Part 1: Test Under Static Transmission Scenario

For
SMARTPHONE

FCC ID: BCG-E8427A
Model Name: A2846

Report Number: 14523758-S4V5
Issue Date: 8/3/2023

Prepared for
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Revision History

Rev.	Date	Revisions	Revised By
V1	7/11/2023	Initial Issue	--
V2	7/15/2023	1. §5.1: Updated to cleanly state Design Targets and Limits 2. Updated 10-g $SAR_{\text{Design Targets and Limits}}$ 3. Tables 6-12 to 6-17: Updated with appropriate heading	Nathan Sousa
V3	7/21/2023	1. Updated Table 6-1 with the correct P_{max} values	Nathan Sousa
V4	7/26/2023	1. Updated Tables 6-4 to 6-6 with the correct printed backoff value and contribution factor	Nathan Sousa
V5	8/3/2023	1. Removed n79 from the report	Nathan Sousa

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Tables

1. Attestation of Test Results

Applicant Name	APPLE INC.
FCC ID	BCG-E8427A
Model Name	A2846
Reference SAR Report	14523758-S1
Exposure Category	PD Limit (W/m^2)
General Population (Uncontrolled Exposure)	10
RF Exposure Conditions	Highest Reported PD (W/m^2)
	5.870
Date Tested	5/18/2023 to 6/7/2023

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.
This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.
The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.
This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the U.S. Government, or any agency of the U.S. government.

Approved & Released By:	Prepared By:
	
Dave Weaver Operations Leader UL Verification Services Inc.	Nathan Sousa Senior Laboratory Engineer UL Verification Services Inc.

2. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

47173 Benicia Street	47266 Benicia Street
SAR Labs A to H	SAR Labs 1 to 19

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05

3. Introduction

The equipment under test (EUT) contains the Qualcomm modem supporting 2G/3G/4G/5G technologies and millimeter wave 5G NR bands. Both WWAN modems are enabled with Qualcomm's Smart Transmit feature with algorithms to control and manage transmitting power in real time and to ensure the time-averaged RF exposure from the WWAN modems are always in compliance with FCC requirements.

In addition to these WWAN modems, the EUT supports WLAN/BT/MSS radio(s) as well, but the WLAN/BT/MSS modem is not enabled with Qualcomm's Smart Transmit feature.

The purpose of this Part 1 report is to demonstrate that this EUT complies with FCC RF exposure limits at maximum time-averaged transmit power limits for WWAN technologies, and at maximum transmit power limits for WLAN technologies. The specifics of this report are, as listed:

- SAR and power density (PD) compliance for all WWAN radios (Sub-6 GHz + 5G millimeter wave NR) is assessed based on maximum time-averaged transmit power (static transmission condition). Relevant FCC KDBs and exclusion criteria are applied on a time-average power basis for WWAN technologies. The maximum time-averaged transmit power limits for supported WWAN technologies, bands, and antennas in this report are derived in the Part 0 report. The validation of the Qualcomm's Smart Transmit time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in the Part 2 report.
- SAR compliance for WLAN radios is assessed based on maximum transmit power as per relevant FCC KDBs.
- Demonstrated compliance in simultaneous transmission scenarios involving both WWAN and WLAN transmissions, where WWAN exposure is assessed based on time-averaged transmit power limits, and WLAN exposure is assessed based on maximum transmit power limits.

The P_{limit} and *input.power.limit* used in this report are determined and listed in the Part 0 report.

4. Measurement Setup and General Information

This section provides the details of the test setup used for PD measurement.

4.1. Test Environment

Test Location	UL Verification Services
Ambient Temperature	22±2^{0}C
Tissue Simulating Liquid	22±2^{0}C
Humidity Range	30% ~ 49%

4.2. Power Density Measurement System

The power density measurement system is constructed based on the DASY6 platform by SPEAG. The DASY6/8 with EUmillimeter wavev2, EUmillimeter wavev3, and EUmillimeter wavev4 and 5G software module can measure the electromagnetic exposure (electromagnetic and power density) up to 110GHz as close as 2mm from any transmitter.

4.2.1. Power Density Probe

The novel EUmillimeter wavev2, EUmillimeter wavev3, and EUmillimeter wavev4 probe is used in the power density measurement. It is designed for precise near-field measurements in the mm-wave range by Schmid & Partner Engineering AG of Zurich, Switzerland. The specifications are:

- Frequency range: 0.75 ~ 110 GHz
- Dynamic range: <50 – 3000 V/m (up to 10000 V/m with additional PRE-10 voltage divider)
- Linearity: < ± 0.2 dB
- Supports sensor model calibration (SMC)
- ISO17025 accredited calibration

4.2.2. Power Density Measurement System Verification

The power density system verification is performed using the SPEAG verification device. It consists of a ka-band horn antenna with a corresponding gun oscillator packaged within a cube-shaped housing.

The specification of the verification device is:

- Calibrated frequency: 30 GHz at 10 mm from the case surface
- Frequency accuracy: ± 100 MHz
- E-field polarization: linear
- Harmonics: -20 dBc (typ)
- Total radiated power: 14 dBm (typ)
- Power stability: 0.05 dB
- Power consumption: 5 W (max)
- Size: 100 × 100 × 100 mm
- Weight: 1 kg

Tables 4-1 and 4-2 shows the verification test results. The measured power density (PD) value is within ±1.2 dB of the target level; for the 5G verification source's uncertainty, please refer to Appendix B.

Table 4-1: System validation results for SAR 3

SAR Lab	Test Date	Frequency (GHz)	5G Probe SN	Probe Cal. Due Data	DAE SN	DAE Cal. Due Date	5G Verification Source SN	Source Cal. Due Data	Measured psPDn (W/m²) over 4cm²	Target psPDn (W/m²) over 4cm²	Deviation (dB)	Measured psPDtot (W/m²) over 4cm²	Target psPDtot (W/m²) over 4cm²	Deviation (dB)
3	3/16/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.8	33.3	0.06	34.7	33.3	0.18
3	3/16/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33	33.3	-0.04	34.4	33.3	0.14
3	3/16/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	32.5	33.3	-0.11	33.9	33.3	0.08
3	3/16/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.5	33.3	0.03	34.8	33.3	0.19
3	3/16/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	34.7	33.3	0.18	36.1	33.3	0.35
3	3/21/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.5	33.3	0.03	34.9	33.3	0.20
3	3/21/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.3	33.3	0.00	34.7	33.3	0.18
3	3/21/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.2	33.3	-0.01	34.6	33.3	0.17
3	3/21/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.3	33.3	0.00	34.8	33.3	0.19
3	3/21/2023	30	9589	9/20/2023	1377	9/15/2023	1003	9/14/2023	33.1	33.3	-0.03	34.6	33.3	0.17
								Average	**33.4**	33.3	0.01	**34.8**	33.3	0.19

Table 4-2: System validation results for SAR 6

SAR Lab	Test Date	Frequency (GHz)	5G Probe SN	Probe Cal. Due Data	DAE SN	DAE Cal. Due Date	5G Verification Source SN	Source Cal. Due Data	Measured psPDn (W/m²) over 4cm²	Target psPDn (W/m²) over 4cm²	Deviation (dB)	Measured psPDtot (W/m²) over 4cm²	Target psPDtot (W/m²) over 4cm²	Deviation (dB)
6	3/2/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.5	33.3	-0.11	33.1	33.3	-0.03
6	3/3/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.4	33.3	-0.12	33	33.3	-0.04
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.4	33.3	-0.12	33	33.3	-0.04
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.5	33.3	-0.11	33.1	33.3	-0.03
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.7	33.3	-0.08	33.3	33.3	0.00
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.4	33.3	-0.12	33	33.3	-0.04
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.4	33.3	-0.12	33	33.3	-0.04
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	32.8	33.3	-0.07	33.3	33.3	0.00
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	33.3	33.3	0.00	33.8	33.3	0.06
6	3/6/2023	30	9496	2/20/2024	1540	1/23/2024	1003	9/14/2023	33.7	33.3	0.05	34.2	33.3	0.12
								Average	**32.7**	33.3	-0.08	**33.3**	33.3	0.00

Table 4-3: System Check Results

SAR Lab	Date	Frequency (GHz)	5G Verification Source SN	Source Cal. Due Data	Measured psPDn (W/m²) over 4cm²	Target psPDn (W/m²) over 4cm²	Deviation (dB)	Delta ±10 %	Measured psPDtot (W/m²) over 4cm²	Target psPDtot (W/m²) over 4cm²	Deviation (dB)	Delta ±10 %
3	5/18/2023	30	1003	9/14/2023	35.2	33.4	0.23	5%	37.0	34.8	0.27	6%
3	5/22/2023	30	1003	9/14/2023	32.8	33.4	-0.08	-2%	33.7	34.8	-0.13	-3%
3	5/30/2023	30	1003	9/14/2023	32.5	33.4	-0.12	-3%	34.1	34.8	-0.08	-2%
3	6/4/2023	30	1003	9/14/2023	35.6	33.4	0.28	7%	36.8	34.8	0.25	6%
3	6/7/2023	30	1003	9/14/2023	32.8	33.4	-0.08	-2%	33.7	34.8	-0.13	-3%
SAR Lab	**Date**	**Frequency (GHz)**	**5G Verification Source SN**	**Source Cal. Due Data**	**Measured psPDn (W/m²) over 4cm²**	**Target psPDn (W/m²) over 4cm²**	**Deviation (dB)**	**Delta ±10 %**	**Measured psPDtot (W/m²) over 4cm²**	**Target psPDtot (W/m²) over 4cm²**	**Deviation (dB)**	**Delta ±10 %**
6	5/18/2023	30	1003	9/14/2023	36.1	32.7	0.43	10%	36.5	33.3	0.40	10%
6	5/22/2023	30	1003	9/14/2023	36.0	32.7	0.42	10%	36.5	33.3	0.40	10%
6	5/30/2023	30	1003	9/14/2023	36.3	32.7	0.45	11%	36.8	33.3	0.44	11%
6	6/4/2023	30	1003	9/14/2023	34.1	32.7	0.18	4%	34.6	33.3	0.17	4%
6	6/7/2023	30	1003	9/14/2023	34.4	32.7	0.22	5%	35.0	33.3	0.22	5%

Measurement Report for Device, FRONT, Validation band, UID 0 -, Channel 0 (30000.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
, Device	100.0 x 100.0 x 100.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G Air	FRONT, 5.55	Validation band	CW, 0--	30000.0, 0	1.0

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave- xxxx	---Air	EUmmWV4 - SN9589_F1-55GHz, 2022-09-20	DAE4 Sn1377, 2022-09-15

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	N/A

Measurement Results

	5G Scan
Date	2023-03-16, 19:11
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	34.7
psPDtot+ [W/m^2]	36.1
psPDmod+ [W/m^2]	36.2
E_{max} [V/m]	134
Power Drift [dB]	-0.02

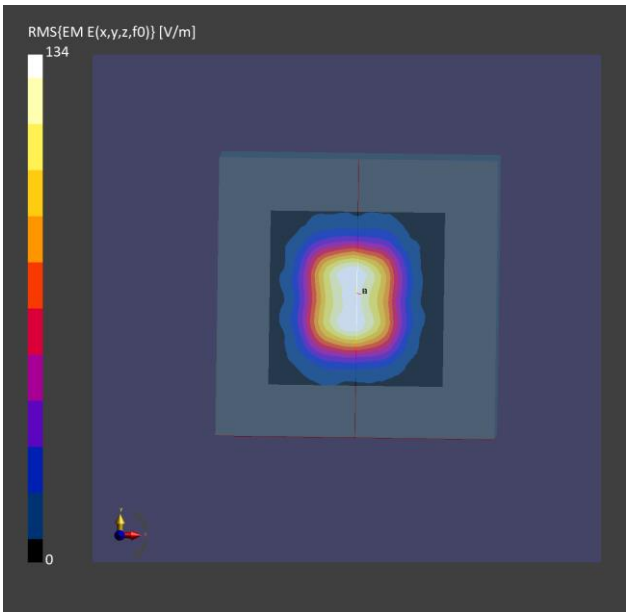

Figure 4-1: 4cm² PD for source validation (worst-case Δ) SAR 3

Measurement Report for Device, FRONT, Validation band, UID 0 -, Channel 0 (30000.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
, Device	100.0 x 100.0 x 100.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G Air	FRONT, 5.55	Validation band	CW, 0--	30000.0, 0	1.0

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave- xxxx	---Air	EUmmWV4 - SN9496_F1-55GHz, 2023-02-20	DAE4 Sn1540, 2023-01-23

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	N/A

Measurement Results

	5G Scan
Date	2023-03-06, 20:44
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	33.7
psPDtot+ [W/m^2]	34.2
psPDmod+ [W/m^2]	34.3
E_{max} [V/m]	129
Power Drift [dB]	0.07

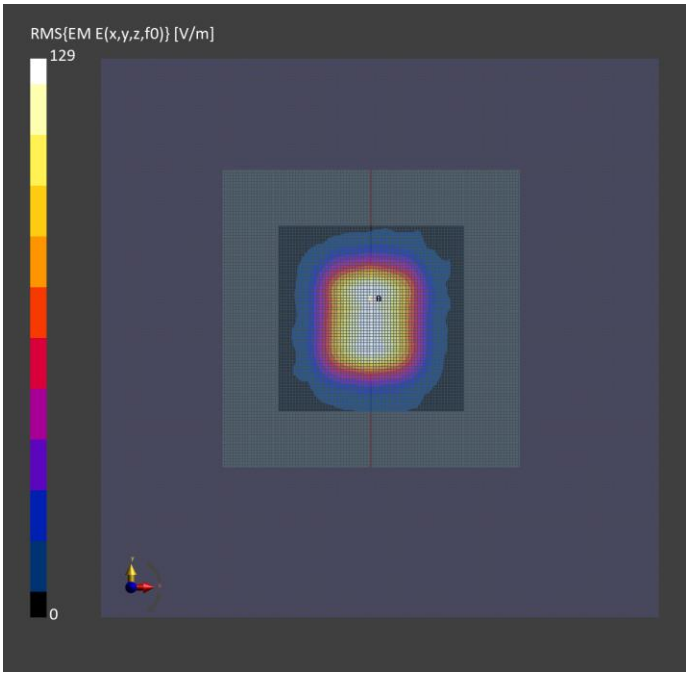

Figure 4-2: 4cm^2 PD for source validation (worst-case Δ) SAR 6

5. Test Condition, Configuration, and Assessment

5.1. Qualcomm Smart Transmit Parameters

These parameters are entered through the *Embedded File System* (EFS) and cannot be accessed by the end-user.

The Part 0 report documents the determination of P_{limit} for Sub-6 GHz WWAN bands and the *input.power.limit* for 5G millimeter wave NR bands using the design targets and limits listed below:

$SAR_{Design\ Target}$ (1-g W/kg)	$SAR_{Design\ Target}$ (10-g W/kg)	$SAR_{Design\ Limit}$ (1-g W/kg)	$SAR_{Design\ Limit}$ (10-g W/kg)
0.8	2.0	1.0	2.5

$PD_{Design\ Target}$ (W/m^2)	$PD_{Design\ Limit}$ (W/m^2)
3.9	6.3

- Tx_power_at_SAR_design_target (P_{limit} in dBm) for Tx transmitting frequency < 6 GHz
  - The maximum time-average transmit power, in dBm, at which this radio configuration (i.e., band and technology) reaches the *SAR_design_target*. This *SAR_design_target* is pre-determined for the specific device, and it shall be less than regulatory SAR limit after accounting for all design related tolerances. The time-averaged SAR is assessed against this *SAR_design_target* in real time to determine the compliance. The P_{limit} could vary with technology, band and DSI (device state index), therefore it has the unique value for each technology, band and DSI.
- Reserve_power_margin (dB)
  - With Smart Transmit EFS version 17 or lower:
    - The margin, in dB, below the P_{limit} to reserve for future transmission with a minimum transmit power ($P_{reserve}$):

$$P_{reserve\ (dBm)} = P_{limit\ (dBm)} - Reserve_{power\ margin\ (dB)}$$

    - The *Reserve_power_margin* is a global parameter, meaning it applies to all the technologies and bands. When the *Reserve_power_margin* is set to zero dB, Smart Transmit effectively limits the upper bound of EUT transmit power to P_{limit}, in other words, the EUT transmits continuously at P_{limit}.
  - With Smart Transmit EFS version 18 or higher:
    - For 2G and 3G WWAN technologies, the parameter of *Reserve_power_margin* has been re-named to *Reserve_power_margin_db_2g_3g_wwan*.
    - For 4G/5G WWAN technologies, the equivalent reserve of *Reserve_power_margin* is denoted as *total_min_exp_budget_linear_4g_5g_wwan*. Furthermore, the parameter of *secondary_split_ratio* is introduced in EFS version 18 and higher so the OEM can determine the minimum reserve margin out of total minimum reserve (i.e., *secondary_split_ratio* * *total_min_exp_budget_linear_4g_5g_wwan*) that is used for the secondary WWAN radio in a two-WWAN-radio transmission scenario. Here, primary WWAN radio in a two-WWAN-radio transmission scenario can get minimum reserve margin of (1 – *secondary_split_ratio*) * *total_min_exp_budget_linear_4g_5g_wwan*.
- *input.power.limit* (dBm) for Tx transmitting frequency ≥ 6 GHz
  - The maximum time-average power at the input of antenna element port, in dBm, at which each beam meets the *PD_design_target* that is less than the regulatory power density limit after accounting for all design related tolerances.

- *Smart Tx Gen*: **ONLY** applicable for Smart Transmit EFS version 16 or higher
  - The EFS version 16 (or higher) supports 2nd generation of Smart Transmit (GEN2). The EUT with Smart Transmit EFS version 16 (or higher) has an option to select GEN1 or GEN2. The procedure to determine PD char (i.e., *input.power.limit*) is different. Therefore, in the case of EUT with Smart Transmit EFS version 16 (or higher), additional millimeter wave module switch test is needed to confirm if Smart Transmit EFS used in EUT is configured for GEN1 or GEN2. The EFS configuration (GEN1 or GEN2) should correspond to the PD char performed in Part 0 report, otherwise, EFS configuration should be changed to match GEN1/GEN2 PD char of Part 0 report.
  - Qualcomm 2nd generation of Smart Transmit (GEN2) supports Sub-6 GHz and millimeter wave favor modes. The Smart Transmit EFS provides below options to configure for a given MCC (country/region):
    - GEN1
    - GEN2_MILLIMETER WAVE
    - GEN2_SUB-6 GHZ
    - GEN2_SUB-6 GHZ_MILLIMETER WAVE
- *force peak* for Tx transmitting frequency < 6 GHz
  - The Smart Transmit feature applies time-averaging windows when the device detects an MCC that matches Time-Averaged Exposure MCCs list. For each of the MCCs under Time-Averaged Exposure MCCs list, the Smart Transmit feature can limit either maximum instantaneous Tx power or maximum time-average power to P_{limit} per tech/band/antenna/DSI. If force peak is set to '1' for a given tech/band/antenna/DSI in the EFS, then the Smart Transmit feature limits the maximum instantaneous Tx power to P_{limit} for the selected tech/band/antenna/DSI. In other words, with force peak set to '1', under static condition (i.e., fixed tech/band/antenna/DSI) and in single active Tx scenario, Smart Transmit can guarantee Tx power level of P_{limit} at all times.
- *WWAN Backoff (dB) for WiFi/BT*: **ONLY** applicable for Smart Transmit EFS version 16 (or higher) in GEN1 or GEN2_MILLIMETER WAVE configurations[1]
  - The EFS version 16 (or higher) provides the entry to backoff WWAN radio when WLAN is transmitting. This backoff when WiFi/BT is transmitting can be configured per tech/band/DSI/antenna (Sub-6 GHz antenna and millimeter wave module) in GEN1 or GEN2_MILLIMETER WAVE configuration only. Therefore, in the case of EUT with Smart Transmit EFS version 16 (or higher), perform additional tests (one for Sub-6 GHz WWAN radio, and one for millimeter wave WWAN radio) to verify whether backoff configured in EFS is properly applied by Smart Transmit for GEN1 or GEN2_MILLIMETER WAVE configurations when WiFi/BT is transmitting.

5.1.1. Qualcomm Smart Transmit Parameters for the Sub-6 Modem

For this EUT, the input parameters listed in §5.3 of the Part 0 report are populated via the EFS entry.

5.1.2. Qualcomm Smart Transmit parameters for the 5G modem

For this EUT, the *input.power.limit* parameters for the 5G millimeter wave NR radio(s) are listed in §5.7.3 of the Part 0 report and are populated via EFS entry into the EUT.

5.2. Device Test Configuration for SAR Measurements

In summary, SAR is evaluated on this EUT in test configurations and test conditions listed below:

- Test configurations: Body-worn & Hotspot SAR exposure (1-g SAR) from all device surfaces/edges (front, back, left, right, top, bottom) having a transmitting antenna located ≤ 25mm from that device surface/edge when in direct contact with flat section of SAM phantom.
- Test condition: The SAR measurements on all supported Sub-6 WWAN technologies and bands are conducted with the EUT transmitting at maximum time-average transmit power (P_{limit}) or maximum RF tune-up power (P_{max}) if $P_{max} \leq P_{limit}$.

[1] This is not a compliance test, the compliance in WWAN + WLAN/BT scenario should be demonstrated in Part 1 simultaneous transmission analysis section; *WWAN Backoff (dB) for WiFi/BT* is applicable **ONLY** when EUT is configured as GEN1 and/or GEN2_MMW.

5.3. Device Test Configuration for PD Measurements

As can be seen in §5 of the Part 0 report, the PD exposure for this EUT has been assessed against the $PD_{Design\ Target}$ listed in §5.1 of this report using a validated simulation approach for the worst cases for all its beams. To further confirm the compliance, a subset of beams and test cases were selected for PD verification, see §5.2.

The below beam selection criteria for the PD verification test are followed:

- Select one single beam (antenna array config) per antenna type (dipole or patch) and per millimeter wave antenna module
  - The single beam containing highest number of active antenna ports. For example, the single beam with 4 active patch ports should be selected over the beam with a single active patch port
- Select one beam pair (if applicable) per antenna type (dipole or patch) and per millimeter wave antenna module
  - The beam pair containing the highest number of active antenna ports.

Additionally, since the worst-case surface dictates the compliance, the PD measurement is made on the worst channel and worst surface determined through the validated simulation approach, see Appendix B of the Part 0 report.

Based on the aforementioned criteria and the EUT codebook in §5.3 of the Part 0 report, Tables 5-1 to 5-3 list the selected beams and test cases for PD verification measurement(s). The definition of the EUT surface is illustrated in Figure 5-1.

Table 5-1: PD verification test cases for n258

Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M2	2018333	44		100	1	Back
	2018333	35	163	100	1	Back
	2025833		173	200	66	Back
	2025833		173	200	66	Left
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M1	2032499		155	100	1	Back
	2032499	27	155	100	1	Back
	2018333	18		100	1	Back
	2018333	18		100	1	Left
	2018333	18		100	1	Top
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M3	2018333		178	100	1	Right
	2032499	38	166	100	1	Right
	2018333	47		50	1	Right
	2018333	47		50	1	Back
	2018333	47		50	1	Front

Table 5-2: PD verification test cases for n260

Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M2	2253330	37		100	1	Back
	2253330	37	165	100	1	Back
	2229167		162	100	66	Back
	2229167		162	100	66	Left
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M1	2253330		157	100	1	Back
	2277500	29	157	100	1	Back
	2253330	18		100	33	Back
	2253330	18		100	33	Left
	2253330	18		100	33	Top
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M3	2253330	50		100	1	Right
	2229167	50	178	100	1	Right
	2229167		177	100	66	Right
	2229167		177	100	66	Back
	2229167		177	100	66	Front

Table 5-3: PD verification test cases for n261

Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M2	2077084	45		100	1	Back
	2083330	35	163	100	1	Back
	2083330		163	100	66	Back
	2083330		163	100	66	Left
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M1	2083330		157	100	1	Back
	2070833	29	157	100	1	Back
	2083330	18		100	33	Back
	2083330	18		100	33	Left
	2083330	18		100	33	Top
Module/Antenna	Ch.	Beam ID1	Beam ID2	BW	RB	DUT
		V	H	MHz	#	Surface
ANT M3	2077084		170	100	1	Right
	2077084	42	170	100	1	Right
	2083330	41		50	1	Right
	2083330	41		50	1	Back
	2083330	41		50	1	Front

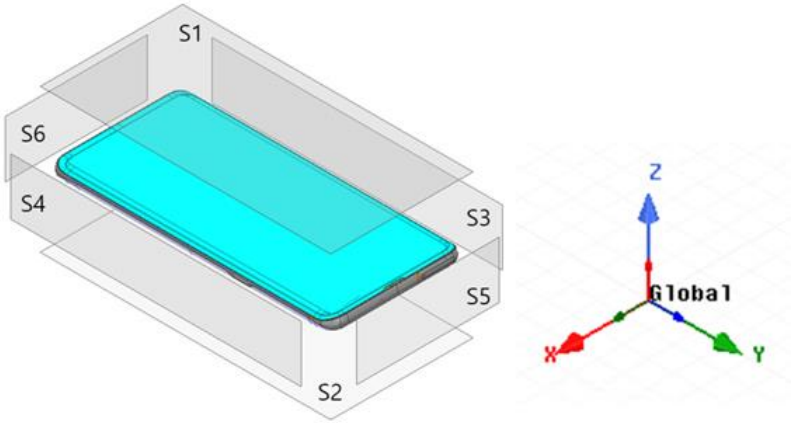

Figure 5-1: EUT surface definition (S1=Front, S2=Back, S3=Edge Left, S4=Edge Right, S5=Edge Top, S6=Edge Bottom)

6. Summary of Results

6.1. SAR Measurement and Conducted Power Results at P_{limit}

The transmit power limit, P_{limit}, that corresponds to the $SAR_{Design\ Target}$, stated in §5.1 for all technologies and bands, was determined through the Part 0 report and are listed in EFS entries in §5.3 of the Part 0 report. For this EUT, the P_{max} (maximum RF tune-up power) for select Sub-6 GHz technologies is less than, or equal to, the corresponding P_{limit}, as summarized and shown in Table 6-1.

Table 6-1: Comparison of Plimit and Pmax

Exposure Scenario		Duty Cycle	Head				Body & Hotspot				Hotspot				P_{max} (dBm)	
Spatial-average			1-g				1-g				1-g					
Test Distance			0 mm				5 mm				5 mm					
Power Mode (DSI)			DSI: 0				DSI: 1				DSI: 1					
Antenna	Tech/Band		P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)		
			Burst Average		Frame Average		Burst Average		Frame Average		Burst Average		Frame Average		Burst Average	Frame Average
ANT 1	GSM 850 2 slots	25.0%	38.51	32.00	32.49	25.98	34.48	32.00	28.46	25.98	34.46	32.00	28.44	25.98	32.00	25.98
	GSM 1900 2 slots	25.0%	35.87	30.50	29.85	24.48	29.25	25.40	23.23	19.38	26.60	25.40	20.58	19.38	31.00	24.98
	W-CDMA B2	100.0%	29.68	24.50	29.68	24.50	22.51	19.40	22.51	19.40	20.51	19.40	20.51	19.40	25.70	25.70
	W-CDMA B4	100.0%	29.72	24.20	29.72	24.20	19.89	19.10	19.89	19.10	19.40	19.10	19.40	19.10	25.70	25.70
	W-CDMA B5	100.0%	31.59	25.70	31.59	25.70	28.77	25.70	28.77	25.70	27.35	25.70	27.35	25.70	25.70	25.70
	LTE Band 5	100.0%	30.82	25.70	30.82	25.70	27.53	25.70	27.53	25.70	26.53	25.70	26.53	25.70	25.70	25.70
	LTE Band 7	100.0%	28.07	24.00	28.07	24.00	21.70	20.30	21.70	20.30	21.21	20.30	21.21	20.30	25.70	25.70
	LTE Band 12/17	100.0%	32.07	25.70	32.07	25.70	28.28	25.70	28.28	25.70	26.11	25.70	26.11	25.70	25.70	25.70
	LTE Band 13	100.0%	31.42	25.70	31.42	25.70	27.19	25.70	27.19	25.70	26.28	25.70	26.28	25.70	25.70	25.70
	LTE Band 14	100.0%	31.17	25.70	31.17	25.70	27.03	25.70	27.03	25.70	26.20	25.70	26.20	25.70	25.70	25.70
	LTE Band 25/2	100.0%	31.02	24.50	31.02	24.50	22.10	19.40	22.10	19.40	19.45	19.40	19.45	19.40	25.70	25.70
	LTE Band 26	100.0%	31.04	25.70	31.04	25.70	27.74	25.70	27.74	25.70	26.74	25.70	26.74	25.70	25.70	25.70
	LTE Band 30	100.0%	28.33	22.90	28.33	22.90	22.10	22.10	22.10	22.10	22.10	22.10	22.10	22.10	25.70	25.70
	LTE Band 41	63.3%	31.03	25.70	29.05	23.71	22.53	22.50	20.54	20.51	22.53	22.50	20.54	20.51	25.70	23.71
	LTE Band 53	63.3%	30.59	20.70	28.61	18.71	24.00	20.70	22.02	18.71	23.75	20.70	21.76	18.71	20.70	18.71
	LTE Band 66/4	100.0%	30.51	24.20	30.51	24.20	20.50	19.10	20.50	19.10	19.95	19.10	19.95	19.10	25.70	25.70
	LTE Band 71	100.0%	33.51	25.70	33.51	25.70	27.62	25.70	27.62	25.70	27.62	25.70	27.62	25.70	25.70	25.70
	MSS	100.0%	N/A	N/A	N/A	N/A	23.93	22.70	23.93	22.70	23.31	22.70	23.31	22.70	28.00	28.00
	NR n5	100.0%	31.59	25.70	31.59	25.70	27.93	25.70	27.93	25.70	27.50	25.70	27.50	25.70	25.70	25.70
	NR n7	100.0%	27.95	24.00	27.95	24.00	21.35	20.30	21.35	20.30	21.35	20.30	21.35	20.30	25.70	25.70
	NR n12	100.0%	31.97	25.70	31.97	25.70	27.09	25.70	27.09	25.70	26.17	25.70	26.17	25.70	25.70	25.70
	NR n14	100.0%	30.67	25.70	30.67	25.70	26.69	25.70	26.69	25.70	26.64	25.70	26.64	25.70	25.70	25.70
	NR n25/2	100.0%	28.80	24.50	28.80	24.50	22.59	19.40	22.59	19.40	20.36	19.40	20.36	19.40	25.70	25.70
	NR n26	100.0%	30.86	25.70	30.86	25.70	26.68	25.70	26.68	25.70	25.76	25.70	25.76	25.70	25.70	25.70
	NR n30	100.0%	29.40	22.90	29.40	22.90	24.08	22.10	24.08	22.10	22.14	22.10	22.14	22.10	25.20	25.20
	NR n41	100.0%	28.45	23.80	28.45	23.80	21.50	20.50	21.50	20.50	21.02	20.50	21.02	20.50	25.70	25.70
	NR n53	100.0%	28.69	20.70	28.69	20.70	21.99	20.70	21.99	20.70	21.22	20.70	21.22	20.70	20.70	20.70
	NR n66	100.0%	31.35	24.20	31.35	24.20	21.02	19.10	21.02	19.10	19.54	19.10	19.54	19.10	25.70	25.70
	NR n70	100.0%	33.99	24.20	33.99	24.20	21.24	19.10	21.24	19.10	19.80	19.10	19.80	19.10	25.70	25.70
	NR n71	100.0%	32.51	25.70	32.51	25.70	27.86	25.70	27.86	25.70	27.08	25.70	27.08	25.70	25.70	25.70
ANT 2	GSM 850 2 slots	25.0%	31.09	29.80	25.07	23.78	35.05	31.50	29.03	25.48	35.05	31.50	29.03	25.48	31.50	25.48
	GSM 1900 2 slots	25.0%	27.24	26.30	21.22	20.28	28.68	26.10	22.66	20.08	26.60	26.10	20.57	20.08	28.50	22.48
	W-CDMA B2	100.0%	20.35	20.30	20.35	20.30	22.44	20.10	22.44	20.10	20.17	20.10	20.17	20.10	23.40	23.40
	W-CDMA B4	100.0%	19.87	19.80	19.87	19.80	21.04	19.80	21.04	19.80	20.12	19.80	20.12	19.80	23.40	23.40
	W-CDMA B5	100.0%	23.90	23.80	23.90	23.80	28.18	24.70	28.18	24.70	28.18	24.70	28.18	24.70	24.70	24.70
	LTE Band 5	100.0%	24.50	23.80	24.50	23.80	27.69	24.70	27.69	24.70	27.69	24.70	27.69	24.70	24.70	24.70
	LTE Band 7	100.0%	19.64	19.10	19.64	19.10	17.58	17.50	17.58	17.50	17.58	17.50	17.58	17.50	23.70	23.70
	LTE Band 12/17	100.0%	24.91	24.70	24.91	24.70	27.66	24.70	27.66	24.70	27.66	24.70	27.66	24.70	24.70	24.70
	LTE Band 13	100.0%	25.31	24.70	25.31	24.70	27.93	24.70	27.93	24.70	27.93	24.70	27.93	24.70	24.70	24.70
	LTE Band 14	100.0%	25.50	24.70	25.50	24.70	28.08	24.70	28.08	24.70	28.08	24.70	28.08	24.70	24.70	24.70
	LTE Band 25/2	100.0%	21.18	20.30	21.18	20.30	22.29	20.10	22.29	20.10	20.42	20.10	20.42	20.10	23.40	23.40
	LTE Band 26	100.0%	24.43	23.80	24.43	23.80	27.92	24.70	27.92	24.70	27.92	24.70	27.92	24.70	24.70	24.70
	LTE Band 30	100.0%	21.86	21.10	21.86	21.10	20.95	20.40	20.95	20.40	20.95	20.40	20.95	20.40	23.70	23.70
	LTE Band 41	63.3%	22.12	21.00	20.14	19.01	22.57	20.60	20.58	18.61	21.46	20.60	19.47	18.61	25.70	23.71
	LTE Band 53	63.3%	21.96	20.70	19.98	18.71	20.25	20.10	18.26	18.11	20.25	20.10	18.26	18.11	20.70	18.71
	LTE Band 66/4	100.0%	19.84	19.80	19.84	19.80	21.80	19.80	21.80	19.80	20.14	19.80	20.14	19.80	25.70	25.70
	LTE Band 71	100.0%	25.71	24.70	25.71	24.70	28.09	24.70	28.09	24.70	28.09	24.70	28.09	24.70	24.70	24.70
	NR n5	100.0%	25.13	23.80	25.13	23.80	27.18	24.70	27.18	24.70	27.18	24.70	27.18	24.70	24.70	24.70
	NR n7	100.0%	19.14	19.10	19.14	19.10	17.59	17.50	17.59	17.50	17.59	17.50	17.59	17.50	23.70	23.70
	NR n12	100.0%	25.76	24.70	25.76	24.70	27.73	24.70	27.73	24.70	27.73	24.70	27.73	24.70	24.70	24.70
	NR n14	100.0%	25.67	24.70	25.67	24.70	27.90	24.70	27.90	24.70	27.90	24.70	27.90	24.70	24.70	24.70
	NR n25/2	100.0%	21.26	20.30	21.26	20.30	21.75	20.10	21.75	20.10	20.74	20.10	20.74	20.10	23.40	23.40
	NR n26	100.0%	24.09	23.80	24.09	23.80	27.08	24.70	27.08	24.70	27.08	24.70	27.08	24.70	24.70	24.70
	NR n30	100.0%	21.18	21.10	21.18	21.10	20.66	20.40	20.66	20.40	20.66	20.40	20.66	20.40	23.20	23.20
	NR n41	100.0%	19.80	19.00	19.80	19.00	20.16	18.60	20.16	18.60	19.68	18.60	19.68	18.60	25.70	25.70
	NR n53	100.0%	19.85	19.60	19.85	19.60	18.22	18.10	18.22	18.10	18.22	18.10	18.22	18.10	20.70	20.70
	NR n66	100.0%	20.01	19.80	20.01	19.80	22.15	19.80	22.15	19.80	20.01	19.80	20.01	19.80	25.70	25.70
	NR n70	100.0%	20.62	19.80	20.62	19.80	22.28	19.80	22.28	19.80	20.22	19.80	20.22	19.80	25.70	25.70
	NR n71	100.0%	25.83	24.70	25.83	24.70	27.74	24.70	27.74	24.70	27.74	24.70	27.74	24.70	24.70	24.70

Exposure Scenario		Duty Cycle	Head				Body & Hotspot				Hotspot				P_{max} (dBm)	
Spatial-average			1-g				1-g				1-g					
Test Distance			0 mm				5 mm				5 mm					
Power Mode (DSI)			DSI: 0				DSI: 1				DSI: 1					
Antenna	Tech/Band		P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	P_{design} (dBm)	P_{limit} + Uncertainty (dBm)	Burst Average	Frame Average
			Burst Average		Frame Average		Burst Average		Frame Average		Burst Average		Frame Average			
ANT 3	GSM 1900 2 slots	25.0%	32.45	27.70	26.43	21.68	29.95	27.80	23.93	21.78	28.83	27.80	22.80	21.78	30.50	24.48
	W-CDMA B2	100.0%	28.02	21.70	28.02	21.70	23.97	21.80	23.97	21.80	21.97	21.80	21.97	21.80	25.50	25.50
	W-CDMA B4	100.0%	28.32	21.60	28.32	21.60	23.20	22.40	23.20	22.40	23.20	22.40	23.20	22.40	25.50	25.50
	LTE Band 5	100.0%	33.54	24.50	33.54	24.50	27.55	25.40	27.55	25.40	27.55	25.40	27.55	25.40	25.40	25.40
	LTE Band 7	100.0%	26.95	22.50	26.95	22.50	20.73	19.70	20.73	19.70	19.86	19.70	19.86	19.70	25.00	25.00
	LTE Band 12/17	100.0%	34.58	25.40	34.58	25.40	27.26	25.40	27.26	25.40	27.26	25.40	27.26	25.40	25.40	25.40
	LTE Band 13	100.0%	34.91	25.40	34.91	25.40	28.34	25.40	28.34	25.40	28.17	25.40	28.17	25.40	25.40	25.40
	LTE Band 14	100.0%	33.82	25.40	33.82	25.40	28.59	25.40	28.59	25.40	28.59	25.40	28.59	25.40	25.40	25.40
	LTE Band 25/2	100.0%	28.45	21.70	28.45	21.70	22.51	21.80	22.51	21.80	22.02	21.80	22.02	21.80	25.50	25.50
	LTE Band 26	100.0%	33.68	24.50	33.68	24.50	27.47	25.40	27.47	25.40	27.47	25.40	27.47	25.40	25.40	25.40
	LTE Band 30	100.0%	30.83	22.00	30.83	22.00	21.65	21.60	21.65	21.60	21.65	21.60	21.65	21.60	25.00	25.00
	LTE Band 41	63.3%	30.92	24.50	28.94	22.51	22.81	21.20	20.83	19.21	22.30	21.20	20.31	19.21	25.70	23.71
	LTE Band 66/4	100.0%	27.80	21.60	27.80	21.60	23.55	22.40	23.55	22.40	22.50	22.40	22.50	22.40	25.50	25.50
	LTE Band 71	100.0%	37.42	25.40	37.42	25.40	28.81	25.40	28.81	25.40	28.81	25.40	28.81	25.40	25.40	25.40
	NR n5	100.0%	33.62	24.50	33.62	24.50	25.96	25.40	25.96	25.40	25.96	25.40	25.96	25.40	25.40	25.40
	NR n7	100.0%	27.09	22.50	27.09	22.50	20.88	19.70	20.88	19.70	20.65	19.70	20.65	19.70	25.00	25.00
	NR n12	100.0%	34.88	25.40	34.88	25.40	28.01	25.40	28.01	25.40	28.01	25.40	28.01	25.40	25.40	25.40
	NR n14	100.0%	35.28	25.40	35.28	25.40	29.04	25.40	29.04	25.40	29.04	25.40	29.04	25.40	25.40	25.40
	NR n25/2	100.0%	29.25	21.70	29.25	21.70	23.20	21.80	23.20	21.80	22.56	21.80	22.56	21.80	25.50	25.50
	NR n26	100.0%	34.13	24.50	34.13	24.50	26.75	25.40	26.75	25.40	26.75	25.40	26.75	25.40	25.40	25.40
	NR n30	100.0%	29.37	22.00	29.37	22.00	22.34	21.60	22.34	21.60	22.34	21.60	22.34	21.60	24.50	24.50
	NR n41	100.0%	34.53	22.50	34.53	22.50	20.74	19.20	20.74	19.20	20.74	19.20	20.74	19.20	25.70	25.70
	NR n66	100.0%	27.94	21.60	27.94	21.60	22.73	22.40	22.73	22.40	22.73	22.40	22.73	22.40	25.50	25.50
	NR n70	100.0%	29.88	21.60	29.88	21.60	24.18	22.40	24.18	22.40	24.18	22.40	24.18	22.40	25.50	25.50
	NR n71	100.0%	37.82	25.40	37.82	25.40	27.74	25.40	27.74	25.40	27.74	25.40	27.74	25.40	25.40	25.40
ANT 4	GSM 1900 2 slots	25.0%	25.88	24.30	19.86	18.28	27.95	26.00	21.93	19.98	26.06	26.00	20.04	19.98	28.00	21.98
	W-CDMA B2	100.0%	19.57	18.30	19.57	18.30	21.43	20.00	21.43	20.00	20.11	20.00	20.11	20.00	22.90	22.90
	W-CDMA B4	100.0%	20.06	19.10	20.06	19.10	23.16	20.70	23.16	20.70	20.72	20.70	20.72	20.70	22.90	22.90
	LTE Band 7	100.0%	19.00	18.90	19.00	18.90	22.55	19.00	22.55	19.00	19.10	19.00	19.10	19.00	22.70	22.70
	LTE Band 25/2	100.0%	18.37	18.30	18.37	18.30	21.78	20.00	21.78	20.00	20.00	20.00	20.00	20.00	22.90	22.90
	LTE Band 30	100.0%	18.33	18.20	18.33	18.20	21.16	19.00	21.16	19.00	19.15	19.00	19.15	19.00	22.70	22.70
	LTE Band 41	63.3%	20.83	20.70	18.84	18.71	23.79	20.10	21.80	18.11	20.27	20.10	18.28	18.11	25.70	23.71
	LTE Band 48	63.3%	21.97	21.50	19.98	19.51	22.36	20.70	20.37	18.71	20.79	20.70	18.80	18.71	22.80	20.81
	LTE Band 66/4	100.0%	20.17	19.10	20.17	19.10	23.30	20.70	23.30	20.70	21.01	20.70	21.01	20.70	25.20	25.20
	MSS	100.0%	N/A	N/A	N/A	N/A	20.59	20.50	20.59	20.50	20.59	20.50	20.59	20.50	25.80	25.80
	NR n7	100.0%	19.71	18.90	19.71	18.90	22.11	19.00	22.11	19.00	20.76	19.00	20.76	19.00	22.70	22.70
	NR n25/2	100.0%	18.95	18.30	18.95	18.30	21.21	20.00	21.21	20.00	20.19	20.00	20.19	20.00	22.90	22.90
	NR n30	100.0%	19.42	18.20	19.42	18.20	21.05	19.00	21.05	19.00	19.16	19.00	19.16	19.00	22.20	22.20
	NR n41	100.0%	18.72	18.70	18.72	18.70	21.73	18.10	21.73	18.10	18.54	18.10	18.54	18.10	25.70	25.70
	NR n48	100.0%	19.71	19.50	19.71	19.50	20.86	18.70	20.86	18.70	19.83	18.70	19.83	18.70	22.80	22.80
	NR n66	100.0%	19.38	19.10	19.38	19.10	23.03	20.70	23.03	20.70	21.29	20.70	21.29	20.70	25.20	25.20
	NR n70	100.0%	19.35	19.10	19.35	19.10	22.84	20.70	22.84	20.70	22.10	20.70	22.10	20.70	25.20	25.20
	NR n77	100.0%	20.23	18.50	20.23	18.50	21.71	18.40	21.71	18.40	19.29	18.40	19.29	18.40	24.70	24.70
ANT 7	LTE Band 48	63.3%	30.62	23.50	28.64	21.51	22.62	20.30	20.64	18.31	22.01	20.30	20.03	18.31	25.30	23.31
	NR n48	100.0%	28.52	21.50	28.52	21.50	20.81	18.30	20.81	18.30	19.11	18.30	19.11	18.30	25.30	25.30
	NR n77	100.0%	29.83	22.50	29.83	22.50	20.33	18.60	20.33	18.60	19.71	18.60	19.71	18.60	25.70	25.70
ANT 8	LTE Band 48	63.3%	22.27	22.20	20.29	20.21	24.73	22.20	22.75	20.21	23.35	22.20	21.36	20.21	25.90	23.91
	NR n48	100.0%	20.29	20.20	20.29	20.20	21.14	20.20	21.14	20.20	20.80	20.20	20.80	20.20	25.90	25.90
	NR n77	100.0%	18.49	18.30	18.49	18.30	20.75	19.50	20.75	19.50	19.57	19.50	19.57	19.50	25.70	25.70
ANT 9	LTE Band 48	63.3%	31.23	21.60	29.25	19.61	21.58	20.60	19.59	18.61	21.58	20.60	19.59	18.61	24.70	22.71
	NR n48	100.0%	29.48	19.60	29.48	19.60	20.27	18.60	20.27	18.60	20.27	18.60	20.27	18.60	24.70	24.70
	NR n77	100.0%	29.25	20.30	29.25	20.30	20.04	17.90	20.04	17.90	20.04	17.90	20.04	17.90	25.70	25.70

Therefore, for this EUT, SAR and conducted power measurements at P_{limit} will be the same as those performed at P_{max}. SAR measured at P_{max} can be leveraged in this section to avoid re-testing. The worst-case reported SAR values for Sub-6 GHz are listed in §4.4 of the Part 0 report and the worst-case reported WLAN SAR results are listed in Table 6-2 and Table 6-3.

Table 6-2: Worst-case reported WLAN SAR (Power State 2)

Techonology	Freq (GHz)	ANT			Reported 1-g SAR (W/kg)			P_{max} (dBm)		
		Head	Body & Hotspot	Hotspot	Head	Body & Hotspot	Hotspot	Head	Body & Hotspot	Hotspot
WLAN	2.4	ANT 4	ANT 3	ANT 4	0.551	0.402	0.538	20.25	21.50	20.25
	5.2	ANT 6	ANT 5	ANT 5	0.450	0.444	0.444	17.50	17.50	17.50
	5.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	5.5	ANT 6	ANT 5	ANT 5	0.376	0.458	0.458	20.00	19.75	19.75
	5.8	ANT 6	ANT 5	ANT 5	0.456	0.376	0.376	20.50	19.25	19.25

Table 6-3: Worst-case reported WLAN SAR (Power State 4)

Techonology	Freq (GHz)	ANT			Reported 1-g SAR (W/kg)			P_{max} (dBm)		
		Head	Body & Hotspot	Hotspot	Head	Body & Hotspot	Hotspot	Head	Body & Hotspot	Hotspot
WLAN	2.4	ANT 4	ANT 4	ANT 4	0.499	0.306	0.445	20.25	20.25	20.25
	5.2	ANT 6	ANT 5	ANT 5	0.349	0.353	0.353	17.50	17.50	17.50
	5.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	5.5	ANT 6	ANT 5	ANT 5	0.299	0.364	0.364	20.00	19.75	19.75
	5.8	ANT 6	ANT 5	ANT 5	0.362	0.299	0.299	20.50	19.25	19.25

Note that WLAN SAR for each of the bands in the above table lists the worst-case SAR out of both WLAN antennas and WLAN MIMO.

6.2. PD Measurement Results at input.power.limit

Tables 5-1 to 5-3 list the beams selected for PD verification test for this EUT and Tables 6-4 to 6-6 list the corresponding PD measurement results at 2 mm spacing. Qualcomm's Smart Transmit algorithm operates based on time-averaged transmit power reported on a per symbol basis, which is independent of modulation, channel, and bandwidth (RBs). Therefore, PD measurements in Table 6-4 to 6-6 were conducted with the EUT in *Factory Test Mode* (FTM), with CW modulation and on the worst-case channel determined through simulations (See Appendix B of the Part 0 report), with the EUT transmitting at *input.power.limit* (listed in Table 5-7 of the Part 0 report) corresponding to the tested beams.

All 4cm^2 PD values for the selected beams are listed in Tables 5-3 to 5-5. In addition to these selected beams, 4cm^2 PD for a few more beams were used in the Part 2 report.

Table 6-4: PD Measurement results n258

Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M2	24350	2018333	44		-0.7	1	100	1	CW	Back	3.590	4.090
	24350	2018333	35	163	-4	1	100	1	CW	Back	4.130	4.430
	24800	2025833		173	-3.2	2	200	66	CW	Back	4.790	**5.280**
	24800	2025833		173	-3.2	2	200	66	CW	Left	1.200	1.210
Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M1	25200	2032499		155	6.4	1	100	1	CW	Back	3.350	3.700
	25200	2032499	27	155	1.9	1	100	1	CW	Back	3.170	3.460
	24350	2018333	18		5.6	1	100	1	CW	Back	5.170	**5.690**
	24350	2018333	18		5.6	1	100	1	CW	Left	1.200	1.200
	24350	2018333	18		5.6	1	100	1	CW	Top	0.334	0.345
Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M3	24350	2018333		178	-0.1	1	100	1	CW	Right	2.940	4.060
	25200	2032499	38	166		1	100	1	CW	Right	1.860	2.980
	24350	2018333	47		-0.5	1	50	1	CW	Right	3.670	**4.850**
	24350	2018333	47		-0.5	1	50	1	CW	Back	1.750	1.880
	24350	2018333	47		-0.5	1	50	1	CW	Front	1.290	1.460

Worst-case: S2 (Back)

Module	Printed Backoff Value b_j (linear)	FCC PD Limit (W/m²)	b_j * $PD_{Design\ Target}$ + Total Uncertainty (W/m²)	Beam/Beam-pair ID	Measured PD (W/m²)	Meas. PD ≤ b_j * $PD_{Design\ Target}$ + Total Uncertainty Criteria 1	Surface	Contribution Factor $c(i, j)$
0	0.9772	10	6.040	18	5.690	Yes	S2	0.0942
1	0.8913	10	5.509	47	4.850	Yes	S4	0.9991
Criteria 2 Verification: (0.0942 x 5.69) + (0.9991 x 4.85) = 5.382 ≤ 6.181								

Note: Module 0 contains antennas M1 and M2; module 1 contains antenna M3

Table 6-5: PD Measurement results n260

Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M2	38500	2253330	37		0.8	1	100	1	CW	Back	2.250	2.550
	38500	2253330	37	165	-2.2	1	100	1	CW	Back	2.070	2.320
	37050	2229167		162	2.5	1	100	66	CW	Back	4.170	**4.870**
	37050	2229167		162	2.5	1	100	66	CW	Left	0.679	0.681
Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M1	38500	2253330		157	9.4	1	100	1	CW	Back	4.070	4.610
	39950	2277500	29	157	5.2	1	100	1	CW	Back	3.200	3.490
	38500	2253330	18		9.6	1	100	33	CW	Back	4.970	**5.750**
	38500	2253330	18		9.6	1	100	33	CW	Left	0.863	0.867
	38500	2253330	18		9.6	1	100	33	CW	Top	0.662	0.739
Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M3	38500	2253330	50		0	1	100	1	CW	Right	3.400	3.840
	37050	2229167	50	178	-3.8	1	100	1	CW	Right	2.400	3.080
	37050	2229167		177	0.5	1	100	66	CW	Right	3.330	**4.270**
	37050	2229167		177	0.5	1	100	66	CW	Back	0.489	0.501
	37050	2229167		177	0.5	1	100	66	CW	Front	1.980	2.950

Worst-case: S2 (Back)

Module	Printed Backoff Value b_j (linear)	FCC PD Limit (W/m²)	b_j * $PD_{Design\ Target}$ + Total Uncertainty (W/m²)	Beam/Beam-pair ID	Measured PD (W/m²)	Meas. PD ≤ b_j * $PD_{Design\ Target}$ + Total Uncertainty Criteria 1	Surface	Contribution Factor *c(i, j)*
0	0.9772	10	6.040	18	5.750	Yes	S2	0.0657
1	0.8710	10	5.384	177	4.270	Yes	S4	1.0000
Criteria 2 Verification: (0.0657 x 5.75) + (1 x 4.27) = 4.648 ≤ 6.181								

Note: Module 0 contains antennas M1 and M2; module 1 contains antenna M3

Table 6-6: PD Measurement results n261

Module/Antenna	Frequency		Beam ID1	Beam ID2	input.power.limit	CC	BW	RB	Signal Type	DUT Surface	Normal psPD	Total psPD
	MHz	Ch.	V	H	dBm	#	MHz	#			W/m²	W/m²
ANT M2	27925	2077084	45		-1.3	1	100	1	CW	Back	4.530	4.870
	28300	2083330	35	163	-4	1	100	1	CW	Back	4.270	4.670
	28300	2083330		163	0	1	100	66	CW	Back	5.380	**5.870**
	28300	2083330		163	0	1	100	66	CW	Left	0.494	0.542
Module/Antenna	**Frequency**		**Beam ID1**	**Beam ID2**	**input.power.limit**	**CC**	**BW**	**RB**	**Signal Type**	**DUT Surface**	**Normal psPD**	**Total psPD**
	MHz	**Ch.**	**V**	**H**	**dBm**	**#**	**MHz**	**#**			**W/m²**	**W/m²**
ANT M1	28300	2083330		157	6.8	1	100	1	CW	Back	2.670	3.290
	27550	2070833	29	157	2.2	1	100	1	CW	Back	2.530	2.830
	28300	2083330	18		5.4	1	100	33	33	Back	4.170	**4.570**
	28300	2083330	18		5.4	1	100	33	33	Left	0.523	0.550
	28300	2083330	18		5.4	1	100	33	33	Top	0.295	0.319
Module/Antenna	**Frequency**		**Beam ID1**	**Beam ID2**	**input.power.limit**	**CC**	**BW**	**RB**	**Signal Type**	**DUT Surface**	**Normal psPD**	**Total psPD**
	MHz	**Ch.**	**V**	**H**	**dBm**	**#**	**MHz**	**#**			**W/m²**	**W/m²**
ANT M3	27925	2077084		170	-1	1	100	1	CW	Right	2.380	2.930
	27925	2077084	42	170	-4.8	1	100	1	CW	Right	1.820	2.760
	28300	2083330	41		0.1	1	50	1	CW	Right	4.100	**4.820**
	28300	2083330	41		0.1	1	50	1	CW	Back	1.550	1.630
	28300	2083330	41		0.1	1	50	1	CW	Front	1.590	1.930

Worst-case: S2 (Back)

Module	Printed Backoff Value b_j (linear)	FCC PD Limit (W/m²)	b_j * $PD_{Design\ Target}$ + Total Uncertainty (W/m²)	Beam/Beam-pair ID	Measured PD (W/m²)	Meas. PD ≤ b_j * $PD_{Design\ Target}$ + Total Uncertainty Criteria 1	Surface	Contribution Factor *c(i, j)*
0	0.9772	10	6.040	163	5.870	Yes	S2	0.0506
1	0.9333	10	5.769	41	4.820	Yes	S4	0.9984
Criteria 2 Verification: (0.0506 x 5.87) + (0.9984 x 4.82) = 5.109 ≤ 6.181								

Note: Module 0 contains antennas M1 and M2; module 1 contains antenna M3

The PD distribution plots for both point PD and 4cm² avg PD for the highest PD configuration in Tables 6-4 to 6-6 are given below.

UL Verification Services Inc. SAR Lab 6 **Date/Time:** 2023-05-19, 03:53

Measurement Report for Custom Band: CW, BACK

Exposure Conditions

Band	Custom Band	**Phantom Section**	5G
Frequency [MHz] | Channel Number	24350.0 | 2018333	**Conversion Factor**	1.0
Group | UID	CW, 0--	**Position | Test Distance [mm]**	BACK | 2.00

Hardware Setup

Probe | Calibration Date	EUmmWV4 - SN9496_F1-55GHz | 2023-02-20	**Phantom**	mmWave | xxxx
DAE | Calibration Date	DAE4 Sn1540 | 2023-01-23	**Medium**	Air | -
Software Version	3.2.0.1840		

Scan Setup

Scan Type	5G Scan	**Grid Extents [mm]**	25.0 x 25.0
Grid Steps [lambda]	0.1657954629531585 x 0.1657954629531585	**Sensor Surface [mm]**	2.0

Measurement Results

Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	5.17
psPDtot+ [W/m^2]	5.69
psPDmod+ [W/m^2]	6.04
E_{max} [V/m]	91.9
Power Drift [dB]	-0.50

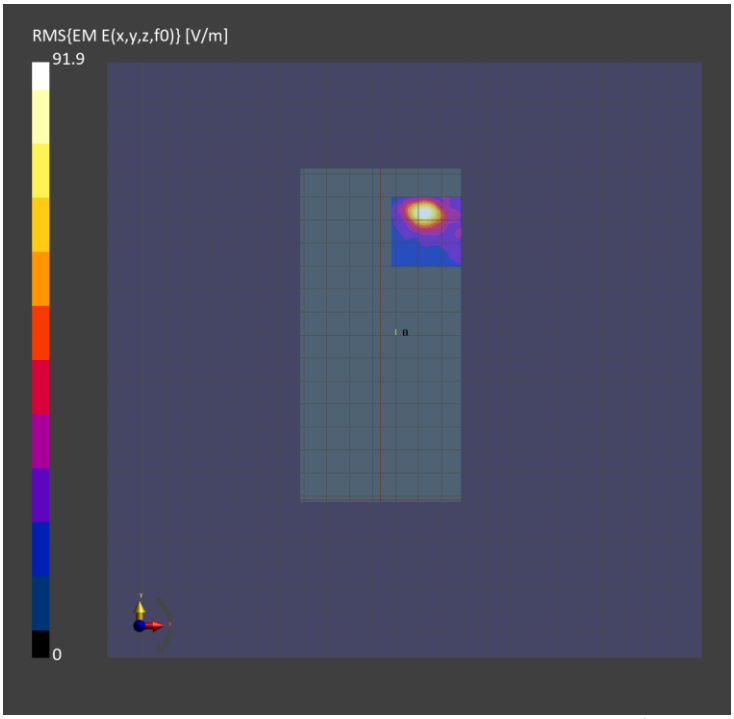

Figure 6-1: Band n258, Beam ID 18, point PD and 4cm^2 PD, Back

UL Verification Services Inc. SAR Lab 6 **Date/Time:** 2023-05-20, 21:32

Measurement Report for Custom Band: CW, BACK

Exposure Conditions

Band	Custom Band	**Phantom Section**	5G
Frequency [MHz] | Channel Number	38500.0 | 2253330	**Conversion Factor**	1.0
Group | UID	CW, 0--	**Position | Test Distance [mm]**	BACK | 2.00

Hardware Setup

Probe | Calibration Date	EUmmWV4 - SN9496_F1-55GHz | 2023-02-20	**Phantom**	mmWave | xxxx
DAE | Calibration Date	DAE4 Sn1540 | 2023-01-23	**Medium**	Air | -
Software Version	3.2.0.1840		

Scan Setup

Scan Type	5G Scan	**Grid Extents [mm]**	25.0 x 25.0
Grid Steps [lambda]	0.25 x 0.25	**Sensor Surface [mm]**	2.0

Measurement Results

Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	4.97
psPDtot+ [W/m^2]	5.75
psPDmod+ [W/m^2]	6.07
E_{max} [V/m]	116
Power Drift [dB]	-0.23

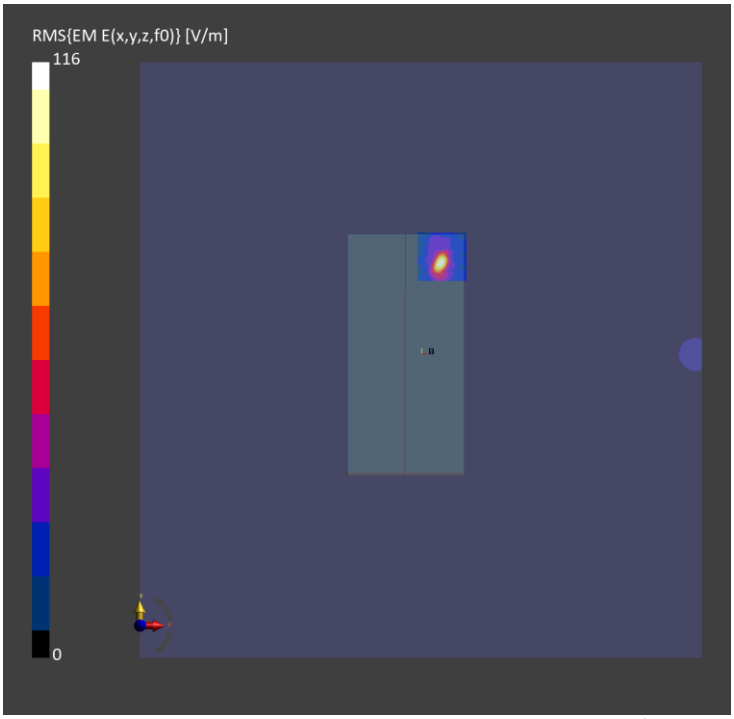

Figure 6-2: Band n260, Beam ID 18, point PD and 4cm^2 PD, Back

UL Verification Services Inc. SAR Lab 3 **Date/Time:** 2023-05-19, 02:18

Measurement Report for Custom Band: CW, BACK

Exposure Conditions

Band	Custom Band	**Phantom Section**	5G
Frequency [MHz] | Channel Number	28300.0 | 2083330	**Conversion Factor**	1.0
Group | UID	CW, 0--	**Position | Test Distance [mm]**	BACK | 2.00

Hardware Setup

Probe | Calibration Date	EUmmWV4 - SN9589_F1-55GHz | 2022-09-20	**Phantom**	mmWave | xxxx
DAE | Calibration Date	DAE4 Sn1377 | 2022-09-15	**Medium**	Air | -
Software Version	3.2.0.1840		

Scan Setup

Scan Type	5G Scan	**Grid Extents [mm]**	25.0 x 25.0
Grid Steps [lambda]	0.19269041484905072 x 0.19269041484905072	**Sensor Surface [mm]**	2.0

Measurement Results

Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	5.38
psPDtot+ [W/m^2]	5.87
psPDmod+ [W/m^2]	6.03
E_{max} [V/m]	79.2
Power Drift [dB]	0.01

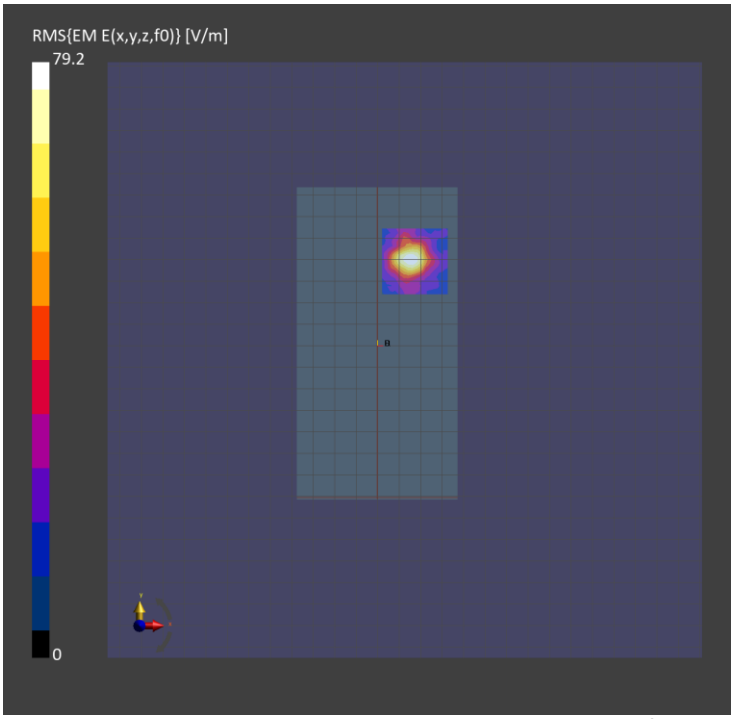

Figure 6-3: Band n261, Beam ID 163, point PD and 4cm^2 PD, Back

6.3. Simultaneous Transmission Analysis

The EUT supports simultaneous transmission of multiple radios. RF exposure compliance in simultaneous transmission scenarios is evaluated in this section.

It must be noted here that Qualcomm's Smart Transmit time-averaging algorithm was applied to only WWAN (Sub-6GHz/5G millimeter wave NR) on this device, where the time-averaged power level is controlled so that the RF exposure is ≤ $SAR_{Design\ Target}$ (corresponding to P_{limit}) for Sub-6 GHz WWAN and ≤ $PD_{Design\ Target}$ (corresponding to input.power.limit) for 5G millimeter wave NR. Since there is total design-related uncertainty arising from TxAGC and device-to-device variation, the worst-case RF exposure should be determined by accounting for this uncertainty in the corresponding design target, listed in Table 6-7.

Table 6-7: Worst-case time-averaged RF exposure for WWAN

Scenario	WWAN	
	Sub-6 GHz WWAN	5G mmW NR
Maximum time-averaged power level	P_{limit}	input.power.limit
Maximum time-averaged exposure (Design Targets)	0.8 W/kg (1-g SAR)	3.9 W/m²
Worst-case time-averaged RF exposure	Reported SAR† = 1 W/kg (1-g SAR)	Reported PD* = 4.7 W/m²

†: For this EUT, (P_{limit} + 1.0dB uncertainty) ≥ P_{max} (maximum RF tune-up output power). Therefore, time-averaged SAR exposure from Smart Transmit enabled EUT (at P_{limit}) cannot exceed the reported SAR corresponding to Pmax listed in Table 5-2.

WLAN does not employ time-averaging in this device, reported 1-g SAR at the maximum RF tune-up output power is listed in Table 6-2 and Table 6-3.

6.3.1. Analysis

RF exposure compliance with WWAN+WLAN simultaneous transmission scenarios is demonstrated for various radio configurations using the equation below:

> Total norm. RF exposure = norm. RF exposure from Smart Transmit enabled WWAN (norm. SAR from Sub-6 GHz + norm. PD from 5G millimeter wave NR) + norm. SAR from WLAN ≤ 1.0 normalized limit (1)

Smart Transmit algorithm in WWAN adds directly the time-averaged RF exposure from Sub-6 GHz WWAN and time-averaged RF exposure from 5G millimeter wave NR, i.e.,

> norm. RF exposure from Smart Transmit enabled WWAN: (normalized SAR exposure from Sub-6 GHz) + (normalized PD exposure from 5G millimeter wave NR) ≤ 1.0 normalized limit (2)

In other words, Smart Transmit algorithm controls the total RF exposure from both Sub-6 GHz radio and 5G millimeter wave NR to not exceed the FCC limit. Smart transmit algorithm assumes hotspots are collocated (i.e., ignoring spatial distribution of hotspots) and directly adds normalized RF exposures from Sub-6 GHz WWAN and from 5G millimeter wave NR, i.e.,

> If A = max normalized time-averaged SAR exposure from 4G,
> B = max normalized time-averaged PD exposure from 5G millimeter wave NR,

Then, equation (2) can be re-written as below because Smart Transmit assumes Sub-6 GHz WWAN hotspots are collocated with 5G millimeter wave NR hotspot:

> Smart Transmit enabled WWAN: x(t) * A + (1-x(t)) * B ≤ 1.0 normalized limit (3)

Here, "*x(t)*A*" represents percentage of normalized time-averaged RF exposure from Sub-6 GHz WWAN, and x(t) ranges between [0,1]; "*(1-x(t))*B*" is remaining percentage of RF exposure contribution from 5G millimeter wave NR. Smart Transmit controls '*x*' in real time such that the sum of these exposures never exceeds the 1.0 normalized limit.

Note that mathematically:

$$x(t) * A + (1 - x(t)) * B \leq max(A, B) \leq 1.0\ normalized\ limit \text{ for } x(t) \in [0,1] \quad (4)$$

Therefore, if equations (5a) and (5b) are proven:

$$A + norm.SAR\ from\ WLAN \leq 1.0\ norm.limit \quad (5a),$$

$$B + norm.SAR\ from\ WLAN \leq 1.0\ norm.limit \quad (5b),$$

Then, based on equation (4), the condition below is also proved:

$$[x(t) * A + (1 - x(t)) * B] + norm.SAR\ from\ WLAN \leq 1.0\ norm.limit \quad (5c)$$

which is the same as equation (1), as a means to demonstrate compliance for simultaneous transmission.

Additionally, it should be noted that in the absence of 5G millimeter wave NR, Smart Transmit limits the maximum RF exposure contributed from Sub-6 GHz WWAN to 100% normalized exposure (i.e., *x*=1.0 in equation 3), while with 5G millimeter wave NR active, Smart Transmit limits the maximum RF exposure contributed from 5G millimeter wave NR to 75% normalized exposure to guarantee at least 25% margin allocated to the Sub-6 GHz WWAN anchor to maintain the link (i.e., *x*=0.25 in equation 3). Therefore:

Smart Transmit enabled WWAN: A=max (normalized SAR exposure from 4G) ≤ 1.0 normalized limit (6a)

Smart Transmit enabled WWAN: B=max (normalized PD exposure from 5G millimeter wave NR) ≤ 0.75 normalized limit (6b)

Thus, for compliance demonstration given by equation (1), equation (7) is obtained by combining equations (5a & 5b) and (6a & 6b) and should be proven to guarantee simultaneous transmission compliance:

Total normalized RF exposure = norm. SAR from 4G WWAN + norm. SAR from WLAN < 1.0 normalized FCC limit (7a)

*Total normalized RF exposure = 0.75*norm. PD from 5G millimeter wave NR WWAN + norm. SAR from WLAN < 1.0 normalized FCC limit* (7b)

The compliance for simultaneous transmission scenarios of WWAN (Sub-6 GHz/5G millimeter wave NR) radio enabled with Smart Transmit and WLAN without Smart Transmit is re-evaluated for all transmission scenarios supported by this EUT.

As described in equation (7), simultaneous transmission analysis for WWAN + WLAN is performed in two parts:

1. Sub-6 GHz WWAN + WLAN (i.e., Eq. (7a) with compliance demonstration in §5.3.2)
2. 5G millimeter wave NR WWAN + WLAN (i.e., Eq. (7b) with compliance demonstration in §5.3.3)

By combining equations *a* and *b* variants, the FCC requirement expressed in Eq. (1) is re-written below:

Total norm. RF exposure = norm. RF exposure from Smart Transmit enabled WWAN (norm. SAR from Sub-6 GHz WWAN + norm. PD from 5G millimeter wave NR) + norm. SAR from WLAN ≤ 1.0 normalized limit (1)

6.3.2. Simultaneous Transmission Compliance Demonstration for Sub-6 GHz WWAN + WLAN

Simultaneous transmission analysis for Sub-6 WWAN + WLAN is shown in the referenced UL FCC SAR Test Report mentioned in §1.

6.3.3. Simultaneous Transmission Compliance demonstration for 5G millimeter wave NR WWAN + WLAN

Simultaneous transmission analysis is performed in this section using worst-case PD values listed in Tables 6-4 to 6-6 for compliance demonstration of 5G millimeter wave NR WWAN + WLAN.

Simultaneous transmission analysis on all 5G millimeter wave NR WWAN + WLAN scenarios are listed below:

Table 6-8: Simultaneous transmission analysis scenarios for 5G millimeter wave NR WWAN + WLAN

1	2.4GHz WLAN* + 5G millimeter wave NR
2	2.4GHz WLAN* + 802.15.4ab + 5G millimeter wave NR
3	5GHz WLAN* + 5G millimeter wave NR
4	5GHz WLAN* + BT + 5G millimeter wave NR
5	5GHz WLAN* + BT + 802.15.4ab + 5G millimeter wave NR

*: For each of the WLAN bands, worst-case SAR out of both WLAN antennas and WLAN MIMO scenarios is used during simultaneous transmission analysis. Additionally, note that WLAN 2.4GHz and WLAN 5GHz cannot transmit simultaneously.

The total exposure ratio (TER) is calculated using the equation below, followed by the calculated TER for this EUT:

$$TER = \sum_{n=1}^{N} \frac{\mathrm{SAR}_n}{\mathrm{SAR}_{n,limit}} + \sum_{n=1}^{N} \frac{\mathrm{S}_{m,avg}}{\mathrm{S}_{m,limit}} < 1$$

Table 6-9: 5G Millimeter Wave NR Simulation PD Surface Ratio for n258

n258					
Surface	PD Magnitude Ratio		Head	Body[1]	Meas. Total PD (W/m^2)
	PD Measurement Plane	SAR Measurement Plane	PD Measurement Plane (W/m^2)	SAR Measurement Plane (W/m^2)	
S1	0.571	-	**3.569**	**3.281**	1.460
S2	1.000	0.920	-	**5.750**	5.690
S3	0.524	-	-	**3.013**	1.210
S4	1.000	0.647	-	**5.750**	4.850
S5	0.180	-	-	**1.038**	0.345
S6	0.065	-	-	**0.375**	-

[1] Results for Body were calculated using the most conservative ratio between the PD Magnitudes for 2mm and 5mm with the following multiplier: $PD_{\text{Design Limit}}$

Table 6-10: 5G Millimeter Wave NR Simulation PD Surface Ratio for n260

n260					
Surface	PD Magnitude Ratio		Head	Body[1]	Meas. Total PD (W/m^2)
	PD Measurement Plane	SAR Measurement Plane	PD Measurement Plane (W/m^2)	SAR Measurement Plane (W/m^2)	
S1	0.556	-	**3.475**	**3.269**	2.950
S2	1.000	0.941	-	**5.881**	5.750
S3	0.414	-	-	**2.438**	0.867
S4	1.000	0.674	-	**5.881**	4.270
S5	0.282	-	-	**1.656**	0.739
S6	0.052	-	-	**0.306**	-

[1] Results for Body were calculated using the most conservative ratio between the PD Magnitudes for 2mm and 5mm with the following multiplier: $PD_{Design\ Limit}$

Table 6-11: 5G Millimeter Wave NR Simulation PD Surface Ratio for n261

n261					
Surface	PD Magnitude Ratio		Head	Body[1]	Meas. Total PD (W/m^2)
	PD Measurement Plane	SAR Measurement Plane	PD Measurement Plane (W/m^2)	SAR Measurement Plane (W/m^2)	
S1	0.578	-	**3.613**	**3.300**	1.930
S2	1.000	0.914	-	**5.713**	5.870
S3	0.439	-	-	**2.506**	0.550
S4	1.000	0.637	-	**5.713**	4.820
S5	0.232	-	-	**1.325**	0.319
S6	0.051	-	-	**0.294**	-

[1] Results for Body were calculated using the most conservative ratio between the PD Magnitudes for 2mm and 5mm with the following multiplier: $PD_{Design\ Limit}$

Table 6-12: TER for Worst-case WLAN + 5G Millimeter Wave NR for n258 Head

n258												
Head TER	psPD	2.4 GHz WiFi State 2	2.4 GHz WiFi State 4	5 GHz WiFi State 2	5 GHz WiFi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
	W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
TER Combinations	1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit	10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
Reported Exposure	3.569	0.551	0.499	0.456	0.362	0.084	0.065	-	-	-	-	-
Ratio to Limit	0.357	0.345	0.312	0.285	0.226	0.052	0.040	0.702	0.709	0.642	0.694	0.675

Table 6-13: TER for Worst-case WLAN + 5G Millimeter Wave NR for n260 Head

n260												
Head TER	psPD	2.4 GHz WiFi State 2	2.4 GHz WiFi State 4	5 GHz WiFi State 2	5 GHz WiFi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
	W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
TER Combinations	1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit	10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
Reported Exposure	3.475	0.551	0.499	0.456	0.362	0.084	0.065	-	-	-	-	-
Ratio to Limit	0.348	0.345	0.312	0.285	0.226	0.052	0.040	0.693	0.700	0.633	0.685	0.666

Table 6-14: TER for Worst-case WLAN + 5G Millimeter Wave NR for n261 Head

n261												
Head TER	psPD	2.4 GHz WiFi State 2	2.4 GHz WiFi State 4	5 GHz WiFi State 2	5 GHz WiFi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
	W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
TER Combinations	1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit	10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
Reported Exposure	3.613	0.551	0.499	0.456	0.362	0.084	0.065	-	-	-	-	-
Ratio to Limit	0.361	0.345	0.312	0.285	0.226	0.052	0.040	0.706	0.713	0.646	0.698	0.679

Table 6-15: TER for Worst-case WLAN + 5G Millimeter Wave NR for n258 Body/Hotspot

n258												
Body/Hotspot TER		psPD	2.4 GHz Wi-Fi State 2	2.4 GHz Wi-Fi State 4	5 GHz Wi-Fi State 2	5 GHz Wi-Fi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
		W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
Scenario		1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit		10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
S1 @ 5 mm	Reported Exposure	3.281	0.317	0.265	0.396	0.315	0.039	0.008	-	-	-	-	-
	Ratio to Limit	0.328	0.198	0.166	0.248	0.197	0.024	0.005	0.527	0.499	0.576	0.600	0.554
S2 @ 5 mm	Reported Exposure	5.750	0.402	0.306	0.448	0.356	0.046	0.089	-	-	-	-	-
	Ratio to Limit	0.575	0.251	0.191	0.280	0.222	0.029	0.056	0.826	0.882	0.855	0.884	0.939
S3 @ 5 mm	Reported Exposure	3.013	0.332	0.312	0.323	0.269	0.045	0.046	-	-	-	-	-
	Ratio to Limit	0.301	0.208	0.195	0.202	0.168	0.028	0.029	0.509	0.538	0.503	0.531	0.560
S4 @ 5 mm	Reported Exposure	5.750	0.538	0.445	0.323	0.269	0.073	0.008	-	-	-	-	-
	Ratio to Limit	0.575	0.336	0.278	0.202	0.168	0.046	0.005	0.911	0.916	0.777	0.823	0.828
S5 @ 5 mm	Reported Exposure	1.038	0.254	0.265	0.323	0.269	0.004	0.005	-	-	-	-	-
	Ratio to Limit	0.104	0.159	0.166	0.202	0.168	0.003	0.003	0.262	0.265	0.306	0.308	0.311
S6 @ 5 mm	Reported Exposure	0.375	0.254	0.265	0.323	0.269	0.017	0.001	-	-	-	-	-
	Ratio to Limit	0.038	0.159	0.166	0.202	0.168	0.011	0.001	0.196	0.197	0.240	0.250	0.251

Table 6-16: TER for Worst-case WLAN + 5G Millimeter Wave NR for n260 Body/Hotspot

n260												
Body/Hotspot TER		psPD	2.4 GHz Wi-Fi State 2	2.4 GHz Wi-Fi State 4	5 GHz Wi-Fi State 2	5 GHz Wi-Fi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
		W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
Scenario		1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit		10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
S1 @ 5 mm	Reported Exposure	3.269	0.317	0.265	0.396	0.315	0.039	0.008	-	-	-	-	-
	Ratio to Limit	0.327	0.198	0.166	0.248	0.197	0.024	0.005	0.525	0.498	0.574	0.599	0.553
S2 @ 5 mm	Reported Exposure	5.881	0.402	0.306	0.448	0.356	0.046	0.089	-	-	-	-	-
	Ratio to Limit	0.588	0.251	0.191	0.280	0.222	0.029	0.056	0.839	0.895	0.868	0.897	0.952
S3 @ 5 mm	Reported Exposure	2.438	0.332	0.312	0.323	0.269	0.045	0.046	-	-	-	-	-
	Ratio to Limit	0.244	0.208	0.195	0.202	0.168	0.028	0.029	0.451	0.480	0.446	0.474	0.503
S4 @ 5 mm	Reported Exposure	5.881	0.538	0.445	0.323	0.269	0.073	0.008	-	-	-	-	-
	Ratio to Limit	0.588	0.336	0.278	0.202	0.168	0.046	0.005	0.924	0.929	0.790	0.836	0.841
S5 @ 5 mm	Reported Exposure	1.656	0.254	0.265	0.323	0.269	0.004	0.005	-	-	-	-	-
	Ratio to Limit	0.166	0.159	0.166	0.202	0.168	0.003	0.003	0.324	0.327	0.368	0.370	0.373
S6 @ 5 mm	Reported Exposure	0.306	0.254	0.265	0.323	0.269	0.017	0.001	-	-	-	-	-
	Ratio to Limit	0.031	0.159	0.166	0.202	0.168	0.011	0.001	0.189	0.190	0.233	0.243	0.244

Table 6-17: TER for Worst-case WLAN + 5G Millimeter Wave NR for n261 Body/Hotspot

n261													
Body/Hotspot TER		psPD	2.4 GHz Wi-Fi State 2	2.4 GHz Wi-Fi State 4	5 GHz Wi-Fi State 2	5 GHz Wi-Fi State 4	BT P_{Low} 2.4 GHz	802.15.4ab	psPD + 2.4 GHz WLAN	psPD + 2.4 GHz WLAN + 802.15.4ab	psPD + 5 GHz WLAN	psPD + 5 GHz WLAN + BT	psPD + 5 GHz WLAN + BT + 802.15.4ab
		W/m²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg					
Scenario		1	2	3	4	5	6	7	1+2	1+3+7	1+4	1+4+6	1+5+6+7
Applicable limit		10	1.6	1.6	1.6	1.6	1.6	1.6	1	1	1	1	1
S1 @ 5 mm	Reported Exposure	3.300	0.317	0.265	0.396	0.315	0.039	0.008	-	-	-	-	-
	Ratio to Limit	0.330	0.198	0.166	0.248	0.197	0.024	0.005	0.528	0.501	0.578	0.602	0.556
S2 @ 5 mm	Reported Exposure	5.713	0.402	0.306	0.448	0.356	0.046	0.089	-	-	-	-	-
	Ratio to Limit	0.571	0.251	0.191	0.280	0.222	0.029	0.056	0.822	0.878	0.851	0.880	0.936
S3 @ 5 mm	Reported Exposure	2.506	0.332	0.312	0.323	0.269	0.045	0.046	-	-	-	-	-
	Ratio to Limit	0.251	0.208	0.195	0.202	0.168	0.028	0.029	0.458	0.487	0.453	0.481	0.510
S4 @ 5 mm	Reported Exposure	5.713	0.538	0.445	0.323	0.269	0.073	0.008	-	-	-	-	-
	Ratio to Limit	0.571	0.336	0.278	0.202	0.168	0.046	0.005	0.907	0.912	0.773	0.819	0.824
S5 @ 5 mm	Reported Exposure	1.325	0.254	0.265	0.323	0.269	0.004	0.005	-	-	-	-	-
	Ratio to Limit	0.133	0.159	0.166	0.202	0.168	0.003	0.003	0.291	0.294	0.335	0.337	0.340
S6 @ 5 mm	Reported Exposure	0.294	0.254	0.265	0.323	0.269	0.017	0.001	-	-	-	-	-
	Ratio to Limit	0.029	0.159	0.166	0.202	0.168	0.011	0.001	0.188	0.189	0.232	0.242	0.243

7. Conclusions

Table 7-1 shows the worst-case 1-g SAR at P_{limit} and worst-case 4cm²-avg PD at *input.power.limit.*

Table 7-1: Reported RF exposure level

Reported RF Exposure Level		Notes
Highest 1-g SAR at P_{limit} (W/kg)	0.950	Refer to §1 for the reference SAR Report
Highest 4cm²-avg PD at *input.power.limit* (W/m²)	5.870	§6.2
Highest 1-g SAR (W/kg) for simultaneous Tx (Sub-6 WWAN + WLAN)	1.496	Refer to §1 for the reference SAR Report
Highest Total Exposure Ratio for simultaneous Tx (5G mmW NR + WLAN)	0.952	§6.3

Qualcomm's Smart Transmit feature employed in the EUT meets the $SAR_{Design\ Target}$ and $PD_{Design\ Target}$ (within the design uncertainties) when operating in the static transmission condition at P_{limit} and *input.power.limit*, respectively, and is compliant with the FCC RF exposure limits.

Appendices

A. Millimeter Wave Probe Certificate
B. Verification Source Certificate