SAR Test Report

FOR:

Manufacturer: Honeywell International Inc.
Model Numbers: 75eL00, 75eL0N
FCC ID: HD5-75EL00 & HD5-75EL0N
IC Certification Number: 1693B-75EL00 & 1693B-75EL0N

Test Report #: SAR_HONEY_134_14001_FCC_Rev1

Date of Report: 2015-02-06

CTIA Authorized Test Lab
LAB CODE 20020328-00

ACCREDITED
TESTING LABORATORY
Certificate #2135.01

FCC Listed #:
A2LA Accredited

IC Recognized #
3462B-1

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecomusa.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1. Assessment

The following device was evaluated against the limits for general population uncontrolled exposure specified in FCC 2.1093 and RSS 102, Issue 4 according to measurement procedures specified in FCC regulation as listed in chapter 5, IEEE 1528:2013, IEC 62209-1:2005, and IEC 62209-2:2010 and no deviations were ascertained during the course of the tests performed.

Manufacturer	Description	Model #
Honeywell International Inc.	Dolphin 75e Handheld Computer	75eL0N and 75eL00

Note: Testing was focused on Model 75eL0N. Model variant 75eL00 is declared to be identical except that it has no NFC radio. This model was also spot checked as seen in Section 8.

Responsible for Testing Laboratory:

2015-02-06	Compliance	Josie Sabado (EMC Lab Manager)	
Date	**Section**	**Name**	**Signature**

Responsible for the Report:

2015-02-06	Compliance	James Donnellan (SR EMC Engineer)	James Donnellan — Digitally signed by James Donnellan DN: cn=James Donnellan, c=US, o=Cetecom Inc., ou=Compliance, email=james.donnellan@cetecom.com Date: 2015.02.06 12:52:31 -08'00'
Date	**Section**	**Name**	**Signature**

The test results of this test report relate exclusively to the test item specified in Section 3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the SAR Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Industry Canada Company Number:	3462B
Test Lab Manager:	Josie Sabado
Responsible Project Manager:	Cathy Palacios

2.2. Identification of the Client

Applicant's Name:	Honeywell International Inc
Street Address:	9160 Old Bailes Road
City/Zip Code	Fort Mill, SC 29707
Country	USA
Contact Person:	Mandana Salahshour
Phone No.	803-835-8190
e-mail:	Mandana.Salahshour@honeywell.com

2.3. Identification of the Manufacturer

Same as Client.

3. Equipment under Test (EUT)

3.1. General Specification of the Equipment under Test

Model No:	75eL0N and 75eL00
Equipment Information	75eL0N and 75eL00 are identical except for an NFC radio on 75eL0N model. Holster-2 (Long) and 6000-Holster (Short) are included in testing in addition to two Li-Ion battery models 70e-BTSC and 70e-BTEC
FCC ID:	HD5-75EL00 & HD5-75EL0N
IC Certification Number:	1693B-75EL00 & 1693B-75EL0N
Product Type:	Portable
Prototype/Production:	Prototype
RF Exposure Environment:	General / Uncontrolled
Dimensions:	Width: 74mm Height: 133mm Depth: 24mm
Exposure Conditions:	Hand Held. Next to the ear. Body worn.
Operating Voltage Range:	Li-ion Battery Vmin: 3.3V dc/ Vnom: 3.7V dc / Vmax: 4.2V dc
Operating Temperature Range:	-20°C – 50°C
Supported Radios:	Qualcomm Chipset Supports Bluetooth v4.0 (BR/EDR + BLE), 802.11a/g/n/ac NFC (Model 75eL0N only)
Power Back-Off Modes:	None
Simultaneous Transmission Configurations:	None.
Date of Testing:	2014-11-19 to 2015-1-27

3.2. Technical Specification of Supported Radios

Signal Type	Duty Cycle	Type(s) of Modulation	Band	Uplink Transmit Frequency Range (MHz)	Measured Maximum Conducted Output Power (dBm)
802.11 b/g/n	100%	BPSK, QPSK, 16-QAM, 64-QAM	N/A	2400 – 2483.5	17.5
802.11 a/n	100%	BPSK, QPSK, 16-QAM, 64-QAM	Sub-Band 1	5150 - 5250	14.6
			Sub-Band 2	5250 - 5350	14.54
			Sub-Band 3	5475 - 5725	14.4
			Sub-Band 4	5725 - 5850	14.34
802.11.15.1	100%	GFSK п/4-DPSK 8DPSK	2.4GHz	2402-2480	3.28
802.11.15.4	100%	GFSK	2.4GHz	2402-2480	2.31

3.3. Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version
1	14270J0043	2	54.00
2	14269J0090	2	54.00
3	14268J006E	2	54.00
4	14269J005F	2	54.00
5	14269J0070	2	54.00

3.4. Identification of Accessory equipment

AE #	Type	Manufacturer	Model	SN / PN	Comments
1	Holster	Agora	Holster-2	N/A	Long Holster
2	Holster	--	6000-Holster	N/A	Short Holster
3	3.7 V Li ION Battery	TWS (for Honeywell)	70e-BTSC	BAT-STANDARD-01	Small
4	3.7 V Li ION Battery	TWS (for Honeywell)	70e-BTEC	BAT-EXTENDED-01	Big

3.5. Maximum SAR values

Equipment Class	Exposure Condition	Measured 1g SAR (W/kg)	Maximum Reported 1g SAR[1] (W/kg)
DTS	Head	0.248	0.367
	Body	0.403	0.596
NII	Head	0.192	0.239
	Body	0.290	0.351

Note: the above table lists the maximum SAR values per equipment class and exposure condition out of the evaluation of the 2 model variants identified in section 3.1. See also section 3.6 Miscellaneous Information.

3.6. Miscellaneous Information

The two model variants 75eL0N and 75eL00 are covered from this SAR report. The models are declared and documented to be identical in all HW, SW and FW portions except that model 75eL0N is in addition equipped with NFC functionalty.
Testing is focussed on the NFC variant while worst case spot-checks has been applied to the non-NFC model only, since the impact on SAR is considered marginal.
In addition, the 2 optional holsters and 2 battery types as identified in section 3.4 are tested at worse case.

4. Subject of Investigation

The objective of the measurements done by CETECOM Inc. was the dosimetric assessment of the EUT described in section 3. The tests were performed in configurations for devices operated next to a person's body. The examinations were carried out with the dosimetric assessment system DASY52 described in Section 6.

4.1. The IEEE Standard C95.1 and the FCC Exposure Criteria

The limits are set by CFR 47 FCC rule parts 1.1307 and 2.1093, following the recommendations in IEEE C95.1-1999 (ANSI/IEEE C95.1-1999), "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz."

4.2. The IEEE Standard C95.1 , FCC Exposure Criteria, and IC Exposure Criteria

The FCC limits are set by CFR 47 FCC rule parts 1.1307 and 2.1093. The IC limits are set by RSS 102, Issue 4. The limits are derived from the recommendations in IEEE C95.1-1999
(ANSI/IEEE C95.1-1999), "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz."

4.3. SAR Limit

In this report the comparison between the exposure limits and the SAR data is made using the spatial peak SAR.

Having in mind a worst case consideration, the SAR limit is valid for uncontrolled environment and portable transmitters. The SAR values have to be averaged over a mass of 1g (SAR_{1g}) with the shape of a cube.

Standard	Exposure Condition	Average SAR (W/kg)	Mass Average (g)
FCC CFR 47 Part 2.1093 (d)(2)	Partial-Body	1.6	1
RSS 102, Issue 4	Localized Head and Trunk	1.6	1

5. Measurement Procedure

The Federal Communications Commission (FCC) requires routine dosimetric assessment of mobile telecom-communications devices, either by laboratory measurement techniques or by computational modeling, prior to equipment authorization or use. The measurement procedure shall be performed according to IEEE 1528:2013. The following KDB publications have additionally been applied:

447498 D01 V05 – General RF Exposure Guidance
648474 D04 V01 – SAR Evaluation Considerations for Wireless Handsets.
865664 D01V01 – SAR measurement 100 MHz to 6 GHz
248227 D01 V01R02 – SAR Measurement Procedures for 802.11 a/b/g Transmitters

Industry Canada (IC) requirements and measurement techniques regarding RF exposure are described in RSS-102, Issue 4, which refers to the latest version of IEEE 1528 and IEC 62209. IC follows many of the same procedures as applied for compliance with FCC requirements regarding EUT specific technologies and form factors. IC allows the use of the above listed KDBs in most aspects as described in IC Notice 2012-DRS1203 regarding Applicability of Latest FCC RF Exposure KDB Procedures (Publication Date: October 24, 2012) and Other Procedures.

5.1. General Requirements

SAR evaluation was performed in a laboratory with an environment which avoids influence on SAR measurements by ambient EM sources and any reflection from the environment itself. The ambient temperature was in the range of 18°C to 25°C and 30-70% humidity. Simulating liquid temperature did not deviate more than 2°C throughout SAR evaluation.

5.2. Body-worn and Other Configurations

Test Position
The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration. Devices with a headset output shall be tested with a connected headset.

Test to be Performed
For purpose of determining test requirements, accessories may be divided into two categories: those that do not contain metallic components and those that do. For multiple accessories that do not contain metallic components, the device may be tested only with that accessory which provides the closest spacing to the body. For multiple accessories that contain metallic components, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component, only the accessory that provides the closest spacing to the body must be tested. If the manufacturer provides none body-worn accessories a separation distance of 1.5 cm between the back of the device and the flat phantom is recommended. Other separation distances may be used, but they shall not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

For devices with retractable antenna the SAR test shall be performed with the antenna fully extended and fully retracted. Other factors that may affect the exposure shall also be tested. For example, optional antennas or optional battery packs which may significantly change the volume, lengths, flip open/closed, etc. of the device, or any other accessories which might have the potential to considerably increase the peak spatial-average SAR value.

5.3. Procedure for assessing the peak spatial-average SAR

Step 1*: Power reference measurement:*

Prior to the SAR test, a local SAR measurement should be taken at a user-selected spatial reference point to monitor power variations during testing.

Step 2: Area scan

The measurement procedures for evaluating SAR associated with wireless handsets typically start with a coarse measurement grid in order to determine the approximate location of the local peak SAR values. This is referred to as the "area scan" procedure. The SAR distribution is scanned along the inside surface of typically half of the head of the phantom but at least larger than the areas projected (normal to the phantom's surface) by the handset and antenna. An example grid is given in Figure 4. The distance between the measured points and phantom surface should be less than 8 mm, and should remain constant (variation less than ± 1 mm) during the entire scan in order to determine the locations of the local peak SAR with sufficient precision. The distance between the measurement points should enable the detection of the location of local maximum with an accuracy of better than half the linear dimension of the tissue cube after interpolation. The approximate locations of the peak SARs should be determined from area scan. Since a given amplitude local peak with steep gradients may produce lower spatial-average SAR than slightly lower amplitude peaks with less steep gradients, it is necessary to evaluate the other peaks as well. However, since the spatial gradients of local SAR peaks are a function of wavelength inside the tissue simulating liquid and incident magnetic field strength, it is not necessary to evaluate peaks that are less than –2dB of the local maximum. Two-dimensional spline algorithms [Press, et al, 1996], [Brishoual, 2001] are typically used to determine the peaks and gradients within the scanned area. If the peak is closer than one-half of the linear dimension of the 1 g or 10 g tissue cube to the scan border, the measurement area should be enlarged if possible, e.g., by tilting the probe or the phantom (see Figure 5).

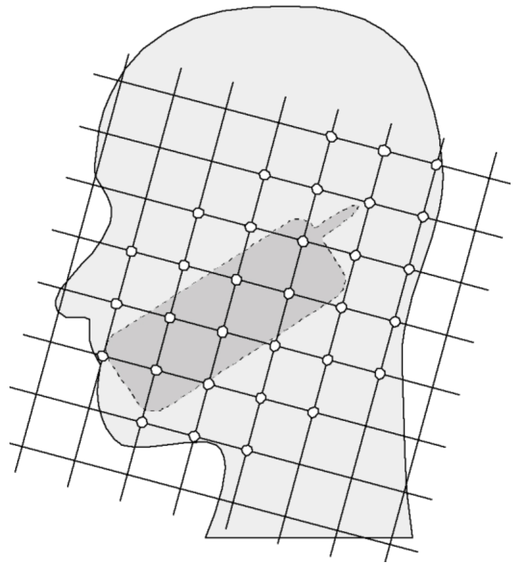


Figure 4 – Example of an area scan including the position of the handset. The scanned area (white dots) should be larger than the area projected by the handset and antenna.

The SPEAG DASY SAR system uses a mechanical sensor detection to find the phantom surface. To decrease test time, the DASY software allows the operator to choose an option where the SAR probe will reuse measurement locations from a previous identical area scan. With this option enabled, the DASY system will not use mechanical sensor detection to find the phantom surface. Locations of each measurement point of the area scan is taken at the same locations as an identical area scan if one is available. Area scans that reused location of measurement points is noted in the result plots under DASY Configuration > Sensor-Surface.

Step 3: Zoom scan

In order to assess the peak spatial SAR values averaged over a 1 g and 10 g cube, fine resolution volume scans, called "zoom scans", are performed at the peak SAR locations determined during the "area scan." The zoom scan volume should have at least 1.5 times the linear dimension of either a 1 g or a 10 g tissue cube for whichever peak spatial-average SAR is being evaluated. The peak local SAR locations that were determined in the area scan (interpolated value) should be on the centerline of the zoom scans. The centerline is the line that is normal to the surface and in the center of the volume scan. If this is not possible, the zoom scan can be shifted but not by more than half the dimension of the 1 g or a 10 g tissue cube.

The maximum spatial-average SAR is determined by a numerical analysis of the SAR values obtained in the volume of the zoom scan, whereby interpolation (between measured points) and extrapolation (between surface and closest measured points) routines should be applied. A 3-D-spline algorithm [Press, et al, 1996], [Kreyszig, 1983], [Brishoual, 2001] can be used for interpolation and a trapezoidal algorithm for the integration (averaging). Scan resolutions of larger than 2 mm can be used provided the uncertainty is evaluated according to E (see E.5).

In some areas of the phantom, such as the jaw and upper head region, the angle of the probe with respect to the line normal to the surface might become large, e.g., at angles larger than ± 30º (see Figure 5), which may increase the boundary effect to an unacceptable level. In these cases, a change in the orientation of the probe and/or the phantom is recommended during the zoom scan so that the angle between the probe housing tube and the line normal to the surface is significantly reduced (<30º).

Step 4: Power reference measurement

The local SAR should be measured at exactly the same location as in Step 1. The absolute value of the measurement drift (the difference between the SAR measured in Step 4 and Step 1) should be recorded in the uncertainty budget. It is recommended that the drift be kept within ± 5%. If this is not possible, even with repeat testing, additional information may be used to demonstrate the power stability during the test. Power reference measurements can be taken after each zoom scan, if more than one zoom scan is needed. However, the drift should always be referred to the initial state with fully charged battery.

5.4. Determination of the largest peak spatial-average SAR

In order to determine the largest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes should be tested for each frequency band according to steps 1 to 3 below.

Step 1: The tests of 6.4 should be conducted at the channel that is closest to the center of the transmit frequency band (*fc*) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom,
b) all configurations for each device position in (a), e.g. antenna extended and retracted, and
c) all operational modes for each device position in (a) and configuration in (b) in each frequency band, e.g. analog and digital.

If more than three frequencies need to be tested, (i.e., Nc > 3), then all frequencies, configurations and modes must be tested for all of the above positions.

Step 2: For the condition providing highest spatial peak SAR determined in Step 1 conduct all tests of 6.4 at all other test frequencies, e.g. lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the spatial peak SAR value determined in Step 1 is within 3dB of the applicable SAR limit, it is recommended that all other test frequencies should be tested as well.

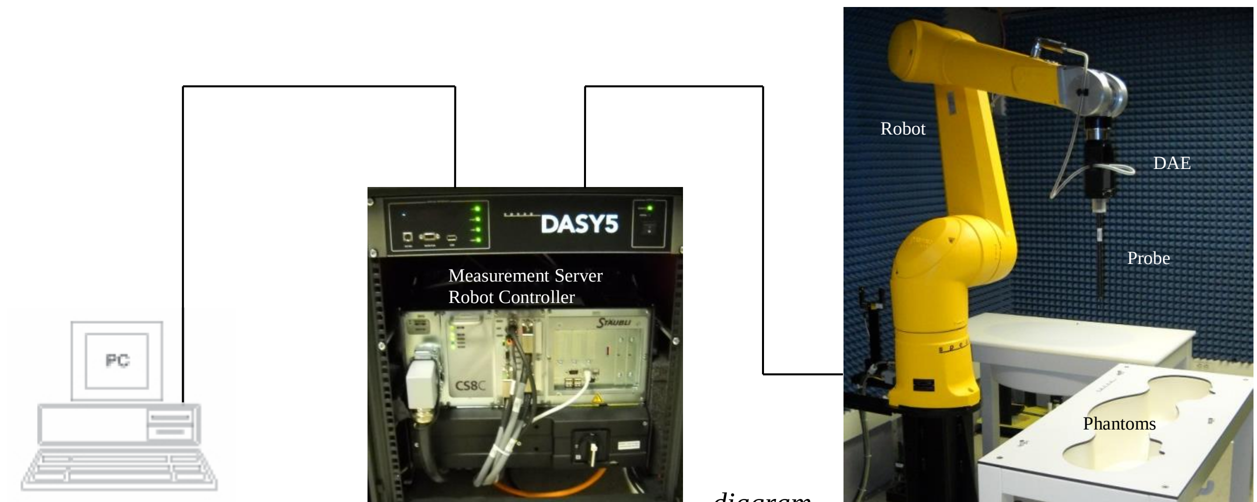
Step 3: Examine all data to determine the largest value of the peak spatial-average SAR found in Steps 1 to 2.

6. The Measurement System

6.1. Robot system specification

The SAR measurement system being used is the SPEAG DASY52 system, which consists of a Stäubli TX90XL 6-axis robot arm and CS8c controller, SPEAG SAR Probe, Data Acquisition Electronics, and SAM Twin Phantom. The robot is used to articulate the probe to programmed positions inside the phantom to obtain the SAR readings from the EUT.

The system is controlled remotely from a PC, which contains the software to control the robot and data acquisition equipment. The software also displays the data obtained from test scans.



Schematic diagram of the SAR measurement system

In operation, the system first does an area (2D) scan at a fixed depth within the liquid from the inside wall of the phantom. When the maximum SAR point has been found, the system will then carry out a 3D scan centered at that point to determine volume averaged SAR level.

6.2. Isotropic E-Field Probe for Dosimetric Measurements

The probes are constructed using three orthogonal dipole sensors arranged on an interlocking, triangular prism core. The probes have built-in shielding against static charges and are contained within a PEEK cylindrical enclosure material at the tip. Probe calibration is described in the probe's calibration certificate.

6.3. Data Acquisition Electronics

The DAE contains a signal amplifier, multiplexer, 16bit A/D converter and control logic. It uses an optical link for communication with the DASY5 system. The DAE has a dynamic range of -100 to 300 mV. It also contains a two step probe touch detector for mechanical surface detection and emergency robot stop.

6.4. Phantoms

The Twin SAM V4.0 Phantom is designed to specifications defined in IEEE 1528 and IEC/EN 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. The material shell thickness is 2mm +/- 0.2 mm at the flat section and 6mm +/- 0.2 mm at the ear reference point. The relative permativity is 3.5 +/- 0.5 and the loss tangent is ≤ 0.05 for frequencies ≤ 6 GHz.

Additionally, the Oval Flat ELI V4.0 Phantom is designed to specification defined in IEEE 1528 and IEC/EN 62209-2. It enables the dosimetric evaluation of body mounted usage. The material thickness is 2mm +/- 0.2 mm. For frequencies ≤ 6 GHz, the relative permativity is 4 +/- 1 and the loss tangent is ≤ 0.05. The bottom plate is 600 x 400 mm elliptical shape with a depth of 190 mm.

6.5. Interpolation and Extrapolation schemes

The interpolation, extrapolation and maximum search routines are all based on the modifed Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The routines construct a once-continuously differentiable function that interpolates the measurement values.

7. Uncertainty Assessment

7.1. Measurement Uncertainty Budget According to IEEE 1528:2013

Note: The uncertainty budget (sar measurement uncertainty analysis) is documented here for IC related requirements.
The uncertainty values for components specified were evaluated according to the procedures of *IEEE 1528-2013, NIST 1297 1994 edition and ISO Guide to the Expression of Uncertainty in Measurements (GUM)*.

a	***b***	***c***	***d***	***e = f(d,k)***	***f***	***g = c x f / e***	***k***
Uncertainty Component	**Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1-g)**	**1-g u_i (±%)**	**v_i**
Measurement System							
Probe Calibration	E2.1	5.5	N	1	1	5.5	∞
Axial Isotropy	E2.2	4.7	R	√3	0.7	1.9	∞
Hemispherical Isotropy	E2.2	9.6	R	√3	0.7	3.9	∞
Boundary Effect	E2.3	1.0	R	√3	1	0.6	∞
Linearity	E2.4	4.7	R	√3	1	2.7	∞
System Detection Limits	E2.5	1.0	R	√3	1	0.6	∞
Readout Electronics	E2.6	0.3	N	1	1	0.3	∞
Response Time	E2.7	0.8	R	√3	1	0.5	∞
Integration Time	E2.8	2.6	R	√3	1	1.5	∞
RF Ambient Noise	E6.1	3.0	R	√3	1	1.7	∞
RF Ambient Reflections	E6.1	3.0	R	√3	1	1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	0.4	R	√3	1	0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	2.9	R	√3	1	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5.2	1.0	R	√3	1	0.6	∞
Test sample Related							
Test Sample Positioning	E4.2	2.9	N	1	1	2.9	*145*
Device Holder Uncertainty	E4.1	3.6	N	1	1	3.6	*5*
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	√3	1	2.9	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	4.0	R	√3	1	2.3	∞
Liquid Conductivity Target - tolerance	E3.2	5.0	R	√3	0.7	1.8	∞
Liquid Conductivity - measurement uncertainty	E3.3	2.5	N	1	0.7	1.6	∞
Liquid Permittivity Target tolerance	E3.2	5.0	R	√3	0.6	1.7	∞
Liquid Permittivity - measurement uncertainty	E3.3	2.5	N	1	0.6	1.5	∞
Combined Standard Uncertainty			RSS			**± 10.7%**	
Expanded Uncertainty (95% CONFIDENCE INTERVAL)			*k*= 2.00705			**± 21.4%**	

7.2. Measurement Uncertainty Budget According to EN 62209

A measurement uncertainty assessment has been undertaken following guidance given in IEC/EN-62209. Some of the uncertainty contributions are site-specific and, for these, CETECOM, Inc. has assessed the uncertainty contributions arising from local environmental and procedural factors. The resultant uncertainty budget, following the assessment template given IEC/EN-62209 is shown below:

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g = c x f / e*	*k*
Uncertainty Component	**Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1-g)**	**1-g u_i (±%)**	**v_i**
Measurement System							
Probe Calibration	E2.1	5.5	N	1	1	5.5	∞
Axial Isotropy	E2.2	4.7	R	√3	0.7	1.9	∞
Hemispherical Isotropy	E2.2	9.6	R	√3	0.7	3.9	∞
Boundary Effect	E2.3	1.0	R	√3	1	0.6	∞
Linearity	E2.4	4.7	R	√3	1	2.7	∞
System Detection Limits	E2.5	1.0	R	√3	1	0.6	∞
Readout Electronics	E2.6	0.3	N	1	1	0.3	∞
Response Time	E2.7	0.8	R	√3	1	0.5	∞
Integration Time	E2.8	2.6	R	√3	1	1.5	∞
RF Ambient Noise	E6.1	3.0	R	√3	1	1.7	∞
RF Ambient Reflections	E6.1	3.0	R	√3	1	1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	0.4	R	√3	1	0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	2.9	R	√3	1	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5.2	1.0	R	√3	1	0.6	∞
Test sample Related							
Test Sample Positioning	E4.2	2.9	N	1	1	2.9	*145*
Device Holder Uncertainty	E4.1	3.6	N	1	1	3.6	*5*
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	√3	1	2.9	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	4.0	R	√3	1	2.3	∞
Liquid Conductivity Target - tolerance	E3.2	5.0	R	√3	0.43	1.2	∞
Liquid Conductivity - measurement uncertainty	E3.3	2.5	N	1	0.43	1.1	∞
Liquid Permittivity Target tolerance	E3.2	5.0	R	√3	0.49	1.4	∞
Liquid Permittivity - measurement uncertainty	E3.3	2.5	N	1	0.49	1.2	∞
Combined Standard Uncertainty			RSS			**± 10.5%**	
Expanded Uncertainty (95% CONFIDENCE INTERVAL)			*k*= 2.00705			**± 21.0%**	

8. Test results summary

8.1. Conducted Average Output Power

Measurement uncertainty for conducted measurements is ±0.5dB

2.4 GHz WLAN – 802.11 b/g/n HT20

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]		
		802.11b	802.11g	802.11n, HT20
1	2412	17.3	14.45	14.22
6	2437	16.9	14.21	14.16
11	2462	16.5	13.81	13.8
Upper Power Tolerance Limit		19	15	15

NOTES: 1. Upper Tolerance Limit given by manufacturer.

2.4 GHz 802.15.1 Bluetooth

Channel	Frequency	Max Conducted Power (8-DPSK	Upper Power Tolerance Limit [dBm]
0	2402	1.07	4.0
39	2441	3.28	
78	2480	1.48	

Notes: Conducted measurements from EMC_HONEY_128_14001_15.247_BT_75E.

2.4 GHz 802.15.4 Bluetooth LE

Channel	Frequency	Max Conducted Power (8-DPSK	Upper Power Tolerance Limit [dBm]
0	2402	0.05	4.0
19	2441	2.31	
39	2480	0.26	

Notes: Conducted measurements from EMC_HONEY_128_14001_15.247_DTS_BTLE_75E.

5 GHz WLAN – 802.11 a/n HT20

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]	
		802.11a	802.11n, HT20
36	5180	14.6	14.49
48	5240	14.54	14.72
52	5260	14.17	14.25
64	5320	13.98	14.97
104	5520	14.35	14.34
116	5580	14.05	14.13
124	5620	14.4	14.56
136	5680	14.05	14.17
149	5745	14.05	14.15
157	5785	14.34	14.39
161	5805	14.02	14.19
165	5825	13.74	13.7
Upper Power Tolerance Limit		15	15

Note: Upper Tolerance Limit given by manufacturer.

5 GHz WLAN – 802.11 n HT40

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]
		802.11n, HT40
38	5190	14.74
46	5230	14.7
54	5270	14.77
62	5310	14.75
102	5510	14.3
110	5550	14.75
134	5670	14.38
151	5755	14.16
159	5795	14.35
Upper Power Tolerance Limit		15

Note: Upper Tolerance Limit given by manufacturer.

5 GHz WLAN – 802.11 ac VHT80

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]
		802.11ac, VHT80
42	5210	14.68
58	5290	14.28
106	5530	14.53
155	5775	14.23
Upper Power Tolerance Limit		15

Note: Upper Tolerance Limit given by manufacturer.

8.2. Stand-Alone SAR Evaluation Exclusion

Antenna	Operation Mode	SAR Evaluation Exclusion Reason
WLAN	802.11g 802.11n	According to KDB 248227 D03, 802.11g and/or 802.11n HT20 is not required when the maximum average output power is < ¼ dB higher than that measured on the corresponding 802.11b channels.
Bluetooth	Bluetooth Bluetooth LE	According to KDB 447498, SAR evaluation can be excluded if the following equation is satisfied: [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 The maximum average output power is 2.5 mW. SAR evaluation is excluded when the minimum separation distance is at least 5mm.

8.3. Test Positions and Configurations

Exposure Condition	Distance	Position	Setup Photo (Appendix B)
Head SAR	0 mm	Left Touch	Photo 1
		Left 15° Tilt	Photo 2
		Right Touch	Photo 3
		Right 15° Tilt	Photo 4
Body SAR	Provided by Holster	Front Long Holster (Holster-2)	Photo 5
		Back Long Holster (Holster-2	Photo 6
		Back Short Holster (6000-Holster)	Photo 7

Note: A measured 8mm material thickness is provided by the Long Holster and 12 mm thickness provided by the Short Holster. The Short Holster has a metal clip located near the center of holster to attach to a belt. See photo in annex B.

8.4. SAR Results for Head

Band	Channel	Frequency (MHz)	Position	Model	Accessory	Measured SAR 1g (W/kg)	Reported Scaled SAR 1g (W/kg)	Results (Appendix A)
802.11b	**6**	**2437**	Right Touch	75eL0N	Small Battery	0.127	0.206	Plot 1
			Right Tilt	75eL0N	Small Battery	0.14	0.227	Plot 2
			Left Touch	75eL0N	Small Battery	0.203	0.329	Plot 3
			Left Tilt	75eL0N	Small Battery	0.17	0.276	Plot 4
	1	**2412**	Left Touch	75eL0N	Small Battery	0.237	0.351	Plot 5
	11	**2462**		75eL0N	Small Battery	0.216	0.384	Plot 6
	1	**2462**	Left Touch Worst Case	75eL00	Small Battery	0.248	0.367	Plot 7
				75eL0N	Big Battery	0.236	0.349	Plot 8
				75eL00	Big Battery	0.247	0.365	Plot 9

8.5. SAR Results for Head NII

Band	Channel	Frequency (MHz)	Position	Model	Accessory	Measured SAR 1g (W/kg)	Reported Scaled SAR 1g (W/kg)	Results (Appendix A)
802.11a	36	5180	Right Touch	75eL0N	Small Battery	0.050	0.055	Plot 10
			Right Tilt	75eL0N	Small Battery	0.064	0.070	Plot 11
			Left Touch	75eL0N	Small Battery	0.041	0.045	Plot 12
			Left Tilt	75eL0N	Small Battery	0.046	0.050	Plot 13
			WC_Right Tilt	75eL00	Small Battery	0.052	0.057	Plot 14
				75eL0N	Big Battery	0.057	0.064	Plot 15
				75eL00	Big Battery	0.056	0.061	Plot 16
	52	5260	Right Touch	75eL0N	Small Battery	0.046	0.056	Plot 17
			Right Tilt	75eL0N	Small Battery	0.083	0.100	Plot 18
			Left Touch	75eL0N	Small Battery	0.071	0.086	Plot 19
			Left Tilt	75eL0N	Small Battery	0.038	0.046	Plot 20
			WC_Right Tilt	75eL00	Small Battery	0.065	0.079	Plot 21
				75eL0N	Big Battery	0.065	0.079	Plot 22
				75eL00	Big Battery	0.055	0.067	Plot 23
	116	5580	Right Touch	75eL0N	Small Battery	0.105	0.131	Plot 24
			Right Tilt	75eL0N	Small Battery	0.131	0.163	Plot 25
			Left Touch	75eL0N	Small Battery	0.055	0.068	Plot 26
			Left Tilt	75eL0N	Small Battery	0.068	0.085	Plot 27
			WC_Right Tilt	75eL00	Small Battery	0.125	0.156	Plot 28
				75eL0N	Big Battery	0.122	0.152	Plot 29
				75eL00	Big Battery	0.126	0.157	Plot 30
	149	5745	Right Touch	75eL0N	Small Battery	0.111	0.138	Plot 31
			Right Tilt	75eL0N	Small Battery	0.155	0.193	Plot 32
			Left Touch	75eL0N	Small Battery	0.090	0.112	Plot 33
			Left Tilt	75eL0N	Small Battery	0.081	0.101	Plot 34
			WC_Right Tilt	75eL00	Small Battery	0.126	0.157	Plot 35
				75eL0N	Big Battery	0.171	0.213	Plot 36
				75eL00	Big Battery	0.192	0.239	Plot 37

8.6. SAR Results for Body

Band	Channel	Frequency (MHz)	Position	Model	Accessory	Measured SAR 1g (W/kg)	Reported Scaled SAR 1g (W/kg)	Results (Appendix A)
802.11b	6	2437	Front	75eL0N	SB / LH	0.072	0.116	Plot 38
			Back	75eL0N	SB / LH	0.258	0.418	Plot 39
	1	2412	Back	75eL0N	SB / LH	0.403	0.596	Plot 40
	11	2462		75eL0N	SB / LH	0.240	0.427	Plot 41
	1	2412		75eL00	SB / LH	0.338	0.500	Plot 42
				75eL0N	BB / LH	0.206	0.305	Plot 43
				75eL00	BB / LH	0.239	0.354	Plot 44
				75eL0N	SB / SH	0.186	0.275	Plot 45
802.11a	36	5180	Front	75eL0N	SB / LH	0.000298	0.0	Plot 46
			Back	75eL0N	SB / LH	0.275	0.302	Plot 47
			Back	75eL00	SB / LH	0.212	0.232	Plot 48
				75eL0N	BB / LH	0.198	0.217	Plot 49
				75eL00	BB / LH	0.153	0.168	Plot 50
				75eL0N	SB / SH	0.233	0.255	Plot 51
	52	5260	Front	75eL0N	SB / LH	0.026	0.031	Plot 52
			Back	75eL0N	SB / LH	0.290	0.351	Plot 53
			Back	75eL00	SB / LH	0.242	0.293	Plot 54
				75eL0N	BB / LH	0.276	0.334	Plot 55
				75eL00	BB / LH	0.167	0.202	Plot 56
				75eL0N	SB / SH	0.179	0.217	Plot 57
	116	5580	Front	75eL0N	SB / LH	0.000108	0.0	Plot 58
			Back	75eL0N	SB / LH	0.201	0.250	Plot 59
			Back	75eL00	SB / LH	0.219	0.273	Plot 60
				75eL0N	BB / LH	0.155	0.193	Plot 61
				75eL00	BB / LH	0.135	0.168	Plot 62
				75eL00	SB / SH	0.262	0.326	Plot 63
	149	5745	Front	75eL0N	SB / LH	0.00578	0.007	Plot 64
			Back	75eL0N	SB / LH	0.262	0.326	Plot 65
			Back	75eL00	SB / LH	0.245	0.305	Plot 66
				75eL0N	BB / LH	0.143	0.178	Plot 67
				75eL00	BB / LH	0.062	0.078	Plot 68
				75eL0N	SB / SH	0.141	0.175	Plot 69

Note: SB=Small Battery: BB=Big Battery: SH=Short Holster (6000-Holster): LH=Long Holster (Holster-2).

8.7. Dipole verification

Prior to formal testing at each frequency a system verification was performed in accordance with IEEE 1528. The 1 Watt reference SAR value is taken from the SPEAG dipole calibration report. All of the testing described in this report was performed within 24 hours of the system verification. The following results were obtained:

Date	Liquid Type	Frequency (MHz)	CW input at dipole feed (Watts)	1g SAR (W/kg)[1]	1 Watt reference SAR value (W/kg)	Difference reference SAR value to normalized SAR	Results (Appendix A)
11/18/2014	MSL	2450	1	46.1	50.4	-8.5%	Plot 70
11/19/2014	HSL	2450	1	48.9	51.2	-4.4%	Plot 71
11/20/2014	MSL	2450	1	47.1	50.4	-6.5%	Plot 72
11/20/2014	HSL	2450	1	49.3	51.2	-3.7%	Plot 73
11/20/2014	HSL	5200	1	7.07	77.4	-8.6%	Plot 74
11/21/2014	HSL	5200	1	7.08	77.4	-8.5%	Plot 75
11/24/2014	HSL	5200	1	7.03	77.4	-9.1%	Plot 76
11/25/2014	HSL	5200	1	7.28	77.4	-5.9%	Plot 77
12/1/2014	HSL	5800	1	7.08	77.8	-8.9%	Plot 78
12/3/2014	MSL	5200	1	7.07	76.6	-7.7%	Plot 79
12/4/2014	MSL	5200	1	7.46	76.6	-2.6%	Plot 80
1/6/2015	MSL	5800	1	7.65	76.9	-0.5%	Plot 81
1/8/2015	MSL	5800	1	7.48	76.9	-2.7%	Plot 82
1/12/2015	MSL	5200	1	7.52	76.6	-1.8%	Plot 83
1/19/2015	MSL	5500	1	7.57	81.4	-7%	Plot 84
1/27/2015	HSL	2450	1	50.8	51.2	-0.7%	Plot 85

NOTES:
Verification between 5000 MHz and 6000 MHz is performed with 100 mW (20 dBm) input power to the dipole. The measured SAR values are scaled to 1 W (30 dBm)

9. References

1. [IEEE 1999] IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, Inst. of Electrical and Electronics Engineers, Inc., December 1998.

2. [IEEE 2013] IEEE Std 1528-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head From Wireless Communications Devices: Measurement Techniques. Inst. of Electrical and Electronics Engineers, Inc., June 2013.

3. [NIST 1994] NIST: Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, Technical Note 1297 (TN1297), United States Department of Commerce Technology Administration, National Institute of Standards and Technology, September 1994.

4. [FCC 20XX] Various FCC KDB Publications,
< http://transition.fcc.gov/oet/ea/eameasurements.html#sar>

5. [IC 2010] RSS-102: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), Industry Canada, Issue 4, March 2010.

6. [IC 2012] Notice 2012-DRS1203: RE: APPLICABILITY OF LATEST FCC RF EXPOSURE KDB PROCEDURES (PUBLICATION DATE: OCTOBER 24, 2012) AND OTHER PROCEDURES, Industry Canada, December 2012

7. 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)

10. Report History

Date	Report Name	Changes To Report	Report prepared by
2015-1-28	SAR_HONEY_134_14001 _FCC	Initial Release	James Donnellan
2015-02-06	SAR_HONEY_134_14001 _FCC_Rev1	Updated based on PCB review.	James Donnellan