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SAR TEST REPORT

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue:** 03. 18, 2019 **Test Report No.:** HCT-SR-1903-FI003-R1 **Test Site: HCT CO., LTD.**

FCC ID: **A3LSMT720**

Equipment Type:	**Tablet**
Application Type	**Certification**
FCC Rule Part(s):	**CFR §2.1093**
Model Name:	**SM-T720**
Additional FCC Model(s):	**SM-T720X**
Date of Test:	**03/14/2019**

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested By	**Reviewed By**
이다솔	
Da-sol, Lee **Test Engineer** **SAR Team** **Certification Division**	**Yun-jeang, Heo** **Technical Manager** **SAR Team** **Certification Division**

DOCUMENT HISTORY

Rev.	DATE	DESCRIPTION
HCT-SR-1903-FI003	03. 15, 2019	First Approval Report
HCT-SR-1903-FI003-R1	03. 18, 2019	Revised Sec 2.3, 2.5 11.2 and attachment 5.

Table of Contents

1. ATTESTATION OF TEST RESULT OF DEVICE UNDER TEST

Test Laboratory	
Company Name:	HCT Co., LTD
Address:	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of Korea
Telephone:	+82 31 645 6300
Fax.:	+82 31 645 6401

Attestation of SAR test result			
Applicant Name:	SAMSUNG Electronics Co., Ltd.		
FCC ID:	A3LSMT720		
Model:	SM-T720		
Additional FCC Model(s):	SM-T720X		
EUT Type:	Tablet		
Application Type:	Certification		
The Highest Reported SAR			
Band	**Tx. Frequency (MHz)**	**Equipment Class**	**Reported 1g Body SAR (W/kg)**
802.11b	2 412 ~ 2 472	DTS	1.03
U-NII-1	5 180 ~ 5 240	NII	N/A
U-NII-2A	5 260 ~ 5 320	NII	0.58
U-NII-2C	5 500 ~ 5 720	NII	1.37
U-NII-3	5 745 ~ 5 825	NII	1.04
Bluetooth	2 402 ~ 2 480	DSS	0.45
Date(s) of Tests:	03/14/2019		

2. DEVICE UNDER TEST DESCRIPTION

2.1 DUT specification

<table>
<tr><th colspan="3">Device Wireless specification overview</th></tr>
<tr><th>Band & Mode</th><th>Operating Mode</th><th>Tx Frequency</th></tr>
<tr><td>2.4GHz WLAN</td><td>Data</td><td>2 412 ~ 2 472 MHz</td></tr>
<tr><td>U-NII-1</td><td>Data</td><td>5 180 ~ 5 240 MHz</td></tr>
<tr><td>U-NII-2A</td><td>Data</td><td>5 260 ~ 5 320 MHz</td></tr>
<tr><td>U-NII-2C</td><td>Data</td><td>5 500 ~ 5 720 MHz</td></tr>
<tr><td>U-NII-3</td><td>Data</td><td>5 745 ~ 5 825 MHz</td></tr>
<tr><td>Bluetooth v5.0</td><td>Data</td><td>2 402 ~ 2 480 MHz</td></tr>
<tr><td>ANT+</td><td>Data</td><td>2 402 ~ 2 480 MHz</td></tr>
</table>

<table>
<tr><th colspan="3">Device Description</th></tr>
<tr><td>Device Dimension</td><td colspan="2">Overall (Length x Width): 245 mm x 160 mm
Overall Diagonal: 286 mm
Display Diagonal: 268 mm</td></tr>
<tr><td rowspan="2">Battery Options:</td><td colspan="2">Standard (Li-ion Polymer Battery)</td></tr>
<tr><td colspan="2">Battery Model Name: EB-BT725ABU (BYD)</td></tr>
<tr><td>Keyboard Options:</td><td colspan="2">Model Name: EJ-FT720 (SAMSUNG)</td></tr>
<tr><td rowspan="4">Device Serial Numbers</td><td>Mode</td><td>Serial Number</td></tr>
<tr><td>2.4GHz WLAN / Bluetooth</td><td>R32M100GBEA</td></tr>
<tr><td>5GHz WLAN</td><td>R32M100GFJJ</td></tr>
<tr><td colspan="2">The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.</td></tr>
<tr><td>Cover</td><td colspan="2">Keyboard cover</td></tr>
</table>

2.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for SAR compliance. The power reduction mechanism is activated when the device is used in close proximity to user's Body. FCC KDB Publication 616217 D04v01r02 Sec.6 was used as a guideline for selecton SAR test distances for device when being used in Proximity use conditions. Detailed descriptions of the power reduction mechanism are included in the operational description.

The reduced powers for the power reduction mechanisms were conformed via conducted power measurements at the RF Port.and verified Reduced power at attachment 5

2.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB publication 447498 D01v06.

2.3.1 Maximum WLAN/ Bluetooth Power

Mode/Band			Modulated Average (dBm)				
Mode	Ch.		IEEE 802.11				
			a	b	g	n	ac
2.4 GHz WIFI (Inactive)	Ch.1	Maximum	N/A	20	19.5	18.5	N/A
		Nominal	N/A	19	18.5	17.5	N/A
	Ch.2~11	Maximum	N/A	20	20	20	N/A
		Nominal	N/A	19	19	18	N/A
	Ch.12	Maximum	N/A	9	9	9	N/A
		Nominal	N/A	8	8	8	N/A
	Ch.13	Maximum	N/A	3	3	3	N/A
		Nominal	N/A	2	2	2	N/A
5 GHz WIFI (20 MHz) (Inactive)	(U-NII-1) 5200 MHz	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
	(U-NII-2A) 5300 MHz	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
	(U-NII-2C) 5500 MHz	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
	(U-NII-3) 5800 MHz	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
5 GHz WIFI (40 MHz) (Inactive)	(U-NII-1) 5190MHz	Maximum	N/A	N/A	N/A	16	16
		Nominal	N/A	N/A	N/A	15	15
	(U-NII-1) 5230MHz	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-2A) 5270MHz	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-2A) 5310MHz	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-2C) 5510MHz	Maximum	N/A	N/A	N/A	16.5	16.5
		Nominal	N/A	N/A	N/A	15.5	15.5
	(U-NII-2C) 5550MHz ~5710MHz	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-3) 5815MHz	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
5 GHz WIFI (80 MHz) (Inactive)	(U-NII-1) 5210MHz	Maximum	N/A	N/A	N/A	N/A	14
		Nominal	N/A	N/A	N/A	N/A	13
	(U-NII-A) 5290MHz	Maximum	N/A	N/A	N/A	N/A	14.5
		Nominal	N/A	N/A	N/A	N/A	13.5
	(U-NII-2C) 5530MHz	Maximum	N/A	N/A	N/A	N/A	14
		Nominal	N/A	N/A	N/A	N/A	13
	(U-NII-2C) 5610MHz~ 5690MHz	Maximum	N/A	N/A	N/A	N/A	18
		Nominal	N/A	N/A	N/A	N/A	17
	(U-NII-3) 5775MHz	Maximum	N/A	N/A	N/A	N/A	18
		Nominal	N/A	N/A	N/A	N/A	17

Mode/Band			Modulated Average (dBm)				
Mode	Ch.		IEEE 802.11				
			a	b	g	n	ac
2.4 GHz WIFI (Active)	Ch.1~11	Maximum	N/A	13	13	13	N/A
		Nominal	N/A	12	12	12	N/A
	Ch.12	Maximum	N/A	-	-	-	N/A
		Nominal	N/A	-	-	-	N/A
	Ch.13	Maximum	N/A	-	-	-	N/A
		Nominal	N/A	-	-	-	N/A
5 GHz WIFI (20 MHz) (Active)	5200 MHz	Maximum	10	N/A	N/A	10	10
		Nominal	9	N/A	N/A	9	9
	5300 MHz	Maximum	10	N/A	N/A	10	10
		Nominal	9	N/A	N/A	9	9
	5500 MHz	Maximum	10	N/A	N/A	10	10
		Nominal	9	N/A	N/A	9	9
	5800 MHz	Maximum	10	N/A	N/A	10	10
		Nominal	9	N/A	N/A	9	9
5 GHz WIFI (40 MHz) (Active)	5200 MHz	Maximum	N/A	N/A	N/A	10	10
		Nominal	N/A	N/A	N/A	9	9
	5300 MHz	Maximum	N/A	N/A	N/A	10	10
		Nominal	N/A	N/A	N/A	9	9
	5500 MHz	Maximum	N/A	N/A	N/A	10	10
		Nominal	N/A	N/A	N/A	9	9
	5800 MHz	Maximum	N/A	N/A	N/A	10	10
		Nominal	N/A	N/A	N/A	9	9
5 GHz WIFI (80 MHz) (Active)	5200 MHz	Maximum	N/A	N/A	N/A	N/A	10
		Nominal	N/A	N/A	N/A	N/A	9
	5300 MHz	Maximum	N/A	N/A	N/A	N/A	10
		Nominal	N/A	N/A	N/A	N/A	9
	5500 MHz	Maximum	N/A	N/A	N/A	N/A	10
		Nominal	N/A	N/A	N/A	N/A	9
	5800 MHz	Maximum	N/A	N/A	N/A	N/A	10
		Nominal	N/A	N/A	N/A	N/A	9

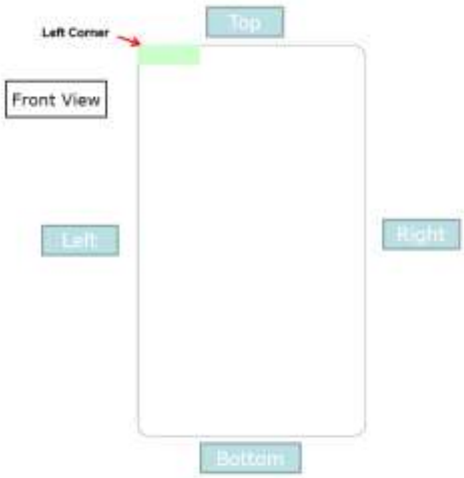
Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	9.5
	Nominal	8.5
Bluetooth LE	Maximum	7.0
	Nominal	6.0

2.4 Test Methodology and Procedures

The tests documented in this report were performed in accordance with IEEE Standard 1528-2013 and the following published KDB procedures.

- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB Publication 447498 D01 General SAR Guidance v06
- FCC KDB Publication 616217 D04 SAR for laptop and Tablets v01r02
- FCC KDB Publication 648474 D04 Handset SAR v01r03
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r02

2.5 SAR Test Configurations



Full Power Condition: Sensor Inactive

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					SAR Test Exclusion Thresholds (test separation distances < 50 mm) threshold value <3					SAR Test Exclusion Thresholds(test separation distances > 50 mm) Power mW				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
WLAN	BT	2 480	9.5	8.9	0	0	0	116	234	2.80	2.80	0.30	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	1187.2	3138.1
WLAN	2.4 GHz	2 472	20	100	0	0	0	116	234	31.45	31.45	3.42	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	1183.68	3128.3
WLAN	5 GHz	5 825	19	79.4	0	0	0	116	234	38.33	38.33	4.17	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	2385.2	3104.1

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					Device Conifigurations for SAR Testing				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
WLAN	BT	2 480	9.5	8.9	0	0	0	116	234	Yes	Yes	Yes	No	No
WLAN	2.4 GHz	2 472	20	100.0	0	0	0	116	234	Yes	Yes	Yes	No	No
WLAN	5 GHz	5 825	19	79.4	0	0	0	116	234	Yes	Yes	Yes	No	No

Reduced Power Condition: Sensor Active

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					SAR Test Exclusion Thresholds (test separation distances < 50 mm) threshold value <3					SAR Test Exclusion Thresholds (test separation distances > 50 mm) mW				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
WLAN	BT	2 480	9.5	8.9	0	0	0	116	234	2.83	2.83	2.80	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	1187.2	3138.1
WLAN	2.4 GHz	2 472	13	20	0	0	0	116	234	6.29	6.29	6.29	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	1183.68	3128.3
WLAN	5 GHz	5 825	10	10	0	0	0	116	234	4.83	4.83	4.83	distances < 50 mm	distances < 50 mm	distances >50 mm	distances >50 mm	distances >50 mm	2385.2	3104.1

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					Device Conifigurations for SAR Testing				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
WLAN	BT	2 480	9.5	8.9	0	0	0	116	234	234	Yes	Yes	No	No
WLAN	2.4 GHz	2 472	13	20.0	0	0	0	116	234	234	Yes	Yes	No	No
WLAN	5 GHz	5 825	10	10.0	0	0	0	116	234	234	Yes	Yes	No	No

Antennas <50mm to adjacent edges: According to KDB 447498 D01v06, if the calculated threshold value >3 then SAR test is required.
Antennas >50mm to adjacent edges: According to KDB 447498 D01v06, if the power threshold is less than the output power ,SAR is required.

Antennas <50mm to adjacent edges: According to KDB 447498 D01v06, if the calculated threshold value >3 then SAR test is required.

Per FCC KDB 447498 D01v06, The SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1\mathrm{g}\ \ \mathrm{SAR}), 7.5(10\mathrm{g}\ \ \mathrm{SAR})$$

Antennas >50mm to adjacent edges: According to KDB 447498 D01v06, if the power threshold is less than the output power ,SAR is required.

Per KDB 447498 D01v06 Sec 4.3.1 b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B)
1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

Additional Test Scenarios

Test Configurations	SAR Required	Note
Left Corner	Yes	2.4GHz /5GHz WLAN

Note; All test configurations are based on front view.
Per FCC KDB Publication 616217 D04v01r02, the rear surface and edges of tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closet distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

2.6 SAR Test Considerations

2.6.1 WiFi

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg for 1g SAR and is less than 3.0 W/kg for 10g SAR, SAR is not required for U-NII-1 band according to FCC KDB 248227D01v02r01.

This device supports IEEE 802.11 ac with the following features:

a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) TDWR channels are supported.
f) Straddle channels are supported

2.6.2 Bluetooth LE

Per FCC KDB 447498 D01v06, The SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1\text{g SAR}), 7.5(10\text{g SAR})$$

Mode		Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0
		[MHz]	[mW]	[mm]	1-g SAR
Bluetooth LE	BodySAR	2 480	5.0	5	1.6
			5.0	5	

Based on the maximum conducted power of Bluetooth LE and antenna to use separation distance, Bluetooth LE SAR was not required [(5/5)*√2.480] = 1.6≤3.0 for 1-g SAR.

The Reported SAR for WLAN and Bluetooth

The Reported SAR = The Measured SAR *- $\frac{Maximum\ tune{-}up\ (mW)}{Measured\ Conducted\ Power(mW)}$ * Duty factor

3. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$\boxed{SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right)}$$

Figure 1. SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg)

$$SAR = \sigma E^2 / \rho$$

Where:
σ = conductivity of the tissue-simulant material (S/m)
ρ = mass density of the tissue-simulant material (kg/㎥)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

4. DESCRIPTION OF TEST EQUIPMENT

4.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY4 & DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

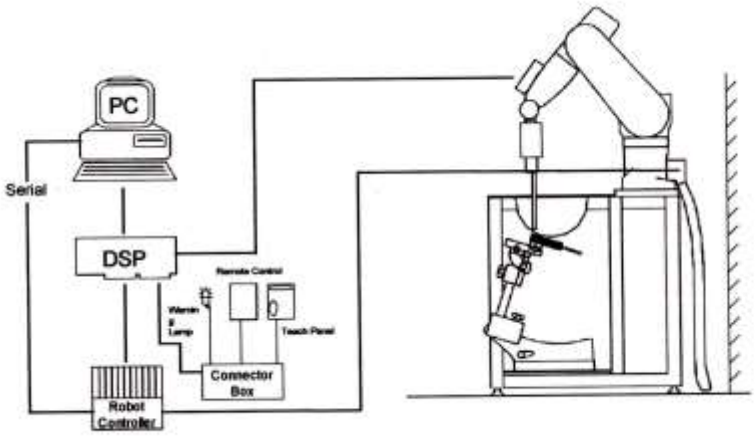


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

5. SAR MEASUREMENT PROCEDURE

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013

1. The SAR distribution at the exposed side of the head or body was measured at a distance no more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.

2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.

3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 table 4-1 and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (reference from the DASY manual.)

   a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

<table>
<tr><td colspan="3"></td><td>$\leq$ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5±1 mm</td><td>$\frac{1}{2}\cdot\delta\cdot\ln(2)\pm0.5$ mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30°±1°</td><td>20°±1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan Spatial resolution: Δx_{Area}, Δy_{Area}</td><td>$\leq$ 2 GHz: $\leq$15 mm
2-3 GHz: $\leq$12 mm</td><td>3-4 GHz: $\leq$12 mm
4-6 GHz: $\leq$10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan Spatial resolution: Δx_{zoom}, Δy_{zoom}</td><td>$\leq$ 2 GHz: $\leq$8mm
2-3 GHz: $\leq$5mm*</td><td>3-4 GHz: $\leq$5 mm*
4-6 GHz: $\leq$4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan Spatial resolution normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3-4 GHz: $\leq$4 mm
4-5 GHz: $\leq$3 mm
5-6 GHz: $\leq$2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{zoom}(1)$: between 1st two Points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3-4 GHz: $\leq$3 mm
4-5 GHz: $\leq$2.5 mm
5-6 GHz: $\leq$2 mm</td></tr>
<tr><td>$\Delta z_{zoom}(n>1)$: between subsequent Points</td><td colspan="2">$\leq 1.5\cdot\Delta z_{zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3-4 GHz: $\geq$28 mm
4-5 GHz: $\geq$25 mm
5-6 GHz: $\geq$22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

6. DESCRIPTION OF TEST POSITION

6.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε and loss tangent δ=0.02

6.2 SAR Testing for Tablet Per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configuration. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

6.3 Proximity Sensor Considerations.

This device uses a sensor to reduce output powers in cetain use conditions when the device is used close the user’s body.

When the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power However, the proximity sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, an additional exposure condition is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level.

FCC KDB 616217 D04 Section 8 was used as a guideline for selecting SAR test distances for this device at these additional exposure conditions. The smallest separation distance determined by the sensor triggering and sensor coverage for each applicable edge, minus 1 mm. was used as the test separation distance for SAR testing. Sensor triggering distance summary data is included in below table.

The proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antennas.

7. RF EXPOSURE LIMITS

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population	CONTROLLED ENVIRONMENT Occupational
	(W/kg) or (mW/g)	(W/kg) or (mW/g)
SPATIAL PEAK SAR * (Head)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

******* The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be mad fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

8. FCC SAR GENERAL MEASUREMENT PROCEDURES

Power Measurements for licensed transmitters are performed using a base simulator under digital average power

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as Reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

8.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR system to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92-96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.2.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg for 1g SAR or > 3.0 W/kg for 10g SAR. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg for 1g SAR or > 3.0 W/kg for 10g SAR.

8.2.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 -5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.
Unless band gap channels are permanently disabled, SAR must be considered for these channels.

8.2.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating nest to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g SAR and ≤ 1.0 W/kg for 10g SAR, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg for 1g SAR and ≤ 2.0 W/kg for 10g SAR or all test positions are measured.

8.2.5 2.4 GHz SAR test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS is that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

8.2.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate and lowest order 802.11 a/g/n/ac mode. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11 ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.2., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.2.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 GHZ and 5 GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 dB of each other, mid channel of the transmission mode with highest average RF output power is the initial test channel. Otherwise, the channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements.

8.2.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position on procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg for 1g SAR and ≤ 3.0 W/kg for 10g SAR, no additional SAR tests for the subsequent test configurations are required.

9. OUTPUT POWER SPECIFICATIONS

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB publication 447498 D01v06.

9.1 WiFi

WLAN Conducted power measurement method

2.4 GHz DTS Test Procedure
The transmitter output is connected to the Power Meter.

▪ Peak Power (Procedure 8.3.1.3 in KDB 558074 v05, Procedure 11.9.1.3 in ANSI 63.10-2013)
: Measure the peak power of the transmitter.

▪ Average Power (Procedure 8.3.2.3 in KDB 558074 v05, Procedure 11.9.2.3 in ANSI 63.10-2013)

1) Measure the duty cycle.
2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

UNII Test Procedure(Power Meter)
We tested according to Procedure E.3.a in KDB 789033 D02 v02r01.

1) Measure the duty cycle.
2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

UNII Test Procedure(Spectrum Analyzer)
The transmitter output is connected to the Spectrum Analyzer.
We use the spectrum analyzer's integrated band power measurement function.
We tested according to Procedure E.2.d) in KDB 789033 D02 v02r01.

1) Measure the duty cycle.
2) Set span to encompass the 26 dB EBW of the signal.
3) RBW = 1 MHz.
4) VBW ≥ 3 MHz.
5) Number of points in sweep ≥ 2*span/RBW.
6) Sweep time = auto.
7) Detector = RMS.
8) Do not use sweep triggering. Allow the sweep to “free run”.
9) Trace average at least 100 traces in power averaging(RMS) mode
10) Integrated bandwidth = OBW

Add 10log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

9.1.1 WiFi Maximum Conducted Power

IEEE 802.11 Average Conducted Power

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2 412	1	18.20
	2 437	6	18.79
	2 462	11	18.04
	2 467	12	7.22
	2 472	13	1.92
802.11g	2 412	1	17.81
	2 417	2	18.38
	2 437	6	18.83
	2 462	11	17.63
	2 467	12	6.82
	2 472	13	1.41
802.11n (HT20)	2 412	1	16.61
	2 417	2	17.30
	2 437	6	17.75
	2 462	11	17.06
	2 467	12	6.69
	2 472	13	1.29

IEEE 802.11a Average RF Power– 20 MHz Bandwidth (Maximum Conducted Power)

Mode	Freq. [MHz]	Channel	IEEE 802.11 (5 GHz) Conducted Power [dBm]
802.11a	5 180	36	17.30
	5 200	40	17.07
	5 220	44	17.01
	5 240	48	17.02
	5 260	52	17.28
	5 280	56	17.63
	5 300	60	17.73
	5 320	64	17.75
	5 500	100	17.49
	5 580	116	17.42
	5 600	120	17.39
	5 620	124	17.25
	5 720	144	17.19
	5 745	149	17.38
	5 785	157	17.22
	5 825	165	17.37

9.1.2 WiFi Reduced Conducted Power

IEEE 802.11 Reduced Average RF Conducted Power

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2 412	1	11.40
	2 437	6	11.91
	2 462	11	11.27
802.11g	2 412	1	11.45
	2 437	6	11.82
	2 462	11	11.35
802.11n (HT20)	2 412	1	11.32
	2 437	6	11.67
	2 462	11	11.22

IEEE 802.11ac Reduced Average RF Conducted Power – 80 MHz Bandwidth

Mode	Freq. [MHz]	Channel	IEEE 802.11ac (5 GHz) Conducted Power [dBm]
802.11ac	5 210	42	9.67
	5 290	58	9.85
	5 530	106	9.70
	5 610	122	9.29
	5 690	138	9.55
	5 775	155	9.87

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission mode with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

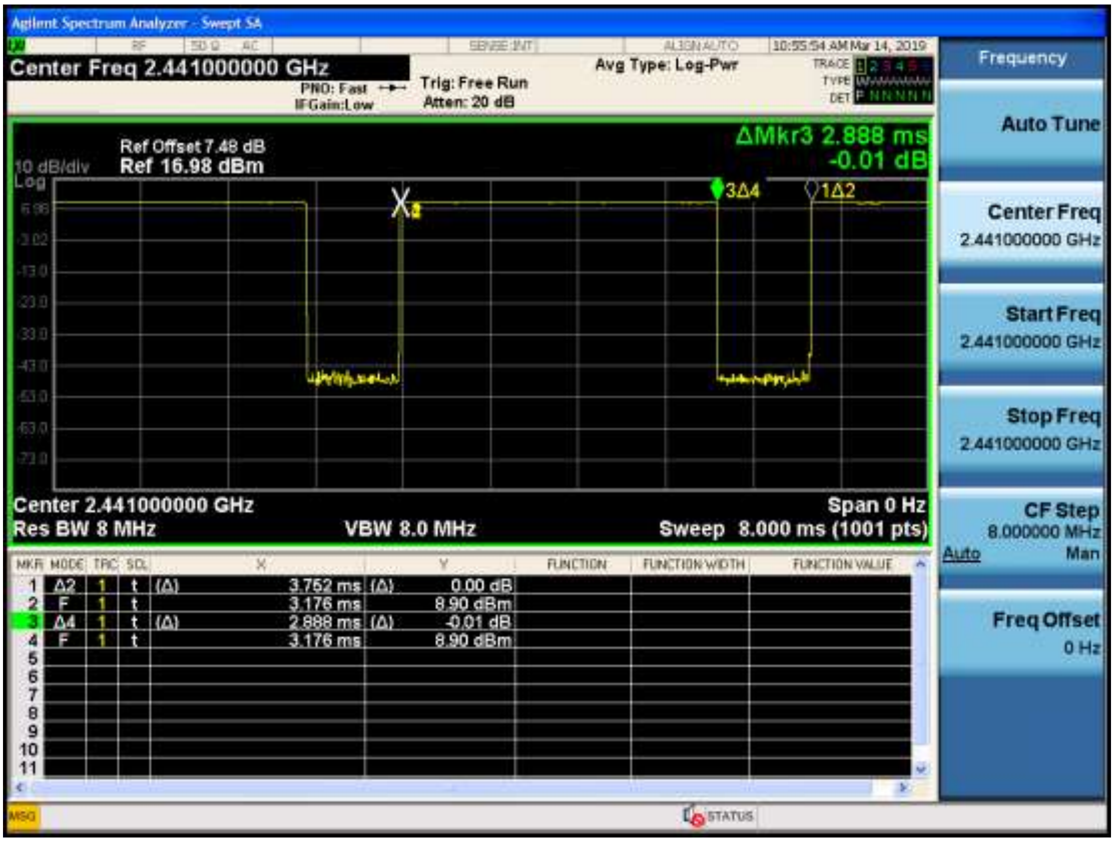
Test Configuration

9.1.3 Bluetooth Conducted Power

The Burst averaged-conducted Power

Mode	Channel	Bluetooth Power
		[dBm]
DH5	0	8.48
	39	7.63
	78	7.61
2-DH5	0	7.64
	39	6.81
	78	6.85
3-DH5	0	7.84
	39	6.98
	78	6.99

Per October 2016 TCB Workshop Notes:
When call box and Bluetooth protocol are used for BT SAR measurement, time-domain plot is required to identify duty factor for supporting the test setup and result.
Bluetooth duty cycle was measured using Bluetooth tester equipment (CBT / R&S) with Bluetooth protocol. DH5 mode is the highest duty cycle and conducted power. SAR test were performed at DH5 mode.



Duty Cycle

= (BT-On time /BT-Full time) =(2.888/3.752) = 0.770 (DH5)

Duty factor= 1/Duty cycle : 1.299

10. SYSTEM VERIFICATION

10.1 Tissue Verification

The body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity.

Table for Body Tissue Verification									
Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε	Target Conductivity σ (S/m)	Target Dielectric Constant, ε	% dev σ	% dev ε
03/14/2019	21.1	2450B	2400	1.864	51.807	1.902	52.770	-2.00%	-1.82%
			2450	1.936	51.741	1.950	52.700	-0.72%	-1.82%
			2500	2.003	51.627	2.021	52.640	-0.89%	-1.92%
03/14/2019	20.1	5180B–5825B	5180	5.329	47.591	5.276	49.038	1.00%	-2.95%
			5250	5.504	47.251	5.358	48.950	2.72%	-3.47%
			5280	5.570	47.614	5.393	48.908	3.28%	-2.65%
			5320	5.562	47.323	5.439	48.852	2.26%	-3.13%
			5500	5.766	47.074	5.650	48.610	2.05%	-3.16%
			5600	5.806	46.734	5.766	48.470	0.69%	-3.58%
			5750	6.145	46.387	5.942	48.270	3.42%	-3.90%
			5800	6.050	46.370	6.000	48.200	0.83%	-3.80%
			5825	6.030	46.660	6.029	48.165	0.02%	-3.12%

10.2 System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications 2 450 MHz / 5 250 MHz / 5 600 MHz / 5 750 MHz by using the system Verification kit. (Graphic Plots Attached)

*** Input Power: 50mW**

Freq.	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp.	Liquid Temp.	1 W Target SAR_{1g} (SPEAG)	50mW Measured SAR_{1g}	1 W Normalized SAR_{1g}	Deviation	Limit [%]
[MHz]					[°C]	[°C]	[W/kg]	[W/kg]	[W/kg]	[%]	[%]
2 450	03/14/2019	7370	743	Body	21.3	21.1	49.9	2.41	48.2	- 3.41	± 10
5 250	03/14/2019	3903	1253	Body	20.3	20.1	78.0	3.67	73.4	- 5.90	± 10
5 250	03/14/2019	3903		Body	20.3	20.1	81.6	3.87	77.4	- 5.15	± 10
5 750	03/14/2019	3903		Body	20.3	20.1	77.3	3.93	78.6	+ 1.68	± 10

10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system verification kit. (Graphic Plots Attached)

- Cabling the system, using the verification kit equipments.
- Generate about 50 mW Input level from the signal generator to the Dipole Antenna.
- Dipole antenna was placed below the flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

NOTE;
SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

11. SAR TEST DATA SUMMARY

11.1 SAR Measurement Results

Wi-Fi (DTS) Body SAR																	
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
2 437	6	802.11b	22	1	13	11.91	-0.01	Rear	Active	98.62	0	1.84	0.544	1.285	1.014	0.709	-
2 412	1	802.11b	22	1	13	11.40	-0.15	Left	Active	98.62	0	0.981	0.513	1.445	1.014	0.752	-
2 437	6	802.11b	22	1	13	11.91	-0.19	Left	Active	98.62	0	0.781	0.609	1.285	1.014	0.794	-
2 462	11	802.11b	22	1	13	11.27	-0.16	Left	Active	98.62	0	1.39	0.581	1.489	1.014	0.877	-
2 437	6	802.11b	22	1	13	11.91	-0.14	Top	Active	98.62	0	0.583	0.236	1.285	1.014	0.308	-
2 437	6	802.11b	22	1	13	11.91	-0.17	Left Corner	Active	98.62	0	0.243	0.146	1.285	1.014	0.190	-
2 437	6	802.11b	22	1	20	18.79	-0.17	Rear	Inactive	98.62	8	0.590	0.365	1.321	1.014	0.489	-
2 412	1	802.11b	22	1	20	18.20	-0.18	Left	Inactive	98.62	4	0.926	0.531	1.514	1.014	0.815	-
2 437	6	802.11b	22	1	20	18.79	-0.17	Left	Inactive	98.62	4	1.32	0.770	1.321	1.014	**1.031**	1
2 462	11	802.11b	22	1	20	18.04	-0.13	Left	Inactive	98.62	4	1.08	0.607	1.570	1.014	0.966	-
2 437	6	802.11b	22	1	20	18.79	-0.05	Top	Inactive	98.62	9	0.0934	0.060	1.321	1.014	0.080	-
2 437	6	802.11b	22	1	20	18.79	-0.18	Left Corner	Inactive	98.62	6	0.297	0.180	1.321	1.014	0.241	-
2 437	6	802.11b	22	1	20	18.79	0.04	Left	Inactive	98.62	4	1.15	0.727	1.321	1.014	0.974	*
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population											Body 1.6 W/kg Averaged over 1 gram						

Note: * with Keyboard cover

Wi-Fi (NII) Body SAR																	
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
5 290	58	802.11ac	80	MCS0	10	9.85	0.15	Rear	Active	90.2	0	0.821	0.242	1.035	1.109	0.278	-
5 290	58	802.11ac	80	MCS0	10	9.85	-0.12	Left	Active	90.2	0	0.975	0.491	1.035	1.109	0.564	-
5 290	58	802.11ac	80	MCS0	10	9.85	0.10	Top	Active	90.2	0	0.778	0.258	1.035	1.109	0.296	-
5 290	58	802.11ac	80	MCS0	10	9.85	0.13	Left Corner	Active	90.2	0	0.383	0.179	1.035	1.109	0.205	-
5 320	64	802.11a	20	6Mbps	19	17.75	-0.15	Rear	Inactive	97.5	8	0.229	0.084	1.334	1.026	0.115	-
5 320	64	802.11a	20	6Mbps	19	17.75	-0.12	Left	Inactive	97.5	4	1.02	0.427	1.334	1.026	0.584	-
5 320	64	802.11a	20	6Mbps	19	17.75	-0.16	Top	Inactive	97.5	9	0.246	0.095	1.334	1.026	0.130	-
5 320	64	802.11a	20	6Mbps	19	17.75	-0.16	Left Corner	Inactive	97.5	6	0.203	0.094	1.334	1.026	0.129	-
5 530	106	802.11ac	80	MCS0	10	9.70	0.18	Rear	Active	90.2	0	1.11	0.411	1.072	1.109	0.489	-
5 530	106	802.11ac	80	MCS0	10	9.70	-0.16	Left	Active	90.2	0	2.04	**1.06**	1.072	1.109	1.260	2
5 690	138	802.11ac	80	MCS0	10	9.55	0.11	Left	Active	90.2	0	1.49	0.969	1.109	1.109	1.192	-
5 530	106	802.11ac	80	MCS0	10	9.70	0.01	Top	Active	90.2	0	0.907	0.503	1.072	1.109	0.598	-
5 530	106	802.11ac	80	MCS0	10	9.70	0.03	Left Corner	Active	90.2	0	0.438	0.238	1.072	1.109	0.283	-
5 500	100	802.11a	20	6Mbps	19	17.49	0.02	Rear	Inactive	97.5	8	0.307	0.133	1.416	1.026	0.193	-
5 500	100	802.11a	20	6Mbps	19	17.49	-0.19	Left	Inactive	97.5	4	1.48	0.614	1.416	1.026	0.892	-
5 580	116	802.11a	20	6Mbps	19	17.42	-0.15	Left	Inactive	97.5	4	2.17	0.927	1.439	1.026	**1.369**	3
5 720	144	802.11a	20	6Mbps	19	17.19	-0.12	Left	Inactive	97.5	4	1.51	0.635	1.517	1.026	0.988	-
5 500	100	802.11a	20	6Mbps	19	17.49	-0.12	Top	Inactive	97.5	9	0.420	0.151	1.416	1.026	0.219	-
5 500	100	802.11a	20	6Mbps	19	17.49	-0.12	Left Corner	Inactive	97.5	6	0.430	0.183	1.416	1.026	0.266	-
5 530	106	802.11ac	80	MCS0	10	9.70	-0.10	Left	Active	90.2	0	1.04	0.498	1.072	1.109	0.592	*
5 530	106	802.11ac	80	MCS0	10	9.70	-0.19	Left	Active	90.2	0	2.12	0.999	1.072	1.109	1.188	**
5 775	155	802.11ac	80	MCS0	10	9.87	0.17	Rear	Active	90.2	0	0.849	0.199	1.030	1.109	0.227	-
5 775	155	802.11ac	80	MCS0	10	9.87	0.04	Left	Active	90.2	0	2.11	0.914	1.030	1.109	1.044	-
5 775	155	802.11ac	80	MCS0	10	9.87	0.17	Top	Active	90.2	0	0.573	0.199	1.030	1.109	0.227	-
5 775	155	802.11ac	80	MCS0	10	9.87	-0.10	Left Corner	Active	90.2	0	0.387	0.262	1.030	1.109	0.299	-
5 745	149	802.11a	20	6Mbps	19	17.38	-0.12	Rear	Inactive	97.5	8	0.249	0.095	1.452	1.026	0.142	-
5 745	149	802.11a	20	6Mbps	19	17.38	-0.10	Left	Inactive	97.5	4	1.35	0.592	1.452	1.026	0.882	-
5 825	165	802.11a	20	6Mbps	19	17.37	-0.15	Left	Inactive	97.5	4	1.46	0.596	1.455	1.026	0.890	-
5 745	149	802.11a	20	6Mbps	19	17.38	0.11	Top	Inactive	97.5	9	0.241	0.094	1.452	1.026	0.140	-
5 745	149	802.11a	20	6Mbps	19	17.38	-0.14	Left Corner	Inactive	97.5	6	0.513	0.220	1.452	1.026	0.328	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population											Body 1.6 W/kg Averaged over 1 gram						

Note: * with Keyboard cover

** Data entry indicate Variability measurement.

DSS Body SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dBm)	(dBm)	(dB)		(mm)	(W/kg)		(Duty)	(W/kg)	
2 402	0	Bluetooth DH5	9.5	8.48	0.01	Rear	0	0.207	1.265	1.299	0.340	-
2 402	0	Bluetooth DH5	9.5	8.48	-0.18	Left	0	0.274	1.265	1.299	**0.450**	4
2 402	0	Bluetooth DH5	9.5	8.48	0.13	Top	0	0.071	1.265	1.299	0.117	-
2 402	0	Bluetooth DH5	9.5	8.48	-0.18	Left Corner	0	0.062	1.265	1.299	0.102	-
2 402	0	Bluetooth DH5	9.5	8.48	-0.07	Left	0	0.132	1.265	1.299	0.217	*
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram					

Note: * with Keyboard cover

11.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 and KDB Publication 447498 D01v06
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v06.
6. This device utilizes power reduction for wireless mode and technologies, as outlined in sec. 2.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous scenarios.
7. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v06 was applied to determine SAR test exclusion for adjacent edge configurations.
8. Per FCC KDB 865664 D01v01r04, variability SAR measurement were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg for 1g SAR and >2 for 10g SAR Please see Section 13 for variability analysis. the maximum tune-up tolerance limit.
9. Regarding additional test configuration with keyboard, Samsung wants to verify this configuration based on the worst case of the stand-alone mode. If the mode of Tablet is idle and the case is folded, the SAR test was not applied

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. For initial test position, the highest extrapolated peak SAR will be used. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g SAR and ≤ 1.0 W/kg for 10g SAR, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR results is ≤ 0.8 W/kg for 1g SAR and ≤ 2.0 W/kg for 10g SAR or all test position are measured.
2. Per KDB 2482227 D01v02r02 justification for test configurations of 2.4 GHz WiFi Single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11 g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
3. Per KDB 2482227 D01v02r02 justification for test configurations of 5 GHz WiFi Single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission mode were not investigated since the highest reported SAR for initial test configuration adjusted by the ration of maximum output powers is less than 1.2 W/kg for 1g SAR and less than 3.0 W/kg for 10 g SAR.
4. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rated, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated WLAN test reports.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests mode type. Per October 2016 TCBC Workshop Notes, the reported SAR was scaled to 100% transmission duty factor to determine compliance. Please see sec.9. for the time-domain plot and calculation for duty factor of the device.

12. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz, SAR additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement variability was assessed using the following procedures for each frequency band:

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg for 1g SAR or < 2.0 W/kg for 10g SAR; steps 2) through 4) do not apply.

2) When the original highest measured 1g SAR is ≥ 0.80 W/kg or 10g SAR ≥ 2.0W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg for 1g SAR or ≥ 3.625 W/kg for 10g SAR (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg for 1g SAR or ≥3.75 W/kg for 10g SAR and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Body SAR measurement variability Results

Frequency		Mode/Band	Configuration	Measured SAR	Repeated SAR	SAR Ratio
MHz	Channel			(W/kg)	(W/kg)	
5 530	106	Wi-Fi(NII)	Left	1.06	0.999	1.06

13. Device Holder Pertubation Verification.

In accordance with published DUT Holder Perturbations in Oct.2016 TCB Workshop.
When Highest reported SAR is over 1.2 W/kg, Holder Perturbation Verification is required for each antenna, using the highest configuration among all applicable frequency bands.

Frequency		Mode/Band	Configuration	Highest Reported SAR		Deviation
				(with Device Holder)	(without Device Holder)	
MHz	Channel			(W/kg)	(W/kg)	
5 580	6Mbps	802.11a	Left Side	1.369	1.361	1.01

14. MEASUREMENT UNCERTAINTY

The measured SAR was <1.5 W/Kg for 1g SAR and <3.75 W/KgFor 10g SAR for all frequency bands. Therefore,per KDB Publication 865664 D01v01r04,the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

15. SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/ 59CHA1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/ 59RAA1/ C/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/ 59CHA1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/ 59RAA1/ A/ 01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	010963	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	011578	N/A	N/A	N/A
SPEAG	DAE4	652	04/20/2018	Annual	04/20/2019
SPEAG	DAE4	869	09/19/2018	Annual	09/19/2019
SPEAG	E-Field Probe EX3DV4	7370	08/30/2018	Annual	08/30/2019
SPEAG	E-Field Probe EX3DV4	3903	09/24/2018	Annual	09/24/2020
SPEAG	Dipole D2450V2	743	01/28/2019	Annual	01/28/2020
SPEAG	Dipole D5GHzV2	1253	11/22/2018	Annual	11/22/2019
Agilent	Power Meter E4419B	MY40511244	04/25/2018	Annual	04/25/2019
Agilent	Power Meter E4419B	MY40511243	03/30/2018	Annual	03/30/2019
Agilent	Power Sensor 8481A	SG1091286	10/11/2018	Annual	10/11/2019
Agilent	Power Sensor 8481A	MY41090873	10/11/2018	Annual	10/11/2019
SPEAG	DAKS 3.5	1038	05/29/2018	Annual	05/29/2019
SPEAG	VNA-R140	0141013	05/29/2018	Annual	05/29/2019
Agilent	Signal Generator N5182A	MY47070230	05/10/2018	Annual	05/10/2019
Agilent	11636B/Power Divider	58698	02/28/2019	Annual	03/06/2020
TESTO	175-H1/Thermometer	40331915309	01/29/2019	Annual	01/29/2020
TESTO	175-H1/Thermometer	40331922309	01/29/2019	Annual	01/29/2020
EMPOWER	RF Power Amplifier	1084	06/11/2018	Annual	06/11/2019
EMPOWER	RF Power Amplifier	1011	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-30N	-	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-60N	32011	10/11/2018	Annual	10/11/2019
Apitech	Attenuator (3dB) 18B-03	1	06/07/2018	Annual	06/07/2019
Agilent	Attenuator (20dB) 33340C	13311	05/10/2018	Annual	05/10/2019
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
Agilent	Directional Bridge	3140A03878	06/11/2018	Annual	06/11/2019
Agilent	MXA Signal Analyzer N9020A	MY50510407	10/31/2018	Annual	10/31/2019
HP	Dual Directional Coupler	16072	10/11/2018	Annual	10/11/2019
R&S	Bluetooth CBT	100272	03/04/2019	Annual	03/04/2020

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

16. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 - 2005.

These measurements were taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the abortion and distribution of electromagnetic energy in the body are very complex phenomena the depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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Attachment 1. – SAR Test Plots

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: 03/14/2019
Plot No.: 1

DUT: SM-T720

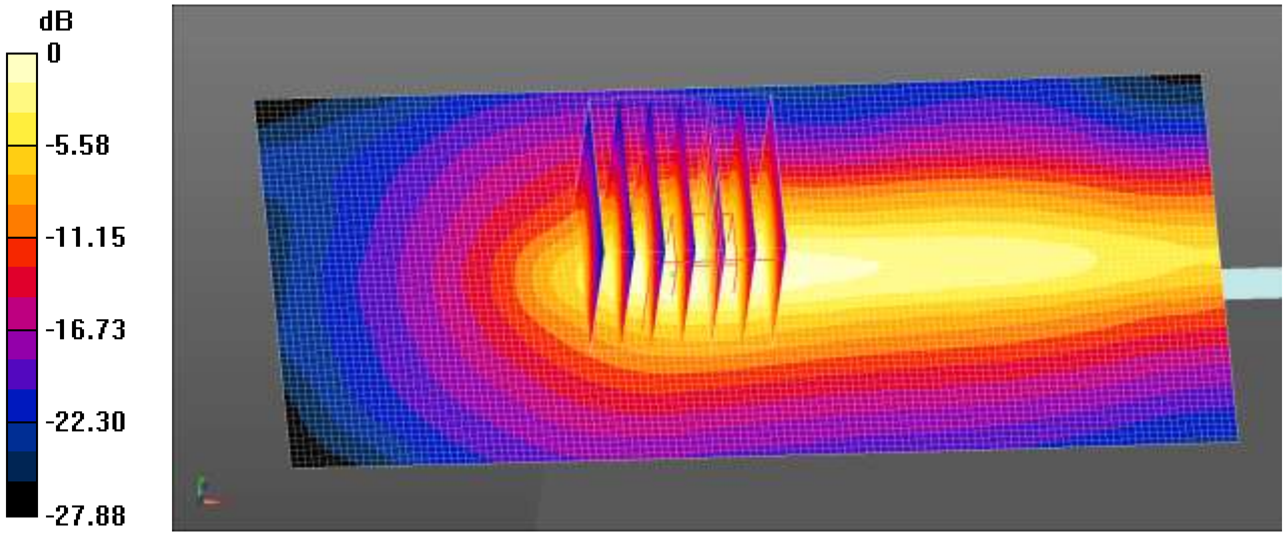
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.908 S/m; ε_r = 51.743; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(7.45, 7.45, 7.45); Calibrated: 2018-08-30;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2018-04-20
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

SM-T720/802.11b Body Left 1Mbps 6ch/Area Scan (61x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.32 W/kg

SM-T720/802.11b Body Left 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.72 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 0.770 W/kg; SAR(10 g) = 0.344 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Mobile Phone
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	03/14/2019
Plot No.:	2

DUT: SM-T720

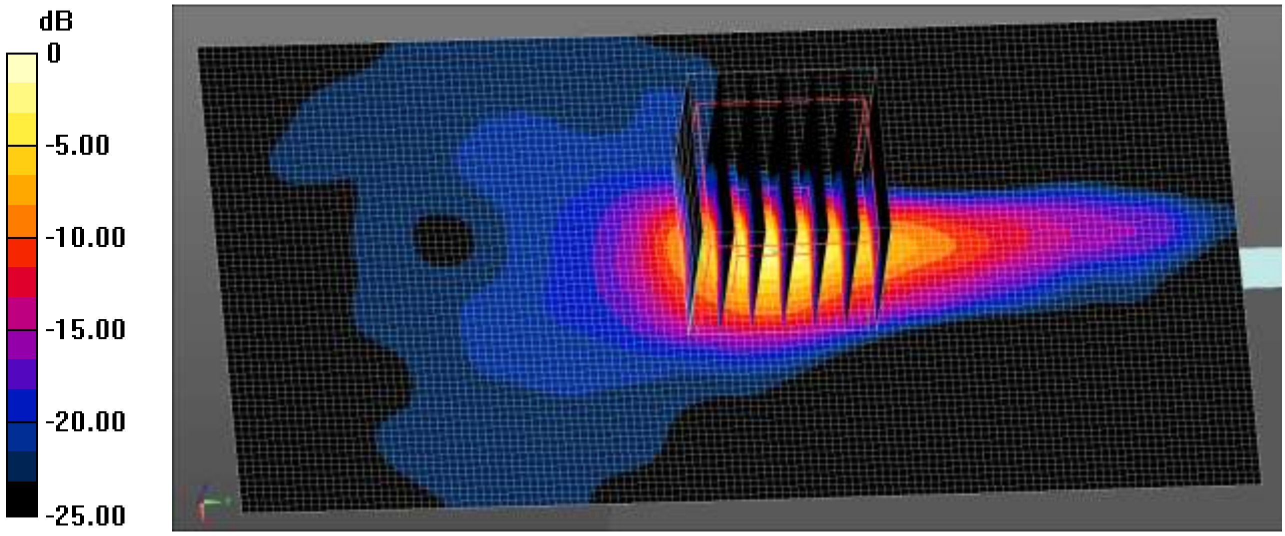
Communication System: UID 0, WIFI 5GHz UNII2C (0); Frequency: 5530 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5530 MHz; σ = 5.754 S/m; ε_r = 47.007; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.02, 4.02, 4.02); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

SM-T720/802.11ac80 Body Left MCS0 106ch Backoff repeat/Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.04 W/kg

SM-T720/802.11ac80 Body Left MCS0 106ch Backoff repeat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm ; Graded Ratio:1.4
Reference Value = 8.123 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 8.99 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 3.78 W/kg



0 dB = 3.78 W/kg = 5.77 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Mobile Phone
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	03/14/2019
Plot No.:	3

DUT: SM-T720

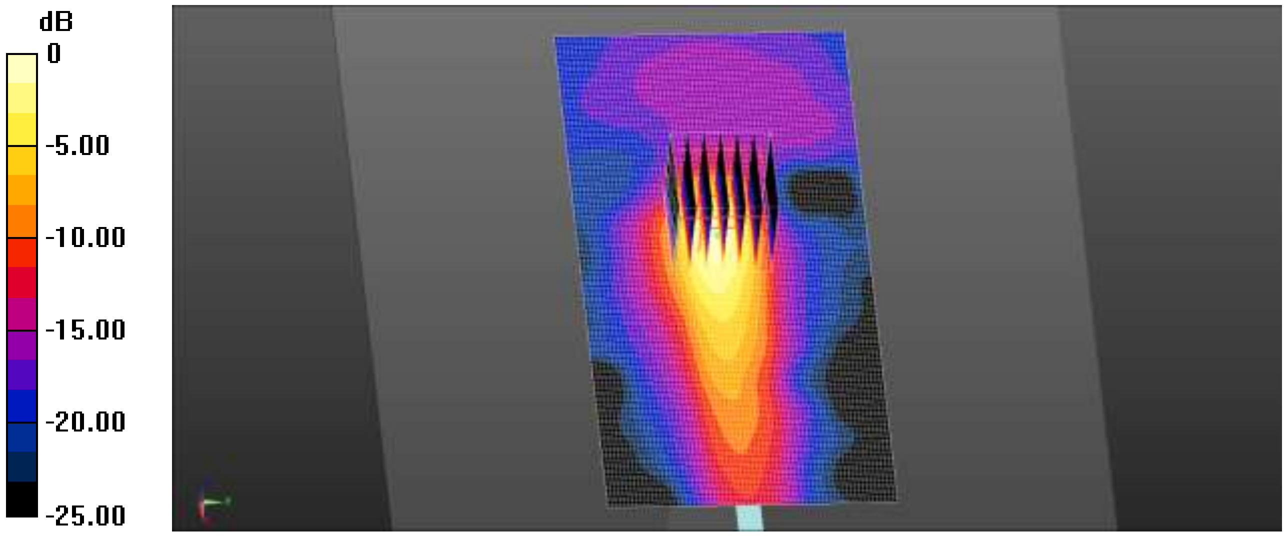
Communication System: UID 0, WIFI 5GHz UNII2C (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.787 S/m; ε_r = 46.932; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.02, 4.02, 4.02); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

SM-T720/802.11a Body Left 6Mbps 116ch 4mm/Area Scan (151x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.17 W/kg

SM-T720/802.11a Body Left 6Mbps 116ch 4mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm ; Graded Ratio:1.4
Reference Value = 15.20 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 4.41 W/kg
SAR(1 g) = 0.927 W/kg; SAR(10 g) = 0.274 W/kg
Maximum value of SAR (measured) = 2.51 W/kg



0 dB = 2.51 W/kg = 4.00 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: 03/14/2019
Plot No.: 4

DUT: SM-T720

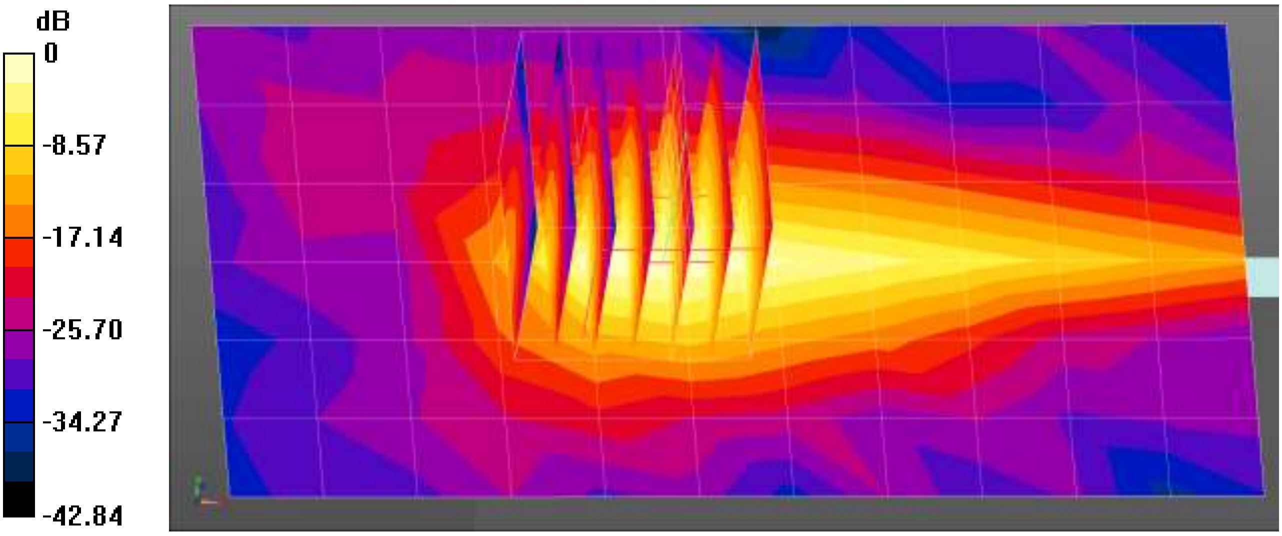
Communication System: UID 0, Bluetooth (0); Frequency: 2402 MHz;Duty Cycle: 1:1.299
Medium parameters used (interpolated): f = 2402 MHz; σ = 1.868 S/m; ε_r = 51.78; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(7.45, 7.45, 7.45); Calibrated: 2018-08-30;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2018-04-20
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

SM-T720/BT Body Left DH5 0ch/Area Scan (7x12x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.572 W/kg

SM-T720/BT Body Left DH5 0ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.965 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.886 W/kg
SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.095 W/kg
Maximum value of SAR (measured) = 0.609 W/kg



0 dB = 0.609 W/kg = -2.15 dBW/kg

Attachment 2. – Dipole Verification Plots

■ Verification Data (2 450 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.1 ℃
Test Date:	03/14/2019

DUT: Dipole 2450 MHz; Type: D2450V2

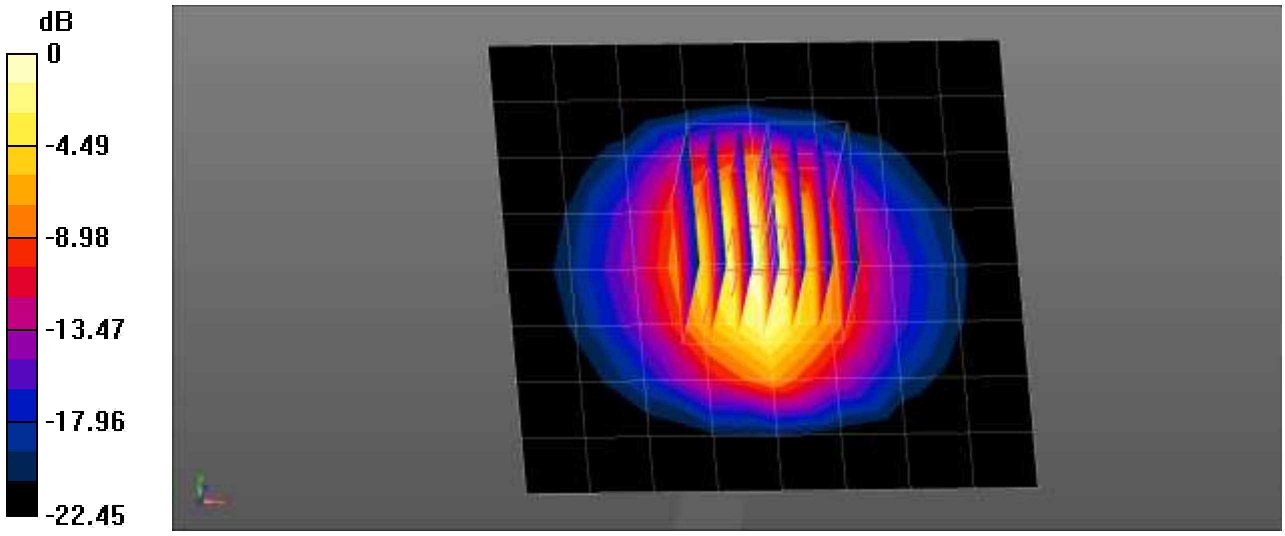
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.936 S/m; ε_r = 51.741; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(7.45, 7.45, 7.45); Calibrated: 2018-08-30;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2018-04-20
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/2450MHz Verification/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 4.01 W/kg

Dipole/2450MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.12 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 5.10 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.1 W/kg
Maximum value of SAR (measured) = 4.11 W/kg



0 dB = 4.11 W/kg = 6.14 dBW/kg

■ Verification Data (5 250 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	20.1 ℃
Test Date:	03/14/2019

DUT: Dipole D5GHzV2; Type: D5GHzV2

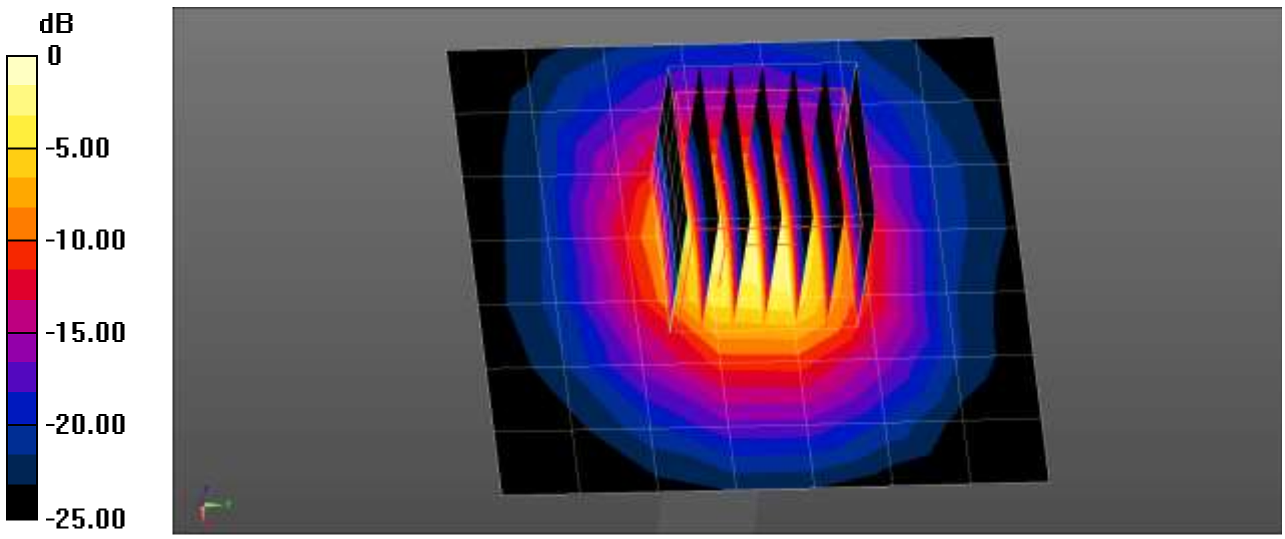
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.504 S/m; ε_r = 47.251; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.59, 4.59, 4.59); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 250 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.47 W/kg

Dipole/5 250 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 46.13 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 15.2 W/kg
SAR(1 g) = 3.67 W/kg; SAR(10 g) = 1.04 W/kg
Maximum value of SAR (measured) = 9.45 W/kg



0 dB = 9.45 W/kg = 9.75 dBW/kg

■ Verification Data (5 600 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	20.1 ℃
Test Date:	03/14/2019

DUT: Dipole D5GHzV2; Type: D5GHzV2

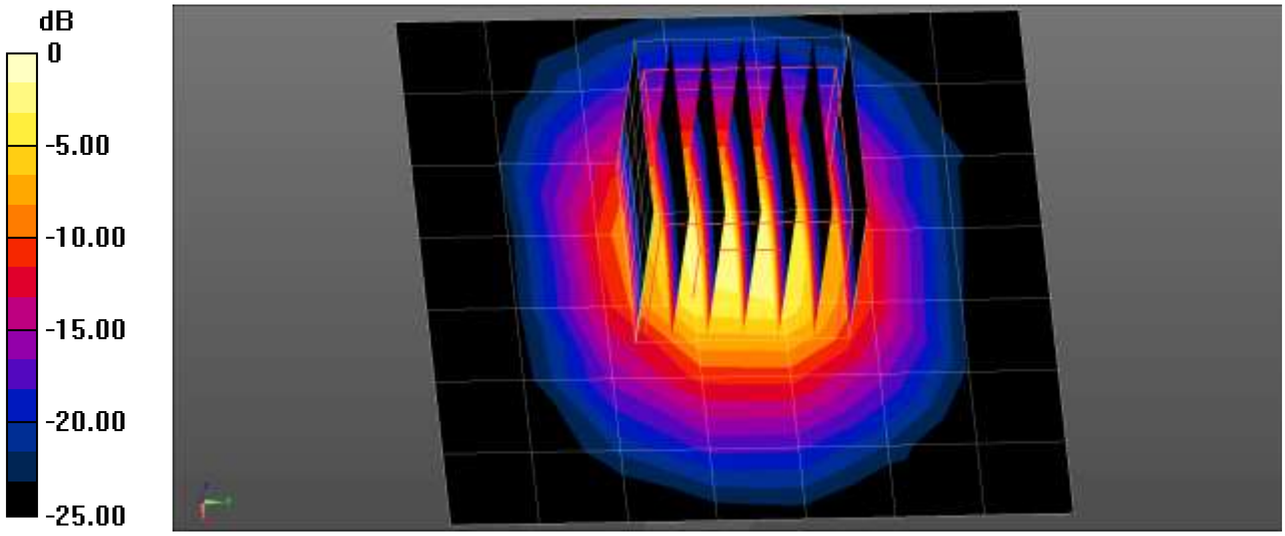
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.806 S/m; ε_r = 46.734; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.02, 4.02, 4.02); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 600 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.80 W/kg

Dipole/5 600 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 47.04 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 3.87 W/kg; SAR(10 g) = 1.08 W/kg
Maximum value of SAR (measured) = 10.3 W/kg



0 dB = 10.3 W/kg = 10.13 dBW/kg

■ Verification Data (5 750 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	20.1 ℃
Test Date:	03/14/2019

DUT: Dipole D5GHzV2; Type: D5GHzV2

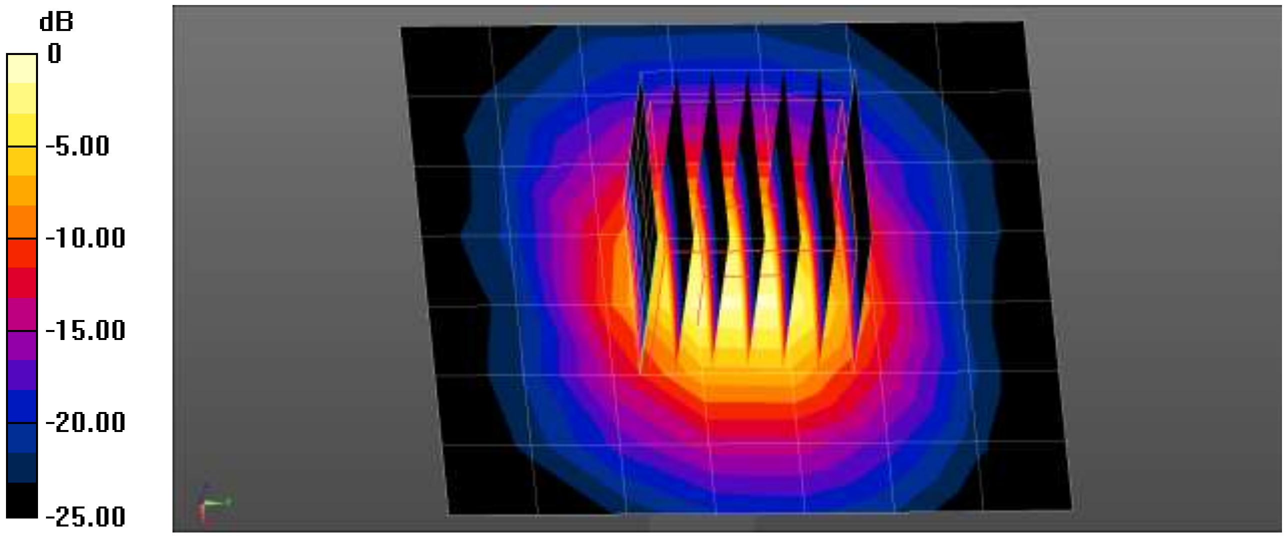
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 6.145 S/m; ε_r = 46.387; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.36, 4.36, 4.36); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 750 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.84 W/kg

Dipole/5 750 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 44.57 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 3.93 W/kg; SAR(10 g) = 1.11 W/kg
Maximum value of SAR (measured) = 10.4 W/kg



0 dB = 10.4 W/kg = 10.17 dBW/kg

Attachment 3. – SAR Tissue Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Harts grove.

Ingredients (% by weight)	Frequency (MHz)			
	2 450 – 2 700		5 200 - 5 800	
Tissue Type	Head	Body	Head	Body
Water	71.88	73.2	65.52	78.66
Salt (NaCl)	0.16	0.1	0.0	0.0
Sugar	0.0	0.0	0.0	0.0
HEC	0.0	0.0	0.0	0.0
Bactericide	0.0	0.0	0.0	0.0
Triton X-100	19.97	0.0	17.24	10.67
DGBE	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra-pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Composition of the Tissue Equivalent Matter

Attachment 4. – SAR SYSTEM VALIDATION

Per FCC KCB 865664 D02v01r02, SAR system validation status should be document to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in IEEE 1528-2013 and FCC KDB 865664 D01v01r04. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
12	7370	EX3DV4	Body	2450	743	2019-02-11	52.8	1.94	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5250	1253	2018-12-03	48.8	5.36	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5600	1253	2018-12-03	48.3	5.78	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5750	1253	2018-12-03	48.4	5.95	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary 1g

Note;

All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r04.

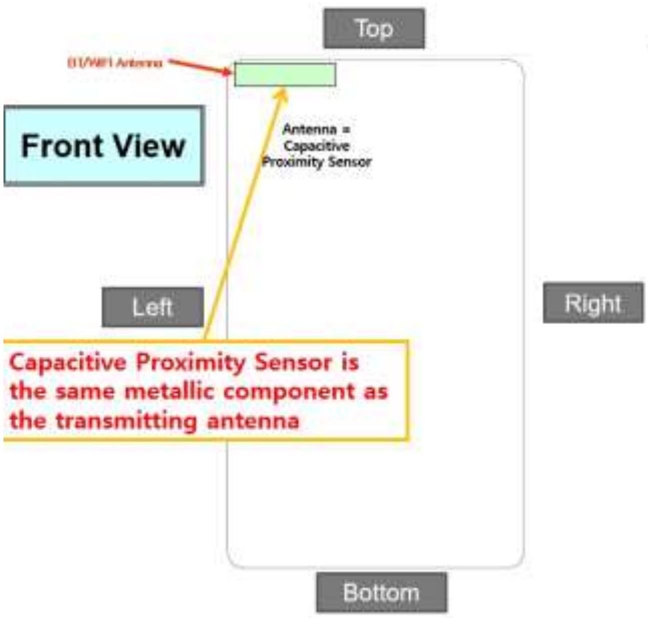
Attachment 5. – The Verification of Power reduction

Per the May 2017 TCBC Workshop notes, demonstration of proper functioning of the power reduction mechanism is required to support the corresponding SAR Configurations. The verification process was divided into two parts:

- Evaluation of the triggering distances for proximity-based sensors.

1. Power Reduction Verification for WLAN Antenna

This device utilizes a power reduction mechanism for WLAN Antenna wireless modes for SAR compliance under some conditions when the device is being used in close proximity to the user's hand. All SAR evaluations for this device were performed at the maximum allowed output Power when Proximity Sensor is activated. FCC KDB Publication 616217D04v01r02 section 6 was used as a guideline for selection SAR test distances for this device when being used in proximity senor used conditions. For detailed measurement conducted power results, please refer to the Section .9



1.1. Power Verification Procedure for WLAN Ant

The Power verification was performed according to the following procedure:

Power Reduction Verification for WLAN mode

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
		Un-triggered (Max Power)	Triggered (Reduced Power)
Proximity sensor On	2.4GHz 802.11b	18.21	11.51
Proximity sensor On	2.4GHz 802.11g(2ch – 11ch)	18.17	11.44
Proximity sensor On	2.4GHz 802.11n(2ch -11ch)	17.42	11.32
Proximity sensor On	5GHz 802.11a	17.53	8.91
Proximity sensor On	5GHz 802.11n 20MHz	17.32	9.11
Proximity sensor On	5GHz 802.11n 40MHz	17.35	9.10
Proximity sensor On	5GHz 802.11ac 20MHz	17.35	9.15
Proximity sensor On	5GHz 802.11ac 40MHz	17.21	9.13
Proximity sensor On	5GHz 802.11ac 80MHz	16.94	9.08

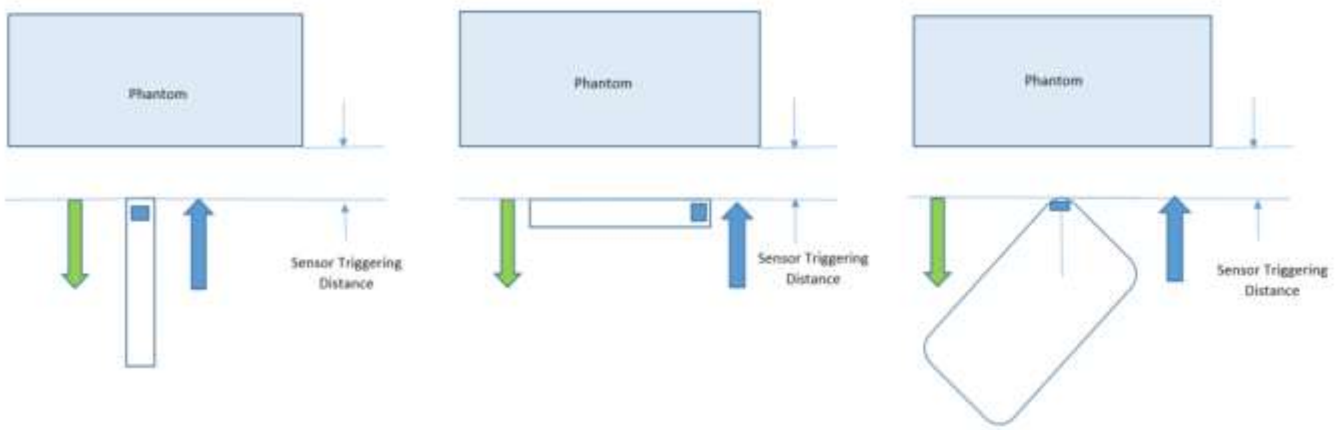
1.2. Procedures for determining proximity sensor triggering distances

(KDB 616217 D04v01r02 §6.2)

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 .Each applicable test position was evaluated. The distance were conformed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Step 1 and 2 were repeated for the relevant modes, as appropriate
4. Steps1 through 3 were repeated for all distance-based power reduction mechanisms.

For detailed measurement conducted power results, please refer to the Section .9



Proximity Sensor Trigger Distance Assessment KDB616217 §6.2 Left ,Top Side

Proximity Sensor Trigger Distance Assessment KDB616217 §6.2 Rear Side

Proximity Sensor Trigger Distance Assessment KDB616217 §6.2 Corner Side

Away from the Phantom direction of DUT travel for determination of triggering release point
Toward the Phantom direction of DUT travel for determination of power reduction triggering point

Tissue simulating liquid	Trigger distance - Rear		Trigger distance – Top		Trigger distance – Left		Trigger distance – corner	
	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom
2450MHz Muscle	9	15	10	15	5	10	7	15
5000Mhz Muscle	9	15	10	15	5	10	7	15

Distance Measurement verification for Proximity sensor

Rear side – EUT Moving toward (trigger) to the Phantom

Distance	Distance to DUT Output power (dBm)									
	14	13	12	11	10	9	8	7	6	5
2.4GHz 802.11b	18.2	18.14	18.25	18.25	18.19	11.52	11.57	11.59	11.57	11.59
2.4GHz 802.11g(2ch – 11ch)	18.21	18.27	18.09	18.07	18.27	11.46	11.44	11.48	11.52	11.46
2.4GHz 802.11n(2ch -11ch)	17.41	17.32	17.41	17.43	17.45	11.26	11.3	11.29	11.26	11.33
5GHz 802.11a	17.52	17.58	17.63	17.48	17.52	8.94	8.82	8.84	8.92	8.89
5GHz 802.11n 20MHz	17.3	17.34	17.4	17.23	17.33	9.05	9.2	9.19	9.18	9.14
5GHz 802.11n 40MHz	17.45	17.34	17.38	17.31	17.4	9	9.09	9.11	9.15	9.06
5GHz 802.11ac 20MHz	17.32	17.32	17.35	17.4	17.26	9.07	9.05	9.11	9.07	9.15
5GHz 802.11ac 40MHz	17.3	17.29	17.31	17.27	17.31	9.17	9.1	9.12	9.2	9.12
5GHz 802.11ac 80MHz	16.97	16.95	17.01	17.02	16.98	9.17	9	9.11	9.05	9.12

Rear side – EUT Moving away (Release) from the Phantom

Distance	Distance to DUT Output power (dBm)									
	11	12	13	14	15	16	17	18	19	20
2.4GHz 802.11b	11.61	11.54	11.5	11.46	11.54	18.19	18.26	18.21	18.3	18.17
2.4GHz 802.11g(2ch – 11ch)	11.47	11.44	11.51	11.44	11.39	18.19	18.08	18.23	18.11	18.08
2.4GHz 802.11n(2ch -11ch)	11.27	11.4	11.41	11.4	11.35	17.37	17.35	17.35	17.43	17.32
5GHz 802.11a	8.92	8.89	8.81	9	8.86	17.61	17.45	17.57	17.45	17.47
5GHz 802.11n 20MHz	9.14	9.05	9.2	9.08	9.19	17.39	17.28	17.34	17.38	17.32
5GHz 802.11n 40MHz	9.1	9.18	9	9.15	9.1	17.37	17.45	17.26	17.28	17.25
5GHz 802.11ac 20MHz	9.14	9.23	9.17	9.06	9.2	17.33	17.33	17.32	17.29	17.42
5GHz 802.11ac 40MHz	9.13	9.22	9.04	9.17	9.19	17.16	17.11	17.16	17.23	17.23
5GHz 802.11ac 80MHz	9.1	9.09	9.14	9.12	9.01	16.97	16.9	16.94	16.94	16.94

Based on the most conservative measured triggering distance of 9mm, additional Body SAR measurements were required at 8mm from Rear side for the above modes

Top side – EUT Moving toward (trigger) to the Phantom

Distance	Distance to DUT Output power (dBm)									
	15	14	13	12	11	10	9	8	7	6
2.4GHz 802.11b	18.2	18.26	18.15	18.27	18.19	11.5	11.58	11.44	11.59	11.54
2.4GHz 802.11g(2ch – 11ch)	18.14	18.13	18.19	18.22	18.27	11.46	11.49	11.54	11.41	11.39
2.4GHz 802.11n(2ch -11ch)	17.44	17.39	17.39	17.4	17.37	11.23	11.32	11.27	11.22	11.35
5GHz 802.11a	17.49	17.59	17.47	17.58	17.63	8.86	8.86	8.92	8.87	8.99
5GHz 802.11n 20MHz	17.35	17.31	17.35	17.33	17.39	9.08	9.1	9.16	9.05	9.02
5GHz 802.11n 40MHz	17.44	17.32	17.41	17.38	17.37	9.14	9.11	9.05	9.06	9.12
5GHz 802.11ac 20MHz	17.33	17.36	17.44	17.27	17.29	9.15	9.08	9.1	9.06	9.11
5GHz 802.11ac 40MHz	17.11	17.16	17.26	17.26	17.23	9.08	9.07	9.15	9.12	9.03
5GHz 802.11ac 80MHz	16.84	16.96	16.85	17.01	16.84	8.98	9.17	9.07	9.13	9.09

Top side – EUT Moving away (Release) from the Phantom

Distance	Distance to DUT Output power (dBm)									
	11	12	13	14	15	16	17	18	19	20
2.4GHz 802.11b	11.58	11.56	11.57	11.56	11.5	18.11	18.28	18.22	18.22	18.23
2.4GHz 802.11g(2ch – 11ch)	11.34	11.39	11.54	11.52	11.35	18.09	18.18	18.11	18.08	18.21
2.4GHz 802.11n(2ch -11ch)	11.33	11.39	11.31	11.37	11.29	17.35	17.3	17.37	17.47	17.36
5GHz 802.11a	8.93	8.87	8.94	9	8.82	17.6	17.44	17.42	17.52	17.6
5GHz 802.11n 20MHz	9.2	9.21	9.11	9.09	9.21	17.33	17.41	17.39	17.24	17.32
5GHz 802.11n 40MHz	9.11	9.06	9	9.05	9.17	17.34	17.22	17.28	17.31	17.22
5GHz 802.11ac 20MHz	9.08	9.05	9.17	9.14	9.09	17.3	17.38	17.41	17.4	17.31
5GHz 802.11ac 40MHz	9.07	9.08	9.22	9.23	9.1	17.18	17.18	17.25	17.22	17.11
5GHz 802.11ac 80MHz	9.12	9.08	9.1	9.02	9.17	16.84	16.91	16.87	16.92	16.93

Based on the most conservative measured triggering distance of 10mm, additional Body SAR measurements were required at 9mm from Top side for the above modes

Left side – EUT Moving toward (trigger) to the Phantom

Distance	Distance to DUT Output power (dBm)									
	10	9	8	7	6	5	4	4	3	1
2.4GHz 802.11b	18.17	18.13	18.23	18.23	18.31	11.58	11.49	11.53	11.49	11.57
2.4GHz 802.11g(2ch – 11ch)	18.08	18.2	18.07	18.21	18.25	11.41	11.49	11.44	11.53	11.34
2.4GHz 802.11n(2ch -11ch)	17.42	17.48	17.44	17.31	17.45	11.26	11.25	11.41	11.32	11.22
5GHz 802.11a	17.42	17.6	17.54	17.43	17.59	8.93	8.82	8.9	8.87	8.97
5GHz 802.11n 20MHz	17.39	17.42	17.33	17.39	17.22	9.14	9.08	9.09	9.13	9.07
5GHz 802.11n 40MHz	17.42	17.45	17.45	17.27	17.3	9.1	9.08	9.02	9.06	9.07
5GHz 802.11ac 20MHz	17.44	17.43	17.4	17.45	17.31	9.2	9.15	9.11	9.08	9.15
5GHz 802.11ac 40MHz	17.15	17.25	17.22	17.19	17.21	9.2	9.08	9.13	9.22	9.12
5GHz 802.11ac 80MHz	16.87	16.97	16.95	16.96	16.96	8.98	9.1	9.05	9.04	9

Left side – EUT Moving away (Release) from the Phantom

Distance	Distance to DUT Output power (dBm)									
	8	7	8	9	10	11	17	18	19	20
2.4GHz 802.11b	11.58	11.54	11.5	11.57	11.6	18.25	18.27	18.19	18.12	18.13
2.4GHz 802.11g(2ch – 11ch)	11.5	11.45	11.36	11.42	11.46	18.18	18.22	18.19	18.12	18.15
2.4GHz 802.11n(2ch -11ch)	11.42	11.41	11.23	11.22	11.31	17.36	17.43	17.43	17.49	17.42
5GHz 802.11a	8.96	8.91	8.93	8.9	8.84	17.52	17.46	17.42	17.49	17.48
5GHz 802.11n 20MHz	9.02	9.03	9.04	9.18	9.08	17.4	17.24	17.42	17.33	17.31
5GHz 802.11n 40MHz	9.03	9.1	9.17	9.08	9.13	17.3	17.33	17.29	17.28	17.3
5GHz 802.11ac 20MHz	9.1	9.05	9.18	9.08	9.05	17.32	17.39	17.29	17.39	17.43
5GHz 802.11ac 40MHz	9.14	9.16	9.11	9.12	9.14	17.3	17.26	17.18	17.17	17.25
5GHz 802.11ac 80MHz	9.11	9.15	8.98	9.04	9.05	17	16.86	16.97	16.87	16.87

Based on the most conservative measured triggering distance of 5mm, additional Body SAR measurements were required at 4mm from Left side for the above modes

Corner side – EUT Moving toward (trigger) to the Phantom

Distance	Distance to DUT Output power (dBm)									
	12	11	10	9	8	7	6	5	4	3
2.4GHz 802.11b	18.25	18.21	18.25	18.18	18.15	11.44	11.44	11.63	11.53	11.44
2.4GHz 802.11g(2ch – 11ch)	18.13	18.09	18.16	18.21	18.07	11.51	11.38	11.46	11.46	11.34
2.4GHz 802.11n(2ch -11ch)	17.32	17.34	17.32	17.32	17.46	11.3	11.31	11.39	11.36	11.41
5GHz 802.11a	17.41	17.49	17.52	17.53	17.56	8.92	8.9	8.92	8.95	8.86
5GHz 802.11n 20MHz	17.38	17.28	17.34	17.39	17.3	9.08	9.19	9.15	9.11	9.16
5GHz 802.11n 40MHz	17.42	17.45	17.45	17.27	17.3	9.15	9.2	9.12	9.08	9
5GHz 802.11ac 20MHz	17.4	17.32	17.33	17.37	17.31	9.15	9.13	9.24	9.25	9.06
5GHz 802.11ac 40MHz	17.17	17.25	17.13	17.19	17.15	9.07	9.22	9.19	9.06	9.12
5GHz 802.11ac 80MHz	16.84	16.86	16.97	16.94	17.02	9.11	9.08	8.99	9.08	9.13

Corner– EUT Moving away (Release) from the Phantom

Distance	Distance to DUT Output power (dBm)									
	11	12	13	14	15	16	17	18	19	20
2.4GHz 802.11b	11.63	11.63	11.53	11.43	11.47	18.15	18.17	18.14	18.3	18.3
2.4GHz 802.11g(2ch – 11ch)	11.48	11.49	11.38	11.4	11.46	18.07	18.1	18.17	18.13	18.24
2.4GHz 802.11n(2ch -11ch)	11.22	11.23	11.28	11.22	11.35	17.48	17.47	17.48	17.31	17.48
5GHz 802.11a	8.88	8.82	8.95	8.9	8.91	17.61	17.53	17.59	17.43	17.45
5GHz 802.11n 20MHz	9.11	9.06	9.19	9.14	9.12	17.36	17.26	17.42	17.23	17.38
5GHz 802.11n 40MHz	9.04	9.12	9.01	9.07	9.09	17.26	17.36	17.32	17.29	17.32
5GHz 802.11ac 20MHz	9.23	9.14	9.21	9.1	9.1	17.37	17.36	17.27	17.28	17.41
5GHz 802.11ac 40MHz	9.04	9.22	9.21	9.18	9.15	17.21	17.16	17.24	17.17	17.23
5GHz 802.11ac 80MHz	9.1	9.06	9.07	9.1	9.04	16.92	16.87	16.85	16.85	17

Based on the most conservative measured triggering distance of 7mm, additional Body SAR measurements were required at 6mm from Corner side for the above modes

1.3 Proximity Sensor Coverage for SAR measurements

(KDB 616217 D04v01r02 §6.3)

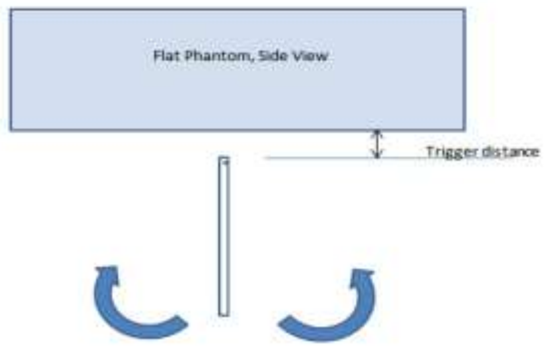
As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

1.4 Proximity Sensor Tilt Angle Assessment

(KDB 616217 D04v01r02 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Top/Left side parallel to the base of the flat phantom for each band.

The EUT was rotated about Bottom side for angles up to ±45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up ±45°.



Proximity sensor tilt angle assessment (Bottom side) KDB 616217 §6.4

Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Top side)

Band (MHz)	Minimum distance at which power reduction was maintained over-45°	Power reduction status										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
2450 MHz Muscle	10 mm	On	On	On	On	On	On	On	On	On	On	On
5000 MHz Muscle	10 mm	On	On	On	On	On	On	On	On	On	On	On

Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Left side)

Band (MHz)	Minimum distance at which power reduction was maintained over-45°	Power reduction status										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
2450 MHz Muscle	5 mm	On	On	On	On	On	On	On	On	On	On	On
5000 MHz Muscle	5 mm	On	On	On	On	On	On	On	On	On	On	On

1.5 Resulting test positions for Tablet SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance forTablet SAR
WLAN 2.4GHz/5GHz	Rear	9	N/A	N/A	8
	Top Side	10	N/A	10	9
	Left Side	5	N/A	5	4
	Corner	7	N/A	N/A	6

Note: FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in proximity use conditions.