FCC SAR Exclusion Report

Report No.	:	**SA150505C12**
Applicant	:	**ASUSTek COMPUTER INC.**
Address	:	**4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN**
Product	:	**Mobile Dock**
Brand	:	**ASUS**
FCC ID	:	**MSQDA01**
Model No.	:	**DA01**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2003 IEEE 1528a-2005 / KDB 865664 D01 v01r03 / KDB 447498 D01 v05r02**
Sample Received Date	:	**May 05, 2015**
Date of Evaluation	:	**May 12, 2015**

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

Prepared By : Evonne Liu / Specialist

Approved By : Gordon Lin / Assistant Manager

Table of Contents

Release Control Record

Issue No.	Reason for Change	Date Issued
SA150505C12	Initial release	Jun. 09, 2015

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported SAR_{1g} (W/kg)
DSS	Bluetooth	Not Required

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Mobile Dock
Brand Name	ASUS
FCC ID	MSQDA01
Model Name	DA01
Tx Frequency Bands (Unit: MHz)	Bluetooth : 2402 ~ 2480
Uplink Modulations	Bluetooth : GFSK Bluetooth EDR : GFSK, π/4-DQPSK, 8DPSK
Maximum Tune-up Conducted Power (Unit: dBm)	Bluetooth : 3.1 Bluetooth EDR : 1.5
Antenna Type	Mode A: PIFA Antenna (Peak Antenna Gain : 2.83 dBi) Mode B: Monopole Antenna (Peak Antenna Gain : 2.96 dBi)
EUT Stage	Identical Prototype

Note:

1. There're 2 modes for the EUT listed as below.
   Mode A: EUT + Bluetooth module with keyboard
   Mode B: EUT + Bluetooth module with speaker
2. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

List of Accessory:

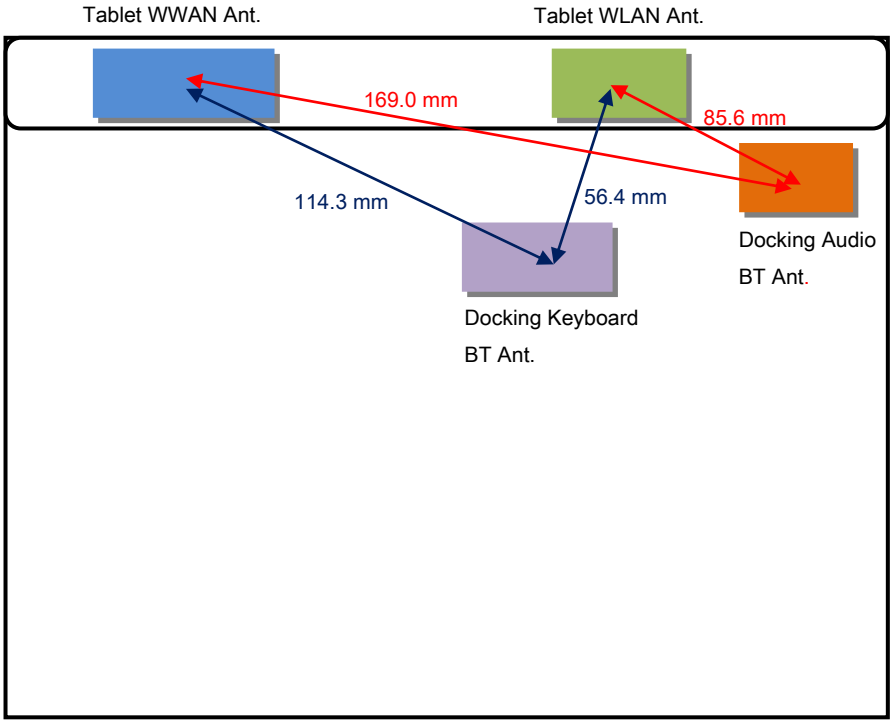
Battery	**Brand Name**	ASUS
	Model Name	C11P1503
	Power Rating	3.8Vdc, 6Wh
	Type	Li-ion
Main Board	**Brand Name**	ASUS
	Model Name	Z300_DOCK (DA01)
BT Module (BT KB)	**Brand Name**	Broadcom
	Model Name	BCM20730A1KFBG
BT Module (BT Speaker)	**Brand Name**	Broadcom
	Model Name	BCM20771A0KWFBG

3. SAR Measurement Evaluation

3.1 Maximum Output Power

The maximum conducted power (Unit: dBm) including tune-up tolerance is shown as below.

Mode	Bluetooth	Bluetooth EDR
All	3.1	1.5



3.2 SAR Testing Exclusions

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. For the test separation distance <= 50 mm

$$\frac{\text{Max. Tune up Power}_{(mW)}}{\text{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq 3.0$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

3. For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times 10]_{(mW)}$$

Mode	Band	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
A	BT	3.1	2	5	0.6	No
B	BT EDR	1.5	1	5	0.3	No

Note:

1. When separation distance <= 50 mm and the calculated result shown in above table is <= 3.0, the SAR testing exclusion is applied.
2. When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, the SAR testing exclusion is applied.

Summary:

Since the SAR testing for all device orientations apply SAR test exclusion per KDB 447498, SAR testing for this device is not required.

3.3.1 Simultaneous Multi-band Transmission Evaluation

<Estimated SAR Calculation>

According to KDB 447498 D01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values of <= 0.4 W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \frac{\sqrt{f_{(\text{GHz})}}}{7.5}$$

If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation. When the test separation distance is > 50 mm, the 0.4 W/kg is used for SAR-1g.

Mode	Mode / Band	Frequency (GHz)	Max. Tune-up Power (dBm)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
A	BT (DSS)	2.48	3.1	Body-Worn	5	0.09
B	BT (DSS)	2.48	1.5	Body-Worn	5	0.06

Note:

1. The separation distance is determined from the outer housing of the EUT to the user.
2. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

<SAR Summation Analysis>

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR_{1g} 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
1	**Keyboard BT ModeA (DSS) + Keyboard BT ModeB (DSS)**	Body-Worn	0.09	0.06	0.15	Σ SAR < 1.6, Not required
2	**Keyboard BT ModeA (DSS) + Tablet WWAN**	Body-Worn	0.09	1.60	1.69	**Analyzed as below**
3	**Keyboard BT ModeB (DSS) + Tablet WWAN**	Body-Worn	0.06	1.60	1.66	**Analyzed as below**
4	**Keyboard BT ModeA (DSS) + Tablet WLAN**	Body-Worn	0.09	1.60	1.69	**Analyzed as below**
5	**Keyboard BT ModeB (DSS) + Tablet WLAN**	Body-Worn	0.06	1.60	1.66	**Analyzed as below**

<SAR to Peak Location Separation Ratio Analysis>

The simultaneous transmitting antennas in each operating mode and exposure condition combination are considered one pair at a time to determine the SPLSR. When SAR is measured for both antennas in the pair, the peak location separation distance is computed by the following formula.

$$\text{Peak Location Separation Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

Where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the area or zoom scans.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location will be translated onto the test device to determine the peak location separation for the antenna pair.

The SPLSR is determined by the following formula.

$$\text{SPLSR} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{R_i}$$

Where SAR_1 and SAR_2 are the highest reported or estimated SAR for each antenna in the pair, and R_i is the separation distance between the peak SAR locations for the antenna pair in mm.

When the SPLSR is <= 0.04, the simultaneous transmission SAR is not required. Otherwise, the enlarged zoom scan and volume scan post-processing procedures will be performed.

Conditions	Exposure Condition	SAR Value (W/kg)	Ant to Ant Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
Keyboard BT ModeA (DSS)	Body	0.09	114.3	0.019	SPLSR < 0.04, Not required
Tablet WWAN		1.6			
Keyboard BT ModeB (DSS)	Body	0.06	169.0	0.013	SPLSR < 0.04, Not required
Tablet WWAN		1.6			
Keyboard BT ModeA (DSS)	Body	0.09	56.4	0.039	SPLSR < 0.04, Not required
Tablet WLAN		1.6			
Keyboard BT ModeB (DSS)	Body	0.06	85.6	0.025	SPLSR < 0.04, Not required
Tablet WLAN		1.6			

4. Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Taiwan HwaYa EMC/RF/Safety Lab:
Add: No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C.)
Tel: 886-3-318-3232
Fax: 886-3-327-0892

Taiwan LinKo EMC/RF Lab:
Add: No. 47-2, 14th Ling, Chia Pau Vil., Linkou Dist., New Taipei City 244, Taiwan, R.O.C.
Tel: 886-2-2605-2180
Fax: 886-2-2605-1924

Taiwan HsinChu EMC/RF/Telecom Lab:
Add: No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Vil., Chiung Lin Township, Hsinchu County 307, Taiwan, R.O.C.
Tel: 886-3-593-5343
Fax: 886-3-593-5342

Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

The road map of all our labs can be found in our web site also.

---END---