



Sony Mobile Communications (China) Co., Ltd.
Test Laboratory
Test Report

Report Title: 415CBA SAR FCC Test Report

Report NO: TARC-415CBA-SAR-FCC-01

Report Date: 2015-10-19

Initial Test Report / Test Report replace <document ID>

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2.948 Listed: No.634550

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SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7- 415CBA-FCC-01	
	415CBA SAR FCC Test Report	Edition 1	Revision 0

Report Edition

Report Number	Edition	Date	Memo
TARC-415CBA-SAR- FCC-01	1	2015-10-19	Initial creation of test report

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7- 415CBA-FCC-01
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1 SUMMARY

The Sony Mobile Communications (China) Co., Ltd. Test Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with IEEE 1528-2013. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in IEEE Std C95.1-1992.

For IEEE (1g), the final stand-alone SAR readings for this phone are given in the table below. These measurements were performed using a DASY52™ system manufactured by SPEAG, of Zurich Switzerland.

1.1 Highest Standalone Reported SAR

Equipment Class	Frequency Band	Head SAR 1g (w/kg)	Body-worn SAR 1g (w/kg)	Hotspot SAR 1g (w/kg)
PCE	WWAN	0.370	0.544	1.144
DTS	WLAN 2.4 GHz	0.388	0.122	0.122
UNII	WLAN 5 GHz	0.307	0.072	NA
DSS	Bluetooth	NA	0.197	NA
Highest Simultaneous Transmission SAR (W/kg)		1.321		

1.2 Statement of Compliance

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the IEEE C95.1-1992 and FCC rule §2.1093.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 10 mm for data and 15mm for speech between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

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1.3 EUT Information

1.3.1 Basic Information


Description	Phone handset
FCC ID	PY7-PM0913
IC ID	N/A
Operating Mode(s)	GSM/UMTS/LTE/ 2.4G/5G WLAN/BT
GPRS/ EGPRS Class	33
DTM Multislot Class	11
WCDMA UE Category	6
RF Exposure Limits	General Population / Uncontrolled

Band	Modulation	Maximum Output Power Setting (dBm)	Duty Cycle	Transmitting Frequency Range(s)
GSM 850	GMSK	33.4	1:8	824.2 – 848.8 MHz
GSM 1900	GMSK	30.4	1:8	1850.2 – 1910 MHz
UMTS Band 5	QPSK	24.9	1:1	826.4 – 846.6 MHz
UMTS Band 4	QPSK	22.5	1:1	1712.4 – 1752.6 MHz
UMTS Band 2	QPSK	22.2	1:1	1852.4 – 1907.6 MHz
LTE Band 2	QPSK	22.2	1:1	1850.7 – 1909.3 MHz
LTE Band 4	QPSK	22.5	1:1	1710.7 – 1754.3 MHz
LTE Band 5	QPSK	24	1:1	824.7 – 848.3 MHz
LTE Band 7	QPSK	20.5	1:1	2502.5 – 2567.5 MHz
LTE Band 12	QPSK	24	1:1	699.7 – 715.3 MHz
LTE Band 17	QPSK	24	1:1	706.5 – 713.5 MHz
LTE Band 41	QPSK	20.5	1:1.59	2498.5 – 2687.5 MHz
Wlan 2.4G	DSSS/OFDM	14	1:1	2412 – 2462 MHz
Wlan 5G	OFDM	10	1:1	5180 – 5825 MHz
Bluetooth	GFSK	11.5	1:1	2402– 2480 MHz

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1.3.2 Reference Standard and Criteria

Reference	Version	Test Standard Description
IEEE 1528	2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE Std. C95-1	1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
KDB 865664D01	v01r04	SAR measurement 100 MHz to 6 GHz
KDB 865664D02	v01r01	RF Exposure Reporting
KDB 447498D01	v05r02	General RF Exposure Guidance
KDB 648474D04	v01r02	SAR Evaluation Considerations for Wireless Handsets
KDB 248227D01	v02r01	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters
KDB 941225D01	v03	3G SAR Procedures
KDB 941225D05	v02r03	SAR Evaluation Considerations for LTE Devices
KDB 941225D06	v02	Hotspot SAR

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1.3.3 RF Exposure Limits

Human Exposure	Uncontrolled Environment General Population (W/Kg)	Controlled Environment Occupational (W/Kg)
Spatial Peak SAR (Head and Body)	1.6	8.00
Spatial Average SAR (Whole Body)	0.08	0.40
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00	20.00

Note that the limit applied in this test report is shown in bold letters

1.3.4 Test Basic Information

Testing Engineers	Yao, JuMing / Zhou, ZhiLi / Zhang, Song/ Yang, Kun
Testing Start Date	2015-9-26
Testing End Date	2015-10-12
Ambient Temperature	18~25 °C
Relative Humidity	30~70%

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2 SPECIFIC ABSORPTION RATE (SAR)

2.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

2.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δ T is the temperature rise and δ t is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

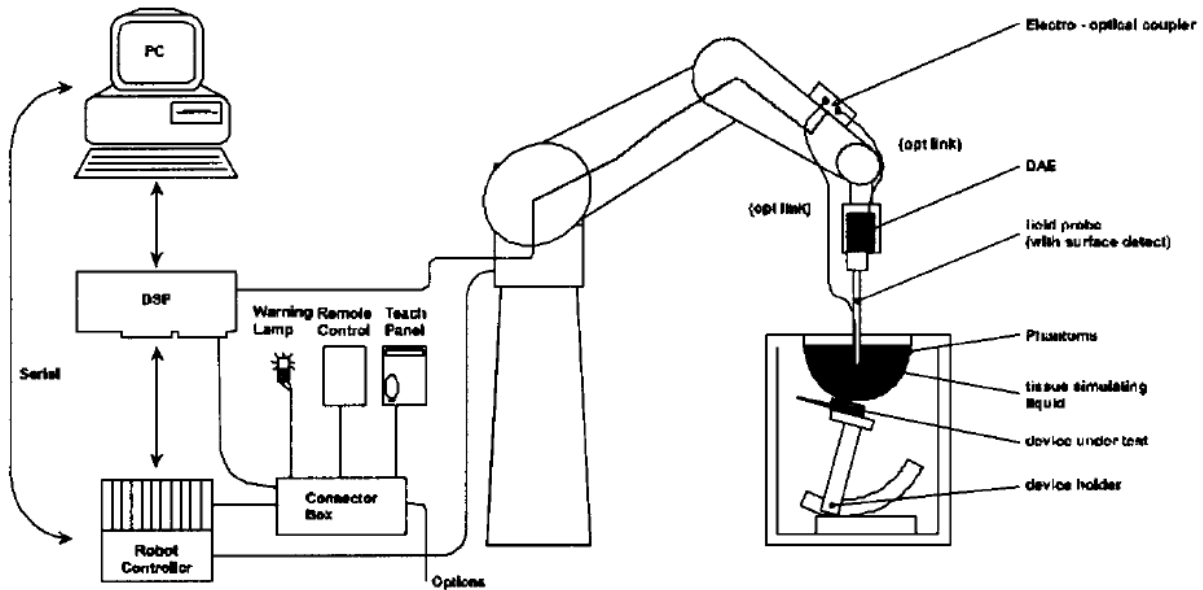
Where: δ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.


3 TEST SET UP AND PROCESS

3.1 SAR System set-up

3.1.1 System Description




- The DASY system for performing compliance tests consists of the following items:
- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A Data Acquisition Electronic (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.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY measurement server.
- The DASY measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows XP or Windows 7.
- DASY software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

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- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System check dipoles allowing to validate the proper functioning of the system.

3.1.2 Probe Description

EX3DV4 E-Field Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

ES3DV3 E-Field Probe

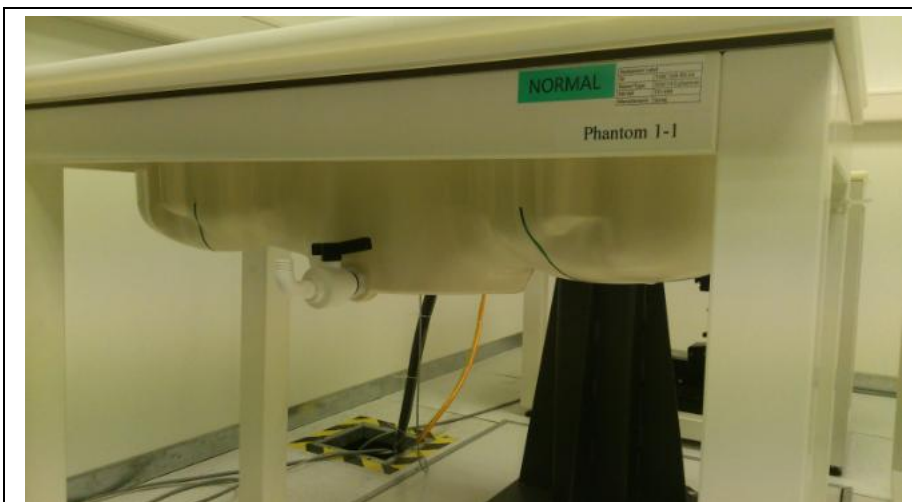
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm	
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones	

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3.1.3 Phantom Description

The used SAM and ELI Phantom meet the requirements specified in IEEE 1528 and EN 62209-1 for Specific Absorption Rate (SAR) measurements.

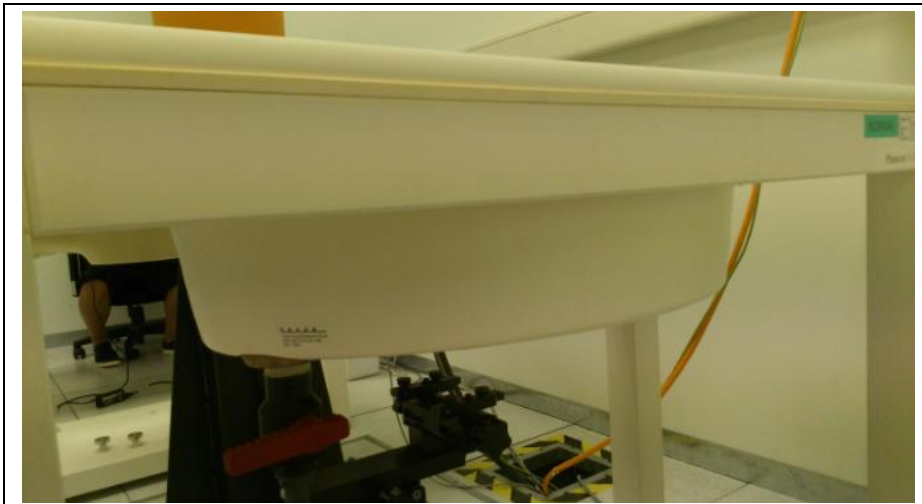
SAM phantom enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.



Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ±0.2 mm (6 ±0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

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ELI phantom is fully compatible with the EN 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

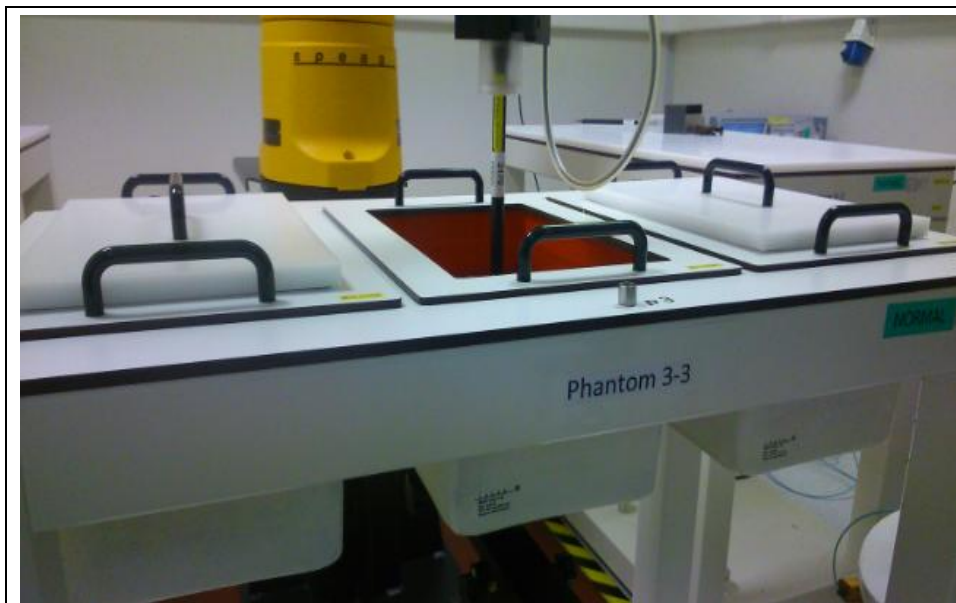


Material	Vynylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters
Wooden Support	SPEAG standard phantom table

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Triple Modular Phantom consists of three identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids.

Applicable for system performance check from 700 MHz to 6 GHz (MFP V5.1C) as well as dosimetric evaluations for body-worn operation.

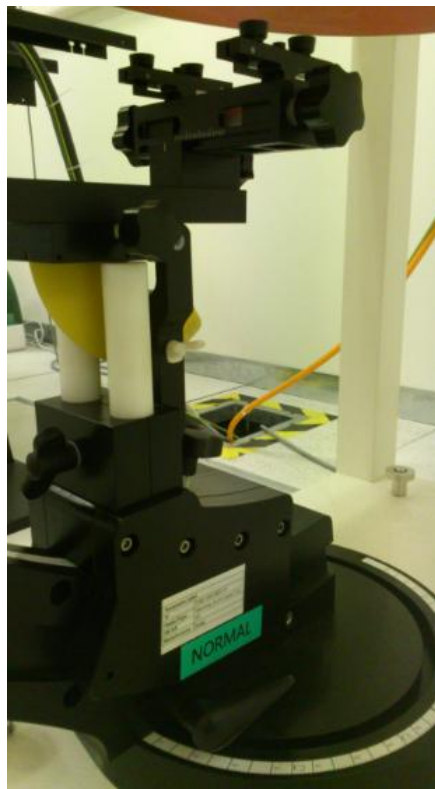


Material	Vinylester, glass fiber reinforced VE-GF (color: red)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids incl. DGBE type
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Phantom (Module) Inner Dimensions	Length: 292 mm Width: 178 mm Height: 178 mm Useable Area: 280 x 175 mm
Filling Volume	approx. 8.1 liters (filling height: 155 mm)
Wooden Support	Length: 830 mm Width: 500 mm

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3.1.4 Device Holder Description

The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.



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3.1.5 Scanning Procedure

- The DASY installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions are tested with the same configuration of test steps differing only in the grid definition for the different test positions.
- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.
- The “surface check” measurement tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above $\pm 0.1\text{mm}$). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within $\pm 30^\circ$)
- The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y-dimension. If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in Appendix B.
- A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine 7x7 grid where the robot additionally moves the probe in 7 steps along the z-axis away from the bottom of the Phantom. Grid spacing for the cube measurement is 5 mm / 4 mm in x and y-direction and 5 mm / 2 mm in z-direction. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex 2. Test results relevant for the specified standard.

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3.1.6 Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 7 x 7 x 7 points. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2 or 3 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effect on E-field probes.

3.2 Electrical Parameters of the Tissue Simulating Liquid

Prior to conducting SAR measurements, the relative permittivity, ϵ_r , and the conductivity, σ , of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit.

These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho = 1 \text{ g/cm}^3$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in IEEE 1528.

Tissue Simulating Liquid for head:

Liquid	Freq. (MHz)	Target head tissue		Measurement head tissue				Measurement date
		Permittivity	Conductivity (S/m)	Permittivity	Dev. %	Conductivity (S/m)	Dev. %	
HSL750	750	41.9	0.89	41.25	-1.55	0.85	-4.11	2015-10-03
HSL835	835	41.5	0.90	40.47	-2.48	0.88	-2.22	2015-10-03
HSL900	900	41.5	0.97	39.75	-4.22	0.95	-2.06	2015-10-03
HSL1800	1800	40.0	1.40	38.26	-4.35	1.36	-2.86	2015-10-04
HSL1900	1900	40.0	1.40	38.24	-4.40	1.39	-0.71	2015-10-03
HSL2450	2450	39.2	1.80	37.98	-3.11	1.87	3.89	2015-10-06
HSL2450	2450	39.2	1.80	37.87	-3.39	1.86	3.33	2015-10-07
HSL2600	2600	39.0	1.96	37.32	-4.31	2.04	4.08	2015-10-06
HSL2600	2600	39.0	1.96	37.29	-4.38	2.04	4.08	2015-10-07
HSL5300	5300	35.90	4.76	35.00	-2.51	4.75	-0.21	2015-10-03
HSL5600	5600	35.50	5.07	34.36	-3.21	5.00	-1.38	2015-10-03
HSL5800	5800	35.30	5.27	33.94	-3.85	5.26	-0.19	2015-10-03

Tissue Simulating Liquid for body:

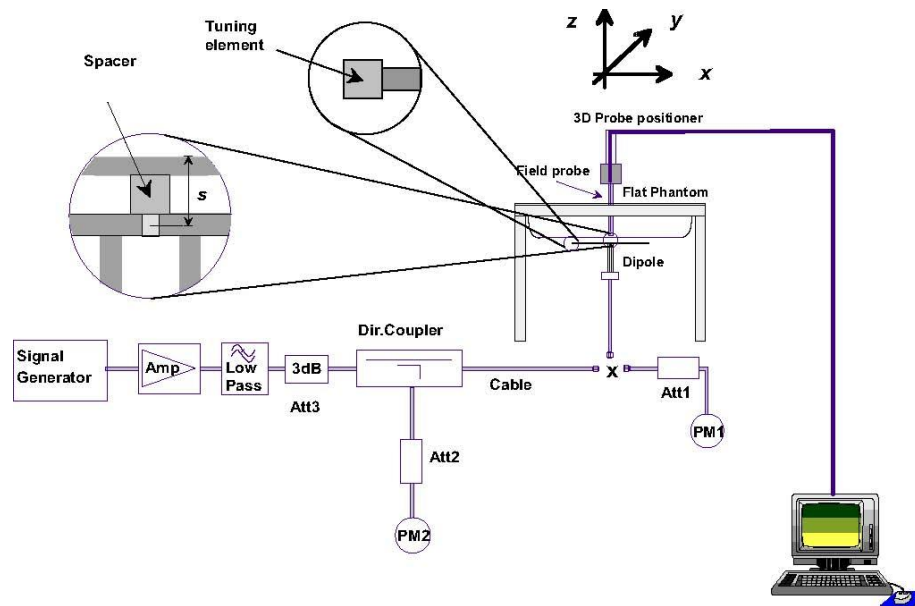
Liquid	Freq. (MHz)	Target Body tissue		Measurement Body tissue				Measurement date
		Permittivity	Conductivity (S/m)	Permittivity	Dev. %	Conductivity (S/m)	Dev. %	
MSL750	750	55.5	0.96	55.67	0.31	0.98	2.08	2015-10-03
MSL835	835	55.2	0.97	53.42	-3.22	0.97	0.00	2015-10-05
MSL1800	1800	40.0	1.40	51.60	-3.19	1.52	0.00	2015-10-04
MSL1900	1900	53.3	1.52	50.88	-4.54	1.50	-1.32	2015-10-03
MSL2450	2450	52.7	1.95	51.00	-3.23	1.95	0.00	2015-10-06
MSL2600	2600	52.5	2.16	50.50	-3.81	2.16	-0.14	2015-10-06
MSL5200	5200	49.0	5.30	46.90	-4.09	5.45	0.46	2015-10-05
MSL5600	5600	48.50	5.77	46.34	-4.45	5.86	1.56	2015-10-05
MSL5800	5800	48.20	6.00	46.00	-4.56	6.10	1.67	2015-10-05

All of the stimulating liquid used in this test report are supplied and manufactured by SPEAG. The list of ingredients and the percent composition are indicated in the table below.

Ingredients (% of weight)	Frequency (MHz)											
	835		900		1800		1900		2450		5000	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.45	52.4	40.92	56.0	52.64	69.91	54.9	69.91	62.7	73.2	64-78	64-78
Salt (NaCl)	1.45	1.4	1.48	0.76	0.36	0.13	0.18	0.13	0.5	0.04	2-3	2-3
Sugar	56.0	45.0	56.5	41.76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	1.0	1.21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.1	0.27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	0.0	47.0	29.96	44.92	29.96	0.0	26.7	0.0	0.0
Emulsifiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9-15	9-15
Mineral Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11-18	11-18

3.3 System Accuracy Verifications

The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed by using a validation dipole which is positioned parallel to the planar part of the test phantom at the reference point. The distance of the dipole to the test phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. A forward power of 250mW was applied to the dipoles. To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant.



System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The following tables show system check results for all frequency bands and tissue liquids used during the tests (see Appendix A).

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.

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The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequency < 3 GHz and 10.0 cm ± 0.5 cm for frequency > 3 GHz. (see Appendix C).

System Accuracy Verification Measurements for Head

Frequency (MHz)	Target value (W/Kg)		Measured value 250 mW(W/Kg)		Measured value 1W (W/Kg)		Dev.		Measurement date
	1g	1g	1g	10g	1g	10g	1g	10g	
750	8.11	5.33	2.03	8.12	1.33	5.32	0.12	-0.19	2015-10-03
835	9.09	5.90	2.26	1.48	9.04	5.92	-0.55	0.34	2015-10-03
900	10.60	6.86	2.54	1.64	10.16	6.56	-4.15	-4.37	2015-10-03
1800	38.7	20.5	9.2	4.87	36.8	19.48	-4.91	-4.98	2015-10-04
1900	41.10	21.60	9.88	5.13	39.52	20.52	-3.84	-5.00	2015-10-03
2450	54.00	25.40	13.5	6.2	54	24.8	0.00	-2.36	2015-10-06
2450	54.00	25.40	13.2	6.04	52.8	24.16	-2.22	-4.88	2015-10-07
2600	57.10	25.90	15.6	6.87	62.4	27.48	9.28	6.10	2015-10-06
2600	57.10	25.90	15.4	6.78	61.6	27.12	7.88	4.71	2015-10-07
Frequency (MHz)	Target value (W/Kg)		Measured value 100 mW(W/Kg)		Measured value 1W (W/Kg)		Dev.		Frequency (MHz)
	1g	1g	1g	10g	1g	10g			
5300	82.40	23.70	8.73	2.48	87.3	24.8	5.95	4.64	2015-10-03
5600	83.80	23.90	8.87	2.53	88.7	25.3	5.85	5.86	2015-10-03
5800	80.10	22.70	8.52	2.42	85.2	24.2	6.37	6.61	2015-10-03

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System Accuracy Verification Measurements for Body

Frequency (MHz)	Target value (W/Kg)		Measured value 250 mW(W/Kg)		Measured value 1W(W/Kg)		Dev.		Measurement date
	1g	1g	1g	10g	1g	10g	1g	10g	
750	8.49	5.60	2.29	1.52	9.16	6.08	7.89	8.57	2015-10-03
835	9.22	6.04	2.44	1.6	9.76	6.4	5.86	5.96	2015-10-05
1800	37.30	19.80	9.2	4.9	36.8	19.6	-1.34	-1.01	2015-10-04
1900	40.00	21.70	9.99	5.26	39.96	21.04	-0.10	-3.04	2015-10-03
1900	40.00	21.70	10.1	5.3	40.4	21.2	1.00	-2.30	2015-10-08
2450	52.50	24.60	13.4	6.22	53.6	24.88	2.10	1.14	2015-10-06
2600	57.20	25.80	14.8	6.5	59.2	26	3.50	0.78	2015-10-06
Frequency (MHz)	Target value (W/Kg)		Measured value 100 mW(W/Kg)		Measured value 1W(W/Kg)		Dev.		Measurement date
	1g	1g	1g	10g	1g	10g	1g	10g	
5300	77.60	21.70	7.51	2.17	75.1	21.7	-3.22	0.00	2015-10-05
5600	81.10	22.50	8.52	2.41	85.2	24.1	5.06	7.11	2015-10-05
5800	78.90	21.70	7.27	2.06	72.7	20.6	-7.86	-5.07	2015-10-05

4 POWER MEASUREMENT

4.1 Power Reduction for SAR

This device utilize power reduction scheme under mobile hotspot conditions for SAR compliance in some bands, therefore conducted power were measured both in “hotspot off mode” and “hotspot on mode” for these bands at the RF port.

4.2 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB 447498 D01.

4.2.1 Hotspot Mode Disabled

4.2.1.1 GSM

GSM Speech

		GSM	
		Target [dBm]	Tolerance +/-[dB]
GSM850	low	32.7	-1.3~+0.7
	mid	32.7	-1.3~+0.7
	high	32.7	-1.3~+0.7
GSM1900	low	29.7	-1.3~+0.7
	mid	29.7	-1.3~+0.7
	high	29.7	-1.3~+0.7

GPRS tolerance

		GPRS							
		TX Slot 1		TX Slot 2		TX Slot 3		TX Slot 4	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM850	low	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
	mid	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
	high	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
GSM1900	low	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7
	mid	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7
	high	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7

EGPRS tolerance

		EGPRS GMSK Modulation (MCS 1-4)							
		TX Slot 1		TX Slot 2		TX Slot 3		TX Slot 4	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM850	low	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
	mid	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
	high	32.7	-1.3~+0.7	31.2	-1.3~+0.7	29.4	-1.3~+0.7	28.2	-1.3~+0.7
GSM1900	low	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7
	mid	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7
	high	29.7	-1.3~+0.7	28.2	-1.3~+0.7	26.4	-1.3~+0.7	25.2	-1.3~+0.7

		EGPRS 8PSK Modulation (MCS 5-9)							
		TX Slot 1		TX Slot 2		TX Slot 3		TX Slot 4	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM850	low	27.0	-2.0~+1.0	25.5	-2.0~+1.0	23.7	-2.0~+1.0	22.5	-2.0~+1.0
	mid	27.0	-2.0~+1.0	25.5	-2.0~+1.0	23.7	-2.0~+1.0	22.5	-2.0~+1.0
	high	27.0	-2.0~+1.0	25.5	-2.0~+1.0	23.7	-2.0~+1.0	22.5	-2.0~+1.0
GSM1900	low	26.0	-2.0~+1.0	24.5	-2.0~+1.0	22.7	-2.0~+1.0	20.0	-2.0~+1.0
	mid	26.0	-2.0~+1.0	24.5	-2.0~+1.0	22.7	-2.0~+1.0	20.0	-2.0~+1.0
	high	26.0	-2.0~+1.0	24.5	-2.0~+1.0	22.7	-2.0~+1.0	20.0	-2.0~+1.0

DTM tolerance

GPRS/EGPRS GMSK Modulation (MCS 1-4)											
		GSM only		DTM							
		TX Slot 1		TX Slot 2				TX Slot 3			
		CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM850	low	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	31.2	- 1.3~+0.7	29.4	- 1.3~+0.7	29.4	- 1.3~+0.7
	mid	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	31.2	- 1.3~+0.7	29.4	- 1.3~+0.7	29.4	- 1.3~+0.7
	high	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	31.2	- 1.3~+0.7	29.4	- 1.3~+0.7	29.4	- 1.3~+0.7
GSM1900	low	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	28.2	- 1.3~+0.7	26.4	- 1.3~+0.7	26.4	- 1.3~+0.7
	mid	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	28.2	- 1.3~+0.7	26.4	- 1.3~+0.7	26.4	- 1.3~+0.7
	high	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	28.2	- 1.3~+0.7	26.4	- 1.3~+0.7	26.4	- 1.3~+0.7

EGPRS GMSK Modulation (MCS 5-9)											
		GSM only		DTM							
		TX Slot 1		TX Slot 2				TX Slot 3			
		CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM850	low	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	25.5	- 2.0~+1.0	29.4	- 1.3~+0.7	23.7	- 2.0~+1.0
	mid	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	25.5	- 2.0~+1.0	29.4	- 1.3~+0.7	23.7	- 2.0~+1.0
	high	32.7	- 1.3~+0.7	31.2	- 1.3~+0.7	25.5	- 2.0~+1.0	29.4	- 1.3~+0.7	23.7	- 2.0~+1.0
GSM1900	low	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	24.5	- 2.0~+1.0	26.4	- 1.3~+0.7	22.7	- 2.0~+1.0
	mid	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	24.5	- 2.0~+1.0	26.4	- 1.3~+0.7	22.7	- 2.0~+1.0
	high	29.7	- 1.3~+0.7	28.2	- 1.3~+0.7	24.5	- 2.0~+1.0	26.4	- 1.3~+0.7	22.7	- 2.0~+1.0

4.2.1.2 UMTS

UMTS tolerance

		CS		HSDPA(1/2)		HSDPA(3/4)	
		Target [dBm]	Tolerance+- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
UMTS B2	low	21.2	-2.0~+1.0	20.2	-2~+1.5	19.7	-2~+1.5
	mid	21.2	-2.0~+1.0	20.2	-2~+1.5	19.7	-2~+1.5
	high	21.2	-2.0~+1.0	20.2	-2~+1.5	19.7	-2~+1.5
UMTS B4	low	21.5	-2.0~+1.0	20.5	-2~+1.5	20.0	-2~+1.5
	mid	21.5	-2.0~+1.0	20.5	-2~+1.5	20.0	-2~+1.5
	high	21.5	-2.0~+1.0	20.5	-2~+1.5	20.0	-2~+1.5
UMTS B5	low	24.2	-1.3~+0.7	22.7	-2~+1.5	22.2	-2~+1.5
	mid	24.2	-1.3~+0.7	22.7	-2~+1.5	22.2	-2~+1.5
	high	24.2	-1.3~+0.7	22.7	-2~+1.5	22.2	-2~+1.5

HSUPA tolerance

		HSUPA(1/5)		HSUPA(2/4)		HSUPA(3)	
		Target [dBm]	Tolerance+- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
UMTS B2	low	20.2	-2~+1.5	19.2	-2~+1.5	18.7	-2~+1.5
	mid	20.2	-2~+1.5	19.2	-2~+1.5	18.7	-2~+1.5
	high	20.2	-2~+1.5	19.2	-2~+1.5	18.7	-2~+1.5
UMTS B4	low	20.5	-2~+1.5	19.5	-2~+1.5	19.0	-2~+1.5
	mid	20.5	-2~+1.5	19.5	-2~+1.5	19.0	-2~+1.5
	high	20.5	-2~+1.5	19.5	-2~+1.5	19.0	-2~+1.5
UMTS B5	low	22.2	-2~+1.5	22.2	-2~+1.5	20.7	-2~+1.5
	mid	22.2	-2~+1.5	22.2	-2~+1.5	20.7	-2~+1.5
	high	22.2	-2~+1.5	22.2	-2~+1.5	20.7	-2~+1.5

4.2.1.3 LTE

LTE tolerance

Band	BW	Channel	RF Config	QPSK		16-QAM	
				Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
LTE B2	1.4MHz	low	1RB	21.2	-1.0 ~ +1.0	21.2	-1.0 ~ +1.0
		mid	50%RB	21.2	-1.0 ~ +1.0	21.2	-1.0 ~ +1.0
		high	100%RB	21.2	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
	3MHz 5MHz 10MHz 15MHz 20MHz	low	1RB	21.2	-1.0 ~ +1.0	21.2	-1.0 ~ +1.0
		mid	50%RB	21.2	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
		high	100%RB	21.2	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
LTE B4	1.4MHz	low	1RB	21.5	-1.0 ~ +1.0	21.5	-1.0 ~ +1.0
		mid	50%RB	21.5	-1.0 ~ +1.0	21.5	-1.0 ~ +1.0
		high	100%RB	21.5	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
	3MHz 5MHz 10MHz 15MHz 20MHz	low	1RB	21.5	-1.0 ~ +1.0	21.5	-1.0 ~ +1.0
		mid	50%RB	21.5	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
		high	100%RB	21.5	-1.0 ~ +1.0	21.0	-1.0 ~ +1.0
LTE B5	1.4MHz	low	1RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		mid	50%RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		high	100%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
	3MHz 5MHz 10MHz	low	1RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		mid	50%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
		high	100%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
LTE B7	5MHz 10MHz 15MHz 20MHz	low	1RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5
		mid	50%RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5
		high	100%RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5
LTE B12	1.4MHz	low	1RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		mid	50%RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		high	100%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
	3MHz 5MHz 10MHz	low	1RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		mid	50%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
		high	100%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
LTE B17	5MHz 10MHz	low	1RB	23	-1.0 ~ +1.0	22	-1.0 ~ +1.0
		mid	50%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
		high	100%RB	22	-1.0 ~ +1.0	21	-1.0 ~ +1.0
LTE B41	5MHz 10MHz 15MHz 20MHz	low	1RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5
		mid	50%RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5
		high	100%RB	19	-1.0 ~ +1.5	19	-1.0 ~ +1.5

LTE MPR will follow up 3GPP setting as below:

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	≤ 0
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

4.2.1.4 WLAN and BT

WLAN tolerance

Maximum Power Chain0:

11b		Manufacturing Max Power [dBm]	
Band	channel	1Mbps	11Mbps
2400~2485MHz	1,11	14.0	14.0
	12	14.0	14.0
	13	13.25	13.25
	Other	14.0	14.0

11g		Manufacturing Max Power [dBm]	
Band	channel	6Mbps	54Mbps
2400~2485MHz	1,11	14.0	14.0
	12	10.75	10.75
	13	4.25	4.25
	Other	14.0	14.0

11a		Manufacturing Max Power [dBm]	
Band	channel	6Mbps	54Mbps
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11n HT-20		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-7
2400~2485MHz	1,11	14.0	14.0
	12	9.0	9.0
	13	3.5	3.5
	Other	14.0	14.0
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11ac VHT-20		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	165	10.0	10.0
	Other	10.0	10.0

11n VHT-40		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-7
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11ac VHT-40		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	38	10.0	10.0
	Other	10.0	10.0
5250~5350MHz	62	10.0	10.0
	Other	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	151	10.0	10.0
	Other	10.0	10.0

11ac VHT-80		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

Maximum Power Chain1:

11b		Manufacturing Max Power [dBm]	
Band	channel	1Mbps	11Mbps
2400~2485MHz	1,11	14.0	14.0
	12	14.0	14.0
	13	12.75	12.75
	Other	14.0	14.0

11g		Manufacturing Max Power [dBm]	
Band	channel	6Mbps	54Mbps
2400~2485MHz	1,11	14.0	14.0
	12	9.75	9.75
	13	3.25	3.25
	Other	14.0	14.0

11a		Manufacturing Max Power [dBm]	
Band	channel	6Mbps	54Mbps
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11n HT-20		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-7
2400~2485MHz	1,11	14.0	12.8
	12	8.0	8.0
	13	2.5	2.5
	Other	14.0	12.8
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11ac VHT-20		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8
5150~5250MHz	All	10.0	10.0
5250~5350MHz	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

11n VHT-40		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-7
5150~5250MHz	38	10.0	10.0
	Other	10.0	10.0
5250~5350MHz	62	10.0	10.0
	All	10.0	10.0
5470~5725MHz	All	10.0	10.0
5725~5850MHz	151	10.0	10.0
	Other	10.0	10.0

11ac VHT-40		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	38	10.0	9.89
	Other	10.0	9.89
5250~5350MHz	54	10.0	9.64
	Other	10.0	9.64
5470~5725MHz	All	10.0	10.0
5725~5850MHz	151	10.0	10.0
	Other	10.0	10.0

11ac VHT-80		Manufacturing Max Power [dBm]	
Band	channel	MCS-0	MCS-8, 9
5150~5250MHz	All	10.0	9.47
5250~5350MHz	All	10.0	9.15
5470~5725MHz	All	10.0	10.0
5725~5850MHz	All	10.0	10.0

Bluetooth tolerance

		Manufacturing Max Power [dBm]		
		BR	EDR	BLE
2400~2485MHz	Low	11.5	8.5	7.5
	mid	11.5	8.5	7.5
	high	11.5	8.5	7.5

4.2.2 Hotspot Mode Enabled

The device implemented power reduction on specific frequency bands while working in hotspot mode. Below only listed the bands which implement power reduction during tethering on.

4.2.2.1 GSM

GSM Speech tolerance-Tethering on

		GSM	
		Target [dBm]	Tolerance +/-[dB]
GSM1900	low	28.7	-1.3~+0.7
	mid	28.7	-1.3~+0.7
	high	28.7	-1.3~+0.7

GPRS tolerance-Tethering on

		GPRS							
		TX Slot 1		TX Slot 2		TX Slot 3		TX Slot 4	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM1900	low	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7
	mid	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7
	high	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7

EGPRS GMSK tolerance-Tethering on

		EGPRS GMSK Modulation (MCS 1-4)							
		TX Slot 1		TX Slot 2		TX Slot 3		TX Slot 4	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM1900	low	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7
	mid	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7
	high	28.7	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	22.0	-1.3~+0.7

Dual Transfer Mode (GSM speech + Data (GPRS)) -Tethering on

		GSM only		DTM							
		TX Slot 1		TX Slot 2				TX Slot 3			
		CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM 1900	low	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7
	mid	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7
	high	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7

Dual Transfer Mode (GSM speech + Data (EGPRS)) -Tethering on

EGPRS GMSK Modulation (MCS 1-4)											
		GSM only		DTM							
		TX Slot 1		TX Slot 2				TX Slot 3			
		CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM 1900	low	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7
	mid	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7
	high	28.7	-1.3~+0.7	25.0	-1.3~+0.7	25.0	-1.3~+0.7	23.0	-1.3~+0.7	23.0	-1.3~+0.7

EGPRS GMSK Modulation (MCS 5-9)											
		GSM only		DTM							
		TX Slot 1		TX Slot 2				TX Slot 3			
		CS GMSK		CS GMSK		PS GMSK		CS GMSK		PS GMSK	
		Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]	Target [dBm]	Tolerance +/-[dB]
GSM 1900	low	28.7	-1.3~+0.7	25.0	-1.3~+0.7	24.5	-2.0~+1.0	23.0	-1.3~+0.7	22.7	-2.0~+1.0
	mid	28.7	-1.3~+0.7	25.0	-1.3~+0.7	24.5	-2.0~+1.0	23.0	-1.3~+0.7	22.7	-2.0~+1.0
	high	28.7	-1.3~+0.7	25.0	-1.3~+0.7	24.5	-2.0~+1.0	23.0	-1.3~+0.7	22.7	-2.0~+1.0

4.2.2.2 UMTS

UMTS tolerance–Tethering on

		CS		HSDPA(1/2)		HSDPA(3/4)	
		Target [dBm]	Tolerance+- [dB]	Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
UMTS B2	low	18.0	-2.0~+1.0	17.0	-2~+1.5	16.5	-2~+1.5
	mid	18.0	-2.0~+1.0	17.0	-2~+1.5	16.5	-2~+1.5
	high	18.0	-2.0~+1.0	17.0	-2~+1.5	16.5	-2~+1.5
UMTS B4	low	20.0	-2.0~+1.0	19.0	-2~+1.5	18.5	-2~+1.5
	mid	20.0	-2.0~+1.0	19.0	-2~+1.5	18.5	-2~+1.5
	high	20.0	-2.0~+1.0	19.0	-2~+1.5	18.5	-2~+1.5

4.2.2.3 LTE

LTE tolerance-Tethering on

Band	BW	Channel	RF Config	QPSK		16-QAM	
				Target [dBm]	Tolerance +- [dB]	Target [dBm]	Tolerance +- [dB]
LTE B2	1.4MHz	low	1RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
		mid	50%RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
		high	100%RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
	3MHz 5MHz 10MHz 15MHz 20MHz	low	1RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
		mid	50%RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
		high	100%RB	18	-1.0 ~ +1.0	18	-1.0 ~ +1.0
LTE B4	1.4MHz	low	1RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0
		mid	50%RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0
		high	100%RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0
	3MHz 5MHz 10MHz 15MHz 20MHz	low	1RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0
		mid	50%RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0
		high	100%RB	20	-1.0 ~ +1.0	20	-1.0 ~ +1.0

4.3 Conducted Power Results

4.3.1 GSM

Technical Description

The phone under test contains a GSM transmitter that supports voice (circuit-switched) capability, and data (packet switched) capabilities over GPRS/EDGE (GMSK) or EDGE (8PSK).

Exposure Conditions and Test Exclusions

Mode	Type	Head Adjacent	Body Worn Accessory	WiFi Hotspot
GSM (GMSK 1 slot)/DTM	Voice/Data	Tested	Tested	NA
GPRS/EDGE (GMSK Multi-slots)	Data	Tested	Tested	Tested
EDGE (8PSK Multi-slots)	Data	Excluded	Excluded	Excluded

Burst Average Power was measured using a power meter set to the appropriate profile to capture average power in the transmitting timeslot(s). Source-Based Time-Averaged Power, being related to the Burst Average Power by a fixed factor dependent on the number of time slots active in the frame, was calculated as follows (in dB), where x is the number of time slots active:

$$P_{Source} = P_{Burst} - 10 * \log \left(\frac{x}{8.3} \right)$$

So the scale factor for uplink time slots to calculate Source-Based Time-Averaged Power:

- 1 Tx slot = 9.03 dB
- 2 Tx slots = 6.02 dB
- 3 Tx slots = 4.26 dB
- 4 Tx slots = 3.01 dB

Justification of SAR measurements in GSM mode

According to the conducted power as below, the head measurement are performed with DTM (1TX CS+2TX PS) for GSM850 and DTM (1TX CS+1TX PS) for GSM1900; the body measurements are performed with 2Txslot for GSM850 and 2Txslot GSM1900, because highest time based averaged output power was calculated for that configuration.

4.3.1.1 Hotspot Mode Disabled

GSM850	Conducted Power (dBm)		
	Channel 128 (824.2MHz)	Channel 190 (836.6MHz)	Channel 251 (848.8MHz)
	32.8	32.9	32.8
GSM1900	Conducted Power (dBm)		
	Channel 512 (1850.2MHz)	Channel 661(1880.0MHz)	Channel 810 (1909.8MHz)
	30	30	30.1

GPRS and EGPRS POWER LEVELS

GSM850 GPRS (GMSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	128	190	251		128	190	251
1TX Slot	32.9	32.9	32.9	-9.03dBm	23.87	23.87	23.87
2TX Slots	31.8	31.9	31.9	-6.02dBm	25.78	25.88	25.88
3TX Slots	29.9	30	30	-4.26dBm	25.64	25.74	25.74
4TX Slots	28.60	28.7	28.7	-3.01dBm	25.59	25.69	25.69
GSM850 EGPRS (8PSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	128	190	251		128	190	251
1TX Slot	27.2	27.4	27.3	-9.03dBm	18.17	18.37	18.27
2TX Slots	26.00	26	26.00	-6.02dBm	19.98	19.98	19.98
3TX Slots	24.1	24.1	24.10	-4.26dBm	19.84	19.84	19.84
4TX Slots	23.2	23.3	23.3	-3.01dBm	20.19	20.29	20.29
GSM1900 GPRS (GMSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	512	661	810		512	661	810
1TX Slot	30	30	30	-9.03dBm	20.97	20.97	20.97
2TX Slots	28.6	28.5	28.6	-6.02dBm	22.58	22.48	22.58
3TX Slots	26.6	26.6	26.6	-4.26dBm	22.34	22.34	22.34
4TX Slots	25.50	25.4	25.5	-3.01dBm	22.49	22.39	22.49
GSM1900 EGPRS (8PSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	512	661	810		512	661	810
1TX Slot	26.4	26.3	26.3	-9.03dBm	17.37	17.27	17.27
2TX Slots	25.2	25.1	25.1	-6.02dBm	19.18	19.08	19.08
3TX Slots	23.2	23.1	23.10	-4.26dBm	18.94	18.84	18.84
4TX Slots	20.9	21	21.00	-3.01dBm	17.89	17.99	17.99

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GSM DTM POWER LEVELS

GSM850 GPRS (GMSK)	Measured Power (dBm)			Calculation	Averaged Power (dBm)		
	128	190	251		128	190	251
1TX CS+1TX PS	31.7	31.8	31.8	-6.02dBm	25.68	25.78	25.78
1TX CS+2TX PS	29.8	29.9	29.9	-4.26dBm	25.54	25.64	25.64
GSM850 EGPRS (8PSK)	Measured Power (dBm)			Calculation	Averaged Power (dBm)		
	128	190	251		128	190	251
1TX CS+1TX PS	25.8	25.9	25.90	-6.02dBm	19.78	19.88	19.88
1TX CS+2TX PS	24.4	24.5	24.5	-4.26dBm	20.14	20.24	20.24
GSM1900 GPRS (GMSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	512	661	810		512	661	810
1TX CS+1TX PS	28.9	28.9	28.9	-6.02dBm	22.88	22.88	22.88
1TX CS+2TX PS	27.0	26.7	26.6	-4.26dBm	22.74	22.44	22.34
GSM1900 EGPRS (8PSK)	Measured Power(dBm)			Calculation	Averaged Power(dBm)		
	512	661	810		512	661	810
1TX CS+1TX PS	25.4	25.3	25.3	-6.02dBm	19.38	19.28	19.28
1TX CS+2TX PS	23.3	23.20	23.2	-4.26dBm	19.04	18.94	18.94

4.3.2 WCDMA

Technical Description

The phone under test contains a WCDMA transmitter designed per 3GPP TS 25.101, that supports both voice and data capabilities.

Exposure Conditions and Test Exclusions

Mode	Type	Head	Body Worn Accessory	WiFi Hotspot
RMC	Voice/Data	Tested	Tested	Tested
AMR	Voice/Data	Excluded	Excluded	Excluded
HSDPA (Rel 5) Modes	Data	Excluded	Excluded	Excluded
HSPA (Rel 6) Modes	Data	Excluded	Excluded	Excluded
DC-HSDPA (Rel 8) Modes	Data	Excluded	Excluded	Excluded

Justification of SAR measurements in WCDMA mode

Per KDB 941225 D01, 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

Device Test Setup

For WCDMA modes, the test sample was operated using transmission to a base station simulator. The base station simulator was set up for the proper channel and transmit mode of operation on the phone's uplink. The transmitter power level and transmit power control were set to "All 1's" for RMC and AMR modes in WCDMA or HSDPA, or inner loop power control procedures were applied to maintain maximum output power while HSUPA was active.

a). HSDPA

HSDPA adds the HS-DPCCH in uplink as a control channel for high speed data transfer in downlink.


In HSDPA mode 4 sub-tests are defined by 3GPP 34.121 according to the following table:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{ns}^{(1)}$	CM(dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: $\Delta_{ACK}, \Delta_{NACK}, \Delta_{CQI} = 8 \iff A_{ns} = \beta_{ns}/\beta_c = 30/15 \iff \beta_{ns} = 30/15 * \beta_c$

Note 2 : CM = 1 for $\beta_c/\beta_d = 12/15, \beta_{ns}/\beta_c = 24/15$

Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

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The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the above table, β_{hs} for HS-DPCCH is set automatically to the correct value when ΔACK , $\Delta NACK$, $\Delta CQI = 8$. The variation of the β_c / β_d ratio causes a power reduction at sub-tests 2 - 4.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Settings of required H-Set 1 QPSK acc. to 3GPP 34.121

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI's
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

b). HSUPA

In HSUPA mode additional code channels (E-DPCCH, E-DPDCHn) are added for data transfer in uplink at higher bit rates.

5 sub-tests are defined by 3GPP 34.121 according to the following table :

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1 : ΔACK , $\Delta NACK$, $\Delta CQI = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

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

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

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6 : β_{ed} can not be set directly; it is set by Absolute Grant Value

To achieve the settings above some additional procedures were defined by 3GPP 34.121.

Those have been included in an application note for the CMU200 and were exactly followed :

- Test mode connection (BS signal tab) :
- RMC 12.2 kbit/s + HSPA 34.108 with loop mode 1
- HS-DSCH settings (BS signal tab):
- FRC with H-set 1 QPSK
- ACK-NACK repetition factor = 3
- CQI feedback cycle = 4ms
- CQI repetition factor = 2

- HSUPA-specific signalling settings (UE signal tab) :
- E-TFCI table index = 0
- E-DCH minimum set E-TFCI = 9
- Puncturing limit non-max = 0.84
- max. number of channelisation codes = 2x SF4
- Initial Serving Grant Value = Off
- HSDPA and HSUPA Gain factors (UE signal tab)

<i>Sub-test</i>	β_c	β_d	$\Delta_{ACK}, \Delta_{NACK}, \Delta_{CQI}$	$\Delta E-DPCCH$)*
1	10	15	8	6
2	6	15	8	8
3	15	9	8	8
4	2	15	8	5
5	14	15	8	7

* : β_{ec} and β_{ed} ratios (relative to β_c and β_d) are set by $\Delta E-DPCCH$

- HSUPA Reference E-TFCIs (UE signal tab > HSUPA gain factors) :


<i>Sub-test</i>	1, 2, 4, 5				
Number of E-TFCIs	5				
Reference E-TFCI	11	67	71	75	81
Reference E-TFCI power offset	4	18	23	26	27

<i>Sub-test</i>	3	
Number of E-TFCIs	2	
Reference E-TFCI	11	92
Reference E-TFCI power offset	4	18

- HSUPA-specific generator parameters (BS Signal tab > HSUPA > E-AGCH > AG Pattern)

<i>Sub-test</i>	<i>Absolute Grant Value (AG Index)</i>
1	20
2	12
3	15
4	17
5	21

- Power Level settings (BS Signal tab > Node B-settings):
- Level reference : Output Channel Power (lor)
- Output Channel Power (lor) : -86 dBm
- Downlink Physical Channel Settings (BS signal tab)
- P-CPICH : -10 dB
- S-CPICH : Off
- P-SCH : -15 dB
- S-SCH : -15 dB
- P-CCPCH : -12 dB
- S-CCPCH : -12 dB
- PICH : -15 dB
- AICH : -12 dB
- DPDCH : -10 dB
- HS-SCCH : -8 dB

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- HS-PDSCH : -3 dB
- E-AGCH : -20 dB
- E-RGCH/E-HICH - 20 dB
- E-RGCH Active : Off

The settings above were stored once for each sub-test and recalled before the measurement.

HSUPA test procedure :

To reach maximum output power in HSUPA mode the following procedures were followed:

3 different TPC patterns were defined :

Set 1 : Closed loop with target power 10 dBm

Set 2 : Single Pattern+Alternating with binary pattern '11111' for 1 dB steps 'up'

Set 3 : Single Pattern+Alternating with binary pattern '00000' for 1 dB steps 'down'

After recalling a certain HSUPA sub-test the HSUPA E-AGCH graph with E-TFCI event counter is displayed. After starting with the closed loop command the power is increased in 1 dB steps by activating pattern set 2 until the UE decreases the transmitted E-TFCI.

At this point set 3 is activated once to reduce the output power to the value at which the original E-TFCI, which is required for the sub-test, appears again.

For conducted power measurements the same steps are repeated in the power menu to read out the corresponding maximum RMS output power with the target E-TFCI.

For SAR measurements it is useful to switch to Code Domain Power vs. Time display.

Here the CMU200 shows relative power values (max. and min.) of each code channel which should roughly correspond to the numerators of the gain factors e.g. :

Sub-test	β_c	β_d	β_{hs}	β_{ec}	β_{ed}
5	15	15	30	24	134


By this way a surveillance of signaling conditions is possible to make sure that HSUPA code channels are active during the complete SAR measurement.

c) DC-HSDPA (3GPP Release 8)

Dual Cell – HSDPA has been signaled using the following settings for connection setup:

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

Downlink Physical Channels according to 3GPP 34.121 Table E.5.0

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The fixed reference channel has been set to H-set 12 according to 3GPP TS 34.121 Table C.8.1.12:

Parameter	Unit	Value
Nominal Average Inf. Bit Rate	kbit/s	60
Inter-TTI Distance	TTI's	1
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 Process	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codecs	Codecs	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.		

H-Set 12 QPSK configuration

Power measurements were executed per FCC KDB 941225 D01:

4.3.2.1 Hotspot Mode Disabled

Band	UMTS Band 2			UMTS Band 4			UMTS Band 5		
	TX Channel	9262	9400	9538	1312	1412	1513	4132	4182
RX Channel	9662	9800	9938	1537	1637	1738	4357	4407	4458
RMC 12.2kbps	22.2	22.2	22.1	22.4	22.5	22.4	24.4	24.5	24.5
HSDPA Subtest-1	21.2	21.4	21.2	21.5	21.5	21.4	23.4	23.5	23.5
HSDPA Subtest-2	20.7	20.9	20.7	20.9	21	20.9	22.9	23	23
HSDPA Subtest-3	20.7	20.9	20.7	20.9	21	20.9	23	23	23
HSDPA Subtest-4	20.7	20.9	20.7	21	21	21	23	23	23
HSUPA Subtest-1	21.2	21.2	20.8	21.1	20.2	21.3	23.3	23.4	23.3
HSUPA Subtest-2	20.5	20.5	20.4	20.6	20.6	20.6	22.6	22.7	22.7
HSUPA Subtest-3	20.1	20.2	19.9	20.3	20.5	20.3	22.2	22.2	22.2
HSUPA Subtest-4	20.6	20.7	20.6	20.7	20.7	20.8	22.7	22.9	22.9
HSUPA Subtest-5	20	20.2	20	20.4	20.5	20.2	22.4	22.5	22.6
DC-HSDPA Subtest-1	20.6	20.8	20.3	21.6	21.9	21.6	22.8	22.8	22.9
DC-HSDPA Subtest-2	20.5	20.7	20.5	21.8	21.8	21.7	22.8	22.9	22.8
DC-HSDPA Subtest-3	20.5	20.7	20.5	21.7	21.8	21.7	22.8	22.9	22.8
DC-HSDPA Subtest-4	20.6	20.7	20.5	21.8	21.9	21.7	22.5	22.7	22.8

4.3.2.2 Hotspot Mode Enabled

Sets/Modes		UMTS	HSDPA				HSUPA				
Band	Uplink Channel	RMC/Voice 12.2kbps	1	2	3	4	1	2	3	4	5
UMTS Band 2	9262	18.8	17.9	17.4	17.4	17.4	17.8	16.4	16	17.4	16.7
	9400	18.8	18	17.5	17.5	17.5	16.5	17	17	17.3	17
	9538	18.5	17.8	17.3	17.3	17.3	17.4	16.9	16.5	17.2	16.6
UMTS Band 4	1312	20.8	19.7	19.2	19.2	19.2	19.4	18.8	18.5	19.1	18.7
	1412	20.6	19.7	19.2	19.3	19.3	18.5	18.9	18.8	19	18.8
	1513	20.6	19.7	19.3	19.3	19.3	19.5	18.9	18.6	19.1	18.6

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4.3.3 LTE

Technical Description

TDD LTE was tested using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using normal cyclic prefix only and special subframe configuration 6. Due to equipment setup issues with extended cyclic as a result of test samples configured for normal cyclic prefix. SAR tests were performed at maximum output power and worst-case transmission duty factor in normal cyclic prefix. Results were then scaled to the duty factor required for extended cyclic prefix listed in 3GPP TS36.211 Section 4. The cyclic prefix scaling factor for LTE Band 41 was calculated by dividing the extended cyclic prefix duty factor by the normal cyclic prefix duty factor. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using normal cyclic prefix is 0.629. The duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.

Justification of SAR measurements in LTE mode

- (1) Per KDB 941225 D05, 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.
- (2) 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.
- (3) 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.
- (4) 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.
- (5) 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.

4.3.3.1 Hotspot Mode Disabled

Conductive average power measurement: LTE Band 2

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 2	1.4MHz	QPSK	1	0	18607	1850.7	22.20	21.6
					18900	1880	22.20	21.6
					19193	1909.3	22.20	21.7
				3	18607	1850.7	22.20	21.6
					18900	1880	22.20	21.6
					19193	1909.3	22.20	21.7
				5	18607	1850.7	22.20	21.8
					18900	1880	22.20	21.6
					19193	1909.3	22.20	21.8
			3	0	18607	1850.7	22.20	21.5
					18900	1880	22.20	21.5
					19193	1909.3	22.20	21.6
				1	18607	1850.7	22.20	21.6
					18900	1880	22.20	21.7
					19193	1909.3	22.20	21.7
				3	18607	1850.7	22.20	21.5
					18900	1880	22.20	21.5
					19193	1909.3	22.20	21.7
6	0	18607	1850.7	22.20	21.5			
		18900	1880	22.20	21.6			
		19193	1909.3	22.20	21.3			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 2	1.4MHz	16-QAM	1	0	18607	1850.7	22.20	21.8
					18900	1880	22.20	21.8
					19193	1909.3	22.20	21.5
				3	18607	1850.7	22.20	21.8
					18900	1880	22.20	21.7
					19193	1909.3	22.20	21.5
				5	18607	1850.7	22.20	21.8
					18900	1880	22.20	22
					19193	1909.3	22.20	21.4
			3	0	18607	1850.7	22.20	21.6
					18900	1880	22.20	21.7
					19193	1909.3	22.20	21.4
				1	18607	1850.7	22.20	21.6
					18900	1880	22.20	21.8
					19193	1909.3	22.20	21.4
				3	18607	1850.7	22.20	21.5
					18900	1880	22.20	21.7
					19193	1909.3	22.20	21.4

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	5MHz	QPSK	1	0	19185	1908.5	22.00	20.5			
					18625	1852.5	22.20	21.8			
					18900	1880	22.20	21.8			
				12	12	18625	1852.5	22.20	21.7		
						18900	1880	22.20	21.5		
						19175	1907.5	22.20	21.6		
					24	18625	1852.5	22.20	21.7		
						18900	1880	22.20	21.8		
						19175	1907.5	22.20	21.8		
			12	0	18625	1852.5	22.20	21.6			
					18900	1880	22.20	21.6			
					19175	1907.5	22.20	21.6			
				6	18625	1852.5	22.20	21.7			
					18900	1880	22.20	21.6			
					19175	1907.5	22.20	21.6			
				13	18625	1852.5	22.20	21.6			
					18900	1880	22.20	21.6			
					19175	1907.5	22.20	21.5			
			25	0	18625	1852.5	22.20	21.6			
					18900	1880	22.20	21.6			
					19175	1907.5	22.20	21.5			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	5MHz	16-QAM	1	0	18625	1852.5	22.20	21.9
								18900	1880	22.20	21.8
19175	1907.5	22.20						21.6			
12	12	18625					1852.5	22.20	22.1		
		18900					1880	22.20	21.8		
		19175					1907.5	22.20	21.6		
	24	18625					1852.5	22.20	21.9		
		18900					1880	22.20	21.9		
		19175					1907.5	22.20	21.5		
12	0	18625				1852.5	22.00	21.1			
		18900				1880	22.00	21.1			
		19175				1907.5	22.00	20.6			
	6	18625				1852.5	22.00	21.1			
		18900				1880	22.00	21.1			
		19175				1907.5	22.00	20.6			
	13	18625				1852.5	22.00	21.1			
		18900				1880	22.00	21.1			
		19175				1907.5	22.00	20.5			
25	0	18625				1852.5	22.00	21.2			
		18900				1880	22.00	21.2			
		19175				1907.5	22.00	20.6			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	10MHz	QPSK	1	0	18650	1855	22.20	21.9			
					18900	1880	22.20	21.7			
					19150	1905	22.20	21.8			
				24	18650	1855	22.20	21.7			
					18900	1880	22.20	21.7			
					19150	1905	22.20	21.5			
				49	18650	1855	22.20	21.8			
					18900	1880	22.20	21.8			
					19150	1905	22.20	21.5			
			25	0	18650	1855	22.20	21.7			
					18900	1880	22.20	21.6			
					19150	1905	22.20	21.5			
				12	18650	1855	22.20	21.7			
					18900	1880	22.20	21.6			
					19150	1905	22.20	21.4			
				25	18650	1855	22.20	21.7			
					18900	1880	22.20	21.7			
					19150	1905	22.20	21.4			
			50	0	18650	1855	22.20	21.7			
					18900	1880	22.20	21.7			
					19150	1905	22.20	21.5			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	10MHz	16-QAM	1	0	18650	1855	22.20	22
								18900	1880	22.20	21.8
19150	1905	22.20						21.8			
24	18650	1855					22.20	21.8			
	18900	1880					22.20	21.7			
	19150	1905					22.20	21.5			
49	18650	1855					22.20	21.9			
	18900	1880					22.20	21.9			
	19150	1905					22.20	21.2			
25	0	18650				1855	22.00	21.2			
		18900				1880	22.00	21.1			
		19150				1905	22.00	20.8			
	12	18650				1855	22.00	21.3			
		18900				1880	22.00	21.2			
		19150				1905	22.00	20.7			
	25	18650				1855	22.00	21.3			
		18900				1880	22.00	21.2			
		19150				1905	22.00	20.6			
50	0	18650				1855	22.00	21.2			
		18900				1880	22.00	21.1			
		19150				1905	22.00	20.7			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	15MHz	QPSK	1	0	18675	1857.5	22.20	21.5			
					18900	1880	22.20	21.6			
					19125	1902.5	22.20	21.5			
				37	18675	1857.5	22.20	21.3			
					18900	1880	22.20	21.7			
					19125	1902.5	22.20	21.4			
				74	18675	1857.5	22.20	21.3			
					18900	1880	22.20	21.7			
					19125	1902.5	22.20	21.3			
			36	0	18675	1857.5	22.20	21.3			
					18900	1880	22.20	21.6			
					19125	1902.5	22.20	21.3			
					20	18675	1857.5	22.20	21.3		
						18900	1880	22.20	21.7		
						19125	1902.5	22.20	21.3		
				39	18675	1857.5	22.20	21.2			
					18900	1880	22.20	21.7			
					19125	1902.5	22.20	21.3			
				75	0	18675	1857.5	22.20	21.3		
						18900	1880	22.20	21.6		
						19125	1902.5	22.20	21.3		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	15MHz	16-QAM	1	0	18675	1857.5	22.20	21.4
								18900	1880	22.20	21.5
19125	1902.5	22.20						21.3			
37	18675	1857.5					22.20	21.1			
	18900	1880					22.20	21.5			
	19125	1902.5					22.20	21.2			
74	18675	1857.5					22.20	21.1			
	18900	1880					22.20	21.6			
	19125	1902.5					22.20	21.2			
36	0	18675				1857.5	22.00	20.9			
		18900				1880	22.00	21.1			
		19125				1902.5	22.00	20.8			
		20				18675	1857.5	22.00	20.8		
						18900	1880	22.00	21.2		
						19125	1902.5	22.00	20.8		
	39	18675				1857.5	22.00	20.7			
		18900				1880	22.00	21.2			
		19125				1902.5	22.00	20.6			
	75	0				18675	1857.5	22.00	20.8		
						18900	1880	22.00	21.2		
						19125	1902.5	22.00	20.8		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	20MHz	QPSK	1	0	18700	1860	22.20	21.5			
					18900	1880	22.20	21.8			
					19100	1900	22.20	21.8			
				49	18700	1860	22.20	21			
					18900	1880	22.20	21.5			
					19100	1900	22.20	21.2			
				99	18700	1860	22.20	21.2			
					18900	1880	22.20	21.7			
					19100	1900	22.20	21.5			
			50	0	18700	1860	22.20	21.2			
					18900	1880	22.20	21.6			
					19100	1900	22.20	21.5			
					25	18700	1860	22.20	21.1		
						18900	1880	22.20	21.6		
						19100	1900	22.20	21.4		
				50	18700	1860	22.20	21.2			
					18900	1880	22.20	21.7			
					19100	1900	22.20	21.4			
				100	0	18700	1860	22.20	21.2		
						18900	1880	22.20	21.6		
						19100	1900	22.20	21.4		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	20MHz	16-QAM	1	0	18700	1860	22.20	21.9
								18900	1880	22.20	22.2
19100	1900	22.20						22.2			
49	18700	1860					22.20	21.7			
	18900	1880					22.20	22.1			
	19100	1900					22.20	21.9			
99	18700	1860					22.20	21.7			
	18900	1880					22.20	22.1			
	19100	1900					22.20	22			
50	0	18700				1860	22.00	20.7			
		18900				1880	22.00	21.1			
		19100				1900	22.00	21.1			
		25				18700	1860	22.00	20.7		
						18900	1880	22.00	21.2		
						19100	1900	22.00	21		
	50	18700				1860	22.00	20.7			
		18900				1880	22.00	21.2			
		19100				1900	22.00	20.8			
	100	0				18700	1860	22.00	20.8		
						18900	1880	22.00	21.2		
						19100	1900	22.00	21		

Conductive average power measurement: LTE Band 4

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band 4	1.4MHz	QPSK	1	0	19957	1710.7	22.50	21.4				
					20175	1732.5	22.50	21.9				
					20393	1754.3	22.50	21.3				
				3	5	19957	1710.7	22.50	21.5			
						20175	1732.5	22.50	21.8			
						20393	1754.3	22.50	21.3			
				3	0	19957	1710.7	22.50	21.4			
						20175	1732.5	22.50	21.7			
						20393	1754.3	22.50	21.2			
			1		3	19957	1710.7	22.50	21.5			
						20175	1732.5	22.50	21.8			
						20393	1754.3	22.50	21.3			
			3		6	19957	1710.7	22.50	21.4			
						20175	1732.5	22.50	21.7			
						20393	1754.3	22.50	21.1			
			LTE Band 4	1.4MHz	16-QAM	1	0	19957	1710.7	22.50	21.7	
								20175	1732.5	22.50	21.9	
								20393	1754.3	22.50	21.4	
							3	5	19957	1710.7	22.50	21.7
									20175	1732.5	22.50	22
									20393	1754.3	22.50	21.4
							3	0	19957	1710.7	22.50	21.8
									20175	1732.5	22.50	21.9
									20393	1754.3	22.50	21.4
1	3	19957				1710.7		22.20	21.5			
		20175				1732.5		22.20	21.9			
		20393				1754.3		22.20	21.3			
3	6	19957				1710.7		22.20	21.7			
		20175				1732.5		22.20	22			
		20393				1754.3		22.20	21.4			
3	0	19957				1710.7	22.20	21.7				
		20175				1732.5	22.20	21.8				
		20393				1754.3	22.20	21.4				
6	0	19957				1710.7	22.00	20.5				
		20175				1732.5	22.00	20.8				
		20393				1754.3	22.00	20.3				

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 4	3MHz	QPSK	1	0	19965	1711.5	22.50	21.8			
					20175	1732.5	22.50	21.7			
					20385	1753.5	22.50	21.1			
				7	19965	1711.5	22.50	22.1			
					20175	1732.5	22.50	21.8			
					20385	1753.5	22.50	21.2			
				14	19965	1711.5	22.50	21.9			
					20175	1732.5	22.50	21.8			
					20385	1753.5	22.50	21.2			
			8	0	19965	1711.5	22.50	21.9			
					20175	1732.5	22.50	21.7			
					20385	1753.5	22.50	21.2			
				4	19965	1711.5	22.50	21.9			
					20175	1732.5	22.50	21.8			
					20385	1753.5	22.50	21.2			
				7	19965	1711.5	22.50	21.9			
					20175	1732.5	22.50	21.8			
					20385	1753.5	22.50	21.2			
				15	0	19965	1711.5	22.50	21.9		
						20175	1732.5	22.50	21.7		
						20385	1753.5	22.50	21.2		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 4	3MHz	16-QAM	1	0	19965	1711.5	22.50	22
								20175	1732.5	22.50	21.8
20385	1753.5	22.50						21.3			
7	19965	1711.5					22.50	22.1			
	20175	1732.5					22.50	22			
	20385	1753.5					22.50	21.6			
14	19965	1711.5					22.50	22.1			
	20175	1732.5					22.50	21.9			
	20385	1753.5					22.50	21.4			
8	0	19965				1711.5	22.00	21			
		20175				1732.5	22.00	20.8			
		20385				1753.5	22.00	20.2			
	4	19965				1711.5	22.00	21			
		20175				1732.5	22.00	20.9			
		20385				1753.5	22.00	20.2			
	7	19965				1711.5	22.00	20.9			
		20175				1732.5	22.00	20.8			
		20385				1753.5	22.00	20.2			
	15	0				19965	1711.5	22.00	20.9		
						20175	1732.5	22.00	20.7		
						20385	1753.5	22.00	20.2		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band 4	5MHz	QPSK	1	0	19975	1712.5	22.50	21.9				
					20175	1732.5	22.50	21.7				
					20375	1752.5	22.50	21.7				
				12	12	19975	1712.5	22.50	21.9			
						20175	1732.5	22.50	21.6			
						20375	1752.5	22.50	21.5			
					24	19975	1712.5	22.50	21.9			
						20175	1732.5	22.50	21.7			
						20375	1752.5	22.50	21.8			
			12	0	19975	1712.5	22.50	21.9				
					20175	1732.5	22.50	21.7				
					20375	1752.5	22.50	21.7				
				6	19975	1712.5	22.50	21.9				
					20175	1732.5	22.50	21.8				
					20375	1752.5	22.50	21.7				
					13	19975	1712.5	22.50	21.9			
						20175	1732.5	22.50	21.6			
						20375	1752.5	22.50	21.6			
				25	0	19975	1712.5	22.50	21.8			
						20175	1732.5	22.50	21.7			
						20375	1752.5	22.50	21.6			
				Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
				LTE Band 4	5MHz	16-QAM	1	0	19975	1712.5	22.50	22.2
									20175	1732.5	22.50	21.9
20375	1752.5	22.50	22									
12	12	19975	1712.5					22.50	22			
		20175	1732.5					22.50	22			
		20375	1752.5					22.50	21.8			
	24	19975	1712.5					22.50	22.1			
		20175	1732.5					22.50	22			
		20375	1752.5					22.50	22.3			
12	0	19975	1712.5				22.00	20.9				
		20175	1732.5				22.00	20.7				
		20375	1752.5				22.00	20.7				
	6	19975	1712.5				22.00	20.9				
		20175	1732.5				22.00	20.7				
		20375	1752.5				22.00	20.7				
		13	19975				1712.5	22.00	20.9			
			20175				1732.5	22.00	20.7			
			20375				1752.5	22.00	20.7			
	25	0	19975				1712.5	22.00	20.8			
			20175				1732.5	22.00	20.7			
			20375				1752.5	22.00	20.6			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 4	10MHz	QPSK	1	0	20000	1715	22.50	21.8			
					20175	1732.5	22.50	22			
					20350	1750	22.50	21.4			
				24	20000	1715	22.50	21.7			
					20175	1732.5	22.50	21.8			
					20350	1750	22.50	21.2			
				49	20000	1715	22.50	21.7			
					20175	1732.5	22.50	21.8			
					20350	1750	22.50	21.2			
			25	0	20000	1715	22.50	21.6			
					20175	1732.5	22.50	21.8			
					20350	1750	22.50	21.2			
				12	20000	1715	22.50	21.7			
					20175	1732.5	22.50	21.8			
					20350	1750	22.50	21.2			
				25	20000	1715	22.50	21.6			
					20175	1732.5	22.50	21.8			
					20350	1750	22.50	21.2			
				50	0	20000	1715	22.50	21.6		
						20175	1732.5	22.50	21.8		
						20350	1750	22.50	21.2		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 4	10MHz	16-QAM	1	0	20000	1715	22.50	22
								20175	1732.5	22.50	22.2
20350	1750	22.50						21.6			
24	20000	1715					22.50	21.9			
	20175	1732.5					22.50	22.2			
	20350	1750					22.50	21.6			
49	20000	1715					22.50	21.9			
	20175	1732.5					22.50	22			
	20350	1750					22.50	21.4			
25	0	20000				1715	22.00	20.6			
		20175				1732.5	22.00	20.7			
		20350				1750	22.00	20.1			
	12	20000				1715	22.00	20.6			
		20175				1732.5	22.00	20.7			
		20350				1750	22.00	20.1			
	25	20000				1715	22.00	20.6			
		20175				1732.5	22.00	20.7			
		20350				1750	22.00	20.1			
	50	0				20000	1715	22.00	20.6		
						20175	1732.5	22.00	20.7		
						20350	1750	22.00	20.1		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 4	15MHz	QPSK	1	0	20025	1717.5	22.50	21.9			
					20175	1732.5	22.50	22.1			
					20325	1747.5	22.50	21.7			
				37	20025	1717.5	22.50	21.6			
					20175	1732.5	22.50	21.8			
					20325	1747.5	22.50	21.5			
				74	20025	1717.5	22.50	21.9			
					20175	1732.5	22.50	21.8			
					20325	1747.5	22.50	21.6			
			36	0	20025	1717.5	22.50	21.8			
					20175	1732.5	22.50	21.9			
					20325	1747.5	22.50	21.6			
				20	20025	1717.5	22.50	21.8			
					20175	1732.5	22.50	21.9			
					20325	1747.5	22.50	21.6			
				39	20025	1717.5	22.50	21.8			
					20175	1732.5	22.50	21.9			
					20325	1747.5	22.50	21.6			
				75	0	20025	1717.5	22.50	21.8		
						20175	1732.5	22.50	21.9		
						20325	1747.5	22.50	21.6		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 4	15MHz	16-QAM	1	0	20025	1717.5	22.50	22
								20175	1732.5	22.50	22.2
20325	1747.5	22.50						21.9			
37	20025	1717.5					22.50	21.9			
	20175	1732.5					22.50	21.9			
	20325	1747.5					22.50	21.8			
74	20025	1717.5					22.50	22			
	20175	1732.5					22.50	22			
	20325	1747.5					22.50	21.8			
36	0	20025				1717.5	22.00	20.8			
		20175				1732.5	22.00	20.8			
		20325				1747.5	22.00	20.5			
	20	20025				1717.5	22.00	20.8			
		20175				1732.5	22.00	20.8			
		20325				1747.5	22.00	20.5			
	39	20025				1717.5	22.00	20.8			
		20175				1732.5	22.00	20.8			
		20325				1747.5	22.00	20.6			
	75	0				20025	1717.5	22.00	20.8		
						20175	1732.5	22.00	20.9		
						20325	1747.5	22.00	20.6		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	20MHz	QPSK	1	0	20050	1720	22.50	21.9
					20175	1732.5	22.50	22.1
					20300	1745	22.50	21.8
				49	20050	1720	22.50	21.7
					20175	1732.5	22.50	21.7
					20300	1745	22.50	21.4
				99	20050	1720	22.50	21.8
					20175	1732.5	22.50	21.8
					20300	1745	22.50	21.6
			50	0	20050	1720	22.50	21.8
					20175	1732.5	22.50	22
					20300	1745	22.50	21.7
				25	20050	1720	22.50	21.8
					20175	1732.5	22.50	21.9
					20300	1745	22.50	21.6
				50	20050	1720	22.50	21.9
					20175	1732.5	22.50	21.9
					20300	1745	22.50	21.6
			100	0	20050	1720	22.50	21.9
					20175	1732.5	22.50	21.9
					20300	1745	22.50	21.7
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	20MHz	16-QAM	1	0	20050	1720	22.50	22.2
					20175	1732.5	22.50	22.3
					20300	1745	22.50	22
				49	20050	1720	22.50	21.9
					20175	1732.5	22.50	22
					20300	1745	22.50	21.8
				99	20050	1720	22.50	22.1
					20175	1732.5	22.50	22.1
					20300	1745	22.50	21.9
			50	0	20050	1720	22.00	20.8
					20175	1732.5	22.00	20.9
					20300	1745	22.00	20.6
				25	20050	1720	22.00	20.8
					20175	1732.5	22.00	20.9
					20300	1745	22.00	20.5
				50	20050	1720	22.00	20.8
					20175	1732.5	22.00	20.8
					20300	1745	22.00	20.6
			100	0	20050	1720	22.00	20.8
					20175	1732.5	22.00	20.9
					20300	1745	22.00	20.6

Conductive average power measurement: LTE Band 5

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 5	1.4MHz	QPSK	1	0	20407	824.7	24.00	23			
					20525	836.5	24.00	23.1			
					20643	848.3	24.00	23.3			
				3	20407	824.7	24.00	23			
					20525	836.5	24.00	23.3			
					20643	848.3	24.00	23.3			
				5	20407	824.7	24.00	23			
					20525	836.5	24.00	23.1			
					20643	848.3	24.00	23.2			
			3	0	20407	824.7	24.00	22.8			
					20525	836.5	24.00	23.1			
					20643	848.3	24.00	23.2			
				1	20407	824.7	24.00	22.8			
					20525	836.5	24.00	23.2			
					20643	848.3	24.00	23.2			
				3	20407	824.7	24.00	22.8			
					20525	836.5	24.00	23.1			
					20643	848.3	24.00	23.2			
			6	0	20407	824.7	23.00	21.7			
					20525	836.5	23.00	22.1			
					20643	848.3	23.00	22.1			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 5	1.4MHz	16-QAM	1	0	20407	824.7	23.00	21.9
								20525	836.5	23.00	22.3
20643	848.3	23.00						22.4			
3	20407	824.7					23.00	22.2			
	20525	836.5					23.00	22.5			
	20643	848.3					23.00	22.4			
5	20407	824.7					23.00	22.1			
	20525	836.5					23.00	22.4			
	20643	848.3					23.00	22.4			
3	0	20407				824.7	23.00	21.8			
		20525				836.5	23.00	22.1			
		20643				848.3	23.00	22.1			
	1	20407				824.7	23.00	21.9			
		20525				836.5	23.00	22.1			
		20643				848.3	23.00	22.2			
	3	20407				824.7	23.00	21.8			
		20525				836.5	23.00	22.1			
		20643				848.3	23.00	22.2			
6	0	20407				824.7	22.00	20.8			
		20525				836.5	22.00	21.1			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band 5	3MHz	QPSK	1	0	20643	848.3	22.00	21.2				
					20415	825.5	24.00	22.9				
					20525	836.5	24.00	23.2				
								7	20635	847.5	24.00	23.2
				20415	825.5	24.00	23.4					
				20525	836.5	24.00	23.7					
							14	20635	847.5	24.00	23.8	
				20415	825.5	24.00		22.9				
				20525	836.5	24.00		23.2				
						8	0	20635	847.5	24.00	23.3	
			20415	825.5	23.00			21.8				
			20525	836.5	23.00			22				
							4	20635	847.5	23.00	22.1	
			20415	825.5	23.00			21.9				
			20525	836.5	23.00			22.2				
							7	20635	847.5	23.00	22.2	
			20415	825.5	23.00			21.8				
			20525	836.5	23.00			22.1				
						15	0	20635	847.5	23.00	22.1	
			20415	825.5	23.00			21.8				
			20525	836.5	23.00			22.1				
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band 5	3MHz	16-QAM	1	0	20415	825.5	23.00	21.8				
					20525	836.5	23.00	22.1				
					20635	847.5	23.00	22.1				
							7	20415	825.5	23.00	21.8	
				20525	836.5	23.00		22.2				
				20635	847.5	23.00		22				
							14	20415	825.5	23.00	21.8	
				20525	836.5	23.00		22.1				
				20635	847.5	23.00		22.2				
						8	0	20415	825.5	22.00	20.8	
			20525	836.5	22.00			21.1				
			20635	847.5	22.00			21.2				
							4	20415	825.5	22.00	20.9	
			20525	836.5	22.00			21.2				
			20635	847.5	22.00			21.2				
							7	20415	825.5	22.00	20.8	
			20525	836.5	22.00			21.1				
			20635	847.5	22.00			21.2				
						15	0	20415	825.5	22.00	20.8	
			20525	836.5	22.00			21.1				
			20635	847.5	22.00			21.2				

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 5	5MHz	QPSK	1	0	20425	826.5	24.00	23.1			
					20525	836.5	24.00	23.3			
					20625	846.5	24.00	23.3			
				12	20425	826.5	24.00	22.8			
					20525	836.5	24.00	23			
					20625	846.5	24.00	23			
				24	20425	826.5	24.00	23			
					20525	836.5	24.00	23.3			
					20625	846.5	24.00	23.3			
			12	0	20425	826.5	23.00	21.9			
					20525	836.5	23.00	22.1			
					20625	846.5	23.00	22.1			
					6	20425	826.5	23.00	21.9		
						20525	836.5	23.00	22.1		
						20625	846.5	23.00	22.2		
				13	20425	826.5	23.00	21.9			
					20525	836.5	23.00	22.1			
					20625	846.5	23.00	22.1			
				25	0	20425	826.5	23.00	21.9		
						20525	836.5	23.00	22.1		
						20625	846.5	23.00	22.1		
			LTE Band 5	5MHz	16-QAM	1	0	20425	826.5	23.00	22.3
								20525	836.5	23.00	22.4
								20625	846.5	23.00	22.4
12	20425	826.5					23.00	22.2			
	20525	836.5					23.00	22.6			
	20625	846.5					23.00	22.6			
24	20425	826.5					23.00	22.2			
	20525	836.5					23.00	22.5			
	20625	846.5					23.00	22.5			
12	0	20425				826.5	22.00	20.8			
		20525				836.5	22.00	21			
		20625				846.5	22.00	21.1			
		6				20425	826.5	22.00	20.9		
						20525	836.5	22.00	21		
						20625	846.5	22.00	21.1		
	13	20425				826.5	22.00	20.9			
		20525				836.5	22.00	21			
		20625				846.5	22.00	21.1			
	25	0				20425	826.5	22.00	21		
						20525	836.5	22.00	21.1		
						20625	846.5	22.00	21.2		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 5	10MHz	QPSK	1	0	20450	829	24.00	23.2			
					20525	836.5	24.00	23.2			
					20600	844	24.00	23.4			
				24	20450	829	24.00	23.1			
					20525	836.5	24.00	23.2			
					20600	844	24.00	23.2			
				49	20450	829	24.00	23.1			
					20525	836.5	24.00	23.2			
					20600	844	24.00	23.3			
			25	0	20450	829	23.00	22.1			
					20525	836.5	23.00	22.1			
					20600	844	23.00	22.1			
					12	20450	829	23.00	22		
						20525	836.5	23.00	22.1		
						20600	844	23.00	22.1		
				25	20450	829	23.00	22			
					20525	836.5	23.00	22.1			
					20600	844	23.00	22.2			
				50	0	20450	829	23.00	22.1		
						20525	836.5	23.00	22.1		
						20600	844	23.00	22.2		
			LTE Band 5	10MHz	16-QAM	1	0	20450	829	23.00	22.3
								20525	836.5	23.00	22.4
								20600	844	23.00	22.5
24	20450	829					23.00	22			
	20525	836.5					23.00	22			
	20600	844					23.00	22.1			
49	20450	829					23.00	22.2			
	20525	836.5					23.00	22.5			
	20600	844					23.00	22.4			
25	0	20450				829	22.00	21			
		20525				836.5	22.00	21.1			
		20600				844	22.00	21.1			
	12	20450				829	22.00	21			
		20525				836.5	22.00	21.1			
		20600				844	22.00	21.1			
	25	20450				829	22.00	21			
		20525				836.5	22.00	21			
		20600				844	22.00	21.1			
50	0	20450				829	22.00	20.9			
		20525				836.5	22.00	21.1			
		20600				844	22.00	21.1			

Conducted power measurements LTE Band 7

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 7	5MHz	QPSK	1	0	20775	2502.5	20.50	19.9	
					21100	2535	20.50	19.9	
					21425	2567.5	20.50	19.9	
				12	12	20775	2502.5	20.50	19.8
						21100	2535	20.50	19.8
						21425	2567.5	20.50	19.8
				24	24	20775	2502.5	20.50	20
						21100	2535	20.50	20
						21425	2567.5	20.50	19.9
			12	0	20775	2502.5	20.50	19.9	
					21100	2535	20.50	19.9	
					21425	2567.5	20.50	19.9	
				6	6	20775	2502.5	20.50	19.9
						21100	2535	20.50	19.9
						21425	2567.5	20.50	20
				13	13	20775	2502.5	20.50	20
						21100	2535	20.50	19.8
						21425	2567.5	20.50	19.9
			25	0	20775	2502.5	20.50	20	
					21100	2535	20.50	19.8	
					21425	2567.5	20.50	19.9	

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 7	5MHz	16-QAM	1	0	20775	2502.5	20.50	20.1	
					21100	2535	20.50	19.7	
					21425	2567.5	20.50	20.1	
				12	12	20775	2502.5	20.50	20.1
						21100	2535	20.50	19.8
						21425	2567.5	20.50	19.9
				24	24	20775	2502.5	20.50	20.2
						21100	2535	20.50	19.8
						21425	2567.5	20.50	20
			12	0	20775	2502.5	20.50	20	
					21100	2535	20.50	20	
					21425	2567.5	20.50	20	
				6	6	20775	2502.5	20.50	19.9
						21100	2535	20.50	20
						21425	2567.5	20.50	20
				13	13	20775	2502.5	20.50	20
						21100	2535	20.50	20
						21425	2567.5	20.50	20
			25	0	20775	2502.5	20.50	20.1	
					21100	2535	20.50	20.1	

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 7	10MHz	QPSK	1	0	21425	2567.5	20.50	20			
					20800	2505	20.50	19.9			
					21100	2535	20.50	20			
				21400	2565	20.50	19.8				
				24	20800	2505	20.50	19.9			
					21100	2535	20.50	19.9			
					21400	2565	20.50	19.9			
				49	20800	2505	20.50	20			
					21100	2535	20.50	19.9			
					21400	2565	20.50	19.9			
				25	0	20800	2505	20.50	20.1		
						21100	2535	20.50	19.8		
			21400			2565	20.50	19.9			
			12		20800	2505	20.50	20.1			
					21100	2535	20.50	19.8			
					21400	2565	20.50	20			
			25		20800	2505	20.50	20.1			
					21100	2535	20.50	19.9			
					21400	2565	20.50	20			
			50		0	20800	2505	20.50	20.1		
						21100	2535	20.50	19.8		
						21400	2565	20.50	20		
			LTE Band 7	10MHz	16-QAM	1	0	20800	2505	20.50	20.2
								21100	2535	20.50	20.1
21400	2565	20.50						20.2			
24	20800	2505					20.50	20.1			
	21100	2535					20.50	19.8			
	21400	2565					20.50	20			
49	20800	2505					20.50	20.2			
	21100	2535					20.50	19.9			
	21400	2565					20.50	20.1			
25	0	20800					2505	20.50	20.1		
		21100					2535	20.50	19.9		
		21400					2565	20.50	19.9		
	12	20800				2505	20.50	20.1			
		21100				2535	20.50	20			
		21400				2565	20.50	20.1			
	25	20800				2505	20.50	20.1			
		21100				2535	20.50	20.1			
		21400				2565	20.50	20.1			
	50	0				20800	2505	20.50	20		
						21100	2535	20.50	19.9		
						21400	2565	20.50	19.9		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 7	15MHz	QPSK	1	0	20825	2507.5	20.50	19.7	
					21100	2535	20.50	20	
					21375	2562.5	20.50	19.7	
				37	20825	2507.5	20.50	19.5	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.5	
				74	20825	2507.5	20.50	19.9	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.7	
			36	0	20825	2507.5	20.50	19.6	
					21100	2535	20.50	19.9	
					21375	2562.5	20.50	19.5	
					20825	2507.5	20.50	19.8	
					21100	2535	20.50	19.9	
					21375	2562.5	20.50	19.5	
				20	20825	2507.5	20.50	19.9	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.8	
					20825	2507.5	20.50	19.9	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.8	
			75	0	20825	2507.5	20.50	19.6	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.8	
LTE Band 7	15MHz	16-QAM	1	0	20825	2507.5	20.50	19.5	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.6	
				37	20825	2507.5	20.50	19.7	
					21100	2535	20.50	19.8	
					21375	2562.5	20.50	19.6	
				74	20825	2507.5	20.50	19.9	
					21100	2535	20.50	19.7	
					21375	2562.5	20.50	19.6	
				36	0	20825	2507.5	20.50	19.8
						21100	2535	20.50	20
						21375	2562.5	20.50	19.8
			20825			2507.5	20.50	19.9	
			21100			2535	20.50	20.1	
			21375			2562.5	20.50	19.8	
			20		20825	2507.5	20.50	19.9	
					21100	2535	20.50	20	
					21375	2562.5	20.50	19.9	
					20825	2507.5	20.50	19.9	
					21100	2535	20.50	20	
					21375	2562.5	20.50	19.9	
			75	0	20825	2507.5	20.50	19.9	
					21100	2535	20.50	20	
					21375	2562.5	20.50	19.8	

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 7	20MHz	QPSK	1	0	20850	2510	20.50	19.9			
					21100	2535	20.50	20			
					21350	2560	20.50	19.8			
				49	20850	2510	20.50	19.8			
					21100	2535	20.50	19.8			
					21350	2560	20.50	19.6			
				99	20850	2510	20.50	19.9			
					21100	2535	20.50	19.8			
					21350	2560	20.50	19.8			
			50	0	20850	2510	20.50	19.7			
					21100	2535	20.50	19.9			
					21350	2560	20.50	19.8			
					25	20850	2510	20.50	19.9		
						21100	2535	20.50	19.9		
						21350	2560	20.50	19.7		
				50	20850	2510	20.50	20			
					21100	2535	20.50	20			
					21350	2560	20.50	19.8			
				100	0	20850	2510	20.50	19.9		
						21100	2535	20.50	19.9		
						21350	2560	20.50	19.7		
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 7	20MHz	16-QAM	1	0	20850	2510	20.50	20.5
								21100	2535	20.50	20.5
21350	2560	20.50						20.5			
49	20850	2510					20.50	20.5			
	21100	2535					20.50	20.5			
	21350	2560					20.50	20.4			
99	20850	2510					20.50	20.3			
	21100	2535					20.50	20.5			
	21350	2560					20.50	20.3			
50	0	20850				2510	20.50	19.9			
		21100				2535	20.50	20			
		21350				2560	20.50	19.9			
		25				20850	2510	20.50	19.9		
						21100	2535	20.50	20		
						21350	2560	20.50	19.9		
	50	20850				2510	20.50	20.1			
		21100				2535	20.50	20.1			
		21350				2560	20.50	19.9			
	100	0				20850	2510	20.50	20		
						21100	2535	20.50	20.1		
						21350	2560	20.50	19.9		

Conducted power measurements LTE Band 12

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 12	1.4MHz	QPSK	1	0	23017	699.7	24.00	23	
					23095	707.5	24.00	23.1	
					23173	715.3	24.00	23.1	
				3	0	23017	699.7	24.00	23
						23095	707.5	24.00	23.3
						23173	715.3	24.00	23.1
				5	0	23017	699.7	24.00	23
						23095	707.5	24.00	23.2
						23173	715.3	24.00	22.9
			3	0	0	23017	699.7	24.00	22.9
						23095	707.5	24.00	23
						23173	715.3	24.00	22.9
					1	23017	699.7	24.00	22.9
						23095	707.5	24.00	23.1
						23173	715.3	24.00	23
					3	23017	699.7	24.00	22.8
						23095	707.5	24.00	23
						23173	715.3	24.00	22.9
6	0	23017	699.7	23.00	21.8				
		23095	707.5	23.00	21.9				
		23173	715.3	23.00	21.9				
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 12	1.4MHz	16-QAM	1	0	23017	699.7	23.00	22.1	
					23095	707.5	23.00	22.3	
					23173	715.3	23.00	22.1	
				3	0	23017	699.7	23.00	21.9
						23095	707.5	23.00	22.3
						23173	715.3	23.00	22
				5	0	23017	699.7	23.00	22.2
						23095	707.5	23.00	22.4
						23173	715.3	23.00	22.1
			3	0	0	23017	699.7	23.00	21.8
						23095	707.5	23.00	21.9
						23173	715.3	23.00	21.9
					1	23017	699.7	23.00	21.8
						23095	707.5	23.00	21.9
						23173	715.3	23.00	22
					3	23017	699.7	23.00	21.8
						23095	707.5	23.00	21.9
						23173	715.3	23.00	21.9
6	0	23017	699.7	22.00	20.8				
		23095	707.5	22.00	21				

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 12	3MHz	QPSK	1	0	23173	715.3	22.00	21			
					23025	700.5	24.00	22.9			
					23095	707.5	24.00	23			
								23165	714.5	24.00	23
							7	23025	700.5	24.00	23.7
								23095	707.5	24.00	23.8
								23165	714.5	24.00	23.8
							14	23025	700.5	24.00	22.8
								23095	707.5	24.00	23.1
						23165		714.5	24.00	23.1	
						8	0	23025	700.5	23.00	21.8
								23095	707.5	23.00	21.9
								23165	714.5	23.00	22
							4	23025	700.5	23.00	21.9
								23095	707.5	23.00	22
								23165	714.5	23.00	22.1
							7	23025	700.5	23.00	21.8
								23095	707.5	23.00	22
								23165	714.5	23.00	22
						15	0	23025	700.5	23.00	21.8
								23095	707.5	23.00	21.9
			23165	714.5	23.00			22			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 12	3MHz	16-QAM	1	0	23025	700.5	23.00	21.7			
					23095	707.5	23.00	21.8			
					23165	714.5	23.00	21.9			
							7	23025	700.5	23.00	21.8
								23095	707.5	23.00	21.9
								23165	714.5	23.00	21.8
							14	23025	700.5	23.00	21.8
								23095	707.5	23.00	22.1
								23165	714.5	23.00	22
						8	0	23025	700.5	22.00	20.9
								23095	707.5	22.00	21
								23165	714.5	22.00	21
							4	23025	700.5	22.00	20.9
								23095	707.5	22.00	21
								23165	714.5	22.00	21.1
							7	23025	700.5	22.00	20.9
								23095	707.5	22.00	21
								23165	714.5	22.00	21.1
						15	0	23025	700.5	22.00	20.8
								23095	707.5	22.00	20.9
								23165	714.5	22.00	21

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)					
LTE Band 12	5MHz	QPSK	1	0	23035	701.5	24.00	23.1					
					23095	707.5	24.00	23					
					23155	713.5	24.00	23.1					
				12	24	23035	701.5	24.00	22.9				
						23095	707.5	24.00	23.1				
						23155	713.5	24.00	23				
				12	0	6	23035	701.5	23.00	22.1			
							23095	707.5	23.00	22			
							23155	713.5	23.00	22			
			13		0	23035	701.5	23.00	22				
						23095	707.5	23.00	22				
						23155	713.5	23.00	21.9				
			25		0	23035	701.5	23.00	22				
						23095	707.5	23.00	21.9				
						23155	713.5	23.00	22				
			LTE Band 12	5MHz	16-QAM	1	0	23035	701.5	23.00	22.1		
								23095	707.5	23.00	22.1		
								23155	713.5	23.00	22.1		
							12	24	23035	701.5	23.00	22.2	
									23095	707.5	23.00	22.7	
									23155	713.5	23.00	22.2	
							12	0	6	23035	701.5	22.00	21.1
										23095	707.5	22.00	20.8
										23155	713.5	22.00	21.1
13	0	23035				701.5		22.00	21.1				
		23095				707.5		22.00	21				
		23155				713.5		22.00	21.1				
25	0	23035				701.5		22.00	21.1				
		23095				707.5		22.00	21				
		23155				713.5		22.00	21				

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 12	10MHz	QPSK	1	0	23060	704	24.00	23.1			
					23095	707.5	24.00	23			
					23130	711	24.00	23.2			
				24	23060	704	24.00	23			
					23095	707.5	24.00	23			
					23130	711	24.00	23			
				49	23060	704	24.00	23.2			
					23095	707.5	24.00	23.1			
					23130	711	24.00	23			
			25	0	23060	704	23.00	22			
					23095	707.5	23.00	22			
					23130	711	23.00	22			
					12	23060	704	23.00	21.9		
						23095	707.5	23.00	22		
						23130	711	23.00	21.9		
				25	23060	704	23.00	22			
					23095	707.5	23.00	21.9			
					23130	711	23.00	21.9			
				50	0	23060	704	23.00	22		
						23095	707.5	23.00	22		
						23130	711	23.00	22		
			LTE Band 12	10MHz	16-QAM	1	0	23060	704	23.00	22.1
								23095	707.5	23.00	22.2
								23130	711	23.00	22.2
24	23060	704					23.00	21.9			
	23095	707.5					23.00	21.8			
	23130	711					23.00	22.1			
49	23060	704					23.00	22.2			
	23095	707.5					23.00	22.1			
	23130	711					23.00	22.1			
25	0	23060				704	22.00	20.9			
		23095				707.5	22.00	20.9			
		23130				711	22.00	21			
		12				23060	704	22.00	21		
						23095	707.5	22.00	20.9		
						23130	711	22.00	21		
	25	23060				704	22.00	20.9			
		23095				707.5	22.00	21			
		23130				711	22.00	20.9			
	50	0				23060	704	22.00	20.9		
						23095	707.5	22.00	20.9		
						23130	711	22.00	21		

Conducted power measurements LTE Band 17

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 17	5MHz	QPSK	1	0	23755	706.5	24.00	23.2			
					23790	710	24.00	23.1			
					23825	713.5	24.00	23.2			
				12	12	23755	706.5	24.00	22.9		
						23790	710	24.00	22.8		
						23825	713.5	24.00	23		
				24	24	23755	706.5	24.00	23.2		
						23790	710	24.00	22.9		
						23825	713.5	24.00	22.3		
			12	0	23755	706.5	23.00	22			
					23790	710	23.00	21.8			
					23825	713.5	23.00	22			
					6	23755	706.5	23.00	22		
						23790	710	23.00	21.9		
						23825	713.5	23.00	22.1		
				13	23755	706.5	23.00	22			
					23790	710	23.00	21.8			
					23825	713.5	23.00	21.6			
				25	0	23755	706.5	23.00	22		
						23790	710	23.00	21.9		
						23825	713.5	23.00	22.1		
			LTE Band 17	5MHz	16-QAM	1	0	23755	706.5	23.00	22.2
								23790	710	23.00	22.2
								23825	713.5	23.00	22.2
12	12	23755					706.5	23.00	22.7		
		23790					710	23.00	22.2		
		23825					713.5	23.00	22		
24	24	23755					706.5	23.00	22.7		
		23790					710	23.00	22		
		23825					713.5	23.00	21.3		
12	0	23755				706.5	22.00	20.9			
		23790				710	22.00	20.8			
		23825				713.5	22.00	21			
		6				23755	706.5	22.00	20.9		
						23790	710	22.00	20.9		
						23825	713.5	22.00	21.1		
	13	23755				706.5	22.00	20.9			
		23790				710	22.00	20.9			
		23825				713.5	22.00	20.6			
	25	0				23755	706.5	22.00	21.1		
						23790	710	22.00	21		
						23825	713.5	22.00	21.1		

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 17	10MHz	QPSK	1	0	23780	709	24.00	23.2			
					23790	710	24.00	23.1			
					23800	711	24.00	23.3			
				24	23780	709	24.00	23			
					23790	710	24.00	22.9			
					23800	711	24.00	23.1			
				49	23780	709	24.00	22.9			
					23790	710	24.00	22.5			
					23800	711	24.00	22.1			
			25	0	23780	709	23.00	21.9			
					23790	710	23.00	21.9			
					23800	711	23.00	22			
					12	23780	709	23.00	21.9		
						23790	710	23.00	21.9		
						23800	711	23.00	22		
				25	23780	709	23.00	21.9			
					23790	710	23.00	21.9			
					23800	711	23.00	22			
				50	0	23780	709	23.00	22		
						23790	710	23.00	22		
						23800	711	23.00	22		
			LTE Band 17	10MHz	16-QAM	1	0	23780	709	23.00	22.2
								23790	710	23.00	22.2
								23800	711	23.00	22.4
24	23780	709					23.00	22			
	23790	710					23.00	22			
	23800	711					23.00	22			
49	23780	709					23.00	21.8			
	23790	710					23.00	21.3			
	23800	711					23.00	21			
25	0	23780				709	22.00	20.9			
		23790				710	22.00	20.9			
		23800				711	22.00	21			
		12				23780	709	22.00	20.9		
						23790	710	22.00	20.9		
						23800	711	22.00	21		
	25	23780				709	22.00	20.9			
		23790				710	22.00	20.8			
		23800				711	22.00	20.9			
	50	0				23780	709	22.00	20.9		
						23790	710	22.00	20.9		
						23800	711	22.00	21		

Conducted power measurements LTE Band 41

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 41	5MHz	QPSK	1	0	39675	2498.5	20.50	19.6
					40148	2545.75	20.50	19.6
					40620	2593	20.50	19.7
					41093	2640.25	20.50	19.7
					41565	2687.5	20.50	19.5
				12	39675	2498.5	20.50	19.4
					40148	2545.75	20.50	19.1
					40620	2593	20.50	19.1
					41093	2640.25	20.50	19.3
					41565	2687.5	20.50	19.2
			24	39675	2498.5	20.50	19.7	
				40148	2545.75	20.50	19.6	
				40620	2593	20.50	19.6	
				41093	2640.25	20.50	19.4	
				41565	2687.5	20.50	19.6	
			12	0	39675	2498.5	20.50	19.7
					40148	2545.75	20.50	19.6
					40620	2593	20.50	19.6
					41093	2640.25	20.50	19.7
					41565	2687.5	20.50	19.8
7	39675	2498.5		20.50	19.8			
	40148	2545.75		20.50	19.7			
	40620	2593		20.50	19.6			
	41093	2640.25		20.50	19.7			
	41565	2687.5		20.50	19.8			
13	39675	2498.5	20.50	19.7				
	40148	2545.75	20.50	19.6				
	40620	2593	20.50	19.6				
	41093	2640.25	20.50	19.5				
	41565	2687.5	20.50	19.7				
25	0	39675	2498.5	20.50	19.6			
		40148	2545.75	20.50	19.5			
		40620	2593	20.50	19.5			
		41093	2640.25	20.50	19.6			
		41565	2687.5	20.50	19.8			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)

LTE Band 41	5MHz	16-QAM	1	0	39675	2498.5	20.50	19.9
					40148	2545.75	20.50	19.8
					40620	2593	20.50	19.9
					41093	2640.25	20.50	20
					41565	2687.5	20.50	20
				12	39675	2498.5	20.50	19.8
					40148	2545.75	20.50	19.5
					40620	2593	20.50	19.6
					41093	2640.25	20.50	19.8
					41565	2687.5	20.50	20
				24	39675	2498.5	20.50	20.1
					40148	2545.75	20.50	20
					40620	2593	20.50	20
					41093	2640.25	20.50	19.9
					41565	2687.5	20.50	20
			12	0	39675	2498.5	20.50	19.7
					40148	2545.75	20.50	19.8
					40620	2593	20.50	19.9
					41093	2640.25	20.50	19.9
					41565	2687.5	20.50	19.9
				7	39675	2498.5	20.50	19.8
					40148	2545.75	20.50	19.9
					40620	2593	20.50	19.8
					41093	2640.25	20.50	19.9
					41565	2687.5	20.50	19.9
				13	39675	2498.5	20.50	19.8
					40148	2545.75	20.50	19.8
					40620	2593	20.50	19.8
					41093	2640.25	20.50	19.8
					41565	2687.5	20.50	19.8
			25	0	39675	2498.5	20.50	19.7
					40148	2545.75	20.50	19.7
					40620	2593	20.50	19.7
					41093	2640.25	20.50	19.8
					41565	2687.5	20.50	19.8
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number
LTE Band 41	10MHz	QPSK	1	0	39700	2501	20.50	20.2
					40160	2547	20.50	20
					40620	2593	20.50	19.8
					41080	2639	20.50	20
					41540	2685	20.50	19.9

			24		39700	2501	20.50	20.1	
					40160	2547	20.50	19.9	
					40620	2593	20.50	19.7	
					41080	2639	20.50	20.1	
					41540	2685	20.50	20.2	
				49		39700	2501	20.50	20.2
						40160	2547	20.50	19.8
						40620	2593	20.50	20
						41080	2639	20.50	19.8
						41540	2685	20.50	20.1
			25	0		39700	2501	20.50	19.6
						40160	2547	20.50	19.5
						40620	2593	20.50	19.5
						41080	2639	20.50	19.6
						41540	2685	20.50	19.8
				12		39700	2501	20.50	19.8
						40160	2547	20.50	19.6
						40620	2593	20.50	19.5
						41080	2639	20.50	19.6
						41540	2685	20.50	19.8
				25		39700	2501	20.50	19.7
						40160	2547	20.50	19.7
						40620	2593	20.50	19.5
						41080	2639	20.50	19.4
						41540	2685	20.50	19.8
50	0		39700	2501	20.50	19.7			
			40160	2547	20.50	19.5			
			40620	2593	20.50	19.5			
			41080	2639	20.50	19.5			
			41540	2685	20.50	19.8			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 41	10MHz	16-QAM	1	0		39700	2501	20.50	20.2
						40160	2547	20.50	20.3
						40620	2593	20.50	20.4
						41080	2639	20.50	20
						41540	2685	20.50	20.4
				24		39700	2501	20.50	19.9
						40160	2547	20.50	20
						40620	2593	20.50	20.2
						41080	2639	20.50	19.8
						41540	2685	20.50	20.1

			25	49	39700	2501	20.50	20.4
					40160	2547	20.50	20.3
					40620	2593	20.50	20.5
					41080	2639	20.50	19.8
					41540	2685	20.50	20.3
				0	39700	2501	20.50	19.7
					40160	2547	20.50	19.7
					40620	2593	20.50	19.7
					41080	2639	20.50	19.7
					41540	2685	20.50	20
			50	12	39700	2501	20.50	19.8
					40160	2547	20.50	19.8
					40620	2593	20.50	19.7
					41080	2639	20.50	19.7
					41540	2685	20.50	19.9
				25	39700	2501	20.50	19.9
					40160	2547	20.50	19.8
					40620	2593	20.50	19.7
					41080	2639	20.50	19.6
					41540	2685	20.50	19.9
0	39700	2501	20.50	19.9				
	40160	2547	20.50	19.7				
	40620	2593	20.50	19.6				
	41080	2639	20.50	19.7				
	41540	2685	20.50	19.9				
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 41	15MHz	QPSK	1	0	39725	2503.5	20.50	19.7
					40173	2548.25	20.50	19.8
					40620	2593	20.50	19.9
					41068	2637.75	20.50	19.7
					41515	2682.5	20.50	19.7
				37	39725	2503.5	20.50	18.7
					40173	2548.25	20.50	19.3
					40620	2593	20.50	19.6
					41068	2637.75	20.50	20
					41515	2682.5	20.50	20.1
				74	39725	2503.5	20.50	20
					40173	2548.25	20.50	19.7
					40620	2593	20.50	19.8
					41068	2637.75	20.50	19.7
					41515	2682.5	20.50	19.9

			36	0	39725	2503.5	20.50	19.6
					40173	2548.25	20.50	19.4
					40620	2593	20.50	19.6
					41068	2637.75	20.50	19.8
					41515	2682.5	20.50	19.9
				20	39725	2503.5	20.50	19.7
					40173	2548.25	20.50	19.5
					40620	2593	20.50	19.5
					41068	2637.75	20.50	19.9
					41515	2682.5	20.50	20
			39	39725	2503.5	20.50	19.7	
				40173	2548.25	20.50	19.5	
				40620	2593	20.50	19.9	
				41068	2637.75	20.50	19.7	
				41515	2682.5	20.50	20	
			75	0	39725	2503.5	20.50	19.7
					40173	2548.25	20.50	19.5
					40620	2593	20.50	19.6
					41068	2637.75	20.50	19.8
					41515	2682.5	20.50	20
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 41	15MHz	16-QAM	1	0	39725	2503.5	20.50	19.9
					40173	2548.25	20.50	19.8
					40620	2593	20.50	20
					41068	2637.75	20.50	19.9
					41515	2682.5	20.50	20.1
				37	39725	2503.5	20.50	19.7
					40173	2548.25	20.50	19.6
					40620	2593	20.50	19.9
					41068	2637.75	20.50	19.9
					41515	2682.5	20.50	20.2
			74	39725	2503.5	20.50	19.9	
				40173	2548.25	20.50	19.7	
				40620	2593	20.50	19.9	
				41068	2637.75	20.50	20	
				41515	2682.5	20.50	20.2	
			36	0	39725	2503.5	20.50	19.6
					40173	2548.25	20.50	19.6
					40620	2593	20.50	19.8
					41068	2637.75	20.50	20
					41515	2682.5	20.50	20

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
				20	39725	2503.5	20.50	19.8			
					40173	2548.25	20.50	19.7			
					40620	2593	20.50	19.8			
					41068	2637.75	20.50	20.2			
					41515	2682.5	20.50	20.3			
				39	39725	2503.5	20.50	19.8			
					40173	2548.25	20.50	19.7			
					40620	2593	20.50	19.8			
					41068	2637.75	20.50	19.9			
					41515	2682.5	20.50	20.1			
			75	0	39725	2503.5	20.50	19.8			
					40173	2548.25	20.50	19.7			
					40620	2593	20.50	19.8			
					41068	2637.75	20.50	20			
					41515	2682.5	20.50	20.2			
			LTE Band 41	20MHz	QPSK	1	0	39750	2506	20.50	19.7
								40185	2549.5	20.50	19.8
								40620	2593	20.50	20
								41055	2636.5	20.50	19.7
								41490	2680	20.50	19.7
50	39750	2506					20.50	19.7			
	40185	2549.5					20.50	19.5			
	40620	2593					20.50	19.6			
	41055	2636.5					20.50	20			
	41490	2680					20.50	20.2			
99	39750	2506				20.50	19.8				
	40185	2549.5				20.50	19.7				
	40620	2593				20.50	19.7				
	41055	2636.5				20.50	19.7				
	41490	2680				20.50	19.9				
50	0	39750				2506	20.50	19.7			
		40185				2549.5	20.50	19.5			
		40620				2593	20.50	19.7			
		41055				2636.5	20.50	19.9			
		41490				2680	20.50	19.9			
	25	39750	2506	20.50	19.7						
		40185	2549.5	20.50	19.4						
		40620	2593	20.50	19.6						
		41055	2636.5	20.50	20						
		41490	2680	20.50	20.1						

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 41	20MHz	16-QAM	1	50	39750	2506	20.50	19.8
					40185	2549.5	20.50	19.5
					40620	2593	20.50	20
					41055	2636.5	20.50	19.7
					41490	2680	20.50	20
				0	39750	2506	20.50	19.7
					40185	2549.5	20.50	19.5
					40620	2593	20.50	19.6
					41055	2636.5	20.50	19.8
					41490	2680	20.50	20
			50	0	39750	2506	20.50	20.3
					40185	2549.5	20.50	20.2
					40620	2593	20.50	20.5
					41055	2636.5	20.50	20.3
					41490	2680	20.50	20.5
				50	39750	2506	20.50	20.3
					40185	2549.5	20.50	20
					40620	2593	20.50	20.3
					41055	2636.5	20.50	20.5
					41490	2680	20.50	20.5
50	99	39750	2506	20.50	20.2			
		40185	2549.5	20.50	20.3			
		40620	2593	20.50	20.3			
		41055	2636.5	20.50	20.3			
		41490	2680	20.50	20.5			
	0	39750	2506	20.50	19.6			
		40185	2549.5	20.50	19.6			
		40620	2593	20.50	19.8			
		41055	2636.5	20.50	20			
		41490	2680	20.50	19.9			
50	25	39750	2506	20.50	19.6			
		40185	2549.5	20.50	19.6			
		40620	2593	20.50	19.8			
		41055	2636.5	20.50	20.1			
		41490	2680	20.50	20.2			
	50	39750	2506	20.50	19.8			
		40185	2549.5	20.50	19.6			
		40620	2593	20.50	19.8			
		41055	2636.5	20.50	19.8			
		41490	2680	20.50	20.1			

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			100	0	39750	2506	20.50	19.8
					40185	2549.5	20.50	19.6
					40620	2593	20.50	19.9
					41055	2636.5	20.50	20
					41490	2680	20.50	20.1

4.3.3.2 Hotspot Mode Enabled

Conductive average power measurement: LTE Band 2

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	1.4MHz	QPSK	1	0	18607	1850.7	19.00	18.4			
					18900	1880	19.00	18.4			
					19193	1909.3	19.00	18.4			
				3	18607	1850.7	19.00	18.5			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.4			
				5	18607	1850.7	19.00	18.4			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.5			
			3	0	18607	1850.7	19.00	18.4			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.4			
				1	18607	1850.7	19.00	18.4			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.5			
				3	18607	1850.7	19.00	18.3			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.4			
			6	0	18607	1850.7	19.00	18.4			
					18900	1880	19.00	18.3			
					19193	1909.3	19.00	18.4			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	1.4MHz	16-QAM	1	0	18607	1850.7	19.00	18.6
								18900	1880	19.00	18.6
19193	1909.3	19.00						18.7			
3	18607	1850.7					19.00	18.7			
	18900	1880					19.00	18.6			
	19193	1909.3					19.00	18.7			
5	18607	1850.7					19.00	18.6			
	18900	1880					19.00	18.5			
	19193	1909.3					19.00	18.7			
3	0	18607				1850.7	19.00	18.6			
		18900				1880	19.00	18.5			
		19193				1909.3	19.00	18.6			
	1	18607				1850.7	19.00	18.6			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 2	3MHz	QPSK	1	0	18615	1851.5	19.00	18.4
					18900	1880	19.00	18.3
					19185	1908.5	19.00	18.4
				7	18615	1851.5	19.00	18.6
					18900	1880	19.00	18.7
					19185	1908.5	19.00	18.6
			14	18615	1851.5	19.00	18.3	
				18900	1880	19.00	18.4	
				19185	1908.5	19.00	18.4	
			8	0	18615	1851.5	19.00	18.3
					18900	1880	19.00	18.3
					19185	1908.5	19.00	18.4
				4	18615	1851.5	19.00	18.3
					18900	1880	19.00	18.4
					19185	1908.5	19.00	18.5
7	18615	1851.5	19.00	18.3				
	18900	1880	19.00	18.4				
	19185	1908.5	19.00	18.5				
15	0	18615	1851.5	19.00	18.4			
		18900	1880	19.00	18.4			
		19185	1908.5	19.00	18.4			
LTE Band 2	3MHz	16-QAM	1	0	18615	1851.5	19.00	18.4
					18900	1880	19.00	18.5
					19185	1908.5	19.00	18.5
				7	18615	1851.5	19.00	18.6
					18900	1880	19.00	18.5
					19185	1908.5	19.00	18.6
				14	18615	1851.5	19.00	18.6
					18900	1880	19.00	18.6
					19185	1908.5	19.00	18.6
			8	0	18615	1851.5	19.00	18.4

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
				4	18900	1880	19.00	18.4			
					19185	1908.5	19.00	18.5			
					18615	1851.5	19.00	18.4			
				7	18900	1880	19.00	18.4			
					19185	1908.5	19.00	18.5			
					18615	1851.5	19.00	18.4			
			15	0	18900	1880	19.00	18.4			
					19185	1908.5	19.00	18.5			
					18615	1851.5	19.00	18.4			
			LTE Band 2	5MHz	QPSK	1	0	18625	1852.5	19.00	18.4
								18900	1880	19.00	18.4
								19175	1907.5	19.00	18.4
12	18625	1852.5					19.00	18.1			
	18900	1880					19.00	18.4			
	19175	1907.5					19.00	18.4			
24	18625	1852.5					19.00	18.4			
	18900	1880					19.00	18.4			
	19175	1907.5					19.00	18.5			
12	0	18625					1852.5	19.00	18.3		
		18900					1880	19.00	18.3		
		19175					1907.5	19.00	18.4		
	6	18625				1852.5	19.00	18.4			
		18900				1880	19.00	18.4			
		19175				1907.5	19.00	18.5			
	13	18625				1852.5	19.00	18.3			
		18900				1880	19.00	18.3			
		19175				1907.5	19.00	18.4			
25	0	18625				1852.5	19.00	18.3			
		18900				1880	19.00	18.4			
		19175				1907.5	19.00	18.4			
LTE Band 2	5MHz	16-QAM				1	0	18625	1852.5	19.00	18.6
								18900	1880	19.00	18.6
								19175	1907.5	19.00	18.7
			12	18625	1852.5		19.00	18.6			
				18900	1880		19.00	18.5			
				19175	1907.5		19.00	18.6			

				24	18625	1852.5	19.00	18.5				
					18900	1880	19.00	18.6				
					19175	1907.5	19.00	18.6				
			12	0	18625	1852.5	19.00	18.3				
					18900	1880	19.00	18.4				
					19175	1907.5	19.00	18.4				
				6	18625	1852.5	19.00	18.3				
					18900	1880	19.00	18.4				
					19175	1907.5	19.00	18.4				
				13	18625	1852.5	19.00	18.3				
					18900	1880	19.00	18.3				
					19175	1907.5	19.00	18.5				
			25	0	18625	1852.5	19.00	18.2				
					18900	1880	19.00	18.3				
					19175	1907.5	19.00	18.3				
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band 2	10MHz	QPSK	1	0	18650	1855	19.00	18.5				
					18900	1880	19.00	18.4				
					19150	1905	19.00	18.5				
							24		18650	1855	19.00	18.5
						18900			1880	19.00	18.5	
						19150			1905	19.00	18.4	
							49		18650	1855	19.00	18.6
						18900			1880	19.00	18.4	
						19150			1905	19.00	18.4	
						25	0	18650	1855	19.00	18.5	
									18900	1880	19.00	18.4
									19150	1905	19.00	18.3
								6	18650	1855	19.00	18.5
									18900	1880	19.00	18.4
									19150	1905	19.00	18.3
								13	18650	1855	19.00	18.5
									18900	1880	19.00	18.4
									19150	1905	19.00	18.3
						50	0	18650	1855	19.00	18.5	
									18900	1880	19.00	18.4
									19150	1905	19.00	18.3
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)				
LTE Band	10MHz	16-QAM	1	0	18650	1855	19.00	18.8				
					18900	1880	19.00	18.8				

2						19150	1905	19.00	18.6					
						24	18650	1855	19.00	18.7				
							18900	1880	19.00	18.6				
							19150	1905	19.00	18.5				
						49	18650	1855	19.00	18.8				
							18900	1880	19.00	18.7				
							19150	1905	19.00	18.7				
						25	0	18650	1855	19.00	18.4			
								18900	1880	19.00	18.3			
								19150	1905	19.00	18.3			
							6	18650	1855	19.00	18.4			
								18900	1880	19.00	18.3			
								19150	1905	19.00	18.3			
							13	18650	1855	19.00	18.4			
								18900	1880	19.00	18.4			
								19150	1905	19.00	18.3			
						50	0	18650	1855	19.00	18.4			
								18900	1880	19.00	18.4			
								19150	1905	19.00	18.3			
						Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
						LTE Band 2	15MHz	QPSK	1	0	18675	1857.5	19.00	18.2
											18900	1880	19.00	18.4
											19125	1902.5	19.00	18.3
										37	18675	1857.5	19.00	17.9
18900	1880	19.00	18.3											
19125	1902.5	19.00	18											
74	18675	1857.5	19.00	18										
	18900	1880	19.00	18.4										
	19125	1902.5	19.00	18.2										
36	0	18675	1857.5	19.00	18.1									
		18900	1880	19.00	18.4									
		19125	1902.5	19.00	18.1									
	20	18675	1857.5	19.00	18									
		18900	1880	19.00	18.4									
		19125	1902.5	19.00	18.1									
	39	18675	1857.5	19.00	18									
		18900	1880	19.00	18.4									
		19125	1902.5	19.00	18.1									
75	0	18675	1857.5	19.00	18									
		18900	1880	19.00	18.4									
		19125	1902.5	19.00	18.1									

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 2	15MHz	16-QAM	1	0	18675	1857.5	19.00	18.3			
					18900	1880	19.00	18.6			
					19125	1902.5	19.00	18.4			
				37	18675	1857.5	19.00	18			
					18900	1880	19.00	18.6			
					19125	1902.5	19.00	18.2			
				74	18675	1857.5	19.00	18.2			
					18900	1880	19.00	18.6			
					19125	1902.5	19.00	18.3			
			36	0	18675	1857.5	19.00	18.1			
					18900	1880	19.00	18.4			
					19125	1902.5	19.00	18.1			
				20	18675	1857.5	19.00	18			
					18900	1880	19.00	18.3			
					19125	1902.5	19.00	18.1			
				39	18675	1857.5	19.00	18			
					18900	1880	19.00	18.4			
					19125	1902.5	19.00	18.1			
			75	0	18675	1857.5	19.00	18.1			
					18900	1880	19.00	18.4			
					19125	1902.5	19.00	18.2			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 2	20MHz	QPSK	1	0	18700	1860	19.00	18.3
								18900	1880	19.00	18.4
19100	1900	19.00						18.5			
49	18700	1860					19.00	17.8			
	18900	1880					19.00	18.4			
	19100	1900					19.00	18.1			
99	18700	1860					19.00	18			
	18900	1880					19.00	18.4			
	19100	1900					19.00	18.2			
50	0	18700				1860	19.00	18.1			
		18900				1880	19.00	18.4			
		19100				1900	19.00	18.4			
	25	18700				1860	19.00	18			
		18900				1880	19.00	18.4			
		19100				1900	19.00	18.2			
	50	18700				1860	19.00	18.1			
		18900				1880	19.00	18.5			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)	
LTE Band 2	20MHz	16-QAM	100	0	19100	1900	19.00	18.3	
					18700	1860	19.00	18.1	
					18900	1880	19.00	18.5	
					19100	1900	19.00	18.3	
			1	0	18700	1860	19.00	18.4	
					18900	1880	19.00	18.6	
					19100	1900	19.00	18.7	
				49	18700	1860	19.00	18.1	
					18900	1880	19.00	18.6	
					19100	1900	19.00	18.4	
				99	18700	1860	19.00	18.2	
					18900	1880	19.00	18.6	
					19100	1900	19.00	18.6	
				50	0	18700	1860	19.00	18
						18900	1880	19.00	18.4
						19100	1900	19.00	18.3
			25		18700	1860	19.00	18	
					18900	1880	19.00	18.4	
					19100	1900	19.00	18.3	
			50		18700	1860	19.00	18	
					18900	1880	19.00	18.4	
					19100	1900	19.00	18.3	
			100	0	18700	1860	19.00	18.1	
					18900	1880	19.00	18.4	
19100	1900	19.00			18.3				

Conductive average power measurement: LTE Band 4

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)			
LTE Band 4	1.4MHz	QPSK	1	0	19957	1710.7	21.00	20.2			
					20175	1732.5	21.00	20.5			
					20393	1754.3	21.00	19.9			
				3	19957	1710.7	21.00	20.2			
					20175	1732.5	21.00	20.5			
					20393	1754.3	21.00	19.9			
				5	19957	1710.7	21.00	20			
					20175	1732.5	21.00	20.3			
					20393	1754.3	21.00	19.8			
			3	0	19957	1710.7	21.00	20.1			
					20175	1732.5	21.00	20.4			
					20393	1754.3	21.00	19.9			
				1	19957	1710.7	21.00	20.1			
					20175	1732.5	21.00	20.5			
					20393	1754.3	21.00	19.9			
				3	19957	1710.7	21.00	20.1			
					20175	1732.5	21.00	20.4			
					20393	1754.3	21.00	19.9			
			6	0	19957	1710.7	21.00	20			
					20175	1732.5	21.00	20.3			
					20393	1754.3	21.00	19.8			
			LTE Band 4	1.4MHz	16-QAM	1	0	19957	1710.7	21.00	20.4
								20175	1732.5	21.00	20.6
								20393	1754.3	21.00	20.2
3	19957	1710.7					21.00	20.4			
	20175	1732.5					21.00	20.6			
	20393	1754.3					21.00	20			
5	19957	1710.7					21.00	20.2			
	20175	1732.5					21.00	20.6			
	20393	1754.3					21.00	20.1			
3	0	19957				1710.7	21.00	20.2			
		20175				1732.5	21.00	20.5			
		20393				1754.3	21.00	19.8			
	1	19957				1710.7	21.00	20.3			
		20175				1732.5	21.00	20.5			
		20393				1754.3	21.00	20			
	3	19957				1710.7	21.00	20.2			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
					20175	1732.5	21.00	20.5
					20393	1754.3	21.00	19.9
			6	0	19957	1710.7	21.00	20.2
					20175	1732.5	21.00	20.4
					20393	1754.3	21.00	19.9
					19965	1711.5	21.00	20.5
					20175	1732.5	21.00	20.3
					20385	1753.5	21.00	19.8
			1	7	19965	1711.5	21.00	20.7
					20175	1732.5	21.00	20.5
					20385	1753.5	21.00	20
				14	19965	1711.5	21.00	20.5
					20175	1732.5	21.00	20.4
					20385	1753.5	21.00	19.8
				0	19965	1711.5	21.00	20.5
					20175	1732.5	21.00	20.3
					20385	1753.5	21.00	19.8
			8	4	19965	1711.5	21.00	20.6
					20175	1732.5	21.00	20.4
					20385	1753.5	21.00	19.9
				7	19965	1711.5	21.00	20.6
					20175	1732.5	21.00	20.4
					20385	1753.5	21.00	19.8
			15	0	19965	1711.5	21.00	20.5
					20175	1732.5	21.00	20.4
					20385	1753.5	21.00	19.8
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
					19965	1711.5	21.00	20.6
					20175	1732.5	21.00	20.5
					20385	1753.5	21.00	20
			1	7	19965	1711.5	21.00	20.8
					20175	1732.5	21.00	20.6
					20385	1753.5	21.00	20
				14	19965	1711.5	21.00	20.8
					20175	1732.5	21.00	20.7
					20385	1753.5	21.00	20.1
			8	0	19965	1711.5	21.00	20.6
					20175	1732.5	21.00	20.4
					20385	1753.5	21.00	19.9

				4	19965	1711.5	21.00	20.7
				4	20175	1732.5	21.00	20.5
				4	20385	1753.5	21.00	19.9
				7	19965	1711.5	21.00	20.7
				7	20175	1732.5	21.00	20.5
				7	20385	1753.5	21.00	19.9
			15	0	19965	1711.5	21.00	20.6
			15	0	20175	1732.5	21.00	20.4
			15	0	20385	1753.5	21.00	19.9
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	5MHz	QPSK	1	0	19975	1712.5	21.00	20.6
					20175	1732.5	21.00	20.5
					20375	1752.5	21.00	20.4
				12	19975	1712.5	21.00	20.5
					20175	1732.5	21.00	20.2
					20375	1752.5	21.00	20.2
			24	19975	1712.5	21.00	20.6	
				20175	1732.5	21.00	20.5	
				20375	1752.5	21.00	20.5	
			12	0	19975	1712.5	21.00	20.5
					20175	1732.5	21.00	20.4
					20375	1752.5	21.00	20.4
				6	19975	1712.5	21.00	20.6
					20175	1732.5	21.00	20.5
					20375	1752.5	21.00	20.4
			13	19975	1712.5	21.00	20.6	
				20175	1732.5	21.00	20.4	
				20375	1752.5	21.00	20.3	
25	0	19975	1712.5	21.00	20.6			
		20175	1732.5	21.00	20.4			
		20375	1752.5	21.00	20.3			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	5MHz	16-QAM	1	0	19975	1712.5	21.00	20.8
					20175	1732.5	21.00	20.7
					20375	1752.5	21.00	20.6
				12	19975	1712.5	21.00	20.9
					20175	1732.5	21.00	20.7
					20375	1752.5	21.00	20.6
24	19975	1712.5	21.00	20.9				
	20175	1732.5	21.00	20.7				

					20375	1752.5	21.00	20.7
			12	0	19975	1712.5	21.00	20.6
					20175	1732.5	21.00	20.4
					20375	1752.5	21.00	20.4
				6	19975	1712.5	21.00	20.8
					20175	1732.5	21.00	20.4
					20375	1752.5	21.00	20.4
				13	19975	1712.5	21.00	20.6
					20175	1732.5	21.00	20.4
					20375	1752.5	21.00	20.4
			25	0	19975	1712.5	21.00	20.5
					20175	1732.5	21.00	20.3
					20375	1752.5	21.00	20.3
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	10MHz	QPSK	1	0	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.6
					20350	1750	21.00	20
				24	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.5
					20350	1750	21.00	19.9
				49	20000	1715	21.00	20.4
					20175	1732.5	21.00	20.5
					20350	1750	21.00	20
			25	0	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.5
					20350	1750	21.00	19.9
				6	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.5
					20350	1750	21.00	19.9
				13	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.5
					20350	1750	21.00	19.8
			50	0	20000	1715	21.00	20.3
					20175	1732.5	21.00	20.4
					20350	1750	21.00	19.9
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	10MHz	16-QAM	1	0	20000	1715	21.00	20.6
					20175	1732.5	21.00	20.9
					20350	1750	21.00	20.3
				24	20000	1715	21.00	20.5

				49	20175	1732.5	21.00	20.7
					20350	1750	21.00	20.1
					20000	1715	21.00	20.6
					20175	1732.5	21.00	20.7
					20350	1750	21.00	20.2
			25	0	20000	1715	21.00	20.2
					20175	1732.5	21.00	20.4
					20350	1750	21.00	19.8
				6	20000	1715	21.00	20.2
					20175	1732.5	21.00	20.4
					20350	1750	21.00	19.8
				13	20000	1715	21.00	20.2
					20175	1732.5	21.00	20.4
					20350	1750	21.00	19.8
			50	0	20000	1715	21.00	20.2
20175	1732.5	21.00			20.4			
20350	1750	21.00			19.9			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	15MHz	QPSK	1	0	20025	1717.5	21.00	20.6
					20175	1732.5	21.00	20.7
					20325	1747.5	21.00	20.3
				37	20025	1717.5	21.00	20.5
					20175	1732.5	21.00	20.4
					20325	1747.5	21.00	20.1
				74	20025	1717.5	21.00	20.5
					20175	1732.5	21.00	20.6
					20325	1747.5	21.00	20.3
			36	0	20025	1717.5	21.00	20.4
					20175	1732.5	21.00	20.6
					20325	1747.5	21.00	20.2
				20	20025	1717.5	21.00	20.4
					20175	1732.5	21.00	20.6
					20325	1747.5	21.00	20.2
				39	20025	1717.5	21.00	20.5
					20175	1732.5	21.00	20.5
					20325	1747.5	21.00	20.2
75	0	20025	1717.5	21.00	20.4			
		20175	1732.5	21.00	20.6			
		20325	1747.5	21.00	20.3			
Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)

LTE Band 4	15MHz	16-QAM	1	0	20025	1717.5	21.00	20.7			
					20175	1732.5	21.00	20.9			
					20325	1747.5	21.00	20.5			
				37	20025	1717.5	21.00	20.4			
					20175	1732.5	21.00	20.6			
					20325	1747.5	21.00	20.2			
				74	20025	1717.5	21.00	20.7			
					20175	1732.5	21.00	20.6			
					20325	1747.5	21.00	20.4			
			36	0	20025	1717.5	21.00	20.5			
					20175	1732.5	21.00	20.6			
					20325	1747.5	21.00	20.3			
				20	20025	1717.5	21.00	20.5			
					20175	1732.5	21.00	20.6			
					20325	1747.5	21.00	20.2			
				39	20025	1717.5	21.00	20.5			
					20175	1732.5	21.00	20.5			
					20325	1747.5	21.00	20.2			
			75	0	20025	1717.5	21.00	20.5			
					20175	1732.5	21.00	20.6			
					20325	1747.5	21.00	20.3			
			Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
			LTE Band 4	20MHz	QPSK	1	0	20050	1720	21.00	20.6
								20175	1732.5	21.00	20.8
20300	1745	21.00						20.5			
49	20050	1720					21.00	20.4			
	20175	1732.5					21.00	20.4			
	20300	1745					21.00	20.1			
99	20050	1720					21.00	20.5			
	20175	1732.5					21.00	20.5			
	20300	1745					21.00	20.3			
50	0	20050				1720	21.00	20.5			
		20175				1732.5	21.00	20.6			
		20300				1745	21.00	20.3			
	25	20050				1720	21.00	20.4			
		20175				1732.5	21.00	20.6			
		20300				1745	21.00	20.2			
	50	20050				1720	21.00	20.6			
		20175				1732.5	21.00	20.5			
		20300				1745	21.00	20.3			
100	0	20050				1720	21.00	20.5			
		20175				1732.5	21.00	20.6			

Band	Bandwidth (MHz)	Modulation	RB Size	RB offset	20300	1745	21.00	20.4
					Uplink Channel Number	Freq. (MHz)	Maximum Power (dBm)	Output Power (dBm)
LTE Band 4	20MHz	16-QAM	1	0	20050	1720	21.00	20.8
					20175	1732.5	21.00	21
					20300	1745	21.00	20.7
				49	20050	1720	21.00	20.6
					20175	1732.5	21.00	20.6
					20300	1745	21.00	20.3
				99	20050	1720	21.00	20.8
					20175	1732.5	21.00	20.8
					20300	1745	21.00	20.5
			50	0	20050	1720	21.00	20.4
					20175	1732.5	21.00	20.6
					20300	1745	21.00	20.2
				25	20050	1720	21.00	20.5
					20175	1732.5	21.00	20.6
					20300	1745	21.00	20.2
				50	20050	1720	21.00	20.5
					20175	1732.5	21.00	20.5
					20300	1745	21.00	20.2
			100	0	20050	1720	21.00	20.5
					20175	1732.5	21.00	20.6
					20300	1745	21.00	20.2

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4.3.4 WLAN

Technical Description


The phone under test contains a Wi-Fi 802.11b/g/n/a/ac transmitter capable of data transmission in the 2.45 GHz and 5 GHz band.

Exposure Conditions and Test Exclusions

Mode	Type	Head Adjacent	Body Worn Accessory	WiFi Hotspot
802.11b/g/n	Data	Tested	Tested	Tested
802.11a/ac	Data	Tested	Tested	NA

Justification of SAR measurements in WLAN mode

- (1) Per FCC KDB 248227 D01, for 2.4GHz 802.11g/n output power and SAR is not required 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.
- (2) Per FCC KDB 248227 D01, for UNII-1 band, head and bodyworn SAR testing is not required when the UNII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for UNII-1 band.
- (3) When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode 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 position are tested.
- (4) For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
- (5) For WLAN SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
- (6) Per FCC KDB 248227 D01, the simultaneous SAR provisions in KDB 447498 should be applied to determine simultaneous transmission SAR test exclusion for WLAN MIMO. If the sum of 1g single transmission chain SAR measurement is < 1.6 W/kg and SPLSR < 0.04 , no additional SAR measurements are needed for MIMO.

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Device Test Setup

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

In order to testing the conducted power of WLAN, the DUT is controlled to transmit WLAN TX as maximum power by the terminal software installed on the PC. The procedure how to control is presented as blew:

1. Connect DUT and PC via the USB cable and check the port is opened.
2. Input the command "WLPU" to power on WLAN.
3. Input the command "WTFD" to firmware download.
4. Input the WBTX command to start transmit (i.e., WBTX=1,0,1,1500,25,0,12).
5. Input the command "WIDL" to stop transmit.
6. Input the command "WLPD" to power off WLAN.

The average conducted power for Wi-Fi (chain0) is as following:

2.4G WLAN CHAIN0	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11b	Channel 1	2412	1Mbps	13.4
		Channel 6	2437		13.6
		Channel 11	2462		13.1
		Channel 12	2467		13.4
		Channel 13	2472		12.7
	802.11g	Channel 1	2412	6Mbps	12.8
		Channel 6	2437		13.4
		Channel 11	2462		13.2
		Channel 12	2467		9.7
Channel 13		2472	3.7		
802.11n- HT20	Channel 1	2412	MCS0	13.1	
	Channel 6	2437		13.7	
	Channel 11	2462		13.4	
	Channel 12	2467		8.3	
	Channel 13	2472		3.1	

	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
5.2G WLAN CHAIN0	802.11a	Channel 36	5180	6Mbps	9.2
		Channel 40	5200		9.1
		Channel 44	5220		9.2
		Channel 48	5240		9
	802.11n-HT20	Channel 36	5180	MCS0	9.4
		Channel 40	5200		9.1
		Channel 44	5220		9
		Channel 48	5240		9.5
	802.11n-HT40	Channel 38	5190	MCS0	9.1
		Channel 46	5230		9.1
	802.11ac-VHT20	Channel 36	5180	MCS0	8.4
		Channel 40	5200		8.7
		Channel 44	5220		8.9
		Channel 48	5240		9
	802.11ac-VHT40	Channel 38	5190	MCS0	8.5
		Channel 46	5230		8.9
	802.11ac-VHT80	Channel 42	5210	MCS0	8.7

5.3G WLAN CHAIN0	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11a	Channel 52	5260	6Mbps	9.4
		Channel 56	5280		9.4
		Channel 60	5300		9.4
		Channel 64	5320		9.3
	802.11n-HT20	Channel 52	5260	MCS0	9
		Channel 56	5280		9.4
		Channel 60	5300		9.3
		Channel 64	5320		9.2
	802.11n-HT40	Channel 54	5270	MCS0	9.2
Channel 62		5310	9.2		
802.11ac-VHT20	Channel 52	5260	MCS0	9.2	
	Channel 56	5280		9.3	
	Channel 60	5300		9.2	
	Channel 64	5320		9.1	
802.11ac-VHT40	Channel 54	5270	MCS0	9.2	
	Channel 62	5310		8.9	
802.11ac-VHT80	Channel 58	5290	MCS0	9.3	

5.5G WLAN CHAIN0	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11a	Channel 100	5500	6Mbps	9.5
		Channel 116	5580		9.7
		Channel 124	5620		9.7
		Channel 132	5660		10
		Channel 144	5720		9.6
	802.11n- HT20	Channel 100	5500	MCS0	9.4
		Channel 116	5580		9.7
		Channel 124	5620		9.9
		Channel 132	5660		10
Channel 144		5720	9.5		
802.11n- HT40	Channel 102	5510	MCS0	9.5	
	Channel 110	5550		9.7	
	Channel 126	5630		9.9	
	Channel 134	5670		9.8	
	Channel 142	5710		9.5	
802.11ac- VHT20	Channel 100	5500	MCS0	9.3	
	Channel 116	5580		9.6	
	Channel 124	5620		9.9	
	Channel 132	5660		10	
	Channel 144	5720		9.4	
802.11ac- VHT40	Channel 102	5510	MCS0	9.3	
	Channel 110	5550		9.5	
	Channel 126	5630		9.7	
	Channel 134	5670		9.9	
	Channel 142	5710		9.2	
802.11ac- VHT80	Channel 106	5530	MCS0	9.4	
	Channel 122	5610		9.9	
	Channel 138	5690		9.6	

	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
5.8G WLAN CHAIN0	802.11a	Channel 149	5745	MCS0	9.5
		Channel 157	5785		9.7
		Channel 165	5825		9.7
	802.11n-HT20	Channel 149	5745	MCS0	9.7
		Channel 157	5785		9.7
		Channel 165	5825		9.6
	802.11n-HT40	Channel 151	5755	MCS0	9.9
		Channel 159	5795		9.8
	802.11ac-VHT20	Channel 149	5745	MCS0	9.3
		Channel 157	5785		9.3
		Channel 165	5825		9.4
	802.11ac-VHT40	Channel 151	5755	MCS0	9.6
		Channel 159	5795		9.6
	802.11ac-VHT80	Channel 155	5775	MCS0	9.7

The average conducted power for Wi-Fi (chain1) is as following:

	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
2.4G WLAN CHAIN1	802.11b	Channel 1	2412	1Mbps	13.9
		Channel 6	2437		13.7
		Channel 11	2462		13.9
		Channel 12	2467		13.8
		Channel 13	2472		12.7
	802.11g	Channel 1	2412	6Mbps	13.9
		Channel 6	2437		13.7
		Channel 11	2462		13.9
		Channel 12	2467		9.7
		Channel 13	2472		3.1
	802.11n- HT20	Channel 1	2412	MCS0	13.9
		Channel 6	2437		13.8
		Channel 11	2462		14
		Channel 12	2467		7.9
		Channel 13	2472		1.9

	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
5.2G WLAN CHAIN1	802.11a	Channel 36	5180	6Mbps	9.6
		Channel 40	5200		9.6
		Channel 44	5220		10
		Channel 48	5240		9.8
	802.11n-HT20	Channel 36	5180	MCS0	9.6
		Channel 40	5200		9.9
		Channel 44	5220		9.9
		Channel 48	5240		10
	802.11n-HT40	Channel 38	5190	MCS0	9.7
		Channel 46	5230		9.7
	802.11ac-VHT20	Channel 36	5180	MCS0	9.8
		Channel 40	5200		9.7
		Channel 44	5220		9.9
		Channel 48	5240		9.9
	802.11ac-VHT40	Channel 38	5190	MCS0	9.8
		Channel 46	5230		9.8
	802.11ac-VHT80	Channel 42	5210	MCS0	9.9

5.3G WLAN CHAIN1	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11a	Channel 52	5260	6Mbps	9.8
		Channel 56	5280		9.9
		Channel 60	5300		9.7
		Channel 64	5320		9.6
	802.11n- HT20	Channel 52	5260	MCS0	10
		Channel 56	5280		9.9
		Channel 60	5300		10
		Channel 64	5320		10
	802.11n- HT40	Channel 54	5270	MCS0	10
Channel 62		5310	9.8		
802.11ac- VHT20	Channel 52	5260	MCS0	9.9	
	Channel 56	5280		9.9	
	Channel 60	5300		9.9	
	Channel 64	5320		10	
802.11ac- VHT40	Channel 54	5270	MCS0	10	
	Channel 62	5310		9.8	
802.11ac- VHT80	Channel 58	5290	MCS0	9.9	

5.5G WLAN CHAIN1	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11a	Channel 100	5500	6Mbps	9.5
		Channel 116	5580		9.5
		Channel 124	5620		9.4
		Channel 132	5660		9.5
		Channel 144	5720		9
	802.11n-HT20	Channel 100	5500	MCS0	9.6
		Channel 116	5580		9.5
		Channel 124	5620		9.4
		Channel 132	5660		9.6
Channel 144		5720	9.4		
802.11n-HT40	Channel 102	5510	MCS0	9.3	
	Channel 110	5550		9.5	
	Channel 126	5630		9.4	
	Channel 134	5670		9.3	
	Channel 142	5710		9.3	
802.11ac- VHT20	Channel 100	5500	MCS0	9.5	
	Channel 116	5580		9.2	
	Channel 124	5620		9.6	
	Channel 132	5660		9.7	
	Channel 144	5720		9.3	
802.11ac- VHT40	Channel 102	5510	MCS0	9.6	
	Channel 110	5550		9.5	
	Channel 126	5630		9.4	
	Channel 134	5670		9.2	
	Channel 142	5710		9.1	
802.11ac- VHT80	Channel 106	5530	MCS0	9.5	
	Channel 122	5610		9.6	
	Channel 138	5690		9.2	

5.8G WLAN CHAIN1	MODE	CHANNEL	FREQUENCY (MHz)	DATA RATE	AVERAGE POWER (dBm)
	802.11a	Channel 149	5745	MCS0	9.2
		Channel 157	5785		9.1
		Channel 165	5825		9.3
	802.11n-HT20	Channel 149	5745	MCS0	9.1
		Channel 157	5785		9.3
		Channel 165	5825		9.3
	802.11n-HT40	Channel 151	5755	MCS0	9.1
		Channel 159	5795		9.4
	802.11ac- VHT20	Channel 149	5745	MCS0	9.4
Channel 157		5785	9.3		
Channel 165		5825	9.4		
802.11ac- VHT40	Channel 151	5755	MCS0	9.4	
	Channel 159	5795		9.4	
802.11ac- VHT80	Channel 155	5775	MCS0	9.1	

4.3.5 Bluetooth Conducted Power Measurement Result

Mode Band	Max Power [dBm]		
	BR	EDR	BLE
2.4GHz Bluetooth	11.5	8.5	7.5

Maximum tune-up tolerance limit is 11.5 dBm. This power level qualifies for exclusion of body-worn SAR testing.

5 SAR MEASUREMENTS

5.1 Mobile Hotspot SAR Measurement Positions

Mobile hotspot SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
GSM 850	Yes	Yes	Yes	Yes	No	Yes
GSM 1900	Yes	Yes	Yes	Yes	No	Yes
UMTS B2	Yes	Yes	Yes	Yes	No	Yes
UMTS B4	Yes	Yes	Yes	Yes	No	Yes
UMTS B5	Yes	Yes	Yes	Yes	No	Yes
UMTS B7	Yes	Yes	Yes	Yes	No	Yes
LTE B2	Yes	Yes	Yes	Yes	No	Yes
LTE B4	Yes	Yes	Yes	Yes	No	Yes
LTE B5	Yes	Yes	Yes	Yes	No	Yes
LTE B7	Yes	Yes	Yes	Yes	No	Yes
LTE B12/B17	Yes	Yes	Yes	Yes	No	Yes
LTE B41	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	Yes	Yes	Yes	No

The edges with less than 2.5 cm distance to the TX antennas need to be tested for hotspot SAR.

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5.2 General SAR Test Reduction Criteria

Per KDB 447498 D01, 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

Per KDB 648474 D04, when the reported SAR for body-worn accessory, measured without a headset connected to the handset is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Per the guidance of TCBC 2014 workshop, SAR measurement for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

5.3 Results Overview

The device was put into operation by using a base station simulator. Communication between the device and the call tester was established by air link. The device output power was set to maximum power level for all tests. A fully charged battery was used for every test sequence.

5.3.1 Head Adjacent Test Results

Test results head SAR GSM 850

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
190	836.60	DTM (2)	Cheek	Left	31.80	31.90	22.5	0.247	0.253
190	836.60	DTM (2)	Tilt	Left	31.80	31.90	22.5	0.098	0.101
190	836.60	DTM (2)	Cheek	Right	31.80	31.90	22.5	0.356	0.364
190	836.60	DTM (2)	Tilt	Right	31.80	31.90	22.5	0.118	0.121
190	836.60	GPRS (2)	Cheek	Left	31.90	31.90	22.5	0.230	0.230
190	836.60	GPRS (2)	Cheek	Right	31.90	31.90	22.5	0.269	0.269

Test results head SAR GSM 1900

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
661	1880.00	DTM (2)	Cheek	Left	28.90	28.90	22.6	0.236	0.236
661	1880.00	DTM (2)	Tilt	Left	28.90	28.90	22.6	0.055	0.055
661	1880.00	DTM (2)	Cheek	Right	28.90	28.90	22.6	0.104	0.104
661	1880.00	DTM (2)	Tilt	Right	28.90	28.90	22.6	0.063	0.063
512	1850.20	GPRS (2)	Cheek	Left	28.6	28.90	22.6	0.160	0.171
512	1850.20	GPRS (2)	Cheek	Right	28.6	28.90	22.6	0.084	0.090

Test results head SAR UMTS Band 2

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
9400	1880.00	RMC	Cheek	Left	22.2	22.2	22.5	0.253	0.253
9400	1880.00	RMC	Tilt	Left	22.2	22.2	22.5	0.053	0.053
9400	1880.00	RMC	Cheek	Right	22.2	22.2	22.5	0.105	0.105
9400	1880.00	RMC	Tilt	Right	22.2	22.2	22.5	0.069	0.069

Test results head SAR UMTS Band 4

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
1412	1732.40	RMC	Cheek	Left	22.5	22.5	22.7	0.232	0.232
1412	1732.40	RMC	Tilt	Left	22.5	22.5	22.7	0.063	0.063
1412	1732.40	RMC	Cheek	Right	22.5	22.5	22.7	0.122	0.122
1412	1732.40	RMC	Tilt	Right	22.5	22.5	22.7	0.061	0.061

Test results head SAR UMTS Band 5

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
4233	846.60	RMC	Cheek	Left	24.5	24.9	22.5	0.247	0.271
4233	846.60	RMC	Tilt	Left	24.5	24.9	22.5	0.105	0.115
4233	846.60	RMC	Cheek	Right	24.5	24.9	22.5	0.337	0.370
4233	846.60	RMC	Tilt	Right	24.5	24.9	22.5	0.122	0.134

Test results head SAR LTE Band 2

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
18900	1880.00	QPSK 20M_1RB_0	Cheek	Left	21.80	22.20	22.6	0.258	0.283
18900	1880.00	QPSK 20M_1RB_0	Tilt	Left	21.80	22.20	22.6	0.060	0.066
18900	1880.00	QPSK 20M_1RB_0	Cheek	Right	21.80	22.20	22.6	0.104	0.114
18900	1880.00	QPSK 20M_1RB_0	Tilt	Right	21.80	22.20	22.6	0.059	0.064
18900	1880.00	QPSK 20M_50RB_50	Cheek	Left	21.70	22.20	22.6	0.293	0.329
18900	1880.00	QPSK 20M_50RB_50	Tilt	Left	21.70	22.20	22.6	0.065	0.073
18900	1880.00	QPSK 20M_50RB_50	Cheek	Right	21.70	22.20	22.6	0.120	0.135
18900	1880.00	QPSK 20M_50RB_50	Tilt	Right	21.70	22.20	22.6	0.068	0.076

Test results head SAR LTE Band 4


Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
20175	1732.50	QPSK 20M_1RB_0	Cheek	Left	22.1	22.5	22.7	0.183	0.201
20175	1732.50	QPSK 20M_1RB_0	Tilt	Left	22.1	22.5	22.7	0.050	0.055
20175	1732.50	QPSK 20M_1RB_0	Cheek	Right	22.1	22.5	22.7	0.104	0.114
20175	1732.50	QPSK 20M_1RB_0	Tilt	Right	22.1	22.5	22.7	0.044	0.048
20175	1732.50	QPSK 20M_50RB_0	Cheek	Left	22.0	22.5	22.7	0.144	0.162
20175	1732.50	QPSK 20M_50RB_0	Tilt	Left	22.0	22.5	22.7	0.048	0.054
20175	1732.50	QPSK 20M_50RB_0	Cheek	Right	22.0	22.5	22.7	0.105	0.118
20175	1732.50	QPSK 20M_50RB_0	Tilt	Right	22.0	22.5	22.7	0.041	0.046

Test results head SAR LTE Band 5

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
20600	844.00	QPSK 10M_1RB_0	Cheek	Left	23.40	24.00	22.5	0.190	0.218
20600	844.00	QPSK 10M_1RB_0	Tilt	Left	23.40	24.00	22.5	0.082	0.094
20600	844.00	QPSK 10M_1RB_0	Cheek	Right	23.40	24.00	22.5	0.235	0.270
20600	844.00	QPSK 10M_1RB_0	Tilt	Right	23.40	24.00	22.5	0.068	0.078
20600	844.00	QPSK 10M_25RB_25	Cheek	Left	22.2	23.0	22.5	0.144	0.173
20600	844.00	QPSK 10M_25RB_25	Tilt	Left	22.2	23.0	22.5	0.062	0.075
20600	844.00	QPSK 10M_25RB_25	Cheek	Right	22.2	23.0	22.5	0.186	0.224
20600	844.00	QPSK 10M_25RB_25	Tilt	Right	22.2	23.0	22.5	0.061	0.074

Test results head SAR LTE Band 7

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
21100	2535.00	QPSK 20M_1RB_0	Cheek	Left	20.0	20.5	22.5	0.184	0.206
21100	2535.00	QPSK 20M_1RB_0	Tilt	Left	20.0	20.5	22.5	0.058	0.065
21100	2535.00	QPSK 20M_1RB_0	Cheek	Right	20.0	20.5	22.5	0.091	0.102
21100	2535.00	QPSK 20M_1RB_0	Tilt	Right	20.0	20.5	22.5	0.072	0.081
21100	2535.00	QPSK 20M_50RB_50	Cheek	Left	20.0	20.5	22.5	0.175	0.196
21100	2535.00	QPSK 20M_50RB_50	Tilt	Left	20.0	20.5	22.5	0.056	0.063
21100	2535.00	QPSK 20M_50RB_50	Cheek	Right	20.0	20.5	22.5	0.090	0.101
21100	2535.00	QPSK 20M_50RB_50	Tilt	Right	20.0	20.5	22.5	0.064	0.072

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Test results head SAR LTE Band 12

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
23130	711.00	QPSK/10M_1RB_0	Cheek	Left	23.2	24.0	22.5	0.112	0.135
23130	711.00	QPSK/10M_1RB_0	Tilt	Left	23.2	24.0	22.5	0.052	0.063
23130	711.00	QPSK/10M_1RB_0	Cheek	Right	23.2	24.0	22.5	0.124	0.149
23130	711.00	QPSK/10M_1RB_0	Tilt	Right	23.2	24.0	22.5	0.056	0.067
23130	711.00	QPSK/10M_25RB_0	Cheek	Left	22.0	23.0	22.5	0.088	0.110
23130	711.00	QPSK/10M_25RB_0	Tilt	Left	22.0	23.0	22.5	0.039	0.049
23130	711.00	QPSK/10M_25RB_0	Cheek	Right	22.0	23.0	22.5	0.098	0.123
23130	711.00	QPSK/10M_25RB_0	Tilt	Right	22.0	23.0	22.5	0.043	0.055

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Test results head SAR LTE Band 41

Frequency		Configuration	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
41490	2680.00	QPSK/20M_1RB_49	Cheek	Left	20.2	20.5	22.5	0.108	0.116
41490	2680.00	QPSK/20M_1RB_49	Tilt	Left	20.2	20.5	22.5	0.035	0.038
41490	2680.00	QPSK/20M_1RB_49	Cheek	Right	20.2	20.5	22.5	0.045	0.048
41490	2680.00	QPSK/20M_1RB_49	Tilt	Right	20.2	20.5	22.5	0.064	0.068
41490	2680.00	QPSK/20M_50RB_50	Cheek	Left	20.1	20.5	22.5	0.091	0.099
41490	2680.00	QPSK/20M_50RB_50	Tilt	Left	20.1	20.5	22.5	0.035	0.038
41490	2680.00	QPSK/20M_50RB_50	Cheek	Right	20.1	20.5	22.5	0.041	0.045
41490	2680.00	QPSK/20M_50RB_50	Tilt	Right	20.1	20.5	22.5	0.059	0.064

Test results head SAR Wi-Fi 802.11b Chain0

Frequency		Config. (Bit Rate)	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
6	2437.00	1Mbps	Cheek	Left	13.6	14.0	22.5	0.218	0.239
6	2437.00	1Mbps	Tilt	Left	13.6	14.0	22.5	0.096	0.106
6	2437.00	1Mbps	Cheek	Right	13.6	14.0	22.5	0.080	0.087
6	2437.00	1Mbps	Tilt	Right	13.6	14.0	22.5	0.073	0.080
1	2412.00	1Mbps	Cheek	Left	13.4	14.0	22.5	0.338	0.388
11	2462.00	1Mbps	Cheek	Left	13.1	14.0	22.5	0.293	0.360

Test results head SAR Wi-Fi 802.11b Chain1


Frequency		Config. (Bit Rate)	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
1	2412.00	1Mbps	Cheek	Left	13.9	14.0	22.5	0.152	0.156
1	2412.00	1Mbps	Tilt	Left	13.9	14.0	22.5	0.043	0.043
1	2412.00	1Mbps	Cheek	Right	13.9	14.0	22.5	0.204	0.209
1	2412.00	1Mbps	Tilt	Right	13.9	14.0	22.5	0.095	0.097
6	2437.00	1Mbps	Cheek	Left	13.7	14.0	22.5	0.163	0.175
11	2472.00	1Mbps	Cheek	Left	13.9	14.0	22.5	0.135	0.138

Test results head SAR Wi-Fi 802.11ac Chain0

Frequency		Config. (Bit Rate)	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
58	5290.00	VHT80	Cheek	Left	9.3	10.0	22.5	0.042	0.050
58	5290.00	VHT80	Tilt	Left	9.3	10.0	22.5	0.016	0.019
58	5290.00	VHT80	Cheek	Right	9.3	10.0	22.5	0.008	0.010
58	5290.00	VHT80	Tilt	Right	9.3	10.0	22.5	0.013	0.016
122	5610.00	VHT80	Cheek	Left	9.9	10.0	22.5	0.064	0.065
122	5610.00	VHT80	Tilt	Left	9.9	10.0	22.5	0.023	0.024
122	5610.00	VHT80	Cheek	Right	9.9	10.0	22.5	0.018	0.018
122	5610.00	VHT80	Tilt	Right	9.9	10.0	22.5	0.009	0.009
155	5775.00	VHT80	Cheek	Left	9.7	10.0	22.5	0.076	0.081
155	5775.00	VHT80	Tilt	Left	9.7	10.0	22.5	0.020	0.022
155	5775.00	VHT80	Cheek	Right	9.7	10.0	22.5	0.017	0.018
155	5775.00	VHT80	Tilt	Right	9.7	10.0	22.5	0.014	0.015

Test results head SAR Wi-Fi 802.11ac Chain1

Frequency		Config. (Bit Rate)	Position	Side	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz							Measured	Reported
58	5290.00	VHT80	Cheek	Left	9.9	10.0	22.5	0.032	0.032
58	5290.00	VHT80	Tilt	Left	9.9	10.0	22.5	0.023	0.023
58	5290.00	VHT80	Cheek	Right	9.9	10.0	22.5	0.083	0.085
58	5290.00	VHT80	Tilt	Right	9.9	10.0	22.5	0.049	0.050
106	5530.00	VHT80	Cheek	Left	9.6	10.0	22.5	0.087	0.096
106	5530.00	VHT80	Tilt	Left	9.6	10.0	22.5	0.064	0.070
106	5530.00	VHT80	Cheek	Right	9.6	10.0	22.5	0.280	0.307
106	5530.00	VHT80	Tilt	Right	9.6	10.0	22.5	0.146	0.160
155	5775.00	VHT80	Cheek	Left	9.1	10.0	22.5	0.109	0.134
155	5775.00	VHT80	Tilt	Left	9.1	10.0	22.5	0.073	0.090
155	5775.00	VHT80	Cheek	Right	9.1	10.0	22.5	0.158	0.194
155	5775.00	VHT80	Tilt	Right	9.1	10.0	22.5	0.110	0.135

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5.3.2 Body-Worn Accessory and Hotspot Mode Test Results

There are no body-worn accessories available for this phone at the time of testing thus the device was tested per the FCC KDB publication guidelines for devices that do not have body-worn accessories.

A separation distance of 15 mm between the device and the flat phantom was used for testing body-worn SAR. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

A separation distance of 10mm between the device and the flat phantom was used for testing WiFi hotspot mode SAR due to the form factor of the device is > 9 cm x 5 cm. Detailed test configurations can be found in Section 5.1 in this test report.

As per KDB 941225D06, when the same wireless mode transmission configurations are required for SAR measurements, the more conservative configuration with a smaller separation distance should be tested for the overlapping SAR configurations. Thus, Body-worn accessory testing was excluded for certain wireless bands which does not implement any power reduction while working in hotspot mode.

Test results body SAR GSM 850


Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
190	836.60	DTM(2)	15	OFF	Front	31.80	31.90	22.5	0.249	0.255
190	836.60	DTM(2)	15	OFF	Back	31.80	31.90	22.5	0.257	0.263
190	836.60	GPRS(2)	10	ON	Front	31.90	31.90	22.5	0.299	0.299
190	836.60	GPRS(2)	10	ON	Back	31.90	31.90	22.5	0.374	0.374
190	836.60	GPRS(2)	10	ON	Left	31.90	31.90	22.5	0.091	0.091
190	836.60	GPRS(2)	10	ON	Right	31.90	31.90	22.5	0.285	0.285
190	836.60	GPRS(2)	10	ON	Bottom	31.90	31.90	22.5	0.090	0.090

Test results body SAR GSM 1900

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
661	1880.00	DTM(2)	15	OFF	Front	28.90	28.90	22.6	0.426	0.426
661	1880.00	DTM(2)	15	OFF	Back	28.90	28.90	22.6	0.440	0.440
661	1880.00	GPRS(1)	10	ON	Front	29.4	29.4	22.6	0.572	0.572
661	1880.00	GPRS(1)	10	ON	Back	29.4	29.4	22.6	0.603	0.603
661	1880.00	GPRS(1)	10	ON	Left	29.4	29.4	22.6	0.146	0.146
661	1880.00	GPRS(1)	10	ON	Right	29.4	29.4	22.6	0.034	0.034
661	1880.00	GPRS(1)	10	ON	Bottom	29.4	29.4	22.6	1.030	1.030
512	1850.20	GPRS(1)	10	ON	Bottom	29.4	29.4	22.6	0.915	0.915
810	1909.8	GPRS(1)	10	ON	Bottom	29.4	29.4	22.6	1.100	1.100

Test results body SAR UMTS Band 2

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
9400	1880.00	RMC	15	OFF	Front	22.2	22.2	22.6	0.445	0.445
9400	1880.00	RMC	15	OFF	Back	22.2	22.2	22.6	0.486	0.486
9400	1880.00	RMC	10	ON	Front	18.8	19.0	22.6	0.431	0.451
9400	1880.00	RMC	10	ON	Back	18.8	19.0	22.6	0.500	0.524
9400	1880.00	RMC	10	ON	Left edge	18.8	19.0	22.6	0.146	0.153
9400	1880.00	RMC	10	ON	Right edge	18.8	19.0	22.6	0.023	0.024
9400	1880.00	RMC	10	ON	Bottom edge	18.8	19.0	22.6	0.977	1.023
9262	1852.40	RMC	10	ON	Bottom edge	18.8	19.0	22.6	0.868	0.909
9538	1909.8	RMC	10	ON	Bottom edge	18.5	19.0	22.6	1.020	1.144


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Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
1412	1732.40	RMC	15	OFF	Front	22.5	22.5	22.6	0.332	0.332
1412	1732.40	RMC	15	OFF	Back	22.5	22.5	22.6	0.394	0.394
1412	1732.40	RMC	10	ON	Front	20.6	21.0	22.6	0.465	0.510
1412	1732.40	RMC	10	ON	Back	20.6	21.0	22.6	0.525	0.576
1412	1732.40	RMC	10	ON	Left	20.6	21.0	22.6	0.045	0.050
1412	1732.40	RMC	10	ON	Right	20.6	21.0	22.6	0.032	0.035
1412	1732.40	RMC	10	ON	Bottom	20.6	21.0	22.6	0.616	0.675

Test results body SAR UMTS Band 5

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
4233	846.60	RMC	10	OFF	Front	24.5	24.9	22.5	0.366	0.401
4233	846.60	RMC	10	OFF	Back	24.5	24.9	22.5	0.411	0.451
4233	846.60	RMC	10	OFF	Left	24.5	24.9	22.5	0.089	0.097
4233	846.60	RMC	10	OFF	Right	24.5	24.9	22.5	0.347	0.380
4233	846.60	RMC	10	OFF	Bottom	24.5	24.9	22.5	0.148	0.162

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Test results Body SAR LTE Band 2

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
18900	1880.00	QPSK 20M_1RB_0	15	OFF	Front	21.80	22.20	22.6	0.386	0.423
18900	1880.00	QPSK 20M_1RB_0	15	OFF	Back	21.80	22.20	22.6	0.396	0.434
18900	1880.00	QPSK 20M_50RB_50	15	OFF	Front	21.70	22.20	22.6	0.426	0.478
18900	1880.00	QPSK 20M_50RB_50	15	OFF	Back	21.70	22.20	22.6	0.449	0.504
19100	1900.00	QPSK 20M_1RB_0	10	ON	Front	18.50	19.00	22.6	0.355	0.398
19100	1900.00	QPSK 20M_1RB_0	10	ON	Back	18.50	19.00	22.6	0.406	0.456
19100	1900.00	QPSK 20M_1RB_0	10	ON	Left	18.50	19.00	22.6	0.153	0.172
19100	1900.00	QPSK 20M_1RB_0	10	ON	Right	18.50	19.00	22.6	0.019	0.021
19100	1900.00	QPSK 20M_1RB_0	10	ON	Bottom	18.50	19.00	22.6	0.805	0.903
18900	1880.00	QPSK 20M_50RB_50	10	ON	Front	18.50	19.00	22.6	0.361	0.405
18900	1880.00	QPSK 20M_50RB_50	10	ON	Back	18.50	19.00	22.6	0.404	0.453
18900	1880.00	QPSK 20M_50RB_50	10	ON	Left	18.50	19.00	22.6	0.139	0.156
18900	1880.00	QPSK 20M_50RB_50	10	ON	Right	18.50	19.00	22.6	0.028	0.031
18900	1880.00	QPSK 20M_50RB_50	10	ON	Bottom	18.50	19.00	22.6	0.723	0.811

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Test results Body SAR LTE Band 4

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
20175	1732.50	QPSK 20M_1RB_0	15	OFF	Front	22.1	22.5	22.4	0.339	0.372
20175	1732.50	QPSK 20M_1RB_0	15	OFF	Back	22.1	22.5	22.4	0.419	0.459
20175	1732.50	QPSK 20M_50RB_0	15	OFF	Front	22.0	22.5	22.4	0.326	0.366
20175	1732.50	QPSK 20M_50RB_0	15	OFF	Back	22.0	22.5	22.4	0.382	0.429
20175	1732.50	QPSK 20M_1RB_0	10	ON	Front	20.8	21.0	22.4	0.514	0.538
20175	1732.50	QPSK 20M_1RB_0	10	ON	Back	20.8	21.0	22.4	0.650	0.681
20175	1732.50	QPSK 20M_1RB_0	10	ON	Left	20.8	21.0	22.4	0.045	0.047
20175	1732.50	QPSK 20M_1RB_0	10	ON	Right	20.8	21.0	22.4	0.037	0.039
20175	1732.50	QPSK 20M_1RB_0	10	ON	Bottom	20.8	21.0	22.4	0.802	0.840
20175	1732.50	QPSK 20M_50RB_0	10	ON	Front	20.6	21.0	22.4	0.485	0.532
20175	1732.50	QPSK 20M_50RB_0	10	ON	Back	20.6	21.0	22.4	0.575	0.630
20175	1732.50	QPSK 20M_50RB_0	10	ON	Left	20.6	21.0	22.4	0.041	0.045
20175	1732.50	QPSK 20M_50RB_0	10	ON	Right	20.6	21.0	22.4	0.035	0.038
20175	1732.50	QPSK 20M_50RB_0	10	ON	Bottom	20.6	21.0	22.4	0.759	0.832
20050	1720.00	QPSK 20M_1RB_0	10	ON	Bottom	20.6	21.0	22.4	0.699	0.766
20300	1745.00	QPSK 20M_1RB_0	10	ON	Bottom	20.5	21.0	22.4	0.789	0.885

Test results Body SAR LTE Band 5

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
20600	844.00	QPSK 10M_1RB_0	10	OFF	Front	23.40	24.00	22.5	0.264	0.303
20600	844.00	QPSK 10M_1RB_0	10	OFF	Back	23.40	24.00	22.5	0.309	0.355
20600	844.00	QPSK 10M_1RB_0	10	OFF	Left	23.40	24.00	22.5	0.059	0.067
20600	844.00	QPSK 10M_1RB_0	10	OFF	Right	23.40	24.00	22.5	0.227	0.261
20600	844.00	QPSK 10M_1RB_0	10	OFF	Bottom	23.40	24.00	22.5	0.101	0.116
20600	844.00	QPSK 10M_25RB_25	10	OFF	Front	22.2	23.0	22.5	0.214	0.257
20600	844.00	QPSK 10M_25RB_25	10	OFF	Back	22.2	23.0	22.5	0.249	0.299
20600	844.00	QPSK 10M_25RB_25	10	OFF	Left	22.2	23.0	22.5	0.040	0.048
20600	844.00	QPSK 10M_25RB_25	10	OFF	Right	22.2	23.0	22.5	0.153	0.184
20600	844.00	QPSK 10M_25RB_25	10	OFF	Bottom	22.2	23.0	22.5	0.091	0.109

Test results Body SAR LTE Band 7

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
21100	2535.00	QPSK 20M_1RB_0	10	OFF	Front	20.0	20.5	22.2	0.455	0.511
21100	2535.00	QPSK 20M_1RB_0	10	OFF	Back	20.0	20.5	22.2	0.485	0.544
21100	2535.00	QPSK 20M_1RB_0	10	OFF	Left	20.0	20.5	22.2	0.467	0.524
21100	2535.00	QPSK 20M_1RB_0	10	OFF	Right	20.0	20.5	22.2	0.079	0.088
21100	2535.00	QPSK 20M_1RB_0	10	OFF	Bottom	20.0	20.5	22.2	0.409	0.459
21100	2535.00	QPSK 20M_50RB_50	10	OFF	Front	20.0	20.5	22.2	0.449	0.504
21100	2535.00	QPSK 20M_50RB_50	10	OFF	Back	20.0	20.5	22.2	0.460	0.516
21100	2535.00	QPSK 20M_50RB_50	10	OFF	Left	20.0	20.5	22.2	0.462	0.518
21100	2535.00	QPSK 20M_50RB_50	10	OFF	Right	20.0	20.5	22.2	0.074	0.083
21100	2535.00	QPSK 20M_50RB_50	10	OFF	Bottom	20.0	20.5	22.2	0.415	0.466

Test results Body SAR LTE Band 12

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
23130	711.0	QPSK/10M_1RB_0	10	OFF	Front	23.2	24.0	22.4	0.248	0.298
23130	711.0	QPSK/10M_1RB_0	10	OFF	Back	23.2	24.0	22.4	0.275	0.331
23130	711.0	QPSK/10M_1RB_0	10	OFF	Left	23.2	24.0	22.4	0.159	0.191
23130	711.0	QPSK/10M_1RB_0	10	OFF	Right	23.2	24.0	22.4	0.194	0.233
23130	711.0	QPSK/10M_1RB_0	10	OFF	Bottom	23.2	24.0	22.4	0.029	0.035
23130	711.0	QPSK/10M_25RB_0	10	OFF	Front	22.0	23.0	22.4	0.197	0.248
23130	711.0	QPSK/10M_25RB_0	10	OFF	Back	22.0	23.0	22.4	0.212	0.267
23130	711.0	QPSK/10M_25RB_0	10	OFF	Left	22.0	23.0	22.4	0.124	0.156
23130	711.0	QPSK/10M_25RB_0	10	OFF	Right	22.0	23.0	22.4	0.160	0.201
23130	711.0	QPSK/10M_25RB_0	10	OFF	Bottom	22.0	23.0	22.4	0.022	0.028

Test results Body SAR LTE Band 41

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	MHz								Measured	Reported
41490	2680.00	QPSK/20M_1RB_99	10	OFF	Front	20.2	20.5	22.4	0.132	0.141
41490	2680.00	QPSK/20M_1RB_99	10	OFF	Back	20.2	20.5	22.4	0.125	0.134
41490	2680.00	QPSK/20M_1RB_99	10	OFF	Left	20.2	20.5	22.4	0.123	0.132
41490	2680.00	QPSK/20M_1RB_99	10	OFF	Right	20.2	20.5	22.4	0.013	0.014
41490	2680.00	QPSK/20M_1RB_99	10	OFF	Bottom	20.2	20.5	22.4	0.169	0.181
41490	2680.00	QPSK/20M_50RB_50	10	OFF	Front	20.1	20.5	22.4	0.127	0.139
41490	2680.00	QPSK/20M_50RB_50	10	OFF	Back	20.1	20.5	22.4	0.118	0.129
41490	2680.00	QPSK/20M_50RB_50	10	OFF	Left	20.1	20.5	22.4	0.117	0.128
41490	2680.00	QPSK/20M_50RB_50	10	OFF	Right	20.1	20.5	22.4	0.013	0.014
41490	2680.00	QPSK/20M_50RB_50	10	OFF	Bottom	20.1	20.5	22.4	0.162	0.178

Test results Body SAR Wi-Fi 802.11b Chain0

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	GHz							Measured	Reported
6	2437.00	1 Mbps	10	Front	13.6	14.0	22.5	0.040	0.044
6	2437.00	1 Mbps	10	Back	13.6	14.0	22.5	0.095	0.104
6	2437.00	1 Mbps	10	Right	13.6	14.0	22.5	0.012	0.013
6	2437.00	1 Mbps	10	Top	13.6	14.0	22.5	0.017	0.018
1	2412.00	1 Mbps	10	Back	13.4	14.0	22.5	0.106	0.122
11	2462.00	1 Mbps	10	Back	13.1	14.0	22.5	0.092	0.113

Test results Body SAR Wi-Fi 802.11b Chain1

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	GHz							Measured	Reported
1	2412.00	1 Mbps	10	Front	13.9	14.0	22.5	0.054	0.055
1	2412.00	1 Mbps	10	Back	13.9	14.0	22.5	0.042	0.043
1	2412.00	1 Mbps	10	Left	13.9	14.0	22.5	0.010	0.010
1	2412.00	1 Mbps	10	Top	13.9	14.0	22.5	0.006	0.006
6	2437.00	1 Mbps	10	Back	13.7	14.0	22.5	0.033	0.035
11	2462.00	1 Mbps	10	Back	13.9	14.0	22.5	0.037	0.038

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Test results Body SAR Wi-Fi 802.11ac Chain0

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	GHz							Measured	Reported
58	5290.00	VHT80	15	Front	9.3	10.0	22.5	0.013	0.015
58	5290.00	VHT80	15	Back	9.3	10.0	22.5	0.049	0.058
122	5610.00	VHT80	15	Front	9.9	10.0	22.5	0.017	0.017
122	5610.00	VHT80	15	Back	9.9	10.0	22.5	0.071	0.072
155	5775.00	VHT80	15	Front	9.7	10.0	22.5	0.015	0.016
155	5775.00	VHT80	15	Back	9.7	10.0	22.5	0.051	0.055

Test results Body SAR Wi-Fi 802.11ac Chain1

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 1g	
Ch.	GHz							Measured	Reported
58	5290.00	VHT80	15	Front	9.9	10.0	22.5	0.017	0.018
58	5290.00	VHT80	15	Back	9.9	10.0	22.5	0.015	0.015
106	5530.00	VHT80	15	Front	9.6	10.0	22.5	0.046	0.051
106	5530.00	VHT80	15	Back	9.6	10.0	22.5	0.029	0.032
155	5775.00	VHT80	15	Front	9.1	10.0	22.5	0.026	0.032
155	5775.00	VHT80	15	Back	9.1	10.0	22.5	0.033	0.041

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5.3.3 Extremity Test Result

The overall diagonal dimension of this phone is > 16.0cm, so the phone is classified as a phablet. According to the KDB648474 D04, extremity SAR evaluation is required for phablet product.

Per KDB 648474D04, when hotspot mode applies 10g extremity SAR is required only for the surfaces and edges with hotspot mode 1g reported SAR > 1.2 w/kg, however when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with 1.2 w/kg SAR test reduction threshold. Extremity SAR test is not required as all hotspot mode 1g reported is < 1.2 w/kg.


According to the test results of hotspot mode for each frequency bands and the scaled SAR, only below bands require extremity SAR testing.

Test results extremity SAR GSM 1900

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	MHz								Measured	Reported
810	1909.80	GPRS(2)	0	OFF	Front	28.6	28.9	22.6	1.680	1.800
810	1909.80	GPRS(2)	0	OFF	Back	28.6	28.9	22.6	1.760	1.886
810	1909.80	GPRS(2)	0	OFF	Bottom	28.6	28.9	22.6	0.515	0.552
810	1909.80	GPRS(2)	0	OFF	Left	28.6	28.9	22.6	0.603	0.646
810	1909.80	GPRS(2)	0	OFF	Right	28.6	28.9	22.6	0.044	0.047


Test results extremity SAR UMTS B2

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	MHz								Measured	Reported
9400	1880.00	RMC	0	OFF	Bottom	22.2	22.2	22.6	0.495	0.495
9400	1880.00	RMC	0	OFF	Front	22.2	22.2	22.6	2.050	2.050
9400	1880.00	RMC	0	OFF	Back	22.2	22.2	22.6	2.230	2.230
9262	1852.40	RMC	0	OFF	Back	22.1	22.2	22.6	2.100	2.149
9538	1907.60	RMC	0	OFF	Back	22.2	22.2	22.6	2.360	2.360
9400	1880.00	RMC	0	OFF	Left	22.2	22.2	22.6	0.687	0.687
9400	1880.00	RMC	0	OFF	Right	22.2	22.2	22.6	0.050	0.050

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Test results extremity SAR LTE Band 2

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	MHz								Measured	Reported
19100	1900.00	QPSK 20M_1RB_0	0	OFF	Bottom	21.80	22.20	22.6	0.440	0.482
19100	1900.00	QPSK 20M_1RB_0	0	OFF	Front	21.80	22.20	22.6	1.830	2.007
19100	1900.00	QPSK 20M_1RB_0	0	OFF	Back	21.80	22.20	22.6	1.890	2.072
19100	1900.00	QPSK 20M_1RB_0	0	OFF	Left	21.80	22.20	22.6	0.609	0.668
19100	1900.00	QPSK 20M_1RB_0	0	OFF	Right	21.80	22.20	22.6	0.041	0.045
18900	1880.00	QPSK 20M_50RB_50	0	OFF	Front	21.70	22.20	22.6	2.090	2.345
18900	1880.00	QPSK 20M_50RB_50	0	OFF	Back	21.70	22.20	22.6	1.930	2.165
18900	1880.00	QPSK 20M_50RB_50	0	OFF	Left	21.70	22.20	22.6	0.511	0.573
18900	1880.00	QPSK 20M_50RB_50	0	OFF	Right	21.70	22.20	22.6	0.039	0.044
18900	1880.00	QPSK 20M_50RB_50	0	OFF	Bottom	21.70	22.20	22.6	0.580	0.651
18700	1860.00	QPSK 20M_50RB_50	0	OFF	Front	21.20	22.20	22.6	2.100	2.644
19100	1900.00	QPSK 20M_50RB_50	0	OFF	Front	21.50	22.20	22.6	1.710	2.009
18700	1860.00	QPSK 20M_50RB_50	0	OFF	Back	21.20	22.20	22.6	2.390	3.009
19100	1900.00	QPSK 20M_50RB_50	0	OFF	Back	21.50	22.20	22.6	1.890	2.221

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Test results extremity SAR LTE Band 4

Frequency		Configuration	Distance (mm)	Hotspot	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	MHz								Measured	Reported
20175	1732.50	QPSK 20M_1RB_0	0	OFF	Front	22.1	22.5	22.4	1.520	1.592
20175	1732.50	QPSK 20M_1RB_0	0	OFF	Back	22.1	22.5	22.4	2.130	2.230
20175	1732.50	QPSK 20M_1RB_0	0	OFF	Left	22.1	22.5	22.4	0.247	0.259
20175	1732.50	QPSK 20M_1RB_0	0	OFF	Right	22.1	22.5	22.4	0.064	0.067
20175	1732.50	QPSK 20M_1RB_0	0	OFF	Bottom	22.1	22.5	22.4	0.474	0.496
20175	1732.50	QPSK 20M_50RB_0	0	OFF	Front	22.0	22.5	22.4	1.760	1.930
20175	1732.50	QPSK 20M_50RB_0	0	OFF	Back	22.0	22.5	22.4	2.140	2.346
20175	1732.50	QPSK 20M_50RB_0	0	OFF	Left	22.0	22.5	22.4	0.240	0.263
20175	1732.50	QPSK 20M_50RB_0	0	OFF	Right	22.0	22.5	22.4	0.063	0.070
20175	1732.50	QPSK 20M_50RB_0	0	OFF	Bottom	22.0	22.5	22.4	0.455	0.499
20050	1720.00	QPSK 20M_50RB_0	0	OFF	Back	21.9	22.5	22.4	2.080	2.388
20300	1745.00	QPSK 20M_50RB_0	0	OFF	Back	21.7	22.5	22.4	2.290	2.753

Test results extremity SAR Wi-Fi 802.11ac Chain0

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	GHz							Measured	Reported
122	5610.00	VHT80	0	Front	9.9	10.0	22.5	0.062	0.063
122	5610.00	VHT80	0	Back	9.9	10.0	22.5	1.000	1.023
122	5610.00	VHT80	0	Right	9.9	10.0	22.5	0.039	0.039
122	5610.00	VHT80	0	Top	9.9	10.0	22.5	0.012	0.012
58	5290.00	VHT80	0	Back	9.3	10.0	22.5	0.426	0.501
155	5775.00	VHT80	0	Back	9.7	10.0	22.5	0.332	0.356

Test results extremity SAR Wi-Fi 802.11ac Chain1

Frequency		Config. (Bit Rate)	Distance (mm)	Position	Meas. Avg. power [dBm]	Max. Output power [dBm]	Liquid T [°C]	SAR 10g	
Ch.	GHz							Measured	Reported
58	5290.00	VHT80	0	Front	9.9	10.0	22.5	0.053	0.054
58	5290.00	VHT80	0	Back	9.9	10.0	22.5	0.121	0.124
58	5290.00	VHT80	0	Left	9.9	10.0	22.5	0.018	0.019
58	5290.00	VHT80	0	Top	9.9	10.0	22.5	0.021	0.021
122	5610.00	VHT80	0	Back	9.6	10.0	22.5	0.189	0.207
155	5775.00	VHT80	0	Back	9.1	10.0	22.5	0.148	0.182

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5.3.4 SAR measurement variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements.

When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

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

Per the measurement result from above, the reported SAR of this product are below 0.8W/Kg for all frequency bands, so no additional variability measurement was made.

Frequency band	Test configuration	Highest measurement result at worst case position (W/kg)	Second measurement result at worst case position (W/kg)	Ratio <1.2
GSM1900	Hotspot 10mm, bottom	1.1	1.11	Yes
UMTS B2	Hotspot 10mm, bottom	1.144	1.144	Yes
LTE B2	Hotspot 10mm, bottom	0.903	0.852	Yes
LTE B4	Hotspot 10mm, bottom	0.885	0.822	Yes

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5.3.5 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

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

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, where:

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

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Frequency Band	Freq. (MHz)	Max. declared Pavg(dBm)	Max. declared Pavg(mW)	Test Exclusion
WiFi 2450	2450	14	25.2	No
WiFi 5G MIMO	5180~5825	10	10	No

SAR test exclusion evaluation for Head position (min test separation distance=5mm)

Frequency Band	Freq. (MHz)	Max. declared Pavg(dBm)	Max. declared Pavg(mW)	Test Exclusion
WiFi 2450	2450	14	25.2	No


SAR test exclusion evaluation for Hotspot mode (min test separation distance=10mm)

Frequency Band	Freq. (MHz)	Max. declared Pavg(dBm)	Max. declared Pavg(mW)	Test Exclusion
WiFi 2450	2450	14	25.2	No
WiFi 5G MIMO	5180~5825	10	10	No
Bluetooth	2450	11.5	14.13	Yes

SAR test exclusion evaluation for Body-worn (min test separation distance=15mm)

5.3.6 Multiple Transmitter Information

Exposure Condition	Item	Capable Transmit Configurations
Head	1	GSM + DTS
	2	GSM + UNII
	3	UMTS + DTS
	4	UMTS + UNII
	5	LTE + DTS
	6	LTE + UNII
Body-worn	7	GSM + DTS
	8	GSM + UNII
	9	GSM + BT
	10	GSM + UNII + BT
	11	UMTS + DTS
	12	UMTS + UNII
	13	UMTS + BT
	14	UMTS + UNII + BT
	15	LTE + DTS
	16	LTE + UNII
	17	LTE + BT
	18	LTE + UNII + BT
	19	UNII + BT
Hotspot	20	GSM + DTS
	21	GSM + UNII
	22	UMTS + DTS
	23	UMTS + UNII
	24	LTE + DTS
	25	LTE + UNII

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Evaluations of the head, body-worn and hotspot simultaneous SAR summations for the worst-case SAR transmitter configurations are presented in the tables below.

Exposure Conditions	① WWAN	② DTS		③ UNII		④ BT *	①+②		①+③		①+③+④	
		Chain0	Chain1	Chain0	Chain1		Σ 1g SAR, w/kg	SPLSR	Σ 1g SAR, w/kg	SPLSR	Σ 1g SAR, w/kg	SPLSR
Head	0.370	0.388	0.209	0.081	0.307	X	0.967	N/A	0.758	N/A	X	N/A
Body-worn	0.544	0.122	0.055	0.072	0.051	0.197	0.721	N/A	0.667	N/A	0.864	N/A
Hotspot	1.144	0.122	0.055	X	X	X	1.321	N/A	X	N/A	X	N/A

For the transmitters requiring stand-alone SAR testing, the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required.

*Where the estimated SAR for Bluetooth can be get from below table

Estimated SAR					
Frequency band	Freq. (GHz)	Distance (mm)	Max. declared Pavg(dBm)	Max. declared Pavg(mW)	Estimated 1g (W/kg)
Bluetooth Body	2.45	15	11.5	14.13	0.197

Calculated SARmax for Bluetooth 2450MHz

When standalone SAR test exclusion applies 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.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

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6 TEST EQUIPMENT UTILIZED

6.1 Dosimetric System

The Laboratory utilizes a Dosimetric Assessment System (DASY52™) manufactured by SPEAG, of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure.

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The list of calibrated equipment used for the measurements is shown in the following table.

Instrument	Type	Manufacture	Serial Number	Cal Date	Cal Due Date
DAE	DAE4	SPEAG	854	2014.12.15	2015-12-14
DAE	DAE4	SPEAG	1325	2015.02.12	2016-02-11
DAE	DAE4	SPEAG	1326	2015.02.11	2016.02.10
DAE	DAE4	SPEAG	1437	2015.07.23	2016.07.22
Probe	EX3DV4	SPEAG	3293	2015.07.20	2016.07.19
Probe	ES3DV3	SPEAG	3169	2014.12.16	2015.12.15
Probe	ES3DV3	SPEAG	3170	2014.12.16	2015.12.15
Probe	EX3DV4	SPEAG	7306	2015.07.21	2016.07.20
Dipole Validation Kit	D750V2	SPEAG	1055	2015.07.23	2016.07.22
Dipole Validation Kit	D835V2	SPEAG	4d060	2015.07.23	2016.07.22
Dipole Validation Kit	D900V2	SPEAG	1d065	2015.07.23	2016.07.22
Dipole Validation Kit	D1800V2	SPEAG	2d159	2015.07.16	2016.07.15
Dipole Validation Kit	D1900V2	SPEAG	5d092	2015.07.23	2016.07.22
Dipole Validation Kit	D2450V2	SPEAG	805	2015.07.21	2016.07.20
Dipole Validation Kit	D2600V2	SPEAG	1088	2015.07.21	2016.07.20
Dipole Validation Kit	D5GHzV2	SPEAG	1061	2015.07.20	2016.07.19
SAM Phantom	V4.0	SPEAG	TP-1488	-	-
SAM Phantom	V4.0	SPEAG	TP-1489	-	-
ELI4 Phantom	ELI4	SPEAG	1041	-	-
SAM Phantom	V4.0	SPEAG	TP-1696	-	-
SAM Phantom	V4.0	SPEAG	TP-1697	-	-
ELI4 Phantom	ELI4	SPEAG	1164	-	-
MFP Phantom	V5.1C	SPEAG	1164/1/2/3	-	-

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6.2 Additional Equipment


Instrument	Type	Manufacture	Serial Number	Cal Date	Cal Due Date
Signal generator	SML03	R&S	103818	2015.06.02	2016.06.01
Signal generator	SMR20	R&S	102049	2015.06.02	2016.06.01
Directional coupler	HP778D	Agilent	20500	2015.06.02	2016.06.01
Directional coupler	11691D	Agilent	MY4815020	2015.06.03	2016.06.02
Power meter	NRVD	R&S	102081	2015.06.02	2016.06.01
Power sensor	NRV-Z5	R&S	100538	2015.06.02	2016.06.01
Power sensor	NRV-Z5	R&S	100539	2015.06.02	2016.06.01
Network analyzer	E5071C	Agilent	MY46104758	2015.06.02	2016.06.01
Amplifier	0.3-3GHz	Bonn Elektronik	087193A	2015.06.02	2016.06.01
Amplifier	2-6GHz	Bonn Elektronik	087193B	2015.06.02	2016.06.01
Wireless Communication Test Set	CMU200	R&S	117336	2015.05.29	2016.05.28
Wireless Communication Test Set	CMU200	R&S	116498	2015.06.01	2016.05.31
Wireless Communication Test Set	CMW500	R&S	115793	2015.05.29	2016.05.28
Wireless Communication Test Set	MT8820C	Anritsu	6201274349	2015.07.09	2016.07.08

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7 MEASUREMENT UNCERTAINTY

According to IEEE 1528 and IEC 62209, Valid for frequency range 300MHz - 3GHz

Uncertainty Component	Unc. Value % (1g)	Unc. Value % (10g)	Probably Distribution	Div.	C 1g	C 10g	Std. Unc.% (1g)	Std. Unc.% (10g)
Measurement System								
Probe Calibration	6.0	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	4.7	R	$\sqrt{3}$	0.71	0.71	1.9	1.9
Hemispherical Isotropy	9.6	9.6	R	$\sqrt{3}$	0.71	0.71	3.9	3.9
Boundary Effect	1.0	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
System Detection Limits	1.0	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	0.3	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration Time	2.6	2.6	R	$\sqrt{3}$	1	1	1.5	1.5
RF Ambient Conditions - Noise	3.0	3.0	R	$\sqrt{3}$	1	1	1.7	1.7
RF Ambient Conditions - Reflections	3.0	3.0	R	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech. Tolerance	0.4	0.4	R	$\sqrt{3}$	1	1	0.2	0.2
Probe Positioning w.r.t Phantom	2.9	2.9	R	$\sqrt{3}$	1	1	1.7	1.7
Post-processing	1.0	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Test Sample Related								
Test Sample Positioning	3.6	1.7	N	1	1	1	3.6	1.7
Device Holder Uncertainty	0.3	1.0	N	1	1	1	0.3	1.0
SAR drift	5.0	5.0	R	$\sqrt{3}$	1	1	2.9	2.9
Phantom and Tissue Parameters								
Phantom Uncertainty	4.0	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Liquid Conductivity (target)	5.0	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2
Liquid Conductivity (measurement)	2.8	2.8	N	1	0.64	0.43	1.8	1.2
Liquid Permittivity (target)	5.0	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4
Liquid Permittivity (measurement)	3.3	3.3	N	1	0.6	0.49	2.0	1.6
Combined Standard Uncertainty (%)							10.7	10.0
Expanded Uncertainty (95% CONFIDENCE LEVEL, k=2)							21.4	20.0

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According to IEEE 1528 and IEC 62209, Valid for frequency range 3GHz - 6GHz

Uncertainty Component	Unc. Value % (1g)	Unc. Value % (10g)	Probably Distribution	Div.	C 1g	C 10g	Std. Unc. % (1g)	Std. Unc. % (10g)
Measurement System								
Probe Calibration	6.6	6.6	N	1	1	1	6.6	6.6
Axial Isotropy	4.7	4.7	R	√3	0.71	0.71	1.9	1.9
Hemispherical Isotropy	9.6	9.6	R	√3	0.71	0.71	3.9	3.9
Boundary Effect	2.0	2.0	R	√3	1	1	1.2	1.2
Linearity	4.7	4.7	R	√3	1	1	2.7	2.7
System Detection Limits	1.0	1.0	R	√3	1	1	0.6	0.6
Readout Electronics	0.3	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	0.0	R	√3	1	1	0.0	0.0
Integration Time	2.6	2.6	R	√3	1	1	1.5	1.5
RF Ambient Conditions - Noise	3.0	3.0	R	√3	1	1	1.7	1.7
RF Ambient Conditions - Reflections	3.0	3.0	R	√3	1	1	1.7	1.7
Probe Positioner Mech. Tolerance	0.4	0.4	R	√3	1	1	0.2	0.2
Probe Positioning w.r.t Phantom	6.7	6.7	R	√3	1	1	3.9	3.9
Post-processing	4.0	4.0	R	√3	1	1	2.3	2.3
Test Sample Related								
Test Sample Positioning	2.9	0.6	N	1	1	1	2.9	0.6
Device Holder Uncertainty	0.3	1.0	N	1	1	1	0.3	1.0
SAR drift	5.0	5.0	R	√3	1	1	2.9	2.9
Phantom and Tissue Parameters								
Phantom Uncertainty	4.0	4.0	R	√3	1	1	2.3	2.3
Liquid Conductivity (target)	5.0	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid Conductivity (measurement)	2.6	2.6	N	1	0.64	0.43	1.7	1.1
Liquid Permittivity (target)	10.0	10.0	R	√3	0.6	0.49	3.5	2.8
Liquid Permittivity (measurement)	2.1	2.1	N	1	0.6	0.49	1.3	1.0
Combined Standard Uncertainty (%)							11.9	11.3
Expanded Uncertainty (95% CONFIDENCE LEVEL, k=2)							23.8	22.5

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8 GLOSSARY

BW	-	Bandwidth
DTS	-	Distributed Transmission System
DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
LTE	-	Long Term Evolution
NA	-	Not Applicable
NP	-	Not Performed
PCE	-	Personal Consumption Expenditure
OET	-	Office of Engineering and Technology
RB	-	Resource Block(s)
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
SPLSR	-	SAR-to-(peak-locations spacing) ratio
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure

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