



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

SAR EVALUATION REPORT

For

**A tablet (PAD) computer, containing 802.11a/b/g/n, BT4.0 and
GSM/UMTS transceiver (radio module) Devices**

**Model: TP00045A1
FCC ID: PU5-TP00045A1TC**

**Report Number: 12U14547-1C
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Prepared for

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Revision History

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--	11/1/2012	Initial Issue	--
A	11/20/2012	Section 7.1 – Added note describing Bluetooth transmitter. Section 7.2 – Expanded simultaneous transmission table. Section 7.5 – Added Accessories section. Section 13.3 – Corrected tune-up limit to 23.5dBm. Section 14.1 – Justified Wi-Fi MIMO simultaneous transmission analysis.	Dave Weaver
B	12/4/2012	Section 14 – Corrected scaled SAR tables. Included unscaled SAR tables and added justification for performing SPSLR calculations upon scaled results only. Section 1 – Updated simultaneous transmission reported SAR result.	Dave Weaver
C	12/14/2012	Correct FCC model number	Aliza Zaffar

Table of Contents

1. Attestation of Test Results.....	6
2. Test Methodology	7
3. Facilities and Accreditation	7
4. Calibration and Uncertainty	8
4.1. Measuring Instrument Calibration	8
4.2. Measurement Uncertainty	9
5. Measurement System Description and Setup.....	10
6. SAR Measurement Procedures.....	11
6.1. Normal SAR Measurement Procedure.....	11
6.2. Volume Scan Procedures	12
7. Device Under Test.....	13
7.1. Band and Air Interfaces	13
7.2. Simultaneous Transmission.....	14
7.3. Hotspot (Wireless router) Exposure Condition	14
7.4. Power Reduction Implementation	14
7.5. Summary Table of Power Reduction dB Levels per Mode & Band.....	15
8. Sensor Coverage Area.....	17
8.1. Edge Coverage.....	17
8.2. Rear/Bottom Coverage	18
9. Summary of Test Configurations.....	19
9.1. Body Test Condition for WWAN.....	19
9.2. Body Test Conditions for Wi-Fi (Main Antenna)	19
9.3. Body Test Conditions for Wi-Fi (Aux Antenna).....	19
9.4. Rear 20° Tilt testing justification.....	20
10. RF Output Power Measurement	21
10.1. GSM850.....	21
10.2. GSM1900.....	22
10.3. WCDMA (UMTS) Band V	23
10.4. WCDMA (UMTS) Band II.....	27
10.5. Wi-Fi (2.4 GHz Band)	31
10.6. Wi-Fi (5 GHz Bands)	33
10.7. Bluetooth.....	37

11. Tissue Dielectric Properties	38
11.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests	39
11.2. Tissue Dielectric Parameter Check Results.....	40
12. System Performance Check	44
12.1. System Performance Check Measurement Conditions.....	44
12.2. Reference SAR Values for System Performance Check.....	44
12.3. System Performance Check Results	45
13. SAR Test Results	46
13.1. GSM850.....	46
13.2. GSM1900.....	47
13.3. W-CDMA (UMTS) Band V.....	48
13.4. W-CDMA (UMTS) Band II	49
13.5. Wi-Fi (2.4GHz Band).....	50
13.6. Wi-Fi (5GHz Bands)	51
13.7. Summary of Highest SAR Values.....	53
13.8. SAR Plot(from Summary of Highest Measured SAR Values)	54
14. Simultaneous Transmission SAR Analysis.....	72
14.1. Sum of the 1g SAR of Body Exposure Condition	72
14.2. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 2.4GHz	77
14.3. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.2GHz	78
14.4. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.3GHz	78
14.5. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.5GHz	79
14.6. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.8GHz	79
15. Appendixes.....	102
15.1. System Performance Check Plots.....	102
15.2. SAR Test Plots for GSM850.....	102
15.3. SAR Test Plots for GSM1900.....	102
15.4. SAR Test Plots for WCDMA (UMTS) Band V.....	102
15.5. SAR Test Plots for WCDMA (UMTS) Band II.....	102
15.6. SAR Test Plots for Wi-Fi 2.4GHz Band	102
15.7. SAR Test Plots for Wi-Fi 5GHz Bands.....	102
15.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749	102
15.9. Calibration Certificate for D835V2 - SN 4d002	102
15.10. Calibration Certificate for D1900V2 - SN 5d043	102
15.11. Calibration Certificate for D2450V2 - SN 748	102

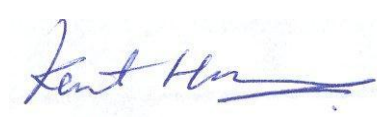
15.12. Calibration Certificate for D5GHzV2 - SN 1075 102

16. External Device Photos..... 103

17. Antenna Locations & Separation Distances..... 104

18. Setup Photos 105

1. Attestation of Test Results

Applicant	Lenovo US		
DUT description	A tablet (PAD) computer, contains 802.11a/b/g/n, BT4.0 and GSM+UMTS transceiver (radio module) Devices		
Model	TP00045A1		
Test device is	An identical prototype		
Device category	Portable		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	8/2/2012-10/16/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22H	824-849 MHz	1.270 W/kg (Rear 20° Tilt @ Edge1)	1.6 mW/g
24E	1850-1910 MHz	1.470 W/kg (Rear 20° Tilt @ Edge1)	
15.247	2412-2462	1.200 W/kg (Rear 20° Tilt @ Edge1)	
15.407	5150-5250	0.981 W/kg (Edge 2)	
	5250-5350	1.100 W/kg (Rear/Bottom)	
	5500-5700	1.370 W/kg (Rear/Bottom)	
15.247	5725-5850	1.320 W/kg (Edge 1)	
Simultaneous transmission condition:		1.542 W/kg (The highest SAR across exposure conditions for which SPLSR was not calculated)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003 and 1528a-2005			Pass
Compliance Certification Services, Inc. (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.			
Approved & Released For UL CCS By:		Tested By:	
			
Dave Weaver Program Manager UL CCS		Kent Huang SAR Engineer UL CCS	

2. Test Methodology

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528-2003 & 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
- 865664 SAR 3 to 6 GHz Rev SAR measurement procedures for transmitters operating in the 3 to 6 GHz range
- Power Reduction by Sensing (April/October 2012 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>.

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
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	2013
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
Thermometer	ERTCO	639-1S	8350	7	30	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	Agilent	N1912A	MY50001018	8	10	2013
Power Sensor A	Agilent	N10149	MY52200012	7	24	2013
Power Sensor B	Agilent	N10149	MY52020011	1	17	2013
Power Meter	HP	438A	3513U04320	9	17	2013
Power Sensor A	HP	8481A	2237A31744	8	17	2013
Power Sensor B	HP	8481A	3318A95392	8	17	2013
Amplifier	MITEQ	4D00400600-50-30P	1622052	N/A		
Directional coupler	Werlatone	C8060-102	2149	N/A		
Synthesized Signal Generator	HP	8665B	3744A01084	5	3	2013
Power Meter	HP	438A	2822A05684	10	7	2013
Power Sensor A	HP	8481A	2702A66876	8	1	2013
Power Sensor B	HP	8482A	2349A08568	4	14	2013
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

4.2. Measurement Uncertainty

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

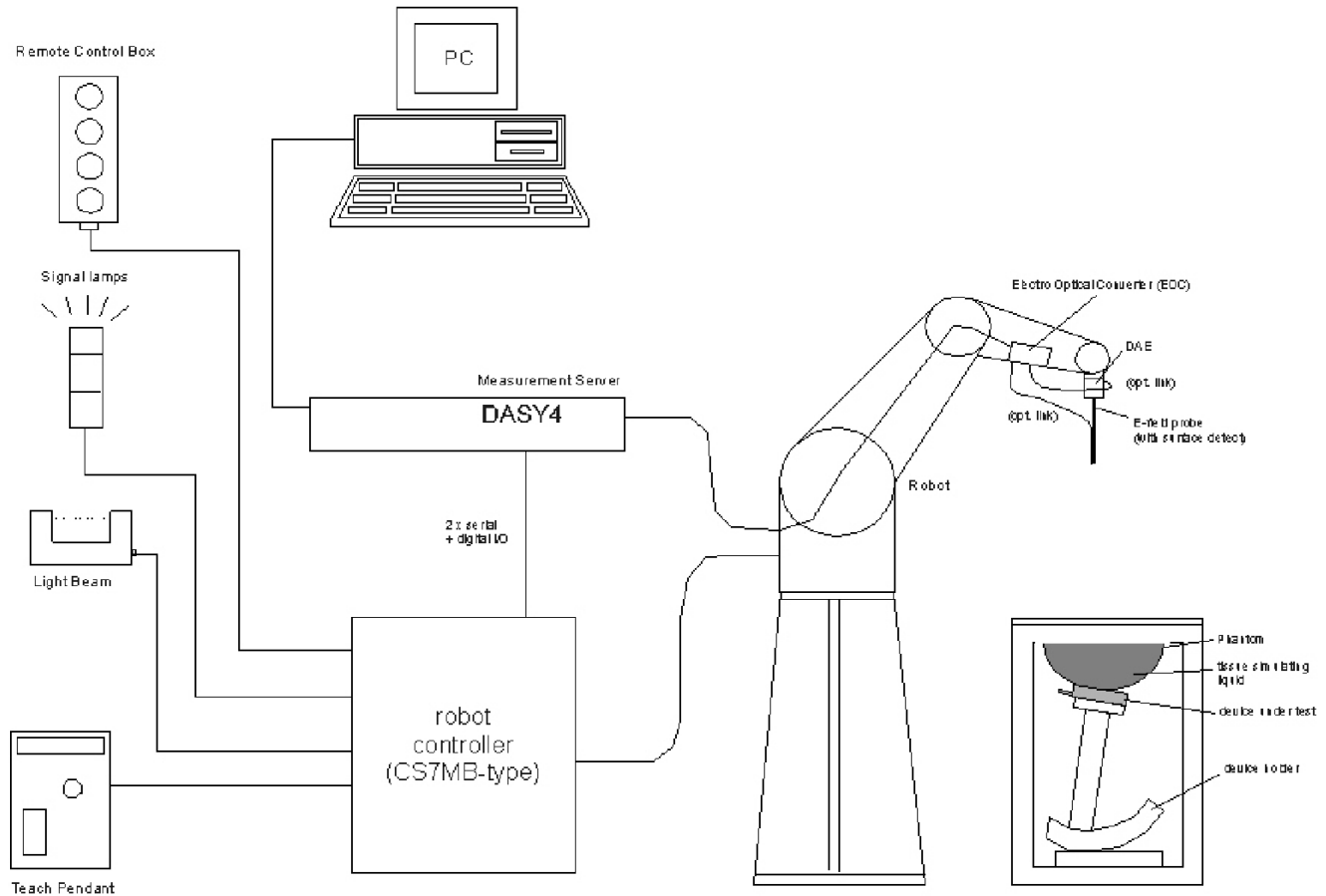
Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	6.00	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	-4.44	Normal	1	0.64	-2.84
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) =					10.28
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =					20.56 %
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =					1.62 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	4.46	Normal	1	0.64	2.85
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	-3.34	Normal	1	0.6	-2.00
Combined Standard Uncertainty Uc(y), %:					11.02
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =					21.59 %
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =					1.70 dB

5. Measurement System Description and Setup

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.

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 $\geq 7 \times 7 \times 9$ (above 4.5 GHz) or $5 \times 5 \times 7$ (below 3 GHz) points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

6.2. Volume Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures $\geq 7 \times 7 \times 9$ (above 4.5 GHz) or $5 \times 5 \times 7$ (below 3 GHz) points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Volume Scan

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

Step 5: Power drift measurement

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

7. Device Under Test

11.6 inch Tablet with GSM+UMTS+WI-FI Bands +BT 4.0+LE Model: TP00045A1		
Normal operation	Body (Rear/bottom and each edge): Multiple display orientations supporting both portrait and landscape configurations	
Device Dimension (mm)	295 mm(L) x 188 mm(W) x 11 mm (H)	
Antenna Tested	Manufacturer	Part number
	Wistron Corporation	Wi-Fi Main Antenna: (P/N:25.90AFI.001)
	Wistron Corporation	Wi-Fi Aux. Antenna: (P/N:25.90AFJ.001)
	Wistron Corporation	WWAN Main Antenna: (P/N:25.90AFE.001)
	Wistron Corporation	WWAN Aux Antenna: (P/N:25.90AFF.001) Rx only
Transmitters	GSM and UMTS Wi-Fi Bluetooth	Ericsson Model: C5621 Intel Model: 62205ANSFF Broadcom model: BCM92070MD_LEN0

7.1. Band and Air Interfaces

Air Interfaces	- 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, HT40 - Bluetooth Ver 4.0
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 <u>Note:</u> There are two antennas for WLAN. Both antennas can transmit 2.4GHz and 5GHz bands. The WLAN and BT can simultaneously transmit. There is a separate Bluetooth antenna. - Bluetooth: 2402 - 2480 MHz <u>Note:</u> Bluetooth operation is provided by the installation of a module (FCC ID QDS-BRCM1067) and is not part of the DUT's FCC ID for this application

7.2. Simultaneous Transmission

No.	Conditions	Head	Body	Hotspot
1	GSM850 GPRS + Wi-Fi 2.4GHz	☐	☒	☒
2	GSM850 GPRS + Wi-Fi 5GHz	☐	☒	☐
3	GSM1900 GPRS + Wi-Fi 2.4GHz	☐	☒	☒
4	GSM1900 GPRS + Wi-Fi 5GHz	☐	☒	☐
5	W-CDMA (UMTS) Band V+ Wi-Fi 2.4GHz	☐	☒	☒
6	W-CDMA (UMTS) Band V+ Wi-Fi 5GHz	☐	☒	☐
7	W-CDMA (UMTS) Band II+ Wi-Fi 2.4GHz	☐	☒	☒
8	W-CDMA (UMTS) Band II+ Wi-Fi 5GHz	☐	☒	☐
9	GSM850 GPRS + BT	☐	☒	☐
10	GSM1900 GPRS + BT	☐	☒	☐
11	W-CDMA (UMTS) Band V+ BT	☐	☒	☐
12	W-CDMA (UMTS) Band II+ BT	☐	☒	☐
13	Wi-Fi 2.4GHz and 5GHz+ 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.

7.3. Hotspot (Wireless router) Exposure Condition

The device is capable of personal hotspot mode. The hotspot mode can be enabled by the user. As the DUT has a form factor >9 cm x 5 cm the hotspot procedures from 941225 D06 Hot Spot SAR v01 do not apply.

7.4. Power Reduction Implementation

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

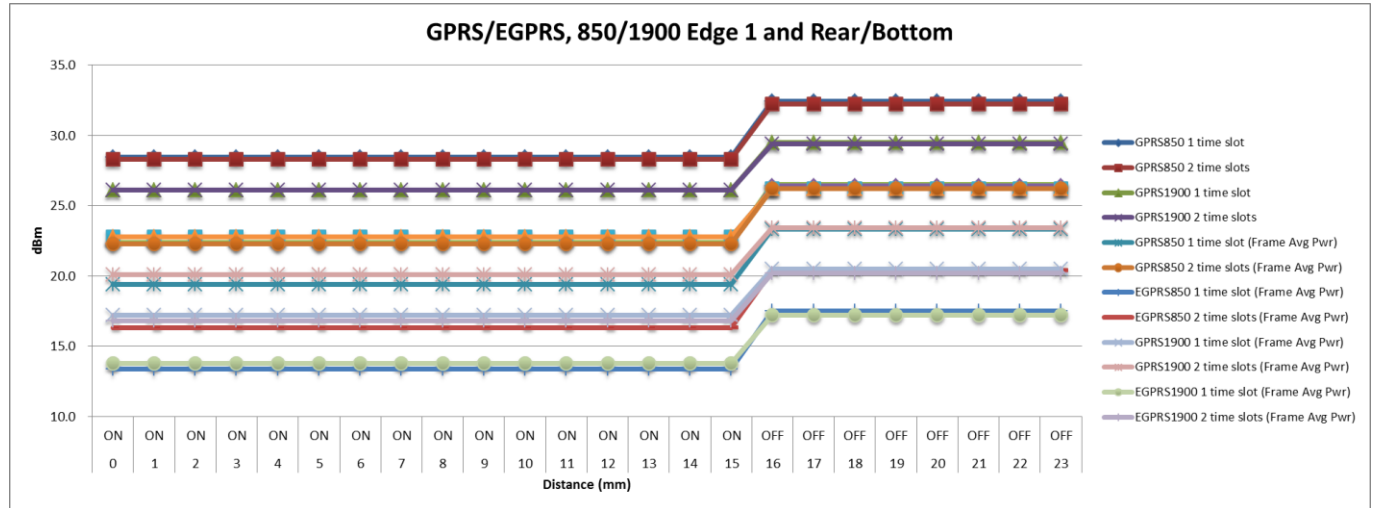
- 15 mm from Bottom (Rear) of the DUT
- 15 mm from Top-edge (Edge 1) of the DUT

7.5. Accessories

A docking station or keyboard with stand are available for this device. Both accessories restrict the DUT to being used upright (edge 3 to the user). Use of the docking station or keyboard with stand will increase the separation distance between the edge 3 and the user by the thickness of the accessory. Edge 3 SAR measurements were performed at zero separation distance which constitutes the most conservative scenario. Additional testing with the docking station or keyboard with stand was considered unnecessary.

Summary Table of Power Reduction dB Levels per Mode & Band

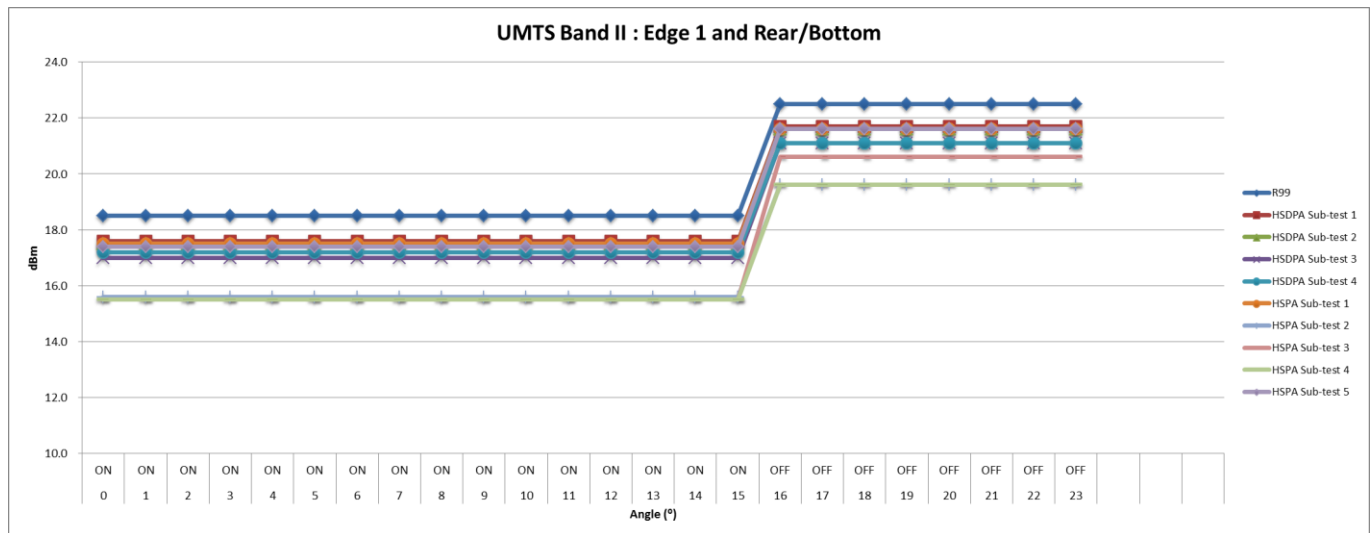
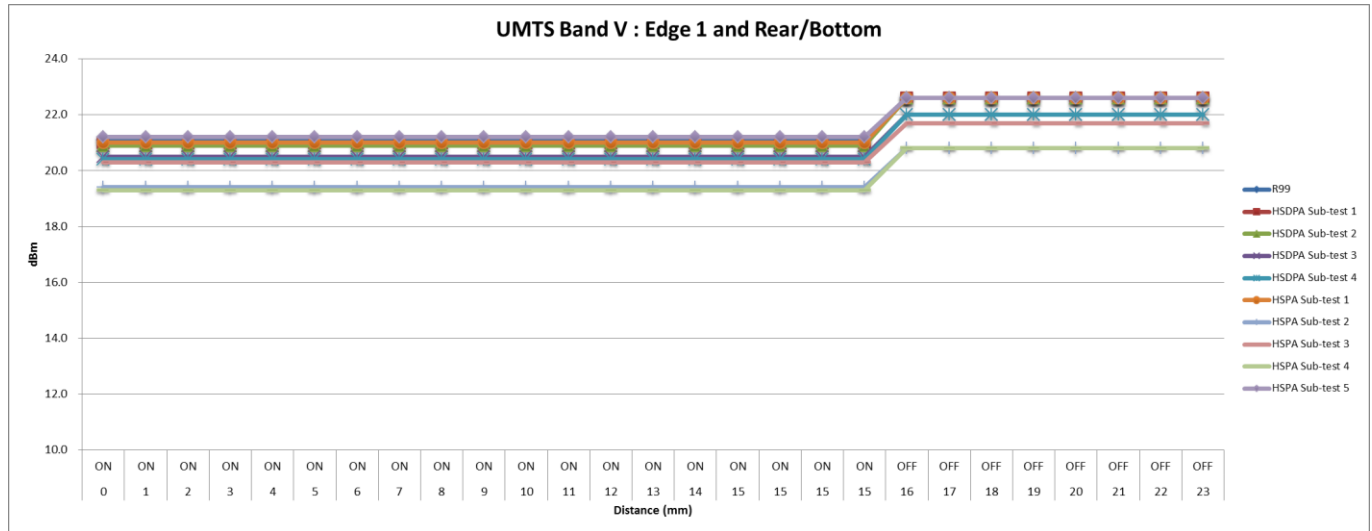
Edge 1 and Rear/Bottom																								
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
GPRS850 1 time slot	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
GPRS850 2 time slots	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
EGPRS850 1 time slot	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
EGPRS850 2 time slots	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4
GPRS1900 1 time slot	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
GPRS1900 2 time slots	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4
EGPRS1900 1 time slot	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS1900 2 time slots	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
GPRS850 1 time slot (Frame Avg Pwr)	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3
GPRS850 2 time slots (Frame Avg Pwr)	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
EGPRS850 1 time slot (Frame Avg Pwr)	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
EGPRS850 2 time slots (Frame Avg Pwr)	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
GPRS1900 1 time slot (Frame Avg Pwr)	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
GPRS1900 2 time slots (Frame Avg Pwr)	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
EGPRS1900 1 time slot (Frame Avg Pwr)	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
EGPRS1900 2 time slots (Frame Avg Pwr)	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2



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

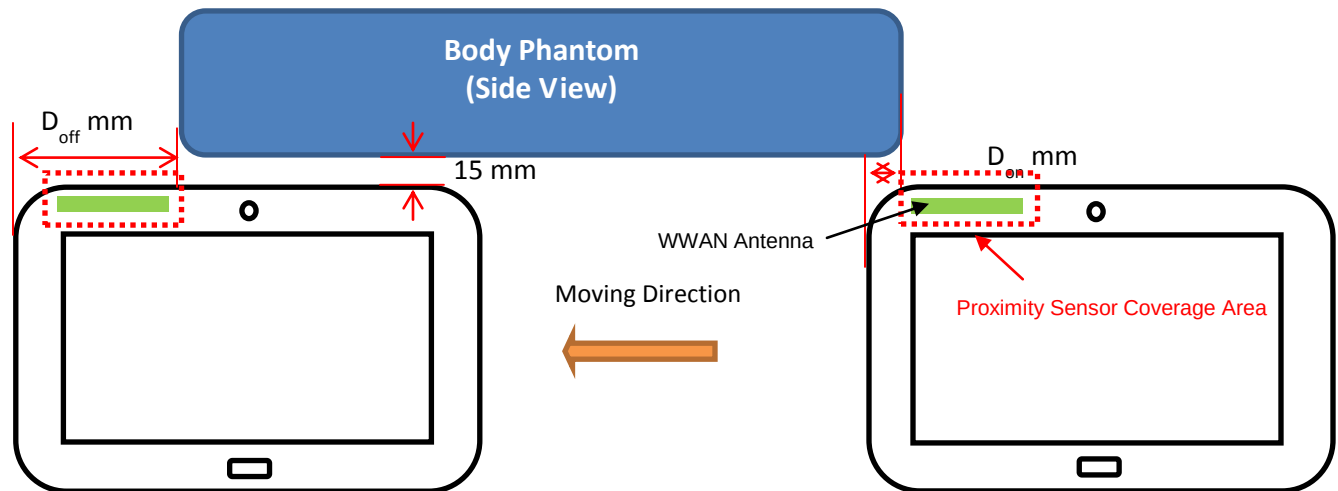
Edge 1 Rear/Bottom (UMTS Band V)																							
Distance (mm):	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15	15	15	16	17	18	19
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF
R99	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	22.6	22.6	22.6	22.6
HSDPA Sub-test 1	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	22.6	22.6	22.6	22.6
HSDPA Sub-test 2	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	22.6	22.6	22.6	22.6
HSDPA Sub-test 3	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	22.0	22.0	22.0	22.0
HSDPA Sub-test 4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	22.0	22.0	22.0	22.0
HSPA Sub-test 1	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	22.6	22.6	22.6	22.6
HSPA Sub-test 2	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	20.8	20.8	20.8	20.8
HSPA Sub-test 3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	21.7	21.7	21.7	21.7
HSPA Sub-test 4	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	20.8	20.8	20.8	20.8
HSPA Sub-test 5	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2	22.6	22.6	22.6	22.6

Edge 1 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
Proximity sensor with reduced power activation:	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
R99	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
HSDPA Sub-test 1	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	21.7	21.7	21.7	21.7	21.7	21.7	21.7
HSDPA Sub-test 2	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	21.6	21.6	21.6	21.6	21.6	21.6	21.6
HSDPA Sub-test 3	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	21.1	21.1	21.1	21.1	21.1	21.1	21.1
HSDPA Sub-test 4	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	21.1	21.1	21.1	21.1	21.1	21.1	21.1
HSPA Sub-test 1	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	21.6	21.6	21.6	21.6	21.6	21.6	21.6
HSPA Sub-test 2	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
HSPA Sub-test 3	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	20.6	20.6	20.6	20.6	20.6	20.6	20.6
HSPA Sub-test 4	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	19.6	19.6	19.6	19.6	19.6	19.6	19.6
HSPA Sub-test 5	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6



8. Sensor Coverage Area

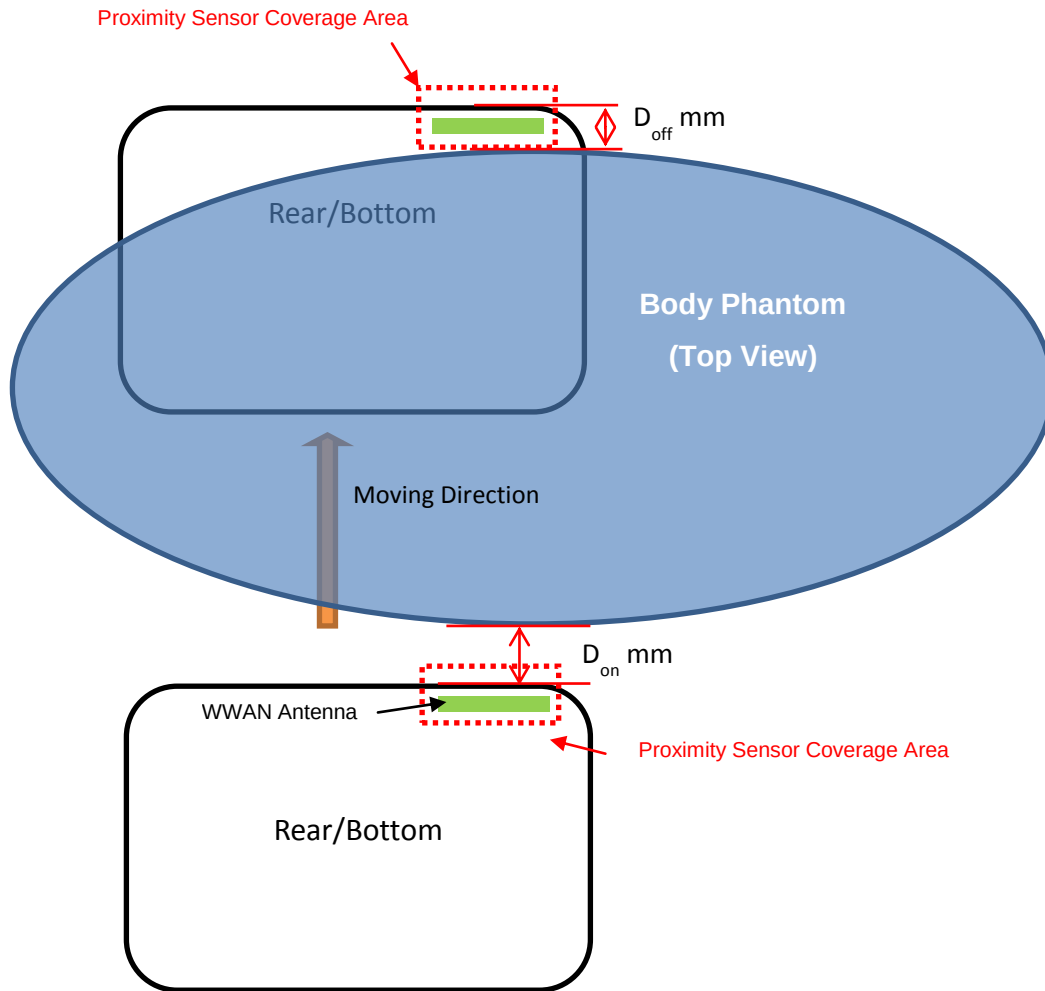
8.1. Edge Coverage



The DUT is positioned perpendicular to the phantom with the test separation distance, 14 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 15 mm.
- The minimum distance from the secondary portrait (Edge 4) to the edge of body phantom to trigger proximity sensor off, D_{off} , is 130 mm.

8.2. Rear/Bottom Coverage



The DUT is positioned under the phantom with the test separation distance, 1 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 15 mm.
- The minimum distance from the secondary landscape (Edge 1) to the edge of body phantom to trigger proximity sensor off, D_{off} , is 15 mm.

9. Summary of Test Configurations

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

9.1. Body Test Condition for WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear/Bottom	< 25 mm	Yes	
Rear 20° Tilt (Tilt @Edge1)	< 25 mm	Yes	
Edge 1	3.5 mm	Yes	
Edge 2	198 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	175 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	30 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)

9.2. Body Test Conditions for Wi-Fi (Main Antenna)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear/Bottom	< 25 mm	Yes	
Rear 20° Tilt (Tilt @Edge1)	< 25 mm	Yes	
Edge 1	3.5 mm	Yes	
Edge 2	48 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	172 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	223 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)

9.3. Body Test Conditions for Wi-Fi (Aux Antenna)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear/Bottom	< 25 mm	Yes	
Rear 20° Tilt (Tilt @Edge2)	< 25 mm	Yes	
Edge 1	133 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	3.5 mm	Yes	
Edge 3	31 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	282 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)

9.4. 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.

10. RF Output Power Measurement

10.1. GSM850

GMSK(GPRS) - Coding Scheme: CS1

Target Power: 32 dBm (W/o Pwr back-off)

28 dBm (W/ Pwr back-off)

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

GMSK(GPRS) Mode (W/o Pwr 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	32.2	23.2	32.1	26.1
	190	836.6	32.4	23.3	32.2	26.2
	251	848.8	32.2	23.2	32.1	26.1

GMSK (GPRS) Mode (W/ Pwr 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	28.4	19.4	28.3	22.3
	190	836.6	28.4	19.4	28.3	22.3
	251	848.8	28.3	19.2	28.2	22.2

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 (W/o Pwr back-off)

23 dBm (W/ Pwr back-off)

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

8PSK (EGPRS) Mode (W/o Pwr 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	26.5	17.5	26.4	20.4
	190	836.6	26.5	17.5	26.4	20.4
	251	848.8	26.3	17.3	26.3	20.3

8PSK (EGPRS) Mode (W/ Pwr 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	22.4	13.4	22.3	16.3
	190	836.6	22.3	13.3	22.3	16.3
	251	848.8	22.2	13.2	22.2	16.2

10.2. GSM1900

GMSK (GPRS) Mode - Coding Scheme: CS1

Target Power: 29 dBm (W/o Pwr back-off)
25.5 dBm (W/ Pwr back-off)

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

GMSK (GPRS) Mode (W/o Pwr 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	29.5	20.5	29.7	23.7
	661	1880.0	29.3	20.3	29.6	23.6
	810	1909.8	29.2	20.2	29.1	23.1

GMSK (GPRS) Mode (W/ Pwr 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	26.5	20.5
	661	1880.0	25.7	16.7	26.2	20.2
	810	1909.8	25.6	16.6	26.0	20.1

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 (W/o Pwr back-off)
23 dBm (W/ Pwr back-off)

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

8PSK (EGPRS) Mode (W/o Pwr 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	26.2	17.2	26.2	20.2
	661	1880.0	26.1	17.1	26.0	20.0
	810	1909.8	25.8	16.8	25.8	19.8

8PSK (EGPRS) Mode (W/ Pwr 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	22.8	13.8	22.8	16.8
	661	1880.0	22.8	13.8	22.7	16.7
	810	1909.8	22.3	13.3	22.2	16.2

10.3. WCDMA (UMTS) Band V

Target Power: 23 dBm (W/o Pwr back-off)
21.5 dBm (W/ Pwr 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
	β_c/β_d	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	22.6	21.1
		4183	836.6	22.6	21.0
		4233	846.6	22.6	21.0

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
Loopback Mode	Test Mode 1			
Rel99 RMC	12.2kbps RMC			
HSDPA FRC	H-Set1			
Power Control Algorithm	Algorithm 2			
β_c	2/15	12/15	15/15	15/15
β_d	15/15	15/15	8/15	4/15
Bd (SF)	64			
β_c/β_d	2/15	12/15	15/8	15/4
β_{hs}	4/15	24/15	30/15	30/15
CM (dB)	0	1	1.5	1.5
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			
A _{hs} = β_{hs}/β_c	30/15			

Results

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	Subtest 1	4132	826.4	22.6	21.0
		4183	836.6	22.6	21.0
		4233	846.6	22.5	20.8
	Subtest 2	4132	826.4	22.6	20.9
		4183	836.6	22.6	20.9
		4233	846.6	22.5	20.8
	Subtest 3	4132	826.4	22.0	20.4
		4183	836.6	22.0	20.5
		4233	846.6	22.0	20.5
	Subtest 4	4132	826.4	22.0	20.4
		4183	836.6	22.0	20.4
		4233	846.6	21.9	20.3

Note(s):

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

HSPA (HSDPA & HSUPA)

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

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA	
	Subtest	1	2	3	4	5	
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					
	β_c	11/15	6/15	15/15	2/15	15/15	
	β_d	15/15	15/15	9/15	15/15	15/15	
	β_{ec}	209/225	12/15	30/15	2/15	24/15	
	β_c/β_d	11/15	6/15	15/9	2/15	15/15	
	β_{hs}	22/15	12/15	30/15	4/15	30/15	
	β_{ed}	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					
	A _{hs} = β_{hs}/β_c	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 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11	E-TFCI 11 E-TFCI PO 4 E-TFCI 71 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 PO 4					
		E-TFCI 67					
		E-TFCI PO 18					
E-TFCI 71							
E-TFCI PO 23							
E-TFCI 75							
E-TFCI PO 26							

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	Subtest 1	4132	826.4	22.6	21.0
		4183	836.6	22.6	21.0
		4233	846.6	22.6	21.0
	Subtest 2	4132	826.4	20.8	19.4
		4183	836.6	20.7	19.3
		4233	846.6	20.7	19.3
	Subtest 3	4132	826.4	21.7	20.3
		4183	836.6	21.6	20.2
		4233	846.6	21.6	20.3
	Subtest 4	4132	826.4	20.8	19.3
		4183	836.6	20.7	19.3
		4233	846.6	20.7	19.2
	Subtest 5	4132	826.4	22.6	21.3
		4183	836.6	22.6	21.2
		4233	846.6	22.6	21.2

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.

10.4. WCDMA (UMTS) Band II

Target Power: 22 dBm (W/o Pwr back-off)
18 dBm (W/ Pwr 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
	β_c/β_d	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	22.5	18.5
		9400	1880.0	22.5	18.4
		9538	1907.6	22.5	18.4

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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	CM (dB)	0	1	1.5	1.5
	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			
	A _{hs} = β_{hs}/β_c	30/15			

Results

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	21.7	17.6
		9400	1880.0	21.4	17.5
		9538	1907.6	21.4	17.4
	Subtest 2	9262	1852.4	21.6	17.5
		9400	1880.0	21.4	17.4
		9538	1907.6	21.4	17.4
	Subtest 3	9262	1852.4	21.1	17.0
		9400	1880.0	20.9	16.9
		9538	1907.6	20.9	17.0
	Subtest 4	9262	1852.4	21.1	17.2
		9400	1880.0	20.9	17.0
		9538	1907.6	20.9	17.0

Note(s):

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

HSPA (HSDPA & HSUPA)

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

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA	
	Subtest	1	2	3	4	5	
WCDMA General Settings	Loopback Mode	Test Mode 1					
	Rel99 RMC	12.2kbps RMC					
	HSDPA FRC	H-Set1					
	HSUPA Test	HSUPA Loopback					
	Power Control Algorithm	Algorithm2					
	β_c	11/15	6/15	15/15	2/15	15/15	
	β_d	15/15	15/15	9/15	15/15	15/15	
	β_{ec}	209/225	12/15	30/15	2/15	24/15	
	β_c/β_d	11/15	6/15	15/9	2/15	15/15	
	β_{hs}	22/15	12/15	30/15	4/15	30/15	
	β_{ed}	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					
	A _{hs} = β_{hs}/β_c	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 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11	E-TFCI 11 E-TFCI PO 4 E-TFCI 71 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 PO 4					
		E-TFCI 67					
		E-TFCI PO 18					
E-TFCI 71							
E-TFCI PO 23							
E-TFCI 75							
E-TFCI PO 26							

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	21.6	17.5
		9400	1880.0	21.5	17.4
		9538	1907.6	21.5	17.4
	Subtest 2	9262	1852.4	19.6	15.6
		9400	1880.0	19.5	15.5
		9538	1907.6	19.5	15.5
	Subtest 3	9262	1852.4	20.5	16.3
		9400	1880.0	20.5	16.4
		9538	1907.6	20.5	16.3
	Subtest 4	9262	1852.4	19.6	15.5
		9400	1880.0	19.4	15.4
		9538	1907.6	19.5	15.4
	Subtest 5	9262	1852.4	21.6	17.4
		9400	1880.0	21.5	17.5
		9538	1907.6	21.5	17.4

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.

10.5. Wi-Fi (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 $\frac{1}{4}$ dB $\geq$ 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.

The indicated Wi-Fi target powers in the following table are absolute maximums.

Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)		Avg. Pwr (dBm)	
					Main	Aux	Main	Aux
2.4	802.11b 1 Tx	1	1	2412	15.5		15.4	
			6	2437	15.5		15.5	
			11	2462	15.5		15.2	
			1	2412		15.5		15.4
			6	2437		15.5		15.5
			11	2462		15.5		15.4
	802.11g 1 Tx	6	1	2412	14.0		14.0	
			2	2417	16.0		15.8	
			6	2437	16.0		15.7	
			10	2457	16.5		16.5	
			11	2462	14.0		13.9	
			1	2412		14.0		14.0
			2	2417		16.0		15.9
			6	2437		16.0		16.0
			10	2457		16.5		16.4
			11	2462		14.0		14.0
	802.11n (HT20) 1 Tx	6.5	1	2412	13.0		12.7	
			2	2417	16.0		15.8	
			6	2437	16.0		16.0	
			10	2457	16.0		15.9	
			11	2462	12.5		12.4	
			1	2412		13.0		12.7
			2	2417		16.0		15.8
			6	2437		16.0		16.0
			10	2457		16.0		15.9
			11	2462		12.5		12.4
	802.11n (HT20) 2 Tx	13	1	2412	11.0	11.0	10.9	10.8
			2	2417	13.0	13.0	12.7	13.0
			6	2437	13.0	13.0	12.9	13.0
			10	2457	13.0	13.0	13.0	12.9
			11	2462	11.0	11.0	11.0	10.8
	802.11n (HT40) 1 Tx	13.5	3	2422	9.0		9.0	
			4	2427	10.5		10.5	
			5	2432	12.5		12.4	
			7	2442	12.5		12.4	
			8	2447	10.5		10.4	
			9	2452	9.5		9.5	
			3	2422		9.0		8.9
			4	2427		10.5		10.5
			5	2432		12.5		12.5
			7	2442		12.5		12.4
			8	2447		10.5		10.4
			9	2452		9.5		9.5
	802.11n (HT40) 2 Tx	27	3	2422	8.0	8.0	7.7	7.8
			4	2427	9.5	9.5	9.3	9.4
			5	2432	11.5	11.5	11.3	11.4
			7	2442	11.5	11.5	11.3	11.5
			8	2447	9.5	9.5	9.4	9.5
			9	2452	8.5	8.5	8.3	8.4

Note(s):

SAR is not required for 802.11g/HT20/HT40 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

10.6. Wi-Fi (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.

The indicated Wi-Fi target powers on the following tables are absolute maximums.

Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)		Avg Pwr (dBm)	
					Main	Aux	Main	Aux
5.2	802.11a 1 Tx	1	36	5180	15.5		15.5	
			40	5200	15.5		15.4	
			44	5220	15.5		15.4	
			48	5240	15.5		15.5	
			36	5180		15.5		15.5
			40	5200		15.5		15.4
			44	5220		15.5		15.4
			48	5240		15.5		15.4
	802.11n (HT20) 1 Tx	6.5	36	5180	15.0		15.0	
			40	5200	15.0		14.9	
			48	5240	15.0		14.9	
			36	5180		15.0		14.9
			40	5200		15.0		15.0
			48	5240		15.0		14.9
	802.11n (HT20) 2 Tx	13	36	5180	13.0	13.0	12.9	12.9
			40	5200	13.0	13.0	12.9	12.9
			48	5240	13.0	13.0	13.0	13.0
	802.11n (HT40) 1 Tx	13.5	38	5190	10.5		10.4	
			46	5230	10.5		10.5	
			38	5190		10.5		10.5
			46	5230		10.5		10.4
	802.11n (HT40) 2 Tx	27	38	5190	9.0	9.0	8.9	8.8
			46	5230	9.0	9.0	8.9	8.8
Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)		Avg Pwr (dBm)	
					Main	Aux	Main	Aux
5.3	802.11a 1 Tx	1	52	5260	15.0		15.0	
			56	5280	15.0		14.9	
			60	5300	15.0		14.9	
			64	5320	15.0		15.0	
			52	5260		15.0		14.9
			56	5280		15.0		14.8
			60	5300		15.0		14.8
			64	5320		15.0		15.0
	802.11n (HT20) 1 Tx	6.5	52	5260	15.5		15.5	
			60	5300	15.5		15.4	
			64	5320	15.5		15.5	
			52	5260		15.5		15.4
			60	5300		15.5		15.4
			64	5320		15.5		15.5
	802.11n (HT20) 1 Tx	13	52	5260	13.0	13.0	13.0	12.9
			60	5300	13.0	13.0	12.9	13.0
			64	5320	13.0	13.0	12.9	13.0
	802.11n (HT40) 1 Tx	13.5	54	5270	11.0		11.0	
			62	5310	11.0		10.9	
			54	5270		11.0		11.0
			62	5310		11.0		10.9
	802.11n (HT40) 2 Tx	27	54	5270	9.5	9.5	9.4	9.5
			62	5310	9.5	9.5	9.4	9.4

Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)		Avg Pwr (dBm)	
					Main	Aux	Main	Aux
5.5	802.11a 1 Tx	6	100	5500	16.0		15.9	
			104	5520	16.0		16.0	
			108	5540	16.0		15.9	
			112	5560	16.0		16.0	
			116	5580	16.0		16.0	
			120	5600	16.0		15.8	
			124	5620	16.0		16.0	
			128	5640	16.0		15.9	
			132	5660	16.0		16.0	
			136	5680	16.0		16.0	
			140	5700	15.5		15.5	
			100	5500		16.0		15.9
			104	5520		16.0		16.0
			108	5540		16.0		16.0
			112	5560		16.0		15.8
			116	5580		16.0		16.0
			120	5600		16.0		16.0
			124	5620		16.0		16.0
			128	5640		16.0		15.9
			132	5660		16.0		15.9
			136	5680		16.0		16.0
			140	5700		15.5		15.5
	802.11n (HT20) 1 Tx	6.5	100	5500	16.0		15.9	
			120	5600	16.0		15.9	
			140	5700	15.5		15.4	
			100	5500		16.0		16.0
			120	5600		16.0		15.9
			140	5700		15.5		15.5
	802.11n (HT20) 2 Tx	13	100	5500	13.0	13.0	13.0	13.0
			120	5600	13.0	13.0	13.0	13.0
			140	5700	13.5	13.5	13.5	13.5
	802.11n (HT40) 1 Tx	13.5	102	5510	13.5		13.5	
			118	5590	15.5		15.5	
			134	5670	15.5		15.5	
			102	5510		13.5		13.5
			118	5590		15.5		15.5
			134	5670		15.5		15.5
	802.11n (HT40) 2 Tx	27	102	5510	12.5	12.5	12.4	12.4
			118	5590	12.5	12.5	12.5	12.4
			134	5670	13.0	13.0	13.0	13.0

Band (MHz)	Mode	Data rate (Mbps)	Ch #	Freq. (MHz)	Target Pwr (dBm)		Avg Pwr (dBm)	
					Main	Aux	Main	Aux
5.8	802.11a 1 Tx	1	149	5745	16.5		16.5	
			153	5765	16.5		16.5	
			157	5785	16.5		16.5	
			161	5805	16.5		16.4	
			165	5825	16.5		16.4	
			149	5745		16.5		16.5
			153	5765		16.5		16.4
			157	5785		16.5		16.5
			161	5805		16.5		16.4
			165	5825		16.5		16.5
	802.11n (HT20) 1 Tx	6.5	149	5745	15.5		15.5	
			157	5785	15.5		15.4	
			161	5805	15.5		15.5	
			149	5745		16.0		16.0
			157	5785		16.0		15.9
			161	5805		16.0		15.9
	802.11n (HT20) 2 Tx	26.5	149	5745	16.5	16.5	16.5	16.5
			157	5785	16.5	16.5	16.4	16.3
			161	5805	16.5	16.5	16.5	16.5
	802.11n (HT40) 1 Tx	13.5	151	5755	15.5		15.4	
			159	5795	15.5		15.5	
			151	5755		16.0		15.8
			159	5795		16.0		15.9
	802.11n (HT40) 2 Tx	27	151	5755	12.5	12.5	12.5	12.4
			159	5795	12.5	12.5	12.5	12.4

Note(s):

SAR is not required for 802.11HT20/HT40 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

10.7. Bluetooth

Version 4.0 , Power class: 2 (2.5 mW/4 dBm)

Mode	Channel #	Freq. (MHz)	Measured Avg Pwr(dBm)
GFSK	0	2402	0.41
	39	2441	0.91
	78	2480	0.62
8-PSK	0	2402	1.68
	39	2441	2.19
	78	2480	1.31
V4.0 LE, GFSK	0	2402	0.88
	39	2440	1.40
	78	2480	1.13

Note(s):

According to KDB 648474, Table 2, Unlicensed transmitters

When there is simultaneous transmission, Stand-alone SAR not required due to

- ☒ Output $\leq 2 \cdot P_{\text{Ref}}$ (13.8dBm / 24 mW) and antenna is ≥ 5.0 cm from other antennas
- ☐ Output $\leq P_{\text{Ref}}$ (10.79dBm / 12 mW) and antenna is ≥ 2.5 cm from other antennas
- ☐ Output $\leq P_{\text{Ref}}$ (10.79dBm / 12 mW) and antenna is < 2.5 cm from other antennas

11. 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

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

11.1. 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

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

11.2. 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 $\pm$ (%)
8/2/2012	Body 1900	e'	52.9237	Relative Permittivity (ϵ_r):	52.92	53.30	-0.71	5
		e''	14.4036	Conductivity (σ):	1.52	1.52	0.11	5
	Body 1850	e'	53.1006	Relative Permittivity (ϵ_r):	53.10	53.30	-0.37	5
		e''	14.2006	Conductivity (σ):	1.46	1.52	-3.90	5
	Body 1880	e'	53.1241	Relative Permittivity (ϵ_r):	53.12	53.30	-0.33	5
		e''	14.3417	Conductivity (σ):	1.50	1.52	-1.37	5
	Body 1910	e'	53.0125	Relative Permittivity (ϵ_r):	53.01	53.30	-0.54	5
		e''	14.4472	Conductivity (σ):	1.53	1.52	0.94	5
8/3/2012	Body 1900	e'	53.3753	Relative Permittivity (ϵ_r):	53.38	53.30	0.14	5
		e''	14.8215	Conductivity (σ):	1.57	1.52	3.02	5
	Body 1850	e'	53.5896	Relative Permittivity (ϵ_r):	53.59	53.30	0.54	5
		e''	14.6483	Conductivity (σ):	1.51	1.52	-0.87	5
	Body 1880	e'	53.5441	Relative Permittivity (ϵ_r):	53.54	53.30	0.46	5
		e''	14.8197	Conductivity (σ):	1.55	1.52	1.92	5
	Body 1910	e'	53.3183	Relative Permittivity (ϵ_r):	53.32	53.30	0.03	5
		e''	14.9299	Conductivity (σ):	1.59	1.52	4.31	5
8/6/2012	Body 835	e'	54.8009	Relative Permittivity (ϵ_r):	54.80	55.20	-0.72	5
		e''	21.3182	Conductivity (σ):	0.99	0.97	2.04	5
	Body 820	e'	55.0348	Relative Permittivity (ϵ_r):	55.03	55.28	-0.44	5
		e''	21.2836	Conductivity (σ):	0.97	0.97	0.20	5
	Body 850	e'	54.7514	Relative Permittivity (ϵ_r):	54.75	55.16	-0.74	5
		e''	21.1551	Conductivity (σ):	1.00	0.99	1.29	5
8/7/2012	Body 835	e'	54.5760	Relative Permittivity (ϵ_r):	54.58	55.20	-1.13	5
		e''	21.5660	Conductivity (σ):	1.00	0.97	3.22	5
	Body 820	e'	54.7278	Relative Permittivity (ϵ_r):	54.73	55.28	-0.99	5
		e''	21.5206	Conductivity (σ):	0.98	0.97	1.32	5
	Body 850	e'	54.4846	Relative Permittivity (ϵ_r):	54.48	55.16	-1.22	5
		e''	21.4349	Conductivity (σ):	1.01	0.99	2.63	5
8/15/2012	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

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)
8/23/2012	Body 5180	e'	48.5865	Relative Permittivity (ϵ_r):	48.59	49.05	-0.94	10
		e''	18.4600	Conductivity (σ):	5.32	5.27	0.86	5
	Body 5200	e'	48.5313	Relative Permittivity (ϵ_r):	48.53	49.02	-1.00	10
		e''	18.4471	Conductivity (σ):	5.33	5.29	0.74	5
	Body 5500	e'	48.1170	Relative Permittivity (ϵ_r):	48.12	48.61	-1.02	10
		e''	18.8519	Conductivity (σ):	5.77	5.64	2.14	5
	Body 5800	e'	47.9335	Relative Permittivity (ϵ_r):	47.93	48.20	-0.55	10
		e''	18.8703	Conductivity (σ):	6.09	6.00	1.43	5
8/28/2012	Body 5180	e'	47.6399	Relative Permittivity (ϵ_r):	47.64	49.05	-2.87	10
		e''	18.5812	Conductivity (σ):	5.35	5.27	1.53	5
	Body 5200	e'	47.6341	Relative Permittivity (ϵ_r):	47.63	49.02	-2.83	10
		e''	18.6093	Conductivity (σ):	5.38	5.29	1.62	5
	Body 5500	e'	47.0819	Relative Permittivity (ϵ_r):	47.08	48.61	-3.15	10
		e''	18.9415	Conductivity (σ):	5.79	5.64	2.63	5
	Body 5800	e'	46.5878	Relative Permittivity (ϵ_r):	46.59	48.20	-3.34	10
		e''	19.3159	Conductivity (σ):	6.23	6.00	3.82	5
8/29/2012	Body 5180	e'	47.8532	Relative Permittivity (ϵ_r):	47.85	49.05	-2.43	10
		e''	18.3774	Conductivity (σ):	5.29	5.27	0.41	5
	Body 5200	e'	47.6861	Relative Permittivity (ϵ_r):	47.69	49.02	-2.72	10
		e''	18.4011	Conductivity (σ):	5.32	5.29	0.49	5
	Body 5500	e'	47.1658	Relative Permittivity (ϵ_r):	47.17	48.61	-2.98	10
		e''	18.6920	Conductivity (σ):	5.72	5.64	1.27	5
	Body 5800	e'	46.7526	Relative Permittivity (ϵ_r):	46.75	48.20	-3.00	10
		e''	18.9712	Conductivity (σ):	6.12	6.00	1.97	5
9/1/2012	Body 5180	e'	48.3880	Relative Permittivity (ϵ_r):	48.39	49.05	-1.34	10
		e''	18.3106	Conductivity (σ):	5.27	5.27	0.05	5
	Body 5200	e'	48.8420	Relative Permittivity (ϵ_r):	48.84	49.02	-0.36	10
		e''	18.0838	Conductivity (σ):	5.23	5.29	-1.25	5
	Body 5500	e'	47.7643	Relative Permittivity (ϵ_r):	47.76	48.61	-1.75	10
		e''	18.3748	Conductivity (σ):	5.62	5.64	-0.44	5
	Body 5800	e'	47.5895	Relative Permittivity (ϵ_r):	47.59	48.20	-1.27	10
		e''	18.8369	Conductivity (σ):	6.07	6.00	1.25	5
	Body 5825	e'	47.3977	Relative Permittivity (ϵ_r):	47.40	48.20	-1.66	10
		e''	18.7009	Conductivity (σ):	6.06	6.00	0.95	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)
9/4/2012	Body 5180	e'	48.1201	Relative Permittivity (ϵ_r):	48.12	49.05	-1.89	10
		e''	18.5550	Conductivity (σ):	5.34	5.27	1.38	5
	Body 5200	e'	48.1330	Relative Permittivity (ϵ_r):	48.13	49.02	-1.81	10
		e''	18.5295	Conductivity (σ):	5.36	5.29	1.19	5
	Body 5500	e'	47.6084	Relative Permittivity (ϵ_r):	47.61	48.61	-2.07	10
		e''	18.7684	Conductivity (σ):	5.74	5.64	1.69	5
	Body 5800	e'	47.1494	Relative Permittivity (ϵ_r):	47.15	48.20	-2.18	10
		e''	19.2145	Conductivity (σ):	6.20	6.00	3.28	5
	Body 5825	e'	47.0514	Relative Permittivity (ϵ_r):	47.05	48.20	-2.38	10
		e''	19.0790	Conductivity (σ):	6.18	6.00	2.99	5
9/5/2012	Body 5180	e'	48.6303	Relative Permittivity (ϵ_r):	48.63	49.05	-0.85	10
		e''	18.5228	Conductivity (σ):	5.34	5.27	1.21	5
	Body 5200	e'	48.7793	Relative Permittivity (ϵ_r):	48.78	49.02	-0.49	10
		e''	18.6206	Conductivity (σ):	5.38	5.29	1.68	5
	Body 5500	e'	48.1470	Relative Permittivity (ϵ_r):	48.15	48.61	-0.96	10
		e''	18.7637	Conductivity (σ):	5.74	5.64	1.66	5
	Body 5800	e'	47.6026	Relative Permittivity (ϵ_r):	47.60	48.20	-1.24	10
		e''	19.1070	Conductivity (σ):	6.16	6.00	2.70	5
	Body 5825	e'	47.4985	Relative Permittivity (ϵ_r):	47.50	48.20	-1.46	10
		e''	19.0403	Conductivity (σ):	6.17	6.00	2.78	5
9/6/2012	Body 5180	e'	48.1446	Relative Permittivity (ϵ_r):	48.14	49.05	-1.84	10
		e''	18.4990	Conductivity (σ):	5.33	5.27	1.08	5
	Body 5200	e'	48.2010	Relative Permittivity (ϵ_r):	48.20	49.02	-1.67	10
		e''	18.5324	Conductivity (σ):	5.36	5.29	1.20	5
	Body 5500	e'	47.6244	Relative Permittivity (ϵ_r):	47.62	48.61	-2.03	10
		e''	18.7425	Conductivity (σ):	5.73	5.64	1.55	5
	Body 5800	e'	47.1168	Relative Permittivity (ϵ_r):	47.12	48.20	-2.25	10
		e''	18.9294	Conductivity (σ):	6.10	6.00	1.74	5
	Body 5825	e'	47.1047	Relative Permittivity (ϵ_r):	47.10	48.20	-2.27	10
		e''	18.9154	Conductivity (σ):	6.13	6.00	2.11	5
9/13/2012	Body 5180	e'	48.6748	Relative Permittivity (ϵ_r):	48.67	49.05	-0.76	10
		e''	18.1109	Conductivity (σ):	5.22	5.27	-1.04	5
	Body 5200	e'	48.4774	Relative Permittivity (ϵ_r):	48.48	49.02	-1.11	10
		e''	18.0106	Conductivity (σ):	5.21	5.29	-1.65	5
	Body 5500	e'	48.0280	Relative Permittivity (ϵ_r):	48.03	48.61	-1.20	10
		e''	18.3952	Conductivity (σ):	5.63	5.64	-0.33	5
	Body 5800	e'	47.4858	Relative Permittivity (ϵ_r):	47.49	48.20	-1.48	10
		e''	18.5916	Conductivity (σ):	6.00	6.00	-0.07	5
	Body 5825	e'	47.6394	Relative Permittivity (ϵ_r):	47.64	48.20	-1.16	10
		e''	18.6486	Conductivity (σ):	6.04	6.00	0.67	5

Tissue Dielectric Parameter Check Results (continued)

Date	Freq. (MHz)		Liquid Parameters	Measured	Target	Delta (%)	Limit ±(%)
9/14/2012	Body 5180	e'	47.8186 Relative Permittivity (ϵ_r):	47.82	49.05	-2.50	10
		e''	18.4294 Conductivity (σ):	5.31	5.27	0.70	5
	Body 5200	e'	47.9570 Relative Permittivity (ϵ_r):	47.96	49.02	-2.17	10
		e''	18.5691 Conductivity (σ):	5.37	5.29	1.40	5
	Body 5500	e'	47.2995 Relative Permittivity (ϵ_r):	47.30	48.61	-2.70	10
		e''	18.7137 Conductivity (σ):	5.72	5.64	1.39	5
	Body 5800	e'	46.8468 Relative Permittivity (ϵ_r):	46.85	48.20	-2.81	10
		e''	18.9583 Conductivity (σ):	6.11	6.00	1.90	5
	Body 5825	e'	46.8450 Relative Permittivity (ϵ_r):	46.85	48.20	-2.81	10
		e''	19.0173 Conductivity (σ):	6.16	6.00	2.66	5
10/9/2012	Body 2450	e'	51.9314 Relative Permittivity (ϵ_r):	51.93	52.70	-1.46	5
		e''	13.7958 Conductivity (σ):	1.88	1.95	-3.62	5
	Body 2410	e'	52.0689 Relative Permittivity (ϵ_r):	52.07	52.76	-1.31	5
		e''	13.6020 Conductivity (σ):	1.82	1.91	-4.44	5
	Body 2435	e'	51.9660 Relative Permittivity (ϵ_r):	51.97	52.73	-1.44	5
		e''	13.7083 Conductivity (σ):	1.86	1.93	-3.89	5
	Body 2460	e'	51.9109 Relative Permittivity (ϵ_r):	51.91	52.69	-1.47	5
		e''	13.8547 Conductivity (σ):	1.90	1.96	-3.51	5
10/16/2012	Body 2450	e'	51.3134 Relative Permittivity (ϵ_r):	51.31	52.70	-2.63	5
		e''	13.9822 Conductivity (σ):	1.90	1.95	-2.32	5
	Body 2410	e'	51.7008 Relative Permittivity (ϵ_r):	51.70	52.76	-2.01	5
		e''	13.9638 Conductivity (σ):	1.87	1.91	-1.90	5
	Body 2435	e'	51.5371 Relative Permittivity (ϵ_r):	51.54	52.73	-2.26	5
		e''	13.9079 Conductivity (σ):	1.88	1.93	-2.49	5
	Body 2460	e'	51.2238 Relative Permittivity (ϵ_r):	51.22	52.69	-2.78	5
		e''	14.1361 Conductivity (σ):	1.93	1.96	-1.55	5

12. 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 $\pm 10\%$.

12.1. 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.

12.2. Reference SAR Values for System Performance Check

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D835V2	4d002	3/6/12	835	1g	9.32	9.41
				10g	6.08	6.20
D1900V2	5d043	11/10/11	1900	1g	40.3	41.1
				10g	21.0	21.7
D2450V2	748	2/7/12	2450	1g	52.7	49.9
				10g	24.6	23.4
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

12.3. 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.						
8/2/2012	D1900V2	5d043	Body	1g	41.40	41.10	0.73	±10
				10g	21.80	21.70	0.46	
8/3/2012	D1900V2	5d043	Body	1g	42.10	41.10	2.43	±10
				10g	22.20	21.70	2.30	
8/6/2012	D835V2	4d002	Body	1g	9.54	9.41	1.38	±10
				10g	6.28	6.20	1.29	
8/7/2012	D835V2	4d002	Body	1g	9.67	9.41	2.76	±10
				10g	6.50	6.20	4.84	
8/15/2012	D1900V2	5d043	Body	1g	42.60	41.10	3.65	±10
				10g	22.50	21.70	3.69	
8/23/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	74.1	72.8	1.79	±10
				10g	21.5	20.5	4.88	
8/28/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	75.7	72.8	3.98	±10
				10g	21.7	20.5	5.85	
8/29/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	77.0	72.8	5.77	±10
				10g	22.2	20.5	8.29	
9/1/2012	D5GHz V2 (5.5 GHz)	1075	Body	1g	74.5	77.7	-4.12	±10
				10g	21.1	21.7	-2.76	
9/4/2012	D5GHz V2 (5.5 GHz)	1075	Body	1g	81.7	77.7	5.15	±10
				10g	23.3	21.7	7.37	
9/4/2012	D5GHz V2 (5.8 GHz)	1075	Body	1g	73.4	72.4	1.38	±10
				10g	20.9	20.2	3.47	
9/5/2012	D5GHz V2 (5.5 GHz)	1075	Body	1g	80.4	77.7	3.47	±10
				10g	23.1	21.7	6.45	
9/6/2012	D5GHz V2 (5.8 GHz)	1075	Body	1g	74.3	72.4	2.62	±10
				10g	21.0	20.2	3.96	
9/13/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	72.2	72.8	-0.82	±10
				10g	20.8	20.5	1.46	
9/14/2012	D5GHz V2 (5.2 GHz)	1075	Body	1g	73.7	72.8	1.24	±10
				10g	21.1	20.5	2.93	
9/14/2012	D5GHz V2 (5.5 GHz)	1075	Body	1g	78.6	77.7	1.16	±10
				10g	22.4	21.7	3.23	
10/9/2012	D2450V2	748	Body	1g	48.50	49.90	-2.81	±10
				10g	22.90	23.40	-2.14	
10/16/2012	D2450V2	748	Body	1g	50.80	49.90	1.80	±10
				10g	23.20	23.40	-0.85	

13. SAR Test Results

13.1. GSM850

Body SAR W/ Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	GPRS 2 slots	0	128	824.20	23.0	22.3	0.800	0.946	
			190	836.60	23.0	22.3	0.880	1.029	
			251	848.80	23.0	22.2	0.950	1.147	
Rear 20° Tilt (Tilt @Edge1)	GPRS 2 slots	0	128	824.20	23.0	22.3	1.210	1.431	
			190	836.60	23.0	22.3	1.270	1.485	
			251	848.80	23.0	22.2	1.270	1.534	
Edge 1	GPRS 2 slots	0	128	824.20	23.0	22.3	0.960	1.136	
			190	836.60	23.0	22.3	0.989	1.157	
			251	848.80	23.0	22.2	0.981	1.185	

Body SAR W/o Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	GPRS 2 slots	14	128	824.20	27.0	26.1			1
			190	836.60	27.0	26.2	0.463	0.557	
			251	848.80	27.0	26.1			1
Edge 1	GPRS 2 slots	14	128	824.20	27.0	26.1			1
			190	836.60	27.0	26.2	0.391	0.470	
			251	848.80	27.0	26.1			1

Note(s):

- 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.

13.2. GSM1900

Body SAR W/ Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	GPRS 2 slots	0	512	1850.20	20.5	20.5	1.230	1.230	
			661	1880.00	20.5	20.2	1.140	1.222	
			810	1909.80	20.5	20.1	0.893	0.979	
Rear 20° Tilt (Tilt @Edge1)	GPRS 2 slots	0	512	1850.20	20.5	20.5	1.470	1.470	
			661	1880.00	20.5	20.2	1.350	1.447	
			810	1909.80	20.5	20.1	1.050	1.151	
Edge 1	GPRS 2 slots	0	512	1850.20	20.5	20.4			1
			661	1880.00	20.5	20.2	0.541	0.580	
			810	1909.80	20.5	20.1			1

Body SAR W/o Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	GPRS 2 slots	14	512	1850.20	24.0	23.7			1
			661	1880.00	24.0	23.6	0.267	0.293	
			810	1909.80	24.0	23.1			1
Edge 1	GPRS 2 slots	14	512	1850.20	24.0	23.7			1
			661	1880.00	24.0	23.6	0.270	0.296	
			810	1909.80	24.0	23.1			1

Note(s):

- 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.

13.3. W-CDMA (UMTS) Band V

Test mode reduction considerations for Data Devices with Release 6 HSPA

Body SAR is not required for handsets/data modems 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 W/ Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	Rel 99 RMC 12.2kbps	0	4132	826.40	22.0	21.1			1
			4183	836.60	22.0	21.0	0.609	0.760	
			4233	846.60	22.0	21.0			1
Rear 20° Tilt (Tilt @Edge1)	Rel 99 RMC 12.2kbps	0	4132	826.40	22.0	21.1	0.930	1.149	
			4183	836.60	22.0	21.0	0.899	1.121	
			4233	846.60	22.0	21.0	0.910	1.138	
Edge 1	Rel 99 RMC 12.2kbps	0	4132	826.40	22.0	21.1			1
			4183	836.60	22.0	21.0	0.779	0.972	
			4233	846.60	22.0	21.0			1

Body SAR W/o Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	Rel 99 RMC 12.2kbps	14	4132	826.40	23.5	22.6			1
			4183	836.60	23.5	22.6	0.203	0.250	
			4233	846.60	23.5	22.6			1
Edge 1	Rel 99 RMC 12.2kbps	14	4132	826.40	23.5	22.6			1
			4183	836.60	23.5	22.6	0.194	0.239	
			4233	846.60	23.5	22.6			1

Note(s):

- 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.

13.4. W-CDMA (UMTS) Band II

Test mode reduction considerations for Data Devices with Release 6 HSPA

Body SAR is not required for handsets/data modems 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 W/ Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	Rel 99 RMC 12.2kbps	0	9262	1852.40	18.5	18.5	1.300		
			9400	1880.00	18.5	18.4	1.200	1.242	
			9538	1907.60	18.5	18.4	1.190	1.223	
Rear 20° Tilt (Tilt @Edge1)	Rel 99 RMC 12.2kbps	0	9262	1852.40	18.5	18.5	1.420		
			9400	1880.00	18.5	18.4	1.300	1.346	
			9538	1907.60	18.5	18.4	1.330	1.367	
Edge 1	Rel 99 RMC 12.2kbps	0	9262	1852.40	18.5	18.5			1
			9400	1880.00	18.5	18.4	0.524	0.542	
			9538	1907.60	18.5	18.4			1

Body SAR W/o Pwr back off

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (mW/g)		Note
					Tune-up Limit	Measured	Measured	Scaled	
Rear/Bottom	Rel 99 RMC 12.2kbps	14	9262	1852.40	22.5	22.5			1
			9400	1880.00	22.5	22.5	0.325		
			9538	1907.60	22.5	22.5			1
Edge 1	Rel 99 RMC 12.2kbps	14	9262	1852.40	22.5	22.5			1
			9400	1880.00	22.5	22.5	0.306		
			9538	1907.60	22.5	22.5			1

Note(s):

- 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.

13.5. Wi-Fi (2.4GHz Band)

Test Reduction Consideration

SAR is not required for 802.11g/n (HT20/HT40) 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.

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Target Power (dBm)	Measured Power (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Note
Rear/Bottom	802.11b	Main	0	1	2412.0	15.5	15.4			1
				6	2437.0	15.5	15.5	0.654	0.654	
				11	2462.0	15.5	15.2			1
	802.11g	Main	0	2	2417.0	16.0	15.8	1.070	1.120	
				6	2437.0	16.0	15.7	0.974	1.044	
				10	2457.0	16.5	16.5	1.140		
Rear 20° Tilt (Tilt @Edge1)	802.11b	Main	0	1	2412.0	15.5	15.4	0.597	0.611	
				6	2437.0	15.5	15.5	0.828		
				11	2462.0	15.5	15.2	0.649	0.695	
	802.11g	Main	0	2	2417.0	16.0	15.8	0.773	0.809	
				6	2437.0	16.0	15.7	0.910	0.975	
				10	2457.0	16.5	16.5	1.200		
Edge 1	802.11b	Main	0	1	2412.0	15.5	15.4			1
				6	2437.0	15.5	15.5	0.499		
				11	2462.0	15.5	15.2			1
	802.11g	Main	0	2	2417.0	16.0	15.8			1
				6	2437.0	16.0	15.7			1
				10	2457.0	16.5	16.5	0.674		
Rear/Bottom	802.11b	Aux	0	1	2412.0	15.6	15.4			1
				6	2437.0	15.6	15.5	0.394	0.403	
				11	2462.0	15.5	15.4			1
	802.11g	Aux	0	2	2417.0	16.0	15.8			1
				6	2437.0	16.0	15.7			1
				10	2457.0	16.6	16.5	0.643	0.658	
Rear 20° Tilt (Tilt @Edge2)	802.11b	Aux	0	1	2412.0	15.6	15.4			1
				6	2437.0	15.6	15.5	0.441	0.451	
				11	2462.0	15.5	15.4			1
	802.11g	Aux	0	2	2417.0	16.0	15.8			1
				6	2437.0	16.0	15.7			1
				10	2457.0	16.6	16.5	0.612	0.626	
Edge 2	802.11b	Aux	0	1	2412.0	15.6	15.4			1
				6	2437.0	15.6	15.5	0.292	0.299	
				11	2462.0	15.5	15.4			1
	802.11g	Aux	0	2	2417.0	16.0	15.8			1
				6	2437.0	16.0	15.7			1
				10	2457.0	16.6	16.5	0.405	0.414	

Note(s):

- 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)

13.6. Wi-Fi (5GHz Bands)

Test Reduction Consideration

SAR is not required for 802.11n (HT20/HT40) 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	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Target Power (dBm)	Measured Power (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)
Rear/Bottom	802.11a	Main	0	36	5180.0	15.5	15.5	0.681	
				48	5240.0	15.5	15.5	0.557	
Rear 20° Tilt (Tilt @Edge1)	802.11a	Main	0	36	5180.0	15.5	15.5	0.493	
				48	5240.0	15.5	15.5	0.590	
Edge 1	802.11a	Main	0	36	5180.0	15.5	15.5	0.185	
				48	5240.0	15.5	15.5	0.148	
Rear/Bottom	802.11a	Aux	0	36	5180.0	15.5	15.5	0.861	
				48	5240.0	15.5	15.4	0.631	0.646
Rear 20° Tilt (Tilt @Edge2)	802.11a	Aux	0	36	5180.0	15.5	15.5	0.792	
				48	5240.0	15.5	15.4	0.727	0.744
Edge 2	802.11a	Aux	0	36	5180.0	15.5	15.5	0.981	
				48	5240.0	15.5	15.4	0.915	0.936

5.3GHz Band

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Target Power (dBm)	Measured Power (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)
Rear	802.11a	Main	0	52	5260.0	15.0	15.0	0.946	
				64	5320.0	15.0	15.0	1.100	
	802.11n HT20	Main	0	52	5260.0	15.5	15.5	1.060	
				64	5320.0	15.5	15.5	0.946	
Rear 20° Tilt (Tilt @Edge1)	802.11a	Main	0	52	5260.0	15.0	15.0	0.575	
				64	5320.0	15.0	15.0	0.628	
	802.11n HT20	Main	0	52	5260.0	15.5	15.5	0.695	
				64	5320.0	15.5	15.5	0.687	
Edge 1	802.11a	Main	0	52	5260.0	15.0	15.0	0.167	
				64	5320.0	15.0	15.0	0.254	
	802.11n HT20	Main	0	52	5260.0	15.5	15.5	0.176	
				64	5320.0	15.5	15.5	0.199	
Rear/Bottom	802.11a	Aux	0	52	5260.0	15.0	14.9	0.915	0.936
				64	5320.0	15.0	15.0	0.666	
	802.11n HT20	Aux	0	52	5260.0	15.5	15.4	0.861	0.881
				64	5320.0	15.5	15.5	0.849	
Rear 20° Tilt (Tilt @Edge2)	802.11a	Aux	0	52	5260.0	15.0	14.9	0.740	0.757
				64	5320.0	15.0	15.0	0.598	
	802.11n HT20	Aux	0	52	5260.0	15.5	15.4	0.761	0.779
				64	5320.0	15.5	15.5	0.663	
Edge 2	802.11a	Aux	0	52	5260.0	15.0	14.9	0.908	0.929
				64	5320.0	15.0	15.0	0.677	
	802.11n HT20	Aux	0	52	5260.0	15.5	15.4	0.964	0.986
				64	5320.0	15.5	15.5	0.857	

5.5GHz Band

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Target Power (dBm)	Measured Power (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)
Rear/Bottom	802.11a	Main	0	104	5520.0	16.0	16.0	1.120	
				116	5580.0	16.0	16.0	1.300	
				124	5620.0	16.0	16.0	1.370	
				136	5680.0	16.0	16.0	1.150	
Rear 20° Tilt (Tilt @Edge1)	802.11a	Main	0	104	5520.0	16.0	16.0	0.856	
				116	5580.0	16.0	16.0	0.780	
				124	5620.0	16.0	16.0	1.050	
				136	5680.0	16.0	16.0	1.170	
Edge 1	802.11a	Main	0	104	5520.0	16.0	16.0	0.613	
				116	5580.0	16.0	16.0	0.748	
				124	5620.0	16.0	16.0	0.935	
				136	5680.0	16.0	16.0	1.120	
Rear/Bottom	802.11a	Aux	0	104	5520.0	16.0	16.0	0.541	
				116	5580.0	16.0	16.0	0.853	
				124	5620.0	16.0	16.0	0.987	
				136	5680.0	16.0	16.0	0.924	
Rear 20° Tilt (Tilt @Edge2)	802.11a	Aux	0	104	5520.0	16.0	16.0	0.743	
				116	5580.0	16.0	16.0	0.854	
				124	5620.0	16.0	16.0	0.908	
				136	5680.0	16.0	16.0	1.050	
Edge 2	802.11a	Aux	0	104	5520.0	16.0	16.0	0.649	
				116	5580.0	16.0	16.0	0.877	
				124	5620.0	16.0	16.0	1.060	
				136	5680.0	16.0	16.0	1.190	

5.8GHz Band

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Target Power (dBm)	Measured Power (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)
Rear/Bottom	802.11a	Main	0	149	5745.0	16.5	16.5	1.250	
				157	5785.0	16.5	16.5	1.110	
				165	5825.0	16.5	16.4	1.160	1.187
Rear 20° Tilt (Tilt @Edge1)	802.11a	Main	0	149	5745.0	16.5	16.5	1.160	
				157	5785.0	16.5	16.5	1.020	
				165	5825.0	16.5	16.4	0.943	0.965
Edge 1	802.11a	Main	0	149	5745.0	16.5	16.5	1.320	
				157	5785.0	16.5	16.5	0.967	
				165	5825.0	16.5	16.4	0.845	0.865
Rear/Bottom	802.11a	Aux	0	149	5745.0	16.5	16.5	1.040	
				157	5785.0	16.5	16.5	1.260	
				165	5825.0	16.5	16.5	1.170	
Rear 20° Tilt (Tilt @Edge2)	802.11a	Aux	0	149	5745.0	16.5	16.5	0.934	
				157	5785.0	16.5	16.5	0.849	
				165	5825.0	16.5	16.5	0.754	
Edge 2	802.11a	Aux	0	149	5745.0	16.5	16.5	1.020	
				157	5785.0	16.5	16.5	1.010	
				165	5825.0	16.5	16.5	0.878	

13.7. 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	Rear 20° Tilt @ Edge1	GPRS 2 slot	1.270
GSM1900	Rear 20° Tilt @ Edge1	GPRS 2 slot	1.470
W-CDMA (UMTS) Band V	Rear 20° Tilt @ Edge1	Rel 99 RMC 12.2kbps	0.930
W-CDMA (UMTS) Band II	Rear 20° Tilt @ Edge1	Rel 99 RMC 12.2kbps	1.420
WiFi 2.4 GHz	Rear 20° Tilt @ Edge1	802.11g 6Mbps	1.200
WiFi 5.2 GHz	Edge 2	802.11a 6Mbps	0.981
WiFi 5.3 GHz	Rear/Bottom	802.11a 6Mbps	1.100
WiFi 5.5 GHz	Rear/Bottom	802.11a 6Mbps	1.370
WiFi 5.8 GHz	Edge 1	802.11a 6Mbps	1.320

13.8. SAR Plot(from Summary of Highest Measured SAR Values)

Test Laboratory: UL CCS SAR Lab D

Date/Time: 8/6/2012

GSM850

Frequency: 848.8 MHz; Duty Cycle: 1:4; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 1$ mho/m; $\epsilon_r = 54.7$; $\rho = 1000$ kg/m³;

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(8.84, 8.84, 8.84); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear 20 deg Tilt@Edge 1/GPRS 2 Slots/Ch251/Area Scan (12x15x1): Measurement grid:

dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.65 mW/g

Rear 20 deg Tilt@Edge 1/GPRS 2 Slots/Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement

grid: dx=8mm, dy=8mm, dz=5mm

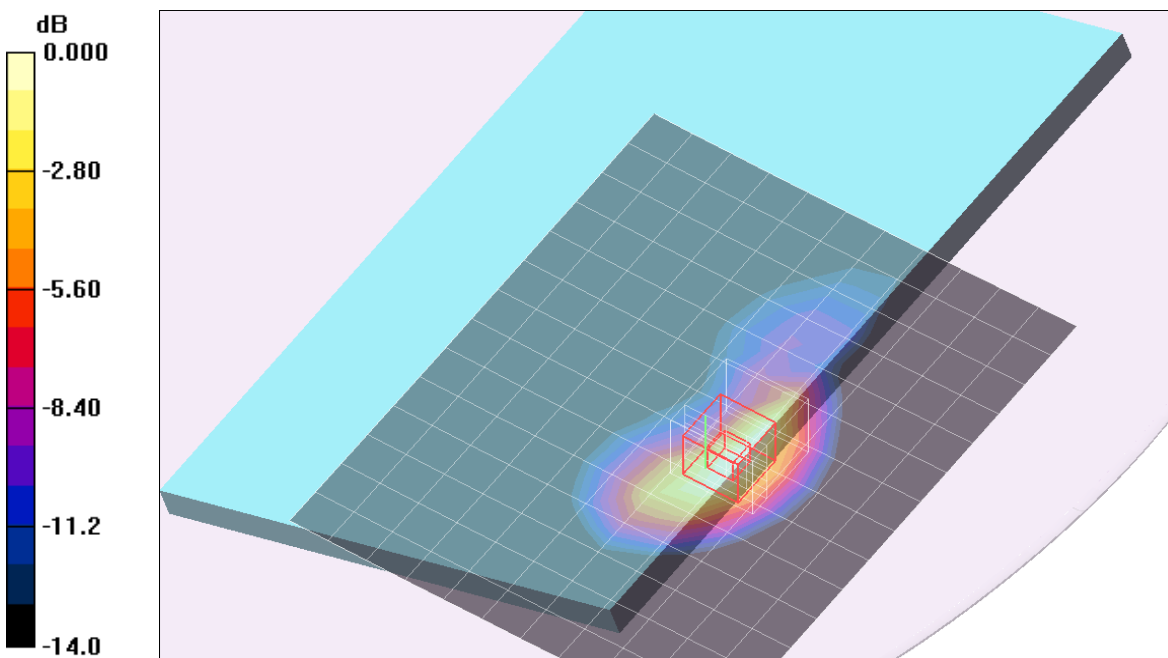
Reference Value = 40.2 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 2.31 W/kg

SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.694 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.50 mW/g



0 dB = 1.50mW/g

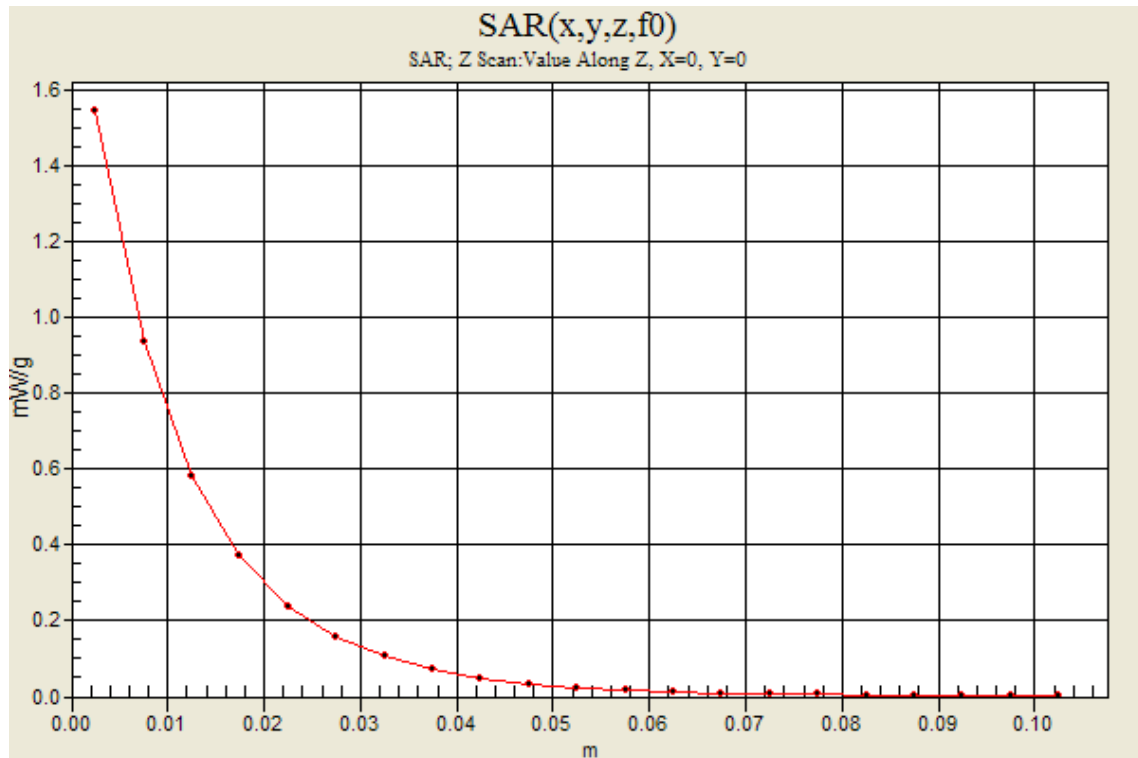
GSM850

Frequency: 848.8 MHz; Duty Cycle: 1:4

Rear 20 deg Tilt@Edge 1/GPRS 2 Slots/Ch251/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



GSM1900

Frequency: 1850.2 MHz; Duty Cycle: 1:4; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³;

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/GPRS 2 Slots/Ch512/Area Scan (11x15x1): Measurement grid:

dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.31 mW/g

Rear 20 deg Tilt@Edge 1/GPRS 2 Slots/Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement

grid: dx=8mm, dy=8mm, dz=5mm

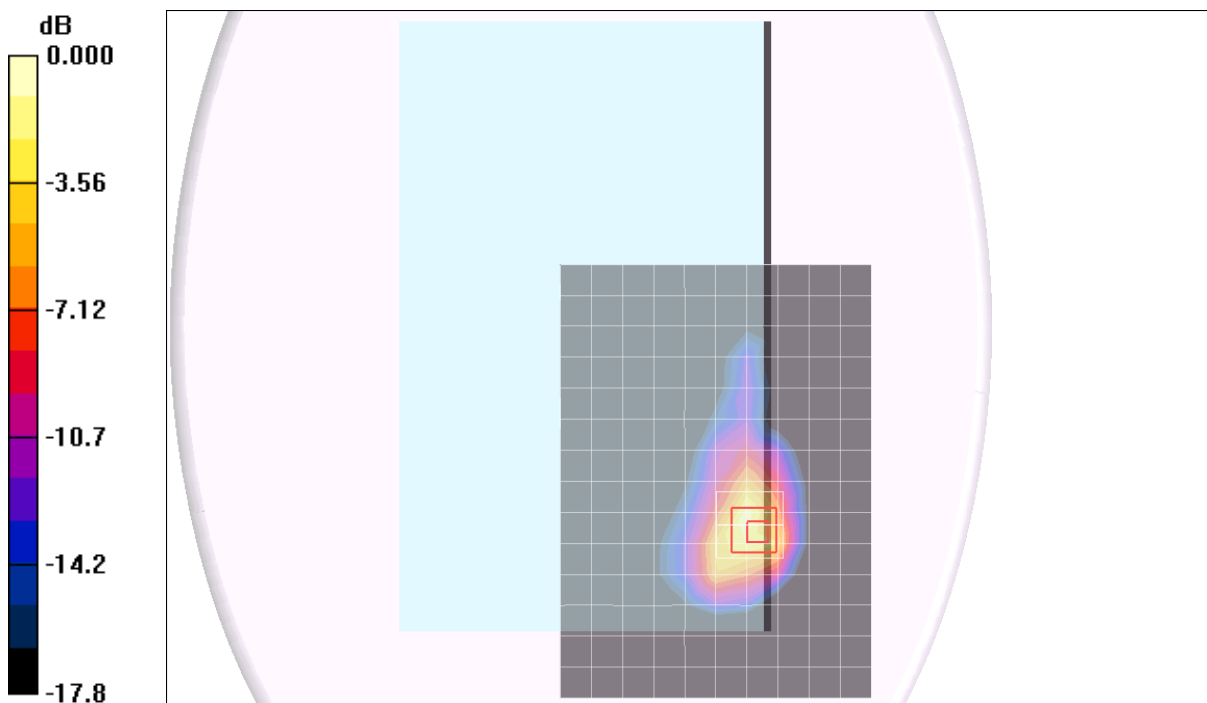
Reference Value = 30.9 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 2.86 W/kg

SAR(1 g) = 1.47 mW/g; SAR(10 g) = 0.701 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.90 mW/g



0 dB = 1.90mW/g

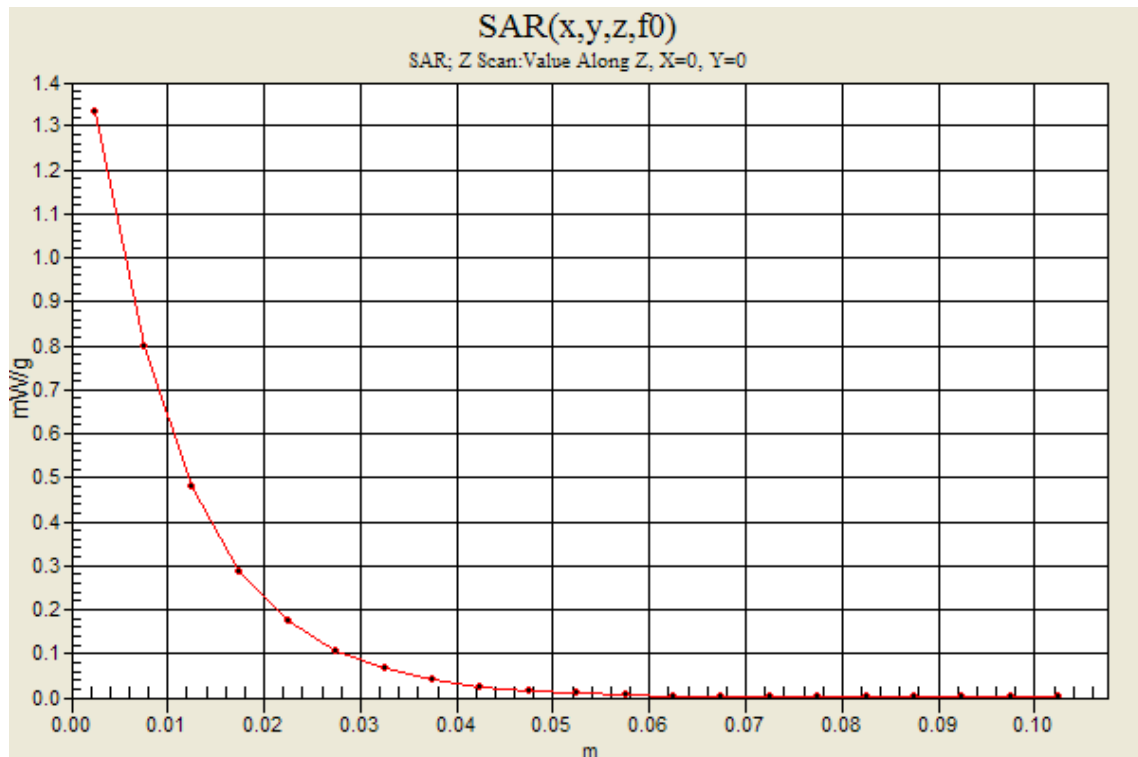
GSM1900

Frequency: 1850.2 MHz; Duty Cycle: 1:4

Rear 20 deg Tilt@Edge 1/GPRS 2 Slots/Ch512/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.33 mW/g



W-CDMA Band V

Frequency: 826.4 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.981$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³;

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(8.84, 8.84, 8.84); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear 20 deg Tilt@Edge 1/Rel.99/Ch4132/Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.17 mW/g

Rear 20 deg Tilt@Edge 1/Rel.99/Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm

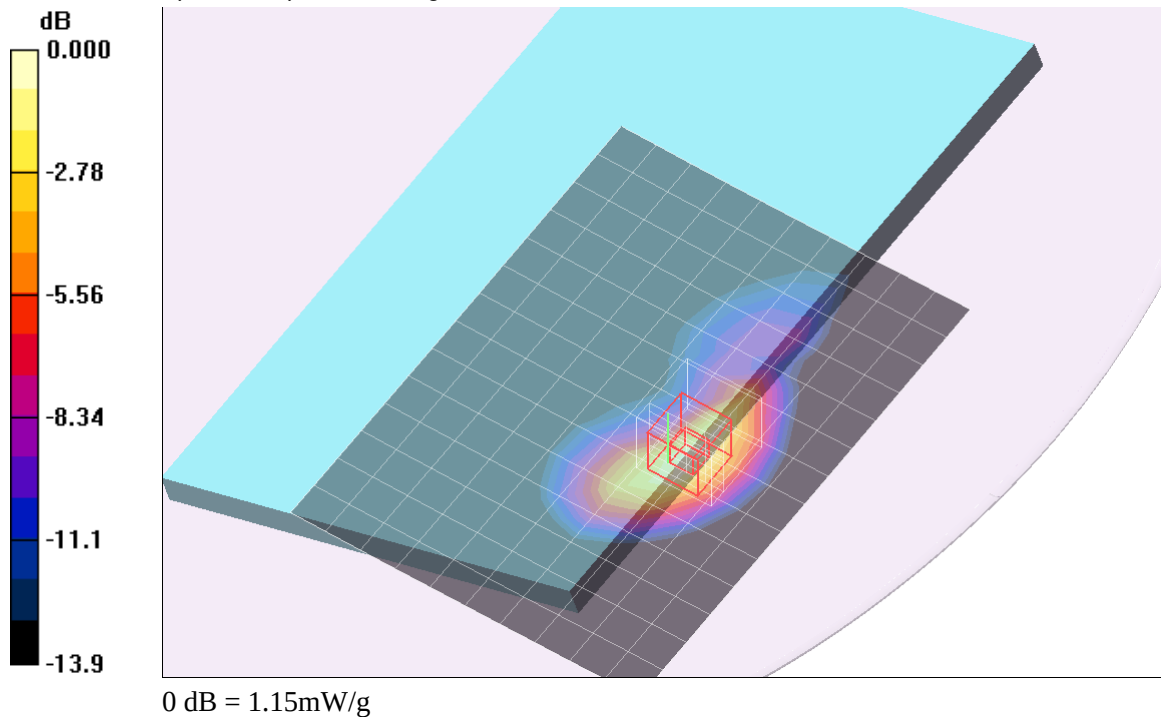
Reference Value = 34.5 V/m; Power Drift = 0.178 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.930 mW/g; SAR(10 g) = 0.519 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.15 mW/g



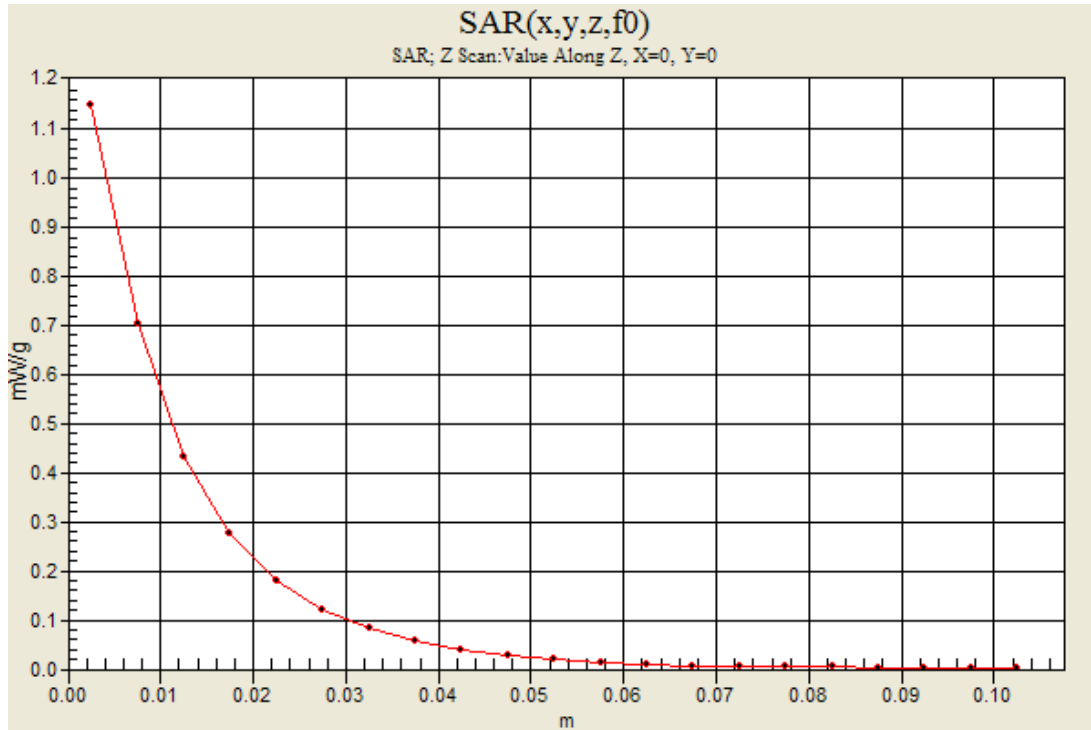
W-CDMA Band V

Frequency: 826.4 MHz; Duty Cycle: 1:1

Rear 20 deg Tilt@Edge 1/Rel.99/Ch4132/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.15 mW/g



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; $\sigma = 1.51$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³;

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 (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear 20 deg Tilt@Edge 1/Rel.99/Ch9262/Area Scan (13x15x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.95 mW/g

Rear 20 deg Tilt@Edge 1/Rel.99/Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

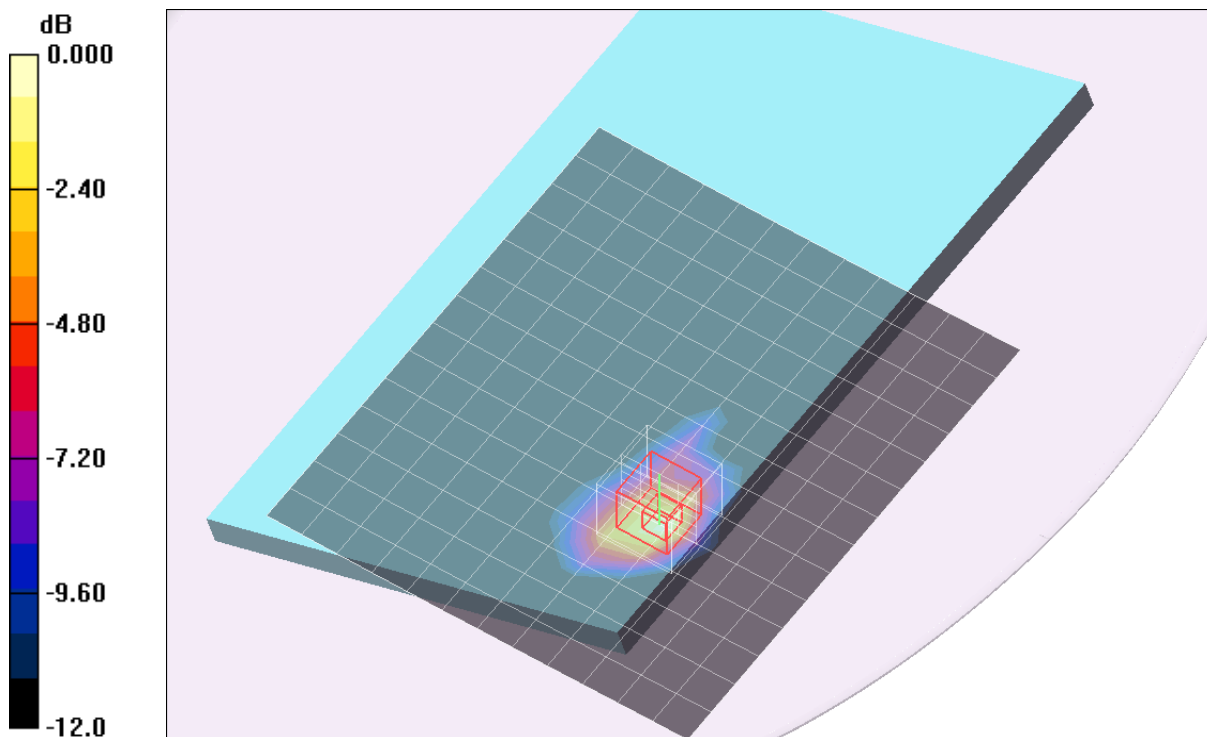
Reference Value = 35.9 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 2.82 W/kg

SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.692 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 2.01 mW/g



0 dB = 2.01mW/g

Test Laboratory: UL CCS SAR Lab D

Date/Time: 8/3/2012

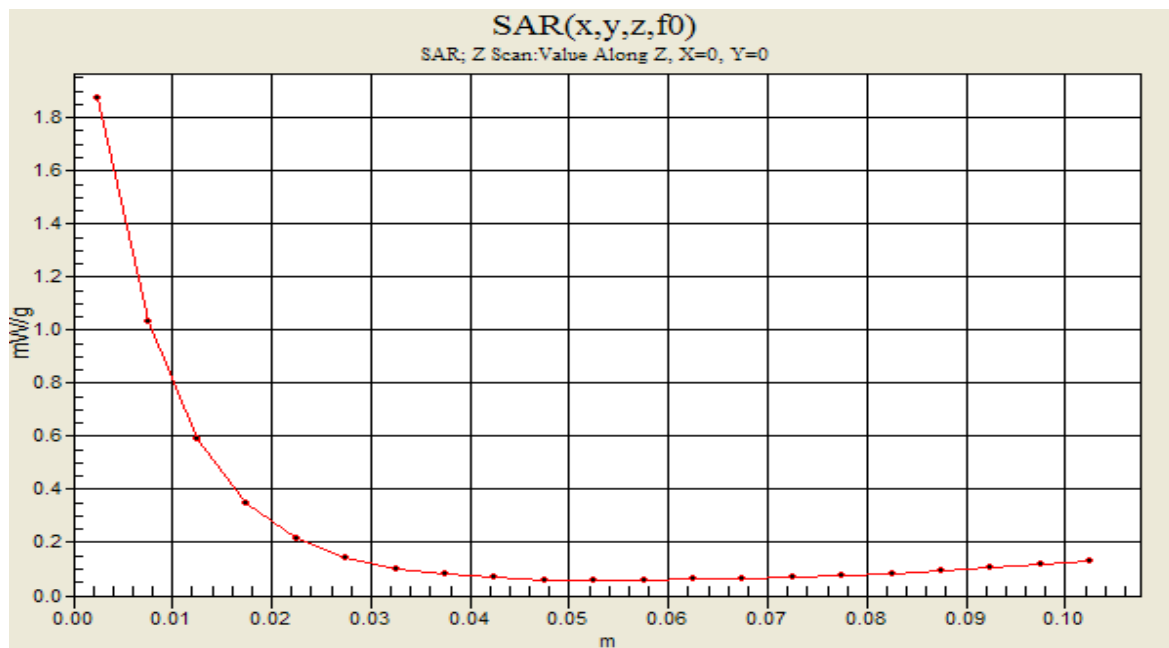
W-CDMA Band II

Frequency: 1852.4 MHz; Duty Cycle: 1:1

Rear 20 deg Tilt@Edge 1/Rel.99/Ch9262/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.88 mW/g



WiFi 2.4GHz Band

Frequency: 2457 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used (interpolated): $f = 2457$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 51.2$; $\rho = 1000$ kg/m³;

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(6.66, 6.66, 6.66); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear 20 deg. tilt @ Edge 1/Main Ant/802.11g/Ch 10/Area Scan (7x11x1): Measurement grid:
dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.51 mW/g

Rear 20 deg. tilt @ Edge 1/Main Ant/802.11g/Ch 10/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

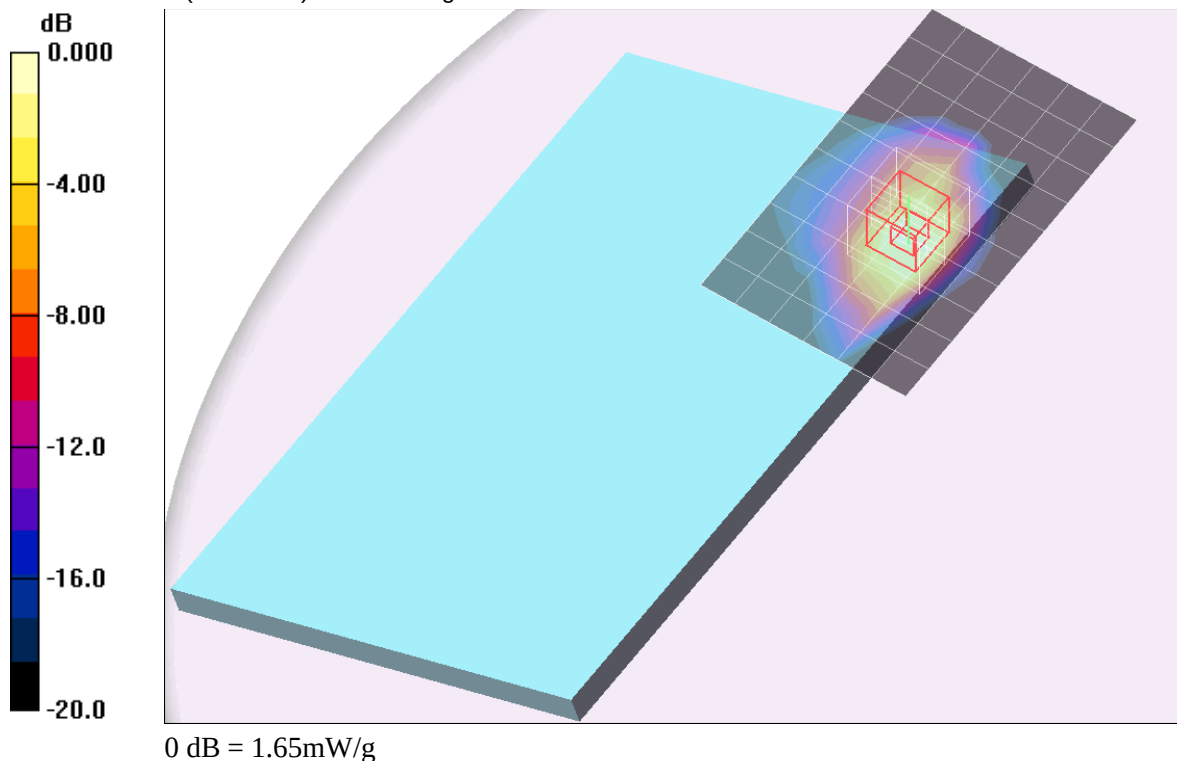
Reference Value = 27.8 V/m; Power Drift = -0.164 dB

Peak SAR (extrapolated) = 2.71 W/kg

SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.512 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.65 mW/g



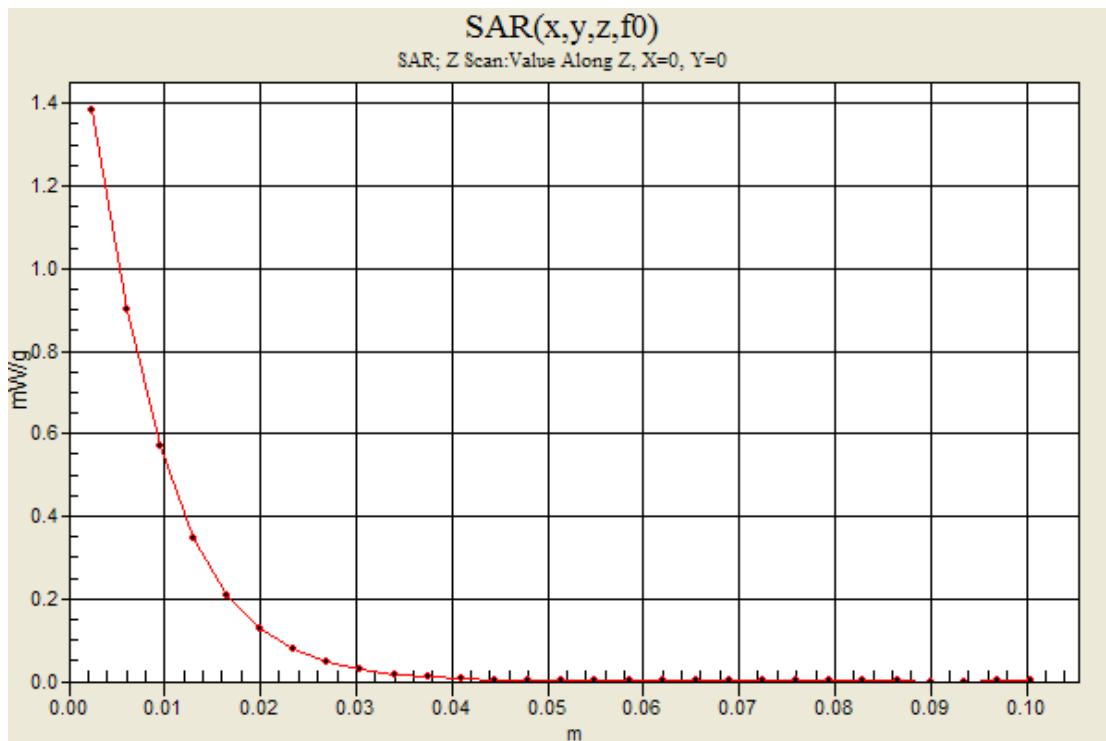
WiFi 2.4GHz Band

Frequency: 2457 MHz; Duty Cycle: 1:1

Rear 20 deg. tilt @ Edge 1/Main Ant/802.11g/Ch 10/Z Scan (1x1x29): Measurement grid:
dx=20mm, dy=20mm, dz=3.5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.38 mW/g



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; $\sigma = 5.22$ mho/m; $\epsilon_r = 48.7$; $\rho = 1000$ kg/m³;

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(4.23, 4.23, 4.23); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Edge2 Touch/Aux Ant/802.11a/Ch 36/Area Scan (10x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.878 mW/g

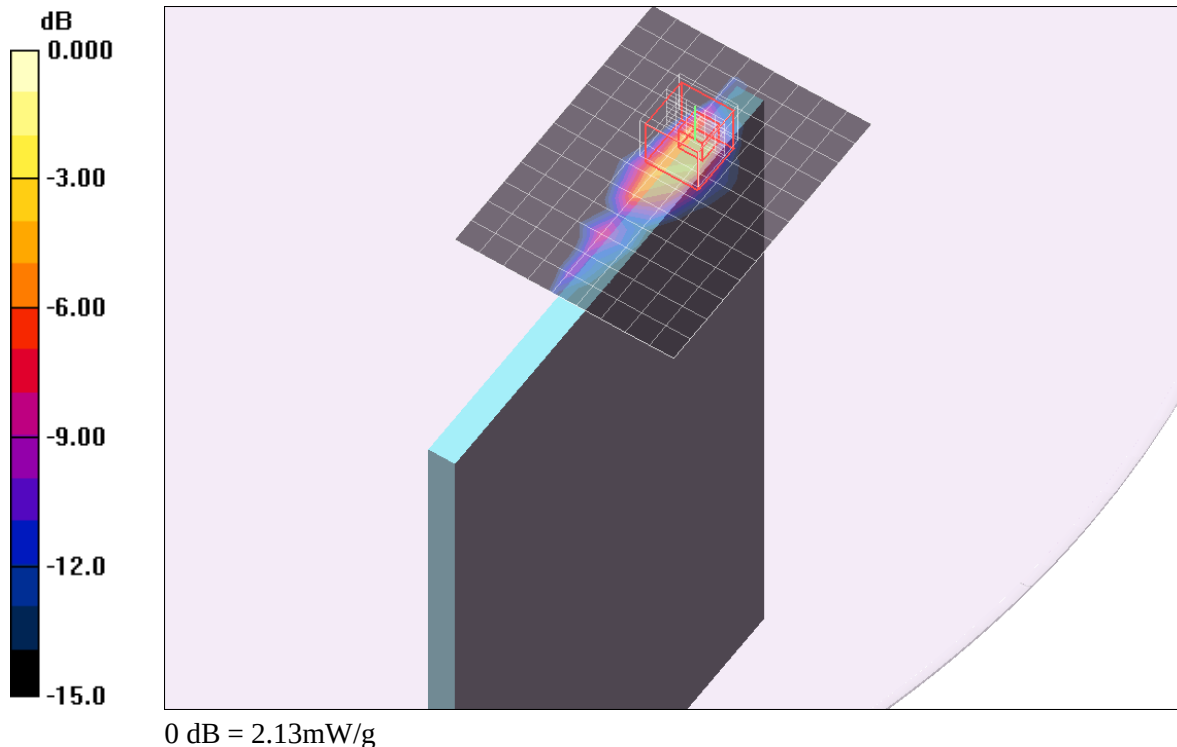
Edge2 Touch/Aux Ant/802.11a/Ch 36/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 14.2 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 7.14 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.272 mW/g

Maximum value of SAR (measured) = 2.13 mW/g

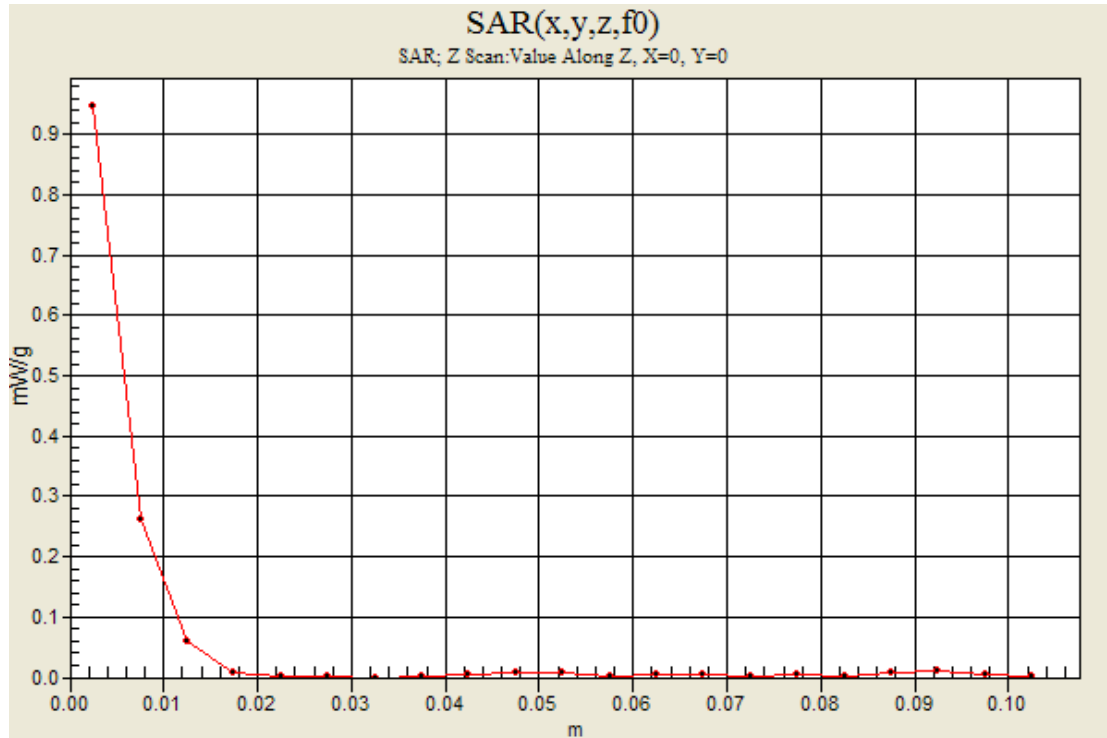


WiFi 5.2 GHz Band

Frequency: 5180 MHz; Duty Cycle: 1:1

Edge2 Touch/Aux Ant/802.11a/Ch 36/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.947 mW/g



WiFi 5.3 GHz Band

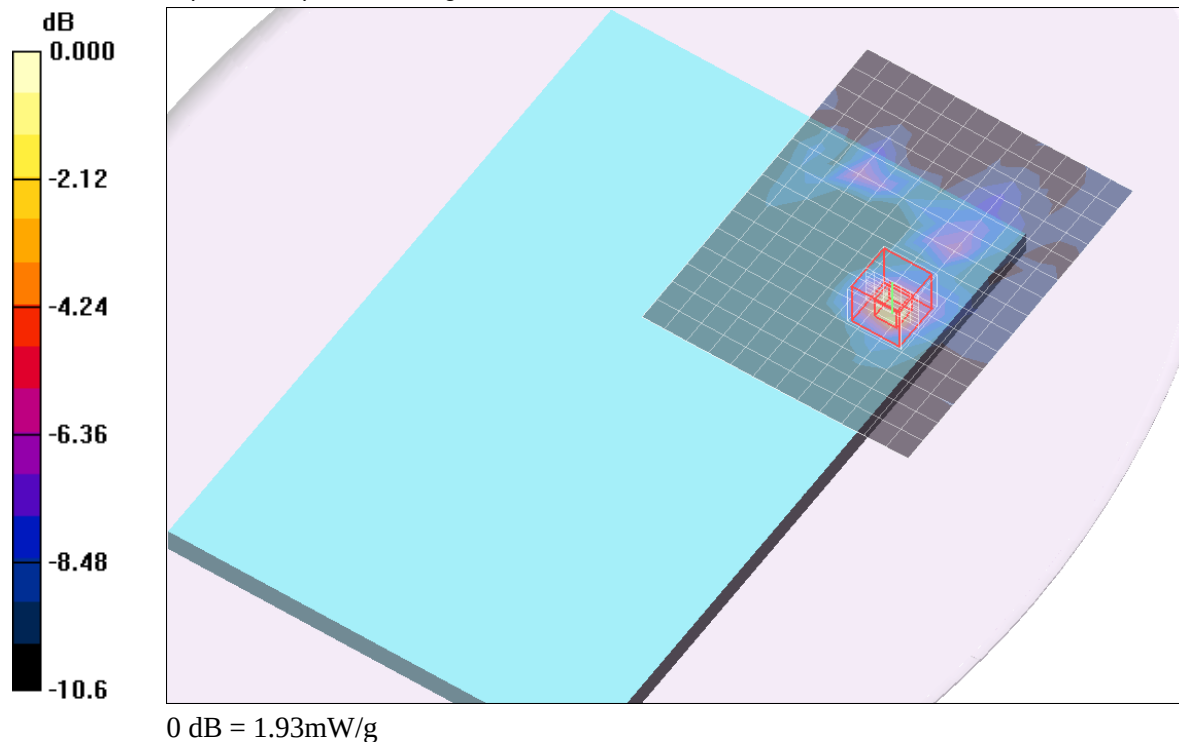
Frequency: 5240 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5240$ MHz; $\sigma = 5.35$ mho/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³;

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(4.23, 4.23, 4.23); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear Touch/Main Ant/802.11a/Ch 64/Area Scan (13x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.986 mW/g

Rear Touch/Main Ant/802.11a/Ch 64/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 14.7 V/m; Power Drift = 0.193 dB
Peak SAR (extrapolated) = 5.81 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.382 mW/g
Maximum value of SAR (measured) = 1.93 mW/g

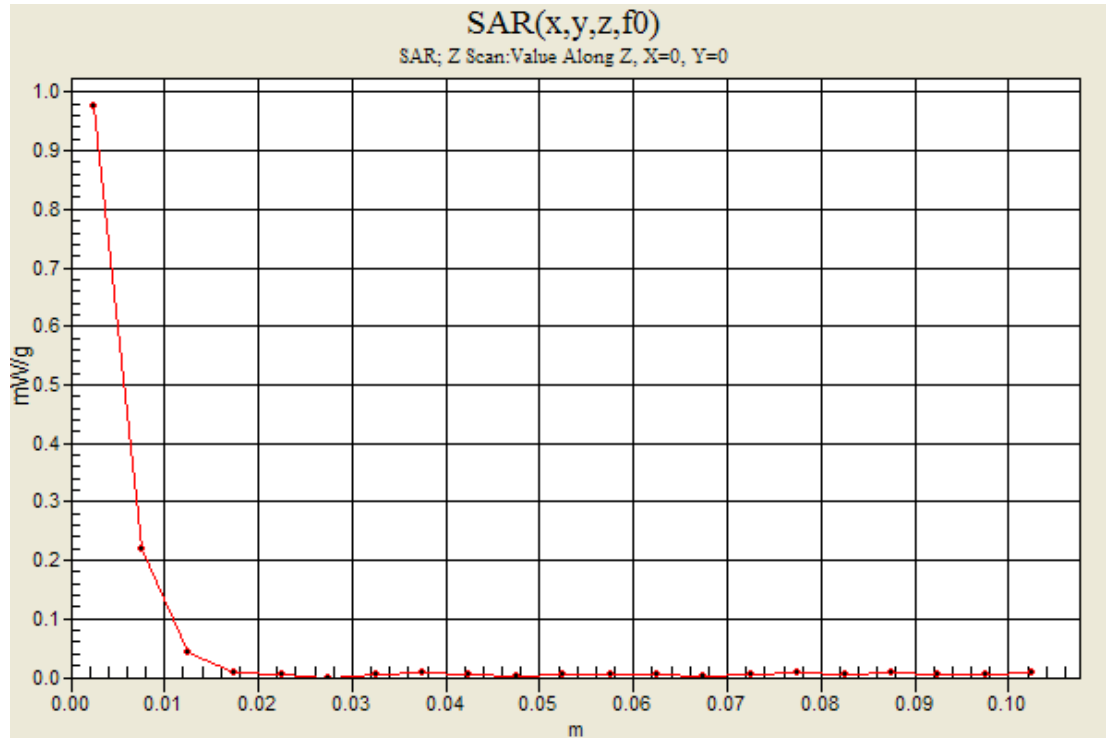


WiFi 5.3 GHz Band

Frequency: 5240 MHz; Duty Cycle: 1:1

Rear Touch/Main Ant/802.11a/Ch 64/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 0.976 mW/g



WiFi 5.5 GHz Band

Frequency: 5620 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5620$ MHz; $\sigma = 5.77$ mho/m; $\epsilon_r = 47.5$; $\rho = 1000$ kg/m³;

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(3.57, 3.57, 3.57); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Rear Touch/Main Ant/802.11a/Ch 124/Area Scan (13x16x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.32 mW/g

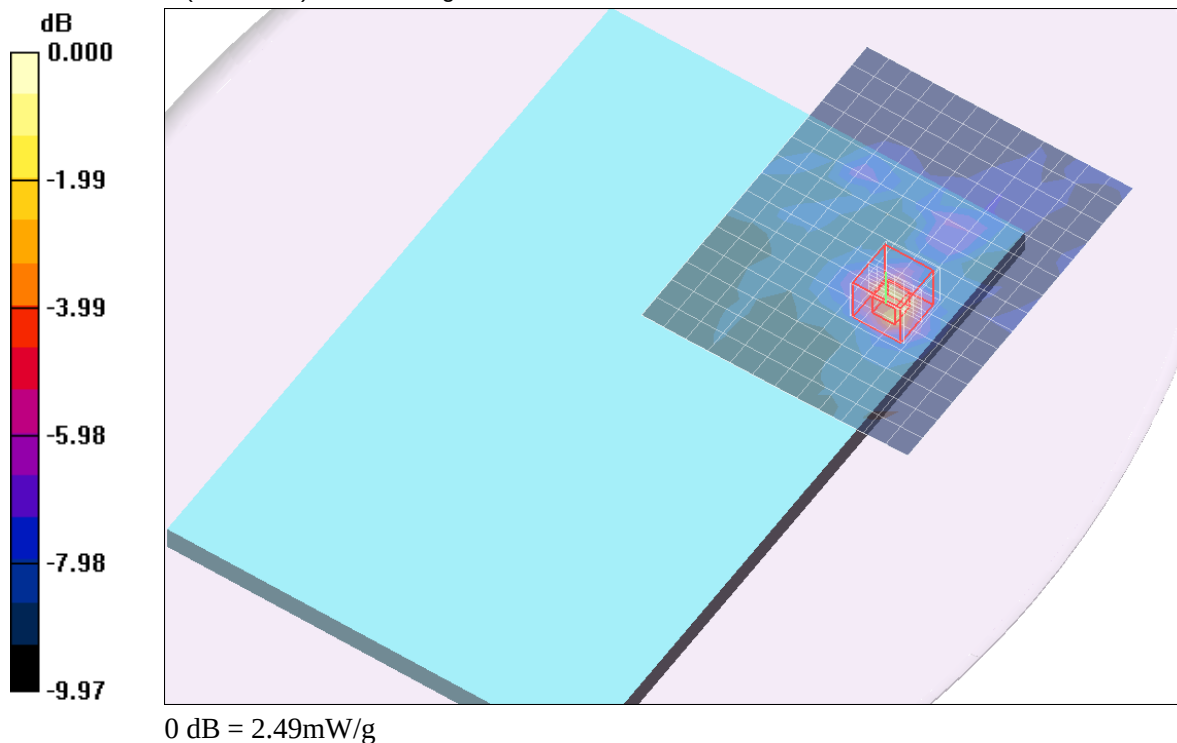
Rear Touch/Main Ant/802.11a/Ch 124/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 16.3 V/m; Power Drift = -0.109 dB

Peak SAR (extrapolated) = 7.18 W/kg

SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.528 mW/g

Maximum value of SAR (measured) = 2.49 mW/g



Test Laboratory: UL CCS SAR Lab D
9/1/2012

Date/Time:

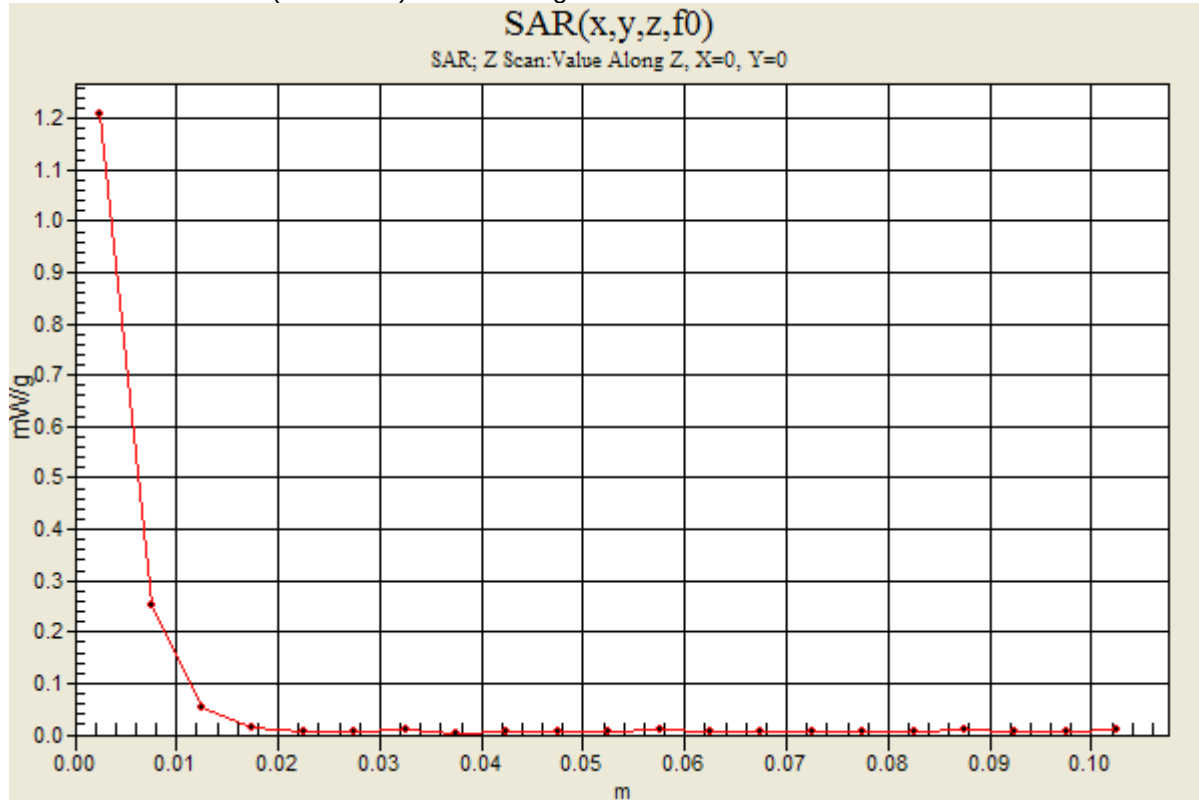
WiFi 5.5 GHz Band

Frequency: 5620 MHz; Duty Cycle: 1:1

Rear Touch/Main Ant/802.11a/Ch 124/Z Scan (1x1x21): Measurement grid:

dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 1.21 mW/g



WiFi 5.8 GHz Band

Frequency: 5745 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: $f = 5745$ MHz; $\sigma = 6.12$ mho/m; $\epsilon_r = 47.1$; $\rho = 1000$ kg/m³;

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(3.81, 3.81, 3.81); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017

Edge1 Touch/Main Ant/802.11a/Ch 149/Area Scan (10x15x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 2.69 mW/g

Edge1 Touch/Main Ant/802.11a/Ch 149/Zoom Scan (7x7x9)/Cube 0: Measurement grid:

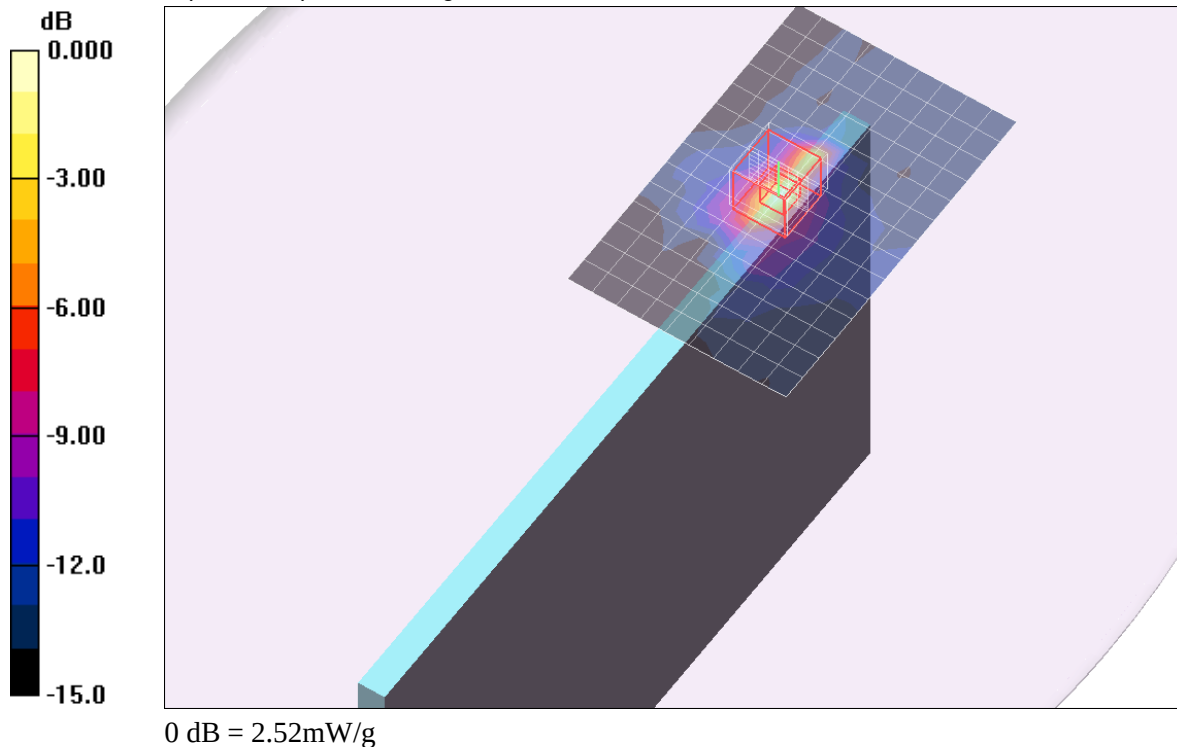
dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 22.6 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 10.7 W/kg

SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.380 mW/g

Maximum value of SAR (measured) = 2.52 mW/g

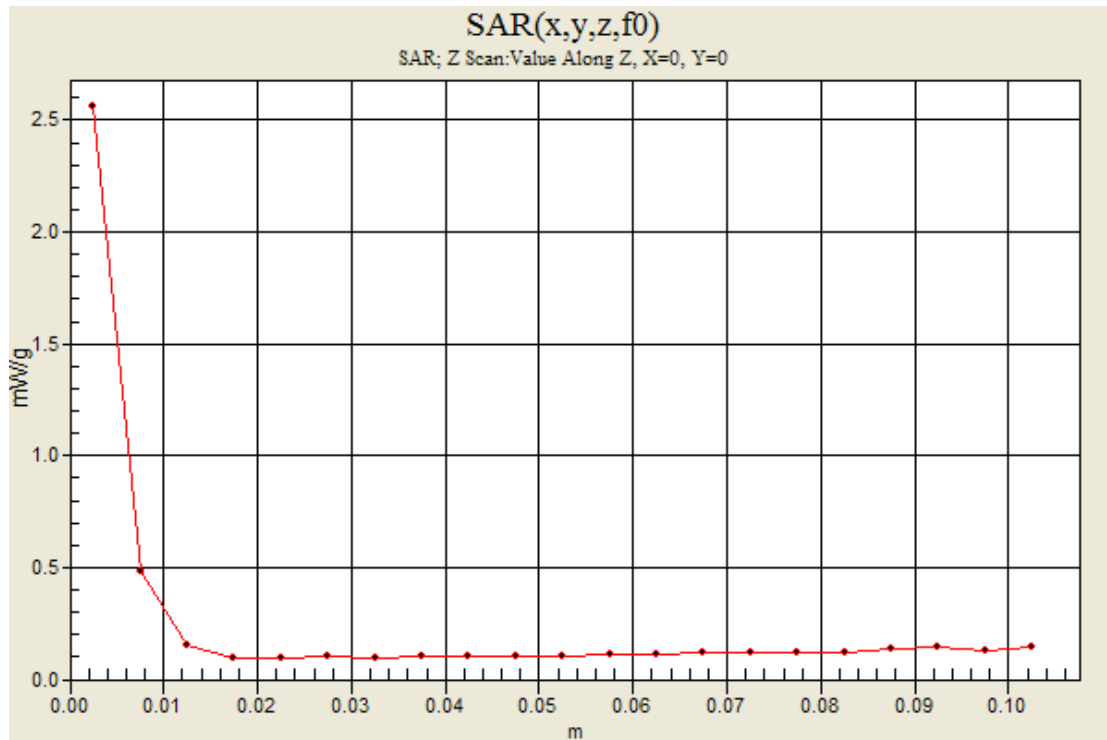


WiFi 5.8 GHz Band

Frequency: 5745 MHz; Duty Cycle: 1:1

Edge1 Touch/Main Ant/802.11a/Ch 149/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.56 mW/g



14. Simultaneous Transmission SAR Analysis

As Bluetooth's max average power is 1.6 mW [$<60/f(\text{GHz})$ 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 Wi-Fi and WWAN is not required.

14.1. Wi-Fi Simultaneous Transmission Analysis

Standalone testing of the 802.11n (HT20 and HT40) 2Tx (MIMO) modes was not performed based upon the test exclusion guidelines in KDB 248227. However as simultaneous transmission between the WLAN main and aux antennas is possible simultaneous transmission SAR analysis is required.

As the 802.11b and g output power is higher than the 802.11n output power it was judged that performing the simultaneous transmission SAR analysis using the 802.11b and g SAR data could be considered a worst case situation. If the DUT is compliant using the 802.11b and g SAR data then 802.11n 2Tx can be presumed compliant too.

14.2. SPLSR Test Case Selection

SPLSR analysis was only performed using scaled SAR values. Any unscaled SAR summations that exceeded 1.6mW/g also exceeded 1.6mW/g when scaled. As the scaled SAR values are equal to or greater than the measured SAR values then compliant scaled SPLSR calculations indicate that SPLSR calculations performed using measured SAR values would have yielded lower values.

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

Sum of the 1g measured SAR of Body Exposure Condition

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 2.4 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	0.950				1.140		2.090
		1.230			1.140		2.370
			0.609		1.140		1.749
				1.300	1.140		2.440
	0.950					0.643	1.593
		1.230				0.643	1.873
			0.609			0.643	1.252
				1.300		0.643	1.943
Rear 20° Tilt (Tilt @Edge1)					1.140	0.643	1.783
	1.270				1.200		2.470
		1.470			1.200		2.670
			0.930		1.200		2.130
Edge 1				1.420	1.200		2.620
	0.989				0.674		1.663
		0.541			0.674		1.215
			0.779		0.674		1.453
				0.524	0.674		1.198

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.2 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	0.950				0.681		1.631
		1.230			0.681		1.911
			0.609		0.681		1.290
				1.300	0.681		1.981
	0.950					0.861	1.811
		1.230				0.861	2.091
			0.609			0.861	1.470
				1.300		0.861	2.161
Rear 20° Tilt (Tilt @Edge1)					0.681	0.861	1.542
	1.270				0.590		1.860
		1.470			0.590		2.060
			0.930		0.590		1.520
Edge 1				1.420	0.590		2.010
	0.989				0.185		1.174
		0.541			0.185		0.726
			0.779		0.185		0.964
Rear/Bottom				0.524	0.185		0.709
	0.950				1.100		2.050
		1.230			1.100		2.330
			0.609		1.100		1.709
				1.300	1.100		2.400
	0.950					0.915	1.865
		1.230				0.915	2.145
			0.609			0.915	1.524
Rear 20° Tilt (Tilt @Edge1)				1.300		0.915	2.215
					1.100	0.915	2.015
	1.270				0.695		1.965
		1.470			0.695		2.165
Edge 1			0.930		0.695		1.625
				1.420	0.695		2.115
	0.989				0.254		1.243
		0.541			0.254		0.795
Edge 1			0.779		0.254		1.033
				0.524	0.254		0.778

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.5 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	0.950				1.370		2.320
		1.230			1.370		2.600
			0.609		1.370		1.979
				1.300	1.370		2.670
	0.950					0.987	1.937
		1.230				0.987	2.217
			0.609			0.987	1.596
				1.300		0.987	2.287
Rear 20° Tilt (Tilt @Edge1)					1.370	0.987	2.357
	1.270				1.170		2.440
		1.470			1.170		2.640
			0.930		1.170		2.100
Edge 1				1.420	1.170		2.590
	0.989				1.120		2.109
		0.541			1.120		1.661
			0.779		1.120		1.899
Rear/Bottom				0.524	1.120		1.644
	0.950				1.250		2.200
		1.230			1.250		2.480
			0.609		1.250		1.859
				1.300	1.250		2.550
Rear/Bottom	0.950					1.260	2.210
		1.230				1.260	2.490
			0.609			1.260	1.869
				1.300		1.260	2.560
					1.250	1.260	2.510
Rear 20° Tilt (Tilt @Edge1)	1.270				1.160		2.430
		1.470			1.160		2.630
			0.930		1.160		2.090
				1.420	1.160		2.580
Edge 1	0.989				1.320		2.309
		0.541			1.320		1.861
			0.779		1.320		2.099
				0.524	1.320		1.844

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

Sum of the 1g Scaled SAR of Body Exposure Condition

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 2.4 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	1.147				1.140		2.287
		1.230			1.140		2.370
			0.760		1.140		1.900
				1.300	1.140		2.440
	1.147					0.658	1.805
		1.230				0.658	1.888
			0.760			0.658	1.418
				1.300		0.658	1.958
Rear 20° Tilt (Tilt @Edge1)					1.140	0.658	1.798
	1.534				1.200		2.734
		1.470			1.200		2.670
			1.149		1.200		2.349
Edge 1				1.420	1.200		2.620
	1.185				0.674		1.859
		0.580			0.674		1.254
			0.972		0.674		1.646
				0.542	0.674		1.216

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.2 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	1.147				0.681		1.828
		1.230			0.681		1.911
			0.760		0.681		1.441
				1.300	0.681		1.981
	1.147					0.861	2.008
		1.230				0.861	2.091
			0.760			0.861	1.621
				1.300		0.861	2.161
Rear 20° Tilt (Tilt @Edge1)					0.681	0.861	1.542
	1.534				0.590		2.124
		1.470			0.590		2.060
			1.149		0.590		1.739
Edge 1				1.420	0.590		2.010
	1.185				0.185		1.370
		0.580			0.185		0.765
			0.972		0.185		1.157
				0.542	0.185		0.727

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.3 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	1.147				1.100		2.247
		1.230			1.100		2.330
			0.760		1.100		1.860
				1.300	1.100		2.400
	1.147					0.936	2.083
		1.230				0.936	2.166
			0.760			0.936	1.696
				1.300		0.936	2.236
Rear 20° Tilt (Tilt @Edge1)					1.100	0.936	2.036
	1.534				0.695		2.229
		1.470			0.695		2.165
			1.149		0.695		1.844
Edge 1				1.420	0.695		2.115
	1.185				0.254		1.439
		0.580			0.254		0.834
			0.972		0.254		1.226
				0.542	0.254		0.796

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.5 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	1.147				1.370		2.517
		1.230			1.370		2.600
			0.760		1.370		2.130
				1.300	1.370		2.670
	1.147					0.987	2.134
		1.230				0.987	2.217
			0.760			0.987	1.747
				1.300		0.987	2.287
Rear 20° Tilt (Tilt @Edge1)					1.370	0.987	2.357
	1.534				1.170		2.704
		1.470			1.170		2.640
			1.149		1.170		2.319
Edge 1				1.420	1.170		2.590
	1.185				1.120		2.305
		0.580			1.120		1.700
			0.972		1.120		2.092
				0.542	1.120		1.662

Test Position	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.8 GHz Band		Σ 1-g SAR (mW/g)
					Main	AUX	
Rear/Bottom	1.147				1.250		2.397
		1.230			1.250		2.480
			0.760		1.250		2.010
				1.300	1.250		2.550
	1.147					1.260	2.407
		1.230				1.260	2.490
			0.760			1.260	2.020
				1.300		1.260	2.560
Rear 20° Tilt (Tilt @Edge1)					1.250	1.260	2.510
	1.534				1.160		2.694
		1.470			1.160		2.630
			1.149		1.160		2.309
Edge 1				1.420	1.160		2.580
	1.185				1.320		2.505
		0.580			1.320		1.900
			0.972		1.320		2.292
				0.542	1.320		1.862

NOTE:

- Where the Σ 1-g SAR exceeds 1.6mW/g SPLSR calculations will determine if further Simultaneous transmission SAR measurements (Volume Scan) are required.
- Simultaneous transmission SAR measurement (Volume Scan) is not required when the Σ 1-g SAR is < 1.6 mW/g

14.4. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 2.4GHz

Test Position	Worst-case combination						Σ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 2.4GHz Band					
					Main	Aux				
Rear/Bottom	1.147				1.140		2.287	17.33	0.132	
		1.230			1.140		2.370	18.45	0.128	
			0.760		1.140		1.900	17.93	0.106	
				1.300	1.140		2.440	18.45	0.132	1
	1.147					0.643	1.790	26.81	0.067	
		1.230				0.643	1.873	27.44	0.068	
				1.300		0.643	1.943	27.17	0.072	2
					1.140	0.643	1.783	13.74	0.130	3
Rear 20° Tilt (Tilt @Edge1)	1.534				1.200		2.734	19.54	0.140	4
		1.470			1.200		2.670	21.3	0.125	
			1.149		1.200		2.349	19.94	0.118	
				1.420	1.200		2.620	21.31	0.123	
Edge 1	1.185				0.674		1.859	17.11	0.109	5
			0.972		0.674		1.646	16.59	0.099	

Conclusions:

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

14.5. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.2GHz

Test Position	Worst-case combination						Σ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.2GHz Band					
					Main	Aux				
Rear/Bottom	1.147				0.681		1.828	16.95	0.108	
		1.230			0.681		1.911	18.06	0.106	
				1.300	0.681		1.981	18.06	0.110	6
	1.147					0.861	2.008	26.97	0.074	
		1.230				0.861	2.091	27.64	0.076	
			0.760			0.861	1.621	27.24	0.060	
				1.300		0.861	2.161	27.38	0.079	7
Rear 20° Tilt (Tilt @Edge1)	1.534				0.590		2.124	18.73	0.113	8
		1.470			0.590		2.060	20.49	0.101	
			1.149		0.590		1.739	19.13	0.091	
				1.420	0.590		2.010	20.5	0.098	

Conclusions:

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

14.6. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.3GHz

Test Position	Worst-case combination						Σ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.3GHz Band					
					Main	Aux				
Rear/Bottom	1.147				1.100		2.247	17.13	0.131	
		1.230			1.100		2.330	18.24	0.128	
			0.760		1.100		1.860	17.72	0.105	
				1.300	1.100		2.400	18.24	0.132	9
	1.147					0.915	2.062	26.67	0.077	
		1.230				0.915	2.145	27.34	0.078	
			0.760			0.915	1.675	26.94	0.062	
				1.300		0.915	2.215	27.09	0.082	10
Rear 20° Tilt (Tilt @Edge1)					1.100	0.915	2.015	13.19	0.153	11
	1.534				0.695		2.229	18.72	0.119	12
		1.470			0.695		2.165	20.49	0.106	
			1.149		0.695		1.844	19.12	0.096	
				1.420	0.695		2.115	20.5	0.103	

Conclusions:

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

14.7. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.5GHz

Test Position	Worst-case combination						Σ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.5GHz Band					
					Main	Aux				
Rear/Bottom	1.147				1.370		2.517	17.33	0.145	
		1.230			1.370		2.600	18.45	0.141	
			0.760		1.370		2.130	17.93	0.119	
				1.300	1.370		2.670	18.44	0.145	13
	1.147					0.987	2.134	26.92	0.079	
		1.230				0.987	2.217	27.57	0.080	
			0.760			0.987	1.747	27.18	0.064	
				1.300		0.987	2.287	27.31	0.084	14
Rear 20° Tilt (Tilt @Edge1)					1.370	0.987	2.357	13.45	0.175	15
	1.534				1.170		2.704	19.07	0.142	16
		1.470			1.170		2.640	20.82	0.127	
			1.149		1.170		2.319	19.47	0.119	
Edge 1				1.420	1.170		2.590	20.82	0.124	
	1.185				1.120		2.305	18.36	0.126	17
		0.580			1.120		1.700	18.83	0.090	
			0.972		1.120		2.092	17.84	0.117	

Conclusions:

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

14.8. SAR to Peak Location Separation Ratio (SPLSR) for WWAN and Wi-Fi 5.8GHz

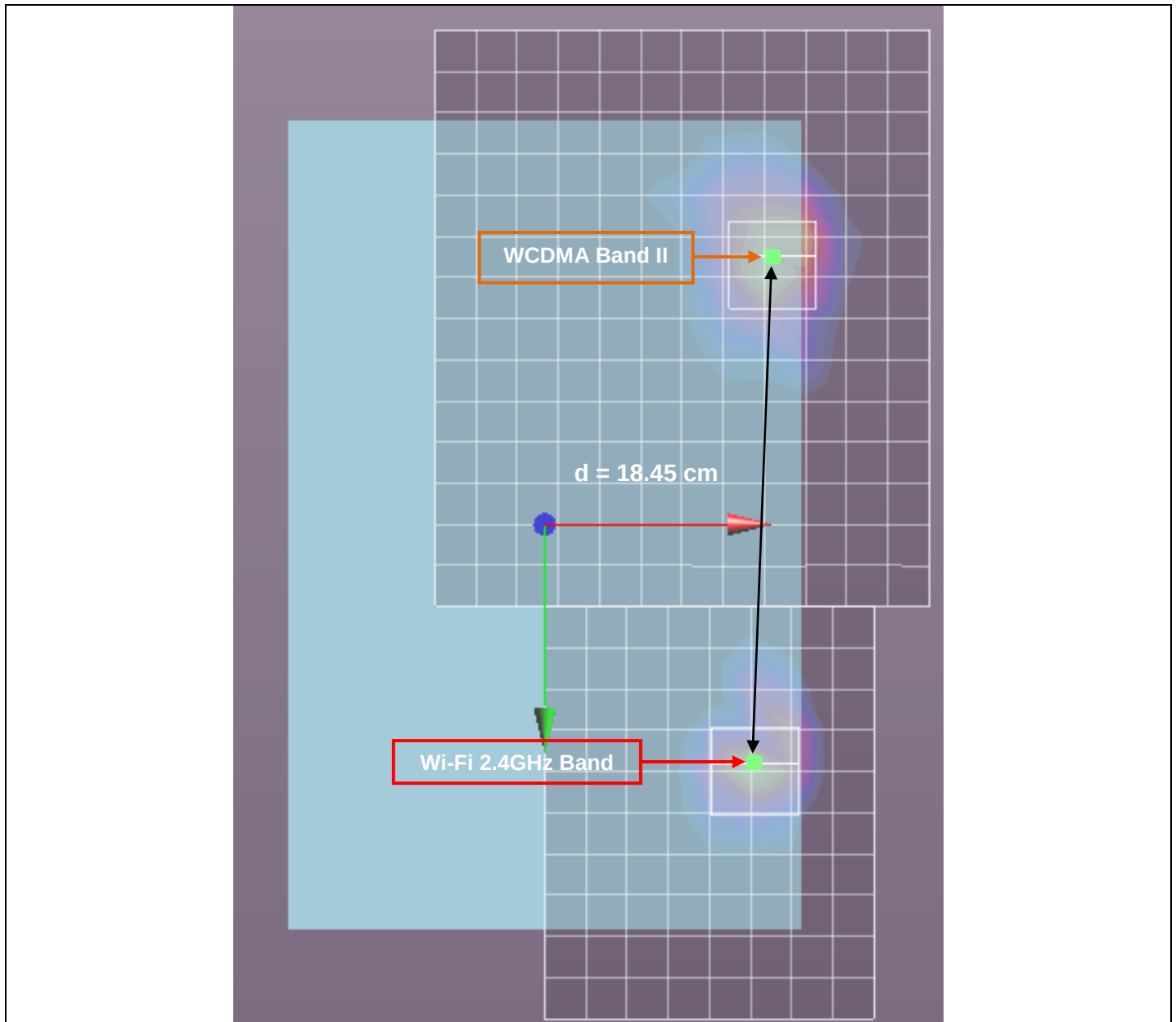
Test Position	Worst-case combination						Σ 1-g SAR (mW/g)	Calculated distance (cm)	SPLSR	Figure
	GSM850	GSM1900	W-CDMA (UMTS) Band V	W-CDMA (UMTS) Band II	WiFi 5.8GHz Band					
					Main	Aux				
Rear/Bottom	1.147				1.250		2.397	17.06	0.141	
		1.230			1.250		2.480	18.19	0.136	
			0.760		1.250		2.010	17.67	0.114	
				1.300	1.250		2.550	18.19	0.140	18
	1.147					1.260	2.407	26.83	0.090	
		1.230				1.260	2.490	27.49	0.091	
			0.760			1.260	2.020	27.09	0.075	
				1.300		1.260	2.560	27.23	0.094	19
Rear 20° Tilt (Tilt @Edge1)					1.250	1.260	2.510	13.54	0.185	20
	1.534				1.160		2.694	18.86	0.143	21
		1.470			1.160		2.630	20.62	0.128	
			1.149		1.160		2.309	19.26	0.120	
Edge 1				1.420	1.160		2.580	20.63	0.125	
	1.185				1.320		2.505	18.36	0.136	22
		0.580			1.320		1.900	18.83	0.101	
			0.972		1.320		2.292	17.84	0.128	
				0.542	1.320		1.862	18.99	0.098	

Conclusions:

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

SAR Peak Location Separation Distance

Figure (1)

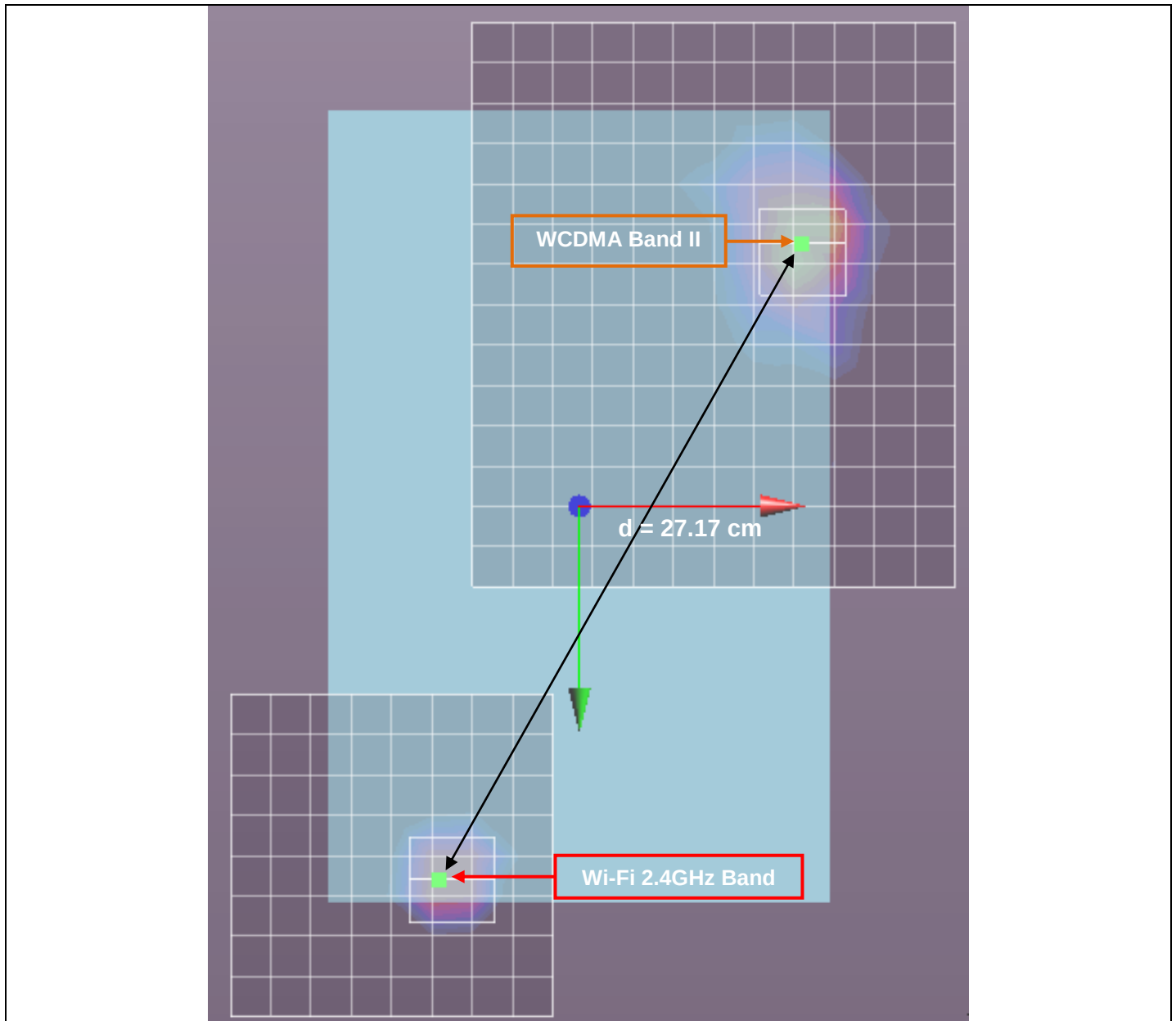


Mode	Peak SAR mW/g	X m	Y m	Z m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 2.4GHz Band	2.61	0.0765	0.0868	-0.18
Separation distance (cm)				
18.45				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (2)

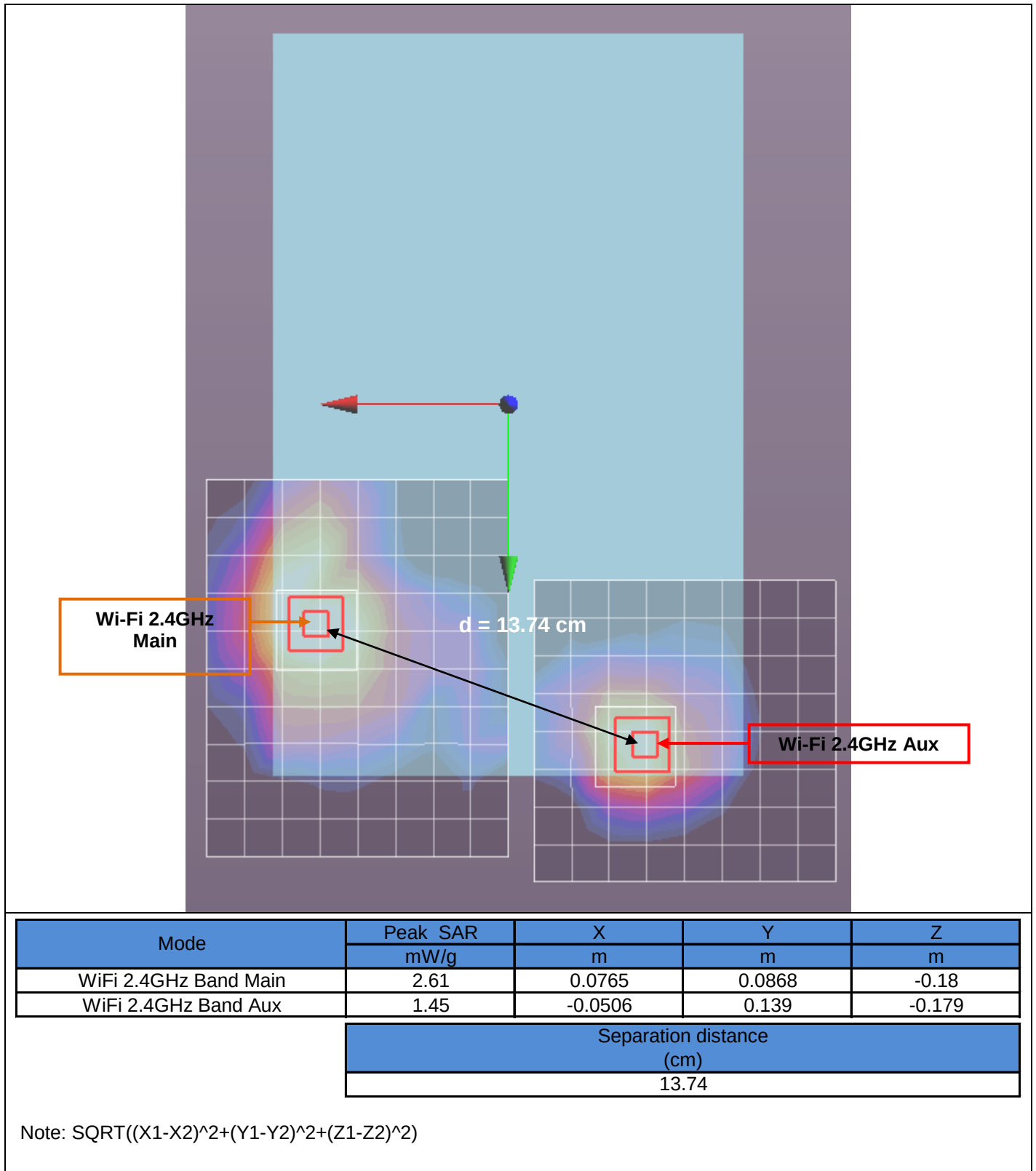


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
Wi-Fi 2.4GHz Band	1.45	-0.0506	0.139	-0.179
Separation distance (cm)				
27.17				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

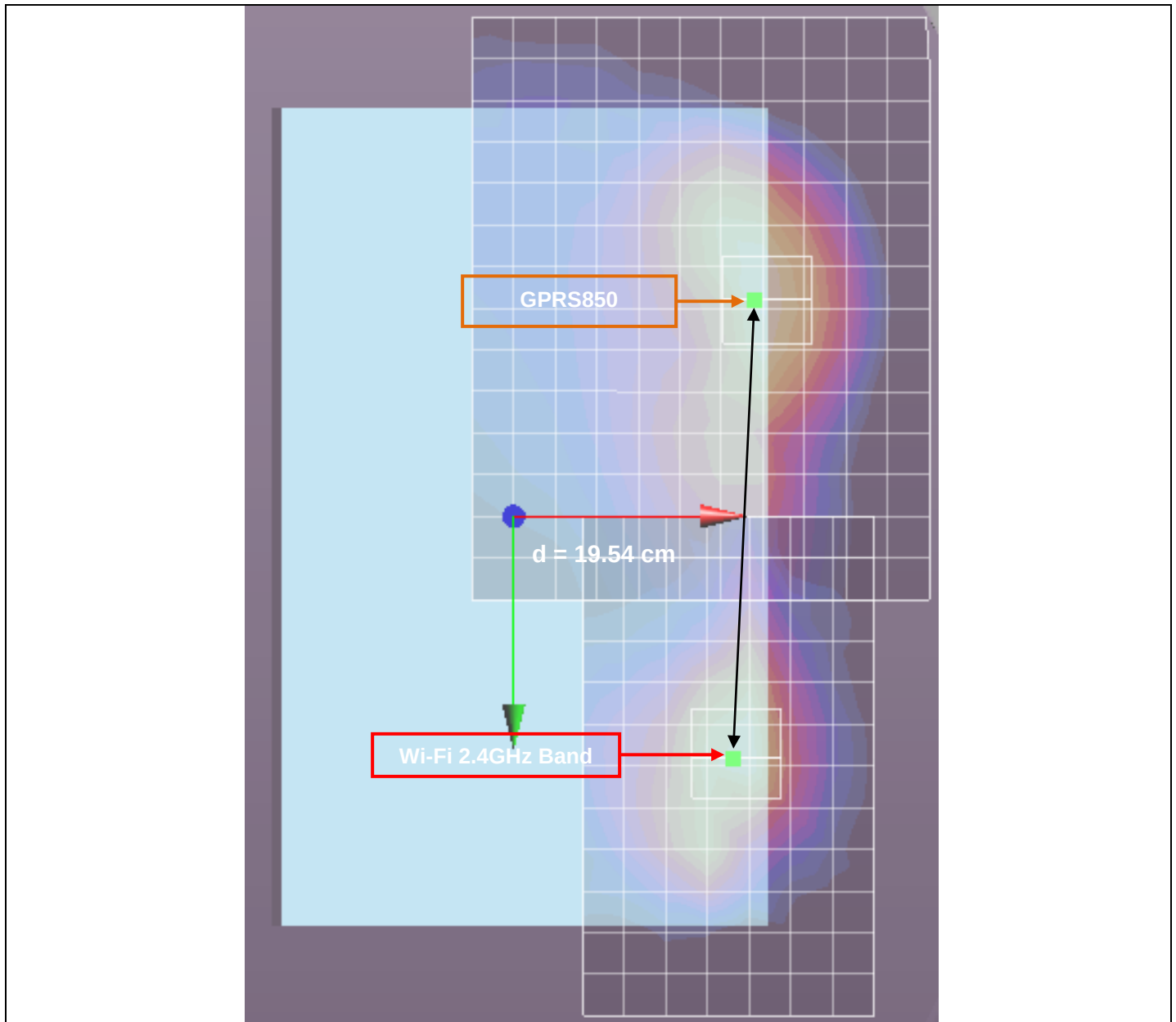
SAR Peak Location Separation Distance

Figure (3)



SAR Peak Location Separation Distance

Figure (4)

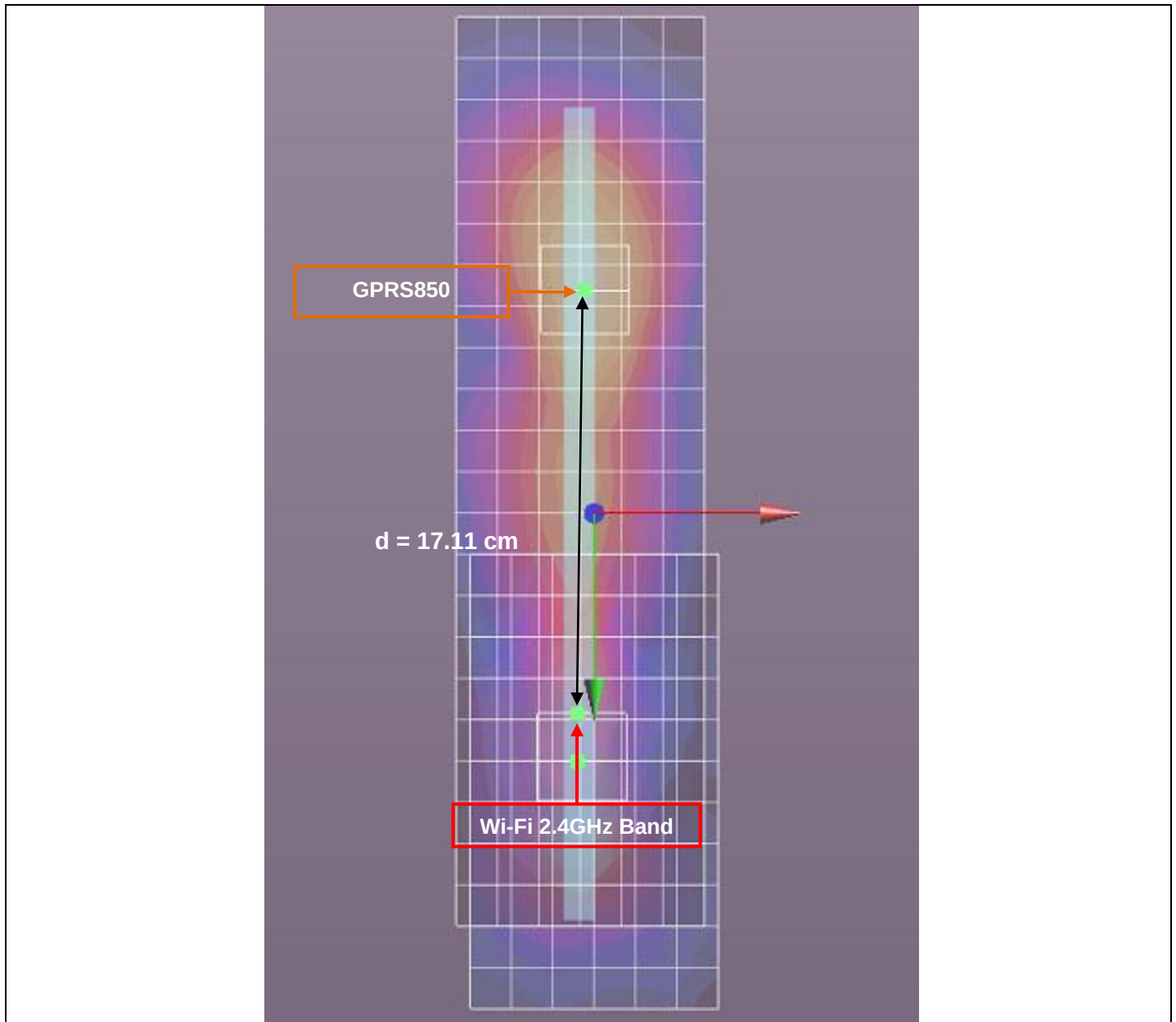


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	2.31	0.0867	-0.078	-0.181
WiFi 2.4GHz Band	2.71	-0.0126	0.0903	-0.18
Separation distance				
(cm)				
19.54				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (5)

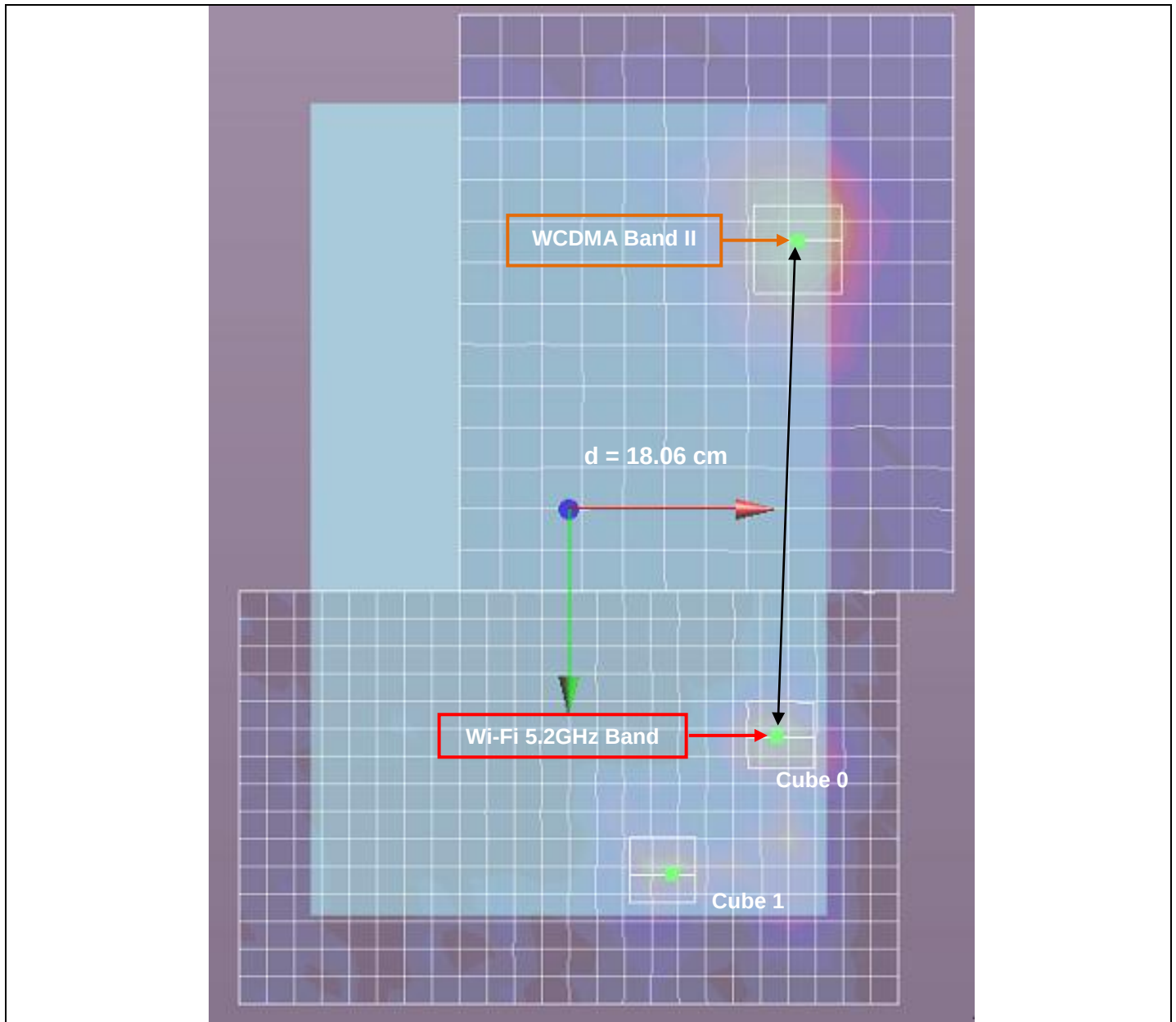


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	1.73	-0.00344	-0.0826	-0.182
WiFi 2.4GHz Band	1.58	-0.00605	0.0885	-0.18
Separation distance				
(cm)				
17.11				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (6)

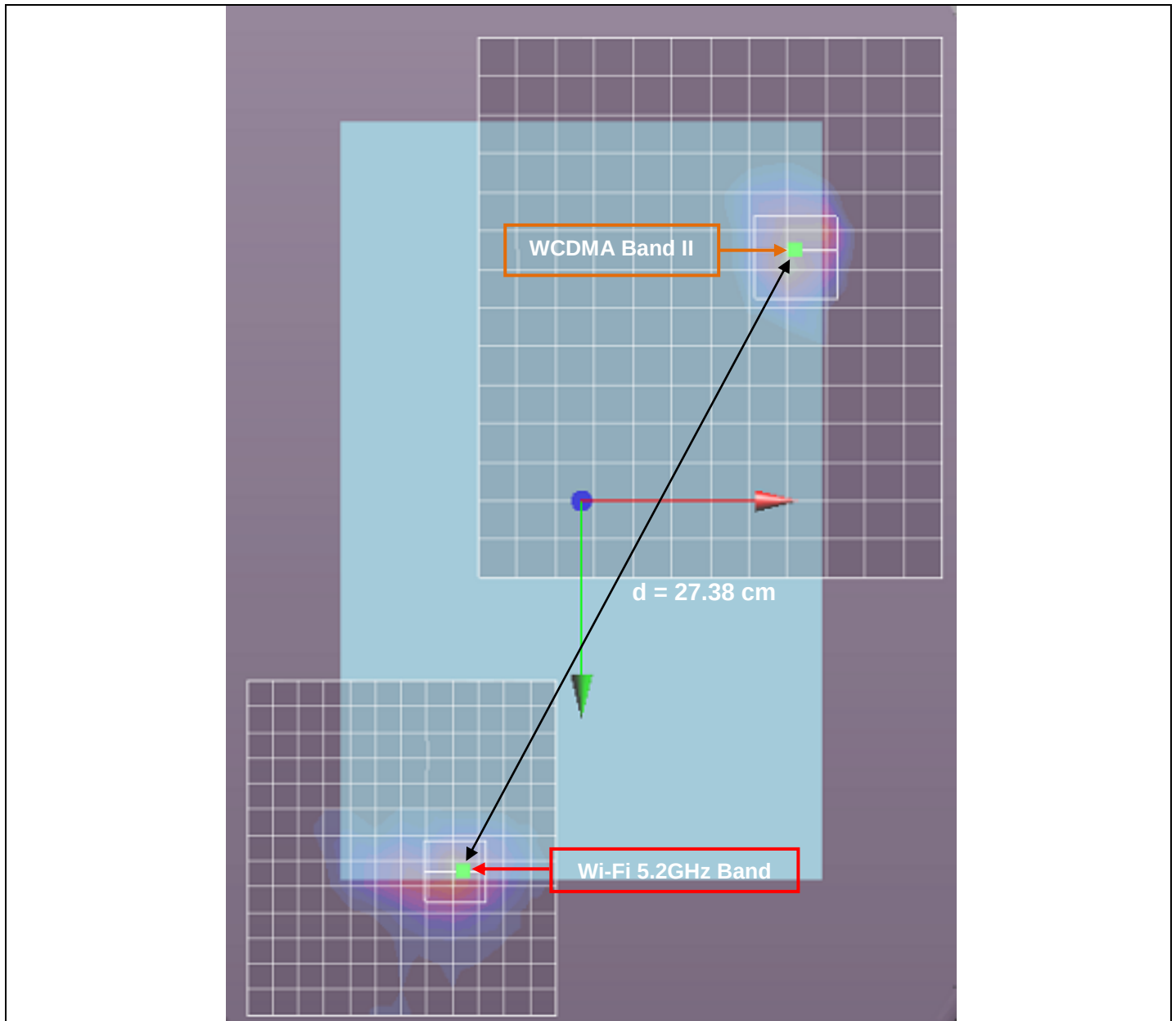


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.2GHz Band	3.65	0.0762	0.0829	-0.18
Separation distance (cm)				
18.06				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (7)

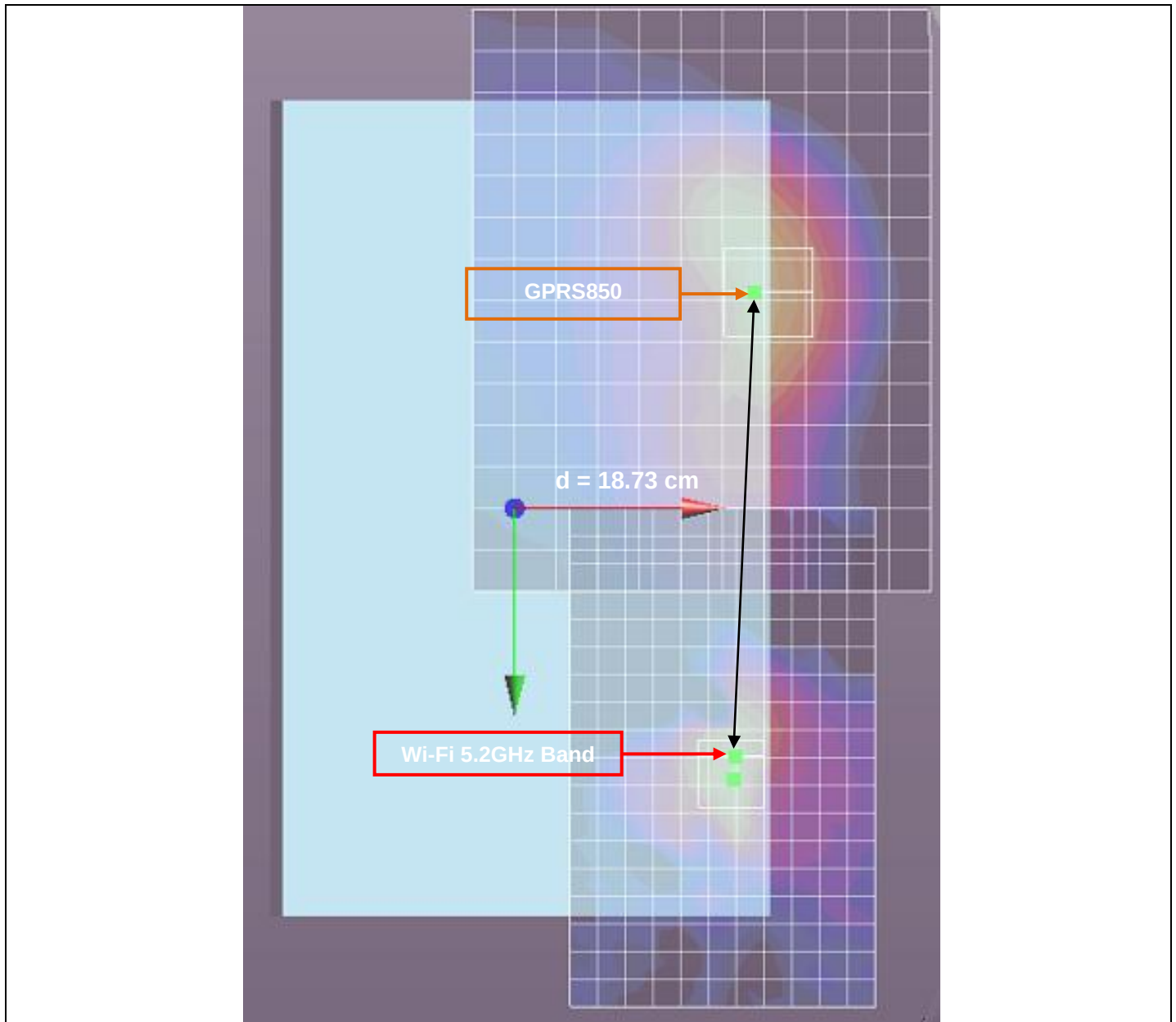


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
Wi-Fi 5.2GHz Band	3.46	-0.0458	0.144	-0.179
Separation distance (cm)				
27.38				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (8)

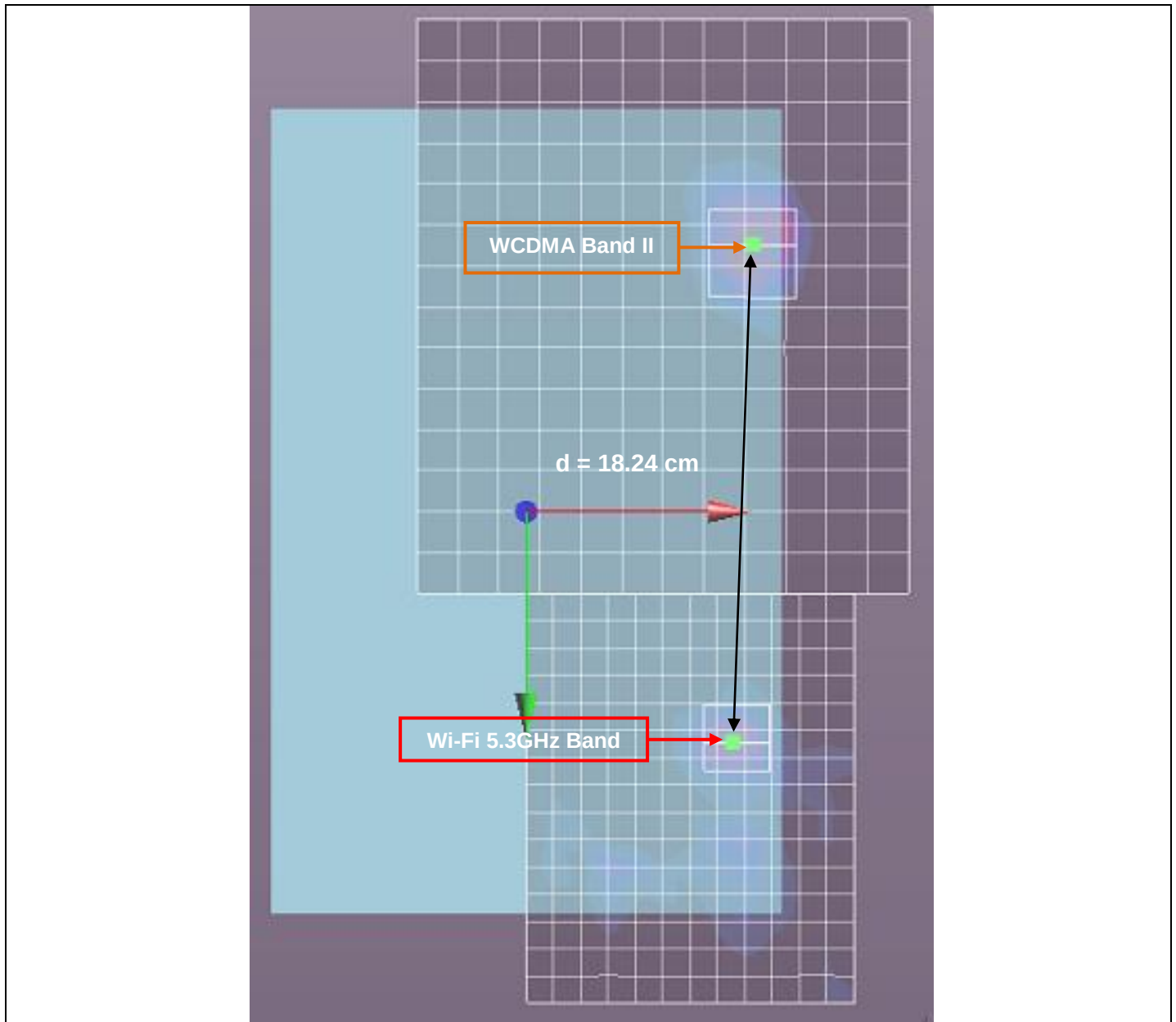


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	2.31	0.0867	-0.078	-0.181
WiFi 5.2GHz Band	2.58	-0.00826	0.0834	-0.181
Separation distance (cm)				
18.73				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (9)

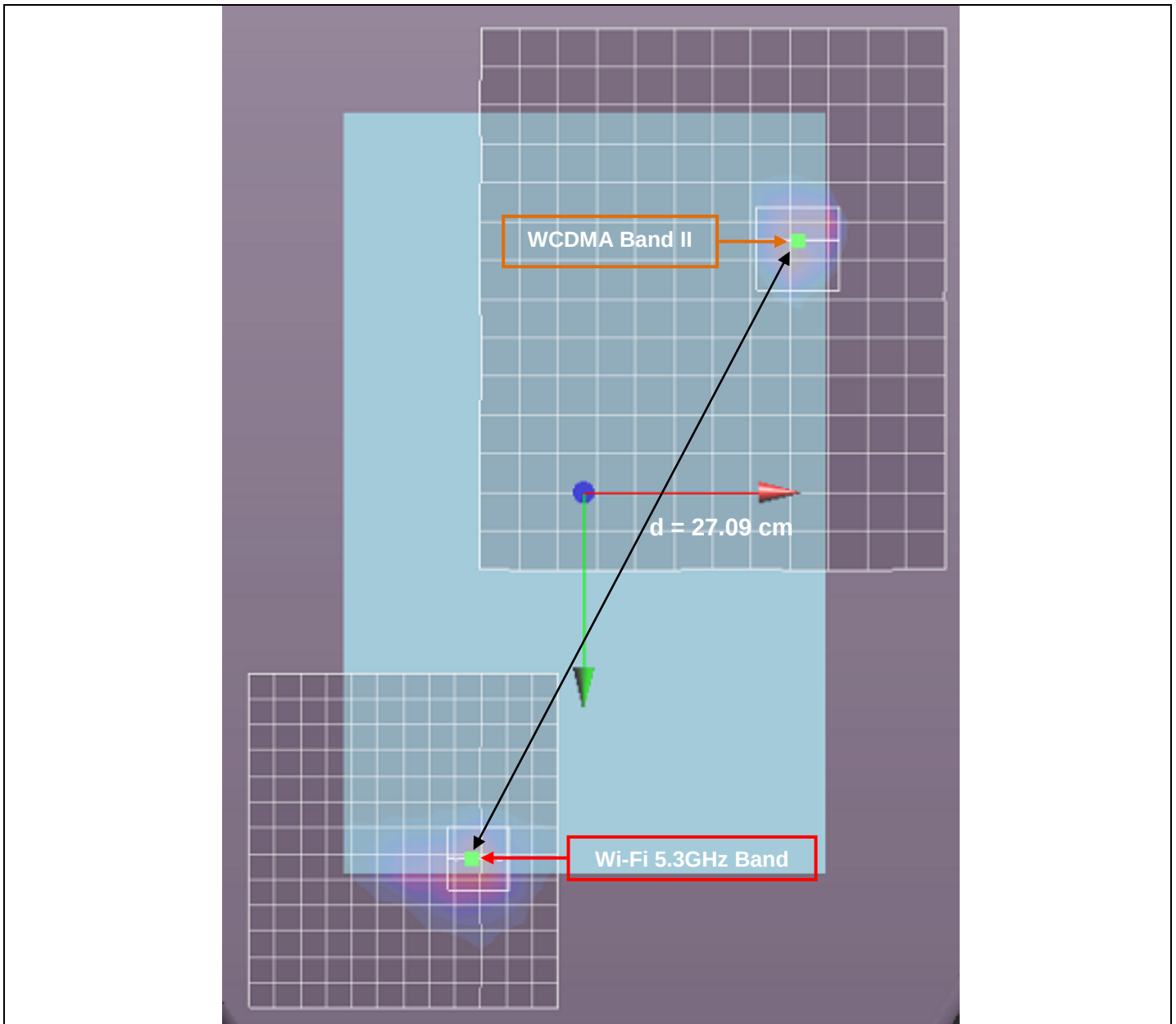


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.3GHz Band	5.81	0.0754	0.0846	-0.179
Separation distance				
(cm)				
18.24				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (10)

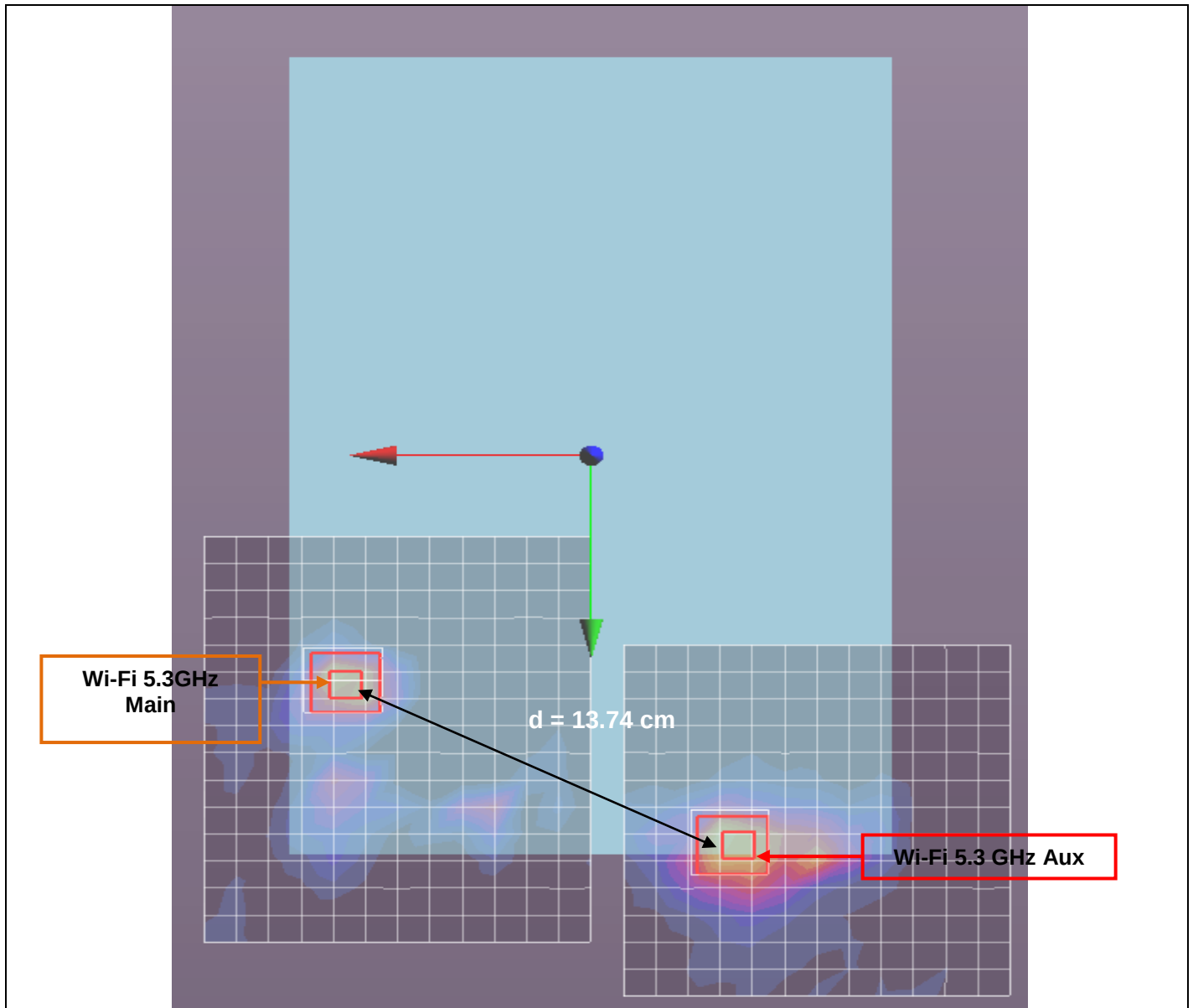


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.3GHz Band	3.22	-0.0433	0.142	-0.179
Separation distance				
(cm)				
27.09				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (11)



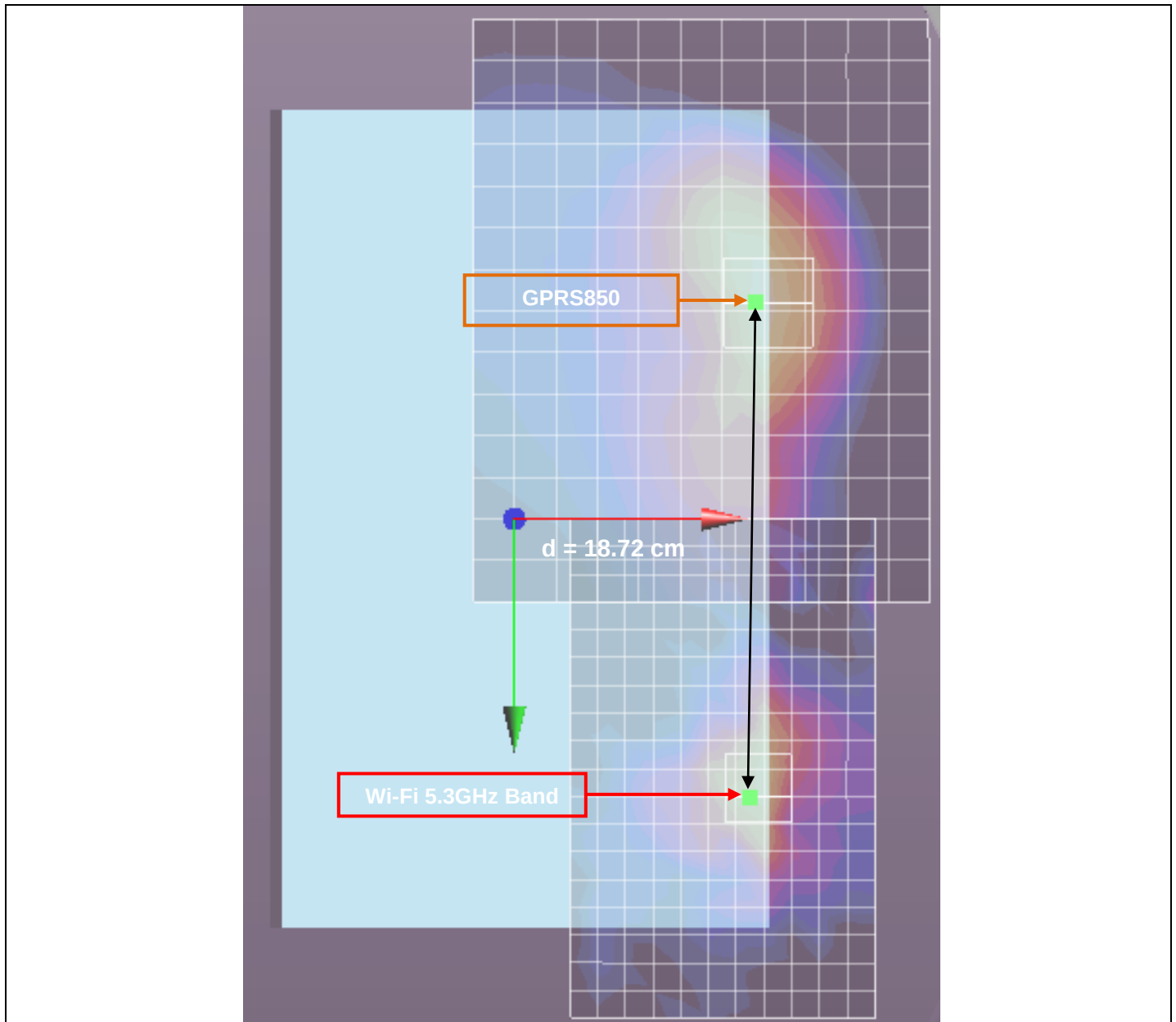
Mode	Peak SAR mW/g	X m	Y m	Z m
WiFi 5.3GHz Band Main	5.81	0.0754	0.0846	-0.179
WiFi 5.3GHz Band Aux	3.22	-0.0433	0.142	-0.179

Separation distance (cm)
13.19

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (12)

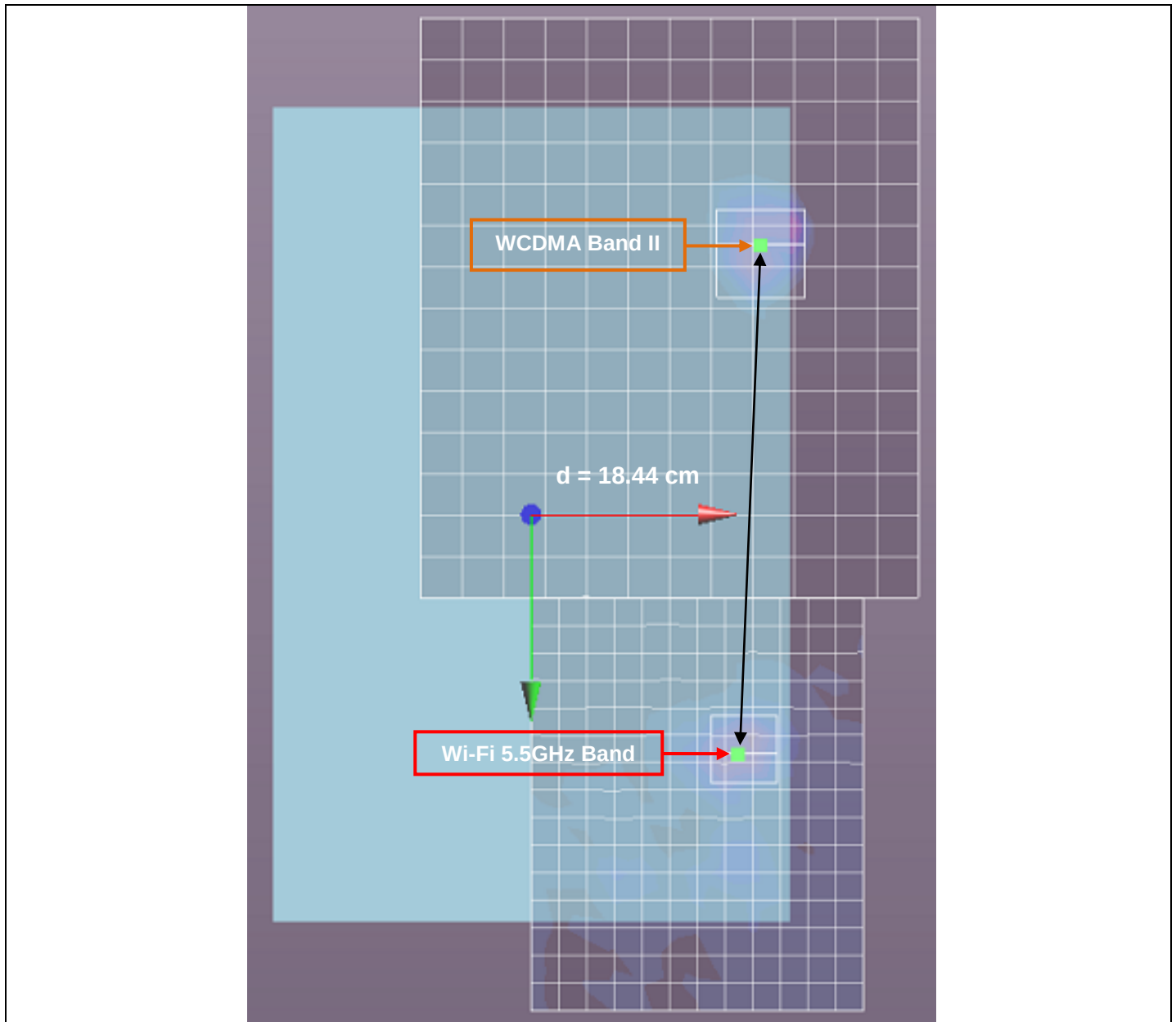


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	2.31	0.0867	-0.078	-0.181
WiFi 5.3GHz Band	3.12	-0.00785	0.0836	-0.181
Separation distance (cm)				
18.72				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (13)

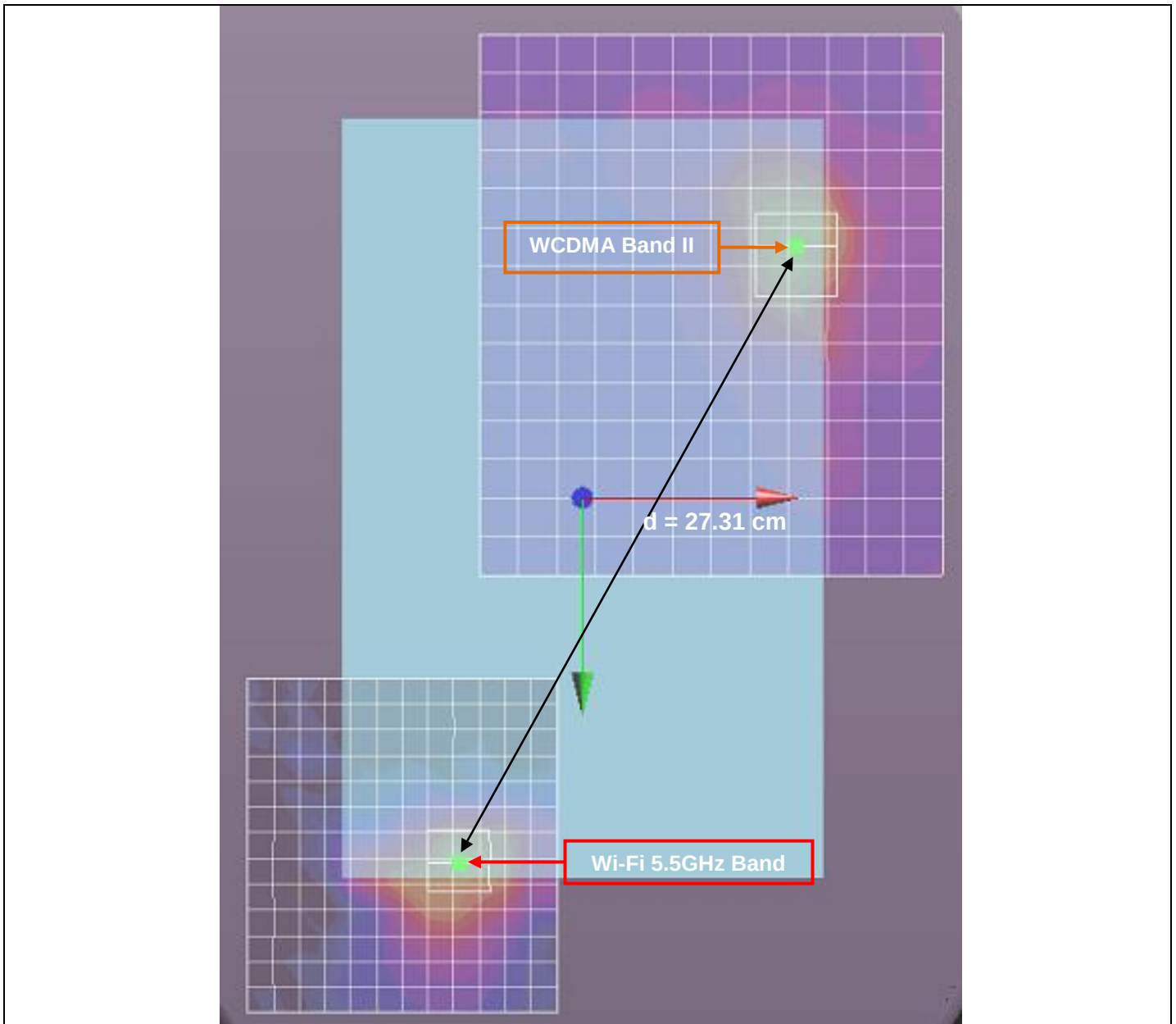


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.5GHz Band	7.18	0.0746	0.0866	-0.18
Separation distance				
(cm)				
18.44				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (14)

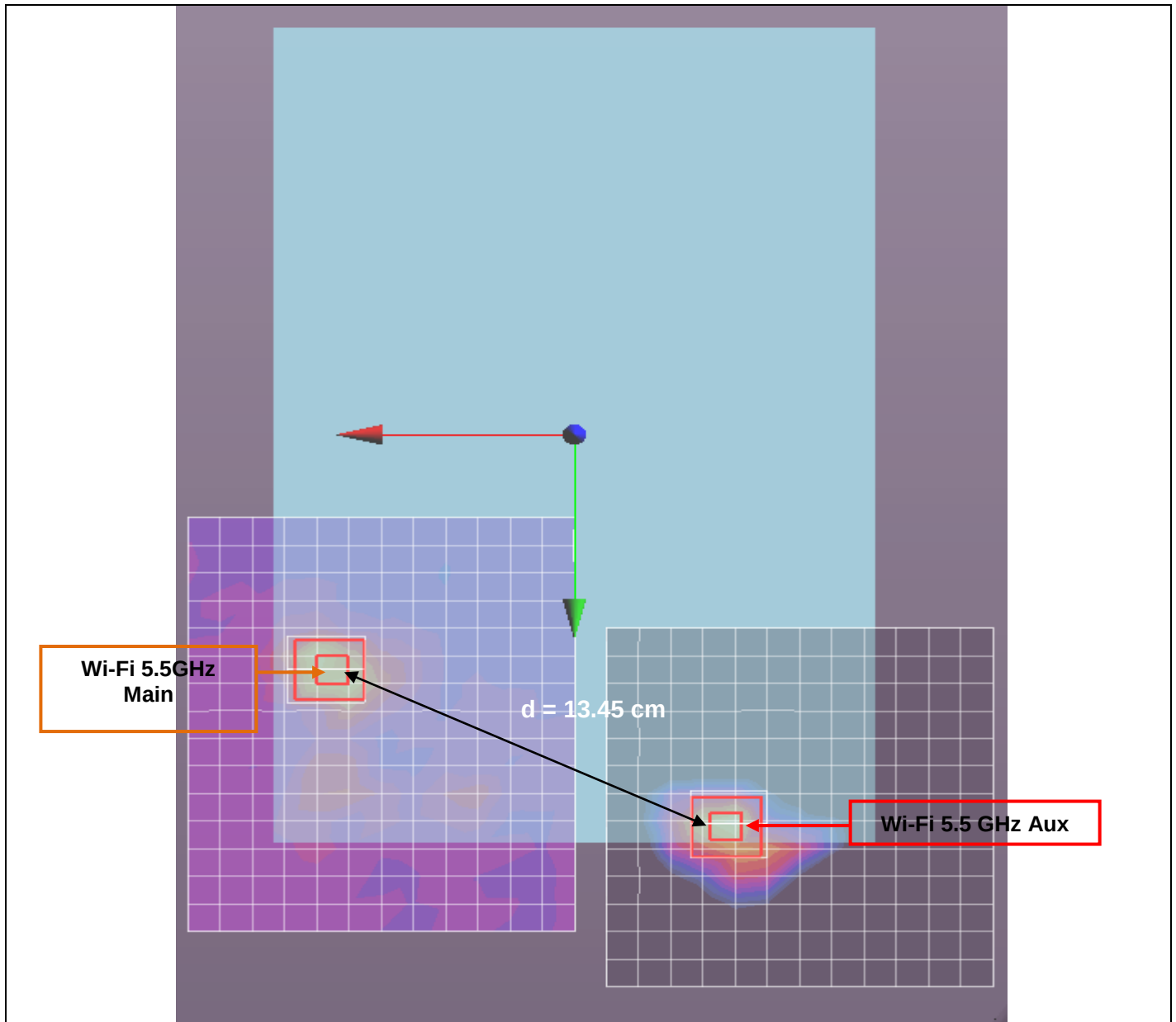


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.5GHz Band	4.76	-0.048	0.142	-0.179
Separation distance				
(cm)				
27.31				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (15)

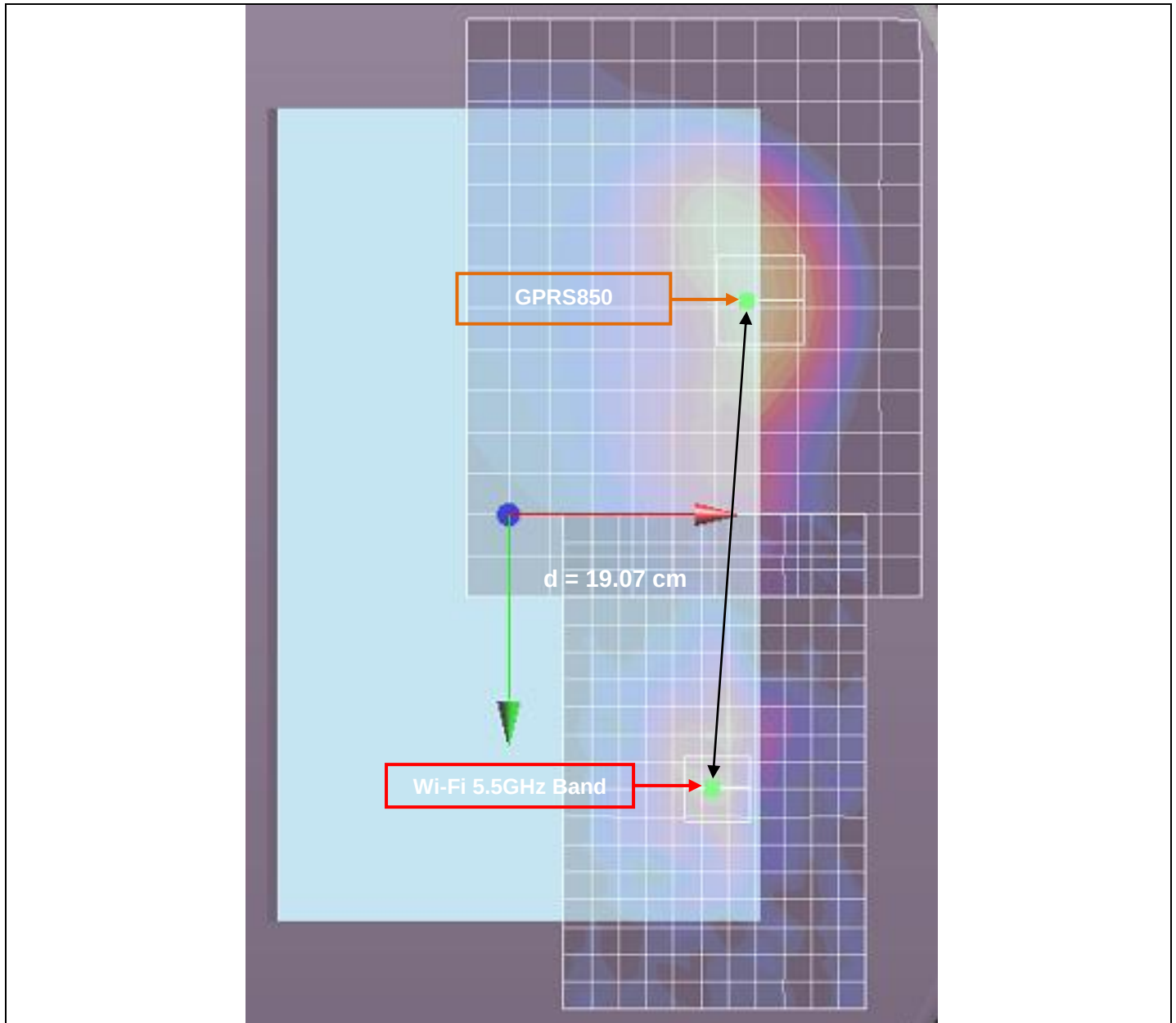


Mode	Peak SAR mW/g	X m	Y m	Z m
WiFi 5.5 GHz Band Main	7.18	0.0746	0.0866	-0.18
WiFi 5.5 GHz Band Aux	4.76	-0.048	0.142	-0.179
Separation distance (cm)				
13.45				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (16)



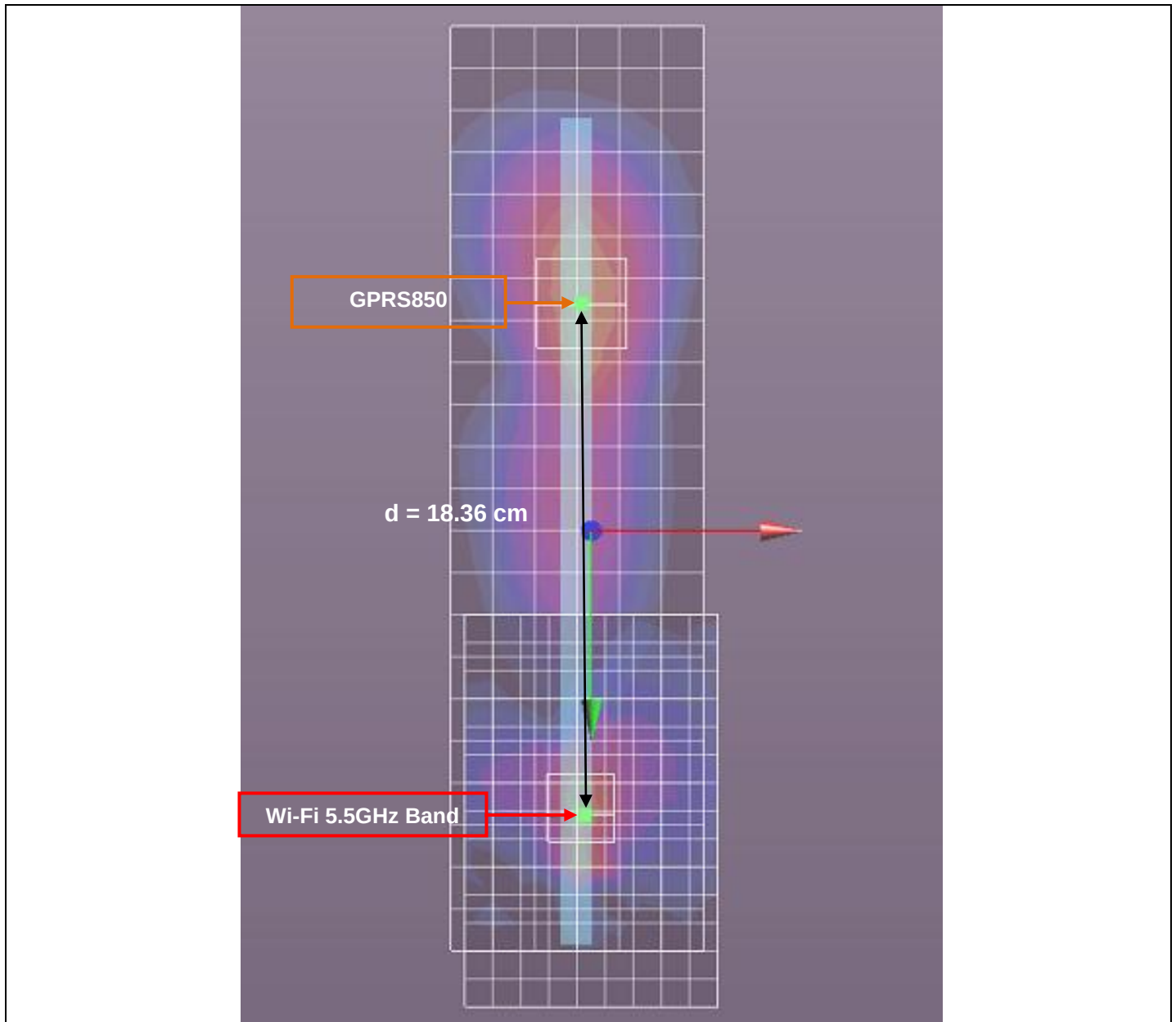
Mode	Peak SAR mW/g	X m	Y m	Z m
GPRS850	2.31	0.0867	-0.078	-0.181
WiFi 5.5GHz Band	6.54	-0.0113	0.0856	-0.181

Separation distance (cm)
19.07

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (17)

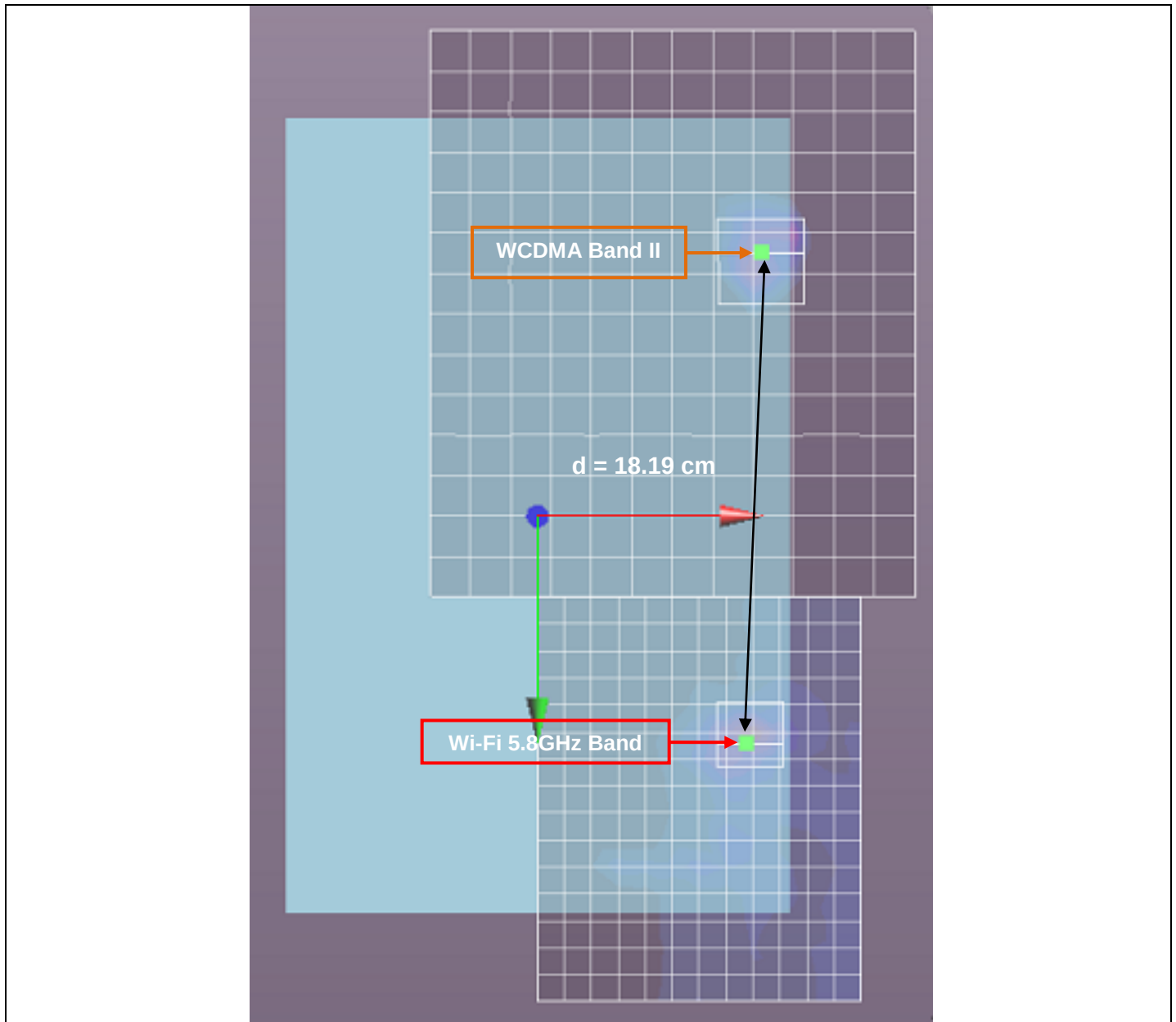


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	1.73	-0.00344	-0.0826	-0.182
WiFi 5.5GHz Band	7.71	-0.00234	0.101	-0.18
Separation distance				
(cm)				
18.36				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (18)

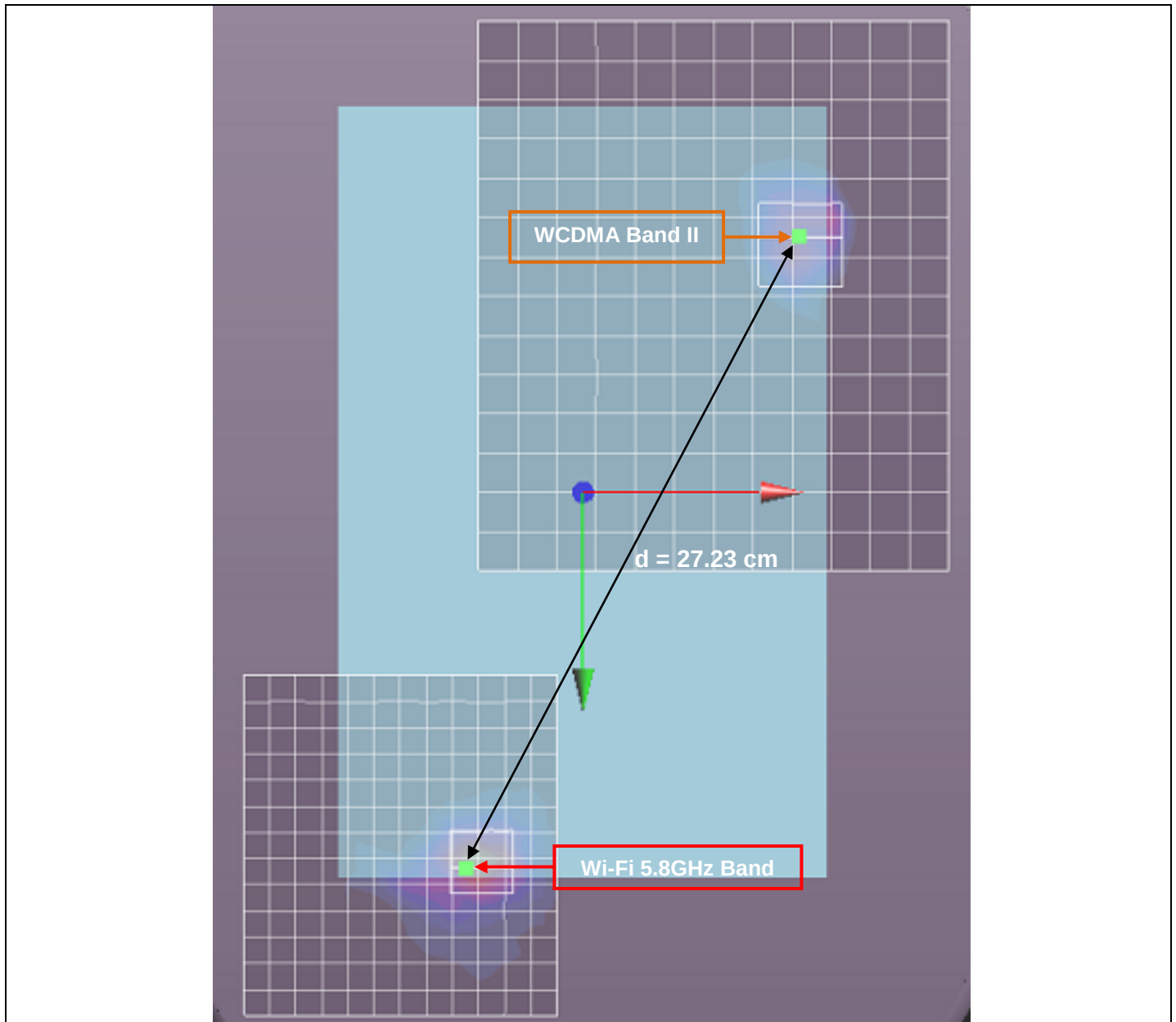


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
WiFi 5.8GHz Band	6.64	0.0774	0.0842	-0.18
Separation distance (cm)				
18.19				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (19)

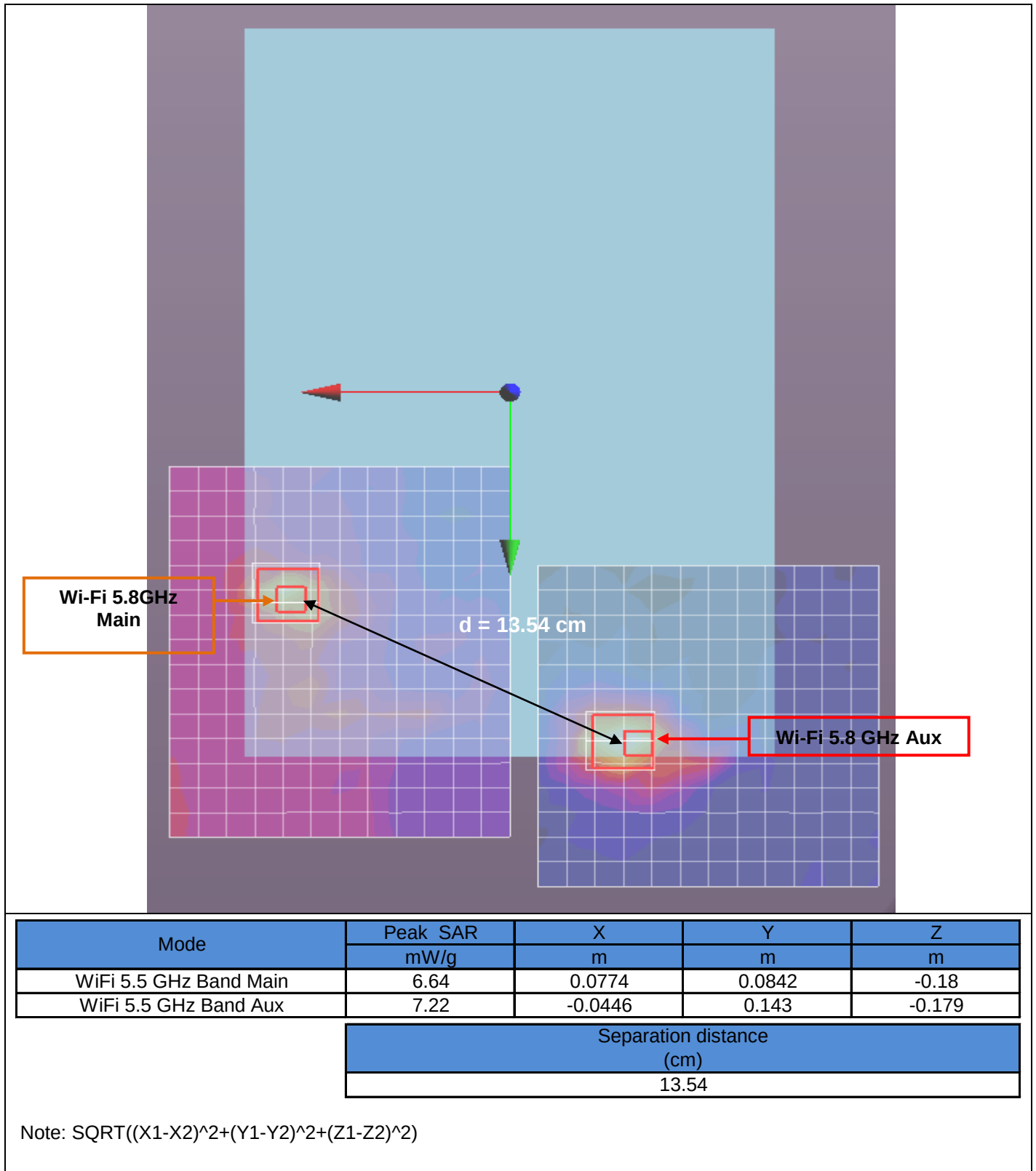


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
WCDMA Band II	2.62	0.083	-0.0976	-0.18
Wi-Fi 5.8GHz Band	7.22	-0.0446	0.143	-0.179
Separation distance				
(cm)				
27.23				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

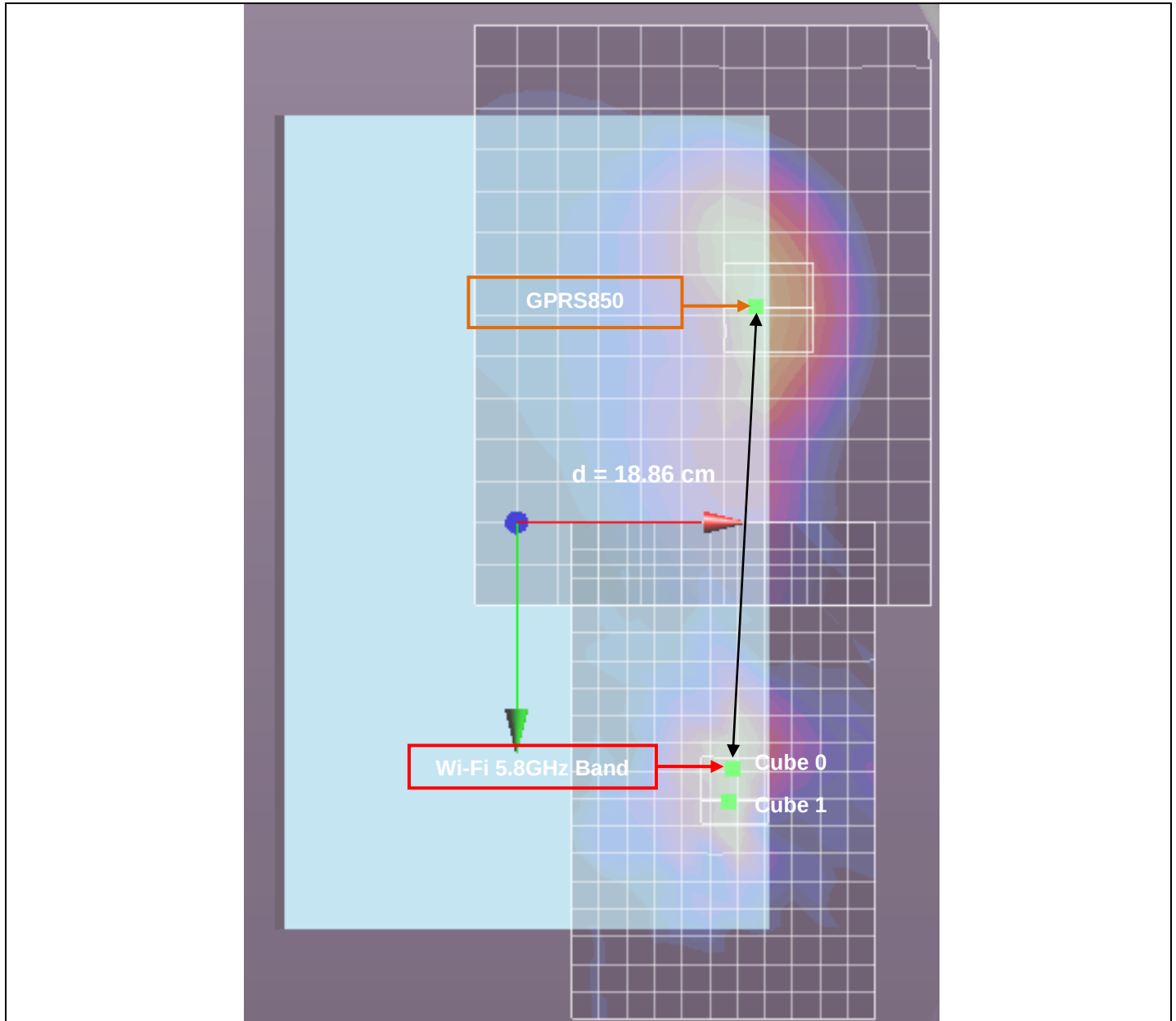
SAR Peak Location Separation Distance

Figure (20)



SAR Peak Location Separation Distance

Figure (21)

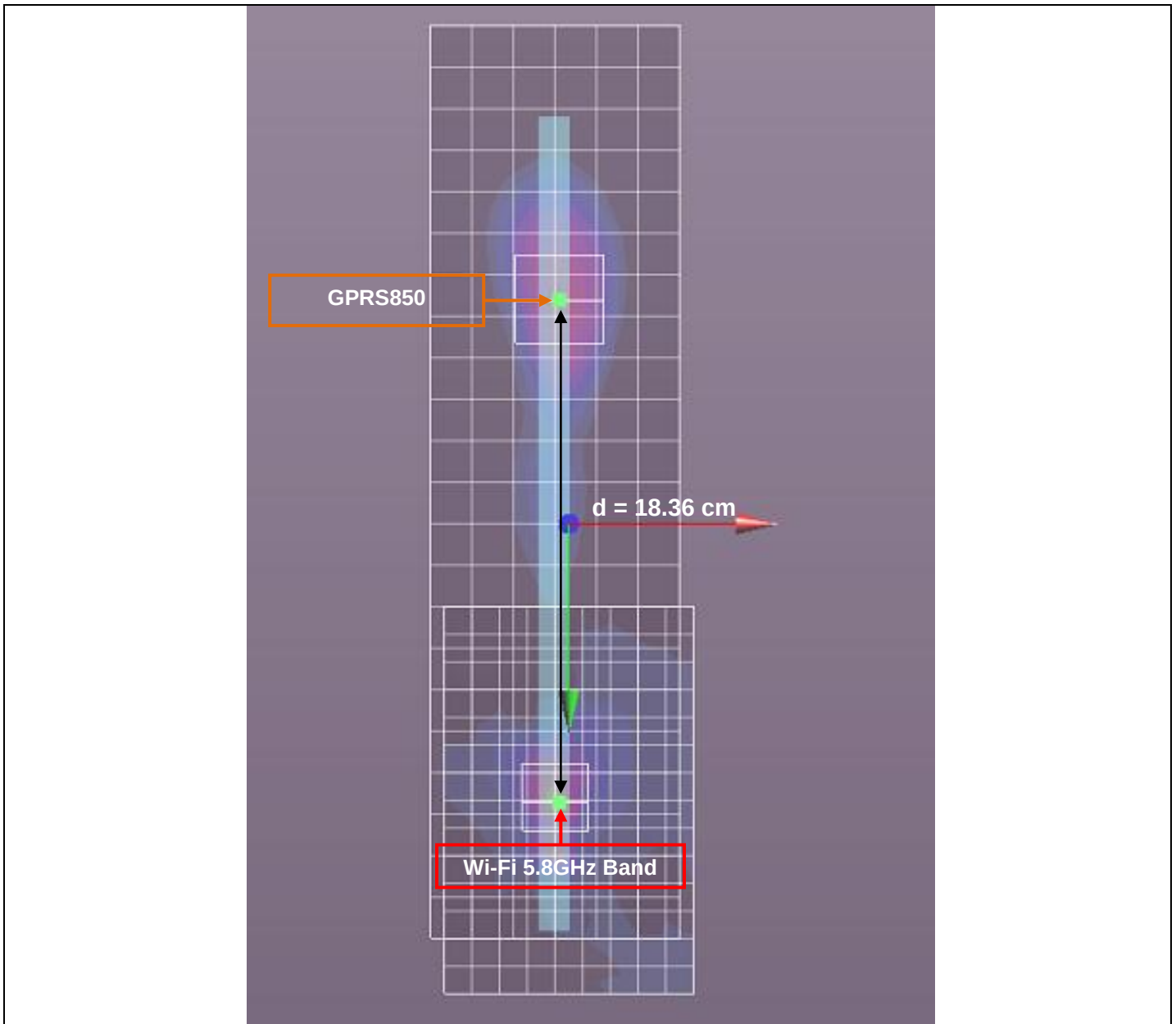


Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	2.31	0.0867	-0.078	-0.181
WiFi 5.8GHz Band	7.36	-0.00924	0.0844	-0.181
Separation distance (cm)				
18.86				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

SAR Peak Location Separation Distance

Figure (22)



Mode	Peak SAR	X	Y	Z
	mW/g	m	m	m
GPRS850	1.73	-0.00344	-0.0826	-0.182
WiFi 5.8GHz Band	10.7	-0.00336	0.101	-0.181
Separation distance				
(cm)				
18.36				

Note: $\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$

15. Appendixes

Refer to separated files for the following appendixes.

- 15.1. System Performance Check Plots**
- 15.2. SAR Test Plots for GSM850**
- 15.3. SAR Test Plots for GSM1900**
- 15.4. SAR Test Plots for WCDMA (UMTS) Band V**
- 15.5. SAR Test Plots for WCDMA (UMTS) Band II**
- 15.6. SAR Test Plots for Wi-Fi 2.4GHz Band**
- 15.7. SAR Test Plots for Wi-Fi 5GHz Bands**
- 15.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749**
- 15.9. Calibration Certificate for D835V2 - SN 4d002**
- 15.10. Calibration Certificate for D1900V2 - SN 5d043**
- 15.11. Calibration Certificate for D2450V2 - SN 748**
- 15.12. Calibration Certificate for D5GHzV2 - SN 1075**