Part 0 SAR Char Report

The following samples were submitted and identified on behalf of the client as:

Equipment Under Test	Notebook Computer
Brand Name	HP
Model No.	HSN-I32C
Company Name	HP Inc.
Company Address	1501 Page Mill Road, Palo Alto CA 94304 USA
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013
FCC ID	B94HNI32CTKR
Date of Receipt	Sep. 03, 2020
Date of Test(s)	Oct. 04, 2020 ~ Oct. 06, 2020
Date of Issue	Nov. 03, 2020

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Ltd. Central RF Lab or testing done by SGS Taiwan Ltd. Central RF Lab in connection with distribution or use of the product described in this report must be approved by SGS Taiwan Ltd. Central RF Lab in writing.

Signed on behalf of SGS

Clerk / Ruby Ou	Engineer / Jay Tseng	Asst. Manager / John Yeh
Ruby Ou	Jay Tseng	John Yeh

Date: Nov. 03, 2020

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Revision History

Report Number	Revision	Description	Issue Date
ES/2020/90007	Rev.00	Initial creation of document	Nov. 03, 2020

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0. Guidance applied

The SAR testing method and procedure for this device is in accordance with the following standards:

IEEE/ANSI C95.1-1992
IEEE 1528-2013
KDB616217D04v01r02
KDB865664D01v01r04
KDB865664D02v01r02
KDB941225D01v03r01
KDB941225D05v02r05
KDB941225D05Av01r02
KDB447498D01v06

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1. General Information

1.1 Testing Laboratory

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Fax	+886-2-2298-0488
Internet	http://www.tw.sgs.com/

1.2 Details of Applicant

Company Name	HP Inc.
Company Address	1501 Page Mill Road, Palo Alto CA 94304 USA

1.3 Description of EUT

<table>
<tr><td>Equipment Under Test</td><td colspan="3">Notebook Computer</td></tr>
<tr><td>Brand Name</td><td colspan="3">HP</td></tr>
<tr><td>Model No.</td><td colspan="3">HSN-I32C</td></tr>
<tr><td>FCC ID</td><td colspan="3">B94HNI32CTKR</td></tr>
<tr><td rowspan="2">Integrated Module</td><td>WLAN</td><td colspan="2">Brand Name : Intel
Model Name : AX201D2W</td></tr>
<tr><td>WWAN</td><td colspan="2">Brand Name : Foxconn
Model Name : T99W175</td></tr>
<tr><td>Mode of Operation</td><td colspan="3">☒WCDMA ☒HSDPA ☒HSUPA
☒HSPA+ ☒DC-HSDPA
☒LTE FDD ☒LTE TDD ☒5G NR
☒WLAN802.11 a/b/g/n/ac/ax(20M/40M/80M/160M)
☒Bluetooth</td></tr>
<tr><td rowspan="7">Duty Cycle</td><td>WCDMA</td><td colspan="2">100%</td></tr>
<tr><td>LTE FDD</td><td colspan="2">100%</td></tr>
<tr><td>LTE TDD Power Class 3</td><td colspan="2">63.3%</td></tr>
<tr><td>LTE TDD Power Class 2</td><td colspan="2">43.3%</td></tr>
<tr><td>5G NR</td><td colspan="2">100%</td></tr>
<tr><td>WLAN802.11 a/b/g/n/ac/ax(20M/40M/80M/160M)</td><td colspan="2">100%</td></tr>
<tr><td>Bluetooth</td><td colspan="2">100%</td></tr>
<tr><td rowspan="7">TX Frequency Range (MHz)</td><td colspan="3">Tx5 antenna</td></tr>
<tr><td>WCDMA Band II</td><td colspan="2">1850 — 1910</td></tr>
<tr><td>WCDMA Band IV</td><td colspan="2">1710 — 1755</td></tr>
<tr><td>WCDMA Band V</td><td colspan="2">824 — 849</td></tr>
<tr><td>LTE FDD Band 2</td><td colspan="2">1850 — 1910</td></tr>
<tr><td>LTE FDD Band 4</td><td colspan="2">1710 — 1755</td></tr>
<tr><td>LTE FDD Band 5</td><td colspan="2">824 — 849</td></tr>
</table>

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TX Frequency Range (MHz)	LTE FDD Band 7	2500	–	2570
	LTE FDD Band 12	699	–	716
	LTE FDD Band 13	777	–	787
	LTE FDD Band 14	788	–	798
	LTE FDD Band 17	704	–	716
	LTE FDD Band 25	1850	–	1915
	LTE FDD Band 26	814	–	849
	LTE FDD Band 30	2305	–	2315
	LTE TDD Band 38 Power Class 3	2570	–	2620
	LTE TDD Band 41 Power Class 2/3	2496	–	2690
	LTE FDD Band 66	1710	–	1780
	n2	1850	–	1910
	n5	824	–	849
	n12	699	–	716
	n66	1710	–	1780
	Tx8 antenna			
	LTE FDD Band 2	1850	–	1910
	LTE FDD Band 7	2500	–	2570
	LTE FDD Band 42 Power Class 3	3400	–	3600
	LTE FDD Band 48 Power Class 3	3550	–	3700
	LTE FDD Band 66	1710	–	1780
	n2	1850	–	1910
	n7	2500	–	2570
	n41 Power Class 2/3	2496	–	2690
	n66	1710	–	1780
	WLAN/BT			
	WLAN802.11 b/g/n/ax(20M)	2412	–	2472
	WLAN802.11 n/ax(40M)	2422	–	2462

TX Frequency Range (MHz)	WLAN802.11 a/n/ac/ax(20M) 5.2G	5180 — 5240
	WLAN802.11 n/ac/ax(40M) 5.2G	5190 — 5230
	WLAN802.11 ac/ax(80M) 5.2G	5210
	WLAN802.11 ac/ax(160M) 5.2G	5250
	WLAN802.11 a/n/ac/ax(20M) 5.3G	5260 — 5320
	WLAN802.11 n/ac/ax(40M) 5.3G	5270 — 5310
	WLAN802.11 ac/ax(80M) 5.3G	5290
	WLAN802.11 a/n/ac/ax(20M) 5.6G	5500 — 5720
	WLAN802.11 n/ac/ax(40M) 5.6G	5510 — 5710
	WLAN802.11 ac/ax(80M) 5.6G	5530 — 5690
	WLAN802.11 ac/ax(160M) 5.6G	5570
	WLAN802.11 a/n/ac/ax(20M) 5.8G	5745 — 5825
	WLAN802.11 n/ac/ax(40M) 5.8G	5755 — 5795
	WLAN802.11 ac/ax(80M) 5.8G	5775
	Bluetooth	2402 — 2480
Channel Number (ARFCN)	Tx5 antenna	
	WCDMA Band II	9262 — 9538
	WCDMA Band IV	1312 — 1513
	WCDMA Band V	4132 — 4233
	LTE FDD Band 2	18607 — 19193
	LTE FDD Band 4	19957 — 20393
	LTE FDD Band 5	20407 — 20643
	LTE FDD Band 7	20775 — 21425
	LTE FDD Band 12	23017 — 23173
	LTE FDD Band 13	23205 — 23255
	LTE FDD Band 14	23305 — 23355
	LTE FDD Band 17	23755 — 23825

Channel Number (ARFCN)	LTE FDD Band 25	26047	–	26683
	LTE FDD Band 26	26697	–	27033
	LTE FDD Band 30	27685	–	27735
	LTE TDD Band 38 Power Class 3	37775	–	38225
	LTE TDD Band 41 Power Class 2/3	39675	–	41565
	LTE FDD Band 66	131979	–	132665
	n2	370500	–	381500
	n5	165300	–	169300
	n12	140300	–	142200
	n66	342500	–	355500
	Tx8 antenna			
	LTE FDD Band 2	18607	–	19193
	LTE FDD Band 7	20775	–	21425
	LTE FDD Band 42 Power Class 3	41615	–	43565
	LTE FDD Band 48 Power Class 3	55265	–	56715
	LTE FDD Band 66	131979	–	132665
	n2	370500	–	381500
	n7	500500	–	513500
	n41 Power Class 2/3	501204	–	535998
	n66	342500	–	355500
	WLAN/BT			
	WLAN802.11 b/g/n/ax(20M)	1	–	13
	WLAN802.11 n/ax(40M)	3	–	11
	WLAN802.11 a/n/ac/ax(20M) 5.2G	36	–	48
	WLAN802.11 n/ac/ax(40M) 5.2G	38	–	46
	WLAN802.11 ac/ax(80M) 5.2G	42		
	WLAN802.11 ac/ax(160M) 5.2G	50		
	WLAN802.11 a/n/ac/ax(20M) 5.3G	52	–	64
	WLAN802.11 n/ac/ax(40M) 5.3G	54	–	62

Channel Number (ARFCN)	WLAN802.11 ac/ax(80M) 5.3G	58		
	WLAN802.11 a/n/ac/ax(20M) 5.6G	100	—	144
	WLAN802.11 n/ac/ax(40M) 5.6G	102	—	142
	WLAN802.11 ac/ax(80M) 5.6G	106	—	138
	WLAN802.11 ac/ax(160M) 5.6G	114		
	WLAN802.11 a/n/ac/ax(20M) 5.8G	149	—	165
	WLAN802.11 n/ac/ax(40M) 5.8G	151	—	159
	WLAN802.11 ac/ax(80M) 5.8G	155		
	Bluetooth	0	—	78

This device uses the Qualcomm® Smart Transmit feature to control and manage transmitting power in real time and to ensure the time-averaged RF exposure is in compliance with the FCC requirement at all times for 3G/4G/5G Sub-6 NR WWAN operations. Additionally, this device supports WLAN/BT technologies, but the output power of these modems is not controlled by the Smart Transmit algorithm.

Antenna Information

Notebook mode							
Vendor	AWAN						
Antenna	Mian Tx5 (PIFA)						
Part Number	6036B0285701(AUF6Y-100027)						
Frequency	699~716	777~798	814~849	1710~1780	1850~1915	2300~2400	2496~2690
Gain (dBi)	-4.53	-3.46	-0.89	1.95	1.79	2.04	0.41

Tablet mode							
Vendor	AWAN						
Antenna	Mian Tx5 (PIFA)						
Part Number	6036B0285701(AUF6Y-100027)						
Frequency	699~716	777~798	814~849	1710~1780	1850~1915	2300~2400	2496~2690
Gain (dBi)	-7.42	-5.07	-3.38	-2.38	-1.15	-4.79	-5.30

Notebook mode				
Vendor	AWAN			
Antenna	Aux3 Tx8 (PIFA)			
Part Number	6036B0285301(AUP6Y-100093)			
Frequency	1710-1780	1850-1910	2496~2690	3550-3700
Gain (dBi)	1.17	1.62	-3.55	-2.43

Tablet mode				
Vendor	AWAN			
Antenna	Aux3 Tx8 (PIFA)			
Part Number	6036B0285301(AUP6Y-100093)			
Frequency	1710-1780	1850-1910	2496~2690	3550-3700
Gain (dBi)	-0.33	-1.78	-2.22	-5.77

1.4 Time-Averaging for SAR

This device is enabled with Qualcomm® Smart Transmit algorithm to control and manage transmitting power in real time and to ensure that the time-averaged RF exposure from 3G/4G/5G Sub-6 NR WWAN is in compliance with FCC requirements. This Part 0 report shows SAR characterization of WWAN radios for 3G/4G and 5G Sub-6 NR. Characterization is achieved by determining Plimit for 3G/4G and 5G Sub-6 NR that correspond to the exposure design targets after accounting for all device design related uncertainties, i.e., SAR_design_target (< FCC SAR limit) for sub-6 radio. The SAR characterization is denoted as SAR Char in this report. Section 1.5 includes a nomenclature of the specific terms used in this report.

The compliance test under the static transmission scenario and simultaneous transmission analysis are reported in Part 1 report. The validation of the time-averaging algorithm and compliance under the dynamic (time-varying) transmission scenario for WWAN technologies are reported in Part 2 report (report Number could be found in Section 1.6 – Bibliography).

1.5 Nomenclature for Part 0 Report

Technology	Term	Description
3G/4G/5G Sub-6 NR	Plimit	The time-averaged RF power which corresponds to SAR_design_target
	Pmax	Maximum tune-up power level
	SAR_design_target	The SAR design target for SAR compliance. It shall be less than SAR limit after accounting for all device design related uncertainties.
	SAR Char	Plimit for all technologies/bands for all applicable DSI

1.6 Bibliography

Report Type	Report Number
FCC SAR Test Report (Part 1)	ES/2020/90007
RF Exposure Part 2 Test Report	ES/2020/90007

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1.7 Test Environment

Ambient Temperature: 22±2° C
Tissue Simulating Liquid: 22±2° C

1.8 Operation Description

For WWAN, the EUT is controlled by using a Radio Communication Tester, and the communication between the EUT and the tester is established by air link. The device was tested based on FCC guidance (KDB inquiry).

Notebook mode

SAR is measured with display screen open at 90 degree and bottom side of keyboard touch against the flat phantom.

Tablet mode

SAR is measured with backside/edges of tablet mode touch against the flat phantom.

Note

1. For WWAN, there are two TX antennas, the one is WWAN 5 TX located on the keyboard section, the other is WWAN 8 TX antenna located on the top edge of display screen. In order to mitigate RF exposure concern, Qualcomm smart transmit is used in WWAN.

2. For laptop SAR of WWAN 8 TX, SAR is excluded from testing based on the following test exclusion table.

Laptop Mode		LTE B2	LTE B7	LTE B42	LTE B48	LTE B66	n2	n7	n41	n41(HPUE)	n66
Max. tune-up power(dBm)		24	24	24	22	24	24	24	24	27	24
Max. tune-up power(mW)		251.189	251.189	251.189	158.489	251.189	251.189	251.189	251.189	501.187	251.189
Bottom side	Test separation distance (mm)	198	198	198	198	198	198	198	198	198	198
	Calculation value	1588.536	1573.567	1559.057	1557.981	1592.430	1588.536	1573.567	1571.457	1571.457	1592.430
	Require SAR testing?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

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1.9 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage intissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

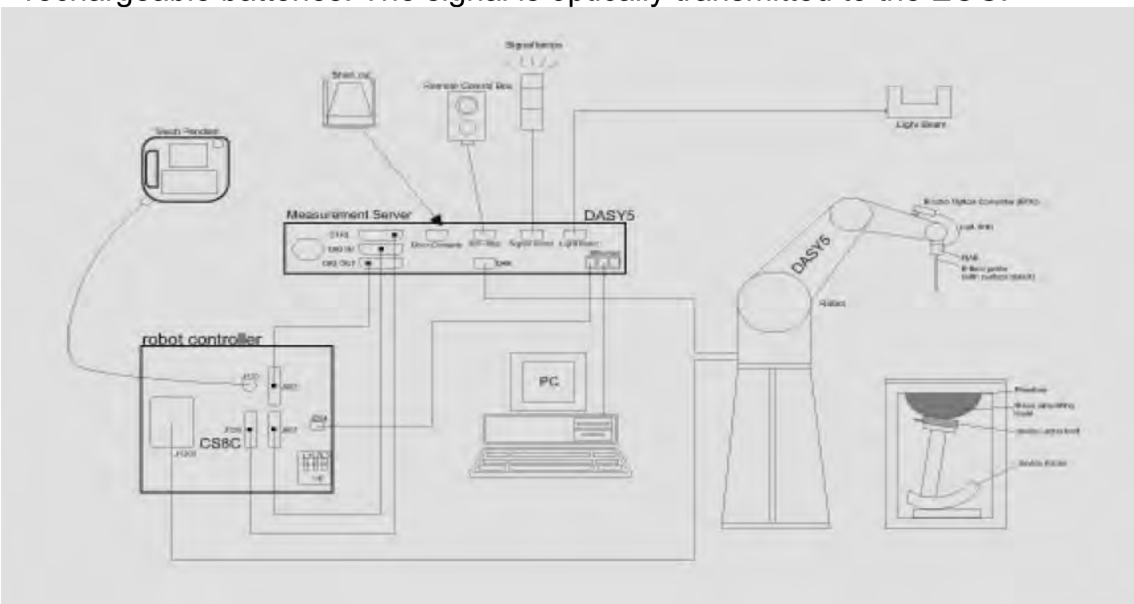

Fig. a The block diagram of SAR system

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4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
7. A computer operating Windows 7.
8. DASY 5 software.
9. Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
10. Tissue simulating liquid mixed according to the given recipes.
11. Validation dipole kits allowing to validate the proper functioning of the system.

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1.10 System Components

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)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 750/835/1750/1900/2300/2600/3500/3700MHz Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Tip diameter: 2.5 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

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PHANTOM

Model	ELI
Construction	The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 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.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 30 liters
Dimensions	Major axis: 600 mm Minor axis: 400 mm

DEVICE HOLDER

Construction	The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin) , which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks.

Device Holder

1.11 Evaluation Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements.

The measured volume of 30x30x30mm contains about 30g of tissue.

The first procedure is an extrapolation (incl. Boundary correction) to get the points

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between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.12 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

1.12.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (E) and the temperature gradient ($\delta T / \delta t$) in the liquid.

$$SAR = \frac{\sigma}{\rho} \left| E \right|^2 = c \frac{\delta T}{\delta t}$$

whereby σ is the conductivity, ρ the density and c the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

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1. The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the thermal equilibrium in the liquid. With a careful setup these errors can be kept small.
2. The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.
3. The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ) , there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.
4. Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about ±10% (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is ±5% (RSS) when the same liquid is used for the calibration and for actual measurements and ±7-9% (RSS) when not, which is in good agreement with the estimates given in [2].

1.12.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.
When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:
1. The setup must enable accurate determination of the incident power.
2. The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.

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3. Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

References

1. N. Kuster, Q. Balzano, and J.C. Lin, Eds., *Mobile Communications Safety*, Chapman & Hall, London, 1997.
2. K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, \Broadband calibration of E-field probes in lossy media", *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 10, pp. 1954{1962, Oct. 1996.
3. K. Jokela, P. Hyysalo, and L. Puranen, \Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", *IEEE Transactions on Instrumentation and Measurements*, vol. 47, no. 2, pp. 432{438, Apr. 1998.

1.13 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,’’ ANSI/IEEE C95.1, By the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1. Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).
2. Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.
3. Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of

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tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section. (Table 4.)

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR (Brain)	1.60 W/Kg	8.00 W/Kg
Spatial Average SAR (Whole Body)	0.08 W/Kg	0.40 W/Kg
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 W/Kg	20.00 W/Kg

Table 4. RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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2. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
SPEAG	Dosimetric E-Field Probe	EX3DV4	7509	Mar.25,2020	Mar.24,2021
SPEAG	System Validation Dipole	D750V3	1015	Aug.13,2020	Aug.12,2021
		D835V2	4d063	Aug.13,2020	Aug.12,2021
		D1750V2	1008	Aug.14,2020	Aug.13,2021
		D1900V2	5d173	Apr.22,2020	Apr.21,2021
		D2300V2	1023	Aug.13,2020	Aug.12,2021
		D2600V2	1005	Jan.29,2020	Jan.28,2021
		D3500V2	1009	Aug.12,2020	Aug.11,2021
		D3700V2	1057	Nov.04,2019	Nov.03,2020
SPEAG	Data acquisition Electronics	DAE4	877	Mar.17,2020	Mar.16,2021
SPEAG	Software	DASY 52 V52.10.4	N/A	Calibration not required	Calibration not required
SPEAG	Phantom	ELI	N/A	Calibration not required	Calibration not required
Agilent	Network Analyzer	E5071C	MY46100433	Dec.13,2019	Dec.12,2020
Agilent	Dielectric Probe Kit	85070E	MY44300677	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	772D	MY46151242	Aug.17,2020	Aug.16,2021
		778D	MY48220468	Aug.17,2020	Aug.16,2021
Agilent	RF Signal Generator	N5181A	MY50141235	May.04,2020	May.03,2021
Agilent	Power Meter	E4417A	MY51410006	Mar.09,2020	Mar.08,2021
Agilent	Power Sensor	E9301H	MY51470001	Mar.09,2020	Mar.08,2021
			MY51470002	Mar.09,2020	Mar.08,2021

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Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
TECPEL	Digital thermometer	DTM-303A	TP130074	Apr.10,2020	Apr.09,2021
Anritsu	Radio Communication Test	MT8820C	6201061049	Dec.08,2019	Dec.07,2020
R&S	Radio Communication Test	CMW 500	125470	Dec.11,2019	Dec.10,2020

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3. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test (3-6G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.55%	N	1	1	1	1	6.55%	6.55%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	0.72%	N	1	1	0.64	0.43	0.46%	0.31%	M
Liquid Conductivity (mea.)	1.68%	N	1	1	0.6	0.49	1.01%	0.82%	M
Combined standard uncertainty		RSS					11.77%	11.74%	
Expant uncertainty (95% confidence							23.54%	23.48%	

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Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.00%	N	1	1	1	1	6.00%	6.00%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	2.50%	N	1	1	0.64	0.43	1.60%	1.08%	M
Liquid Conductivity (mea.)	4.55%	N	1	1	0.6	0.49	2.73%	2.23%	M
Combined standard uncertainty		RSS					11.85%	11.67%	
Expant uncertainty (95% confidence							23.70%	23.35%	

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4. SAR Characterization

4.1 SAR_design_target and Uncertainty

SAR_design_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer (see Table 4-1).

SAR_design_target < SAR_limit x 10 ^$(-\text{total uncertainty}/10)$

	Uncertainty dB (k=2)
Total uncertainty	1.0

Exposure	Antenna	Frequency band	SAR_design_target
Laptop mode	Tx5	All	1.11 W/Kg
	Tx8	All	0.635 W/Kg

Exposure	Antenna	Frequency band	SAR_design_target
Tablet mode	Tx5	All	1.16 W/Kg
	Tx8	All	0.635 W/Kg

4.2 SAR Characterization

SAR test results corresponding to Pmax for each antenna/technology/band/DSI can be found in next chapter.

Plimit is calculated by linearly scaling the measured SAR at the Pmax to SAR_design_target. Plimit determination corresponding to SAR_design_target are shown in next chapter.

5. SAR test results for Plimit calculations

Tx5 (Notebook mode)

Band / Mode	Antenna	Antenna Vendor	Bandwidth	Modulation	RB size	RB offset	Frequency (MHz)	Channel	Duty cycle	Test position	Test Distance	MPR (dBm)	Measured conducted power (dBm)	TDD Correction	Measured 1g-SAR (W/Kg)	Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
WCDMA B2	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1852.4	9262	100.00%	Laptop mode_bottom_0mm	0mm	0	23.57	[redacted]	4.41	17.5788		23.5
WCDMA B2	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1880	9400	100.00%	Laptop mode_bottom_0mm	0mm	0	23.50	[redacted]	4.22	17.7001	17.46	23.5
WCDMA B2	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1907.6	9538	100.00%	Laptop mode_bottom_0mm	0mm	0	23.62	[redacted]	4.58	17.4646		23.5
WCDMA B4	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1712.4	1312	100.00%	Laptop mode_bottom_0mm	0mm	0	23.52	[redacted]	2.82	19.4707		23.5
WCDMA B4	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1732.4	1412	100.00%	Laptop mode_bottom_0mm	0mm	0	23.96	[redacted]	3.34	19.1758	18.46	23.5
WCDMA B4	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	1752.6	1513	100.00%	Laptop mode_bottom_0mm	0mm	0	23.63	[redacted]	3.65	18.4603		23.5
WCDMA B5	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	826.4	4132	100.00%	Laptop mode_bottom_0mm	0mm	0	24.04	[redacted]	1.29	23.3873		23.5
WCDMA B5	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	836.4	4182	100.00%	Laptop mode_bottom_0mm	0mm	0	23.71	[redacted]	1.12	23.671	22.91	23.5
WCDMA B5	5	AWAN	[redacted]	[redacted]	[redacted]	[redacted]	846.6	4233	100.00%	Laptop mode_bottom_0mm	0mm	0	23.82	[redacted]	1.37	22.906		23.5
LTE B2	5	AWAN	20	QPSK	1	0	1860	18700	100.00%	Laptop mode_bottom_0mm	0mm	0	23.28	[redacted]	3.93	17.7893		23
LTE B2	5	AWAN	20	QPSK	1	0	1880	18900	100.00%	Laptop mode_bottom_0mm	0mm	0	23.31	[redacted]	4.02	17.721	17.59	23
LTE B2	5	AWAN	20	QPSK	1	0	1900	19100	100.00%	Laptop mode_bottom_0mm	0mm	0	23.36	[redacted]	4.19	17.5911		23
LTE B4	5	AWAN	20	QPSK	1	0	1720	20050	100.00%	Laptop mode_bottom_0mm	0mm	0	23.21	[redacted]	3.17	18.6526		23
LTE B4	5	AWAN	20	QPSK	1	0	1732.5	20175	100.00%	Laptop mode_bottom_0mm	0mm	0	23.65	[redacted]	3.31	18.9049	17.27	23
LTE B4	5	AWAN	20	QPSK	1	0	1745	20300	100.00%	Laptop mode_bottom_0mm	0mm	0	22.12	[redacted]	3.39	17.2712		23
LTE B5	5	AWAN	10	QPSK	1	0	829	20450	100.00%	Laptop mode_bottom_0mm	0mm	0	24.14	[redacted]	1.24	23.659		23.5
LTE B5	5	AWAN	10	QPSK	1	0	836.5	20525	100.00%	Laptop mode_bottom_0mm	0mm	0	24.17	[redacted]	1.26	23.6195	23.62	23.5
LTE B5	5	AWAN	10	QPSK	1	0	844	20600	100.00%	Laptop mode_bottom_0mm	0mm	0	24.10	[redacted]	1.21	23.7254		23.5
LTE B7	5	AWAN	20	QPSK	1	0	2510	20850	100.00%	Laptop mode_bottom_0mm	0mm	0	23.69	[redacted]	4.29	17.8187		23
LTE B7	5	AWAN	20	QPSK	1	0	2535	21100	100.00%	Laptop mode_bottom_0mm	0mm	0	23.59	[redacted]	4.37	17.6384	17.64	23
LTE B7	5	AWAN	20	QPSK	1	0	2560	21350	100.00%	Laptop mode_bottom_0mm	0mm	0	23.42	[redacted]	4.09	17.756		23
LTE B12	5	AWAN	10	QPSK	1	0	704	23060	100.00%	Laptop mode_bottom_0mm	0mm	0	24.03	[redacted]	1.12	23.991		23.5
LTE B12	5	AWAN	10	QPSK	1	0	707.5	23095	100.00%	Laptop mode_bottom_0mm	0mm	0	23.81	[redacted]	1.46	22.6197	22.48	23.5
LTE B12	5	AWAN	10	QPSK	1	0	711	23130	100.00%	Laptop mode_bottom_0mm	0mm	0	23.85	[redacted]	1.52	22.4848		23.5
LTE B13	5	AWAN	10	QPSK	1	0	782	23230	100.00%	Laptop mode_bottom_0mm	0mm	0	23.91	[redacted]	1.39	22.9331		23.5
LTE B13	5	AWAN	10	QPSK	1	25	782	23230	100.00%	Laptop mode_bottom_0mm	0mm	0	23.85	[redacted]	1.45	22.6895	22.69	23.5
LTE B13	5	AWAN	10	QPSK	1	49	782	23230	100.00%	Laptop mode_bottom_0mm	0mm	0	23.63	[redacted]	1.25	23.1141		23.5
LTE B14	5	AWAN	10	QPSK	1	0	793	23330	100.00%	Laptop mode_bottom_0mm	0mm	0	24.11	[redacted]	1.19	23.8078		23.5
LTE B14	5	AWAN	10	QPSK	1	25	793	23330	100.00%	Laptop mode_bottom_0mm	0mm	0	24.01	[redacted]	1.36	23.1278	23.13	23.5
LTE B14	5	AWAN	10	QPSK	1	49	793	23330	100.00%	Laptop mode_bottom_0mm	0mm	0	23.85	[redacted]	1.01	24.26		23.5
LTE B17	5	AWAN	10	QPSK	1	0	709	23780	100.00%	Laptop mode_bottom_0mm	0mm	0	23.89	[redacted]	1.42	22.8203		23.5
LTE B17	5	AWAN	10	QPSK	1	0	710	23790	100.00%	Laptop mode_bottom_0mm	0mm	0	23.90	[redacted]	1.47	22.6801	22.59	23.5
LTE B17	5	AWAN	10	QPSK	1	0	711	23800	100.00%	Laptop mode_bottom_0mm	0mm	0	23.98	[redacted]	1.53	22.5863		23.5
LTE B25	5	AWAN	20	QPSK	1	0	1860	26140	100.00%	Laptop mode_bottom_0mm	0mm	0	23.53	[redacted]	3.88	18.0949		23
LTE B25	5	AWAN	20	QPSK	1	0	1880	26340	100.00%	Laptop mode_bottom_0mm	0mm	0	23.66	[redacted]	3.98	18.1144	17.88	23
LTE B25	5	AWAN	20	QPSK	1	0	1905	26590	100.00%	Laptop mode_bottom_0mm	0mm	0	23.57	[redacted]	4.11	17.8848		23
LTE B26	5	AWAN	15	QPSK	1	0	821.5	26765	100.00%	Laptop mode_bottom_0mm	0mm	0	24.29	[redacted]	1.31	23.5705		23.5
LTE B26	5	AWAN	15	QPSK	1	0	831.5	26865	100.00%	Laptop mode_bottom_0mm	0mm	0	24.18	[redacted]	1.24	23.699	23.39	23.5
LTE B26	5	AWAN	15	QPSK	1	0	841.5	26965	100.00%	Laptop mode_bottom_0mm	0mm	0	24.14	[redacted]	1.32	23.3875		23.5
LTE B30	5	AWAN	10	QPSK	1	0	2310	27710	100.00%	Laptop mode_bottom_0mm	0mm	0	22.47	[redacted]	2.23	19.4402		22
LTE B30	5	AWAN	10	QPSK	1	25	2310	27710	100.00%	Laptop mode_bottom_0mm	0mm	0	22.53	[redacted]	2.36	19.2541	19.25	22
LTE B30	5	AWAN	10	QPSK	1	49	2310	27710	100.00%	Laptop mode_bottom_0mm	0mm	0	22.42	[redacted]	2.08	19.6926		22
LTE B66	5	AWAN	20	QPSK	1	0	1720	132072	100.00%	Laptop mode_bottom_0mm	0mm	0	23.81	[redacted]	3.15	19.2801		23
LTE B66	5	AWAN	20	QPSK	1	0	1745	132322	100.00%	Laptop mode_bottom_0mm	0mm	0	23.58	[redacted]	3.44	18.6676	18.48	23
LTE B66	5	AWAN	20	QPSK	1	0	1770	132572	100.00%	Laptop mode_bottom_0mm	0mm	0	23.66	[redacted]	3.66	18.4784		23
LTE B38	5	AWAN	20	QPSK	1	0	2580	37850	63.30%	Laptop mode_bottom_0mm	0mm	0	23.60	21.614	1.72	19.712		21
LTE B38	5	AWAN	20	QPSK	1	0	2595	38000	63.30%	Laptop mode_bottom_0mm	0mm	0	23.50	21.514	1.74	19.5618	19.21	21
LTE B38	5	AWAN	20	QPSK	1	0	2610	38150	63.30%	Laptop mode_bottom_0mm	0mm	0	23.20	21.214	1.76	19.2121		21
LTE B41	5	AWAN	20	QPSK	1	0	2506	39750	63.30%	Laptop mode_bottom_0mm	0mm	0	23.75	21.764	1.33	20.9788		21
LTE B41	5	AWAN	20	QPSK	1	0	2549.5	40185	63.30%	Laptop mode_bottom_0mm	0mm	0	23.89	21.904	1.81	19.7805		21
LTE B41	5	AWAN	20	QPSK	1	0	2593	40620	63.30%	Laptop mode_bottom_0mm	0mm	0	23.92	21.934	1.17	21.7054	19.34	21
LTE B41	5	AWAN	20	QPSK	1	0	2636.5	41055	63.30%	Laptop mode_bottom_0mm	0mm	0	23.80	21.814	1.96	19.3447		21
LTE B41	5	AWAN	20	QPSK	1	0	2680	41490	63.30%	Laptop mode_bottom_0mm	0mm	0	23.82	21.834	1.04	22.1169		21
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2506	39750	43.30%	Laptop mode_bottom_0mm	0mm	0	25.82	22.185	2.06	19.4994		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2549.5	40185	43.30%	Laptop mode_bottom_0mm	0mm	0	25.81	22.175	2.02	19.5746		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2593	40620	43.30%	Laptop mode_bottom_0mm	0mm	0	25.69	22.055	1.85	19.8364	19.33	22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2636.5	41055	43.30%	Laptop mode_bottom_0mm	0mm	0	25.83	22.195	2.12	19.3848		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2680	41490	43.30%	Laptop mode_bottom_0mm	0mm	0	25.84	22.205	2.15	19.3337		22.4
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1860	372000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.39	[redacted]	4.76	17.0672		23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1880	376000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.28	[redacted]	4.58	17.1246	17.07	23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.43	[redacted]	4.71	17.153		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	834	166800	100.00%	Laptop mode_bottom_0mm	0mm	0	23.53	[redacted]	1.52	22.1648		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	836.5	167300	100.00%	Laptop mode_bottom_0mm	0mm	0	23.56	[redacted]	1.55	22.1099	21.96	23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	839	167800	100.00%	Laptop mode_bottom_0mm	0mm	0	23.63	[redacted]	1.63	21.9614		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	706.5	141300	100.00%	Laptop mode_bottom_0mm	0mm	0	23.80	[redacted]	1.83	21.6287		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	707.5	141500	100.00%	Laptop mode_bottom_0mm	0mm	0	23.73	[redacted]	1.71	21.8533	21.49	23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	708.5	141700	100.00%	Laptop mode_bottom_0mm	0mm	0	23.71	[redacted]	1.85	21.4915		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.67	[redacted]	4.14	17.9532		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1745	349000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.38	[redacted]	4.28	17.5188	17.39	23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1770	354000	100.00%	Laptop mode_bottom_0mm	0mm	0	23.55	[redacted]	4.59	17.3851		23

***** Pmax is used for RF tune-up procedure. The maximum allowed output power is equal to Pmax + 1dB uncertainty.

** All Plimit power levels in above table corresponding to average power levels after accounting for duty cycle in the case TDD modulation schemes (LTE TDD).

The maximum allowed output power is the Plimit + 1dB device uncertainty, and if Plimit is higher than Pmax, the device output power will be Pmax instead.

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Tx5 (Tablet mode)

Band / Mode	Antenna	Antenna Vendor	Bandwidth	Modulation	RB size	RB offset	Frequency (MHz)	Channel	Duty cycle	Test position	Test Distance	MPR (dBm)	Measured conducted power (dBm)	TDD Correction	Measured 1g-SAR (W/Kg)	Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
WCDMA B2	5	AWAN	[redacted]				1852.4	9262	100.00%	TB mode_back_0mm	0mm	0	23.57	[redacted]	9.44	14.46	14.28	23.5
WCDMA B2	5	AWAN					1880	9400	100.00%	TB mode_back_0mm	0mm	0	23.50		9.69	14.28		23.5
WCDMA B2	5	AWAN					1907.6	9538	100.00%	TB mode_back_0mm	0mm	0	23.62		9.32	14.57		23.5
WCDMA B2	5	AWAN					1907.6	9538	100.00%	TB mode_Left side_0mm	0mm	0	23.62		4.04	18.20		23.5
WCDMA B2	5	AWAN					1907.6	9538	100.00%	TB mode_Top side_0mm	0mm	0	23.62		1.12	23.77		23.5
WCDMA B4	5	AWAN					1712.4	1312	100.00%	TB mode_back_0mm	0mm	0	23.52		7.75	15.27	15.27	23.5
WCDMA B4	5	AWAN					1732.4	1412	100.00%	TB mode_back_0mm	0mm	0	23.96		7.33	15.95		23.5
WCDMA B4	5	AWAN					1752.6	1513	100.00%	TB mode_back_0mm	0mm	0	23.63		7.45	15.55		23.5
WCDMA B4	5	AWAN					1732.4	1412	100.00%	TB mode_Left side_0mm	0mm	0	23.96		4.39	18.18		23.5
WCDMA B4	5	AWAN					1732.4	1412	100.00%	TB mode_Top side_0mm	0mm	0	23.96		0.717	26.05		23.5
WCDMA B5	5	AWAN					826.4	4132	100.00%	TB mode_back_0mm	0mm	0	24.04		2.48	20.74	20.30	23.5
WCDMA B5	5	AWAN					836.4	4182	100.00%	TB mode_back_0mm	0mm	0	23.71		2.47	20.43		23.5
WCDMA B5	5	AWAN					846.6	4233	100.00%	TB mode_back_0mm	0mm	0	23.82		2.61	20.30		23.5
WCDMA B5	5	AWAN					826.4	4132	100.00%	TB mode_Left side_0mm	0mm	0	24.04		2.35	20.97		23.5
WCDMA B5	5	AWAN					826.4	4132	100.00%	TB mode_Top side_0mm	0mm	0	24.04		0.263	30.49		23.5
LTE B2	5	AWAN	20	QPSK	1	0	1860	18700	100.00%	TB mode_back_0mm	0mm	0	23.28		7.21	15.35	15.32	23
LTE B2	5	AWAN	20	QPSK	1	0	1880	18900	100.00%	TB mode_back_0mm	0mm	0	23.31		7.3	15.32		23
LTE B2	5	AWAN	20	QPSK	1	0	1900	19100	100.00%	TB mode_back_0mm	0mm	0	23.36		7.12	15.48		23
LTE B2	5	AWAN	20	QPSK	1	0	1900	19100	100.00%	TB mode_Left side_0mm	0mm	0	23.36		3.79	18.22		23
LTE B2	5	AWAN	20	QPSK	1	0	1900	19100	100.00%	TB mode_Top side_0mm	0mm	0	23.36		0.962	24.17		23
LTE B4	5	AWAN	20	QPSK	1	0	1720	20050	100.00%	TB mode_back_0mm	0mm	0	23.21		6.29	15.87	15.87	23
LTE B4	5	AWAN	20	QPSK	1	0	1732.5	20175	100.00%	TB mode_back_0mm	0mm	0	23.65		6.12	16.43		23
LTE B4	5	AWAN	20	QPSK	1	0	1745	20300	100.00%	TB mode_back_0mm	0mm	0	22.12		4.67	16.07		23
LTE B4	5	AWAN	20	QPSK	1	0	1745	20300	100.00%	TB mode_Left side_0mm	0mm	0	23.65		3.69	18.62		23
LTE B4	5	AWAN	20	QPSK	1	0	1732.5	20175	100.00%	TB mode_Top side_0mm	0mm	0	23.65		0.757	25.50		23
LTE B5	5	AWAN	10	QPSK	1	0	829	20450	100.00%	TB mode_back_0mm	0mm	0	24.14		2.34	21.09	20.77	23.5
LTE B5	5	AWAN	10	QPSK	1	0	836.5	20525	100.00%	TB mode_back_0mm	0mm	0	24.17		2.21	21.37		23.5
LTE B5	5	AWAN	10	QPSK	1	0	844	20600	100.00%	TB mode_back_0mm	0mm	0	24.10		2.5	20.77		23.5
LTE B5	5	AWAN	10	QPSK	1	0	836.5	20525	100.00%	TB mode_Left side_0mm	0mm	0	24.17		2.1	21.59		23.5
LTE B5	5	AWAN	10	QPSK	1	0	836.5	20525	100.00%	TB mode_Top side_0mm	0mm	0	24.17		0.311	29.89		23.5
LTE B7	5	AWAN	20	QPSK	1	0	2510	20850	100.00%	TB mode_back_0mm	0mm	0	23.69		10.7	14.04	13.57	23
LTE B7	5	AWAN	20	QPSK	1	0	2535	21100	100.00%	TB mode_back_0mm	0mm	0	23.59		10.1	14.19		23
LTE B7	5	AWAN	20	QPSK	1	0	2560	21350	100.00%	TB mode_back_0mm	0mm	0	23.42		11.2	13.57		23
LTE B7	5	AWAN	20	QPSK	1	0	2510	20850	100.00%	TB mode_Left side_0mm	0mm	0	23.69		3.22	19.26		23
LTE B7	5	AWAN	20	QPSK	1	0	2510	20850	100.00%	TB mode_Top side_0mm	0mm	0	23.69		0.698	25.90		23
LTE B12	5	AWAN	10	QPSK	1	0	704	23060	100.00%	TB mode_back_0mm	0mm	0	24.03		3.18	19.65	19.26	23.5
LTE B12	5	AWAN	10	QPSK	1	0	707.5	23095	100.00%	TB mode_back_0mm	0mm	0	23.81		3.31	19.26		23.5
LTE B12	5	AWAN	10	QPSK	1	0	711	23130	100.00%	TB mode_back_0mm	0mm	0	23.85		3.12	19.55		23.5
LTE B12	5	AWAN	10	QPSK	1	0	704	23060	100.00%	TB mode_Left side_0mm	0mm	0	24.03		3.24	19.57		23.5
LTE B12	5	AWAN	10	QPSK	1	0	704	23060	100.00%	TB mode_Top side_0mm	0mm	0	24.03		0.334	29.44		23.5
LTE B13	5	AWAN	10	QPSK	1	0	782	23230	100.00%	TB mode_back_0mm	0mm	0	23.91		2.07	21.39	20.49	23.5
LTE B13	5	AWAN	10	QPSK	1	25	782	23230	100.00%	TB mode_back_0mm	0mm	0	23.85		2.14	21.19		23.5
LTE B13	5	AWAN	10	QPSK	1	49	782	23230	100.00%	TB mode_back_0mm	0mm	0	23.63		2.39	20.49		23.5
LTE B13	5	AWAN	10	QPSK	1	0	782	23230	100.00%	TB mode_Left side_0mm	0mm	0	23.91		2.25	21.03		23.5
LTE B13	5	AWAN	10	QPSK	1	0	782	23230	100.00%	TB mode_Top side_0mm	0mm	0	23.91		0.255	30.49		23.5
LTE B14	5	AWAN	10	QPSK	1	0	793	23330	100.00%	TB mode_back_0mm	0mm	0	24.11		2.15	21.43	20.85	23.5
LTE B14	5	AWAN	10	QPSK	1	25	793	23330	100.00%	TB mode_back_0mm	0mm	0	24.01		2.4	20.85		23.5
LTE B14	5	AWAN	10	QPSK	1	49	793	23330	100.00%	TB mode_back_0mm	0mm	0	23.85		2.03	21.42		23.5
LTE B14	5	AWAN	10	QPSK	1	0	793	23330	100.00%	TB mode_Left side_0mm	0mm	0	24.11		2.24	21.25		23.5
LTE B14	5	AWAN	10	QPSK	1	0	793	23330	100.00%	TB mode_Top side_0mm	0mm	0	24.11		0.238	30.99		23.5
LTE B17	5	AWAN	10	QPSK	1	0	709	23780	100.00%	TB mode_back_0mm	0mm	0	23.89		2.8	20.06	20.06	23.5
LTE B17	5	AWAN	10	QPSK	1	0	710	23790	100.00%	TB mode_back_0mm	0mm	0	23.90		2.56	20.46		23.5
LTE B17	5	AWAN	10	QPSK	1	0	711	23800	100.00%	TB mode_back_0mm	0mm	0	23.98		2.37	20.88		23.5
LTE B17	5	AWAN	10	QPSK	1	0	711	23800	100.00%	TB mode_Left side_0mm	0mm	0	23.98		2.16	21.28		23.5
LTE B17	5	AWAN	10	QPSK	1	0	711	23800	100.00%	TB mode_Top side_0mm	0mm	0	23.98		0.244	30.75		23.5
LTE B25	5	AWAN	20	QPSK	1	0	1860	26140	100.00%	TB mode_back_0mm	0mm	0	23.53		7.85	15.23	15.19	23
LTE B25	5	AWAN	20	QPSK	1	0	1880	26340	100.00%	TB mode_back_0mm	0mm	0	23.66		8.06	15.24		23
LTE B25	5	AWAN	20	QPSK	1	0	1905	26590	100.00%	TB mode_back_0mm	0mm	0	23.57		7.99	15.19		23
LTE B25	5	AWAN	20	QPSK	1	0	1880	26340	100.00%	TB mode_Left side_0mm	0mm	0	23.66		3.25	19.19		23
LTE B25	5	AWAN	20	QPSK	1	0	1880	26340	100.00%	TB mode_Top side_0mm	0mm	0	23.66		0.612	26.44		23
LTE B26	5	AWAN	15	QPSK	1	0	821.5	26765	100.00%	TB mode_back_0mm	0mm	0	24.29		2.24	21.43	21.09	23.5
LTE B26	5	AWAN	15	QPSK	1	0	831.5	26865	100.00%	TB mode_back_0mm	0mm	0	24.18		2.11	21.58		23.5
LTE B26	5	AWAN	15	QPSK	1	0	841.5	26965	100.00%	TB mode_back_0mm	0mm	0	24.14		2.34	21.09		23.5
LTE B26	5	AWAN	15	QPSK	1	0	821.5	26765	100.00%	TB mode_Left side_0mm	0mm	0	24.29		2.2	21.51		23.5
LTE B26	5	AWAN	15	QPSK	1	0	821.5	26765	100.00%	TB mode_Top side_0mm	0mm	0	24.29		0.237	31.19		23.5
LTE B30	5	AWAN	10	QPSK	1	0	2310	27710	100.00%	TB mode_back_0mm	0mm	0	22.47		5.51	15.70	15.59	22
LTE B30	5	AWAN	10	QPSK	1	25	2310	27710	100.00%	TB mode_back_0mm	0mm	0	22.53		5.74	15.59		22
LTE B30	5	AWAN	10	QPSK	1	49	2310	27710	100.00%	TB mode_back_0mm	0mm	0	22.42		4.57	16.47		22
LTE B30	5	AWAN	10	QPSK	1	25	2310	27710	100.00%	TB mode_Left side_0mm	0mm	0	22.53		2.12	19.91		22
LTE B30	5	AWAN	10	QPSK	1	25	2310	27710	100.00%	TB mode_Top side_0mm	0mm	0	22.53		0.468	26.47		22
LTE B66	5	AWAN	20	QPSK	1	0	1720	132072	100.00%	TB mode_back_0mm	0mm	0	23.81		7.38	15.77	15.77	23
LTE B66	5	AWAN	20	QPSK	1	0	1745	132322	100.00%	TB mode_back_0mm	0mm	0	23.58		6.87	15.86		23
LTE B66	5	AWAN	20	QPSK	1	0	1770	132572	100.00%	TB mode_back_0mm	0mm	0	23.66		7.12	15.78		23
LTE B66	5	AWAN	20	QPSK	1	0	1720	132072	100.00%	TB mode_Left side_0mm	0mm	0	23.81		3.23	19.36		23
LTE B66	5	AWAN	20	QPSK	1	0	1720	132072	100.00%	TB mode_Top side_0mm	0mm	0	23.81		0.7	26.00		23
LTE B38	5	AWAN	20	QPSK	1	0	2580	37850	63.30%	TB mode_back_0mm	0mm	0	23.60	21.614	5.99	14.48	13.78	21
LTE B38	5	AWAN	20	QPSK	1	0	2595	38000	63.30%	TB mode_back_0mm	0mm	0	23.50	21.514	6.04	14.35		21
LTE B38	5	AWAN	20	QPSK	1	0	2610	38150	63.30%	TB mode_back_0mm	0mm	0	23.20	21.214	6.42	13.78		21
LTE B38	5	AWAN	20	QPSK	1	0	2610	38150	63.30%	TB mode_Left side_0mm	0mm	0	23.60	21.614	2.67	17.99		21
LTE B38	5	AWAN	20	QPSK	1	0	2580	37850	63.30%	TB mode_Top side_0mm	0mm	0	23.60	21.614	0.127	31.22		21
LTE B41	5	AWAN	20	QPSK	1	0	2506	39750	63.30%	TB mode_back_0mm	0mm	0	23.75	21.764	4.64	15.74	14.36	21
LTE B41	5	AWAN	20	QPSK	1	0	2549.5	40185	63.30%	TB mode_back_0mm	0mm	0	23.89	21.904	6.59	14.36		21
LTE B41	5	AWAN	20	QPSK	1	0	2593	40620	63.30%	TB mode_back_0mm	0mm	0	23.92	21.934	6.04	14.77		21
LTE B41	5	AWAN	20	QPSK	1	0	2636.5	41055	63.30%	TB mode_back_0mm	0mm	0	23.80	21.814	5.78	14.84		21
LTE B41	5	AWAN	20	QPSK	1	0	2680	41490	63.30%	TB mode_back_0mm	0mm	0	23.82	21.834	4.11	16.34		21
LTE B41	5	AWAN	20	QPSK	1	0	2593	40620	63.30%	TB mode_Left side_0mm	0mm	0	23.92	21.934	2.39	18.79		21
LTE B41	5	AWAN	20	QPSK	1	0	2593	40620	63.30%	TB mode_Top side_0mm	0mm	0	23.92	21.934	0.124	31.64		21
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2506	39750	43.30%	TB mode_back_0mm	0mm	0	25.82	22.185	6.26	14.86	14.81	22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2549.5	40185	43.30%	TB mode_back_0mm	0mm	0	25.81	22.175	6.18	14.91		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2593	40620	43.30%	TB mode_back_0mm	0mm	0	25.69	22.055	5.95	14.95		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2636.5	41055	43.30%	TB mode_back_0mm	0mm	0	25.83	22.195	6.05	15.02		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2680	41490	43.30%	TB mode_back_0mm	0mm	0	25.84	22.205	6.36	14.81		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2680	41490	43.30%	TB mode_Left side_0mm	0mm	0	25.84	22.205	3.57	17.32		22.4
LTE B41 PC2	5	AWAN	20	QPSK	1	0	2680	41490	43.30%	TB mode_Top side_0mm	0mm	0	25.84	22.205	0.451	26.31		22.4
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1860	372000	100.00%	TB mode_back_0mm	0mm	0	23.39	[redacted]	17.54	11.59	11.38	23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1880	376000	100.00%	TB mode_back_0mm	0mm	0	23.28		15.42	12.04		23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	TB mode_back_0mm	0mm	0	23.43		18.6	11.38		23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	TB mode_Left side_0mm	0mm	0	23.43		4.87	17.20		23
5G n2	5	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	TB mode_Top side_0mm	0mm	0	23.43		0.951	24.29		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	834	166800	100.00%	TB mode_back_0mm	0mm	0	23.53		3.35	18.92	18.91	23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	836.5	167300	100.00%	TB mode_back_0mm	0mm	0	23.56		3.29	19.03		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	839	167800	100.00%	TB mode_back_0mm	0mm	0	23.63		3.44	18.91		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	839	167800	100.00%	TB mode_Left side_0mm	0mm	0	23.63		2.4	20.47		23
5G n5	5	AWAN	20	PI/2 BPSK	1	1	839	167800	100.00%	TB mode_Top side_0mm	0mm	0	23.63		0.288	29.68		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	706.5	141300	100.00%	TB mode_back_0mm	0mm	0	23.80		5.66	16.92	16.78	23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	707.5	141500	100.00%	TB mode_back_0mm	0mm	0	23.73		5.45	17.01		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	708.5	141700	100.00%	TB mode_back_0mm	0mm	0	23.71		5.72	16.78		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	706.5	141300	100.00%	TB mode_Left side_0mm	0mm	0	23.80		5.63	16.94		23
5G n12	5	AWAN	15	PI/2 BPSK	1	1	706.5	141300	100.00%	TB mode_Top side_0mm	0mm	0	23.80		0.254	30.40		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	TB mode_back_0mm	0mm	0	23.67		13.7	12.95	12.74	23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1745	349000	100.00%	TB mode_back_0mm	0mm	0	23.38		13.45	12.74		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1770	354000	100.00%	TB mode_back_0mm	0mm	0	23.55		13.54	12.88		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	TB mode_Left side_0mm	0mm	0	23.67		3.11	19.39		23
5G n66	5	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	TB mode_Top side_0mm	0mm	0	23.67		0.677	26.01		23

Tx8 (Tablet mode)

Band / Mode	Antenna	Antenna Vendor	Bandwidth	Modulation	RB size	RB offset	Frequency (MHz)	Channel	Duty cycle	Test position	Test Distance	MPR (dBm)	Measured conducted power (dBm)	TDD Correction	Measured 1g-SAR (W/Kg)	Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
LTE B2	8	AWAN	20	QPSK	1	0	1860	18700	100.00%	Tablet mode_Top side_0mm	0mm	0	23.92		3.87	16.074	15.43	23
	8	AWAN	20	QPSK	1	0	1880	18900	100.00%	Tablet mode_Top side_0mm	0mm	0	23.89		4.46	15.428		23
	8	AWAN	20	QPSK	1	0	1900	19100	100.00%	Tablet mode_Top side_0mm	0mm	0	23.98		4.12	15.862		23
	8	AWAN	20	QPSK	1	0	1860	18700	100.00%	Tablet mode_Right side_0mm	0mm	0	23.92		0.167	29.724		23
	8	AWAN	20	QPSK	1	0	1880	18900	100.00%	Tablet mode_Right side_0mm	0mm	0	23.89		0.123	31.022		23
	8	AWAN	20	QPSK	1	0	1900	19100	100.00%	Tablet mode_Right side_0mm	0mm	0	23.98		0.155	30.108		23
	8	AWAN	20	QPSK	1	0	1860	18700	100.00%	Tablet mode_back_0mm	0mm	0	23.92		0.287	27.372		23
	8	AWAN	20	QPSK	1	0	1880	18900	100.00%	Tablet mode_back_0mm	0mm	0	23.89		0.316	26.924		23
	8	AWAN	20	QPSK	1	0	1900	19100	100.00%	Tablet mode_back_0mm	0mm	0	23.98		0.301	27.225		23
LTE B7	8	AWAN	20	QPSK	1	0	2510	20850	100.00%	Tablet mode_Top side_0mm	0mm	0	23.91		13.5	10.638	10.64	23
	8	AWAN	20	QPSK	1	0	2535	21100	100.00%	Tablet mode_Top side_0mm	0mm	0	22.97		10.43	10.818		23
	8	AWAN	20	QPSK	1	0	2560	21350	100.00%	Tablet mode_Top side_0mm	0mm	0	23.98		13.23	10.795		23
	8	AWAN	20	QPSK	1	0	2510	20850	100.00%	Tablet mode_Right side_0mm	0mm	0	23.91		0.0123	41.042		23
	8	AWAN	20	QPSK	1	0	2535	21100	100.00%	Tablet mode_Right side_0mm	0mm	0	22.97		0.0112	40.509		23
	8	AWAN	20	QPSK	1	0	2560	21350	100.00%	Tablet mode_Right side_0mm	0mm	0	23.98		0.017	39.706		23
	8	AWAN	20	QPSK	1	0	2510	20850	100.00%	Tablet mode_back_0mm	0mm	0	23.91		0.278	27.5		23
	8	AWAN	20	QPSK	1	0	2535	21100	100.00%	Tablet mode_back_0mm	0mm	0	22.97		0.167	28.774		23
	8	AWAN	20	QPSK	1	0	2560	21350	100.00%	Tablet mode_back_0mm	0mm	0	23.98		0.143	30.458		23
LTE B42	8	AWAN	20	QPSK	1	0	3560	43190	63.30%	Tablet mode_Top side_0mm	0mm	0	23.75	21.76	3.12	14.853	14.58	21
	8	AWAN	20	QPSK	1	0	3575	43340	63.30%	Tablet mode_Top side_0mm	0mm	0	23.79	21.80	3.35	14.584		21
	8	AWAN	20	QPSK	1	0	3590	43490	63.30%	Tablet mode_Top side_0mm	0mm	0	23.69	21.70	2.89	15.126		21
	8	AWAN	20	QPSK	1	0	3560	43190	63.30%	Tablet mode_Right side_0mm	0mm	0	23.75	21.76	0.0845	30.526		21
	8	AWAN	20	QPSK	1	0	3575	43340	63.30%	Tablet mode_Right side_0mm	0mm	0	23.79	21.80	0.09	30.293		21
	8	AWAN	20	QPSK	1	0	3590	43490	63.30%	Tablet mode_Right side_0mm	0mm	0	23.69	21.70	0.0766	30.893		21
	8	AWAN	20	QPSK	1	0	3560	43190	63.30%	Tablet mode_back_0mm	0mm	0	23.75	21.76	0.266	25.546		21
	8	AWAN	20	QPSK	1	0	3575	43340	63.30%	Tablet mode_back_0mm	0mm	0	23.79	21.80	0.28	25.363		21
	8	AWAN	20	QPSK	1	0	3590	43490	63.30%	Tablet mode_back_0mm	0mm	0	23.69	21.70	0.258	25.619		21
LTE B48	8	AWAN	20	QPSK	1	0	3560	55340	63.30%	Tablet mode_Top side_0mm	0mm	0	21.53	19.54	1.82	14.974	14.77	19
	8	AWAN	20	QPSK	1	0	3603.3	55773	63.30%	Tablet mode_Top side_0mm	0mm	0	21.58	19.59	1.93	14.769		19
	8	AWAN	20	QPSK	1	0	3646.7	56207	63.30%	Tablet mode_Top side_0mm	0mm	0	21.51	19.52	1.76	15.1		19
	8	AWAN	20	QPSK	1	0	3690	56640	63.30%	Tablet mode_Top side_0mm	0mm	0	21.45	19.46	1.55	15.592		19
	8	AWAN	20	QPSK	1	0	3560	55340	63.30%	Tablet mode_Right side_0mm	0mm	0	21.53	19.54	0.061	29.722		19
	8	AWAN	20	QPSK	1	0	3603.3	55773	63.30%	Tablet mode_Right side_0mm	0mm	0	21.58	19.59	0.073	28.992		19
	8	AWAN	20	QPSK	1	0	3646.7	56207	63.30%	Tablet mode_Right side_0mm	0mm	0	21.51	19.52	0.056	30.073		19
	8	AWAN	20	QPSK	1	0	3690	56640	63.30%	Tablet mode_Right side_0mm	0mm	0	21.45	19.46	0.051	30.419		19
	8	AWAN	20	QPSK	1	0	3560	55340	63.30%	Tablet mode_back_0mm	0mm	0	21.53	19.54	0.201	24.543		19
	8	AWAN	20	QPSK	1	0	3603.3	55773	63.30%	Tablet mode_back_0mm	0mm	0	21.58	19.59	0.211	24.382		19
	8	AWAN	20	QPSK	1	0	3646.7	56207	63.30%	Tablet mode_back_0mm	0mm	0	21.51	19.52	0.187	24.837		19
	8	AWAN	20	QPSK	1	0	3690	56640	63.30%	Tablet mode_back_0mm	0mm	0	21.45	19.46	0.177	25.015		19
LTE B66	8	AWAN	20	QPSK	1	0	1720	132072	100.00%	Tablet mode_Top side_0mm	0mm	0	23.96		2.49	18.029	18.03	23
	8	AWAN	20	QPSK	1	0	1745	132322	100.00%	Tablet mode_Top side_0mm	0mm	0	23.99		2.33	18.347		23
	8	AWAN	20	QPSK	1	0	1770	132572	100.00%	Tablet mode_Top side_0mm	0mm	0	23.94		2.12	18.708		23
	8	AWAN	20	QPSK	1	0	1720	132072	100.00%	Tablet mode_Right side_0mm	0mm	0	23.96		0.212	28.728		23
	8	AWAN	20	QPSK	1	0	1745	132322	100.00%	Tablet mode_Right side_0mm	0mm	0	23.99		0.229	28.423		23
	8	AWAN	20	QPSK	1	0	1770	132572	100.00%	Tablet mode_Right side_0mm	0mm	0	23.94		0.204	28.875		23
	8	AWAN	20	QPSK	1	0	1720	132072	100.00%	Tablet mode_back_0mm	0mm	0	23.96		0.311	27.063		23
	8	AWAN	20	QPSK	1	0	1745	132322	100.00%	Tablet mode_back_0mm	0mm	0	23.99		0.305	27.178		23
	8	AWAN	20	QPSK	1	0	1770	132572	100.00%	Tablet mode_back_0mm	0mm	0	23.94		0.309	27.071		23
5G n2	8	AWAN	20	PI/2 BPSK	1	1	1860	372000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.18		2.431	17.353	17.03	23
	8	AWAN	20	PI/2 BPSK	1	1	1880	376000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.04		2.21	17.627		23
	8	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.05		2.54	17.033		23
	8	AWAN	20	PI/2 BPSK	1	1	1860	372000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.18		0.078	32.29		23
	8	AWAN	20	PI/2 BPSK	1	1	1880	376000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.04		0.062	33.147		23
	8	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.05		0.041	34.953		23
	8	AWAN	20	PI/2 BPSK	1	1	1860	372000	100.00%	Tablet mode_back_0mm	0mm	0	23.18		0.189	28.446		23
	8	AWAN	20	PI/2 BPSK	1	1	1880	376000	100.00%	Tablet mode_back_0mm	0mm	0	23.04		0.177	28.591		23
	8	AWAN	20	PI/2 BPSK	1	1	1900	380000	100.00%	Tablet mode_back_0mm	0mm	0	23.05		0.166	28.88		23
5G n7	8	AWAN	20	PI/2 BPSK	1	1	2510	502000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.53		11.9	10.805	10.81	23
	8	AWAN	20	PI/2 BPSK	1	1	2535	507000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.48		11.32	10.972		23
	8	AWAN	20	PI/2 BPSK	1	1	2560	512000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.52		11.54	10.929		23
	8	AWAN	20	PI/2 BPSK	1	1	2510	502000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.53		0.0872	32.156		23
	8	AWAN	20	PI/2 BPSK	1	1	2535	507000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.48		0.0721	32.932		23
	8	AWAN	20	PI/2 BPSK	1	1	2560	512000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.52		0.078	32.63		23
	8	AWAN	20	PI/2 BPSK	1	1	2510	502000	100.00%	Tablet mode_back_0mm	0mm	0	23.53		0.192	28.728		23
	8	AWAN	20	PI/2 BPSK	1	1	2535	507000	100.00%	Tablet mode_back_0mm	0mm	0	23.48		0.179	28.982		23
	8	AWAN	20	PI/2 BPSK	1	1	2560	512000	100.00%	Tablet mode_back_0mm	0mm	0	23.52		0.189	28.786		23
5G n41 PC2	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_Top side_0mm	0mm	0	25.61		9.37	13.924	13.92	26
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_Top side_0mm	0mm	0	25.59		9.1	14.03		26
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_Top side_0mm	0mm	0	25.85		9.49	14.108		26
	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_Right side_0mm	0mm	0	25.61		0.084	34.398		26
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_Right side_0mm	0mm	0	25.59		0.0801	34.585		26
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_Right side_0mm	0mm	0	25.85		0.0789	34.91		26
	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_back_0mm	0mm	0	25.61		0.263	29.441		26
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_back_0mm	0mm	0	25.59		0.291	28.982		26
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_back_0mm	0mm	0	25.85		0.289	29.272		26
5G n41 PC3	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_Top side_0mm	0mm	0	23.98		9.23	12.359	11.52	23
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_Top side_0mm	0mm	0	23.35		9.11	11.786		23
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.20		9.35	11.523		23
	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_Right side_0mm	0mm	0	23.98		0.054	34.687		23
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_Right side_0mm	0mm	0	23.35		0.062	33.457		23
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.20		0.056	33.749		23
	8	AWAN	100	PI/2 BPSK	1	1	2546.01	509202	100.00%	Tablet mode_back_0mm	0mm	0	23.98		0.366	26.376		23
	8	AWAN	100	PI/2 BPSK	1	1	2592.99	518598	100.00%	Tablet mode_back_0mm	0mm	0	23.35		0.341	26.053		23
	8	AWAN	100	PI/2 BPSK	1	1	2640	528000	100.00%	Tablet mode_back_0mm	0mm	0	23.20		0.333	26.006		23
5G n66	8	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.85		6.7	13.62	12.88	23
	8	AWAN	20	PI/2 BPSK	1	1	1745	349000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.34		7.07	12.877		23
	8	AWAN	20	PI/2 BPSK	1	1	1770	354000	100.00%	Tablet mode_Top side_0mm	0mm	0	23.91		6.9	13.552		23
	8	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.85		0.323	26.789		23
	8	AWAN	20	PI/2 BPSK	1	1	1745	349000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.34		0.347	25.968		23
	8	AWAN	20	PI/2 BPSK	1	1	1770	354000	100.00%	Tablet mode_Right side_0mm	0mm	0	23.91		0.425	25.657		23
	8	AWAN	20	PI/2 BPSK	1	1	1720	344000	100.00%	Tablet mode_back_0mm	0mm	0	23.85		0.409	25.764		23
	8	AWAN	20	PI/2 BPSK	1	1	1745	349000	100.00%	Tablet mode_back_0mm	0mm	0	23.34		0.415	25.19		23
	8	AWAN	20	PI/2 BPSK	1	1	1770	354000	100.00%	Tablet mode_back_0mm	0mm	0	23.91		0.566	24.413		23

- End of report -

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