



A Test Lab Techno Corp.

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SAR Test Exclusion Evaluation



Test Report No.	: 1510FS12
Applicant	: Realtek Semiconductor Corp.
Manufacturer	: Realtek Semiconductor Corp.
Product Type	: 802.11b/g/n RTL8723BS Combo module
Trade Name	: REALTEK
Model Number	: RTL8723BS
Dates of Received	: Sep. 16, 2015
Dates of Test	: Oct. 12, 2015
Dates of Issued	: Oct. 13, 2015
Test Specification	: ANSI/IEEE C95.1-1999/ IEEE Std. 1528-2013 IEEE Std. 1528a-2005 47 CFR § 2.1093 KDB 447498 D01 General RF Exposure Guidance v05r02 KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04 KDB 865664 D02 RF Exposure Reporting v01r01 KDB 248227 D01 802.11 Wi-Fi SAR v02r01 KDB 616217 D04 SAR for laptop and tablets v01r01
Location of Test Lab.	: Chang-an Lab.

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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1. Description of Equipment under Test (EUT)

Applicant	Realtek Semiconductor Corp.		
Applicant Address	No.2 Innovation Road II, Hsinchu Science Park Hsinchu, 300 Taiwan		
Manufacturer	Realtek Semiconductor Corp.		
Manufacturer Address	No.2 Innovation Road II, Hsinchu Science Park Hsinchu, 300 Taiwan		
Product Type	802.11b/g/n RTL8723BS Combo module		
Trade Name	REALTEK		
Model Number	RTL8723BS		
FCC ID	TX2-RTL8723BS		
Frequency Range	Band	Operate Frequency (MHz)	
	IEEE 802.11b / 802.11g / 802.11n (2.4GHz) 20MHz	2412 - 2462	
	IEEE 802.11n (2.4GHz) 40MHz	2422 - 2452	
	Bluetooth LE	2402 - 2480	
Transmit Power (conducted power)	Band	Power	
		W	dBm
	IEEE 802.11b	0.044	16.43
	IEEE 802.11g	0.041	16.17
	IEEE 802.11n (2.4GHz) 20MHz	0.042	16.24
	IEEE 802.11n (2.4GHz) 40MHz	0.030	14.78
	Bluetooth LE	0.003	5.05
Antenna Specification	1.32 dBi		
Antenna Designation	PIFA Antenna		
Host Information	Trade Name: ECS ELITEGROUP Model Number: EG20BI2,EG20Bxx(x=0~9, A~Z or blank or "-") *These model number differ from each other in selling region.		

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1093. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.



2. ***Summary of Maximum Reported SAR Value***

Equipment Class	Mode	Estimated SAR 1g (W/kg)
DTS	2.4G WLAN	0.4
DSS	Bluetooth	0.4

Note:1. The SAR limit (Head & Body: SAR1g 1.6 W/kg) for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1999.

Note: 2. The Bluetooth and Wi-Fi are can't simultaneous transmission therefore without assessment simultaneous transmission.



3. SAR Test Exclusion

As RF exposure evaluation of portable device, SAR test is not required when the evaluation results . According to KDB 447498 4.3.1, unless excluded by specific FCC test procedures, portable devices shall include SAR data for equipment approval. SAR test necessity will be based on the exclusion result.

The test exclusion refers KDB 447498 as below:

≤50mm:

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

≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

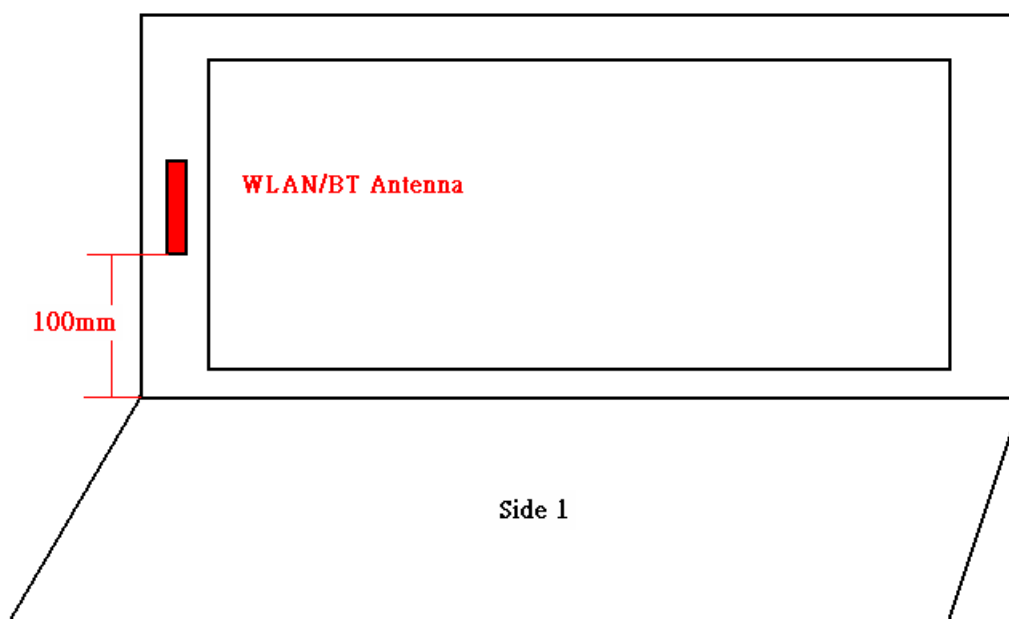
>50mm and <200mm:

- a) $\left[\text{Power allowed at numeric threshold for 50 mm in step 1} + (\text{test separation distance} - 50 \text{ mm}) \cdot \left(\frac{f(\text{MHz})}{150} \right) \right] \text{ mW}$, at 100 MHz to 1500 MHz
- b) $\left[\text{Power allowed at numeric threshold for 50 mm in step 1} + (\text{test separation distance} - 50 \text{ mm}) \cdot 10 \right] \text{ mW}$ at > 1500 MHz and ≤ 6 GHz

3.1 Antenna Distance

Antenna to Side (The evaluated distance available extremity SAR as below):

Distance of WLAN / Bluetooth Antenna to edge		
Antenna	Side	Distance (mm)
WLAN	Side 1	100



3.2 Conducted Power

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
IEEE 802.11b	1M	1	2412.0	16.43
		6	2437.0	16.27
		11	2462.0	16.02
IEEE 802.11g	6M	1	2412.0	14.26
		6	2437.0	16.17
		11	2462.0	14.21
IEEE 802.11n 20MHz (2.4GHz)	6.5M	1	2412.0	13.26
		6	2437.0	16.24
		11	2462.0	12.29
IEEE 802.11n 40MHz (2.4GHz)	13.5M	3	2422.0	13.19
		6	2437.0	14.78
		9	2452.0	13.02

Band	CH	Frequency (MHz)	Packet Type	Average Power (dBm)
Bluetooth LE	0	2402	---	5.05
	19	2440		4.82
	39	2480		4.28



3.3 Stand-alone SAR Evaluate

Transmitter and antenna implementation as below:

Band	WLAN antenna	Bluetooth antenna
WLAN	V	---
Bluetooth	---	V

Stand-alone transmission configurations as below:

Band	Side 1
IEEE 802.11b	---
IEEE 802.11g	---
IEEE 802.11n 20MHz (2.4GHz)	---
IEEE 802.11n 40MHz (2.4GHz)	---
Bluetooth LE	---

Note: The "-" on behalf of Stand-alone SAR is not required (Refer to KDB447498 D01 v05r02 4.3.1 for the Standalone SAR test exclusion considerations)

3.4 Evaluation Results

The evaluation of SAR test reduction according to KDB447498

SAR test is not required when the results showed “SAR is not required”.

Extremity SAR:

> 50 mm and <200mm									
Antenna	Side	Band	Channel	Power (dBm)	Frequency (GHz)	Distance (mm)	Power (mW)	Power thresholds SAR _{1g} (mW)	Exclusion considerations
WLAN / Bluetooth	1	IEEE 802.11b	1	16.50	2.412	100	45	597	SAR is not required
		IEEE 802.11g	6	16.50	2.437	100	45	596	SAR is not required
		IEEE 802.11n 20MHz (2.4GHz)	6	16.50	2.437	100	45	596	SAR is not required
		IEEE 802.11n 40MHz (2.4GHz)	9	15.00	2.437	100	32	596	SAR is not required
		Bluetooth LE	39	5.50	2.402	100	4	597	SAR is not required

Note1: For antenna to edge more than 50 mm that sar test is not required when the minimum distance(worst case) evaluated by results of above.

Note2: When KDB Publication 447498 SAR test exclusion is applies , SAR is not required for 2.4G OFDM configuration.



3.5 Simultaneous Transmitting Evaluate

Simultaneous transmission configurations as below:

Condition	Side	Frequency Band	
		WLAN	Bluetooth
1	1	---	---

3.5.1 Estimated SAR

Estimated SAR for test separation distances > 50 mm

Antenna	Side	Band	Estimated SAR ^{1g} (W/kg)
WLAN / Bluetooth	1	IEEE 802.11b	0.4
		IEEE 802.11g	0.4
		IEEE 802.11n 20MHz (2.4GHz)	0.4
		IEEE 802.11n 40MHz (2.4GHz)	0.4
		Bluetooth LE	0.4