RF Exposure Report

(Part 0: SAR and PD Char Evaluation)

FCC ID	**: HLZRXMG1**
Equipment	**: Notebook Computer**
Brand Name	**: ACER**
Model Name	**: N20C7**
Applicant	**: Acer Incorporated** **8F,. No. 88, Sec. 1, Xintai 5th Rd., Xizhi,** **New Taipei City 22181, Taiwan (R.O.C)**
Standard	**: FCC 47 CFR Part 2 (2.1093)**

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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Approved by: Cona Huang / Deputy Manager

Sporton International Inc.
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History of this test report

Report No.	Version	Description	Issued Date
FA070206D	01	Initial issue of report	Oct. 05, 2020
FA070206D	02	Update section3.1 and 4.3	Oct. 30, 2020
FA070206D	03	Add SAR result for Plimit calculation	Nov. 06, 2020

1. Introduction

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter sto ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency ≤ 6GHz) and power density (transmit frequency > 6GHz). to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement. Cannot operat without SAR and PD characterization at the device level, beforehand.

This report describes the procedures for the SAR char and PD char generation, and the parameters obtained from SAR and PD characterization (reffered to as SAR char and PD char, respectively) will be used as input for Smart Transmit. Both SAR char and PD char will be entered via the Embedded File System (EFS) to enable the Smart Transmit Feature.

Terminologies in this report

P_{limit}	The time-averaged RF power which corresponds to SAR_design_target.
P_{max}	Maximum target power level
SAR_design_target:	The design target for SAR compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
SAR char	P_{limit} for all the technologies/bands for all applicable DSI
PD_design_target:	The design target for PD compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
input.power.limit	For a PD characterized wireless device, the input power level at antenna port(s) for each beam corresponding to PD_design_target.
PD char	The table that contains input.power.limit fed to antenna port(s) for all supported beams.

2. Product Description

Product Feature & Specification	
Equipment Name	Notebook Computer
FCC ID	HLZRXMG1
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 30: 2307.5 MHz ~ 2312.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 48: 3652.5 MHz ~ 3697.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz LTE Band 71: 665.5 MHz ~ 695.5 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n260: 37GHz~40GHz 5G NR n261: 27.5GHz~28.35GHz WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac HT20 / HT40 / VHT20 / VHT40 / VHT80 Bluetooth BR/EDR/LE
EUT Stage	Production Unit

3. SAR Characterization

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz.

3.1 SAR design target and uncertainty

Exposure conditions	SAR design target	W/kg
Body Exposure condition	1g SAR design target	0.95

Item	Uncertainty dB (k=2)
Sub6 radio TxAGC	1.0
Device to device variation	1.2
Total uncertainty	1.5

To account for total uncertainty, SAR_design_target should be determined as:

$$SAR\_design\_target < SAR_{regulatory\_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

3.2 SAR Char Table

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

<WWAN Ant1>

Band	NB Sensor OFF (DSI0)	TB Sensor OFF (DSI:1)	NB Sensor ON (DSI2)	TB Sensor ON (DSI3)	Pmax*
WCDMA II	29.6	24.7	18	13	24.5
WCDMA IV	26.6	26	18.4	11.4	24.5
WCDMA V	26	29.2	20.3	15.1	24
LTE Band 7	26.7	27	20.7	12.9	24
LTE Band 12/17	25.6	29.4	19.7	17.5	24
LTE Band 13	24.8	26.1	18.7	15.5	24
LTE Band 14	24.7	25.8	18.9	15.6	24
LTE Band 25/2	24.8	26.3	17.4	14.1	24
LTE Band 26/5	26	27	21.6	14.8	24
LTE Band 30	26.3	24.2	19.4	11.1	24
LTE Band 38/41**	26.7	27	18.1	9.9	22
LTE Band 41 HPUE**					22.4
LTE Band 66/4	24.3	24.5	17.3	11.8	24
LTE Band 71	27.2	29.5	19.9	17.9	24
FR1 n2	24.4	24.1	17.9	14.3	24
FR1 n5	26.7	30.4	20.3	15.7	24
FR1 n41**	24.8	24.9	18.6	10.3	24
FR1 n66	26.8	24.7	19.1	13.1	24
FR1 n71	26.8	27	19.8	18.2	24

<WWAN Ant2>

Band	NB Sensor OFF (DSI0)	TB Sensor OFF (DSI:1)	NB Sensor ON (DSI2)	TB Sensor ON (DSI3)	Pmax*
LTE Band 12/17	27	28.2	18.8	16.5	24
LTE Band 13	26.5	25.7	18.8	16.5	24
LTE Band 14	26.6	26.5	19	16.3	24
LTE Band 26/5	27.6	30.3	20.2	14	24
LTE Band 48**	27.1	25.2	18.3	11	22
LTE Band 71	28.4	28.7	18.5	16	24
FR1 n5	28.5	31.4	21.2	15	24
FR1 n41	26.3	24.9	17.1	9.5	24
FR1 n71	28.1	29.9	18.5	18	24

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

**All Plimit power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The Plimit values, corresponding to SAR_design_target.

Maximum target power, P_{max}, is configured in NV settings in EUT to limit maximum transmitting power. This power is converted into peak power in NV settings for TDD schemes. The EUT maximum allowed output power is equal to P_{max} + 1.0dB device uncertainty

4. Power Density Characterization

The device with 5G mmW NR typically supports many beams and contains multiple mmW antenna arrays installed at different locations to achieve good coverage in the field. The power density (PD) measurement is a time-consuming test, and it is not practical to measure the power density for all the beams on all the surfaces of the device, thus a hybrid approach using electromagnetic (EM) simulation in combination with measurement is recommended for PD char generation

4.1 PD Char Table

The mmW device supports total N beams, where M out of N are single beams and the rest of (N-M) are beam pairs (where 2 single beams are excited at the same time).

The following figure outlines the PD char process.

Simulation modeling and validation

- Correlate the simulated PD distributions with measured PD distribution for the selected beams to validate simulation model

↓

Uncertainty Budget

- Calculate the total device design uncertainty to include worst case RF tune-up accuracy and device-to-device variation

↓

PD_design_target

Specify a power density design target, which should be less than power density regulatory limit to account for the total device design uncertainties

↓

Worst-case housing material Influence Quantification

- Determine

$$\Delta_{min} = \min\{\textit{simulated PD@8dBm} - \textit{measured PD@8dBm}\}$$

to quantify the worst-case housing influence

↓

PD Char Generation

- Use validated simulation approach to determine input power limit for all the beams after accounting for the worst-case housing influence

4.2 Codebook for all beams

All the beams that the device supports are specified in the pre-defined codebook, and the codebook is device design specific and generated after evaluating radiation coverage from this particular device. In the field, a smartphone manages the beam selection and utilization based on this pre-defined codebook that is loaded and stored in the device.

<n260>

Module	Type	Beam ID_1	Beam ID_2	Feed no.
L	Patch	1		1
		6		2
		7		2
		8		2
		14		2
		15		2
		23		4
		24		4
		25		4
		26		4
		27		4
		37		4
		38		4
		39		4
		40		4
		129		1
		134		2
		135		2
		136		2
		142		2
		143		2
		151		4
		152		4
		153		4
		154		4
		155		4
		165		4
		166		4
		167		4
		168		4
		1	129	2
		6	134	4
		7	135	4
		8	136	4
		14	142	4
		15	143	4
		23	151	8
		24	152	8
		25	153	8
		26	154	8
		27	155	8
		37	165	8
		38	166	8
		39	167	8
		40	168	8

Module	Type	Beam ID_1	Beam ID_2	Feed no.
J	Patch	0		1
		3		2
		4		2
		5		2
		12		2
		13		2
		18		4
		19		4
		20		4
		21		4
		22		4
		33		4
		34		4
		35		4
		36		4
		128		1
		131		2
		132		2
		133		2
		140		2
		141		2
		146		4
		147		4
		148		4
		149		4
		150		4
		161		4
		162		4
		163		4
		164		4
		0	128	2
		3	131	4
		4	132	4
		5	133	4
		12	140	4
		13	141	4
		18	146	8
		19	147	8
		20	148	8
		21	149	8
		22	150	8
		33	161	8
		34	162	8
		35	163	8
		36	164	8

Module	Type	Beam ID_1	Beam ID_2	Feed no.
K	Patch	2		1
		9		2
		10		2
		11		2
		16		2
		17		2
		28		4
		29		4
		30		4
		31		4
		32		4
		41		4
		42		4
		43		4
		44		4
		130		1
		137		2
		138		2
		139		2
		144		2
		145		2
		156		4
		157		4
		158		4
		159		4
		160		4
		169		4
		170		4
		171		4
		172		4
		2	130	2
		9	137	4
		10	138	4
		11	139	4
		16	144	4
		17	145	4
		28	156	8
		29	157	8
		30	158	8
		31	159	8
		32	160	8
		41	169	8
		42	170	8
		43	171	8
		44	172	8

<n261>

Module	Type	Beam ID_1	Beam ID_2	Feed no.
L	Patch	1		1
		6		2
		7		2
		8		2
		14		2
		15		2
		23		4
		24		4
		25		4
		26		4
		27		4
		37		4
		38		4
		39		4
		40		4
		129		1
		134		2
		135		2
		136		2
		142		2
		143		2
		151		4
		152		4
		153		4
		154		4
		155		4
		165		4
		166		4
		167		4
		168		4
		1	129	2
		6	134	4
		7	135	4
		8	136	4
		14	142	4
		15	143	4
		23	151	8
		24	152	8
		25	153	8
		26	154	8
		27	155	8
		37	165	8
		38	166	8
		39	167	8
		40	168	8

Module	Type	Beam ID_1	Beam ID_2	Feed no.
J	Patch	0		1
		3		2
		4		2
		5		2
		12		2
		13		2
		18		4
		19		4
		20		4
		21		4
		22		4
		33		4
		34		4
		35		4
		36		4
		128		1
		131		2
		132		2
		133		2
		140		2
		141		2
		146		4
		147		4
		148		4
		149		4
		150		4
		161		4
		162		4
		163		4
		164		4
		0	128	2
		3	131	4
		4	132	4
		5	133	4
		12	140	4
		13	141	4
		18	146	8
		19	147	8
		20	148	8
		21	149	8
		22	150	8
		33	161	8
		34	162	8
		35	163	8
		36	164	8

Module	Type	Beam ID_1	Beam ID_2	Feed no.
K	Patch	2		1
		9		2
		10		2
		11		2
		16		2
		17		2
		28		4
		29		4
		30		4
		31		4
		32		4
		41		4
		42		4
		43		4
		44		4
		130		1
		137		2
		138		2
		139		2
		144		2
		145		2
		156		4
		157		4
		158		4
		159		4
		160		4
		169		4
		170		4
		171		4
		172		4
		2	130	2
		9	137	4
		10	138	4
		11	139	4
		16	144	4
		17	145	4
		28	156	8
		29	157	8
		30	158	8
		31	159	8
		32	160	8
		41	169	8
		42	170	8
		43	171	8
		44	172	8

4.3 PD_design_target determination

To account for total uncertainty, PD_design_target should meet the criteria:

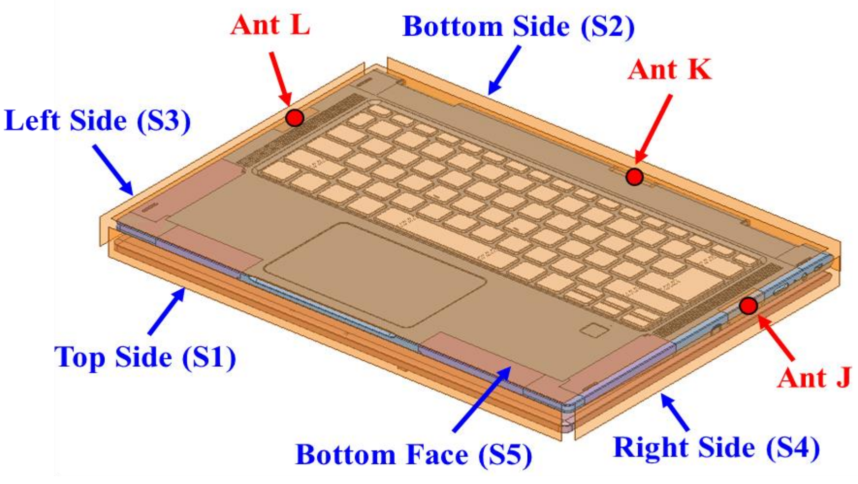
$$PD\_design\_target < PD_{regulatory\_limit} \times 10^{\frac{-totaluncertainty}{10}}$$

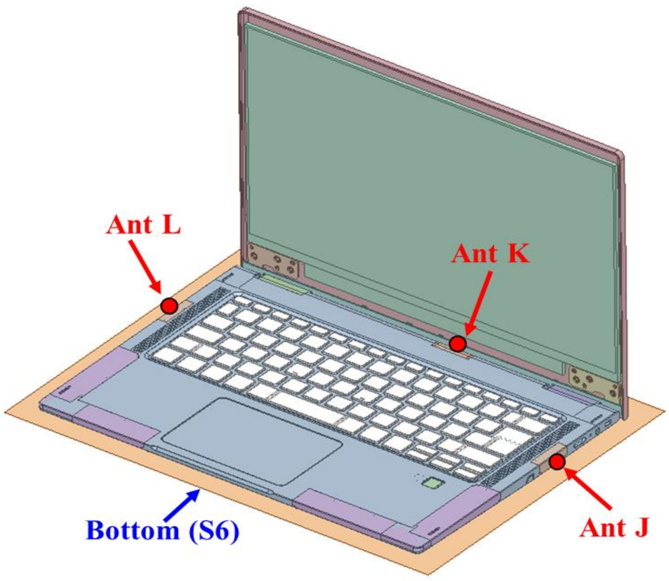
For this EUT, the PD design target and the uncertainty value are listed below

n260/261	PD design target	6.15 W/m^2

Item	Uncertainty dB (k=2)
TxAGC	1.9
Device to device variation	1.2
Total uncertainty	2.1

4.4 Exposure positions for PD evaluation





Evaluation positions

Mode	Tablet Mode					Laptop
Position	Top Side (S1)	Bottom Side (S2)	Left Side (S3)	Right Side (S4)	Bottom Face (S5)	Bottom (S6)
Ant L	V	V	V	X	V	V
Ant J	V	V	X	V	V	V
Ant K	X	V	V	V	V	V

Remark:
Referring to the PD simulation report for the reason of selecting surfaces/edges

4.5 Simulation and modeling validation

Power density simulations of all beams and surfaces were performed by the manufacturer. Details of these simulations and modeling validation can be found in the Power Density Simulation Report. Following Table includes a summary of the validation results to support worst-case housing influence quantification in power density characterization for this model With an input power of 6 dBm for n261 and n260 band, PD measurements are conducted for at least one single beam per antenna type and per antenna module (0,1) on worst-surface(s) . PD measurements are performed at mid channel of each mmW band and with CW modulation.
PD value will be used to determine worst-case housing influence for conservative assessment

antenna module	Beam ID 1	Beam ID 2	Band	Frequency (GHz)	Exposure Surface	Power Setting	Test separation	modulation	Measured results Savg tot 4cm^2 (W/m2)	Simulated Pd (W/m^2), averaged over 4 cm2	Sim vs meas (dB)
L	25	-	n261	27.925	S3 (Left Side)	60	2mm	CW	8.18	18.68	3.6
L	-	153	n261	27.925	S3 (Left Side)	60	2mm	CW	11.8	18.13	1.9
L	37	-	n261	27.925	S5 (Bottom Face)	60	2mm	CW	3.72	7.04	2.8
L	-	167	n261	27.925	S5 (Bottom Face)	60	2mm	CW	4.21	7.26	2.4
J	20	-	n261	27.925	S4 (Right Side)	60	2mm	CW	10.2	18.58	2.6
J	-	163	n261	27.925	S4 (Right Side)	60	2mm	CW	9.92	17.63	2.5
J	20	-	n261	27.925	S5 (Bottom Face)	60	2mm	CW	4.2	7.97	2.8
J	-	163	n261	27.925	S5 (Bottom Face)	60	2mm	CW	5.19	7.33	1.5
K	30	-	n261	27.925	S2 (Bottom Side)	60	2mm	CW	11.1	15.82	1.5
K	-	158	n261	27.925	S2 (Bottom Side)	60	2mm	CW	10	15.34	1.9
K	43	-	n261	27.925	S5 (Bottom Face)	60	2mm	CW	5.2	8.01	1.9
K	-	170	n261	27.925	S5 (Bottom Face)	60	2mm	CW	5.65	7.18	1.0
L	23	-	n260	38.5	S3 (Left Side)	60	2mm	CW	10.8	17.82	2.2
L	-	155	n260	38.5	S3 (Left Side)	60	2mm	CW	5.89	15.69	4.3
L	26	-	n260	38.5	S5 (Bottom Face)	60	2mm	CW	4.61	5.99	1.1
L	-	151	n260	38.5	S5 (Bottom Face)	60	2mm	CW	4.54	6.92	1.8
J	33	-	n260	38.5	S4 (Right Side)	60	2mm	CW	9.1	16.56	2.6
J	-	164	n260	38.5	S4 (Right Side)	60	2mm	CW	12.8	15.99	1.0
J	35	-	n260	38.5	S5 (Bottom Face)	60	2mm	CW	4.47	7.86	2.5
J	-	163	n260	38.5	S5 (Bottom Face)	60	2mm	CW	3.85	7.39	2.8
K	43	-	n260	38.5	S2 (Bottom Side)	60	2mm	CW	9.45	17.27	2.6
K	-	171	n260	38.5	S2 (Bottom Side)	60	2mm	CW	10.5	15.53	1.7
K	31	-	n260	38.5	S5 (Bottom Face)	60	2mm	CW	5.09	8.67	2.3
K	-	157	n260	38.5	S5 (Bottom Face)	60	2mm	CW	5.7	6.96	0.9

4.6 PD Char

4.6.1 Simulated input power limit for single beams

Perform simulation at low, mid and high channel for each mmW band supported, with a given input power per active port, *sim.input.power.per.active.port* (6 dBm for this product):

1. Obtain $PD_{surface}$ value (the worst PD among all identified surfaces of the device) at all three channels for all single beams (1~M) specified in *codebook_sim*.
2. Adjust input power to determine a scaling factor at all three channels by:
   $$s(i)_{low\_or\_mid\_high} = \frac{PD\ design\ target}{sim.PD_{surface}(i)},\ i = 1,2,\ldots M \qquad (4)$$
3. Determine the worst-case scaling factor among low, mid and high channels:
   $$s(i) = \min\{s_{low}(i), s_{mid}(i), s_{high}(i)\},\ i = 1,2,\ldots M \qquad (5)$$
   Note: This scaling factor applies to the input power at each antenna port
4. Determine the simulated input power limit, sim.powerlimit, for single beam i by:
   $$sim.\ power_{limit}.(i)dBm = 10 * \log(s(i)) + sim.input.power.per.active.port\ ,\ i = 1,2,\ldots M \qquad (6)$$

4.6.2 Simulated input power limit for beam pairs

The relative phase between single beams of a beam pair is sweeped to find the worst case PD for beam-pairs operation, and PD simulation data has taken this into considerationfor beam-pair operations take consideration of the variation relative phase was reported

For beam pair, extract the E-fields and H-fields from the corresponding single beams at and high channel for each supported band and for all identified surfaces of the device.

For a given beam pair containing *beam_a* and *beam_b with relative phase Ø* and for a given channel, determine the worst-case $Ø_{worstcase}$ which results in the highest $total\ PD$ (Ø) among all identified surfaces for this beam pair at this channel. When $Ø_{worstcase}$ is determined for all three channels, obtain the scaling factor given by the below equation for low, mid and high channels:

$$s(i)_{low\_or\_mid\_high} = \frac{PD\ design\ target}{total.PD(Ø(i)_{worstcase})},\ i = M+1,\ M+2,\ldots N \qquad (8)$$

The $Ø_{worstcase}$ varies with channel and beam pair, the lowest scaling factor among all three channels, *s(i)*, is determined for the beam pair *i*:

$$s(i) = \min\{s_{low}(i), s_{mid}(i), s_{high}(i)\},\ i = M+1,\ M+2,\ldots N \qquad (9)$$

The simulated input power limit, $sim.power_{limit}$, for beam pair *i* can be determined by

$$sim.power_{limit}(i)dBm = 10*\log(s(i)) + sim.input.power.per.active.port,\ i = M+1,\ M+2,\ \ldots N \qquad (10)$$

4.6.3 Worst-case housing influence determination

Referring to the PD simulation report for PD simulation data for all beams . For non-metal material, the material property cannot be accurately characterized at mmW frequencies. The estimated material property for the device housing is used in the simulation model, which could impact the accuracy in simulation for PD amplitude quantification. Since the housing influence on PD could vary from surface to surface where the EM field propagates through, the most underestimated surface is used to quantify the worst-case housing influence for conservative assessment.

Referring to the PD simulation report for PD simulation data for all beams, and the worst beams are selected to be tested Power density simulation for all

The mmW antenna modules are placed at different locations and only surrounding material/housing has impact on EM field propagation and in turn power density, and depending on the type of antenna array the nature of EM field propagation in the near field is different. Therefore, the worst-case housing influence is determined per antenna module and per antenna type.

For this DUT, the procedure to determine worst-case housing influence, denoted as $\Delta_{\min}$:

1. Based on PD simulation, determine one or more worst-surface(s) that contains all the highest 4cm^2-averaged PD for each of the beams, per antenna module and per antenna type in the mid channel of each band.
2. For identified worst surface(s) per antenna module and per antenna type group,
   a. First determine Δ_{min} based on identified worst surface(s) in Step 1, and then follow the procedures described in Section 4.6 to derive *input.power.limit* corresponding to *PD_design_target* for all the beams
   b. Then prove all other surface(s) near-by the mmW module, i.e., surface(s) not selected in Step 1, is not required for housing material loss quantification (in other words, these nonevaluated surfaces have no influence on the determined *input.power.limit*) by:
      i. Scale the simulated 4cm^2-averaged PD values for all single beams to correspond to their *sim.power*$_{limit}$, and identify the worst-PD beam per each non-selected surface.
      ii. Measure 4cm^2-averaged PD at *input.power.limit* for the identified worst-PD beam at each non-selected surface
      iii. Demonstrate all measured 4cm^2-averaged PD values are below *PD_design_target*.
3. If any of the above surface(s) in Step (2.b.iii) have measured 4cm^2-averaged PD ≥ *PD_design_target*, then those surfaces must be included in the Δ_{min} determination in Step (2.a), and follow the procedures in Section 4.6 to re-evaluate *input.power.limit* with these added surfaces.

Therefore, when comparing a simulated 4cm^2-avgeraged PD and measured 4cm^2-avgeraged PD for the above identified surfaces, the worst errors introduced when using the estimated material property in the simulation per module and per antenna type (worst out of both polarizations) is highlighted in bolded numbers in section 4.5. Thus, the worst-case housing influence, denoted as Δ_{min} (= minimum of (sim.PD – meas.PD) for the same antenna type of each module), is determined as:

Band	Antenna module	_Δ minimum (dB)
n260	L	1.9
	J	1.5
	K	1.0
Band	Antenna module	_Δ minimum (dB)
n261	L	1.1
	J	1.0
	K	0.9

Δ_{min} represents the worst case where RF exposure is underestimated the most by simulation upon using the estimated material property for glass/plastics of the housing. For conservative assessment, the Δ_{min} is used as the worst case correction and applied to each corresponding beam group to determine power limits in PD char for compliance. To ensure that condition described in Step (2.b.iii) is met, apply the correct input.power.limit to derive the PD simulated results for all beams, and select the worst beams (yellow highlighted in the PD table) for each of non-selected applicable surface(s).
The PD test results for non-selected surfaces are less than PD_design_target, and meets condition in Step (2.b.iii), thus performing Step (3) is not needed

Simulated 4cm^2-averaged PD at input.power.limit

<n260>

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S1 (Top Side)	S2 (Bottom Side)	S3 (Left Side)	S5 (Bottom Face)	S6 (Bottom)
L	Patch	1		1	0.041	0.020	5.503	2.334	1.783
		6		2	0.032	0.032	6.165	2.026	2.843
		7		2	0.027	0.061	5.014	2.057	1.512
		8		2	0.029	0.029	5.866	2.013	1.915
		14		2	0.030	0.043	4.927	1.640	1.750
		15		2	0.026	0.039	5.901	2.306	1.636
		23		4	0.039	0.019	5.764	1.866	3.057
		24		4	0.029	0.043	6.165	2.018	2.982
		25		4	0.027	0.061	5.319	2.191	2.435
		26		4	0.023	0.080	5.592	2.287	2.096
		27		4	0.035	0.056	5.863	1.983	2.996
		37		4	0.036	0.026	5.634	1.688	2.997
		38		4	0.015	0.044	5.924	2.209	2.547
		39		4	0.031	0.047	5.283	2.321	2.651
		40		4	0.030	0.100	5.780	2.007	2.625
		129		1	0.016	0.032	5.545	2.034	1.478
		134		2	0.016	0.022	4.967	1.594	1.513
		135		2	0.021	0.041	5.847	2.011	2.419
		136		2	0.028	0.063	5.615	2.300	1.763
		142		2	0.029	0.069	4.872	1.844	1.890
		143		2	0.012	0.043	5.709	1.780	2.131
		151		4	0.037	0.049	5.648	2.592	1.817
		152		4	0.031	0.050	5.269	2.049	1.776
		153		4	0.025	0.041	5.311	2.386	2.227
		154		4	0.012	0.045	5.706	1.884	2.652
		155		4	0.020	0.063	6.165	2.625	2.550
		165		4	0.025	0.043	5.111	2.112	1.626
		166		4	0.040	0.072	4.968	2.038	2.006
		167		4	0.020	0.012	5.371	1.997	2.292
		168		4	0.012	0.066	6.165	1.971	2.797
		1	129	2	0.035	0.021	5.228	2.139	1.782
		6	134	4	0.031	0.029	5.551	1.336	2.634
		7	135	4	0.027	0.055	5.417	1.750	2.028
		8	136	4	0.064	0.072	6.165	2.343	2.049
		14	142	4	0.030	0.080	4.874	1.967	1.447
		15	143	4	0.012	0.036	5.975	2.364	1.681
		23	151	8	0.050	0.029	6.126	2.185	2.287
		24	152	8	0.025	0.038	5.265	1.547	2.348
		25	153	8	0.022	0.051	4.979	2.058	1.914
		26	154	8	0.013	0.078	5.842	2.250	2.325
		27	155	8	0.023	0.075	6.165	2.049	2.059
		37	165	8	0.043	0.021	5.702	1.811	2.623
		38	166	8	0.032	0.049	4.924	1.538	2.235
		39	167	8	0.018	0.030	5.453	2.250	2.341
		40	168	8	0.017	0.099	6.165	2.187	2.059

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S1 (Top Side)	S2 (Bottom Side)	S4 (Right Side)	S5 (Bottom Face)	S6 (Bottom)
J	Patch	0		1	0.013	0.052	5.386	2.518	1.454
		3		2	0.006	0.029	5.588	1.761	1.684
		4		2	0.031	0.047	5.453	2.748	1.800
		5		2	0.025	0.070	6.044	3.292	1.338
		12		2	0.018	0.054	5.354	2.263	1.827
		13		2	0.019	0.019	5.761	1.948	1.660
		18		4	0.022	0.037	5.878	2.797	2.054
		19		4	0.011	0.068	5.602	2.586	2.112
		20		4	0.035	0.046	5.736	2.753	1.708
		21		4	0.026	0.067	5.634	2.902	1.564
		22		4	0.021	0.046	5.811	2.695	2.030
		33		4	0.011	0.057	5.939	2.783	2.320
		34		4	0.032	0.025	5.777	2.654	1.844
		35		4	0.042	0.094	5.360	2.971	1.826
		36		4	0.023	0.053	5.795	2.790	1.557
		128		1	0.016	0.048	5.507	1.686	2.472
		131		2	0.018	0.061	6.079	2.760	1.405
		132		2	0.026	0.045	5.337	2.297	1.578
		133		2	0.014	0.072	5.283	1.865	2.407
		140		2	0.028	0.055	5.516	2.610	1.332
		141		2	0.023	0.023	5.685	2.345	1.656
		146		4	0.015	0.088	6.032	2.272	2.923
		147		4	0.027	0.057	6.165	3.043	1.734
		148		4	0.021	0.060	5.319	2.962	1.627
		149		4	0.023	0.023	6.076	2.729	2.177
		150		4	0.019	0.087	5.819	2.434	2.945
		161		4	0.017	0.157	5.922	2.678	2.617
		162		4	0.028	0.051	6.165	3.062	1.777
		163		4	0.012	0.029	6.165	3.033	2.044
		164		4	0.022	0.052	5.903	2.540	2.894
		0	128	2	0.007	0.037	5.805	2.156	1.979
		3	131	4	0.009	0.032	5.846	2.398	1.570
		4	132	4	0.047	0.041	5.733	3.184	1.421
		5	133	4	0.015	0.049	6.165	2.840	1.768
		12	140	4	0.019	0.044	5.089	2.282	1.594
		13	141	4	0.012	0.026	5.488	1.374	2.036
		18	146	8	0.023	0.054	6.165	2.518	1.893
		19	147	8	0.017	0.058	5.844	2.944	1.940
		20	148	8	0.025	0.091	5.175	2.848	1.188
		21	149	8	0.013	0.038	5.938	3.140	1.923
		22	150	8	0.022	0.070	6.165	2.651	1.897
		33	161	8	0.014	0.106	6.009	2.582	1.897
		34	162	8	0.030	0.037	5.834	3.163	1.612
		35	163	8	0.019	0.065	5.641	3.146	1.853
		36	164	8	0.017	0.046	6.165	2.394	2.535

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S2 (Bottom Side)	S3 (Left Side)	S4 (Right Side)	S5 (Bottom Face)	S6 (Bottom)
K	Patch	2		1	6.104	0.046	0.015	3.121	1.218
		9		2	5.642	0.036	0.018	2.247	1.310
		10		2	6.010	0.021	0.035	1.642	1.839
		11		2	5.820	0.006	0.025	1.538	1.107
		16		2	5.723	0.068	0.012	2.159	1.282
		17		2	6.120	0.006	0.045	1.628	1.208
		28		4	6.165	0.031	0.047	2.652	1.332
		29		4	6.008	0.094	0.024	2.246	1.589
		30		4	5.689	0.022	0.041	2.086	1.410
		31		4	6.165	0.018	0.047	3.167	1.326
		32		4	6.165	0.062	0.023	3.198	1.321
		41		4	6.165	0.023	0.027	2.835	1.198
		42		4	6.059	0.033	0.016	1.960	2.225
		43		4	6.165	0.032	0.036	3.074	1.224
		44		4	6.165	0.012	0.039	2.739	1.246
		130		1	5.920	0.014	0.014	2.123	1.116
		137		2	6.125	0.013	0.034	1.957	0.844
		138		2	6.165	0.037	0.060	2.414	1.181
		139		2	5.703	0.007	0.026	2.013	0.792
		144		2	5.736	0.014	0.014	2.384	0.892
		145		2	6.165	0.020	0.040	1.808	0.877
		156		4	6.043	0.017	0.025	2.460	1.447
		157		4	6.090	0.042	0.023	3.241	1.872
		158		4	6.109	0.039	0.048	1.761	2.051
		159		4	6.165	0.020	0.044	1.495	1.765
		160		4	5.950	0.035	0.013	2.344	1.460
		169		4	5.893	0.026	0.017	2.457	1.505
		170		4	5.765	0.017	0.043	2.304	1.586
		171		4	6.165	0.020	0.028	1.489	2.060
		172		4	6.144	0.030	0.047	1.670	1.782
		2	130	2	6.121	0.022	0.022	2.776	1.202
		9	137	4	6.151	0.025	0.022	2.412	1.179
		10	138	4	6.165	0.045	0.066	2.200	1.412
		11	139	4	5.356	0.009	0.028	1.045	1.292
		16	144	4	5.724	0.069	0.015	2.417	1.263
		17	145	4	6.165	0.016	0.060	1.991	0.739
		28	156	8	6.101	0.030	0.052	1.747	1.648
		29	157	8	6.165	0.078	0.024	2.551	1.940
		30	158	8	6.002	0.041	0.041	1.943	1.617
		31	159	8	6.165	0.034	0.042	2.218	1.794
		32	160	8	6.165	0.060	0.025	2.530	1.209
		41	169	8	6.165	0.030	0.034	2.391	1.830
		42	170	8	5.748	0.009	0.040	2.208	1.854
		43	171	8	6.165	0.045	0.038	2.241	1.917
		44	172	8	6.165	0.028	0.025	2.460	1.585

<n261>

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S1 (Top Side)	S2 (Bottom Side)	S3 (Left Side)	S5 (Bottom Face)	S6 (Bottom)
L	Patch	1		1	0.048	0.048	6.165	2.055	2.867
		6		2	0.014	0.035	6.116	2.403	2.327
		7		2	0.012	0.019	5.949	1.983	3.323
		8		2	0.084	0.084	6.127	2.007	1.885
		14		2	0.027	0.053	6.165	2.425	2.551
		15		2	0.034	0.117	5.910	1.805	1.860
		23		4	0.094	0.099	6.165	3.468	2.065
		24		4	0.011	0.029	6.165	2.518	3.073
		25		4	0.017	0.013	6.165	2.284	3.254
		26		4	0.020	0.139	5.751	1.696	3.039
		27		4	0.041	0.166	5.778	2.293	2.809
		37		4	0.044	0.080	5.936	2.833	2.447
		38		4	0.003	0.010	6.091	2.249	3.213
		39		4	0.023	0.046	6.135	2.284	2.959
		40		4	0.027	0.155	5.642	2.056	2.987
		129		1	0.035	0.035	5.864	2.090	1.789
		134		2	0.037	0.202	5.918	2.185	2.050
		135		2	0.012	0.025	6.165	2.477	2.812
		136		2	0.061	0.220	5.771	2.658	1.492
		142		2	0.013	0.044	6.165	2.293	2.868
		143		2	0.053	0.079	5.582	2.685	2.190
		151		4	0.093	0.103	5.779	2.616	2.416
		152		4	0.016	0.040	5.701	2.108	2.663
		153		4	0.007	0.024	6.165	2.459	3.077
		154		4	0.026	0.009	6.165	2.766	2.672
		155		4	0.108	0.232	5.695	3.118	2.259
		165		4	0.047	0.065	5.517	2.074	2.707
		166		4	0.011	0.036	6.165	2.580	3.009
		167		4	0.011	0.011	6.165	2.553	2.908
		168		4	0.036	0.027	5.853	2.682	2.397
		1	129	2	0.016	0.048	5.641	2.248	2.574
		6	134	4	0.019	0.135	5.939	1.761	2.866
		7	135	4	0.003	0.010	6.151	1.879	3.157
		8	136	4	0.077	0.298	5.584	2.823	2.401
		14	142	4	0.022	0.065	6.165	2.289	2.935
		15	143	4	0.051	0.056	5.492	2.610	2.144
		23	151	8	0.087	0.105	6.149	2.177	3.117
		24	152	8	0.017	0.038	5.844	2.112	3.122
		25	153	8	0.008	0.029	6.157	2.180	3.616
		26	154	8	0.026	0.074	6.046	2.186	2.837
		27	155	8	0.091	0.133	6.114	2.523	2.917
		37	165	8	0.044	0.084	5.750	2.159	3.155
		38	166	8	0.009	0.026	5.980	2.241	3.365
		39	167	8	0.011	0.028	6.059	2.079	3.271
		40	168	8	0.040	0.107	6.135	2.164	3.147

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S1 (Top Side)	S2 (Bottom Side)	S4 (Right Side)	S5 (Bottom Face)	S6 (Bottom)
J	Patch	0		1	0.028	0.055	5.778	2.018	1.728
		3		2	0.034	0.095	5.085	1.949	1.534
		4		2	0.013	0.087	6.085	2.892	2.398
		5		2	0.014	0.076	5.717	2.700	2.314
		12		2	0.013	0.025	5.885	2.189	2.570
		13		2	0.042	0.216	5.774	3.089	1.995
		18		4	0.044	0.097	5.413	2.469	2.526
		19		4	0.012	0.079	6.094	2.680	2.925
		20		4	0.007	0.033	6.165	2.645	2.996
		21		4	0.022	0.150	5.899	2.791	2.596
		22		4	0.036	0.380	5.529	3.356	2.069
		33		4	0.030	0.156	5.740	2.575	2.835
		34		4	0.007	0.017	6.165	2.590	3.141
		35		4	0.015	0.066	6.165	2.779	2.838
		36		4	0.023	0.283	5.357	2.880	2.102
		128		1	0.013	0.063	6.127	1.798	2.127
		131		2	0.065	0.102	6.045	2.583	1.518
		132		2	0.006	0.019	6.165	2.539	2.644
		133		2	0.031	0.074	5.943	1.540	2.236
		140		2	0.020	0.033	6.158	2.618	2.307
		141		2	0.011	0.045	5.972	1.814	2.775
		146		4	0.111	0.100	5.654	2.880	2.169
		147		4	0.014	0.102	6.165	2.808	2.757
		148		4	0.007	0.022	6.165	2.621	3.099
		149		4	0.004	0.033	6.147	2.443	2.876
		150		4	0.023	0.131	5.939	1.887	3.037
		161		4	0.075	0.120	5.819	2.892	2.360
		162		4	0.013	0.064	6.131	2.782	2.842
		163		4	0.003	0.007	6.165	2.563	2.965
		164		4	0.021	0.094	6.165	1.944	3.335
		0	128	2	0.018	0.071	5.844	1.972	2.079
		3	131	4	0.055	0.087	6.121	2.076	1.781
		4	132	4	0.009	0.039	6.040	2.748	2.855
		5	133	4	0.039	0.123	6.105	2.444	2.514
		12	140	4	0.010	0.024	6.100	2.223	2.585
		13	141	4	0.015	0.105	6.165	2.915	2.308
		18	146	8	0.078	0.053	5.996	2.544	3.225
		19	147	8	0.019	0.079	6.121	3.062	2.840
		20	148	8	0.008	0.022	6.165	3.222	2.853
		21	149	8	0.009	0.048	6.163	3.126	2.599
		22	150	8	0.026	0.207	5.973	2.510	2.725
		33	161	8	0.048	0.067	5.950	2.749	3.073
		34	162	8	0.013	0.026	6.165	3.172	2.961
		35	163	8	0.009	0.038	6.165	3.335	2.573
		36	164	8	0.010	0.121	5.799	2.305	2.928

Module	Type	Beam ID_1	Beam ID_2	Feed no.	HFSS Simulated 4cm2 Average Total PD (W/m^2)				
					S2 (Bottom Side)	S3 (Left Side)	S4 (Right Side)	S5 (Bottom Face)	S6 (Bottom)
K	Patch	2		1	5.797	0.028	0.042	2.432	1.188
		9		2	5.755	0.065	0.196	2.863	1.231
		10		2	6.157	0.008	0.017	2.286	1.387
		11		2	6.165	0.035	0.053	2.706	1.130
		16		2	5.851	0.026	0.096	2.119	1.386
		17		2	6.165	0.025	0.050	2.346	1.622
		28		4	5.822	0.059	0.130	4.278	1.911
		29		4	5.545	0.015	0.045	2.328	1.494
		30		4	6.099	0.004	0.008	2.888	1.230
		31		4	5.855	0.004	0.027	2.885	1.532
		32		4	5.710	0.031	0.067	2.829	1.996
		41		4	5.645	0.023	0.085	3.125	1.503
		42		4	5.736	0.004	0.012	2.285	1.576
		43		4	5.957	0.004	0.004	3.084	0.978
		44		4	5.863	0.005	0.038	2.825	1.710
		130		1	5.820	0.069	0.035	1.865	1.451
		137		2	5.980	0.014	0.027	2.898	0.993
		138		2	6.151	0.007	0.022	2.742	1.328
		139		2	6.157	0.075	0.075	2.513	1.498
		144		2	6.158	0.007	0.007	3.065	1.205
		145		2	6.125	0.024	0.040	2.240	1.567
		156		4	5.945	0.046	0.014	2.523	1.693
		157		4	6.078	0.004	0.008	2.755	1.121
		158		4	6.165	0.004	0.004	2.785	1.346
		159		4	5.817	0.028	0.028	2.237	1.707
		160		4	6.017	0.114	0.137	3.855	1.848
		169		4	6.030	0.020	0.008	2.635	1.285
		170		4	6.121	0.004	0.004	2.884	1.177
		171		4	5.884	0.009	0.004	2.381	1.613
		172		4	5.612	0.063	0.068	2.957	1.960
		2	130	2	5.469	0.047	0.063	2.206	0.970
		9	137	4	5.769	0.023	0.093	2.759	1.114
		10	138	4	6.165	0.011	0.026	2.630	1.300
		11	139	4	6.058	0.070	0.086	3.000	0.973
		16	144	4	6.165	0.027	0.066	2.622	1.417
		17	145	4	6.021	0.039	0.050	2.208	1.680
		28	156	8	6.004	0.027	0.059	3.118	1.704
		29	157	8	5.846	0.011	0.035	2.316	1.263
		30	158	8	6.067	0.004	0.011	2.222	1.336
		31	159	8	5.860	0.014	0.041	2.355	1.485
		32	160	8	5.784	0.048	0.163	3.127	2.174
		41	169	8	5.901	0.017	0.057	2.476	1.430
		42	170	8	5.855	0.002	0.004	2.304	1.256
		43	171	8	5.819	0.004	0.004	2.262	1.379
		44	172	8	6.039	0.031	0.090	2.912	1.977

4cm^2-averaged PD for the selected beams on non-selected surfaces for Δ_{min}determination

antenna module	Beam ID 1	Beam ID 2	Band	Frequency (GHz)	Exposure Surface	Input Power limit	Test separation	modulation	Measured results Savg tot 4cm^2 (W/m2)
L	-	155	n261	27.925	S1 (Top Side)	4.73	2mm	CW	0.033
L	8	136	n261	27.925	S2 (Bottom Side)	4.51	2mm	CW	0.214
L	25	153	n261	27.925	S6 (Bottom of Laptop)	-0.33	2mm	CW	1.12
J	-	146	n261	27.925	S1 (Top Side)	4.21	2mm	CW	0.062
J	22	-	n261	27.925	S2 (Bottom Side)	4.17	2mm	CW	0.402
J	-	164	n261	27.925	S6 (Bottom of Laptop)	3.13	2mm	CW	1.47
K	-	160	n261	27.925	S3 (Left Side)	4.06	2mm	CW	0.038
K	9	-	n261	27.925	S4 (Right Side)	6.2	2mm	CW	0.066
K	32	-	n261	27.925	S6 (Bottom of Laptop)	0.55	2mm	CW	0.49
L	8	136	n260	38.5	S1 (Top Side)	2.89	2mm	CW	0.042
L	40	-	n260	38.5	S2 (Bottom Side)	2.29	2mm	CW	0.148
L	23	-	n260	38.5	S6 (Bottom of Laptop)	1.7	2mm	CW	1.13
J	4	132	n260	38.5	S1 (Top Side)	1.46	2mm	CW	0.06
J	-	161	n260	38.5	S2 (Bottom Side)	2.88	2mm	CW	0.097
J	-	150	n260	38.5	S6 (Bottom of Laptop)	2.25	2mm	CW	0.923
K	29	-	n260	38.5	S3 (Left Side)	2.35	2mm	CW	0.039
K	10	138	n260	38.5	S4 (Right Side)	1.79	2mm	CW	0.061
K	42	-	n260	38.5	S6 (Bottom of Laptop)	2.52	2mm	CW	0.967

4.7 PD Char

This section describes the PD char generation that complies with the *PD_design_target* and is in compliance with the regulatory power density limit.

4.7.1 PD char generation

Ideally, if there is no uncertainty associated with hardware as described in Section 4.4, after accounting for the housing influence ($\boldsymbol{\Delta_{min}}$), *input.power.limit(i)*, for beam *i* can be obtained:

$$input.power.limit(i) = 6\ dBm + 10 * \log(s(i)) + \Delta_{min},\ i \in all\ beams \quad (11)$$

If simulation overestimates the housing influence, then $\boldsymbol{\Delta_{min}}$ (= minimum {simulated PD – measured PD}) is negative, which means that the measured PD would be higher than the simulated PD. The input power to antenna elements determined via simulation must be decreased for compliance.
Similarly, if simulation underestimates loss, then $\boldsymbol{\Delta_{min}}$ is positive (measured PD would be lower than the simulated value). Input power to antenna elements determined via simulation can be increased and still be PD compliant.
In reality, the hardware design has uncertainty which must be properly considered in equation (11). In Section 4.7, the TxAGC uncertainty at reference power level (6dBm in report) is embedded in the process of $\boldsymbol{\Delta_{min}}$ determination and should be removed to avoid double counting this uncertainty.

If -TxAGC uncertainty at reference power level < *Δmin* < TxAGC uncertainty at reference power level,

$$Input.power.limit(i) = sim.power_{limit}(i), i = 1,2,..,N \quad (12)$$

else if Δmin < **-**TxAGC uncertainty at reference power level,

$$Input.power.limit(i) = sim.power_{limit}(i) + (\Delta min + TxAGC\ uncertainty), i = 1,2,..,N \quad (13)$$

else if Δmin > TxAGC uncertainty at reference power level,

$$Input.power.limit(i) = sim.power_{limit}(i) + (\Delta min - TxAGC\ uncertainty), i = 1,2,..,N \quad (14)$$

The input power limit is derived and listed in the table below

Band	Anenna Module	Δ_{min} (dB)	TxAGC uncertainty (dB)	Input.power.limit (dBm)
n260	L	1.9	0.5	6 +10* log(s(i))+1.4
	J	1.5	0.5	6 +10* log(s(i))+1.0
	K	1.0	0.5	6 +10* log(s(i))+0.5
n260	L	1.1	0.5	6 +10* log(s(i))+0.6
	J	1.0	0.5	6 +10* log(s(i))+0.5
	K	0.9	0.5	6 +10* log(s(i))+0.4

4.7.2 PD char Table

Combining the information in previous sections, PD char is derived and listed below

<n260>

Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
L	Patch	1		1	6.68
		6		2	3.90
		7		2	4.93
		8		2	4.20
		14		2	4.45
		15		2	4.69
		23		4	1.70
		24		4	2.14
		25		4	2.41
		26		4	2.42
		27		4	2.06
		37		4	1.78
		38		4	2.29
		39		4	2.50
		40		4	2.29
		129		1	8.61
		134		2	3.94
		135		2	5.00
		136		2	5.08
		142		2	4.19
		143		2	4.49
		151		4	2.34
		152		4	2.45
		153		4	2.71
		154		4	2.69
		155		4	2.54
		165		4	2.13
		166		4	2.62
		167		4	2.55
		168		4	2.74
		1	129	2	5.04
		6	134	4	1.15
		7	135	4	1.95
		8	136	4	2.89
		14	142	4	1.30
		15	143	4	1.39
		23	151	8	-1.15
		24	152	8	-0.88
		25	153	8	-0.45
		26	154	8	-0.63
		27	155	8	-1.17
		37	165	8	-0.87
		38	166	8	-0.62
		39	167	8	-0.33
		40	168	8	-1.09

Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
J	Patch	0		1	7.63
		3		2	4.20
		4		2	3.69
		5		2	4.52
		12		2	4.32
		13		2	4.57
		18		4	2.16
		19		4	2.05
		20		4	1.99
		21		4	2.20
		22		4	2.03
		33		4	2.05
		34		4	1.97
		35		4	2.27
		36		4	2.32
		128		1	8.56
		131		2	4.38
		132		2	4.61
		133		2	5.09
		140		2	4.89
		141		2	4.02
		146		4	2.30
		147		4	2.96
		148		4	2.83
		149		4	2.37
		150		4	2.25
		161		4	2.88
		162		4	3.13
		163		4	2.63
		164		4	2.17
		0	128	2	5.17
		3	131	4	1.13
		4	132	4	1.46
		5	133	4	1.36
		12	140	4	1.49
		13	141	4	1.13
		18	146	8	-1.09
		19	147	8	-0.77
		20	148	8	-0.63
		21	149	8	-0.98
		22	150	8	-1.16
		33	161	8	-0.97
		34	162	8	-0.80
		35	163	8	-0.68
		36	164	8	-0.65

Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
K	Patch	2		1	8.22
		9		2	4.19
		10		2	4.88
		11		2	4.29
		16		2	4.34
		17		2	4.50
		28		4	2.30
		29		4	2.35
		30		4	2.07
		31		4	2.03
		32		4	2.27
		41		4	2.24
		42		4	2.52
		43		4	1.93
		44		4	2.34
		130		1	7.74
		137		2	4.66
		138		2	5.13
		139		2	4.60
		144		2	4.80
		145		2	4.69
		156		4	2.65
		157		4	3.08
		158		4	2.76
		159		4	2.46
		160		4	2.83
		169		4	2.75
		170		4	2.69
		171		4	2.39
		172		4	2.71
		2	130	2	6.79
		9	137	4	1.96
		10	138	4	1.79
		11	139	4	1.39
		16	144	4	2.20
		17	145	4	1.41
		28	156	8	-0.62
		29	157	8	-0.61
		30	158	8	-0.92
		31	159	8	-1.02
		32	160	8	-0.76
		41	169	8	-0.63
		42	170	8	-0.96
		43	171	8	-1.19
		44	172	8	-0.83

<n261>

Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
L	Patch	1		1	8.17
		6		2	5.83
		7		2	5.31
		8		2	6.23
		14		2	5.62
		15		2	5.78
		23		4	4.34
		24		4	3.06
		25		4	2.59
		26		4	3.52
		27		4	4.03
		37		4	3.45
		38		4	2.65
		39		4	2.59
		40		4	3.87
		129		1	9.88
		134		2	6.14
		135		2	5.33
		136		2	6.19
		142		2	5.40
		143		2	6.86
		151		4	4.52
		152		4	3.38
		153		4	2.72
		154		4	3.69
		155		4	4.73
		165		4	4.08
		166		4	2.96
		167		4	2.86
		168		4	3.95
		1	129	2	6.40
		6	134	4	2.48
		7	135	4	2.81
		8	136	4	4.51
		14	142	4	3.00
		15	143	4	4.44
		23	151	8	0.98
		24	152	8	0.22
		25	153	8	-0.33
		26	154	8	0.17
		27	155	8	1.07
		37	165	8	0.20
		38	166	8	-0.22
		39	167	8	-0.46
		40	168	8	0.46

Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
J	Patch	0		1	8.41
		3		2	5.32
		4		2	5.25
		5		2	5.38
		12		2	5.04
		13		2	5.43
		18		4	3.43
		19		4	2.96
		20		4	2.21
		21		4	2.73
		22		4	4.17
		33		4	3.38
		34		4	2.34
		35		4	2.63
		36		4	2.83
		128		1	8.02
		131		2	6.66
		132		2	4.91
		133		2	4.89
		140		2	5.21
		141		2	4.55
		146		4	4.21
		147		4	3.68
		148		4	2.66
		149		4	2.60
		150		4	3.54
		161		4	4.01
		162		4	3.29
		163		4	2.44
		164		4	3.13
		0	128	2	6.50
		3	131	4	2.61
		4	132	4	1.73
		5	133	4	2.45
		12	140	4	2.34
		13	141	4	1.91
		18	146	8	0.59
		19	147	8	0.20
		20	148	8	-0.70
		21	149	8	-0.30
		22	150	8	0.07
		33	161	8	0.37
		34	162	8	-0.27
		35	163	8	-0.60
		36	164	8	-0.61

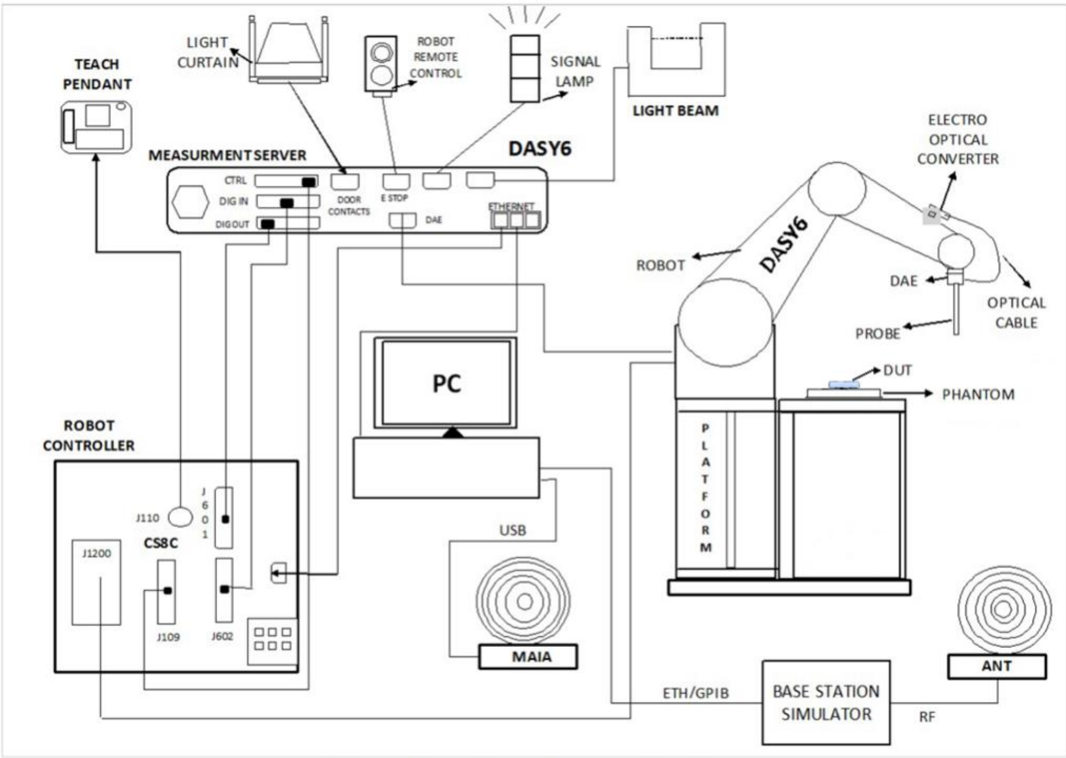
Module	Type	Beam ID_1	Beam ID_2	Feed no.	Input Power limit
K	Patch	2		1	8.00
		9		2	6.20
		10		2	5.67
		11		2	5.92
		16		2	5.91
		17		2	5.70
		28		4	4.22
		29		4	3.46
		30		4	2.36
		31		4	3.03
		32		4	3.64
		41		4	4.02
		42		4	2.58
		43		4	2.36
		44		4	3.24
		130		1	8.87
		137		2	4.86
		138		2	5.06
		139		2	5.70
		144		2	4.88
		145		2	5.48
		156		4	3.12
		157		4	2.49
		158		4	2.54
		159		4	3.92
		160		4	4.06
		169		4	2.62
		170		4	2.54
		171		4	3.00
		172		4	4.06
		2	130	2	5.43
		9	137	4	2.39
		10	138	4	2.22
		11	139	4	3.78
		16	144	4	2.38
		17	145	4	2.39
		28	156	8	0.37
		29	157	8	-0.05
		30	158	8	-0.20
		31	159	8	0.31
		32	160	8	0.55
		41	169	8	0.26
		42	170	8	-0.29
		43	171	8	-0.15
		44	172	8	0.60

5. PD Test Setup

5.1 PD Test – System Setup

The system to be used for the near field power density measurement

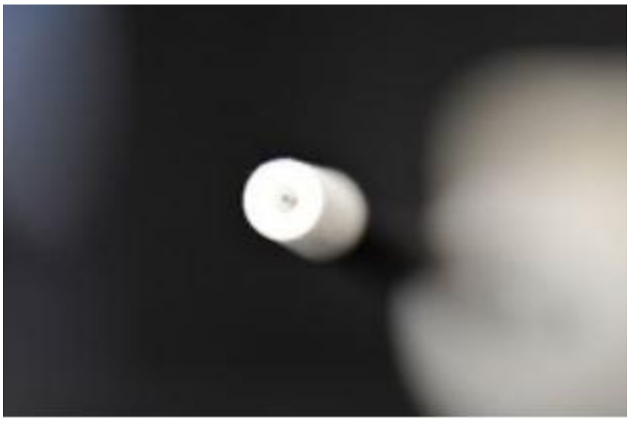
- SPEAG DASY6 system
  - SPEAG cDASY6 5G module software
  - EUmmWVx probe
- 5G Phantom cover

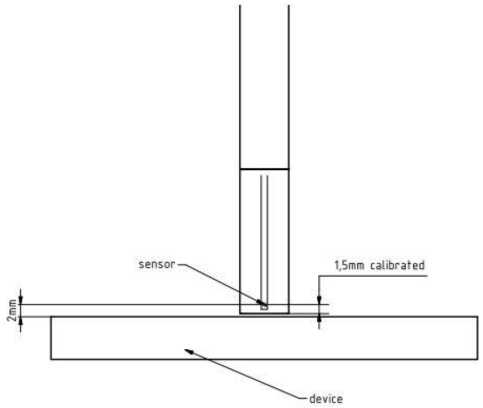


5.2 EUmmWave Probe / E-Field 5G Probe

The probe design allows measurements at distances as small as 2 mm from the sensors to the surface of the device under test (DUT). The typical sensor to probe tip distance is 1.5 mm.

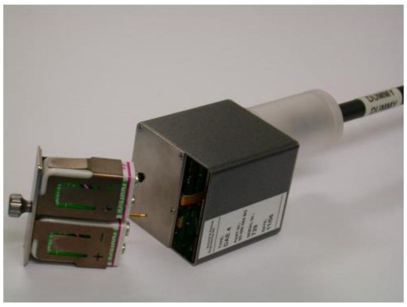
Frequency	750 MHz – 110 GHz
Probe Overall Length	320 mm
Probe Body Diameter	8.0 mm
Tip Length	23.0 mm
Tip Diameter	8.0 mm
Probe's two dipoles length	0.9 mm – Diode loaded
Dynamic Range	< 20 V/m - 10000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)
Position Precision	< 0.2 mm
Distance between diode sensors and probe's tip	1.5 mm
Minimum Mechanical separation between probe tip and a Surface	0.5 mm
Applications	E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in < 2 mm distance from device (free-space) Power density, H-field and far-field analysis using total field reconstruction.
Compatibility	cDASY6 + 5G-Module SW1.0 and higher





5.3 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



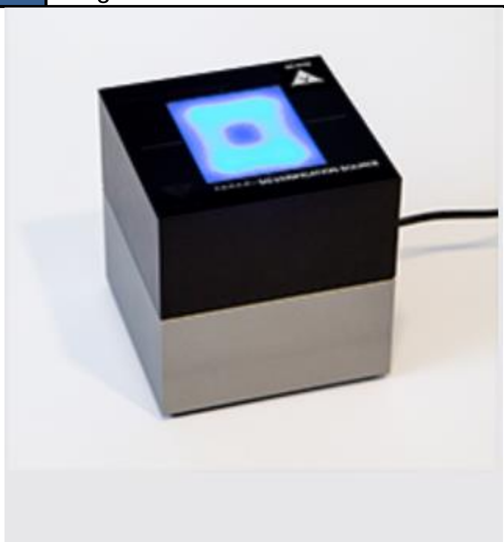
5.4 Scan configuration

Fine-resolution scans on 2 different planes are performed to reconstruct the E- and H-fields as well as the power density; the z-distance between the 2 planes is set to $\lambda/4$.
The (x, y) grid step is also set $\lambda/4$, the grid extent is set to sufficiently large to identify the field pattern and the peak.

5.5 System Verification Source

The System Verification sources at 30 GHz and above comprise horn-antennas and very stable signal generators.

Model	Ka-band horn antenna
Calibrated frequency:	30 GHz at 10mm from the case surface
Frequency accuracy	± 100 MHz
E-field polarization	linear
Harmonics	-20 dBc
Total radiated power	14 dBm
Power stability	0.05 dB
Power consumption	5 W
Size	00 x 100 x 100 mm
Weight	1 kg

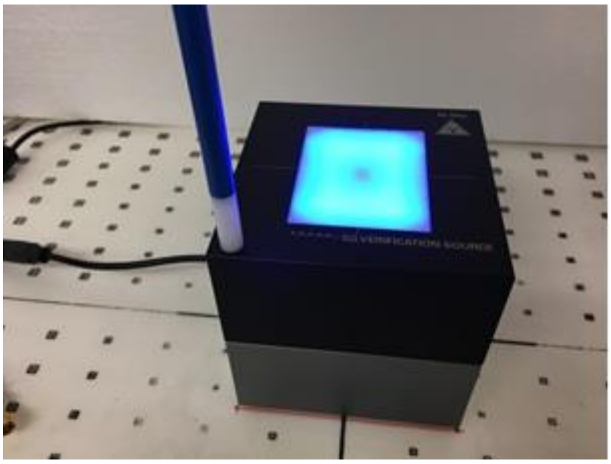


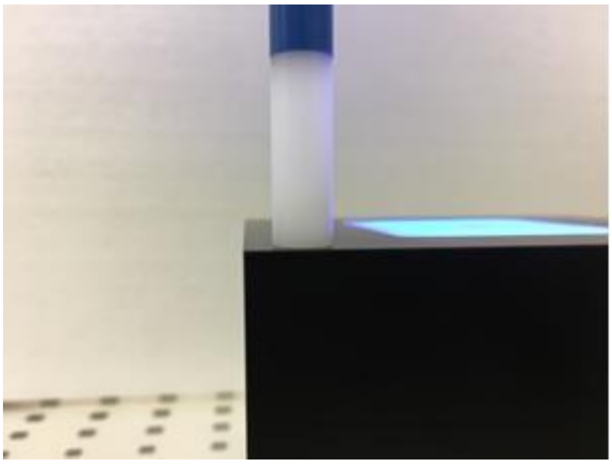
5.6 Power Density System Verification

The system performance check verifies that the system operates within its specifications.
The EUT is replaced by a calibrated source, the same spatial resolution, measurement region and the test separation used in the calibration was applied to system check. Through visual inspection into the measured power density distribution, both spatially (shape) and numerically (level) have no noticeable difference. The measured results should be within 0.66B of the calibrated targets.

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	$0.25\ (\frac{\lambda}{4})$	120/120	16×16
30	$0.25\ (\frac{\lambda}{4})$	60/60	24×24
60	$0.25\ (\frac{\lambda}{4})$	32.5/32.5	26×26
90	$0.25\ (\frac{\lambda}{4})$	30/30	36×36

Settings for measurement of verification sources





Verification Setup photo

5.7 System Verification Results

Date	Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Measured 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)
2020/7/27	30	30GHz_1007	9461	1424	10	31.8	34.1	-0.28
2020/8/7	30	30GHz_1007	9461	1424	10	31.5	34.1	-0.32
2020/9/7	30	30GHz_1007	9461	1424	10	32.5	34.1	-0.20

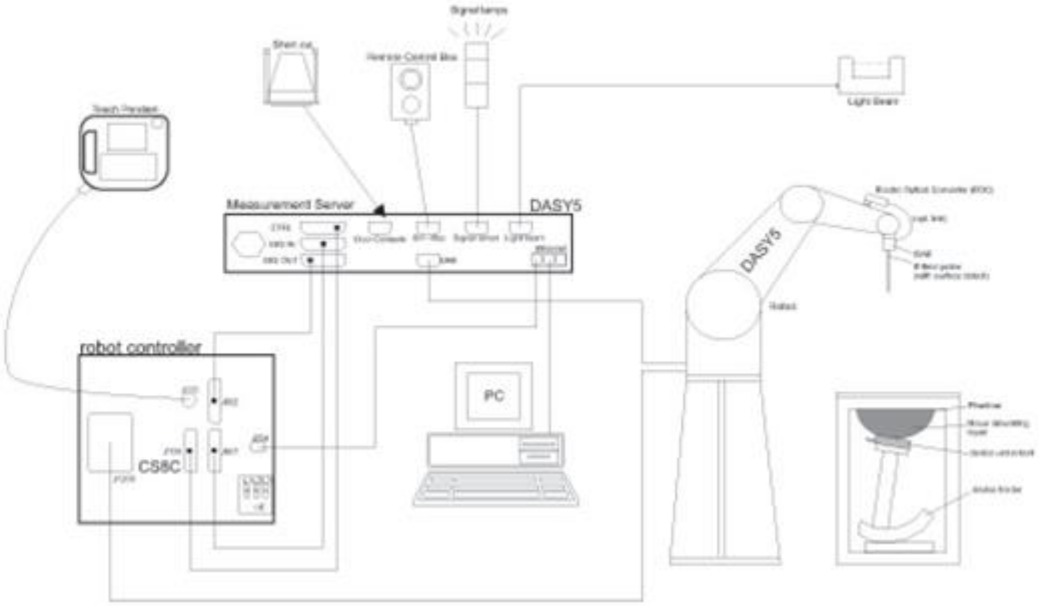
5.8 PD Uncertainty Assessment

The budget is valid for evaluation distances > λ/2π. For specific tests and configurations, the Uncertainty could be considerably smaller.

Preliminary Module mmWave Uncertainty Budget Evaluation Distances to the Antennas > λ / 2π						
Error Description	**Uncertainty Value (± dB)**	**Probability**	**Divisor**	**(Ci)**	**Standard Uncertainty (±dB)**	**(Vi) Veff**
Measurement System						
Probe Calibration	0.49	N	1	1	0.49	∞
Hemispherical Isotropy	0.50	R	1.732	1	0.29	∞
Linearity	0.20	R	1.732	0	0.12	∞
System Detection Limits	0.04	R	1.732	1	0.02	∞
Modulation Response	0.40	R	1.732	1	0.23	∞
Readout Electronics	0.03	N	1	1	0.03	∞
Response Time	0.00	R	1.732	1	0.00	∞
Integration Time	0.00	R	1.732	1	0.00	∞
RF Ambient Noise	0.2	R	1.732	1	0.12	∞
RF Ambient Reflections	0.21	R	1.732	1	0.12	∞
Probe Positioner	0.04	R	1.732	1	0.02	∞
Probe Positioning	0.30	R	1.732	1	0.17	∞
S_{avg} Reconstruction	0.60	R	1.732	1	0.35	∞
Test Sample Related						
Power Drift	0.2	R	1.732	1	0.12	∞
Input Power	0	N	1	0	0.00	∞
Combined Std. Uncertainty					0.76 dB	∞
Coverage Factor for 95 %					K=2	
Expanded STD Uncertainty					1.52 dB	

6. SAR Test Setup

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



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

6.1 Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

6.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

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 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

6.3 Power Reference Measurement

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

6.4 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

6.5 Zoom Scan

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

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

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

6.6 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

6.7 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

6.8 SAR Test Result for Plimit Calculation

DSI 0 for Laptop Mode when P-sensor is non-active

Band	Mode	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
WCDMA II	RMC 12.2Kbps	Bottom of Laptop	11mm	Laptop	9400	1880	24.92	25.50	0.317	0.362	29.6
WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	11mm	Laptop	1413	1732.6	24.92	25.50	0.632	0.722	26.6
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	11mm	Laptop	4132	826.4	24.44	25.50	0.663	0.846	
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	11mm	Laptop	4182	836.4	24.40	25.50	0.612	0.788	26
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	11mm	Laptop	4233	846.6	24.30	25.50	0.632	0.833	

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
LTE Band 7	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	21100	2535	24.60	25.00	0.583	0.639	26.7
LTE Band 12	10M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	23095	707.5	23.24	25.00	0.544	0.816	25.6
LTE Band 12_Ant 2	10M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	23095	707.5	23.24	25.00	0.396	0.594	27
LTE Band 13	10M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	23230	782	23.26	25.00	0.658	0.982	24.8
LTE Band 13_Ant 2	10M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	23230	782	23.26	25.00	0.447	0.667	26.5
LTE Band 14	10M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	23330	793	23.47	25.00	0.700	0.996	24.7
LTE Band 14_Ant 2	10M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	23330	793	23.47	25.00	0.455	0.647	26.6
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	26140	1860	24.32	25.00	0.838	0.980	
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	26340	1880	24.18	25.00	0.802	0.969	24.8
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	26590	1905	23.85	25.00	0.735	0.958	
LTE Band 26	15M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	26865	831.5	24.16	25.00	0.621	0.754	26
LTE Band 26_Ant 2	15M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	26865	831.5	24.16	25.00	0.425	0.516	27.6
LTE Band 30	10M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	27710	2310	24.34	25.00	0.598	0.696	26.3
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	40620	2593	24.98	25.00	0.399	0.403	26.7
LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	56150	3641	24.68	25.00	0.338	0.366	27.1
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	132572	1770	24.45	25.00	0.977	1.109	
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	132072	1720	24.02	25.00	0.865	1.084	24.3
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	132322	1745	24.06	25.00	0.881	1.094	
LTE Band 71	20M	QPSK	1	0	Bottom of Laptop	11mm	Laptop	133322	683	23.77	25.00	0.425	0.564	27.2
LTE Band 71_Ant 2	20M	QPSK	1	0	Bottom of Laptop	12mm	Laptop	133322	683	23.77	25.00	0.321	0.426	28.4
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	376000	1880	23.72	25.00	0.800	1.074	
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	372000	1860	23.52	25.00	0.725	1.019	24.4
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	380000	1900	23.60	25.00	0.733	1.012	
FR1 n5	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	167300	836.5	23.64	25.00	0.454	0.621	26.7
FR1 n5_Ant 2	20M	BPSK	1	1	Bottom of Laptop	12mm	Laptop	167300	836.5	23.51	25.00	0.297	0.419	28.5
FR1 n41	100M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	518598	2592.99	24.10	25.00	0.793	0.976	24.8
FR1 n41_Ant 2	100M	BPSK	1	1	Bottom of Laptop	12mm	Laptop	518598	2592.99	24.60	25.00	0.628	0.689	26.3
FR1 n66	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	349000	1745	24.23	25.00	0.518	0.618	26.8
FR1 n71	20M	BPSK	1	1	Bottom of Laptop	11mm	Laptop	136100	680.5	23.52	25.00	0.444	0.624	26.8
FR1 n71_Ant 2	20M	BPSK	1	1	Bottom of Laptop	12mm	Laptop	136100	680.5	23.71	25.00	0.340	0.458	28.1

DSI 1 for Tablet Mode when P-sensor is non-active

Band	Mode	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
WCDMA II	RMC 12.2Kbps	Bottom Face	17mm	Tablet	9400	1880	24.92	25.50	0.993	1.135	
WCDMA II	RMC 12.2Kbps	Bottom Face	17mm	Tablet	9262	1852.4	24.89	25.50	0.956	1.100	24.7
WCDMA II	RMC 12.2Kbps	Bottom Face	17mm	Tablet	9538	1907.6	24.91	25.50	0.923	1.057	
WCDMA IV	RMC 12.2Kbps	Bottom Face	17mm	Tablet	1413	1732.6	24.92	25.50	0.738	0.843	
WCDMA IV	RMC 12.2Kbps	Bottom Face	17mm	Tablet	1312	1712.4	24.53	25.50	0.659	0.824	26
WCDMA IV	RMC 12.2Kbps	Bottom Face	17mm	Tablet	1513	1752.6	24.89	25.50	0.703	0.809	
WCDMA V	RMC 12.2Kbps	Bottom Face	17mm	Tablet	4132	826.4	24.44	25.50	0.307	0.392	29.2

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
LTE Band 7	20M	QPSK	1	0	Bottom Face	17mm	Tablet	21100	2535	24.60	25.00			0.538	0.590	27
LTE Band 12	10M	QPSK	1	0	Bottom Face	17mm	Tablet	23095	707.5	23.24	25.00			0.228	0.342	29.4
LTE Band 12_Ant 2	10M	QPSK	1	0	Bottom Face	15mm	Tablet	23095	707.5	23.24	25.00			0.301	0.451	28.2
LTE Band 13	10M	QPSK	1	0	Bottom Face	17mm	Tablet	23230	782	23.26	25.00			0.486	0.725	26.1
LTE Band 13_Ant 2	10M	QPSK	1	0	Bottom Face	15mm	Tablet	23230	782	23.26	25.00			0.535	0.799	25.7
LTE Band 14	10M	QPSK	1	0	Bottom Face	17mm	Tablet	23330	793	23.47	25.00			0.543	0.772	25.8
LTE Band 14_Ant 2	10M	QPSK	1	0	Bottom Face	15mm	Tablet	23330	793	23.47	25.00			0.465	0.661	26.5
LTE Band 25	20M	QPSK	1	0	Bottom Face	17mm	Tablet	26140	1860	24.32	25.00			0.650	0.760	26.3
LTE Band 26	15M	QPSK	1	0	Bottom Face	17mm	Tablet	26865	831.5	24.16	25.00			0.490	0.595	27
LTE Band 26_Ant 2	15M	QPSK	1	0	Bottom Face	15mm	Tablet	26865	831.5	24.16	25.00			0.231	0.280	30.3
LTE Band 30	10M	QPSK	1	0	Bottom Face	17mm	Tablet	27710	2310	24.34	25.00			0.981	1.142	24.2
LTE Band 41	20M	QPSK	1	0	Bottom Face	17mm	Tablet	40620	2593	24.98	25.00	62.90	1.006	0.590	0.596	27
LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom Face	15mm	Tablet	56150	3641	24.68	25.20	62.90	1.006	0.825	0.936	25.2
LTE Band 66	20M	QPSK	1	0	Bottom Face	17mm	Tablet	132572	1770	24.45	25.00			0.921	1.045	
LTE Band 66	20M	QPSK	1	0	Bottom Face	17mm	Tablet	132072	1720	24.02	25.00			0.826	1.035	24.5
LTE Band 66	20M	QPSK	1	0	Bottom Face	17mm	Tablet	132322	1745	24.06	25.00			0.818	1.016	
LTE Band 71	20M	QPSK	1	0	Bottom Face	17mm	Tablet	133322	683	23.77	25.00			0.250	0.332	29.5
LTE Band 71_Ant 2	20M	QPSK	1	0	Bottom Face	15mm	Tablet	133322	683	23.77	25.00			0.302	0.401	28.7
FR1 n2	20M	BPSK	1	1	Bottom Face	17mm	Tablet	376000	1880	23.72	25.00			0.869	1.167	
FR1 n2	20M	BPSK	1	1	Bottom Face	17mm	Tablet	372000	1860	23.52	25.00			0.821	1.154	24.1
FR1 n2	20M	BPSK	1	1	Bottom Face	17mm	Tablet	380000	1900	23.60	25.00			0.833	1.150	
FR1 n5	20M	BPSK	1	1	Bottom Face	17mm	Tablet	167300	836.5	23.64	25.00			0.193	0.264	30.4
FR1 n5_Ant 2	20M	BPSK	1	1	Bottom Face	15mm	Tablet	167300	836.5	23.51	25.00			0.151	0.213	31.4
FR1 n41	100M	BPSK	1	1	Bottom Face	17mm	Tablet	518598	2592.99	24.10	25.00			0.780	0.960	24.9
FR1 n41_Ant 2	100M	BPSK	1	1	Bottom Face	15mm	Tablet	518598	2592.99	24.60	25.00			0.886	0.971	24.9
FR1 n66	20M	BPSK	1	1	Bottom Face	17mm	Tablet	349000	1745	24.23	25.00			0.844	1.008	
FR1 n66	20M	BPSK	1	1	Bottom Face	17mm	Tablet	344000	1720	24.18	25.00			0.826	0.998	24.7
FR1 n66	20M	BPSK	1	1	Bottom Face	17mm	Tablet	354000	1770	24.12	25.00			0.814	0.997	
FR1 n71	20M	BPSK	1	1	Bottom Face	17mm	Tablet	136100	680.5	23.52	25.00			0.426	0.599	27
FR1 n71_Ant 2	20M	BPSK	1	1	Bottom Face	15mm	Tablet	136100	680.5	23.71	25.00			0.226	0.304	29.9

DSI 2 for Laptop Mode when P-sensor is active

Band	Mode	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	9400	1880	24.92	25.50	4.290	4.903	
WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	9262	1852.4	24.89	25.50	4.600	5.294	18
WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	9538	1907.6	24.91	25.50	4.450	5.098	
WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	1413	1732.6	24.92	25.50	4.260	4.869	
WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	1312	1712.4	24.53	25.50	3.650	4.563	18.4
WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	1513	1752.6	24.89	25.50	4.020	4.626	
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	4182	836.4	24.40	25.50	2.410	3.105	
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	4132	826.4	24.44	25.50	2.210	2.821	20.3
WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Laptop	4233	846.6	24.30	25.50	2.120	2.795	

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
LTE Band 7	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	21350	2560	23.65	25.00			1.860	2.538	
LTE Band 7	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	20850	2510	23.56	25.00			1.240	1.728	20.7
LTE Band 7	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	21100	2535	23.40	25.00			1.260	1.821	
LTE Band 12	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23095	707.5	23.24	25.00			2.150	3.224	19.7
LTE Band 12_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23095	707.5	23.24	25.00			2.630	3.944	18.8
LTE Band 13	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23230	782	23.26	25.00			2.690	4.016	18.7
LTE Band 13_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23230	782	23.26	25.00			2.630	3.926	18.8
LTE Band 14	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23330	793	23.47	25.00			2.700	3.840	18.9
LTE Band 14_Ant 2	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	23330	782	23.47	25.00			2.650	3.769	19
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	26340	1880	24.48	25.00			3.250	3.663	
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	26140	1860	24.05	25.00			3.340	4.157	17.4
LTE Band 25	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	26590	1905	23.80	25.00			4.070	5.365	
LTE Band 26	15M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	26865	831.5	24.16	25.00			1.710	2.075	21.6
LTE Band 26_Ant 2	15M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	26865	831.5	24.16	25.00			2.350	2.851	20.2
LTE Band 30	10M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	27710	2310	24.34	25.00			2.950	3.434	19.4
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	40620	2593	24.98	25.00	62.90	1.006	1.650	1.668	
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	39750	2506	24.94	25.00	62.90	1.006	1.530	1.561	
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	40185	2549.5	24.86	25.00	62.90	1.006	1.500	1.558	18.1
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	41055	2636.5	24.45	25.00	62.90	1.006	1.880	2.147	
LTE Band 41	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	41490	2680	23.81	25.00	62.90	1.006	2.230	2.951	
LTE Band 41_HPUE	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	41490	2680	25.10	27.00	42.90	1.009	2.080	3.251	
LTE Band 48	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	56150	3641	24.68	25.00	62.90	1.006	1.520	1.646	
LTE Band 48	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	55340	3560	24.52	25.00	62.90	1.006	1.360	1.528	18.3
LTE Band 48	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	55830	3609	24.37	25.00	62.90	1.006	1.350	1.570	
LTE Band 48	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	56640	3690	23.93	25.00	62.90	1.006	2.180	2.806	
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	132072	1720	24.02	25.00			3.444	4.315	
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	132322	1745	24.06	25.00			4.320	5.364	17.3
LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	132572	1770	24.45	25.00			4.880	5.539	
LTE Band 71	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	133322	683	23.77	25.00			2.310	3.066	19.9
LTE Band 71_Ant 2	20M	QPSK	1	0	Bottom of Laptop	0mm	Laptop	133322	683	23.77	25.00			3.160	4.195	18.5
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	372000	1860	23.52	25.00			3.450	4.851	
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	376000	1880	23.72	25.00			3.000	4.028	17.9
FR1 n2	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	380000	1900	23.60	25.00			2.900	4.003	
FR1 n5	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	167300	836.5	23.64	25.00			2.050	2.804	20.3
FR1 n5_Ant 2	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	167300	836.5	23.51	25.00			1.610	2.269	21.2
FR1 n41	100M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	518598	2592.99	24.10	25.00			3.370	4.146	18.6
FR1 n41_Ant 2	100M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	518598	2592.99	24.6	25.00			5.340	5.855	17.1
FR1 n66	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	344000	1720	24.18	25.00			2.800	3.382	
FR1 n66	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	349000	1745	24.23	25.00			2.970	3.546	
FR1 n66	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	354000	1770	24.12	25.00			2.990	3.662	19.1
FR1 n71	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	136100	680.5	23.52	25.00			2.230	3.135	19.8
FR1 n71_Ant 2	20M	BPSK	1	1	Bottom of Laptop	0mm	Laptop	136100	680.5	23.71	25.00			3.150	4.239	18.5

DSI 3 for Tablet Mode when P-sensor is active

Band	Mode	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	Tablet	9400	1880	24.92	25.50	14.700	16.800	
WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	Tablet	9262	1852.4	24.89	25.50	13.700	15.766	
WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	Tablet	9538	1907.6	24.91	25.50	13.700	15.694	13
WCDMA II	RMC 12.2Kbps	Edge 1	0mm	Tablet	9400	1880	24.92	25.50	0.413	0.472	
WCDMA II	RMC 12.2Kbps	Edge 2	0mm	Tablet	9400	1880	24.92	25.50	3.480	3.977	
WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	Tablet	1413	1732.6	24.92	25.50	19.900	22.743	
WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	Tablet	1312	1712.4	24.53	25.50	19.200	24.005	
WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	Tablet	1513	1752.6	24.89	25.50	20.300	23.361	11.4
WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	Tablet	1413	1732.6	24.92	25.50	0.469	0.536	
WCDMA IV	RMC 12.2Kbps	Edge 2	0mm	Tablet	1413	1732.6	24.92	25.50	3.100	3.543	
WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	Tablet	4182	836.4	24.40	25.50	8.080	10.409	
WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	Tablet	4132	826.4	24.44	25.50	8.010	10.224	
WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	Tablet	4233	846.6	24.30	25.50	7.830	10.322	15.1
WCDMA V	RMC 12.2Kbps	Edge 1	0mm	Tablet	4182	836.4	24.40	25.50	0.246	0.317	
WCDMA V	RMC 12.2Kbps	Edge 2	0mm	Tablet	4182	836.4	24.40	25.50	2.110	2.718	

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
LTE Band 7	20M	QPSK	1	0	Bottom Face	0mm	Tablet	21350	2560	23.88	25.00		1.000	11.800	15.272	
LTE Band 7	20M	QPSK	1	0	Bottom Face	0mm	Tablet	20850	2510	24.54	25.00		1.000	10.400	11.562	
LTE Band 7	20M	QPSK	1	0	Bottom Face	0mm	Tablet	21100	2535	24.60	25.00		1.000	10.900	11.952	12.9
LTE Band 7	20M	QPSK	1	0	Edge 1	0mm	Tablet	21350	2560	23.88	25.00		1.000	0.454	0.588	
LTE Band 7	20M	QPSK	1	0	Edge 2	0mm	Tablet	21350	2560	23.88	25.00		1.000	3.550	4.594	
LTE Band 12	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23095	707.5	23.24	25.00		1.000	3.520	5.279	
LTE Band 12	10M	QPSK	1	0	Edge 1	0mm	Tablet	23095	707.5	23.24	25.00		1.000	0.051	0.076	17.5
LTE Band 12	10M	QPSK	1	0	Edge 2	0mm	Tablet	23095	707.5	23.24	25.00		1.000	3.250	4.874	
LTE Band 12_Ant 2	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23095	707.5	23.24	25.00		1.000	4.480	6.719	
LTE Band 12_Ant 2	10M	QPSK	1	0	Edge 1	0mm	Tablet	23095	707.5	23.24	25.00		1.000	0.127	0.190	16.5
LTE Band 12_Ant 2	10M	QPSK	1	0	Edge 4	0mm	Tablet	23095	707.5	23.24	25.00		1.000	2.230	3.344	
LTE Band 13	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23230	782	23.26	25.00		1.000	5.620	8.390	
LTE Band 13	10M	QPSK	1	0	Edge 1	0mm	Tablet	23230	782	23.26	25.00		1.000	0.183	0.273	15.5
LTE Band 13	10M	QPSK	1	0	Edge 2	0mm	Tablet	23230	782	23.26	25.00		1.000	1.250	1.866	
LTE Band 13_Ant 2	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23230	782	23.26	25.00		1.000	4.450	6.643	
LTE Band 13_Ant 2	10M	QPSK	1	0	Edge 1	0mm	Tablet	23230	782	23.26	25.00		1.000	0.238	0.355	16.5
LTE Band 13_Ant 2	10M	QPSK	1	0	Edge 4	0mm	Tablet	23230	782	23.26	25.00		1.000	0.852	1.272	
LTE Band 14	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23330	793	23.47	25.00		1.000	5.800	8.250	
LTE Band 14	10M	QPSK	1	0	Edge 1	0mm	Tablet	23330	793	23.47	25.00		1.000	0.177	0.252	15.6
LTE Band 14	10M	QPSK	1	0	Edge 2	0mm	Tablet	23330	793	23.47	25.00		1.000	1.080	1.536	
LTE Band 14_Ant 2	10M	QPSK	1	0	Bottom Face	0mm	Tablet	23330	793	23.47	25.00		1.000	4.930	7.012	
LTE Band 14_Ant 2	10M	QPSK	1	0	Edge 1	0mm	Tablet	23330	793	23.47	25.00		1.000	0.211	0.300	16.3
LTE Band 14_Ant 2	10M	QPSK	1	0	Edge 4	0mm	Tablet	23330	793	23.47	25.00		1.000	0.774	1.101	
LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	Tablet	26340	1880	24.18	25.00		1.000	9.200	11.112	
LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	Tablet	26140	1860	24.32	25.00		1.000	9.980	11.672	
LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	Tablet	26590	1905	23.85	25.00		1.000	8.800	11.468	
LTE Band 25	20M	QPSK	1	0	Edge 1	0mm	Tablet	26340	1880	24.18	25.00		1.000	0.418	0.505	14.1
LTE Band 25	20M	QPSK	1	0	Edge 2	0mm	Tablet	26340	1880	24.18	25.00		1.000	2.170	2.621	
LTE Band 25	20M	QPSK	1	0	Edge 2	0mm	Tablet	26140	1860	24.32	25.00		1.000	2.620	3.064	
LTE Band 25	20M	QPSK	1	0	Edge 2	0mm	Tablet	26590	1905	23.85	25.00		1.000	2.040	2.658	

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
LTE Band 26	15M	QPSK	1	0	Bottom Face	0mm	Tablet	26865	831.5	24.16	25.00			8.190	9.938	
LTE Band 26	15M	QPSK	1	0	Edge 1	0mm	Tablet	26865	831.5	24.16	25.00			0.171	0.207	14.8
LTE Band 26	15M	QPSK	1	0	Edge 2	0mm	Tablet	26865	831.5	24.16	25.00			0.704	0.854	
LTE Band 26_Ant 2	15M	QPSK	1	0	Bottom Face	0mm	Tablet	26865	831.5	24.16	25.00			9.800	11.891	
LTE Band 26_Ant 2	15M	QPSK	1	0	Edge 1	0mm	Tablet	26865	831.5	24.16	25.00			0.187	0.227	14
LTE Band 26_Ant 2	15M	QPSK	1	0	Edge 4	0mm	Tablet	26865	831.5	24.16	25.00			0.679	0.824	
LTE Band 30	10M	QPSK	1	0	Bottom Face	0mm	Tablet	27710	2310	24.34	25.00			19.820	23.073	
LTE Band 30	10M	QPSK	1	0	Edge 1	0mm	Tablet	27710	2310	24.34	25.00			0.232	0.270	11.1
LTE Band 30	10M	QPSK	1	0	Edge 2	0mm	Tablet	27710	2310	24.34	25.00			1.210	1.409	
LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Tablet	40620	2593	24.98	25.00	62.90	1.006	8.450	8.540	
LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Tablet	39750	2506	24.94	25.00	62.90	1.006	5.350	5.457	
LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Tablet	40185	2549.5	24.86	25.00	62.90	1.006	6.720	6.982	
LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Tablet	41055	2636.5	24.45	25.00	62.90	1.006	10.580	12.080	
LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Tablet	41490	2680	23.81	25.00	62.90	1.006	14.800	19.582	
LTE Band 41_HPUE	20M	QPSK	1	0	Bottom Face	0mm	Tablet	41490	2680	25.10	27.00	42.90	1.009	13.530	21.144	9.9
LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	Tablet	40620	2593	24.98	25.00	62.90	1.006	0.242	0.245	9.9
LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	Tablet	40620	2593	24.98	25.00	62.90	1.006	0.799	0.808	
LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	Tablet	39750	2506	24.94	25.00	62.90	1.006	0.670	0.683	
LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	Tablet	40185	2549.5	24.86	25.00	62.90	1.006	0.677	0.703	
LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	Tablet	41055	2636.5	24.45	25.00	62.90	1.006	0.654	0.747	
LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	Tablet	41490	2680	23.81	25.00	62.90	1.006	0.650	0.860	
LTE Band 48	20M	QPSK	1	0	Bottom Face	0mm	Tablet	56150	3641	24.68	25.00	62.90	1.006	8.400	9.097	
LTE Band 48	20M	QPSK	1	0	Bottom Face	0mm	Tablet	55340	3560	24.52	25.00	62.90	1.006	10.900	12.247	
LTE Band 48	20M	QPSK	1	0	Bottom Face	0mm	Tablet	55830	3609	24.37	25.00	62.90	1.006	9.080	10.560	
LTE Band 48	20M	QPSK	1	0	Bottom Face	0mm	Tablet	56640	3690	23.93	25.00	62.90	1.006	11.650	14.994	
LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	Tablet	56150	3641	24.68	25.00	62.90	1.006	0.313	0.339	11
LTE Band 48	20M	QPSK	1	0	Edge 4	0mm	Tablet	56150	3641	24.68	25.00	62.90	1.006	1.410	1.527	
LTE Band 48	20M	QPSK	1	0	Edge 4	0mm	Tablet	55340	3560	24.52	25.00	62.90	1.006	1.290	1.449	
LTE Band 48	20M	QPSK	1	0	Edge 4	0mm	Tablet	55830	3609	24.37	25.00	62.90	1.006	1.180	1.372	
LTE Band 48	20M	QPSK	1	0	Edge 4	0mm	Tablet	56640	3690	23.93	25.00	62.90	1.006	2.540	3.269	
LTE Band 66	20M	QPSK	1	0	Bottom Face	0mm	Tablet	132072	1720	24.02	25.00			12.900	16.166	
LTE Band 66	20M	QPSK	1	0	Bottom Face	0mm	Tablet	132322	1745	24.06	25.00			15.600	19.370	
LTE Band 66	20M	QPSK	1	0	Bottom Face	0mm	Tablet	132572	1770	24.45	25.00			15.200	17.252	
LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	Tablet	132072	1720	24.02	25.00			0.437	0.548	11.8
LTE Band 66	20M	QPSK	1	0	Edge 2	0mm	Tablet	132072	1720	24.02	25.00			3.210	4.023	
LTE Band 66	20M	QPSK	1	0	Edge 2	0mm	Tablet	132322	1745	24.06	25.00			4.130	5.128	
LTE Band 66	20M	QPSK	1	0	Edge 2	0mm	Tablet	132572	1770	24.45	25.00			3.800	4.313	
LTE Band 71	20M	QPSK	1	0	Bottom Face	0mm	Tablet	133322	683	23.77	25.00			3.650	4.845	
LTE Band 71	20M	QPSK	1	0	Edge 1	0mm	Tablet	133322	683	23.77	25.00			0.053	0.070	17.9
LTE Band 71	20M	QPSK	1	0	Edge 2	0mm	Tablet	133322	683	23.77	25.00			1.980	2.628	
LTE Band 71_Ant 2	20M	QPSK	1	0	Bottom Face	0mm	Tablet	133322	683	23.77	25.00			5.680	7.540	
LTE Band 71_Ant 2	20M	QPSK	1	0	Edge 1	0mm	Tablet	133322	683	23.77	25.00			0.094	0.125	16
LTE Band 71_Ant 2	20M	QPSK	1	0	Edge 4	0mm	Tablet	133322	683	23.77	25.00			5.560	7.380	

Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Configure (Tablet / Laptop)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	P-Limit
FR1 n2	20M	BPSK	1	1	Bottom Face	0mm	Tablet	372000	1860	23.52	25.00	7.910	11.122	
FR1 n2	20M	BPSK	1	1	Bottom Face	0mm	Tablet	376000	1880	23.72	25.00	7.110	9.547	
FR1 n2	20M	BPSK	1	1	Bottom Face	0mm	Tablet	380000	1900	23.60	25.00	6.280	8.669	
FR1 n2	20M	BPSK	1	1	Edge 1	0mm	Tablet	372000	1860	23.52	25.00	0.555	0.780	14.3
FR1 n2	20M	BPSK	1	1	Edge 2	0mm	Tablet	372000	1860	23.52	25.00	2.830	3.979	
FR1 n2	20M	BPSK	1	1	Edge 2	0mm	Tablet	376000	1880	23.72	25.00	2.340	3.142	
FR1 n2	20M	BPSK	1	1	Edge 2	0mm	Tablet	380000	1900	23.60	25.00	2.080	2.871	
FR1 n5	20M	BPSK	1	1	Bottom Face	0mm	Tablet	167300	836.5	23.64	25.00	6.780	9.273	
FR1 n5	20M	BPSK	1	1	Edge 1	0mm	Tablet	167300	836.5	23.64	25.00	0.197	0.269	15.7
FR1 n5	20M	BPSK	1	1	Edge 2	0mm	Tablet	167300	836.5	23.64	25.00	0.710	0.971	
FR1 n5_Ant 2	20M	BPSK	1	1	Bottom Face	0mm	Tablet	167300	836.5	23.51	25.00	6.690	9.428	
FR1 n5_Ant 2	20M	BPSK	1	1	Edge 1	0mm	Tablet	167300	836.5	23.51	25.00	0.132	0.186	15
FR1 n5_Ant 2	20M	BPSK	1	1	Edge 4	0mm	Tablet	167300	836.5	23.51	25.00	0.691	0.974	
FR1 n41	100M	BPSK	1	1	Bottom Face	0mm	Tablet	518598	2592.99	24.10	25.00	22.350	27.497	
FR1 n41	100M	BPSK	1	1	Edge 1	0mm	Tablet	518598	2592.99	24.10	25.00	0.120	0.148	10.3
FR1 n41	100M	BPSK	1	1	Edge 2	0mm	Tablet	518598	2592.99	24.10	25.00	4.480	5.512	
FR1 n41_Ant 2	100M	BPSK	1	1	Bottom Face	0mm	Tablet	518598	2592.99	24.60	25.00	30.610	33.563	
FR1 n41_Ant 2	100M	BPSK	1	1	Edge 1	0mm	Tablet	518598	2592.99	24.60	25.00	0.145	0.159	9.5
FR1 n41_Ant 2	100M	BPSK	1	1	Edge 4	0mm	Tablet	518598	2592.99	24.60	25.00	4.130	4.528	
FR1 n66	20M	BPSK	1	1	Bottom Face	0mm	Tablet	344000	1720	24.18	25.00	11.600	14.011	
FR1 n66	20M	BPSK	1	1	Bottom Face	0mm	Tablet	349000	1745	24.23	25.00	11.800	14.089	
FR1 n66	20M	BPSK	1	1	Bottom Face	0mm	Tablet	354000	1770	24.12	25.00	11.900	14.573	
FR1 n66	20M	BPSK	1	1	Edge 1	0mm	Tablet	344000	1720	24.18	25.00	0.921	1.112	13.1
FR1 n66	20M	BPSK	1	1	Edge 2	0mm	Tablet	344000	1720	24.18	25.00	3.500	4.227	
FR1 n66	20M	BPSK	1	1	Edge 2	0mm	Tablet	349000	1745	24.23	25.00	3.870	4.621	
FR1 n66	20M	BPSK	1	1	Edge 2	0mm	Tablet	354000	1770	24.12	25.00	3.500	4.286	
FR1 n71	20M	BPSK	1	1	Bottom Face	0mm	Tablet	136100	680.5	23.52	25.00	3.220	4.527	
FR1 n71	20M	BPSK	1	1	Edge 1	0mm	Tablet	136100	680.5	23.52	25.00	0.056	0.079	18.2
FR1 n71	20M	BPSK	1	1	Edge 2	0mm	Tablet	136100	680.5	23.52	25.00	2.460	3.459	
FR1 n71_Ant 2	20M	BPSK	1	1	Bottom Face	0mm	Tablet	136100	680.5	23.71	25.00	3.490	4.697	
FR1 n71_Ant 2	20M	BPSK	1	1	Edge 1	0mm	Tablet	136100	680.5	23.71	25.00	0.068	0.092	18
FR1 n71_Ant 2	20M	BPSK	1	1	Edge 4	0mm	Tablet	136100	680.5	23.71	25.00	2.940	3.957	

6.9 SAR Uncertainty Assessment

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.00	N	1	1	1	6.0	6.0
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.00	R	1.732	1	1	0.6	0.6
Linearity	4.70	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	2.90	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.00	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.03	N	1	1	1	3.0	3.0
Device Holder	3.60	N	1	1	1	3.6	3.6
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.10	R	1.732	1	1	3.5	3.5
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.71	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.71	1.7	1.5
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.6%	11.6%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						23.2%	23.1%

Uncertainty Budget for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.55	N	1	1	1	6.6	6.6
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.00	R	1.732	1	1	1.2	1.2
Linearity	4.70	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	6.70	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.00	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.03	N	1	1	1	3.0	3.0
Device Holder	3.60	N	1	1	1	3.6	3.6
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.60	R	1.732	1	1	3.8	3.8
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.71	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.71	1.7	1.5
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.7%	12.6%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.4%	25.3%

Uncertainty Budget for frequency range 3 GHz to 6 GHz