

FCC ID: A3LSMF976U

Power Density Simulation Report

Revision B

April 10th, 2026

SAMSUNG ELECTRONICS

1. Simulation methodology for Power Density (PD)

1.1 Simulation tool

1.1.1 Tool description

For the simulation approach to calculating power density (PD) evaluation for mobile phone with mmWave antenna modules, ANSYS Electromagnetics suite version 2025.R1 (HFSS) is used. ANSYS HFSS is one of several commercial tools for 3D full-wave electromagnetic simulation used for antenna and RF structure design of high frequency component. ANSYS Electromagnetics suite version 2025.R1 (HFSS) is implemented based on Finite Element Method (FEM), which operates in the frequency domain.

1.1.2 Mesh and Convergence criteria

To solve the PD analysis using FEM, volume area containing simulated objects should be subdivided into electrically small parts that are called finite elements as the unknown functions. To subdivide system, the adaptive mesh technique in ANSYS Electromagnetics suite version 2025.R1 (HFSS) is used. ANSYS Electromagnetics suite version 2025.R1 (HFSS) starts to refine the initial mesh based on wavelength and calculate the error to iterative process for adaptive mesh refinement. The determination parameter of the number of iteration in ANSYS Electromagnetics suite version 2025.R1 (HFSS) is defined as convergence criteria, delta S, and the iterative adaptive mesh process repeats until the delta S is met. In ANSYS Electromagnetics suite version 2025.R1 (HFSS), the accuracy of converged results depends on the delta S. Figure 1 is an example of final adaptive mesh of the device (cross-section of top view).

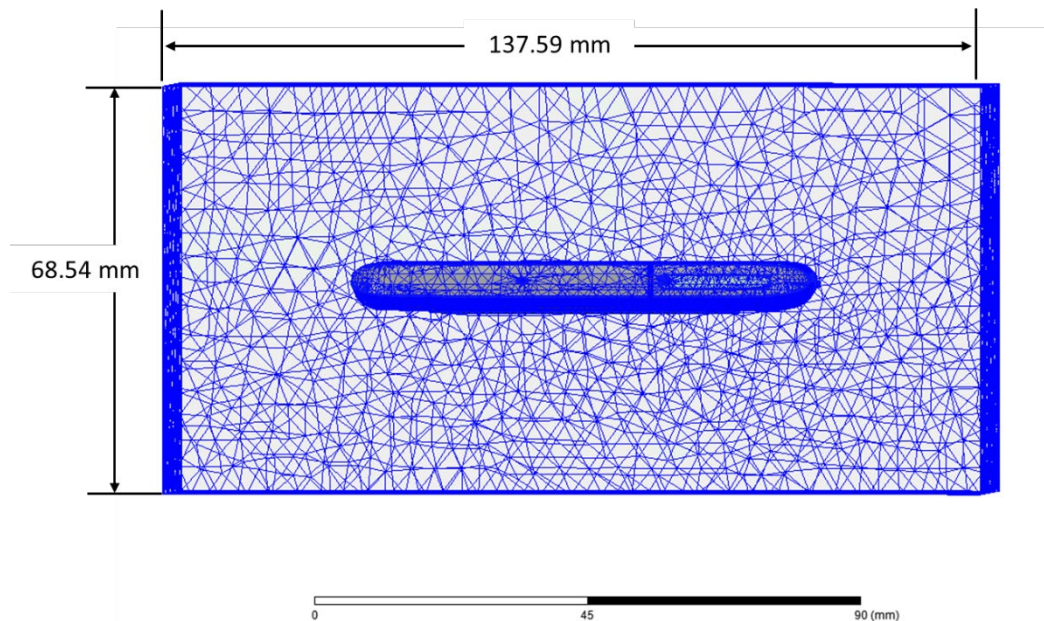


Figure 1 Example of the adaptive mesh technique (Top view)

1.1.3 Power density calculation

After solving 3D full-wave electromagnetic simulation, various kinds of physical quantities can be obtained. To calculate PD evaluation, two physical quantities, an electric field ($\vec{E}$) and a magnetic field ($\vec{H}$) are needed. The actual consumption power can be expressed as the real term of the Poynting vector ($\vec{S}$) from the cross product of $\vec{E}$ and complex conjugation of $\vec{H}$ as shown below:

$$\langle \vec{S} \rangle = \text{Re} \left(\frac{1}{2} \vec{E} \times \vec{H}^* \right)$$

$\langle \vec{S} \rangle$ can be expressed as point power density based on a peak value of each spatial point on mesh grids, and obtained directly from ANSYS Electromagnetics suite version 2020.R1 (HFSS).

From the point power density $\langle \vec{S} \rangle$, the spatial-averaged power density (PD_{av}) on an evaluated area (A) can be derived as shown below:

$$PD_{av} = \frac{1}{A} \int_A \langle \vec{S} \rangle \cdot d\vec{s} = \frac{1}{2A_{av}} \iint_{A_{av}} \| \text{Re}\{E \times H^*\} \| dA$$

, where the spatial-averaged power density (PD_{av}) is total power density value considering on x, y and z components of point power density $\langle \vec{S} \rangle$ and the evaluated area (A) is 4cm^2 .

1.2 Simulation setup

1.2.1 3D modeling

Figure 2 shows the simulation model which is mounted a mmWave antenna modules. The simulation modeling includes most of the entire structure of device itself such as PCB, metal frame, battery, cables, and legacy antennas as well as a mmWave antenna module called as Ant J. For a folder open status (Fig. 2-1), Ant J is placed on the back side and antennas are facing the back side of the device. For a folder close status (Fig. 2-2), Ant J is placed same of the folder open status.

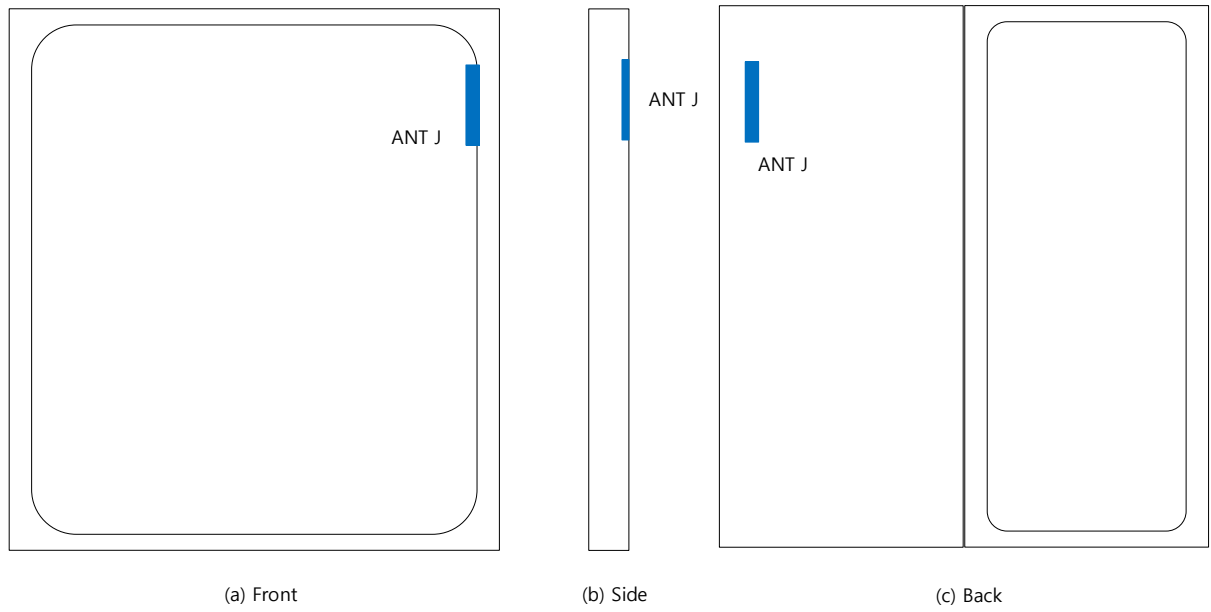


Figure 2-1. Simulation model which is mounted a mmWave antenna module (Folder Open Status)

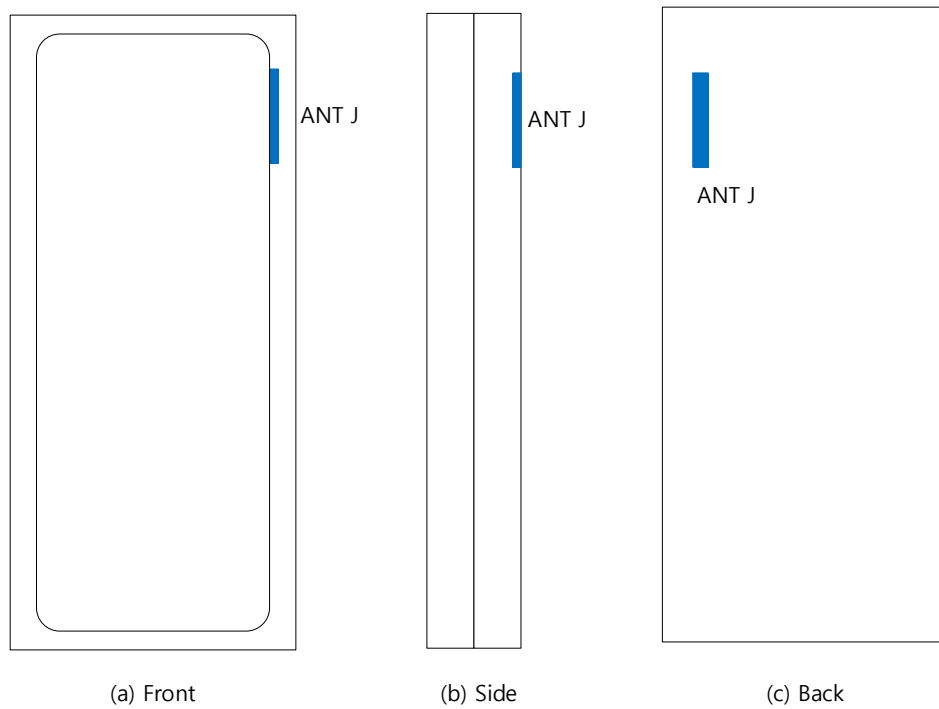


Figure 3-2. Simulation model which is mounted a mmWave antenna module (Folder Closed Status)

1.2.2 PD evaluation planes

Table 1 shows the PD evaluation planes for each mmWave antenna module and Figure 3 shows the PD evaluation planes and whole area of the simulation model to find worst case of beamforming cases.

Please note that the “right” and “left” edge of mentioned in this report are defined from the

perspective of looking at the device from the front side.

Table 1. PD evaluation planes

Module	Front	Back	Left From Front View	Right From Front View	Top	Bottom
	S1	S2	S3	S4	S5	S6
Ant J	O	O	O	O	O	O

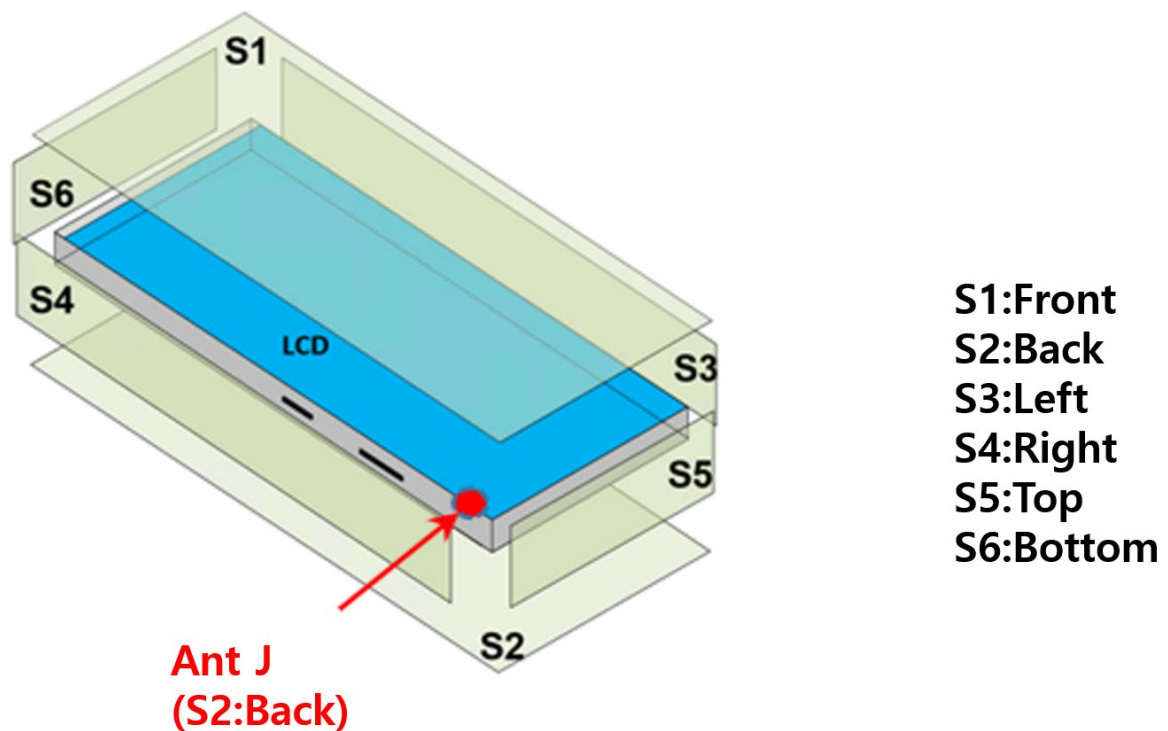


Figure 4. PD evaluation planes

1.2.3 Boundary condition

To simulate electromagnetic tool based on FEM, the boundary condition allows electromagnetic waves to be electrically open at the boundary and radiated far away without reflection. ANSYS Electromagnetics suite version 2025.R1 (HFSS) can support the absorbing boundary condition (ABC) for radiation boundary and make normally a quarter wave length from the radiating structure. In this report, to cover all beamforming cases of mmWave antenna module, 40 mm spacing from each surfaces of the device were adopted. This distance is sufficiently large enough for “Qualcomm IPLG Script” to extract valid E-fields and H-fields from all adjacent exposure surfaces of the EUT.

1.2.4 Source excitation condition

The number of antenna ports of ANT J for source excitation are the same. The antenna port of ANT J is divided into 10 ports for n261 and n258 1 x 5 patch array antennas, 10 ports for n260 1 x 5 patch array antennas. In the 10 ports included in each patch antenna, 5 ports are divided into vertical polarization feeding, and the other 5 ports are divided into horizontal polarization feeding.

Figure 4 shows the ANT J module structure and surrounding structure. The ANT J module is encrypted in the ANSYS Electromagnetics suite (HFSS) and can only check the feeding position.

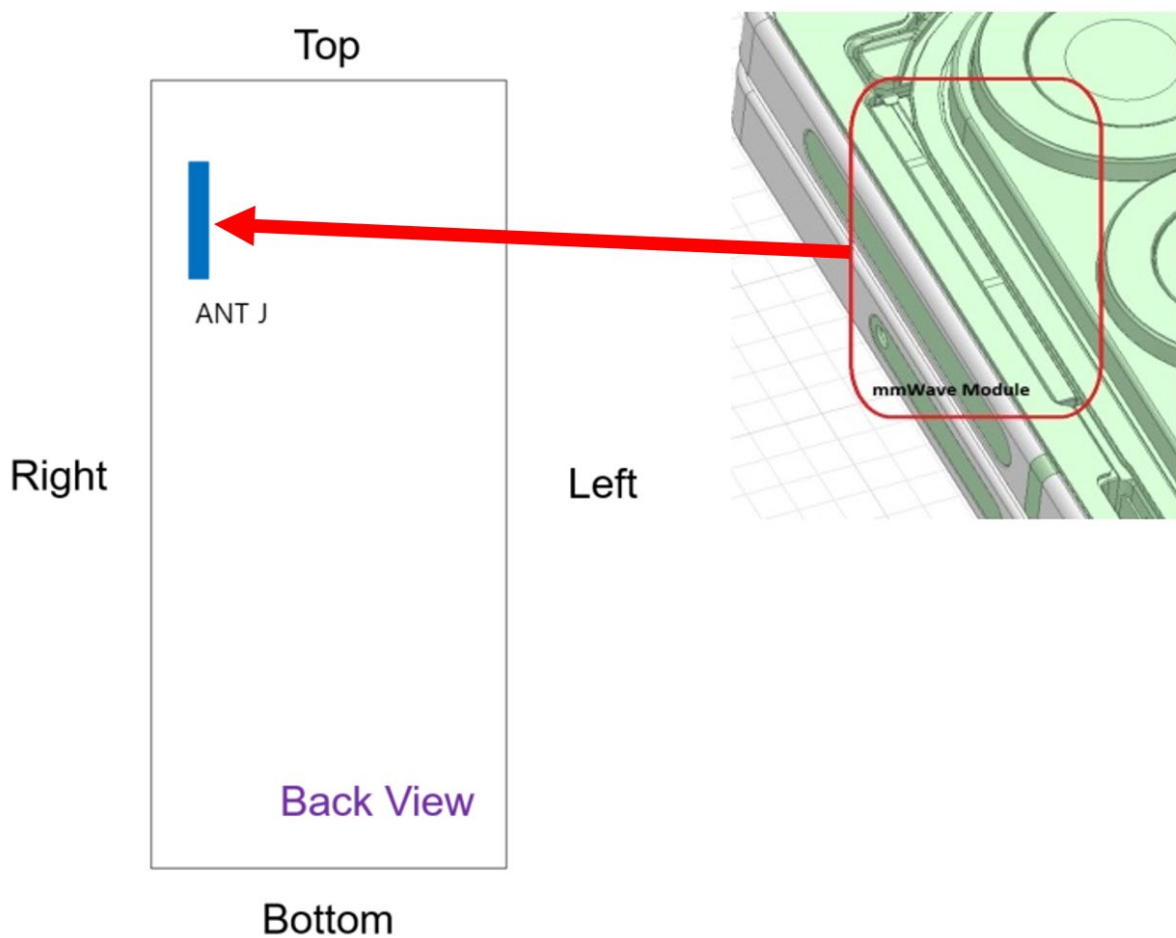
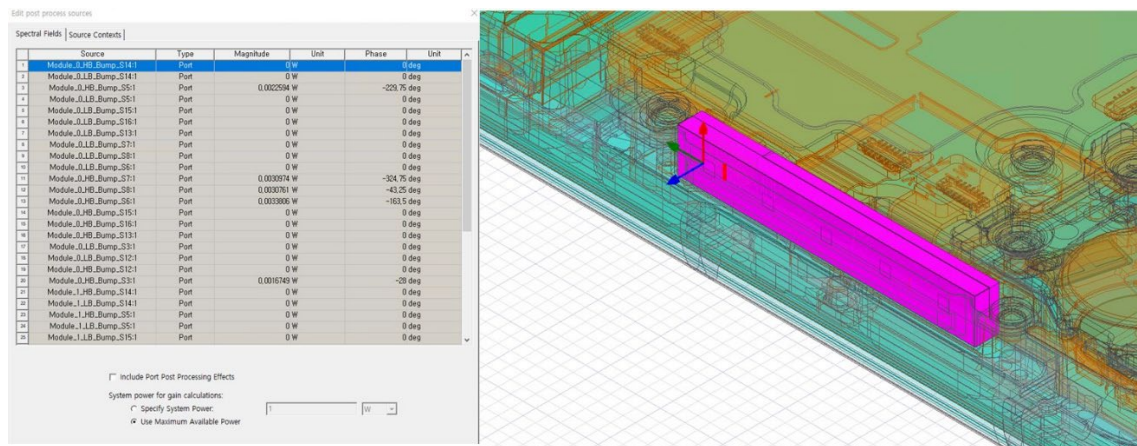


Figure 5. mmWave module (ANT J)

After finishing 3D full wave electromagnetic simulation of modeling structure, the magnitude and phase information can be loaded for each port by using “Edit Sources” function in ANSYS Electromagnetics suite (HFSS). Figure 5 shows an example of antenna port excitations.



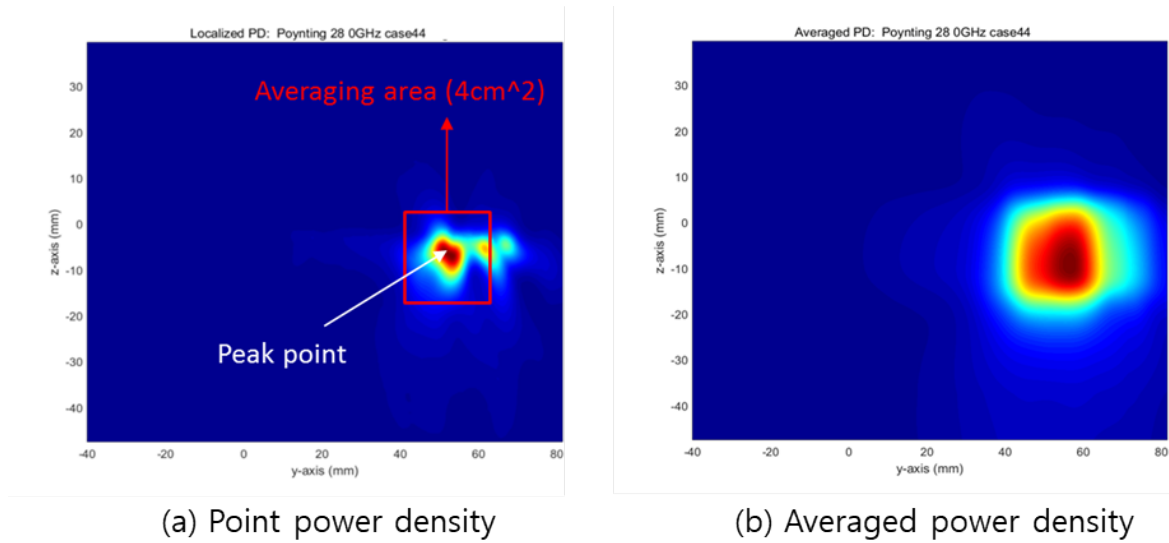


Figure 7. Power density distribution (Example)

For the Smart Transmit, the “Qualcomm Input Power Limit Generator(Qualcomm IPLG script)” were used to assess the mutual coupling between all the mmWave module and all the beams in the codebook for each mmWave module. Once the script is done with assessment, it will provide the `sim.power_limit` for all the beams for all three channels for the specified `PD_design_target`. This mode take the minimum `sim.power_limit` out of all three channels (low, mid and high) and use the resulted `sim.power_limit`.

2.2 Comparison between simulation and measurement

In this section, the simulated-power density distributions and measured-power density distributions are compared to each mmWave antenna. Furthermore, to verify the Smart transmit GEN2, the PD distributions printing out from the “Qualcomm IPLG script” are added.

“Qualcomm IPLG script” prints the simulated 4cm^2 averaged PD values at the reference level (6dBm) for all channels on all surfaces.

Based on comparison of power density distributions, the power densities of simulated, measured and the “Qualcomm IPLG Script” have a good correlation. The discrepancy in amplitude between the “Qualcomm IPLG Script” 4cm^2 averaged power density and measured 4cm^2 averaged power density is considered as housing influence and used in determining input power limit for each beam for RF exposure compliance.

The input powers per each active port are listed below for both Simulation and Measurement validation and power density characterization. For Simulation, these values were entered directly into HFSS model. For measurement, FTM S/W was used to input these values for each active port also.

Mode/Band	Antenna	Input Power (dBm) SISO	Input Power (dBm) MIMO
5G NR n261	J Patch	6.0	6.0

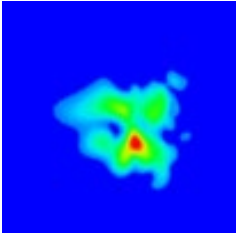
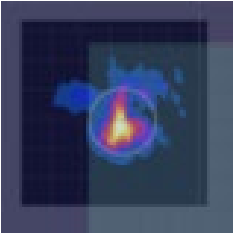
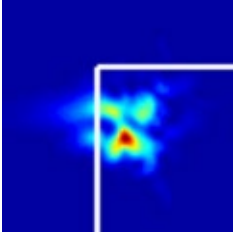
5G NR n260	J Patch	6.0	6.0
5G NR n258	J Patch	6.0	6.0

* The below simulation and measurement result were performed at 2mm evaluation distance and 24.8GHz / 28GHz / 38.5GHz. The *input.power.limit* was determined based on below results.

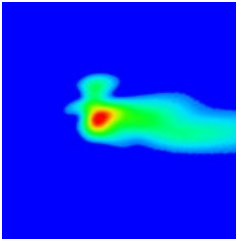
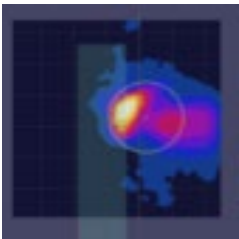
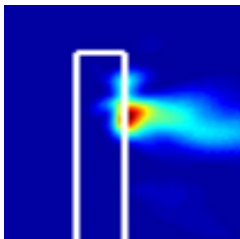
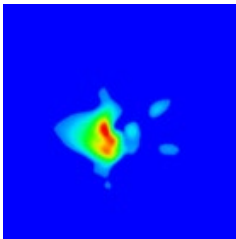
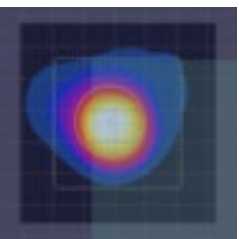
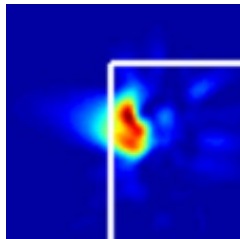
conditon	Band	Channel	Module	Type(P or D)	Side	Beam ID	PLS (10 dBm)	Sim. PD (mW/cm2)	Meas. PD (mW/cm2) * Circle Avg
Folder open	n261	Mid Ch. 2077915 (27924.96 MHz)	J	Patch	Right	275	60	0.66	0.485
					Rear	14		1.18	0.767
						275		1.20	0.92
	n260	Mid Ch. 2254165 (38499.96 MHz)	J	Patch	Right	19	60	0.88	0.316
						275		0.86	0.475
					Rear	19		1.29	0.627
						275		1.16	0.622
	n258	Mid Ch. 2025833 (24800.04 MHz)	J	Patch	Rear	14	60	1.15	0.638
						273		1.38	1.01
conditon	Band	Channel	Module	Type(P or D)	Side	Beam ID	PLS (10 dBm)	Sim. PD (mW/cm2)	Meas. PD (mW/cm2) * Circle Avg
Folder close	n261	Mid Ch. 2077915 (27924.96 MHz)	J	Patch	Right	274	60	0.61	0.378
					Rear	14		1.20	0.795
						275		1.16	0.918
	n260	Mid Ch. 2254165 (38499.96 MHz)	J	Patch	Right	19	60	0.88	0.461
						275		0.80	0.296
					Rear	19		1.28	0.616
						275		1.13	0.422
	n258	Mid Ch. 2025833 (24800.04 MHz)	J	Patch	Right	273	60	0.72	0.466
					Rear	14		1.16	0.612
						273		1.43	1.01

[Folder Closed Status]

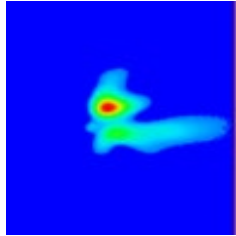
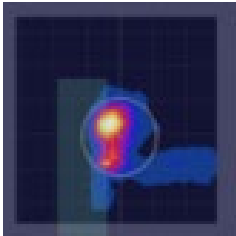
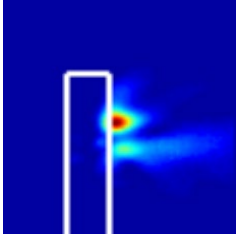
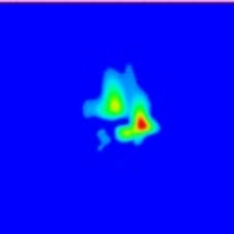
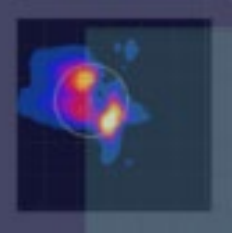
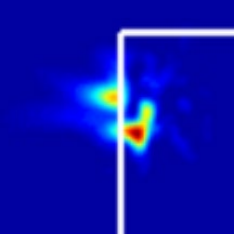
- Table 2-1, n261 ANT J-Patch: Mid Channel, Beam ID 14 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
14	S2 (Rear)				

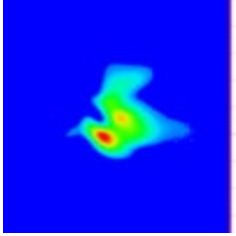
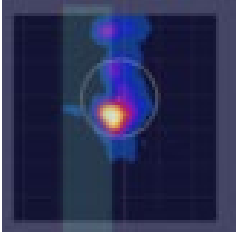
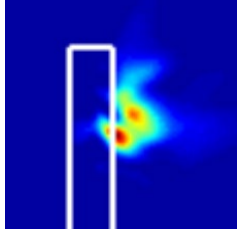
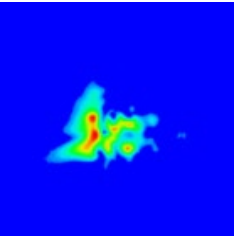
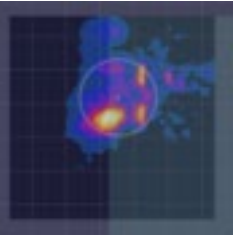
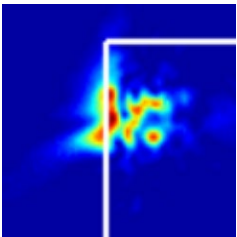
- Table 2-2, n261 ANT J-Patch: Mid Channel, Beam ID 274,275 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
274	S4 (Right)				
275	S2 (Rear)				

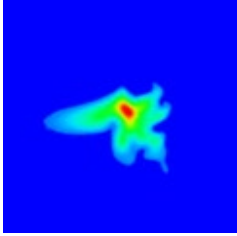
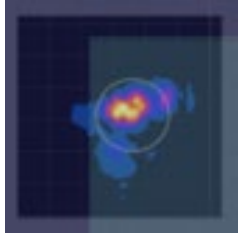
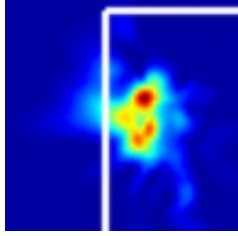
- Table 2-3, n260 ANT J-Patch: Mid Channel, Beam ID 19 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
19	S4 (Right)				
	S2 (Rear)				

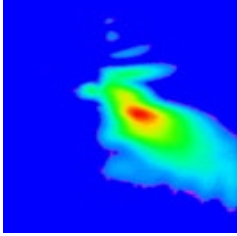
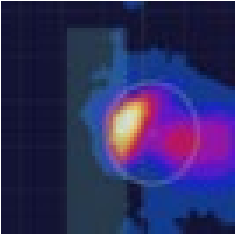
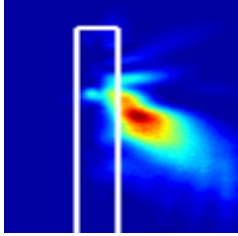
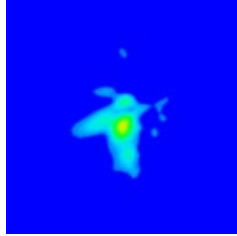
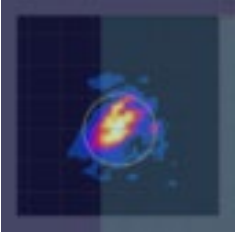
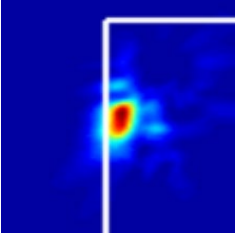
- Table 2-4, n260 ANT J-Patch: Mid Channel, Beam ID 275 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
275	S4 (Right)				
	S2 (Rear)				

- Table 2-5, n258 ANT J-Patch: Mid Channel, Beam ID 14 for selected surfaces

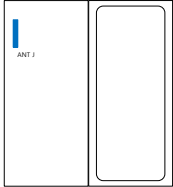
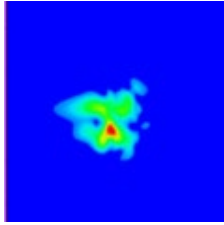
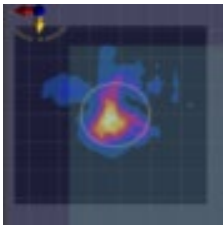
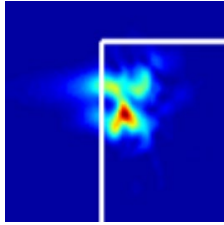
Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
14	S2 (Rear)				

- Table 2-6, n258 ANT J-Patch: Mid Channel, Beam ID 273 for selected surfaces

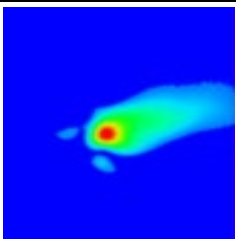
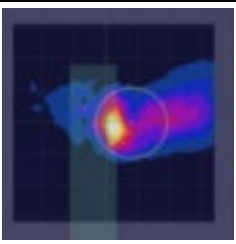
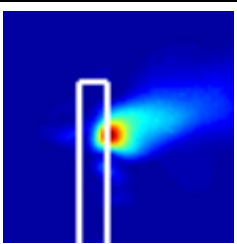
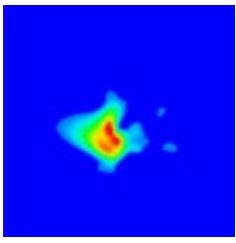
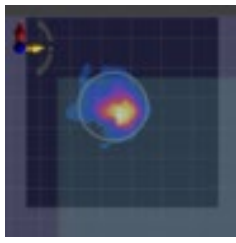
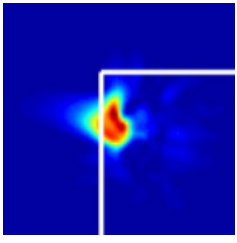
Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
273	S4 (Right)				
	S2 (Rear)				

[Folder Opened Status]

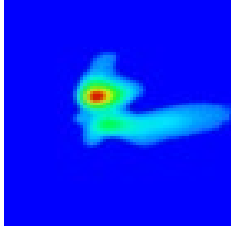
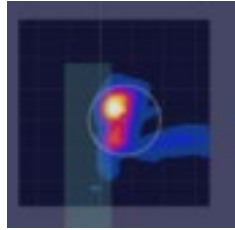
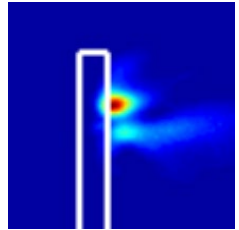
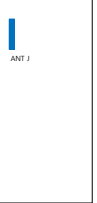
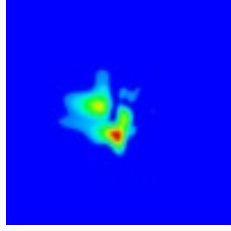
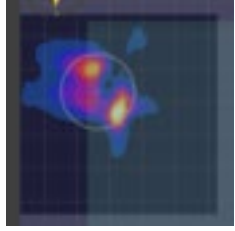
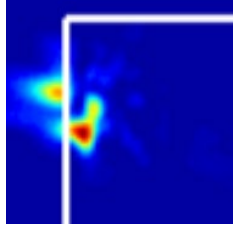
- Table 2-7, n261 ANT J-Patch: Mid Channel, Beam ID 14 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
14	S2 (Rear)				

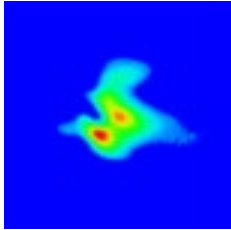
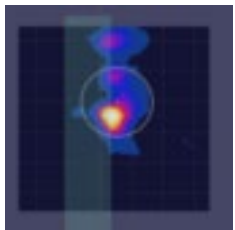
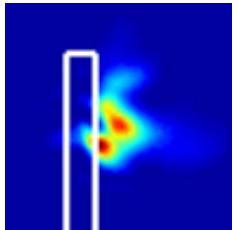
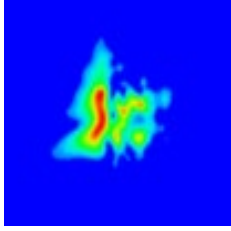
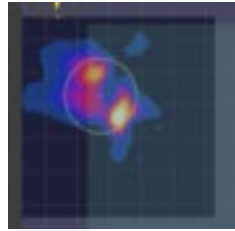
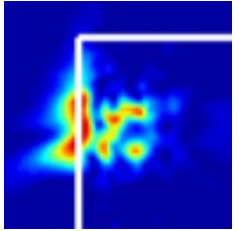
- Table 2-8, n261 ANT J-Patch: Mid Channel, Beam ID 275 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
275	S4 (Right)				
	S2 (Rear)				

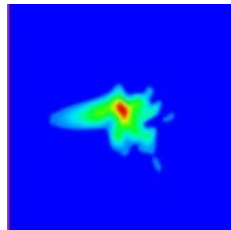
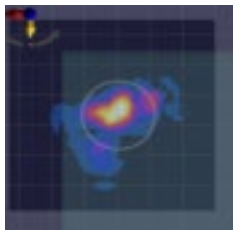
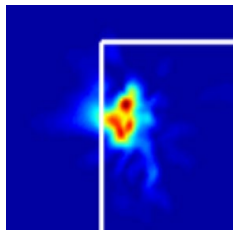
- Table 2-9, n260 ANT J-Patch: Mid Channel, Beam ID 19 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
19	S4 (Right)				
	S2 (Rear)				

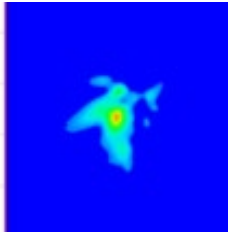
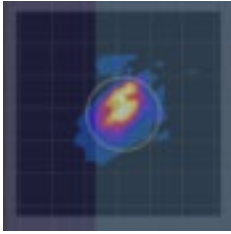
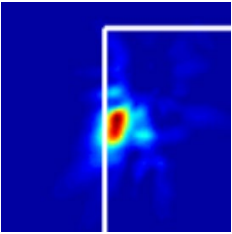
● Table 2-10, n260 ANT J-Patch: Mid Channel, Beam ID 275 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
275	S4 (Right)				
	S2 (Rear)				

● Table 2-11, n258 ANT J-Patch: Mid Channel, Beam ID 14 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
14	S2 (Rear)				

- Table 2-12, n258 ANT J-Patch: Mid Channel, Beam ID 273 for selected surfaces

Beam ID	Surface	View	Simulated PD	Measured PD	Print out from Qualcomm IPLG Script
273	S2 (Rear)				

The Smart transmit GEN2 cannot be finalized until the additional verifications are performed and passed. Follow the below steps for verifications in the mid channel:

VERIFICATION 1 : Use “Qualcomm IPLG script” to print the PD plots for all the beams selected and evaluated for model validation.

- Throughout above comparisons (Table 2-1 to 2-12), the model validation including IPLG script was verified.

This model takes “GEN2_SUB6” mode, thus, only verification 1 is required.

3 Simulation results

This section shows the PD simulation results of Ant J at 24GHz, 28GHz and 39GHz for each evaluation plane specified in Table 3 at separation distances of 2mm for open condition and for closed conditions. The ratio of PD exposure from any surface to the worst surface at 2mm (open and closed) evaluation distance for each beam are also reported in this section to support RF exposure analysis for simultaneous transmission scenarios performed in the Part 1 Near Field PD report.

The relative phase between beam pairs is not controlled in the chipset design. Therefore, the relative phase between each beam pair was considered mathematically to identify the worst case conditions. The below MIMO results represent the highest reported MIMO simulation results after sweeping across the relative phase between beams a 5° step interval from 0° to 360°,

The worst-case simulated PD determined from the tables in this section were used for conservativeness in *input.power.limit* determination in RF Exposure Part 0 Report.

3.1 PD for Low/Mid/High Channel at 24GHz / 28GHz / 39GHz

- Mid CH

[illegible]

- High CH

[illegible]

- Mid CH

[illegible]

- High CH

[illegible]

- Low CH

[illegible]

- Mid CH

- High CH

- Table 3-3, PD of Ant J – patch antenna (39GHz – n260)

[Folder Opened Status]

- Low CH

[illegible]

- Mid CH

[illegible]

- High CH

[illegible]

[Folder Closed Status]

- Low CH

												max ratio of all beams						
No.	Module	Type(P or D)	Beam ID_1	Bema ID_2	Feed no.	4cm2 PD(mW/cm2)						per beam backoff	max ratio of all beams					
						S4(Right)	S3(Left)	S5(Top)	S6(Bottom)	S1(Front)	S2(Rear)		right/ worst	left/ worst	top/ worst	bottom/ worst	front/ worst	rear/ worst
1	J	Patch	0		1	0.18	0.00	0.05	0.00	0.01	0.21	84.6%	1.4%	26.0%	0.5%	4.8%	100.0%	
2			1	0.13	0.01	0.04	0.00	0.01	0.18	74.0%	3.9%	21.5%	1.1%	5.0%	100.0%			
3			2	0.12	0.01	0.02	0.00	0.01	0.23	50.0%	3.8%	9.8%	0.9%	4.7%	100.0%			
4			3	0.10	0.01	0.01	0.00	0.01	0.19	50.8%	2.6%	7.3%	1.6%	6.8%	100.0%			
5			4	0.09	0.01	0.02	0.00	0.01	0.16	56.7%	3.2%	9.6%	2.5%	3.8%	100.0%			
6			5	0.15	0.01	0.04	0.01	0.01	0.32	48.4%	4.4%	12.3%	3.5%	4.1%	100.0%			
7			6	0.23	0.01	0.03	0.01	0.02	0.41	55.9%	2.9%	7.1%	1.7%	4.2%	100.0%			
8			7	0.21	0.01	0.03	0.00	0.03	0.33	63.1%	2.2%	8.3%	0.9%	7.7%	100.0%			
9			8	0.16	0.01	0.04	0.01	0.02	0.27	59.9%	4.4%	13.5%	3.3%	7.7%	100.0%			
10			9	0.28	0.01	0.07	0.00	0.03	0.35	78.2%	2.8%	20.1%	1.1%	8.5%	100.0%			
11			10	0.24	0.01	0.02	0.00	0.02	0.40	60.5%	2.3%	5.0%	0.8%	4.8%	100.0%			
12			11	0.28	0.01	0.10	0.00	0.03	0.37	75.1%	2.7%	27.3%	0.8%	7.2%	100.0%			
13			12	0.46	0.02	0.29	0.02	0.04	0.80	57.3%	3.0%	36.2%	2.4%	5.5%	100.0%			
14			13	0.65	0.02	0.18	0.02	0.09	0.83	79.1%	2.7%	21.5%	1.8%	11.3%	100.0%			
15			14	0.75	0.02	0.06	0.00	0.03	1.07	69.8%	1.4%	5.4%	0.4%	3.0%	100.0%			
16			15	0.61	0.03	0.12	0.01	0.06	0.99	62.0%	2.7%	12.6%	0.5%	5.8%	100.0%			
17			16	0.43	0.03	0.27	0.01	0.07	0.62	70.6%	4.2%	43.7%	2.3%	11.2%	100.0%			
18			17	0.48	0.03	0.24	0.03	0.05	0.76	63.8%	3.6%	31.0%	3.3%	7.1%	100.0%			
19			18	0.65	0.02	0.12	0.01	0.08	0.87	75.1%	2.5%	14.3%	0.8%	9.6%	100.0%			
20			19	0.72	0.02	0.06	0.01	0.03	1.04	69.9%	1.5%	5.6%	0.5%	3.2%	100.0%			
21			20	0.59	0.02	0.15	0.01	0.06	0.97	61.3%	2.0%	15.6%	0.6%	6.2%	100.0%			
22			256	1	0.11	0.01	0.05	0.00	0.01	0.15	73.3%	3.4%	36.3%	0.7%	5.5%	100.0%		
23			257	1	0.15	0.01	0.03	0.00	0.01	0.21	69.7%	6.3%	12.5%	1.9%	4.8%	100.0%		
24			258	1	0.15	0.01	0.03	0.00	0.02	0.23	64.9%	3.1%	14.5%	1.3%	7.5%	100.0%		
25			259	1	0.16	0.01	0.03	0.00	0.01	0.22	72.6%	4.2%	15.3%	1.4%	4.2%	100.0%		
26			260	1	0.11	0.01	0.01	0.00	0.01	0.20	55.4%	3.9%	4.4%	1.0%	3.4%	100.0%		
27			261	2	0.23	0.02	0.12	0.01	0.02	0.38	61.6%	4.3%	31.7%	1.9%	6.1%	100.0%		
28			262	2	0.35	0.02	0.06	0.01	0.02	0.50	69.3%	3.8%	11.6%	1.0%	4.0%	100.0%		
29			263	2	0.36	0.02	0.02	0.01	0.02	0.51	70.5%	4.1%	4.3%	1.0%	3.7%	100.0%		
30			264	2	0.19	0.02	0.12	0.01	0.03	0.26	70.7%	6.8%	44.9%	1.9%	9.5%	100.0%		
31			265	2	0.22	0.01	0.09	0.01	0.03	0.35	63.9%	3.4%	24.4%	2.9%	8.0%	100.0%		
32			266	2	0.38	0.03	0.03	0.00	0.02	0.52	72.2%	5.7%	5.0%	0.4%	4.4%	100.0%		
33			267	2	0.34	0.02	0.08	0.01	0.02	0.41	82.2%	4.6%	19.8%	1.2%	4.4%	100.0%		
34			268	5	0.52	0.03	0.36	0.02	0.05	0.75	69.1%	4.0%	48.5%	2.4%	6.3%	100.0%		
35			269	5	0.63	0.04	0.17	0.02	0.05	0.84	75.0%	5.2%	19.6%	1.8%	6.2%	100.0%		
36			270	5	0.88	0.09	0.09	0.01	0.03	1.20	73.1%	7.1%	7.3%	0.6%	2.7%	100.0%		
37			271	5	0.72	0.04	0.09	0.01	0.06	0.95	75.8%	4.5%	9.3%	1.3%	6.4%	100.0%		
38			272	5	0.39	0.05	0.14	0.01	0.08	0.72	53.5%	6.3%	19.7%	1.9%	11.1%	100.0%		
39			273	5	0.55	0.03	0.40	0.02	0.06	0.84	65.2%	3.3%	47.3%	2.6%	6.5%	100.0%		
40			274	5	0.65	0.05	0.14	0.01	0.04	0.89	72.8%	5.9%	15.7%	1.3%	4.8%	100.0%		
41			275	5	0.94	0.05	0.08	0.00	0.06	1.23	76.9%	4.4%	6.3%	0.3%	4.8%	100.0%		
42			276	5	0.45	0.04	0.11	0.02	0.08	0.78	57.7%	5.7%	13.7%	2.2%	10.6%	100.0%		
43			0	256	2	0.31	0.01	0.13	0.00	0.03	0.39	79.5%	2.6%	32.5%	0.8%	6.6%	100.0%	
44			1	257	2	0.29	0.03	0.08	0.01	0.03	0.43	67.8%	6.8%	17.6%	1.4%	7.1%	100.0%	
45			2	258	2	0.31	0.02	0.08	0.01	0.04	0.51	60.6%	4.5%	16.4%	1.2%	7.6%	100.0%	
46			3	259	2	0.31	0.02	0.06	0.01	0.04	0.46	67.7%	4.6%	12.7%	2.2%	7.9%	100.0%	
47			4	260	2	0.22	0.02	0.03	0.01	0.02	0.43	50.3%	3.9%	7.0%	1.9%	4.4%	100.0%	
48			5	261	4	0.55	0.05	0.21	0.03	0.06	0.74	74.5%	6.2%	28.2%	3.4%	7.5%	100.0%	
49			6	262	4	0.71	0.04	0.12	0.02	0.07	0.99	71.9%	3.9%	12.0%	1.6%	6.7%	100.0%	
50			7	263	4	0.73	0.04	0.06	0.01	0.08	0.92	78.7%	4.7%	6.0%	1.1%	8.2%	100.0%	
51			8	264	4	0.35	0.03	0.18	0.02	0.05	0.47	74.8%	7.0%	38.0%	4.9%	10.4%	100.0%	
52			9	265	4	0.62	0.03	0.22	0.02	0.08	0.88	71.3%	3.2%	25.5%	2.1%	8.6%	100.0%	
53			10	266	4	0.67	0.05	0.06	0.01	0.07	0.91	73.1%	4.9%	7.0%	0.9%	7.9%	100.0%	
54			11	267	4	0.67	0.04	0.18	0.01	0.05	0.83	80.3%	5.3%	21.5%	1.6%	6.0%	100.0%	
55			12	268	10	1.22	0.06	0.81	0.05	0.13	1.66	73.7%	3.8%	48.6%	2.9%	8.0%	100.0%	
56			13	269	10	1.73	0.09	0.56	0.04	0.27	2.09	82.6%	4.3%	26.8%	2.0%	12.8%	100.0%	
57			14	270	10	1.74	0.12	0.20	0.01	0.09	2.33	74.8%	5.0%	8.6%	0.5%	4.0%	100.0%	
58			15	271	10	1.93	0.10	0.27	0.02	0.21	2.18	88.3%	4.4%	12.3%	1.0%	9.4%	100.0%	
59			16	272	10	1.21	0.09	0.55	0.04	0.25	1.44	83.6%	6.1%	38.4%	2.7%	17.0%	100.0%	
60			17	273	10	1.23	0.06	0.84	0.06	0.16	1.85	66.8%	3.2%	45.7%	3.1%	8.5%	100.0%	
61			18	274	10	1.70	0.10	0.41	0.02	0.23	2.09	81.0%	4.9%	19.7%	1.1%	10.8%	100.0%	
62			19	275	10	2.04	0.09	0.18	0.01	0.16	2.39	85.4%	3.9%	7.3%	0.5%	6.8%	100.0%	
63			20	276	10	1.23	0.09	0.36	0.03	0.21	1.84	66.9%	4.8%	19.4%	1.5%	11.7%	100.0%	

- Mid CH

												max ratio of all beams						
No.	Module	Type(P or D)	Beam ID_1	Bema ID_2	Feed no.	4cm2 PD(mW/cm2)		S5(Top)	S6(Bottom)	S1(Front)	S2(Rear)	per beam backoff	89.4%	7.2%	49.1%	5.4%	16.3%	100.0%
						S4(Right)	S3(Left)											
1	J	Patch	0		1	0.198	0.004	0.054	0.001	0.010	0.223		88.8%	1.8%	24.2%	0.4%	4.5%	100.0%
2			1	0.212	0.006	0.044	0.001	0.008	0.256		82.8%	2.3%	17.2%	0.4%	3.1%	100.0%		
3			2	0.111	0.012	0.025	0.002	0.010	0.245		45.3%	4.9%	10.2%	0.8%	4.1%	100.0%		
4			3	0.079	0.008	0.026	0.002	0.008	0.231		34.2%	3.5%	11.3%	0.9%	3.5%	100.0%		
5			4	0.110	0.005	0.015	0.003	0.007	0.193		57.0%	2.6%	7.8%	1.6%	3.6%	100.0%		
6			5	0.168	0.019	0.068	0.008	0.018	0.388		43.3%	4.9%	17.5%	2.1%	4.6%	100.0%		
7			6	0.217	0.015	0.054	0.006	0.018	0.484		44.8%	3.1%	11.2%	1.2%	3.7%	100.0%		
8			7	0.207	0.009	0.037	0.003	0.015	0.407		50.9%	2.2%	9.1%	0.7%	3.7%	100.0%		
9			8	0.177	0.015	0.053	0.007	0.017	0.353		50.1%	4.2%	15.0%	2.0%	4.8%	100.0%		
10			9	0.342	0.011	0.085	0.005	0.025	0.436		78.4%	2.5%	19.5%	1.1%	5.7%	100.0%		
11			10	0.219	0.009	0.024	0.003	0.016	0.469		46.7%	1.9%	5.1%	0.6%	3.4%	100.0%		
12			11	0.444	0.008	0.112	0.002	0.014	0.510		87.1%	1.6%	22.0%	0.4%	2.7%	100.0%		
13			12	0.504	0.027	0.302	0.017	0.057	0.765		65.9%	3.5%	39.5%	2.2%	7.5%	100.0%		
14			13	0.705	0.030	0.219	0.013	0.102	1.031		68.4%	2.9%	21.2%	1.3%	9.9%	100.0%		
15			14	0.802	0.036	0.080	0.004	0.027	1.168		68.7%	3.1%	6.8%	0.3%	2.3%	100.0%		
16			15	0.661	0.037	0.205	0.006	0.037	1.094		60.4%	3.4%	18.7%	0.5%	3.4%	100.0%		
17			16	0.597	0.032	0.277	0.010	0.071	0.725		82.3%	4.4%	38.2%	1.4%	9.8%	100.0%		
18			17	0.558	0.037	0.370	0.018	0.048	0.948		58.9%	3.9%	39.0%	1.9%	5.1%	100.0%		
19			18	0.672	0.035	0.126	0.010	0.096	0.980		68.6%	3.6%	12.9%	1.0%	9.8%	100.0%		
20			19	0.876	0.031	0.069	0.003	0.034	1.279		68.5%	2.4%	5.4%	0.2%	2.7%	100.0%		
21			20	0.620	0.032	0.211	0.005	0.034	1.105		56.1%	2.9%	19.1%	0.5%	3.1%	100.0%		
22			256	1	0.098	0.006	0.040	0.001	0.008	0.143		68.5%	4.2%	28.0%	0.7%	5.6%	100.0%	
23			257	1	0.140	0.007	0.027	0.004	0.013	0.206		68.0%	3.4%	13.1%	1.9%	6.3%	100.0%	
24			258	1	0.128	0.008	0.031	0.004	0.014	0.165		77.6%	4.8%	18.8%	2.4%	8.5%	100.0%	
25			259	1	0.143	0.009	0.028	0.005	0.013	0.197		72.6%	4.6%	14.2%	2.5%	6.6%	100.0%	
26			260	1	0.149	0.009	0.011	0.002	0.013	0.196		76.0%	4.6%	5.6%	1.0%	6.6%	100.0%	
27			261	2	0.200	0.014	0.087	0.014	0.035	0.261		76.6%	5.4%	33.3%	5.4%	13.4%	100.0%	
28			262	2	0.303	0.020	0.036	0.008	0.023	0.395		76.7%	5.1%	9.1%	2.0%	5.8%	100.0%	
29			263	2	0.408	0.025	0.028	0.003	0.022	0.524		77.9%	4.8%	5.3%	0.6%	4.2%	100.0%	
30			264	2	0.167	0.017	0.083	0.006	0.018	0.280		59.6%	6.1%	29.6%	2.1%	6.4%	100.0%	
31			265	2	0.256	0.010	0.086	0.009	0.030	0.328		78.0%	3.0%	26.2%	2.7%	9.1%	100.0%	
32			266	2	0.309	0.020	0.032	0.006	0.020	0.434		71.2%	4.6%	7.4%	1.4%	4.6%	100.0%	
33			267	2	0.298	0.010	0.110	0.004	0.022	0.385		77.4%	2.6%	28.6%	1.0%	5.7%	100.0%	
34			268	5	0.372	0.032	0.313	0.021	0.060	0.638		58.3%	5.0%	49.1%	3.3%	9.4%	100.0%	
35			269	5	0.667	0.045	0.167	0.014	0.054	0.782		85.3%	5.8%	21.4%	1.8%	6.9%	100.0%	
36			270	5	0.771	0.054	0.112	0.006	0.068	1.130		68.2%	4.8%	9.9%	0.5%	6.0%	100.0%	
37			271	5	0.790	0.032	0.113	0.014	0.074	0.920		85.9%	3.5%	12.3%	1.5%	8.0%	100.0%	
38			272	5	0.434	0.041	0.148	0.031	0.093	0.571		76.0%	7.2%	25.9%	5.4%	16.3%	100.0%	
39			273	5	0.477	0.029	0.328	0.021	0.079	0.690		69.1%	4.2%	47.5%	3.0%	11.4%	100.0%	
40			274	5	0.668	0.043	0.124	0.011	0.047	0.849		78.7%	5.1%	14.6%	1.3%	5.5%	100.0%	
41			275	5	0.804	0.057	0.096	0.004	0.044	1.131		71.1%	5.0%	8.5%	0.4%	3.9%	100.0%	
42			276	5	0.556	0.035	0.128	0.026	0.104	0.664		83.7%	5.3%	19.3%	3.9%	15.7%	100.0%	
43			0	256	2	0.310	0.013	0.123	0.003	0.027	0.390		79.5%	3.3%	31.5%	0.8%	6.9%	100.0%
44			1	257	2	0.410	0.013	0.084	0.006	0.033	0.492		83.3%	2.6%	17.1%	1.2%	6.7%	100.0%
45			2	258	2	0.317	0.020	0.060	0.006	0.038	0.440		72.0%	4.5%	13.6%	1.4%	8.6%	100.0%
46			3	259	2	0.254	0.021	0.071	0.008	0.030	0.500		50.8%	4.2%	14.2%	1.6%	6.0%	100.0%
47			4	260	2	0.307	0.017	0.032	0.006	0.029	0.457		67.2%	3.7%	7.0%	1.3%	6.3%	100.0%
48			5	261	4	0.453	0.041	0.192	0.028	0.079	0.778		58.2%	5.3%	24.7%	3.6%	10.2%	100.0%
49			6	262	4	0.691	0.049	0.118	0.017	0.068	0.940		73.5%	5.2%	12.6%	1.8%	7.2%	100.0%
50			7	263	4	0.756	0.037	0.095	0.006	0.060	1.117		67.7%	3.3%	8.5%	0.5%	5.4%	100.0%
51			8	264	4	0.357	0.028	0.153	0.020	0.042	0.559		63.9%	5.0%	27.4%	3.6%	7.5%	100.0%
52			9	265	4	0.653	0.025	0.211	0.013	0.083	0.850		76.8%	2.9%	24.8%	1.5%	9.8%	100.0%
53			10	266	4	0.602	0.042	0.059	0.011	0.050	0.902		66.7%	4.7%	6.5%	1.2%	5.5%	100.0%
54			11	267	4	0.768	0.021	0.234	0.007	0.041	0.911		84.3%	2.3%	25.7%	0.8%	4.5%	100.0%
55			12	268	10	1.024	0.070	0.676	0.052	0.117	1.458		70.2%	4.8%	46.4%	3.6%	8.0%	100.0%
56			13	269	10	1.832	0.090	0.486	0.037	0.258	2.050		89.4%	4.4%	23.7%	1.8%	12.6%	100.0%
57			14	270	10	1.735	0.118	0.239	0.014	0.141	2.405		72.1%	4.9%	9.9%	0.6%	5.9%	100.0%
58			15	271	10	2.009	0.101	0.366	0.021	0.178	2.510		80.0%	4.0%	14.6%	0.8%	7.1%	100.0%
59			16	272	10	1.360	0.093	0.588	0.042	0.250	1.610		84.5%	5.8%	36.5%	2.6%	15.5%	100.0%
60			17	273	10	1.111	0.070	0.764	0.051	0.192	1.699		65.4%	4.1%	45.0%	3.0%	11.3%	100.0%
61			18	274	10	1.758	0.099	0.305	0.028	0.218	1.985		88.6%	5.0%	15.4%	1.4%	11.0%	100.0%
62			19	275	10	2.007	0.078	0.247	0.010	0.132	2.584		77.7%	3.0%	9.6%	0.4%	5.1%	100.0%
63			20	276	10	1.266	0.074	0.436	0.032	0.165	1.959		64.6%	3.8%	22.3%	1.6%	8.4%	100.0%

- High CH

												max ratio of all beams						
No.	Module	Type(P or D)	Beam ID_1	Berna ID_2	Feed no.	4cm2 PD(mW/cm2)					per beam backoff	100.0%	7.0%	58.2%	4.7%	16.5%	100.0%	
						S4(Right)	S3(Left)	S5(Top)	S6(Bottom)			S1(Front)	S2(Rear)	right / worst	left / worst	top / worst	bottom / worst	front / worst
1	J	Patch	0		1	0.17	0.00	0.06	0.00	0.01	0.19		87.8%	2.1%	29.3%	1.1%	3.7%	100.0%
2			1		1	0.24	0.01	0.04	0.00	0.01	0.26		89.4%	1.9%	16.7%	0.4%	3.4%	100.0%
3			2		1	0.12	0.01	0.03	0.00	0.01	0.23		54.9%	3.1%	11.1%	1.3%	3.5%	100.0%
4			3		1	0.08	0.01	0.03	0.00	0.01	0.23		33.6%	3.1%	12.2%	0.9%	2.6%	100.0%
5			4		1	0.10	0.00	0.02	0.00	0.01	0.19		53.6%	2.1%	10.9%	1.6%	2.6%	100.0%
6			5		2	0.22	0.01	0.08	0.01	0.02	0.42		52.5%	3.1%	17.8%	1.7%	4.3%	100.0%
7			6		2	0.22	0.01	0.07	0.01	0.01	0.50		44.5%	2.2%	13.1%	1.0%	2.6%	100.0%
8			7		2	0.15	0.02	0.03	0.00	0.01	0.36		40.5%	4.2%	9.5%	0.6%	2.5%	100.0%
9			8		2	0.18	0.01	0.06	0.01	0.02	0.35		52.3%	3.8%	18.2%	1.4%	4.6%	100.0%
10			9		2	0.36	0.01	0.08	0.01	0.02	0.39		91.3%	2.3%	20.7%	1.8%	5.1%	100.0%
11			10		2	0.18	0.01	0.03	0.00	0.01	0.44		39.6%	2.9%	7.0%	0.7%	1.6%	100.0%
12			11		2	0.41	0.01	0.07	0.00	0.02	0.43		94.9%	2.3%	15.4%	0.7%	3.7%	100.0%
13			12		5	0.63	0.02	0.28	0.01	0.06	0.86		72.7%	2.7%	32.4%	1.4%	6.9%	100.0%
14			13		5	0.69	0.03	0.18	0.01	0.06	1.02		67.4%	2.4%	17.5%	1.2%	5.6%	100.0%
15			14		5	0.78	0.03	0.08	0.01	0.02	1.08		72.0%	2.6%	7.4%	0.6%	1.7%	100.0%
16			15		5	0.65	0.06	0.12	0.01	0.02	1.08		60.0%	5.1%	10.9%	0.7%	1.6%	100.0%
17			16		5	0.59	0.03	0.21	0.01	0.09	0.75		78.8%	4.0%	27.8%	1.1%	11.7%	100.0%
18			17		5	0.82	0.03	0.32	0.01	0.04	1.05		78.2%	2.5%	30.6%	1.3%	3.3%	100.0%
19			18		5	0.61	0.03	0.16	0.01	0.05	0.95		64.9%	2.6%	17.3%	1.3%	5.0%	100.0%
20			19		5	0.65	0.03	0.12	0.01	0.02	1.08		60.2%	2.7%	10.8%	0.6%	1.6%	100.0%
21			20		5	0.61	0.06	0.13	0.01	0.02	1.08		56.6%	5.3%	12.4%	0.6%	1.8%	100.0%
22			256		1	0.08	0.01	0.05	0.00	0.01	0.13		60.0%	3.8%	39.2%	1.5%	6.9%	100.0%
23			257		1	0.18	0.01	0.06	0.00	0.02	0.18		100.0%	3.9%	30.4%	1.7%	12.7%	98.9%
24			258		1	0.16	0.01	0.04	0.00	0.01	0.19		82.1%	2.6%	20.5%	2.1%	6.8%	100.0%
25			259		1	0.19	0.01	0.02	0.01	0.02	0.20		94.4%	3.1%	10.2%	2.6%	9.2%	100.0%
26			260		1	0.14	0.01	0.02	0.00	0.01	0.17		81.9%	3.5%	9.4%	1.2%	7.0%	100.0%
27			261		2	0.29	0.01	0.07	0.01	0.04	0.30		99.0%	3.0%	23.9%	4.7%	13.8%	100.0%
28			262		2	0.40	0.02	0.05	0.01	0.03	0.44		90.2%	3.4%	10.5%	1.6%	7.5%	100.0%
29			263		2	0.37	0.02	0.03	0.01	0.03	0.43		86.7%	4.2%	6.1%	1.4%	7.0%	100.0%
30			264		2	0.21	0.01	0.14	0.01	0.03	0.27		79.3%	4.9%	52.3%	2.3%	12.8%	100.0%
31			265		2	0.32	0.01	0.12	0.01	0.05	0.35		89.3%	2.5%	34.5%	1.7%	13.6%	100.0%
32			266		2	0.31	0.01	0.06	0.01	0.03	0.34		92.6%	4.1%	17.5%	2.7%	9.2%	100.0%
33			267		2	0.30	0.01	0.13	0.00	0.03	0.33		91.1%	2.8%	40.4%	0.9%	9.8%	100.0%
34			268		5	0.63	0.04	0.42	0.02	0.11	0.72		87.7%	4.9%	58.2%	2.9%	14.8%	100.0%
35			269		5	0.88	0.03	0.18	0.02	0.10	0.81		100.0%	2.9%	20.5%	2.2%	11.9%	92.7%
36			270		5	0.69	0.05	0.16	0.01	0.04	1.01		68.4%	4.6%	15.8%	0.7%	4.0%	100.0%
37			271		5	0.68	0.03	0.21	0.02	0.08	0.69		98.1%	3.9%	29.9%	2.9%	11.7%	100.0%
38			272		5	0.78	0.02	0.24	0.02	0.09	0.82		94.9%	2.8%	29.5%	2.4%	11.1%	100.0%
39			273		5	0.70	0.03	0.40	0.02	0.11	0.75		92.5%	4.4%	53.8%	2.9%	15.0%	100.0%
40			274		5	0.84	0.03	0.15	0.02	0.09	0.79		100.0%	3.7%	18.0%	1.9%	11.0%	94.3%
41			275		5	0.68	0.05	0.13	0.01	0.04	0.90		75.3%	5.0%	14.3%	0.6%	4.9%	100.0%
42			276		5	0.75	0.03	0.19	0.02	0.08	0.81		93.0%	3.3%	24.0%	2.6%	10.4%	100.0%
43			0	256	2	0.28	0.01	0.13	0.00	0.02	0.38		74.2%	3.4%	35.0%	1.1%	5.8%	100.0%
44			1	257	2	0.44	0.02	0.10	0.01	0.05	0.50		87.3%	3.4%	20.4%	1.2%	8.9%	100.0%
45			2	258	2	0.31	0.02	0.08	0.01	0.03	0.44		69.5%	3.8%	17.9%	1.6%	7.2%	100.0%
46			3	259	2	0.30	0.02	0.05	0.01	0.03	0.49		61.9%	4.7%	10.7%	2.3%	6.2%	100.0%
47			4	260	2	0.27	0.02	0.05	0.01	0.03	0.42		63.5%	3.8%	11.3%	1.9%	6.7%	100.0%
48			5	261	4	0.58	0.03	0.14	0.03	0.08	0.77		75.6%	3.6%	18.1%	4.4%	10.5%	100.0%
49			6	262	4	0.68	0.03	0.10	0.02	0.07	0.97		69.3%	3.5%	9.9%	2.1%	6.7%	100.0%
50			7	263	4	0.61	0.05	0.09	0.01	0.05	0.97		63.0%	4.7%	8.8%	1.0%	5.5%	100.0%
51			8	264	4	0.40	0.04	0.20	0.02	0.06	0.55		72.2%	7.0%	36.8%	2.9%	11.6%	100.0%
52			9	265	4	0.73	0.02	0.26	0.01	0.10	0.83		87.9%	2.6%	31.7%	1.6%	11.6%	100.0%
53			10	266	4	0.56	0.03	0.08	0.02	0.05	0.80		69.6%	3.6%	9.5%	2.5%	6.1%	100.0%
54			11	267	4	0.80	0.03	0.20	0.01	0.05	0.85		94.1%	3.3%	23.3%	1.1%	6.4%	100.0%
55			12	268	10	1.64	0.07	0.91	0.04	0.21	1.79		91.6%	4.1%	50.9%	2.0%	11.7%	100.0%
56			13	269	10	1.76	0.07	0.40	0.05	0.26	2.11		83.5%	3.2%	18.8%	2.4%	12.3%	100.0%
57			14	270	10	1.54	0.09	0.27	0.02	0.10	2.21		70.0%	4.3%	12.2%	0.7%	4.3%	100.0%
58			15	271	10	1.73	0.13	0.41	0.03	0.16	2.12		81.4%	6.0%	19.1%	1.5%	7.4%	100.0%
59			16	272	10	1.89	0.08	0.57	0.03	0.31	1.79		100.0%	4.1%	30.3%	1.6%	16.5%	94.8%
60			17	273	10	1.74	0.06	0.86	0.05	0.21	1.94		89.7%	3.0%	44.4%	2.6%	10.8%	100.0%
61			18	274	10	1.63	0.08	0.38	0.04	0.23	2.06		78.9%	4.0%	18.5%	2.1%	10.9%	100.0%
62			19	275	10	1.59	0.09	0.38	0.02	0.09	2.29		69.4%	4.0%	16.4%	0.7%	3.8%	100.0%
63			20	276	10	1.43	0.10	0.39	0.03	0.13	2.08		69.0%	4.7%	18.8%	1.6%	6.1%	100.0%