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Report No.: SZEM180800802303

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SAR Evaluation Report

Application No.: SZEM1808008023CR
Applicant: BRYDGE GLOBAL
Address of Applicant: 110A Meyer, Rd, Singapore
Manufacturer: BRYDGE Technologies LLC
Address of Manufacturer: 1910 Prospector Avenue, Unit 301, Park City, UT 84060 U.S.A
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 G-Type
Model No.: BRY09001
Trade mark: Brydge
FCC ID: 2ADRG-BRY901
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2018-09-03
Date of Test: 2018-09-14 to 2018-09-18
Date of Issue: 2018-09-18

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



Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-09-18		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 from adapter input AC 120V/60Hz Lithium Ion Battery: 3.7V rechargeable battery which charged by USB port
Cable:	USB cable: 50cm unshielded
Bluetooth Version:	V4.2 single mode
Modulation Type	GFSK
Operation Frequency	2402MHz to 2480MHz
Number of Channels	40
Channel Spacing	2MHz
Antenna Type	PCB Antenna
Antenna Gain	1.87dBi



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.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



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:

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

$f(\text{GHz})$ 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:BCGA1652):

- 1) the maximum peak output power (including tune-up tolerance) is 32.5dBm in GSM 850 mode(GPRS 2slot). The highest transmission duty cycle= $T_{on}/T=2/8=25\%$, so the duty factor= $10\log(\text{duty cycle})=-6.02$, Then the Max. average power (including tune-up tolerance) is $32.5\text{dBm}-6.02=26.48\text{dBm}=444.63\text{mW}$

- 2) the maximum output power (including tune-up tolerance) is 17dBm(50.12mw) for WiFi/BT antenna (Antenna A) in WiFi mode(802.11nHT40, channel 46) .

the maximum output power (including tune-up tolerance) is 17dBm(50.12mw) for WiFi antenna (Antenna B) in WiFi mode(802.11nHT40, channel 46) .



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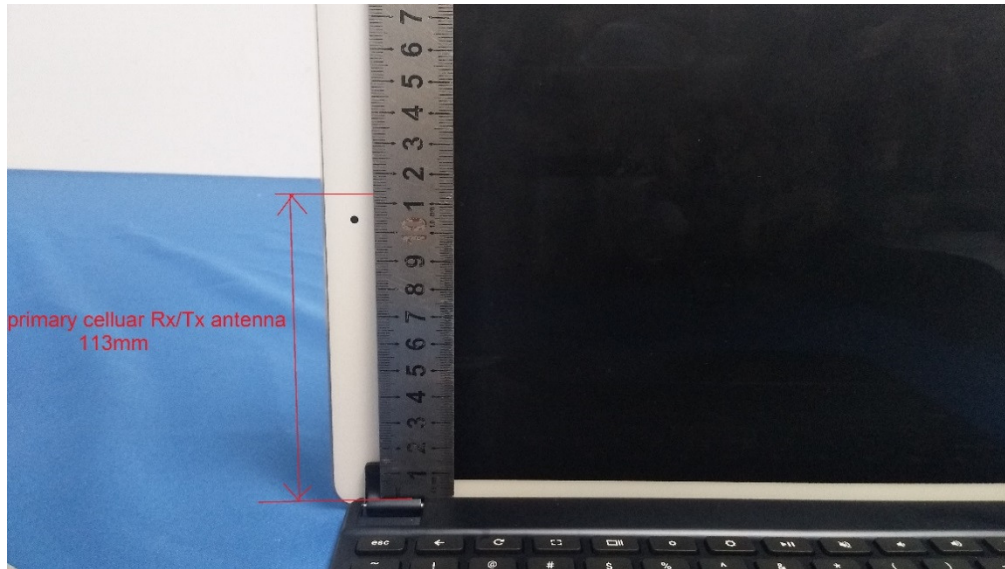
2 The separation distances between the Ipad Pro's antennas to the upper edge of the EUT is illustrated bellow

Front view:

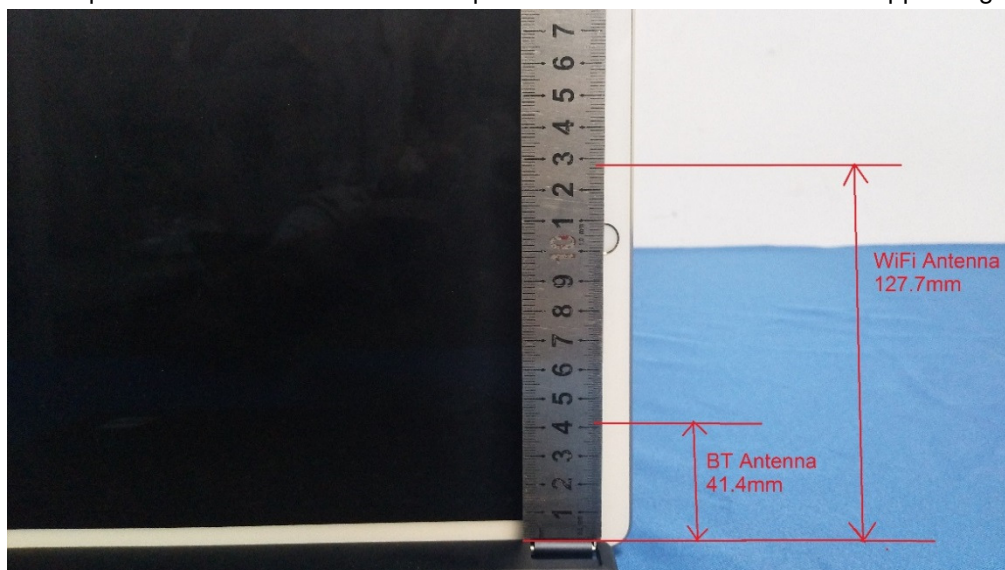




The separation distances between the Ipad Pro's primary cellular Rx/Tx antenna to the upper edge of the EUT



The separation distances between the Ipad Pro's WiFi/BT 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 GSM 850: $(\text{max. power of channel, including tune-up tolerance, mW}) / 50 \cdot [\sqrt{0.85}] \leq 3.0$,
max. power of channel, (including tune-up tolerance) = 162.70mW

For WiFi/BT antenna (Antenna A): $50.12/41.4 \cdot [\sqrt{5.23}] = 2.769\text{mw} \leq 3.0\text{mW}$

For WiFi antenna (Antenna B): max. power of channel, (including tune-up tolerance, mW) $/ 50 \cdot [\sqrt{5.23}] \leq 3.0$
max. power of channel, (including tune-up tolerance) = 65.59mW

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:

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

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

So for GSM 850 of the Ipad Pro(FCC ID:BCGA1652):

calculation limit = $162.70 + (113 - 50) \cdot (850/150) = 519.7\text{mW}$

Then the Max. average power (including tune-up tolerance) is 444.63mW $< 519.7\text{mW}$

So for WiFi antenna (Antenna B) of the Ipad Pro(FCC ID:BCGA1652):

calculation limit = $65.59 + (127.7 - 50) \cdot 10 = 842.59\text{mW}$

the maximum output power (including tune-up tolerance) is 50.12mw $< 842.59\text{mW}$

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) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$, 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 0.50 mW (-3.01dBm) @ 2480MHz (With Tune-up tolerance),

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] = 0.0210$.

So, the estimated SAR1 for EUT is 0.0210 W/kg (1-g).



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For WiFi/BT antenna (Antenna A) of the Ipad Pro, the max. output power of channel, including tune-up tolerance(mW) is 50.12 mW (17dBm) @ 5230MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 41.4 mm,

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] = 0.3771.$$

So, the estimated SAR2 for WiFi of the Ipad Pro is 0.3771 W/kg (1-g).

For WiFi antenna (Antenna B) of the Ipad Pro, the max. output power of channel, including tune-up tolerance(mW) is 50.12 mW (17dBm) @ 5230MHz (With Tune-up tolerance),

The min. test separation distance (mm) is 127.7mm>50mm,

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

For GSM 850 of the Ipad Pro, the separation distances between the Ipad Pro's primary cellular Rx/Tx antenna to the upper edge of the EUT is 113mm>50mm,

So, the estimated SAR4 for GSM 850 of the Ipad Pro is 0.4 W/kg (1-g).

The sum of SAR is (SAR1+SAR2+SAR3+SAR4) = (0.0210 + 0.3771+0.4+0.4) = 1.1981 W/kg (1-g) <1.6 W/kg (1-g)

In conclusion, the SAR evaluation is not required.

- End of the Report -