FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE Std 1528-2003

SAR EVALUATION REPORT

For
Tablet with GSM/GPRS/EDGE/WCDMA, 802.11bgn, BT3.0

Model: GT-P3100B
FCC ID: A3LGTP3100B

Report number: 12I14351-2A
Issue Date: 4/20/2012

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/13/2012	Initial Issue	--
A	4/20/2012	Corrected section 7.3 to indicate that hotspot mode is supported. Updated note in 7.2 to clarify hotspot test rationale Corrected section 13 GSM head SAR results to indicate voice mode Added a note in section 13 to explain the differences in SAR values between A3LGTP3100B and A3LGTP3100	Dave Weaver

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1. Attestation of Test Results

Applicant	Samsung Electronics Co., Ltd.		
DUT description	Tablet with GSM/GPRS/EDGE/WCDMA, 802.11bgn, BT3.0		
Model	GT-P3100B IMEI: 004999010640000/01		
Test device is	An identical prototype		
Device category	Portable devices		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	3/22/2012 –3/27/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	0.504 W/kg (Head: Right Touch) 0.757 W/kg (Body: Rear with 0 mm distance)	1.6 W/kg
24	1850-1910 MHz	0.693W/kg (Head: Right Tilt) 0.790 W/kg (Body: Edge 1 with 5 mm distance)	
15.247	2412-2462 MHz	0.054 W/kg (Head: SAR in flat phantom) 0.563 W/kg (Body: Rear with 0 mm distance)	
Simultaneous transmission condition:		1.320 W/kg (The highest SAR across exposure conditions)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528-2003			Pass

Compliance Certification Services, Inc. (UL CCS) 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 For UL CCS By:

Dave Weaver
Staff Engineer
Compliance Certification Services (UL CCS)

Tested By:

Elijah Garcia
SAR Engineer
Compliance Certification Services (UL CCS)

2. Test Methodology

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE Std 1528-2003 and the following KDBs Procedures.

- 447498 D01 Mobile Portable RF Exposure v04
- 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05
- 941225 D01 SAR test for 3G devices v02
- 941225 D02 Guidance for 3GPP R6 and R7 HSPA v02v01
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 248227 D01 SAR meas for 802 11abg v01r02
- 941225 D06 Hot Spot SAR v01

3. Facilities and Accreditation

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

UL CCS 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 utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Base Station Simulator	R & S	CMU 200	106291	6	24	2012
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Synthesized Signal Generator	HP	83732B	US34490599	5	3	2013
E-Field Probe	SPEAG	EX3DV3	3531	12	19	2012
Thermometer	ERTCO	639-1S	1718	7	19	2012
Data Acquisition Electronics	SPEAG	DAE4	1259	2	13	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	15	2012
System Validation Dipole	SPEAG	D1900V2	5d043	11	10	2012
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
Power Meter	HP	437B	3125U16345	5	13	2012
Power Sensor	HP	8481A	2702A60780	5	13	2012
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

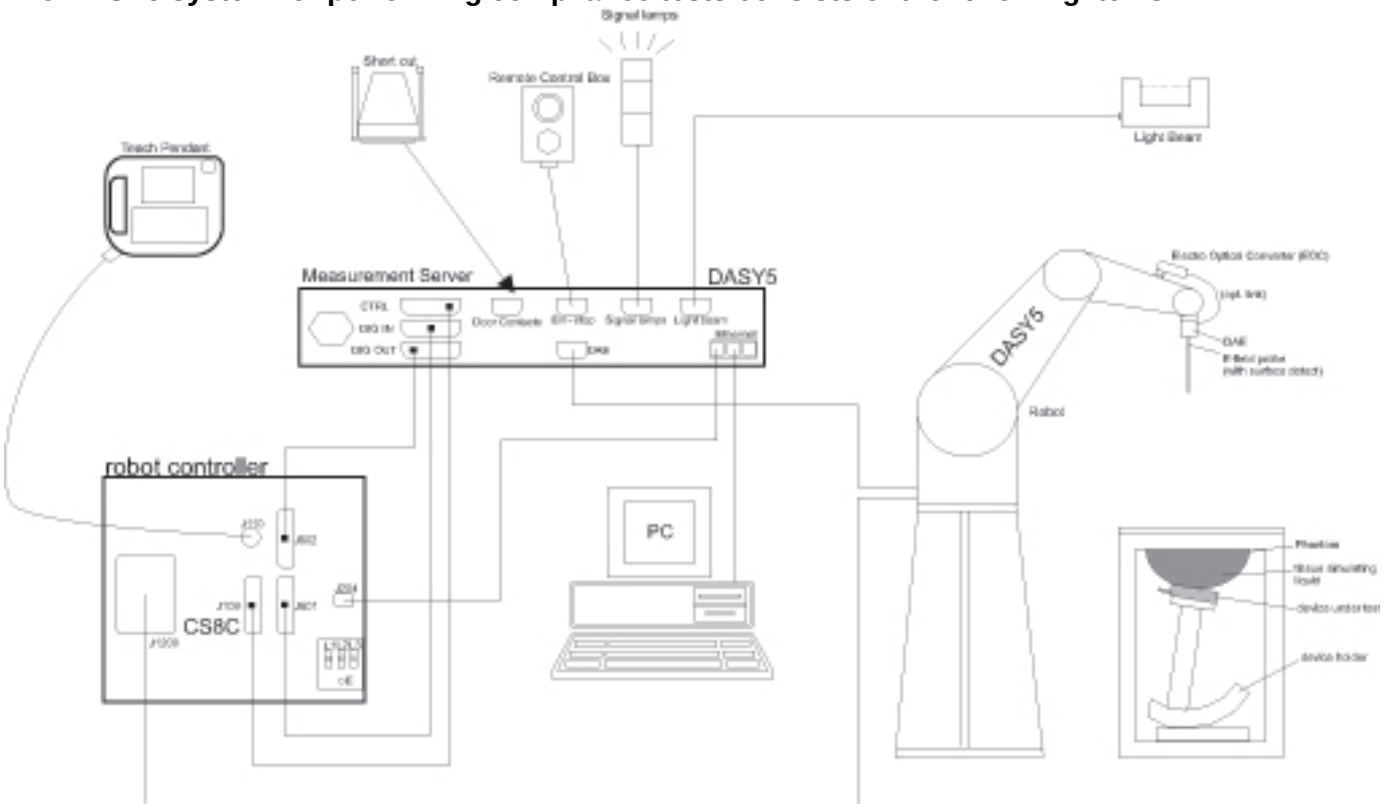
4.2. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	**6.00**	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	-4.30	Normal	1	0.64	-2.75
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	3.29	Normal	1	0.6	1.97
				Combined Standard Uncertainty Uc(y) =	10.31
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 20.62 %	
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.63 dB	

5. Measurement System Description and Setup

The DASY5 system 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.
- Data acquisition electronics (DAE) which performs the signal amplification, 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 Procedures

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.

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 ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points 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.

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: 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.

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 ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points 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.

Step 4: 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 5: 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

Tablet with GSM/GPRS/EDGE/WCDMA, 802.11bgn, BT3.0 Model: GT-P3100B	
Mode of operation:	Held to head Body Bottom face Edges (Edge 1, 2, 3, and 4): Multiple display orientations supporting both portrait and landscape configurations
Device dimensions (mm):	193.7 x 122.4 x 10.5 (length x width x height)

7.1. Band and Air Interlaces

Air Interfaces:	GSM, GPRS, EGPRS 850/1900 MHz WCDMA (Rel 99), HSDPA, HSPA, HSPA+ (DL: 64QAM, UL: QPSK) 850/1900 MHz WiFi: 802.11bgn: 2.4GHz Bluetooth: 2.4 GHz
Uplink Modulations:	GSM Modes: GMSK, 8PSK UMTS Modes: BPSK, QPSK WiFi: 802.11bgn: 2.4GHz, Bluetooth: Ver 3.0
GPRS Multi-Slot Class:	12
GPRS Class:	B
DTM Class:	Not supported

7.2. Simultaneous Transmission Conditions

No	Simultaneous Transmission	Head	Body	Hot-spot
1	GSM voice + WiFi 2.4 GHz	☒	☒	☐
2	WCDMA Voice + WiFi 2.4 GHz	☒	☒	☐
3	GSM voice + BT	☒	☒	☐
4	WCDMA Voice + BT	☒	☒	☐
5	GPRS/EGPRS + WiFi 2.4 GHz	☐	☒	☒
6	WCDMA/HSPA + WiFi 2.4 GHz	☐	☒	☒

Note(s):

As the tablet has been assessed in accordance with KDB 447498, which has more conservative measurement distances than KDB 941225, further assessment in accordance with KDB 941225 is judged unnecessary. This is also in accordance with FCC training provided in October 2011 (TCBC Workshop) which indicates that hotspot mode KDB procedures are not intended for larger tablets.

7.3. Hotspot (Wireless router) Exposure Condition

The device is capable of personal hotspot mode. The hotspot mode can be enabled by the user.

7.4. Power Sensor

The following sensors (functioning as proximity sensor) are used for power reduction.

- Grip sensor 1: Covers the Rear and Top-edge (Edge 1) of the DUT.
- Grip sensor 2: Covers the Rear of the DUT
- 1 IR sensor: Covers the front, located adjacent to receiver at the front of the DUT.

7.5. Power Reduction Implementation

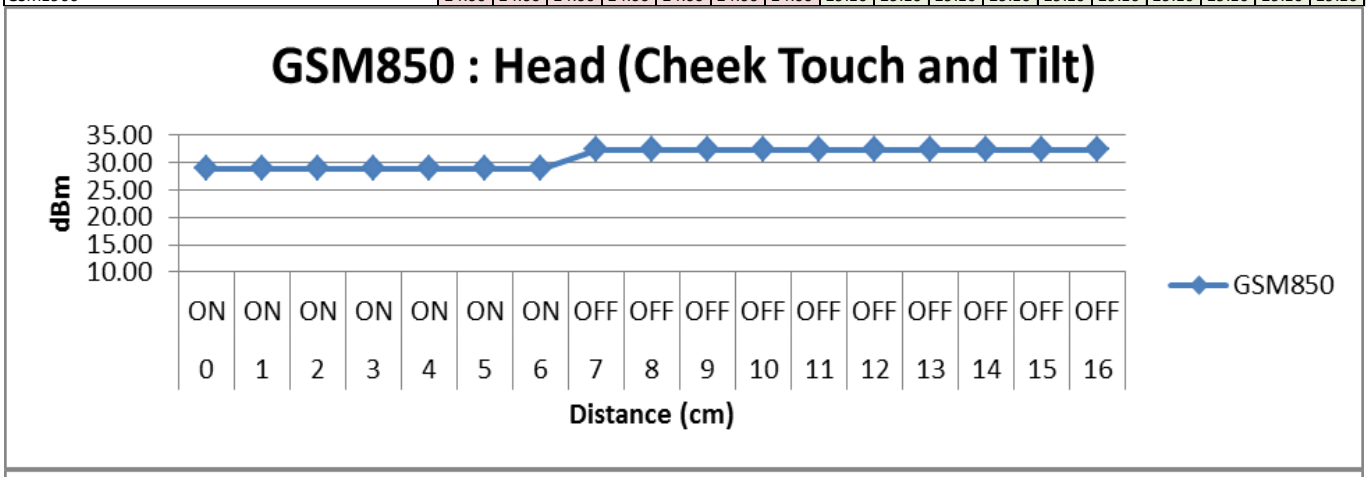
Trigger distances are:

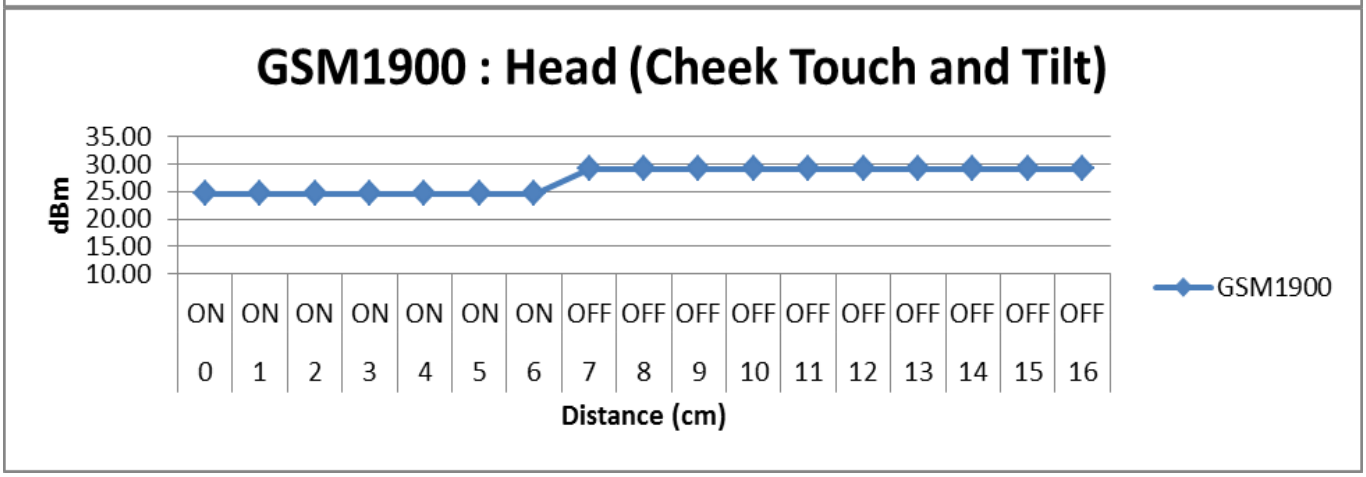
- Grip sensor 1: 8 mm from Rear and 5 mm from Top-edge (Edge 1) of the DUT
- Grip sensor 2: 8 mm from Rear of the DUT
- IR sensor: 60 mm from front of the DUT

Both Grip and IR sensors have the same levels of power reduction.

7.6. Summary Table of Power Reduction dB Levels per Mode & Band

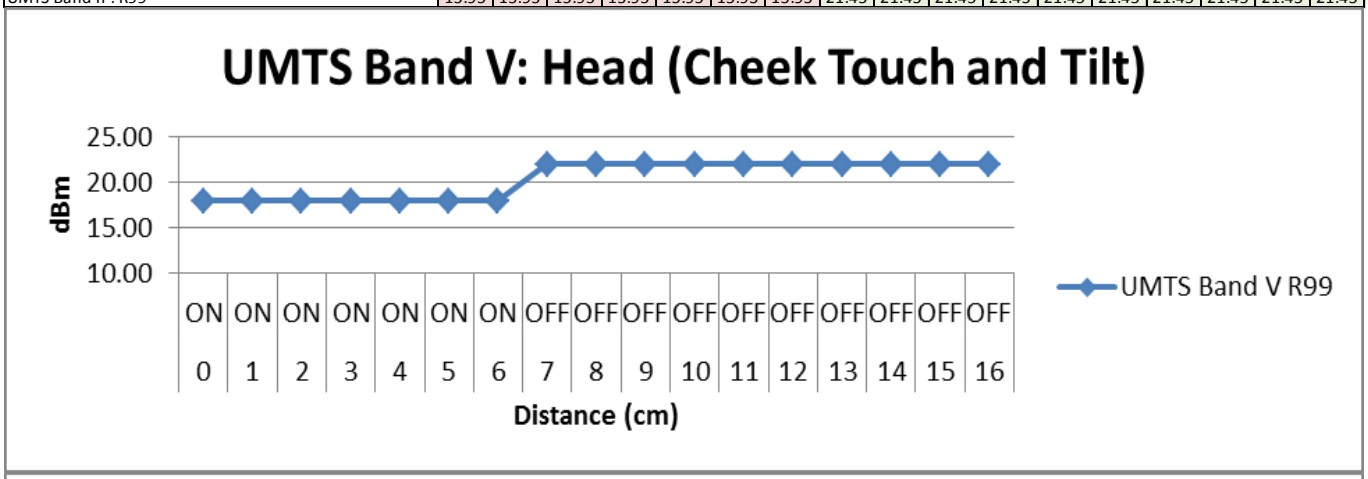
Head (Cheek Touch and Tilt)																	
Distance (cm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IR Sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
GSM850	28.83	28.83	28.83	28.83	28.83	28.83	28.83	32.33	32.33	32.33	32.33	32.33	32.33	32.33	32.33	32.33	32.33
GSM1900	24.60	24.60	24.60	24.60	24.60	24.60	24.60	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10

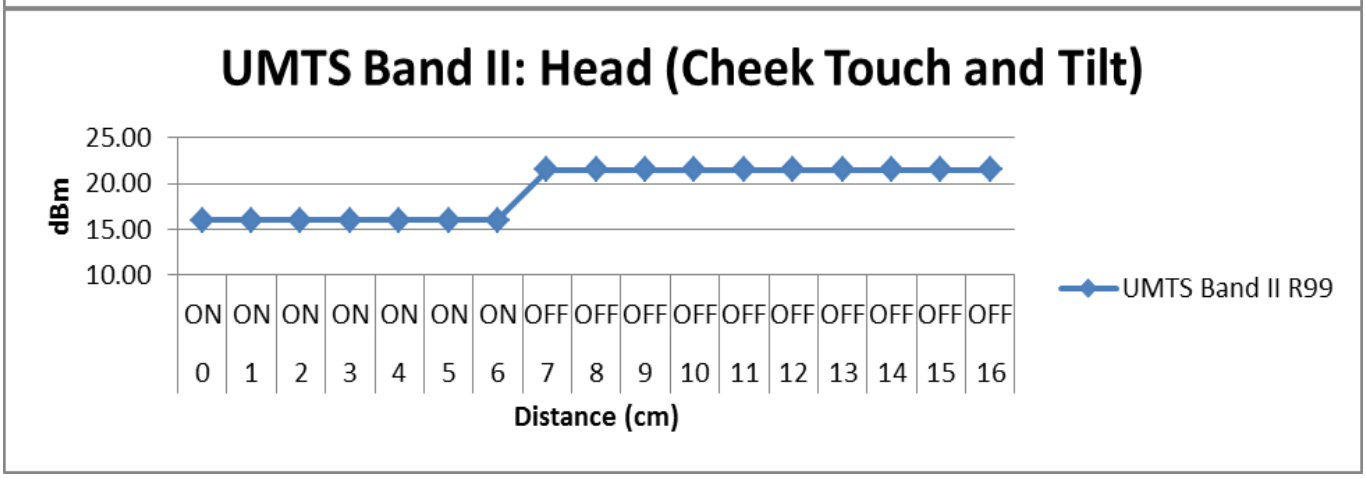




Summary Table of Power Reduction dB Levels per Mode & Band (continued)

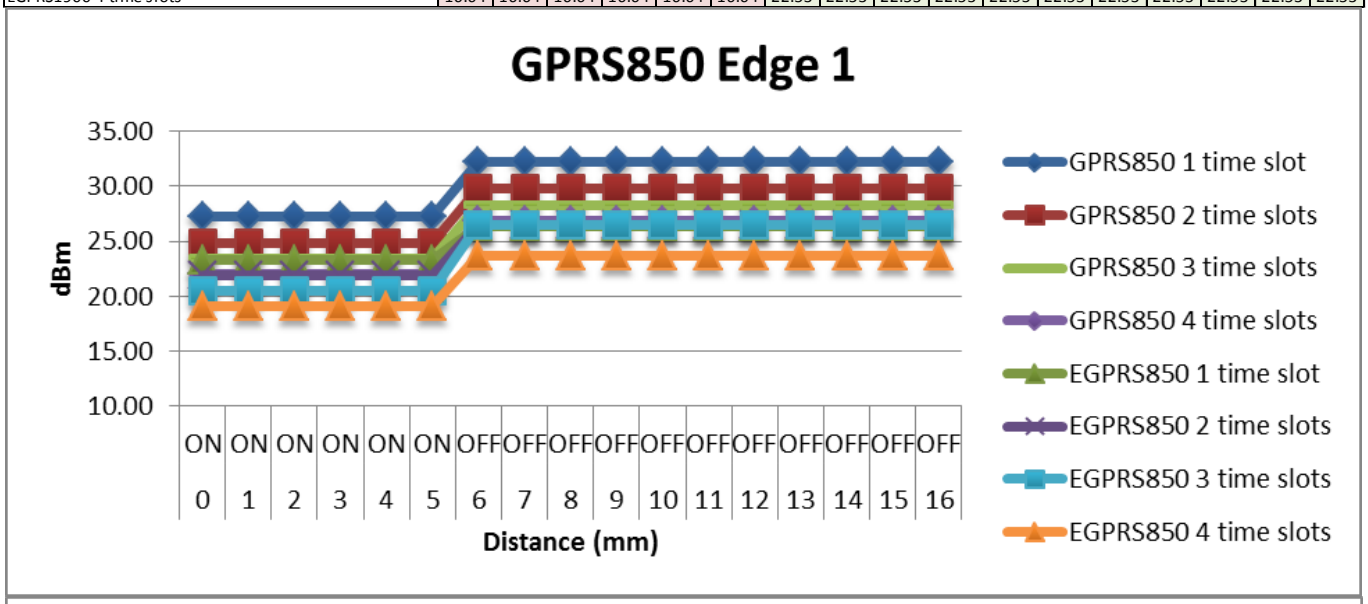
Head (Cheek Touch and Tilt)																	
Distance (cm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IR Sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
UMTS Band V : R99	18.00	18.00	18.00	18.00	18.00	18.00	18.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
UMTS Band II : R99	15.95	15.95	15.95	15.95	15.95	15.95	15.95	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45

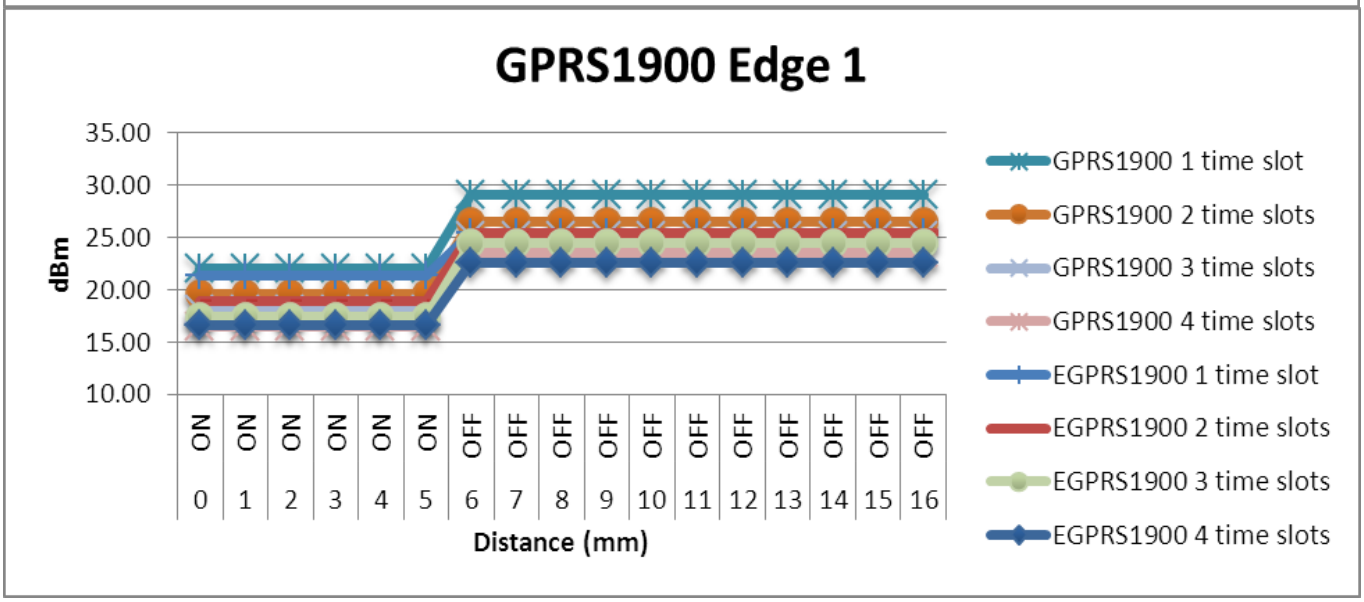




Summary Table of Power Reduction dB Levels per Mode & Band (continued)

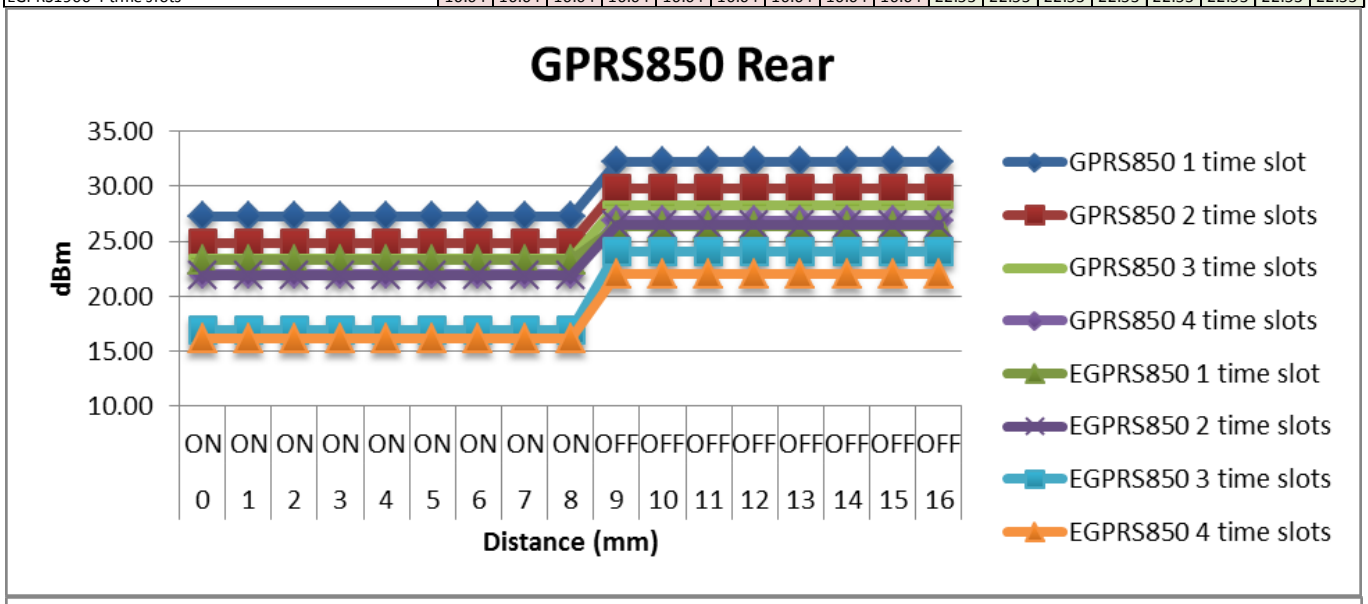
Edge 1																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
GPRS850 1 time slot	27.21	27.21	27.21	27.21	27.21	27.21	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17
GPRS850 2 time slots	24.88	24.88	24.88	24.88	24.88	24.88	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81
GPRS850 3 time slots	23.46	23.46	23.46	23.46	23.46	23.46	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32
GPRS850 4 time slots	21.97	21.97	21.97	21.97	21.97	21.97	26.91	26.91	26.91	26.91	26.91	26.91	26.91	26.91	26.91	26.91	26.91
EGPRS850 1 time slot	23.30	23.30	23.30	23.30	23.30	23.30	26.35	26.35	26.35	26.35	26.35	26.35	26.35	26.35	26.35	26.35	26.35
EGPRS850 2 time slots	21.93	21.93	21.93	21.93	21.93	21.93	26.44	26.44	26.44	26.44	26.44	26.44	26.44	26.44	26.44	26.44	26.44
EGPRS850 3 time slot	20.43	20.43	20.43	20.43	20.43	20.43	26.46	26.46	26.46	26.46	26.46	26.46	26.46	26.46	26.46	26.46	26.46
EGPRS850 4 time slots	19.06	19.06	19.06	19.06	19.06	19.06	23.63	23.63	23.63	23.63	23.63	23.63	23.63	23.63	23.63	23.63	23.63
GPRS1900 1 time slot	22.08	22.08	22.08	22.08	22.08	22.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08
GPRS1900 2 time slots	19.55	19.55	19.55	19.55	19.55	19.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55
GPRS1900 3 time slots	18.08	18.08	18.08	18.08	18.08	18.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08
GPRS1900 4 time slots	16.53	16.53	16.53	16.53	16.53	16.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53
EGPRS1900 1 time slot	21.35	21.35	21.35	21.35	21.35	21.35	25.34	25.34	25.34	25.34	25.34	25.34	25.34	25.34	25.34	25.34	25.34
EGPRS1900 2 time slots	18.86	18.86	18.86	18.86	18.86	18.86	25.47	25.47	25.47	25.47	25.47	25.47	25.47	25.47	25.47	25.47	25.47
EGPRS1900 3 time slots	17.46	17.46	17.46	17.46	17.46	17.46	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
EGPRS1900 4 time slots	16.64	16.64	16.64	16.64	16.64	16.64	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53

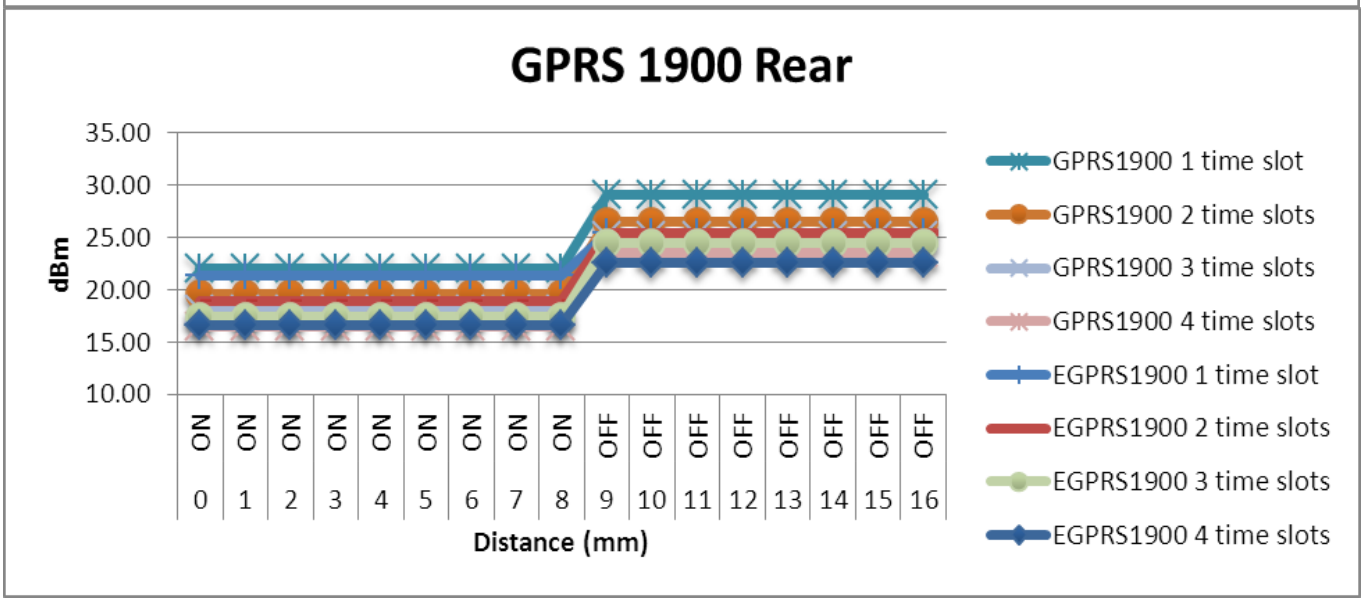




Summary Table of Power Reduction dB Levels per Mode & Band (continued)

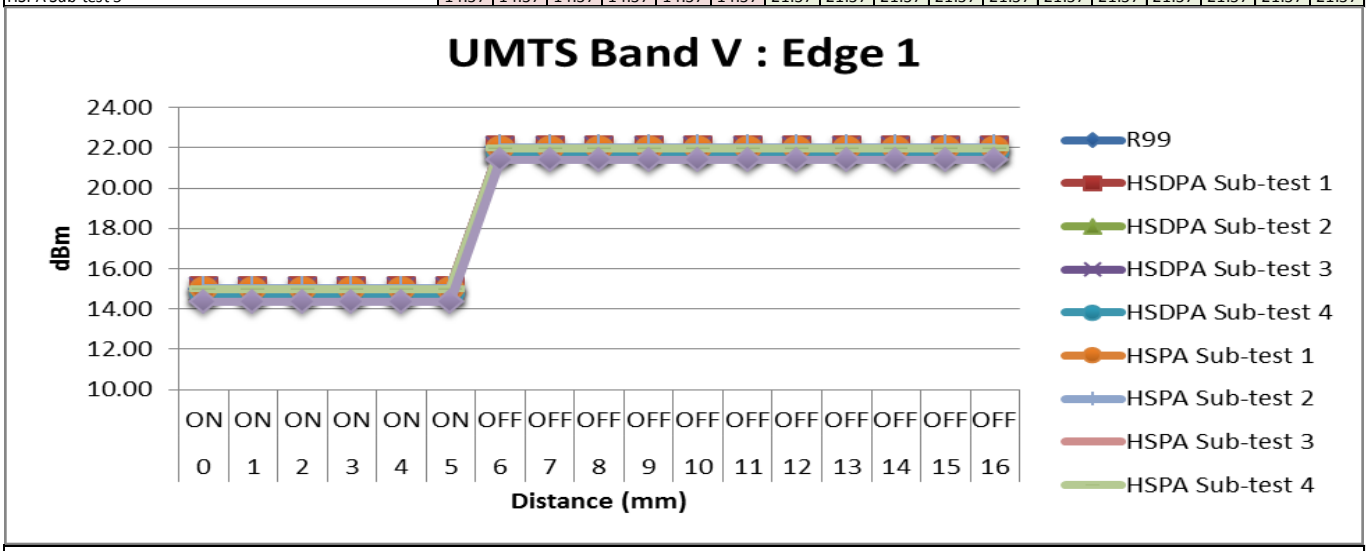
Rear/Base																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
GPRS850 1 time slot	27.21	27.21	27.21	27.21	27.21	27.21	27.21	27.21	27.21	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17
GPRS850 2 time slots	24.88	24.88	24.88	24.88	24.88	24.88	24.88	24.88	24.88	29.81	29.81	29.81	29.81	29.81	29.81	29.81	29.81
GPRS850 3 time slots	23.46	23.46	23.46	23.46	23.46	23.46	23.46	23.46	23.46	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32
GPRS850 4 time slots	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	26.91	26.91	26.91	26.91	26.91	26.91	26.91	26.91
EGPRS850 1 time slot	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	26.35	26.35	26.35	26.35	26.35	26.35	26.35	26.35
EGPRS850 2 time slots	21.93	21.93	21.93	21.93	21.93	21.93	21.93	21.93	21.93	26.44	26.44	26.44	26.44	26.44	26.44	26.44	26.44
EGPRS850 3 time slot	20.43	20.43	20.43	20.43	20.43	20.43	20.43	20.43	20.43	26.46	26.46	26.46	26.46	26.46	26.46	26.46	26.46
EGPRS850 4 time slots	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	19.06	23.63	23.63	23.63	23.63	23.63	23.63	23.63	23.63
GPRS1900 1 time slot	22.08	22.08	22.08	22.08	22.08	22.08	22.08	22.08	22.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08	29.08
GPRS1900 2 time slots	19.55	19.55	19.55	19.55	19.55	19.55	19.55	19.55	19.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55
GPRS1900 3 time slots	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08	25.08
GPRS1900 4 time slots	16.53	16.53	16.53	16.53	16.53	16.53	16.53	16.53	16.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53
EGPRS1900 1 time slot	21.35	21.35	21.35	21.35	21.35	21.35	21.35	21.35	21.35	25.34	25.34	25.34	25.34	25.34	25.34	25.34	25.34
EGPRS1900 2 time slots	18.86	18.86	18.86	18.86	18.86	18.86	18.86	18.86	18.86	25.47	25.47	25.47	25.47	25.47	25.47	25.47	25.47
EGPRS1900 3 time slots	17.46	17.46	17.46	17.46	17.46	17.46	17.46	17.46	17.46	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
EGPRS1900 4 time slots	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53



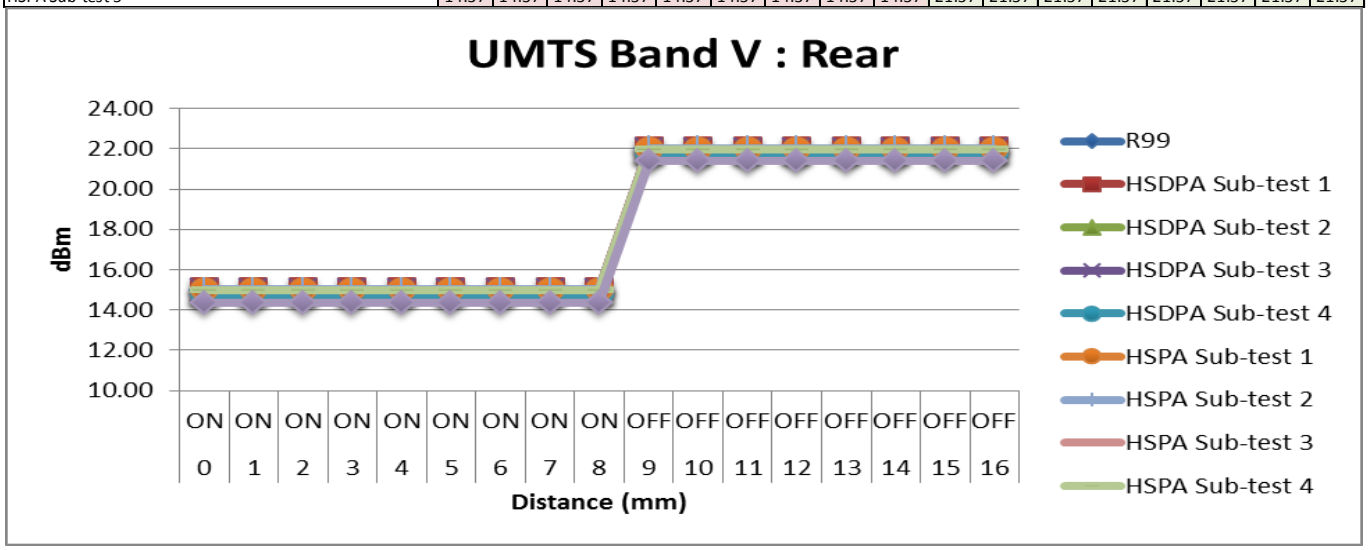


Summary Table of Power Reduction dB Levels per Mode & Band (continued)

Edge 1 (UMTS Band V)																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R99	15.00	15.00	15.00	15.00	15.00	15.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
HSDPA Sub-test 1	15.04	15.04	15.04	15.04	15.04	15.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04
HSDPA Sub-test 2	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSDPA Sub-test 3	14.98	14.98	14.98	14.98	14.98	14.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98
HSDPA Sub-test 4	14.73	14.73	14.73	14.73	14.73	14.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73
HSPA Sub-test 1	15.02	15.02	15.02	15.02	15.02	15.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02
HSPA Sub-test 2	15.03	15.03	15.03	15.03	15.03	15.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03
HSPA Sub-test 3	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSPA Sub-test 4	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSPA Sub-test 5	14.37	14.37	14.37	14.37	14.37	14.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37

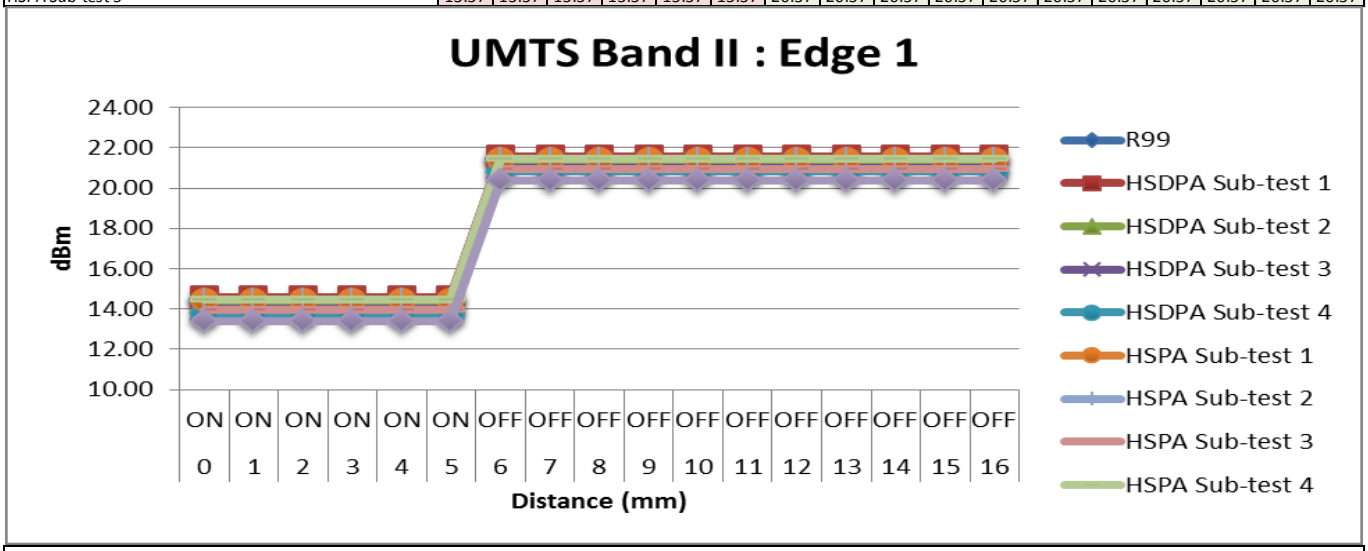


Rear/Base (UMTS Band V)																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R99	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
HSDPA Sub-test 1	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04	22.04
HSDPA Sub-test 2	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSDPA Sub-test 3	14.98	14.98	14.98	14.98	14.98	14.98	14.98	14.98	14.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98	21.98
HSDPA Sub-test 4	14.73	14.73	14.73	14.73	14.73	14.73	14.73	14.73	14.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73
HSPA Sub-test 1	15.02	15.02	15.02	15.02	15.02	15.02	15.02	15.02	15.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02	22.02
HSPA Sub-test 2	15.03	15.03	15.03	15.03	15.03	15.03	15.03	15.03	15.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03	22.03
HSPA Sub-test 3	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSPA Sub-test 4	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99	21.99
HSPA Sub-test 5	14.37	14.37	14.37	14.37	14.37	14.37	14.37	14.37	14.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37	21.37

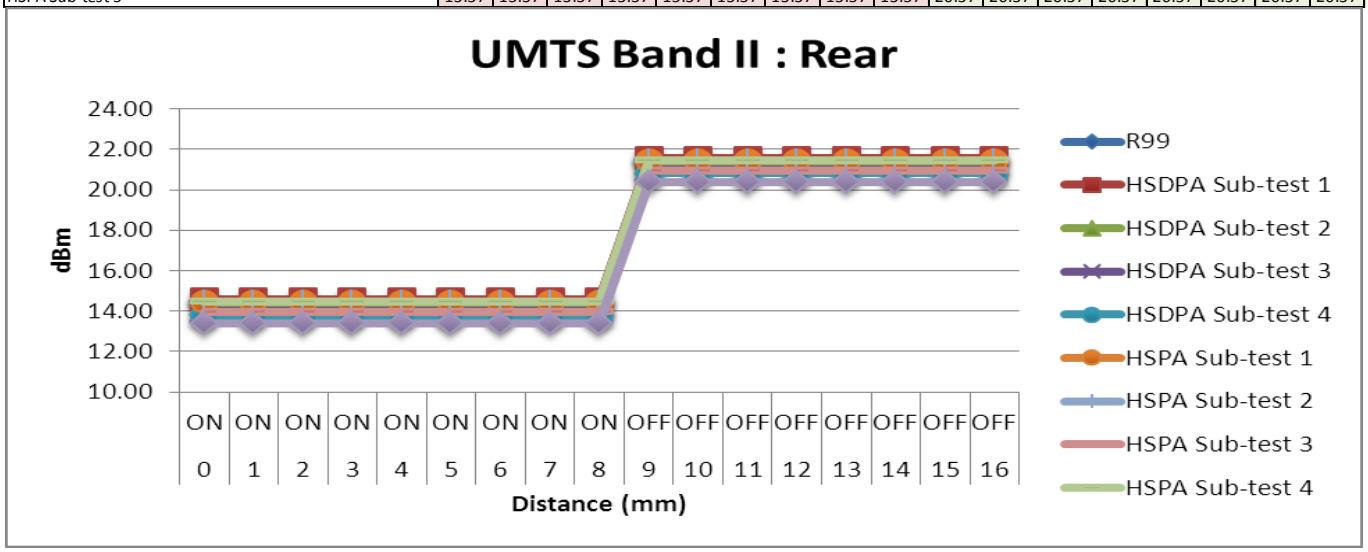


Summary Table of Power Reduction dB Levels per Mode & Band (continued)

Edge 1 (UMTS Band II)																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R99	14.45	14.45	14.45	14.45	14.45	14.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45
HSDPA Sub-test 1	14.56	14.56	14.56	14.56	14.56	14.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56
HSDPA Sub-test 2	14.33	14.33	14.33	14.33	14.33	14.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33
HSDPA Sub-test 3	14.02	14.02	14.02	14.02	14.02	14.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02
HSDPA Sub-test 4	13.81	13.81	13.81	13.81	13.81	13.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81
HSPA Sub-test 1	14.47	14.47	14.47	14.47	14.47	14.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47
HSPA Sub-test 2	14.48	14.48	14.48	14.48	14.48	14.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48
HSPA Sub-test 3	13.95	13.95	13.95	13.95	13.95	13.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95
HSPA Sub-test 4	14.48	14.48	14.48	14.48	14.48	14.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48
HSPA Sub-test 5	13.37	13.37	13.37	13.37	13.37	13.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37



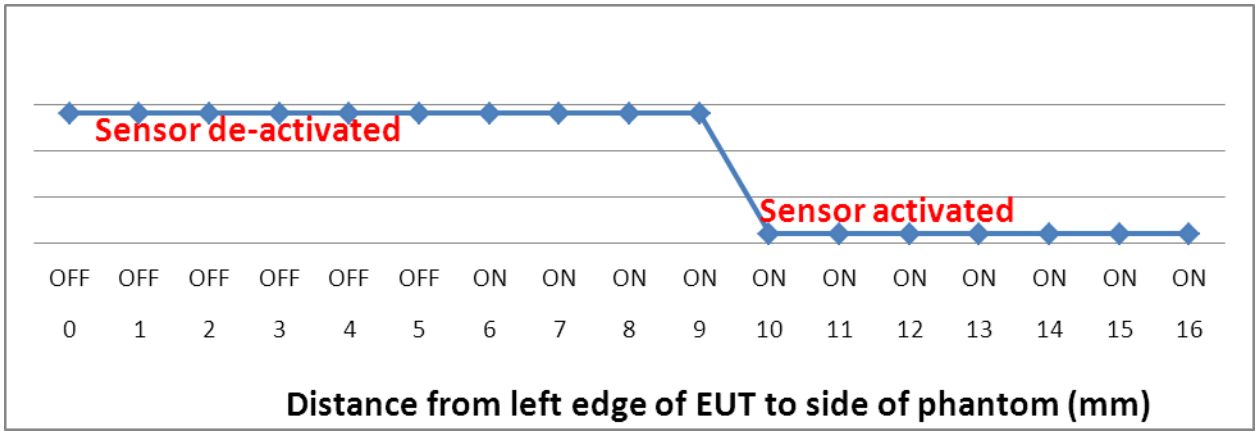
Rear/Base (UMTS Band II)																	
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R99	14.45	14.45	14.45	14.45	14.45	14.45	14.45	14.45	14.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45	21.45
HSDPA Sub-test 1	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	14.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56	21.56
HSDPA Sub-test 2	14.33	14.33	14.33	14.33	14.33	14.33	14.33	14.33	14.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33
HSDPA Sub-test 3	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02
HSDPA Sub-test 4	13.81	13.81	13.81	13.81	13.81	13.81	13.81	13.81	13.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81
HSPA Sub-test 1	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47	21.47
HSPA Sub-test 2	14.48	14.48	14.48	14.48	14.48	14.48	14.48	14.48	14.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48
HSPA Sub-test 3	13.95	13.95	13.95	13.95	13.95	13.95	13.95	13.95	13.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95	20.95
HSPA Sub-test 4	14.48	14.48	14.48	14.48	14.48	14.48	14.48	14.48	14.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48
HSPA Sub-test 5	13.37	13.37	13.37	13.37	13.37	13.37	13.37	13.37	13.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37	20.37



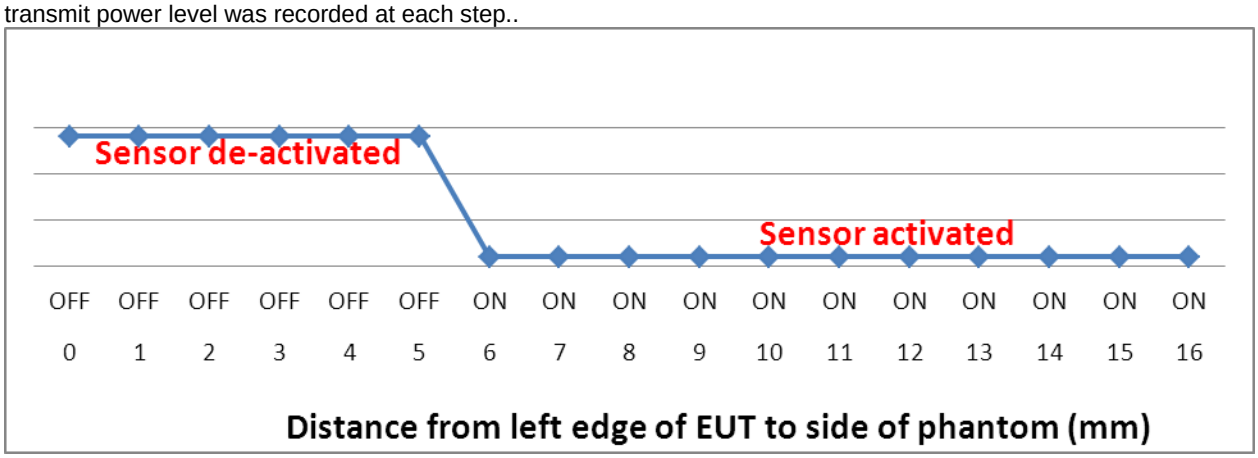
7.7. Sensor Coverage Area

Refer to Sensor Triggering distance of A3LGTP3100B

7.7.1. Edge Coverage



Note. The EUT was positioned parallel to the phantom, front facing down, off to one side with the left edge facing the phantom. The vertical separation distance was 8 mm. The EUT was then moved horizontally toward the phantom in 1 mm steps. The transmit power level was recorded at each step..

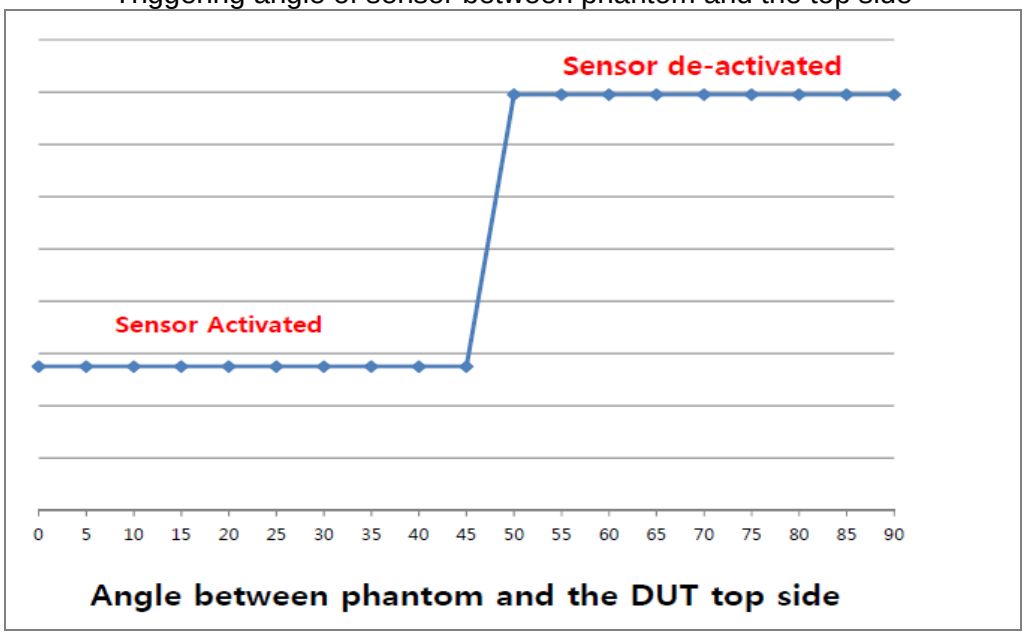


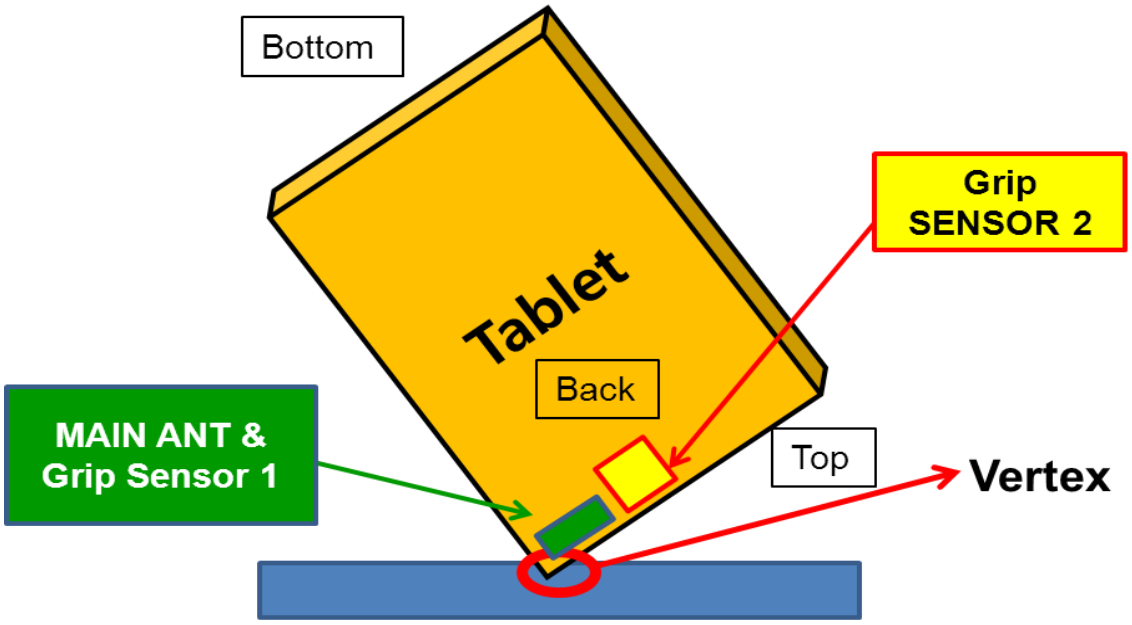
Note. The EUT was positioned perpendicular to the phantom, top edge facing up, off to one side with the left edge facing the phantom. The vertical separation distance was 5 mm. The EUT was then moved horizontally toward the phantom in 1 mm steps. The transmit power level was recorded at each step.

7.7.2. Vertex Coverage / Top Left Corner

At the top left corner, top edge and rear sensor are not activated. Taken into the account if the device could be easily be used in such a way that the antenna could be in close proximity to the user without the proximity sensor triggering power reduction; for example, held by the left corner or with the left corner resting on the left knee or leg of the user. Based upon the trigger angle for power reduction as illustrated below, additional Vertex at 45 degree SAR evaluation with full power (no power reduction was performed)

Triggering angle of sensor between phantom and the top side





7.8. Targeted Power Reduction Levels

Head (Implemented with IR Sensor)

GSM/GPRS

Normal		Back-Off Level
GSM850	128	3.5
	190	
	251	
GSM1900	512	4.5
	661	
	810	

UMTS Bands (WCDMA)

Normal		Back-Off Level (dB)
WCDMA 850	4357	4
	4407	
	4458	
WCDMA 1900	9662	5.5
	9799	
	9638	

Body (Implemented with Grip Sensors)

GSM/GPRS

Normal		Back-Off Level
GSM850	128	5
	190	
	251	
GSM1900	512	7
	661	
	810	

UMTS Bands (WCDMA)

Normal		Back-Off Level (dB)
WCDMA 850	4357	7
	4407	
	4458	
WCDMA 1900	9662	7
	9799	
	9638	

8. Summary of Test Configurations

As the tablet has a diagonal size of greater than 20 cm, and in accordance with FCC training provided in October 2011 (TCBC Workshop) hot spot SAR is not required for this device.

The following test configurations are based on KDB 447498 4) b) Tablet Mode

See section 17 for the antenna locations and dimensions.

8.1. Exposure Conditions for WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	1.91 mm	Yes	
Edge 1	5.63 mm	Yes	
Edge 1 at 45° (Vertex)	> 4.9 mm	Yes	With full power
Edge 2	> 78 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2), SAR is required only for the edge with the most conservative exposure conditions.
Edge 3	> 193.7 mm	No	ditto
Edge 4	7.67 mm	Yes	

8.2. Exposure Conditions for WiFi

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	< 0.85 mm	Yes	
Edge 1	>133.5mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2), SAR is required only for the edge with the most conservative exposure conditions.
Edge 2	> 107.8 mm	No	ditto
Edge 3	> 40.7 mm	No	ditto
Edge 4	< 4.3 mm	Yes	
Edge 4 Tilt @ 45°	< 0.85 mm	Yes	

9. RF Output Power Measurement

9.1. GSM850

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	32.33
	190	836.6	32.33
	251	848.8	32.33

GMSK (Voice) Mode with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
850	128	824.2	28.83
	190	836.6	28.83
	251	848.8	28.83

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128.0	824.2	32.15	23.12	29.80	23.78	28.32	24.06	26.91	23.90
	190.0	836.6	32.17	23.14	29.81	23.79	28.32	24.06	26.91	23.90
	251.0	848.8	32.17	23.14	29.81	23.79	28.32	24.06	26.90	23.89

GMSK (GPRS) Mode - Coding Scheme: CS1 with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	27.21	18.18	24.88	18.86	23.46	19.20	21.97	18.96
	190	836.6	27.20	18.17	24.88	18.86	23.46	19.20	21.95	18.94
	251	848.8	27.20	18.17	24.88	18.86	23.46	19.20	21.95	18.94

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128.0	824.2	26.35	17.32	26.44	20.42	26.46	22.20	23.63	20.62
	190.0	836.6	26.34	17.31	26.44	20.42	26.45	22.19	23.60	20.59
	251.0	848.8	26.30	17.27	26.43	20.41	26.45	22.19	23.60	20.59

8PSK (EGPRS) Mode - Coding Scheme: MCS5 with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
850	128	824.2	23.28	14.25	21.90	15.88	20.43	16.17	19.06	16.05
	190	836.6	23.30	14.27	21.90	15.88	20.43	16.17	19.01	16.00
	251	848.8	23.28	14.25	21.93	15.91	20.43	16.17	19.00	15.99

Notes:

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

- Head: GMSK Voice Mode
- Body: GMSK (GPRS) mode with 3 time slots, based on the output power measurements above

9.2. GSM1900

GMSK (Voice) Mode

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	29.1
	661	1880.0	29.1
	810	1909.8	29.1

GMSK (Voice) Mode with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)
1900	512	1850.2	24.6
	661	1880.0	24.6
	810	1909.8	24.6

GMSK (GPRS) Mode - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512.0	1850.2	29.08	20.05	26.55	20.53	25.08	20.82	23.53	20.52
	661.0	1880.0	29.07	20.04	26.54	20.52	25.07	20.81	23.52	20.51
	810.0	1909.8	29.08	20.05	26.55	20.53	25.08	20.82	23.53	20.52

GMSK (GPRS) Mode - Coding Scheme: CS1 with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	22.08	13.05	19.55	13.53	18.08	13.82	16.53	13.52
	661	1880.0	22.07	13.04	19.54	13.52	18.07	13.81	16.52	13.51
	810	1909.8	22.08	13.05	19.55	13.53	18.08	13.82	16.53	13.52

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512.0	1850.2	25.31	16.28	25.47	19.45	24.50	20.24	22.51	19.50
	661.0	1880.0	25.34	16.31	25.44	19.42	24.50	20.24	22.49	19.48
	810.0	1909.8	25.33	16.30	25.42	19.40	24.50	20.24	22.53	19.52

8PSK (EGPRS) Mode - Coding Scheme: MCS5 with power back off

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	3 slots	Frame Avg Pwr	4 slots	Frame Avg Pwr
1900	512	1850.2	21.32	12.29	18.84	12.82	17.46	13.20	16.61	13.60
	661	1880.0	21.35	12.32	18.86	12.84	17.45	13.19	16.59	13.58
	810	1909.8	21.33	12.30	18.86	12.84	17.46	13.20	16.64	13.63

Notes:

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

- Head: GMSK Voice Mode
- Body: GMSK (GPRS) mode with 3 time slots, based on the output power measurements above

9.3. W-CDMA (UMTS) Band V

Release 99 (RMC, 12.2kbps)

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

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Output power table for Head

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
			W/o Pwr back-off	W/ Pwr back-off
850 (Band V)	4132	826.4	22.00	18.00
	4183	846.6	21.95	17.95
	4233	846.6	21.95	17.95

Output power table for Body

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
			W/o Pwr back-off	W/ Pwr back-off
850 (Band V)	4132	826.4	22.00	15.00
	4183	846.6	21.95	14.95
	4233	846.6	21.95	14.95

HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Output power table

Band	Subtest	Ch No.	Freq. (MHz)	Target MPR	Meas. MPR	Avg Pwr (dBm)	
						W/o Pwr back-off	W/ Pwr back-off
850 (Band V)	1	4132	826.4	0	0	22.04	15.04
		4183	836.6	0	0	21.92	14.92
		4233	846.6	0	0	21.90	14.90
	2	4132	826.4	1	0	21.99	14.99
		4183	836.6	1	0	21.84	14.84
		4233	846.6	1	0	21.86	14.86
	3	4132	826.4	1.5	0.5	21.98	14.98
		4183	836.6	1.5	0.5	21.81	14.81
		4233	846.6	1.5	0.5	21.83	14.83
	4	4132	826.4	1.5	0.5	21.73	14.73
		4183	836.6	1.5	0.5	21.56	14.56
		4233	846.6	1.5	0.5	21.57	14.57

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Results

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Tx Conducted Pwr (dBm)	
					W/o Pwr back-off	W/ Pwr back-off
UMTS (WCDMA) Band V	Subtest 1	4132	826.4	0	22.02	15.02
		4183	836.6	0	21.86	14.86
		4233	846.6	0	21.86	14.86
	Subtest 2	4132	826.4	2	22.03	15.03
		4183	836.6	2	21.87	14.87
		4233	846.6	2	21.89	14.89
	Subtest 3	4132	826.4	1	21.99	14.99
		4183	836.6	1	21.83	14.83
		4233	846.6	1	21.82	14.82
	Subtest 4	4132	826.4	2	21.99	14.99
		4183	836.6	2	21.83	14.83
		4233	846.6	2	21.83	14.83
	Subtest 5	4132	826.4	0	21.37	14.37
		4183	836.6	0	21.23	14.23
		4233	846.6	0	21.24	14.24

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

9.4. W-CDMA (UMTS) Band II

Release 99 (RMC, 12.2kbps)
The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Output power table for Head

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
			W/o Pwr back-off	W/ Pwr back-off
1900 (Band II)	9262	1852.4	21.45	15.95
	9400	1880.0	21.40	15.90
	9538	1907.6	21.45	15.95

Output power table for Body

Band	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
			W/o Pwr back-off	W/ Pwr back-off
1900 (Band II)	9262	1852.4	21.45	14.45
	9400	1880.0	21.40	14.40
	9538	1907.6	21.45	14.45

HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Output power table

Band	Subtest	Ch No.	Freq. (MHz)	Target MPR	Meas. MPR	Avg Pwr (dBm)	
						W/o Pwr back-off	W/ Pwr back-off
1900 (Band II)	1	9262	1852.4	0	0	21.56	14.56
		9400	1880.0	0	0	21.50	14.50
		9538	1907.6	0	0	21.56	14.56
	2	9262	1852.4	1	0	21.33	14.33
		9400	1880.0	1	0	21.21	14.21
		9538	1907.6	1	0	21.26	14.26
	3	9262	1852.4	1.5	0.5	21.02	14.02
		9400	1880.0	1.5	0.5	20.97	13.97
		9538	1907.6	1.5	0.5	21.00	14.00
	4	9262	1852.4	1.5	0.5	20.81	13.81
		9400	1880.0	1.5	0.5	20.69	13.69
		9538	1907.6	1.5	0.5	20.75	13.75

Note(s):

KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Results

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Tx Conducted Pwr (dBm)	
					W/o Pwr back-off	W/ Pwr back-off
UMTS (WCDMA) Band II	Subtest 1	9262	1852.4	0	21.47	14.47
		9400	1880.0	0	21.42	14.42
		9538	1907.6	0	21.47	14.47
	Subtest 2	9262	1852.4	2	21.48	14.48
		9400	1880.0	2	21.37	14.37
		9538	1907.6	2	21.43	14.43
	Subtest 3	9262	1852.4	1	20.93	13.93
		9400	1880.0	1	20.90	13.90
		9538	1907.6	1	20.95	13.95
	Subtest 4	9262	1852.4	2	21.48	14.48
		9400	1880.0	2	21.38	14.38
		9538	1907.6	2	21.46	14.46
	Subtest 5	9262	1852.4	0	20.37	13.37
		9400	1880.0	0	20.29	13.29
		9538	1907.6	0	20.34	13.34

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

9.5. Wi-Fi 802.11bgn

Required Test Channels per KDB 248227 D01

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b/g	2.4 GHz	**2.412**	1#	√	∇
		2.437	6	√	∇
		2.462	11#	√	∇

Notes:
√ = "default test channels"
∇ = possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"
= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

Output power table

Band (MHz)	Mode	Ch #	Freq. (MHz)	Measured Avg Pwr(dBm)
2.4	802.11b	1	2412	11.7
		6	2437	11.8
		11	2462	11.8
	802.11g	1	2412	11.7
		6	2437	11.8
		11	2462	11.8
	802.11g	1	2412	11.7
		6	2437	11.8
		11	2462	11.7

Note(s):

1. SAR is not required for 802.11g channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels. As per KDB 248227

9.6. Bluetooth

Mode	Channel #	Freq. (MHz)	Average output power	
			(dBm)	(mW)
GFSK	0	2402	11.1	12.88
	39	2441	11.3	13.49
	78	2480	11.1	12.88
8PSK	0	2402	8.9	7.76
	39	2441	9.3	8.51
	78	2480	9.2	8.32

Note(s):

According to KDB 648474, Table 2, Unlicensed transmitters
When there is simultaneous transmission, Stand-alone SAR not required due to

☒ Output ≤ 2 · P_{Ref} (24 mW) and antenna is ≥ 5.0 cm from other antennas
☒ Output ≤ P_{Ref} (12 mW) and antenna is ≥ 2.5 cm from other antennas
☒ Output ≤ P_{Ref} (12 mW) and antenna is < 2.5 cm from other antennas

10. Tissue Dielectric Property

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 OET Bulletin 65 Supplement C 01-01

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	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 parameters check results

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
03/22/2012	Body 2450	e'	51.2141	Relative Permittivity (ε_r):	51.21	52.70	-2.82	5
		e"	14.6030	Conductivity (σ):	1.99	1.95	2.02	5
	Body 2410	e'	51.2898	Relative Permittivity (ε_r):	51.29	52.76	-2.79	5
		e"	14.4068	Conductivity (σ):	1.93	1.91	1.21	5
	Body 2435	e'	51.2646	Relative Permittivity (ε_r):	51.26	52.73	-2.77	5
		e"	14.5359	Conductivity (σ):	1.97	1.93	1.91	5
	Body 2475	e'	51.0572	Relative Permittivity (ε_r):	51.06	52.67	-3.06	5
		e"	14.6971	Conductivity (σ):	2.02	1.99	1.89	5
03/22/2012	Head 2450	e'	38.1914	Relative Permittivity (ε_r):	38.19	39.20	-2.57	5
		e"	13.1356	Conductivity (σ):	1.79	1.80	-0.59	5
	Head 2410	e'	38.4108	Relative Permittivity (ε_r):	38.41	39.28	-2.21	5
		e"	13.0190	Conductivity (σ):	1.74	1.76	-0.90	5
	Head 2435	e'	38.2637	Relative Permittivity (ε_r):	38.26	39.24	-2.48	5
		e"	13.0904	Conductivity (σ):	1.77	1.78	-0.56	5
	Head 2475	e'	38.1259	Relative Permittivity (ε_r):	38.13	39.17	-2.66	5
		e"	13.2140	Conductivity (σ):	1.82	1.83	-0.47	5
03/23/2012	Body 1900	e'	53.5465	Relative Permittivity (ε_r):	53.55	53.30	0.46	5
		e"	14.3352	Conductivity (σ):	1.51	1.52	-0.36	5
	Body 1850	e'	53.6579	Relative Permittivity (ε_r):	53.66	53.30	0.67	5
		e"	14.1418	Conductivity (σ):	1.45	1.52	-4.30	5
	Body 1880	e'	53.5494	Relative Permittivity (ε_r):	53.55	53.30	0.47	5
		e"	14.2526	Conductivity (σ):	1.49	1.52	-1.98	5
	Body 1910	e'	53.5463	Relative Permittivity (ε_r):	53.55	53.30	0.46	5
		e"	14.3693	Conductivity (σ):	1.53	1.52	0.40	5
03/23/2012	Head 1900	e'	39.8341	Relative Permittivity (ε_r):	39.83	40.00	-0.41	5
		e"	13.1916	Conductivity (σ):	1.39	1.40	-0.45	5
	Head 1850	e'	40.0156	Relative Permittivity (ε_r):	40.02	40.00	0.04	5
		e"	13.0646	Conductivity (σ):	1.34	1.40	-4.01	5
	Head 1880	e'	39.8981	Relative Permittivity (ε_r):	39.90	40.00	-0.25	5
		e"	13.1466	Conductivity (σ):	1.37	1.40	-1.84	5
	Head 1910	e'	39.8024	Relative Permittivity (ε_r):	39.80	40.00	-0.49	5
		e"	13.2102	Conductivity (σ):	1.40	1.40	0.21	5

Tissue dielectric parameters check results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
03/26/2012	Body 835	e'	55.8570	Relative Permittivity (ϵ_r):	55.86	55.20	1.19	5
		e''	21.3130	Conductivity (σ):	0.99	0.97	2.01	5
	Body 820	e'	55.9922	Relative Permittivity (ϵ_r):	55.99	55.28	1.29	5
		e''	21.3929	Conductivity (σ):	0.98	0.97	0.72	5
	Body 850	e'	55.7344	Relative Permittivity (ϵ_r):	55.73	55.16	1.05	5
		e''	21.2396	Conductivity (σ):	1.00	0.99	1.69	5
03/27/2012	Head 835	e'	42.8192	Relative Permittivity (ϵ_r):	42.82	41.50	3.18	5
		e''	19.1677	Conductivity (σ):	0.89	0.90	-1.12	5
	Head 825	e'	42.9450	Relative Permittivity (ϵ_r):	42.95	41.58	3.29	5
		e''	19.1956	Conductivity (σ):	0.88	0.90	-2.04	5
	Head 850	e'	42.6379	Relative Permittivity (ϵ_r):	42.64	41.50	2.74	5
		e''	19.1320	Conductivity (σ):	0.90	0.92	-1.18	5
03/27/2012	Body 1900	e'	53.0020	Relative Permittivity (ϵ_r):	53.00	53.30	-0.56	5
		e''	14.1458	Conductivity (σ):	1.49	1.52	-1.68	5
	Body 1850	e'	53.5237	Relative Permittivity (ϵ_r):	53.52	53.30	0.42	5
		e''	14.3505	Conductivity (σ):	1.48	1.52	-2.88	5
	Body 1880	e'	53.3536	Relative Permittivity (ϵ_r):	53.35	53.30	0.10	5
		e''	14.2293	Conductivity (σ):	1.49	1.52	-2.14	5
	Body 1910	e'	52.8577	Relative Permittivity (ϵ_r):	52.86	53.30	-0.83	5
		e''	14.1601	Conductivity (σ):	1.50	1.52	-1.06	5

11. System Performance Check

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. The system performance check verifies that the system operates within its specifications of ±10%.

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 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)	SAR Measured (mW/g)		
				1g/10g	Head	Body
D835V2	4d117	4/15/11	835	1g	9.64	10.1
				10g	6.28	6.60
D1900V2	5d043	11/10/11	1900	1g	40.8	42.0
				10g	21.2	22.0
D2450V2	748	2/7/12	2450	1g	53.6	50.8
				10g	24.8	23.6

11.3. System Performance Check Results

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
3/22/2012	D2450V2	748	Body	1g	51.7	50.8	1.77	±10
				10g	24.0	23.6	1.69	
3/22/2012	D2450V2	748	Head	1g	55.7	53.6	3.92	±10
				10g	25.8	24.8	4.03	
3/23/2012	D1900V2	5d043	Body	1g	43.4	42.0	3.33	±10
				10g	22.8	22.0	3.64	
3/23/2012	D1900V2	5d043	Head	1g	40.5	40.8	-0.74	±10
				10g	21.3	21.2	0.47	
3/26/2012	D835V2	4d117	Body	1g	10.2	10.1	0.99	±10
				10g	6.74	6.60	2.12	
3/27/2012	D835V2	4d117	Body	1g	9.67	9.64	0.31	±10
				10g	6.39	6.28	1.75	
3/27/2012	D1900V2	5d043	Body	1g	40.2	42.0	-4.29	±10
				10g	21.4	22.0	-2.73	

12. SAR Test Result

12.1. GSM850

12.1.1. Head SAR with IR sensor activated

Test Position	Pwr back-off	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Left Touch	Yes	Voice	128	824.20	28.83			1
			190	836.60	28.83	0.261	0.178	
			251	848.80	28.83			1
Left Tilt	Yes	Voice	128	824.20	28.83			1
			190	836.60	28.83	0.316	0.210	
			251	848.80	28.83			1
Right Touch	Yes	Voice	128	824.20	28.83			1
			190	836.60	28.83	0.504	0.307	
			251	848.80	28.83			1
Right Tilt	Yes	Voice	128	824.20	28.83			1
			190	836.60	28.83	0.476	0.288	
			251	848.80	28.83			1

12.1.2. Body SAR

Test position	Distance (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
							1-g	10-g	
Rear	0	Yes	GPRS 3 Slot	128	824.2	23.46			1
				190	836.6	23.46	0.742	0.392	
				251	848.8	23.46			1
				190	836.6	23.46	0.757	0.400	2
	8	No	GPRS 3 Slot	128	824.2	28.32			1
				190	836.6	28.32	0.447	0.282	
				251	848.8	28.32			1
Edge 1	0	Yes	GPRS 3 Slot	128	824.2	23.46			1
				190	836.6	23.46	0.353	0.212	
				251	848.8	23.46			1
	5	No	GPRS 3 Slot	128	824.2	28.32			1
				190	836.6	28.32	0.558	0.362	
				251	848.8	28.32			1
Edge 1 @45° (Vertex)	0	No	GPRS 3 Slot	128	824.2	28.32			1
				190	836.6	28.32	0.158	0.082	
				251	848.8	28.32			1
Edge 4	0	No	GPRS 3 Slot	128	824.2	28.32			1
				190	836.6	28.32	0.322	0.193	
				251	848.8	28.32			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC “Public Notice DA 02-1438” by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.2. GSM1900

12.2.1. Head SAR with IR sensor activated

Test Position	Pwr back-off	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Left Touch	Yes	Voice	512	1850.2	24.60			1
			661	1880.0	24.60	0.246	0.127	
			810	1909.8	24.60			1
Left Tilt	Yes	Voice	512	1850.2	24.60			1
			661	1880.0	24.60	0.221	0.116	
			810	1909.8	24.60			1
Right Touch	Yes	Voice	512	1850.2	24.60			1
			661	1880.0	24.60	0.611	0.280	
			810	1909.8	24.60			1
Right Tilt	Yes	Voice	512	1850.2	24.60			1
			661	1880.0	24.60	0.562	0.261	
			810	1909.8	24.60			1

12.2.2. Body SAR

Test position	Distance (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
							1-g	10-g	
Rear	0	Yes	GPRS 3 Slot	512	1850.2	18.08			1
				661	1880.0	18.07	0.530	0.245	
				810	1909.8	18.08			1
				661	1880.0	18.07	0.477	0.220	2
	8	No	GPRS 3 Slot	512	1850.2	25.08			1
				661	1880.0	25.07	0.459	0.246	
				810	1909.8	25.08			1
Edge 1	0	Yes	GPRS 3 Slot	512	1850.2	18.08			1
				661	1880.0	18.07	0.497	0.220	
				810	1909.8	18.08			1
	5	No	GPRS 3 Slot	512	1850.2	25.08			1
				661	1880.0	25.07	0.778	0.393	
				810	1909.8	25.08			1
Edge 1 @45° (Vertex)	0	No	GPRS 3 Slot	512	1850.2	25.08			1
				661	1880.0	25.07	0.412	0.221	
				810	1909.8	25.08			1
Edge 4	0	No	GPRS 3 Slot	512	1850.2	25.08			1
				661	1880.0	25.07	0.388	0.192	
				810	1909.8	25.08			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC “Public Notice DA 02-1438” by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.3. WCDMA (UMTS) Band V

Test mode reduction considerations

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit as per KDB 941225 D01

12.3.1. Head SAR with IR sensor activated

Test Position	Pwr back-off	Mode	UL Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Left Touch	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	18.00			1
			4183	836.6	17.95	0.194	0.132	
			4233	846.6	17.95			1
Left Tilt	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	18.00			1
			4183	836.6	17.95	0.220	0.145	
			4233	846.6	17.95			1
Right Touch	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	18.00			1
			4183	836.6	17.95	**0.390**	0.233	
			4233	846.6	17.95			1
Right Tilt	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	18.00			1
			4183	836.6	17.95	0.292	0.179	
			4233	846.6	17.95			1

12.3.2. Body SAR

Test position	Distance (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
							1-g	10-g	
Rear	0	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	15.00			1
				4183	836.6	14.95	0.330	0.171	
				4233	846.6	14.95			1
				4183	836.6	14.95	0.290	0.155	2
	8	No	R99 (RMC, 12.2 kbps)	4132	826.4	22.00			1
				4183	836.6	21.95	0.307	0.195	
				4233	846.6	21.95			1
Edge 1	0	Yes	R99 (RMC, 12.2 kbps)	4132	826.4	15.00			1
				4183	836.6	14.95	0.141	0.084	
				4233	846.6	14.95			1
	5	No	R99 (RMC, 12.2 kbps)	4132	826.4	22.00			1
				4183	836.6	21.95	0.311	0.201	
				4233	846.6	21.95			1
Top-edge @45° (Vertex)	0	No	R99 (RMC, 12.2 kbps)	4132	826.4	22.00			1
				4183	836.6	21.95	0.105	0.056	
				4233	846.6	21.95			1
Edge 4	0	No	R99 (RMC, 12.2 kbps)	4132	826.4	22.00			1
				4183	836.6	21.95	0.183	0.109	
				4233	846.6	21.95			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.4. WCDMA (UMTS) Band II

Test mode reduction considerations

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit as per KDB 941225 D01

12.4.1. Head SAR with IR sensor activated

Test Position	Pwr back-off	Mode	UL Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Left Touch	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	15.95			1
			9400	1880.0	15.90	0.353	0.176	
			9538	1907.6	15.95			1
Left Tilt	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	15.95			1
			9400	1880.0	15.90	0.365	0.182	
			9538	1907.6	15.95			1
Right Touch	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	15.95			1
			9400	1880.0	15.90	0.680	0.308	
			9538	1907.6	15.95			1
Right Tilt	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	15.95			1
			9400	1880.0	15.90	0.693	0.317	
			9538	1907.6	15.95			1

12.4.2. Body SAR

Test position	Distance (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
							1-g	10-g	
Rear	0	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	14.45			1
				9400	1880.0	14.40	0.416	0.193	
				9538	1907.6	14.45			1
	8	No	R99 (RMC, 12.2 kbps)	9262	1852.4	21.45			1
				9400	1880.0	21.40	0.597	0.309	
				9538	1907.6	21.45			1
				9400	1880.0	21.40	0.574	0.296	2
Edge 1	0	Yes	R99 (RMC, 12.2 kbps)	9262	1852.4	14.45			1
				9400	1880.0	14.40	0.468	0.207	
				9538	1907.6	14.45			1
	5	No	R99 (RMC, 12.2 kbps)	9262	1852.4	21.45			1
				9400	1880.0	21.40	0.790	0.402	
				9538	1907.6	21.45			1
Top-edge @45° (Vertex)	0	No	R99 (RMC, 12.2 kbps)	9262	1852.4	21.45			1
				9400	1880.0	21.40	0.441	0.235	
				9538	1907.6	21.45			1
Edge 4	0	No	R99 (RMC, 12.2 kbps)	9262	1852.4	21.45			1
				9400	1880.0	21.40	0.434	0.215	
				9538	1907.6	21.45			1

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC “Public Notice DA 02-1438” by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. With headset attached.

12.5. Wi-Fi 802.11bgn

Justification for using body phantom for measuring head SAR for WiFi Antenna

Due to the size of the DUT and the position of the WiFi antenna, it was impossible to get meaningful data for head SAR.

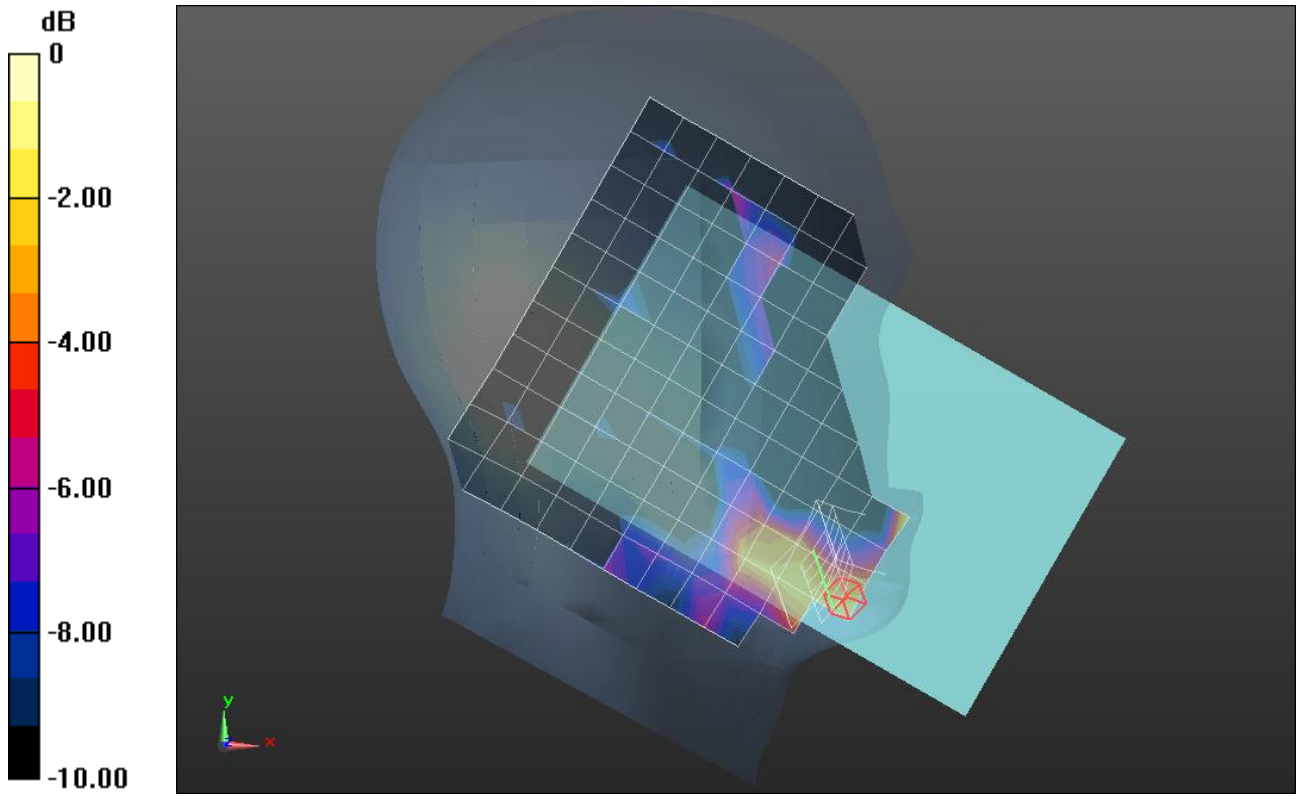
The following procedure was applied (KDB 648474 section on SAR Tests in Mouth and Jaw Regions of the SAM Phantom):

- DUT was positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM.
- The ear reference point (ERP, as defined for SAM) of the device should be positioned ½ cm from the flat phantom shell.
- The lower half of the DUT is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the DUT in the cheek touching position using SAM.

The DUT protruded too far from the SAM to allow measurement from its bottom edge. The separation distance from the antenna to the phantom was used as a reference. This resulted in the antenna being closer to the phantom when the DUT was mounted on the left. Therefore the left head distance was used as the most conservative.

See section 21 Setup Photos for details on device positioning and photographs showing how separation distances are determined.

The following head SAR plot is provided to show the difficulties associated with using the Flat Phantom for measuring head SAR with this DUT.



0 dB = 0.0054mW/g = -45.35 dB mW/g

12.5.1. Head SAR

Test Position	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
					1-g	10-g	
Under Flat Phantom	802.11b	1	2412	11.7			1
		6	2437	11.8	0.054	0.026	
		11	2462	11.8			1

12.5.2. Body SAR

Test Position	Distance (mm)	Mode	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	0	802.11b	1	2412	11.7			1
			6	2437	11.8	0.563	0.225	
			11	2462	11.8			1
			6	2437	11.8	0.550	0.220	2
Edge 4	0	802.11b	1	2412	11.7			1
			6	2437	11.8	0.362	0.150	
			11	2462	11.8			1
Edge 4 @ 45º	0	802.11b	1	2412	11.7			1
			6	2437	11.8	0.152	0.068	
			11	2462	11.8			1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i)
2. With headset attached.

13. Summary of Highest SAR Values

The test configuration for each body exposure condition (head, body and Hotspot) is dependent on the applicable voice or data modes, and antenna selected.

Technology/Band	Test configuration	Mode	Separation distance (mm)	Highest 1g SAR (W/kg)
GSM850	Head: Right Touch	Voice	--	0.504
	Body: Rear	GPRS 3 Slot, CS1 (with power back off)	0	0.757
GSM1900	Head: Right Touch	Voice	--	0.611
	Body: Edge 1	GPRS 3 Slot, CS1	5	0.778
WCDMA (UMTS) Band V	Head: Right Touch	R99 (RMC, 12.2 kbps) (with power back off)	--	0.390
	Body: Rear	R99 (RMC, 12.2 kbps) (with power back off)	0	0.330
WCDMA (UMTS) Band II	Head: Right Tilt	R99 (RMC, 12.2 kbps) (with power back off)	--	0.693
	Body: Edge 1	R99 (RMC, 12.2 kbps)	5	0.790
Wi-Fi 802.11bgn	Head on Flat Phantom	802.11b	--	0.054
	Body: Rear	802.11b	0	0.563

Note: The results show some variation from those in UL CCS test report 12I14206 (A3LGTP3100)**.** This is due to A3LGTP3100 having a different main antenna.

SAR Plots (from Summary of Highest SAR Values)

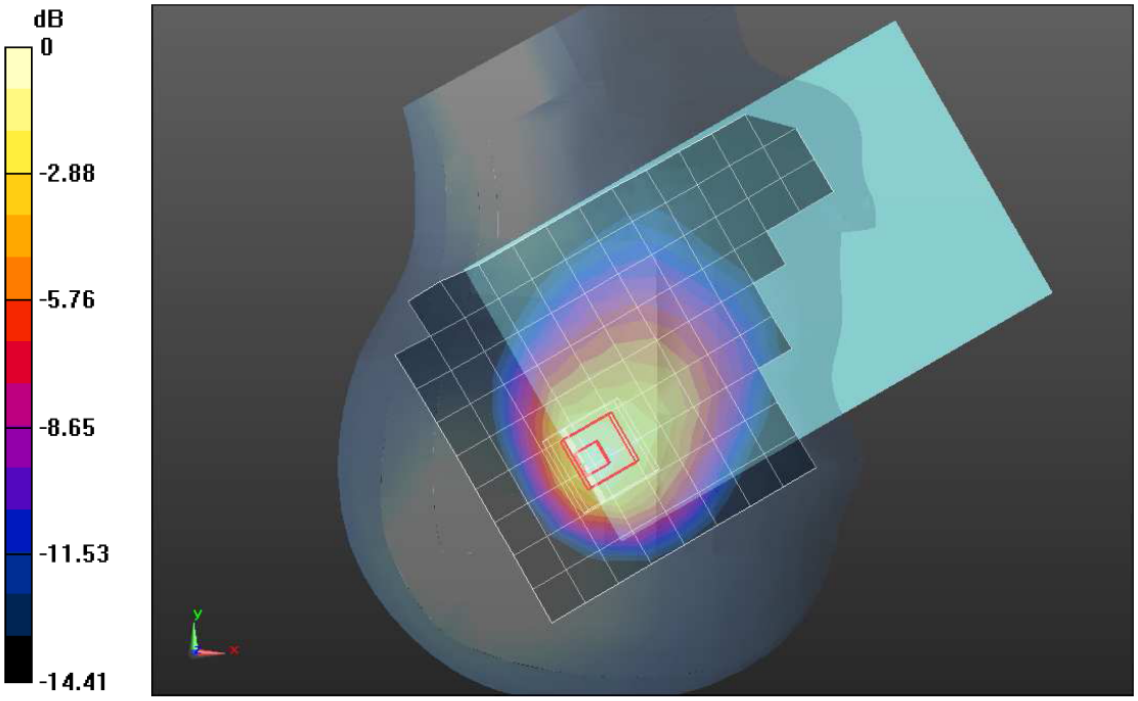
Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.30042; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.892 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(9.81, 9.81, 9.81); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1629

Right/Touch_Ch 190/Area Scan (10x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.647 mW/g

Right/Touch_Ch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.843 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.8570
SAR(1 g) = 0.504 mW/g; SAR(10 g) = 0.307 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.616 mW/g



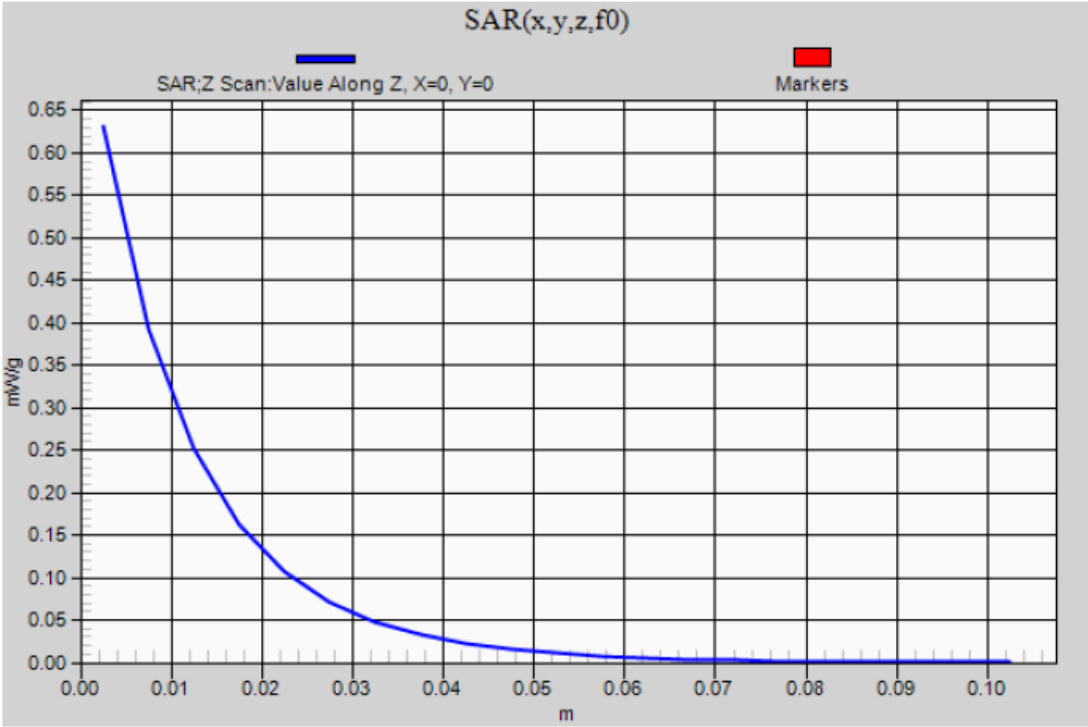
0 dB = 0.620mW/g = -4.15 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Right/Touch_Ch 190/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.631 mW/g



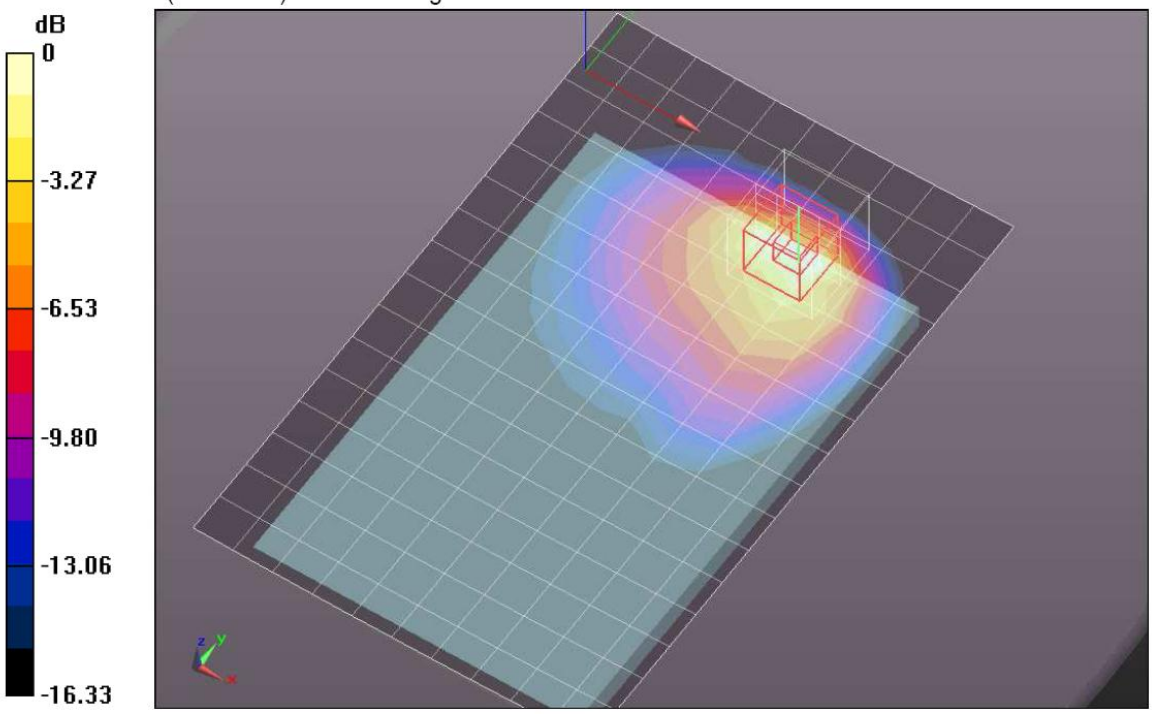
Test Laboratory: UL CCS SAR Lab B Date: 3/26/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:2.60016; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.992 mho/m; ε_r = 55.844; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(10, 10, 10); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear_0mm/GPRS 3slots Ch-190 w/Headset/Area Scan (11x17x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.953 mW/g

Rear_0mm/GPRS 3slots Ch-190 w/Headset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.488 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.3940
SAR(1 g) = 0.757 mW/g; SAR(10 g) = 0.400 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.914 mW/g



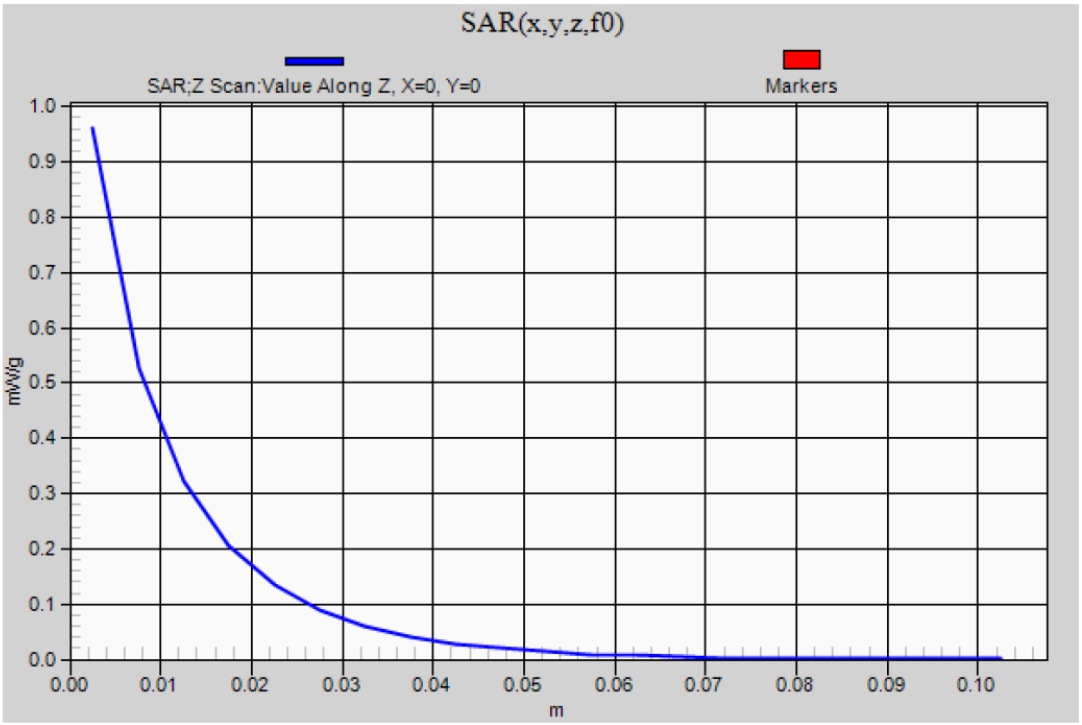
0 dB = 0.910mW/g = -0.82 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/26/2012

GSM850

Frequency: 836.6 MHz; Duty Cycle: 1:2.60016

Rear_0mm/GPRS 3slots Ch-190 w/Headset/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.961 mW/g



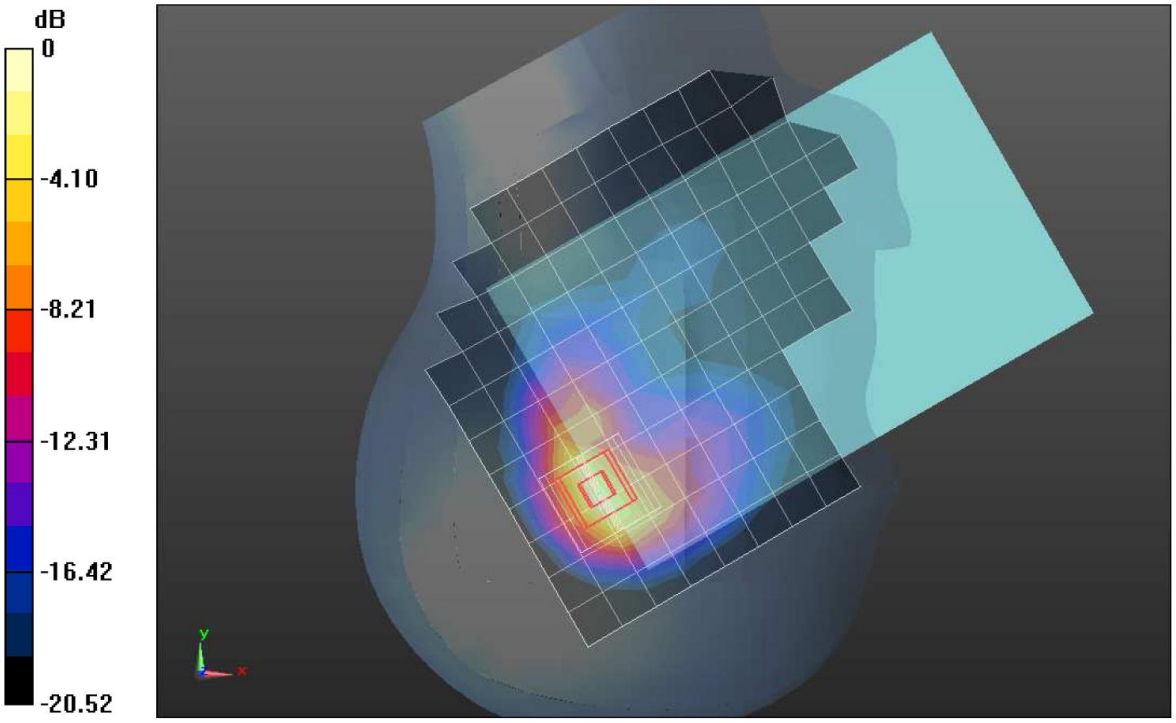
Test Laboratory: UL CCS SAR Lab B Date: 3/23/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.30042; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.375 mho/m; ε_r = 39.898; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(8.53, 8.53, 8.53); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1629

Right/Touch_Ch 661/Area Scan (12x16x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.751 mW/g

Right/Touch_Ch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.014 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.2280
SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.280 mW/g
Maximum value of SAR (measured) = 0.822 mW/g



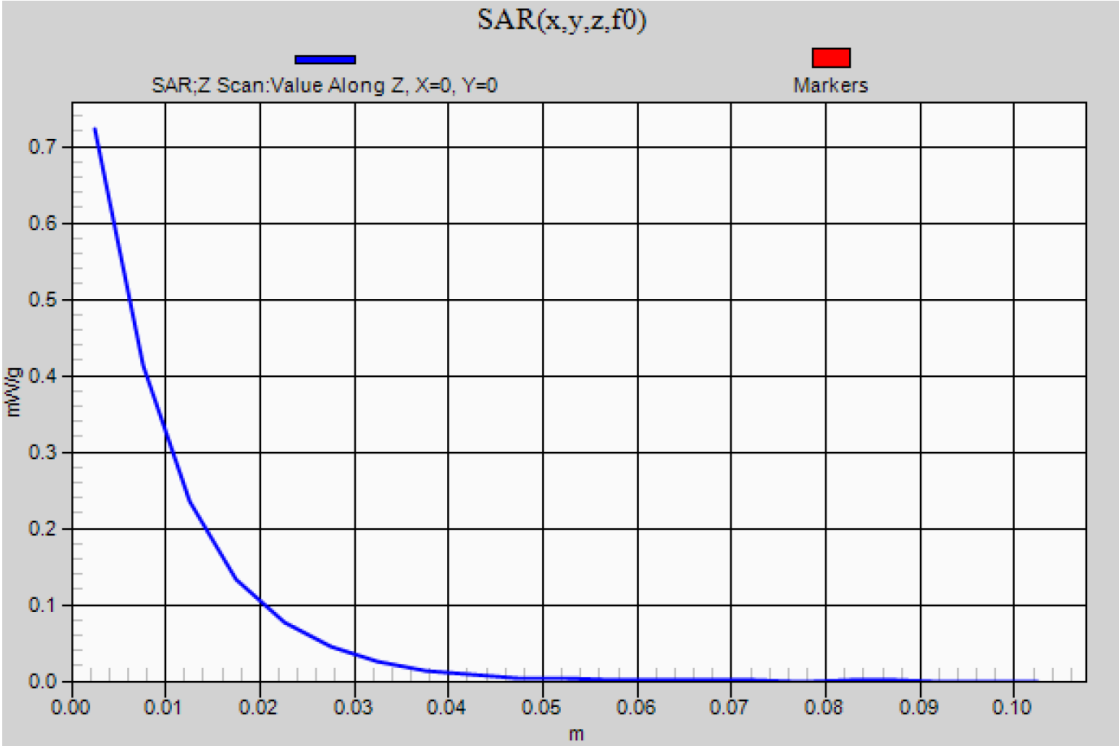
0 dB = 0.820mW/g = -1.72 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/23/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Right/Touch_Ch 661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.723 mW/g



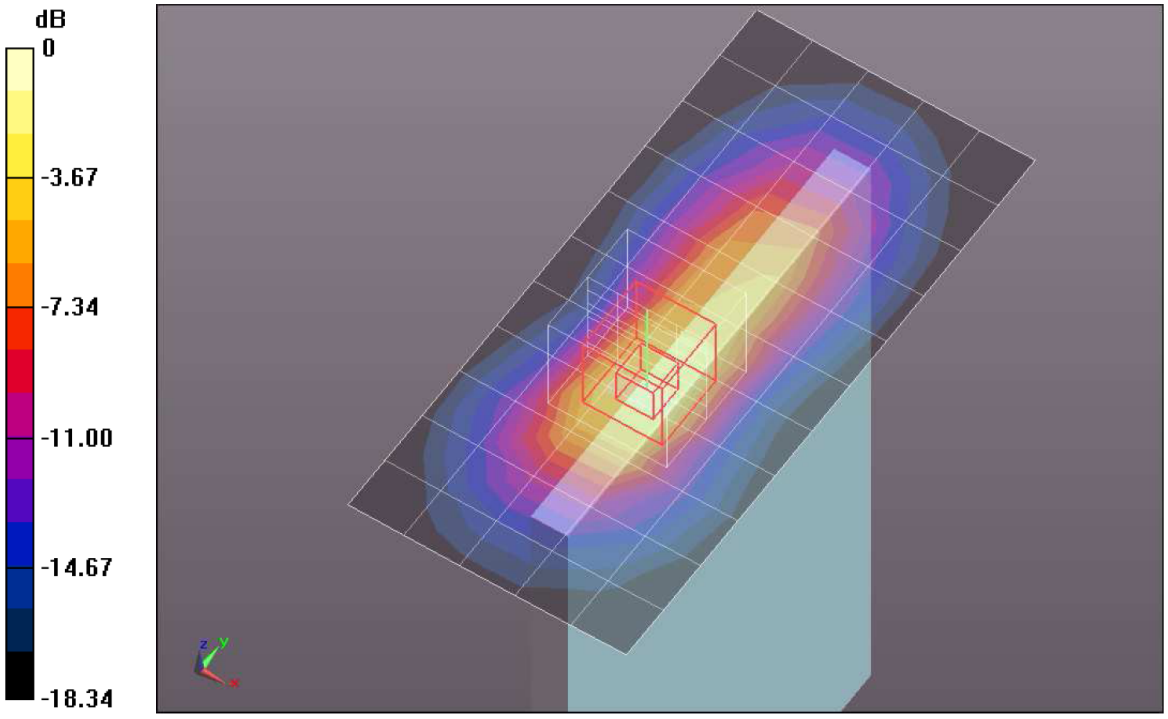
Test Laboratory: UL CCS SAR Lab B Date: 3/23/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:2.60016; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.491 mho/m; ε_r = 53.549; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(7.91, 7.91, 7.91); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge_1_5mm/GPRS 3 slots_CH 661/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.643 mW/g

Edge_1_5mm/GPRS 3 slots_CH 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.867 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.3790
SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.393 mW/g
Maximum value of SAR (measured) = 1.051 mW/g



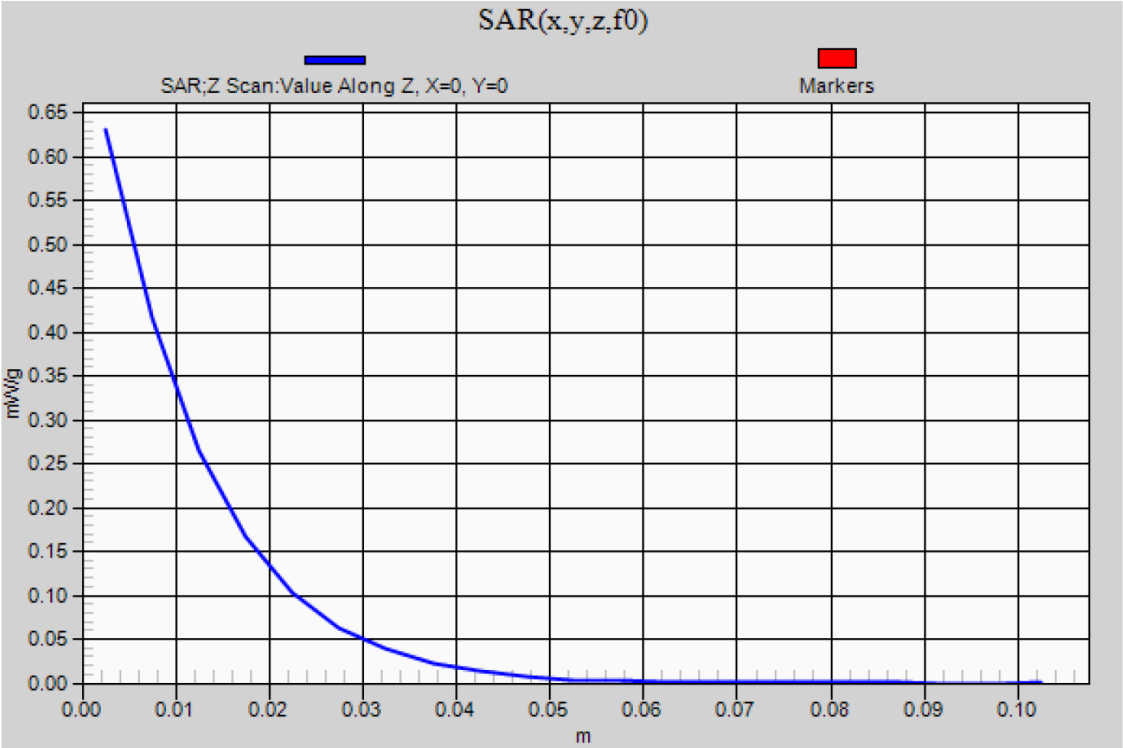
0 dB = 1.050mW/g = 0.42 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/23/2012

GSM1900

Frequency: 1880 MHz; Duty Cycle: 1:2.60016

Edge_1_5mm/GPRS 3 slots_CH 661/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.631 mW/g



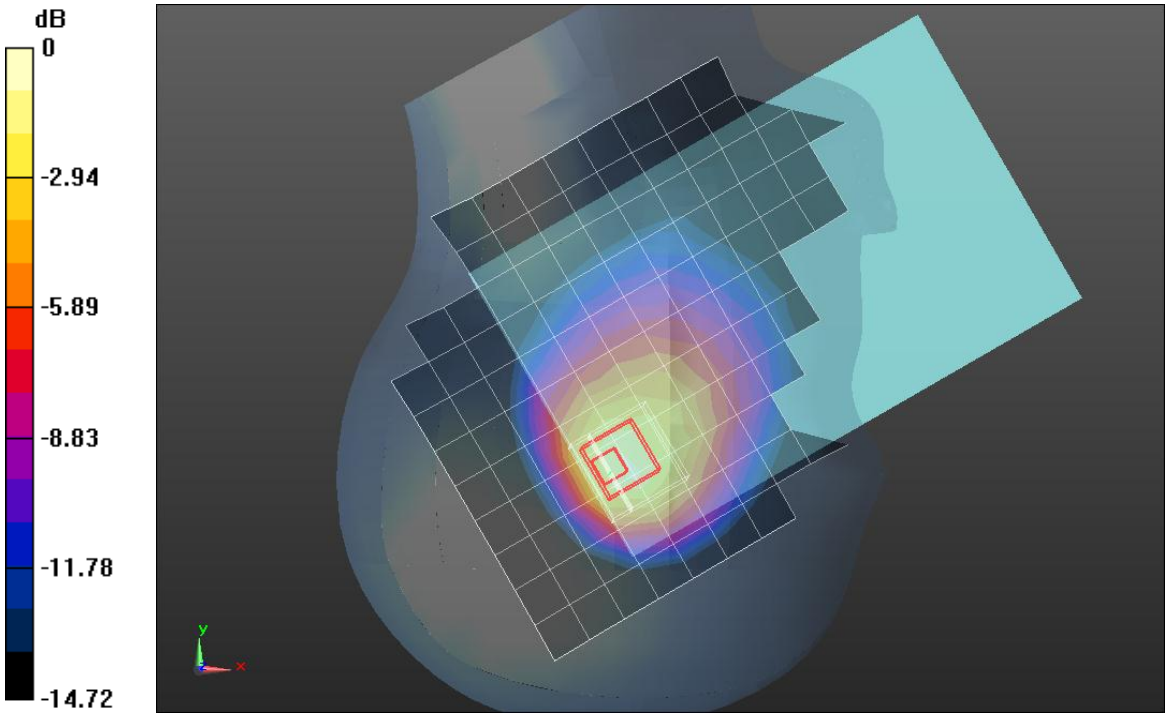
Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

WCDMA UMTS Band II

Frequency: 836.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.892 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(9.81, 9.81, 9.81); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1629

Right/Touch_R.99_Ch 4183/Area Scan (12x17x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.437 mW/g

Right/Touch_R.99_Ch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.060 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.6780
SAR(1 g) = 0.390 mW/g; SAR(10 g) = 0.233 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.502 mW/g



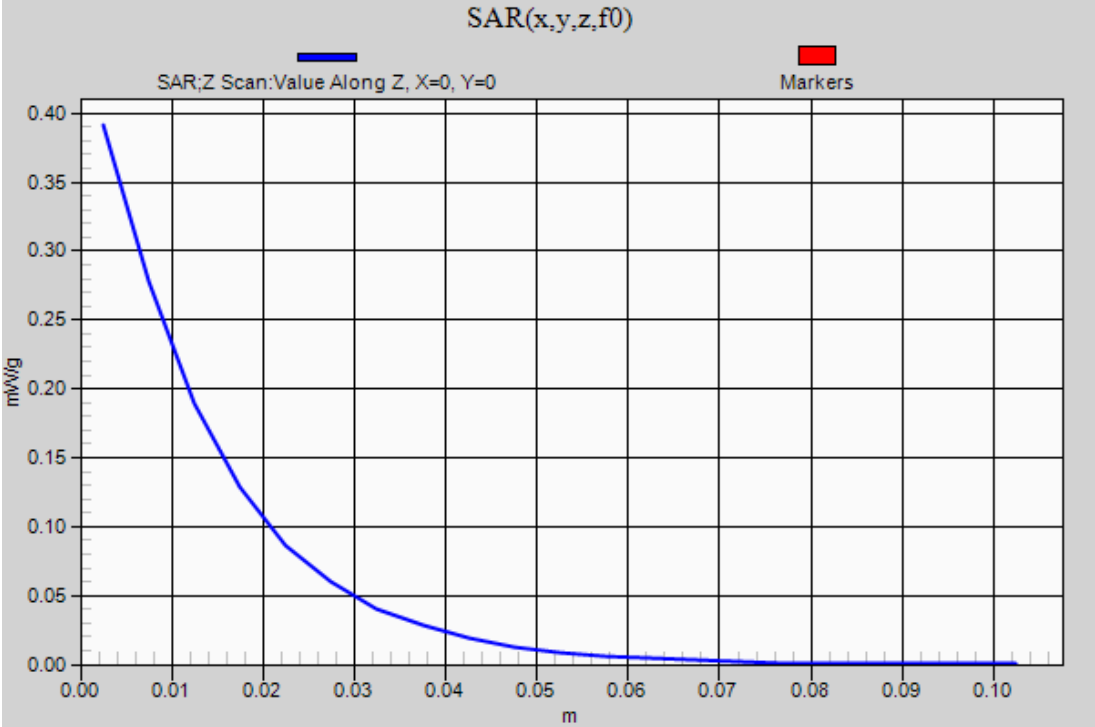
0 dB = 0.500mW/g = -6.02 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

WCDMA UMTS Band II

Frequency: 836.6 MHz; Duty Cycle: 1:1

Right/Touch_R.99_Ch 4183/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.391 mW/g



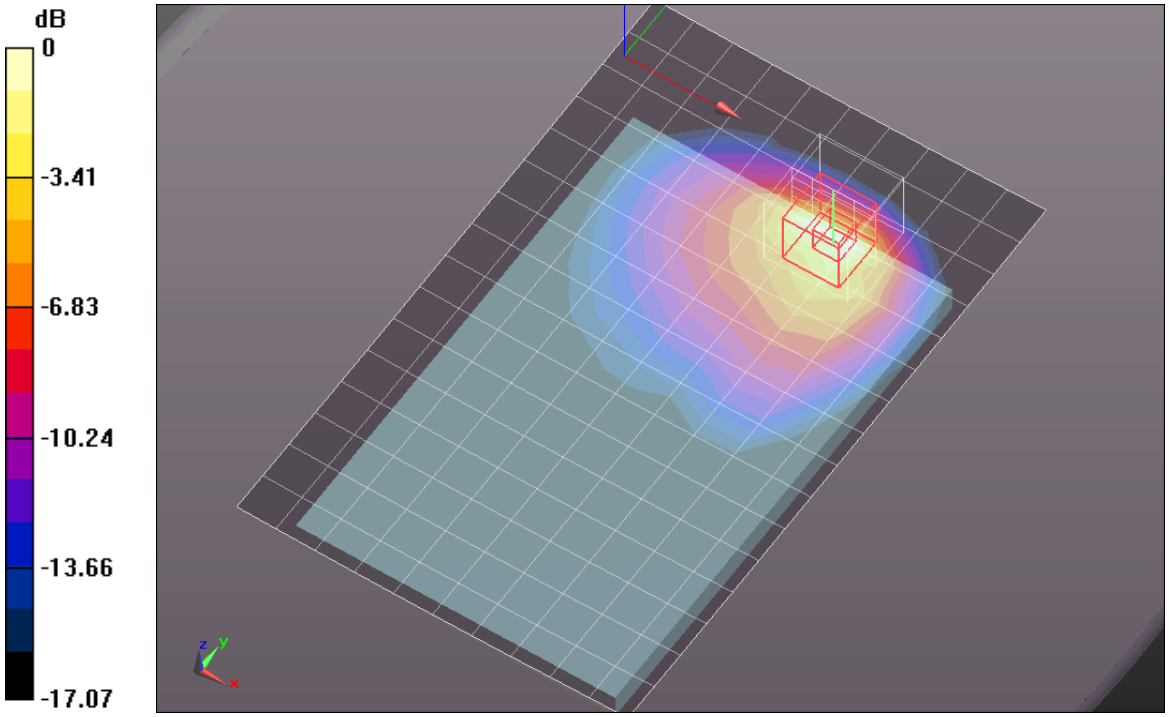
Test Laboratory: UL CCS SAR Lab B Date: 3/26/2012

WCDMA UMTS Band V

Frequency: 836.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.992 mho/m; ε_r = 55.844; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(10, 10, 10); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear_0mm/R99_Ch 4183/Area Scan (11x17x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.445 mW/g

Rear_0mm/R99_Ch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.472 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.6140
SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.171 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.434 mW/g



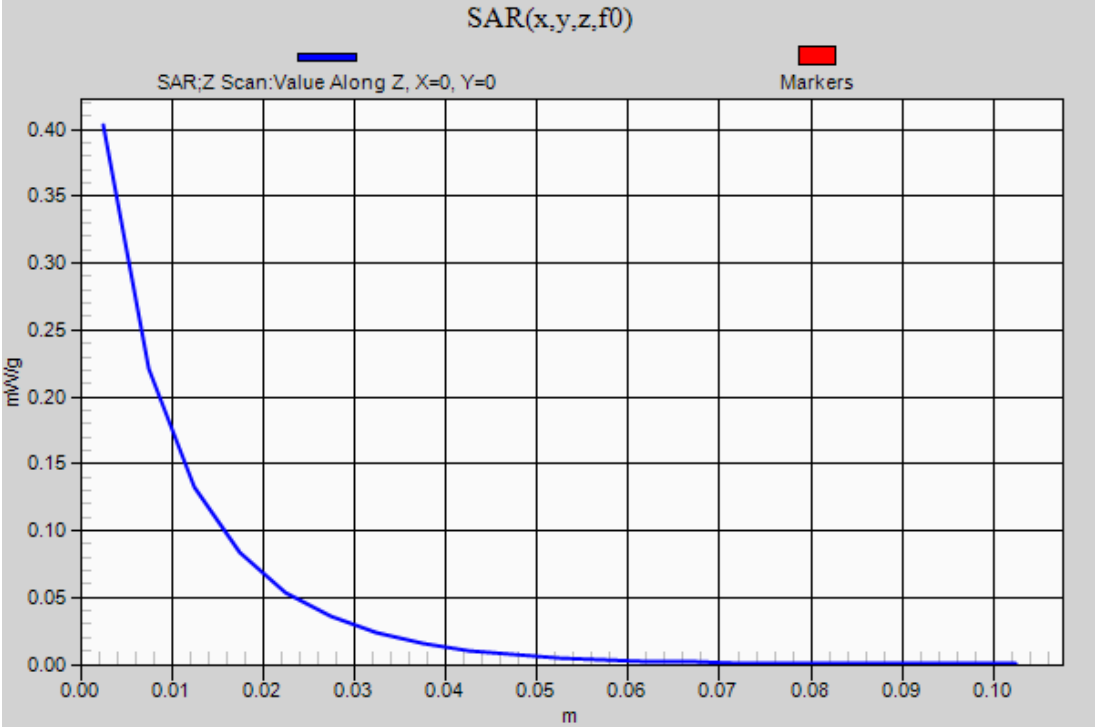
0 dB = 0.430mW/g = -7.33 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/26/2012

WCDMA UMTS Band V

Frequency: 836.6 MHz; Duty Cycle: 1:1

Rear_0mm/R99_Ch4183 w/headset/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.403 mW/g



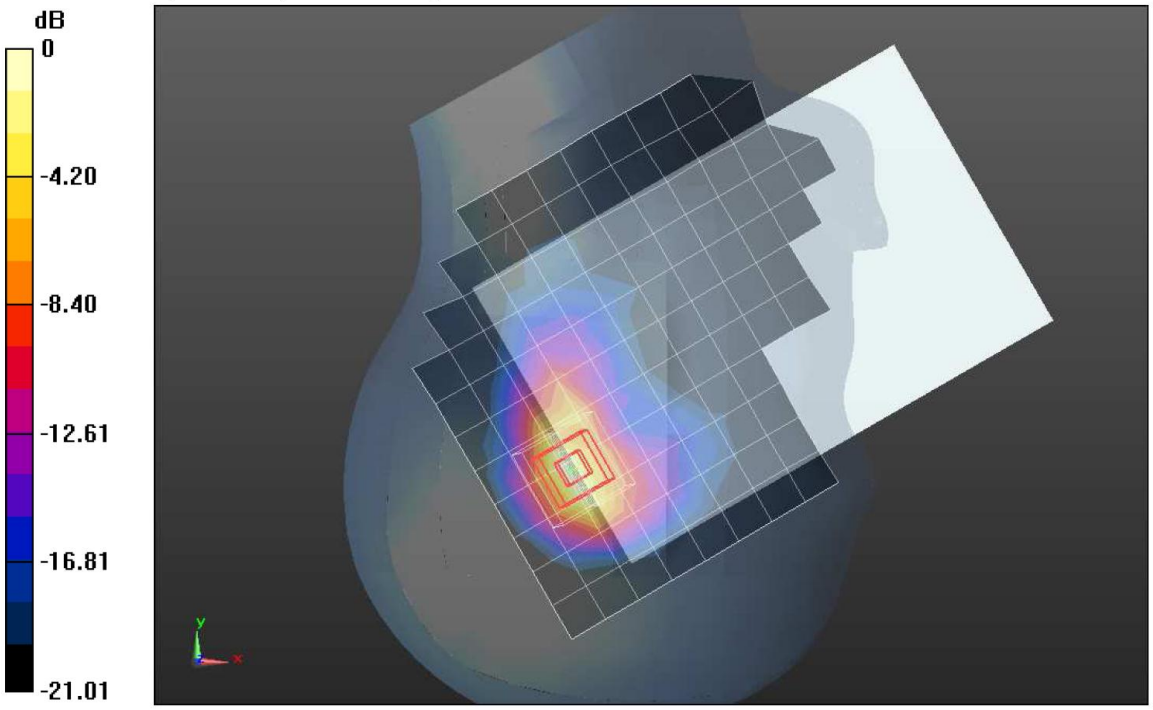
Test Laboratory: UL CCS SAR Lab B Date: 3/24/2012

WCDMA UMTS Band II

Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.375 mho/m; ε_r = 39.898; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(8.53, 8.53, 8.53); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: SAM; Type: QD000P40CD; Serial: 1629

Right/Tilt_Rel99_Ch9400/Area Scan (12x16x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.818 mW/g

Right/Tilt_Rel99_Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.344 V/m; Power Drift = -0.0048 dB
Peak SAR (extrapolated) = 1.3910
SAR(1 g) = 0.693 mW/g; SAR(10 g) = 0.317 mW/g
Maximum value of SAR (measured) = 0.924 mW/g



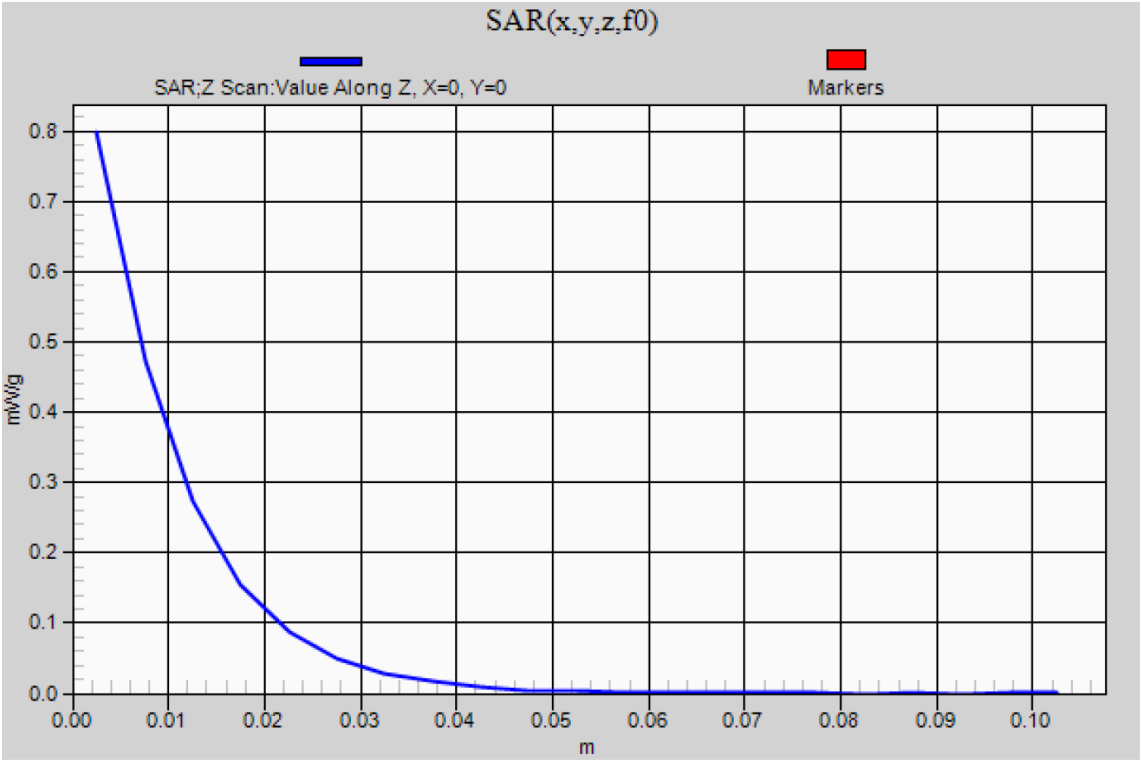
0 dB = 0.920mW/g = -0.72 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/24/2012

WCDMA UMTS Band II

Frequency: 1880 MHz; Duty Cycle: 1:1

Right/Tilt_Rel99_Ch9400/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.798 mW/g



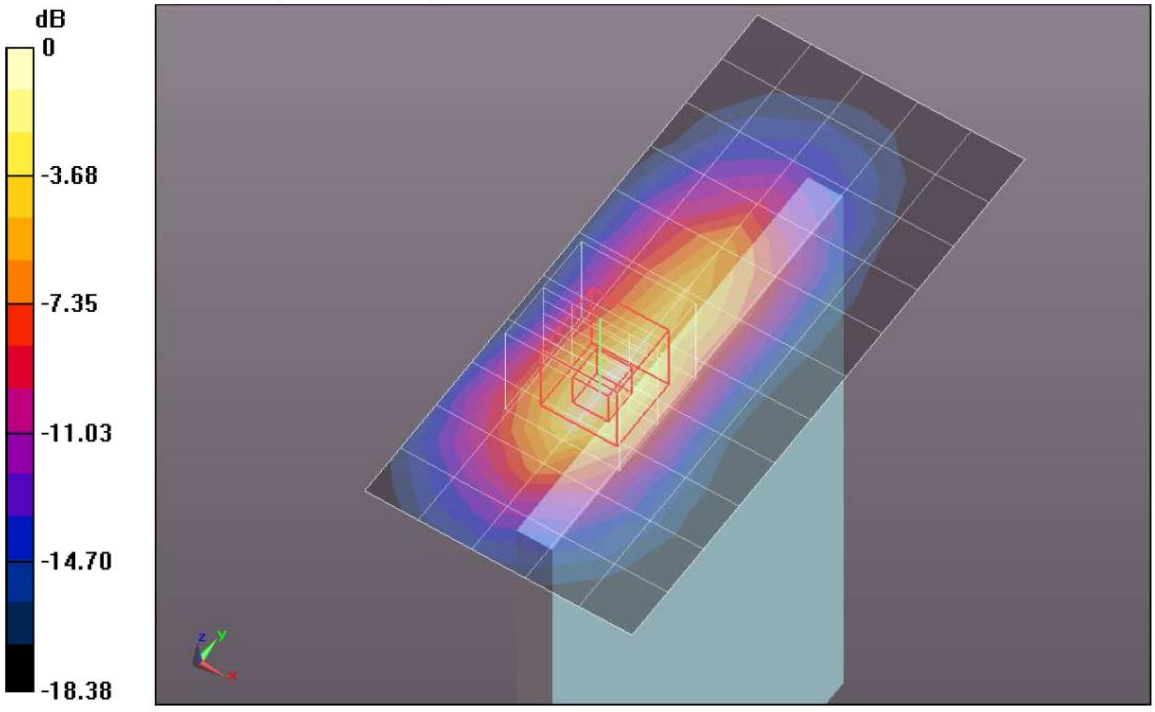
Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

WCDMA UMTS Band II

Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.488 mho/m; ε_r = 53.354; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(7.91, 7.91, 7.91); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge_1_5mm/R.99_Ch 9400/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.031 mW/g

Edge_1_5mm/R.99_Ch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.057 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.3980
SAR(1 g) = 0.790 mW/g; SAR(10 g) = 0.402 mW/g
Maximum value of SAR (measured) = 1.058 mW/g



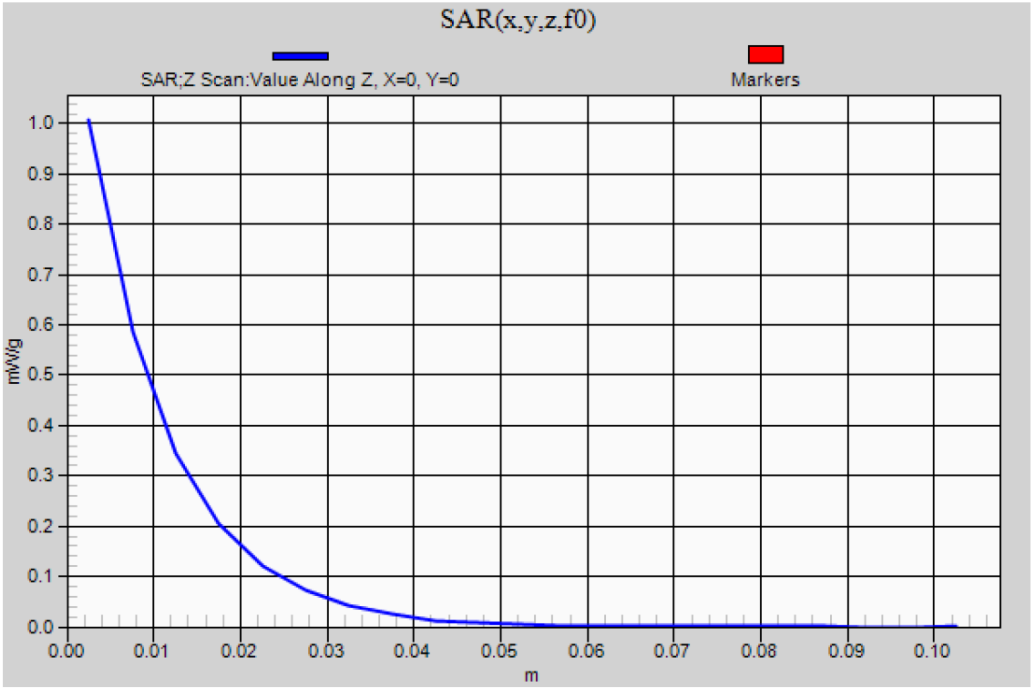
0 dB = 1.060mW/g = 0.51 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/27/2012

WCDMA UMTS Band II

Frequency: 1880 MHz; Duty Cycle: 1:1

Edge_1_5mm/R.99_Ch 9400/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.007 mW/g



Test Laboratory: UL CCS SAR Lab B Date: 3/22/2012

WiFi 2.4GHz Band

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.776 mho/m; ε_r = 38.253; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(7.4, 7.4, 7.4); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

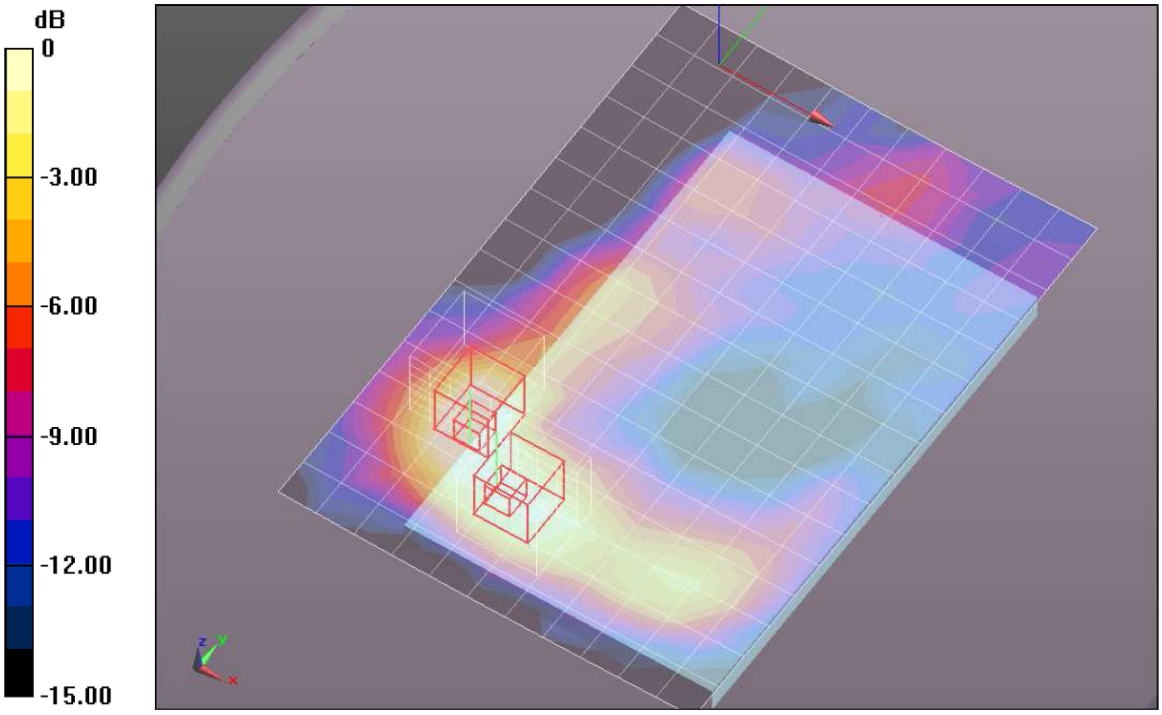
Flat Phantom/802.11b, ch 6/Area Scan (12x17x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.061 mW/g

Flat Phantom/802.11b, ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.090 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.1010
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.026 mW/g
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.073 mW/g

Flat Phantom/802.11b, ch 6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.090 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.0700
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.022 mW/g
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.053 mW/g



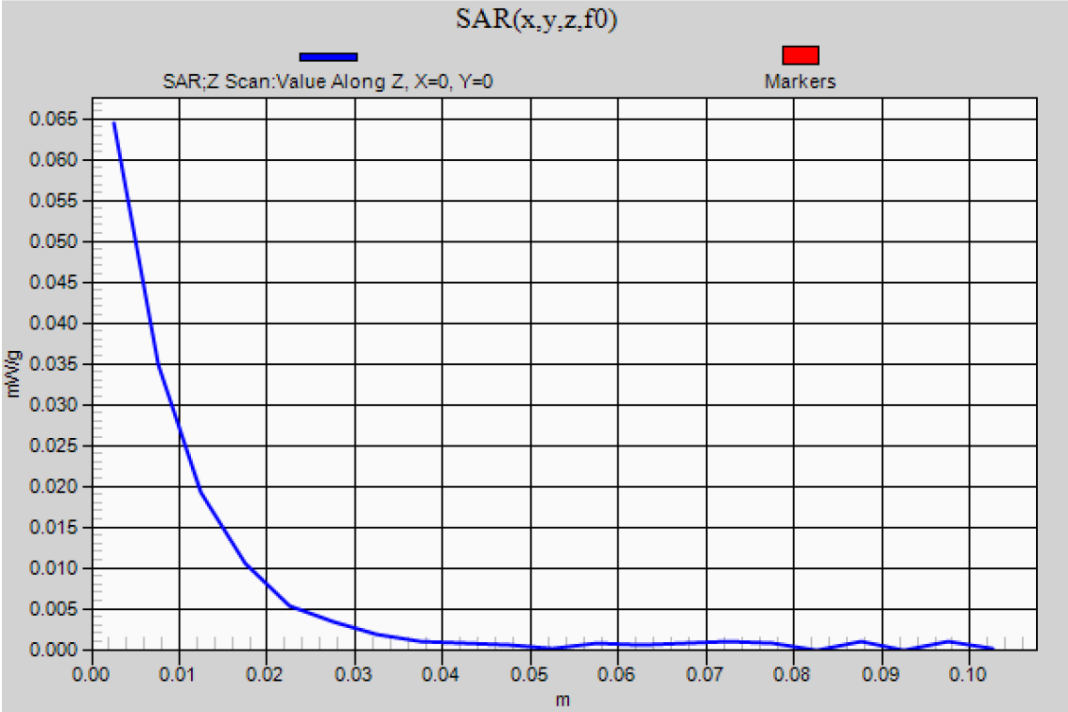
0 dB = 0.050mW/g = -26.02 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/22/2012

WiFi 2.4GHz Band

Frequency: 2437 MHz; Duty Cycle: 1:1

Flat Phantom/802.11b, ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.064 mW/g



Test Laboratory: UL CCS SAR Lab B Date: 3/22/2012

WiFi 2.4GHz Band

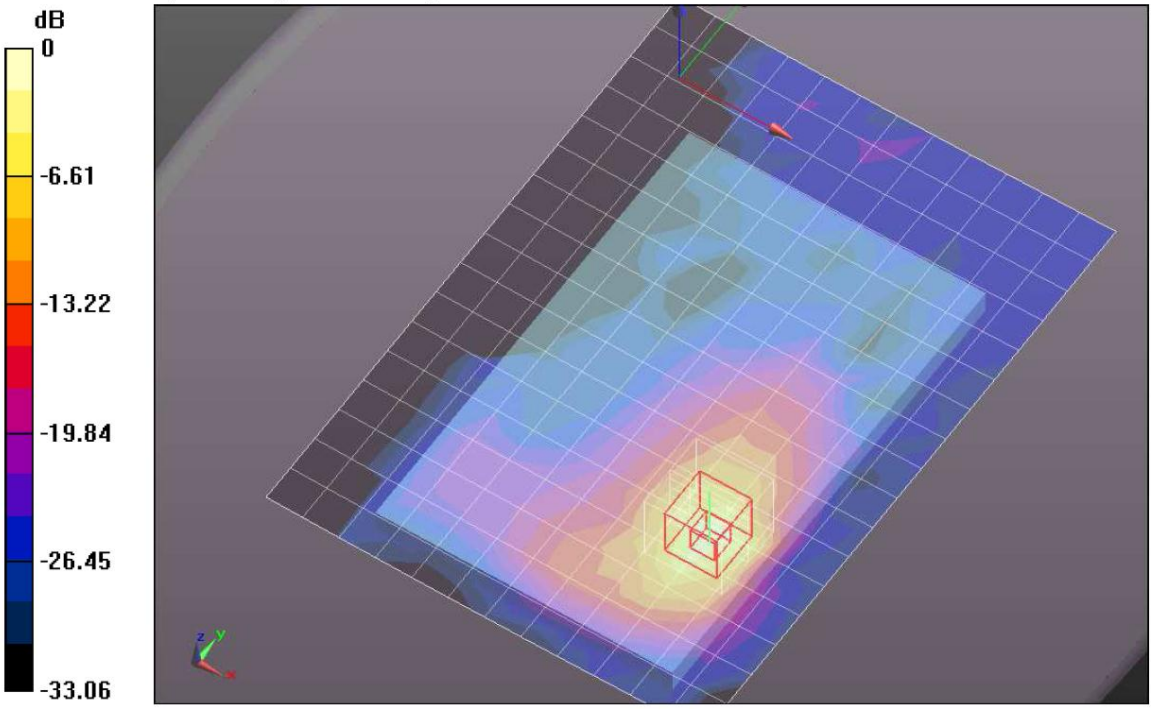
Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.972 mho/m; ε_r = 51.259; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV3 - SN3531; ConvF(7.44, 7.44, 7.44); Calibrated: 12/19/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear/802.11b, ch 6/Area Scan (13x18x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.573 mW/g

Rear/802.11b, ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.178 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.5510
SAR(1 g) = 0.563 mW/g; SAR(10 g) = 0.225 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.959 mW/g



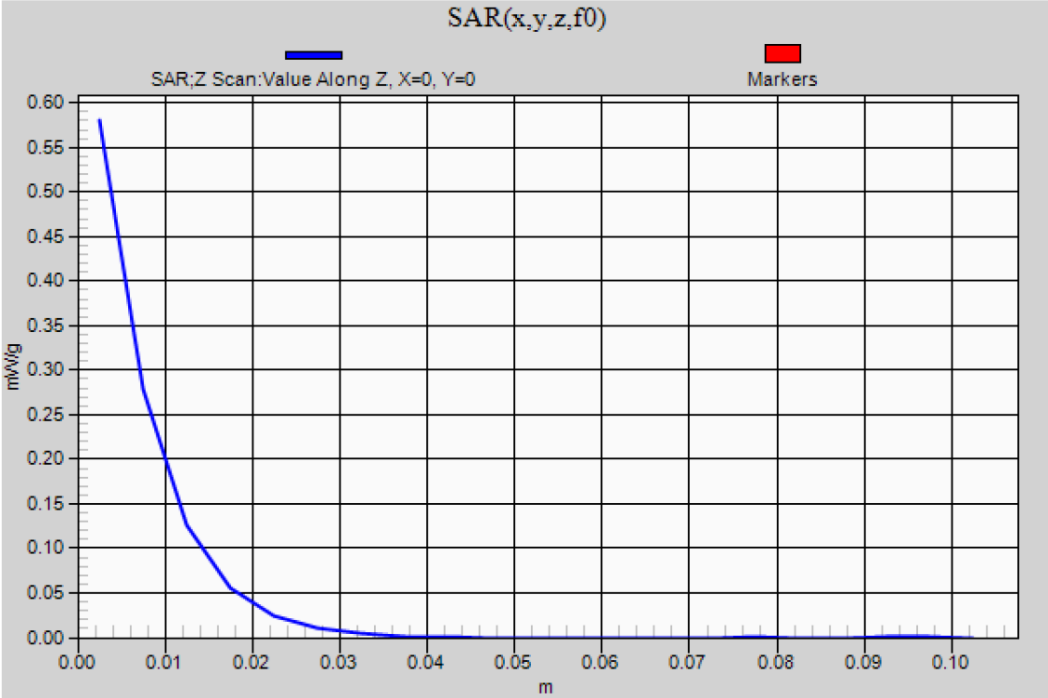
0 dB = 0.960mW/g = -0.35 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 3/22/2012

WiFi 2.4GHz Band

Frequency: 2437 MHz; Duty Cycle: 1:1

Rear/802.11b, ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.580 mW/g



14. Simultaneous Transmission SAR Analysis

As Bluetooth's maximum average power is less than 25 mW [<60/f(GHz) mW] standalone SAR is not required. Therefore, WiFi and Bluetooth simultaneous transmission SAR evaluation is not required.

Head

Test Position	GSM850	GSM1900	WCDMA UMTS Band V	WCDMA UMTS Band II	WiFi	Σ 1g SAR (mW/g)
Left Touch	0.261				0.054	0.315
		0.246			0.054	0.300
			0.194		0.054	0.248
				0.353	0.054	0.407
Left Tilt	0.316				0.054	0.370
		0.221			0.054	0.275
			0.220		0.054	0.274
				0.365	0.054	0.419
Right Touch	0.504				0.054	0.558
		0.611			0.054	0.665
			0.390		0.054	0.444
				0.680	0.054	0.734
Right Tilt	0.476				0.054	0.530
		0.562			0.054	0.616
			0.292		0.054	0.346
				0.693	0.054	0.747

Body

Test Position	GSM850	GSM1900	WCDMA UMTS Band V	WCDMA UMTS Band II	WiFi	Σ 1g SAR (mW/g)
Rear	0.757				0.563	1.320
		0.530			0.563	1.093
			0.330		0.563	0.893
				0.597	0.563	1.160
Edge 4	0.322				0.362	0.684
		0.388			0.362	0.750
			0.183		0.362	0.545
				0.434	0.362	0.796
Edge 1 at 45° (Vertex)	0.158				0.152	0.310
		0.412			0.152	0.564
			0.105		0.152	0.257
				0.441	0.152	0.593

15. Appendixes

Refer to separated files for the following appendixes.

15.1. System Performance Check Plots

15.2. SAR Test Plots for GSM850

15.3. SAR Test Plots for GSM1900

15.4. SAR Test Plots for WCDMA (UMTS) Band V

15.5. SAR Test Plots for WCDMA (UMTS) Band II

15.6. SAR Test Plots for WiFi 2.4 GHz Band

15.7. Calibration Certificate for E-Field Probe EX3DV3 - SN 3531

15.8. Calibration Certificate for D835V2 - SN 4d117

15.9. Calibration Certificate for D1900V2 - SN 5d043

15.10. Calibration Certificate for D2450V2 - SN 748