HCT CO.,LTD
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
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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: 02. 01, 2017** **Test Report No.: HCT-A-1702-F001** **Test Site: HCT CO., LTD.**

FCC ID: **A3LSMW727V**

Equipment Type:	**Tablet**
Model Name:	**SM-W727V**
Testing has been carried out in accordance with:	**47CFR §2.1093** **ANSI/ IEEE C95.1 – 1992** **IEEE 1528-2013**
Date of Test:	**01/03/2017 ~ 01/31/2017**

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

Tae-Jun Kang
Test Engineer / SAR Team
Certification Division

Reviewed By

Yun-Jeang Heo
Technical Manager / SAR Team
Certification Division

DOCUMENT HISTORY

Rev.	DATE	DESCRIPTION
HCT-A-1702-F001	02. 01, 2017	First Approval Report

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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:	A3LSMW727V		
Model:	SM-W727V		
EUT Type:	Tablet		
Application Type:	Certification		
The Highest Reported SAR			
Band	**Tx. Frequency (MHz)**	**Equipment Class**	**Reported 1g Body SAR (W/kg)**
UMTS 850	826.4 - 846.6	PCE	0.85
UMTS 1900	1 852.4 - 1 907.6	PCE	1.07
LTE 2 (PCS)	1 850.7 ~ 1 909.3	PCE	0.88
LTE 4 (AWS)	1 710.7 – 1 754.3	PCE	0.90
LTE 5	824.7 - 848.3	PCE	0.89
LTE 13	779.5 ~ 784.5	PCE	0.73
802.11b	2 412 - 2 462	DTS	0.51
U-NII-1	5 180 - 5 240	NII	0.35
U-NII-2A	5 260 - 5 320	NII	0.26
U-NII-2C	5 500 - 5 700	NII	0.25
U-NII-3	5 745 - 5 825	NII	0.34
Bluetooth	2 402 - 2 480	DSS/DTS	0.44
Simultaneous SAR per KDB 690783 D01v01r03			1.596
Date(s) of Tests:	01/03/2017 ~ 01/31/2017		

2. Device Under Test Description

2.1 DUT specification

Device Wireless specification overview		
Band & Mode	**Operating Mode**	**Tx Frequency**
UMTS 850	Voice / Data	826.4 – 846.6 MHz
UMTS 1900	Voice / Data	1 852.4 – 1 907.6 MHz
LTE Band 2 (PCS)	Data	1 850.7 – 1 909.3 MHz
LTE Band 4 (AWS)	Data	1 710.7 – 1 754.3 MHz
LTE Band 5 (Cell)	Data	824.7 – 848.3 MHz
LTE Band 13	Data	779.5 – 784.5 MHz
2.4 GHz WLAN	Data	2 412 – 2 462 MHz
U-NII-1	Data	5 180 – 5 240 MHz
U-NII-2A	Data	5 260 – 5 320 MHz
U-NII-2C	Data	5 500 – 5 700 MHz
U-NII-3	Data	5 745 – 5 825 MHz
Bluetooth	Data	2 402 – 2 480 MHz

Device Description		
Device Dimension:	Overall (Length x Width): 287.5 mm x 196 mm Overall Diagonal: 348 mm Display Diagonal: 315 mm	
Battery Options	Standard (Li-ion Battery)	
	EB-BW720ABA	
Hardware Version:	W727V.03	
Software Version :	W727V.001	
Device Serial Numbers	Mode	Serial Number
	UMTS 850, LTE 13	354771080001082
	UMT1900 , LTE 2/4/5	354771080001082
	WiFi 2.4GHz, 5GHz / Bluetooth	354771080001108 354771080001116
	Several samples with identical hardware were used to SAR testing. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.	
Cover	Keyboard cover	

2.2 DUT Wireless mode

Wireless Modulation	Band	Operating Mode		Duty Cycle
WCDMA (UMTS)	Band 5 Band 2	UMTS Rel.99 (Voice / DATA) HSDPA (Rel. 5) HSUPA (Rel. 6) HSPA+ (Rel. 7) (Uplink QPSK Only)		100 %
LTE Band	2 (PCS)	Data (QPSK, 16QAM)		100 % (FDD)
	4 (AWS)	Data (QPSK, 16QAM)		100 % (FDD)
	5 (Cell)	Data (QPSK, 16QAM)		100 % (FDD)
	13	Data (QPSK, 16QAM)		100 % (FDD)
2.4 GHz WLAN		Data	802.11b, 802.11g, 802.11n (HT20)	99.96 %
5 GHz WLAN		Data	802.11 a, 802.11 n (HT20/HT40) 802.11 ac (VHT20/40/80)	94.62 % (802.11a) 85.23 % (802.11ac)
Bluetooth		Data		76.8 % (DH5)
Bluetooth LE 4.1		Data		N/A

2.2.1 Power Reduction for SAR

This device uses a power reduction mechanism for SAR compliance. The power reduction mechanism is activated when the device is used in close proximity to the user's body. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selection SAR test distances for this device. Detailed description of the power reduction mechanism are include in [A3LSMW727V] Main_Sensor triggering distance document and [A3LSMW727V] WLAN_Sensor triggering distance Document.

2.3 LTE information

Item.		Description		
Frequency Rang	LTE Band 2 (PCS)	1 850.7 MHz ~ 1 909.3 MHz		
	LTE Band 4 (AWS)	1 710.7 MHz ~ 1 754.3 MHz		
	LTE Band 5 (Cell)	824.7 MHz ~ 848.3 MHz		
	LTE Band 13	779.5 MHz ~ 784.5 MHz		
Channel Bandwidths	LTE Band 2 (PCS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 4 (AWS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 5 (Cell)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 13	5 MHz, 10 MHz		
Channel Numbers & Freq.(MHz)		Low	Mid	High
LTE Band 2 (PCS)	1.4 MHz	1850.7 (18607)	1880.0 (18900)	1909.3 (19193)
	3 MHz	1851.5 (18615)	1880.0 (18900)	1908.5 (19185)
	5 MHz	1852.5 (18625)	1880.0 (18900)	1907.5 (19175)
	10 MHz	1855.0 (18650)	1880.0 (18900)	1905.0 (19150)
	15 MHz	1857.5 (18675)	1880.0 (18900)	1902.5 (19125)
	20 MHz	1860.0 (18700)	1880.0 (18900)	1900.0 (19100)
LTE Band 4 (AWS)	1.4 MHz	1710.7 (19957)	1732.5 (20175)	1754.3 (20393)
	3 MHz	1711.5 (19965)	1732.5 (20175)	1753.5 (20385)
	5 MHz	1712.5 (19975)	1732.5 (20175)	1752.5 (20375)
	10 MHz	1715.0 (20000)	1732.5 (20175)	1750.0 (20350)
	15 MHz	1717.5 (20025)	1732.5 (20175)	1747.5 (20325)
	20 MHz	1720.0 (20050)	1732.5 (20175)	1745.0 (20300)
LTE Band 5 (Cell)	1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
	3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
	5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
	10 MHz	829.0 (20450)	836.5 (20525)	844.0 (20600)
LTE Band 13	5 MHz	779.5(23205)	782(23230)	784.5(23255)
	10 MHz		782(23230)	

Item.	Description	
UE Category	UE Category 6	
Modulations Supported in UL	QPSK, 16QAM	
LTE voice/data requirements	Data Only	
LTE MPR options	The EUT incorporates MPR as per 3GPP TS 36.101 sec. 6.2.3 ~ 6.2.5 (Manufacturer attestation to be provided)	
	The MPR is permanently built-in by design as a mandatory.	
	A-MPR is not implemented in the DUT.	
Description of the LTE Transmitter & antenna	This model has two Tx. paths.	
	One is for WCDMA and LTE. It can not transmit simultaneously.	
	The other is for BT & WLAN	
LTE Carrier Aggregation	This device only supports down link Carrier Aggregation. Up link carrier aggregations do not support.	
LTE Carrier Aggregation Configuration combinations	PCC(BW) + SCC(BW)	
	LTE B2(5,10,15,20) + LTE B13(10)	LTE B13(10) +LTE B2(5,10,15,20)
	LTE B4(5,10,15,20) +LTE B13(10)	LTE B13(10) +LTE B4(5,10,15,20)
	LTE B2(1.4,3,5,10,15,20) +LTE B4(5,10,15,20)	LTE B4(5,10,15,20) +LTE B2(1.4,3,5,10,15,20)
	LTE B2(5,10,15,20) +LTE B5(5,10)	LTE B5(5,10) +LTE B2(5,10,15,20)
	LTE B4(5,10,15,20) +LTE B5(5,10)	LTE B5(5,10) +LTE B4(5,10,15,20)
	LTE B4(5,10,15,20) + LTE B4(5,10,15,20)	-
LTE Release 10 Additional Information	This device does not support full feature on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink. All uplink communications are identical to the Release 8 specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE release 10 features are not supported: Replay, HetNet, Enhanced MIMO, eICI, WIFI offloading, MDH, eMBHA, Cross-Carrier Scheduling, Enhanced SC-FDMA.	

2.4 TEST METHODOLOGY and Procedures

The tests documented in this report were performed in accordance with IEEE Standard 1528-2013 & IEEE 1528-2005 and the following published KDB procedures.

- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r05
- FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r02
- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB Publication 447498 D01 General SAR Guidance v06
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r02
- FCC KDB Publication 616217 D04 SAR Tablet v01r02
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)

2.5 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.

2.5.1 Maximum Output Power

Mode / Band			3GPP WCDMA (dBm)	3GPP HSDPA (dBm)	3GPP HSUPA (dBm)
UMTS Band 5 (850 MHz)	Active	Maximum	18.0	18.0	17.5
		Nominal	17.5	17.5	17.0
	Inactive	Maximum	23.5	23.5	23.0
		Nominal	23.0	23.0	22.5
UMTS Band 2 (1900 MHz)	Active	Maximum	15.0	15.0	14.0
		Nominal	14.5	14.5	13.5
	Inactive	Maximum	23.5	23.5	23.5
		Nominal	23.0	23.0	23.0

Mode / Band			Modulated Average (dBm)
LTE Band 2 (PCS)	Active	Maximum	13.5
		Nominal	13.0
	Inactive	Maximum	24.5
		Nominal	24.0
LTE Band 4 (AWS)	Active	Maximum	13.5
		Nominal	13.0
	Inactive	Maximum	24.5
		Nominal	24.0
LTE Band 5 (Cell)	Active	Maximum	18.0
		Nominal	17.5
	Inactive	Maximum	24.5
		Nominal	24.0
LTE Band 13	Active	Maximum	18.0
		Nominal	17.5
	Inactive	Maximum	24.5
		Nominal	24.0

Mode/Band			Modulated Average (dBm)				
	Sensor State		a	b	g	n	ac
2.4 GHz WIFI (Ch.1 ~ 11)	Active	Maximum		8.5	8.5	8.5	
		Nominal		8.0	8.0	8.0	
	Inactive	Maximum		14.5	12.5	12.5	
		Nominal		14.0	12.0	12.0	
5 GHz WIFI (20MHz BW)							
5200 MHz	Active	Maximum	7.5			7.5	7.5
		Nominal	7.0			7.0	7.0
	Inactive	Maximum	12.5			11.5	11.5
		Nominal	12.0			11.0	11.0
5300 MHz	Active	Maximum	7.5			7.5	7.5
		Nominal	7.0			7.0	7.0
	Inactive	Maximum	12.5			11.5	11.5
		Nominal	12.0			11.0	11.0
5500 MHz	Active	Maximum	7.5			7.5	7.5
		Nominal	7.0			7.0	7.0
	Inactive	Maximum	12.5			11.5	11.5
		Nominal	12.0			11.0	11.0
5800 MHz	Active	Maximum	7.5			7.5	7.5
		Nominal	7.0			7.0	7.0
	Inactive	Maximum	12.5			11.5	11.5
		Nominal	12.0			11.0	11.0
5 GHz WIFI (40MHz BW)							
5200 MHz	Active	Maximum				7.5	7.5
		Nominal				7.0	7.0
	Inactive	Maximum				10.5	10.5
		Nominal				10.0	10.0
5300 MHz	Active	Maximum				7.5	7.5
		Nominal				7.0	7.0
	Inactive	Maximum				10.5	10.5
		Nominal				10.0	10.0
5500 MHz	Active	Maximum				7.5	7.5
		Nominal				7.0	7.0
	Inactive	Maximum				10.5	10.5
		Nominal				10.0	10.0
5800 MHz	Active	Maximum				7.5	7.5
		Nominal				7.0	7.0
	Inactive	Maximum				10.5	10.5
		Nominal				10.0	10.0

Mode/Band			Modulated Average (dBm)				
	Sensor State		a	b	g	n	ac
5 GHz WIFI (80MHz BW)							
5200 MHz	Active	Maximum					7.5
		Nominal					7.0
	Inactive	Maximum					10.5
		Nominal					10.0
5300 MHz	Active	Maximum					7.5
		Nominal					7.0
	Inactive	Maximum					10.5
		Nominal					10.0
5500 MHz	Active	Maximum					7.5
		Nominal					7.0
	Inactive	Maximum					10.5
		Nominal					10.0
5800 MHz	Active	Maximum					7.5
		Nominal					7.0
	Inactive	Maximum					10.5
		Nominal					10.0

Mode / Band		Modulated Average (dBm)
Bluetooth (DH5)	Maximum	10.0
	Nominal	9.5
Bluetooth LE	Maximum	4.5
	Nominal	4.0

2.6 Power Reduction by Proximity Sensing

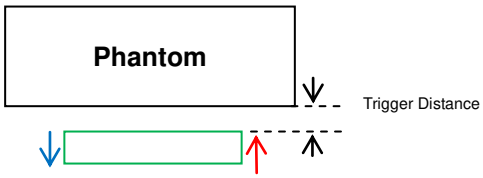
2.6.1 Proximity Sensor Triggering Distance

Rear of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

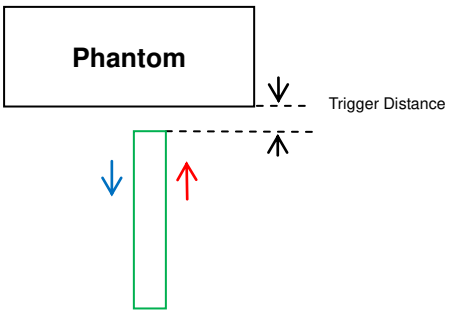
The measurement was repeated for the surface of Rear and Top side.

The DUT featured a visual indicator on is display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Rear side



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Top side

LEGEND
→ Direction of DUT travel for determination of power reduction triggering point
→ Direction of DUT travel for determination of full power resumption triggering point

Tissue simulating liquid	Trigger distance - Rear		Trigger distance - Top	
	Moving toward phantom	Moving from phantom	Moving from phantom	Moving from phantom
750 muscle	16	16	21	21
850 muscle	16	16	21	21
1800 muscle	16	16	21	21
1900 muscle	16	16	21	21
2450 muscle	7	7	7	7
5000 muscle	7	7	7	7

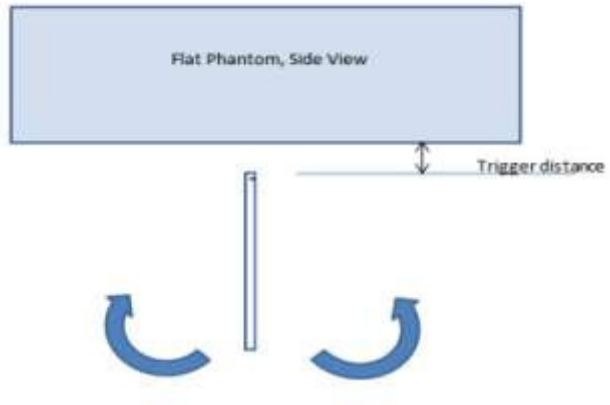
Summary of Trigger Distances

2.6.2 Proximity Sensor Coverage for SAR measurements

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

2.6.3 Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Top side parallel to the base of the flat phantom for each band.
The EUT was rotated about Top 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 (Top side) KDB 616217 §6.4

Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering

Band (MHz)	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over-45°	Power reduction status										
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
750	21 mm	21 mm	On	On	On	On	On	On	On	On	On	On	On
850	21 mm	21 mm	On	On	On	On	On	On	On	On	On	On	On
1800	21 mm	21 mm	On	On	On	On	On	On	On	On	On	On	On
1900	21 mm	21 mm	On	On	On	On	On	On	On	On	On	On	On
2450	7 mm	7 mm	On	On	On	On	On	On	On	On	On	On	On
5000	7 mm	7 mm	On	On	On	On	On	On	On	On	On	On	On

2.6.4 Proximity sensor triggering distance measurement results Wi-Fi

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

Distance (mm)	12	11	10	9	8	7	6	5	4	3
2.4GHz 802.11b	13.81	13.79	13.79	13.80	13.82	8.41	8.39	8.45	8.39	8.38
2.4GHz 802.11g	11.26	11.26	11.25	11.25	11.23	7.24	7.21	7.24	7.29	7.29
2.4GHz 802.11n	11.06	11.03	11.11	11.06	11.07	7.30	7.34	7.33	7.30	7.29
5 GHz 802.11a [BW 20]	11.22	11.23	11.26	11.25	11.19	6.14	6.13	6.11	6.17	6.19
5 GHz 802.11n [BW 20]	9.96	9.97	9.93	9.95	10.00	5.59	5.57	5.60	5.63	5.60
5 GHz 802.11n [BW 40]	8.93	8.97	8.96	8.94	8.96	5.40	5.43	5.37	5.36	5.36
5 GHz 802.11ac [BW 20]	9.87	9.88	9.89	9.92	9.90	5.48	5.50	5.43	5.52	5.46
5 GHz 802.11ac [BW 40]	8.81	8.76	8.80	8.78	8.84	5.32	5.31	5.33	5.34	5.31
5 GHz 802.11ac [BW80]	8.04	8.03	8.00	7.99	8.02	5.37	5.36	5.35	5.36	5.35

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

Distance (mm)	3	4	5	6	7	8	9	10	11	12
2.4GHz 802.11b	8.41	8.44	8.43	8.46	8.44	13.73	13.69	13.69	13.76	13.70
2.4GHz 802.11g	7.28	7.24	7.33	7.32	7.27	11.30	11.26	11.28	11.27	11.35
2.4GHz 802.11n	7.40	7.42	7.38	7.38	7.43	11.01	11.03	11.03	11.00	11.00
5 GHz 802.11a [BW 20]	6.21	6.23	6.25	6.26	6.26	11.18	11.15	11.14	11.23	11.14
5 GHz 802.11n [BW 20]	5.60	5.56	5.61	5.62	5.59	9.98	9.95	10.02	10.01	9.94
5 GHz 802.11n [BW 40]	5.43	5.46	5.43	5.39	5.46	9.00	9.05	9.03	9.05	9.03
5 GHz 802.11ac [BW 20]	5.56	5.51	5.59	5.56	5.53	9.83	9.78	9.84	9.83	9.81
5 GHz 802.11ac [BW 40]	5.47	5.51	5.44	5.50	5.47	8.74	8.73	8.73	8.75	8.76
5 GHz 802.11ac [BW80]	5.34	5.34	5.35	5.36	5.35	8.12	8.08	8.14	8.11	8.12

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

Distance (mm)	12	11	10	9	8	7	6	5	4	3
2.4GHz 802.11b	13.88	13.85	13.92	13.90	13.89	8.47	8.44	8.46	8.52	8.43
2.4GHz 802.11g	11.23	11.21	11.22	11.25	11.24	7.24	7.24	7.23	7.25	7.21
2.4GHz 802.11n	11.00	10.95	10.96	11.04	10.97	7.43	7.48	7.41	7.42	7.40
5 GHz 802.11a [BW 20]	11.18	11.23	11.14	11.18	11.16	6.16	6.12	6.21	6.16	6.13
5 GHz 802.11n [BW 20]	9.92	9.97	9.92	9.96	9.91	5.54	5.59	5.50	5.55	5.54
5 GHz 802.11n [BW 40]	9.00	9.05	8.97	8.99	9.00	5.41	5.39	5.45	5.43	5.39
5 GHz 802.11ac [BW 20]	9.81	9.83	9.83	9.83	9.79	5.61	5.60	5.63	5.62	5.62
5 GHz 802.11ac [BW 40]	8.74	8.69	8.77	8.72	8.77	5.43	5.42	5.40	5.48	5.46
5 GHz 802.11ac [BW80]	8.10	8.08	8.11	8.09	8.06	5.37	5.38	5.38	5.35	5.36

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

Distance (mm)	3	4	5	6	7	8	9	10	11	12
2.4GHz 802.11b	8.38	8.35	8.40	8.35	8.41	13.76	13.73	13.71	13.80	13.79
2.4GHz 802.11g	7.20	7.16	7.22	7.24	7.17	11.28	11.30	11.25	11.29	11.31
2.4GHz 802.11n	7.26	7.29	7.29	7.31	7.21	11.03	11.07	11.06	10.99	11.08
5 GHz 802.11a [BW 20]	6.21	6.17	6.21	6.17	6.20	11.11	11.16	11.14	11.08	11.11
5 GHz 802.11n [BW 20]	5.62	5.60	5.61	5.57	5.58	9.98	10.01	10.02	9.96	9.95
5 GHz 802.11n [BW 40]	5.44	5.44	5.47	5.41	5.43	9.04	9.00	8.99	9.05	9.05
5 GHz 802.11ac [BW 20]	5.50	5.49	5.47	5.53	5.51	9.87	9.85	9.87	9.85	9.82
5 GHz 802.11ac [BW 40]	5.37	5.37	5.40	5.42	5.36	8.81	8.79	8.81	8.83	8.86
5 GHz 802.11ac [BW80]	5.35	5.36	5.35	5.36	5.35	8.15	8.15	8.17	8.10	8.20

2.6.5 Proximity sensor triggering distance measurement results Main Band

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

Distance (mm)	21	20	19	18	17	16	15	14	13	12	11
WCDAM 850	22.81	22.77	22.83	22.81	22.82	17.06	17.09	17.02	17.11	17.01	17.09
WCDMA 1900	22.93	22.92	22.98	22.94	22.97	14.09	14.10	14.10	14.05	14.13	14.10
LTE 2	22.78	22.80	22.75	22.77	22.78	12.63	12.61	12.59	12.64	12.66	12.61
LTE 4	22.72	22.73	22.74	22.70	22.76	12.43	12.48	12.40	12.48	12.44	12.48
LTE 5	23.32	23.33	23.33	23.37	23.27	16.90	16.93	16.92	16.89	16.92	16.93
LTE 13	23.01	23.05	22.96	23.06	23.05	17.31	17.36	17.32	17.26	17.35	17.36

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

Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WCDAM 850	*17.14*	*17.17*	*17.14*	*17.17*	*17.17*	*22.83*	*22.86*	*22.79*	*22.84*	*22.86*	*22.86*
WCDMA 1900	*14.01*	*14.06*	*14.03*	*14.01*	*14.02*	*22.90*	*22.95*	*22.88*	*22.89*	*22.90*	*22.95*
LTE 2	*12.59*	*12.60*	*12.56*	*12.58*	*12.54*	*22.83*	*22.88*	*22.85*	*22.79*	*22.87*	*22.88*
LTE 4	*12.53*	*12.58*	*12.57*	*12.49*	*12.52*	*22.73*	*22.68*	*22.78*	*22.76*	*22.76*	*22.68*
LTE 5	*16.88*	*16.92*	*16.84*	*16.90*	*16.85*	*23.36*	*23.36*	*23.41*	*23.34*	*23.32*	*23.36*
LTE 13	*17.27*	*17.27*	*17.25*	*17.23*	*17.23*	*23.04*	*23.04*	*23.03*	*23.01*	*23.03*	*23.04*

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

Distance (mm)	26	25	24	23	22	21	20	19	18	17	16
WCDAM 850	22.86	22.87	22.90	22.85	22.91	17.02	17.04	17.05	17.01	17.03	*17.04*
WCDMA 1900	22.91	22.87	22.92	22.92	22.93	14.01	14.06	14.02	13.97	14.05	*14.06*
LTE 2	22.83	22.82	22.88	22.81	22.80	12.54	12.59	12.54	12.54	12.53	*12.59*
LTE 4	22.08	22.10	22.10	22.13	22.04	12.48	12.49	12.45	12.49	12.47	*12.49*
LTE 5	23.28	23.27	23.26	23.32	23.24	16.94	16.96	16.97	16.92	16.91	*16.96*
LTE 13	23.04	23.07	23.03	23.03	23.01	17.25	17.22	17.27	17.26	17.25	17.22

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

Distance (mm)	16	17	18	19	20	21	22	23	24	25	26
WCDAM 850	17.10	17.09	17.13	17.13	17.11	22.91	22.91	22.87	22.87	22.92	22.91
WCDMA 1900	14.12	14.08	14.14	14.12	14.11	22.90	22.89	22.92	22.94	22.89	22.89
LTE 2	12.61	12.58	12.62	12.59	12.59	22.80	22.81	22.85	22.76	22.80	22.81
LTE 4	12.50	12.55	12.50	12.53	12.46	22.74	22.75	22.73	22.75	22.70	22.75
LTE 5	16.82	16.79	16.86	16.77	16.86	23.31	23.34	23.28	23.27	23.28	23.34
LTE 13	17.30	17.26	17.30	17.31	17.32	23.07	23.07	23.05	23.08	23.08	23.07

2.6.6 Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WWAN	Rear	16	N/A	N/A	15
	Top	21	N/A	21	20
WLAN	Rear	7	N/A	N/A	6
	Top	7	N/A	7	6

2.6.7 SAR Test Configurations

Full Power Condition : Sensor Inactive

Antenna	Band	Frequency (MHz)	Maximum Power		Separation Distances (mm)					Device Configurations for SAR Testing				
			dBm	mW	Rear	Top	Left side	Right side	Bottom	Rear	Top	Left side	Right side	Bottom
Main	WCDMA 5	846.6	23.5	224	2	3	54	193	191	YES	YES	YES	NO	NO
Main	WCDMA 2	1907.6	23.5	224	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 2	1907.6	24.5	282	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 4	1 754.3	24.5	282	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 5	848.3	24.5	282	2	3	54	193	191	YES	YES	YES	NO	NO
Main	LTE 13	784.5	24.5	282	2	3	54	193	191	YES	YES	YES	NO	NO
WLAN Ant1	2.4Ghz	2462	14.5	28	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant1	BT	2480	10	10	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant1	5GHz	5 825	12.5	18	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant2	2.4Ghz	2462	14.5	28	3.1	3.4	177	95.5	188.5	YES	YES	NO	NO	NO
WLAN Ant2	5GHz	5 825	12.5	18	3.1	3.4	177	95.5	188.5	YES	YES	NO	NO	NO

Reduced Power : Sensor Active

Antenna	Band	Frequency (MHz)	Maximum Power		Separation Distances (mm)					Device Configurations for SAR Testing				
			dBm	mW	Rear	Top	Left side	Right side	Bottom	Rear	Top	Left side	Right side	Bottom
Main	WCDMA 5	846.6	18	63	2	3	54	193	191	YES	YES	NO	NO	NO
Main	WCDMA 2	1907.6	15	32	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 2	1907.6	13.5	22	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 4	1 754.3	13.5	22	2	3	108	163	191	YES	YES	NO	NO	NO
Main	LTE 5	848.3	18	63	2	3	54	193	191	YES	YES	NO	NO	NO
Main	LTE 13	784.5	18	63	2	3	54	193	191	YES	YES	NO	NO	NO
WLAN Ant1	2.4Ghz	2462	8.5	7	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant1	5GHz	5 825	7.5	6	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant2	2.4Ghz	2462	8.5	7	3.1	3.4	196.2	81	188.5	YES	YES	NO	NO	NO
WLAN Ant2	5GHz	5 825	7.5	6	3.1	3.4	177	95.5	188.5	YES	YES	NO	NO	NO

Antennas <50mm to adjacent edges : Accroding to KDB 447498 D01v06., if the caluated threshold value >3 then SAR test is requird

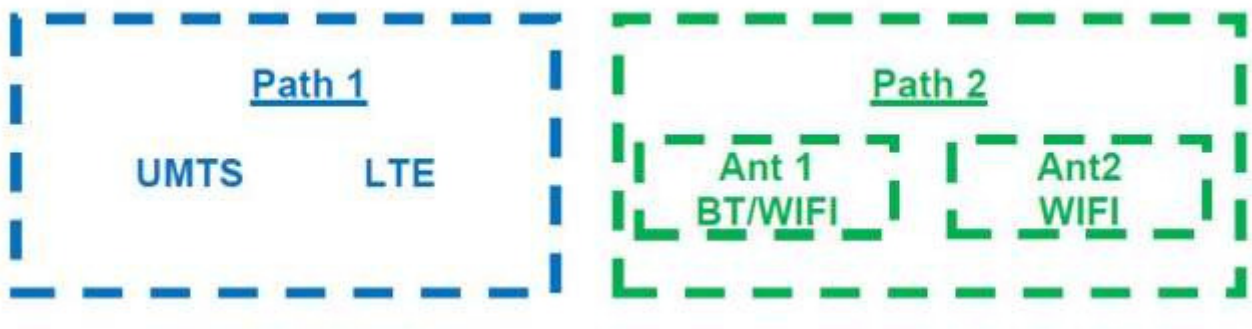
Antennas > 50mm to adjacent edges : Accroding to KDB 447498 D01v06., if the caluated Power threshold is less than the output power then SAR test is requird

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.

2.7 SAR Summation Scenario

According to FCC KDB 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown below paths and are mode in same rectangle to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Simultaneous transmission paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB 447498 D01v06.

FCC KDB 447498 D01v06 General RF Exposure Guidance introduces a new formula for calculating the SAR a Peak Location Ratio(SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5}/R_i$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured of estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

$R_i$is the separation distance between the pair of simultaneous transmitting antennas, When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $\sqrt{[(X_1 - X_2)^2 + (Y_1 - Y_2)^2]}$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR> 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:
$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04$

Simultaneous Transmission Scenarios	
Applicable Combination	Body
UMTS + 2.4 GHz WiFi	Yes
UMTS + 5 GHz WiFi	Yes
UMTS + 2.4 GHz Bluetooth	Yes
UMTS + 2.4 GHz WiFi MIMO	Yes
UMTS + 5 GHz WiFi MIMO	Yes
LTE + 2.4 GHz WiFi	Yes
LTE + 5 GHz WiFi	Yes
LTE+ 2.4 GHz Bluetooth	Yes
LTE + 2.4 GHz WiFi MIMO	Yes
LTE S + 5 GHz WiFi MIMO	Yes

1 . All licensed modes share the same antenna path and cannot transmit simultaneously.
2. This device support 2X2 MIMO Tx for WLAN 802.11a/gn/ac .each antenna can transmit independently or together when operating with MIMO

2.8 SAR Test Exclusions Applied

(A) WiFi

Since wireless router operations are not allowed by the chipset firmware using U-NII-1, U-NII-2A & U-NII-2C WiFi, WiFi Hotspot SAR test and combinations are considered only 2.4 GHz and U-NII-3 for SAR with respected to wireless router configurations according to FCC KDB 941225 D06v02.

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 not supported.
f) Band gap channels are not not supported

(B) Licensed Transmitter(s)

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in FCC KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r05.

This device supports LTE Carrier Aggregation (CA) in the downlink only. All uplink communications are identical to Release 8 specifications. Per FCC KDB publication 941225 D05A v01r02, SAR for LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

Per FCC KDB 941225 D01v03r01, 12.2 kbps RMC is the primary mode and HSPA (HSUPA/HSDPA with RMC) is the secondary mode.

Per FCC KDB 941225 D01v03r01, The SAR test exclusion is applied to the secondary mode by the following equation.

$$\text{Adjusted SAR} = \text{Highest Reported SAR} * \frac{Secondary\ Max\ tune-up\ (mW)}{Primary\ Max\ tune\ tune-up(mW)} \leq 1.2\ \text{W/kg}.$$

Based on the highest Reported SAR, the secondary mode is not required.

And the maximum output power and tune-up tolerance in secondary mode is ≤ 0.25 dB higher than the primary mode.

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 C95.1-2005 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., Ne York, 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.

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho\, dv}\right)$$

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.

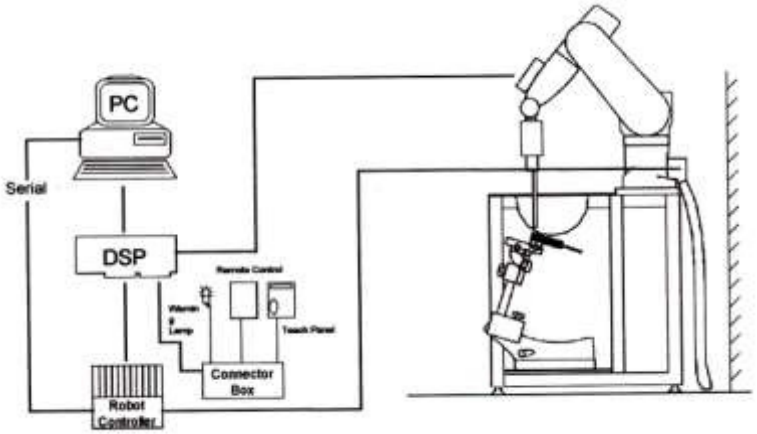


Figure 2. HCT SAR Lab. Test Measurement Set-up

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 with the following procedure:

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.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5±1 mm	$^1/_2 \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30°±1°	20°±1°
Maximum area scan Spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤15 mm 2-3 GHz: ≤12 mm	3-4 GHz: ≤12 mm 4-6 GHz: ≤10 mm
			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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan Spatial resolution: Δx_{zoom}, Δy_{zoom}			≤ 2 GHz: ≤8mm 2-3 GHz: ≤5mm*	3-4 GHz: ≤5 mm* 4-6 GHz: ≤4 mm*
Maximum zoom scan Spatial resolution normal to phantom surface	uniform grid: $\Delta z_{zoom}(n)$		≤ 5 mm	3-4 GHz: ≤4 mm 4-5 GHz: ≤3 mm 5-6 GHz: ≤2 mm
	graded grid	$\Delta z_{zoom}(1)$: between 1st two Points closest to phantom surface	≤ 4 mm	3-4 GHz: ≤3 mm 4-5 GHz: ≤2.5 mm 5-6 GHz: ≤2 mm
		$\Delta z_{zoom}(n>1)$: between subsequent Points	$\leq 1.5 \cdot \Delta z_{zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3-4 GHz: ≥28 mm 4-5 GHz: ≥25 mm 5-6 GHz: ≥22 mm

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 ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 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.

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 εand 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 certain 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. ANSI/ IEEE C95.1 - 1992 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 * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 8.1 Safety Limits for Partial Body Exposure

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

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 Measurement Conditions for UMTS

8.2.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in sec. 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

8.2.2 Body SAR measurements

SAR for body exposure configurations is measured using the 12.2kbps RMC with the TPC bits all “1s”. the 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2kbps RMC.

8.2.3 SAR Measurements with Rel. 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using and FRC with H-SET 1 in Sub-test and a 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to release 6 HSPA test procedures. 8.4.5 SAR Measurement with Rel 6 HSUPA The 3G SAR test Reduction Procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, Using H-Set 1 and QPSK for FRC and a 12.2kbps RMC configured in Test Loop Mode 1 and Power Control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

8.2.4 SAR Measurements with Rel. 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

8.3 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r05 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during

SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.3.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

8.3.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

8.3.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

8.3.4 Required RB Size and RB offsets for SAR testing

According to FCC KDB 941225 D05v02r05

a. Per sec 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/Kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Sec 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Sec 4.2.1.

c. Per Sec. 4.2.3, QPSK SAR is not required for the 100% all0cation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Sec. 4.2.4 and 4.3, SAR test for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sec. 4.2.1 through 4.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/Kg.

8.3.5 Downlink Carrier Aggregation

Conducted power measurements with LTE Carrier aggregation (CA) downlink only active are made in accordance to KDB publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output Powers are measured with downlink carrier aggregation active for the configuration with highest measured maximum conducted power with the downlink carrier aggregation inactive measured among the channel bandwidth, modulation and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25dB higher than the average output power with downlink only carrier aggregation inactive.

8.4 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.

8.4.1 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.

8.4.2 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.

8.4.3 U-NII-C 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.

8.4.4 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.

8.4.5 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.

8.4.6 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.

8.4.7 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.

8.4.8 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.

8.4.9 MIMO SAR Considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR Measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

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 UMTS

HSPA+

This DUT is only capable of QPSK HSPA+ in uplink. Therefore, the RF conducted power is not measured according to 941225 D01 3G SAR.

WCDMA850 Maximum Average Conducted output powers

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]		
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458
99	WCDMA	12.2 kbps RMC	22.95	22.89	22.88
5	HSDPA	Subtest 1	22.82	22.78	22.79
5		Subtest 2	22.53	22.46	22.49
5		Subtest 3	22.27	22.21	22.19
5		Subtest 4	22.00	21.93	21.93
6	HSUPA	Subtest 1	21.56	21.53	21.44
6		Subtest 2	20.75	20.71	20.65
6		Subtest 3	21.48	21.45	21.42
6		Subtest 4	20.75	20.73	20.67
6		Subtest 5	21.48	21.46	21.44

WCDMA850 Reduced Average Conducted output powers

Note : MPR is not applied when proximity sensor is in operation

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]		
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458
99	WCDMA	12.2 kbps RMC	17.22	17.17	17.09
5	HSDPA	Subtest 1	17.04	16.99	16.92
5		Subtest 2	17.05	16.99	16.92
5		Subtest 3	17.06	16.99	16.91
5		Subtest 4	17.06	17.00	16.91
6	HSUPA	Subtest 1	16.63	16.60	16.55
6		Subtest 2	17.06	17.03	16.97
6		Subtest 3	16.73	16.69	16.63
6		Subtest 4	16.84	16.81	16.72
6		Subtest 5	16.58	16.54	16.51

WCDMA1900 Maximum Average Conducted output powers

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]		
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938
99	WCDMA	12.2 kbps RMC	23.37	22.97	22.88
5	HSDPA	Subtest 1	23.41	23.05	22.96
5		Subtest 2	23.18	22.76	22.67
5		Subtest 3	22.89	22.51	22.42
5		Subtest 4	22.65	22.28	22.14
6	HSUPA	Subtest 1	22.52	22.15	21.96
6		Subtest 2	21.17	21.12	21.01
6		Subtest 3	22.23	21.81	21.69
6		Subtest 4	21.37	21.12	21.01
6		Subtest 5	22.43	22.12	21.86

WCDMA1900 Reduced Average Conducted output powers

Note : MPR is not applied when proximity sensor is in operation

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]		
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938
99	WCDMA	12.2 kbps RMC	14.48	14.06	13.83
5	HSDPA	Subtest 1	14.48	14.09	13.91
5		Subtest 2	14.49	14.09	13.92
5		Subtest 3	14.51	14.12	13.92
5		Subtest 4	14.50	14.13	13.93
6	HSUPA	Subtest 1	13.56	13.20	12.98
6		Subtest 2	13.53	13.18	12.90
6		Subtest 3	13.12	12.75	12.56
6		Subtest 4	13.30	12.96	12.67
6		Subtest 5	13.48	13.10	12.97

9.2 LTE

- LTE Band 2 Maximum Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18607	18900	19193	[dB]	[dB]
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	23.62	23.03	23.20	0	0
		1	3	23.17	22.63	22.85	0	0
		1	5	23.64	23.07	23.23	0	0
		3	0	23.59	22.99	23.15	0	0
		3	1	23.35	22.83	22.97	0	0
		3	3	23.55	22.93	23.12	0	0
		6	0	22.66	22.21	22.36	0-1	1
	16QAM	1	0	23.17	22.46	22.57	0-1	1
		1	3	22.85	21.9	22.12	0-1	1
		1	5	23.26	22.39	22.55	0-1	1
		3	0	22.96	22.39	22.61	0-1	1
		3	1	22.85	22.27	22.46	0-1	1
		3	3	22.89	22.34	22.55	0-1	1
		6	0	21.61	21.45	21.64	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18615	18900	19185	[dB]	[dB]
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	23.55	23.12	23.20	0	0
		1	7	23.76	23.09	23.35	0	0
		1	14	23.61	23.06	23.18	0	0
		8	0	22.83	22.33	22.43	0-1	1
		8	3	22.81	22.30	22.40	0-1	1
		8	7	22.83	22.28	22.40	0-1	1
		15	0	22.84	22.31	22.45	0-1	1
	16QAM	1	0	22.76	22.77	22.66	0-1	1
		1	7	22.86	22.80	22.64	0-1	1
		1	14	22.68	22.62	22.45	0-1	1
		8	0	21.95	21.47	21.50	0-2	2
		8	3	21.95	21.43	21.44	0-2	2
		8	7	21.90	21.42	21.46	0-2	2
		15	0	21.86	21.26	21.40	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18625	18900	19175	[dB]	[dB]
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	23.42	22.87	22.87	0	0
		1	12	23.42	22.82	22.97	0	0
		1	24	23.35	22.77	22.90	0	0
		12	0	22.69	22.26	22.30	0-1	1
		12	6	22.64	22.16	22.34	0-1	1
		12	11	22.68	22.20	22.30	0-1	1
		25	0	22.65	22.15	22.31	0-1	1
	16QAM	1	0	22.85	22.46	22.82	0-1	1
		1	12	22.76	22.39	22.91	0-1	1
		1	24	22.66	22.31	22.80	0-1	1
		12	0	21.86	21.31	21.42	0-2	2
		12	6	21.72	21.21	21.49	0-2	2
		12	11	21.77	21.23	21.49	0-2	2
		25	0	21.66	21.11	21.33	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18650	18900	19150	[dB]	[dB]
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	23.55	23.17	23.15	0	0
		1	24	23.44	22.89	23.01	0	0
		1	49	23.28	22.93	22.94	0	0
		25	0	22.71	22.27	22.31	0-1	1
		25	12	22.68	22.15	22.23	0-1	1
		25	24	22.62	22.16	22.30	0-1	1
		50	0	22.66	22.21	22.28	0-1	1
	16QAM	1	0	22.79	22.41	22.78	0-1	1
		1	24	22.70	22.14	22.64	0-1	1
		1	49	22.62	22.10	22.65	0-1	1
		25	0	21.83	21.26	21.32	0-2	2
		25	12	21.81	21.17	21.28	0-2	2
		25	24	21.74	21.18	21.28	0-2	2
		50	0	21.75	21.23	21.22	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18675	18900	19125	[dB]	[dB]
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	23.42	23.11	23.03	0	0
		1	36	23.23	22.86	22.93	0	0
		1	74	22.90	22.69	22.78	0	0
		36	0	22.83	22.50	22.58	0-1	1
		36	18	22.62	22.20	22.34	0-1	1
		36	38	22.68	22.31	22.32	0-1	1
		75	0	22.73	22.32	22.33	0-1	1
	16QAM	1	0	23.15	22.33	22.66	0-1	1
		1	36	23.03	22.02	22.60	0-1	1
		1	74	22.85	21.89	22.44	0-1	1
		36	0	21.85	21.51	21.59	0-2	2
		36	18	21.69	21.19	21.38	0-2	2
		36	38	21.74	21.26	21.40	0-2	2
		75	0	21.78	21.24	21.36	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18700	18900	19100	[dB]	[dB]
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	23.35	22.88	22.75	0	0
		1	49	23.23	22.75	22.85	0	0
		1	99	22.50	22.55	22.52	0	0
		50	0	22.75	22.55	22.44	0-1	1
		50	25	22.59	22.23	22.26	0-1	1
		50	49	22.53	22.28	22.25	0-1	1
		100	0	22.66	22.28	22.36	0-1	1
	16QAM	1	0	22.91	22.84	22.53	0-1	1
		1	49	23.00	22.62	22.62	0-1	1
		1	99	22.33	22.33	22.14	0-1	1
		50	0	21.85	21.52	21.42	0-2	2
		50	25	21.62	21.18	21.19	0-2	2
		50	49	21.61	21.24	21.20	0-2	2
		100	0	21.75	21.28	21.27	0-2	2

- LTE Band 4 Maximum Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19957	20175	20393	[dB]	[dB]
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	23.47	23.40	23.40	0	0
		1	3	22.99	22.92	23.00	0	0
		1	5	23.42	23.35	23.45	0	0
		3	0	23.38	23.25	23.38	0	0
		3	1	23.22	23.18	23.20	0	0
		3	3	23.35	23.24	23.34	0	0
		6	0	22.56	22.47	22.56	0-1	1
	16QAM	1	0	23.03	22.70	22.79	0-1	1
		1	3	22.67	22.29	22.32	0-1	1
		1	5	23.11	22.69	22.74	0-1	1
		3	0	22.81	22.74	22.73	0-1	1
		3	1	22.65	22.58	22.64	0-1	1
		3	3	22.74	22.63	22.69	0-1	1
		6	0	21.46	21.66	21.73	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19965	20175	20385	[dB]	[dB]
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	23.32	23.26	23.35	0	0
		1	7	23.50	23.35	23.40	0	0
		1	14	23.37	23.31	23.33	0	0
		8	0	22.64	22.51	22.64	0-1	1
		8	3	22.62	22.53	22.65	0-1	1
		8	7	22.59	22.57	22.63	0-1	1
		15	0	22.65	22.54	22.60	0-1	1
	16QAM	1	0	22.66	22.45	23.03	0-1	1
		1	7	22.79	22.53	23.12	0-1	1
		1	14	22.67	22.40	22.94	0-1	1
		8	0	21.64	21.55	21.75	0-2	2
		8	3	21.65	21.56	21.68	0-2	2
		8	7	21.67	21.57	21.62	0-2	2
		15	0	21.62	21.45	21.56	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19975	20175	20375	[dB]	[dB]
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	23.15	22.97	23.10	0	0
		1	12	23.23	23.04	23.08	0	0
		1	24	23.01	22.97	23.08	0	0
		12	0	22.57	22.40	22.52	0-1	1
		12	6	22.51	22.38	22.47	0-1	1
		12	11	22.45	22.39	22.49	0-1	1
		25	0	22.51	22.37	22.48	0-1	1
	16QAM	1	0	22.52	22.55	23.05	0-1	1
		1	12	22.62	22.64	23.09	0-1	1
		1	24	22.47	22.49	22.98	0-1	1
		12	0	21.60	21.42	21.63	0-2	2
		12	6	21.56	21.44	21.56	0-2	2
		12	11	21.46	21.38	21.58	0-2	2
		25	0	21.49	21.32	21.48	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20000	20175	20350	[dB]	[dB]
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	23.26	23.26	23.30	0	0
		1	24	23.26	23.18	23.20	0	0
		1	49	23.01	23.12	23.12	0	0
		25	0	22.59	22.45	22.55	0-1	1
		25	12	22.48	22.40	22.46	0-1	1
		25	24	22.33	22.43	22.48	0-1	1
		50	0	22.43	22.42	22.53	0-1	1
	16QAM	1	0	22.58	22.44	22.96	0-1	1
		1	24	22.59	22.34	22.86	0-1	1
		1	49	22.38	22.26	22.80	0-1	1
		25	0	21.68	21.40	21.54	0-2	2
		25	12	21.51	21.38	21.48	0-2	2
		25	24	21.45	21.38	21.45	0-2	2
		50	0	21.46	21.36	21.46	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20025	20175	20325	[dB]	[dB]
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	23.12	23.10	23.07	0	0
		1	36	23.00	23.07	23.14	0	0
		1	74	22.68	22.87	22.80	0	0
		36	0	22.67	22.57	22.66	0-1	1
		36	18	22.41	22.43	22.45	0-1	1
		36	38	22.49	22.51	22.47	0-1	1
		75	0	22.48	22.51	22.55	0-1	1
	16QAM	1	0	22.89	22.24	22.76	0-1	1
		1	36	22.78	22.17	22.78	0-1	1
		1	74	22.52	22.01	22.46	0-1	1
		36	0	21.60	21.53	21.64	0-2	2
		36	18	21.37	21.35	21.54	0-2	2
		36	38	21.46	21.43	21.58	0-2	2
		75	0	21.44	21.45	21.52	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				20175	[dB]	[dB]
				1732.5 MHz		
20 MHz	QPSK	1	0	22.76	0	0
		1	49	23.08	0	0
		1	99	22.57	0	0
		50	0	22.62	0-1	1
		50	25	22.46	0-1	1
		50	49	22.45	0-1	1
		100	0	22.50	0-1	1
	16QAM	1	0	22.69	0-1	1
		1	49	22.89	0-1	1
		1	99	22.47	0-1	1
		50	0	21.58	0-2	2
		50	25	21.40	0-2	2
		50	49	21.46	0-2	2
		100	0	21.47	0-2	2

Note: LTE Band 4 (AWS) at 20 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 5 Maximum Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20407	20525	20643	[dB]	[dB]
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	23.50	23.41	23.37	0	0
		1	3	23.07	23.02	22.95	0	0
		1	5	23.51	23.43	23.32	0	0
		3	0	23.40	23.38	23.17	0	0
		3	1	23.31	23.23	23.08	0	0
		3	3	23.40	23.33	23.22	0	0
		6	0	22.66	22.55	22.41	0-1	1
	16QAM	1	0	22.83	23.05	22.64	0-1	1
		1	3	22.44	22.65	22.19	0-1	1
		1	5	22.79	23.10	22.62	0-1	1
		3	0	22.76	22.82	22.70	0-1	1
		3	1	22.71	22.64	22.53	0-1	1
		3	3	22.83	22.70	22.66	0-1	1
		6	0	21.77	21.42	21.65	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20415	20525	20635	[dB]	[dB]
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.47	23.36	23.22	0	0
		1	7	23.50	23.47	23.34	0	0
		1	14	23.37	23.38	23.26	0	0
		8	0	22.73	22.60	22.45	0-1	1
		8	3	22.71	22.55	22.44	0-1	1
		8	7	22.72	22.62	22.52	0-1	1
		15	0	22.70	22.65	22.45	0-1	1
	16QAM	1	0	23.10	22.74	22.38	0-1	1
		1	7	23.16	22.75	22.47	0-1	1
		1	14	23.03	22.64	22.35	0-1	1
		8	0	21.83	21.57	21.48	0-2	2
		8	3	21.79	21.60	21.50	0-2	2
		8	7	21.77	21.62	21.51	0-2	2
		15	0	21.69	21.56	21.48	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20425	20525	20625	[dB]	[dB]
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	23.21	23.11	23.00	0	0
		1	12	23.22	23.16	23.02	0	0
		1	24	23.16	23.07	22.92	0	0
		12	0	22.63	22.52	22.44	0-1	1
		12	6	22.59	22.47	22.32	0-1	1
		12	11	22.60	22.48	22.36	0-1	1
		25	0	22.60	22.52	22.38	0-1	1
	16QAM	1	0	22.71	23.04	22.52	0-1	1
		1	12	22.76	23.04	22.48	0-1	1
		1	24	22.67	22.98	22.43	0-1	1
		12	0	21.61	21.60	21.49	0-2	2
		12	6	21.60	21.55	21.37	0-2	2
		12	11	21.59	21.59	21.38	0-2	2
		25	0	21.56	21.51	21.27	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				20525	[dB]	[dB]
				836.5 MHz		
10 MHz	QPSK	1	0	23.36	0	0
		1	24	23.23	0	0
		1	49	23.26	0	0
		25	0	22.64	0-1	1
		25	12	22.53	0-1	1
		25	24	22.53	0-1	1
		50	0	22.59	0-1	1
	16QAM	1	0	23.04	0-1	1
		1	24	22.90	0-1	1
		1	49	22.87	0-1	1
		25	0	21.66	0-2	2
		25	12	21.55	0-2	2
		25	24	21.55	0-2	2
		50	0	21.52	0-2	2

Note: LTE Band 5 at 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 13 Maximum Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				23230	[dB]	[dB]
				782 MHz		
5 MHz	QPSK	1	0	23.20	0	0
		1	12	23.21	0	0
		1	24	23.17	0	0
		12	0	22.64	0-1	1
		12	6	22.55	0-1	1
		12	11	22.65	0-1	1
		25	0	22.58	0-1	1
	16QAM	1	0	23.21	0-1	1
		1	12	23.14	0-1	1
		1	24	23.12	0-1	1
		12	0	21.77	0-2	2
		12	6	21.65	0-2	2
		12	11	21.76	0-2	2
		25	0	21.57	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				23230	[dB]	[dB]
				782 MHz		
10 MHz	QPSK	1	0	23.05	0	0
		1	24	23.25	0	0
		1	49	22.89	0	0
		25	0	22.84	0-1	1
		25	12	22.67	0-1	1
		25	24	22.72	0-1	1
		50	0	22.74	0-1	1
	16QAM	1	0	22.26	0-1	1
		1	24	22.44	0-1	1
		1	49	22.07	0-1	1
		25	0	21.84	0-2	2
		25	12	21.64	0-2	2
		25	24	21.73	0-2	2
		50	0	21.70	0-2	2

Note: LTE Band 13 at 5 MHz/ 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 2 Reduced Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18607	18900	19193	[dB]	[dB]
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	13.20	12.60	12.83	0	0
		1	3	12.89	12.34	12.42	0	0
		1	5	13.20	12.63	12.83	0	0
		3	0	13.02	12.51	12.72	0	0
		3	1	12.94	12.42	12.57	0	0
		3	3	13.05	12.52	12.67	0	0
		6	0	12.02	11.52	11.70	0-1	1
	16QAM	1	0	12.45	11.76	12.25	0-1	1
		1	3	12.03	11.33	11.84	0-1	1
		1	5	12.46	11.78	12.25	0-1	1
		3	0	12.31	11.69	11.90	0-1	1
		3	1	12.18	11.61	11.77	0-1	1
		3	3	12.25	11.60	11.78	0-1	1
		6	0	11.37	10.85	10.70	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18615	18900	19185	[dB]	[dB]
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	13.22	12.56	12.75	0	0
		1	7	13.28	12.65	12.77	0	0
		1	14	13.10	12.59	12.74	0	0
		8	0	12.10	11.57	11.76	0-1	1
		8	3	12.04	11.56	11.78	0-1	1
		8	7	12.05	11.60	11.77	0-1	1
		15	0	12.16	11.57	11.75	0-1	1
	16QAM	1	0	12.38	11.76	12.13	0-1	1
		1	7	12.45	11.55	12.19	0-1	1
		1	14	12.30	11.54	12.18	0-1	1
		8	0	11.23	10.67	11.02	0-2	2
		8	3	11.19	10.76	11.07	0-2	2
		8	7	11.16	10.78	11.00	0-2	2
		15	0	11.22	10.62	10.87	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18625	18900	19175	[dB]	[dB]
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	13.01	12.38	12.36	0	0
		1	12	12.97	12.34	12.48	0	0
		1	24	12.74	12.19	12.37	0	0
		12	0	12.04	11.53	11.59	0-1	1
		12	6	11.96	11.45	11.62	0-1	1
		12	11	12.00	11.45	11.63	0-1	1
		25	0	11.92	11.43	11.59	0-1	1
	16QAM	1	0	11.98	11.56	12.10	0-1	1
		1	12	12.00	11.58	12.23	0-1	1
		1	24	11.87	11.47	12.12	0-1	1
		12	0	11.22	10.63	10.85	0-2	2
		12	6	11.10	10.52	10.89	0-2	2
		12	11	11.14	10.55	10.89	0-2	2
		25	0	11.02	10.50	10.70	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18650	18900	19150	[dB]	[dB]
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	13.18	12.70	12.70	0	0
		1	24	13.05	12.46	12.63	0	0
		1	49	13.01	12.43	12.60	0	0
		25	0	12.13	11.59	11.66	0-1	1
		25	12	12.10	11.53	11.60	0-1	1
		25	24	12.03	11.51	11.65	0-1	1
		50	0	12.12	11.48	11.61	0-1	1
	16QAM	1	0	12.48	11.79	12.07	0-1	1
		1	24	12.31	11.55	11.97	0-1	1
		1	49	12.17	11.53	12.02	0-1	1
		25	0	11.37	10.65	10.76	0-2	2
		25	12	11.36	10.58	10.73	0-2	2
		25	24	11.30	10.55	10.77	0-2	2
		50	0	11.26	10.59	10.64	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18675	18900	19125	[dB]	[dB]
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	12.94	12.63	12.45	0	0
		1	36	12.91	12.29	12.38	0	0
		1	74	12.54	12.09	12.25	0	0
		36	0	12.29	11.76	11.76	0-1	1
		36	18	12.07	11.50	11.57	0-1	1
		36	38	12.12	11.54	11.62	0-1	1
		75	0	12.17	11.58	11.61	0-1	1
	16QAM	1	0	12.48	12.23	11.53	0-1	1
		1	36	12.44	11.98	11.47	0-1	1
		1	74	12.27	11.79	11.32	0-1	1
		36	0	11.32	10.80	10.81	0-2	2
		36	18	11.14	10.55	10.60	0-2	2
		36	38	11.16	10.64	10.59	0-2	2
		75	0	11.19	10.62	10.65	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				18700	18900	19100	[dB]	[dB]
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	12.84	12.56	12.42	0	0
		1	49	12.87	12.31	12.48	0	0
		1	99	12.28	11.98	12.03	0	0
		50	0	12.26	11.86	11.71	0-1	1
		50	25	12.04	11.54	11.56	0-1	1
		50	49	11.97	11.57	11.53	0-1	1
		100	0	12.05	11.60	11.66	0-1	1
	16QAM	1	0	12.39	12.18	12.08	0-1	1
		1	49	12.46	12.00	12.13	0-1	1
		1	99	11.86	11.61	11.84	0-1	1
		50	0	11.28	10.88	10.79	0-2	2
		50	25	11.10	10.55	10.62	0-2	2
		50	49	11.14	10.61	10.65	0-2	2
		100	0	11.28	10.67	10.67	0-2	2

- LTE Band 4 Reduced Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19957	20175	20393	[dB]	[dB]
				1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	12.96	12.76	12.90	0	0
		1	3	12.51	12.32	12.48	0	0
		1	5	12.96	12.78	12.96	0	0
		3	0	12.74	12.74	12.90	0	0
		3	1	12.60	12.61	12.73	0	0
		3	3	12.79	12.70	12.83	0	0
		6	0	11.84	11.64	11.84	0-1	1
	16QAM	1	0	12.36	11.97	12.45	0-1	1
		1	3	11.97	11.54	12.05	0-1	1
		1	5	12.38	11.94	12.45	0-1	1
		3	0	11.94	11.86	11.80	0-1	1
		3	1	11.79	11.67	11.74	0-1	1
		3	3	11.97	11.80	11.90	0-1	1
		6	0	11.01	10.65	10.76	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19965	20175	20385	[dB]	[dB]
				1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	12.95	12.76	12.96	0	0
		1	7	12.85	12.86	13.01	0	0
		1	14	12.83	12.64	12.86	0	0
		8	0	11.90	11.76	11.92	0-1	1
		8	3	11.90	11.77	11.84	0-1	1
		8	7	11.93	11.72	11.79	0-1	1
		15	0	11.93	11.67	11.85	0-1	1
	16QAM	1	0	12.15	12.19	12.24	0-1	1
		1	7	12.28	12.26	12.39	0-1	1
		1	14	12.15	12.14	12.19	0-1	1
		8	0	10.92	10.78	10.87	0-2	2
		8	3	10.89	10.71	10.87	0-2	2
		8	7	10.93	10.67	10.85	0-2	2
		15	0	10.85	10.74	10.88	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				19975	20175	20375	[dB]	[dB]
				1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	12.60	12.39	12.69	0	0
		1	12	12.61	12.43	12.71	0	0
		1	24	12.46	12.35	12.62	0	0
		12	0	11.74	11.55	11.71	0-1	1
		12	6	11.68	11.53	11.66	0-1	1
		12	11	11.67	11.55	11.64	0-1	1
		25	0	11.72	11.50	11.63	0-1	1
	16QAM	1	0	11.91	11.75	11.87	0-1	1
		1	12	11.99	11.79	11.97	0-1	1
		1	24	11.85	11.71	11.82	0-1	1
		12	0	10.82	10.72	10.75	0-2	2
		12	6	10.78	10.66	10.70	0-2	2
		12	11	10.74	10.67	10.74	0-2	2
		25	0	10.75	10.58	10.73	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20000	20175	20350	[dB]	[dB]
				1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	12.83	12.67	12.80	0	0
		1	24	12.75	12.56	12.78	0	0
		1	49	12.57	12.46	12.64	0	0
		25	0	11.85	11.65	11.74	0-1	1
		25	12	11.73	11.61	11.71	0-1	1
		25	24	11.64	11.59	11.70	0-1	1
		50	0	11.69	11.59	11.72	0-1	1
	16QAM	1	0	12.07	12.16	12.09	0-1	1
		1	24	12.05	12.05	12.10	0-1	1
		1	49	11.78	11.96	11.98	0-1	1
		25	0	10.79	10.70	10.83	0-2	2
		25	12	10.68	10.69	10.80	0-2	2
		25	24	10.62	10.67	10.76	0-2	2
		50	0	10.72	10.69	10.77	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20025	20175	20325	[dB]	[dB]
				1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	12.63	12.56	12.61	0	0
		1	36	12.48	12.56	12.65	0	0
		1	74	12.32	12.30	12.37	0	0
		36	0	11.92	11.75	11.81	0-1	1
		36	18	11.65	11.59	11.66	0-1	1
		36	38	11.72	11.67	11.72	0-1	1
		75	0	11.72	11.65	11.79	0-1	1
	16QAM	1	0	11.87	11.86	11.92	0-1	1
		1	36	11.72	11.82	11.93	0-1	1
		1	74	11.45	11.56	11.71	0-1	1
		36	0	10.89	10.74	10.79	0-2	2
		36	18	10.68	10.60	10.66	0-2	2
		36	38	10.72	10.68	10.76	0-2	2
		75	0	10.73	10.71	10.84	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				20175	[dB]	[dB]
				1732.5 MHz		
20 MHz	QPSK	1	0	12.48	0	0
		1	49	12.67	0	0
		1	99	12.19	0	0
		50	0	11.85	0-1	1
		50	25	11.64	0-1	1
		50	49	11.66	0-1	1
		100	0	11.68	0-1	1
	16QAM	1	0	11.62	0-1	1
		1	49	11.77	0-1	1
		1	99	11.29	0-1	1
		50	0	10.86	0-2	2
		50	25	10.66	0-2	2
		50	49	10.69	0-2	2
		100	0	10.75	0-2	2

Note: LTE Band 4 (AWS) at 20 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 5 Reduced Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20407	20525	20643	[dB]	[dB]
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	16.93	16.83	16.71	0	0
		1	3	16.53	16.36	16.28	0	0
		1	5	16.94	16.86	16.73	0	0
		3	0	16.84	16.76	16.69	0	0
		3	1	16.74	16.61	16.50	0	0
		3	3	16.82	16.73	16.63	0	0
		6	0	15.81	15.76	15.58	0-1	1
	16QAM	1	0	16.12	16.01	16.18	0-1	1
		1	3	15.72	15.5	15.78	0-1	1
		1	5	16.12	15.96	16.18	0-1	1
		3	0	16.09	15.94	15.81	0-1	1
		3	1	15.95	15.79	15.64	0-1	1
		3	3	16.02	15.90	15.74	0-1	1
		6	0	15.09	14.98	14.46	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP	MPR
				20415	20525	20635	[dB]	[dB]
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	16.86	16.83	16.61	0	0
		1	7	17.05	16.87	16.72	0	0
		1	14	16.90	16.81	16.71	0	0
		8	0	15.91	15.86	15.66	0-1	1
		8	3	15.87	15.82	15.64	0-1	1
		8	7	15.94	15.81	15.70	0-1	1
		15	0	15.96	15.79	15.69	0-1	1
	16QAM	1	0	16.02	16.26	15.69	0-1	1
		1	7	16.10	16.33	15.74	0-1	1
		1	14	16.01	16.18	15.60	0-1	1
		8	0	14.90	14.95	14.68	0-2	2
		8	3	14.90	14.95	14.73	0-2	2
		8	7	14.93	14.87	14.77	0-2	2
		15	0	14.89	14.79	14.72	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20425	20525	20625	[dB]	[dB]
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	16.71	16.50	16.49	0	0
		1	12	16.73	16.60	16.43	0	0
		1	24	16.65	16.43	16.37	0	0
		12	0	15.87	15.74	15.61	0-1	1
		12	6	15.81	15.70	15.44	0-1	1
		12	11	15.83	15.68	15.49	0-1	1
		25	0	15.84	15.70	15.53	0-1	1
	16QAM	1	0	15.89	16.14	15.69	0-1	1
		1	12	15.92	16.19	15.68	0-1	1
		1	24	15.83	16.11	15.60	0-1	1
		12	0	14.89	14.85	14.58	0-2	2
		12	6	14.83	14.79	14.49	0-2	2
		12	11	14.88	14.81	14.49	0-2	2
		25	0	14.80	14.74	14.48	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				20525	[dB]	[dB]
				836.5 MHz		
10 MHz	QPSK	1	0	16.83	0	0
		1	24	16.65	0	0
		1	49	16.63	0	0
		25	0	15.78	0-1	1
		25	12	15.70	0-1	1
		25	24	15.72	0-1	1
		50	0	15.77	0-1	1
	16QAM	1	0	15.85	0-1	1
		1	24	15.65	0-1	1
		1	49	15.67	0-1	1
		25	0	14.77	0-2	2
		25	12	14.66	0-2	2
		25	24	14.71	0-2	2
		50	0	14.74	0-2	2

Note: LTE Band 5 at 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 13 Reduced Conducted Power

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				23230	[dB]	[dB]
				782 MHz		
5 MHz	QPSK	1	0	17.46	0	0
		1	12	17.46	0	0
		1	24	17.32	0	0
		12	0	16.65	0-1	1
		12	6	16.51	0-1	1
		12	11	16.60	0-1	1
		25	0	16.50	0-1	1
	16QAM	1	0	16.49	0-1	1
		1	12	16.46	0-1	1
		1	24	16.36	0-1	1
		12	0	15.67	0-2	2
		12	6	15.56	0-2	2
		12	11	15.70	0-2	2
		25	0	15.56	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power (dBm)	MPR Allowed Per 3GPP	MPR
				23230	[dB]	[dB]
				782 MHz		
10 MHz	QPSK	1	0	17.34	0	0
		1	24	17.52	0	0
		1	49	17.13	0	0
		25	0	16.80	0-1	1
		25	12	16.61	0-1	1
		25	24	16.67	0-1	1
		50	0	16.66	0-1	1
	16QAM	1	0	16.28	0-1	1
		1	24	16.49	0-1	1
		1	49	16.14	0-1	1
		25	0	15.70	0-2	2
		25	12	15.69	0-2	2
		25	24	15.68	0-2	2
		50	0	15.67	0-2	2

Note: LTE Band 13 at 5 MHz/ 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

Note:

The EUT enables maximum power reduction in accordance with 3GPP 36.101. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

9.2.1 LTE Down-Link Carrier Aggregation Conducted Powers

LTE Carrier Aggregation Conducted Power -Max Power

Inter-band Downlik CA

PCC									SCC				Tx Power	
Band	BW	Modulation	RB	offset	PCC(UL) channel	PCC(UL) Frequency	PCC(DL) channel	PCC(DL) Frequency	Band	BW	SCC(DL) channel	SCC(DL) Frequency	Rel 8	Rel 10
2	3	QPSK	1	7	18615	1851.5	615	1931.5	4	10	2000	2115	**23.76**	**23.74**
2	10	QPSK	1	0	18650	1855	650	1935	5	10	2525	881.5	**23.55**	**23.53**
2	10	QPSK	1	0	18650	1855	650	1935	13	10	5230	751	**23.55**	**23.54**
4	10	QPSK	1	0	20000	1715	2000	2115	5	10	2525	881.5	**23.26**	**23.22**
4	10	QPSK	1	0	20000	1715	2000	2115	13	10	5230	751	**23.26**	**23.23**
4	10	QPSK	1	0	20000	1715	2000	2115	2	3	615	1931.5	**23.26**	**23.24**
5	10	QPSK	1	0	20525	836.5	2525	881.5	2	10	650	1935	**23.36**	**23.34**
5	10	QPSK	1	0	20525	836.5	2525	881.5	4	10	2000	2115	**23.36**	**23.35**
13	10	QPSK	1	24	23230	782	5230	751	2	10	650	1935	**23.25**	**23.21**
13	10	QPSK	1	24	23230	782	5230	751	4	10	2000	2115	**23.25**	**23.23**

Intra-band Non-continuous Downlik CA

PCC									SCC				Tx Power	
Band	BW	Modulation	RB	offset	PCC(UL) channel	PCC(UL) Frequency	PCC(DL) channel	PCC(DL) Frequency	Band	BW	SCC(DL) channel	SCC(DL) Frequency	Rel 8	Rel 10
4	10	QPSK	1	0	20000	1715	2000	2115	4	20	2300	2145	**23.26**	23.26

LTE Carrier Aggregation Conducted Power -Reduced Power

Inter-band Downlik CA

PCC									SCC				Tx Power	
Band	BW	Modulation	RB	offset	PCC(UL) channel	PCC(UL) Frequency	PCC(DL) channel	PCC(DL) Frequency	Band	BW	SCC(DL) channel	SCC(DL) Frequency	Rel 8	Rel 10
2	3	QPSK	1	7	18615	1851.5	615	1931.5	4	10	2000	2115	**13.28**	13.22
2	10	QPSK	1	0	18650	1855	650	1935	5	10	2525	881.5	**13.18**	13.17
2	10	QPSK	1	0	18650	1855	650	1935	13	10	5230	751	**13.18**	13.17
4	10	QPSK	1	0	20000	1715	2000	2115	5	10	2525	881.5	**12.83**	12.81
4	10	QPSK	1	0	20000	1715	2000	2115	13	10	5230	751	**12.83**	12.81
4	10	QPSK	1	0	20000	1715	2000	2115	2	3	615	1931.5	**12.83**	12.82
5	10	QPSK	1	0	20525	836.5	2525	881.5	2	10	650	1935	**16.83**	16.8
5	10	QPSK	1	0	20525	836.5	2525	881.5	4	10	2000	2115	**16.83**	16.8
13	10	QPSK	1	24	23230	782	5230	751	2	10	650	1935	**17.52**	17.47
13	10	QPSK	1	24	23230	782	5230	751	4	10	2000	2115	**17.52**	17.49

Intra-band Non-continuous Downlik CA

PCC									SCC				Tx Power	
Band	BW	Modulation	RB	offset	PCC(UL) channel	PCC(UL) Frequency	PCC(DL) channel	PCC(DL) Frequency	Band	BW	SCC(DL) channel	SCC(DL) Frequency	Rel 8	Rel 10
4	10	QPSK	1	0	20000	1715	2000	2115	4	20	2300	2145	**12.83**	12.74

Notes:

1. This device only supports downlink Carrier Aggregation. Uplink Carrier Aggregations are not supported. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation and RB combinations in each frequency band.
2. This device supports Down link CA with 2 carriers.
3. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive

9.3 WiFi

9.3.1 Maximum Power : Sensor Active Conditions:

IEEE 802.11 Average RF Conducted Power – Antenna 1

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2412	1	13.98
	2437	6	13.89
	2462	11	**14.17**
802.11g	2412	1	11.59
	2437	6	11.56
	2462	11	11.75
802.11n	2412	1	11.42
	2437	6	11.40
	2462	11	11.52

IEEE 802.11a Average RF Conducted Power – 20 MHz Bandwidth – Antenna 1

Mode	Freq. [MHz]	Channel	IEEE 802.11 (5 GHz) Conducted Power [dBm]
802.11a	5 180	36	11.61
	5 200	40	11.14
	5 240	48	11.38
	5 260	52	11.27
	5 300	60	11.59
	5 320	64	11.35
	5 500	100	11.52
	5 580	116	11.47
	5 700	140	11.41
	5 745	149	11.63
	5 785	157	11.17
	5 825	165	11.47

IEEE 802.11 Average RF Conducted Power – Antenna 2

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2412	1	14.21
	2437	6	14.09
	2462	11	**14.31**
802.11g	2412	1	11.71
	2437	6	11.59
	2462	11	11.85
802.11n	2412	1	11.41
	2437	6	11.44
	2462	11	11.68

IEEE 802.11a Average RF Conducted Power – 20 MHz Bandwidth – Antenna 2

Mode	Freq. [MHz]	Channel	IEEE 802.11 (5 GHz) Conducted Power [dBm]
802.11a	5 180	36	11.37
	5 200	40	11.31
	5 240	48	11.57
	5 260	52	11.55
	5 300	60	11.45
	5 320	64	11.50
	5 500	100	11.47
	5 580	116	11.81
	5 700	140	11.20
	5 745	149	11.35
	5 785	157	11.52
	5 825	165	11.72

9.3.2 Reduced Power Condition: Sensor Active Conditions:

IEEE 802.11 Reduced Average RF Conducted Power – Antenna 1

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2412	1	8.34
	2437	6	7.09
	2462	11	7.19
802.11g	2412	1	7.30
	2437	6	6.92
	2462	11	6.95
802.11n	2412	1	7.39
	2437	6	7.19
	2462	11	7.23

IEEE 802.11ac Average RF Conducted Power – 80 MHz Bandwidth – Antenna 1

Mode	Freq. [MHz]	Channel	IEEE 802.11 (5 GHz) Conducted Power [dBm]
802.11ac	5 210	42	5.75
	5 290	58	6.00
	5 530	106	6.07
	5 775	155	6.11

IEEE 802.11 Reduced Average RF Conducted Power – Antenna 2

Mode	Freq. [MHz]	Channel	IEEE 802.11 (2.4 GHz) Conducted Power [dBm]
802.11b	2412	1	**8.48**
	2437	6	8.19
	2462	11	7.98
802.11g	2412	1	8.25
	2437	6	7.82
	2462	11	8.13
802.11n	2412	1	8.09
	2437	6	7.56
	2462	11	7.92

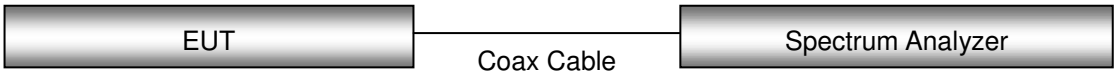
IEEE 802.11ac Average RF Conducted Power – 80 MHz Bandwidth – Antenna 2

Mode	Freq. [MHz]	Channel	IEEE 802.11 (5 GHz) Conducted Power [dBm]
802.11ac	5 210	42	6.61
	5 290	58	6.35
	5 530	106	6.93
	5 775	155	6.50

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.
- Output power and SAR measurement is not required for 802.11n channels when the specified tune-up tolerances for 802.11n are lower than 802.11a by more than 1/2dB and the measured SAR is ≤ 1.2 W/kg

Test Configuration



9.4 BT

Averaged-conducted Power

Mode	Channel	BT Power [dBm]
DH5	0	8.52
	39	9.36
	78	7.60
2-DH5	0	4.99
	39	5.90
	78	4.03
3-DH5	0	4.99
	39	5.90
	78	4.04

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) =(2.880/3.750)*100 = 0.768(DH5)

Duty factor= 1/Duty cycle : 1.3

10. SYSTEM VERIFICATION

10.1 Tissue Verification

The Head /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	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
01/04/2017	21.3	750B	740	0.978	54.605	0.963	55.570	1.56%	-1.74%
			750	0.987	54.561	0.963	55.530	2.49%	-1.75%
			775	0.998	54.248	0.966	55.425	3.31%	-2.12%
			785	1.001	54.191	0.967	55.397	3.51%	-2.18%
01/03/2017	21.3	835B	820	0.959	54.155	0.969	55.258	-1.03%	-2.00%
			835	0.971	54.142	0.970	55.200	0.10%	-1.92%
			850	0.981	54.135	0.988	55.154	-0.71%	-1.85%
01/10/2017	20.1	1800B	1710	1.451	52.616	1.463	53.537	-0.82%	-1.72%
			1750	1.476	52.517	1.488	53.432	-0.81%	-1.71%
			1800	1.526	52.309	1.520	53.300	0.39%	-1.86%
01/09/2017	20.2	1900B	1 850	1.490	53.200	1.520	53.300	-1.97%	-0.19%
			1 900	1.544	53.063	1.520	53.300	1.58%	-0.44%
			1 910	1.559	53.045	1.520	53.300	2.57%	-0.48%
01/16/2017	19.6	2450B	2 400	1.888	52.442	1.902	52.770	-0.74%	-0.62%
			2 450	1.954	52.231	1.950	52.700	0.21%	-0.89%
			2 500	2.015	52.065	2.021	52.640	-0.30%	-1.09%
01/16/2017	19.6	2450B	2 400	1.888	52.442	1.902	52.770	-0.74%	-0.62%
			2 450	1.954	52.231	1.950	52.700	0.21%	-0.89%
			2 500	2.015	52.065	2.021	52.640	-0.30%	-1.09%
01/31/2017	21.3	5200B-5300B	5 180	5.138	48.514	5.283	49.038	-2.74%	-1.07%
			5 250	5.253	48.303	5.358	48.950	-1.96%	-1.32%
01/17/2017	19.6	5200B-5800B	5 250	5.206	48.190	5.377	48.936	-3.18%	-1.52%
			5 280	5.253	48.119	5.400	48.908	-2.72%	-1.61%
			5 320	5.315	48.013	5.447	48.852	-2.42%	-1.72%
			5 500	5.614	47.491	5.650	48.610	-0.64%	-2.30%
			5 600	5.770	47.254	5.766	48.470	0.07%	-2.51%
			5 720	5.973	46.933	5.915	48.312	0.98%	-2.85%
			5 750	6.026	46.868	5.944	48.277	1.38%	-2.92%
			5 800	6.098	46.753	6.000	48.200	1.63%	-3.00%
			5 825	6.134	46.672	6.037	48.165	1.61%	-3.10%

10.2 System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications at 750 MHz / 835 MHz / 1 800 MHz / 1 900 MHz / 2 450 MHz / 5 250 MHz / 5 600 MHz / 5 750 MHz by using the system Verification kit. (Graphic Plots Attached)

System Verification Results

Freq.	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp.	Liquid Temp.	1 W Target SAR_{1g} (SPEAG)	Measured SAR_{1g}	1 W Normalized SAR_{1g}	Deviation	Limit [%]
[MHz]					[°C]	[°C]	[W/kg]	[W/kg]	[W/kg]	[%]	[%]
750	01/04/2017	1609	1014	Body	21.5	21.3	8.49	0.858	8.58	+ 1.06	± 10
835	01/03/2017	1609	441	Body	21.5	21.3	9.62	0.934	9.34	- 2.91	± 10
1 800	01/10/2017	3863	2d007	Body	20.2	20.1	37.6	3.96	39.6	+ 5.32	± 10
1 900	01/09/2017	3863	5d061	Body	20.4	20.2	39.7	3.98	39.8	+ 0.25	± 10
2 450	01/16/2017	3968	965	Body	19.8	19.6	49.2	4.78	47.8	- 2.85	± 10
2 450	01/16/2017	3968	965	Body	19.8	19.6	49.2	4.78	47.8	- 2.85	± 10
5 250	01/31/2017	3968	1253	Body	21.5	21.3	76.4	7.11	71.1	- 6.94	± 10
5 250	01/17/2017	3968	1253	Body	19.8	19.6	76.4	7.47	74.7	- 2.23	± 10
5 600	01/17/2017	3968	1253	Body	19.8	19.6	80.0	8.04	80.4	+ 0.50	± 10
5 750	01/17/2017	3968	1253	Body	19.8	19.6	77.1	7.76	77.6	+ 0.65	± 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 100 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

UMTS 850 Body SAR													
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)				(mm)	(W/kg)		(W/kg)	
836.6	4183	RMC	23.5	22.89	0.03	Rear	Inactive	1:1	15	0.437	1.151	0.503	-
836.6	4183	RMC	23.5	22.89	0.10	Top	Inactive	1:1	20	0.185	1.151	0.213	-
836.6	4183	RMC	23.5	22.89	-0.10	Left	Inactive	1:1	0	0.360	1.151	0.414	-
826.4	4132	RMC	18.0	17.22	0.07	Rear	Active	1:1	0	0.628	1.197	0.752	-
836.6	4183	RMC	18.0	17.17	0.11	Rear	Active	1:1	0	0.699	1.211	**0.846**	1
846.6	4233	RMC	18.0	17.09	-0.03	Rear	Active	1:1	0	0.637	1.233	0.785	-
826.4	4132	RMC	18.0	17.22	0.07	Top	Active	1:1	0	0.627	1.197	0.751	-
836.6	4183	RMC	18.0	17.17	0.16	Top	Active	1:1	0	0.685	1.211	0.830	-
846.6	4233	RMC	18.0	17.09	-0.03	Top	Active	1:1	0	0.658	1.233	0.811	-
836.6	4183	RMC	18.0	17.17	0.13	Rear With cover	Active	1:1	0	0.559	1.211	0.677	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram							

UMTS 1900 Body SAR													
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)				(mm)	(W/kg)		(W/kg)	
1 852.4	9262	RMC	15.0	14.48	0.16	Rear	Active	1:1	0	0.945	1.127	1.065	2
1 880.0	9400	RMC	15.0	14.06	0.10	Rear	Active	1:1	0	0.865	1.242	**1.074**	3
1 907.6	9538	RMC	15.0	13.83	-0.19	Rear	Active	1:1	0	0.782	1.309	1.024	-
1 880.0	9400	RMC	23.5	22.97	0.19	Rear	Inactive	1:1	15	0.374	1.130	0.423	-
1 852.4	9262	RMC	15.0	14.48	0.10	Top	Active	1:1	0	0.335	1.127	0.378	-
1 880.0	9400	RMC	23.5	22.97	0.15	Top	Inactive	1:1	20	0.194	1.130	0.219	-
1 852.4	9262	RMC	15.0	14.48	0.18	Rear With cover	Active	1:1	0	0.546	1.127	0.615	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram							

LTE Band 2 (PCS) Body SAR																	
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)			(dB)				(mm)	(W/kg)		(W/kg)	
1 860	18700	QPSK	20	13.5	12.87	0.10	Rear	Active	0	1	49	1:1	0	0.748	1.156	0.865	4
1 880	18900	QPSK	20	13.5	12.56	0.14	Rear	Active	0	1	0	1:1	0	0.694	1.242	0.862	-
1 900	19100	QPSK	20	13.5	12.48	0.11	Rear	Active	0	1	49	1:1	0	0.693	1.265	**0.877**	5
1 860	18700	QPSK	20	12.5	12.26	0.14	Rear	Active	1	50	0	1:1	0	0.519	1.057	0.549	-
1 860	18700	QPSK	20	12.5	12.05	0.12	Rear	Active	1	100	0	1:1	0	0.505	1.109	0.560	-
1 860	18700	QPSK	20	24.5	23.35	0.07	Rear	Inactive	0	1	0	1:1	15	0.502	1.303	0.654	-
1 860	18700	QPSK	20	23.5	22.75	0.16	Rear	Inactive	1	50	0	1:1	15	0.461	1.189	0.548	-
1 860	18700	QPSK	20	13.5	12.87	0.16	Top	Active	0	1	49	1:1	0	0.277	1.156	0.320	-
1 860	18700	QPSK	20	12.5	12.26	0.09	Top	Active	1	50	0	1:1	0	0.233	1.057	0.246	-
1 860	18700	QPSK	20	24.5	23.35	0.02	Top	Inactive	0	1	0	1:1	20	0.265	1.303	0.345	-
1 860	18700	QPSK	20	23.5	22.75	0.00	Top	Inactive	1	50	0	1:1	20	0.245	1.189	0.291	-
1 860	18700	QPSK	20	13.5	12.87	0.15	Rear With cover	Active	0	1	49	1:1	0	0.464	1.156	0.536	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram										

LTE Band 4 (AWS) Body SAR																	
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)			(dB)				(mm)	(W/kg)		(W/kg)	
1 732.5	20175	QPSK	20	13.5	12.67	0.14	Rear	Active	0	1	49	1:1	0	0.743	1.211	**0.900**	6
1 732.5	20175	QPSK	20	12.5	11.85	0.19	Rear	Active	1	50	0	1:1	0	0.493	1.161	0.572	-
1 732.5	20175	QPSK	20	12.5	11.68	0.17	Rear	Active	1	100	0	1:1	0	0.495	1.208	0.598	-
1 732.5	20175	QPSK	20	24.5	23.08	0.07	Rear	Inactive	0	1	49	1:1	15	0.525	1.387	0.728	-
1 732.5	20175	QPSK	20	23.5	22.62	0.13	Rear	Inactive	1	50	0	1:1	15	0.475	1.225	0.582	-
1 732.5	20175	QPSK	20	13.5	12.67	0.17	Top	Active	0	1	49	1:1	0	0.181	1.211	0.219	-
1 732.5	20175	QPSK	20	12.5	11.85	0.13	Top	Active	1	50	0	1:1	0	0.147	1.161	0.171	-
1 732.5	20175	QPSK	20	24.5	23.08	0.16	Top	Inactive	0	1	49	1:1	20	0.190	1.387	0.264	-
1 732.5	20175	QPSK	20	23.5	22.62	0.16	Top	Inactive	1	50	0	1:1	20	0.167	1.225	0.205	-
1 732.5	20175	QPSK	20	13.5	12.67	0.17	Rear With cover	Active	0	1	49	1:1	0	0.466	1.211	0.564	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram										

LTE Band 5 (Cell) Body SAR

Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)			(dB)				(mm)	(W/kg)		(W/kg)	
836.5	20525	QPSK	10	24.5	23.36	0.01	Rear	Inactive	0	1	0	1:1	15	0.328	1.300	0.426	-
836.5	20525	QPSK	10	23.5	22.64	0.01	Rear	Inactive	1	25	0	1:1	15	0.304	1.219	0.371	-
836.5	20525	QPSK	10	24.5	23.36	0.01	Top	Inactive	0	1	0	1:1	20	0.227	1.300	0.295	-
836.5	20525	QPSK	10	23.5	22.64	0.01	Top	Inactive	1	25	0	1:1	20	0.193	1.219	0.235	-
836.5	20525	QPSK	10	24.5	23.36	-0.13	Left	Inactive	0	1	0	1:1	0	0.404	1.300	0.525	-
836.5	20525	QPSK	10	23.5	22.64	-0.09	Left	Inactive	1	25	0	1:1	0	0.345	1.219	0.421	-
836.5	20525	QPSK	10	18.0	16.83	0.16	Rear	Active	0	1	0	1:1	0	0.680	1.309	**0.890**	7
836.5	20525	QPSK	10	17.0	15.78	0.11	Rear	Active	1	25	0	1:1	0	0.552	1.324	0.731	-
836.5	20525	QPSK	10	17.0	15.77	0.19	Rear	Active	1	50	0	1:1	0	0.546	1.327	0.725	-
836.5	20525	QPSK	10	18.0	16.83	-0.01	Top	Active	0	1	0	1:1	0	0.646	1.309	0.846	-
836.5	20525	QPSK	10	17.0	15.78	0.07	Top	Active	1	25	0	1:1	0	0.531	1.324	0.703	-
836.5	20525	QPSK	10	17.0	15.77	-0.11	Top	Active	1	50	0	1:1	0	0.529	1.327	0.702	-
836.5	20525	QPSK	10	18.0	16.83	0.11	Rear With cover	Active	0	1	0	1:1	0	0.565	1.309	0.740	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram										

LTE Band 13 Body SAR

Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)			(dB)				(mm)	(W/kg)		(W/kg)	
782	23230	QPSK	10	24.5	23.25	0.13	Rear	Inactive	0	1	24	1:1	15	0.399	1.334	0.532	-
782	23230	QPSK	10	23.5	22.84	-0.18	Rear	Inactive	1	25	0	1:1	15	0.347	1.164	0.404	-
782	23230	QPSK	10	24.5	23.25	-0.08	Top	Inactive	0	1	24	1:1	20	0.131	1.334	0.175	-
782	23230	QPSK	10	23.5	22.84	-0.01	Top	Inactive	1	25	0	1:1	20	0.110	1.164	0.128	-
782	23230	QPSK	10	24.5	23.25	-0.11	Left	Inactive	0	1	24	1:1	0	0.355	1.334	0.474	-
782	23230	QPSK	10	23.5	22.84	-0.08	Left	Inactive	1	25	0	1:1	0	0.317	1.164	0.369	-
782	23230	QPSK	10	18.0	17.52	0.12	Rear	Active	0	1	24	1:1	0	0.654	1.117	**0.731**	8
782	23230	QPSK	10	17.5	16.80	0.03	Rear	Active	1	25	0	1:1	0	0.572	1.175	0.672	-
782	23230	QPSK	10	18.0	17.52	-0.08	Top	Active	0	1	24	1:1	0	0.650	1.117	0.726	-
782	23230	QPSK	10	17.5	16.80	-0.13	Top	Active	1	25	0	1:1	0	0.622	1.175	0.731	-
782	23230	QPSK	10	18.0	17.52	-0.04	Rear With cover	Active	0	1	24	1:1	0	0.578	1.117	0.646	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram										

Wi-Fi (DTS) Body SAR - Antenna 1																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)		(Duty)	(W/kg)	
2 462	11	802.11b	22	1	14.5	14.17	0.14	Rear	Inactive	99.96	6	0.352	1.079	1.000	0.380	-
2 462	11	802.11b	22	1	14.5	14.17	0.11	Top	Inactive	99.96	6	0.224	1.079	1.000	0.242	-
2 412	1	802.11b	22	1	8.5	8.34	-0.18	Rear	Active	99.96	0	**0.489**	1.038	1.000	**0.508**	9
2 412	1	802.11b	22	1	8.5	8.34	0.11	Top	Active	99.96	0	0.073	1.038	1.000	0.076	-
2 412	1	802.11b	22	1	8.5	8.34	-0.13	Rear With cover	Active	99.96	0	0.246	1.038	1.000	0.255	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

Wi-Fi (DTS) Body SAR - Antenna 2																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)		(Duty)	(W/kg)	
2 462	11	802.11b	22	1	14.5	14.31	0.19	Rear	Inactive	99.96	6	0.230	1.045	1.000	0.240	-
2 462	11	802.11b	22	1	14.5	14.31	0.02	Top	Inactive	99.96	6	0.171	1.045	1.000	0.179	-
2 412	1	802.11b	22	1	8.5	8.48	0.03	Rear	Active	99.96	0	**0.241**	1.005	1.000	**0.242**	10
2 412	1	802.11b	22	1	8.5	8.48	0.02	Top	Active	99.96	0	0.168	1.005	1.000	0.169	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

Bluetooth Body SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dBm)	(dBm)	(dB)		(mm)	(W/kg)		(W/kg)	
2 441	39	Bluetooth DH5	10.0	9.36	0.00	Rear	0	**0.381**	1.159	**0.441**	11
2 441	39	Bluetooth DH5	10.0	9.36	0.18	Top	0	0.131	1.159	0.152	-
2 441	39	Bluetooth DH5	10.0	9.36	0.12	Rear With cover	0	0.294	1.159	0.341	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram					

Wi-Fi (NII) Body SAR - Antenna 1																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)		(Duty)	(W/kg)	
5240	48	802.11a	20	6Mbps	12.5	12.021	-0.10	Rear	Inactive	94.62	6	0.043	1.117	1.057	0.051	-
5240	48	802.11a	20	6Mbps	12.5	12.021	-0.10	Top	Inactive	94.62	6	0.05	1.117	1.057	0.059	-
5210	42	802.11ac	80	MCS0	7.5	5.75	0.00	Rear	Active	85.23	0	0.107	1.496	1.173	0.188	-
5210	42	802.11ac	80	MCS0	7.5	5.75	-0.10	Top	Active	85.23	0	0.168	1.496	1.173	**0.295**	-
5 320	64	802.11a	20	6Mbps	12.5	11.35	-0.13	Rear	Inactive	94.62	6	0.116	1.303	1.057	0.160	-
5 320	64	802.11a	20	6Mbps	12.5	11.35	0.10	Top	Inactive	94.62	6	0.140	1.303	1.057	0.193	-
5 290	58	802.11ac	80	MCS0	7.5	6.00	0.00	Rear	Active	85.23	0	0.084	1.413	1.173	0.139	-
5 290	58	802.11ac	80	MCS0	7.5	6.00	0.00	Top	Active	85.23	0	0.156	1.413	1.173	0.259	-
5 700	140	802.11a	20	6Mbps	12.5	11.41	-0.10	Rear	Inactive	94.62	6	0.150	1.285	1.057	0.204	-
5 700	140	802.11a	20	6Mbps	12.5	11.41	-0.18	Top	Inactive	94.62	6	0.157	1.285	1.057	0.213	-
5 530	106	802.11ac	80	MCS0	7.5	6.07	-0.10	Rear	Active	85.23	0	0.151	1.390	1.173	0.246	-
5 530	106	802.11ac	80	MCS0	7.5	6.07	0.00	Top	Active	85.23	0	0.053	1.390	1.173	0.086	-
5 745	149	802.11a	20	6Mbps	12.5	11.63	0.00	Rear	Inactive	94.62	6	0.139	1.222	1.057	0.180	-
5 745	149	802.11a	20	6Mbps	12.5	11.63	-0.10	Top	Inactive	94.62	6	0.164	1.222	1.057	0.212	-
5 775	155	802.11ac	80	MCS0	7.5	6.11	0.00	Rear	Active	85.23	0	0.213	1.377	1.173	**0.344**	12
5 775	155	802.11ac	80	MCS0	7.5	6.11	0.00	Top	Active	85.23	0	0.060	1.377	1.173	0.097	-
5 775	155	802.11ac	80	MCS0	7.5	6.11	0.00	Rear With cover	Active	80.91	0	0.058	1.377	1.236	0.099	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

Wi-Fi (NII) Body SAR - Antenna 2																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Sensor	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)				(mm)	(W/kg)		(Duty)	(W/kg)	
5 240	48	802.11a	20	6Mbps	12.5	11.875	-0.10	Rear	Inactive	94.62	6	0.115	1.155	1.057	0.140	-
5 240	48	802.11a	20	6Mbps	12.5	11.875	-0.10	Top	Inactive	94.62	6	0.036	1.155	1.057	0.044	-
5 210	42	802.11ac	80	MCS0	7.5	6.61	0.00	Rear	Active	85.23	0	0.244	1.227	1.173	**0.351**	13
5 210	42	802.11ac	80	MCS0	7.5	6.61	0.00	Top	Active	85.23	0	0.062	1.227	1.173	0.089	-
5 260	52	802.11a	20	6Mbps	12.5	11.55	-0.17	Rear	Inactive	94.62	6	0.114	1.245	1.057	0.150	-
5 260	52	802.11a	20	6Mbps	12.5	11.55	0.19	Top	Inactive	94.62	6	0.057	1.245	1.057	0.075	-
5 290	58	802.11ac	80	MCS0	7.5	6.35	0.00	Rear	Active	85.23	0	0.102	1.303	1.173	0.156	-
5 290	58	802.11ac	80	MCS0	7.5	6.35	0.00	Top	Active	85.23	0	0.051	1.303	1.173	0.078	-
5 500	100	802.11a	20	6Mbps	12.5	11.47	-0.10	Rear	Inactive	94.62	6	0.071	1.268	1.057	0.095	-
5 500	100	802.11a	20	6Mbps	12.5	11.47	-0.10	Top	Inactive	94.62	6	0.053	1.268	1.057	0.071	-
5 530	106	802.11ac	80	MCS0	7.5	6.93	0.00	Rear	Active	85.23	0	0.103	1.140	1.173	0.138	-
5 530	106	802.11ac	80	MCS0	7.5	6.93	0.00	Top	Active	85.23	0	0.038	1.140	1.173	0.051	-
5 825	165	802.11a	20	6Mbps	12.5	11.72	-0.10	Rear	Inactive	94.62	6	0.146	1.197	1.057	0.185	-
5 825	165	802.11a	20	6Mbps	12.5	11.72	-0.13	Top	Inactive	94.62	6	0.069	1.197	1.057	0.087	-
5 775	155	802.11ac	80	MCS0	7.5	6.50	0.00	Rear	Active	85.23	0	0.164	1.259	1.173	0.242	-
5 775	155	802.11ac	80	MCS0	7.5	6.50	0.00	Top	Active	85.23	0	0.061	1.259	1.173	0.090	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

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. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for frequency band were grater than or equal to 0.8W/kg. Repeated SAR measurements are performed.. Please see Section 13 for variability analysis information.
7. This device utilizes power reduction for wireless mode and technologies, as outlined in sec. 2.5 and sec.9. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous scenarios.
8. 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.

UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. UMTS mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB 941225 D01v03r01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and Adjusted SAR value was less than 1.2 W/kg.
3. Per FCC KDB 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the channel highest output power channel was used.
4. UMTS SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB publication 941225 D01v03r01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Consideration for LTE Devices in FCC KDB 941225 D05v02r05.
2. According to FCC KDB 941225 D05v02r05:
   When the reported SAR is ≤ 0.8 W/kg, testing of the 100%RB allocation and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the 1RB, 50%RB and 100%RB allocation with highest output power for that channel.
   Only one channel, and as reported SAR values for 1RB allocation and 50%RB allocation were less than 1.45W/Kg only the highest power RB offset for each allocation was required.
3. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to target MPR is indicated alongside the SAR results.
4. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
5. Per KDB 941225 D05Av01r02, SAR for LTE Carrier Aggregation operations was not needed because the maximum average output power in LTE CA mode was not > 0.25 dB higher than the maximum output power when downlink CA was not activated.
6. SAR test reduction is applied using the following criteria:
   Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is >0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are >0.8 W/kg, Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation <1.45 W/kg. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is <1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is <1.45 W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

WLAN Notes:

1. 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.
2. 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.
3. Per KDB 2482227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR Provisions from KDB 447498D01v06.
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.
6. Only channels in the U-NII-2C (> 5.65 GHz WIFI) & U-NII-3 aggregate band that support wireless router were considered for hotspot SAR tests.

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.9.5 for the time-domain plot and calculation for duty factor of the device.

12. Simultaneous Transmission SAR Analysis

12.1 Simultaneous Transmission Summation for Body

Simultaneous Tx	configurations	WCDMA5 (W/kg)	2.4 Ant1 (W/kg)	2.4 Ant2 (W/kg)	∑ 1-g SAR (W/kg)	SPLSR (Yes/No)
Body SAR	Rear	0.846	0.508	0.242	1.596	No
	Top	0.830	0.242	0.179	1.251	No
	Left	0.414	-	-	0.414	No
Simultaneous Tx	**configurations**	**WCDMA2**	**2.4 Ant1**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	**(W/kg)**	**(W/kg)**	**(W/kg)**	**(Yes/No)**
Body SAR	Rear	1.074	0.508	0.242	1.824	Yes
	Top	0.378	0.242	0.179	0.799	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 2**	**2.4 Ant1**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	**(W/kg)**	**(W/kg)**	**(W/kg)**	**(Yes/No)**
Body SAR	Rear	0.877	0.508	0.242	1.627	Yes
	Top	0.345	0.242	0.179	0.766	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 4**	**2.4 Ant1**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	**(W/kg)**	**(W/kg)**	**(W/kg)**	**(Yes/No)**
Body SAR	Rear	0.900	0.508	0.242	1.650	Yes
	Top	0.264	0.242	0.179	0.685	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 5**	**2.4 Ant1**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	**(W/kg)**	**(W/kg)**	**(W/kg)**	**(Yes/No)**
Body SAR	Rear	0.890	0.508	0.242	1.640	Yes
	Top	0.846	0.242	0.179	1.267	No
	Left	0.525	-	-	0.525	No
Simultaneous Tx	**configurations**	**LTE 13**	**2.4 Ant1**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	**(W/kg)**	**(W/kg)**	**(W/kg)**	**(Yes/No)**
Body SAR	Rear	0.731	0.508	0.242	1.481	No
	Top	0.731	0.242	0.179	0.973	No
	Left	0.474	-	-	0.474	No

Simultaneous Tx	configurations	WCDMA5	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.846	0.344	0.351	1.541	No
	Top	0.830	0.295	0.090	1.215	No
	Left	0.414	-	-	0.414	No
Simultaneous Tx	configurations	WCDMA2	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	1.074	0.344	0.351	**1.769**	Yes
	Top	0.378	0.295	0.090	0.763	No
	Left	-	-	-	-	-
Simultaneous Tx	configurations	LTE 2	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.877	0.344	0.351	1.572	No
	Top	0.345	0.295	0.090	0.730	No
	Left	-	-	-	-	-
Simultaneous Tx	configurations	LTE 4	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.900	0.344	0.351	1.595	No
	Top	0.264	0.295	0.090	0.649	No
	Left	-	-	-	-	-
Simultaneous Tx	configurations	LTE 5	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.890	0.344	0.351	1.585	No
	Top	0.846	0.295	0.090	1.231	No
	Left	0.525	-	-	0.525	No
Simultaneous Tx	configurations	LTE 13	5GHz Ant1	5GHz Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.731	0.344	0.351	1.426	No
	Top	0.731	0.295	0.090	1.116	No
	Left	0.474	-	-	0.474	No

Simultaneous Tx	configurations	WCDMA5	BT	2.4 Ant2	∑ 1-g SAR	SPLSR
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.846	0.441	0.242	1.529	No
	Top	0.830	0.152	0.179	1.161	No
	Left	0.414	-	-	0.414	No
Simultaneous Tx	**configurations**	**WCDMA2**	**BT**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	1.074	0.441	0.242	**1.757**	Yes
	Top	0.378	0.152	0.179	0.709	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 2**	**BT**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.877	0.441	0.242	1.560	No
	Top	0.345	0.152	0.179	0.676	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 4**	**BT**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.900	0.441	0.242	1.583	No
	Top	0.264	0.152	0.179	0.595	No
	Left	-	-	-	-	-
Simultaneous Tx	**configurations**	**LTE 5**	**BT**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.890	0.441	0.242	1.573	No
	Top	0.846	0.152	0.179	1.177	No
	Left	0.525	-	-	0.525	No
Simultaneous Tx	**configurations**	**LTE 13**	**BT**	**2.4 Ant2**	**∑ 1-g SAR**	**SPLSR**
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(Yes/No)
Body SAR	Rear	0.731	0.441	0.242	1.414	No
	Top	0.731	0.152	0.179	1.062	No
	Left	0.474	-	-	0.474	No

12.2 SAR to Peak Location Separation Ratio (SPLSR)

FCC KDB 447498 D01v06 General RF Exposure Guidance introduces a new formula for calculating the SAR a Peak Location Separation Ratio(SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5}/R_i$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured of estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

R_i is the separation distance between the pair of simultaneous transmitting antennas, When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $\sqrt{[(X_1 - X_2)^2 + (Y_1 - Y_2)^2]}$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR> 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:
$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04$

Per Sec. 12, below simultaneous transmission summations need to be calculated SPLSR.

12.2.1 WCDMA Band2 & 2.4GHz WiFi (Antenna1 + Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
WCDMA Band2	1.481	-0.004	-0.0275
2.4GHz Antenna1	0.87	-0.011	0.0612
2.4GHz Antenna2	0.405	0.001	0.0386

SAR to Peak Location Separation Ratio (SPLSR)

Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	WCDMA 2	1.074	1.582	88.976	0.02	No	1
Rear	2.4GHz WIFI (Antenna1)	0.508					
Rear	WCDMA 2	1.074	1.316	66.289	0.02	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					
Rear	2.4GHz WIFI (Antenna1)	0.508	0.75	25.588	0.03	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					

12.2.2 LTE Band2 & 2.4GHz WiFi (Antenna1 + Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
LTE Band2	1.184	-0.0025	-0.0295
2.4GHz Antenna1	0.87	-0.011	0.0612
2.4GHz Antenna2	0.405	0.001	0.0386

SAR to Peak Location Separation Ratio (SPLSR)

Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	LTE 2	0.877	1.385	91.097	0.02	No	2
Rear	2.4GHz WIFI (Antenna1)	0.508					
Rear	LTE 2	0.877	1.119	68.190	0.02	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					
Rear	2.4GHz WIFI (Antenna1)	0.508	0.75	25.588	0.03	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					

12.2.3 LTE Band4 & 2.4GHz WiFi (Antenna1 + Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
LTE Band4	1.242	-0.0025	-0.029
2.4GHz Antenna1	0.87	-0.011	0.0612
2.4GHz Antenna2	0.405	0.001	0.0386

SAR to Peak Location Separation Ratio (SPLSR)

Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	LTE Band4	0.9	1.408	90.600	0.02	No	3
Rear	2.4GHz WIFI (Antenna1)	0.508					
Rear	LTE Band4	0.9	1.142	67.691	0.02	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					
Rear	2.4GHz WIFI (Antenna1)	0.508	0.75	25.588	0.03	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					

12.2.4 LTE Band5 & 2.4GHz WiFi (Antenna1 + Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
LTE Band5	0.731	0.004	-0.087
2.4GHz Antenna1	0.87	-0.011	0.0612
2.4GHz Antenna2	0.405	0.001	0.0386

SAR to Peak Location Separation Ratio (SPLSR)

Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	LTE Band5	0.89	1.398	148.957	0.01	No	4
Rear	2.4GHz WIFI (Antenna1)	0.508					
Rear	LTE Band5	0.89	1.132	125.636	0.01	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					
Rear	2.4GHz WIFI (Antenna1)	0.508	0.75	25.588	0.03	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					

12.2.5 WCDMA Band2 & 5GHz WiFi (Antenna1 + Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
WCDMA Band2	1.481	-0.004	-0.0275
5GHz Antenna1	0.732	-0.007	0.054
5GHz Antenna2	0.712	-0.008	0.04

SAR to Peak Location Separation Ratio (SPLSR)

Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	WCDMA 2	1.074	1.418	88.976	0.02	No	5
Rear	5GHz WIFI (Antenna1)	0.344					
Rear	WCDMA 2	1.074	1.425	66.289	0.03	No	
Rear	5GHz WIFI (Antenna2)	0.351					
Rear	5GHz WIFI (Antenna1)	0.344	0.695	14.036	0.04	No	
Rear	5GHz WIFI (Antenna2)	0.351					

12.2.6 WCDMA Band2 & Bluetooth & 2.4GHz WiFi (Antenna2)

Mode	Peak SAR	X	Y
	[mW/g]	M	M
WCDMA Band2	1.481	-0.004	-0.0275
Bluetooth	0.646	-0.0074	0.0588
2.4GHz Antenna2	0.405	0.001	0.0386

SAR to Peak Location Separation Ratio (SPLSR)

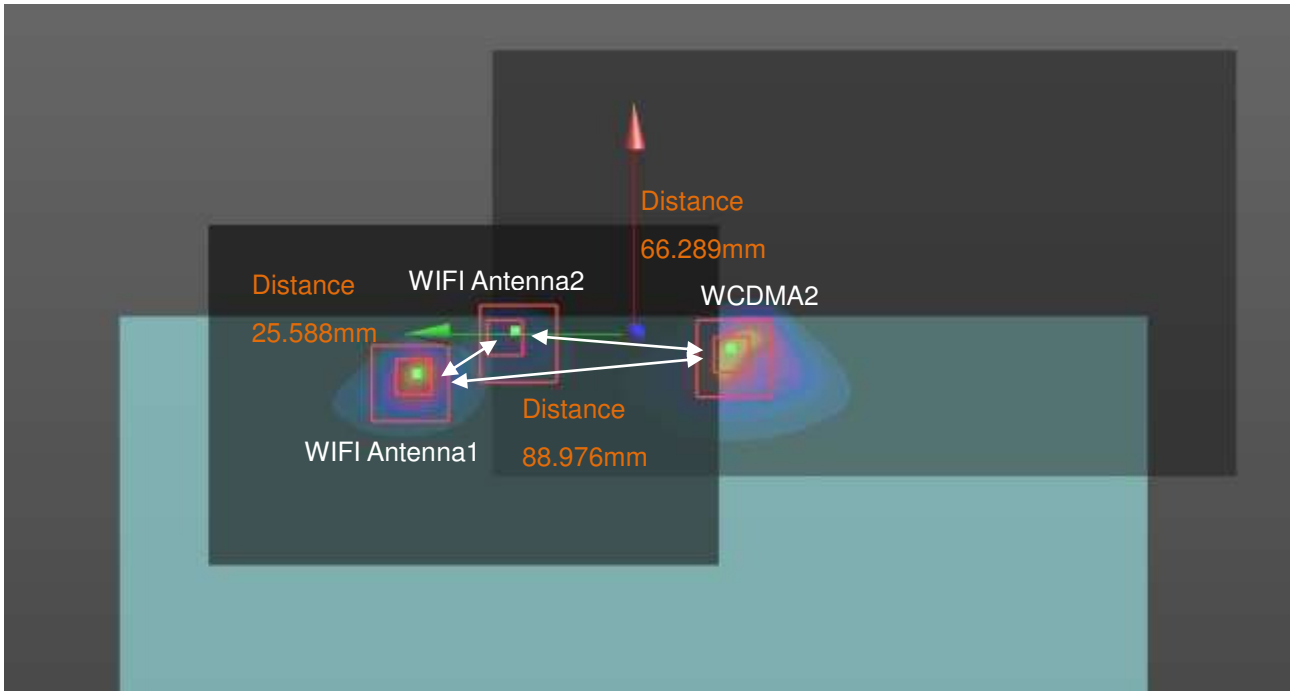
Simultaneous Transmission Scenario		Standalone SAR Value	∑ 1-g SAR	Calculated Distance	SPLSR	Volume Scan	Figure
Position	Combination	(W/kg)	(W/kg)	(mm)	(≤0.04)	(Yes/No)	
Rear	WCDMA 2	1.074	1.515	86.367	0.02	No	6
Rear	Bluetooth	0.441					
Rear	WCDMA 2	1.074	1.316	66.289	0.02	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					
Rear	Bluetooth	0.441	0.683	21.877	0.02	No	
Rear	2.4GHz WIFI (Antenna2)	0.242					

SPLSR Conclusion

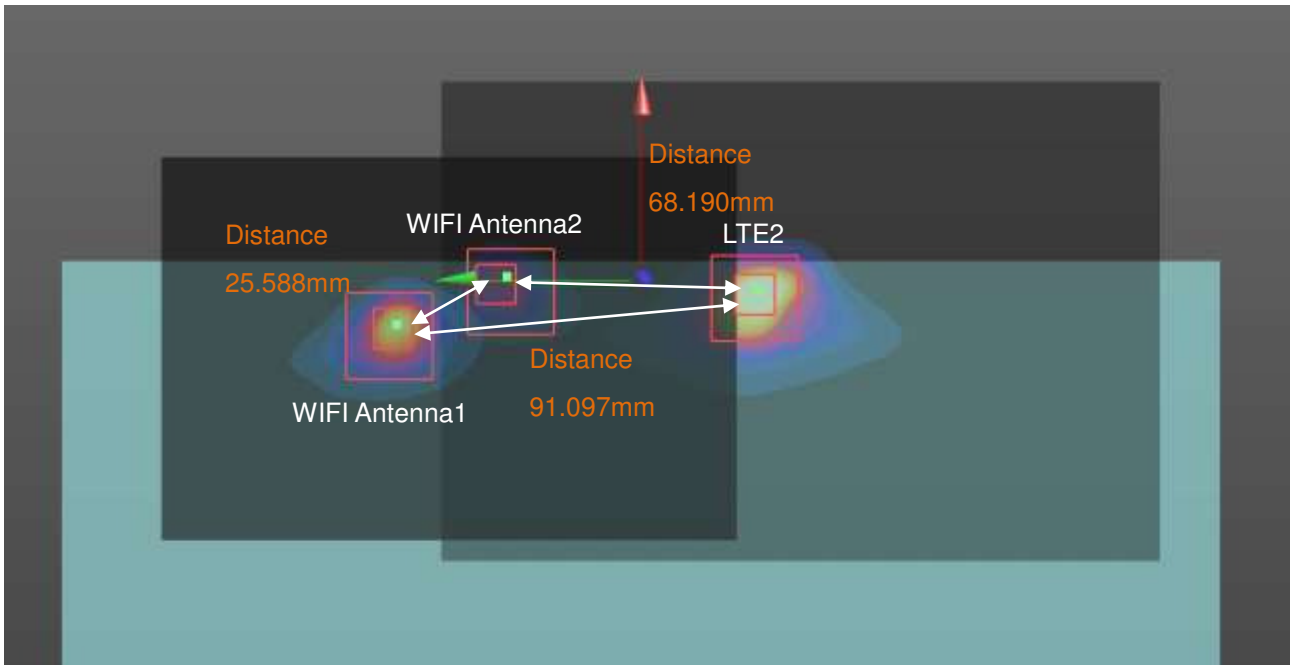
Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is ≤ 0.04 for all circumstances that require SPLSR calculation.

12.2.7 SAR to Peak Location Ratio (SPLSR) Figures

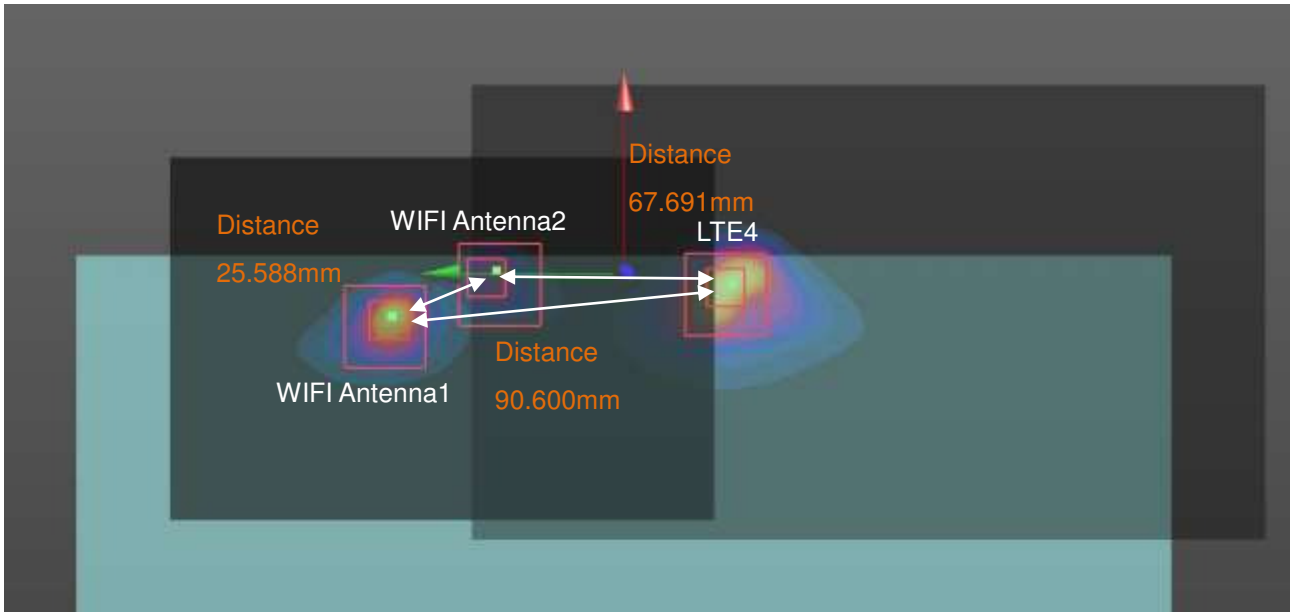
WCDMA B2 & 2.4GHz WiFi (Antenna 1 + Antenna 2) – Figure 1



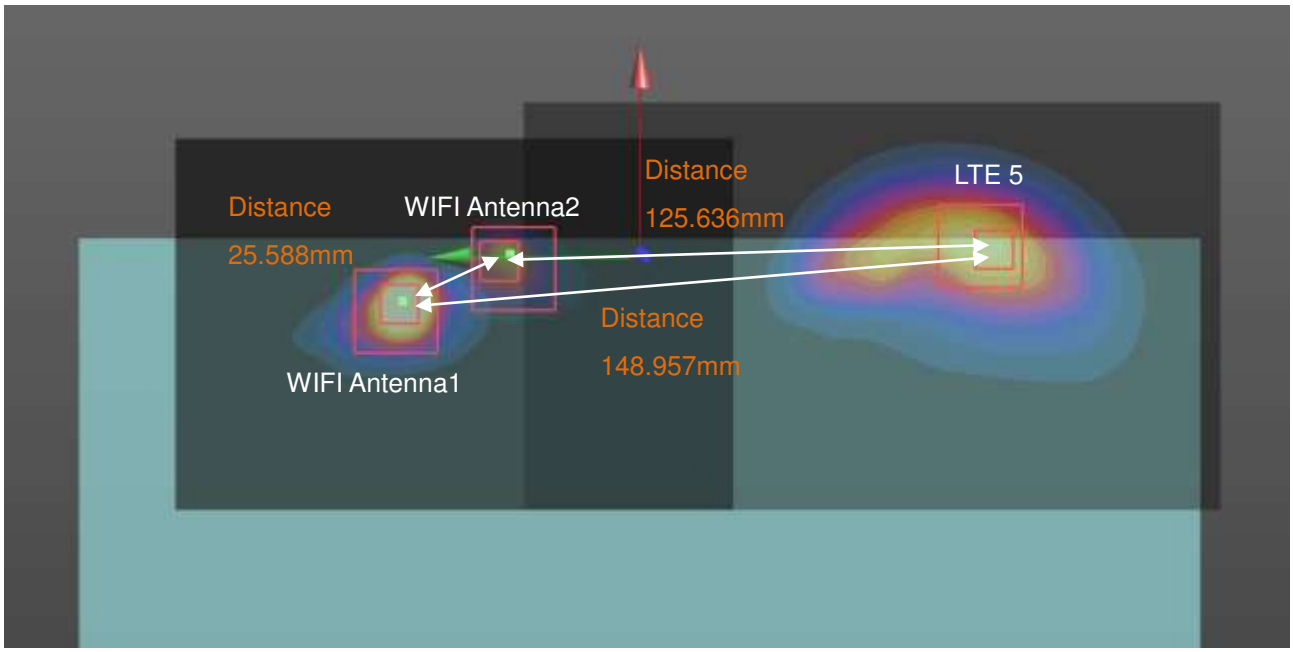
LTE Band2 & 2.4GHz WiFi (Antenna 1 + Antenna 2) – Figure 2



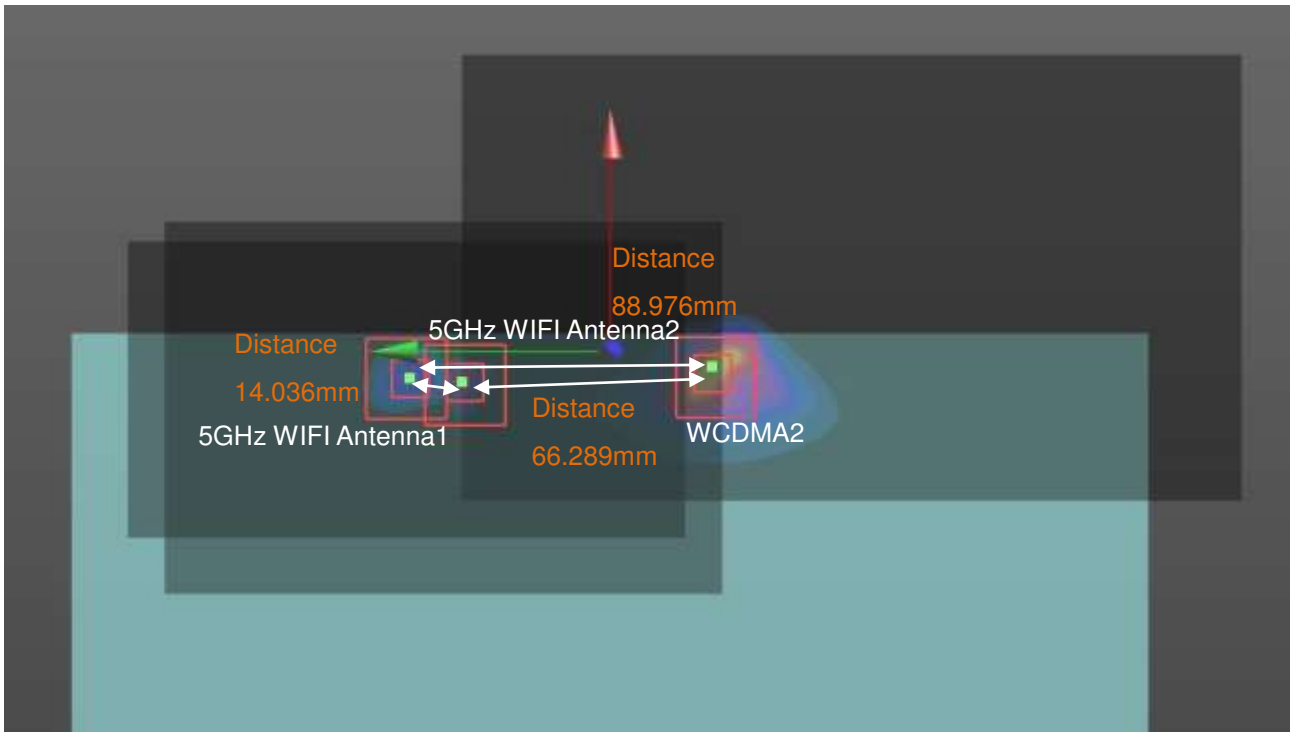
LTE Band4 & 2.4GHz WiFi (Antenna 1 + Antenna 2) – Figure 3



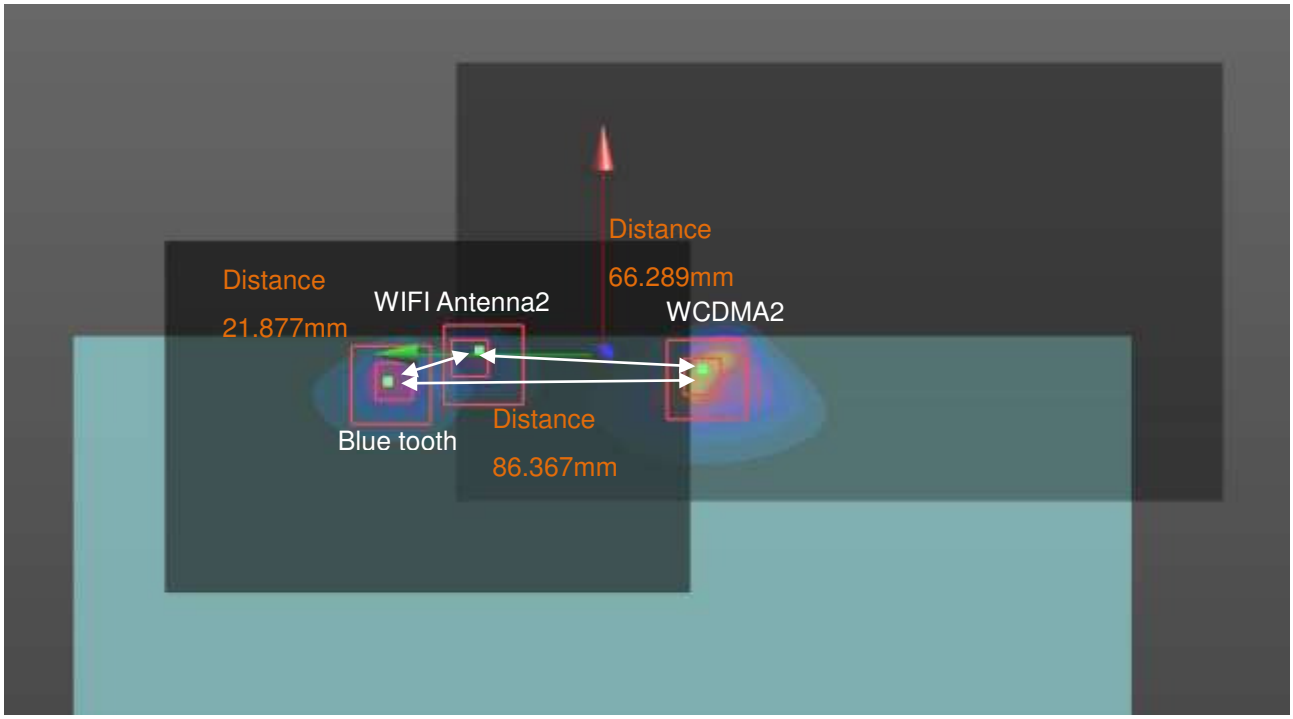
LTE Band 5 & 2.4GHz WiFi (Antenna 1 + Antenna 2) – Figure 4



WCDMA B2 & 5GHz WiFi (Antenna 1 + Antenna 2) – Figure 5



WCDMA B2 & Bluetooth & 2.4GHz WiFi (Antenna 2) – Figure 6



12.3 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013.

13. 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.

Frequency		Modulation	Battery	Configuration	Original SAR	Repeated SAR	Largest to Smallest SAR Ratio	Plot No.
MHz	Channel				(W/kg)	(W/kg)		
1 852.4	9262	UMTS 1900	Standard	Rear	0.945	0.910	1.04	14

14. MEASUREMENT UNCERTAINTY

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.55	N	1	1	6.55	∞
Axial Isotropy	4.70	R	1.73	0.70	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.70	3.88	∞
Boundary Effects	2.00	R	1.73	1	1.15	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	0.25	R	1.73	1	0.14	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.80	R	1.73	1	0.46	∞
Integration Time	2.60	R	1.73	1	1.50	∞
RF Ambient Noise	3.00	R	1.73	1	1.73	∞
RF Ambient Reflections	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.80	R	1.73	1	0.46	∞
Probe Positioning	6.70	R	1.73	1	3.87	∞
Max SAR Eval	4.00	R	1.73	1	2.31	∞
2.Test Sample Related						
Device Positioning	2.11	N	1.00	1	2.11	9
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
Power Scaling	0.00	R	1.73	1	0.00	∞
3.Phantom and Setup						
Phantom Uncertainty	7.90	R	1.73	1	3.82	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Permitivity(target)	5.00	R	1.73	0.60	1.73	∞
Liquid Conductivity(meas.)	3.80	N	1	0.78	2.96	5
Liquid Permitivity(meas.)	2.60	N	1	0.23	0.60	5
Liquid Conductivity(temp.)	1.70	R	1.73	0.78	0.77	∞
Liquid Permitivity(temp.)	2.70	R	1.73	0.23	0.36	∞
Combind Standard Uncertainty					12.49	
Coverage Factor for 95 %					*k*=2	
Expanded STD Uncertainty					24.98	

15. SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	ELI Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	Robot RX90B L	F05/ 510XA1/ A/ 01	N/A	N/A	N/A
Staubli	Robot RX90B L	F01/ 5K09A1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 Xlspeag	F10/ 5D1CA1/ A/ 01	N/A	N/A	N/A
Staubli	Robot ControllerCS7MB	F05/ 510XA1/ C/ 01	N/A	N/A	N/A
Staubli	Robot ControllerCS7MB	F01/ 5K09A1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F10/ 5D1CA1/ C/ 01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D22134002 2	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D221340.01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142106	N/A	N/A	N/A
SPEAG	DAE3	504	07/26/2016	Annual	07/26/2017
SPEAG	DAE4	652	01/22/2016	Annual	01/22/2017
SPEAG	DAE4	911	02/19/2016	Annual	02/19/2017
SPEAG	E-Field Probe EX3DV4	3968	05/31/2016	Annual	05/31/2017
SPEAG	E-Field Probe EX3DV4	3863	07/28/2016	Annual	07/28/2017
SPEAG	E-Field Probe ET3DV6	1609	03/18/2016	Annual	03/18/2017
SPEAG	Dipole D750V3	1014	07/22/2016	Annual	07/22/2017
SPEAG	Dipole D835V2	441	11/16/2016	Annual	11/16/2017
SPEAG	Dipole D1800V2	2d007	11/16/2016	Annual	11/16/2017
SPEAG	Dipole D1900V2	5d061	04/25/2016	Annual	04/25/2017
SPEAG	Dipole D2450V2	965	04/19/2016	Annual	04/19/2017
SPEAG	Dipole D5GHzV2	1253	01/09/2017	Annual	01/09/2018
Agilent	Power Meter N1911A	MY45101406	09/28/2016	Annual	09/28/2017
HP	Power Sensor 8481A	2702A72055	05/27/2016	Annual	05/27/2017
SPEAG	DAKS 3.5	1038	05/31/2016	Annual	05/31/2017
HP	Directional Bridge	86205A	05/18/2016	Annual	05/18/2017
Agilent	Base Station E5515C	GB44400269	02/05/2016	Annual	02/05/2017
HP	Signal Generator N5182A	MY47070230	05/13/2016	Annual	05/13/2017
Hewlett Packard	11636B/Power Divider	58698	02/27/2016	Annual	02/27/2017
TESTO	175-H1/Thermometer	40332651310	02/12/2016	Annual	02/12/2017
TESTO	175-H1/Thermometer	40331939309	02/12/2016	Annual	02/12/2017
EMPOWER	RF Power amplifier	1011	10/17/2016	Annual	10/17/2017
Agilent	Attenuator(3dB)	52744	10/16/2016	Annual	10/16/2017
Agilent	Attenuator(20dB)	52664	10/16/2016	Annual	10/16/2017
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler	16072	10/16/2016	Annual	10/16/2017
R&S	Wideband Radio Communication Tester CMW500	101519	09/07/2016	Annual	09/07/2017
Anritsu	Radio Communication Analyzer/ MT8820C	6200628628	07/05/2016	Annual	07/05/2017
Anritsu	Radio Communication Analyzer/ MT8820C	6200576565	07/05/2016	Annual	07/05/2017

NOTE:

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- 1992

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada. These measurements were taken to simulate the RF effects of RF 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.

17. REFERENCES

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Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	01/03/2017
Plot No.:	1

DUT: SM-W727V; Type: Tablet

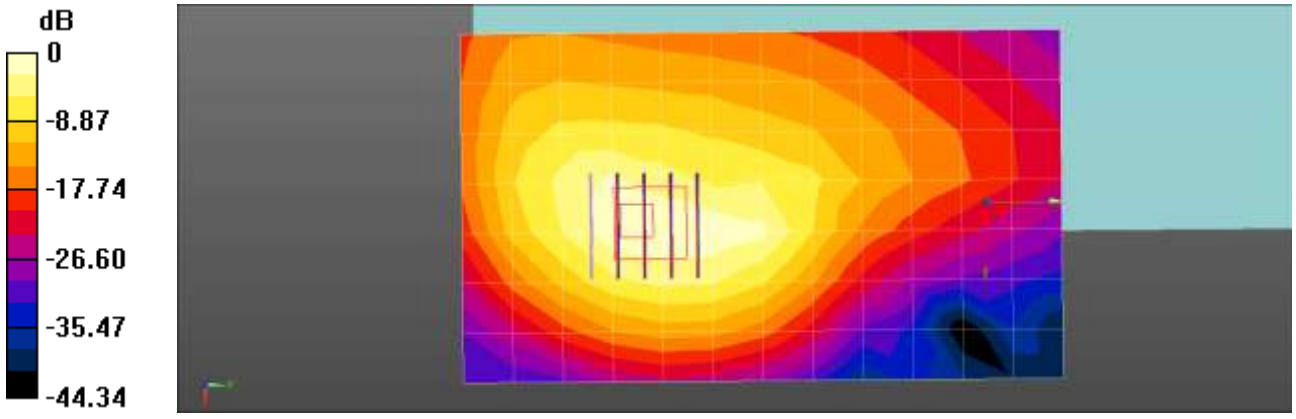
Communication System: UID 0, WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.972 S/m; ε_r = 54.142; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.16, 6.16, 6.16); Calibrated: 2016-03-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2016-01-22
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/WCDMA850 Body Power back-off Rear 4183ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.725 W/kg

SM-W727V/WCDMA850 Body Power back-off Rear 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.745 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.699 W/kg; SAR(10 g) = 0.369 W/kg
Maximum value of SAR (measured) = 0.753 W/kg



0 dB = 0.725 W/kg = −1.40 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	01/09/2017
Plot No.:	2

DUT: SM-W727V; Type: Tablet

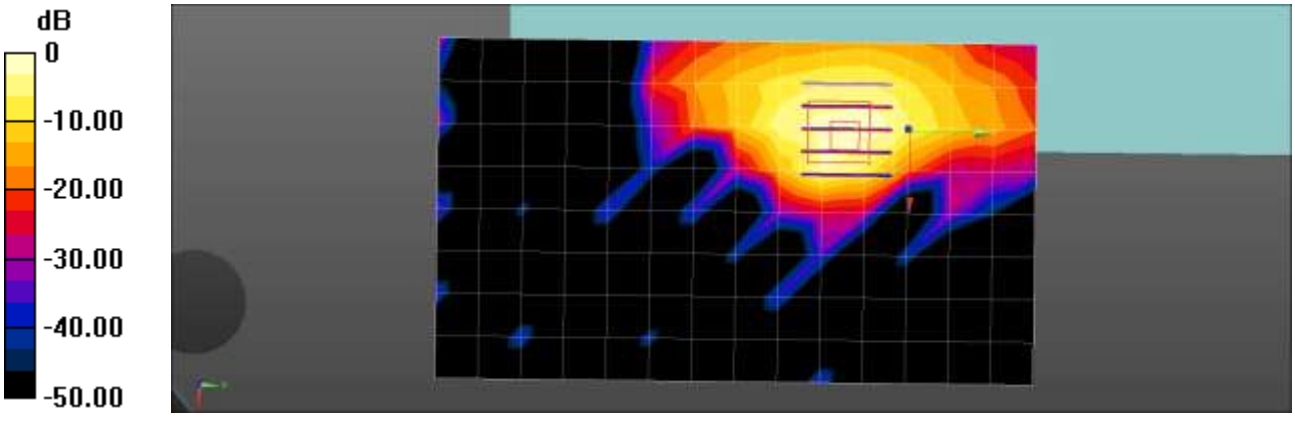
Communication System: UID 0, WCDMA1900 (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.493 S/m; ε_r = 53.193; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/WCDMA1900 Body Rear 9262ch/Area Scan (15x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.01 W/kg

SM-W727V/WCDMA1900 Body Rear 9262ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.242 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 0.945 W/kg; SAR(10 g) = 0.407 W/kg
Maximum value of SAR (measured) = 1.64 W/kg



0 dB = 1.01 W/kg = 0.03 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	01/09/2017
Plot No.:	3

DUT: SM-W727V; Type: Tablet

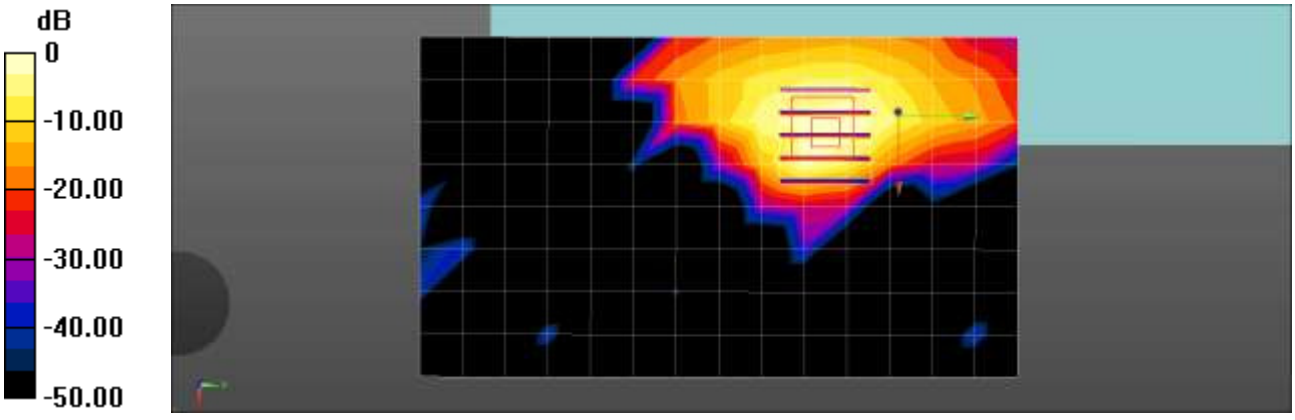
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.523 S/m; ε_r = 53.096; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/WCDMA1900 Body Rear 9400ch/Area Scan (15x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.858 W/kg

SM-W727V/WCDMA1900 Body Rear 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.050 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 0.865 W/kg; SAR(10 g) = 0.364 W/kg
Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 0.858 W/kg = −0.66 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	01/09/2017
Plot No.:	4

DUT: SM-W727V; Type: Tablet

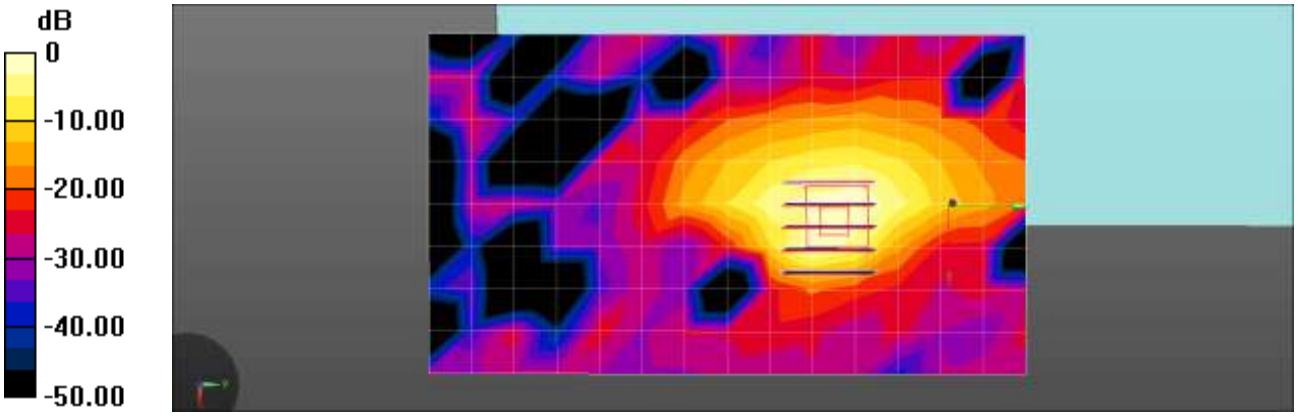
Communication System: UID 0, LTE Band 2 (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.502 S/m; ε_r = 53.172; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/LTE2 Body Rear 20MHz 1RB 49offset 18700ch/Area Scan (15x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.768 W/kg

SM-W727V/LTE2 Body Rear 20MHz 1RB 49offset 18700ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.847 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 0.748 W/kg; SAR(10 g) = 0.326 W/kg
Maximum value of SAR (measured) = 1.22 W/kg



0 dB = 0.768 W/kg = −1.15 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	01/09/2017
Plot No.:	5

DUT: SM-W727V; Type: Tablet

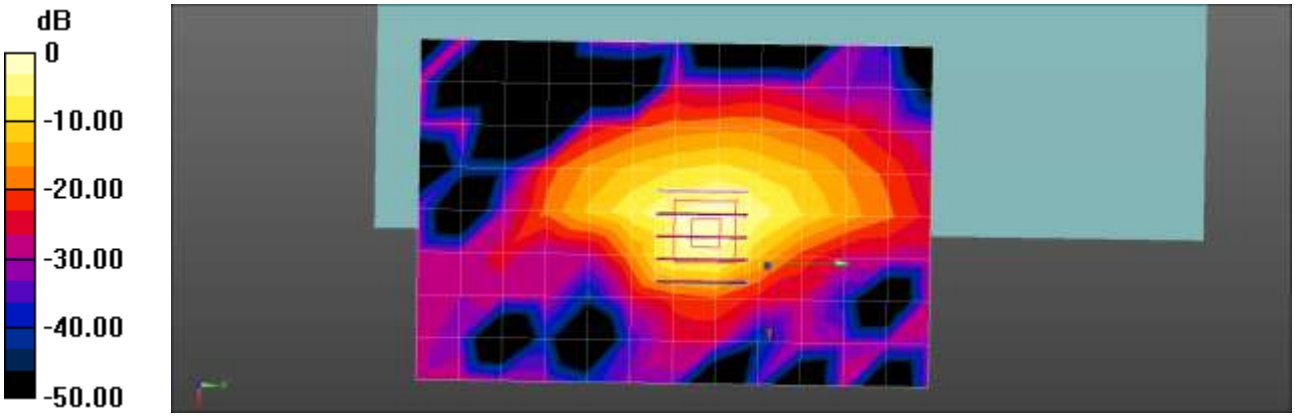
Communication System: UID 0, LTE Band 2 (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.544 S/m; ε_r = 53.063; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/LTE2 Body Rear 20MHz 1RB 49offset 19100ch/Area Scan (13x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.945 W/kg

SM-W727V/LTE2 Body Rear 20MHz 1RB 49offset 19100ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.244 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.693 W/kg; SAR(10 g) = 0.296 W/kg
Maximum value of SAR (measured) = 1.18 W/kg



0 dB = 0.945 W/kg = −0.24 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.2 ℃
Test Date:	01/10/2017
Plot No.:	6

DUT: SM-W727V; Type: Tablet

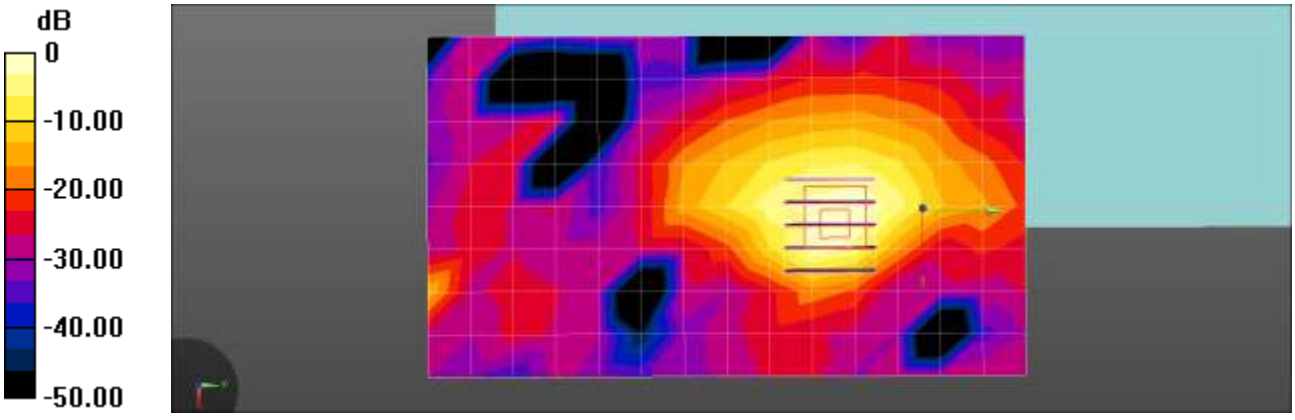
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.465 S/m; ε_r = 52.56; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.17, 8.17, 8.17); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/LTE4 Body Rear 20MHz 1RB 49offset 20175ch/Area Scan (15x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.813 W/kg

SM-W727V/LTE4 Body Rear 20MHz 1RB 49offset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.041 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 0.743 W/kg; SAR(10 g) = 0.332 W/kg
Maximum value of SAR (measured) = 1.24 W/kg



0 dB = 0.813 W/kg = −0.90 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	01/03/2017
Plot No.:	7

DUT: SM-W727V; Type: Tablet

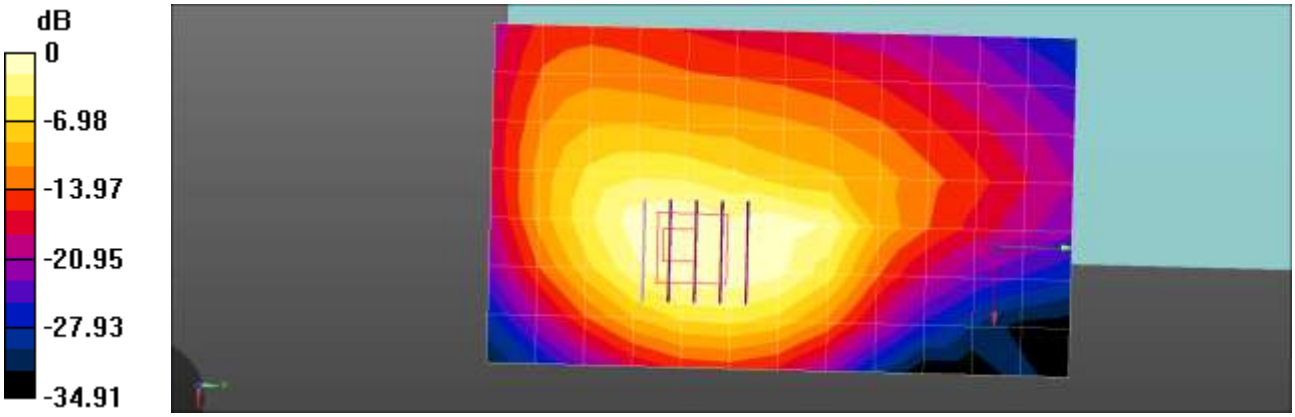
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.972 S/m; ε_r = 54.142; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.16, 6.16, 6.16); Calibrated: 2016-03-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2016-01-22
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/LTE 5 Body Rear Pwr back-off QPSK 10MHz 1RB 0 offset 20525ch/Area Scan (8x13x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.553 W/kg

SM-W727V/LTE 5 Body Rear Pwr back-off QPSK 10MHz 1RB 0 offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.846 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.680 W/kg; SAR(10 g) = 0.361 W/kg
Maximum value of SAR (measured) = 0.731 W/kg



0 dB = 0.553 W/kg = −2.57 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	01/04/2017
Plot No.:	8

DUT: SM-W727V; Type: Tablet

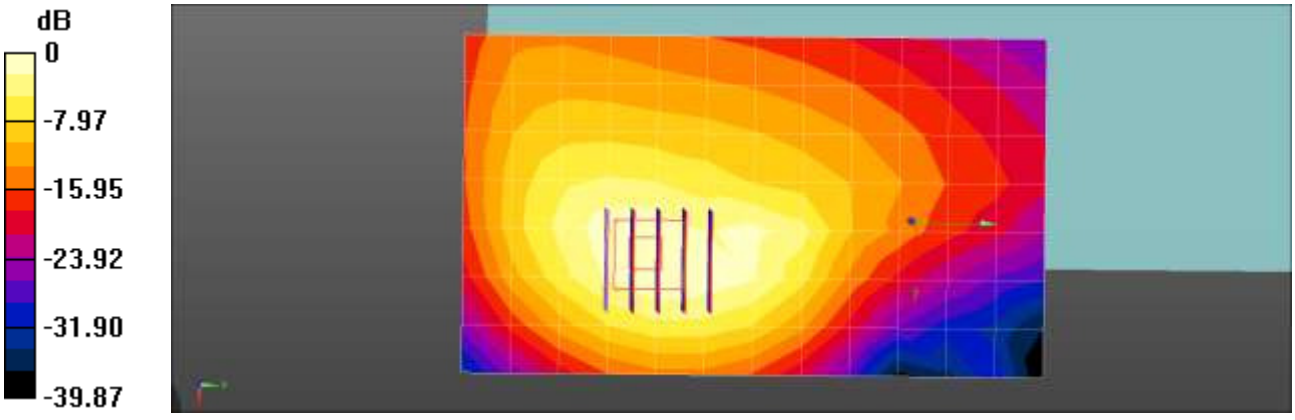
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 782 MHz; σ = 1.018 S/m; ε_r = 54.206; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.25, 6.25, 6.25); Calibrated: 2016-03-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2016-01-22
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/LTE 13 Body Rear Pwr back-off QPSK 10MHz 1RB 24 offset 23230ch 2/Area Scan (8x13x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.587 W/kg

SM-W727V/LTE 13 Body Rear Pwr back-off QPSK 10MHz 1RB 24 offset 23230ch 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.673 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.654 W/kg; SAR(10 g) = 0.353 W/kg
Maximum value of SAR (measured) = 0.706 W/kg



0 dB = 0.587 W/kg = −2.31 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	01/16/2017
Plot No.:	9

DUT: SM-W727V; Type: Tablet

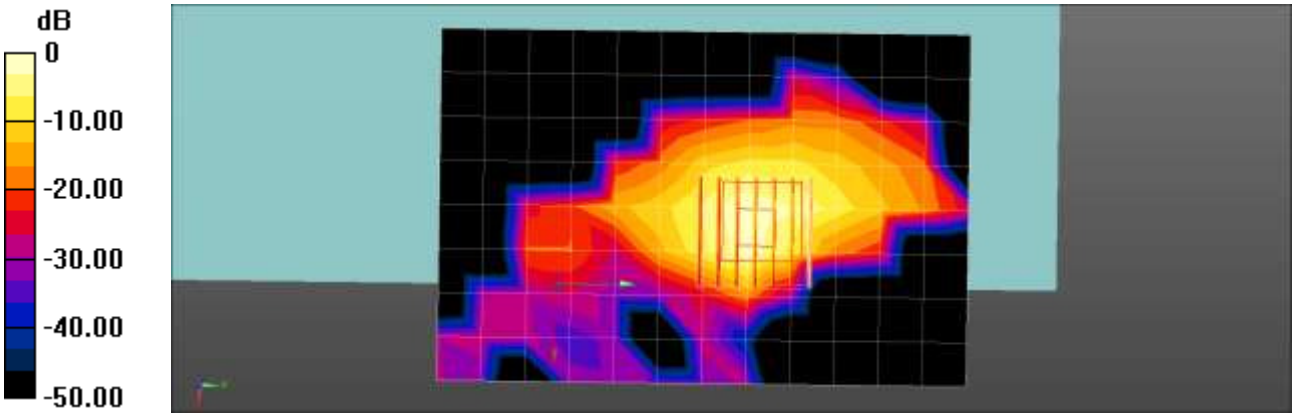
Communication System: UID 0, 2450MHz FCC; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.901 S/m; ε_r = 52.395; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.31, 7.31, 7.31); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/Ant 1 802.11b Pwr back-off Body Rear 1Mbps 1ch/Area Scan (9x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.729 W/kg

SM-W727V/Ant 1 802.11b Pwr back-off Body Rear 1Mbps 1ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.678 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.177 W/kg
Maximum value of SAR (measured) = 0.870 W/kg



0 dB = 0.729 W/kg = −1.37 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	01/16/2017
Plot No.:	10

DUT: SM-W727V; Type: Tablet

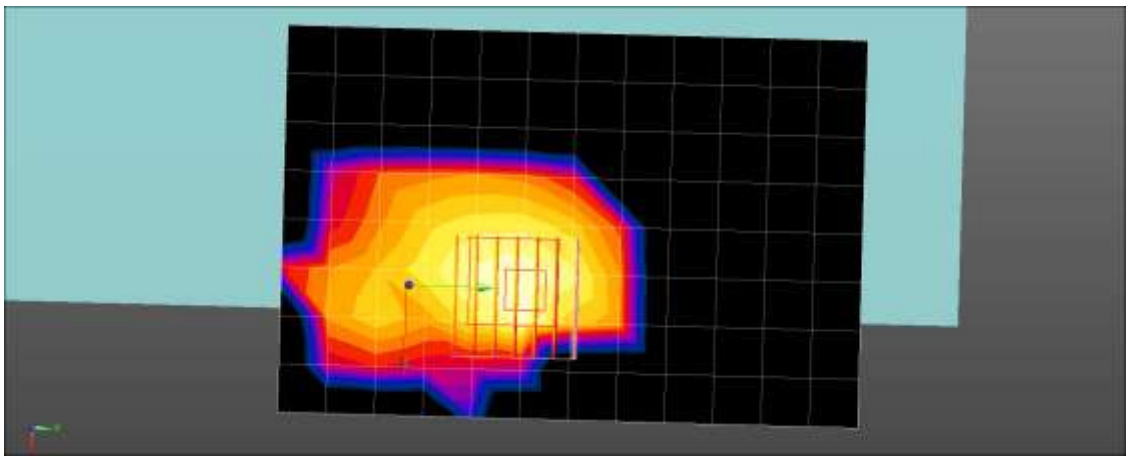
Communication System: UID 0, 2450MHz FCC; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.901 S/m; ε_r = 52.395; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.31, 7.31, 7.31); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/Ant 2 802.11b PWR back-off Body Rear 1Mbps 1ch/Area Scan (9x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.406 W/kg

SM-W727V/Ant 2 802.11b PWR back-off Body Rear 1Mbps 1ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.503 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.679 W/kg
SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.089 W/kg
Maximum value of SAR (measured) = 0.405 W/kg



0 dB = 0.406 W/kg = −3.92 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	01/16/2017
Plot No.:	11

DUT: SM-W727V; Type: Tablet

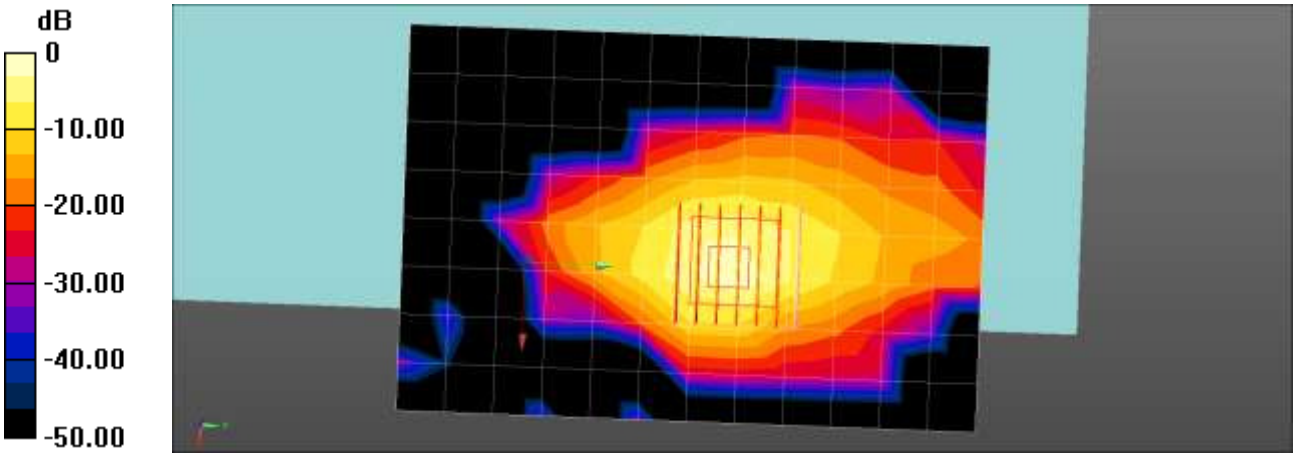
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1.3
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.942 S/m; ε_r = 52.267; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.31, 7.31, 7.31); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/BT Body Rear DH5 39ch 2/Area Scan (9x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.645 W/kg

SM-W727V/BT Body Rear DH5 39ch 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.381 W/kg; SAR(10 g) = 0.137 W/kg
Maximum value of SAR (measured) = 0.646 W/kg



0 dB = 0.645 W/kg = −1.91 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	01/17/2017
Plot No.:	12

DUT: SM-W727V; Type: Tablet

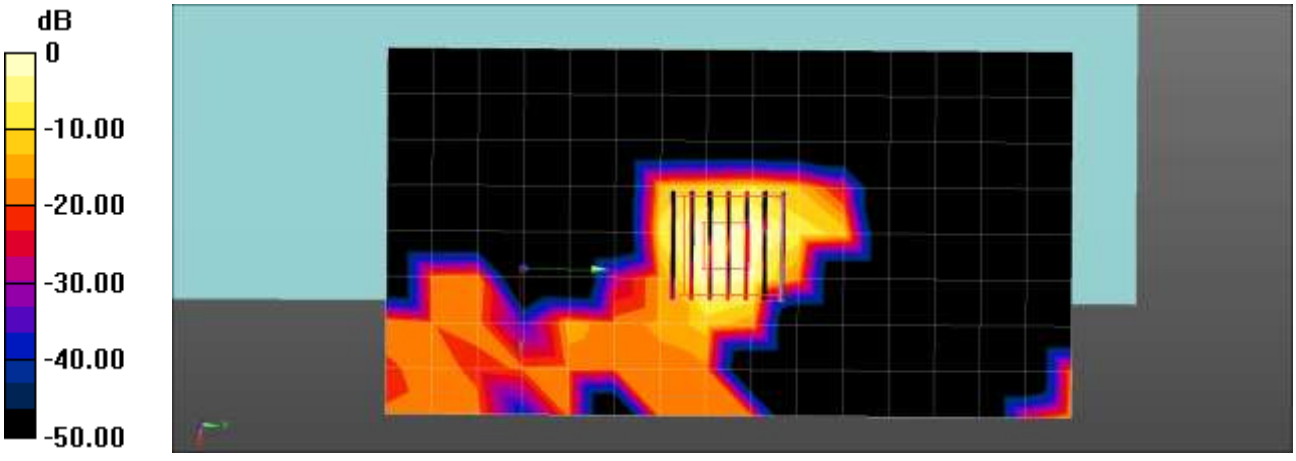
Communication System: UID 0, WiFI5GHz ac80; Frequency: 5775 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5775 MHz; σ = 6.062 S/m; ε_r = 46.811; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(3.92, 3.92, 3.92); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/Ant 1 802.11ac80 UNII_3 Pwr back-off 0mm Body Rear VHT0 155ch/Area Scan (9x16x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.338 W/kg

SM-W727V/Ant 1 802.11ac80 UNII_3 Pwr back-off 0mm Body Rear VHT0 155ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.044 W/kg
Maximum value of SAR (measured) = 0.732 W/kg



0 dB = 0.338 W/kg = −4.71 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	01/17/2017
Plot No.:	13

DUT: SM-W727V; Type: Tablet

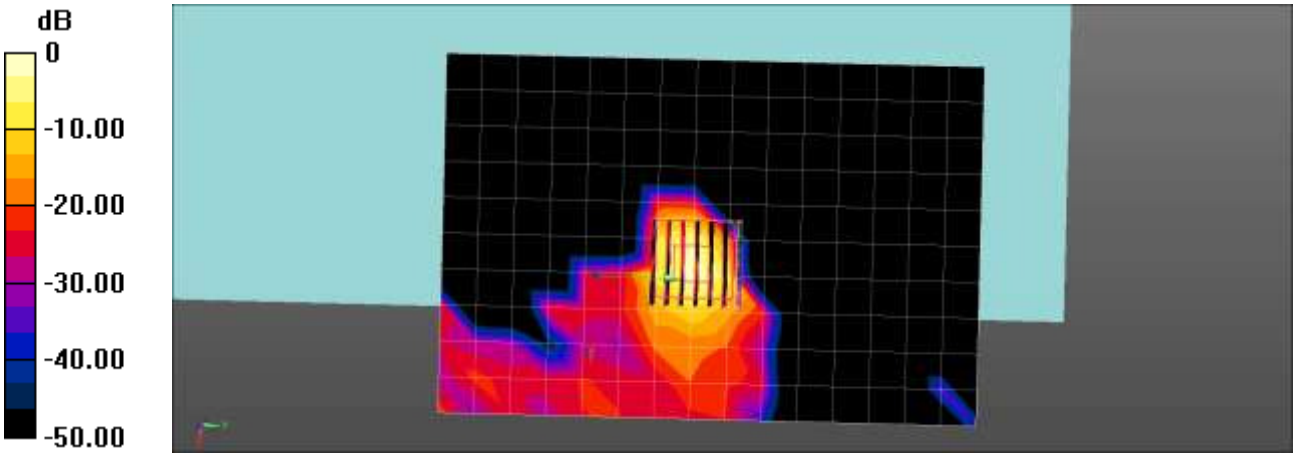
Communication System: UID 0, WiFI5GHz ac80; Frequency: 5210 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5210 MHz; σ = 5.185 S/m; ε_r = 48.424; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(4.37, 4.37, 4.37); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

SM-W727V/Ant 2 802.11ac80 UNII-1 Back-off Pwr 0mm Body Rear VHT0 42ch/Area Scan (11x16x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.598 W/kg

SM-W727V/Ant 2 802.11ac80 UNII-1 Back-off Pwr 0mm Body Rear VHT0 42ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.712 W/kg



0 dB = 0.598 W/kg = −2.23 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	01/09/2017
Plot No.:	14

DUT: SM-W727V; Type: Tablet

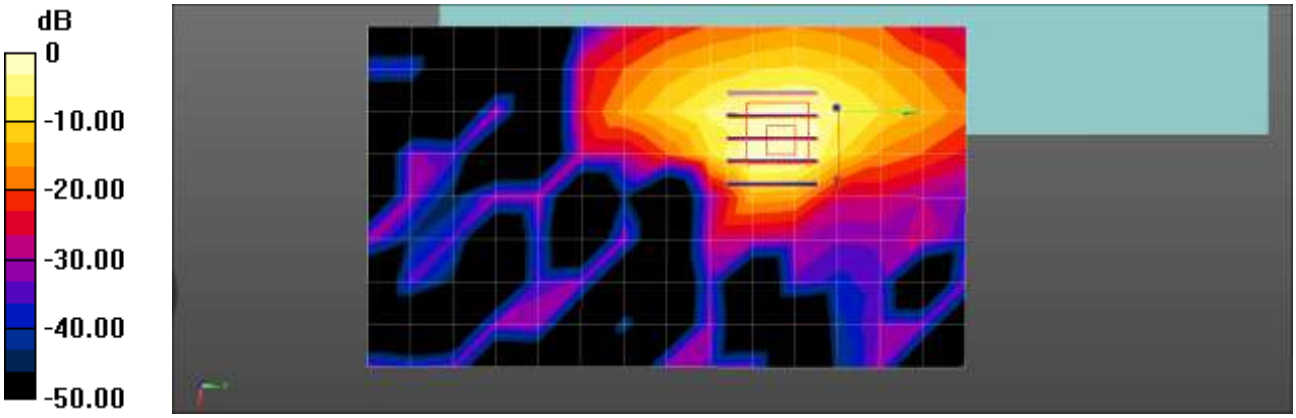
Communication System: UID 0, WCDMA1900 (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.493 S/m; ε_r = 53.193; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2016-01-27
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

SM-W727V/WCDMA1900 Body Rear 9262ch/Area Scan (15x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.980 W/kg

SM-W727V/WCDMA1900 Body Rear 9262ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.915 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 0.910 W/kg; SAR(10 g) = 0.400 W/kg
Maximum value of SAR (measured) = 1.43 W/kg



0 dB = 0.980 W/kg = −0.09 dBW/kg

Attachment 2. – Dipole Verification Plots

■ Verification Data (750 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.3 ℃
Test Date:	01/04/2017

DUT: Dipole 750 MHz D750V3; Type: D750V3

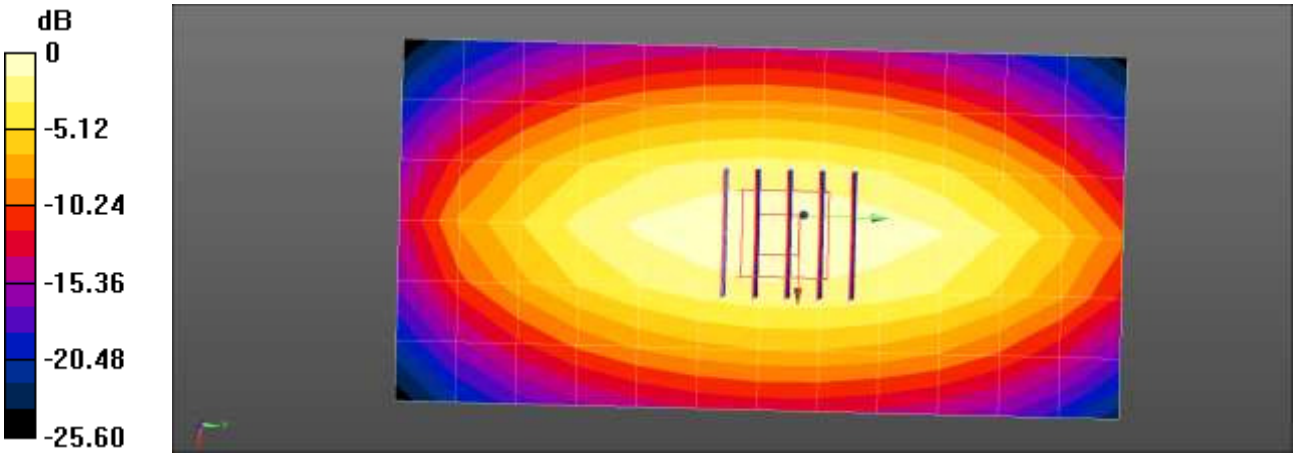
Communication System: UID 0, CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.987 S/m; ε_r = 54.561; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.25, 6.25, 6.25); Calibrated: 2016-03-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection
- Electronics: DAE4 Sn652; Calibrated: 2016-01-22
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

750MHz Verification /Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.866 W/kg

750MHz Verification /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.74 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.858 W/kg; SAR(10 g) = 0.563 W/kg
Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 0.866 W/kg = −0.63 dBW/kg

■ Verification Data (835 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.3 ℃
Test Date:	01/03/2017

DUT: Dipole 835 MHz D835V2; Type: D835V2

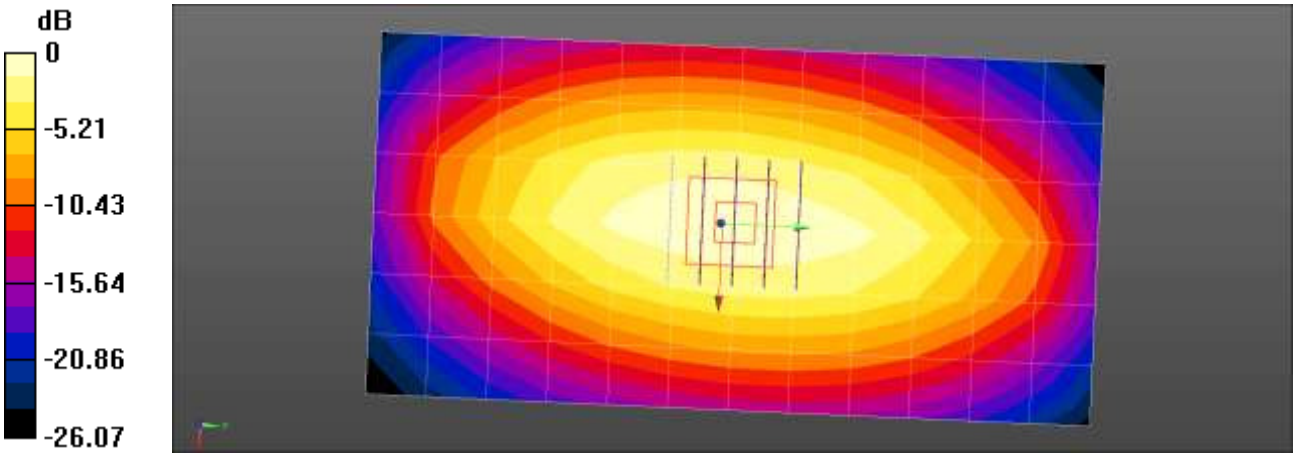
Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.971 S/m; ε_r = 54.142; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.16, 6.16, 6.16); Calibrated: 2016-03-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection
- Electronics: DAE4 Sn652; Calibrated: 2016-01-22
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

835MHz Verification/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.953 W/kg

835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.54 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.934 W/kg; SAR(10 g) = 0.598 W/kg
Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 0.953 W/kg = −0.21 dBW/kg

■ Verification Data (1 800 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	01/10/2017

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

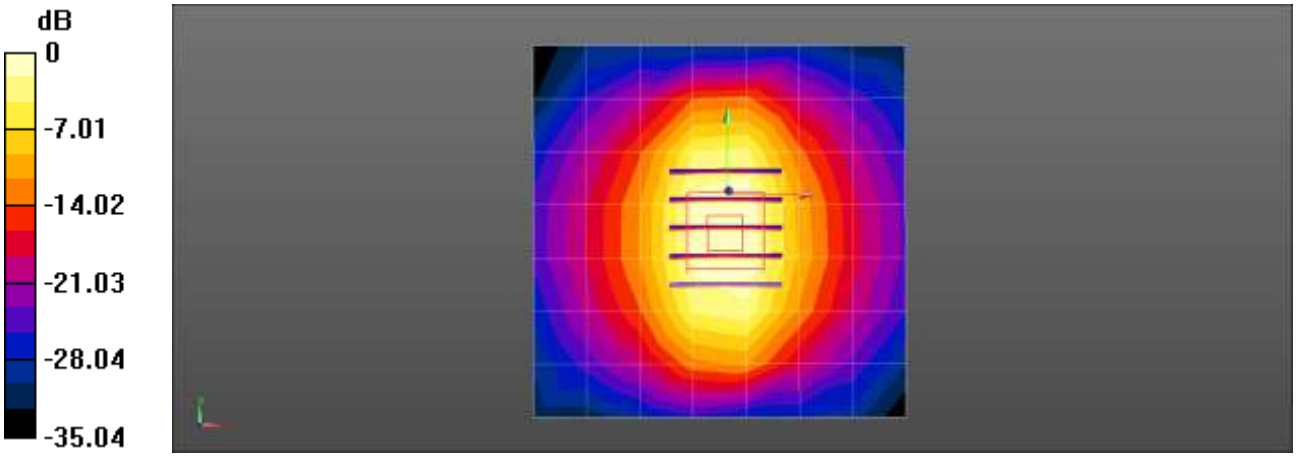
Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.526 S/m; ε_r = 52.309; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.17, 8.17, 8.17); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

1800MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.88 W/kg

1800MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.95 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 6.97 W/kg
SAR(1 g) = 3.96 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 5.60 W/kg



0 dB = 3.88 W/kg = 5.89 dBW/kg

■ Verification Data (1 900 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.2 ℃
Test Date:	01/09/2017

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

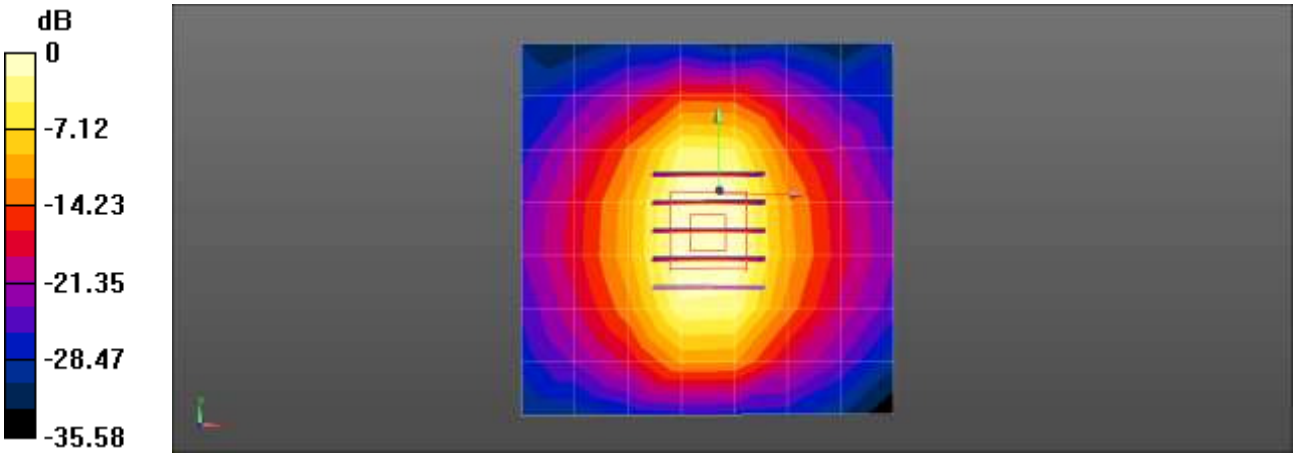
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.544 S/m; ε_r = 53.063; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.83, 7.83, 7.83); Calibrated: 2016-07-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn911; Calibrated: 2016-02-19
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

1900MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.62 W/kg

1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.70 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 7.12 W/kg
SAR(1 g) = 3.98 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 5.66 W/kg



0 dB = 3.62 W/kg = 5.59 dBW/kg

Verification Data (2 450 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	19.6 ℃
Test Date:	01/16/2017

DUT: Dipole 2450 MHz; Type: D2450V2

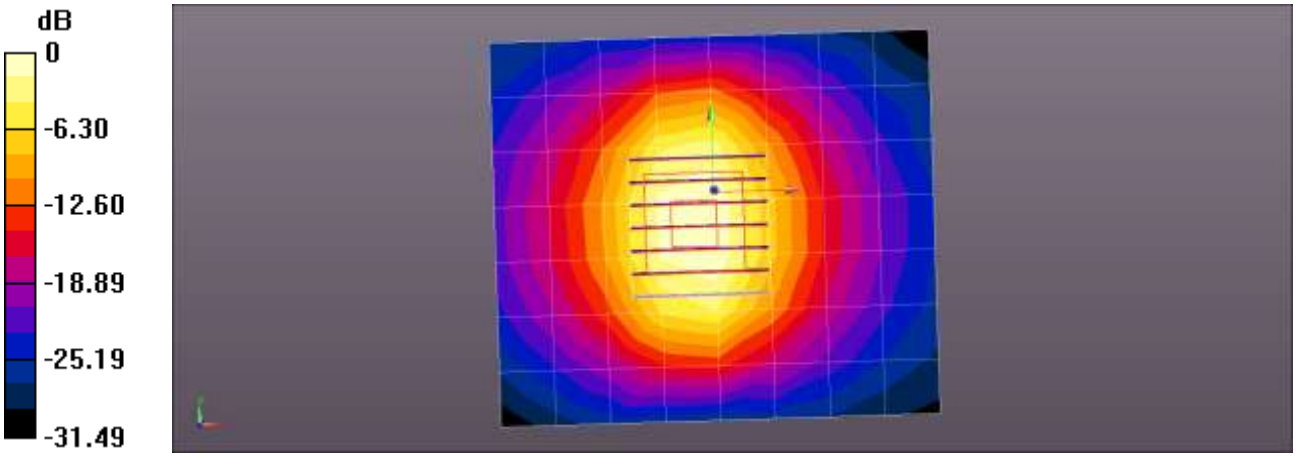
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.954 S/m; ε_r = 52.231; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.31, 7.31, 7.31); Calibrated: 2016-05-31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: Flat Phantom
- Measurement SW: DASY52, Version 52.8 (1);

2.45GHz Verification body/Area Scan (9x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 5.90 W/kg

2.45GHz Verification body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.51 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 9.92 W/kg
SAR(1 g) = 4.78 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 7.32 W/kg



0 dB = 5.90 W/kg = 7.71 dBW/kg

Verification Data (2 450 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	19.6 ℃
Test Date:	01/16/2017

DUT: Dipole 2450 MHz; Type: D2450V2

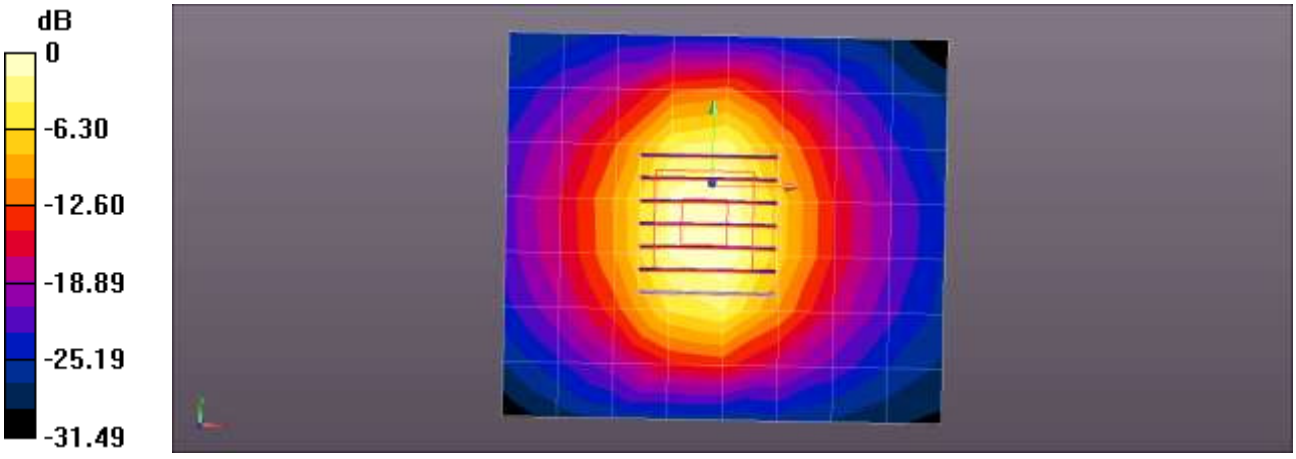
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.954 S/m; ε_r = 52.231; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.31, 7.31, 7.31); Calibrated: 2016-05-31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: Flat Phantom
- Measurement SW: DASY4, Version 4.7 (80);

2.45GHz Verification body/Area Scan (9x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 5.90 W/kg

2.45GHz Verification body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.51 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 9.92 W/kg
SAR(1 g) = 4.78 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 7.32 W/kg



0 dB = 5.90 W/kg = 7.71 dBW/kg

■ Verification Data (5.25 GHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 ℃

Test Date: 01/31/2017

DUT: Dipole D5GHzV2; Type: D5GHzV2

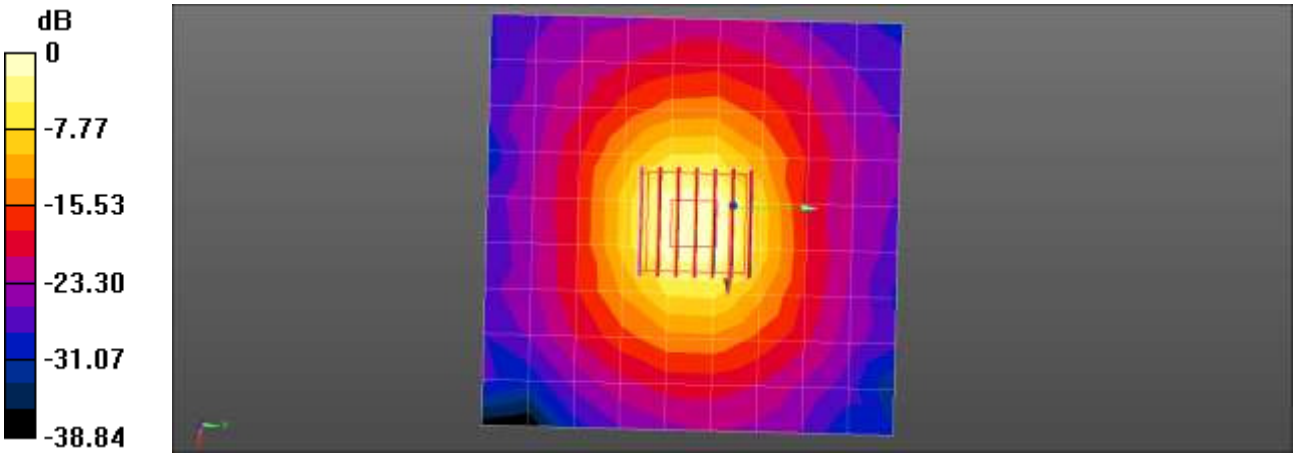
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.253 S/m; ε_r = 48.303; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(4.37, 4.37, 4.37); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (1);

5250MHz Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.5 W/kg

5250MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Graded Ratio:1.4
Reference Value = 41.33 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 29.3 W/kg
SAR(1 g) = 7.11 W/kg; SAR(10 g) = 1.99 W/kg
Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 10.5 W/kg = 10.22 dBW/kg

■ Verification Data (5.25 GHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	19.6 ℃
Test Date:	01/17/2017

DUT: Dipole D5GHzV2; Type: D5GHzV2

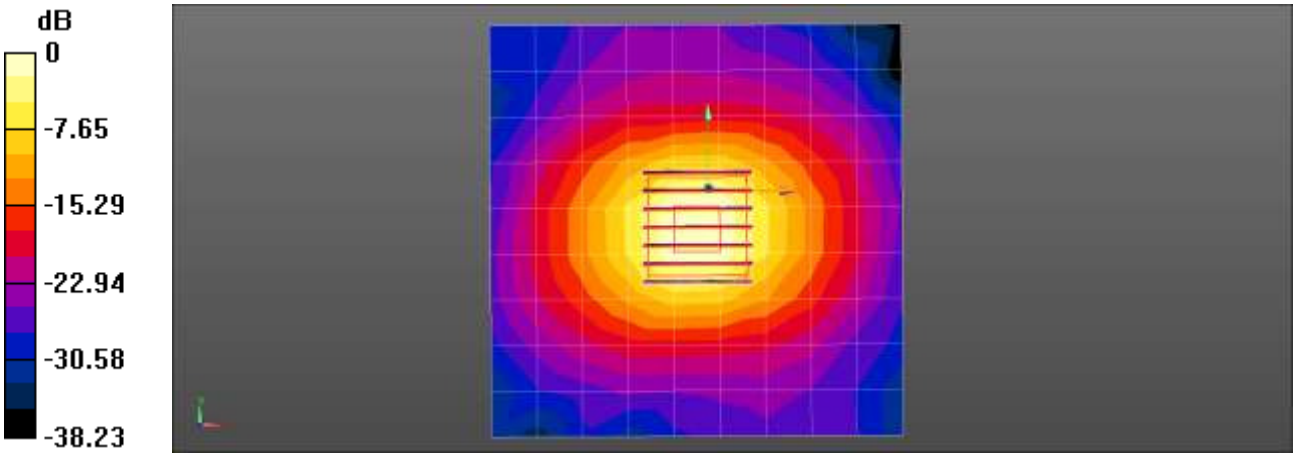
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.206 S/m; ε_r = 48.19; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(4.37, 4.37, 4.37); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

5250MHz Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.9 W/kg

5250MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Graded Ratio:1.4
Reference Value = 41.85 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 7.47 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 10.9 W/kg = 10.37 dBW/kg

■ Verification Data (5.6 GHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	19.6 ℃
Test Date:	01/17/2017

DUT: Dipole D5GHzV2; Type: D5GHzV2

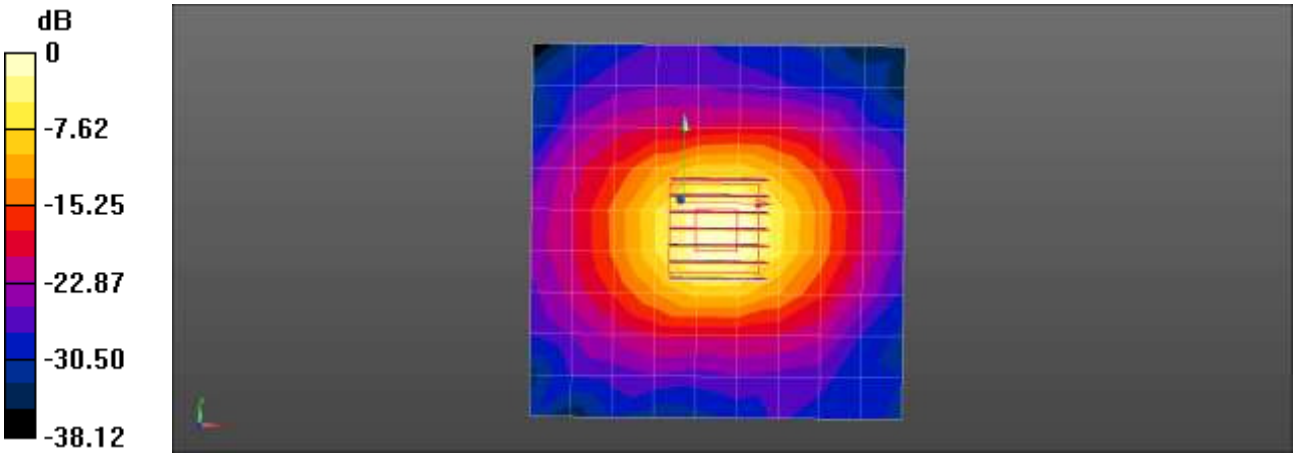
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.77 S/m; ε_r = 47.254; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(3.78, 3.78, 3.78); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

5600MHz Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.3 W/kg

5600MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Graded Ratio:1.4
Reference Value = 41.06 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 12.3 W/kg = 10.90 dBW/kg

■ Verification Data (5.75 GHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	19.6 ℃
Test Date:	01/17/2017

DUT: Dipole D5GHzV2; Type: D5GHzV2

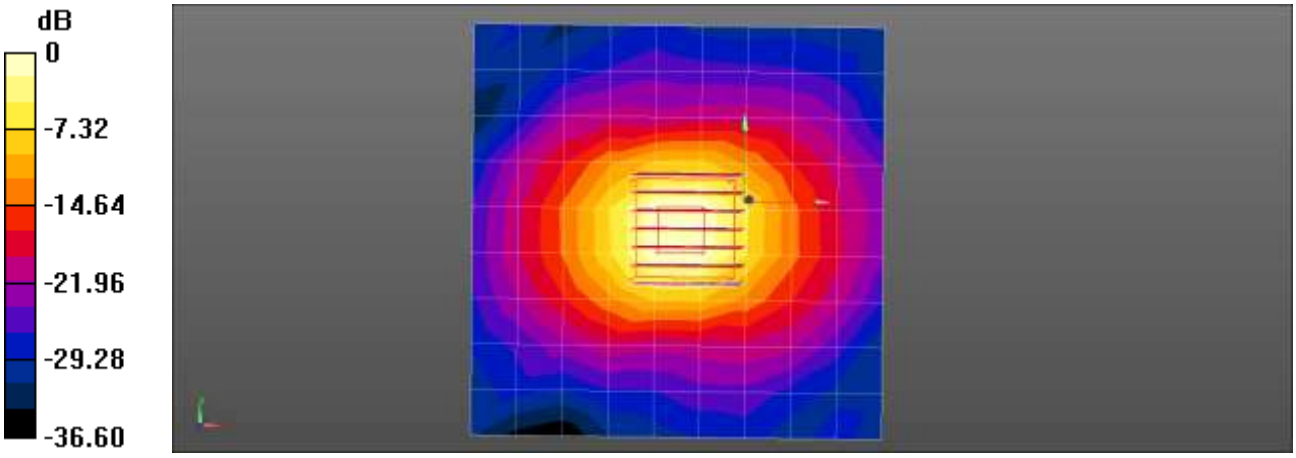
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 6.026 S/m; ε_r = 46.868; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(3.92, 3.92, 3.92); Calibrated: 2016-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2016-07-26
- Phantom: ELI
- Measurement SW: DASY52, Version 52.8 (8);

5750MHz Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.1 W/kg

5750MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Graded Ratio:1.4
Reference Value = 38.78 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 20.6 W/kg



0 dB = 12.1 W/kg = 10.83 dBW/kg