EMC Technologies

Global Product Certification
EMC-EMF-Safety Approvals

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SAR Test Report

Report Number: M120812_FCC_AR5BHB116_SAR_5.6

Test Sample: Stylistic Q Series Tablet PC
Radio Modules: WLAN HB116 (11A/B/G/N)
AR5BHB116

FCC ID: PPD-AR5BHB116
IC: 4104A-AR5BHB116
Date of Issue: 23rd August 2012

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SAR TEST REPORT

Report Number: M120812_FCC_AR5BHB116_SAR_5.6

FCC ID: PPD-AR5BHB116

IC: 4104A-AR5BHB116

1.0 GENERAL INFORMATION

Table 1

Test Sample:	Stylistic Q Series Tablet PC
Model Name:	Q702
Radio Modules:	WLAN AR5BHB116 & Bluetooth BCM92070MD_REF6
Interface Type:	Half Mini-PCI Module
Device Category:	Portable Transmitter
Test Device:	Pre-Production Unit
FCC System ID:	PPD-AR5BHB116
PC System IC:	4104A-AR5BHB116
RF exposure Category:	General Population/Uncontrolled
Manufacturer:	Fujitsu Limited

Test Standard/s:

1. Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields
   Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)
2. Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), RSS-102
3. **EN 62209-2:2010**
   Human exposure to radio frequency fields from hand-held and bodymounted wireless communication devices. Human models, instrumentation, and procedures.
   Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

Statement Of Compliance: The Fujitsu TABLET Computer Q702 with Wireless LAN model AR5BHB116 and Bluetooth module BCM92070MD_REF6 complied***** with the FCC General public/uncontrolled RF exposure limits of 1.6mW/g per requirements of 47CFR2.1093(d). It also complied with IC RSS-102 requirements.

Test Dates: 15th August 2012 to 17th August 2012

Test Officer: **Peter Jakubiec** **Emad Mansour**

Authorised Signature: **Peter Jakubiec**

SAR TEST REPORT
Stylistic Q Series Tablet PC
Model: Q702
Report Number: M120812_FCC_AR5BHB116_SAR_5.6

2.0 INTRODUCTION

Testing was performed on the Fujitsu TABLET PC, Model: Q702 with ATHEROS Half Mini-PCI Wireless LAN Module (HB116 (11A/B/G/N)), Model: AR5BHB116 & BROADCOM Bluetooth Module, Model: BCM92070MD_REF6. The HB116 (11A/B/G/N) module is an OEM product. The Half Mini-PCI Wireless LAN (WLAN) was tested in the dedicated host – STYLISTIC Q SERIES, Model Q702. The system tested will be referred to as the DUT throughout this report.
There are two variants of the Fujitsu Tablet PC, Model: Q702 one that is equipped with the Bluetooth transmitter and Bluetooth antenna, and one variant that does not contain Bluetooth transmitter or Bluetooth antenna FCC ID: PPD-AR5BHB116 IC: 4104A-AR5BHB116
SAR testing was conducted on the sample that is equipped with the Bluetooth transmitter and Bluetooth antenna. The Q702 also has an Optional Keyboard Docking unit located at a distance of >20cms from transmitting antennas when connected. The SAR tests listed in this report were conducted with no Docking unit present.

The measurement test results mentioned hereon only apply to the 5GHz frequency band; an additional report titled “M120812_FCC_AR5BHB116_SAR_2.4” applies to the 2450MHz frequency range.

3.0 TEST SAMPLE TECHNICAL INFORMATION

(Information supplied by the client)

3.1 DUT (WLAN) Details

Table 2

Transmitter:	Half Mini-Card Wireless LAN Module
Wireless Module:	HB116 (11a/b/g/n)
Model Number:	AR5BHB116
Manufacturer:	Atheros Communication Inc,
Modulation Type:	DSSS for 802.11b OFDM for 802.11g OFDM for 802.11a OFDM for 802.11n
5GHz (802.11a/n)	BPSK, QPSK, 16QAM, 64QAM
2.4GHz (802.11b/g/n)	CCK, DQPSK, DBPSK, 16QAM, 64QAM
Maximum Data Rate:	802.11b = 11 Mbps, 802.11g and 802.11a = 54 Mbps 802.11n = 300 Mbps
Frequency Range:	2.412–2.462 GHz for 11b/g/n 5.18-5.32 GHz, 5.5-5.6 GHz and 5.745-5.825 GHz for 11a/n
Number of Channels:	11 channels for 11b/g/n with 20MHz Bandwidth 24 channels for 11a/n with 20MHz Bandwidth 18 channels for 11n with 40MHz Bandwidth
Antenna Types:	Nissei Electric Inverted F Antenna Model: refer to WLAN antenna data Location: refer to Antenna location file
Antenna gain:	Please refer antenna data provided separately
Power Supply:	3.3 VDC from PCI Express bus

Table 3 Channels and Output power setting

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tx BW (MHz)	Average Power Target (dBm) Ch A		Ch B
802.11a	**5.2 GHz**						
	36	5180	6	-	**12.0**		**12.0**
	40	5200					
	44	5220					
	48	5240					
	5.3 GHz						
	52	5260	6	-	**13.5**		**13.5**
	56	5280					
	60	5300					
	64	5320					
	5.6 GHz						
	100	5500	6	-	**13.5**		**13.5**
	104	5520					
	108	5540					
	112	5560					
	116	5580					
	120	5600					
	124	5620					
	128	5640					
	132	5660					
	136	5680					
	140	5700					
	5.8 GHz						
	149	5745	6	-	**15.0**		**15.0**
	153	5765					
	157	5785					
	161	5805					
	165	5825					

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tx BW (MHz)	Average Power Target (dBm) Ch A		Ch B
802.11n	**5.2 GHz**						
	36	5180	HT0	20	**12.0**		**12.0**
	40	5200					
	44	5220					
	48	5240			**12.5**		**12.5**
	5.3 GHz						
	52	5260	HT0	20	**13.0**		**13.0**
	56	5280					
	60	5300					
	64	5320					
	5.6 GHz						
	100	5500	HT0	20	**13.5**		**13.5**
	104	5520					
	108	5540					
	112	5560					
	116	5580					
	120	5600					
	124	5620					
	128	5640					
	132	5660					
	136	5680					
	140	5700					

802.11n	**5.8 GHz**						
	149	5745	HT0	20	**15.0**		**15.0**
	153	5765					
	157	5785					
	161	5805					
	165	5825			**14.5**		**14.5**
	5.2 GHz						
	38	5190	HT0	40 Wide	**11.0**		**11.0**
	46	5230			**13.5**		**13.5**
	54	5270	HT0	40 Wide	**12.0**		**12.0**
	62	5310			**8.5**		**8.5**
	5.6 GHz						
	102	5510	HT0	40 Wide	**14.0**		**14.0**
	110	5550					
	118	5590					
	126	5630					
	134	5670					
	5.8 GHz						
	151	5755	HT0	40 Wide	**15.5**		**15.5**
	159	5795			**15.0**		**15.0**

NOTE: For 2450 MHz SAR results refer to report titled “M120812_FCC_AR5BHB116_SAR_2.4”.

3.2 DUT (Notebook PC) Details

Table 4

Host notebook :	STYLISTIC Q series
Model Name:	Q702
Serial Number:	Pre-production Sample
Manufacturer:	FUJITSU LIMITED
CPU Type and Speed:	Core i5 1.8GHz
LCD	11.7”WXGA(1280x800 : LP116WH4
Graphics chip	None
Wired LAN:	None
Modem:	None
Optional Docking Unit:	**FPCPR199**
AC Adapter Model:	60W: PXW1931N
Voltage:	19 V
Current Specs:	3.16A
Watts:	60W

3.3 Test sample Accessories

3.3.1 Battery Types

One type of Fujitsu Lithium Ion battery is used to power the DUT.

Table 5 Battery Details

Model	LIS3094FTPC(SY6)
V/mAh	10.8V/3150mAh

4.0 TEST SIGNAL, FREQUENCY AND OUTPUT POWER

ATHEROS's ART test tool was used to configure the WLAN for testing. The DUT Wireless LAN had a total of 11 channels within the 2412 to 2462 MHz frequency band and 24 channels within the frequency range 5180 to 5825 MHz. In The frequency range 2412 MHz to 2462 MHz the DUT operates in 2 modes, OFDM and DSSS. Within the 5180 to 5825 MHz frequency range the DUT operates in OFDM mode only. For the SAR measurements the DUT was operating in continuous transmit mode using programming codes supplied by Fujitsu.

The Bluetooth module operates over 79 channels within the frequency range 2402 to 2480 MHz. It is possible for the Bluetooth module to operate simultaneously with the WLAN module (co-transmission). However, due to low output power of Bluetooth module (less than 5mW), standalone SAR measurement for Bluetooth module was not conducted (**"Supplement to the KDB 616217"**).

The test results mentioned in this report only apply to the 5.6 GHz frequency range. An additional report titled *"*M120812_FCC_AR5BHB116_SAR_2.4*"* is specific to the 2450MHz range.

The WLAN modules can be configured in a number of different data rates. It was found that the highest source based time averaged power was measured when using the lowest data rates available in each mode. This lowest data rate corresponds to 6Mbps in OFDM mode and 1Mbps in DSSS mode.

The frequency span of the 5600MHz Bands was more than 10MHz consequently; the SAR levels of the test sample were measured for lowest, centre and highest channels in the applicable modes. The DUT is capable of using two antennas transmitting simultaneously (HT8 DATA mode) the power level is 3dB lower (50%) than if a single antenna was transmitting, There were no wires or other connections to the DUT during the SAR measurements.

At the beginning of the SAR tests, the conducted power of the DUT was measured after temporary modification of antenna connector inside the DUT's TX RX compartment. Measurements were performed with a calibrated Power Meter. The Transmitter power was set to be equal or higher than power specified by the manufacturer.

4.1 Battery Status

The DUT battery was fully charged prior to commencement of measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the RF field at a defined position inside the phantom before the commencement of each test and again after the completion of the test. It was not possible to perform conducted power measurements at the output of the DUT, at the beginning and end of each scan due to lack of a suitable antenna port. The uncertainty associated with the power drift was less than 5% and was assessed in the uncertainty budget.

5.0 DETAILS OF TEST LABORATORY

5.1 Location

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5.2 Accreditations

EMC Technologies Pty. Ltd. is accredited by the National Association of Testing Authorities, Australia (NATA).
NATA Accredited Laboratory Number: 5292

EMC Technologies Pty Ltd is NATA accredited for the following standards:

Table 6

AS/NZS 2772.1:	RF and microwave radiation hazard measurement
ACMA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003, Amdt (No. 1):2007
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
EN 50360: 2001	Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)
EN 62209-1:2006	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures. **Part 1:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
EN 62209-2:2010	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures **Part 2**: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz
IEEE 1528: 2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

Refer to NATA website www.nata.asn.au for the full scope of accreditation.

5.3 Environmental Factors

The measurements were performed in a shielded room with no background RF signals. The temperature in the laboratory was controlled to within 21±1°C, the humidity was in the range 38% to 41%. The liquid parameters are measured daily prior to the commencement of each test. Tests were performed to check that reflections within the environment did not influence the SAR measurements. The noise floor of the DASY5 SAR measurement system using the SN3563 probe was less than 5μV in both air and liquid mediums.

6.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

Table 7

Applicable Head Configurations Applicable Body Configurations	: None : Lap Held Position : Edge On Position

6.1 Probe Positioning System

The measurements were performed with the state-of-the-art automated near-field scanning system **DASY5 Version 52** from Schmid & Partner Engineering AG (SPEAG). The DASY5 fully complies with the OET65 C (01-01), IEEE 1528 and EN62209-1 and EN62209-2 SAR measurement requirements.

6.2 E-Field Probe Type and Performance

The SAR measurements were conducted with SPEAG dosimetric probe EX3DV4 Serial: 3563. Please refer to appendix C for detailed information.

6.3 System verification

6.3.1 System verification Results @ 5GHz

The following table lists the dielectric properties of the tissue simulating liquid measured prior to SAR system verification. The results of the system verification are listed in columns 4 and 5. The forward power into the reference dipole for SAR system verification was adjusted to 100 mW.

Table 8 System verification Results (Dipole: SPEAG D5GHzV2 SN: 1008)

1. System Frequency and verification Date	2. $\in$r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
5800 15th August 2012	46.3	6.21	9.23	2.57
5500 16th August 2012	47.2	5.80	10.1	2.84
5200 17th August 2012	48.2	5.36	9.67	2.72

6.3.2 Deviation from reference system verification values

Currently no IEEE Std 1528-2003 SAR reference values are available in 5.6 GHz band, as a consequence all system verification results were compared against the SPEAG calibration reference SAR values.

The reference SAR value is the SAR system verification result obtained in a specific dielectric liquid using the validation dipole (D5GHzV2) after system component calibration. The measured one-gram SAR should be within 10% of the expected target reference values shown in table below.

Table 9 Deviation from reference system verification values in 5.6 GHz band

Frequency and Date	Measured SAR 1g (mW/g)	Measured SAR 1g (Normalized to 1W)	EMCT Calibration reference SAR Value 1g (mW/g)	Deviation From EMCT Reference 1g (%)
5800 15th August 2012	9.23	92.30	87.6	5.37
5500 16th August 2012	10.1	101.00	97.3	3.80
5200 17th August 2012	9.67	96.70	94	2.87

NOTE: All reference system verification values are referenced to 1W input power.

6.3.3 Liquid Depth 15cm

During the SAR measurement process the liquid level was maintained to a level of a least 15cm with a tolerance of 0.5cm.

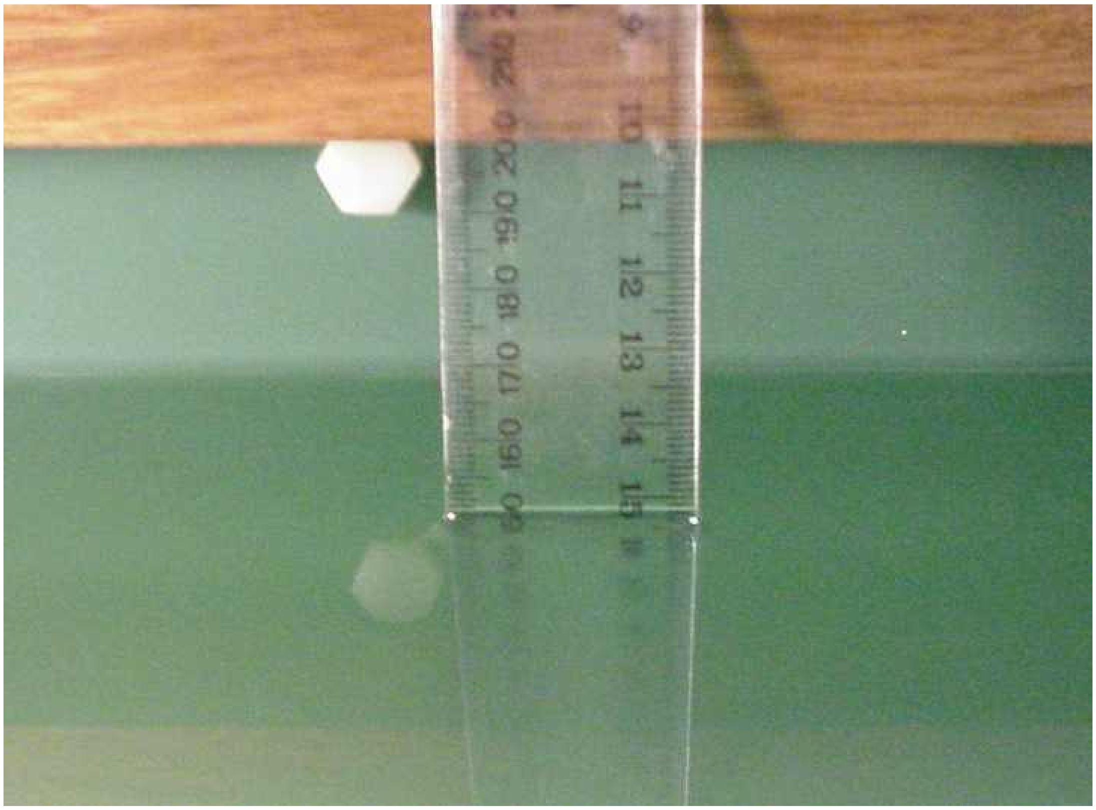


Photo of liquid Depth in Flat Phantom

6.4 Phantom Properties

The phantoms used during the testing comply with the OET65 C (01-01), IEEE 1528 and EN62209-1 and EN62209-2 SAR measurement requirements.

Phantom Properties	Required
Thickness of flat section	2.0mm ± 0.2mm (bottom section)
Dielectric Constant	<5.0
Loss Tangent	<0.05

6.5 Tissue Material Properties

The dielectric parameters of the brain simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8753ES Network Analyser. The actual dielectric parameters are shown in the following table.

Table 10 Measured Body Simulating Liquid Dielectric Values for 5200MHz range

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5180 MHz Body	48.3	49.0 ±5% (46.55 to 51.45)	5.32	5.3 ±5% (5.04 to 5.57)	1000
5230 MHz Body	48.2	48.9 ±5% (46.46 to 51.35)	5.41	5.4 ±5% (5.13 to 5.67)	1000
5260 MHz Body	48.1	48.9 ±5% (46.46 to 51.35)	5.49	5.4 ±5% (5.13 to 5.67)	1000
5320 MHz Body	47.9	48.8 ±5% (46.36 to 51.24)	5.61	5.4 ±5% (5.13 to 5.67)	1000

Table 11 Measured Body Simulating Liquid Dielectric Values for 5600MHz range

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5510 MHz Body	47.1	48.6 ±5% (46.17 to 51.03)	5.82	5.6 ±5% (5.32 to 5.88)	1000
5590 MHz Body	46.9	48.5 ±5% (46.08 to 50.93)	5.97	5.77 ±5% (5.48 to 6.06)	1000
5670 MHz Body	46.6	48.4 ±5% (45.98 to 50.82)	6.10	5.9 ±5% (5.61 to 6.20)	1000

Table 12 Measured Body Simulating Liquid Dielectric Values for 5800MHz range

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5755 MHz Body	46.4	48.3 ±5% (45.89 to 50.72)	6.14	5.9 ±5% (5.61 to 6.20)	1000
5785 MHz Body	46.4	48.2 ±5% (45.79 to 50.61)	6.19	6.0 ±5% (5.7 to 6.3)	1000
5825 MHz Body	46.2	48.2 ±5% (45.79 to 50.61)	6.25	6.0 ±5% (5.7 to 6.3)	1000

NOTE: The muscle liquid parameters were within the required tolerances of ±5% for σ for ∈r

6.5.1 Liquid Temperature and Humidity

The humidity and dielectric/ambient temperatures were recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

Table 13 Temperature and Humidity recorded for each day

Date	Ambient Temperature (°C)	Liquid Temperature (°C)	Humidity (%)
15th August 2012	20.7	20.5	38
16th August 2012	20.8	20.6	39
17th August 2012	20.5	20.2	41

6.6 Simulated Tissue Composition Used for SAR Test

A low loss clamp was used to position the TABLET underneath the phantom surface. Small pieces of foam were then used to press the TABLET flush against the phantom surface.

Table 14 Tissue Type: Muscle @ 5600MHz

EMCT Liquid, Volume of Liquid: 60 Litres

Composition
Distilled Water
Salt
Triton X-100

6.7 Device Holder for Laptops and P 10.1 Phantom

A low loss clamp was used to position the DUT underneath the phantom surface.
Refer to Appendix A for photographs of device positioning

7.0 SAR MEASUREMENT PROCEDURE USING DASY5

The SAR evaluation was performed with the SPEAG DASY5 system. A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the DUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.0 mm from the inner surface of the shell. The area covers the entire dimension of the DUT and the horizontal grid spacing is 10 mm x 10 mm. The actual Area Scan has dimensions of __mm x __mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

c) Around this point, a volume of 24 mm x 24 mm x 20 mm is assessed by measuring 7 x 7 x 9 points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

   (i) The data at the surface are extrapolated, since the centre of the dipoles is 1.0 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 2.0 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

   (ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

   (iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

   (iv) The SAR value at the same location as in Step (a) is again measured to evaluate the actual power drift.

8.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both device SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently.

Table 15 Uncertainty Budget for DASY5 Version 52 – DUT SAR test 5GHz

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6.55	N	1.00	1	1	6.55	6.55	∞
Axial Isotropy	4.7	R	1.73	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.6	R	1.73	0.7	0.7	3.88	3.88	∞
Boundary Effects	2	R	1.73	1	1	1.15	1.15	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0.8	R	1.73	1	1	0.46	0.46	∞
Integration Time	2.6	R	1.73	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	1.73	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	1.73	1	1	1.73	1.73	∞
Probe Positioner	0.8	R	1.73	1	1	0.46	0.46	∞
Probe Positioning	9.9	R	1.73	1	1	5.72	5.72	∞
Max. SAR Eval.	4	R	1.73	1	1	2.31	2.31	∞
Post Processing	4	R	1.73	1	1	2.31	2.31	∞
Test Sample Related								
Power Scaling	0	R	1.73	1	1	0.00	0.00	∞
Test Sample Positioning	2.9	N	1.00	1	1	2.90	2.90	145
Device Holder Uncertainty	3.6	N	1.00	1	1	3.60	3.60	5
Output Power Variation – SAR Drift Measurement	4.72	R	1.73	1	1	2.73	2.73	∞
Phantom and Setup								
Phantom Uncertainty	7.9	R	1.73	1	1	4.56	4.56	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.71	1.60	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.6	0.26	1.50	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						13.6	13.4	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=	2		27.1	26.8	

Estimated total measurement uncertainty for the DASY5 measurement system was ±13.6%. The extended uncertainty (K = 2) was assessed to be ±27.1% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table 16 Uncertainty Budget for DASY5 Version 52 – System verification 5GHz

Error Description	Uncert. Value	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i	10g u_i	v_i
Measurement System								
Probe Calibration	6.55	N	1.00	1	1	6.55	6.55	∞
Axial Isotropy	4.7	R	1.73	1	1	2.71	2.71	∞
Hemispherical Isotropy	9.6	R	1.73	0	0	0.00	0.00	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0	R	1.73	1	1	0.00	0.00	∞
Integration Time	0	R	1.73	1	1	0.00	0.00	∞
RF Ambient Noise	1	R	1.73	1	1	0.58	0.58	∞
RF Ambient Reflections	1	R	1.73	1	1	0.58	0.58	∞
Probe Positioner	0.8	R	1.73	1	1	0.46	0.46	∞
Probe Positioning	6.7	R	1.73	1	1	3.87	3.87	∞
Max. SAR Eval.	2	R	1.73	1	1	1.15	1.15	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Dipole Related								
Deviation of exp. dipole	5.5	R	1.73	1	1	3.18	3.18	∞
Dipole Axis to Liquid Dist.	2	R	1.73	1	1	1.15	1.15	∞
Input power & SAR drift	5.00	R	1.73	1	1	2.89	2.89	∞
Phantom and Setup								
Phantom Uncertainty	4	R	1.73	1	1	2.31	2.31	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.78	0.71	1.95	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.26	0.26	0.65	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u_c)						10.6	10.5	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k= 2			21.3	20.9	

Estimated total measurement uncertainty for the DASY5 measurement system was ±10.6%. The extended uncertainty (K = 2) was assessed to be ±21.3% based on 95% confidence level. The uncertainty is not added to the measurement result.

9.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table 17 SPEAG DASY5 Version 52

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable	✓
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	✓
SAM Phantom	SPEAG	N/A	1260	Not applicable	
SAM Phantom	SPEAG	N/A	1060	Not applicable	
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	✓
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	
Flat Phantom	SPEAG	ELI 4.0	1101	Not Applicable	
Data Acquisition Electronics	SPEAG	DAE3 V1	359	21-June-2013	
Data Acquisition Electronics	SPEAG	DAE3 V1	442	05-Dec-2012	✓
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	
Probe E-Field	SPEAG	ET3DV6	1380	12-Dec-2012	
Probe E-Field	SPEAG	ET3DV6	1377	20-June-2013	
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	
Probe E-Field	SPEAG	EX3DV4	3563	21-June-2013	✓
Probe E-Field	SPEAG	EX3DV4	3657	14-Dec-2012	
Antenna Dipole 300 MHz	SPEAG	D300V3	1012	30-Nov-2012	
Antenna Dipole 450 MHz	SPEAG	D450V3	1074	30-Nov-2012	
Antenna Dipole 750 MHz	SPEAG	D750V2	1051	9-Jan-2014	
Antenna Dipole 900 MHz	SPEAG	D900V2	047	22-June-2014	
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	20-June-2014	
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	20-June-2014	
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	10-Dec -2012	
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	09-Dec-2012	
Antenna Dipole 2600 MHz	SPEAG	D2600V2	1044	10-Jan-2014	
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	13-July-2013	
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	14-Dec-2013	✓
RF Amplifier	EIN	603L	N/A	*In test	
RF Amplifier	Mini-Circuits	ZHL-42	N/A	*In test	
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	✓
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	
RF Power Meter	Hewlett Packard	437B	3125012786	23-Aug-2012	✓
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	23-Aug-2012	✓
RF Power Meter	Rohde & Schwarz	NRP	101415	18-Aug-2012	
RF Power Sensor	Rohde & Schwarz	NRP - Z81	100174	21-Sept-2012	
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*In test	✓
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*In test	✓
Network Analyser	Hewlett Packard	8714B	GB3510035	27-Sept-2012	
Network Analyser	Hewlett Packard	8753ES	JP39240130	7-Nov-2012	✓
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	*In test	
Dual Directional Coupler	NARDA	3022	75453	*In test	✓
Radio Communication Test Set	Rohde & Schwarz	CMU200	101573	Not Applicable	
Radio Communication Test Set	Anritsu	MT8820A	6200240559	Not Applicable	
Radio Communication Test Set	Agilent	PXT E6621A	MY51100168	Not Applicable	

* Calibrated during the test for the relevant parameters.

10.0 TEST METHODOLOGY

Notebooks should be evaluated in normal use positions, typical for lap-held bottom-face only. However the number of positions will depend on the number of configurations the tablet can be operated in. The “STYLISTIC Q SERIES” PC can be used on the lap (see Appendix A) or hand held as a Tablet PC

10.1 Positions

10.1.1 “Lap Held” Position Definition (0mm spacing)

The DUT was tested in the 2.00 mm flat section of the AndreT Flat phantom for the “Lap Held” position. The Transceiver was placed at the bottom of the phantom and suspended in such way that the back of the DUT was touching the phantom. This device orientation simulates the PC’s normal use – being held on the lap of the user. A spacing of 0mm ensures that the SAR results are conservative and represent a worst-case position.

10.1.2 “Edge On” Position (Portrait or Landscape)

The DUT was tested in the (2.00 mm) flat section of the AndreT Flat phantom for the “Edge On” position. The Antenna edge of the Transceiver was placed underneath the flat section of the phantom and suspended until the edge touched the phantom. *Refer to Appendix A for photos of measurement positions.*

10.2 List of All Test Cases (Antenna In/Out, Test Frequencies, User Modes)

The DUT has a fixed antenna. Depending on the measured SAR level up to three test channels with the test sample operating at maximum power were recorded. The following table represents the matrix used to determine what testing was required. All relevant provisions of KDB 447498 are applied for SAR measurements of the host system. Due to the screen size <12 inches, KDB 616217 was not used in the SAR evaluation instead “Supplement to the KDB 616217” was followed.

Table 18 Testing configurations

Phantom Configuration	*Device Mode	Antenna	Test Configurations		
			Channel (Low)	Channel (Middle)	Channel (High)
Lap Held	OFDM 5GHz All Bands	A		X	
		B		X	
Edge On	OFDM 5GHz All Bands	A		X	
		B		X	

Legend

X (blue)	Testing Required in this configuration
(green)	Testing required in this configuration only if SAR of middle channel is more than 3dB below the SAR limit or it is the worst case.

NOTE: Throughout this report, Antenna A, B refer to Tx1, Tx2 in the host respectively.

11.0 SAR MEASUREMENT RESULTS

The SAR values averaged over 1g tissue masses were determined for the sample DUT for all test configurations listed in section 10.2.

11.1 5GHz Band SAR Results

Table 19 SAR MEASUREMENT RESULTS Lower Band – OFDM Mode

Test Position	Plot No.	Ant	Bit rate Mode (Mbps)	Channel Bandwidth (MHz)	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Lap Held	1	A	6	-	36	5180	0.335	-0.14
	2		6	-	52	5240	0.497	-0.21
	3		6	-	64	5320	0.518	-0.06
	4		HT0	40	46	5230	0.516	0.16
	5	B	6	-	36	5180	0.337	-0.21
	6		6	-	52	5240	0.457	-0.18
	7		6	-	64	5320	0.439	0.04
	8		HT0	40	46	5230	**0.527**	-0.14
Edge On Primary Portrait	-	A	HT0	40	46	5230	Noise Floor	-
	-	B	HT0	40	46	5230	Noise Floor	-

NOTE: The measurement uncertainty of 27.1% for 5GHz testing is not added to the result.

The highest SAR level recorded in the 5.2 GHz band was 0.527 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in Lap Held position in OFDM (HT0-40MHz) mode, utilizing channel 46 (5230 MHz) and antenna B.

Table 20 SAR MEASUREMENT RESULTS Middle Band – OFDM Mode

Test Position	Plot No.	Ant	Bit rate Mode (Mbps)	Channel Bandwidth (MHz)	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Lap Held	9	A	HT0	40	102	5510	0.497	0.16
	10		HT0	40	118	5590	0.655	-0.12
	11		HT0	40	134	5670	**0.838**	0.02
	12	B	HT0	40	102	5510	0.698	-0.07
	13		HT0	40	118	5590	0.748	-0.14
	14		HT0	40	134	5670	0.431	-0.17
				40				
Edge On Primary Portrait	-	A	HT0	40	118	5590	Noise Floor	-
	-	B	HT0	40	118	5590	Noise Floor	-

NOTE: The measurement uncertainty of 27.1% for 5GHz testing is not added to the result.

The highest SAR level recorded in the 5.6 GHz band was 0.838 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in Lap Held position in OFDM (HT0-40 MHz) mode, utilizing channel 134 (5670 MHz) and antenna A.

Table 21 SAR MEASUREMENT RESULTS Upper Band – OFDM Mode

Test Position	Plot No.	Ant	Bit rate Mode (Mbps)	Channel Bandwidth (MHz)	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Lap Held	15	A	HT0	40	151	5755	0.927	0.11
	16		6	-	157	5785	**1.090**	-0.05
	17		6	-	165	5825	1.060	-0.09
	18	B	HT0	40	151	5755	0.368	0.04
	19		6	-	157	5785	0.314	-0.06
	20		6	-	165	5825	0.357	-0.19
Edge On Primary Portrait	21	A	6	-	157	5785	0.068	0.04
	-	B	6	-	157	5785	Noise Floor	-

NOTE: The measurement uncertainty of 27.1% for 5GHz testing is not added to the result.

The highest SAR level recorded in the 5.8 GHz band was 1.090 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in Lap Held position in OFDM mode, utilizing channel 157 (5785 MHz) and antenna A.

12.0 COMPLIANCE STATEMENT

The Fujitsu TABLET PC, Model: Q702 with ATHEROS Mini-PCI Wireless LAN Module (HB116 (11A/B/G/N)), Model: AR5BHB116 & BROADCOM Bluetooth Module, Model: BCM92070MD_REF6 was found to comply with the FCC and RSS-102 SAR requirements.

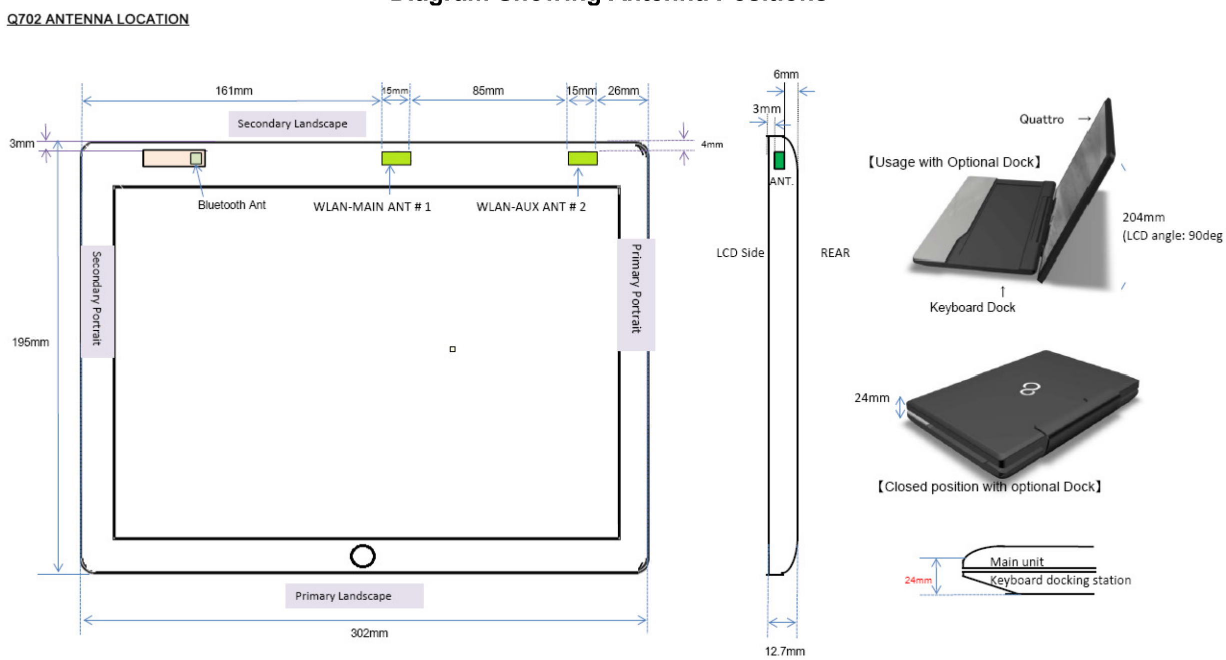
The highest SAR level recorded was 1.090 mW/g for a 1g cube. This value was measured at 5785 MHz (channel 157) in the “Lap Held” position in OFDM modulation mode at the antenna A. This was below the limit of 1.6 mW/g for uncontrolled exposure, even taking into account the measurement uncertainty of 27.1 %.

13.0 MULTIBAND EVALUATION CONSIDERATIONS

According to the FCC SAR evaluation procedures mentioned in **Supplement to KDB 616217**, stand-alone SAR evaluation is NOT required when the maximum transmitter and antenna output power is less than or equal to $60/f_{(GHz)}$ (P_{ref}) The Bluetooth module in the DUT operates in the 2.4GHz range. It has a maximum output power of 5mW which is < P_{ref} (=60/2.4=25mW).

The shortest distance between the BT module and any other transmitting antenna was 9cm. Because 9cm > 5cm, and 5mW < 25mW, the Bluetooth module was not considered for SAR evaluation. This is in accordance with the test reduction methods detailed in **"Supplement to the KDB 616217"** and KDB 447498

Diagram Showing Antenna Positions



NOTE: Throughout this report, Antenna A and B refer to Tx1 and Tx2 in the host.