SAR EVALUATION REPORT

IEEE Std 1528-2013

For
51mm Extremity Worn Digital Transceiver

FCC ID: IPH-05201
Model Name: A05201

Report Number: 15628768-S1
Issue Date: 2025-08-12

Prepared for
Garmin International Inc.
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CERT #0751.05

Revision History

Rev.	Date	Revisions	Revised By
V1	2025-08-12	Initial Issue	--

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1. Attestation of Test Results

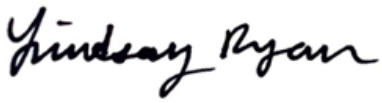
Applicant Name		Garmin International Inc.			
FCC ID		IPH-05201			
Model Name		A05201			
Applicable Standards		Published RF exposure KDB procedures. IEEE Std 1528-2013			
Exposure Category		SAR Limits (W/Kg)			
		Peak spatial-average (1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure		1.6		4	
RF Exposure Conditions		Equipment Class - Highest Reported SAR (W/kg)			
		PCT	DTS	DSS	DXX
Head		0.092	0.168	0.030	0.001
Extremity		0.154	0.116	0.029	0.001
Simultaneous TX	Head	0.122	N/A	0.122	0.122
	Extremity	0.183	N/A	0.183	0.183
Date Tested		2025-04-29 to 2025-08-06			
Test Results		Complies			

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 can demonstrate 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 ensure 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 considered unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are 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:
	
Sunghoon Kim Senior Laboratory Engineer UL Korea, Ltd. Suwon Laboratory	Lindsay Ryan Project Engineer 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
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet 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)

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.

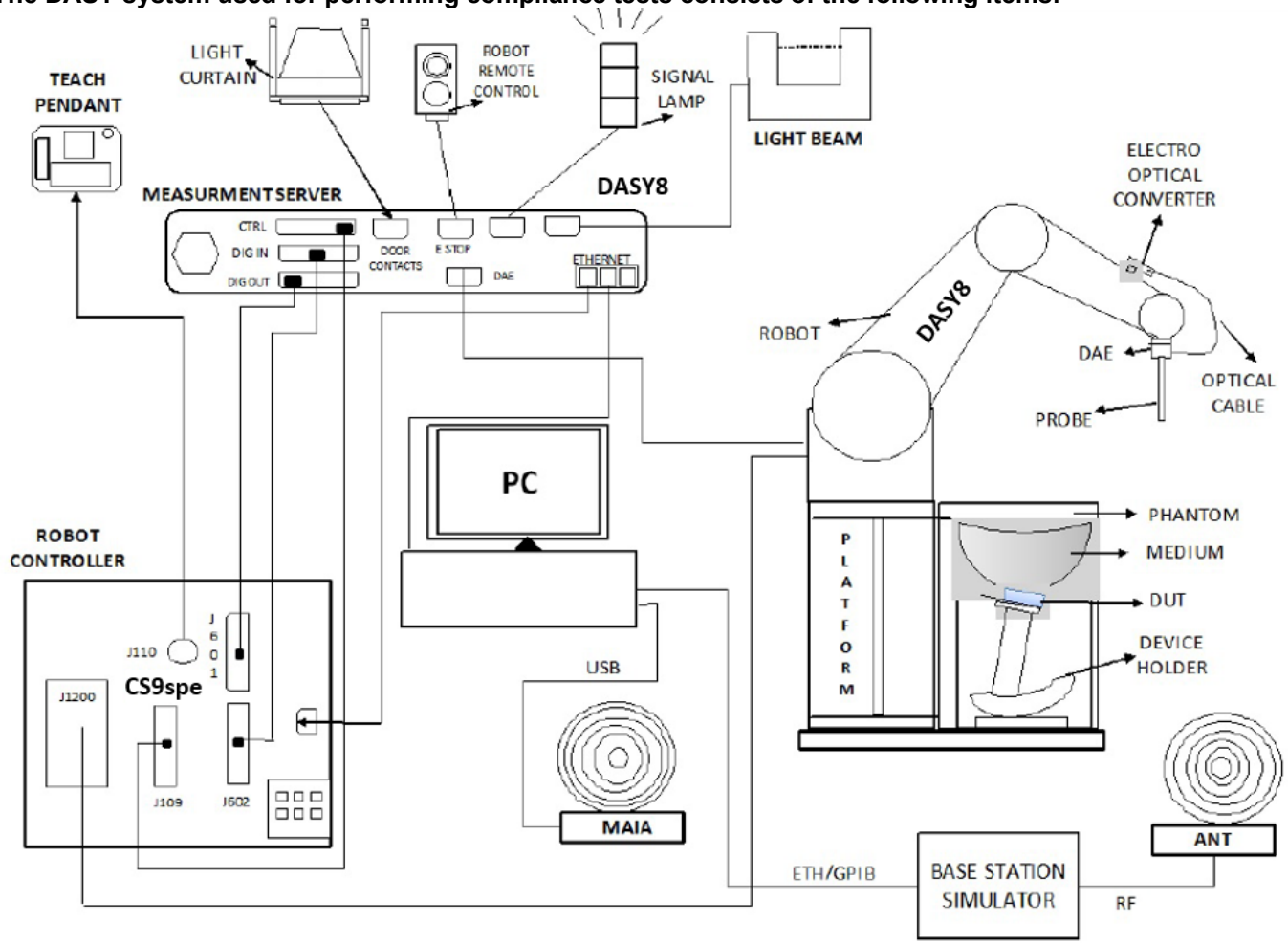
- SAR Lab 1A
- SAR Lab 2A

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr Durham, NC 27713, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

4. 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: DASY16.4.0.5005 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. Date	Cal. Due Date
Network Analyzer[1]	Keysight	E5063A	MY54100681	2024-07-31	2025-07-31
Network Analyzer[2]	Keysight	E5063A	MY54100681	2025-08-01	2026-08-01
Dielectric Probe	SPEAG	DAKS-3.5	1051	2024-10-14	2025-10-14
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 DA	2024-10-14	2025-10-14
Dielectric Probe	SPEAG	DAKS-12	1037	2025-03-05	2026-03-05
Shorting Block	SPEAG	DAK-12 Short	2044	2025-03-05	2026-03-05

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Date	Cal. Due Date
Signal Generator[1]	Keysight	N5181A	MY50140788	2024-08-01	2025-08-01
Signal Generator[1]	Keysight	N5182B	MY51350128	2024-07-09	2025-07-09
3-Path Diode Power Sensor[1]	Rohde & Schwarz	NRP8S	112236	2024-07-12	2025-07-12
3-Path Diode Power Sensor[1]	Rohde & Schwarz	NRP8S	112237	2024-07-12	2025-07-12
RF Power Meter[1]	Keysight	N1912A	MY55136012	2024-08-02	2025-08-02
RF Power Sensor	Keysight	N1921A	MY55090025	2024-08-16	2025-08-16
RF Power Sensor[1]	Keysight	N1921A	MY55090030	2024-07-09	2025-07-30
Amplifier	Mini-Circuits	ZVA-183WA-S+	S C484802241	N/A	N/A
Directional Coupler	Mini-Circuits	ZUDC10-183+	2214	N/A	N/A
Dual Directional Coupler	Werlatone	C5100-10	92249	N/A	N/A
DC Power Supply	Miteq	PS 15V1	1990186	N/A	N/A
RF Power Source[1]	Speag	PowerSource1	4278	2024-06-17	2025-06-17
RF Power Source[2]	Speag	PowerSource1	4278	2025-06-12	2026-06-12

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Date	Cal. Due Date
E-Field Probe	SPEAG	EX3DV4	7709	2024-11-11	2025-11-11
E-Field Probe	SPEAG	EX3DV4	7710	2025-01-14	2026-01-14
E-Field Probe	SPEAG	EX3DV4	7711	2025-03-10	2026-03-10
Data Acquisition Electronics	SPEAG	DAE4	1714	2024-11-06	2025-11-06
Data Acquisition Electronics	SPEAG	DAE4	1715	2025-01-13	2026-01-13
System Validation Dipole	SPEAG	CLA13	1017	2025-03-10	2026-03-10
System Validation Dipole	SPEAG	D750V3	1139	2024-10-11	2025-10-11
System Validation Dipole	SPEAG	D1640V2	359	2025-04-30	2026-04-30
System Validation Dipole	SPEAG	D1750V2	1136	2024-10-10	2025-10-10
System Validation Dipole	SPEAG	D1900V2	5d202	2024-10-11	2025-10-11
System Validation Dipole	SPEAG	D2100V2	1043	2024-10-11	2025-10-11
System Validation Dipole	SPEAG	D2450V2	963	2024-10-11	2025-10-11
Environmental Indicator	Fisher Scientific	Traceable	240072452	2024-01-24	2026-01-24

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Keysight	N9030A	MY54490314	2024-08-01	2025-08-01

Note(s):

1. Equipment not used past calibration due date.
2. Equipment calibrated during course of testing.

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

Back Cover	The Back Cover is not removable
Battery Options	The rechargeable battery is not user accessible.
Accessory	Strap 1, 2, 3. Refer to Appendix A.
Test sample information	**S/N** — **Notes** 3604021707 — Radiated Sample #1 3604021429 — Radiated Sample #2 603037845 — Conducted Sample #1
Hardware Version	A05201
Software Version	16.29

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
LTE	FDD Band 2 FDD Band 4 FDD Band 12 NTN Band 23 NTN Band 255	QPSK 16QAM BPSK[1] Does not support Carrier Aggregation (CA)	Cat eMTC M1 11.1% (QPSK) 34.4% (BPSK)
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100% $_{(802.11b)}$ [2]
Bluetooth	2.4 GHz	BR, EDR, and LE	100% $_{(GFSK)}$ [2]
ANT/ANT+	2.4GHz	GFSK	N/A[3]
NFC	13.56 MHz	Type A, B, A & B, F, A & F	100% $_{(Type F)}$ [2]

Notes:

1. NTN bands only.
2. Duty cycle is referenced from §9.
3. Measured Duty Cycle is not required due to SAR test exemption.

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>
</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>

7. RF Exposure Conditions (Test Configurations)

7.1. Standalone SAR Test Exclusion Considerations

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

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

SAR Test Exclusion Calculations

Antennas < 50mm to adjacent edges

Head

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)	Calculated Threshold Value
		dBm	mW	Back	Back
ANT/ANT+	2480	6.50	4.50	10	0.7 -EXEMPT-

Note(s):

According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.
Head exposure is only required for Bluetooth as it is the only communication system supporting voice mode.

Extremity

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)	Calculated Threshold Value
		dBm	mW	Back	Back
ANT/ANT+	2480	6.50	4.50	5	1.4 -EXEMPT-

Note(s):

According to KDB 447498, if the calculated threshold value is >7.5, then SAR testing is required.

7.2. Required Test Configurations

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

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	10	Front	N/A	Yes	
	Extremity	0	Back	N/A	Yes	
WLAN/BT	Head	10	Front	N/A	Yes	
	Extremity	0	Back	N/A	Yes	
NFC	Head	10	Front	N/A	Yes	
	Extremity	0	Back	N/A	Yes	
ANT/ANT+	Head	10	Front	N/A	No	1
	Extremity	0	Back	N/A	No	1

Note(s):

1. Testing not required per §7.1.

8. Dielectric Property Measurements & System Check

8.1. SAR Dielectric Property Measurements and System Checks

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:

Liquid Check											
SAR Lab	Date	Tissue Type	Band (MHz)	Freq. (MHz)	Relative Permittivity (εr)			Conductivity (σ)			
					Measured	Target	Delta	Measured	Target	Delta	
SAR 1A	2025-06-10	Head	13	13	54.0	55.0	-1.80%	0.72	0.75	-4.27%	
				12	54.0	55.0	-1.76%	0.72	0.75	-4.28%	
				14	54.0	55.0	-1.87%	0.72	0.75	-4.25%	
SAR 1A	2025-07-21	Head	1750	1750	42.1	40.1	5.10%	1.25	1.37	-8.69%	
				1710	42.2	40.1	5.09%	1.23	1.35	-8.94%	
				1780	42.1	40.0	5.10%	1.27	1.39	-8.43%	
SAR 1A	2025-07-21	Head	1900	1900	41.3	40.0	3.33%	1.30	1.40	-7.21%	
				1850	41.4	40.0	3.52%	1.27	1.40	-9.29%	
				2000	41.2	40.0	3.00%	1.36	1.40	-2.86%	
SAR 1A	2025-07-28	Head	750	750	42.3	42.0	0.81%	0.83	0.89	-7.31%	
				660	42.6	42.4	0.30%	0.80	0.89	-9.53%	
				800	42.2	41.7	1.21%	0.84	0.90	-6.12%	
SAR 1A	2025-07-28	Head	1640	1640	40.8	40.3	1.38%	1.19	1.31	-9.25%	
				1625	40.8	40.3	1.35%	1.18	1.30	-9.35%	
				1665	40.8	40.2	1.45%	1.19	1.32	-9.62%	
SAR 1A	2025-08-04	Head	1640	1640	42.1	40.3	4.46%	1.18	1.31	-9.79%	
				1625	42.1	40.3	4.45%	1.17	1.30	-9.89%	
				1665	42.0	40.2	4.51%	1.19	1.32	-9.77%	
SAR 2A	2025-07-07	Head	2450	2450	39.7	39.2	1.28%	1.89	1.80	4.83%	
				2400	39.9	39.3	1.54%	1.83	1.75	4.53%	
				2500	39.5	39.1	0.98%	1.94	1.85	4.74%	
SAR 2A	2025-07-29	Head	1900	1900	40.8	40.0	2.10%	1.33	1.40	-5.00%	
				1920	40.8	40.0	2.08%	1.34	1.40	-4.14%	
				1950	40.8	40.0	2.00%	1.36	1.40	-3.07%	
SAR 2A	2025-07-29	Head	2100	2100	40.6	39.8	2.02%	1.45	1.49	-2.35%	
				2000	40.7	40.0	1.82%	1.39	1.40	-0.71%	
				2200	40.5	38.6	5.06%	1.52	1.62	-6.11%	

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 recorded and 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.

System Check													
SAR Lab	Date	Dipole Type & Serial Number	Dipole Cal. Due Date	Input Power (dBm)	Measured results for 1-g SAR				Measured results for 10-g SAR				Plot No.
					Meas. Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	Meas. Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	
SAR 1A	2025-06-10	CLA13 SN: 1017	2026-03-10	17.0	0.025	0.499	0.538	-7.28%	0.016	0.319	0.336	-4.99%	1
SAR 1A	2025-07-21	D1750V2 SN: 1136	2025-10-10	17.0	1.710	34.119	37.100	-8.04%	0.937	18.696	19.700	-5.10%	2
SAR 1A	2025-07-21	D1900V2 SN: 5d202	2025-10-11	17.0	1.900	37.910	40.200	-5.70%	1.020	20.352	21.200	-4.00%	3
SAR 1A	2025-07-28	D750V3 SN: 1139	2025-10-11	17.0	0.417	8.320	8.320	0.00%	0.278	5.547	5.410	2.53%	4
SAR 1A	2025-07-28	D1640V2 SN: 359	2026-04-30	17.0	1.740	34.718	34.200	1.51%	0.949	18.935	18.600	1.80%	
SAR 1A	2025-08-04	D1640V2 SN: 359	2026-04-30	17.0	1.620	32.323	34.200	-5.49%	0.911	18.177	18.600	-2.28%	5
SAR 2A	2025-07-07	D2450V2 SN: 963	2025-10-11	17.0	2.470	49.283	52.600	-6.31%	1.140	22.746	24.400	-6.78%	6
SAR 2A	2025-07-29	D1900V2 SN: 5d202	2025-10-11	17.0	1.960	39.107	40.200	-2.72%	1.030	20.551	21.200	-3.06%	7
SAR 2A	2025-07-29	D2100V2 SN: 1043	2025-10-11	17.0	2.070	41.302	44.200	-6.56%	1.050	20.950	22.400	-6.47%	8

9. Conducted Output Power Measurements

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

9.1. 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

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 Band 4 (1710-1755 MHz)
- LTE Band 12 (699-716 MHz)

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

SAR measurement is not required for 16QAM when the highest maximum output power for 16QAM 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
		Main Antenna
		Maximum
LTE Band 2	QPSK	24.00
LTE Band 4	QPSK	24.50
LTE Band 12	QPSK	25.00
NTN n23	QPSK	24.00
NTN n255	QPSK	24.00

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18700	18900	19100		
					1860 MHz	1880 MHz	1900 MHz		
20	QPSK	1	0	Low	23.2	23.2	23.6	0	24.0
		1	3	NB7	23.2	22.1	23.3	0	24.0
		1	5	High	23.3	23.3	23.3	0	24.0
		3	0	Low	23.3	22.9	23.6	0	24.0
		3	1	NB7	23.1	23.1	23.4	0	24.0
		3	3	High	23.6	23.0	23.0	0	24.0
		6	0	Low	23.6	23.5	23.5	0	24.0
	16QAM	1	0	Low	23.8	23.1	22.9	0	24.0
		1	3	NB7	23.3	23.4	23.4	0	24.0
		1	5	High	23.9	23.1	22.9	0	24.0
		3	0	Low	23.4	23.3	23.7	0	24.0
		3	1	NB7	23.9	23.4	23.2	0	24.0
		3	3	High	23.3	23.2	23.8	0	24.0
		6	0	Low	23.3	23.2	23.2	0	24.0

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18675	18900	19125		
					1857.5 MHz	1880 MHz	1902.5 MHz		
15	QPSK	1	0	Low	23.2	23.2	22.9	0	24.0
		1	3	NB5	23.3	23.2	22.6	0	24.0
		1	5	High	23.3	23.4	23.1	0	24.0
		3	0	Low	23.3	23.6	22.9	0	24.0
		3	1	NB5	23.2	23.1	22.9	0	24.0
		3	3	High	23.2	23.6	23.0	0	24.0
		6	0	Low	23.2	23.4	23.5	0	24.0
	16QAM	1	0	Low	23.3	23.3	23.3	0	24.0
		1	3	NB5	23.5	23.4	23.5	0	24.0
		1	5	High	23.5	23.5	23.3	0	24.0
		3	0	Low	23.3	23.6	23.5	0	24.0
		3	1	NB5	23.9	23.5	23.4	0	24.0
		3	3	High	23.9	23.6	23.3	0	24.0
		6	0	Low	22.9	23.2	23.3	0	24.0

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18650	18900	19150		
					1855 MHz	1880 MHz	1905 MHz		
10	QPSK	1	0	Low	23.2	23.4	23.6	0	24.0
		1	3	NB3	23.2	23.4	23.2	0	24.0
		1	5	High	23.3	23.4	23.3	0	24.0
		3	0	Low	23.3	23.4	24.0	0	24.0
		3	1	NB3	23.1	23.3	23.0	0	24.0
		3	3	High	23.3	23.3	23.5	0	24.0
		6	0	Low	22.7	22.6	22.5	1	23.0
	16QAM	1	0	Low	23.0	23.8	22.9	0	24.0
		1	3	NB3	23.3	23.6	23.4	0	24.0
		1	5	High	23.2	23.7	22.9	0	24.0
		3	0	Low	23.4	23.6	23.5	0	24.0
		3	1	NB3	23.5	23.1	23.6	0	24.0
		3	3	High	23.3	23.7	23.1	0	24.0
		6	0	Low	21.2	21.3	21.2	2	22.0

LTE Band 2 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18625	18900	19175		
					1852.5 MHz	1880 MHz	1907.5 MHz		
5	QPSK	1	0	Low	23.2	23.3	23.9	0	24.0
		1	3	NB1	23.2	23.2	22.1	0	24.0
		1	5	High	23.3	23.3	23.2	0	24.0
		3	0	Low	22.4	22.4	22.0	1	23.0
		3	1	NB1	22.7	22.5	22.4	1	23.0
		3	3	High	22.4	22.4	22.0	1	23.0
		6	0	Low	22.7	22.7	22.6	1	23.0
	16QAM	1	0	Low	23.1	23.9	23.0	0	24.0
		1	3	NB1	23.9	24.0	23.2	0	24.0
		1	5	High	23.8	23.9	23.0	0	24.0
		3	0	Low	22.5	22.3	22.2	1	23.0
		3	1	NB1	22.7	22.5	21.7	1	23.0
		3	3	High	22.2	22.1	22.1	1	23.0
		6	0	Low	21.2	21.2	21.2	2	22.0
BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18615	18900	19185		
					1851.5 MHz	1880 MHz	1908.5 MHz		
3	QPSK	1	0	Low	23.1	23.8	23.4	0	24.0
		1	3	Low	23.0	23.6	23.1	0	24.0
		1	5	High	23.3	23.6	23.4	0	24.0
		3	0	Low	22.4	22.1	22.7	1	23.0
		3	1	Low	22.6	22.2	22.5	1	23.0
		3	3	High	22.4	22.1	22.5	1	23.0
		6	0	Low	21.5	21.3	21.7	2	22.0
	16QAM	1	0	Low	22.0	22.7	21.8	1	23.0
		1	3	Low	22.2	22.8	22.0	1	23.0
		1	5	High	22.0	22.7	21.9	1	23.0
		3	0	Low	21.6	21.4	21.4	2	22.0
		3	1	Low	21.2	21.4	21.5	2	22.0
		3	3	High	21.1	21.1	21.3	2	22.0
		6	0	Low	21.1	20.9	21.0	2	22.0
BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					18607	18900	19193		
					1850.7 MHz	1880 MHz	1909.3 MHz		
1.4	QPSK	1	0	Low	23.4	23.3	23.4	0	24.0
		1	3	Low	23.0	24.0	23.0	0	24.0
		1	5	High	23.3	23.7	23.3	0	24.0
		3	0	Low	22.8	22.1	22.7	1	23.0
		3	1	Low	22.2	22.7	22.8	1	23.0
		3	3	High	22.4	22.3	22.2	1	23.0
		6	0	Low	21.5	21.4	21.4	2	22.0
	16QAM	1	0	Low	22.8	22.7	22.6	1	23.0
		1	3	Low	22.9	22.8	22.8	1	23.0
		1	5	High	22.7	22.6	22.6	1	23.0
		3	0	Low	21.6	21.4	21.4	2	22.0
		3	1	Low	21.2	21.9	21.0	2	22.0
		3	3	High	21.5	21.3	21.3	2	22.0
		6	0	Low	21.0	20.6	21.3	2	22.0

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					20050	20175	20300		
					1720 MHz	1732.5 MHz	1745 MHz		
20	QPSK	1	0	Low	23.4	23.4	23.3	0	24.5
		1	3	NB7	23.2	23.2	23.2	0	24.5
		1	5	High	23.2	23.3	23.5	0	24.5
		3	0	Low	23.3	23.2	23.5	0	24.5
		3	1	NB7	23.0	23.1	22.9	0	24.5
		3	3	High	23.2	23.1	23.4	0	24.5
		6	0	Low	23.7	23.5	23.5	0	24.5
	16QAM	1	0	Low	22.8	23.4	23.7	0	24.5
		1	3	NB7	23.0	23.4	23.5	0	24.5
		1	5	High	22.8	23.4	23.7	0	24.5
		3	0	Low	23.7	23.7	23.6	0	24.5
		3	1	NB7	24.1	23.2	23.5	0	24.5
		3	3	High	23.7	23.5	23.6	0	24.5
		6	0	Low	23.2	23.1	23.3	0	24.5

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					20025	20175	20325		
					1717.5 MHz	1732.5 MHz	1747.5 MHz		
15	QPSK	1	0	Low	23.4	23.3	23.2	0	24.5
		1	3	NB5	23.2	23.2	22.0	0	24.5
		1	5	High	23.2	23.2	23.2	0	24.5
		3	0	Low	23.2	23.1	23.0	0	24.5
		3	1	NB5	23.3	23.1	23.0	0	24.5
		3	3	High	23.2	23.1	23.0	0	24.5
		6	0	Low	23.7	23.6	23.4	0	24.5
	16QAM	1	0	Low	23.5	23.8	23.1	0	24.5
		1	3	NB5	23.5	23.6	23.5	0	24.5
		1	5	High	23.7	23.6	23.2	0	24.5
		3	0	Low	23.7	23.1	23.7	0	24.5
		3	1	NB5	23.6	23.2	23.7	0	24.5
		3	3	High	23.6	23.5	23.9	0	24.5
		6	0	Low	23.1	23.1	23.1	0	24.5

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					20000	20175	20350		
					1715 MHz	1732.5 MHz	1750 MHz		
10	QPSK	1	0	Low	23.6	23.3	23.3	0	24.5
		1	3	NB3	23.4	23.2	23.1	0	24.5
		1	5	High	23.6	23.3	23.3	0	24.5
		3	0	Low	23.1	23.3	23.1	0	24.5
		3	1	NB3	23.0	23.1	22.7	0	24.5
		3	3	High	23.0	23.1	23.1	0	24.5
		6	0	Low	22.5	22.7	22.6	1	23.5
	16QAM	1	0	Low	23.3	22.8	23.1	0	24.5
		1	3	NB3	23.6	23.0	23.6	0	24.5
		1	5	High	23.4	22.8	23.4	0	24.5
		3	0	Low	23.9	23.7	23.2	0	24.5
		3	1	NB3	23.7	23.2	23.6	0	24.5
		3	3	High	24.0	23.7	23.0	0	24.5
		6	0	Low	21.1	21.1	20.9	2	22.5

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)				
					19975	20175	20375	MPR	Tune-up Limit
					1712.5 MHz	1732.5 MHz	1752.5 MHz		
5	QPSK	1	0	Low	23.4	23.3	23.3	0	24.5
		1	3	NB1	23.3	23.2	22.0	0	24.5
		1	5	High	23.2	23.3	23.3	0	24.5
		3	0	Low	22.3	22.2	22.0	1	23.5
		3	1	NB1	22.4	22.2	22.0	1	23.5
		3	3	High	22.3	22.2	22.0	1	23.5
		6	0	Low	22.7	22.6	22.4	1	23.5
	16QAM	1	0	Low	22.9	23.4	23.2	0	24.5
		1	3	NB1	23.1	23.4	23.6	0	24.5
		1	5	High	22.9	23.3	23.4	0	24.5
		3	0	Low	22.8	22.3	22.9	1	23.5
		3	1	NB1	22.7	22.3	22.7	1	23.5
		3	3	High	22.8	22.1	22.9	1	23.5
		6	0	Low	21.1	21.0	21.1	2	22.5

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)				
					19965	20175	20385	MPR	Tune-up Limit
					1711.5 MHz	1732.5 MHz	1753.5 MHz		
3	QPSK	1	0	Low	23.4	23.4	23.3	0	24.5
		1	3	Low	23.0	22.9	22.9	0	24.5
		1	5	High	23.3	23.3	23.2	0	24.5
		3	0	Low	22.0	22.4	22.4	1	23.5
		3	1	Low	22.1	22.7	22.3	1	23.5
		3	3	High	22.3	22.2	22.2	1	23.5
		6	0	Low	21.3	21.7	21.6	2	22.5
	16QAM	1	0	Low	21.9	21.8	21.7	1	23.5
		1	3	Low	22.2	22.0	21.9	1	23.5
		1	5	High	21.8	21.8	21.8	1	23.5
		3	0	Low	21.3	21.3	21.2	2	22.5
		3	1	Low	21.2	21.4	20.9	2	22.5
		3	3	High	21.4	21.2	21.3	2	22.5
		6	0	Low	20.9	20.9	21.2	2	22.5

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)				
					19957	20175	20393	MPR	Tune-up Limit
					1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4	QPSK	1	0	Low	23.4	23.2	23.2	0	24.5
		1	3	Low	22.2	22.8	22.8	0	24.5
		1	5	High	23.4	23.2	23.2	0	24.5
		3	0	Low	22.2	22.6	22.6	1	23.5
		3	1	Low	22.2	22.2	22.3	1	23.5
		3	3	High	21.9	22.1	22.1	1	23.5
		6	0	Low	21.6	21.2	21.2	2	22.5
	16QAM	1	0	Low	22.9	21.4	22.5	1	23.5
		1	3	Low	23.0	21.4	22.6	1	23.5
		1	5	High	23.0	21.1	22.4	1	23.5
		3	0	Low	21.1	20.9	21.1	2	22.5
		3	1	Low	21.1	20.7	20.7	2	22.5
		3	3	High	21.2	20.9	21.1	2	22.5
		6	0	Low	21.0	20.6	20.5	2	22.5

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB Offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					23060	23095	23130		
					704 MHz	707.5 MHz	711 MHz		
10	QPSK	1	0	Low	23.6	23.6	23.6	0	25.0
		1	3	NB3	23.5	23.5	23.5	0	25.0
		1	5	High	23.5	23.6	23.6	0	25.0
		3	0	Low	23.5	23.5	23.5	0	25.0
		3	1	NB3	23.3	23.5	23.3	0	25.0
		3	3	High	23.4	23.4	23.4	0	25.0
		6	0	Low	23.0	22.7	22.7	1	24.0
	16QAM	1	0	Low	23.1	23.7	23.7	0	25.0
		1	3	NB3	23.4	23.8	23.8	0	25.0
		1	5	High	23.1	23.7	23.7	0	25.0
		3	0	Low	24.0	23.5	23.5	0	25.0
		3	1	NB3	24.5	23.5	23.9	0	25.0
		3	3	High	24.0	23.4	23.4	0	25.0
		6	0	Low	21.6	21.7	21.4	2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					23035	23095	23155		
					701.5 MHz	707.5 MHz	713.5 MHz		
5	QPSK	1	0	Low	23.7	23.6	23.8	0	25.0
		1	3	NB1	23.5	23.5	23.6	0	25.0
		1	5	High	23.5	23.6	23.8	0	25.0
		3	0	Low	22.5	22.5	22.8	1	24.0
		3	1	NB1	22.6	22.4	22.2	1	24.0
		3	3	High	22.5	22.5	22.7	1	24.0
		6	0	Low	22.8	22.7	22.8	1	24.0
	16QAM	1	0	Low	23.3	23.8	24.1	0	25.0
		1	3	NB1	23.5	23.8	23.9	0	25.0
		1	5	High	23.2	24.0	24.0	0	25.0
		3	0	Low	23.1	23.0	23.0	1	24.0
		3	1	NB1	22.9	22.6	22.9	1	24.0
		3	3	High	23.1	22.9	22.2	1	24.0
		6	0	Low	21.2	21.4	21.4	2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					23025	23095	23165		
					700.5 MHz	707.5 MHz	714.5 MHz		
3	QPSK	1	0	Low	23.6	23.9	23.6	0	25.0
		1	3	Low	23.3	23.7	23.2	0	25.0
		1	5	High	23.6	23.7	23.5	0	25.0
		3	0	Low	22.7	22.3	22.6	1	24.0
		3	1	Low	22.4	22.4	22.0	1	24.0
		3	3	High	22.5	22.3	22.5	1	24.0
		6	0	Low	22.0	21.5	21.9	2	23.0
	16QAM	1	0	Low	22.0	22.0	22.0	1	24.0
		1	3	Low	22.3	22.3	22.3	1	24.0
		1	5	High	22.1	21.9	22.0	1	24.0
		3	0	Low	21.5	21.6	21.6	2	23.0
		3	1	Low	21.6	21.5	21.6	2	23.0
		3	3	High	21.6	21.6	21.3	2	23.0
		6	0	Low	21.2	21.2	21.4	2	23.0

BW (MHz)	Mode	RB Allocation	RB offset	NB Position	Maximum Average Power (dBm)			MPR	Tune-up Limit
					23017	23095	23173		
					699.7 MHz	707.5 MHz	715.3 MHz		
1.4	QPSK	1	0	Low	23.6	24.5	23.5	0	25.0
		1	3	Low	23.2	24.2	22.4	0	25.0
		1	5	High	23.5	24.2	23.5	0	25.0
		3	0	Low	22.8	22.2	22.6	1	24.0
		3	1	Low	22.4	22.5	22.4	1	24.0
		3	3	High	22.6	22.4	22.4	1	24.0
		6	0	Low	21.7	21.5	21.9	2	23.0
	16QAM	1	0	Low	21.9	22.8	23.5	1	24.0
		1	3	Low	21.9	23.0	22.5	1	24.0
		1	5	High	22.0	22.8	23.5	1	24.0
		3	0	Low	21.2	21.6	22.6	2	23.0
		3	1	Low	21.3	21.0	21.3	2	23.0
		3	3	High	21.3	21.4	22.4	2	23.0
		6	0	Low	21.1	20.8	20.8	2	23.0

NTN n23

Sub-Carrier Spacing (kHz)	Mode	SC Size	SC Offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				25501	25600	25699		
				2000.1MHz	2010MHz	2019.9MHz		
3.75	BPSK	1	0	23.6	23.3	23.4	0	24.0
		1	23	23.4	23.2	23.4	0	24.0
		1	46	23.4	23.4	23.5	0	24.0
	QPSK	1	0	23.5	23.6	23.6	0	24.0
		1	23	23.7	23.5	23.6	0	24.0
		1	46	23.5	23.5	23.6	0	24.0
Sub-Carrier Spacing (kHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				25501	25600	25699		
				2000.1MHz	2010MHz	2019.9MHz		
15	BPSK	1	0	23.6	23.5	23.7	0	24.0
		1	5	23.6	23.6	23.6	0	24.0
		1	10	23.7	23.5	23.7	0	24.0
	QPSK	1	0	23.7	23.5	23.7	0	24.0
		1	5	23.6	23.5	23.7	0	24.0
		1	10	23.6	23.6	23.6	0	24.0
		3	0	20.4	20.1	20.2	0	24.0
		3	9	20.3	20.1	20.1	0	24.0
		6	0	20.1	20.1	20.0	0	24.0
		12	0	20.9	21.1	21.2	1	23.0

NTN n255

Sub-Carrier Spacing (kHz)	Mode	SC Size	SC Offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				261505	261674	261843		
				1626.6MHz	1643.5MHz	1660.4MHz		
3.75	BPSK	1	0	22.5	22.5	22.6	0	24.0
		1	23	22.6	22.6	22.6	0	24.0
		1	46	22.5	22.5	22.6	0	24.0
	QPSK	1	0	22.6	22.7	22.7	0	24.0
		1	23	22.6	22.7	22.8	0	24.0
		1	46	22.6	22.7	22.7	0	24.0
Sub-Carrier Spacing (kHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				261505	261674	261843		
				1626.6MHz	1643.5MHz	1660.4MHz		
15	BPSK	1	0	22.2	22.2	22.4	0	24.0
		1	5	22.1	22.3	22.4	0	24.0
		1	10	22.1	22.3	22.4	0	24.0
	QPSK	1	0	22.1	22.2	22.4	0	24.0
		1	5	22.1	22.2	22.3	0	24.0
		1	10	22.1	22.3	22.3	0	24.0
		3	0	21.4	21.5	21.6	0	24.0
		3	9	21.4	21.5	21.5	0	24.0
		6	0	20.9	20.9	21.0	0	24.0
		12	0	19.5	19.6	19.7	1	23.0

9.2. Wi-Fi 2.4GHz (DTS Band)

Maximum Output Power (Tune-up Limit) for Wi-Fi 2.4 GHz

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) 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 802.11b/g/n mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

SAR testing is not required for OFDM mode(s) 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.

Mode	Bandwidth	Channel	Frequency (MHz)	Tune-up PowerLimit
				Main Antenna
802.11b DSSS (SISO)	20 MHz	1	2412	18.5
		6	2437	18.5
		11	2462	18.5
		12	2467	16.0
		13	2472	15.0
802.11g OFDM (SISO)	20 MHz	1	2412	18.5
		6	2437	18.5
		11	2462	18.5
		12	2467	15.5
		13	2472	15.5
802.11n OFDM (SISO)	20 MHz	1	2412	16.0
		6	2437	16.0
		11	2462	16.0
		12	2467	15.0
		13	2472	14.5

Wi-Fi 2.4GHz Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1	2412	17.1	18.5	Yes
		6	2437	16.9	18.5	
		11	2462	17.0	18.5	
		12	2467	14.4	16.0	
		13	2472	13.1	15.0	
OFDM 2.4 GHz	802.11g	1	2412	17.1	18.5	No
		6	2437	17.2	18.5	
		11	2462	16.6	18.5	
		12	2467	12.9	15.5	
		13	2472	12.8	15.5	
	802.11n (HT20)	1	2412	15.1	16.0	No
		6	2437	15.9	16.0	
		11	2462	14.3	16.0	
		12	2467	13.4	15.0	
		13	2472	12.8	14.5	

Duty Factor Measured Results

Mode	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
802.11b	100	100	100.00%	1.00

Note(s):

Duty Cycle = (T on / period) * 100%

Duty Cycle Plots

802.11b

9.3. Bluetooth

Maximum Output Power (Tune-up Limit) for Bluetooth

SAR measurement is not required for the EDR and LE. When the secondary mode is ≤ ¼ dB higher than the primary mode.

Band	Mode	Channel	Frequency (MHz)	Tune-up PowerLimit
				Main Antenna
				Maximum
Bluetooth 2.4 GHz	BR	0	2402	11.5
		1	2403	11.5
		39	2441	11.5
		77	2479	11.5
		78	2480	11.5
	EDR, π/4 DQPSK	0	2402	11.5
		1	2403	11.5
		39	2441	11.5
		77	2479	11.5
		78	2480	11.5
	EDR, 8-DPSK	0	2402	11.5
		1	2403	11.5
		39	2441	11.5
		78	2480	11.5
	LE	37	2402	2.5
		0	2404	6.5
		17	2440	6.5
		35	2476	6.5
		36	2478	3.0
		39	2480	3.0

Bluetooth Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
Bluetooth 2.4 GHz	BR GFSK	0	2402	11.5	11.5	Yes
		1	2403	10.2	11.5	
		39	2441	9.5	11.5	
		77	2479	10.1	11.5	
		78	2480	10.1	11.5	
	EDR, π/4 DQPSK	0	2402	10.3	11.5	No
		1	2403	10.3	11.5	
		39	2441	9.5	11.5	
		77	2479	10.2	11.5	
		78	2480	10.1	11.5	
	EDR, 8-DPSK	0	2402	10.4	11.5	No
		1	2403	10.4	11.5	
		39	2441	9.5	11.5	
		78	2480	9.7	11.5	
	LE, GFSK	37	2402	1.7	2.5	No
		0	2404	5.3	6.5	
		17	2440	5.2	6.5	
		35	2476	4.8	6.5	
		36	2478	1.0	3.0	
		39	2480	1.4	3.0	

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	100	100	100.00%	1.00

Note(s):

Duty Cycle = (T on / period) * 100%

Duty Cycle Plots

GFSK

9.4. NFC

Conducted output power cannot be measured for NFC, therefore a 2 dB scaling factor shall be used to account for potential variations between samples.

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
NFC	Type F	100	100	100.00%	1.00

Note(s):

Duty Cycle = (T on / period) * 100%

Duty Cycle Plots

Type F

9.5. ANT/ANT+

Maximum Output Power (Tune-up Limit) for ANT/ANT+

Maximum tune-up tolerance limit is 6.5 dBm (GFSK). This power level qualifies for exclusion of SAR testing. Please refer to section 10.9. Standalone SAR Test Exclusion Considerations & Estimated SAR

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 and Bluetooth = 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 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. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	10	Front	Strap 1	18900	1880.0	1	5	High	24.0	23.3	0.004	0.005	
							3	1	NB7	24.0	23.1	0.006	0.007	
				Strap 2	18900	1880.0	3	1	NB7	24.0	23.1	0.009	0.011	1
				Strap 3	18900	1880.0	3	1	NB7	24.0	23.1	0.001	0.001	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	QPSK	0	Back	Strap 1	18900	1880.0	1	5	High	24	23.3	0.094	0.110	
							3	1	NB7	24	23.1	0.096	0.118	
				Strap 2	18900	1880.0	3	1	NB7	24.0	23.1	0.109	0.134	
				Strap 3	18900	1880.0	3	1	NB7	24.0	23.1	0.111	0.137	2

10.2. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	10	Front	Strap 1	20175	1732.5	1	0	Low	24.5	23.4	0.019	0.024	
							3	0	Low	24.5	23.2	0.019	0.026	
				Strap 2	20175	1732.5	3	0	Low	24.5	23.2	0.020	0.027	
				Strap 3	20175	1732.5	3	0	Low	24.5	23.2	0.025	0.034	3
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	QPSK	0	Back	Strap 1	20175	1732.5	1	0	Low	24.5	23.4	0.110	0.142	
							3	0	Low	24.5	23.2	0.109	0.147	
				Strap 2	20175	1732.5	3	0	Low	24.5	23.2	0.100	0.135	
				Strap 3	20175	1732.5	3	0	Low	24.5	23.2	0.114	**0.154**	4

10.3. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Head	QPSK	10	Front	Strap 1	23095	707.5	1	0	Low	25.0	23.6	<0.001	<0.001	-
							3	0	Low	25.0	23.5	<0.001	<0.001	
				Strap 2	23095	707.5	1	0	Low	25.0	23.6	<0.001	<0.001	
				Strap 3	23095	707.5	1	0	Low	25.0	23.6	<0.001	<0.001	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	NB Position	Power (dBm)		10-g SAR (W/kg)		Plot No.
										Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	QPSK	0	Back	Strap 1	23095	707.5	1	0	Low	25.0	23.6	0.026	0.036	5
							3	0	Low	25.0	23.5	0.024	0.034	
				Strap 2	23095	707.5	1	0	Low	25.0	23.6	0.025	0.035	
				Strap 3	23095	707.5	1	0	Low	25.0	23.6	0.025	0.035	

10.4. NTN Band 23

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	BPSK	10	Front	Strap 1	25501	2000.1	1	10	24.0	23.7	0.079	0.085	
					25600	2010.0	1	5	24.0	23.6	0.076	0.083	
					25699	2019.9	1	0	24.0	23.7	0.086	**0.092**	6
				Strap 2	25699	2019.9	1	0	24.0	23.7	0.081	0.087	
				Strap 3	25699	2019.9	1	0	24.0	23.7	0.083	0.089	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	BPSK	0	Back	Strap 1	25501	2000.1	1	10	24.0	23.7	0.063	0.068	7
					25600	2010.0	1	5	24.0	23.6	0.061	0.067	
					25699	2019.9	1	0	24.0	23.7	0.055	0.059	
				Strap 2	25501	2000.1	1	10	24.0	23.7	0.061	0.065	
				Strap 3	25501	2000.1	1	10	24.0	23.7	0.062	0.066	

10.5. NTN Band 255

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	BPSK	10	Front	Strap 1	261505	1626.6	1	10	24.0	22.2	0.019	0.029	
					261674	1643.5	1	0	24.0	22.3	0.041	0.061	
					261843	1660.4	1	0	24.0	22.4	0.055	0.079	8
				Strap 2	261843	1660.4	1	0	24.0	22.4	0.046	0.066	
				Strap 3	261843	1660.4	1	0	24.0	22.4	0.047	0.068	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	BPSK	0	Back	Strap 1	261505	1626.6	1	10	24.0	22.2	0.052	0.079	
					261674	1643.5	1	0	24.0	22.3	0.025	0.037	
					261843	1660.4	1	0	24.0	22.4	0.104	0.150	9
				Strap 2	261843	1660.4	1	0	24.0	22.4	0.099	0.143	
				Strap 3	261843	1660.4	1	0	24.0	22.4	0.097	0.140	

10.6. Wi-Fi (DTS Band)

When the 802.11b reported SAR of the highest measured maximum output power channel is ≤ 0.8 W/kg, no further SAR testing is required. If SAR is > 0.8 W/kg and ≤ 1.2 W/kg, SAR is required for the next highest measured output power channel. Finally, if SAR is > 1.2 W/kg, SAR is required for the third channel.

SAR testing is not required for OFDM mode(s) 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.

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b	10	Front	Strap 1	6	2437	0.079	100.0%	18.5	16.9	0.082	0.119	
				Strap 2	6	2437	0.075	100.0%	18.5	16.9	0.116	**0.168**	10
				Strap 3	6	2437	0.087	100.0%	18.5	16.9	0.088	0.127	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	802.11b	0	Back	Strap 1	6	2437	0.058	100.0%	18.5	16.9	0.080	**0.116**	11
				Strap 2	6	2437	0.085	100.0%	18.5	16.9	0.079	0.114	
				Strap 3	6	2437	0.049	100.0%	18.5	16.9	0.072	0.104	

10.7. Bluetooth

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Head	GFSK	10	Front	Strap 1	39	2441	100.0%	11.5	9.5	0.019	**0.030**	12
				Strap 2	39	2441	100.0%	11.5	9.5	0.019	0.030	
				Strap 3	39	2441	100.0%	11.5	9.5	0.019	0.030	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Ch #.	Freq. (MHz)	Duty Cycle	Power (dBm)		10-g SAR (W/kg)		Plot No.
								Tune-up Limit	Meas.	Meas.	Scaled	
Extremity	GFSK	0	Back	Strap 1	39	2441	100.0%	11.5	9.5	0.018	**0.029**	13
				Strap 2	39	2441	100.0%	11.5	9.5	0.017	0.027	
				Strap 3	39	2441	100.0%	11.5	9.5	0.018	0.029	

10.8. NFC

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Freq. (MHz)	Duty Cycle	Tolerance Scaling[1]	1-g SAR (W/kg)		Plot No.
								Meas.	Scaled	
Head	Type F	10	Front	Strap 1	13.56	100%	2	<0.001	**<0.001**	-
				Strap 2	13.56	100%	2	<0.001	<0.001	
				Strap 3	13.56	100%	2	<0.001	<0.001	
RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Accessory	Freq. (MHz)	Duty Cycle	Tolerance Scaling[1]	10-g SAR (W/kg)		Plot No.
								Meas.	Scaled	
Extremity	Type F	0	Back	Strap 1	13.56	100%	2	<0.001	**<0.001**	-
				Strap 2	13.56	100%	2	<0.001	<0.001	
				Strap 3	13.56	100%	2	<0.001	<0.001	

Note(s):

Conducted output power cannot be measured for NFC, therefore a 2 dB scaling factor shall be used to account for potential variations between samples.

10.9. 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:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(GHz)}$ 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:

- *(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√$f_{(GHz)}$/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	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)			
ANT/ANT+	Head	2.480	6.5	4.5	10	0.8	0.094

Conclusion:

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

RF Air interface	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)			
ANT/ANT+	Extremity	2.480	6.5	4.5	5	1.6	0.076

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 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

The simultaneous transmission possibilities for this device are listed as below.

RF Exposure Condition	Item	Capable Transmit Configurations				
Standalone	1	WWAN	+	BT	+	NFC

RF Exposure conditions	Test Position	Standalone SAR (W/kg)			∑ 1-g SAR (W/kg)
		1	2	3	1+2+3
		WWAN	BT	NFC	
Head	Front	0.092	0.030	0.001	**0.122**

RF Exposure conditions	Test Position	Standalone SAR (W/kg)			∑ 10-g SAR (W/kg)
		1	2	3	1+2+3
		WWAN	BT	NFC	
Extremity	Back	0.154	0.029	0.001	**0.183**

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: Tissue Ingredients

Appendix E: Probe Certificates

Appendix F: Dipole Certificates

END OF REPORT