FCC ID: A3LSMF916U

Part 0 Power Density Report
Power Density Characterization

Revision B

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SAMSUNG ELECTRONICS

Power Density Characterization

1 Exposure Scenarios

At frequencies > 6 GHz, the total peak spatial averaged power density (psPD) is required to be assessed for all antenna configurations (beams) from all mmW antenna modules installed inside the device.

As showed in Figure 1, the surfaces near-by each mmW antenna module for PD characterization are identified and listed in Table 1.

Table 1
Evaluation Surfaces for PD Characterization

Band/Mode	Antenna Module	Condition	Back	Front	Top	Bottom	Right	Left
NR n261	J dipole	Closed	Yes	Yes	Yes	No	No	Yes
NR n261	J patch	Closed	Yes	No	Yes	No	No	Yes
NR n261	K patch	Closed	Yes	Yes	No	No	Yes	No
NR n260	J dipole	Closed	Yes	Yes	Yes	No	No	Yes
NR n260	J patch	Closed	Yes	No	Yes	No	No	Yes
NR n260	K patch	Closed	Yes	Yes	No	No	Yes	No
NR n261	J dipole	Open	Yes	Yes	Yes	No	No	No
NR n261	J patch	Open	Yes	No	Yes	No	No	No
NR n261	K patch	Open	Yes	Yes	No	No	Yes	No
NR n260	J dipole	Open	Yes	Yes	Yes	No	No	No
NR n260	J patch	Open	Yes	No	Yes	No	No	No
NR n260	K patch	Open	Yes	Yes	No	No	Yes	No

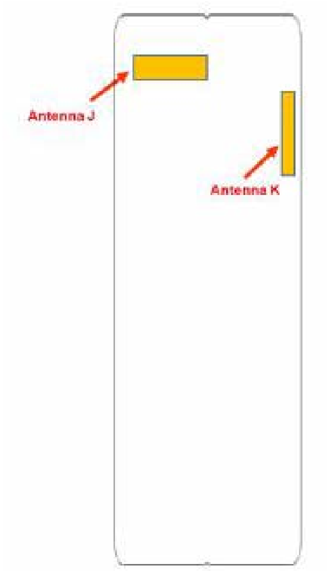


Figure 1: Location of mmW antenna modules looking from front of the DUT – closed

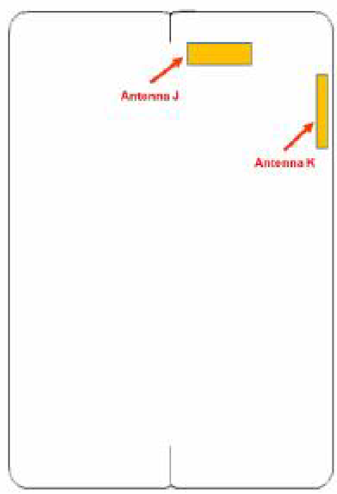
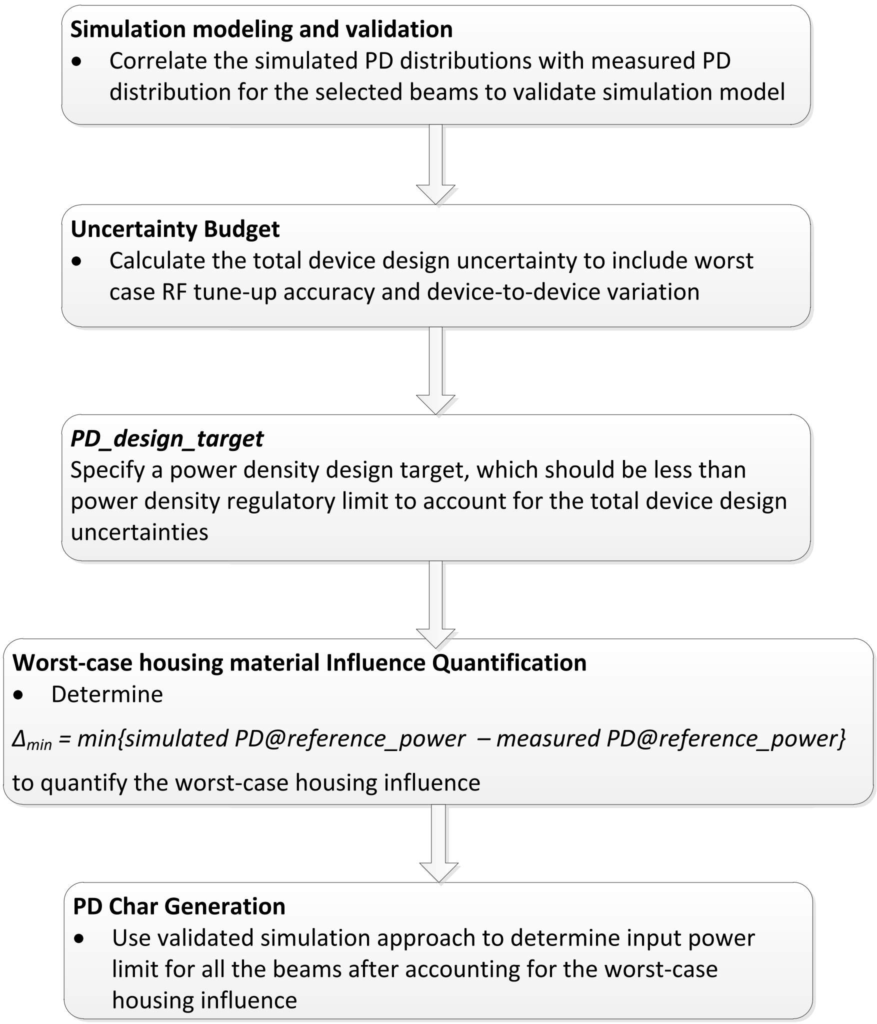


Figure 2: Location of mmW antenna modules looking from front of the DUT - open

2 Power Density Characterization Method



3 Codebook for all supported beams

Table 2
5G mmW NR Band n261 Ant J dipole Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	1	J	DIPOLE	2	129
n261	6	J	DIPOLE	4	134
n261	7	J	DIPOLE	4	135
n261	8	J	DIPOLE	4	136
n261	14	J	DIPOLE	4	142
n261	15	J	DIPOLE	4	143
n261	129	J	DIPOLE	2	1
n261	134	J	DIPOLE	4	6
n261	135	J	DIPOLE	4	7
n261	136	J	DIPOLE	4	8
n261	142	J	DIPOLE	4	14
n261	143	J	DIPOLE	4	15

Table 3
5G mmW NR Band n261 Ant J patch Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	0	J	PATCH	1	128
n261	3	J	PATCH	2	131
n261	4	J	PATCH	2	132
n261	5	J	PATCH	2	133
n261	12	J	PATCH	2	140
n261	13	J	PATCH	2	141
n261	18	J	PATCH	4	146
n261	19	J	PATCH	4	147
n261	20	J	PATCH	4	148
n261	21	J	PATCH	4	149
n261	22	J	PATCH	4	150
n261	28	J	PATCH	4	156
n261	29	J	PATCH	4	157
n261	30	J	PATCH	4	158
n261	31	J	PATCH	4	159
n261	128	J	PATCH	1	0
n261	131	J	PATCH	2	3
n261	132	J	PATCH	2	4
n261	133	J	PATCH	2	5
n261	140	J	PATCH	2	12
n261	141	J	PATCH	2	13
n261	146	J	PATCH	4	18
n261	147	J	PATCH	4	19
n261	148	J	PATCH	4	20
n261	149	J	PATCH	4	21
n261	150	J	PATCH	4	22
n261	156	J	PATCH	4	28
n261	157	J	PATCH	4	29
n261	158	J	PATCH	4	30
n261	159	J	PATCH	4	31

Table 4
5G mmW NR Band n261 Ant K patch Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	2	K	PATCH	1	130
n261	9	K	PATCH	2	137
n261	10	K	PATCH	2	138
n261	11	K	PATCH	2	139
n261	16	K	PATCH	2	144
n261	17	K	PATCH	2	145
n261	23	K	PATCH	4	151
n261	24	K	PATCH	4	152
n261	25	K	PATCH	4	153
n261	26	K	PATCH	4	154
n261	27	K	PATCH	4	155
n261	32	K	PATCH	4	160
n261	33	K	PATCH	4	161
n261	34	K	PATCH	4	162
n261	35	K	PATCH	4	163
n261	130	K	PATCH	1	2
n261	137	K	PATCH	2	9
n261	138	K	PATCH	2	10
n261	139	K	PATCH	2	11
n261	144	K	PATCH	2	16
n261	145	K	PATCH	2	17
n261	151	K	PATCH	4	23
n261	152	K	PATCH	4	24
n261	153	K	PATCH	4	25
n261	154	K	PATCH	4	26
n261	155	K	PATCH	4	27
n261	160	K	PATCH	4	32
n261	161	K	PATCH	4	33
n261	162	K	PATCH	4	34
n261	163	K	PATCH	4	35

Table 5
5G mmW NR Band n260 Ant J dipole Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	1	J	DIPOLE	2	129
n261	6	J	DIPOLE	4	134
n261	7	J	DIPOLE	4	135
n261	8	J	DIPOLE	4	136
n261	14	J	DIPOLE	4	142
n261	15	J	DIPOLE	4	143
n261	129	J	DIPOLE	2	1
n261	134	J	DIPOLE	4	6
n261	135	J	DIPOLE	4	7
n261	136	J	DIPOLE	4	8
n261	142	J	DIPOLE	4	14
n261	143	J	DIPOLE	4	15

Table 6
5G mmW NR Band n260 Ant J patch Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	0	J	PATCH	1	128
n261	3	J	PATCH	2	131
n261	4	J	PATCH	2	132
n261	5	J	PATCH	2	133
n261	12	J	PATCH	2	140
n261	13	J	PATCH	2	141
n261	18	J	PATCH	4	146
n261	19	J	PATCH	4	147
n261	20	J	PATCH	4	148
n261	21	J	PATCH	4	149
n261	22	J	PATCH	4	150
n261	28	J	PATCH	4	156
n261	29	J	PATCH	4	157
n261	30	J	PATCH	4	158
n261	31	J	PATCH	4	159
n261	128	J	PATCH	1	0
n261	131	J	PATCH	2	3
n261	132	J	PATCH	2	4
n261	133	J	PATCH	2	5
n261	140	J	PATCH	2	12
n261	141	J	PATCH	2	13
n261	146	J	PATCH	4	18
n261	147	J	PATCH	4	19
n261	148	J	PATCH	4	20
n261	149	J	PATCH	4	21
n261	150	J	PATCH	4	22
n261	156	J	PATCH	4	28
n261	157	J	PATCH	4	29
n261	158	J	PATCH	4	30
n261	159	J	PATCH	4	31

Table 7
5G mmW NR Band n260 Ant K patch Codebook

Band	Beam ID	Module	Type(P or D)	Feed no.	Paired with
n261	2	K	PATCH	1	130
n261	9	K	PATCH	2	137
n261	10	K	PATCH	2	138
n261	11	K	PATCH	2	139
n261	16	K	PATCH	2	144
n261	17	K	PATCH	2	145
n261	23	K	PATCH	4	151
n261	24	K	PATCH	4	152
n261	25	K	PATCH	4	153
n261	26	K	PATCH	4	154
n261	27	K	PATCH	4	155
n261	32	K	PATCH	4	160
n261	33	K	PATCH	4	161
n261	34	K	PATCH	4	162
n261	35	K	PATCH	4	163
n261	130	K	PATCH	1	2
n261	137	K	PATCH	2	9
n261	138	K	PATCH	2	10
n261	139	K	PATCH	2	11
n261	144	K	PATCH	2	16
n261	145	K	PATCH	2	17
n261	151	K	PATCH	4	23
n261	152	K	PATCH	4	24
n261	153	K	PATCH	4	25
n261	154	K	PATCH	4	26
n261	155	K	PATCH	4	27
n261	160	K	PATCH	4	32
n261	161	K	PATCH	4	33
n261	162	K	PATCH	4	34
n261	163	K	PATCH	4	35

4 Simulation and Modeling Validation

Power density simulations of all beams and surfaces were performed. Details of these simulations and modeling validation can be found in the Power Density Simulation Report. Table below 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 band and 6 dBm for n260 band, PD measurements are conducted for at least one single beam per antenna module on worst-surface(s). PD measurements are performed at mid channel of each mmW band and with CW modulation. All measured PD values are listed in table below along with corresponding simulated PD values for the same configuration.

PD value will be used to determine worst-case housing influence for conservative assessment.

Table 8

Folder open position

Band	Antenna	Beam ID	Surface	4cm² psPD Measured (mW/cm2)	4cm² psPD Simulated (mW/cm2)	Delta = Simulated - Measured (dB)
n261	J (dipole)	15	Back	0.419	0.743	**2.49**
		135	Back	0.315	0.812	4.11
	J (Patch)	21	Back	0.729	1.487	3.10
		159	Back	0.771	1.164	**1.79**
	K (Patch)	34	Back	0.312	0.412	1.20
			Right	0.923	1.187	**1.09**
		152	Back	0.556	0.888	2.03
			Right	0.836	1.210	1.61
n260	J (dipole)	6	Back	0.290	0.583	3.03
		135	Back	0.347	0.431	**0.94**
	J (Patch)	22	Back	0.623	1.211	2.89
		149	Back	0.604	1.059	**2.44**
	K (Patch)	34	Back	0.168	0.382	3.57
			Right	0.510	0.850	2.22
		160	Back	0.387	0.657	2.30
			Right	0.648	1.013	**1.94**

Table 9

Folder closed position

Band	Antenna	Beam ID	Surface	4cm² psPD Measured (mW/cm2)	4cm² psPD Simulated (mW/cm2)	Delta = Simulated - Measured (dB)
n261	J (dipole)	15	Back	0.57	0.74	**1.16**
		135	Back	0.38	0.80	3.21
	J (Patch)	21	Back	0.87	1.48	2.31
		149	Back	0.96	1.18	**0.92**
	K (Patch)	34	Back	0.29	0.41	1.47
			Right	1.03	1.22	**0.73**
		152	Back	0.53	0.86	2.08
			Right	0.92	1.19	1.14
n260	J (dipole)	6	Back	0.33	0.58	2.43
		135	Back	0.36	0.44	**0.82**
	J (Patch)	18	Back	0.70	1.21	2.37
		149	Back	0.65	1.07	**2.18**
	K (Patch)	34	Back	0.15	0.39	4.19
			Right	0.68	0.87	**1.09**
		160	Back	0.33	0.68	3.07
			Right	0.67	1.05	1.91

5 *PD_design_target*

Table 10

PD_design_target	
$PD\_design\_target < PD\_regulatory\_limit \times 10^{\frac{-Total\ Uncertainty}{10}}$	
psPD over 4 cm^2 Averaging Area (mW/cm^2)	
Total Uncertainty	2.1 dB
PD_regulatory_limit	1.0 mW/cm^2
PD_design_target	0.6166 mW/cm^2

6 Δmin

For non-metal material, the material property cannot be accurately characterized at mmW frequencies to date. The estimated material property for the device housing is used in the simulation model, which could influence 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.

Since the mmW antenna modules are placed at different locations, only surrounding material/housing has impact on EM field propagation, and in turn power density. Furthermore, depending on the type of antenna array, i.e., dipole antenna array or patch 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 below procedure was used to determine worst-case housing influence, Δmin:

1. Based on PD simulation, for each module and antenna type, determine one or more worst-surface(s) that has highest 4cm2 PD for all the single 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 Δmin based on identified worst surface(s), and derive input.power.limit
    b. Then prove all other near-by surface(s), i.e., non-selected surface(s), is not required for housing material loss quantification (in other words, these non-evaluated surfaces have no influence on the determined input.power.limit) by:

i. re-scale all simulated 4cm2 PD values to input.power.limit to identify the worst-PD beam per each non-evaluated surface

ii. Measure 4cm2 PD at input.power.limit on identified worst-PD beam per each non-evaluated surface

iii. Demonstrate all measured 4cm2 PD values are below PD_design_target

3. If any of the above surface(s) in Step (2.b.iii) have measured 4cm2 PD ≥ PD_design_target, then those surfaces must be included in the Δmin determination in Step (2.a), and re-evaluate input.power.limit with these added surfaces.

Following above procedure, the worst-surface(s) having highest 4cm2 PD for all the single beams per each antenna type and each antenna module group in the mid channel of n261 and n260 bands are identified as:

a. for J dipole: Back

b. for J patch: Back

c. for K patch: Back/Right

Thus, when comparing a simulated 4cm2-averaged PD and measured 4 cm2-averaged PD for the identified worst surface(s), the worst error introduced for each antenna type and each antenna module group when using the estimated material property in the simulation is highlighted in bold numbers in Table 8. Thus, the worst-case housing influence, denoted as $\Delta_{min} = \mathrm{Sim.PD} - \mathrm{Meas.PD}$, is determined as

Table 11
Δ_{min} folder open

Band	Antenna	Δmin (dB)
n261	J (dipole)	2.49
	J (Patch)	1.79
	K (Patch)	1.09
n260	J (dipole)	0.94
	J (Patch)	2.44
	K (Patch)	1.94

Table 12
Δ_{min} folder closed

Band	Antenna	Δmin (dB)
n261	J (dipole)	1.16
	J (Patch)	0.92
	K (Patch)	0.73
n260	J (dipole)	0.82
	J (Patch)	2.18
	K (Patch)	1.09

Δ_{min} represents the worst case where RF exposure is underestimated the most in simulation when using the estimated material property of the housing. For conservative assessment, the Δ_{min} is used as the worst-case factor and applied to all the beams in the corresponding antenna type and antenna module group to determine input power limits in PD char for compliance.

The detail input.power.limit derivation is described in Section 7.

Simulated 4cm2 PD values in in Power Density Simulation Report are scaled to input.power.limit and are listed in below for all single beams for all identified surfaces, when assuming the simulation is performed with correct housing influence.

Determine the worst beam for each of non-selected surface(s), i.e.,

a. for J dipole: Front/Top/Left

b. for J patch: Top/Left

c. for K patch: Front

Then perform PD measurement for all determined worst-case beams on the corresponding surface. Measurement is performed in the mid channel of each band with CW modulation. The evaluation distance is at 2 mm.

The test results in below shows that the all measured 4cm2 PD values are less than PD_design_target of 0.6166 mW/cm2, thus, the non-selected surfaces have no influence on the determined Δ_{min} and input.power.limit in Section 7.

Table 13
n261/mid channel, J dipole simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J dipole	1	0.013	0.111	0.204	N/A	0.042	0.587
J dipole	6	0.013	0.163	0.253	N/A	0.053	0.614
J dipole	7	0.009	0.058	0.277	N/A	0.041	0.594
J dipole	8	0.022	0.133	0.225	N/A	0.025	0.617
J dipole	14	0.016	0.174	0.255	N/A	0.052	0.617
J dipole	15	0.017	0.073	0.280	N/A	0.028	0.613
J dipole	129	0.012	0.056	0.253	N/A	0.095	0.617
J dipole	134	0.010	0.088	0.304	N/A	0.120	0.617
J dipole	135	0.009	0.034	0.274	N/A	0.048	0.585
J dipole	136	0.020	0.062	0.304	N/A	0.088	0.617
J dipole	142	0.008	0.072	0.309	N/A	0.106	0.617
J dipole	143	0.014	0.017	0.284	N/A	0.046	0.589

Table 14

n261/mid channel, J patch simulated 4cm2 PD at PD_Design_Target

(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J patch	0	0.016	0.141	0.094	N/A	0.014	0.617
J patch	3	0.032	0.092	0.095	N/A	0.017	0.617
J patch	4	0.007	0.076	0.080	N/A	0.011	0.602
J patch	5	0.014	0.114	0.091	N/A	0.009	0.617
J patch	12	0.018	0.030	0.095	N/A	0.013	0.617
J patch	13	0.005	0.082	0.090	N/A	0.007	0.575
J patch	18	0.044	0.058	0.058	N/A	0.017	0.617
J patch	19	0.015	0.020	0.085	N/A	0.010	0.600
J patch	20	0.004	0.037	0.099	N/A	0.010	0.545
J patch	21	0.005	0.131	0.103	N/A	0.010	0.588
J patch	22	0.006	0.215	0.069	N/A	0.007	0.617
J patch	28	0.029	0.026	0.075	N/A	0.012	0.617
J patch	29	0.006	0.026	0.102	N/A	0.011	0.573
J patch	30	0.005	0.056	0.117	N/A	0.011	0.572
J patch	31	0.005	0.197	0.093	N/A	0.007	0.616
J patch	128	0.013	0.073	0.094	N/A	0.026	0.598
J patch	131	0.029	0.088	0.068	N/A	0.026	0.617
J patch	132	0.013	0.034	0.092	N/A	0.019	0.593
J patch	133	0.007	0.117	0.083	N/A	0.019	0.617
J patch	140	0.025	0.029	0.079	N/A	0.033	0.617
J patch	141	0.006	0.090	0.088	N/A	0.013	0.602
J patch	146	0.050	0.046	0.106	N/A	0.024	0.617
J patch	147	0.027	0.050	0.072	N/A	0.024	0.567
J patch	148	0.015	0.049	0.083	N/A	0.018	0.559
J patch	149	0.005	0.077	0.087	N/A	0.008	0.572
J patch	150	0.005	0.203	0.066	N/A	0.014	0.603
J patch	156	0.045	0.048	0.100	N/A	0.022	0.606
J patch	157	0.019	0.057	0.075	N/A	0.027	0.571
J patch	158	0.007	0.054	0.086	N/A	0.011	0.554
J patch	159	0.007	0.141	0.079	N/A	0.008	0.578

Table 15

n261/mid channel, K Patch simulated 4cm2 PD at PD_Design_Target

(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
K patch	2	0.606	0.013	0.049	N/A	0.335	0.183
K patch	9	0.568	0.011	0.064	N/A	0.175	0.179
K patch	10	0.611	0.009	0.036	N/A	0.325	0.205
K patch	11	0.617	0.012	0.028	N/A	0.287	0.229
K patch	16	0.584	0.012	0.057	N/A	0.308	0.204
K patch	17	0.617	0.007	0.011	N/A	0.320	0.251
K patch	23	0.617	0.013	0.040	N/A	0.300	0.279
K patch	24	0.572	0.008	0.112	N/A	0.307	0.231
K patch	25	0.617	0.012	0.013	N/A	0.368	0.216
K patch	26	0.617	0.007	0.012	N/A	0.363	0.216
K patch	27	0.617	0.018	0.038	N/A	0.300	0.309
K patch	32	0.582	0.011	0.126	N/A	0.314	0.232
K patch	33	0.560	0.008	0.068	N/A	0.320	0.217
K patch	34	0.617	0.008	0.009	N/A	0.384	0.214
K patch	35	0.617	0.014	0.009	N/A	0.300	0.290
K patch	130	0.592	0.006	0.030	N/A	0.093	0.370
K patch	137	0.617	0.008	0.061	N/A	0.122	0.328
K patch	138	0.587	0.010	0.023	N/A	0.104	0.472
K patch	139	0.551	0.010	0.049	N/A	0.096	0.334
K patch	144	0.603	0.006	0.044	N/A	0.119	0.440
K patch	145	0.539	0.012	0.013	N/A	0.097	0.415
K patch	151	0.550	0.010	0.114	N/A	0.133	0.334
K patch	152	0.617	0.005	0.101	N/A	0.130	0.452
K patch	153	0.575	0.011	0.017	N/A	0.114	0.446
K patch	154	0.566	0.014	0.007	N/A	0.102	0.467
K patch	155	0.575	0.013	0.040	N/A	0.120	0.366
K patch	160	0.614	0.008	0.134	N/A	0.143	0.400
K patch	161	0.605	0.007	0.056	N/A	0.128	0.464
K patch	162	0.575	0.014	0.011	N/A	0.104	0.461
K patch	163	0.560	0.016	0.018	N/A	0.112	0.401

Table 16
n260/mid channel, J Dipole simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J dipole	1	0.024	0.080	0.083	N/A	0.038	0.500
J dipole	6	0.014	0.119	0.158	N/A	0.043	0.582
J dipole	7	0.019	0.103	0.151	N/A	0.027	0.545
J dipole	8	0.009	0.088	0.176	N/A	0.036	0.575
J dipole	14	0.025	0.188	0.130	N/A	0.055	0.591
J dipole	15	0.006	0.044	0.194	N/A	0.024	0.551
J dipole	129	0.020	0.059	0.137	N/A	0.027	0.541
J dipole	134	0.023	0.104	0.092	N/A	0.034	0.481
J dipole	135	0.014	0.046	0.189	N/A	0.028	0.535
J dipole	136	0.032	0.107	0.099	N/A	0.029	0.530
J dipole	142	0.016	0.085	0.109	N/A	0.035	0.475
J dipole	143	0.016	0.091	0.101	N/A	0.035	0.473

Table 17

n260/mid channel, J Patch simulated 4cm2 PD at PD_Design_Target

(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J patch	0	0.011	0.040	0.121	N/A	0.007	0.617
J patch	3	0.017	0.070	0.128	N/A	0.012	0.617
J patch	4	0.010	0.049	0.177	N/A	0.011	0.617
J patch	5	0.020	0.083	0.096	N/A	0.011	0.617
J patch	12	0.012	0.044	0.149	N/A	0.013	0.617
J patch	13	0.013	0.062	0.159	N/A	0.009	0.617
J patch	18	0.031	0.057	0.106	N/A	0.010	0.617
J patch	19	0.012	0.079	0.135	N/A	0.012	0.617
J patch	20	0.007	0.089	0.115	N/A	0.010	0.617
J patch	21	0.009	0.164	0.122	N/A	0.007	0.617
J patch	22	0.045	0.082	0.107	N/A	0.011	0.617
J patch	28	0.015	0.056	0.129	N/A	0.009	0.617
J patch	29	0.009	0.087	0.155	N/A	0.014	0.615
J patch	30	0.006	0.109	0.116	N/A	0.009	0.617
J patch	31	0.029	0.176	0.101	N/A	0.008	0.617
J patch	128	0.011	0.098	0.095	N/A	0.014	0.617
J patch	131	0.017	0.134	0.069	N/A	0.015	0.617
J patch	132	0.009	0.135	0.123	N/A	0.017	0.617
J patch	133	0.012	0.121	0.073	N/A	0.020	0.617
J patch	140	0.016	0.104	0.107	N/A	0.010	0.617
J patch	141	0.005	0.051	0.131	N/A	0.018	0.617
J patch	146	0.026	0.193	0.093	N/A	0.014	0.617
J patch	147	0.013	0.081	0.108	N/A	0.019	0.617
J patch	148	0.014	0.076	0.134	N/A	0.019	0.595
J patch	149	0.009	0.172	0.120	N/A	0.016	0.617
J patch	150	0.030	0.182	0.083	N/A	0.018	0.617
J patch	156	0.020	0.138	0.091	N/A	0.021	0.617
J patch	157	0.008	0.062	0.142	N/A	0.009	0.617
J patch	158	0.018	0.080	0.124	N/A	0.014	0.617
J patch	159	0.018	0.165	0.101	N/A	0.018	0.617

Table 18
n260/mid channel, K Patch simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder open

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
K patch	2	0.494	0.011	0.023	N/A	0.259	0.162
K patch	9	0.617	0.016	0.031	N/A	0.385	0.178
K patch	10	0.552	0.014	0.023	N/A	0.344	0.221
K patch	11	0.617	0.007	0.041	N/A	0.274	0.196
K patch	16	0.546	0.015	0.027	N/A	0.322	0.203
K patch	17	0.605	0.010	0.035	N/A	0.297	0.201
K patch	23	0.616	0.009	0.082	N/A	0.410	0.219
K patch	24	0.614	0.020	0.047	N/A	0.414	0.187
K patch	25	0.585	0.026	0.039	N/A	0.403	0.207
K patch	26	0.613	0.008	0.080	N/A	0.324	0.208
K patch	27	0.617	0.010	0.101	N/A	0.380	0.226
K patch	32	0.548	0.008	0.026	N/A	0.386	0.171
K patch	33	0.617	0.032	0.036	N/A	0.410	0.185
K patch	34	0.617	0.015	0.039	N/A	0.359	0.277
K patch	35	0.590	0.011	0.113	N/A	0.292	0.185
K patch	130	0.610	0.019	0.063	N/A	0.170	0.363
K patch	137	0.599	0.013	0.083	N/A	0.099	0.376
K patch	138	0.562	0.015	0.040	N/A	0.110	0.426
K patch	139	0.617	0.019	0.042	N/A	0.123	0.403
K patch	144	0.617	0.017	0.033	N/A	0.166	0.382
K patch	145	0.617	0.015	0.048	N/A	0.101	0.426
K patch	151	0.617	0.024	0.118	N/A	0.120	0.468
K patch	152	0.608	0.020	0.019	N/A	0.158	0.369
K patch	153	0.549	0.019	0.044	N/A	0.119	0.426
K patch	154	0.617	0.019	0.157	N/A	0.153	0.439
K patch	155	0.617	0.025	0.112	N/A	0.122	0.459
K patch	160	0.617	0.023	0.085	N/A	0.110	0.400
K patch	161	0.521	0.015	0.014	N/A	0.142	0.398
K patch	162	0.604	0.020	0.167	N/A	0.152	0.428
K patch	163	0.617	0.022	0.134	N/A	0.139	0.466

Table 19
n261/mid channel, J dipole simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J dipole	1	0.021	0.105	0.183	N/A	0.016	0.587
J dipole	6	0.020	0.153	0.230	N/A	0.011	0.612
J dipole	7	0.011	0.064	0.254	N/A	0.022	0.605
J dipole	8	0.033	0.127	0.217	N/A	0.018	0.617
J dipole	14	0.022	0.162	0.236	N/A	0.010	0.615
J dipole	15	0.024	0.070	0.270	N/A	0.022	0.615
J dipole	129	0.022	0.048	0.210	N/A	0.017	0.579
J dipole	134	0.019	0.079	0.256	N/A	0.032	0.590
J dipole	135	0.008	0.036	0.234	N/A	0.009	0.561
J dipole	136	0.032	0.054	0.269	N/A	0.022	0.575
J dipole	142	0.013	0.066	0.262	N/A	0.028	0.589
J dipole	143	0.017	0.016	0.243	N/A	0.009	0.555

Table 20
n261/mid channel, J patch simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J patch	0	0.014	0.143	0.087	N/A	0.008	0.617
J patch	3	0.039	0.086	0.074	N/A	0.006	0.615
J patch	4	0.009	0.071	0.074	N/A	0.006	0.596
J patch	5	0.015	0.101	0.080	N/A	0.004	0.617
J patch	12	0.020	0.028	0.087	N/A	0.006	0.617
J patch	13	0.008	0.073	0.084	N/A	0.004	0.577
J patch	18	0.050	0.057	0.055	N/A	0.005	0.617
J patch	19	0.018	0.021	0.077	N/A	0.004	0.596
J patch	20	0.005	0.033	0.099	N/A	0.006	0.547
J patch	21	0.005	0.122	0.095	N/A	0.007	0.587
J patch	22	0.007	0.204	0.062	N/A	0.003	0.617
J patch	28	0.035	0.029	0.072	N/A	0.004	0.613
J patch	29	0.006	0.026	0.094	N/A	0.004	0.567
J patch	30	0.005	0.053	0.116	N/A	0.008	0.565
J patch	31	0.005	0.182	0.079	N/A	0.004	0.617
J patch	128	0.017	0.072	0.079	N/A	0.010	0.615
J patch	131	0.032	0.085	0.062	N/A	0.009	0.617
J patch	132	0.016	0.032	0.083	N/A	0.004	0.600
J patch	133	0.010	0.108	0.077	N/A	0.008	0.609
J patch	140	0.031	0.028	0.073	N/A	0.007	0.617
J patch	141	0.007	0.086	0.078	N/A	0.006	0.598
J patch	146	0.055	0.042	0.096	N/A	0.009	0.617
J patch	147	0.035	0.052	0.066	N/A	0.006	0.588
J patch	148	0.017	0.043	0.077	N/A	0.003	0.569
J patch	149	0.005	0.073	0.084	N/A	0.003	0.581
J patch	150	0.005	0.193	0.063	N/A	0.004	0.606
J patch	156	0.052	0.043	0.090	N/A	0.008	0.617
J patch	157	0.024	0.053	0.073	N/A	0.004	0.582
J patch	158	0.006	0.054	0.077	N/A	0.003	0.556
J patch	159	0.006	0.136	0.075	N/A	0.003	0.585

Table 21
n261/mid channel, K Patch simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
K patch	2	0.617	0.005	0.033	N/A	0.201	0.180
K patch	9	0.578	0.005	0.068	N/A	0.133	0.154
K patch	10	0.582	0.003	0.030	N/A	0.226	0.165
K patch	11	0.617	0.003	0.033	N/A	0.199	0.219
K patch	16	0.575	0.004	0.057	N/A	0.218	0.180
K patch	17	0.564	0.003	0.013	N/A	0.211	0.218
K patch	23	0.570	0.006	0.032	N/A	0.237	0.218
K patch	24	0.617	0.003	0.120	N/A	0.239	0.239
K patch	25	0.596	0.003	0.011	N/A	0.265	0.200
K patch	26	0.610	0.003	0.011	N/A	0.276	0.200
K patch	27	0.576	0.009	0.032	N/A	0.226	0.254
K patch	32	0.617	0.005	0.131	N/A	0.237	0.224
K patch	33	0.582	0.002	0.060	N/A	0.242	0.223
K patch	34	0.617	0.002	0.009	N/A	0.274	0.207
K patch	35	0.582	0.003	0.012	N/A	0.227	0.255
K patch	130	0.595	0.003	0.032	N/A	0.052	0.363
K patch	137	0.617	0.002	0.063	N/A	0.083	0.366
K patch	138	0.581	0.003	0.021	N/A	0.064	0.454
K patch	139	0.560	0.003	0.050	N/A	0.048	0.335
K patch	144	0.614	0.001	0.046	N/A	0.075	0.440
K patch	145	0.539	0.004	0.013	N/A	0.061	0.397
K patch	151	0.552	0.002	0.112	N/A	0.069	0.327
K patch	152	0.617	0.001	0.088	N/A	0.080	0.444
K patch	153	0.579	0.003	0.023	N/A	0.077	0.437
K patch	154	0.579	0.007	0.010	N/A	0.081	0.452
K patch	155	0.617	0.002	0.031	N/A	0.071	0.356
K patch	160	0.617	0.002	0.117	N/A	0.083	0.405
K patch	161	0.617	0.002	0.045	N/A	0.084	0.463
K patch	162	0.582	0.004	0.015	N/A	0.074	0.447
K patch	163	0.613	0.005	0.019	N/A	0.083	0.403

Table 22

n260/mid channel, J Dipole simulated 4cm2 PD at PD_Design_Target

(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J dipole	1	0.024	0.078	0.067	N/A	0.007	0.493
J dipole	6	0.013	0.113	0.139	N/A	0.012	0.576
J dipole	7	0.021	0.105	0.130	N/A	0.006	0.547
J dipole	8	0.009	0.081	0.154	N/A	0.011	0.565
J dipole	14	0.024	0.185	0.110	N/A	0.012	0.595
J dipole	15	0.007	0.040	0.171	N/A	0.006	0.541
J dipole	129	0.021	0.062	0.106	N/A	0.007	0.538
J dipole	134	0.025	0.110	0.078	N/A	0.009	0.498
J dipole	135	0.021	0.048	0.162	N/A	0.009	0.550
J dipole	136	0.032	0.113	0.085	N/A	0.009	0.541
J dipole	142	0.021	0.088	0.093	N/A	0.009	0.498
J dipole	143	0.020	0.095	0.086	N/A	0.009	0.494

Table 23

n260/mid channel, J Patch simulated 4cm2 PD at PD_Design_Target

(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
J patch	0	0.012	0.038	0.108	N/A	0.004	0.617
J patch	3	0.019	0.069	0.114	N/A	0.005	0.617
J patch	4	0.010	0.048	0.171	N/A	0.005	0.617
J patch	5	0.021	0.082	0.083	N/A	0.005	0.617
J patch	12	0.012	0.038	0.144	N/A	0.006	0.617
J patch	13	0.013	0.060	0.151	N/A	0.004	0.617
J patch	18	0.032	0.053	0.098	N/A	0.004	0.617
J patch	19	0.006	0.076	0.127	N/A	0.004	0.617
J patch	20	0.008	0.086	0.116	N/A	0.004	0.617
J patch	21	0.009	0.158	0.111	N/A	0.003	0.617
J patch	22	0.045	0.082	0.099	N/A	0.004	0.617
J patch	28	0.008	0.053	0.117	N/A	0.004	0.617
J patch	29	0.006	0.082	0.153	N/A	0.004	0.617
J patch	30	0.007	0.104	0.114	N/A	0.004	0.617
J patch	31	0.027	0.177	0.102	N/A	0.003	0.617
J patch	128	0.011	0.089	0.092	N/A	0.003	0.617
J patch	131	0.016	0.125	0.067	N/A	0.004	0.617
J patch	132	0.008	0.124	0.109	N/A	0.005	0.617
J patch	133	0.013	0.113	0.065	N/A	0.004	0.617
J patch	140	0.015	0.100	0.107	N/A	0.003	0.617
J patch	141	0.006	0.052	0.118	N/A	0.003	0.617
J patch	146	0.025	0.193	0.086	N/A	0.005	0.617
J patch	147	0.012	0.077	0.105	N/A	0.006	0.617
J patch	148	0.014	0.072	0.119	N/A	0.003	0.595
J patch	149	0.009	0.157	0.106	N/A	0.004	0.617
J patch	150	0.027	0.182	0.078	N/A	0.006	0.617
J patch	156	0.019	0.134	0.089	N/A	0.006	0.617
J patch	157	0.009	0.062	0.136	N/A	0.003	0.617
J patch	158	0.017	0.076	0.106	N/A	0.003	0.617
J patch	159	0.018	0.159	0.095	N/A	0.004	0.617

Table 24
n260/mid channel, K Patch simulated 4cm2 PD at PD_Design_Target
(if simulation performed with correct housing material properties) (Δmin) folder closed

Antenna	Beam ID_1	Simulated 4cm2 PD(mW/cm2) Corresponding to PD_design_target if the simulation was performed with correct No. Module Type housing material properties					
		S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Back)
K patch	2	0.517	0.002	0.020	N/A	0.172	0.169
K patch	9	0.617	0.003	0.030	N/A	0.242	0.177
K patch	10	0.579	0.002	0.023	N/A	0.207	0.210
K patch	11	0.617	0.001	0.040	N/A	0.167	0.195
K patch	16	0.540	0.002	0.023	N/A	0.194	0.191
K patch	17	0.617	0.002	0.032	N/A	0.209	0.190
K patch	23	0.617	0.005	0.081	N/A	0.303	0.229
K patch	24	0.617	0.003	0.041	N/A	0.229	0.194
K patch	25	0.617	0.003	0.031	N/A	0.213	0.230
K patch	26	0.611	0.002	0.076	N/A	0.264	0.213
K patch	27	0.617	0.005	0.103	N/A	0.270	0.233
K patch	32	0.557	0.003	0.025	N/A	0.269	0.180
K patch	33	0.617	0.002	0.027	N/A	0.187	0.198
K patch	34	0.617	0.002	0.036	N/A	0.241	0.277
K patch	35	0.592	0.003	0.116	N/A	0.216	0.193
K patch	130	0.617	0.003	0.059	N/A	0.062	0.355
K patch	137	0.613	0.004	0.081	N/A	0.035	0.383
K patch	138	0.556	0.002	0.037	N/A	0.056	0.411
K patch	139	0.617	0.002	0.043	N/A	0.035	0.386
K patch	144	0.608	0.003	0.029	N/A	0.082	0.380
K patch	145	0.617	0.001	0.045	N/A	0.044	0.419
K patch	151	0.617	0.003	0.108	N/A	0.057	0.453
K patch	152	0.570	0.005	0.015	N/A	0.057	0.365
K patch	153	0.550	0.004	0.041	N/A	0.064	0.423
K patch	154	0.617	0.002	0.148	N/A	0.059	0.446
K patch	155	0.617	0.003	0.105	N/A	0.049	0.444
K patch	160	0.617	0.002	0.084	N/A	0.044	0.398
K patch	161	0.531	0.002	0.010	N/A	0.070	0.399
K patch	162	0.595	0.002	0.153	N/A	0.058	0.427
K patch	163	0.617	0.003	0.124	N/A	0.062	0.454

Table 25
4cm2 PD of the selected beams measured on the corresponding surfaces that are not selected for Δmin determination of folder open

Band	Antenna	Beam ID	Surface	Tested Power Level (dBm)	input.power.limit (dBm)	Meas. 4cm^2 PD (mW/cm^2)
n261	J (dipole)	134	Front	5.9	5.9	0.066
	J (dipole)	142	Top	5.6	5.6	0.148
	J (Patch)	30	Top	2.7	2.7	0.057
	K (Patch)	34	Front	3.3	3.3	0.203
n260	J (dipole)	14	Front	6.4	6.4	0.055
	J (dipole)	15	Top	6.3	6.3	0.160
	J (Patch)	4	Top	8.0	8.0	0.132
	K (Patch)	23	Front	5.4	5.4	0.296

Table 26
4cm2 PD of the selected beams measured on the corresponding surfaces that are not selected for Δmin determination of folder closed

Band	Antenna	Beam ID	Surface	Tested Power Level (dBm)	input.power.limit (dBm)	Meas. 4cm^2 PD (mW/cm^2)
n261	J (dipole)	134	Front	5.9	5.9	0.050
	J (dipole)	15	Top	5.7	5.7	0.230
	J (dipole)	14	Left	6.0	6.0	0.080
	J (Patch)	30	Top	2.7	2.7	0.080
	J (Patch)	22	Left	3.8	3.8	0.120
	K (Patch)	26	Front	3.5	3.5	0.240
n260	J (dipole)	14	Front	6.4	6.4	0.050
	J (dipole)	15	Top	6.3	6.3	0.260
	J (dipole)	14	Left	6.4	6.4	0.050
	J (Patch)	4	Top	8.0	8.0	0.140
	J (Patch)	146	Left	5.7	5.7	0.080
	K (Patch)	23	Front	5.4	5.4	0.250

7 PD Char

7.1 Single Beams

To determine the input power limit at each antenna port, simulation was performed at low, mid, and high channel for each mmW band supported, with 6 dBm input power per active port for n261 band and 6 dBm input power per active port for n260 band:

1. Obtained PDsurface value (the worst PD among all identified surfaces of the DUT) at all three channels for all single beams specified in the codebook.
2. Derived a scaling factor at low, mid and high channel, $s(i)_{low\_or\_mid\_or\_high}$, by:

   $$s(i)_{low\_or\_mid\_or\_high} = \frac{PD\ design\ target}{sim.PD_{surface}(i)},\ i \in single\ beams \quad (1)$$

3. Determined the worst-case scaling factor, $\boldsymbol{s(i)}$, among low, mid and high channels:

   $$\boldsymbol{s(i)} = min\{s_{low}(i), s_{mid}(i), s_{high}(i)\},\ i \in single\ beams \quad (2)$$

and this scaling factor applies to the input power at each antenna port.

7.2 Beam Pairs

Per the manufacturer, the relative phase between beam pair is not controlled in the chipset design and could vary from run to run. Therefore, for each beam pair, based on the simulation results, the worst-case scaling factor was determined mathematically to ensure the compliance. The worst-case PD for MIMO operations was found by sweeping the relative phase for all possible angles to ensure a conservative assessment. The power density simulation report contains the worst-case power density for each surface after sweeping through all relative phases between beams.

Once the power density was determined for the worst-case ∅, the scaling factor was obtained by the below equation for low, mid and high channels:

$$s(i)_{low\_or\_mid\_or\_high} = \frac{PD\ design\ target}{total\ PD\ (\emptyset(i)_{worstcase})}, i \in beam\ pairs \quad (3)$$

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

$$\boldsymbol{s(i)} = min\{s_{low}(i), s_{mid}(i), s_{high}(i)\},\ i \in beam\ pairs \quad (4)$$

7.3 *Input.Power.Limit* Calculations

The PD Char specifies the limit of input power at antenna port that corresponds to PD_design_target for all the beams.

Ideally, if there is no uncertainty associated with hardware design, the input power limit, denoted as $input.power.limit(i)$, for beam i can be obtained after accounting for the housing influence (Δ_{min}) determined in Table 8, given by:

- For n260 and n261

$$input.power.limit(i) = 6\ dBm + 10 * \log(s(i)) + \Delta_{min},\ i \in all\ beams \quad (5)$$

where $6\ dBm$ is the input power used in simulation for n261 and n260, respectively; $s(i)$ is the scaling factor obtained from Eq. (2) or Eq. (4) for beam i; Δ_{min} is the worst-case housing influence factor (determined in Table 10) for beam i.

If simulation overestimates the housing influence, then Δ_{min} (= 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 the loss, then Δ_{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. The device design related uncertainty is embedded in the process of Δ_{min} determination. Since the device uncertainty is already accounted for in PD_design_target, it needs to be removed to avoid double counting this uncertainty.

Thus, Equation 5 is modified to:

If -TxAGC uncertainty < Δmin < TxAGC uncertainty,

$$input.power.limit(i) = 6\ dBm + 10 * \log\big(s(i)\big),\ i \in all\ beams, \text{ for n260 and n261} \quad (6)$$

else if Δmin < -TxAGC uncertainty,

$$input.power.limit(i) = 6\ dBm + 10 * \log\big(s(i)\big) + (\Delta_{min} + \text{TxAGC uncertainty}),$$
$$i \in all\ beams, \text{ for n260 and n261} \quad (7)$$

else if Δmin > TxAGC uncertainty,

$$input.power.limit(i) = 6\ dBm + 10 * \log\big(s(i)\big) + (\Delta_{min} - \text{TxAGC uncertainty}),$$
$$i \in all\ beams, \text{ for n260 and n261} \quad (8)$$

Following above logic, the input.power.limit for this DUT can be calculated using Equations (6), (7), and (8), i.e.,

Table 27

***input.power.limit* Calculation based on folder open results**

Band	Antenna	Δmin	TxAGC Uncertainty	*input.power.limit*	Notes
		(dB)	(dB)	(dBm)	
n261	J (dipole)	2.49	0.7	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 1.79*	Using Eq.8
	J (Patch)	1.79	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 1.29*	Using Eq.8
	K (Patch)	1.09	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.59*	Using Eq.8
n260	J (dipole)	0.94	0.7	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.24*	Using Eq.8
	J (Patch)	2.44	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 1.94*	Using Eq.8
	K (Patch)	1.94	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 1.44*	Using Eq.8

Table 28

***input.power.limit* Calculation based on folder closed results**

Band	Antenna	Δmin	TxAGC Uncertainty	*input.power.limit*	Notes
		(dB)	(dB)	(dBm)	
n261	J (dipole)	1.16	0.7	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.46*	Using Eq.8
	J (Patch)	0.92	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.42*	Using Eq.8
	K (Patch)	0.73	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.23*	Using Eq.8
n260	J (dipole)	0.82	0.7	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.12*	Using Eq.8
	J (Patch)	2.18	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 1.68*	Using Eq.8
	K (Patch)	1.09	0.5	*input.power.limit(i) = 6 dBm + 10 x log(s(i)) + 0.59*	Using Eq.8

Note: Final input.power.limit for each beam and each band is the minimum of the calculated input.power.limit between open position and closed position. See below for final input.power.limit and PD char.

Table 29

5G NR n261 J Dipole *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n261	1		8.8
n261	6		5.9
n261	7		5.6
n261	8		5.9
n261	14		6.0
n261	15		5.7
n261		129	7.9
n261		134	5.9
n261		135	5.0
n261		136	6.4
n261		142	5.6
n261		143	5.1
n261	1	129	5.1
n261	6	134	2.2
n261	7	135	2.8
n261	8	136	4.1
n261	14	142	2.2
n261	15	143	2.3

Table 30

5G NR n261 J Patch *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n261	0		9.2
n261	3		8.4
n261	4		4.8
n261	5		7.4
n261	12		5.6
n261	13		6.5
n261	18		4.1
n261	19		3.0
n261	20		2.7
n261	21		2.5
n261	22		3.8
n261	28		3.5
n261	29		2.9
n261	30		2.7
n261	31		2.8
n261		128	8.8
n261		131	6.9
n261		132	5.2
n261		133	6.4
n261		140	6.3
n261		141	5.6
n261		146	4.9
n261		147	4.3
n261		148	3.9
n261		149	3.4
n261		150	3.8
n261		156	4.7
n261		157	4.2
n261		158	3.5
n261		159	3.5
n261	0	128	6.3
n261	3	131	3.7
n261	4	132	2.2
n261	5	133	3.4
n261	12	140	2.9
n261	13	141	2.5
n261	18	146	0.6
n261	19	147	0.3
n261	20	148	-0.1
n261	21	149	-0.4
n261	22	150	0.6
n261	28	156	0.5
n261	29	157	0.4
n261	30	158	-0.1
n261	31	159	-0.1

Table 31

5G NR n261 K Patch *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n261	2		9.8
n261	9		5.9
n261	10		6.8
n261	11		7.0
n261	16		7.3
n261	17		5.6
n261	23		4.2
n261	24		3.4
n261	25		3.7
n261	26		3.5
n261	27		4.0
n261	32		4.2
n261	33		3.3
n261	34		3.3
n261	35		3.2
n261		130	8.0
n261		137	6.0
n261		138	6.0
n261		139	6.8
n261		144	6.2
n261		145	6.2
n261		151	4.8
n261		152	3.4
n261		153	3.8
n261		154	4.1
n261		155	4.4
n261		160	3.9
n261		161	3.8
n261		162	3.9
n261		163	4.3
n261	2	130	6.3
n261	9	137	2.8
n261	10	138	2.8
n261	11	139	3.3
n261	16	144	3.2
n261	17	145	2.7
n261	23	151	1.5
n261	24	152	0.2
n261	25	153	0.3
n261	26	154	0.0
n261	27	155	0.7
n261	32	160	0.5
n261	33	161	0.5
n261	34	162	0.1
n261	35	163	0.3

Table 32

5G NR n260 J Dipole *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n260	1		8.4
n260	6		6.1
n260	7		6.8
n260	8		6.1
n260	14		6.4
n260	15		6.3
n260		129	10.9
n260		134	6.9
n260		135	7.2
n260		136	7.3
n260		142	6.8
n260		143	6.8
n260	1	129	7.2
n260	6	134	4.3
n260	7	135	4.5
n260	8	136	4.4
n260	14	142	4.1
n260	15	143	3.8

Table 33
5G NR n260 J Patch *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n260	0		11.6
n260	3		8.6
n260	4		8.0
n260	5		8.4
n260	12		8.4
n260	13		7.9
n260	18		4.8
n260	19		5.7
n260	20		5.5
n260	21		5.1
n260	22		4.8
n260	28		5.3
n260	29		5.7
n260	30		5.3
n260	31		5.2
n260		128	10.9
n260		131	7.9
n260		132	8.0
n260		133	8.1
n260		140	8.1
n260		141	8.4
n260		146	5.7
n260		147	5.6
n260		148	6.0
n260		149	5.4
n260		150	5.7
n260		156	5.9
n260		157	5.5
n260		158	5.7
n260		159	5.6
n260	0	128	8.0
n260	3	131	4.9
n260	4	132	4.6
n260	5	133	4.5
n260	12	140	5.1
n260	13	141	4.4
n260	18	146	1.6
n260	19	147	2.2
n260	20	148	2.7
n260	21	149	1.6
n260	22	150	1.4
n260	28	156	2.3
n260	29	157	2.2
n260	30	158	2.1
n260	31	159	1.6

Table 34

5G NR n260 K Patch *input.power.limit*

Band	V Beam ID	H Beam ID	input.power.limit (dBm)
n260	2		11.6
n260	9		7.6
n260	10		8.3
n260	11		8.1
n260	16		8.3
n260	17		8.1
n260	23		5.4
n260	24		6.0
n260	25		5.9
n260	26		5.8
n260	27		5.5
n260	32		5.3
n260	33		6.0
n260	34		5.1
n260	35		6.0
n260		130	10.2
n260		137	7.2
n260		138	7.1
n260		139	6.0
n260		144	8.0
n260		145	6.4
n260		151	4.6
n260		152	6.0
n260		153	5.7
n260		154	5.8
n260		155	4.6
n260		160	4.3
n260		161	5.4
n260		162	5.9
n260		163	5.0
n260	2	130	7.5
n260	9	137	3.9
n260	10	138	4.6
n260	11	139	3.4
n260	16	144	4.7
n260	17	145	3.8
n260	23	151	1.1
n260	24	152	2.8
n260	25	153	2.5
n260	26	154	2.1
n260	27	155	1.2
n260	32	160	1.4
n260	33	161	2.4
n260	34	162	2.2
n260	35	163	1.7