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

SAR EVALUATION REPORT

For

Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio

Model: A1454
FCC ID: BCGA1454

Report Number: 12U14526-8A
Issue Date: 10/19/2012

Prepared for

APPLE INC.
1 INFINITE LOOP
CUPERTINO, CA 95014-2084

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/5/2012	Initial Issue	--
A	10/19/2012	1. Sec. 12.2: Added note regarding dipole calibration date. 2. Re-generated four 5 GHz WiFi plots (pages 4, 5, 12 and 13) with corrected probe calibration file. 3. Updated 5 GHz WiFi SAR values in section 13.10, 15.4 and 15.7 based on the item 1 above.	Sunny Shih

Table of Contents

1. Attestation of Test Results

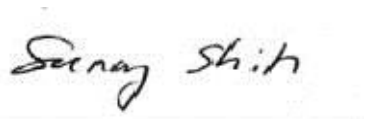
Applicant	Apple Inc.
DUT description	Model A1454, is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA / LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio
Model	A1454
Test device is	An identical prototype
Device category	Portable
Exposure category	General Population/Uncontrolled Exposure
Highest 1g SAR	Refer to Sec. 7.
Date tested	7/31/2012 - 9/20/2012

Applicable Standards	Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528-2003 & IEEE 1528a-2005	Pass

UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

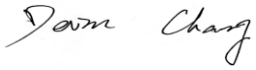
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For UL CCS By:



Sunny Shih
Engineering Leader
UL CCS

Tested By:



Devin Chang
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 & IEEE 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 D05 SAR for LTE Devices v02 **(Draft)**
- 248227 D01 SAR Meas for 802 11abg v01r02
- 616217 D04 SAR for laptop and tablets v01 **(Daft)**
- KDB Inquiry: Tracking Number 416104 for Proximity Sensor discussion
- KDB Inquiry: Tracking Number 583922 for EVDO Rev.B discussion

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
S-Parameter Network Analyzer	Agilent	8753ES	MY40001647	6	27	2013
Dielectronic Probe kit	HP	85070C	2569	N/A		
ENA Series Network Analyzer	Agilent	E5071B	MY42100131	2	11	2013
Dielectronic Probe kit	HP	85070E	594	N/A		
Synthesized Signal Generator	HP	8665B	3438A00633	2	22	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		
Base Station Simulator	R & S	CMU200	106301	6	6	2013
Base Station Simulator	R & S	CMU200	118339	5	20	2013
Base Station Simulator	R & S	CMW500	104245	12	14	2012
Base Station Simulator	R & S	CMW500	124593	7	1	2013
Base Station Simulator	Agilent	8960	GB42361452	4	4	2013
Thermometer	ERTCO	639-1S	8350	7	30	2013
E-Field Probe	SPEAG	EX3DV4	3686	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3772	2	16	2013
E-Field Probe	SPEAG	EX3DV4	3773	3	14	2013
Data Acquisition Electronics	SPEAG	DAE4	1239	6	6	2013
Data Acquisition Electronics	SPEAG	DAE4	1258	3	8	2013
Data Acquisition Electronics	SPEAG	DAE4	1259	2	13	2013
System Validation Dipole	SPEAG	D750V3	1024	4	4	2013
System Validation Dipole	SPEAG	D835V2	4d002	3	6	2013
System Validation Dipole	SPEAG	D835V2	4d117	4	10	2013
System Validation Dipole	SPEAG	D1750V2	1050	4	19	2013
System Validation Dipole	SPEAG	D1900V2	5d140	4	18	2013
System Validation Dipole	SPEAG	D2450V2	748	2	7	2013
System Validation Dipole	SPEAG	D5GHzV2	1075	2	14	2013
System Validation Dipole	SPEAG	D5GHzV2	1003	8	23	2012
Power Meter	R & S	NRP	100673	5	5	2013
Power Sensor	R & S	NRP - Z23	100168	5	5	2013
Power Meter	Agilent	N1912A	MY52310061	7	5	2013
Power Sensor Ch A	Agilent	N1921A	MY52260009	7	5	2013
Power Sensor Ch B	Agilent	N1921A	MY52270022	7	21	2013
Power Meter	Agilent	N1912A	MY50001018	8	10	2013
Power Sensor Ch A	Agilent	N1921A	MY52020011	1	17	2013
Power Sensor Ch B	Agilent	N1921A	MY52200012	7	24	2013

4.2. Measurement Uncertainty

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

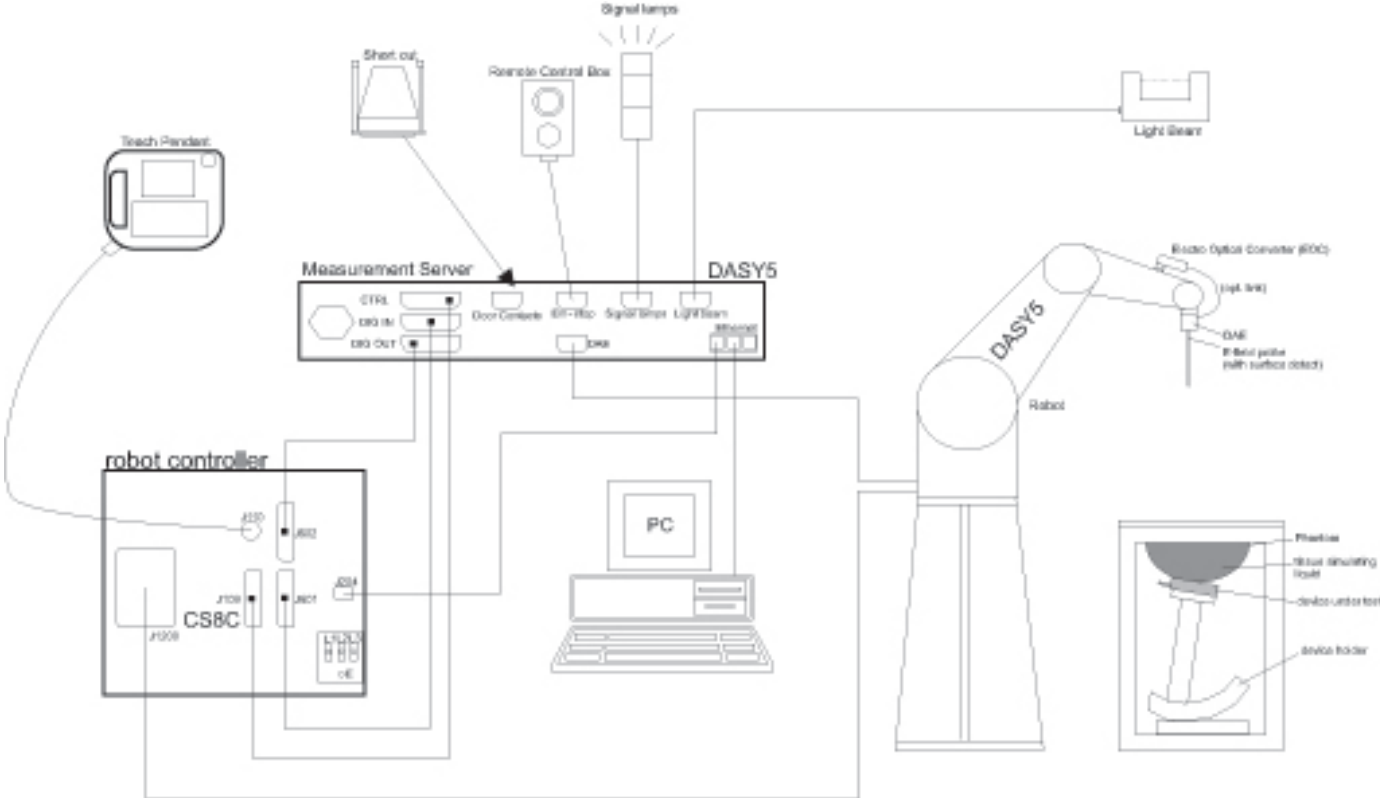
Component	Error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	**6.00**	Normal	1	1	6.00
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	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	**-4.96**	Normal	1	0.64	-3.17
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	**4.64**	Normal	1	0.6	2.78
				Combined Standard Uncertainty Uc(y) =	10.62
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	21.23 %
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =	1.67 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	**4.87**	Normal	1	0.64	3.12
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	**-6.78**	Normal	1	0.6	-4.07
				Combined Standard Uncertainty Uc(y), %:	11.64
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =	22.81 %
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =	1.78 dB

5. Measurement System Description and Setup

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



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

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01 (Draft)

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01 (Draft)

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

6.2. Volume Scan Procedures

Step 1: Repeat Step 1-4 in Section 6.1

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

Step 3: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

7. Summary of Highest 1g SAR Results

Worst Case SAR data for each Frequency Band

FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
22	824-849 MHz	1.18 W/kg (Body Rear w/ 0 mm distance)	1.6 W/kg
24	1850-1910 MHz	1.16 W/kg (Body Rear w/ 0 mm distance)	
27 (LTE Band 2)	1850-1910 MHz	1.19 W/kg (Body Rear w/ 0 mm distance)	
27 (LTE Band 4)	1710–1755 MHz	1.17 W/kg (Body Rear w/ 0 mm distance)	
27 (LTE Band 5)	824-849 MHz	1.19 W/kg (Body Rear w/ 0 mm distance)	
27 (LTE Band 17)	704–716 MHz	1.14 W/kg (Body Rear w/ 0 mm distance)	
15.247 (WiFi)	2412-2462 MHz	1.05 W/kg (Body Edge 3 w/ 0 mm distance)	
15.247 (BT)	2402-2480 MHz	0.356 W/kg (Body Edge 3 w/ 0 mm distance)	
15.407	5150-5250 MHz	0.836 W/kg (Body Edge 3 w/ 0 mm distance)	
	5250-5350 MHz	1.11 W/kg (Body Edge 3 w/ 0 mm distance)	
	5500-5700 MHz	1.14 W/kg (Body Edge 3 w/ 0 mm distance)	
15.247	5725-5850 MHz	1.19 W/kg (Body Edge 3 w/ 0 mm distance)	
Simultaneous transmission condition		1.546 W/kg (refer to Section 15.7) (The highest SAR across exposure conditions)	

Notes:

- Edge 1 = Top Edge
- Edge 2 = Right Edge
- Edge 3 = Bottom Edge
- Edge 4 = Left Edge
- Edge 1 and Edge 2 Tilt 40 deg = Top-Edge/Right Corner Tilt 40 deg
- Edge 2 Tile 35 deg = Right Edge Tile 35 deg

8. Device Under Test

Model A1454, is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA / LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio	
Exposure conditions	Body Exposure with all surfaces and edges. Refer to Section 9 for detailed.

8.1. Band and Air Interfaces

Tx Frequencies	• GSM850: 824 - 849 MHz • GSM1900: 1850 - 1910 MHz • W-CDMA Band II: 1850 - 1910 MHz • W-CDMA Band V: 824 - 849 MHz • LTE Band 2: 1850 - 1910 MHz • LTE Band 4: 1710 - 1755 MHz • LTE Band 5: 824 - 849 MHz • LTE Band 17: 704 - 716 MHz • 802.11a/b/g/n: 2412 - 2462 MHz 5180 – 5825 MHz • Bluetooth: 2402 - 2480 MHz
Mode	• GSM/GPRS/EGPRS • UMTS Rel 99 • HSDPA (Rel 7, CAT 14) • HSUPA (Rel 6, CAT 6) • DC-HSDPA (Rel 8, CAT 24) • HSPA+ (Rel 6, CAT 6) • 802.11a/b/g/n HT20/HT40(a mode only) • Bluetooth 4.0 LE

8.2. Hotspot (Wireless router) Function

The device is capable of personal hotspot mode. The hotspot mode can be enabled by the users by the following this sequence of soft-keys; Settings > General > Network > Enable Personal Hotspot.

WiFi Hotspot mode permits the device to share its cellular data connection with other 2.4 GHz WiFi-enabled devices (channels 1 - 11). WiFi Hotspot mode is not supported in 5.0 GHz WiFi band.

8.3. Simultaneous Transmission

8.3.1. Body Exposure Condition

A1454 Cellular + Wi-Fi, Cellular+ BT Simultaneous Transmission Configurations

User usage	SAR Test distance	Mode	Mode of Operation	Band	LTE	GPRS/ EGPRS	WCDMA	DC-HSDPA / HSPA+	Wi-Fi 5GHz	Wi-Fi 2.4GHz	BT 2.4GHz
Body SAR	0 cm	Cellular + 2.4GHz WiFi	GPRS/ EGPRS	850	No	Yes	No	No	No	Yes	No
			GPRS/ EGPRS	1900	No	Yes	No	No	No		No
			WCDMA	835	No	No	Yes	No	No		No
			WCDMA	1900	No	No	Yes	No	No		No
			DC-HSDPA	835	No	No	No	Yes	No		No
			DC-HSDPA	1900	No	No	No	Yes	No		No
			HSPA+	835	No	No	No	Yes	No		No
			HSPA+	1900	No	No	No	Yes	No		No
			LTE data	710	Yes	No	No	No	No		No
			LTE data	850	Yes	No	No	No	No		No
			LTE data	1700	Yes	No	No	No	No		No
			LTE data	1900	Yes	No	No	No	No		No
		Cellular+5GHz Wifi / Cellular+BT / 5GHz Wifi+BT	GPRS/ EGPRS	850	No	Yes	No	No	Yes	No	Yes
			GPRS/ EGPRS	1900	No	Yes	No	No		No	
			WCDMA	835	No	No	Yes	No		No	
			WCDMA	1900	No	No	Yes	No		No	
			DC-HSDPA	835	No	No	No	Yes		No	
			DC-HSDPA	1900	No	No	No	Yes		No	
			HSPA+	835	No	No	No	Yes		No	
			HSPA+	1900	No	No	No	Yes		No	
			LTE data	710	Yes	No	No	No		No	
			LTE data	850	Yes	No	No	No		No	
			LTE data	1700	Yes	No	No	No		No	
			LTE data	1900	Yes	No	No	No		No	

8.3.2. Wireless Router (hotspot) Exposure Condition

A1454 Hotspot simultaneous transmission

User usage	SAR Test distance	Mode	Mode of Operation	Band	LTE	GPRS/ EGPRS	WCDMA	DC-HSDPA / HSPA+	Wi-Fi HOTSPOT 2.4GHz Only)	BT 2.4GHz
Hotspot	0 cm	Cellular + 2.4GHz Wi-Fi	GPRS/ EGPRS	850	No	Yes	No	No	Yes	No
			GPRS/ EGPRS	1900	No	Yes	No	No		No
			WCDMA	850	No	No	Yes	No		
			WCDMA	1900	No	No	Yes	No		
			DC-HSDPA	835	No	No	No	Yes		No
			DC-HSDPA	1900	No	No	No	Yes		No
			HSPA+	835	No	No	No	Yes		No
			HSPA+	1900	No	No	No	Yes		No
			LTE data	710	Yes	No	No	No		No
			LTE data	850	Yes	No	No	No		No
			LTE data	1700	Yes	No	No	No		No
			LTE data	1900	Yes	No	No	No		No

8.4. 941225 D05 SAR for LTE Devices v02 (Draft)

<table>
<tr><th>#</th><th>Description</th><th>Information</th></tr>
<tr><td>A</td><td>List the frequency range and channel bandwidths used in each LTE band; 1.4, 3, 5, 10, 15, 20 MHz, etc.</td><td>
<table>
<tr><td colspan="2">Band 2</td></tr>
<tr><td>Tx: 1850 - 1910 MHz</td><td>Rx: 1930 - 1990 MHz</td></tr>
<tr><td colspan="2">Band 4</td></tr>
<tr><td>Tx: 1710 – 1755 MHz</td><td>Rx: 2100 – 2155 MHz</td></tr>
<tr><td colspan="2">Band 5</td></tr>
<tr><td>Tx: 824 - 849 MHz</td><td>Rx: 869 - 894 MHz</td></tr>
<tr><td colspan="2">Band 17</td></tr>
<tr><td>Tx: 704 – 716 MHz</td><td>Rx: 734 – 746 MHz</td></tr>
<tr><td colspan="2">Channel Bandwidths: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz</td></tr>
</table>
</td></tr>
<tr><td>B</td><td>Identify the high, middle and low (H, M, L) channel numbers and channel frequencies for each LTE bandwidth and frequency band</td><td>
<table>
<tr><td rowspan="2">Band 2</td><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>18700 /1860</td><td>18675/ 1857.5</td><td>18650/ 1855</td><td>18625/ 1852.5</td><td>18615/ 1851.5</td><td>18607/ 1850.7</td></tr>
<tr><td>Mid</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td></tr>
<tr><td>High</td><td>19100/ 1900</td><td>19125/ 1902.5</td><td>19150/ 1905</td><td>19175/ 1907.5</td><td>19184/ 1908.4</td><td>19192/ 1909.2</td></tr>
<tr><td rowspan="2">Band 4</td><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>20050/ 1720</td><td>20025/ 1717.5</td><td>20000/ 1715</td><td>19975/ 1712.5</td><td>19965/ 1711.5</td><td>19957/ 1710.7</td></tr>
<tr><td>Mid</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td></tr>
<tr><td>High</td><td>20300/ 1745</td><td>20325/ 1747.5</td><td>20350/ 1750</td><td>20375/ 1752.5</td><td>20384/ 1753.4</td><td>20392/ 1754.2</td></tr>
<tr><td rowspan="2">Band 5</td><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td></td><td>20450/ 829</td><td>20425/ 826.5</td><td>20415/ 825.5</td><td>20407/ 824.7</td></tr>
<tr><td>Mid</td><td></td><td></td><td>20525/ 836.5</td><td>20525/ 836.5</td><td>20525/ 836.5</td><td>20525/ 836.5</td></tr>
<tr><td>High</td><td></td><td></td><td>20600/ 844</td><td>20625/ 846.5</td><td>20634/ 847.4</td><td>20642/ 848.2</td></tr>
<tr><td rowspan="2">Band 17</td><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td></td><td>23780/ 709</td><td>23755/ 706.5</td><td></td><td></td></tr>
<tr><td>Mid</td><td></td><td></td><td>23790/ 710</td><td>23790/ 710</td><td></td><td></td></tr>
<tr><td>High</td><td></td><td></td><td>23800/ 711</td><td>23825/ 713.5</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>C</td><td>Descriptions of the LTE transmitter and antenna implementation, and identify if the transmitter operates independently of the other wireless transmitters in the device; i.e., whether the LTE hardware, components and/or antenna(s) are shared with other transmitters.</td><td>A single antenna is used for LTE and other wireless modes (GPRS/EGPRS/UMTS) for both Transmit and Receive.
A Secondary antenna is used for LTE and other wireless modes (GPRS/EGPRS/UMTS) for Receive Only. This device does not support DTM.</td></tr>
</table>

941225 D05 SAR for LTE Devices v02 (Continued)

<table>
<tr><th>#</th><th>Description</th><th>Information</th></tr>
<tr><td>D</td><td>Identify the voice and data transmission requirements for all LTE operating modes and exposure conditions, for standalone and simultaneous transmission, with respect to the required head and body test configurations, antenna locations, handset flip or slide cover positions, antenna diversity requirements, etc.</td><td>Data Device Only.
Exposure Conditions:
Body – Rear, Bottom-edge, Left-edge, Top-edge, and Right-edge of the DUT at a separation distance of 0 cm from the flat phantom.
With Proximity Sensor disabled
Top-Edge/Right Corner of the DUT with separation distance of 0 mm and 40° angle to the flat body phantom. At the first-stage power back-off.
Rear-Surface/Right Corner of the DUT with separation distance of 0 mm and 35° angle to the flat body phantom. At the first-stage power back-off.
Rear surface of the DUT at the separation distance of 14 mm to the flat phantom. No Power back-off.
Top-edge of the DUT at the separation distance of 14 mm to the flat phantom. No Power back-off.</td></tr>
<tr><td>E</td><td>Identify if Maximum Power Reduction (MPR) is implemented as an optional or permanent feature, i.e., built-in by design:
MPR may be considered during SAR testing only when the maximum output power is permanently limited by the MPR implemented within the device, according to the RB (resource block) configurations specified in 3GPP/LTE standards.
Regardless of network requirements, only those RB configurations allowed (see 3GPP standards) for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.
A-MPR (additional MPR) must be disabled during SAR testing.</td><td>As per 3GPP TS 36.101 v11.0.0 (2012-03)
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3<table><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table>A-MPR is supported by design, but is disabled for SAR testing.
A-MPR is disabled, by using Network Setting value of NS_01.</td></tr>
<tr><td>F</td><td>When power reduction is required for one or more LTE modes to satisfy SAR compliance for simultaneous transmission or other equipment certification and operating requirements, maximum average conducted output power measurement results for each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands are required.</td><td>Yes. A Proximity sensor for cellular power reduction is implemented in the device to address RF exposure compliance when the cellular antenna is positioned close to the user’s body or other objects. See Section 8.4 for details.</td></tr>
</table>

941225 D05 SAR for LTE Devices v02 (Continued)

#	Description	Information
G	Based on the design specifications and other information available to the manufacturer, through measurement and analysis during product development, when the maximum output power for different RB allocations and RB offset conditions within a channel bandwidth, modulation, or across the channels in a frequency band varies by more than 1 dB, a KDB inquiry is required to confirm if the required test channels are appropriate for SAR testing or if a different set of required test channels is necessary.	Refer to the Section 10
H	The maximum average conducted output power should be measured for the required test channels, for each channel bandwidth and uplink modulation, in each frequency band, using the following configurations to support the SAR test reduction and exclusion applied in the evaluation: 1. 100% RB allocation 2. 1 RB and also 50% RB allocation, offset to the upper and lower edges of each required test channel and also to the middle of the channel bandwidth	Refer to the Section 10
I	Spectrum plots should be included in SAR reports to demonstrate the tested RB allocations have been established correctly at the maximum output power conditions.	N/A

8.5. Power Reduction by Proximity Sensing

A proximity sensor for power reduction is implemented in this device to address RF exposure compliance when the cellular antenna is positioned close to the user's body. The sensor's mechanical structure is designed to fit within the enclosure design used in this device and also extended around the edge and top of the antenna element in order to optimize sensitivity in these orientations. This design combines the antenna printed directly on a plastic part and proximity sensor FPC (Flexible Printed Circuit) bonded together into one piece.

8.5.1. Proximity Sensor Detection Area

The proximity sensor is combined with the primary antenna in a single FPC (Flexible Printed Circuit), therefore, the proximity sensor occupies the same area as the primary antenna.

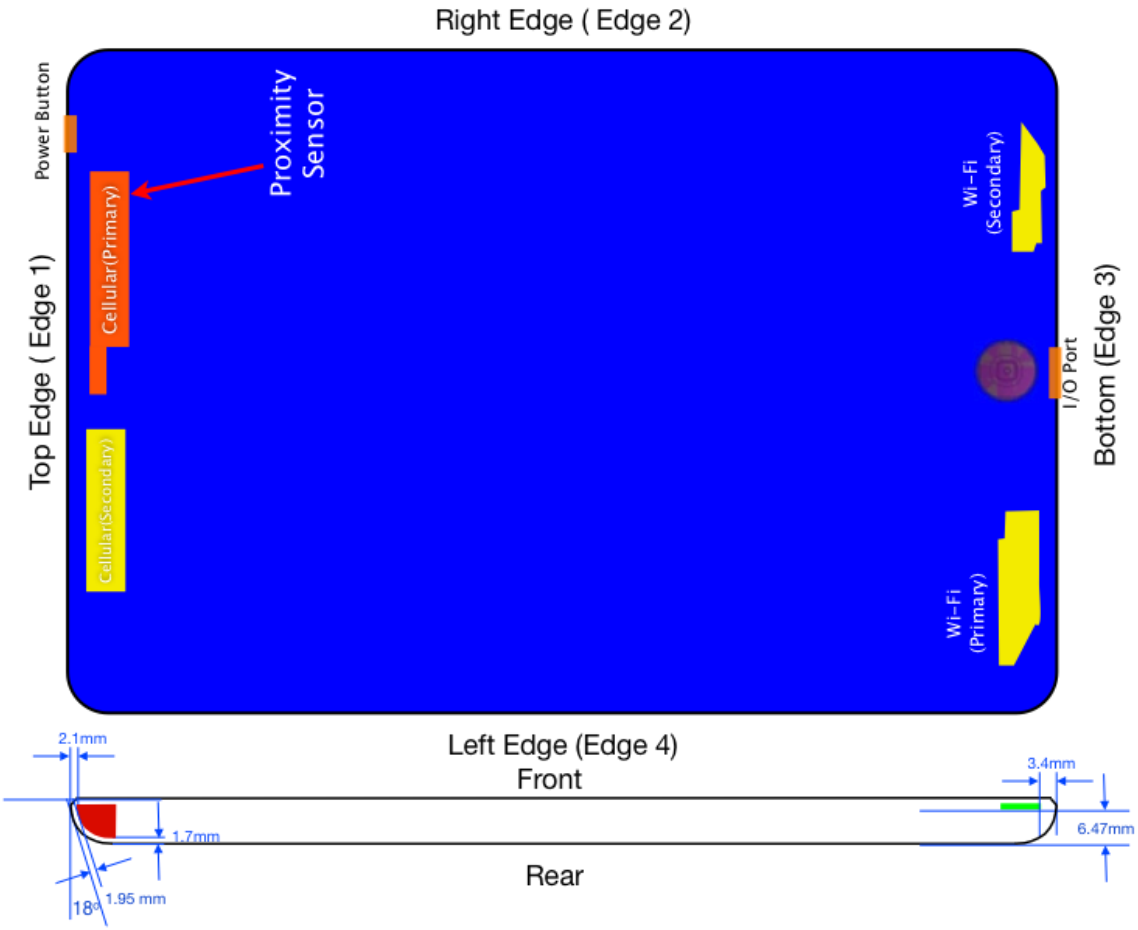
A two-step power back-off mechanism is implemented in this device. For design and testing purposes Top-Edge, Front Surface, and Rear Surface are chosen as the dimensions of interest.

The proximity sensor is triggered at the following conservative distances when:

- the Top-edge of the device is 20 mm for the first-stage trigger, and 14mm for the second-stage trigger, from the phantom.
- the Rear Surface of the device is 20 mm for the first-stage trigger, and 14mm for the second-stage trigger, from the phantom.

The expected capacitance trigger values are programmed in each device for each power back-off stage. Capacitance trigger value for first stage (t1) is C1, and for second stage (t2) is C2. C1 is always smaller than C2.

When a certain object or human body approaches the DUT, if the measured capacitance is lower than C1, proximity sensor is not triggered. If the measured capacitance is higher than C1, but lower than C2, first power back-off (P1) is triggered. If the measured capacitance is higher than C2, second power back-off (P2) is triggered



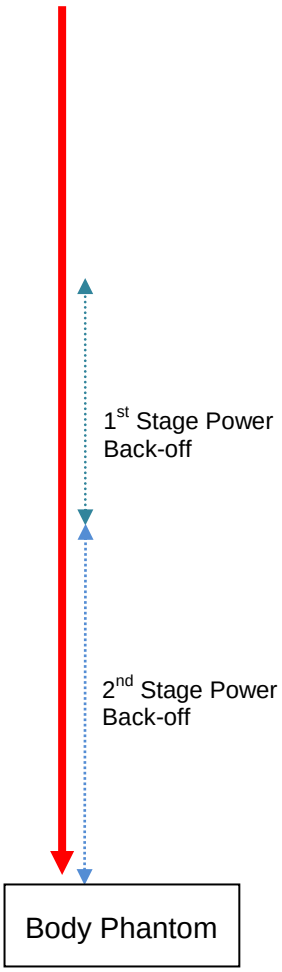
Separation Distances (mm)	Cellular (Primary)	Cellular (Secondary)	Wi-Fi (Primary)	Wi-Fi (Secondary)
Cellular (Primary)		5.2	181.2	176.1
Cellular (Secondary)			173.3	185.9
Wi-Fi (Primary)				52.3
Wi-Fi (Secondary)				
Top-Edge (Edge 1)	2.1	2.1	181.3	191.1
Right-Edge (Edge 2)	24.8	75.9	93.5	14.4
Bottom-Edge (Edge 3)	185.1	185.1	3.4	3.4
Left-Edge (Edge 4)	64.1	24.8	9.8	93.5
Rear Surface	1.7	1.7	6.47	6.47

As per the 616217 D04 SAR for laptop and tablets v01, section 6.1, 6.2, following procedure is used to determine the triggering distances.

First, the DUT is moved towards the flat phantom.

Proximity Sensor Status Table when DUT is moving towards the phantom

Distance to the DUT (mm)	Proximity Sensor Status – Rear Surface	Proximity Sensor Status – Top-Edge
30	OFF	OFF
27	OFF	OFF
25	OFF	OFF
24	OFF	OFF
23	OFF	OFF
22	OFF	OFF
21	OFF	OFF
20	ON (C1, t1, P1)	ON (C1, t1, P1)
19	ON (C1, t1, P1)	ON (C1, t1, P1)
18	ON (C1, t1, P1)	ON (C1, t1, P1)
17	ON (C1, t1, P1)	ON (C1, t1, P1)
16	ON (C1, t1, P1)	ON (C1, t1, P1)
15	ON (C1, t1, P1)	ON (C1, t1, P1)
14	ON (C2, t2, P2)	ON (C2, t2, P2)
13	ON (C2, t2, P2)	ON (C2, t2, P2)
12	ON (C2, t2, P2)	ON (C2, t2, P2)
11	ON (C2, t2, P2)	ON (C2, t2, P2)
10	ON (C2, t2, P2)	ON (C2, t2, P2)
9	ON (C2, t2, P2)	ON (C2, t2, P2)
6	ON (C2, t2, P2)	ON (C2, t2, P2)
3	ON (C2, t2, P2)	ON (C2, t2, P2)
0	ON (C2, t2, P2)	ON (C2, t2, P2)



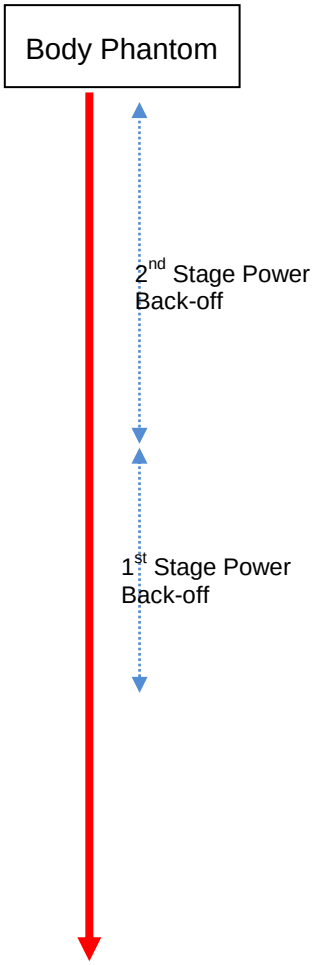
Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

Now, the DUT is moved away from flat phantom

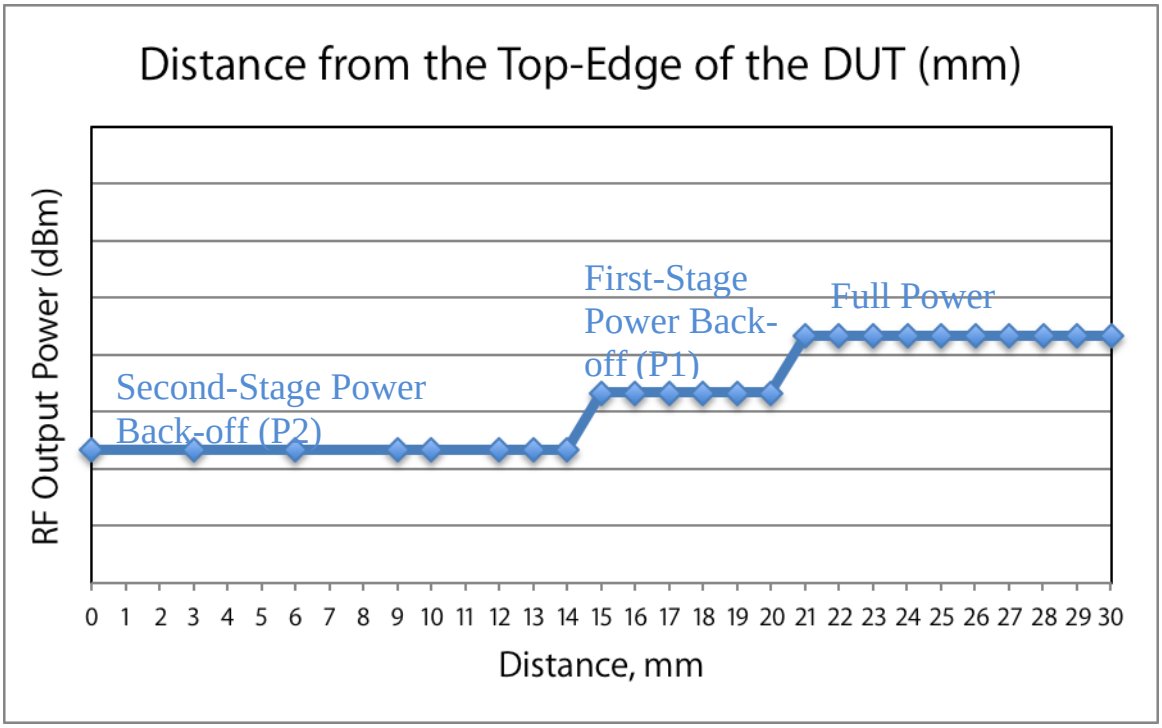
Proximity Sensor Status Table when DUT is moving away from the phantom

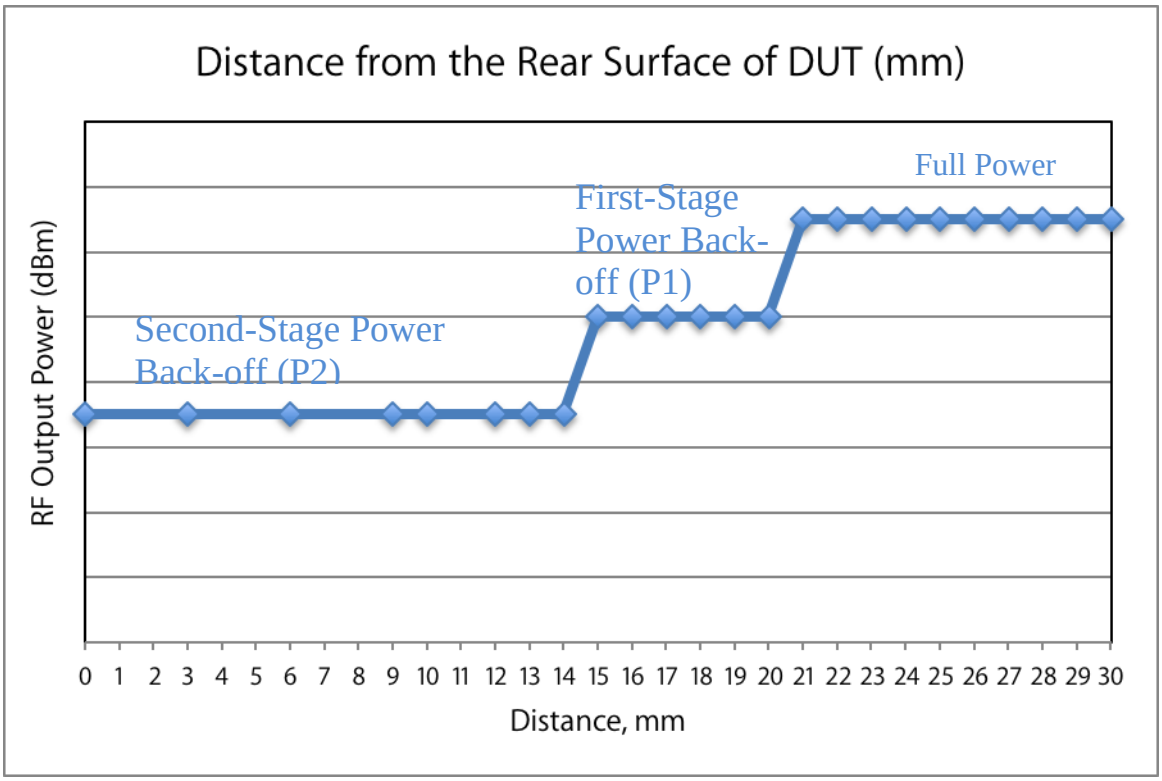
Distance to the DUT (mm)	Proximity Sensor Status – Rear Surface	Proximity Sensor Status – Top-Edge
0	ON (C2, t2, P2)	ON (C2, t2, P2)
3	ON (C2, t2, P2)	ON (C2, t2, P2)
6	ON (C2, t2, P2)	ON (C2, t2, P2)
9	ON (C2, t2, P2)	ON (C2, t2, P2)
10	ON (C2, t2, P2)	ON (C2, t2, P2)
11	ON (C2, t2, P2)	ON (C2, t2, P2)
12	ON (C2, t2, P2)	ON (C2, t2, P2)
13	ON (C2, t2, P2)	ON (C2, t2, P2)
14	ON (C2, t2, P2)	ON (C2, t2, P2)
15	ON (C1, t1, P1)	ON (C1, t1, P1)
16	ON (C1, t1, P1)	ON (C1, t1, P1)
17	ON (C1, t1, P1)	ON (C1, t1, P1)
18	ON (C1, t1, P1)	ON (C1, t1, P1)
19	ON (C1, t1, P1)	ON (C1, t1, P1)
20	ON (C1, t1, P1)	ON (C1, t1, P1)
21	OFF	OFF
22	OFF	OFF
23	OFF	OFF
24	OFF	OFF
25	OFF	OFF
27	OFF	OFF
30	OFF	OFF



Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.



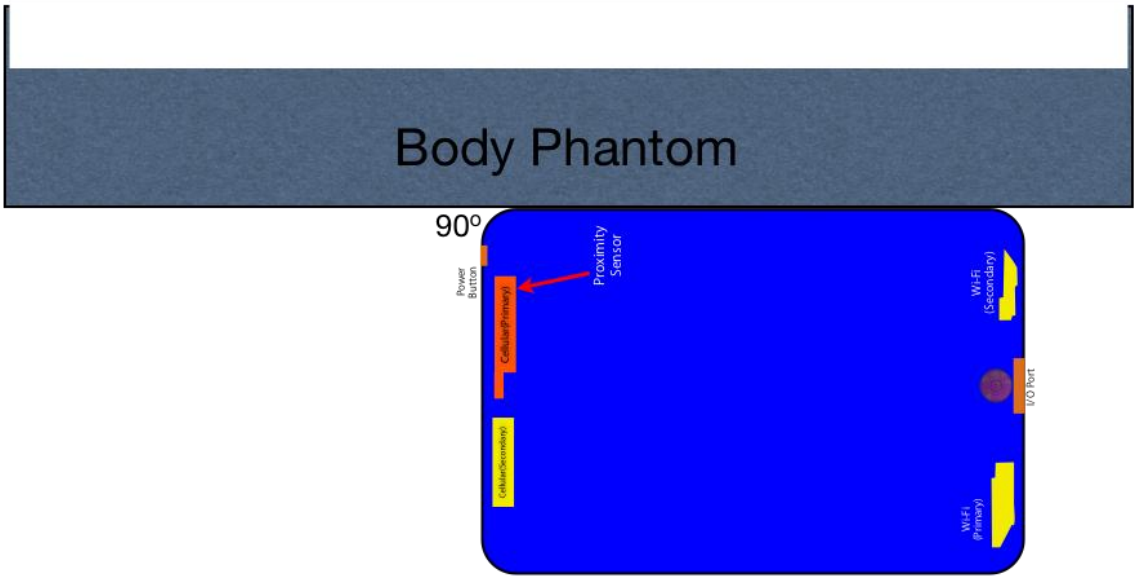


Since, the antenna and proximity sensor are not spatially offset in this implementation, the procedure in KDB 616217, section V.)B.) doesn't apply to device. However, the primary antenna is 24.8 mm from the edge of the device, additional testing is performed to evaluate the coverage of the proximity sensor detection area in the corner of the DUT.

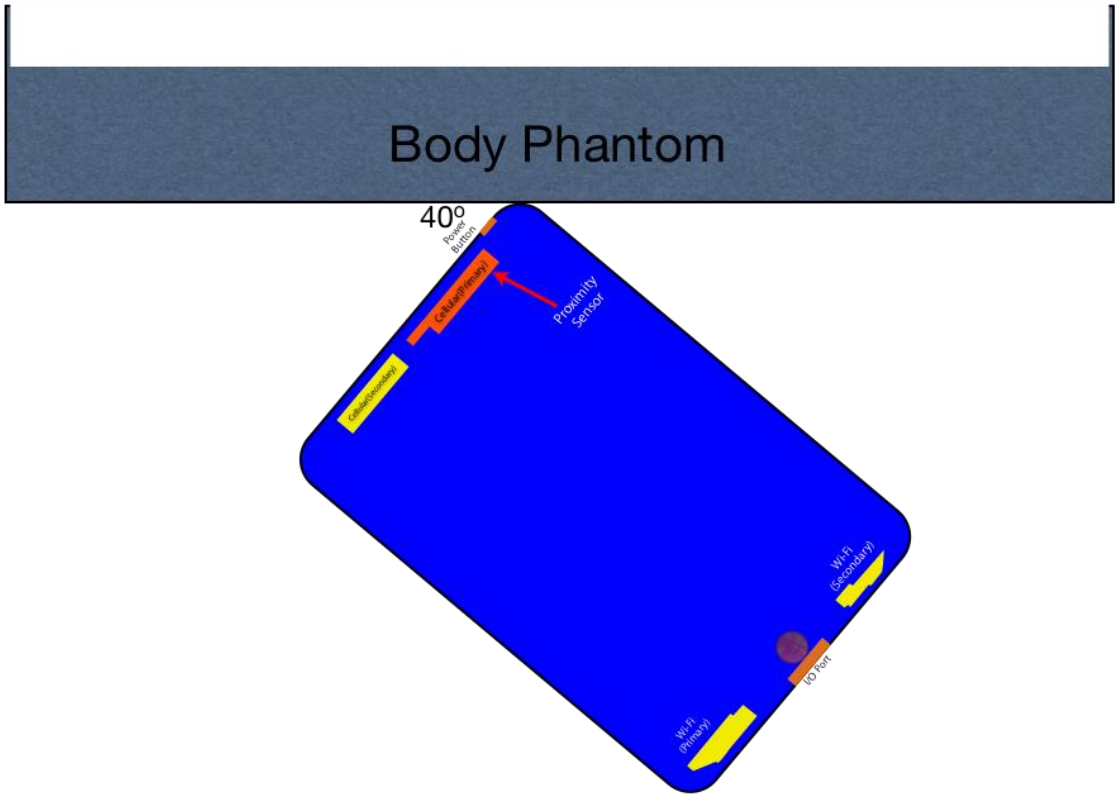
8.5.2. Coverage at the Corner of the DUT

The proximity sensor coverage at the Top-Edge/Right-corner of the device is determined by changing the angle of the device relative to the phantom, and observe the angle at which the proximity sensor is triggered.

In this case, the proximity sensor remains triggered at the first-stage when the Right-Edge of the device is touching the flat phantom, i.e., Top-Edge/Right Corner of the device is 90° from the phantom. The conservative angle at which the first-stage of proximity sensor is triggered is 40°.



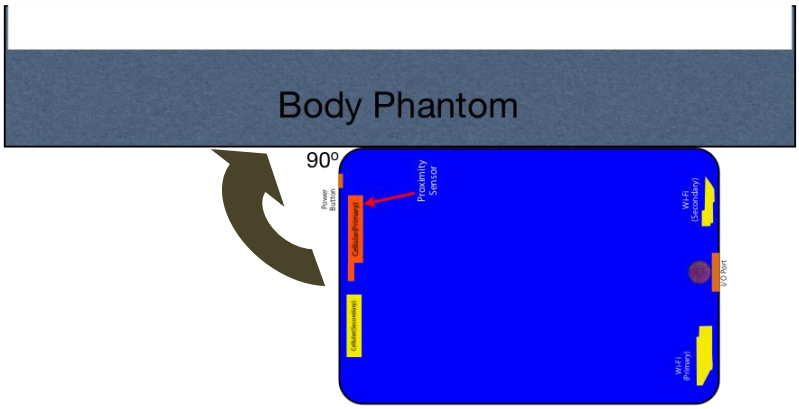
DUT angle at which First–stage is activated



DUT angle at which second–stage is activated

Proximity Sensor Status Table when DUT is moving towards the phantom

Angle to the DUT(Degrees)	Proximity Sensor Status – Top-Edge/Right Corner
90	ON (C1, t1, P1)
85	ON (C1, t1, P1)
80	ON (C1, t1, P1)
75	ON (C1, t1, P1)
70	ON (C1, t1, P1)
65	ON (C1, t1, P1)
60	ON (C1, t1, P1)
55	ON (C1, t1, P1)
50	ON (C1, t1, P1)
45	ON (C1, t1, P1)
44	ON (C1, t1, P1)
43	ON (C1, t1, P1)
42	ON (C1, t1, P1)
41	ON (C1, t1, P1)
40	ON (C2, t2, P2)
39	ON (C2, t2, P2)
38	ON (C2, t2, P2)
35	ON (C2, t2, P2)
30	ON (C2, t2, P2)
25	ON (C2, t2, P2)
20	ON (C2, t2, P2)
15	ON (C2, t2, P2)
10	ON (C2, t2, P2)
5	ON (C2, t2, P2)
0	ON (C2, t2, P2)

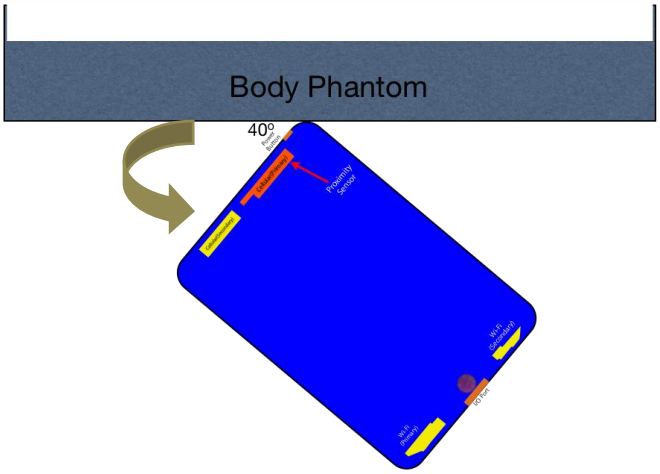


Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

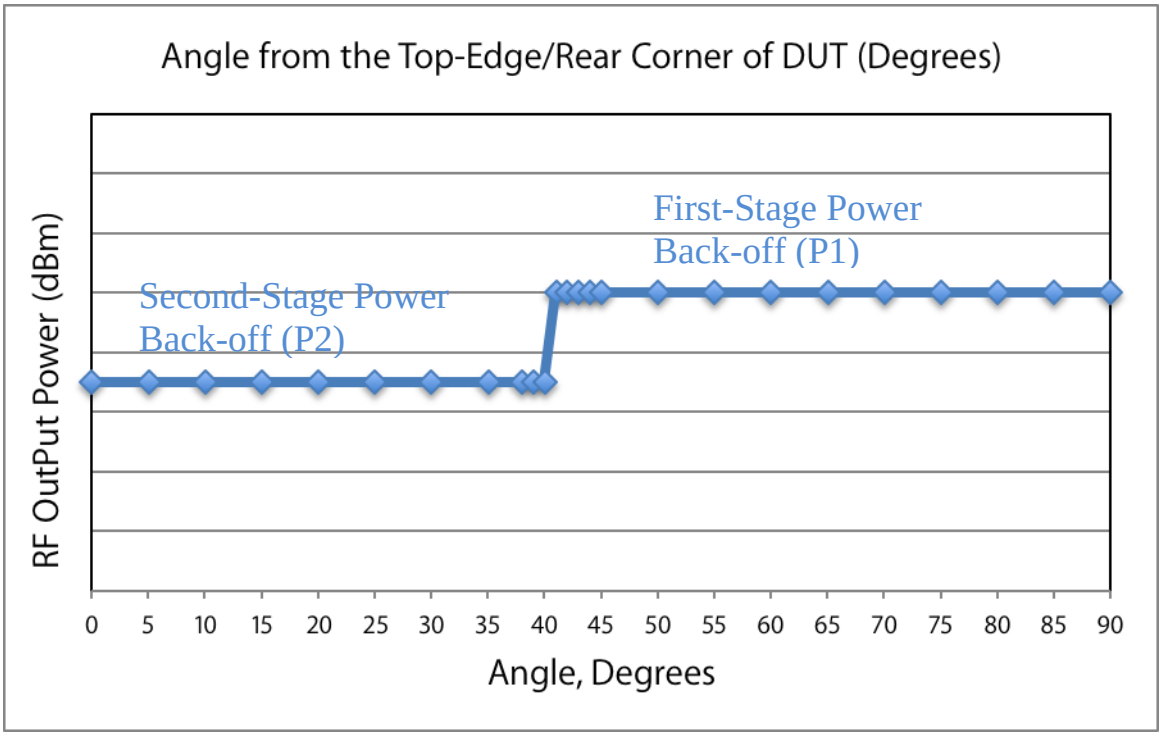
Proximity Sensor Status Table when DUT is moving away from the phantom

Angle to the DUT(Degrees)	Proximity Sensor Status – Top-Edge/Right Corner
0	ON (C2, t2, P2)
5	ON (C2, t2, P2)
10	ON (C2, t2, P2)
15	ON (C2, t2, P2)
20	ON (C2, t2, P2)
25	ON (C2, t2, P2)
30	ON (C2, t2, P2)
35	ON (C2, t2, P2)
38	ON (C2, t2, P2)
39	ON (C2, t2, P2)
40	ON (C2, t2, P2)
41	ON (C1, t1, P1)
42	ON (C1, t1, P1)
43	ON (C1, t1, P1)
44	ON (C1, t1, P1)
45	ON (C1, t1, P1)
50	ON (C1, t1, P1)
55	ON (C1, t1, P1)
60	ON (C1, t1, P1)
65	ON (C1, t1, P1)
70	ON (C1, t1, P1)
75	ON (C1, t1, P1)
80	ON (C1, t1, P1)
85	ON (C1, t1, P1)
90	ON (C1, t1, P1)



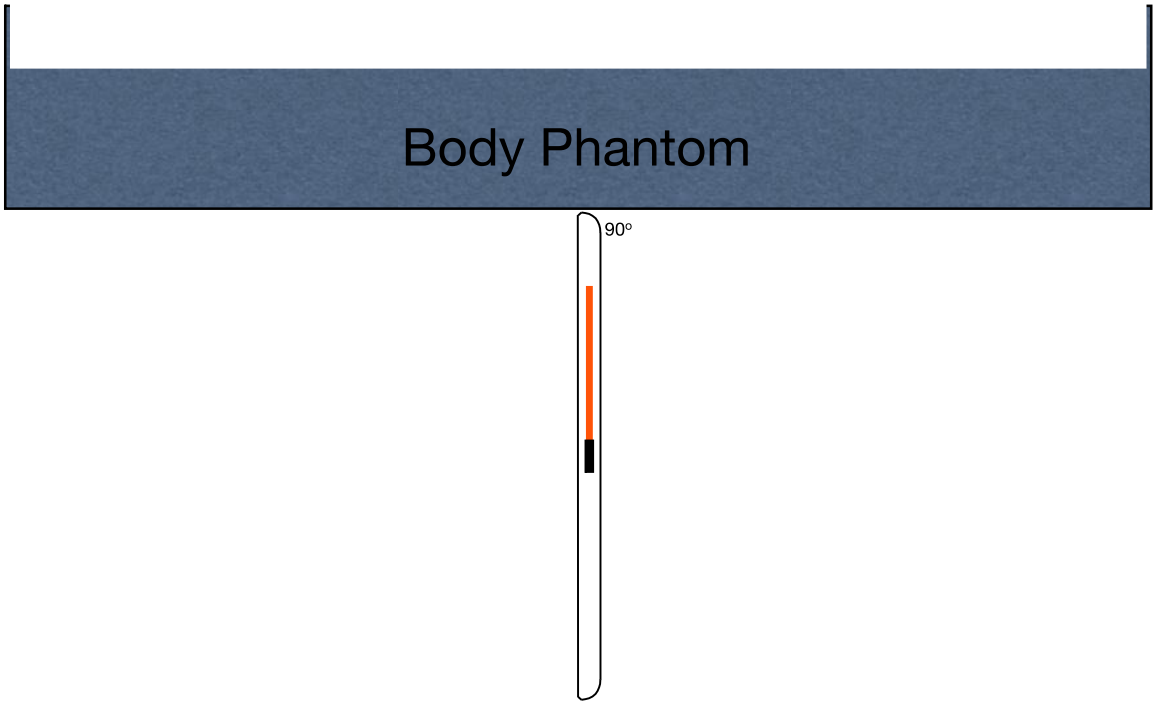
Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

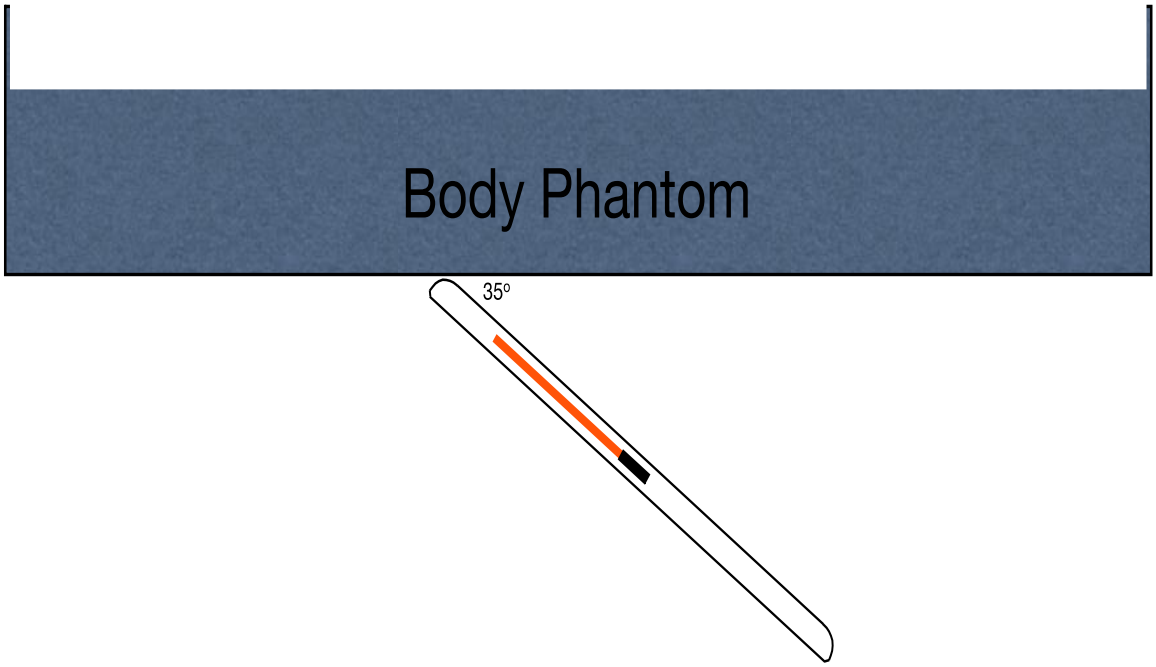


The proximity sensor coverage at the Rear Surface/Right-corner of the device is determined by changing the angle of the device relative to the phantom, and observe the angle at which the proximity sensor is triggered.

In this case, the conservative angles at which the proximity sensor is triggered are: 90° for the first-stage, and 35° for the second-stage, from the phantom. Therefore, the proximity sensor remains triggered at the first-stage when the Right-Edge of the device is touching the flat phantom.



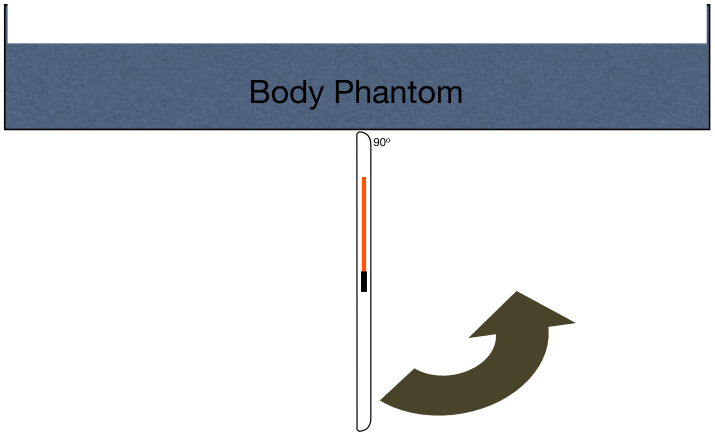
DUT angle at which first-stage is activated



DUT angle at which second-stage is activated

Proximity Sensor Status Table when DUT is moving towards the phantom

Angle to the DUT(Degrees)	Proximity Sensor Status – Rear-Surface/Right Corner
90	ON (C1, t1, P1)
85	ON (C1, t1, P1)
80	ON (C1, t1, P1)
75	ON (C1, t1, P1)
70	ON (C1, t1, P1)
65	ON (C1, t1, P1)
60	ON (C1, t1, P1)
55	ON (C1, t1, P1)
50	ON (C1, t1, P1)
45	ON (C1, t1, P1)
40	ON (C1, t1, P1)
37	ON (C1, t1, P1)
36	ON (C1, t1, P1)
35	ON (C2, t2, P2)
34	ON (C2, t2, P2)
33	ON (C2, t2, P2)
30	ON (C2, t2, P2)
25	ON (C2, t2, P2)
20	ON (C2, t2, P2)
15	ON (C2, t2, P2)
10	ON (C2, t2, P2)
5	ON (C2, t2, P2)
0	ON (C2, t2, P2)

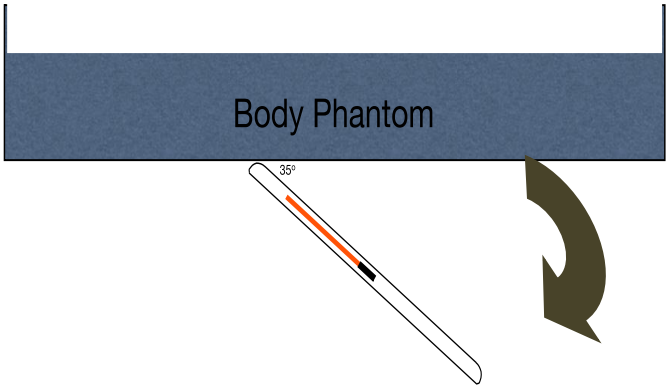


Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

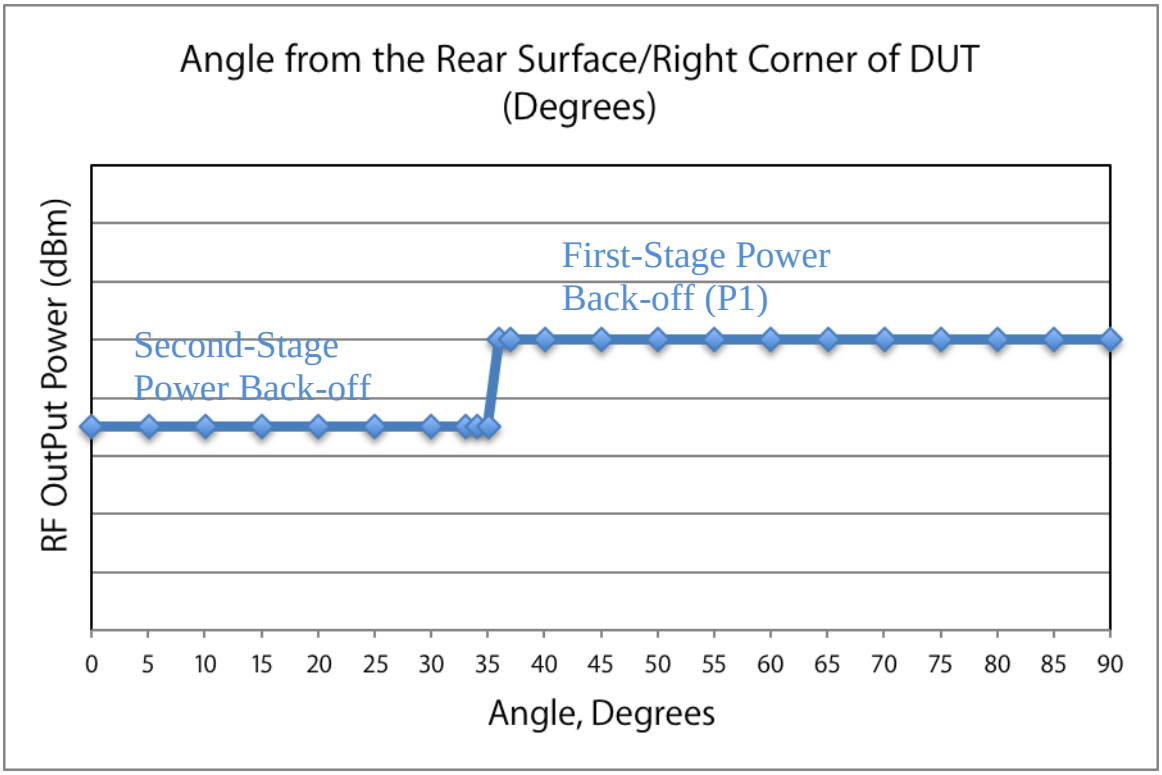
Proximity Sensor Status Table when DUT is moving away from the phantom

Angle to the DUT(Degrees)	Proximity Sensor Status – Rear-Surface/Right Corner
0	ON (C2, t2, P2)
5	ON (C2, t2, P2)
10	ON (C2, t2, P2)
15	ON (C2, t2, P2)
20	ON (C2, t2, P2)
25	ON (C2, t2, P2)
30	ON (C2, t2, P2)
33	ON (C2, t2, P2)
34	ON (C2, t2, P2)
35	ON (C2, t2, P2)
36	ON (C1, t1, P1)
37	ON (C1, t1, P1)
40	ON (C1, t1, P1)
45	ON (C1, t1, P1)
46	ON (C1, t1, P1)
47	ON (C1, t1, P1)
50	ON (C1, t1, P1)
55	ON (C1, t1, P1)
60	ON (C1, t1, P1)
65	ON (C1, t1, P1)
70	ON (C1, t1, P1)
75	ON (C1, t1, P1)
80	ON (C1, t1, P1)
85	ON (C1, t1, P1)
90	ON (C1, t1, P1)



Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.



With the Top-Edge of the device against the phantom, when the front of the device (LCD side) is tilted toward the phantom, the proximity sensor will remain triggered all the time.

The proximity sensor is not triggered, when approaching from any other corner, therefore, the proximity sensor coverage is only evaluated when approaching from the Top/Right Corner.

8.5.3. SAR Test Configurations

For body exposure condition, the DUT is evaluated in the following configurations:

- Rear surface of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered in this configuration, therefore, the conducted power is backed-off.

- Top-Edge/Edge 1 of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered in this configuration, therefore, the conducted power is backed-off.

- Bottom-Edge/Edge 3 of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active, but not triggered in this configuration. Therefore, the conducted power is NOT backed-off.

- Left-Edge/Edge 4 of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active, but not triggered in this configuration. Therefore, the conducted power is NOT backed-off.

- Right-Edge/Edge 2 of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered at the first-stage power back-off level (P1) in this configuration. Therefore, the conducted power is backed-off.

- Rear surface of the DUT with conservative distance of 14 mm to the flat phantom. The proximity sensor is disabled, by special development software, in this configuration. Therefore, the conducted power has NO backed-off.

- Top-Edge/Edge 1 of the DUT with conservative distance of 14 mm to the flat phantom. The proximity sensor is disabled, by special development software, in this configuration. Therefore, the conducted power has NO backed-off.

- Top-Edge/Edge 1 of the DUT with separation distance of 0 mm and 40° angle to the flat body phantom. The proximity sensor is set to the first-stage power back-off level (P1), by special development software, in this configuration.

- Rear-Surface of the DUT with separation distance of 0 mm and 35° angle to the flat body phantom. The proximity sensor is set to the first-stage power back-off level (P1), by special development software, in this configuration.

SAR evaluation of the DUT on the Front Surface with separation distance of 0 mm to the flat phantom is NOT performed because there is no use case for this configuration.

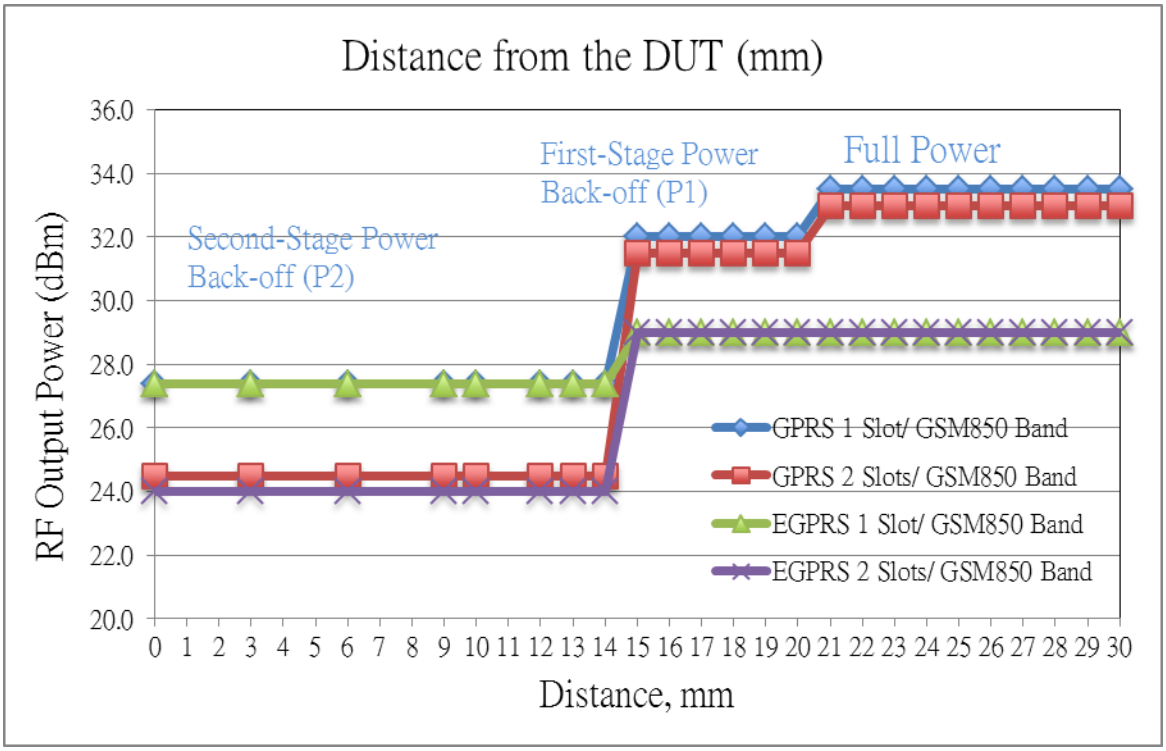
8.5.4. Special Development Software

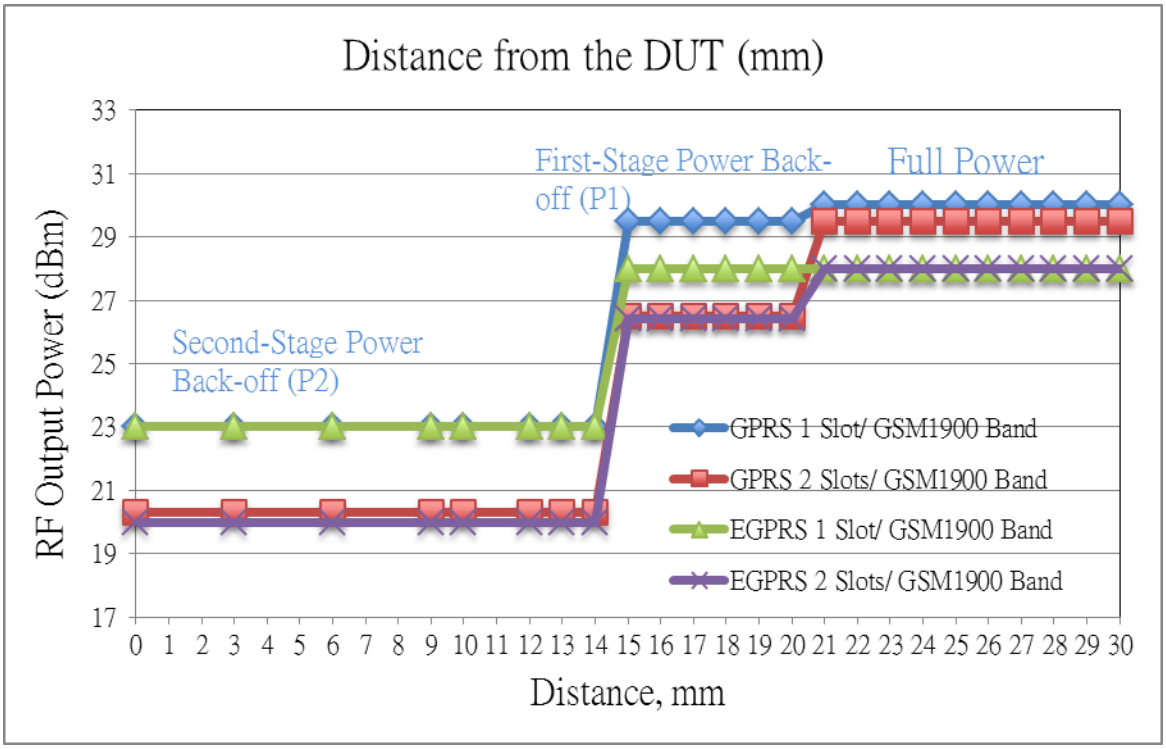
During the 14 mm (Top-Edge), Rear (14mm), Right-Edge (0mm), 40° angle from the Top-Edge (0mm), and 35° angle from the Rear Surface (0mm) SAR evaluation, the power reduction due to proximity sensor was disabled using a series of test commands which are only available in development software. The proximity sensor or the power reduction cannot be intentionally or unintentionally turned-off by the user. The software provided on production units will not allow the proximity sensor or the power cap to be disabled.

8.6. Power Reduction per Air-interface

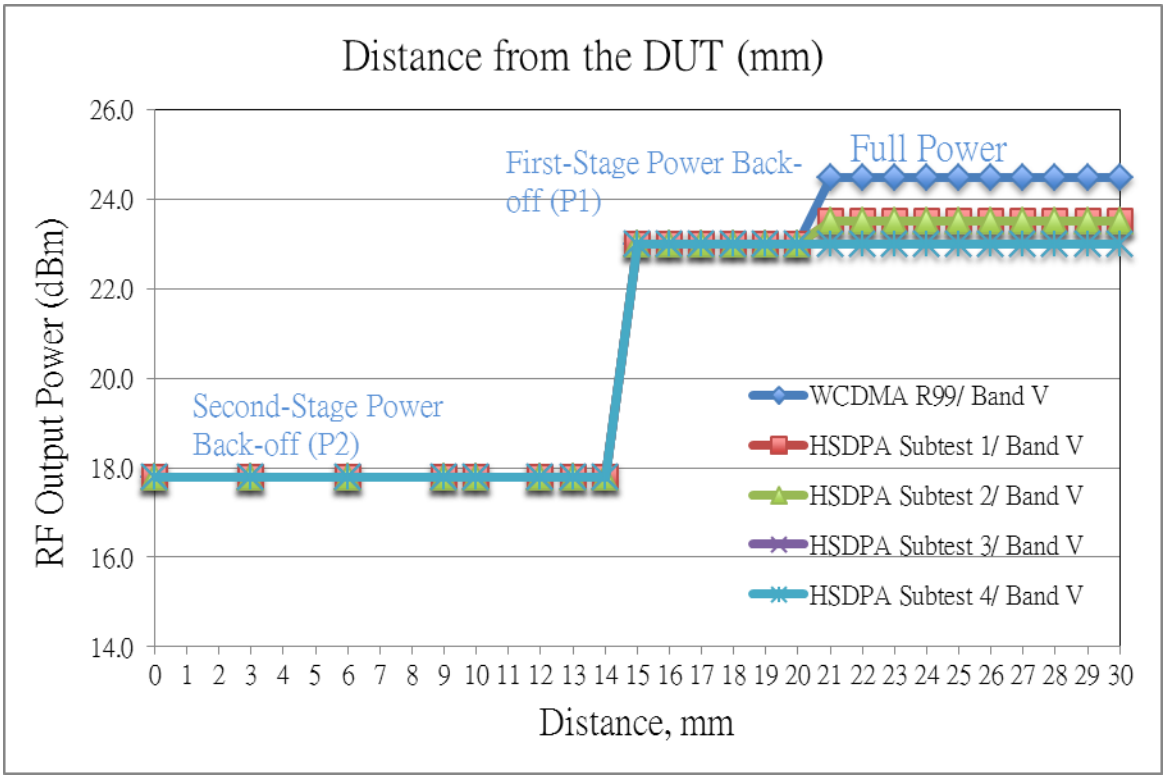
The following graphs show the power level vs the distance from the DUT to the flat phantom for the Top-Edge and Rear Surface.

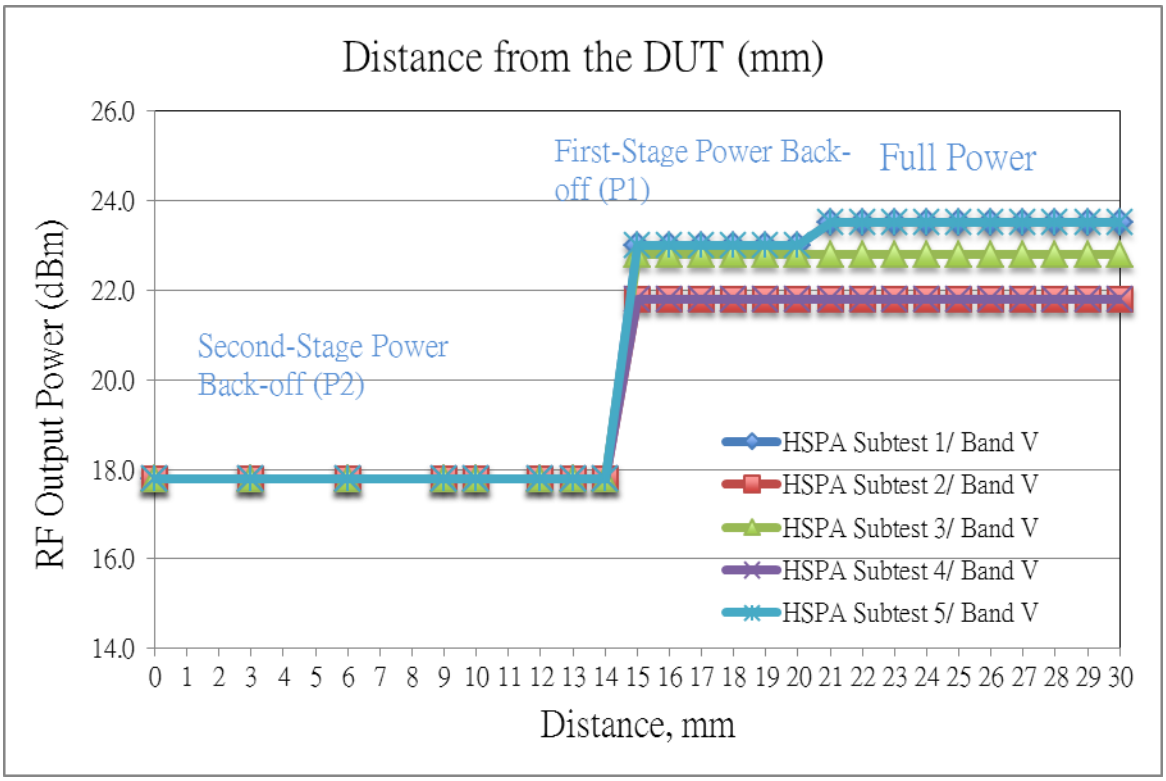
8.6.1. GSM Bands

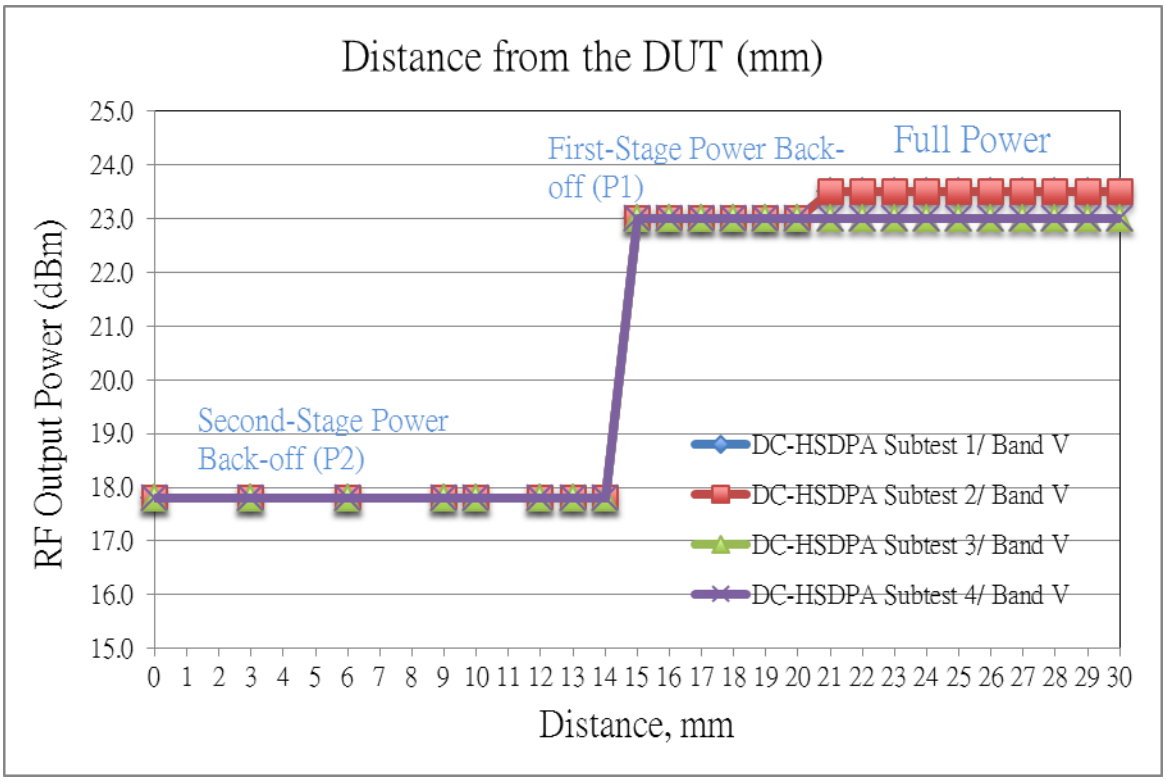


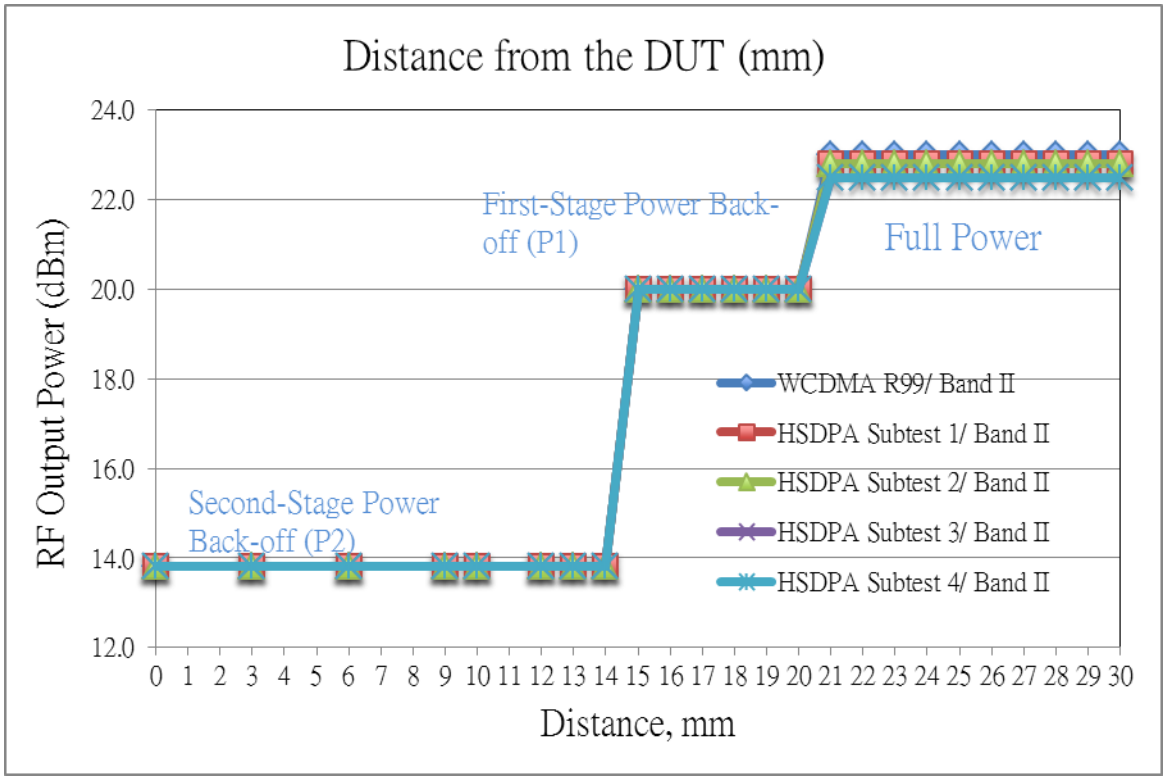


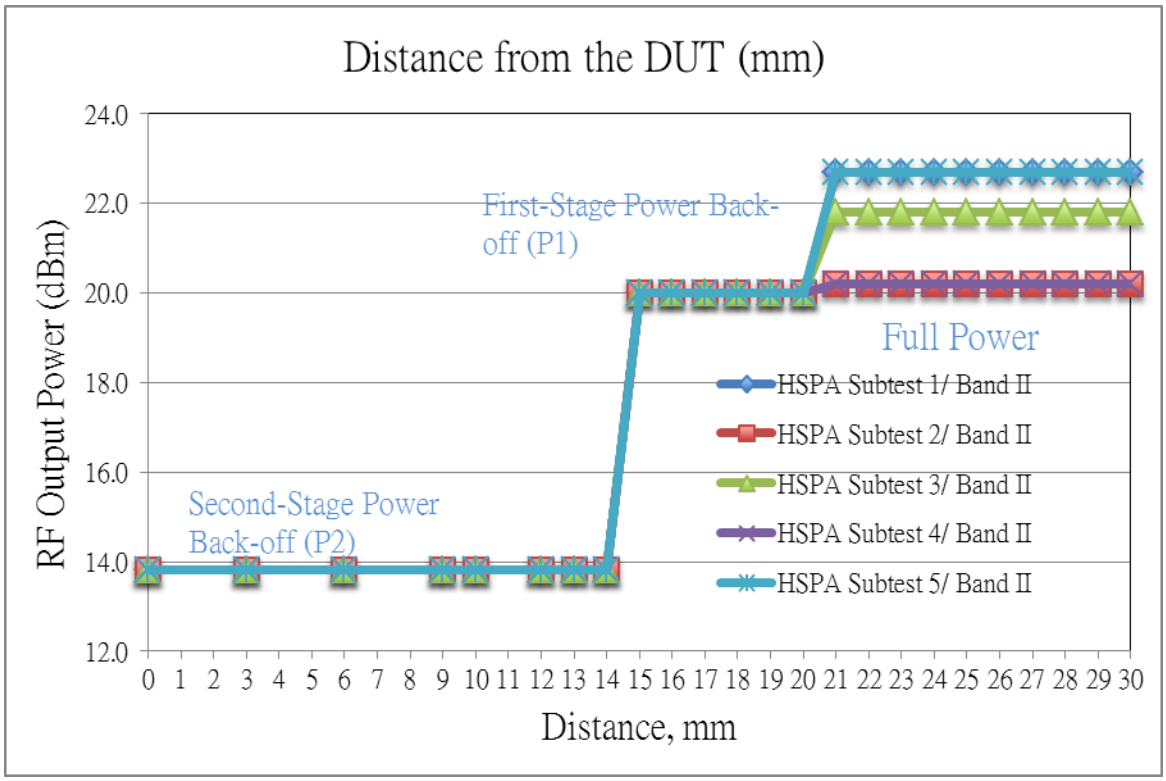
8.6.2. WCDMA Bands

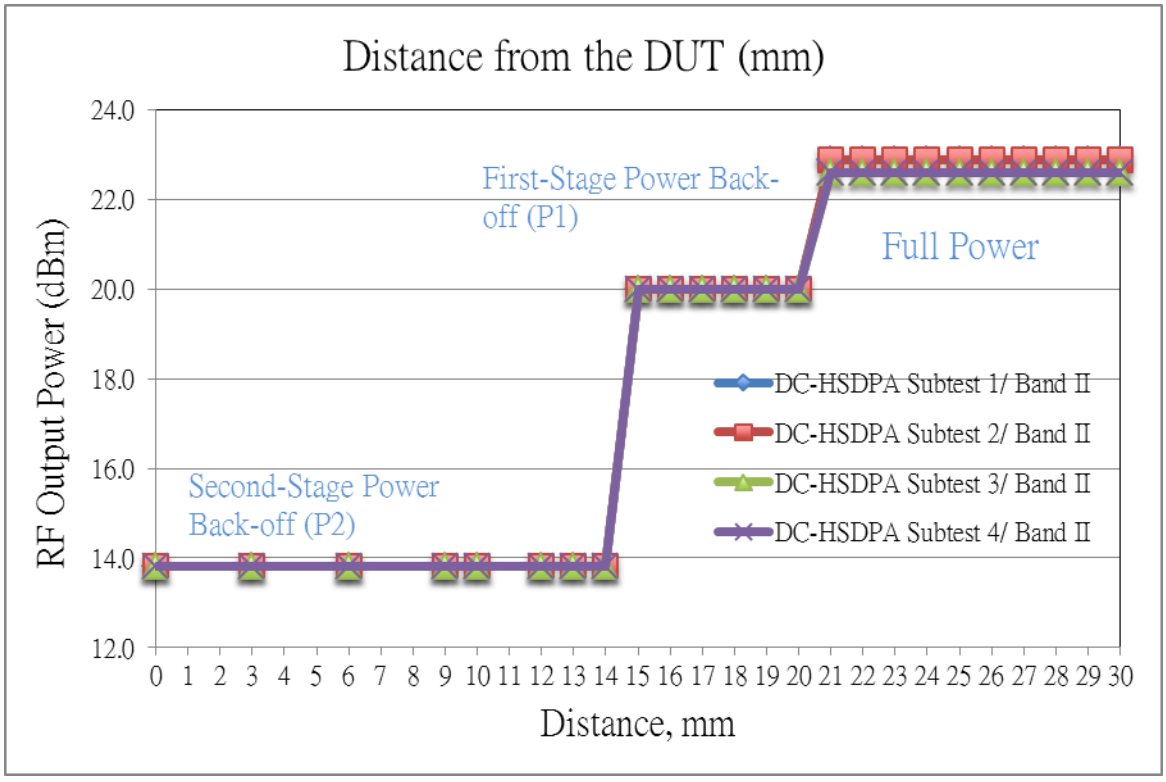




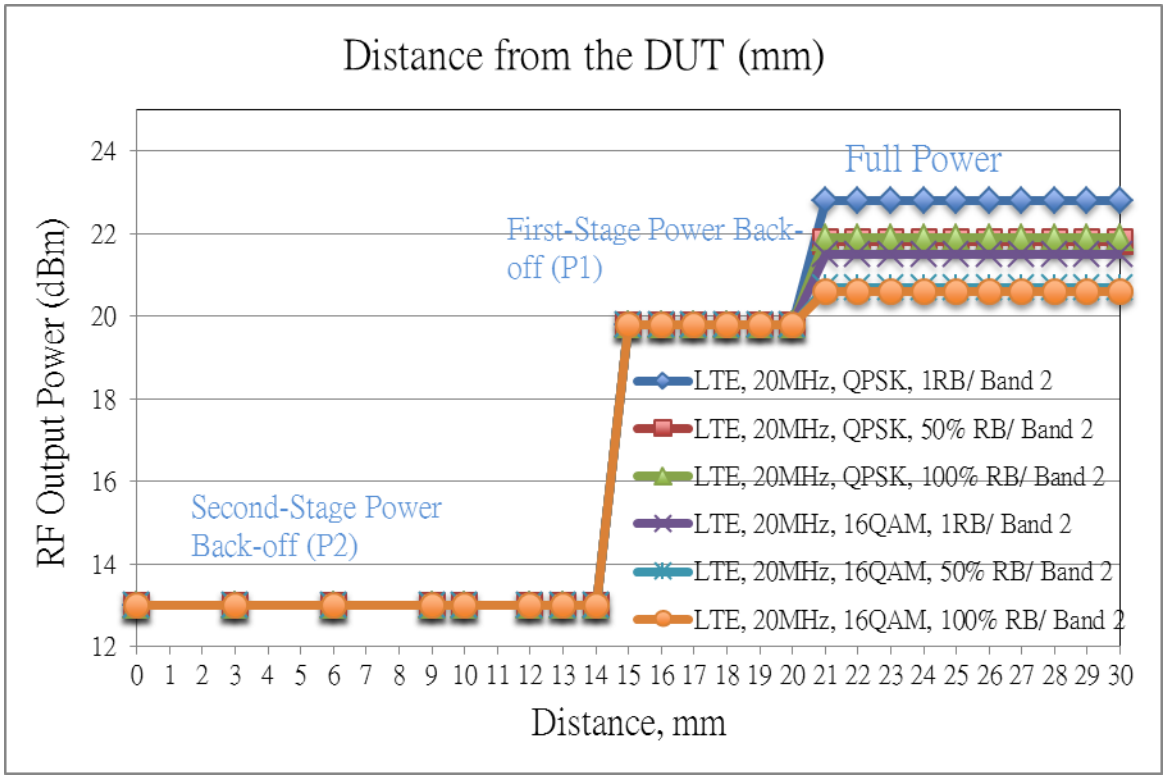


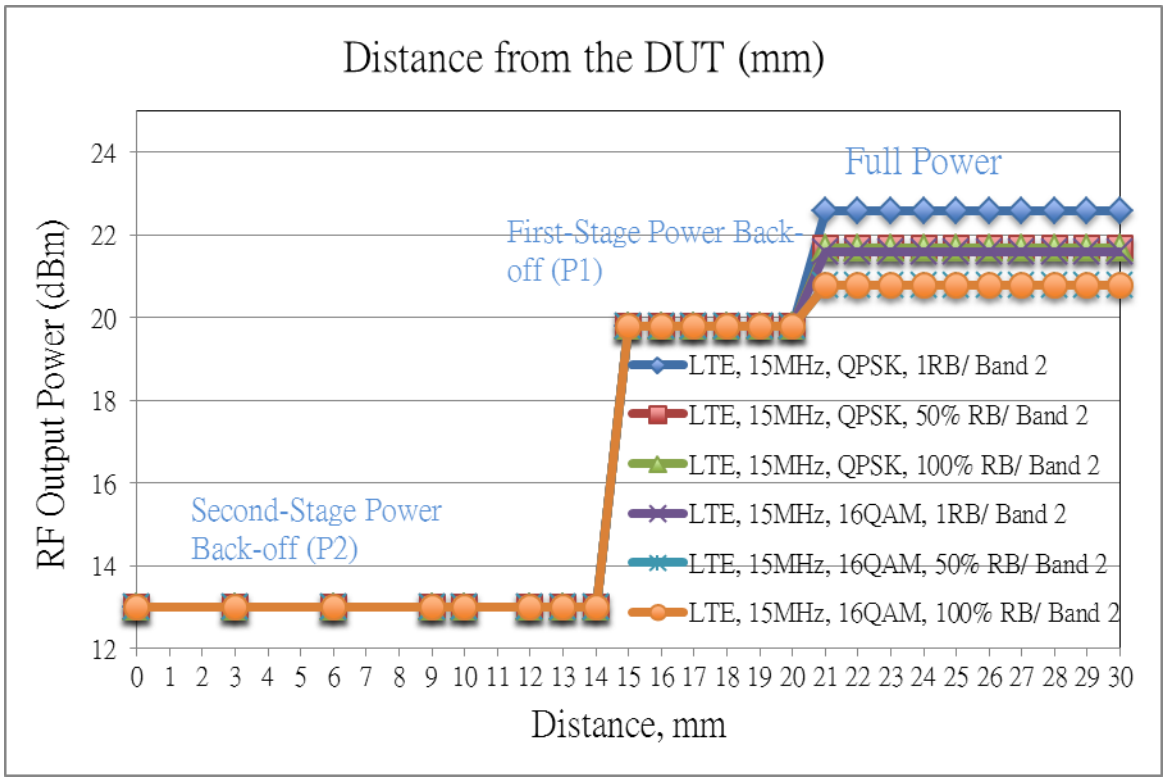


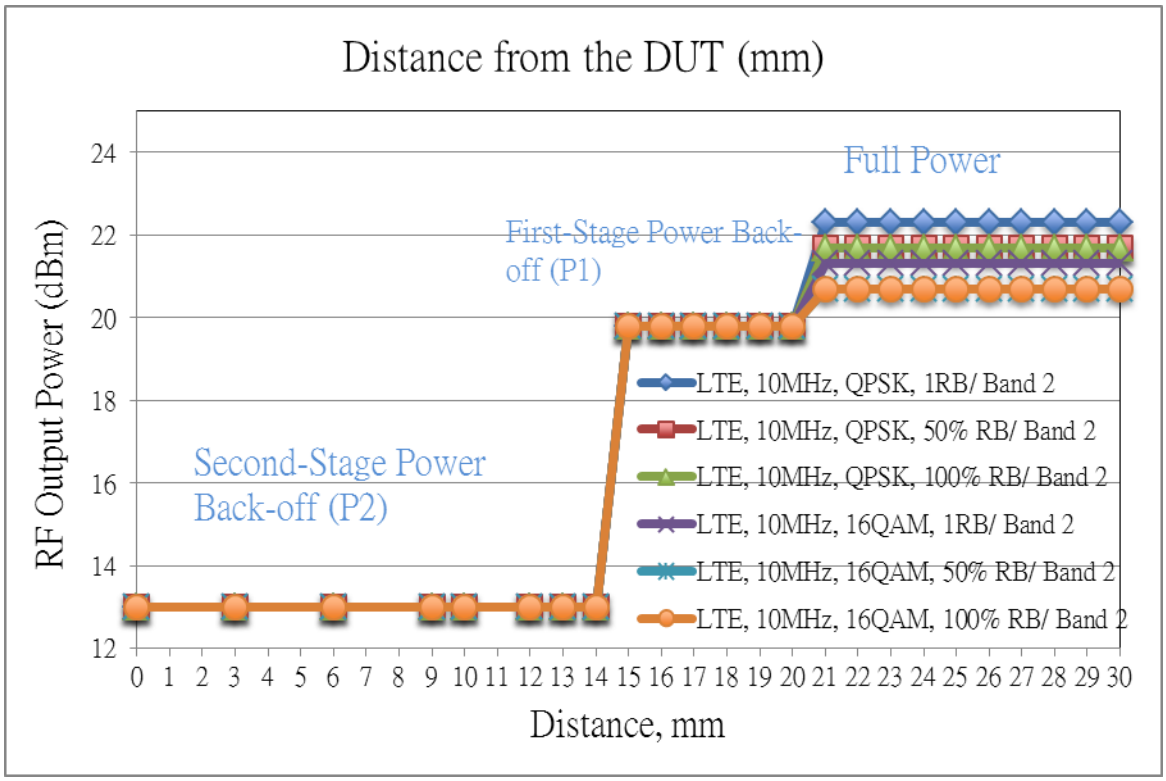


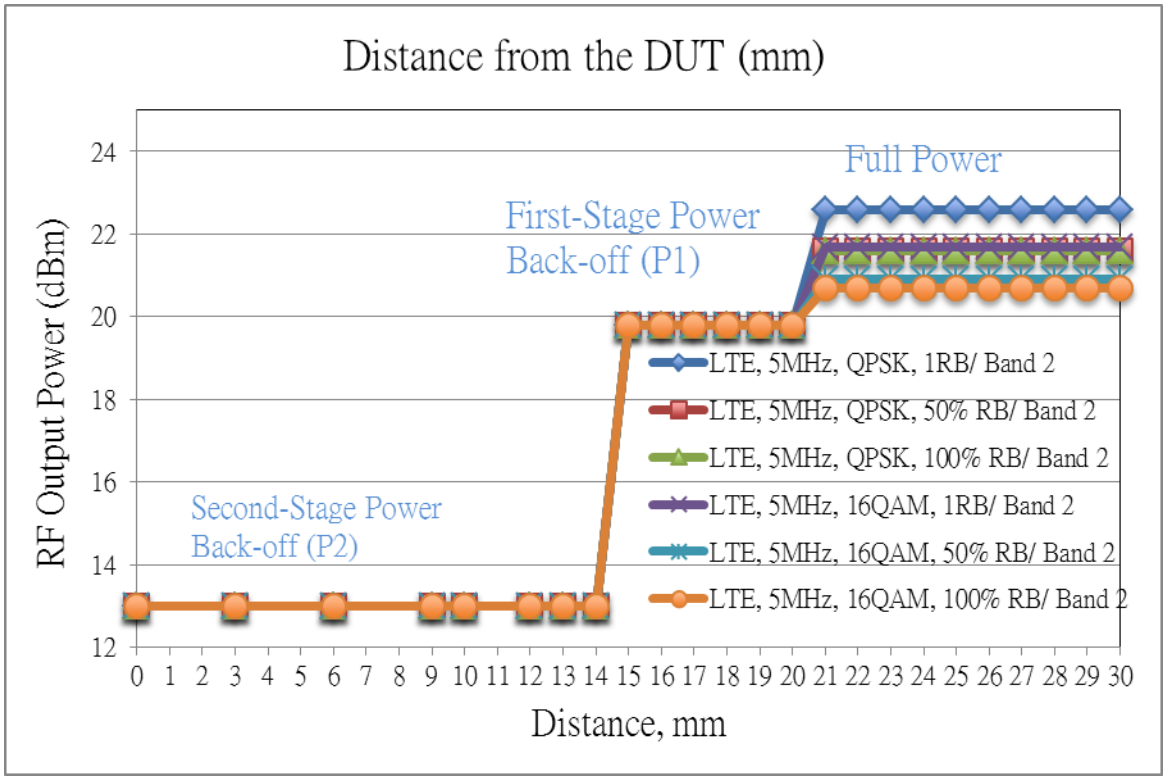


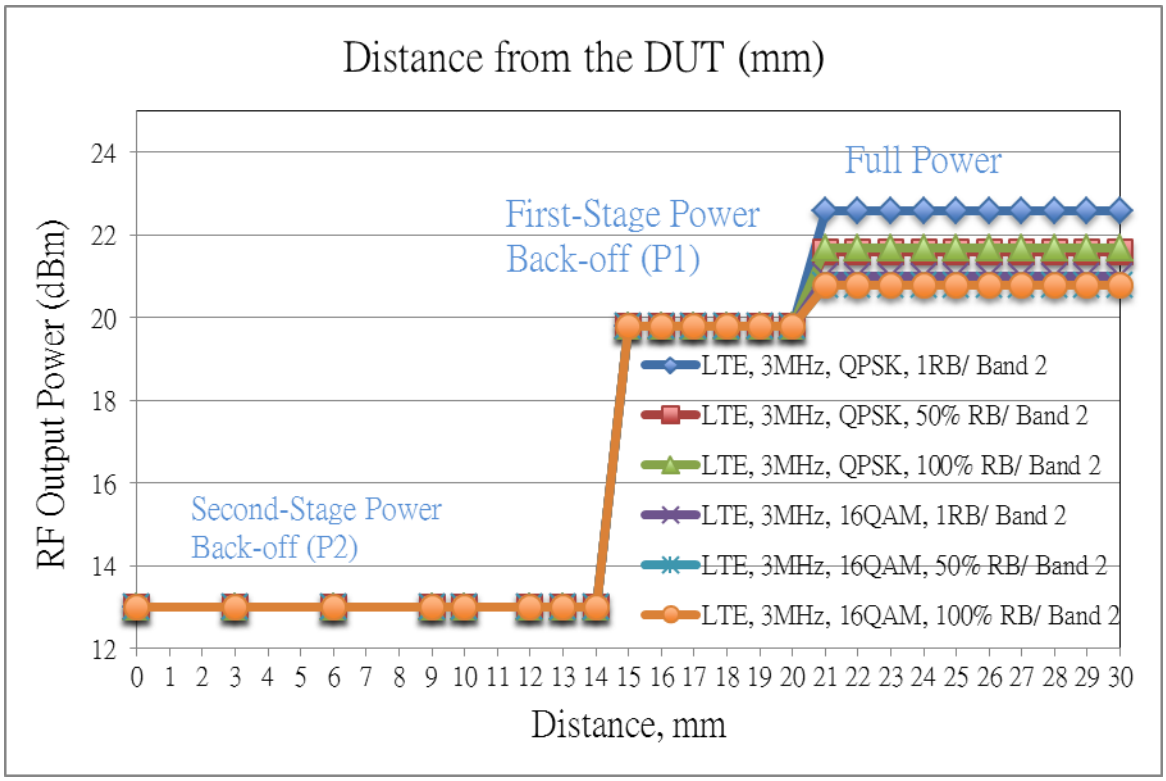
8.6.3. LTE Bands

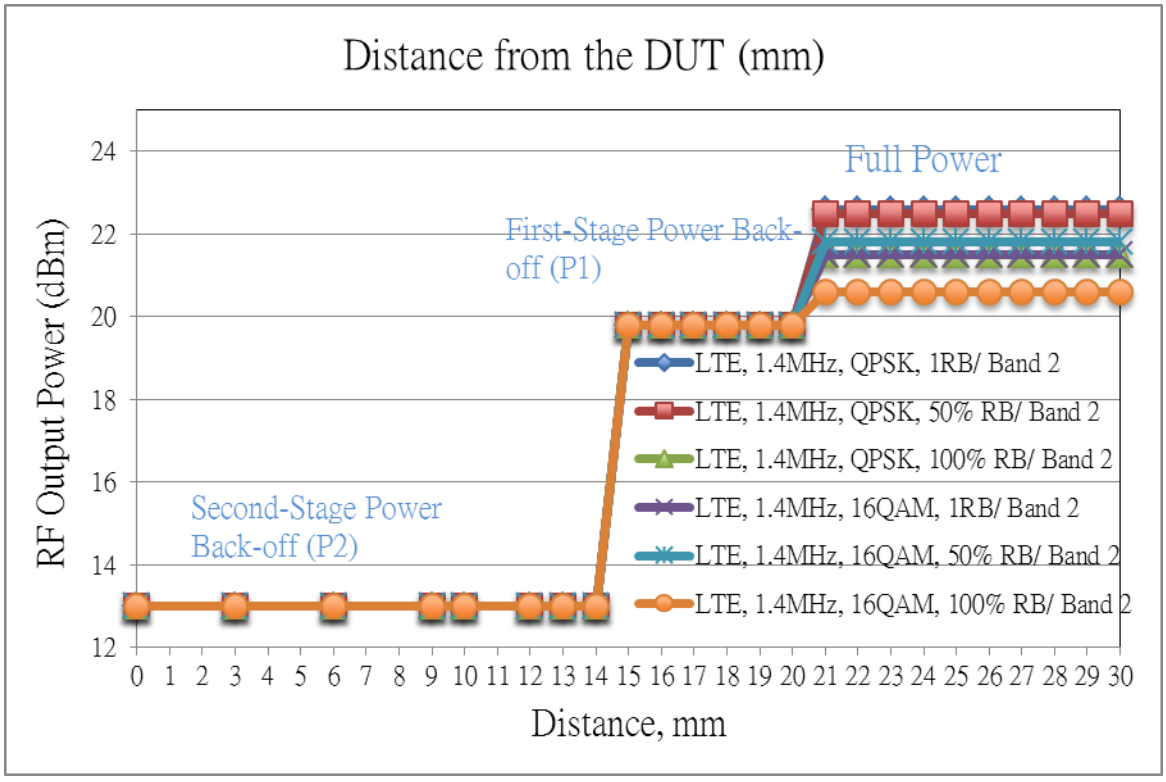


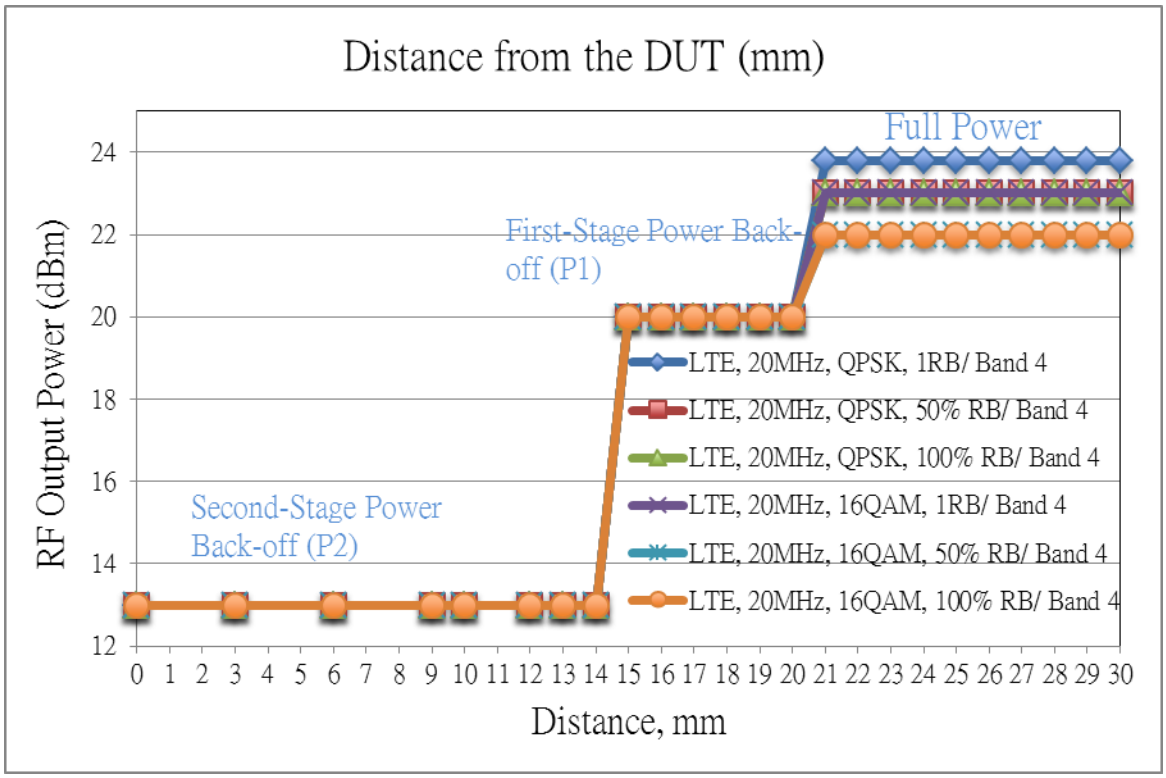


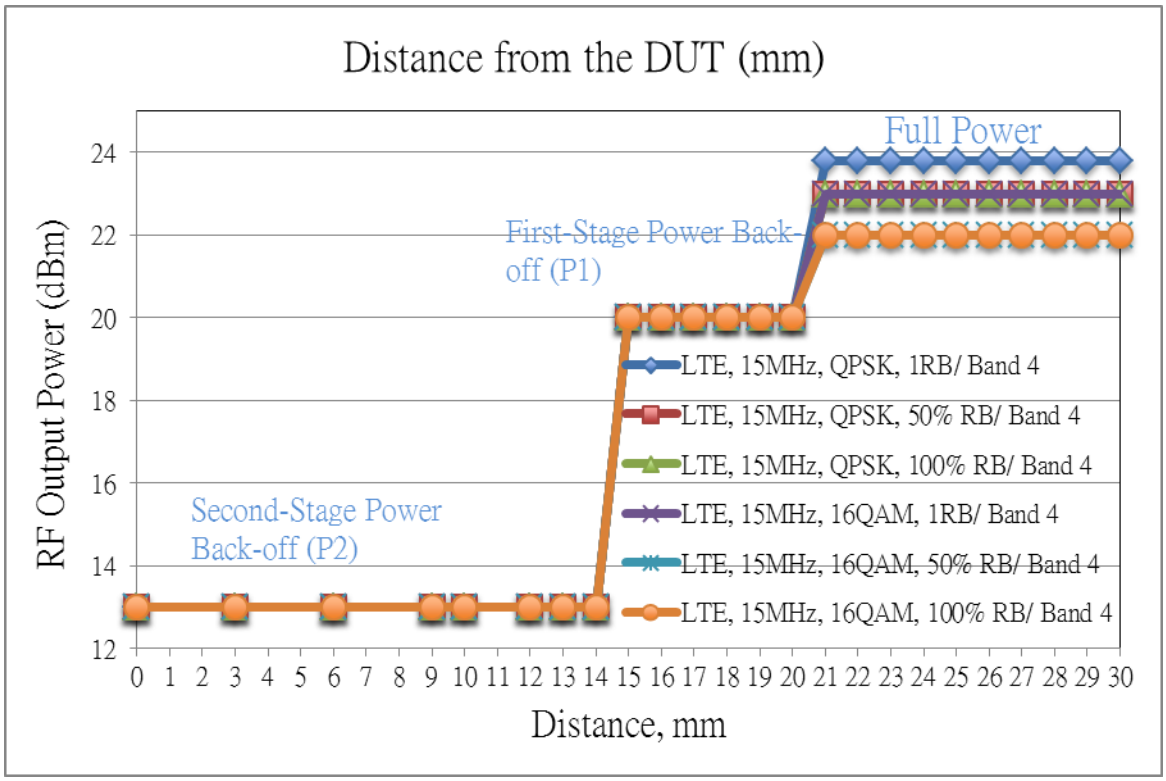


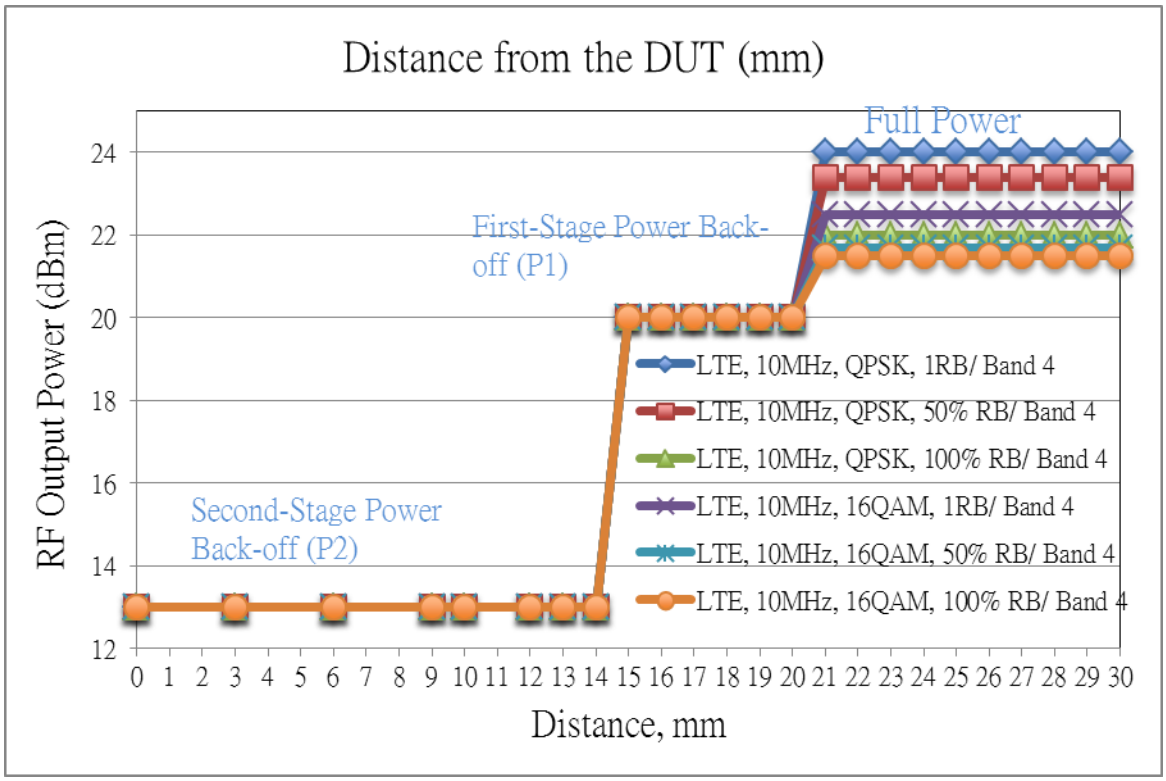


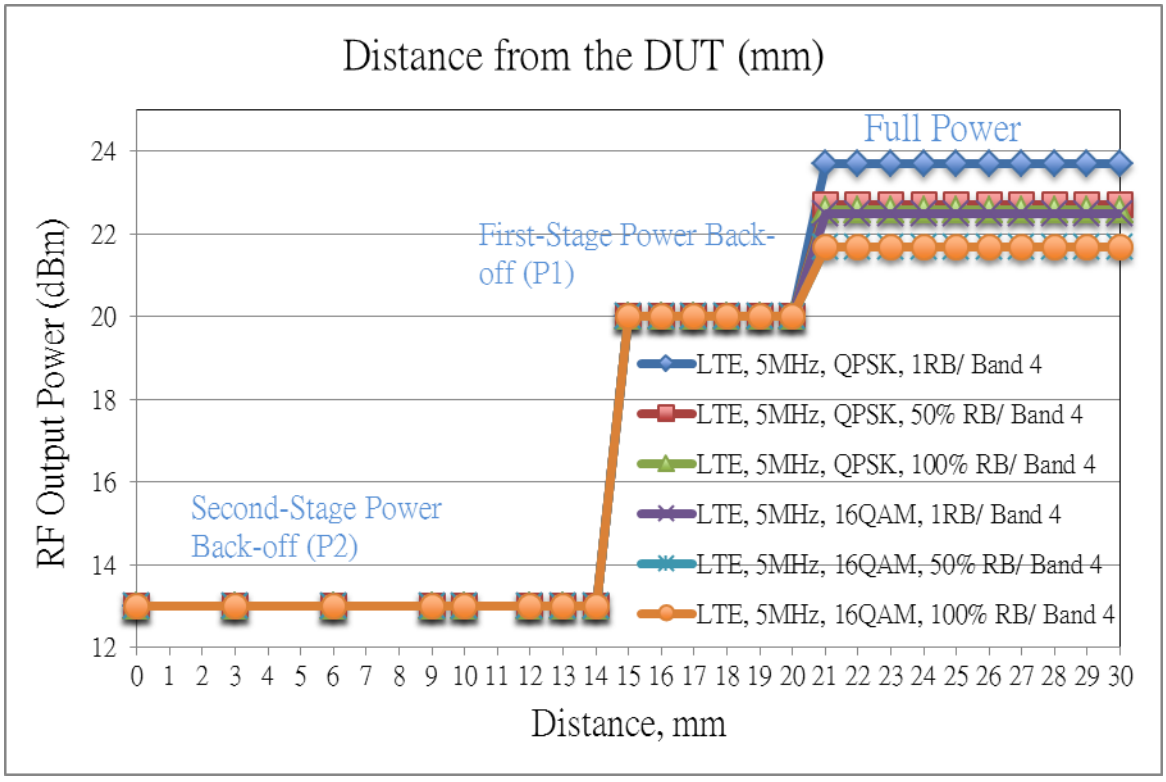


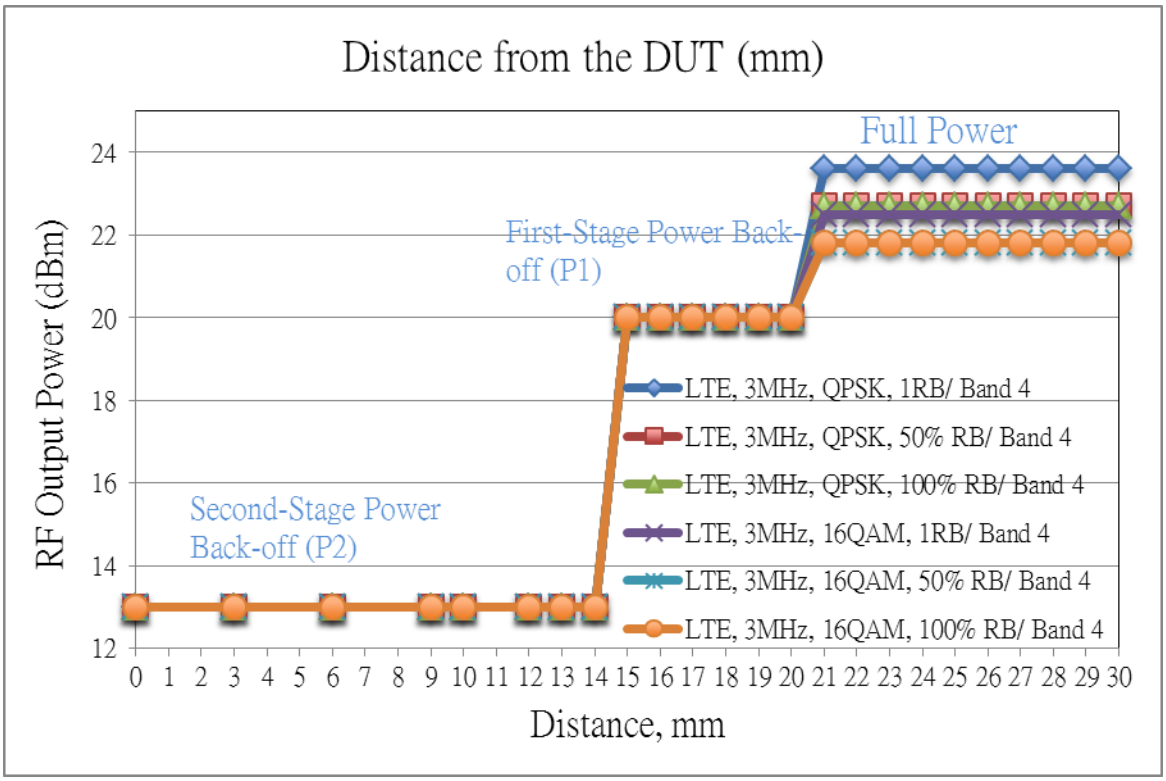


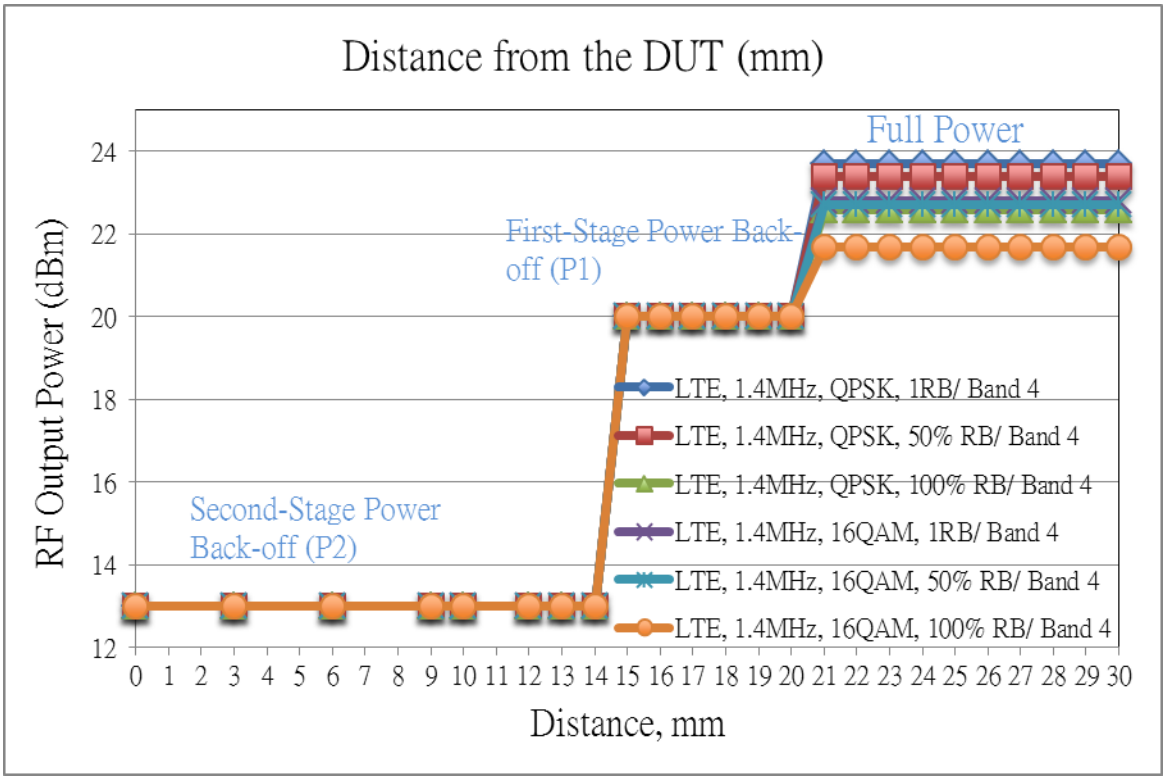


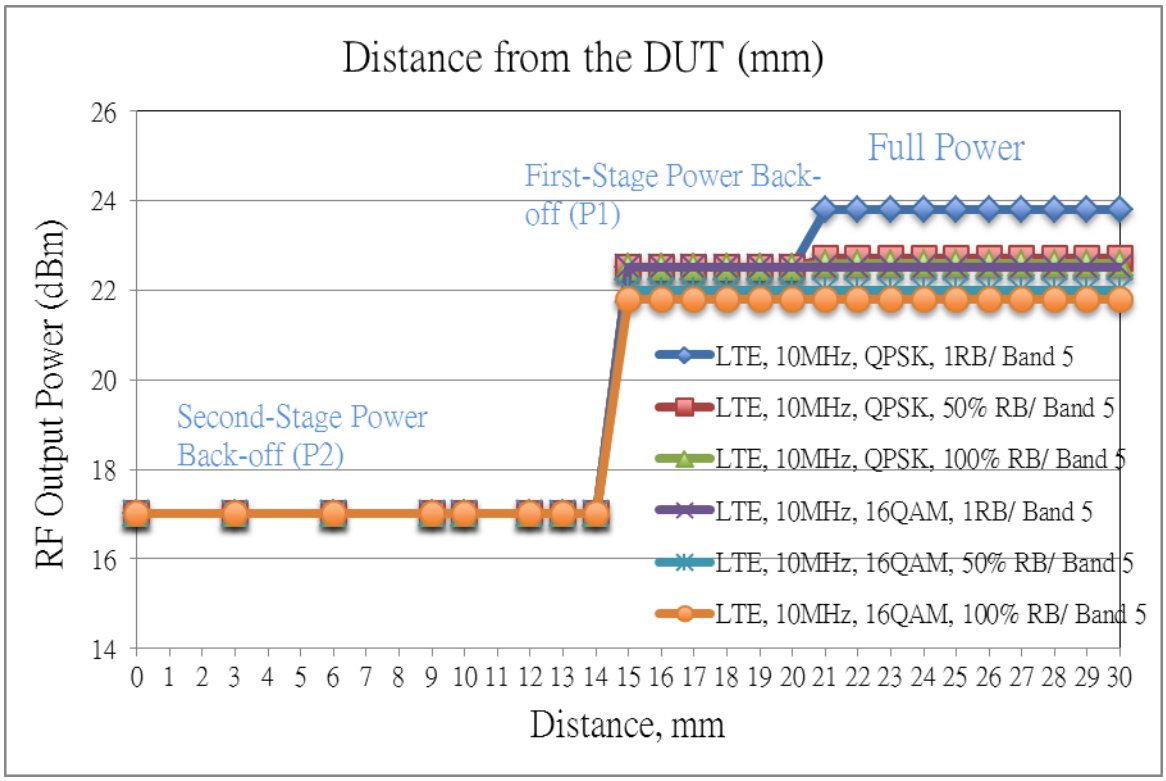


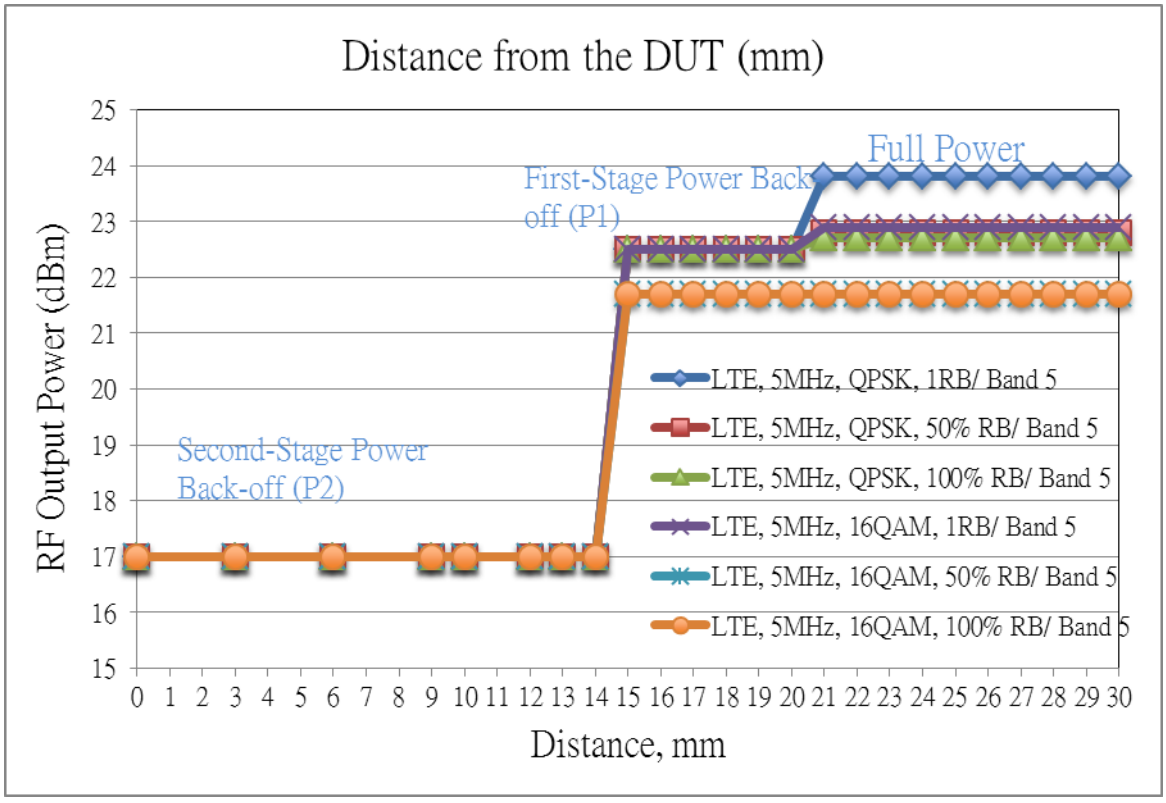


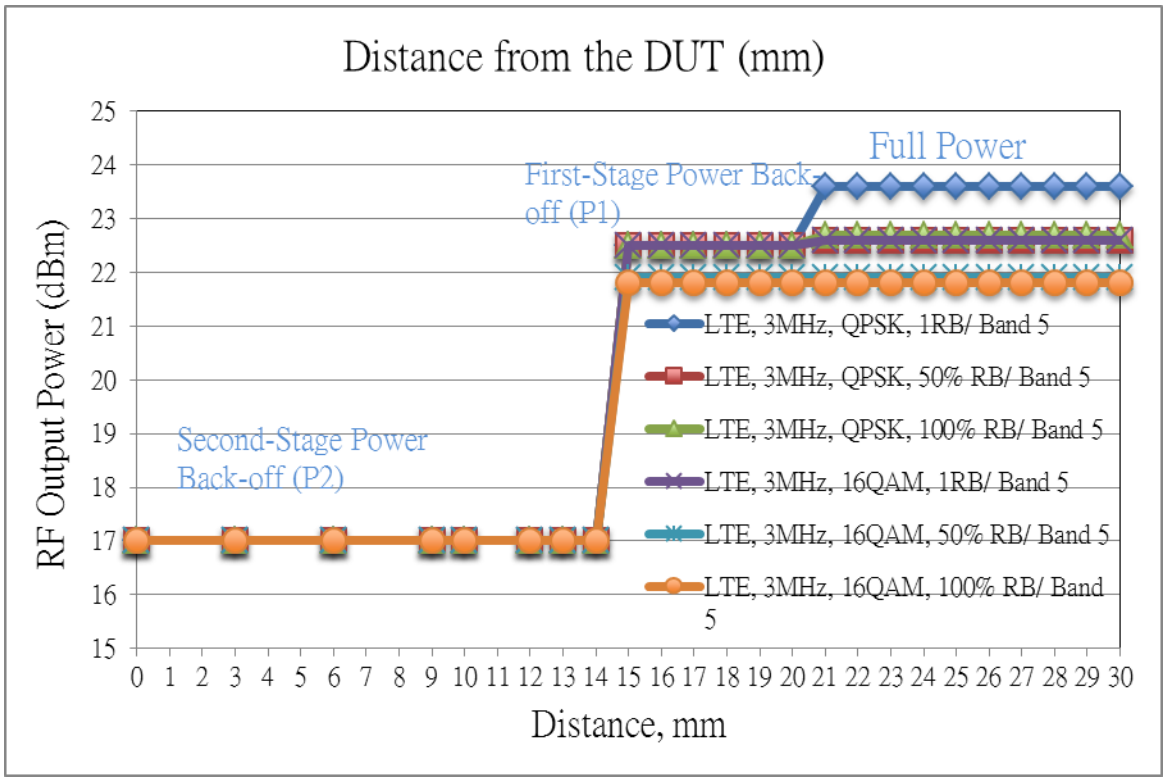


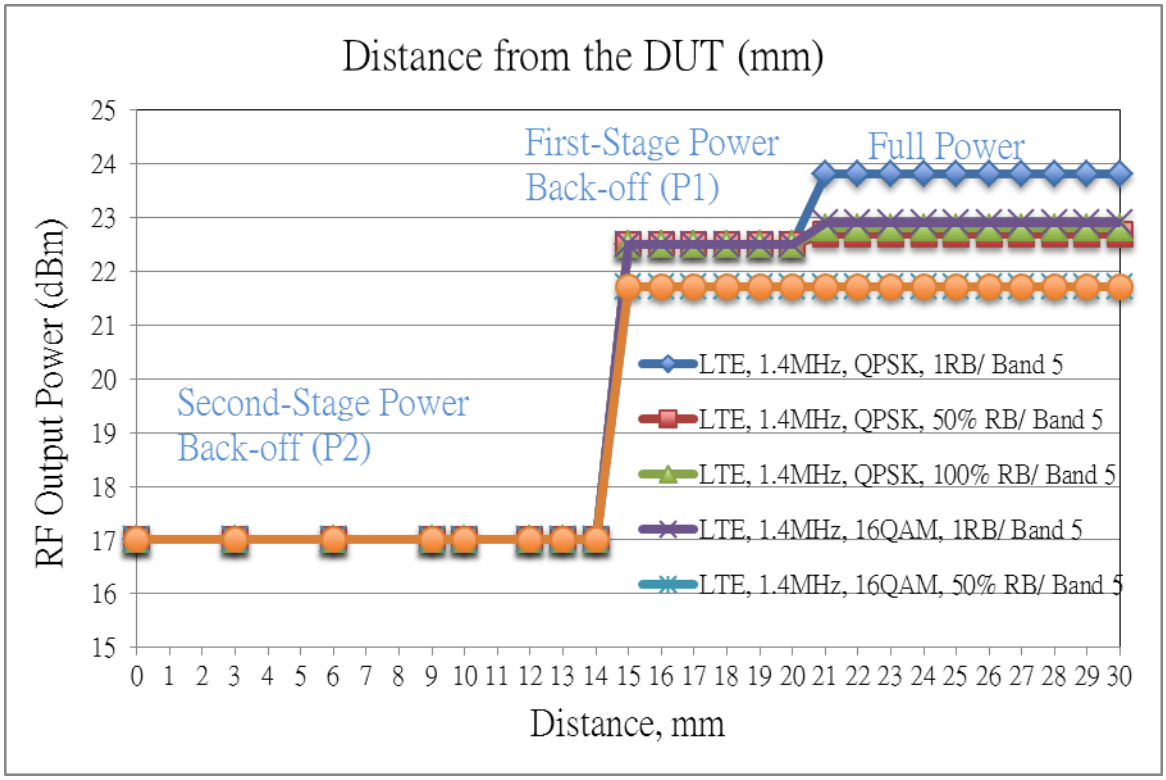


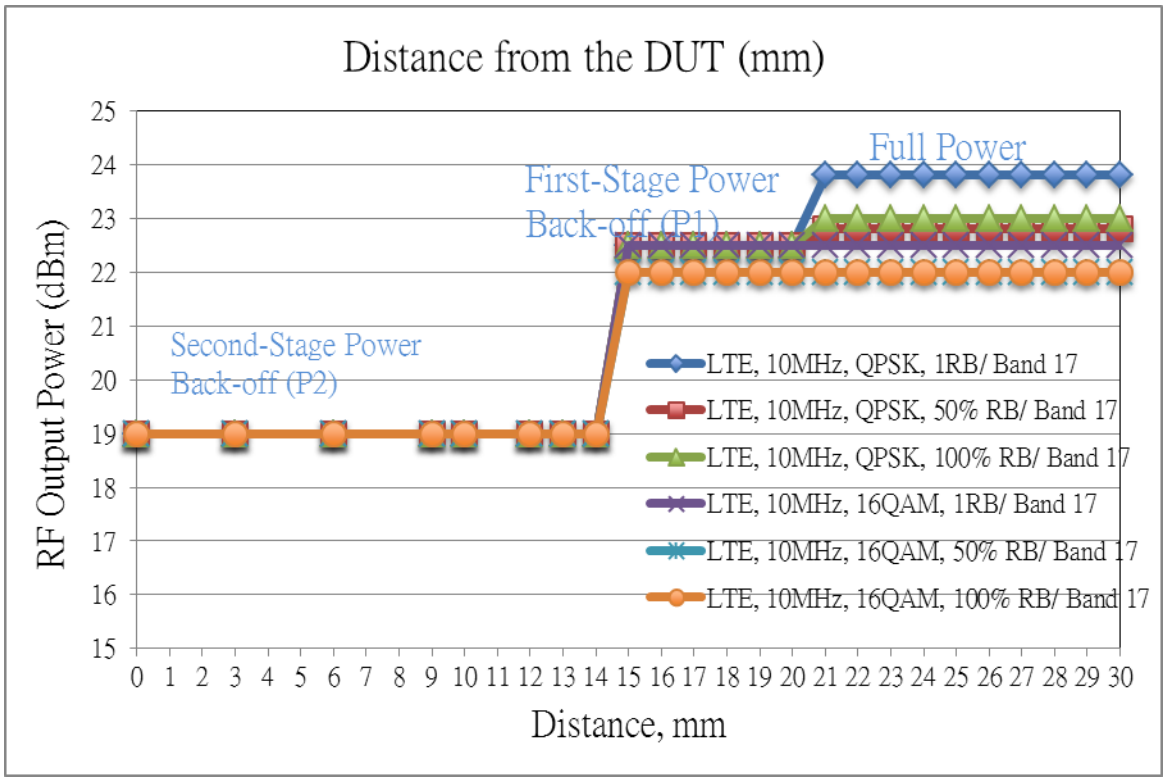


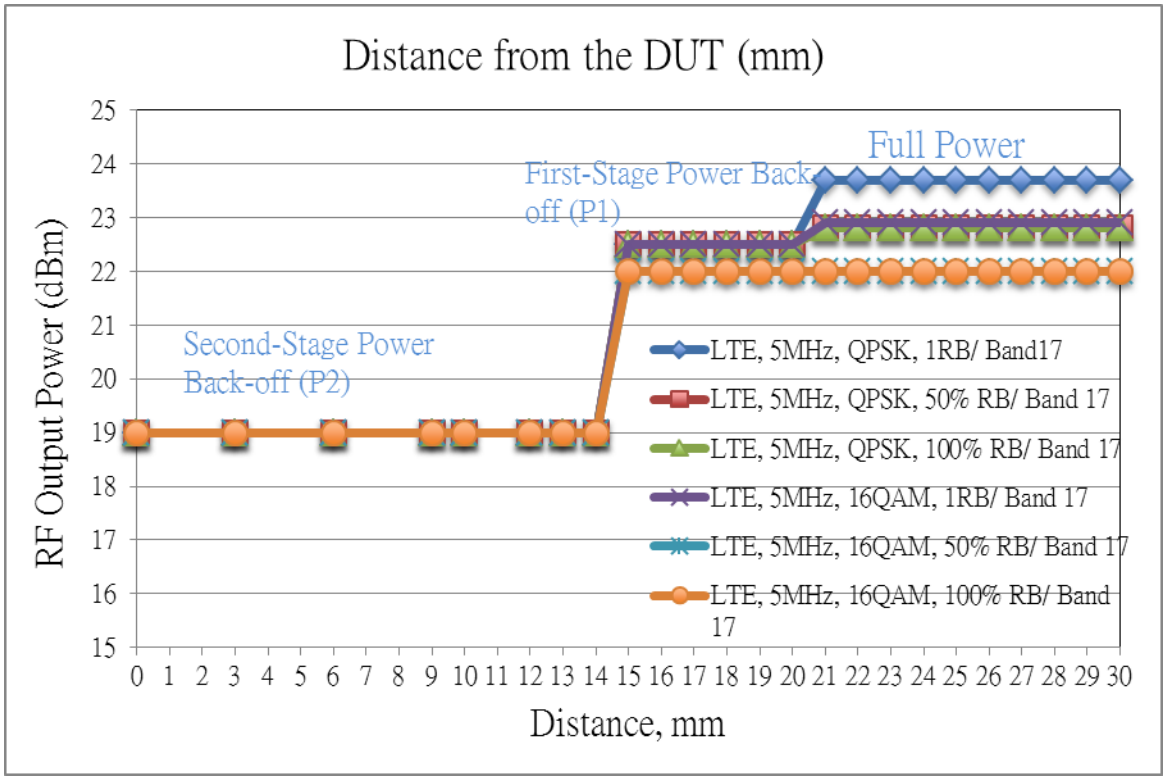












9. Exposure Conditions

Refer to Section 17 “Antenna Location and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

9.1. Body

For WiFi (Primary Antenna)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	6.47 mm	Yes	
Edge 1	181.3 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 2	93.5 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 3	3.4 mm	Yes	
Edge 4	9.8 mm	Yes	

For WiFi (Secondary Antenna)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	6.47 mm	Yes	
Edge 1	191.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 2	14.4 mm	Yes	
Edge 3	3.4 mm	Yes	
Edge 4	93.5 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)

For WWAN and LTE (Primary Antenna)

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	1.7 mm	Yes	
Edge 1	2.1 mm	Yes	
Edge 1 Tilt 18 deg	1.95 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 2	24.8 mm	Yes	
Edge 3	185.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 4	64.1 mm	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2)
Edge 1 and Edge 2 Tilt 40 deg	<25 mm	Yes	
Edge 2 Tilt 35 deg	<25 mm	Yes	

Notes:

- Edge 1 = Top Edge
- Edge 2 = Right Edge
- Edge 3 = Bottom Edge
- Edge 4 = Left Edge
- Edge 1 and Edge 2 Tilt 40 deg = Top-Edge/Right Corner Tilt 40 deg
- Edge 2 Tile 35 deg = Right Edge Tile 35 deg

10. RF Output Power Measurement

10.1. GSM850

Without Power Back-off

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	33.5	24.5	**33.0**	27.0
	190	836.6	33.5	24.5	**33.0**	27.0
	251	848.8	33.4	24.4	**33.0**	27.0

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
850	128	824.2	29.0	20.0	29.0	23.0
	190	836.6	29.0	20.0	29.0	23.0
	251	848.8	29.0	20.0	29.0	23.0

With Power Back-off

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
			Second-stage Power Back-off				First-Stage Power Back-off			
850	128	824.2	27.3	18.3	**24.5**	18.5	32.0	23.0	**31.5**	25.5
	190	836.6	27.3	18.3	**24.5**	18.5	32.0	23.0	**31.5**	25.5
	251	848.8	27.4	18.4	**24.5**	18.5	32.0	23.0	**31.5**	25.5

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
			Second-stage Power Back-off				First-Stage Power Back-off			
850	128	824.2	27.3	18.3	24.0	18.0	29.0	20.0	29.0	23.0
	190	836.6	27.3	18.3	24.0	18.0	29.0	20.0	29.0	23.0
	251	848.8	27.4	18.4	24.0	18.0	29.0	20.0	29.0	23.0

Notes:

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

- GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) Mode because its output power is less than that of GPRS Mode

10.2. GSM1900

Without Power Back-off

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	30.0	21.0	**29.4**	23.4
	661	1880.0	30.0	21.0	**29.5**	23.5
	810	1909.8	29.9	20.9	**29.5**	23.5

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
1900	512	1850.2	28.0	19.0	28.0	22.0
	661	1880.0	28.0	19.0	28.0	22.0
	810	1909.8	28.0	19.0	28.0	22.0

With Power Back-off

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
			Second-stage Power Back-off				First-Stage Power Back-off			
1900	512	1850.2	23.0	14.0	**20.3**	14.3	29.4	20.4	**26.5**	20.5
	661	1880.0	23.0	14.0	**20.3**	14.3	29.5	20.5	**26.5**	20.5
	810	1909.8	23.0	14.0	**20.3**	14.3	29.5	20.5	**26.5**	20.5

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr	1 slot	Frame Avg Pwr	2 slots	Frame Avg Pwr
			Second-stage Power Back-off				First-Stage Power Back-off			
1900	512	1850.2	23.0	14.0	20.0	14.0	28.0	19.0	26.4	20.4
	661	1880.0	23.0	14.0	20.0	14.0	28.0	19.0	26.4	20.4
	810	1909.8	23.0	14.0	20.0	14.0	28.0	19.0	26.4	20.4

Notes:

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

- GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) Mode because its output power is less than that of GPRS Mode

10.3. W-CDMA Band V

Release 99

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

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.5	17.8	23.0
		4183	836.6	24.5	17.8	23.0
		4233	846.6	24.5	17.8	23.0

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band V	Subtest 1	4132	826.4	23.6	17.8	23.0
		4183	836.6	23.5	17.8	22.9
		4233	846.6	23.6	17.7	23.0
	Subtest 2	4132	826.4	23.5	17.8	23.0
		4183	836.6	23.7	17.7	22.9
		4233	846.6	23.6	17.8	22.9
	Subtest 3	4132	826.4	23.0	17.8	23.0
		4183	836.6	23.1	17.7	22.9
		4233	846.6	23.2	17.7	22.9
	Subtest 4	4132	826.4	23.0	17.7	23.0
		4183	836.6	23.1	17.8	23.0
		4233	846.6	23.1	17.8	23.0

Maximum output power levels that are possible for all subtests reported.

Note(s):

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

HSPA (HSDPA & HSUPA)

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

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band V	Subtest 1	4132	826.4	23.5	17.8	23.0
		4183	836.6	23.6	17.8	23.0
		4233	846.6	23.6	17.8	23.0
	Subtest 2	4132	826.4	21.8	17.7	21.8
		4183	836.6	21.8	17.8	21.8
		4233	846.6	21.8	17.8	21.8
	Subtest 3	4132	826.4	22.9	17.7	22.9
		4183	836.6	22.8	17.8	22.8
		4233	846.6	22.9	17.8	22.9
	Subtest 4	4132	826.4	21.8	17.7	21.8
		4183	836.6	21.9	17.8	21.9
		4233	846.6	22.0	17.8	22.0
	Subtest 5	4132	826.4	23.5	17.7	22.9
		4183	836.6	23.5	17.8	22.9
		4233	846.6	23.6	17.7	23.0

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.

DC-HSDPA (Rel 8, CAT 24)

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

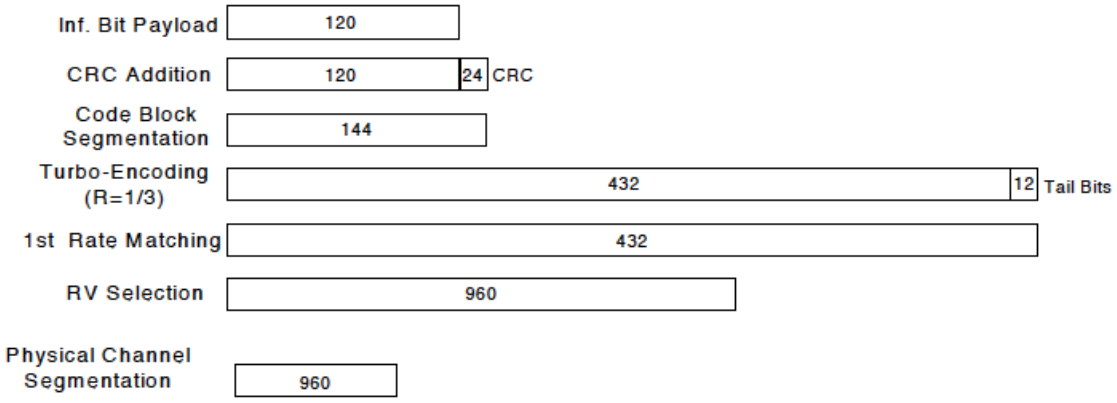


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

Up commands are set continuously to set the UE to Max power.

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band V	Subtest 1	4132	826.4	23.5	17.8	23.0
		4183	836.6	23.5	17.8	23.0
		4233	846.6	23.5	17.7	23.0
	Subtest 2	4132	826.4	23.5	17.8	23.0
		4183	836.6	23.5	17.8	23.0
		4233	846.6	23.5	17.8	22.9
	Subtest 3	4132	826.4	23.0	17.7	22.9
		4183	836.6	23.0	17.7	23.0
		4233	846.6	23.0	17.7	23.0
	Subtest 4	4132	826.4	23.0	17.8	22.9
		4183	836.6	23.0	17.8	23.0
		4233	846.6	23.0	17.7	22.9

HSPA+

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

10.4. W-CDMA Band II

Release 99

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

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA (UMTS) Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.9	13.8	20.0
		9400	1880.0	23.0	13.8	20.0
		9538	1907.6	23.0	13.8	20.0

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band II	Subtest 1	9262	1852.4	22.8	13.8	20.0
		9400	1880.0	22.9	13.8	20.0
		9538	1907.6	22.8	13.8	20.0
	Subtest 2	9262	1852.4	22.8	13.8	19.9
		9400	1880.0	22.9	13.7	19.9
		9538	1907.6	22.8	13.8	20.0
	Subtest 3	9262	1852.4	22.4	13.7	20.0
		9400	1880.0	22.5	13.7	19.9
		9538	1907.6	22.5	13.8	20.0
	Subtest 4	9262	1852.4	22.4	13.8	20.0
		9400	1880.0	22.5	13.6	20.0
		9538	1907.6	22.5	13.8	19.9

Maximum output power levels that are possible for all subtests reported.

Note(s):

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

HSPA (HSDPA & HSUPA)

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

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

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band II	Subtest 1	9262	1852.4	22.7	13.7	20.0
		9400	1880.0	22.9	13.8	20.0
		9538	1907.6	22.7	13.8	20.0
	Subtest 2	9262	1852.4	20.2	13.8	20.0
		9400	1880.0	20.5	13.8	20.0
		9538	1907.6	20.2	13.8	20.0
	Subtest 3	9262	1852.4	21.8	13.7	19.9
		9400	1880.0	21.9	13.7	20.0
		9538	1907.6	21.9	13.8	19.9
	Subtest 4	9262	1852.4	20.2	13.8	20.0
		9400	1880.0	20.5	13.7	20.0
		9538	1907.6	20.3	13.8	19.9
	Subtest 5	9262	1852.4	22.7	13.7	20.0
		9400	1880.0	22.8	13.7	20.0
		9538	1907.6	22.7	13.8	19.9

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.

DC-HSDPA (Rel 8, CAT 24)

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

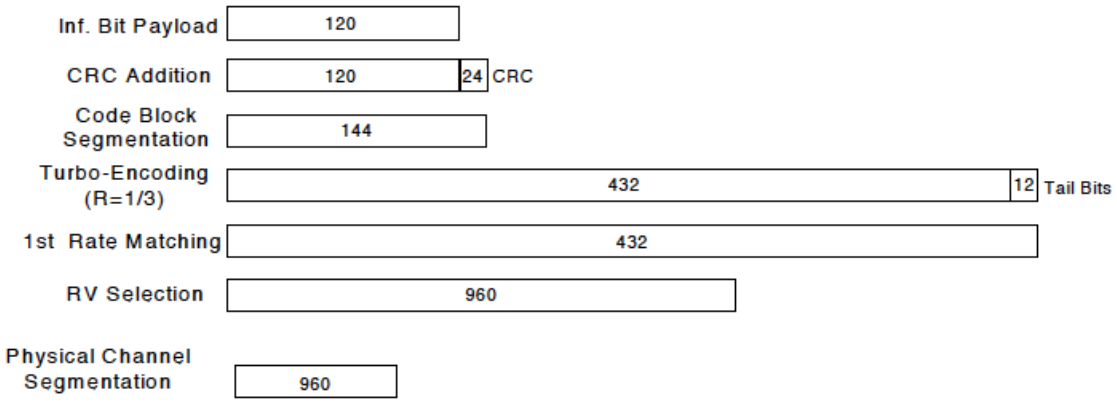


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

Up commands are set continuously to set the UE to Max power.

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Without Pwr Back-off	With Pwr Back-off	
					Second-stage	First-Stage
W-CDMA Band II	Subtest 1	9262	1852.4	23.0	13.8	20.0
		9400	1880.0	23.0	13.8	20.0
		9538	1907.6	22.9	13.8	19.9
	Subtest 2	9262	1852.4	22.9	13.7	20.0
		9400	1880.0	22.9	13.7	20.0
		9538	1907.6	22.9	13.8	20.0
	Subtest 3	9262	1852.4	22.7	13.8	19.9
		9400	1880.0	22.7	13.7	20.0
		9538	1907.6	22.6	13.8	19.9
	Subtest 4	9262	1852.4	22.6	13.8	20.0
		9400	1880.0	22.6	13.7	19.9
		9538	1907.6	22.6	13.8	20.0

HSPA+

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

10.5. LTE Band 2

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
20	18700	1860.0	QPSK	1	0	0	22.8	13.0	19.8
				1	49	0	22.7	13.0	19.7
				1	99	0	22.7	12.9	19.7
				50	0	1	21.9	13.0	19.7
				50	24	1	22.0	13.0	19.8
				50	49	1	21.8	13.0	19.7
				100	0	1	21.9	13.0	19.7
			16QAM	1	0	1	21.7	12.9	19.7
				1	49	1	21.8	13.0	19.7
				1	99	1	21.8	13.0	19.7
				50	0	2	20.7	12.9	19.7
				50	24	2	20.7	13.0	19.7
				50	49	2	20.7	13.0	19.7
				100	0	2	20.8	13.0	19.8
	18900	1880.0	QPSK	1	0	0	22.8	13.0	19.8
				1	49	0	22.8	13.0	19.8
				1	99	0	22.8	13.0	19.8
				50	0	1	22.0	13.0	19.8
				50	24	1	22.1	13.0	19.8
				50	49	1	22.0	13.0	19.7
				100	0	1	22.0	13.0	19.7
			16QAM	1	0	1	21.8	13.0	19.8
				1	49	1	21.5	13.0	19.8
				1	99	1	21.5	13.0	19.7
				50	0	2	20.8	13.0	19.8
				50	24	2	20.8	13.0	19.8
				50	49	2	20.8	13.0	19.8
				100	0	2	20.6	12.9	19.7
	19100	1900.0	QPSK	1	0	0	22.8	13.0	19.8
				1	49	0	22.7	12.9	19.7
				1	99	0	22.7	12.9	19.8
				50	0	1	21.8	13.0	19.8
				50	24	1	21.9	13.0	19.8
				50	49	1	21.8	13.0	19.7
				100	0	1	21.9	13.0	19.7
			16QAM	1	0	1	21.6	13.0	19.8
				1	49	1	21.7	13.0	19.8
				1	99	1	21.7	13.0	19.7
				50	0	2	20.7	13.0	19.8
				50	24	2	20.7	12.9	19.8
				50	49	2	20.7	12.9	19.7
				100	0	2	20.7	13.0	19.8

LTE Band 2 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
15	18675	1857.5	QPSK	1	0	0	22.8	13.0	19.8
				1	37	0	22.7	12.9	19.7
				1	74	0	22.7	12.9	19.8
				38	0	1	21.7	13.0	19.7
				38	18	1	21.7	13.0	19.8
				38	37	1	21.7	12.9	19.7
				75	0	1	21.7	12.9	19.8
			16QAM	1	0	1	21.7	13.0	19.7
				1	37	1	21.8	13.0	19.8
				1	74	1	21.8	13.0	19.8
				38	0	2	20.9	12.9	19.7
				38	18	2	20.9	12.9	19.8
				38	37	2	20.9	13.0	19.7
				75	0	2	20.8	13.0	19.8
	18900	1880.0	QPSK	1	0	0	22.8	12.8	19.8
				1	37	0	22.7	12.9	19.7
				1	74	0	22.7	12.9	19.8
				38	0	1	21.7	13.0	19.7
				38	18	1	21.8	12.8	19.8
				38	37	1	21.8	13.0	19.8
				75	0	1	21.7	13.0	19.8
			16QAM	1	0	1	21.8	12.9	19.7
				1	37	1	21.6	12.9	19.8
				1	74	1	21.6	12.8	19.7
				38	0	2	21.0	13.0	19.8
				38	18	2	21.0	13.0	19.8
				38	37	2	20.9	12.8	19.7
				75	0	2	20.9	12.9	19.8
	19125	1902.5	QPSK	1	0	0	22.7	13.0	19.7
				1	37	0	22.6	13.0	19.8
				1	74	0	22.6	13.0	19.8
				38	0	1	21.8	12.9	19.7
				38	18	1	21.9	12.9	19.8
				38	37	1	21.9	13.0	19.7
				75	0	1	21.8	13.0	19.8
			16QAM	1	0	1	21.8	13.0	19.8
				1	37	1	21.8	12.9	19.7
				1	74	1	21.8	12.8	19.8
				38	0	2	20.8	13.0	19.7
				38	18	2	20.9	13.0	19.8
				38	37	2	20.9	13.0	19.8
				75	0	2	20.8	13.0	19.7

LTE Band 2 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
10	18650	1855.0	QPSK	1	0	0	22.7	13.0	19.7
				1	24	0	22.5	13.0	19.8
				1	49	0	22.5	12.9	19.7
				25	0	1	21.7	12.9	19.8
				25	12	1	21.7	13.0	19.8
				25	24	1	21.7	13.0	19.7
				50	0	1	21.7	12.8	19.8
			16QAM	1	0	1	21.5	12.9	19.7
				1	24	1	21.5	12.9	19.8
				1	49	1	21.3	13.0	19.8
				25	0	2	20.8	12.9	19.8
				25	12	2	20.8	12.9	19.7
				25	24	2	20.7	13.0	19.8
				50	0	2	20.7	13.0	19.7
	18900	1880.0	QPSK	1	0	0	22.8	12.8	19.8
				1	24	0	22.8	12.9	19.8
				1	49	0	22.5	12.8	19.7
				25	0	1	21.7	13.0	19.7
				25	12	1	21.8	13.0	19.8
				25	24	1	21.8	12.8	19.8
				50	0	1	21.7	12.9	19.8
			16QAM	1	0	1	21.6	13.0	19.7
				1	24	1	21.6	13.0	19.8
				1	49	1	21.3	13.0	19.7
				25	0	2	20.9	12.9	19.8
				25	12	2	21.0	12.9	19.8
				25	24	2	21.0	13.0	19.7
				50	0	2	20.9	12.9	19.8
	19150	1905.0	QPSK	1	0	0	22.8	13.0	19.7
				1	24	0	22.8	13.0	19.8
				1	49	0	22.3	13.0	19.8
				25	0	1	21.8	12.9	19.7
				25	12	1	21.8	12.9	19.7
				25	24	1	21.8	13.0	19.8
				50	0	1	21.8	13.0	19.8
			16QAM	1	0	1	21.7	13.0	19.8
				1	24	1	21.7	13.0	19.7
				1	49	1	21.3	12.9	19.8
				25	0	2	20.9	12.9	19.7
				25	12	2	20.9	13.0	19.8
				25	24	2	20.9	13.0	19.8
				50	0	2	20.9	13.0	19.7

LTE Band 2 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
5	18625	1855.0	QPSK	1	0	0	22.6	13.0	19.7
				1	12	0	22.6	13.0	19.8
				1	24	0	22.6	12.8	19.8
				12	0	1	21.6	12.9	19.8
				12	6	1	21.6	12.8	19.7
				12	11	1	21.6	13.0	19.8
				25	0	1	21.6	13.0	19.7
			16QAM	1	0	1	21.7	12.8	19.8
				1	12	1	21.8	12.9	19.8
				1	24	1	21.8	13.0	19.7
				12	0	2	20.9	13.0	19.8
				12	6	2	20.9	13.0	19.7
				12	11	2	20.9	12.9	19.8
				25	0	2	20.7	12.9	19.8
	18900	1880.0	QPSK	1	0	0	22.8	13.0	19.7
				1	12	0	22.7	12.9	19.7
				1	24	0	22.7	12.8	19.8
				12	0	1	21.8	13.0	19.8
				12	6	1	21.8	13.0	19.8
				12	11	1	21.8	12.8	19.8
				25	0	1	21.8	12.9	19.8
			16QAM	1	0	1	21.8	13.0	19.7
				1	12	1	21.8	12.9	19.8
				1	24	1	21.8	13.0	19.7
				12	0	2	21.0	13.0	19.8
				12	6	2	21.0	13.0	19.8
				12	11	2	21.0	12.9	19.8
				25	0	2	20.9	12.9	19.7
	19175	1907.5	QPSK	1	0	0	22.8	13.0	19.8
				1	12	0	22.7	12.9	19.8
				1	24	0	22.7	12.8	19.7
				12	0	1	21.7	13.0	19.8
				12	6	1	21.7	12.9	19.7
				12	11	1	21.7	13.0	19.8
				25	0	1	21.7	12.9	19.8
			16QAM	1	0	1	21.8	12.8	19.7
				1	12	1	21.7	13.0	19.7
				1	24	1	21.7	12.9	19.8
				12	0	2	20.9	12.9	19.8
				12	6	2	20.9	13.0	19.8
				12	11	2	20.9	13.0	19.8
				25	0	2	20.9	13.0	19.8

LTE Band 2 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
3	18615	1851.5	QPSK	1	0	0	22.7	13.0	19.8
				1	7	0	22.6	13.0	19.8
				1	14	0	22.6	13.0	19.7
				8	0	1	21.7	12.9	19.8
				8	4	1	21.7	12.9	19.8
				8	7	1	21.7	13.0	19.7
				15	0	1	21.7	12.9	19.8
			16QAM	1	0	1	21.3	12.8	19.7
				1	7	1	21.2	13.0	19.8
				1	14	1	21.2	13.0	19.8
				8	0	2	20.8	12.8	19.7
				8	4	2	20.9	12.9	19.8
				8	7	2	20.9	13.0	19.7
				15	0	2	20.8	12.9	19.8
	18900	1880.0	QPSK	1	0	0	22.8	12.8	19.8
				1	7	0	22.7	13.0	19.7
				1	14	0	22.7	13.0	19.8
				8	0	1	21.8	12.8	19.7
				8	4	1	22.0	12.9	19.8
				8	7	1	22.0	13.0	19.8
				15	0	1	21.8	12.9	19.7
			16QAM	1	0	1	21.0	13.0	19.7
				1	7	1	21.2	12.8	19.8
				1	14	1	21.0	13.0	19.7
				8	0	2	20.9	13.0	19.8
				8	4	2	21.0	12.8	19.8
				8	7	2	21.0	12.9	19.8
				15	0	2	20.9	13.0	19.7
	19184	1908.4	QPSK	1	0	0	22.8	12.9	19.8
				1	7	0	22.6	13.0	19.8
				1	14	0	22.6	13.0	19.8
				8	0	1	21.7	12.9	19.7
				8	4	1	21.6	13.0	19.8
				8	7	1	21.6	13.0	19.8
				15	0	1	21.7	12.9	19.7
			16QAM	1	0	1	21.3	12.8	19.8
				1	7	1	21.0	13.0	19.7
				1	14	1	21.0	13.0	19.8
				8	0	2	21.0	12.8	19.8
				8	4	2	20.8	12.9	19.7
				8	7	2	20.8	13.0	19.8
				15	0	2	21.0	12.9	19.8

LTE Band 2 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
1.4	18607	1850.7	QPSK	1	0	0	22.7	13.0	19.8
				1	2	0	22.6	13.0	19.8
				1	5	0	22.7	12.8	19.7
				3	0	0	22.5	12.9	19.8
				3	1	0	22.5	13.0	19.7
				3	2	0	22.5	12.9	19.8
				6	0	1	21.5	12.8	19.8
			16QAM	1	0	1	21.6	13.0	19.7
				1	2	1	21.8	13.0	19.7
				1	5	1	21.8	12.8	19.8
				3	0	1	21.8	12.9	19.7
				3	1	1	21.8	13.0	19.8
				3	2	1	21.8	12.9	19.8
				6	0	2	20.7	13.0	19.8
	18900	1880.0	QPSK	1	0	0	22.8	12.8	19.8
				1	2	0	22.8	13.0	19.7
				1	5	0	22.7	13.0	19.8
				3	0	0	22.7	12.8	19.7
				3	1	0	22.7	12.9	19.8
				3	2	0	22.7	13.0	19.8
				6	0	1	21.5	12.9	19.8
			16QAM	1	0	1	21.7	13.0	19.8
				1	2	1	21.6	12.8	19.8
				1	5	1	21.6	13.0	19.8
				3	0	1	22.0	13.0	19.7
				3	1	1	22.0	12.8	19.8
				3	2	1	22.0	13.0	19.7
				6	0	2	20.8	12.8	19.8
	19192	1909.2	QPSK	1	0	0	22.8	13.0	19.8
				1	2	0	22.7	13.0	19.8
				1	5	0	22.7	12.8	19.8
				3	0	0	22.6	12.9	19.8
				3	1	0	22.6	13.0	19.8
				3	2	0	22.6	13.0	19.7
				6	0	1	21.5	13.0	19.7
			16QAM	1	0	1	21.5	12.8	19.8
				1	2	1	21.6	13.0	19.8
				1	5	1	21.6	13.0	19.8
				3	0	1	21.9	12.8	19.7
				3	1	1	21.9	12.9	19.7
				3	2	1	21.9	13.0	19.8
				6	0	2	20.6	12.9	19.8

10.6. LTE Band 4

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
20	20050	1720.0	QPSK	1	0	0	23.9	12.9	19.9
				1	49	0	23.9	12.9	19.9
				1	99	0	24.0	13.0	20.0
				50	0	1	23.0	12.8	19.9
				50	24	1	23.1	13.0	20.0
				50	49	1	23.0	12.9	19.9
				100	0	1	22.9	12.9	19.9
			16QAM	1	0	1	23.0	13.0	20.0
				1	49	1	23.3	12.8	19.9
				1	99	1	23.3	13.0	20.0
				50	0	2	22.1	13.0	19.8
				50	24	2	22.0	12.8	19.9
				50	49	2	22.0	13.0	20.0
				100	0	2	22.1	12.9	19.9
	20175	1732.5	QPSK	1	0	0	23.9	13.0	19.9
				1	49	0	23.9	13.0	19.9
				1	99	0	23.8	13.0	20.0
				50	0	1	23.2	13.0	19.9
				50	24	1	23.2	13.0	20.0
				50	49	1	23.1	13.0	19.8
				100	0	1	22.9	13.0	19.9
			16QAM	1	0	1	23.1	13.0	20.0
				1	49	1	23.0	13.0	19.8
				1	99	1	23.0	13.0	19.8
				50	0	2	22.2	13.0	19.9
				50	24	2	22.0	13.0	19.9
				50	49	2	22.0	13.0	20.0
				100	0	2	22.2	13.0	19.9
	20300	1745.0	QPSK	1	0	0	23.9	13.0	20.0
				1	49	0	23.9	12.9	19.9
				1	99	0	24.0	13.0	19.9
				50	0	1	22.9	13.0	20.0
				50	24	1	22.9	12.9	19.8
				50	49	1	22.9	12.8	19.8
				100	0	1	23.0	12.9	19.9
			16QAM	1	0	1	23.1	12.8	19.9
				1	49	1	23.0	12.9	20.0
				1	99	1	23.0	13.0	20.0
				50	0	2	21.9	13.0	19.8
				50	24	2	21.8	12.9	19.8
				50	49	2	21.8	12.8	19.9
				100	0	2	22.0	12.9	19.9

LTE Band 4 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
15	20025	1717.5	QPSK	1	0	0	23.9	12.9	19.9
				1	37	0	23.8	12.9	20.0
				1	74	0	23.8	13.0	19.9
				38	0	1	23.0	12.8	19.9
				38	18	1	23.0	13.0	19.9
				38	37	1	23.0	12.9	20.0
				75	0	1	22.9	12.9	19.9
			16QAM	1	0	1	22.9	12.9	20.0
				1	37	1	22.8	12.9	19.8
				1	74	1	22.8	13.0	19.9
				38	0	2	22.0	12.8	20.0
				38	18	2	22.0	12.9	19.8
				38	37	2	22.0	12.9	19.8
				75	0	2	21.9	13.0	19.9
	20175	1732.5	QPSK	1	0	0	24.0	12.8	19.9
				1	37	0	24.0	13.0	19.9
				1	74	0	24.0	12.9	20.0
				38	0	1	23.1	12.9	19.9
				38	18	1	23.2	13.0	20.0
				38	37	1	23.2	12.8	19.8
				75	0	1	23.1	13.0	19.9
			16QAM	1	0	1	23.1	12.9	20.0
				1	37	1	23.0	12.9	19.8
				1	74	1	23.0	13.0	19.8
				38	0	2	22.1	12.8	19.9
				38	18	2	22.2	13.0	19.9
				38	37	2	22.2	12.9	20.0
				75	0	2	22.0	12.9	19.9
	20325	1747.5	QPSK	1	0	0	23.8	12.9	20.0
				1	37	0	23.7	13.0	19.9
				1	74	0	23.7	12.8	19.9
				38	0	1	23.2	12.9	20.0
				38	18	1	23.2	12.9	19.8
				38	37	1	23.2	13.0	19.8
				75	0	1	22.8	12.8	19.9
			16QAM	1	0	1	23.1	13.0	19.9
				1	37	1	22.9	12.9	20.0
				1	74	1	22.9	12.9	19.9
				38	0	2	21.8	12.8	20.0
				38	18	2	21.9	13.0	19.9
				38	37	2	21.9	12.9	19.9
				75	0	2	21.8	12.9	19.9

LTE Band 4 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
10	20000	1715.0	QPSK	1	0	0	23.8	12.9	19.9
				1	24	0	23.8	12.9	19.9
				1	49	0	23.8	13.0	19.9
				25	0	1	23.4	12.8	20.0
				25	12	1	23.4	12.9	19.9
				25	24	1	23.4	12.9	20.0
				50	0	1	22.1	13.0	19.8
			16QAM	1	0	1	22.5	12.8	19.8
				1	24	1	22.4	13.0	19.9
				1	49	1	22.4	12.9	19.9
				25	0	2	22.0	12.9	19.9
				25	12	2	21.9	13.0	20.0
				25	24	2	21.9	12.8	19.9
				50	0	2	21.6	13.0	20.0
	20175	1732.5	QPSK	1	0	0	24.0	12.9	19.8
				1	24	0	24.0	12.9	19.9
				1	49	0	24.0	13.0	20.0
				25	0	1	23.3	12.8	19.8
				25	12	1	23.3	13.0	19.9
				25	24	1	23.3	12.8	20.0
				50	0	1	22.3	13.0	19.9
			16QAM	1	0	1	22.7	12.9	20.0
				1	24	1	22.6	12.9	19.8
				1	49	1	22.6	13.0	19.8
				25	0	2	21.9	12.8	19.9
				25	12	2	21.9	13.0	19.9
				25	24	2	22.0	12.9	20.0
				50	0	2	21.5	12.9	19.9
	20350	1750.0	QPSK	1	0	0	23.8	12.9	20.0
				1	24	0	23.8	13.0	19.8
				1	49	0	23.8	12.8	19.9
				25	0	1	23.4	12.9	20.0
				25	12	1	23.4	12.9	19.8
				25	24	1	23.4	13.0	19.9
				50	0	1	22.3	12.8	20.0
			16QAM	1	0	1	22.5	12.8	19.9
				1	24	1	22.4	13.0	20.0
				1	49	1	22.5	12.9	19.8
				25	0	2	21.7	12.9	20.0
				25	12	2	21.7	12.9	19.9
				25	24	2	21.7	13.0	19.9
				50	0	2	21.7	12.9	19.9

LTE Band 4 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
5	19975	1712.5	QPSK	1	0	0	23.8	13.0	19.9
				1	12	0	23.7	12.9	19.9
				1	24	0	23.8	12.9	20.0
				12	0	1	22.7	13.0	19.9
				12	6	1	22.8	12.8	20.0
				12	11	1	22.8	13.0	19.8
				25	0	1	22.7	12.9	19.9
			16QAM	1	0	1	22.9	12.9	20.0
				1	12	1	22.7	13.0	19.8
				1	24	1	22.9	12.8	20.0
				12	0	2	21.7	13.0	19.8
				12	6	2	21.7	12.8	19.9
				12	11	2	21.7	13.0	20.0
				25	0	2	21.7	12.9	19.8
	20175	1732.5	QPSK	1	0	0	24.0	12.9	19.9
				1	12	0	24.0	13.0	20.0
				1	24	0	24.0	12.8	19.9
				12	0	1	23.0	13.0	20.0
				12	6	1	23.0	12.9	19.9
				12	11	1	23.0	12.8	20.0
				25	0	1	23.0	13.0	19.9
			16QAM	1	0	1	23.0	12.9	20.0
				1	12	1	22.9	12.9	20.0
				1	24	1	22.9	13.0	19.8
				12	0	2	21.9	12.8	19.9
				12	6	2	21.9	13.0	20.0
				12	11	2	21.9	12.9	19.8
				25	0	2	21.8	12.9	19.9
	20375	1752.5	QPSK	1	0	0	23.7	12.9	20.0
				1	12	0	23.7	13.0	19.9
				1	24	0	23.7	12.8	20.0
				12	0	1	22.8	13.0	20.0
				12	6	1	22.8	12.9	19.8
				12	11	1	22.8	12.8	19.9
				25	0	1	22.6	13.0	20.0
			16QAM	1	0	1	22.5	12.9	19.8
				1	12	1	22.8	12.9	19.9
				1	24	1	22.8	13.0	20.0
				12	0	2	21.7	12.9	19.8
				12	6	2	21.7	12.9	19.9
				12	11	2	21.7	13.0	20.0
				25	0	2	21.7	12.9	19.9

LTE Band 4 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
3	19965	1711.5	QPSK	1	0	0	23.7	12.8	19.9
				1	7	0	23.7	13.0	20.0
				1	14	0	23.7	12.9	19.8
				8	0	1	22.7	12.9	19.9
				8	4	1	22.7	13.0	20.0
				8	7	1	22.7	12.8	19.8
				15	0	1	22.7	13.0	19.9
			16QAM	1	0	1	22.6	12.8	20.0
				1	7	1	22.8	13.0	19.9
				1	14	1	22.8	12.9	20.0
				8	0	2	21.8	12.9	19.9
				8	4	2	22.0	13.0	20.0
				8	7	2	22.0	12.8	19.9
				15	0	2	21.8	13.0	20.0
	20175	1732.5	QPSK	1	0	0	23.9	12.9	19.9
				1	7	0	23.9	12.8	20.0
				1	14	0	23.9	13.0	19.9
				8	0	1	22.9	12.9	20.0
				8	4	1	22.9	13.0	19.9
				8	7	1	22.8	12.9	19.9
				15	0	1	22.8	12.9	20.0
			16QAM	1	0	1	22.5	13.0	19.9
				1	7	1	22.8	12.8	20.0
				1	14	1	22.8	13.0	19.9
				8	0	2	22.2	12.9	20.0
				8	4	2	22.2	12.8	19.9
				8	7	2	22.2	13.0	19.8
				15	0	2	22.1	12.9	19.9
	20384	1753.4	QPSK	1	0	0	23.6	12.8	19.8
				1	7	0	23.6	13.0	19.9
				1	14	0	23.6	12.9	20.0
				8	0	1	22.8	13.0	19.8
				8	4	1	22.8	12.9	19.9
				8	7	1	22.8	12.8	20.0
				15	0	1	22.8	13.0	20.0
			16QAM	1	0	1	22.6	12.9	19.8
				1	7	1	22.9	12.8	19.9
				1	14	1	22.9	13.0	20.0
				8	0	2	22.0	12.9	19.8
				8	4	2	22.0	13.0	19.9
				8	7	2	22.0	13.0	20.0
				15	0	2	22.0	12.9	19.9

LTE Band 4 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
1.4	19957	1710.7	QPSK	1	0	0	23.8	13.0	19.9
				1	2	0	23.8	12.8	20.0
				1	5	0	23.8	13.0	19.9
				3	0	0	23.4	12.9	19.9
				3	1	0	23.4	12.8	20.0
				3	2	0	23.4	13.0	19.9
				6	0	1	22.6	12.9	19.8
			16QAM	1	0	1	22.8	13.0	19.9
				1	2	1	23.0	12.9	19.8
				1	5	1	23.0	12.9	19.9
				3	0	1	23.0	12.9	20.0
				3	1	1	23.0	12.8	19.9
				3	2	1	23.0	13.0	20.0
				6	0	2	21.7	12.9	19.9
	20175	1732.5	QPSK	1	0	0	24.0	13.0	20.0
				1	2	0	24.0	12.9	19.9
				1	5	0	24.0	12.9	19.9
				3	0	0	23.5	13.0	19.8
				3	1	0	23.5	12.8	19.9
				3	2	0	23.5	13.0	19.8
				6	0	1	22.7	12.9	20.0
			16QAM	1	0	1	23.0	12.8	19.9
				1	2	1	23.0	13.0	20.0
				1	5	1	22.8	13.0	19.9
				3	0	1	22.8	12.9	20.0
				3	1	1	22.8	12.8	19.9
				3	2	1	22.8	12.9	19.9
				6	0	2	21.8	13.0	20.0
	20392	1754.2	QPSK	1	0	0	23.8	12.8	19.9
				1	2	0	23.7	13.0	19.8
				1	5	0	23.7	12.9	19.9
				3	0	0	23.6	12.8	19.8
				3	1	0	23.6	13.0	19.9
				3	2	0	23.6	12.8	20.0
				6	0	1	22.6	13.0	19.9
			16QAM	1	0	1	22.8	12.9	20.0
				1	2	1	23.0	13.0	19.9
				1	5	1	23.0	12.8	20.0
				3	0	1	22.7	13.0	19.8
				3	1	1	22.7	12.9	19.9
				3	2	1	22.7	12.8	20.0
				6	0	2	21.8	13.0	19.9

10.7. LTE Band 5

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
10	20450	829.0	QPSK	1	0	0	23.8	16.9	22.4
				1	24	0	23.9	17.0	22.5
				1	49	0	23.8	16.9	22.4
				25	0	1	22.8	17.0	22.5
				25	12	1	22.8	16.9	22.5
				25	24	1	22.7	16.9	22.5
				50	0	1	22.7	16.9	22.4
			16QAM	1	0	1	22.6	17.0	22.5
				1	24	1	22.5	16.9	22.4
				1	49	1	22.6	17.0	22.5
				25	0	2	22.1	16.9	22.1
				25	12	2	22.1	16.9	22.1
				25	24	2	22.1	16.9	22.1
				50	0	2	22.1	16.9	22.1
	20525	836.5	QPSK	1	0	0	24.0	17.0	22.4
				1	24	0	23.9	17.0	22.3
				1	49	0	24.0	17.0	22.5
				25	0	1	22.8	17.0	22.5
				25	12	1	22.8	17.0	22.5
				25	24	1	22.9	17.0	22.5
				50	0	1	22.6	16.9	22.4
			16QAM	1	0	1	22.6	16.9	22.4
				1	24	1	22.5	16.9	22.3
				1	49	1	22.6	17.0	22.5
				25	0	2	22.0	16.9	22.0
				25	12	2	22.0	17.0	22.0
				25	24	2	22.0	16.9	22.0
				50	0	2	21.8	16.9	21.8
	20600	844.0	QPSK	1	0	0	23.8	17.0	22.5
				1	24	0	23.7	16.9	22.5
				1	49	0	23.7	16.9	22.3
				25	0	1	22.9	16.9	22.5
				25	12	1	22.9	17.0	22.5
				25	24	1	23.0	16.9	22.5
				50	0	1	22.7	17.0	22.4
			16QAM	1	0	1	22.5	16.9	22.5
				1	24	1	22.5	17.0	22.5
				1	49	1	22.5	16.9	22.5
				25	0	2	22.0	16.9	22.0
				25	12	2	22.1	16.9	22.1
				25	24	2	22.1	17.0	22.1
				50	0	2	22.0	16.9	22.0

LTE Band 5 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
5	20425	826.5	QPSK	1	0	0	23.8	17.0	22.5
				1	12	0	23.8	16.9	22.4
				1	24	0	23.8	16.9	22.3
				12	0	1	22.8	16.9	22.5
				12	6	1	22.8	17.0	22.5
				12	11	1	22.8	16.9	22.5
				25	0	1	22.8	17.0	22.5
			16QAM	1	0	1	23.0	16.9	22.4
				1	12	1	22.9	16.9	22.3
				1	24	1	22.9	16.9	22.5
				12	0	2	22.0	17.0	22.0
				12	6	2	22.0	17.0	22.0
				12	11	2	22.0	16.9	22.0
				25	0	2	21.7	16.9	21.7
	20525	836.5	QPSK	1	0	0	23.9	16.9	22.5
				1	12	0	23.8	17.0	22.5
				1	24	0	23.8	16.9	22.5
				12	0	1	22.8	17.0	22.5
				12	6	1	22.7	16.9	22.4
				12	11	1	22.7	16.9	22.3
				25	0	1	22.8	16.9	22.5
			16QAM	1	0	1	22.9	17.0	22.5
				1	12	1	23.0	16.9	22.5
				1	24	1	23.0	17.0	22.5
				12	0	2	21.8	16.9	21.8
				12	6	2	21.7	16.9	21.7
				12	11	2	21.7	16.9	21.7
				25	0	2	21.8	17.0	21.8
	20625	846.5	QPSK	1	0	0	24.0	16.9	22.5
				1	12	0	23.9	17.0	22.5
				1	24	0	23.9	16.9	22.4
				12	0	1	22.9	16.9	22.3
				12	6	1	23.0	16.9	22.5
				12	11	1	23.0	17.0	22.5
				25	0	1	22.9	17.0	22.5
			16QAM	1	0	1	23.0	17.0	22.5
				1	12	1	22.9	16.9	22.4
				1	24	1	22.9	16.9	22.3
				12	0	2	21.9	16.9	21.9
				12	6	2	21.9	17.0	21.9
				12	11	2	22.0	16.9	22.0
				25	0	2	21.7	17.0	21.7

LTE Band 5 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
3	20415	825.5	QPSK	1	0	0	23.8	16.9	22.5
				1	7	0	23.8	17.0	22.5
				1	14	0	23.8	16.9	22.5
				8	0	1	22.8	16.9	22.4
				8	4	1	22.8	16.9	22.3
				8	7	1	22.8	17.0	22.5
				15	0	1	22.9	17.0	22.5
			16QAM	1	0	1	22.7	16.9	22.5
				1	7	1	22.7	16.9	22.5
				1	14	1	22.6	16.9	22.5
				8	0	2	22.0	17.0	22.0
				8	4	2	22.0	16.9	22.0
				8	7	2	22.0	17.0	22.0
				15	0	2	21.8	16.9	21.8
	20525	836.5	QPSK	1	0	0	23.8	16.9	22.3
				1	7	0	23.7	16.9	22.5
				1	14	0	23.7	17.0	22.5
				8	0	1	22.7	16.9	22.5
				8	4	1	22.6	17.0	22.5
				8	7	1	22.6	16.9	22.4
				15	0	1	22.7	16.9	22.3
			16QAM	1	0	1	22.7	17.0	22.5
				1	7	1	22.6	16.9	22.5
				1	14	1	22.6	17.0	22.5
				8	0	2	21.9	16.9	21.9
				8	4	2	22.0	17.0	22.0
				8	7	2	22.0	16.9	22.0
				15	0	2	21.9	17.0	21.9
	20634	847.4	QPSK	1	0	0	23.9	16.9	22.5
				1	7	0	23.6	16.9	22.5
				1	14	0	23.6	17.0	22.5
				8	0	1	22.9	16.9	22.5
				8	4	1	23.0	17.0	22.5
				8	7	1	23.0	16.9	22.4
				15	0	1	22.9	16.9	22.3
			16QAM	1	0	1	22.8	16.9	22.5
				1	7	1	22.7	16.9	22.4
				1	14	1	22.7	16.9	22.3
				8	0	2	22.2	16.9	22.2
				8	4	2	22.2	17.0	22.2
				8	7	2	22.2	16.9	22.2
				15	0	2	22.1	17.0	22.1

LTE Band 5 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
1.4	20407	824.7	QPSK	1	0	0	23.9	16.9	22.5
				1	2	0	23.9	16.9	22.5
				1	5	0	23.9	17.0	22.5
				3	0	0	23.7	16.9	22.4
				3	1	0	23.7	17.0	22.3
				3	2	0	23.7	16.9	22.5
				6	0	1	22.7	16.9	22.5
			16QAM	1	0	1	22.7	16.9	22.5
				1	2	1	22.6	17.0	22.5
				1	5	1	22.6	16.9	22.5
				3	0	1	22.2	17.0	22.2
				3	1	1	22.2	16.9	22.2
				3	2	1	22.2	16.9	22.2
				6	0	2	21.9	17.0	21.9
	20525	836.5	QPSK	1	0	0	23.8	16.9	22.5
				1	2	0	23.8	16.9	22.5
				1	5	0	23.8	17.0	22.5
				3	0	0	23.5	16.9	22.4
				3	1	0	23.5	16.9	22.5
				3	2	0	23.5	17.0	22.4
				6	0	1	22.5	16.9	22.3
			16QAM	1	0	1	22.6	17.0	22.5
				1	2	1	22.4	16.9	22.5
				1	5	1	22.4	16.9	22.4
				3	0	1	22.3	16.9	22.3
				3	1	1	22.3	16.9	22.3
				3	2	1	22.3	16.9	22.3
				6	0	2	21.8	17.0	21.8
	20642	848.2	QPSK	1	0	0	23.9	16.9	22.5
				1	2	0	23.8	16.9	22.4
				1	5	0	23.8	17.0	22.5
				3	0	0	23.7	16.9	22.5
				3	1	0	23.7	17.0	22.5
				3	2	0	23.7	16.9	22.5
				6	0	1	22.7	16.9	22.5
			16QAM	1	0	1	22.7	16.9	22.4
				1	2	1	22.5	16.9	22.3
				1	5	1	22.5	16.9	22.5
				3	0	1	22.2	16.9	22.2
				3	1	1	22.2	17.0	22.2
				3	2	1	22.2	16.9	22.2
				6	0	2	21.9	17.0	21.9

10.8. LTE Band 17

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
10	23789	709.0	QPSK	1	0	0	23.9	19.0	22.5
				1	24	0	23.8	18.9	22.4
				1	49	0	23.8	18.9	22.4
				25	0	1	22.8	18.9	22.5
				25	12	1	22.9	19.0	22.5
				25	24	1	23.0	19.0	22.5
				50	0	1	23.0	18.9	22.5
			16QAM	1	0	1	22.6	18.9	22.4
				1	24	1	22.6	18.9	22.5
				1	49	1	22.6	18.9	22.4
				25	0	2	22.0	18.9	22.0
				25	12	2	22.0	19.0	22.0
				25	24	2	22.0	19.0	22.0
				50	0	2	21.9	18.9	21.9
	23790	710.0	QPSK	1	0	0	23.8	19.0	22.5
				1	24	0	23.9	19.0	22.5
				1	49	0	23.9	19.0	22.5
				25	0	1	22.9	18.8	22.4
				25	12	1	23.0	18.8	22.3
				25	24	1	23.0	18.9	22.4
				50	0	1	23.0	19.0	22.5
			16QAM	1	0	1	22.7	18.9	22.5
				1	24	1	22.5	18.9	22.4
				1	49	1	22.7	19.0	22.4
				25	0	2	22.0	19.0	22.0
				25	12	2	22.0	18.9	22.0
				25	24	2	22.0	19.0	22.0
				50	0	2	21.9	19.0	21.9
	23800	711.0	QPSK	1	0	0	23.9	19.0	22.4
				1	24	0	23.8	18.9	22.5
				1	49	0	23.8	18.8	22.3
				25	0	1	22.9	18.9	22.5
				25	12	1	23.0	19.0	22.5
				25	24	1	22.9	19.0	22.5
				50	0	1	23.0	18.9	22.5
			16QAM	1	0	1	22.6	18.9	22.4
				1	24	1	22.7	19.0	22.3
				1	49	1	22.7	19.0	22.4
				25	0	2	22.0	18.9	22.0
				25	12	2	22.0	18.9	22.0
				25	24	2	22.0	18.9	22.0
				50	0	2	22.0	18.9	22.0

LTE Band 17 Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Without Pwr Back-off	With Pwr Back-off	
								Second-stage	First-Stage
5	23755	706.5	QPSK	1	0	0	23.9	19.0	22.4
				1	12	0	23.9	19.0	22.3
				1	24	0	23.9	18.9	22.3
				12	0	1	22.8	18.8	22.5
				12	6	1	22.8	19.0	22.5
				12	11	1	22.8	18.9	22.5
				25	0	1	22.8	18.8	22.4
			16QAM	1	0	1	23.2	18.9	22.3
				1	12	1	23.0	19.0	22.3
				1	24	1	23.0	19.0	22.5
				12	0	2	21.9	18.9	21.9
				12	6	2	21.9	19.0	21.9
				12	11	2	21.8	18.9	21.8
				25	0	2	21.9	18.8	21.9
	23790	710.0	QPSK	1	0	0	23.7	19.0	22.5
				1	12	0	23.8	18.9	22.4
				1	24	0	23.8	18.8	22.4
				12	0	1	22.8	18.9	22.3
				12	6	1	22.9	19.0	22.3
				12	11	1	22.9	19.0	22.5
				25	0	1	22.8	18.9	22.4
			16QAM	1	0	1	22.9	18.8	22.3
				1	12	1	23.0	18.9	22.3
				1	24	1	23.0	19.0	22.5
				12	0	2	21.9	18.9	21.9
				12	6	2	21.8	18.8	21.8
				12	11	2	21.8	18.9	21.8
				25	0	2	21.7	19.0	21.7
	23825	713.5	QPSK	1	0	0	23.8	19.0	22.4
				1	12	0	23.8	18.9	22.3
				1	24	0	23.8	18.8	22.3
				12	0	1	23.1	18.9	22.5
				12	6	1	23.1	19.0	22.5
				12	11	1	23.1	19.0	22.4
				25	0	1	22.8	18.9	22.3
			16QAM	1	0	1	23.0	18.8	22.3
				1	12	1	22.9	19.0	22.4
				1	24	1	22.9	18.9	22.3
				12	0	2	21.9	18.8	21.9
				12	6	2	21.9	18.9	21.9
				12	11	2	21.9	19.0	21.9
				25	0	2	21.9	19.0	21.9

10.9. WiFi (2.4 GHz Band)

There are three Bill of Material variations of the Wi-Fi/Bluetooth Radio to support the production volumes of the device. The three BOM variants are:

- BOM # 1
- BOM # 2
- BOM # 3

The Model A1454share the same Wi-Fi/Bluetooth chipset, have the same mechanical outline (e.g., the same dimension package and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform the same specifications and to operate within the same tolerances.

Complete SAR evaluation is performed on the BOM # 1 that has the highest SAR, and then, the test is repeated for the other BOM variants at the highest peak SAR value.

Required Test Channels per KDB 248227 D01

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

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

Band (MHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	
				Primary	Secondary
2.4	802.11b	1	2412	15.9	15.9
		6	2437	16.0	16.0
		11	2462	16.0	16.0
	802.11g	1	2412	16.0	16.0
		6	2437	15.9	15.9
		11	2462	16.0	15.9
	802.11n (HT20)	1	2412	16.0	15.9
		6	2437	16.0	16.0
		11	2462	15.9	16.0

Note(s):
Per KDB 248227 D01, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.

10.10. WiFi (5 GHz Bands)

Required Test Channels per KDB 248227 D01

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.

Band (MHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	
				Primary	Secondary
5.2	802.11a	36	5180	14.0	14.0
		40	5200	13.9	14.0
		44	5220	13.9	13.9
		48	5240	13.9	13.9
	802.11n (HT20)	36	5180	13.9	14.0
		40	5200	13.9	13.9
		48	5240	13.9	13.9
	802.11n (HT40)	38	5190	12.0	12.0
		46	5230	15.5	15.5
5.3	802.11a	52	5260	16.9	17.0
		56	5280	16.9	16.9
		60	5300	16.9	16.9
		64	5320	16.0	15.9
	802.11n (HT20)	52	5260	16.9	17.0
		60	5300	16.9	16.9
		64	5320	15.9	16.0
	802.11n (HT40)	54	5270	17.0	16.9
		62	5310	11.9	11.9
5.5	802.11a	100	5500	15.5	15.5
		104	5520	16.0	16.0
		108	5540	15.9	15.9
		112	5560	15.9	15.9
		116	5580	15.9	16.0
		120	5600	15.9	15.9
		124	5620	16.0	16.0
		128	5640	16.0	16.0
		132	5660	16.0	16.0
		136	5680	16.0	16.0
		140	5700	15.5	15.5
	802.11n (HT20)	100	5500	15.5	15.5
		104	5520	16.0	15.9
		116	5580	15.9	15.9
		136	5680	16.0	16.0
		140	5700	14.5	14.5
	802.11n (HT40)	102	5510	12.5	12.5
		110	5550	16.0	16.0
		134	5670	16.0	16.0
5.8	802.11a	149	5745	15.9	16.0
		153	5765	15.9	15.9
		157	5785	15.9	16.0
		161	5805	15.9	15.9
		165	5825	16.0	16.0
	802.11n (HT20)	149	5745	16.0	16.0
		157	5785	16.0	16.0
		165	5825	16.0	15.9
	802.11n (HT40)	151	5755	16.0	15.9
		159	5795	15.9	15.9

Note(s):

Per KDB 248227 D01, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.

10.11. Bluetooth

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
V2.1 + EDR, GFSK	0	2402	11.8	15.14
	39	2441	12.0	15.85
	78	2480	11.9	15.49
V2.1 + EDR, π/4 DQPSK	0	2402	9.5	8.91
	39	2441	9.3	8.51
	78	2480	9.4	8.71
V2.1 + EDR, 8-DPSK	0	2402	9.0	7.94
	39	2441	9.5	8.91
	78	2480	9.5	8.91
V4.0 LE, GFSK	0	2402	7.9	6.17
	19	2440	7.8	6.03
	39	2480	7.8	6.03

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

MSL/HSL750 (Body and Head liquids for 700 – 800 MHz)

Item	Head Tissue Simulation Liquids HSL750 Muscle (body) Tissue Simulation Liquids MSL750
Type No	SL AAH 075
Manufacturer	SPEAG
The item is composed of the following ingredients:	
H^2O	Water, 35 – 58%
Sucrese	Sugar, white, refined, 40-60%
NaCl	Sodium Chloride, 0-6%
Hydroxyethel-cellulsoe	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone, 0.1-0.7%

MSL/HSL1750 (Body and Head liquids for 1700 – 1800 MHz)

Item	Head Tissue Simulation Liquids HSL1750 Muscle (body) Tissue Simulation Liquids MSL1750
Type No	SL AAM 175
Manufacturer	SPEAG
-The item is composed of the following ingredients:	
H^2O	Water, 52 – 75%
C8H18O3	Diethylene glycol monobutyl ether (DGBE), 25-48%
NaCl	Sodium Chloride, <1.0%

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.

SAR Room A

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/2/2012	Body 5180	e'	47.4227	Relative Permittivity (ε_r):	47.42	49.05	-3.31	10
		e''	18.5990	Conductivity (σ):	5.36	5.27	1.62	5
	Body 5200	e'	47.4484	Relative Permittivity (ε_r):	47.45	49.02	-3.21	10
		e''	18.5067	Conductivity (σ):	5.35	5.29	1.06	5
	Body 5500	e'	46.9694	Relative Permittivity (ε_r):	46.97	48.61	-3.38	10
		e''	18.7858	Conductivity (σ):	5.75	5.64	1.78	5
	Body 5800	e'	46.5704	Relative Permittivity (ε_r):	46.57	48.20	-3.38	10
		e''	18.8566	Conductivity (σ):	6.08	6.00	1.35	5
	Body 5825	e'	46.3940	Relative Permittivity (ε_r):	46.39	48.20	-3.75	10
		e''	19.1079	Conductivity (σ):	6.19	6.00	3.15	5
8/6/2012	Body 5180	e'	45.9306	Relative Permittivity (ε_r):	45.93	49.05	-6.35	10
		e''	17.6803	Conductivity (σ):	5.09	5.27	-3.40	5
	Body 5200	e'	45.9133	Relative Permittivity (ε_r):	45.91	49.02	-6.34	10
		e''	17.7380	Conductivity (σ):	5.13	5.29	-3.14	5
	Body 5500	e'	45.4718	Relative Permittivity (ε_r):	45.47	48.61	-6.46	10
		e''	17.7883	Conductivity (σ):	5.44	5.64	-3.62	5
	Body 5800	e'	44.9462	Relative Permittivity (ε_r):	44.95	48.20	-6.75	10
		e''	18.0618	Conductivity (σ):	5.82	6.00	-2.92	5
	Body 5825	e'	44.9319	Relative Permittivity (ε_r):	44.93	48.20	-6.78	10
		e''	17.9827	Conductivity (σ):	5.82	6.00	-2.93	5
8/7/2012	Body 5180	e'	47.4889	Relative Permittivity (ε_r):	47.49	49.05	-3.18	10
		e''	18.7223	Conductivity (σ):	5.39	5.27	2.30	5
	Body 5200	e'	47.4517	Relative Permittivity (ε_r):	47.45	49.02	-3.20	10
		e''	18.7441	Conductivity (σ):	5.42	5.29	2.36	5
	Body 5500	e'	46.8770	Relative Permittivity (ε_r):	46.88	48.61	-3.57	10
		e''	19.0817	Conductivity (σ):	5.84	5.64	3.39	5
	Body 5800	e'	46.2821	Relative Permittivity (ε_r):	46.28	48.20	-3.98	10
		e''	18.2845	Conductivity (σ):	5.90	6.00	-1.72	5
	Body 5825	e'	46.1998	Relative Permittivity (ε_r):	46.20	48.20	-4.15	10
		e''	19.4270	Conductivity (σ):	6.29	6.00	4.87	5
8/8/2012	Body 5180	e'	48.6849	Relative Permittivity (ε_r):	48.68	49.05	-0.74	10
		e''	18.4545	Conductivity (σ):	5.32	5.27	0.83	5
	Body 5200	e'	48.6780	Relative Permittivity (ε_r):	48.68	49.02	-0.70	10
		e''	18.6699	Conductivity (σ):	5.40	5.29	1.95	5
	Body 5500	e'	48.2502	Relative Permittivity (ε_r):	48.25	48.61	-0.75	10
		e''	18.7538	Conductivity (σ):	5.74	5.64	1.61	5
	Body 5800	e'	47.7486	Relative Permittivity (ε_r):	47.75	48.20	-0.94	10
		e''	18.9256	Conductivity (σ):	6.10	6.00	1.72	5
	Body 5825	e'	47.5942	Relative Permittivity (ε_r):	47.59	48.20	-1.26	10
		e''	18.9113	Conductivity (σ):	6.13	6.00	2.09	5

Tissue Dielectric Parameter Check Results (continued)
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Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/9/2012	Body 5180	e'	50.0167	Relative Permittivity (ϵ_r):	50.02	49.05	1.98	10
		e"	17.7958	Conductivity (σ):	5.13	5.27	-2.77	5
	Body 5200	e'	50.0766	Relative Permittivity (ϵ_r):	50.08	49.02	2.16	10
		e"	17.6202	Conductivity (σ):	5.09	5.29	-3.78	5
	Body 5500	e'	49.5195	Relative Permittivity (ϵ_r):	49.52	48.61	1.86	10
		e"	17.9877	Conductivity (σ):	5.50	5.64	-2.54	5
	Body 5800	e'	49.0135	Relative Permittivity (ϵ_r):	49.01	48.20	1.69	10
		e"	18.2035	Conductivity (σ):	5.87	6.00	-2.16	5
	Body 5825	e'	49.2007	Relative Permittivity (ϵ_r):	49.20	48.20	2.08	10
		e"	18.3558	Conductivity (σ):	5.95	6.00	-0.91	5
8/10/2012	Body 5180	e'	51.1145	Relative Permittivity (ϵ_r):	51.11	49.05	4.22	10
		e"	17.5871	Conductivity (σ):	5.07	5.27	-3.91	5
	Body 5200	e'	51.2692	Relative Permittivity (ϵ_r):	51.27	49.02	4.59	10
		e"	17.6231	Conductivity (σ):	5.10	5.29	-3.76	5
	Body 5500	e'	50.8285	Relative Permittivity (ϵ_r):	50.83	48.61	4.56	10
		e"	17.8928	Conductivity (σ):	5.47	5.64	-3.06	5
	Body 5800	e'	50.3047	Relative Permittivity (ϵ_r):	50.30	48.20	4.37	10
		e"	18.0492	Conductivity (σ):	5.82	6.00	-2.99	5
	Body 5825	e'	50.3342	Relative Permittivity (ϵ_r):	50.33	48.20	4.43	10
		e"	18.1567	Conductivity (σ):	5.88	6.00	-1.99	5
8/14/2012	Body 5180	e'	48.2465	Relative Permittivity (ϵ_r):	48.25	49.05	-1.63	10
		e"	18.5287	Conductivity (σ):	5.34	5.27	1.24	5
	Body 5200	e'	48.2196	Relative Permittivity (ϵ_r):	48.22	49.02	-1.63	10
		e"	18.4492	Conductivity (σ):	5.33	5.29	0.75	5
	Body 5500	e'	47.6249	Relative Permittivity (ϵ_r):	47.62	48.61	-2.03	10
		e"	18.7309	Conductivity (σ):	5.73	5.64	1.48	5
	Body 5800	e'	47.1676	Relative Permittivity (ϵ_r):	47.17	48.20	-2.14	10
		e"	19.0745	Conductivity (σ):	6.15	6.00	2.52	5
	Body 5825	e'	47.3040	Relative Permittivity (ϵ_r):	47.30	48.20	-1.86	10
		e"	18.8947	Conductivity (σ):	6.12	6.00	2.00	5
8/15/2012	Body 5180	e'	48.5995	Relative Permittivity (ϵ_r):	48.60	49.05	-0.91	10
		e"	18.3943	Conductivity (σ):	5.30	5.27	0.50	5
	Body 5200	e'	48.4594	Relative Permittivity (ϵ_r):	48.46	49.02	-1.14	10
		e"	18.3836	Conductivity (σ):	5.32	5.29	0.39	5
	Body 5500	e'	48.1153	Relative Permittivity (ϵ_r):	48.12	48.61	-1.02	10
		e"	18.5137	Conductivity (σ):	5.66	5.64	0.31	5
	Body 5800	e'	47.4977	Relative Permittivity (ϵ_r):	47.50	48.20	-1.46	10
		e"	18.6150	Conductivity (σ):	6.00	6.00	0.06	5
	Body 5825	e'	47.5856	Relative Permittivity (ϵ_r):	47.59	48.20	-1.27	10
		e"	18.7032	Conductivity (σ):	6.06	6.00	0.96	5
8/16/2012	Body 5180	e'	48.7118	Relative Permittivity (ϵ_r):	48.71	49.05	-0.68	10
		e"	18.7163	Conductivity (σ):	5.39	5.27	2.26	5
	Body 5200	e'	48.6713	Relative Permittivity (ϵ_r):	48.67	49.02	-0.71	10
		e"	18.7227	Conductivity (σ):	5.41	5.29	2.24	5
	Body 5500	e'	48.2723	Relative Permittivity (ϵ_r):	48.27	48.61	-0.70	10
		e"	18.8955	Conductivity (σ):	5.78	5.64	2.38	5
	Body 5800	e'	47.7244	Relative Permittivity (ϵ_r):	47.72	48.20	-0.99	10
		e"	18.9997	Conductivity (σ):	6.13	6.00	2.12	5
	Body 5825	e'	47.6267	Relative Permittivity (ϵ_r):	47.63	48.20	-1.19	10
		e"	19.0521	Conductivity (σ):	6.17	6.00	2.85	5

Tissue Dielectric Parameter Check Results (continued)
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Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/17/2012	Body 5180	e'	47.9306	Relative Permittivity (ϵ_r):	47.93	49.05	-2.28	10
		e''	18.5457	Conductivity (σ):	5.34	5.27	1.33	5
	Body 5200	e'	47.8616	Relative Permittivity (ϵ_r):	47.86	49.02	-2.36	10
		e''	18.6181	Conductivity (σ):	5.38	5.29	1.67	5
	Body 5500	e'	47.4940	Relative Permittivity (ϵ_r):	47.49	48.61	-2.30	10
		e''	18.6422	Conductivity (σ):	5.70	5.64	1.00	5
	Body 5800	e'	47.0629	Relative Permittivity (ϵ_r):	47.06	48.20	-2.36	10
		e''	18.8077	Conductivity (σ):	6.07	6.00	1.09	5
	Body 5825	e'	46.8756	Relative Permittivity (ϵ_r):	46.88	48.20	-2.75	10
		e''	18.7591	Conductivity (σ):	6.08	6.00	1.26	5
8/20/2012	Body 5180	e'	47.8111	Relative Permittivity (ϵ_r):	47.81	49.05	-2.52	10
		e''	18.0955	Conductivity (σ):	5.21	5.27	-1.13	5
	Body 5200	e'	47.8668	Relative Permittivity (ϵ_r):	47.87	49.02	-2.35	10
		e''	18.3031	Conductivity (σ):	5.29	5.29	-0.05	5
	Body 5500	e'	47.3897	Relative Permittivity (ϵ_r):	47.39	48.61	-2.52	10
		e''	18.5210	Conductivity (σ):	5.66	5.64	0.35	5
	Body 5800	e'	46.9527	Relative Permittivity (ϵ_r):	46.95	48.20	-2.59	10
		e''	18.7964	Conductivity (σ):	6.06	6.00	1.03	5
	Body 5825	e'	46.9368	Relative Permittivity (ϵ_r):	46.94	48.20	-2.62	10
		e''	18.7242	Conductivity (σ):	6.06	6.00	1.08	5
9/11/2012	Body 750	e'	54.3139	Relative Permittivity (ϵ_r):	54.31	55.55	-2.22	5
		e''	22.5117	Conductivity (σ):	0.94	0.96	-2.52	5
	Body 775	e'	54.0175	Relative Permittivity (ϵ_r):	54.02	55.45	-2.58	5
		e''	22.3051	Conductivity (σ):	0.96	0.97	-0.40	5
	Body 780	e'	53.9582	Relative Permittivity (ϵ_r):	53.96	55.43	-2.66	5
		e''	22.2677	Conductivity (σ):	0.97	0.97	0.04	5
	Body 790	e'	53.8452	Relative Permittivity (ϵ_r):	53.85	55.39	-2.79	5
		e''	22.2007	Conductivity (σ):	0.98	0.97	0.94	5
9/12/2012	Body 750	e'	54.0397	Relative Permittivity (ϵ_r):	54.04	55.55	-2.71	5
		e''	22.3758	Conductivity (σ):	0.93	0.96	-3.11	5
	Body 775	e'	53.8920	Relative Permittivity (ϵ_r):	53.89	55.45	-2.81	5
		e''	22.4613	Conductivity (σ):	0.97	0.97	0.30	5
	Body 780	e'	53.6930	Relative Permittivity (ϵ_r):	53.69	55.43	-3.14	5
		e''	22.4774	Conductivity (σ):	0.97	0.97	0.98	5
	Body 790	e'	53.7091	Relative Permittivity (ϵ_r):	53.71	55.39	-3.04	5
		e''	22.1688	Conductivity (σ):	0.97	0.97	0.79	5
9/13/2012	Body 1750	e'	53.3021	Relative Permittivity (ϵ_r):	53.30	53.44	-0.26	5
		e''	15.0186	Conductivity (σ):	1.46	1.49	-1.67	5
	Body 1710	e'	53.4405	Relative Permittivity (ϵ_r):	53.44	53.54	-0.19	5
		e''	14.9032	Conductivity (σ):	1.42	1.46	-3.05	5
	Body 1735	e'	53.3448	Relative Permittivity (ϵ_r):	53.34	53.48	-0.25	5
		e''	14.9767	Conductivity (σ):	1.44	1.48	-2.17	5
	Body 1755	e'	53.2889	Relative Permittivity (ϵ_r):	53.29	53.43	-0.26	5
		e''	15.0319	Conductivity (σ):	1.47	1.49	-1.50	5
9/13/2012	Body 750	e'	54.8665	Relative Permittivity (ϵ_r):	54.87	55.55	-1.22	5
		e''	22.6119	Conductivity (σ):	0.94	0.96	-2.09	5
	Body 775	e'	54.5872	Relative Permittivity (ϵ_r):	54.59	55.45	-1.56	5
		e''	22.4568	Conductivity (σ):	0.97	0.97	0.28	5
	Body 780	e'	54.4349	Relative Permittivity (ϵ_r):	54.43	55.43	-1.80	5
		e''	22.2704	Conductivity (σ):	0.97	0.97	0.05	5
	Body 790	e'	54.4907	Relative Permittivity (ϵ_r):	54.49	55.39	-1.63	5
		e''	22.2545	Conductivity (σ):	0.98	0.97	1.18	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room A

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9/14/2012	Body 1750	e'	52.7972	Relative Permittivity (ϵ_r):	52.80	53.44	-1.20	5
		e''	15.3234	Conductivity (σ):	1.49	1.49	0.33	5
	Body 1710	e'	52.9016	Relative Permittivity (ϵ_r):	52.90	53.54	-1.20	5
		e''	15.2159	Conductivity (σ):	1.45	1.46	-1.01	5
	Body 1735	e'	52.8489	Relative Permittivity (ϵ_r):	52.85	53.48	-1.18	5
		e''	15.2815	Conductivity (σ):	1.47	1.48	-0.18	5
	Body 1755	e'	52.7773	Relative Permittivity (ϵ_r):	52.78	53.43	-1.22	5
		e''	15.3330	Conductivity (σ):	1.50	1.49	0.47	5
9/17/2012	Body 1720	e'	53.3382	Relative Permittivity (ϵ_r):	53.34	53.52	-0.34	5
		e''	15.6414	Conductivity (σ):	1.50	1.47	1.92	5
	Body 1735	e'	53.2518	Relative Permittivity (ϵ_r):	53.25	53.48	-0.43	5
		e''	15.6572	Conductivity (σ):	1.51	1.48	2.27	5
	Body 1750	e'	53.1986	Relative Permittivity (ϵ_r):	53.20	53.44	-0.45	5
		e''	15.6440	Conductivity (σ):	1.52	1.49	2.43	5
	Body 1755	e'	53.2629	Relative Permittivity (ϵ_r):	53.26	53.43	-0.31	5
		e''	15.7381	Conductivity (σ):	1.54	1.49	3.13	5
9/18/2012	Body 1720	e'	51.8315	Relative Permittivity (ϵ_r):	51.83	53.52	-3.15	5
		e''	15.1231	Conductivity (σ):	1.45	1.47	-1.46	5
	Body 1735	e'	51.7787	Relative Permittivity (ϵ_r):	51.78	53.48	-3.18	5
		e''	15.0047	Conductivity (σ):	1.45	1.48	-1.99	5
	Body 1750	e'	51.6769	Relative Permittivity (ϵ_r):	51.68	53.44	-3.30	5
		e''	15.1077	Conductivity (σ):	1.47	1.49	-1.08	5
	Body 1755	e'	51.5405	Relative Permittivity (ϵ_r):	51.54	53.43	-3.53	5
		e''	15.1328	Conductivity (σ):	1.48	1.49	-0.84	5
9/19/2012	Body 1720	e'	51.9610	Relative Permittivity (ϵ_r):	51.96	53.52	-2.91	5
		e''	15.0553	Conductivity (σ):	1.44	1.47	-1.90	5
	Body 1735	e'	51.9747	Relative Permittivity (ϵ_r):	51.97	53.48	-2.81	5
		e''	15.1696	Conductivity (σ):	1.46	1.48	-0.91	5
	Body 1750	e'	51.9086	Relative Permittivity (ϵ_r):	51.91	53.44	-2.87	5
		e''	15.2208	Conductivity (σ):	1.48	1.49	-0.34	5
	Body 1755	e'	51.8599	Relative Permittivity (ϵ_r):	51.86	53.43	-2.94	5
		e''	15.2138	Conductivity (σ):	1.48	1.49	-0.31	5
9/20/2012	Body 750	e'	53.5584	Relative Permittivity (ϵ_r):	53.56	55.55	-3.58	5
		e''	22.3617	Conductivity (σ):	0.93	0.96	-3.17	5
	Body 775	e'	53.2733	Relative Permittivity (ϵ_r):	53.27	55.45	-3.93	5
		e''	22.0728	Conductivity (σ):	0.95	0.97	-1.43	5
	Body 780	e'	53.2180	Relative Permittivity (ϵ_r):	53.22	55.43	-3.99	5
		e''	22.1350	Conductivity (σ):	0.96	0.97	-0.56	5
	Body 790	e'	52.9820	Relative Permittivity (ϵ_r):	52.98	55.39	-4.35	5
		e''	22.0531	Conductivity (σ):	0.97	0.97	0.27	5

Tissue Dielectric Parameter Check Results (continued)
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Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/6/2012	Body 5180	e'	50.3505	Relative Permittivity (ϵ_r):	50.35	49.05	2.66	10
		e"	18.5802	Conductivity (σ):	5.35	5.27	1.52	5
	Body 5200	e'	50.3299	Relative Permittivity (ϵ_r):	50.33	49.02	2.67	10
		e"	18.7169	Conductivity (σ):	5.41	5.29	2.21	5
	Body 5500	e'	49.6953	Relative Permittivity (ϵ_r):	49.70	48.61	2.23	10
		e"	18.9396	Conductivity (σ):	5.79	5.64	2.62	5
	Body 5800	e'	49.1173	Relative Permittivity (ϵ_r):	49.12	48.20	1.90	10
		e"	19.2398	Conductivity (σ):	6.20	6.00	3.41	5
	Body 5825	e'	49.1851	Relative Permittivity (ϵ_r):	49.19	48.20	2.04	10
		e"	19.2203	Conductivity (σ):	6.23	6.00	3.75	5
8/7/2012	Body 5180	e'	49.3549	Relative Permittivity (εr):	49.35	49.05	0.63	10
		e"	18.4870	Conductivity (σ):	5.32	5.27	1.01	5
	Body 5200	e'	49.3064	Relative Permittivity (εr):	49.31	49.02	0.59	10
		e"	18.5200	Conductivity (σ):	5.35	5.29	1.14	5
	Body 5500	e'	48.7311	Relative Permittivity (εr):	48.73	48.61	0.24	10
		e"	18.9555	Conductivity (σ):	5.80	5.64	2.70	5
	Body 5800	e'	48.1185	Relative Permittivity (εr):	48.12	48.20	-0.17	10
		21	19.2494	Conductivity (σ):	6.21	6.00	3.46	5
	Body 5825	e'	48.0361	Relative Permittivity (εr):	48.04	48.20	-0.34	10
		e"	19.3698	Conductivity (σ):	6.27	6.00	4.56	5
8/8/2012	Body 5180	e'	48.8628	Relative Permittivity (ϵ_r):	48.86	49.05	-0.37	10
		e"	18.3911	Conductivity (σ):	5.30	5.27	0.49	5
	Body 5200	e'	48.8719	Relative Permittivity (ϵ_r):	48.87	49.02	-0.30	10
		e"	18.4319	Conductivity (σ):	5.33	5.29	0.65	5
	Body 5500	e'	48.3374	Relative Permittivity (ϵ_r):	48.34	48.61	-0.57	10
		e"	18.8451	Conductivity (σ):	5.76	5.64	2.10	5
	Body 5800	e'	47.7311	Relative Permittivity (ϵ_r):	47.73	48.20	-0.97	10
		e"	18.9198	Conductivity (σ):	6.10	6.00	1.69	5
	Body 5825	e'	47.5038	Relative Permittivity (ϵ_r):	47.50	48.20	-1.44	10
		e"	18.9680	Conductivity (σ):	6.14	6.00	2.39	5
8/9/2012	Body 5180	e'	50.1412	Relative Permittivity (ϵ_r):	50.14	49.05	2.23	10
		e"	17.6598	Conductivity (σ):	5.09	5.27	-3.51	5
	Body 5200	e'	50.1077	Relative Permittivity (ϵ_r):	50.11	49.02	2.22	10
		e"	17.5405	Conductivity (σ):	5.07	5.29	-4.21	5
	Body 5500	e'	49.6400	Relative Permittivity (ϵ_r):	49.64	48.61	2.11	10
		e"	17.9349	Conductivity (σ):	5.48	5.64	-2.83	5
	Body 5800	e'	49.1484	Relative Permittivity (ϵ_r):	49.15	48.20	1.97	10
		e"	18.1093	Conductivity (σ):	5.84	6.00	-2.66	5
	Body 5825	e'	49.1677	Relative Permittivity (ϵ_r):	49.17	48.20	2.01	10
		e"	18.1718	Conductivity (σ):	5.89	6.00	-1.91	5
8/10/2012	Body 5180	e'	48.0484	Relative Permittivity (ϵ_r):	48.05	49.05	-2.04	10
		e"	17.4752	Conductivity (σ):	5.03	5.27	-4.52	5
	Body 5200	e'	48.1015	Relative Permittivity (ϵ_r):	48.10	49.02	-1.87	10
		e"	17.4428	Conductivity (σ):	5.04	5.29	-4.75	5
	Body 5500	e'	47.6570	Relative Permittivity (ϵ_r):	47.66	48.61	-1.97	10
		e"	17.7340	Conductivity (σ):	5.42	5.64	-3.92	5
	Body 5800	e'	47.1026	Relative Permittivity (ϵ_r):	47.10	48.20	-2.28	10
		e"	17.8650	Conductivity (σ):	5.76	6.00	-3.98	5
	Body 5825	e'	49.1207	Relative Permittivity (ϵ_r):	49.12	48.20	1.91	10
		e"	17.9714	Conductivity (σ):	5.82	6.00	-2.99	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room B

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/13/2012	Body 5180	e'	48.5028	Relative Permittivity (ϵ_r):	48.50	49.05	-1.11	10
		e''	18.2468	Conductivity (σ):	5.26	5.27	-0.30	5
	Body 5200	e'	48.3370	Relative Permittivity (ϵ_r):	48.34	49.02	-1.39	10
		e''	18.3525	Conductivity (σ):	5.31	5.29	0.22	5
	Body 5500	e'	47.8479	Relative Permittivity (ϵ_r):	47.85	48.61	-1.57	10
		e''	18.5103	Conductivity (σ):	5.66	5.64	0.29	5
	Body 5800	e'	47.4264	Relative Permittivity (ϵ_r):	47.43	48.20	-1.60	10
		e''	18.6197	Conductivity (σ):	6.00	6.00	0.08	5
	Body 5825	e'	47.4995	Relative Permittivity (ϵ_r):	47.50	48.20	-1.45	10
		e''	18.5146	Conductivity (σ):	6.00	6.00	-0.06	5
8/14/2012	Body 5180	e'	49.0752	Relative Permittivity (ϵ_r):	49.08	49.05	0.06	10
		e''	17.7595	Conductivity (σ):	5.12	5.27	-2.96	5
	Body 5200	e'	49.0160	Relative Permittivity (ϵ_r):	49.02	49.02	-0.01	10
		e''	17.8327	Conductivity (σ):	5.16	5.29	-2.62	5
	Body 5500	e'	48.5035	Relative Permittivity (ϵ_r):	48.50	48.61	-0.23	10
		e''	17.9545	Conductivity (σ):	5.49	5.64	-2.72	5
	Body 5800	e'	48.1823	Relative Permittivity (ϵ_r):	48.18	48.20	-0.04	10
		e''	18.2509	Conductivity (σ):	5.89	6.00	-1.90	5
	Body 5825	e'	48.0949	Relative Permittivity (ϵ_r):	48.09	48.20	-0.22	10
		e''	18.2699	Conductivity (σ):	5.92	6.00	-1.38	5
8/15/2012	Body 5180	e'	48.0595	Relative Permittivity (ϵ_r):	48.06	49.05	-2.01	10
		e''	18.1991	Conductivity (σ):	5.24	5.27	-0.56	5
	Body 5200	e'	47.9316	Relative Permittivity (ϵ_r):	47.93	49.02	-2.22	10
		e''	18.2833	Conductivity (σ):	5.29	5.29	-0.16	5
	Body 5500	e'	47.5440	Relative Permittivity (ϵ_r):	47.54	48.61	-2.20	10
		e''	18.5148	Conductivity (σ):	5.66	5.64	0.31	5
	Body 5800	e'	47.0569	Relative Permittivity (ϵ_r):	47.06	48.20	-2.37	10
		e''	18.8771	Conductivity (σ):	6.09	6.00	1.46	5
	Body 5825	e'	46.9506	Relative Permittivity (ϵ_r):	46.95	48.20	-2.59	10
		e''	18.8884	Conductivity (σ):	6.12	6.00	1.96	5
8/16/2012	Body 5180	e'	49.2839	Relative Permittivity (ϵ_r):	49.28	49.05	0.48	10
		e''	18.6913	Conductivity (σ):	5.38	5.27	2.13	5
	Body 5200	e'	49.2187	Relative Permittivity (ϵ_r):	49.22	49.02	0.41	10
		e''	18.6436	Conductivity (σ):	5.39	5.29	1.81	5
	Body 5500	e'	48.7253	Relative Permittivity (ϵ_r):	48.73	48.61	0.23	10
		e''	18.9824	Conductivity (σ):	5.81	5.64	2.85	5
	Body 5800	e'	48.1800	Relative Permittivity (ϵ_r):	48.18	48.20	-0.04	10
		e''	19.1824	Conductivity (σ):	6.19	6.00	3.10	5
	Body 5825	e'	48.1298	Relative Permittivity (ϵ_r):	48.13	48.20	-0.15	10
		e''	19.1786	Conductivity (σ):	6.21	6.00	3.53	5
8/17/2012	Body 5180	e'	49.1557	Relative Permittivity (ϵ_r):	49.16	49.05	0.22	10
		e''	18.4435	Conductivity (σ):	5.31	5.27	0.77	5
	Body 5200	e'	49.1739	Relative Permittivity (ϵ_r):	49.17	49.02	0.31	10
		e''	18.5103	Conductivity (σ):	5.35	5.29	1.08	5
	Body 5500	e'	48.7362	Relative Permittivity (ϵ_r):	48.74	48.61	0.25	10
		e''	18.7274	Conductivity (σ):	5.73	5.64	1.47	5
	Body 5800	e'	48.1285	Relative Permittivity (ϵ_r):	48.13	48.20	-0.15	10
		e''	19.0461	Conductivity (σ):	6.14	6.00	2.37	5
	Body 5825	e'	47.9493	Relative Permittivity (ϵ_r):	47.95	48.20	-0.52	10
		e''	19.0401	Conductivity (σ):	6.17	6.00	2.78	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room B

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/20/2012	Body 5180	e'	47.7515	Relative Permittivity (ϵ_r):	47.75	49.05	-2.64	10
		e''	18.1913	Conductivity (σ):	5.24	5.27	-0.60	5
	Body 5200	e'	47.8549	Relative Permittivity (ϵ_r):	47.85	49.02	-2.38	10
		e''	18.4420	Conductivity (σ):	5.33	5.29	0.71	5
	Body 5500	e'	47.2314	Relative Permittivity (ϵ_r):	47.23	48.61	-2.84	10
		e''	18.6035	Conductivity (σ):	5.69	5.64	0.79	5
	Body 5800	e'	46.7722	Relative Permittivity (ϵ_r):	46.77	48.20	-2.96	10
		e''	18.9938	Conductivity (σ):	6.13	6.00	2.09	5
	Body 5825	e'	46.7596	Relative Permittivity (ϵ_r):	46.76	48.20	-2.99	10
		e''	19.0485	Conductivity (σ):	6.17	6.00	2.83	5
9/12/2012	Body 835	e'	53.1697	Relative Permittivity (ϵ_r):	53.17	55.20	-3.68	5
		e''	20.9745	Conductivity (σ):	0.97	0.97	0.39	5
	Body 820	e'	53.1541	Relative Permittivity (ϵ_r):	53.15	55.28	-3.84	5
		e''	20.9309	Conductivity (σ):	0.95	0.97	-1.46	5
	Body 830	e'	52.9734	Relative Permittivity (ϵ_r):	52.97	55.24	-4.10	5
		e''	20.9414	Conductivity (σ):	0.97	0.97	-0.29	5
	Body 850	e'	52.8549	Relative Permittivity (ϵ_r):	52.85	55.16	-4.17	5
		e''	20.9519	Conductivity (σ):	0.99	0.99	0.31	5
9/13/2012	Body 835	e'	52.6381	Relative Permittivity (ϵ_r):	52.64	55.20	-4.64	5
		e''	20.8588	Conductivity (σ):	0.97	0.97	-0.16	5
	Body 820	e'	52.9264	Relative Permittivity (ϵ_r):	52.93	55.28	-4.25	5
		e''	20.9122	Conductivity (σ):	0.95	0.97	-1.55	5
	Body 830	e'	52.9462	Relative Permittivity (ϵ_r):	52.95	55.24	-4.15	5
		e''	20.8445	Conductivity (σ):	0.96	0.97	-0.75	5
	Body 850	e'	52.6478	Relative Permittivity (ϵ_r):	52.65	55.16	-4.55	5
		e''	20.7887	Conductivity (σ):	0.98	0.99	-0.47	5
9/14/2012	Body 835	e'	53.3419	Relative Permittivity (ϵ_r):	53.34	55.20	-3.37	5
		e''	21.0940	Conductivity (σ):	0.98	0.97	0.97	5
	Body 820	e'	53.5619	Relative Permittivity (ϵ_r):	53.56	55.28	-3.10	5
		e''	21.1086	Conductivity (σ):	0.96	0.97	-0.62	5
	Body 830	e'	53.5374	Relative Permittivity (ϵ_r):	53.54	55.24	-3.08	5
		e''	21.1318	Conductivity (σ):	0.98	0.97	0.62	5
	Body 850	e'	53.2117	Relative Permittivity (ϵ_r):	53.21	55.16	-3.53	5
		e''	20.9140	Conductivity (σ):	0.99	0.99	0.13	5
9/17/2012	Body 835	e'	54.3297	Relative Permittivity (ϵ_r):	54.33	55.20	-1.58	5
		e''	21.6054	Conductivity (σ):	1.00	0.97	3.41	5
	Body 820	e'	54.4795	Relative Permittivity (ϵ_r):	54.48	55.28	-1.44	5
		e''	21.6459	Conductivity (σ):	0.99	0.97	1.91	5
	Body 830	e'	54.3774	Relative Permittivity (ϵ_r):	54.38	55.24	-1.56	5
		e''	21.6201	Conductivity (σ):	1.00	0.97	2.95	5
	Body 850	e'	54.1755	Relative Permittivity (ϵ_r):	54.18	55.16	-1.78	5
		e''	21.5571	Conductivity (σ):	1.02	0.99	3.21	5
9/18/2012	Body 835	e'	54.8345	Relative Permittivity (ϵ_r):	54.83	55.20	-0.66	5
		e''	20.9499	Conductivity (σ):	0.97	0.97	0.28	5
	Body 820	e'	55.0569	Relative Permittivity (ϵ_r):	55.06	55.28	-0.40	5
		e''	21.1927	Conductivity (σ):	0.97	0.97	-0.23	5
	Body 830	e'	54.6821	Relative Permittivity (ϵ_r):	54.68	55.24	-1.01	5
		e''	21.0008	Conductivity (σ):	0.97	0.97	0.00	5
	Body 850	e'	54.8736	Relative Permittivity (ϵ_r):	54.87	55.16	-0.51	5
		e''	20.8447	Conductivity (σ):	0.99	0.99	-0.20	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room B

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9/19/2012	Body 835	e'	55.3272	Relative Permittivity (ϵ_r):	55.33	55.20	0.23	5
		e''	21.5041	Conductivity (σ):	1.00	0.97	2.93	5
	Body 820	e'	55.4217	Relative Permittivity (ϵ_r):	55.42	55.28	0.26	5
		e''	21.6476	Conductivity (σ):	0.99	0.97	1.92	5
	Body 830	e'	55.3455	Relative Permittivity (ϵ_r):	55.35	55.24	0.19	5
		e''	21.3660	Conductivity (σ):	0.99	0.97	1.74	5
	Body 850	e'	55.2972	Relative Permittivity (ϵ_r):	55.30	55.16	0.25	5
		e''	21.5032	Conductivity (σ):	1.02	0.99	2.95	5
9/20/2012	Body 835	e'	53.6538	Relative Permittivity (ϵ_r):	53.65	55.20	-2.80	5
		e''	21.2163	Conductivity (σ):	0.99	0.97	1.55	5
	Body 820	e'	53.6377	Relative Permittivity (ϵ_r):	53.64	55.28	-2.97	5
		e''	21.1958	Conductivity (σ):	0.97	0.97	-0.21	5
	Body 830	e'	53.8145	Relative Permittivity (ϵ_r):	53.81	55.24	-2.58	5
		e''	21.2025	Conductivity (σ):	0.98	0.97	0.96	5
	Body 850	e'	53.5281	Relative Permittivity (ϵ_r):	53.53	55.16	-2.95	5
		e''	21.0810	Conductivity (σ):	1.00	0.99	0.93	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room C

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/2/2012	Body 5180	e'	50.1754	Relative Permittivity (ϵ_r):	50.18	49.05	2.30	10
		e"	18.6554	Conductivity (σ):	5.37	5.27	1.93	5
	Body 5200	e'	50.2335	Relative Permittivity (ϵ_r):	50.23	49.02	2.48	10
		e"	18.7091	Conductivity (σ):	5.41	5.29	2.17	5
	Body 5500	e'	49.7657	Relative Permittivity (ϵ_r):	49.77	48.61	2.37	10
		e"	18.9954	Conductivity (σ):	5.81	5.64	2.92	5
	Body 5800	e'	49.1958	Relative Permittivity (ϵ_r):	49.20	48.20	2.07	10
		21	19.1512	Conductivity (σ):	6.18	6.00	2.94	5
	Body 5825	e'	49.1038	Relative Permittivity (ϵ_r):	49.10	48.20	1.88	10
		e"	19.2658	Conductivity (σ):	6.24	6.00	4.00	5
8/3/2012	Body 5180	e'	50.6250	Relative Permittivity (ϵ_r):	50.63	49.05	3.22	10
		e"	18.3096	Conductivity (σ):	5.27	5.27	0.04	5
	Body 5200	e'	50.5250	Relative Permittivity (ϵ_r):	50.53	49.02	3.07	10
		e"	18.3198	Conductivity (σ):	5.30	5.29	0.04	5
	Body 5500	e'	49.9786	Relative Permittivity (ϵ_r):	49.98	48.61	2.81	10
		e"	18.6691	Conductivity (σ):	5.71	5.64	1.15	5
	Body 5800	e'	49.6193	Relative Permittivity (ϵ_r):	49.62	48.20	2.94	10
		21	18.9052	Conductivity (σ):	6.10	6.00	1.61	5
	Body 5825	e'	49.5981	Relative Permittivity (ϵ_r):	49.60	48.20	2.90	10
		e"	19.0181	Conductivity (σ):	6.16	6.00	2.66	5
8/6/2012	Body 5180	e'	49.4070	Relative Permittivity (ϵ_r):	49.41	49.05	0.73	10
		e"	18.3091	Conductivity (σ):	5.27	5.27	0.04	5
	Body 5200	e'	49.5240	Relative Permittivity (ϵ_r):	49.52	49.02	1.03	10
		e"	18.3926	Conductivity (σ):	5.32	5.29	0.44	5
	Body 5500	e'	48.9430	Relative Permittivity (ϵ_r):	48.94	48.61	0.68	10
		e"	18.5751	Conductivity (σ):	5.68	5.64	0.64	5
	Body 5800	e'	48.4399	Relative Permittivity (ϵ_r):	48.44	48.20	0.50	10
		21	18.9092	Conductivity (σ):	6.10	6.00	1.64	5
	Body 5825	e'	48.4224	Relative Permittivity (ϵ_r):	48.42	48.20	0.46	10
		e"	18.7377	Conductivity (σ):	6.07	6.00	1.15	5
8/7/2012	Body 5180	e'	50.0938	Relative Permittivity (ϵ_r):	50.09	49.05	2.13	10
		e"	18.0259	Conductivity (σ):	5.19	5.27	-1.51	5
	Body 5200	e'	50.0489	Relative Permittivity (ϵ_r):	50.05	49.02	2.10	10
		e"	18.0519	Conductivity (σ):	5.22	5.29	-1.42	5
	Body 5500	e'	49.4898	Relative Permittivity (ϵ_r):	49.49	48.61	1.80	10
		e"	18.4526	Conductivity (σ):	5.64	5.64	-0.02	5
	Body 5800	e'	48.9295	Relative Permittivity (ϵ_r):	48.93	48.20	1.51	10
		21	18.7275	Conductivity (σ):	6.04	6.00	0.66	5
	Body 5825	e'	48.8403	Relative Permittivity (ϵ_r):	48.84	48.20	1.33	10
		e"	18.8618	Conductivity (σ):	6.11	6.00	1.82	5
8/8/2012	Body 5180	e'	48.8382	Relative Permittivity (ϵ_r):	48.84	49.05	-0.43	10
		e"	18.6552	Conductivity (σ):	5.37	5.27	1.93	5
	Body 5200	e'	48.8041	Relative Permittivity (ϵ_r):	48.80	49.02	-0.44	10
		e"	18.6890	Conductivity (σ):	5.40	5.29	2.06	5
	Body 5500	e'	48.2451	Relative Permittivity (ϵ_r):	48.25	48.61	-0.76	10
		e"	19.0079	Conductivity (σ):	5.81	5.64	2.99	5
	Body 5800	e'	47.7518	Relative Permittivity (ϵ_r):	47.75	48.20	-0.93	10
		e"	19.3213	Conductivity (σ):	6.23	6.00	3.85	5
	Body 5825	e'	47.6913	Relative Permittivity (ϵ_r):	47.69	48.20	-1.06	10
		e"	19.3452	Conductivity (σ):	6.27	6.00	4.43	5

Tissue Dielectric Parameter Check Results (continued)
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Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/9/2012	Body 5180	e'	50.6505	Relative Permittivity (ϵ_r):	50.65	49.05	3.27	10
		e''	18.5131	Conductivity (σ):	5.33	5.27	1.15	5
	Body 5200	e'	50.7573	Relative Permittivity (ϵ_r):	50.76	49.02	3.54	10
		e''	18.4001	Conductivity (σ):	5.32	5.29	0.48	5
	Body 5500	e'	50.2265	Relative Permittivity (ϵ_r):	50.23	48.61	3.32	10
		e''	18.8221	Conductivity (σ):	5.76	5.64	1.98	5
	Body 5800	e'	49.5784	Relative Permittivity (ϵ_r):	49.58	48.20	2.86	10
		e''	19.1053	Conductivity (σ):	6.16	6.00	2.69	5
	Body 5825	e'	49.7488	Relative Permittivity (ϵ_r):	49.75	48.20	3.21	10
		e''	19.2240	Conductivity (σ):	6.23	6.00	3.77	5
8/10/2012	Body 5180	e'	50.6616	Relative Permittivity (ϵ_r):	50.66	49.05	3.29	10
		e''	18.5124	Conductivity (σ):	5.33	5.27	1.15	5
	Body 5200	e'	50.7758	Relative Permittivity (ϵ_r):	50.78	49.02	3.58	10
		e''	18.5459	Conductivity (σ):	5.36	5.29	1.28	5
	Body 5500	e'	50.2002	Relative Permittivity (ϵ_r):	50.20	48.61	3.26	10
		e''	18.7610	Conductivity (σ):	5.74	5.64	1.65	5
	Body 5800	e'	49.6879	Relative Permittivity (ϵ_r):	49.69	48.20	3.09	10
		e''	19.0538	Conductivity (σ):	6.14	6.00	2.41	5
	Body 5825	e'	49.6407	Relative Permittivity (ϵ_r):	49.64	48.20	2.99	10
		e''	19.1026	Conductivity (σ):	6.19	6.00	3.12	5
8/13/2012	Body 5180	e'	48.0072	Relative Permittivity (ϵ_r):	48.01	49.05	-2.12	10
		e''	19.0712	Conductivity (σ):	5.49	5.27	4.20	5
	Body 5200	e'	47.9843	Relative Permittivity (ϵ_r):	47.98	49.02	-2.11	10
		e''	19.0098	Conductivity (σ):	5.50	5.29	3.81	5
	Body 5500	e'	47.3566	Relative Permittivity (ϵ_r):	47.36	48.61	-2.58	10
		e''	19.2492	Conductivity (σ):	5.89	5.64	4.29	5
	Body 5800	e'	46.8841	Relative Permittivity (ϵ_r):	46.88	48.20	-2.73	10
		e''	19.4430	Conductivity (σ):	6.27	6.00	4.51	5
	Body 5825	e'	46.9549	Relative Permittivity (ϵ_r):	46.95	48.20	-2.58	10
		e''	19.3493	Conductivity (σ):	6.27	6.00	4.45	5
8/14/2012	Body 2450	e'	51.7921	Relative Permittivity (ϵ_r):	51.79	52.70	-1.72	5
		e''	14.2409	Conductivity (σ):	1.94	1.95	-0.51	5
	Body 2410	e'	51.9321	Relative Permittivity (ϵ_r):	51.93	52.76	-1.57	5
		e''	14.1021	Conductivity (σ):	1.89	1.91	-0.93	5
	Body 2435	e'	51.8417	Relative Permittivity (ϵ_r):	51.84	52.73	-1.68	5
		e''	14.1868	Conductivity (σ):	1.92	1.93	-0.53	5
	Body 2475	e'	51.7143	Relative Permittivity (ϵ_r):	51.71	52.67	-1.81	5
		e''	14.3417	Conductivity (σ):	1.97	1.99	-0.58	5
8/14/2012	Body 5180	e'	49.1518	Relative Permittivity (ϵ_r):	49.15	49.05	0.21	10
		e''	18.3560	Conductivity (σ):	5.29	5.27	0.30	5
	Body 5200	e'	49.0101	Relative Permittivity (ϵ_r):	49.01	49.02	-0.02	10
		e''	18.3938	Conductivity (σ):	5.32	5.29	0.45	5
	Body 5500	e'	48.5548	Relative Permittivity (ϵ_r):	48.55	48.61	-0.12	10
		e''	18.5777	Conductivity (σ):	5.68	5.64	0.65	5
	Body 5800	e'	48.2517	Relative Permittivity (ϵ_r):	48.25	48.20	0.11	10
		e''	18.8030	Conductivity (σ):	6.06	6.00	1.07	5
	Body 5825	e'	48.1728	Relative Permittivity (ϵ_r):	48.17	48.20	-0.06	10
		e''	18.8948	Conductivity (σ):	6.12	6.00	2.00	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room C

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
8/15/2012	Body 5180	e'	48.5995	Relative Permittivity (ϵ_r):	48.60	49.05	-0.91	10
		e''	18.3943	Conductivity (σ):	5.30	5.27	0.50	5
	Body 5200	e'	48.4594	Relative Permittivity (ϵ_r):	48.46	49.02	-1.14	10
		e''	18.3836	Conductivity (σ):	5.32	5.29	0.39	5
	Body 5500	e'	48.1153	Relative Permittivity (ϵ_r):	48.12	48.61	-1.02	10
		e''	18.5137	Conductivity (σ):	5.66	5.64	0.31	5
	Body 5800	e'	47.4977	Relative Permittivity (ϵ_r):	47.50	48.20	-1.46	10
		e''	18.6150	Conductivity (σ):	6.00	6.00	0.06	5
	Body 5825	e'	47.5856	Relative Permittivity (ϵ_r):	47.59	48.20	-1.27	10
		e''	18.7032	Conductivity (σ):	6.06	6.00	0.96	5
8/15/2012	Body 2450	e'	51.7454	Relative Permittivity (ϵ_r):	51.75	52.70	-1.81	5
		e''	14.3203	Conductivity (σ):	1.95	1.95	0.04	5
	Body 2410	e'	51.8113	Relative Permittivity (ϵ_r):	51.81	52.76	-1.80	5
		e''	14.1058	Conductivity (σ):	1.89	1.91	-0.90	5
	Body 2435	e'	51.7429	Relative Permittivity (ϵ_r):	51.74	52.73	-1.87	5
		e''	14.3036	Conductivity (σ):	1.94	1.93	0.29	5
	Body 2475	e'	51.6605	Relative Permittivity (ϵ_r):	51.66	52.67	-1.91	5
		e''	14.4150	Conductivity (σ):	1.98	1.99	-0.07	5
8/16/2012	Body 5180	e'	48.4064	Relative Permittivity (ϵ_r):	48.41	49.05	-1.31	10
		e''	18.6560	Conductivity (σ):	5.37	5.27	1.93	5
	Body 5200	e'	48.3425	Relative Permittivity (ϵ_r):	48.34	49.02	-1.38	10
		e''	18.5963	Conductivity (σ):	5.38	5.29	1.55	5
	Body 5500	e'	47.9376	Relative Permittivity (ϵ_r):	47.94	48.61	-1.39	10
		e''	18.7508	Conductivity (σ):	5.73	5.64	1.59	5
	Body 5800	e'	47.3793	Relative Permittivity (ϵ_r):	47.38	48.20	-1.70	10
		e''	18.9161	Conductivity (σ):	6.10	6.00	1.67	5
	Body 5825	e'	47.3125	Relative Permittivity (ϵ_r):	47.31	48.20	-1.84	10
		e''	18.9128	Conductivity (σ):	6.13	6.00	2.09	5
8/16/2012	Body 2450	e'	52.2979	Relative Permittivity (ϵ_r):	52.30	52.70	-0.76	5
		e''	14.6373	Conductivity (σ):	1.99	1.95	2.26	5
	Body 2410	e'	52.3673	Relative Permittivity (ϵ_r):	52.37	52.76	-0.74	5
		e''	14.3715	Conductivity (σ):	1.93	1.91	0.96	5
	Body 2435	e'	52.3166	Relative Permittivity (ϵ_r):	52.32	52.73	-0.78	5
		e''	14.4953	Conductivity (σ):	1.96	1.93	1.63	5
	Body 2475	e'	52.1746	Relative Permittivity (ϵ_r):	52.17	52.67	-0.94	5
		e''	14.6164	Conductivity (σ):	2.01	1.99	1.33	5
8/17/2012	Body 5180	e'	48.7582	Relative Permittivity (ϵ_r):	48.76	49.05	-0.59	10
		e''	18.2983	Conductivity (σ):	5.27	5.27	-0.02	5
	Body 5200	e'	48.6895	Relative Permittivity (ϵ_r):	48.69	49.02	-0.67	10
		e''	18.5292	Conductivity (σ):	5.36	5.29	1.19	5
	Body 5500	e'	48.2614	Relative Permittivity (ϵ_r):	48.26	48.61	-0.72	10
		e''	18.4879	Conductivity (σ):	5.65	5.64	0.17	5
	Body 5800	e'	47.8280	Relative Permittivity (ϵ_r):	47.83	48.20	-0.77	10
		e''	18.5839	Conductivity (σ):	5.99	6.00	-0.11	5
	Body 5825	e'	47.6417	Relative Permittivity (ϵ_r):	47.64	48.20	-1.16	10
		e''	18.6662	Conductivity (σ):	6.05	6.00	0.76	5
9/11/2012	Body 1900	e'	51.2260	Relative Permittivity (ϵ_r):	51.23	53.30	-3.89	5
		e''	14.7107	Conductivity (σ):	1.55	1.52	2.25	5
	Body 1850	e'	51.4013	Relative Permittivity (ϵ_r):	51.40	53.30	-3.56	5
		e''	14.5465	Conductivity (σ):	1.50	1.52	-1.56	5
	Body 1880	e'	51.2906	Relative Permittivity (ϵ_r):	51.29	53.30	-3.77	5
		e''	14.6529	Conductivity (σ):	1.53	1.52	0.77	5
	Body 1910	e'	51.1866	Relative Permittivity (ϵ_r):	51.19	53.30	-3.97	5
		e''	14.7319	Conductivity (σ):	1.56	1.52	2.93	5

Tissue Dielectric Parameter Check Results (continued)
SAR Room C

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
9/12/2012	Body 1900	e'	51.6261	Relative Permittivity (ϵ_r):	51.63	53.30	-3.14	5
		e''	14.5269	Conductivity (σ):	1.53	1.52	0.97	5
	Body 1850	e'	51.7984	Relative Permittivity (ϵ_r):	51.80	53.30	-2.82	5
		e''	14.4135	Conductivity (σ):	1.48	1.52	-2.46	5
	Body 1880	e'	51.7562	Relative Permittivity (ϵ_r):	51.76	53.30	-2.90	5
		e''	14.4369	Conductivity (σ):	1.51	1.52	-0.71	5
	Body 1910	e'	51.6945	Relative Permittivity (ϵ_r):	51.69	53.30	-3.01	5
		e''	14.5810	Conductivity (σ):	1.55	1.52	1.88	5
9/13/2012	Body 1900	e'	51.9879	Relative Permittivity (ϵ_r):	51.99	53.30	-2.46	5
		e''	14.4385	Conductivity (σ):	1.53	1.52	0.35	5
	Body 1850	e'	52.1447	Relative Permittivity (ϵ_r):	52.14	53.30	-2.17	5
		e''	14.2516	Conductivity (σ):	1.47	1.52	-3.55	5
	Body 1880	e'	52.0531	Relative Permittivity (ϵ_r):	52.05	53.30	-2.34	5
		e''	14.3615	Conductivity (σ):	1.50	1.52	-1.23	5
	Body 1910	e'	51.9514	Relative Permittivity (ϵ_r):	51.95	53.30	-2.53	5
		e''	14.4740	Conductivity (σ):	1.54	1.52	1.13	5
9/14/2012	Body 1900	e'	51.9336	Relative Permittivity (ϵ_r):	51.93	53.30	-2.56	5
		e''	14.6119	Conductivity (σ):	1.54	1.52	1.56	5
	Body 1850	e'	52.1564	Relative Permittivity (ϵ_r):	52.16	53.30	-2.15	5
		e''	14.4091	Conductivity (σ):	1.48	1.52	-2.49	5
	Body 1880	e'	52.0213	Relative Permittivity (ϵ_r):	52.02	53.30	-2.40	5
		e''	14.5254	Conductivity (σ):	1.52	1.52	-0.11	5
	Body 1910	e'	51.9040	Relative Permittivity (ϵ_r):	51.90	53.30	-2.62	5
		e''	14.6599	Conductivity (σ):	1.56	1.52	2.43	5
9/17/2012	Body 1900	e'	52.8023	Relative Permittivity (ϵ_r):	52.80	53.30	-0.93	5
		e''	14.1685	Conductivity (σ):	1.50	1.52	-1.52	5
	Body 1850	e'	53.0268	Relative Permittivity (ϵ_r):	53.03	53.30	-0.51	5
		e''	14.0442	Conductivity (σ):	1.44	1.52	-4.96	5
	Body 1880	e'	52.8830	Relative Permittivity (ϵ_r):	52.88	53.30	-0.78	5
		e''	14.1243	Conductivity (σ):	1.48	1.52	-2.86	5
	Body 1910	e'	52.7716	Relative Permittivity (ϵ_r):	52.77	53.30	-0.99	5
		e''	14.1927	Conductivity (σ):	1.51	1.52	-0.84	5
9/18/2012	Body 1900	e'	50.8465	Relative Permittivity (ϵ_r):	50.85	53.30	-4.60	5
		e''	14.3171	Conductivity (σ):	1.51	1.52	-0.49	5
	Body 1850	e'	51.0403	Relative Permittivity (ϵ_r):	51.04	53.30	-4.24	5
		e''	14.0619	Conductivity (σ):	1.45	1.52	-4.84	5
	Body 1880	e'	51.0418	Relative Permittivity (ϵ_r):	51.04	53.30	-4.24	5
		e''	14.1273	Conductivity (σ):	1.48	1.52	-2.84	5
	Body 1910	e'	50.8894	Relative Permittivity (ϵ_r):	50.89	53.30	-4.52	5
		e''	14.3799	Conductivity (σ):	1.53	1.52	0.47	5
9/19/2012	Body 1900	e'	51.5435	Relative Permittivity (ϵ_r):	51.54	53.30	-3.30	5
		e''	14.0979	Conductivity (σ):	1.49	1.52	-2.01	5
	Body 1850	e'	51.6815	Relative Permittivity (ϵ_r):	51.68	53.30	-3.04	5
		e''	14.0661	Conductivity (σ):	1.45	1.52	-4.81	5
	Body 1880	e'	51.5313	Relative Permittivity (ϵ_r):	51.53	53.30	-3.32	5
		e''	14.0355	Conductivity (σ):	1.47	1.52	-3.47	5
	Body 1910	e'	51.4987	Relative Permittivity (ϵ_r):	51.50	53.30	-3.38	5
		e''	14.1411	Conductivity (σ):	1.50	1.52	-1.20	5
9/20/2012	Body 1900	e'	52.3670	Relative Permittivity (ϵ_r):	52.37	53.30	-1.75	5
		e''	14.1323	Conductivity (σ):	1.49	1.52	-1.78	5
	Body 1850	e'	52.3549	Relative Permittivity (ϵ_r):	52.35	53.30	-1.77	5
		e''	14.0843	Conductivity (σ):	1.45	1.52	-4.68	5
	Body 1880	e'	52.3862	Relative Permittivity (ϵ_r):	52.39	53.30	-1.71	5
		e''	14.1017	Conductivity (σ):	1.47	1.52	-3.02	5
	Body 1910	e'	52.3582	Relative Permittivity (ϵ_r):	52.36	53.30	-1.77	5
		e''	14.1978	Conductivity (σ):	1.51	1.52	-0.80	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 ±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
D750V3	1019	2/9/12	750	1g	8.44	8.84
				10g	5.53	5.84
D835V2	4d117	4/10/12	835	1g	9.38	9.52
				10g	6.15	6.31
D835V2	4d002	3/26/12	835	1g	9.32	9.41
				10g	6.08	6.20
D1750V2	1050	4/19/12	1750	1g	35.9	36.9
				10g	19.1	19.9
D1900V2	5d140	4/12/12	1900	1g	39.8	40.2
				10g	20.8	21.3
D2450V2	748	2/7/12	2450	1g	52.7	49.9
				10g	24.6	23.4
D5GHzV2	1075	2/14/12	5200	1g	79.4	72.7
				10g	22.8	20.5
			5500	1g	85.7	77.7
				10g	24.3	21.7
			5800	1g	78.9	72.5
				10g	22.5	20.2
D5GHzV2	1003*	8/23/11	5200	1g	76.3	74.4
				10g	21.7	20.8
			5500	1g	80.7	79.9
				10g	23.0	22.3
			5800	1g	76.0	76.2
				10g	21.6	21.2

Note(s):

* No further system performance checks were performed after 8/23/12.

12.3. System Performance Check Results

SAR Room A

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
8/2/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	72.1	72.7	-0.83	±10
				10g	20.5	20.5	0.00	
8/6/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	72.1	72.7	-0.83	±10
				10g	20.5	20.5	0.00	
8/7/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	70.5	72.7	-3.03	±10
				10g	20.0	20.5	-2.44	
8/8/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	71.2	72.7	-2.06	±10
				10g	20.2	20.5	-1.46	
8/8/2012	D2450V2 (2450MHz)	748	Body	1g	46.9	49.9	-6.01	±10
				10g	22.1	23.4	-5.56	
8/9/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	68.3	72.7	-6.05	±10
				10g	19.4	20.5	-5.37	
8/10/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	72.7	72.7	0.00	±10
				10g	20.6	20.5	0.49	
8/13/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	79.6	72.7	9.49	±10
				10g	22.5	20.5	9.76	
8/14/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	78.3	72.7	7.70	±10
				10g	22.1	20.5	7.80	
8/15/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	75.2	72.7	3.44	±10
				10g	21.3	20.5	3.90	
8/16/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	73.6	72.7	1.24	±10
				10g	20.8	20.5	1.46	
8/17/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	72.1	72.7	-0.83	±10
				10g	20.4	20.5	-0.49	
8/20/2012	D5GHzV2 (5.2GHz)	1075	Body	1g	72.0	72.7	-0.96	±10
				10g	20.5	20.5	0.00	
9/11/2012	D750V3	1024	Body	1g	8.60	8.76	-1.83	±10
				10g	5.73	5.80	-1.21	
9/12/2012	D750V3	1024	Body	1g	8.59	8.76	-1.94	±10
				10g	5.70	5.80	-1.72	
9/13/2012	D1750V2	1050	Body	1g	36.2	36.9	-1.90	±10
				10g	19.3	19.9	-3.02	
9/13/2012	D750V3	1024	Body	1g	8.78	8.76	0.23	±10
				10g	5.85	5.80	0.86	
9/14/2012	D1750V2	1050	Body	1g	38.2	36.9	3.52	±10
				10g	20.3	19.9	2.01	
9/17/2012	D1750V2	1050	Body	1g	35.5	36.9	-3.79	±10
				10g	18.8	19.9	-5.53	
9/18/2012	D1750V2	1050	Body	1g	36.7	36.9	-0.54	±10
				10g	19.5	19.9	-2.01	
9/19/2012	D1750V2	1050	Body	1g	38.5	36.9	4.34	±10
				10g	20.4	19.9	2.51	
9/20/2012	D750V3	1024	Body	1g	8.43	8.76	-3.77	±10
				10g	5.35	5.8	-7.76	

SAR Room B

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
8/6/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	79.5	79.9	-0.50	±10
				10g	21.6	22.3	-3.14	
8/6/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	79.0	79.9	-1.13	±10
				10g	22.1	22.3	-0.90	
8/7/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	81.7	79.9	2.25	±10
				10g	23.1	22.3	3.59	
8/7/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	79.7	79.9	-0.25	±10
				10g	22.4	22.3	0.45	
8/8/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	78.1	79.9	-2.25	±10
				10g	22.2	22.3	-0.45	
8/8/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	82.5	79.9	3.25	±10
				10g	23.4	23.3	0.43	
8/9/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	76.5	79.9	-4.26	±10
				10g	21.7	22.3	-2.69	
8/9/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	77.4	79.9	-3.13	±10
				10g	21.8	23.3	-6.44	
8/10/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	78.2	79.9	-2.13	±10
				10g	22.0	22.3	-1.35	
8/10/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	80.0	79.9	0.13	±10
				10g	22.9	23.3	-1.72	
8/13/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	76.5	79.9	-4.26	±10
				10g	21.6	22.3	-3.14	
8/13/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	86.3	79.9	8.01	±10
				10g	24.3	23.3	4.29	
8/14/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	78.7	79.9	-1.50	±10
				10g	22.2	22.3	-0.45	
8/14/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	83.2	79.9	4.13	±10
				10g	23.4	23.3	0.43	
8/15/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	83.5	79.9	4.51	±10
				10g	23.6	22.3	5.83	
8/15/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	77.3	79.9	-3.25	±10
				10g	21.9	23.3	-6.01	
8/16/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	79.4	79.9	-0.63	±10
				10g	22.5	22.3	0.90	
8/16/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	76.8	79.9	-3.88	±10
				10g	21.5	23.3	-7.73	
8/17/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	79.6	79.9	-0.38	±10
				10g	22.5	22.3	0.90	
8/17/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	76.2	79.9	-4.63	±10
				10g	21.9	23.3	-6.01	
8/20/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	80.2	79.9	0.38	±10
				10g	22.6	22.3	1.35	
8/20/2012	D5GHzV2 (5.6GHz)	1003	Body	1g	79.6	79.9	-0.38	±10
				10g	22.3	23.3	-4.29	
9/12/2012	D835V2	4d002	Body	1g	9.60	9.41	2.02	±10
				10g	6.32	6.20	1.94	
9/13/2012	D835V2	4d002	Body	1g	9.51	9.41	1.06	±10
				10g	6.26	6.20	0.97	

SAR Room B

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
9/14/2012	D835V2	4d002	Body	1g	9.41	9.41	0.00	±10
				10g	6.19	6.20	-0.16	
9/17/2012	D835V2	4d002	Body	1g	9.90	9.41	5.21	±10
				10g	6.48	6.20	4.52	
9/18/2012	D835V2	4d002	Body	1g	8.91	9.41	-5.31	±10
				10g	5.87	6.20	-5.32	
9/19/2012	D835V2	4d002	Body	1g	9.47	9.41	0.64	±10
				10g	6.23	6.20	0.48	
9/20/2012	D835V2	4d002	Body	1g	9.42	9.41	0.11	±10
				10g	6.19	6.20	-0.16	

SAR Room C

Date Tested	System Dipole		T.S. Liquid	SAR Measured (Normalized to 1 W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
	Type	Serial No.						
8/2/2012	D5GHzV2 (5.5GHz)	1003	Body	1g	80.3	79.9	0.50	±10
				10g	22.4	22.3	0.45	
8/3/2012	D5GHzV2 (5.5GHz)	1075	Body	1g	83.5	77.7	7.46	±10
				10g	23.5	21.7	8.29	
8/3/2012	D5GHzV2 (5.8GHz)	1075	Body	1g	73.4	72.5	1.24	±10
				10g	20.6	20.2	1.98	
8/6/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	70.5	76.2	-7.48	±10
				10g	19.7	21.2	-7.08	
8/7/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	74.9	76.2	-1.71	±10
				10g	21.2	21.2	0.00	
8/8/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	77.1	76.2	1.18	±10
				10g	21.6	21.2	1.89	
8/9/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	69.1	76.2	-9.32	±10
				10g	19.5	21.2	-8.02	
8/10/2012	D5GHzV2 (5.8GHz)	1075	Body	1g	72.2	72.5	-0.41	±10
				10g	20.2	20.2	0.00	
8/13/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	79.5	76.2	4.33	±10
				10g	22.4	21.2	5.66	
8/14/2012	D2450	748	Body	1g	54.2	49.9	8.62	±10
				10g	25.4	23.4	8.55	
8/14/2012	D5GHzV2 (5.8GHz)	1075	Body	1g	74.4	72.5	2.62	±10
				10g	20.9	20.2	3.47	
8/15/2012	D5GHzV2 (5.8GHz)	1003	Body	1g	77.5	76.2	1.71	±10
				10g	21.8	21.2	2.83	
8/15/2012	D2450	748	Body	1g	47.3	49.9	-5.21	±10
				10g	22.1	23.4	-5.56	
8/16/2012	D5GHzV2 (5.8GHz)	1075	Body	1g	66.6	72.5	-8.14	±10
				10g	18.8	20.2	-6.93	
8/16/2012	D2450	748	Body	1g	52.3	49.9	4.81	±10
				10g	24.3	23.4	3.85	
8/17/2012	D5GHzV2 (5.8GHz)	1075	Body	1g	74.4	72.5	2.62	±10
				10g	20.9	20.2	3.47	
9/11/2012	D1900V2	5d140	Body	1g	43.0	40.2	6.97	±10
				10g	22.5	21.3	5.63	
9/12/2012	D1900V2	5d140	Body	1g	41.5	40.2	3.23	±10
				10g	21.7	21.3	1.88	
9/13/2012	D1900V2	5d140	Body	1g	40.3	40.2	0.25	±10
				10g	21.1	21.3	-0.94	
9/14/2012	D1900V2	5d140	Body	1g	40.5	40.2	0.75	±10
				10g	21.1	21.3	-0.94	
9/17/2012	D1900V2	5d140	Body	1g	41.9	40.2	4.23	±10
				10g	22.0	21.3	3.29	
9/18/2012	D1900V2	5d140	Body	1g	42.6	40.2	5.97	±10
				10g	22.3	21.3	4.69	
9/19/2012	D1900V2	5d140	Body	1g	41.7	40.2	3.73	±10
				10g	21.8	21.3	2.35	
9/20/2012	D1900V2	5d140	Body	1g	39.3	40.2	-2.24	±10
				10g	20.6	21.3	-3.29	

13. SAR Test Results

13.1. GSM850

Test Position	Pwr Back-off	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	GPRS 2 slots	128	824.2	24.5	**1.180**	
				190	836.6	24.5	1.170	
				251	848.8	24.5	1.070	
Edge 1	on (Second-stage)	0	GPRS 2 slots	128	824.2	24.5	0.823	
				190	836.6	24.5	0.830	
				251	848.8	24.5	0.823	
Edge 2	on (First-Stage)	0	GPRS 2 slots	128	824.2	31.5		1
				190	836.6	31.5	0.709	
				251	848.8	31.5		1
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	GPRS 2 slots	128	824.2	31.5	0.927	
				190	836.6	31.5	0.865	
				251	848.8	31.5	0.873	
Edge 2 Tile 35 deg	on (First-Stage)	0	GPRS 2 slots	128	824.2	31.5	1.120	
				190	836.6	31.5	0.998	
				251	848.8	31.5	0.966	
Rear	off	14	GPRS 2 slots	128	824.2	33.0	1.020	2
				190	836.6	33.0	1.020	2
				251	848.8	33.0	1.020	2
Edge 1	off	14	GPRS 2 slots	128	824.2	33.0	0.841	2
				190	836.6	33.0	0.844	2
				251	848.8	33.0	0.835	2

Note(s):

1. SAR test was performed in the middle channel only as the measured level was < 50% of the SAR limit as stated in FCC "Public Notice DA 02-1438" by the SCC-34/SC-2. Testing in the low and high channel is optional.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.2. GSM1900

Test Position	Pwr Back-off	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	GPRS 2 slots	512	1850.2	20.3	0.975	
				661	1880.0	20.3	1.060	
				810	1909.8	20.3	**1.160**	
Edge 1	on (Second-stage)	0	GPRS 2 slots	512	1850.2	20.3		1
				661	1880.0	20.3	0.742	
				810	1909.8	20.3		1
Edge 2	on (First-Stage)	0	GPRS 2 slots	512	1850.2	26.5		1
				661	1880.0	26.5	0.735	
				810	1909.8	26.5		1
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	GPRS 2 slots	512	1850.2	26.5		1
				661	1880.0	26.5	0.701	
				810	1909.8	26.5		1
Edge 2 Tile 35 deg	on (First-Stage)	0	GPRS 2 slots	512	1850.2	26.5		1
				661	1880.0	26.5	0.771	
				810	1909.8	26.5		1
Rear	off	14	GPRS 2 slots	512	1850.2	29.4	0.951	2
				661	1880.0	29.5	0.958	2
				810	1909.8	29.5	0.977	2
Edge 1	off	14	GPRS 2 slots	512	1850.2	29.4	1.040	2
				661	1880.0	29.5	1.120	2
				810	1909.8	29.5	1.100	2

Note(s):

1. According to FCC “Public Notice DA 02-1438” by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.3. W-CDMA Band V

Test reduction considerations

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

Test Position	Pwr Back-off	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	Rel 99 RMC 12.2kbps	4132	826.4	17.8	1.130	
				4183	836.6	17.8	**1.150**	
				4233	846.6	17.8	1.140	
Edge 1	on (Second-stage)	0	Rel 99 RMC 12.2kbps	4132	826.4	17.8		1
				4183	836.6	17.8	0.672	
				4233	846.6	17.8		1
Edge 2	on (First-Stage)	0	Rel 99 RMC 12.2kbps	4132	826.4	23.0		1
				4183	836.6	23.0	0.421	
				4233	846.6	23.0		1
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	Rel 99 RMC 12.2kbps	4132	826.4	23.0		1
				4183	836.6	23.0	0.494	
				4233	846.6	23.0		1
Edge 2 Tile 35 deg	on (First-Stage)	0	Rel 99 RMC 12.2kbps	4132	826.4	23.0		1
				4183	836.6	23.0	0.551	
				4233	846.6	23.0		1
Rear	off	14	Rel 99 RMC 12.2kbps	4132	826.4	24.5	0.725	2
				4183	836.6	24.5	0.815	2
				4233	846.6	24.5	0.856	2
Edge 1	off	14	Rel 99 RMC 12.2kbps	4132	826.4	24.5		1
				4183	836.6	24.5	0.618	2
				4233	846.6	24.5		1

Note(s):

1. According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.4. W-CDMA Band II

Test reduction considerations

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

Test Position	Pwr Back-off	Dist. (mm)	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	Rel 99 RMC 12.2kbps	9262	1852.4	13.8	1.090	
				9400	1880.0	13.8	1.020	
				9538	1907.6	13.8	**1.110**	
Edge 1	on (Second-stage)	0	Rel 99 RMC 12.2kbps	9262	1852.4	13.8		1
				9400	1880.0	13.8	0.738	
				9538	1907.6	13.8		1
Edge 2	on (First-Stage)	0	Rel 99 RMC 12.2kbps	9262	1852.4	20.0		1
				9400	1880.0	20.0	0.623	
				9538	1907.6	20.0		1
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	Rel 99 RMC 12.2kbps	9262	1852.4	20.0		1
				9400	1880.0	20.0	0.626	
				9538	1907.6	20.0		1
Edge 2 Tile 35 deg	on (First-Stage)	0	Rel 99 RMC 12.2kbps	9262	1852.4	20.0		1
				9400	1880.0	20.0	0.663	
				9538	1907.6	20.0		1
Rear	off	14	Rel 99 RMC 12.2kbps	9262	1852.4	22.9	0.920	2
				9400	1880.0	23.0	0.926	2
				9538	1907.6	23.0	0.978	2
Edge 1	off	14	Rel 99 RMC 12.2kbps	9262	1852.4	22.9	1.050	2
				9400	1880.0	23.0	1.090	2
				9538	1907.6	23.0	1.010	2

Note(s):

1. According to FCC "Public Notice DA 02-1438" by the SCC-34/SC-2, when the SAR measured for the middle channel is < 50% of the SAR limit, testing for the low and high channel is optional.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.5. LTE Band 2 (20 MHz Bandwidth)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	QPSK	18700	1960.0	1	0	0	13.0	0.912	
						50	24	1	13.0	0.967	
			QPSK	18900	1880.0	1	0	0	13.0	1.110	
						1	49	0	13.0	1.160	
						1	99	0	13.0	1.030	
						50	0	1	13.0	**1.190**	
						50	24	1	13.0	1.190	
						50	49	1	13.0	1.120	
						100	0	1	13.0	1.160	
			QPSK	19100	1900.0	1	0	0	13.0	0.966	
						50	24	1	13.0	1.040	
Edge 1	on (Second-stage)	0	QPSK	18700	1960.0	1	0	0	13.0	0.726	
						50	24	1	13.0	0.721	
			QPSK	18900	1880.0	1	0	0	13.0	0.841	
						1	49	0	13.0	0.983	
						1	99	0	13.0	0.783	
						50	0	1	13.0	0.986	
						50	24	1	13.0	1.010	
						50	49	1	13.0	0.935	
						100	0	1	13.0	0.960	
			QPSK	19100	1900.0	1	0	0	13.0	0.741	
						50	24	1	13.0	0.762	
Edge 2	on (First-Stage)	0	QPSK	18900	1880.0	1	0	0	19.8	0.790	
						1	49	0	19.8	0.707	
						1	99	0	19.8	0.689	
						50	0	1	19.8	0.766	
						50	24	1	19.8	0.710	
						50	49	1	19.7	0.688	
						100	0	1	19.7	0.701	
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	QPSK	18700	1960.0	1	0	0	19.8	0.531	
						50	24	1	19.8	0.590	
			QPSK	18900	1880.0	1	0	0	19.8	0.796	
						1	49	0	19.8	0.769	
						1	99	0	19.8	0.685	
						50	0	1	19.8	0.809	
						50	24	1	19.8	0.765	
						50	49	1	19.7	0.720	
						100	0	1	19.7	0.757	
			QPSK	19100	1900.0	1	0	0	19.8	0.653	
						50	24	1	19.8	0.794	

LTE Band 2 (20 MHz Bandwidth) (continued)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Edge 2 Tile 35 deg	on (First-Stage)	0	QPSK	18700	1960.0	1	0	0	19.8	0.581	
						50	24	1	19.8	0.678	
			QPSK	18900	1880.0	1	0	0	19.8	0.824	
						1	49	0	19.8	0.756	
						1	99	0	19.8	0.718	
						50	0	1	19.8	0.836	
						50	24	1	19.8	0.794	
						50	49	1	19.7	0.766	
						100	0	1	19.7	0.773	
			QPSK	19100	1900.0	1	0	0	19.8	0.740	
						50	24	1	19.8	0.915	
Rear	off	14	QPSK	18700	1960.0	1	0	0	22.8	0.850	2
						50	24	1	22.0	0.735	2
			QPSK	18900	1880.0	1	0	0	22.8	0.849	2
						1	49	0	22.8	0.753	2
						1	99	0	22.8	0.726	2
						50	0	1	22.0	0.709	2
						50	24	1	22.1	0.701	2
						50	49	1	22.0	0.700	2
						100	0	1	22.0	0.705	2
			QPSK	19100	1900.0	1	0	0	22.8	0.919	2
						50	24	1	21.9	0.727	2
Edge 1	off	14	QPSK	18700	1960.0	1	0	0	22.8	0.714	2
						50	24	1	22.0	0.633	2
			QPSK	18900	1880.0	1	0	0	22.8	1.030	2
						1	49	0	22.8	0.940	2
						1	99	0	22.8	0.863	2
						50	0	1	22.0	0.826	2
						50	24	1	22.1	0.676	2
						50	49	1	22.0	0.634	2
						100	0	1	22.0	0.669	2
			QPSK	19100	1900.0	1	0	0	22.8	0.785	2
						50	24	1	21.9	0.757	2

Note(s):

1. Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction are applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel
   - Testing for 16-QAM modulation is not required because the measured SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the measured SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.6. LTE Band 4 (20 MHz Bandwidth)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)
Rear	on (Second-stage)	0	QPSK	20500	1720.0	1	99	0	13.0	**1.170**
						50	24	1	13.0	0.961
			QPSK	20175	1732.5	1	0	0	13.0	1.040
						1	49	0	13.0	1.070
						1	99	0	13.0	1.090
						50	0	1	13.0	1.130
						50	24	1	13.0	1.110
						50	49	1	13.0	0.968
						100	0	1	13.0	1.070
			QPSK	20300	1745.0	1	99	0	13.0	1.020
						50	0	1	13.0	1.060
Edge 1	on (Second-stage)	0	QPSK	20500	1720.0	1	99	0	13.0	1.110
						50	24	1	13.0	0.787
			QPSK	20175	1732.5	1	0	0	13.0	0.933
						1	49	0	13.0	1.130
						1	99	0	13.0	1.150
						50	0	1	13.0	1.120
						50	24	1	13.0	1.170
						50	49	1	13.0	1.050
						100	0	1	13.0	1.100
			QPSK	20300	1745.0	1	99	0	13.0	0.857
						50	0	1	13.0	0.867
Edge 2	on (First-Stage)	0	QPSK	20175	1732.5	1	0	0	21.0	0.569
						1	49	0	21.0	0.489
						1	99	0	21.0	0.518
						50	0	1	21.0	0.569
						50	24	1	21.0	0.513
						50	49	1	20.9	0.437
						100	0	1	21.0	0.513
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	QPSK	20500	1720.0	1	99	0	21.0	0.829
						50	24	1	21.0	0.621
			QPSK	20175	1732.5	1	0	0	21.0	0.744
						1	49	0	21.0	0.837
						1	99	0	21.0	0.701
						50	0	1	21.0	0.755
						50	24	1	21.0	0.764
						50	49	1	20.9	0.702
						100	0	1	21.0	0.740
			QPSK	20300	1745.0	1	99	0	21.0	0.766
						50	0	1	21.0	0.746

LTE Band 4 (20 MHz Bandwidth) (continued)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Edge 2 Tile 35 deg	on (First-Stage)	0	QPSK	20175	1732.5	1	0	0	21.0	0.771	
						1	49	0	21.0	0.687	
						1	99	0	21.0	0.609	
						50	0	1	21.0	0.641	
						50	24	1	21.0	0.569	
						50	49	1	20.9	0.576	
						100	0	1	21.0	0.622	
Rear	off	14	QPSK	20500	1720.0	1	99	0	24.0	0.925	2
						50	24	1	23.1	0.635	2
			QPSK	20175	1732.5	1	0	0	23.9	0.794	2
						1	49	0	23.9	0.694	2
						1	99	0	23.8	0.643	2
						50	0	1	23.2	0.626	2
						50	24	1	23.2	0.573	2
						50	49	1	23.1	0.500	2
						100	0	1	22.9	0.580	2
			QPSK	20300	1745.0	1	99	0	24.0	0.821	2
						50	0	1	22.9	0.513	2
Edge 1	off	14	QPSK	20175	1732.5	1	0	0	23.9	0.750	2
						1	49	0	23.9	0.690	2
						1	99	0	23.8	0.726	2
						50	0	1	23.2	0.649	2
						50	24	1	23.2	0.603	2
						50	49	1	23.1	0.533	2
						100	0	1	22.9	0.557	2

Note(s):

1. Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction are applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel
   - Testing for 16-QAM modulation is not required because the measured SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the measured SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.7. LTE Band 5 (10 MHz Bandwidth)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	QPSK	20450	829.0	1	24	0	17.0	1.010	
						25	0	1	17.0	1.050	
			QPSK	20525	836.5	1	0	0	17.0	0.905	
						1	24	0	17.0	0.912	
						1	49	0	17.0	1.100	
						25	0	1	17.0	0.947	
						25	12	1	17.0	0.985	
						25	24	1	17.0	1.050	
			QPSK	20600	844.0	1	0	0	17.0	1.030	
						25	12	1	17.0	**1.190**	
						50	0	1	17.0	1.190	
Edge 1	on (Second-stage)	0	QPSK	20525	836.5	1	0	0	17.0	0.631	
						1	24	0	17.0	0.592	
						1	49	0	17.0	0.599	
						25	0	1	17.0	0.544	
						25	12	1	17.0	0.568	
						25	24	1	17.0	0.622	
						50	0	1	16.9	0.549	
Edge 2	on (First-Stage)	0	QPSK	20525	836.5	1	0	0	22.5	0.304	
						1	24	0	22.5	0.275	
						1	49	0	22.5	0.348	
						25	0	1	22.5	0.284	
						25	12	1	22.5	0.286	
						25	24	1	22.5	0.310	
						50	0	1	22.4	0.290	
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	QPSK	20525	836.5	1	0	0	22.5	0.365	
						1	24	0	22.5	0.331	
						1	49	0	22.5	0.406	
						25	0	1	22.5	0.334	
						25	12	1	22.5	0.337	
						25	24	1	22.5	0.363	
						50	0	1	22.4	0.350	
Edge 2 Tile 35 deg	on (First-Stage)	0	QPSK	20525	836.5	1	0	0	22.5	0.462	
						1	24	0	22.5	0.417	
						1	49	0	22.5	0.536	
						25	0	1	22.5	0.432	
						25	12	1	22.5	0.419	
						25	24	1	22.5	0.439	
						50	0	1	22.4	0.422	

LTE Band 5 (10 MHz Bandwidth) (continued)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Rear	off	14	QPSK	20525	836.5	1	0	0	24.0	0.463	2
						1	24	0	23.9	0.537	2
						1	49	0	24.0	0.540	2
						25	0	1	22.8	0.365	2
						25	12	1	22.8	0.375	2
						25	24	1	22.9	0.408	2
						50	0	1	22.6	0.384	2
Edge 1	off	14	QPSK	20525	836.5	1	0	0	24.0	0.384	2
						1	24	0	23.9	0.344	2
						1	49	0	24.0	0.404	2
						25	0	1	22.8	0.272	2
						25	12	1	22.8	0.284	2
						25	24	1	22.9	0.306	2
						50	0	1	22.6	0.288	2

Note(s):

1. Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction are applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel
   - Testing for 16-QAM modulation is not required because the measured SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the measured SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.8. LTE Band 17 (10 MHz Bandwidth)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Rear	on (Second-stage)	0	QPSK	23789	709.0	1	0	0	19.0	0.988	
						25	12	1	19.0	1.000	
			QPSK	23790	710.0	1	0	0	19.0	1.080	
						1	24	0	19.0	1.040	
						1	49	0	19.0	1.090	
						25	0	1	18.8	1.120	
						25	12	1	18.8	1.110	
						25	24	1	18.9	1.120	
						50	0	1	19.0	**1.140**	
			QPSK	23800	711.0	1	0	0	19.0	1.000	
						25	12	1	19.0	0.988	
Edge 1	on (Second-stage)	0	QPSK	23790	710.0	1	0	0	19.0	0.578	
						1	24	0	19.0	0.581	
						1	49	0	19.0	0.541	
						25	0	1	18.8	0.631	
						25	12	1	18.8	0.609	
						25	24	1	18.9	0.594	
						50	0	1	19.0	0.607	
Edge 2	on (First-Stage)	0	QPSK	23790	710.0	1	0	0	22.5	0.173	
						1	24	0	22.5	0.193	
						1	49	0	22.5	0.182	
						25	0	1	22.4	0.169	
						25	12	1	22.3	0.175	
						25	24	1	22.4	0.167	
						50	0	1	22.5	0.169	
Edge 1 and Edge 2 Tilt 40 deg	on (First-Stage)	0	QPSK	23790	710.0	1	0	0	22.5	0.229	
						1	24	0	22.5	0.253	
						1	49	0	22.5	0.232	
						25	0	1	22.4	0.222	
						25	12	1	22.3	0.229	
						25	24	1	22.4	0.218	
						50	0	1	22.5	0.224	
Edge 2 Tile 35 deg	on (First-Stage)	0	QPSK	23790	710.0	1	0	0	22.5	0.247	
						1	24	0	22.5	0.275	
						1	49	0	22.5	0.254	
						25	0	1	22.4	0.244	
						25	12	1	22.3	0.244	
						25	24	1	22.4	0.234	
						50	0	1	22.5	0.238	

LTE Band 17 (10 MHz Bandwidth) (continued)

Test Position	Pwr Back-off	Dist. (mm)	Mode	UL Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	MPR	Power (dBm)	1g SAR (W/kg)	Note
Rear	off	14	QPSK	23790	710.0	1	0	0	23.8	0.284	2
						1	24	0	23.9	0.292	2
						1	49	0	23.9	0.278	2
						25	0	1	22.9	0.263	2
						25	12	1	23.0	0.256	2
						25	24	1	23.0	0.254	2
						50	0	1	23.0	0.252	2
Edge 1	off	14	QPSK	23790	710.0	1	0	0	23.8	0.178	2
						1	24	0	23.9	0.181	2
						1	49	0	23.9	0.169	2
						25	0	1	22.9	0.163	2
						25	12	1	23.0	0.159	2
						25	24	1	23.0	0.156	2
						50	0	1	23.0	0.155	2

Note(s):

1. Per KDB 941225 D05 SAR for LTE Devices v02, SAR test reduction are applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel
   - Testing for 16-QAM modulation is not required because the measured SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the measured SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
2. SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage trigger. Therefore, additional SAR testing for different stages of power back-off is not performed.

13.9. Wi-Fi (2.4 GHz Band)

(BOM #1)

Test Position	Mode	Dist. (mm)	Antenna	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	802.11b	0	Primary	1	2412	15.9		1
				6	2437	16.0	0.066	
				11	2462	16.0		1
Edge 3	802.11b	0	Primary	1	2412	15.9	0.759	
				6	2437	16.0	0.990	
				11	2462	16.0	**1.050**	
Edge 4	802.11b	0	Primary	1	2412	15.9		1
				6	2437	16.0	0.158	
				11	2462	16.0		1
Test Position	Mode	Dist. (mm)	Antenna	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	802.11b	0	Secondary	1	2412	15.9		1
				6	2437	16.0	0.019	
				11	2462	16.0		1
Edge 2	802.11b	0	Secondary	1	2412	15.9		1
				6	2437	16.0	0.011	
				11	2462	16.0		1
Edge 3	802.11b	0	Secondary	1	2412	15.9		1
				6	2437	16.0	0.466	
				11	2462	16.0		1

Highest SAR Configuration (BOM #2)

Test Position	Mode	Dist. (mm)	Antenna	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Edge 3	802.11b	0	Primary	11	2462	16.0	1.040	

Highest SAR Configuration (BOM #3)

Test Position	Mode	Dist. (mm)	Antenna	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Edge 3	802.11b	0	Primary	11	2462	16.0	0.924	

Note(s):

1. When the 1-g SAR for the mid-band channel, or the channel with the highest output power satisfy the following conditions, testing of the other channels in the band is not required. (Per KDB 447498)
   ≤ 0.8 W/kg and transmission band ≤ 100 MHz
   ≤ 0.6 W/kg and, 100 MHz < transmission bandwidth ≤ 200 MHz
   ≤ 0.4 W/kg and transmission band > 200 MHz

13.10. Wi-Fi (5 GHz Bands)

(BOM #1)

Band (GHz)	Test Position	Dist. (mm)	Antenna	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
5.2	Rear	0	Primary	802.11a	36	5180	14.0	0.027	
					48	5240	13.9	0.029	
				802.11n HT40	46	5230	15.5	0.040	
	Edge 3	0	Primary	802.11a	36	5180	14.0	0.392	
					48	5240	13.9	0.437	
				802.11n HT40	46	5230	15.5	0.714	
	Edge 4	0	Primary	802.11a	36	5180	14.0	0.052	
					48	5240	13.9	0.055	
				802.11n HT40	46	5230	15.5	0.094	
5.3	Rear	0	Primary	802.11a	52	5260	16.9	0.087	
					60	5300	16.9	0.054	
	Edge 3	0	Primary	802.11a	52	5260	16.9	1.040	
					60	5300	16.9	0.868	
	Edge 4	0	Primary	802.11a	52	5260	16.9	0.137	
					60	5300	16.9	0.120	
5.5	Rear	0	Primary	802.11a	104	5520	16.0	0.081	
					116	5580	15.9	0.048	
					124	5620	16.0	0.092	
					136	5680	16.0	0.095	
	Edge 3	0	Primary	802.11a	104	5520	16.0	0.757	
					116	5580	15.9	0.913	
					124	5620	16.0	0.914	
					136	5680	16.0	1.040	
	Edge 4	0	Primary	802.11a	104	5520	16.0	0.111	
					116	5580	15.9	0.139	
					124	5620	16.0	0.136	
					136	5680	16.0	0.135	
5.8	Rear	0	Primary	802.11a	149	5745	15.9	0.079	
					157	5785	15.9	0.070	
					165	5825	16.0	0.080	
	Edge 3	0	Primary	802.11a	149	5745	15.9	0.972	
					157	5785	15.9	0.852	
					165	5825	16.0	0.839	
	Edge 4	0	Primary	802.11a	149	5745	15.9	0.112	
					157	5785	15.9	0.101	
					165	5825	16.0	0.101	

Wi-Fi (5 GHz Bands) continued

Band (GHz)	Test Position	Dist. (mm)	Antenna	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
5.2	Rear	0	Secondary	802.11a	36	5180	14.0	0.062	
					48	5240	13.9	0.069	
				802.11n HT40	46	5230	15.5	0.135	
	Edge 2	0	Secondary	802.11a	36	5180	14.0	0.019	
					48	5240	13.9	0.031	
				802.11n HT40	46	5230	15.5	0.047	
	Edge 3	0	Secondary	802.11a	36	5180	14.0	0.509	
					48	5240	13.9	0.609	
				802.11n HT40	46	5230	15.5	**0.836**	
5.3	Rear	0	Secondary	802.11a	52	5260	17.0	0.175	
					60	5300	16.9	0.144	
	Edge 2	0	Secondary	802.11a	52	5260	17.0	0.062	
					60	5300	16.9	0.047	
	Edge 3	0	Secondary	802.11a	52	5260	17.0	1.080	
					60	5300	16.9	**1.110**	
5.5	Rear	0	Secondary	802.11a	104	5520	16.0	0.196	
					116	5580	16.0	0.221	
					124	5620	16.0	0.192	
					136	5680	16.0	0.200	
	Edge 2	0	Secondary	802.11a	104	5520	16.0	0.073	
					116	5580	16.0	0.073	
					124	5620	16.0	0.065	
					136	5680	16.0	0.058	
	Edge 3	0	Secondary	802.11a	104	5520	16.0	1.060	
					116	5580	16.0	1.120	
					124	5620	16.0	1.090	
					136	5680	16.0	**1.140**	
5.8	Rear	0	Secondary	802.11a	149	5745	16.0	0.151	
					157	5785	16.0	0.129	
					165	5825	16.0	0.121	
	Edge 2	0	Secondary	802.11a	149	5745	16.0	0.024	
					157	5785	16.0	0.030	
					165	5825	16.0	0.013	
	Edge 3	0	Secondary	802.11a	149	5745	16.0	**1.190**	
					157	5785	16.0	1.080	
					165	5825	16.0	1.010	

Highest SAR Configuration (BOM #2)

Band (GHz)	Test Position	Dist. (mm)	Antenna	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
5.2	Edge 3	0	Secondary	802.11n HT40	46	5230	15.5	0.810	
5.3	Edge 3	0	Secondary	802.11a	64	5320	16.9	0.969	
5.5	Edge 3	0	Secondary	802.11a	136	5680	16.0	0.947	
5.8	Edge 3	0	Secondary	802.11a	149	5745	16.0	1.060	

Highest SAR Configuration (BOM #3)

Band (GHz)	Test Position	Dist. (mm)	Antenna	Mode	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
5.2	Edge 3	0	Secondary	802.11n HT40	46	5230	15.5	0.769	
5.3	Edge 3	0	Secondary	802.11a	64	5320	16.9	0.977	
5.5	Edge 3	0	Secondary	802.11a	136	5680	16.0	1.120	
5.8	Edge 3	0	Secondary	802.11a	149	5745	16.0	1.040	

13.11. Bluetooth

(BOM #1)

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	V2.1 + EDR, GFSK	primary	0	0	2412	11.8		1
				39	2437	12.0	0.029	
				78	2462	11.9		1
Edge 3	V2.1 + EDR, GFSK	primary	0	0	2412	11.8		1
				39	2437	12.0	**0.356**	
				78	2462	11.9		1
Edge 4	V2.1 + EDR, GFSK	primary	0	0	2412	11.8		1
				39	2437	12.0	0.072	
				78	2462	11.9		1
Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Rear	V2.1 + EDR, GFSK	Secondary	0	0	2412	11.8		1
				39	2437	12.0	0.00276	
				78	2462	11.9		1
Edge 2	V2.1 + EDR, GFSK	Secondary	0	0	2412	11.8		1
				39	2437	12.0	0.025	
				78	2462	11.9		1
Edge 3	V2.1 + EDR, GFSK	Secondary	0	0	2412	11.8		1
				39	2437	12.0	0.149	
				78	2462	11.9		1

Highest SAR Configuration (BOM #2)

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Edge 3	V2.1 + EDR, GFSK	primary	0	39	2437	12.0	0.314	

Highest SAR Configuration (BOM #3)

Test Position	Mode	Antenna	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)	1g SAR (W/kg)	Note
Edge 3	V2.1 + EDR, GFSK	primary	0	39	2437	12.0	0.309	

14. Summary of Highest SAR Values

Results for highest SAR values for each frequency band and mode

Technology/Band	Test configuration				Mode	Highest 1g SAR (W/kg)
	Exposure	Position	Pwr Back-off	Tx Ant.		
GSM850	Body	Rear	on (Second-stage)	Primary	GPRS 2 slots	1.180
GSM1900	Body	Rear	on (Second-stage)	Primary	GPRS 2 slots	1.160
W-CDMA Band V	Body	Rear	on (Second-stage)	Primary	Rel 99 RMC 12.2kbps	1.150
W-CDMA Band II	Body	Rear	on (Second-stage)	Primary	Rel 99 RMC 12.2kbps	1.110
LTE Band 2	Body	Rear	on (Second-stage)	Primary	20 MHz (QPSK) RB 50/0	1.190
LTE Band 4	Body	Rear	on (Second-stage)	Primary	20 MHz (QPSK) RB 1/99	1.170
LTE Band 5	Body	Rear	on (Second-stage)	Primary	10 MHz (QPSK) RB 25/12	1.190
LTE Band 17	Body	Rear	on (Second-stage)	Primary	10 MHz (QPSK) RB 50/0	1.140
WiFi 2.4 GHz	Body	Edge 3		Primary	802.11b 1Mbps	1.050
Bluetooth	Body	Edge 3		Primary	GFSK	0.356
WiFi 5.2 GHz	Body	Edge 3		Secondary	802.11n HT40 MCS0	0.836
WiFi 5.3 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	1.110
WiFi 5.5 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	1.140
WiFi 5.8 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	1.190

14.1. Scaled SAR Values to the Maximum Target Output Power

The highest measured SAR results were scaled, in cases where measured output power is lower than the maximum Target output power level, in each frequency band.

Technology /Band	Test Configuration				Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		SAR (W/kg)	
	Exposure	Position	Pwr Back-off	Tx Ant.					Tune-up limit	Measured	Measured	Scaled
LTE Band 17	Body	Rear	on (Second-stage)	Primary	10 MHz(QPSK) RB 50/0	0	23790	710.0	19.0	19.0	1.140	*
LTE Band 5	Body	Rear	on (Second-stage)	Primary	10 MHz(QPSK) RB 25/12	0	20600	844.0	17.0	17.0	1.190	*
LTE Band 4	Body	Rear	on (Second-stage)	Primary	20 MHz(QPSK) RB 1/99	0	20500	1720.0	13.0	13.0	1.170	*
LTE Band 2	Body	Rear	on (Second-stage)	Primary	20 MHz(QPSK) RB 50/0	0	18900	1880.0	13.0	13.0	1.190	*
WiFi 2.4 GHz	Body	Edge 3		Primary	802.11b 1Mbps	0	11	2462	16.0	16.0	1.050	*
WiFi 5.2 GHz	Body	Edge 3		Secondary	802.11n HT40 MCS0	0	46	5230	15.5	15.5	0.836	*
WiFi 5.3 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	0	60	5300	17.0	16.9	1.110	1.136
WiFi 5.5 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	0	136	5680	16.0	16.0	1.140	*
WiFi 5.8 GHz	Body	Edge 3		Secondary	802.11a 6Mbps	0	149	5745	16.0	16.0	1.190	*

Note(s):

*: SAR Scaling was not applied when the measured output power is equal or greater than the maximum target output power.

14.2. SAR Plots (from Summary of Highest SAR Values)

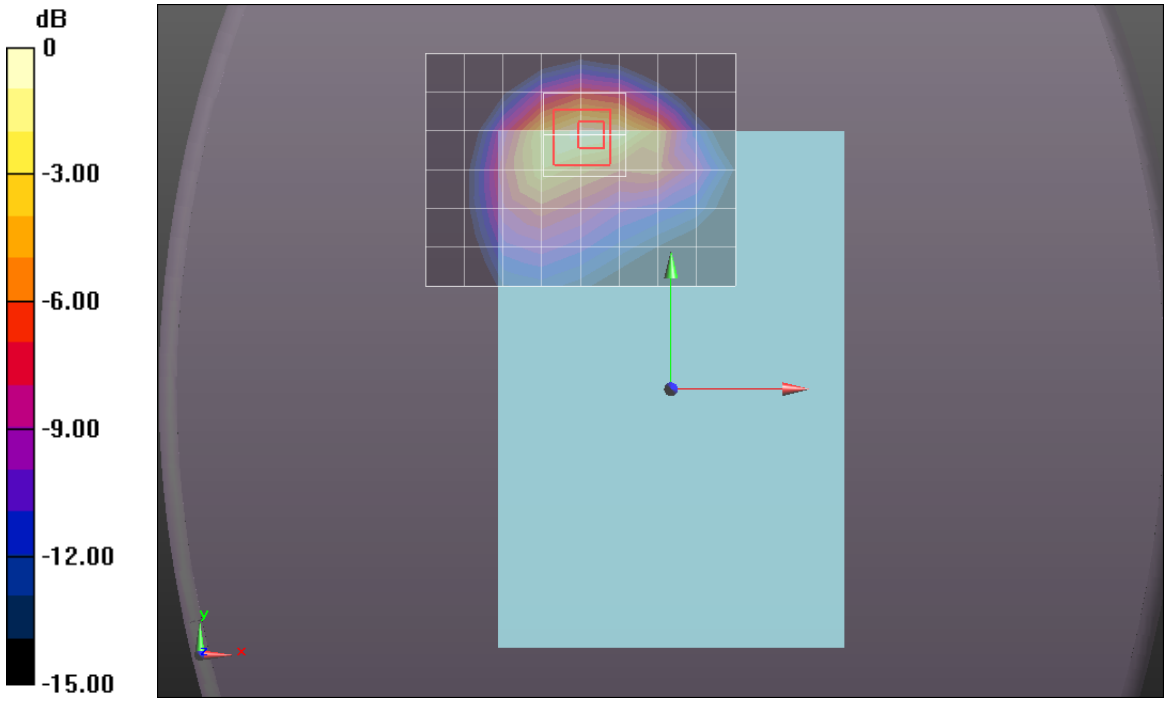
Test Laboratory: UL CCS SAR Lab B Date: 9/14/2012

GSM850

Frequency: 824.4 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 825 MHz; σ = 0.967 mho/m; ε_r = 53.478; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear/GPRS 2 slot_Ch 128 w/ Pwr back-off (Pri.) (0 mm)/Area Scan (9x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.576 mW/g

Rear/GPRS 2 slot_Ch 128 w/ Pwr back-off (Pri.) (0 mm)/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.998 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.3550
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.621 mW/g
Maximum value of SAR (measured) = 1.682 mW/g



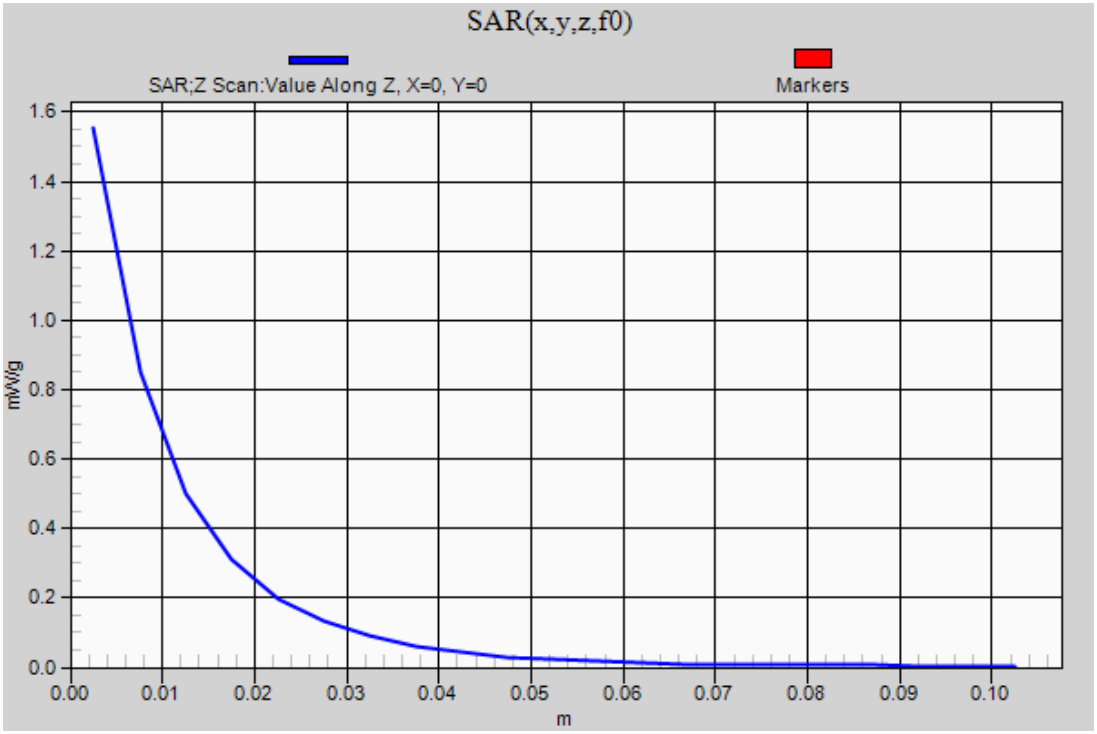
0 dB = 1.680mW/g = 4.51 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 9/14/2012

GSM850

Frequency: 824.4 MHz; Duty Cycle: 1:4.00037

Rear/GPRS 2 slot_Ch 128 w/ Pwr back-off (Pri.) (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.553 mW/g



Test Laboratory: UL CCS SAR Lab C Date: 9/18/2012

GSM1900

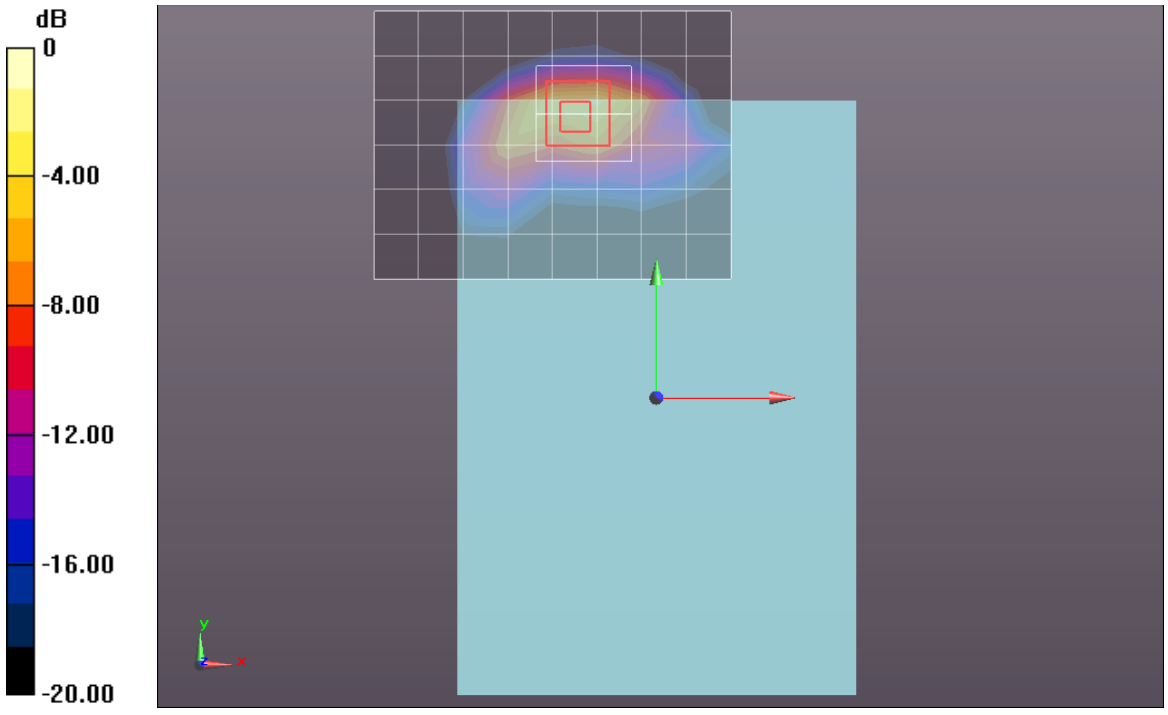
Frequency: 1909.8 MHz; Duty Cycle: 1:4.00037; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1910 MHz; σ = 1.528 mho/m; ε_r = 50.889; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1121

Rear/GPRS 2 slots Ch 810 w/ Pwr back-off (0 mm)/Area Scan (9x7x1): Measurement grid:

dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.996 mW/g

Rear/GPRS 2 slots Ch 810 w/ Pwr back-off (0 mm)/Zoom Scan (5x5x7)/Cube 0: Measurement

grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.183 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 2.3070
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.521 mW/g
Maximum value of SAR (measured) = 1.606 mW/g



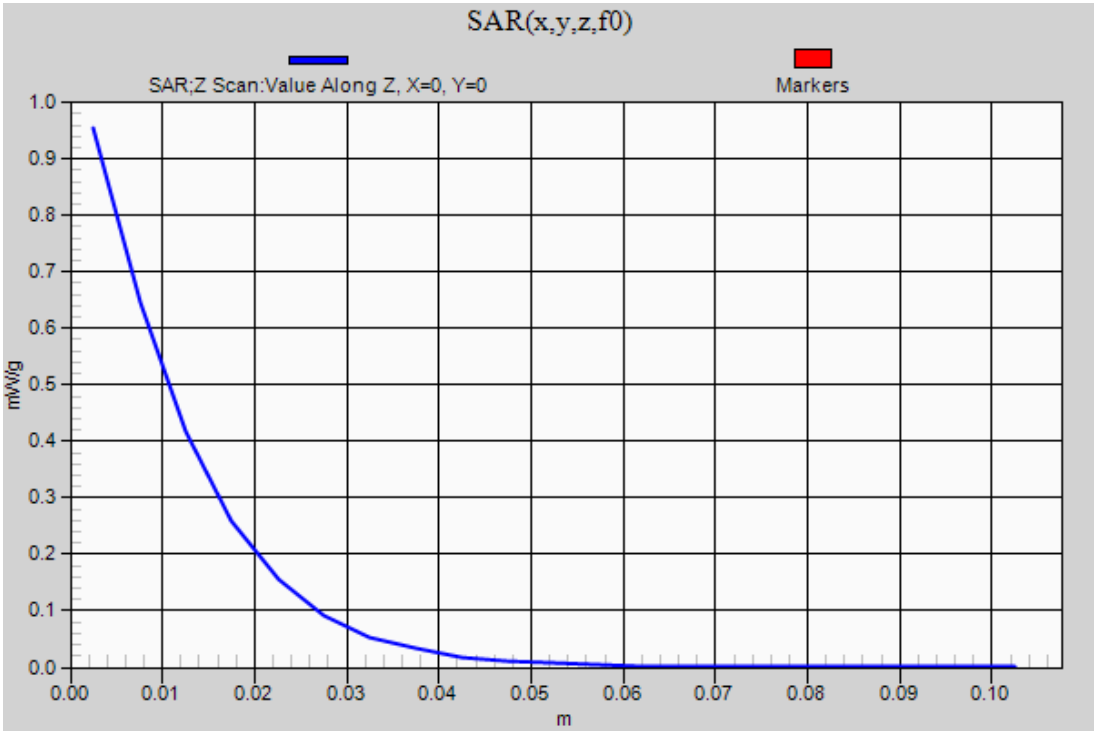
0 dB = 1.610mW/g = 4.14 dB mW/g

Test Laboratory: UL CCS SAR Lab C Date: 9/18/2012

GSM1900

Frequency: 1909.8 MHz; Duty Cycle: 1:4.00037

Rear/GPRS 2 slots Ch 810 w/ Pwr back-off (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.954 mW/g



Test Laboratory: UL CCS SAR Lab B Date: 9/13/2012

UMTS Band V

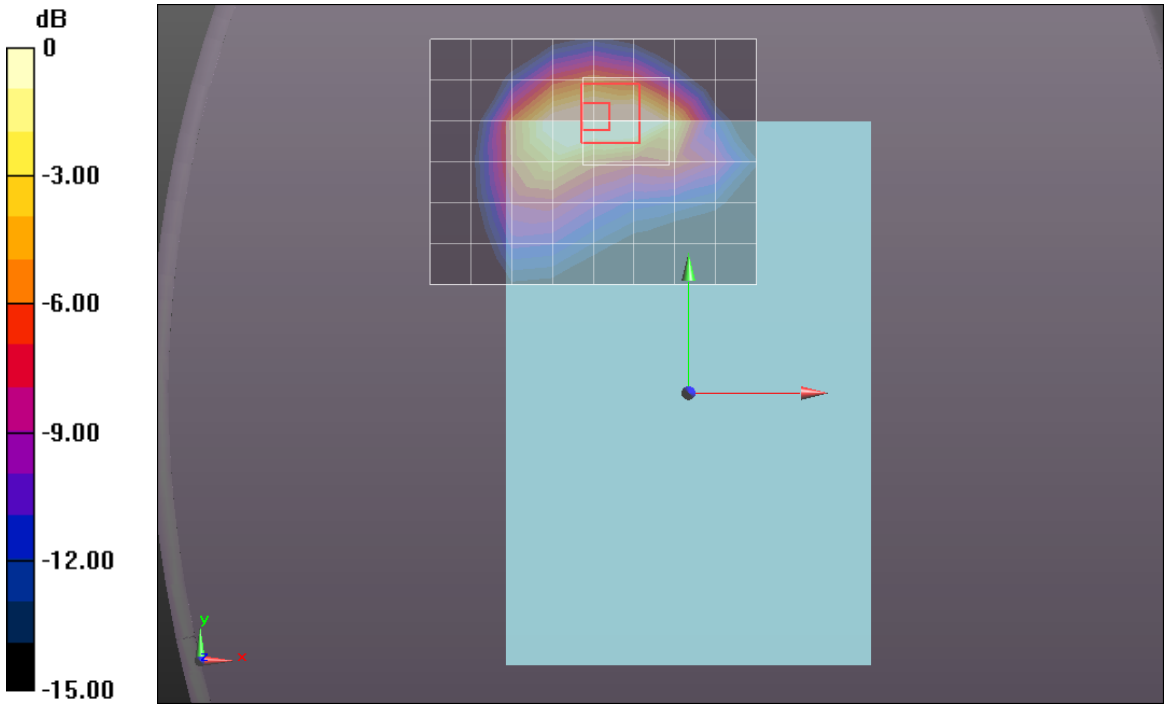
Frequency: 836.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.971 mho/m; ε_r = 52.67; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear/R99_Ch 4183 w/ Pwr back-off (Pri.) (0 mm)/Area Scan (9x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 3.284 mW/g

Rear/R99_Ch 4183 w/ Pwr back-off (Pri.) (0 mm)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 39.483 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.4210
SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.570 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.692 mW/g



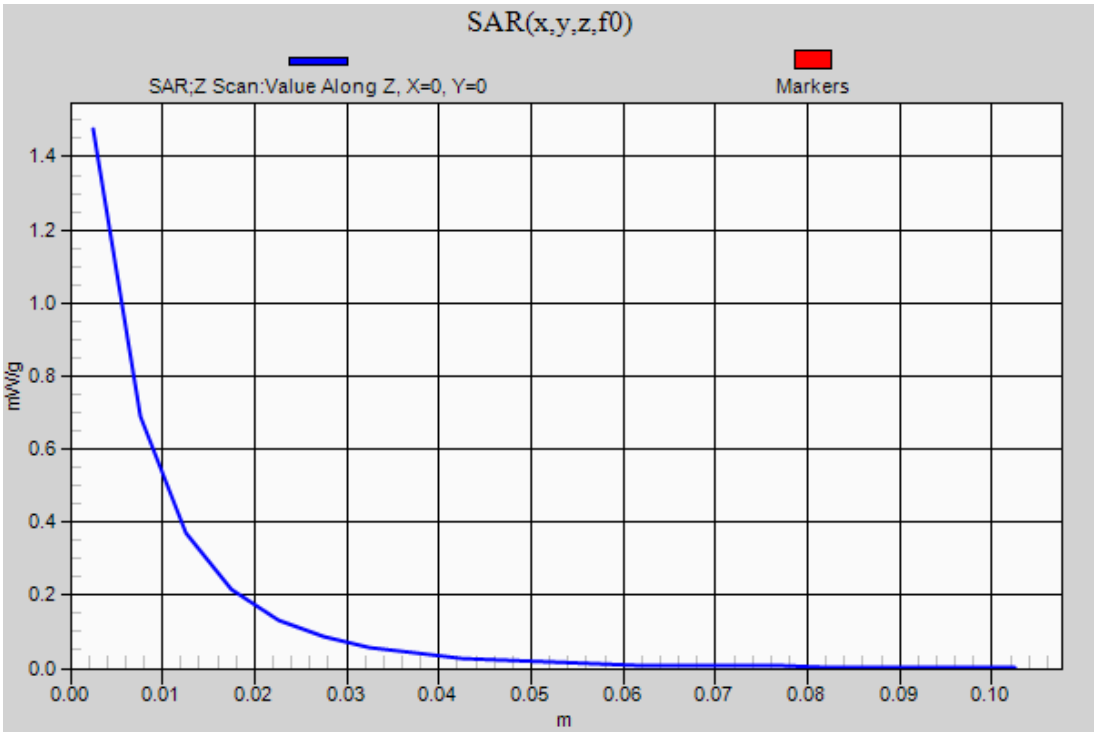
0 dB = 1.690mW/g = 4.56 dB mW/g

Test Laboratory: UL CCS SAR Lab B Date: 9/13/2012

UMTS Band V

Frequency: 836.6 MHz; Duty Cycle: 1:1

Rear/R99_Ch 4183 w/ Pwr back-off (Pri.) (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.476 mW/g



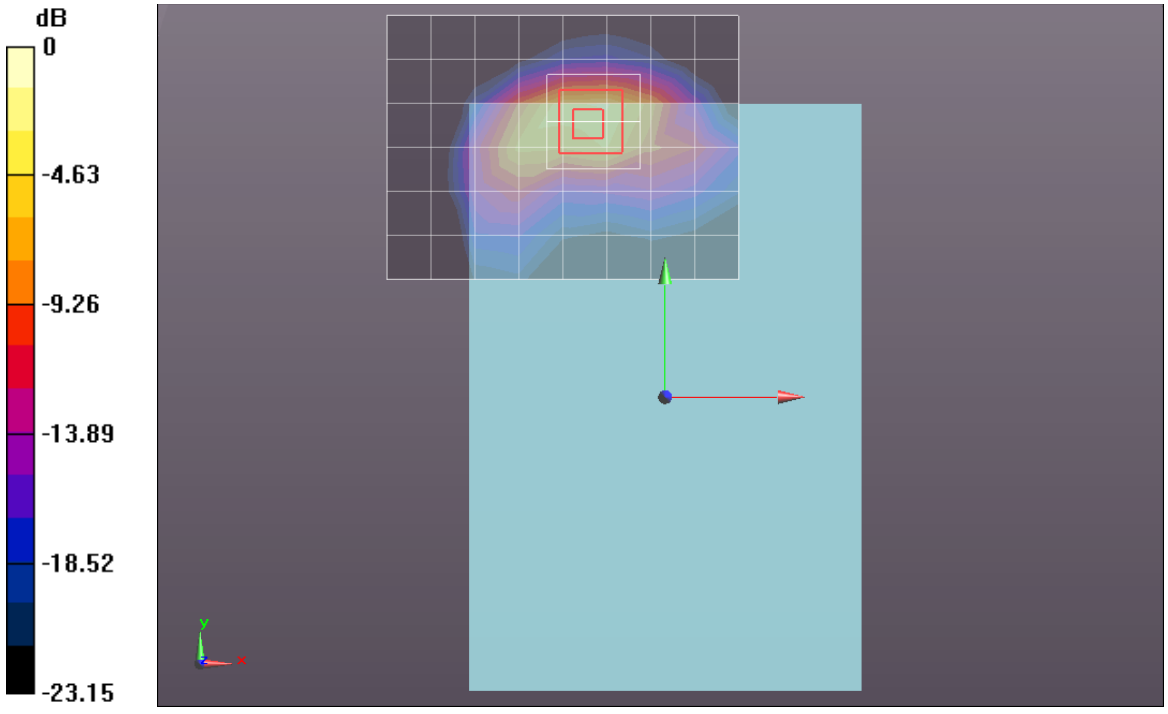
Test Laboratory: UL CCS SAR Lab C Date: 9/17/2012

W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.506 mho/m; ε_r = 52.778; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/R99_Ch 9538 w/ Pwr back-off (0 mm)/Area Scan (9x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.822 mW/g

Rear/R99_Ch 9538 w/ Pwr back-off (0 mm)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.976 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 2.2220
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.499 mW/g
Maximum value of SAR (measured) = 1.563 mW/g



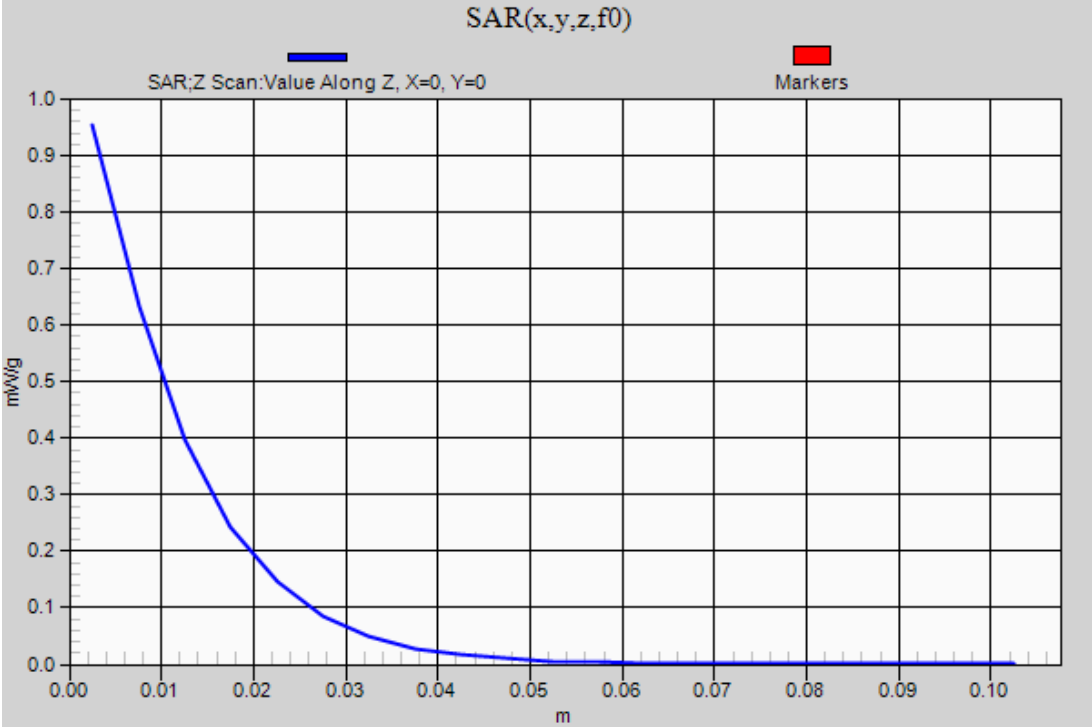
0 dB = 1.560mW/g = 3.86 dB mW/g

Test Laboratory: UL CCS SAR Lab C Date: 9/17/2012

W-CDMA Band II

Frequency: 1907.6 MHz; Duty Cycle: 1:1

Rear/R99_Ch 9538 w/ Pwr back-off (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.954 mW/g



Test Laboratory: UL CCS SAR Lab C Date: 9/11/2012

LTE Band 2

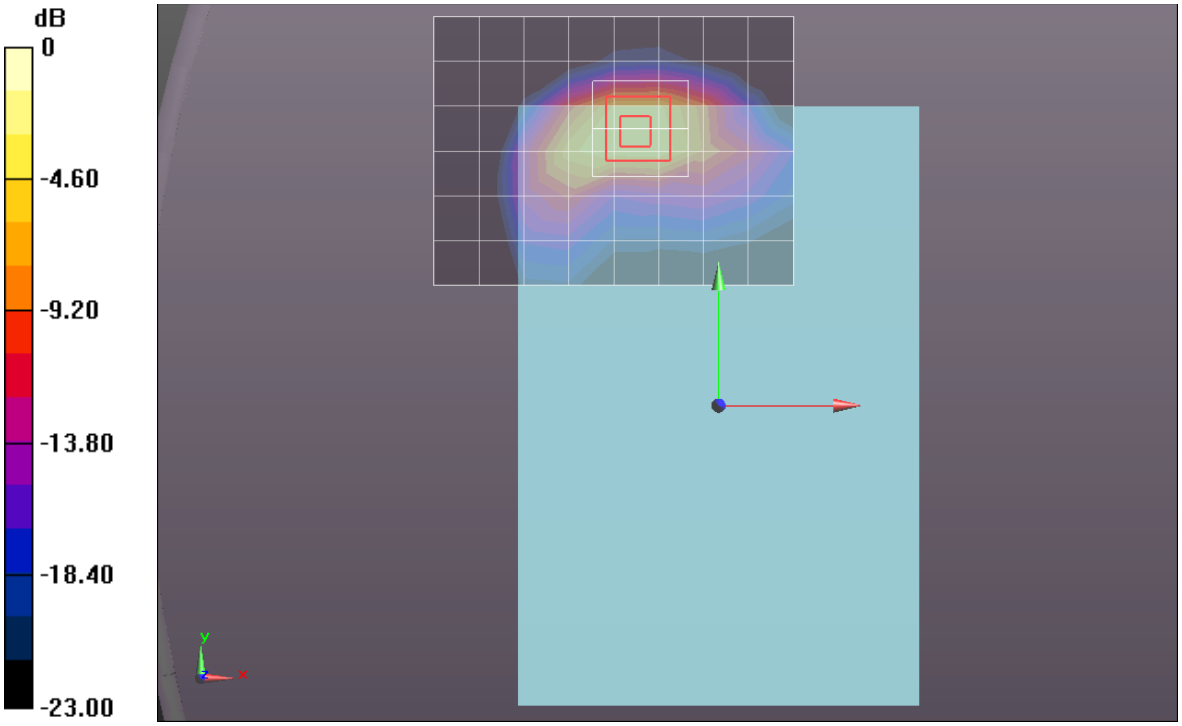
Frequency: 1880 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1880 MHz; σ = 1.533 mho/m; ε_r = 51.291; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(7.11, 7.11, 7.11); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/QPSK_RB# 50, 0_Ch 18900 w/ Pwr back-off (0 mm)/Area Scan (9x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.816 mW/g

Rear/QPSK_RB# 50, 0_Ch 18900 w/ Pwr back-off (0 mm)/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.400 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.3820
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.533 mW/g
Maximum value of SAR (measured) = 1.641 mW/g



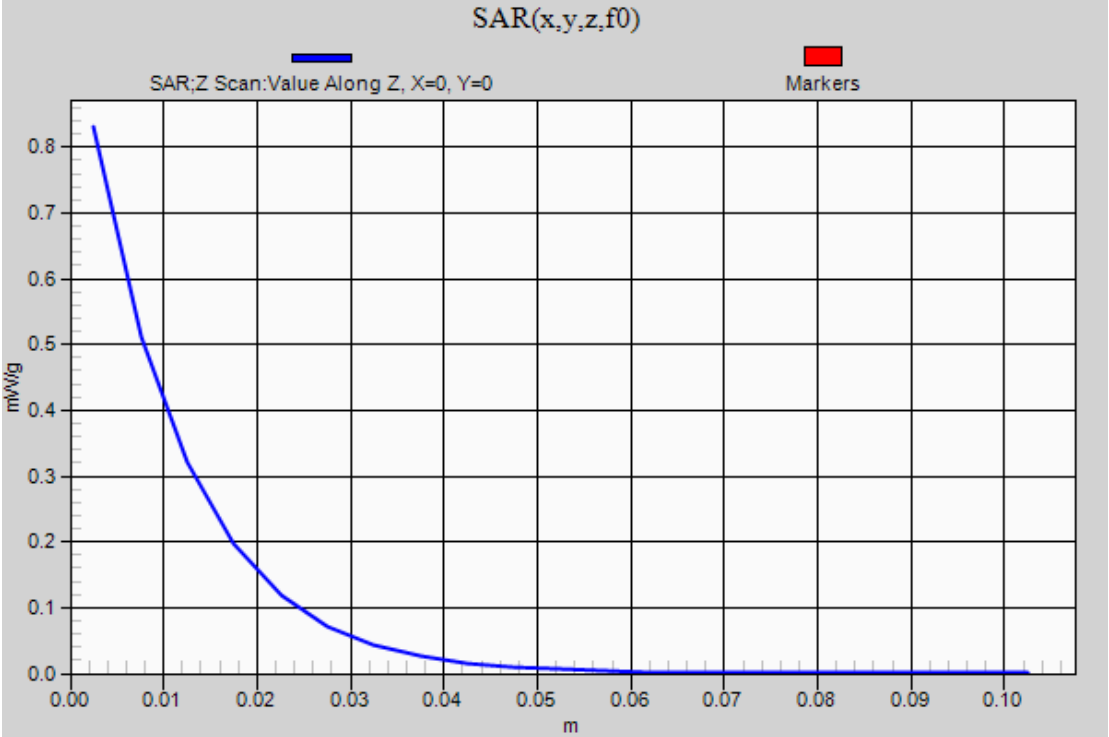
0 dB = 1.640mW/g = 4.30 dB mW/g

Test Laboratory: UL CCS SAR Lab C Date: 9/11/2012

LTE Band 2

Frequency: 1880 MHz; Duty Cycle: 1:1

Rear/QPSK_RB# 50, 0_Ch 18900 w/ Pwr back-off (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.831 mW/g



Test Laboratory: UL CCS SAR Lab A Date: 9/13/2012

LTE Band 4

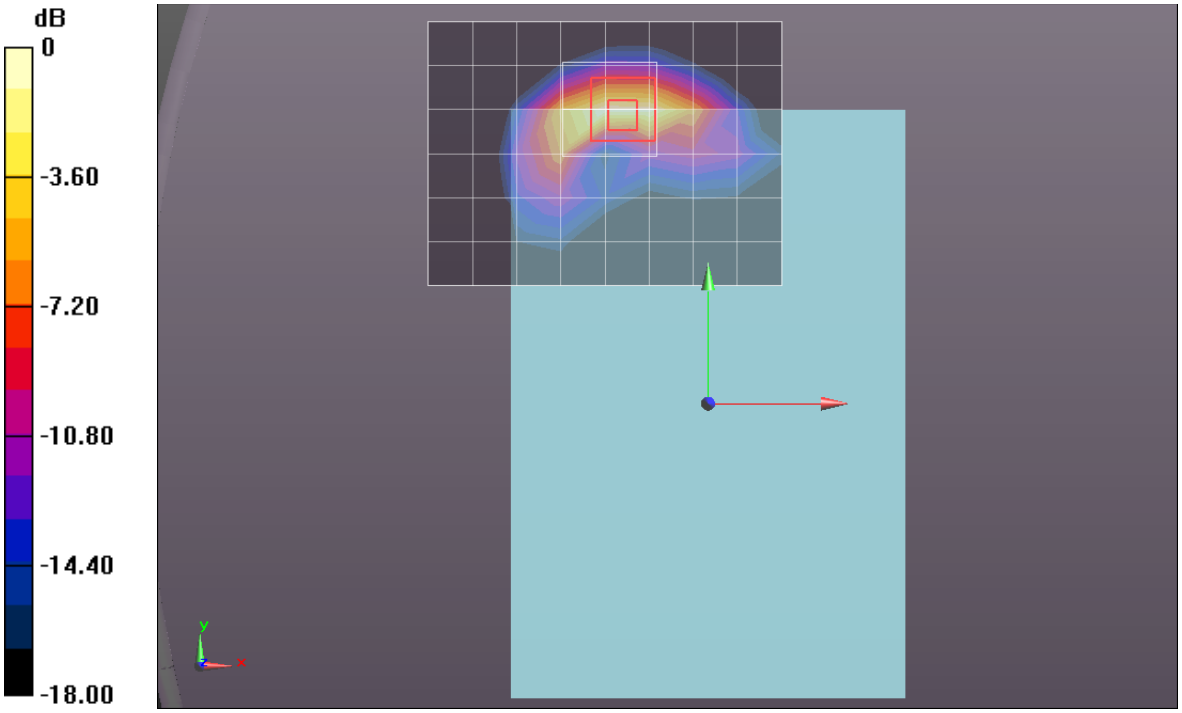
Frequency: 1720 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 1720 MHz; σ = 1.429 mho/m; ε_r = 53.406; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(7.55, 7.55, 7.55); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Rear/QPSK_RB# 1, 99_Ch 20050 w/ Pwr back-off (Pri.) (0 mm)/Area Scan (9x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.428 mW/g

Rear/QPSK_RB# 1, 99_Ch 20050 w/ Pwr back-off (Pri.) (0 mm)/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.383 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 2.3180
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.524 mW/g
Maximum value of SAR (measured) = 1.493 mW/g



0 dB = 1.490mW/g = 3.46 dB mW/g

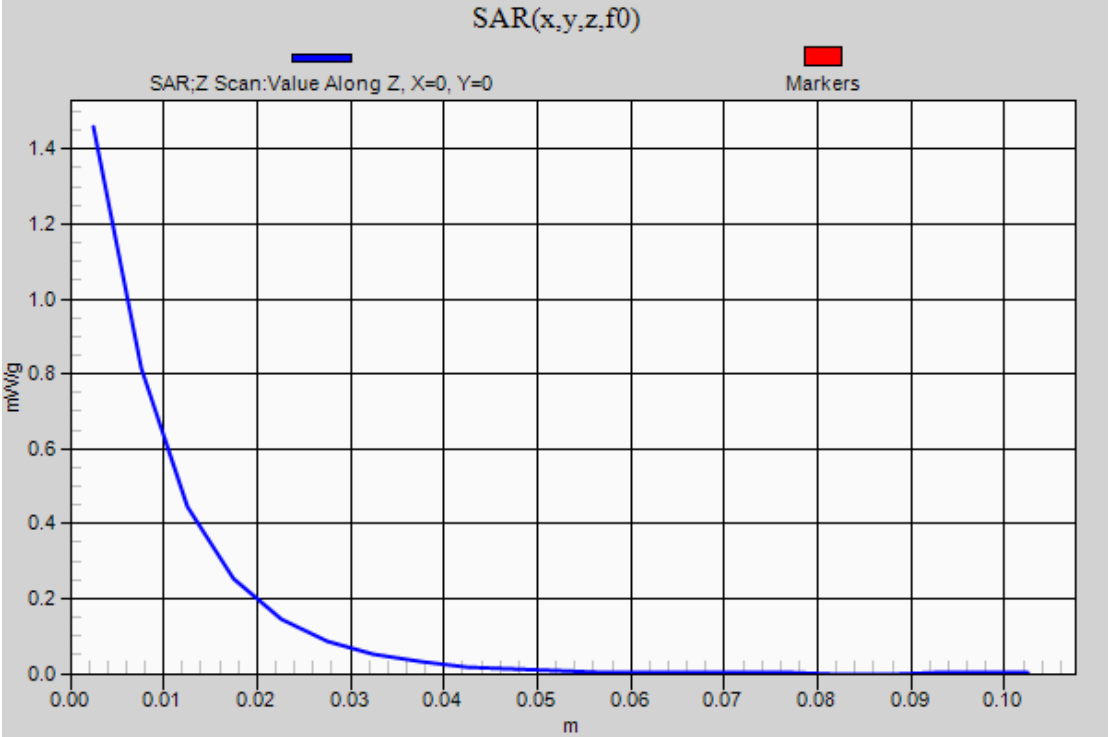
Test Laboratory: UL CCS SAR Lab A Date: 9/13/2012

LTE Band 4

Frequency: 1720 MHz; Duty Cycle: 1:1

Rear/QPSK_RB# 1, 99_Ch 20050 w/ Pwr back-off (Pri.) (0 mm)/Z Scan (1x1x21):

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.459 mW/g



Test Laboratory: UL CCS SAR Lab B Date: 9/18/2012

LTE Band 5

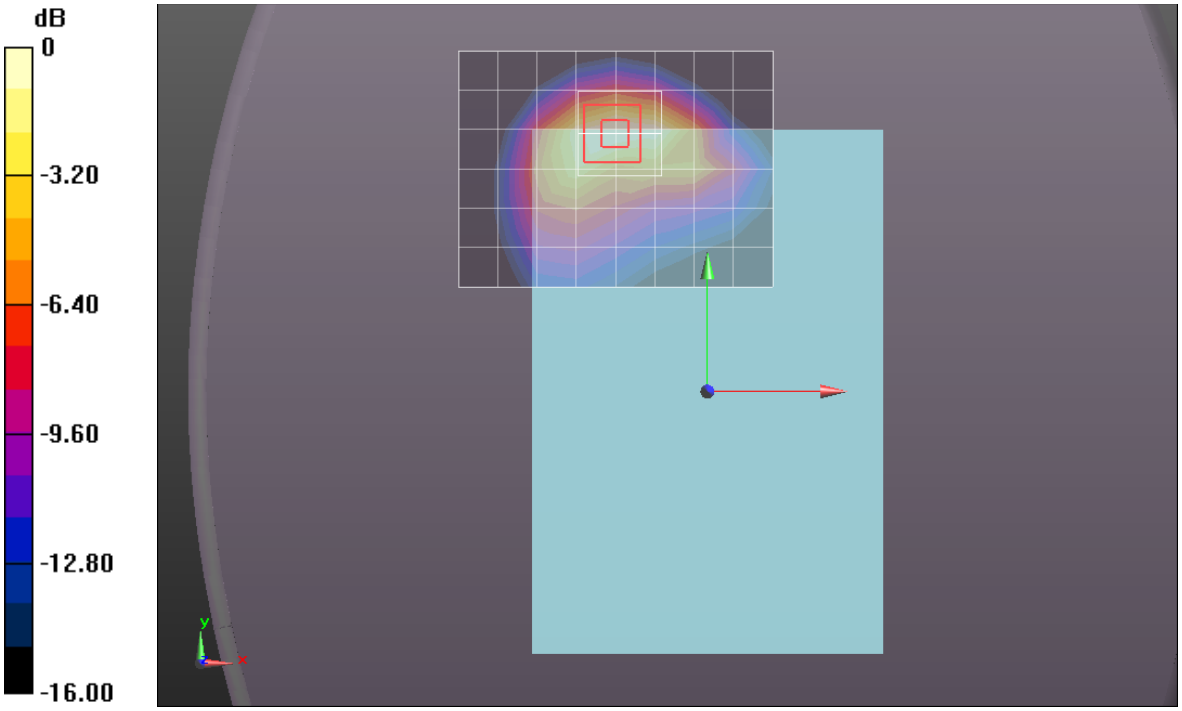
Frequency: 844 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 844 MHz; σ = 0.98 mho/m; ε_r = 54.574; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(8.73, 8.73, 8.73); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Rear/QPSK_RB# 25, 12_Ch 20600 w/ Pwr back-off (Pri.) (0 mm)/Area Scan (9x7x1):

Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.071 mW/g

Rear/QPSK_RB# 25, 12_Ch 20600 w/ Pwr back-off (Pri.) (0 mm)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 40.655 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.3930
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.615 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.706 mW/g



0 dB = 1.710mW/g = 4.66 dB mW/g

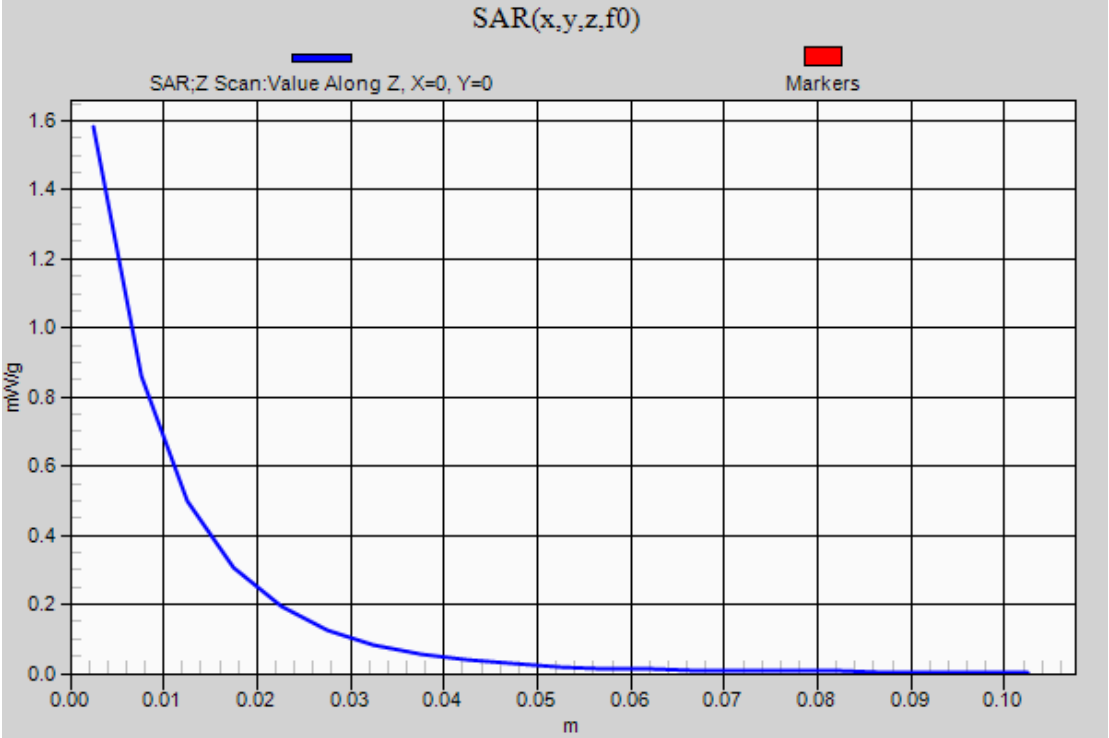
Test Laboratory: UL CCS SAR Lab B Date: 9/18/2012

LTE Band 5

Frequency: 844 MHz; Duty Cycle: 1:1

Rear/QPSK_RB# 25, 12_Ch 20600 w/ Pwr back-off (Pri.) (0 mm)/Z Scan (1x1x21):

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.582 mW/g



Test Laboratory: UL CCS SAR Lab A Date: 9/11/2012

LTE Band 17

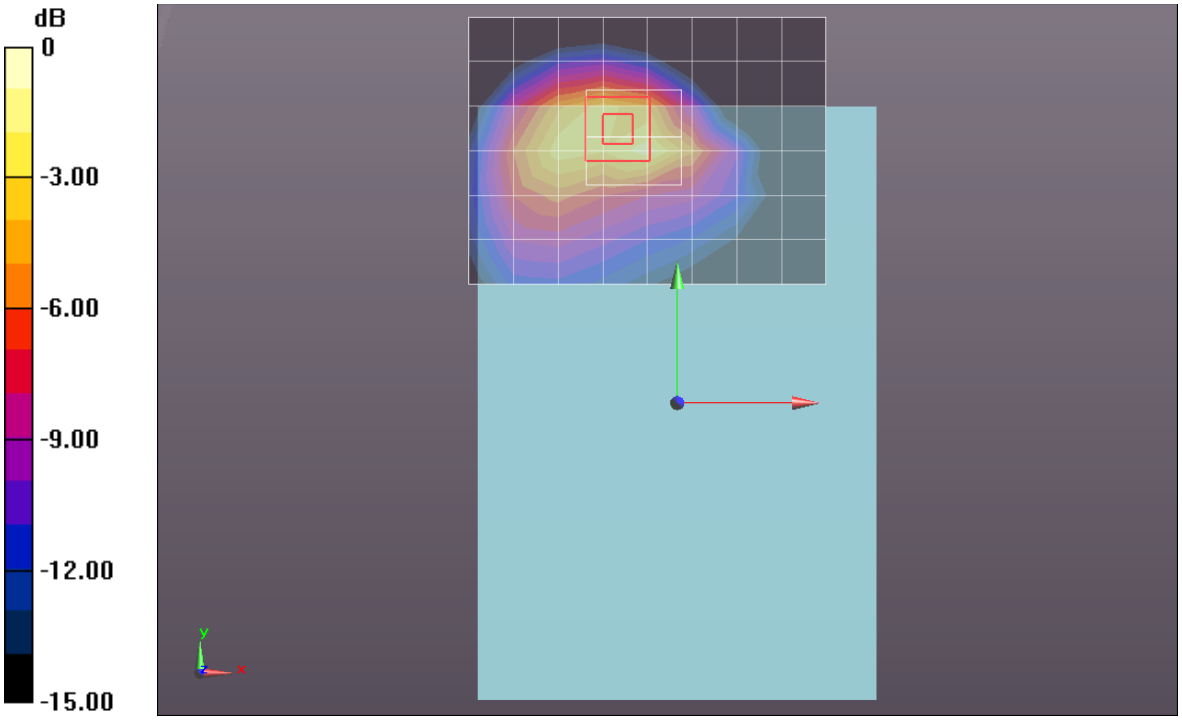
Frequency: 710 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used: f = 710 MHz; σ = 0.901 mho/m; ε_r = 54.719; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(8.94, 8.94, 8.94); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1119

Rear/QPSK_RB# 50, 0_Ch 23790 w/ Pwr back-off (0 mm)/Area Scan (9x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.192 mW/g

Rear/QPSK_RB# 50, 0_Ch 23790 w/ Pwr back-off (0 mm)/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.741 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.9680
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.565 mW/g
Maximum value of SAR (measured) = 1.646 mW/g



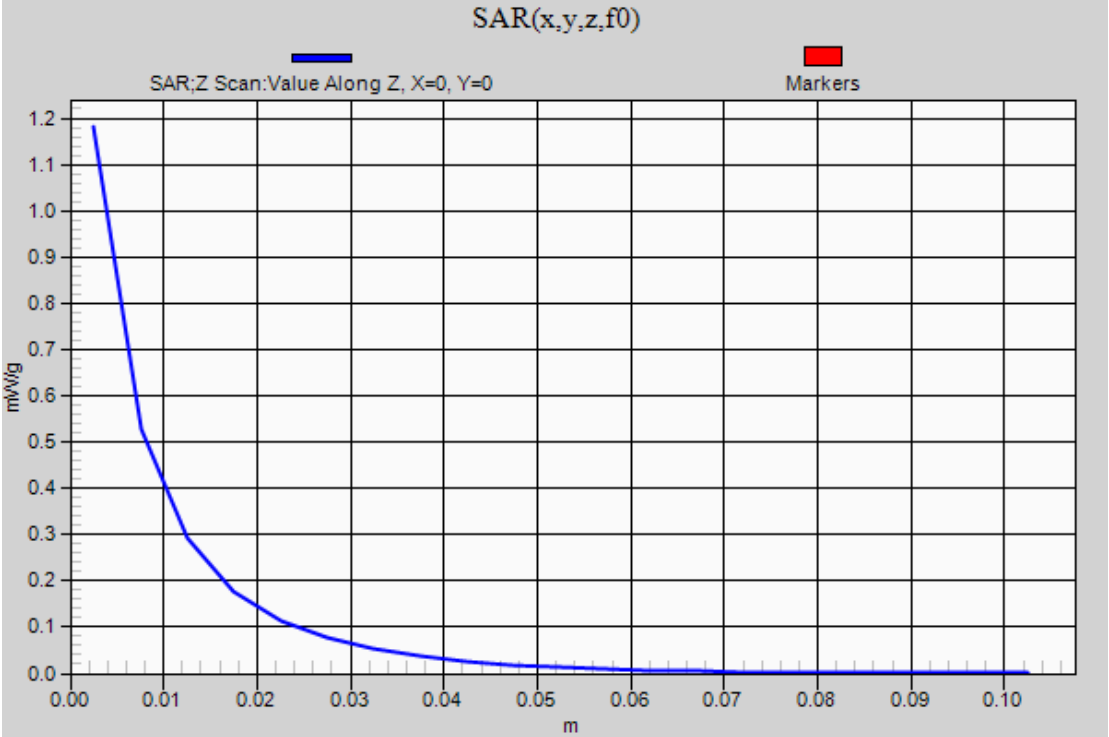
0 dB = 1.650mW/g = 4.35 dB mW/g

Test Laboratory: UL CCS SAR Lab A Date: 9/11/2012

LTE Band 17

Frequency: 710 MHz; Duty Cycle: 1:1

Rear/QPSK_RB# 50, 0_Ch 710 w/ Pwr back-off (0 mm)/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.181 mW/g



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

WiFi 2.4GHz (Primary Antenna)

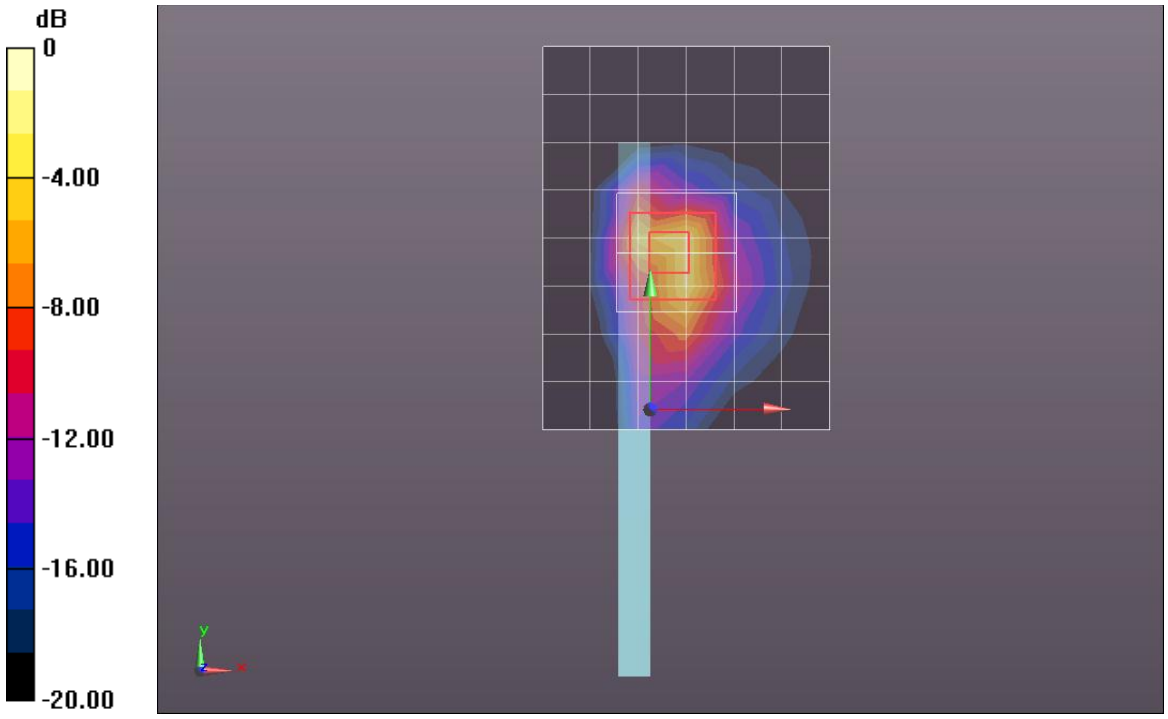
Frequency: 2462 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.957 mho/m; ε_r = 51.751; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(6.67, 6.67, 6.67); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Edge 3/802.11b_ch 11/Area Scan (7x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.035 mW/g

Edge 3/802.11b_ch 11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.627 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 3.4010
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.335 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.731 mW/g



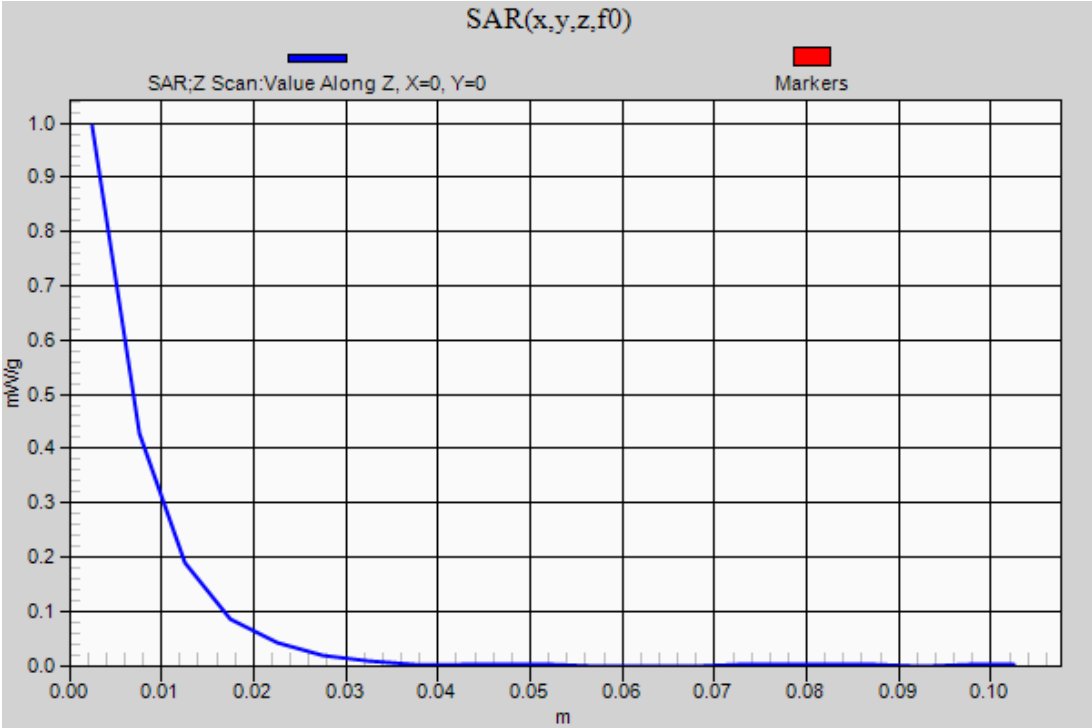
0 dB = 1.730mW/g = 4.76 dB mW/g

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

WiFi 2.4GHz (Primary Antenna)

Frequency: 2462 MHz; Duty Cycle: 1:1

Edge 3/802.11b_ch 11/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.994 mW/g



Test Laboratory: UL CCS SAR Lab A Date: 9/5/2012

Bluetooth 2.4GHz (Primary Antenna)

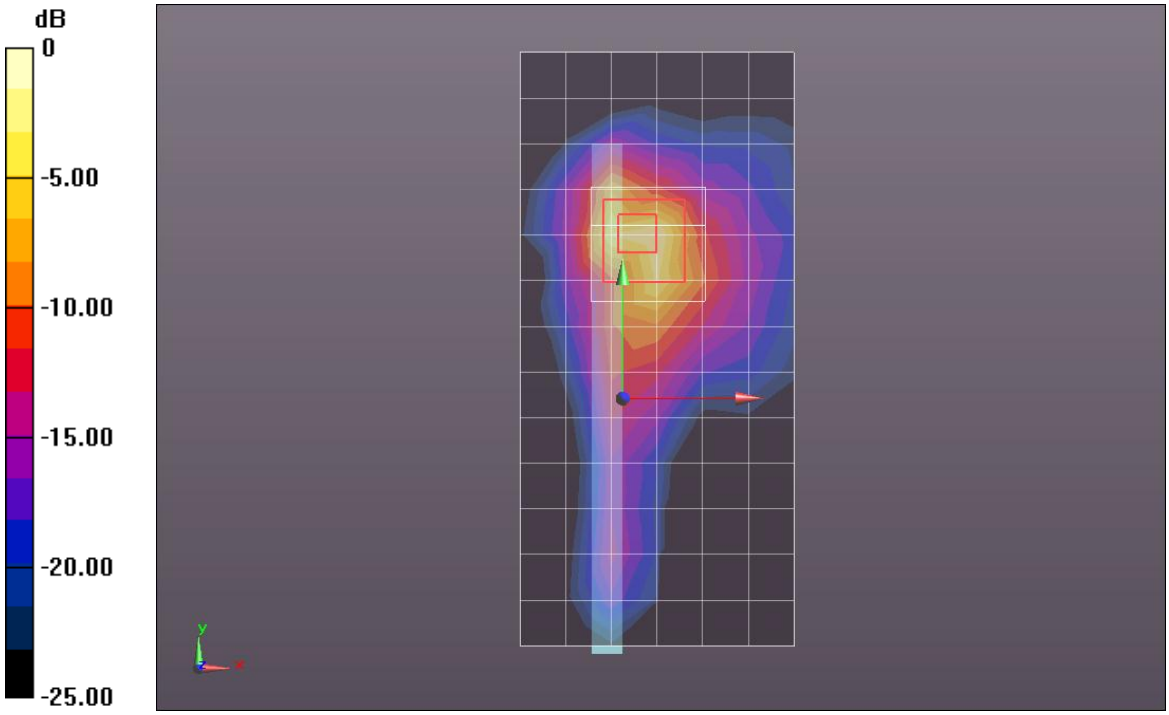
Frequency: 2441 MHz; Duty Cycle: 1:3.43954; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.903 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(6.65, 6.65, 6.65); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1099

Edge 3/ch 39/Area Scan (7x14x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.408 mW/g

Edge 3/ch 39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.599 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.0510
SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.121 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.549 mW/g



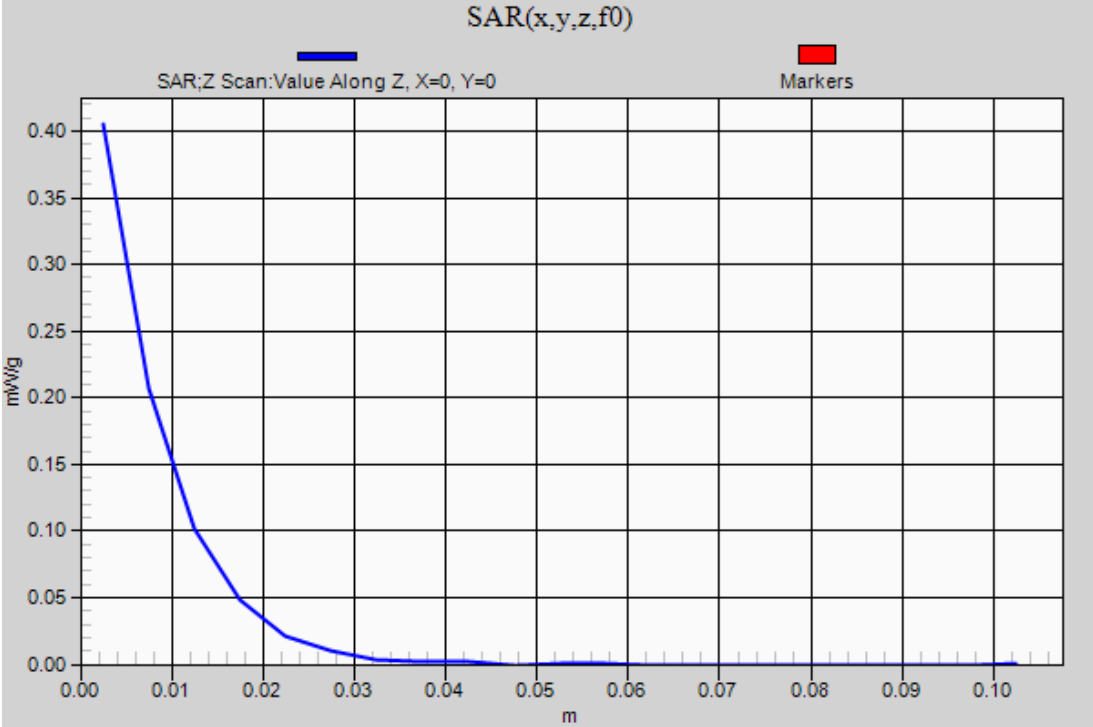
0 dB = 0.550mW/g = -5.19 dB mW/g

Test Laboratory: UL CCS SAR Lab A Date: 9/5/2012

Bluetooth 2.4GHz (Primary Antenna)

Frequency: 2441 MHz; Duty Cycle: 1:3.43954

Edge 3/ch 39/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.405 mW/g



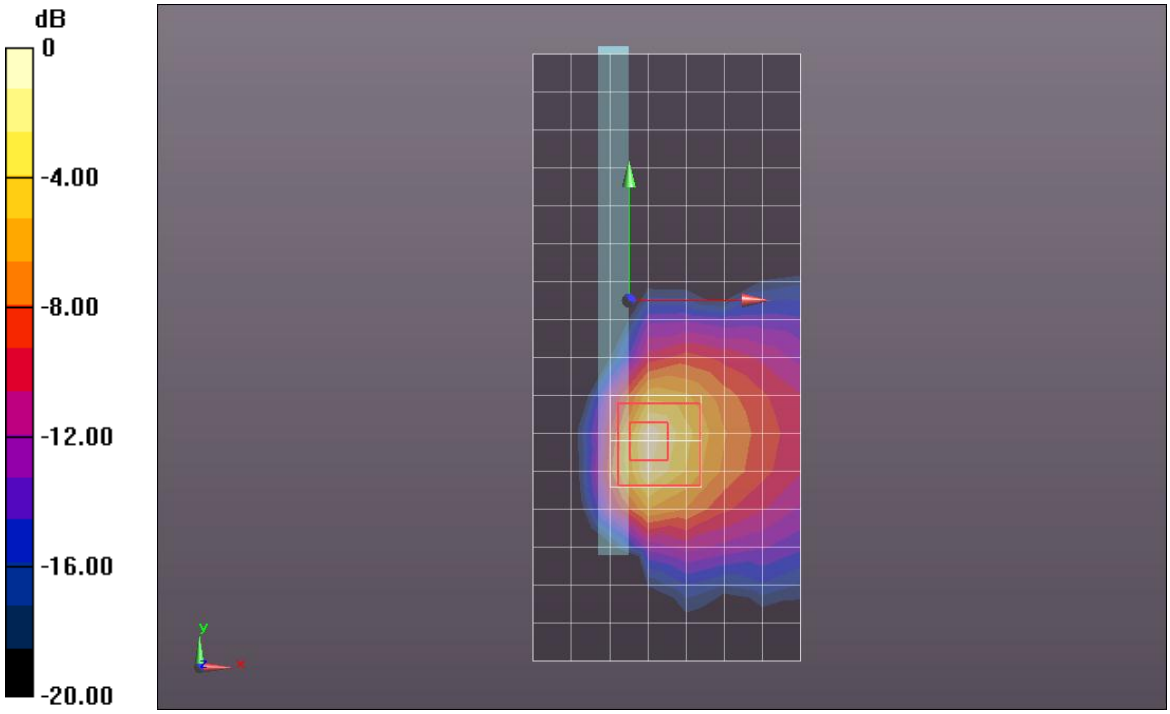
Test Laboratory: UL CCS SAR Lab A Date: 8/28/2012

WiFi 5.2GHz (Secondary Antenna)

Frequency: 5230 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5230 MHz; σ = 5.241 mho/m; ε_r = 47.121; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(4.17, 4.17, 4.17); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/802.11n HT40_ch 46/Area Scan (8x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.449 mW/g

Edge 3/802.11n HT40_ch 46/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 17.491 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 3.2710
SAR(1 g) = 0.836 mW/g; SAR(10 g) = 0.290 mW/g
Maximum value of SAR (measured) = 1.590 mW/g

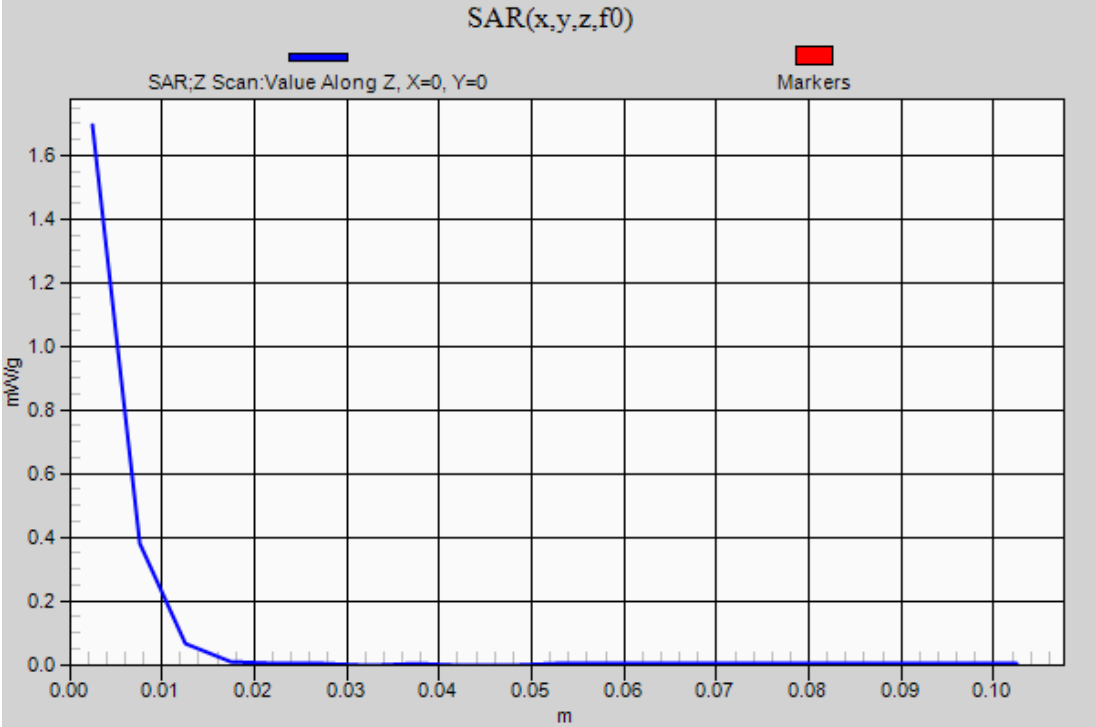


0 dB = 1.590mW/g = 4.03 dB mW/g

WiFi 5.2GHz (Secondary Antenna)

Frequency: 5230 MHz; Duty Cycle: 1:1

Edge 3/802.11n HT40_ch 46/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.695 mW/g



Test Laboratory: UL CCS SAR Lab A Date: 8/14/2012

WiFi 5.3GHz (Secondary Antenna)

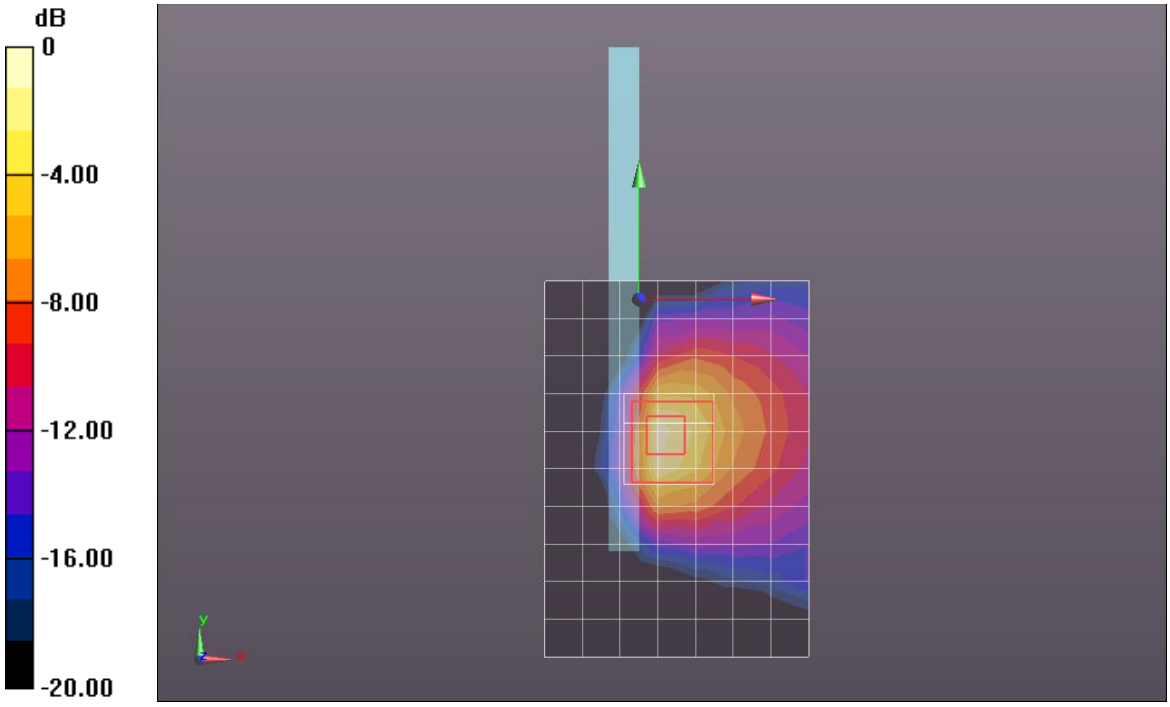
Frequency: 5300 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5300 MHz; σ = 5.477 mho/m; ε_r = 48.033; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1258; Calibrated: 3/8/2012
- Probe: EX3DV4 - SN3772; ConvF(3.99, 3.99, 3.99); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1119

Edge 3/802.11a_ch 60/Area Scan (8x11x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.806 mW/g

Edge 3/802.11a_ch 60/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 19.409 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 4.3890
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.378 mW/g
Maximum value of SAR (measured) = 2.094 mW/g



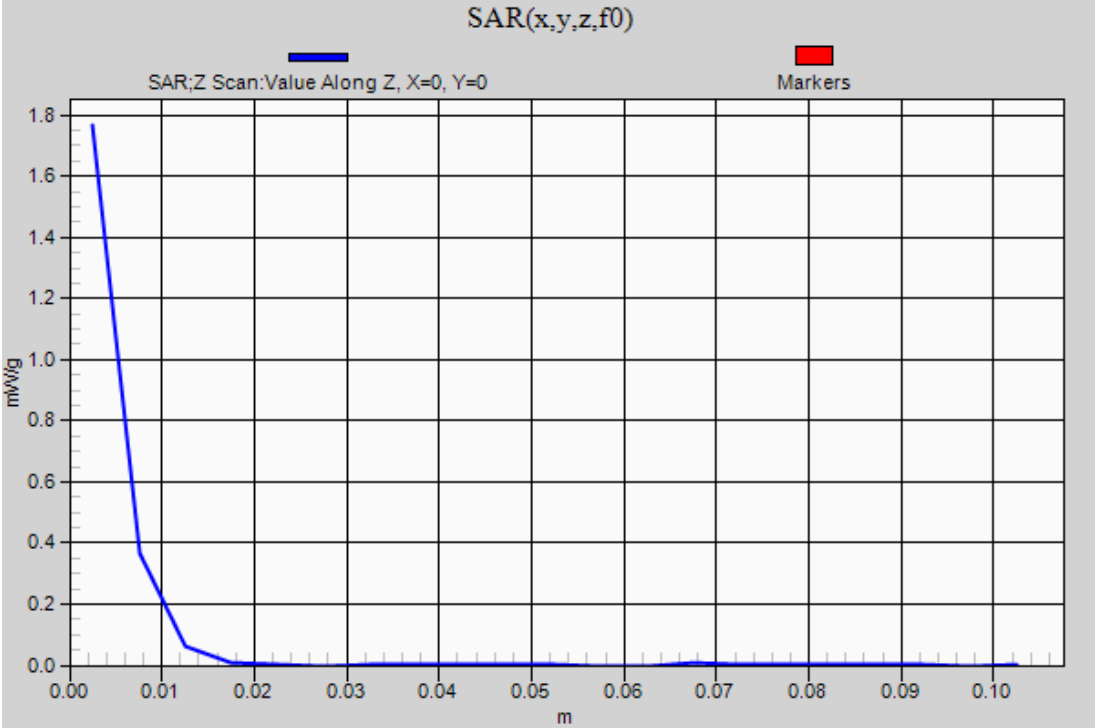
0 dB = 2.090mW/g = 6.40 dB mW/g

Test Laboratory: UL CCS SAR Lab A Date: 8/14/2012

WiFi 5.3GHz (Secondary Antenna)

Frequency: 5300 MHz; Duty Cycle: 1:1

Edge 3/802.11a_ch 60/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.767 mW/g



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

WiFi 5.5GHz (Secondary Antenna)

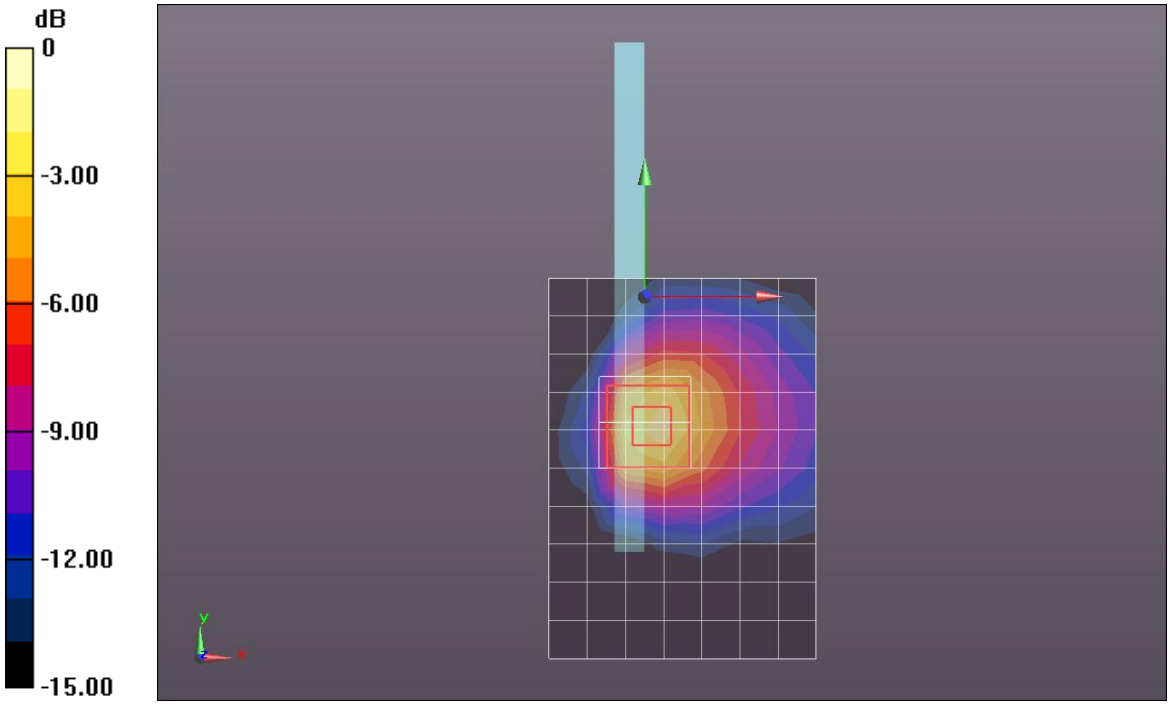
Frequency: 5680 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5680 MHz; σ = 5.954 mho/m; ε_r = 47.22; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1259; Calibrated: 2/13/2012
- Probe: EX3DV4 - SN3686; ConvF(3.44, 3.44, 3.44); Calibrated: 2/16/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (B); Type: QDOVA001BB; Serial: 1118

Edge 3/802.11a_ch 136/Area Scan (8x11x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.630 mW/g

Edge 3/802.11a_ch 136/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 17.663 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 4.3430
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 2.147 mW/g



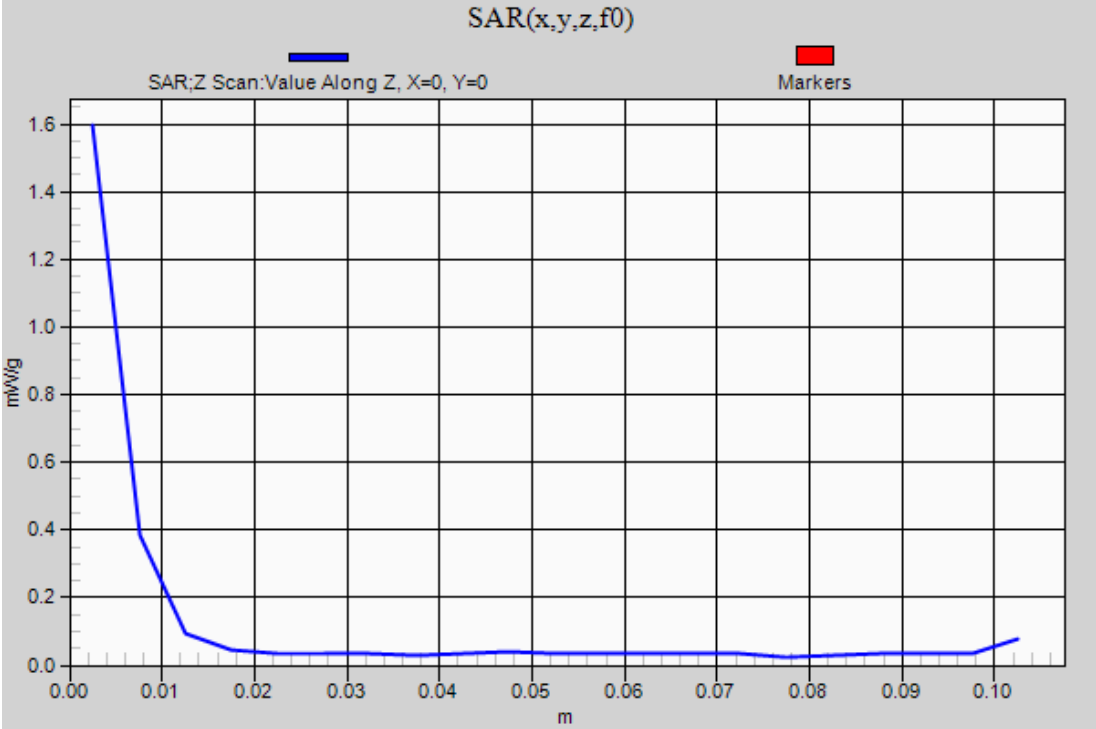
0 dB = 2.150mW/g = 6.65 dB mW/g

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

WiFi 5.5GHz (Secondary Antenna)

Frequency: 5680 MHz; Duty Cycle: 1:1

Edge 3/802.11a_ch 136/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.596 mW/g



Test Laboratory: UL CCS SAR Lab C Date: 8/7/2012

WiFi 5.8GHz (Secondary Antenna)

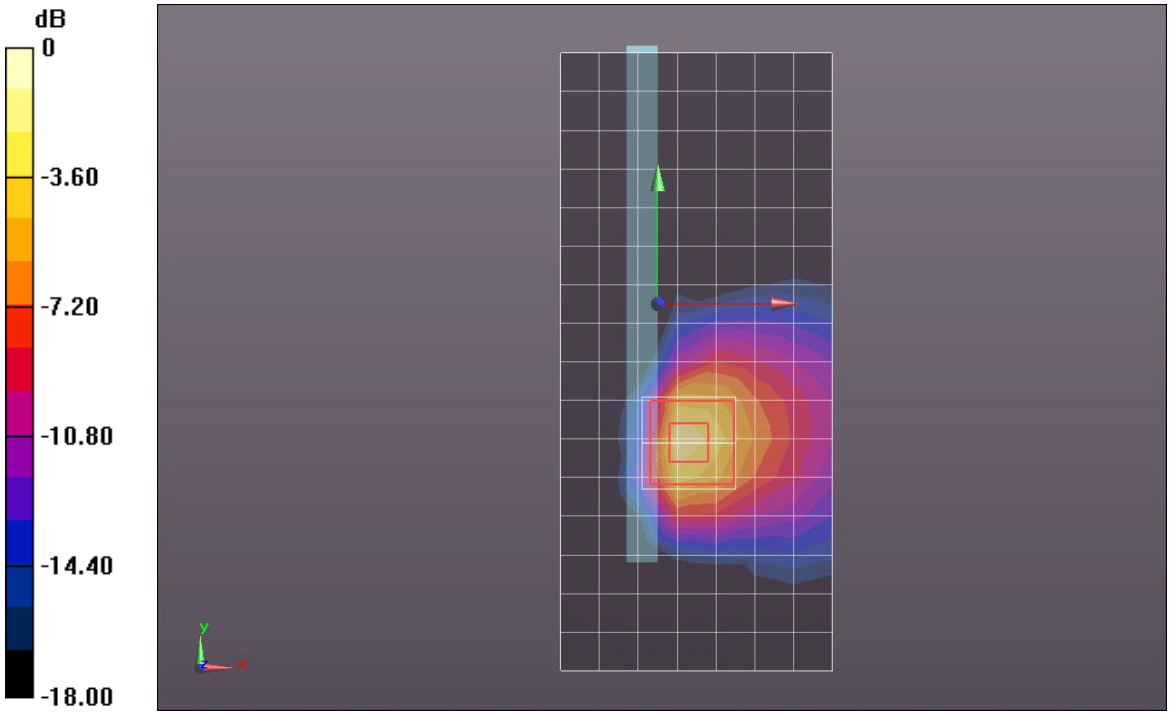
Frequency: 5745 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 25.0°C; Liquid Temperature: 24.0°C
Medium parameters used: f = 5745 MHz; σ = 6.047 mho/m; ε_r = 48.294; ρ = 1000 kg/m^3
DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012
- Probe: EX3DV4 - SN3773; ConvF(3.57, 3.57, 3.57); Calibrated: 3/14/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Phantom: ELI v5.0 (A); Type: QDOVA001BB; Serial: 1120

Edge 3/802.11a_ch 149/Area Scan (8x17x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.831 mW/g

Edge 3/802.11a_ch 149/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 19.105 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 4.7080
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 2.360 mW/g



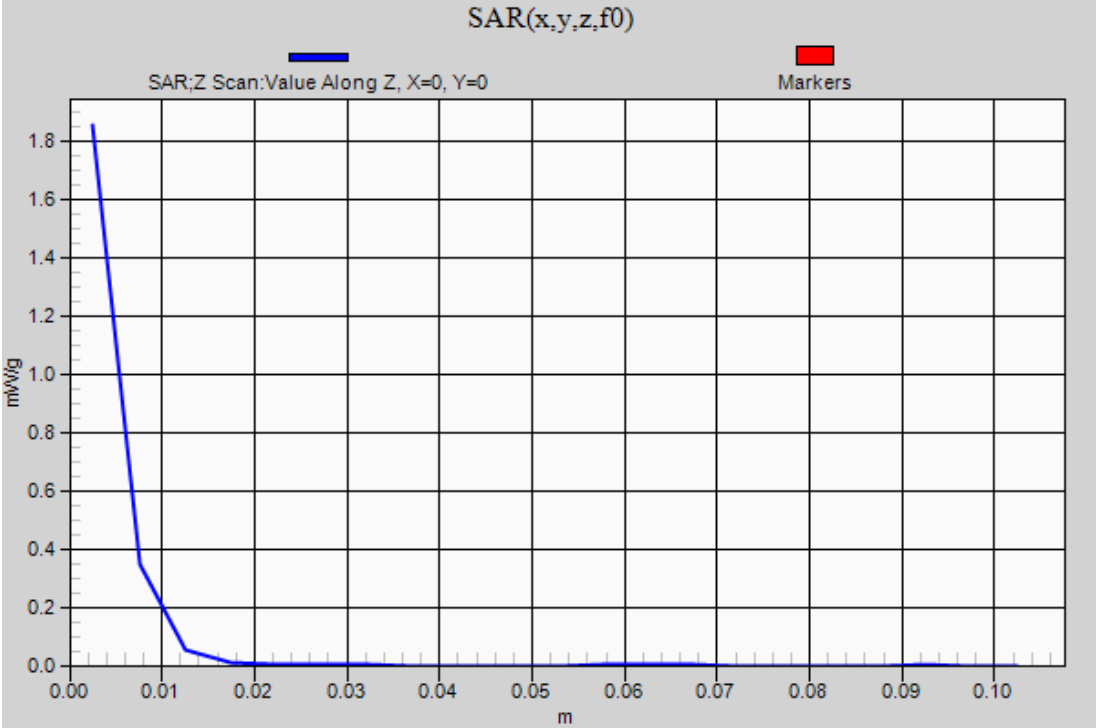
0 dB = 2.360mW/g = 7.46 dB mW/g

Test Laboratory: UL CCS SAR Lab C
Date: 8/7/2012

WiFi 5.8GHz (Secondary Antenna)

Frequency: 5745 MHz; Duty Cycle: 1:1

Edge 3/802.11a_ch 149/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.856 mW/g



15. Simultaneous Transmission SAR Analysis

15.1. Sum of the SAR for GSM, W-CDMA, LTE and WiFi 2.4 GHz

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 2.4 GHz	
Rear	1.180								0.066	1.246
		1.160							0.066	1.226
			1.150						0.066	1.216
				1.110					0.066	1.176
					1.190				0.066	1.256
						1.170			0.066	1.236
							1.190		0.066	1.256
								1.140	0.066	1.206
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								1.050	1.050
		0							1.050	1.050
			0						1.050	1.050
				0					1.050	1.050
					0				1.050	1.050
						0			1.050	1.050
							0		1.050	1.050
								0	1.050	1.050
Edge 4	0								0.158	0.158
		0							0.158	0.158
			0						0.158	0.158
				0					0.158	0.158
					0				0.158	0.158
						0			0.158	0.158
							0		0.158	0.158
								0	0.158	0.158

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 2.4 GHz	
Rear	1.180								0.019	1.199
		1.160							0.019	1.179
			1.150						0.019	1.169
				1.110					0.019	1.129
					1.190				0.019	1.209
						1.170			0.019	1.189
							1.190		0.019	1.209
								1.140	0.019	1.159
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.011	0.720
		0.735							0.011	0.746
			0.421						0.011	0.432
				0.623					0.011	0.634
					0.790				0.011	0.801
						0.569			0.011	0.580
							0.348		0.011	0.359
								0.193	0.011	0.204
Edge 3	0								0.466	0.466
		0							0.466	0.466
			0						0.466	0.466
				0					0.466	0.466
					0				0.466	0.466
						0			0.466	0.466
							0		0.466	0.466
								0	0.466	0.466
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.2. Sum of the SAR for GSM, W-CDMA, LTE and Bluetooth

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									∑ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	Bluetooth	
Rear	1.180								0.029	1.209
		1.160							0.029	1.189
			1.150						0.029	1.179
				1.110					0.029	1.139
					1.190				0.029	1.219
						1.170			0.029	1.199
							1.190		0.029	1.219
								1.140	0.029	1.169
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								0.356	0.356
		0							0.356	0.356
			0						0.356	0.356
				0					0.356	0.356
					0				0.356	0.356
						0			0.356	0.356
							0		0.356	0.356
								0	0.356	0.356
Edge 4	0								0.072	0.072
		0							0.072	0.072
			0						0.072	0.072
				0					0.072	0.072
					0				0.072	0.072
						0			0.072	0.072
							0		0.072	0.072
								0	0.072	0.072

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									∑ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	Bluetooth	
Rear	1.180								0.003	1.183
		1.160							0.003	1.163
			1.150						0.003	1.153
				1.110					0.003	1.113
					1.190				0.003	1.193
						1.170			0.003	1.173
							1.190		0.003	1.193
								1.140	0.003	1.143
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.025	0.734
		0.735							0.025	0.760
			0.421						0.025	0.446
				0.623					0.025	0.648
					0.790				0.025	0.815
						0.569			0.025	0.594
							0.348		0.025	0.373
								0.193	0.025	0.218
Edge 3	0								0.149	0.149
		0							0.149	0.149
			0						0.149	0.149
				0					0.149	0.149
					0				0.149	0.149
						0			0.149	0.149
							0		0.149	0.149
								0	0.149	0.149
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.3. Sum of the SAR for GSM, W-CDMA, LTE, WiFi 5.2 GHz

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.2 GHz	
Rear	1.180								0.040	1.220
		1.160							0.040	1.200
			1.150						0.040	1.190
				1.110					0.040	1.150
					1.190				0.040	1.230
						1.170			0.040	1.210
							1.190		0.040	1.230
								1.140	0.040	1.180
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								0.714	0.714
		0							0.714	0.714
			0						0.714	0.714
				0					0.714	0.714
					0				0.714	0.714
						0			0.714	0.714
							0		0.714	0.714
								0	0.714	0.714
Edge 4	0								0.094	0.094
		0							0.094	0.094
			0						0.094	0.094
				0					0.094	0.094
					0				0.094	0.094
						0			0.094	0.094
							0		0.094	0.094
								0	0.094	0.094

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.2 GHz	
Rear	1.180								0.135	1.315
		1.160							0.135	1.295
			1.150						0.135	1.285
				1.110					0.135	1.245
					1.190				0.135	1.325
						1.170			0.135	1.305
							1.190		0.135	1.325
								1.140	0.135	1.275
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.047	0.756
		0.735							0.047	0.782
			0.421						0.047	0.468
				0.623					0.047	0.670
					0.790				0.047	0.837
						0.569			0.047	0.616
							0.348		0.047	0.395
								0.193	0.047	0.240
Edge 3	0								0.836	0.836
		0							0.836	0.836
			0						0.836	0.836
				0					0.836	0.836
					0				0.836	0.836
						0			0.836	0.836
							0		0.836	0.836
								0	0.836	0.836
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.4. Sum of the SAR for GSM, W-CDMA, LTE, WiFi 5.3 GHz

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.3 GHz	
Rear	1.180								0.087	1.267
		1.160							0.087	1.247
			1.150						0.087	1.237
				1.110					0.087	1.197
					1.190				0.087	1.277
						1.170			0.087	1.257
							1.190		0.087	1.277
								1.140	0.087	1.227
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								1.040	1.040
		0							1.040	1.040
			0						1.040	1.040
				0					1.040	1.040
					0				1.040	1.040
						0			1.040	1.040
							0		1.040	1.040
								0	1.040	1.040
Edge 4	0								0.137	0.137
		0							0.137	0.137
			0						0.137	0.137
				0					0.137	0.137
					0				0.137	0.137
						0			0.137	0.137
							0		0.137	0.137
								0	0.137	0.137

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.3 GHz	
Rear	1.180								0.175	1.355
		1.160							0.175	1.335
			1.150						0.175	1.325
				1.110					0.175	1.285
					1.190				0.175	1.365
						1.170			0.175	1.345
							1.190		0.175	1.365
								1.140	0.175	1.315
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.062	0.771
		0.735							0.062	0.797
			0.421						0.062	0.483
				0.623					0.062	0.685
					0.790				0.062	0.852
						0.569			0.062	0.631
							0.348		0.062	0.410
								0.193	0.062	0.255
Edge 3	0								1.110	1.110
		0							1.110	1.110
			0						1.110	1.110
				0					1.110	1.110
					0				1.110	1.110
						0			1.110	1.110
							0		1.110	1.110
								0	1.110	1.110
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.5. Sum of the SAR for GSM, W-CDMA, LTE, WiFi 5.5 GHz

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.5 GHz	
Rear	1.180								0.095	1.275
		1.160							0.095	1.255
			1.150						0.095	1.245
				1.110					0.095	1.205
					1.190				0.095	1.285
						1.170			0.095	1.265
							1.190		0.095	1.285
								1.140	0.095	1.235
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								1.040	1.040
		0							1.040	1.040
			0						1.040	1.040
				0					1.040	1.040
					0				1.040	1.040
						0			1.040	1.040
							0		1.040	1.040
								0	1.040	1.040
Edge 4	0								0.139	0.139
		0							0.139	0.139
			0						0.139	0.139
				0					0.139	0.139
					0				0.139	0.139
						0			0.139	0.139
							0		0.139	0.139
								0	0.139	0.139

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.5 GHz	
Rear	1.180								0.221	1.401
		1.160							0.221	1.381
			1.150						0.221	1.371
				1.110					0.221	1.331
					1.190				0.221	1.411
						1.170			0.221	1.391
							1.190		0.221	1.411
								1.140	0.221	1.361
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.073	0.782
		0.735							0.073	0.808
			0.421						0.073	0.494
				0.623					0.073	0.696
					0.790				0.073	0.863
						0.569			0.073	0.642
							0.348		0.073	0.421
								0.193	0.073	0.266
Edge 3	0								1.140	1.140
		0							1.140	1.140
			0						1.140	1.140
				0					1.140	1.140
					0				1.140	1.140
						0			1.140	1.140
							0		1.140	1.140
								0	1.140	1.140
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.6. Sum of the SAR for GSM, W-CDMA, LTE, WiFi 5.8 GHz

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data									∑ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.8 GHz	
Rear	1.180								0.080	1.260
		1.160							0.080	1.240
			1.150						0.080	1.230
				1.110					0.080	1.190
					1.190				0.080	1.270
						1.170			0.080	1.250
							1.190		0.080	1.270
								1.140	0.080	1.220
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0	0.709
		0.735							0	0.735
			0.421						0	0.421
				0.623					0	0.623
					0.790				0	0.790
						0.569			0	0.569
							0.348		0	0.348
								0.193	0	0.193
Edge 3	0								0.972	0.972
		0							0.972	0.972
			0						0.972	0.972
				0					0.972	0.972
					0				0.972	0.972
						0			0.972	0.972
							0		0.972	0.972
								0	0.972	0.972
Edge 4	0								0.112	0.112
		0							0.112	0.112
			0						0.112	0.112
				0					0.112	0.112
					0				0.112	0.112
						0			0.112	0.112
							0		0.112	0.112
								0	0.112	0.112

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data									Σ 1-g SAR (mW/g)
	GSM 850	GSM 1900	W-CDMA Band V	W-CDMA Band II	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 17	WiFi 5.8 GHz	
Rear	1.180								0.151	1.331
		1.160							0.151	1.311
			1.150						0.151	1.301
				1.110					0.151	1.261
					1.190				0.151	1.341
						1.170			0.151	1.321
							1.190		0.151	1.341
								1.140	0.151	1.291
Edge 1	0.830								0	0.830
		0.742							0	0.742
			0.672						0	0.672
				0.738					0	0.738
					1.010				0	1.010
						1.170			0	1.170
							0.631		0	0.631
								0.631	0	0.631
Edge 2	0.709								0.030	0.739
		0.735							0.030	0.765
			0.421						0.030	0.451
				0.623					0.030	0.653
					0.790				0.030	0.820
						0.569			0.030	0.599
							0.348		0.030	0.378
								0.193	0.030	0.223
Edge 3	0								1.190	1.190
		0							1.190	1.190
			0						1.190	1.190
				0					1.190	1.190
					0				1.190	1.190
						0			1.190	1.190
							0		1.190	1.190
								0	1.190	1.190
Edge 4	0								0	0
		0							0	0
			0						0	0
				0					0	0
					0				0	0
						0			0	0
							0		0	0
								0	0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

15.7. Sum of the SAR for WiFi 5 GHz and Bluetooth

Sum of the SAR with Measured Values (WiFi Primary Antenna)

Test Position	Data						∑ 1-g SAR (mW/g)
	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.5 GHz	WiFi 5.8 GHz	Bluetooth (Primary)	Bluetooth (Secondary)	
Rear	0.040				0.029		0.069
		0.087			0.029		0.116
			0.095		0.029		0.124
				0.080	0.029		0.109
	0.040					0.003	0.043
		0.087				0.003	0.090
			0.095			0.003	0.098
				0.080		0.003	0.083
Edge 1	0				0		0
		0			0		0
			0		0		0
				0	0		0
	0					0	0
		0				0	0
			0			0	0
				0		0	0
Edge 2	0				0		0
		0			0		0
			0		0		0
				0	0		0
	0					0.025	0.025
		0				0.025	0.025
			0			0.025	0.025
				0		0.025	0.025
Edge 3	0.714				0.356		1.070
		1.040			0.356		1.396
			1.040		0.356		1.396
				0.972	0.356		1.328
	0.714					0.149	0.863
		1.040				0.149	1.189
			1.040			0.149	1.189
				0.972		0.149	1.121
Edge 4	0.094				0.072		0.166
		0.137			0.072		0.209
			0.139		0.072		0.211
				0.112	0.072		0.184
	0.094					0	0.094
		0.137				0	0.137
			0.139			0	0.139
				0.112		0	0.112

Sum of the SAR with Measured Values (WiFi Secondary Antenna)

Test Position	Data						∑ 1-g SAR (mW/g)
	WiFi 5.2 GHz	WiFi 5.3 GHz	WiFi 5.5 GHz	WiFi 5.8 GHz	Bluetooth (Primary)	Bluetooth (Secondary)	
Rear	0.135				0.029		0.164
		0.175			0.029		0.204
			0.221		0.029		0.250
				0.151	0.029		0.180
	0.135					0.003	0.138
		0.175				0.003	0.178
			0.221			0.003	0.224
				0.151		0.003	0.154
Edge 1	0				0		0
		0			0		0
			0		0		0
				0	0		0
	0					0	0
		0				0	0
			0			0	0
				0		0	0
Edge 2	0.047				0		0
		0.062			0		0
			0.073		0		0
				0.030	0		0
	0.047					0.025	0.072
		0.062				0.025	0.087
			0.073			0.025	0.098
				0.030		0.025	0.055
Edge 3	0.836				0.356		1.192
		1.110			0.356		1.466
			1.140		0.356		1.496
				1.190	0.356		**1.546**
	0.836					0.149	0.985
		1.110				0.149	1.259
			1.140			0.149	1.289
				1.190		0.149	1.339
Edge 4	0				0.072		0.072
		0			0.072		0.072
			0		0.072		0.072
				0	0.072		0.072
	0					0	0
		0				0	0
			0			0	0
				0		0	0

Sum of the SAR with Scaled Values for the Worst-case Configuration

As the SAR for these configurations were measured at the maximum of tune-up tolerance limit, SAR scaling does not need to be applied.

SAR to Peak Location Separation Ratio (SPLSR)

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

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.3 for all circumstances that require SPLSR calculation.

16. Appendixes

Refer to separated files for the following appendixes.

16.1. System Performance Check Plots

16.2. SAR Test Plots for GSM850

16.3. SAR Test Plots for GSM1900

16.4. SAR Test Plots for W-CDMA Band V

16.5. SAR Test Plots for W-CDMA Band II

16.6. SAR Test Plots for LTE Band 2

16.7. SAR Test Plots for LTE Band 4

16.8. SAR Test Plots for LTE Band 5

16.9. SAR Test Plots for LTE Band 17

16.10. SAR Test Plots for WiFi 2.4 GHz Band

16.11. SAR Test Plots for WiFi 5 GHz Bands

16.12. SAR Test Plots for Bluetooth

16.13. Calibration Certificate for E-Field Probe EX3DV4 - SN 3686

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

16.15. Calibration Certificate for E-Field Probe EX3DV4 - SN 3773

16.16. Calibration Certificate for D750V3 - SN 1024

16.17. Calibration Certificate for D835V2 - SN 4d002

16.18. Calibration Certificate for D835V2 - SN 4d117

16.19. Calibration Certificate for D1750V2 - SN 1050

16.20. Calibration Certificate for D1900V2 - SN 5d140

16.21. Calibration Certificate for D2450V2 - SN 748

16.22. Calibration Certificate for D5GHzV2 - SN 1075

16.23. Calibration Certificate for D5GHzV2 - SN 1003