FCC 47 CFR Parts 1 & 2
Published RF Exposure KDB Procedures
IEEE Std 1528-2013

SAR EVALUATION REPORT

For
Tri-Band 1xRTT CDMA with Bluetooth

Model: S3150
FCC ID: V65S3150

Report Number: 13U16201-6

Issue Date: 10/23/2013

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/23/2013	Initial Issue	--

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1. Attestation of Test Results

Applicant	Kyocera Communications	
DUT description	Tri-Band 1xRTT CDMA with Bluetooth	
Model	S3150	
Test device is	An identical prototype	
Device category	Mobile	
Exposure category	General Population/Uncontrolled Exposure	
Date tested	10/07/2013 – 10/15/2013	
The highest reported SAR values	RF exposure condition	Licensed
	Head	1.286 W/kg
	Body-worn Accessory	1.257 W/kg
Applicable Standards	FCC 47 CFR Parts 1 & 2 Published RF Exposure KDB Procedures, and TCB workshop updates IEEE Std 1528-2003 and IEEE Std 1528a-2005	
Test Results	Pass	

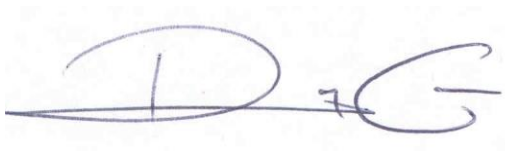
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement 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:

Bobby Bayani
WiSE Engineer
UL Verification Services Inc.

Prepared By:



Roy Chen
WiSE Laboratory Technician
UL Verification Services Inc.

2. Test Methodology

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures, and TCB workshop updates:

- 447498 D01 General RF Exposure Guidance v05r01
- 648474 D04 Handset SAR v01r01
- 941225 D01 SAR test for 3G devices v02
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01
- 865664 D02 SAR Reporting v01r01
- 690783 D01 SAR Listings on Grants v01r02

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

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.

Tissue Dielectric Properties

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/11/2014
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/10/2014
Thermometer	Control Company	4242	122529162	9/19/2014

System Performance Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3546A00784	5/7/2014
Power Meter	HP	437B	3125U12345	3/26/2014
Power Sensor	HP	8481A	1926A16917	8/28/2014
Power Meter	Agilent	N1912A	MY50001018	8/23/21014
Power Sensor	Agilent	E9323A	US40411556	8/9/2014
Amplifier	Sorensen	XT 20-3	1318A00529	N/A
Directional coupler	Werlatone	C8060-102	2711	N/A
DC Power Supply	Ametek	XT 20-3	1318A00530	N/A
E-Field Probe	SPEAG	EX3DV4	3749	1/15/2014
Data Acquisition Electronics	SPEAG	DAE4	1239	4/9/2014
System Validation Dipole	SPEAG	D835V2	4d002	10/24/2014
System Validation Dipole	SPEAG	D1900V2	5d043	11/6/2014

Others

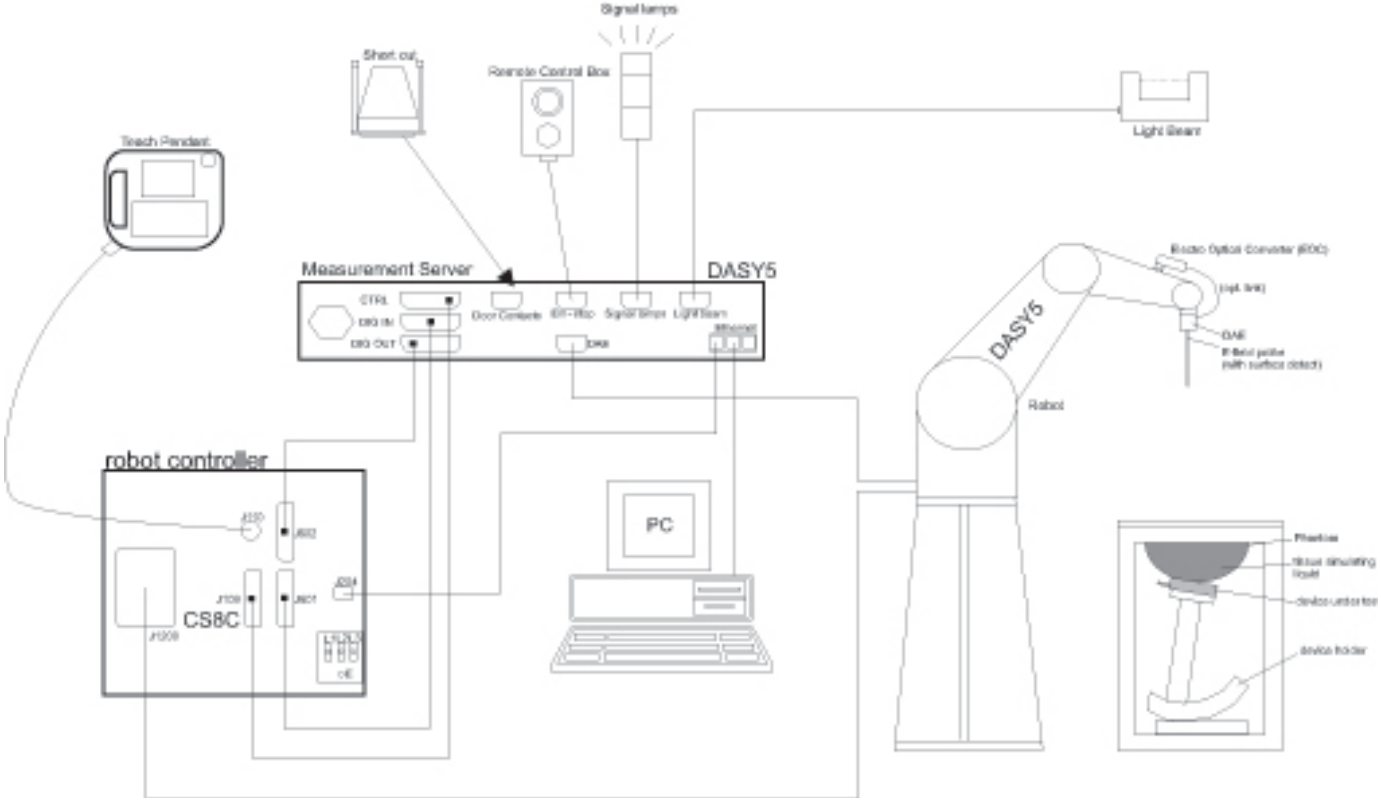
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMU200	106301	7/3/2014

4.2. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 Section 2.8.1., 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 1528-2003 is not required in SAR reports submitted for equipment approval.

5. Measurement System Description and Setup

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.

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

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 v01r01

	≤ 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.	

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 v01r01

			≤ 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.

6.2. Volume Scan Procedures

Step 1: Repeat Step 1-4 in Section 6.1

Step 2: Volume Scan
Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 3: 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.

7. Device Under Test

7.1. General Information

Operating Configuration(s)	Held to head, Body-worn (Voice call)
Device dimensions	Overall (Length x Width): 115 mm x 54 mm Overall – Keyboard Out (Length x Width): 115 mm x 84 mm Overall Diagonal: 120 mm Display Diagonal: 63 mm
Accessory	☒ Headset
Battery Options	☒ Standard – Lithium-ion battery, Rating 3.7V, 4.1 Wh ☐ Extended (large capacity)

7.2. Wireless Technologies

Wireless Technology and Frequency Bands	CDMA: BC 0, BC 1, BC 10 Bluetooth: 2.4 GHz.
Mode	CDMA2000 - ☒ 1xRTT (Voice & Data) - ☐ 1xEVDO Rel. 0 - ☐ 1xEVDO Rev. A - ☐ 1xAdvanced Bluetooth Ver. 2.1 + EDR
Duty Cycle	CDMA: 100%

7.3. Output Power Tune-up Tolerance

Upper limit (dB): 0.7 ~ -0.7		RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
CDMA BC0	1xRTT	24.8	**25.5**
CDMA BC1	1xRTT	24.5	**25.2**
CDMA BC10	1xRTT	24.5	**25.2**

Upper limit (dB): 2.0 ~ -2.0	RF Output Power (dBm)	
RF Air interface	Target	Max. tune-up tolerance limit
Bluetooth	0.5	**2.5**

7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Body-worn Accessory	1. CDMA BC0 + BT 2. CDMA BC1 + BT 3. CDMA BC10 + BT

8. RF Exposure Conditions

Refer to Appendix for “Antenna Locations and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

For WWAN

8.1. Head Exposure Conditions

Test Configurations	SAR Required	Note
Left Touch	Yes	
Left Tilt (15°)	Yes	
Right Touch	Yes	
Right Tilt (15°)	Yes	
Left Touch – Keyboard Out	Yes	
Left Tilt – Keyboard Out (15°)	Yes	
Right Touch – Keyboard Out	Yes	
Right Tilt – Keyboard Out (15°)	Yes	

8.2. Body-worn Accessory Exposure Conditions

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	2mm	Yes	
Front	9.5mm	Yes	
Rear – Keyboard Out	2mm	Yes	
Front – Keyboard Out	0mm	Yes	

9. RF Output Power Measurement

9.1. CDMA

1xRTT Measured Results

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC 0	RC1 SO55 (Loopback)	1013	824.70	24.2
		384	836.52	25.1
		777	848.31	25.1
	RC3 SO55 (Loopback)	1013	824.70	25.1
		384	836.52	25.1
		777	848.31	25.0
	RC3 SO32 (+F-SCH)	1013	824.70	25.1
		384	836.52	25.1
		777	848.31	25.0
BC 1	RC1 SO55 (Loopback)	25	1851.25	24.7
		600	1880.00	24.6
		1175	1908.75	24.7
	RC3 SO55 (Loopback)	25	1851.25	24.7
		600	1880.00	24.6
		1175	1908.75	24.7
	RC3 SO32 (+F-SCH)	25	1851.25	24.7
		600	1880.00	24.6
		1175	1908.75	24.7
BC 10	RC1 SO55 (Loopback)	476	817.9	24.9
		580	820.5	24.9
		684	823.1	25.0
	RC3 SO55 (Loopback)	476	817.9	24.8
		580	820.5	25.0
		684	823.1	25.0
	RC3 SO32 (+F-SCH)	476	817.9	24.8
		580	820.5	24.9
		684	823.1	25.0

9.2. Bluetooth

Maximum tune-up tolerance limit is 2.5 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

Refer to Section 11.4. Standalone SAR Test Exclusion Considerations

10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01

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

10.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

10.2. Tissue Dielectric Parameter Check Results

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.

SAR Lab A

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
10/7/2013	Body 835	e'	54.4000	Relative Permittivity (ϵ_r):	54.40	55.20	-1.45	5
		e"	21.8200	Conductivity (σ):	1.01	0.97	4.44	5
	Body 820	e'	54.4900	Relative Permittivity (ϵ_r):	54.49	55.28	-1.42	5
		e"	21.8400	Conductivity (σ):	1.00	0.97	2.82	5
	Body 850	e'	54.2600	Relative Permittivity (ϵ_r):	54.26	55.16	-1.63	5
		e"	21.7700	Conductivity (σ):	1.03	0.99	4.23	5
10/7/2013	Head 835	e'	40.4900	Relative Permittivity (ϵ_r):	40.49	41.50	-2.43	5
		e"	19.4200	Conductivity (σ):	0.90	0.90	0.18	5
	Head 820	e'	40.6500	Relative Permittivity (ϵ_r):	40.65	41.60	-2.29	5
		e"	19.4500	Conductivity (σ):	0.89	0.90	-1.30	5
	Head 850	e'	40.3000	Relative Permittivity (ϵ_r):	40.30	41.50	-2.89	5
		e"	19.4100	Conductivity (σ):	0.92	0.92	0.26	5
10/7/2013	Body 1900	e'	53.3000	Relative Permittivity (ϵ_r):	53.30	53.30	0.00	5
		e"	14.9600	Conductivity (σ):	1.58	1.52	3.98	5
	Body 1850	e'	53.4700	Relative Permittivity (ϵ_r):	53.47	53.30	0.32	5
		e"	14.8300	Conductivity (σ):	1.53	1.52	0.36	5
	Body 1910	e'	53.2600	Relative Permittivity (ϵ_r):	53.26	53.30	-0.08	5
		e"	14.9800	Conductivity (σ):	1.59	1.52	4.66	5
10/7/2013	Head 1900	e'	39.1200	Relative Permittivity (ϵ_r):	39.12	40.00	-2.20	5
		e"	13.6600	Conductivity (σ):	1.44	1.40	3.08	5
	Head 1850	e'	39.3400	Relative Permittivity (ϵ_r):	39.34	40.00	-1.65	5
		e"	13.5300	Conductivity (σ):	1.39	1.40	-0.59	5
	Head 1910	e'	39.0700	Relative Permittivity (ϵ_r):	39.07	40.00	-2.33	5
		e"	13.6700	Conductivity (σ):	1.45	1.40	3.70	5
10/10/2013	Head 835	e'	40.9100	Relative Permittivity (ϵ_r):	40.91	41.50	-1.42	5
		e"	19.5800	Conductivity (σ):	0.91	0.90	1.01	5
	Head 820	e'	41.1200	Relative Permittivity (ϵ_r):	41.12	41.60	-1.16	5
		e"	19.6100	Conductivity (σ):	0.89	0.90	-0.48	5
	Head 850	e'	40.7200	Relative Permittivity (ϵ_r):	40.72	41.50	-1.88	5
		e"	19.5500	Conductivity (σ):	0.92	0.92	0.98	5
10/10/2013	Head 1900	e'	38.6300	Relative Permittivity (ϵ_r):	38.63	40.00	-3.42	5
		e"	13.4700	Conductivity (σ):	1.42	1.40	1.65	5
	Head 1850	e'	38.8400	Relative Permittivity (ϵ_r):	38.84	40.00	-2.90	5
		e"	13.3400	Conductivity (σ):	1.37	1.40	-1.98	5
	Head 1910	e'	38.5800	Relative Permittivity (ϵ_r):	38.58	40.00	-3.55	5
		e"	13.4900	Conductivity (σ):	1.43	1.40	2.33	5

Tissue Dielectric Parameter Check Results (Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
10/11/2013	Body 835	e'	53.2300	Relative Permittivity (ϵ_r):	53.23	55.20	-3.57	5
		e''	21.7800	Conductivity (σ):	1.01	0.97	4.25	5
	Body 820	e'	53.3900	Relative Permittivity (ϵ_r):	53.39	55.28	-3.41	5
		e''	21.8000	Conductivity (σ):	0.99	0.97	2.63	5
	Body 850	e'	53.0700	Relative Permittivity (ϵ_r):	53.07	55.16	-3.78	5
		e''	21.6900	Conductivity (σ):	1.03	0.99	3.85	5
10/11/2013	Body 1900	e'	51.2400	Relative Permittivity (ϵ_r):	51.24	53.30	-3.86	5
		e''	14.4400	Conductivity (σ):	1.53	1.52	0.36	5
	Body 1850	e'	51.4100	Relative Permittivity (ϵ_r):	51.41	53.30	-3.55	5
		e''	14.3400	Conductivity (σ):	1.48	1.52	-2.95	5
	Body 1910	e'	51.1900	Relative Permittivity (ϵ_r):	51.19	53.30	-3.96	5
		e''	14.4300	Conductivity (σ):	1.53	1.52	0.82	5
10/14/2013	Body 835	e'	53.2800	Relative Permittivity (ϵ_r):	53.28	55.20	-3.48	5
		e''	21.7200	Conductivity (σ):	1.01	0.97	3.96	5
	Body 820	e'	53.4400	Relative Permittivity (ϵ_r):	53.44	55.28	-3.32	5
		e''	21.7500	Conductivity (σ):	0.99	0.97	2.40	5
	Body 850	e'	53.0800	Relative Permittivity (ϵ_r):	53.08	55.16	-3.77	5
		e''	21.6300	Conductivity (σ):	1.02	0.99	3.56	5
10/14/2013	Body 1900	e'	51.4100	Relative Permittivity (ϵ_r):	51.41	53.30	-3.55	5
		e''	14.8800	Conductivity (σ):	1.57	1.52	3.42	5
	Body 1850	e'	51.5900	Relative Permittivity (ϵ_r):	51.59	53.30	-3.21	5
		e''	14.7600	Conductivity (σ):	1.52	1.52	-0.11	5
	Body 1910	e'	51.3800	Relative Permittivity (ϵ_r):	51.38	53.30	-3.60	5
		e''	14.9200	Conductivity (σ):	1.58	1.52	4.25	5

11. System Performance 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 remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

11.1. 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 ± 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm ± 0.5 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.

11.2. Reference SAR Values for System Performance Check

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 (mW/g)		
				1g/10g	Head	Body
D835V2	4d002	10/24/2012	835	1g	9.58	9.48
				10g	6.28	6.26
D1900V2	5d043	11/6/2012	1900	1g	39.9	40.9
				10g	20.9	21.6

11.3. System Performance 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 A

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
10/7/2013	835 MHz	4d002	Head	1g	1.04	1.01	10.1	9.58	5.43	2.88	
				10g	0.703	0.662	6.6	6.28	5.41		
10/7/2013	835 MHz	4d002	Body	1g	1.05	1.01	10.1	9.48	6.54	3.81	1, 2
				10g	0.702	0.662	6.6	6.26	5.75		
10/7/2013	1900 MHz	5d043	Head	1g	4.26	4.19	41.9	39.90	5.01	1.64	3, 4
				10g	2.240	2.17	21.7	20.90	3.83		
10/7/2013	1900 MHz	5d043	Body	1g	4.38	4.31	43.1	40.9	5.38	1.60	
				10g	2.210	2.230	22.3	21.6	3.24		
10/10/2013	835 MHz	4d002	Head	1g	1.02	0.991	9.9	9.58	3.44	2.84	
				10g	0.684	0.648	6.5	6.28	3.18		
10/10/2013	1900 MHz	5d043	Head	1g	4.08	4.05	40.5	39.90	1.50	0.74	
				10g	2.150	2.10	21.0	20.90	0.48		
10/11/2013	835 MHz	4d002	Body	1g	1.02	0.997	10.0	9.48	5.17	2.25	
				10g	0.687	0.658	6.6	6.26	5.11		
10/11/2013	1900 MHz	5d043	Body	1g	4.10	4.11	41.1	40.9	0.49	-0.24	
				10g	2.060	2.110	21.1	21.6	-2.31		
10/14/2013	835 MHz	4d002	Body	1g	1.00	0.970	9.7	9.48	2.32	3.00	
				10g	0.670	0.637	6.4	6.26	1.76		
10/14/2013	1900 MHz	5d043	Body	1g	4.13	4.05	40.5	40.9	-0.98	1.94	
				10g	2.070	2.080	20.8	21.6	-3.70		

12. SAR Test Results

12.1. CDMA BC0

12.1.1. Head Exposure Conditions

Head Exposure Conditions (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1	0.903	0.990	1	
		384	836.52	25.5	25.1	0.835	0.916		
		777	848.31	25.5	25.0	0.810	0.909		
Left Tilt (15°)	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.670	0.735		
		777	848.31	25.5	25.0				1
Right Touch	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1	0.886	0.971		
		384	836.52	25.5	25.1	0.842	0.923		
		777	848.31	25.5	25.0	0.751	0.843		
Right Tilt (15°)	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.642	0.704		
		777	848.31	25.5	25.0				1

Head Exposure Conditions – Keyboard Out (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.558	0.612		
		777	848.31	25.5	25.0				1
Left Tilt (15°)	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.389	0.427		
		777	848.31	25.5	25.0				1
Right Touch	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.447	0.490		
		777	848.31	25.5	25.0				1
Right Tilt (15°)	1xRTT (RC3 SO55)	1013	824.70	25.5	25.1				1
		384	836.52	25.5	25.1	0.367	0.402		
		777	848.31	25.5	25.0				1

Note(s):

1. 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

12.1.2. Body-worn Accessory

Body-worn Accessory (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	1013	824.70	25.5	25.1	1.120	1.228	2	
			1013	824.70	25.5	25.1	0.849	0.931		2
			384	836.52	25.5	25.1	0.901	0.988		
			777	848.31	25.5	25.0	0.583	0.654		
Front	1xRTT (RC3 SO32)	15	1013	824.70	25.5	25.1				1
			384	836.52	25.5	25.1	0.648	0.711		
			777	848.31	25.5	25.0				1

Body-worn Accessory – Keyboard Out (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	1013	824.70	25.5	25.1	0.878	0.963		
			384	836.52	25.5	25.1	0.754	0.827		
			777	848.31	25.5	25.0	0.500	0.561		
Front	1xRTT (RC3 SO32)	15	1013	824.70	25.5	25.1				1
			384	836.52	25.5	25.1	0.601	0.659		
			777	848.31	25.5	25.0				1

Note(s):

1. 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
2. With headset attached. According to KDB 648474 Section 2.3, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

12.2. CDMA BC1

12.2.1. Head Exposure Conditions

Head Exposure Conditions (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7	0.863	0.968		
		600	1880.00	25.2	24.6	0.816	0.937		
		1175	1908.75	25.2	24.7	0.926	1.039		
Left Tilt (15°)	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7				1
		600	1880.00	25.2	24.6	0.410	0.471		
		1175	1908.75	25.2	24.7				1
Right Touch	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7	1.070	1.201		
		600	1880.00	25.2	24.6	1.090	1.251		
		1175	1908.75	25.2	24.7	1.060	1.189		
Right Tilt (15°)	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7				1
		600	1880.00	25.2	24.6	0.422	0.485		
		1175	1908.75	25.2	24.7				1

Head Exposure Conditions – Keyboard Out (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7	0.754	0.846		
		600	1880.00	25.2	24.6	0.876	1.006		
		1175	1908.75	25.2	24.7	0.940	1.055		
Left Tilt (15°)	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7				1
		600	1880.00	25.2	24.6	0.149	0.171		
		1175	1908.75	25.2	24.7				1
Right Touch	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7	0.996	1.118		
		600	1880.00	25.2	24.6	1.120	1.286	3	
		1175	1908.75	25.2	24.7	1.110	1.245		
Right Tilt (15°)	1xRTT (RC3 SO55)	25	1851.25	25.2	24.7				1
		600	1880.00	25.2	24.6	0.180	0.207		
		1175	1908.75	25.2	24.7				1

Note(s):

1. 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

12.2.2. Body-worn Accessory

Body-worn Accessory (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	25	1851.25	25.2	24.7	0.866	0.972		
			600	1880.00	25.2	24.6	0.895	1.028		
			1175	1908.75	25.2	24.7	0.847	0.950		
Front	1xRTT (RC3 SO32)	15	25	1851.25	25.2	24.7				1
			600	1880.00	25.2	24.6	0.570	0.654		
			1175	1908.75	25.2	24.7				1

Body-worn Accessory – Keyboard Out (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	25	1851.25	25.2	24.7				1
			600	1880.00	25.2	24.6	0.667	0.766		
			1175	1908.75	25.2	24.7				1
Front	1xRTT (RC3 SO32)	15	25	1851.25	25.2	24.7	0.918	1.030		
			600	1880.00	25.2	24.6	1.070	1.229		
			1175	1908.75	25.2	24.7	1.120	1.257	4	
			1175	1908.75	25.2	24.7	1.040	1.167		2

Note(s):

1. 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
2. With headset attached. According to KDB 648474 Section 2.3, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

12.3. CDMA BC10

12.3.1. Head Exposure Conditions

Head Exposure Conditions (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.754	0.790	5	
		684	823.1	25.2	25.0				1
Left Tilt (15°)	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.532	0.557		
		684	823.1	25.2	25.0				1
Right Touch	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.747	0.782		
		684	823.1	25.2	25.0				1
Right Tilt (15°)	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.563	0.590		
		684	823.1	25.2	25.0				1

Head Exposure Conditions – Keyboard Out (Voice mode)

Test Position	Mode	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
				Tune-up limit	Meas.	Meas.	Scaled		
Left Touch	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.491	0.514		
		684	823.1	25.2	25.0				1
Left Tilt (15°)	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.317	0.332		
		684	823.1	25.2	25.0				1
Right Touch	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.414	0.434		
		684	823.1	25.2	25.0				1
Right Tilt (15°)	1xRTT (RC3 SO55)	476	817.9	25.2	24.8				1
		580	820.5	25.2	25.0	0.365	0.382		
		684	823.1	25.2	25.0				1

Note(s):

1. 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

12.3.2. Body-worn Accessory

Body-worn Accessory (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	476	817.9	25.2	24.8	1.020	1.118		
			580	820.5	25.2	24.9	1.030	1.104		
			684	823.1	25.2	25.0	1.120	1.173	6	
Front	1xRTT (RC3 SO32)	15	476	817.9	25.2	24.8				1
			580	820.5	25.2	24.9	0.672	0.720		
			684	823.1	25.2	25.0				1

Body-worn Accessory – Keyboard Out (Voice mode)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Rear	1xRTT (RC3 SO32)	15	476	817.9	25.2	24.8	0.792	0.868		
			580	820.5	25.2	24.9	0.786	0.842		
			684	823.1	25.2	25.0	0.811	0.849		
Front	1xRTT (RC3 SO32)	15	476	817.9	25.2	24.8				1
			580	820.5	25.2	24.9	0.583	0.625		
			684	823.1	25.2	25.0				1

Note(s):

1. 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
2. With headset attached. According to KDB 648474 Section 2.3, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

12.4. Bluetooth

12.4.1. Standalone SAR Test Exclusion Considerations

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	Result
(dBm)	(mW)			
2.5	2	10	2.480	0.3

Conclusion:

The computed value is < 3; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

12.4.2. Estimated SAR

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- *(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√$f_{(GHz)}$/x]* W/kg for test separation distances ≤ 50 mm;
  where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Estimated SAR Result for Body-worn Accessory Conditions:

Test Configuration	Max. tune-up tolerance limit (mW)	Min. test separation distance (mm)	Frequency (GHz)	Estimated 1-g SAR (W/kg)
Rear/Front	2	10	2.480	0.042

12.5. SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01r01. 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.

12.5.1. The Highest Measured SAR Configuration in Each Frequency Band

Frequency Band (MHz)	Air Interface	Head (W/kg)	Body-worn Accessory (W/kg)
835	CDMA BC0	0.903	1.120
	CDMA BC10	0.754	1.120
1900	CDMA BC1	1.120	1.120

12.5.2. Repeated Measurement Results

Head Exposure Condition

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
					Original	Repeated	
1900 MHz	Right Touch (KB)	1xRTT (RC3 SO55)	600	1880.00	1.120	1.090	1.03

Body-worn Accessory Exposure Condition

Frequency band	Test Position	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
					Original	Repeated	
835MHz	Rear	1xRTT (RC3 SO32)	1013	824.70	1.120	1.100	1.02

Note(s):

1. 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.

13. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance v05, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

A new threshold of 0.04 is also introduced in the draft KDB. Thus, in order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

13.1. Sum of the SAR for CDMA BC0 & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario		∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		CDMA BC0	Bluetooth		
Body-worn Accessory	Rear	1.228	0.042	1.270	No
	Front	0.711	0.042	0.753	No
Body-worn Accessory (Keyboard Out)	Rear	0.963	0.042	1.005	No
	Front	0.659	0.042	0.701	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

13.2. Sum of the SAR for CDMA BC1 & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario		∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		CDMA BC1	Bluetooth		
Body-worn Accessory	Rear	1.028	0.042	1.070	No
	Front	0.654	0.042	0.696	No
Body-worn Accessory (Keyboard Out)	Rear	0.766	0.042	0.808	No
	Front	1.257	0.042	1.299	No

SAR to Peak Location Separation Ratio (SPLSR)
As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

13.3. Sum of the SAR for CDMA BC10 & BT

RF Exposure conditions	Test Position	Simultaneous Transmission Scenario		∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		CDMA BC10	Bluetooth		
Body-worn Accessory	Rear	1.173	0.042	1.215	No
	Front	0.720	0.042	0.762	No
Body-worn Accessory (Keyboard Out)	Rear	0.868	0.042	0.910	No
	Front	0.625	0.042	0.667	No

14. Appendixes

Refer to separated files for the following appendixes.

14.1. Photos and Antenna Locations

14.2. System Performance Check Plots

14.3. Highest SAR Test Plots

14.4. Calibration Certificate for E-Field Probe EX3DV4 – SN 3749

14.5. Calibration Certificate for D835V2 – SN 4d002

14.6. Calibration Certificate for D1900V2 – SN 5d043

END OF REPORT