

# FCC SAR Test Report

**APPLICANT** : Lenovo (Shanghai) Electronics Technology Co., Ltd.  
**EQUIPMENT** : Portable Tablet Computer  
**BRAND NAME** : Lenovo  
**MODEL NAME** : TB352XU  
**FCC ID** : O57TB352XU  
**STANDARD** : FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

**Sporton International Inc. (Shenzhen)**

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People's Republic of China**



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### 1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Lenovo (Shanghai) Electronics Technology Co., Ltd., Portable Tablet Computer, TB352XU**, are as follows.

Highest 1g SAR Summary				
Equipment Class	Frequency Band		Body (Separation 0mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)	
Licensed	GSM	GSM850	1.10	1.59
		GSM1900	1.01	
	WCDMA	WCDMA II	1.14	
		WCDMA V	1.07	
	LTE	LTE Band 2	1.12	
		LTE Band 4	1.10	
		LTE Band 26/5	1.15	
		LTE Band 7	1.01	
		LTE Band 41/38	1.18	
DTS	WLAN	2.4GHz WLAN	<b>1.19</b>	1.51
NII		5GHz WLAN	<b>1.19</b>	1.59
DSS	Bluetooth	2.4GHz Bluetooth	0.25	1.59
Date of Testing:		2024/8/7 ~ 2024/8/24		
<b>Remark:</b>				
1. This device supports LTE B5 / B38 and B26 / B41. Since the supported frequency span for LTE B5 / B38 falls completely within the supports frequency span for LTE B26 / B41, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B26 / B41.				

**Declaration of Conformity:**  
 The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**  
 The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.  
 This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.



### 2. Administration Data

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR02-SZ	CN1256	421272

Applicant	
Company Name	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer	
Company Name	Lenovo PC HK Limited
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China

### 3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

**4. Equipment Under Test (EUT) Information**

**4.1 General Information**

Product Feature & Specification	
<b>Equipment Name</b>	Portable Tablet Computer
<b>Brand Name</b>	Lenovo
<b>Model Name</b>	TB352XU
<b>FCC ID</b>	O57TB352XU
<b>IMEI Code</b>	Sample 1: 868752070005779 Sample 2: 868752070008906 Sample 3: 868752070006397
<b>Wireless Technology and Frequency Range</b>	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
<b>Mode</b>	GSM/GPRS/EGPRS/DTM RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/HE20/HE40/HE80 Bluetooth BR/EDR/LE NFC:ASK
<b>HW Version</b>	TB352XU
<b>SW Version</b>	TB352XU_RF01_20240729
<b>GSM / (E)GPRS Dual Transfer mode</b>	Class A – EUT can support Packet Switched and Circuit Switched Network simultaneously.
<b>EUT Stage</b>	Identical Prototype
<b>Remark:</b>	
<ol style="list-style-type: none"> <li>This device has voice function, but limited to speakerphone mode.</li> <li>This device supports DTM operation up to multi-slot class 11, and support GRPS/EGRPS mode up to multi-slot class 33.</li> <li>The 2.4GHz/5GHz WLAN can transmit in SISO and MIMO antenna mode. 802.11b supports SISO mode for 2.4GHz WLAN Ant.0 only.</li> <li>The device implements Proximity sensors mechanism for the power management for SAR compliance at different exposure conditions (Body/Limbs). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.</li> <li>For WLAN when transmit simultaneous with WWAN and Proximity sensors trigger, power reduction will be activated to body exposure conditions.</li> <li>There are four samples. The difference between them could be referred to the TB352XU_Operational Description of Product Equality Declaration which is exhibited separately. According to the differences, we choose sample 1 to</li> </ol>	

perform full test, and the sample 2/3 are verified the difference with the sample 1. For sample 4, the differences do not affect the test, so sample 4 are not tested.

7. This device has NFC function and the NFC SAR report will be separately submitted.

**4.2 General LTE SAR Test and Reporting Considerations**

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	O57TB352XU																																																														
Equipment Name	Portable Tablet Computer																																																														
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz																																																														
Channel Bandwidth	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz																																																														
Uplink Modulations used	QPSK / 16QAM / 64QAM																																																														
LTE Voice / Data requirements	Voice and Data																																																														
LTE Release Version	R10																																																														
CA Support	Yes, Downlink only																																																														
LTE MPR permanently built-in by design	<p><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N<sub>RB</sub>)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (N <sub>RB</sub> )						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
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256 QAM	≥ 1						≤ 5																																																								
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)																																																														
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																														
Power reduction applied to satisfy SAR compliance	Yes, when operating in Proximity sensors detect mechanism; body will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to section 13.																																																														
LTE Carrier Aggregation Combinations	Intra-Band possible combinations and the detail power verification please referred to section 13.																																																														
LTE Carrier Aggregation Additional Information	This device supports maximum of 2 carriers in the downlink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.																																																														

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829	20450	829	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844	20600	844	20600	844
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510	20850	2510	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560	21350	2560	21350	2560
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26990	844	26965	841.5
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580	37850	2580	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610	38150	2610	38150	2610
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506	39750	2506	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5	40185	2549.5	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5	41055	2636.5	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680	41490	2680	41490	2680

**<For LTE Overlap Bands Description>**

1) LTE Bands BW

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
LTE Band 5	Yes	Yes	Yes	Yes		
LTE Band 26	Yes	Yes	Yes	Yes	Yes	
LTE Band 38			Yes	Yes	Yes	Yes
LTE Band 41			Yes	Yes	Yes	Yes

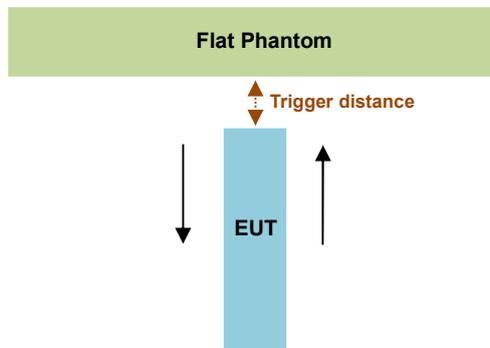
2) LTE Bands tune up:

Band	Full	DSI 3	DSI 5
	Tune-up Limit	Tune-up Limit	Tune-up Limit
LTE Band 5	24	18.5	16.5
LTE Band 26	24	18.5	16.5
LTE Band 38	24	15	13
LTE Band 41	24	15	13

## 5. Proximity Sensor Triggering Test

### <Proximity Sensor Triggering Distance (KDB 616217 D04 section 6.2)>:

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency 5825MHz and lowest 835MHz frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensor placed coincident with antenna elements at the Bottom Face and Edge 1 of the device are utilized to determine when the device comes in proximity of the user's body at the Bottom Face or Edge 1 side of the device. There is no need to do sensor coverage testing for 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 antenna.
3. When the sensor is active, all WWAN/WLAN bands reduced power will be active.
4. The sensors used to detect the proximity of the user's body at the Bottom Face for Ant0 and Bottom Face or Edge 1 side for Ant1 of the device use a detection threshold distance. The data shown in the sections below shows the distance(s).



### <Ant0 Frequency Bands>

Proximity Sensor Triggering Distance (mm)		
Position	Bottom Face	
	Moving away	Moving towards
Minimum	10	14

### <Ant1 Frequency Bands>

Proximity Sensor Triggering Distance (mm)				
Position	Bottom Face		Edge 1	
	Moving away	Moving towards	Moving away	Moving towards
Minimum	10	17	11	18

**<Proximity Sensor Triggering Coverage (KDB 616217 D04 section 6.3)>:**

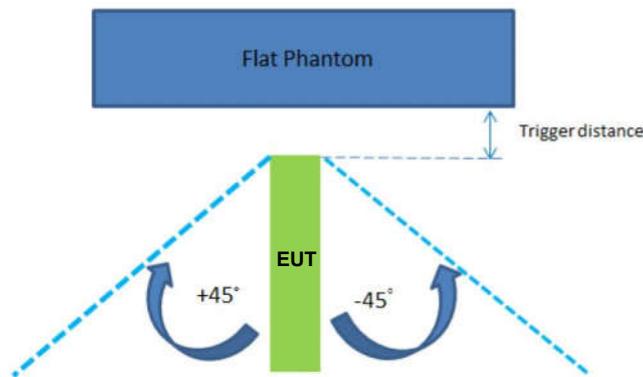
If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and “along the direction of maximum antenna and sensor offset”.

Illustrated in the internal photo exhibit, although the sensor is spatially offset, there is no trigger condition where the antenna is next to the user but the sensor is laterally further away, therefore proximity sensor coverage testing is not required.

This procedure is not required because antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

**<Tablet Tilt angle influences to proximity sensor triggering (KDB 616217 D04 section 6.4)>:**

The influence of table tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, the detail please refers to following tables. Rotating the tablet around the edge next to the phantom in  $\leq 10^\circ$  increments until the tablet is  $\pm 45^\circ$  from the vertical position at  $0^\circ$ , and the maximum output power remains in the reduced mode.



**<Ant1 Frequency Bands>**

The Sensor Trigger Distance (mm)	
Position	Edge 1
Minimum	11

**Proximity sensor power reduction**

Exposure Position / wireless mode for Ant0	Bottom Face <sup>(1)</sup>	Edge 1	Edge 2	Edge 3	Edge 4
WLAN 2.4GHz	6.00 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.2GHz	6.00 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.3GHz	6.00 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.5GHz	7.00 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.8GHz	7.00 dB	0 dB	0 dB	0 dB	0 dB

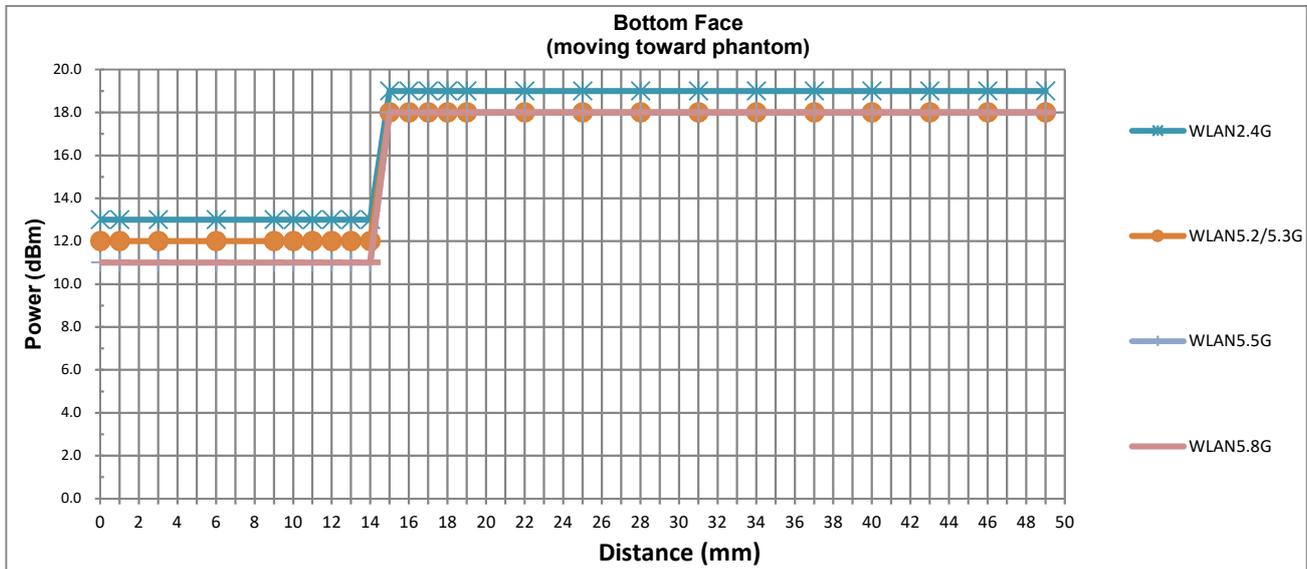
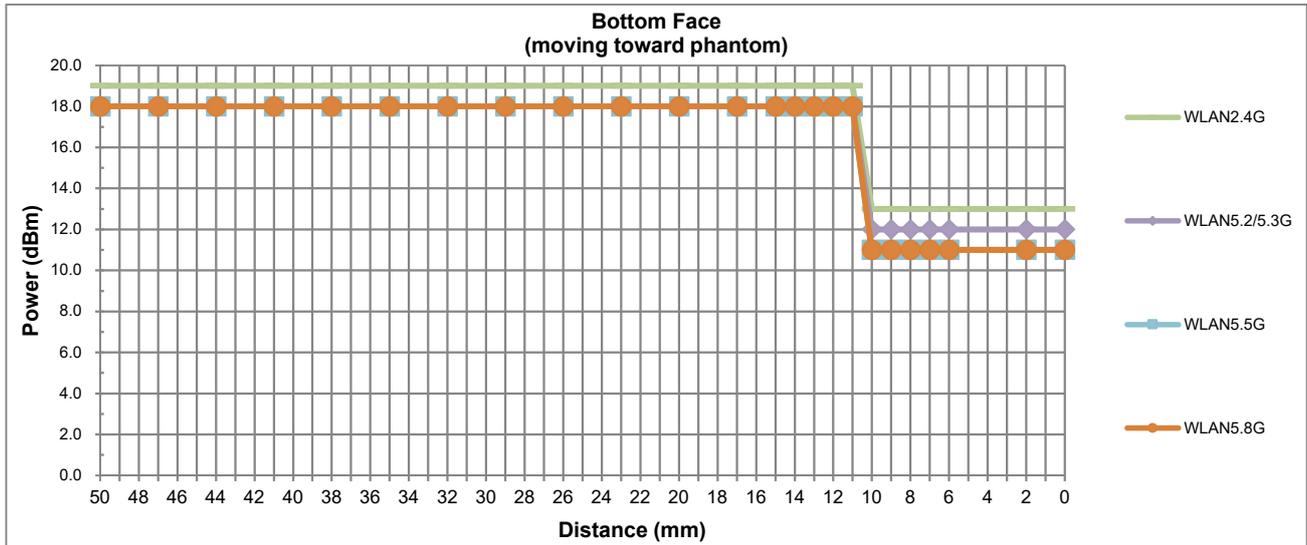
Exposure Position / wireless mode for Ant1	Bottom Face <sup>(1)</sup>	Edge 1 <sup>(1)</sup>	Edge 2	Edge 3	Edge 4
GSM850	5.50 dB	5.50 dB	0 dB	0 dB	0 dB
GSM1900	4.00 dB	4.00 dB	0 dB	0 dB	0 dB
WCDMA Band II	7.00 dB	7.00 dB	0 dB	0 dB	0 dB
WCDMA Band V	5.50 dB	5.50 dB	0 dB	0 dB	0 dB
LTE Band 2	8.00 dB	8.00 dB	0 dB	0 dB	0 dB
LTE Band 4	7.00 dB	7.00 dB	0 dB	0 dB	0 dB
LTE Band 26/5	5.50 dB	5.50 dB	0 dB	0 dB	0 dB
LTE Band 7	11.00 dB	11.00 dB	0 dB	0 dB	0 dB
LTE Band 41/38	9.00 dB	9.00 dB	0 dB	0 dB	0 dB
WLAN 2.4GHz	3.00 dB	3.00 dB	0 dB	0 dB	0 dB
WLAN 5.2GHz	4.00 dB	4.00 dB	0 dB	0 dB	0 dB
WLAN 5.3GHz	4.00 dB	4.00 dB	0 dB	0 dB	0 dB
WLAN 5.5GHz	5.00 dB	5.00 dB	0 dB	0 dB	0 dB
WLAN 5.8GHz	6.00 dB	6.00 dB	0 dB	0 dB	0 dB

**Remark:**

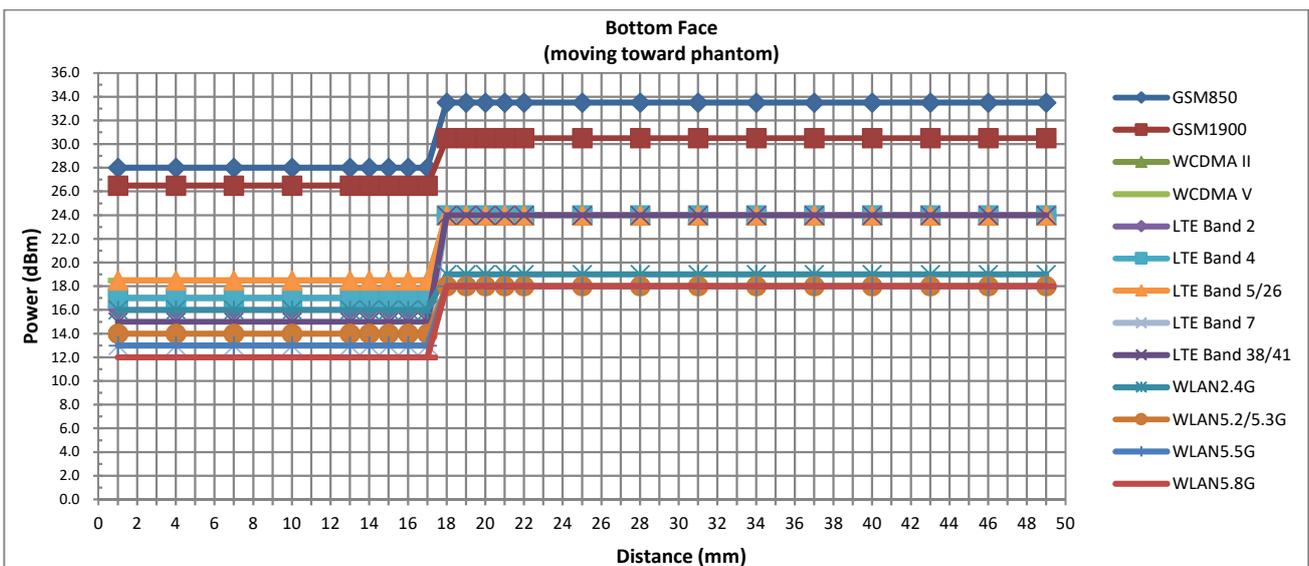
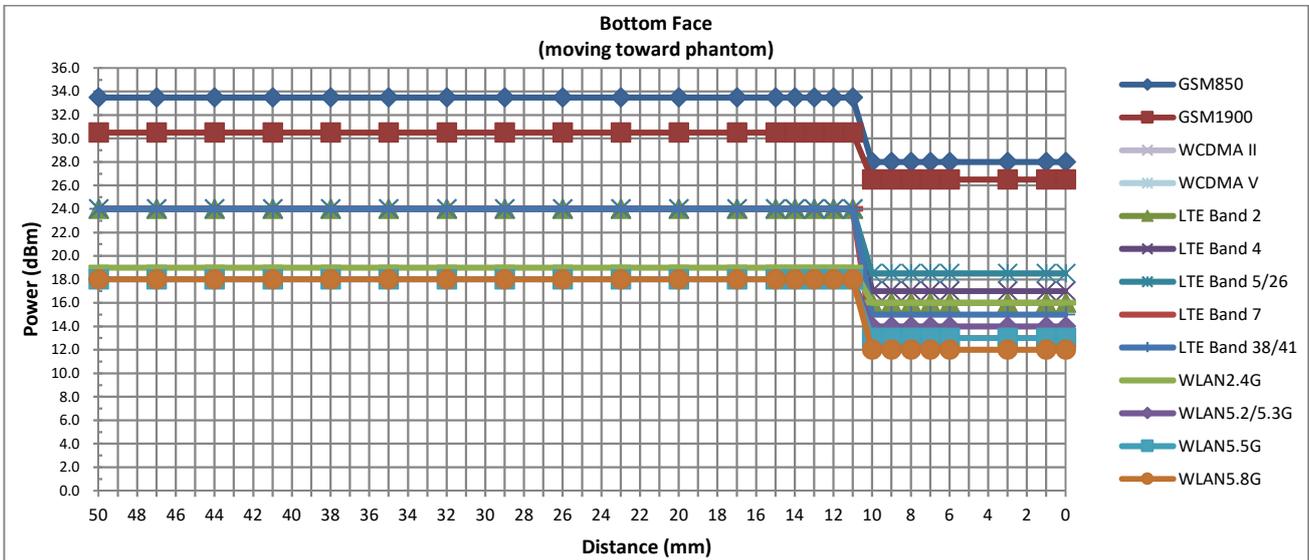
- <sup>(1)</sup>: Reduced maximum limit applied by activation of proximity sensor.
- Power reduction is not applicable for Bluetooth.
- Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown and described in exhibit "P-Sensor operational description"
- For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:  
 For Ant0:
  - Bottom Face: 9mm
 For Ant1:
  - Bottom Face: 9mm
  - Edge 1: 10mm

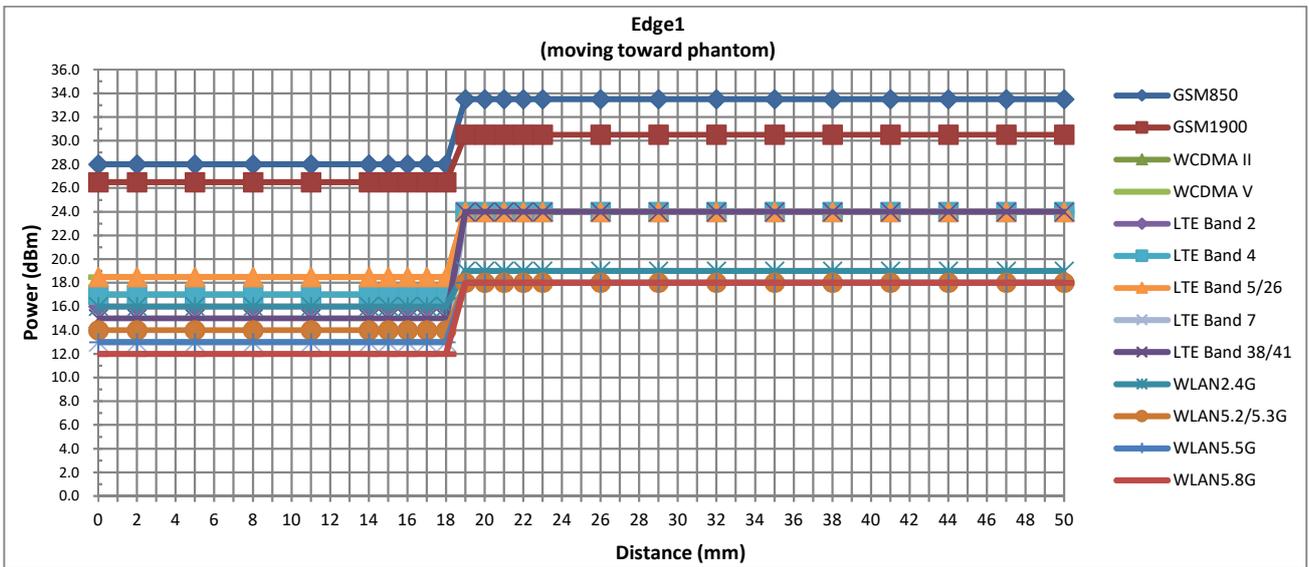
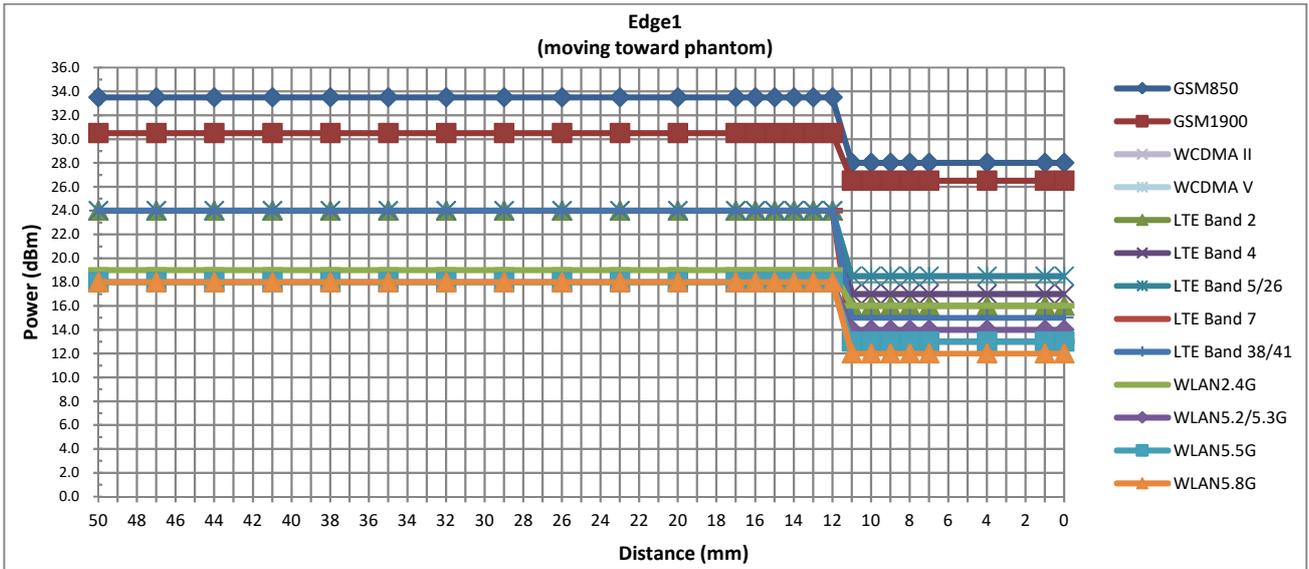
Power Measurement during Sensor Trigger distance testing

Band/Mode for Ant0	Measured power reduction (dBm)		Reduction Levels (dB)
	w/o power back-off	w/ power back-off	
WLAN 2.4GHz	19.00	13.00	6.00
WLAN 5.2GHz	18.00	12.00	6.00
WLAN 5.3GHz	18.00	12.00	6.00
WLAN 5.5GHz	18.00	11.00	7.00
WLAN 5.8GHz	18.00	11.00	7.00



Band/Mode for Ant1	Measured power reduction (dBm)		Reduction Levels (dB)
	w/o power back-off	w/ power back-off	
GSM850	33.50	28.00	5.50
GSM1900	30.50	26.50	4.00
WCDMA Band II	24.00	17.00	7.00
WCDMA Band V	24.00	18.50	5.50
LTE Band 2	24.00	16.00	8.00
LTE Band 4	24.00	17.00	7.00
LTE Band 26/5	24.00	18.50	5.50
LTE Band 7	24.00	13.00	11.00
LTE Band 41/38	24.00	15.00	9.00
WLAN 2.4GHz	19.00	16.00	3.00
WLAN 5.2GHz	18.00	14.00	4.00
WLAN 5.3GHz	18.00	14.00	4.00
WLAN 5.5GHz	18.00	13.00	5.00
WLAN 5.8GHz	18.00	12.00	6.00





**6. RF Exposure Limits**

**6.1 Uncontrolled Environment**

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 made 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.

**6.2 Controlled Environment**

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. The 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.

**Limits for Occupational/Controlled Exposure (W/kg)**

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

**Limits for General Population/Uncontrolled Exposure (W/kg)**

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

## **7. Specific Absorption Rate (SAR)**

### **7.1 Introduction**

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

### **7.2 SAR Definition**

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density ( $\rho$ ). The equation description is as below:

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

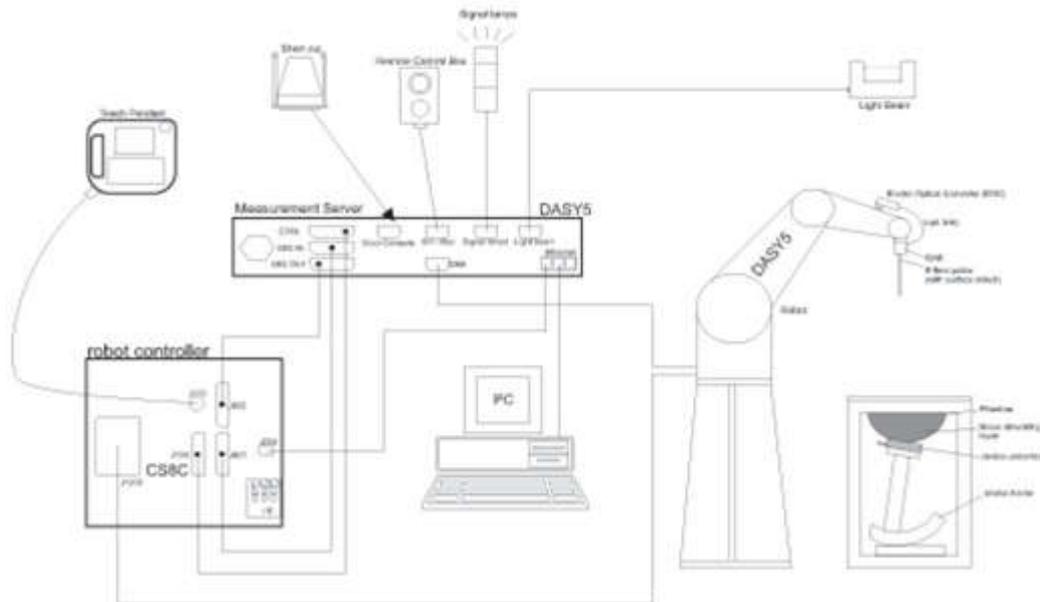
SAR is expressed in units of Watts per kilogram (W/kg)

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of the tissue and E is the RMS electrical field strength.

## 8. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

**8.1 E-Field Probe**

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

**<EX3DV4 Probe>**

<b>Construction</b>	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	4 MHz – 10 GHz Linearity: $\pm 0.2$ dB (30 MHz – 10 GHz)	
<b>Directivity</b>	$\pm 0.3$ dB in TSL (rotation around probe axis) $\pm 0.5$ dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 $\mu$ W/g – >100 mW/g Linearity: $\pm 0.2$ dB (noise: typically <1 $\mu$ W/g)	
<b>Dimensions</b>	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

**8.2 Data Acquisition Electronics (DAE)**

The data acquisition electronics (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 measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



**Photo of DAE**

### 8.3 Phantom

#### <SAM Twin Phantom>

<b>Shell Thickness</b>	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
<b>Filling Volume</b>	Approx. 25 liters	
<b>Dimensions</b>	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
<b>Measurement Areas</b>	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

#### <ELI Phantom>

<b>Shell Thickness</b>	2 ± 0.2 mm (sagging: <1%)	
<b>Filling Volume</b>	Approx. 30 liters	
<b>Dimensions</b>	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

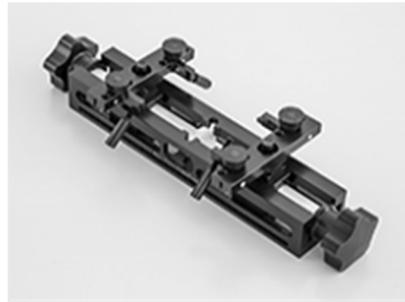
## 8.4 Device Holder

### <Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

### <Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

## **9. Measurement Procedures**

The measurement procedures are as follows:

### <Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

### <SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

### **9.1 Spatial Peak SAR Evaluation**

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

**9.2 Power Reference Measurement**

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

**9.3 Area Scan**

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$	≤ 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.	

**9.4 Zoom Scan**

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

		≤ 3 GHz	> 3 GHz	
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ 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	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ 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 <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

**9.5 Volume Scan Procedures**

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

**9.6 Power Drift Monitoring**

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASy measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.



10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 15, 2024
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Oct. 19, 2021	Oct. 17, 2024
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 18, 2024
SPEAG	2450MHz System Validation Kit	D2450V2	924	Nov. 03, 2023	Nov. 02, 2024
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 20, 2021	Dec. 18, 2024
SPEAG	5000MHz System Validation Kit	D5GHzV2	1341	Dec. 13, 2021	Dec. 11, 2024
SPEAG	Data Acquisition Electronics	DAE4	1664	Jul. 10, 2024	Jul. 09, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7577	Dec. 13, 2023	Dec. 12, 2024
SPEAG	ELI Phantom	QD OVA 002 AA	1233	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201341952	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Radio communication analyzer	MT8820C	6201563813	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Radio communication analyzer	MT8821C	6272416837	Apr. 08, 2024	Apr. 07, 2025
Anritsu	Radio communication analyzer	MT8821C	6272416846	Apr. 08, 2024	Apr. 07, 2025
Anritsu	Radio communication analyzer	MT8821C	6272416863	Apr. 08, 2024	Apr. 07, 2025
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 16, 2023	Oct. 15, 2024
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Feb. 19, 2024	Feb. 18, 2025
Speag	Dielectric Assessment KIT	DAK-12	1170	Oct. 25, 2023	Oct. 24, 2024
Agilent	Signal Generator	N5181A	MY50145381	Dec. 28, 2023	Dec. 27, 2024
R&S	Signal Generator	SMB100A	175779	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Power Sensor	MA2411B	1306099	Oct. 16, 2023	Oct. 15, 2024
Anritsu	Power Meter	ML2495A	1349001	Oct. 16, 2023	Oct. 15, 2024
Anritsu	Power Sensor	MA2411B	1542004	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Power Meter	ML2495A	1339473	Dec. 28, 2023	Dec. 27, 2024
R&S	Power Sensor	NRP8S	109228	Apr. 08, 2024	Apr. 07, 2025
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 28, 2023	Dec. 27, 2024
R&S	Spectrum Analyzer	FSP7	100818	Jul. 04, 2024	Jul. 03, 2025
TES	Hygrometer	1310	200505600	Jul. 05, 2024	Jul. 04, 2025
Anymetre	Thermo-Hygrometer	JR593	2015102801	Jan. 02, 2024	Jan. 01, 2025
Anymetre	Thermo-Hygrometer	JR593	2018100802	Oct. 19, 2023	Oct. 18, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
AR	Amplifier	5S1G4	0333096	Note 1	
Mini-Circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
Mini-Circuits	Amplifier	ZVA-183W-S+	726202215	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
Jinkexinhua	Attenuator	10db-8G	N/A	Note 1	

Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

## 11. System Verification

### 11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

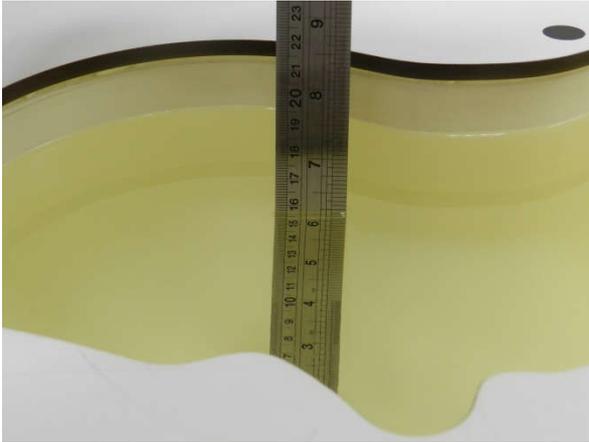


Fig 10.1 Photo of Liquid Height for Head SAR



Fig 10.2 Photo of Liquid Height for Body SAR

**11.2 Tissue Verification**

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

**Simulating Liquid for 5GHz, Manufactured by SPEAG**

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

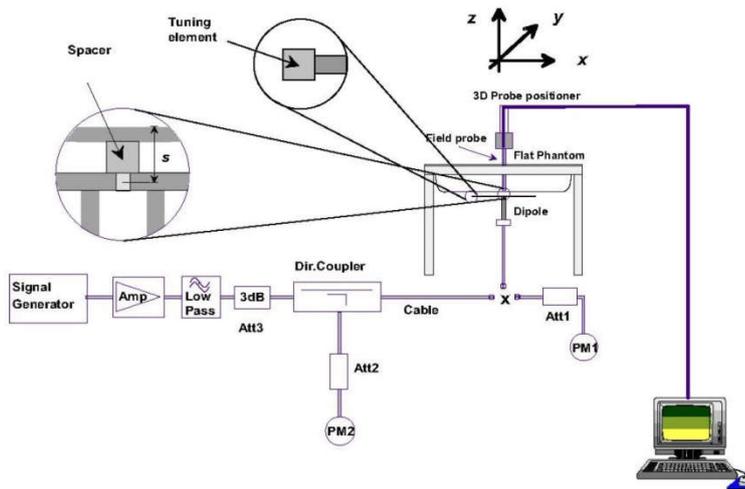
**<Tissue Dielectric Parameter Check Results>**

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
835	Head	22.5	0.925	41.799	0.90	41.50	2.78	0.72	±5	2024/8/7
1750	Head	22.4	1.382	41.560	1.37	40.10	0.88	3.64	±5	2024/8/8
1900	Head	22.6	1.443	40.011	1.40	40.00	3.07	0.03	±5	2024/8/9
2450	Head	22.5	1.811	37.601	1.80	39.20	0.61	-4.08	±5	2024/8/10
2600	Head	22.5	2.051	37.981	1.96	39.00	4.64	-2.61	±5	2024/8/11
2600	Head	22.4	2.049	37.991	1.96	39.00	4.54	-2.59	±5	2024/8/15
5250	Head	22.4	4.683	36.973	4.71	35.95	-0.57	2.85	±5	2024/8/12
5250	Head	22.7	4.675	36.988	4.71	35.95	-0.74	2.89	±5	2024/8/20
5600	Head	22.6	5.188	36.101	5.07	35.50	2.33	1.69	±5	2024/8/13
5600	Head	22.3	5.171	36.135	5.07	35.50	1.99	1.79	±5	2024/8/23
5750	Head	22.4	5.351	35.818	5.22	35.35	2.51	1.32	±5	2024/8/14
5750	Head	22.5	5.366	35.801	5.22	35.35	2.80	1.28	±5	2024/8/24

**11.3 System Performance Check Results**

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2024/8/7	835	Head	250	4d162	7577	1664	2.500	9.640	10	3.73
2024/8/8	1750	Head	250	1137	7577	1664	8.980	36.500	35.92	-1.59
2024/8/9	1900	Head	250	5d182	7577	1664	10.500	39.600	42	6.06
2024/8/10	2450	Head	250	924	7577	1664	12.400	52.300	49.6	-5.16
2024/8/11	2600	Head	250	1070	7577	1664	13.300	56.200	53.2	-5.34
2024/8/15	2600	Head	250	1070	7577	1664	13.800	56.200	55.2	-1.78
2024/8/12	5250	Head	100	1341	7577	1664	7.830	80.700	78.3	-2.97
2024/8/20	5250	Head	100	1341	7577	1664	7.630	80.700	76.3	-5.45
2024/8/13	5600	Head	100	1341	7577	1664	8.790	84.500	87.9	4.02
2024/8/23	5600	Head	100	1341	7577	1664	8.650	84.500	86.5	2.37
2024/8/14	5750	Head	100	1341	7577	1664	8.450	80.600	84.5	4.84
2024/8/24	5750	Head	100	1341	7577	1664	8.230	80.600	82.3	2.11



**Fig 10.3.1 System Performance Check Setup**



**Fig 10.3.2 Setup Photo**



## **12. RF Exposure Positions**

### **12.1 SAR Testing for Tablet**

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, 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 configurations. 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.

#### **<EUT Setup Photos>**

Please refer to Appendix D for the test setup photos.

### **13. Conducted RF Output Power (Unit: dBm)**

The detailed conducted power table can refer to Appendix E.

#### **<GSM Conducted Power>**

**General Note:**

1. For DTM multi-slot class mode, the device was linked with base station simulator (Agilent E5515C) and transmit maximum power on maximum number of TX slots, i.e. one CS timeslot, and additional PS timeslots (1 for DTM class 5 and 9, 2 for DTM class 11) in one TDMA frame.
2. Agilent E5515C was used to setup the device operated under DTM mode for power measurement and SAR testing. For conducted power, the power of the burst for voice and the power of the bursts for data was reported separately in the table below, and the frame-average power is derived below to determine SAR testing.  
$$DTM \text{ frame average power (dBm)} = 10 * \log [\sum(\text{power of each slot, in mW})/8]$$
3. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE / DTM modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.
5. Other configurations of GSM / GPRS / EDGE / DTM are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode, SAR measurement is not required for the secondary mode.

#### **<WCDMA Conducted Power>**

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

**HSDPA Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each
  - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
  - iii. Set RMC 12.2Kbps + HSDPA mode.
  - iv. Set Cell Power = -86 dBm
  - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  - vi. Select HSDPA Uplink Parameters
  - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
  - viii. Set Ack-Nack Repetition Factor to 3
  - ix. Set CQI Feedback Cycle (k) to 4 ms
  - x. Set CQI Repetition Factor to 2
  - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

**Table C.10.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA,  $\Delta_{ACK}$  and  $\Delta_{NACK} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ , and  $\Delta_{CQI} = 24/15$  with  $\beta_{hs} = 24/15 * \beta_c$ .

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

**Setup Configuration**

**HSUPA Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting \* :
  - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
  - ii. Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
  - iii. Set Cell Power = -86 dBm
  - iv. Set Channel Type = 12.2k + HSPA
  - v. Set UE Target Power
  - vi. Power Ctrl Mode= Alternating bits
  - vii. Set and observe the E-TFCl
  - viii. Confirm that E-TFCl is equal to the target E-TFCl of 75 for sub-test 1, and other subtest's E-TFCl
- d. The transmitted maximum output power was recorded.

**Table C.11.1.3:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note1)	$\beta_{ec}$	$\beta_{ed}$ (Note 4) (Note 5)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCl
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ . For sub-test 5,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 5/15$  with  $\beta_{HS} = 5/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{HS}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

**Setup Configuration**

**DC-HSDPA 3GPP release 8 Setup Configuration:**

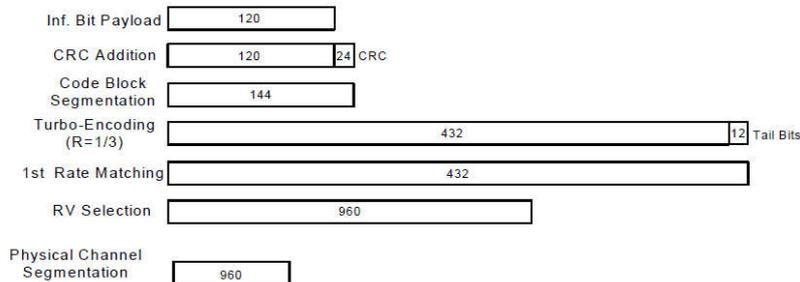
- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set RMC 12.2Kbps + HSDPA mode.
  - ii. Set Cell Power = -25 dBm
  - iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
  - iv. Select HSDPA Uplink Parameters
  - v. Set Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
    - a). Subtest 1:  $\beta_c/\beta_d=2/15$
    - b). Subtest 2:  $\beta_c/\beta_d=12/15$
    - c). Subtest 3:  $\beta_c/\beta_d=15/8$
    - d). Subtest 4:  $\beta_c/\beta_d=15/4$
  - vi. Set Delta ACK, Delta NACK and Delta CQI = 8
  - vii. Set Ack-Nack Repetition Factor to 3
  - viii. Set CQI Feedback Cycle (k) to 4 ms
  - ix. Set CQI Repetition Factor to 2
  - x. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

**C.8.1.12 Fixed Reference Channel Definition H-Set 12**

**Table C.8.1.12: Fixed Reference Channel H-Set 12**

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload ( $N_{INF}$ )	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		



**Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)**

**Setup Configuration**

**HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting \* :
  - i. Call Configs = 5.2E:HSPA+:UL with 16QAM
  - ii. Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.4, quoted from the TS 34.121-1 s5.2E
  - iii. Set Channel Params
  - iv. Set Cell Power = -86 dBm
  - v. Set Channel Type = HSPA
  - vi. Set UE Target Power =21 dBm
  - vii. Power Ctrl Mode= All Up Bits
  - viii. Set Manual Uplink DPCH Bc/Bd = Manual
  - ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
  - x. Set HSPA Conn DL Channel Levels
  - xi. Set HS-SCCH Configs
  - xii. Set RB Test Mode Setup
  - xiii. Set Common HSUPA Parameters
  - xiv. Set Serving Grant
  - xv. Confirm that E-TFCl is equal to the target E-TFCl of 105 for sub-test 1, and other subtest's E-TFCl
- d. The transmitted maximum output power was recorded.

**Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	$\beta_c$ (Note 3)	$\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCl (Note 5)	E-TFCl (boost)
1	1	0	30/15	30/15	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{fs} = 30/15 * \beta_c$ .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the  $\beta_c$  is set to 1 and  $\beta_d = 0$  by default.

Note 4:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

**Setup Configuration**

**<WCDMA Conducted Power>**

**General Note:**

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is  $\leq 1/4$  dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than  $1/4$  dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

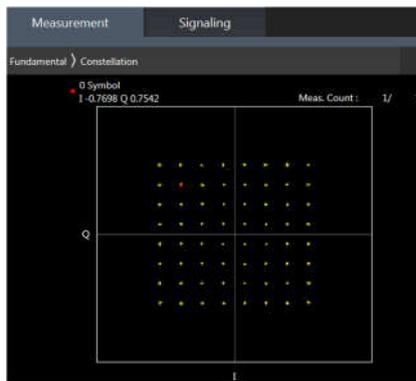
**<LTE Conducted Power>**

**General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B26 / B38 the maximum 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 middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 5 / 38 SAR test was covered by Band 26 / 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
  - a. the maximum output power, including tolerance, for the smaller band is  $\leq$  the larger band to qualify for the SAR test exclusion
  - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to May 2017 TCB workshop, for 16QAM and 64QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



**16QAM**



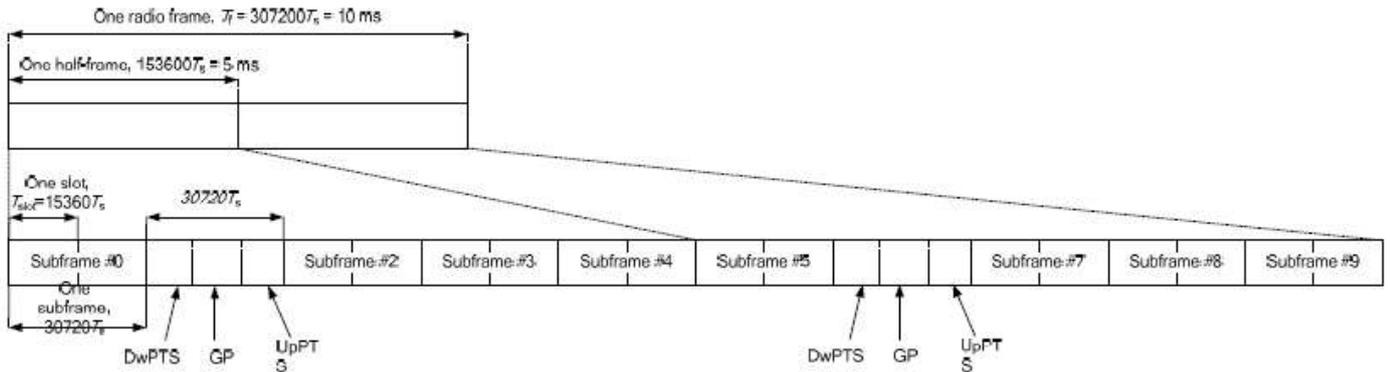
**64QAM**

**<TDD LTE SAR Measurement>**

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.



**Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).**

**Table 4.2-2: Uplink-downlink configurations.**

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

**Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).**

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$	-	-	-	-	-

<b>Special subframe (30720·T<sub>s</sub>): Normal cyclic prefix in downlink (UpPTS)</b>			
	<b>Special subframe configuration</b>	<b>Normal cyclic prefix in uplink</b>	<b>Extended cyclic prefix in uplink</b>
<b>Uplink duty factor in one special subframe</b>	<b>0~4</b>	7.13%	8.33%
	<b>5~9</b>	14.3%	16.7%

<b>Special subframe(30720·T<sub>s</sub>): Extended cyclic prefix in downlink (UpPTS)</b>			
	<b>Special subframe configuration</b>	<b>Normal cyclic prefix in uplink</b>	<b>Extended cyclic prefix in uplink</b>
<b>Uplink duty factor in one special subframe</b>	<b>0~3</b>	7.13%	8.33%
	<b>4~7</b>	14.3%	16.7%

The highest duty factor is resulted from:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix  $63.3\%/62.9\% = 1.006$  is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)\* Tune-up Scaling Factor\* scaling factor for extended cyclic prefix.

**<LTE Carrier Aggregation>**

The detailed LTE Carrier Aggregation conducted power table can refer to Appendix F.

**General Note:**

1. This device supports Carrier Aggregation on downlink for inter and intra band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.

Index	2CC Downlink Carrier Aggregation
2CC #1	CA_7C
2CC #2	CA_7A-7A
2CC #3	CA_38C
2CC #4	CA_41C
2CC #5	CA_41A-41A

**LTE Carrier Aggregation Conducted Power (Downlink)**

- i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. The device supports downlink two carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.
- vi. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$



<WLAN Conducted Power>

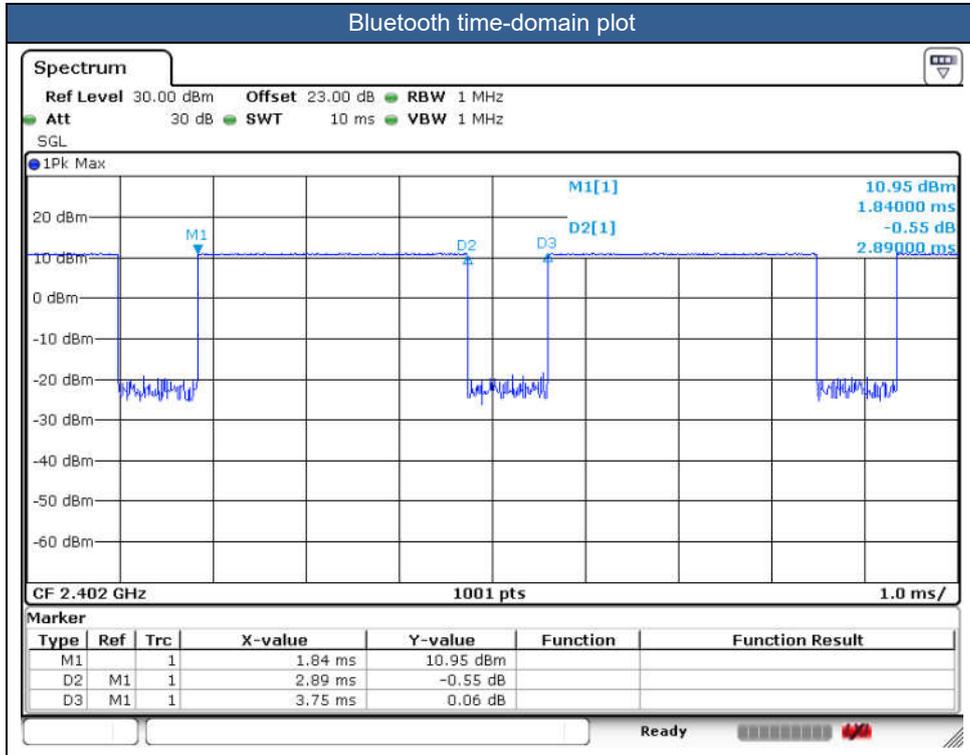
General Note:

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration. Additional output power measurements were not necessary.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
  - a. When the reported SAR of the initial test position is  $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
  - b. When the reported SAR of the test position is  $> 0.4$  W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is  $\leq 0.8$  W/kg or all required test position are tested.
  - c. For all positions/configurations, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.
6. The 2.4GHz/5GHz WLAN can transmit in SISO/MIMO antenna mode.
7. 802.11 ax supports both full tone size mode and partial tone size mode, after verification on partial tone size mode that partial size tone mode power will not be higher than full tone size mode, therefore, full tone mode power was chosen to be measured in this report.
8. For each antenna, transmit power in SISO operation is larger than or equal to the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode. So WLAN SAR testing was performed on SISO antenna, MIMO SAR base on standalone SAR summed together as MIMO SAR.

**<2.4GHz Bluetooth>**

**General Note:**

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 77.07 % as following figure, according to Oct. 2016 TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to 100% for Bluetooth reported SAR calculation.





### 14. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

**<SAR test exclusion table>**

**General Note:**

- The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
- Maximum power is the source-based time-average power and represents the maximum RF output power among production units
- Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
- Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
  - $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
    - f(GHz) is the RF channel transmit frequency in GHz
    - Power and distance are rounded to the nearest mW and mm before calculation
    - The result is rounded to one decimal place for comparison
- Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
  - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · ( f(MHz)/150)] mW, at 100 MHz to 1500 MHz
  - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	GPRS 850 Class 10	GPRS 1900 Class 10	WCDMA Band V	WCDMA Band II	LTE Band 5	LTE Band 26	LTE Band 4	LTE Band 2	LTE Band 7	LTE Band 38	LTE Band 41	BT ANT 0	2.4GHz WLAN ANT 0	2.4GHz WLAN ANT 1	5GHz WLAN ANT 0	5GHz WLAN ANT 1
	Calculated Frequency (MHz)	848	1909	846	1907	848	848	1754	1909	2567	2617	2687	2480	2462	2462	5825	5825
	Maximum power (dBm)	28.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	12.0	19.0	19.0	18.0	18.0
	Maximum rated power(mW)	630.96	316.23	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	15.85	79.43	79.43	63.10	63.10
Bottom Face	Separation distance(mm)	5.0											5.0	5.0	5.0	5.0	5.0
	exclusion threshold	116.2	87.4	46.2	69.4	46.3	46.3	66.5	69.4	80.5	81.3	82.4	5.0	24.9	24.9	30.5	30.5
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	5.0											15.0	15.0	5.0	15.0	5.0
	exclusion threshold	116.2	87.4	46.2	69.4	46.3	46.3	66.5	69.4	80.5	81.3	82.4	1.7	8.3	24.9	10.2	30.5
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Edge 2	Separation distance(mm)	135.9											215.0	215.0	23.0	215.0	23.0
	exclusion threshold	649.0	968.0	648.0	968.0	649.0	649.0	972.0	968.0	953.0	952.0	951.0	1745.0	1746.0	5.4	1712.0	6.6
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
Edge 3	Separation distance(mm)	164.0											132.0	132.0	167.0	132.0	167.0
	exclusion threshold	807.0	1249.0	806.0	1249.0	807.0	807.0	1253.0	1249.0	1234.0	1233.0	1232.0	915.0	916.0	1266.0	882.0	1232.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Edge 4	Separation distance(mm)	62.8											26.0	26.0	202.8	26.0	202.8
	exclusion threshold	235.0	237.0	235.0	237.0	235.0	235.0	241.0	237.0	222.0	221.0	220.0	1.0	4.8	1624.0	5.9	1590.0
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No

## 15. SAR Test Results

### General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
  - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
  - b. For SAR testing of WLAN/Bluetooth signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
  - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)\*Tune-up Scaling Factor
  - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)\* Duty Cycle scaling factor \* Tune-up scaling factor
  - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR (W/kg) = measured SAR (W/kg)\* Tune-up Scaling Factor\* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
  - $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
  - $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
  - $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.
4. The device implements Proximity sensors mechanism for the power management for SAR compliance at different exposure conditions (Body/Limbs). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.
5. For WLAN when transmit simultaneous with WWAN and Proximity sensors trigger, power reduction will be activated to body exposure conditions.

### GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.
2. Other configurations of GSM / GPRS / EDGE / DTM are considered as secondary modes. Both primary and secondary modes must be in the same frequency band. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode.

### WCDMA Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is  $\leq \frac{1}{4}$  dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than  $\frac{1}{4}$  dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

**LTE Note:**

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B26 / B38 the maximum 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 middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 5 / 38 SAR test was covered by Band 26 / 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
  - a. the maximum output power, including tolerance, for the smaller band is  $\leq$  the larger band to qualify for the SAR test exclusion
  - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

**WLAN/Bluetooth Note:**

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is  $> 0.4$  W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is  $\leq 0.8$  W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

**DSI status description:**

The device has the following DSI state which used at different exposure condition for WWAN bands.

Exposure Condition	DSI	Trigger Conditions
Body SAR(Standalone)	DSI 3	Sensor On
Body SAR(Simultaneous)	DSI 5	Sensor On+WLAN
Sensor Off SAR	-	Sensor Off



15.1 Body SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
<b>835HMz</b>																					
	GSM850	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	189	836.4	1	21.21	22.00	1.199	-	-	-0.14	0.801	0.961
	GSM850	-	-	-	-	GPRS (4 TX slots)	Edge 1	0mm	Ant 3	DSI3	189	836.4	1	21.21	22.00	1.199	-	-	0.12	0.764	0.916
	GSM850	-	-	-	-	GPRS (2 TX slots)	Bottom Face	9mm	Ant 3	Full	189	836.4	1	32.70	33.50	1.202	-	-	-0.12	0.089	0.107
	GSM850	-	-	-	-	GPRS (2 TX slots)	Edge 1	10mm	Ant 3	Full	189	836.4	1	32.70	33.50	1.202	-	-	-0.19	0.081	0.097
	GSM850	-	-	-	-	GPRS (2 TX slots)	Edge 4	0mm	Ant 3	Full	189	836.4	1	32.70	33.50	1.202	-	-	0.17	0.166	0.200
	GSM850	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	128	824.2	1	21.18	22.00	1.208	-	-	0.05	0.779	0.941
01	GSM850	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	251	848.8	1	21.17	22.00	1.211	-	-	0.03	0.909	1.100
	GSM850	-	-	-	-	DTM Multi-slot class 9	Bottom Face	0mm	Ant 3	DSI3	251	848.8	1	17.98	18.98	1.259	-	-	0.05	0.831	1.046
	GSM850	-	-	-	-	GPRS (4 TX slots)	Edge 1	0mm	Ant 3	DSI3	128	824.2	1	21.18	22.00	1.208	-	-	-0.15	0.736	0.889
	GSM850	-	-	-	-	GPRS (4 TX slots)	Edge 1	0mm	Ant 3	DSI3	251	848.8	1	21.17	22.00	1.211	-	-	0.06	0.761	0.921
	GSM850	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI5	251	848.8	1	19.28	20.00	1.180	-	-	0.03	0.574	0.678
	GSM850	-	-	-	-	DTM Multi-slot class 9	Bottom Face	0mm	Ant 3	DSI5	251	848.8	1	15.89	16.98	1.285	-	-	0.01	0.502	0.645
	GSM850	-	-	-	-	GPRS (4 TX slots)	Edge 1	0mm	Ant 3	DSI5	251	848.8	1	19.28	20.00	1.180	-	-	0.06	0.380	0.449
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	4182	836.4	1	18.05	18.50	1.109	-	-	-0.17	0.831	0.922
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 3	DSI3	4182	836.4	1	18.05	18.50	1.109	-	-	-0.01	0.611	0.678
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	9mm	Ant 3	Full	4182	836.4	1	23.58	24.00	1.102	-	-	-0.17	0.339	0.373
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	9mm	Ant 3	DSI5	4182	836.4	1	15.90	16.50	1.148	-	-	-0.12	0.060	0.069
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	10mm	Ant 3	Full	4182	836.4	1	23.58	24.00	1.102	-	-	-0.07	0.285	0.314
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 4	0mm	Ant 3	Full	4182	836.4	1	23.58	24.00	1.102	-	-	-0.12	0.117	0.129
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	4132	826.4	1	18.03	18.50	1.114	-	-	-0.19	0.804	0.896
02	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	4233	846.6	1	18.02	18.50	1.117	-	-	-0.05	0.959	1.071
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI5	4233	846.6	1	15.88	16.50	1.153	-	-	-0.05	0.605	0.698
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 3	DSI5	4182	836.4	1	15.90	16.50	1.148	-	-	-0.01	0.386	0.443
03	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	1	17.77	18.50	1.183	-	-	0.14	0.970	1.148
	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	2	17.77	18.50	1.183	-	-	0.05	0.911	1.078
	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	3	17.77	18.50	1.183	-	-	-0.06	0.940	1.112
	LTE Band 26	15M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	26865	831.5	1	17.77	18.50	1.183	-	-	-0.18	0.505	0.597
	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	Full	26865	831.5	1	23.16	24.00	1.213	-	-	0.04	0.159	0.193
	LTE Band 26	15M	QPSK	1	0	-	Edge 1	10mm	Ant 3	Full	26865	831.5	1	23.16	24.00	1.213	-	-	0.16	0.156	0.189
	LTE Band 26	15M	QPSK	1	0	-	Edge 4	0mm	Ant 3	Full	26865	831.5	1	23.16	24.00	1.213	-	-	-0.1	0.078	0.095
	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI5	26865	831.5	1	15.63	16.50	1.222	-	-	0.14	0.612	0.748
	LTE Band 26	15M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI5	26865	831.5	1	15.63	16.50	1.222	-	-	-0.18	0.319	0.390
	LTE Band 26	15M	QPSK	36	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	1	17.75	18.50	1.189	-	-	0.01	0.848	1.008
	LTE Band 26	15M	QPSK	36	0	-	Edge 1	0mm	Ant 3	DSI3	26865	831.5	1	17.75	18.50	1.189	-	-	-0.02	0.509	0.605
	LTE Band 26	15M	QPSK	36	0	-	Bottom Face	9mm	Ant 3	Full	26865	831.5	1	21.95	23.00	1.274	-	-	0.02	0.140	0.178
	LTE Band 26	15M	QPSK	36	0	-	Edge 1	10mm	Ant 3	Full	26865	831.5	1	21.95	23.00	1.274	-	-	0.05	0.141	0.180
	LTE Band 26	15M	QPSK	36	0	-	Edge 4	0mm	Ant 3	Full	26865	831.5	1	21.95	23.00	1.274	-	-	-0.04	0.069	0.088
	LTE Band 26	15M	QPSK	75	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	1	17.73	18.50	1.194	-	-	0.04	0.825	0.985
<b>1750HMz</b>																					
04	LTE Band 4	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	20175	1732.5	1	15.83	17.00	1.309	-	-	0.09	0.839	1.098
	LTE Band 4	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	20175	1732.5	1	15.83	17.00	1.309	-	-	-0.19	0.623	0.816
	LTE Band 4	20M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	Full	20175	1732.5	1	22.73	24.00	1.340	-	-	-0.09	0.189	0.253
	LTE Band 4	20M	QPSK	1	0	-	Edge 1	10mm	Ant 3	Full	20175	1732.5	1	22.73	24.00	1.340	-	-	0.05	0.121	0.162
	LTE Band 4	20M	QPSK	1	0	-	Edge 4	0mm	Ant 3	Full	20175	1732.5	1	22.73	24.00	1.340	-	-	0.11	0.216	0.289
	LTE Band 4	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI5	20175	1732.5	1	13.75	15.00	1.334	-	-	0.09	0.529	0.705
	LTE Band 4	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI5	20175	1732.5	1	13.75	15.00	1.334	-	-	-0.19	0.353	0.471
	LTE Band 4	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	20175	1732.5	1	15.81	17.00	1.315	-	-	-0.12	0.802	1.055
	LTE Band 4	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	20175	1732.5	1	15.81	17.00	1.315	-	-	-0.05	0.628	0.826
	LTE Band 4	20M	QPSK	50	0	-	Bottom Face	9mm	Ant 3	Full	20175	1732.5	1	21.55	23.00	1.396	-	-	-0.11	0.177	0.247
	LTE Band 4	20M	QPSK	50	0	-	Edge 1	10mm	Ant 3	Full	20175	1732.5	1	21.55	23.00	1.396	-	-	-0.15	0.110	0.154
	LTE Band 4	20M	QPSK	50	0	-	Edge 4	0mm	Ant 3	Full	20175	1732.5	1	21.55	23.00	1.396	-	-	0.06	0.173	0.242



	LTE Band 4	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 3	DSI3	20175	1732.5	1	15.80	17.00	1.318	-	-	-0.14	0.812	1.070
	LTE Band 4	20M	QPSK	100	0	-	Edge 1	0mm	Ant 3	DSI3	20175	1732.5	1	15.80	17.00	1.318	-	-	-0.01	0.633	0.834
<b>1900HMz</b>																					
	GSM1900	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	661	1880	1	20.35	20.50	1.035	-	-	-0.01	0.811	0.840
	GSM1900	-	-	-	-	GPRS (4 TX slots)	Edge 1	0mm	Ant 3	DSI3	661	1880	1	20.35	20.50	1.035	-	-	0.07	0.342	0.354
	GSM1900	-	-	-	-	GPRS (2 TX slots)	Bottom Face	9mm	Ant 3	Full	661	1880	1	29.86	30.50	1.159	-	-	0.19	0.103	0.119
	GSM1900	-	-	-	-	GPRS (2 TX slots)	Edge 1	10mm	Ant 3	Full	661	1880	1	29.86	30.50	1.159	-	-	0.12	0.084	0.097
	GSM1900	-	-	-	-	GPRS (2 TX slots)	Edge 4	0mm	Ant 3	Full	661	1880	1	29.86	30.50	1.159	-	-	0.06	0.296	0.343
	GSM1900	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	512	1850.2	1	20.33	20.50	1.040	-	-	-0.06	0.805	0.837
05	GSM1900	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI3	810	1909.8	1	20.31	20.50	1.045	-	-	-0.11	0.964	1.007
	GSM1900	-	-	-	-	DTM Multi-slot class 9	Bottom Face	0mm	Ant 3	DSI3	810	1909.8	1	17.36	17.48	1.028	-	-	0.04	0.902	0.927
	GSM1900	-	-	-	-	GPRS (4 TX slots)	Bottom Face	0mm	Ant 3	DSI5	810	1909.8	1	18.20	18.50	1.072	-	-	-0.11	0.608	0.651
	GSM1900	-	-	-	-	DTM Multi-slot class 9	Bottom Face	0mm	Ant 3	DSI5	810	1909.8	1	15.30	15.48	1.042	-	-	0.03	0.536	0.559
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9400	1880	1	16.56	17.00	1.107	-	-	0.09	0.849	0.940
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 3	DSI3	9400	1880	1	16.56	17.00	1.107	-	-	0.05	0.381	0.422
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	9mm	Ant 3	Full	9400	1880	1	23.60	24.00	1.096	-	-	-0.06	0.178	0.195
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Edge 1	10mm	Ant 3	Full	9400	1880	1	23.60	24.00	1.096	-	-	0.01	0.122	0.134
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Edge 4	0mm	Ant 3	Full	9400	1880	1	23.60	24.00	1.096	-	-	0.16	0.405	0.444
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9262	1852.4	1	16.55	17.00	1.109	-	-	-0.17	0.821	0.911
06	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9538	1907.6	1	16.53	17.00	1.114	-	-	0.19	1.020	1.137
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9538	1907.6	2	16.53	17.00	1.114	-	-	0.01	0.965	1.075
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9538	1907.6	3	16.53	17.00	1.114	-	-	-0.05	0.988	1.101
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI5	9538	1907.6	1	14.48	15.00	1.127	-	-	0.19	0.624	0.703
	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	18900	1880	1	14.82	16.00	1.312	-	-	-0.09	0.729	0.957
	LTE Band 2	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	18900	1880	1	14.82	16.00	1.312	-	-	0.06	0.257	0.337
	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	Full	18900	1880	1	22.75	24.00	1.334	-	-	0.13	0.235	0.313
	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	DSI5	18900	1880	1	12.80	14.00	1.318	-	-	0.13	0.024	0.032
	LTE Band 2	20M	QPSK	1	0	-	Edge 1	10mm	Ant 3	Full	18900	1880	1	22.75	24.00	1.334	-	-	0.16	0.134	0.179
	LTE Band 2	20M	QPSK	1	0	-	Edge 4	0mm	Ant 3	Full	18900	1880	1	22.75	24.00	1.334	-	-	-0.09	0.347	0.463
	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	18700	1860	1	14.78	16.00	1.324	-	-	0.13	0.686	0.908
07	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	19100	1900	1	14.80	16.00	1.318	-	-	0.09	0.852	1.123
	LTE Band 2	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI5	19100	1900	1	12.81	14.00	1.315	-	-	0.09	0.538	0.708
	LTE Band 2	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	18900	1880	1	14.81	16.00	1.315	-	-	0.11	0.703	0.925
	LTE Band 2	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	18900	1880	1	14.81	16.00	1.315	-	-	0.03	0.250	0.329
	LTE Band 2	20M	QPSK	50	0	-	Bottom Face	9mm	Ant 3	Full	18900	1880	1	21.68	23.00	1.355	-	-	0.13	0.243	0.329
	LTE Band 2	20M	QPSK	50	0	-	Edge 1	10mm	Ant 3	Full	18900	1880	1	21.68	23.00	1.355	-	-	-0.12	0.144	0.195
	LTE Band 2	20M	QPSK	50	0	-	Edge 4	0mm	Ant 3	Full	18900	1880	1	21.68	23.00	1.355	-	-	-0.05	0.282	0.382
	LTE Band 2	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	18700	1860	1	14.76	16.00	1.330	-	-	-0.1	0.660	0.878
	LTE Band 2	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	19100	1900	1	14.78	16.00	1.324	-	-	0	0.747	0.989
	LTE Band 2	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 3	DSI3	18900	1880	1	14.80	16.00	1.318	-	-	0.15	0.711	0.937
<b>2600HMz</b>																					
	LTE Band 7	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	21100	2535	1	12.11	13.00	1.227	-	-	0.03	0.665	0.816
	LTE Band 7	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	21100	2535	1	12.11	13.00	1.227	-	-	0.05	0.574	0.705
	LTE Band 7	20M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	Full	21100	2535	1	23.02	24.00	1.253	-	-	-0.11	0.102	0.128
	LTE Band 7	20M	QPSK	1	0	-	Edge 1	10mm	Ant 3	Full	21100	2535	1	23.02	24.00	1.253	-	-	-0.03	0.064	0.080
	LTE Band 7	20M	QPSK	1	0	-	Edge 4	0mm	Ant 3	Full	21100	2535	1	23.02	24.00	1.253	-	-	-0.02	0.280	0.351
08	LTE Band 7	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	20850	2510	1	12.05	13.00	1.245	-	-	-0.02	0.812	1.011
	LTE Band 7	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	21350	2560	1	12.08	13.00	1.236	-	-	-0.16	0.652	0.806
	LTE Band 7	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI5	20850	2510	1	10.17	11.00	1.211	-	-	-0.02	0.512	0.620
	LTE Band 7	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI5	21100	2535	1	10.20	11.00	1.202	-	-	0.05	0.362	0.435
	LTE Band 7	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	21100	2535	1	12.10	13.00	1.230	-	-	0.03	0.622	0.765
	LTE Band 7	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	21100	2535	1	12.10	13.00	1.230	-	-	-0.09	0.559	0.688
	LTE Band 7	20M	QPSK	50	0	-	Bottom Face	9mm	Ant 3	Full	21100	2535	1	21.95	23.00	1.274	-	-	0.11	0.097	0.124
	LTE Band 7	20M	QPSK	50	0	-	Edge 1	10mm	Ant 3	Full	21100	2535	1	21.95	23.00	1.274	-	-	-0.11	0.069	0.088
	LTE Band 7	20M	QPSK	50	0	-	Edge 4	0mm	Ant 3	Full	21100	2535	1	21.95	23.00	1.274	-	-	-0.12	0.222	0.283
	LTE Band 7	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	20850	2510	1	12.03	13.00	1.250	-	-	0.09	0.647	0.809



	LTE Band 7	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	21350	2560	1	12.06	13.00	1.242	-	-	-0.07	0.650	0.807
	LTE Band 7	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 3	DSI3	21100	2535	1	12.08	13.00	1.236	-	-	0.05	0.631	0.780
09	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	41490	2680	1	14.80	15.00	1.047	62.90	1.006	0.11	1.120	1.180
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	41490	2680	1	14.80	15.00	1.047	62.90	1.006	0.01	0.767	0.808
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	9mm	Ant 3	Full	41490	2680	1	23.86	24.00	1.033	62.90	1.006	-0.12	0.106	0.110
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	10mm	Ant 3	Full	41490	2680	1	23.86	24.00	1.033	62.90	1.006	0.16	0.112	0.116
	LTE Band 41	20M	QPSK	1	0	-	Edge 4	0mm	Ant 3	Full	41490	2680	1	23.86	24.00	1.033	62.90	1.006	0.13	0.342	0.355
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	39750	2506	1	14.38	15.00	1.153	62.90	1.006	-0.12	0.816	0.947
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	40185	2549.5	1	14.48	15.00	1.127	62.90	1.006	0.14	0.795	0.901
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	40620	2593	1	14.56	15.00	1.107	62.90	1.006	-0.12	0.887	0.987
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	41055	2636.5	1	14.45	15.00	1.135	62.90	1.006	-0.15	0.968	1.105
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	39750	2506	1	14.38	15.00	1.153	62.90	1.006	-0.12	0.581	0.674
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	40185	2549.5	1	14.48	15.00	1.127	62.90	1.006	0.14	0.566	0.642
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	40620	2593	1	14.56	15.00	1.107	62.90	1.006	-0.12	0.632	0.704
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI3	41055	2636.5	1	14.45	15.00	1.135	62.90	1.006	-0.15	0.689	0.787
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI5	41490	2680	1	12.82	13.00	1.042	62.90	1.006	0.11	0.711	0.746
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	DSI5	41490	2680	1	12.82	13.00	1.042	62.90	1.006	0.01	0.487	0.511
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	41490	2680	1	14.78	15.00	1.052	62.90	1.006	0.07	1.070	1.132
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	41490	2680	1	14.78	15.00	1.052	62.90	1.006	-0.13	0.665	0.704
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	9mm	Ant 3	Full	41490	2680	1	22.84	23.00	1.038	62.90	1.006	0.12	0.097	0.101
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	10mm	Ant 3	Full	41490	2680	1	22.84	23.00	1.038	62.90	1.006	0.02	0.102	0.106
	LTE Band 41	20M	QPSK	50	0	-	Edge 4	0mm	Ant 3	Full	41490	2680	1	22.84	23.00	1.038	62.90	1.006	-0.04	0.253	0.264
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	39750	2506	1	14.35	15.00	1.161	62.90	1.006	0.12	0.878	1.026
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	40185	2549.5	1	14.45	15.00	1.135	62.90	1.006	-0.09	0.878	1.003
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	40620	2593	1	14.53	15.00	1.114	62.90	1.006	0.02	0.977	1.095
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	DSI3	41055	2636.5	1	14.43	15.00	1.140	62.90	1.006	0.06	0.985	1.130
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	39750	2506	1	14.35	15.00	1.161	62.90	1.006	0.12	0.625	0.730
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	40185	2549.5	1	14.45	15.00	1.135	62.90	1.006	-0.09	0.625	0.714
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	40620	2593	1	14.53	15.00	1.114	62.90	1.006	0.02	0.696	0.780
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	DSI3	41055	2636.5	1	14.43	15.00	1.140	62.90	1.006	0.06	0.702	0.805
	LTE Band 41	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 3	DSI3	41490	2680	1	14.75	15.00	1.059	62.90	1.006	0.04	1.020	1.087
	LTE Band 41	20M	QPSK	100	0	-	Edge 1	0mm	Ant 3	DSI3	41490	2680	1	14.75	15.00	1.059	62.90	1.006	-0.11	0.673	0.717



Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	
<b>2450HMz</b>																		
10	Bluetooth	DH5 1Mbps	Bottom Face	0mm	Ant 0	Full	78	2480	1	8.70	9.00	1.072	77.07	1.298	-0.08	0.182	<b>0.253</b>	
	Bluetooth	DH5 1Mbps	Bottom Face	9mm	Ant 0	Full	78	2480	1	8.70	9.00	1.072	77.07	1.298	-0.16	0.079	0.110	
	Bluetooth	DH5 1Mbps	Edge 1	0mm	Ant 0	Full	78	2480	1	8.70	9.00	1.072	77.07	1.298	-0.02	0.060	0.083	
	Bluetooth	DH5 1Mbps	Edge 4	0mm	Ant 0	Full	78	2480	1	8.70	9.00	1.072	77.07	1.298	-0.18	0.020	0.028	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	1	2412	1	12.53	13.00	1.114	97.93	1.021	-0.03	0.890	1.013	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	9mm	Ant 0	Full	1	2412	1	18.40	19.00	1.148	97.93	1.021	-0.05	0.612	0.717	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	9mm	Ant 0	Full	6	2437	1	18.30	19.00	1.175	97.93	1.021	-0.01	0.458	0.549	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	9mm	Ant 0	Full	11	2462	1	18.20	19.00	1.202	97.93	1.021	-0.08	0.727	0.892	
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0mm	Ant 0	Full	1	2412	1	18.40	19.00	1.148	97.93	1.021	-0.16	0.129	0.151	
	WLAN2.4GHz	802.11b 1Mbps	Edge 4	0mm	Ant 0	Full	1	2412	1	18.40	19.00	1.148	97.93	1.021	-0.12	0.060	0.070	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	6	2437	1	12.41	13.00	1.146	97.93	1.021	-0.15	0.654	0.765	
11	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	11	2462	1	12.35	13.00	1.161	97.93	1.021	0.08	1.000	<b>1.186</b>	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	11	2462	2	12.35	13.00	1.161	97.93	1.021	0.06	0.933	1.106	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	11	2462	3	12.35	13.00	1.161	97.93	1.021	0.11	0.905	1.073	
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on_Simultaneous	11	2462	1	9.47	10.00	1.130	97.93	1.021	0.08	0.512	0.591	
	WLAN2.4GHz	802.11g 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	1	2412	1	15.55	16.00	1.109	88.58	1.129	0.04	0.916	1.147	
	WLAN2.4GHz	802.11g 6Mbps	Edge 1	0mm	Ant 1	Sensor on	1	2412	1	15.55	16.00	1.109	88.58	1.129	0.17	0.394	0.493	
	WLAN2.4GHz	802.11g 6Mbps	Bottom Face	9mm	Ant 1	Full	6	2437	1	18.00	19.00	1.259	88.58	1.129	0.13	0.258	0.366	
	WLAN2.4GHz	802.11g 6Mbps	Edge 1	10mm	Ant 1	Full	6	2437	1	18.00	19.00	1.259	88.58	1.129	0.07	0.070	0.100	
	WLAN2.4GHz	802.11g 6Mbps	Edge 2	0mm	Ant 1	Full	1	2412	1	18.40	19.00	1.148	88.58	1.129	0.11	0.095	0.123	
	WLAN2.4GHz	802.11g 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	10	2452	1	15.40	16.00	1.148	88.58	1.129	0.09	0.820	1.063	
	WLAN2.4GHz	802.11g 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	11	2462	1	14.60	15.00	1.096	88.58	1.129	0.01	0.683	0.846	
	WLAN2.4GHz	802.11g 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	6	2437	1	15.14	16.00	1.219	88.58	1.129	0.05	0.629	0.866	
<b>5000HMz</b>																		
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	52	5260	1	10.91	12.00	1.286	90.45	1.106	0.15	0.797	1.134	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 0	Full	52	5260	1	16.76	18.00	1.332	90.45	1.106	0.08	0.396	0.583	
	WLAN5.3GHz	802.11a 6Mbps	Edge 1	0mm	Ant 0	Full	52	5260	1	16.76	18.00	1.332	90.45	1.106	0.05	0.087	0.128	
	WLAN5.3GHz	802.11a 6Mbps	Edge 4	0mm	Ant 0	Full	52	5260	1	16.76	18.00	1.332	90.45	1.106	-0.19	0.070	0.103	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	56	5280	1	10.78	12.00	1.326	90.45	1.106	-0.01	0.483	0.708	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	60	5300	1	10.77	12.00	1.329	90.45	1.106	-0.15	0.464	0.682	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	64	5320	1	10.70	12.00	1.350	90.45	1.106	-0.07	0.436	0.651	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on_Simultaneous	52	5260	1	8.01	9.00	1.257	90.45	1.106	0.15	0.402	0.559	
12	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	52	5260	1	13.12	14.00	1.225	90.45	1.106	-0.09	0.879	<b>1.191</b>	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	52	5260	2	13.12	14.00	1.225	90.45	1.106	0.07	0.856	1.159	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	52	5260	3	13.12	14.00	1.225	90.45	1.106	0.02	0.810	1.097	
	WLAN5.3GHz	802.11a 6Mbps	Edge 1	0mm	Ant 1	Sensor on	52	5260	1	13.12	14.00	1.225	90.45	1.106	0.02	0.327	0.443	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 1	Full	52	5260	1	16.88	18.00	1.295	90.45	1.106	-0.12	0.183	0.262	
	WLAN5.3GHz	802.11a 6Mbps	Edge 1	10mm	Ant 1	Full	52	5260	1	16.88	18.00	1.295	90.45	1.106	0.19	0.122	0.175	
	WLAN5.3GHz	802.11a 6Mbps	Edge 2	0mm	Ant 1	Full	52	5260	1	16.88	18.00	1.295	90.45	1.106	-0.16	0.056	0.080	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	56	5280	1	12.95	14.00	1.274	90.45	1.106	-0.12	0.802	1.130	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	60	5300	1	12.97	14.00	1.268	90.45	1.106	0.06	0.810	1.136	
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	64	5320	1	12.89	14.00	1.292	90.45	1.106	-0.12	0.805	1.150	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	100	5500	1	10.28	11.00	1.181	90.45	1.106	-0.07	0.659	0.861	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 0	Full	100	5500	1	17.16	18.00	1.214	90.45	1.106	-0.05	0.351	0.471	
	WLAN5.5GHz	802.11a 6Mbps	Edge 1	0mm	Ant 0	Full	100	5500	1	17.16	18.00	1.214	90.45	1.106	0.15	0.154	0.207	
	WLAN5.5GHz	802.11a 6Mbps	Edge 4	0mm	Ant 0	Full	100	5500	1	17.16	18.00	1.214	90.45	1.106	0.03	0.080	0.107	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	116	5580	1	9.97	11.00	1.269	90.45	1.106	-0.16	0.695	0.975	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	132	5660	1	9.89	11.00	1.292	90.45	1.106	-0.03	0.683	0.976	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	140	5700	1	9.34	11.00	1.467	90.45	1.106	-0.05	0.619	1.004	
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on_Simultaneous	140	5700	1	6.47	8.00	1.424	90.45	1.106	-0.05	0.343	0.540	
13	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	100	5500	1	12.55	13.00	1.109	90.45	1.106	-0.12	0.932	<b>1.144</b>	



	WLAN5.5GHz	802.11a 6Mbps	Edge 1	0mm	Ant 1	Sensor on	100	5500	1	12.55	13.00	1.109	90.45	1.106	0.17	0.429	0.526
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 1	Full	100	5500	1	17.43	18.00	1.141	90.45	1.106	-0.1	0.194	0.245
	WLAN5.5GHz	802.11a 6Mbps	Edge 1	10mm	Ant 1	Full	100	5500	1	17.43	18.00	1.141	90.45	1.106	-0.17	0.113	0.143
	WLAN5.5GHz	802.11a 6Mbps	Edge 2	0mm	Ant 1	Full	100	5500	1	17.43	18.00	1.141	90.45	1.106	-0.13	0.096	0.121
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	116	5580	1	12.14	13.00	1.219	90.45	1.106	-0.02	0.672	0.906
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	132	5660	1	12.05	13.00	1.245	90.45	1.106	-0.12	0.545	0.750
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	140	5700	1	11.67	13.00	1.359	90.45	1.106	-0.04	0.678	1.019
14	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	157	5785	1	9.50	11.00	1.414	90.45	1.106	0.11	0.708	1.107
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 0	Full	157	5785	1	16.38	18.00	1.453	90.45	1.106	0.18	0.508	0.817
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 0	Full	149	5745	1	16.36	18.00	1.460	90.45	1.106	0.18	0.442	0.714
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 0	Full	165	5825	1	16.35	18.00	1.463	90.45	1.106	0.18	0.328	0.531
	WLAN5.8GHz	802.11a 6Mbps	Edge 1	0mm	Ant 0	Full	157	5785	1	16.38	18.00	1.453	90.45	1.106	0.15	0.204	0.328
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	0mm	Ant 0	Full	157	5785	1	16.38	18.00	1.453	90.45	1.106	-0.15	0.050	0.080
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	149	5745	1	9.49	11.00	1.417	90.45	1.106	0.17	0.533	0.835
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on	165	5825	1	9.50	11.00	1.414	90.45	1.106	-0.15	0.454	0.710
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 0	Sensor on_Simultaneous	157	5785	1	6.60	8.00	1.382	90.45	1.106	0.11	0.362	0.553
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	149	5745	1	10.85	12.00	1.304	90.45	1.106	0.12	0.720	1.038
	WLAN5.8GHz	802.11a 6Mbps	Edge 1	0mm	Ant 1	Sensor on	149	5745	1	10.85	12.00	1.304	90.45	1.106	0.03	0.465	0.670
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	9mm	Ant 1	Full	149	5745	1	16.75	18.00	1.334	90.45	1.106	0.03	0.176	0.260
	WLAN5.8GHz	802.11a 6Mbps	Edge 1	10mm	Ant 1	Full	149	5745	1	16.75	18.00	1.334	90.45	1.106	-0.1	0.141	0.208
	WLAN5.8GHz	802.11a 6Mbps	Edge 2	0mm	Ant 1	Full	149	5745	1	16.75	18.00	1.334	90.45	1.106	-0.11	0.331	0.488
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	157	5785	1	10.71	12.00	1.346	90.45	1.106	-0.13	0.714	1.063
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	165	5825	1	10.70	12.00	1.349	90.45	1.106	0.13	0.698	1.042



**15.2 Repeated SAR Measurement**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	17.77	18.50	1.183	-	-	0.14	0.970	1	1.148
2nd	LTE Band 26	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	26865	831.5	17.77	18.50	1.183	-	-	0.11	0.944	1.027	1.117
1st	LTE Band 4	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	20175	1732.5	15.83	17.00	1.309	-	-	0.09	0.839	1	1.098
2nd	LTE Band 4	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	20175	1732.5	15.83	17.00	1.309	-	-	0.02	0.824	1.018	1.079
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9538	1907.6	16.53	17.00	1.114	-	-	0.19	1.020	1	1.137
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 3	DSI3	9538	1907.6	16.53	17.00	1.114	-	-	0.12	0.987	1.033	1.100
1st	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	41490	2680	14.80	15.00	1.047	62.90	1.006	0.11	1.120	1	1.180
2nd	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	DSI3	41490	2680	14.80	15.00	1.047	62.90	1.006	0.04	1.050	1.067	1.106
1st	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	11	2462	12.35	13.00	1.161	97.93	1.021	0.08	1.000	1	1.186
2nd	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Bottom Face	0mm	Ant 0	Sensor on	11	2462	12.35	13.00	1.161	97.93	1.021	0.02	0.989	1.011	1.173
1st	WLAN5.3GHz	-	-	-	-	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	52	5260	13.12	14.00	1.225	90.45	1.106	-0.09	0.879	1	1.191
2nd	WLAN5.3GHz	-	-	-	-	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	52	5260	13.12	14.00	1.225	90.45	1.106	-0.02	0.865	1.016	1.172
1st	WLAN5.5GHz	-	-	-	-	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	100	5500	12.55	13.00	1.109	90.45	1.106	-0.12	0.932	1	1.144
2nd	WLAN5.5GHz	-	-	-	-	802.11a 6Mbps	Bottom Face	0mm	Ant 1	Sensor on	100	5500	12.55	13.00	1.109	90.45	1.106	-0.14	0.924	1.009	1.134

**General Note:**

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8W/kg$ .
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is  $\leq 1.2$  and the measured SAR  $< 1.45W/kg$ , only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

## 16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Tablet
		Body
1.	WWAN + 2.4GHz WLAN	Yes
2.	WWAN + 5GHz WLAN	Yes
3.	WWAN + Bluetooth	Yes
4.	5GHz WLAN+ Bluetooth	Yes
5.	WWAN + 5GHz WLAN+ Bluetooth	Yes
6.	WWAN + 2.4GHz WLAN + NFC	Yes
7.	WWAN + 5GHz WLAN + NFC	Yes
8.	WWAN + Bluetooth + NFC	Yes
9.	5GHz WLAN+ Bluetooth + NFC	Yes
10.	WWAN + 5GHz WLAN+ Bluetooth + NFC	Yes

**General Note:**

1. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment though they have independent antenna.
3. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
4. According to the EUT characteristic, WLAN 5GHz and Bluetooth can transmit simultaneously.
5. According to the EUT character, WLAN 2.4GHz and Bluetooth can't transmit simultaneously.
6. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
7. NFC can transmit simultaneously with other Radios in extremity exposure condition.
8. For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
9. All licensed modes share the same antenna part and cannot transmit simultaneously.
10. The reported SAR summation is calculated based on the same configuration and test position
11. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
  - i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
  - ii)  $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$ , and the peak separation distance is determined from the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
  - iii) If  $SPLSR \leq 0.04$  for 1g SAR and  $SPLSR \leq 0.10$  for 10g SAR , simultaneously transmission SAR measurement is not necessary.
  - iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
  - v) The SPLSR calculated results please refer to section 16.2.



16.1 Body Exposure Conditions

Exposure Position	6	7	9	10	6+7+9+10	7+9+10	6+9+10	Case No
	WLAN5GHz Ant 0	WLAN5GHz Ant 1	Bluetooth Ant 0	NFC	Summed	Summed	Summed	
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Bottom Face at 9mm	0.817	0.262	0.110		1.19	0.37	0.93	
Edge 1 at 10mm		0.208			0.21	0.21	0.00	
Bottom Face at 0mm	1.134	1.191	0.253	0.020	<b>2.60</b>	1.46	1.41	#1
Edge 1 at 0mm	0.328	0.670	0.083		1.08	0.75	0.41	
Edge 2 at 0mm		0.488			0.49	0.49	0.00	
Edge 3 at 0mm					0.00	0.00	0.00	
Edge 4 at 0mm	0.107		0.028		0.14	0.03	0.14	

WWAN Band	Exposure Position	1	3	4	6	7	9	10	1+3+4+10	1+6+7+9+10	1+3+10	1+6+10	1+9+10	1+6+9+10	Case No
		WWAN Ant 0	WLAN2.4GHz Ant 1	WLAN2.4GHz Ant 1	WLAN5GHz Ant 0	WLAN5GHz Ant 1	Bluetooth Ant 0	NFC	Summed	Summed	Summed	Summed	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
GSM850 Ant 1	Bottom Face at 9mm	0.107	0.892	0.366	0.817	0.262	0.110		1.37	1.30	1.00	0.92	0.22	1.03	
	Edge 1 at 10mm	0.097		0.100		0.208			0.20	0.31	0.10	0.10	0.10	0.10	
	Bottom Face at 0mm	0.678	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.44</b>	<b>2.70</b>	1.29	1.26	0.95	1.51	#2, #11
	Edge 1 at 0mm	0.449	0.151	0.493	0.328	0.670	0.083		1.09	1.53	0.60	0.78	0.53	0.86	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.200	0.070		0.107		0.028		0.27	0.34	0.27	0.31	0.23	0.34	
WCDMA V Ant 1	Bottom Face at 9mm	0.069	0.892	0.366	0.817	0.262	0.110		1.33	1.26	0.96	0.89	0.18	1.00	
	Edge 1 at 10mm	0.314		0.100		0.208			0.41	0.52	0.31	0.31	0.31	0.31	
	Bottom Face at 0mm	0.698	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.46</b>	<b>2.72</b>	1.31	1.28	0.97	1.53	#3, #12
	Edge 1 at 0mm	0.443	0.151	0.493	0.328	0.670	0.083		1.09	1.52	0.59	0.77	0.53	0.85	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.129	0.070		0.107		0.028		0.20	0.26	0.20	0.24	0.16	0.26	
LTE Band 26 Ant 1	Bottom Face at 9mm	0.193	0.892	0.366	0.817	0.262	0.110		1.45	1.38	1.09	1.01	0.30	1.12	
	Edge 1 at 10mm	0.189		0.100		0.208			0.29	0.40	0.19	0.19	0.19	0.19	
	Bottom Face at 0mm	0.748	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.51</b>	<b>2.77</b>	1.36	1.33	1.02	1.58	#4, #13
	Edge 1 at 0mm	0.390	0.151	0.493	0.328	0.670	0.083		1.03	1.47	0.54	0.72	0.47	0.80	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.095	0.070		0.107		0.028		0.17	0.23	0.17	0.20	0.12	0.23	
LTE Band 4 Ant 1	Bottom Face at 9mm	0.253	0.892	0.366	0.817	0.262	0.110		<b>1.51</b>	1.44	1.15	1.07	0.36	1.18	
	Edge 1 at 10mm	0.162		0.100		0.208			0.26	0.37	0.16	0.16	0.16	0.16	
	Bottom Face at 0mm	0.705	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.46</b>	<b>2.73</b>	1.32	1.28	0.98	1.54	#5, #14
	Edge 1 at 0mm	0.471	0.151	0.493	0.328	0.670	0.083		1.12	1.55	0.62	0.80	0.55	0.88	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.289	0.070		0.107		0.028		0.36	0.42	0.36	0.40	0.32	0.42	
GSM1900 Ant 1	Bottom Face at 9mm	0.119	0.892	0.366	0.817	0.262	0.110		1.38	1.31	1.01	0.94	0.23	1.05	
	Edge 1 at 10mm	0.097		0.100		0.208			0.20	0.31	0.10	0.10	0.10	0.10	
	Bottom Face at 0mm	0.651	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.41</b>	<b>2.67</b>	1.26	1.23	0.92	1.48	#6, #15
	Edge 1 at 0mm	0.354	0.151	0.493	0.328	0.670	0.083		1.00	1.44	0.51	0.68	0.44	0.77	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.343	0.070		0.107		0.028		0.41	0.48	0.41	0.45	0.37	0.48	
WCDMA II Ant 1	Bottom Face at 9mm	0.195	0.892	0.366	0.817	0.262	0.110		1.45	1.38	1.09	1.01	0.31	1.12	
	Edge 1 at 10mm	0.134		0.100		0.208			0.23	0.34	0.13	0.13	0.13	0.13	
	Bottom Face at 0mm	0.703	0.591	1.147	0.559	1.191	0.253	0.020	<b>2.46</b>	<b>2.73</b>	1.31	1.28	0.98	1.54	#7, #16

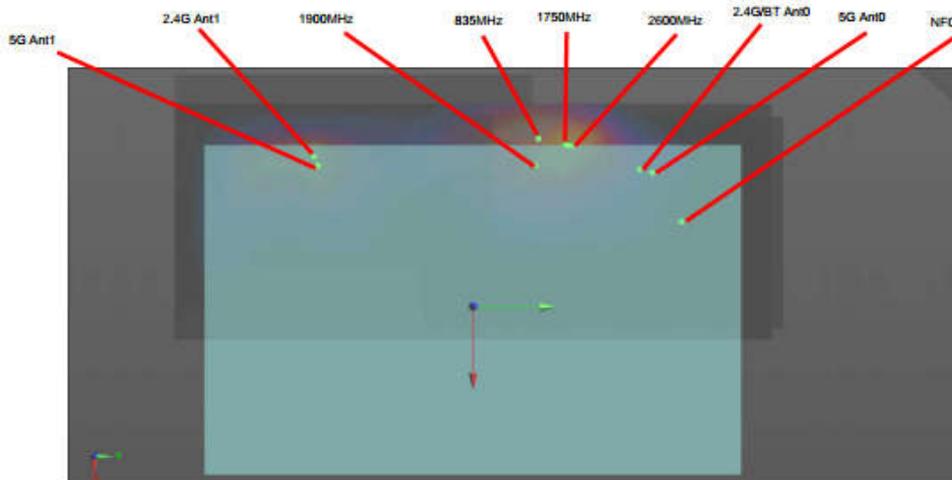


	Edge 1 at 0mm	0.422	0.151	0.493	0.328	0.670	0.083		1.07	1.50	0.57	0.75	0.51	0.83	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.444	0.070		0.107		0.028		0.51	0.58	0.51	0.55	0.47	0.58	
LTE Band 2 Ant 1	Bottom Face at 9mm	0.032	0.892	0.366	0.817	0.262	0.110		1.29	1.22	0.92	0.85	0.14	0.96	
	Edge 1 at 10mm	0.195		0.100		0.208			0.30	0.40	0.20	0.20	0.20	0.20	
	Bottom Face at 0mm	0.708	0.591	1.147	0.559	1.191	0.253	0.020	2.47	2.73	1.32	1.29	0.98	1.54	#8, #17
	Edge 1 at 0mm	0.337	0.151	0.493	0.328	0.670	0.083		0.98	1.42	0.49	0.67	0.42	0.75	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.463	0.070		0.107		0.028		0.53	0.60	0.53	0.57	0.49	0.60	
LTE Band 7 Ant 1	Bottom Face at 9mm	0.128	0.892	0.366	0.817	0.262	0.110		1.39	1.32	1.02	0.95	0.24	1.06	
	Edge 1 at 10mm	0.088		0.100		0.208			0.19	0.30	0.09	0.09	0.09	0.09	
	Bottom Face at 0mm	0.620	0.591	1.147	0.559	1.191	0.253	0.020	2.38	2.64	1.23	1.20	0.89	1.45	#9, #18
	Edge 1 at 0mm	0.435	0.151	0.493	0.328	0.670	0.083		1.08	1.52	0.59	0.76	0.52	0.85	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.351	0.070		0.107		0.028		0.42	0.49	0.42	0.46	0.38	0.49	
LTE Band 41 Ant 1	Bottom Face at 9mm	0.110	0.892	0.366	0.817	0.262	0.110		1.37	1.30	1.00	0.93	0.22	1.04	
	Edge 1 at 10mm	0.116		0.100		0.208			0.22	0.32	0.12	0.12	0.12	0.12	
	Bottom Face at 0mm	0.746	0.591	1.147	0.559	1.191	0.253	0.020	2.50	2.77	1.36	1.33	1.02	1.58	#10, #19
	Edge 1 at 0mm	0.511	0.151	0.493	0.328	0.670	0.083		1.16	1.59	0.66	0.84	0.59	0.92	
	Edge 2 at 0mm			0.123		0.488			0.12	0.49	0.00	0.00	0.00	0.00	
	Edge 3 at 0mm								0.00	0.00	0.00	0.00	0.00	0.00	
	Edge 4 at 0mm	0.355	0.070		0.107		0.028		0.43	0.49	0.43	0.46	0.38	0.49	

**16.2 SPLSR Evaluation and Analysis**

**General Note:**

1. When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where  $(x1, y1, z1)$  and  $(x2, y2, z2)$  are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2.  $SPLSR = (SAR1 + SAR2)1.5 / (\text{min. separation distance, mm})$ . If  $SPLSR \leq 0.04$  for 1g SAR, simultaneously transmission SAR measurement is not necessary.
3. Per April 2022 TCB Workshop Notes, WWAN band antenna 3 was summed algebraically with the BT/WIFI Antenna 0 and NFC Antenna separately for the purposes of hybrid SPLSR combination and they are located at the side of the device.
4. Per April 2022 TCB Workshop, instead of doing a small volume scan over a co-located antenna pair, used summing the SAR values of the co-located pair and using that value in SPLSR calculation. In the calculation used the minimum distance between the spatially separated antenna and the closest antenna of the co-located antenna pair to be conservative.



**5G WLAN + Bluetooth + NFC/ WWAN+2.4GHz WLAN+NFC/  
WWAN + 5G WLAN + Bluetooth + NFC\_Bottom Face**

**<5G WLAN + Bluetooth + NFC >**

Case #1	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
						X	Y	Z				
	WLAN5GHz Ant 0	Bottom Face	1.134	1.407	0	-0.065	0.092	-0.179	171.6	2.60	0.02	Not required
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1	Bottom Face	1.191	1.191	0	-0.079	-0.079	-0.178	171.6	2.60	0.02	Not required
	WLAN5GHz Ant 0		1.134		0							
	Bluetooth Ant 0		0.253		0	-0.06	0.0915	-0.179				
	NFC	0.02	0									
	WLAN5GHz Ant 1	Bottom Face	1.191	1.191	0	-0.079	-0.079	-0.178	187.1	2.60	0.02	Not required
	WLAN5GHz Ant 0		1.134		0							
Bluetooth Ant 0	0.253		0									
NFC	0.02	0	-0.045	0.105	-0.179							
WLAN5GHz Ant 1	Bottom Face	1.191	1.191	0	-0.079	-0.079	-0.178	187.1	2.60	0.02	Not required	



<WWAN+2.4GHz WLAN+NFC>

	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
						X	Y	Z				
Case #2	GSM850	Bottom Face	0.678	1.289	0	-0.087	0.033	-0.178	111.8	2.44	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	GSM850	Bottom Face	0.678	1.289	0				162.0	2.44	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	GSM850	Bottom Face	0.678	1.289	0				185.2	2.44	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
Case #3	WCDMA V	Bottom Face	0.698	1.309	0	-0.0795	0.045	-0.179	123.1	2.46	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	WCDMA V	Bottom Face	0.698	1.309	0				162.0	2.46	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	WCDMA V	Bottom Face	0.698	1.309	0				185.2	2.46	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
Case #4	LTE Band 26	Bottom Face	0.748	1.359	0	-0.0915	0.036	-0.178	115.4	2.51	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	LTE Band 26	Bottom Face	0.748	1.359	0				162.0	2.51	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	LTE Band 26	Bottom Face	0.748	1.359	0				185.2	2.51	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
Case #5	LTE Band 4	Bottom Face	0.705	1.316	0	-0.084	0.0465	-0.179	124.9	2.46	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	LTE Band 4	Bottom Face	0.705	1.316	0				162.0	2.46	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
LTE Band 4	Bottom		0.705	1.316	0				185.2	2.46	0.02	Not required



Case	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
						X	Y	Z				
	WLAN2.4GHz Ant 0	Face	0.591		0							
	NFC		0.02		0	-0.045	0.105	-0.179				
	WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179				
Case #6	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	GSM1900	Bottom Face	0.651	1.262	0	-0.0735	0.0315	-0.179	109.5	2.41	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		1.147	0	-0.0735	-0.078				
	GSM1900	Bottom Face	0.651	1.262	0				162.0	2.41	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1	Bottom Face	1.147	1.262	0	-0.0735	-0.078	-0.179	185.2	2.41	0.02	Not required
	GSM1900		0.651		0							
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179					
Case #7	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II	Bottom Face	0.703	1.314	0	-0.0765	0.022	-0.179	100.0	2.46	0.04	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		1.147	0	-0.0735	-0.078				
	WCDMA II	Bottom Face	0.703	1.314	0				162.0	2.46	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1	Bottom Face	1.147	1.314	0	-0.0735	-0.078	-0.179	185.2	2.46	0.02	Not required
	WCDMA II		0.703		0							
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179					
Case #8	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 2	Bottom Face	0.709	1.32	0	-0.075	0.0235	-0.179	101.5	2.47	0.04	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		1.147	0	-0.0735	-0.078				
	LTE Band 2	Bottom Face	0.709	1.32	0				162.0	2.47	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1	Bottom Face	1.147	1.32	0	-0.0735	-0.078	-0.179	185.2	2.47	0.02	Not required
	LTE Band 2		0.709		0							
	WLAN2.4GHz Ant 0		0.591		0	-0.045	0.105	-0.179				
	NFC		0.02		0							
WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179					
Case #9	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7	Bottom Face	0.62	1.231	0	-0.0836	0.0542	-0.179	132.6	2.38	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		1.147	0	-0.0735	-0.078				
	LTE Band 7	Bottom Face	0.62	1.231	0				162.0	2.38	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
NFC	0.02		0									



Case #	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z					
	WLAN2.4GHz Ant 1	Bottom Face	1.147	1.147	0	-0.0735	-0.078	-0.179	185.2	2.38	0.02	Not required
	LTE Band 7		0.62	1.231	0							
	WLAN2.4GHz Ant 0		0.591	0								
	NFC		0.02	0	-0.045	0.105	-0.179					
	WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179				
Case #10	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41	Bottom Face	0.746	1.357	0	-0.0836	0.059	-0.179	137.4	2.50	0.03	Not required
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0							
	WLAN2.4GHz Ant 1		1.147		0	-0.0735	-0.078	-0.179				
	LTE Band 41	Bottom Face	0.746	1.357	0				162.0	2.50	0.02	Not required
	WLAN2.4GHz Ant 0		0.591		0	-0.0716	0.084	-0.179				
	NFC		0.02		0							
	WLAN2.4GHz Ant 1	Bottom Face	1.147	1.357	0	-0.0735	-0.078	-0.179	185.2	2.50	0.02	Not required
	LTE Band 41		0.746		0							
	WLAN2.4GHz Ant 0		0.591		0							
	NFC		0.02		0	-0.045	0.105	-0.179				
	WLAN2.4GHz Ant 1		1.147	1.147	0	-0.0735	-0.078	-0.179				

<WWAN + 5G WLAN + Bluetooth + NFC>

Case #	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z					
Case 11	GSM850	Bottom Face	0.678	1.51	0	-0.087	0.033	-0.178	112.3	2.70	0.04	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178				
	GSM850	Bottom Face	0.678	1.51	0	-0.065	0.092	-0.179	171.6	2.70	0.03	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178				
	GSM850	Bottom Face	0.678	1.51	0				171.6	2.70	0.03	Not required
	WLAN5GHz Ant 0		0.559		0	-0.06	0.0915	-0.179				
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178				
	GSM850	Bottom Face	0.678	1.51	0				187.1	2.70	0.02	Not required
WLAN5GHz Ant 0	0.559		0									
Bluetooth Ant 0	0.253		0		-0.045	0.105	-0.179					
NFC	0.02		0									
WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178					
Case 12	Band	Position	SAR (W/kg)	Summed 1g SAR	Gap (mm)	X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA V	Bottom Face	0.698	1.53	0	-0.0795	0.045	-0.179	124.0	2.72	0.04	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178				
	WCDMA V	Bottom Face	0.698	1.53	0	-0.065	0.092	-0.179	171.6	2.72	0.03	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178					
WCDMA V	Bottom	0.698	1.53	0				171.6	2.72	0.03	Not required	



	WLAN5GHz Ant 0	Face	0.559	1.191	0	-0.079	-0.079	-0.178	187.1	2.72	0.02	Not required			
	Bluetooth Ant 0		0.253		0								-0.06	0.0915	-0.179
	NFC		0.02		0										
	WLAN5GHz Ant 1	Bottom Face	0.698	1.53	0	-0.045	0.105	-0.179							
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC		0.02		0										
	WLAN5GHz Ant 1		1.191		0								-0.079	-0.079	-0.178
	WCDMA V		1.191		0										
Case 13	<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>			
	LTE Band 26	Bottom Face	0.748	1.58	0	-0.0915	0.036	-0.178	115.7	2.77	0.04	Not required			
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC		0.02		0										
	WLAN5GHz Ant 1	Bottom Face	1.191	1.58	0	-0.065	0.092	-0.179	171.6	2.77	0.03	Not required			
	LTE Band 26		0.748		0										
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC	0.02	0												
	WLAN5GHz Ant 1	Bottom Face	1.191	1.58	0	-0.079	-0.079	-0.178	171.6	2.77	0.03	Not required			
	LTE Band 26		0.748		0										
	WLAN5GHz Ant 0		0.559		0	-0.06	0.0915	-0.179							
	Bluetooth Ant 0		0.253		0										
	NFC	0.02	0												
	WLAN5GHz Ant 1	Bottom Face	1.191	1.58	0	-0.045	0.105	-0.179	187.1	2.77	0.02	Not required			
	LTE Band 26		0.748		0										
	WLAN5GHz Ant 0		0.559		0										
Bluetooth Ant 0	0.253		0												
NFC	0.02	0													
WLAN5GHz Ant 1	1.191	0	-0.079	-0.079	-0.178										
Case 14	<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>			
	LTE Band 4	Bottom Face	0.705	1.537	0	-0.084	0.0465	-0.179	125.6	2.73	0.04	Not required			
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC		0.02		0										
	WLAN5GHz Ant 1	Bottom Face	1.191	1.537	0	-0.065	0.092	-0.179	171.6	2.73	0.03	Not required			
	LTE Band 4		0.705		0										
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC	0.02	0												
	WLAN5GHz Ant 1	Bottom Face	1.191	1.537	0	-0.079	-0.079	-0.178	171.6	2.73	0.03	Not required			
	LTE Band 4		0.705		0										
	WLAN5GHz Ant 0		0.559		0										
	Bluetooth Ant 0		0.253		0										
	NFC	0.02	0												
	WLAN5GHz Ant 1	Bottom Face	1.191	1.537	0	-0.045	0.105	-0.179	187.1	2.73	0.02	Not required			
	LTE Band 4		0.705		0										
	WLAN5GHz Ant 0		0.559		0										
Bluetooth Ant 0	0.253		0												
NFC	0.02	0													
WLAN5GHz Ant 1	1.191	0	-0.079	-0.079	-0.178										
Case 15	<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>			
	GSM1900	Bottom	0.651	1.483	0	-0.0735	0.0315	-0.179	110.6	2.67	0.04	Not required			



	WLAN5GHz Ant 0	Face	0.559	1.191	0				171.6	2.67	0.03	Not required
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178				
	GSM1900	Bottom Face	0.651	1.483	0				171.6	2.67	0.03	Not required
	WLAN5GHz Ant 0		0.559		0	-0.065	0.092	-0.179				
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1	Bottom Face	1.191	1.483	0				171.6	2.67	0.03	Not required
	GSM1900		0.651		0							
	WLAN5GHz Ant 0		0.559		0	-0.06	0.0915	-0.179				
	Bluetooth Ant 0		0.253		0							
	NFC	Bottom Face	0.02	1.483	0				187.1	2.67	0.02	Not required
	WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178				
	GSM1900		0.651		0							
	WLAN5GHz Ant 0		0.559		0							
Bluetooth Ant 0	Bottom Face	0.253	1.483	0				187.1	2.67	0.02	Not required	
NFC		0.02		0	-0.045	0.105	-0.179					
WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178					
GSM1900		0.651		0								
Case 16	<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>
	WCDMA II	Bottom Face	0.703	1.535	0	-0.0765	0.022	-0.179	101.0	2.73	0.04	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1	Bottom Face	1.191	1.535	0	-0.079	-0.079	-0.178	171.6	2.73	0.03	Not required
	WCDMA II		0.703		0							
	WLAN5GHz Ant 0		0.559		0	-0.065	0.092	-0.179				
	Bluetooth Ant 0		0.253		0							
	NFC	Bottom Face	0.02	1.535	0				171.6	2.73	0.03	Not required
	WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178				
	WCDMA II		0.703		0							
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0	Bottom Face	0.253	1.535	0				187.1	2.73	0.02	Not required
	NFC		0.02		0	-0.045	0.105	-0.179				
	WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178				
WCDMA II	0.703		0									
WLAN5GHz Ant 0	Bottom Face	0.559	1.535	0				187.1	2.73	0.02	Not required	
Bluetooth Ant 0		0.253		0								
NFC		0.02		0	-0.045	0.105	-0.179					
WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178					
Case 17	<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>
	LTE Band 2	Bottom Face	0.709	1.541	0	-0.075	0.0235	-0.179	102.6	2.73	0.04	Not required
	WLAN5GHz Ant 0		0.559		0							
	Bluetooth Ant 0		0.253		0							
	NFC		0.02		0							
	WLAN5GHz Ant 1	Bottom Face	1.191	1.541	0	-0.079	-0.079	-0.178	171.6	2.73	0.03	Not required
	LTE Band 2		0.709		0							
	WLAN5GHz Ant 0		0.559		0	-0.065	0.092	-0.179				
	Bluetooth Ant 0		0.253		0							
	NFC	Bottom Face	0.02	1.541	0				171.6	2.73	0.03	Not required
	WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178				
	LTE Band 2		0.709		0							
WLAN5GHz Ant 0	0.559		0									
Bluetooth Ant 0	Bottom Face	0.253	1.541	0				171.6	2.73	0.03	Not required	
NFC		0.02		0								
WLAN5GHz Ant 1		1.191		0	-0.079	-0.079	-0.178					
LTE Band 2	Bottom Face	0.709	1.541	0				171.6	2.73	0.03	Not required	
WLAN5GHz Ant 0		0.559		0								
Bluetooth Ant 0		0.253		0	-0.06	0.0915	-0.179					

	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191	1.191	0	-0.079	-0.079	-0.178					
	LTE Band 2	Bottom Face	0.709	1.541	0				187.1	2.73	0.02	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0	-0.045	0.105	-0.179					
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
<b>Case 18</b>		<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>
	LTE Band 7	Bottom Face	0.62	1.452	0	-0.0836	0.0542	-0.179	133.3	2.64	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 7	Bottom Face	0.62	1.452	0	-0.065	0.092	-0.179	171.6	2.64	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 7	Bottom Face	0.62	1.452	0	-0.06	0.0915	-0.179	171.6	2.64	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 7	Bottom Face	0.62	1.452	0	-0.045	0.105	-0.179	187.1	2.64	0.02	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
<b>Case 19</b>		<b>Band</b>	<b>Position</b>	<b>SAR (W/kg)</b>	<b>Summed 1g SAR</b>	<b>Gap (mm)</b>	<b>SAR peak location (m)</b>			<b>3D distance (mm)</b>	<b>Summed SAR (W/kg)</b>	<b>SPLSR Results</b>	<b>Simultaneous SAR</b>
	LTE Band 41	Bottom Face	0.746	1.578	0	-0.0836	0.059	-0.179	138.1	2.77	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 41	Bottom Face	0.746	1.578	0	-0.065	0.092	-0.179	171.6	2.77	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 41	Bottom Face	0.746	1.578	0	-0.06	0.0915	-0.179	171.6	2.77	0.03	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178
	LTE Band 41	Bottom Face	0.746	1.578	0	-0.045	0.105	-0.179	187.1	2.77	0.02	Not required	
	WLAN5GHz Ant 0		0.559		0								
	Bluetooth Ant 0		0.253		0								
	NFC		0.02		0								
	WLAN5GHz Ant 1		1.191		1.191	0	-0.079	-0.079					-0.178

**Test Engineer :** Hank Huang, Kevin Xu, David Dai, Bin He



## **17. Uncertainty Assessment**

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be  $\leq 30\%$ , for a confidence interval of  $k = 2$ . If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.



## **18. References**

- [1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”
- [2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992
- [3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.
- [6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015
- [7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.
- [8] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015
- [9] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015
- [10] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015
- [11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [12] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.
- [13] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

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