

FCC SAR Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : 10809
FCC ID : IHDT56WJ1
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, SPORTON INTERNATIONAL (XI'AN) 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 (XI'AN) INC., the test report shall not be reproduced except in full.



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SPORTON INTERNATIONAL (XI'AN) INC.

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SPORTON INTERNATIONAL (XI'AN) INC.

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Mobility LLC, Mobile Cellular Phone, 10809** are as follows.

Equipment Class	Frequency Band		Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.40	0.53	0.68	1.46
		GSM1900	0.14	0.54	1.07	
	WCDMA	Band V	0.58	0.83	1.18	
		Band II	0.27	0.80	1.16	
	LTE	Band 5	0.47	0.65	0.96	
		Band 7	1.07	0.80	1.18	
DTS	WLAN	2.4GHz WLAN	0.79	0.15	0.15	1.38
NII		5GHz WLAN	0.84	0.15	0.28	1.46
DSS	2.4GHz Band	Bluetooth				1.20
Date of Testing:			2017/03/15 ~ 2017/04/07			

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) 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 (XI'AN) INC.
Test Site Location	No. 39 Building A3, Entrepreneurship Avenue, New industrial park, High-tech district, Xi'an City, Shaanxi Province, P. R. China TEL: +86-029-8860-8767 FAX: +86-029-8860-8791

Applicant	
Company Name	Motorola Mobility LLC
Address	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility LLC
Address	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

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	Mobile Cellular Phone
Brand Name	Motorola
Model Name	10809
FCC ID	IHDT56WJ1
IMEI Code	SIM1: 356489080000354 SIM2: 356489080000362
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 V: 826.4 MHz ~ 846.6 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 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
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is not supported) LTE 802.11b/g/n HT20 802.11a/n HT20/HT40 Bluetooth v3.0 + EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE, Bluetooth v4.2 LE
HW Version	DVT1-B
SW Version	montana_n-userdebug 7.11 NPP26.56 1473 intcfg,test-keys
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
Remark: 802.11n-HT40 is not supported in 2.4GHz WLAN. - This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation. - 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). - This device does not support DTM operation and support GRPS/EGRPS mode up to multi-slot class 12. - For dual SIM card mobile 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. - When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately in WLAN 5GHz, all WWAN bands and WLAN2.4GHz are full powers. - The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA Band II, and LTE B7 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.) - When operating in hotspot mode, GSM1900, WCDMA Band II, and LTE B7 reduced power will be active. - This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power level for hotspot reduced power and P-sensor reduced power for this application.	

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																					
FCC ID	IHDT56WJ1																																																				
Equipment Name	Mobile Cellular Phone																																																				
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz																																																				
Channel Bandwidth	LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz																																																				
uplink modulations used	QPSK, and 16QAM																																																				
LTE Voice / Data requirements	Voice and Data																																																				
LTE MPR permanently built-in by design	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</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><tr><td>QPSK</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>≤ 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>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table>							Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3								Modulation	Channel bandwidth / Transmission bandwidth (RB)						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
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																																																					
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	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																																														
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, 1. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately in WLAN 5GHz, all WWAN bands and WLAN2.4GHz are full powers. 2. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA Band II, and LTE B7 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.) 3. When operating in hotspot mode, GSM1900, WCDMA Band II, and LTE B7 reduced power will be active.																																																				
LTE Release Version	R8, Cat 4																																																				
CA Support	Not Supported																																																				

Transmission (H, M, L) channel numbers and frequencies in each LTE band								
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 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
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

4.3 Re-use of Measured Data

4.3.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: 10809, FCC ID: IHDT56WJ1) is electrically identical to the reference device (Model: 10808, 10807, FCC ID: IHDT56WJ4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

4.3.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration "PED" file.

The re-used RF data includes the following bands provided in Appendix A (Sporton SAR Report No. FA730825-02 for the reference device Model: 10808, 10807, FCC ID: IHDT56WJ4):

- GSM850/1900
- WCDMA Band II/V
- LTE Band 5/7
- 2.4GHz WLAN
- 5GHz WLAN
- 2.4GHz Bluetooth

Spot check for WWAN and WLAN are performed for ensure that SAR measurement for both device are the same. So, the original SAR value can represent this application.



4.3.3 Spot Check Verification Data Section

Band	BW (MHz)	Modulation	RB Size	RB Offset	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Original model (FCC ID: IHDT56WJ4)				Spot check model (FCC ID: IHDT56WJ1)				Deviation
											Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	
WLAN 2.4GHz	-	-	-	-	802.11b 1Mbps	Right Cheek	0	OFF	1	2412	16.61	17	0.706	0.792	16.61	17	0.703	0.788	-0.51%
WLAN 5.3GHz	-	-	-	-	802.11a 6Mbps	Right Cheek	0	ON	52	5260	11.41	12	0.578	0.758	11.41	12	0.555	0.728	-3.96%
WLAN 5.5GHz	-	-	-	-	802.11a 6Mbps	Right Cheek	0	ON	116	5580	14.55	15	0.663	0.842	14.55	15	0.588	0.747	-11.28%
WLAN 5.8GHz	-	-	-	-	802.11a 6Mbps	Right Cheek	0	ON	149	5745	13.53	14	0.573	0.731	13.53	14	0.551	0.703	-3.83%
WLAN 5.2GHz	-	-	-	-	802.11a 6Mbps	Left Side	10	OFF	40	5200	14.96	16	0.195	0.284	14.96	16	0.179	0.260	-8.45%
GSM 850	-	-	-	-	GPRS 4 Tx slots	Left Side	10	OFF	251	848.8	27.37	28	0.586	0.677	27.37	28	0.523	0.605	-10.64%
GSM1900	-	-	-	-	GPRS 1 Tx slots	Bottom Side	10	ON	661	1880	26.21	26.5	1.000	1.069	26.21	26.5	0.910	0.973	-8.98%
WCDMA Band V	-	-	-	-	RMC 12.2Kbps	Left Side	10	OFF	4132	826.4	22.9	24	0.912	1.175	22.9	24	0.776	1.000	-14.89%
WCDMA Band II	-	-	-	-	RMC 12.2Kbps	Bottom Side	10	ON	9400	1880	16.36	17.5	0.893	1.161	16.36	17.5	0.799	1.039	-10.51%
LTE Band 5	10M	QPSK	1RB	25offset	-	Left Side	10	OFF	20525	836.5	23.2	24	0.797	0.958	23.2	24	0.747	0.898	-6.26%
LTE Band 7	20M	QPSK	1RB	49offset	-	Bottom Side	10	ON	21100	2535	20.78	21.5	0.996	1.176	20.78	21.5	0.979	1.156	-1.70%

Note: In the table above, all the deviation of SAR test results are compliant with uncertainty budget.

4.3.4 Reference detail Section

Equipment Class	Reference FCC ID	Folder Test/RF Exposure	Report Title/Section
PCE (2G/3G/4G)	IHDT56WJ4	RF Exposure(FA730825-02)	All sections applicable
DTS (BLE)	IHDT56WJ4	RF Exposure(FA730825-02)	All sections applicable
DSS(BER)	IHDT56WJ4	RF Exposure(FA730825-02)	All sections applicable
DTS (WLAN)	IHDT56WJ4	RF Exposure(FA730825-02)	All sections applicable
NII (WLAN)	IHDT56WJ4	RF Exposure(FA730825-02)	All sections applicable

5. 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	WWAN VoIP
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	WWAN VoIP
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	WWAN VoIP
5.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes		
6.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
7.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
8.	LTE + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
9.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes	Yes	
10.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WWAN VoIP
11.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	WWAN VoIP
12.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WWAN VoIP
13.	GSM Voice + Bluetooth		Yes		
14.	GPRS/EDGE + Bluetooth		Yes		WWAN VoIP
15.	WCDMA + Bluetooth		Yes		WWAN VoIP
16.	LTE + Bluetooth		Yes		WWAN VoIP

General Note:

- This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- 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).
- 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.
- WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
- According to the EUT character, WLAN 5GHz and Bluetooth can't transmit simultaneously.
- Chose the worst zoom scan SAR of WLAN2.4GHz correspondingly for co-located with WWAN analysis.
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, 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.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
- For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
 - 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth Max Power (dBm)	Exposure Position	Body worn
	Test separation	10 mm
12.50	Estimated SAR (W/kg)	0.378

5.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.338	0.792	1.13		
		Right Tilted	0.247	0.542	0.79		
		Left Cheek	0.401	0.792	1.19		
		Left Tilted	0.230	0.792	1.02		
	GSM1900	Right Cheek	0.136	0.792	0.93		
		Right Tilted	0.042	0.542	0.58		
		Left Cheek	0.053	0.792	0.85		
		Left Tilted	0.043	0.792	0.84		
WCDMA	Band V	Right Cheek	0.419	0.792	1.21		
		Right Tilted	0.327	0.542	0.87		
		Left Cheek	0.584	0.792	1.38		
		Left Tilted	0.368	0.792	1.16		
	Band II	Right Cheek	0.274	0.792	1.07		
		Right Tilted	0.085	0.542	0.63		
		Left Cheek	0.120	0.792	0.91		
		Left Tilted	0.072	0.792	0.86		
LTE	Band 5	Right Cheek	0.399	0.792	1.19		
		Right Tilted	0.279	0.542	0.82		
		Left Cheek	0.469	0.792	1.26		
		Left Tilted	0.302	0.792	1.09		
	Band 7	Right Cheek	1.070	0.792	1.86	0.03	#1
		Right Tilted	0.226	0.542	0.77		
		Left Cheek	0.396	0.792	1.19		
		Left Tilted	0.284	0.792	1.08		

WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.3GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.338	0.758	1.10		
		Right Tilted	0.247	0.589	0.84		
		Left Cheek	0.401	0.233	0.63		
		Left Tilted	0.230	0.194	0.42		
	GSM1900	Right Cheek	0.136	0.758	0.89		
		Right Tilted	0.042	0.589	0.63		
		Left Cheek	0.053	0.233	0.29		
		Left Tilted	0.043	0.194	0.24		
WCDMA	Band V	Right Cheek	0.419	0.758	1.18		
		Right Tilted	0.327	0.589	0.92		
		Left Cheek	0.584	0.233	0.82		
		Left Tilted	0.368	0.194	0.56		
	Band II	Right Cheek	0.274	0.758	1.03		
		Right Tilted	0.085	0.589	0.67		
		Left Cheek	0.120	0.233	0.35		
		Left Tilted	0.072	0.194	0.27		

WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.3GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Right Cheek	0.399	0.758	1.16		
		Right Tilted	0.279	0.589	0.87		
		Left Cheek	0.469	0.233	0.70		
		Left Tilted	0.302	0.194	0.50		
	Band 7	Right Cheek	1.070	0.758	1.83	0.03	#2
		Right Tilted	0.226	0.589	0.82		
		Left Cheek	0.396	0.233	0.63		
		Left Tilted	0.284	0.194	0.48		

WWAN Band		Exposure Position	1	4	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.5GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.338	0.842	1.18		
		Right Tilted	0.247	0.381	0.63		
		Left Cheek	0.401	0.250	0.65		
		Left Tilted	0.230	0.196	0.43		
	GSM1900	Right Cheek	0.136	0.842	0.98		
		Right Tilted	0.042	0.381	0.42		
		Left Cheek	0.053	0.250	0.30		
		Left Tilted	0.043	0.196	0.24		
WCDMA	Band V	Right Cheek	0.419	0.842	1.26		
		Right Tilted	0.327	0.381	0.71		
		Left Cheek	0.584	0.250	0.83		
		Left Tilted	0.368	0.196	0.56		
	Band II	Right Cheek	0.274	0.842	1.12		
		Right Tilted	0.085	0.381	0.47		
		Left Cheek	0.120	0.250	0.37		
		Left Tilted	0.072	0.196	0.27		

WWAN Band		Exposure Position	1	4	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.5GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Right Cheek	0.399	0.842	1.24		
		Right Tilted	0.279	0.381	0.66		
		Left Cheek	0.469	0.250	0.72		
		Left Tilted	0.302	0.196	0.50		
	Band 7	Right Cheek	1.070	0.842	1.91	0.03	#3
		Right Tilted	0.226	0.381	0.61		
		Left Cheek	0.396	0.250	0.65		
		Left Tilted	0.284	0.196	0.48		

WWAN Band		Exposure Position	1	5	1+5 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.8GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.338	0.731	1.07		
		Right Tilted	0.247	0.583	0.83		
		Left Cheek	0.401	0.254	0.66		
		Left Tilted	0.230	0.216	0.45		
	GSM1900	Right Cheek	0.136	0.731	0.87		
		Right Tilted	0.042	0.583	0.63		
		Left Cheek	0.053	0.254	0.31		
		Left Tilted	0.043	0.216	0.26		
WCDMA	Band V	Right Cheek	0.419	0.731	1.15		
		Right Tilted	0.327	0.583	0.91		
		Left Cheek	0.584	0.254	0.84		
		Left Tilted	0.368	0.216	0.58		
	Band II	Right Cheek	0.274	0.731	1.01		
		Right Tilted	0.085	0.583	0.67		
		Left Cheek	0.120	0.254	0.37		
		Left Tilted	0.072	0.216	0.29		

WWAN Band		Exposure Position	1	5	1+5 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.8GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Right Cheek	0.399	0.731	1.13		
		Right Tilted	0.279	0.583	0.86		
		Left Cheek	0.469	0.254	0.72		
		Left Tilted	0.302	0.216	0.52		
	Band 7	Right Cheek	1.070	0.731	1.80	0.03	#4
		Right Tilted	0.226	0.583	0.81		
		Left Cheek	0.396	0.254	0.65		
		Left Tilted	0.284	0.216	0.50		

5.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.145	0.61		
		Back	0.528	0.145	0.67		
		Left side	0.677	0.145	0.82		
		Right side	0.414		0.41		
		Top side		0.145	0.15		
		Bottom side	0.126		0.13		
	GSM1900	Front	0.447	0.145	0.59		
		Back	0.543	0.145	0.69		
		Left side	0.029	0.145	0.17		
		Right side	0.039		0.04		
		Top side		0.145	0.15		
		Bottom side	1.069		1.07		
WCDMA	Band V	Front	0.692	0.145	0.84		
		Back	0.826	0.145	0.97		
		Left side	1.175	0.145	1.32		
		Right side	0.712		0.71		
		Top side		0.145	0.15		
		Bottom side	0.174		0.17		
	Band II	Front	0.667	0.145	0.81		
		Back	0.802	0.145	0.95		
		Left side	0.038	0.145	0.18		
		Right side	0.054		0.05		
		Top side		0.145	0.15		
		Bottom side	1.161		1.16		

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Front	0.541	0.145	0.69		
		Back	0.652	0.145	0.80		
		Left side	0.958	0.145	1.10		
		Right side	0.485		0.49		
		Top side		0.145	0.15		
		Bottom side	0.150		0.15		
	Band 7	Front	0.582	0.145	0.73		
		Back	0.798	0.145	0.94		
		Left side	0.090	0.145	0.24		
		Right side	0.371		0.37		
		Top side		0.145	0.15		
		Bottom side	1.176		1.18		

WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.2GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.109	0.58		
		Back	0.528	0.074	0.60		
		Left side	0.677	0.284	0.96		
		Right side	0.414		0.41		
		Top side		0.102	0.10		
		Bottom side	0.126		0.13		
	GSM1900	Front	0.447	0.109	0.56		
		Back	0.543	0.074	0.62		
		Left side	0.029	0.284	0.31		
		Right side	0.039		0.04		
		Top side		0.102	0.10		
		Bottom side	1.069		1.07		
WCDMA	Band V	Front	0.692	0.109	0.80		
		Back	0.826	0.074	0.90		
		Left side	1.175	0.284	1.46		
		Right side	0.712		0.71		
		Top side		0.102	0.10		
		Bottom side	0.174		0.17		
	Band II	Front	0.667	0.109	0.78		
		Back	0.802	0.074	0.88		
		Left side	0.038	0.284	0.32		
		Right side	0.054		0.05		
		Top side		0.102	0.10		
		Bottom side	1.161		1.16		

WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.2GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Front	0.541	0.109	0.65		
		Back	0.652	0.074	0.73		
		Left side	0.958	0.284	1.24		
		Right side	0.485		0.49		
		Top side		0.102	0.10		
		Bottom side	0.150		0.15		
	Band 7	Front	0.582	0.109	0.69		
		Back	0.798	0.074	0.87		
		Left side	0.090	0.284	0.37		
		Right side	0.371		0.37		
		Top side		0.102	0.10		
		Bottom side	1.176		1.18		

WWAN Band		Exposure Position	1	4	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.8GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.101	0.57		
		Back	0.528	0.039	0.57		
		Left side	0.677	0.140	0.82		
		Right side	0.414		0.41		
		Top side		0.054	0.05		
		Bottom side	0.126		0.13		
	GSM1900	Front	0.447	0.101	0.55		
		Back	0.543	0.039	0.58		
		Left side	0.029	0.140	0.17		
		Right side	0.039		0.04		
		Top side		0.054	0.05		
		Bottom side	1.069		1.07		
WCDMA	Band V	Front	0.692	0.101	0.79		
		Back	0.826	0.039	0.87		
		Left side	1.175	0.140	1.32		
		Right side	0.712		0.71		
		Top side		0.054	0.05		
		Bottom side	0.174		0.17		
	Band II	Front	0.667	0.101	0.77		
		Back	0.802	0.039	0.84		
		Left side	0.038	0.140	0.18		
		Right side	0.054		0.05		
		Top side		0.054	0.05		
		Bottom side	1.161		1.16		

WWAN Band		Exposure Position	1	4	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.8GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 5	Front	0.541	0.101	0.64		
		Back	0.652	0.039	0.69		
		Left side	0.958	0.140	1.10		
		Right side	0.485		0.49		
		Top side		0.054	0.05		
		Bottom side	0.150		0.15		
	Band 7	Front	0.582	0.101	0.68		
		Back	0.798	0.039	0.84		
		Left side	0.090	0.140	0.23		
		Right side	0.371		0.37		
		Top side		0.054	0.05		
		Bottom side	1.176		1.18		



5.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.145	0.61		
		Back	0.528	0.145	0.67		
	GSM1900	Front	0.447	0.145	0.59		
		Back	0.543	0.145	0.69		
WCDMA	Band V	Front	0.692	0.145	0.84		
		Back	0.826	0.145	0.97		
	Band II	Front	0.667	0.145	0.81		
		Back	0.802	0.145	0.95		
LTE	Band 5	Front	0.541	0.145	0.69		
		Back	0.652	0.145	0.80		
	Band 7	Front	0.582	0.145	0.73		
		Back	0.798	0.145	0.94		

WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.3GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.152	0.62		
		Back	0.528	0.087	0.62		
	GSM1900	Front	0.447	0.152	0.60		
		Back	0.543	0.087	0.63		
WCDMA	Band V	Front	0.692	0.152	0.84		
		Back	0.826	0.087	0.91		
	Band II	Front	0.667	0.152	0.82		
		Back	0.802	0.087	0.89		
LTE	Band 5	Front	0.541	0.152	0.69		
		Back	0.652	0.087	0.74		
	Band 7	Front	0.582	0.152	0.73		
		Back	0.798	0.087	0.89		

WWAN Band		Exposure Position	1	4	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.5GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.107	0.58		
		Back	0.528	0.051	0.58		
	GSM1900	Front	0.447	0.107	0.55		
		Back	0.543	0.051	0.59		
WCDMA	Band V	Front	0.692	0.107	0.80		
		Back	0.826	0.051	0.88		
	Band II	Front	0.667	0.107	0.77		
		Back	0.802	0.051	0.85		
LTE	Band 5	Front	0.541	0.107	0.65		
		Back	0.652	0.051	0.70		
	Band 7	Front	0.582	0.107	0.69		
		Back	0.798	0.051	0.85		

WWAN Band		Exposure Position	1	5	1+5 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	5.8GHz WLAN			
			1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.101	0.57		
		Back	0.528	0.039	0.57		
	GSM1900	Front	0.447	0.101	0.55		
		Back	0.543	0.039	0.58		
WCDMA	Band V	Front	0.692	0.101	0.79		
		Back	0.826	0.039	0.87		
	Band II	Front	0.667	0.101	0.77		
		Back	0.802	0.039	0.84		
LTE	Band 5	Front	0.541	0.101	0.64		
		Back	0.652	0.039	0.69		
	Band 7	Front	0.582	0.101	0.68		
		Back	0.798	0.039	0.84		

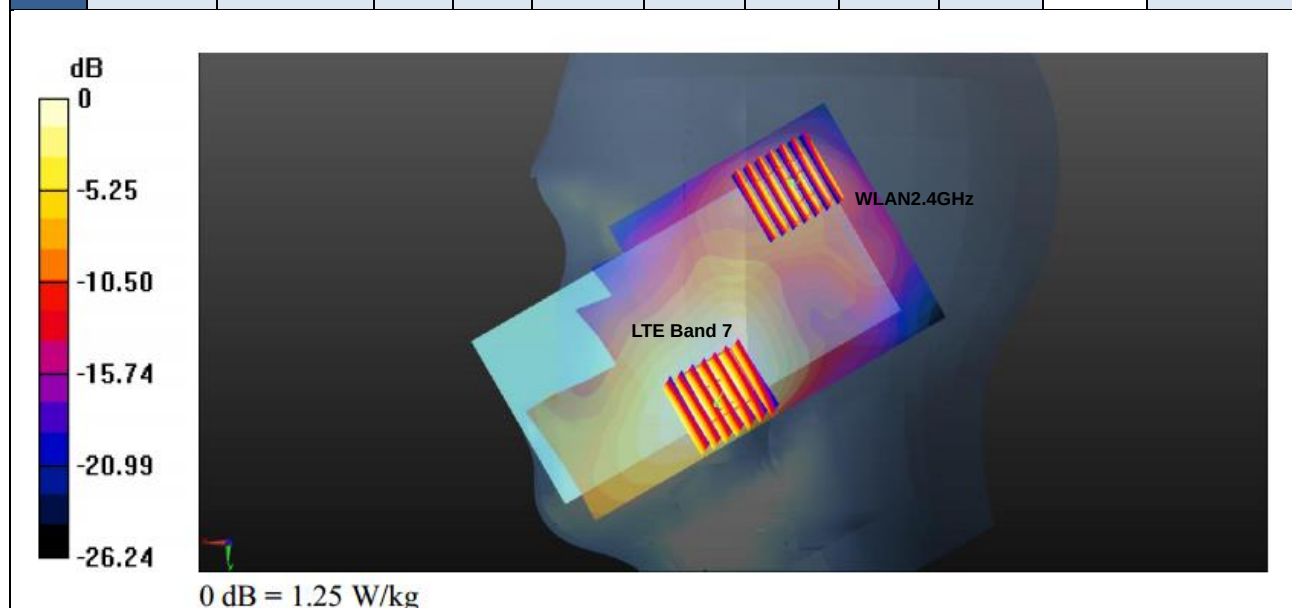
WWAN Band		Exposure Position	1	6	1+6 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	Bluetooth			
			1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.468	0.378	0.85		
		Back	0.528	0.378	0.91		
	GSM1900	Front	0.447	0.378	0.83		
		Back	0.543	0.378	0.92		
WCDMA	Band V	Front	0.692	0.378	1.07		
		Back	0.826	0.378	1.20		
	Band II	Front	0.667	0.378	1.05		
		Back	0.802	0.378	1.18		
LTE	Band 5	Front	0.541	0.378	0.92		
		Back	0.652	0.378	1.03		
	Band 7	Front	0.582	0.378	0.96		
		Back	0.798	0.378	1.18		

5.4 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 (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Right Cheek	1.070	0	4.33	6.5	-0.21	93.55	1.86	0.03	Not required
	WLAN2.4GHz		0.792	0	1.27	-2.34	-0.23				



Remark: As the above table, 3D distance (mm) = $10 \times \sqrt{(X_1-X_2)^2 + (Y_1-Y_2)^2 + (Z_1-Z_2)^2}$
 $= 10 \times \sqrt{(4.33-1.27)^2 + (6.5-(-2.34))^2 + ((-0.21)-(-0.23))^2}$
 $= 93.55$

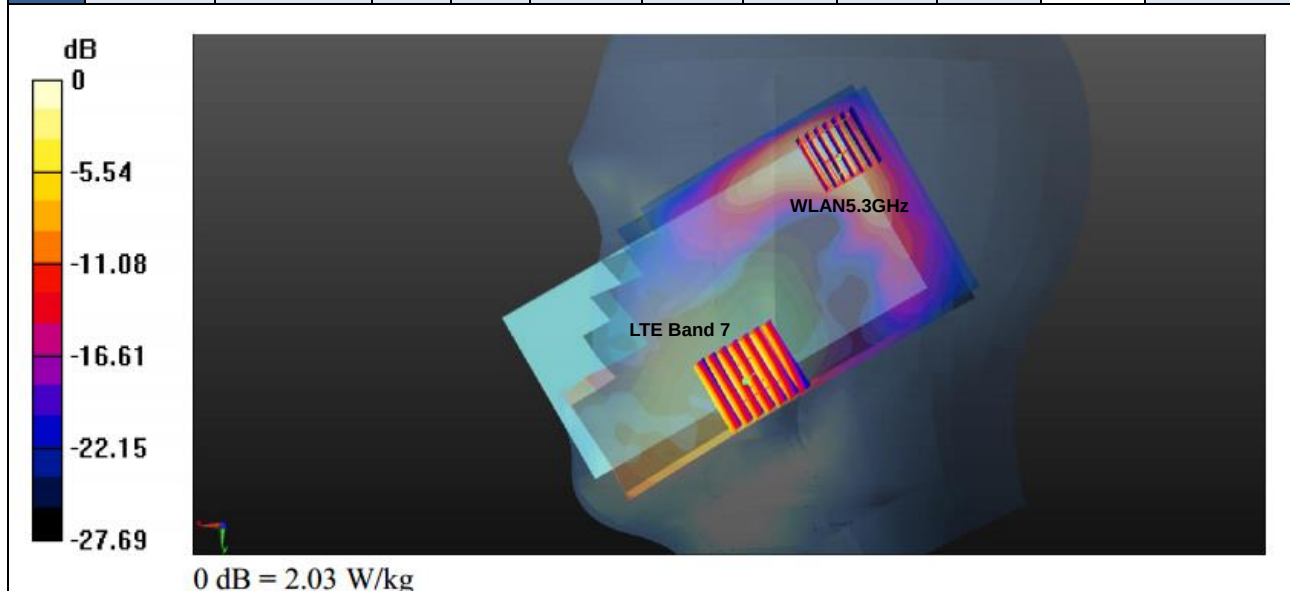
$$SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm}).$$

$$= (1.070 + 0.792)^{1.5} / 93.55$$

$$= 0.03$$

SPLSR is 0.03 less than 0.04, so simultaneously transmission SAR measurement is not necessary.

Case 2	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Right Cheek	1.070	0	4.33	6.5	-0.21	92.17	1.83	0.03	Not required
	WLAN5.3GHz		0.758	0	0.84	-2.03	-0.15				

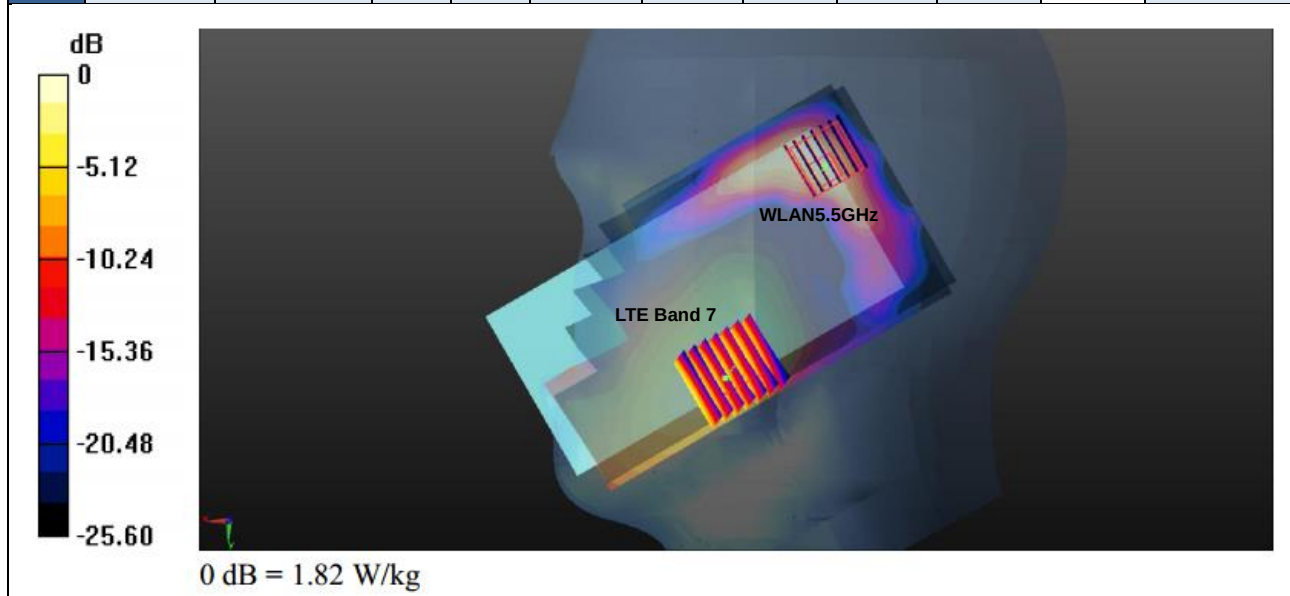


Remark: As the above table, 3D distance (mm)= $10 \times \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$
 $= 10 \times \sqrt{(4.33-0.84)^2 + (6.5-(-2.03))^2 + ((-0.21)-(-0.15))^2}$
 $= 92.17$

SPLSR = $(SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$
 $= (1.070 + 0.758)^{1.5} / 92.17$
 $= 0.03$

SPLSR is 0.03 less than 0.04, so simultaneously transmission SAR measurement is not necessary.

Case 3	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Right Cheek	1.070	0	4.33	6.5	-0.21	90.17	1.91	0.03	Not required
	WLAN5.5GHz		0.842	0	0.76	-1.78	-0.15				

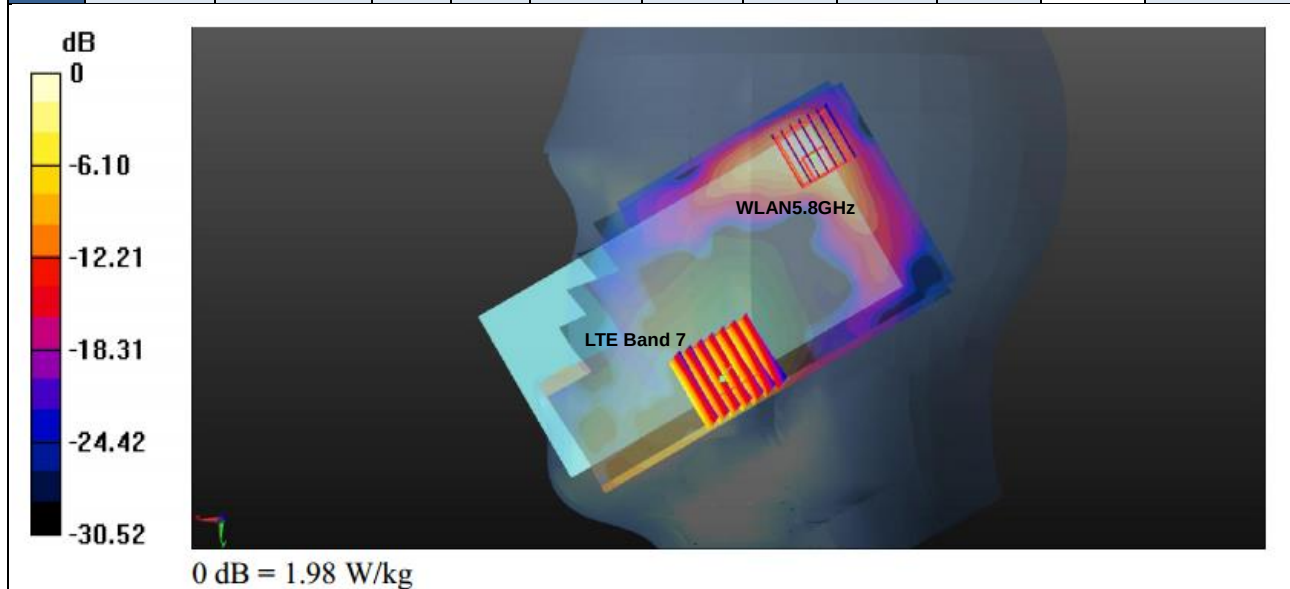


Remark: As the above table, 3D distance (mm)= $10 \times \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$
 $= 10 \times \sqrt{(4.33-0.76)^2 + (6.5-(-1.78))^2 + ((-0.21)-(-0.15))^2}$
 $= 90.17$

SPLSR = $(SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$.
 $= (1.070 + 0.842)^{1.5} / 90.17$
 $= 0.03$

SPLSR is 0.03 less than 0.04, so simultaneously transmission SAR measurement is not necessary.

Case 4	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Right Cheek	1.070	0	4.33	6.5	-0.21	91.40	1.80	0.03	Not required
	WLAN5.8GHz		0.731	0	0.92	-1.98	-0.17				



Remark: As the above table, 3D distance (mm)= $10 \times \sqrt{(X1-X2)^2 + (Y1-Y2)^2 + (Z1-Z2)^2}$
 $= 10 \times \sqrt{(4.33-0.92)^2 + (6.5-(-1.98))^2 + ((-0.21)-(-0.17))^2}$
 $= 91.40$

SPLSR = $(SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$
 $= (1.070 + 0.731)^{1.5} / 91.40$
 $= 0.03$

SPLSR is 0.03 less than 0.04, so simultaneously transmission SAR measurement is not necessary.

Test Engineer : Kat Yin



Appendix A. Reference Report

Please refer to Sporton report number FA730825-02 which is issued separately.