Annex A. Plots of System Verification

The plots for system verification are shown as follows.

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/13

S01 System Check_H2450_211113

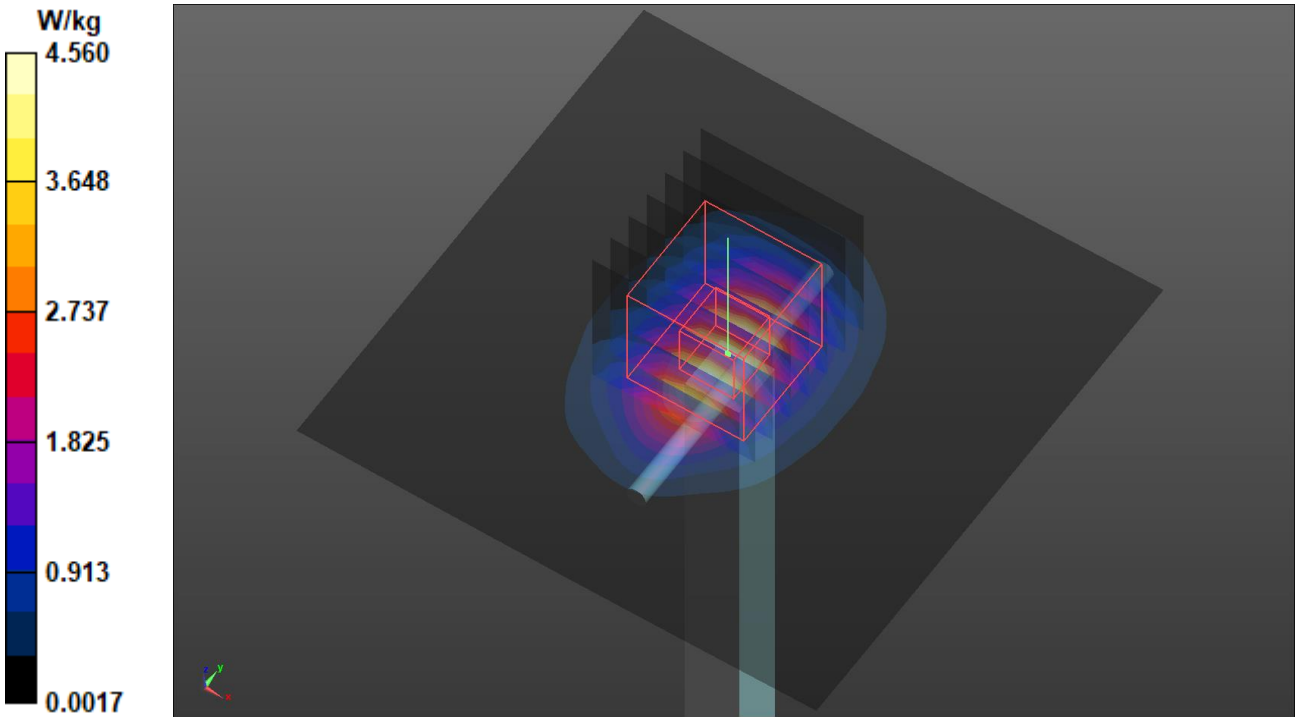
DUT: Dipole 2450 MHz; Type: D2450V2; SN: 737

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: H19T27N1_1113 Medium parameters used (interpolated): f = 2450 MHz; σ = 1.862 S/m; ε_r = 39.176; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(6.81, 6.81, 6.81) @ 2450 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 4.56 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.70 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 5.69 W/kg
SAR(1 g) = 2.73 W/kg; SAR(10 g) = 1.29 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 4.64 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

S02 System Check_H5250_211112

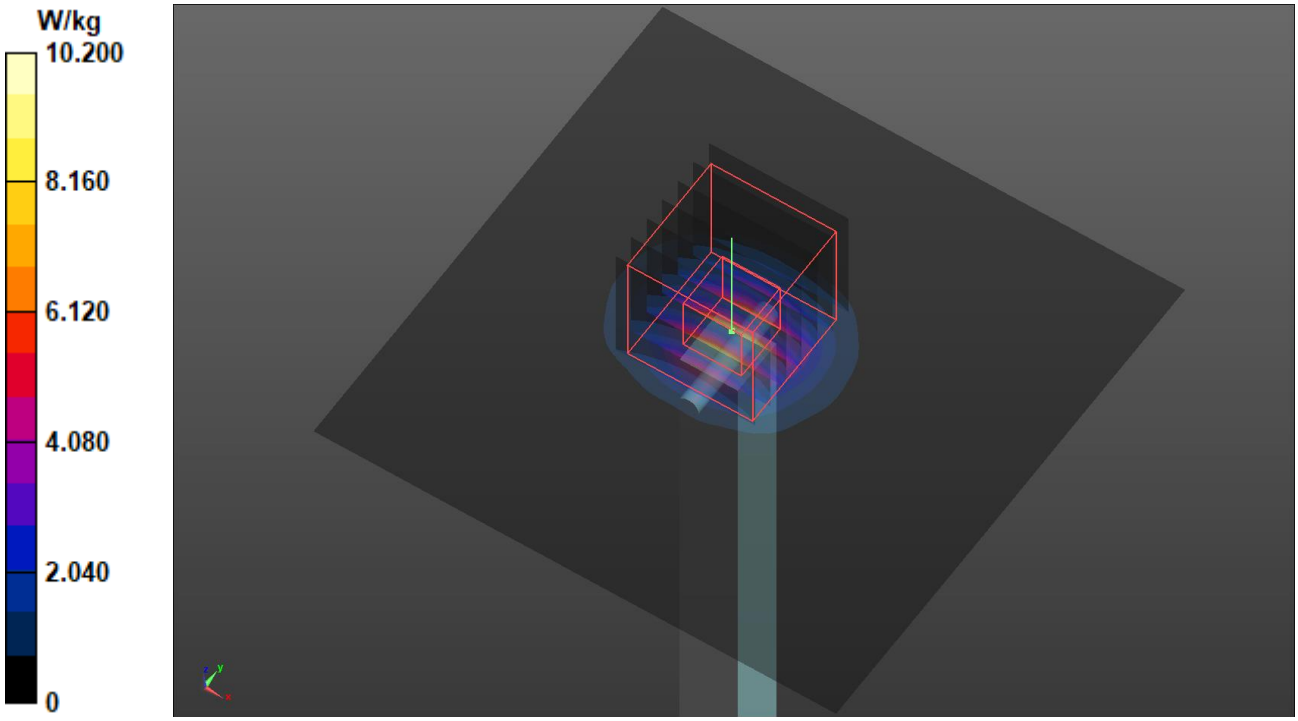
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: UID 0, CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used (interpolated): f = 5250 MHz; σ = 4.757 S/m; ε_r = 35.545; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.75, 4.75, 4.75) @ 5250 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 10.2 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 41.70 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 15.0 W/kg
SAR(1 g) = 3.94 W/kg; SAR(10 g) = 1.17 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 9.68 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

S03 System Check_H5600_201112

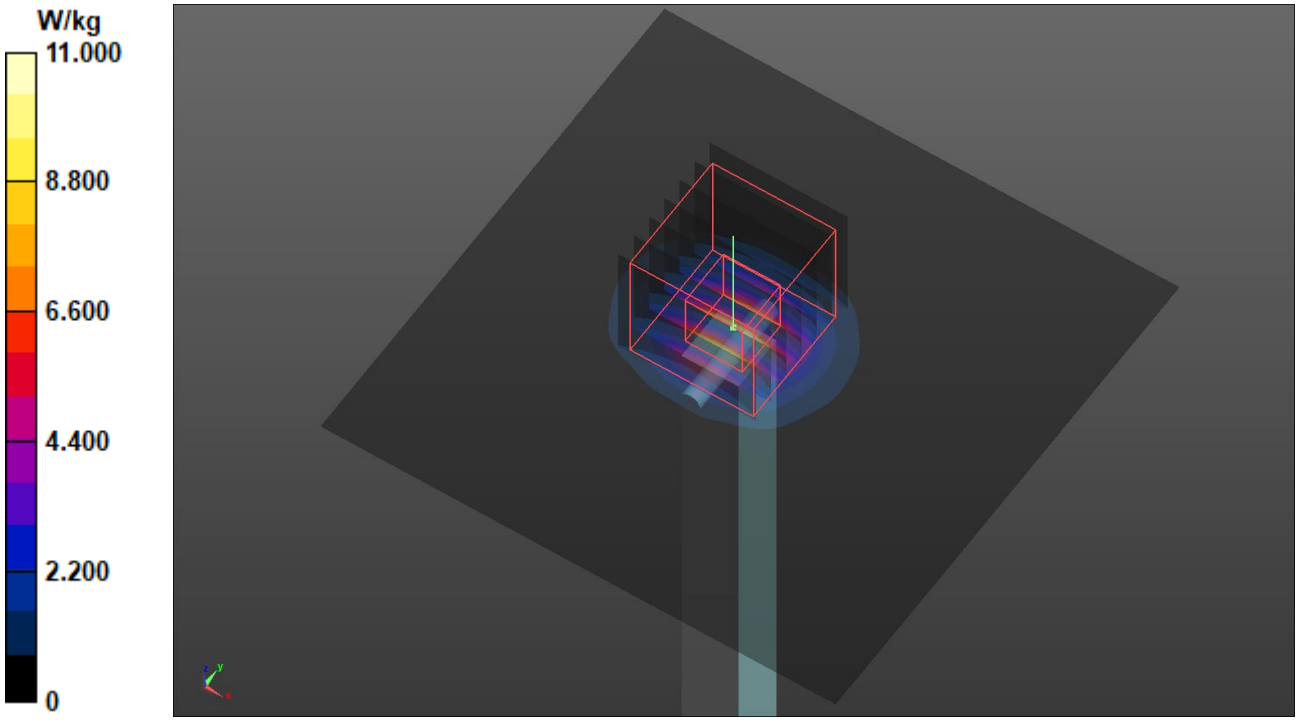
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: UID 0, CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used: f = 5600 MHz; σ = 5.089 S/m; ε_r = 35.066; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.38, 4.38, 4.38) @ 5600 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 11.0 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 42.80 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 4.4 W/kg; SAR(10 g) = 1.29 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 11.2 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

S04 System Check_H5750_211112

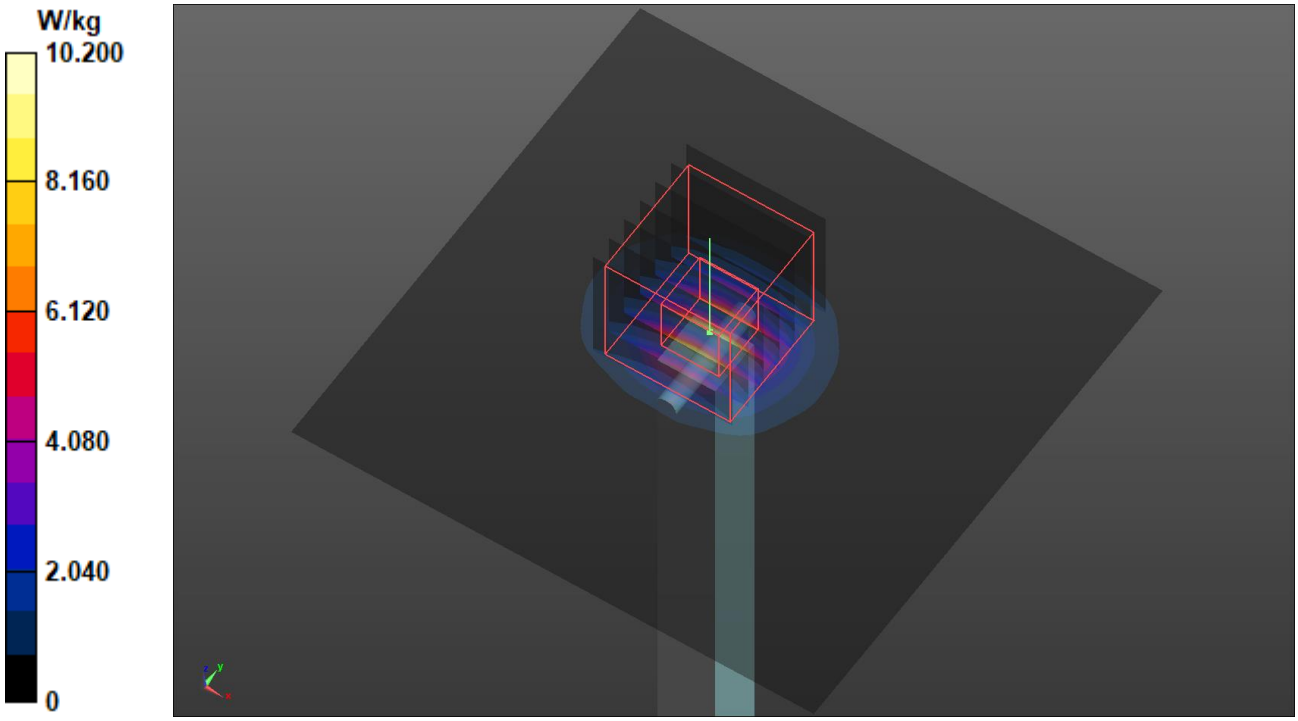
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: UID 0, CW; Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used: f = 5750 MHz; σ = 5.231 S/m; ε_r = 34.859; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.4, 4.4, 4.4) @ 5750 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 10.2 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 40.68 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 3.98 W/kg; SAR(10 g) = 1.17 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 10.4 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2022/01/05

S05 System Check_H5750_220105

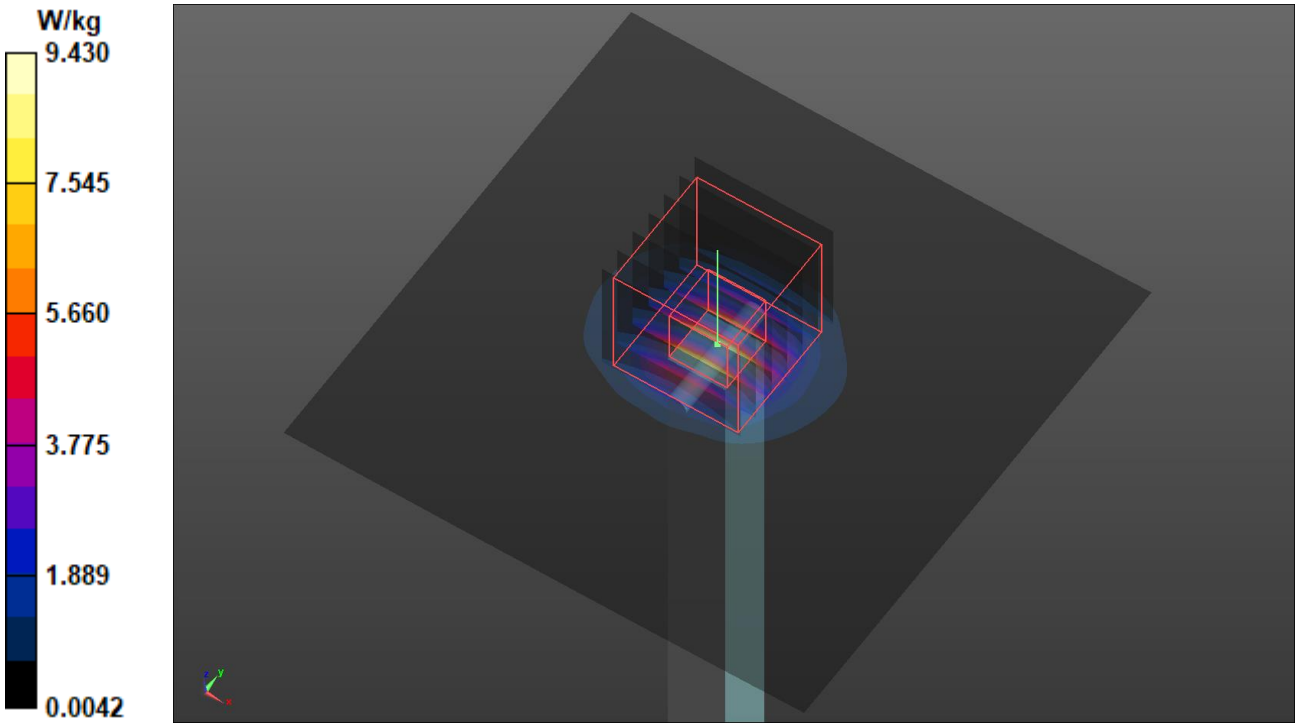
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: UID 0, CW; Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: H34T60N1_0105 Medium parameters used: f = 5750 MHz; σ = 5.123 S/m; ε_r = 36.45; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃； Liquid Temperature：23.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(5.1, 5.1, 5.1) @ 5750 MHz; Calibrated: 2021/03/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1590; Calibrated: 2021/09/20
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.43 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 45.92 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 3.87 W/kg; SAR(10 g) = 1.13 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 9.98 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2022/01/05

S06 System Check_H2450_220105

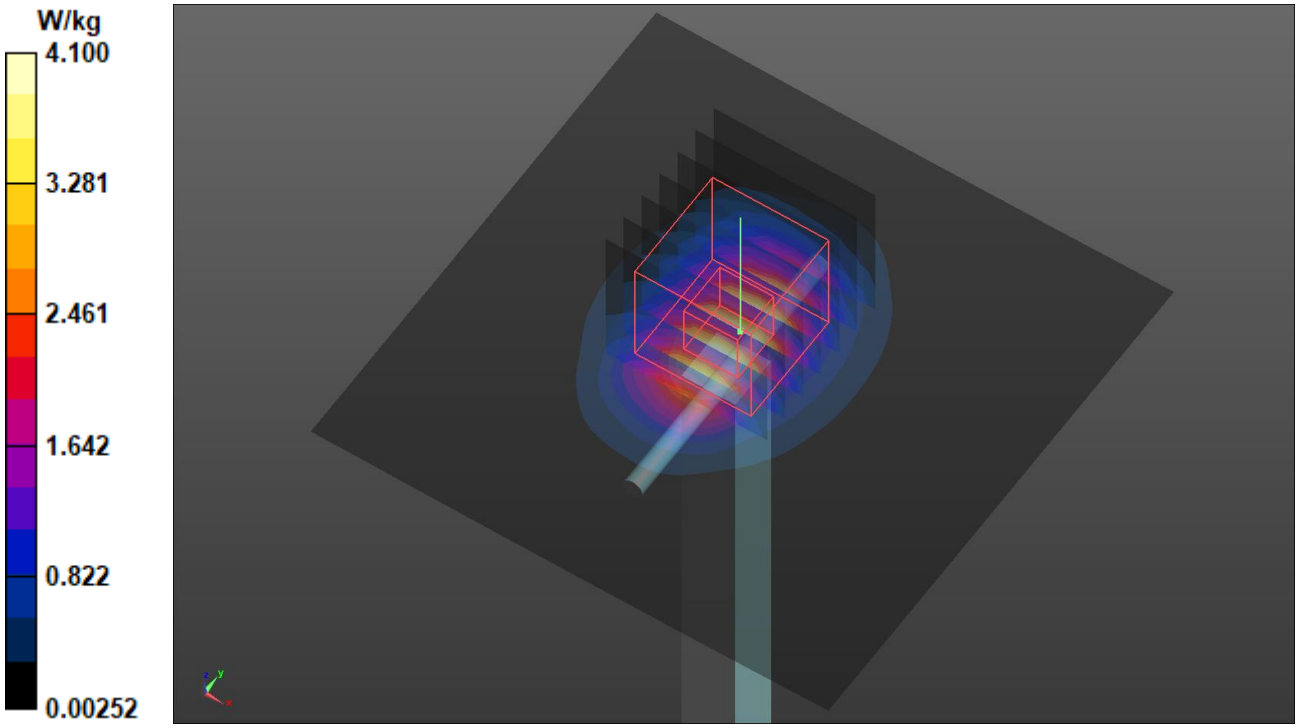
DUT: Dipole 2450 MHz; Type: D2450V2; SN: 737

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: H19T27N1_0105 Medium parameters used (interpolated): f = 2450 MHz; σ = 1.869 S/m; ε_r = 39.087; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃； Liquid Temperature：23.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.77, 7.77, 7.77) @ 2450 MHz; Calibrated: 2021/03/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1590; Calibrated: 2021/09/20
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 4.10 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 44.45 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 5.17 W/kg
SAR(1 g) = 2.49 W/kg; SAR(10 g) = 1.18 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 4.18 W/kg



Plots of System Verification

Measurement Report for Device

S07 System Check_H6.5GHz_220106

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Speag 6.5GHz System Valisation Kit	50.0 x 10.0 x 8.0		6.5GHzV2 Valisation Kit

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	-	-	UID 0	6500.0,	5.65	6.15	34.2

Hardware Setup

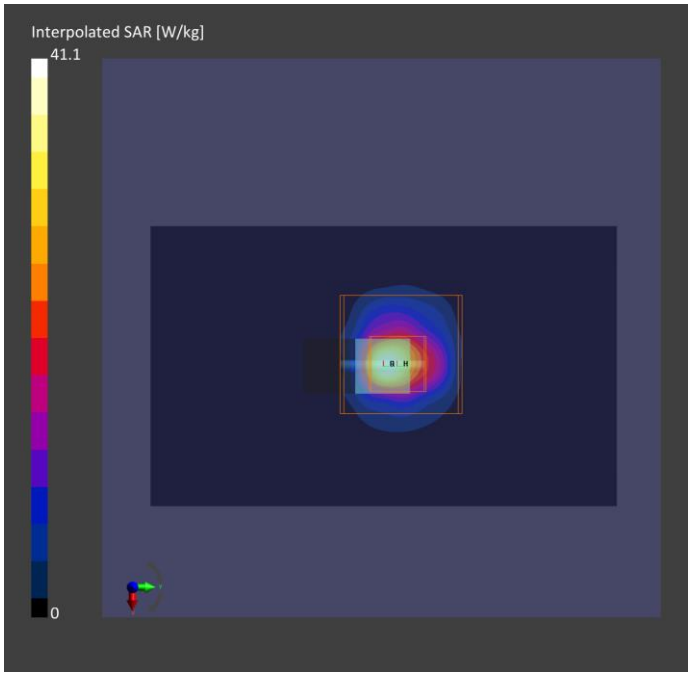
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 1204	H50T72N1 , 2022-Jan-06	EX3DV4 - SN3650, 2021-03-26	DAE4 Sn1590, 2021-09-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	51.0 x 85.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	8.5 x 8.5	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
Date	2022-01-06	2022-01-06
psSAR1g [W/Kg]	23.7	29.5
psSAR10g [W/Kg]	4.96	5.44
Power Drift [dB]	0.02	-0.01



Plots of System Verification

Test Lab: Bureau Veritas ADT SAR/HAC/PD Testing Lab

Power Density Plot No.:

S07 PD_System Check_10 GHz_2022.01.06

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
SPEAG	100.0 x 100.0 x 172.0	SN: 1025	Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5GAir	Front 10.00	Validation band	CW	10000.0	1.0

Hardware Setup

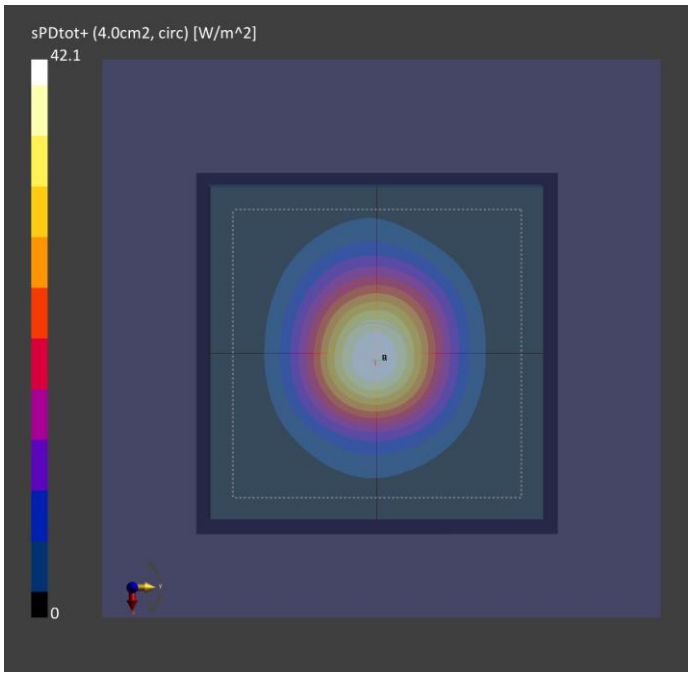
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	--Air--	EUmmWV4 - SN9438_F1-55GHz, 2021-07-26	DAE4 Sn1590, 2021-09-20

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0

Measurement Results

	5G Scan
Date	2022-01-06
Avg. Area [cm^2]	4.00
$pS_{tot}avg$[W/m^2]	42.1
$pS_{n}avg$ [W/m^2]	41.8
E_{peak} [V/m]	136
Power Drift [dB]	0.01



Annex B. Plots of Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination are shown as follows.

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/13

P01 WLAN2.4G_802.11b_Bottom Side_5mm_Ch11_SKU Div-Ver.A_Ant 1

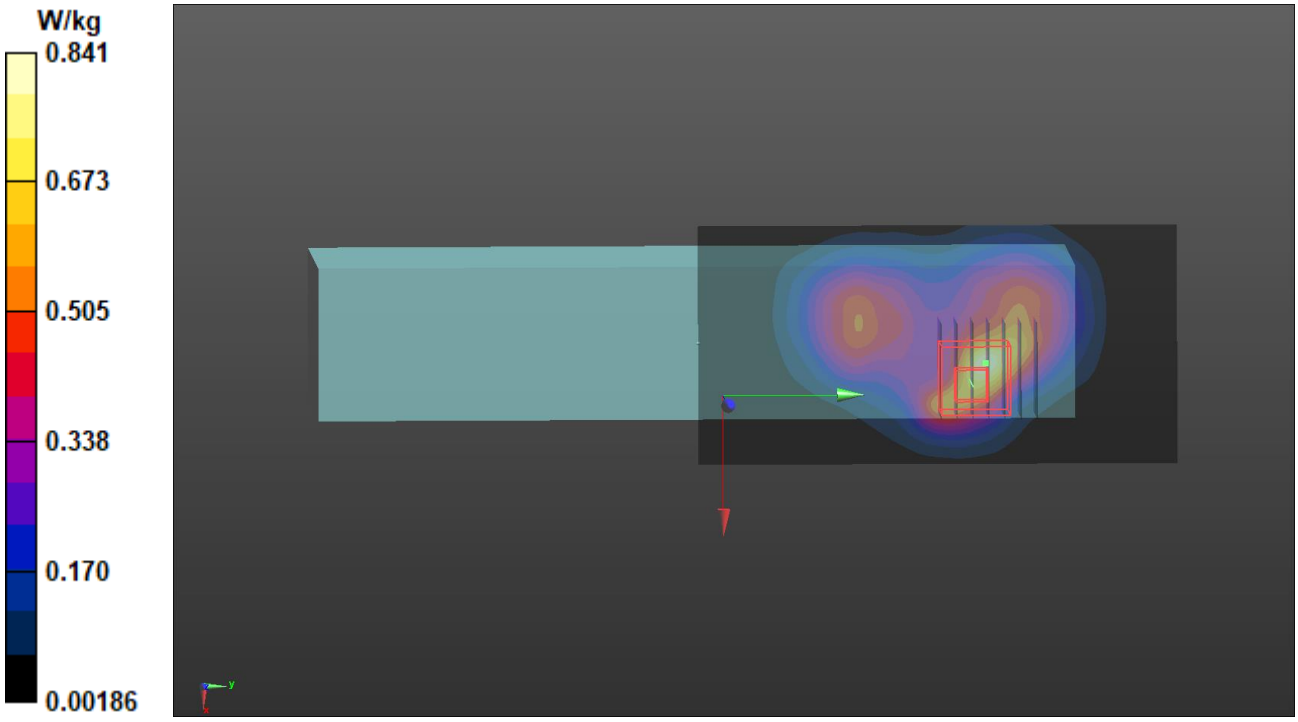
DUT: BARR-WTW-P21100969

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: H19T27N1_1113 Medium parameters used: f = 2462 MHz; σ = 1.874 S/m; ε_r = 39.139; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(6.81, 6.81, 6.81) @ 2462 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (71x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.841 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.639 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.726 W/kg; SAR(10 g) = 0.322 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 8.1 mm
Ratio of SAR at M2 to SAR at M1 = 43.1%
Maximum value of SAR (measured) = 1.25 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

P02 WLAN5.3G_802.11ac VHT160_Bottom Side_5mm_Ch50_SKU Div-Ver.A_Ant 1

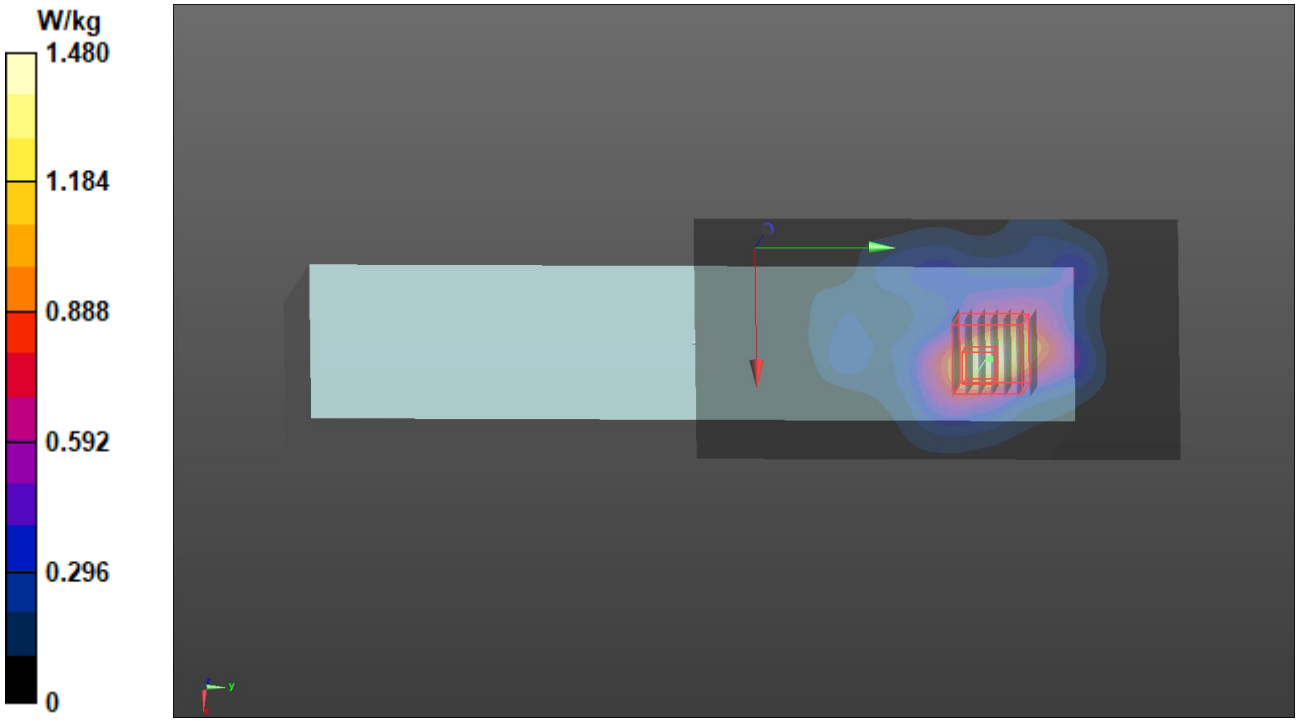
DUT: BARR-WTW-P21100969

Communication System: UID 10554 - AAD, IEEE 802.11ac WiFi (160MHz, MCS0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used (interpolated): f = 5250 MHz; σ = 4.757 S/m; ε_r = 35.545; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.75, 4.75, 4.75) @ 5250 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (81x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.48 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.380 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.40 W/kg
SAR(1 g) = 0.744 W/kg; SAR(10 g) = 0.243 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9.1 mm
Ratio of SAR at M2 to SAR at M1 = 63.5%
Maximum value of SAR (measured) = 1.43 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

P03 WLAN5.6G_802.11ac VHT160_Bottom Side_5mm_Ch114_SKU Div-Ver.A_Ant 1

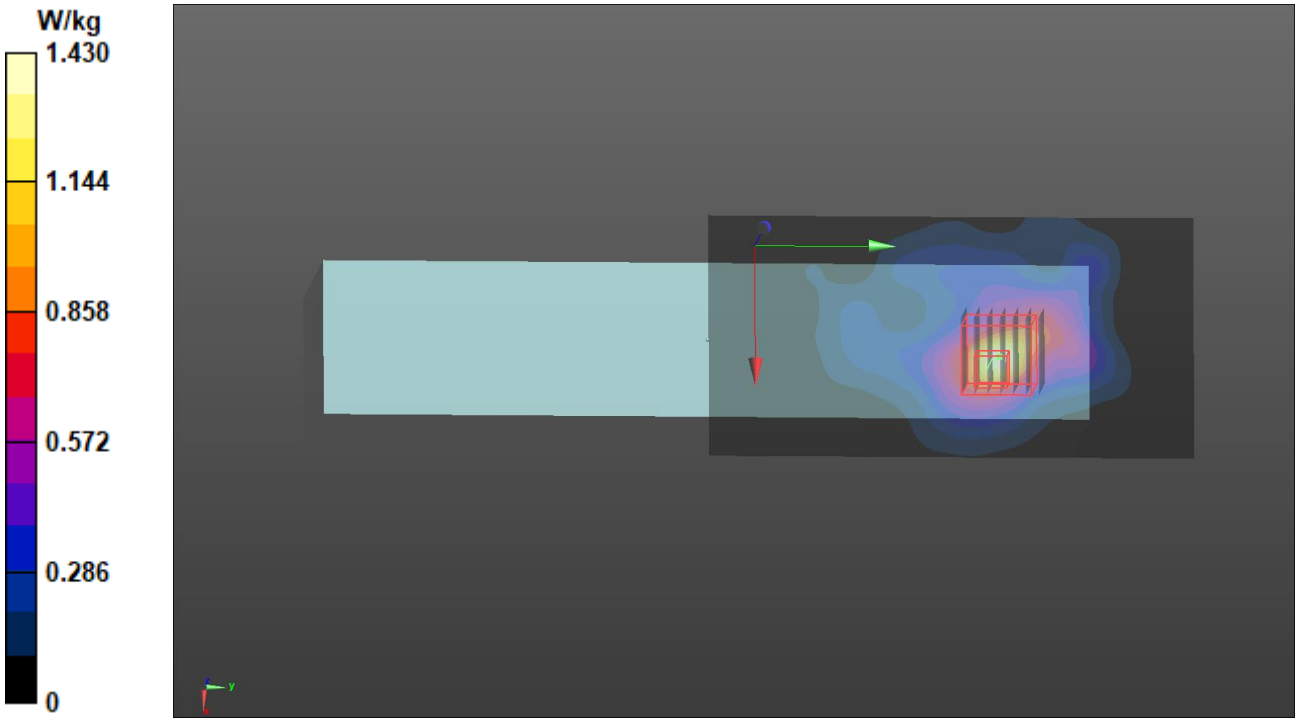
DUT: BARR-WTW-P21100969

Communication System: UID 10554 - AAD, IEEE 802.11ac WiFi (160MHz, MCS0); Frequency: 5570 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used (interpolated): f = 5570 MHz; σ = 5.063 S/m; ε_r = 35.062; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.38, 4.38, 4.38) @ 5570 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (81x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.43 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.033 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 0.737 W/kg; SAR(10 g) = 0.242 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 59.8%
Maximum value of SAR (measured) = 1.66 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2021/11/12

P04 WLAN5.8G_802.11ac VHT80_Bottom Side_5mm_Ch155_SKU Div-Ver.A_Ant 1

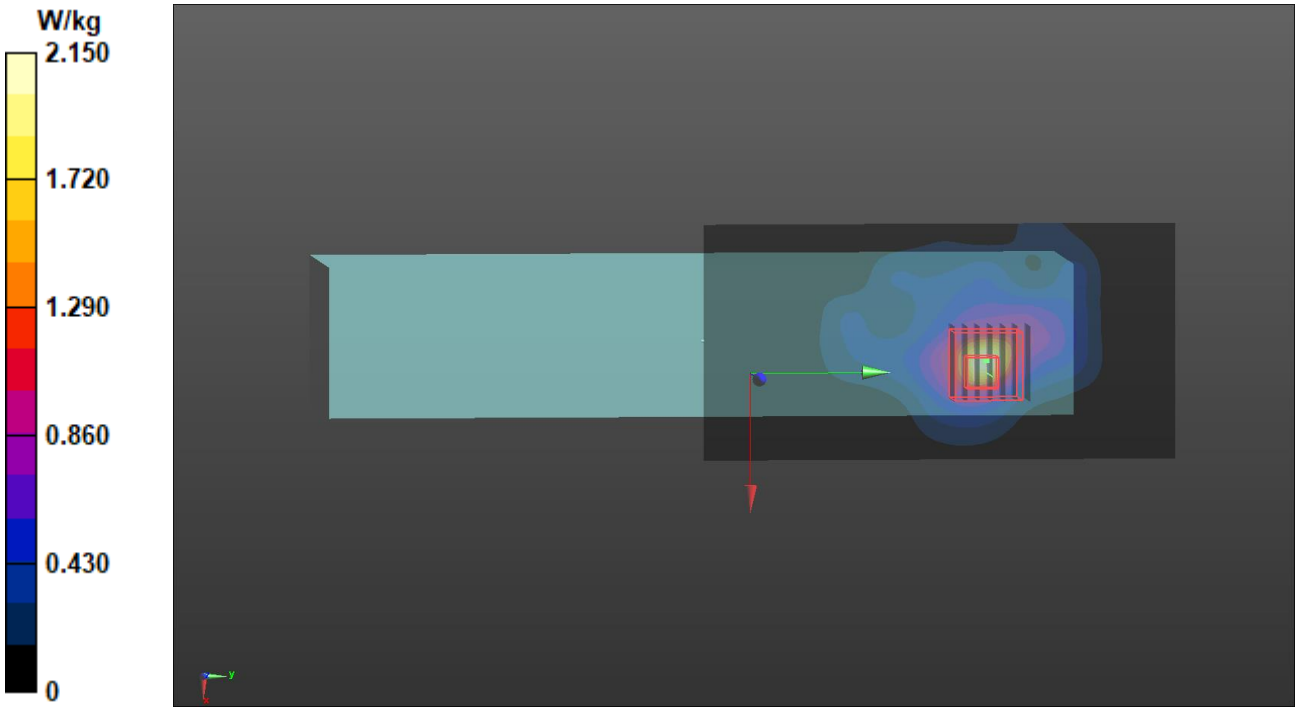
DUT: BARR-WTW-P21100969

Communication System: UID 10544 - AAC, IEEE 802.11ac WiFi (80MHz, MCS0); Frequency: 5775 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1112 Medium parameters used: f = 5775 MHz; σ = 5.262 S/m; ε_r = 34.778; ρ = 1000 kg/m^3
Ambient Temperature：23.8 ℃； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3820; ConvF(4.4, 4.4, 4.4) @ 5775 MHz; Calibrated: 2021/07/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2021/04/14
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (81x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.15 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.430 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.10 W/kg
SAR(1 g) = 0.759 W/kg; SAR(10 g) = 0.271 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 58.8%
Maximum value of SAR (measured) = 2.17 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2022/01/05

P05 WLAN5.9G_802.11ac VHT160_Bottom Side_5mm_Ch163_SKU Div-Ver.A_Ant 1

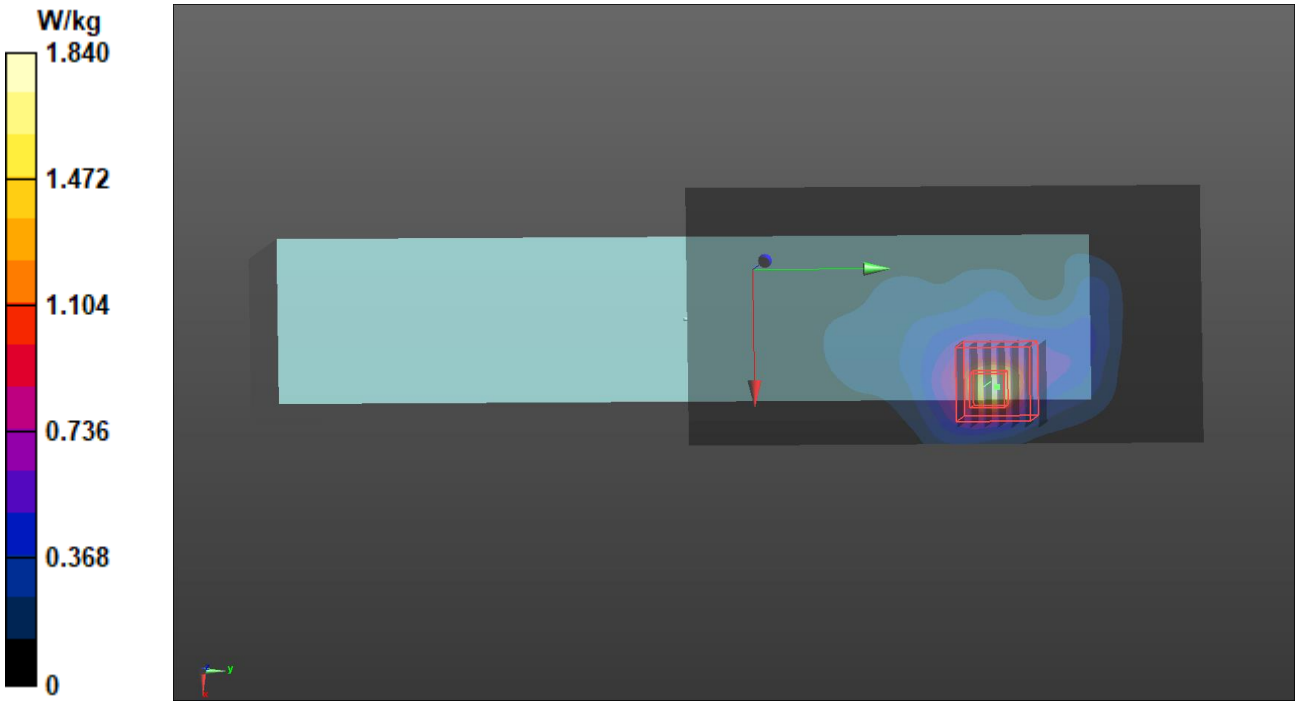
DUT: BARR-WTW-P21100969

Communication System: UID 10554 - AAD, IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle); Frequency: 5815 MHz;Duty Cycle: 1:1
Medium: H34T60N1_0105 Medium parameters used: f = 5815 MHz; σ = 5.293 S/m; ε_r = 35.817; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃； Liquid Temperature：23.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(5.1, 5.1, 5.1) @ 5815 MHz; Calibrated: 2021/03/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1590; Calibrated: 2021/09/20
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (81x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.84 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.252 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 0.712 W/kg; SAR(10 g) = 0.207 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 57.9%
Maximum value of SAR (measured) = 1.62 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2022/01/05

P06 BT_BDR_Bottom Side_5mm_Ch39_SKU Div-Ver.A_Ant 1

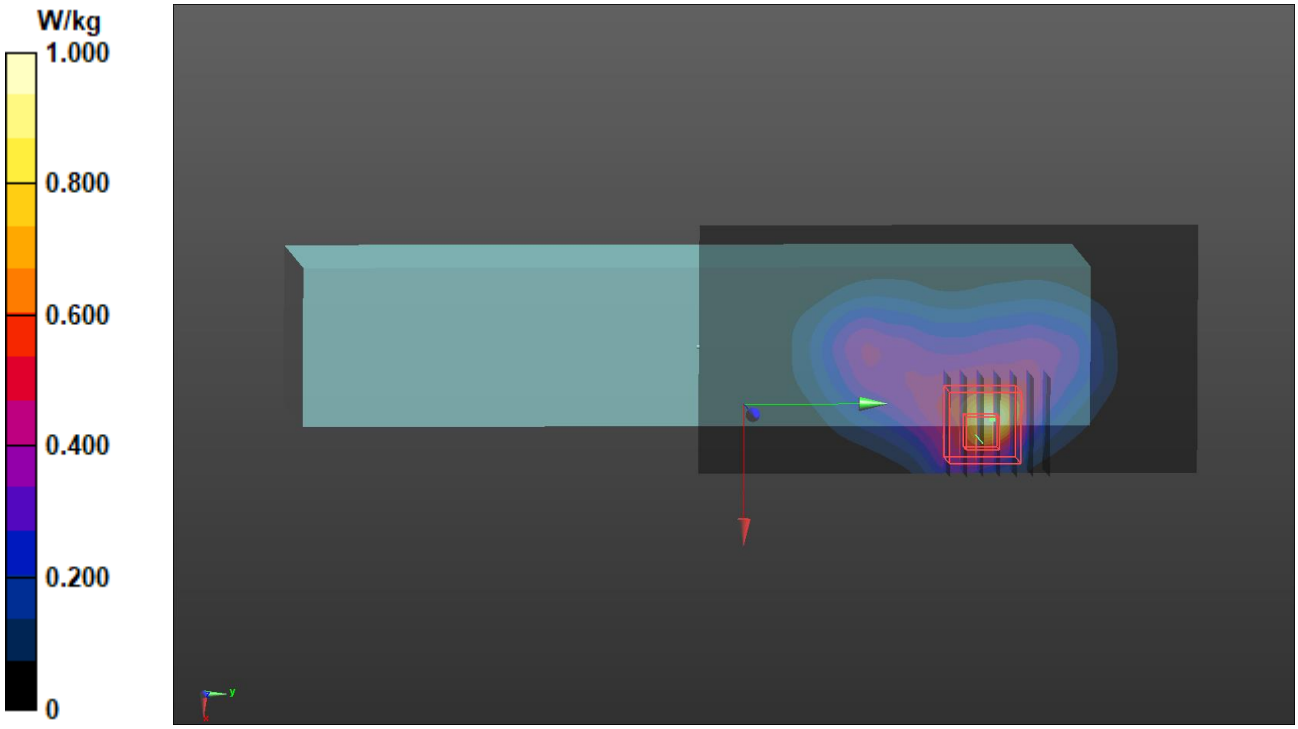
DUT: BARR-WTW-P21100969

Communication System: UID 10032 - CAA, IEEE 802.15.1 Bluetooth (GFSK, DH5); Frequency: 2441 MHz;Duty Cycle: 1:1.34
Medium: H19T27N1_0105 Medium parameters used (interpolated): f = 2441 MHz; σ = 1.858 S/m; ε_r = 39.114; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ; Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.77, 7.77, 7.77) @ 2441 MHz; Calibrated: 2021/03/26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1590; Calibrated: 2021/09/20
- Phantom: ELI V5.0 1204; Type: QD OVA 002 AA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (71x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.00 W/kg

Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9610 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.573 W/kg; SAR(10 g) = 0.201 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 41.5%
Maximum value of SAR (measured) = 1.05 W/kg



Measurement Report

P07 UNII-7_802.11ax HE160_Bottom Side_5mm_Ch143_SKU Div – Ver.A_Ant 1

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
BARR-WTW-P21100969	237.0 x 48.0 x 74.0		Module

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	Bottom Side, 5.00	U-NII-7	WLAN, 10755-AAC	6665.0, 143	5.7	6.32	33.2

Hardware Setup

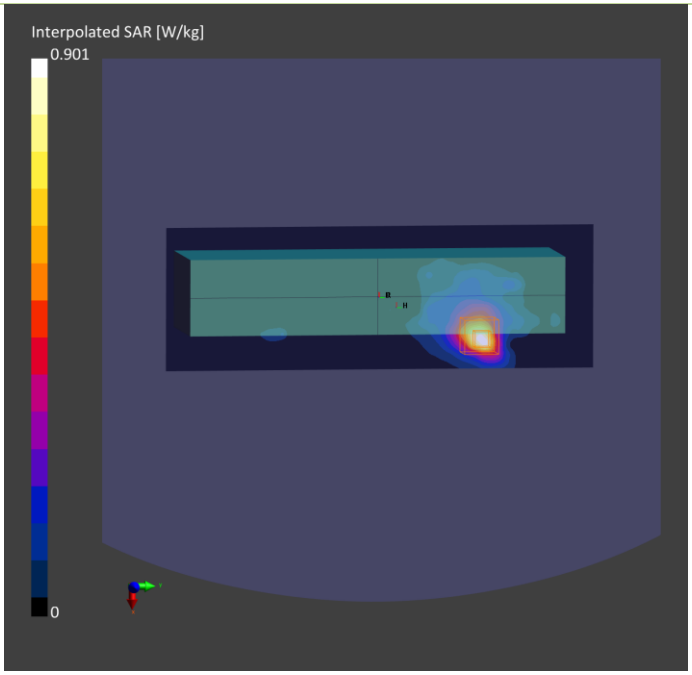
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V5.0 (20deg probe tilt) - 1204	H50T72N1 , 2022-Jan-06	EX3DV4 - SN3650, 2021-03-26	DAE4 Sn1590, 2021-09-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 270.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	7.5 x 7.5	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
Date	2022-01-06	2022-01-06
psSAR1g [W/Kg]	0.704	0.728
psSAR10g [W/Kg]	0.248	0.258
Power Drift [dB]	0.17	-0.05



Plots of Measurement

Test Lab: Bureau Veritas ADT SAR/HAC/PD Testing Lab

Power Density Plot No.:

P07 UNII-7_802.11ax HE160_Bottom Side_5mm_Ch143_SKU Div – Ver.A_Ant 1

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
BARR-WTW-P21100969	237.0 x 48.0 x 74.0		Module

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5GAir	Bottom Side 5.00	U-NII-7	WLAN 10755	6665.0 143	1.0

Hardware Setup

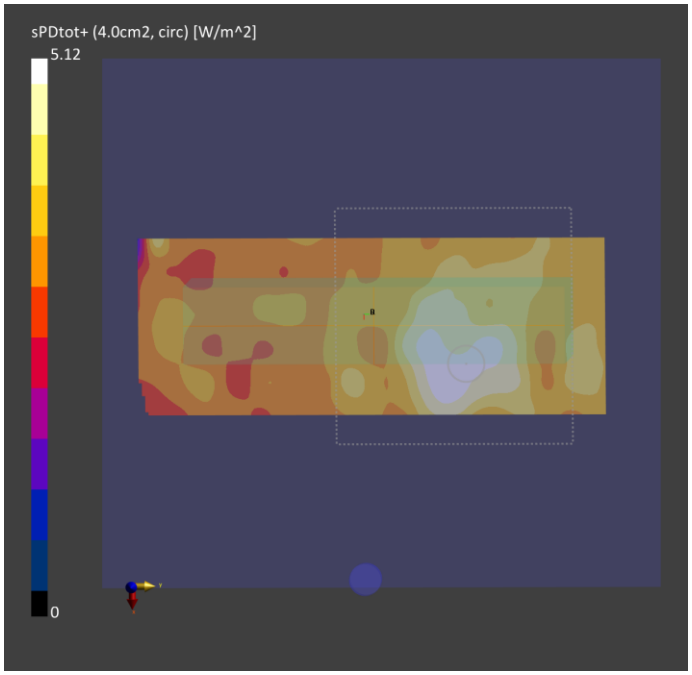
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	--Air--	EUmmWV4 - SN9438_F1-55GHz	DAE4 Sn1590

Scan Setup

	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.0

Measurement Results

	5G Scan
Date	2022-01-06
Avg. Area [cm^2]	4.00
$pS_{tot}avg$[W/m^2]	5.12
$pS_{n}avg$ [W/m^2]	4.79
E_{peak} [V/m]	69.5
Power Drift [dB]	-0.06



Annex C. Tissue & System Verification

The measuring results for tissue simulating liquid and system check are shown as below.

Note:

1. For Section 4.3, the dielectric properties of the tissue simulating liquid have been measured within 24 hours before the SAR testing and within ±10 % of the target values. Liquid temperature during the SAR testing has kept within ±2 ℃.
2. For Section 4.4, The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.
3. For Section 4.5, Comparing to the reference SAR value provided by SPEAG in dipole calibration certificate, the deviation of system check results is within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots please refer to Annex A of this report.

Tissue Verification									Validation for CW			Validation for Modulation				System Validation					Note			
Plot No.	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ)	Deviation Permittivity (εr)	Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR	Date	Frequency (MHz)	Targeted 1g SAR (W/kg)	Measured 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N	Output Power (dB)
S01	2450	23.4	1.862	39.176	1.8	39.2	3.44	-0.06	Pass	Pass	Pass	OFDM	N/A	Pass	Nov. 13, 2021	2450	52.60	2.73	54.47	3.56	737	3820	861	17
S02	5250	23.3	4.757	35.545	4.71	35.9	1.00	-0.99	Pass	Pass	Pass	OFDM	N/A	Pass	Nov. 12, 2021	5250	80.60	3.94	78.61	-2.46	1019	3820	861	17
S03	5600	23.3	5.089	35.066	5.07	35.5	0.37	-1.22	Pass	Pass	Pass	OFDM	N/A	Pass	Nov. 12, 2021	5600	82.40	4.4	87.79	6.54	1019	3820	861	17
S04	5750	23.3	5.231	34.859	5.22	35.4	0.21	-1.53	Pass	Pass	Pass	OFDM	N/A	Pass	Nov. 12, 2021	5750	79.40	3.98	79.41	0.01	1019	3820	861	17
S05	5750	23.2	5.123	36.45	5.22	35.4	-1.86	2.97	Pass	Pass	Pass	OFDM	N/A	Pass	Jan. 05, 2022	5750	79.40	3.87	77.22	-2.75	1019	3650	1590	17
S06	2450	23.2	1.869	39.087	1.8	39.2	3.83	-0.29	Pass	Pass	Pass	OFDM	N/A	Pass	Jan. 05, 2022	2450	52.60	2.49	49.68	-5.55	737	3650	1590	17
S07	6500	23.2	6.15	34.2	6.07	34.5	1.32	-0.87	Pass	Pass	Pass	OFDM	N/A	Pass	Jan. 06, 2022	6500	290.00	29.5	295.00	1.72	1029	3650	1590	20

Plot No.	Test Date	Frequency [GHz]	mmWave Probe S/N	Verification Source S/N	Averaging Area [cm^2]	Distance [mm]	Target Power Density [W/m^2]	Measured Power Density [W/m^2]	Deviation [%]
S07	Jan. 06, 2022	10	9438	1025	4	10.0	42.7	42.1	-1.41%

Annex D. Maximum Target Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

WLAN Tune-up Power (Full)			
WLAN 2.4GHz			
Mode	Channel	Frequency	Max Tune up
802.11b	1	2412	16.5
	6	2437	16.5
	11	2462	16.5
	12	2467	16.5
	13	2472	16.5
802.11g	1	2412	16.5
	6	2437	16.5
	11	2462	16.5
	12	2467	16.5
	13	2472	11.0
802.11ac VHT20	1	2412	16.5
	6	2437	16.5
	11	2462	16.5
	12	2467	16.5
	13	2472	13.5
802.11ac VHT40	3	2422	16.5
	6	2437	16.5
	9	2452	16.5
	10	2457	16.5
	11	2462	12.0
802.11ax HE20	1	2412	16.5
	6	2437	16.5
	11	2462	16.5
	12	2467	16.5
	13	2472	13.5
802.11ax HE40	3	2422	16.5
	6	2437	16.5
	9	2452	16.5
	10	2457	16.5
	11	2462	12.0

WLAN Tune-up Power (Full)			
Bluetooth			
Mode	Channel	Frequency	Max Tune up
BR / EDR	0	2402	12.0
	39	2441	12.0
	78	2480	12.0
LE	0	2402	12.0
	19	2440	12.0
	39	2480	12.0

WLAN Tune-up Power (Full)			
WLAN 5.2GHz			
Mode	Channel	Frequency	Max Tune up
802.11a	36	5180	14.5
	40	5200	14.5
	44	5220	14.5
	48	5240	14.5
802.11ac VHT20	36	5180	14.5
	40	5200	14.5
	44	5220	14.5
	48	5240	14.5
802.11ac VHT40	38	5190	14.5
	46	5230	14.5
802.11ac VHT80	42	5210	14.5
802.11ax HE20	36	5180	14.5
	40	5200	14.5
	44	5220	14.5
	48	5240	14.5
802.11ax HE40	38	5190	14.5
	46	5230	14.5
802.11ax HE80	42	5210	14.5

WLAN Tune-up Power (Full)			
WLAN 5.3GHz			
Mode	Channel	Frequency	Max Tune up
802.11a	52	5260	14.5
	56	5280	14.5
	60	5300	14.5
	64	5320	14.5
802.11ac VHT20	52	5260	14.5
	56	5280	14.5
	60	5300	14.5
	64	5320	14.5
802.11ac VHT40	54	5270	14.5
	62	5310	14.5
802.11ac VHT80	58	5290	14.5
802.11ac VHT160	50	5250	14.5
802.11ax HE20	52	5260	14.5
	56	5280	14.5
	60	5300	14.5
	64	5320	14.5
802.11ax HE40	54	5270	14.5
	62	5310	14.5
802.11ax HE80	58	5290	14.5
802.11ax HE160	50	5250	14.5

WLAN Tune-up Power (Full)			
WLAN 5.6GHz			
Mode	Channel	Frequency	Max Tune up
802.11a	100	5500	14.5
	116	5580	14.5
	120	5600	14.5
	124	5620	14.5
	132	5660	14.5
	140	5700	14.5
	144	5720	14.5
802.11ac VHT20	100	5500	14.5
	116	5580	14.5
	120	5600	14.5
	124	5620	14.5
	132	5660	14.5
	140	5700	14.5
	144	5720	14.5
802.11ac VHT40	102	5510	14.5
	110	5550	14.5
	118	5590	14.5
	126	5630	14.5
	134	5670	14.5
	142	5710	14.5
802.11ac VHT80	106	5530	14.5
	122	5610	14.5
	138	5690	14.5
802.11ac VHT160	114	5570	14.5
802.11ax HE20	100	5500	14.5
	116	5580	14.5
	120	5600	14.5
	124	5620	14.5
	132	5660	14.5
	140	5700	14.5
	144	5720	14.5
802.11ax HE40	102	5510	14.5
	110	5550	14.5
	118	5590	14.5
	126	5630	14.5
	134	5670	14.5
	142	5710	14.5
802.11ax HE80	106	5530	14.5
	122	5610	14.5
	138	5690	14.5
802.11ax HE160	114	5570	14.5

WLAN Tune-up Power (Full)			
WLAN 5.8GHz			
Mode	Channel	Frequency	Max Tune up
802.11a	149	5745	14.5
	153	5765	14.5
	157	5785	14.5
	161	5805	14.5
	165	5825	14.5
802.11ac VHT20	149	5745	14.5
	153	5765	14.5
	157	5785	14.5
	161	5805	14.5
	165	5825	14.5
802.11ac VHT40	151	5755	14.5
	159	5795	14.5
802.11ac VHT80	155	5775	14.5
802.11ax HE20	149	5745	14.5
	153	5765	14.5
	157	5785	14.5
	161	5805	14.5
	165	5825	14.5
802.11ax HE40	151	5755	14.5
	159	5795	14.5
802.11ax HE80	155	5775	14.5

WLAN Tune-up Power (Full)			
WLAN 5.9GHz			
Mode	Channel	Frequency	Max Tune up
802.11a	169	5845	14.5
	173	5865	14.5
	177	5885	14.5
802.11ac VHT20	169	5845	14.5
	173	5865	14.5
	177	5885	14.5
802.11ac VHT40	167	5835	14.5
	175	5875	14.5
802.11ac VHT80	171	5855	14.5
802.11ac VHT160	163	5815	14.5
802.11ax HE20	169	5845	14.5
	173	5865	14.5
	177	5885	14.5
802.11ax HE40	167	5835	14.5
	175	5875	14.5
802.11ax HE80	171	5855	14.5
802.11ax HE160	163	5815	14.5

WLAN Tune-up Power (Full)			
UNII-5			
Mode	Channel	Frequency	Max Tune up
802.11a	1	5955	8.0
	5	5975	8.0
	9	5995	8.0
	13	6015	8.0
	17	6035	8.0
	21	6055	8.0
	25	6075	8.0
	29	6095	8.0
	33	6115	8.0
	37	6135	8.0
	41	6155	8.0
	45	6175	8.0
	49	6195	8.0
	53	6215	8.0
	57	6235	8.0
	61	6255	8.0
	65	6275	8.0
	69	6295	8.0
	73	6315	8.0
	77	6335	8.0
	81	6355	8.0
	85	6375	8.0
	89	6395	8.0
	93	6415	8.0
802.11ax HE20	1	5955	8.5
	5	5975	8.5
	9	5995	8.5
	13	6015	8.5
	17	6035	8.5
	21	6055	8.5
	25	6075	8.5
	29	6095	8.5
	33	6115	8.5
	37	6135	8.5
	41	6155	8.5
	45	6175	8.5
	49	6195	8.5
	53	6215	8.5
	57	6235	8.5
	61	6255	8.5
	65	6275	8.5
	69	6295	8.5
	73	6315	8.5
	77	6335	8.5
	81	6355	8.5
	85	6375	8.5
	89	6395	8.5
	93	6415	8.5
802.11ax HE40	3	5965	11.5
	11	6005	11.5
	19	6045	11.5
	27	6085	11.5
	35	6125	11.5
	43	6165	11.5
	51	6205	11.5
	59	6245	11.5
	67	6285	11.5
	75	6325	11.5
	83	6365	11.5
	91	6405	11.5
802.11ax HE80	7	5985	14.5
	23	6065	14.5
	39	6145	14.5
	55	6225	14.5
	71	6305	14.5
	87	6385	14.5
802.11ax HE160	15	6025	16.0
	47	6185	16.0
	79	6345	16.0

WLAN Tune-up Power (Full)			
UNII-6			
Mode	Channel	Frequency	SISO Ant 1 Max Tune up
802.11a	97	6435	8.0
	101	6455	8.0
	105	6475	8.0
	109	6495	8.0
	113	6515	8.0
	117	6535	8.0
802.11ax HE20	97	6435	8.5
	101	6455	8.5
	105	6475	8.5
	109	6495	8.5
	113	6515	8.5
	117	6535	8.5
802.11ax HE40	99	6445	11.5
	107	6485	11.5
	115	6525	11.5
802.11ax HE80	103	6465	14.5
	119	6545	14.5
802.11ax HE160	111	6505	16.0

WLAN Tune-up Power (Full)			
UNII-7			
Mode	Channel	Frequency	SISO Ant 1 Max Tune up
802.11a	121	6555	8.0
	125	6575	8.0
	129	6595	8.0
	133	6615	8.0
	137	6635	8.0
	141	6655	8.0
	145	6675	8.0
	149	6695	8.0
	153	6715	8.0
	157	6735	8.0
	161	6755	8.0
	165	6775	8.0
	169	6795	8.0
	173	6815	8.0
	177	6835	8.0
	181	6855	8.0
	185	6875	8.0
802.11ax HE20	121	6555	8.5
	125	6575	8.5
	129	6595	8.5
	133	6615	8.5
	137	6635	8.5
	141	6655	8.5
	145	6675	8.5
	149	6695	8.5
	153	6715	8.5
	157	6735	8.5
	161	6755	8.5
	165	6775	8.5
	169	6795	8.5
	173	6815	8.5
	177	6835	8.5
	181	6855	8.5
	185	6875	8.5
802.11ax HE40	123	6565	11.5
	131	6605	11.5
	139	6645	11.5
	147	6685	11.5
	155	6725	11.5
	163	6765	11.5
	171	6805	11.5
	179	6845	11.5
	187	6885	11.5
802.11ax HE80	135	6625	14.5
	151	6705	14.5
	167	6785	14.5
	183	6865	14.5
802.11ax HE160	143	6665	16.0
	175	6825	16.0

WLAN Tune-up Power (Full)			
UNII-8			
Mode	Channel	Frequency	SISO Ant 1 Max Tune up
802.11a	189	6895	8.0
	193	6915	8.0
	197	6935	8.0
	201	6955	8.0
	205	6975	8.0
	209	6995	8.0
	213	7015	8.0
	217	7035	8.0
	221	7055	8.0
	225	7075	8.0
	229	7095	8.0
	233	7115	8.0
802.11ax HE20	189	6895	8.5
	193	6915	8.5
	197	6935	8.5
	201	6955	8.5
	205	6975	8.5
	209	6995	8.5
	213	7015	8.5
	217	7035	8.5
	221	7055	8.5
	225	7075	8.5
	229	7095	8.5
	233	7115	8.5
802.11ax HE40	195	6925	11.5
	203	6965	11.5
	211	7005	11.5
	219	7045	11.5
	227	7085	11.5
802.11ax HE80	199	6945	14.5
	215	7025	14.5
802.11ax HE160	207	6985	16.0

Annex E. Measured Conducted Power Result

The measuring conducted power (Unit: dBm) are shown as below.

WLAN Conducted Power (Full)			
WLAN2.4GHz			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11b	1	2412	16.39
	6	2437	16.31
	11	2462	16.41
	12	2467	16.33
	13	2472	15.77

Bluetooth			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
BR / EDR	0	2402	11.77
	39	2441	11.99
	78	2480	11.85
LE	0	2402	11.72
	19	2440	11.96
	39	2480	11.93

WLAN 5.3GHz			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ac VHT160	50	5250	14.47

WLAN 5.6GHz			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ac VHT160	114	5570	14.43

WLAN 5.8GHz			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ac VHT80	155	5775	14.31

WLAN 5.9GHz			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ac VHT160	163	5815	14.39

UNII-5			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ax HE160	15	6025	15.38
	47	6185	15.5
	79	6345	15.23

UNII-6			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ax HE160	111	6505	15.52

UNII-7			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ax HE160	143	6665	15.68
	175	6825	15.49

UNII-8			
Mode	Channel	Frequency	SISO Ant 0 Avg. Power
802.11ax HE160	207	6985	15.66

Annex F. SAR and Power Density Test Result

SAR Results for Body Exposure Condition.

Note:
1. SAR testing for WLAN was performed on the maximum power mode.

Body SAR Test Result

System & Position						DUT & Accessory		SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	SKU	Ant Status	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Front Face	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	-0.03	0.312	0.32
	WLAN2.4G	802.11b	Rear Face	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	0.12	0.109	0.11
	WLAN2.4G	802.11b	Left Side	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	0.05	0.241	0.25
	WLAN2.4G	802.11b	Right Side	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	-0.07	0.414	0.42
	WLAN2.4G	802.11b	Top Side	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	0.05	0.316	0.32
1	WLAN2.4G	802.11b	Bottom Side	5	11	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	-0.03	0.726	0.74
	WLAN2.4G	802.11b	Front Face	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	-0.01	0.469	0.48
	WLAN2.4G	802.11b	Rear Face	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	0.18	0.178	0.18
	WLAN2.4G	802.11b	Left Side	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	-0.1	0.324	0.33
	WLAN2.4G	802.11b	Right Side	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	-0.19	0.393	0.40
	WLAN2.4G	802.11b	Top Side	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	0.18	0.353	0.36
	WLAN2.4G	802.11b	Bottom Side	5	11	Div - Ver.A	Ant 2	99.90	1.00	16.50	16.41	1.02	0.13	0.666	0.68
	WLAN2.4G	802.11b	Bottom Side	5	1	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.39	1.03	0.01	0.649	0.67
	WLAN2.4G	802.11b	Bottom Side	5	6	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.31	1.04	0.1	0.649	0.67
	WLAN2.4G	802.11b	Bottom Side	5	12	Div - Ver.A	Ant 1	99.90	1.00	16.50	16.33	1.04	0.13	0.601	0.63
	WLAN2.4G	802.11b	Bottom Side	5	13	Div - Ver.A	Ant 1	99.90	1.00	16.50	15.77	1.18	0.01	0.581	0.69
	WLAN2.4G	802.11b	Bottom Side	5	11	Div - Ver.B	Ant 1	99.90	1.00	16.50	16.41	1.02	-0.07	0.573	0.58
	WLAN2.4G	802.11b	Bottom Side	5	11	1Tx - Ver.A	Ant 1	99.90	1.00	16.50	16.41	1.02	0.09	0.584	0.60
	WLAN2.4G	802.11b	Bottom Side	5	11	1Tx - Ver.B	Ant 1	99.90	1.00	16.50	16.41	1.02	-0.04	0.572	0.58
	WLAN5.3G	802.11ac VHT160	Front Face	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	0.16	0.518	0.52
	WLAN5.3G	802.11ac VHT160	Rear Face	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	0.02	0.139	0.14
	WLAN5.3G	802.11ac VHT160	Left Side	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	-0.03	0.404	0.41
	WLAN5.3G	802.11ac VHT160	Right Side	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	0.07	0.2	0.20
	WLAN5.3G	802.11ac VHT160	Top Side	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	-0.05	0.503	0.51
2	WLAN5.3G	802.11ac VHT160	Bottom Side	5	50	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	-0.03	0.744	0.75
	WLAN5.3G	802.11ac VHT160	Front Face	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	0.01	0.575	0.58
	WLAN5.3G	802.11ac VHT160	Rear Face	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	-0.05	0.168	0.17
	WLAN5.3G	802.11ac VHT160	Left Side	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	0.12	0.432	0.44
	WLAN5.3G	802.11ac VHT160	Right Side	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	0.05	0.171	0.17
	WLAN5.3G	802.11ac VHT160	Top Side	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	-0.09	0.494	0.50
	WLAN5.3G	802.11ac VHT160	Bottom Side	5	50	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.47	1.01	0.03	0.605	0.61
	WLAN5.3G	802.11ac VHT160	Bottom Side	5	50	Div - Ver.B	Ant 1	99.90	1.00	14.50	14.47	1.01	0.01	0.596	0.60
	WLAN5.3G	802.11ac VHT160	Bottom Side	5	50	1Tx - Ver.A	Ant 1	99.90	1.00	14.50	14.47	1.01	-0.16	0.555	0.56
	WLAN5.3G	802.11ac VHT160	Bottom Side	5	50	1Tx - Ver.B	Ant 1	99.90	1.00	14.50	14.47	1.01	0.05	0.592	0.60

Body SAR Test Result

System & Position						DUT & Accessory		SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	SKU	Ant Status	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN5.6G	802.11ac VHT160	Front Face	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	0.03	0.569	0.58
	WLAN5.6G	802.11ac VHT160	Rear Face	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	-0.12	0.153	0.16
	WLAN5.6G	802.11ac VHT160	Left Side	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	0.05	0.444	0.45
	WLAN5.6G	802.11ac VHT160	Right Side	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	-0.09	0.219	0.22
	WLAN5.6G	802.11ac VHT160	Top Side	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	0.07	0.552	0.56
3	WLAN5.6G	802.11ac VHT160	Bottom Side	5	114	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	0.06	0.737	0.75
	WLAN5.6G	802.11ac VHT160	Front Face	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	-0.01	0.631	0.64
	WLAN5.6G	802.11ac VHT160	Rear Face	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	0.13	0.185	0.19
	WLAN5.6G	802.11ac VHT160	Left Side	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	-0.1	0.474	0.48
	WLAN5.6G	802.11ac VHT160	Right Side	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	0.12	0.188	0.19
	WLAN5.6G	802.11ac VHT160	Top Side	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	-0.12	0.543	0.55
	WLAN5.6G	802.11ac VHT160	Bottom Side	5	114	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.43	1.02	-0.06	0.664	0.68
	WLAN5.6G	802.11ac VHT160	Bottom Side	5	114	Div - Ver.B	Ant 1	99.90	1.00	14.50	14.43	1.02	-0.1	0.654	0.67
	WLAN5.6G	802.11ac VHT160	Bottom Side	5	114	1Tx - Ver.A	Ant 1	99.90	1.00	14.50	14.43	1.02	-0.19	0.609	0.62
	WLAN5.6G	802.11ac VHT160	Bottom Side	5	114	1Tx - Ver.B	Ant 1	99.90	1.00	14.50	14.43	1.02	0.18	0.649	0.66
	WLAN5.8G	802.11ac VHT80	Front Face	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.17	0.619	0.64
	WLAN5.8G	802.11ac VHT80	Rear Face	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.18	0.166	0.17
	WLAN5.8G	802.11ac VHT80	Left Side	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.19	0.483	0.50
	WLAN5.8G	802.11ac VHT80	Right Side	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	0.07	0.239	0.25
	WLAN5.8G	802.11ac VHT80	Top Side	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.15	0.6	0.62
4	WLAN5.8G	802.11ac VHT80	Bottom Side	5	155	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.01	0.759	0.79
	WLAN5.8G	802.11ac VHT80	Front Face	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	-0.01	0.686	0.71
	WLAN5.8G	802.11ac VHT80	Rear Face	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	-0.1	0.201	0.21
	WLAN5.8G	802.11ac VHT80	Left Side	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	0.08	0.516	0.54
	WLAN5.8G	802.11ac VHT80	Right Side	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	-0.02	0.205	0.21
	WLAN5.8G	802.11ac VHT80	Top Side	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	-0.05	0.59	0.61
	WLAN5.8G	802.11ac VHT80	Bottom Side	5	155	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.31	1.04	-0.06	0.722	0.75
	WLAN5.8G	802.11ac VHT80	Bottom Side	5	155	Div - Ver.B	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.1	0.712	0.74
	WLAN5.8G	802.11ac VHT80	Bottom Side	5	155	1Tx - Ver.A	Ant 1	99.90	1.00	14.50	14.31	1.04	-0.02	0.662	0.69
	WLAN5.8G	802.11ac VHT80	Bottom Side	5	155	1Tx - Ver.B	Ant 1	99.90	1.00	14.50	14.31	1.04	0.16	0.706	0.73

Body SAR Test Result

System & Position						DUT & Accessory		SAR							
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	SKU	Ant Status	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN5.9G	802.11ac VHT160	Front Face	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	0.11	0.527	0.54
	WLAN5.9G	802.11ac VHT160	Rear Face	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	0.03	0.141	0.15
	WLAN5.9G	802.11ac VHT160	Left Side	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	-0.07	0.411	0.42
	WLAN5.9G	802.11ac VHT160	Right Side	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	0.05	0.203	0.21
	WLAN5.9G	802.11ac VHT160	Top Side	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	-0.13	0.511	0.53
5	WLAN5.9G	802.11ac VHT160	Bottom Side	5	163	Div - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	-0.08	0.712	0.73
	WLAN5.9G	802.11ac VHT160	Front Face	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	0.07	0.584	0.60
	WLAN5.9G	802.11ac VHT160	Rear Face	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	-0.01	0.171	0.18
	WLAN5.9G	802.11ac VHT160	Left Side	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	0.05	0.439	0.45
	WLAN5.9G	802.11ac VHT160	Right Side	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	-0.02	0.174	0.18
	WLAN5.9G	802.11ac VHT160	Top Side	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	0.01	0.502	0.52
	WLAN5.9G	802.11ac VHT160	Bottom Side	5	163	Div - Ver.A	Ant 2	99.90	1.00	14.50	14.39	1.03	0.03	0.615	0.63
	WLAN5.9G	802.11ac VHT160	Bottom Side	5	163	Div - Ver.B	Ant 1	99.90	1.00	14.50	14.39	1.03	-0.09	0.606	0.62
	WLAN5.9G	802.11ac VHT160	Bottom Side	5	163	1Tx - Ver.A	Ant 1	99.90	1.00	14.50	14.39	1.03	-0.06	0.564	0.58
	WLAN5.9G	802.11ac VHT160	Bottom Side	5	163	1Tx - Ver.B	Ant 1	99.90	1.00	14.50	14.39	1.03	0.02	0.601	0.62
	BT	BDR	Front Face	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	0.08	0.212	0.28
	BT	BDR	Rear Face	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.06	0.074	0.10
	BT	BDR	Left Side	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.04	0.164	0.22
	BT	BDR	Right Side	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	0.07	0.282	0.38
	BT	BDR	Top Side	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.09	0.216	0.29
6	BT	BDR	Bottom Side	5	39	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.08	0.573	0.77
	BT	BDR	Front Face	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.01	0.319	0.43
	BT	BDR	Rear Face	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.14	0.121	0.16
	BT	BDR	Left Side	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.1	0.221	0.30
	BT	BDR	Right Side	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.03	0.268	0.36
	BT	BDR	Top Side	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.19	0.24	0.32
	BT	BDR	Bottom Side	5	39	Div - Ver.A	Ant 2	74.47	1.34	12.00	11.99	1.00	-0.03	0.401	0.54
	BT	BDR	Bottom Side	5	0	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.77	1.05	0.11	0.389	0.55
	BT	BDR	Bottom Side	5	78	Div - Ver.A	Ant 1	74.47	1.34	12.00	11.85	1.04	0.05	0.386	0.54
	BT	BDR	Bottom Side	5	39	Div - Ver.B	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.03	0.391	0.52
	BT	BDR	Bottom Side	5	39	1Tx - Ver.A	Ant 1	74.47	1.34	12.00	11.99	1.00	0.15	0.398	0.53
	BT	BDR	Bottom Side	5	39	1Tx - Ver.B	Ant 1	74.47	1.34	12.00	11.99	1.00	-0.07	0.389	0.52

SAR and Power Density Test Result

System & Position						DUT & Accessory		SAR								Power Density								
Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Channel	SKU	Ant Status	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Measured APD W/m^2 (4cm^2)	Grid Step [λ]	iPD [W/m2]	Scaling Factor for Measurement Uncertainty	Averaging Area [cm2]	Power Drift [dB]	Normal psPD [W/m2]	Scaled Normal psPD [W/m2]	Total psPD [W/m2]	Scaled Total psPD [W/m2]
	UNII-7	802.11ax HE160	Front Face	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	-0.03	0.38	0.41	3.37			-				-		-
	UNII-7	802.11ax HE160	Rear Face	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	0.12	0.299	0.32	2.64			-				-		-
	UNII-7	802.11ax HE160	Left Side	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	0.05	0.211	0.23	1.87			-				-		-
	UNII-7	802.11ax HE160	Right Side	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	0.09	0.54	0.58	4.78			-				-		-
	UNII-7	802.11ax HE160	Top Side	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	-0.07	0.659	0.71	5.84			-				-		-
7	UNII-7	802.11ax HE160	Bottom Side	5	143	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.68	1.08	-0.05	0.728	0.79	6.45	0.25	8.97	1.545	4.00	-0.06	**4.79**	7.4	5.12	**7.91**
	UNII-7	802.11ax HE160	Front Face	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	0.11	0.312	0.34	2.77			-				-		-
	UNII-7	802.11ax HE160	Rear Face	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	0.05	0.229	0.25	2.03			-				-		-
	UNII-7	802.11ax HE160	Left Side	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	-0.03	0.187	0.20	1.66			-				-		-
	UNII-7	802.11ax HE160	Right Side	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	0.08	0.52	0.56	4.61			-				-		-
	UNII-7	802.11ax HE160	Top Side	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	0.01	0.691	0.75	6.12			-				-		-
	UNII-7	802.11ax HE160	Bottom Side	5	143	Div - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	-0.07	0.641	0.69	5.68			-				-		-
	UNII-5	802.11ax HE160	Bottom Side	5	15	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.38	1.15	0.13	0.534	0.61	4.73			-				-		-
	UNII-5	802.11ax HE160	Bottom Side	5	47	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.50	1.12	-0.06	0.496	0.56	4.39			-				-		-
	UNII-5	802.11ax HE160	Bottom Side	5	79	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.23	1.19	0.01	0.487	0.58	4.31			-				-		-
	UNII-6	802.11ax HE160	Bottom Side	5	111	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.52	1.12	-0.08	0.579	0.65	5.13			-				-		-
	UNII-7	802.11ax HE160	Bottom Side	5	175	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.49	1.12	0.12	0.684	0.77	6.06			-				-		-
	UNII-8	802.11ax HE160	Bottom Side	5	207	Div - Ver.A	Ant 1	99.90	1.00	16.00	15.66	1.08	0.06	0.681	0.74	6.03			-				-		-
	UNII-7	802.11ax HE160	Bottom Side	5	143	Div - Ver.B	Ant 2	99.90	1.00	16.00	15.68	1.08	-0.11	0.691	0.75	6.12			-				-		-
	UNII-7	802.11ax HE160	Bottom Side	5	143	1Tx - Ver.A	Ant 2	99.90	1.00	16.00	15.68	1.08	0.07	0.678	0.73	6.01			-				-		-
	UNII-7	802.11ax HE160	Bottom Side	5	143	1Tx - Ver.B	Ant 2	99.90	1.00	16.00	15.68	1.08	0.02	0.672	0.73	5.95			-				-		-

Annex G. SAR Measurement Variability

Since all the measured SAR_{1g} are less than 0.8 W/kg, the repeated measurement is not required.

Annex H. Analysis of Simultaneous Transmission SAR

The simultaneous transmission evaluation are shown as below.

<Possibilities of Simultaneous Transmission>

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
A	WLAN 5G + BT	Yes
B	WLAN 6G + BT	Yes

Notes

1. WLAN 2.4G & BT cannot transmit simultaneously in this device.

Simultaneous Transmission SAR Evaluation					
Position	1	2	3	A (1 + 3)	B (2 + 3)
	Max WLAN 5GHz	**Max WLAN 6G**	**Max BT**	Summimg result 1g SAR W/kg	Summimg result 1g SAR W/kg
	1g SAR W/kg	**1g SAR W/kg**	**1g SAR W/kg**		
Front Face	0.71	0.41	0.43	1.14	0.84
Rear Face	0.21	0.32	0.16	0.37	0.48
Left Side	0.54	0.23	0.30	0.84	0.53
Right Side	0.25	0.58	0.38	0.63	0.96
Top Side	0.62	0.75	0.32	0.94	1.07
Bottom Side	0.79	0.79	0.77	1.56	1.56

Annex I. SAR to Peak Location Separation Ratio Analysis.

Since sum of simultaneous transmission SAR is less than the SAR limit for Body / Head : SAR_{1g} 1.6 W/kg ; Extremity SAR_{10g} 4.0 W/kg. There is no requirement for SAR to Peak Location Separation Ratio Analysis.

Annex J. Calibration of Test Equipment List

Calibration of Test Equipment List are shown as below.

Equipment for SAR Test					
Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D2450V2	737	Aug. 26, 2021	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1019	Mar. 19, 2021	1 Year
System Validation Dipole	SPEAG	D6.5GHzV2	1029	Feb. 10, 2021	1 Year
System Verification Source	SPEAG	5G Verification Source 10 GHz	1025	Jan. 19, 2021	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3820	Jul. 28, 2021	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3650	Mar. 26, 2021	1 Year
E-Field Probe	SPEAG	EUmmWV4	9438	Jul. 26, 2021	1 Year
Data Acquisition Electronics	SPEAG	DAE4	861	Apr. 14, 2021	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1590	Sep. 20, 2021	1 Year
Spectrum Analyzer	R&S	FSL6	102006	Apr. 06, 2021	1 Year
Power Meter	Anritsu	ML2495A	1218009	Jun. 24, 2021	1 Year
Universal Wireless Test Set	Anritsu	MT8870A/MU887000A	6201699387	Sep. 22, 2021	1 Year
Thermometer	YFE	YF-160A	191100743	Apr. 12, 2021	1 Year
Dielectric Assessment Kit	SPEAG	DAKS-3.5	1151	Jul. 14, 2021	1 Year
Powersource1	SPEAG	SE_UMS_160 BA	4010	Jul. 13, 2021	1 Year

Annex K. Considerations Related to Bluetooth for Setup and Testing

This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

The Bluetooth call box has been used during SAR measurement and the EUT was set to DH5 mode at the maximum output power. Its duty factor was calculated as below and the measured SAR for Bluetooth would be scaled to the 100% transmission duty factor to determine compliance.

The duty factor of Bluetooth signal are shown as below.

<Time-domain plot for Bluetooth transmission signal>

Time-domain plot for Bluetooth transmission signal

The duty factor of Bluetooth signal has been calculated as following.

Duty Factor = Pulse Width / Total Period = (8032 - 5232) / (8992 - 5232) = 74.47%