SAR Compliance Test Report

Test report no.:	FCC_RM-1135_04	**Date of report:**	2015-06-23
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Testing laboratory:	TCC Microsoft Beijing Laboratory Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550	**Client:**	Microsoft Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550
Responsible test engineer:	Zhang Luwen	**Product contact person:**	Hu Dongji
Measurements made by:	Yuan Rui, He Ying		
Tested device:	RM-1135, HW0240 and HW0242		
FCC ID:	PYARM-1135	**IC:**	-
Supplement reports:	FCC_RM-1135_01 and SAR_Photo_RM-1135_05		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC published RF exposure KDB procedures** **RSS-102, Issue 4** Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields **IEEE 1528 - 2013** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique		
Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test results:	**The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.		

Date and signatures:

For the contents:

Zhang Luwen

Digitally signed by Zhang Luwen
DN: cn=Zhang Luwen, o=Microsoft, ou=RCL, email=luwen.zhang@microsoft.com, c=CN
Date: 2015.06.23 09:31:03 +08'00'

CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2015-06-03 to 2015-06-18
HW and SW numbers of tested device	RM-1135, HW: 0240 and 0242, SW: 10.02.14
Batteries used in testing	BL-5CB: 54928, 54929, 54930, 54931
Headsets used in testing	WH-108: 54873, 54874
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum reported SAR values for Head, Body-worn 15 mm configurations are given in section 1.2.1, 1.2.2 respectively. The device conforms to the requirements of the standards when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
GSM850	**1.11 W/kg**	1.6 W/kg	**PASSED**	**H1**
GSM1900	**0.98 W/kg**	1.6 W/kg	**PASSED**	**H2**

1.2.2 Body-worn 15 mm Configuration

Mode	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
GSM850	**0.46 W/kg**	1.6 W/kg	**PASSED**	**B1**
GSM1900	**0.30 W/kg**	1.6 W/kg	**PASSED**	**B2**

* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.

1.2.3 Summary SAR data

Description	FCC-defined SAR values for the Grants of Equipment Authorization		
	PCE	DTS	NII
Maximum Head SAR values	1.11	-	-
{Max + Max} Simultaneous Head SAR value	-		
Maximum Body-worn 15 mm SAR values	0.46	-	-
{Max + Max} Simultaneous Body-worn 15 mm SAR value	-		
Maximum Simultaneous SAR value **Head SAR: GSM850**	1.11		

Note:

PCE contains the highest results between all cellular modes (cellular, AWS and PCS bands)
DTS contains the highest results between WLAN 2.4 GHz + RLAN 5725-5850 MHz
NII contains the highest results between RLAN 5150-5250, 5250-5350 and 5470-5725 MHz

1.2.4 Maximum Drift

Maximum drift during measurements	≤ 0.2 dB

1.2.5 Measurement Uncertainty

Expanded Uncertainty (k=2) 95 %	± 29.8 %

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

2.1 Bands and Modes of the DUT

Bands	Modes of Operation	Modulation Mode	Duty Cycle	Channel Bandwidth (MHz)	Transmitter Frequency Range (MHz)
850	GSM	GMSK	1/8		824 – 849
1900	GSM	GMSK	1/8		1850 – 1910

2.2 DUT Features and Test Requirements

Common features	**Testing / Specification / KDB**
Number of SIM cards:	HW0240:1 HW0242:1
Test bands	The Project RM-1135 has two HW versions, which are HW0240 and HW0242. The testing of all RM-1135 HW 0242 cellular bands has been minimised based on the earlier report FCC_RM-1135_01. The difference between HW 0240 and HW 0242 is that HW0242 have RF components from 2nd source supplier.
Ambient temperature:	20.5 – 22.5 °C / Controlled
Ambient humidity (RH %):	35 – 55 % RH / Controlled
Antennas	One antenna for cellular bands.
Output power and batteries	The device output power was set to maximum power level for all tests. A fully charged battery was used for every test sequence.
Test channels	In all operating bands the measurements were performed on lowest, middle and highest channels, and/or on all required test channels as defined in Published FCC KDB Procedures.
GSM/GPRS/EGPRS	**KDB 941225 D03 SAR Test Reduction Procedures for GSM/GPRS/EDGE**
Call tester settings	CMU200: MS signal was always set to maximum power: Pmax 5 for GSM850 and 0 for GSM1900.

3. CONDUCTED POWERS

The conducted output power of the device was measured by a separate test laboratory on the same units as used for SAR testing.

Shaded lines in the tables below show which mode/configuration is used in testing.

3.1 GSM

3.1.1 GSM850 Head, Body-worn 15 mm

HW0240

GSM 850								
SN: 004402741723641			Conducted power (dBm)			Time-averaged power (dBm)		
Slot configuration	Tuning target (dBm)	Upper limit (dBm)	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GSM 1-slot	32.0	32.4	31.7	31.8	31.8	22.7	22.8	**22.8**
GPRS 2-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 3-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 4-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

HW0242

GSM 850								
SN: 004402741723468			Conducted power (dBm)			Time-averaged power (dBm)		
Slot configuration	Tuning target (dBm)	Upper limit (dBm)	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GSM 1-slot	32.0	32.4	31.9	32.0	32.0	22.9	23.0	**23.0**
GPRS 2-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 3-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 4-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3.1.2 GSM1900 Head, Body-worn 15 mm

HW0240

GSM 1900								
SN: 004402741722213			Conducted power (dBm)			Time-averaged power (dBm)		
Slot configuration	Tuning target (dBm)	Upper limit (dBm)	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GSM 1-slot	30.0	30.4	30.3	30.3	30.4	21.3	21.3	**21.3**
GPRS 2-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 3-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 4-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

HW0242

GSM 1900								
SN: 004402741723468			Conducted power (dBm)			Time-averaged power (dBm)		
Slot configuration	Tuning target (dBm)	Upper limit (dBm)	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GSM 1-slot	30.0	30.4	30.0	30.0	30.0	20.9	21.0	**21.0**
GPRS 2-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 3-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GPRS 4-slot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated DASY near-field scanning system manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration date	Calibration expiry
DAE 4	860	2014-09	2015-09
DAE 4	480	2014-09	2015-09
E-field Probe EX3DV4	3839	2014-09	2015-09
E-field Probe EX3DV4	3574	2014-09	2015-09
Dipole Validation Kit, D835V2	4d005	2014-03	2016-03
Dipole Validation Kit, D1900V2	509	2014-09	2016-09
DASY5 software	Version 52.8	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	8648C	3847M00258	2015-04	2016-04
Signal Generator	SME03	846923/014	2015-04	2016-04
Amplifier	ZHL-42W	QA1252001	-	-
Amplifier	ZHL-4240W	e060204/1	-	-
Power Meter	NRP	101293	2015-04	2016-04
Power Meter	NRVD	840297/008	2015-04	2016-04
Power Sensor	NRV-Z51	101135	2015-04	2016-04
Power Sensor	NRP-Z51	100410	2015-04	2016-04
Call Tester	CMU200	835352/008	-	-
Call Tester	CMU200	831593/001	-	-
RF Network Analyzer	E5071C	MY46104578	2015-04	2016-04
RF Network Analyzer	8753ES	My40002096	2015-04	2016-04
Dielectric Probe Kit	DAK-3.5	1123	-	-
Dielectric Probe Kit	85070C	2577	-	-

4.1.1 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix D
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g, Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 10 mm Body diameter: 12 mm Tip diameter: 2.5 mm Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The phantom used for all Head SAR tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG; the SAM phantom conforms to the requirements of IEEE 1528.

The phantom used for all Body SAR tests i.e. for both system checks and device testing, was a flat phantom also manufactured by SPEAG this phantom conform to the requirements of FCC published RF Exposure KDB Procedures.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 and FCC published RF Exposure KDB Procedures. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was at least 15.0 cm for all system check and device tests, measured from the ear reference point in the case of the SAM phantom and from the inner surface of the flat phantom.

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue simulant(s):

850 MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	39.74	55.97
HEC	0.25	1.21
Sugar	58.31	41.76
Preservative	0.15	0.27
Salt	1.55	0.79

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	51.50	69.25
Tween 20	47.35	30.00
Salt	1.15	0.75

1900 MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

4.4 System validation and System checking

4.4.1 System validation status

Probe Calibration Point f / MHz	Test System	DASY SW	Dipole Type / SN	Probe Type / SN	Calibrated signal type(s)	DAE unit Type / SN	Validation done	
							Head tissue simulant	Body tissue simulant
835	TCC Beijing / SAR-1	V52.8	D835V2 / 4d005	EX3DV4 / 3839	CW	DAE4 / 860	2015-03	2015-03
1900	TCC Beijing / SAR-4	V52.8	D1900V2 / 509	EX3DV4 / 3574	CW	DAE4 / 480	2015-03	2015-03

4.4.2 System checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna. The dipole was placed under the flat section of the twin SAM phantom for head system checking, and under the flat phantom for body system checking. The system checking results (dielectric parameters and SAR values) are given in the table below.

System checking, head tissue simulant

Dipole freq. [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Dev. dSAR [%]	Scaled 1W SAR 1g [W/kg]	Dielectric Parameters		SAR 1g Deviation from target	Dielectric Parameters Deviation from target		Temp [°C]	Plot #
						e_r	s [S/m]	dSAR [%]	de_r [%]	ds [%]		
	Tolerances			±3%				±10 %	±5 %	±5 %		
835	Target result **SN:4d005**	-	-	-	9.32	41.5	0.90	TCC Bej / SAR1 3839 Head 835 MHz				
	2015-06-03	2.35	2.40	2.13	9.40	41.6	0.91	0.86	0.24	1.11	21.1	-
	2015-06-05	2.32	2.34	0.86	9.28	41.9	0.89	-0.43	0.96	-1.11	20.5	-
	2015-06-18	2.39	2.42	1.26	9.56	40.9	0.91	2.58	-1.45	1.11	20.5	1
	Tolerances			±3%				±10 %	±5 %	±5 %		
1900	Target result **SN:509**	-	-	-	40.10	40.0	1.40	TCC Bej / SAR4 3574 Head 1900 MHz				
	2015-06-03	9.58	9.55	-0.31	38.32	38.8	1.39	-4.44	-3.00	-0.71	21.0	-
	2015-06-18	9.54	9.66	1.26	38.16	38.3	1.37	-4.84	-4.25	-2.14	20.5	2

* Dielectric parameter reference data taken from IEEE1528/IEC622094

System checking, body tissue simulant

Dipole freq. [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Dev. dSAR [%]	Scaled 1W SAR 1g [W/kg]	Dielectric Parameters		SAR 1g Deviation from target	Dielectric Parameters Deviation from target		Temp [°C]	Plot #
						e_r	s [S/m]	dSAR [%]	de_r [%]	ds [%]		
	Tolerances			±3%				±10 %	±5 %	±5 %		
835	Target result **SN:4d005**	-	-	-	9.31	55.2	0.97	TCC Bej / SAR1 3839 Body 835 MHz				
	2015-06-03	2.42	2.45	1.24	9.68	53.3	0.94	3.97	-3.44	-3.09	21.1	-
	2015-06-18	2.49	2.52	1.20	9.96	53.6	0.96	6.98	-2.90	-1.03	20.5	3
	Tolerances			±3%				±10 %	±5 %	±5 %		
1900	Target result **SN:509**	-	-	-	38.70	53.3	1.52	TCC Bej / SAR4 3574 Body 1900 MHz				
	2015-06-03	9.18	9.25	0.76	36.72	52.6	1.49	-5.12	-1.31	-1.97	21.0	4
	2015-06-18	9.39	9.30	-0.96	37.56	53.7	1.51	-2.95	0.75	-0.66	20.5	-

* Dielectric parameter reference data taken from FCC Published RF Exposure KDB Procedures

Plots of the system checking scans are given in Appendix A.

4.5 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Dielectric Parameters Deviation from recommended value		Temp
		e_r	s [S/m]	de_r [%]	ds [%]	[°C]
835	Tolerances			±5 %	±5 %	
	Recommended value	41.5	0.90			
	2015-06-03	41.6	0.91	0.24	1.11	21.1
	2015-06-05	41.9	0.89	0.96	-1.11	20.5
	2015-06-18	40.9	0.91	-1.45	1.11	20.5
1880	Tolerances			±5 %	±5 %	
	Recommended value	40.0	1.40			
	2015-06-03	38.9	1.37	-2.75	-2.14	21.0
	2015-06-18	38.4	1.35	-4.00	-3.57	20.5

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Dielectric Parameters Deviation from recommended value		Temp
		e_r	s [S/m]	de_r [%]	ds [%]	[°C]
835	Tolerances			±5 %	±5 %	
	Recommended value	55.2	0.97			
	2015-06-03	53.3	0.94	-3.44	-3.09	21.1
	2015-06-18	53.6	0.96	-2.90	-1.03	20.5
1880	Tolerances			±5 %	±5 %	
	Recommended value	53.3	1.52			
	2015-06-03	52.7	1.47	-1.13	-3.29	21.0
	2015-06-18	53.7	1.49	0.75	-1.97	20.5

Dielectric parameter data for the band edges is given in Appendix C.

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

A spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

5.2.2 Body-worn 15 mm Configuration

The device was placed in the SPEAG holder using the spacer and placed below the flat phantom. The distance between the device and the phantom was kept at the separation distance indicated in Section 1.2 using a separate flat spacer that was removed before the start of the measurements. The device was oriented with both sides facing the phantom to find the highest results.

Microsoft Body-worn accessories are commonly available for the separation distance used in this testing.

5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 5x5x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine

the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan. Fast SAR is measured according to the KDB 447498 D01 General RF Exposure Guidance v05r01.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy52 are all based on the modified Quadratic Shepard's method (Robert J. Renka,"Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation for 1g Full SAR in 0.3-6G Hz range

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±6.6	N	1	1	±6.6	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±2.0	R	√3	1	±1.2	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Modulation response	E2.5	±2.4	R	√3	1	±1.4	
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 Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.8	R	√3	1	±0.5	∞
Probe Positioning with respect to Phantom Shell	E6.3	±6.7	R	√3	1	±3.9	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5	±4.0	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1	±3.6	N	1	1	±3.6	5
Output Power Variation - SAR drift measurement	E2.9	±5.0	R	√3	1	±2.9	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±6.6	R	√3	1	±3.8	∞
SAR correction	E3.2	±1.9	R	√3	1	±1.1	∞
Conductivity Target - tolerance	E3.4	±5.0	R	√3	0.6	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.6	±3.5	5
Permittivity Target - tolerance	E3.4	±5.0	R	√3	0.6	±1.7	∞
Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±14.0**	198
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±28.2**	

Table 6.2 – Measurement uncertainty evaluation for 1g Fast SAR in 0.3-6G Hz range

Relative DASY5 Uncertainty Budget for Fast SAR Tests According to IEEE 1528/2011 and IEC 62209-1/2011 (0.3-6 GHz range)						
Uncertainty Component	**Tol. (%)**	**Prob Dist.**	**Div.**	**c_i**	**$c_i . u_i$ (%)**	**v_i**
Measurement System						
Probe Calibration	±6.6	N	1	0		
Axial Isotropy	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	±2.0	R	√3	1	±1.2	∞
Linearity	±4.7	R	√3	1	±2.7	∞
System Detection Limits	±1.0	R	√3	1	±0.6	∞
Modulation Response	±2.4	R	√3	1	±1.4	∞
Readout Electronics	±0.3	N	1	0		
Response Time	±0.8	R	√3	0		
Integration Time	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	±3.0	R	√3	0		
Probe Positioner Mechanical Tolerance	±0.8	R	√3	1	±0.5	∞
Probe Positioning with respect to Phantom Shell	±6.7	R	√3	1	±3.9	∞
Spatial x-y Resolution	±10.0	R	√3	1	±5.8	∞
Fast SAR z Approximation	±14.0	R	√3	1	±8.1	∞
Test sample Related						
Test Sample Positioning	±6.0	N	1	1	±6.0	12
Device Holder Uncertainty	±3.6	N	1	1	±3.6	5
Output Power Variation - SAR drift measurement	±5.0	R	√3	1	±2.9	∞
Power Scaling	±0	R	√3	0		
Phantom and Setup						
Phantom Uncertainty (shape and thickness tolerances)	±6.6	R	√3	1	±3.8	∞
SAR correction	±1.9	R	√3	0		
Conductivity Target - tolerance	±1.9	R	√3	0		
Conductivity - measurement uncertainty	±5.0	R	√3	0		
Permittivity Target - tolerance	±5.5	N	1	0		
Permittivity - measurement uncertainty	±5.0	R	√3	0		
Combined Standard Uncertainty		RSS			**±14.9**	748
Coverage Factor for 95%		**k=2**				
Expanded Uncertainty					**±29.8**	

7. RESULTS

7.1 The measured Head SAR values for the test device

7.1.1 GSM 850 Head SAR results for **HW0240**

GSM850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		32.4			Scaling factor*				
Conducted Power		**31.7**	**31.8**	**31.8**	**0.7**	**0.6**	**0.6**	**dB**	
Time-averaged Power		**22.7**	**22.8**	**22.8**	**1.17**	**1.15**	**1.15**	**Lin**	
Left Cheek	Estimated SAR	0.786	0.856	0.928	0.917	0.983	1.063	0.01	-
	Full SAR	-	-	0.921	-	-	1.055		
Left Tilt	Estimated SAR	-	0.399	-	-	0.458	-	0.03	-
	Full SAR	-	0.373	-	-	0.428	-		
Right Cheek	Estimated SAR	0.781	0.855	0.910	0.911	0.982	1.042	0.01	-
	Full SAR	-	-	0.904	-	-	1.036		
Right Tilt	Estimated SAR	-	0.379	-	-	0.435	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Cheek Repeated	Estimated SAR	-	-	0.974	-	-	1.116	0.01	**H1**
	Full SAR	-	-	0.966	-	-	**1.107**		

7.1.2 GSM 850 Head SAR results for **HW0242**

GSM850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		32.4			Scaling factor*				
Conducted Power		**31.9**	**32.0**	**32.0**	**0.5**	**0.4**	**0.4**	**dB**	
Time-averaged Power		**22.9**	**23.0**	**23.0**	**1.12**	**1.10**	**1.10**	**Lin**	
Left Cheek	Estimated SAR	0.716	0.794	0.868	0.803	0.871	0.952	0.00	-
	Full SAR	-	-	0.866	-	-	0.950		
Left Cheek Repeated	Estimated SAR	-	-	0.907	-	-	0.995	-	-
	Full SAR	-	-	0.907	-	-	0.995		

7.1.3 GSM 1900 Head SAR results for **HW0240**

GSM1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		30.4			Scaling factor*				
Conducted Power		**30.3**	**30.3**	**30.4**	**0.1**	**0.1**	**-**	**dB**	
Time-averaged Power		**21.3**	**21.3**	**21.4**	**1.02**	**1.02**	**1.00**	**Lin**	
Left Cheek	Estimated SAR	0.822	0.835	0.875	0.841	0.854	0.875	0.00	-
	Full SAR	-	-	0.878	-	-	0.878		
Left Tilt	Estimated SAR	-	0.312	-	-	0.319	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.965	0.984	0.988	0.987	1.007	0.988	0.03	**H2**
	Full SAR	-	0.957	-	-	**0.979**	-		
Right Tilt	Estimated SAR	-	0.347	-	-	0.355	-	0.00	-
	Full SAR	-	0.342	-	-	0.350	-		
Right Cheek Repeated	Estimated SAR	-	0.965	-	-	0.987	-	0.02	-
	Full SAR	-	0.947	-	-	0.969	-		

7.1.4 GSM 850 Head SAR results for **HW0242**

GSM1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		30.4			Scaling factor*				
Conducted Power		**30.0**	**30.0**	**30.0**	**0.4**	**0.4**	**0.4**	**dB**	
Time-averaged Power		**21.3**	**21.3**	**21.4**	**1.10**	**1.10**	**1.10**	**Lin**	
Right Cheek	Estimated SAR	0.814	0.855	0.876	0.893	0.937	0.961	0.04	-
	Full SAR	-	-	0.832	-	-	0.912		
Right Cheek Repeated	Estimated SAR	-	-	0.856	-	-	0.939	0.03	-
	Full SAR	-	-	0.828	-	-	0.908		

Individual Head SAR plots are given in Appendix B.
Note:
* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.
The highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. The highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results is given in the Section for the simultaneous transmitter combination giving the highest combinated value.

7.2 The measured Body-worn 15 mm SAR values for the test device

7.2.1 GSM 850 Body-worn 15 mm SAR results for **HW0240**

GSM850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**32.4**			**Scaling factor***				
Conducted Power		**31.7**	**31.8**	**31.8**	**0.7**	**0.6**	**0.6**	**dB**	
Time-averaged Power		**22.7**	**22.8**	**22.8**	**1.17**	**1.15**	**1.15**	**Lin**	
Back	Estimated SAR	-	0.342	-	-	0.393	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.371	0.387	0.403	0.433	0.444	0.462	-	**B1**
	Full SAR	-	-	0.403	-	-	**0.462**		
Display WH-108	Estimated SAR	-	-	0.322	-	-	0.369	-	-
	Full SAR	-	-	-	-	-	-		

7.2.2 GSM 850 Body-worn 15 mm SAR results for **HW0242**

GSM850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**32.4**			**Scaling factor***				
Conducted Power		**31.9**	**32.0**	**32.0**	**0.5**	**0.4**	**0.4**	**dB**	
Time-averaged Power		**22.9**	**23.0**	**23.0**	**1.12**	**1.10**	**1.10**	**Lin**	
Display	Estimated SAR	0.368	0.381	0.396	0.413	0.418	0.434	-	-
	Full SAR	-	-	0.396	-	-	0.434		

7.2.3 GSM 1900 Body-worn 15 mm SAR results for **HW0240**

GSM1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		30.4			Scaling factor*				
Conducted Power		**30.3**	**30.3**	**30.4**	**0.1**	**0.1**	**-**	**dB**	
Time-averaged Power		**21.3**	**21.3**	**21.4**	**1.02**	**1.02**	**1.00**	**Lin**	
Back	Estimated SAR	-	0.262	-	-	0.268	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.294	0.294	0.314	0.301	0.301	0.314	0.01	**B2**
	Full SAR	-	-	0.304	-	-	**0.304**		
Display WH-108	Estimated SAR	-	-	0.273	-	-	0.273	-	-
	Full SAR	-	-	-	-	-	-		

7.2.4 GSM 1900 Body-worn 15 mm SAR results for **HW0242**

GSM1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		30.4			Scaling factor*				
Conducted Power		**30.0**	**30.0**	**30.0**	**0.4**	**0.4**	**0.4**	**dB**	
Time-averaged Power		**21.3**	**21.3**	**21.4**	**1.10**	**1.10**	**1.10**	**Lin**	
Display	Estimated SAR	0.240	0.238	0.251	0.263	0.261	0.275	0.00	-
	Full SAR	-	-	0.247	-	-	0.271		

Individual Body-worn 15 mm SAR plots are given Appendix B.

Note:
* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.
The highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. The highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results is given in the Section for the simultaneous transmitter combination giving the highest combinated value.