SAR EVALUATION REPORT

IEEE Std 1528-2013

For
GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT, & NFC

FCC ID: PY7-83376C

Report Number: R14639481-S1 v3
Issue Date: 3/27/2023

Prepared for
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Prepared by
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CERT #0751.06

Revision History

Rev.	Date	Revisions	Revised By
V1	3/23/2023	Initial Issue	--
V2	3/24/2023	Corrected measured power for section 10.8 Bluetooth and 5.5 GHz WLAN extremity. Updated NFC measurements to current variant PY7-83376C in Section 1, Section 10.9, and Section 12.6. Added highest NFC test plot in Appendix C. Updated Simultaneous Tx Extremity value in Section 1. Added 13MHz liquid check, system performance check, and system performance check plot in Appendix B; updated CLA13 dipole in Section 4.3 and in Appendix F.	Lindsay Ryan
V3	3/27/2023	Removed IMEIs from §6.1. Updated Tune-up for GSM DTM in §9.1.	Richard Jankovics

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1. Attestation of Test Results

Applicant Name		Sony Corporation				
FCC ID		PY7-83376C				
Applicable Standards		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	NFC
Head		0.121	0.539	0.241	0.265	N/A
Body-worn*		0.459	0.077	0.089	0.058	N/A
Hotspot/BT Tethering		0.459	0.121	0.077	0.093	N/A
Extremity (10g)		N/A	N/A	0.397	N/A	0.033
Simultaneous Tx	Head/Body-Worn/Hotspot/ BT Tethering (1g)	0.737	0.737	0.716	0.716	N/A
	Extremity (10g)	N/A	N/A	0.641	N/A	0.641
Date Tested		1/4/2023 to 3/24/2023				
Test Results		Pass				

Note: The Body-worn minimum separation distance is 10 mm. To cover both body-worn and hotspot RF exposure conditions testing was performed at a separation distance of 10 mm.

Note: WLAN and Bluetooth are referenced from FCC ID: **PY7-12907W** (UL report #14634918-S1) and are leveraged to cover variant FCC ID: **PY7-83376C**. All circuitry and features for WLAN and Bluetooth operations are identical between the two variants. The data reuse test plan was approved via manufacturer, with spot check measurements on worst case conditions. Worst case SAR results for WLAN and Bluetooth from referenced variant FCC ID: **PY7-12907W** are listed above. WLAN and Bluetooth SAR results from FCC ID: **PY7-12907W** have been used in this report for Simultaneous Transmission analysis.

(continued next page)

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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 A2LA, NIST, or any agency of the U.S. Government, or any agency of the U.S. government.

Approved & Released By:	Prepared By:
	
Devin Chang Senior Test Engineer UL Verification Services Inc.	Richard Jankovics Operations Leader UL LLC

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
- 941225 D07 UMPC Mini Tablet v01r02

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

- TCB Workshop October 2014; RF Exposure Procedures (Other LTE Considerations)
- TCB Workshop April 2015; RF Exposure Procedures (Overlapping LTE Bands)
- TCB Workshop October 2015; RF Exposure Procedures (KDB 941225 D05A)
- TCB Workshop October 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- TCB Workshop October 2016; RF Exposure Procedures (DUT Holder Perturbations)
- TCB Workshop May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- TCB Workshop April 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))
- TCB Workshop April 2019; RF Exposure Procedures (802.11ax SAR Testing)

3. Facilities and Accreditation

UL LLC is accredited by A2LA, cert. # 0751.06 for all testing performed within the scope of this report. Testing was performed at the locations noted below.

The test sites and measurement facilities used to collect data are located at 2800 Perimeter Park Dr, Morrisville, NC, USA.

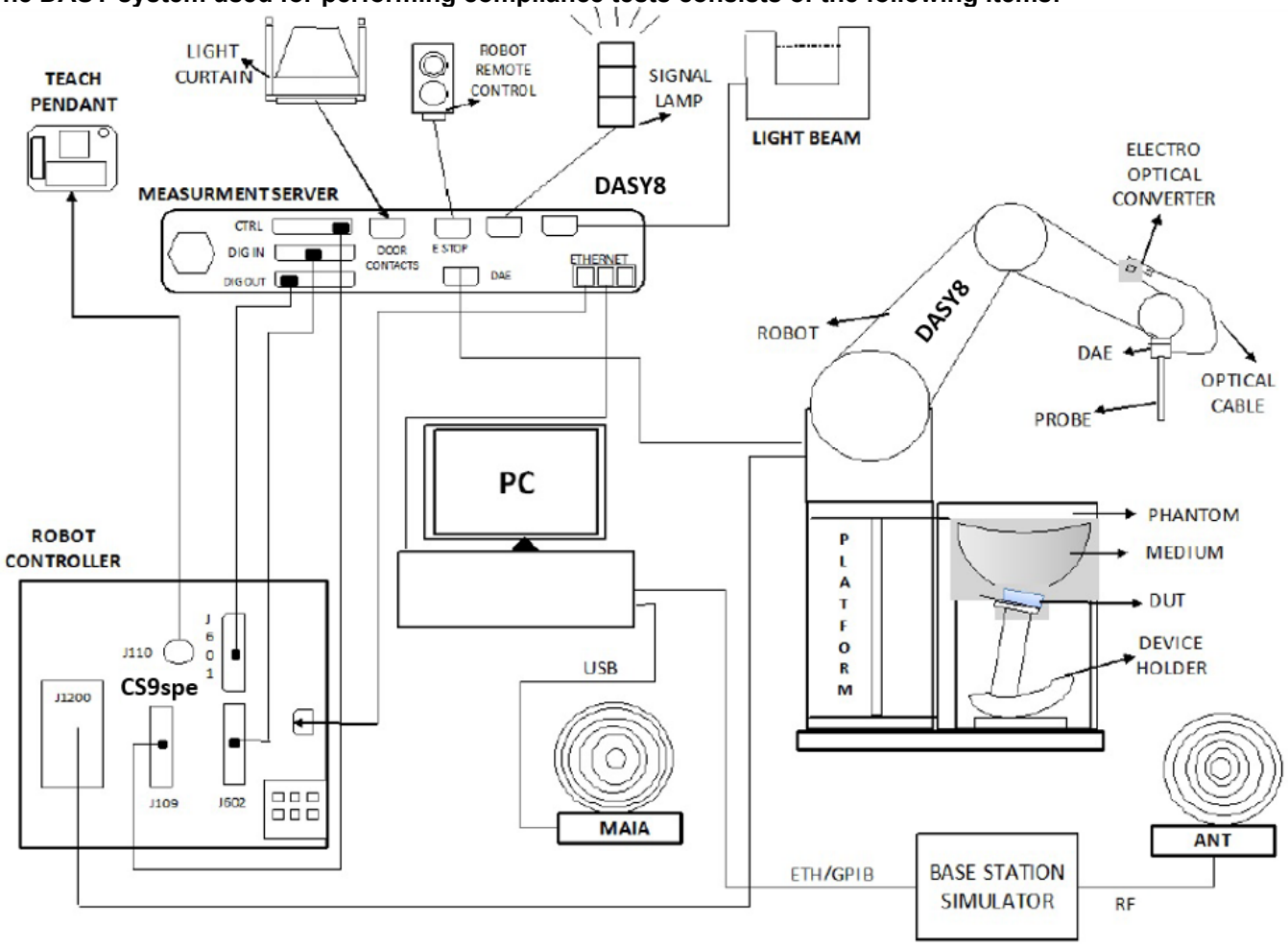
- SAR Lab 1A
- SAR Lab 2A
- SAR Lab 2B

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY 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 Win10 and the DASY8[1] 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.

[1] DASY8 software used: DASY16.0.2.83 and older generations.

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 IEC/IEEE 62209-1528, 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	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

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	Keysight	E5063A	MY54100681	9/30/2023
Dielectric Probe	SPEAG	DAKS-3.5	1051	10/17/2023
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 DA	10/17/2023
Dielectric Probe	SPEAG	DAK-12	1128	1/30/2024
Shorting Block	SPEAG	DAK-12 Short	N/A	1/30/2024
Thermometer	Fisher Scientific	15-078-181	210204689	3/31/2023

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Signal Generator	Keysight	N5181A	MY50140788	1/12/2024
3-Path Diode Power Sensor	Rohde & Schwarz	NRP8S	112236	5/31/2023
3-Path Diode Power Sensor	Rohde & Schwarz	NRP8S	112237	5/31/2023
Amplifier	MITEQ	AMF-4D-00400600-50-30P	N/A	N/A
Directional Coupler	Mini-Circuits	ZUDC10-183+	1438	NA
Dual Directional Coupler	Werlatone	C5100-10	92249	N/A
DC Power Supply	Miteq	PS 15V1	1990186	N/A
RF Power Source	Speag	PowerSource1	4278	6/21/2023

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe	SPEAG	EX3DV4	7587	4/27/2023
E-Field Probe	SPEAG	EX3DV4	7709	12/12/2023
E-Field Probe	SPEAG	EX3DV4	7710	2/3/2024
E-Field Probe	SPEAG	EX3DV4	7711	3/11/2023
Data Acquisition Electronics	SPEAG	DAE4	1673	9/15/2023
Data Acquisition Electronics[1]	SPEAG	DAE4	1716	3/8/2023
Data Acquisition Electronics	SPEAG	DAE4	1714	11/23/2023
Data Acquisition Electronics	SPEAG	DAE4	1715	1/23/2024
System Validation Dipole	SPEAG	CLA13	1008	1/12/2024
System Validation Dipole	SPEAG	D750V3	1139	10/12/2023
System Validation Dipole	SPEAG	D900V2	1d180	10/12/2023
System Validation Dipole	SPEAG	D1750V2	1136	10/17/2023
System Validation Dipole	SPEAG	D1900V2	5d202	10/12/2023
System Validation Dipole	SPEAG	D2450V2	963	10/18/2023
System Validation Dipole	SPEAG	D5GHzV2	1213	10/11/2023
Environmental Indicator	Control Company	06-662-4	200037610	2/24/2024
Environmental Indicator	Control Company	06-662-4	200037635	2/24/2024

Notes:

1. Items past calibration were not used past due date.

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
RF Power Meter	Keysight	N1911a	MY55116002	9/10/2023
RF Power Meter	Keysight	N1911a	MY55116004	9/02/2023
RF Power Sensor	Keysight	N1921a	MY55120011	7/07/2023
RF Power Sensor	Keysight	N1921a	MY55090025	9/27/2023
RF Power Sensor	Keysight	N1921a	MY55090030	6/15/2023
RF Power Sensor	Keysight	N1921a	MY55090023	3/22/2023
RF Power Sensor	ETS Lindgren	7002-006	160129	3/11/2023
RF Power Sensor	Boonton Electronics	RTP5008	11835	10/20/2023
RF Power Sensor	Boonton Electronics	RTP5008	12002	3/11/2023
Base Station Simulator	R & S	CMW 500	170733	12/14/2023
Base Station Simulator	R & S	CMW 500	170732	9/13/2023
Base Station Simulator	R & S	CMW 500	170193	4/29/2023
Base Station Simulator	Anritsu	MT8821C	6262116751	5/14/2023
DC Power Supply	Keysight	E3633A	MY58426145	N/A
DC Power Supply	Keysight	E3633A	MY62176088	N/A
DC Power Supply	Keysight	E3633A	MY62176089	N/A
DC Power Supply	Keysight	E3633A	MY61466084	N/A

Notes:

2. Items past calibration were not used past due date.

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 expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	This is a Phablet Device (display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm) Refer to Appendix A
Back Cover	The Back Cover is not removable
Battery Options	The rechargeable battery is not user accessible.
Accessory	Headset and wireless power charger
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 5.2 GHz and 5.8 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other Per Manufacturer, the DUT support only as a group client and not support as a group owner.
Bluetooth Tethering (Hotspot)	BT Tethering mode permits the device to share its cellular data connection with other devices. ☒ BT Tethering (Bluetooth 2.4 GHz)
Test sample information	**S/N** / **Notes** QV7700B4FR – WLAN/BT - 2.4GHz/5GHz (SAR) QV77000NFR – FCC SAR #1 2G/3G QV7700ECFR – FCC SAR #2 2G/3G QV7700DBFR – FCC SAR #3 4G QV77005NFR – FCC SAR #4 4G QV7700L2FR – NFC - SpotCheck + FCC Part 15B
Hardware Version	A
Software Version	WLAN Conducted: 0.77 SAR Measurements: 0.77 NFC SAR Measurements: 0.99

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EDGE (8PSK)	GSM Class : B Multi-Slot Class: 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	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 12 FDD Band 17	QPSK 16QAM 64QAM Rel. 15 Does not support Carrier Aggregation (CA)		100% (FDD) 63.3% (TDD) Power Class 3
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20) 802.11ac (VHT20) 802.11ax (HE20)		99.9% (802.11b) [1] 99.1% (802.11g) [1]
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80) 802.11ac (VHT160) 802.11ax (HE20) 802.11ax (HE40) 802.11ax (HE80) 802.11ax (HE160)		99.7% (802.11n 40MHz BW) [1] 99.7% (802.11ac 80MHz BW) [1] 99.6% (802.11ac 160MHz BW) [1]
	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	BR, EDR, LE		77.2%[1]
NFC	13.56 MHz	Type A/B/F /V		N/A

Notes:

3. Duty cycle is referenced from the Section 9.

6.3. General LTE SAR Test and Reporting Considerations

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Frequency range, Channel Bandwidth, Numbers and Frequencies</td><td>
<table>
<tr><td rowspan="3">Band 2</td><td colspan="6">Frequency range: 1850 - 1910 MHz (BW = 60 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>18700 /1860</td><td>18675/ 1857.5</td><td>18650/ 1855</td><td>18625/ 1852.5</td><td>18615/ 1851.5</td><td>18607/ 1850.7</td></tr>
<tr><td>Mid</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td></tr>
<tr><td>High</td><td>19100/ 1900</td><td>19125/ 1902.5</td><td>19150/ 1905</td><td>19175/ 1907.5</td><td>19185/ 1908.5</td><td>19193/ 1909.3</td></tr>
<tr><td rowspan="3">Band 4</td><td colspan="6">Frequency range: 1710 - 1755 MHz (BW = 45 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz [1]</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>20050/ 1720</td><td>20025/ 1717.5</td><td>20000/ 1715</td><td>19975/ 1712.5</td><td>19965/ 1711.5</td><td>19957/ 1710.7</td></tr>
<tr><td>Mid</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td><td>20175/ 1732.5</td></tr>
<tr><td>High</td><td>20300/ 1745</td><td>20325/ 1747.5</td><td>20350/ 1750</td><td>20375/ 1752.5</td><td>20385/ 1753.5</td><td>20393/ 1754.3</td></tr>
<tr><td rowspan="3">Band 12</td><td colspan="6">Frequency range: 699 – 716 MHz (BW = 17 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz [1]</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td></td><td>23060/ 704</td><td>23035/ 701.5</td><td>23025/ 700.5</td><td>23017/ 699.7</td></tr>
<tr><td>Mid</td><td></td><td></td><td>23095/ 707.5</td><td>23095/ 707.5</td><td>23095/ 707.5</td><td>23095/ 707.5</td></tr>
<tr><td>High</td><td></td><td></td><td>23130/ 711</td><td>23155/ 713.5</td><td>23165/ 714.5</td><td>23173/ 715.3</td></tr>
<tr><td rowspan="3">Band 17</td><td colspan="6">Frequency range: 704 - 716 MHz (BW = 12 MHz)</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz [1]</td><td>5 MHz [1]</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td></td><td>23780/ 709</td><td>23755/ 706.5</td><td></td><td></td></tr>
<tr><td>Mid</td><td></td><td></td><td>23790/ 710</td><td>23790/ 710</td><td></td><td></td></tr>
<tr><td>High</td><td></td><td></td><td>23800/ 711</td><td>23825/ 713.5</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td>Refer to Appendix A.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td>
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{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>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table>
MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.
A-MPR (additional MPR) was disabled during SAR testing
</td></tr>
<tr><td>Power reduction</td><td>No</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td>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.</td></tr>
</table>

6.4. Power Back-off Operation

The DUT supports power reduction when Simultaneous WLAN transmission is active (i.e. WLAN WiFi Main and WiFi Sub Antenna transmitting simultaneously).

Power Back-off mode	Technologies Supported	Exposure Conditions Active			
		Head	Body-worn	Hotspot	Phablet SAR (Extremity 10g)
WLAN Simultaneous Tx	Wi-Fi 2.4GHz Wi-Fi 5GHz	✓	✓	✓	✓

Note(s):

Tune-Up Limits for WLAN (Simultaneous 2G_5G state) is Reduced Average Power. Please refer to §9 for all conducted power measurements.

Phablet SAR (Extremity 10g):

When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

When hotspot mode does not apply, 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.

7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Antenna	Band	Head	Rear	Front	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Left Edge)	Extremity (0 mm)
Cellular Main Antenna 1	GSM 850 LTE B12/17	Yes	Yes	Yes	No	No	Yes	Yes	No
Cellular Main Antenna 2	GSM 1900 WCDMA B2/4 LTE B2/4	Yes	Yes	Yes	No	Yes	Yes	No	No
Wi-Fi Main Antenna	Wi-Fi 2.4GHz Wi-Fi 5GHz Bluetooth	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Wi-Fi Sub Antenna	Wi-Fi 2.4GHz Wi-Fi 5GHz Bluetooth	Yes	Yes	Yes	No	No	Yes	Yes	Yes

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. The Body-worn minimum separation distance is 10 mm. To cover both body-worn and hotspot RF exposure conditions testing was performed at a separation distance of 10 mm.
3. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg. When hotspot mode does not apply, 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.
4. Please note that Wi-Fi Main Antenna is also referred to as WLAN Chain0/GPS/BT Antenna
5. Please note that Wi-Fi Sub Antenna is also referred to as WLAN Chain 1/BT Antenna

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 ± 2° 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.
The dielectric constant (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but 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 εr and σ may be relaxed to ± 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

Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
1A	2023-02-20	1750	Head	1750	39.41	40.08	-1.68	1.38	1.37	1.10
				1710	39.43	40.15	-1.78	1.36	1.35	1.01
				1755	39.41	40.08	-1.66	1.39	1.37	1.04
1A	2023-02-24	5600	Head	5600	35.90	35.53	1.03	5.10	5.06	0.81
				5500	36.17	35.65	1.46	4.98	4.96	0.36
				5725	35.62	35.39	0.65	5.26	5.19	1.29
1A	2023-02-27	5600	Head	5600	35.71	35.53	0.50	5.16	5.06	1.89
				5500	35.90	35.65	0.71	5.04	4.96	1.61
				5725	35.45	35.39	0.17	5.31	5.19	2.39
1A	2023-03-23	13	Head	13	57.60	55.00	4.73	0.74	0.75	-1.99
				12	57.60	55.00	4.73	0.74	0.75	-1.99
				14	57.58	55.00	4.69	0.74	0.75	-1.99
2A	2023-02-20	900	Head	900	42.96	41.50	3.52	0.96	0.97	-1.35
				825	43.16	41.58	3.81	0.93	0.90	3.63
				915	42.93	41.50	3.45	0.97	0.98	-1.44
2A	2023-02-20	750	Head	750	43.41	41.96	3.45	0.91	0.89	1.36
				660	43.68	42.42	2.96	0.87	0.89	-1.46
				825	43.16	41.58	3.81	0.93	0.90	3.63
2B	2023-02-20	1900	Head	1900	38.90	40.00	-2.75	1.41	1.40	0.57
				1850	39.09	40.00	-2.27	1.36	1.40	-2.93
				1920	38.84	40.00	-2.90	1.43	1.40	1.93
2B	2023-02-24	2450	Head	2450	41.14	39.20	4.95	1.82	1.80	1.28
				2400	41.22	39.30	4.89	1.78	1.75	1.73
				2480	41.11	39.16	4.97	1.84	1.83	0.58
2B	2023-03-17	2450	Head	2450	39.70	39.20	1.28	1.85	1.80	2.78
				2400	39.77	39.30	1.20	1.81	1.75	3.16
				2480	39.67	39.16	1.30	1.87	1.83	2.16

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 50 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. Refer to Appendix B for the SAR System Check Plots.

SAR Lab	Date	Tissue Type	Dipole Type_Serial #	Dipole Cal. Due Data	Dipole Power (dBm)	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
						Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10 %	
1A	2/20/2023	Head	D1750V2 SN: 1136	10/17/2023	17.0	1.780	35.52	36.10	-1.62	0.948	18.92	19.10	-0.97	1
1A	2/24/2023	Head	D5GHzV2 SN: 1213 (5.60 GHz)	10/11/2023	17.0	3.850	76.82	82.40	-6.77	1.090	21.75	23.50	-7.45	2
1A	2/27/2023	Head	D5GHzV2 SN: 1213 (5.60 GHz)	10/11/2023	17.0	3.890	77.62	82.40	-5.81	1.100	21.95	23.50	-6.60	
1A	3/23/2023	Head	CLA13 SN: 1008	1/12/2024	16.5	0.024	0.54	0.54	-1.23	0.015	0.34	0.34	-0.65	3
2A	2/20/2023	Head	D900V2 SN: 1d180	10/12/2023	17.00	0.523	10.44	10.90	-4.26	0.339	6.76	6.99	-3.23	4
2A	2/20/2023	Head	D750V3 SN: 1139	10/12/2023	17.0	0.412	8.22	8.51	-3.40	0.271	5.41	5.58	-3.10	5
2B	2/20/2023	Head	D1900V2 SN: 5d202	10/12/2023	17.0	1.910	38.11	39.20	-2.78	0.992	19.79	20.40	-2.98	6
2B	2/24/2023	Head	D2450V2 SN: 963	10/18/2023	17.0	2.410	48.09	52.40	-8.23	1.120	22.35	24.50	-8.79	7
2B	3/17/2023	Head	D2450V2 SN: 963	10/18/2023	17.0	2.690	53.67	51.36	4.50	1.240	24.74	24.56	0.74	

9. Conducted Output Power Measurements

Tune-Up Power Limits provided by the manufacturer are used to scale measured SAR values.

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.

When different maximum output power applies to GSM voice or GPRS/EDGE time slots, GSM voice and GPRS/EDGE time slots should be tested separately to determine compliance by summing the corresponding reported SAR.

The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance

Per October 2013 TCB Workshop:
When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.

Maximum Output Power (Tune-up Limit) for GSM

SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2W/kg.

RF Air interface	Mode	GSM Burst Power Tune-up Limit (dBm)		GSM DTM CS Burst Power Tune-Up Limit (dBm)		GSM DTM PS Burst Power Tune-Up Limit (dBm)	
		CELL Main1	CELL Main2	CELL Main1	CELL Main2	CELL Main1	CELL Main2
		Normal	Normal	Normal	Normal	Normal	Normal
GSM850	Voice/GPRS (1 slot)	32.9		32.9			
	GPRS 2 slots	29.9		29.9		29.9	
	GPRS 3 slots	28.1		28.1		28.1	
	GPRS 4 slots	26.9					
	EGPRS 1 slot	28.0		32.9			
	EGPRS 2 slot	25.0		29.9		29.9 (MCS1-4) 25.0 (MCS5-9	
	EGPRS 3 slot	23.2		28.1		28.1 (MCS1-4) 23.2 (MCS5-9)	
	EGPRS 4 slots	22.0					
GSM1900	Voice/GPRS (1 slot)		28.0		28.0		
	GPRS 2 slots		25.0		25.0		25.0
	GPRS 3 slots		23.2		23.2		23.2
	GPRS 4 slots		22.0				
	EGPRS 1 slot		27.0		28.0		
	EGPRS 2 slot		24.0		25.0		25.0 (MCS1-4) 24.0 (MCS5-9)
	EGPRS 3 slot		22.2		23.2		23.2 (MCS1-4) 22.2 (MCS-59)
	EGPRS 4 slots		21.0				

GSM850 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Normal Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.1	23.0	32.9	23.9
			190	836.6	32.3	23.3		
			251	848.8	32.3	23.3		
		2	128	824.2	28.9	22.9	29.9	23.9
			190	836.6	29.0	23.0		
			251	848.8	29.0	23.0		
		3	128	824.2	27.1	22.8	28.1	23.8
			190	836.6	27.4	23.2		
			251	848.8	27.3	23.1		
		4	128	824.2	26.0	23.0	26.9	23.9
			190	836.6	26.2	23.1		
			251	848.8	26.1	23.1		
EDGE (8PSK)	MCS5	1	128	824.2	26.7	17.7	28.0	19.0
			190	836.6	26.8	17.7		
			251	848.8	26.7	17.7		
		2	128	824.2	24.0	17.9	25.0	19.0
			190	836.6	24.0	18.0		
			251	848.8	24.0	17.9		
		3	128	824.2	22.1	17.9	23.2	18.9
			190	836.6	22.1	17.8		
			251	848.8	22.1	17.8		
		4	128	824.2	21.1	18.1	22.0	19.0
			190	836.6	21.0	18.0		
			251	848.8	21.0	18.0		

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Normal Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	27.0	17.9	28.0	19.0
			661	1880.0	27.5	18.4		
			810	1909.8	27.6	18.6		
		2	512	1850.2	24.0	17.9	25.0	19.0
			661	1880.0	24.1	18.1		
			810	1909.8	24.3	18.3		
		3	512	1850.2	22.2	17.9	23.2	18.9
			661	1880.0	22.4	18.1		
			810	1909.8	22.6	18.3		
		4	512	1850.2	21.1	18.0	22.0	19.0
			661	1880.0	21.1	18.1		
			810	1909.8	21.4	18.4		
EDGE (8PSK)	MCS5	1	512	1850.2	26.1	17.0	27.0	18.0
			661	1880.0	26.2	17.1		
			810	1909.8	26.4	17.4		
		2	512	1850.2	22.9	16.9	24.0	18.0
			661	1880.0	23.0	17.0		
			810	1909.8	23.2	17.2		
		3	512	1850.2	21.0	16.8	22.2	17.9
			661	1880.0	21.3	17.1		
			810	1909.8	21.5	17.2		
		4	512	1850.2	19.8	16.8	21.0	18.0
			661	1880.0	19.8	16.8		
			810	1909.8	20.0	17.0		

GSM850 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Normal Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.2		23.2		32.9		23.9	
			190	836.6	32.3		23.3					
			251	848.8	32.4		23.4					
		2	128	824.2	28.9	29.1	22.9	23.0	29.9	29.9	23.9	23.9
			190	836.6	29.1	29.2	23.0	23.1				
			251	848.8	29.1	29.2	23.1	23.2				
		3	128	824.2	27.0	27.0	22.8	22.8	28.1	28.1	23.8	23.8
			190	836.6	27.2	27.2	23.0	22.9				
			251	848.8	27.2	27.1	22.9	22.9				
GSM (Voice) + EDGE (8PSK)	MCS5	1	128	824.2	32.2		23.2		32.9		23.9	
			190	836.6	32.3		23.2					
			251	848.8	32.4		23.4					
		2	128	824.2	29.0	23.8	23.0	17.7	29.9	25.0	23.9	19.0
			190	836.6	29.1	23.8	23.1	17.8				
			251	848.8	29.2	23.9	23.2	17.9				
		3	128	824.2	27.2	21.8	22.9	17.5	28.1	23.2	23.8	18.9
			190	836.6	27.2	21.9	23.0	17.6				
			251	848.8	27.1	21.8	22.9	17.6				

GSM1900 DTM Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Normal Average Power (dBm)							
					Measured				Tune-up Limit			
					CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr	CS Burst Pwr	PS Burst Pwr	CS Frame Pwr	PS Frame Pwr
GSM (Voice) + GPRS/EDGE (GMSK)	CS1	1	512	1850.2	27.2		18.2		28.0		19.0	
			661	1880.0	27.5		18.4					
			810	1909.8	27.5		18.5					
		2	512	1850.2	23.6	23.8	17.6	17.8	25.0	25.0	19.0	19.0
			661	1880.0	23.6	23.7	17.6	17.7				
			810	1909.8	23.7	23.7	17.7	17.7				
		3	512	1850.2	21.8	21.9	17.6	17.6	23.2	23.2	18.9	18.9
			661	1880.0	22.2	22.2	18.0	17.9				
			810	1909.8	22.5	22.5	18.3	18.3				
GSM (Voice) + EDGE (8PSK)	MCS5	1	512	1850.2	27.2		18.2		28.0		19.0	
			661	1880.0	27.5		18.4					
			810	1909.8	27.5		18.5					
		2	512	1850.2	23.8	23.2	17.8	17.1	25.0	24.0	19.0	18.0
			661	1880.0	23.8	23.1	17.7	17.1				
			810	1909.8	23.9	23.1	17.9	17.1				
		3	512	1850.2	21.9	20.8	17.7	16.6	23.2	22.2	18.9	17.9
			661	1880.0	22.1	21.0	17.8	16.7				
			810	1909.8	21.3	21.1	17.0	16.9				

9.2. W-CDMA

Per KDB 941225 D01 3G SAR Procedures for W-CDMA:

Maximum output power is verified on the high, middle and low channels and using the appropriate 12.2 kbps RMC with TPC (transmit power control) set to all "1's"

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. A summary of these settings is illustrated below:

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to procedures in table C.10.1.4 of 3GPP TS 34.121-1
A summary of these settings is illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

HSUPA Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings is illustrated below:

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DC-HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests for DC-HSDPA were completed according to procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings is illustrated below:

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

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

HSPA+ Setup Procedures used to establish the test signals

The following 1 Sub-test was completed according to procedures in table C.11.1.4 of 3GPP TS34.121. A summary of these settings is illustrated below:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

Maximum Output Power (Tune-up Limit) for W-CDMA

SAR measurement is not required for the HSDPA, HSUPA. When primary mode and the adjusted SAR is ≤ 1.2 W/kg and secondary mode is ≤ ¼ dB higher than the primary mode

RF Air interface	Mode	Tune-up PowerLimit (dBm)
		CELL Main2
		Normal
W-CDMA Band 2	R99	19.7
	HSDPA	19.0
	HSUPA	19.0
W-CDMA Band 4	R99	18.7
	HSDPA	18.0
	HSUPA	18.0

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Normal Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	18.8	N/A	19.7
		9400	1880.0	18.8		
		9538	1907.6	18.8		
HSDPA	Subtest 1	9262	1852.4	17.8	0	19.0
		9400	1880.0	17.8		
		9538	1907.6	17.8		
	Subtest 2	9262	1852.4	17.8	0	19.0
		9400	1880.0	17.8		
		9538	1907.6	17.8		
	Subtest 3	9262	1852.4	17.3	0.5	18.5
		9400	1880.0	17.3		
		9538	1907.6	17.3		
	Subtest 4	9262	1852.4	17.5	0.5	18.5
		9400	1880.0	17.3		
		9538	1907.6	17.3		
HSUPA	Subtest 1	9262	1852.4	17.8	0	19.0
		9400	1880.0	17.8		
		9538	1907.6	17.8		
	Subtest 2	9262	1852.4	15.8	2	17.0
		9400	1880.0	15.8		
		9538	1907.6	15.8		
	Subtest 3	9262	1852.4	16.8	1	18.0
		9400	1880.0	16.8		
		9538	1907.6	16.8		
	Subtest 4	9262	1852.4	15.8	2	17.0
		9400	1880.0	15.8		
		9538	1907.6	15.8		
	Subtest 5	9262	1852.4	17.3	0	19.0
		9400	1880.0	17.4		
		9538	1907.6	17.4		

W-CDMA Band IV Measured Results

Mode		UL Ch No.	Freq. (MHz)	Normal Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	17.8	N/A	18.7
		1413	1732.6	17.8		
		1513	1752.6	17.8		
HSDPA	Subtest 1	1312	1712.4	16.8	0	18.0
		1413	1732.6	16.8		
		1513	1752.6	16.8		
	Subtest 2	1312	1712.4	16.8	0	18.0
		1413	1732.6	16.8		
		1513	1752.6	16.8		
	Subtest 3	1312	1712.4	16.5	0.5	17.5
		1413	1732.6	16.3		
		1513	1752.6	16.3		
	Subtest 4	1312	1712.4	16.3	0.5	17.5
		1413	1732.6	16.4		
		1513	1752.6	16.4		
HSUPA	Subtest 1	1312	1712.4	16.7	0	18.0
		1413	1732.6	16.8		
		1513	1752.6	16.8		
	Subtest 2	1312	1712.4	14.8	2	16.0
		1413	1732.6	14.8		
		1513	1752.6	14.8		
	Subtest 3	1312	1712.4	15.8	1	17.0
		1413	1732.6	15.8		
		1513	1752.6	15.8		
	Subtest 4	1312	1712.4	14.8	2	16.0
		1413	1732.6	14.8		
		1513	1752.6	14.8		
	Subtest 5	1312	1712.4	16.3	0	18.0
		1413	1732.6	16.4		
		1513	1752.6	16.4		

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 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{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
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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 (subclause)	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	N/A

Maximum Output Power (Tune-up Limit) for LTE

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

a) The maximum output power, including tolerance, for the smaller band must be ≤ the larger band to qualify for the SAR test exclusion.
b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.
   - LTE Band 17 (704-716 MHz) is covered by LTE Band 12 (699-716 MHz)

For some LTE Bands, certain channel bandwidths do not support at least three non-overlapping channels. When a device supports overlapping channel assignments 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. Please refer to section 6.3. for a detailed list of LTE test channels

LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

SAR measurement is not required for the 16QAM and 64QAM. When the highest maximum output power for 16QAM and 64QAM is ≤ ½ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.

RF Air interface	Mode	Tune-up PowerLimit (dBm)	
		CELL Main1	CELL Main2
		Normal	Normal
LTE Band 2	QPSK		20.0
LTE Band 4	QPSK		19.0
LTE Band 12	QPSK	22.0	
LTE Band 17	QPSK	22.0	

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	19.0	18.9	18.8	0	20
		1	49	19.0	18.9	18.9	0	20
		1	99	19.1	18.9	18.8	0	20
		50	0	19.0	19.0	18.9	0	20
		50	24	19.1	19.0	18.9	0	20
		50	50	19.1	19.0	18.9	0	20
		100	0	19.1	19.0	18.9	0	20
	16QAM	1	0	19.2	19.3	19.1	0	20
		1	49	19.3	19.5	19.3	0	20
		1	99	19.2	19.3	19.2	0	20
		50	0	19.0	18.9	18.9	0	20
		50	24	19.1	18.9	18.9	0	20
		50	50	19.1	19.0	18.9	0	20
		100	0	19.1	18.9	18.9	0	20
	64QAM	1	0	19.2	19.3	19.1	0	20
		1	49	19.4	19.5	19.3	0	20
		1	99	19.2	19.2	19.0	0	20
		50	0	19.0	19.0	18.8	0	20
		50	24	19.1	18.9	18.8	0	20
		50	50	19.1	19.0	18.9	0	20
		100	0	19.1	18.9	18.9	0	20

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	19.0	18.9	18.8	0	20
		1	37	19.0	19.0	18.8	0	20
		1	74	19.0	18.9	18.7	0	20
		36	0	19.1	18.9	18.8	0	20
		36	20	19.1	18.9	18.9	0	20
		36	39	19.1	19.0	18.9	0	20
		75	0	19.0	18.9	18.8	0	20
	16QAM	1	0	19.3	19.3	19.1	0	20
		1	37	19.3	19.3	19.1	0	20
		1	74	19.4	19.1	19.0	0	20
		36	0	19.1	18.9	18.8	0	20
		36	20	19.1	18.9	18.9	0	20
		36	39	19.0	19.0	18.9	0	20
		75	0	19.0	18.9	18.9	0	20
	64QAM	1	0	19.3	19.3	19.0	0	20
		1	37	19.3	19.2	19.1	0	20
		1	74	19.4	19.2	18.9	0	20
		36	0	19.1	19.0	18.8	0	20
		36	20	19.1	18.9	18.9	0	20
		36	39	19.1	19.0	18.9	0	20
		75	0	19.1	18.9	18.8	0	20

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	19.1	19.1	18.9	0	20
		1	25	19.2	19.1	18.9	0	20
		1	49	19.1	19.0	18.8	0	20
		25	0	19.2	19.0	18.9	0	20
		25	12	19.2	19.0	19.0	0	20
		25	25	19.2	19.1	18.9	0	20
		50	0	19.2	19.0	18.9	0	20
	16QAM	1	0	19.5	19.5	19.3	0	20
		1	25	19.5	19.4	19.2	0	20
		1	49	19.4	19.4	19.3	0	20
		25	0	19.2	19.0	19.0	0	20
		25	12	19.2	19.0	19.0	0	20
		25	25	19.2	19.1	19.0	0	20
		50	0	19.2	19.0	19.0	0	20
	64QAM	1	0	19.5	19.3	19.2	0	20
		1	25	19.5	19.3	19.2	0	20
		1	49	19.4	19.3	19.2	0	20
		25	0	19.2	19.1	19.0	0	20
		25	12	19.3	19.1	19.1	0	20
		25	25	19.3	19.2	19.0	0	20
		50	0	19.2	19.1	19.0	0	20

LTE Band 2 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18625	18900	19175		
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	19.1	19.0	18.8	0	20
		1	12	19.2	19.2	18.9	0	20
		1	24	19.1	19.0	18.8	0	20
		12	0	19.2	19.0	18.9	0	20
		12	7	19.2	19.0	18.9	0	20
		12	13	19.2	19.1	18.8	0	20
		25	0	19.2	19.0	18.9	0	20
	16QAM	1	0	19.5	19.3	19.2	0	20
		1	12	19.6	19.5	19.4	0	20
		1	24	19.5	19.3	19.3	0	20
		12	0	19.1	19.0	18.9	0	20
		12	7	19.2	19.0	19.0	0	20
		12	13	19.1	19.1	18.9	0	20
		25	0	19.2	19.0	18.9	0	20
	64QAM	1	0	19.5	19.3	19.2	0	20
		1	12	19.6	19.4	19.3	0	20
		1	24	19.6	19.3	19.2	0	20
		12	0	19.3	19.2	19.0	0	20
		12	7	19.3	19.3	19.0	0	20
		12	13	19.3	19.3	19.0	0	20
		25	0	19.2	19.1	18.9	0	20

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	19.0	19.0	18.8	0	20
		1	8	19.1	19.1	18.9	0	20
		1	14	19.0	19.0	18.8	0	20
		8	0	19.2	19.0	18.9	0	20
		8	4	19.1	19.1	18.9	0	20
		8	7	19.2	19.1	18.9	0	20
		15	0	19.1	19.0	18.8	0	20
	16QAM	1	0	19.4	19.3	19.2	0	20
		1	8	19.5	19.5	19.3	0	20
		1	14	19.4	19.3	19.2	0	20
		8	0	19.2	19.1	18.9	0	20
		8	4	19.2	19.2	18.9	0	20
		8	7	19.2	19.2	18.9	0	20
		15	0	19.2	19.0	18.8	0	20
	64QAM	1	0	19.4	19.2	19.0	0	20
		1	8	19.5	19.3	19.1	0	20
		1	14	19.5	19.2	19.1	0	20
		8	0	19.2	19.1	18.9	0	20
		8	4	19.3	19.2	19.0	0	20
		8	7	19.3	19.2	19.0	0	20
		15	0	19.2	19.1	18.9	0	20

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	19.1	18.9	18.8	0	20
		1	3	19.1	19.0	18.9	0	20
		1	5	19.1	19.0	18.9	0	20
		3	0	19.1	19.0	18.8	0	20
		3	1	19.1	19.0	18.8	0	20
		3	3	19.1	19.0	18.8	0	20
		6	0	19.1	19.0	18.8	0	20
	16QAM	1	0	19.3	19.2	19.1	0	20
		1	3	19.4	19.2	19.1	0	20
		1	5	19.4	19.2	19.1	0	20
		3	0	19.3	19.1	19.0	0	20
		3	1	19.2	19.3	19.0	0	20
		3	3	19.3	19.1	19.0	0	20
		6	0	19.1	19.1	18.8	0	20
	64QAM	1	0	19.4	19.2	19.1	0	20
		1	3	19.4	19.3	19.2	0	20
		1	5	19.4	19.2	19.1	0	20
		3	0	19.3	19.2	19.0	0	20
		3	1	19.3	19.2	19.0	0	20
		3	3	19.3	19.3	19.0	0	20
		6	0	18.1	18.0	17.7	0	20

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				20050	20175	20300		
				1720 MHz	1732.5 MHz	1745 MHz		
20 MHz	QPSK	1	0	18.0	18.1	18.0	0	19
		1	49	18.0	18.1	18.0	0	19
		1	99	18.0	18.1	18.0	0	19
		50	0	18.0	18.1	18.0	0	19
		50	24	18.0	18.1	18.0	0	19
		50	50	18.0	18.1	18.0	0	19
		100	0	18.0	18.1	18.0	0	19
	16QAM	1	0	18.0	18.1	18.0	0	19
		1	49	18.0	18.1	18.0	0	19
		1	99	18.0	18.1	18.0	0	19
		50	0	18.0	18.1	18.0	0	19
		50	24	18.0	18.1	18.0	0	19
		50	50	18.0	18.1	18.0	0	19
		100	0	18.0	18.1	18.0	0	19
	64QAM	1	0	18.2	18.2	18.4	0	19
		1	49	18.4	18.3	18.4	0	19
		1	99	18.3	18.3	18.3	0	19
		50	0	17.9	18.0	18.0	0	19
		50	24	18.0	18.0	18.1	0	19
		50	50	18.0	18.1	18.1	0	19
		100	0	18.0	18.0	18.0	0	19

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				20025	20175	20325		
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	18.0	18.0	18.0	0	19
		1	37	18.0	18.0	17.9	0	19
		1	74	18.0	18.0	18.0	0	19
		36	0	18.0	18.0	18.0	0	19
		36	20	18.0	18.0	18.0	0	19
		36	39	18.0	18.0	18.0	0	19
		75	0	18.0	18.0	18.0	0	19
	16QAM	1	0	18.0	18.0	18.0	0	19
		1	37	18.0	18.0	18.0	0	19
		1	74	18.0	18.0	18.0	0	19
		36	0	18.0	18.0	18.0	0	19
		36	20	18.0	18.0	18.0	0	19
		36	39	18.0	18.0	18.0	0	19
		75	0	18.0	18.0	18.0	0	19
	64QAM	1	0	18.3	18.2	18.1	0	19
		1	37	18.3	18.3	18.2	0	19
		1	74	18.3	18.4	18.2	0	19
		36	0	18.0	18.1	18.0	0	19
		36	20	18.0	18.0	18.0	0	19
		36	39	18.0	18.1	18.1	0	19
		75	0	18.0	18.0	18.0	0	19

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				20000	20175	20350		
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	18.2	18.2	18.2	0	19
		1	25	18.2	18.2	18.1	0	19
		1	49	18.2	18.2	18.1	0	19
		25	0	18.2	18.2	18.1	0	19
		25	12	18.2	18.2	18.1	0	19
		25	25	18.1	18.2	18.1	0	19
		50	0	18.2	18.2	18.1	0	19
	16QAM	1	0	18.2	18.2	18.1	0	19
		1	25	18.2	18.2	18.1	0	19
		1	49	18.2	18.2	18.1	0	19
		25	0	18.2	18.2	18.1	0	19
		25	12	18.2	18.2	18.1	0	19
		25	25	18.2	18.2	18.1	0	19
		50	0	18.2	18.2	18.1	0	19
	64QAM	1	0	18.3	18.5	18.4	0	19
		1	25	18.3	18.5	18.4	0	19
		1	49	18.3	18.5	18.4	0	19
		25	0	18.2	18.2	18.1	0	19
		25	12	18.2	18.2	18.2	0	19
		25	25	18.2	18.3	18.2	0	19
		50	0	18.2	18.2	18.1	0	19

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				19975	20175	20375		
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	18.1	18.2	18.2	0	19
		1	12	18.1	18.2	18.2	0	19
		1	24	18.1	18.2	18.2	0	19
		12	0	18.1	18.2	18.1	0	19
		12	7	18.1	18.2	18.2	0	19
		12	13	18.1	18.2	18.2	0	19
		25	0	18.1	18.2	18.2	0	19
	16QAM	1	0	18.1	18.1	18.2	0	19
		1	12	18.1	18.2	18.2	0	19
		1	24	18.1	18.1	18.2	0	19
		12	0	18.1	18.1	18.2	0	19
		12	7	18.1	18.2	18.2	0	19
		12	13	18.1	18.2	18.2	0	19
		25	0	18.1	18.2	18.1	0	19
	64QAM	1	0	18.5	18.4	18.4	0	19
		1	12	18.6	18.5	18.5	0	19
		1	24	18.5	18.5	18.4	0	19
		12	0	18.2	18.2	18.2	0	19
		12	7	18.2	18.2	18.2	0	19
		12	13	18.2	18.3	18.2	0	19
		25	0	18.1	18.1	18.2	0	19

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				19965	20175	20385		
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	18.1	18.1	18.1	0	19
		1	8	18.0	18.1	18.1	0	19
		1	14	18.1	18.1	18.1	0	19
		8	0	18.0	18.1	18.1	0	19
		8	4	18.1	18.0	18.1	0	19
		8	7	18.1	18.1	18.0	0	19
		15	0	18.0	18.1	18.1	0	19
	16QAM	1	0	18.1	18.1	18.1	0	19
		1	8	18.1	18.1	18.1	0	19
		1	14	18.1	18.1	18.1	0	19
		8	0	18.1	18.0	18.1	0	19
		8	4	18.1	18.0	18.1	0	19
		8	7	18.1	18.0	18.1	0	19
		15	0	18.1	18.0	18.1	0	19
	64QAM	1	0	18.1	18.4	18.3	0	19
		1	8	18.3	18.5	18.4	0	19
		1	14	18.2	18.4	18.3	0	19
		8	0	18.1	18.2	18.2	0	19
		8	4	18.2	18.2	18.2	0	19
		8	7	18.2	18.3	18.2	0	19
		15	0	18.1	18.1	18.2	0	19

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				19957	20175	20393		
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	18.0	18.0	18.0	0	19
		1	3	18.0	18.0	18.0	0	19
		1	5	18.0	18.0	18.0	0	19
		3	0	18.0	18.0	18.0	0	19
		3	1	18.0	18.0	18.0	0	19
		3	3	18.0	18.0	18.0	0	19
		6	0	18.0	18.0	18.0	0	19
	16QAM	1	0	18.0	18.0	18.1	0	19
		1	3	18.0	18.0	18.1	0	19
		1	5	18.0	18.0	18.0	0	19
		3	0	18.0	18.0	18.0	0	19
		3	1	18.0	18.0	18.0	0	19
		3	3	18.0	18.0	18.0	0	19
		6	0	18.0	18.0	18.0	0	19
	64QAM	1	0	18.2	18.3	18.4	0	19
		1	3	18.3	18.4	18.4	0	19
		1	5	18.2	18.3	18.4	0	19
		3	0	18.2	18.2	18.2	0	19
		3	1	18.2	18.2	18.2	0	19
		3	3	18.2	18.2	18.2	0	19
		6	0	18.0	18.3	18.1	0	19

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				23060	23095	23130		
				704 MHz	707.5 MHz	711 MHz		
10 MHz	QPSK	1	0	21.4	21.4	21.2	0	22
		1	25	21.3	21.4	21.3	0	22
		1	49	21.3	21.4	21.1	0	22
		25	0	21.1	21.3	21.2	0	22
		25	12	21.2	21.4	21.2	0	22
		25	25	21.2	21.4	21.2	0	22
		50	0	21.1	21.3	21.2	0	22
	16QAM	1	0	21.7	21.7	21.5	0	22
		1	25	21.7	21.7	21.4	0	22
		1	49	21.5	21.7	21.6	0	22
		25	0	21.1	21.4	21.1	0	22
		25	12	21.1	21.4	21.2	0	22
		25	25	21.2	21.5	21.3	0	22
		50	0	21.0	21.3	21.2	0	22
	64QAM	1	0	21.3	21.6	21.4	0	22
		1	25	21.5	21.6	21.4	0	22
		1	49	21.5	21.6	21.5	0	22
		25	0	21.2	20.9	21.1	0	22
		25	12	21.2	20.9	21.2	0	22
		25	25	21.3	20.9	21.3	0	22
		50	0	21.3	20.9	21.2	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	21.3	21.3	21.3	0	22
		1	12	21.4	21.5	21.5	0	22
		1	24	21.3	21.3	21.4	0	22
		12	0	21.4	21.3	21.3	0	22
		12	7	21.4	21.3	21.4	0	22
		12	13	21.4	21.4	21.4	0	22
		25	0	21.4	21.3	21.4	0	22
	16QAM	1	0	21.7	21.7	21.8	0	22
		1	12	21.8	21.8	21.9	0	22
		1	24	21.7	21.7	21.8	0	22
		12	0	21.5	21.4	21.4	0	22
		12	7	21.5	21.5	21.4	0	22
		12	13	21.5	21.5	21.5	0	22
		25	0	21.4	21.3	21.4	0	22
	64QAM	1	0	21.7	21.6	21.7	0	22
		1	12	21.8	21.7	21.7	0	22
		1	24	21.7	21.6	21.7	0	22
		12	0	21.0	20.8	20.9	0	22
		12	7	21.0	20.8	21.0	0	22
		12	13	21.0	20.9	21.0	0	22
		25	0	20.9	20.8	20.9	0	22

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	21.4	21.3	21.3	0	22
		1	8	21.4	21.4	21.5	0	22
		1	14	21.3	21.3	21.3	0	22
		8	0	21.4	21.4	21.3	0	22
		8	4	21.4	21.4	21.4	0	22
		8	7	21.4	21.4	21.4	0	22
		15	0	21.4	21.3	21.3	0	22
	16QAM	1	0	21.7	21.7	21.7	0	22
		1	8	21.8	21.9	21.8	0	22
		1	14	21.6	21.7	21.7	0	22
		8	0	21.5	21.4	21.5	0	22
		8	4	21.5	21.5	21.5	0	22
		8	7	21.5	21.5	21.6	0	22
		15	0	21.5	21.4	21.4	0	22
	64QAM	1	0	21.5	21.6	21.7	0	22
		1	8	21.6	21.7	21.7	0	22
		1	14	21.5	21.5	21.6	0	22
		8	0	21.0	20.9	20.9	0	22
		8	4	21.0	20.9	20.9	0	22
		8	7	21.0	21.0	21.0	0	22
		15	0	20.9	20.9	20.9	0	22

LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Normal Average Power (dBm)			MPR	Tune-up Limit
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	21.3	21.4	21.4	0	22
		1	3	21.4	21.4	21.4	0	22
		1	5	21.3	21.4	21.4	0	22
		3	0	21.3	21.4	21.4	0	22
		3	1	21.4	21.4	21.4	0	22
		3	3	21.4	21.4	21.4	0	22
		6	0	21.3	21.4	21.4	0	22
	16QAM	1	0	21.5	21.7	21.7	0	22
		1	3	21.6	21.7	21.8	0	22
		1	5	21.6	21.7	21.7	0	22
		3	0	21.5	21.5	21.6	0	22
		3	1	21.6	21.5	21.6	0	22
		3	3	21.5	21.6	21.6	0	22
		6	0	21.4	21.4	21.5	0	22
	64QAM	1	0	21.6	21.5	21.6	0	22
		1	3	21.7	21.6	21.7	0	22
		1	5	21.6	21.6	21.6	0	22
		3	0	21.4	21.5	21.5	0	22
		3	1	21.4	21.5	21.5	0	22
		3	3	21.5	21.5	21.5	0	22
		6	0	21.0	21.0	20.8	0	22

9.4. WLAN 2.4GHz & WLAN 5GHz & Bluetooth

Data Reuse Testing Rational

This application is using the data reuse procedure from TCB workshop April 2021; RF Exposure Procedures (Remarks on Test Reductions via Data Referencing for Closely Related Products). WLAN and Bluetooth SAR data is referenced from FCC ID: PY7-12907W and is leveraged to cover variant FCC ID: PY7-83376C. All circuitry and features for WLAN and Bluetooth operations are identical between the two variants. The data reuse test plan was approved via manufacturer KDB inquiry.

Data Reuse SAR Test Approach

Full RF exposure testing was performed for WLAN and Bluetooth on the parent variant (FCC ID: PY7-12907W). The configurations with the highest SAR values for each equipment class were identified. These configurations were then tested on the variant model (FCC ID: PY7-83376C).
The variation in SAR values were well within the uncertainty budget of the SAR test equipment. The variant SAR results and worst case parent SAR values are summarized in section 1.

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN and Bluetooth = Measured SAR *Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

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):

For smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm.
When hotspot mode does not apply, 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. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

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 ≤ ¼ 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	Antenna	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	CELL Main 1	0	Left Cheek	190	836.6	26.9	26.2	0.075	0.088	
				Left Tilt	190	836.6	26.9	26.2	0.040	0.047	
				Right Cheek	190	836.6	26.9	26.2	0.103	**0.121**	1
				Right Tilt	190	836.6	26.9	26.2	0.040	0.047	
Body-Worn & Hotspot	GPRS 4 Slots	CELL Main 1	10	Back	190	836.6	26.9	26.2	0.334	0.392	2
				Front	190	836.6	26.9	26.2	0.274	0.322	
Hotspot	GPRS 4 Slots	CELL Main 1	10	Edge Bottom	190	836.6	26.9	26.2	0.160	0.188	
				Edge Left	190	836.6	26.9	26.2	0.093	0.109	
Body-Worn & Hotspot	DTM Edge 2 Slots	CELL Main 1	10	Back	190	836.6	29.9	29.2	0.391	**0.459**	3

10.2. GSM1900

RF Exposure Conditions	Mode	Antenna	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	CELL Main 2	0	Left Cheek	810	1909.8	22.0	21.4	0.015	0.017	
				Left Tilt	810	1909.8	22.0	21.4	0.017	0.020	
				Right Cheek	810	1909.8	22.0	21.4	0.033	0.038	4
				Right Tilt	810	1909.8	22.0	21.4	0.010	0.011	
Body-Worn & Hotspot	GPRS 4 Slots	CELL Main 2	10	Back	810	1909.8	22.0	21.4	0.121	0.139	
				Front	810	1909.8	22.0	21.4	0.133	0.153	5
Hotspot	GPRS 4 Slots	CELL Main 2	10	Edge Right	810	1909.8	22.0	21.4	0.056	0.064	
				Edge Bottom	810	1909.8	22.0	21.4	0.205	0.235	6
Body-Worn & Hotspot	DTM Edge 2 Slots	CELL Main 2	10	Edge Bottom	810	1909.8	25.0	23.7	0.221	0.298	7

10.3. W-CDMA Band 2

RF Exposure Conditions	Mode	Antenna	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 12.2 kbps	CELL Main 2	0	Left Cheek	9400	1880.0	19.7	18.8	0.030	0.037	
				Left Tilt	9400	1880.0	19.7	18.8	0.024	0.030	
				Right Cheek	9400	1880.0	19.7	18.8	0.048	0.059	8
				Right Tilt	9400	1880.0	19.7	18.8	0.020	0.025	
Body-Worn & Hotspot	Rel. 99 RMC 12.2 kbps	CELL Main 2	10	Back	9400	1880.0	19.7	18.8	0.198	0.244	9
				Front	9400	1880.0	19.7	18.8	0.159	0.196	
Hotspot	Rel. 99 RMC 12.2 kbps	CELL Main 2	10	Edge Right	9400	1880.0	19.7	18.8	0.092	0.113	
				Edge Bottom	9400	1880.0	19.7	18.8	0.305	0.375	10

10.4. W-CDMA Band 4

RF Exposure Conditions	Mode	Antenna	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 12.2 kbps	CELL Main 2	0	Left Cheek	1413	1732.6	18.7	17.8	0.020	0.025	
				Left Tilt	1413	1732.6	18.7	17.8	0.016	0.020	
				Right Cheek	1413	1732.6	18.7	17.8	0.030	0.037	11
				Right Tilt	1413	1732.6	18.7	17.8	0.015	0.018	
Body-Worn & Hotspot	Rel. 99 RMC 12.2 kbps	CELL Main 2	10	Back	1413	1732.6	18.7	17.8	0.209	0.257	12
				Front	1413	1732.6	18.7	17.8	0.190	0.234	
Hotspot	Rel. 99 RMC 12.2 kbps	CELL Main 2	10	Edge Right	1413	1732.6	18.7	17.8	0.082	0.101	
				Edge Bottom	1413	1732.6	18.7	17.8	0.298	0.367	13

10.5. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	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	CELL Main 2	0	Left Cheek	18900	1880.0	1	99	20.0	18.9	0.026	0.033	
							50	24	20.0	19.0	0.021	0.026	
				Left Tilt	18900	1880.0	1	99	20.0	18.9	0.019	0.024	
							50	24	20.0	19.0	0.013	0.016	
				Right Cheek	18900	1880.0	1	99	20.0	18.9	0.042	0.054	14
							50	24	20.0	19.0	0.032	0.040	
				Right Tilt	18900	1880.0	1	99	20.0	18.9	0.013	0.017	
							50	24	20.0	19.0	0.010	0.013	
Body-Worn & Hotspot	QPSK	CELL Main 2	10	Back	18900	1880.0	1	99	20.0	18.9	0.176	0.227	15
							50	24	20.0	19.0	0.142	0.179	
				Front	18900	1880.0	1	99	20.0	18.9	0.171	0.220	
							50	24	20.0	19.0	0.139	0.175	
Hotspot	QPSK	CELL Main 2	10	Edge Right	18900	1880.0	1	99	20.0	18.9	0.086	0.111	
							50	24	20.0	19.0	0.071	0.089	
				Edge Bottom	18900	1880.0	1	99	20.0	18.9	0.281	0.362	16
							50	24	20.0	19.0	0.230	0.290	

10.6. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	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	CELL Main 2	0	Left Cheek	20175	1732.5	1	0	19.0	18.1	0.021	0.026	
							50	0	19.0	18.1	0.015	0.018	
				Left Tilt	20175	1732.5	1	0	19.0	18.1	0.014	0.017	
							50	0	19.0	18.1	0.010	0.012	
				Right Cheek	20175	1732.5	1	0	19.0	18.1	0.026	0.032	17
							50	0	19.0	18.1	0.018	0.022	
				Right Tilt	20175	1732.5	1	0	19.0	18.1	0.014	0.017	
							50	0	19.0	18.1	0.011	0.014	
Body-Worn & Hotspot	QPSK	CELL Main 2	10	Back	20175	1732.5	1	0	19.0	18.1	0.122	0.150	18
							50	0	19.0	18.1	0.094	0.116	
				Front	20175	1732.5	1	0	19.0	18.1	0.117	0.144	
							50	0	19.0	18.1	0.091	0.112	
Hotspot	QPSK	CELL Main 2	10	Edge Right	20175	1732.5	1	0	19.0	18.1	0.077	0.095	
							50	0	19.0	18.1	0.061	0.075	
				Edge Bottom	20175	1732.5	1	0	19.0	18.1	0.131	0.161	19
							50	0	19.0	18.1	0.108	0.133	

10.7. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Antenna	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	CELL Main 1	0	Left Cheek	23095	707.5	1	0	22.0	21.4	0.043	0.049	
							25	12	22.0	21.4	0.034	0.039	
				Left Tilt	23095	707.5	1	0	22.0	21.4	0.020	0.023	
							25	12	22.0	21.4	0.014	0.016	
				Right Cheek	23095	707.5	1	0	22.0	21.4	0.045	0.052	20
							25	12	22.0	21.4	0.035	0.040	
				Right Tilt	23095	707.5	1	0	22.0	21.4	0.015	0.017	
							25	12	22.0	21.4	0.010	0.011	
Body-Worn & Hotspot	QPSK	CELL Main 1	10	Back	23095	707.5	1	0	22.0	21.4	0.086	0.099	
							25	12	22.0	21.4	0.069	0.079	
				Front	23095	707.5	1	0	22.0	21.4	0.114	0.131	21
							25	12	22.0	21.4	0.093	0.107	
Hotspot	QPSK	CELL Main 1	10	Edge Bottom	23095	707.5	1	0	22.0	21.4	0.054	0.062	
							25	12	22.0	21.4	0.045	0.052	
				Edge Left	23095	707.5	1	0	22.0	21.4	0.066	0.076	
							25	12	22.0	21.4	0.050	0.057	

10.8. WLAN & Bluetooth & NFC Spot Check Verification

WLAN Spot Check Results for Variant FCC ID: PY7-83376C

Technology	RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		FCC ID PY7-12907W 1-g SAR (W/kg)		1-g SAR (W/kg)		Delta	Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	Meas.	Scaled		
WLAN 2.4 GHz	Head	802.11b	WiFi Main	0	Right Cheek	1	2412	99.9%	14.0	13.4	0.387	0.445	0.469	**0.539**	21%	22
WLAN 5.5 GHz	Head	802.11ac (VHT160)	WiFi Main	0	Right Cheek	114	5570	99.6%	11.5	10.4	0.186	0.241	0.179	0.232	-4%	

WLAN Spot Check Results for Variant FCC ID: PY7-83376C (Extremity)

Technology	RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		FCC ID PY7-12907W 10-g SAR (W/kg)		10-g SAR (W/kg)		Delta	Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	Meas.	Scaled		
WLAN 5.5 GHz	Extremity	802.11ac (VHT160)	WiFi Main	0	Edge Left	114	5570	99.6%	11.5	10.4	0.262	0.339	0.307	0.397	17%	23

Bluetooth Spot Check Results for Variant FCC ID: PY7-83376C

Technology	RF Exposure Conditions	Mode	Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		FCC ID PY7-12907W 1-g SAR (W/kg)		1-g SAR (W/kg)		Delta	Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	Meas.	Scaled		
Bluetooth	Head	GFSK	WiFI Main	0	Right Cheek	78	2480	14.0	14.0	0.265	0.265	0.210	0.210	-21%	

10.9. NFC

RF Exposure Conditions	Mode	Dist. (mm)	Freq. (MHz)	Tolerance Scaling[1] (dB)	Test Position	10-g SAR (W/kg)		Plot No.
						Meas.	Scaled	
Extremity	Type A PRBS9 106k	0	13.56	2	Rear	0.021	**0.033**	24
				2	Front	0.000	0.000	
				2	Left	0.000	0.000	

Note(s):

1. The SAR values for the NFC are not scaled for maximum production power because measurements of actual output power are not practical. The values were measured with the device operated within expected tolerances of the transmitter specifications and after accounting for production tolerances the contribution to the RF exposure budget from the NFC transmitter would remain negligible.
2. The data reuse KDB inquiry test plan indicated the leveraging of NFC data, however the delta between the leveraged data and spot check measurements exceeded the approved 30%. Therefore, full testing was performed on PY7-83376C.

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 when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg (~ 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.

Note(s):

Repeated measurement is not required since the original highest measured SAR is <0.8 W/kg (1-g) or 2 W/kg (10-g) .

12. Simultaneous Transmission Conditions

RF Exposure Condition	Tx Mode	WWAN			WiFi Main			Wi-Fi Sub			NFC
		CELL Main1	CELL Main2	CELL Sub	2.4 GHz Wi-Fi	5 GHz Wi-Fi	Bluetooth	2.4 GHz Wi-Fi	5 GHz Wi-Fi	Bluetooth	
Head, Body-worn, & Hotspot	1	✓			✓			✓			
	2	✓				✓			✓		
	3	✓				✓	✓		✓		
	4	✓				✓			✓	✓	
	5	✓			✓	✓		✓	✓		
	6		✓		✓			✓			
	7		✓			✓			✓		
	8		✓			✓	✓		✓		
	9		✓			✓			✓	✓	
	10		✓		✓	✓		✓	✓		
Extremity	11					✓			✓		✓

Note(s):
-WLAN 2.4 GHz and Bluetooth radio cannot transmit simultaneously
-WLAN 2.4 GHz and WLAN 5 GHz radio can transmit simultaneously
-10-g extremity SAR is not required since hotspot mode 1-g reported SAR < 1.2 W/kg for all bands that support hotspot

12.1. Simultaneous transmission SAR test exclusion considerations

KDB 447498 D01 General RF Exposure Guidance provides two procedures for determining simultaneous transmission SAR test exclusion: Sum of SAR and SAR to Peak Location Ratio (SPLSR)

Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

12.2. Sum of the SAR for WWAN CELL Main1 & Wi-Fi Normal State & BT

RF Exposure Conditions	Standalone SAR (W/kg)							Σ 1-g SAR (W/kg)			
	WWAN	WLAN 2.4 GHz		WLAN 5 GHz		BT		WWAN + WLAN 2.4 GHz	WWAN + WLAN 5 GHz	WWAN + WLAN 5 GHz + BT	WWAN + WLAN 5 GHz + BT
	CELL Main1 ①	WiFi Main ②	WiFi Sub ③	WiFi Main ④	WiFi Sub ⑤	WiFi Main ⑥	WiFi Sub ⑦	① + ② + ③	① + ④ + ⑤	① + ④ + ⑤ + ⑥	① + ④ + ⑤ + ⑦
Head	0.121	0.539	0.077	0.241	0.089	0.265	0.058	**0.737**	0.451	**0.716**	0.509
Body	0.459	0.074	0.077	0.041	0.089	0.036	0.058	0.610	0.589	0.625	0.647
Hotspot	0.459	0.121	0.077	0.077	0.070	0.093	0.002	0.657	0.606	0.699	0.608

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.

12.3. Sum of the SAR for WWAN CELL Main1 & Wi-Fi Simultaneous 2G_5G State

RF Exposure Conditions	Standalone SAR (W/kg)					Σ 1-g SAR (W/kg)
	WWAN	WLAN 2.4 GHz		WLAN 5 GHz		WWAN + WLAN 2.4 GHz + WLAN 5 GHz
	CELL Main1 ①	WiFi Main ②	WiFi Sub ③	WiFi Main ④	WiFi Sub ⑤	① + ② + ③ + ④ + ⑤
Head	0.121	0.145	0.036	0.164	0.050	0.516
Body	0.459	0.031	0.036	0.034	0.050	0.610
Hotspot	0.459	0.056	0.036	0.058	0.041	0.650

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.

12.4. Sum of the SAR for WWAN CELL Main2 & Wi-Fi Normal State & BT

RF Exposure Conditions	Standalone SAR (W/kg)							Σ 1-g SAR (W/kg)			
	WWAN	WLAN 2.4 GHz		WLAN 5 GHz		BT		WWAN + WLAN 2.4 GHz	WWAN + WLAN 5 GHz	WWAN + WLAN 5 GHz + BT	WWAN + WLAN 5 GHz + BT
	CELL Main2 ①	WiFi Main ②	WiFi Sub ③	WiFi Main ④	WiFi Sub ⑤	WiFi Main ⑥	WiFi Sub ⑦	① + ② + ③	① + ④ + ⑤	① + ④ + ⑤ + ⑥	① + ④ + ⑤ + ⑦
Head	0.059	0.539	0.077	0.241	0.089	0.265	0.058	0.675	0.389	0.654	0.447
Body	0.257	0.074	0.077	0.041	0.089	0.036	0.058	0.408	0.387	0.423	0.445
Hotspot	0.375	0.121	0.077	0.077	0.070	0.093	0.002	0.573	0.522	0.615	0.524

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.

12.5. Sum of the SAR for WWAN CELL Main2 & Wi-Fi Simultaneous 2G_5G State

RF Exposure Conditions	Standalone SAR (W/kg)					Σ 1-g SAR (W/kg)
	WWAN	WLAN 2.4 GHz		WLAN 5 GHz		WWAN + WLAN 2.4 GHz + WLAN 5 GHz
	CELL Main2 ①	WiFi Main ②	WiFi Sub ③	WiFi Main ④	WiFi Sub ⑤	① + ② + ③ + ④ + ⑤
Head	0.059	0.145	0.036	0.164	0.050	0.454
Body	0.257	0.031	0.036	0.034	0.050	0.408
Hotspot	0.375	0.056	0.036	0.058	0.041	0.566

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.

12.6. Sum of the SAR for Wi-Fi Normal State & NFC

RF Exposure Conditions	Standalone SAR (W/kg)			Σ 10-g SAR (W/kg)
	WLAN 5 GHz		NFC	WLAN 5 GHz + NFC
	WiFi Main ①	WiFi Sub ②	NFC ③	① + ② + ③
Extremity	0.397	0.211	0.033	**0.641**

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 10-g SAR is < 4.0 W/kg or the SPLSR is < 0.1 for all circumstances that require SPLSR calculation.

Appendixes

Refer to separated files for the following appendixes.

Appendix A: SAR Setup Photos

Appendix B: SAR System Check Plots

Appendix C: SAR Highest Test Plots

Appendix D: SAR Tissue Ingredients

Appendix E: SAR Probe Certificates

Appendix F: SAR Dipole Certificates

END OF REPORT