for issue by:				
				
		Leo Li /Project Engineer		
				
		Eric Fu /Reviewer		





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4 General Information

4.1 General Description of EUT

Power supply:	DC 5V Lithium Ion Battery: 3.7V 450mAh rechargeable battery which charged by USB port
Cable:	Type C cable: 50cm shielded
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V4.1 LE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.87dBi

Remark:

Model No.: BRY6021, BRY6022, BRY6021G, BRY6022G, BRY6022A

Only the model BRY6021 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model name, color and key printing.



4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.





4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

5.1.3 EUT RF Exposure



1 Refer to the SAR test report of Ipad Pro(FCC ID:BCGA1876):

For WLAN 2.4GHz

- 1) the maximum average output power (including tune-up tolerance) is 16.5dBm(44.67mw) of WF8 antenna @2412MHz
- 2) the maximum average output power (including tune-up tolerance) is 16.75dBm(47.32mw) of WF7 antenna @2412MHz
- 3) the maximum average output power (including tune-up tolerance) is 21.5dBm(141.25mw) of Lower antenna @2412MHz

For WLAN 5GHz

- 4) the maximum average output power (including tune-up tolerance) is 17.0dBm(50.12mw) of Lower antenna @5200MHz
- 5) the maximum average output power (including tune-up tolerance) is 17.0dBm(50.12mw) of Uper antenna @5200MHz

For BT

- 6) the maximum average output power (including tune-up tolerance) is 18.0dBm(63.10mw) of WF8 antenna @2402MHz
- 7) the maximum average output power (including tune-up tolerance) is 15.25dBm(33.50mw) of WF7 antenna @2402MHz
- 8) the maximum average output power (including tune-up tolerance) is 20.0dBm(100.00mw) of Lower antenna @2402MHz



2 The separation distances between the Ipad Pro's antennas to the upper edge of the EUT is illustrated bellow

Front view:



The separation distances between the Ipad Pro's WF7 antenna to the upper edge of the EUT



The separation distances between the Ipad Pro's WF8,Uper and Lower antenna to the upper edge of the EUT



3 According to KDB 447498 section 4.3.1 a), For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where $f(\text{GHz})$ is the RF channel transmit frequency in GHz

For BT of the EUT

the max. average power of channel, including tune-up tolerance(mW) is 0.58 mW (-2.36dBm) @ 2480MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 5 mm,

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.183 \leq 3.0.$

For WLAN 2.4GHz:

WF8 antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{2.412}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=96.58mW

WF7 antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{2.412}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=96.58mW

For Lower antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{2.412}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=96.58mW

For WLAN 5GHz:

For Lower antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{5.2}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=65.78mW

For Uper Antenna: $(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{5.2}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=65.78mW

For BT:

WF8 antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{2.402}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=96.78mW

WF7 antenna:

$(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{2.402}] \leq 3.0,$

max. power of channel, (including tune-up tolerance)=96.78mW



For Lower antenna:

(max. power of channel, including tune-up tolerance, mW)/50*[$\sqrt{2.402}$] \leq 3.0,
max. power of channel, (including tune-up tolerance)=96.78mW

4 According to KDB 447498 section 4.3.1 b), For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

{[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance-50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

{[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance - 50 mm) · 10]} mW, for > 1500 MHz and \leq 6 GHz

For WLAN 2.4GHz

So for WF8 antenna:

calculation limit=96.58+(180-50)*(10)=1396.58mW

Then the Max. average power (including tune-up tolerance) is 44.67mW < 1396.58mW

So for WF7 antenna:

calculation limit=96.58+(180-50)*(10)=1396.58mW

Then the Max. average power (including tune-up tolerance) is 47.32mW < 1396.58mW

So for Lower antenna:

calculation limit=96.58+(72-50)*(10)=316.58mW

Then the Max. average power (including tune-up tolerance) is 141.25mW < 316.58mW

For WLAN 5GHz

So for Uper antenna:

calculation limit=65.78+(187-50)*(10)=1435.78mW

Then the Max. average power (including tune-up tolerance) is 50.12mW < 1435.78mW

So for Lower antenna:

calculation limit=65.78+(72-50)*(10)=285.78mW

Then the Max. average power (including tune-up tolerance) is 50.12mW < 285.78mW

For BT

So for WF8 antenna:

calculation limit=96.78+(180-50)*(10)=1396.78mW

Then the Max. average power (including tune-up tolerance) is 63.10mW < 1396.78mW

So for WF7 antenna:

calculation limit=96.78+(180-50)*(10)=1396.78mW





Then the Max. average power (including tune-up tolerance) is 56.23mW < 1396.78mW

So for Lower antenna:

calculation limit = 96.78 + (72 - 50) * (10) = 316.78mW

Then the Max. average power (including tune-up tolerance) is 100mW < 316.78mW

5 According to KDB 447498 section 4.3.2 b), when an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- (1) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})/x}$ W/kg, for test separation distances ≤ 50 mm; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.
- (2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm

For BT of the EUT, the max. average power of channel, including tune-up tolerance (mW) is 0.58 mW (-2.36dBm) @ 2480MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 5 mm,

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})/x} = 0.0244$.

So, the estimated SAR1 for EUT is 0.0244 W/kg (1-g).

Refer to page 6 of SAR test report of Ipad Pro (FCC ID: BCGA1876)

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Body
1	2.4 GHz Wi-Fi MIMO	Yes
2	5 GHz Wi-Fi MIMO	Yes
3	2.4 GHz Bluetooth + 5 GHz Wi-Fi	Yes
4	2.4 GHz Bluetooth + 5 GHz Wi-Fi MIMO	Yes

1. 2.4 GHz WLAN and 2.4 GHz Bluetooth cannot transmit simultaneously.
2. 2.4 GHz WLAN Antenna WF7 and 2.4 GHz WLAN Antenna Lower cannot transmit simultaneously.
3. 2.4 GHz WLAN and 5 GHz WLAN cannot transmit simultaneously.
4. This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac supports CDD and 802.11 n/ac additionally supports SDM. Each WLAN antenna can transmit independently or together when operating with MIMO.

The worst case of simultaneous transmission status is **2.4GHz Bluetooth + 5GHz Wi-Fi MIMO**

For Lower antenna (2.4GHz Bluetooth) of the Ipad Pro, the max. output power of channel, including tune-up tolerance (mW) is 100.00 mW (20dBm) @ 2402MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 72mm > 50mm,

So, the estimated SAR2 for WiFi of the Ipad Pro is 0.4W/kg (1-g).



For Lower antenna (5GHz Wi-Fi) of the Ipad Pro, the max. output power of channel, including tune-up tolerance(mW) is 50.12 mW (17dBm) @ 5200MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 72mm>50mm,

So, the estimated SAR3 for WiFi of the Ipad Pro is 0.4W/kg (1-g).

For Uper antenna (5GHz Wi-Fi) of the Ipad Pro, the max. output power of channel, including tune-up tolerance(mW) is 50.12 mW (17dBm) @ 5200MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 187mm>50mm,

So, the estimated SAR4 for WiFi of the Ipad Pro is 0.4W/kg (1-g).

The sum of SAR is (SAR1+SAR2+SAR3+SAR4) = (0.0244+0.4+0.4+0.4) = 1.2244 W/kg (1-g) <1.6 W/kg (1-g)

In conclusion, the SAR evaluation is not required.

- End of the Report -

