



SAR EVALUATION REPORT

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

For
Body worn, Cellular and GNSS enabled MPERS

**FCC ID: 2AGPI-EC21A
Model Names: MA01 and ANH0318-01**

**Report Number: 12040492-S1V3
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	6/19/2018	Initial Issue	--
V2	6/26/2018	Section 1 – Corrected equipment class	Dave Weaver
V3	6/28/2018	Section 6.3 – Corrected 'Appendix 1' to 'Appendix A'	Dave Weaver

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1. Attestation of Test Results

Applicant Name	Anelto Inc.			
FCC ID	2AGPI-EC21A			
Model Name	MA01 and ANH0318-01			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
Exposure Category	SAR Limits (W/Kg)			
	Peak spatial-average(1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
RF Exposure Conditions	Equipment Class - Highest Reported SAR (W/kg)			
	PCB	DTS	NII	DSS
Next to Mouth	0.376	N/A	N/A	N/A
Body-worn	1.393			
Simultaneous TX	N/A			
Date Tested	5/14/2018 to 5/19/2018			
Test Results	Pass			

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

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

Approved & Released By:



Dave Weaver
Operations Leader
UL Verification Services Inc.

Prepared By:



Coltyce Sanders
Test Engineer
UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 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 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02

3. Facilities and Accreditation

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

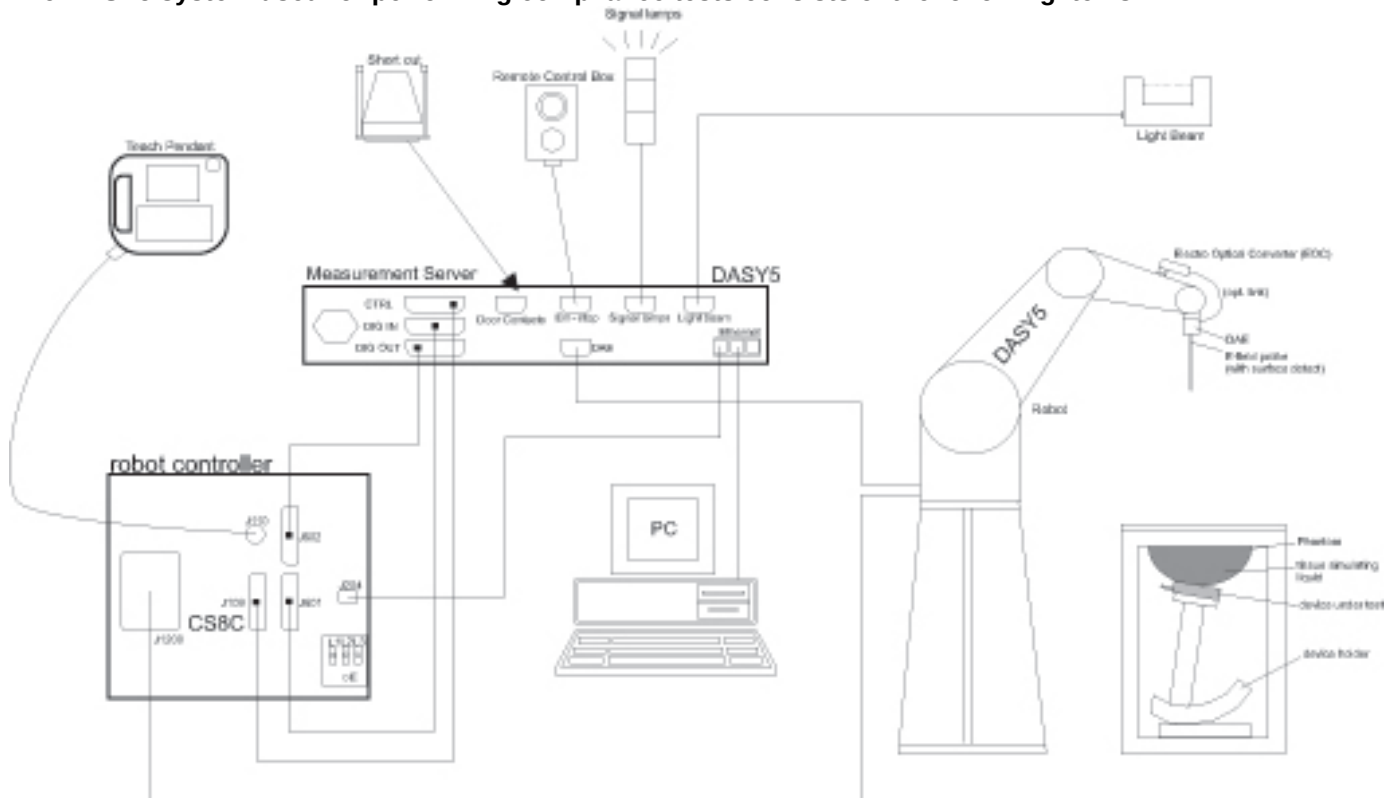
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	
SAR Lab G	
SAR Lab H	

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

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



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

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

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

Step 3: Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	9/15/2018
Dielectric Probe kit	SPEAG	DAK-3.5	1087	11/14/2018
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	11/14/2018
Thermometer	Traceable Calibration Control Co.	4242	122529162	12/8/2018

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	Agilent	N5181A	MY50140610	5/31/2018
Power Meter	Agilent	N1912A	MY5519600	7/14/2018
Power Sensor	Agilent	N1912A	MY52260009	1/8/2019
Power Sensor	Agilent	N1912A	MY53020038	4/23/2019
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3871	8/23/2018
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE4	1359	2/9/2019
System Validation Dipole	SPEAG	D750V3	1019	3/16/2019
System Validation Dipole	SPEAG	D835V2	4d142	10/12/2018
System Validation Dipole	SPEAG	D1750V2	1077	10/5/2018
System Validation Dipole	SPEAG	D1900V2	5d163	10/5/2018

Other

Name of Equipment	Manufacturer	Type/Model	T Number	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	T1871	165411-Ci	2/19/2019

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 $\leq 30\%$, 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.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	MA01	ANH0318-01
	(Length x Width x Height): 74 mm x 47.5 mm x 21.5 mm	(Length x Width x Height): 73 mm x 47 mm x 18 mm
Back Cover	Normal Battery Cover	
Battery Options	☒ Standard – Lithium-polymer battery, Rating 3.7Vdc, 2.8Wh	
Wireless Router (Hotspot)	Not Supported	
Wi-Fi Direct	Not Supported	
Test sample information	S/N	IMEI
	SMS000106	861108033412825
	Photon	N/A
		Notes
		Conducted Unit
		Radiated Unit
Hardware Version	Rev 2	
Software Version	V5.10	

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating Mode	Duty Cycle used for SAR testing
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 9)	100%
LTE	FDD Band 2 FDD Band 4 FDD Band 12	QPSK UE Category 1 16QAM UE Category 1 Rel. 10 Does not support Carrier Aggregation (CA)	100% (FDD)
Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			

6.3. Test Rational

The DUT is available in two models: MA01 and ANH0318-01. Each model uses the same PCB assembly and antenna. The only difference between the models is the plastic enclosure. The overall dimensions of ANH0318-01 are smaller than MA01. The MA01 is slightly narrower at one end but this is at the opposite end to the antenna location. SAR testing was performed only on ANH0318-01 as this was deemed to be the worst case scenario. Refer to Appendix A for images of the devices.

6.4. General LTE SAR Test and Reporting Considerations

Item	Description																																																																				
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz																																																																			
		Channel Bandwidth																																																																			
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7																																																														
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880																																																														
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3																																																														
	Band 4	Frequency range: 1710 - 1755 MHz																																																																			
		Channel Bandwidth																																																																			
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7																																																														
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5																																																														
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3																																																														
	Band 12	Frequency range: 699 – 716 MHz																																																																			
		Channel Bandwidth																																																																			
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7																																																														
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5																																																														
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3																																																														
LTE transmitter and antenna implementation	Refer to Appendix A.																																																																				
Maximum power reduction (MPR)	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							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
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																																																														
Power reduction	No																																																																				
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																																				

Notes:

- SAR Testing for LTE was performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
- LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna location.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Next to Mouth	10 mm	Front	N/A	Yes	
	Body-worn	0 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Left)	< 25 mm	Yes	

Notes:

1. SAR is not required per KDB 447498 D01 §4.2.2 c).

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

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

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

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

The dielectric constant (ϵ_r) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within $\pm 5\%$ 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 ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies $\leq 3\text{ GHz}$.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta (%)	Measured	Target	Delta (%)
G	5/14/2018	1900	Head	1900	40.44	40.00	1.10	1.45	1.40	3.79
				1710	40.73	40.15	1.45	1.33	1.35	-1.59
				1920	40.42	40.00	1.05	1.46	1.40	4.43
G	5/14/2018	1900	Body	1900	53.63	53.30	0.62	1.57	1.52	3.42
				1710	53.79	53.54	0.46	1.42	1.46	-2.57
				1920	53.60	53.30	0.56	1.58	1.52	4.01
G	5/14/2018	835	Head	835	42.85	41.50	3.25	0.94	0.90	4.03
				695	43.25	42.24	2.38	0.89	0.89	-0.28
				905	42.60	41.50	2.65	0.96	0.97	-1.08
G	5/14/2018	835	Body	835	54.66	55.20	-0.98	0.98	0.97	0.74
				695	55.05	55.76	-1.27	0.92	0.96	-3.91
				905	54.51	55.00	-0.89	1.00	1.05	-4.61
G	5/17/2018	1900	Head	1900	39.91	40.00	-0.23	1.43	1.40	2.43
				1710	40.17	40.15	0.06	1.31	1.35	-3.08
				1920	40.00	40.00	0.00	1.45	1.40	3.29
G	5/17/2018	1900	Body	1900	52.19	53.30	-2.08	1.57	1.52	3.09
				1710	52.28	53.54	-2.36	1.42	1.46	-3.12
				1920	52.20	53.30	-2.06	1.57	1.52	3.55
G	5/17/2018	835	Head	835	42.09	41.50	1.42	0.92	0.90	2.24
				695	42.63	42.24	0.91	0.87	0.89	-1.77
				905	41.91	41.50	0.99	0.94	0.97	-3.44
G	5/17/2018	835	Body	835	53.18	55.20	-3.66	1.02	0.97	4.95
				695	53.78	55.76	-3.55	0.96	0.96	-0.08
				905	53.08	55.00	-3.49	1.04	1.05	-1.00
G	5/17/2018	750	Body	750	53.56	55.55	-3.58	0.98	0.96	1.83
				695	53.78	55.76	-3.55	0.96	0.96	-0.08
				790	53.30	55.39	-3.78	0.99	0.97	2.35
G	5/18/2018	750	Head	750	42.37	41.96	0.97	0.89	0.89	-0.05
				695	42.63	42.24	0.91	0.87	0.89	-1.77
				790	42.13	41.76	0.89	0.90	0.90	0.75

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 $\pm$ 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 $\geq$ 15.0 cm for SAR measurements $\leq$ 3 GHz and $\geq$ 10.0 cm for measurements $>$ 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

System Check Results

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

SAR Lab	Date	Tissue Type	Dipole Type Serial #	Dipole Cal. Due Date	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta $\pm$ 10 %	Zoom Scan to 100 mW	Normalize to 1 W	Target (Ref. Value)	Delta $\pm$ 10 %	
G	5/14/2018	Head	D750V3 SN:1019	3/16/2019	0.843	8.43	8.22	2.55	0.561	5.61	5.39	4.08	
G	5/14/2018	Body	D750V3 SN:1019	3/16/2019	0.835	8.35	8.76	-4.68	0.560	5.60	5.80	-3.45	
G	5/14/2018	Head	D835V2 SN:4d142	10/12/2018	1.010	10.10	9.64	4.77	0.670	6.70	6.22	7.72	1,2
G	5/14/2018	Body	D835V2 SN:4d142	10/12/2018	0.954	9.54	9.63	-0.93	0.635	6.35	6.27	1.28	
G	5/14/2018	Head	D1750V2 SN:1077	10/5/2018	3.650	36.50	36.26	0.66	1.970	19.70	19.34	1.86	
G	5/14/2018	Body	D1750V2 SN:1077	10/5/2018	3.650	36.50	37.34	-2.25	1.950	19.50	19.98	-2.40	3,4
G	5/14/2018	Head	D1900V2 SN:5d163	10/5/2018	4.020	40.20	38.77	3.69	2.110	21.10	20.10	4.98	
G	5/14/2018	Body	D1900V2 SN:5d163	10/5/2018	4.040	40.40	42.99	-6.02	2.110	21.10	21.97	-3.96	5,6
G	5/17/2018	Head	D750V3 SN:1019	3/16/2019	0.771	7.71	8.22	-6.20	0.512	5.12	5.39	-5.01	7,8
G	5/17/2018	Body	D750V3 SN:1019	3/16/2019	0.877	8.77	8.76	0.11	0.587	5.87	5.80	1.21	
G	5/17/2018	Head	D1750V2 SN:1077	10/5/2018	3.570	35.70	36.26	-1.54	1.920	19.20	19.34	-0.72	
G	5/17/2018	Body	D1750V2 SN:1077	10/5/2018	3.690	36.90	37.34	-1.18	1.960	19.60	19.98	-1.90	
G	5/17/2018	Head	D1900V2 SN:5d163	10/5/2018	3.860	38.60	38.77	-0.44	2.010	20.10	20.10	0.00	
G	5/17/2018	Body	D1900V2 SN:5d163	10/5/2018	4.510	45.10	42.99	4.91	2.340	23.40	21.97	6.51	
G	5/17/2018	Body	D835V2 SN:4d142	10/12/2018	0.978	9.78	9.63	1.56	0.648	6.48	6.27	3.35	

9. Conducted Output Power Measurements

9.1. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

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

HSDPA Setup Procedures used to establish the test signals

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

Table C.10.2.4: β values for transmitter characteristics tests with HS-DPCCH

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

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

The following 5 Sub-tests were completed according to Release 6 procedures in table C.11.1.3 of 3GPP TS 34.121-1

A summary of these settings are illustrated below:

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

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

DC-HSDPA Setup Procedures used to establish the test signals

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

Downlink Physical Channels are set as per 3GPP TS34.121-1

Table E.5.0: Levels for HSDPA connection setup

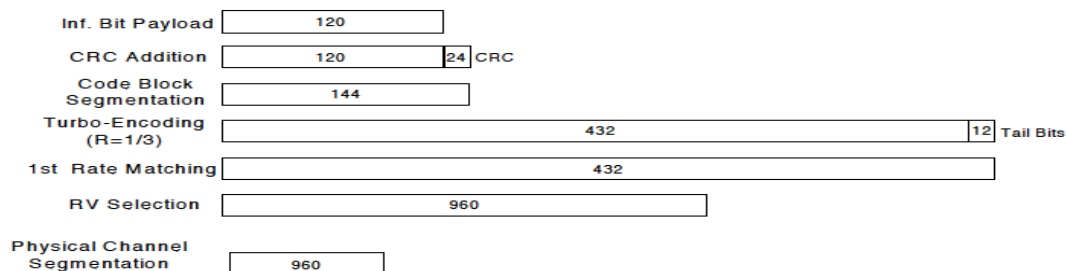
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

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

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

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

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

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

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	18.07	N/A	18.50
		9400	1880.0	18.10		
		9538	1907.6	18.10		
HSDPA	Subtest 1	9262	1852.4	17.10	0	18.50
		9400	1880.0	17.10		
		9538	1907.6	17.20		
	Subtest 2	9262	1852.4	17.10	0	18.50
		9400	1880.0	17.10		
		9538	1907.6	17.20		
	Subtest 3	9262	1852.4	16.60	0.5	18.00
		9400	1880.0	16.60		
		9538	1907.6	16.60		
	Subtest 4	9262	1852.4	16.60	0.5	18.00
		9400	1880.0	16.60		
		9538	1907.6	16.70		
HSUPA	Subtest 1	9262	1852.4	17.01	0	18.50
		9400	1880.0	17.10		
		9538	1907.6	17.28		
	Subtest 2	9262	1852.4	15.12	2	16.50
		9400	1880.0	15.55		
		9538	1907.6	15.82		
	Subtest 3	9262	1852.4	16.46	1	17.50
		9400	1880.0	16.00		
		9538	1907.6	16.50		
	Subtest 4	9262	1852.4	15.12	2	16.50
		9400	1880.0	15.55		
		9538	1907.6	15.82		
	Subtest 5	9262	1852.4	17.01	0	18.50
		9400	1880.0	17.10		
		9538	1907.6	17.28		
DC-HSDPA	Subtest 1	9262	1852.4	17.10	0	18.50
		9400	1880.0	17.20		
		9538	1907.6	17.10		
	Subtest 2	9262	1852.4	17.10	0	18.50
		9400	1880.0	17.20		
		9538	1907.6	17.10		
	Subtest 3	9262	1852.4	16.60	0.5	18.00
		9400	1880.0	16.70		
		9538	1907.6	16.70		
	Subtest 4	9262	1852.4	16.60	0.5	18.00
		9400	1880.0	16.70		
		9538	1907.6	16.70		

W-CDMA Band IV Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	17.87	N/A	19.00
		1413	1732.6	17.91		
		1513	1752.6	17.97		
HSDPA	Subtest 1	1312	1712.4	17.00	0	19.00
		1413	1732.6	17.00		
		1513	1752.6	17.10		
	Subtest 2	1312	1712.4	17.00	0	19.00
		1413	1732.6	17.00		
		1513	1752.6	17.10		
	Subtest 3	1312	1712.4	16.50	0.5	18.50
		1413	1732.6	16.50		
		1513	1752.6	16.50		
	Subtest 4	1312	1712.4	16.50	0.5	18.50
		1413	1732.6	16.50		
		1513	1752.6	16.60		
HSUPA	Subtest 1	1312	1712.4	16.97	0	19.00
		1413	1732.6	16.94		
		1513	1752.6	17.00		
	Subtest 2	1312	1712.4	15.43	2	17.00
		1413	1732.6	15.49		
		1513	1752.6	15.47		
	Subtest 3	1312	1712.4	16.26	1	18.00
		1413	1732.6	16.23		
		1513	1752.6	16.48		
	Subtest 4	1312	1712.4	15.43	2	17.00
		1413	1732.6	15.49		
		1513	1752.6	15.47		
	Subtest 5	1312	1712.4	16.97	0	19.00
		1413	1732.6	16.94		
		1513	1752.6	17.00		
DC-HSDPA	Subtest 1	1312	1712.4	17.00	0	19.00
		1413	1732.6	17.00		
		1513	1752.6	17.10		
	Subtest 2	1312	1712.4	17.00	0	19.00
		1413	1732.6	17.00		
		1513	1752.6	17.10		
	Subtest 3	1312	1712.4	16.50	0.5	18.50
		1413	1732.6	16.50		
		1513	1752.6	16.50		
	Subtest 4	1312	1712.4	16.50	0.5	18.50
		1413	1732.6	16.50		
		1513	1752.6	16.60		

W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.22	N/A	25.00
		4183	836.6	24.23		
		4233	846.6	24.23		
HSDPA	Subtest 1	4132	826.4	23.40	0	25.00
		4183	836.6	23.40		
		4233	846.6	23.40		
	Subtest 2	4132	826.4	23.40	0	25.00
		4183	836.6	23.40		
		4233	846.6	23.40		
	Subtest 3	4132	826.4	22.80	0.5	24.50
		4183	836.6	22.70		
		4233	846.6	22.90		
	Subtest 4	4132	826.4	22.80	0.5	24.50
		4183	836.6	22.70		
		4233	846.6	22.90		
HSUPA	Subtest 1	4132	826.4	22.71	0	25.00
		4183	836.6	22.49		
		4233	846.6	22.80		
	Subtest 2	4132	826.4	21.40	2	23.00
		4183	836.6	21.41		
		4233	846.6	21.79		
	Subtest 3	4132	826.4	21.30	1	24.00
		4183	836.6	21.82		
		4233	846.6	21.00		
	Subtest 4	4132	826.4	22.00	2	23.00
		4183	836.6	21.90		
		4233	846.6	21.81		
	Subtest 5	4132	826.4	22.58	0	25.00
		4183	836.6	22.76		
		4233	846.6	22.91		
DC-HSDPA	Subtest 1	4132	826.4	23.40	0	25.00
		4183	836.6	23.40		
		4233	846.6	23.40		
	Subtest 2	4132	826.4	23.40	0	25.00
		4183	836.6	23.40		
		4233	846.6	23.40		
	Subtest 3	4132	826.4	22.80	0.5	24.50
		4183	836.6	22.70		
		4233	846.6	22.90		
	Subtest 4	4132	826.4	22.80	0.5	24.50
		4183	836.6	22.70		
		4233	846.6	22.90		

9.2. 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
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 38, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>8	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50 (NOTE 1)	≤ 1 (NOTE 1)
			15, 20	Table 6.2.4-18 (NOTE 2)	
		65 (NOTE 3)	10, 15, 20	≥ 50	≤ 1 (NOTE 1)
			15, 20	Table 6.2.4-18 (NOTE 2)	
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1 6.6.3.3.13	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.5	26	1.4, 3, 5, 10, 15	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2 6.6.2.2.1 6.6.3.3.14	23	5, 10, 15, 20	Table 6.2.4-15	
	6.6.2.2.1 6.6.3.3.15				
NS_21	6.6.2.2.1 6.6.3.3.15	30	5, 10	Table 6.2.4-16	
NS_22	6.6.3.3.16	42, 43	5, 10, 15, 20	Table 6.2.4-17	
NS_23	6.6.3.3.17	42, 43	5, 10, 15, 20	N/A	
NS_24	6.6.3.3.20	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-19	
NS_25	6.6.3.3.21	65 (NOTE 4)	5, 10, 15, 20	Table 6.2.4-20	
NS_26	6.6.3.3.22	68	10, 15	Table 6.2.4-21	
NS_27	6.6.2.2.5, 6.6.3.3.23	48	5, 10, 15, 20	Table 6.2.4-22	
NS_28	6.2.2A, 6.6.3.3.24	46 (NOTE 5)	20	Table 6.2.4-23	
NS_29	6.2.2A, 6.6.2.3.1a, 6.6.3.3.25	46 (NOTE 5)	20	Table 6.2.4-24	
NS_30	6.2.2A, 6.6.3.3.26	46 (NOTE 5)	20	Table 6.2.4-25	
NS_31	6.2.2A, 6.6.3.3.27	46 (NOTE 5)	20	Table 6.2.4-26	
NS_32	-	-	-	-	-

NOTE 1: Applicable when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned, where channel BW is as defined in subclause 5.6. A-MPR for

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18700	18900	19100	MPR	Tune-up Limit
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	16.90	16.77	17.03	0	17.5
		1	49	17.25	16.78	17.26	0	17.5
		1	99	16.90	16.67	16.92	0	17.5
		50	0	16.10	16.13	16.39	1	16.5
		50	24	16.20	16.10	16.22	1	16.5
		50	50	16.13	16.14	16.10	1	16.5
		100	0	16.21	16.22	16.17	1	16.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18675	18900	19125	MPR	Tune-up Limit
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	17.00	16.90	17.20	0	17.5
		1	37	17.30	17.10	17.10	0	17.5
		1	74	16.90	17.30	17.00	0	17.5
		36	0	16.10	16.10	16.30	1	16.5
		36	20	16.10	16.20	16.20	1	16.5
		36	39	16.10	16.20	16.10	1	16.5
		75	0	16.10	16.20	16.20	1	16.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18650	18900	19150	MPR	Tune-up Limit
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	17.00	17.00	17.10	0	17.5
		1	25	17.30	17.30	17.50	0	17.5
		1	49	17.10	17.20	17.40	0	17.5
		25	0	16.10	16.10	16.10	1	16.5
		25	12	16.10	16.10	16.10	1	16.5
		25	25	16.10	16.20	16.00	1	16.5
		50	0	16.10	16.10	16.20	1	16.5

Note(s):

Device supports LTE UE Category 1 only. Therefore, 16QAM only supports channel bandwidths up to 5MHz per Table A.2.2.1.2-1 of 3GPP TS 36.101 version 13.2.1 Release 13.

LTE Band 2 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18625	18900	19175	MPR	Tune-up Limit
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	16.80	16.90	16.80	0	17.5
		1	12	17.10	16.20	17.10	0	17.5
		1	24	17.00	17.20	16.90	0	17.5
		12	0	16.10	16.20	16.10	1	16.5
		12	7	16.10	16.20	16.10	1	16.5
		12	13	16.10	16.20	16.10	1	16.5
		25	0	16.10	16.10	16.10	1	16.5
	16QAM	1	0	15.50	15.60	15.50	1	16.5
		1	12	15.30	15.60	15.40	1	16.5
		1	24	15.60	15.70	15.50	1	16.5
		12	0	14.90	15.00	15.10	2	15.5
		12	7	15.00	15.00	15.00	2	15.5
		12	13	15.00	15.10	15.10	2	15.5
		25	0	15.30	15.30	15.20	2	15.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18615	18900	19185	MPR	Tune-up Limit
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	17.00	17.10	17.20	0	17.5
		1	8	17.00	16.90	17.20	0	17.5
		1	14	16.90	17.10	17.20	0	17.5
		8	0	16.10	16.10	16.10	1	16.5
		8	4	16.10	16.10	16.10	1	16.5
		8	7	16.00	16.10	16.10	1	16.5
		15	0	16.10	16.00	16.00	1	16.5
	16QAM	1	0	16.20	15.70	15.80	1	16.5
		1	8	16.10	15.60	15.80	1	16.5
		1	14	16.00	15.80	15.80	1	16.5
		8	0	14.90	14.70	14.90	2	15.5
		8	4	14.90	14.80	15.00	2	15.5
		8	7	14.80	14.80	15.20	2	15.5
		15	0	15.10	15.00	15.10	2	15.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				18607	18900	19193	MPR	Tune-up Limit
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	16.80	17.00	16.90	0	17.5
		1	3	16.90	17.30	17.00	0	17.5
		1	5	16.90	17.10	17.00	0	17.5
		3	0	16.20	16.20	16.10	0	17.5
		3	1	16.10	16.20	16.30	0	17.5
		3	3	16.20	16.10	16.10	0	17.5
		6	0	16.10	16.10	16.00	1	16.5
	16QAM	1	0	16.00	16.10	15.80	1	16.5
		1	3	15.70	16.20	15.80	1	16.5
		1	5	15.70	16.20	15.80	1	16.5
		3	0	15.20	14.90	14.90	1	16.5
		3	1	15.00	15.10	15.00	1	16.5
		3	3	14.90	15.00	15.20	1	16.5
		6	0	14.80	15.40	15.10	2	15.5

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20050	20175	20300	MPR	Tune-up Limit
				1720 MHz	1732.5 MHz	1745 MHz		
20 MHz	QPSK	1	0		16.31		0	17.5
		1	49		16.58		0	17.5
		1	99		16.38		0	17.5
		50	0		15.71		1	16.5
		50	24		15.67		1	16.5
		50	50		15.70		1	16.5
		100	0		15.63		1	16.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20025	20175	20325	MPR	Tune-up Limit
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	16.30	16.20	16.40	0	17.5
		1	37	16.60	16.40	16.80	0	17.5
		1	74	16.70	16.50	16.50	0	17.5
		36	0	15.30	15.40	15.40	1	16.5
		36	20	15.40	15.40	15.30	1	16.5
		36	39	15.40	15.40	15.30	1	16.5
		75	0	15.30	15.40	15.20	1	16.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				20000	20175	20350	MPR	Tune-up Limit
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	16.20	16.20	16.40	0	17.5
		1	25	16.60	16.60	16.50	0	17.5
		1	49	16.60	16.30	16.50	0	17.5
		25	0	15.30	15.40	15.30	1	16.5
		25	12	15.40	15.40	15.40	1	16.5
		25	25	15.40	15.40	15.40	1	16.5
		50	0	15.40	15.50	15.30	1	16.5

Note(s):

- 20 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices.
- Device supports LTE UE Category 1 only. Therefore, 16QAM only supports channel bandwidths up to 5MHz per Table A.2.2.1.2-1 of 3GPP TS 36.101 version 13.2.1 Release 13.

LTE Band 4 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				19975	20175	20375	MPR	Tune-up Limit
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	16.20	16.60	16.30	0	17.5
		1	12	16.70	16.60	16.90	0	17.5
		1	24	16.20	16.60	16.60	0	17.5
		12	0	15.30	15.50	15.30	1	16.5
		12	7	15.40	15.50	15.30	1	16.5
		12	13	15.40	15.60	15.50	1	16.5
		25	0	15.40	15.60	15.40	1	16.5
	16QAM	1	0	15.20	15.20	15.00	1	16.5
		1	12	15.10	15.00	14.60	1	16.5
		1	24	15.40	15.10	15.10	1	16.5
		12	0	14.40	14.50	14.40	2	15.5
		12	7	14.40	14.50	14.30	2	15.5
		12	13	14.30	14.50	14.60	2	15.5
		25	0	14.60	14.50	14.40	2	15.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				19965	20175	20385	MPR	Tune-up Limit
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	16.30	16.40	16.00	0	17.5
		1	8	16.50	16.60	16.20	0	17.5
		1	14	16.70	16.60	16.30	0	17.5
		8	0	15.20	15.70	15.20	1	16.5
		8	4	15.20	15.60	15.20	1	16.5
		8	7	15.20	15.60	15.30	1	16.5
		15	0	15.20	15.60	15.20	1	16.5
	16QAM	1	0	15.10	15.50	14.80	1	16.5
		1	8	14.90	15.40	14.90	1	16.5
		1	14	15.00	15.40	14.90	1	16.5
		8	0	14.30	14.50	14.00	2	15.5
		8	4	14.40	14.60	14.00	2	15.5
		8	7	14.50	14.60	14.00	2	15.5
		15	0	14.40	14.50	14.30	2	15.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				19957	20175	20393	MPR	Tune-up Limit
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	16.40	16.40	16.30	0	17.5
		1	3	16.50	16.70	16.40	0	17.5
		1	5	16.50	16.50	16.40	0	17.5
		3	0	16.30	16.50	16.30	0	17.5
		3	1	16.50	16.50	16.20	0	17.5
		3	3	16.40	16.50	16.40	0	17.5
		6	0	15.30	15.40	15.30	1	16.5
	16QAM	1	0	14.90	15.10	14.80	1	16.5
		1	3	15.00	15.00	14.80	1	16.5
		1	5	15.00	15.00	15.00	1	16.5
		3	0	15.40	15.20	15.00	1	16.5
		3	1	15.30	15.50	15.10	1	16.5
		3	3	15.10	15.50	15.10	1	16.5
		6	0	14.30	14.80	14.20	2	15.5

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23060	23095	23130	MPR	Tune-up Limit
				704 MHz	707.5 MHz	711 MHz		
10 MHz	QPSK	1	0		23.40		0	24
		1	25		23.80		0	24
		1	49		23.80		0	24
		25	0		22.58		1	23
		25	12		22.68		1	23
		25	25		22.67		1	23
		50	0		22.56		1	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23035	23095	23155	MPR	Tune-up Limit
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	23.50	23.50	23.40	0	24
		1	12	23.80	23.80	23.80	0	24
		1	24	23.30	23.70	23.40	0	24
		12	0	22.60	22.60	22.40	1	23
		12	7	22.60	22.50	22.50	1	23
		12	13	22.40	22.40	22.50	1	23
		25	0	22.60	22.50	22.50	1	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23025	23095	23165	MPR	Tune-up Limit
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	23.90	23.40	23.50	0	24
		1	8	23.90	23.70	23.50	0	24
		1	14	23.70	23.60	23.50	0	24
		8	0	22.50	22.60	22.50	1	23
		8	4	22.50	22.50	22.50	1	23
		8	7	22.40	22.50	22.50	1	23
		15	0	22.50	22.50	22.50	1	23
	16QAM	1	0	22.40	22.20	22.20	1	23
		1	8	22.10	22.30	22.10	1	23
		1	14	22.10	22.30	22.10	1	23
		8	0	21.90	22.00	21.30	2	22
		8	4	21.80	21.90	21.20	2	22
		8	7	21.50	21.90	21.80	2	22
		15	0	21.40	21.50	21.60	2	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23017	23095	23173	MPR	Tune-up Limit
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	23.50	23.80	23.50	0	24
		1	3	23.60	23.60	23.90	0	24
		1	5	23.50	23.70	23.70	0	24
		3	0	23.00	23.00	23.00	0	24
		3	1	23.00	23.00	23.00	0	24
		3	3	23.00	23.00	23.00	0	24
		6	0	22.40	22.60	22.40	1	23
	16QAM	1	0	22.30	22.20	22.10	1	23
		1	3	22.20	22.70	22.30	1	23
		1	5	22.40	22.50	22.30	1	23
		3	0	22.00	22.00	21.90	1	23
		3	1	22.00	22.00	22.00	1	23
		3	3	21.90	22.00	22.00	1	23
		6	0	21.57	21.65	21.85	2	22

Note(s):

- 10 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices.
- Device supports LTE UE Category 1 only. Therefore, 16QAM only supports channel bandwidths up to 5MHz per Table A.2.2.1.2-1 of 3GPP TS 36.101 version 13.2.1 Release 13.

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

Reported SAR(W/kg) for WWAN= 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

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 D01 SAR test for 3G devices:

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

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

10.2. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	Rel 99 RMC	10	Front	9400	1880.0	18.5	18.1	0.226	0.248	1
Body-worn	Rel 99 RMC	0	Rear	9262	1852.4	18.5	18.1	1.140	1.259	
				9400	1880.0	18.5	18.1	1.270	1.393	2
				9538	1907.6	18.5	18.1	1.180	1.294	
			Front	9262	1852.4	18.5	18.1	0.833	0.920	
				9400	1880.0	18.5	18.1	0.866	0.950	
				9538	1907.6	18.5	18.1	0.889	0.975	
			Edge 2	9400	1880.0	18.5	18.1	0.197	0.216	
			Edge 3	9262	1852.4	18.5	18.1	0.849	0.937	
				9400	1880.0	18.5	18.1	0.887	0.973	
				9538	1907.6	18.5	18.1	0.875	0.959	
			Edge 4	9262	1852.4	18.5	18.1	0.762	0.841	
				9400	1880.0	18.5	18.1	0.757	0.830	
				9538	1907.6	18.5	18.1	0.690	0.757	

10.3. W-CDMA Band IV

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	Rel 99 RMC	10	Front	1413	1732.6	19.0	17.9	0.175	0.225	3
Body-worn	Rel 99 RMC	0	Rear	1312	1712.4	19.0	17.9	0.910	1.180	4
				1413	1732.6	19.0	17.9	0.913	1.173	
				1513	1752.6	19.0	18.0	0.922	1.169	
			Front	1312	1712.4	19.0	17.9	0.715	0.927	
				1413	1732.6	19.0	17.9	0.691	0.888	
				1513	1752.6	19.0	18.0	0.759	0.962	
			Edge 2	1413	1732.6	19.0	17.9	0.096	0.123	
			Edge 3	1312	1712.4	19.0	17.9	0.857	1.112	
				1413	1732.6	19.0	17.9	0.878	1.128	
				1513	1752.6	19.0	18.0	0.844	1.070	
			Edge 4	1413	1732.6	19.0	17.9	0.552	0.709	

10.4. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	Rel 99 RMC	10	Front	4183	836.6	25.0	24.2	0.315	0.376	5
Body-worn	Rel 99 RMC	0	Rear	4132	826.4	25.0	24.2	0.862	1.032	
				4183	836.6	25.0	24.2	0.827	0.987	
				4233	846.6	25.0	24.2	0.884	1.055	
			Front	4132	826.4	25.0	24.2	0.909	1.088	
				4183	836.6	25.0	24.2	0.951	1.135	6
				4233	846.6	25.0	24.2	0.912	1.089	
			Edge 2	4183	836.6	25.0	24.2	0.487	0.581	
			Edge 3	4183	836.6	25.0	24.2	0.590	0.704	
			Edge 4	4183	836.6	25.0	24.2	0.307	0.367	

10.5. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	QPSK	10	Front	18900	1880.0	1	49	17.5	16.8	0.196	0.231	7
						50	50	16.5	16.1	0.143	0.155	
Body-worn	QPSK	0	Rear	18700	1860.0	1	49	17.5	17.3	1.130	1.197	8
						50	24	16.5	16.2	0.867	0.929	
				18900	1880.0	1	49	17.5	16.8	1.170	1.381	
						50	50	16.5	16.1	0.898	0.976	
						100	0	16.5	16.2	0.849	0.906	
						1	49	17.5	17.3	1.090	1.152	
			Front	19100	1900.0	50	0	16.5	16.4	0.877	0.899	
						1	49	17.5	17.3	0.774	0.820	
				18900	1880.0	1	49	17.5	16.8	0.757	0.894	
						50	50	16.5	16.1	0.602	0.654	
						1	49	17.5	16.2	0.732	0.983	
						50	50	16.5	16.1	0.082	0.089	
			Edge 2	18900	1880.0	1	49	17.5	16.8	0.104	0.123	
						50	50	16.5	16.1	0.082	0.089	
			Edge 3	18900	1880.0	1	49	17.5	16.8	0.649	0.766	
						50	50	16.5	16.1	0.600	0.652	
			Edge 4	18900	1880.0	1	49	17.5	16.8	0.477	0.563	
						50	50	16.5	16.1	0.390	0.424	

10.6. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	QPSK	10	Front	20175	1732.5	1	49	17.5	16.6	0.109	0.135	9
						50	0	16.5	15.7	0.086	0.103	
Body-worn	QPSK	0	Rear	20175	1732.5	1	49	17.5	16.6	0.763	0.943	
						50	0	16.5	15.7	0.649	0.778	
						100	0	16.5	15.6	0.817	0.998	
			Front	20175	1732.5	1	49	17.5	16.6	0.610	0.754	
						50	0	16.5	15.7	0.480	0.576	
						100	0	16.5	15.6	0.493	0.602	
			Edge 2	20175	1732.5	1	49	17.5	16.6	0.061	0.075	
						50	0	16.5	15.7	0.051	0.061	
			Edge 3	20175	1732.5	1	49	17.5	16.6	0.666	0.823	
						50	0	16.5	15.7	0.551	0.661	
			Edge 4	20175	1732.5	1	49	17.5	16.6	0.561	0.685	
						50	0	16.5	15.7	0.371	0.445	

10.7. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Next to Mouth	QPSK	10	Front	23095	707.5	1	49	24.0	23.8	0.338	0.354	11
						25	12	23.0	22.7	0.252	0.271	
Body-worn	QPSK	0	Rear	23095	707.5	1	49	24.0	23.8	0.794	0.831	
						25	12	23.0	22.7	0.667	0.718	
						50	0	23.0	22.6	0.638	0.706	
			Front	23095	707.5	1	49	24.0	23.8	0.902	0.945	12
						25	12	23.0	22.7	0.756	0.814	
						50	0	23.0	22.6	0.740	0.819	
			Edge 2	23095	707.5	1	49	24.0	23.8	0.581	0.608	
						25	12	23.0	22.7	0.511	0.550	
			Edge 3	23095	707.5	1	49	24.0	23.8	0.525	0.550	
						25	12	23.0	22.7	0.462	0.497	
			Edge 4	23095	707.5	1	49	24.0	23.8	0.387	0.405	
						25	12	23.0	22.7	0.367	0.395	

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 ($\sim 10\%$ from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First	
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Body	Front	Yes	0.902	0.867	1.04
850	WCDMA Band V	Body	Front	Yes	0.951	0.921	1.03
1700	WCDMA Band IV	Body	Rear	Yes	0.922	0.905	1.02
	LTE Band 4	Body	Rear	No	0.817	0.802	1.02
1900	WCDMA Band II	Body	Rear	Yes	1.270	1.250	1.02
	LTE Band 2	Body	Rear	No	1.170	1.160	1.01

Note(s):

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

12. Simultaneous Transmission SAR Analysis

The DUT does not support simultaneous transmission.

Appendixes

Refer to separated files for the following appendixes.

12040492-S1V1 Appendix A: SAR Setup Photos

12040492-S1V1 Appendix B: SAR System Check Plots

12040492-S1V1 Appendix C: Highest SAR Test Plots

12040492-S1V1 Appendix D: SAR Liquid Tissue Ingredients

12040492-S1V1 Appendix E: SAR Probe Calibration Certificate

12040492-S1V1 Appendix F: SAR Dipole Calibration Certificates

END OF REPORT