FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE Std 1528-2003 and 1528a-2005

SAR EVALUATION REPORT

For
Tablet (Pad) Computer

Model: TP00043A
FCC ID: PU5-TP00043AEF

Report Number: 12U14468-5, Revision C
Issue Date: 11/9/2012

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/3/2012	Initial Issue	--
A	10/12/2012	Updated company address	A. Zaffar
B	10/30/2012	Corrected Wi-Fi target power levels and updated scaled results accordingly	Dave Weaver
		Added a brief description of scaling to section 13	
C	11/9/2012	Corrected mistyped power level in section 10.1	
		Added explanatory notes to section14 detailing simultaneous analysis rationale	
		Corrected table in section 7.5	Dave Weaver

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1. Attestation of Test Results

Applicant	Wistron Corporation		
DUT description	Tablet (Pad) Computer		
Model	TP00043A		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	6/14/2012-6/25/2012, 8/15/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22H	824-849 MHz	Body: 1.320 mW/g (Edge1)	1.6 mW/g
24E	1850-1910 MHz	Body: 1.340 mW/g (Rear with 20º Tilt @Edge1)	
15.247	2412-2462	Body: 1.310 mW/g (Rear)	
	5725-5850	Body: 0.894 mW/g (Edge3)	
15.407	5150-5250	Body: 0.617 mW/g (Edge3)	
	5250-5350	Body: 0.368 mW/g (Edge3)	
	5500-5700	Body: 0.739 mW/g (Edge3)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003 and 1528a-2005			Pass

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
Program Manger
UL CCS

Tested By:

Kent Huang
SAR Engineer
UL CCS

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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 & 1528a-2005, and the following KDB Procedures:

- 447498 D01 Mobile Portable RF Exposure v04
- 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
- 941225 D06 Hot Spot SAR v01
- 248227 D01 SAR meas for 802 11abg v01r02
- Power Reduction by Sensing (April/October 2011 TCB Workshop SAR Updates)

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.

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4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

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

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	Agilent	8960	GB46160222	6	19	2013
Base Station Simulator	R & S	CMU 200	106291	6	24	2012
Base Station Simulator	Anritsu	MT8820C	6200985430	6	17	2012
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
E-Field Probe	SPEAG	EX3DV4	3686	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3772	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
Thermometer	ERTCO	639-1S	1718	7	19	2012
Thermometer	ERTCO	639-1S	8350	7	30	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
Data Acquisition Electronics	SPEAG	DAE4	1259	2	13	2013
Data Acquisition Electronics	SPEAG	DAE3	500	6	13	2013
System Validation Dipole	SPEAG	D835V2	4d002	3	6	2013
System Validation Dipole	SPEAG	D1900V2	5d043	11	10	2012
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
System Validation Dipole	SPEAG	D5GHzV2	1075	2	14	2013
Power Meter	HP	8481A	2720A66876	8	1	2013
Power Sensor	HP	438A	2822A05684	10	7	2013
Power Meter	HP	8481A	2237A31744	8	17	2013
Power Sensor	HP	438A	3513U04320	9	17	2012
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

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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	**-3.14**	Normal	1	0.64	-2.01
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	**-2.78**	Normal	1	0.6	-1.67
				Combined Standard Uncertainty Uc(y) =	10.08
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 20.17 %	
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.60 dB	

Measurement uncertainty for 3 to 6 GHz averaged over 1 gram

Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	**6.55**	Normal	1	1	6.55
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	1.00	Normal	1	1	1.00
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	3.90	Rectangular	1.732	1	2.25
Test Sample Related					
Test Sample Positioning	1.10	Normal	1	1	1.10
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	**-4.34**	Normal	1	0.64	-2.78
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	**4.95**	Normal	1	0.6	2.97
				Combined Standard Uncertainty Uc(y), %:	11.21
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence = 21.98 %	
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence = 1.73 dB	

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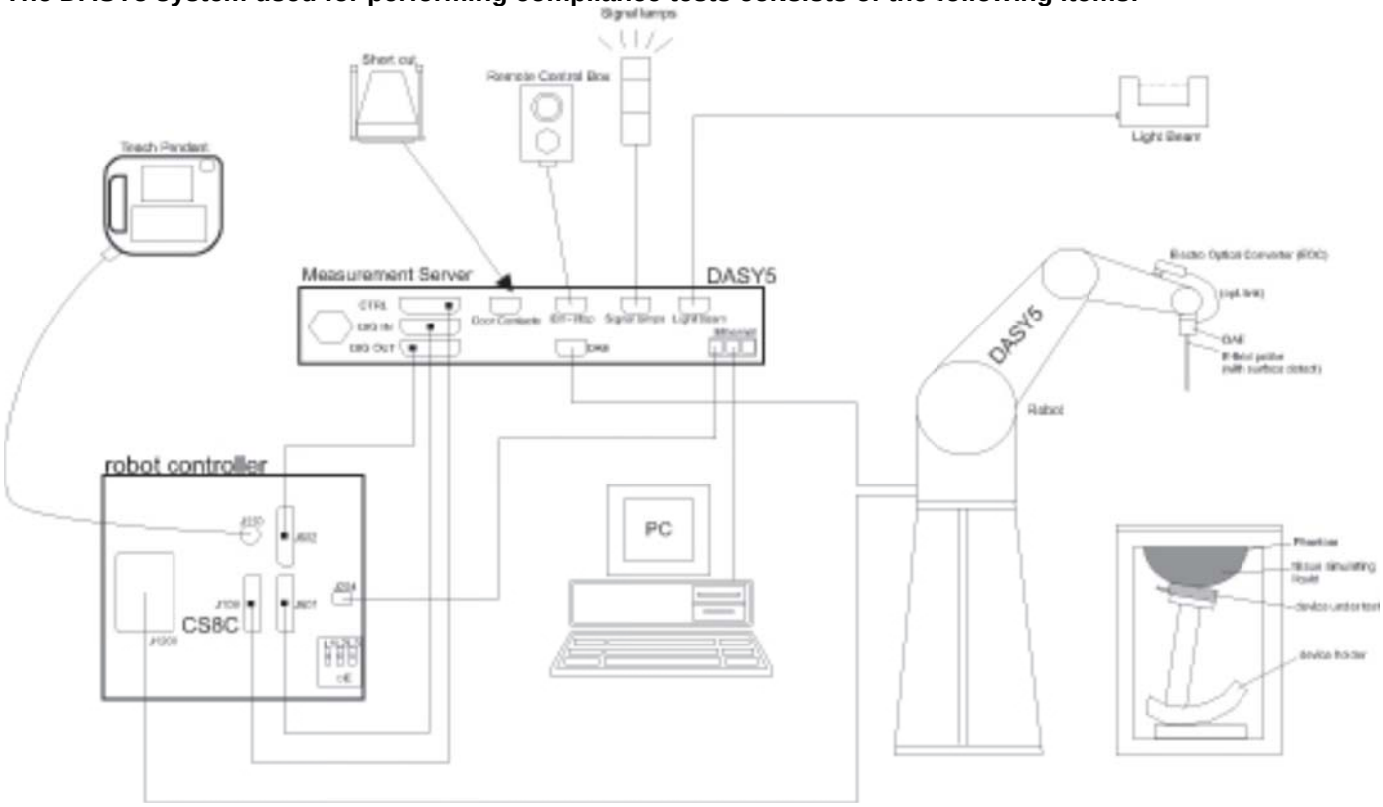
5. Measurement System Description and Setup

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



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

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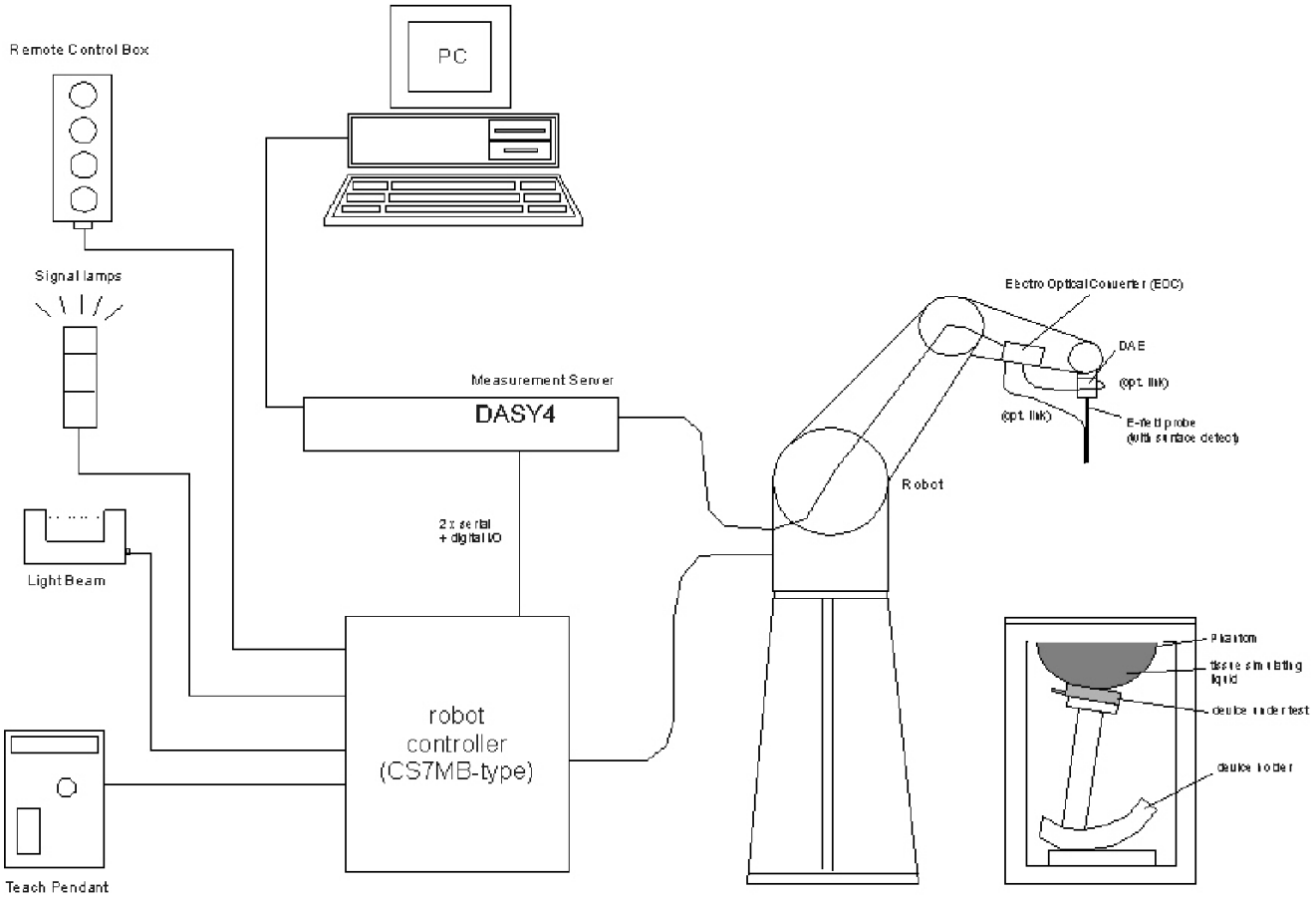
The DASY4 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid.
- 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 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows XP.
- DASY software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing validating the proper functioning of the system.

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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.

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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.

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7. Device Under Test

10.1 inch Tablet with GSM+UMTS+WIFI Bands +BT 3.0+LE Model: TP00043A	
Normal operation	Body (Rear/bottom and each edge): Multiple display orientations supporting both portrait and landscape configurations
Device Dimension (mm)	266 mm(L) x 163 mm(W) x 8 mm (H)
Antenna Tested	Manufacturer / Part number Wistron: WWAN Main Ant: 25.90ADM.001 WWAN Aux Ant: 25.90ADO.001 Wistron: WLAN Main Ant: 25.90ADN.001 WLAN Aux. Ant: 25.90ADP.001
WWAN and WLAN radio modules	Ericsson Model: C5621 Broadcom Model: BCM94330LGA

7.1. Band and Air Interfaces

Air Interfaces	- GSM, GPRS and EGPRS Class 10 - W-CDMA (UMTS) Rel 99, HSDPA (Rel 6, CAT 10), HSUPA (Rel 6, CAT 6) - 802.11a/b/g/n HT20 - Bluetooth Ver 3.0 + LE
Tx Frequency Bands	- GSM850: 824 - 849 MHz - GSM1900: 1850 - 1910 MHz - W-CDMA (UMTS) Band V: 824 - 849 MHz - W-CDMA (UMTS) Band II: 1850 - 1910 MHz - 802.11a/b/g/n: 2412 - 2462 MHz 5180 - 5240 MHz 5260 - 5320 MHz 5500 - 5700 MHz 5745 - 5825 MHz - Bluetooth: 2402 - 2480 MHz Notes: 1. There are two WLAN antennas. Wi-Fi 2.4GHz Band and BT only transmit on the Main antenna. Wi-Fi 5 GHz Bands only transmit on the Aux antenna. 2. There are two WWAN antennas. The WWAN Aux antenna is receive only.

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7.2. Simultaneous Transmission

No.	Conditions	Head	Body	Hotspot
1	GSM850 GPRS + WiFi	☐	☒	☒
2	GSM1900 GPRS + WiFi	☐	☒	☒
3	W-CDMA (UMTS) Band V+ WiFi	☐	☒	☒
4	W-CDMA (UMTS) Band II+ WiFi	☐	☒	☒
5	GSM850 GPRS + BT	☐	☒	☐
6	GSM1900 GPRS + BT	☐	☒	☐
7	W-CDMA (UMTS) Band V+ BT	☐	☒	☐
8	W-CDMA (UMTS) Band II+ BT	☐	☒	☐
9	WiFi 5GHz Bands+ BT	☐	☒	☐

Note(s):

1. 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.
2. WiFi 2.4GHz band and BT cannot simultaneously transmit.
3. Only WiFi 2.4 GHz Band supports hotspot function.

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 Reduction Implementation

When a proximity sensor is enabled, system will reduce the WWAN module TX power. The proximity sensor convers the Rear/Bottom, Top-edge (Edge 1) and Secondary portrait (Edge 4) of the DUT and the trigger distances are:

- 18 mm from Bottom (Rear) of the DUT
- 18 mm from Top-edge (Edge 1) of the DUT
- 18 mm from Top-edge (Edge 4) of the DUT

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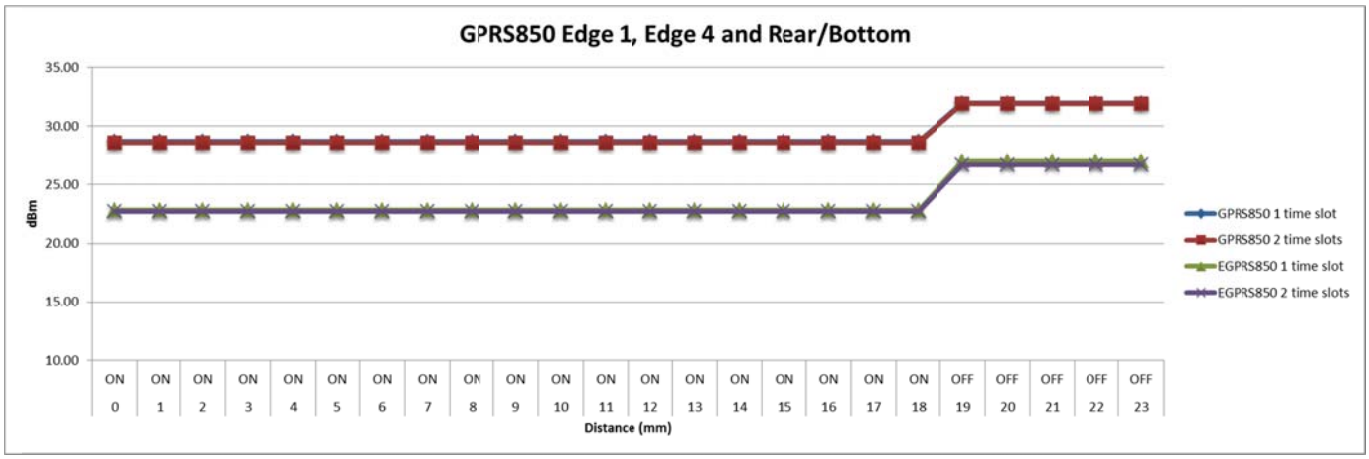
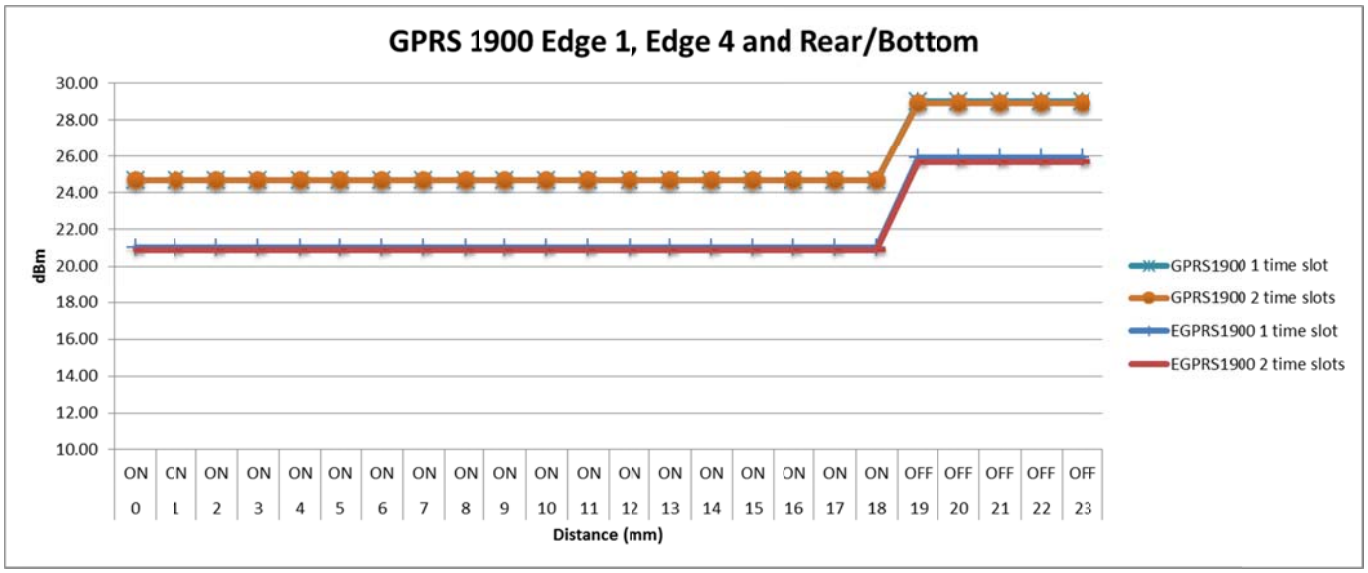
7.5. Summary Table of Power Reduction dB Levels per Mode & Band

Edge 1, Edge4 and Rear/Base																								
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
GPRS850 1 time slot	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	32.00	32.00	32.00	32.00	32.00
GPRS850 2 time slots	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	28.40	31.90	31.90	31.90	31.90	31.90
EGPRS850 1 time slot	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	27.00	27.00	27.00	27.00	27.00
EGPRS850 2 time slots	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	26.70	26.70	26.70	26.70	26.70
GPRS1900 1 time slot	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	29.00	29.00	29.00	29.00	29.00
GPRS1900 2 time slots	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	28.90	28.90	28.90	28.90	28.90
EGPRS1900 1 time slot	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	25.90	25.90	25.90	25.90	25.90
EGPRS1900 2 time slots	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	25.70	25.70	25.70	25.70	25.70





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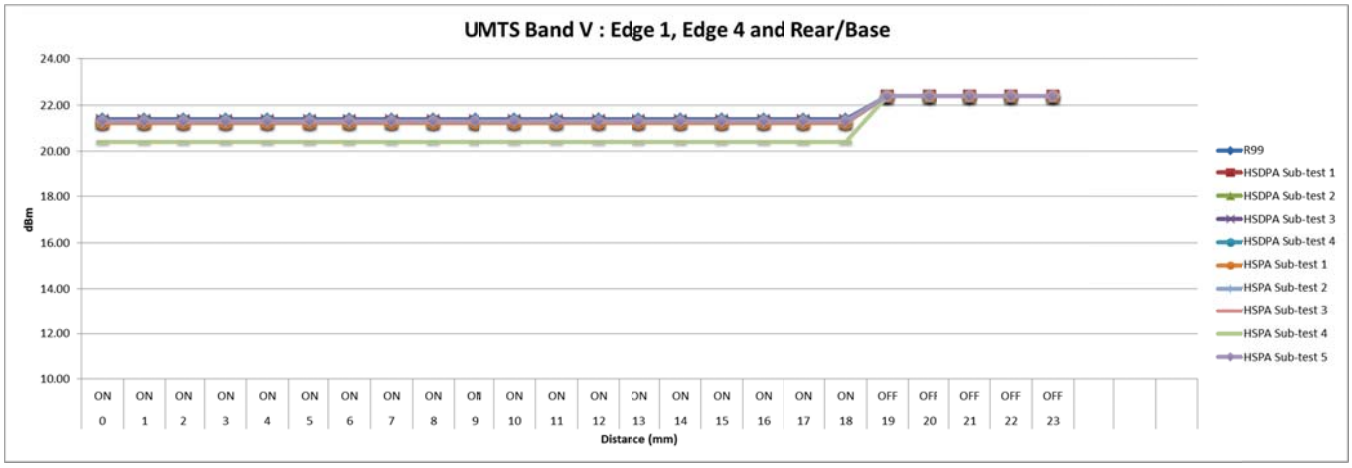
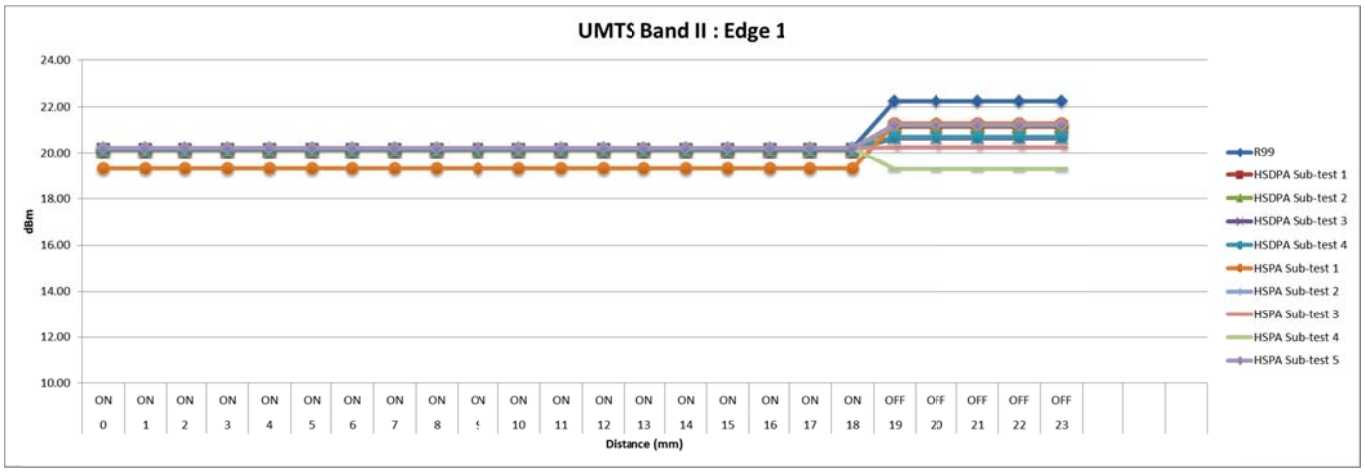
Summary Table of Power Reduction dB Levels per Mode & Band (continued)

Edge 1, Edge 4 and Rear/Base (UMTS Band V)																								
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
R99	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.40	22.40	22.40	22.40	22.40	22.40
HSDPA Sub-test 1	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	21.28	22.40	22.40	22.40	22.40	22.40
HSDPA Sub-test 2	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	21.32	22.40	22.40	22.40	22.40	22.40
HSDPA Sub-test 3	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	21.33	22.40	22.40	22.40	22.40	22.40
HSDPA Sub-test 4	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	21.31	22.40	22.40	22.40	22.40	22.40
HSPA Sub-test 1	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	22.40	22.40	22.40	22.40	22.40
HSPA Sub-test 2	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	21.27	22.40	22.40	22.40	22.40	22.40
HSPA Sub-test 3	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	22.40	22.40	22.40	22.40	22.40
HSPA Sub-test 4	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41	22.40	22.40	22.40	22.40	22.40
HSPA Sub-test 5	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	21.30	22.40	22.40	22.40	22.40	22.40



Edge 1, Edge 4 and Rear/Base (UMTS Band II)																								
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
R99	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	22.25	22.25	22.25	22.25	22.25
HSDPA Sub-test 1	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	20.17	21.15	21.15	21.15	21.15	21.15
HSDPA Sub-test 2	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	20.14	21.19	21.19	21.19	21.19	21.19
HSDPA Sub-test 3	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.65	20.65	20.65	20.65	20.65
HSDPA Sub-test 4	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.18	20.68	20.68	20.68	20.68	20.68
HSPA Sub-test 1	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	19.30	21.27	21.27	21.27	21.27	21.27
HSPA Sub-test 2	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	21.24	21.24	21.24	21.24	21.24
HSPA Sub-test 3	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.24	20.24	20.24	20.24	20.24
HSPA Sub-test 4	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	20.22	19.29	19.29	19.29	19.29	19.29
HSPA Sub-test 5	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	21.23	21.23	21.23	21.23	21.23



Note – When power reduction is enabled MPR is disabled which may cause some power levels to increase or remain the same.

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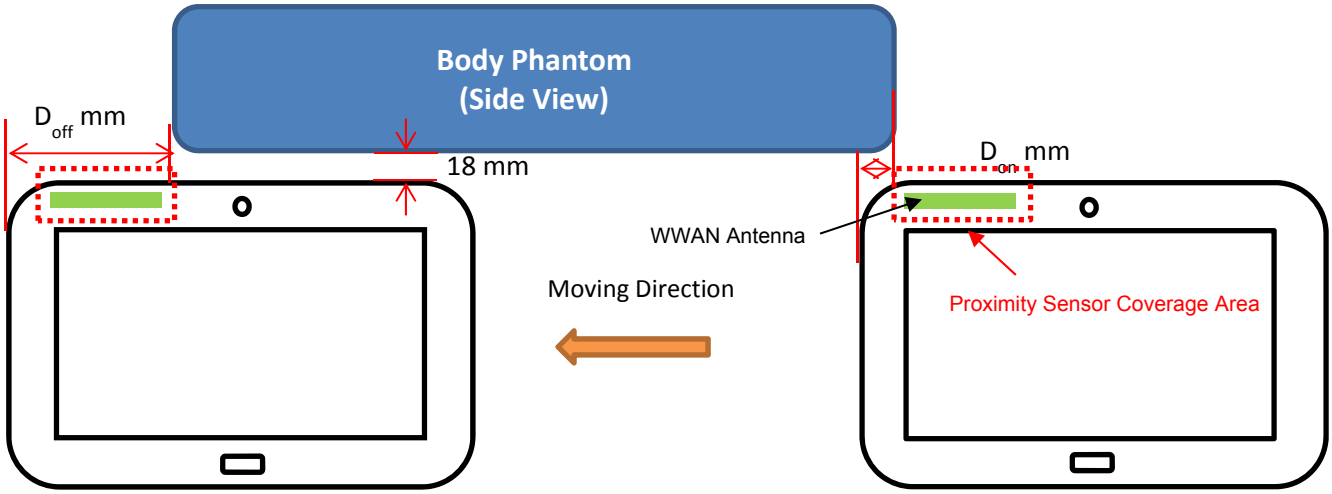
Sensor Coverage Area

7.1. Edge Coverage



The DUT is positioned perpendicular to the phantom with the test separation distance, 11 mm, away from the phantom. The DUT is moved laterally to find the distance of triggering sensor on and off

- The minimum distance from the secondary portrait (Edge 4) to the edge of body phantom to trigger proximity sensor on, D_{on}, is 0mm.
- The minimum distance from the secondary portrait (Edge 4) to the edge of body phantom to trigger proximity sensor off, D_{off}, is 120mm.

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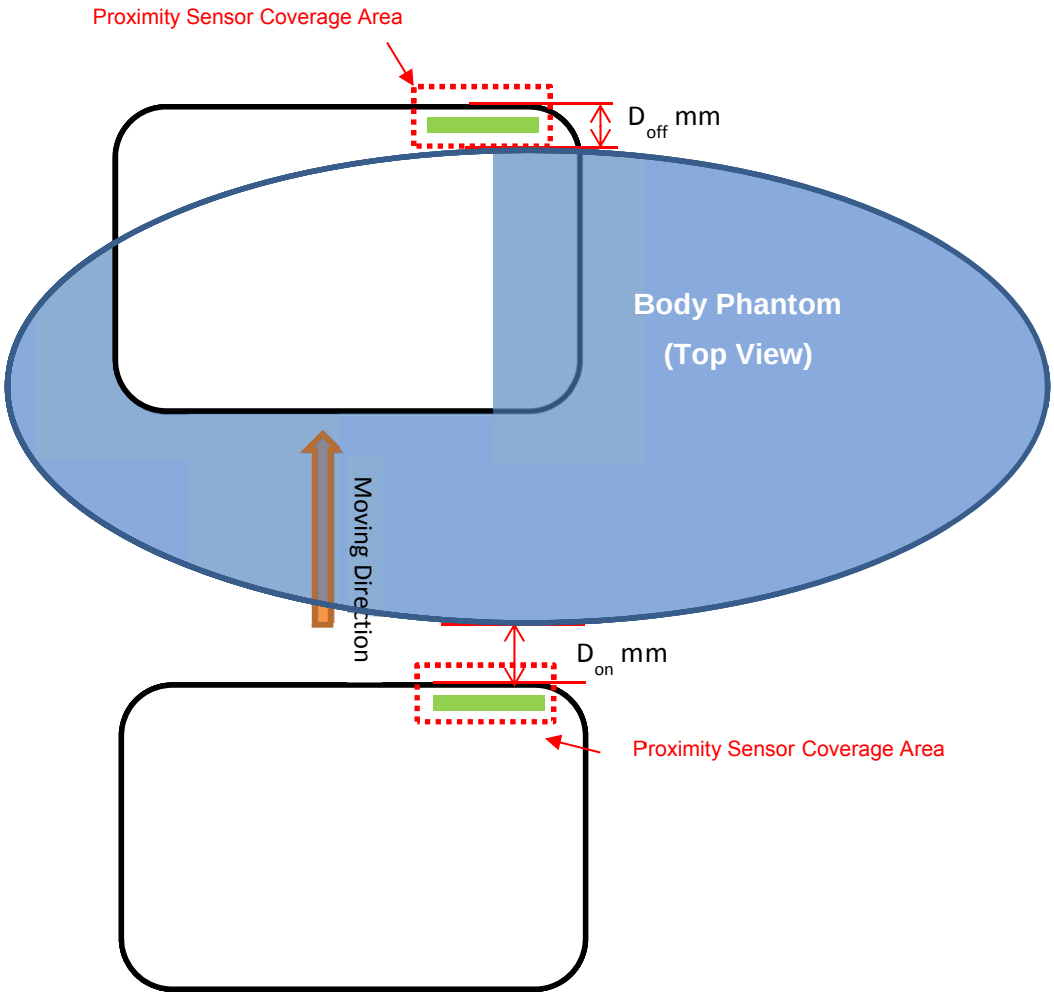
7.2. Rear/Bottom Coverage



The DUT is positioned under the phantom with the test separation distance, 11 mm, away from the phantom. The DUT is moved laterally to find the distance of triggering sensor on and off

- The minimum distance from the secondary landscape (Edge 1) to the edge of body phantom to trigger proximity sensor on, D_{on}, is 0mm.
- The minimum distance from the secondary landscape (Edge 1) to the edge of body phantom to trigger proximity sensor off, D_{off}, is 50mm.

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8. Summary of Test Configurations

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

8.1. Body Test Condition for WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	4.05 mm	Yes	
Rear (20° Tilt at Edge1)	< 25 mm	Yes	This is the most conservative antenna-to-user distance at base/bottom mode
Edge 1	2.5 mm	Yes	
Edge 2	168.3 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 3	152.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 4	24.3 mm	Yes	

8.2. Body Test Conditions for WiFi 2.4GHz Band

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	4.05 mm	Yes	
Rear (20° Tilt at Edge1)	< 25 mm	Yes	This is the most conservative antenna-to-user distance at base/bottom mode
Edge 1	2.5 mm	Yes	
Edge 2	23.9 mm	Yes	
Edge 3	152.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 4	211.7 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)

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8.3. Body Test Conditions for WiFi 5GHz Bands

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	6.45 mm	Yes	
Rear (20° Tilt at Edge 3)	< 25 mm	Yes	This is the most conservative antenna-to-user distance at base/bottom mode
Edge 1	156.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 2	39.5 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 3	2.5 mm	Yes	
Edge 4	182.6 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)

8.4. Rear 20° Tilt testing justification

The rear of the DUT has a 20° bevel along each edge. As a result the most conservative antenna-to-user distance occurs when the beveled edge is placed directly against the user's body. Testing with the beveled edge placed directly against the phantom was considered necessary to ensure compliance.

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9. RF Output Power Measurement

9.1. GSM850

GMSK(GPRS) - Coding Scheme: CS1

Target Power: 32 dBm (without Power Back-off)
28 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dB / +1.0dB

GMSK(GPRS) Mode without Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	32.0	23.0	31.9	25.9
	190	836.6	32.0	23.0	31.9	25.9
	251	848.8	32.0	23.0	31.9	25.9

GMSK (GPRS) Mode with Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	28.5	19.5	28.4	22.4
	190	836.6	28.5	19.5	28.4	22.4
	251	848.8	28.5	19.5	28.4	22.4

Notes:

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

- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Target Power: 27 dBm (without Power Back-off)
23 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dB / +1.0dB

8PSK (EGPRS) Mode without Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	27.0	18.0	26.7	20.7
	190	836.6	27.0	18.0	26.7	20.7
	251	848.8	26.9	17.9	26.7	20.7

8PSK (EGPRS) Mode with Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	22.8	13.8	22.7	16.7
	190	836.6	22.8	13.8	22.7	16.7
	251	848.8	22.8	13.8	22.7	16.7

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9.2. GSM1900

GMSK (GPRS) Mode - Coding Scheme: CS1

Target Power: 29 dBm (without Power Back-off)
24 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dB / +1.0dB

GMSK (GPRS) Mode without Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	30.0	21.0	30.0	24.0
	661	1880.0	29.0	20.0	28.9	22.9
	810	1909.8	29.0	20.0	28.9	22.9

GMSK (GPRS) Mode with Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	25.0	16.0	25.0	**19.0**
	661	1880.0	24.7	15.7	24.7	18.7
	810	1909.8	24.4	15.4	24.4	18.4

Notes:

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

- Body: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above

8PSK (EGPRS) Mode - Coding Scheme: MCS5

Target Power: 26 dBm (without Power Back-off)
21 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dB / +1.0dB

8PSK (EGPRS) Mode without Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	26.1	17.1	26.1	20.1
	661	1880.0	25.9	16.9	25.7	19.7
	810	1909.8	25.9	16.9	25.7	19.7

8PSK (EGPRS) Mode with Power Back off

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	21.3	12.3	21.3	15.3
	661	1880.0	21.0	12.0	20.9	14.9
	810	1909.8	20.9	11.9	20.7	14.7

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9.3. WCDMA (UMTS) Band V

Target Power: 23 dBm (without Power Back-off)
22 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dBm / +0.5dBm

Release 99

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

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				W/o Pwr back-off	W/ Pwr back-off
W-CDMA (UMTS) Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	22.4	21.4
		4183	836.6	22.4	21.4
		4233	846.6	22.3	21.3

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HSDPA

The following 4 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	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-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			

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				Without Pwr back-off	With Pwr back-off
W-CDMA (UMTS) Band V	Subtest 1	4132	826.4	22.20	21.14
		4183	836.6	22.30	21.28
		4233	846.6	22.24	21.31
	Subtest 2	4132	826.4	22.13	21.17
		4183	836.6	22.27	21.32
		4233	846.6	22.28	21.28
	Subtest 3	4132	826.4	22.05	21.18
		4183	836.6	22.20	21.33
		4233	846.6	22.19	21.31
	Subtest 4	4132	826.4	21.54	21.18
		4183	836.6	21.71	21.31
		4233	846.6	21.69	21.32

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.

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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
W-CDMA 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	

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Output power table

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				Without Pwr back-off	With Pwr back-off
W-CDMA (UMTS) Band V	Subtest 1	4132	826.4	22.20	21.05
		4183	836.6	22.34	21.24
		4233	846.6	22.30	21.21
	Subtest 2	4132	826.4	22.15	21.11
		4183	836.6	22.30	21.27
		4233	846.6	22.32	21.29
	Subtest 3	4132	826.4	21.36	21.12
		4183	836.6	21.27	21.29
		4233	846.6	21.30	21.25
	Subtest 4	4132	826.4	20.32	20.28
		4183	836.6	20.41	20.41
		4233	846.6	20.44	20.43
	Subtest 5	4132	826.4	22.31	21.17
		4183	836.6	22.34	21.30
		4233	846.6	22.40	21.35

Note(s):

KDB 941225 D01 – 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.

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9.4. WCDMA (UMTS) Band II

Target Power: 22 dBm (without Power Back-off)
20 dBm (with Power Back-off)
Tune-up Tolerance: -1.0dB / +0.5dB

Release 99

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

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				W/o Pwr back-off	W/ Pwr back-off
UMTS (WCDMA) Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.28	19.8
		9400	1880.0	22.25	19.8
		9538	1907.6	22.36	20.0

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HSDPA

The following 4 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	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-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			

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				Without Pwr back-off	With Pwr back-off
W-CDMA (UMTS) Band II	Subtest 1	9262	1852.4	21.16	20.05
		9400	1880.0	21.15	20.17
		9538	1907.6	21.22	20.22
	Subtest 2	9262	1852.4	21.15	20.09
		9400	1880.0	21.19	20.14
		9538	1907.6	21.20	20.18
	Subtest 3	9262	1852.4	20.55	20.10
		9400	1880.0	20.65	20.15
		9538	1907.6	20.69	20.13
	Subtest 4	9262	1852.4	20.56	20.10
		9400	1880.0	20.68	20.18
		9538	1907.6	20.69	20.17

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.

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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	

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Output power table

Band	Mode	UL Ch No.	Freq. (MHz)	Tx Conducted Pwr (dBm)	
				W/o Pwr back-off	W/ Pwr back-off
W-CDMA (UMTS) Band II	Subtest 1	9262	1852.4	21.35	19.45
		9400	1880.0	21.27	19.30
		9538	1907.6	21.35	19.35
	Subtest 2	9262	1852.4	21.35	20.24
		9400	1880.0	21.24	20.20
		9538	1907.6	21.28	20.25
	Subtest 3	9262	1852.4	20.33	20.25
		9400	1880.0	20.24	20.20
		9538	1907.6	20.28	20.24
	Subtest 4	9262	1852.4	19.39	20.33
		9400	1880.0	19.29	20.22
		9538	1907.6	19.34	20.25
	Subtest 5	9262	1852.4	21.31	20.28
		9400	1880.0	21.23	20.20
		9538	1907.6	21.27	20.32

Note(s):

KDB 941225 D01 – 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.

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9.5. WiFi (2.4 GHz Band)

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.

Target Power: 802.11b: 15.0 dBm
802.11g: 14.5 dBm
802.11n: 13.5 dBm
Tune-up Tolerance: -2.0dB / +1.0dB

Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)	Avg Pwr (dBm)
2.4	802.11b	1	1	2412	15.5	15.5
			6	2437	15.5	15.5
			11	2462	15.5	15.5
	802.11g	6	1	2412	14.5	14.5
			6	2437	14.5	14.5
			11	2462	14.5	14.5
	802.11n (HT20)		1	2412	13.5	13.5
			6	2437	13.5	13.5
			11	2462	13.5	13.5

Note(s):
1. SAR is not required for 802.11g/HT20 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

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9.6. WiFi (5 GHz Bands)

Mode		Band	GHz	Channel	"Default Test Channels" 802.11a	
802.11a	UNII (15.407)	5.2 GHz	5.180	36	√	
			5.200	40		*
			2.220	44		*
			5.240	48	√	
		5.3 GHz	5.260	52	√	
			5.280	56		*
			5.300	60		*
			5.320	64	√	
		5.5 GHz	5.500	100		
			5.520	104	√	
			5.540	108		*
			5.560	112		*
			5.580	116	√	
			5.600	120		*
			5.620	124	√	
			5.640	128		*
			5.660	132		*
			5.680	136	√	
			5.700	140		*
	DTS (15.247)	5.8 GHz	5.745	149	√	
			5.765	153		*
			5.785	157	√	
			5.805	161		*
			5.825	165	√	

√ = "default test channels"

* = possible 802.11a channels with maximum average output > 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.

Target Power: 802.11a: 13.0 dBm
802.11n: 12.0 dBm

Tune-up Tolerance: -2.0dB / +1.0dB

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Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)	Avg Pwr (dBm)
5.2	802.11a	6	36	5180	13.0	13.0
			40	5200	13.0	13.0
			44	5220	13.0	13.0
			48	5240	13.0	13.0
	802.11n (HT20)		36	5180	12.0	12.0
			40	5200	12.0	12.0
			48	5240	12.0	12.0
5.3	802.11a	6	52	5260	13.0	13.0
			56	5280	13.0	13.0
			60	5300	13.0	13.0
			64	5320	13.0	13.0
	802.11n (HT20)		52	5260	12.0	12.0
			60	5300	12.0	12.0
			64	5320	12.0	12.0
5.5	802.11a	6	100	5500	13.0	13.0
			104	5520	13.0	13.0
			108	5540	13.0	13.0
			112	5560	13.0	13.0
			116	5580	13.0	13.0
			120	5600	13.0	13.0
			124	5620	13.0	13.0
			128	5640	13.0	13.0
			132	5660	13.0	13.0
			136	5680	13.0	13.0
			140	5700	13.0	13.0
	802.11n (HT20)		100	5500	12.0	12.0
			120	5600	12.0	12.0
			140	5700	12.0	12.0
5.8	802.11a	6	149	5745	13.0	13.0
			153	5765	13.0	13.0
			157	5785	13.0	13.0
			161	5805	13.0	13.0
			165	5825	13.0	13.0
	802.11n (HT20)		149	5745	12.0	12.0
			157	5785	12.0	12.0
			161	5805	12.0	12.0

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9.7. Bluetooth

Version 3.0 LE, Power class: 1 (100 mW/20 dBm)

Mode	Channel #	Freq. (MHz)	Measured Avg Pwr(dBm)
GFSK	0	2402	4.47
	39	2441	5.13
	78	2480	5.11
8-PSK	0	2402	-1.55
	39	2441	-0.80
	78	2480	-0.96

Note(s):
Stand-alone SAR is not required as the output power is less than 25 mW [$60/f_{(GHz)}$].

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10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

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

FCC OET Bulletin 65 Supplement C 01-01 & IC RSS-102

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

EN 62209-1 and IEC 62209-2 Table 1

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
30	55.0	0.75
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
6000	35.1	5.48

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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

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10.2. Tissue Dielectric Parameter Check Results

Tissue dielectric parameters were 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 ±(%)
6/14/2012	Body 1900	e'	51.8740	Relative Permittivity (ϵ_r):	51.87	53.30	-2.68	5
		e"	14.4679	Conductivity (σ):	1.53	1.52	0.56	5
	Body 1850	e'	51.9718	Relative Permittivity (ϵ_r):	51.97	53.30	-2.49	5
		e"	14.3121	Conductivity (σ):	1.47	1.52	-3.14	5
	Body 1880	e'	51.9271	Relative Permittivity (ϵ_r):	51.93	53.30	-2.58	5
		e"	14.4220	Conductivity (σ):	1.51	1.52	-0.82	5
	Body 1910	e'	51.8193	Relative Permittivity (ϵ_r):	51.82	53.30	-2.78	5
		e"	14.4930	Conductivity (σ):	1.54	1.52	1.26	5
6/16/2012	Body 2450	e'	51.7366	Relative Permittivity (ϵ_r):	51.74	52.70	-1.83	5
		e"	14.6438	Conductivity (σ):	1.99	1.95	2.30	5
	Body 2410	e'	51.8649	Relative Permittivity (ϵ_r):	51.86	52.76	-1.70	5
		e"	14.4577	Conductivity (σ):	1.94	1.91	1.57	5
	Body 2435	e'	51.7867	Relative Permittivity (ϵ_r):	51.79	52.73	-1.78	5
		e"	14.5783	Conductivity (σ):	1.97	1.93	2.21	5
	Body 2475	e'	51.6505	Relative Permittivity (ϵ_r):	51.65	52.67	-1.93	5
		e"	14.7398	Conductivity (σ):	2.03	1.99	2.18	5
6/18/2012	Body 5180	e'	50.9007	Relative Permittivity (ϵ_r):	50.90	49.05	3.78	10
		e"	17.5077	Conductivity (σ):	5.04	5.27	-4.34	5
	Body 5200	e'	50.8745	Relative Permittivity (ϵ_r):	50.87	49.02	3.78	10
		e"	17.5887	Conductivity (σ):	5.09	5.29	-3.95	5
	Body 5500	e'	50.4093	Relative Permittivity (ϵ_r):	50.41	48.61	3.69	10
		e"	17.9554	Conductivity (σ):	5.49	5.64	-2.72	5
	Body 5800	e'	49.8542	Relative Permittivity (ϵ_r):	49.85	48.20	3.43	10
		e"	18.3463	Conductivity (σ):	5.92	6.00	-1.39	5
	Body 5825	e'	49.8242	Relative Permittivity (ϵ_r):	49.82	48.20	3.37	10
		e"	18.5341	Conductivity (σ):	6.00	6.00	0.05	5
6/20/2012	Body 5180	e'	51.4706	Relative Permittivity (ϵ_r):	51.47	49.05	4.94	10
		e"	18.0306	Conductivity (σ):	5.19	5.27	-1.48	5
	Body 5200	e'	51.4481	Relative Permittivity (ϵ_r):	51.45	49.02	4.95	10
		e"	18.0604	Conductivity (σ):	5.22	5.29	-1.37	5
	Body 5500	e'	50.9572	Relative Permittivity (ϵ_r):	50.96	48.61	4.82	10
		e"	18.4525	Conductivity (σ):	5.64	5.64	-0.02	5
	Body 5800	e'	50.3685	Relative Permittivity (ϵ_r):	50.37	48.20	4.50	10
		e"	18.7997	Conductivity (σ):	6.06	6.00	1.05	5
	Body 5825	e'	50.3116	Relative Permittivity (ϵ_r):	50.31	48.20	4.38	10
		e"	18.9368	Conductivity (σ):	6.13	6.00	2.22	5

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Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
06/21/2012	Body 5180	e'	51.2462	Relative Permittivity (ϵ_r):	51.25	49.05	4.48	10
		e"	18.1536	Conductivity (σ):	5.23	5.27	-0.81	5
	Body 5200	e'	51.2159	Relative Permittivity (ϵ_r):	51.22	49.02	4.48	10
		e"	18.1679	Conductivity (σ):	5.25	5.29	-0.79	5
	Body 5500	e'	50.6718	Relative Permittivity (ϵ_r):	50.67	48.61	4.23	10
		e"	18.4953	Conductivity (σ):	5.66	5.64	0.21	5
	Body 5800	e'	50.2027	Relative Permittivity (ϵ_r):	50.20	48.20	4.15	10
		e"	18.8096	Conductivity (σ):	6.07	6.00	1.10	5
	Body 5825	e'	50.1460	Relative Permittivity (ϵ_r):	50.15	48.20	4.04	10
		e"	18.8167	Conductivity (σ):	6.09	6.00	1.58	5
06/22/2012	Body 835	e'	53.8384	Relative Permittivity (εr):	53.84	55.20	-2.47	5
		e"	21.3318	Conductivity (σ):	0.99	0.97	2.10	5
	Body 820	e'	53.9969	Relative Permittivity (εr):	54.00	55.28	-2.32	5
		e"	21.3880	Conductivity (σ):	0.98	0.97	0.69	5
	Body 850	e'	53.6671	Relative Permittivity (εr):	53.67	55.16	-2.70	5
		e"	21.2696	Conductivity (σ):	1.01	0.99	1.84	5
06/25/2012	Body 835	e'	53.8321	Relative Permittivity (εr):	53.83	55.20	-2.48	5
		e"	20.8048	Conductivity (σ):	0.97	0.97	-0.42	5
	Body 820	e'	53.9912	Relative Permittivity (εr):	53.99	55.28	-2.33	5
		e"	20.8695	Conductivity (σ):	0.95	0.97	-1.75	5
	Body 850	e'	53.6750	Relative Permittivity (εr):	53.68	55.16	-2.69	5
		e"	20.7472	Conductivity (σ):	0.98	0.99	-0.67	5
08/15/2012	Body 1900	e'	52.3744	Relative Permittivity (ϵ_r):	52.37	53.30	-1.74	5
		e"	14.5458	Conductivity (σ):	1.54	1.52	1.10	5
	Body 1850	e'	52.4762	Relative Permittivity (ϵ_r):	52.48	53.30	-1.55	5
		e"	14.3929	Conductivity (σ):	1.48	1.52	-2.60	5
	Body 1880	e'	52.3682	Relative Permittivity (ϵ_r):	52.37	53.30	-1.75	5
		e"	14.4575	Conductivity (σ):	1.51	1.52	-0.57	5
	Body 1910	e'	52.3312	Relative Permittivity (ϵ_r):	52.33	53.30	-1.82	5
		e"	14.5595	Conductivity (σ):	1.55	1.52	1.73	5

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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	4d002	3/6/12	835	1g	9.24	9.64
				10g	6.04	6.32
D1900V2	5d043	11/10/11	1900	1g	40.8	42.00
				10g	21.16	21.96
D2450V2	748	2/7/12	2450	1g	53.6	50.8
				10g	24.8	23.6
D5GHzV2	1075	2/14/12	5200	1g	79.7	72.8
				10g	22.9	20.5
			5500	1g	86.1	77.7
				10g	24.5	21.7
			5800	1g	79.4	72.4
				10g	22.7	20.2

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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.						
6/14/2012	D1900V2	5d043	Body	1g	40.20	42.00	-4.29	±10
				10g	21.20	21.96	-3.46	
6/16/2012	D2450V2	748	Body	1g	53.10	50.80	4.53	±10
				10g	24.70	23.60	4.66	
6/18/2012	D5GHz V2 (5.8 GHz)	1075	Body	1g	73.70	72.4	1.80	±10
				10g	20.50	20.2	1.49	
6/20/2012	D5GHz V2 (5.8 GHz)	1075	Body	1g	77.00	72.4	6.35	±10
				10g	21.60	20.2	6.93	
6/20/2012	D5GHz V2 (5.5 GHz)	1075	Body	1g	81.50	77.7	4.89	±10
				10g	23.00	21.7	5.99	
6/21/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	77.80	72.8	6.87	±10
				10g	22.10	20.5	7.80	
6/21/2012	D1900V2	5d043	Body	1g	40.20	42.00	-4.29	±10
				10g	21.00	21.96	-4.37	
6/22/2012	D835V2	4d002	Body	1g	10.20	9.64	5.81	±10
				10g	6.72	6.32	6.33	
6/25/2012	D835V2	4d002	Body	1g	9.87	9.64	2.39	±10
				10g	6.48	6.32	2.53	
8/15/2012	D1900V2	5d043	Body	1g	42.60	42.00	1.43	±10
				10g	22.50	21.96	2.46	

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12. SAR Test Results

12.1. Scaling of Test Results

SAR test results have been scaled based upon the difference between the measured output power and the target output power plus tune-up tolerance. Columns headed 'Tune-up Limit' represent the DUT's target power plus its associated tolerance. Scaling is performed by multiplying the measured SAR value by $10^{\frac{Pdiff}{10}}$

Where P_{diff} = Target power plus tolerance – measured power.

12.2. GSM850

Body SAR with Power Back Off (Proximity Sensor On)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	0	128	824.20	23.0	22.4	0.892	1.024	
			190	836.60	23.0	22.4	1.070	1.229	
			251	848.80	23.0	22.4	1.270	1.458	
Rear (20° Tilt @Edge1)	GPRS 2 slots	0	128	824.20	23.0	22.4	0.693	0.796	
			190	836.60	23.0	22.4	0.895	1.028	
			251	848.80	23.0	22.4	1.090	1.251	
Edge 1	GPRS 2 slots	0	128	824.20	23.0	22.4	0.946	1.086	
			190	836.60	23.0	22.4	1.130	1.297	
			251	848.80	23.0	22.4	**1.320**	1.516	
Edge 4	GPRS 2 slots	0	128	824.20	23.0	22.4			1
			190	836.60	23.0	22.4	0.101	0.116	
			251	848.80	23.0	22.4			1

Body SAR with Full Power (Proximity Sensor Off)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	17	128	824.20	27.0	25.9			1
			190	836.60	27.0	25.9	0.279	0.359	
			251	848.80	27.0	25.9			1
Edge 1	GPRS 2 slots	17	128	824.20	27.0	25.9			1
			190	836.60	27.0	25.9	0.251	0.323	
			251	848.80	27.0	25.9			1
Edge 4	GPRS 2 slots	17	128	824.20	27.0	25.9			1
			190	836.60	27.0	25.9	0.084	0.109	
			251	848.80	27.0	25.9			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.

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12.3. GSM1900

Body SAR with Power Back off (Proximity Sensor On)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	0	512	1850.20	19.0	19.0	1.250	1.250	
			661	1880.00	19.0	18.7	1.170	1.254	
			810	1909.80	19.0	18.4	0.869	0.998	
Rear (20º Tilt @Edge1)	GPRS 2 slots	0	512	1850.20	19.0	19.0	**1.340**	1.340	
			661	1880.00	19.0	18.7	1.170	1.254	
			810	1909.80	19.0	18.4	0.895	1.028	
Edge 1	GPRS 2 slots	0	512	1850.20	19.0	19.0	1.010	1.010	
			661	1880.00	19.0	18.7	0.897	0.961	
			810	1909.80	19.0	18.4	0.809	0.929	
Edge 4	GPRS 2 slots	0	512	1850.20	19.0	19.0			1
			661	1880.00	19.0	18.7	0.227	0.243	
			810	1909.80	19.0	18.4			1

Body SAR with Full Power (Proximity Sensor Off)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	GPRS 2 slots	17	512	1850.20	24.0	24.0			1
			661	1880.00	24.0	22.9	0.362	0.466	
			810	1909.80	24.0	22.9			1
Edge 1	GPRS 2 slots	17	512	1850.20	24.0	24.0			1
			661	1880.00	24.0	22.9	0.402	0.518	
			810	1909.80	24.0	22.9			1
Edge 4	GPRS 2 slots	17	512	1850.20	24.0	24.0			1
			661	1880.00	24.0	22.9	0.089	0.115	
			810	1909.80	24.0	22.9			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.

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12.4. W-CDMA (UMTS) Band V

Test mode reduction considerations for Handset with Realse 6 HSPA(HSDPA/HSUPA)

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

Body SAR with Power Back off (Proximity Sensor On)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	0	4132	826.40	22.5	21.4	0.757	0.975	
			4183	836.60	22.5	21.4	0.831	1.071	
			4233	846.60	22.5	21.3	0.896	1.181	
Rear (20º Tilt @Edge1)	Rel 99 RMC 12.2kbps	0	4132	826.40	22.5	21.4			1
			4183	836.60	22.5	21.4	0.751	0.967	
			4233	846.60	22.5	21.3			1
Edge 1	Rel 99 RMC 12.2kbps	0	4132	826.40	22.5	21.4	0.902	1.162	
			4183	836.60	22.5	21.4	0.978	1.260	
			4233	846.60	22.5	21.3	**1.120**	1.476	
Edge 4	Rel 99 RMC 12.2kbps	0	4132	826.40	22.5	21.4			1
			4183	836.60	22.5	21.4	0.066	0.085	
			4233	846.60	22.5	21.3			1

Body SAR with Full Power (Proximity Sensor Off)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	17	4132	826.40	23.5	22.4			1
			4183	836.60	23.5	22.4	0.129	0.166	
			4233	846.60	23.5	22.3			1
Edge 1	Rel 99 RMC 12.2kbps	17	4132	826.40	23.5	22.4			1
			4183	836.60	23.5	22.4	0.095	0.123	
			4233	846.60	23.5	22.3			1
Edge 4	Rel 99 RMC 12.2kbps	17	4132	826.40	23.5	22.4			1
			4183	836.60	23.5	22.4	0.042	0.054	
			4233	846.60	23.5	22.3			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.

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12.5. W-CDMA (UMTS) Band II

Test mode reduction considerations for Handset with Realse 6 HSPA(HSDPA/HSUPA)

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

Body SAR with Power Back off (Proximity Sensor On)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	0	9262	1852.40	20.5	19.8	1.050	1.234	
			9400	1880.00	20.5	19.8	1.020	1.198	
			9538	1907.60	20.5	20.0	1.090	1.223	
Rear (20° Tilt @Edge1)	Rel 99 RMC 12.2kbps	0	9262	1852.40	20.5	19.8	1.250	**1.469**	
			9400	1880.00	20.5	19.8	1.200	1.410	
			9538	1907.60	20.5	20.0	1.220	1.369	
	HSPA		9262	1852.40	20.5	20.3	**1.300**	1.361	2
Edge 1	Rel 99 RMC 12.2kbps	0	9262	1852.40	20.5	19.8	1.060	1.245	
			9400	1880.00	20.5	19.8	1.110	1.304	
			9538	1907.60	20.5	20.0	1.180	1.324	
Edge 4	Rel 99 RMC 12.2kbps	0	9262	1852.40	20.5	19.8			1
			9400	1880.00	20.5	19.8	0.207	0.243	
			9538	1907.60	20.5	20.0			1

Body SAR with Full Power (Proximity Sensor Off)

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	Rel 99 RMC 12.2kbps	17	9262	1852.40	22.5	22.3			1
			9400	1880.00	22.5	22.3	0.227	0.238	
			9538	1907.60	22.5	22.4			1
Edge 1	Rel 99 RMC 12.2kbps	17	9262	1852.40	22.5	22.3			1
			9400	1880.00	22.5	22.3	0.191	0.200	
			9538	1907.60	22.5	22.4			1
Edge 4	Rel 99 RMC 12.2kbps	17	9262	1852.40	22.5	22.3			1
			9400	1880.00	22.5	22.3	0.057	0.060	
			9538	1907.60	22.5	22.4			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. Based on KDB941225 D01, body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2

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12.6. WiFi (2.4GHz Band)

Test Reduction Consideration

SAR is not required for 802.11g/n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels as per KDB 248227.

Body SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	802.11b	0	1	2412	16.0	15.5	1.050	1.178	
			6	2437	16.0	15.5	1.050	1.178	
			11	2462	16.0	15.5	**1.310**	1.470	
Rear (20º Tilt @Edge1)	802.11b	0	1	2412	16.0	15.5	1.230	1.380	
			6	2437	16.0	15.5	1.190	1.335	
			11	2462	16.0	15.5	1.280	1.436	
Edge 1	802.11b	0	1	2412	16.0	15.5	0.957	1.074	
			6	2437	16.0	15.5	0.867	0.973	
			11	2462	16.0	15.5	0.700	0.785	
Edge 2	802.11b	0	1	2412	16.0	15.5			1
			6	2437	16.0	15.5	0.221	0.248	
			11	2462	16.0	15.5			1

Note(s):

1. For frequency bands with an operating range of < 100 MHz, when the SAR for the highest output power channel within is ≤ 0.8 W/kg, SAR for the remaining channels is not required. Per KDB 447498 1) e) i)

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12.7. WiFi (5GHz Bands)

Test Reduction Consideration

SAR is not required for 802.11n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels as per KDB 248227.

5.2GHz Band

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	802.11a	0	36	5180	14.0	13.0	0.431	0.543	
			48	5240	14.0	13.0	0.463	0.583	
Rear (20° Tilt @Edge3)	802.11a	0	36	5180	14.0	13.0	0.181	0.228	
			48	5240	14.0	13.0	0.177	0.223	
Edge 3	802.11a	0	36	5180	14.0	13.0	**0.617**	0.777	
			48	5240	14.0	13.0	0.578	0.728	

5.3GHz Band

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	802.11a	0	52	5260	14.0	13.0	0.356	0.448	
			64	5320	14.0	13.0	0.279	0.351	
Rear (20° Tilt @Edge3)	802.11a	0	52	5260	14.0	13.0	0.169	0.213	
			64	5320	14.0	13.0	0.157	0.198	
Edge 3	802.11a	0	52	5260	14.0	13.0	**0.368**	0.463	
			64	5320	14.0	13.0	0.364	0.458	

5.5GHz Band

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	802.11a	0	104	5520	14.0	13.0	0.584	0.735	
			116	5580	14.0	13.0	0.297	0.374	
			124	5620	14.0	13.0	0.349	0.439	
			136	5680	14.0	13.0	0.244	0.307	
Rear (20° Tilt @Edge3)	802.11a	0	104	5520	14.0	13.0	0.211	0.266	
			116	5580	14.0	13.0	0.259	0.326	
			124	5620	14.0	13.0	0.246	0.310	
			136	5680	14.0	13.0	0.261	0.329	
Edge 3	802.11a	0	104	5520	14.0	13.0	0.718	0.904	
			116	5580	14.0	13.0	**0.739**	0.930	
			124	5620	14.0	13.0	0.728	0.916	
			136	5680	14.0	13.0	0.657	0.827	

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5.8GHz Band

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear	802.11a	0	149	5745	14.0	13.0	0.354	0.446	
			157	5785	14.0	13.0	0.378	0.476	
			165	5825	14.0	13.0	0.279	0.351	
Rear (20º Tilt @Edge3)	802.11a	0	149	5745	14.0	13.0	0.305	0.384	
			157	5785	14.0	13.0	0.361	0.454	
			165	5825	14.0	13.0	0.412	0.519	
Edge 3	802.11a	0	149	5745	14.0	13.0	0.829	1.044	
			157	5785	14.0	13.0	0.744	0.937	
			165	5825	14.0	13.0	**0.894**	1.125	

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12.8. Summary of Highest SAR Values

Results for highest Body SAR values for each frequency band and mode

Technology/Band	Test configuration	Mode	Highest Measured 1g-SAR (W/kg)
GSM850	Edge 1	GPRS 2 slot	1.320
GSM1900	Rear 20° Tilt @ Edge1	GPRS 2 slot	1.340
W-CDMA (UMTS) Band V	Edge 1	Rel 99 RMC 12.2kbps	1.120
W-CDMA (UMTS) Band II	Rear 20° Tilt @ Edge1	HSPA Sub-test5	1.300
WiFi 2.4 GHz	Rear	802.11b 1Mbps	1.310
WiFi 5.2 GHz	Edge 3	802.11a 6Mbps	0.617
WiFi 5.3 GHz	Edge 3	802.11a 6Mbps	0.368
WiFi 5.5 GHz	Edge 3	802.11a 6Mbps	0.739
WiFi 5.8 GHz	Edge 3	802.11a 6Mbps	0.894

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12.9. SAR Plots (from Summary of Highest Measured SAR Values)

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Test Laboratory: UL CCS SAR Lab B Date: 6/26/2012

GSM850

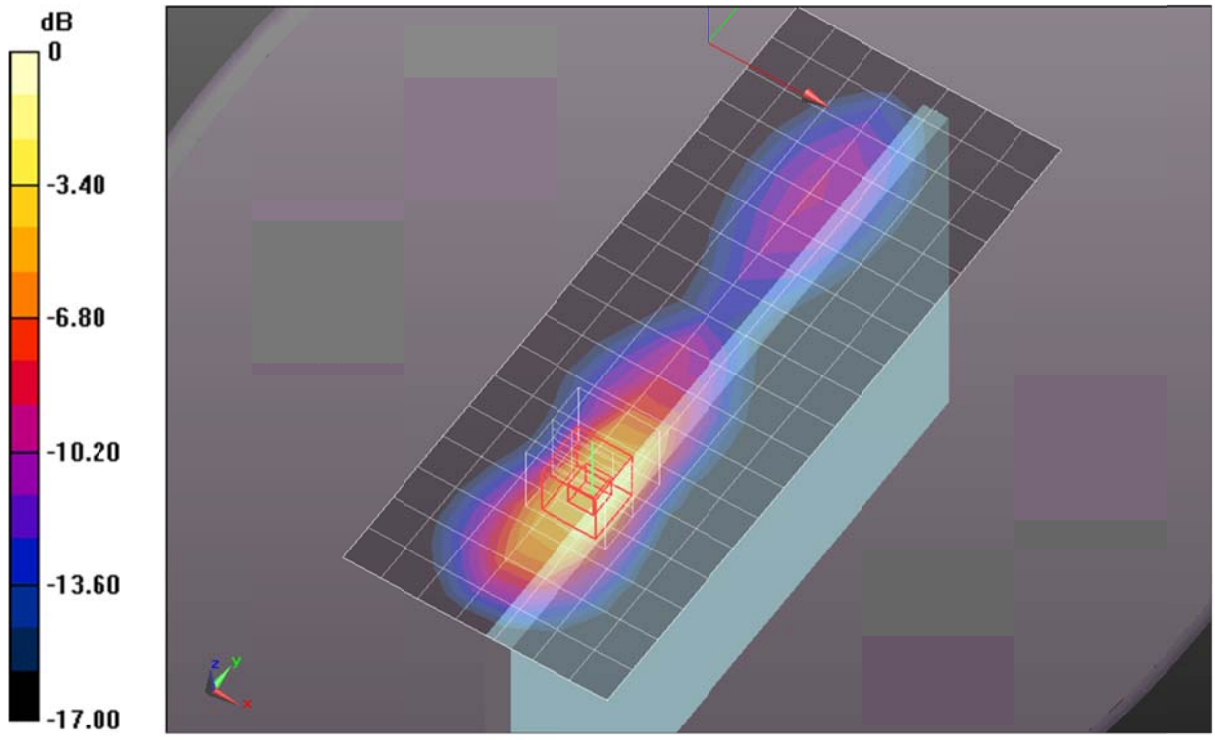
Frequency: 848.8 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.98 mho/m; ε_r = 53.687; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 1/GPRS 2 slots/Ch 251/Area Scan (8x19x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.112 mW/g

Edge 1/GPRS 2 slots/Ch 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 34.109 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 2.3780
SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.717 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.850 mW/g



0 dB = 1.850mW/g = 5.34 dB mW/g

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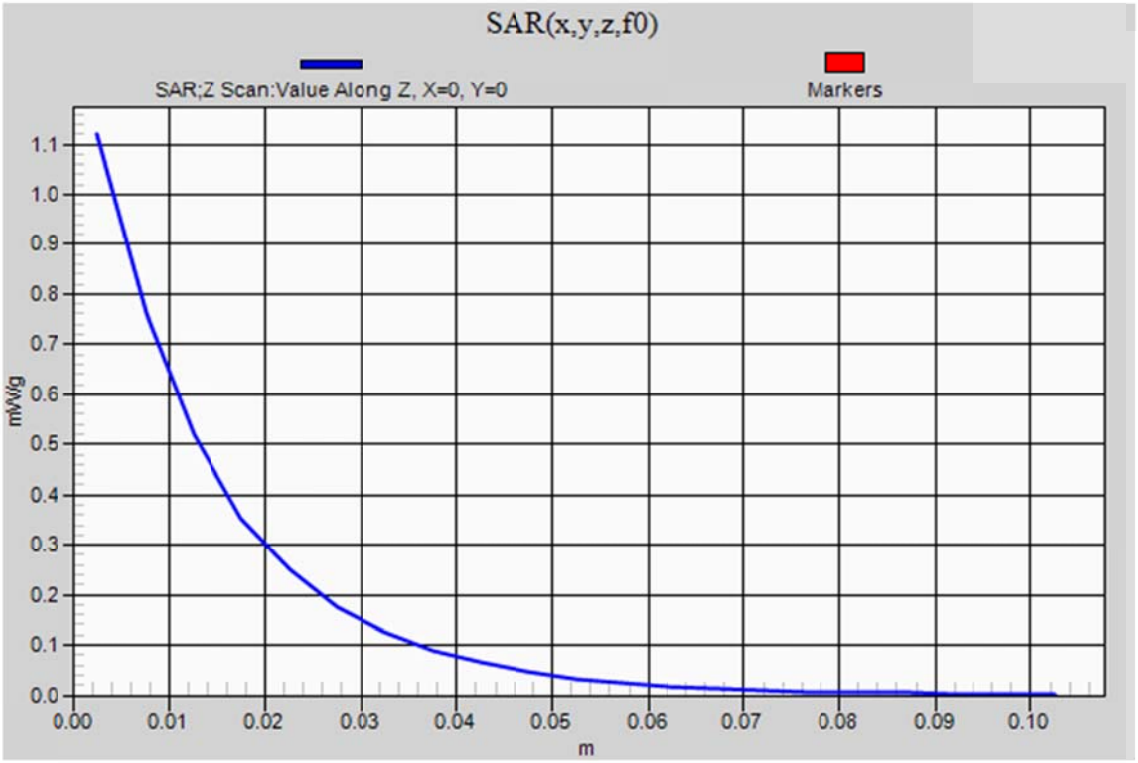
Test Laboratory: UL CCS SAR Lab B Date: 6/26/2012

GSM850

Frequency: 848.8 MHz; Duty Cycle: 1:4.00037

Edge 1/GPRS 2 slots/Ch 251/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.120 mW/g



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Test Laboratory: UL CCS SAR Lab B Date: 6/22/2012

GSM1900

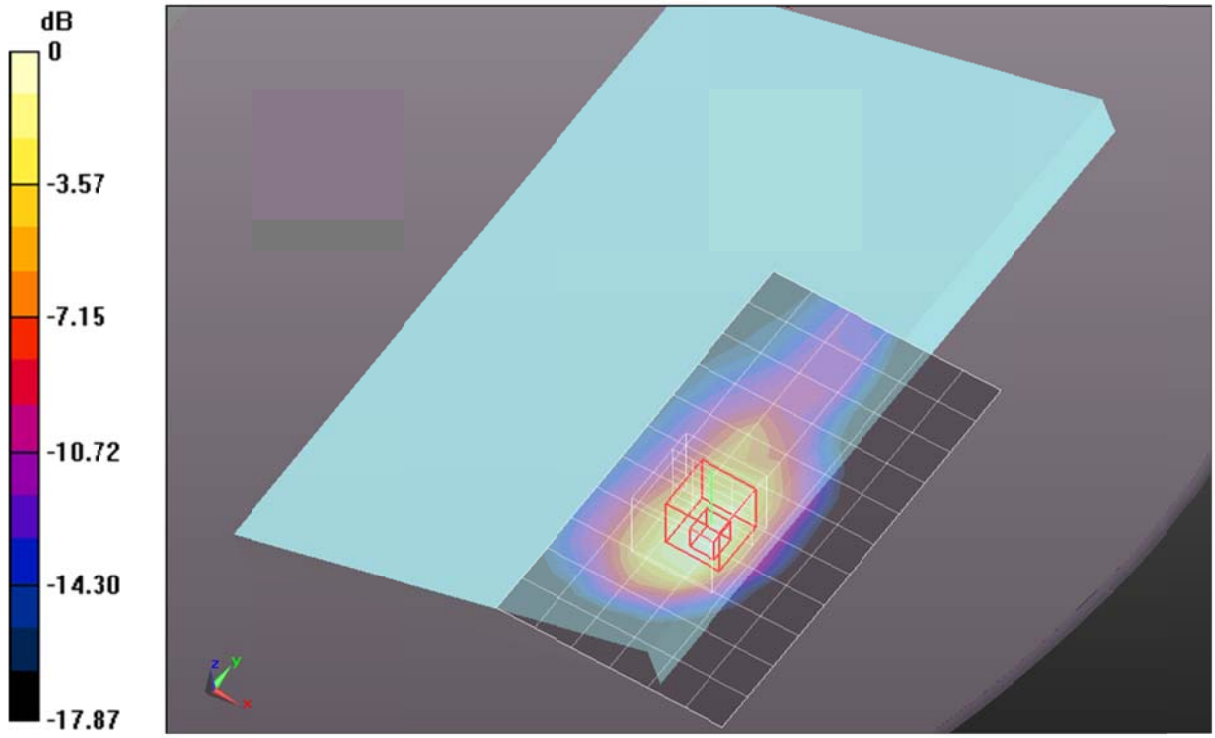
Frequency: 1850.2 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.47 mho/m; ε_r = 50.91; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(7.04, 7.04, 7.04); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear 20 deg Tilt @ Edge 1/GPRS 2 slots/Ch 512/Area Scan (7x12x1): Measurement grid:

dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.872 mW/g

Rear 20 deg Tilt @ Edge 1/GPRS 2 slots/Ch 512/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.095 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.4460
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.694 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.649 mW/g



0 dB = 1.650mW/g = 4.35 dB mW/g

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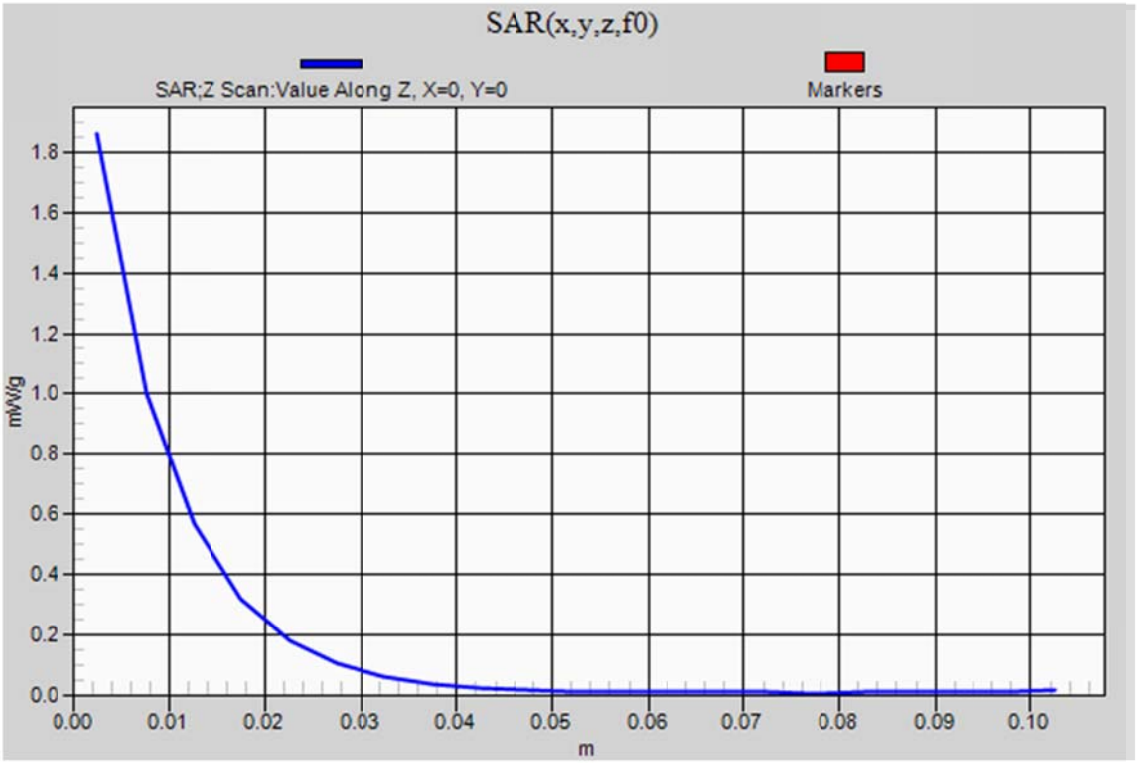
Test Laboratory: UL CCS SAR Lab B Date: 6/22/2012

GSM1900

Frequency: 1850.2 MHz; Duty Cycle: 1:4.00037

Rear 20 deg Tilt @ Edge 1/GPRS 2 slots/Ch 512/Z Scan (1x1x21): Measurement grid:
dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.861 mW/g



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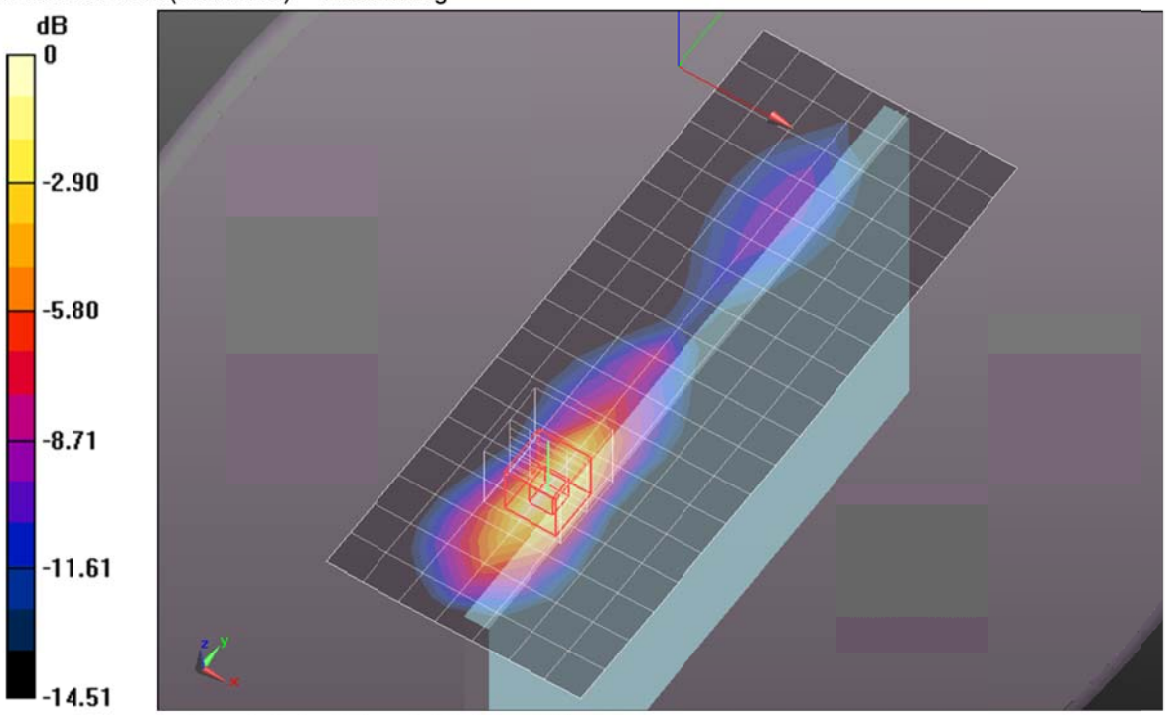
Test Laboratory: UL CCS SAR Lab B Date: 6/26/2012

UMTS Band V

Frequency: 846.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.978 mho/m; ε_r = 53.709; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 1/Ch 4233/Area Scan (8x19x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.409 mW/g

Edge 1/Ch 4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.547 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 2.0830
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.602 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.565 mW/g



0 dB = 1.570mW/g = 3.92 dB mW/g

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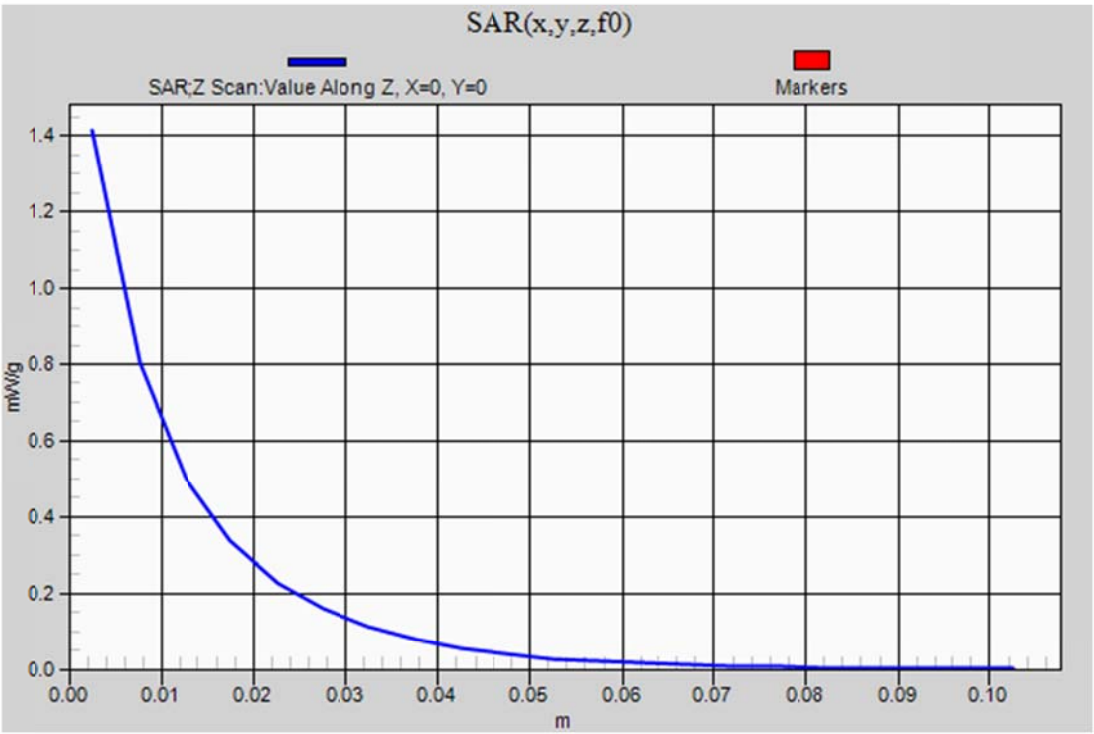
Test Laboratory: UL CCS SAR Lab B Date: 6/26/2012

UMTS Band V

Frequency: 846.6 MHz; Duty Cycle: 1:1

Edge 1/Ch 4233/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.414 mW/g



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Test Laboratory: UL CCS SAR Lab D
Date/Time: 8/15/2012

W-CDMA Band II

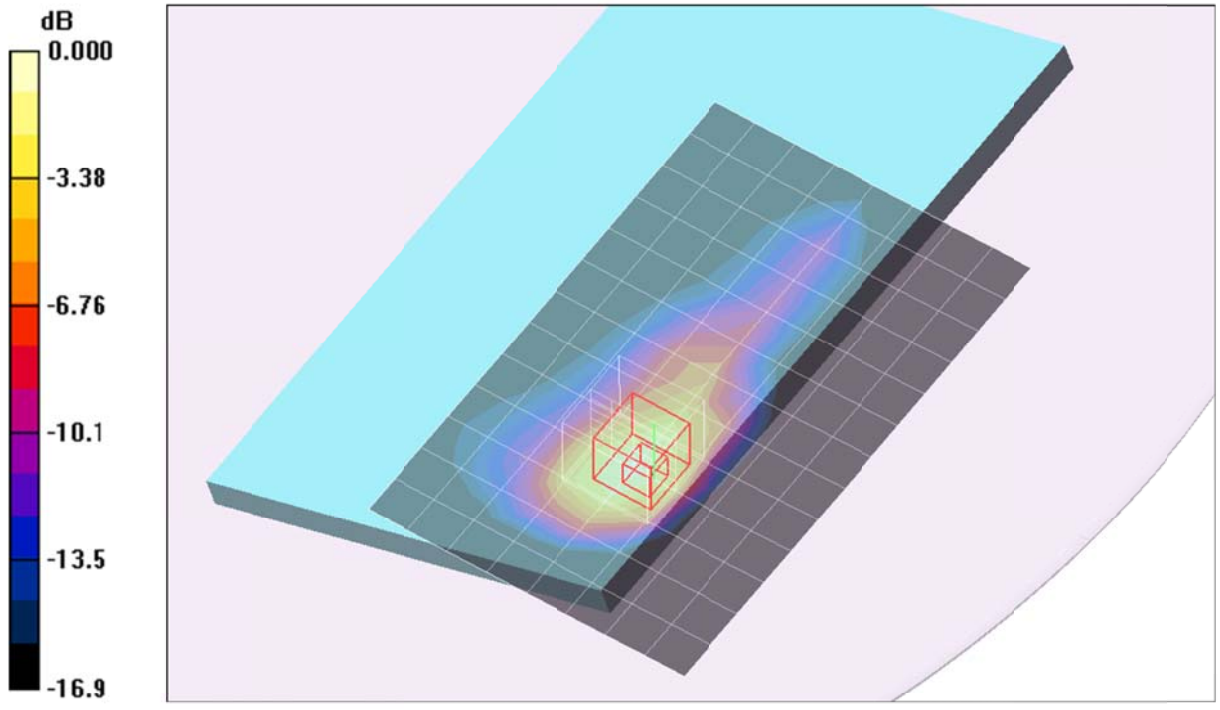
Frequency: 1852.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.49 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE3 Sn500; Calibrated: 6/13/2012
- Probe: EX3DV4 - SN3749; ConvF(6.97, 6.97, 6.97); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear 20 deg Tilt @ Edge 1/HSPA Sub-test5/Ch 9262/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.54 mW/g

Rear 20 deg Tilt @ Edge 1/HSPA Sub-test5/Ch 9262/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.90 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 2.40 W/kg
SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.696 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.69 mW/g



0 dB = 1.69mW/g

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Test Laboratory: UL CCS SAR Lab D
Date/Time: 8/15/2012

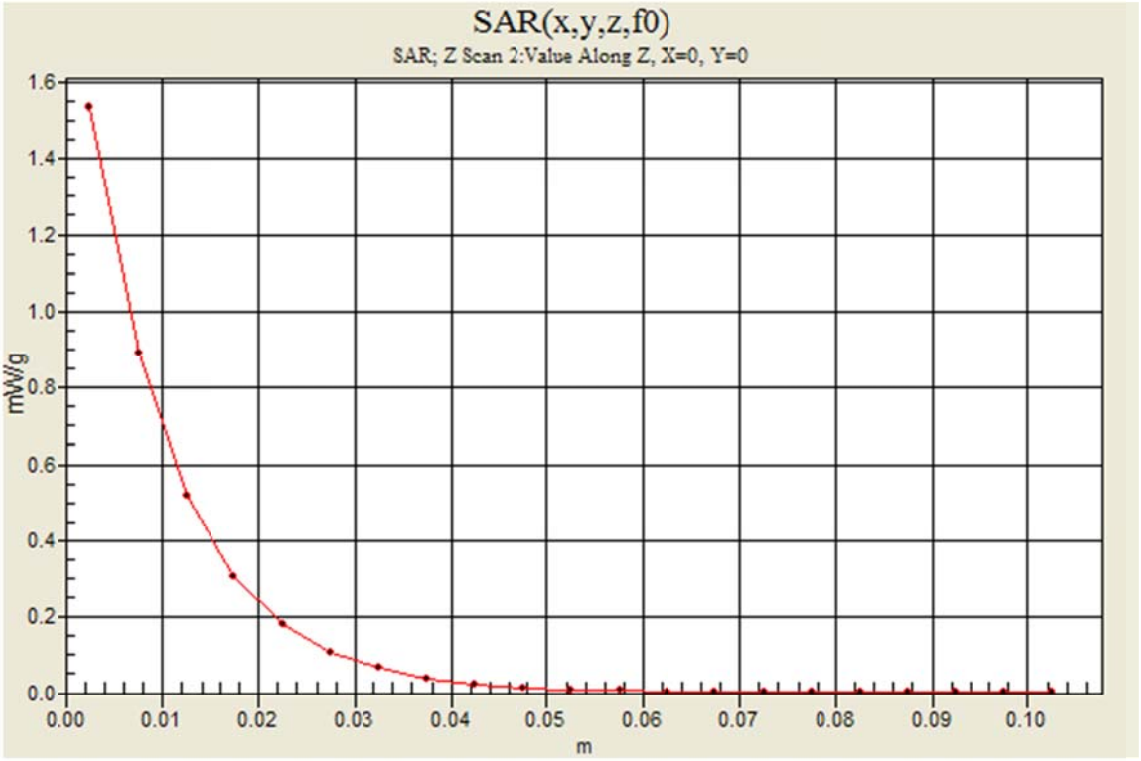
W-CDMA Band II

Frequency: 1852.4 MHz; Duty Cycle: 1:1

Rear 20 deg Tilt @ Edge 1/HSPA Sub-test5/Ch 9262/Z Scan (1x1x21): **Measurement grid: dx=20mm, dy=20mm, dz=5mm**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.54 mW/g



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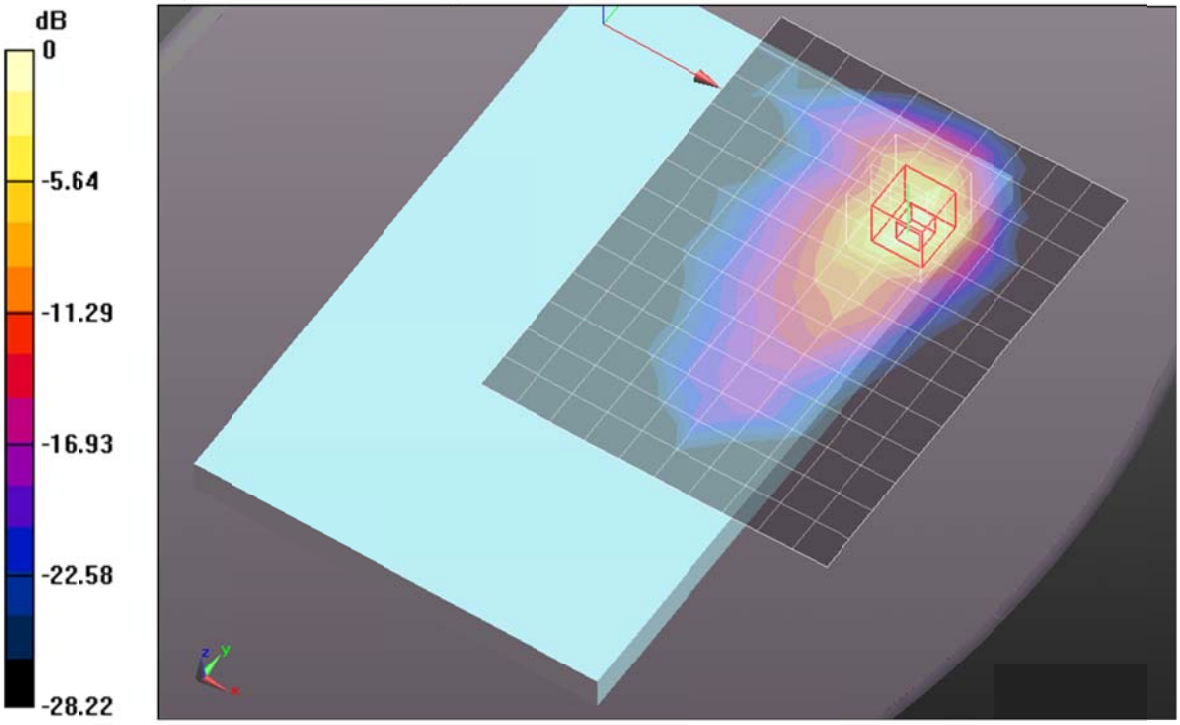
Test Laboratory: UL CCS SAR Lab A
Date: 6/16/2012

WiFi 2.4GHz

Frequency: 2462 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2462 MHz; σ = 2.012 mho/m; ε_r = 51.694; ρ = 1000 kg/m^3
DASY5 Configuration:
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(6.65, 6.65, 6.65); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Rear/802.11b_Ch 11/Area Scan (11x14x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.224 mW/g

Rear/802.11b_Ch 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.189 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.0490
SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.537 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.934 mW/g



0 dB = 1.930mW/g = 5.71 dB mW/g

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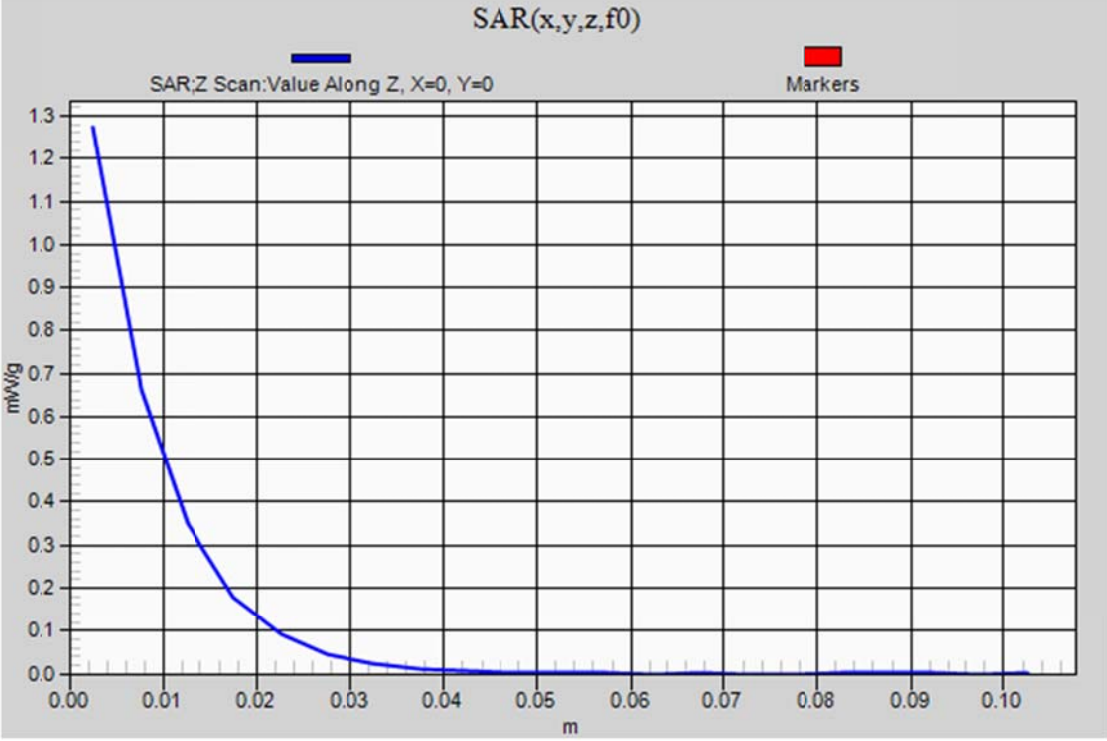
Test Laboratory: UL CCS SAR Lab A
Date: 6/16/2012

WiFi 2.4GHz

Frequency: 2462 MHz; Duty Cycle: 1:1

Rear/802.11b_Ch 11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.273 mW/g



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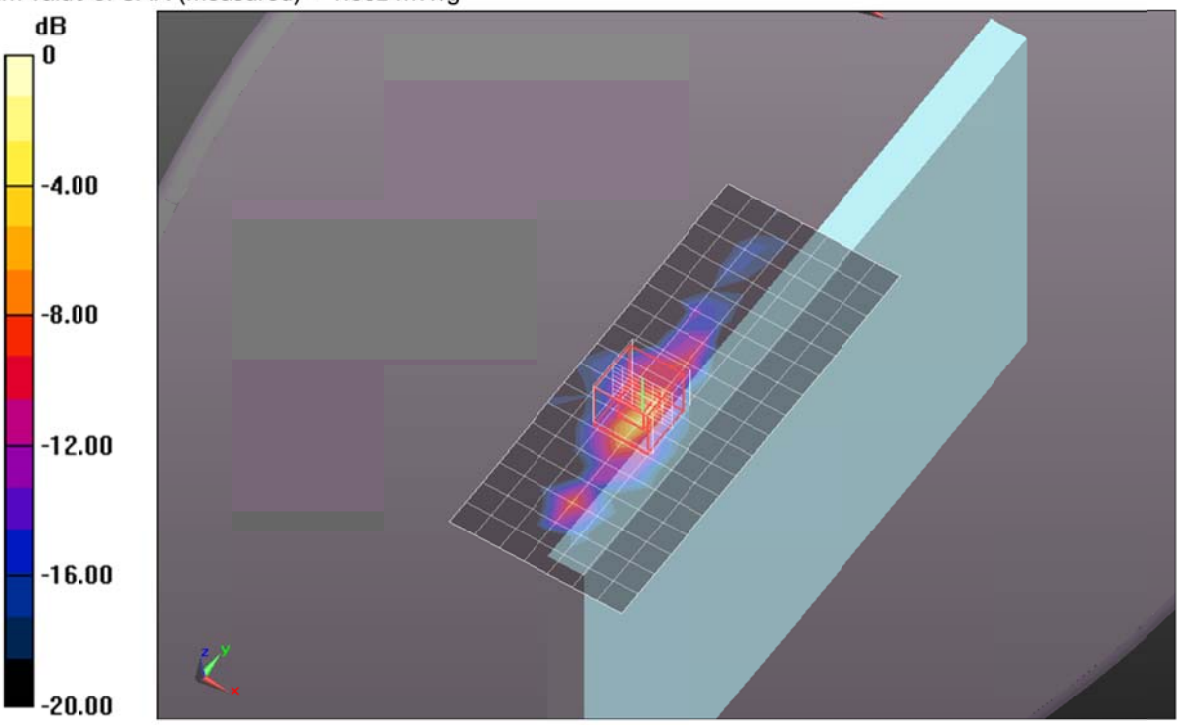
Test Laboratory: UL CCS SAR Lab B Date: 6/21/2012

WiFi 5.2 GHz band

Frequency: 5180 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5180 MHz; σ = 5.231 mho/m; ε_r = 51.246; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(4.04, 4.04, 4.04); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/Ch 36/Area Scan (8x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.924 mW/g

Edge 3/Ch 36/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 14.364 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 3.8760
SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.124 mW/g
Maximum value of SAR (measured) = 1.532 mW/g



0 dB = 1.530mW/g = 3.69 dB mW/g

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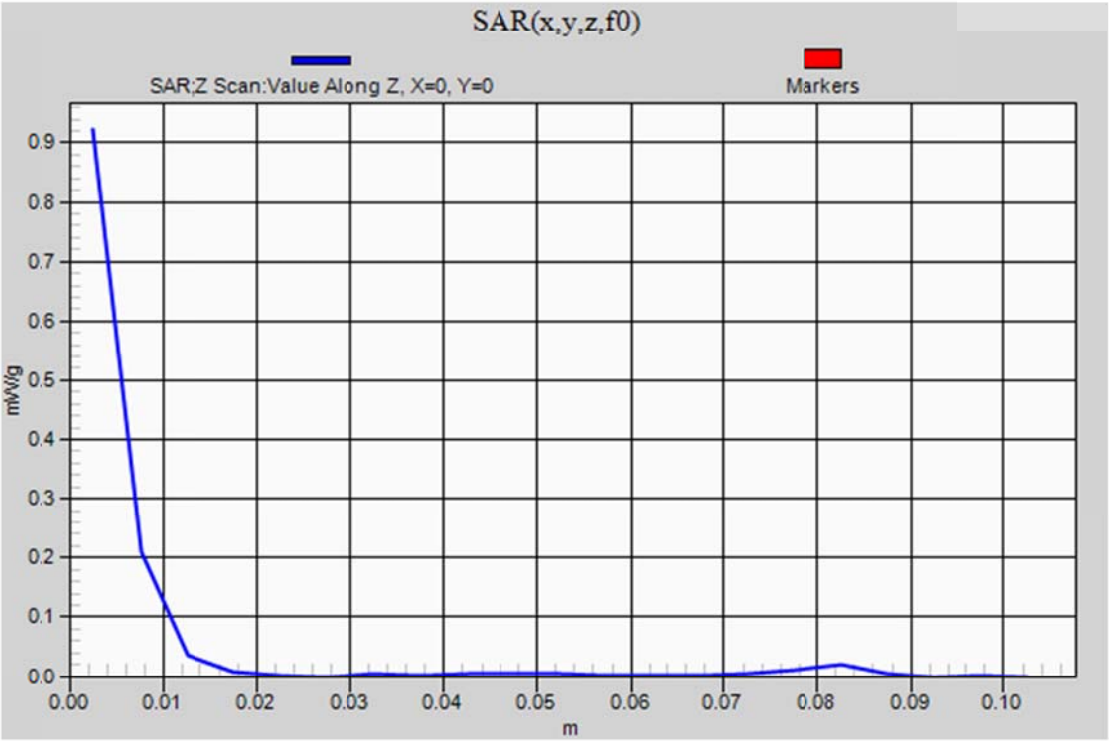
Test Laboratory: UL CCS SAR Lab B Date: 6/21/2012

WiFi 5.2 GHz band

Frequency: 5180 MHz; Duty Cycle: 1:1

Edge 3/Ch 36/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.922 mW/g



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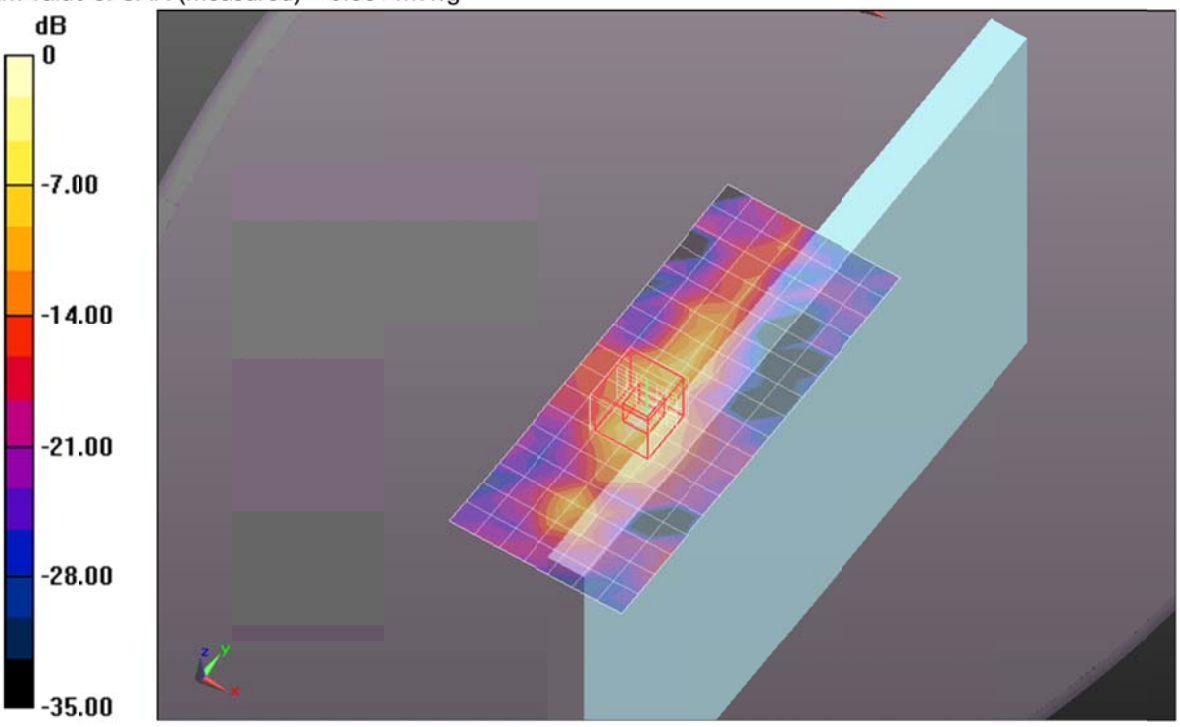
Test Laboratory: UL CCS SAR Lab B Date: 6/21/2012

WiFi 5.3 GHz band

Frequency: 5260 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5260 MHz; σ = 5.334 mho/m; ε_r = 51.123; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(3.8, 3.8, 3.8); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/Ch 52/Area Scan (8x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.730 mW/g

Edge 3/Ch 52/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 12.770 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.1230
SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.081 mW/g
Maximum value of SAR (measured) = 0.981 mW/g



0 dB = 0.980mW/g = -0.18 dB mW/g

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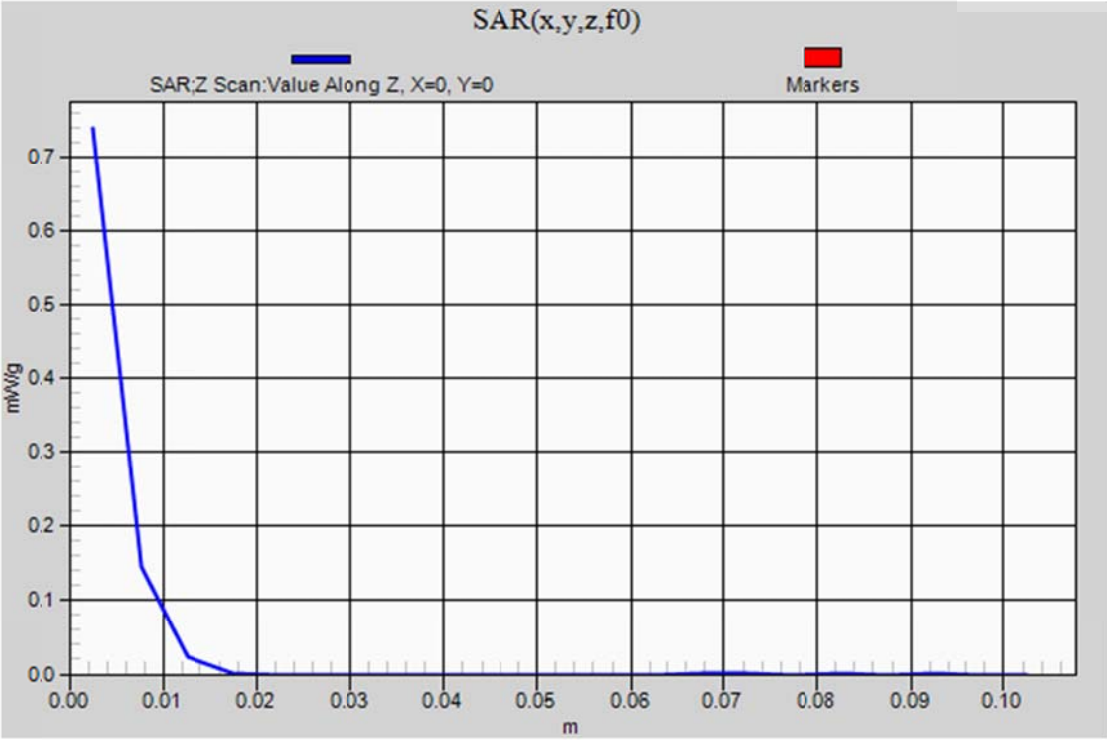
Test Laboratory: UL CCS SAR Lab B Date: 6/21/2012

WiFi 5.3 GHz band

Frequency: 5260 MHz; Duty Cycle: 1:1

Edge 3/Ch 52/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.739 mW/g



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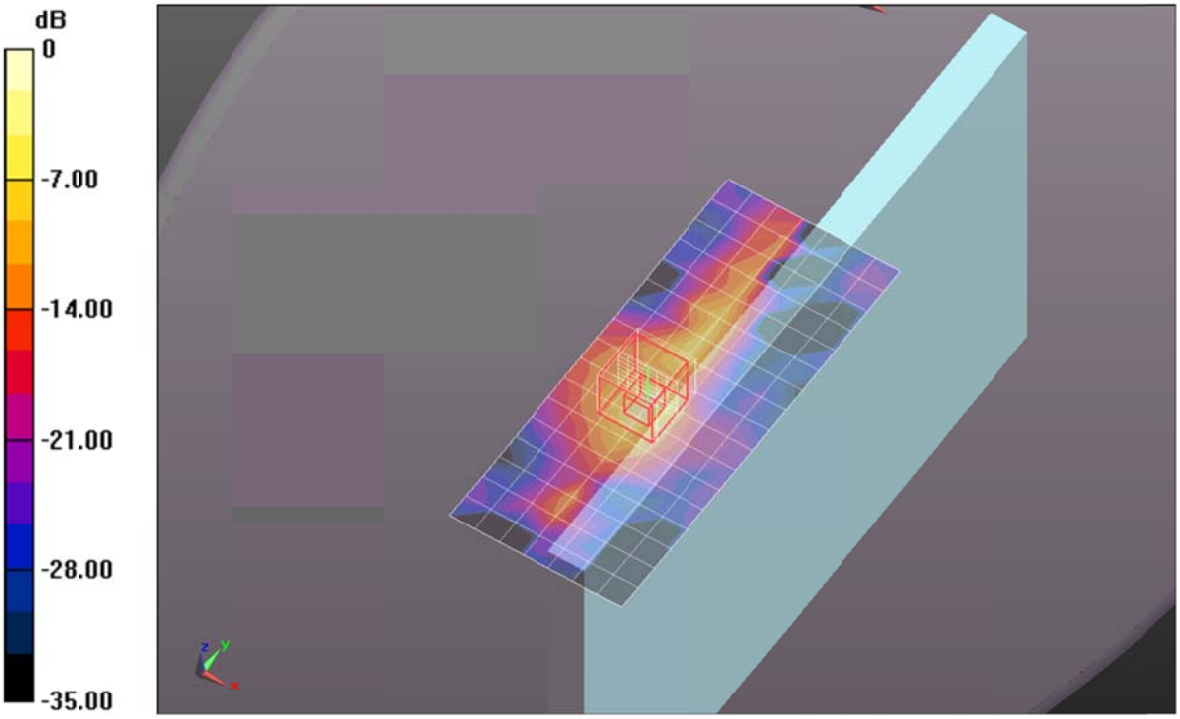
Test Laboratory: UL CCS SAR Lab B Date: 6/20/2012

WiFi 5.5 GHz band

Frequency: 5580 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5580 MHz; σ = 5.777 mho/m; ε_r = 50.749; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(3.44, 3.44, 3.44); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/Ch 116/Area Scan (8x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.335 mW/g

Edge 3/Ch 116/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 15.963 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.0170
SAR(1 g) = 0.739 mW/g; SAR(10 g) = 0.154 mW/g
Maximum value of SAR (measured) = 1.804 mW/g



0 dB = 1.800mW/g = 5.11 dB mW/g

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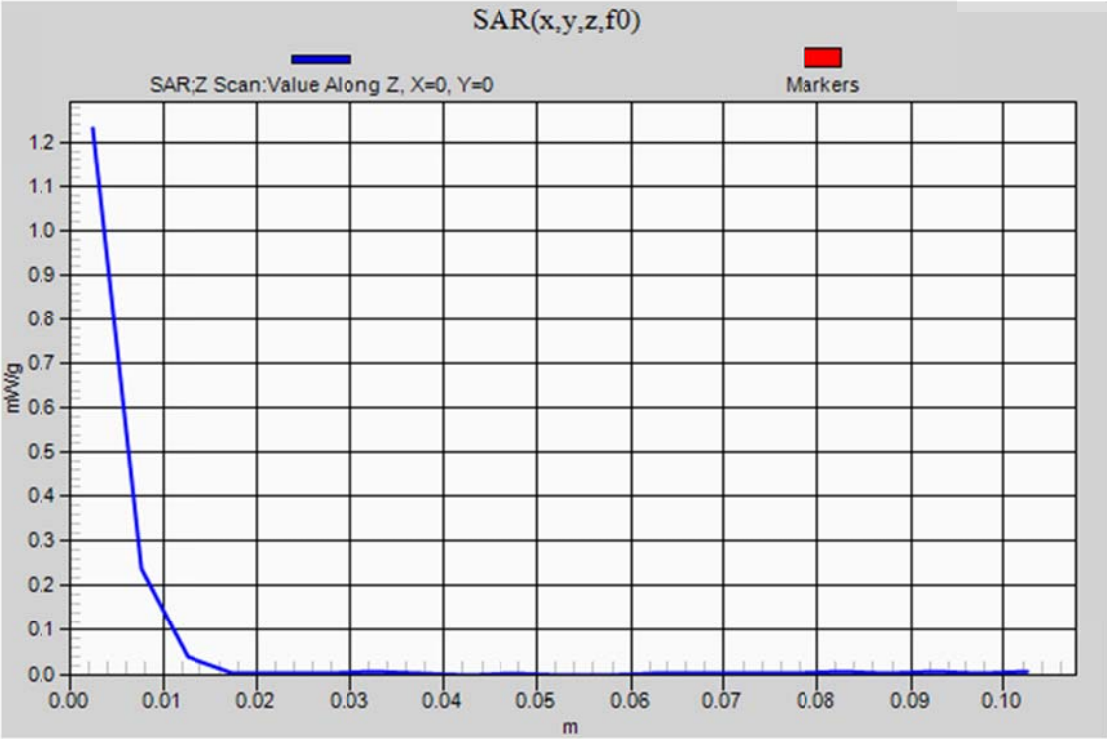
Test Laboratory: UL CCS SAR Lab B Date: 6/20/2012

WiFi 5.5 GHz band

Frequency: 5580 MHz; Duty Cycle: 1:1

Edge 3/Ch 116/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.231 mW/g



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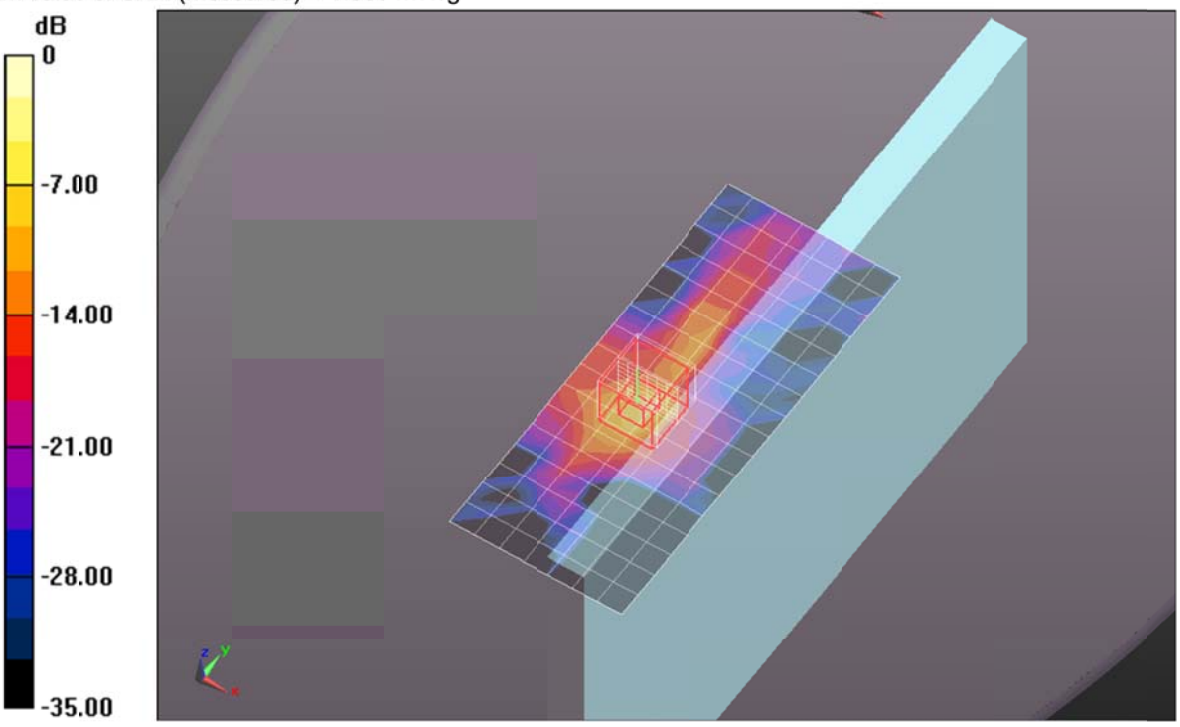
Test Laboratory: UL CCS SAR Lab B Date: 6/20/2012

WiFi 5.8 GHz band

Frequency: 5825 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5825 MHz; σ = 6.137 mho/m; ε_r = 50.312; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(3.57, 3.57, 3.57); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/Ch 165/Area Scan (8x18x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.971 mW/g

Edge 3/Ch 165/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 14.455 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 5.4390
SAR(1 g) = 0.894 mW/g; SAR(10 g) = 0.174 mW/g
Maximum value of SAR (measured) = 1.905 mW/g



0 dB = 1.900mW/g = 5.58 dB mW/g

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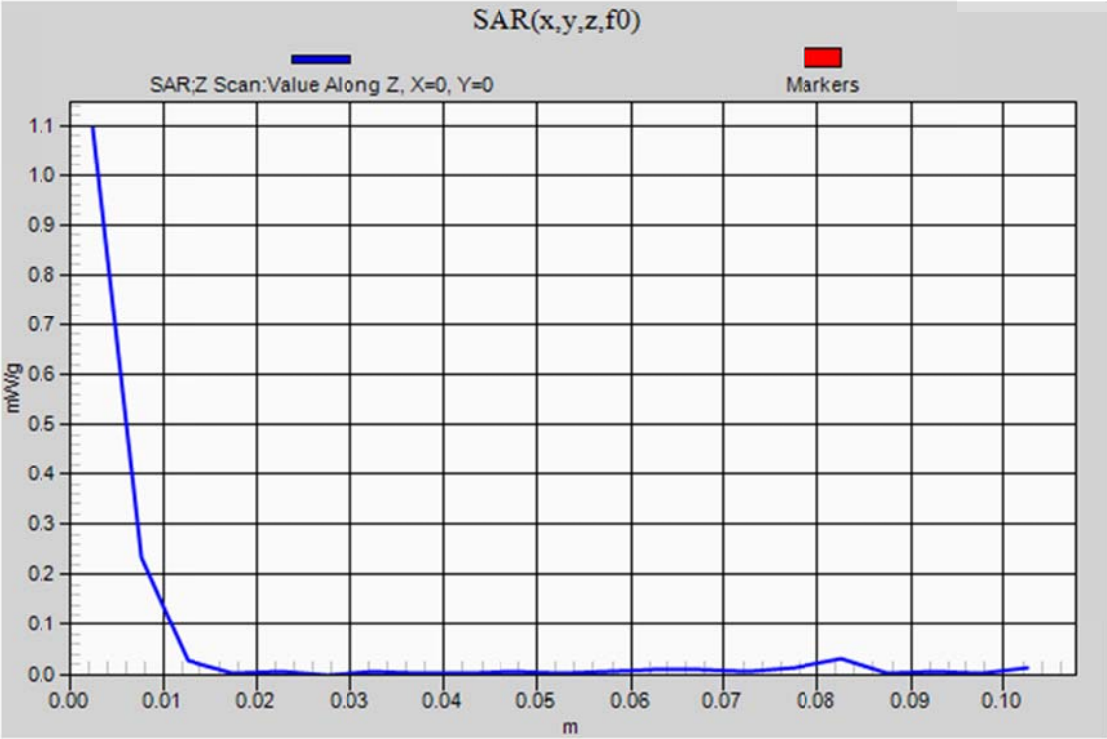
Test Laboratory: UL CCS SAR Lab B Date: 6/20/2012

WiFi 5.8 GHz band

Frequency: 5825 MHz; Duty Cycle: 1:1

Edge 3/Ch 165/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.094 mW/g



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13. Simultaneous Transmission SAR Analysis

As Bluetooth's max average power is 5.13 mW [<60/f(GHz) mW] standalone SAR is not required. Also the Bluetooth antenna is more than 5cm away from other transmitting antennas. Therefore, Bluetooth simultaneous transmission SAR evaluation with WiFi and WWAN is not required.

13.1. Sum of the 1g SAR of Body Exposure Condition

Scaled SAR for Simultaneous Transmission Cases

Technology/Band	Test Configuration	Mode	Ch #.	Freq. (MHz)	Power (dBm)		SAR (W/kg)	
					Max. tune-up limit	Measured	Measured	Scaled
GSM850	Rear	GPRS 2 slots	251	848.80	23.0	22.4	1.270	1.458
GSM850	Rear (20° Tilt@Edge1)	GPRS 2 slots	251	848.80	23.0	22.4	1.090	1.251
GSM850	Edge 1	GPRS 2 slots	251	848.80	23.0	22.4	1.320	1.516
GSM1900	Rear	GPRS 2 slots	512	1850.20	19.0	19.0	1.250	1.250
GSM1900	Rear (20° Tilt@Edge1)	GPRS 2 slots	512	1850.20	19.0	19.0	1.340	1.340
GSM1900	Edge1	GPRS 2 slots	512	1850.20	19.0	19.0	1.010	1.010
W-CDMA Band V	Rear	Rel. 99	4233	846.60	22.5	21.3	0.896	1.181
W-CDMA Band V	Rear (20° Tilt@Edge1)	Rel. 99	4183	836.60	22.5	21.4	0.751	0.967
W-CDMA Band V	Edge 1	Rel. 99	4233	846.60	22.5	21.3	1.120	1.476
W-CDMA Band II	Rear	Rel. 99	9538	1907.60	20.5	20.0	1.090	1.223
W-CDMA Band II	Rear (20° Tilt@Edge1)	Rel. 99	9262	1852.40	20.5	19.8	1.250	1.469
W-CDMA Band II	Edge 1	Rel. 99	9538	1907.60	20.5	20.0	1.180	1.324
WiFi 2.4 GHz	Rear	802.11b	11	2462.00	16.0	15.5	1.310	1.470
WiFi 2.4 GHz	Rear (20° Tilt@Edge1)	802.11b	11	2462.00	16.0	15.5	1.280	1.436
WiFi 2.4 GHz	Edge 1	802.11b	1	2412.00	16.0	15.5	0.957	1.074
WiFi 5.2 GHz	Rear	802.11a	48	5240.00	14.0	13.0	0.463	0.583
WiFi 5.3 GHz	Rear	802.11a	52	5260.00	14.0	13.0	0.356	0.448
WiFi 5.5 GHz	Rear	802.11a	104	5520.00	14.0	13.0	0.584	0.735
WiFi 5.8 GHz	Rear	802.11a	157	5785.00	14.0	13.0	0.378	0.476

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Sum of the Measured 1g SAR for Body Exposure Condition

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.270				1.310	2.580
		1.250			1.310	2.560
			0.896		1.310	2.206
				1.090	1.310	2.400
Rear (20° Tilt@Edge1)	1.090				1.280	2.370
		1.340			1.280	2.620
			0.751		1.280	2.031
				1.250	1.280	2.530
Edge 1	1.320				0.957	2.277
		1.010			0.957	1.967
			1.120		0.957	2.077
				1.180	0.957	2.137
Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.270				0.463	1.733
		1.250			0.463	1.713
			0.896		0.463	1.359
				1.090	0.463	1.553
Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.270				0.356	1.626
		1.250			0.356	1.606
			0.896		0.356	1.252
				1.090	0.356	1.446
Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.5GHz Band	∑ 1-g SAR (mW/g)
Rear	1.270				0.584	1.854
		1.250			0.584	1.834
			0.896		0.584	1.480
				1.090	0.584	1.674
Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.8GHz Band	∑ 1-g SAR (mW/g)
Rear	1.270				0.378	1.648
		1.250			0.378	1.628
			0.896		0.378	1.274
				1.090	0.378	1.468

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the ∑ 1-g SAR is < 1.6 mW/g
2. Where the ∑ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required. Refer to sections 14.2 to 14.5 for the SPLSR calculations.

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Sum of the Scaled 1g SAR for Body Exposure Condition

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 2.4 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.458				1.470	2.928
		1.250			1.470	2.720
			1.181		1.470	2.651
				1.223	1.470	2.693
Rear (20° Tilt@Edge1)	1.251				1.436	2.687
		1.340			1.436	2.776
			0.967		1.436	2.403
				1.469	1.436	2.905
Edge 1	1.516				1.074	2.590
		1.010			1.074	2.084
			1.476		1.074	2.550
				1.324	1.074	2.398

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.2 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.458				0.583	2.041
		1.250			0.583	1.833
			1.181		0.583	1.764
				1.223	0.583	1.806

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.3 GHz Band	∑ 1-g SAR (mW/g)
Rear	1.458				0.448	1.906
		1.250			0.448	1.698
			1.181		0.448	1.629
				1.223	0.448	1.671

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.5GHz Band	∑ 1-g SAR (mW/g)
Rear	1.458				0.735	2.193
		1.250			0.735	1.985
			1.181		0.735	1.916
				1.223	0.735	1.958

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.8GHz Band	∑ 1-g SAR (mW/g)
Rear	1.458				0.476	1.934
		1.250			0.476	1.726
			1.181		0.476	1.657
				1.223	0.476	1.699

1. Simultaneous transmission SAR measurement (Volume Scan) is not required when the ∑ 1-g SAR is < 1.6 mW/g
2. Where the ∑ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required. Refer to sections 14.2 to 14.5 for the SPLSR calculations.

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SAR to Peak Location Separation Ratio (SPLSR) for WWAN and WiFi 2.4GHz Band

Test Position	Worst-case combination					∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM 850	GSM1900	W-CDMA Band V	W-CDMA Band II	WiFi 2.4 GHz Band				
Rear	1.458				1.47	2.928	17.13	0.171	1
		1.250			1.47	2.720	17.99	0.151	2
			1.181		1.47	2.651	16.92	0.157	3
				1.223	1.47	2.693	17.86	0.151	4
Rear (20° Tilt@Edge1)	1.251				1.436	2.687	16.32	0.165	5
		1.340			1.436	2.776	18.59	0.149	6
			0.967		1.436	2.403	16.64	0.144	7
				1.469	1.436	2.905	18.59	0.156	8
Edge 1	1.516				1.074	2.590	17.07	0.152	9
		1.010			1.074	2.084	19.86	0.105	10
			1.476		1.074	2.550	17.21	0.148	11
				1.324	1.074	2.398	19.98	0.120	12

Conclusions:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3.

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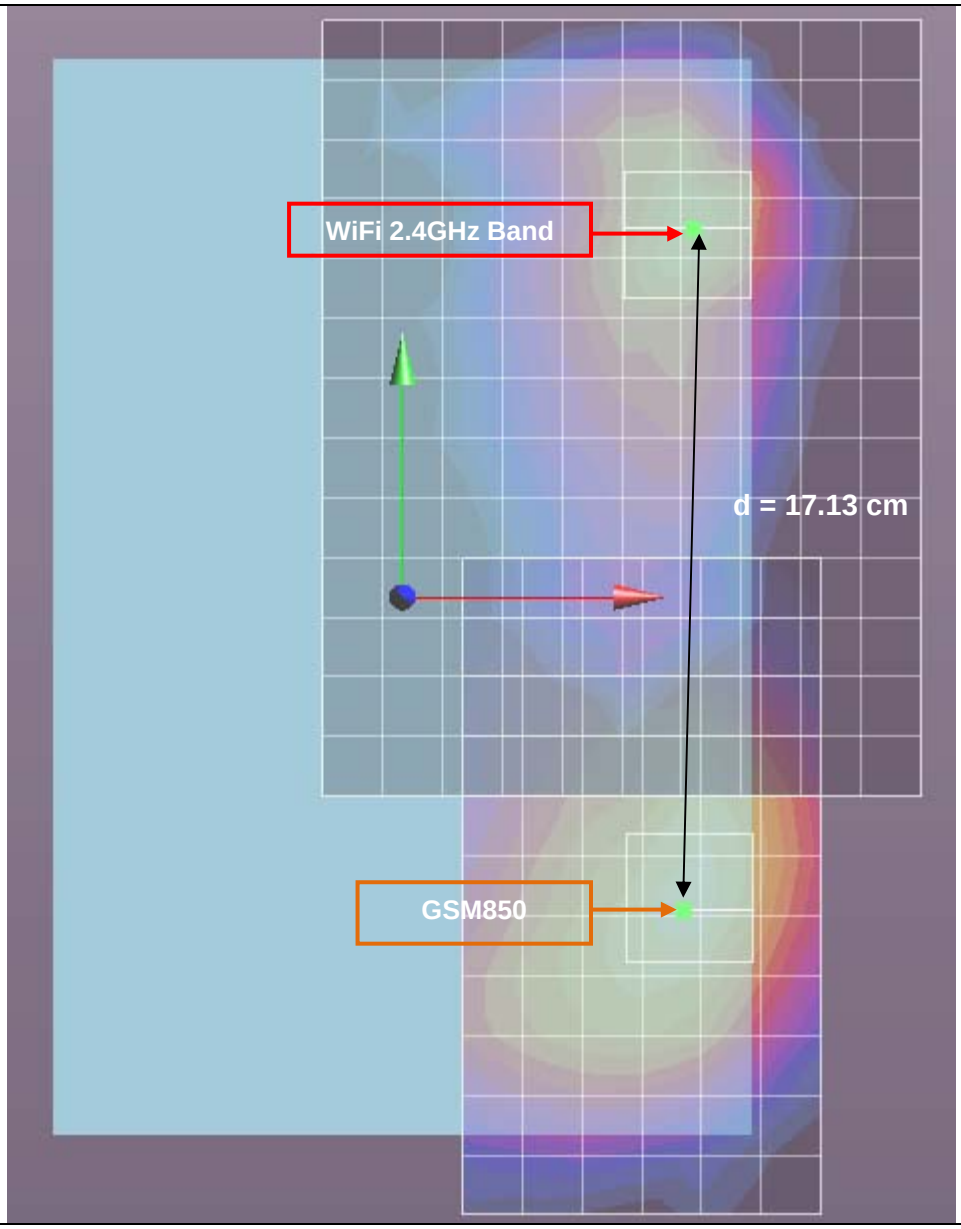
SAR Peak Location Separation Distance

Figure (1)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.23	0.0704	-0.0787	-0.185
WiFi 2.4GHz Band	3.05	0.0731	0.0926	-0.183

Separation distance (cm)
17.13

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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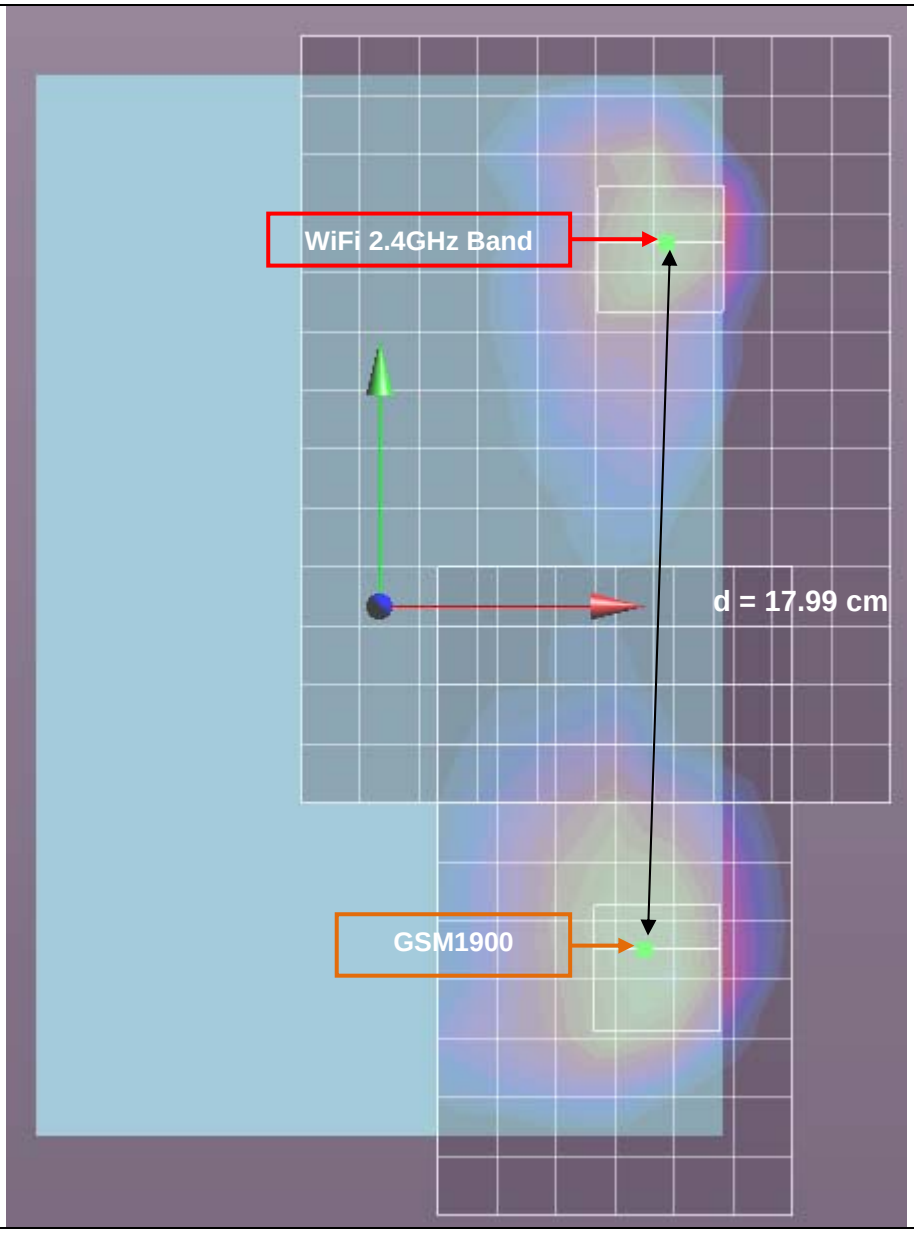
SAR Peak Location Separation Distance

Figure (2)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.34	0.0689	-0.0872	-0.184
WiFi 2.4GHz Band	3.05	0.0731	0.0926	-0.183

Separation distance (cm)
17.99

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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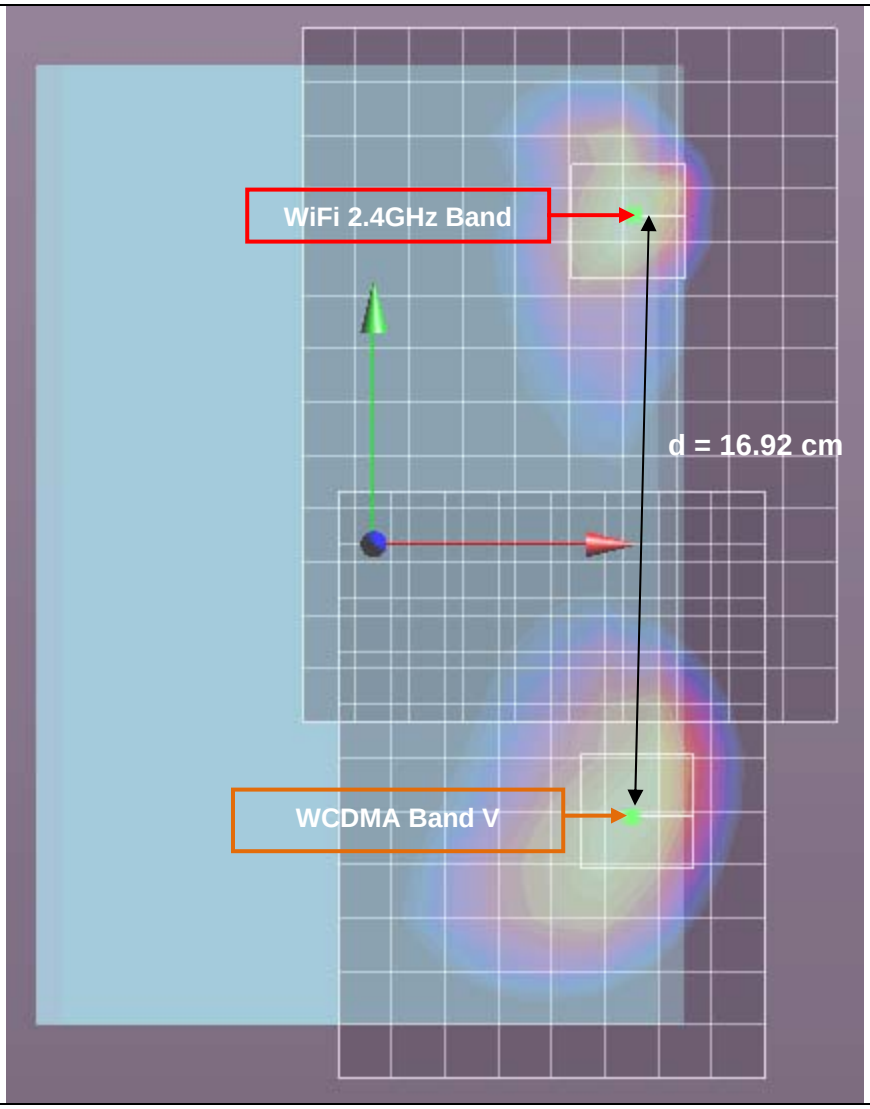
SAR Peak Location Separation Distance

Figure (3)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.61	0.0724	-0.0766	-0.184
WiFi 2.4GHz Band	3.05	0.0731	0.0926	-0.183

Separation distance (cm)
16.92

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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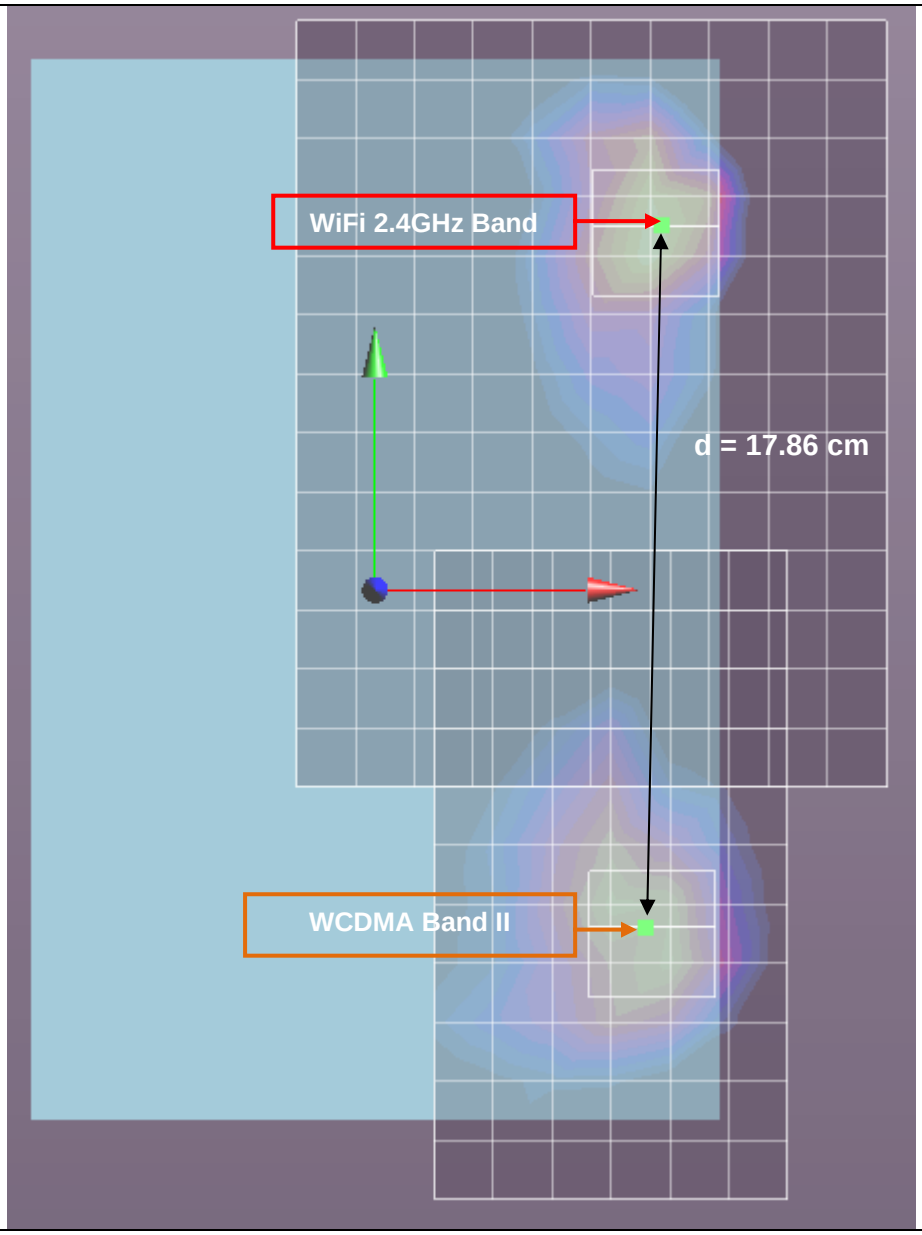
SAR Peak Location Separation Distance

Figure (4)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.03	0.0689	-0.0859	-0.184
WiFi 2.4GHz Band	3.05	0.0731	0.0926	-0.183

Separation distance (cm)
17.86

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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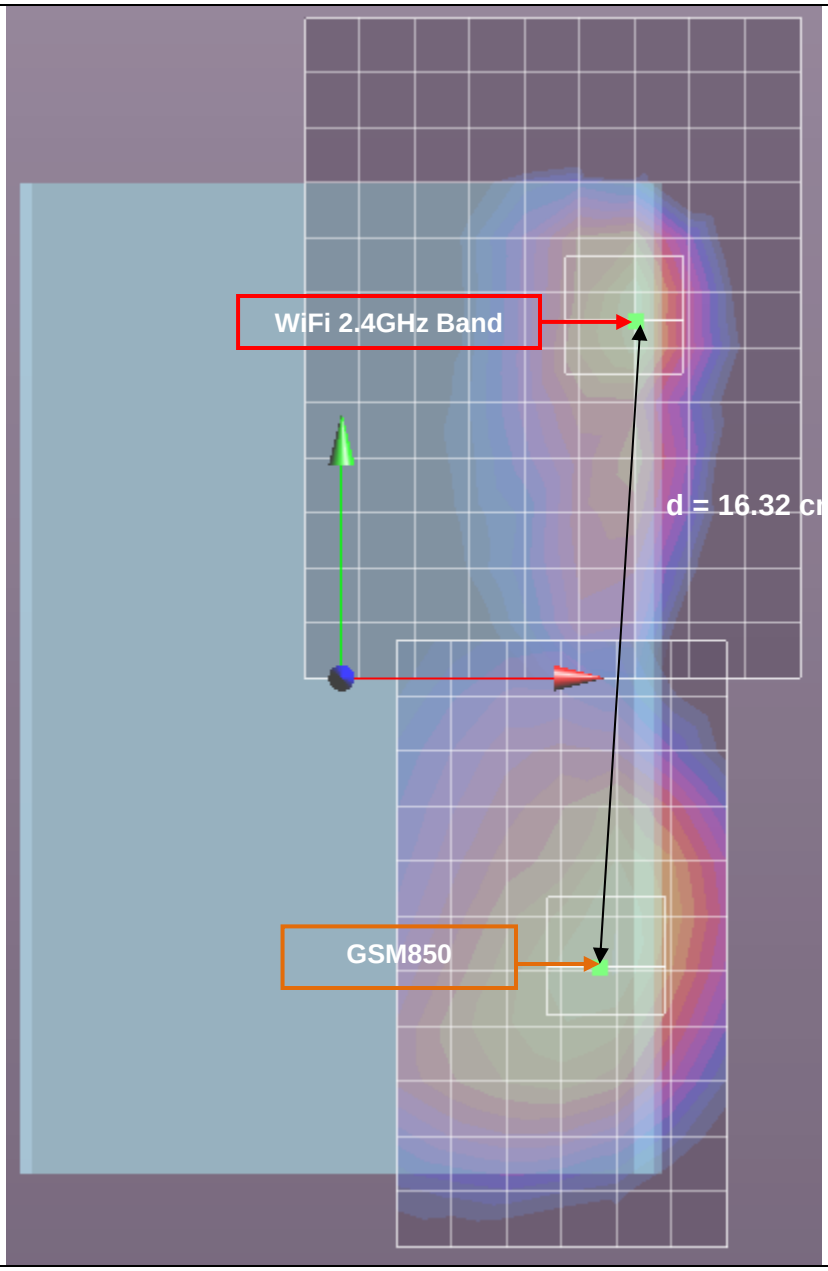
SAR Peak Location Separation Distance

Figure (5)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	1.91	0.0796	-0.0658	-0.185
WiFi 2.4GHz Band	3.42	0.0802	0.0974	-0.183

Separation distance (cm)
16.32

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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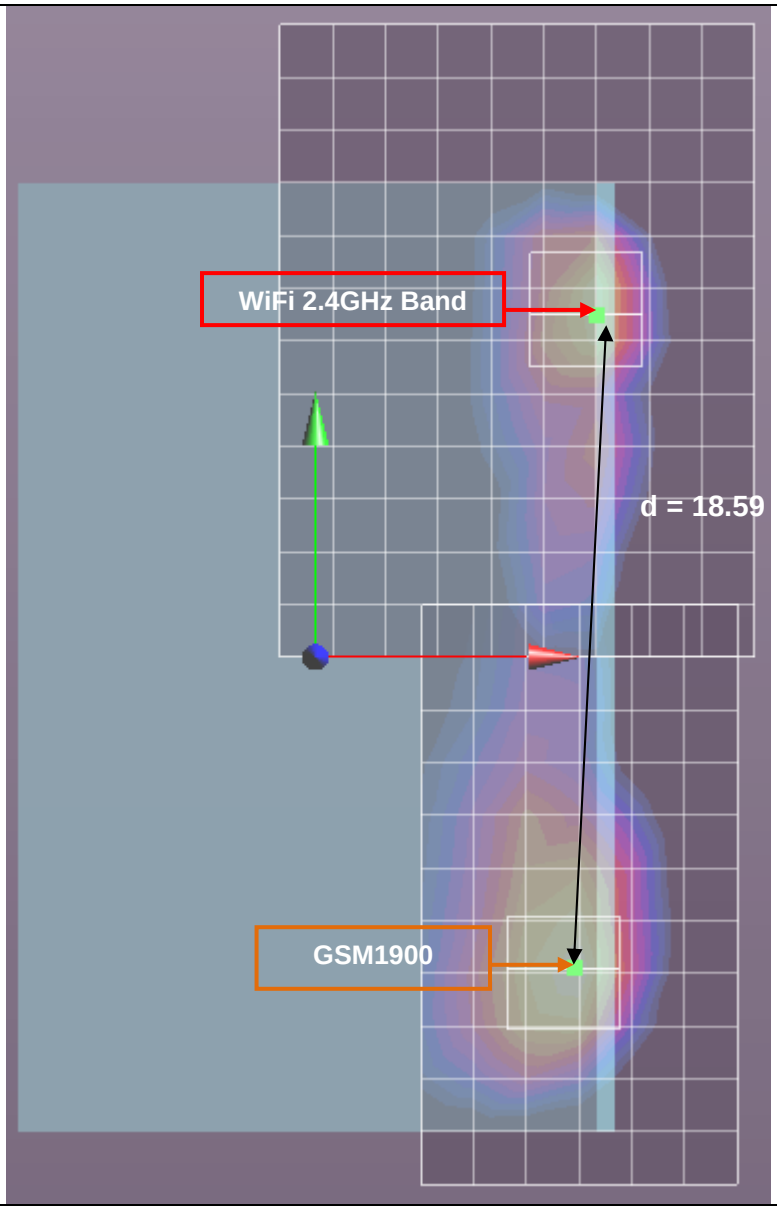
SAR Peak Location Separation Distance

Figure (6)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.45	0.0737	-0.0884	-0.185
WiFi 2.4GHz Band	3.42	0.0802	0.0974	-0.183

Separation distance (cm)
18.59

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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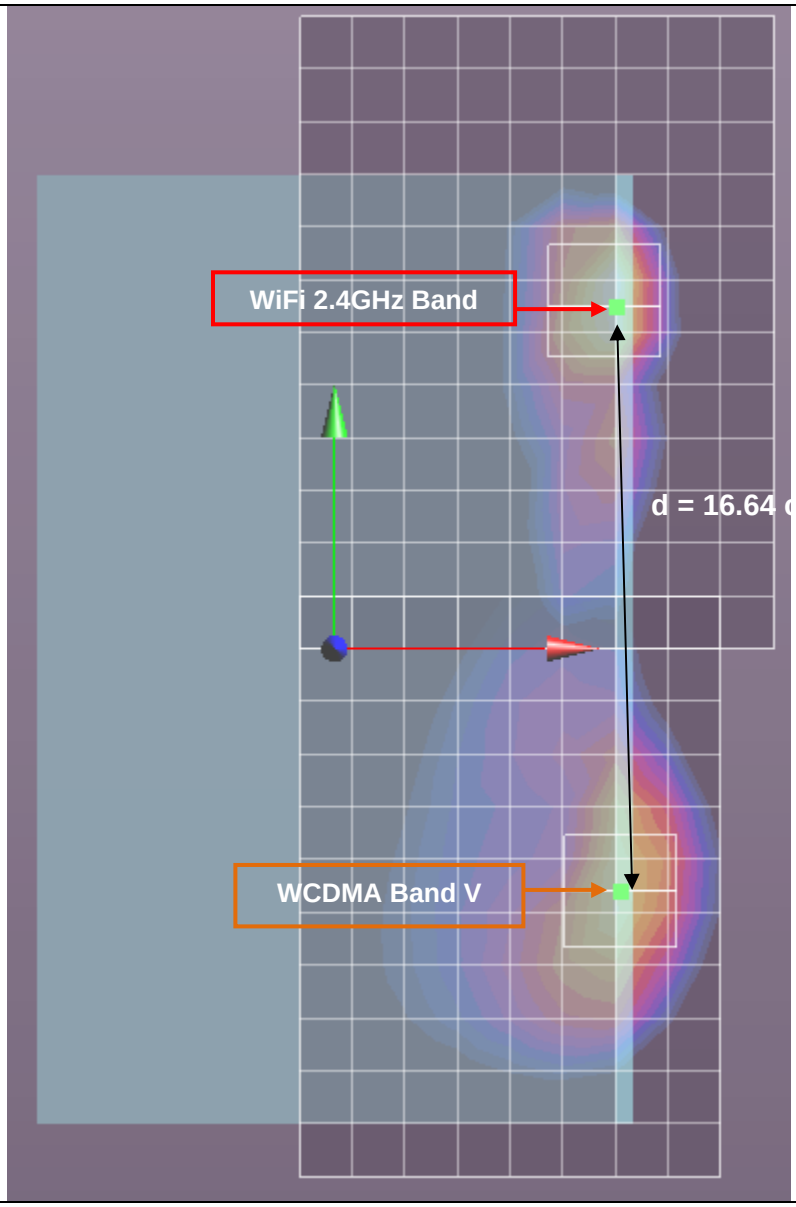
SAR Peak Location Separation Distance

Figure (7)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.33	0.0815	-0.069	-0.185
WiFi 2.4GHz Band	3.42	0.0802	0.0974	-0.183

Separation distance (cm)
16.64

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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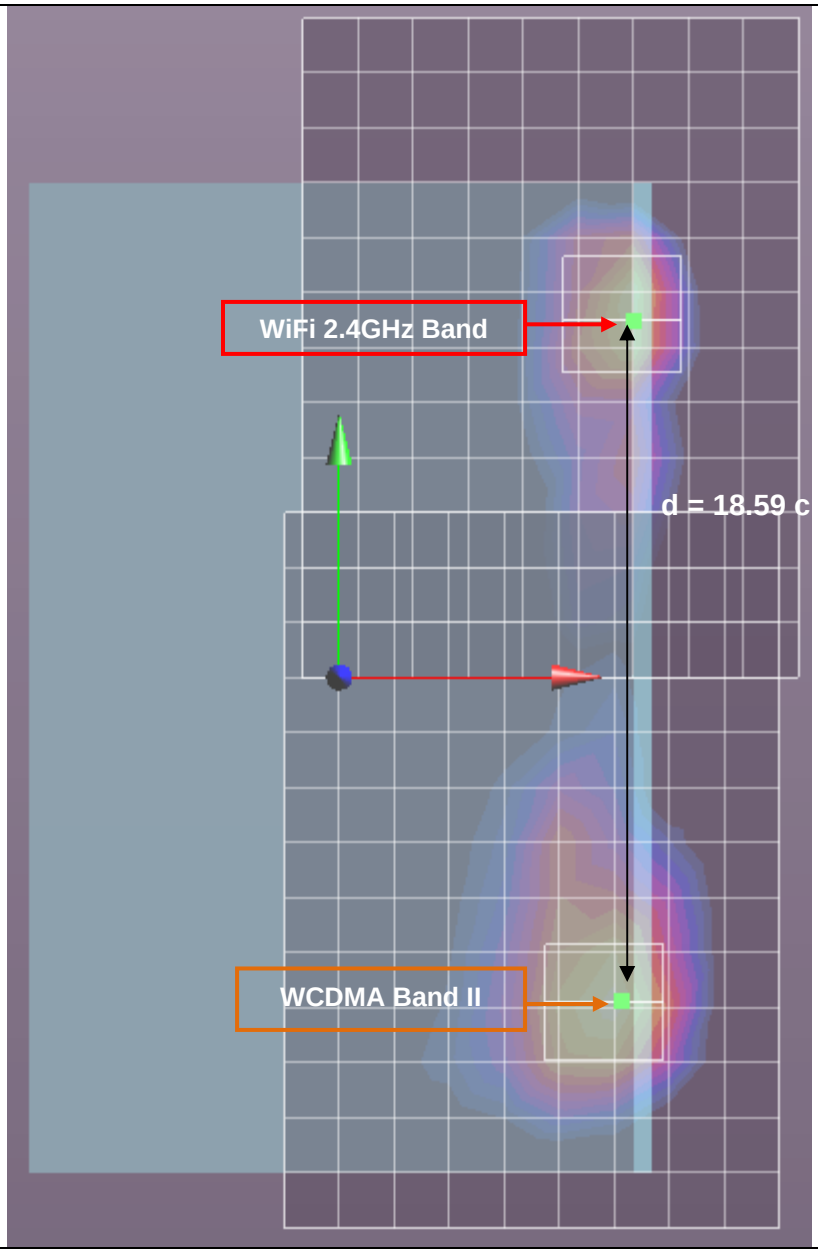
SAR Peak Location Separation Distance

Figure (8)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.27	0.0768	-0.0885	-0.185
WiFi 2.4GHz Band	3.42	0.0802	0.0974	-0.183

Separation distance (cm)
18.59

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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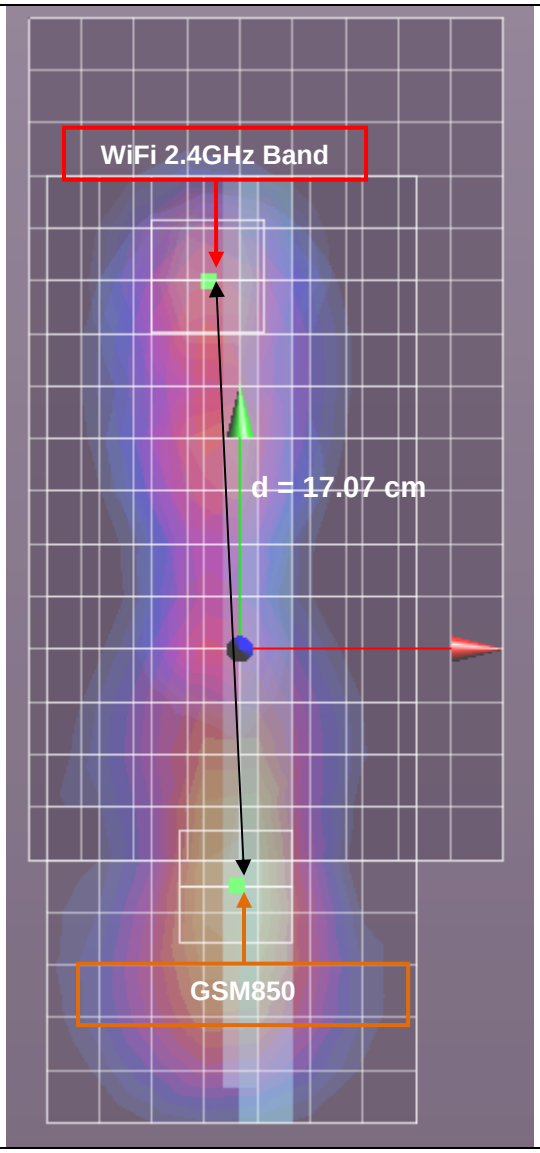
SAR Peak Location Separation Distance

Figure (9)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.38	-0.001	-0.0675	-0.186
WiFi 2.4GHz Band	2.05	-0.009	0.103	-0.183

Separation distance (cm)
17.07

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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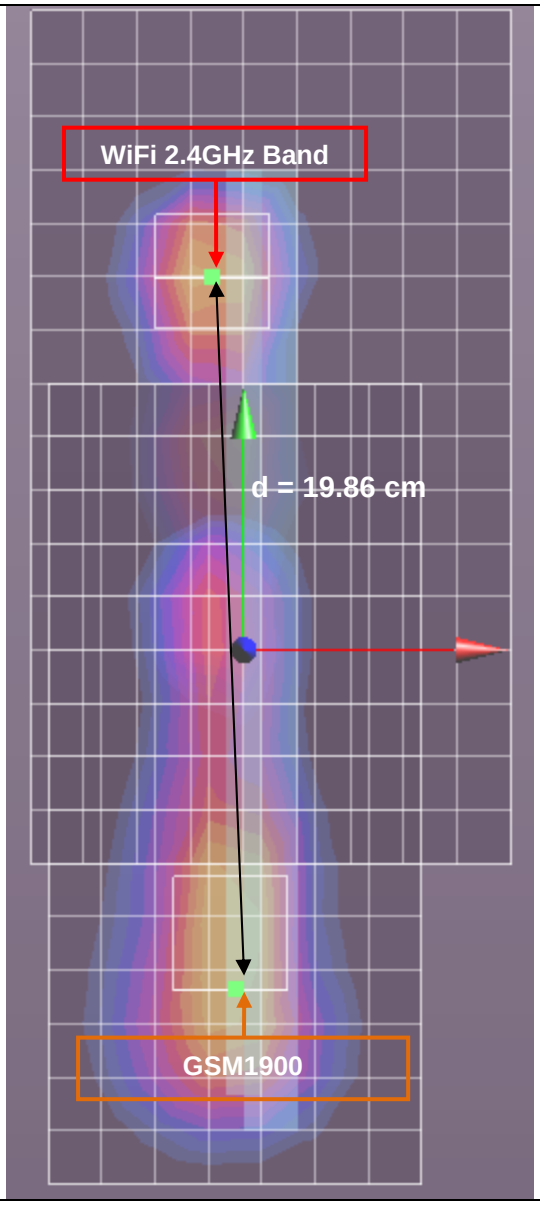
SAR Peak Location Separation Distance

Figure (10)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.00	-0.0024	-0.0955	-0.185
WiFi 2.4GHz Band	2.05	-0.009	0.103	-0.183

Separation distance (cm)
19.86

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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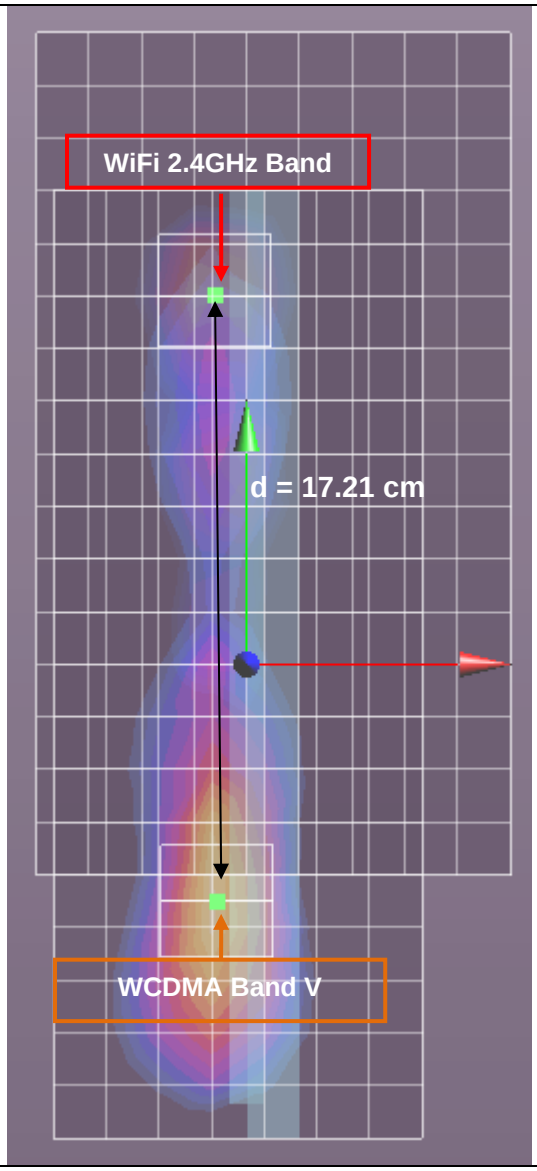
SAR Peak Location Separation Distance

Figure (11)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	2.08	-0.0069	-0.0691	-0.186
WiFi 2.4GHz Band	2.05	-0.009	0.103	-0.183

Separation distance (cm)
17.21

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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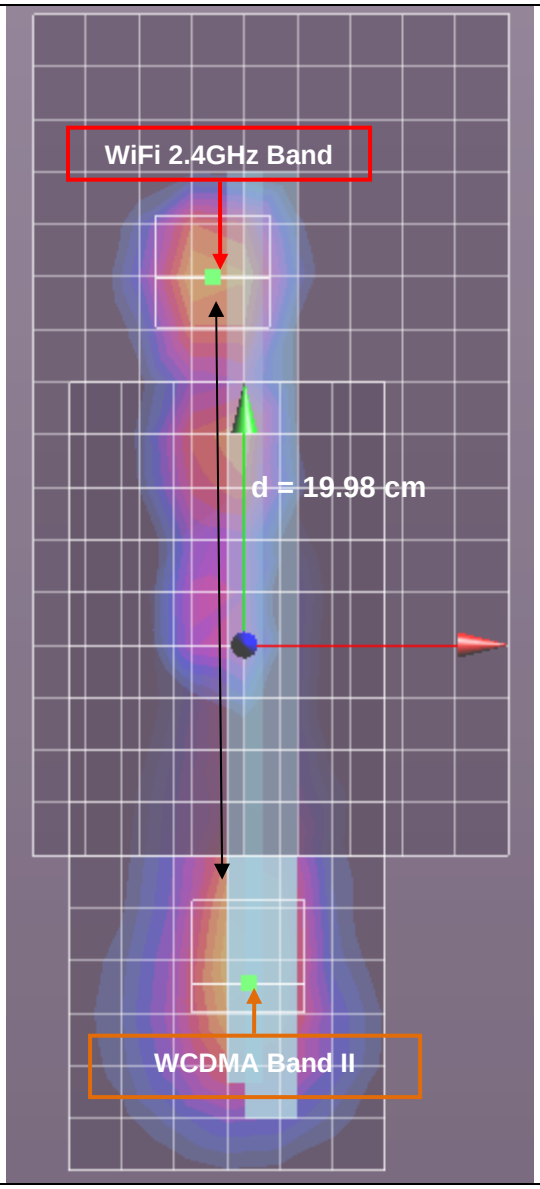
SAR Peak Location Separation Distance

Figure (12)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.32	0.001	-0.0965	-0.186
WiFi 2.4GHz Band	2.05	-0.009	0.103	-0.183

Separation distance (cm)
19.98

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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13.2. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and WiFi 5.2GHz Band

Test Position	Worst-case combination					∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM 850	GSM1900	W-CDMA Band V	W-CDMA Band II	WiFi 5.2 GHz Band				
Rear	1.458				0.583	2.041	19.93	0.102	13
		1.250			0.583	1.833	20.44	0.090	14
			1.181		0.583	1.764	19.93	0.089	15
				1.223	0.583	1.806	20.35	0.089	16

Conclusions:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3.

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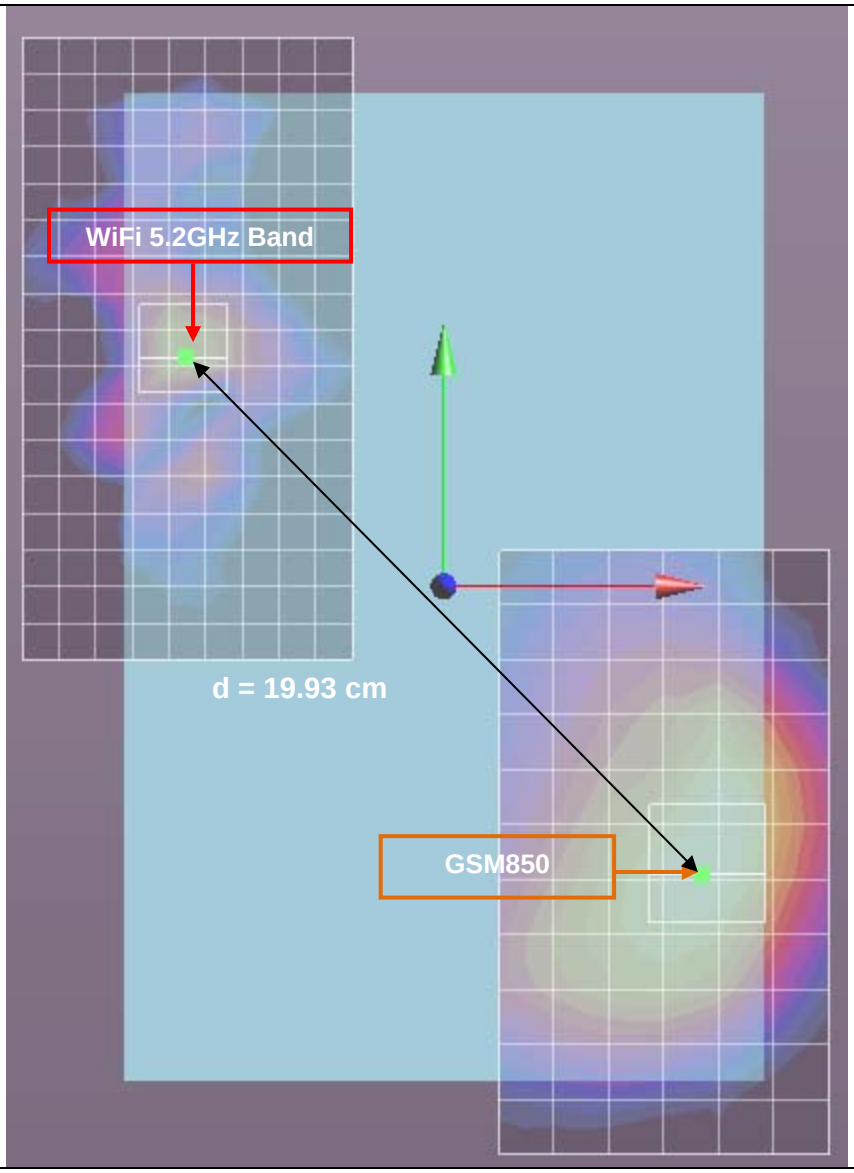
SAR Peak Location Separation Distance

Figure (13)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.23	0.0704	-0.0787	-0.185
WiFi 5.2GHz Band	1.71	-0.0702	0.0626	-0.185

Separation distance (cm)
19.93

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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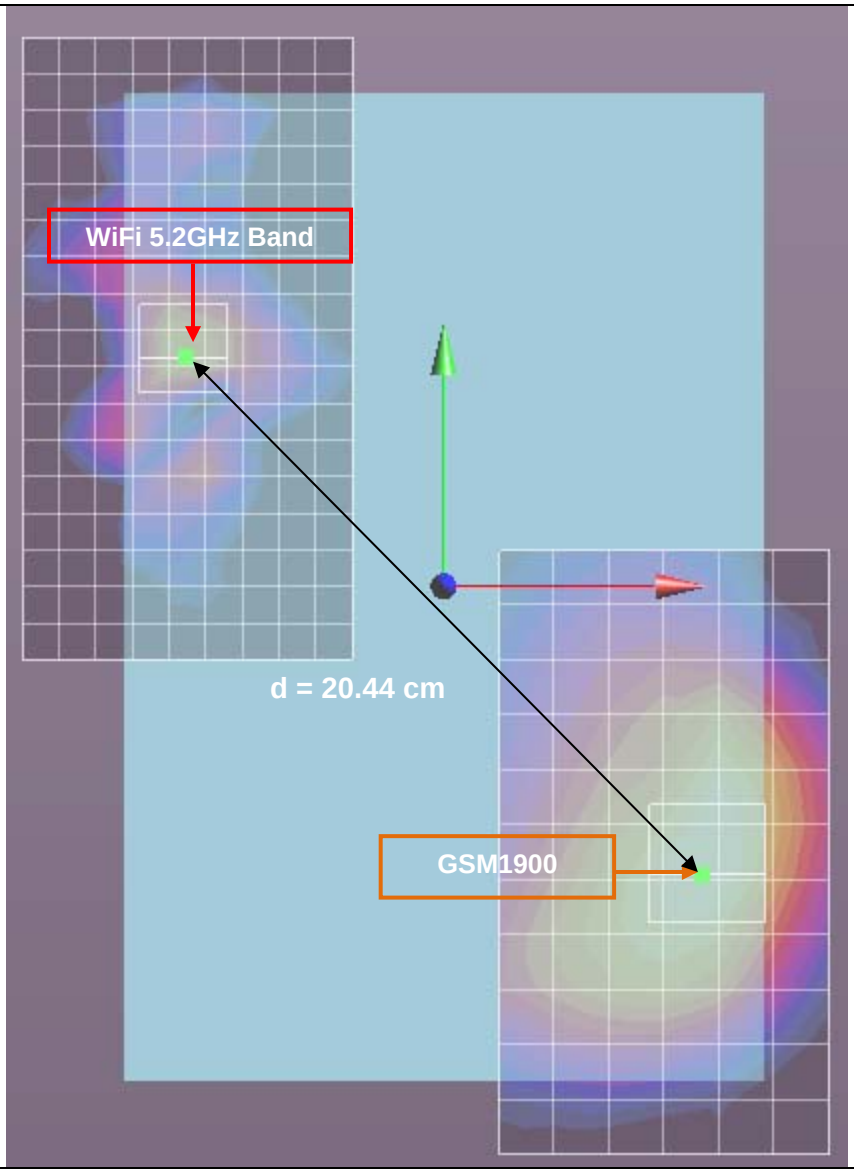
SAR Peak Location Separation Distance

Figure (14)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.34	0.0689	-0.0872	-0.185
WiFi 5.2GHz Band	1.71	-0.0702	0.0626	-0.185

Separation distance (cm)
20.44

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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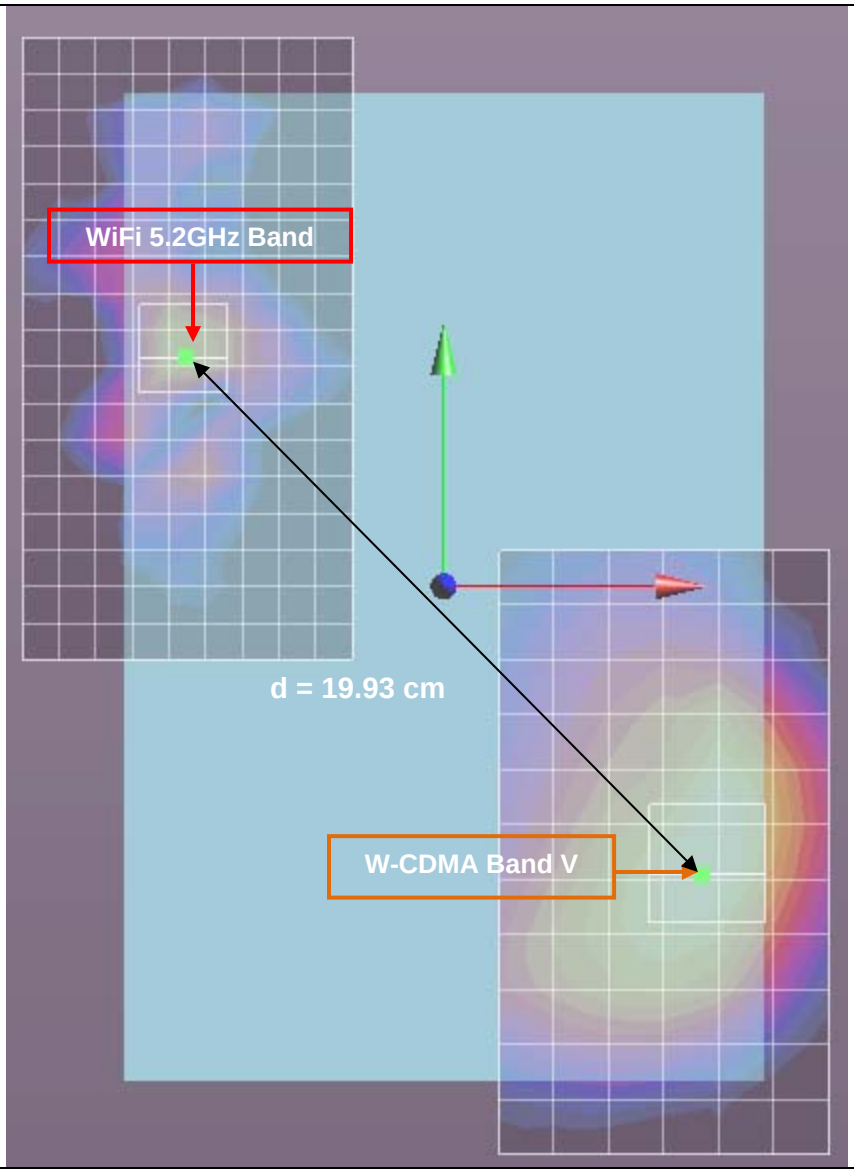
SAR Peak Location Separation Distance

Figure (15)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.61	0.0724	-0.0766	-0.184
WiFi 5.2GHz Band	1.71	-0.0702	0.0626	-0.185

Separation distance (cm)
19.93

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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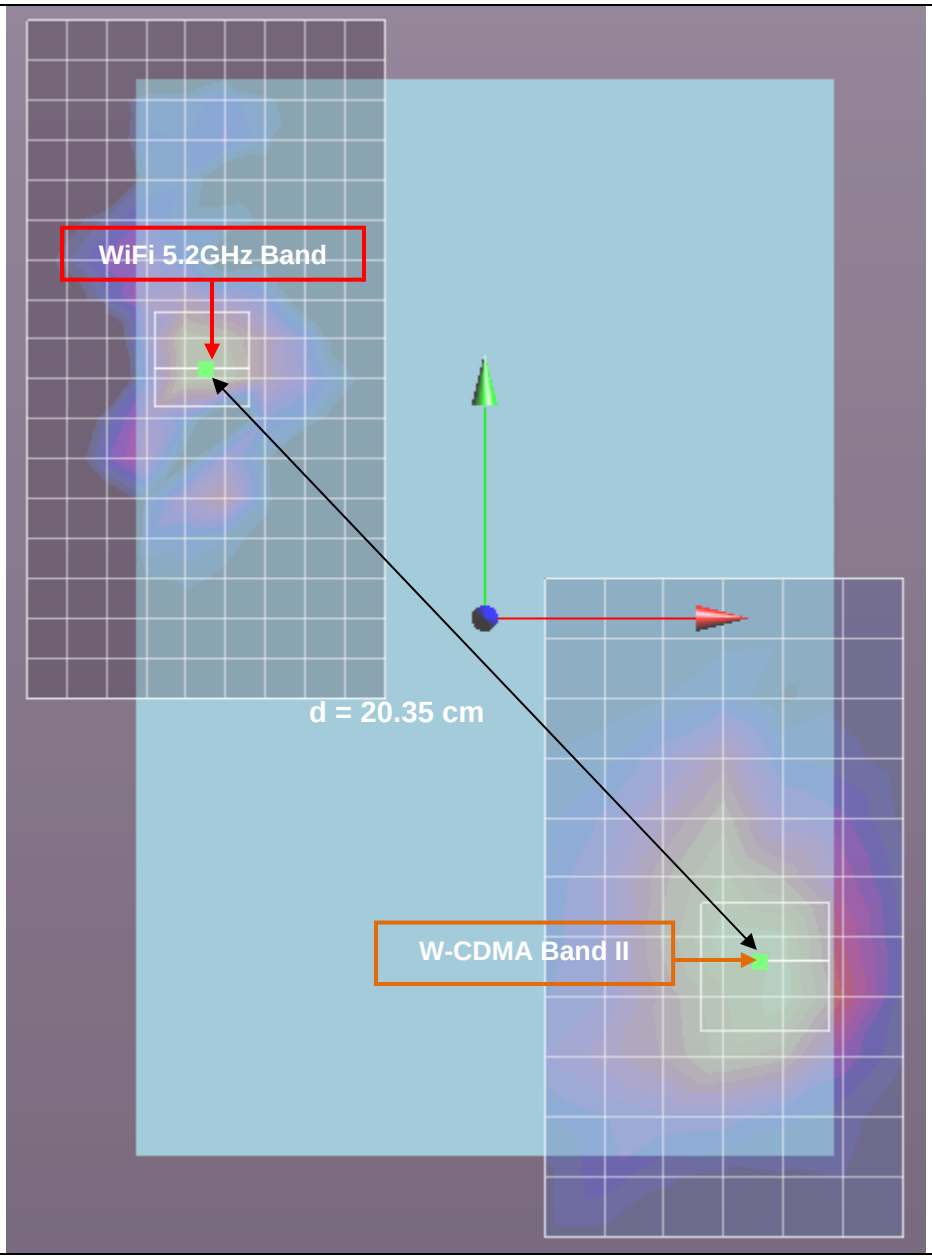
SAR Peak Location Separation Distance

Figure (16)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.03	0.0689	-0.0859	-0.185
WiFi 5.2GHz Band	1.71	-0.0702	0.0626	-0.185

Separation distance (cm)
20.35

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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13.3. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and WiFi 5.3GHz Band

Test Position	Worst-case combination					∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM 850	GSM1900	W-CDMA Band V	W-CDMA Band II	WiFi 5.3 GHz Band				
Rear	1.458				0.448	1.906	19.93	0.096	17
		1.250			0.448	1.698	20.44	0.083	18
			1.181		0.448	1.629	19.93	0.082	19
				1.223	0.448	1.671	20.35	0.082	20

Conclusions:
Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3.

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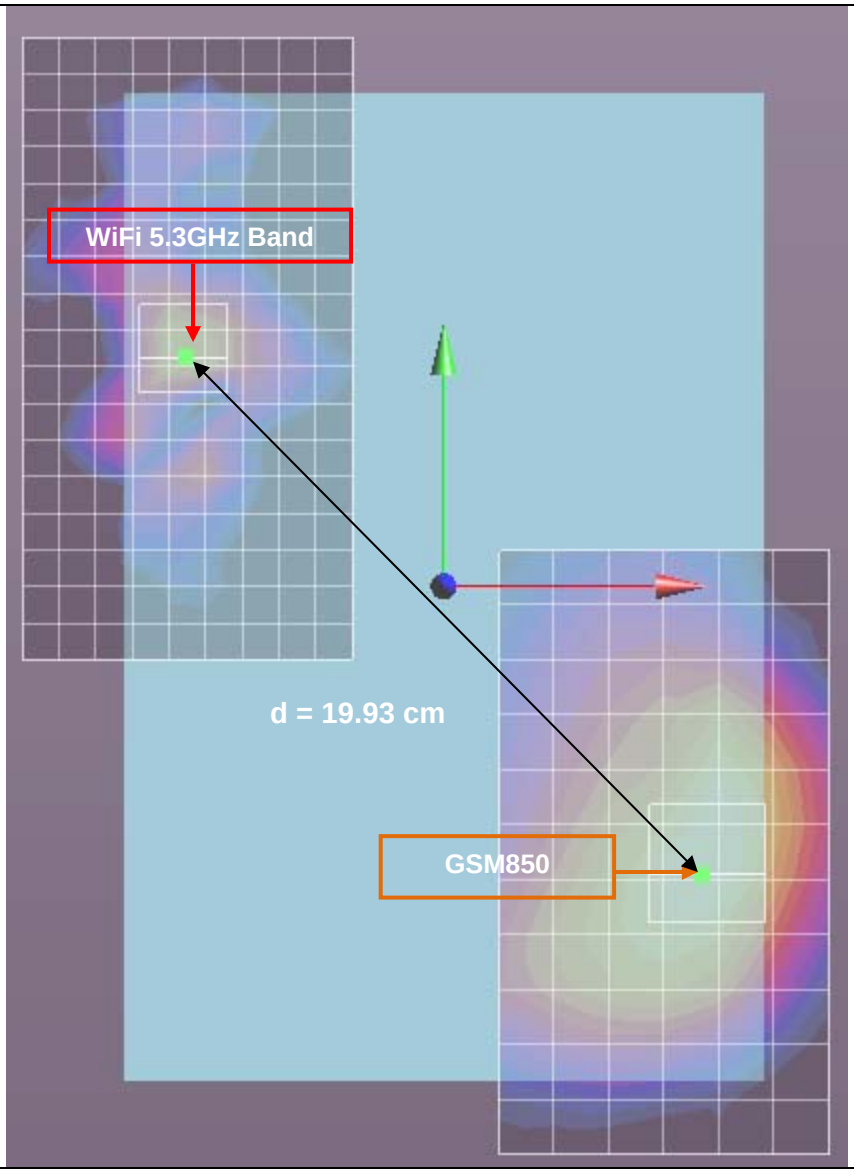
SAR Peak Location Separation Distance

Figure (17)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.23	0.0704	-0.0787	-0.185
WiFi 5.3GHz Band	1.28	-0.0702	0.0626	-0.185

Separation distance (cm)
19.93

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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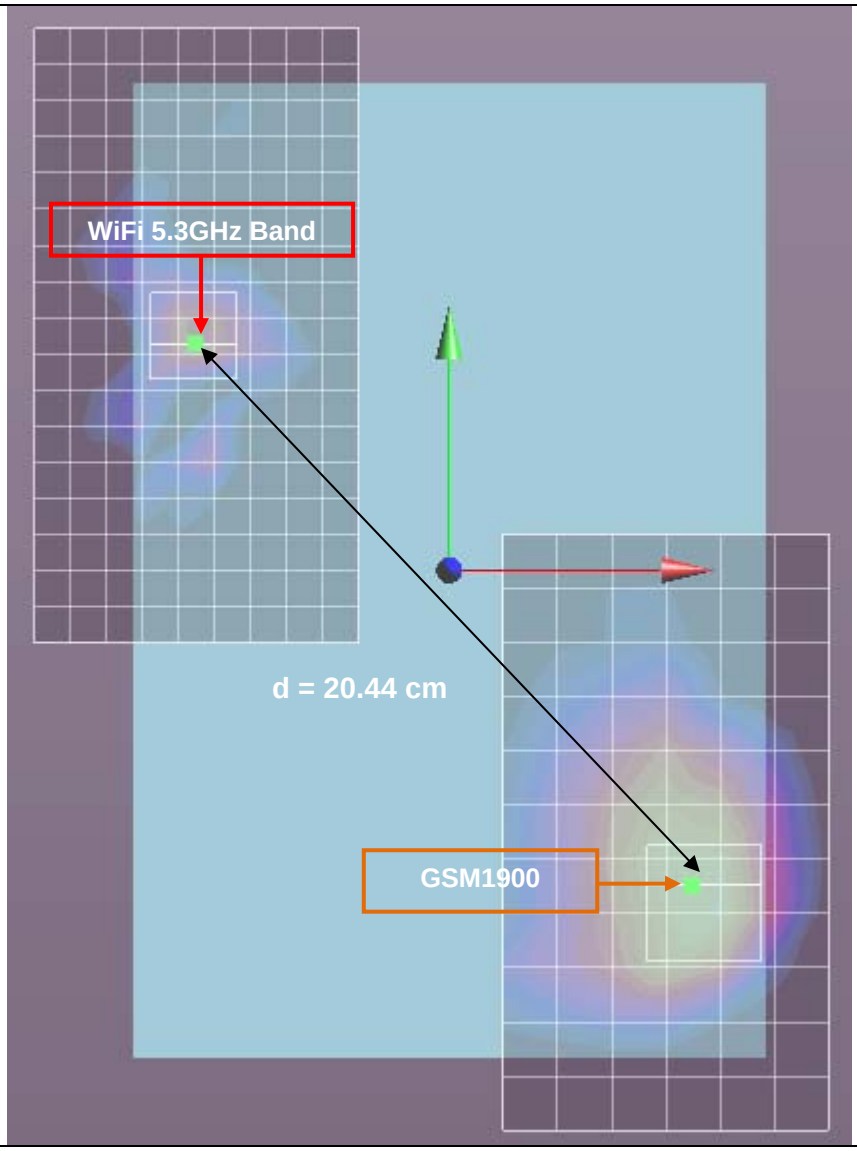
SAR Peak Location Separation Distance

Figure (18)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.34	0.0689	-0.0872	-0.185
WiFi 5.3GHz Band	1.28	-0.0702	0.0626	-0.185

Separation distance (cm)
20.44

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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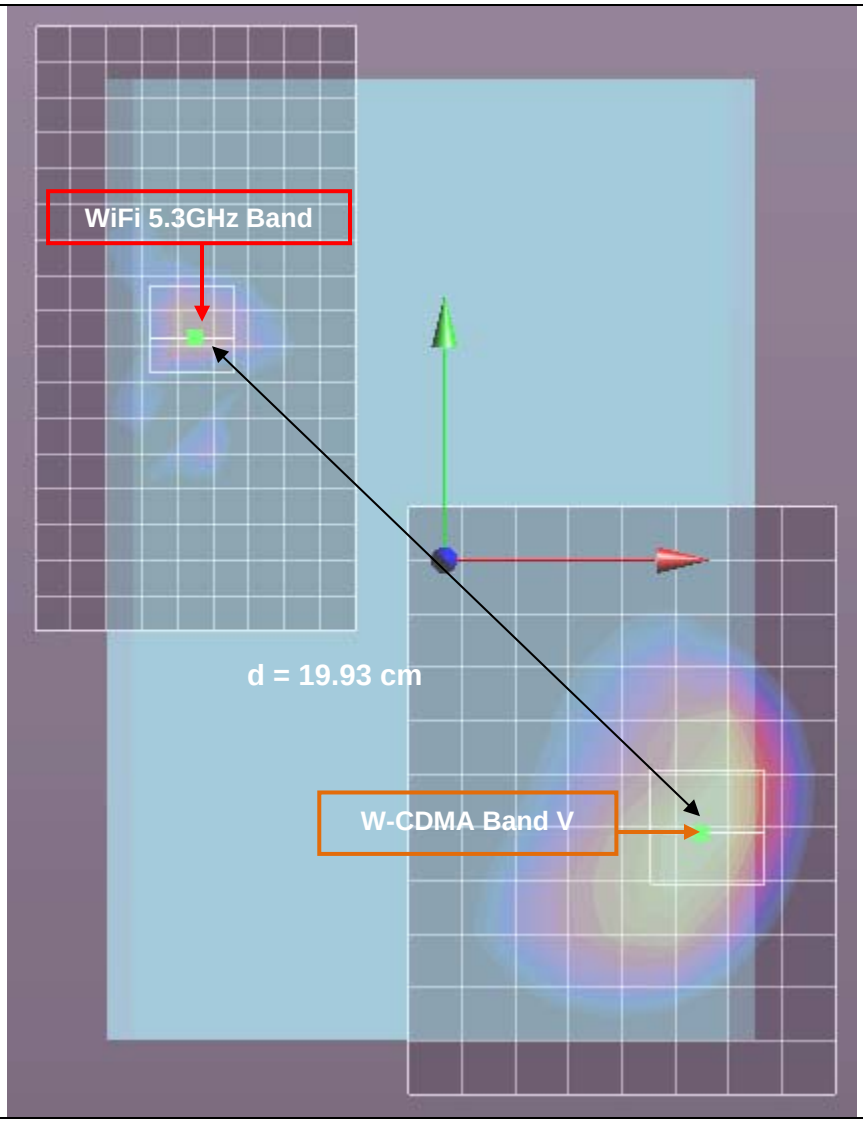
SAR Peak Location Separation Distance

Figure (19)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.61	0.0724	-0.0766	-0.185
WiFi 5.3GHz Band	1.28	-0.0702	0.0626	-0.185

Separation distance (cm)
19.93

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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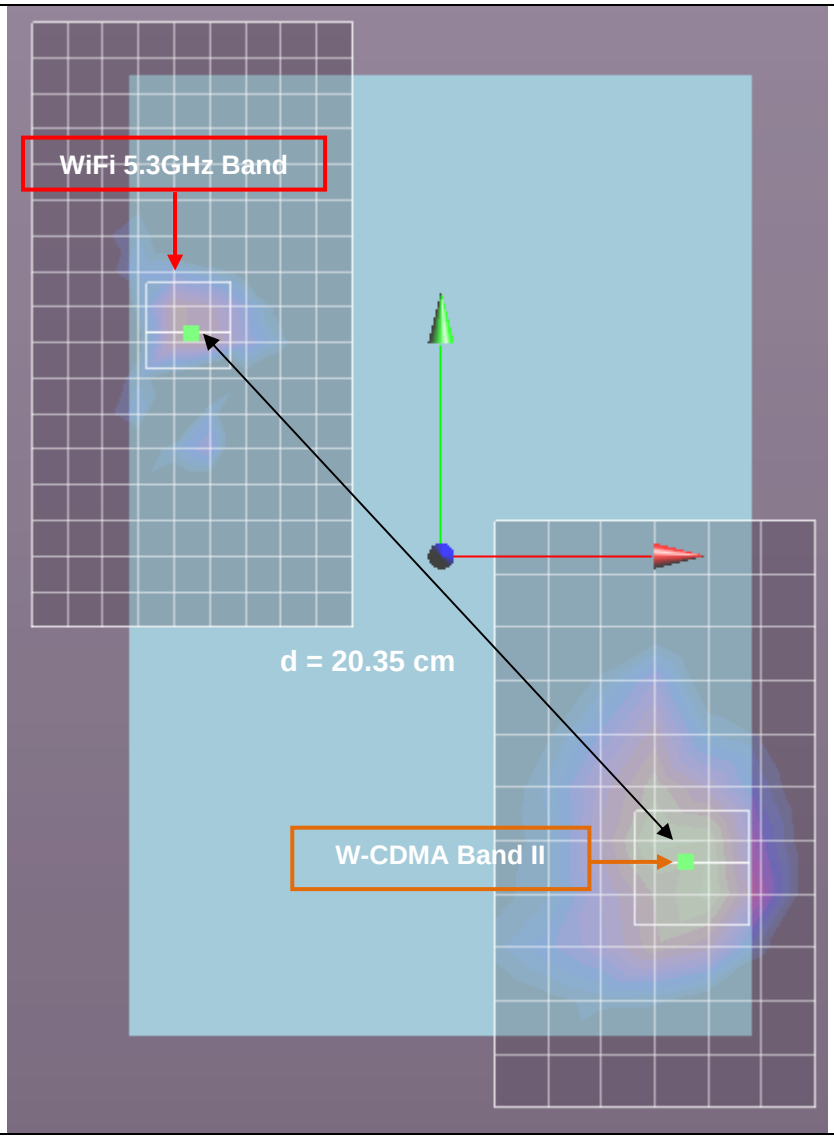
SAR Peak Location Separation Distance

Figure (20)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.03	0.0689	-0.0859	-0.185
WiFi 5.3GHz Band	1.28	-0.0702	0.0626	-0.185

Separation distance (cm)
20.35

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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13.4. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and WiFi 5.5GHz Band

Test Position	Worst-case combination					∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM 850	GSM1900	W-CDMA Band V	W-CDMA Band II	WiFi 5.5 GHz Band				
Rear	1.458				0.735	2.193	21.01	0.104	21
		1.250			0.735	1.985	21.51	0.092	22
			1.181		0.735	1.916	21.01	0.091	23
				1.223	0.735	1.958	21.42	0.091	24

Conclusions:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3.

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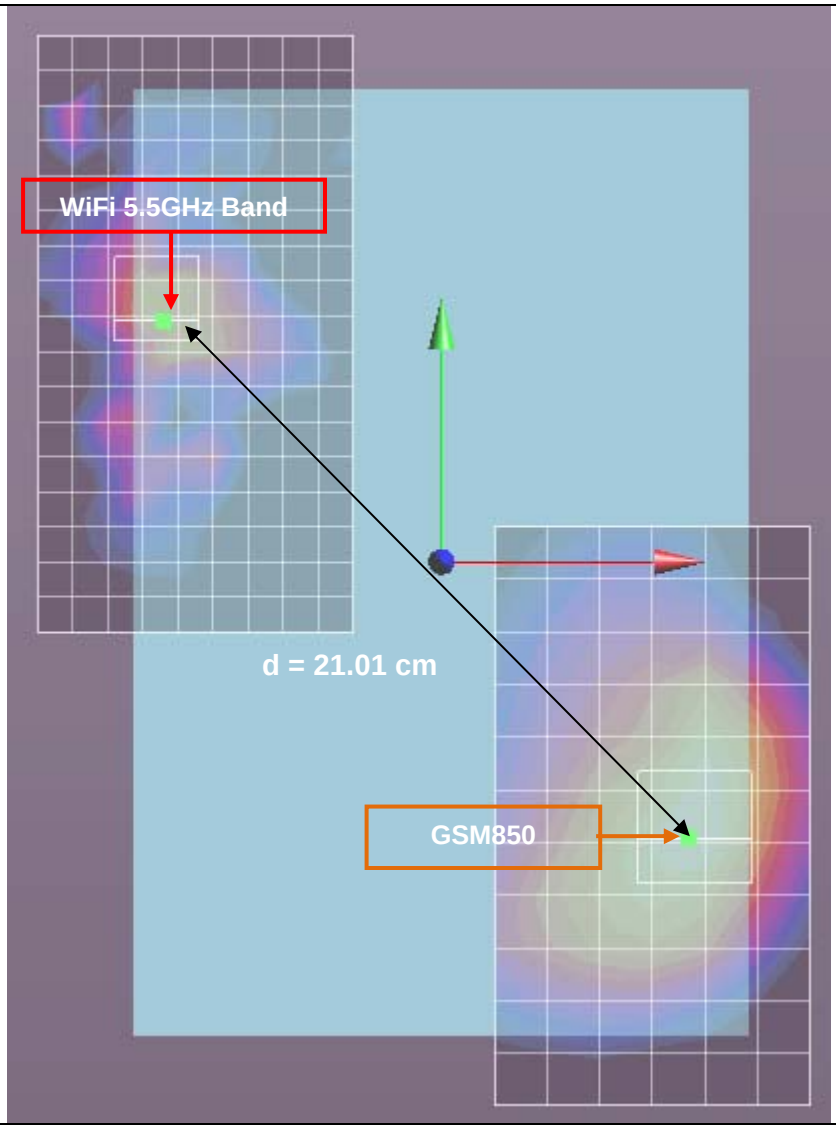
SAR Peak Location Separation Distance

Figure (21)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.23	0.0704	-0.0787	-0.185
WiFi 5.5GHz Band	5.63	-0.0794	0.0686	-0.185

Separation distance (cm)
21.01

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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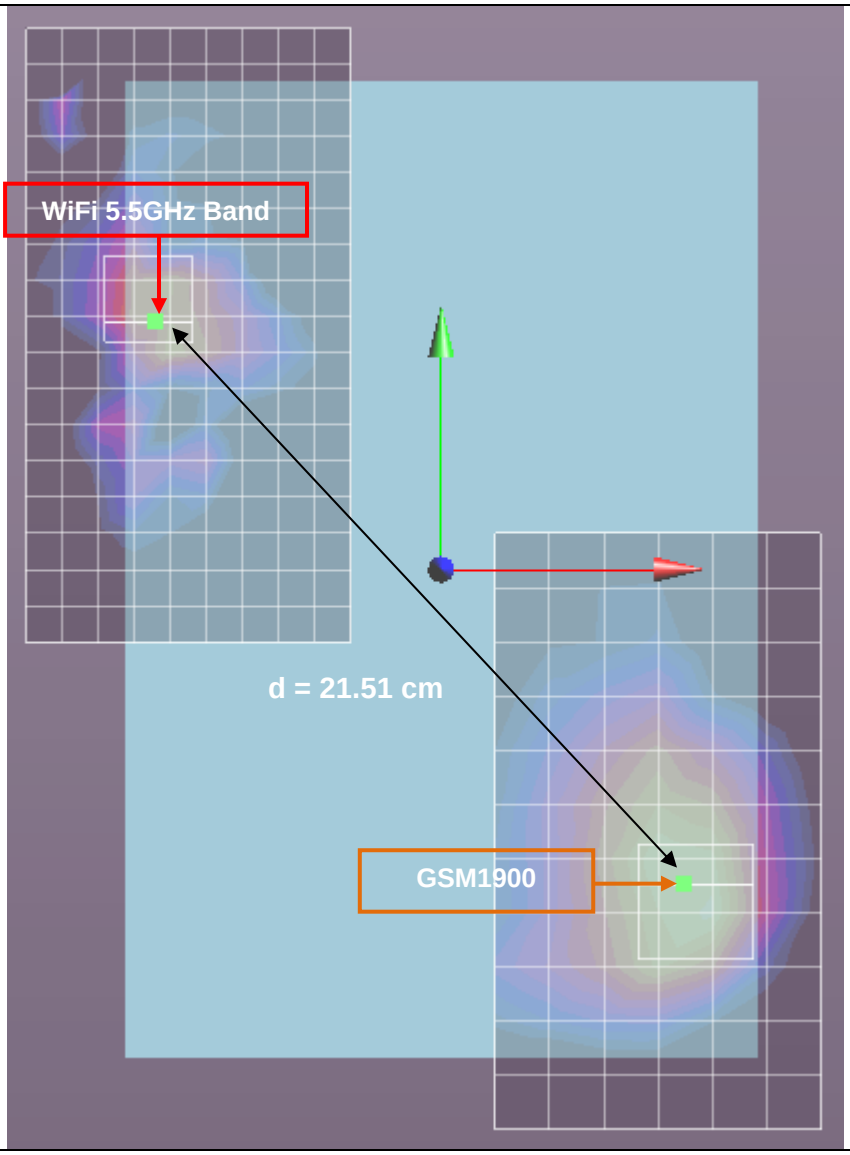
SAR Peak Location Separation Distance

Figure (22)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.34	0.0689	-0.0872	-0.185
WiFi 5.5GHz Band	5.63	-0.0794	0.0686	-0.185

Separation distance (cm)
21.51

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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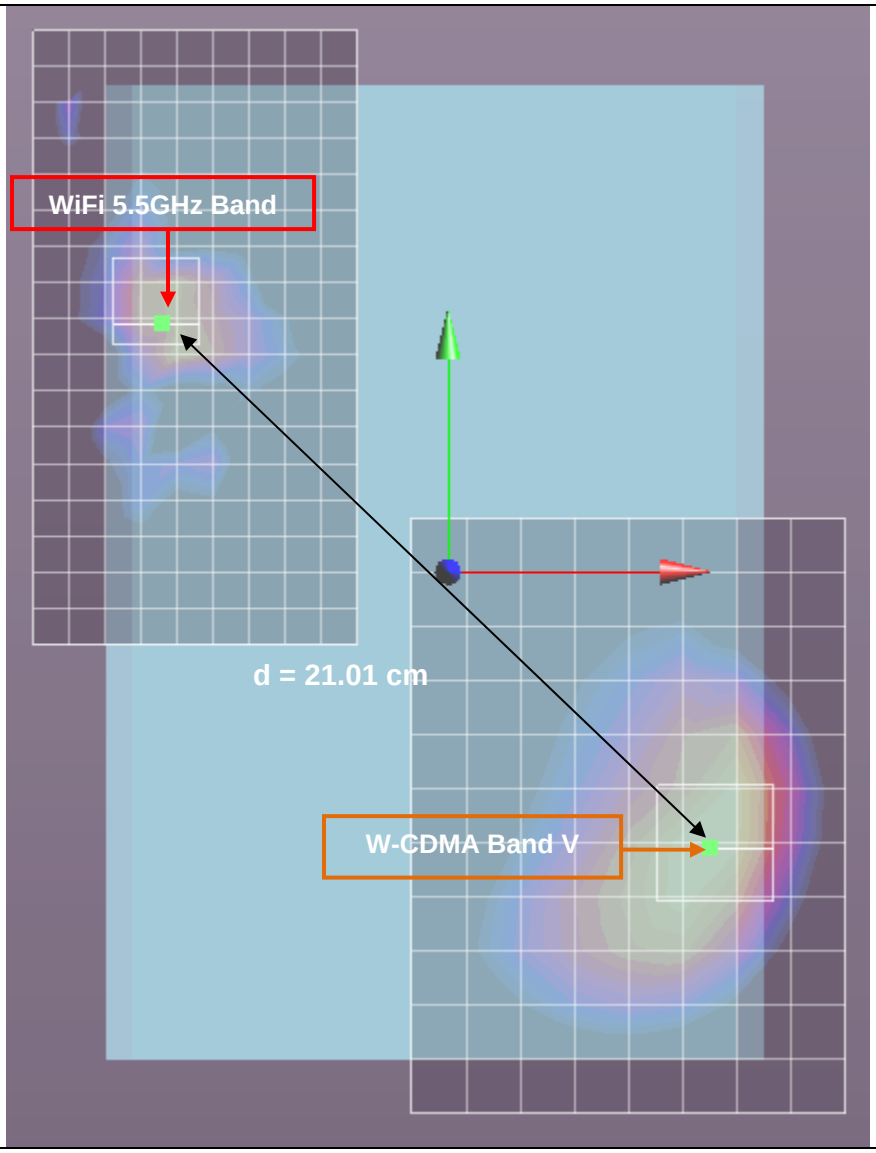
SAR Peak Location Separation Distance

Figure (23)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.61	0.0724	-0.0766	-0.185
WiFi 5.5GHz Band	5.63	-0.0794	0.0686	-0.185

Separation distance (cm)
21.01

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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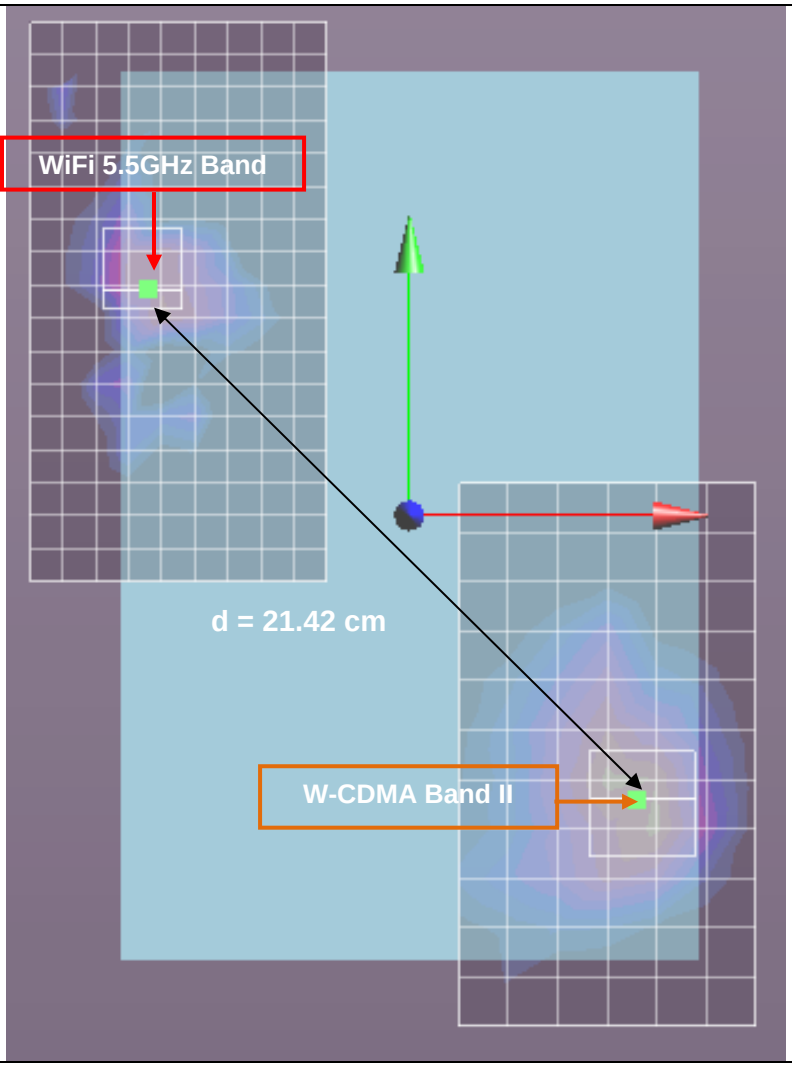
SAR Peak Location Separation Distance

Figure (24)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.03	0.0689	-0.0859	-0.185
WiFi 5.5GHz Band	5.63	-0.0794	0.0686	-0.185

Separation distance (cm)
21.42

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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13.5. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and WiFi 5.8GHz Band

Test Position	Worst-case combination					∑ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM 850	GSM1900	W-CDMA Band V	W-CDMA Band II	WiFi 5.8 GHz Band				
Rear	1.458				0.476	1.934	21.23	0.091	25
		1.250			0.476	1.726	21.76	0.079	26
			1.181		0.476	1.657	21.22	0.078	27
				1.223	0.476	1.699	21.66	0.078	28

Conclusions:
Simultaneous transmission SAR measurement (Volume Scan) is not required because the SAR to peak location separation ratios is < 0.3.

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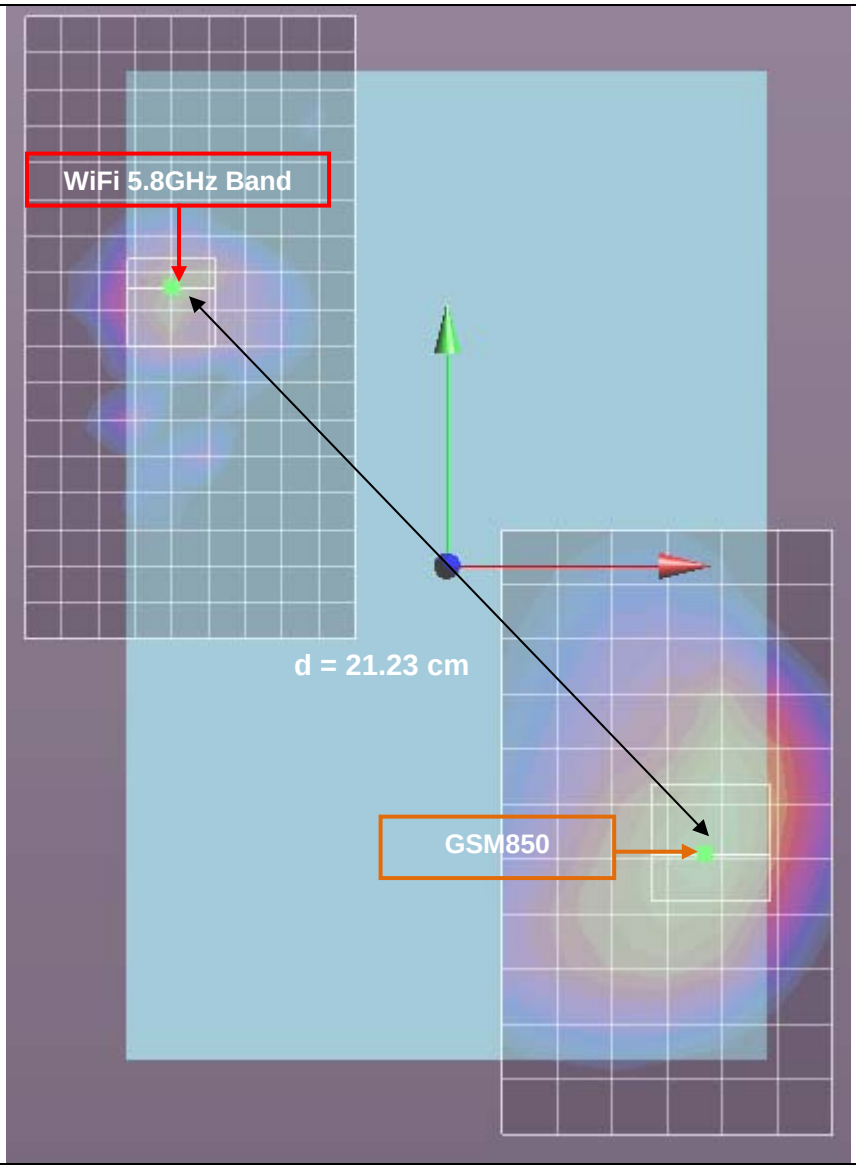
SAR Peak Location Separation Distance

Figure (25)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM850	2.23	0.0704	-0.0787	-0.185
WiFi 5.8GHz Band	3.17	-0.075	0.076	-0.185

Separation distance (cm)
21.23

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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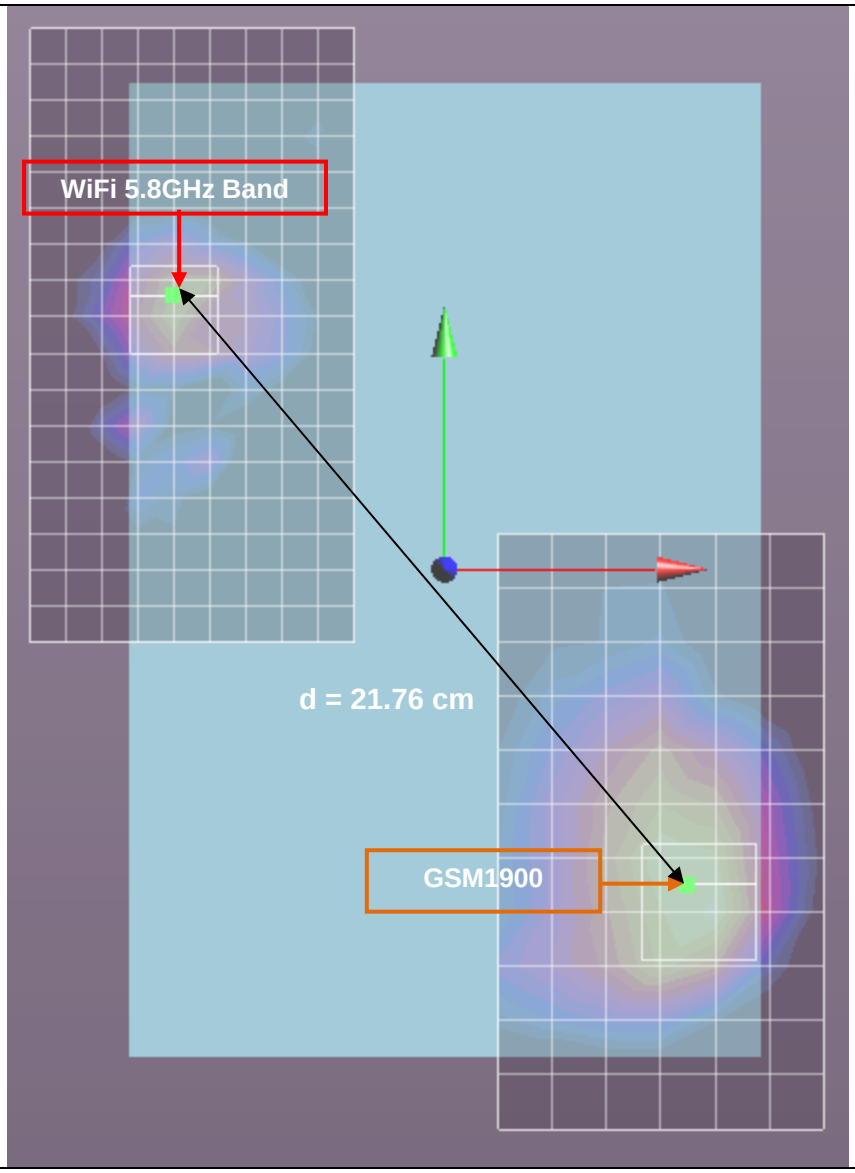
SAR Peak Location Separation Distance

Figure (26)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GSM1900	2.34	0.0689	-0.0872	-0.185
WiFi 5.8GHz Band	3.17	-0.075	0.076	-0.185

Separation distance (cm)
21.76

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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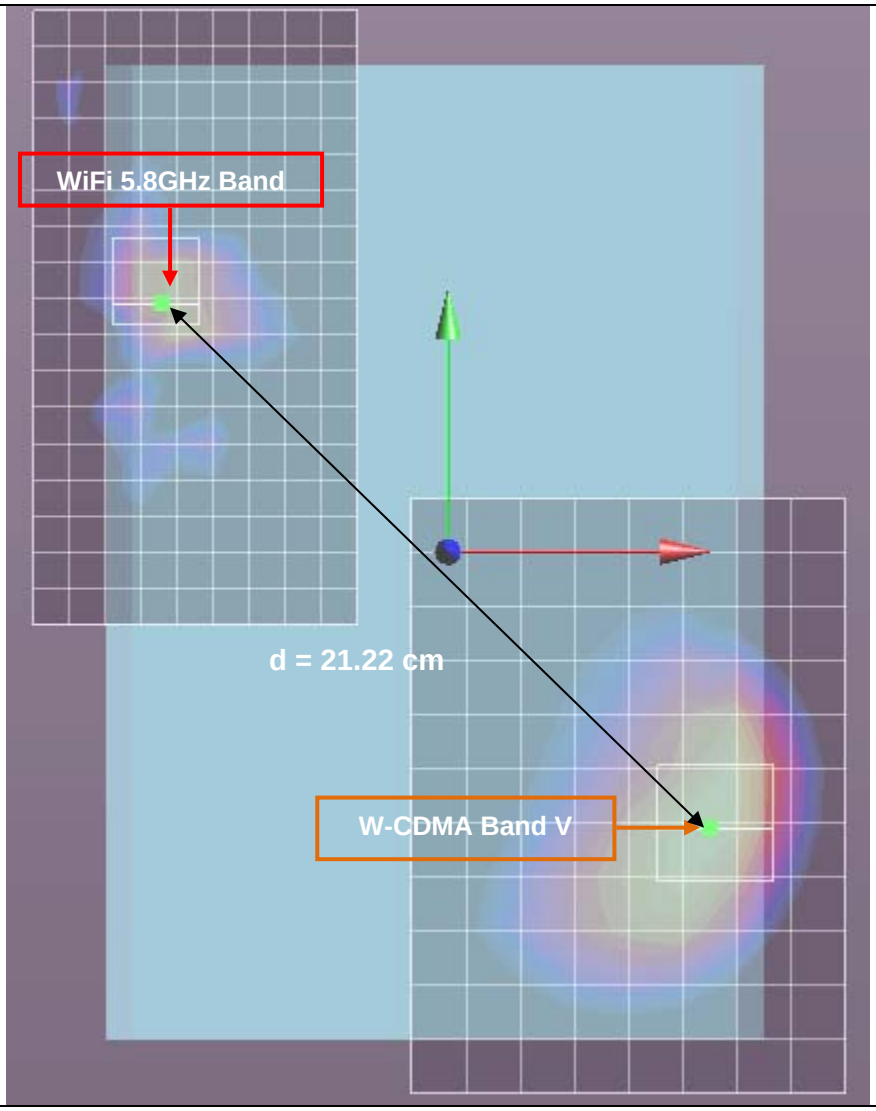
SAR Peak Location Separation Distance

Figure (27)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band V	1.61	0.0724	-0.0766	-0.185
WiFi 5.8GHz Band	3.17	-0.075	0.076	-0.185

Separation distance (cm)
21.22

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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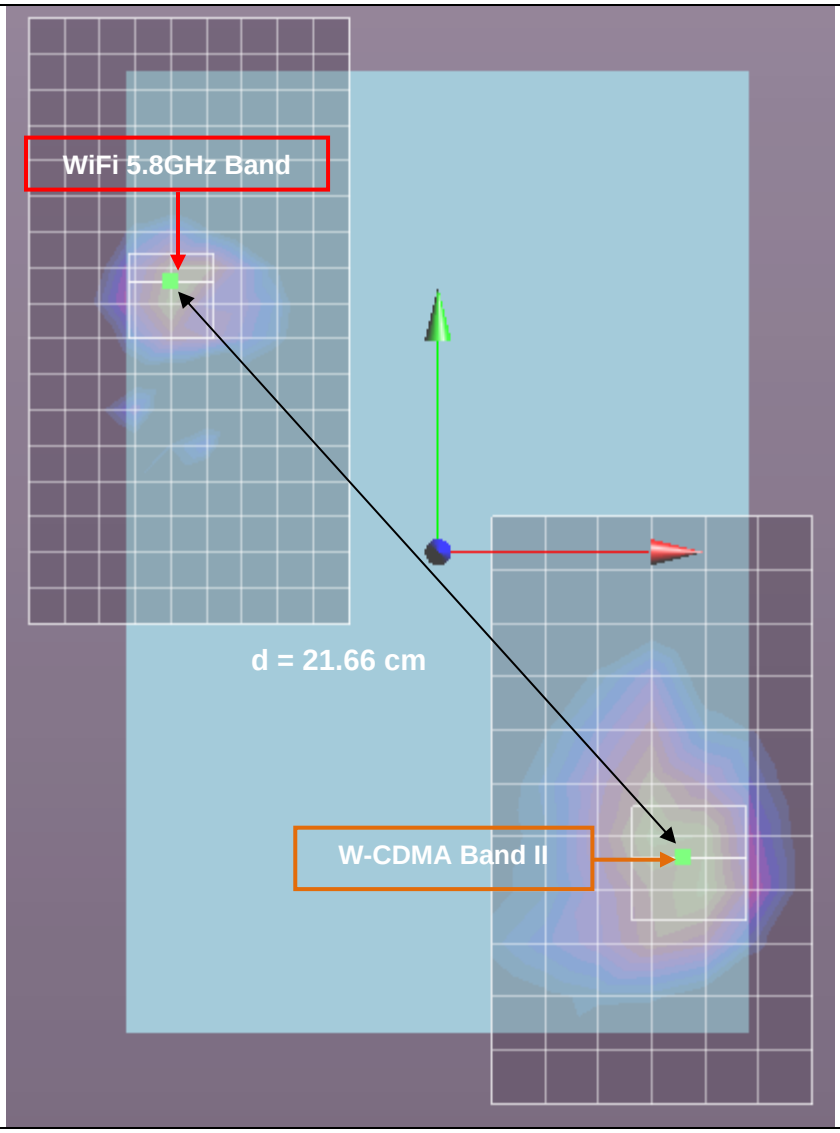
SAR Peak Location Separation Distance

Figure (28)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
W-CDMA Band II	2.03	0.0689	-0.0859	-0.185
WiFi 5.8GHz Band	3.17	-0.075	0.076	-0.185

Separation distance (cm)
21.66

Note: SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

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14. Appendixes

Refer to separated files for the following appendixes.

14.1. System Performance Check Plots

14.2. SAR Test Plots for GSM850

14.3. SAR Test Plots for GSM1900

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

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

14.6. SAR Test Plots for WiFi 2.4GHz Band

14.7. SAR Test Plots for WiFi 5GHz Bands

14.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3668

14.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772

14.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749

14.11. Calibration Certificate for D1900V2 - SN 5d043

14.12. Calibration Certificate for D2450V2 - SN 748

14.13. Calibration Certificate for D5GHzV2 - SN 1075

14.14. Calibration Certificate for D835V2 - SN 4d002

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