

**SAR ANALYSIS REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: XE500T1C

FCC ID: A3LXE500T1C;

To: OET Bulletin 65 Supplement C: (2001-01) & IEEE1528:2003

SAR Analysis Report Serial No: RFI-SAR-RP89958JD01C V3.0

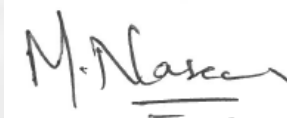
Version 3.0 Supersedes All Previous Versions

This SAR Analysis Report Is Issued Under The Authority Of Richelieu Quoi, SAR Technology Consultant:



(APPROVED SIGNATORY)

Checked By: Naseer Mirza



(APPROVED SIGNATORY)

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21 August to 06 September 2012

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1. Customer Information

Company Name:	Samsung Electronics Co., Ltd
Address:	416, Maetan-3Dong, Yeongtong-Gu, Suwon-City, Gyeonggi-Do, 443-742, Korea

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	SKU2: Tablet PC
Brand Name:	Samsung
Model Name or Number:	XE500T1C
Serial Number:	HX2W91SC700031T
IMEI Number:	Not Applicable
Hardware Version Number:	PV
Software Version Number:	Windows 8 Operating System
SKU2 FCC ID Number:	A3LXE500T1C
Country of Manufacture:	None Stated
Date of Receipt:	17 August 2012

Note(s):

This sample was used to perform WLAN conducted power measurements only.

2.2. Description of EUT

The equipment under test are 2 Tablet PCs with:

Tablet 2 (SKU 2) supporting *Bluetooth*, NFC, WiFi 2.4 GHz and 5.0 GHz Bands.

The EUT SKU2: was used to evaluate WLAN

2.3. Modifications Incorporated in the EUT

EUT (SN: HX2W91SC700031T) was used for WLAN conducted power measurements.

2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Memory Card
Brand Name:	None Stated (Generic)
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	Not Applicable
Country of Manufacture:	China
Connected to Port	Dedicated Micro SD Slot

2.5. Additional Information Related to Testing

Equipment Category	WiFi802.11 a/b/g/n; <i>Bluetooth</i>		
Type of Unit	Portable Transceiver		
Intended Operating Environment:	General Population/Uncontrolled limits		
Transmitter Maximum Output Power Characteristics:	WiFi802.11b/g/n	Test Software was used to configure the EUT to transmit at a maximum power of up to 11.9dBm.	
	WiFi802.11a/n	Test Software was used to configure the EUT to transmit at a maximum power of up to 9.6dBm.	
	<i>Bluetooth</i>	:=9.7 dBm	
Transmitter Frequency Range:	WiFi802.11b/g/n	2412 to 2462 MHz	
	WiFi802.11a/n	5180 to 5825 MHz	
	<i>Bluetooth</i>	2402 to 2480 MHz	
Transmitter Frequency Allocation of EUT When Under Test:	Wi-Fi 802.11b/g/n (2.4 GHz)	1	2412.0
		6	2437.0
		11	2462.0
	Wi-Fi 802.11a/n (5.2 GHz)	36	5180.0
		40	5200.0
		48	5240.0
	Wi-Fi 802.11a/n (5.3 GHz)	52	5260.0
		60	5300.0
		64	5320.0
	Wi-Fi 802.11a/n (5.6 GHz)	100	5500.0
		120	5600.0
		140	5700.0
	Wi-Fi 802.11a/n (5.8 GHz)	149	5745.0
		157	5785.0
		165	5825.0
Modulation(s):	DBPSK, CCK (Wi-Fi), 8PSK (<i>Bluetooth</i>): 0 Hz - Duty Factor modulating frequency		
Modulation Scheme (Crest Factor):	(Wi-Fi / <i>Bluetooth</i>): 1		
Antenna Type:	Internal integral		
Antenna Length:	Unknown		
Number of Antenna Positions:	1 Fixed (WLAN / <i>Bluetooth</i>)		
Power Supply Requirement:	Battery: 7.5V External Supply:12V / 3.33A		
Battery Type(s):	Li-Polymer		

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

Federal Communications Commission, "Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields", OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE Transaction on microwave theory and techniques, Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with know precision", IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02"

KDB 447498 D01 "Mobile Portable RF Exposure v04"

KDB 616217 D03 "SAR Supp Note and Netbook Laptop v01"

KDB 648474 D02 SAR Polcy Handsts Multi Xmitter Ant v01r01

KDB 941225 D06 "Hot Spot SAR v01"

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

Analysis was performed as per KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02", KDB 447498 D01 "Mobile Portable RF Exposure v04", KDB 616217 D03 "SAR Supp Note and Netbook Laptop v01", KDB 648474 D02 SAR Policy Handsts Multi Xmitter Ant v01r01, KDB 941225 D06 "Hot Spot SAR v01" and according to the procedures in IEEE Std 1528-2003 and OET Bulletin 65 Supplement C 01-01.

For SKU2: SAR evaluation was not required as the maximum output power for both 2.4 GHz and 5.0 GHz was less than 60/f & antenna separation distance > 5cm as per FCC KDB publication KDB 447498.

5. Operation and Configuration of the EUT during evaluation

5.1. Operating Modes

The EUT was evaluated in the following operating mode(s) unless otherwise stated:





- The following software setup modes above are identical to what was used in the EMC testing. Except the SAR measured output power is source based average while EMC is conducted peak power.
- 2.4 GHz WiFi802.11b/g/n Data allocated mode using manufacturer preparatory software batch files to excise mode 'b', 'g' and 'n', with maximum power of up to 11.9 dBm for 'b' mode, 9.2 dBm for 'g' and 7.5 dBm for 'n' modes.
- 5.0 GHz WiFi802.11a/n Data allocated mode using manufacturer preparatory software batch files to excise mode 'a' and 'n', with maximum power of up to 9.6 dBm for 'a' mode, 9.6 dBm for 'n' mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration(s) unless otherwise stated:

- Power supply attached and conducted RF port connected to a calibrated broadband power meter.
- '*Bluetooth* and Wi-Fi 2.4 GHz' or '*Bluetooth* and Wi-Fi 5.0 GHz' does not transmit simultaneously.

6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate – WLAN 2.4 GHz Band	OET Bulletin 65 Supplement C: (2001-01)	
Specific Absorption Rate – WLAN 5.0 GHz Band	OET Bulletin 65 Supplement C: (2001-01)	
Key to Results  = Complied  = Did not comply		

6.1. Summary of SAR Analysis

Technology/ Band	Tablet Mode				Hotspot Mode				Note (s)	FCC SAR Limit (W/Kg)
	Max Power Meas. (dBm)	Max Power Rated (dBm)	Max SAR Meas. (W/kg)	Max SAR Scale up (W/kg)	Max Power Meas. (dBm)	Max Power Rated (dBm)	Max SAR Meas. (W/kg)	Max SAR Scale up (W/kg)		
WiFi (2.4 GHz)	11.9	12.0	:=0	-	11.9	12.0	:=0	-	1	1.600
WiFi (5.0 GHz)	9.6	10.0	:=0	-	9.6	10.0	:=0	-	1	
Bluetooth	9.7	9.7	:=0	-	9.7	9.7	:=0	-	1	

Note(s):

1. SAR test not required as Maximum Measured Power < 60/f & antenna separation distance > 5cm as per FCC KDB publication KDB 447498
2. Simultaneous transmission is not required as the sum of 1g SAR is less than 1.6 W/kg
3. The test mode settings for both SAR and EMC report where identical. SAR power measurements where performed using a power meter to measure the burst average power. EMC power measurements used a spectrum analyser to measure the peak power. This therefore reflects in both SAR and EMC reported values; hence an average power vs peak power and power meter vs spectrum analyser comparison.

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains analysis calculation only.

7.2. Analysis tables

SAR Individual Transmitter Evaluation

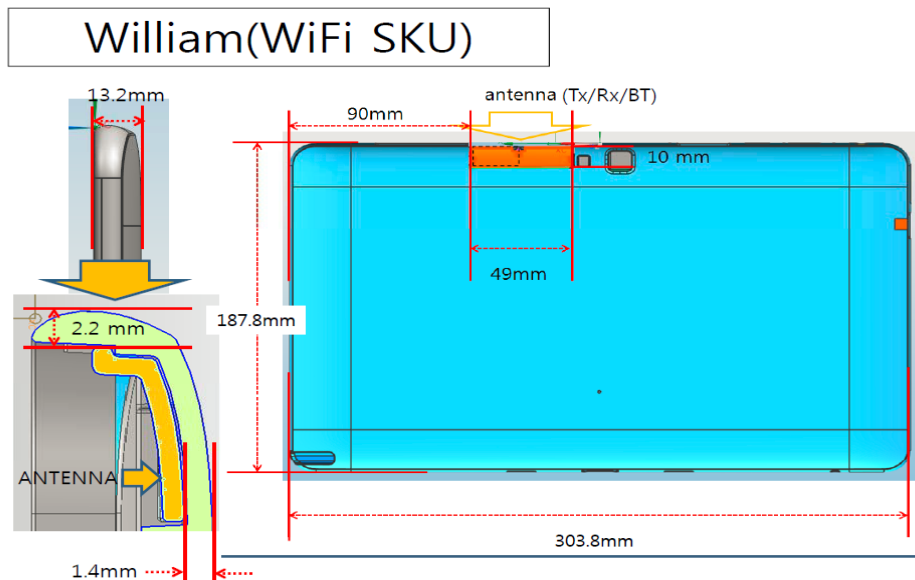
device, mode	Frequency, (MHz)	P_x (mW)	P_{REF} (mW)	single SAR, W/kg	Remarks
WLAN, WiFi802.11b/g/n	2450	~16	12	:=0	{ $P_x \leq 60/f$ }
WLAN, WiFi802.11a/n	5150 -5350	~7	6	:=0	{ $P_x \leq 60/f$ }
WLAN, WiFi802.11a/n	5470 -5850	~9	5	:=0	{ $P_x \leq 60/f$ }
BT, <i>Bluetooth</i>	2400	~9	12	:=0	{ $P_x \leq 60/f$ }

SAR Simultaneous Transmitter Evaluation

(x,y)	D(x,y) cm	L(x,y,z) cm	SPLSR _{xyz}	Sim-Tx SAR	Remarks
(WLAN, BT)	0	N/A	N/A	N/A	{no stand-alone SAR for BT or WLAN $P_x < 60/f$ } { $\Sigma_{WLAN, BT} < 1.6$ W/kg}

Note(s):

- SAR test not required as Maximum Measured Power $< 60/f$ as per FCC KDB publication KDB 447498
- Simultaneous transmission is not required as the sum of 1g SAR is less than 1.6 W/kg and condition meets the requirement of FCC KDB publication 447498 "D01 Mobile Portable RF Exposure v04" section 3) b) ii) 1) c).
- WLAN / *Bluetooth* use the same antenna to transmit.
- '*Bluetooth* and Wi-Fi 2.4 GHz' or '*Bluetooth* and Wi-Fi 5.0 GHz' does not transmit simultaneously.
- As individual SAR was not evaluated due to the average power being less than 60/f SUM of SAR = 0 W/kg



7.3. Conducted Power Measurements Using SKU2

7.3.1. Conducted Power Measurements Wi-Fi 802.11b/g/n (2.4 GHz) 802.11b/g

Maximum Measured: 11.9 dBm

Channel Number	Frequency (MHZ)	TX Power (dBm)	Note
1	2412.0	11.8	2.4GHz 802.11b (1Mbps)
6	2437.0	11.9	
11	2462.0	11.8	
1	2412.0	8.6	2.4GHz 802.11g (6Mbps)
6	2437.0	8.7	
11	2462.0	8.5	

802.11n

Channel Number	Frequency (MHZ)	TX Power (dBm)	Note
1	2412.0	6.8	2.4GHz 802.11n (MCS0 6.5Mbps)
6	2437.0	7.0	
11	2462.0	6.8	

Note:

The test mode batch script used to allow the EUT to transmit at >98% duty cycle.
At 2.4GHz there is a cable loss of 0.5dB which has been accounted for.

The test mode settings for both SAR and EMC report where identical. SAR power measurements were performed using a power meter to measure the burst average power. EMC power measurements used a spectrum analyser to measure the peak power. This therefore reflects in both SAR and EMC reported values; hence an average power vs peak power and power meter vs spectrum analyser comparison.

7.3.2. Conducted Power Measurements Wi-Fi 802.11a/n (5.0 GHz)**802.11a**

Maximum Measured 5180 – 5500 MHz: 8.4

Maximum Measured 5180 – 5500 MHz: 9.6 dBm

Channel Number	Frequency (MHZ)	TX Power (dBm) 6 Mbps	TX Power (dBm) 54 Mbps	Note
36	5180.0	7.3	7.8	5.2 GHz
40	5200.0	7.3	8.0	
48	5240.0	7.3	8.0	
52	5260.0	7.5	8.4	5.3 GHz
60	5300.0	7.7	8.4	
64	5320.0	7.4	8.4	
100	5500.0	7.6	8.1	5.6 GHz
120	5600.0	9.0	9.4	
140	5700.0	9.2	9.5	
149	5745.0	9.4	9.6	5.8 GHz
157	5785.0	9.5	9.6	
165	5825.0	9.5	9.5	

802.11n (5.0 GHz) (HT20)

Channel Number	Frequency (MHZ)	TX Power (dBm) 6.5 Mbps	TX Power (dBm) 65 Mbps	Note
36	5180.0	7.1	7.8	5.2 GHz
40	5200.0	7.1	7.9	
48	5240.0	7.4	7.9	
52	5260.0	7.2	8.4	5.3 GHz
60	5300.0	7.6	8.1	
64	5320.0	7.7	8.3	
100	5500.0	7.5	8.0	5.6 GHz
120	5600.0	8.8	9.5	
140	5700.0	9.0	9.5	
149	5745.0	9.0	9.4	5.8 GHz
157	5785.0	9.3	9.5	
165	5825.0	9.3	9.6	

Note:

The test mode batch script used to allow the EUT to transmit at >98% duty cycle.
At 5.0GHz there is a cable loss of 0.7dB which has been accounted for.

The test mode settings for both SAR and EMC report were identical. SAR power measurements were performed using a power meter to measure the burst average power. EMC power measurements used a spectrum analyser to measure the peak power. This therefore reflects in both SAR and EMC reported values; hence an average power vs peak power and power meter vs spectrum analyser comparison.