

Part 0 SAR Char Report

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

EUT Description	Notebook Computer
Brand Name	HP
Model No.	HSN-I66C-4
Applicant	HP Inc. 1501 PAGE MILL ROAD PALO ALTO, CA 94304 USA
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013
FCC ID	B94HNI66C4SPY
Date of EUT Receipt	Nov. 05, 2025
Date of Test(s)	Nov. 08, 2025 ~ Nov. 30, 2025
Date of Issue	Jan. 15, 2026

Approved By /

John Teh

John Yeh

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.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TESA2511000861EN	00	Initial creation of document	Jan. 07, 2026	Cindy Chou	
TESA2511000861EN	01	Modify comment	Jan. 15, 2026	Cindy Chou	*

Note:

1. The mark " * " is the revised version of the report due to comments submitted by the certification.

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1 GENERAL INFORMATION

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

IEEE/ANSI C95.1-1992

IEEE 1528-2013

KDB 447498 D01v06

KDB 865664 D01v01r04

KDB 865664 D02v01r02

KDB 616217 D04v01r02

KDB 941225 D01v03r01

KDB 941225 D05v02r05

KDB 941225 D05Av01r02

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2 GENERAL INFORMATION

2.1 Test Facility

Laboratory	Test Site Address	Test Site Name	Test Engineer	Project Manager	FCC Designation number/ Registration Number	IC CAB identifier/ Company Number
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	1F, No. 8, Alley 15, Lane 120, Sec. 1, NeiHu Road, NeiHu District, Taipei City, 11493, Taiwan	SAR 2	Allen Chen	Afu Chen	TW0029/ 150169	TW3702/ 23862
		SAR 6	-	-		
		SAR 8	-	-		
	No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 33383, Taiwan	SAR 1	-	-	TW0028/ 200037	TW3702/ 4620E
		SAR 4	-	-		
	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan	SAR 3	-	-	TW0027/ 891563	TW3702/ 4620A
		SAR 7	-	-		

Note: Test site name is remarked on a bolded mark as an indication where measurements occurred in specific test site and address.

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2.2 Description of EUT

EUT Description	Notebook Computer	
Brand Name	HP	
Model No.	HSN-I66C-4	
Integrated WWAN Module	Brand Name: Foxconn Model Name: DP25-42843-47	
Integrated WLAN Module	Brand Name: Qualcomm Model Name: QCNCM825	
Duty Cycle	WCDMA	1
	LTE FDD	1
	LTE TDD Power Class 3	0.633
	LTE TDD Power Class 2	0.433
	5G NR	1
Supported radios (TX Frequency Range, MHz)	WCDMA Band II	1850-1910
	WCDMA Band IV	1710-1755
	WCDMA Band V	824-849
	LTE FDD Band 2	1850-1910
	LTE FDD Band 4	1710-1755
	LTE FDD Band 5	824-849
	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

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Supported radios (TX Frequency Range, MHz)	LTE FDD Band 30	2305-2315
	LTE TDD Band 38 Power Class 2/3	2570-2620
	LTE TDD Band 41 Power Class 2/3	2496-2690
	LTE TDD Band 42 Power Class 2/3	3400-3600
	LTE TDD Band 43	3600-3700
	LTE TDD Band 48 Power Class 2/3	3550-3700
	LTE FDD Band 66	1710-1780
	LTE FDD Band 70	1695-1710
	LTE FDD Band 71	663-698
	n2	1850-1910
	n5	824-849
	n7	2500-2570
	n12	699-716
	n13	777-787
	n14	788-798
	n25	1850-1915
	n26	814-849
	n30	2305-2315
	n38	2570-2620
	n41	2496-2690
	n48	3550-3700
	n66	1710-1780
	n70	1695-1710
	n71	663-698
	n77/78	3450-3550 3700-3980

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Supported radios (TX Frequency Range, MHz)	802.11 b/g/n/ac/ax/be	2.4GHz (2400.0 – 2483.5 MHz)
	802.11a/n/ac/ax/be	5.2GHz (5150.0 – 5250.0 MHz) 5.3GHz (5250.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz) 5.9GHz (5850.0 – 5895.0 MHz)
	802.11a/ax/be	6.2GHz (5925.0 – 6425.0 MHz) 6.5GHz (6425.0 – 6525.0 MHz) 6.7GHz (6525.0 – 6875.0 MHz) 7.0GHz (6875.0 – 7125.0 MHz)
	Bluetooth	2.4GHz (2400.0 – 2483.5 MHz)

This device has WLAN module QCNCM825(FCC ID: J9C-QCNCM825) integrated into the device for this model. The antennas for WLAN module QCNCM825 located at the top of panel which the distance of antenna to human body is over 20cm (refer to antenna location) and according to FCC regulation, it is SAR exclusion.

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2.3 Antenna Information

Vendor	Vendor1										
Antenna	Ant5										
Part Number	6036B0383901(260-27594)										
Frequency(MHz)	71	12	17	13	14	26	5	4	70	66	2
	663~698	699~716	704~716	777~787	788~798	814~849	824~849	1710~1755	1695~1710	1710~1780	1850~1910
Peak Gain (dBi)	0.09	0.26	0.26	-0.13	-0.93	-1.47	-1.86	-0.49	-2.02	-0.49	0.15
Frequency(MHz)	25	30	41	7	38	42	43	48	78	77	
	1850~1915	2305~2315	2496~2690	2500~2570	2570~2620	3400~3600	3400~3600	3550~3700	3300~3800	3300~4200	
Peak Gain (dBi)	0.15	-1.87	0.39	-1.47	-2.34	2.92	-1.18	0.94	2.95	2.95	

Vendor	Vendor1										
Antenna	Ant8										
Part Number	6036B0383701 (260-27596)										
Frequency(MHz)	70	4	66	2	25	30	41	7	38		
	1695~1710	1710~1755	1710~1780	1850~1910	1850~1915	2305~2315	2496~2690	2500~2570	2570~2620		
Peak Gain (dBi)		-2.67	-2.67	-2.21	-2.21	-5.28	-2.93	-3.98	-3.24		
Frequency(MHz)	42	43	48	78	77						
	3400~3600	3600~3800	3550~3700	3300~3800	3300~4200						
Peak Gain (dBi)	-3.75	-3.75	-3.80	-3.24	-2.56						

Vendor	Vendor2										
Antenna	Ant5										
Part Number	6036B0385001 (81EACC15.G29)										
Frequency(MHz)	71	12	17	13	14	26	5	4	70	66	2
	663~698	699~716	704~716	777~787	788~798	814~849	824~849	1710~1755	1695~1710	1710~1780	1850~1910
Peak Gain (dBi)	-2.56	-1.60	-1.60	-1.73	-2.40	-3.36	-3.54	1.19	-0.54	1.59	-0.06
Frequency(MHz)	25	30	41	7	38	42	43	48	78	77	
	1850~1915	2305~2315	2496~2690	2500~2570	2570~2620	3400~3600	3400~3600	3550~3700	3300~3800	3300~4200	
Peak Gain (dBi)	-0.06	-1.49	-3.54	-3.54	-3.54	-2.96	-1.22	-1.22	-1.22	-1.22	

Vendor	Vendor2										
Antenna	Ant8										
Part Number	6036B0384801 (81EACC15.G31)										
Frequency(MHz)	70	4	66	2	25	30	41	7	38		
	1695~1710	1710~1755	1710~1780	1850~1910	1850~1915	2305~2315	2496~2690	2500~2570	2570~2620		
Peak Gain (dBi)	-2.00	-0.69	-0.69	-0.54	-0.80	-0.27	0.17	0.17	-0.34		
Frequency(MHz)	42	43	48	78	77						
	3400~3600	3400~3600	3550~3700	3300~3800	3300~4200						
Peak Gain (dBi)	-1.68	-0.34	-0.34	-0.34	1.04						

Vendor	Vendor1										
Antenna	Ant 1										
Part Number	6036B0384001(260-27593)										
Frequency(MHz)	2400~2500	5150~5250	5250~5350	5470~5725	5725~5850	5850~5895	5925~6425	6425~6525	6525~6875	6875~7125	
Peak Gain (dBi)	1.17	1.53	0.53	1.28	1.28	1.28	1.64	1.54	-0.68	2.11	
Antenna	Ant 2										
Part Number	6036B0384201(260-27592)										
Frequency(MHz)	2400~2500	5150~5250	5250~5350	5470~5725	5725~5850	5850~5895	5925~6425	6425~6525	6525~6875	6875~7125	
Peak Gain (dBi)	-0.47	1.05	1.05	0.93	0.93	0.93	0.36	-1.28	0.40	1.94	

Vendor	Vendor2										
Antenna	Ant 1										
Part Number	81EACC15.G27(6036B0385201)										
Frequency(MHz)	2400~2500	5150~5250	5250~5350	5470~5725	5725~5850	5850~5895	5925~6425	6425~6525	6525~6875	6875~7125	
Peak Gain (dBi)	1.94	1.17	1.58	0.88	0.57	0.57	0.31	0.31	2.28	1.83	
Antenna	Ant 2										
Part Number	81EACC15.G28(6036B0385101)										
Frequency(MHz)	2400~2500	5150~5250	5250~5350	5470~5725	5725~5850	5850~5895	5925~6425	6425~6525	6525~6875	6875~7125	
Peak Gain (dBi)	1.63	-0.65	-0.16	-0.50	-0.26	-0.26	-0.93	-1.06	-1.06	-1.57	

Note: Antenna information is provided by the applicant.

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2.4 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.

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).

2.5 Time-Averaging for SAR

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

2.6 Reference

Report Type	Report Number
FCC Qualcomm WWAN TAS part 1 report	TESA2511000874EN
FCC Qualcomm WWAN TAS part 2 report	TESA2511000875EN

2.7 Test Environment

Ambient Temperature: 22±2° C

Tissue Simulating Liquid: 22±2° C

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2.8 Operation Description

The device was tested for bottom surface with 0mm separation distance.

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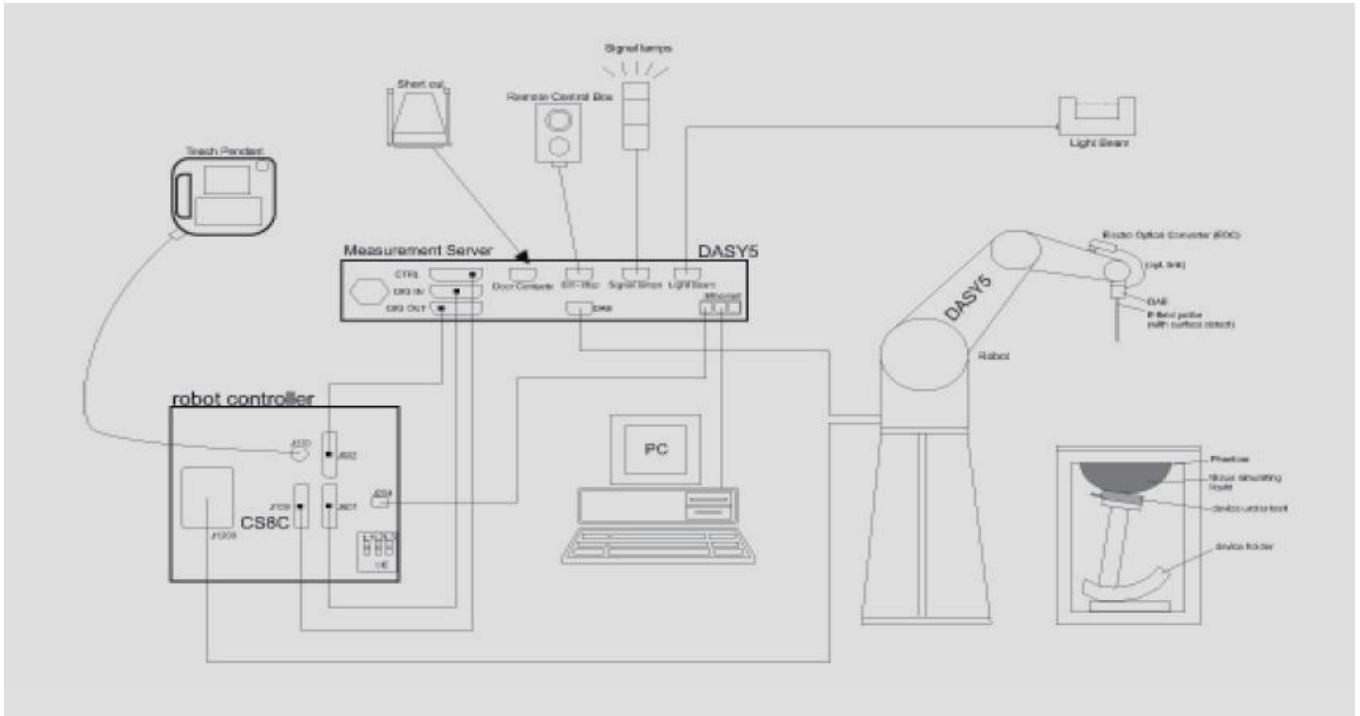
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2.9 SAR System

Block Diagram (DASY5)

A block diagram of the SAR measurement System is given in below. 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 $SAR = \sigma (|E|)^2 / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.



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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 750/835/1750/1900/2300/2600/3500/3700/3900 MHz 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 (ELI)

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

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2.10 SAR System

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 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 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

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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.

2.11 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:

2.10.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (ST/St) and the temperature gradient (E) in the liquid.

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

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:

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 ($\sim 2\%$ 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 $\pm 5\%$.

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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 $\pm 10\%$ (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 $\pm 5\%$ (RSS) when the same liquid is used for the calibration and for actual measurements and $\pm 7-9\%$ (RSS) when not, which is in good agreement with the estimates given in [2].

2.10.2 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.
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.

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2.12 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 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.)

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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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3 INSTRUMENTS LIST

Equipment List					
Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
SPEAG	Data acquisition Electronics	DAE4	1336	Aug/29/2025	Aug/28/2026
SPEAG	Dosimetric E-Field Probe	EX3DV4	3770	Jun/05/2025	Jun/04/2026
SPEAG	System Validation Dipole	D750V3	1015	Sep/26/2025	Sep/25/2026
SPEAG	System Validation Dipole	D835V2	4d063	Sep/09/2025	Sep/08/2026
SPEAG	System Validation Dipole	D1750V2	1008	Sep/28/2025	Sep/27/2026
SPEAG	System Validation Dipole	D1900V2	5d173	Apr/16/2025	Apr/15/2026
SPEAG	System Validation Dipole	D2300V2	1023	Sep/28/2025	Sep/27/2026
SPEAG	System Validation Dipole	D2600V2	1005	Jan/14/2025	Jan/13/2026
SPEAG	System Validation Dipole	D3500V2	1009	Sep/26/2025	Sep/25/2026
SPEAG	System Validation Dipole	D3700V2	1057	Nov/18/2025	Nov/17/2026
SPEAG	System Validation Dipole	D3900V2	1032	Nov/17/2025	Nov/16/2026
SPEAG	Dielectric Assessment Kit	DAK-3.5	1032	May/19/2025	May/18/2026
R&S	MXG Analog Signal Generator	SMB100A03	182996	Apr/19/2025	Apr/18/2026
Agilent	Dual-directional coupler	772D	MY46151258	Oct/08/2025	Oct/07/2026
Agilent	Dual-directional coupler	778D	MY46151242	Sep/09/2025	Sep/08/2026
EMCI	Amplifier	EMC 074225P	980155	Calibration not required	Calibration not required
Anritsu	Power Meter	ML2496A	1337004	Sep/30/2025	Sep/29/2026
Anritsu	Power Sensor	MA2411B	1306052	Sep/30/2025	Sep/29/2026
R&S	Power Sensor	NRP18S	101973	Feb/21/2025	Feb/20/2026
Agilent	Network Analyzer	E5071C	MY46107530	Apr/24/2025	Apr/23/2026
Keysight	Economy calibration kit	85032E	MY61410221	May/29/2025	May/28/2026
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
R&S	Radio Communication Test	CMW 500	125470	May/15/2025	May/14/2026
TECPEL	Digital thermometer	DTM-303A	TP130074	May/15/2025	May/14/2026

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4 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 Distributio	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%	∞
<i>Isotropy, Axial</i>	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
<i>Isotropy, Hemispherical</i>	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 shell	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.)	3.71%	N	1	1	0.64	0.43	2.37%	1.60%	M
Liquid Conductivity (mea.)	2.54%	N	1	1	0.6	0.49	1.52%	1.24%	M
Combined standard uncertainty		RSS					12.05%	11.88%	
Expan uncertainty (95% confidence interval), K=2							24.10%	23.76%	

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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 Distribution	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%	∞
<i>Isotropy , Axial</i>	3.50%	R	$\sqrt{3}$	1.732	1	1	2.02%	2.02%	∞
<i>Isotropy, Hemispherical</i>	9.60%	R	$\sqrt{3}$	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	$\sqrt{3}$	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	$\sqrt{3}$	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	$\sqrt{3}$	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	$\sqrt{3}$	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	$\sqrt{3}$	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	$\sqrt{3}$	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	$\sqrt{3}$	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	$\sqrt{3}$	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	$\sqrt{3}$	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	$\sqrt{3}$	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom shell	2.90%	R	$\sqrt{3}$	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	$\sqrt{3}$	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	$\sqrt{3}$	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	$\sqrt{3}$	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	$\sqrt{3}$	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	1.55%	N	1	1	0.64	0.43	0.99%	0.67%	M
Liquid Conductivity (mea.)	3.86%	N	1	1	0.6	0.49	2.32%	1.89%	M
Combined standard uncertainty		RSS					11.69%	11.58%	
Expan uncertainty (95% confidence interval), K=2							23.38%	23.17%	

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5 SAR CHARACTERIZATION

5.1 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.

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

	Uncertainty dB (k=2)
Total uncertainty	1

Exposure	Antenna	Frequency band	SAR_design_target
Test mode	Tx5	All	0.95 W/Kg
	Tx8	All	0.95 W/Kg

5.2 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.

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6 SAR TEST RESULTS FOR PLIMIT CALCULATIONS

Ant5

Band	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
								Measured	Reported			
WCDMA Band II	Bottom Surface	0	9262	1852.4	24.5	23.71	119.95%	4.20	5.038	17.25	17.25	23.5
WCDMA Band II	Bottom Surface	0	9400	1880	24.5	23.68	120.78%	3.46	4.179	18.06		23.5
WCDMA Band II	Bottom Surface	0	9538	1907.6	24.5	23.86	115.88%	3.91	4.531	17.71		23.5
WCDMA Band IV	Bottom Surface	0	1312	1712.4	24.5	23.68	120.78%	2.67	3.225	19.19	18.4	23.5
WCDMA Band IV	Bottom Surface	0	1412	1732.4	24.5	23.66	121.34%	3.02	3.664	18.63		23.5
WCDMA Band IV	Bottom Surface	0	1513	1752.6	24.5	23.71	119.95%	3.22	3.862	18.4		23.5
WCDMA Band V	Bottom Surface	0	4132	826.4	24.5	24.20	107.15%	0.85	0.908	24.69	23.5	23.5
WCDMA Band V	Bottom Surface	0	4183	836.6	24.5	24.22	106.66%	1.00	1.067	23.99		23.5
WCDMA Band V	Bottom Surface	0	4233	846.6	24.5	24.26	105.68%	1.04	1.099	23.86		23.5

Band	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
												Measured	Reported			
LTE Band 2	20MHz	QPSK	1	0	Bottom Surface	0	18700	1860	24.50	23.52	125.31%	3.420	4.286	17.95	17.55	23.50
LTE Band 2			1	0	Bottom Surface	0	18900	1880	24.50	23.46	127.06%	3.540	4.498	17.74		23.50
LTE Band 2			1	0	Bottom Surface	0	19100	1900	24.50	23.48	126.47%	3.720	4.705	17.55		23.50
LTE Band 4	20MHz	QPSK	1	0	Bottom Surface	0	20050	1720	24.50	23.34	130.62%	3.050	3.984	18.27	18.08	23.5
LTE Band 4			1	0	Bottom Surface	0	20175	1732.5	24.50	23.44	127.64%	3.140	4.008	18.24		23.5
LTE Band 4			1	0	Bottom Surface	0	20300	1745	24.50	23.35	130.32%	3.190	4.157	18.08		23.5
LTE Band 5	10MHz	QPSK	1	0	Bottom Surface	0	20450	829	24.50	23.90	114.82%	0.938	1.077	23.95	23.41	23.5
LTE Band 5			1	0	Bottom Surface	0	20525	836.5	24.50	23.93	114.02%	1.070	1.220	23.41		23.5
LTE Band 5			1	0	Bottom Surface	0	20600	844	24.50	23.88	115.35%	0.945	1.090	23.9		23.5
LTE Band 7	20MHz	QPSK	1	0	Bottom Surface	0	20850	2510	24.50	23.41	128.53%	3.020	3.882	18.38	18.19	23.5
LTE Band 7			1	0	Bottom Surface	0	21100	2535	24.50	23.65	121.62%	3.260	3.965	18.29		23.5
LTE Band 7			1	0	Bottom Surface	0	21350	2560	24.50	23.72	119.67%	3.390	4.057	18.19		23.5
LTE Band 12	10MHz	QPSK	1	0	Bottom Surface	0	23060	704	24.50	23.91	114.55%	0.796	0.912	24.67	23.5	23.5
LTE Band 12			1	0	Bottom Surface	0	23095	707.5	24.50	23.97	112.98%	0.812	0.917	24.65		23.5
LTE Band 12			1	0	Bottom Surface	0	23130	711	24.50	23.92	114.29%	0.818	0.935	24.56		23.5
LTE Band 13	10MHz	QPSK	1	0	Bottom Surface	0	23230	782	24.50	23.91	114.55%	0.846	0.969	24.41	23.5	23.5
LTE Band 14	10MHz	QPSK	1	0	Bottom Surface	0	23330	793	24.50	23.97	112.98%	0.807	0.912	24.67	23.5	23.5
LTE Band 17	10MHz	QPSK	1	0	Bottom Surface	0	23780	709	24.50	23.99	112.46%	0.788	0.886	24.8	23.5	23.5
LTE Band 17			1	0	Bottom Surface	0	23790	710	24.50	23.98	112.72%	0.802	0.904	24.71		23.5
LTE Band 17			1	0	Bottom Surface	0	23800	711	24.50	23.92	114.29%	0.812	0.928	24.6		23.5
LTE Band 25	20MHz	QPSK	1	0	Bottom Surface	0	26140	1860	24.50	23.43	127.94%	3.470	4.439	17.8	17.48	23.5
LTE Band 25			1	0	Bottom Surface	0	26365	1882.5	24.50	23.44	127.64%	3.580	4.570	17.67		23.5
LTE Band 25			1	0	Bottom Surface	0	26590	1905	24.50	23.47	126.77%	3.770	4.779	17.48		23.5
LTE Band 26_FCC	15MHz	QPSK	1	0	Bottom Surface	0	26765	821.5	24.50	23.86	115.88%	0.828	0.959	24.45	23.24	23.5
LTE Band 26_FCC			1	0	Bottom Surface	0	26865	831.5	24.50	23.95	113.50%	0.925	1.050	24.06		23.5
LTE Band 26_FCC			1	0	Bottom Surface	0	26965	841.5	24.50	23.88	115.35%	1.100	1.269	23.24		23.5
LTE Band 30	10MHz	QPSK	1	0	Bottom Surface	0	27710	2310	23.00	22.51	111.94%	2.500	2.799	18.3	18.3	22
LTE Band 66	20MHz	QPSK	1	0	Bottom Surface	0	132072	1720	24.50	23.48	126.47%	3.020	3.820	18.45	18.2	23.5
LTE Band 66			1	0	Bottom Surface	0	132322	1745	24.50	23.41	128.53%	3.150	4.049	18.2		23.5
LTE Band 66			1	0	Bottom Surface	0	132572	1770	24.50	23.44	127.64%	2.800	3.574	18.74		23.5
LTE Band 70	20MHz	QPSK	1	0	Bottom Surface	0	133047	1702.5	24.50	23.53	125.03%	3.400	4.251	17.99	17.99	23.5
LTE Band 71	20MHz	QPSK	1	0	Bottom Surface	0	133222	673	24.50	23.83	116.68%	0.792	0.924	24.61	23.5	23.5
LTE Band 71			1	0	Bottom Surface	0	133297	680.5	24.50	23.80	117.49%	0.748	0.879	24.83		23.5
LTE Band 71			1	0	Bottom Surface	0	133372	688	24.50	23.81	117.22%	0.776	0.910	24.68		23.5
LTE Band 38	20MHz	QPSK	1	0	Bottom Surface	0	37850	2580	24.50	23.86	115.88%	1.840	2.132	20.98	20.77	23.5
LTE Band 38			1	0	Bottom Surface	0	38000	2595	24.50	23.95	113.50%	1.880	2.134	20.98		23.5
LTE Band 38			1	0	Bottom Surface	0	38150	2610	24.50	23.83	116.68%	1.920	2.240	20.77		23.5
LTE Band 41_PC3	20MHz	QPSK	1	0	Bottom Surface	0	39750	2506	25.00	23.63	137.09%	1.920	2.632	20.57	20.45	24
LTE Band 41_PC3			1	0	Bottom Surface	0	40185	2549.5	25.00	23.82	131.22%	2.060	2.703	20.45		24
LTE Band 41_PC3			1	0	Bottom Surface	0	40620	2593	25.00	23.87	129.72%	1.980	2.568	20.68		24
LTE Band 41_PC3			1	0	Bottom Surface	0	41055	2636.5	25.00	23.66	136.14%	1.890	2.573	20.67		24
LTE Band 41_PC3			1	0	Bottom Surface	0	41490	2680	25.00	23.67	135.83%	1.840	2.499	20.79		24
LTE Band 41_PC2	20MHz	QPSK	1	0	Bottom Surface	0	39750	2506	27.00	24.16	192.31%	1.310	2.519	22.76	22.47	26
LTE Band 41_PC2			1	0	Bottom Surface	0	40185	2549.5	27.00	24.13	193.64%	1.390	2.692	22.47		26
LTE Band 41_PC2			1	0	Bottom Surface	0	40620	2593	27.00	24.15	192.75%	1.320	2.544	22.72		26
LTE Band 41_PC2			1	0	Bottom Surface	0	41055	2636.5	27.00	24.26	187.93%	1.310	2.462	22.86		26
LTE Band 41_PC2			1	0	Bottom Surface	0	41490	2680	27.00	24.23	189.23%	1.220	2.309	23.14		26
LTE Band 42_Part1	20MHz	QPSK	1	0	Bottom Surface	0	41690	3410	24.50	23.36	130.02%	1.110	1.443	22.68	22.68	23.5
LTE Band 42_Part1			1	0	Bottom Surface	0	42590	3500	24.50	23.14	136.77%	1.040	1.422	22.74		23.5
LTE Band 42_Part1			1	0	Bottom Surface	0	43490	3590	24.50	23.34	130.62%	0.996	1.301	23.13		23.5
LTE Band 42_Part2	20MHz	QPSK	1	0	Bottom Surface	0	43190	3560	24.50	23.38	129.42%	1.040	1.346	22.98	22.98	23.5
LTE Band 42_Part2			1	0	Bottom Surface	0	43340	3575	24.50	23.47	126.77%	1.020	1.293	23.16		23.5
LTE Band 42_Part2			1	0	Bottom Surface	0	43490	3590	24.50	23.40	128.82%	0.997	1.284	23.19		23.5
LTE Band 43	20MHz	QPSK	1	0	Bottom Surface	0	44190	3660	24.50	23.61	122.74%	1.980	2.430	20.42	20.04	23.5
LTE Band 43			1	0	Bottom Surface	0	44215	3662.5	24.50	23.52	125.31%	2.050	2.569	20.17		23.5
LTE Band 43			1	0	Bottom Surface	0	44240	3665	24.50	23.53	125.03%	2.120	2.651	20.04		23.5
LTE Band 48	20MHz	QPSK	1	0	Bottom Surface	0	55340	3560	21.80	21.71	102.99%	1.260	1.286	20.48	19.5	20.8
LTE Band 48			1	0	Bottom Surface	0	55830	3609	21.80	21.55	105.93%	1.220	1.292	20.46		20.8
LTE Band 48			1	0	Bottom Surface	0	56150	3641	21.80	21.48	107.65%	1.280	1.378	20.18		20.8
LTE Band 48			1	0	Bottom Surface	0	56640	3690	21.80	21.31	111.94%	1.440	1.612	19.5		20.8

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Band	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
												Measured	Reported			
NR n2	35MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	373500	1867.5	24.60	24.15	110.92%	3.830	4.248	18.09	18.09	23.6
NR n2			1	1	Bottom Surface	0	376000	1880	24.60	24.10	112.20%	3.720	4.174	18.17		23.6
NR n2			1	1	Bottom Surface	0	378500	1892.5	24.60	24.01	114.55%	3.660	4.193	18.15		23.6
NR n5	20MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	166800	834	24.50	24.20	107.15%	1.090	1.168	23.6	23.2	23.5
NR n5			1	1	Bottom Surface	0	167300	836.5	24.50	24.22	106.66%	1.160	1.237	23.35		23.5
NR n5			1	1	Bottom Surface	0	167800	839	24.50	24.26	105.68%	1.210	1.279	23.2		23.5
NR n7	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	504000	2520	24.50	23.75	118.85%	2.810	3.340	19.04	19.04	23.5
NR n7			1	1	Bottom Surface	0	507000	2535	24.50	23.81	117.22%	2.650	3.106	19.35		23.5
NR n7			1	1	Bottom Surface	0	510000	2550	24.50	23.80	117.49%	2.690	3.160	19.27		23.5
NR n12	15MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	141300	706.5	24.50	24.21	106.91%	1.110	1.187	23.53	23.3	23.5
NR n12			1	1	Bottom Surface	0	141500	707.5	24.50	24.25	105.93%	1.180	1.250	23.3		23.5
NR n12			1	1	Bottom Surface	0	141700	708.5	24.50	24.20	107.15%	1.130	1.211	23.44		23.5
NR n13	10MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	156400	782	24.50	23.95	113.50%	1.030	1.169	23.59	23.5	23.5
NR n14	10MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	158600	793	24.50	23.90	114.82%	0.997	1.145	23.69	23.5	23.5
NR n25	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	374000	1870	24.60	24.11	111.94%	3.900	4.366	17.97	17.97	23.6
NR n25			1	1	Bottom Surface	0	376500	1882.5	24.60	24.20	109.65%	3.820	4.189	18.15		23.6
NR n25			1	1	Bottom Surface	0	379000	1895	24.60	24.13	111.43%	3.520	3.922	18.44		23.6
NR n26	20MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	164800	824	24.50	24.08	110.15%	1.130	1.245	23.32	23.09	23.5
NR n26			1	1	Bottom Surface	0	166300	831.5	24.50	24.12	109.14%	1.170	1.277	23.21		23.5
NR n26			1	1	Bottom Surface	0	167800	839	24.50	24.26	105.68%	1.242	1.313	23.09		23.5
NR n30	10MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	462000	2310	23.00	22.59	109.90%	2.400	2.638	18.56	18.56	22
NR n66	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	346000	1730	24.50	23.95	113.50%	3.370	3.825	18.45	18.36	23.5
NR n66			1	1	Bottom Surface	0	349000	1745	24.50	23.98	112.72%	3.460	3.900	18.36		23.5
NR n66			1	1	Bottom Surface	0	352000	1760	24.50	23.89	115.08%	3.040	3.498	18.83		23.5
NR n70	15MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	340500	1702.5	24.60	23.81	119.95%	3.330	3.994	18.36	18.36	23.6
NR n71	20MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	134600	673	24.50	24.06	110.66%	0.886	0.980	24.36	23.5	23.5
NR n71			1	1	Bottom Surface	0	136100	680.5	24.50	24.10	109.65%	0.930	1.020	24.19		23.5
NR n71			1	1	Bottom Surface	0	137600	688	24.50	24.12	109.14%	0.925	1.010	24.23		23.5
NR n38	40MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	518000	2590	24.70	24.22	111.69%	2.590	2.893	19.66	19.63	23.7
NR n38			1	1	Bottom Surface	0	519000	2595	24.70	24.26	110.66%	2.680	2.966	19.75		23.7
NR n38			1	1	Bottom Surface	0	520000	2600	24.70	24.25	110.92%	2.750	3.050	19.63		23.7
NR n41_PC3	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	509202	2546.01	25.00	23.85	130.32%	1.550	2.020	21.72	21.72	24
NR n41_PC3			1	1	Bottom Surface	0	518598	2592.99	25.00	24.42	114.29%	1.520	1.737	22.37		24
NR n41_PC3			1	1	Bottom Surface	0	528000	2640	25.00	24.25	118.85%	1.630	1.937	21.9		24
NR n41_PC2	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	509202	2546.01	27.00	25.78	132.43%	2.080	2.768	22.35	22.35	26
NR n41_PC2			1	1	Bottom Surface	0	518598	2592.99	27.00	26.53	111.43%	2.050	2.284	23.18		26
NR n41_PC2			1	1	Bottom Surface	0	528000	2640	27.00	26.41	114.55%	2.140	2.451	22.88		26
NR n48	40MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	638000	3570	21.80	21.11	117.22%	1.140	1.336	20.31	19.56	20.8
NR n48			1	1	Bottom Surface	0	641668	3625.02	21.80	20.92	122.46%	1.160	1.421	20.05		20.8
NR n48			1	1	Bottom Surface	0	645332	3679.98	21.80	20.89	123.31%	1.290	1.591	19.56		20.8
NR n77_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	25.10	23.30	151.36%	5.930	8.975	15.34	15.34	24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	653000	3795	25.10	23.26	152.76%	5.780	8.829	15.41		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	656000	3840	25.10	23.41	147.57%	5.130	7.570	16.08		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	659000	3885	25.10	23.51	144.21%	5.240	7.557	16.09		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	662000	3930	25.10	23.57	142.23%	4.200	5.974	17.11		24.1
NR n77_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	26.00	25.88	102.80%	9.300	9.561	15.97	15.4	25
NR n77_PC2_FCC			1	1	Bottom Surface	0	653000	3795	26.00	25.89	102.57%	9.600	9.846	15.84		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	656000	3840	26.00	25.79	104.95%	9.900	10.390	15.61		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	659000	3885	26.00	25.76	105.68%	10.300	10.885	15.4		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	662000	3930	26.00	25.73	106.41%	9.200	9.790	15.86		25
NR n77 & n78_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	633333	3499.995	25.10	23.18	155.60%	2.490	3.874	18.99	18.99	24.1
NR n77 & n78_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	633333	3499.995	26.00	25.87	103.04%	4.860	5.008	18.78	18.78	25
NR n78_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	25.10	23.38	148.59%	3.330	4.948	17.93	17.93	24.1
NR n78_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	26.00	25.93	101.62%	6.410	6.514	17.63	17.63	25

* 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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Ant6

Band	Bandwidth (MHz)	Modulation	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Duty Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
											Measured	Reported			
NR n41_PC3	100MHz	CW	Bottom Surface	0	509202	2546.01	25.00	22.25	188.36%	10.00%	2.31	0.435	23.52	23.36	24
NR n41_PC3			Bottom Surface	0	518598	2592.99	25.00	22.25	188.36%	10.00%	2.40	0.452	23.36		24
NR n41_PC3			Bottom Surface	0	528000	2640	25.00	22.22	189.67%	10.00%	2.26	0.429	23.59		24
NR n77_PC3_FCC	100MHz	CW	Bottom Surface	0	650000	3750	25.00	23.78	132.43%	10.00%	1.47	0.195	27.02	24	24
NR n77_PC3_FCC			Bottom Surface	0	653000	3795	25.00	23.74	133.66%	10.00%	1.13	0.151	28.12		24
NR n77_PC3_FCC			Bottom Surface	0	656000	3840	25.00	23.80	131.83%	10.00%	1.05	0.138	28.5		24
NR n77_PC3_FCC			Bottom Surface	0	659000	3885	25.00	23.91	128.53%	10.00%	1.08	0.139	28.48		24
NR n77_PC3_FCC			Bottom Surface	0	662000	3930	25.00	23.98	126.47%	10.00%	1.10	0.139	28.47		24
NR n77 & n78_PC3_FCC	100MHz	CW	Bottom Surface	0	633333	3499.995	25.00	24.28	118.03%	10.00%	3.75	0.443	23.45	23.45	24
NR n78_PC3_FCC	100MHz	CW	Bottom Surface	0	650000	3750	25.00	23.98	126.47%	10.00%	1.68	0.212	26.64	24	24

Ant7

Band	Bandwidth (MHz)	Modulation	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Duty Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
											Measured	Reported			
NR n41_PC3	100MHz	CW	Bottom Surface	0	509202	2546.01	25.00	23.68	135.52%	10.00%	1.07	0.145	28.29	17.34	24
NR n41_PC3			Bottom Surface	0	518598	2592.99	25.00	23.54	139.96%	10.00%	1.23	0.172	27.55		24
NR n41_PC3			Bottom Surface	0	528000	2640	25.00	23.42	143.88%	10.00%	1.42	0.204	26.81		24
NR n77_PC3_FCC	100MHz	CW	Bottom Surface	0	650000	3750	25.00	24.25	118.85%	10.00%	3.01	0.358	24.37	14.56	24
NR n77_PC3_FCC			Bottom Surface	0	653000	3795	25.00	23.72	134.28%	10.00%	2.90	0.389	24		24
NR n77_PC3_FCC			Bottom Surface	0	656000	3840	25.00	23.70	134.90%	10.00%	2.94	0.397	23.93		24
NR n77_PC3_FCC			Bottom Surface	0	659000	3885	25.00	23.70	134.90%	10.00%	2.85	0.384	24.06		24
NR n77_PC3_FCC			Bottom Surface	0	662000	3930	25.00	23.71	134.59%	10.00%	2.93	0.394	23.95		24
NR n77 & n78_PC3_FCC	100MHz	CW	Bottom Surface	0	633333	3499.995	25.00	23.84	130.62%	10.00%	2.02	0.264	25.7	15.32	24
NR n78_PC3_FCC	100MHz	CW	Bottom Surface	0	650000	3750	25.00	24.57	110.41%	10.00%	3.29	0.363	24.31	14.39	24

Ant8

Band	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plimit** (dBm)	Minimum Plimit** (dBm)	Pmax* (dBm)
												Measured	Reported			
LTE Band 2	20MHz	QPSK	1	0	Bottom Surface	0	18700	1860	24.50	23.61	122.74%	1.62	1.988	21.29	20.71	23.5
LTE Band 2			1	0	Bottom Surface	0	18900	1880	24.50	23.24	133.66%	1.58	2.112	21.03		23.5
LTE Band 2			1	0	Bottom Surface	0	19100	1900	24.50	23.16	136.14%	1.67	2.274	20.71		23.5
LTE Band 4	20MHz	QPSK	1	0	Bottom Surface	0	20050	1720	24.50	23.23	133.97%	1.48	1.983	21.3	20.48	23.5
LTE Band 4			1	0	Bottom Surface	0	20175	1732.5	24.50	22.89	144.88%	1.43	2.072	21.11		23.5
LTE Band 4			1	0	Bottom Surface	0	20300	1745	24.50	22.55	156.68%	1.53	2.397	20.48		23.5
LTE Band 7	20MHz	QPSK	1	0	Bottom Surface	0	20850	2510	24.50	21.02	222.84%	0.85	1.883	21.52	20.89	23.5
LTE Band 7			1	0	Bottom Surface	0	21100	2535	24.50	21.49	199.99%	0.99	1.988	21.29		23.5
LTE Band 7			1	0	Bottom Surface	0	21350	2560	24.50	21.16	215.77%	1.01	2.179	20.89		23.5
LTE Band 25	20MHz	QPSK	1	0	Bottom Surface	0	26140	1860	24.50	23.59	123.31%	1.66	2.047	21.16	20.44	23.5
LTE Band 25			1	0	Bottom Surface	0	26365	1882.5	24.50	23.24	133.66%	1.69	2.259	20.73		23.5
LTE Band 25			1	0	Bottom Surface	0	26590	1905	24.50	23.10	138.04%	1.75	2.416	20.44		23.5
LTE Band 30	10MHz	QPSK	1	0	Bottom Surface	0	27710	2310	23.00	20.90	162.18%	1.22	1.979	19.81	19.81	22
LTE Band 66	20MHz	QPSK	1	0	Bottom Surface	0	132072	1720	24.50	23.58	123.59%	1.66	2.052	21.15	19.9	23.5
LTE Band 66			1	0	Bottom Surface	0	132322	1745	24.50	22.81	147.57%	1.62	2.391	20.49		23.5
LTE Band 66			1	0	Bottom Surface	0	132572	1770	24.50	22.46	159.96%	1.71	2.735	19.9		23.5
LTE Band 70	20MHz	QPSK	1	0	Bottom Surface	0	133047	1702.5	24.50	23.32	131.22%	1.71	2.244	20.76	20.76	23.5
LTE Band 38	20MHz	QPSK	1	0	Bottom Surface	0	37850	2580	24.50	20.22	267.92%	0.88	2.358	20.55	19.58	23.5
LTE Band 38			1	0	Bottom Surface	0	38000	2595	24.50	19.93	288.42%	0.91	2.612	20.1		23.5
LTE Band 38			1	0	Bottom Surface	0	38150	2610	24.50	19.63	306.90%	0.96	2.946	19.58		23.5
LTE Band 41_PC3	20MHz	QPSK	1	0	Bottom Surface	0	39750	2506	25.00	24.26	118.58%	2.27	2.692	20.47	19.68	24
LTE Band 41_PC3			1	0	Bottom Surface	0	40185	2549.5	25.00	24.56	110.66%	2.33	2.578	20.66		24
LTE Band 41_PC3			1	0	Bottom Surface	0	40620	2593	25.00	23.80	131.83%	2.45	3.230	19.68		24
LTE Band 41_PC3			1	0	Bottom Surface	0	41055	2636.5	25.00	23.89	129.12%	2.41	3.112	19.84		24
LTE Band 41_PC2	20MHz	QPSK	1	0	Bottom Surface	0	39750	2506	27.00	25.20	151.36%	2.69	4.071	20.67	19.88	26
LTE Band 41_PC2			1	0	Bottom Surface	0	40185	2549.5	27.00	25.55	139.64%	2.57	3.589	21.22		26
LTE Band 41_PC2			1	0	Bottom Surface	0	40620	2593	27.00	24.82	165.20%	2.96	4.890	19.88		26
LTE Band 41_PC2			1	0	Bottom Surface	0	41055	2636.5	27.00	24.80	165.96%	2.91	4.829	19.93		26
LTE Band 42_Part1	20MHz	QPSK	1	0	Bottom Surface	0	42190	3410	24.50	24.46	100.93%	2.73	2.755	19.87	19.05	23.5
LTE Band 42_Part1			1	0	Bottom Surface	0	42590	3500	24.50	24.49	100.23%	2.90	2.907	19.64		23.5
LTE Band 42_Part1			1	0	Bottom Surface	0	42990	3590	24.50	24.48	100.46%	3.31	3.325	19.05		23.5
LTE Band 42_Part2	20MHz	QPSK	1	0	Bottom Surface	0	43190	3560	24.50	24.45	101.16%	3.46	3.500	18.83	18.83	23.5
LTE Band 42_Part2			1	0	Bottom Surface	0	43340	3575	24.50	24.46	100.93%	3.38	3.411	18.94		23.5
LTE Band 42_Part2			1	0	Bottom Surface	0	43490	3590	24.50	24.35	103.51%	3.22	3.333	19.04		23.5
LTE Band 43	20MHz	QPSK	1	0	Bottom Surface	0	44190	3660	24.50	19.60	309.03%	1.19	3.677	18.62	18.01	23.5
LTE Band 43			1	0	Bottom Surface	0	44215	3662.5	24.50	19.52	314.77%	1.25	3.935	18.32		23.5
LTE Band 43			1	0	Bottom Surface	0	44240	3665	24.50	19.48	317.69%	1.33	4.225	18.01		23.5
LTE Band 48	20MHz	QPSK	1	0	Bottom Surface	0	55340	3560	21.80	21.79	100.23%	1.54	1.544	19.69	18.4	20.8
LTE Band 48			1	0	Bottom Surface	0	55830	3609	21.80	21.38	110.15%	1.61	1.773	19.08		20.8
LTE Band 48			1	0	Bottom Surface	0	56150	3641	21.80	21.46	108.14%	1.82	1.968	18.63		20.8
LTE Band 48			1	0	Bottom Surface	0	56640	3690	21.80	21.30	112.20%	1.85	2.076	18.4		20.8

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Band	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		P _{limit} ** (dBm)	Minimum P _{limit} ** (dBm)	P _{max} * (dBm)
												Measured	Reported			
NR n2	35MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	373500	1867.5	24.60	24.06	113.24%	1.96	2.220	20.91	20.63	23.6
NR n2			1	1	Bottom Surface	0	376000	1880	24.60	24.11	111.94%	1.91	2.138	21.07		23.6
NR n2			1	1	Bottom Surface	0	378500	1892.5	24.60	24.02	114.29%	2.07	2.369	20.63		23.6
NR n7	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	504000	2520	24.50	23.95	113.50%	1.68	1.907	21.47	21.14	23.5
NR n7			1	1	Bottom Surface	0	507000	2535	24.50	23.96	113.24%	1.80	2.038	21.18		23.5
NR n7			1	1	Bottom Surface	0	510000	2550	24.50	24.02	111.69%	1.84	2.055	21.14		23.5
NR n25	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	374000	1870	24.60	23.89	117.76%	1.96	2.308	20.74	20.65	23.6
NR n25			1	1	Bottom Surface	0	376500	1882.5	24.60	23.68	123.59%	1.84	2.274	20.8		23.6
NR n25			1	1	Bottom Surface	0	379000	1895	24.60	23.93	116.68%	2.02	2.357	20.65		23.6
NR n30	100MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	462000	2310	23.00	22.80	104.71%	1.43	1.497	21.02	21.02	22
NR n66	40MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	346000	1730	24.50	24.02	111.69%	2.14	2.390	20.49	20.12	23.5
NR n66			1	1	Bottom Surface	0	349000	1745	24.50	24.05	110.92%	2.17	2.407	20.46		23.5
NR n66			1	1	Bottom Surface	0	352000	1760	24.50	23.91	114.55%	2.27	2.600	20.12		23.5
NR n70	15MHz	SCS 15KHz Pi/2 BPSK	1	1	Bottom Surface	0	340500	1702.5	24.60	24.02	114.29%	2.01	2.297	20.76	20.76	23.6
NR n38	40MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	518000	2590	24.70	24.23	111.43%	1.75	1.950	21.57	21.46	23.7
NR n38			1	1	Bottom Surface	0	519000	2595	24.70	24.21	111.94%	1.72	1.925	21.63		23.7
NR n38			1	1	Bottom Surface	0	520000	2600	24.70	24.24	111.17%	1.80	2.001	21.46		23.7
NR n41_PC3	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	509202	2546.01	25.00	24.01	125.60%	2.28	2.864	20.2	20.18	24
NR n41_PC3			1	1	Bottom Surface	0	518598	2592.99	25.00	24.42	114.29%	2.38	2.720	20.43		24
NR n41_PC3			1	1	Bottom Surface	0	528000	2640	25.00	24.25	118.85%	2.42	2.876	20.18		24
NR n41_PC2	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	509202	2546.01	27.00	25.02	157.76%	2.71	4.275	20.46	20.32	26
NR n41_PC2			1	1	Bottom Surface	0	518598	2592.99	27.00	25.74	133.66%	2.82	3.769	21.01		26
NR n41_PC2			1	1	Bottom Surface	0	528000	2640	27.00	25.35	146.22%	3.02	4.416	20.32		26
NR n48	40MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	638000	3570	21.80	20.88	123.59%	1.42	1.755	19.13	18.53	20.8
NR n48			1	1	Bottom Surface	0	641668	3625.02	21.80	20.85	124.45%	1.51	1.879	18.83		20.8
NR n48			1	1	Bottom Surface	0	645332	3679.98	21.80	20.72	128.23%	1.57	2.013	18.53		20.8
NR n77_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	25.10	23.10	158.49%	2.09	3.312	19.67	19.04	24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	653000	3795	25.10	23.06	159.96%	2.13	3.407	19.55		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	656000	3840	25.10	23.17	155.96%	2.07	3.228	19.78		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	659000	3885	25.10	23.04	160.69%	2.12	3.407	19.55		24.1
NR n77_PC3_FCC			1	1	Bottom Surface	0	662000	3930	25.10	23.03	161.06%	2.38	3.833	19.04		24.1
NR n77_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	26.00	25.88	102.80%	3.96	4.071	19.68	19.34	25
NR n77_PC2_FCC			1	1	Bottom Surface	0	653000	3795	26.00	25.85	103.51%	4.02	4.161	19.58		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	656000	3840	26.00	25.91	102.09%	4.04	4.125	19.62		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	659000	3885	26.00	25.86	103.28%	4.14	4.276	19.46		25
NR n77_PC2_FCC			1	1	Bottom Surface	0	662000	3930	26.00	25.93	101.62%	4.33	4.400	19.34		25
NR n77 & n78_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	633333	3499.995	25.10	23.04	160.69%	1.84	2.957	20.16	20.16	24.1
NR n77 & n78_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	633333	3499.995	26.00	25.76	105.68%	3.66	3.868	19.9	19.9	25
NR n78_PC3_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	25.10	23.14	157.04%	3.00	4.711	18.14	18.14	24.1
NR n78_PC2_FCC	100MHz	SCS 30KHz Pi/2 BPSK	1	1	Bottom Surface	0	650000	3750	26.00	25.88	102.80%	5.26	5.407	18.44	18.44	25

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7 APPENDIXES

Refer to separated files for the following appendixes.

- 7.1 SAR_Appendix A Photographs**
- 7.2 SAR_Appendix B DAE & Probe Cal. Certificate**
- 7.3 SAR_Appendix C Phantom Description & Dipole Cal. Certificate**

- End of report -

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