SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
GSM/WCDMA PHONE

FCC ID: ZNF329G
Model Name: LG329G, 329G

Report Number: 15I20528-S1
Issue Date: 5/26/2015

Prepared for
LG ELECTRONICS MOBILECOMM U.S.A., INC.
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
--	5/26/2015	Initial Issue	--

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1. Attestation of Test Results

Applicant Name	LG ELECTRONICS MOBILECOMM U.S.A., INC.			
FCC ID	ZNF329G			
Model Name	LG329G, 329G			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
SAR Limits (W/Kg)				
Exposure Category	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	**Equipment Class**			
	Licensed	**DTS**	**U-NII**	**DSS (BT)**
Head	1.218	N/A	N/A	N/A
Body-worn*	1.093	N/A	N/A	N/A
Date Tested	5/12/2015 to 5/15/2015			
Test Results	Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:	Prepared By:
	
Bobby Bayani Senior Engineer UL Verification Services Inc.	Jose Abadilla Laboratory Technician UL Verification Services Inc.

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2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures:

- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

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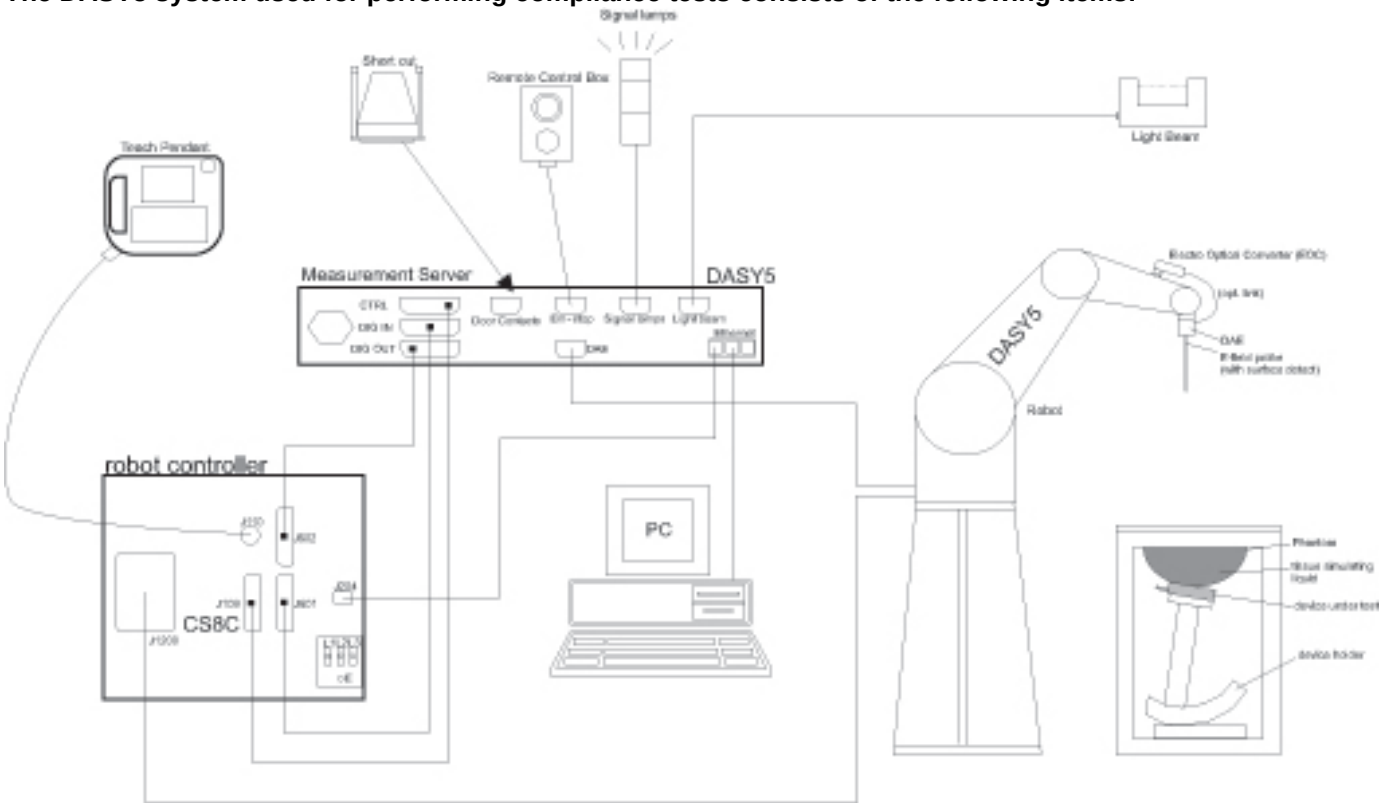
4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

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Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

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4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/17/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	10/8/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	1000622	5/8/2016
Power Meter	Agilent	N1912A	MY50001018	9/3/2015
Power Sensor	Agilent	E9323A	US40411556	8/27/2015
Power Sensor	Agilent	E9323A	MY53070007	3/2/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	AMETEK	XT 15-4	1319A02778	N/A
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3936	7/24/2015
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	7335	3/13/2016
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1359	2/18/2016
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1472	3/5/2016
System Validation Dipole	SPEAG	D835V2	4d002	11/13/2015
System Validation Dipole	SPEAG	D1900V2	5d140	4/14/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	135387	7/8/2015

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5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

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6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 111.5 mm x 46.4 mm Overall Diagonal: 112 mm Display Diagonal: 51 mm
Back Cover	☒ Normal Battery Cover.
Battery Options	☒ Standard – Lithium-ion battery, Rating 3.7Vdc, 3.6Wh

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☒ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☐ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% GPRS: 1 Slot: 12.5% 2 Slots: 25%
	☒ Class A = both simultaneously. Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA	Band V Band II	Rel. 99 RMC 12.2 kbps		100%

6.3. Nominal and Maximum Output Power

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

Upper limit (dB):	-1.5	~	0.5	Max. RF Output Power (dBm)	
RF Air interface	Mode			Target	Max. tune-up tolerance limit
GSM 850	Voice			32.2	**32.7**
GSM 850	GPRS 1 Slot			32.2	**32.7**
GSM 850	GPRS 2 Slot			30.2	**30.7**
GSM 1900	Voice			30.2	**30.7**
GSM 1900	GPRS 1 Slot			30.2	**30.7**
GSM 1900	GPRS 2 Slot			28.2	**28.7**
W-CDMA Band V	Rel. 99 RMC 12.2 kbps			22.7	**23.2**
W-CDMA Band II	Rel. 99 RMC 12.2 kbps			22.2	**22.7**

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7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	

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8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

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Dielectric Property Measurements Results:

SAR Lab F

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/12/2015	Head 835	e'	40.5200	Relative Permittivity (ε_r):	40.52	41.50	-2.36	5
		e''	19.7400	Conductivity (σ):	0.92	0.90	1.83	5
	Head 820	e'	40.7000	Relative Permittivity (ε_r):	40.70	41.60	-2.17	5
		e''	19.8500	Conductivity (σ):	0.91	0.90	0.73	5
	Head 850	e'	40.3000	Relative Permittivity (ε_r):	40.30	41.50	-2.89	5
		e''	19.6300	Conductivity (σ):	0.93	0.92	1.40	5
5/12/2015	Body 835	e'	54.8900	Relative Permittivity (ε_r):	54.89	55.20	-0.56	5
		e''	21.8800	Conductivity (σ):	1.02	0.97	4.73	5
	Body 820	e'	54.9300	Relative Permittivity (ε_r):	54.93	55.28	-0.63	5
		e''	21.8900	Conductivity (σ):	1.00	0.97	3.06	5
	Body 850	e'	54.7100	Relative Permittivity (ε_r):	54.71	55.16	-0.81	5
		e''	21.8900	Conductivity (σ):	1.03	0.99	4.81	5

SAR Lab H

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/12/2015	Body 1900	e'	51.8500	Relative Permittivity (ε_r):	51.85	53.30	-2.72	5
		e''	14.8600	Conductivity (σ):	1.57	1.52	3.28	5
	Body 1850	e'	52.0300	Relative Permittivity (ε_r):	52.03	53.30	-2.38	5
		e''	14.7300	Conductivity (σ):	1.52	1.52	-0.31	5
	Body 1910	e'	51.8000	Relative Permittivity (ε_r):	51.80	53.30	-2.81	5
		e''	14.8800	Conductivity (σ):	1.58	1.52	3.97	5
5/12/2015	Head 1900	e'	38.5700	Relative Permittivity (ε_r):	38.57	40.00	-3.58	5
		e''	13.4700	Conductivity (σ):	1.42	1.40	1.65	5
	Head 1850	e'	38.8300	Relative Permittivity (ε_r):	38.83	40.00	-2.93	5
		e''	13.3800	Conductivity (σ):	1.38	1.40	-1.69	5
	Head 1910	e'	38.4200	Relative Permittivity (ε_r):	38.42	40.00	-3.95	5
		e''	13.4600	Conductivity (σ):	1.43	1.40	2.11	5

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8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

Reference Target SAR Values

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D835V2	4d002	11/13/2014	835	1g	9.23	9.33
				10g	5.99	6.12
D1900V2	5d140	4/14/2015	1900	1g	39.9	39.9
				10g	20.8	21.3

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System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

SAR Lab E

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
5/12/2015	D835V2	4d002	Head	1g	0.956	9.56	9.23	3.58	
				10g	0.626	6.26	5.99	4.51	
5/12/2015	D835V2	4d002	Body	1g	0.886	8.86	9.33	-5.04	1, 2
				10g	0.582	5.82	6.12	-4.90	

SAR Lab H

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
5/12/2015	D1900V2	5d140	Body	1g	4.05	40.5	39.9	1.50	3, 4
				10g	2.10	21.0	21.3	-1.41	
5/12/2015	D1900V2	5d140	Head	1g	3.97	39.7	39.9	-0.50	
				10g	2.03	20.3	20.8	-2.40	

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9. Conducted Output Power Measurements

9.1. GSM

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
850	GSM (Voice)	CS1	1	128	824.2	32.5	23.5
				190	836.6	32.6	23.6
				251	848.8	32.6	23.6
	GPRS (GMSK)	CS1	1	128	824.2	32.4	23.4
				190	836.6	32.5	23.5
				251	848.8	32.5	23.5
			2	128	824.2	30.5	24.5
				190	836.6	30.6	24.6
				251	848.8	30.6	24.6

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Head & Body-worn: GMSK Voice Mode
- Body-worn: GMSK (GPRS) mode with 2 time slots based on the output power measurements above.

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	30.6	21.6
				661	1880.0	30.6	21.6
				810	1909.8	30.5	21.5
	GPRS (GMSK)	CS1	1	512	1850.2	30.6	21.6
				661	1880.0	30.6	21.6
				810	1909.8	30.5	21.5
			2	512	1850.2	28.6	22.6
				661	1880.0	28.6	22.6
				810	1909.8	28.6	22.6

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Head & Body-worn: GMSK Voice Mode
- Body-worn: GMSK (GPRS) mode with 2 time slots based on the output power measurements above.

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9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

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W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	22.2
			9400	1880.0	22.1
			9538	1907.6	22.1
	HSDPA	Subtest 1	9262	1852.4	22.6
			9400	1880.0	22.5
			9538	1907.6	22.5
		Subtest 2	9262	1852.4	22.6
			9400	1880.0	22.4
			9538	1907.6	22.5
		Subtest 3	9262	1852.4	22.6
			9400	1880.0	22.5
			9538	1907.6	22.4
		Subtest 4	9262	1852.4	22.6
			9400	1880.0	22.5
			9538	1907.6	22.4

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Max. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	23.0
			4183	836.6	22.9
			4233	846.6	23.1
	HSDPA	Subtest 1	4132	826.4	21.7
			4183	836.6	21.8
			4233	846.6	21.6
		Subtest 2	4132	826.4	21.7
			4183	836.6	21.7
			4233	846.6	21.9
		Subtest 3	4132	826.4	21.8
			4183	836.6	21.7
			4233	846.6	21.7
		Subtest 4	4132	826.4	21.7
			4183	836.6	21.6
			4233	846.6	21.8

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10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

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10.1. GSM 850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	128	824.2	32.7	32.5	0.685	0.717	
				190	836.6	32.7	32.6	0.845	0.865	
				251	848.8	32.7	32.6	1.000	1.023	
			Left Tilt	190	836.6	32.7	32.6	0.385	0.394	
			Right Touch	128	824.2	32.7	32.5	0.660	0.691	
				190	836.6	32.7	32.6	0.806	0.825	
				251	848.8	32.7	32.6	0.973	0.996	
			Right Tilt	190	836.6	32.7	32.6	0.486	0.497	
Head (VoIP)	GPRS 2 Slots	0	Left Touch	128	824.2	30.7	30.5	0.842	0.882	
				190	836.6	30.7	30.6	1.030	1.054	
				251	848.8	30.7	30.6	1.190	1.218	1
			Left Tilt	190	836.6	30.7	30.6	0.562	0.575	
			Right Touch	128	824.2	30.7	30.5	0.808	0.846	
				190	836.6	30.7	30.6	1.010	1.034	
				251	848.8	30.7	30.6	1.150	1.177	
			Right Tilt	190	836.6	30.7	30.6	0.567	0.580	
Body-worn	Voice	15	Rear	128	824.2	32.7	32.5	0.830	0.869	
				190	836.6	32.7	32.6	0.884	0.905	
				251	848.8	32.7	32.6	0.892	0.913	
			Front	190	836.6	32.7	32.6	0.608	0.622	
Body-worn (VoIP)	GPRS 2 Slots	15	Rear	128	824.2	30.7	30.5	0.866	0.907	
				190	836.6	30.7	30.6	0.953	0.975	
				251	848.8	30.7	30.6	1.000	1.023	2
			Front	128	824.2	30.7	30.5	0.560	0.586	
				190	836.6	30.7	30.6	0.726	0.743	
				251	848.8	30.7	30.6	0.725	0.742	

10.2. GSM 1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Toucg	661	1880.0	30.7	30.6	0.703	0.719	
			Left Tilt	661	1880.0	30.7	30.6	0.115	0.118	
			Right Touch	512	1850.2	30.7	30.6	0.608	0.622	
				661	1880.0	30.7	30.6	0.727	0.744	
				810	1909.8	30.7	30.5	0.822	0.861	
			Right TIlt	661	1880.0	30.7	30.6	0.112	0.115	
Head (VoIP)	GPRS 2 Slots	0	Left Touch	512	1850.2	28.7	28.6	0.651	0.666	
				661	1880.0	28.7	28.6	0.836	0.855	
				810	1909.8	28.7	28.6	0.996	1.019	3
			Left Tilt	661	1880.0	28.7	28.6	0.140	0.143	
			Right Touch	512	1850.2	28.7	28.6	0.707	0.723	
				661	1880.0	28.7	28.6	0.928	0.950	
				810	1909.8	28.7	28.6	0.986	1.009	
			Right Tilt	661	1880.0	28.7	28.6	0.144	0.147	
Body-worn	Voice	15	Rear	661	1880.0	30.7	30.3	0.414	0.459	
			Front	661	1880.0	30.7	30.3	0.200	0.222	
Body-worn (VoIP)	GPRS 2 Slots	15	Rear	661	1880.0	28.7	28.6	0.478	0.489	4
			Front	661	1880.0	28.7	28.6	0.231	0.236	

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10.3. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	0	Left Touch	4132	826.4	23.2	23.0	1.030	1.079	
				4183	836.6	23.2	22.9	1.080	1.157	
				4233	846.6	23.2	23.1	1.190	1.218	5
			Left Tilt	4183	836.6	23.2	22.9	0.551	0.590	
			Right Touch	4132	826.4	23.2	23.0	1.020	1.068	
				4183	836.6	23.2	22.9	1.080	1.157	
				4233	846.6	23.2	23.1	1.160	1.187	
			Right Tilt	4183	836.6	23.2	22.9	0.526	0.564	
Body-worn	Rel 99 RMC 12.2 kbps	15	Rear	4132	826.4	23.2	23.0	0.830	0.869	
				4183	836.6	23.2	22.9	0.897	0.961	6
				4233	846.6	23.2	23.1	0.905	0.926	
			Front	4132	826.4	23.2	23.0	0.707	0.740	
				4183	836.6	23.2	22.9	0.762	0.816	
				4233	846.6	23.2	23.1	0.821	0.840	

10.4. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	0	Left Touch	9262	1852.4	22.7	22.2	0.862	0.967	
				9400	1880.0	22.7	22.1	1.050	1.197	
				9538	1907.6	22.7	22.1	0.998	1.146	
			Left Tilt	9400	1880.0	22.7	22.1	0.151	0.172	
			Right Touch	9262	1852.4	22.7	22.2	0.821	0.921	
				9400	1880.0	22.7	22.1	1.060	1.209	7
				9538	1907.6	22.7	22.1	1.030	1.183	
			Right Tilt	9400	1880.0	22.7	22.1	0.157	0.179	
Body-worn	Rel 99 RMC 12.2 kbps	15	Rear	9262	1852.4	22.7	22.2	0.974	1.093	8
				9400	1880.0	22.7	22.1	0.799	0.911	
				9538	1907.6	22.7	22.1	0.669	0.768	
			Front	9400	1880.0	22.7	22.1	0.314	0.358	

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11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
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 (~ 10% from the 1-g SAR limit).
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.

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
850	W-CDMA	Head	Left Touch	Yes	1.19	1.13	1.05
1900	W-CDMA	Head	Right Touch	Yes	1.06	1.05	1.01

Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

12. Simultaneous Transmission SAR Analysis

N/A

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Appendixes

Refer to separated files for the following appendixes.

A_15I20528v0 SAR Photos & Ant. Locations

B_15I20528v0 SAR System Check Plots

C_15I20528v0 SAR Highest Test Plots

D_15I20528v0 SAR Tissue Ingredients

E_15I20528v0 SAR Probe Cal. Certificates

F_15I20528v0 SAR Dipole Cal. Certificates

END OF REPORT

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