



SAR EVALUATION REPORT

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

For
GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC

FCC ID: PY7-29752M

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Prepared for
**SONY MOBILE COMMUNICATIONS INC.
4-12-3 HIGASHI-SHINAGAWA
SHINAGAWA-KU, TOKYO, 140-0002, JAPAN**

Prepared by
**UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

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V1	8/11/2016	Initial Issue	--
V2	8/17/2016	Added DC-HSDPA Section 9.1: Added Max Frame Power Section 9.6: Updated Table Section 12: Updated Simultaneous Transmission Table Appendix C: Updated GSM plots	Coltyce Sanders
		Section 6.4 and 7 and Appendix A: Updated Antenna location information.	Devin Chang
V3	8/18/2016	1. Section 6.1: Updated Software Version. 2. Appendix A: Updated setup photos	Devin Chang

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1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS INC.			
FCC ID	PY7-29752M			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category	SAR Limits (W/Kg)			
	Peak spatial-average(1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	PCE	DTS	NII	DSS
Head	0.529	0.529	0.810	N/A
Body-worn	0.347	0.055	0.039	
Hotspot/Wi-Fi Direct	0.799	0.125	N/A	
Extremity	N/A	N/A	0.251	
Simultaneous Tx	1.473			0.722
Date Tested	7/25/2016 to 8/4/2016			
Test Results	Pass			
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. 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.				
Approved & Released By:		Prepared By:		
				
Devin Chang Senior Engineer UL Verification Services Inc.		Coltyce Sanders Laboratory Engineer UL Verification Services Inc.		

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01

In addition to the above, the following information was used:

- [TCB workshop](#) October, 2014; Page 36, RF Exposure Procedures Update (Overlapping LTE Bands)
- [TCB workshop](#) October, 2014; Page 37, LTE Considerations (LTE Band 41 Test Channels)

3. Facilities and Accreditation

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

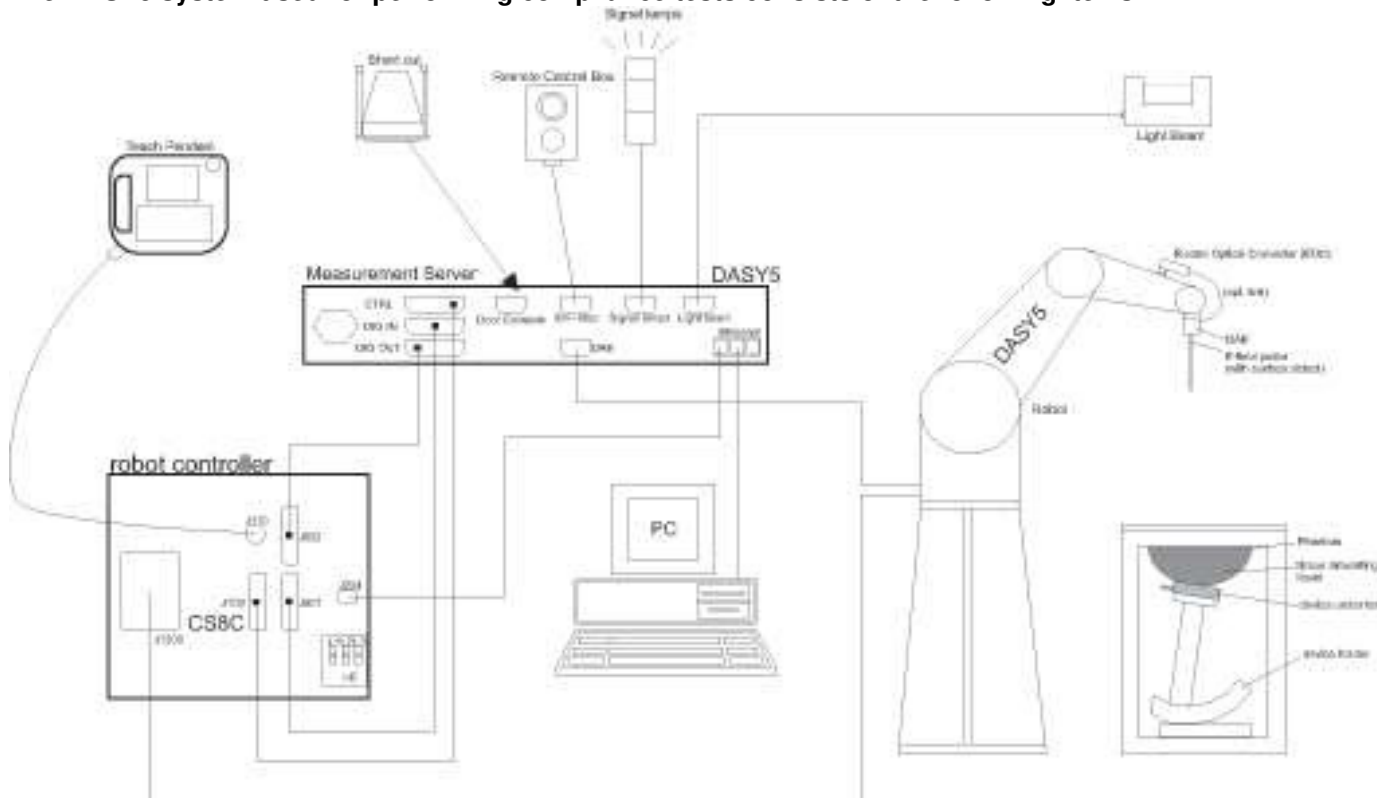
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

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 Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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 <i>area scan based 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	8753ES	MY40001647	7/28/2016
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
PNA Network Analyzer	Keysight	N5227A	US51270480	7/22/2017
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/10/2016
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	11/10/2016
Thermometer	Fisher Scientific	Traceable	140493798	8/4/2016
Network Analyzer	Agilent	8753ES	MY40000980	4/27/2017
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/15/2016
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	140562250	8/24/2016

Notes:

*Network Analyzer S/N: MY40001647 only used for test dates 7/25/2016 to 7/27/2016.

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Signal Generator	Agilent	N5181A	MY50140630	5/9/2017
Power Meter	HP	437B	3125U12345	7/31/2016
Power Sensor	HP	8481A	1926A27048	12/17/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2141	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A

Notes:

System Check Cart was only used for test dates 7/25/2016 to 7/29/2016.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	5/9/2017
Power Meter	Agilent	N1912A	MY50001018	10/19/2016
Power Sensor	Agilent	E9323A	MY53070007	2/27/2017
Power Sensor	Agilent	E9323A	MY53070002	3/22/2017
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	AMETEK	XT 15-4	1319A02778	N/A
Synthesized Signal Generator	Agilent	8665B	CCS-167	9/4/2016
Power Meter	HP	437B	3125U11347	8/28/2016
Power Meter	HP	437B	3125U11364	8/10/2016
Power Sensor	HP	8481A	2702A76223	9/3/2016
Power Sensor	HP	8481A	3318A95392	9/16/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Directional coupler	Werlatone	C8000-102	2710	N/A
DC Power Supply	BK PRECISION	1611	215-02292	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	3929	3/22/2017
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	3772	2/23/2017
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3901	1/26/2017
E-Field Probe (SAR Lab 4)	SPEAG	EX3DV4	3773	4/19/2017
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	3871	8/14/2016
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1434	4/15/2017
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1257	9/16/2016
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1360	3/16/2017
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1239	4/14/2017
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1258	5/10/2017
System Validation Dipole	SPEAG	D750V3	1071	11/12/2016
System Validation Dipole	SPEAG	D900V2	1d143	9/17/2016
System Validation Dipole	SPEAG	D1800V2	2d194	9/22/2016
System Validation Dipole	SPEAG	D1900V2	5d163	9/21/2016
System Validation Dipole	SPEAG	D1950V3	1136	4/18/2017
System Validation Dipole	SPEAG	D2450V2	899	3/15/2017
System Validation Dipole	SPEAG	D2600V2	1036	3/18/2017
System Validation Dipole	SPEAG	D5GHzV2	1138	9/23/2016
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/24/2017
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	3/24/2017
Thermometer (SAR Lab 3)	EXTECH	445703	CCS-237	6/6/2017
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/6/2017
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/13/2017

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY50001018	10/19/2017
Power Sensor	Agilent	N1921A	MY52260009	12/17/2016
Base Station Simulator	R & S	CMW500	135384	6/21/2017
Base Station Simulator	R & S	CMW500	134853	7/12/2017
Base Station Simulator	R & S	CMW500	135390	4/13/2017
Base Station Simulator	R & S	CMW500	125236	2/11/2017
Base Station Simulator	R & S	CMW500	134855	5/26/2017
Base Station Simulator	Agilent	8960	MY53211024	9/16/2017

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 and the measured 10-g SAR within a frequency band is < 3.75 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 146.4 mm x 71.9 mm Overall Diagonal: 162.4 mm Display Diagonal: 131 mm		
Back Cover	☒ The rechargeable battery is not user accessible.		
Battery Options	☒ The rechargeable battery is not user accessible.		
Accessory	Headset		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☐ Mobile Hotspot (Wi-Fi 5 GHz)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☐ Wi-Fi Direct (Wi-Fi 5 GHz)		
Test sample information	S/N	IMEI	Notes
	CB512AP7SK	004402456403090	SAR_GSM_#1
	CB512AP7SK	004402456403041	SAR_GSM_#2
	CB512AP7UJ	004402456402944	SAR_UMTS_#1
	CB512AP7SG	004402456403108	SAR_UMTS_#2
	CB512AP7WD	004402456402860	SAR_LTE L Band_#1
	CB512AP7UZ	004402456402902	SAR_LTE L Band_#2
	CB512AP7VM	004402456402894	SAR_LTE MH Band #1
	CB512AP7WQ	004402456402837	SAR_LTE MH Band #2
	CB512AP7U2	004402456403025	SAR_WLAN 2.4G_#1
	CB512AP7SW	004402456403058	SAR_WLAN 2.4G_#2
	CB512AP7UW	004402456402928	SAR_WLAN 5G_#1
	CB512AP7UY	004402456402910	SAR_WLAN 5G_#2
	CB512AP7ST	004402456403074	SAR_GSM/UMTS Power (Cond.)_#1
	CB512AP832	004402456402647	SAR_GSM/UMTS POWER (COND.)_#2
	CB512AP84K	004402456402662	SAR_LTE POWER (COND.)_#1
	CB512AP7UE	004402456402969	SAR_LTE POWER (COND.)_#2
	CB512AP7UK	004402456402936	SAR_WLAN 2.4G POWER COND.
	CB512AP7U4	004402456403017	SAR_WLAN 5G POWER COND.
Hardware Version	A		
Software Version	0.382		

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☒ Yes ☐ No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 7) DC-HSDPA (Rel. 8)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 26 FDD Band 29 (Rx Only) TDD Band 41	QPSK 16QAM ☒ Rel. 11 Carrier Aggregation (1 Uplink and 3 Downlinks) (Carrier Aggregation is only supported for downlink and not for uplink.)		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ 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%
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 4.2 LE		77.5% (DH5)

6.3. Maximum Output Power from Tune-up Procedure

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

6.3.1. GSM

RF Air Interface	GPRS							
	Voice/Tx 1 Slot		Tx 2 Slots		Tx 3 Slots		Tx 4 Slots	
	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
GSM 850	32.0	-1.3~+0.7	31.0	-1.3~+0.7	29.0	-1.3~+0.7	28.0	-1.3~+0.7
GSM 1900	29.0	-1.3~+0.7	27.5	-1.3~+0.7	25.5	-1.3~+0.7	24.5	-1.3~+0.7
RF Air Interface	EGPRS 8PSK Modulation (MCS5-9)							
	Voice/Tx 1 Slot		Tx 2 Slots		Tx 3 Slots		Tx 4 Slots	
	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
GSM 850	27.0	-2.0~+1.0	25.5	-2.0~+1.0	23.5	-2.0~+1.0	22.5	-2.0~+1.0
GSM 1900	26.0	-2.0~+1.0	24.5	-2.0~+1.0	22.5	-2.0~+1.0	21.5	-2.0~+1.0

RF Air Interface	CS Only		GPRS DTM GMSK							
	Tx 1 Slot		CS + TX 2 Slots				CS + TX 3 Slots			
	CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
GSM 850	32.0	-1.3~+0.7	31.0	-1.3~+0.7	31.0	-1.3~+0.7	29.0	-1.3~+0.7	29.0	-1.3~+0.7
GSM 1900	29.0	-1.3~+0.7	27.5	-1.3~+0.7	27.5	-1.3~+0.7	25.5	-1.3~+0.7	25.5	-1.3~+0.7
RFAir Interface	CS Only		EGPRS DTM 8PSK Modulation (MCS5-9)							
	Tx 1 Slot		CS + TX 2 Slots				CS + TX 3 Slots			
	CS GMSK		CS GMSK		PS 8PSK		CS GMSK		PS 8PSK	
	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
GSM 850	32.0	-1.3~+0.7	31.0	-1.3~+0.7	25.5	-2.0~+1.0	29.0	-1.3~+0.7	23.5	-2.0~+1.0
GSM 1900	29.0	-1.3~+0.7	27.5	-1.3~+0.7	24.5	-2.0~+1.0	25.5	-1.3~+0.7	22.5	-2.0~+1.0

6.3.2. W-CDMA

RF Air Interface	CS		HSDPA/DC-HSDPA				HSUPA					
			Subtest 1/2		Subtest 3/4		Subtest 1/5		Subtest 2/4		Subtest 3	
	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
FDD 2 Low Mid High	21.5	-1.5~+0.5	20.5	-2~+1.0	20.0	-2~+1.0	20.0	-2~+1.0	18.5	-2~+1.0	19.5	-2~+1.0
FDD 4 Low Mid High	20.0	-1.5~+0.5	19.0	-2~+1.0	18.5	-2~+1.0	18.5	-2~+1.0	17.0	-2~+1.0	18.0	-2~+1.0
FDD 5 Low Mid High	24.2	-1.5~+0.5	23.2	-2~+1.0	22.7	-2~+1.0	22.7	-2~+1.0	21.2	-2~+1.0	22.2	-2~+1.0

6.3.3. LTE

RF Air Interface	LTE			Data			
				QPSK		16QAM	
				Target	Tolerance	Target	Tolerance
Band	BW	CH	RB Config	[dBm]	+/-[dB]	[dBm]	+/-[dB]
LTE B2	1.4MHz	Low Mid High	1RB	21.5	-1.5~+1.0	20.5	-1.5~+1.0
			50% RB	21.5	-1.5~+1.0	20.5	-1.5~+1.0
			100% RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
	3MHz 5MHz, 10MHz 15MHz, 20MHz	Low Mid High	1RB	21.5	-1.5~+1.0	20.5	-1.5~+1.0
			50% RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
			100% RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
LTE B4	1.4MHz	Low Mid High	1RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
			50% RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
			100% RB	29.5	-1.5~+1.0	28.5	-1.5~+1.0
	3MHz 5MHz, 10MHz 15MHz, 20MHz	Low Mid High	1RB	20.5	-1.5~+1.0	19.5	-1.5~+1.0
			50% RB	19.5	-1.5~+1.0	18.5	-1.5~+1.0
			100% RB	19.5	-1.5~+1.0	18.5	-1.5~+1.0
LTE B5	1.4MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
	3MHz 5MHz, 10MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
LTE B7	5MHz, 10MHz 15MHz, 20MHz	Low Mid High	1RB	19.0	-1.5~+1.0	18.0	-1.5~+1.0
			50% RB	18.0	-1.5~+1.0	17.0	-1.5~+1.0
			100% RB	18.0	-1.5~+1.0	17.0	-1.5~+1.0
LTE B12	1.4MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
	3MHz 5MHz, 10MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
LTE B13	5MHz, 10MHz	Low Mid High	1RB	23.0	-1.5~+1.0	22.0	-1.5~+1.0
			50% RB	22.0	-1.5~+1.0	21.0	-1.5~+1.0
			100% RB	22.0	-1.5~+1.0	21.0	-1.5~+1.0
LTE B17	5MHz, 10MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
LTE B26	1.4MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
	3MHz 5MHz, 10MHz, 15MHz	Low Mid High	1RB	23.5	-1.5~+1.0	22.5	-1.5~+1.0
			50% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
			100% RB	22.5	-1.5~+1.0	21.5	-1.5~+1.0
LTE B41	5MHz, 10MHz, 15MHz, 20MHz	Low Mid High	1RB	22.0	-1.5~+1.0	21.0	-1.5~+1.0
			50% RB	21.0	-1.5~+1.0	20.0	-1.5~+1.0
			100% RB	21.0	-1.5~+1.0	20.0	-1.5~+1.0

6.3.4. Wi-Fi 2.4GHz

RF Air Interface		Wi-Fi Chain 0		RF Air Interface		Wi-Fi Chain 1	
11b		Manufacturing Max Power {dBm}		11b		Manufacturing Max Power {dBm}	
Band 2400~2485	channel	1Mbps	11Mbps	Band 2400~2485	channel	1Mbps	11Mbps
	1,11	14.2	14.2		1,11	9.0	9.0
	12	14.2	14.2		12	9.0	9.0
	13	12.2	12.2		13	9.0	9.0
	Other	14.2	14.2		Other	9.0	9.0
11g		Manufacturing Max Power {dBm}		11g		Manufacturing Max Power {dBm}	
Band 2400~2485	channel	6Mbps	54Mbps	Band 2400~2485	channel	6Mbps	54Mbps
	1,11	14.8	14.8		1,11	9.7	9.7
	12	10.3	10.3		12	5.2	5.2
	13	3.8	3.8		13	0.7	0.7
	Other	14.8	14.8		Other	9.7	9.7
11n HT20		Manufacturing Max Power {dBm}		11n HT20		Manufacturing Max Power {dBm}	
Band 2400~2485	channel	MCS-0	MCS-7	Band 2400~2485	channel	MCS-0	MCS-7
	1,11	14.9	13.9		1,11	9.7	8.7
	12	8.4	8.4		12	3.2	3.2
	13	2.9	2.9		13	-0.3	-0.3
	Other	14.9	13.9		Other	9.7	8.7

6.3.5. Wi-Fi 5GHz

RF Air Interface		Wi-Fi Main Ant (Chain 0)		RF Air Interface		Wi-Fi Sub Ant (Chain 1)	
11a		Manufacturing Max Power {dBm}		11a		Manufacturing Max Power {dBm}	
Band	channel	6Mbps	54Mbps	Band	channel	6Mbps	54Mbps
5150~5250MHz	All	11.9	11.9	5150~5250MHz	All	6.4	6.4
5250~5350MHz	All	11.3	11.3	5250~5350MHz	All	5.4	5.4
5470~5725MHz	All	10.5	10.5	5470~5725MHz	All	6.2	6.2
5725~5850MHz	All	11.0	11.0	5725~5850MHz	All	6.5	6.5
11n HT-20		Manufacturing Max Power {dBm}		11n HT-20		Manufacturing Max Power {dBm}	
Band	channel	MCS-0	MCS-7	Band	channel	MCS-0	MCS-7
5150~5250MHz	All	11.8	11.8	5150~5250MHz	All	6.4	6.4
5250~5350MHz	All	11.5	11.5	5250~5350MHz	All	5.5	5.5
5470~5725MHz	All	10.4	10.4	5470~5725MHz	All	6.1	6.1
5725~5850MHz	All	11.1	11.1	5725~5850MHz	All	6.5	6.5
11n HT-40		Manufacturing Max Power {dBm}		11n HT-40		Manufacturing Max Power {dBm}	
Band	channel	MCS-0	MCS-7	Band	channel	MCS-0	MCS-7
5150~5250MHz	All	11.9	11.9	5150~5250MHz	All	7.2	7.2
5250~5350MHz	All	11.8	11.8	5250~5350MHz	All	5.9	5.9
5470~5725MHz	All	10.6	10.6	5470~5725MHz	All	6.9	6.9
5725~5850MHz	All	11.2	11.2	5725~5850MHz	All	7.0	7.0
11ac VHT-20		Manufacturing Max Power {dBm}		11ac VHT-20		Manufacturing Max Power {dBm}	
Band	channel	MCS-0	MCS-8	Band	channel	MCS-0	MCS-8
5150~5250MHz	All	11.8	11.8	5150~5250MHz	All	6.4	6.4
5250~5350MHz	All	11.5	11.5	5250~5350MHz	All	5.5	5.5
5470~5725MHz	All	10.4	10.4	5470~5725MHz	All	6.1	6.1
5725~5850MHz	All	11.1	11.1	5725~5850MHz	All	6.5	6.5
11ac VHT-40		Manufacturing Max Power {dBm}		11ac VHT-40		Manufacturing Max Power {dBm}	
Band	channel	MCS-0	MCS-8, 9	Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	All	11.9	11.9	5150~5250MHz	All	7.2	7.2
5250~5350MHz	All	11.8	11.8	5250~5350MHz	All	5.9	5.9
5470~5725MHz	All	10.6	10.1	5470~5725MHz	All	6.9	6.4
5725~5850MHz	All	11.2	10.7	5725~5850MHz	All	7.0	6.5
11ac VHT-80		Manufacturing Max Power {dBm}		11ac VHT-80		Manufacturing Max Power {dBm}	
Band	channel	MCS-0	MCS-8, 9	Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	All	11.9	11.9	5150~5250MHz	All	7.0	7.0
5250~5350MHz	All	11.6	11.6	5250~5350MHz	All	5.7	5.7
5470~5725MHz	All	10.5	10.0	5470~5725MHz	All	6.9	6.4
5725~5850MHz	All	11.0	10.5	5725~5850MHz	All	6.8	6.3

6.3.6. Bluetooth

RF Air Interface			Manufacturing Max Power [dBm]		
BT			BR	EDR	BLE
2400~2485MHz	Low	Time Averaged	9.0	5.0	5.3
		Calculated to 100% Duty Cycle	10.1	6.1	6.0
	Mid	Time Averaged	10.7	6.7	7.0
		Calculated to 100% Duty Cycle	11.8	7.8	7.7
	High	Time Averaged	8.7	4.6	5.1
		Calculated to 100% Duty Cycle	9.9	5.7	5.8

6.4. 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 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	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		

General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies	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																																																
	Band 26	Frequency range: 814 - 849 MHz																																																			
		Channel Bandwidth																																																			
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																														
	Low		26765/ 821.5	26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7																																														
	Mid		26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5																																														
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3																																														
	Band 41	Frequency range: 2496 - 2690 MHz																																																			
		Channel Bandwidth																																																			
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																														
	Low	39750 / 2506.0																																																			
	Low-Mid	40185 / 2549.5																																																			
Mid	40620 / 2593.0																																																				
Mid-High	41055 / 2636.5																																																				
High	41490 / 2680.0																																																				
LTE transmitter and antenna implementation	Refer to Appendix A.																																																				
Maximum power reduction (MPR)	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing							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
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																																														
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.																																																				

Release 11 Carrier Aggregation (CA) Combinations:

Combination	CA configuration	Bandwidth (MHz)											
		Carrier 1						Carrier 2					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4
Inter-Band	2A-4A	√	√	√	√	√	√	√	√	√	√		
	2A-5A	√	√	√	√					√	√		
	2A-12A	√	√	√	√					√	√	√	
	2A-13A	√	√	√	√					√			
	2A-17A			√	√					√	√		
	2A-29A	√	√	√	√					√	√	√	
	4A-5A	√	√	√	√					√	√		
	4A-7A			√	√			√	√	√	√		
	4A-12A	√	√	√	√	√	√			√	√	√	
	4A-13A	√	√	√	√					√			
	4A-17A			√	√					√	√		
	4A-29A	√	√	√	√					√	√	√	
Intra-Band contiguous	7C			√				√					
			√					√	√				
		√						√	√	√			
	41C				√			√					
				√				√					
			√					√	√				
Intra-Band non-contiguous	2A-2A	√	√	√	√			√	√	√	√		
	4A-4A	√	√	√	√			√	√	√	√		
	7A-7A				√				√				
				√					√	√			
			√					√	√				
		√						√					

Notes:

For supported channels, please refer to the channels above.

Release 11 Carrier Aggregation (CA) Combinations (continued):

Combination	CA configuration	Bandwidth (MHz)																	
		Carrier 1						Carrier 2						Carrier 3					
		20	15	10	5	3	1.4	20	15	10	5	3	1.4	20	15	10	5	3	1.4
Inter-Band	2A-2A-13A	√	√	√	√			√	√	√	√					√			
	4A-4A-5A	√	√	√	√			√	√	√	√					√	√		
	4A-4A-12A	√	√	√	√			√	√	√	√					√	√		
	4A-4A-13A	√	√	√	√			√	√	√	√					√			
	2A-4A-5A	√	√	√	√			√	√	√	√					√	√		
	2A-4A-12A	√	√	√	√			√	√	√	√					√	√		
	2A-4A-13A	√	√	√	√			√	√	√	√					√			
	2A-4A-29A	√	√	√	√			√	√	√	√					√	√		

Notes:

For supported channels, please refer to the channels above.

6.5. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Bands support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink $\times (T_s) \times \# \text{ of S} + \# \text{ of U}$

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle = $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$

where

$T_s = 1/(15000 \times 2048)$ seconds

7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Left)	< 25 mm	Yes	
WLAN Main (Chain 0)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	15 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	> 25 mm	No	1
	Extremity	0 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	> 25 mm	No	1
WLAN Sub (Chain 1)	Head	0 mm	Left Touch	N/A	Yes	2
			Left Tilt (15°)	N/A	Yes	2
			Right Touch	N/A	Yes	2
			Right Tilt (15°)	N/A	Yes	2
	Body	15 mm	Rear	N/A	Yes	2
			Front	N/A	Yes	2
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	2
			Front	< 25 mm	Yes	2
			Edge 1 (Top)	< 25 mm	Yes	2
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	2
	Extremity	0 mm	Rear	< 25 mm	Yes	2
			Front	< 25 mm	Yes	2
			Edge 1 (Top)	< 25 mm	Yes	2
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	2

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. Wi-Fi Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

8. Dielectric Property Measurements & System Check

8.1. 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.

For SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies ≤ 3 GHz.

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 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR Room	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta $\pm 5\%$	Measured	Target	Delta $\pm 5\%$
1	7/25/2016	2450	Head	2450	39.15	39.20	-0.13	1.88	1.80	4.44
				2400	39.29	39.30	-0.02	1.82	1.75	3.85
				2480	39.02	39.16	-0.36	1.90	1.83	3.91
1	7/25/2016	2450	Body	2450	50.86	52.70	-3.49	2.01	1.95	2.87
				2400	50.93	52.77	-3.49	1.93	1.90	1.53
				2480	50.77	52.66	-3.59	2.03	1.99	1.85
1	7/25/2016	2600	Head	2600	37.46	39.01	-3.98	2.04	1.96	3.92
				2495	37.86	39.14	-3.28	1.93	1.85	4.56
				2690	37.18	38.90	-4.41	2.14	2.06	4.10
1	7/29/2016	2600	Head	2600	39.31	39.01	0.77	1.97	1.96	0.25
				2495	39.64	39.14	1.27	1.85	1.85	0.02
				2690	38.99	38.90	0.24	2.07	2.06	0.41
1	7/29/2016	2600	Body	2600	50.79	52.51	-3.28	2.16	2.16	-0.22
				2495	51.15	52.64	-2.84	2.01	2.01	-0.31
				2690	50.44	52.40	-3.74	2.28	2.29	-0.14
1	8/1/2016	2600	Body	2600	50.98	52.51	-2.92	2.21	2.16	2.14
				2495	51.38	52.64	-2.40	2.07	2.01	2.72
				2690	50.59	52.40	-3.45	2.34	2.29	2.22
1	8/3/2016	2600	Head	2600	38.32	39.01	-1.77	1.97	1.96	0.35
				2495	38.68	39.14	-1.18	1.85	1.85	0.24
				2690	37.98	38.90	-2.36	2.06	2.06	0.17
2	7/29/2016	2450	Body	2450	52.03	52.70	-1.27	1.98	1.95	1.28
				2400	52.28	52.77	-0.93	1.93	1.90	1.79
				2480	51.98	52.66	-1.30	2.02	1.99	1.30
2	7/29/2016	2450	Head	2450	38.20	39.20	-2.55	1.91	1.80	6.11
				2400	38.38	39.30	-2.33	1.85	1.75	5.44
				2480	38.11	39.16	-2.69	1.95	1.83	6.20
2	8/1/2016	2450	Head	2450	38.48	39.20	-1.84	1.83	1.80	1.78
				2400	38.37	39.30	-2.36	1.74	1.75	-0.72
				2480	38.33	39.16	-2.12	1.82	1.83	-0.68
3	7/25/2016	1900	Head	1900	38.56	40.00	-3.61	1.41	1.40	0.71
				1850	38.85	40.00	-2.88	1.35	1.40	-3.57
				1920	38.51	40.00	-3.74	1.41	1.40	0.71
3	7/25/2016	1900	Body	1900	52.22	53.30	-2.03	1.51	1.52	-0.66
				1850	53.39	53.30	0.17	1.46	1.52	-4.01
				1920	52.10	53.30	-2.25	1.53	1.52	0.39

Dielectric Property Measurements Results (continued):

SAR Room	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta $\pm 5\%$	Measured	Target	Delta $\pm 5\%$
3	7/28/2016	5200	Body	5200	48.08	49.02	-1.92	5.21	5.29	-1.58
				5150	48.14	49.09	-1.93	5.16	5.24	-1.55
				5350	47.82	48.82	-2.04	5.40	5.47	-1.22
3	7/28/2016	5600	Body	5600	47.46	48.48	-2.10	5.72	5.76	-0.68
				5500	47.58	48.61	-2.13	5.58	5.64	-1.09
				5725	47.26	48.31	-2.17	5.89	5.91	-0.22
3	7/28/2016	5800	Body	5800	47.12	48.20	-2.24	6.01	6.00	0.08
				5700	47.30	48.34	-2.16	5.87	5.88	-0.16
				5850	47.10	48.20	-2.28	6.06	6.00	1.00
3	7/28/2016	5200	Head	5200	35.78	35.99	-0.58	4.68	4.65	0.67
				5150	35.88	36.05	-0.46	4.62	4.60	0.35
				5350	35.53	35.82	-0.81	4.85	4.80	1.01
3	7/28/2016	5600	Head	5600	35.15	35.53	-1.08	5.13	5.06	1.28
				5500	35.31	35.65	-0.95	5.01	4.96	0.95
				5725	34.93	35.39	-1.30	5.27	5.19	1.50
3	7/28/2016	5800	Head	5800	34.79	35.30	-1.44	5.35	5.27	1.50
				5700	34.96	35.42	-1.30	5.24	5.16	1.44
				5850	34.75	35.30	-1.56	5.40	5.27	2.39
3	8/1/2016	5200	Body	5200	46.89	49.02	-4.34	5.23	5.29	-1.20
				5150	46.93	49.09	-4.39	5.20	5.24	-0.73
				5350	46.56	48.82	-4.62	5.42	5.47	-0.92
3	8/1/2016	5600	Body	5600	46.25	48.48	-4.60	5.75	5.76	-0.21
				5500	46.30	48.61	-4.76	5.61	5.64	-0.56
				5725	46.08	48.31	-4.61	5.92	5.91	0.28
3	8/1/2016	5800	Body	5800	45.98	48.20	-4.61	6.06	6.00	0.97
				5700	46.18	48.34	-4.47	5.91	5.88	0.62
				5850	45.91	48.20	-4.75	6.08	6.00	1.33
4	7/25/2016	750	Head	750	41.33	41.96	-1.51	0.91	0.89	1.74
				695	42.17	42.24	-0.17	0.86	0.89	-3.72
				790	40.90	41.76	-2.05	0.94	0.90	4.44
4	7/25/2016	750	Body	750	56.93	55.55	2.49	0.97	0.96	1.03
				695	57.44	55.76	3.02	0.92	0.96	-4.08
				790	56.56	55.39	2.11	1.00	0.97	3.61
4	7/26/2016	835	Head	835	42.04	41.50	1.30	0.92	0.90	2.03
				805	42.39	41.68	1.70	0.89	0.90	-0.60
				905	41.21	41.50	-0.70	0.99	0.97	1.43
4	7/26/2016	835	Body	835	53.46	55.20	-3.15	1.01	0.97	3.71
				805	53.76	55.33	-2.85	0.98	0.97	1.15
				905	52.77	55.00	-4.05	1.08	1.05	2.42

Dielectric Property Measurements Results (continued):

SAR Room	Date	Tissue Type	Band (MHz)	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta $\pm 5\%$	Measured	Target	Delta $\pm 5\%$
4	8/1/2016	835	Head	835	40.92	41.50	-1.40	0.98	0.90	8.49
				805	41.24	41.68	-1.05	0.94	0.90	4.33
				905	39.82	41.50	-4.05	1.03	0.97	5.81
4	8/1/2016	835	Body	835	52.46	55.20	-4.96	0.92	0.97	-5.05
				805	52.99	55.33	-4.24	0.91	0.97	-5.93
				905	52.16	55.00	-5.16	0.98	1.05	-6.46
4	8/2/2016	835	Head	835	40.28	41.50	-2.94	0.90	0.90	0.23
				805	40.69	41.68	-2.37	0.87	0.90	-2.68
				905	39.44	41.50	-4.96	0.97	0.97	-0.23
4	8/2/2016	835	Body	835	53.60	55.20	-2.90	1.01	0.97	4.23
				805	53.96	55.33	-2.48	0.98	0.97	1.33
				905	52.93	55.00	-3.76	1.09	1.05	3.18
5	7/25/2016	1800	Head	1800	40.57	40.00	1.43	1.41	1.40	0.50
				1710	40.98	40.15	2.08	1.32	1.35	-2.26
				1785	40.60	40.03	1.42	1.39	1.39	0.31
5	7/25/2016	1800	Body	1800	51.26	53.30	-3.83	1.53	1.52	0.86
				1710	51.57	53.54	-3.69	1.43	1.46	-2.23
				1785	51.27	53.35	-3.90	1.51	1.51	0.35

8.2. 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 re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ± 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

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 Room	Date	Tissue Type	Dipole Type _Serial #	Dipole Cal. Due Date	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
1	7/25/2016	Head	D2450V2 SN:899	3/15/2017	5.410	54.10	50.00	8.20	2.430	24.30	23.60	2.97	1,2
1	7/25/2016	Body	D2450V2 SN:899	3/15/2017	5.030	50.30	49.60	1.41	2.310	23.10	23.40	-1.28	
1	7/25/2016	Head	D2600V2 SN:1036	3/18/2017	5.820	58.20	55.40	5.05	2.540	25.40	24.60	3.25	
1	7/29/2016	Head	D2600V2 SN:1036	3/18/2017	5.830	58.30	55.40	5.23	2.540	25.40	24.60	3.25	
1	7/29/2016	Body	D2600V2 SN:1036	3/18/2017	5.440	54.40	53.40	1.87	2.370	23.70	23.80	-0.42	
1	8/2/2016	Body	D2600V2 SN:1036	3/18/2017	5.460	54.60	53.40	2.25	2.380	23.80	23.80	0.00	
1	8/3/2016	Head	D2600V2 SN:1036	3/18/2017	6.080	60.80	55.40	9.75	2.650	26.50	24.60	7.72	3,4
2	7/29/2016	Body	D2450V2 SN:899	3/15/2017	4.830	48.30	49.60	-2.62	2.220	22.20	23.40	-5.13	
2	7/29/2016	Head	D2450V2 SN:899	3/15/2017	5.400	54.00	50.00	8.00	2.470	24.70	23.60	4.66	5,6
3	7/25/2016	Head	D1950V3 SN:1136	4/18/2017	4.160	41.60	40.00	4.00	2.100	21.00	20.50	2.44	7,8
3	7/25/2016	Body	D1900V2 SN:5d163	9/21/2016	3.870	38.70	39.90	-3.01	2.030	20.30	21.00	-3.33	9,10
3	7/28/2016	Body	D5GHzV2 SN:1138 (5.2 GHz)	9/23/2016	7.600	76.00	76.90	-1.17	2.180	21.80	21.50	1.40	
3	7/28/2016	Body	D5GHzV2 SN:1138 (5.6 GHz)	9/23/2016	7.800	78.00	81.60	-4.41	2.180	21.80	22.80	-4.39	
3	7/28/2016	Body	D5GHzV2 SN:1138 (5.8 GHz)	9/23/2016	7.290	72.90	77.90	-6.42	2.040	20.40	21.60	-5.56	
3	7/28/2016	Head	D5GHzV2 SN:1138 (5.2 GHz)	9/23/2016	8.690	86.90	81.70	6.36	2.500	25.00	23.50	6.38	
3	7/28/2016	Head	D5GHzV2 SN:1138 (5.6 GHz)	9/23/2016	9.180	91.80	84.70	8.38	2.610	26.10	24.20	7.85	11,12
3	7/29/2016	Head	D5GHzV2 SN:1138 (5.8 GHz)	9/23/2016	8.680	86.80	81.60	6.37	2.460	24.60	23.10	6.49	
3	8/1/2016	Body	D5GHzV2 SN:1138 (5.2 GHz)	9/23/2016	7.370	73.70	76.90	-4.16	2.090	20.90	21.50	-2.79	
3	8/1/2016	Body	D5GHzV2 SN:1138 (5.6 GHz)	9/23/2016	7.830	78.30	81.60	-4.04	2.170	21.70	22.80	-4.82	
3	8/1/2016	Body	D5GHzV2 SN:1138 (5.8 GHz)	9/23/2016	7.610	76.10	77.90	-2.31	2.120	21.20	21.60	-1.85	
4	7/25/2016	Head	D750V3 SN:1071	11/12/2016	0.836	8.36	8.21	1.83	0.548	5.48	5.38	1.86	13,14
4	7/25/2016	Body	D750V3 SN:1071	11/12/2016	0.875	8.75	8.74	0.11	0.585	5.85	5.81	0.69	
4	7/26/2016	Head	D900V2 SN:1d143	9/17/2016	1.100	11.00	10.90	0.92	0.712	7.12	6.92	2.89	
4	7/26/2016	Body	D900V2 SN:1d143	9/17/2016	1.100	11.00	11.10	-0.90	0.708	7.08	7.09	-0.14	
4	8/1/2016	Head	D900V2 SN:1d143	9/17/2016	1.150	11.50	10.90	5.50	0.745	7.45	6.92	7.66	15,16
4	8/1/2016	Body	D900V2 SN:1d143	9/17/2016	1.060	10.60	11.10	-4.50	0.687	6.87	7.09	-3.10	
5	7/25/2016	Head	D1800V2 SN:2d194	9/22/2016	3.890	38.90	38.80	0.26	2.030	20.30	20.20	0.50	
5	7/25/2016	Body	D1800V2 SN:2d194	9/22/2016	3.980	39.80	39.50	0.76	2.090	20.90	20.80	0.48	17,18

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	
850	GPRS (GMSK)	CS4	1	128	824.2	31.5	22.4	23.67
				190	836.6	31.5	22.5	
				251	848.8	31.6	22.6	
			2	128	824.2	30.6	24.6	25.68
				190	836.6	30.6	24.6	
				251	848.8	30.6	24.6	
			3	128	824.2	28.3	24.0	25.44
				190	836.6	28.2	23.9	
				251	848.8	28.2	23.9	
			4	128	824.2	27.4	24.4	25.69
				190	836.6	27.4	24.4	
				251	848.8	27.3	24.3	
	EGPRS (8PSK)	MCS9	1	128	824.2	26.5	17.5	18.97
				190	836.6	26.6	17.6	
				251	848.8	26.8	17.8	
			2	128	824.2	25.2	19.2	20.48
				190	836.6	25.2	19.2	
				251	848.8	25.5	19.5	
			3	128	824.2	23.2	18.9	20.24
				190	836.6	23.2	18.9	
				251	848.8	23.4	19.1	
			4	128	824.2	22.1	19.1	20.49
				190	836.6	22.1	19.1	
				251	848.8	22.2	19.2	

Notes:

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

- GMSK (GPRS) mode with 4 time slots, based on the Tune-up Procedure.
- 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)	Max. Pwr		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	
1900	GPRS (GMSK)	CS4	1	512	1850.2	28.5	19.5	20.67
				661	1880.0	28.6	19.6	
				810	1909.8	28.6	19.6	
			2	512	1850.2	27.0	21.0	22.18
				661	1880.0	27.0	21.0	
				810	1909.8	27.0	21.0	
			3	512	1850.2	25.3	21.0	21.94
				661	1880.0	25.0	20.7	
				810	1909.8	25.0	20.7	
			4	512	1850.2	24.2	21.2	22.19
				661	1880.0	24.2	21.2	
				810	1909.8	24.2	21.2	
	EGPRS (8PSK)	MCS9	1	512	1850.2	25.5	16.5	17.97
				661	1880.0	25.6	16.6	
				810	1909.8	25.4	16.4	
			2	512	1850.2	23.9	17.9	19.48
				661	1880.0	23.9	17.9	
				810	1909.8	23.7	17.7	
			3	512	1850.2	22.2	17.9	19.24
				661	1880.0	22.4	18.1	
				810	1909.8	22.1	17.8	
			4	512	1850.2	21.0	18.0	19.49
				661	1880.0	21.0	18.0	
				810	1909.8	20.9	17.9	

Notes:

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

- GMSK (GPRS) mode with 4 time slots, based on the Tune-up Procedure.
- 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)	Max. Pwr				
						CS		PS		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	
850	GSM(Voice) + GPRS(GMSK)	CS4	1	128	824.2	31.2	22.2			
				190	836.6	31.2	22.2			
				251	848.8	31.2	22.2			
			2	128	824.2	30.6	24.6	30.7	24.7	25.68
				190	836.6	30.6	24.6	30.8	24.8	
				251	848.8	30.7	24.7	30.9	24.9	
			3	128	824.2	28.6	24.3	28.7	24.4	25.44
				190	836.6	28.6	24.3	28.7	24.4	
				251	848.8	28.6	24.3	28.7	24.4	
	GSM(Voice) + EGPRS(8PSK)	MCS9	1	128	824.2	31.7	22.7			
				190	836.6	31.6	22.6			
				251	848.8	31.6	22.6			
			2	128	824.2	30.6	24.6	25.5	19.5	20.48
				190	836.6	30.7	24.7	25.5	19.5	
				251	848.8	30.8	24.8	25.7	19.7	
			3	128	824.2	28.7	24.4	23.4	19.1	20.24
				190	836.6	28.7	24.4	23.5	19.2	
				251	848.8	28.8	24.5	23.6	19.3	

Notes:

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

- GSM (Voice) + GMSK (GPRS) mode with 1 time slots, based on the Tune-up Procedure.
- SAR is not required for GSM(Voice) + EGPRS (8PSK) mode because its output power is less than that of GSM (Voice) + GMSK (GPRS) mode.

GSM1900 DTM Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr				
						CS		PS		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)	
1900	GSM(Voice) + GPRS(GMSK)	CS4	1	512	1850.2	28.9	19.9			
				661	1880.0	28.9	19.9			
				810	1909.8	28.9	19.9			
			2	512	1850.2	27.2	21.2	27.3	21.3	22.18
				661	1880.0	27.2	21.2	27.4	21.4	
				810	1909.8	27.0	21.0	27.1	21.1	
			3	512	1850.2	25.4	21.1	25.4	21.1	21.94
				661	1880.0	25.3	21.0	25.4	21.1	
				810	1909.8	25.3	21.0	25.4	21.1	
	GSM(Voice) + EGPRS(8PSK)	MCS9	1	512	1850.2	28.8	19.8			
				661	1880.0	28.8	19.8			
				810	1909.8	28.7	19.7			
			2	512	1850.2	27.0	21.0	24.2	18.2	19.48
				661	1880.0	27.1	21.1	24.5	18.5	
				810	1909.8	27.0	21.0	24.3	18.3	
			3	512	1850.2	25.4	21.1	22.4	18.1	19.24
				661	1880.0	25.4	21.1	22.6	18.3	
				810	1909.8	25.3	21.0	22.3	18.0	

Notes:

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

- GSM (Voice) + GMSK (GPRS) mode with 1 time slots, based on the Tune-up Procedure.
- SAR is not required for GSM (Voice) + EGPRS (8PSK) mode because its output power is less than that of GSM (Voice) + GMSK (GPRS) mode.

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs}=\beta_{hs}/\beta_c$	30/15			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

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				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCH	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	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

DC-HSDPA Setup Procedures used to establish the test signals

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 E_c/I_{tot}	dB	-10
P-CCPCH and SCH E_c/I_{tot}	dB	-12
PICH E_c/I_{tot}	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH E_c/I_{tot}	dB	-5
OCNS E_c/I_{tot}	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	TTIs	1
Number of HARQ Processes	Proces	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.		

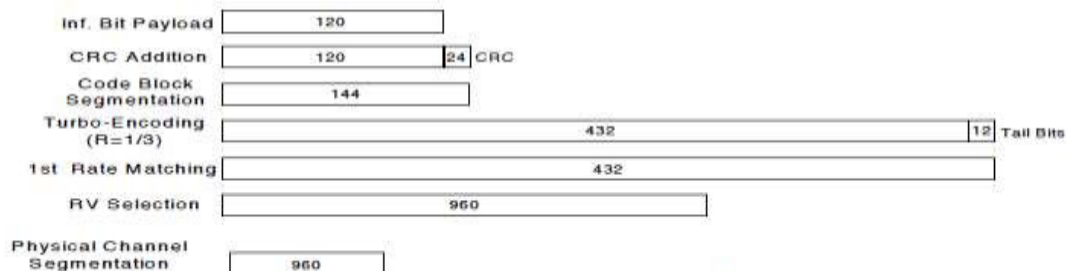


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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-Set 12			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 7 Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	21.3
			9400	1880.0	N/A	21.3
			9538	1907.6	N/A	21.3
	HSDPA	Subtest 1	9262	1852.4	0	19.9
			9400	1880.0	0	19.9
			9538	1907.6	0	19.9
		Subtest 2	9262	1852.4	0	19.9
			9400	1880.0	0	19.9
			9538	1907.6	0	19.9
		Subtest 3	9262	1852.4	0.5	19.9
			9400	1880.0	0.5	19.8
			9538	1907.6	0.5	19.9
		Subtest 4	9262	1852.4	0.5	20.0
			9400	1880.0	0.5	19.8
			9538	1907.6	0.5	20.0
	HSUPA	Subtest 1	9262	1852.4	0	19.8
			9400	1880.0	0	19.9
			9538	1907.6	0	19.9
		Subtest 2	9262	1852.4	2	19.1
			9400	1880.0	2	19.2
			9538	1907.6	2	19.1
		Subtest 3	9262	1852.4	1	19.9
			9400	1880.0	1	20.0
			9538	1907.6	1	19.5
		Subtest 4	9262	1852.4	2	19.1
			9400	1880.0	2	19.1
			9538	1907.6	2	19.2
		Subtest 5	9262	1852.4	0	19.9
			9400	1880.0	0	19.9
			9538	1907.6	0	20.0
	DC-HSDPA	Subtest 1	9262	1852.4	0	20.2
			9400	1880.0	0	20.3
			9538	1907.6	0	20.2
		Subtest 2	9262	1852.4	0	20.2
			9400	1880.0	0	20.3
			9538	1907.6	0	20.2
		Subtest 3	9262	1852.4	0.5	19.6
			9400	1880.0	0.5	19.9
			9538	1907.6	0.5	20.2
		Subtest 4	9262	1852.4	0.5	20.2
			9400	1880.0	0.5	20.4
			9538	1907.6	0.5	20.2

W-CDMA Band IV Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	19.8
			1413	1732.6	N/A	19.9
			1513	1752.6	N/A	19.9
	HSDPA	Subtest 1	1312	1712.4	0	18.2
			1413	1732.6	0	18.4
			1513	1752.6	0	18.5
		Subtest 2	1312	1712.4	0	18.1
			1413	1732.6	0	18.4
			1513	1752.6	0	18.4
		Subtest 3	1312	1712.4	0.5	18.2
			1413	1732.6	0.5	18.4
			1513	1752.6	0.5	18.4
		Subtest 4	1312	1712.4	0.5	18.3
			1413	1732.6	0.5	18.5
			1513	1752.6	0.5	18.5
	HSUPA	Subtest 1	1312	1712.4	0	18.4
			1413	1732.6	0	18.5
			1513	1752.6	0	18.6
		Subtest 2	1312	1712.4	2	16.8
			1413	1732.6	2	16.9
			1513	1752.6	2	17.0
		Subtest 3	1312	1712.4	1	18.4
			1413	1732.6	1	18.5
			1513	1752.6	1	18.6
		Subtest 4	1312	1712.4	2	16.8
			1413	1732.6	2	17.0
			1513	1752.6	2	16.9
		Subtest 5	1312	1712.4	0	18.4
			1413	1732.6	0	18.5
			1513	1752.6	0	18.6
	DC-HSDPA	Subtest 1	1312	1712.4	0	18.7
			1413	1732.6	0	18.7
			1513	1752.6	0	18.9
		Subtest 2	1312	1712.4	0	18.7
			1413	1732.6	0	18.7
			1513	1752.6	0	18.9
		Subtest 3	1312	1712.4	0.5	18.8
			1413	1732.6	0.5	18.7
			1513	1752.6	0.5	18.9
		Subtest 4	1312	1712.4	0.5	18.7
			1413	1732.6	0.5	18.7
			1513	1752.6	0.5	18.9

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	23.9
			4183	836.6	N/A	24.0
			4233	846.6	N/A	24.0
	HSDPA	Subtest 1	4132	826.4	0	23.0
			4183	836.6	0	23.0
			4233	846.6	0	23.0
		Subtest 2	4132	826.4	0	23.0
			4183	836.6	0	23.1
			4233	846.6	0	23.1
		Subtest 3	4132	826.4	0.5	22.5
			4183	836.6	0.5	22.5
			4233	846.6	0.5	22.6
		Subtest 4	4132	826.4	0.5	22.5
			4183	836.6	0.5	22.5
			4233	846.6	0.5	22.6
	HSUPA	Subtest 1	4132	826.4	0	23.1
			4183	836.6	0	23.1
			4233	846.6	0	23.1
		Subtest 2	4132	826.4	2	21.0
			4183	836.6	2	21.0
			4233	846.6	2	21.0
		Subtest 3	4132	826.4	1	23.1
			4183	836.6	1	23.1
			4233	846.6	1	23.1
		Subtest 4	4132	826.4	2	21.0
			4183	836.6	2	21.1
			4233	846.6	2	21.1
		Subtest 5	4132	826.4	0	23.1
			4183	836.6	0	23.0
			4233	846.6	0	23.1
	DC-HSDPA	Subtest 1	4132	826.4	0	22.9
			4183	836.6	0	22.9
			4233	846.6	0	22.9
		Subtest 2	4132	826.4	0	22.9
			4183	836.6	0	22.9
			4233	846.6	0	22.9
		Subtest 3	4132	826.4	0.5	22.9
			4183	836.6	0.5	22.9
			4233	846.6	0.5	22.9
		Subtest 4	4132	826.4	0.5	22.9
			4183	836.6	0.5	23.0
			4233	846.6	0.5	22.9

9.3. LTE

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

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

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

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

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

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	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	MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	21.5	21.5	21.5
			1	50	0	21.2	21.2	21.3
			1	99	0	21.7	21.6	21.7
			50	0	1	20.4	20.3	20.4
			50	25	1	20.4	20.3	20.4
			50	50	1	20.6	20.4	20.5
			100	0	1	20.5	20.4	20.5
		16QAM	1	0	1	20.9	21.0	21.0
			1	50	1	20.6	20.7	20.8
			1	99	1	20.8	21.2	21.0
			50	0	2	19.3	19.4	19.4
			50	25	2	19.3	19.3	19.4
			50	50	2	19.5	19.4	19.5
			100	0	2	19.5	19.4	19.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	21.3	21.1	21.3
			1	36	0	21.0	21.0	21.0
			1	74	0	21.3	21.0	21.1
			36	0	1	20.2	20.2	20.3
			36	18	1	20.1	20.1	20.2
			36	37	1	20.2	20.1	20.1
			75	0	1	20.3	20.1	20.3
		16QAM	1	0	1	20.8	20.1	20.7
			1	36	1	20.5	19.9	20.4
			1	74	1	20.8	20.0	20.5
			36	0	2	19.2	19.1	19.3
			36	18	2	19.1	19.1	19.3
			36	37	2	19.2	19.1	19.2
			75	0	2	19.3	19.1	19.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	21.2	21.6	21.5
			1	25	0	21.0	21.4	21.2
			1	49	0	21.2	21.6	21.4
			25	0	1	20.2	20.6	20.4
			25	12	1	20.1	20.5	20.3
			25	25	1	20.1	20.5	20.3
			50	0	1	20.1	20.5	20.4
		16QAM	1	0	1	20.2	20.6	20.8
			1	25	1	20.0	20.4	20.6
			1	49	1	20.2	20.5	20.7
			25	0	2	19.3	19.6	19.4
			25	12	2	19.2	19.5	19.4
			25	25	2	19.1	19.5	19.3
			50	0	2	19.1	19.4	19.4

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	21.1	21.5	21.4
			1	12	0	21.1	21.5	21.2
			1	24	0	21.0	21.4	21.3
			12	0	1	20.1	20.4	20.2
			12	6	1	20.1	20.4	20.2
			12	11	1	20.1	20.5	20.2
			25	0	1	20.1	20.5	20.2
		16QAM	1	0	1	20.3	20.7	20.8
			1	12	1	20.2	20.6	20.7
			1	24	1	20.2	20.5	20.7
			12	0	2	19.2	19.5	19.3
			12	6	2	19.2	19.5	19.3
			12	11	2	19.1	19.6	19.3
			25	0	2	19.1	19.5	19.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	20.9	21.3	21.2
			1	7	0	21.2	21.5	21.4
			1	14	0	20.9	21.2	21.1
			8	0	1	20.1	20.4	20.2
			8	4	1	20.1	20.5	20.2
			8	7	1	20.1	20.5	20.2
			15	0	1	20.0	20.4	20.2
		16QAM	1	0	1	20.0	20.3	20.5
			1	7	1	20.2	20.5	20.7
			1	14	1	19.9	20.2	20.4
			8	0	2	19.1	19.5	19.1
			8	4	2	19.3	19.6	19.2
			8	7	2	19.3	19.6	19.2
			15	0	2	19.0	19.4	19.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	20.8	21.3	21.1
			1	2	0	20.9	21.4	21.2
			1	5	0	20.8	21.3	21.1
			3	0	0	20.9	21.3	21.1
			3	1	0	21.1	21.4	21.2
			3	2	0	21.1	21.4	21.2
			6	0	1	20.0	20.3	20.1
		16QAM	1	0	1	19.9	20.4	20.4
			1	2	1	20.0	20.5	20.5
			1	5	1	19.9	20.5	20.4
			3	0	1	19.9	20.4	20.3
			3	1	1	20.0	20.4	20.3
			3	2	1	20.1	20.5	20.3
			6	0	2	19.1	19.5	19.0

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1732.5 MHz		
LTE Band 4	20	QPSK	1	0	0		20.5	
			1	50	0		20.1	
			1	99	0		20.6	
			50	0	1		19.3	
			50	25	1		19.2	
			50	50	1		19.3	
			100	0	1		19.4	
		16QAM	1	0	1		20.0	
			1	50	1		19.6	
			1	99	1		20.2	
			50	0	2		18.3	
			50	25	2		18.3	
			50	50	2		18.4	
			100	0	2		18.5	
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	20.6	20.3	20.3
			1	36	0	20.3	20.2	20.1
			1	74	0	20.4	20.2	20.3
			36	0	1	19.3	19.1	19.1
			36	18	1	19.2	19.0	19.1
			36	37	1	19.2	19.1	19.2
			75	0	1	19.2	19.1	19.1
		16QAM	1	0	1	19.9	19.2	19.6
			1	36	1	19.4	19.0	19.3
			1	74	1	19.6	19.2	19.6
			36	0	2	18.4	18.2	18.2
			36	18	2	18.3	18.1	18.3
			36	37	2	18.3	18.1	18.3
			75	0	2	18.3	18.2	18.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	20.9	20.7	20.6
			1	25	0	20.5	20.4	20.4
			1	49	0	20.7	20.6	20.5
			25	0	1	19.6	19.5	19.4
			25	12	1	19.5	19.5	19.3
			25	25	1	19.5	19.5	19.4
			50	0	1	19.6	19.5	19.3
		16QAM	1	0	1	19.8	19.6	19.9
			1	25	1	19.5	19.4	19.7
			1	49	1	19.6	19.5	19.9
			25	0	2	18.7	18.5	18.5
			25	12	2	18.7	18.5	18.4
			25	25	2	18.7	18.6	18.4
			50	0	2	18.7	18.5	18.4

Note(s):

20 MHz Bandwidth does not support at least three non-overlapping channels. 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; therefore, the requirement for H, M and L channels may not fully apply per KDB 941225 D05 SAR for LTE Devices.

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	20.7	20.5	20.3
			1	12	0	20.6	20.6	20.4
			1	24	0	20.5	20.4	20.3
			12	0	1	19.6	19.5	19.2
			12	6	1	19.6	19.5	19.3
			12	11	1	19.5	19.5	19.3
			25	0	1	19.5	19.5	19.2
		16QAM	1	0	1	19.7	19.7	19.8
			1	12	1	19.6	19.7	19.8
			1	24	1	19.6	19.6	19.8
			12	0	2	18.7	18.6	18.4
			12	6	2	18.6	18.6	18.5
			12	11	2	18.6	18.6	18.4
			25	0	2	18.5	18.6	18.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	20.6	20.4	20.1
			1	7	0	20.6	20.5	20.2
			1	14	0	20.4	20.3	20.0
			8	0	1	19.5	19.4	19.1
			8	4	1	19.6	19.4	19.1
			8	7	1	19.4	19.5	19.1
			15	0	1	19.5	19.5	19.1
		16QAM	1	0	1	19.5	19.3	19.4
			1	7	1	19.6	19.5	19.6
			1	14	1	19.4	19.2	19.4
			8	0	2	18.8	18.6	18.1
			8	4	2	18.8	18.5	18.1
			8	7	2	18.7	18.6	18.1
			15	0	2	18.4	18.5	18.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	20.5	20.4	20.1
			1	2	0	20.6	20.4	20.2
			1	5	0	20.5	20.4	20.1
			3	0	0	20.6	20.4	20.2
			3	1	0	20.6	20.4	20.2
			3	2	0	20.6	20.5	20.2
			6	0	1	19.5	19.3	19.1
		16QAM	1	0	1	19.6	19.7	19.1
			1	2	1	19.7	19.8	19.2
			1	5	1	19.6	19.8	19.1
			3	0	1	19.6	19.6	19.3
			3	1	1	19.6	19.6	19.4
			3	2	1	19.7	19.7	19.4
			6	0	2	18.7	18.3	18.3

LTE Band 5 Measured Results

SAR for LTE Band 5 is covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	19.9	19.8	19.8
			1	49	0	19.3	19.4	19.0
			1	99	0	19.6	19.5	19.3
			50	0	1	18.5	18.6	18.4
			50	24	1	18.4	18.5	18.2
			50	50	1	18.4	18.5	18.1
			100	0	1	18.5	18.6	18.3
		16QAM	1	0	1	19.0	19.0	19.0
			1	49	1	18.8	18.8	18.6
			1	99	1	19.0	18.9	18.8
			50	0	2	17.5	17.5	17.4
			50	24	2	17.4	17.5	17.2
			50	50	2	17.4	17.4	17.1
			100	0	2	17.5	17.6	17.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	19.6	19.6	19.4
			1	37	0	19.3	19.5	19.2
			1	74	0	19.4	19.4	19.1
			36	0	1	18.5	18.7	18.4
			36	20	1	18.4	18.6	18.3
			36	39	1	18.5	18.6	18.2
			75	0	1	18.5	18.6	18.4
		16QAM	1	0	1	18.9	18.6	18.8
			1	37	1	18.8	18.5	18.5
			1	74	1	18.9	18.4	18.5
			36	0	2	17.4	17.7	17.4
			36	20	2	17.4	17.6	17.3
			36	39	2	17.5	17.6	17.2
			75	0	2	17.6	17.6	17.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	19.6	19.7	19.2
			1	25	0	19.5	19.6	19.0
			1	49	0	19.6	19.6	19.0
			25	0	1	18.6	18.6	18.2
			25	12	1	18.7	18.7	18.2
			25	25	1	18.6	18.5	18.1
			50	0	1	18.6	18.7	18.1
		16QAM	1	0	1	18.5	18.7	18.6
			1	25	1	18.5	18.7	18.5
			1	49	1	18.5	18.5	18.5
			25	0	2	17.7	17.6	17.2
			25	12	2	17.8	17.7	17.1
			25	25	2	17.7	17.5	17.1
			50	0	2	17.6	17.7	17.1

LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	19.4	19.7	19.1
			1	12	0	19.5	19.9	19.1
			1	24	0	19.6	19.7	19.1
			12	0	1	18.6	18.6	18.0
			12	7	1	18.5	18.7	18.1
			12	13	1	18.5	18.6	18.1
			25	0	1	18.5	18.7	18.1
		16QAM	1	0	1	18.7	18.2	18.3
			1	12	1	18.8	18.3	18.2
			1	24	1	18.9	18.3	18.3
			12	0	2	17.6	17.8	17.2
			12	7	2	17.6	17.9	17.2
			12	13	2	17.6	17.8	17.2
			25	0	2	17.5	17.8	17.1

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						707.5 MHz		
LTE Band 12	10	QPSK	1	0	0	24.1		
			1	49	0	23.7		
			1	99	0	23.7		
			50	0	1	22.9		
			50	24	1	22.8		
			50	50	1	22.8		
		16QAM	100	0	1	22.8		
			1	0	1	23.2		
			1	49	1	22.7		
			1	99	1	22.8		
			50	0	2	21.9		
			50	24	2	21.8		
			50	50	2	21.8		
			100	0	2	21.8		
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	23.8	24.1	23.9
			1	37	0	23.7	23.8	23.8
			1	74	0	23.8	23.9	23.8
			36	0	1	22.9	22.8	22.8
			36	20	1	22.9	22.8	22.9
			36	39	1	22.8	22.8	22.8
			75	0	1	22.8	22.8	22.8
		16QAM	1	0	1	23.4	23.0	23.1
			1	37	1	23.3	22.9	23.2
			1	74	1	23.3	22.9	23.0
			36	0	2	22.1	21.8	21.9
			36	20	2	21.9	21.8	21.9
			36	39	2	21.8	21.8	21.8
			75	0	2	21.8	21.7	21.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	23.8	23.9	23.8
			1	25	0	23.8	23.9	23.8
			1	49	0	23.6	23.8	23.7
			25	0	1	22.8	22.8	22.8
			25	12	1	22.8	22.8	22.8
			25	25	1	22.8	22.8	22.9
			50	0	1	22.8	22.8	22.7
		16QAM	1	0	1	22.7	23.2	22.8
			1	25	1	22.6	23.3	22.9
			1	49	1	22.5	23.1	22.7
			25	0	2	21.9	21.7	21.9
			25	12	2	21.9	21.6	22.0
			25	25	2	21.9	21.7	22.0
			50	0	2	21.9	21.8	21.7

Note(s):

10 MHz Bandwidth does not support at least three non-overlapping channels. 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; therefore, the requirement for H, M and L channels may not fully apply per KDB 941225 D05 SAR for LTE Devices.

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	23.7	23.8	23.7
			1	12	0	23.8	23.8	23.7
			1	24	0	23.7	23.7	23.6
			12	0	1	23.7	23.7	23.8
			12	7	1	23.8	23.8	23.9
			12	13	1	23.8	23.8	23.9
			25	0	1	22.7	22.7	22.8
		16QAM	1	0	1	22.7	23.1	22.7
			1	12	1	22.8	23.1	22.8
			1	24	1	22.8	23.0	22.7
			12	0	2	22.8	22.9	22.9
			12	7	2	22.9	22.9	22.9
			12	13	2	22.9	22.9	22.9
			25	0	2	21.9	21.6	21.9

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	10	QPSK	1	0	0	23.1
			1	25	0	22.9
			1	49	0	23.1
			25	0	1	22.1
			25	12	1	22.1
			25	25	1	22.0
			50	0	1	22.0
		16QAM	1	0	1	22.3
			1	25	1	22.2
			1	49	1	22.3
			25	0	2	21.2
			25	12	2	21.3
			25	25	2	21.1
			50	0	2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	5	QPSK	1	0	0	23.2
			1	12	0	23.1
			1	24	0	23.2
			12	0	1	22.2
			12	6	1	22.2
			12	11	1	22.1
			25	0	1	22.2
		16QAM	1	0	1	22.1
			1	12	1	22.0
			1	24	1	22.1
			12	0	2	21.3
			12	6	2	21.2
			12	11	2	21.2
			25	0	2	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

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 26 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						819 MHz	831.5 MHz	844 MHz
LTE Band 26	15	QPSK	1	0	0		23.6	
			1	36	0		23.7	
			1	74	0		23.5	
			36	0	1		22.5	
			36	18	1		22.5	
			36	37	1		22.5	
			75	0	1		22.5	
		16QAM	1	0	1		22.6	
			1	36	1		22.5	
			1	74	1		22.5	
			36	0	2		21.5	
			36	18	2		21.6	
			36	37	2		21.5	
			75	0	2		21.5	
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	23.8	23.7	23.8
			1	25	0	23.7	23.8	23.6
			1	49	0	23.6	23.6	23.6
			25	0	1	22.7	22.7	22.8
			25	12	1	22.7	22.8	22.8
			25	25	1	22.7	22.7	22.7
			50	0	1	22.7	22.8	22.8
		16QAM	1	0	1	23.2	22.8	22.8
			1	25	1	23.0	22.8	22.7
			1	49	1	23.0	22.6	22.5
			25	0	2	21.8	21.9	21.9
			25	12	2	21.8	22.0	21.8
			25	25	2	21.8	21.8	21.7
			50	0	2	21.8	21.8	21.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						816.5 MHz	831.5 MHz	846.5 MHz
LTE Band 26	5	QPSK	1	0	0	23.8	23.8	23.7
			1	12	0	23.7	23.7	23.7
			1	24	0	23.7	23.7	23.6
			12	0	1	22.8	22.8	22.7
			12	6	1	22.7	22.8	22.7
			12	11	1	22.7	22.8	22.7
			25	0	1	22.7	22.8	22.7
		16QAM	1	0	1	23.0	23.0	23.3
			1	12	1	22.8	23.0	23.3
			1	24	1	22.9	23.0	23.4
			12	0	2	21.9	21.8	21.9
			12	6	2	21.8	21.9	21.9
			12	11	2	21.8	21.8	21.9
			25	0	2	21.7	21.8	21.8

Note(s):

15 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 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						815.5 MHz	831.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	23.8	23.8	23.8
			1	7	0	23.9	23.8	23.7
			1	14	0	23.7	23.7	23.6
			8	0	1	22.9	22.7	22.7
			8	4	1	22.8	22.7	22.6
			8	7	1	22.8	22.7	22.6
			15	0	1	22.9	22.8	22.8
		16QAM	1	0	1	22.9	22.6	23.1
			1	7	1	23.0	22.7	23.1
			1	14	1	22.8	22.6	23.0
			8	0	2	22.0	21.9	21.6
			8	4	2	22.0	21.8	21.6
			8	7	2	22.1	21.8	21.6
			15	0	2	21.8	21.8	21.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)		
						814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	23.7	23.7	23.6
			1	2	0	23.8	23.8	23.6
			1	5	0	23.7	23.7	23.5
			3	0	0	23.7	23.6	23.7
			3	1	0	23.7	23.8	23.7
			3	2	0	23.7	23.8	23.7
			6	0	1	22.7	22.7	22.5
		16QAM	1	0	1	22.8	23.0	22.6
			1	2	1	22.8	23.2	22.7
			1	5	1	22.8	23.0	22.6
			3	0	1	22.8	22.9	22.8
			3	1	1	22.9	23.0	22.9
			3	2	1	22.8	23.0	22.8
			6	0	2	21.8	21.7	21.8

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	22.1	22.5	21.7	22.5	21.8
			1	50	0	21.9	22.0	21.6	22.2	21.5
			1	99	0	22.3	22.1	22.0	22.4	21.8
			50	0	1	21.0	21.3	20.7	21.4	20.7
			50	25	1	21.0	21.1	20.7	21.3	20.7
			50	50	1	21.1	21.1	20.8	21.4	20.7
		16QAM	100	0	1	21.1	21.2	20.7	21.3	20.8
			1	0	1	21.2	21.4	20.7	21.5	20.8
			1	50	1	21.1	20.9	20.5	21.1	20.4
			1	99	1	21.4	21.1	20.9	21.3	20.7
			50	0	2	20.0	20.3	19.7	20.4	19.7
			50	25	2	20.0	20.1	19.7	20.2	19.7
			50	50	2	20.2	20.0	19.7	20.3	19.6
			100	0	2	20.0	20.1	19.7	20.3	19.7
LTE Band 41	15	QPSK	1	0	0	21.8	22.1	21.5	22.1	21.6
			1	36	0	21.7	21.6	21.4	21.9	21.3
			1	74	0	21.8	21.6	21.4	21.9	21.3
			36	0	1	20.9	21.1	20.6	21.2	20.6
			36	18	1	20.9	20.9	20.5	21.0	20.5
			36	37	1	20.9	20.8	20.6	21.0	20.5
			75	0	1	20.9	20.9	20.5	21.1	20.6
		16QAM	1	0	1	20.8	21.2	20.6	21.3	20.6
			1	36	1	20.7	20.9	20.5	21.0	20.3
			1	74	1	20.9	20.7	20.5	21.0	20.3
			36	0	2	19.8	20.0	19.5	20.2	19.5
			36	18	2	19.8	19.9	19.5	20.0	19.4
			36	37	2	19.9	19.8	19.5	20.0	19.4
			75	0	2	19.8	19.9	19.5	20.0	19.5
LTE Band 41	10	QPSK	1	0	0	22.0	22.0	21.4	21.9	21.7
			1	25	0	22.0	21.8	21.4	21.8	21.6
			1	49	0	22.1	21.8	21.4	21.8	21.6
			25	0	1	21.1	21.0	20.5	21.0	20.7
			25	12	1	21.1	20.9	20.4	20.9	20.6
			25	25	1	21.1	20.9	20.5	20.8	20.7
		16QAM	50	0	1	21.1	20.9	20.5	20.8	20.8
			1	0	1	21.0	21.0	20.4	20.7	20.7
			1	25	1	20.9	20.9	20.3	20.6	20.6
			1	49	1	21.0	20.8	20.4	20.6	20.7
			25	0	2	20.0	19.9	19.5	19.9	19.6
			25	12	2	20.1	19.8	19.4	19.8	19.6
			25	25	2	20.2	19.8	19.5	19.8	19.6
			50	0	2	20.1	19.9	19.5	19.8	19.7

LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	MPR	Max. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	5	QPSK	1	0	0	22.2	21.9	21.6	22.0	21.6
			1	12	0	22.2	21.8	21.6	22.0	21.6
			1	24	0	22.1	21.7	21.5	21.9	21.5
			12	0	1	21.1	20.9	20.5	20.8	20.7
			12	7	1	21.1	20.8	20.4	20.8	20.6
			12	13	1	21.1	20.9	20.4	20.8	20.6
		16QAM	25	0	1	21.1	20.8	20.4	20.8	20.6
			1	0	1	21.2	20.3	20.4	21.0	20.6
			1	12	1	21.3	20.4	20.4	20.9	20.5
			1	24	1	21.4	20.4	20.4	21.0	20.5
			12	0	2	20.1	19.9	19.5	19.7	19.7
			12	7	2	20.1	19.8	19.4	19.8	19.6
			12	13	2	20.0	19.9	19.4	19.8	19.6
			25	0	2	20.1	19.9	19.4	19.8	19.6

9.4. LTE Carrier Aggregation

PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	PCC UL# RB/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 8 Tx. Power [dBm]	LTE Rel 11 Tx. Power [dBm]
Band 2	20	18700	1860	RB 1/99	Band 2	20	900	1960	21.70	21.65
Band 2	20	18700	1860	RB 1/99	Band 4	20	2175	2132.5	21.70	21.68
Band 2	20	18700	1860	RB 1/99	Band 5	10	2525	881.5	21.70	21.66
Band 2	20	18700	1860	RB 1/99	Band 12	10	5095	737.5	21.70	21.59
Band 2	20	18700	1860	RB 1/99	Band 13	10	5230	751	21.70	21.61
Band 2	10	18900	1880	RB 1/0	Band 17	10	5790	740	21.59	21.48
Band 2	20	18700	1860	RB 1/99	Band 29	10	9715	722.5	21.70	21.70
Band 4	20	20050	1720	RB 1/99	Band 4	20	2175	2132.5	20.72	20.70
Band 4	20	20050	1720	RB 1/99	Band 5	10	2525	881.5	20.72	20.71
Band 4	10	20000	1715	RB 1/0	Band 7	20	3100	2655	20.85	20.80
Band 4	20	20050	1720	RB 1/99	Band 12	10	5095	737.5	20.72	20.60
Band 4	20	20050	1720	RB 1/99	Band 13	10	5230	751	20.72	20.60
Band 4	10	20000	1715	RB 1/0	Band 17	10	5790	740	20.85	20.80
Band 4	20	20050	1720	RB 1/99	Band 29	10	9715	722.5	20.72	20.60
Band 5	10	20450	829	RB 1/0	Band 7	20	3100	2655	23.76	23.80
Band 7	20	20850	2510	RB 1/0	Band 7	20	3100	2655	19.01	19.00
Band 7	20	21350	2560	RB 1/0	Band 7	20	3100	2655	18.92	18.90
Band 41	20	41055	2636.5	RB 1/0	Band 41	20	40620	2593	22.54	22.53

Note:

Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $\frac{1}{4}$ dBm

PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	PCC UL# RB/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC2 Band	SCC2 Bandwidth [MHz]	SCC2 (DL) Frequency [MHz]	SCC2 (DL) Channel	LTE Rel 8 Tx. Power [dBm]	LTE Rel 11 Tx. Power [dBm]
Band 2	20	18700	1860	RB 1/99	Band 2	20	900	1960	Band 13	10	5230	751	21.70	21.71
Band 2	20	18700	1860	RB 1/99	Band 4	20	2175	2132.5	Band 5	10	2525	881.5	21.70	21.72
Band 2	20	18700	1860	RB 1/99	Band 4	20	2175	2132.5	Band 12	10	5095	737.5	21.70	21.62
Band 2	20	18700	1860	RB 1/99	Band 4	20	2175	2132.5	Band 13	10	5230	751	21.70	21.71
Band 2	20	18700	1860	RB 1/99	Band 4	20	2175	2132.5	Band 29	10	9715	722.5	21.70	21.72
Band 4	20	20050	1720	RB 1/99	Band 4	20	2175	2132.5	Band 5	10	2525	881.5	20.72	20.70
Band 4	20	20050	1720	RB 1/99	Band 4	20	2175	2132.5	Band 12	10	5095	737.5	20.72	20.70
Band 4	20	20050	1720	RB 1/99	Band 4	20	2175	2132.5	Band 13	10	5230	751	20.72	20.70

Note:

Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $\frac{1}{4}$ dBm

9.5. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0			Chain 1		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
2.4	802.11b	1 Mbps	1	2412	12.9	14.2	Yes	7.6	9.0	No
			6	2437	13.0			7.5		
			11	2462	12.9			7.7		
	802.11g	6 Mbps	1	2412	Not Required	14.8	No	Not Required	9.7	No
			6	2437						
			11	2462						
	802.11n (HT20)	6.5 Mbps	1	2412	Not Required	14.9	No	Not Required	9.7	No
			6	2437						
			11	2462						

Note(s):

- Output Power and SAR is not required for 802.11g/n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
- Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are not greater than those for the default test channels.
- Wi-Fi 2.4GHz Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

9.6. Wi-Fi 5GHz (U-NII Bands)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0			Chain 1		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
5.2 UNII-1	802.11a	6 Mbps	36	5180	11.06	11.9	No	5.4	6.4	No
			40	5200	11.05			5.3		
			44	5220	11.00			5.5		
			48	5240	11.11			5.4		
	802.11n (HT20)	6.5 Mbps	36	5180	11.10	11.8	No	5.4	6.4	No
			40	5200	11.15			5.4		
			44	5220	11.17			5.3		
			48	5240	11.21			5.4		
	802.11n (HT40)	13.5 Mbps	38	5190	11.47	11.9	No	6.1	7.2	No
			46	5230	11.48			6.3		
	802.11ac (VHT20)	6.5 Mbps	36	5180	11.10	11.8	No	5.3	6.4	No
			40	5200	11.19			5.4		
			44	5220	11.17			5.3		
			48	5240	11.37			5.3		
	802.11ac (VHT40)	13.5 Mbps	38	5190	11.21	11.9	No	6.4	7.2	No
			46	5230	11.44			6.1		
	802.11ac (VHT80)	29.3 Mbps	42	5210	11.21	11.9	Yes	5.7	7.0	No
5.3 UNII-2A	802.11a	6 Mbps	52	5260	10.58	11.3	No	4.5	5.4	No
			56	5280	10.54			4.6		
			60	5300	10.62			4.6		
			64	5320	10.66			4.5		
	802.11n (HT20)	6.5 Mbps	52	5260	10.92	11.5	No	4.7	5.5	No
			56	5280	10.96			4.6		
			60	5300	10.92			4.6		
			64	5320	10.85			4.6		
	802.11n (HT40)	13.5 Mbps	54	5270	11.32	11.8	No	4.7	5.9	No
			62	5310	11.28			4.7		
	802.11ac (VHT20)	6.5 Mbps	52	5260	10.94	11.5	No	4.5	5.5	No
			56	5280	11.23			4.5		
			60	5300	11.09			4.6		
			64	5320	11.07			4.6		
	802.11ac (VHT40)	13.5 Mbps	54	5270	11.31	11.8	No	4.7	5.9	No
			62	5310	11.21			4.7		
	802.11ac (VHT80)	29.3 Mbps	58	5290	10.8	11.6	No	4.8	5.7	No

Note(s):

- Output Power and SAR measurement is not required for 802.11 transmission modes when the specified tune-up tolerances for these modes are lower than the other transmission modes by more than ½ dB and the measured SAR is ≤ 1.2 W/Kg.
- When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
- UNII band I and UNII band 2A:
 - When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.
- Wi-Fi 5GHz Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

Measured Results (continued)

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0			Chain 1		
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)
UNII-2C	802.11a	6 Mbps	100	5500	9.91	10.5	No	5.3	6.2	No
			116	5580	9.89			5.0		
			124	5620	9.7			5.3		
			144	1720	9.7			5.4		
	802.11n (HT20)	6.5 Mbps	100	5500	9.6	10.4	No	5.2	6.1	No
			116	5580	9.71			5.3		
			124	5620	9.7			5.4		
			144	1720	9.7			5.5		
	802.11n (HT40)	13.5 Mbps	102	5510	9.84	10.6	Yes	5.5	6.9	No
			118	5590	9.8			6.1		
			134	5670	9.79			5.7		
	802.11ac (VHT20)	6.5 Mbps	100	5500	9.71	10.4	No	4.9	6.1	No
			116	5580	9.68			5.3		
			124	5620	9.7			5.1		
			144	1720	9.7			5.4		
	802.11ac (VHT40)	13.5 Mbps	102	5510	9.9	10.6	No	5.7	6.9	No
			118	5590	9.8			6.0		
			134	5670	9.74			5.8		
	802.11ac (VHT80)	29.3 Mbps	106	5530	9.65	10.5	No	5.6	6.9	No
			122	5610	9.9			5.9		
UNII-3	802.11a	6 Mbps	149	5745	10.3	11.0	No	5.6	6.5	No
			157	5785	10.45			5.7		
			165	5825	10.53			5.7		
	802.11n (HT20)	6.5 Mbps	149	5745	10.32	11.1	No	5.6	6.5	No
			157	5785	10.38			5.8		
			165	5825	10.35			5.5		
	802.11n (HT40)	13.5 Mbps	151	5755	10.51	11.2	Yes	5.9	7.0	No
			159	5795	10.47			6.1		
	802.11ac (VHT20)	6.5 Mbps	149	5745	10.26	11.1	No	5.6	6.5	No
			157	5785	10.41			5.6		
			165	5825	10.31			5.7		
	802.11ac (VHT40)	13.5 Mbps	151	5755	10.47	11.2	No	5.9	7.0	No
			159	5795	10.51			6.1		
	802.11ac (VHT80)	29.3 Mbps	155	5775	9.92	11.0	No	5.7	6.8	No

Note(s):

- Output Power and SAR measurement is not required for 802.11 transmission modes when the specified tune-up tolerances for these modes are lower than the other transmission modes by more than ½ dB and the measured SAR is ≤ 1.2 W/Kg.
- When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
- Wi-Fi 5GHz Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

9.7. Bluetooth

Maximum tune-up tolerance limit is 11.80 dBm. This power level qualifies for exclusion of SAR testing. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

10. 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 648474 D04 Handset SAR (Phablet Only):

When Hotspot Mode is not supported, 10-g Extremity SAR is required for all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.

Additional 1-g SAR testing at 5 mm is not required when hotspot mode 10-g extremity SAR is not required for the surfaces and edges since all 1-g reported SAR < 1.2 W/kg.

KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

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.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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; therefore, the requirement for H, M and L channels may not fully apply.

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions are tested.
 - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
 - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.
 - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	190	836.6	28.7	27.4	0.156	0.210	1
			Left Tilt	190	836.6	28.7	27.4	0.047	0.063	
			Right Touch	190	836.6	28.7	27.4	0.126	0.170	
			Right Tilt	190	836.6	28.7	27.4	0.070	0.095	
Body-worn	GPRS 4 Slots	15	Rear	190	836.6	28.7	27.4	0.152	0.205	2
			Front	190	836.6	28.7	27.4	0.147	0.198	
Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.7	27.4	0.210	0.283	3
			Front	190	836.6	28.7	27.4	0.173	0.233	
			Edge 2	190	836.6	28.7	27.4	0.079	0.107	
			Edge 3	190	836.6	28.7	27.4	0.115	0.155	
			Edge 4	190	836.6	28.7	27.4	0.183	0.247	
Hotspot	DTM CS + 1 Slot	10	Rear	190	836.6	31.7	30.8	0.185	0.228	

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	GPRS 4 Slots	0	Left Touch	661	1880.0	25.2	24.2	0.107	0.135	4
			Left Tilt	661	1880.0	25.2	24.2	0.036	0.045	
			Right Touch	661	1880.0	25.2	24.2	0.106	0.133	
			Right Tilt	661	1880.0	25.2	24.2	0.036	0.045	
Body-worn	GPRS 4 Slots	15	Rear	661	1880.0	25.2	24.2	0.185	0.233	
			Front	661	1880.0	25.2	24.2	0.231	0.291	5
Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	25.2	24.2	0.310	0.390	
			Front	661	1880.0	25.2	24.2	0.432	0.544	6
			Edge 2	661	1880.0	25.2	24.2	0.066	0.083	
			Edge 3	661	1880.0	25.2	24.2	0.263	0.331	
			Edge 4	661	1880.0	25.2	24.2	0.361	0.454	
Hotspot	DTM CS + 1 Slot	10	Front	661	1880.0	28.2	27.4	0.335	0.403	

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	9400	1880.0	22.0	21.3	0.090	0.106	
			Left Tilt	9400	1880.0	22.0	21.3	0.046	0.054	
			Right Touch	9400	1880.0	22.0	21.3	0.114	0.135	7
			Right Tilt	9400	1880.0	22.0	21.3	0.046	0.054	
Body-worn	Rel 99 RMC	15	Rear	9400	1880.0	22.0	21.3	0.202	0.239	
			Front	9400	1880.0	22.0	21.3	0.235	0.278	8
Hotspot	Rel 99 RMC	10	Rear	9400	1880.0	22.0	21.3	0.441	0.522	
			Front	9400	1880.0	22.0	21.3	0.501	0.593	9
			Edge 2	9400	1880.0	22.0	21.3	0.080	0.095	
			Edge 3	9400	1880.0	22.0	21.3	0.338	0.400	
			Edge 4	9400	1880.0	22.0	21.3	0.416	0.492	

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	1413	1732.6	20.5	19.9	0.107	0.123	
			Left Tilt	1413	1732.6	20.5	19.9	0.042	0.048	
			Right Touch	1413	1732.6	20.5	19.9	0.121	0.140	10
			Right Tilt	1413	1732.6	20.5	19.9	0.043	0.050	
Body-worn	Rel 99 RMC	15	Rear	1413	1732.6	20.5	19.9	0.272	0.314	11
			Front	1413	1732.6	20.5	19.9	0.228	0.263	
Hotspot	Rel 99 RMC	10	Rear	1413	1732.6	20.5	19.9	0.459	0.529	
			Front	1413	1732.6	20.5	19.9	0.476	0.549	
			Edge 2	1413	1732.6	20.5	19.9	0.058	0.067	
			Edge 3	1413	1732.6	20.5	19.9	0.309	0.356	
			Edge 4	1413	1732.6	20.5	19.9	0.499	0.576	12

10.5. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	4183	836.6	25.0	24.0	0.167	0.213	13
			Left Tilt	4183	836.6	25.0	24.0	0.112	0.143	
			Right Touch	4183	836.6	25.0	24.0	0.152	0.194	
			Right Tilt	4183	836.6	25.0	24.0	0.105	0.134	
Body-worn	Rel 99 RMC	15	Rear	4183	836.6	25.0	24.0	0.240	0.306	14
			Front	4183	836.6	25.0	24.0	0.211	0.269	
Hotspot	Rel 99 RMC	10	Rear	4183	836.6	25.0	24.0	0.273	0.348	15
			Front	4183	836.6	25.0	24.0	0.236	0.301	
			Edge 2	4183	836.6	25.0	24.0	0.125	0.159	
			Edge 3	4183	836.6	25.0	24.0	0.146	0.186	
			Edge 4	4183	836.6	25.0	24.0	0.253	0.322	

10.7. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	18900	1880.0	1	99	22.5	21.6	0.136	0.166	16
						50	50	21.5	20.4	0.096	0.124	
			Left Tilt	18900	1880.0	1	99	22.5	21.6	0.036	0.044	
						50	50	21.5	20.4	0.029	0.037	
			Right Touch	18900	1880.0	1	99	22.5	21.6	0.118	0.144	
						50	50	21.5	20.4	0.099	0.128	
			Right Tilt	18900	1880.0	1	99	22.5	21.6	0.048	0.058	
						50	50	21.5	20.4	0.039	0.050	
Body-worn	QPSK	15	Rear	18900	1880.0	1	99	22.5	21.6	0.238	0.290	
						50	50	21.5	20.4	0.187	0.242	
			Front	18900	1880.0	1	99	22.5	21.6	0.273	0.333	17
						50	50	21.5	20.4	0.212	0.274	
Hotspot	QPSK	10	Rear	18900	1880.0	1	99	22.5	21.6	0.456	0.556	
						50	50	21.5	20.4	0.356	0.460	
			Front	18900	1880.0	1	99	22.5	21.6	0.546	0.665	18
						50	50	21.5	20.4	0.368	0.476	
			Edge 2	18900	1880.0	1	99	22.5	21.6	0.059	0.072	
						50	50	21.5	20.4	0.053	0.069	
			Edge 3	18900	1880.0	1	99	22.5	21.6	0.343	0.418	
						50	50	21.5	20.4	0.256	0.331	
			Edge 4	18900	1880.0	1	99	22.5	21.6	0.462	0.563	
						50	50	21.5	20.4	0.369	0.477	

10.8. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	20175	1732.5	1	99	21.5	20.6	0.154	0.187	19
						50	50	20.5	19.3	0.116	0.152	
			Left Tilt	20175	1732.5	1	99	21.5	20.6	0.051	0.062	
						50	50	20.5	19.3	0.038	0.050	
			Right Touch	20175	1732.5	1	99	21.5	20.6	0.148	0.180	
						50	50	20.5	19.3	0.112	0.146	
			Right Tilt	20175	1732.5	1	99	21.5	20.6	0.048	0.058	
						50	50	20.5	19.3	0.038	0.050	
Body-worn	QPSK	15	Rear	20175	1732.5	1	99	21.5	20.6	0.280	0.341	
						50	50	20.5	19.3	0.223	0.292	
			Front	20175	1732.5	1	99	21.5	20.6	0.285	0.347	20
						50	50	20.5	19.3	0.222	0.290	
Hotspot	QPSK	10	Rear	20175	1732.5	1	99	21.5	20.6	0.502	0.611	
						50	50	20.5	19.3	0.392	0.512	
			Front	20175	1732.5	1	99	21.5	20.6	0.578	0.703	
						50	50	20.5	19.3	0.453	0.592	
			Edge 2	20175	1732.5	1	99	21.5	20.6	0.070	0.085	
						50	50	20.5	19.3	0.051	0.067	
			Edge 3	20175	1732.5	1	99	21.5	20.6	0.387	0.471	
						50	50	20.5	19.3	0.290	0.379	
			Edge 4	20175	1732.5	1	99	21.5	20.6	0.657	0.799	21
						50	50	20.5	19.3	0.496	0.648	

10.9. LTE Band 5 (10MHz Bandwidth)

SAR for LTE Band 5 is covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.10. LTE Band 7 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	21100	2535.0	1	0	20.0	18.9	0.208	0.268	22
						50	0	19.0	17.7	0.160	0.217	
			Left Tilt	21100	2535.0	1	0	20.0	18.9	0.069	0.089	
						50	0	19.0	17.7	0.051	0.069	
			Right Touch	21100	2535.0	1	0	20.0	18.9	0.385	0.496	
						50	0	19.0	17.7	0.306	0.415	
			Right Tilt	21100	2535.0	1	0	20.0	18.9	0.064	0.082	
						50	0	19.0	17.7	0.044	0.060	
Body-worn	QPSK	15	Rear	21100	2535.0	1	0	20.0	18.9	0.097	0.125	23
						50	0	19.0	17.7	0.076	0.103	
			Front	21100	2535.0	1	0	20.0	18.9	0.198	0.255	
						50	0	19.0	17.7	0.151	0.205	
Hotspot	QPSK	10	Rear	21100	2535.0	1	0	20.0	18.9	0.182	0.234	24
						50	0	19.0	17.7	0.140	0.190	
			Front	21100	2535.0	1	0	20.0	18.9	0.398	0.513	
						50	0	19.0	17.7	0.309	0.420	
			Edge 2	21100	2535.0	1	0	20.0	18.9	0.257	0.331	
						50	0	19.0	17.7	0.199	0.270	
			Edge 3	21100	2535.0	1	0	20.0	18.9	0.105	0.135	
						50	0	19.0	17.7	0.087	0.118	
			Edge 4	21100	2535.0	1	0	20.0	18.9	0.053	0.068	
						50	0	19.0	17.7	0.040	0.054	

10.11. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	23095	707.5	1	0	24.5	24.1	0.079	0.087	25
						25	0	23.5	22.9	0.062	0.071	
			Left Tilt	23095	707.5	1	0	24.5	24.1	0.046	0.051	
						25	0	23.5	22.9	0.034	0.039	
			Right Touch	23095	707.5	1	0	24.5	24.1	0.057	0.063	
						25	0	23.5	22.9	0.046	0.053	
			Right Tilt	23095	707.5	1	0	24.5	24.1	0.039	0.043	
						25	0	23.5	22.9	0.033	0.038	
Body-worn	QPSK	15	Rear	23095	707.5	1	0	24.5	24.1	0.083	0.092	26
						25	0	23.5	22.9	0.068	0.078	
			Front	23095	707.5	1	0	24.5	24.1	0.094	0.104	
						25	0	23.5	22.9	0.076	0.087	
Hotspot	QPSK	10	Rear	23095	707.5	1	0	24.5	24.1	0.092	0.102	27
						25	0	23.5	22.9	0.075	0.086	
			Front	23095	707.5	1	0	24.5	24.1	0.111	0.123	
						25	0	23.5	22.9	0.088	0.101	
			Edge 2	23095	707.5	1	0	24.5	24.1	0.082	0.091	
						25	0	23.5	22.9	0.063	0.073	
			Edge 3	23095	707.5	1	0	24.5	24.1	0.036	0.040	
						25	0	23.5	22.9	0.031	0.036	
			Edge 4	23095	707.5	1	0	24.5	24.1	0.221	0.245	
						25	0	23.5	22.9	0.173	0.199	

10.12. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	23230	782.0	1	49	24.0	23.1	0.124	0.152	28
						25	12	23.0	22.1	0.092	0.113	
			Left Tilt	23230	782.0	1	49	24.0	23.1	0.071	0.087	
						25	12	23.0	22.1	0.055	0.067	
			Right Touch	23230	782.0	1	49	24.0	23.1	0.102	0.125	
						25	12	23.0	22.1	0.073	0.089	
			Right Tilt	23230	782.0	1	49	24.0	23.1	0.064	0.079	
						25	12	23.0	22.1	0.045	0.055	
Body-worn	QPSK	15	Rear	23230	782.0	1	49	24.0	23.1	0.174	0.213	29
						25	12	23.0	22.1	0.123	0.151	
			Front	23230	782.0	1	49	24.0	23.1	0.165	0.202	
						25	12	23.0	22.1	0.118	0.145	
Hotspot	QPSK	10	Rear	23230	782.0	1	49	24.0	23.1	0.194	0.238	
						25	12	23.0	22.1	0.143	0.175	
			Front	23230	782.0	1	49	24.0	23.1	0.196	0.240	
						25	12	23.0	22.1	0.147	0.180	
			Edge 2	23230	782.0	1	49	24.0	23.1	0.108	0.133	
						25	12	23.0	22.1	0.075	0.092	
			Edge 3	23230	782.0	1	49	24.0	23.1	0.092	0.113	
						25	12	23.0	22.1	0.068	0.083	
			Edge 4	23230	782.0	1	49	24.0	23.1	0.222	0.272	30
						25	12	23.0	22.1	0.173	0.212	

10.13. LTE Band 17 (10MHz Bandwidth)

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.14. LTE Band 26 (15MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	26865	831.5	1	37	24.5	23.7	0.164	0.196	31
						36	39	23.5	22.5	0.130	0.162	
			Left Tilt	26865	831.5	1	37	24.5	23.7	0.085	0.102	
						36	39	23.5	22.5	0.063	0.079	
			Right Touch	26865	831.5	1	37	24.5	23.7	0.134	0.160	
						36	39	23.5	22.5	0.117	0.146	
			Right Tilt	26865	831.5	1	37	24.5	23.7	0.074	0.089	
						36	39	23.5	22.5	0.066	0.082	
Body-worn	QPSK	15	Rear	26865	831.5	1	37	24.5	23.7	0.142	0.170	32
						36	39	23.5	22.5	0.123	0.153	
			Front	26865	831.5	1	37	24.5	23.7	0.140	0.168	
						36	39	23.5	22.5	0.118	0.147	
Hotspot	QPSK	10	Rear	26865	831.5	1	37	24.5	23.7	0.213	0.255	33
						36	39	23.5	22.5	0.184	0.230	
			Front	26865	831.5	1	37	24.5	23.7	0.186	0.223	
						36	39	23.5	22.5	0.155	0.193	
			Edge 2	26865	831.5	1	37	24.5	23.7	0.083	0.099	
						36	39	23.5	22.5	0.067	0.084	
			Edge 3	26865	831.5	1	37	24.5	23.7	0.139	0.166	
						36	39	23.5	22.5	0.111	0.138	
			Edge 4	26865	831.5	1	37	24.5	23.7	0.155	0.185	
						36	39	23.5	22.5	0.134	0.167	

10.15. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	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	
Head	QPSK	0	Left Touch	40620	2593.0	1	99	23.0	22.0	0.229	0.286	
						50	50	22.0	20.8	0.181	0.241	
			Left Tilt	40620	2593.0	1	99	23.0	22.0	0.105	0.131	
						50	50	22.0	20.8	0.084	0.112	
			Right Touch	40620	2593.0	1	99	23.0	22.0	0.423	0.529	
						50	50	22.0	20.8	0.329	0.437	
			Right Tilt	40620	2593.0	1	99	23.0	22.0	0.045	0.056	
						50	50	22.0	20.8	0.035	0.047	
Body-worn	QPSK	15	Rear	40620	2593.0	1	99	23.0	22.0	0.151	0.189	
						50	50	22.0	20.8	0.114	0.152	
			Front	40620	2593.0	1	99	23.0	22.0	0.174	0.217	
						50	50	22.0	20.8	0.123	0.164	
Hotspot	QPSK	10	Rear	40620	2593.0	1	99	23.0	22.0	0.290	0.362	
						50	50	22.0	20.8	0.234	0.311	
			Front	26865	831.5	1	99	23.0	22.0	0.357	0.446	
						36	50	22.0	20.8	0.283	0.376	
			Edge 2	40620	2593.0	1	99	23.0	22.0	0.242	0.302	
						50	50	22.0	20.8	0.195	0.259	
			Edge 3	40620	2593.0	1	99	23.0	22.0	0.135	0.169	
						50	50	22.0	20.8	0.101	0.134	
			Edge 4	40620	2593.0	1	99	23.0	22.0	0.027	0.034	
						50	50	22.0	20.8	0.022	0.029	

10.16. Wi-Fi (DTS Band)

Frequency Band	Mode	Antenna	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Chain 0	Head	0	Left Touch	6	2437.0	0.665	14.2	13.0	0.401	0.529	37
					Left Tilt	6	2437.0	0.157	14.2	13.0			
					Right Touch	6	2437.0	0.167	14.2	13.0	0.149	0.196	
					Right Tilt	6	2437.0	0.079	14.2	13.0			
			Body-worn	15	Rear	6	2437.0	0.024	14.2	13.0			
					Front	6	2437.0	0.053	14.2	13.0	0.042	0.055	38
			Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.053	14.2	13.0			
					Front	6	2437.0	0.110	14.2	13.0			
					Edge 1	6	2437.0	0.011	14.2	13.0			
					Edge 2	6	2437.0	0.118	14.2	13.0	0.095	0.125	39

Notes:

Wi-Fi 2.4GHz Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

10.17. Wi-Fi (U-NII Band)

Frequency Band	Mode	Antenna	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.2 GHz U-NII 1	802.11ac VHT80	Chain 0	Head	0	Left Touch	42	5210.0	0.227	11.9	11.2	0.370	0.434			40
					Left Tilt	42	5210.0	0.032	11.9	11.2					
					Right Touch	42	5210.0	0.082	11.9	11.2	0.088	0.103			
					Right Tilt	42	5210.0	0.024	11.9	11.2					
			Body-worn	15	Rear	42	5210.0	0.012	11.9	11.2					
					Front	42	5210.0	0.053	11.9	11.2	0.023	0.027			41
			Extremity	0	Rear	42	5210.0	0.235	11.9	11.2					
					Front	42	5210.0	3.140	11.9	11.2			0.158	0.185	42
					Edge 1	42	5210.0	0.021	11.9	11.2					
					Edge 2	42	5210.0	2.140	11.9	11.2					
Frequency Band	Mode	Antenna	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.5 GHz U-NII 2C	802.11n HT40	Chain 0	Head	0	Left Touch	102	5510.0	1.230	10.6	9.8	0.680	0.810			43
					Left Tilt	118	5590.0		10.6	9.8	0.534	0.642			
					Right Touch	102	5510.0	0.152	10.6	9.8					
					Right Tilt	102	5510.0	0.239	10.6	9.8	0.139	0.166			
			Body-worn	15	Rear	102	5510.0	0.022	10.6	9.8					
					Front	102	5510.0	0.075	10.6	9.8	0.033	0.039			44
			Extremity	0	Rear	102	5510.0	0.334	10.6	9.8					
					Front	102	5510.0	3.020	10.6	9.8			0.211	0.251	45
					Edge 1	102	5510.0	0.015	10.6	9.8					
					Edge 2	102	5510.0	2.150	10.6	9.8					
Frequency Band	Mode	Antenna	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.8 GHz U-NII 3	802.11n HT40	Chain 0	Head	0	Left Touch	151	5755.0	0.179	11.2	10.5	0.386	0.452			46
					Left Tilt	151	5755.0	0.025	11.2	10.5					
					Right Touch	151	5755.0	0.083	11.2	10.5	0.068	0.080			
					Right Tilt	151	5755.0	0.022	11.2	10.5					
			Body-worn	15	Rear	151	5755.0	0.012	11.2	10.5					
					Front	151	5755.0	0.035	11.2	10.5	0.016	0.019			47
			Extremity	0	Rear	151	5755.0	0.185	11.2	10.5					
					Front	151	5755.0	1.410	11.2	10.5			0.091	0.107	48
					Edge 1	151	5755.0	0.011	11.2	10.5					
					Edge 2	151	5755.0	1.170	11.2	10.5					

Notes:

Wi-Fi 5GHz Antenna Chain 1 qualifies for SAR Test Exclusion. Refer to §10.18 for SAR Test Exclusion and Estimated SAR.

10.18. Standalone SAR Test Exclusion Considerations & Estimated SAR

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f_{(\text{GHz})}}/x]$ W/kg for test separation distances ≤ 50 mm;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

RF Air interface	Antenna	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 1-g SAR (W/kg)
				(dBm)	(mW)			
Wi-Fi 2.4GHz	Chain 1	Head	2.472	9.7	9	5	2.8	0.377
Wi-Fi 5GHz	Chain 1	Head	5.825	7.2	5	5	2.4	0.322

RF Air interface	Antenna	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 1-g SAR (W/kg)
				(dBm)	(mW)			
Wi-Fi 2.4GHz	Chain 1	Body-w orn	2.472	9.7	9	15	0.9	0.126
Bluetooth	Chain 1	Body-w orn	2.480	11.8	15	15	1.6	0.210
Wi-Fi 5GHz	Chain 1	Body-w orn	5.825	7.2	5	15	0.8	0.107

RF Air interface	Antenna	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 1-g SAR (W/kg)
				(dBm)	(mW)			
Wi-Fi 2.4GHz	Chain 1	Hotspot/ Wi-Fi Direct	2.472	9.7	9	10	1.4	0.189

Conclusion:

*: The computed value is ≤ 3 ; therefore, this qualifies for Standalone SAR test exclusion.

RF Air interface	Antenna	RF Exposure Conditions	Frequency (GHz)	Max. tune-up tolerance Power		Min. test separation distance (mm)	SAR test exclusion Result*	Estimated 10-g SAR (W/kg)
				(dBm)	(mW)			
Wi-Fi 5GHz	Chain1	Extremity	5.825	7.2	5	5	2.4	0.129

Conclusion:

*: The computed value is ≤ 7.5 ; therefore, this qualifies for Standalone SAR test exclusion.

11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. 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 <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), 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 3 (1-g or 10-g respectively) or when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg ($\sim 10\%$ from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 or 3 (1-g or 10-g respectively).

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
700	LTE Band 12	Hotspot	Edge 4	No	0.221
	LTE Band 13	Hotspot	Edge 4	No	0.222
850	GSM 850	Body & Hotspot	Rear	No	0.210
	WCDMA Band V	Hotspot	Rear	No	0.273
	LTE Band 26	Hotspot	Rear	No	0.213
1900	GSM 1900	Body & Hotspot	Front	No	0.432
	WCDMA Band II	Hotspot	Front	No	0.501
	LTE Band 2	Hotspot	Front	No	0.546
1700	LTE Band 4	Hotspot	Edge 4	No	0.657
	WCDMA Band IV	Hotspot	Edge 4	No	0.499
2400	Wi-Fi 802.11b/g/n	Head	Left Touch	No	0.401
2600	LTE Band 7	Hotspot	Front	No	0.398
	LTE Band 41	Head	Right Touch	No	0.423
5200	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.370
5500	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.680
5800	Wi-Fi 802.11a/n/ac	Head	Left Touch	No	0.386

Note(s):

Repeated measurement is not required when the original highest measured SAR is <0.8 (1-g).

Extremity:

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)
5200	Wi-Fi 802.11a/n/ac	Extremity	Front	No	0.158
5500	Wi-Fi 802.11a/n/ac	Extremity	Front	No	0.211
5800	Wi-Fi 802.11a/n/ac	Extremity	Front	No	0.091

Note(s):

Repeated measurement is not required when the original highest measured SAR is < 2 W/kg (10-g).

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

Case	Cellular	WLAN/BT Main	WLAN/BT Sub	Note
1	GSM/GPRS/EDGE	BT/BLE	(None)	
2		WLAN 2.4G	WLAN 2.4G	
3		WLAN 5G	WLAN 5G	
4	UMTS/HSPA	BT/BLE	(None)	
5		WLAN 2.4G	WLAN 2.4G	
6		WLAN 5G	WLAN 5G	
7	LTE	BT/BLE	(None)	
8		WLAN 2.4G	WLAN 2.4G	
9		WLAN 5G	WLAN 5G	
10	(None)	BT/BLE WLAN 5G	WLAN 5G	
11	GSM/GPRS/EDGE	BT/BLE WLAN 5G	WLAN 5G	
12	UMTS/HSPA	BT/BLE WLAN 5G	WLAN 5G	
13	LTE	BT/BLE WLAN 5G	WLAN 5G	
14	GSM/GPRS/EDGE	WLAN 2.4G	WLAN 5G	
15		WLAN 5G	WLAN 2.4G	
16	UMTS/HSPA	WLAN 2.4G	WLAN 5G	
17		WLAN 5G	WLAN 2.4G	
18	LTE	WLAN 2.4G	WLAN 5G	
19		WLAN 5G	WLAN 2.4G	

12.1. Sum of the SAR for GSM850 & Wi-Fi DTS

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.210	0.629	0.377	0.810	0.322		1.216	1.342	1.161	1.397		
	Left Tilt	0.063	0.629	0.377	0.810	0.322		1.069	1.195	1.014	1.250		
	Right Touch	0.170	0.196	0.377	0.166	0.322		0.743	0.658	0.688	0.713		
	Right Tilt	0.095	0.196	0.377	0.166	0.322		0.668	0.583	0.613	0.638		
Body-worn	Rear	0.205	0.055	0.126	0.039	0.107	0.210	0.386	0.351	0.367	0.370	0.561	0.580
	Front	0.198	0.055	0.126	0.039	0.107	0.210	0.379	0.344	0.360	0.363	0.554	0.573
Hotspot	Rear	0.283	0.125	0.189				0.597	0.283	0.408	0.472		
	Front	0.233	0.125	0.189				0.547	0.233	0.358	0.422		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.107	0.125	0.189				0.421	0.107	0.232	0.296		
	Edge 3	0.155						0.155	0.155	0.155	0.155		
	Edge 4	0.247						0.247	0.247	0.247	0.247		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.135	0.629	0.377	0.810	0.322		1.141	1.267	1.086	1.322		
	Left Tilt	0.045	0.629	0.377	0.810	0.322		1.051	1.177	0.996	1.232		
	Right Touch	0.133	0.196	0.377	0.166	0.322		0.706	0.621	0.651	0.676		
	Right Tilt	0.045	0.196	0.377	0.166	0.322		0.618	0.533	0.563	0.588		
Body-worn	Rear	0.233	0.055	0.126	0.039	0.107	0.210	0.414	0.379	0.395	0.398	0.589	0.608
	Front	0.291	0.055	0.126	0.039	0.107	0.210	0.472	0.437	0.453	0.456	0.647	0.666
Hotspot	Rear	0.390	0.125	0.189				0.704	0.390	0.515	0.579		
	Front	0.544	0.125	0.189				0.858	0.544	0.669	0.733		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.083	0.125	0.189				0.397	0.083	0.208	0.272		
	Edge 3	0.331						0.331	0.331	0.331	0.331		
	Edge 4	0.454						0.454	0.454	0.454	0.454		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.106	0.629	0.377	0.810	0.322		1.112	1.238	1.057	1.293		
	Left Tilt	0.054	0.629	0.377	0.810	0.322		1.060	1.186	1.005	1.241		
	Right Touch	0.135	0.196	0.377	0.166	0.322		0.708	0.623	0.653	0.678		
	Right Tilt	0.054	0.196	0.377	0.166	0.322		0.627	0.542	0.572	0.597		
Body-worn	Rear	0.239	0.055	0.126	0.039	0.107	0.210	0.420	0.385	0.401	0.404	0.595	0.614
	Front	0.278	0.055	0.126	0.039	0.107	0.210	0.459	0.424	0.440	0.443	0.634	0.653
Hotspot	Rear	0.522	0.125	0.189				0.836	0.522	0.647	0.711		
	Front	0.593	0.125	0.189				0.907	0.593	0.718	0.782		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.095	0.125	0.189				0.409	0.095	0.220	0.284		
	Edge 3	0.400						0.400	0.400	0.400	0.400		
	Edge 4	0.492						0.492	0.492	0.492	0.492		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.123	0.629	0.377	0.810	0.322		1.129	1.255	1.074	1.310		
	Left Tilt	0.048	0.629	0.377	0.810	0.322		1.054	1.180	0.999	1.235		
	Right Touch	0.140	0.196	0.377	0.166	0.322		0.713	0.628	0.658	0.683		
	Right Tilt	0.050	0.196	0.377	0.166	0.322		0.623	0.538	0.568	0.593		
Body-worn	Rear	0.314	0.055	0.126	0.039	0.107	0.210	0.495	0.460	0.476	0.479	0.670	0.689
	Front	0.263	0.055	0.126	0.039	0.107	0.210	0.444	0.409	0.425	0.428	0.619	0.638
Hotspot	Rear	0.529	0.125	0.189				0.843	0.529	0.654	0.718		
	Front	0.549	0.125	0.189				0.863	0.549	0.674	0.738		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.067	0.125	0.189				0.381	0.067	0.192	0.256		
	Edge 3	0.356						0.356	0.356	0.356	0.356		
	Edge 4	0.576						0.576	0.576	0.576	0.576		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.213	0.629	0.377	0.810	0.322		1.219	1.345	1.164	1.400		
	Left Tilt	0.143	0.629	0.377	0.810	0.322		1.149	1.275	1.094	1.330		
	Right Touch	0.194	0.196	0.377	0.166	0.322		0.767	0.682	0.712	0.737		
	Right Tilt	0.134	0.196	0.377	0.166	0.322		0.707	0.622	0.652	0.677		
Body-worn	Rear	0.306	0.055	0.126	0.039	0.107	0.210	0.487	0.452	0.468	0.471	0.662	0.681
	Front	0.269	0.055	0.126	0.039	0.107	0.210	0.450	0.415	0.431	0.434	0.625	0.644
Hotspot	Rear	0.348	0.125	0.189				0.662	0.348	0.473	0.537		
	Front	0.301	0.125	0.189				0.615	0.301	0.426	0.490		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.159	0.125	0.189				0.473	0.159	0.284	0.348		
	Edge 3	0.186						0.186	0.186	0.186	0.186		
	Edge 4	0.322						0.322	0.322	0.322	0.322		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.166	0.629	0.377	0.810	0.322		1.172	1.298	1.117	1.353		
	Left Tilt	0.044	0.629	0.377	0.810	0.322		1.050	1.176	0.995	1.231		
	Right Touch	0.144	0.196	0.377	0.166	0.322		0.717	0.632	0.662	0.687		
	Right Tilt	0.058	0.196	0.377	0.166	0.322		0.631	0.546	0.576	0.601		
Body-worn	Rear	0.290	0.055	0.126	0.039	0.107	0.210	0.471	0.436	0.452	0.455	0.646	0.665
	Front	0.333	0.055	0.126	0.039	0.107	0.210	0.514	0.479	0.495	0.498	0.689	0.708
Hotspot	Rear	0.556	0.125	0.189				0.870	0.556	0.681	0.745		
	Front	0.665	0.125	0.189				0.979	0.665	0.790	0.854		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.072	0.125	0.189				0.386	0.072	0.197	0.261		
	Edge 3	0.418						0.418	0.418	0.418	0.418		
	Edge 4	0.563						0.563	0.563	0.563	0.563		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.187	0.629	0.377	0.810	0.322		1.193	1.319	1.138	1.374		
	Left Tilt	0.062	0.629	0.377	0.810	0.322		1.068	1.194	1.013	1.249		
	Right Touch	0.180	0.196	0.377	0.166	0.322		0.753	0.668	0.698	0.723		
	Right Tilt	0.058	0.196	0.377	0.166	0.322		0.631	0.546	0.576	0.601		
Body-worn	Rear	0.341	0.055	0.126	0.039	0.107	0.210	0.522	0.487	0.503	0.506	0.697	0.716
	Front	0.347	0.055	0.126	0.039	0.107	0.210	0.528	0.493	0.509	0.512	0.703	0.722
Hotspot	Rear	0.611	0.125	0.189				0.925	0.611	0.736	0.800		
	Front	0.703	0.125	0.189				1.017	0.703	0.828	0.892		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.085	0.125	0.189				0.399	0.085	0.210	0.274		
	Edge 3	0.471						0.471	0.471	0.471	0.471		
	Edge 4	0.799						0.799	0.799	0.799	0.799		

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

LTE Band 5 is covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.268	0.629	0.377	0.810	0.322		1.274	1.400	1.219	1.455		
	Left Tilt	0.089	0.629	0.377	0.810	0.322		1.095	1.221	1.040	1.276		
	Right Touch	0.496	0.196	0.377	0.166	0.322		1.069	0.984	1.014	1.039		
	Right Tilt	0.082	0.196	0.377	0.166	0.322		0.655	0.570	0.600	0.625		
Body-worn	Rear	0.125	0.055	0.126	0.039	0.107	0.210	0.306	0.271	0.287	0.290	0.481	0.500
	Front	0.255	0.055	0.126	0.039	0.107	0.210	0.436	0.401	0.417	0.420	0.611	0.630
Hotspot	Rear	0.234	0.125	0.189				0.548	0.234	0.359	0.423		
	Front	0.513	0.125	0.189				0.827	0.513	0.638	0.702		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.331	0.125	0.189				0.645	0.331	0.456	0.520		
	Edge 3	0.135						0.135	0.135	0.135	0.135		
	Edge 4	0.068						0.068	0.068	0.068	0.068		

12.10. Sum of the SAR for LTE Band 12 & Wi-Fi & BT

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.087	0.629	0.377	0.810	0.322		1.093	1.219	1.038	1.274		
	Left Tilt	0.051	0.629	0.377	0.810	0.322		1.057	1.183	1.002	1.238		
	Right Touch	0.063	0.196	0.377	0.166	0.322		0.636	0.551	0.581	0.606		
	Right Tilt	0.043	0.196	0.377	0.166	0.322		0.616	0.531	0.561	0.586		
Body-worn	Rear	0.092	0.055	0.126	0.039	0.107	0.210	0.273	0.238	0.254	0.257	0.448	0.467
	Front	0.104	0.055	0.126	0.039	0.107	0.210	0.285	0.250	0.266	0.269	0.460	0.479
Hotspot	Rear	0.102	0.125	0.189				0.416	0.102	0.227	0.291		
	Front	0.123	0.125	0.189				0.437	0.123	0.248	0.312		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.091	0.125	0.189				0.405	0.091	0.216	0.280		
	Edge 3	0.040						0.040	0.040	0.040	0.040		
	Edge 4	0.245						0.245	0.245	0.245	0.245		

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

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.152	0.629	0.377	0.810	0.322		1.158	1.284	1.103	1.339		
	Left Tilt	0.087	0.629	0.377	0.810	0.322		1.093	1.219	1.038	1.274		
	Right Touch	0.125	0.196	0.377	0.166	0.322		0.698	0.613	0.643	0.668		
	Right Tilt	0.079	0.196	0.377	0.166	0.322		0.652	0.567	0.597	0.622		
Body-worn	Rear	0.213	0.055	0.126	0.039	0.107	0.210	0.394	0.359	0.375	0.378	0.569	0.588
	Front	0.202	0.055	0.126	0.039	0.107	0.210	0.383	0.348	0.364	0.367	0.558	0.577
Hotspot	Rear	0.238	0.125	0.189				0.552	0.238	0.363	0.427		
	Front	0.240	0.125	0.189				0.554	0.240	0.365	0.429		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.133	0.125	0.189				0.447	0.133	0.258	0.322		
	Edge 3	0.113						0.113	0.113	0.113	0.113		
	Edge 4	0.272						0.272	0.272	0.272	0.272		

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

LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

12.13. Sum of the SAR for LTE Band 26 & Wi-Fi & BT

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.196	0.629	0.377	0.810	0.322		1.202	1.328	1.147	1.383		
	Left Tilt	0.102	0.629	0.377	0.810	0.322		1.108	1.234	1.053	1.289		
	Right Touch	0.160	0.196	0.377	0.166	0.322		0.733	0.648	0.678	0.703		
	Right Tilt	0.089	0.196	0.377	0.166	0.322		0.662	0.577	0.607	0.632		
Body-worn	Rear	0.170	0.055	0.126	0.039	0.107	0.210	0.351	0.316	0.332	0.335	0.526	0.545
	Front	0.168	0.055	0.126	0.039	0.107	0.210	0.349	0.314	0.330	0.333	0.524	0.543
Hotspot	Rear	0.255	0.125	0.189				0.569	0.255	0.380	0.444		
	Front	0.223	0.125	0.189				0.537	0.223	0.348	0.412		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.099	0.125	0.189				0.413	0.099	0.224	0.288		
	Edge 3	0.166						0.166	0.166	0.166	0.166		
	Edge 4	0.185						0.185	0.185	0.185	0.185		

12.14. Sum of the SAR for LTE Band 41 & Wi-Fi & BT

RF Exposure conditions	Test Position	Standalone SAR (W/kg)						Σ 1-g SAR (W/kg)					
		WWAN	DTS		U-NII		BT	WWAN + DTS	WWAN + U-NII	WWAN+DTS+U-NII	WWAN+DTS+U-NII	WWAN+U-NII+BT	WWAN+DTS+U-NII+BT
		①	Chain 0 ②	Chain 1 ③	Chain 0 ④	Chain 1 ⑤	⑥	① + ② + ③	① + ④ + ⑤	① + ② + ⑤	① + ③ + ④	① + ④ + ⑤ + ⑥	① + ③ + ④ + ⑥
Head	Left Touch	0.286	0.629	0.377	0.810	0.322		1.292	1.418	1.237	1.473		
	Left Tilt	0.131	0.629	0.377	0.810	0.322		1.137	1.263	1.082	1.318		
	Right Touch	0.529	0.196	0.377	0.166	0.322		1.102	1.017	1.047	1.072		
	Right Tilt	0.056	0.196	0.377	0.166	0.322		0.629	0.544	0.574	0.599		
Body-worn	Rear	0.189	0.055	0.126	0.039	0.107	0.210	0.370	0.335	0.351	0.354	0.545	0.564
	Front	0.217	0.055	0.126	0.039	0.107	0.210	0.398	0.363	0.379	0.382	0.573	0.592
Hotspot	Rear	0.362	0.125	0.189				0.676	0.362	0.487	0.551		
	Front	0.446	0.125	0.189				0.760	0.446	0.571	0.635		
	Edge 1		0.125	0.189				0.314		0.125	0.189		
	Edge 2	0.302	0.125	0.189				0.616	0.302	0.427	0.491		
	Edge 3	0.169						0.169	0.169	0.169	0.169		
	Edge 4	0.034						0.034	0.034	0.034	0.034		

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

Appendixes

Refer to separated files for the following appendixes.

16J23633A-S1V3 SAR_App A Setup Photos & Ant. Locations

16J23633A-S1V1 SAR_App B System Check Plots

16J23633A-S1V2 SAR_App C Highest Test Plots

16J23633A-S1V1 SAR_App D Tissue Ingredients

16J23633A-S1V1 SAR_App E Probe Cal. Certificates

16J23633A-S1V1 SAR_App F Dipole Cal. Certificates

END OF REPORT