



## **SAR EVALUATION REPORT**

**FCC 47 CFR § 2.1093  
IEEE Std 1528-2013**

*For*

**Mobile barcode scanner with Bluetooth connectivity and Contactless reader**

**Contains FCC ID: YRWDATECSBT301  
Model Name: InfineaX7**

**Report Number: 11718294-S1V2  
Issue Date: 3/2/2018**

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NVLAP LAB CODE 200065-0

**Revision History**

Rev.	Date	Revisions	Revised By
V1	3/2/2018	Initial Issue	--
V2	3/13/2018	Revised report based on reviewer's comments: 1. Cover Page and Sec. 1: Updated FCC ID.	Bobby Bayani

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## 1. Attestation of Test Results

Applicant Name	DATECS Ltd.			
Contains FCC ID	YRWDATECSBT301			
Model Name	InfinneaX7			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category	SAR Limits (W/Kg)			
	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	PCE	DTS	NII	DSS
Head	1.161	0.257	0.545	0.486
Body-worn	0.459	0.558	0.734	0.153
Hotspot	0.578	0.558	0.734	N/A
Simultaneous TX	1.578	1.518	1.578	1.578
Date Tested	5/22/2017 to 11/3/2017; 1/31/2018 to 2/2/2018			
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:
	
Devin Chang Senior Test Engineer UL Verification Services Inc.	Florencio Pesigan Laboratory Technician UL Verification Services Inc.

## 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:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D06 Hotspot Mode v02r01

In addition to the above, the following information was used:

- TCB workshop October,2014; Page 37, RF Exposure Procedures Update (Other LTE Considerations)
- TCB workshop October,2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)

## 3. Facilities and Accreditation

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

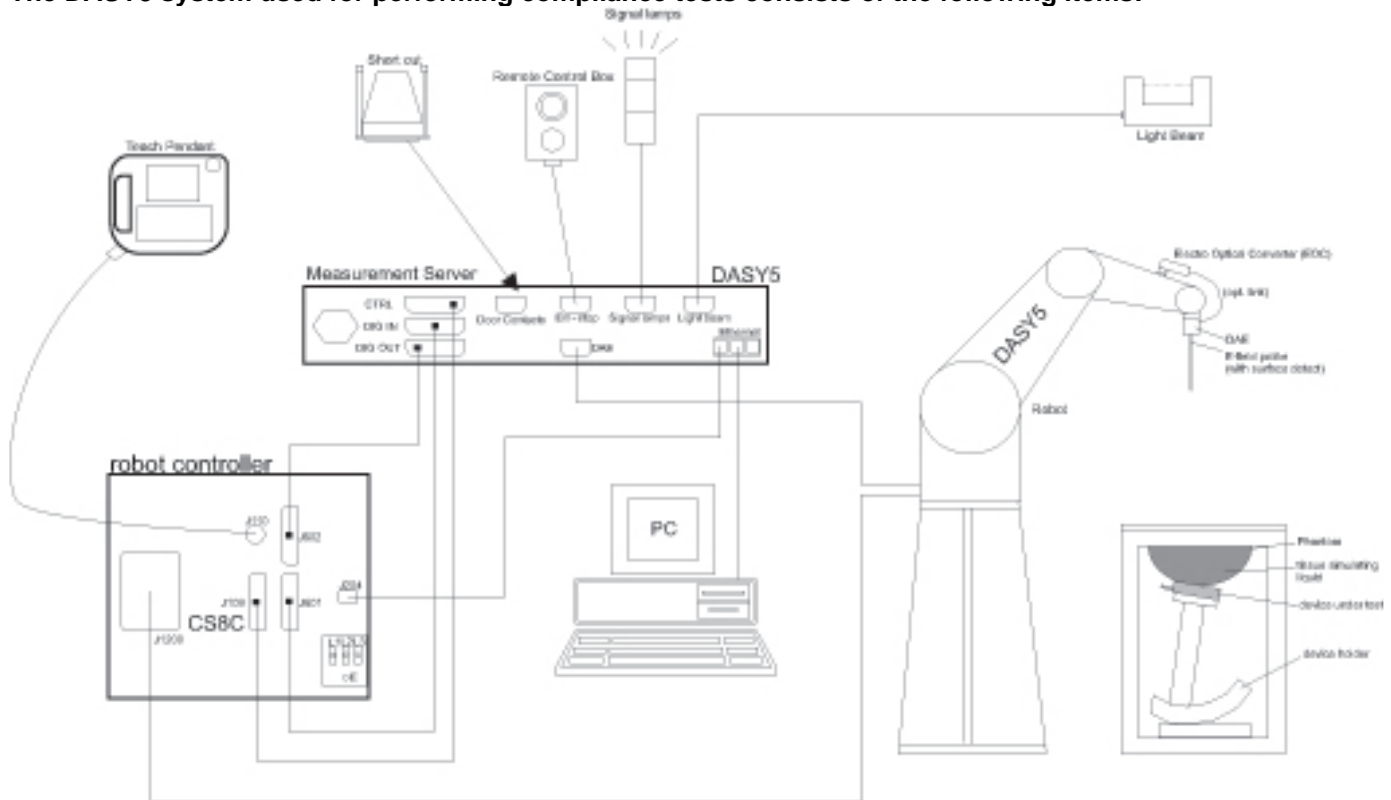
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

## 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.

## 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

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	$\leq 2$ GHz: $\leq 15$ mm $2 - 3$ GHz: $\leq 12$ mm	$3 - 4$ GHz: $\leq 12$ mm $4 - 6$ GHz: $\leq 10$ 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 $\leq$ 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

			$\leq 3$ GHz	$> 3$ GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{\text{Zoom}}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm
Note: $\delta$ 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 <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ 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.



### 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	CCS00922-1C	9/15/2018
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/8/2018
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	12/8/2018

#### System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	5/31/2018
Power Meter	Keysight	N1912A	MY55196008	5/12/2018
Power Sensor	Agilent	N1921A	MY53260001	10/27/2018
Power Sensor	Agilent	N1921A	MY53020038	4/13/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8060-102	2141	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
Synthesized Signal Generator	Agilent	N5181A	MY50140630	5/16/2018
Power Meter	HP	437B	3125U12345	8/10/2018
Power Meter	HP	437B	3125U11347	8/15/2018
Power Sensor	HP	8481A	T233	8/15/2018
Power Sensor	HP	8481A	T269	8/10/2018
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	BK PRECISION	1161	215-02292	N/A

**Lab Equipment**

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	7463	7/5/2018
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1434	4/19/2018
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3991	5/30/2018
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	7335	3/15/2018
Data Acquisition Electronics (SAR Lab B)*	SPEAG	DAE4	1257	9/15/2017
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE4	1380	7/24/2018
E-Field Probe (SAR Lab D)	SPEAG	EX3DV4	7356	4/21/2018
Data Acquisition Electronics (SAR Lab D)	SPEAG	DAE4	1359	2/10/2018
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3773	4/21/2018
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1259	1/20/2018
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3749	1/23/2018
Data Acquisition Electronics (SAR Lab G)*	SPEAG	DAE4	1352	11/11/2017
System Validation Dipole	SPEAG	D750V3	1019	3/13/2018
System Validation Dipole	SPEAG	D835V2	4d142	10/12/2018
System Validation Dipole	SPEAG	D835V2	4d117	5/23/2018
System Validation Dipole	SPEAG	D1750V2	1053	9/18/2018
System Validation Dipole	SPEAG	D1750V2	1077	10/10/2018
System Validation Dipole	SPEAG	D1900V2	5d043	11/29/2018
System Validation Dipole	SPEAG	D1900V2	5d140	4/21/2018
System Validation Dipole	SPEAG	D2300V2	1002	3/10/2018
System Validation Dipole	SPEAG	D2450V2	706	5/9/2018
System Validation Dipole	SPEAG	D2450V2	899	3/10/2018
System Validation Dipole	SPEAG	D2600V2	1006	10/10/2018
System Validation Dipole	SPEAG	D5GHzV2	1138	10/26/2018

**Notes:**

\*Equipment not past due calibration date.

**Other**

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Keysight	N1912A	MY50001018	10/17/2019
Power Sensor	Agilent	N1921A	MY52270022	12/28/2018
Base Station Simulator	R & S	CMW500	135393	5/15/2018

## 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 and the measured 10-g SAR within a frequency band is  $< 3.75$  W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

The InfineaX7 is a mobile barcode scanner with Bluetooth connectivity and contactless reader. The sleeve is designed to operate with an Apple iPhone 7.

Device Dimension	Case Unit with barcode scanner: Overall (Length x Width x Thickness): 167 mm x 84 mm x 27 mm Overall Diagonal: 172 mm Display Diagonal: 144 mm		
Back Cover	<input type="checkbox"/> The rechargeable battery is not user accessible.		
Battery Options	<input type="checkbox"/> The rechargeable battery is not user accessible.		
Test sample information	<b>S/N</b>	<b>IMEI</b>	<b>Notes</b>
	IX7030000070317	N/A	Conducted Sample BT
	IX7030000110317	N/A	Radiated Sample BT
	IX7030000080317	N/A	Radiated Sample RFID
	IX7030000290317	N/A	Radiated Sample RFID
Hardware Version	N/A		
Software Version	N/A		

## 6.2. Wireless Technologies

### Sleeve Device (InfineaX7)

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
Bluetooth	2.4 GHz	Version 2.0 +EDR Basic Rate	N/A
RFID	13.56 MHz	ASK Type A (100%) or ASK Type B (10%)	N/A

### Host Device (FCC ID: BCG-E3085A)

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: <input type="checkbox"/> Class 8 - 1 Up, 4 Down <input checked="" type="checkbox"/> Class 10 - 2 Up, 4 Down <input type="checkbox"/> Class 12 - 4 Up, 4 Down <input type="checkbox"/> Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25%
	Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
CDMA (CDMA2000)	BC0 BC1 BC10	1xRTT (Voice & Data) 1xEV-DO Rel. 0 1xEV-DO Rev. A 1xAdvanced		100%
	Does this device support SV-DO (1xRTT-1xEVDO)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 8) HSPA+ (Rel. 7)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 25 FDD Band 26 FDD Band 27 FDD Band 30 TDD Band 41	QPSK 16QAM <input checked="" type="checkbox"/> Rel. 11 Carrier Aggregation (2 Uplinks and 3 Downlinks), UE Category 10		100% (FDD) 63.3% (TDD) This device supports uplink-downlink configuration 0-6. The configuration with the highest duty cycle was used (config. 0 at 63.3%).
	Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		100%
	Does this device support bands 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
	Does this device support Band gap channel(s)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Bluetooth	2.4 GHz	Version 4.2 LE		77.5% (DH5)

### 6.3. Maximum Output Power from Tune-up Procedure

#### Sleeve Device

RF Air interface	Mode	Max. Avg. RF Output Power
Bluetooth		3.0

#### Host Device

All nominal and maximum output power measurements for WWAN and WLAN are documented in the original SAR report FCC ID: BCG-E3085A.

## 7. RF Exposure Conditions (Test Configurations)

Refer to the original granted SAR report FCC ID: BCG-E3085A for test configurations used during testing of the host device. Baseline measurements were performed on the worst case positions for all bands on the host device and compared to the results reported in the original granted SAR report.

## 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  $\pm 2^\circ\text{C}$  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.

The dielectric constant ( $\epsilon_r$ ) and conductivity ( $\sigma$ ) of typical tissue-equivalent media recipes are expected to be within  $\pm 5\%$  of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for  $\epsilon_r$  and  $\sigma$  may be relaxed to  $\pm 10\%$ . This is limited to frequencies  $\leq 3$  GHz.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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



**Dielectric Property Measurements Results:**

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
A	8/28/2017	Body	835	835	53.52	55.20	-3.04	1.02	0.97	5.05
				805	53.84	55.33	-2.70	0.99	0.97	1.99
				905	52.90	55.00	-3.82	1.09	1.05	3.47
A	8/28/2017	Head	835	835	40.52	41.50	-2.36	0.91	0.90	0.90
				805	40.89	41.68	-1.89	0.88	0.90	-2.15
				905	39.71	41.50	-4.31	0.97	0.97	-0.29
A	9/12/2017	Head	835	835	40.68	41.50	-1.98	0.91	0.90	0.61
				805	41.20	41.68	-1.15	0.88	0.90	-1.88
				905	40.13	41.50	-3.30	0.99	0.97	1.67
A	9/12/2017	Body	835	835	55.63	55.20	0.78	1.00	0.97	3.40
				805	56.06	55.33	1.31	0.98	0.97	1.80
				905	55.36	55.00	0.65	1.09	1.05	3.85
A	10/9/2017	Head	900	900	39.99	41.50	-3.64	1.01	0.97	3.61
				805	41.18	41.68	-1.20	0.90	0.90	0.78
				915	39.85	41.50	-3.98	1.02	0.98	4.08
A	10/9/2017	Body	835	835	53.03	55.20	-3.93	1.01	0.97	4.33
				805	53.34	55.33	-3.60	0.98	0.97	1.28
				905	52.34	55.00	-4.84	1.08	1.05	2.99
A	1/31/2018	Head	835	835	42.06	41.50	1.35	0.88	0.90	-2.13
				805	42.37	41.68	1.66	0.86	0.90	-4.24
				855	41.67	41.50	0.41	0.89	0.92	-2.88
A	1/31/2018	Body	835	835	53.45	55.20	-3.17	0.95	0.97	-2.07
				805	53.63	55.33	-3.08	0.93	0.97	-4.17
				905	52.75	55.00	-4.09	1.01	1.05	-3.75

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
B	5/22/2017	Head	2600	2600	38.59	39.01	-1.08	2.05	1.96	4.53
				2495	38.93	39.14	-0.54	1.92	1.85	4.08
				2690	38.23	38.90	-1.72	2.15	2.06	4.40
B	5/22/2017	Body	2600	2600	52.71	52.51	0.38	2.23	2.16	2.97
				2495	52.99	52.64	0.66	2.10	2.01	4.16
				2690	52.30	52.40	-0.19	2.33	2.29	1.82
B	5/22/2017	Head	2450	2450	38.78	39.20	-1.07	1.88	1.80	4.28
				2400	38.91	39.30	-0.98	1.83	1.75	4.47
				2480	38.69	39.16	-1.21	1.91	1.83	4.12
B	5/22/2017	Body	2450	2450	50.53	52.70	-4.12	2.04	1.95	4.51
				2400	50.64	52.77	-4.04	1.99	1.90	4.58
				2480	50.48	52.66	-4.14	2.06	1.99	3.51
B	5/25/2017	Head	2450	2450	39.46	39.20	0.66	1.86	1.80	3.17
				2400	39.65	39.30	0.90	1.80	1.75	2.93
				2480	39.94	39.16	1.99	1.92	1.83	4.78
B	5/25/2017	Body	2450	2450	52.09	52.70	-1.16	2.04	1.95	4.62
				2400	52.29	52.77	-0.91	1.99	1.90	4.58
				2480	52.10	52.66	-1.07	2.08	1.99	4.61
B	5/25/2017	Head	2300	2300	38.94	39.47	-1.35	1.67	1.66	0.38
				2350	38.77	39.38	-1.56	1.72	1.71	0.84
				2400	38.59	39.30	-1.80	1.77	1.75	1.22
B	5/25/2017	Body	2300	2300	50.79	52.90	-4.00	1.82	1.80	0.69
				2350	50.79	52.84	-3.88	1.88	1.85	1.42
				2400	50.70	52.77	-3.93	1.93	1.90	1.68
B	5/30/2017	Head	2450	2450	39.81	39.20	1.56	1.85	1.80	2.78
				2400	39.94	39.30	1.64	1.80	1.75	2.59
				2480	39.70	39.16	1.37	1.88	1.83	2.38
B	5/30/2017	Body	2450	2450	50.26	52.70	-4.63	2.04	1.95	4.51
				2400	50.36	52.77	-4.57	1.98	1.90	4.16
				2480	50.17	52.66	-4.73	2.07	1.99	3.71
B	5/30/2017	Head	2300	2300	40.33	39.47	2.17	1.70	1.66	1.88
				2350	40.16	39.38	1.97	1.75	1.71	2.42
				2400	39.94	39.30	1.64	1.80	1.75	2.76

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
B	5/30/2017	Body	2300	2300	50.70	52.90	-4.17	1.80	1.80	-0.36
				2350	50.56	52.84	-4.31	1.93	1.85	4.06
				2400	50.36	52.77	-4.57	1.98	1.90	4.32
B	5/30/2017	Head	2600	2600	39.28	39.01	0.69	2.02	1.96	2.85
				2495	39.63	39.14	1.24	1.89	1.85	2.35
				2690	38.90	38.90	0.01	2.13	2.06	3.38
B	5/30/2017	Body	2600	2600	50.09	52.51	-4.61	2.21	2.16	2.05
				2495	50.37	52.64	-4.32	2.07	2.01	2.87
				2690	49.78	52.40	-5.00	2.33	2.29	2.04
B	5/31/2017	Head	1900	1900	38.58	40.00	-3.55	1.46	1.40	4.00
				1850	38.78	40.00	-3.05	1.41	1.40	0.50
				1920	38.50	40.00	-3.75	1.47	1.40	4.93
B	5/31/2017	Body	1900	1900	55.02	53.30	3.23	1.58	1.52	4.21
				1850	55.20	53.30	3.56	1.53	1.52	0.92
				1920	54.96	53.30	3.11	1.60	1.52	5.00
B	6/1/2017	Head	1750	1750	38.86	40.08	-3.06	1.39	1.37	1.83
				1710	39.03	40.15	-2.78	1.35	1.35	0.49
				1755	38.83	40.08	-3.11	1.40	1.37	1.76
B	6/1/2017	Body	1750	1750	51.32	53.44	-3.97	1.55	1.49	4.43
				1710	51.36	53.54	-4.08	1.52	1.46	3.66
				1755	51.32	53.43	-3.95	1.56	1.49	4.42
B	6/2/2017	Head	750	750	40.97	41.96	-2.36	0.89	0.89	-0.36
				695	41.66	42.24	-1.38	0.84	0.89	-5.81
				790	40.53	41.76	-2.94	0.93	0.90	4.00
B	6/2/2017	Body	750	750	54.24	55.55	-2.35	0.95	0.96	-1.31
				695	54.73	55.76	-1.84	0.90	0.96	-6.35
				790	53.95	55.39	-2.60	1.00	0.97	3.00
B	8/21/2017	Body	1900	1900	52.27	53.30	-1.93	1.57	1.52	3.49
				1850	52.39	53.30	-1.71	1.53	1.52	0.86
				1920	52.24	53.30	-1.99	1.59	1.52	4.61
B	8/21/2017	Head	1900	1900	39.15	40.00	-2.13	1.40	1.40	0.07
				1850	39.35	40.00	-1.63	1.35	1.40	-3.29
				1920	39.08	40.00	-2.30	1.42	1.40	1.36
B	9/7/2017	Body	1900	1900	50.85	53.30	-4.60	1.57	1.52	3.03
				1850	50.87	53.30	-4.56	1.53	1.52	0.72
				1920	50.78	53.30	-4.73	1.58	1.52	3.68
B	9/11/2017	Head	750	750	41.45	41.96	-1.22	0.92	0.89	3.25
				695	42.34	42.24	0.23	0.88	0.89	-0.75
				790	40.82	41.76	-2.24	0.95	0.90	6.06
B	9/11/2017	Body	750	750	55.62	55.55	0.13	0.96	0.96	-0.35
				695	56.12	55.76	0.65	0.90	0.96	-5.72
				790	55.49	55.39	0.18	1.00	0.97	3.21
B	11/14/2017	Head	1750	1750	41.29	40.08	3.01	1.33	1.37	-2.55
				1710	41.45	40.15	3.25	1.30	1.35	-3.67
				1755	41.27	40.08	2.98	1.34	1.37	-2.39
B	11/14/2017	Body	1750	1750	51.92	53.44	-2.85	1.49	1.49	0.46
				1710	52.03	53.54	-2.83	1.45	1.46	-0.79
				1755	51.90	53.43	-2.86	1.50	1.49	0.59

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
C	9/7/2017	Head	1900	1900	38.88	40.00	-2.80	1.41	1.40	0.57
				1850	39.30	40.00	-1.75	1.38	1.40	-1.14
				1920	38.94	40.00	-2.65	1.45	1.40	3.43

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
D	8/25/2017	Head	835	835	40.85	41.50	-1.57	0.91	0.90	1.00
				805	41.28	41.68	-0.96	0.89	0.90	-1.26
				905	40.06	41.50	-3.47	0.98	0.97	0.36
D	8/25/2017	Body	835	835	54.80	55.20	-0.72	1.03	0.97	6.19
				805	55.03	55.33	-0.55	1.00	0.97	3.79
				905	54.02	55.00	-1.78	1.10	1.05	4.04

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
E	9/5/2017	Body	5200	5200	49.16	49.02	0.29	5.23	5.29	-1.20
				5300	49.10	48.88	0.44	5.16	5.41	-4.70
				5350	49.27	48.82	0.93	5.34	5.47	-2.39
E	9/5/2017	Body	5800	5800	49.72	48.20	3.15	5.77	6.00	-3.87
				5700	48.96	48.34	1.28	5.80	5.88	-1.34
				5850	48.61	48.20	0.85	6.16	6.00	2.58

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
F	11/16/2017	Head	2300	2300	38.33	39.47	-2.89	1.72	1.66	3.14
				2350	38.11	39.38	-3.24	1.77	1.71	3.71
				2400	37.92	39.30	-3.50	1.83	1.75	4.19

SAR Lab	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity ( $\epsilon_r$ )			Conductivity ( $\sigma$ )		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	9/6/2017	Body	5200	5200	47.03	49.02	-4.06	5.40	5.29	1.99
				5300	46.82	48.88	-4.22	5.52	5.41	1.99
				5700	46.02	48.34	-4.80	6.12	5.88	4.14
				5800	45.88	48.20	-4.81	6.20	6.00	3.33
G	9/6/2017	Head	5200	5200	35.25	35.99	-2.06	4.57	4.65	-1.85
				5150	35.17	36.05	-2.43	4.52	4.60	-1.84
				5350	35.05	35.82	-2.15	4.70	4.80	-2.22
G	9/6/2017	Head	5600	5600	34.68	35.53	-2.40	4.97	5.06	-1.84
				5500	34.81	35.65	-2.35	4.83	4.96	-2.54
				5725	34.47	35.39	-2.60	5.12	5.19	-1.24
G	9/6/2017	Head	5800	5800	34.27	35.30	-2.92	5.17	5.27	-1.95
				5700	34.42	35.42	-2.82	5.09	5.16	-1.37
				5850	34.28	35.30	-2.89	5.26	5.27	-0.28
G	11/13/2017	Body	750	750	55.49	55.55	-0.10	0.99	0.96	2.38
				695	56.03	55.76	0.49	0.93	0.96	-2.61
				790	54.76	55.39	-1.14	1.02	0.97	5.78
G	11/15/2017	Head	750	750	40.87	41.96	-2.60	0.91	0.89	1.74
				695	41.77	42.24	-1.12	0.86	0.89	-3.12
				790	40.48	41.76	-3.06	0.95	0.90	5.94

## 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  $\pm$  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  $\geq$  15.0 cm for SAR measurements  $\leq$  3 GHz and  $\geq$  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.

**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	Date	Tissue Type	Dipole Type _Serial #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
A	8/28/2017	Body	D835V2 SN:4d117	5/22/2018	1.000	10.00	10.39	-3.75	0.659	6.59	6.76	-2.51	
A	8/28/2017	Head	D835V2 SN:4d117	5/22/2018	0.970	9.70	9.43	2.86	0.636	6.36	6.09	4.43	
A	9/12/2017	Head	D835V2 SN:4d117	5/23/2018	0.991	9.91	9.43	5.09	0.648	6.48	6.09	6.40	1,2
A	9/12/2017	Body	D835V2 SN:4d117	5/23/2018	1.010	10.10	10.39	-2.79	0.667	6.67	6.76	-1.33	
A	10/9/2017	Head	D900V2 SN:1d118	5/10/2018	1.110	11.10	10.66	4.13	0.718	7.18	6.88	4.36	3,4
A	10/9/2017	Body	D835V2 SN:4d117	5/23/2018	1.020	10.20	10.39	-1.83	0.672	6.72	6.76	-0.59	
A	1/31/2018	Head	D835V2 SN:4d117	5/23/2018	0.905	9.05	9.43	-4.03	0.596	5.96	6.09	-2.13	
A	1/31/2018	Body	D835V2 SN:4d117	5/23/2018	1.040	10.40	10.39	0.10	0.691	6.91	6.76	2.22	

SAR Lab	Date	Tissue Type	Dipole Type _Serial #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
B	5/22/2017	Head	D2600V2 SN:1006	9/13/2017	5.660	56.60	55.50	1.98	2.490	24.90	25.00	-0.40	
B	5/22/2017	Body	D2600V2 SN:1006	9/13/2017	5.340	53.40	54.20	-1.48	2.350	23.50	24.30	-3.29	
B	5/22/2017	Head	D2450V2 SN:748	2/8/2018	5.100	51.00	52.10	-2.11	2.330	23.30	24.20	-3.72	
B	5/22/2017	Body	D2450V2 SN:748	2/8/2018	5.070	50.70	51.30	-1.17	2.320	23.20	23.90	-2.93	
B	5/25/2017	Head	D2450V2 SN:748	2/8/2018	4.920	49.20	52.10	-5.57	2.220	22.20	24.20	-8.26	5,6
B	5/25/2017	Body	D2450V2 SN:748	2/8/2018	5.000	50.00	51.30	-2.53	2.260	22.60	23.90	-5.44	
B	5/25/2017	Head	D2300V2 SN:1058	8/18/2017	4.890	48.90	50.50	-3.17	2.290	22.90	24.20	-5.37	
B	5/25/2017	Body	D2300V2 SN:1058	8/18/2017	4.870	48.70	48.50	0.41	2.280	22.80	23.50	-2.98	
B	5/30/2017	Head	D2450V2 SN:748	2/8/2018	5.200	52.00	52.10	-0.19	2.350	23.50	24.20	-2.89	
B	5/30/2017	Body	D2450V2 SN:748	2/8/2018	5.410	54.10	51.30	5.46	2.440	24.40	23.90	2.09	
B	5/30/2017	Head	D2300V2 SN:1058	8/18/2017	4.930	49.30	50.50	-2.38	2.310	23.10	24.20	-4.55	
B	5/30/2017	Body	D2300V2 SN:1058	8/18/2017	5.050	50.50	48.50	4.12	2.360	23.60	23.50	0.43	7,8
B	5/30/2017	Head	D2600V2 SN:1006	9/13/2017	5.750	57.50	55.50	3.60	2.510	25.10	25.00	0.40	
B	5/30/2017	Body	D2600V2 SN:1006	9/13/2017	5.130	51.30	54.20	-5.35	2.220	22.20	24.30	-8.64	9,10
B	5/31/2017	Head	D1900V2 SN:5d140	4/19/2018	4.070	40.70	40.80	-0.25	2.080	20.80	21.16	-1.70	
B	5/31/2017	Body	D1900V2 SN:5d140	4/19/2018	4.160	41.60	41.20	0.97	2.130	21.30	21.52	-1.02	
B	6/1/2017	Head	D1750V2 SN:1050	4/18/2018	3.640	36.40	36.76	-0.98	1.930	19.30	19.60	-1.53	
B	6/1/2017	Body	D1750V2 SN:1050	4/18/2018	3.690	36.90	37.68	-2.07	1.950	19.50	19.92	-2.11	11,12
B	6/2/2017	Head	D750V3 SN:1071	11/8/2017	0.855	8.55	8.28	3.26	0.567	5.67	5.43	4.42	13,14
B	6/2/2017	Body	D750V3 SN:1071	11/8/2017	0.873	8.73	8.62	1.28	0.582	5.82	5.73	1.57	
B	8/21/2017	Body	D1900V2 SN:5d140	4/19/2018	4.140	41.40	41.20	0.49	2.130	21.30	21.52	-1.02	
B	8/21/2017	Head	D1900V2 SN:5d140	4/19/2018	3.830	38.30	40.80	-6.13	2.000	20.00	21.16	-5.48	15,16
B	9/7/2017	Body	D1900V2 SN:5d043	11/9/2017	4.230	42.30	39.10	8.18	2.160	21.60	20.70	4.35	17,18
B	9/11/2017	Head	D750V3 SN:1019	3/13/2018	0.885	8.85	8.22	7.66	0.586	5.86	5.39	8.72	19,20
B	9/11/2017	Body	D750V3 SN:1019	3/13/2018	0.890	8.90	8.76	1.60	0.597	5.97	5.80	2.93	
B	11/14/2017	Head	D1750V2 SN:1050	4/18/2018	3.600	36.00	36.76	-2.07	1.910	19.10	19.60	-2.55	
B	11/14/2017	Body	D1750V2 SN:1050	4/18/2018	3.730	37.30	37.68	-1.01	1.980	19.80	19.92	-0.60	

SAR Lab	Date	Tissue Type	Dipole Type _Serial #	Dipole Cal. Due Data	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
C	9/7/2017	Head	D1900V2 SN:5d043	11/9/2017	3.970	39.70	40.00	-0.75	2.020	20.20	20.90	-3.35	21,22
D	8/25/2017	Head	D835V2 SN:4d117	5/23/2018	1.000	10.00	9.43	6.04	0.660	6.60	6.09	8.37	23,24
D	8/25/2017	Body	D835V2 SN:4d117	5/23/2018	0.980	9.80	10.39	-5.68	0.645	6.45	6.76	-4.59	
E	9/5/2017	Body	D5GHzV2 SN:1138 (5.2 GHz)	9/22/2017	7.340	73.40	74.20	-1.08	2.060	20.60	20.90	-1.44	
E	9/5/2017	Body	D5GHzV2 SN:1138 (5.8 GHz)	9/22/2017	6.850	68.50	75.70	-9.51	1.900	19.00	21.10	-9.95	25,26
F	11/16/2017	Head	D2300V2 SN:1058	8/31/2018	5.310	53.10	53.74	-1.19	2.450	24.50	25.31	-3.20	27,28
G	9/6/2017	Body	D5GHzV2 SN:1168 (5.2 GHz)	11/14/2017	7.930	79.30	73.60	7.74	2.240	22.40	20.50	9.27	29,30
G	9/6/2017	Body	D5GHzV2 SN:1168 (5.8 GHz)	11/14/2017	7.810	78.10	73.90	5.68	2.160	21.60	20.50	5.37	
G	9/6/2017	Head	D5GHzV2 SN:1168 (5.2 GHz)	11/14/2017	8.140	81.40	76.80	5.99	2.360	23.60	22.00	7.27	
G	9/6/2017	Head	D5GHzV2 SN:1168 (5.6 GHz)	11/14/2017	8.120	81.20	83.30	-2.52	2.300	23.00	23.80	-3.36	
G	9/6/2017	Head	D5GHzV2 SN:1168 (5.8 GHz)	11/14/2017	7.590	75.90	78.10	-2.82	2.170	21.70	22.20	-2.25	
G	11/13/2017	Body	D750V3 SN:1019	3/13/2018	0.931	9.31	8.76	6.28	0.622	6.22	5.80	7.24	
G	11/15/2017	Head	D750V3 SN:1019	3/13/2018	0.863	8.63	8.22	4.99	0.570	5.70	5.39	5.75	



## 9. Conducted Output Power Measurements

Please refer to Section 10 for the measured output power results alongside SAR measurement results.

## 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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### **KDB 648474 D04 Handset SAR:**

A handset must be tested according to all required SAR test procedures, without the after-market accessory (additional batteries, battery cover and sleeve, etc.), to demonstrate compliance. For handsets with additional batteries, NFC and wireless charging battery covers or similar accessory (sleeve carrier, etc.), the highest reported SAR for each wireless technology (1xRTT, EVDO, WCDMA, GSM, Wi-Fi, etc.), frequency band, operating mode (different modes/configurations within each wireless technology) and applicable exposure condition (head, body-worn accessory, hotspot mode, etc.) without the accessory must be repeated with the specific accessory attached. In addition, for test cases where the measured SAR for a handset without the accessory is greater than 1.2 W/kg, these tests should be repeated with the additional batteries, NFC and wireless charging battery covers or similar accessory.

For third-party accessories, such as sleeves, it is necessary to verify the maximum output power and SAR distribution of the handset test sample without the accessory attached, for each wireless mode and exposure condition in each frequency band, to ensure the test sample is acceptable before testing with the accessory.

All SAR results tested without the accessory attached, when adjusted to 100% duty factor at maximum tune-up tolerance, must be within 15% of those reported in the original equipment certification of the phone and remain compliant before testing with the accessory. The test setup and all relevant information must be clearly explained in the SAR report for the results to be acceptable.

With headset attached, 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

### **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  $\leq \frac{1}{4}$  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  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode

### **KDB 941225 D05 SAR for LTE Devices:**

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is  $> 0.8$  W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are  $> 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth

configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

**KDB 248227 D01 SAR meas for 802.11:**

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- $> 0.4$  W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is  $\leq 0.8$  W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is  $\leq 1.2$  W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

## 10.1. Measured and Reported SAR Results

Technology/ Band	Frequency	RF Exposure Conditions	Test Position	Antenna	Ch. No.	Mode	Test Distance (mm)		Original Reported Values				Baseline with Host Device (1660)			Scaled Baseline SAR vs Original Reported SAR	Host Device + Terminal		Adjusted SAR Reported 1g (W/kg)	Plot No.
							Baseline	Accessory	Tune-up Limit (dBm)	Measured Power (dBm)	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Measured Power (dBm)	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg)		Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg)		
GSM 850	850	Head	Left Touch	UAT	190	GPRS 2 Slots	0mm	0mm	29.5	29.1	0.488	0.535	29.1	0.479	0.525	-2%	0.033	0.036	0.037	
		Hotspot	Edge 2	UAT	190	GPRS 2 Slots	5mm	0mm	29.5	29.1	0.383	0.420	29.1	0.358	0.393	-7%	0.003	0.003	0.003	
		Head	Left Touch	LAT	190	GPRS 2 Slots	0mm	0mm	32.5	32.5	0.592	0.592	31.9	0.439	0.504	-15%	0.045	0.051	0.060	1
		Hotspot	Edge 4	LAT	128	GPRS 2 Slots	5mm	0mm	32.5	32.5	1.160	1.160	31.9	0.855	0.982	-15%	0.048	0.055	0.066	2
GSM 1900	1900	Head	Right Touch	UAT	661	GPRS 2 Slots	0mm	0mm	24.2	24.0	0.998	1.045	24.0	1.080	1.131	8%	0.870	0.911	0.911	3
		Hotspot	Edge 4	UAT	661	GPRS 2 Slots	5mm	0mm	24.2	24.0	0.329	0.345	24.0	0.370	0.387	12%	0.009	0.009	0.009	
		Head	Right Touch	LAT	661	GPRS 2 Slots	0mm	0mm	29.5	29.5	0.553	0.553	29.5	0.499	0.499	-10%	0.146	0.146	0.162	
		Body & Hotspot	Front	LAT	810	GPRS 2 Slots	5mm	5mm	25.5	25.5	1.060	1.060	25.5	0.917	0.917	-13%	0.114	0.114	0.132	4
WCDMA Band V	850	Head	Right Touch	UAT	4183	Rel. 99 RMC 12.2kbps	0mm	0mm	23.0	23.0	0.738	0.738	22.7	0.594	0.636	-14%	0.431	0.462	0.535	5
		Hotspot	Edge 2	UAT	4183	Rel. 99 RMC 12.2kbps	5mm	0mm	23.0	23.0	0.429	0.429	21.5	0.272	0.384	-10%	0.234	0.331	0.369	6
		Head	Left Touch	LAT	4183	Rel. 99 RMC 12.2kbps	0mm	0mm	25.0	25.0	0.556	0.556	23.5	0.336	0.475	-15%	0.022	0.031	0.036	
		Hotspot	Edge 4	LAT	4183	Rel. 99 RMC 12.2kbps	5mm	0mm	25.0	25.0	0.934	0.934	24.0	0.635	0.799	-14%	0.045	0.056	0.065	
WCDMA Band IV	1750	Head	Right Touch	UAT	1513	Rel. 99 RMC 12.2kbps	0mm	0mm	18.0	17.5	0.920	1.032	17.5	0.821	0.921	-11%	0.729	0.818	0.917	7
		Hotspot	Edge 1	UAT	1513	Rel. 99 RMC 12.2kbps	5mm	0mm	21.0	21.0	0.983	0.983	21.0	0.886	0.886	-10%	0.331	0.331	0.367	8
		Head	Right Touch	LAT	1413	Rel. 99 RMC 12.2kbps	0mm	0mm	25.2	25.1	0.895	0.916	25.1	0.780	0.798	-13%	0.032	0.033	0.038	
		Hotspot	Edge 3	LAT	1513	Rel. 99 RMC 12.2kbps	5mm	0mm	19.7	19.7	1.040	1.040	19.7	1.170	1.170	13%	0.043	0.043	0.043	
WCDMA Band II	1900	Head	Right Touch	UAT	9400	Rel. 99 RMC 12.2kbps	0mm	0mm	18.5	18.5	1.050	1.050	18.5	1.140	1.140	9%	0.488	0.488	0.488	9
		Body & Hotspot	Front	UAT	9538	Rel. 99 RMC 12.2kbps	5mm	5mm	21.0	21.0	0.934	0.934	21.0	0.882	0.882	-6%	0.430	0.430	0.455	10
		Head	Right Touch	LAT	9400	Rel. 99 RMC 12.2kbps	0mm	0mm	25.2	25.2	0.984	0.984	25.2	0.844	0.844	-14%	0.154	0.154	0.180	
		Body & Hotspot	Rear	LAT	9538	Rel. 99 RMC 12.2kbps	5mm	0mm	19.5	19.0	0.919	1.031	19.0	0.883	0.991	-4%	0.074	0.083	0.086	
CDMA BC0	850	Head	Left Touch	UAT	384	1xRTT RC3 SO55	0mm	0mm	23.5	23.2	0.864	0.926	22.4	0.615	0.792	-14%	0.771	0.993	1.161	11
		Hotspot	Edge 2	UAT	384	1xRTT RC3 SO32	5mm	0mm	23.5	23.2	0.520	0.557	22.4	0.377	0.486	-13%	0.391	0.504	0.578	12
		Head	Left Touch	LAT	384	1xRTT RC3 SO55	0mm	0mm	25.0	25.0	0.398	0.398	25.0	0.340	0.340	-15%	0.042	0.042	0.049	
		Body & Hotspot	Front	LAT	384	1xRTT RC3 SO32	5mm	5mm	25.0	25.0	0.632	0.632	25.0	0.568	0.568	-10%	0.042	0.042	0.047	
CDMA BC1	1900	Head	Right Touch	UAT	1175	1xRTT RC3 SO55	0mm	0mm	18.5	18.5	1.080	1.080	18.5	1.000	1.000	-7%	0.994	0.994	1.074	13
		Body & Hotspot	Front	UAT	600	1xRTT RC3 SO32	5mm	5mm	21.0	20.8	0.903	0.946	20.8	0.780	0.817	-14%	0.302	0.316	0.366	
		Head	Right Touch	LAT	1175	1xRTT RC3 SO55	0mm	0mm	25.2	25.2	0.844	0.844	25.2	0.836	0.836	-1%	0.529	0.529	0.534	
		Hotspot	Edge 3	LAT	1175	1xRTT RC3 SO32	5mm	0mm	19.5	19.0	0.942	1.057	19.0	1.040	1.167	10%	0.398	0.447	0.447	14
CDMA BC10	850	Head	Left Touch	UAT	580	1xRTT RC3 SO55	0mm	0mm	23.5	23.5	0.781	0.781	22.5	0.712	0.896	15%	0.709	0.893	0.893	15
		Hotspot	Edge 2	UAT	580	1xRTT RC3 SO32	5mm	0mm	23.5	23.5	0.456	0.456	22.5	0.326	0.410	-10%	0.332	0.418	0.464	16
		Head	Left Touch	LAT	580	1xRTT RC3 SO55	0mm	0mm	25.0	25.0	0.271	0.271	25.0	0.269	0.269	-1%	0.099	0.099	0.100	
		Hotspot	Edge 4	LAT	580	1xRTT RC3 SO32	5mm	0mm	25.0	25.0	0.471	0.471	24.0	0.362	0.456	-3%	0.178	0.224	0.232	
LTE Band 4	1750	Head	Right Touch	UAT	20300	QPSK RB 1,49 20MHz BW	0mm	0mm	18.0	17.9	1.070	1.095	17.9	1.070	1.095	0%	0.492	0.503	0.503	17
		Hotspot	Edge 1	UAT	20175	QPSK RB 1,49 20MHz BW	5mm	0mm	21.0	21.0	1.000	1.000	20.5	0.827	0.928	-7%	0.200	0.224	0.242	18
		Head	Right Touch	LAT	20300	QPSK RB 1,49 20MHz BW	0mm	0mm	24.5	24.5	0.870	0.870	23.5	0.586	0.738	-15%	0.061	0.077	0.091	
		Hotspot	Edge 3	LAT	20300	QPSK RB 1,49 20MHz BW	5mm	0mm	19.7	19.7	1.140	1.140	19.7	1.180	1.180	4%	0.038	0.038	0.038	
LTE Band 7	2500	Head	Left Tilt	UAT	20850	QPSK RB 50,24 20MHz BW	0mm	0mm	15.3	15.0	0.952	1.020	15.0	0.888	0.952	-7%	0.413	0.443	0.474	19
		Body & Hotspot	Front	UAT	21100	QPSK RB 1,49 20MHz BW	5mm	5mm	18.7	18.4	0.904	0.969	18.4	0.801	0.858	-11%	0.290	0.311	0.351	
		Head	Left Touch	LAT	21350	QPSK RB 1,49 20MHz BW	0mm	0mm	23.5	23.5	1.030	1.030	23.5	0.968	0.968	-6%	0.174	0.174	0.185	
		Body & Hotspot	Front	LAT	21350	QPSK RB 1,49 20MHz BW	5mm	5mm	17.7	17.7	1.140	1.140	17.7	1.100	1.100	-4%	0.362	0.362	0.375	20
LTE Band 12	750	Head	Right Touch	UAT	23095	QPSK RB 1,24 10MHz BW	0mm	0mm	23.5	23.5	0.574	0.574	23.5	0.541	0.541	-6%	0.398	0.398	0.422	21
		Hotspot	Edge 2	UAT	23095	QPSK RB 1,24 10MHz BW	5mm	0mm	23.5	23.5	0.348	0.348	22.9	0.259	0.297	-15%	0.361	0.414	0.485	22
		Head	Left Touch	LAT	23095	QPSK RB 1,24 10MHz BW	0mm	0mm	24.5	24.5	0.290	0.290	24.5	0.254	0.254	-12%	0.032	0.032	0.037	
		Hotspot	Edge 4	LAT	23095	QPSK RB 1,24 10MHz BW	5mm	0mm	24.5	24.5	0.455	0.455	24.5	0.518	0.518	14%	0.056	0.056	0.056	
LTE Band 13	750	Head	Right Touch	UAT	23230	QPSK RB 1,24 10MHz BW	0mm	0mm	23.5	23.1	0.672	0.737	22.0	0.470	0.664	-10%	0.269	0.380	0.422	23
		Body & Hotspot	Front	UAT	23230	QPSK RB 1,24 10MHz BW	5mm	5mm	23.5	23.1	0.429	0.470	23.1	0.390	0.428	-9%	0.160	0.175	0.193	24
		Head	Left Touch	LAT	23230	QPSK RB 1,24 10MHz BW	0mm	0mm	24.5	24.5	0.355	0.355	24.5	0.383	0.383	8%	0.076	0.076	0.076	
		Hotspot	Edge 4	LAT	23230	QPSK RB 1,24 10MHz BW	5mm	0mm	24.5	24.5	0.838	0.838	24.5	0.838	0.838	0%	0.076	0.076	0.076	
LTE Band 25	1900	Head	Right Touch	UAT	26590	QPSK RB 1,49 20MHz BW	0mm	0mm	18.5	18.5	1.080	1.080	18.5	1.160	1.160	7%	0.647	0.647	0.647	25
		Hotspot	Edge 4	UAT	26590	QPSK RB 1,49 20MHz BW	5mm	0mm	21.0	20.9	0.974	0.997	20.9	0.916	0.937	-6%	0.093	0.095	0.101	
		Head	Right Touch	LAT	26590	QPSK RB 1,49 20MHz BW	0mm	0mm	24.5	24.5	0.965	0.965	24.5	0.885	0.885	-8%	0.128	0.128	0.140	
		Hotspot	Edge 3	LAT	26590	QPSK RB 1,49 20MHz BW	5mm	0mm	19.5	19.3	1.050	1.099	19.3	1.140	1.194	9%	0.118	0.124	0.124	26
LTE Band 26	850	Head	Right Touch	UAT	26865	QPSK RB 1,24 10MHz BW	0mm	0mm	22.5	22.5	0.572	0.572	22.5	0.504	0.504	-12%	0.329	0.329	0.373	27
		Body & Hotspot	Rear	UAT	26865	QPSK RB 1,24 10MHz BW	5mm	0mm	22.5	22.5	0.435	0.435	21.5	0.315	0.397	-9%	0.154	0.194	0.213	28
		Head	Left Touch	LAT	26865	QPSK RB 1,24 10MHz BW	0mm	0mm	24.0	24.0	0.385	0.385	22.5	0.249	0.352	-9%	0.046	0.065	0.071	
		Hotspot	Edge 4	LAT	26740	QPSK RB 1,24 10MHz BW	5mm	0mm	24.0	23.5	0.751	0.843	22.4	0.495	0.715	-15%	0.046	0.066	0.078	

**Measured and Reported SAR Results (continued):**

Technology/ Band	Frequency	RF Exposure Conditions	Test Position	Antenna	Ch. No.	Mode	Test Distance (mm)		Original Reported Values				Baseline with Host Device (1569)			Scaled Baseline SAR	Host Device + Terminal		Adjusted SAR Reported 1g (W/kg)	Plot No.
							Baseline	Accessory	Tune-up Limit (dBm)	Measured Power (dBm)	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Measured Power (dBm)	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg)	Original Reported SAR	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg)		
LTE Band 30	2300	Head	Right Touch	UAT	27710	QPSK RB 1,24 10MHz BW	0mm	0mm	15.5	15.5	1.090	1.090	15.5	0.945	0.945	-13%	0.453	0.453	0.523	29
		Body & Hotspot	Front	UAT	27710	QPSK RB 50,0 10MHz BW	5mm	5mm	17.5	17.4	0.922	0.943	17.4	0.786	0.804	-15%	0.382	0.391	0.459	30
		Head	Right Tilt	LAT	27710	QPSK RB 1,24 10MHz BW	0mm	0mm	22.3	22.3	0.424	0.424	21.0	0.268	0.362	-15%	0.008	0.011	0.013	
		Body & Hotspot	Front	LAT	27710	QPSK RB 1,24 10MHz BW	5mm	5mm	18.3	18.3	1.110	1.110	18.3	0.954	0.954	-14%	0.190	0.190	0.221	
LTE Band 41	2600	Head	Left Touch	UAT	39750	QPSK RB 1,49 20MHz BW	0mm	0mm	17.5	17.5	1.080	1.080	17.5	1.010	1.010	-6%	0.510	0.510	0.545	31
		Body & Hotspot	Front	UAT	40620	QPSK RB 1,49 20MHz BW	5mm	5mm	20.5	19.7	0.613	0.737	19.7	0.588	0.707	-4%	0.335	0.403	0.420	32
		Head	Left Touch	LAT	40620	QPSK RB 1,49 20MHz BW	0mm	0mm	22.5	22.5	0.535	0.535	22.5	0.591	0.591	10%	0.057	0.057	0.057	
		Body & Hotspot	Front	LAT	40620	QPSK RB 1,49 20MHz BW	5mm	5mm	19.5	19.5	1.060	1.060	19.5	0.978	0.978	-8%	0.170	0.170	0.184	
Wi-Fi 2.4GHz	2450	Head	Left Tilt	Chain 0	6	802.11g Cell ON MIMO	0mm	0mm	10.3	10.3	0.329	0.329	10.3	0.327	0.327	-1%	0.095	0.095	0.096	33
		Body & Hotspot	Front	Chain 0	6	802.11b Cell ON SISO	5mm	5mm	13.3	13.2	0.391	0.400	13.2	0.377	0.386	-4%	0.198	0.203	0.210	34
		Head	Right Touch	Chain 1	6	802.11b Cell ON SISO	0mm	0mm	18.0	18.0	0.179	0.179	18.0	0.202	0.202	13%	0.042	0.042	0.042	
		Body & Hotspot	Front	Chain 1	6	802.11b Cell ON SISO	5mm	5mm	13.0	13.0	0.249	0.249	13.0	0.255	0.255	2%	0.177	0.177	0.177	
		Head	Right Tilt	Chain 0	9	802.11g Cell OFF MIMO	0mm	0mm	15.5	15.5	1.170	1.170	15.5	1.170	1.170	0%	0.257	0.257	0.257	35
		Body & Hotspot	Front	Chain 0	6	802.11b Cell OFF SISO	5mm	5mm	17.5	17.0	0.916	1.028	17.0	0.988	1.109	8%	0.497	0.558	0.558	36
		Head	Right Touch	Chain 1	6	802.11b Cell OFF SISO	0mm	0mm	19.0	19.0	0.215	0.215	19.0	0.224	0.224	4%	0.043	0.043	0.043	
		Body & Hotspot	Front	Chain 1	6	802.11b Cell OFF SISO	5mm	5mm	19.0	19.0	0.748	0.748	19.0	0.739	0.739	-1%	0.355	0.355	0.359	
Wi-Fi 5GHz	5000	Head	Right Touch	Chain 0	42	802.11ac VHT80 SISO Cell ON	0mm	0mm	6.0	5.9	0.182	0.186	5.9	0.207	0.212	14%	0.123	0.126	0.126	
		Body & Hotspot	Front	Chain 0	42	802.11ac VHT80 SISO Cell ON	5mm	5mm	13.8	13.8	0.334	0.334	13.8	0.295	0.295	-12%	0.170	0.170	0.192	
		Head	Right Touch	Chain 1	159	802.11n HT40 MIMO Cell ON	0mm	0mm	19.0	19.0	0.244	0.244	19.0	0.212	0.212	-13%	0.216	0.216	0.249	37
		Body & Hotspot	Front	Chain 1	42	802.11ac VHT80 SISO Cell ON	5mm	5mm	11.0	11.0	0.240	0.240	11.0	0.241	0.241	0%	0.236	0.236	0.236	38
		Head	Right Touch	Chain 0	42	802.11ac VHT80 SISO Cell OFF	0mm	0mm	13.8	13.8	1.190	1.190	13.8	1.080	1.080	-9%	0.495	0.495	0.545	39
		Body & Hotspot	Front	Chain 0	155	802.11ac VHT80 SISO Cell OFF	5mm	5mm	16.8	16.4	1.090	1.195	16.4	1.150	1.261	6%	0.299	0.328	0.328	
		Head	Right Touch	Chain 1	138	802.11ac VHT80 MIMO Cell OFF	0mm	0mm	19.0	19.0	0.288	0.288	19.0	0.264	0.264	-8%	0.278	0.278	0.303	
		Body & Hotspot	Front	Chain 1	46	802.11n HT40 SISO Cell OFF	5mm	5mm	18.0	18.0	1.150	1.150	18.0	1.160	1.160	1%	0.734	0.734	0.734	40
Bluetooth	2450	Head	Right Touch	Chain 0	39	GFSK, P <sub>high</sub>	0mm	0mm	12.0	11.6	0.221	0.242	11.6	0.239	0.262	8%	0.117	0.128	0.128	41
		Body	Front	Chain 0	39	GFSK, P <sub>high</sub>	5mm	5mm	12.0	11.6	0.193	0.212	11.6	0.174	0.191	-10%	0.068	0.075	0.083	42
		Head	Right Touch	Chain 0	39	GFSK, P <sub>low</sub>	0mm	0mm	10.0	9.9	0.146	0.149	9.9	0.142	0.145	-3%	0.064	0.066	0.068	
		Body	Front	Chain 0	39	GFSK, P <sub>low</sub>	5mm	5mm	10.0	9.9	0.085	0.087	9.9	0.083	0.085	-3%	0.042	0.043	0.044	
		Head	Left Touch	Chain 0	39	GFSK, P <sub>standalone</sub>	0mm	0mm	16.5	16.5	0.688	0.688	16.5	0.700	0.700	2%	0.486	0.486	0.486	43
		Body	Front	Chain 0	39	GFSK, P <sub>standalone</sub>	5mm	5mm	16.5	16.5	0.335	0.335	16.5	0.307	0.307	-8%	0.140	0.140	0.153	44

**Notes:**

- When the *reported* SAR of the test sample measured without accessory (sleeve) attached is equal to or higher than the *reported* SAR of the same test configuration in the original equipment certification filing, the measured SAR of the test sample with accessory (sleeve) attached is used as the reported SAR result of the test configuration.
- When the *reported* SAR of the test sample measured without accessory (sleeve) attached is lower than the *reported* SAR of the same test configuration in the original equipment certification filing, adjust the *reported* SAR of the test sample with accessory (sleeve) attached by the ratio of *reported* SAR in the original filing to the *reported* SAR of the test sample without the accessory (sleeve) attached as the SAR result of the test configuration.

## 10.2. Bluetooth (Sleeve)

### Standalone SAR Test Exclusion Considerations & Estimated SAR

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ , for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f(\text{GHz})$  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  $\leq 50$  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.

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:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}]$  W/kg for test separation distances  $\leq 50$  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.

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
3.0	2	5	2.480	0.6	Head and Body-w orn	0.1

#### **Conclusion:**

\*: The computed value is  $\leq 3$ ; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

## 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  $< 0.8$  or  $2 \text{ W/kg}$  (1-g or 10-g respectively); steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.8$  or  $2 \text{ W/kg}$  (1-g or 10-g respectively), 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  $3$  (1-g or 10-g respectively) or when the original or repeated measurement is  $\geq 1.45$  or  $3.6 \text{ W/kg}$  ( $\sim 10\%$  from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is  $\geq 1.5$  or  $3.75 \text{ W/kg}$  (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$  or  $3$  (1-g or 10-g respectively).

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Antenna	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated	
							Measured SAR (W/kg)	Largest to Smallest SAR Ratio
750	LTE Band 12	Head	Right Touch	UAT	No	0.398	N/A	N/A
	LTE Band 13	Head	Right Touch	UAT	No	0.269	N/A	N/A
850	GSM 850	Hotspot	Edge 4	LAT	No	0.048	N/A	N/A
	CDMA BC0	Head	Left Touch	UAT	No	0.771	N/A	N/A
	CDMA BC10	Head	Left Touch	UAT	No	0.709	N/A	N/A
	WCDMA Band V	Head	Right Touch	UAT	No	0.431	N/A	N/A
	LTE Band 26	Head	Right Touch	UAT	No	0.329	N/A	N/A
1900	GSM 1900	Head	Right Touch	UAT	No	0.870	N/A	N/A
	CDMA BC1	Head	Right Touch	UAT	Yes	0.994	0.996	1.00
	WCDMA Band II	Head	Right Touch	UAT	No	0.488	N/A	N/A
	LTE Band 25	Head	Right Touch	UAT	No	0.647	N/A	N/A
1700	LTE Band 4	Head	Right Touch	UAT	No	0.492	N/A	N/A
	WCDMA Band IV	Head	Right Touch	UAT	No	0.729	N/A	N/A
2300	LTE Band 30	Head	Right Touch	UAT	No	0.453	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Body	Front	Chain 0	No	0.497	N/A	N/A
	BT	Head	Right Touch	Chain 0	No	0.486	N/A	N/A
2500	LTE Band 7	Head	Left Tilt	UAT	No	0.445	N/A	N/A
2600	LTE Band 41	Head	Left Touch	UAT	No	0.547	N/A	N/A
5200	Wi-Fi 802.11a/n/ac	Body	Front	Chain 1	No	0.734	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	Chain 1	No	0.278	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Body	Front	Chain 0	No	0.299	N/A	N/A

### Note(s):

Repeated Measurement is not required since there is no measured value  $> 0.8 \text{ W/kg}$ .

## 12. Simultaneous Transmission SAR Analysis

### 12.1. Sum of the SAR for Host device & Sleeve device (BT)

#### UAT

RF Exposure conditions	Host Device with Sleeve Attached				Sleeve			
	① WWAN	② DTS	① + ② WWAN + DTS		④ BT	① + ② + ④ WWAN + DTS + BT		
			∑ 1g SAR (mW/g)	SPLSR (Yes/ No)		∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	
Head	1.161	0.257	1.418	No	0.1	1.518	No	
Body-w or n & Hotspot	0.578	0.558	1.136	No	0.1	1.236	No	
RF Exposure conditions	Host Device with Sleeve Attached				Sleeve			
	① WWAN	③ BT (P <sub>High</sub> )	① + ③ WWAN + BT		④ BT	① + ③ + ④ WWAN + BT + BT		
			∑ 1g SAR (mW/g)	SPLSR (Yes/ No)		∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	
Head	1.161	0.128	1.289	No	0.1	1.389	No	
Body-w or n & Hotspot	0.578	0.083	0.661	No	0.1	0.761	No	
RF Exposure conditions	Host Device with Sleeve Attached					Sleeve		
	① WWAN	② U-NII (Cell on)	③ BT (P <sub>Low</sub> )	① + ② + ③ WWAN + U-NII + BT		④ BT	① + ② + ③ + ④ WWAN + U-NII + BT + BT	
				∑ 1g SAR (mW/g)	SPLSR (Yes/ No)		∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	1.161	0.249	0.068	1.478	No	0.1	1.578	No
Body-w or n & Hotspot	0.578	0.236	0.044	0.858	No	0.1	0.958	No

#### LAT

RF Exposure conditions	Host Device with Sleeve Attached				Sleeve			
	① WWAN	② DTS	① + ② WWAN + BT		④ BT	① + ② + ④ WWAN + DTS + BT		
			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	
Head	0.534	0.257	0.791	No	0.1	0.891	No	
Body-worn & Hotspot	0.447	0.558	1.005	No	0.1	1.105	No	
RF Exposure conditions	Host Device with Sleeve Attached				Sleeve			
	① WWAN	③ BT (P <sub>High</sub> )	① + ③ WWAN + BT		④ BT	① + ③ + ④ WWAN + BT + BT		
			Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	
Head	0.534	0.128	0.662	No	0.1	0.762	No	
Body-worn & Hotspot	0.447	0.083	0.530	No	0.1	0.630	No	
RF Exposure conditions	Host Device with Sleeve Attached				Sleeve			
	① WWAN	② U-NII (Cell Off)	③ BT (P <sub>High</sub> )	① + ② + ③ WWAN + U-NII + BT		④ BT	① + ② + ③ + ④ WWAN + U-NII + BT + BT	
				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.534	0.545	0.128	1.207	No	0.1	1.307	No
Body-worn & Hotspot	0.447	0.734	0.083	1.264	No	0.1	1.364	No

#### Note(s):

- Host device for DTS & Bluetooth cannot transmit simultaneously.



## **Appendixes**

**Refer to separated files for the following appendixes.**

**11718294-S1V1 Appendix A: SAR Setup Photos**

**11718294-S1V1 Appendix B: System Check Plots**

**11718294-S1V1 Appendix C: Highest SAR Test Plots**

**11718294-S1V1 Appendix D: SAR Liquid Tissue Ingredients**

**11718294-S1V1 Appendix E: SAR Probe Calibration Certificates**

**11718294-S1V1 Appendix F: SAR Dipole Calibration Certificates**

**END OF REPORT**