

# FCC SAR Test Report

APPLICANT : Sonim Technologies, Inc.  
EQUIPMENT : LTE Phone  
BRAND NAME : Sonim  
MODEL NAME : XP5800(PG2112)  
FCC ID : WYPPG2132  
STANDARD : FCC 47 CFR Part 2 (2.1093)  
ANSI/IEEE C95.1-1992  
IEEE 1528-2013

We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures and had 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 (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: Mark Qu / Manager



**Sporton International (Kunshan) Inc.**  
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## Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA792101-07	Rev. 01	Initial issue of report	Dec. 19, 2017

## 1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Sonim Technologies, Inc., LTE Phone, XP5800(PG2112)**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-Worn (Separation 15mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.72	0.74	0.57	1.54
		GSM1900	0.47	1.17	0.63	
	WCDMA	Band V	0.75	0.71	0.56	
		Band IV	0.85	1.15	1.17	
		Band II	0.82	1.11	1.05	
	LTE	Band 12	0.39	0.61	0.48	
		Band 13	0.57	0.47	0.35	
		Band 14	0.59	0.61	0.41	
		Band 26/Band 5	0.81	0.74	0.59	
		Band 66/Band 4	0.43	1.20	0.71	
		Band 25/Band 2	0.83	1.18	1.20	
		Band 30	0.52	0.79	0.45	
		Band 7	0.51	1.13	0.51	
		Band 41/Band 38	0.29	0.64	0.33	
DTS	WLAN	2.4GHz WLAN	0.54	0.18	0.10	1.38
NII		5GHz WLAN	0.96	0.91	0.52	1.54
DSS	Bluetooth	2.4GHz Bluetooth		<0.10	<0.10	1.23
Date of Testing:			2017/9/26~2017/11/30			
<b>Remark:</b> This device supports LTE B2 / B4 / B5 / B38 and B25 / B66 / B26 / B41. Since the supported frequency span for LTE B2 / B4 / B5 / B38 falls completely within the supports frequency span for B25 / B66 / 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 B25 / B66 / B26 / B41.						

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg as averaged over any 1 gram of tissue) 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

Testing Laboratory	
Test Site	Sporton International (Kunshan) Inc.
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958

Applicant	
Company Name	Sonim Technologies, Inc.
Address	1825 S. Grant St., Suite 200., San Mateo, CA, 94402

Manufacturer	
Company Name	Sonim Technologies (Shenzhen) Limited
Address	2nd Floor, No. 2 Building Phase B, Daqian Industrial park, Longchang Road, 67 District, Baoan, Shenzhen, P. R. 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 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- 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 D06 Hotspot Mode SAR v02r01

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

### **4.1 General Information**

Product Feature & Specification	
Equipment Name	LTE Phone
Brand Name	Sonim
Model Name	XP5800(PG2112)
FCC ID	WYPPG2132
IMEI Code	SIM1: 001080001911412 SIM2: 001080001911420
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 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 ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) CDMA2000: 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.2 LE
HW Version	A
SW Version	5SA.0.0-00-7.1.2-10.36.01
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
<b>Remark:</b> <ol style="list-style-type: none"> <li>This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.</li> <li>This device WLAN 2.4GHz supports hotspot operation and Bluetooth support tethering applications.</li> <li>This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).</li> <li>This device does not support DTM operation and supports GRPS/EGRPS mode up to multi-slot class 12.</li> <li>The device has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.</li> </ol>	



6. For WWAN transmitter  
Hotspot exposure condition:  
When hotspot mode is enabled, power reduction will be activated to limit the maximum power of WCDMA B2 / B4 and LTE B2 / B4 / B25 / B66.
7. For WLAN transmitter  
Head exposure conditions:  
While the device is in talking mode and receiver worked, then power reduction will be implemented immediately at WLAN5.5GHz and WLAN5.8GHz.
8. This is a variant report for XP5800(PG2112). The difference between the previous and current is enabled WLAN 5GHz 802.11ac function. Based on the similarity between two models, only the conducted power of WLAN 5GHz 802.11ac from original report (Sporton Report Number FA792101-01) were verified and found it didn't affect the SAR test, so the original SAR value can represent this application.

## 5. Conducted RF Output Power (Unit: dBm)

### <5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11ac VHT20 MCS0	36	5180	15.01	15.50	83.33
		40	5200	14.95	15.50	
		44	5220	15.22	15.50	
		48	5240	14.91	15.50	
	802.11ac VHT40 MCS0	38	5190	12.74	13.50	70.92
		46	5230	13.05	13.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11ac VHT20 MCS0	52	5260	15.23	15.50	83.33
		56	5280	15.24	15.50	
		60	5300	15.21	15.50	
		64	5320	14.73	15.50	
	802.11ac VHT40 MCS0	54	5270	13.14	13.50	70.92
		62	5310	12.91	13.50	



5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11ac VHT20 MCS0	100	5500	14.52	15.50	83.33
		108	5540	15.13	15.50	
		116	5580	14.67	15.50	
		120	5600	14.74	15.50	
		124	5620	14.91	15.50	
		128	5640	14.62	15.50	
		132	5660	14.37	15.50	
		136	5680	14.41	15.50	
		140	5700	14.72	15.50	
		144	5720	13.91	15.50	
	802.11ac VHT40 MCS0	102	5510	12.81	13.50	70.92
		110	5550	13.03	13.50	
		126	5630	12.90	13.50	
		134	5670	12.67	13.50	
		142	5710	12.75	13.50	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11ac VHT20 MCS0	149	5745	13.94	15.50	83.33
		157	5785	14.98	15.50	
		165	5825	14.32	15.50	
	802.11ac VHT40 MCS0	151	5755	12.56	14.50	70.92
		159	5795	12.94	14.50	

**<Reduced Power Mode for Receiver On>**

**<5GHz WLAN>**

5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11ac VHT20 MCS0	100	5500	14.00	14.50	83.33
		108	5540	14.42	14.50	
		116	5580	14.12	14.50	
		120	5600	14.20	14.50	
		124	5620	14.38	14.50	
		128	5640	14.00	14.50	
		132	5660	13.81	14.50	
		136	5680	13.88	14.50	
		140	5700	14.17	14.50	
		144	5720	13.38	14.50	
	802.11ac VHT40 MCS0	102	5510	12.21	12.50	70.92
		110	5550	12.36	12.50	
		126	5630	12.27	12.50	
		134	5670	11.74	12.50	
		142	5710	11.85	12.50	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11ac VHT20 MCS0	149	5745	13.41	14.50	83.33
		157	5785	14.22	14.50	
		165	5825	13.77	14.50	
	802.11ac VHT40 MCS0	151	5755	12.02	12.50	70.92
		159	5795	12.31	12.50	

## 6. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
5.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes		
6.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
7.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
8.	LTE + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
9.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes		
10.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
11.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
12.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
13.	GSM Voice + Bluetooth		Yes		
14.	GPRS/EDGE + Bluetooth		Yes	Yes	BT Tethering
15.	WCDMA + Bluetooth		Yes	Yes	BT Tethering
16.	LTE + Bluetooth		Yes	Yes	BT Tethering

### General Note:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. This device WLAN 2.4GHz supports hotspot operation and Bluetooth support tethering applications.
4. This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
5. 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.
6. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
7. According to the EUT character, WLAN 5GHz and Bluetooth can't transmit simultaneously.
8. Chose the worst zoom scan SAR of WLAN correspondingly for co-located with WWAN analysis.
9. For simultaneous transmission analysis for exposure position of back with headset 15mm, Bluetooth/WLAN SAR tested at back position 15mm separation is worse and the test data is used for conservative SAR summation.
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) Scalar SAR summation < 1.6W/kg.
  - ii)  $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$ , 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  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.
  - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
  - v) The SPLSR calculated results please refer to section 6.4.

### 6.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3		
			WWAN	2.4GHz WLAN	5GHz WLAN		Summed 1g SAR (W/kg)	SPLSR	Case No
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)				
GSM	GSM850	Right Cheek	0.545	0.233	0.604	0.78	1.15		
		Right Tilted	0.345	0.544	0.615	0.89	0.96		
		Left Cheek	0.719	0.544	0.955	1.26	1.67	0.04	#1
		Left Tilted	0.319	0.544	0.568	0.86	0.89		
	GSM1900	Right Cheek	0.473	0.233	0.604	0.71	1.08		
		Right Tilted	0.159	0.544	0.615	0.70	0.77		
		Left Cheek	0.310	0.544	0.955	0.85	1.27		
		Left Tilted	0.133	0.544	0.568	0.68	0.70		
WCDMA	Band V	Right Cheek	0.711	0.233	0.604	0.94	1.32		
		Right Tilted	0.419	0.544	0.615	0.96	1.03		
		Left Cheek	0.750	0.544	0.955	1.29	1.71	0.04	#2
		Left Tilted	0.393	0.544	0.568	0.94	0.96		
	Band IV	Right Cheek	0.854	0.233	0.604	1.09	1.46		
		Right Tilted	0.188	0.544	0.615	0.73	0.80		
		Left Cheek	0.446	0.544	0.955	0.99	1.40		
		Left Tilted	0.106	0.544	0.568	0.65	0.67		
	Band II	Right Cheek	0.818	0.233	0.604	1.05	1.42		
		Right Tilted	0.281	0.544	0.615	0.83	0.90		
		Left Cheek	0.516	0.544	0.955	1.06	1.47		
		Left Tilted	0.226	0.544	0.568	0.77	0.79		

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3		
			WWAN	2.4GHz WLAN	5GHz WLAN		Summed 1g SAR (W/kg)	SPLSR	Case No
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)				
LTE	Band 12	Right Cheek	0.376	0.233	0.604	0.61	0.98		
		Right Tilted	0.242	0.544	0.615	0.79	0.86		
		Left Cheek	0.392	0.544	0.955	0.94	1.35		
		Left Tilted	0.247	0.544	0.568	0.79	0.82		
	Band 13	Right Cheek	0.471	0.233	0.604	0.70	1.08		
		Right Tilted	0.293	0.544	0.615	0.84	0.91		
		Left Cheek	0.567	0.544	0.955	1.11	1.52		
		Left Tilted	0.281	0.544	0.568	0.83	0.85		
	Band 14	Right Cheek	0.560	0.233	0.604	0.79	1.16		
		Right Tilted	0.291	0.544	0.615	0.84	0.91		
		Left Cheek	0.587	0.544	0.955	1.13	1.54		
		Left Tilted	0.291	0.544	0.568	0.84	0.86		
	Band 26	Right Cheek	0.780	0.233	0.604	1.01	1.38		
		Right Tilted	0.460	0.544	0.615	1.00	1.08		
		Left Cheek	0.813	0.544	0.955	1.36	1.77	0.04	#3
		Left Tilted	0.437	0.544	0.568	0.98	1.01		
	Band 66	Right Cheek	0.433	0.233	0.604	0.67	1.04		
		Right Tilted	0.074	0.544	0.615	0.62	0.69		
		Left Cheek	0.239	0.544	0.955	0.78	1.19		
		Left Tilted	0.049	0.544	0.568	0.59	0.62		
	Band 25	Right Cheek	0.832	0.233	0.604	1.07	1.44		
		Right Tilted	0.292	0.544	0.615	0.84	0.91		
		Left Cheek	0.506	0.544	0.955	1.05	1.46		
		Left Tilted	0.253	0.544	0.568	0.80	0.82		
	Band 30	Right Cheek	0.524	0.233	0.604	0.76	1.13		
		Right Tilted	0.273	0.544	0.615	0.82	0.89		
		Left Cheek	0.323	0.544	0.955	0.87	1.28		
		Left Tilted	0.152	0.544	0.568	0.70	0.72		
	Band 7	Right Cheek	0.470	0.233	0.604	0.70	1.07		
		Right Tilted	0.444	0.544	0.615	0.99	1.06		
		Left Cheek	0.513	0.544	0.955	1.06	1.47		
		Left Tilted	0.214	0.544	0.568	0.76	0.78		
	Band 41	Right Cheek	0.293	0.233	0.604	0.53	0.90		
		Right Tilted	0.128	0.544	0.615	0.67	0.74		
		Left Cheek	0.144	0.544	0.955	0.69	1.10		
		Left Tilted	0.070	0.544	0.568	0.61	0.64		

## 6.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2	1+3	1+4
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.599	0.179	0.531	0.017	0.78	1.13	0.62
		Back	0.735	0.179	0.167	0.032	0.91	0.90	0.77
		Left Side	0.441				0.44	0.44	0.44
		Right Side	0.404	0.179	0.910	0.023	0.58	1.31	0.43
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.172				0.17	0.17	0.17
	GSM1900	Front	0.334	0.179	0.531	0.017	0.51	0.87	0.35
		Back	1.165	0.179	0.167	0.032	1.34	1.33	1.20
		Left Side	0.062				0.06	0.06	0.06
		Right Side	0.180	0.179	0.910	0.023	0.36	1.09	0.20
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.558				0.56	0.56	0.56
WCDMA	Band V	Front	0.708	0.179	0.531	0.017	0.89	1.24	0.73
		Back	0.685	0.179	0.167	0.032	0.86	0.85	0.72
		Left Side	0.407				0.41	0.41	0.41
		Right Side	0.461	0.179	0.910	0.023	0.64	1.37	0.48
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.186				0.19	0.19	0.19
	Band IV	Front	0.223	0.179	0.531	0.017	0.40	0.75	0.24
		Back	1.145	0.179	0.167	0.032	1.32	1.31	1.18
		Left Side	0.029				0.03	0.03	0.03
		Right Side	0.179	0.179	0.910	0.023	0.36	1.09	0.20
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.516				0.52	0.52	0.52
	Band II	Front	0.272	0.179	0.531	0.017	0.45	0.80	0.29
		Back	1.105	0.179	0.167	0.032	1.28	1.27	1.14
		Left Side	0.054				0.05	0.05	0.05
		Right Side	0.189	0.179	0.910	0.023	0.37	1.10	0.21
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.584				0.58	0.58	0.58



WWAN Band		Exposure Position	1	2	3	4	1+2	1+3	1+4
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 12	Front	0.461	0.179	0.531	0.017	0.64	0.99	0.48
		Back	0.612	0.179	0.167	0.032	0.79	0.78	0.64
		Left Side	0.376				0.38	0.38	0.38
		Right Side	0.330	0.179	0.910	0.023	0.51	1.24	0.35
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.093				0.09	0.09	0.09
	Band 13	Front	0.474	0.179	0.531	0.017	0.65	1.01	0.49
		Back	0.391	0.179	0.167	0.032	0.57	0.56	0.42
		Left Side	0.229				0.23	0.23	0.23
		Right Side	0.217	0.179	0.910	0.023	0.40	1.13	0.24
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.113				0.11	0.11	0.11
	Band 14	Front	0.563	0.179	0.531	0.017	0.74	1.09	0.58
		Back	0.608	0.179	0.167	0.032	0.79	0.78	0.64
		Left Side	0.236				0.24	0.24	0.24
		Right Side	0.357	0.179	0.910	0.023	0.54	1.27	0.38
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.123				0.12	0.12	0.12
	Band 26	Front	0.740	0.179	0.531	0.017	0.92	1.27	0.76
		Back	0.690	0.179	0.167	0.032	0.87	0.86	0.72
		Left Side	0.467				0.47	0.47	0.47
		Right Side	0.426	0.179	0.910	0.023	0.61	1.34	0.45
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.190				0.19	0.19	0.19
	Band 66	Front	0.223	0.179	0.531	0.017	0.40	0.75	0.24
		Back	1.197	0.179	0.167	0.032	1.38	1.36	1.23
		Left Side	0.036				0.04	0.04	0.04
		Right Side	0.218	0.179	0.910	0.023	0.40	1.13	0.24
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.607				0.61	0.61	0.61
	Band 25	Front	0.280	0.179	0.531	0.017	0.46	0.81	0.30
		Back	1.183	0.179	0.167	0.032	1.36	1.35	1.22
		Left Side	0.051				0.05	0.05	0.05
		Right Side	0.186	0.179	0.910	0.023	0.37	1.10	0.21
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.576				0.58	0.58	0.58
	Band 30	Front	0.408	0.179	0.531	0.017	0.59	0.94	0.43
		Back	0.794	0.179	0.167	0.032	0.97	0.96	0.83
		Left Side	0.075				0.08	0.08	0.08
		Right Side	0.331	0.179	0.910	0.023	0.51	1.24	0.35
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.472				0.47	0.47	0.47
	Band 7	Front	0.563	0.179	0.531	0.017	0.74	1.09	0.58
		Back	1.132	0.179	0.167	0.032	1.31	1.30	1.16
		Left Side	0.237				0.24	0.24	0.24
		Right Side	0.220	0.179	0.910	0.023	0.40	1.13	0.24
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.389				0.39	0.39	0.39
	Band 41	Front	0.245	0.179	0.531	0.017	0.42	0.78	0.26
		Back	0.641	0.179	0.167	0.032	0.82	0.81	0.67
		Left Side	0.059				0.06	0.06	0.06
		Right Side	0.139	0.179	0.910	0.023	0.32	1.05	0.16
		Top Side		0.179	0.910	0.014	0.18	0.91	0.01
		Bottom Side	0.220				0.22	0.22	0.22

### 6.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2	1+3	1+4
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.518	0.102	0.517	0.001	0.62	1.04	0.52
		Back	0.565	0.102	0.127	0.019	0.67	0.69	0.58
	GSM1900	Front	0.162	0.102	0.517	0.001	0.26	0.68	0.16
		Back	0.630	0.102	0.127	0.019	0.73	0.76	0.65
WCDMA	Band V	Front	0.562	0.102	0.517	0.001	0.66	1.08	0.56
		Back	0.500	0.102	0.127	0.019	0.60	0.63	0.52
	Band IV	Front	0.275	0.102	0.517	0.001	0.38	0.79	0.28
		Back	1.169	0.102	0.127	0.019	1.27	1.30	1.19
	Band II	Front	0.300	0.102	0.517	0.001	0.40	0.82	0.30
		Back	1.046	0.102	0.127	0.019	1.15	1.17	1.07
LTE	Band 12	Front	0.372	0.102	0.517	0.001	0.47	0.89	0.37
		Back	0.477	0.102	0.127	0.019	0.58	0.60	0.50
	Band 13	Front	0.354	0.102	0.517	0.001	0.46	0.87	0.36
		Back	0.274	0.102	0.127	0.019	0.38	0.40	0.29
	Band 14	Front	0.412	0.102	0.517	0.001	0.51	0.93	0.41
		Back	0.413	0.102	0.127	0.019	0.52	0.54	0.43
	Band 26	Front	0.586	0.102	0.517	0.001	0.69	1.10	0.59
		Back	0.514	0.102	0.127	0.019	0.62	0.64	0.53
	Band 66	Front	0.132	0.102	0.517	0.001	0.23	0.65	0.13
		Back	0.709	0.102	0.127	0.019	0.81	0.84	0.73
	Band 25	Front	0.330	0.102	0.517	0.001	0.43	0.85	0.33
		Back	1.198	0.102	0.127	0.019	1.30	1.33	1.22
	Band 30	Front	0.240	0.102	0.517	0.001	0.34	0.76	0.24
		Back	0.452	0.102	0.127	0.019	0.55	0.58	0.47
	Band 7	Front	0.337	0.102	0.517	0.001	0.44	0.85	0.34
		Back	0.513	0.102	0.127	0.019	0.62	0.64	0.53
	Band 41	Front	0.171	0.102	0.517	0.001	0.27	0.69	0.17
		Back	0.333	0.102	0.127	0.019	0.44	0.46	0.35

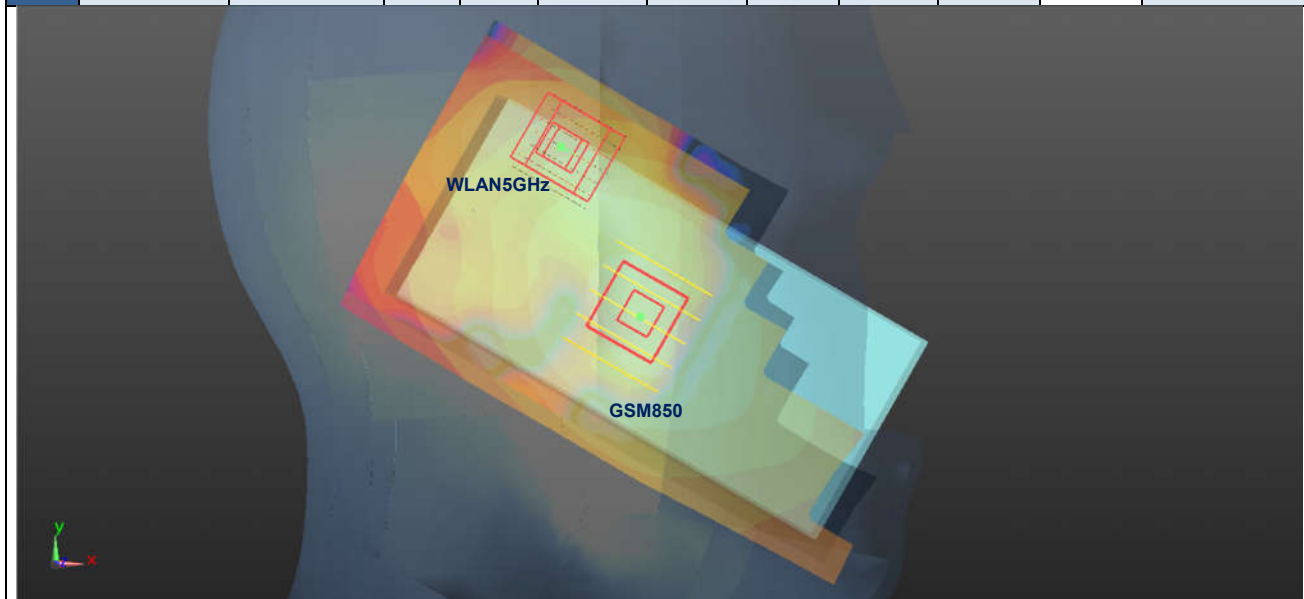


## 6.4 SPLSR Evaluation and Analysis

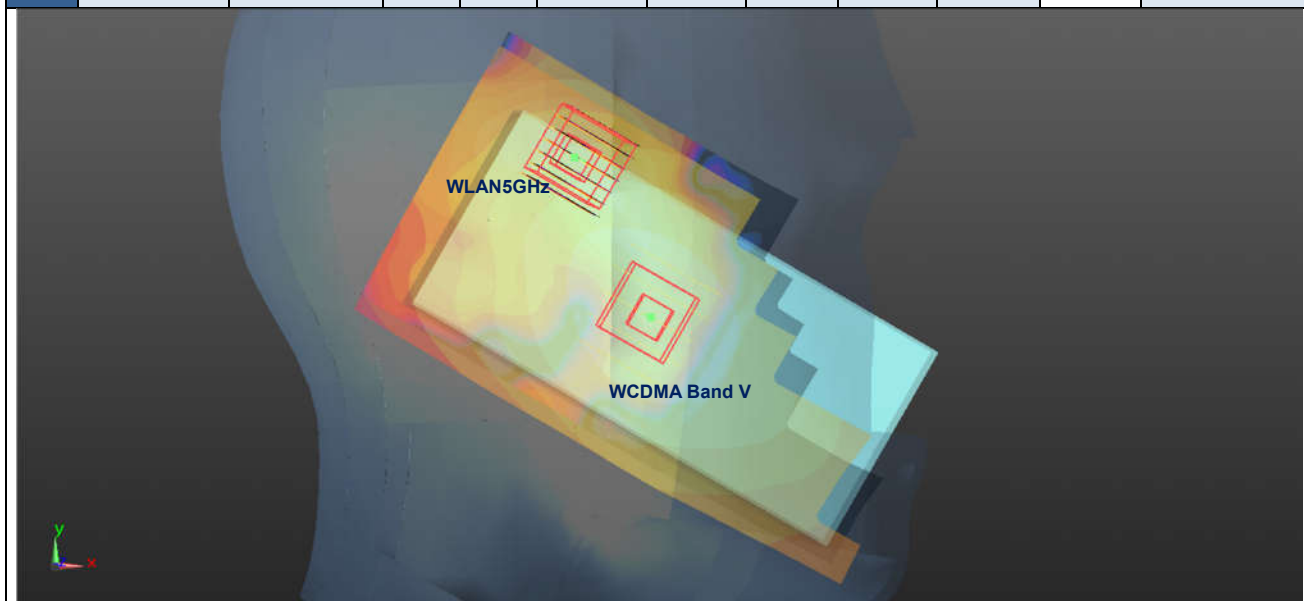
### General Note:

- When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of  $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$ , where  $(x_1, y_1, z_1)$  and  $(x_2, y_2, z_2)$  are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
- $SPLSR = (SAR_1 + SAR_2)1.5 / (\text{min. separation distance, mm})$ . If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.

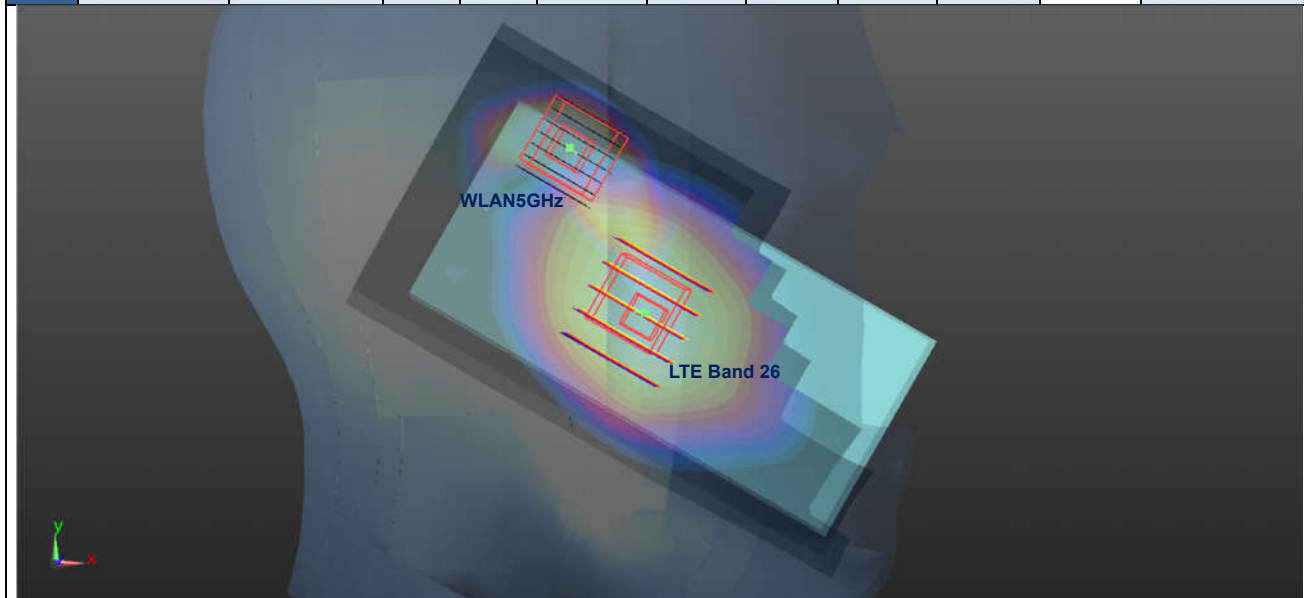
Case #1	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM850	Left Cheek	0.719	0	4.51	-3.69	-0.24	59.66	1.67	0.04	Not required
	WLAN5GHz		0.955	0	2.35	1.87	-0.12				



Case #2	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA Band V	Left Cheek	0.750	0	4.69	-3.07	-0.24	54.68	1.71	0.04	Not required
	WLAN5GHz		0.955	0	2.35	1.87	-0.12				



Case #3	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 26	Left Cheek	0.813	0	4.46	-3.48	-0.26	57.53	1.77	0.04	Not required
	WLAN5GHz		0.955	0	2.35	1.87	-0.12				



**Test Engineer:** Nick Hu



## **7. Uncertainty Assessment**

Pre KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is  $< 1.5$  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. Therefore, the measurement uncertainty table is not required in this report.

## **8. 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 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", 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.



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**Appendix A. Original Report**

Please refer to Sporton report number FA792101-01 which is issued separately.