SAR Test Report

FOR:

Manufacturer: Research In Motion Limited
Model Name: RFM121LW
FCC ID: L6ARFM120LW
IC ID: 2503A-RFM120LW

Test Report #: SAR_CETE4_023_13001

Date of Report: 2012/04/08

ACCREDITED
TESTING LABORATORY
Certificate #2135.01

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC Listed #:
A2LA Accredited

IC Recognized #
3462B-1

***CETECOM* Inc.**
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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 OET Bulletin 65, Supplement C (Edition 01-01), additional FCC regulation as listed in chapter 5, and IEEE 1528:2003 and no deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Research In Motion Limited	Smartphone	RFM121LW

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2013/04/08	Compliance	Sajay Jose (Test Lab Manager)	

Responsible for the Report:

Date	Section	Name	Signature
2013/04/08	Compliance	Josie Sabado (Project Engineer)	

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

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Test Lab Manager:	Sajay Jose
Responsible Project Leader:	Josie Sabado

Company Name:	CETECOM ICT Services GmbH
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Test Report authorised:	Thomas Vogler
Test performed:	Oleksandr Hnatovskiy

2.2. Identification of the Client

Applicant's Name:	Research In Motion Limited
Street Address:	305 Phillip Street
City/Zip Code	Waterloo, ON N2L 3W8
Country	CANADA
Contact Person:	Masud Attayi
Phone No.	+1 51 98 88 74 65
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2.3. Identification of the Manufacturer

Same as above client.

3. Equipment under Test (EUT)

3.1. General Specification of the Equipment under Test

Product Type:	Portable
Prototype/Production:	Identical Prototype
RF Exposure Environment:	General / Uncontrolled
Dimensions:	120 x 67 x 11 mm
Exposure Conditions:	Held next to the ear Body worn Wireless Router
Model No:	RFM121LW
FCC ID:	L6ARFM120LW
IC ID:	2503A-RFM120LW
Antenna Type:	Internal
Operating Voltage Range:	Battery 3.8 – 4.35 V, charger 5 Vdc
Operating Temperature Range:	32 - 95 degrees F (0 – 35 degrees C)
Supported Radios:	GSM/GPRS/EGPRS, MS Class 12, Power Class 4/1, Mobile Class A WCDMA/HSDPA/HSUPA Power Class 3, Cat 6 (5.7 Mbps uplink and QPSK) LTE CDMA Bluetooth v2.1 + EDR 802.11 a/b/g/n, HT20, HT40 NFC
Power Back-Off Modes:	LTE power back off in SVLTE
Date of Testing:	February 26, 2013 – April 5, 2013

3.2. Technical Specification of Supported Radios

Technology	Duty Cycle	Type(s) of Modulation	Band	Transmit Frequency Range (MHz)	Measured Maximum Conducted Output Power (dBm)
GSM	12.5%	GMSK	GSM 850	824.2 – 848.8	32.7
			PCS 1900	1850.2 – 1909.8	30.1
(E)GPRS	1 uplink timeslot: 12.5% 2 uplink timeslots: 25% 3 uplink timeslots: 37.5% 4 uplink timeslots: 50%	GMSK, 8PSK	GSM 850	824.2 – 848.8	32.6
			PCS 1900	1850.2 – 1909.8	30.2
WCDMA	100%	QPSK, 16 QAM	FDD II	1852.4 – 1907.6	23.5
			FDD V	826.4 – 846.6	24.27
CDMA	100%	QPSK, HPSK	Band Class 0	824.7 – 848.31	24.22
			Band Class 1	1851.25 – 1908.75	23.69
LTE	100%	QPSK, 16 QAM	Band 4	1710.7 – 1754.3	24.28
			Band 13	779.5 – 784.5	23.88
Bluetooth	46%	GFSK, π/4 DQPSK, 8DPSK	N/A	2402 – 2480	10.17
802.11 b/g/n	100%	BPSK, QPSK, 16-QAM, 64-QAM	N/A	2412 – 2462	17.4
802.11 a/n	100%	BPSK, QPSK, 16-QAM, 64-QAM	Sub-Band 1	5180 – 5240	15.0
			Sub-Band 2	5260 – 5320	15.3
			Sub-Band 3	5500 – 5700	17.3
			Sub-Band 4	5745 – 5825	13.1

3.3. Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	OS Version	Comments
1	0809-3914-5655	CER-53013-001 Rev1-905-00	127.01.3901	Conducted; LTE max power
2	0809-3914-6155	CER-53013-001 Rev1-905-00	127.01.3901	Radiated; LTE Power Back off for CDMA BC1
3	0809-3914-7154	CER-53013-001 Rev1-905-00	127.01.3901	Radiated
4	0809-3914-7252	CER-53013-001 Rev1-905-00	127.01.3901	Conducted; LTE Power Back off for CDMA BC0
5	0809-3914-7555	CER-53013-001 Rev1-905-00	127.01.3901	Conducted; LTE Power Back off for CDMA BC1
6	0809-3915-1461	CER-53013-001 Rev1-905-00	127.01.3901	Radiated; LTE Power Back off for CDMA BC0
7	0809-3920-6260	CER-53013-001 Rev1-905-00	10.1.0.33	Radiated; LTE max power
8	0809-3929-6848	CER-53013-001 Rev2-905-00	127.0.1.4429	Radiated; LTE Power Back off for CDMA BC0
9	0809-3929-7446	CER-53013-001 Rev2-905-00	127.0.1.4429	Radiated; LTE Power Back off for CDMA BC1
10	0809-3929-7651	CER-53013-001 Rev2-905-00	127.0.1.4318	Radiated; LTE max power
11	0809-3929-8748	CER-53013-001 Rev2-905-00	127.0.1.4429	Radiated; LTE max power
12	0809-3929-8846	CER-53013-001 Rev2-905-00	127.0.1.4429	Conducted; LTE Power Back off for CDMA BC0
13	0809-3929-8850	CER-53013-001 Rev2-905-00	127.0.1.4429	Conducted; LTE max power
14	0809-3929-8944	CER-53013-001 Rev2-905-00	127.0.1.4429	Conducted; LTE Power Back off for CDMA BC1
15	990002430036317	CER-53013-001 Rev1-905-00	127.01.3901	Radiated WLAN

3.4. Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number	Comments
1	Headset	Research In Motion Limited	N/A	N/A	
2	Leather Holster	Research In Motion Limited	N/A	N/A	Contains metallic parts
3	High Capacity Battery	Research In Motion Limited	N/A	N/A	

3.5. Maximum SAR values

Band	Exposure Condition	Measured 1g SAR	Maximum Extrapolated 1g SAR[1,2]
GSM 850	Head	0.394	0.432
	Body Worn Accessory	0.275	0.331
	Wireless Router	0.387	0.465
PCS 1900	Head	0.82	0.963
	Body Worn Accessory	0.366	0.420
	Wireless Router	0.698	0.801
CDMA BC0	Head	0.843	0.935
	Body Worn Accessory	0.700	0.776
	Wireless Router	0.939	1.05
CDMA BC0	Head	1.18	1.29
	Body Worn Accessory	0.662	0.726
	Wireless Router	1.14	1.25
WCDMA FDD II	Head	1.00	1.10
	Body Worn Accessory	0.548	0.604
	Wireless Router	1.15	1.27
WCDMA FDD V	Head	0.522	0.571
	Body Worn Accessory	0.288	0.315
	Wireless Router	0.466	0.491
LTE Band 4	Head	1.28	1.410
	Body Worn Accessory	0.691	0.758
	Wireless Router	1.29	1.43
LTE Band 13	Head	0.872	0.907
	Body Worn Accessory	0.654	0.680
	Wireless Router	0.762	0.792
Bluetooth	Head	0.014	
	Body Worn Accessory	0.139	
	Wireless Router	0.209	
WLAN	Head	0.230	
	Body Worn Accessory	0.342	
	Wireless Router	0.606	
Simultaneous Transmission	Head		1.57
	Body Worn Accessory		1.41
	Wireless Router		1.48

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Bluetooth and WLAN tested at maximum output power

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 , 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."

4.2. 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)
OET Bulletin 65C	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. In 2001 the Commission's Office of Engineering and Technology has released Edition 01-01 of Supplement C to OET Bulletin 65. This revised edition, which replaces Edition 97-01, provides additional guidance and information for evaluating compliance of mobile and portable devices with FCC limits for human exposure to radiofrequency emissions. The following KDB Publications have also been used:

447498 D01 V05 – Mobile and portable device RF Exposure Procedures
648474 D04 V01 – SAR Evaluation Considerations for Handsets with Multiple Transmitters
865664 D01 V01 – SAR measurement 100 MHz to 6 GHz
248227 D01 V01R02 – SAR Measurement Procedures for 802.11 a/b/g Transmitters
941225 D01 V02 – SAR Measurement Procedures for 3G Devices
941225 D05 V02R01 – SAR for LTE Devices
941225 D03 V01 – Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE

The Industry Canada (IC) measurement procedure follows RSS-102, Issue 4, March 2010. IC follows many of the same procedures as the FCC regarding EUT specific technologies and form factors. The above FCC KDBs are applied to the IC SAR measurements.

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 20°C to 26°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

Phantom Requirements
For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

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 resolution can also be tested using the functions in Annex E (see E.5.2). 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).

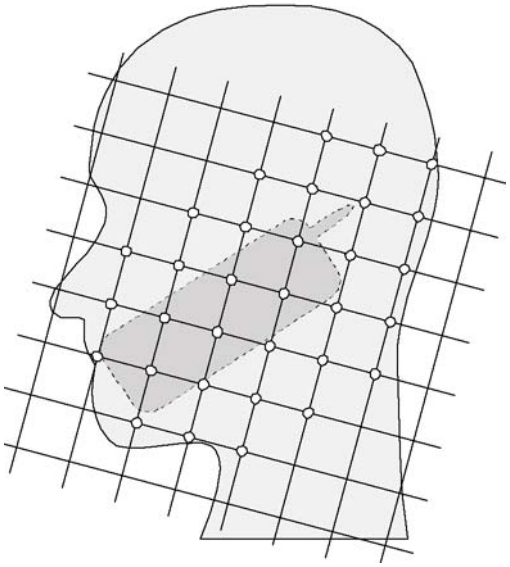

Figure 4 – Example of an area scan including the position of the handset. The scanned area (white dots) should be larger than the area projected by the handset and antenna.

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[1].

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.

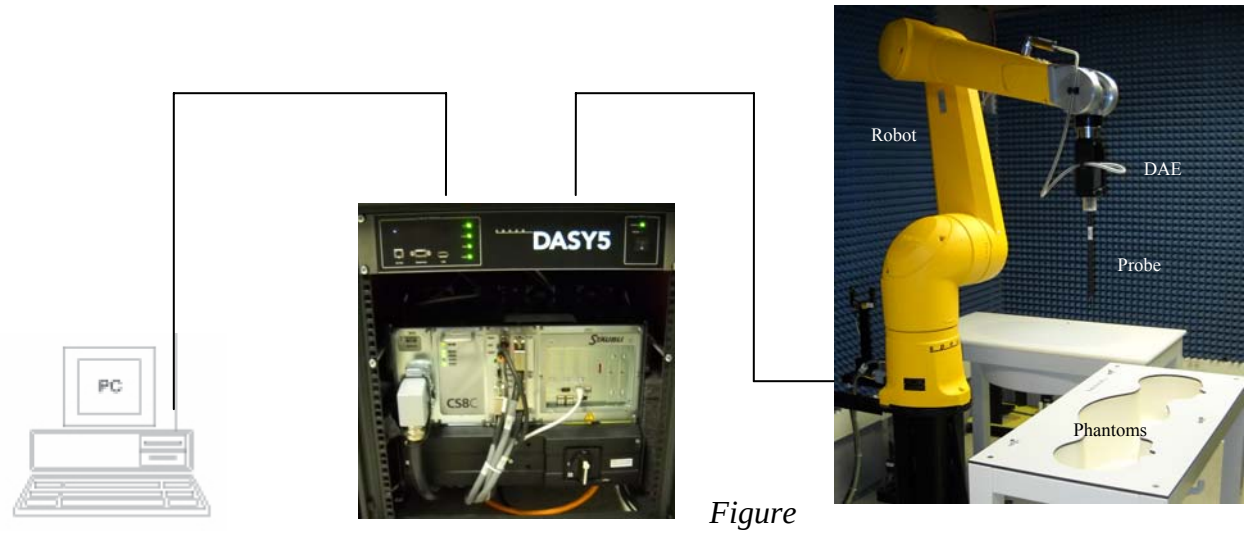

Figure 5: Schematic diagram of the SAR measurement system

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 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.

Additionally, the Oval Flat ELI V4.0 Phantom is designed to specification defined in IEEE 1528, and IEC 62209-2. It enables the dosimetric evaluation of body mounted usage.

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

Measurement uncertainty values were evaluated for SAR measurements performed by Cetecom Inc. The uncertainty values for components specified in *FCC Supplement C (01-01) to OET Bulletin 65 (97-01)* were evaluated according to the procedures of *IEEE 1528-200X December 29, 2002, NIST 1297 1994 edition and ISO Guide to the Expression of Uncertainty in Measurements (GUM).*

7.1. CETECOM Inc. Measurement Uncertainty Budget

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. CETECOM ICT Measurement Uncertainty Budget

Relative DASY4 Uncertainty Budget for SAR Tests According to IEEE 1528/2003 and IEC62209 (0.3-3GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i	c_i	Standard Uncertainty		v_i^2 or v_{eff}
				(1g)	(10g)	± %, (1g)	± %, (10g)	
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.64	0.43	± 3.2 %	± 2.2 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.6	0.49	± 3.0 %	± 2.5 %	∞
Combined Uncertainty						± 11.5 %	± 11.0 %	330
Expanded Std. Uncertainty						± **23.1** %	± **22.1** %	

Relative DASY4 Uncertainty Budget for SAR Tests According to IEEE 1528/2003 and IEC62209 (3-6GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 5.8 %	Rectangular	√ 3	1	1	± 3.3 %	± 3.3 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.64	0.43	± 3.2 %	± 2.2 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.6	0.49	± 3.0 %	± 2.5 %	∞
Combined Uncertainty						± 12.3 %	± 11.8 %	330
Expanded Std. Uncertainty						± **24.5** %	± **23.6** %	

8. Test results summary

8.1. Conducted Average Output Power

Measurement uncertainty for conducted measurements is ±0.5dB

Bluetooth

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]		
		GFSK	π/4 DQPSK	8-DPSK
0	2402	10.15	10.14	9.84
39	2441	10.17	9.32	8.97
78	2480	8.99	8.20	7.71

WLAN – 802.11 b/g/n

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]		
		802.11b	802.11g	802.11n, HT20
1	2412	18.2	17.7	17.7
6	2437	18.3	18.3	18.3
11	2462	18.1	17.0	17.0

WLAN – 802.11 a/n

Average power measured using an average power meter.

Channel	Frequency [MHz]	Average Power [dBm]		
		802.11a	802.11n HT20	802.11n, HT40
36	5180	15.0	15.0	12.7
40	5200	14.9	15.0	
44	5220	14.9	14.8	12.7
48	5240	14.8	14.8	
52	5260	15.3	15.3	12.7
56	5280	15.3	15.2	
60	5300	15.1	15.2	12.7
64	5320	15.1	15.0	
100	5500	17.3	17.3	12.7
104	5520	17.3	17.2	
108	5540	17.2	17.2	12.7
112	5560	17.2	17.2	
116	5580	17.1	17.2	12.7
120	5600	17.1	17.2	
124	5620	17.1	17.2	12.7
128	5640	17.2	17.2	
132	5660	16.6	16.7	12.7
136	5680	16.5	16.6	
140	5700	16.5	16.6	---
149	5745	13.1	13.1	12.7
153	5765	13.1	13.1	
157	5785	13.0	13.0	12.7
161	5805	12.8	12.8	
165	5825	12.6	12.7	---

GSM

Average power measured using a Rhode and Schwarz CMU 200.

Band	Channel	Frequency [MHz]	Average Power [dBm]
GSM 850	128	824.2	32.7
	190	836.6	32.7
	251	848.8	32.4
PCS 1900	512	1850.2	30
	661	1880	30.1
	810	1909.8	30

GSM 850 Band – (E)GPRS

Average power measured using a Rhode and Schwarz CMU 200.

Mode of Operation		Modulation	Channel / Frequency [MHz]					
			128 / 824.2		190 / 836.6		251 / 848.8	
			Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]
GPRS	1 Uplink Timeslot	GMSK	32.6	23.6	32.5	23.5	32.3	23.3
	2 Uplink Timeslots		30.3	24.3	30.1	24.1	29.7	23.7
	3 Uplink Timeslots		**28.6**	**24.35**	**28.9**	**24.65**	**28.7**	**24.45**
	4 Uplink Timeslots		26.8	23.8	26.7	23.7	26.5	23.5
EGPRS	1 Uplink Timeslot	GMSK	32.5	23.5	32.5	23.5	32.4	23.4
	2 Uplink Timeslots		29.8	23.8	29.6	23.6	29.5	23.5
	3 Uplink Timeslots		29	24.75	29	24.75	28.8	24.55
	4 Uplink Timeslots		26.9	23.9	26.8	23.8	26.5	23.5
	1 Uplink Timeslot	8PSK	26.7	17.7	26.7	17.7	26.3	17.3
	2 Uplink Timeslots		26.6	20.6	26.5	20.5	26.2	20.2
	3 Uplink Timeslots		25	20.75	24.9	20.65	24.6	20.35
	4 Uplink Timeslots		24	21	23.9	20.9	23.6	20.6

GSM 850 Band – Dual Transfer Mode

Average power measured using a Rhode and Schwarz CMU 200.

Mode of Operation		Modulation	Channel / Frequency [MHz]					
			128 / 824.2		190 / 836.6		251 / 848.8	
			Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]
GPRS	1 CS + 1 PD Timeslot	GMSK	30.1	24.1	30.2	24.2	29.9	24.1
	1 CS + 2 PD Timeslot		28.8	24.55	28.9	24.65	28.9	24.65
EGPRS	1 CS + 1 PD Timeslot	GMSK	30.2	24.2	30.2	24.2	29.9	23.9
	1 CS + 2 PD Timeslot		28.8	24.55	28.8	24.55	28.9	24.65
	1 CS + 1 PD Timeslot	GMSK (CS) 8PSK (PD)	30.2/26.5	22.71	30.1/26.5	22.64	29.8/26.1	22.31
	1 CS + 2 PD Timeslot		28.8/24.9	21.25	28.9/24.9	21.32	28.8/24.6	21.17

PCS 1900 Band - (E)GPRS

Average power measured using a Rhode and Schwarz CMU 200.

Mode of Operation		Modulation	Channel / Frequency [MHz]					
			512 / 1850.2		661 / 1880		810 / 1909.8	
			Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]
GPRS	1 Uplink Timeslot	GMSK	30.1	21.1	30.2	21.2	30	21
	2 Uplink Timeslots		29.1	23.1	29.1	23.1	28.9	22.9
	3 Uplink Timeslots		26.6	22.35	26.5	22.25	26.4	22.15
	4 Uplink Timeslots		**26.1**	**23.1**	**26**	**23**	**25.9**	**22.9**
EGPRS	1 Uplink Timeslot	GMSK	30	21	30	21	30	21
	2 Uplink Timeslots		29.1	23.1	29.1	23.1	28.9	22.9
	3 Uplink Timeslots		26.6	22.35	26.5	22.25	26.4	22.15
	4 Uplink Timeslots		26.1	23.1	26	23	25.9	22.9
	1 Uplink Timeslot	8PSK	26.5	17.5	26.5	17.5	26.2	17.2
	2 Uplink Timeslots		25.9	19.9	25.8	19.8	25.7	19.7
	3 Uplink Timeslots		24.9	20.65	24.8	20.55	24.7	20.45
	4 Uplink Timeslots		24	21	23.8	20.8	23.7	20.7

PCS 1900 Band – Dual Transfer Mode

Average power measured using a Rhode and Schwarz CMU 200.

Mode of Operation		Modulation	Channel / Frequency [MHz]					
			512 / 1850.2		661 / 1880		810 / 1909.8	
			Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]	Measured Burst Average Power [dBm]	Calculated Time Average Power [dBm]
GPRS	1 CS + 1 PD Timeslot	GMSK	28.6	22.6	28.6	22.6	28.3	22.3
	1 CS + 2 PD Timeslot		26.1	21.85	25.9	21.65	25.9	21.65
EGPRS	1 CS + 1 PD Timeslot	GMSK	28.6	22.6	28.5	22.5	28.3	22.3
	1 CS + 2 PD Timeslot		26.1	21.85	25.9	21.65	25.9	21.65
	1 CS + 1 PD Timeslot	GMSK (CS) 8PSK (PD)	28.6/25.2	21.20	28.7/25.1	21.24	28.3/24.8	20.87
	1 CS + 2 PD Timeslot		26.1/24.1	19.19	26/24	19.09	25.9/23.9	18.99

WCDMA

Average power measured using a Rhode and Schwarz CMU 200.

Band	Channel	Frequency [MHz]	Average Power [dBm]	
			12.2kbps AMR, 3.4kb SRB	12.2kbps RMC
FDD II	9262	1852.4	23.5	23.5
	9400	1880	23.16	23.22
	9538	1907.6	23.02	23.08
FDD V	4132	826.4	24.17	24.11
	4175	835	24.16	24.27
	4233	846.6	23.88	23.85

HSDPA

Settings are according to FCC KDB 941225 D01, "SAR Measurement Procedures for 3G Devices" section "Release 5 HSDPA Data Devices"

Average power measured using a Rhode and Schwarz CMU 200. Reference Rhode and Schwarz application note 1CM72: Operation Guide for HSDPA Test Setup according to 3GPP TS 34.121, section 2.2.

Band	Channel	Frequency [MHz]	Average Power [dBm]			
			Sub-test 1	Sub-test 2	Sub-test 3	Sub-test 4
WCDMA FDD V	4132	826.4	23	22.9	22.55	22.65
	4175	835	23.02	23.11	22.61	22.62
	4233	846.6	22.9	22.99	22.5	22.36
WCDMA FDD II	9262	1852.4	22.78	22.72	22.36	22.31
	9400	1880	22.78	22.82	22.31	22.35
	9538	1907.6	22.61	22.66	22.19	22.13

HSUPA

Settings are according to FCC KDB 941225 D01, "SAR Measurement Procedures for 3G Devices" section "Release 6 HSPA Data Devices"

Average power measured using a Rhode and Schwarz CMU 200. Reference Rhode and Schwarz application note 1CM73: Operation Guide for HSUPA Test Setup according to 3GPP TS 34.121, section 2.1 and 2.2.

Band	Channel	Frequency [MHz]	Average Power [dBm]				
			Sub-test 1	Sub-test 2	Sub-test 3	Sub-test 4	Sub-test 5
WCDMA FDD V	4132	826.4	22.6	21.82	20.55	21.92	22.03
	4175	835	22.43	21.74	20.81	21.95	22.48
	4233	846.6	23.12	21.78	20.43	21.86	22.94
WCDMA FDD II	9262	1852.4	22.3	21.62	20.53	21.88	22.07
	9400	1880	22.7	21.55	20.27	21.4	22.38
	9538	1907.6	22.85	21.43	20.44	22.3	21.92

CDMA

Average power measured using a Rhode and Schwarz CMU 200.

Band	Channel	Frequency [MHz]	Average Power [dBm]			
			RC1/1, SO55	RC3/3, SO55	SO32, SCH0 Disabled	SO32, SCH0 Enabled
BC0	1013	824.7	24.03	24.02	24.03	24.1
	384	836.6	24.01	24.05	24.13	23.93
	777	848.31	24.2	24.22	24.15	24.17
BC1	25	1851.25	23.62	23.62	23.6	23.66
	600	1880	23.58	23.6	23.64	23.61
	1175	1908.75	23.69	23.61	23.6	23.61

EVDO

Average power measured using a Rhode and Schwarz CMU 200

Band	Channel	Frequency [MHz]	Average Power [dBm]	
			Rev 0	Rev A
BC0	1013	824.7	23.85	23.72
	384	836.6	23.59	23.56
	777	848.31	23.72	23.62
BC1	25	1851.25	20.55	20.79
	600	1880	20.57	20.52
	1175	1908.75	19.29	19.35

LTE – QPSK Modulation – Max Power

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	22.77	22.72	22.73	22.81	24.03	24.02	24.1
		20175	1732.5	22.81	22.81	22.81	22.82	24.02	24.03	24.08
		20300	1745	22.84	22.65	22.62	22.83	23.82	23.91	24.04
	15	20025	1717.5	22.71	23.04	22.3	22.87	23.99	24.13	24.13
		20175	1732.5	22.74	22.74	22.38	22.81	23.96	23.89	23.78
		20325	1747.5	22.78	22.7	22.25	22.76	23.98	24.04	24.12
	10	20000	1715	22.69	22.88	22.19	22.87	24	24.17	24.12
		20175	1732.5	22.76	22.82	22.9	22.9	24.13	24.07	24.06
		20350	1750	22.82	22.97	22.7	22.93	24.09	24.01	24.12
	5	19975	1712.5	22.86	22.85	22.75	22.95	24.03	24.06	24.28
		20175	1732.5	22.85	22.97	22.94	22.95	24.14	24.13	24.11
		20375	1752.5	22.95	22.98	23.03	23.13	24.19	24.25	24.19
	3	19965	1711.5	22.89	22.89	22.83	22.86	24	24.01	24.01
		20175	1732.5	23.02	22.95	22.72	22.97	24.14	24.15	24.08
		20385	1753.5	23.08	23.19	23.08	23.11	24.18	24.14	24.13
	1.4	19957	1710.7	22.95	23.98	22.88	23.91	23.97	23.99	24
		20175	1732.5	23.09	23.91	23.16	24.1	23.94	24.03	24.07
		20393	1754.3	22.99	24.11	22.63	24.03	24.13	24.08	24.1
13	10	23230	782	22.42	22.61	22.55	22.55	23.83	23.78	23.82
	5	23205	779.5	22.65	22.77	22.5	22.72	23.7	23.86	23.85
		23230	782	22.57	22.64	22.72	22.78	23.79	23.75	23.8
		23255	784.5	22.52	22.73	22.76	22.76	23.88	23.7	23.67

Notes:

1. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

LTE – 16QAM Modulation – Max Power

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	21.91	21.74	21.77	21.8	22.63	22.44	22.61
		20175	1732.5	21.74	21.78	21.69	21.73	22.42	22.45	22.54
		20300	1745	21.73	21.78	21.73	21.76	22.96	22.99	23.1
	15	20025	1717.5	21.75	21.7	21.82	21.76	22.39	22.52	22.54
		20175	1732.5	21.79	21.69	21.8	21.88	22.68	22.62	22.45
		20325	1747.5	21.75	21.74	21.68	21.72	22.5	22.6	22.61
	10	20000	1715	21.97	21.87	21.85	21.93	22.54	22.65	22.73
		20175	1732.5	21.85	21.79	21.9	21.87	22.65	22.59	22.52
		20350	1750	21.75	21.84	21.92	21.88	22.6	22.65	22.66
	5	19975	1712.5	21.75	21.86	21.84	21.9	22.91	23.02	23.21
		20175	1732.5	21.88	21.81	21.83	21.77	23.07	23.06	23.07
		20375	1752.5	22.03	21.85	21.86	21.86	23.14	23.14	23.14
	3	19965	1711.5	21.92	21.99	21.93	21.94	22.42	22.48	22.44
		20175	1732.5	21.89	21.93	22.1	21.86	22.65	22.61	22.51
		20385	1753.5	22.08	22.02	21.99	21.88	22.73	22.65	22.67
	1.4	19957	1710.7	21.65	21.78	21.82	21.94	22.44	22.47	22.43
		20175	1732.5	21.86	21.85	21.77	21.82	22.64	22.62	22.7
		20393	1754.3	21.95	21.94	21.76	22.02	22.72	22.64	22.71
13	10	23230	782	22.15	22. 22	22.19	22.23	22.62	23.01	23.04
	5	23205	779.5	22.38	22.31	22.35	22.26	23.71	23.46	23.48
		23230	782	22.35	22.37	22.29	22.26	23.47	23.56	23.52
		23255	784.5	22.27	22.31	22.32	22.28	23.52	23.52	23.65

Notes:

1. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

LTE – QPSK Modulation – Low Power for CDMA BC0

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	16.61	16.5	16.6	16.6	17.33	17.47	17.43
		20175	1732.5	16.57	16.42	16.31	16.33	17.8	17.32	17.8
		20300	1745	16.72	16.25	16.32	16.36	17.28	17.42	17.65
	15	20025	1717.5	16.59	16.51	16.49	16.58	16.17	16.3	16.43
		20175	1732.5	16.28	16.48	16.58	16.19	17.57	17.22	17.14
		20325	1747.5	16.28	16.33	16.3	16.37	17.19	17.24	17.54
	10	20000	1715	16.53	16.05	16.47	16.49	17.44	17.49	17.54
		20175	1732.5	16.37	16.31	16.27	16.43	17.48	17.3	17.23
		20350	1750	16.35	16.37	16.34	16.44	17.21	17.19	17.57
	5	19975	1712.5	16.41	16.38	16.43	16.44	17.32	16.92	17.4
		20175	1732.5	16.33	16.35	16.33	16.32	17.42	17.28	17.2
		20375	1752.5	16.42	16.33	16.43	16.6	17.12	17.38	17.53
	3	19965	1711.5	16.4	16.41	16.44	16.29	17.39	17.41	17.26
		20175	1732.5	16.28	16.37	16.33	16.31	17.26	17.27	17.22
		20385	1753.5	16.52	16.48	16.53	16.59	17.27	17.37	17.47
	1.4	19957	1710.7	16.44	17.38	17.01	17.34	17.33	17.33	17.34
		20175	1732.5	16.42	17.28	17.33	17.3	17.3	17.25	17.26
		20393	1754.3	16.74	17.56	17.52	17.53	17.57	17.56	17.56
13	10	23230	782	19.31	19.42	19.43	19.35	20.75	20.53	20.5
	5	23205	779.5	19.47	19.58	19.45	19.55	20.73	20.58	20.58
		23230	782	19.35	19.47	19.53	19.44	20.65	20.64	20.66
		23255	784.5	19.32	19.53	19.75	19.48	20.51	20.55	20.55

Notes:

2. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions						
	100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

LTE – 16QAM Modulation – Low Power for CDMA BC0

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	15.75	15.83	15.78	15.92	16.45	16.63	16.5
		20175	1732.5	15.58	15.66	15.86	15.82	16.45	16.23	16.11
		20300	1745	15.48	15.24	15.53	15.38	16.03	16.1	16.43
	15	20025	1717.5	15.71	15.73	15.62	15.62	16.42	16.56	16.69
		20175	1732.5	15.47	15.73	15.37	15.83	16.88	16.62	16.12
		20325	1747.5	15.48	15.88	15.9	15.63	16.05	16.11	16.37
	10	20000	1715	15.63	15.42	15.38	15.91	16.63	16.68	16.72
		20175	1732.5	15.51	15.83	15.72	15.48	16.32	16.2	16.14
		20350	1750	15.56	15.73	15.74	15.84	16.12	16.07	16.48
	5	19975	1712.5	15.55	15.31	15.62	15.73	16.53	16.42	16.6
		20175	1732.5	15.53	15.6	15.81	15.75	16.38	16.23	16.14
		20375	1752.5	15.55	15.85	15.41	15.88	16.57	16.5	16.66
	3	19965	1711.5	15.61	15.49	15.49	15.35	16.58	16.62	16.55
		20175	1732.5	15.58	15.53	15.74	15.63	16.19	16.15	16.13
		20385	1753.5	15.68	15.82	15.69	15.69	16.18	16.27	16.42
	1.4	19957	1710.7	15.56	15.63	15.66	15.9	16.11	16.14	16.15
		20175	1732.5	15.51	15.78	15.73	15.73	16.12	16.11	16.13
		20393	1754.3	15.81	15.92	15.83	15.89	16.53	16.5	16.51
13	10	23230	782	18.26	18.43	18.33	18.5	19.28	19.2	19.42
	5	23205	779.5	18.33	18.36	18.49	18.3	19.4	19.25	19.34
		23230	782	18.44	18.4	18.52	18.57	19.21	19.22	19.46
		23255	784.5	18.62	18.59	18.47	18.5	19.53	19.78	19.76

Notes:

2. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

LTE – QPSK Modulation – Low Power for CDMA BC1

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	13.27	13.26	13	13.34	13.84	13.97	14.43
		20175	1732.5	13.63	13.5	13.51	13.72	13.74	14.1	14.78
		20300	1745	13.44	13.58	13.35	13.43	14.16	13.97	14.68
	15	20025	1717.5	13.22	13.17	13.16	13.18	13.81	14.42	13.85
		20175	1732.5	13.56	13.44	13.55	13.62	13.94	14.8	14.17
		20325	1747.5	13.38	13.38	13.32	13.36	14.08	14.62	13.96
	10	20000	1715	13.23	13.2	13.22	13.26	13.9	14.39	13.84
		20175	1732.5	13.61	13.54	13.67	13.66	14.02	14.76	14.27
		20350	1750	13.41	13.4	13.5	13.44	14.05	14.64	14.08
	5	19975	1712.5	13.28	13.42	13.31	13.25	14.14	14.38	14.15
		20175	1732.5	13.75	13.68	13.81	13.77	14.42	14.77	14.52
		20375	1752.5	13.5	13.44	13.62	13.52	14.26	14.62	14.31
	3	19965	1711.5	13.28	13.37	13.27	13.3	14.16	14.37	14.11
		20175	1732.5	13.76	13.73	13.86	13.78	14.52	14.83	14.62
		20385	1753.5	13.65	13.63	13.69	13.68	14.42	14.73	14.47
	1.4	19957	1710.7	13.5	14.51	13.62	14.51	14.53	14.42	14.55
		20175	1732.5	13.78	14.78	13.99	14.79	14.81	14.83	14.86
		20393	1754.3	13.7	14.69	13.17	14.62	14.66	14.65	14.74
13	10	23230	782	17.5	17.61	17.15	17.6	18.79	18.66	18.74
	5	23205	779.5	17.66	17.72	17.11	17.68	18.82	18.75	18.79
		23230	782	17.5	17.49	17.25	17.56	18.65	18.62	18.68
		23255	784.5	17.48	17.58	17.47	17.65	18.65	18.71	18.77

Notes:

3. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

LTE – 16QAM Modulation – Low Power for CDMA BC1

Average power measured using a Rhode and Schwarz CMU 200 and using an average power sensor.

Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Average Power [dBm] # RB / RB Position[1] 100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
4	20	20050	1720	11.89	12.03	12.1	12.15	12.53	13.18	12.72
		20175	1732.5	12.21	12.06	11.96	12.09	12.56	13.56	12.82
		20300	1745	12.06	12.11	11.83	12.13	13.02	13.49	12.81
	15	20025	1717.5	11.92	12.03	12.21	12.08	12.56	13.23	12.62
		20175	1732.5	12.18	11.89	11.79	12.01	12.85	13.69	13.02
		20325	1747.5	12.13	11.97	12.04	11.92	12.85	13.42	12.76
	10	20000	1715	11.95	12	12.26	12.24	12.65	13.25	12.71
		20175	1732.5	12.19	11.93	12.18	11.97	12.87	13.62	13.08
		20350	1750	12.08	12.23	12.04	12.05	12.64	13.36	12.72
	5	19975	1712.5	11.92	12.06	12.21	11.96	12.91	13.16	12.83
		20175	1732.5	12.32	12.17	12.18	12.08	13.13	13.55	13.26
		20375	1752.5	12.1	11.83	12.16	12.05	12.98	13.36	13.06
	3	19965	1711.5	11.92	11.92	12.03	12.07	12.91	13.08	12.84
		20175	1732.5	12.37	12.25	12.06	11.87	13.36	13.62	13.43
		20385	1753.5	12.2	12.1	12.17	12.08	13.02	13.35	13.06
	1.4	19957	1710.7	12.09	12.16	12.04	12.05	13.2	13.22	13.23
		20175	1732.5	12.42	12.27	12.33	12.11	13.46	13.46	13.48
		20393	1754.3	12.22	12.12	12.1	12.27	13.42	13.41	13.42
13	10	23230	782	16.12	16.21	16.18	16.17	17.9	17	17.17
	5	23205	779.5	16.23	16.13	16.04	16.21	17.05	17.1	17.09
		23230	782	16.14	16.3	16.19	16.17	16.9	17.03	17.12
		23255	784.5	16.29	16.09	16.14	16.2	17.24	17.51	17.42

Notes:

3. Low, mid, high RB positions refer to the RB allocation position in the channel. The following table is the starting RB position set for the Rhode & Schwarz CMW 500.

Bandwidth [MHz]	Start Positions						
	100% / Low	50% / Low	50% / Mid	50% / High	1 / Low	1 / Mid	1 / High
20	0	0	25	50	0	49	99
15	0	0	19	39	0	35	74
10	0	0	12	25	0	24	49
5	0	0	6	13	0	12	24
3	0	0	3	7	0	7	14
1.4	0	0	1	3	0	2	5

SVLTE Power Reduction Check

LTE power reduction is verified by simultaneously connecting the EUT to a CMW500 and CMU200 for enable signaling for LTE and CDMA, respectively. Connection was established through a conducted link.

During initial connection, CDMA is set to transmit at maximum power. CDMA power is then reduced by 1 dB using the following settings:

- Power Control Bit: Auto
- RF Level: Varied from 24 dBm until LTE was at maximum power
- RF Mode: Manual

Power reduction is measured at the mid channel for all bands for verification. LTE was only checked for QPSK, highest bandwidth, 1 RB.

Band	LTE Bandwidth [MHz]	Channel	Frequency [MHz]	#RB / RB Position	Average Power [dBm]	
					LTE	CDMA
LTE Band 4 CDMA BC0	20	LTE: 20175 CDMA: 384	LTE: 1732.5 CDMA: 836.6	1 / Low	17.63	23.55
					17.63	23.07
					19.62	22.1
					19.62	20.84
					19.64	19.9
					19.68	18.9
					22.6	17.88
					22.62	16.82
					22.61	15.93
					22.64	14.93
					24.1	13.94
					24.1	13.05
					24.1	11.97
LTE Band 4 CDMA BC1	20	LTE: 20175 CDMA: 600	LTE: 1732.5 CDMA: 1880	1 / Low	15.67	23.87
					15.64	22.95
					16.67	22.11
					16.67	21.24
					16.67	20.27
					16.67	19.26
					20.72	18.25
					20.72	17.05
					20.71	15.9
					20.72	15.07
					24.11	13.92
					24.1	12.9
					24.1	11.93

Band	LTE Bandwidth [MHz]	Channel	Frequency [MHz]	#RB / RB Position	Average Power [dBm]	
					LTE	CDMA
LTE Band 13 CDMA BC0	10	LTE: 23230 CDMA: 384	LTE: 782 CDMA: 836.6	1 / High	20.95	23.53
					20.96	23.04
					21.98	21.95
					22.97	20.97
					22.96	19.83
					23.92	18.85
					23.98	17.82
					23.97	16.82
LTE Band 13 CDMA BC1	10	LTE: 23230 CDMA: 600	LTE: 782 CDMA: 1880	1 / High	18.99	23.59
					20.00	22.79
					20.93	21.82
					20.95	20.85
					20.95	19.85
					23.82	18.85
					23. 86	17.83
					23.84	16.83

8.2. Stand-Alone SAR Evaluation Exclusion

Antenna	Operation Mode	SAR Evaluation Exclusion Reason
WLAN	802.11g 802.11n HT20	According to KDB 248227, 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	GFSK π/4 DQPSK 8DPSK	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*)] ·[$\sqrt{f_{(GHz)}}$] ≤ 3.0 The maximum average output power is 10.4 mW. SAR evaluation is excluded when the minimum separation distance is at least 6 mm.
Cellular	8PSK Modulation	According to KDB 941225 and IEEE 1528-2003 footnote 11, SAR evaluation for low-power modes are required for devices that produced a peak SAR larger than one half of the compliance limit. The highest SAR value for GMSK is less than one half of the 1.6 W/kg limit.
Cellular	HSDPA	According to KDB 941225, SAR evaluation is not required when the maximum average output power is < ¼ dB higher than that measured on the corresponding channels without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is less than 1.2 W/kg. Additionally, if HSPA is supported, HSPA shall be evaluated according to KDB 941225.
Cellular	HSPA	According to KDB 941225, SAR evaluation is not required when the maximum average output power is < ¼ dB higher than that measured on the corresponding channels without HSPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is less than 1.2 W/kg.
Cellular	LTE - 16QAM	According to KDB 941225, SAR evaluation for higher order modulations is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when extrapolated SAR for QPSK configuration is > 1.45 W/kg
Cellular	LTE smaller channel bandwidths	According to KDB 941225, SAR evaluation for smaller channel bandwidths is required when the output power is > ½ dB higher than the equivalent channel configuration (RB configuration) in the largest channel bandwidth configuration or when the extrapolated SAR of a configuration is > 1.45 W/kg.
Cellular	EVDO Rev 0	According to KDB 941225, SAR evaluation for EVDO Rev 0 is not required when the maximum average output power is less than ¼ dB higher than in CDMA RC3.
Cellular	EVDO Rev A	According to KDB 941225, SAR evaluation for EVDO Rev A is not required when the maximum average output power is less than ¼ dB higher than in CDMA RC3 or EVDO Rev 0.

8.3. Test Positions and Configurations

Exposure Condition	Accessory	Distance	Position	Positioning Photo (Appendix B)
Head SAR	N/A	0 mm	Left Touch	Photo 1
			Left 15° Tilt	Photo 2
			Right Touch	Photo 3
			Right 15° Tilt	Photo 4
Body-Worn SAR	None	15 mm	Front	Photo 5
			Back	Photo 6
	Holster	0 mm	Front	Photo 7
			Back	Photo 8
	Headset	15 mm	Back	Photo 9
Wireless Router	None	10 mm	Front	Photo 10
			Back	Photo 11
			Bottom Edge	Photo 12
			Top Edge	Photo 13
			Left Edge	Photo 14
			Right Edge	Photo 15
	Headset	10 mm	Back	Photo 16

High and low channels are evaluated for the worst case positions for each band and exposure condition regardless of the SAR value on the middle channel, according to guidance in Industry Canada Notice 2012-DRS1203. FCC only requires high and low channels is evaluated when the SAR value on the middle channel is more than 3 dB below the limit.

For GSM bands, the uplink timeslot configuration with the highest source-based time-averaged output power is used for full SAR evaluation at the middle channel for body exposure positions. Spot check measurements for other uplink timeslot configurations are performed on the position with the highest measured SAR value. Low and high channels are evaluated for the uplink timeslot configuration with the highest SAR value at middle channel.

Dual Transfer Mode for GSM bands is tested for head exposure conditions. The worst case configuration tested for GSM operating mode is used to evaluate SAR for DTM.

According to KDB 648474 D04, SAR evaluation with the headset attached is required if the reported SAR without the headset is greater than 1.2 W/kg.

In SVLTE mode, CDMA and LTE are able to transmit simultaneously to enable simultaneous voice and data modes. In SVLTE mode, LTE power is reduced. Full SAR evaluation for LTE is performed with LTE at maximum power. Spot check measurements for LTE low power modes are performed at the positions with the highest SAR value with maximum power for LTE and additionally for positions with

the highest SAR value in CDMA. Spot check measurements are to be used in simultaneous transmission analysis.

Two battery options are available: a standard battery and a high capacity battery. Full SAR evaluation is performed with the standard battery. Spot checks are performed with the high capacity battery using the configuration with the highest SAR values for each band and exposure condition.

8.4. SAR Results for Head

Band	Operation Mode	Channel	Frequency (MHz)	Battery	Position	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
GSM 850	GSM	190	836.6	Standard	Right Touch	0.223	0.239	Plot 1
					Right Tilt	0.157	0.168	Plot 2
					Left Touch	0.32	0.343	Plot 3
					Left Tilt	0.195	0.209	Plot 4
		128	824.2		Left Touch	0.337	0.361	Plot 5
		251	848.8		Left Touch	0.327	0.375	Plot 6
	DTM: 1 CS Timeslot / 1 PS Timeslot	128	824.2		Left Touch	0.394	0.432	Plot 7
	DTM: 1 CS Timeslot / 2 PS Timeslot	128	824.2		Left Touch	0.32	0.335	Plot 8
	DTM: 1 CS Timeslot / 1 PS Timeslot	128	824.2	High Capacity	Left Touch	0.393	0.431	Plot 9
PCS 1900	GSM	661	1880	Standard	Right Touch	0.356	0.390	Plot 10
					Right Tilt	0.222	0.243	Plot 11
					Left Touch	0.417	0.457	Plot 12
					Left Tilt	0.19	0.208	Plot 13
		512	1850.2		Left Touch	0.34	0.381	Plot 14
		810	1909.8		Left Touch	0.521	0.585	Plot 15
	DTM: 1 CS Timeslot / 1 PS Timeslot	810	1909.8		Left Touch	0.801	0.941	Plot 16
	DTM: 1 CS Timeslot / 2 PS Timeslot	810	1909.8		Left Touch	0.605	0.695	Plot 17
	DTM: 1 CS Timeslot / 1 PS Timeslot	810	1909.8	High Capacity	Left Touch	0.82	0.963	Plot 18
CDMA BC0	RC 3/3, SO55	384	836.6	Standard	Right Touch	0.843	0.935	Plot 19
					Right Tilt	0.436	0.484	Plot 20
					Left Touch	0.531	0.589	Plot 21
					Left Tilt	0.412	0.457	Plot 22
		1013	824.7		Right Touch	0.76	0.849	Plot 23
		777	848.31		Right Touch	0.818	0.872	Plot 24
		384	836.6	High Capacity	Right Touch	0.703	0.780	Plot 25

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.

Band	Operation Mode	Channel	Frequency (MHz)	Battery	Position	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
CDMA BC1	RC 3/3, SO55	600	1880	Standard	Right Touch	1.04	1.14	Plot 26
					Right Tilt	0.745	0.817	Plot 27
					Left Touch	1.07	1.17	Plot 28
					Left Tilt	0.607	0.666	Plot 29
		25	1851.25		Left Touch	0.923	1.01	Plot 30
		1175	1908.75		Left Touch	0.941	1.03	Plot 31
		600	1880	High Capacity	Left Touch	1.18	1.29	Plot 32
WCDMA FDD II	12.2 kbps RMC	9400	1880	Standard	Right Touch	0.714	0.762	Plot 33
					Right Tilt	0.512	0.546	Plot 34
					Left Touch	0.841	0.897	Plot 35
					Left Tilt	0.494	0.527	Plot 36
		9262	1852.4		Left Touch	0.725	0.725	Plot 37
		9538	1907.6		Left Touch	0.99	1.09	Plot 38
		9538	1907.6	High Capacity	Left Touch	1.00	1.10	Plot 39
WCDMA FDD V	12.2 kbps RMC	4183	836.6	Standard	Right Touch	0.299	0.315	Plot 40
					Right Tilt	0.211	0.222	Plot 41
					Left Touch	0.506	0.534	Plot 42
					Left Tilt	0.276	0.291	Plot 43
		4132	826		Left Touch	0.522	0.571	Plot 44
		4233	847		Left Touch	0.436	0.506	Plot 45
		4132	826	High Capacity	Left Touch	0.422	0.462	Plot 46

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.

Band	Operation Mode	Channel	Frequency (MHz)	Battery	Position	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 4	20 MHz BW, 1 RB, High Allocation	20175	1732.5	Standard	Right Touch	0.812	0.894	Plot 47
					Right Tilt	0.510	0.562	Plot 48
					Left Touch	1.28	1.410	Plot 49
					Left Tilt	0.532	0.586	Plot 50
		20050	1720		Left Touch	1.23	1.349	Plot 51
		20300	1745		Left Touch	1.16	1.290	Plot 52
		20175	1732.5	High Cap.	Left Touch	1.06	1.17	Plot 53
	20 MHz BW, 50% RB, High Allocation	20175	1732.5	Standard	Right Touch	0.567	0.663	Plot 54
					Right Tilt	0.372	0.435	Plot 55
					Left Touch	0.925	1.082	Plot 56
					Left Tilt	0.381	0.446	Plot 57
		20050	1720		Left Touch	1.01	1.18	Plot 58
		20300	1745		Left Touch	0.898	1.048	Plot 59
		20050	1720	High Cap.	Left Touch	0.942	1.10	Plot 60
	20 MHz BW, 100% RB	20175	1732.5	Standard	Right Touch	0.554	0.649	Plot 61
					Right Tilt	0.362	0.424	Plot 62
					Left Touch	0.947	1.110	Plot 63
					Left Tilt	0.335	0.393	Plot 64
		20050	1720		Left Touch	1.01	1.195	Plot 65
		20300	1745		Left Touch	0.960	1.118	Plot 66
		20050	1720	High Cap.	Left Touch	0.913	1.08	Plot 67
SVLTE Band 4	20 MHz BW, 1 RB, High Allocation, 6.5 dB Power Back Off	20175	1732.5	Standard	Right Touch	0.195	0.204	Plot 68
					Left Touch	0.292	0.306	Plot 69
	20 MHz BW, 1 RB, High Allocation, 8.5 dB Power Back Off				Left Touch	0.120	0.159	Plot 70

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.

Band	Operation Mode	Channel	Frequency (MHz)	Battery	Position	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 13	20 MHz BW, 1 RB, Low Allocation	23230	782	Standard	Right Touch	0.484	0.503	Plot 71
					Right Tilt	0.312	0.324	Plot 72
					Left Touch	0.872	0.907	Plot 73
					Left Tilt	0.421	0.438	Plot 74
				High Cap.	Left Touch	0.849	0.883	Plot 75
	20 MHz BW, 50% RB, Low Allocation	23230	782	Standard	Right Touch	0.349	0.382	Plot 76
					Right Tilt	0.236	0.258	Plot 77
					Left Touch	0.587	0.642	Plot 78
					Left Tilt	0.292	0.319	Plot 79
				High Cap.	Left Touch	0.570	0.624	Plot 80
	20 MHz BW, 100% RB	23230	782	Standard	Right Touch	0.345	0.394	Plot 81
					Right Tilt	0.242	0.277	Plot 82
					Left Touch	0.557	0.637	Plot 83
					Left Tilt	0.273	0.312	Plot 84
				High Cap.	Left Touch	0.592	0.677	Plot 85
SVLTE Band 13	20 MHz BW, 1 RB, Low Allocation, 3 dB Power Back Off	23230	782	Standard	Right Touch	0.249	0.259	Plot 86
					Left Touch	0.380	0.203	Plot 87
	20 MHz BW, 1 RB, Low Allocation, 5 dB Power Back Off	23230	782	Standard	Left Touch	0.193	0.403	Plot 88

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.

Band	Operation Mode	Channel	Frequency (MHz)	Battery	Position	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
Bluetooth	**GFSK, DH5**	**39**	**2442**	Standard	Right Touch	0.012	N/A[2]	Plot 89
					Right Tilt	0.012		Plot 90
					Left Touch	0.00513		Plot 91
					Left Tilt	0.012		Plot 92
		0	**2402**		Right Touch	0.014		Plot 93
		78	**2480**		Right Touch	0.00724		Plot 94
		0	**2402**	High Cap.	Right Touch	0.014		Plot 95
WLAN 802.11b	**CCK, 1 Mbit/s**	**6**	**2437**	Standard	Right Touch	0.210	N/A[2]	Plot 96
					Right Tilt	0.203		Plot 97
					Left Touch	0.122		Plot 98
					Left Tilt	0.163		Plot 99
		1	**2412**		Right Touch	0.230		Plot 100
		11	**2462**		Right Touch	0.220		Plot 101
		1	**2412**	High Cap.	Right Touch	0.227		Plot 102
WLAN 802.11a	**OFDM, 6 Mbit/s**	**36**	**5180**	Standard	Right Touch	0.057	N/A[2]	Plot 103
					Right Tilt	0.076		Plot 104
					Left Touch	0.037		Plot 105
					Left Tilt	0.062		Plot 106
		64	**5320**		Right Touch	0.114		Plot 107
					Right Tilt	0.125		Plot 108
					Left Touch	0.048		Plot 109
					Left Tilt	0.070		Plot 110
		100	**5500**		Right Touch	0.068		Plot 111
					Right Tilt	0.054		Plot 112
					Left Touch	0.043		Plot 113
					Left Tilt	0.065		Plot 114
		149	**5745**		Right Touch	0.064		Plot 115
					Right Tilt	0.056		Plot 116
					Left Touch	0.061		Plot 117
					Left Tilt	0.079		Plot 118
		64	**5320**	High Cap.	Right Tilt	0.113		Plot 119

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Bluetooth and WLAN tested at highest output power. No extrapolation required.

8.5. SAR Results for Body

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
GSM 850	3 Uplink Timeslots	190	836.6	Back	None	15	0.188	0.192	Plot 120
				Front	None	15	0.166	0.170	Plot 121
				Back	Holster	0	0.148	0.151	Plot 122
				Front	Holster	0	0.151	0.155	Plot 123
	4 Uplink Timeslots	190	836.6	Back	None	15	0.160	0.164	Plot 124
	2 Uplink Timeslots	190	836.6	Back	None	15	0.279	0.285	Plot 125
		128	824.2	Back	None	15	0.290	0.304	Plot 126
		251	848.8	Back	None	15	0.275	0.331	Plot 127
	1 Uplink Timeslots	190	836.6	Back	None	15	0.247	0.253	Plot 128
	3 Uplink Timeslots	190	836.6	Back	Headset	15	0.158	0.162	Plot 129
		190	836.6	Back	High Cap. Battery	15	0.187	0.191	Plot 130
PCS 1900	4 Uplink Timeslots	661	1880	Back	None	15	0.287	0.315	Plot 131
				Front	None	15	0.180	0.197	Plot 132
				Back	Holster	0	0.165	0.181	Plot 133
				Front	Holster	0	0.115	0.126	Plot 134
	3 Uplink Timeslots	661	1880	Back	None	15	0.252	0.283	Plot 135
	2 Uplink Timeslots	661	1880	Back	None	15	0.301	0.330	Plot 136
		512	1850.2	Back	None	15	0.258	0.283	Plot 137
		810	1909.8	Back	None	15	0.366	0.420	Plot 138
	1 Uplink Timeslots	661	1880	Back	None	15	0.198	0.212	Plot 139
	2 Uplink Timeslots	810	1909.8	Back	Headset	15	0.362	0.416	Plot 140
					High Cap. Battery	15	0.379	0.435	Plot 141

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
CDMA BC0	RC3/3, SO55	384	836.6	Back	None	15	0.700	0.776	Plot 142
				Front	None	15	0.552	0.612	Plot 143
				Back	Holster	0	0.423	0.469	Plot 144
				Front	Holster	0	0.400	0.444	Plot 145
		1013	824.7	Back	None	15	0.656	0.733	Plot 146
		777	848.8	Back	None	15	0.624	0.666	Plot 147
		384	836.6	Back	Headset	15	0.534	0.592	Plot 148
				Back	High Cap. Battery	15	0.602	0.668	Plot 149
CDMA BC1	RC3/3, SO55	600	1880	Back	None	15	0.662	0.726	Plot 150
				Front[2]	None	15	0.498	0.546	Plot 151
							0.442	0.485	
				Back[2]	Holster	0	0.358	0.393	Plot 152
							0.255	0.280	
				Front[2]	Holster	0	0.308	0.338	Plot 153
							0.246	0.270	
		25	1851.25	Back[2]	None	15	0.558	0.609	Plot 154
							0.356	0.389	
		1175	1908.75	Back	None	15	0.595	0.651	Plot 155
		600	1880	Back	Headset	15	0.611	0.670	Plot 156
				Back[2]	High Cap. Battery	15	0.631	0.692	Plot 157
							0.432	0.474	

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
WCDMA FDD II	12.2 kbps RMC	9400	1880	Back	None	15	0.517	0.551	Plot 158
				Front	None	15	0.281	0.300	Plot 159
				Back	Holster	0	0.33	0.352	Plot 160
				Front[2]	Holster	0	0.193	0.206	Plot 161
							0.131	0.140	
		9262	1852.4	Back	None	15	0.432	0.432	Plot 162
		9538	1907.6	Back	None	15	0.548	0.604	Plot 163
		9538	1907.6	Back	Headset	15	0.487	0.519	Plot 164
				Back	High Cap. Battery	15	0.499	0.532	Plot 165
WCDMA FDD V	12.2 kbps RMC	4183	836.6	Back	None	15	0.295	0.311	Plot 166
				Front	None	15	0.268	0.283	Plot 167
				Back	Holster	0	0.209	0.220	Plot 168
				Front	Holster	0	0.203	0.214	Plot 169
		4132	826	Back	None	15	0.288	0.315	Plot 170
		4233	847	Back	None	15	0.249	0.289	Plot 171
		4183	836.6	Back	Headset	15	0.231	0.244	Plot 172
				Back	High Cap. Battery	15	0.296	0.312	Plot 173

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 4	20 MHz BW, 1 RB, High Allocation	20175	1732.5	Back	None	15	0.620	0.683	Plot 174
				Front[2]	None	15	0.396	0.436	Plot 175
							0.384	0.423	
				Back[2]	Holster	0	0.390	0.276	Plot 176
							0.265	0.292	
				Front[2]	Holster	0	0.251	0.430	Plot 177
							0.232	0.256	
		20050	1720	Back	None	15	0.680	0.746	Plot 178
		20300	1745	Back	None	15	0.625	0.695	Plot 179
		20050	1720	Back	Headset	15	0.677	0.742	Plot 180
				Back	High Cap. Battery	15	0.691	0.758	Plot 181
	20 MHz BW, 50% RB, High Allocation	20175	1732.5	Back	None	15	0.486	0.568	Plot 182
				Front[2]	None	15	0.295	0.345	Plot 183
							0.286	0.299	
				Back	Holster	0	0.284	0.332	Plot 184
				Front[2]	Holster	0	0.171	0.200	Plot 185
							0.177	0.207	
		20050	1720	Back	None	15	0.549	0.644	Plot 186
		20300	1745	Back	None	15	0.499	0.582	Plot 187
		20050	1720	Back	Headset	15	0.532	0.624	Plot 188
				Back	High Cap. Battery	15	0.457	0.536	Plot 189
SVLTE Band 4	20 MHz BW, 1 RB, High Allocation, 6.5 dB Power Back Off	20050	1720	Back	None	15	0.132	0.151	Plot 190
	20 MHz BW, 1 RB, High Allocation, 8.5 dB Power Back Off						0.051	0.074	Plot 191

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 13	20 MHz BW, 1 RB, Low Allocation	23230	782	Back	None	15	0.564	0.587	Plot 192
				Front	None	15	0.508	0.528	Plot 193
				Back	Holster	0	0.379	0.394	Plot 194
				Front	Holster	0	0.371	0.386	Plot 195
				Back	Headset	15	0.505	0.525	Plot 196
				Back	High Cap. Battery	15	0.654	0.680	Plot 197
	20 MHz BW, 50% RB, Low Allocation	23230	782	Back	None	15	0.401	0.439	Plot 198
				Front	None	15	0.358	0.392	Plot 199
				Back	Holster	0	0.267	0.292	Plot 200
				Front	Holster	0	0.230	0.252	Plot 201
				Back	Headset	15	0.373	0.408	Plot 202
				Back	High Cap. Battery	15	0.475	0.520	Plot 203
SVLTE Band 13	20 MHz BW, 1 RB, High Allocation, 3 dB Power Back Off	23230	782	Back	None	15	0.276	0.292	Plot 204
	20 MHz BW, 1 RB, High Allocation, 5 dB Power Back Off	23230	782	Back	None	15	0.139	0.146	Plot 205
WLAN 802.11b	CCK, 1 Mbit/s	6	2437	Back	None	15	0.223	N/A[3]	Plot 206
				Back	Holster	0	0.110		Plot 207
WLAN 802.11a	OFDM, 6 Mbit/s	36	5180	Back	None	15	0.310	N/A[3]	Plot 208
		64	5320	Back	None	15	0.154		Plot 209
		100	5500	Back	None	15	0.072		Plot 210
		149	5745	Back	None	15	0.252		Plot 211
		36	5180	Back	Holster	0	0.065		Plot 212
				Back	High Cap. Battery	15	0.342		Plot 213

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.
3. Bluetooth and WLAN tested at highest output power. No extrapolation required.

8.6. SAR Results for Wireless Router Mode

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
GSM 850	3 Uplink Timeslots	190	836.6	Front	None	10	0.207	0.212	Plot 214
				Back	None	10	0.258	0.264	Plot 215
				Bottom Edge	None	10	0.127	0.130	Plot 216
				Left Edge	None	10	0.253	0.259	Plot 217
				Right Edge	None	10	0.096	0.098	Plot 218
	4 Uplink Timeslots	190	836.6	Back	None	10	0.215	0.230	Plot 219
	2 Uplink Timeslots	190	836.6	Back	None	10	0.361	0.396	Plot 220
		128	824.2	Back	None	10	0.382	0.400	Plot 221
		251	848.8	Back	None	10	0.387	0.465	Plot 222
	1 Uplink Timeslot	190	836.6	Back	None	10	0.317	0.356	Plot 223
	3 Uplink Timeslots	190	836.6	Back	Headset	10	0.224	0.229	Plot 224
				Back	High Cap. Battery	10	0.252	0.258	Plot 225
PCS 1900	4 Uplink Timeslots	661	1880	Front	None	10	0.516	0.566	Plot 226
				Back	None	10	0.717	0.786	Plot 227
				Bottom Edge	None	10	0.392	0.430	Plot 228
				Left Edge[2]	None	10	0.327	0.359	Plot 229
							0.220	0.241	
				Right Edge	None	10	0.097	0.106	Plot 230
		512	1850.2	Back	None	10	0.559	0.613	Plot 231
		810	1909.8	Back	None	10	0.697	0.800	Plot 232
	4 Uplink Timeslots, 8PSK	810	1909.8	Back	None	10	0.429	0.460	Plot 233
	3 Uplink Timeslots	661	1880	Back	None	10	0.603	0.661	Plot 234
	2 Uplink Timeslots	661	1880	Back	None	10	0.71	0.778	Plot 235
	1 Uplink Timeslot	661	1880	Back	None	10	0.633	0.694	Plot 236
	4 Uplink Timeslots	661	1880	Back	Headset	10	0.615	0.674	Plot 237
		810	1909.8	Back	High Cap. Battery	10	0.698	0.801	Plot 238

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
CDMA BC0	RC3/3, SO55	384	836.6	Front	None	10	0.660	0.732	Plot 239
				Back	None	10	0.874	0.969	Plot 240
				Bottom Edge	None	10	0.302	0.335	Plot 241
				Left Edge	None	10	0.308	0.342	Plot 242
				Right Edge	None	10	0.784	0.870	Plot 243
		1013	824.7	Back	None	10	0.939	1.05	Plot 244
		777	848.31	Back	None	10	0.951	1.01	Plot 245
		777	848.31	Back	Headset	10	0.957	1.02	Plot 246
				Back	High Cap. Battery + Headset	10	0.878	0.936	Plot 247
CDMA BC1	RC3/3, SO55	600	1880	Front	None	10	0.81	0.888	Plot 248
				Back	None	10	1.02	1.12	Plot 249
				Bottom Edge	None	10	0.926	1.02	Plot 250
				Left Edge	None	10	0.241	0.264	Plot 251
				Right Edge[2]	None	10	0.399	0.437	Plot 252
							0.296	0.325	
		25	1851.25	Back	None	10	0.831	0.907	Plot 253
		1175	1908.75	Back	None	10	0.877	0.959	Plot 254
		600	1880	Back	Headset	10	1.14	1.25	Plot 255
				Back	High Cap. Battery + Headset	10	1.01	1.11	Plot 256

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
WCDMA FDD II	12.2 kbps RMC	9400	1880	Front	None	10	0.512	0.546	Plot 257
				Back	None	10	1.02	1.09	Plot 258
				Bottom Edge	None	10	0.340	0.363	Plot 259
				Left Edge	None	10	0.316	0.337	Plot 260
				Right Edge	None	10	0.118	0.13	Plot 261
		9262	1852.4	Back	None	10	0.846	0.846	Plot 262
		9538	1907.6	Back	None	10	1.15	1.27	Plot 263
		9538	1907.6	Back	Headset	10	1.01	1.11	Plot 264
		9538	1907.6	Back	High Cap. Battery	10	1.13	1.25	Plot 265
	HSPA	9538	1907.6	Back	None	10	0.826	0.828	Plot 266
WCDMA FDD V	12.2 kbps RMC	4183	836.6	Front	None	10	0.321	0.338	Plot 267
				Back	None	10	0.413	0.435	Plot 268
				Bottom Edge	None	10	0.192	0.202	Plot 269
				Left Edge	None	10	0.466	0.491	Plot 270
				Right Edge	None	10	0.46	0.485	Plot 271
		4132	826	Left Edge	None	10	0.401	0.439	Plot 272
		4233	847	Left Edge	None	10	0.359	0.417	Plot 273
		4183	836.6	Left Edge	Headset	10	0.389	0.410	Plot 274
		4183	836.6	Left Edge	High Cap. Battery	10	0.416	0.439	Plot 275

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 4	20 MHz BW, 1 RB, High Allocation	20175	1732.5	Front	None	10	0.749	0.825	Plot 276
							0.501	0.552	
				Back	None	10	1.18	1.30	Plot 277
				Bottom Edge	None	10	0.407	0.448	Plot 278
				Left Edge	None	10	0.353	0.389	Plot 279
				Right Edge	None	10	0.228	0.251	Plot 280
		20050	1720	Back	None	10	1.19	1.31	Plot 281
		20300	1745	Back	None	10	1.29	1.43	Plot 282
		20300	1745	Back	Headset	10	1.21	1.35	Plot 283
				Back	High Cap. Battery	10	1.21	1.35	Plot 284
	20 MHz BW, 50% RB, High Allocation	20175	1732.5	Front	None	10	0.450	0.526	Plot 285
				Back	None	10	0.901	1.054	Plot 286
				Bottom Edge	None	10	0.293	0.343	Plot 287
				Left Edge	None	10	0.326	0.381	Plot 288
				Right Edge	None	10	0.179	0.209	Plot 289
		20050	1720	Back	None	10	1.14	1.336	Plot 290
		20300	1745	Back	None	10	1.06	1.237	Plot 291
		20050	1720	Back	Headset	10	0.931	1.091	Plot 292
				Back	High Cap. Battery	10	0.966	1.132	Plot 293
	20 MHz BW, 100% RB, High Allocation	20175	1732.5	Front	None	10	0.472	0.553	Plot 294
				Back	None	10	0.787	0.923	Plot 295
				Bottom Edge	None	10	0.304	0.356	Plot 296
				Left Edge	None	10	0.341	0.400	Plot 297
				Right Edge	None	10	0.185	0.217	Plot 298
		20050	1720	Back	None	10	0.868	1.03	Plot 299
		20300	1745	Back	None	10	0.973	1.13	Plot 300
		20300	1745	Back	Headset	10	0.864	1.01	Plot 301
				Back	High Cap. Battery	10	0.885	1.03	Plot 302
	20 MHz BW, 1 RB, High Allocation, 6.5 dB Power Back Off	20300	1745	Back	None	10	0.234	0.254	Plot 303
	20 MHz BW, 1 RB, High Allocation, 8.5 dB Power Back Off	20300	1745	Back	None	10	0.081	0.109	Plot 304

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Measurements with more than one SAR value have a secondary peak that is within 2 dB of the primary peak.

Band	Operation Mode	Channel	Frequency (MHz)	Position	Accessory	Distance (mm)	SAR 1g (W/kg)	Extrapolated SAR 1g (W/kg)[1]	Results (Appendix A)
LTE Band 13	10 MHz BW, 1 RB, High Allocation	23230	782	Front	None	10	0.596	0.620	Plot 305
				Back	None	10	0.698	0.726	Plot 306
				Bottom Edge	None	10	0.312	0.324	Plot 307
				Left Edge	None	10	0.658	0.684	Plot 308
				Right Edge	None	10	0.275	0.286	Plot 309
				Back	Headset	10	0.657	0.683	Plot 310
				Back	High Cap. Battery	10	0.762	0.792	Plot 311
	10 MHz BW, 50% RB, High Allocation	23230	782	Front	None	10	0.424	0.464	Plot 312
				Back	None	10	0.505	0.552	Plot 313
				Bottom Edge	None	10	0.225	0.246	Plot 314
				Left Edge	None	10	0.468	0.512	Plot 315
				Right Edge	None	10	0.212	0.232	Plot 316
				Back	Headset	10	0.538	0.589	Plot 317
				Back	High Cap. Battery	10	0.541	0.592	Plot 318
	10 MHz BW, 1 RB, High Allocation, 3 dB Power Back Off	23230	782	Back	None	10	0.323	0.342	Plot 319
	10 MHz BW, 1 RB, High Allocation, 5 dB Power Back Off	23230	782	Back	None	10	0.178	0.187	Plot 320
WLAN 802.11b	CCK, 1 Mbit/s	6	2437	Front	None	10	0.068	N/A[2]	Plot 321
				Back	None	10	0.606		Plot 322
				TopEdge	None	10	0.167		Plot 323
				Left Edge	None	10	0.155		Plot 324
				Right Edge	None	10	0.052		Plot 325
		1	2412	Back	None	10	0.498		Plot 326
		11	2462	Back	None	10	0.473		Plot 327

NOTES:
1. Measured 1g SAR extrapolated to manufacturer stated output power upper tolerance limit.
2. Bluetooth and WLAN tested at highest output power. No extrapolation required.

8.7. SAR Results for Repeatability Measurements

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement.

Band	SAR Ratio Measured Head to Body Liquid	Liquid Type	Original Measured SAR	Repeated Measured SAR	SAR Ratio Repeated SAR	Results (Appendix A)
PCS 1900	N/A	Head	0.82	0.735	1.11	Plot 328
CDMA BC0	1.14	Body	0.957	0.869	1.10	Plot 329
		Head	0.843	0.702	1.20	Plot 330
CDMA BC1	1.04	Head	1.18	1.10	1.07	Plot 331
WCDMA FDD II	1.15	Body	1.15	1.08	1.06	Plot 332
		Head	1.00	1.02	1.02	Plot 333
LTE Band 4	1.01	Body	1.29	1.29	1.00	Plot 334
LTE Band 13	N/A	Head	0.849	0.793	1.07	Plot 335

8.8. Simultaneous Transmission SAR Evaluation Consideration

According to KDB 648474, SAR evaluation for simultaneous transmission can be excluded when specific requirements are satisfied.

Positions used in simultaneous transmission analysis are the positions with the highest SAR value in the band.

SVLTE Analysis

Exposure Condition	Position	Bands	Highest Extrapolated SAR 1g (W/kg)		
			CDMA	LTE	Sum for SVLTE
Head SAR	Right Touch	CDMA BC0 + LTE Band 4	0.935	0.204	1.14
	Right Touch	CDMA BC0 + LTE Band 13	0.935	0.259	1.19
	Left Touch	CDMA BC0 + LTE Band 4	0.589	0.306	0.895
	Left Touch	CDMA BC0 + LTE Band 13	0.589	0.403	0.992
	Left Touch	CDMA BC1 + LTE Band 4	1.29	0.162	1.45
	Left Touch	CDMA BC1 + LTE Band 13	1.29	0.203	1.49
Body Worn Accessory SAR	Back 15 mm	CDMA BC0 + LTE Band 4	0.776	0.151	0.927
	Back 15 mm	CDMA BC0 + LTE Band 13	0.776	0.292	1.07
	Back 15 mm	CDMA BC1 + LTE Band 4	0.726	0.074	0.800
	Back 15 mm	CDMA BC1 + LTE Band 13	0.726	0.146	0.872
Wireless Router SAR	Back 10 mm	CDMA BC0 + LTE Band 4	1.05	0.254	1.30
	Back 10 mm	CDMA BC0 + LTE Band 13	1.05	0.342	1.39
	Back 10 mm	CDMA BC1 + LTE Band 4	1.25	0.109	1.37
	Back 10 mm	CDMA BC1 + LTE Band 13	1.25	0.187	1.44

Note:
1. Stand Alone SAR measurement has more than one zoom scan. SAR value in table above is the sum of all zoom scans.

Estimated SAR for Bluetooth

The equation used to estimate SAR is
(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg where x = 7.5 for 1-g SAR

Power (mW)	Exposure Condition	Test Separation Distance (mm)	Frequency (GHz)	Estimated SAR (W/kg)
10.4	Body Worn Accessory	15	2.45	0.139
	Wireless Router	10	2.45	0.209

Summary of Critical Maximum Stand Alone SAR Values for Analysis

Exposure Condition	Position	Antenna	Highest Extrapolated SAR 1g (W/kg)	Coordinate Locations[1] (mm)	
				x	y
Head SAR	Right Touch	WLAN	0.230	26.22	-330.10
	Left Touch	WLAN	0.163	-2.67	302.00
	Right Touch	Bluetooth	0.014	21.7	-333.6
	Left Touch	GSM	0.585	70.1	244.5
	Left Touch	WCDMA	1.12	69.0	246.5
	Left Touch	CDMA	1.29	70.7	249.5
	Right Touch	LTE	0.894	67.8	-252.4
	Left Touch	LTE	1.41	65.6	248.4
	Right Touch	SVLTE	1.19	62.8	-256.9
	Left Touch	SVLTE	1.49	64.6	262.4
Body Worn Accessory SAR	Back 15 mm (Worst Case Position for All Bands)	WLAN	0.342	-4.978	49
		Bluetooth[2]	0.139	0	41
		(E)GPRS	0.435	3.8	-45.2
		WCDMA	0.604	5.5	-49.0
		CDMA	0.776	-38	-45.4
		LTE	0.758	18.5	-38.6
		SVLTE	1.07	-19.4	-35.2
Wireless Router SAR	Back 10 mm (Worst Case Position for All Bands)	WLAN	0.606	-3.966	40
		Bluetooth[2]	0.209	0	41
		(E)GPRS	0.801	3.4	-48.3
		WCDMA	1.27	7	-44.5
		CDMA	1.25	-35	-58.3
		LTE	1.43	15.4	-41.7
		SVLTE	1.44	-17.3	-43.4

NOTE:
1. Origin of coordinate locations for body worn accessory and wireless router SAR is center of EUT
2. SAR value is calculated. Coordinate Locations are approximated as worst case distance from origin to edge of antenna.

Exposure Condition	Position	Simultaneous Transmission Combinations	Sum of SAR 1g (W/kg)	Peak location separation distance (mm)	SAR to Peak Location Separation Ratio[1,2]
Head SAR	Left Touch	SVLTE + WLAN	1.65	78.06	0.03
	Right Touch	SVLTE + WLAN	1.42		
	Highest of each band	SVLTE + Bluetooth	1.50		
	Highest of each band	WCDMA + Bluetooth	1.13		
	Highest of each band	WCDMA + WLAN	1.35		
	Highest of each band	CDMA + Bluetooth	1.30		
	Highest of each band	CDMA + WLAN	1.52		
	Highest of each band	GSM + WLAN	0.815		
	Highest of each band	GSM + Bluetooth	0.599		
	Left Touch	LTE + WLAN	1.57		
	Right Touch	LTE + WLAN	1.12		
Body Worn Accessory SAR	Back 15 mm	SVLTE + WLAN	1.41		
		SVLTE + Bluetooth	1.21		
		WCDMA + Bluetooth	0.743		
		WCDMA + WLAN	0.946		
		CDMA + Bluetooth	0.915		
		CDMA + WLAN	1.12		
		(E)GPRS + WLAN	0.777		
		(E)GPRS + Bluetooth	0.574		
		LTE + WLAN	1.10		
Wireless Router SAR	Back 10 mm	SVLTE + WLAN	2.046	84.36	0.03
		SVLTE + Bluetooth	1.65	84.3	0.03
		WCDMA + Bluetooth	1.48		
		WCDMA + WLAN	1.88	85.21	0.03
		CDMA + Bluetooth	1.46		
		CDMA + WLAN	1.86	103.08	0.03
		(E)GPRS + WLAN	1.407		
		(E)GPRS + Bluetooth	1.01		
		LTE + WLAN	2.036	83.96	0.03

NOTE:
1. SAR to Peak Location Separation Ratio is only calculated if the Sum of SAR 1g (W/kg) is equal to or greater than 1.6 W/kg.
2. SAR to Peak Location Separation Ratio is calculated as $(SAR_1 + SAR_2)^{1.5}/R_i$, where R_i is the separation distance between the peak SAR locations.

Exposure Condition	Simultaneous Transmission Antenna Combinations	Simultaneous Transmission SAR Evaluation Exclusion Reason
Head SAR	WLAN and Cellular	SAR to Peak Location Separation Ratio is ≤ 0.04
	Bluetooth and Cellular	Sum of SAR 1g is less than 1.6 W/kg
Body Worn Accessory SAR	WLAN and Cellular	Sum of SAR 1g is less than 1.6 W/kg
	Bluetooth and Cellular	Sum of SAR 1g is less than 1.6 W/kg
Wireless Router SAR	WLAN and Cellular	SAR to Peak Location Separation Ratio is ≤ 0.04
	Bluetooth and Cellular	SAR to Peak Location Separation Ratio is ≤ 0.04

8.9. 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 as required by FCC KDB 450824 D01. 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)
2013/03/15	HSL	750	1	8.64	8.47	2.01%	Plot 336
2013/03/18	HSL	750	1	8.14	8.47	-3.90%	Plot 337
2013/03/20	HSL	750	1	8.35	8.47	-1.42%	Plot 338
2013/04/01	HSL	750	1	8.42	8.47	-0.59%	Plot 339
2013/02/26	HSL	835	1	9.74	9.47	2.85%	Plot 340
2013/03/19	HSL	835	1	9.77	9.47	3.17%	Plot 341
2013/03/20	HSL	835	1	10.1	9.47	6.65%	Plot 342
2013/03/22	HSL	835	1	10.2	9.47	7.71%	Plot 343
2013/03/01	HSL	1900	1	36.5	39.1	-6.65%	Plot 344
2013/03/11	HSL	1900	1	37.1	39.1	-5.12%	Plot 345
2013/03/12	HSL	1900	1	36.3	39.1	-7.16%	Plot 346
2013/03/13	HSL	1900	1	38.7	39.1	-1.02%	Plot 347
2013/03/21	HSL	1900	1	41.8	39.1	6.91%	Plot 348
2013/03/29	HSL	1750	1	33.6	35.59	-5.59%	Plot 349
2013/03/21	HSL	1750	1	36	35.59	1.15%	Plot 350
2013/03/22	HSL	1750	1	34.9	35.59	-1.94%	Plot 351
2013/04/01	HSL	1750	1	32.6	35.59	-8.40%	Plot 352
2013/03/20	HSL	2450	1	54.1	51.5	5.05%	Plot 353
2013/04/05	HSL	2450	1	51.8	52.8	-1.89%	Plot 354
2013/03/23	HSL	5200	1	73.8	77.3	-4.53%	Plot 355
2013/03/23	HSL	5500	1	80.1	81.8	-2.08%	Plot 356
2013/03/23	HSL	5800	1	81.1	75.4	7.56%	Plot 357

NOTE:
1. Measured 1g SAR normalized to 1 W.

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)
2013/03/28	MSL	750	1	8.78	8.89	-1.24%	Plot 358
2013/02/27	MSL	835	1	9.96	9.57	4.08%	Plot 359
2013/03/06	MSL	835	1	10.1	9.57	5.54%	Plot 360
2013/03/07	MSL	835	1	9.96	9.57	4.08%	Plot 361
2013/03/12	MSL	835	1	10.5	9.57	9.72%	Plot 362
2013/03/13	MSL	835	1	10.4	9.57	8.67%	Plot 363
2013/03/14	MSL	835	1	9.79	9.57	2.30%	Plot 364
2013/03/15	MSL	835	1	9.92	9.57	3.66%	Plot 365
2013/03/18	MSL	835	1	10.1	9.57	5.54%	Plot 366
2013/03/25	MSL	1750	1	38.1	37.6	1.33%	Plot 367
2013/03/36	MSL	1750	1	40.7	37.6	8.24%	Plot 368
2013/03/27	MSL	1750	1	34.6	37.6	-7.98%	Plot 369
2013/03/04	MSL	1900	1	39.7	40.5	-1.98%	Plot 370
2013/03/07	MSL	1900	1	37.8	40.5	-6.67%	Plot 371
2013/03/08	MSL	1900	1	40.3	40.5	-0.49%	Plot 372
2013/03/14	MSL	1900	1	37.7	40.5	-6.91%	Plot 373
2013/03/18	MSL	1900	1	36.7	40.5	-9.38%	Plot 374
2013/03/19	MSL	1900	1	39.3	40.5	-2.96%	Plot 375
2013/03/20	MSL	1900	1	39.2	40.5	-3.21%	Plot 376
2013/03/19	MSL	2450	1	54.5	51.2	6.45%	Plot 377
2013/03/20	MSL	2450	1	54.1	51.2	5.66%	Plot 378
2013/03/22	MSL	5200	1	73.9	73.4	0.68%	Plot 379
2013/03/22	MSL	5500	1	83.4	78.4	6.38%	Plot 380
2013/03/23	MSL	5800	1	80.2	74	8.38%	Plot 381

NOTE:
2. Measured 1g SAR normalized to 1 W.

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 2003] IEEE Std 1528-2003: 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., December 2003.

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 2001] Federal Communications Commission: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), FCC, June 2001.

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

10. Report History

Date	Report Name	Changes to report	Report prepared by
2013/04/08	SAR_CETE4_023_13001	First Version	**J. Sabado**