



SAR EVALUATION REPORT

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

For

Tablet

FCC ID: PY7TM-0050

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	9/9/2014	Initial Issue	--
A	9/19/2014	Sec 6.3., 7.1., 11.5., and 13.: Tune-up procedure tolerance updated.	Yu Chen

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1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS, INC.				
Application Purpose	<input checked="" type="checkbox"/> Original Grant <input type="checkbox"/> Class II Permissive Change				
FCC ID	PY7TM-0050				
DUT Description	Tablet				
Exposure Category	General Population/Uncontrolled Exposure (1g SAR limit: 1.6 W/kg)				
The highest reported SAR	RF Exposure Conditions	Equipment Class			
		Licensed	DTS	UNII	Bluetooth
	Stand-alone	1.414 W/kg	1.030 W/kg	1.423 W/kg	0.246 W/kg
	Simultaneous Transmission	0.146 W/kg	0.146 W/kg	N/A	N/A
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013				
Test Results	Pass				
Date tested	8/11/2014 – 8/27/2014				
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.</p>					
Approved & Released By:  Devin Chang Senior Engineer UL Verification Services Inc.			Prepared By:  Yu Chen Laboratory Technician UL Verification Services Inc.		

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures, and TCB workshop updates:

- 447498 D01 General RF Exposure Guidance v05r02
- 616217 D04 SAR for Laptop and Tablets v01r01
- 941225 D01 SAR test for 3G devices v02
- 941225 D02 HSPA and 1x Advanced v02r02
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r01
- 248227 D01 SAR Meas for 802 11abg v01r02
- 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- 865664 D02 SAR Reporting v01r01
- 690783 D01 SAR Listings on Grants v01r02

3. Facilities and Accreditation

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

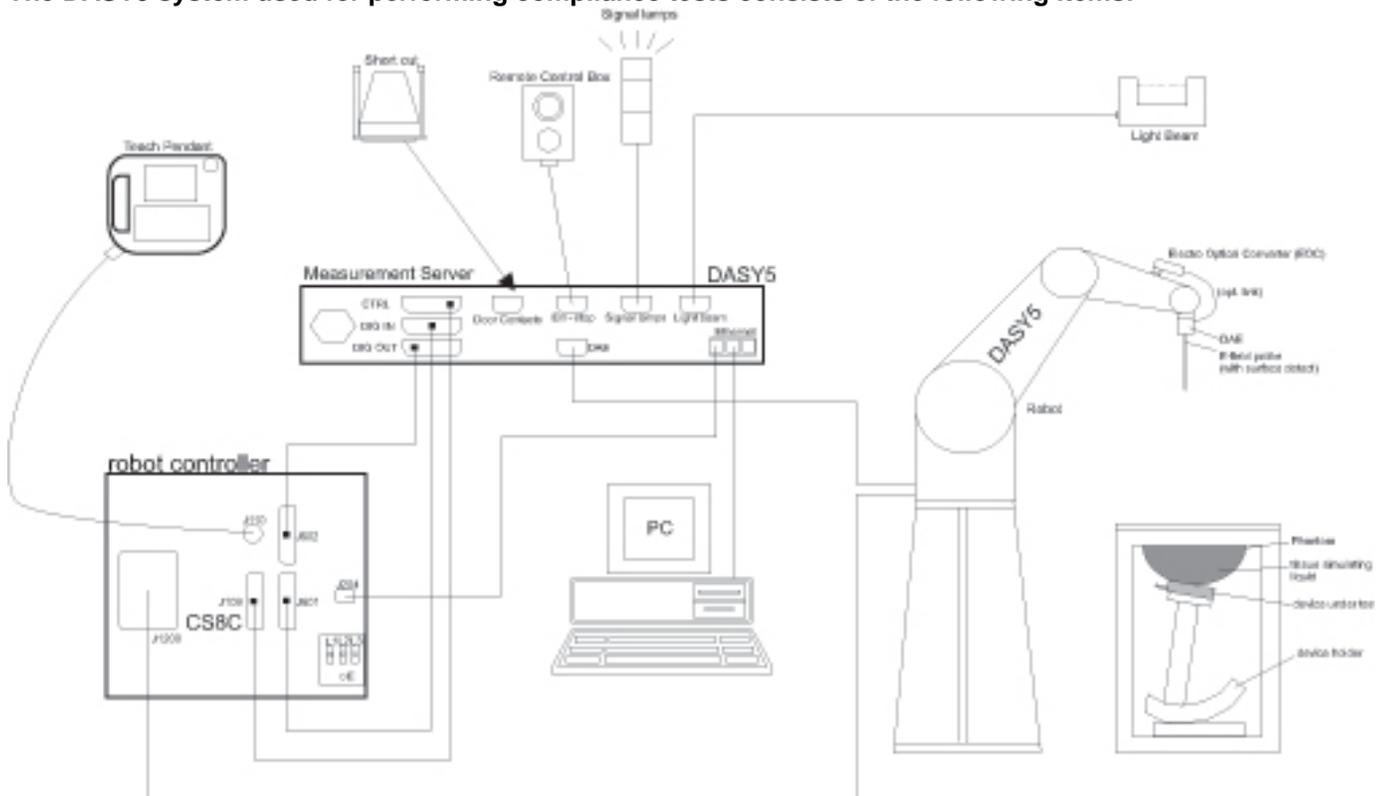
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan 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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: 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 \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

		≤ 3 GHz	> 3 GHz	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		≤ 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: $\Delta z_{\text{Zoom}}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm	
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> 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.

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	ENA Series/E5071B	MY42100131	2/24/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/13/2014
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	4242	122529163	9/19/2014
Thermometer	EXTECH	445703	CCS-200	3/24/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01155	5/12/2015
Power Meter	HP	438A	3513U04320	10/2/2014
Power Sensor	Agilent	8481A	2702A66876	9/30/2014
Power Sensor	Agilent	8481A	3318A95392	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
E-Field Probe (SAR 2)	SPEAG	EX3DV3	3531	11/21/2014
E-Field Probe (SAR 3)	SPEAG	EX3DV4	3773	4/22/2015
E-Field Probe (SAR 4)	SPEAG	EX3DV4	3929	5/9/2015
Data Acquisition Electronics (SAR 2)	SPEAG	DAE4	1359	2/17/2015
Data Acquisition Electronics (SAR 3)	SPEAG	DAE4	1380	7/23/2015
Data Acquisition Electronics (SAR 4)	SPEAG	DAE4	1352	9/11/2014
System Validation Dipole	SPEAG	D750V3	1071	11/15/2014
System Validation Dipole	SPEAG	D835V2	4d002	11/15/2015
System Validation Dipole	SPEAG	D1750V2	1050	4/22/2015
System Validation Dipole	SPEAG	D1750V2	1077	9/12/2014
System Validation Dipole	SPEAG	D1900V2	5d043	11/12/2015
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D2600V2	1006	9/11/2014
System Validation Dipole	SPEAG	D5GHzV2	1138	11/19/2014
System Validation Dipole	SPEAG	D5GHzV2	1168	12/12/2014
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	3/28/2015
Thermometer (SAR Lab 3)	EXTECH	445703	CCS-237	6/3/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/3/2015

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53040015	7/10/2015
Power Sensor	Agilent	N1921A	MY52020011	5/6/2015
Power Sensor	Agilent	N1921A	MY52200012	9/25/2014
Base Station Simulator	Agilent	8960	GB46160222	11/21/2014
Base Station Simulator	R & S	CMW500	132910-cp	4/25/2015
Bluetooth Tester	R & S	CBT	100987-ww	4/21/2015

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2003 & 2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix 14.1
Battery Back Cover	The rechargeable battery is not user accessible.
Battery Options	The rechargeable battery is not user accessible.
Wireless Router (Hotspot)	<p>Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices.</p> <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	<p>Wi-Fi Direct enabled devices transfer data directly between each other</p> <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz) (Group Client only)

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
GSM	850, 1900	GPRS (GMSK) EGPRS (8PSK)	GPRS/EGPRS: 1 Slot: 12.5%; 2 Slots: 25%, 3 Slots: 37.5%, 4 Slots: 50%,
		GPRS Multi-Slot Class: <input type="checkbox"/> Class 8 - One Up <input type="checkbox"/> Class 10 - Two Up <input type="checkbox"/> Class 12 - Four Up <input checked="" type="checkbox"/> Class 33 - Four Up DTM (Dual Transfer Mode): Support	
W-CDMA (UMTS)	Band II, IV, V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 7) HSUPA (Rel. 6) DC-HSDPA (Rel. 8) HSPA+ (Rel. 6)	100%
LTE (FDD)	Band 2 / 4 / 5 / 7 / 13 / 17	QPSK, 16QAM (Rel. 10) Do not support Carrier Aggregation (CA).	100%
		Does this device SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)	100%
Bluetooth	2.4 GHz	Version 4.0 LE	32.25% (DH1), 66.68% (DH3), 77.52% (DH5)

6.3. Nominal and Maximum Output Power

RF Air interface	Mode		Full Power			Reduce Power		
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
GSM850	GPRS GMSK	Tx Slot 1	33.0	-1.4 ~ 0.6	33.6	27.5	-2.4 ~ 1.6	29.1
		Tx Slot 2	31.0	-1.5 ~ 0.6	31.6	24.5	-2.5 ~ 1.6	26.1
		Tx Slot 3	29.0	-1.5 ~ 0.6	29.6	23.0	-2.5 ~ 1.6	24.6
		Tx Slot 4	28.0	-1.5 ~ 0.6	28.6	21.5	-2.5 ~ 1.6	23.1
	EGPRS 8PSK	Tx Slot 1	27.0	-1.5 ~ 1.0	28.0	27.0	-1.5 ~ 1.0	28.0
		Tx Slot 2	25.0	-1.5 ~ 1.0	26.0	23.6	-2.5 ~ 2.0	25.6
		Tx Slot 3	24.0	-1.5 ~ 1.0	25.0	22.1	-2.5 ~ 2.0	24.1
		Tx Slot 4	22.0	-1.5 ~ 1.0	23.0	20.6	-2.5 ~ 2.0	22.6
GSM1900	GPRS GMSK	Tx Slot 1	30.0	-0.7 ~ 0.6	30.6	22.4	-1.7 ~ 1.6	24.0
		Tx Slot 2	28.0	-1.5 ~ 0.6	28.6	19.9	-2.5 ~ 1.6	21.5
		Tx Slot 3	27.0	-1.5 ~ 0.6	27.6	17.9	-2.5 ~ 1.6	19.5
		Tx Slot 4	26.0	-1.5 ~ 0.6	26.6	16.4	-2.5 ~ 1.6	18.0
	EGPRS 8PSK	Tx Slot 1	26.0	-1.5 ~ 1.0	27.0	21.5	-2.5 ~ 2.0	23.5
		Tx Slot 2	24.0	-1.5 ~ 1.0	25.0	19.0	-2.5 ~ 2.0	21.0
		Tx Slot 3	23.0	-1.5 ~ 1.0	24.0	17.0	-2.5 ~ 2.0	19.0
		Tx Slot 4	22.0	-1.5 ~ 1.0	23.0	15.5	-2.5 ~ 2.0	17.5

Dual Transfer Mode

RF Air interface	Mode		Full Power			Reduce Power				
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)		
GSM850	GSM(Voice) + GPRS(Data)	Tx Slot 1	CS	33.0	-1.4 ~ 0.6	33.6	27.5	-2.4 ~ 1.6	29.1	
		Tx Slot 2	CS	31.0	-1.5 ~ 0.6	31.6	24.5	-2.4 ~ 1.6	26.1	
			PS	31.0	-1.5 ~ 0.6	31.6	24.5	-2.4 ~ 1.6	26.1	
		Tx Slot 3	CS	29.0	-1.5 ~ 0.6	29.6	23.0	-2.4 ~ 1.6	24.6	
			PS	29.0	-1.5 ~ 0.6	29.6	23.0	-2.4 ~ 1.6	24.6	
		GSM(Voice) + EGPRS(Data)	Tx Slot 1	CS	33.0	-1.4 ~ 0.6	33.6	27.5	-2.4 ~ 1.6	29.1
	Tx Slot 2		CS	31.0	-1.5 ~ 0.6	31.6	24.5	-2.5 ~ 1.6	26.1	
			PS	25.0	-1.5 ~ 1.0	26.0	23.6	-2.5 ~ 2.0	25.6	
	Tx Slot 3		CS	29.0	-1.5 ~ 0.6	29.6	23.0	-2.5 ~ 1.6	24.6	
			PS	24.0	-1.5 ~ 1.0	25.0	22.1	-2.5 ~ 2.0	24.1	
	GSM1900		GSM(Voice) + GPRS(Data)	Tx Slot 1	CS	30.0	-0.7 ~ 0.6	30.6	22.4	-1.7 ~ 1.6
		Tx Slot 2		CS	28.0	-1.5 ~ 0.6	28.6	19.9	-2.5 ~ 1.6	21.5
PS				28.0	-1.5 ~ 0.6	28.6	19.9	-2.5 ~ 1.6	21.5	
Tx Slot 3		CS		27.0	-1.5 ~ 0.6	27.6	17.9	-2.5 ~ 1.6	19.5	
		PS		27.0	-1.5 ~ 0.6	27.6	17.9	-2.5 ~ 1.6	19.5	
GSM(Voice) + EGPRS(Data)		Tx Slot 1		CS	30.0	-0.7 ~ 0.6	30.6	22.4	-1.7 ~ 1.6	24.0
		Tx Slot 2	CS	28.0	-1.5 ~ 0.6	28.6	19.9	-2.5 ~ 1.6	21.5	
			PS	24.0	-1.5 ~ 1.0	25.0	19.0	-2.5 ~ 2.0	21.0	
		Tx Slot 3	CS	27.0	-1.5 ~ 0.6	27.6	17.9	-2.5 ~ 1.6	19.5	
			PS	23.0	-1.5 ~ 1.0	24.0	17.0	-2.5 ~ 2.0	19.0	

Note: CS : circuid switched PS : packet switched

RF Air interface	Mode		Full Power			Reduce Power			
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	
WCDMA Band II	R99		24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
	HSDPA	Subtest 1	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 2	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 3	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 4	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
	HSUPA	Subtest 1	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 2	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 3	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 4	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 5	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
	DC-HSDPA	Subtest 1	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 2	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 3	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
		Subtest 4	24.0	-0.7 ~ 0.3	24.3	13.5	-2.0 ~ 2.0	15.5	
	WCDMA Band IV	R99		24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5
		HSDPA	Subtest 1	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5
Subtest 2			24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
Subtest 3			24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
Subtest 4			24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
HSUPA		Subtest 1	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 2	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 3	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 4	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 5	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
DC-HSDPA		Subtest 1	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 2	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 3	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
		Subtest 4	24.0	-0.7 ~ 0.5	24.5	15.5	-2.0 ~ 2.0	17.5	
WCDMA Band V		R99		24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0
		HSDPA	Subtest 1	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0
	Subtest 2		24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
	Subtest 3		24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
	Subtest 4		24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
	HSUPA	Subtest 1	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 2	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 3	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 4	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 5	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
	DC-HSDPA	Subtest 1	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 2	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 3	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	
		Subtest 4	24.0	-0.7 ~ 0.5	24.5	19.0	-1.0 ~ 1.0	20.0	

RF Air interface	Mode	Full Power			Reduce Power		
		Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
LTE B2	QPSK	23.0	-1.0 ~ 1.0	24.0	13.5	-2.0 ~ 2.0	15.5
	16QAM	22.0	-1.0 ~ 1.0	23.0	13.5	-2.0 ~ 2.0	15.5
LTE B4	QPSK	23.0	-1.0 ~ 1.0	24.0	15.5	-2.0 ~ 2.0	17.5
	16QAM	22.0	-1.0 ~ 1.0	23.0	15.5	-2.0 ~ 2.0	17.5
LTE B5	QPSK	23.0	-1.0 ~ 1.0	24.0	19.0	-1.0 ~ 1.0	20.0
	16QAM	22.0	-1.0 ~ 1.0	23.0	19.0	-1.0 ~ 1.0	20.0
LTE B7	QPSK	23.0	-1.5 ~ 1.0	24.0	12.5	-2.0 ~ 2.0	14.5
	16QAM	22.0	-1.5 ~ 1.0	23.0	12.5	-2.0 ~ 2.0	14.5
LTE B13	QPSK	23.0	-1.0 ~ 1.0	24.0	21.0	-1.0 ~ 1.0	22.0
	16QAM	22.0	-1.0 ~ 1.0	23.0	21.0	-1.0 ~ 1.0	22.0
LTE B17	QPSK	23.0	-1.0 ~ 1.0	24.0	20.5	-1.0 ~ 1.0	21.5
	16QAM	22.0	-1.0 ~ 1.0	23.0	20.5	-1.0 ~ 1.0	21.5

RF Air interface	Mode	Full Power
		Max. Tune-up Limit (dBm)
Wi-Fi 2.4 GHz	802.11b	14.0
	802.11g	13.5
	802.11n HT20	13.5
Wi-Fi 5 GHz	802.11a	11.5
	802.11n HT20	11.5
	802.11n HT40	11.5
	802.11ac VHT20	11.5
	802.11ac VHT40	11.5
	802.11ac VHT80	11.5
Bluetooth	BDR	10.5
	EDR	7.9
	BLE	2.4

6.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Body	<ol style="list-style-type: none"> 1. WWAN + Wi-Fi 2.4 GHz (MIMO) 2. WWAN + Wi-Fi 5 GHz (MIMO) + BT
Notes: <ol style="list-style-type: none"> 1. WWAN include GSM850/1900, W-CDMA Band V/IV/II, LTE Band 2/4/5/7/13/17. 2. Wi-Fi 2.4/5 GHz supports MIMO only. 3. Wi-Fi 2.4 GHz Radio cannot transmit simultaneously with Wi-Fi 5 GHz Radio. 4. Wi-Fi 2.4 GHz Radio cannot transmit simultaneously with Bluetooth Radio. 5. Wi-Fi 5 GHz Radio can transmit simultaneously with Bluetooth Radio. 	

6.5. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850 2510	20825 2507.5	20800 2505	20775 2502.5		
	Mid	21100 2535	21100 2535	21100 2535	21100 2535		
	High	21350 2560	21375 2562.5	21400 2565	21425 2567.5		
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low				23205/ 779.5			
Mid			23230/ 782	23230/ 782			
High				23255/ 784.5			
Band 17	Frequency range: 704 - 716 MHz						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low				23755/ 706.5			
Mid			23790/ 710	23790/ 710			
High				23825/ 713.5			

General LTE SAR Test and Reporting Considerations (Continued)

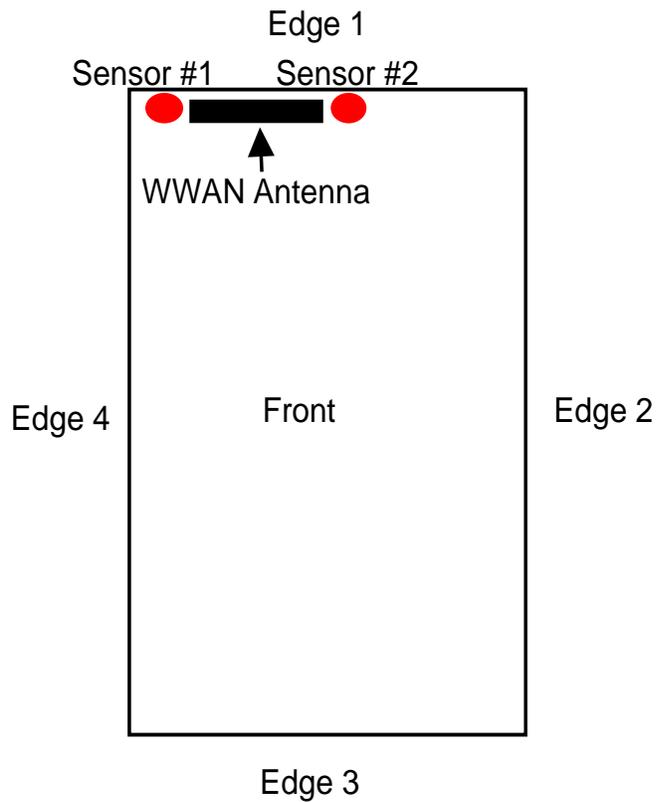
LTE transmitter and antenna implementation	LTE has one (1) TX/RX antennas and one (1) RX antennas Refer to Appendix 14.1. Photos and Antenna Locations.																																						
Maximum power reduction (MPR)	<p style="text-align: center;">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <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> </thead> <tbody> <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> </tbody> </table> <p>MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing</p>	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
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																																
Power reduction	No																																						
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																						

6.6. Antenna Dimensions and Separation Distances

Refer to Appendix 14.1. Photos and Antenna Locations.

6.7. Power Reduction by Proximity Sensing

The DUT has two proximity sensors to reduce the output power. The position of the sensors and antenna are as shown in the graphic.



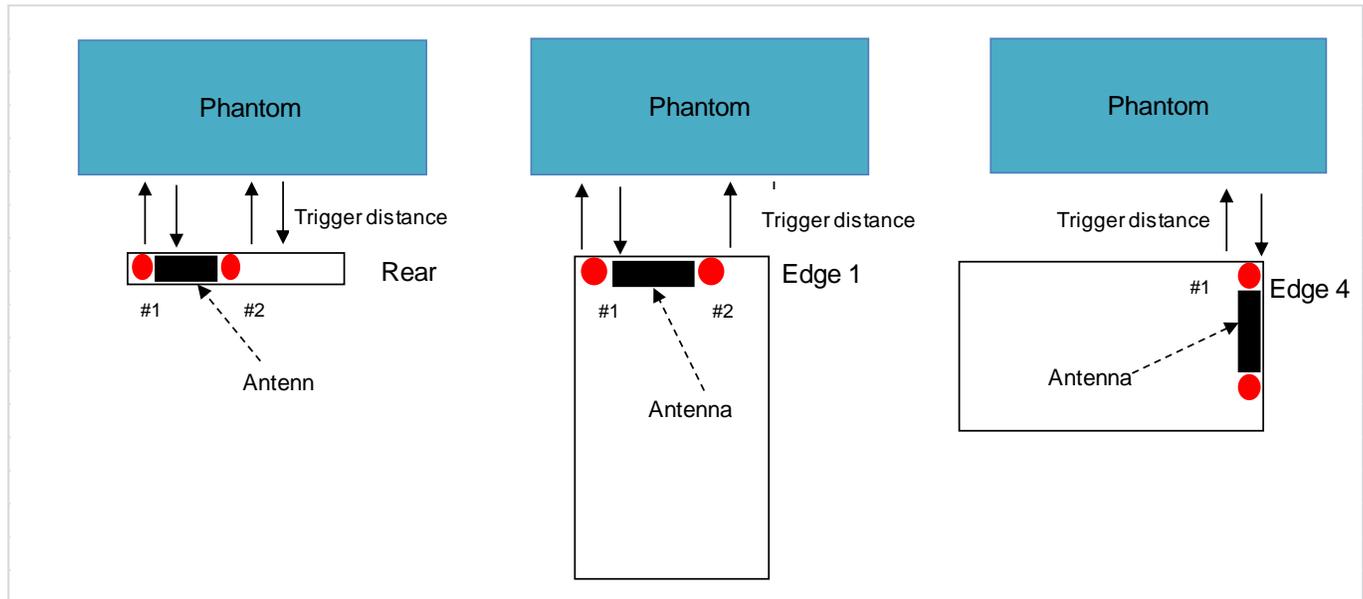
6.7.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Edge 1 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the Rear surface.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



Summary of Trigger Distances

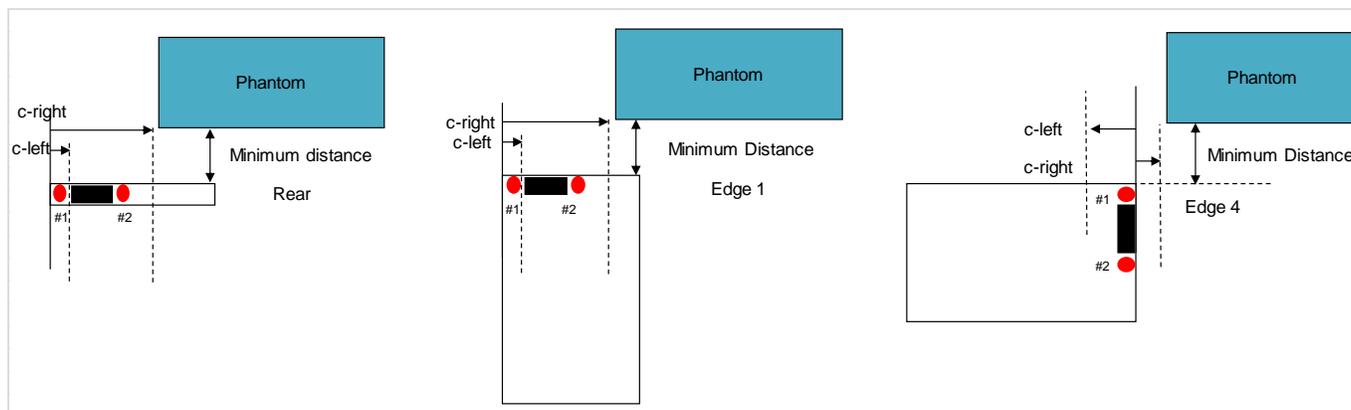
Band		Rear				Edge 1				Edge 4	
		#1		#2		#1		#2		#1	
		upward	downward								
LTE	2	28	32	30	35	22	29	23	31	16	22
	4	28	32	30	34	23	30	22	31	16	22
	5	28	32	31	35	22	29	24	30	17	21
	7	28	33	30	34	22	30	24	30	16	21
	13	27	34	30	34	22	31	24	33	17	22
	17	28	32	30	34	22	29	24	31	17	22
UMTS	II	27	32	30	34	22	29	23	30	16	21
	IV	27	33	29	33	21	30	23	30	17	22
	V	27	31	29	33	22	30	23	31	16	22
GSM	1900	28	31	30	34	22	29	22	30	17	22
	850	29	32	30	34	22	29	22	32	17	22

6.7.2. Proximity Sensor Coverage (KDB 616217 §6.3)

The rear surface or edge of the tablet is positioned at a test separation distance less than or equal to the distance required for rear surface or edge triggering, with both the antenna and sensor pad located at least 20 mm laterally outside the edge (boundary) of the phantom, along the direction of maximum antenna and sensor offset.

For the rear surface, if the direction of maximum offset is not aligned with the tablet coordinates (physical edges) the tablet test position would not be aligned with the phantom coordinates (orientations).

Each applicable tablet edge should be positioned perpendicularly to the phantom to determine sensor coverage. For antennas and/or sensors located near the corner of a tablet, both adjacent edges must be considered.



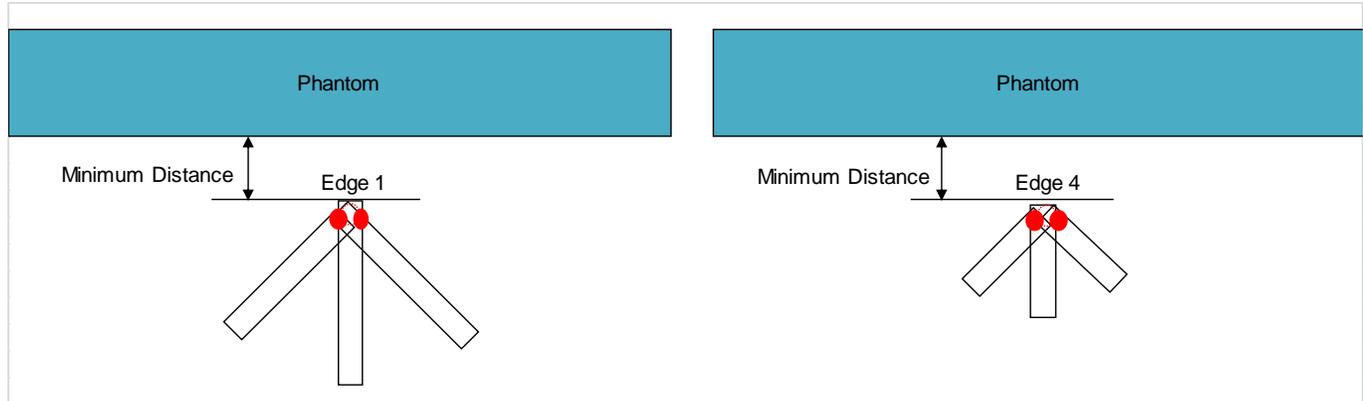
Summary of Tablet Sensor coverage to Proximity Sensor Triggering

Band		Rear (mm)		Minimum Distance (mm)	Edge 1 (mm)		Minimum Distance (mm)	Edge 4 (mm)		Minimum Distance (mm)
		#1	#2		#1	#2		#1		
		c-left	c-right		c-left	c-right		c-left	c-right	
LTE	2	0	60	18	0	52	18	5	1	16
	4	0	62	18	0	52	18	5	2	16
	5	0	62	18	0	53	18	6	2	16
	7	0	62	18	0	52	18	5	2	16
	13	-1	63	18	0	54	18	6	1	16
	17	-1	64	18	0	52	18	6	2	16
UMTS	II	0	64	18	0	54	18	6	2	16
	IV	0	64	18	0	54	18	6	2	16
	V	0	62	18	0	53	18	6	2	16
GSM	1900	0	63	18	0	52	18	6	1	16
	850	0	63	18	0	53	18	6	2	16

6.7.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 1 and Edge 4 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 1 and Edge 4 for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



Proximity sensor tilt angle assessment (Edge 1 and Edge 4) KDB 616217 §6.4

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering

Band		Minimum Distance (mm)		
		Edge 1		Edge 4
		#1	#2	#1
LTE	2	17	18	16
	4	17	18	16
	5	17	17	17
	7	16	17	16
	13	17	18	17
UMTS	17	17	18	17
	II	18	18	17
	IV	18	18	16
GSM	V	18	18	17
	1900	18	18	17
	850	18	18	17

6.7.4. Resulting test positions for SAR measurements

Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
Rear	27 mm	18 mm	N/A	15 mm
Edge 1	21 mm	18 mm	16 mm	
Edge 4	16 mm	16 mm	16 mm	

7. RF Exposure Conditions (Test Configurations)

The EUT implements the power reduction scheme for SAR compliance, for specific device configuration and orientations, as described below. The complete description of the implementation and functionality is provided in the “Operational Description of Power Reduction” exhibit.

7.1. Standalone SAR Test Exclusion Considerations

Since the *Dedicated Host Approach* is applied, the standalone SAR test exclusion procedure in KDB 447498 § 4.3.1 is applied in conjunction with KDB 616217 § 4.3 to determine the minimum test separation distance:

- When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
- When the separation distance from the antenna to an adjacent edge is > 5 mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion.

SAR Test Exclusion Calculations for WWAN

Antennas < 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)					Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4
Full Power, Proximity Sensor Off. A sensor triggering of 15 mm is included for Rear and Edge 1 & 4															
Cellular	GPRS 4 Slots	848.8	28.60	362	17.46	18	67.6	200.4	19.45		19.6	18.5	> 50 mm	> 50 mm	17.6
Cellular	GPRS 4 Slots	1909.8	26.60	229	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	16.7
Cellular	W-CDMA 2	1907.6	24.30	269	17.46	18	67.6	200.4	19.45		21.9	20.6	> 50 mm	> 50 mm	19.6
Cellular	W-CDMA 4	1752.6	24.50	282	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	W-CDMA 5	846.6	24.50	282	17.46	18	67.6	200.4	19.45		22	20.7	> 50 mm	> 50 mm	19.8
Cellular	LTE Band 2	1900	24.00	251	17.46	18	67.6	200.4	19.45		15.3	14.4	> 50 mm	> 50 mm	13.7
Cellular	LTE Band 4	1754.3	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	LTE Band 5	844	24.00	251	17.46	18	67.6	200.4	19.45		20.4	19.2	> 50 mm	> 50 mm	18.2
Cellular	LTE Band 7	2560	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	LTE Band 13	782	24.00	251	17.46	18	67.6	200.4	19.45		19.6	18.5	> 50 mm	> 50 mm	17.5
Cellular	LTE Band 17	710	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Second Stage Power Back-off, Proximity Sensor On															
Cellular	GPRS 3 Slots	848.8	24.60	108	2.46	3	67.6	200.4	4.45		19.9	19.9	> 50 mm	> 50 mm	19.9
Cellular	GPRS 2 Slots	1909.8	21.50	35	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	W-CDMA 2	1907.6	20.00	100	2.46	3	67.6	200.4	4.45		9.7	9.7	> 50 mm	> 50 mm	9.7
Cellular	W-CDMA 4	1752.6	17.50	56	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	W-CDMA 5	846.6	15.50	35	2.46	3	67.6	200.4	4.45		27.6	27.6	> 50 mm	> 50 mm	27.6
Cellular	LTE Band 2	1900	15.50	35	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	LTE Band 4	1754.3	17.50	56	2.46	3	67.6	200.4	4.45		14.8	14.8	> 50 mm	> 50 mm	14.8
Cellular	LTE Band 5	844	24.00	251	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	LTE Band 7	2560	14.50	28	2.46	3	67.6	200.4	4.45		6.4	6.4	> 50 mm	> 50 mm	6.4
Cellular	LTE Band 13	782	24.00	251	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	-MEASURE-
Cellular	LTE Band 17	710	24.00	251	2.46	3	67.6	200.4	4.45		9.6	9.6	> 50 mm	> 50 mm	9.6
Note(s):															
1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.															

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off. A sensor triggering of 15 mm is included for Rear and Edge 1 & 4																
Cellular	GPRS 4 Slots	848.8	28.60	362	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	262.4 mW -MEASURE-	1013.9 mW -EXEMPT-	< 50 mm	
Cellular	GPRS 4 Slots	1909.8	26.60	229	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	284.5 mW -EXEMPT-	1612.5 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 2	1907.6	24.30	269	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	284.6 mW -EXEMPT-	1612.6 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 4	1752.6	24.50	282	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	289.3 mW -EXEMPT-	1617.3 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 5	846.6	24.50	282	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	262.4 mW -MEASURE-	1011.9 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 2	1900	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	284.8 mW -EXEMPT-	1612.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 4	1754.3	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	289.3 mW -EXEMPT-	1617.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	844	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	262.3 mW -EXEMPT-	1009.5 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 7	2560	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	269.8 mW -EXEMPT-	1597.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 13	782	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	261.4 mW -EXEMPT-	953.7 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	710	24.00	251	17.46	18	67.6	200.4	19.45		< 50 mm	< 50 mm	261.3 mW -EXEMPT-	889.9 mW -EXEMPT-	< 50 mm	
Second Stage Power Back-off, Proximity Sensor On																
Cellular	GPRS 3 Slots	848.8	24.60	108	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	262.4 mW -EXEMPT-	1013.9 mW -EXEMPT-	< 50 mm	
Cellular	GPRS 2 Slots	1909.8	21.50	35	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	284.5 mW -EXEMPT-	1612.5 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 2	1907.6	20.00	100	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	284.6 mW -EXEMPT-	1612.6 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 4	1752.6	17.50	56	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	289.3 mW -EXEMPT-	1617.3 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA 5	846.6	15.50	35	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	262.4 mW -EXEMPT-	1011.9 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 2	1900	15.50	35	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	284.8 mW -EXEMPT-	1612.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 4	1754.3	17.50	56	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	289.3 mW -EXEMPT-	1617.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	844	24.00	251	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	262.3 mW -EXEMPT-	1009.5 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 7	2560	14.50	28	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	269.8 mW -EXEMPT-	1597.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 13	782	24.00	251	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	261.4 mW -EXEMPT-	953.7 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	710	24.00	251	2.46	3	67.6	200.4	4.45		< 50 mm	< 50 mm	261.3 mW -EXEMPT-	889.9 mW -EXEMPT-	< 50 mm	

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

SAR Test Exclusion Calculations for WLAN

Antennas < 50mm to adjacent edges

MIMO

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna															
Wi-Fi 2.4 GHz	2462	14.00	25	2.46	187.7	55.1	3	36		7.8 -MEASURE-	> 50 mm	> 50 mm	7.8 -MEASURE-	1.1 -EXEMPT-	
Wi-Fi 5.2 GHz	5240	11.50	14	2.46	187.7	55.1	3	36		6.4 -MEASURE-	> 50 mm	> 50 mm	6.4 -MEASURE-	0.9 -EXEMPT-	
Wi-Fi 5.3 GHz	5320	11.50	14	2.46	187.7	55.1	3	36		6.5 -MEASURE-	> 50 mm	> 50 mm	6.5 -MEASURE-	0.9 -EXEMPT-	
Wi-Fi 5.5 GHz	5700	11.50	14	2.46	187.7	55.1	3	36		6.7 -MEASURE-	> 50 mm	> 50 mm	6.7 -MEASURE-	0.9 -EXEMPT-	
Wi-Fi 5.8 GHz	5825	11.50	14	2.46	187.7	55.1	3	36		6.8 -MEASURE-	> 50 mm	> 50 mm	6.8 -MEASURE-	0.9 -EXEMPT-	
Bluetooth	2480	10.50	11	2.46	187.7	55.1	3	36		3.5 -MEASURE-	> 50 mm	> 50 mm	3.5 -MEASURE-	0.5 -EXEMPT-	
Wi-Fi Sub Antenna															
Wi-Fi 2.4 GHz	2462	14.00	25	2.32	187.7	8.85	4.6	90.685		7.8 -MEASURE-	> 50 mm	4.4 -MEASURE-	7.8 -MEASURE-	> 50 mm	
Wi-Fi 5.2 GHz	5240	11.50	14	2.32	187.7	8.85	4.6	90.685		6.4 -MEASURE-	> 50 mm	3.6 -MEASURE-	6.4 -MEASURE-	> 50 mm	
Wi-Fi 5.3 GHz	5320	11.50	14	2.32	187.7	8.85	4.6	90.685		6.5 -MEASURE-	> 50 mm	3.6 -MEASURE-	6.5 -MEASURE-	> 50 mm	
Wi-Fi 5.5 GHz	5700	11.50	14	2.32	187.7	8.85	4.6	90.685		6.7 -MEASURE-	> 50 mm	3.7 -MEASURE-	6.7 -MEASURE-	> 50 mm	
Wi-Fi 5.8 GHz	5825	11.50	14	2.32	187.7	8.85	4.6	90.685		6.8 -MEASURE-	> 50 mm	3.8 -MEASURE-	6.8 -MEASURE-	> 50 mm	

Note(s):

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

Antennas > 50mm to adjacent edges

MIMO

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Wi-Fi Main Antenna															
Wi-Fi 2.4 GHz	2462	14.00	25	2.46	187.7	55.1	3	36		< 50 mm	1472.6 mW -EXEMPT-	146.6 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.2 GHz	5240	11.50	14	2.46	187.7	55.1	3	36		< 50 mm	1442.5 mW -EXEMPT-	116.5 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.3 GHz	5320	11.50	14	2.46	187.7	55.1	3	36		< 50 mm	1442 mW -EXEMPT-	116 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.5 GHz	5700	11.50	14	2.46	187.7	55.1	3	36		< 50 mm	1439.8 mW -EXEMPT-	113.8 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.8 GHz	5825	11.50	14	2.46	187.7	55.1	3	36		< 50 mm	1439.2 mW -EXEMPT-	113.2 mW -EXEMPT-	< 50 mm	< 50 mm	
Bluetooth	2480	10.50	11	2.46	187.7	55.1	3	36		< 50 mm	1472.3 mW -EXEMPT-	146.3 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi Sub Antenna															
Wi-Fi 2.4 GHz	2462	14.00	25	2.32	187.7	8.85	4.6	90.685		< 50 mm	1472.6 mW -EXEMPT-	< 50 mm	< 50 mm	502.4 mW -EXEMPT-	
Wi-Fi 5.2 GHz	5240	11.50	14	2.32	187.7	8.85	4.6	90.685		< 50 mm	1442.5 mW -EXEMPT-	< 50 mm	< 50 mm	472.4 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	11.50	14	2.32	187.7	8.85	4.6	90.685		< 50 mm	1442 mW -EXEMPT-	< 50 mm	< 50 mm	471.9 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5700	11.50	14	2.32	187.7	8.85	4.6	90.685		< 50 mm	1439.8 mW -EXEMPT-	< 50 mm	< 50 mm	469.7 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	11.50	14	2.32	187.7	8.85	4.6	90.685		< 50 mm	1439.2 mW -EXEMPT-	< 50 mm	< 50 mm	469 mW -EXEMPT-	

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

7.2. Required Test Configurations

The table below identifies the standalone WWAN test configurations required for this device according to the findings in Section 7.1:

Test Configurations	Rear	Edge 1	Edge 2	Edge 3	Edge 4
		(Top Edge)	(Right Edge)	(Bottom Edge)	(Left Edge)
GSM850 Full Power	Yes	Yes	Yes	No	Yes
GSM850 w/ Power Reduction	Yes	Yes	No	No	Yes
GSM1900 Full Power	Yes	Yes	No	No	Yes
GSM1900 w/ Power Reduction	Yes	Yes	No	No	Yes
W-CDMA Band 2 Full Power	Yes	Yes	No	No	Yes
W-CDMA Band 2 w/ Power Reduction	Yes	Yes	No	No	Yes
W-CDMA Band 4 Full Power	Yes	Yes	No	No	Yes
W-CDMA Band 4 w/ Power Reduction	Yes	Yes	No	No	Yes
W-CDMA Band 5 Full Power	Yes	Yes	Yes	No	Yes
W-CDMA Band 5 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 2 Full Power	Yes	Yes	No	No	Yes
LTE Band 2 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 4 Full Power	Yes	Yes	No	No	Yes
LTE Band 4 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 5 Full Power	Yes	Yes	No	No	Yes
LTE Band 5 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 7 Full Power	Yes	Yes	No	No	Yes
LTE Band 7 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 13 Full Power	Yes	Yes	No	No	Yes
LTE Band 13 w/ Power Reduction	Yes	Yes	No	No	Yes
LTE Band 17 Full Power	Yes	Yes	No	No	Yes
LTE Band 17 w/ Power Reduction	Yes	Yes	No	No	Yes
Wi-Fi 2.4 GHz MIMO	Yes	No	Yes	Yes	No
Wi-Fi 5 GHz MIMO	Yes	No	Yes	Yes	No
Bluetooth	Yes	No	No	Yes	No

Note(s):

1. Yes = Testing is required.
2. No = Testing is not required.

8. RF Output Power Measurement

8.1. GSM850/1900

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Full Pwr		Reduce Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)
850	GPRS (GMSK)	CS1	1	128	824.2	33.5	24.5	29.0	20.0
				190	836.6	33.5	24.5	28.9	19.9
				251	848.8	33.5	24.5	28.9	19.9
			2	128	824.2	31.6	25.6	29.0	23.0
				190	836.6	31.6	25.6	28.9	22.9
				251	848.8	31.6	25.6	28.9	22.9
			3	128	824.2	29.5	25.2	26.1	21.8
				190	836.6	29.6	25.3	26.1	21.8
				251	848.8	29.6	25.3	26.0	21.7
			4	128	824.2	28.6	25.6	24.5	21.5
				190	836.6	28.6	25.6	24.5	21.5
				251	848.8	28.6	25.6	24.4	21.4
	EGPRS (8PSK)	MCS5	1	128	824.2	27.7	18.7	23.0	14.0
				190	836.6	27.8	18.8	23.0	14.0
				251	848.8	27.8	18.8	23.0	14.0
			2	128	824.2	25.6	19.6	27.7	21.7
				190	836.6	25.7	19.7	27.7	21.7
				251	848.8	25.7	19.7	27.6	21.6
			3	128	824.2	24.8	20.5	25.3	21.0
				190	836.6	24.9	20.6	25.3	21.0
				251	848.8	24.9	20.6	25.3	21.0
			4	128	824.2	22.8	19.8	23.9	20.9
				190	836.6	22.9	19.9	23.9	20.9
				251	848.8	22.9	19.9	24.0	21.0

Notes:

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

RF Exposure Conditions	Mode	Pwr Back-off	Tx Slot
Body-worn	GPRS (GMSK)	OFF	4
Body-worn	GPRS (GMSK)	ON	3

- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode.

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Full Pwr		Reduce Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)
1900	GPRS (GMSK)	CS1	1	512	1850.2	30.1	21.1	23.7	14.7
				661	1880.0	30.4	21.4	23.6	14.6
				810	1909.8	30.2	21.2	23.5	14.5
			2	512	1850.2	30.1	24.1	23.7	17.7
				661	1880.0	30.4	24.4	23.6	17.6
				810	1909.8	30.2	24.2	23.5	17.5
			3	512	1850.2	28.4	24.1	21.3	17.0
				661	1880.0	28.5	24.2	21.3	17.0
				810	1909.8	28.4	24.1	21.2	16.9
			4	512	1850.2	27.6	24.6	19.3	16.3
				661	1880.0	27.6	24.6	19.2	16.2
				810	1909.8	27.5	24.5	19.1	16.1
	EGPRS (8PSK)	MCS5	1	512	1850.2	26.5	17.5	17.8	8.8
				661	1880.0	26.6	17.6	17.7	8.7
				810	1909.8	26.5	17.5	17.6	8.6
			2	512	1850.2	26.5	20.5	23.1	17.1
				661	1880.0	26.6	20.6	23.2	17.2
				810	1909.8	26.5	20.5	23.1	17.1
			3	512	1850.2	24.7	20.4	20.9	16.6
				661	1880.0	24.8	20.5	20.9	16.6
				810	1909.8	24.7	20.4	20.9	16.6
			4	512	1850.2	23.6	20.6	19.0	16.0
				661	1880.0	23.6	20.6	19.0	16.0
				810	1909.8	23.5	20.5	18.8	15.8

Notes:

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

RF Exposure Conditions	Mode	Pwr Back-off	Tx Slot
Body-worn	GPRS (GMSK)	OFF	4
Body-worn	GPRS (GMSK)	ON	2

- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM850 DTM Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Full Pwr				Reduce Pwr			
						CS		PS		CS		PS	
						Burst (dBm)	Frame (dBm)						
850	GSM(Voice) + GPRS(GMSK)	CS1	1	128	824.2	33.2	24.2			29.1	20.1		
				190	836.6	33.2	24.2			29.1	20.1		
				251	848.8	33.2	24.2			29.0	20.0		
			2	128	824.2	31.1	25.1	31.2	25.2	26.1	20.1	26.0	20.0
				190	836.6	31.2	25.2	31.3	25.3	26.1	20.1	26.0	20.0
				251	848.8	31.2	25.2	31.3	25.3	26.1	20.1	26.0	20.0
			3	128	824.2	29.2	24.9	29.3	25.0	24.6	20.3	24.6	20.3
				190	836.6	29.2	24.9	29.4	25.1	24.6	20.3	24.5	20.2
				251	848.8	29.2	24.9	29.3	25.0	24.6	20.3	24.5	20.2
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	128	824.2	33.2	24.2			29.1	20.1		
				190	836.6	33.2	24.2			29.1	20.1		
				251	848.8	33.2	24.2			29.0	20.0		
			2	128	824.2	31.2	25.2	25.3	19.3	26.1	20.1	25.0	19.0
				190	836.6	31.3	25.3	25.3	19.3	26.1	20.1	24.9	18.9
				251	848.8	31.3	25.3	25.3	19.3	26.0	20.0	24.8	18.8
			3	128	824.2	29.2	24.9	24.3	20.0	24.6	20.3	23.6	19.3
				190	836.6	29.4	25.1	24.4	20.1	24.6	20.3	23.6	19.3
				251	848.8	29.3	25.0	24.4	20.1	24.6	20.3	23.5	19.2

Notes:

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

RF Exposure Conditions	Mode	Pwr Back-off	Tx Slot
Body-worn	GSM(Voice) + GPRS(GMSK)	OFF	2
Body-worn	GSM(Voice) + GPRS(GMSK)	ON	3

- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM1900 DTM Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Full Pwr				Reduce Pwr			
						CS		PS		CS		PS	
						Burst (dBm)	Frame (dBm)						
1900	GSM(Voice) + GPRS(GMSK)	CS1	1	512	1850.2	29.9	20.9			24.0	15.0		
				661	1880.0	30.0	21.0			24.0	15.0		
				810	1909.8	29.9	20.9			24.0	15.0		
			2	512	1850.2	28.2	22.2	28.1	22.1	21.5	15.5	21.5	15.5
				661	1880.0	28.4	22.4	28.3	22.3	21.5	15.5	21.5	15.5
				810	1909.8	28.2	22.2	28.1	22.1	21.5	15.5	21.5	15.5
			3	512	1850.2	27.4	23.1	27.3	23.0	19.5	15.2	19.5	15.2
				661	1880.0	27.5	23.2	27.4	23.1	19.5	15.2	19.5	15.2
				810	1909.8	27.4	23.1	27.3	23.0	19.5	15.2	19.5	15.2
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	512	1850.2	29.9	20.9			24.0	15.0		
				661	1880.0	30.2	21.2			24.0	15.0		
				810	1909.8	30.0	21.0			24.0	15.0		
			2	512	1850.2	28.2	22.2	24.4	18.4	21.5	15.5	20.7	14.7
				661	1880.0	28.4	22.4	24.5	18.5	21.5	15.5	20.7	14.7
				810	1909.8	28.4	22.4	24.4	18.4	21.5	15.5	20.7	14.7
			3	512	1850.2	27.4	23.1	23.3	19.0	19.5	15.2	18.9	14.6
				661	1880.0	27.5	23.2	23.4	19.1	19.5	15.2	18.9	14.6
				810	1909.8	27.4	23.1	23.3	19.0	19.5	15.2	18.7	14.4

Notes:

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

RF Exposure Conditions	Mode	Pwr Back-off	Tx Slot
Body-worn	GSM(Voice) + GPRS(GMSK)	OFF	3
Body-worn	GSM(Voice) + GPRS(GMSK)	ON	2

- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

8.2. W-CDMA Band V/IV/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
	β_c/β_d	8/15

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Full Avg Pwr (dBm)	Reduce Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.5	19.8
		4183	836.6	24.4	19.8
		4233	846.6	24.4	19.9
W-CDMA Band IV	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	23.8	17.4
		1413	1732.6	23.9	17.5
		1513	1752.6	24.0	17.4
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	24.0	15.3
		9400	1880.0	24.0	15.4
		9538	1907.6	23.9	15.3

HSDPA

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

	Mode	HSDPA		HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR (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			
$A_{hs} = \beta_{hs}/\beta_c$	30/15				

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Full Avg Pwr (dBm)	Reduce Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	24.4	19.8
		4183	836.6	24.4	19.8
		4233	846.6	24.5	19.8
	Subtest 2	4132	826.4	24.5	20.0
		4183	836.6	24.4	19.9
		4233	846.6	24.4	19.9
	Subtest 3	4132	826.4	24.0	19.4
		4183	836.6	24.0	19.4
		4233	846.6	23.9	19.4
	Subtest 4	4132	826.4	24.0	19.4
		4183	836.6	24.0	19.4
		4233	846.6	23.9	19.5
W-CDMA Band IV	Subtest 1	1312	1712.4	23.8	16.9
		1413	1732.6	24.0	17.2
		1513	1752.6	24.0	16.9
	Subtest 2	1312	1712.4	23.9	16.9
		1413	1732.6	24.0	17.0
		1513	1752.6	23.9	16.9
	Subtest 3	1312	1712.4	23.9	16.9
		1413	1732.6	24.0	17.0
		1513	1752.6	23.9	16.9
	Subtest 4	1312	1712.4	23.9	16.9
		1413	1732.6	23.9	17.0
		1513	1752.6	23.9	16.9
W-CDMA Band II	Subtest 1	9262	1852.4	23.4	14.5
		9400	1880.0	23.5	14.9
		9538	1907.6	23.3	14.8
	Subtest 2	9262	1852.4	23.5	14.5
		9400	1880.0	23.5	15.0
		9538	1907.6	23.4	14.7
	Subtest 3	9262	1852.4	23.5	14.7
		9400	1880.0	23.5	15.0
		9538	1907.6	23.3	14.7
	Subtest 4	9262	1852.4	23.4	14.9
		9400	1880.0	23.5	15.1
		9538	1907.6	23.3	14.8

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

HSPA (HSDPA & HSUPA)

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

Mode	HSPA	HSPA	HSPA	HSPA	HSPA	
Subtest	1	2	3	4	5	
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	15/15
	β_{ec}	209/225	12/15	30/15	2/15	24/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
	β_{hs}	22/15	12/15	30/15	4/15	30/15
	β_{ed}	1309/225	94/75	47/15	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 = β_{hs}/β_c	30/15					
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI 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

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Full Avg Pwr (dBm)	Reduce Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	23.5	18.9
		4183	836.6	23.3	18.8
		4233	846.6	23.4	18.9
	Subtest 2	4132	826.4	22.5	18.4
		4183	836.6	22.5	18.3
		4233	846.6	22.5	18.3
	Subtest 3	4132	826.4	23.3	18.9
		4183	836.6	23.2	18.7
		4233	846.6	23.4	18.8
	Subtest 4	4132	826.4	22.5	18.1
		4183	836.6	22.5	18.0
		4233	846.6	22.5	18.1
	Subtest 5	4132	826.4	24.5	19.8
		4183	836.6	24.4	19.8
		4233	846.6	24.4	19.9
W-CDMA Band IV	Subtest 1	1312	1712.4	23.5	16.9
		1413	1732.6	23.9	17.2
		1513	1752.6	23.5	16.8
	Subtest 2	1312	1712.4	22.3	15.5
		1413	1732.6	22.5	15.9
		1513	1752.6	22.3	16.1
	Subtest 3	1312	1712.4	23.1	16.6
		1413	1732.6	22.9	16.6
		1513	1752.6	23.0	16.2
	Subtest 4	1312	1712.4	22.4	16.0
		1413	1732.6	22.5	16.0
		1513	1752.6	22.4	16.2
	Subtest 5	1312	1712.4	23.9	17.0
		1413	1732.6	24.0	17.1
		1513	1752.6	24.0	17.1
W-CDMA Band II	Subtest 1	9262	1852.4	23.4	14.7
		9400	1880.0	23.3	14.8
		9538	1907.6	23.3	14.7
	Subtest 2	9262	1852.4	22.1	13.4
		9400	1880.0	22.0	13.5
		9538	1907.6	22.3	13.3
	Subtest 3	9262	1852.4	22.8	14.1
		9400	1880.0	22.7	14.3
		9538	1907.6	22.6	14.1
	Subtest 4	9262	1852.4	22.3	13.6
		9400	1880.0	22.3	13.8
		9538	1907.6	22.3	13.4
	Subtest 5	9262	1852.4	23.4	14.7
		9400	1880.0	23.5	14.8
		9538	1907.6	23.3	14.7

DC-HSDPA

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	Processes	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.		

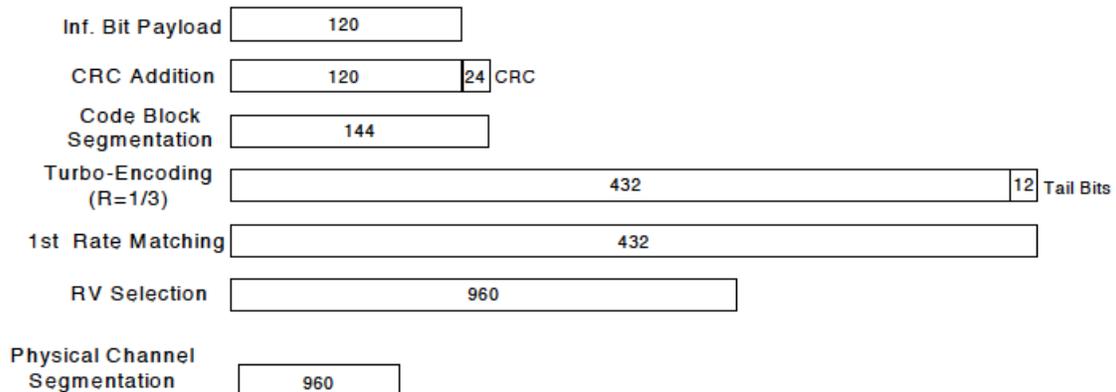


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR (dB)	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			
	A _{hs} = β_{hs}/β_c	30/15			

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

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Full Avg Pwr (dBm)	Reduce Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	24.5	19.8
		4183	836.6	24.4	19.7
		4233	846.6	24.3	19.8
	Subtest 2	4132	826.4	24.5	19.6
		4183	836.6	24.4	19.6
		4233	846.6	24.4	19.6
	Subtest 3	4132	826.4	24.0	19.0
		4183	836.6	24.0	19.0
		4233	846.6	23.9	19.1
	Subtest 4	4132	826.4	24.0	19.0
		4183	836.6	24.0	19.0
		4233	846.6	23.9	19.0
W-CDMA Band IV	Subtest 1	1312	1712.4	23.8	17.2
		1413	1732.6	24.0	17.3
		1513	1752.6	24.0	17.2
	Subtest 2	1312	1712.4	23.9	16.9
		1413	1732.6	24.0	17.1
		1513	1752.6	23.9	17.0
	Subtest 3	1312	1712.4	23.9	16.9
		1413	1732.6	24.0	17.0
		1513	1752.6	23.9	16.9
	Subtest 4	1312	1712.4	23.9	16.9
		1413	1732.6	23.9	17.0
		1513	1752.6	23.9	16.9
W-CDMA Band II	Subtest 1	9262	1852.4	23.4	14.8
		9400	1880.0	23.5	15.0
		9538	1907.6	23.3	14.8
	Subtest 2	9262	1852.4	23.4	14.8
		9400	1880.0	23.5	15.0
		9538	1907.6	23.3	14.8
	Subtest 3	9262	1852.4	23.5	14.8
		9400	1880.0	23.5	14.9
		9538	1907.6	23.3	14.7
	Subtest 4	9262	1852.4	23.4	14.7
		9400	1880.0	23.5	14.9
		9538	1907.6	23.3	14.7

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.

8.3. LTE Band 2/4/5/7/13/17

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
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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
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.

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz		1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.8	23.7	23.9	0	15.3	15.2	15.0
			1	50	0	23.9	23.8	23.8	0	15.2	15.1	14.8
			1	99	0	23.8	23.8	23.4	0	15.3	15.1	14.5
			50	0	1	22.8	22.8	22.7	0	15.2	15.1	13.5
			50	25	1	22.7	22.8	22.9	0	15.2	15.1	14.5
			50	50	1	22.7	22.8	22.8	0	15.4	15.2	14.8
			100	0	1	22.7	22.8	22.8	0	15.4	15.1	14.1
		16QAM	1	0	1	22.9	22.8	23.0	0	15.3	15.3	13.5
			1	50	1	23.0	22.8	22.8	0	15.5	15.2	15.2
			1	99	1	22.9	22.8	22.9	0	15.3	15.2	14.7
			50	0	2	21.9	21.8	21.7	0	15.3	15.2	13.6
			50	25	2	21.8	21.7	21.8	0	15.4	15.1	14.4
			50	50	2	21.8	21.8	21.7	0	15.3	15.1	14.7
			100	0	2	21.7	21.8	21.8	0	15.3	15.1	14.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz		1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	23.7	23.8	23.8	0	15.2	15.2	15.0
			1	36	0	23.7	23.8	23.7	0	15.0	15.2	15.0
			1	74	0	23.7	23.7	23.5	0	15.3	15.2	15.0
			36	0	1	22.8	22.8	22.8	0	15.1	15.2	14.4
			36	18	1	22.8	22.8	22.8	0	15.2	15.1	15.1
			36	37	1	22.7	22.8	22.8	0	15.2	15.2	15.0
			75	0	1	22.8	22.8	22.9	0	15.2	15.2	14.7
		16QAM	1	0	1	22.6	22.9	23.0	0	15.1	15.4	14.3
			1	36	1	22.6	22.9	23.0	0	15.1	15.4	15.5
			1	74	1	22.6	23.0	23.0	0	15.1	15.3	15.3
			36	0	2	21.8	21.8	21.7	0	15.2	15.3	14.4
			36	18	2	21.8	21.8	21.7	0	15.4	15.2	15.0
			36	37	2	21.7	21.8	21.8	0	15.3	15.1	14.9
			75	0	2	21.9	21.8	21.8	0	15.4	15.2	14.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz		1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.7	23.8	23.6	0	15.1	15.2	14.8
			1	25	0	23.7	23.7	23.7	0	15.0	15.2	15.0
			1	49	0	23.7	23.8	23.5	0	15.2	15.2	15.2
			25	0	1	22.7	22.8	22.8	0	15.1	15.1	15.1
			25	12	1	22.8	22.8	22.8	0	15.2	15.1	15.0
			25	25	1	22.8	22.8	22.8	0	15.2	15.2	14.8
			50	0	1	22.8	22.8	22.8	0	15.1	15.2	14.9
		16QAM	1	0	1	22.6	22.9	22.5	0	15.1	15.4	15.0
			1	25	1	22.6	22.9	22.6	0	15.1	15.3	15.0
			1	49	1	22.6	22.9	22.6	0	15.1	15.3	15.0
			25	0	2	21.8	21.8	21.8	0	15.3	15.2	15.1
			25	12	2	21.8	21.7	21.9	0	15.3	15.2	15.1
			25	25	2	21.8	21.7	21.8	0	15.5	15.1	14.9
			50	0	2	21.8	21.7	21.8	0	15.3	15.2	15.0

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz		1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.7	23.9	23.8	0	15.0	15.2	15.0
			1	12	0	23.7	23.9	23.8	0	15.0	15.2	14.9
			1	24	0	23.7	23.9	23.5	0	15.0	15.2	15.1
			12	0	1	22.8	22.8	22.7	0	15.1	15.2	14.9
			12	6	1	22.8	22.8	22.7	0	15.1	15.2	14.8
			12	11	1	22.8	22.8	22.8	0	15.1	15.2	14.9
			25	0	1	22.8	22.8	22.7	0	15.2	15.2	14.8
		16QAM	1	0	1	22.5	22.7	23.0	0	15.0	15.2	15.5
			1	12	1	22.5	22.7	23.0	0	15.0	15.2	15.5
			1	24	1	22.6	22.7	23.0	0	15.1	15.2	15.5
			12	0	2	21.8	21.7	21.7	0	15.3	15.2	14.9
			12	6	2	21.8	21.7	21.7	0	15.3	15.2	14.8
			12	11	2	21.8	21.8	21.8	0	15.3	15.2	14.9
			25	0	2	21.9	21.7	21.7	0	15.3	15.1	14.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz		1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.7	23.8	23.7	0	15.0	15.2	15.0
			1	7	0	23.7	23.8	23.7	0	14.9	15.1	15.0
			1	14	0	23.7	23.8	23.4	0	15.0	15.2	15.2
			8	0	1	22.8	22.8	22.9	0	15.2	15.2	14.8
			8	4	1	22.8	22.8	22.8	0	15.1	15.1	15.0
			8	7	1	22.7	22.8	22.8	0	15.1	15.2	15.0
			15	0	1	22.8	22.8	22.8	0	15.1	15.2	15.0
		16QAM	1	0	1	22.6	22.9	22.6	0	15.0	15.4	14.9
			1	7	1	22.5	22.9	22.5	0	15.0	15.3	15.1
			1	14	1	22.6	22.9	22.5	0	15.1	15.3	15.1
			8	0	2	21.8	21.6	21.8	0	15.2	15.0	15.0
			8	4	2	21.8	21.6	21.8	0	15.2	15.0	15.2
			8	7	2	21.8	21.6	21.8	0	15.2	14.9	15.2
			15	0	2	21.8	21.8	21.7	0	15.2	15.1	14.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz		1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.8	23.8	23.6	0	15.1	15.2	14.8
			1	2	0	23.7	23.8	23.6	0	15.1	15.1	15.0
			1	5	0	23.8	23.8	23.4	0	15.1	15.2	14.9
			3	0	0	23.9	23.8	23.5	0	15.1	15.2	14.9
			3	1	0	23.8	23.8	23.6	0	15.1	15.1	15.0
			3	2	0	23.8	23.8	23.5	0	15.1	15.1	15.0
			6	0	1	22.8	22.8	22.6	0	15.1	15.1	14.9
		16QAM	1	0	1	22.9	23.0	22.7	0	15.4	15.4	14.9
			1	2	1	22.8	22.9	22.6	0	15.3	15.3	15.0
			1	5	1	22.9	23.0	22.5	0	15.4	15.3	15.0
			3	0	1	22.7	22.7	22.8	0	15.2	15.1	15.1
			3	1	1	22.7	22.7	22.8	0	15.2	15.1	15.3
			3	2	1	22.7	22.7	22.8	0	15.2	15.1	15.2
			6	0	2	21.8	21.6	21.9	0	15.2	14.9	15.2

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz		1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	23.5	23.5	23.5	0	17.3	17.3	17.3
			1	50	0	23.5	23.6	23.6	0	17.3	17.2	17.3
			1	99	0	23.6	23.6	23.6	0	17.3	17.2	17.3
			50	0	1	22.5	22.6	22.6	0	17.3	17.3	17.2
			50	25	1	22.6	22.6	22.6	0	17.3	17.3	17.3
			50	50	1	22.6	22.6	22.6	0	17.3	17.3	17.3
			100	0	1	22.5	22.6	22.6	0	17.3	17.3	17.3
		16QAM	1	0	1	22.6	22.5	22.6	0	17.4	17.3	17.4
			1	50	1	22.6	22.6	22.7	0	17.4	17.3	17.3
			1	99	1	22.6	22.6	22.7	0	17.4	17.3	17.4
			50	0	2	21.5	21.5	21.5	0	17.4	17.3	17.2
			50	25	2	21.5	21.5	21.5	0	17.4	17.3	17.2
			50	50	2	21.6	21.5	21.5	0	17.4	17.4	17.3
			100	0	2	21.5	21.6	21.5	0	17.4	17.3	17.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	23.4	23.5	23.5	0	17.2	17.2	17.2
			1	36	0	23.4	23.5	23.6	0	17.2	17.2	17.3
			1	74	0	23.5	23.5	23.5	0	17.2	17.2	17.2
			36	0	1	22.5	22.6	22.6	0	17.3	17.3	17.3
			36	18	1	22.5	22.6	22.6	0	17.3	17.3	17.3
			36	37	1	22.6	22.6	22.7	0	17.3	17.3	17.4
			75	0	1	22.6	22.7	22.7	0	17.3	17.4	17.3
		16QAM	1	0	1	22.3	22.7	22.9	0	17.1	17.4	17.6
			1	36	1	22.3	22.7	23.0	0	17.1	17.5	17.6
			1	74	1	22.4	22.7	23.0	0	17.1	17.4	17.6
			36	0	2	21.4	21.6	21.5	0	17.3	17.4	17.2
			36	18	2	21.4	21.6	21.5	0	17.3	17.3	17.2
			36	37	2	21.4	21.6	21.6	0	17.3	17.3	17.3
			75	0	2	21.5	21.6	21.6	0	17.4	17.4	17.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz		1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	23.4	23.6	23.5	0	17.2	17.3	17.2
			1	25	0	23.4	23.6	23.5	0	17.2	17.3	17.2
			1	49	0	23.5	23.5	23.4	0	17.2	17.3	17.2
			25	0	1	22.5	22.5	22.6	0	17.4	17.3	17.3
			25	12	1	22.5	22.6	22.6	0	17.4	17.3	17.3
			25	25	1	22.5	22.6	22.6	0	17.3	17.3	17.3
			50	0	1	22.5	22.6	22.7	0	17.4	17.3	17.4
		16QAM	1	0	1	22.3	22.7	22.4	0	17.1	17.4	17.1
			1	25	1	22.3	22.7	22.4	0	17.1	17.4	17.1
			1	49	1	22.3	22.6	22.4	0	17.2	17.5	17.1
			25	0	2	21.4	21.5	21.6	0	17.3	17.3	17.4
			25	12	2	21.5	21.5	21.7	0	17.3	17.3	17.4
			25	25	2	21.5	21.6	21.6	0	17.3	17.3	17.3
			50	0	2	21.4	21.6	21.6	0	17.3	17.3	17.4

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	23.4	23.7	23.7	0	17.2	17.4	17.4
			1	12	0	23.4	23.7	23.6	0	17.2	17.4	17.3
			1	24	0	23.4	23.7	23.6	0	17.2	17.4	17.3
			12	0	1	22.5	22.6	22.5	0	17.3	17.3	17.3
			12	6	1	22.5	22.6	22.6	0	17.3	17.3	17.2
			12	11	1	22.5	22.6	22.5	0	17.3	17.3	17.2
			25	0	1	22.5	22.6	22.6	0	17.3	17.3	17.3
		16QAM	1	0	1	22.3	22.6	23.0	0	17.0	17.3	17.7
			1	12	1	22.3	22.5	22.9	0	17.1	17.2	17.6
			1	24	1	22.3	22.5	22.9	0	17.1	17.3	17.6
			12	0	2	21.5	21.6	21.5	0	17.4	17.3	17.3
			12	6	2	21.5	21.5	21.5	0	17.3	17.4	17.3
			12	11	2	21.5	21.6	21.6	0	17.4	17.3	17.3
			25	0	2	21.6	21.5	21.5	0	17.4	17.3	17.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	23.4	23.6	23.5	0	17.2	17.3	17.2
			1	7	0	23.4	23.6	23.4	0	17.2	17.3	17.1
			1	14	0	23.4	23.6	23.5	0	17.3	17.3	17.2
			8	0	1	22.5	22.6	22.6	0	17.3	17.3	17.3
			8	4	1	22.5	22.6	22.6	0	17.3	17.3	17.3
			8	7	1	22.5	22.6	22.5	0	17.3	17.3	17.3
			15	0	1	22.5	22.6	22.6	0	17.3	17.3	17.3
		16QAM	1	0	1	22.3	22.7	22.4	0	17.1	17.4	17.1
			1	7	1	22.3	22.7	22.3	0	17.0	17.4	17.0
			1	14	1	22.4	22.8	22.4	0	17.1	17.5	17.1
			8	0	2	21.5	21.3	21.6	0	17.3	17.1	17.3
			8	4	2	21.5	21.4	21.6	0	17.3	17.1	17.3
			8	7	2	21.5	21.3	21.6	0	17.3	17.1	17.3
			15	0	2	21.5	21.6	21.5	0	17.4	17.3	17.2
			Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR
1710.7 MHz	1732.5 MHz	1754.3 MHz							1710.7 MHz	1732.5 MHz	1754.3 MHz	
LTE Band 4	1.4	QPSK	1	0	0	23.5	23.6	23.5	0	17.3	17.3	17.2
			1	2	0	23.4	23.5	23.5	0	17.3	17.3	17.2
			1	5	0	23.5	23.6	23.6	0	17.3	17.3	17.2
			3	0	0	23.5	23.5	23.6	0	17.4	17.3	17.3
			3	1	0	23.5	23.6	23.6	0	17.3	17.3	17.3
			3	2	0	23.5	23.6	23.6	0	17.3	17.3	17.3
			6	0	1	22.6	22.6	22.6	0	17.4	17.3	17.3
		16QAM	1	0	1	22.6	22.8	22.7	0	17.4	17.5	17.1
			1	2	1	22.6	22.7	22.6	0	17.3	17.5	17.1
			1	5	1	22.6	22.8	22.7	0	17.4	17.5	17.2
			3	0	1	22.5	22.6	22.5	0	17.3	17.3	17.4
			3	1	1	22.5	22.5	22.5	0	17.3	17.2	17.4
			3	2	1	22.4	22.5	22.5	0	17.3	17.2	17.4
			6	0	2	21.6	21.4	21.6	0	17.4	17.1	17.4

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz		829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.4	23.5	23.5	0	19.3	19.6	19.6
			1	25	0	23.4	23.5	23.4	0	19.4	19.5	19.5
			1	49	0	23.4	23.5	23.5	0	19.5	19.6	19.5
			25	0	1	22.5	22.5	22.6	1	19.4	19.6	19.6
			25	12	1	22.5	22.5	22.6	1	19.5	19.6	19.6
			25	25	1	22.6	22.6	22.6	1	19.5	19.6	19.6
		16QAM	50	0	1	22.5	22.5	22.6	1	19.5	19.6	19.6
			1	0	1	22.3	22.7	22.4	1	19.3	19.8	19.5
			1	25	1	22.4	22.7	22.2	1	19.3	19.8	19.4
			1	49	1	22.3	22.7	22.3	1	19.4	19.8	19.4
			25	0	2	21.6	21.6	21.7	2	19.4	19.7	19.7
			25	12	2	21.6	21.5	21.7	2	19.5	19.6	19.7
			25	25	2	21.6	21.7	21.7	2	19.5	19.6	19.7
			50	0	2	21.6	21.5	21.7	2	19.5	19.6	19.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.4	23.6	23.7	0	19.5	19.7	19.6
			1	12	0	23.4	23.5	23.7	0	19.4	19.7	19.6
			1	24	0	23.4	23.6	23.7	0	19.4	19.7	19.6
			12	0	1	22.4	22.5	22.6	1	19.4	19.7	19.6
			12	6	1	22.5	22.5	22.5	1	19.4	19.6	19.5
			12	11	1	22.5	22.5	22.5	1	19.5	19.6	19.6
		16QAM	25	0	1	22.5	22.5	22.5	1	19.4	19.6	19.6
			1	0	1	22.2	22.5	23.0	1	19.3	19.6	20.0
			1	12	1	22.3	22.5	22.9	1	19.2	19.6	20.0
			1	24	1	22.4	22.5	22.9	1	19.3	19.6	20.0
			12	0	2	21.5	21.6	21.6	2	19.4	19.7	19.6
			12	6	2	21.6	21.6	21.7	2	19.5	19.7	19.6
			12	11	2	21.6	21.6	21.7	2	19.6	19.7	19.6
			25	0	2	21.7	21.5	21.6	2	19.6	19.6	19.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.4	23.5	23.5	0	19.6	19.7	19.6
			1	7	0	23.3	23.5	23.5	0	19.3	19.7	19.6
			1	14	0	23.5	23.5	23.5	0	19.5	19.7	19.6
			8	0	1	22.5	22.5	22.6	1	19.6	19.7	19.7
			8	4	1	22.4	22.5	22.6	1	19.4	19.7	19.6
			8	7	1	22.5	22.5	22.6	1	19.4	19.7	19.6
		16QAM	15	0	1	22.5	22.6	22.6	1	19.4	19.7	19.7
			1	0	1	22.3	22.7	22.4	1	19.5	19.9	19.6
			1	7	1	22.3	22.6	22.4	1	19.2	19.9	19.5
			1	14	1	22.4	22.7	22.3	1	19.4	19.9	19.5
			8	0	2	21.5	21.4	21.7	2	19.6	19.6	19.8
			8	4	2	21.5	21.4	21.7	2	19.5	19.6	19.8
			8	7	2	21.5	21.3	21.7	2	19.5	19.6	19.8
			15	0	2	21.5	21.6	21.6	2	19.5	19.8	19.7

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.4	23.5	23.6	0	19.6	19.6	19.6
			1	2	0	23.3	23.5	23.5	0	19.5	19.6	19.6
			1	5	0	23.5	23.5	23.6	0	19.5	19.7	19.6
			3	0	0	23.5	23.5	23.6	0	19.6	19.7	19.6
			3	1	0	23.4	23.5	23.6	0	19.5	19.7	19.7
			3	2	0	23.4	23.5	23.5	0	19.5	19.7	19.6
			6	0	1	22.5	22.5	22.6	1	19.6	19.7	19.7
		16QAM	1	0	1	22.6	22.7	22.7	1	19.7	19.6	19.8
			1	2	1	22.5	22.7	22.6	1	19.6	19.5	19.7
			1	5	1	22.5	22.7	22.7	1	19.6	19.6	19.7
			3	0	1	22.4	22.5	22.5	1	19.5	19.8	19.6
			3	1	1	22.4	22.5	22.5	1	19.5	19.8	19.6
			3	2	1	22.4	22.5	22.5	1	19.5	19.8	19.6
			6	0	2	21.6	21.4	21.7	2	19.6	19.8	19.8

LTE Band 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz		2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	23.7	23.7	23.7	0	13.5	13.4	13.6
			1	49	0	23.8	23.6	23.6	0	13.9	13.6	13.6
			1	99	0	23.7	23.6	23.1	0	13.8	13.4	13.2
			50	0	1	22.9	22.7	22.6	0	13.7	13.3	13.9
			50	24	1	22.8	22.6	22.6	0	13.6	13.4	13.8
			50	50	1	22.8	22.7	22.6	0	13.4	13.2	13.5
			100	0	1	22.8	22.6	22.6	0	13.4	13.3	13.7
		16QAM	1	0	1	23.0	22.7	22.7	0	13.7	13.8	14.3
			1	49	1	22.9	22.7	22.7	0	14.1	13.9	14.2
			1	99	1	22.8	22.7	22.5	0	13.7	13.8	13.6
			50	0	2	21.9	21.7	21.6	0	13.4	13.3	13.8
			50	24	2	21.8	21.7	21.6	0	13.6	13.3	13.8
			50	50	2	21.8	21.7	21.5	0	13.4	13.1	13.4
			100	0	2	21.8	21.6	21.7	0	13.4	13.2	13.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz		2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	23.8	23.6	23.5	0	14.0	13.8	14.0
			1	37	0	23.8	23.7	23.5	0	14.0	13.8	13.6
			1	74	0	23.6	23.6	23.3	0	13.9	13.8	13.7
			36	0	1	22.8	22.7	22.6	0	13.9	13.7	13.8
			36	20	1	22.9	22.7	22.6	0	13.7	13.7	13.7
			36	39	1	22.8	22.6	22.6	0	13.6	13.6	13.6
			75	0	1	22.9	22.6	22.5	0	13.7	13.6	13.8
		16QAM	1	0	1	22.7	23.0	22.4	0	13.6	13.9	14.0
			1	37	1	22.7	23.0	22.5	0	13.6	13.7	13.6
			1	74	1	22.5	23.0	22.2	0	13.7	13.8	13.5
			36	0	2	21.7	21.7	21.7	0	13.7	13.4	13.8
			36	20	2	21.8	21.7	21.6	0	13.7	13.4	13.6
			36	39	2	21.7	21.7	21.6	0	13.7	13.3	13.5
			75	0	2	21.8	21.6	21.6	0	13.9	13.4	13.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz		2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	23.8	23.6	23.6	0	14.3	13.9	13.9
			1	25	0	23.7	23.6	23.5	0	14.1	14.0	13.6
			1	49	0	23.8	23.6	23.4	0	14.3	14.1	14.0
			25	0	1	22.8	22.7	22.7	0	14.2	14.1	13.8
			25	12	1	22.8	22.7	22.6	0	14.1	13.9	13.6
			25	25	1	22.9	22.7	22.6	0	14.2	14.1	13.7
			50	0	1	22.9	22.6	22.6	0	14.1	14.0	13.6
		16QAM	1	0	1	22.8	22.5	22.5	0	14.1	13.9	14.1
			1	25	1	22.6	22.5	22.4	0	14.0	13.8	13.9
			1	49	1	22.7	22.5	22.3	0	14.1	13.9	14.2
			25	0	2	21.7	21.8	21.7	0	14.2	14.0	13.6
			25	12	2	21.7	21.8	21.6	0	14.1	13.8	13.5
			25	25	2	21.8	21.8	21.6	0	14.2	14.0	13.6
			50	0	2	21.9	21.7	21.6	0	14.1	13.9	13.6

LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz		2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	23.8	23.8	23.6	0	14.1	14.0	13.7
			1	12	0	23.7	23.8	23.5	0	14.1	14.0	13.8
			1	24	0	23.7	23.8	23.4	0	14.1	14.0	13.9
			12	0	1	22.9	22.7	22.7	0	14.1	14.0	13.8
			12	7	1	22.8	22.7	22.5	0	14.2	14.0	13.8
			12	13	1	22.8	22.7	22.6	0	14.0	14.0	13.8
			25	0	1	22.8	22.7	22.6	0	14.1	14.0	13.8
		16QAM	1	0	1	22.6	22.7	23.0	0	14.1	14.1	14.4
			1	12	1	22.5	22.7	23.0	0	14.1	14.1	14.5
			1	24	1	22.6	22.7	23.0	0	14.1	14.1	14.5
			12	0	2	21.9	21.8	21.7	0	14.1	13.9	13.8
			12	7	2	21.8	21.8	21.7	0	14.2	13.9	13.8
			12	13	2	21.8	21.8	21.7	0	14.0	13.9	13.8
			25	0	2	21.8	21.7	21.6	0	14.2	13.8	13.7

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)	Target MPR	Reduce Avg Pwr (dBm)
						782 MHz		782 MHz
LTE Band 13	10	QPSK	1	0	0	23.4	0	21.4
			1	25	0	23.4	0	21.3
			1	49	0	23.4	0	20.9
			25	0	1	22.5	0	20.9
			25	12	1	22.5	0	21.0
			25	25	1	22.5	0	21.0
		16QAM	50	0	1	22.5	0	21.0
			1	0	1	22.3	0	20.8
			1	25	1	22.3	0	20.8
			1	49	1	22.3	0	20.9
			25	0	2	21.5	0	20.7
			25	12	2	21.5	0	20.8
			25	25	2	21.5	0	20.8
			50	0	2	21.5	0	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)	Target MPR	Reduce Avg Pwr (dBm)
						782 MHz		782 MHz
LTE Band 13	5	QPSK	1	0	0	23.4	0	21.5
			1	12	0	23.4	0	21.5
			1	24	0	23.5	0	21.1
			12	0	1	22.5	0	20.8
			12	6	1	22.5	0	21.0
			12	11	1	22.5	0	21.0
		16QAM	25	0	1	22.5	0	21.0
			1	0	1	22.2	0	20.8
			1	12	1	22.3	0	20.9
			1	24	1	22.3	0	21.0
			12	0	2	21.6	0	20.9
			12	6	2	21.6	0	21.0
			12	11	2	21.6	0	21.0
			25	0	2	21.6	0	21.1

Note(s):
 10/5 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)	Target MPR	Reduce Avg Pwr (dBm)
						710 MHz		710 MHz
LTE Band 17	10	QPSK	1	0	0	23.5	0	21.1
			1	25	0	23.3	0	21.0
			1	49	0	23.3	0	21.1
			25	0	1	22.4	0	21.1
			25	12	1	22.5	0	21.2
			25	25	1	22.5	0	21.2
		16QAM	50	0	1	22.4	0	21.2
			1	0	1	22.4	0	21.0
			1	25	1	22.2	0	21.0
			1	49	1	22.2	0	21.0
			25	0	2	21.4	0	21.2
			25	12	2	21.5	0	21.1
			25	25	2	21.5	0	21.1
			50	0	2	21.4	0	21.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)	Target MPR	Reduce Avg Pwr (dBm)
						710 MHz		710 MHz
LTE Band 17	5	QPSK	1	0	0	23.4	0	21.1
			1	12	0	23.3	0	21.1
			1	24	0	23.4	0	21.1
			12	0	1	22.4	0	21.2
			12	6	1	22.4	0	21.2
			12	11	1	22.5	0	21.1
		16QAM	25	0	1	22.5	0	21.1
			1	0	1	22.2	0	21.0
			1	12	1	22.2	0	21.0
			1	24	1	22.3	0	21.0
			12	0	2	21.4	0	21.2
			12	6	2	21.4	0	21.2
			12	11	2	21.5	0	21.2
			25	0	2	21.6	0	21.3

Note(s):

10/5 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

8.4. Wi-Fi (2.4 GHz Band)

Required Test Channels per KDB 248227 D01

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant	Sub Ant	SAR Test (Yes/No)
					Avg Pwr (dBm)		
2.4 (DTS)	802.11b	1 Mbps	1	2412	13.0	13.3	Yes
			6	2437	13.3	13.3	
			11	2462	14.0	13.8	
	802.11g	6 Mbps	1	2412	12.8	13.0	No
			6	2437	12.8	13.0	
			11	2462	13.5	13.1	
	802.11n (HT20)	MCS0	1	2412	12.8	13.0	No
			6	2437	12.8	13.0	
			11	2462	13.5	13.1	

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 802.11b channels.

Power measurements to determine worst-case data rates

Mode	Ch #	Freq. (MHz)	Data Rate	Main Ant	Sub Ant	SAR test (Yes/No)
				Avg Pwr (dBm)		
802.11b	11	2462	1 Mbps	14.0	13.8	Yes
			2 Mbps	14.0	13.8	No
			5.5 Mbps	14.0	13.7	No
			11 Mbps	14.0	13.7	No

8.5. Wi-Fi (5 GHz Bands)

Required Test Channels per KDB 248227 D01

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant	Sub Ant	SAR Test (Yes/No)
					Avg Pwr (dBm)		
5.2 (U-NII-1)	802.11a	6 Mbps	36	5180	11.5	10.4	Yes
			40	5200	11.5	10.5	
			44	5220	11.5	10.6	
			48	5240	11.5	10.6	
	802.11n (HT20)	MCS0	36	5180	11.4	10.4	No
			40	5200	11.4	10.6	
			48	5240	11.5	10.5	
	802.11n (HT40)	MCS0	38	5190	11.4	10.6	No
			46	5230	11.3	10.3	
	802.11ac (VHT20)	MCS0	36	5180	11.4	10.5	Yes
			40	5200	11.4	10.4	
			48	5240	11.4	10.5	
	802.11ac (VHT40)	MCS0	38	5190	11.3	10.5	No
			46	5230	11.3	10.5	
802.11ac (VHT80)	MCS0	42	5210	11.3	10.4	No	
5.3 (U-NII-2A)	802.11a	6 Mbps	52	5260	11.5	10.7	Yes
			56	5280	11.5	10.7	
			60	5300	11.4	10.7	
			64	5320	11.5	10.7	
	802.11n (HT20)	MCS0	52	5260	11.4	10.7	No
			60	5300	11.5	10.6	
			64	5320	11.5	10.5	
	802.11n (HT40)	MCS0	54	5270	11.4	10.7	No
			62	5310	11.4	10.7	
	802.11ac (VHT20)	MCS0	52	5260	11.5	10.7	Yes
			60	5300	11.5	10.6	
			64	5320	11.5	10.6	
	802.11ac (VHT40)	MCS0	54	5270	11.4	10.7	No
			62	5310	11.5	10.7	
802.11ac (VHT80)	MCS0	58	5290	11.4	10.5	No	

Wi-Fi (5 GHz Bands) Measured Results (continued)

Band (GHz)	Mode	Mode	Ch #	Freq. (MHz)	Main Ant	Sub Ant	SAR Test (Yes/No)
					Avg Pwr (dBm)		
5.5 (U-NII-2C)	802.11a	6 Mbps	100	5500	11.0	11.3	Yes
			104	5520	11.1	11.4	
			108	5540	10.7	11.0	
			112	5560	10.9	11.2	
			116	5580	10.9	11.1	
			120	5600	Not Supported		
			124	5620	Not Supported		
			128	5640	Not Supported		
			132	5660	10.8	10.8	
			136	5680	10.7	10.8	
	140	5700	11.1	11.0			
	802.11n (HT20)	MCS0	100	5500	11.3	11.4	No
			116	5580	11.1	11.3	
			140	5700	11.3	11.4	
	802.11n (HT40)	MCS0	102	5510	11.4	11.4	No
			110	5550	11.1	11.3	
			134	5670	11.2	11.2	
	802.11ac (VHT20)	MCS0	100	5500	11.4	11.3	Yes
			116	5580	11.2	11.2	
			140	5700	11.4	11.3	
	802.11ac (VHT40)	MCS0	102	5510	11.3	11.3	No
110			5550	11.3	11.4		
134			5670	11.4	11.4		
802.11ac (VHT80)	MCS0	106	5530	11.2	11.2	No	
		122	5610	11.2	11.2		
5.8 (U-NII-3)	802.11a	6 Mbps	149	5745	10.8	10.8	Yes
			153	5765	10.9	10.9	
			157	5785	10.9	10.9	
			161	5805	11.0	11.0	
			165	5825	11.0	11.1	
	802.11n (HT20)	MCS0	149	5745	11.3	11.0	No
			157	5785	11.3	11.0	
			161	5805	11.3	11.0	
	802.11n (HT40)	MCS0	151	5755	11.3	11.0	No
			159	5795	11.3	11.0	
	802.11ac (VHT20)	MCS0	149	5745	11.3	11.0	Yes
			157	5785	11.3	11.0	
	802.11ac (VHT40)	MCS0	151	5755	11.3	10.9	No
			159	5795	11.3	11.0	
	802.11ac (VHT80)	MCS0	155	5775	11.2	11	No

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 and 802.11ac VHT40/VHT80 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

Power measurements to determine worst-case data rates

Band	Mode	Ch #	Freq. (MHz)	Data Rate	Main Ant	Sub Ant	SAR test (Yes/No)
					Avg Pwr (dBm)		
5.2 GHz (U-NII-1)	802.11a	48	5180	6 Mbps	11.5	10.6	Yes
				9 Mbps	11.4	10.6	No
				12 Mbps	11.4	10.6	No
				18 Mbps	11.5	10.5	No
				24 Mbps	11.5	10.5	No
				36 Mbps	11.5	10.5	No
				48 Mbps	11.5	10.5	No
54 Mbps	11.5	10.5	No				
5.3 GHz (U-NII-2A)	802.11a	64	5280	6 Mbps	11.5	10.9	Yes
				9 Mbps	11.5	10.8	No
				12 Mbps	11.4	10.8	No
				18 Mbps	11.4	10.8	No
				24 Mbps	11.4	10.8	No
				36 Mbps	11.4	10.8	No
				48 Mbps	11.4	10.8	No
54 Mbps	11.4	10.8	No				
5.5 GHz (U-NII-2C)	802.11a	104	5580	6 Mbps	11.1	11.4	Yes
				9 Mbps	11.1	11.4	No
				12 Mbps	11.1	11.4	No
				18 Mbps	11.2	11.4	No
				24 Mbps	11.3	11.5	No
				36 Mbps	11.4	11.5	No
				48 Mbps	11.4	11.5	No
54 Mbps	11.4	11.5	No				
5.8 GHz (U-NII-3)	802.11a	165	5745	6 Mbps	11.0	11.1	Yes
				9 Mbps	11.0	11.1	No
				12 Mbps	11.0	11.1	No
				18 Mbps	11.1	11.1	No
				24 Mbps	11.1	11.3	No
				36 Mbps	11.1	11.3	No
				48 Mbps	11.1	11.2	No
54 Mbps	11.0	11.2	No				

8.6. Bluetooth

Band (MHz)	Mode	Ch #	Freq. (MHz)	Freq. (MHz)	Main Ant - Conducted Avg Power	
					(dBm)	(mW)
2.4	V3.0 + EDR, GFSK	0	2402	2412	5.4	3.47
		39	2441	2437	8.8	7.59
		78	2480	2462	8.6	7.24
	V3.0 + EDR, π/4 DQPSK	0	2402	2412	3.0	2.00
		39	2441	2437	6.3	4.27
		78	2480	2462	5.8	3.80
	V3.0 + EDR, 8-DPSK	0	2402	2412	3.0	2.00
		39	2441	2437	6.3	4.27
		78	2480	2462	5.7	3.72
	V4.0 LE, GFSK	0	2402	2422	-3.9	0.41
		19	2440	2437	-0.4	0.91
		39	2480	2452	-1.6	0.69

9. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

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

9.1. Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3

9.2. Dielectric Property Measurements Results

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

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

SAR Lab 2

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit \pm (%)	
8/19/2014	Body 835	e'	53.0200	Relative Permittivity (ϵ_r):	53.02	55.20	-3.95	5
		e"	21.5100	Conductivity (σ):	1.00	0.97	2.96	5
	Body 820	e'	53.1800	Relative Permittivity (ϵ_r):	53.18	55.28	-3.79	5
		e"	21.6000	Conductivity (σ):	0.98	0.97	1.69	5
	Body 850	e'	52.8700	Relative Permittivity (ϵ_r):	52.87	55.16	-4.15	5
		e"	21.4400	Conductivity (σ):	1.01	0.99	2.65	5
8/19/2014	Body 1900	e'	51.9900	Relative Permittivity (ϵ_r):	51.99	53.30	-2.46	5
		e"	14.2700	Conductivity (σ):	1.51	1.52	-0.82	5
	Body 1850	e'	52.1800	Relative Permittivity (ϵ_r):	52.18	53.30	-2.10	5
		e"	14.2000	Conductivity (σ):	1.46	1.52	-3.90	5
	Body 1910	e'	51.9600	Relative Permittivity (ϵ_r):	51.96	53.30	-2.51	5
		e"	14.2700	Conductivity (σ):	1.52	1.52	-0.30	5

SAR Lab 3

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/11/2014	Body 1900	e'	51.6200	Relative Permittivity (ε _r):	51.62	53.30	-3.15	5
		e"	14.7000	Conductivity (σ):	1.55	1.52	2.17	5
	Body 1850	e'	51.7900	Relative Permittivity (ε _r):	51.79	53.30	-2.83	5
		e"	14.5200	Conductivity (σ):	1.49	1.52	-1.74	5
	Body 1910	e'	51.6000	Relative Permittivity (ε _r):	51.60	53.30	-3.19	5
		e"	14.7300	Conductivity (σ):	1.56	1.52	2.92	5
8/12/2014	Body 1900	e'	51.9000	Relative Permittivity (ε _r):	51.90	53.30	-2.63	5
		e"	14.2000	Conductivity (σ):	1.50	1.52	-1.30	5
	Body 1850	e'	52.1000	Relative Permittivity (ε _r):	52.10	53.30	-2.25	5
		e"	14.0600	Conductivity (σ):	1.45	1.52	-4.85	5
	Body 1910	e'	51.8700	Relative Permittivity (ε _r):	51.87	53.30	-2.68	5
		e"	14.2100	Conductivity (σ):	1.51	1.52	-0.72	5
8/13/2014	Body 1750	e'	51.5800	Relative Permittivity (ε _r):	51.58	53.44	-3.48	5
		e"	15.6400	Conductivity (σ):	1.52	1.49	2.40	5
	Body 1710	e'	51.6900	Relative Permittivity (ε _r):	51.69	53.54	-3.46	5
		e"	15.5000	Conductivity (σ):	1.47	1.46	0.84	5
	Body 1755	e'	51.5600	Relative Permittivity (ε _r):	51.56	53.43	-3.50	5
		e"	15.6600	Conductivity (σ):	1.53	1.49	2.61	5
8/15/2014	Body 835	e'	53.5700	Relative Permittivity (ε _r):	53.57	55.20	-2.95	5
		e"	21.8700	Conductivity (σ):	1.02	0.97	4.68	5
	Body 820	e'	53.7200	Relative Permittivity (ε _r):	53.72	55.28	-2.82	5
		e"	21.8900	Conductivity (σ):	1.00	0.97	3.06	5
	Body 850	e'	53.4100	Relative Permittivity (ε _r):	53.41	55.16	-3.17	5
		e"	21.8200	Conductivity (σ):	1.03	0.99	4.47	5
8/18/2014	Body 835	e'	53.6300	Relative Permittivity (ε _r):	53.63	55.20	-2.84	5
		e"	21.7300	Conductivity (σ):	1.01	0.97	4.01	5
	Body 820	e'	53.7700	Relative Permittivity (ε _r):	53.77	55.28	-2.73	5
		e"	21.8300	Conductivity (σ):	1.00	0.97	2.77	5
	Body 850	e'	53.4800	Relative Permittivity (ε _r):	53.48	55.16	-3.04	5
		e"	21.6600	Conductivity (σ):	1.02	0.99	3.70	5
8/18/2014	Body 1750	e'	52.2000	Relative Permittivity (ε _r):	52.20	53.44	-2.32	5
		e"	15.0500	Conductivity (σ):	1.46	1.49	-1.46	5
	Body 1710	e'	52.3300	Relative Permittivity (ε _r):	52.33	53.54	-2.27	5
		e"	14.9400	Conductivity (σ):	1.42	1.46	-2.81	5
	Body 1755	e'	52.1800	Relative Permittivity (ε _r):	52.18	53.43	-2.34	5
		e"	15.0700	Conductivity (σ):	1.47	1.49	-1.25	5
8/19/2014	Body 790	e'	53.6800	Relative Permittivity (ε _r):	53.68	55.39	-3.09	5
		e"	22.9600	Conductivity (σ):	1.01	0.97	4.39	5
	Body 750	e'	54.0200	Relative Permittivity (ε _r):	54.02	55.55	-2.75	5
		e"	23.2300	Conductivity (σ):	0.97	0.96	0.59	5
	Body 770	e'	53.8500	Relative Permittivity (ε _r):	53.85	55.47	-2.92	5
		e"	23.0900	Conductivity (σ):	0.99	0.96	2.48	5
8/19/2014	Body 750	e'	54.0200	Relative Permittivity (ε _r):	54.02	55.55	-2.75	5
		e"	23.2300	Conductivity (σ):	0.97	0.96	0.59	5
	Body 700	e'	54.5600	Relative Permittivity (ε _r):	54.56	55.74	-2.11	5
		e"	23.6100	Conductivity (σ):	0.92	0.96	-4.20	5
	Body 725	e'	54.2900	Relative Permittivity (ε _r):	54.29	55.64	-2.43	5
		e"	23.4000	Conductivity (σ):	0.94	0.96	-1.86	5
8/19/2014	Body 2600	e'	50.2900	Relative Permittivity (ε _r):	50.29	52.51	-4.23	5
		e"	15.4300	Conductivity (σ):	2.23	2.16	3.23	5
	Body 2500	e'	50.5300	Relative Permittivity (ε _r):	50.53	52.64	-4.00	5
		e"	15.1400	Conductivity (σ):	2.10	2.02	4.17	5
	Body 2700	e'	49.9800	Relative Permittivity (ε _r):	49.98	52.38	-4.59	5
		e"	15.6900	Conductivity (σ):	2.36	2.30	2.35	5

SAR Lab 3 (continue)

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
8/20/2014	Body 2450	e'	50.7600	Relative Permittivity (ϵ_r):	50.76	52.70	-3.68	5
		e"	14.8000	Conductivity (σ):	2.02	1.95	3.39	5
	Body 2410	e'	50.8800	Relative Permittivity (ϵ_r):	50.88	52.76	-3.56	5
		e"	14.7300	Conductivity (σ):	1.97	1.91	3.48	5
	Body 2475	e'	50.6900	Relative Permittivity (ϵ_r):	50.69	52.67	-3.76	5
		e"	14.8700	Conductivity (σ):	2.05	1.99	3.08	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
8/13/2014	Body 5180	e'	47.7900	Relative Permittivity (ϵ_r):	47.79	49.05	-2.56	5	
		e"	18.8400	Conductivity (σ):	5.43	5.27	2.94	5	
	Body 5200	e'	47.7500	Relative Permittivity (ϵ_r):	47.75	49.02	-2.59	5	
		e"	18.8600	Conductivity (σ):	5.45	5.29	2.99	5	
	Body 5600	e'	47.0600	Relative Permittivity (ϵ_r):	47.06	48.48	-2.92	5	
		e"	19.2000	Conductivity (σ):	5.98	5.76	3.77	5	
	Body 5800	e'	46.7300	Relative Permittivity (ϵ_r):	46.73	48.20	-3.05	5	
		e"	19.3800	Conductivity (σ):	6.25	6.00	4.17	5	
	Body 5825	e'	46.6800	Relative Permittivity (ϵ_r):	46.68	48.20	-3.15	5	
		e"	19.4200	Conductivity (σ):	6.29	6.00	4.83	5	
	8/20/2014	Body 5180	e'	47.8200	Relative Permittivity (ϵ_r):	47.82	49.05	-2.50	5
			e"	18.2600	Conductivity (σ):	5.26	5.27	-0.23	5
Body 5200		e'	47.7700	Relative Permittivity (ϵ_r):	47.77	49.02	-2.55	5	
		e"	18.2900	Conductivity (σ):	5.29	5.29	-0.12	5	
Body 5600		e'	47.1400	Relative Permittivity (ϵ_r):	47.14	48.48	-2.76	5	
		e"	18.7600	Conductivity (σ):	5.84	5.76	1.40	5	
Body 5800		e'	46.9600	Relative Permittivity (ϵ_r):	46.96	48.20	-2.57	5	
		e"	19.0000	Conductivity (σ):	6.13	6.00	2.12	5	
Body 5825		e'	46.9200	Relative Permittivity (ϵ_r):	46.92	48.20	-2.66	5	
		e"	19.0300	Conductivity (σ):	6.16	6.00	2.73	5	
8/25/2014		Body 5180	e'	47.5000	Relative Permittivity (ϵ_r):	47.50	49.05	-3.15	5
			e"	18.4800	Conductivity (σ):	5.32	5.27	0.97	5
	Body 5200	e'	47.4700	Relative Permittivity (ϵ_r):	47.47	49.02	-3.16	5	
		e"	18.5100	Conductivity (σ):	5.35	5.29	1.08	5	
	Body 5600	e'	46.8000	Relative Permittivity (ϵ_r):	46.80	48.48	-3.46	5	
		e"	18.8500	Conductivity (σ):	5.87	5.76	1.88	5	
	Body 5800	e'	46.4800	Relative Permittivity (ϵ_r):	46.48	48.20	-3.57	5	
		e"	19.0600	Conductivity (σ):	6.15	6.00	2.45	5	
	Body 5825	e'	46.4400	Relative Permittivity (ϵ_r):	46.44	48.20	-3.65	5	
		e"	19.0900	Conductivity (σ):	6.18	6.00	3.05	5	

10. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

10.1. Reference Target SAR Values

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 (W/kg)		
				1g/10g	Head	Body
D750V3	1071	11/15/2013	750	1g	8.46	8.64
				10g	5.5	5.72
D835V2	4d002	11/15/2013	835	1g	9.49	9.43
				10g	6.18	6.21
D1750V2	1050	4/22/2014	1750	1g	36.6	37.2
				10g	19.4	20.0
D1750V2	1077	9/12/2013	1750	1g	37.6	37.7
				10g	20.0	20.3
D1900V2	5d043	11/12/2013	1900	1g	40.1	39.0
				10g	21.1	20.8
D2450V2	899	9/10/2013	2450	1g	51.3	49.7
				10g	23.9	23.3
D2600V2	1006	9/11/2013	2600	1g	56.50	55.7
				10g	25.20	24.8
D5GHzV2	1138	11/19/2013	5200	1g	78.5	72.9
				10g	22.5	20.4
			5600	1g	82.7	78.3
				10g	23.5	21.7
5800	1g	78.3	72.8			
	10g	22.4	20.1			
D5GHzV2	1168	12/12/2013	5200	1g	79.3	75.2
				10g	22.7	21.0
			5600	1g	85.3	80.6
				10g	24.3	22.3
5800	1g	81.0	75.7			
	10g	22.9	20.9			

10.2. System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

SAR Lab 2

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
8/19/2014	D1900V2	5d043	Body	1g	3.69	3.81	38.1	39.0	-2.31	-3.25	1,2
				10g	1.86	2.12	21.2	20.8	1.92		
8/19/2014	D835V2	4d002	Body	1g	0.957	0.956	9.56	9.43	1.38	0.10	3,4
				10g	0.647	0.656	6.56	6.21	5.64		
8/25/2014	D2600V2	1006	Body	1g	5.62	5.53	55.3	55.7	-0.72	1.60	5,6
				10g	2.48	2.61	26.1	24.8	5.24		

SAR Lab 3

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta $\pm 10\%$	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
8/11/2014	D1900V2	5d043	Body	1g	4.09	4.06	40.6	39.0	4.10	0.73	
				10g	2.07	2.12	21.2	20.8	7.21		
8/12/2014	D1900V2	5d043	Body	1g	3.66	3.63	36.3	39.0	-6.92	0.82	7,8
				10g	1.85	1.89	18.9	20.8	-9.13		
8/13/2014	D1750V2	1077	Body	1g	3.75	3.73	37.3	37.7	-1.06	0.53	9,10
				10g	1.98	1.99	19.9	20.3	-1.97		
8/15/2014	D835V2	4d002	Body	1g	1.04	1.02	10.2	9.4	8.17	1.92	11,12
				10g	0.698	0.672	6.72	6.21	8.21		
8/18/2014	D835V2	4d002	Body	1g	1.01	0.98	9.8	9.40	4.68	2.57	
				10g	0.672	0.646	6.46	6.21	4.03		
8/18/2014	D1750V2	1077	Body	1g	3.82	3.79	37.9	37.7	0.53	0.79	
				10g	1.99	2.02	20.2	20.3	-0.49		
8/19/2014	D750V3	1071	Body	1g	0.893	0.878	8.78	8.6	1.62	1.68	13,14
				10g	0.604	0.585	5.85	5.72	2.27		
8/19/2014	D2600V2	1006	Body	1g	6.02	5.81	58.1	55.7	4.31	3.49	15,16
				10g	2.62	2.56	25.6	24.8	3.23		
8/20/2014	D2450V2	899	Body	1g	5.43	5.40	54.0	49.7	8.65	0.55	17,18
				10g	2.34	2.49	24.9	23.3	6.87		

SAR Lab 4

Date Tested	System Dipole		T.S. Liquid	Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio	Plot No.	
	Type	Serial #		Area Scan	Zoom Scan	Normalize to 1 W					
8/13/2014	D5GHzV2 5200	1138	Body	1g	7.39	7.57	75.7	72.9	3.84	-2.44	19,20
				10g	2.04	2.19	21.9	20.4	7.35		
8/13/2014	D5GHzV2 5600	1138	Body	1g	8.06	8.18	81.8	78.3	4.47	-1.49	21,22
				10g	2.20	2.34	23.4	21.7	7.83		
8/13/2014	D5GHzV2 5800	1138	Body	1g	7.15	7.50	75.0	72.8	3.02	-4.90	
				10g	1.96	2.19	21.9	20.1	8.96		
8/20/2014	D5GHzV2 5200	1168	Body	1g	7.48	7.60	76.0	75.2	1.06	-1.60	23,24
				10g	2.05	2.18	21.8	21.0	3.81		
8/20/2014	D5GHzV2 5600	1168	Body	1g	7.70	8.16	81.6	80.6	1.24	-5.97	25,26
				10g	2.12	2.35	23.5	22.3	5.38		
8/20/2014	D5GHzV2 5800	1168	Body	1g	7.16	7.64	76.4	75.7	0.92	-6.70	27,28
				10g	1.97	2.19	21.9	20.9	4.78		
8/25/2014	D5GHzV2 5200	1138	Body	1g	6.95	7.44	74.4	72.9	2.06	-7.05	
				10g	1.92	2.15	21.5	20.4	5.39		
8/25/2014	D5GHzV2 5600	1138	Body	1g	7.59	8.09	80.9	78.3	3.32	-6.59	
				10g	2.04	2.30	23.0	21.7	5.99		
8/25/2014	D5GHzV2 5800	1138	Body	1g	7.10	7.60	76.0	72.8	4.40	-7.04	29,30
				10g	1.93	2.17	21.7	20.1	7.96		

11. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

KDB 941225 D01 SAR test for 3G devices:

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least $\frac{1}{4}$ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2.

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR Measurements Procedures for 802.11 a/b/g Transmitters v01r02 (pg.6):

Each channel should be tested at the lowest data rate in each a-b/g mode or 4.9 GHz channel BW configuration.

When the extrapolated maximum peak SAR for the maximum output channel is ≤ 1.6 W/kg and the 1-g averaged SAR is ≤ 0.8 W/kg, testing of other channels in the "default test channels" or "required test channels" configuration is optional.

April 2013 TCB Workshop Updates:

Apply usual 802.11 test exclusion considerations, but include 802.11ac SAR for highest 802.11a configuration in each frequency band and each exposure condition.

11.1. GSM850

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
GPRS 3 slots	ON	0	Rear	128	824.2	24.6	24.5	1.290	1.320	1
				190	836.6	24.6	24.5	1.260	1.289	
				251	848.8	24.6	24.4	1.230	1.288	
			Edge 1	190	836.6	24.6	24.5	0.235	0.240	
			Edge 4	190	836.6	24.6	24.5	0.405	0.414	
GPRS 4 slots	OFF	15	Rear	128	824.2	28.6	28.6	0.679	0.679	
				190	836.6	28.6	28.6	0.818	0.818	
				251	848.8	28.6	28.6	0.874	0.874	
			Edge 1	190	836.6	28.6	28.6	0.422	0.422	
			Edge 2	190	836.6	28.6	28.6	0.074	0.074	
			Edge 4	190	836.6	28.6	28.6	0.158	0.158	

Additional test in DTM (Dual Transfer Mode)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
CS + GPRS 3 Slots	ON	0	Rear	128	824.2	24.6	24.6	1.060	1.060	
CS + GPRS 2 Slots	OFF	15	Rear	251	848.8	31.6	31.2	0.652	0.715	

11.2. GSM1900

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
GPRS 2 slots	ON	0	Rear	512	1850.2	21.5	21.3	0.994	1.041	
				661	1880.0	21.5	21.3	1.180	1.236	
				810	1909.8	21.5	21.2	1.240	1.329	2
			Edge 1	512	1850.2	21.5	21.3	0.724	0.758	
				661	1880.0	21.5	21.3	0.873	0.914	
				810	1909.8	21.5	21.2	0.929	0.995	
GPRS 4 slots	OFF	15	Rear	661	1880.0	26.6	26.6	0.481	0.481	
			Edge 1	661	1880.0	26.6	26.6	0.569	0.569	
			Edge 4	661	1880.0	26.6	26.6	0.119	0.119	

Additional test in DTM (Dual Transfer Mode)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
CS + GPRS 2 Slots	ON	0	Rear	810	1909.8	21.5	21.5	1.130	1.130	
CS + GPRS 3 Slots	OFF	15	Rear	661	1880.0	27.6	27.5	0.384	0.393	

11.3. W-CDMA Band V

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	
						Tune-up limit	Meas.	Meas.	Scaled		
Rel 99 RMC 12.2 kbps	ON	0	Rear	4132	826.4	20.0	19.8	1.120	1.173		
				4183	836.6	20.0	19.8	1.130	1.183		
				4233	846.6	20.0	19.9	1.180	1.207	3	
			Edge 1	4183	836.6	20.0	19.8	0.339	0.355		
	Edge 4	4183	836.6	20.0	19.8	0.304	0.318				
	OFF	15	Rear	4183	836.6	24.5	24.4	0.537	0.550		
				Edge 1	4183	836.6	24.5	24.4	0.299	0.306	
				Edge 2	4183	836.6	24.5	24.4	0.050	0.051	
Edge 4			4183	836.6	24.5	24.4	0.096	0.098			

11.4. W-CDMA Band IV

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	
						Tune-up limit	Meas.	Meas.	Scaled		
Rel 99 RMC 12.2 kbps	ON	0	Rear	1312	1712.4	17.5	17.4	1.100	1.126		
				1413	1732.6	17.5	17.5	1.330	1.330	4	
				1513	1752.6	17.5	17.4	1.250	1.279		
			Edge 1	1413	1732.6	17.5	17.5	0.751	0.751		
			Edge 4	1413	1732.6	17.5	17.5	0.276	0.276		
	OFF	15	Rear	1413	1732.6	24.5	23.9	0.613	0.704		
				Edge 1	1413	1732.6	24.5	23.9	0.401	0.460	
				Edge 4	1413	1732.6	24.5	23.9	0.170	0.195	

11.5. W-CDMA Band II

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Rel 99 RMC 12.2 kbps	ON	0	Rear	9262	1852.4	15.5	15.3	0.944	0.988	
				9400	1880.0	15.5	15.4	1.200	1.228	5
				9538	1907.6	15.5	15.3	1.130	1.183	
			Edge 1	9262	1852.4	15.5	15.3	0.722	0.756	
				9400	1880.0	15.5	15.4	0.825	0.844	
				9538	1907.6	15.5	15.3	0.835	0.874	
	Edge 4	9400	1880.0	15.5	15.4	0.122	0.125			
	OFF	15	Rear	9262	1852.4	24.3	24.0	0.988	1.059	
				9400	1880.0	24.3	24.0	1.040	1.114	
				9538	1907.6	24.3	23.9	1.010	1.107	
			Edge 1	9262	1852.4	24.3	24.0	0.643	0.689	
				9400	1880.0	24.3	24.0	0.745	0.798	
9538				1907.6	24.3	23.9	0.800	0.877		
Edge 4	9400	1880.0	24.3	24.0	0.188	0.201				

11.6. LTE Band 2

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
QPSK	ON	0	Rear	18700	1860.0	1	0	15.5	15.3	1.100	1.152	
						50	50	15.5	15.4	1.150	1.177	
						100	0	15.5	15.4	1.120	1.146	
				18900	1880.0	1	0	15.5	15.2	1.180	1.264	
						50	50	15.5	15.2	1.220	1.307	
						1	0	15.5	15.0	1.160	1.302	
			Edge 1	18700	1860.0	1	0	15.5	15.3	0.793	0.830	
						50	50	15.5	15.4	0.783	0.801	
						100	0	15.5	15.4	0.784	0.802	
				18900	1880.0	1	0	15.5	15.2	0.838	0.898	
						50	50	15.5	15.2	0.878	0.941	
						1	0	15.5	15.0	0.895	1.004	
	Edge 4	18900	1880.0	1	0	15.5	15.2	0.133	0.143			
				50	50	15.5	15.2	0.122	0.131			
				1	0	15.5	15.0	0.895	1.004			
		Rear	18700	1860.0	1	49	24.0	23.9	0.892	0.913		
					50	0	23.0	22.8	0.547	0.573		
					1	99	24.0	23.8	0.899	0.941		
	18900		1880.0	50	24	23.0	22.8	0.661	0.692			
				1	0	24.0	23.9	0.917	0.938			
				50	24	23.0	22.9	0.539	0.552			
	Edge 1	18700	1860.0	1	49	24.0	23.9	0.701	0.717			
				50	0	23.0	22.8	0.516	0.540			
				1	99	24.0	23.8	0.853	0.893			
18900		1880.0	50	24	23.0	22.8	0.615	0.644				
			1	0	24.0	23.9	0.755	0.773				
			50	24	23.0	22.9	0.632	0.647				
Edge 4	18900	1880.0	1	99	24.0	23.8	0.131	0.137				
			50	24	23.0	22.8	0.112	0.117				
			1	0	24.0	23.9	0.755	0.773				
	19100	1900.0	50	24	23.0	22.9	0.632	0.647				
			100	0	23.0	22.8	0.633	0.663				
			1	0	24.0	23.9	0.755	0.773				

11.7. LTE Band 4

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	
								Tune-up limit	Meas.	Meas.	Scaled		
QPSK	ON	0	Rear	20050	1720.0	1	0	17.5	17.3	1.190	1.246		
						50	50	17.5	17.3	1.280	1.340		
						100	0	17.5	17.3	1.270	1.330		
				20175	1732.5	1	0	17.5	17.3	1.270	1.330		
						50	24	17.5	17.3	1.350	1.414	7	
						1	99	17.5	17.3	1.320	1.382		
			20300	1745.0	1	0	17.5	17.3	0.796	0.834			
					50	50	17.5	17.3	0.828	0.867			
					100	0	17.5	17.3	0.828	0.867			
			Edge 1	20175	1732.5	1	0	17.5	17.3	0.807	0.845		
						50	24	17.5	17.3	0.847	0.887		
						1	99	17.5	17.3	0.800	0.838		
	20300	1745.0		1	0	17.5	17.3	0.833	0.872				
				50	50	17.5	17.3	0.833	0.872				
				100	0	17.5	17.3	0.833	0.872				
	Edge 4	20175	1732.5	1	0	17.5	17.3	0.185	0.194				
				50	24	17.5	17.3	0.202	0.212				
	OFF	15	Rear	20175	1732.5	1	49	24.0	23.6	0.672	0.737		
						50	0	23.0	22.6	0.550	0.603		
						1	49	24.0	23.6	0.309	0.339		
				Edge 1	20175	1732.5	50	0	23.0	22.6	0.250	0.274	
							1	49	24.0	23.6	0.146	0.160	
							50	0	23.0	22.6	0.120	0.132	
			Edge 4	20175	1732.5	1	49	24.0	23.6	0.146	0.160		
50						0	23.0	22.6	0.120	0.132			
1						49	24.0	23.6	0.146	0.160			

11.1. LTE Band 5

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	
								Tune-up limit	Meas.	Meas.	Scaled		
QPSK	ON	0	Rear	20450	829.0	1	49	20.0	19.5	1.150	1.290		
						25	12	20.0	19.5	1.160	1.302		
						1	0	20.0	19.6	1.170	1.283		
				20525	836.6	25	0	20.0	19.7	1.160	1.243		
						50	0	20.0	19.6	1.180	1.294		
						1	0	20.0	19.6	1.200	1.316		
			20600	844.0	25	0	20.0	19.6	1.260	1.382	8		
					1	0	20.0	19.6	0.329	0.361			
					25	0	20.0	19.7	0.318	0.341			
			Edge 1	20525	836.6	1	0	20.0	19.6	0.297	0.326		
						25	0	20.0	19.7	0.307	0.329		
						1	0	20.0	19.6	0.297	0.326		
	Edge 4	20525		836.6	25	0	20.0	19.7	0.307	0.329			
					1	0	20.0	19.6	0.297	0.326			
					25	0	20.0	19.7	0.307	0.329			
	OFF	15	Rear	20525	836.6	1	0	24.0	23.5	0.468	0.525		
						25	25	23.0	22.6	0.375	0.411		
						1	0	24.0	23.5	0.248	0.278		
				Edge 1	20525	836.6	25	25	23.0	22.6	0.212	0.232	
							1	0	24.0	23.5	0.082	0.092	
							25	25	23.0	22.6	0.072	0.079	
			Edge 4	20525	836.6	1	0	24.0	23.5	0.082	0.092		
						25	25	23.0	22.6	0.072	0.079		
						1	0	24.0	23.5	0.082	0.092		

11.1. LTE Band 7

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
QPSK	ON	0	Rear	20850	2510.0	1	49	14.5	13.9	0.932	1.070	
						50	0	14.5	13.7	0.858	1.032	
				21100	2535.0	1	49	14.5	13.6	0.861	1.059	
						50	24	14.5	13.4	0.859	1.107	
			21350	2560.0	1	49	14.5	13.6	1.020	1.255	9	
					50	0	14.5	13.9	0.942	1.082		
			100	0	14.5	13.7	0.934	1.123				
					1	49	14.5	13.6	0.164	0.202		
	Edge 1	21100	2535.0	50	24	14.5	13.4	0.170	0.219			
				1	49	14.5	13.6	0.519	0.639			
	Edge 4	21100	2535.0	50	24	14.5	13.4	0.511	0.658			
				1	0	24.0	23.7	0.544	0.583			
	OFF	15	Rear	21100	2535.0	50	0	23.0	22.7	0.422	0.452	
						1	0	24.0	23.7	0.269	0.288	
Edge 1				21100	2535.0	50	0	23.0	22.7	0.196	0.210	
						1	0	24.0	23.7	0.618	0.662	
Edge 4			21100	2535.0	50	0	23.0	22.7	0.489	0.524		
					1	0	24.0	23.7	0.618	0.662		

11.1. LTE Band 13

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.	
								Tune-up limit	Meas.	Meas.	Scaled		
QPSK	ON	0	Rear	23230	782.0	1	0	22.0	21.5	0.999	1.121		
						25	25	22.0	21.0	0.986	1.241		
						50	0	22.0	21.0	1.000	1.259	10	
			Edge 1	23230	782.0	1	0	22.0	21.5	0.525	0.589		
						25	25	22.0	21.0	0.524	0.660		
						1	0	22.0	21.5	0.226	0.254		
	Edge 4	23230	782.0	25	25	22.0	21.0	0.225	0.283				
				Rear	23230	782.0	1	49	24.0	23.4	0.245	0.281	
							25	25	23.0	22.5	0.190	0.213	
	OFF	15	Edge 1	23230	782.0	1	49	24.0	23.4	0.147	0.169		
						25	25	23.0	22.5	0.110	0.123		
			Edge 4	23230	782.0	1	49	24.0	23.4	0.039	0.044		
25						25	23.0	22.5	0.031	0.035			

11.1. LTE Band 17

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
QPSK	ON	0	Rear	23790	710.0	1	0	21.5	21.1	1.230	1.349	11
						25	12	21.5	21.2	1.230	1.318	
						50	0	21.5	21.2	1.240	1.329	
			Edge 1	23790	710.0	1	0	21.5	21.1	0.511	0.560	
						25	12	21.5	21.2	0.533	0.571	
						Edge 4	23790	710.0	1	0	21.5	21.1
	25	12	21.5	21.2	0.214	0.229						
	OFF	15	Rear	23790	710.0	1	0	24.0	23.5	0.246	0.276	
						25	12	23.0	22.5	0.194	0.218	
			Edge 1	23790	710.0	1	0	24.0	23.5	0.135	0.151	
						25	12	23.0	22.5	0.113	0.127	
			Edge 4	23790	710.0	1	0	24.0	23.5	0.040	0.045	
25						12	23.0	22.5	0.031	0.035		

11.2. Wi-Fi DTS Band

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Main Antenna				Sub Antenna				Plot No.	
					Power (dBm)		1-g SAR (W/kg)		Power (dBm)		1-g SAR (W/kg)			
					Tune-up limit	Meas.	Meas.	Scaled	Tune-up limit	Meas.	Meas.	Scaled		
MIMO (Main + Sub)	802.11a	0	Rear	1	2412	14.0	13.0	0.781	0.983	14.0	13.3	0.650	0.764	
				6	2437	14.0	13.3	0.818	0.961	14.0	13.3	0.733	0.861	
				11	2462	14.0	14.0	1.030	1.030	14.0	13.8	0.883	0.925	12
			Edge 2	11	2462	14.0	14.0			14.0	13.8	0.069	0.072	
			Edge 3	11	2462	14.0	14.0	0.497	0.497	14.0	13.8	0.269	0.282	

11.3. Wi-Fi UNII Band

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Main Antenna				Sub Antenna				Plot No.	
					Power (dBm)		1-g SAR (W/kg)		Power (dBm)		1-g SAR (W/kg)			
					Tune-up limit	Meas.	Meas.	Scaled	Tune-up limit	Meas.	Meas.	Scaled		
MIMO (Main + Sub)	802.11a	0	Rear	40	5200	11.5	11.5	0.750	0.750	11.5	10.5	0.809	1.018	
				48	5240	11.5	11.5	0.789	0.789	11.5	10.6	0.871	1.072	
				52	5260	11.5	11.5	0.674	0.674	11.5	10.7	0.964	1.159	
				64	5320	11.5	11.5	0.670	0.670	11.5	10.7	0.836	1.005	
				104	5520	11.5	11.1	0.479	0.525	11.5	11.4	0.896	0.917	
				116	5580	11.5	10.9	0.453	0.520	11.5	11.1	0.937	1.027	15
				140	5700	11.5	11.1	0.310	0.340	11.5	11.0	0.832	0.934	
			Edge 2	165	5825	11.5	11.0	0.195	0.219	11.5	11.1	0.547	0.600	16
				40	5200	11.5	11.5			11.5	10.5	0.189	0.238	
				52	5260	11.5	11.8			11.5	10.7	0.192	0.231	
				104	5520	11.5	11.1			11.5	11.4	0.136	0.139	
			Edge 3	165	5825	11.5	11.0			11.5	11.1	0.102	0.112	
				40	5200	11.5	11.5	1.260	1.260	11.5	10.5	1.130	1.423	13
				48	5240	11.5	11.5	1.240	1.240	11.5	10.6	1.080	1.329	
				52	5260	11.5	11.5	1.190	1.190	11.5	10.7	1.110	1.335	
				64	5320	11.5	11.5	1.090	1.090	11.5	10.7	1.040	1.250	
				104	5520	11.5	11.1	0.798	0.875	11.5	11.4	0.864	0.884	
				116	5580	11.5	10.9	0.607	0.697	11.5	11.1	0.930	1.020	
			140	5700	11.5	11.1	0.278	0.305	11.5	11.0	0.788	0.884		
			165	5825	11.5	11.0	0.177	0.199	11.5	11.1	0.544	0.596		

Repeated SAR

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Main Antenna				Sub Antenna				Plot No.	
					Power (dBm)		1-g SAR (W/kg)		Power (dBm)		1-g SAR (W/kg)			
					Tune-up limit	Meas.	Meas.	Scaled	Tune-up limit	Meas.	Meas.	Scaled		
MIMO (Main + Sub)	802.11ac VHT20	0	Edge 3	52	5260	11.5	11.5	1.210	1.210	11.5	10.7	1.100	1.322	14

Additional Test for 802.11ac VHT20 Mode

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Main Antenna				Sub Antenna				Plot No.	
					Power (dBm)		1-g SAR (W/kg)		Power (dBm)		1-g SAR (W/kg)			
					Tune-up limit	Meas.	Meas.	Scaled	Tune-up limit	Meas.	Meas.	Scaled		
MIMO (Main + Sub)	802.11ac VHT20	0	Edge 3	40	5200	11.5	11.4	1.210	1.238	11.5	10.4	1.080	1.391	
			Edge 3	52	5260	11.5	11.5	1.170	1.170	11.5	10.7	1.110	1.335	
			Rear	116	5580	11.5	10.9			11.5	11.1	0.720	0.789	
			Rear	165	5825	11.5	11.0			11.5	11.1	0.503	0.552	

11.1. Bluetooth

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
					Tune-up limit	Meas.	Meas.	Scaled	
802.16 GFSK	0	Rear	39	2441	10.5	8.8	0.166	0.246	17
		Edge 3	39	2441	10.5	8.8	0.041	0.061	

12. SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the **ratio of largest to smallest SAR** for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

12.1. The Highest Measured SAR Configuration in Each Frequency Band

Frequency Band (MHz)	Air Interface	Stand-alone (W/kg)	Repeated SAR (Yes/No)
750	LTE Band 13	1.000	No
	LTE Band 17	1.240	Yes
850	GSM 850	1.290	Yes
	W-CDMA Band V	1.180	No
	LTE Band 5	1.260	No
1750	W-CDMA Band IV	1.330	No
	LTE Band 4	1.350	Yes
1900	GSM 1900	1.240	Yes
	W-CDMA Band II	1.200	No
	LTE Band 2	1.220	No
2400	Wi-Fi 802.11b/g/n	1.030	Yes
	Bluetooth	0.166	No
2600	LTE Band 7	1.020	Yes
5200	Wi-Fi 802.11a/n	1.260	Yes
5300	Wi-Fi 802.11a/n	1.190	Yes
5500	Wi-Fi 802.11a/n	0.937	Yes
5800	Wi-Fi 802.11a/n	0.547	No

12.2. Repeated Measurement Results

Frequency band (MHz)	Air Interface	Test Position	Mode	Pwr Back-off	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
								Original	Repeated	
750	LTE Band 17	Rear	QPSK RB 50/0	ON	0	23790	710.0	1.240	1.220	1.02
850	GSM 850	Rear	GPRS 3 slots	ON	0	128	824.2	1.290	1.100	1.17
1750	LTE Band 4	Rear	QPSK RB 50/24	ON	0	20175	1732.5	1.350	1.190	1.13
1900	GSM 1900	Rear	GPRS 2 slots	ON	0	810	1909.8	1.240	1.230	1.01
2400	Wi-Fi 802.11b/g/n	Rear	802.11b 1Mbps	N/A	0	11	2462.0	1.030	1.030	1.00
2600	LTE Band 7	Rear	QPSK RB 1/49	ON	0	21350	2560.0	1.020	0.930	1.10
5200	Wi-Fi 802.11a/n	Edge 3	802.11a 6Mbps	N/A	0	40	5200.0	1.260	1.210	1.04
5300	Wi-Fi 802.11a/n	Edge 3	802.11a 6Mbps	N/A	0	52	5260.0	1.190	1.210	1.02
5500	Wi-Fi 802.11a/n	Rear	802.11a 6Mbps	N/A	0	116	5580.0	0.937	0.820	1.14

Note(s):

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

13. Simultaneous Transmission SAR Analysis

13.1. Estimated SAR for Simultaneous Transmission SAR Analysis

Considerations for SAR estimation

1. When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
2. Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
 - When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
 - When the separation distance from the antenna to an adjacent edge is > 5 mm but ≤ 50 mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
 - When the minimum test separation distance is > 50 mm, the estimated SAR value is 0.4 W/kg
3. Test positions Edge 3 and Edge 4 are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values < 1.2 W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

13.1.1. Estimated SAR for WWAN

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off. A sensor triggering of 15 mm is included for Rear and Edge 1 & 4																
Cellular	GPRS 4 Slots	848.8	28.60	362	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	GPRS 4 Slots	1909.8	26.60	229	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 2	1907.6	24.30	269	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 4	1752.6	24.50	282	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 5	846.6	24.50	282	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	LTE Band 2	1900	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 4	1754.3	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 5	844	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 7	2560	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 13	782	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 17	710	24.00	251	17.46	18	67.6	200.4	19.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Second Stage Power Back-off, Proximity Sensor On																
Cellular	GPRS 3 Slots	848.8	24.60	108	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	GPRS 2 Slots	1909.8	21.50	35	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 2	1907.6	20.00	100	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 4	1752.6	17.50	56	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	W-CDMA 5	846.6	15.50	35	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 2	1900	15.50	35	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 4	1754.3	17.50	56	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 5	844	24.00	251	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 7	2560	14.50	28	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 13	782	24.00	251	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	
Cellular	LTE Band 17	710	24.00	251	2.46	3	67.6	200.4	4.45		-MEASURE-	-MEASURE-	0.400	0.400	-MEASURE-	

13.1.2. Estimated SAR for WLAN

MIMO

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)						
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	
Wi-Fi Main Antenna																
Wi-Fi 2.4 GHz	2462	14.00	25	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.145	
Wi-Fi 5.2 GHz	5240	11.50	14	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.119	
Wi-Fi 5.3 GHz	5320	11.50	14	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.120	
Wi-Fi 5.5 GHz	5700	11.50	14	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.124	
Wi-Fi 5.8 GHz	5825	11.50	14	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.125	
Bluetooth	2480	10.50	11	2.46	187.7	55.1	3	36			-MEASURE-	0.400	0.400	-MEASURE-	0.064	
Wi-Fi Sub Antenna																
Wi-Fi 2.4 GHz	2462	14.00	25	2.32	187.7	8.85	4.6	90.685			-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.2 GHz	5240	11.50	14	2.32	187.7	8.85	4.6	90.685			-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.3 GHz	5320	11.50	14	2.32	187.7	8.85	4.6	90.685			-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.5 GHz	5700	11.50	14	2.32	187.7	8.85	4.6	90.685			-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
Wi-Fi 5.8 GHz	5825	11.50	14	2.32	187.7	8.85	4.6	90.685			-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	

13.2. Sum of the SAR for GSM850 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① GSM850	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.320	1.030			2.350	Yes
	① + ③ + ④	1.320		1.159	0.246	2.725	Yes
Edge 1	① + ②	0.422	0.400			0.822	No
	① + ③ + ④	0.422		0.400	0.400	1.222	No
Edge 2	① + ②	0.074	0.072			0.146	No
	① + ③ + ④	0.074		0.238	0.400	0.712	No
Edge 4	① + ②	0.414	0.400			0.814	No
	① + ③ + ④	0.414		0.400	0.400	1.214	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Plot No.
		① GSM850	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.320	1.030			2.350	187.6	0.019	No	1
	① + ③ + ④	1.320		1.159	0.246	2.725				2
	① + ③	1.320		1.159		2.479	203.7	0.019	No	
	① + ④	1.320			0.246	1.566	186.3	0.011	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.3. Sum of the SAR for GSM1900 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① GSM1900	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.329	1.030			2.359	Yes
	① + ③ + ④	1.329		1.159	0.246	2.734	Yes
Edge 1	① + ②	0.995	0.400			1.395	No
	① + ③ + ④	0.995		0.400	0.400	1.795	Yes
Edge 4	① + ②	0.146	0.400			0.546	No
	① + ③ + ④	0.146		0.400	0.400	0.946	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① GSM1900	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.329	1.030			2.359	194.1	0.019	No	3
	① + ③ + ④	1.329		1.159	0.246	2.734				4
	① + ③	1.329		1.159		2.488	209.2	0.019	No	
	① + ④	1.329			0.246	1.575	192.7	0.010	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	
Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	* Estimated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① GSM1900	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Edge 1	① + ③ + ④	0.995		0.400	0.400	1.795				5
	① + ③	0.995		0.400		1.395	188.3	0.009	No	
	① + ④	0.995			0.400	1.395	185.1	0.009	No	
	③ + ④			0.400	0.400	0.800	21.2	0.034	No	

Note(s):

* : The Peak Location Separation Distance is estimated by using the antenna locations

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 < 0.04 for all circumstances that require SPLSR calculation.

13.4. Sum of the SAR for W-CDMA Band V + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① W-CDMA Band V	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.207	1.030			2.237	Yes
	① + ③ + ④	1.207		1.159	0.246	2.612	Yes
Edge 1	① + ②	0.355	0.400			0.755	No
	① + ③ + ④	0.355		0.400	0.400	1.155	No
Edge 2	① + ②	0.051	0.072			0.123	No
	① + ③ + ④	0.051		0.238	0.400	0.689	No
Edge 4	① + ②	0.318	0.400			0.718	No
	① + ③ + ④	0.318		0.400	0.400	1.118	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① W-CDMA Band V	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.207	1.030			2.237	191.1	0.018	No	6
	① + ③ + ④	1.207		1.159	0.246	2.612				7
	① + ③	1.207		1.159		2.366	207.2	0.018	No	
	① + ④	1.207			0.246	1.453	189.8	0.009	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.5. Sum of the SAR for W-CDMA Band IV + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① W-CDMA Band IV	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.330	1.030			2.360	Yes
	① + ③ + ④	1.330		1.159	0.246	2.735	Yes
Edge 1	① + ②	0.751	0.400			1.151	No
	① + ③ + ④	0.751		0.400	0.400	1.551	No
Edge 4	① + ②	0.276	0.400			0.676	No
	① + ③ + ④	0.276		0.400	0.400	1.076	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① W-CDMA Band IV	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.330	1.030			2.360	192.5	0.019	No	8
	① + ③ + ④	1.330		1.159	0.246	2.735				9
	① + ③	1.330		1.159		2.489	206.7	0.019	No	
	① + ④	1.330			0.246	1.576	191.1	0.010	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.6. Sum of the SAR for W-CDMA Band II + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① W-CDMA Band II	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.228	1.030			2.258	Yes
	① + ③ + ④	1.228		1.159	0.246	2.633	Yes
Edge 1	① + ②	0.877	0.400			1.277	No
	① + ③ + ④	0.877		0.400	0.400	1.677	Yes
Edge 4	① + ②	0.201	0.400			0.601	No
	① + ③ + ④	0.201		0.400	0.400	1.001	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① W-CDMA Band II	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.228	1.030			2.258	202.4	0.017	No	10
	① + ③ + ④	1.228		1.159	0.246	2.633				11
	① + ③	1.228		1.159		2.387	215.1	0.017	No	
	① + ④	1.228			0.246	1.474	201.0	0.009	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	
Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	* Estimated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① W-CDMA Band II	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Edge 1	① + ③ + ④	0.877		0.400	0.400	1.677				12
	① + ③	0.877		0.400		1.277	188.3	0.008	No	
	① + ④	0.877			0.400	1.277	185.1	0.008	No	
	③ + ④			0.400	0.400	0.800	21.2	0.034	No	

Note(s):

* : The Peak Location Separation Distance is estimated by using the antenna locations

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 < 0.04 for all circumstances that require SPLSR calculation.

13.7. Sum of the SAR for LTE Band 2 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 2	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.410	1.030			2.440	Yes
	① + ③ + ④	1.410		1.159	0.246	2.815	Yes
Edge 1	① + ②	1.148	0.400			1.548	No
	① + ③ + ④	1.148		0.400	0.400	1.948	Yes
Edge 4	① + ②	0.143	0.400			0.543	No
	① + ③ + ④	0.143		0.400	0.400	0.943	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 2	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.410	1.030			2.440	201.5	0.019	No	13
	① + ③ + ④	1.410		1.159	0.246	2.815				14
	① + ③	1.410		1.159		2.569	216.2	0.019	No	
	① + ④	1.410			0.246	1.656	200.2	0.011	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	
Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	* Estimated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 2	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Edge 1	① + ③ + ④	1.148		0.400	0.400	1.948				15
	① + ③	1.148		0.400		1.548	188.3	0.010	No	
	① + ④	1.148			0.400	1.548	185.1	0.010	No	
	③ + ④			0.400	0.400	0.800	21.2	0.034	No	

Note(s):

* : The Peak Location Separation Distance is estimated by using the antenna locations

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 < 0.04 for all circumstances that require SPLSR calculation.

13.8. Sum of the SAR for LTE Band 4 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 4	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.414	1.030			2.444	Yes
	① + ③ + ④	1.414		1.159	0.246	2.819	Yes
Edge 1	① + ②	0.887	0.400			1.287	No
	① + ③ + ④	0.887		0.400	0.400	1.687	Yes
Edge 4	① + ②	0.212	0.400			0.612	No
	① + ③ + ④	0.212		0.400	0.400	1.012	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 4	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.414	1.030			2.444	200.4	0.019	No	16
	① + ③ + ④	1.414		1.159	0.246	2.819				17
	① + ③	1.414		1.159		2.573	213.2	0.019	No	
	① + ④	1.414			0.246	1.660	199.0	0.011	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	
Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	* Estimated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 4	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Edge 1	① + ③ + ④	0.887		0.400	0.400	1.687				18
	① + ③	0.887		0.400		1.287	188.3	0.008	No	
	① + ④	0.887			0.400	1.287	185.1	0.008	No	
	③ + ④			0.400	0.400	0.800	21.2	0.034	No	

Note(s):

* : The Peak Location Separation Distance is estimated by using the antenna locations

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 < 0.04 for all circumstances that require SPLSR calculation.

13.9. Sum of the SAR for LTE Band 5 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 5	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.382	1.030			2.412	Yes
	① + ③ + ④	1.382		1.159	0.246	2.787	Yes
Edge 1	① + ②	0.361	0.400			0.761	No
	① + ③ + ④	0.361		0.400	0.400	1.161	No
Edge 4	① + ②	0.329	0.400			0.729	No
	① + ③ + ④	0.329		0.400	0.400	1.129	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 5	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.382	1.030			2.412	191.7	0.020	No	19
	① + ③ + ④	1.382		1.159	0.246	2.787				20
	① + ③	1.382		1.159		2.541	208.2	0.019	No	
	① + ④	1.382			0.246	1.628	190.4	0.011	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.10. Sum of the SAR for LTE Band 7 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 7	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.255	1.030			2.285	Yes
	① + ③ + ④	1.255		1.159	0.246	2.660	Yes
Edge 1	① + ②	0.288	0.400			0.688	No
	① + ③ + ④	0.288		0.400	0.400	1.088	No
Edge 4	① + ②	0.662	0.400			1.062	No
	① + ③ + ④	0.662		0.400	0.400	1.462	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 7	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.255	1.030			2.285	185.2	0.019	No	21
	① + ③ + ④	1.255		1.159	0.246	2.660				22
	① + ③	1.255		1.159		2.414	204.2	0.018	No	
	① + ④	1.255			0.246	1.501	183.9	0.010	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.11. Sum of the SAR for LTE Band 13 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 13	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.259	1.030			2.289	Yes
	① + ③ + ④	1.259		1.159	0.246	2.664	Yes
Edge 1	① + ②	0.660	0.400			1.060	No
	① + ③ + ④	0.660		0.400	0.400	1.460	No
Edge 4	① + ②	0.283	0.400			0.683	No
	① + ③ + ④	0.283		0.400	0.400	1.083	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 13	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.259	1.030			2.289	189.8	0.018	No	23
	① + ③ + ④	1.259		1.159	0.246	2.664				24
	① + ③	1.259		1.159		2.418	206.9	0.018	No	
	① + ④	1.259			0.246	1.505	188.5	0.010	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

13.12. Sum of the SAR for LTE Band 17 + Wi-Fi & BT

Test Position		Simultaneous Transmission Scenario				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		① LTE Band 17	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth		
Rear	① + ②	1.349	1.030			2.379	Yes
	① + ③ + ④	1.349		1.159	0.246	2.754	Yes
Edge 1	① + ②	0.571	0.400			0.971	No
	① + ③ + ④	0.571		0.400	0.400	1.371	No
Edge 4	① + ②	0.229	0.400			0.629	No
	① + ③ + ④	0.229		0.400	0.400	1.029	No

SAR to Peak Location Separation Ratio (SPLSR)

Test Position		Worst-case combination				Σ 1-g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
		① LTE Band 17	② Wi-Fi(DTS)	③ Wi-Fi(UNII)	④ Bluetooth					
Rear	① + ②	1.349	1.030			2.379	189.8	0.019	No	25
	① + ③ + ④	1.349		1.159	0.246	2.754				26
	① + ③	1.349		1.159		2.508	206.9	0.019	No	
	① + ④	1.349			0.246	1.595	188.5	0.011	No	
	③ + ④			1.159	0.246	1.405	68.2	0.024	No	

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 < 0.04 for all circumstances that require SPLSR calculation.

14. Appendixes

Refer to separated files for the following appendixes.

- 14.1. Photos and Antenna Locations**
- 14.2. System Performance Check Plots**
- 14.3. Highest SAR Test Plots**
- 14.4. Sum of the SAR for SPLSR Test Plots**
- 14.5. Calibration Certificate for E-Field Probe EX3DV3 - SN 3531**
- 14.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3773**
- 14.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3929**
- 14.8. Calibration Certificate for D750V3 - SN 1071**
- 14.9. Calibration Certificate for D835V2 - SN 4d002**
- 14.10. Calibration Certificate for D1750V2 - SN 1050**
- 14.11. Calibration Certificate for D1750V2 - SN 1077**
- 14.12. Calibration Certificate for D1900V2- SN 5d043**
- 14.13. Calibration Certificate for D2450V2 - SN 899**
- 14.14. Calibration Certificate for D2600V2 - SN 1006**
- 14.15. Calibration Certificate for D5GHzV2 - SN 1138**
- 14.16. Calibration Certificate for D5GHzV2 - SN 1168**

END OF REPORT