

FCC SAR TEST REPORT



Report No: E5/2017/70014
Applicant: Huawei Technologies Co.,Ltd.
Manufacturer: Huawei Technologies Co.,Ltd.
Factory: CK Telecom Limited
Product Name: Mobile WiFi
Model No.(EUT): E5788u-96a
Trade Mark: HUAWEI
FCC ID: QISE5788U-96A
Standards: FCC 47CFR §2.1093
Date of Receipt: 2017-07-25
Date of Test: 2017-07-26 to 2017-08-20
Date of Issue: 2017-11-07
Test Result: **PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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Signed on behalf of SGS

Engineer

Supervisor

Jimmy Chang

John Yeh

Date: Nov. 07, 2017

Date: Nov. 07, 2017

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REVISION HISTORY

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-11-07		Original

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TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)
	Hotspot
GSM850	0.98
GSM1900	0.78
WCDMA Band II	1.12
WCDMA Band IV	1.07
WCDMA Band V	0.98
LTE Band 2	1.15
LTE Band 4	1.09
LTE Band 5	1.07
LTE Band 7	0.84
LTE Band 38	1.06
LTE Band 41	1.03
WI-FI (2.4GHz)	0.49
SAR Limited(w/kg)	1.60
Maximum Simultaneous Transmission SAR (W/kg)	
Scenario	Hotspot
Sum SAR	1.52

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1 General Information

1.1 Details of Client

Applicant:	Huawei Technologies Co.,Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer:	Huawei Technologies Co.,Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Factory:	CK Telecom Limited
Address:	Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China.

1.2 Test Location

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1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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1.4 General Description of EUT

Product Name:	Mobile WiFi		
Model No.(EUT):	E5788u-96a		
Trade Mark:	HUAWEI		
Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
FCC ID:	QISE5788U-96A		
IMEI:	865231030025212 / 865231030026517		
Hardware Version:	CL1E5788UM Ver.A		
Software Version:	11.450.03.51.00		
Antenna Type:	Inner Antenna		
Device Operating Configurations :			
Modulation Mode:	GSM:GMSK, 8PSK;WCDMA: QPSK;LTE:QPSK,16QAM,64QAM WIFI: DSSS,OFDM;BT: GFSK, π/4DQPSK,8DPSK		
Device Class:	B		
GPRS Multi-slots Class:	12	GPRS Multi-slots Class:	12
HSDPA UE Category:	24	HSUPA UE Category	6
LTE Category:	5		
Power Class	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control “all 1”(UMTS Band II/IV/V)		
	3, tested with power control Max Power(LTE Band II/IV/V/VII/XXXVIII/XXXXI)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	WCDMA Band II	1850-1910	1930-1990
	WCDMA Band IV	1710-1755	2110- 2155
	WCDMA Band V	824-849	869-894
	LTE Band 2	1850-1910	1930-1990
	LTE Band 4	1710-1755	2110- 2155
	LTE Band 5	824-849	869-894
	LTE Band 7	2500-2570	2620- 2690
	LTE Band 38	2570-2620	2570- 2620

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	LTE Band 41	2496-2690	2496-2690
	WIFI(2.4GHz)	2412-2462	2412-2462
	BT	2402-2480	2402-2480
Battery Information1#:	Model:	HB494590EBC-B	
	Normal Voltage :	3.8V	
	Rated capacity :	3000mAh	
	Manufacturer:	Sunwoda Electronics Co., Ltd	
Battery Information2#:	Model:	HB494590EBC-B	
	Normal Voltage :	3.8V	
	Rated capacity :	3000mAh	
	Manufacturer:	SCUD (FUJIAN) Electronics Co., Ltd	

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1.4.1 DUT Antenna Locations



According to the distance between LTE/WCDMA/GSM&WIFI antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing						
Mode	Front	Back	Left	Right	Top	Bottom
GSM	Yes	Yes	No	Yes	Yes	Yes
WCDMA	Yes	Yes	No	Yes	Yes	Yes
LTE	Yes	Yes	No	Yes	Yes	Yes
Wi-Fi 1 (2.4GHz)	Yes	Yes	No	No	Yes	No
Wi-Fi 2 (2.4GHz)	Yes	Yes	No	No	No	Yes
Wi-Fi MIMO (2.4GHz)	Yes	Yes	No	No	Yes	Yes
Sub& MIMO1&MIMO2 antenna	Only receive signal					

Table 1: EUT Sides for SAR Testing

Note:

- 1) When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

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1.4.2 Downlink LTE CA additional specification

The device supports downlink LTE Carrier Aggregation (CA) only. Other Release 10 or higher features are not supported, including Uplink Carrier Aggregation, Enhanced SC-FDMA and Uplink MIMO or other antenna diversity configurations etc. All uplink communications are identical to the Release 8 Specifications.

The possible downlink LTE CA combinations supported by this device are as below tables per 3GPP TS 36.101. The conducted power measurement results of downlink LTE CA are provided in this report per 3GPP TS 36.521-1. According to KDB 941225 D05A, the downlink LTE CA SAR test is not required and PAG requirements can be excluded.

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Intra-band contiguous CA

E-UTRA CA configuration	Uplink CA configurations (NOTE 3)	E-UTRA CA configuration / Bandwidth combination set					
		Component carriers in order of increasing carrier frequency				Maximum aggregated bandwidth [MHz]	Bandwidth combination set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_5B		5, 10	10			20	0
		10	5				
CA_7C (4+4)		15	15			40	0
		20	20				
		10	20			40	1
		15	15, 20				
		20	10, 15, 20			40	2
		15	10, 15				
		20	15, 20				
		1.4, 3	10				
CA_38C (4+4)		15	15			40	0
		20	20				
		20	5, 10, 15				
CA_41C (4+4)		10	20			40	0
		15	15, 20				
		20	10, 15, 20				
		5, 10	20			40	1
		15	15, 20				
		20	5, 10, 15, 20				
		10	15, 20			40	2
		15	10, 15, 20				
		20	10, 15, 20				
		10	20			40	3
		20	20				
CA_41D		10	20	15		60	0
		10	15, 20	20			
		15	20	10, 15			
		15	10, 15, 20	20			
		20	15, 20	10			
		20	10, 15, 20	15, 20			

NOTE 1: The CA configuration refers to an operating band and a CA bandwidth class specified in Table 5.6A-1 (the indexing letter). Absence of a CA bandwidth class for an operating band implies support of all classes.

NOTE 2: For the supported CC bandwidth combinations, the CC downlink and uplink bandwidths are equal.

NOTE 3: Uplink CA configurations are the configurations supported by the present release of specifications.

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Test frequencies for CA_5B

Range	CC-Combo / NRB_agg [RB]	CC1 Note1					CC2 Note1				
		BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]	BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]
Low	25+50	25	20428	826.8	2428	871.8	50	20500	834	2500	879
	50+25	50	20450	829	2450	874	25	20522	836.2	2522	881.2
	50+50	50	20450	829	2450	874	50	20549	838.9	2549	883.9
Mid	25+50	25	20478	831.8	2478	876.8	50	20550	839	2550	884
	50+25	50	20500	834	2500	879	25	20572	841.2	2572	886.2
	50+50	50	20476	831.6	2476	876.6	50	20575	841.5	2575	886.5
High	25+50	25	20528	836.8	2528	881.8	50	20600	844	2600	889
	50+25	50	20550	839	2550	884	25	20622	846.2	2622	891.2
	50+50	50	20501	834.1	2501	879.1	50	20600	844	2600	889

Note 1: Carriers in increasing frequency order.

Test frequencies for CA_7C

Range	CC-Combo / NRB_agg [RB]	CC1 Note1					CC2 Note1				
		BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]	BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]
Low	50+100	50	20805	2505.5	2805	2625.5	100	20949	2519.9	2949	2639.9
		100	20850	2510	2850	2630	50	20994	2524.4	2994	2644.4
	75+75	75	20825	2507.5	2825	2627.5	75	20975	2522.5	2975	2642.5
	75+100	75	20828	2507.8	2828	2627.8	100	20999	2524.9	2999	2644.9
		100	20850	2510	2850	2630	75	21021	2527.1	3021	2647.1
	100+100	100	20850	2510	2850	2630	100	21048	2529.8	3048	2649.8
Mid	50+100	50	21006	2525.6	3006	2645.6	100	21150	2540	3150	2660
		100	21051	2530.1	3051	2650.1	50	21195	2544.5	3195	2664.5
	75+75	75	21025	2527.5	3025	2647.5	75	21175	2542.5	3175	2662.5
	75+100	75	21003	2525.3	3003	2645.3	100	21174	2542.4	3174	2662.4
		100	21026	2527.6	3026	2647.6	75	21197	2544.7	3197	2664.7
	100+100	100	21001	2525.1	3001	2645.1	100	21199	2544.9	3199	2664.9
High	50+100	50	21206	2545.6	3206	2665.6	100	21350	2560	3350	2680
		100	21251	2550.1	3251	2670.1	50	21395	2564.5	3395	2684.5
	75+75	75	21225	2547.5	3225	2667.5	75	21375	2562.5	3375	2682.5
	75+100	75	21179	2542.9	3179	2662.9	100	21350	2560	3350	2680
		100	21201	2545.1	3201	2665.1	75	21372	2562.2	3372	2682.2
	100+100	100	21152	2540.2	3152	2660.2	100	21350	2560	3350	2680
Note 1: Carriers in increasing frequency order.											

Note 1: Carriers in increasing frequency order.

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Test frequencies for CA_38C

Range	CC-Combo/ NRB_agg [RB]	CC1 Note1			CC2 Note1		
		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]
Low	75+75	75	37825	2577.5	75	37975	2592.5
	100+100	100	37850	2580	100	38048	2599.8
Mid	75+75	75	37925	2587.5	75	38075	2602.5
	100+100	100	37901	2585.1	100	38099	2604.9
High	75+75	75	38025	2597.5	75	38175	2612.5
	100+100	100	37952	2590.2	100	38150	2610
Note 1: Carriers in increasing frequency order.							

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Test frequencies for CA_41C

Range	CC-Combo / NRB_agg [RB]	CC1 Note1			CC2 Note1		
		BW [RB]	NUL/DL	fUL/DL [MHz]	BW [RB]	NUL/DL	fUL/DL [MHz]
Low	25+100	25	39683	2499.3	100	39800	2511
		100	39750	2506	25	39867	2517.7
	50+75	50	39703	2501.3	75	39823	2513.3
		75	39725	2503.5	50	39845	2515.5
	50+100	50	39705	2501.5	100	39849	2515.9
		100	39750	2506	50	39894	2520.4
	75+75	75	39725	2503.5	75	39875	2518.5
		75	39728	2503.8	100	39899	2520.9
	75+100	100	39750	2506	75	39921	2523.1
		100	39750	2506	100	39948	2525.8
	100+100	100	39750	2506	100	39948	2525.8
		100	39750	2506	100	39948	2525.8
Mid	25+100	25	40528	2583.8	100	40645	2595.5
		100	40595	2590.5	25	40712	2602.2
	50+75	50	40549	2585.9	75	40669	2597.9
		75	40571	2588.1	50	40691	2600.1
	50+100	50	40526	2583.6	100	40670	2598.0
		100	40571	2588.1	50	40715	2602.5
	75+75	75	40545	2585.5	75	40695	2600.5
		75	40523	2583.3	100	40694	2600.4
	75+100	100	40546	2585.6	75	40717	2602.7
		100	40521	2583.1	100	40719	2602.9
	100+100	100	40521	2583.1	100	40719	2602.9
		100	40521	2583.1	100	40719	2602.9
High	25+100	25	41373	2668.3	100	41490	2680
		100	41440	2675	25	41557	2686.7
	50+75	50	41395	2670.5	75	41515	2682.5
		75	41417	2672.7	50	41537	2684.7
	50+100	50	41346	2665.6	100	41490	2680
		100	41391	2670.1	50	41535	2684.5
	75+75	75	41365	2667.5	75	41515	2682.5
		75	41319	2662.9	100	41490	2680
	75+100	100	41341	2665.1	75	41512	2682.2
		100	41292	2660.2	100	41490	2680
	100+100	100	41292	2660.2	100	41490	2680
		100	41292	2660.2	100	41490	2680
		100	41292	2660.2	100	41490	2680

Note 1: Carriers in increasing frequency order.

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Test frequencies for CA_41D

Range	CC-Combo / N _{RB_agg} [RB]	CC1 Note1			CC2 Note1			CC3 Note1		
		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]
Low	50+75+100	50	39705	2501.5	75	39825	2513.5	100	39996	2530.6
		50	39705	2501.5	100	39849	2515.9	75	40020	2533
		75	39728	2503.8	50	39848	2515.8	100	39992	2530.2
		75	39728	2503.8	100	39899	2520.9	50	40043	2535.3
		100	39750	2506	50	39894	2520.4	75	40014	2532.4
		100	39750	2506	75	39921	2523.1	50	40041	2535.1
	50+100+100	50	39705	2501.5	100	39849	2515.9	100	40047	2535.7
		100	39750	2506	50	39894	2520.4	100	40038	2534.8
		100	39750	2506	100	39948	2525.8	50	40092	2540.2
	75+75+100	75	39728	2503.8	75	39878	2518.8	100	40049	2535.9
		75	39728	2503.8	100	39899	2520.9	75	40070	2538
		100	39750	2506	75	39921	2523.1	75	40071	2538.1
	75+100+100	75	39728	2503.8	100	39899	2520.9	100	40097	2540.7
		100	39750	2506	75	39921	2523.1	100	40092	2540.2
		100	39750	2506	100	39948	2525.8	75	40119	2542.9
	100+100+100	100	39750	2506	100	39948	2525.8	100	40146	2545.6
Mid	50+75+100	50	40452	2576.2	75	40572	2588.2	100	40743	2605.3
		50	40451	2576.1	100	40595	2590.5	75	40766	2607.6
		75	40477	2578.7	50	40597	2590.7	100	40741	2605.1
		75	40474	2578.4	100	40645	2595.5	50	40789	2609.9
		100	40499	2580.9	50	40643	2595.3	75	40763	2607.3
		100	40497	2580.7	75	40668	2597.8	50	40788	2609.8
	50+100+100	50	40427	2573.7	100	40571	2588.1	100	40769	2607.9
		100	40476	2578.6	50	40620	2593	100	40764	2607.4
		100	40472	2578.2	100	40670	2598	50	40814	2612.4
	75+75+100	75	40448	2575.8	75	40598	2590.8	100	40769	2607.9
		75	40449	2575.9	100	40620	2593	75	40791	2610.1
		100	40471	2578.1	75	40642	2595.2	75	40792	2610.2
	75+100+100	75	40424	2573.4	100	40595	2590.5	100	40793	2610.3
		100	40449	2575.9	75	40620	2593	100	40791	2610.1
		100	40447	2575.7	100	40645	2595.5	75	40816	2612.6
	100+100+100	100	40422	2573.2	100	40620	2593	100	40818	2612.8

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High	50+75+100	50	41199	2650.9	75	41319	2662.9	100	41490	2680
		50	41197	2650.7	100	41341	2665.1	75	41512	2682.2
		75	41226	2653.6	50	41346	2665.6	100	41490	2680
		75	41220	2653	100	41391	2670.1	50	41535	2684.5
		100	41248	2655.8	50	41392	2670.2	75	41512	2682.2
		100	41244	2655.4	75	41415	2672.5	50	41535	2684.5
	50+100+100	50	41148	2645.8	100	41292	2660.2	100	41490	2680
		100	41202	2651.2	50	41346	2665.6	100	41490	2680
		100	41193	2650.3	100	41391	2670.1	50	41535	2684.5
	75+75+100	75	41169	2647.9	75	41319	2662.9	100	41490	2680
		75	41170	2648	100	41341	2665.1	75	41512	2682.2
		100	41191	2650.1	75	41362	2667.2	75	41512	2682.2
	75+100+100	75	41121	2643.1	100	41292	2660.2	100	41490	2680
		100	41148	2645.8	75	41319	2662.9	100	41490	2680
		100	41143	2645.3	100	41341	2665.1	75	41512	2682.2
	100+100+100	100	41094	2640.4	100	41292	2660.2	100	41490	2680
Note 1: Carriers in increasing frequency order.										

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Intra-band non-contiguous CA

E-UTRA CA configuration / Bandwidth combination set							
E-UTRACA configuratio n	Uplink CA configuration s (NOTE 1)	Component carriers in order of increasing carrier frequency				Maximum aggregated bandwidth [MHz]	Bandwidth combinatio n set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_7A-7A	-	5	15			40	0
		10	10, 15				
		15	15, 20				
		20	20				
		5, 10, 15, 20	5, 10, 15, 20			40	1
		5, 10, 15, 20	5, 10, 15, 20			40	1
CA_41A-41A	-	10, 15, 20	10, 15, 20			40	0
		5, 10, 15, 20	5, 10, 15, 20			40	1
CA_41A-41D		5, 10, 15, 20	See CA_41D Bandwidth Combination Set 0 in Table 5.6A.1-1			80	0
		See CA_41D Bandwidth Combination Set 0 in Table 5.6A.1-1			5, 10, 15, 20		
CA_41A-41C	-	5, 10, 15, 20		See CA_41C Bandwidth Combination Set 1 in Table 5.4.2A.1-1		60	0
		See CA_41C Bandwidth Combination Set 1 in Table 5.4.2A.1-1		5, 10, 15, 20			
CA_41C-41C		See CA_41C Bandwidth Combination Set 0 in Table 5.6A.1-1		See CA_41C Bandwidth Combination Set 0 in Table 5.6A.1-1		80	0
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.							

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Test frequencies for CA_7A-7A

Test Frequency ID	CC-Combo / NRB_agg [RB]	CC1 Note1					Wgap [MHz]	CC2 Note1				
		BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]		BW [RB]	N _{UL}	f _{UL} [MHz]	N _{DL}	f _{DL} [MHz]
Max WGap	25+25	25	20775	2502.5	2775	2622.5	60	25	21425	2567.5	3425	2687.5
	25+50	25	20775	2502.5	2775	2622.5	55	50	21400	2565	3400	2685
		50	20800	2505	2800	2625	55	25	21425	2567.5	3425	2687.5
	25+75	25	20775	2502.5	2775	2622.5	50	75	21375	2562.5	3375	2682.5
		75	20825	2507.5	2825	2627.5	50	25	21425	2567.5	3425	2687.5
	50+50	50	20800	2505	2800	2625	50	50	21400	2565	3400	2685
	25+100	25	20775	2502.5	2775	2622.5	45	100	21350	2560	3350	2680
		100	20850	2510	2850	2630	45	25	21425	2567.5	3425	2687.5
	50+75	50	20800	2505	2800	2625	45	75	21375	2562.5	3375	2682.5
		75	20825	2507.5	2825	2627.5	45	50	21400	2565	3400	2685
	50+100	50	20800	2505	2800	2625	40	100	21350	2560	3350	2680
		100	20850	2510	2850	2630	40	50	21400	2565	3400	2685
	75+75	75	20825	2507.5	2825	2627.5	40	75	21375	2562.5	3375	2682.5
	75+100	75	20825	2507.5	2825	2627.5	35	100	21350	2560	3350	2680
		100	20850	2510	2850	2630	35	75	21375	2562.5	3375	2682.5
Refsens ²	100+100	100	20850	2510	2850	2630	30	100	21350	2560	3350	2680
	75+100	75	21025	2527.5	3025	2647.5	15	100	21350	2560	3350	2680
	100+100	100	21000	2525	3000	2645	15	100	21350	2560	3350	2680

Note 1: Carriers in increasing frequency order.

Note 2: Test point derived with regard to REFSSENS requirements.

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Test frequencies for CA_41A-41A

Test Frequency ID	CC-Combo / NRB_agg [RB]	CC1 Note1			Wgap [MHz]	CC2 Note1		
		BW [RB]	NUL/DL	fUL/DL [MHz]		BW [RB]	NUL/DL	fUL/DL [MHz]
Max WGap	25+25	25	39675	2498.5	184	25	41565	2687.5
	25+50	25	39675	2498.5	179	50	41540	2685
		50	39700	2501	179	25	41565	2687.5
	25+75	25	39675	2498.5	174	75	41515	2682.5
		75	39725	2503.5	174	25	41565	2687.5
	50+50	50	39700	2501	174	50	41540	2685
		25	39675	2498.5	169	100	41490	2680
	50+100	100	39750	2506	169	25	41565	2687.5
		50	39700	2501	169	75	41515	2682.5
	75+75	75	39725	2503.5	169	50	41540	2685
		50	39700	2501	164	100	41490	2680
	75+100	100	39750	2506	164	50	41540	2685
		75	39725	2503.5	164	75	41515	2682.5
	100+100	100	39750	2506	159	100	41490	2680
		100	39750	2506	154	100	41490	2680

Note 1: Carriers in increasing frequency order.

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Test frequencies for CA_41A-41D

Test frequency ID	CC-Combo / N _{RB_agg} [RB]	CC1 Note1			Wgap [MHz]	CC2 Note1			CC3 Note1			CC4 Note1		
		BW	NUL/DL	fUL/DL		BW	NUL/DL	fUL/DL	BW	NUL/DL	fUL/DL	BW	NUL/DL	fUL/DL
		[RB]	[MHz]	[MHz]		[RB]	[MHz]	[MHz]	[RB]	[MHz]	[MHz]	[RB]	[MHz]	[MHz]
Max Wgap	25+50+75+100	25	39675	2498.5	144.9	50	41199	2650.9	75	41319	2662.9	100	41490	2680
		25	39675	2498.5	144.7	50	41197	2650.7	100	41341	2665.1	75	41512	2682.2
		25	39675	2498.5	145.1	75	41226	2653.6	50	41346	2665.6	100	41490	2680
		25	39675	2498.5	144.5	75	41220	2653	100	41391	2670.1	50	41535	2684.5
		25	39675	2498.5	144.8	100	41248	2655.8	50	41392	2670.2	75	41512	2682.2
		25	39675	2498.5	144.4	100	41244	2655.4	75	41415	2672.5	50	41535	2684.5
	25+50+100+100	25	39675	2498.5	139.8	50	41148	2645.8	100	41292	2660.2	100	41490	2680
		25	39675	2498.5	140.2	100	41202	2651.2	50	41346	2665.6	100	41490	2680
		25	39675	2498.5	139.3	100	41193	2650.3	100	41391	2670.1	50	41535	2684.5
	25+75+75+100	25	39675	2498.5	139.4	75	41169	2647.9	75	41319	2662.9	100	41490	2680
		25	39675	2498.5	139.5	75	41170	2648	100	41341	2665.1	75	41512	2682.2
		25	39675	2498.5	139.1	100	41191	2650.1	75	41362	2667.2	75	41512	2682.2
	25+75+100+100	25	39675	2498.5	134.6	75	41121	2643.1	100	41292	2660.2	100	41490	2680
		25	39675	2498.5	134.8	100	41148	2645.8	75	41319	2662.9	100	41490	2680
		25	39675	2498.5	134.3	100	41143	2645.3	100	41341	2665.1	75	41512	2682.2
	25+100+100+100	25	39675	2498.5	129.4	100	41094	2640.4	100	41292	2660.2	100	41490	2680
	50+50+75+100	50	39700	2501	139.9	50	41199	2650.9	75	41319	2662.9	100	41490	2680
		50	39700	2501	139.7	50	41197	2650.7	100	41341	2665.1	75	41512	2682.2
		50	39700	2501	140.1	75	41226	2653.6	50	41346	2665.6	100	41490	2680
		50	39700	2501	139.5	75	41220	2653	100	41391	2670.1	50	41535	2684.5
		50	39700	2501	139.8	100	41248	2655.8	50	41392	2670.2	75	41512	2682.2
		50	39700	2501	139.4	100	41244	2655.4	75	41415	2672.5	50	41535	2684.5
	50+50+100+100	50	39700	2501	134.8	50	41148	2645.8	100	41292	2660.2	100	41490	2680
		50	39700	2501	135.2	100	41202	2651.2	50	41346	2665.6	100	41490	2680
		50	39700	2501	134.3	100	41193	2650.3	100	41391	2670.1	50	41535	2684.5
	50+75+75+100	50	39700	2501	134.4	75	41169	2647.9	75	41319	2662.9	100	41490	2680
		50	39700	2501	134.5	75	41170	2648	100	41341	2665.1	75	41512	2682.2
		50	39700	2501	134.1	100	41191	2650.1	75	41362	2667.2	75	41512	2682.2
		75	39725	2503.5	134.9	50	41199	2650.9	75	41319	2662.9	100	41490	2680
		75	39725	2503.5	134.7	50	41197	2650.7	100	41341	2665.1	75	41512	2682.2
		75	39725	2503.5	135.1	75	41226	2653.6	50	41346	2665.6	100	41490	2680
		75	39725	2503.5	134.5	75	41220	2653	100	41391	2670.1	50	41535	2684.5
		75	39725	2503.5	134.8	100	41248	2655.8	50	41392	2670.2	75	41512	2682.2
		75	39725	2503.5	134.4	100	41244	2655.4	75	41415	2672.5	50	41535	2684.5

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	50+75+ 100+100	50	39700	2501	129.6	75	41121	2643.1	100	41292	2660.2	100	41490	2680
		50	39700	2501	129.8	100	41148	2645.8	75	41319	2662.9	100	41490	2680
		50	39700	2501	129.3	100	41143	2645.3	100	41341	2665.1	75	41512	2682.2
		75	39725	2503.5	129.8	50	41148	2645.8	100	41292	2660.2	100	41490	2680
		75	39725	2503.5	130.2	100	41202	2651.2	50	41346	2665.6	100	41490	2680
		75	39725	2503.5	129.3	100	41193	2650.3	100	41391	2670.1	50	41535	2684.5
		100	39750	2506	129.9	50	41199	2650.9	75	41319	2662.9	100	41490	2680
		100	39750	2506	129.7	50	41197	2650.7	100	41341	2665.1	75	41512	2682.2
		100	39750	2506	130.1	75	41226	2653.6	50	41346	2665.6	100	41490	2680
		100	39750	2506	129.5	75	41220	2653	100	41391	2670.1	50	41535	2684.5
		100	39750	2506	129.8	100	41248	2655.8	50	41392	2670.2	75	41512	2682.2
		100	39750	2506	129.4	100	41244	2655.4	75	41415	2672.5	50	41535	2684.5
	50+100+ 100+100	50	39700	2501	124.4	100	41094	2640.4	100	41292	2660.2	100	41490	2680
		100	39750	2506	124.8	50	41148	2645.8	100	41292	2660.2	100	41490	2680
		100	39750	2506	125.2	100	41202	2651.2	50	41346	2665.6	100	41490	2680
		100	39750	2506	124.3	100	41193	2650.3	100	41391	2670.1	50	41535	2684.5
	75+75+ 75+100	75	39725	2503.5	129.4	75	41169	2647.9	75	41319	2662.9	100	41490	2680
		75	39725	2503.5	129.5	75	41170	2648	100	41341	2665.1	75	41512	2682.2
		75	39725	2503.5	129.1	100	41191	2650.1	75	41362	2667.2	75	41512	2682.2
	75+75+ 100+100	75	39725	2503.5	124.6	75	41121	2643.1	100	41292	2660.2	100	41490	2680
		75	39725	2503.5	124.8	100	41148	2645.8	75	41319	2662.9	100	41490	2680
		75	39725	2503.5	124.3	100	41143	2645.3	100	41341	2665.1	75	41512	2682.2
		100	39750	2506	124.4	75	41169	2647.9	75	41319	2662.9	100	41490	2680
		100	39750	2506	124.5	75	41170	2648	100	41341	2665.1	75	41512	2682.2
		100	39750	2506	124.1	100	41191	2650.1	75	41362	2667.2	75	41512	2682.2
	75+100+ 100+100	75	39725	2503.5	119.4	100	41094	2640.4	100	41292	2660.2	100	41490	2680
		100	39750	2506	119.6	75	41121	2643.1	100	41292	2660.2	100	41490	2680
		100	39750	2506	119.8	100	41148	2645.8	75	41319	2662.9	100	41490	2680
		100	39750	2506	119.3	100	41143	2645.3	100	41341	2665.1	75	41512	2682.2
	100+100+ 100+100	100	39750	2506	114.4	100	41094	2640.4	100	41292	2660.2	100	41490	2680

Note 1: Carriers in increasing frequency order.

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Test frequencies for CA_41A-41C

Test Frequency ID	CC-Combo / N _{RB_agg} [RB]	CC1 Note1			Wgap [MHz]	CC2 Note1			CC3 Note1		
		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]
Max WGap	25+25+100	25	39675	2498.5	164.05	25	41373	2668.3	100	41490	2680
		25	39675	2498.5	164	100	41440	2675	25	41557	2686.7
	25+50+100	25	39675	2498.5	159.1	50	41346	2665.6	100	41490	2680
		25	39675	2498.5	159.1	100	41391	2670.1	50	41535	2684.5
		50	39700	2501	159.05	25	41373	2668.3	100	41490	2680
		50	39700	2501	159	100	41440	2675	25	41557	2686.7
	25+75+75	25	39675	2498.5	159	75	41365	2667.5	75	41515	2682.5
	25+75+100	25	39675	2498.5	154.15	75	41319	2662.9	100	41490	2680
		25	39675	2498.5	154.1	100	41341	2665.1	75	41512	2682.2
		75	39725	2503.5	154.05	25	41373	2668.3	100	41490	2680
		75	39725	2503.5	154	100	41440	2675	25	41557	2686.7
	50+50+100	50	39700	2501	154.1	50	41346	2665.6	100	41490	2680
		50	39700	2501	154.1	100	41391	2670.1	50	41535	2684.5
	25+100+100	25	39675	2498.5	149.2	100	41292	2660.2	100	41490	2680
		100	39750	2506	149.05	25	41373	2668.3	100	41490	2680
		100	39750	2506	149	100	41440	2675	25	41557	2686.7
	50+75+75	50	39700	2501	154	75	41365	2667.5	75	41515	2682.5
	50+75+100	50	39700	2501	149.15	75	41319	2662.9	100	41490	2680
		50	39700	2501	149.1	100	41341	2665.1	75	41512	2682.2
		75	39725	2503.5	149.1	50	41346	2665.6	100	41490	2680
		75	39725	2503.5	149.1	100	41391	2670.1	50	41535	2684.5
	75+75+75	75	39725	2503.5	149	75	41365	2667.5	75	41515	2682.5
	50+100+100	50	39700	2501	144.2	100	41292	2660.2	100	41490	2680
		100	39750	2506	144.1	50	41346	2665.6	100	41490	2680
		100	39750	2506	144.1	100	41391	2670.1	50	41535	2684.5
	75+75+100	75	39725	2503.5	144.15	75	41319	2662.9	100	41490	2680
		75	39725	2503.5	144.1	100	41341	2665.1	75	41512	2682.2
		100	39750	2506	144	75	41365	2667.5	75	41515	2682.5
	75+100+100	75	39725	2503.5	139.2	100	41292	2660.2	100	41490	2680
		100	39750	2506	139.15	75	41319	2662.9	100	41490	2680
		100	39750	2506	139.1	100	41341	2665.1	75	41512	2682.2
	100+100+100	100	39750	2506	134.2	100	41292	2660.2	100	41490	2680
Note 1: Carriers in increasing frequency order.											

Note 1: Carriers in increasing frequency order.

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Test frequencies for CA_41C-41C

Test frequency ID	CC-Combo / N _{RB_agg} [RB]	CC1 Note1			CC2 Note1			Wgap [MHz]	CC3 Note1			CC4 Note1		
		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]		BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]
Max Wgap	50+50+100+100	50	39705	2501.5	100	39849	2515.9	134.7	50	41346	2665.6	100	41490	2680
		100	39750	2506	50	39894	2520.4	134.7	100	41391	2670.1	50	41535	2684.5
		50	39705	2501.5	100	39849	2515.9	134.2	100	41391	2670.1	50	41535	2684.5
		100	39750	2506	50	39894	2520.4	135.2	50	41346	2665.6	100	41490	2680
	50+75+75 100	50	39705	2501.5	100	39849	2515.9	134.1	75	41365	2667.5	75	41515	2682.5
		100	39750	2506	50	39894	2520.4	134.6	75	41365	2667.5	75	41515	2682.5
		75	39725	2503.5	75	39875	2518.5	134.6	50	41346	2665.6	100	41490	2680
		75	39725	2503.5	75	39875	2518.5	134.1	100	41391	2670.1	50	41535	2684.5
	50+75+100+100	50	39705	2501.5	100	39849	2515.9	129.5	75	41319	2662.9	100	41490	2680
		100	39750	2506	50	39894	2520.4	129.7	100	41341	2665.1	75	41512	2682.2
		50	39705	2501.5	100	39849	2515.9	129.2	100	41341	2665.1	75	41512	2682.2
		100	39750	2506	50	39894	2520.4	130	75	41319	2662.9	100	41490	2680
		75	40523	2583.3	100	40694	2600.4	50.2	50	41346	2665.6	100	41490	2680
		100	39750	2506	75	39921	2523.1	129.5	100	41391	2670.1	50	41535	2684.5
		100	39750	2506	75	39921	2523.1	130	50	41346	2665.6	100	41490	2680
		75	40523	2583.3	100	40694	2600.4	49.7	100	41391	2670.1	50	41535	2684.5
	50+100+100+100	50	39705	2501.5	100	39849	2515.9	124.3	100	41292	2660.2	100	41490	2680
		100	39750	2506	50	39894	2520.4	124.8	100	41292	2660.2	100	41490	2680
		100	39750	2506	100	39948	2525.8	124.8	50	41346	2665.6	100	41490	2680
		100	39750	2506	100	39948	2525.8	124.3	100	41391	2670.1	50	41535	2684.5
	75+75+75+100	75	40523	2583.3	100	40694	2600.4	49.6	75	41365	2667.5	75	41515	2682.5
		100	39750	2506	75	39921	2523.1	129.4	75	41365	2667.5	75	41515	2682.5
		75	39725	2503.5	75	39875	2518.5	129.4	75	41319	2662.9	100	41490	2680
		75	39725	2503.5	75	39875	2518.5	129.1	100	41341	2665.1	75	41512	2682.2
	75+75+100+100	75	39725	2503.5	75	39875	2518.5	124.2	100	41292	2660.2	100	41490	2680
		100	39750	2506	100	39948	2525.8	124.2	75	41365	2667.5	75	41515	2682.5
	75+100+100+100	75	40523	2583.3	100	40694	2600.4	39.8	100	41292	2660.2	100	41490	2680
		100	39750	2506	75	39921	2523.1	119.6	100	41292	2660.2	100	41490	2680
		100	39750	2506	100	39948	2525.8	119.6	75	41319	2662.9	100	41490	2680
		100	39750	2506	100	39948	2525.8	119.3	100	41341	2665.1	75	41512	2682.2
	100+100+100+100	100	39750	2506	100	39948	2525.8	114.4	100	41292	2660.2	100	41490	2680

Note 1: Carriers in increasing frequency order.

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1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
IEEE Std C95.1 – 1991	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01 3G SAR Procedures v03r01	3G SAR Measurement Procedures
KDB 941225 D05 SAR for LTE Devices v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
KDB 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02	Rel. 10 LTE SAR Test Guidance and KDB Inquiries
KDB 248227 D01 802.11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 941225 D06 Hotspot Mode SAR v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB447498 D03 Supplement C Cross-Reference v01	OET Bulletin 65, Supplement C Cross-Reference
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations

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1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	1.60 mW/g	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Notes:

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

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

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

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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.)

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2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards.	
Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

Table 2 : The Ambient Conditions

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3 SAR Measurements System Configuration

3.1 The SAR Measurement System

This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E|/2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

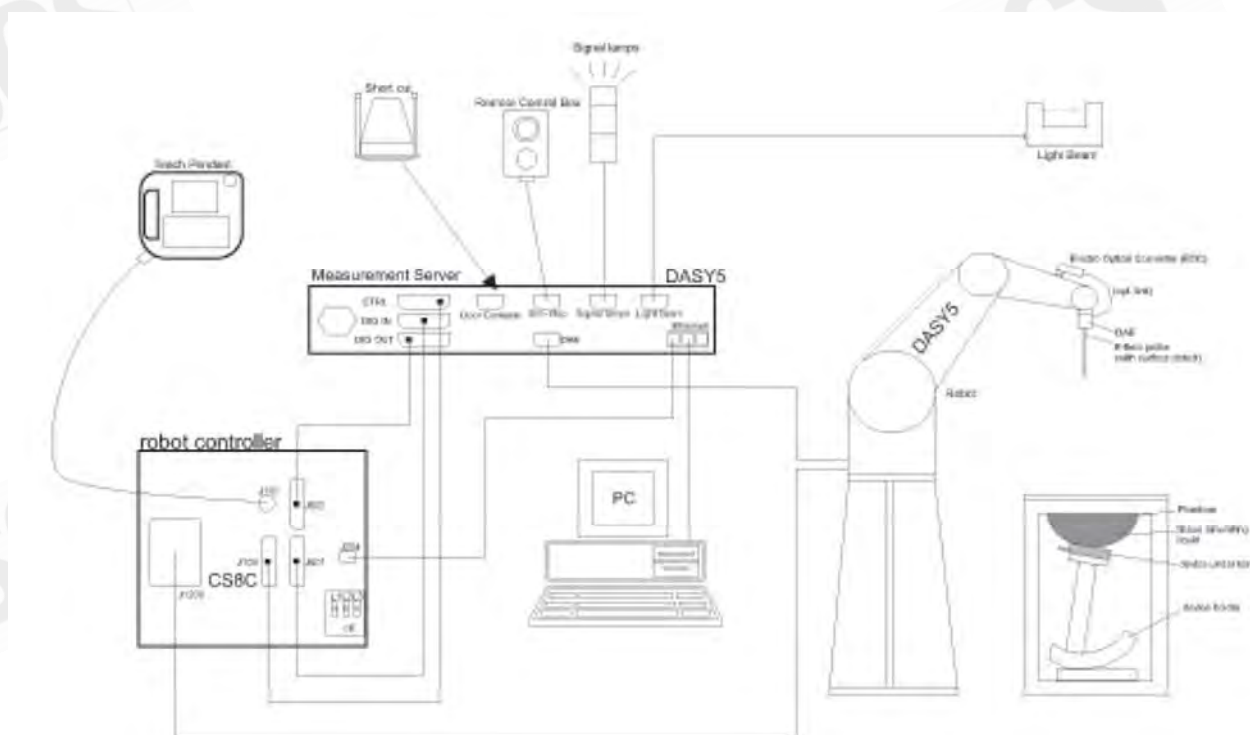
The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

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 between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

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- 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

3.2 Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	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
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

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3.3 Data Acquisition Electronics (DAE)

Model	DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5 μ V (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm



3.4 SAM Twin Phantom

Material	Vynlester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 $\pm$ 0.2 mm (6 $\pm$ 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table



The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

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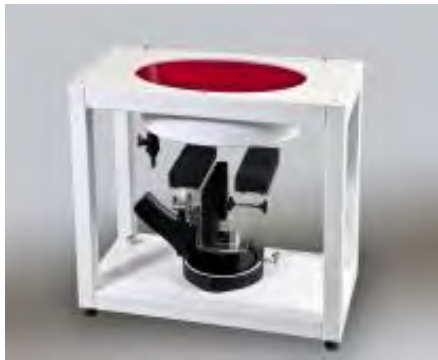
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3.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

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3.6 Device Holder for Transmitters



F-2. Device Holder for Transmitters

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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3.7 Measurement procedure

3.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 32mm*32mm*30mm ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification). The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

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

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. $\pm 5 \%$

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3.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.7.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
- Conversion factor	ConvFi	
- Diode compression point	Dcpi	
Device parameters:	- Frequency	f
- Crest factor	cf	
Media parameters:	- Conductivity	ε
- Density	ρ	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

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E-field probes:

$$E_i = (V_i / \text{Norm}_i \cdot \text{ConvF})^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2) / f$$

With V_i = compensated signal of channel i ($i = x, y, z$)

Norm_i = sensor sensitivity of channel i ($i = x, y, z$)

[mV/(V/m)2] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{\text{tot}} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$\text{SAR} = (E_{\text{tot}}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ϵ = equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{\text{pwe}} = E_{\text{tot}}^2 / 3770 \quad \text{or} \quad P_{\text{pwe}} = H_{\text{tot}}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm2

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m

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4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

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

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

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

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

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4.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

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5 Description of Test Position

5.1 Body Exposure Condition

5.1.1 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

5.2 Proximity Sensor Triggering Test

Description of proximity sensor Techniques:

The proximity sensor is triggered by capacitance changes due to objects in the vicinity of the sensing element.

Capacitive proximity sensor share a metallic electrode with the WCDMA and LTE antenna radiator. The metallic electrode and sar sensor chip works as a sensor.

The proximity sensor or the power reduction cannot be intentionally or unintentionally turned-off by the user.

The expected capacitance trigger values are programmed in each device for each power back-off stage.

Capacitance trigger value is C1

When a certain object or human body approaches the DUT, if the measured capacitance is lower than C1, proximity sensor is not triggered. If the measured capacitance is equal to C1 or higher than C1, the power back-off is triggered.

The common scene is wifi connected when E5 products are used. The product goes into standby mode when there is no USB plug, no external power supply, no wifi access and LCD off screen. In order to ensure SAR meet the requirements, when the product goes into the standby mode, the power level reduced is launched. When the product exits the standby mode, the power is reduced depending on whether the measured capacitance is equal to or higher than C1.

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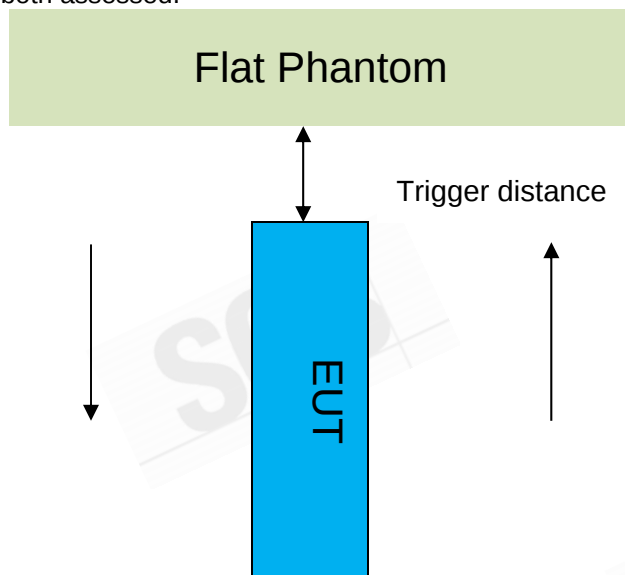
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1) Proximity sensor triggering distances

The Proximity sensor triggering was applied to GSM850,1900; WCDMA Band 2, 4,5; LTE Band 2,4,5,7,38,41. 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.



GSM Antenna				
Proximity Sensor Triggering Distance(mm)				
Position	Front	Back	Right	Bottom
Minimum	23	23	25	12
Required SAR Test	22	22	24	11
WCDMA/LTE Antenna				
Proximity Sensor Triggering Distance(mm)				
Position	Front	Back	Right	Bottom
Minimum	17	17	21	10
Required SAR Test	16	16	20	10

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Antenna	Band	Trigger Condition	Body exposure condition
			Power reduction(dB)
Main Antenna	GPSR 850 1ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	1.5
Main Antenna	GPSR 850 2ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	2
Main Antenna	GPSR 850 3ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	3
Main Antenna	GPSR 850 4ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	3
Main Antenna	GPSR 1900 1ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	0
Main Antenna	GPSR 1900 2ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	2
Main Antenna	GPSR 1900 3ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	1.5
Main Antenna	GPSR 1900 4ST	Front side: 23mm Back side: 23mm right side: 25mm bottom : 12mm	1.5
Main Antenna	WCDMA B2	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	3
Main Antenna	WCDMA B4	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	3.5
Main Antenna	WCDMA B5	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	1.5

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Main Antenna	LTE B2	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	3
Main Antenna	LTE B4	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	3.5
Main Antenna	LTE B5	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	2
Main Antenna	LTE B7	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	3
Main Antenna	LTE B38	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	1
Main Antenna	LTE B41	Front side: 17mm Back side: 17mm right side: 21mm bottom : 10mm	1

Note: SAR tests with proximity sensor power reduction are only required for the sides of frequency bands in the table above. For the other sides and bottom sides of WCDMA/LTE or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off and the separation is 10mm.

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Band/Mode	Ch#	Measured Power(dBm)		Reduction levels(dB)
		Max. Power	Power back-off	
GPSR 850 4ST	190	27.53	25.17	2.36
GPSR 1900 4ST	661	24.44	22.91	1.53
WCDMA B2 RMC 12.2kbps	9400	22.58	19.67	2.91
WCDMA B4 RMC 12.2kbps	1412	22.55	19.97	2.58
WCDMA B5 RMC 12.2kbps	4182	22.39	20.98	1.41
LTE B2(BW20, QPSK 1RB 0Offset)	18900	22.79	19.86	2.93
LTE B4(BW20, QPSK 1RB 0Offset)	20175	22.83	19.02	3.81
LTE B5(BW10, QPSK 1RB 0Offset)	20525	22.95	20.72	2.23
LTE B7(BW20, QPSK 1RB 0Offset)	21100	22.31	19.14	3.17
LTE B38(BW20, QPSK 1RB 0Offset)	38000	22.63	21.37	1.26
LTE B41(BW20, QPSK 1RB 0Offset)	21100	22.44	21.25	1.19

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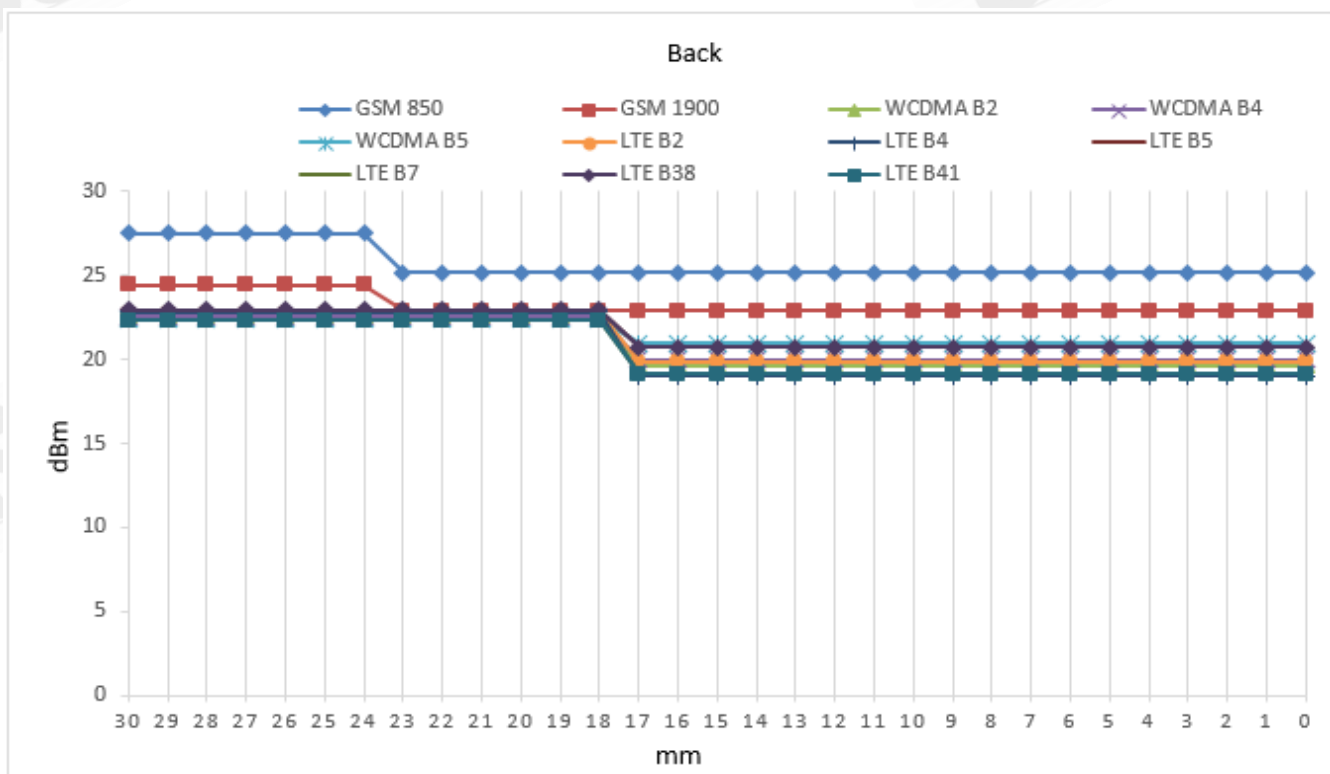
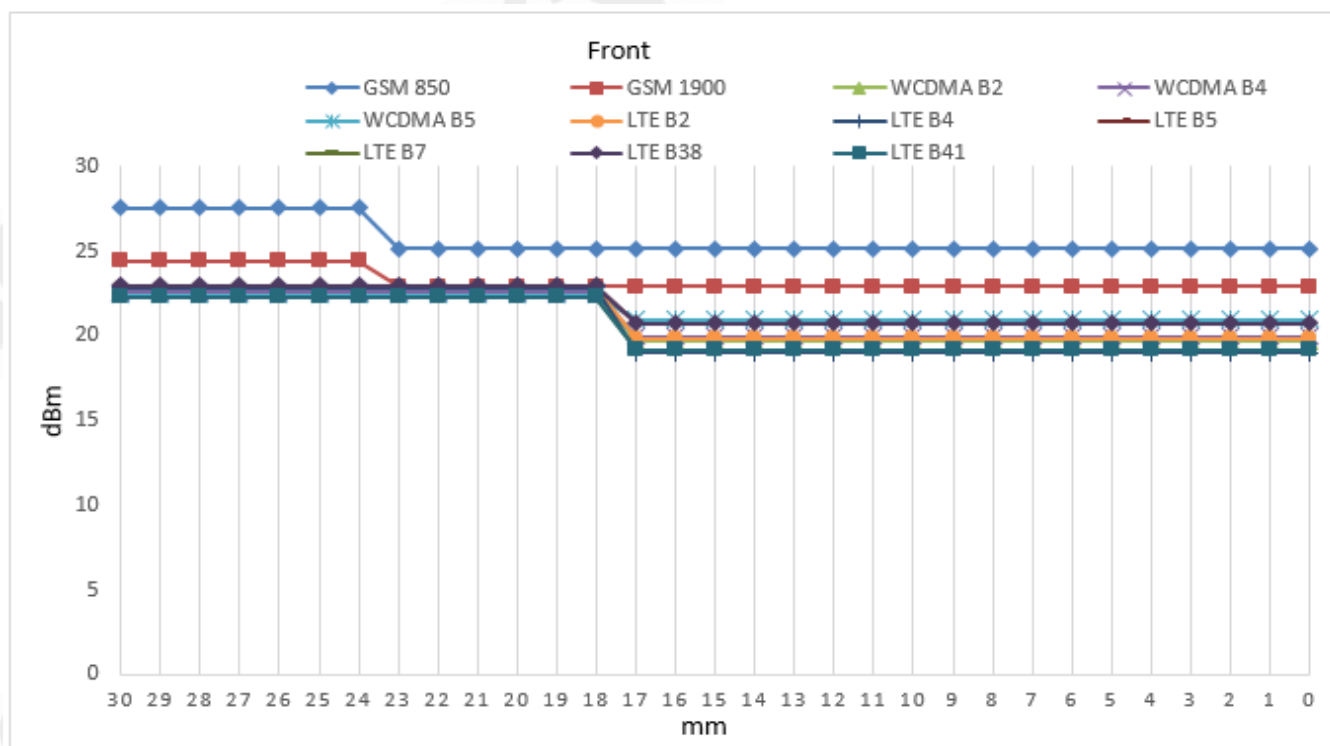
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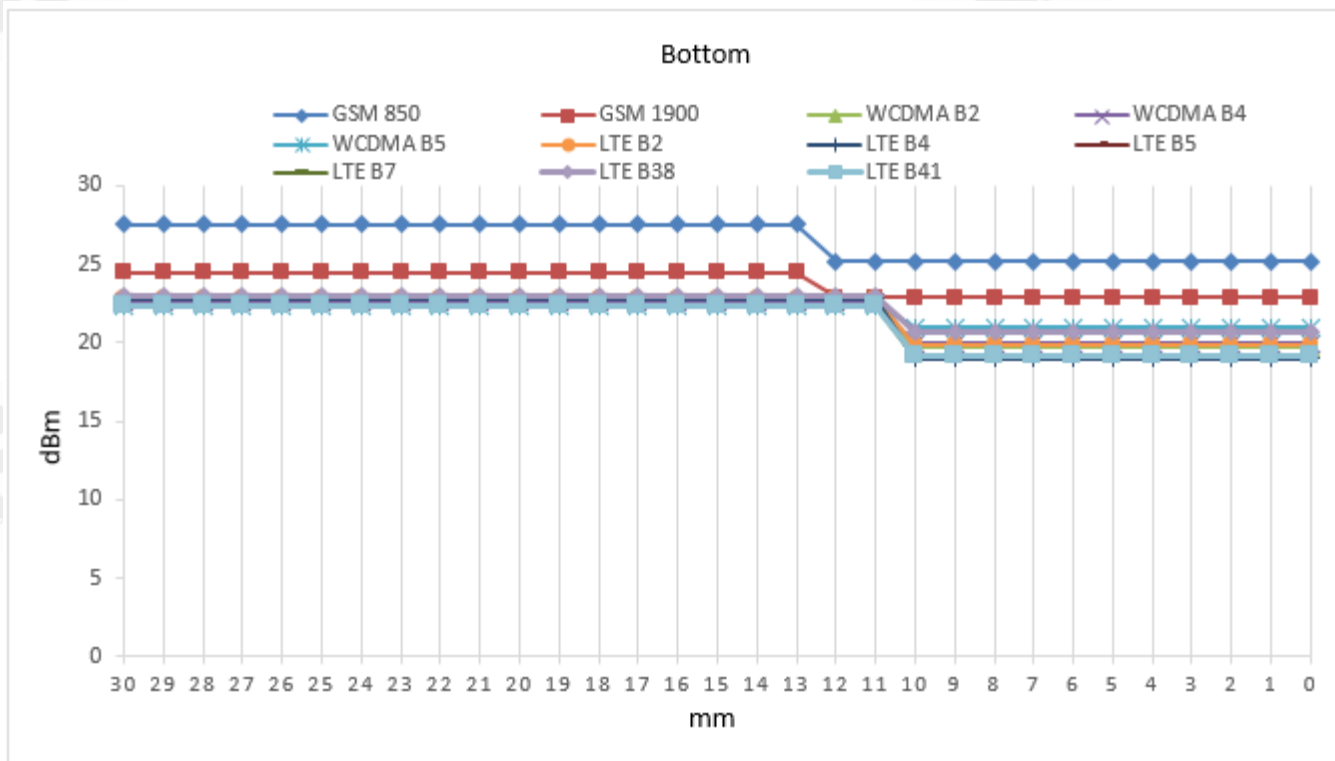
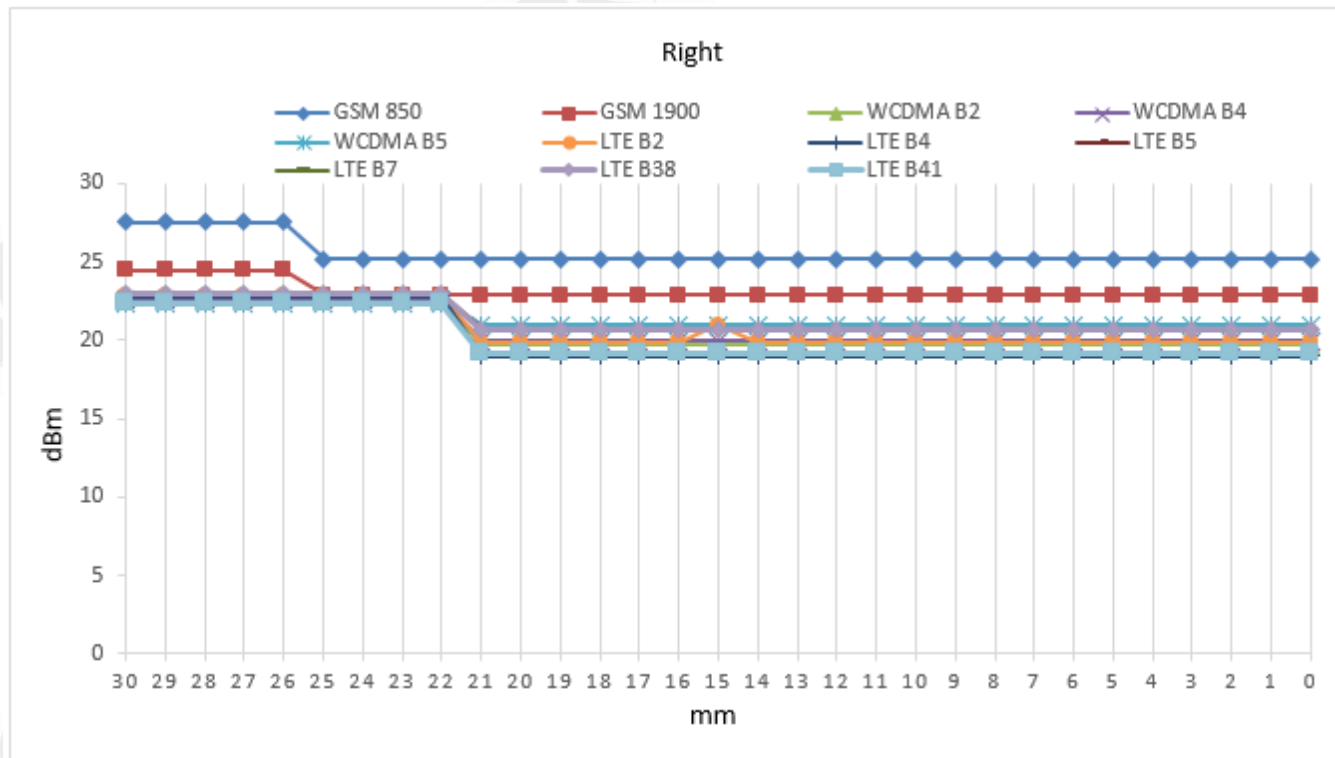
● UT Moving Toward (Trigger) the Phantom



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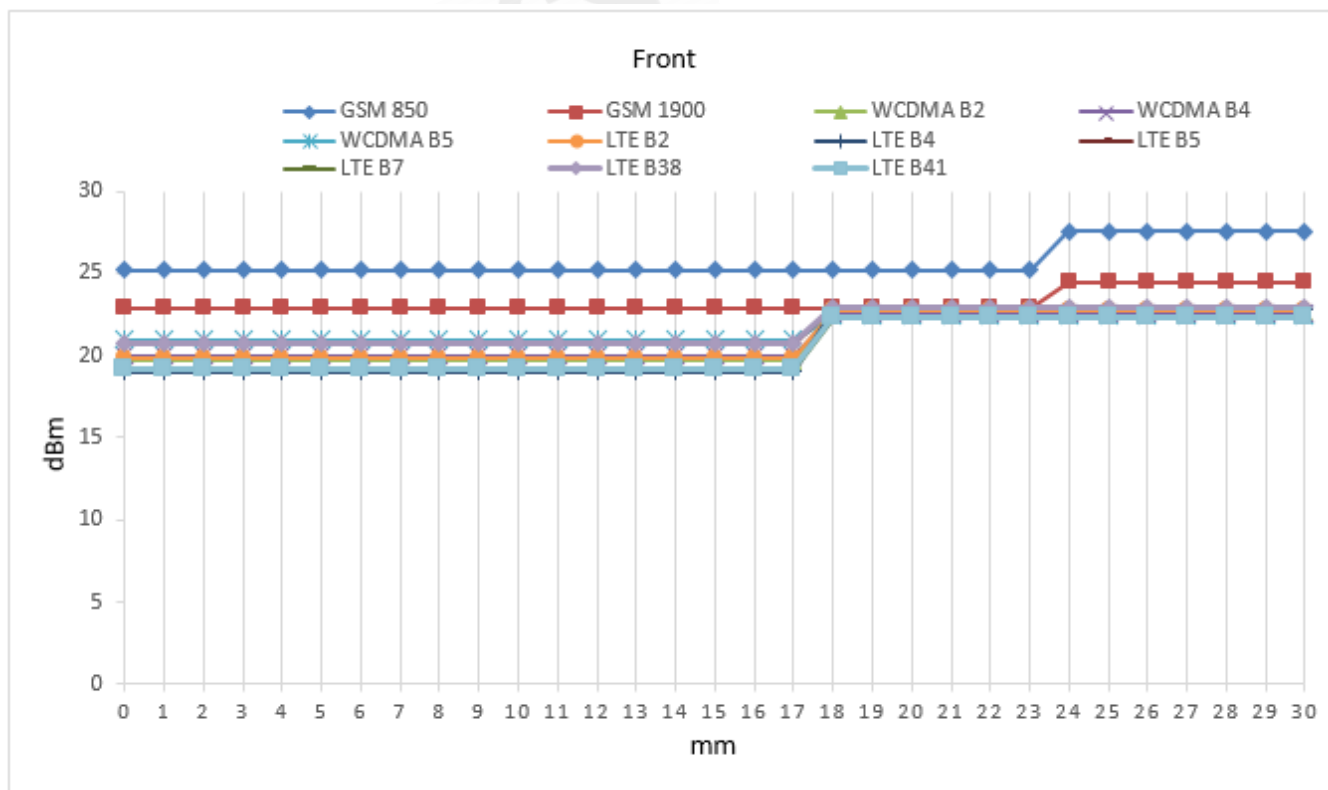


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● DUT Moving Away (Release) from the Phantom



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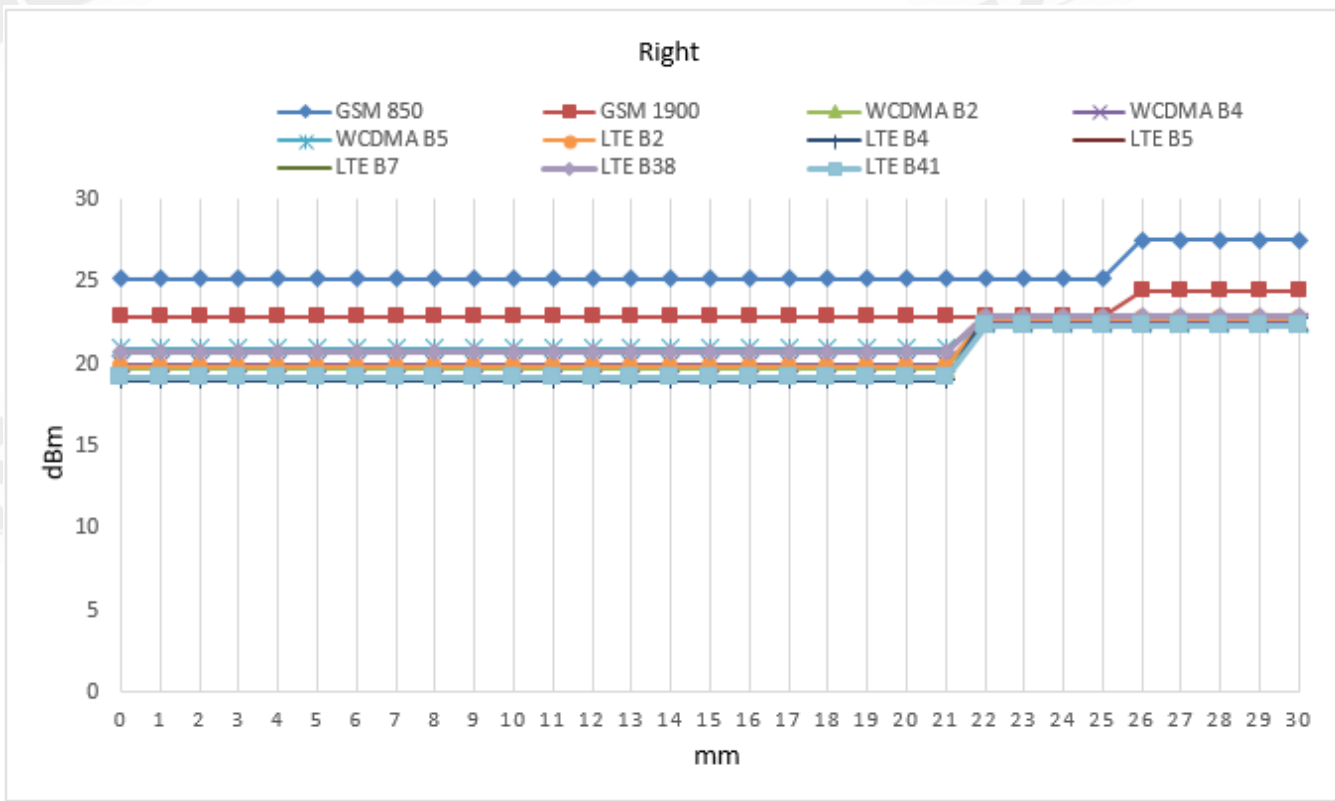
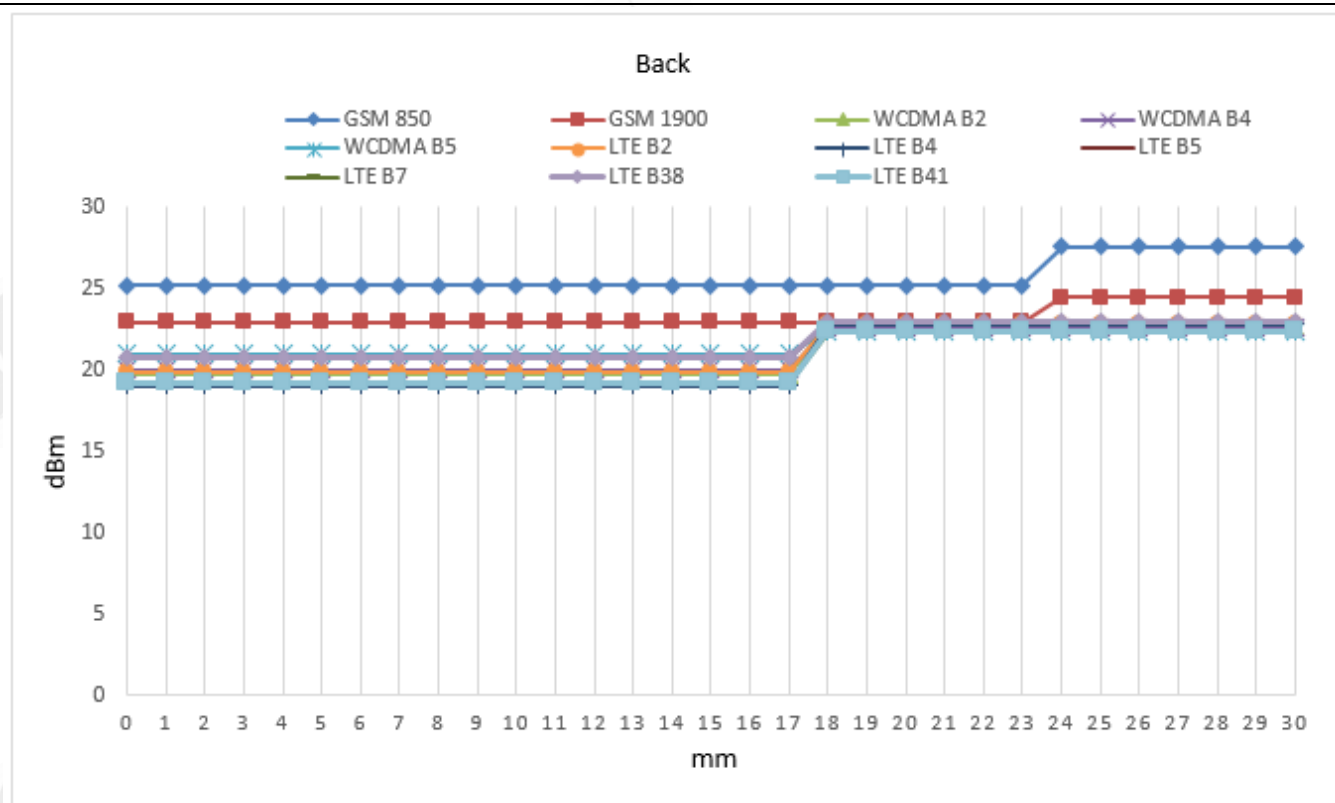
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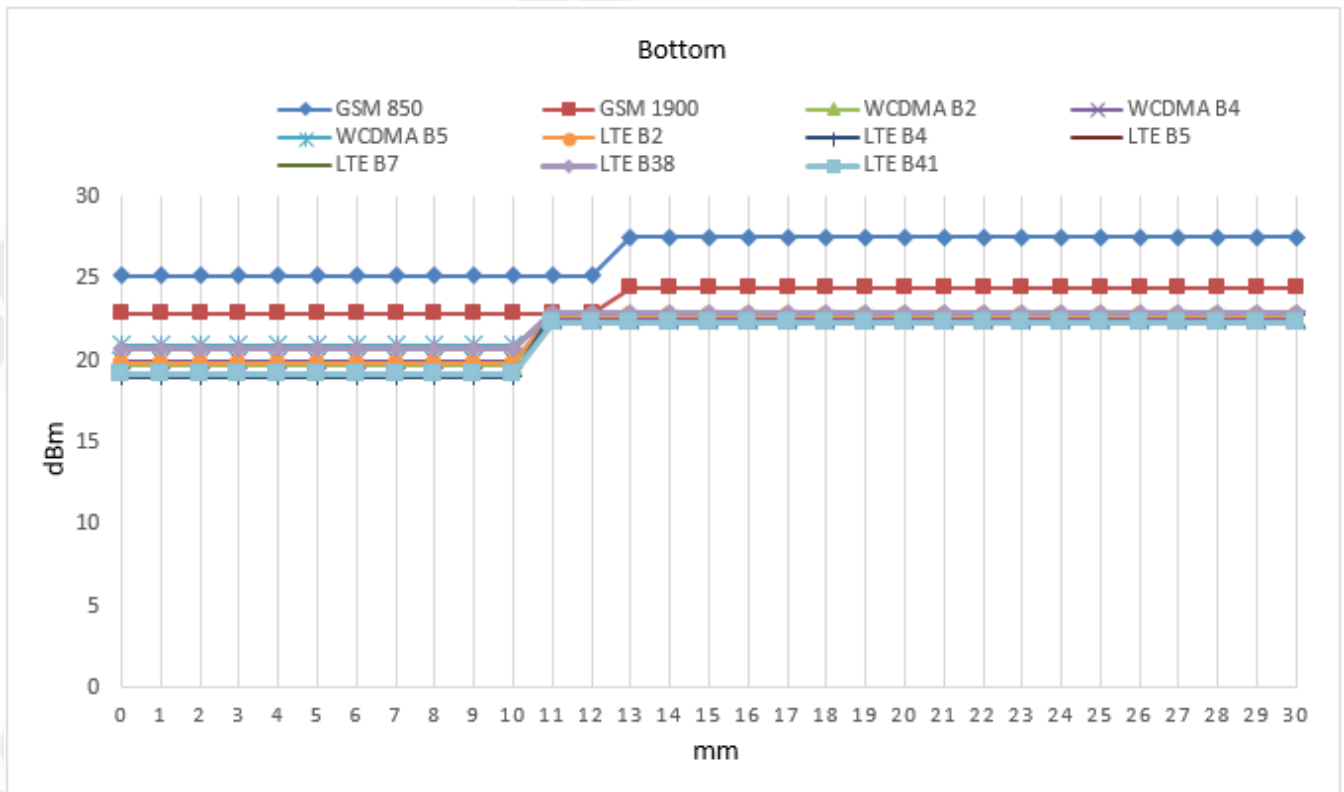
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2) Proximity sensor coverage

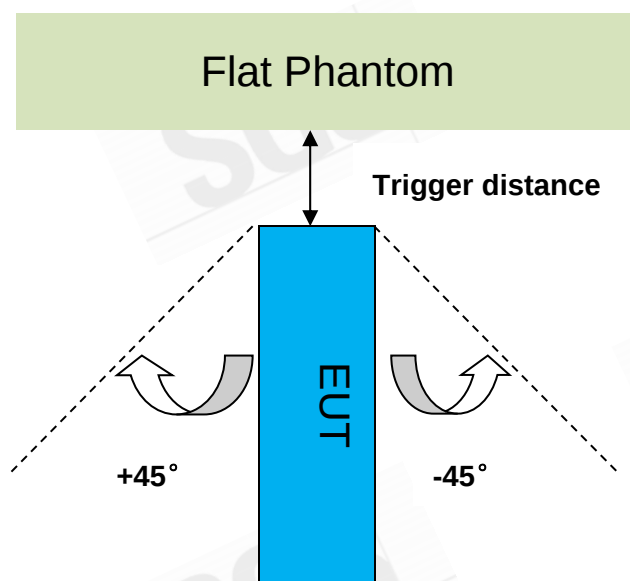
If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing,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

The proximity sensor and main antenna use same metallic electrode, so there is no spatial offset.

3) Device tilt angle influences to proximity sensor triggering

The influence of device tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, at 17 mm separation.

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° , and the maximum output power remains in the reduced mode.



The Sensor Triggering Distance(mm)	
Position	Right
Minimum(GSM)	25
Required SAR Test(GSM)	24
Minimum(WCDMA/LTE)	21
Required SAR Test(WCDMA/LTE)	20

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Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering for Right Side													
Band(MHz)	Minimum trigger distance Per KDB616217\$6.2	Minimum trigger distance at which power reduction was maintained over $\pm 45^\circ$	Power Reduction Status										
			-45°	-35°	-25°	-15°	-5°	0°	5°	15°	25°	35°	45°
GSM 850	25mm	25mm	on	on	on	on	on	on	on	on	on	on	on
GSM 1900	25mm	25mm	on	on	on	on	on	on	on	on	on	on	on
WCDMA B2	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
WCDMA B4	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
WCDMA B5	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B2	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B4	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B5	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B7	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B38	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on
LTE B41	21mm	21mm	on	on	on	on	on	on	on	on	on	on	on

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6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

The following tables give the recipes for tissue simulating liquids to be used in different frequency bands:

Ingredients (% by weight)	Frequency (MHz)				
	750	800-900	1800-2000	2300-2500	2500-2700
Tissue Type	Body	Body	Body	Body	Body
Water	50.3	50.75	70.17	68.53	72.26
Salt (NaCl)	1.60	0.94	0.39	0.1	0.1
Sucrose	47.0	48.21	0	0	0
HEC	0.52	0	0	0	0
Bactericide	0.05	0.10	0	0	0
Tween	0	0	29.44	31.37	27.74
Salt: 99+% Pure Sodium Chloride Water: De-ionized, 16 MΩ ⁺ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate			Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose		

Table 3 : Recipe of Tissue Simulate Liquid

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6.1.2 Measurement for Tissue Simulate Liquid

The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $22 \pm 2^\circ\text{C}$.

Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^\circ\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
835 Body	835	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.301	1.003	22.1	2017/7/27
835 Body	835	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.316	0.992	22.1	2017/8/1
1750 Body	1750	53.4 (50.73~56.07)	1.49 (1.42~1.56)	53.088	1.537	22.2	2017/7/28
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	53.234	1.51	22.3	2017/7/26
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	53.19	1.513	22.3	2017/8/4
2450 Body	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	53.314	1.966	22	2017/8/3
2600 Body	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	52.944	2.132	22.1	2017/7/30
2600 Body	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	52.006	2.175	22.1	2017/8/20

Table 4 : Measurement result of Tissue electric parameters

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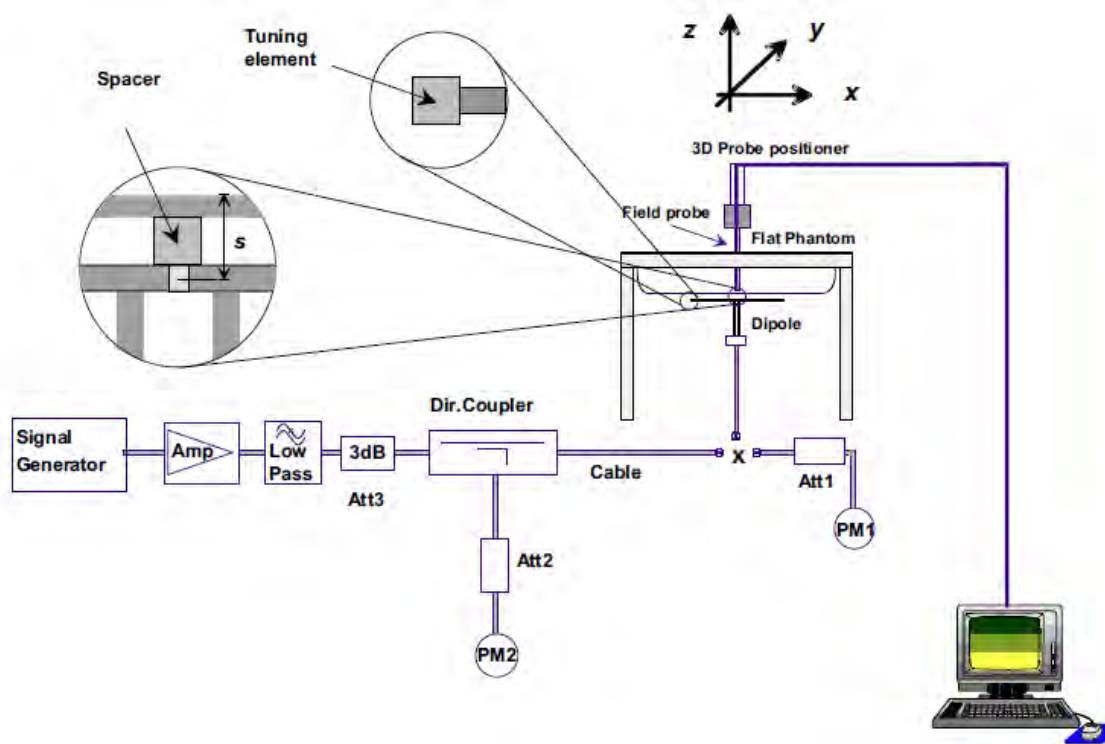
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6.2 SAR System Check

The microwave circuit arrangement for system check is sketched in bellow figure. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table. During the tests, the ambient temperature of the laboratory was in the range $22\pm 2^{\circ}\text{C}$, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-3. the microwave circuit arrangement used for SAR system check

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6.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

- a) There is no physical damage on the dipole;
- b) System check with specific dipole is within 10% of calibrated value;
- c) Return-loss is within 10% of calibrated measurement;
- d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

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6.2.2 Summary System Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1w)	Measured SAR (normalized to 1w)	Target SAR (normalized to 1w) (±10%)	Target SAR (normalized to 1w) (±10%)	Liquid Temp. (°C)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D835V2	Body	2.49	1.63	9.96	6.52	9.65 (8.69~10.62)	6.46 (5.81~7.11)	22.1	2017/7/27
D835V2	Body	2.6	1.7	10.4	6.8	9.65 (8.69~10.62)	6.46 (5.81~7.11)	22.1	2017/8/1
D1750V2	Body	9.54	5.05	38.16	20.2	37 (33.30~40.70)	19.7 (17.73~21.67)	22.2	2017/7/28
D1900V2	Body	10.8	5.68	43.2	22.72	41.6 (37.44~45.76)	21.4 (19.26~23.54)	22.3	2017/7/26
D1900V2	Body	10.8	5.67	43.2	22.68	41.6 (37.44~45.76)	21.4 (19.26~23.54)	22.3	2017/8/4
D2450V2	Body	12.2	5.59	48.8	22.36	51.0 (45.9~56.1)	23.5 (21.15~25.85)	22	2017/8/3
D2600V2	Body	13.4	5.97	53.6	23.88	54.2 (48.78~59.62)	24.3 (21.87~26.73)	22.1	2017/7/30
D2600V2	Body	13.6	6.1	54.4	24.4	54.2 (48.78~59.62)	24.3 (21.87~26.73)	22.1	2017/8/20

Table 5 : SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A

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7 Test Configuration

7.1 3G SAR Test Reduction Procedure

According to KDB 941225D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. 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 ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as "otherwise" in the applicable procedures; SAR measurement is required for the secondary mode.

7.2 Operation Configurations

7.2.1 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to "5" and "0" in SAR of GSM 850 and GSM 1900. The tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data 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.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode

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7.2.2 WCDMA Test Configuration

1) . Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1's" for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2) . Body SAR

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

3) . HSDPA / HSUPA / DC-HSDPA

According to KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA 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 to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA

a) HSDPA

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) are set according to values indicated in the following table. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	β_c	Bd	β_d (SF)	β_c/β_d	β_{hs}	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	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

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Note1: ΔACK , ΔNACK and $\Delta\text{CQI} = 8$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 \cdot \beta_c$

Note2: 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 5.13.1.A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, ΔACK and $\Delta\text{NACK} = 8$ ($A_{hs} = 30/15$) with $\beta_{hs} = 30/15 \cdot \beta_c$, and $\Delta\text{CQI} =$

7 ($A_{hs} = 24/15$) with $\beta_{hs} = 24/15 \cdot \beta_c$.

Note3: $CM = 1$ 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.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI"s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 6 : settings of required H-Set 1 QPSK acc. to 3GPP 34.121

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HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumH S-DSCH Transport BlockBits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 7 : HSDPA UE category

b) HSUPA

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSUPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset“ and „Release 5 HSUPA Data Device“ sections of 3G device.

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Sub-test ^⓪	$\beta_{\text{e}}^{\text{⓪}}$	$\beta_{\text{d}}^{\text{⓪}}$	β_{d} (SF) ^⓪	$\beta_{\text{e}}/\beta_{\text{d}}^{\text{⓪}}$	$\beta_{\text{hs}}^{\text{(1)⓪}}$	$\beta_{\text{e}}^{\text{⓪}}$	$\beta_{\text{ad}}^{\text{⓪}}$	$\beta_{\text{e}}^{\text{⓪}}$ (SF) ^⓪	$\beta_{\text{ad}}^{\text{⓪}}$ (code) ^⓪	CM ^{(2)⓪} (dB) ^⓪	MP R ^⓪ (dB) ^⓪	AG ^{(4)⓪} Inde x ^⓪	E- TFC I ^⓪
1 ^⓪	11/15 ^{(3)⓪}	15/15 ^{(3)⓪}	64 ^⓪	11/15 ^{(3)⓪}	22/15 ^⓪	209/225 ^⓪	1039/225 ^⓪	4 ^⓪	1 ^⓪	1.0 ^⓪	0.0 ^⓪	20 ^⓪	75 ^⓪
2 ^⓪	6/15 ^⓪	15/15 ^⓪	64 ^⓪	6/15 ^⓪	12/15 ^⓪	12/15 ^⓪	94/75 ^⓪	4 ^⓪	1 ^⓪	3.0 ^⓪	2.0 ^⓪	12 ^⓪	67 ^⓪
3 ^⓪	15/15 ^⓪	9/15 ^⓪	64 ^⓪	15/9 ^⓪	30/15 ^⓪	30/15 ^⓪	$\beta_{\text{ad}1}:47/15^{\text{⓪}}$ $\beta_{\text{ad}2}:47/15^{\text{⓪}}$	4 ^⓪	2 ^⓪	2.0 ^⓪	1.0 ^⓪	15 ^⓪	92 ^⓪
4 ^⓪	2/15 ^⓪	15/15 ^⓪	64 ^⓪	2/15 ^⓪	4/15 ^⓪	2/15 ^⓪	56/75 ^⓪	4 ^⓪	1 ^⓪	3.0 ^⓪	2.0 ^⓪	17 ^⓪	71 ^⓪
5 ^⓪	15/15 ^{(4)⓪}	15/15 ^{(4)⓪}	64 ^⓪	15/15 ^{(4)⓪}	30/15 ^⓪	24/15 ^⓪	134/15 ^⓪	4 ^⓪	1 ^⓪	1.0 ^⓪	0.0 ^⓪	21 ^⓪	81 ^⓪
Note 1: ΔACK , ΔNACK and $\Delta \text{CQI}=8$ $A_{\text{hs}} = \beta_{\text{hs}}/\beta_{\text{e}} = 30/15$ $\beta_{\text{hs}} = 30/15 * \beta_{\text{e}}^{\text{⓪}}$ Note 2: CM = 1 for $\beta_{\text{e}}/\beta_{\text{d}} = 12/15$, $\beta_{\text{hs}}/\beta_{\text{e}} = 24/15$. For all other combinations of DPDCH, DPCCCH, HS-DPCCCH, E-DPDCH and E-DPCCCH the MPR is based on the relative CM difference ^⓪ Note 3 : For subtest 1 the $\beta_{\text{e}}/\beta_{\text{d}}$ 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 $\beta_{\text{e}} = 10/15$ and $\beta_{\text{d}} = 15/15^{\text{⓪}}$ Note 4 : For subtest 5 the $\beta_{\text{e}}/\beta_{\text{d}}$ ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_{\text{e}} = 14/15$ and $\beta_{\text{d}} = 15/15^{\text{⓪}}$ Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g ^⓪ Note 6: β_{ad} can not be set directly; it is set by Absolute Grant Value. ^⓪													

Table 8 : Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
	4	8	10	2SF2&2SF	11484	5.76
6 (No DPDCH)	4	4	2	4	20000	2.00
	4	8	2	2SF2&2SF	22996	?
7 (No DPDCH)	4	4	10	4	20000	?
	4	4	10	4	20000	?
NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4. UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM. (TS25.306-7.3.0).						

Table 9 : HSUPA UE category

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c) DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a Second serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH E_c/I_{or}	dB	-10
P-CCPCH and SCH E_c/I_{or}	dB	-12
PICH E_c/I_{or}	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH E_c/I_{or}	dB	-5
OCNS E_c/I_{or}	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13.

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK.

Parameter	Value
Nominal average inf. bit rate	60 kbit/s
Inter-TTI Distance	1 TTI's
Number of HARQ Processes	6 Processes
Information Bit Payload	120 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	960 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	3200 SMLs
Coding Rate	0.15
Number of Physical Channel Codes	1

Table 10 : settings of required H-Set 12 QPSK acc. to 3GPP 34.121

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 above.

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2. Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

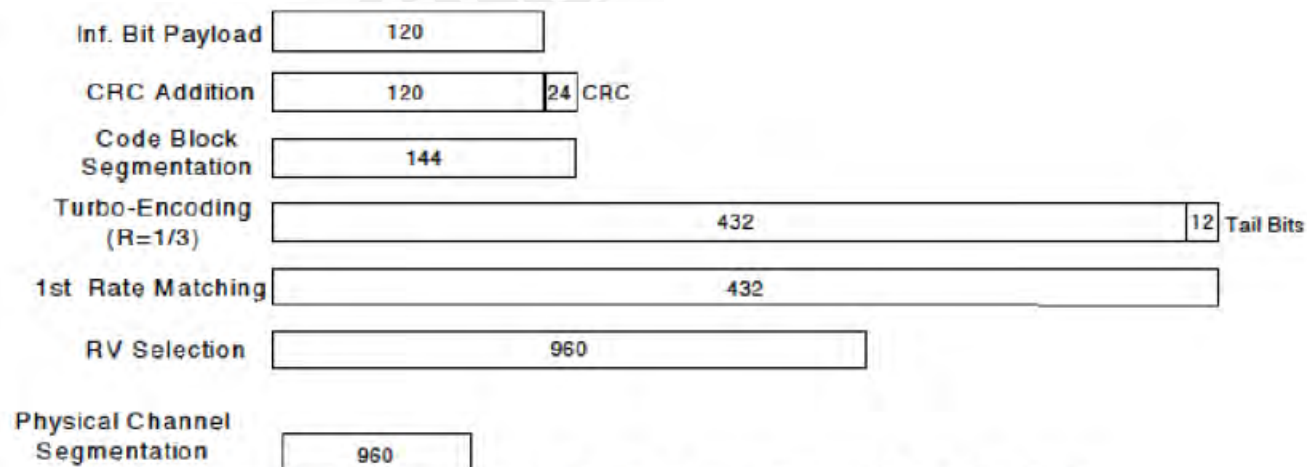


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

Sub-test ¹⁾	β_c ²⁾	β_d ³⁾	β_d (SF) ⁴⁾	β_c/β_d ⁵⁾	$\beta_{hs}(1)$ ⁶⁾	CM(dB)(2) ⁷⁾	MPR (dB) ⁸⁾
1 ⁹⁾	2/15 ¹⁰⁾	15/15 ¹¹⁾	64 ¹²⁾	2/15 ¹³⁾	4/15 ¹⁴⁾	0.0 ¹⁵⁾	0 ¹⁶⁾
2 ¹⁷⁾	12/15(3) ¹⁸⁾	15/15(3) ¹⁹⁾	64 ²⁰⁾	12/15(3) ²¹⁾	24/15 ²²⁾	1.0 ²³⁾	0 ²⁴⁾
3 ²⁵⁾	15/15 ²⁶⁾	8/15 ²⁷⁾	64 ²⁸⁾	15/8 ²⁹⁾	30/15 ³⁰⁾	1.5 ³¹⁾	0.5 ³²⁾
4 ³³⁾	15/15 ³⁴⁾	4/15 ³⁵⁾	64 ³⁶⁾	15/4 ³⁷⁾	30/15 ³⁸⁾	1.5 ³⁹⁾	0.5 ⁴⁰⁾

Note 1: ΔACK , $\Delta NACK$ and $\Delta CQI = 8$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$ ⁴¹⁾

Note 2: 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.⁴²⁾

Note 3: For subtest 2 the β_c/β_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 $\beta_d = 15/15$ ⁴³⁾

Up commands are set continuously to set the UE to Max power.

Note:

1. The Dual Carriers transmission only applies to HSDPA physical channels
2. The Dual Carriers belong to the same Node and are on adjacent carriers.
3. The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation
4. The Dual Carriers operate in the same frequency band .
5. The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.
6. The device doesn't support carrier aggregation for it just can operate in Release 8.

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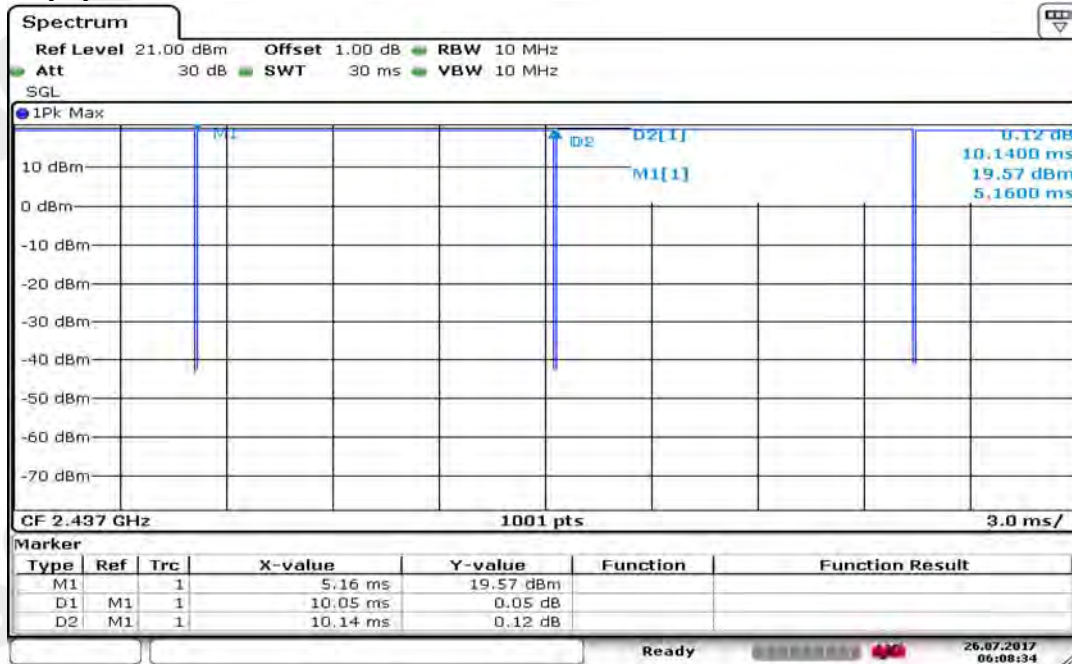
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7.2.3 WiFi Test Configuration

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

- 2.4G WIFI SISO

Duty cycle=10.05/10.14 =99.11%



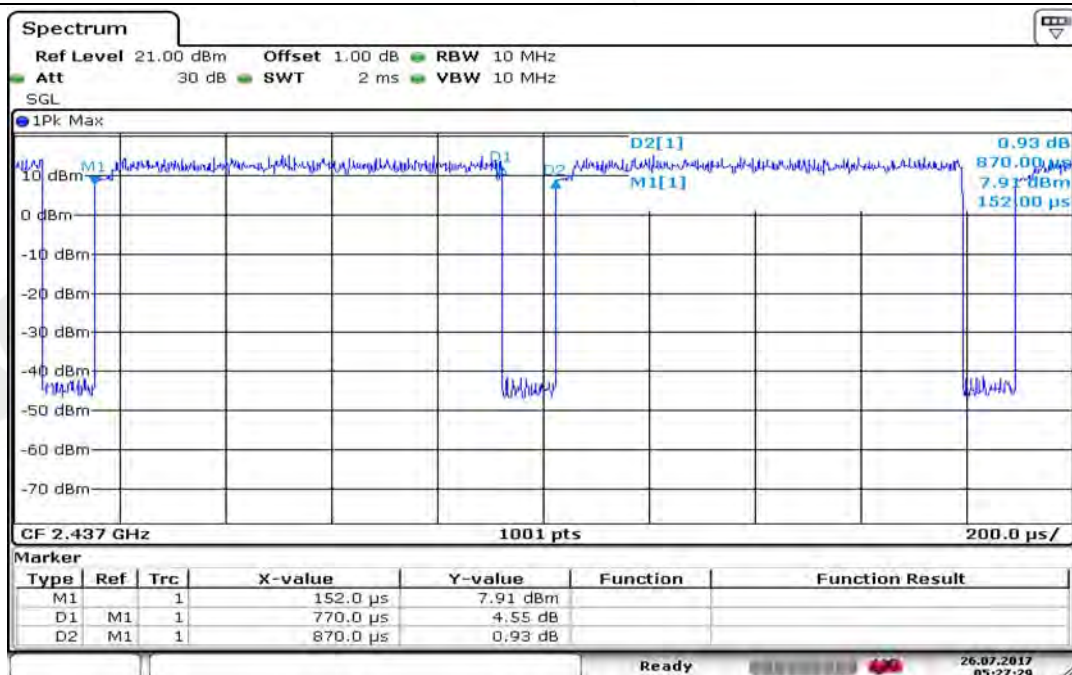
- 2.4G WIFI MIMO

Duty cycle=770/870 =88.51%

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7.2.3.1 Initial Test Position SAR Test Reduction Procedure

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. The initial test position procedure is described in the following:

- 1) . When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
- 2) . When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
- 3) . For all positions/configurations tested using the initial test position and subsequent test positions, 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 ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

7.2.3.2 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.

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For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

7.2.3.3 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

- 1) . When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.
- 2) . When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.
- 3) . The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.
 - a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.
 - b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.
- 4) . SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:
 - a) replace "subsequent test configuration" with "next subsequent test configuration" (i.e., subsequent next highest specified maximum output power configuration)
 - b) replace "initial test configuration" with "all tested higher output power configurations"

7.2.3.4 2.4 GHz SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test

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position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

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

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

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

- 1) . When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
- 2) . 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 ≤ 1.2 W/kg.

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7.2.4 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

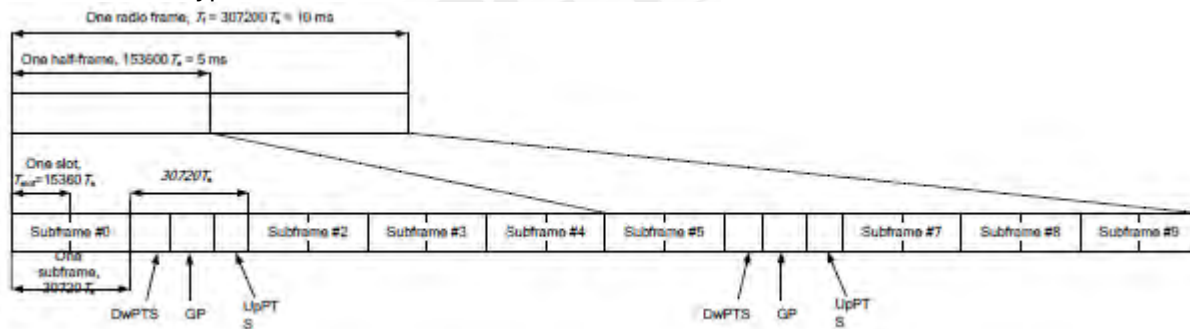
TDD LTE test consideration

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Frame structure type 2:



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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.Ts	2192.Ts	2560.Ts	7680.Ts	2192.Ts	2560.Ts
1	19760.Ts			20480.Ts		
2	21952.Ts			23040.Ts		
3	24144.Ts			25600.Ts		
4	26336.Ts			7680.Ts		
5	6592.Ts	4384.Ts	5120.Ts	20480.Ts	4384.Ts	5120.Ts
6	19760.Ts			23040.Ts		
7	21952.Ts			25600.Ts		
8	24144.Ts			-	-	-
9	13168.Ts			-	-	-

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

Calculated Duty Cycle=[Extended cyclic prefix in uplink x (Ts) x # of S + # of U]/10ms

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

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A) Spectrum Plots for RB Configurations

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

B) MPR

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

C) A-MPR

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

D) Largest channel bandwidth standalone SAR test requirements**1) QPSK with 1 RB allocation**

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. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

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 in 1) and 2) are ≤ 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) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> \frac{1}{2}$ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

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8 Test Result

8.1 Measurement of RF conducted Power

8.1.1 Conducted Power Of GSM

GSM 850-sensor on										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		128	190	251			128	190	251	
GPRS/EGPRS (GMSK)	1 TX Slot	31.18	31.11	31.38	31.5	-9.19	21.99	21.92	22.19	22.31
	2 TX Slots	28.15	28.13	27.93	29	-6.18	21.97	21.95	21.75	22.82
	3 TX Slots	26.28	26.45	26.27	27.5	-4.42	21.86	22.03	21.85	23.08
	4 TX Slots	25.15	25.17	25.08	26.5	-3.17	21.98	22	21.91	23.33
EGPRS(8PSK)	1 TX Slot	26.83	26.78	26.77	27	-9.19	17.64	17.59	17.58	17.81
	2 TX Slots	23.56	23.56	23.43	24	-6.18	17.38	17.38	17.25	17.82
	3 TX Slots	20.99	21.12	21.06	22	-4.42	16.57	16.7	16.64	17.58
	4 TX Slots	19.93	20.02	19.89	21	-3.17	16.76	16.85	16.72	17.83
GSM 1900-sensor on										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		512	661	810			512	661	810	
GPRS/EGPRS (GMSK)	1 TX Slot	29.79	29.6	29.58	30	-9.19	20.6	20.41	20.39	20.81
	2 TX Slots	25.77	25.64	25.74	26.5	-6.18	19.59	19.46	19.56	20.32
	3 TX Slots	24.18	24.11	24.06	25	-4.42	19.76	19.69	19.64	20.58
	4 TX Slots	22.94	22.91	22.96	24	-3.17	19.77	19.74	19.79	20.83
EGPRS(8PSK)	1 TX Slot	25.82	25.77	25.86	26	-9.19	16.63	16.58	16.67	16.81
	2 TX Slots	22.47	22.42	22.41	23	-6.18	16.29	16.24	16.23	16.82
	3 TX Slots	20.4	20.48	20.39	21	-4.42	15.98	16.06	15.97	16.58
	4 TX Slots	19.22	19.25	19.24	20	-3.17	16.05	16.08	16.07	16.83

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GSM 850-sensor off										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		128	190	251			128	190	251	
GPRS/EGPRS (GMSK)	1 TX Slot	32.28	32.38	32.39	33	-9.19	23.09	23.19	23.2	23.81
	2 TX Slots	30.11	30.15	30.28	31	-6.18	23.93	23.97	24.1	24.82
	3 TX Slots	28.92	28.98	29.08	30	-4.42	24.5	24.56	24.66	25.58
	4 TX Slots	27.52	27.53	27.64	29	-3.17	24.35	24.36	24.47	25.83
EGPRS(8PSK)	1 TX Slot	26.85	26.83	26.75	27	-9.19	17.66	17.64	17.56	17.81
	2 TX Slots	23.51	23.55	23.43	24	-6.18	17.33	17.37	17.25	17.82
	3 TX Slots	21.05	21.11	21.07	22	-4.42	16.63	16.69	16.65	17.58
	4 TX Slots	20.03	20.05	20.01	21	-3.17	16.86	16.88	16.84	17.83
GSM 1900-sensor off										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		512	661	810			512	661	810	
GPRS/EGPRS (GMSK)	1 TX Slot	29.98	29.86	29.85	30	-9.19	20.79	20.67	20.66	20.81
	2 TX Slots	28.41	28.22	28.19	28.5	-6.18	22.23	22.04	22.01	22.32
	3 TX Slots	25.69	25.54	25.68	26.5	-4.42	21.27	21.12	21.26	22.08
	4 TX Slots	24.46	24.44	24.42	25.5	-3.17	21.29	21.27	21.25	22.33
EGPRS(8PSK)	1 TX Slot	25.87	25.83	25.84	26	-9.19	16.68	16.64	16.65	16.81
	2 TX Slots	22.62	22.58	22.63	23	-6.18	16.44	16.4	16.45	16.82
	3 TX Slots	20.51	20.57	20.47	21	-4.42	16.09	16.15	16.05	16.58
	4 TX Slots	19.3	19.34	19.32	20	-3.17	16.13	16.17	16.15	16.83

Table 11: Conducted Power Of GSM

Note:

- 1) CMU200 measures GSM peak and average output power for active timeslots. For SAR the time based average power is relevant. The difference in between depends on the duty cycle of the TDMA signal:

No. of timeslots	1	2	3	4
Duty Cycle	1:8.3	1:4.15	1:2.77	1:2.075
Time based avg. power compared to slotted avg. power	-9.19	-6.18	-4.42	-3.17

- 2) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots.

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8.1.2 Conducted Power Of WCDMA

WCDMA Band II-sensor on					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	19.55	19.67	19.6	21
	12.2kbps AMR	19.54	19.64	19.57	21
HSDPA	Subtest 1	19.37	19.26	19.23	21
	Subtest 2	19.28	19.23	19.19	21
	Subtest 3	19.23	19.27	19.17	21
	Subtest 4	19.25	19.24	19.15	21
HSUPA	Subtest 1	19.2	19.08	19.19	21
	Subtest 2	19.11	19.12	19.13	21
	Subtest 3	19.11	19.13	19.15	21
	Subtest 4	19.18	19.11	19.14	21
	Subtest 5	19.19	19.13	19.14	21
DC-HSDPA	Subtest 1	19.36	19.33	19.27	21
	Subtest 2	19.15	19.05	19.04	21
	Subtest 3	19.13	19.15	19.13	21
	Subtest 4	19.17	19.16	19.15	21
WCDMA Band IV-sensor on					
Average Conducted Power(dBm)					
Channel		1312	1412	1513	Tune up
WCDMA	12.2kbps RMC	19.12	19.97	19.06	20.5
	12.2kbps AMR	19.09	19.95	19.03	20.5
HSDPA	Subtest 1	18.92	18.87	18.89	20.5
	Subtest 2	18.73	18.69	18.7	20.5
	Subtest 3	18.2	18.14	18.12	20.5
	Subtest 4	18.15	18.12	18.13	20.5
HSUPA	Subtest 1	18.57	18.51	18.54	20.5
	Subtest 2	18.59	18.48	18.53	20.5
	Subtest 3	18.56	18.49	18.48	20.5
	Subtest 4	18.53	18.47	18.52	20.5
	Subtest 5	18.55	18.5	18.51	20.5
DC-HSDPA	Subtest 1	19.03	18.82	18.91	20.5
	Subtest 2	18.75	18.71	18.75	20.5
	Subtest 3	18.23	18.17	18.13	20.5
	Subtest 4	18.13	18.08	18.11	20.5

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WCDMA Band V-sensor on					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	20.96	20.98	20.97	22.5
	12.2kbps AMR	20.97	20.93	20.91	22.5
HSDPA	Subtest 1	20.75	20.71	20.67	22.5
	Subtest 2	20.66	20.57	20.58	22.5
	Subtest 3	20.57	20.53	20.54	22.5
	Subtest 4	20.63	20.65	20.56	22.5
HSUPA	Subtest 1	20.62	20.58	20.53	22.5
	Subtest 2	20.09	19.96	19.9	21
	Subtest 3	20.06	20.07	20.11	22
	Subtest 4	20.07	19.94	19.91	21
	Subtest 5	20.55	20.53	20.51	22.5
DC-HSDPA	Subtest 1	20.61	20.66	20.63	22.5
	Subtest 2	20.53	20.55	20.51	22.5
	Subtest 3	20.56	20.57	20.56	22.5
	Subtest 4	20.65	20.68	20.67	22.5
WCDMA Band II-sensor off					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	22.48	22.58	22.51	24
	12.2kbps AMR	22.51	22.57	22.5	24
HSDPA	Subtest 1	22.03	21.94	21.97	23.5
	Subtest 2	21.96	21.85	21.9	23.5
	Subtest 3	21.43	21.27	21.3	22.5
	Subtest 4	21.41	21.26	21.29	22.5
HSUPA	Subtest 1	21.77	21.68	21.67	23
	Subtest 2	21.39	21.42	21.41	21.5
	Subtest 3	21.79	21.68	21.7	22.5
	Subtest 4	21.45	21.39	21.46	21.5
	Subtest 5	21.78	21.67	21.69	23
DC-HSDPA	Subtest 1	22.11	21.98	21.95	23.5
	Subtest 2	21.93	21.81	21.83	23.5
	Subtest 3	21.45	21.32	21.31	22.5
	Subtest 4	21.38	21.21	21.25	22.5

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WCDMA Band IV-sensor off					
Average Conducted Power(dBm)					
Channel		1312	1412	1513	Tune up
WCDMA	12.2kbps RMC	22.61	22.55	22.51	24
	12.2kbps AMR	22.57	22.53	22.52	24
HSDPA	Subtest 1	21.98	21.93	21.95	23.5
	Subtest 2	21.87	21.79	21.8	23.5
	Subtest 3	21.26	21.25	21.3	22.5
	Subtest 4	21.29	21.24	21.31	22.5
HSUPA	Subtest 1	21.65	21.61	21.65	23
	Subtest 2	21.39	21.46	21.42	21.5
	Subtest 3	21.66	21.63	21.66	22.5
	Subtest 4	21.32	21.44	21.42	21.5
	Subtest 5	21.67	21.59	21.63	23
DC-HSDPA	Subtest 1	21.93	21.87	21.97	23.5
	Subtest 2	21.82	21.73	21.85	23.5
	Subtest 3	21.23	21.21	21.32	22.5
	Subtest 4	21.25	21.26	21.34	22.5
WCDMA Band V-sensor off					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	22.42	22.39	22.43	24
	12.2kbps AMR	22.41	22.37	22.41	24
HSDPA	Subtest 1	21.92	21.81	21.79	23.5
	Subtest 2	21.85	21.73	21.67	23.5
	Subtest 3	21.34	21.19	21.07	23
	Subtest 4	21.32	21.17	21.14	23
HSUPA	Subtest 1	21.53	21.41	21.38	23
	Subtest 2	20.89	20.78	20.85	21
	Subtest 3	21.56	21.45	21.4	22
	Subtest 4	20.95	20.87	20.93	21
	Subtest 5	21.55	21.42	21.39	23
DC-HSDPA	Subtest 1	21.87	21.85	21.83	23.5
	Subtest 2	21.83	21.76	21.69	23.5
	Subtest 3	21.37	21.23	21.14	23
	Subtest 4	21.31	21.19	21.21	23

Table 12: Conducted Power Of WCDMA

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- 1) when the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used.

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8.1.3 Conducted Power Of LTE

LTE Band 2-sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18607	18900	19193	
1.4MHz	QPSK	1	0	19.22	19.26	19.26	21
		1	2	19.26	19.28	19.31	21
		1	5	19.2	19.25	19.26	21
		3	0	19.26	19.27	19.3	21
		3	2	19.26	19.3	19.32	21
		3	3	19.25	19.29	19.3	21
		6	0	19.27	19.3	19.33	21
	16QAM	1	0	19.5	19.5	19.55	21
		1	2	19.54	19.57	19.62	21
		1	5	19.51	19.56	19.53	21
		3	0	19.27	19.3	19.32	21
		3	2	19.34	19.36	19.38	21
		3	3	19.24	19.27	19.32	21
		6	0	19.29	19.34	19.34	21
	64QAM	1	0	20.08	20	19.92	21
		1	2	19.95	19.81	20.19	21
		1	5	19.97	19.93	20.11	21
		3	0	19.88	19.84	19.81	21
		3	2	19.73	19.69	19.91	21
		3	3	19.66	19.86	19.92	21
		6	0	19.77	19.68	19.86	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18615	18900	19185	
3MHz	QPSK	1	0	19.28	19.31	19.35	21
		1	7	19.33	19.43	19.41	21
		1	14	19.25	19.3	19.3	21
		8	0	19.32	19.36	19.37	21
		8	4	19.37	19.36	19.39	21
		8	7	19.31	19.36	19.37	21
		15	0	19.28	19.35	19.35	21
	16QAM	1	0	19.56	19.63	19.63	21
		1	7	19.65	19.73	19.77	21
		1	14	19.52	19.53	19.61	21
		8	0	19.4	19.4	19.42	21
		8	4	19.4	19.42	19.46	21
		8	7	19.37	19.39	19.43	21
		15	0	19.36	19.37	19.37	21
	64QAM	1	0	20.02	19.96	19.92	21
		1	7	19.95	19.82	20.13	21
		1	14	19.92	19.85	20.12	21
		8	0	19.86	19.76	19.83	21
		8	4	19.75	19.74	19.83	21
		8	7	19.72	19.78	19.89	21
		15	0	19.76	19.69	19.8	21

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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18625	18900	19175	
5MHz	QPSK	1	0	19.39	19.43	19.41	21
		1	13	19.38	19.43	19.45	21
		1	24	19.32	19.37	19.4	21
		12	0	19.39	19.4	19.41	21
		12	6	19.39	19.43	19.45	21
		12	13	19.36	19.41	19.4	21
		25	0	19.38	19.41	19.42	21
	16QAM	1	0	19.66	19.69	19.67	21
		1	13	19.67	19.72	19.71	21
		1	24	19.59	19.66	19.68	21
		12	0	19.38	19.42	19.41	21
		12	6	19.43	19.4	19.44	21
		12	13	19.34	19.38	19.36	21
		25	0	19.37	19.39	19.39	21
	64QAM	1	0	20.14	20.06	20.04	21
		1	13	20.04	19.95	20.25	21
		1	24	20.07	19.98	20.21	21
		12	0	19.97	19.9	19.96	21
		12	6	19.86	19.83	19.96	21
		12	13	19.81	19.91	20.02	21
		25	0	19.83	19.77	19.93	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18650	18900	19150	
10MHz	QPSK	1	0	19.32	19.44	19.36	21
		1	25	19.24	19.38	19.28	21
		1	49	19.26	19.36	19.29	21
		25	0	19.33	19.45	19.37	21
		25	13	19.31	19.45	19.35	21
		25	25	19.25	19.42	19.36	21
		50	0	19.32	19.46	19.38	21
	16QAM	1	0	19.6	19.74	19.59	21
		1	25	19.49	19.63	19.55	21
		1	49	19.51	19.63	19.56	21
		25	0	19.3	19.43	19.36	21
		25	13	19.32	19.44	19.34	21
		25	25	19.24	19.38	19.3	21
		50	0	19.3	19.41	19.34	21
	64QAM	1	0	20.11	20.02	20.07	21
		1	25	20.03	19.95	20.21	21
		1	49	20.08	19.97	20.13	21
		25	0	19.9	19.8	19.98	21
		25	13	19.91	19.82	20.02	21
		25	25	19.84	19.84	19.97	21
		50	0	19.83	19.83	20.01	21

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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18675	18900	19125	
15MHz	QPSK	1	0	19.39	19.58	19.43	21
		1	38	19.24	19.36	19.26	21
		1	74	19.28	19.41	19.32	21
		36	0	19.4	19.49	19.41	21
		36	18	19.35	19.44	19.37	21
		36	39	19.34	19.42	19.32	21
		75	0	19.3	19.44	19.4	21
	16QAM	1	0	19.69	19.82	19.72	21
		1	38	19.52	19.65	19.53	21
		1	74	19.57	19.69	19.6	21
		36	0	19.37	19.51	19.36	21
		36	18	19.32	19.42	19.35	21
		36	39	19.27	19.37	19.34	21
		75	0	19.37	19.48	19.38	21
	64QAM	1	0	20.13	20.12	20.04	21
		1	38	20.01	19.94	20.22	21
		1	74	20.07	20.01	20.19	21
		36	0	19.9	19.8	19.96	21
		36	18	19.92	19.81	19.98	21
		36	39	19.8	19.85	20.02	21
		75	0	19.85	19.78	19.94	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18700	18900	19100	
20MHz	QPSK	1	0	19.72	19.86	19.91	21
		1	50	19.27	19.29	19.29	21
		1	99	19.28	19.31	19.36	21
		50	0	19.66	19.68	19.89	21
		50	25	19.41	19.4	19.41	21
		50	50	19.35	19.37	19.4	21
		100	0	19.61	19.67	19.87	21
	16QAM	1	0	19.92	20.02	20.17	21
		1	50	19.59	19.6	19.63	21
		1	99	19.58	19.62	19.66	21
		50	0	19.68	19.68	19.93	21
		50	25	19.43	19.47	19.44	21
		50	50	19.4	19.39	19.42	21
		100	0	19.65	19.69	19.88	21
	64QAM	1	0	20.34	20.31	20.23	21
		1	50	20.22	20.19	20.15	21
		1	99	20.26	20.17	20.12	21
		50	0	19.74	19.82	19.94	21

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		50	25	19.7	19.79	19.92	21
		50	50	19.67	19.78	19.89	21
		100	0	19.68	19.74	19.87	21
LTE Band 4-sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19957	20175	20393	
1.4MHz	QPSK	1	0	18.75	18.73	18.8	20.5
		1	2	18.79	18.78	18.82	20.5
		1	5	18.73	18.74	18.74	20.5
		3	0	18.8	18.77	18.78	20.5
		3	2	18.8	18.79	18.81	20.5
		3	3	18.78	18.75	18.78	20.5
	16QAM	6	0	18.77	18.75	18.8	20.5
		1	0	19.02	18.98	19.02	20.5
		1	2	19.07	19.02	19.08	20.5
		1	5	19.03	19.01	19.06	20.5
		3	0	18.8	18.82	18.84	20.5
		3	2	18.86	18.85	18.89	20.5
	64QAM	3	3	18.79	18.78	18.8	20.5
		6	0	18.86	18.81	18.81	20.5
		1	0	19.28	18.87	18.94	20.5
		1	2	19.05	18.83	18.92	20.5
		1	5	19.08	18.86	18.81	20.5
		3	0	18.93	18.85	18.81	20.5
		3	2	18.87	18.87	18.83	20.5
		3	3	18.84	18.84	18.86	20.5
		6	0	18.86	18.86	18.86	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19965	20175	20385	
3MHz	QPSK	1	0	18.83	18.79	18.88	20.5
		1	7	18.92	18.88	18.93	20.5
		1	14	18.79	18.78	18.76	20.5
		8	0	18.86	18.83	18.87	20.5
		8	4	18.86	18.83	18.86	20.5
		8	7	18.83	18.79	18.82	20.5
		15	0	18.86	18.82	18.86	20.5
	16QAM	1	0	19.1	19.11	19.13	20.5
		1	7	19.23	19.16	19.19	20.5
		1	14	19.09	19.02	19.05	20.5
		8	0	18.94	18.89	18.89	20.5
		8	4	18.94	18.92	18.94	20.5
		8	7	18.9	18.9	18.92	20.5
		15	0	18.86	18.85	18.88	20.5

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	64QAM	1	0	19.35	19.05	18.87	20.5
		1	7	19.17	18.9	18.81	20.5
		1	14	19.12	18.9	18.87	20.5
		8	0	18.76	18.67	18.74	20.5
		8	4	18.75	18.7	18.72	20.5
		8	7	18.79	18.82	18.71	20.5
		15	0	18.68	18.75	18.77	20.5

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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19975	20175	20375	
5MHz	QPSK	1	0	18.93	18.85	18.81	20.5
		1	13	18.91	18.84	18.81	20.5
		1	24	18.86	18.79	18.71	20.5
		12	0	18.89	18.9	18.85	20.5
		12	6	18.9	18.87	18.83	20.5
		12	13	18.89	18.84	18.78	20.5
		25	0	18.91	18.87	18.8	20.5
	16QAM	1	0	19.19	19.13	19.08	20.5
		1	13	19.22	19.14	19.1	20.5
		1	24	19.12	19.07	19.04	20.5
		12	0	18.9	18.86	18.84	20.5
		12	6	18.88	18.92	18.86	20.5
		12	13	18.87	18.82	18.78	20.5
		25	0	18.91	18.88	18.83	20.5
	64QAM	1	0	19.19	19.26	19.01	20.5
		1	13	19.07	19.1	18.86	20.5
		1	24	19.03	19	18.98	20.5
		12	0	18.99	18.89	18.82	20.5
		12	6	18.96	18.96	18.7	20.5
		12	13	18.92	18.92	18.79	20.5
		25	0	18.78	18.94	18.74	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20000	20175	20350	
10MHz	QPSK	1	0	18.9	18.95	19.17	20.5
		1	25	18.78	18.82	18.99	20.5
		1	49	18.72	18.81	18.98	20.5
		25	0	18.85	18.92	19.09	20.5
		25	13	18.84	18.9	19.07	20.5
		25	25	18.81	18.86	19.01	20.5
		50	0	18.82	18.91	19.07	20.5
	16QAM	1	0	19.16	19.22	19.39	20.5
		1	25	19.03	19.1	19.27	20.5
		1	49	18.99	19.12	19.18	20.5
		25	0	18.82	18.91	19.09	20.5
		25	13	18.84	18.92	19.06	20.5
		25	25	18.76	18.83	18.99	20.5
		50	0	18.85	18.9	19.05	20.5
	64QAM	1	0	19.26	19.26	19.08	20.5
		1	25	19.12	19.19	18.98	20.5
		1	49	19.09	19.15	19.11	20.5
		25	0	19.16	19.05	18.94	20.5
		25	13	19.12	19.1	18.87	20.5
		25	25	19.02	18.95	18.82	20.5
		50	0	18.95	18.97	18.93	20.5

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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20025	20175	20325	
15MHz	QPSK	1	0	18.94	19.02	19.2	20.5
		1	38	18.73	18.8	19	20.5
		1	74	18.77	18.78	18.96	20.5
		36	0	18.91	18.97	19.14	20.5
		36	18	18.83	18.89	19.07	20.5
		36	39	18.78	18.86	19.01	20.5
		75	0	18.85	18.9	19.11	20.5
	16QAM	1	0	19.26	19.32	19.48	20.5
		1	38	19.05	19.08	19.27	20.5
		1	74	19.02	19.1	19.23	20.5
		36	0	18.89	18.99	19.18	20.5
		36	18	18.84	18.93	19.1	20.5
		36	39	18.75	18.88	19.01	20.5
		75	0	18.84	18.93	19.07	20.5
	64QAM	1	0	19.28	19.28	19.06	20.5
		1	38	19.18	19.27	19.08	20.5
		1	74	19.07	19.17	19.14	20.5
		36	0	19.04	19.01	18.93	20.5
		36	18	19	19.02	18.86	20.5
		36	39	19.08	18.99	18.95	20.5
		75	0	19	18.92	18.83	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20050	20175	20300	
20MHz	QPSK	1	0	19.06	19.02	19	20.5
		1	50	18.78	18.76	18.71	20.5
		1	99	18.76	18.72	18.68	20.5
		50	0	18.97	18.95	18.96	20.5
		50	25	18.91	18.89	18.84	20.5
		50	50	18.83	18.79	18.77	20.5
		100	0	18.92	18.9	18.84	20.5
	16QAM	1	0	19.35	19.33	19.27	20.5
		1	50	19.15	19.1	19.07	20.5
		1	99	19.09	19.05	19	20.5
		50	0	19.03	19.01	18.96	20.5
		50	25	18.95	18.92	18.94	20.5
		50	50	18.87	18.86	18.8	20.5
		100	0	18.93	18.91	18.87	20.5
	64QAM	1	0	19.34	19.36	19.22	20.5
		1	50	19.27	19.31	19.13	20.5
		1	99	19.21	19.3	19.22	20.5
		50	0	19.23	19.21	18.96	20.5
		50	25	19.11	19.14	19	20.5
		50	50	19.15	19.08	18.92	20.5
		100	0	19.04	19.05	19.02	20.5

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LTE Band 5				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20407	20525	20643	
1.4MHz	QPSK	1	0	20.53	20.54	20.59	22.5
		1	2	20.56	20.57	20.59	22.5
		1	5	20.54	20.53	20.52	22.5
		3	0	20.51	20.52	20.58	22.5
		3	2	20.52	20.54	20.6	22.5
		3	3	20.53	20.53	20.55	22.5
	16QAM	6	0	20.56	20.52	20.56	22.5
		1	0	20.75	20.84	20.83	22.5
		1	2	20.81	20.88	20.89	22.5
		1	5	20.75	20.77	20.81	22.5
		3	0	20.53	20.58	20.63	22.5
		3	2	20.58	20.64	20.68	22.5
	64QAM	3	3	20.5	20.54	20.61	22.5
		6	0	20.53	20.61	20.64	22.5
		1	0	20.87	20.9	20.9	22.5
		1	2	20.75	20.93	20.71	22.5
		1	5	20.65	20.75	20.77	22.5
		3	0	20.57	20.58	20.58	22.5
		3	2	20.56	20.61	20.59	22.5
		3	3	20.53	20.52	20.57	22.5
		6	0	19.68	19.59	19.69	21.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20415	20525	20635	
3MHz	QPSK	1	0	20.55	20.61	20.67	22.5
		1	7	20.63	20.68	20.72	22.5
		1	14	20.51	20.55	20.62	22.5
		8	0	20.54	20.64	20.7	22.5
		8	4	20.59	20.67	20.72	22.5
		8	7	20.55	20.63	20.69	22.5
		15	0	20.57	20.64	20.7	22.5
	16QAM	1	0	20.85	20.92	20.94	22.5
		1	7	20.9	20.99	21.1	22.5
		1	14	20.79	20.89	20.92	22.5
		8	0	20.62	20.71	20.78	22.5
		8	4	20.63	20.71	20.78	22.5
		8	7	20.61	20.67	20.76	22.5
		15	0	20.6	20.67	20.71	22.5
	64QAM	1	0	20.89	20.96	20.84	22.5
		1	7	20.68	20.98	20.78	22.5
		1	14	20.68	20.79	20.77	22.5
		8	0	20.61	20.63	20.55	21.5

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		8	4	20.57	20.64	20.56	21.5
		8	7	20.55	20.56	20.57	21.5
		15	0	19.74	19.61	19.7	21.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20425	20525	20625	
5MHz	QPSK	1	0	20.56	20.62	20.69	22.5
		1	13	20.61	20.63	20.73	22.5
		1	24	20.53	20.57	20.6	22.5
		12	0	20.6	20.66	20.74	22.5
		12	6	20.61	20.67	20.76	22.5
		12	13	20.55	20.6	20.71	22.5
		25	0	20.56	20.66	20.73	22.5
	16QAM	1	0	20.88	20.94	20.96	22.5
		1	13	20.86	20.98	21.05	22.5
		1	24	20.8	20.85	20.97	22.5
		12	0	20.59	20.69	20.76	22.5
		12	6	20.64	20.66	20.76	22.5
		12	13	20.55	20.62	20.72	22.5
		25	0	20.57	20.65	20.76	22.5
	64QAM	1	0	20.91	21.01	20.83	22.5
		1	13	20.68	20.86	20.78	22.5
		1	24	20.8	20.75	20.76	22.5
		12	0	20.63	20.65	20.57	21.5
		12	6	20.57	20.64	20.56	21.5
		12	13	20.58	20.52	20.59	21.5
		25	0	19.73	19.65	19.71	21.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20450	20525	20600	
10MHz	QPSK	1	0	20.7	20.72	20.7	22.5
		1	25	20.6	20.62	20.58	22.5
		1	49	20.55	20.56	20.54	22.5
		25	0	20.69	20.73	20.72	22.5
		25	13	20.71	20.67	20.71	22.5
		25	25	20.63	20.64	20.64	22.5
		50	0	20.69	20.66	20.69	22.5
	16QAM	1	0	20.97	20.94	20.9	22.5
		1	25	20.92	20.93	20.91	22.5
		1	49	20.86	20.81	20.84	22.5
		25	0	20.7	20.7	20.69	22.5
		25	13	20.72	20.72	20.69	22.5
		25	25	20.65	20.62	20.63	22.5
		50	0	20.72	20.69	20.72	22.5

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	64QAM	1	0	20.97	21.03	20.96	22.5
		1	25	20.86	21.04	20.84	22.5
		1	49	20.84	20.87	20.84	22.5
		25	0	20.68	20.63	20.57	21.5
		25	13	20.59	20.65	20.58	21.5
		25	25	20.61	20.57	20.56	21.5
		50	0	19.81	19.77	19.79	21.5

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LTE Band 7				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20775	21100	21425	
5MHz	QPSK	1	0	18.92	18.95	18.92	20
		1	13	18.98	18.97	18.97	20
		1	24	18.89	18.89	18.87	20
		12	0	18.96	18.98	18.96	20
		12	6	18.99	18.97	18.98	20
		12	13	18.92	18.94	18.93	20
		25	0	18.93	18.98	18.95	20
	16QAM	1	0	19.21	19.14	19.2	20
		1	13	19.22	19.25	19.22	20
		1	24	19.18	19.18	19.14	20
		12	0	18.98	18.93	18.94	20
		12	6	19.03	18.98	18.95	20
		12	13	18.96	18.92	18.88	20
		25	0	18.94	18.93	18.94	20
	64QAM	1	0	18.9	19.32	19.24	20
		1	13	18.88	19.1	19.39	20
		1	24	18.85	19.03	19.27	20
		12	0	18.68	18.86	18.81	20
		12	6	18.74	18.89	18.75	20
		12	13	18.58	18.96	18.82	20
		25	0	18.55	18.91	18.7	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20800	21100	21400	
10MHz	QPSK	1	0	18.99	19	19.03	20
		1	25	18.89	18.97	18.92	20
		1	49	18.85	18.92	18.92	20
		25	0	18.95	19	18.98	20
		25	13	18.96	19	18.99	20
		25	25	18.93	18.92	18.92	20
		50	0	18.96	18.98	18.98	20
	16QAM	1	0	19.27	19.23	19.27	20
		1	25	19.2	19.18	19.19	20
		1	49	19.15	19.15	19.11	20
		25	0	18.98	18.95	18.97	20
		25	13	19.04	18.96	18.98	20
		25	25	18.9	18.89	18.92	20
		50	0	18.98	18.97	18.98	20
	64QAM	1	0	18.95	19.34	19.32	20
		1	25	18.88	19.01	19.36	20
		1	49	18.86	19.08	19.34	20
		25	0	18.67	18.88	18.75	20

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		25	13	18.59	18.93	18.81	20
		25	25	18.73	18.81	18.75	20
		50	0	18.63	18.88	18.75	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20825	21100	21375	
15MHz	QPSK	1	0	18.9	19.04	18.99	20
		1	38	18.74	18.9	18.82	20
		1	74	18.77	18.89	18.85	20
		36	0	18.85	19.03	18.94	20
		36	18	18.83	19.01	18.93	20
		36	39	18.81	18.95	18.88	20
		75	0	18.85	18.99	18.89	20
	16QAM	1	0	19.22	19.32	19.26	20
		1	38	19.04	19.16	19.09	20
		1	74	19.11	19.15	19.05	20
		36	0	18.91	19	18.91	20
		36	18	18.91	18.95	18.9	20
		36	39	18.85	18.89	18.86	20
		75	0	18.9	18.97	18.89	20
	64QAM	1	0	18.94	19.33	19.36	20
		1	38	18.89	19.14	19.35	20
		1	74	18.85	19.02	19.42	20
		36	0	18.7	18.85	18.78	20
		36	18	18.76	18.92	18.85	20
		36	39	18.66	18.95	18.73	20
		75	0	18.7	18.88	18.71	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20850	21100	21350	
20MHz	QPSK	1	0	18.79	19.14	19.13	20
		1	50	18.59	18.96	18.89	20
		1	99	18.6	18.95	18.91	20
		50	0	18.72	19.14	19.07	20
		50	25	18.75	19.08	18.98	20
		50	50	18.67	19.03	18.96	20
		100	0	18.76	19.09	19.03	20
	16QAM	1	0	19.17	19.49	19.31	20
		1	50	18.98	19.28	19.23	20
		1	99	18.9	19.23	19.2	20
		50	0	18.84	19.15	19.07	20
		50	25	18.76	19.06	19.04	20
		50	50	18.74	19.04	18.99	20
		100	0	18.77	19.07	19.06	20

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	64QAM	1	0	18.94	19.14	19.13	20
		1	50	18.96	19.15	19.05	20
		1	99	18.86	19.1	19.06	20
		50	0	18.98	19.03	19.01	20
		50	25	18.86	19.02	18.96	20
		50	50	18.83	18.95	18.86	20
		100	0	18.82	18.95	18.81	20

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LTE Band 38-sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37775	38000	38225	
5MHz	QPSK	1	0	21.2	21.2	21.31	22.5
		1	13	21.2	21.19	21.31	22.5
		1	24	21.13	21.13	21.19	22.5
		12	0	21.19	21.15	21.31	22.5
		12	6	21.18	21.22	21.32	22.5
		12	13	21.13	21.15	21.25	22.5
		25	0	21.16	21.14	21.27	22.5
	16QAM	1	0	21.35	21.25	21.49	22.5
		1	13	21.4	21.33	21.48	22.5
		1	24	21.25	21.22	21.35	22.5
		12	0	20.24	20.23	20.32	21.5
		12	6	20.21	20.22	20.34	21.5
		12	13	20.18	20.16	20.28	21.5
		25	0	20.17	20.18	20.27	21.5
	64QAM	1	0	21.02	21.18	21.06	21.5
		1	13	21.02	21.13	20.93	21.5
		1	24	20.7	20.97	20.77	21.5
		12	0	19.95	19.97	19.86	20.5
		12	6	19.83	19.9	19.8	20.5
		12	13	19.86	19.85	19.7	20.5
		25	0	19.84	19.83	19.71	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37800	38000	38200	
10MHz	QPSK	1	0	21.3	21.23	21.47	22.5
		1	25	21.16	21.13	21.37	22.5
		1	49	21.14	21.11	21.31	22.5
		25	0	21.28	21.19	21.48	22.5
		25	13	21.27	21.19	21.33	22.5
		25	25	21.21	21.18	21.29	22.5
		50	0	21.15	21.18	21.32	22.5
	16QAM	1	0	21.51	21.38	21.52	22.5
		1	25	21.4	21.24	21.41	22.5
		1	49	21.24	21.19	21.28	22.5
		25	0	20.24	20.26	20.38	21.5
		25	13	20.19	20.22	20.35	21.5
		25	25	20.12	20.12	20.25	21.5
		50	0	20.21	20.23	20.36	21.5
	64QAM	1	0	21.02	21.22	21.07	21.5
		1	25	21.01	21.1	20.93	21.5
		1	49	20.71	20.95	20.75	21.5
		25	0	19.97	19.97	19.85	20.5

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		25	13	19.89	19.9	19.81	20.5
		25	25	19.87	19.84	19.72	20.5
		50	0	19.89	19.82	19.71	20.5

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37825	38000	38175	
15MHz	QPSK	1	0	21.2	21.26	21.32	22.5
		1	38	21.01	21.08	21.11	22.5
		1	74	20.96	20.99	21.07	22.5
		36	0	21.21	21.27	21.35	22.5
		36	18	21.15	21.21	21.28	22.5
		36	39	21.07	21.12	21.19	22.5
		75	0	21.12	21.21	21.24	22.5
	16QAM	1	0	21.37	21.42	21.54	22.5
		1	38	21.25	21.29	21.32	22.5
		1	74	21.14	21.18	21.27	22.5
		36	0	20.15	20.18	20.25	21.5
		36	18	20.12	20.16	20.26	21.5
		36	39	20.02	20.07	20.1	21.5
		75	0	20.13	20.23	20.28	21.5
	64QAM	1	0	21	21.17	21.09	21.5
		1	38	21.05	21.12	20.91	21.5
		1	74	20.69	20.92	20.79	21.5
		36	0	19.99	19.99	19.84	20.5
		36	18	19.87	19.88	19.8	20.5
		36	39	19.89	19.84	19.71	20.5
		75	0	19.89	19.83	19.7	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37850	38000	38150	
20MHz	QPSK	1	0	21.45	21.37	21.31	22.5
		1	50	21.13	21.09	21.04	22.5
		1	99	21.03	21	20.94	22.5
		50	0	21.37	21.36	21.29	22.5
		50	25	21.24	21.26	21.17	22.5
		50	50	21.16	21.13	21.09	22.5
		100	0	21.23	21.23	21.18	22.5
	16QAM	1	0	21.55	21.54	21.53	22.5
		1	50	21.37	21.25	21.22	22.5
		1	99	21.18	21.19	21.18	22.5
		50	0	20.34	20.35	20.29	21.5
		50	25	20.25	20.25	20.22	21.5
		50	50	20.21	20.18	20.12	21.5
		100	0	20.24	20.24	20.23	21.5
	64QAM	1	0	21.09	21.26	21.12	21.5
		1	50	21.08	21.19	20.97	21.5
		1	99	20.78	21.01	20.82	21.5

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		50	0	20.02	20.02	19.89	20.5
		50	25	19.92	19.93	19.84	20.5
		50	50	19.92	19.89	19.75	20.5
		100	0	19.92	19.87	19.75	20.5

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LTE FDD Band 41-sensor on				Conducted Power(dBm)					
Bandwidth	Modulation	RB size	RB offset	Channel 39675	Channel 40148	Channel 40620	Channel 41093	Channel 41565	Tune up
5MHz	QPSK	1	0	21.44	21.33	21.09	21.2	21.36	22.5
		1	13	21.43	21.39	21.12	21.24	21.37	22.5
		1	24	21.35	21.26	21.03	21.14	21.27	22.5
		12	0	21.38	21.32	21.1	21.16	21.35	22.5
		12	6	21.46	21.34	21.09	21.24	21.37	22.5
		12	13	21.37	21.28	21.02	21.17	21.3	22.5
		25	0	21.37	21.33	21.05	21.17	21.31	22.5
	16QAM	1	0	21.51	21.55	21.1	21.32	21.46	22.5
		1	13	21.59	21.5	21.24	21.37	21.51	22.5
		1	24	21.45	21.46	21.11	21.17	21.39	22.5
		12	0	20.46	20.38	20.11	20.22	20.37	21.5
		12	6	20.44	20.37	20.1	20.2	20.39	21.5
		12	13	20.42	20.35	20.08	20.15	20.27	21.5
		25	0	20.4	20.32	20.07	20.17	20.32	21.5
	64QAM	1	0	21.22	21.08	21.18	20.96	20.95	21.5
		1	13	21.1	21.15	21.05	20.78	20.8	21.5
		1	24	20.8	20.66	20.72	20.8	20.57	21.5
		12	0	19.85	20.08	19.94	19.92	19.63	20.5
		12	6	19.81	20.03	19.85	19.82	19.57	20.5
		12	13	19.69	19.97	19.77	19.7	19.53	20.5
		25	0	19.76	19.97	19.81	19.74	19.55	20.5
Bandwidth	Modulation	RB size	RB offset	39700	40160	40620	41080	41540	Tune up
10MHz	QPSK	1	0	21.48	21.42	21.16	21.28	21.49	22.5
		1	25	21.33	21.26	21.04	21.15	21.32	22.5
		1	49	21.35	21.28	20.98	21.12	21.27	22.5
		25	0	21.43	21.35	21.08	21.22	21.45	22.5
		25	13	21.43	21.32	21.11	21.21	21.39	22.5
		25	25	21.36	21.31	21.04	21.15	21.3	22.5
		50	0	21.41	21.34	21.09	21.23	21.39	22.5
	16QAM	1	0	21.58	21.53	21.25	21.41	21.56	22.5
		1	25	21.48	21.45	21.2	21.27	21.44	22.5
		1	49	21.42	21.39	21.07	21.17	21.36	22.5
		25	0	20.45	20.52	20.11	20.28	20.44	21.5
		25	13	20.47	20.38	20.13	20.24	20.4	21.5
		25	25	20.39	20.28	20.03	20.15	20.31	21.5
		50	0	20.45	20.4	20.12	20.25	20.46	21.5
	64QAM	1	0	21.21	21.08	21.15	20.96	20.98	21.5
		1	25	21.08	21.14	21.03	20.8	20.82	21.5
		1	49	20.84	20.64	20.76	20.79	20.52	21.5
		25	0	19.86	20.08	19.95	19.94	19.62	20.5

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		25	13	19.82	20.02	19.86	19.81	19.56	20.5
		25	25	19.69	19.98	19.77	19.7	19.52	20.5
		50	0	19.75	19.98	19.82	19.74	19.54	20.5

Bandwidth	Modulation	RB size	RB offset	Channel 39725	Channel 40173	Channel 40620	Channel 41068	Channel 41515	Tune up
15MHz	QPSK	1	0	21.53	21.41	21.18	21.32	21.55	22.5
		1	38	21.32	21.23	20.98	21.12	21.35	22.5
		1	74	21.29	21.15	20.89	21.03	21.26	22.5
		36	0	21.49	21.4	21.17	21.31	21.48	22.5
		36	18	21.44	21.36	21.1	21.23	21.44	22.5
		36	39	21.36	21.27	21.03	21.14	21.34	22.5
		75	0	21.43	21.34	21.1	21.2	21.37	22.5
	16QAM	1	0	21.64	21.63	21.38	21.46	21.66	22.5
		1	38	21.45	21.43	21.13	21.27	21.45	22.5
		1	74	21.42	21.38	21.08	21.23	21.38	22.5
		36	0	20.43	20.35	20.1	20.2	20.43	21.5
		36	18	20.44	20.34	20.07	20.21	20.39	21.5
		36	39	20.3	20.21	19.94	20.09	20.28	21.5
		75	0	20.46	20.35	20.1	20.21	20.43	21.5
	64QAM	1	0	21.18	21.09	21.15	20.94	20.94	21.5
		1	38	21.06	21.13	20.99	20.76	20.78	21.5
		1	74	20.83	20.68	20.72	20.74	20.56	21.5
		36	0	19.86	20.09	19.93	19.94	19.62	20.5
		36	18	19.8	20.04	19.84	19.82	19.58	20.5
		36	39	19.71	19.97	19.78	19.7	19.51	20.5
		75	0	19.75	19.97	19.81	19.73	19.55	20.5
Bandwidth	Modulation	RB size	RB offset	Channel 39750	Channel 40185	Channel 40620	Channel 41055	Channel 41490	Tune up
20MHz	QPSK	1	0	21.61	21.48	21.25	21.39	21.64	22.5
		1	50	21.31	21.25	20.98	21.12	21.34	22.5
		1	99	21.24	21.16	20.9	21.01	21.23	22.5
		50	0	21.54	21.48	21.23	21.35	21.56	22.5
		50	25	21.43	21.36	21.15	21.28	21.46	22.5
		50	50	21.36	21.31	21.01	21.17	21.35	22.5
		100	0	21.43	21.38	21.15	21.3	21.49	22.5
	16QAM	1	0	21.69	21.69	21.44	21.59	21.75	22.5
		1	50	21.47	21.52	21.2	21.3	21.5	22.5
		1	99	21.4	21.38	21.05	21.2	21.36	22.5
		50	0	20.53	20.46	20.26	20.4	20.57	21.5
		50	25	20.49	20.42	20.18	20.28	20.47	21.5
		50	50	20.41	20.31	20.06	20.19	20.4	21.5
		100	0	20.46	20.38	20.14	20.28	20.45	21.5
	64QAM	1	0	21.26	21.16	21.23	21.02	21.01	21.5
		1	50	21.15	21.19	21.08	20.83	20.85	21.5
		1	99	20.89	20.73	20.81	20.83	20.6	21.5

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		50	0	19.9	20.13	19.98	19.97	19.66	20.5
		50	25	19.85	20.07	19.89	19.86	19.61	20.5
		50	50	19.74	20.02	19.82	19.73	19.56	20.5
		100	0	19.79	20.01	19.86	19.78	19.59	20.5

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LTE Band 2-sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18607	18900	19193	
1.4MHz	QPSK	1	0	22.46	22.51	22.51	24
		1	2	22.51	22.53	22.54	24
		1	5	22.46	22.48	22.5	24
		3	0	22.49	22.5	22.53	24
		3	2	22.52	22.54	22.54	24
		3	3	22.48	22.52	22.53	24
		6	0	21.46	21.49	21.52	23
	16QAM	1	0	21.74	21.8	21.76	23
		1	2	21.8	21.85	21.86	23
		1	5	21.71	21.72	21.77	23
		3	0	21.52	21.52	21.54	23
		3	2	21.59	21.62	21.63	23
		3	3	21.49	21.55	21.56	23
		6	0	20.55	20.55	20.59	22
	64QAM	1	0	21.21	21.62	21.32	22
		1	2	21.08	21.56	21.22	22
		1	5	21.11	21.43	21.23	22
		3	0	20.12	20.13	20.15	22
		3	2	20.08	20.11	20.07	22
		3	3	20.21	20.23	20.08	22
		6	0	19.98	19.9	20.02	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18615	18900	19185	
3MHz	QPSK	1	0	22.51	22.55	22.54	24
		1	7	22.6	22.64	22.6	24
		1	14	22.46	22.47	22.53	24
		8	0	21.5	21.53	21.56	23
		8	4	21.53	21.55	21.57	23
		8	7	21.46	21.54	21.56	23
		15	0	21.51	21.53	21.5	23
	16QAM	1	0	21.8	21.82	21.82	23
		1	7	21.91	21.93	21.89	23
		1	14	21.7	21.8	21.82	23
		8	0	20.57	20.6	20.61	22
		8	4	20.61	20.65	20.64	22
		8	7	20.54	20.59	20.6	22
		15	0	20.55	20.59	20.6	22

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		1	0	21.21	21.65	21.4	22
		1	7	21.08	21.58	21.2	22
		1	14	21.07	21.44	21.19	22
		8	0	19.88	19.91	20	21
		8	4	19.88	19.96	19.99	21
		8	7	19.9	19.87	19.93	21
		15	0	19.9	19.87	19.98	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18625	18900	19175	
5MHz	QPSK	1	0	22.57	22.62	22.63	24
		1	13	22.61	22.61	22.63	24
		1	24	22.52	22.55	22.58	24
		12	0	21.56	21.62	21.58	23
		12	6	21.56	21.61	21.61	23
		12	13	21.51	21.6	21.6	23
		25	0	21.53	21.6	21.61	23
	16QAM	1	0	21.87	21.91	21.89	23
		1	13	21.84	21.9	21.91	23
		1	24	21.8	21.81	21.86	23
		12	0	20.54	20.59	20.6	22
		12	6	20.62	20.59	20.63	22
		12	13	20.54	20.56	20.58	22
		25	0	20.55	20.58	20.6	22
	64QAM	1	0	21.24	21.61	21.41	22
		1	13	21.08	21.58	21.26	22
		1	24	21.11	21.46	21.24	22
		12	0	19.93	19.95	20	21
		12	6	19.9	19.88	19.97	21
		12	13	19.9	19.93	19.97	21
		25	0	19.92	19.96	20.02	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18650	18900	19150	
10MHz	QPSK	1	0	22.53	22.69	22.59	24
		1	25	22.44	22.62	22.49	24
		1	49	22.46	22.58	22.5	24
		25	0	21.52	21.65	21.54	23
		25	13	21.5	21.63	21.55	23
		25	25	21.45	21.6	21.51	23
		50	0	21.47	21.66	21.52	23
	16QAM	1	0	21.79	21.94	21.82	23
		1	25	21.73	21.81	21.77	23
		1	49	21.71	21.81	21.77	23
		25	0	20.51	20.63	20.54	22
		25	13	20.52	20.64	20.55	22
		25	25	20.46	20.58	20.53	22

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	64QAM	50	0	20.52	20.66	20.53	22
		1	0	21.17	21.67	21.33	22
		1	25	21.02	21.51	21.26	22
		1	49	21.03	21.5	21.16	22
		25	0	19.93	19.94	19.94	21
		25	13	19.91	19.9	20.05	21
		25	25	19.91	19.94	19.95	21
		50	0	19.9	19.88	19.95	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18675	18900	19125	
15MHz	QPSK	1	0	22.62	22.76	22.67	24
		1	38	22.42	22.55	22.47	24
		1	74	22.5	22.61	22.54	24
		36	0	21.53	21.67	21.62	23
		36	18	21.52	21.64	21.56	23
		36	39	21.44	21.6	21.51	23
		75	0	21.56	21.69	21.54	23
	16QAM	1	0	21.91	22.04	21.94	23
		1	38	21.72	21.84	21.79	23
		1	74	21.78	21.86	21.77	23
		36	0	20.56	20.67	20.57	22
		36	18	20.55	20.62	20.6	22
		36	39	20.43	20.6	20.52	22
		75	0	20.55	20.64	20.57	22
	64QAM	1	0	21.18	21.62	21.42	22
		1	38	21.1	21.51	21.26	22
		1	74	21.1	21.48	21.17	22
		36	0	19.93	19.98	19.94	21
		36	18	19.89	19.9	20.07	21
		36	39	19.93	19.95	19.99	21
		75	0	19.98	19.91	20.04	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18700	18900	19100	
20MHz	QPSK	1	0	22.74	22.79	22.78	24
		1	50	22.59	22.58	22.57	24
		1	99	22.55	22.57	22.61	24
		50	0	21.73	21.75	21.7	23
		50	25	21.64	21.6	21.66	23
		50	50	21.62	21.62	21.61	23
		100	0	21.62	21.67	21.69	23
	16QAM	1	0	21.99	22	22.04	23
		1	50	21.79	21.84	21.9	23
		1	99	21.83	21.88	21.93	23
		50	0	20.74	20.73	20.76	22
		50	25	20.64	20.66	20.69	22
		50	50	20.63	20.6	20.62	22
		100	0	20.69	20.66	20.7	22

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64QAM	1	0	21.29	21.73	21.47	22
	1	50	21.15	21.66	21.34	22
	1	99	21.17	21.58	21.31	22
	50	0	20.01	20.05	20.09	21
	50	25	19.98	20.03	20.12	21
	50	50	20.01	20.02	20.08	21
	100	0	20.03	20.01	20.1	21

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LTE Band 4-sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19957	20175	20393	
1.4MHz	QPSK	1	0	22.51	22.49	22.54	24
		1	2	22.59	22.53	22.55	24
		1	5	22.51	22.5	22.52	24
		3	0	22.54	22.53	22.56	24
		3	2	22.57	22.55	22.59	24
		3	3	22.55	22.54	22.56	24
	16QAM	6	0	21.51	21.48	21.55	23
		1	0	21.77	21.79	21.82	23
		1	2	21.85	21.82	21.84	23
		1	5	21.75	21.74	21.81	23
		3	0	21.58	21.55	21.55	23
		3	2	21.61	21.62	21.66	23
	64QAM	3	3	21.59	21.53	21.59	23
		6	0	20.6	20.53	20.63	22
		1	0	21.44	21.37	21.66	22
		1	2	21.32	21.32	21.63	22
		1	5	21.34	21.22	21.58	22
		3	0	20.31	20.04	20.25	22
		3	2	20.2	20.02	20.07	22
		3	3	20.13	20.07	20.03	22
		6	0	20.15	20.04	19.9	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19965	20175	20385	
3MHz	QPSK	1	0	22.54	22.55	22.6	24
		1	7	22.66	22.62	22.68	24
		1	14	22.54	22.5	22.52	24
		8	0	21.56	21.56	21.6	23
		8	4	21.59	21.56	21.59	23
		8	7	21.53	21.55	21.59	23
		15	0	21.58	21.55	21.58	23
	16QAM	1	0	21.81	21.86	21.8	23
		1	7	21.91	21.92	21.95	23
		1	14	21.78	21.8	21.83	23
		8	0	20.67	20.62	20.67	22
		8	4	20.67	20.62	20.66	22
		8	7	20.61	20.59	20.66	22
		15	0	20.61	20.58	20.6	22
	64QAM	1	0	21.47	21.34	21.7	22
		1	7	21.36	21.23	21.63	22
		1	14	21.32	21.21	21.58	22
		8	0	20.3	20.09	20.28	21

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		8	4	20.24	20.04	20	21
		8	7	20.14	20.06	20.02	21
		15	0	20.15	20.06	19.89	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19975	20175	20375	
5MHz	QPSK	1	0	22.62	22.64	22.56	24
		1	13	22.63	22.61	22.54	24
		1	24	22.54	22.54	22.45	24
		12	0	21.64	21.61	21.55	23
		12	6	21.65	21.61	21.56	23
		12	13	21.61	21.59	21.5	23
		25	0	21.61	21.59	21.55	23
	16QAM	1	0	21.85	21.88	21.83	23
		1	13	21.92	21.9	21.79	23
		1	24	21.81	21.74	21.76	23
		12	0	20.65	20.62	20.55	22
		12	6	20.66	20.61	20.59	22
		12	13	20.62	20.55	20.49	22
		25	0	20.61	20.58	20.53	22
	64QAM	1	0	21.44	21.33	21.67	22
		1	13	21.41	21.33	21.65	22
		1	24	21.34	21.17	21.51	22
		12	0	20.28	20.12	20.27	21
		12	6	20.26	20.01	20.02	21
		12	13	20.1	20	19.98	21
		25	0	20.08	20.07	19.94	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20000	20175	20350	
10MHz	QPSK	1	0	22.65	22.67	22.87	24
		1	25	22.49	22.58	22.74	24
		1	49	22.49	22.54	22.7	24
		25	0	21.59	21.65	21.83	23
		25	13	21.58	21.62	21.8	23
		25	25	21.51	21.57	21.76	23
		50	0	21.6	21.63	21.82	23
	16QAM	1	0	21.83	21.94	22.14	23
		1	25	21.76	21.84	22.01	23
		1	49	21.76	21.76	21.95	23
		25	0	20.58	20.63	20.8	22
		25	13	20.58	20.64	20.83	22
		25	25	20.52	20.56	20.73	22
		50	0	20.58	20.65	20.83	22
	64QAM	1	0	21.52	21.3	21.66	22
		1	25	21.38	21.25	21.6	22
		1	49	21.33	21.14	21.53	22
		25	0	20.3	20.12	20.28	21
		25	13	20.25	20.01	19.99	21

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		25	25	20.13	20.07	20	21
		50	0	20.14	20.01	19.89	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20025	20175	20325	
15MHz	QPSK	1	0	22.68	22.78	22.94	24
		1	38	22.5	22.59	22.72	24
		1	74	22.5	22.58	22.73	24
		36	0	21.61	21.69	21.88	23
		36	18	21.59	21.64	21.81	23
		36	39	21.51	21.59	21.78	23
		75	0	21.58	21.63	21.85	23
	16QAM	1	0	21.93	22.08	22.26	23
		1	38	21.82	21.85	22.01	23
		1	74	21.81	21.79	22	23
		36	0	20.65	20.72	20.9	22
		36	18	20.57	20.67	20.84	22
		36	39	20.51	20.58	20.72	22
		75	0	20.57	20.64	20.81	22
	64QAM	1	0	21.5	21.36	21.71	22
		1	38	21.41	21.3	21.65	22
		1	74	21.27	21.12	21.54	22
		36	0	20.28	20.05	20.18	21
		36	18	20.19	20.07	20.03	21
		36	39	20.07	20.06	19.99	21
		75	0	20.17	20.08	19.89	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20050	20175	20300	
20MHz	QPSK	1	0	22.84	22.83	22.8	24
		1	50	22.59	22.57	22.53	24
		1	99	22.55	22.53	22.46	24
		50	0	21.76	21.73	21.7	23
		50	25	21.66	21.65	21.6	23
		50	50	21.61	21.58	21.54	23
		100	0	21.7	21.67	21.64	23
	16QAM	1	0	22.06	22.08	22.07	23
		1	50	21.88	21.86	21.77	23
		1	99	21.81	21.78	21.69	23
		50	0	20.77	20.75	20.72	22
		50	25	20.69	20.65	20.64	22
		50	50	20.62	20.61	20.58	22
		100	0	20.69	20.67	20.64	22
	64QAM	1	0	21.57	21.45	21.78	22
		1	50	21.46	21.38	21.71	22
		1	99	21.42	21.27	21.64	22
		50	0	20.36	20.18	20.33	21
		50	25	20.31	20.14	20.09	21
		50	50	20.22	20.13	20.11	21

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		100	0	20.23	20.13	20.02	21
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LTE Band 5-sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20407	20525	20643	
1.4MHz	QPSK	1	0	22.65	22.68	22.75	24.5
		1	2	22.7	22.76	22.79	24.5
		1	5	22.67	22.68	22.75	24.5
		3	0	22.69	22.74	22.78	24.5
		3	2	22.75	22.76	22.83	24.5
		3	3	22.69	22.73	22.79	24.5
	16QAM	6	0	21.67	21.72	21.78	23.5
		1	0	21.92	21.95	22.02	23.5
		1	2	22.03	22.06	22.07	23.5
		1	5	21.91	21.99	21.96	23.5
		3	0	21.73	21.75	21.8	23.5
		3	2	21.79	21.81	21.88	23.5
	64QAM	3	3	21.7	21.75	21.82	23.5
		6	0	20.76	20.81	20.86	22.5
		1	0	22.03	22.13	21.94	22.5
		1	2	21.9	22.07	21.84	22.5
		1	5	21.83	21.95	21.9	22.5
		3	0	20.94	20.85	20.83	22.5
		3	2	20.88	20.82	20.83	22.5
		3	3	20.88	20.81	20.84	22.5
		6	0	20.85	20.77	20.83	21.5
3MHz				Channel	Channel	Channel	Tune up
				20415	20525	20635	
	QPSK	1	0	22.74	22.79	22.85	24.5
		1	7	22.85	22.87	22.95	24.5
		1	14	22.7	22.74	22.79	24.5
		8	0	21.77	21.82	21.9	23.5
		8	4	21.76	21.83	21.9	23.5
		8	7	21.74	21.8	21.88	23.5
		15	0	21.75	21.82	21.88	23.5
	16QAM	1	0	22.03	22.02	22.1	23.5
		1	7	22.1	22.15	22.17	23.5
		1	14	21.95	22.06	22.06	23.5
		8	0	20.79	20.88	20.95	22.5
		8	4	20.83	20.89	20.96	22.5
		8	7	20.8	20.86	20.94	22.5
		15	0	20.8	20.82	20.91	22.5
	64QAM	1	0	21.96	22.05	21.97	22.5
		1	7	21.91	21.98	21.93	22.5
		1	14	21.82	21.97	21.84	22.5
		8	0	20.96	20.91	20.87	21.5

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		8	4	20.91	20.78	20.88	21.5
		8	7	20.85	20.73	20.85	21.5
		15	0	20.83	20.74	20.79	21.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20425	20525	20625	
5MHz	QPSK	1	0	22.78	22.83	22.91	24.5
		1	13	22.79	22.86	22.92	24.5
		1	24	22.72	22.75	22.83	24.5
		12	0	21.76	21.86	21.93	23.5
		12	6	21.78	21.85	21.95	23.5
		12	13	21.73	21.82	21.9	23.5
		25	0	21.74	21.85	21.91	23.5
	16QAM	1	0	22.07	22.12	22.18	23.5
		1	13	22.04	22.13	22.22	23.5
		1	24	21.96	21.99	22.16	23.5
		12	0	20.77	20.86	20.91	22.5
		12	6	20.8	20.88	20.91	22.5
		12	13	20.75	20.82	20.88	22.5
		25	0	20.75	20.84	20.93	22.5
	64QAM	1	0	22.02	22.1	21.9	22.5
		1	13	21.87	22.05	21.86	22.5
		1	24	21.89	21.94	21.85	22.5
		12	0	20.89	20.93	20.8	21.5
		12	6	20.88	20.86	20.81	21.5
		12	13	20.85	20.73	20.85	21.5
		25	0	20.84	20.73	20.82	21.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20450	20525	20600	
10MHz	QPSK	1	0	22.92	22.95	22.91	24.5
		1	25	22.79	22.83	22.81	24.5
		1	49	22.75	22.76	22.72	24.5
		25	0	21.9	21.93	21.9	23.5
		25	13	21.89	21.85	21.87	23.5
		25	25	21.85	21.81	21.83	23.5
		50	0	21.82	21.86	21.84	23.5
	16QAM	1	0	22.19	22.18	22.17	23.5
		1	25	22.09	22.03	22.08	23.5
		1	49	22.05	22.01	21.97	23.5
		25	0	20.89	20.9	20.86	22.5
		25	13	20.88	20.86	20.88	22.5
		25	25	20.81	20.78	20.8	22.5
		50	0	20.88	20.87	20.86	22.5

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	64QAM	1	0	22.08	22.19	22.05	22.5
		1	25	21.97	22.12	21.99	22.5
		1	49	21.97	22.03	21.96	22.5
		25	0	21.02	21	20.94	21.5
		25	13	21.01	20.91	20.96	21.5
		25	25	20.93	20.88	20.92	21.5
		50	0	20.95	20.88	20.93	21.5

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LTE Band 7-sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20775	21100	21425	
5MHz	QPSK	1	0	22.15	22.13	22.12	23
		1	13	22.22	22.19	22.14	23
		1	24	22.05	22.09	22.08	23
		12	0	21.14	21.11	21.14	22
		12	6	21.15	21.17	21.16	22
		12	13	21.14	21.12	21.1	22
		25	0	21.13	21.16	21.11	22
	16QAM	1	0	21.43	21.41	21.48	22
		1	13	21.47	21.42	21.5	22
		1	24	21.29	21.33	21.44	22
		12	0	20.17	20.16	20.2	21
		12	6	20.18	20.19	20.23	21
		12	13	20.12	20.12	20.18	21
		25	0	20.15	20.14	20.21	21
	64QAM	1	0	20.86	20.95	20.75	21
		1	13	20.86	20.76	20.51	21
		1	24	20.68	20.67	20.43	21
		12	0	19.28	19.63	19.39	20
		12	6	19.23	19.57	19.45	20
		12	13	19.04	19.7	19.37	20
		25	0	19.09	19.56	19.36	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20800	21100	21400	
10MHz	QPSK	1	0	22.2	22.19	22.19	23
		1	25	22.15	22.13	22.1	23
		1	49	22.09	22.09	22.11	23
		25	0	21.15	21.19	21.18	22
		25	13	21.14	21.16	21.15	22
		25	25	21.1	21.11	21.13	22
		50	0	21.12	21.15	21.13	22
	16QAM	1	0	21.42	21.49	21.48	22
		1	25	21.35	21.41	21.42	22
		1	49	21.34	21.36	21.37	22
		25	0	20.12	20.16	20.11	21
		25	13	20.16	20.19	20.17	21
		25	25	20.09	20.12	20.1	21
		50	0	20.15	20.17	20.16	21
	64QAM	1	0	20.91	20.92	20.72	21
		1	25	20.79	20.77	20.56	21
		1	49	20.65	20.71	20.49	21
		25	0	19.2	19.55	19.4	20

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		25	13	19.21	19.59	19.41	20
		25	25	18.98	19.76	19.41	20
		50	0	19.04	19.52	19.38	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20825	21100	21375	
15MHz	QPSK	1	0	22.08	22.32	22.22	23
		1	38	21.92	22.18	22.09	23
		1	74	21.93	22.17	22.07	23
		36	0	21.06	21.27	21.19	22
		36	18	21.01	21.24	21.15	22
		36	39	21.04	21.18	21.12	22
		75	0	21	21.23	21.15	22
	16QAM	1	0	21.39	21.52	21.44	22
		1	38	21.23	21.4	21.31	22
		1	74	21.25	21.31	21.29	22
		36	0	20.1	20.18	20.12	21
		36	18	20.09	20.17	20.12	21
		36	39	20	20.12	20.04	21
		75	0	20.07	20.17	20.12	21
	64QAM	1	0	20.91	20.98	20.72	21
		1	38	20.86	20.81	20.48	21
		1	74	20.7	20.73	20.48	21
		36	0	19.3	19.6	19.42	20
		36	18	19.16	19.55	19.5	20
		36	39	19	19.7	19.41	20
		75	0	19.02	19.51	19.33	20
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20850	21100	21350	
20MHz	QPSK	1	0	21.96	22.31	22.27	23
		1	50	21.81	22.14	22.07	23
		1	99	21.8	22.13	22.08	23
		50	0	20.94	21.27	21.2	22
		50	25	20.91	21.26	21.13	22
		50	50	20.85	21.19	21.09	22
		100	0	20.89	21.18	21.17	22
	16QAM	1	0	21.24	21.58	21.52	22
		1	50	21.1	21.5	21.35	22
		1	99	21.09	21.36	21.31	22
		50	0	19.96	20.28	20.24	21
		50	25	19.89	20.25	20.17	21
		50	50	19.83	20.19	20.14	21
		100	0	19.89	20.22	20.16	21

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	64QAM	1	0	20.95	20.96	20.82	21
		1	50	20.92	20.89	20.62	21
		1	99	20.77	20.8	20.56	21
		50	0	19.35	19.69	19.53	20
		50	25	19.3	19.67	19.55	20
		50	50	19.13	19.82	19.5	20
		100	0	19.16	19.61	19.47	20

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LTE Band 38-sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37775	38000	38225	
5MHz	QPSK	1	0	22.31	22.4	22.28	23.5
		1	13	22.37	22.44	22.32	23.5
		1	24	22.25	22.32	22.21	23.5
		12	0	21.35	21.46	21.31	22.5
		12	6	21.35	21.22	21.36	22.5
		12	13	21.32	21.35	21.28	22.5
		25	0	21.31	21.41	21.28	22.5
	16QAM	1	0	21.59	21.68	21.32	22.5
		1	13	21.7	21.74	21.64	22.5
		1	24	21.58	21.57	21.55	22.5
		12	0	20.42	20.52	20.42	21.5
		12	6	20.49	20.57	20.46	21.5
		12	13	20.37	20.46	20.39	21.5
		25	0	20.42	20.48	20.39	21.5
	64QAM	1	0	21.08	21.3	21.11	21.5
		1	13	20.74	20.94	20.94	21.5
		1	24	20.79	20.84	20.83	21.5
		12	0	19.87	19.9	19.88	20.5
		12	6	19.78	19.8	19.91	20.5
		12	13	19.83	19.81	19.85	20.5
		25	0	19.81	19.88	19.95	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37800	38000	38200	
10MHz	QPSK	1	0	22.32	22.43	22.41	23.5
		1	25	22.25	22.33	22.26	23.5
		1	49	22.2	22.27	22.24	23.5
		25	0	21.14	21.45	21.43	22.5
		25	13	21.35	21.46	21.39	22.5
		25	25	21.27	21.37	21.36	22.5
		50	0	21.34	21.43	21.38	22.5
	16QAM	1	0	21.68	21.81	21.69	22.5
		1	25	21.57	21.65	21.58	22.5
		1	49	21.5	21.64	21.54	22.5
		25	0	20.43	20.51	20.45	21.5
		25	13	20.39	20.49	20.4	21.5
		25	25	20.32	20.44	20.34	21.5
		50	0	20.35	20.45	20.39	21.5
	64QAM	1	0	21.11	21.31	21.1	21.5
		1	25	20.71	20.96	20.92	21.5
		1	49	20.75	20.81	20.84	21.5
		25	0	19.84	19.94	19.89	20.5

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		25	13	19.75	19.82	19.9	20.5
		25	25	19.82	19.78	19.89	20.5
		50	0	19.78	19.86	19.97	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37825	38000	38175	
15MHz	QPSK	1	0	22.47	22.59	22.58	23.5
		1	38	22.3	22.39	22.36	23.5
		1	74	22.23	22.37	22.3	23.5
		36	0	21.4	21.56	21.51	22.5
		36	18	21.34	21.45	21.44	22.5
		36	39	21.24	21.38	21.38	22.5
		75	0	21.33	21.42	21.41	22.5
	16QAM	1	0	21.74	21.86	21.79	22.5
		1	38	21.56	21.67	21.64	22.5
		1	74	21.5	21.58	21.53	22.5
		36	0	20.35	20.26	20.44	21.5
		36	18	20.33	20.45	20.42	21.5
		36	39	20.2	20.34	20.28	21.5
		75	0	20.33	20.23	20.44	21.5
	64QAM	1	0	21.09	21.35	21.1	21.5
		1	38	20.71	20.94	20.92	21.5
		1	74	20.77	20.85	20.84	21.5
		36	0	19.89	19.89	19.9	20.5
		36	18	19.76	19.85	19.91	20.5
		36	39	19.79	19.77	19.89	20.5
		75	0	19.8	19.88	19.96	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				37850	38000	38150	
20MHz	QPSK	1	0	22.47	22.63	22.59	23.5
		1	50	22.17	22.33	22.29	23.5
		1	99	22.07	22.24	22.2	23.5
		50	0	21.41	21.55	21.51	22.5
		50	25	21.31	21.46	21.43	22.5
		50	50	21.19	21.35	21.34	22.5
		100	0	21.29	21.46	21.39	22.5
	16QAM	1	0	21.73	21.91	21.83	22.5
		1	50	21.43	21.55	21.61	22.5
		1	99	21.37	21.54	21.52	22.5
		50	0	20.41	20.59	20.32	21.5
		50	25	20.35	20.5	20.45	21.5
		50	50	20.29	20.19	20.41	21.5
		100	0	20.33	20.52	20.27	21.5

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	64QAM	1	0	21.17	21.4	21.2	21.5
		1	50	20.8	21.02	21	21.5
		1	99	20.85	20.9	20.89	21.5
		50	0	19.94	19.99	19.98	20.5
		50	25	19.85	19.9	19.99	20.5
		50	50	19.88	19.87	19.95	20.5
		100	0	19.88	19.94	20.02	20.5

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LTE FDD Band 41-sensor off				Conducted Power(dBm)					
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Channel	Tune up
				39675	40148	40620	41093	41565	
5MHz	QPSK	1	0	22.12	22.45	22.38	22.17	22.31	23.5
		1	13	22.17	22.52	22.41	22.21	22.31	23.5
		1	24	22.08	22.41	22.29	22.1	22.18	23.5
		12	0	21.25	21.57	21.45	21.21	21.35	22.5
		12	6	21.29	21.57	21.47	21.26	21.42	22.5
		12	13	21.23	21.48	21.43	21.15	21.35	22.5
		25	0	21.23	21.51	21.42	21.2	21.36	22.5
	16QAM	1	0	21.49	21.77	21.73	21.48	21.62	22.5
		1	13	21.48	21.81	21.7	21.49	21.67	22.5
		1	24	21.4	21.77	21.65	21.37	21.54	22.5
		12	0	20.35	20.63	20.53	20.3	20.46	21.5
		12	6	20.41	20.69	20.63	20.41	20.54	21.5
		12	13	20.27	20.58	20.48	20.26	20.4	21.5
		25	0	20.3	20.6	20.48	20.28	20.44	21.5
	64QAM	1	0	20.88	21.38	21.31	21.11	21.21	21.5
		1	13	20.68	21.15	21.03	20.79	20.93	21.5
		1	24	20.67	21.12	20.91	20.75	20.82	21.5
		12	0	19.8	20.02	19.98	19.78	19.97	20.5
		12	6	19.61	19.92	19.79	19.68	19.96	20.5
		12	13	19.6	19.85	19.85	19.66	19.74	20.5
		25	0	19.59	19.93	19.91	19.67	19.97	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Channel	Tune up
				39700	40160	40620	41080	41540	
10MHz	QPSK	1	0	22.23	22.51	22.44	22.27	22.41	23.5
		1	25	22.1	22.41	22.36	22.18	22.35	23.5
		1	49	22.11	22.42	22.29	21.92	22.31	23.5
		25	0	21.29	21.6	21.49	21.27	21.45	22.5
		25	13	21.24	21.55	21.46	21.25	21.4	22.5
		25	25	21.23	21.48	21.4	21.17	21.34	22.5
		50	0	21.3	21.53	21.49	21.26	21.4	22.5
	16QAM	1	0	21.5	21.86	21.82	21.61	21.74	22.5
		1	25	21.42	21.73	21.62	21.46	21.59	22.5
		1	49	21.32	21.7	21.35	21.46	21.53	22.5
		25	0	20.33	20.61	20.55	20.32	20.54	21.5
		25	13	20.36	20.64	20.52	20.31	20.48	21.5
		25	25	20.26	20.53	20.43	20.21	20.41	21.5
		50	0	20.27	20.59	20.51	20.34	20.47	21.5
	64QAM	1	0	20.87	21.39	21.29	21.12	21.19	21.5
		1	25	20.65	21.11	21.03	20.81	20.93	21.5
		1	49	20.69	21.11	20.87	20.72	20.87	21.5
		25	0	19.8	20.03	19.93	19.76	19.94	20.5

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		25	13	19.61	19.91	19.83	19.69	20.01	20.5
		25	25	19.55	19.88	19.83	19.64	19.76	20.5
		50	0	19.59	19.93	19.92	19.66	19.98	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Channel	Tune up
				39725	40173	40620	41068	41515	
15MHz	QPSK	1	0	22.33	22.66	22.58	22.42	22.58	23.5
		1	38	22.22	22.49	22.36	22.19	22.39	23.5
		1	74	22.13	22.42	22.31	22.14	22.34	23.5
		36	0	21.38	21.66	21.56	21.33	21.57	22.5
		36	18	21.29	21.57	21.5	21.26	21.47	22.5
		36	39	21.22	21.25	21.42	21.2	21.37	22.5
		75	0	21.24	21.53	21.23	21.25	21.45	22.5
	16QAM	1	0	21.56	21.89	21.92	21.66	21.82	22.5
		1	38	21.43	21.76	21.43	21.47	21.62	22.5
		1	74	21.36	21.64	21.6	21.42	21.52	22.5
		36	0	20.3	20.6	20.52	20.31	20.53	21.5
		36	18	20.27	20.54	20.45	20.3	20.52	21.5
		36	39	19.93	20.44	20.36	20.18	20.37	21.5
		75	0	20.29	20.59	20.5	20.3	20.5	21.5
	64QAM	1	0	20.86	21.38	21.28	21.11	21.23	21.5
		1	38	20.68	21.16	21.04	20.77	20.89	21.5
		1	74	20.68	21.1	20.91	20.74	20.84	21.5
		36	0	19.76	20.04	19.98	19.75	19.97	20.5
		36	18	19.57	19.93	19.83	19.68	20.01	20.5
		36	39	19.59	19.84	19.86	19.68	19.73	20.5
		75	0	19.6	19.91	19.92	19.64	20	20.5
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Channel	Tune up
				39750	40185	40620	41055	41490	
20MHz	QPSK	1	0	22.16	22.66	22.63	22.48	22.73	23.5
		1	50	22.13	22.41	22.35	22.23	22.44	23.5
		1	99	21.81	22.33	22.27	22.08	22.34	23.5
		50	0	21.36	21.57	21.58	21.36	21.59	22.5
		50	25	21.25	21.49	21.46	21.29	21.52	22.5
		50	50	21.16	21.47	21.37	21.17	21.35	22.5
		100	0	21.25	21.46	21.47	21.25	21.48	22.5
	16QAM	1	0	21.59	21.98	21.88	21.77	21.91	22.5
		1	50	21.38	21.75	21.64	21.51	21.61	22.5
		1	99	21.33	21.69	21.48	21.39	21.54	22.5
		50	0	20.38	20.69	20.59	20.42	20.62	21.5
		50	25	20.3	20.57	20.52	20.35	20.56	21.5
		50	50	20.24	20.54	20.44	20.26	20.47	21.5
		100	0	20.28	20.62	20.52	20.36	20.58	21.5

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	64QAM	1	0	20.94	21.47	21.37	21.17	21.28	21.5
		1	50	20.74	21.21	21.09	20.87	20.99	21.5
		1	99	20.75	21.19	20.96	20.82	20.92	21.5
		50	0	19.86	20.09	20.03	19.84	20.02	20.5
		50	25	19.67	20	19.89	19.76	20.06	20.5
		50	50	19.65	19.93	19.92	19.74	19.83	20.5
		100	0	19.67	19.99	19.99	19.72	20.07	20.5

Table 13: Conducted Power Of LTE

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8.1.1 Conducted Power Of Downlink LTE CA

In this section, the following conducted power measurement results of downlink LTE carrier aggregation are provided to quantify downlink only carrier aggregation SAR test exclusion per KDB 941225 D05A. Uplink maximum output power is measured with downlink carrier aggregation active, using the channel with highest measured maximum output power when downlink carrier aggregation is inactive, 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.

Power test equipment: R&S Radio Communication Tester CMW500 and/or Anritsu Radio Communication Analyzer MT8821C were used.

The device supports Rel. 11 downlink only LTE Carrier Aggregation and certain network enhancement features (UE Category: cat 5). It supports a maximum of 2 carriers in the downlink. Other Release 11 or higher features are not supported, including Uplink Carrier Aggregation, Enhanced SC-FDMA and Uplink MIMO or other antenna diversity configurations etc.

The possible downlink LTE CA combinations supported by this device are as below tables per 3GPP TS 36.101. The detailed conducted power measurement results of downlink LTE CA are provided in the SAR report per 3GPP TS 36.521. According to KDB 941225 D05A, the downlink only carrier aggregation conditions for this device can be excluded from SAR testing and PAG requirements.

intra-band contiguous CA (per 3GPP TS 36.101 Table 5.6A.1-1)

E-UTRA configuration	Component carriers in order of increasing carrier frequency		Maximum aggregated bandwidth [MHz]	Bandwidth combination set
	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_41C	10	20	40	0
	15	15, 20		
	20	10, 15, 20		

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Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1			NC[, TL/VL, TL/VH, TH/VL, TH/VH]			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.			A: Mid range for PCC and SCC			
Test CC Combination setting (NRB_agg) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest NRB_agg Highest NRB_agg			
Test Parameters for CA Configurations						
CA Configuration / NRB_agg		DL Allocation	CC MOD	UL Allocation		
PCC NRB	SCCs NRB	PCC & SCC RB allocation		NRB_alloc	PCC RB allocations (LCRB @ RBstart)	
6	25	N/A for this test	QPSK	5	P_5@0	-
15	25		QPSK	4	P_4@0	-
25	50		QPSK	8	P_8@0	-
50	75		QPSK	12	P_12@0	-
75	100		QPSK	16	P_16@0	-
100	75		QPSK	18	P_18@0	-
Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1						

The conducted power measurement results of downlink LTE CA Conducted Power are as below, so the downlink only carrier aggregation conditions for this device can be excluded from SAR testing

Sensor off:

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DL LTE CA Class	PCC						SCC				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_5B	Band 5	10M	829	20450	1	0	Band 5	10M	883.9	2549	22.92	22.65
CA_7C	Band 7	20M	2560	21350	1	0	Band 7	20M	2660.2	3152	22.27	22.11
CA_38C	Band 38	20M	2610	38150	1	0	Band 38	20M	2590.2	37952	22.59	22.33
CA_41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	22.73	22.59
CA_7A-7A	Band 7	20M	2560	21350	1	0	Band 7	20M	2630	2850	22.27	22.03
CA_41A-41A	Band 41	20M	2680	41490	1	0	Band 41	20M	2506	39750	22.73	22.44

DL LTE CA Class	PCC						SCC1				SCC2				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_41D	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	22.73	22.52
CA_41A-41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2506	39750	22.73	22.72

DL LTE CA Class	PCC						SCC1				SCC2				SCC3				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_41C-41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2525.8	39948	Band 41	20M	2506	39750	22.73	22.75
CA_41A-41D	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	Band 41	20M	2506	39750	22.73	22.95

sensor on:

DL LTE CA Class	PCC						SCC				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_5B	Band 5	10M	829	20450	1	0	Band 5	10M	883.9	2549	20.97	20.92
CA_7C	Band 7	20M	2560	21350	1	0	Band 7	20M	2660.2	3152	19.31	19.21
CA_38C	Band 38	20M	2580	37850	1	0	Band 38	20M	2599.8	38048	21.55	21.47
CA_41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	21.75	21.68
CA_7A-7A	Band 7	20M	2560	21350	1	0	Band 7	20M	2630	2850	19.31	29.28
CA_41A-41A	Band 41	20M	2680	41490	1	0	Band 41	20M	2506	39750	21.75	21.66

DL LTE CA Class	PCC						SCC1				SCC2				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_41D	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	21.75	21.58
CA_41A-41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2506	39750	21.75	21.57

DL LTE CA Class	PCC						SCC1				SCC2				SCC3				Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power
CA_41C-41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2525.8	39948	Band 41	20M	2506	39750	21.75	21.62
CA_41A-41D	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	Band 41	20M	2506	39750	21.75	21.66

Single Carrier 4x4 Downlink MIMO sensor off

PCC						Power	
LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	Single Antenna Tx.Power (dBm)	4x4 Downlink MIMO Tx.Power(dBm)
Band 7	20M	2560	21350	1	0	22.27	22.22
Band 38	20M	2580	37850	1	0	22.59	22.51
Band 41	20M	2680	41490	1	0	22.73	22.71

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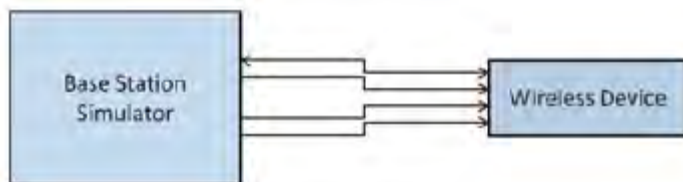
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Single Carrier 4x4 Downlink MIMO sensor on:

PCC						Power	
LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	Single Antenna Tx.Power (dBm)	4x4 Downlink MIMO Tx.Power(dBm)
Band 7	20M	2560	21350	1	0	19.31	19.12
Band 38	20M	2580	37850	1	0	21.55	21.37
Band 41	20M	2680	41490	1	0	21.75	21.59



Carrier Aggregation Scenarios with 2 Component Carriers 4x4 Downlink MIMO sensor off

DL LTE CA Class	PCC						SCC				Power		
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	DL Antenna Configuration	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power (dBm)
CA_7C	Band 7	20M	2560	21350	1	0	Band 7	20M	2660.2	3152	4x4MIMO	22.27	22.23
CA_38C	Band 38	20M	2610	38150	1	0	Band 38	20M	2590.2	37952	4x4MIMO	22.59	22.49
CA_41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	4x4MIMO	22.73	22.68

Carrier Aggregation Scenarios with 2 Component Carriers 4x4 Downlink MIMO sensor on:

DL LTE CA Class	PCC						SCC				Power		
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	DL Antenna Configuration	LTE Rel 8 Tx.Power (dBm)	LTE Rel 10 Tx.Power (dBm)
CA_7C	Band 7	20M	2560	21350	1	0	Band 7	20M	2660.2	3152	4x4MIMO	19.31	19.28
CA_38C	Band 38	20M	2580	37850	1	0	Band 38	20M	2599.8	38048	4x4MIMO	21.55	21.47
CA_41C	Band 41	20M	2680	41490	1	0	Band 41	20M	2660.2	41292	4x4MIMO	21.75	21.68

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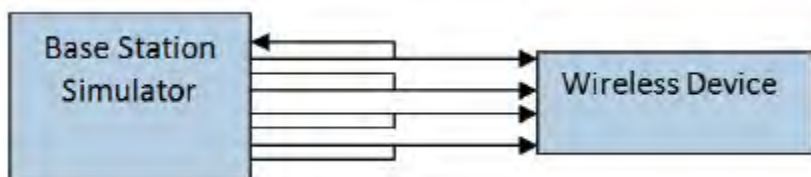
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Note: Testing is not required in bands or modes not intended/allowed for US operation.

According to KDB 941225 D05A, the downlink LTE CA SAR test is not required and PAG requirements can be excluded.

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8.1.2 Conducted Power Of WIFI and BT

Mode	Antenna	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune up	Average Power (dBm)	SAR Test
802.11b	Ant0	1	2412	1	19	17.14	NO
		6	2437		19	17.79	Yes
		11	2462		19	17.07	NO
	Ant1	1	2412		19	16.96	NO
		6	2437		19	17.2	NO
		11	2462		19	17.32	Yes
802.11g	Ant0	1	2412	6	16	13.71	NO
		6	2437		16	14.29	NO
		11	2462		16	12.53	NO
	Ant1	1	2412		16	13.52	NO
		6	2437		16	13.85	NO
		11	2462		16	12.94	NO
802.11n HT20 SISO	Ant0	1	2412	6.5	15	13.62	NO
		6	2437		15	14.17	NO
		11	2462		15	13.4	NO
	Ant1	1	2412		15	13.42	NO
		6	2437		15	13.77	NO
		11	2462		15	13.81	NO
802.11n HT40 SISO	Ant0	3	2422	13.5	15	13.2	NO
		6	2437		15	13.5	NO
		9	2452		15	13.76	NO
	Ant1	3	2422		15	13.23	NO
		6	2437		15	13.25	NO
		9	2452		15	13.86	NO
802.11n HT20 MIMO	Sum	1	2412	13	18	16.62	NO
		6	2437		18	17.07	NO
		11	2462		18	16.63	NO
802.11n HT40 MIMO	Sum	3	2422	27	18	16.3	NO
		6	2437		18	16.49	NO
		9	2452		18	16.8	Yes

Table 14 : Conducted Power Of WIFI.

BT		Average Conducted Power(dBm)			
Band	Channel	GFSK	$\pi/4$ DQPSK	8DPSK	Tune up
BT	0	2.8	-0.2	-0.1	8
	39	4.6	1.8	1.5	
	78	3.9	1.4	1	
BLE	0	3.79	/	/	
	19	5.29	/	/	
	39	3.82	/	/	

Table 15 : Conducted Power Of BT

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8.2 Stand-alone SAR test evaluation

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Freq. Band	Frequency (GHz)	Position	Tune Up		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
Wi-Fi	2.45	hotspot	19	79.4	10	12.4	3.0	N
BT	2.45	hotspot	8	6.3	10	1	3.0	Y

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, where

- $f(\text{GHz})$ 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

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

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8.3 Measurement of SAR Data

8.3.1 SAR Results of GSM850

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scale factor	Scale SAR (W/kg)	Liquid Temp
Hotspot Test data-sensor on(Separate 10mm)										
Front side	GPRS 4TS	190/836.6	1:2.075	0.569	-0.17	25.17	26.5	1.358	0.773	22.1
Back side	GPRS 4TS	190/836.6	1:2.075	0.579	-0.07	25.17	26.5	1.358	0.786	22.1
Right side	GPRS 4TS	190/836.6	1:2.075	0.0442	-0.02	25.17	26.5	1.358	0.060	22.1
Bottom side	GPRS 4TS	190/836.6	1:2.075	0.288	0.03	25.17	26.5	1.358	0.391	22.1
Hotspot Test data -sensor off										
Front side-22mm	GPRS 4TS	190/836.6	1:2.075	0.61	-0.06	27.53	29	1.403	0.856	22.1
Back side-22mm	GPRS 4TS	190/836.6	1:2.075	0.56	-0.05	27.53	29	1.403	0.786	22.1
Right side-24mm	GPRS 4TS	190/836.6	1:2.075	0.0149	-0.04	27.53	29	1.403	0.021	22.1
Top side-10mm	GPRS 4TS	190/836.6	1:2.075	0.413	-0.15	27.53	29	1.403	0.579	22.1
Bottom side-11mm	GPRS 4TS	190/836.6	1:2.075	0.611	0.07	27.53	29	1.403	0.857	22.1
Front side-22mm	GPRS 4TS	128/824.2	1:2.075	0.695	-0.1	27.52	29	1.406	0.977	22.1
Front side-22mm	GPRS 4TS	251/848.8	1:2.075	0.529	-0.01	27.64	29	1.368	0.724	22.1
Bottom side-11mm	GPRS 4TS	128/824.2	1:2.075	0.62	-0.03	27.52	29	1.406	0.872	22.1
Bottom side-11mm	GPRS 4TS	251/848.8	1:2.075	0.521	-0.03	27.64	29	1.368	0.713	22.1
Hotspot Test data at the worst case with Battery2#										
Front side-22mm	GPRS 4TS	190/836.6	1:2.075	0.629	-0.08	27.52	29	1.406	0.884	22.1

Table 16: SAR of GSM850 for Head and Body.

Note:

- 1) The maximum measured SAR value is marked in **bold**. Graph results refer to Appendix B
- 2) Upper and lower frequencies were measured at the worst position.
- 3) The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR1g limit (< 0.8W/kg), testing at the high and low channels is optional.

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- 4) When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.

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8.3.2 SAR Result Of GSM1900

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) ¹ -g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scale factor	Scaled SAR W/kg	Liquid Temp
Hotspot Test data -sensor on(Separate 10mm)										
Front side	GPRS 4TS	661/1880	1:2.075	0.568	0.03	22.91	24	1.285	0.730	22.3
Back side	GPRS 4TS	661/1880	1:2.075	0.518	-0.03	22.91	24	1.285	0.666	22.3
Right side	GPRS 4TS	661/1880	1:2.075	0.566	-0.01	22.91	24	1.285	0.727	22.3
Bottom side	GPRS 4TS	661/1880	1:2.075	0.263	-0.07	22.91	24	1.285	0.338	22.3
Hotspot Test data -sensor off										
Front side-22mm	GPRS 4TS	661/1880	1:2.075	0.221	-0.05	24.44	25.5	1.276	0.282	22.3
Back side-22mm	GPRS 4TS	661/1880	1:2.075	0.204	0.08	24.44	25.5	1.276	0.260	22.3
Right side-24mm	GPRS 4TS	661/1880	1:2.075	0.148	-0.01	24.44	25.5	1.276	0.189	22.3
Top side-10mm	GPRS 4TS	661/1880	1:2.075	0.0397	-0.02	24.44	25.5	1.276	0.051	22.3
Bottom side-11mm	GPRS 4TS	661/1880	1:2.075	0.265	-0.13	24.44	25.5	1.276	0.338	22.3
Hotspot Test data at the worst case with Battery2# -sensor on										
Front side-10mm	GPRS 4TS	661/1880	1:2.075	0.610	0.19	22.91	24	1.285	0.784	22.3

Table 17: SAR of GSM1900 for Head and Body.

Note:

- 1) The maximum measured SAR value is marked in **bold**. Graph results refer to Appendix B
- 2) Upper and lower frequencies were measured at the worst position.
- 3) The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR1g limit (< 0.8W/kg), testing at the high and low channels is optional.
- 4) When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.

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8.3.3 SAR Result Of WCDMA Band 2

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift dB	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp
Hotspot Test data-sensor on(Separate 10mm)										
Front side	RMC	9400/1880	1:1	0.679	-0.03	19.67	21	1.358	0.922	22.3
Back side	RMC	9400/1880	1:1	0.606	0.04	19.67	21	1.358	0.823	22.3
Right side	RMC	9400/1880	1:1	0.684	0.11	19.67	21	1.358	0.929	22.3
Front side	RMC	9262/1852.4	1:1	0.676	-0.16	19.55	21	1.396	0.944	22.3
Front side	RMC	9538/1907.6	1:1	0.74	-0.1	19.6	21	1.380	1.021	22.3
Back side	RMC	9262/1852.4	1:1	0.646	0.09	19.55	21	1.396	0.902	22.3
Back side	RMC	9538/1907.6	1:1	0.58	0.05	19.6	21	1.380	0.801	22.3
Right side	RMC	9262/1852.4	1:1	0.65	-0.01	19.55	21	1.396	0.908	22.3
Right side	RMC	9538/1907.6	1:1	0.807	0.02	19.6	21	1.380	1.114	22.3
Right side-repeated	RMC	9538/1907.6	1:1	0.806	0.02	19.6	21	1.380	1.113	22.3
Hotspot Test data-sensor off										
Front side - 16mm	RMC	9400/1880	1:1	0.611	0.07	22.58	24	1.387	0.847	22.3
Back side - 16mm	RMC	9400/1880	1:1	0.581	-0.05	22.58	24	1.387	0.806	22.3
Right side - 20mm	RMC	9400/1880	1:1	0.359	-0.06	22.58	24	1.387	0.498	22.3
Top side-10mm	RMC	9400/1880	1:1	0.0677	-0.03	22.58	24	1.387	0.094	22.3
Bottom side-10mm	RMC	9400/1880	1:1	0.587	0.03	22.58	24	1.387	0.814	22.3
Front side - 16mm	RMC	9262/1852.4	1:1	0.671	0.02	22.48	24	1.419	0.952	22.3
Front side - 16mm	RMC	9538/1907.6	1:1	0.713	0.03	22.51	24	1.409	1.005	22.3
Back side - 16mm	RMC	9262/1852.4	1:1	0.674	-0.1	22.48	24	1.419	0.956	22.3
Back side - 16mm	RMC	9538/1907.6	1:1	0.608	-0.11	22.51	24	1.409	0.857	22.3
Bottom side-10mm	RMC	9262/1852.4	1:1	0.606	0.04	22.48	24	1.419	0.860	22.3
Bottom side-10mm	RMC	9538/1907.6	1:1	0.661	0.04	22.51	24	1.409	0.932	22.3
Hotspot Test data at the worst case with Battery2#										
Right side-10mm	RMC	9400/1880	1:1	0.808	0.03	19.6	21	1.380	1.115	22.3

Table 18: SAR of WCDMA 2 for Body.

Note:

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- 1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side	9262/1852.4	1.11	1.07	1.04	N/A	N/A
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.						
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).						
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .						
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg						

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8.3.4 SAR Result Of WCDMA Band 4

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp
Hotspot Test data-sensor on(Separate 10mm)										
Front side	RMC	1412/1732.4	1:1	0.646	-0.01	19.97	20.5	1.130	0.730	22.2
Back side	RMC	1412/1732.4	1:1	0.654	0.03	19.97	20.5	1.130	0.739	22.2
Right side	RMC	1412/1732.4	1:1	0.525	-0.05	19.97	20.5	1.130	0.593	22.2
Hotspot Test data-sensor off										
Front side -16mm	RMC	1412/1732.4	1:1	0.721	-0.03	22.55	24	1.396	1.007	22.2
Back side -16mm	RMC	1412/1732.4	1:1	0.751	0.07	22.55	24	1.396	1.049	22.2
Right side -20mm	RMC	1412/1732.4	1:1	0.312	-0.04	22.55	24	1.396	0.436	22.2
Top side-10mm	RMC	1412/1732.4	1:1	0.078	0.04	22.55	24	1.396	0.109	22.2
Bottom side-10mm	RMC	1412/1732.4	1:1	0.516	0.04	22.55	24	1.396	0.721	22.2
Front side -16mm	RMC	1312/1712.4	1:1	0.773	-0.04	22.61	24	1.377	1.065	22.2
Front side -16mm	RMC	1513/1752.6	1:1	0.667	-0.05	22.51	24	1.409	0.940	22.2
Back side -16mm	RMC	1312/1712.4	1:1	0.752	0.08	22.61	24	1.377	1.036	22.2
Back side -16mm	RMC	1513/1752.6	1:1	0.755	0.09	22.51	24	1.409	1.064	22.2
Hotspot Test data at the worst case with Battery2#										
Front side -16mm	RMC	1312/1712.4	1:1	0.75	-0.03	22.61	24	1.377	1.033	22.2

Table 19: SAR of WCDMA Band 4 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

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Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side -17mm	1513/1752.6	1.16	1.18	1.02	N/A	N/A
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.						
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).						
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .						
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg						

DUT Holder Perturbations verification											
Right side -17mm	RMC	1513/1752.6	1:1	1.15	-0.09	21.93	22.8	1.222	1.405	22.3	1.6
Note: According to 201610 FCC TCB workshop RF exposure slides, when the highest reported SAR of an antenna is > 1.2 W/kg, holder perturbation verification is required for each antenna, using the highest SAR configuration among all applicable frequency bands.											

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8.3.1 SAR Result Of WCDMA Band 5

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp
Hotspot Test data-sensor on(Separate 10mm)										
Front side	RMC	4182/836.6	1:1	0.516	-0.13	20.98	22.5	1.419	0.732	22.1
Back side	RMC	4182/836.6	1:1	0.539	-0.09	20.98	22.5	1.419	0.765	22.1
Right side	RMC	4182/836.6	1:1	0.0421	-0.12	20.98	22.5	1.419	0.060	22.1
Hotspot Test data-sensor off										
Front side -16mm	RMC	4182/836.6	1:1	0.557	-0.05	22.39	24	1.449	0.807	22.1
Back side -16mm	RMC	4182/836.6	1:1	0.579	-0.05	22.39	24	1.449	0.839	22.1
Right side -20mm	RMC	4182/836.6	1:1	0.0152	-0.05	22.39	24	1.449	0.022	22.1
Top side-10mm	RMC	4182/836.6	1:1	0.311	-0.07	22.39	24	1.449	0.451	22.1
Bottom side-10mm	RMC	4182/836.6	1:1	0.449	-0.11	22.39	24	1.449	0.650	22.1
Front side -16mm	RMC	4132/826.4	1:1	0.65	-0.06	22.42	24	1.439	0.935	22.1
Front side -16mm	RMC	4233/846.6	1:1	0.454	-0.07	22.43	24	1.435	0.652	22.1
Back side -16mm	RMC	4132/826.4	1:1	0.684	-0.04	22.42	24	1.439	0.984	22.1
Back side -16mm	RMC	4233/846.6	1:1	0.467	-0.15	22.43	24	1.435	0.670	22.1
Hotspot Test data at the worst case with Battery2#										
Back side -16mm	RMC	4132/826.4	1:1	0.66	-0.07	22.42	24	1.439	0.950	22.1

Table 20: SAR of WCDMA 5 for Body.

Note:

- The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

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Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side	9262/1852.4	1.11	1.07	1.04	N/A	N/A
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.						
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).						
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .						
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg						

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8.3.2 SAR Result Of LTE Band 2

Test position	BW	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) ¹ -g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)											
Front side	20	QPSK	18900/1880	1:1	0.738	-0.01	19.53	21	1.403	1.035	22.3
Back side	20	QPSK	18900/1880	1:1	0.636	-0.03	19.53	21	1.403	0.892	22.3
Right side	20	QPSK	18900/1880	1:1	0.636	0	19.53	21	1.403	0.892	22.3
Front side	20	QPSK	18700/1860	1:1	0.715	-0.02	19.49	21	1.416	1.012	22.3
Front side	20	QPSK	19100/1900	1:1	0.786	-0.03	19.52	21	1.406	1.105	22.3
Back side	20	QPSK	18700/1860	1:1	0.691	0	19.49	21	1.416	0.978	22.3
Back side	20	QPSK	19100/1900	1:1	0.608	0.04	19.52	21	1.406	0.855	22.3
Right side	20	QPSK	18700/1860	1:1	0.576	0.04	19.49	21	1.416	0.815	22.3
Right side	20	QPSK	19100/1900	1:1	0.68	0.03	19.52	21	1.406	0.956	22.3
Hotspot Test data-sensor on(Separate 10mm 50RB_0 offset)											
Front side	20	QPSK	18900/1880	1:1	0.719	-0.01	19.48	21	1.419	1.020	22.3
Back side	20	QPSK	18900/1880	1:1	0.63	-0.04	19.48	21	1.419	0.894	22.3
Right side	20	QPSK	18900/1880	1:1	0.629	0.04	19.48	21	1.419	0.893	22.3
Front side	20	QPSK	18700/1860	1:1	0.726	-0.02	19.46	21	1.426	1.035	22.3
Front side	20	QPSK	19100/1900	1:1	0.808	-0.05	19.48	21	1.419	1.147	22.3
Back side	20	QPSK	18700/1860	1:1	0.68	0.04	19.46	21	1.426	0.969	22.3
Back side	20	QPSK	19100/1900	1:1	0.599	-0.02	19.48	21	1.419	0.850	22.3
Right side	20	QPSK	18700/1860	1:1	0.591	0.01	19.46	21	1.426	0.843	22.3
Right side	20	QPSK	19100/1900	1:1	0.7	0.03	19.48	21	1.419	0.993	22.3
Front side-repeat	20	QPSK	19100/1900	1:1	0.765	-0.01	19.48	21	1.419	1.086	22.3
Hotspot Test data-sensor on(Separate 10mm 100RB_0 offset)											
Front side	20	QPSK	18900/1880	1:1	0.716	-0.02	19.47	21	1.422	1.018	22.3
Back side	20	QPSK	18900/1880	1:1	0.607	-0.1	19.47	21	1.422	0.863	22.3
Right side	20	QPSK	18900/1880	1:1	0.646	-0.07	19.47	21	1.422	0.919	22.3

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Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) ¹ -g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)											
Front side	20	64QAM	18900/1880	1:1	0.728	0.05	20.31	21	1.172	0.853	22.3
Back side	20	64QAM	18900/1880	1:1	0.676	0.18	20.31	21	1.172	0.792	22.3
Right side	20	64QAM	18900/1880	1:1	0.644	0.15	20.31	21	1.172	0.755	22.3
Front side	20	64QAM	18700/1860	1:1	0.627	-0.08	20.30	21	1.175	0.737	22.3
Front side	20	64QAM	19100/1900	1:1	0.674	-0.1	20.23	21	1.194	0.805	22.3
Hotspot Test data-sensor on(Separate 10mm 50RB_0 offset)											
Front side	20	64QAM	19100/1900	1:1	0.599	-0.04	19.94	21	1.276	0.765	22.3
Back side	20	64QAM	19100/1900	1:1	0.582	0.08	19.94	21	1.276	0.743	22.3
Right side	20	64QAM	19100/1900	1:1	0.709	0.1	19.94	21	1.276	0.905	22.3
Right side	20	64QAM	18700/1860	1:1	0.573	0.1	19.82	21	1.312	0.752	22.3
Right side	20	64QAM	18900/1880	1:1	0.607	0.12	19.74	21	1.337	0.811	22.3
Hotspot Test data-sensor on(Separate 10mm 100RB_0 offset)											
Front side	20	64QAM	19100/1900	1:1	0.593	-0.07	19.87	21	1.297	0.769	22.3
Right side	20	64QAM	19100/1900	1:1	0.63	-0.06	19.87	21	1.297	0.817	22.3
Hotspot Test data-sensor off(1RB_0 offset)											
Front side - 16mm	20	QPSK	18900/1880	1:1	0.688	-0.09	22.79	24	1.321	0.909	22.3
Back side - 16mm	20	QPSK	18900/1880	1:1	0.632	0	22.79	24	1.321	0.835	22.3
Right side - 20mm	20	QPSK	18900/1880	1:1	0.355	0.1	22.79	24	1.321	0.469	22.3
Top side-10mm	20	QPSK	18900/1880	1:1	0.0838	-0.03	22.79	24	1.321	0.111	22.3
Bottom side-10mm	20	QPSK	18900/1880	1:1	0.646	0.02	22.79	24	1.321	0.854	22.3
Front side - 16mm	20	QPSK	18700/1860	1:1	0.663	-0.12	22.74	24	1.337	0.886	22.3
Front side - 16mm	20	QPSK	19100/1900	1:1	0.739	-0.16	22.78	24	1.324	0.979	22.3
Back side - 16mm	20	QPSK	18700/1860	1:1	0.669	0.01	22.74	24	1.337	0.894	22.3
Back side - 16mm	20	QPSK	19100/1900	1:1	0.604	0.04	22.78	24	1.324	0.800	22.3
Bottom side-10mm	20	QPSK	18700/1860	1:1	0.568	0.02	22.74	24	1.337	0.759	22.3
Bottom side-10mm	20	QPSK	19100/1900	1:1	0.592	0	22.78	24	1.324	0.784	22.3

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Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data-sensor off(50RB_0 offset)											
Front side - 16mm	20	QPSK	18900/1880	1:1	0.526	-0.09	21.75	23	1.334	0.701	22.3
Back side - 16mm	20	QPSK	18900/1880	1:1	0.489	0.15	21.75	23	1.334	0.652	22.3
Right side - 20mm	20	QPSK	18900/1880	1:1	0.281	0.04	21.75	23	1.334	0.375	22.3
Top side-10mm	20	QPSK	18900/1880	1:1	0.0699	0.08	21.75	23	1.334	0.093	22.3
Bottom side-10mm	20	QPSK	18900/1880	1:1	0.487	-0.02	21.75	23	1.334	0.649	22.3
Hotspot Test data-sensor off(100RB_0 offset)											
Front side - 16mm	20	QPSK	18900/1880	1:1	0.518	-0.06	21.67	23	1.358	0.704	22.3
Back side - 16mm	20	QPSK	18900/1880	1:1	0.468	0.06	21.67	23	1.358	0.636	22.3
Bottom side-10mm	20	QPSK	18900/1880	1:1	0.382	0.1	21.67	23	1.358	0.519	22.3
Hotspot Test data at the worst case with Battery2#											
Front side-10mm	20	QPSK	19100/1900	1:1	0.8	0.01	19.48	21	1.419	1.135	22.3

Table 21: SAR of LTE Band 2 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side	18700/1860	1.11	1.07	1.04	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

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

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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8.3.3 SAR Result Of LTE Band 4

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scale d factor	Scale d SAR (W/kg)	Liquid Temp.
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)											
Front side	20	QPSK	20050/1720	1:1	0.675	-0.17	19.06	20.5	1.393	0.940	22.2
Back side	20	QPSK	20050/1720	1:1	0.633	0.06	19.06	20.5	1.393	0.882	22.2
Right side	20	QPSK	20050/1720	1:1	0.55	0.01	19.06	20.5	1.393	0.766	22.2
Front side	20	QPSK	20300/1745	1:1	0.64	-0.11	19	20.5	1.413	0.904	22.2
Front side	20	QPSK	20175/1732.5	1:1	0.657	-0.08	19.02	20.5	1.406	0.924	22.2
Back side	20	QPSK	20300/1745	1:1	0.64	-0.03	19	20.5	1.413	0.904	22.2
Back side	20	QPSK	20175/1732.5	1:1	0.635	-0.06	19.02	20.5	1.406	0.893	22.2
Hotspot Test data-sensor on(Separate 10mm 50%RB)											
Front side	20	QPSK	20050/1720	1:1	0.667	-0.04	18.97	20.5	1.422	0.949	22.2
Back side	20	QPSK	20050/1720	1:1	0.63	0.05	18.97	20.5	1.422	0.896	22.2
Right side	20	QPSK	20050/1720	1:1	0.545	0.08	18.97	20.5	1.422	0.775	22.2
Front side	20	QPSK	20300/1745	1:1	0.628	-0.04	18.96	20.5	1.426	0.895	22.2
Front side	20	QPSK	20175/1732.5	1:1	0.645	0	18.95	20.5	1.429	0.922	22.2
Back side	20	QPSK	20300/1745	1:1	0.638	-0.04	18.96	20.5	1.426	0.910	22.2
Back side	20	QPSK	20175/1732.5	1:1	0.634	0.01	18.95	20.5	1.429	0.906	22.2
Hotspot Test data-sensor on(Separate 10mm 100%RB)											
Front side	20	QPSK	20050/1720	1:1	0.648	0.03	18.92	20.5	1.439	0.932	22.2
Back side	20	QPSK	20050/1720	1:1	0.700	-0.09	18.92	20.5	1.439	1.007	22.2
Hotspot Test data-sensor off(1RB_0 offset)											
Front side -16mm	20	QPSK	20050/1720	1:1	0.834	-0.02	22.84	24	1.306	1.089	22.2
Back side -16mm	20	QPSK	20050/1720	1:1	0.774	-0.07	22.84	24	1.306	1.011	22.2
Right side -20mm	20	QPSK	20050/1720	1:1	0.279	0.01	22.84	24	1.306	0.364	22.2
Top side-10mm	20	QPSK	20050/1720	1:1	0.0501	0.2	22.84	24	1.306	0.065	22.2
Bottom side-10mm	20	QPSK	20050/1720	1:1	0.421	0.02	22.84	24	1.306	0.550	22.2

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Front side -16mm	20	QPSK	20175/1732.5	1:1	0.778	0.06	22.83	24	1.309	1.019	22.2
Front side -16mm	20	QPSK	20300/1745	1:1	0.756	0.02	22.8	24	1.318	0.997	22.2
Back side -16mm	20	QPSK	20175/1732.5	1:1	0.775	-0.06	22.83	24	1.309	1.015	22.2
Back side -16mm	20	QPSK	20300/1745	1:1	0.77	0.04	22.8	24	1.318	1.015	22.2
Front side-16mm-repeat	20	QPSK	20050/1720	1:1	0.791	-0.07	22.84	24	1.306	1.033	22.2
Hotspot Test data-sensor off(50%RB)											
Front side -16mm	20	QPSK	20050/1720	1:1	0.687	0.03	21.76	23	1.330	0.914	22.2
Back side -16mm	20	QPSK	20050/1720	1:1	0.621	0.03	21.76	23	1.330	0.826	22.2
Right side -20mm	20	QPSK	20050/1720	1:1	0.229	0.02	21.76	23	1.330	0.305	22.2
Top side-10mm	20	QPSK	20050/1720	1:1	0.0422	-0.04	21.76	23	1.330	0.056	22.2
Bottom side-10mm	20	QPSK	20050/1720	1:1	0.333	0.12	21.76	23	1.330	0.443	22.2
Front side -16mm	20	QPSK	20175/1732.5	1:1	0.578	-0.1	21.73	23	1.340	0.774	22.2
Front side -16mm	20	QPSK	20300/1745	1:1	0.597	0	21.7	23	1.349	0.805	22.2
Back side -16mm	20	QPSK	20175/1732.5	1:1	0.631	-0.02	21.73	23	1.340	0.845	22.2
Back side -16mm	20	QPSK	20300/1745	1:1	0.613	0.03	21.7	23	1.349	0.827	22.2
Hotspot Test data-sensor off(100%RB)											
Front side -16mm	20	QPSK	20050/1720	1:1	0.583	0.01	21.7	23	1.349	0.786	22.2
Back side -16mm	20	QPSK	20050/1720	1:1	0.606	-0.05	21.7	23	1.349	0.817	22.2
Hotspot Test data at the worst case with Battery2#											
Front side -16mm	20	QPSK	20050/1720	1:1	0.652	-0.06	22.84	24	1.306	0.852	22.2

Table 22: SAR of LTE Band 4 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

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Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side -17mm	20300/1745	1.26	1.28	1.02	N/A	N/A

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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8.3.4 SAR Result Of LTE Band 5

Test position	B W.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)											
Front side	10	QPSK	20525/836.5	1:1	0.614	-0.02	20.72	22.5	1.507	0.925	22.1
Back side	10	QPSK	20525/836.5	1:1	0.61	0.06	20.72	22.5	1.507	0.919	22.1
Right side	10	QPSK	20525/836.5	1:1	0.0535	0.04	20.72	22.5	1.507	0.081	22.1
Front side	10	QPSK	20450/829	1:1	0.615	0.05	20.7	22.5	1.514	0.931	22.1
Front side	10	QPSK	20600/844	1:1	0.607	0.04	20.7	22.5	1.514	0.919	22.1
Back side	10	QPSK	20450/829	1:1	0.602	0.06	20.7	22.5	1.514	0.911	22.1
Back side	10	QPSK	20600/844	1:1	0.603	0.06	20.7	22.5	1.514	0.913	22.1
Hotspot Test data-sensor on(Separate 10mm 25RB_0 offset)											
Front side	10	QPSK	20525/836.5	1:1	0.61	0.03	20.73	22.5	1.503	0.917	22.1
Back side	10	QPSK	20525/836.5	1:1	0.615	0.05	20.73	22.5	1.503	0.924	22.1
Right side	10	QPSK	20525/836.5	1:1	0.0535	0.03	20.73	22.5	1.503	0.080	22.1
Front side	10	QPSK	20450/829	1:1	0.606	0.03	20.69	22.5	1.517	0.919	22.1
Front side	10	QPSK	20600/844	1:1	0.604	0.04	20.72	22.5	1.507	0.910	22.1
Back side	10	QPSK	20450/829	1:1	0.611	0.04	20.69	22.5	1.517	0.927	22.1
Back side	10	QPSK	20600/844	1:1	0.611	0.05	20.72	22.5	1.507	0.921	22.1
Hotspot Test data-sensor on(Separate 10mm 50RB offset)											
Front side	10	QPSK	20600/844	1:1	0.604	0.06	20.69	22.5	1.517	0.916	22.1
Back side	10	QPSK	20600/844	1:1	0.611	0.04	20.69	22.5	1.517	0.927	22.1
Hotspot Test data-sensor off(1RB_0 offset)											
Front side - 16mm	10	QPSK	20525/836.5	1:1	0.692	0.02	22.95	24.5	1.429	0.989	22.1
Back side - 16mm	10	QPSK	20525/836.5	1:1	0.737	0.05	22.95	24.5	1.429	1.053	22.1
Right side - 20mm	10	QPSK	20525/836.5	1:1	0.0325	0.08	22.95	24.5	1.429	0.046	22.1
Top side-10mm	10	QPSK	20525/836.5	1:1	0.387	0.06	22.95	24.5	1.429	0.553	22.1
Bottom side-10mm	10	QPSK	20525/836.5	1:1	0.403	0.06	22.95	24.5	1.429	0.576	22.1

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Front side - 16mm	10	QPSK	20450/829	1:1	0.68	0.02	22.92	24.5	1.439	0.978	22.1
Front side - 16mm	10	QPSK	20600/844	1:1	0.684	0.02	22.91	24.5	1.442	0.986	22.1
Back side - 16mm	10	QPSK	20450/829	1:1	0.708	0.04	22.92	24.5	1.439	1.019	22.1
Back side - 16mm	10	QPSK	20600/844	1:1	0.742	0.03	22.91	24.5	1.442	1.070	22.1
Hotspot Test data-sensor off(25RB_0 offset)											
Front side - 16mm	10	QPSK	20525/836.5	1:1	0.554	0.02	21.93	23.5	1.435	0.795	22.1
Back side - 16mm	10	QPSK	20525/836.5	1:1	0.598	0.08	21.93	23.5	1.435	0.858	22.1
Right side - 20mm	10	QPSK	20525/836.5	1:1	0.0323	0.02	21.93	23.5	1.435	0.046	22.1
Top side-10mm	10	QPSK	20525/836.5	1:1	0.313	0.05	21.93	23.5	1.435	0.449	22.1
Bottom side-10mm	10	QPSK	20525/836.5	1:1	0.326	0.09	21.93	23.5	1.435	0.468	22.1
Back side - 16mm	10	QPSK	20450/829	1:1	0.476	0.06	21.9	23.5	1.445	0.688	22.1
Back side - 16mm	10	QPSK	20600/844	1:1	0.578	0.02	21.9	23.5	1.445	0.835	22.1
Hotspot Test data-sensor off(50RB offset)											
Front side - 16mm	10	QPSK	20525/836.5	1:1	0.466	0	21.86	23.5	1.459	0.680	22.1
Back side - 16mm	10	QPSK	20525/836.5	1:1	0.548	0.08	21.86	23.5	1.459	0.799	22.1
Hotspot Test data at the worst case with Battery2#											
Back side - 16mm	10	QPSK	20600/844	1:1	0.686	0	22.91	24.5	1.442	0.989	22.1

Table 23: SAR of LTE Band 5 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

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8.3.5 SAR Result Of LTE Band 7

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conduct ed power(d Bm)	Tune up Limit(d Bm)	Scaled factor	Scaled SAR(W/ kg)	Liquid Temp.	SAR limit(W/kg)
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)												
Front side	20	QPSK	21100/2535.5	1:1	0.316	-0.1	19.14	20	1.219	0.385	22.1	1.6
Back side	20	QPSK	21100/2535.5	1:1	0.663	0.07	19.14	20	1.219	0.808	22.1	1.6
Right side	20	QPSK	21100/2535.5	1:1	0.41	0.01	19.14	20	1.219	0.500	22.1	1.6
Bottom side	20	QPSK	21100/2535.5	1:1	0.222	0.06	19.14	20	1.219	0.271	22.1	1.6
Back side	20	QPSK	20850/2510	1:1	0.566	0.05	18.79	20	1.321	0.748	22.1	1.6
Back side	20	QPSK	21350/2560	1:1	0.642	0.13	19.13	20	1.222	0.784	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 50RB_0 offset)												
Front side	20	QPSK	21100/2535.5	1:1	0.316	0.07	19.14	20	1.219	0.385	22.1	1.6
Back side	20	QPSK	21100/2535.5	1:1	0.666	0.09	19.14	20	1.219	0.812	22.1	1.6
Right side	20	QPSK	21100/2535.5	1:1	0.405	0.1	19.14	20	1.219	0.494	22.1	1.6
Bottom side	20	QPSK	21100/2535.5	1:1	0.208	0.111	19.14	20	1.219	0.254	22.1	1.6
Back side	20	QPSK	20850/2510	1:1	0.572	0.02	18.72	20	1.343	0.768	22.1	1.6
Back side	20	QPSK	21350/2560	1:1	0.648	0.11	19.07	20	1.239	0.803	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 100%RB)												
Back side	20	QPSK	21100/2535.5	1:1	0.66	-0.04	19.09	20	1.233	0.814	22.1	1.6
Hotspot Test data-sensor off(1RB_0 offset)												
Front side - 16mm	20	QPSK	21100/2535.5	1:1	0.295	-0.07	22.31	23	1.172	0.346	22.1	1.6
Back side - 16mm	20	QPSK	21100/2535.5	1:1	0.629	0.08	22.31	23	1.172	0.737	22.1	1.6
Right side - 20mm	20	QPSK	21100/2535.5	1:1	0.317	0.1	22.31	23	1.172	0.372	22.1	1.6
Top side- 10mm	20	QPSK	21100/2535.5	1:1	0.188	0.08	22.31	23	1.172	0.220	22.1	1.6
Bottom side-10mm	20	QPSK	21100/2535.5	1:1	0.446	-0.05	22.31	23	1.172	0.523	22.1	1.6
Back side - 16mm	20	QPSK	20850/2510	1:1	0.53	0.04	21.96	23	1.271	0.673	22.1	1.6
Back side - 16mm	20	QPSK	21350/2560	1:1	0.67	-0.05	22.27	23	1.183	0.793	22.1	1.6

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Hotspot Test data-sensor off(50RB_0 offset)												
Front side - 16mm	20	QPSK	21100/2535.5	1:1	0.233	0.12	21.27	22	1.183	0.276	22.1	1.6
Back side - 16mm	20	QPSK	21100/2535.5	1:1	0.508	-0.03	21.27	22	1.183	0.601	22.1	1.6
Right side - 20mm	20	QPSK	21100/2535.5	1:1	0.253	0.04	21.27	22	1.183	0.299	22.1	1.6
Top side- 10mm	20	QPSK	21100/2535.5	1:1	0.175	-0.09	21.27	22	1.183	0.207	22.1	1.6
Bottom side-10mm	20	QPSK	21100/2535.5	1:1	0.212	-0.09	21.27	22	1.183	0.251	22.1	1.6
Hotspot Test data-sensor off(100%RB)												
Back side - 16mm	20	QPSK	21100/2535.5	1:1	0.504	0.07	21.18	22	1.208	0.609	22.1	1.6
Hotspot Test data at the worse case with Battery2#												
Back side- 10mm	20	QPSK	21100/2535.5	1:1	0.677	-0.13	19.09	20	1.233	0.835	22.1	1.6

Table 24: SAR of LTE Band 7 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

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8.3.6 SAR Result Of LTE Band 38

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.	SAR limit(W/kg)
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)												
Front side	20	QPSK	37850/2580	1:1.58	0.373	-0.08	21.45	22.5	1.274	0.475	22.1	1.6
Back side	20	QPSK	37850/2580	1:1.58	0.793	0.07	21.45	22.5	1.274	1.010	22.1	1.6
Right side	20	QPSK	37850/2580	1:1.58	0.444	0.08	21.45	22.5	1.274	0.565	22.1	1.6
Bottom side	20	QPSK	37850/2580	1:1.58	0.189	0.06	21.45	22.5	1.274	0.241	22.1	1.6
Back side	20	QPSK	38000/2595	1:1.58	0.815	-0.06	21.37	22.5	1.297	1.057	22.1	1.6
Back side	20	QPSK	38150/2610	1:1.58	0.795	0.11	21.31	22.5	1.315	1.046	22.1	1.6
Back side-repeat	20	QPSK	37850/2580	1:1.58	0.813	0.09	21.45	22.5	1.274	1.035	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 50RB_0 offset)												
Front side	20	QPSK	37850/2580	1:1.58	0.284	0.17	21.37	22.5	1.297	0.368	22.1	1.6
Back side	20	QPSK	37850/2580	1:1.58	0.79	-0.13	21.37	22.5	1.297	1.025	22.1	1.6
Right side	20	QPSK	37850/2580	1:1.58	0.429	0.14	21.37	22.5	1.297	0.556	22.1	1.6
Bottom side	20	QPSK	37850/2580	1:1.58	0.178	0.09	21.37	22.5	1.297	0.231	22.1	1.6
Back side	20	QPSK	38000/2595	1:1.58	0.769	0.08	21.36	22.5	1.300	1.000	22.1	1.6
Back side	20	QPSK	38150/2610	1:1.58	0.742	0.08	21.29	22.5	1.321	0.980	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 100%RB)												
Back side	20	QPSK	37850/2580	1:1.58	0.785	0.14	21.23	22.5	1.340	1.052	22.1	1.6
Hotspot Test data-sensor off(1RB_0 offset)												
Front side-16mm	20	QPSK	38000/2595	1:1.58	0.232	-0.02	22.63	23.5	1.222	0.283	22.1	1.6
Back side-16mm	20	QPSK	38000/2595	1:1.58	0.488	-0.02	22.63	23.5	1.222	0.596	22.1	1.6
Right side-20mm	20	QPSK	38000/2595	1:1.58	0.212	0.04	22.63	23.5	1.222	0.259	22.1	1.6
Top side-10mm	20	QPSK	38000/2595	1:1.58	0.143	-0.08	22.63	23.5	1.222	0.175	22.1	1.6
Bottom side-10mm	20	QPSK	38000/2595	1:1.58	0.205	0.11	22.63	23.5	1.222	0.250	22.1	1.6

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Hotspot Test data-sensor off (Separate 50%RB)												
Front side -16mm	20	QPSK	38000/2595	1:1.58	0.18	0.06	21.55	22.5	1.245	0.224	22.1	1.6
Back side -16mm	20	QPSK	38000/2595	1:1.58	0.382	0.19	21.55	22.5	1.245	0.475	22.1	1.6
Right side -20mm	20	QPSK	38000/2595	1:1.58	0.164	0.09	21.55	22.5	1.245	0.204	22.1	1.6
Top side-10mm	20	QPSK	38000/2595	1:1.58	0.106	-0.16	21.55	22.5	1.245	0.132	22.1	1.6
Bottom side-10mm	20	QPSK	38000/2595	1:1.58	0.163	-0.03	21.55	22.5	1.245	0.203	22.1	1.6
Hotspot Test data at the worse case with Battery2#(Separate 10mm)												
Back side	20	QPSK	38000/2595	1:1.58	0.789	-0.07	21.37	22.5	1.297	1.023	22.1	1.6

Table 25: SAR of LTE Band 38 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Right side	26365/1882.5	0.815	0.813	1.002	N/A	N/A

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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8.3.7 SAR Result Of LTE Band 41

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.	SAR limit(W/kg)
Hotspot Test data-sensor on(Separate 10mm 1RB_0 offset)												
Front side	20	QPSK	41490/2680	1:1.58	0.359	0.04	21.64	22.5	1.219	0.438	22.1	1.6
Back side	20	QPSK	41490/2680	1:1.58	0.747	-0.09	21.64	22.5	1.219	0.911	22.1	1.6
Right side	20	QPSK	41490/2680	1:1.58	0.397	0.11	21.64	22.5	1.219	0.484	22.1	1.6
Bottom side	20	QPSK	41490/2680	1:1.58	0.284	0.03	21.64	22.5	1.219	0.346	22.1	1.6
Back side	20	QPSK	39750/2506	1:1.58	0.779	0.13	21.61	22.5	1.227	0.956	22.1	1.6
Back side	20	QPSK	40185/2549.5	1:1.58	0.804	0.1	21.48	22.5	1.265	1.017	22.1	1.6
Back side	20	QPSK	40620/2593	1:1.58	0.754	0.07	21.25	22.5	1.334	1.005	22.1	1.6
Back side	20	QPSK	41055/2636.5	1:1.58	0.787	0.16	21.39	22.5	1.291	1.016	22.1	1.6
Back side-repeat	20	QPSK	40185/2549.5	1:1.58	0.793	-0.17	21.48	22.5	1.265	1.003	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 50%RB)												
Front side	20	QPSK	41490/2680	1:1.58	0.352	0.02	21.56	22.5	1.242	0.437	22.1	1.6
Back side	20	QPSK	41490/2680	1:1.58	0.724	0.14	21.56	22.5	1.242	0.899	22.1	1.6
Right side	20	QPSK	41490/2680	1:1.58	0.399	0.09	21.56	22.5	1.242	0.495	22.1	1.6
Bottom side	20	QPSK	41490/2680	1:1.58	0.281	0.05	21.56	22.5	1.242	0.349	22.1	1.6
Back side	20	QPSK	39750/2506	1:1.58	0.756	0.02	21.54	22.5	1.247	0.943	22.1	1.6
Back side	20	QPSK	40185/2549.5	1:1.58	0.787	0.09	21.48	22.5	1.265	0.995	22.1	1.6
Back side	20	QPSK	40620/2593	1:1.58	0.765	0.01	21.23	22.5	1.340	1.025	22.1	1.6
Back side	20	QPSK	41055/2636.5	1:1.58	0.774	-0.02	21.35	22.5	1.303	1.009	22.1	1.6
Hotspot Test data-sensor on(Separate 10mm 100%RB)												
Back side	20	QPSK	41490/2680	1:1.58	0.7	0.12	21.49	22.5	1.262	0.883	22.1	1.6

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Hotspot Test data-sensor off(Separate 1RB_0 offset)												
Front side -16mm	20	QPSK	41490/2680	1:1.58	0.217	-0.12	22.73	23.5	1.194	0.259	22.1	1.6
Back side -16mm	20	QPSK	41490/2680	1:1.58	0.461	-0.04	22.73	23.5	1.194	0.550	22.1	1.6
Right side -20mm	20	QPSK	41490/2680	1:1.58	0.199	0.05	22.73	23.5	1.194	0.238	22.1	1.6
Top side-10mm	20	QPSK	41490/2680	1:1.58	0.0974	-0.08	22.73	23.5	1.194	0.116	22.1	1.6
Bottom side-10mm	20	QPSK	41490/2680	1:1.58	0.332	0.01	22.73	23.5	1.194	0.396	22.1	1.6
Hotspot Test data-sensor off (Separate 50%RB)												
Front side -16mm	20	QPSK	41490/2680	1:1.58	0.176	0.02	21.59	22.5	1.233	0.217	22.1	1.6
Back side -16mm	20	QPSK	41490/2680	1:1.58	0.382	0.19	21.59	22.5	1.233	0.471	22.1	1.6
Right side -20mm	20	QPSK	41490/2680	1:1.58	0.164	0.19	21.59	22.5	1.233	0.202	22.1	1.6
Top side-10mm	20	QPSK	41490/2680	1:1.58	0.068	-0.08	21.59	22.5	1.233	0.084	22.1	1.6
Bottom side-10mm	20	QPSK	41490/2680	1:1.58	0.247	-0.04	21.59	22.5	1.233	0.305	22.1	1.6
Hotspot Test data at the worse case with Battery2#(Separate 10mm)												
Back side	20	QPSK	40620/2593	1:1.58	0.746	0.16	21.23	22.5	1.340	0.999	22.1	1.6

Table 26: SAR of LTE Band41 for Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Back Side	40185/2549.5	0.804	0.793	1.014	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

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

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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8.3.8 SAR Result Of 2.4GHz WIFI

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data (Separate 10mm) -WiFi1(Antenna 0)											
Front side	802.11b	6/2437	99.11%	1.01	0.148	0.09	17.79	19	1.320	0.197	22
Back side	802.11b	6/2437	99.11%	1.01	0.211	-0.08	17.79	19	1.320	0.281	22
Top side	802.11b	6/2437	99.11%	1.01	0.327	0.03	17.79	19	1.320	0.436	22
Hotspot Test data at the worst case with Battery2#(Separate 10mm) -WiFi1(Antenna 0)											
Top side	802.11b	6/2437	99.11%	1.01	0.303	0.19	17.79	19	1.320	0.404	22
Hotspot Test data (Separate 10mm) -WiFi2(Antenna 1)											
Front side	802.11b	11/2462	99.11%	1.01	0.167	0.03	17.32	19	1.472	0.248	22
Back side	802.11b	11/2462	99.11%	1.01	0.192	0.09	17.32	19	1.472	0.286	22
Bottom side	802.11b	11/2462	99.11%	1.01	0.237	0.01	17.32	19	1.472	0.352	22
Hotspot Test data at the worst case with Battery2#(Separate 10mm) -WiFi2(Antenna 1)											
Bottom side	802.11b	11/2462	99.11%	1.01	0.216	0.17	17.32	19	1.472	0.321	22

Table 27: SAR of WIFI for Body.

Note:

- 1) The maximum measured SAR value is marked in **bold**. Graph results refer to Appendix B
- 2) Upper and lower frequencies were measured at the worst position.
- 3) The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR1g limit (< 0.8W/kg), testing at the high and low channels is optional.

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8.3.9 SAR Result Of 2.4GHz WIFI MIMO

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Hotspot Test data (Separate 10mm)											
Front side	802.11n HT40	9/2452	88.51%	1.13	0.219	-0.08	16.8	18	1.318	0.326	22
Back side	802.11n HT40	9/2452	88.51%	1.13	0.301	0.12	16.8	18	1.318	0.448	22
Top side	802.11n HT40	9/2452	88.51%	1.13	0.329	0.1	16.8	18	1.318	0.490	22
Bottom side	802.11n HT40	9/2452	88.51%	1.13	0.189	0.04	16.8	18	1.318	0.282	22
Hotspot Test data at the worst case with Battery2#(Separate 10mm)											
Top side	802.11n HT40	9/2452	88.51%	1.13	0.134	0.02	16.8	18	1.318	0.200	22

Table 28: SAR of 2.4GHz WIFI MIMO for Body

Note:

- 1) The maximum measured SAR value is marked in **bold**. Graph results refer to Appendix B
- 2) Upper and lower frequencies were measured at the worst position.
- 3) The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR1g limit ($< 0.8\text{W/kg}$), testing at the high and low channels is optional.

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8.4 Multiple Transmitter Evaluation

8.4.1 Simultaneous SAR test evaluation

Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Hotspot
1	GPRS / EDGE(Data) + WiFi	Yes
2	GPRS / EDGE(Data) + BT	Yes
3	WCDMA(Data) + WiFi	Yes
4	WCDMA(Data) + BT	Yes
5	LTE(Data) + WiFi	Yes
6	LTE(Data) + BT	Yes
7	BT+WIFI	No

Note:

- 1) Wi-Fi 2.4G and Bluetooth share the same Tx antenna and can't transmit simultaneously.

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1) Simultaneous Transmission SAR Summation Scenario for hotspot

WWA N Band	Exposure position	① MAX.WWAN SAR(W/kg)	② MAX.WLA N SAR(W/kg) Ant 0	③ MAX.WLA N SAR(W/kg) Ant 1	④ MAX.WLA N SAR(W/kg) MIMO	⑤ MAX.BT SAR(W/kg)	Summe d SAR① +②	Summe d SAR① +③	Summe d SAR① +④	Summe d SAR① +⑤	Case NO.
GSM 850	Front	0.977	0.197	0.248	0.326	0.132	1.174	1.225	1.303	1.109	No
	Back	0.786	0.281	0.286	0.448	0.132	1.067	1.072	1.234	0.918	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.060	0.028	0.036	0.000	0.132	0.088	0.096	0.060	0.192	No
	Top	0.579	0.436	0.000	0.490	0.132	1.015	0.579	1.069	0.711	No
	Bottom	0.872	0.000	0.352	0.282	0.132	0.872	1.224	1.154	1.004	No
GSM 1900	Front	0.784	0.197	0.248	0.326	0.132	0.981	1.032	1.110	0.916	No
	Back	0.666	0.281	0.286	0.448	0.132	0.947	0.952	1.114	0.798	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.727	0.028	0.036	0.000	0.132	0.755	0.763	0.727	0.859	No
	Top	0.051	0.436	0.000	0.490	0.132	0.487	0.051	0.541	0.183	No
	Bottom	0.338	0.000	0.352	0.282	0.132	0.338	0.690	0.620	0.470	No
WCD MA Band II	Front	1.021	0.197	0.248	0.326	0.132	1.218	1.269	1.347	1.153	No
	Back	0.956	0.281	0.286	0.448	0.132	1.237	1.242	1.404	1.088	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	1.115	0.028	0.036	0.000	0.132	1.143	1.151	1.115	1.247	No
	Top	0.094	0.436	0.000	0.490	0.132	0.530	0.094	0.584	0.226	No
	Bottom	0.932	0.000	0.352	0.282	0.132	0.932	1.284	1.214	1.064	No
WCD MA Band IV	Front	1.065	0.197	0.248	0.326	0.132	1.262	1.313	1.391	1.197	No
	Back	1.064	0.281	0.286	0.448	0.132	1.345	1.350	1.512	1.196	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.593	0.028	0.036	0.000	0.132	0.621	0.629	0.593	0.725	No
	Top	0.109	0.436	0.000	0.490	0.132	0.545	0.109	0.599	0.241	No
	Bottom	0.721	0.000	0.352	0.282	0.132	0.721	1.073	1.003	0.853	No
WCD MA Band V	Front	0.935	0.197	0.248	0.326	0.132	1.132	1.183	1.261	1.067	No
	Back	0.984	0.281	0.286	0.448	0.132	1.265	1.270	1.432	1.116	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.060	0.028	0.036	0.000	0.132	0.088	0.096	0.060	0.192	No
	Top	0.451	0.436	0.000	0.490	0.132	0.887	0.451	0.941	0.583	No
	Bottom	0.650	0.000	0.352	0.282	0.132	0.650	1.002	0.932	0.782	No

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LTE Band 2	Front	1.147	0.197	0.248	0.326	0.132	1.344	1.395	1.473	1.279	No
	Back	0.978	0.281	0.286	0.448	0.132	1.259	1.264	1.426	1.110	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.993	0.028	0.036	0.000	0.132	1.021	1.029	0.993	1.125	No
	Top	0.111	0.436	0.000	0.490	0.132	0.547	0.111	0.601	0.243	No
	Bottom	0.854	0.000	0.352	0.282	0.132	0.854	1.206	1.136	0.986	No
LTE Band 4	Front	1.089	0.197	0.248	0.326	0.132	1.286	1.337	1.415	1.221	No
	Back	1.015	0.281	0.286	0.448	0.132	1.296	1.301	1.463	1.147	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.775	0.028	0.036	0.000	0.132	0.803	0.811	0.775	0.907	No
	Top	0.065	0.436	0.000	0.490	0.132	0.501	0.065	0.555	0.197	No
	Bottom	0.550	0.000	0.352	0.282	0.132	0.550	0.902	0.832	0.682	No
LTE Band 5	Front	0.989	0.197	0.248	0.326	0.132	1.186	1.237	1.315	1.121	No
	Back	1.070	0.281	0.286	0.448	0.132	1.351	1.356	1.518	1.202	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.081	0.028	0.036	0.000	0.132	0.109	0.117	0.081	0.213	No
	Top	0.553	0.436	0.000	0.490	0.132	0.989	0.553	1.043	0.685	No
	Bottom	0.576	0.000	0.352	0.282	0.132	0.576	0.928	0.858	0.708	No
LTE Band 7	Front	0.432	0.197	0.248	0.326	0.132	0.629	0.680	0.758	0.564	No
	Back	0.937	0.281	0.286	0.448	0.132	1.218	1.223	1.385	1.069	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.561	0.028	0.036	0.000	0.132	0.589	0.597	0.561	0.693	No
	Top	0.247	0.436	0.000	0.490	0.132	0.683	0.247	0.737	0.379	No
	Bottom	0.587	0.000	0.352	0.282	0.132	0.587	0.939	0.869	0.719	No
LTE Band 38	Front	0.475	0.197	0.248	0.326	0.132	0.672	0.723	0.801	0.607	No
	Back	1.057	0.281	0.286	0.448	0.132	1.338	1.343	1.505	1.189	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.565	0.028	0.036	0.000	0.132	0.593	0.601	0.565	0.697	No
	Top	0.175	0.436	0.000	0.490	0.132	0.611	0.175	0.665	0.307	No
	Bottom	0.250	0.000	0.352	0.282	0.132	0.250	0.602	0.532	0.382	No

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LTE Band 41	Front	0.438	0.197	0.248	0.326	0.132	0.635	0.686	0.764	0.570	No
	Back	1.025	0.281	0.286	0.448	0.132	1.306	1.311	1.473	1.157	No
	Left	0.000	0.000	0.000	0.000	0.132	0.000	0.000	0.000	0.132	No
	Right	0.495	0.028	0.036	0.000	0.132	0.523	0.531	0.495	0.627	No
	Top	0.116	0.436	0.000	0.490	0.132	0.552	0.116	0.606	0.248	No
	Bottom	0.396	0.000	0.352	0.282	0.132	0.396	0.748	0.678	0.528	No

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9 Equipment list

Test Platform		SPEAG DASY5 Professional				
Description		SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference		DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	ELI v4.0	1123	NCR	NCR
☒	DAE	SPEAG	DAE4	1267	2017-02-23	2018-02-22
☒	DAE	SPEAG	DAE4	1374	2016-08-23	2017-08-22
☒	E-Field Probe	SPEAG	EX3DV4	3962	2016-12-19	2017-12-18
☒	E-Field Probe	SPEAG	EX3DV4	3789	2017-01-13	2018-01-12
☒	Validation Kits	SPEAG	D835V2	4d105	2016-12-08	2019-12-07
☒	Validation Kits	SPEAG	D1750V2	1149	2016-06-23	2019-06-22
☒	Validation Kits	SPEAG	D1900V2	5d028	2016-12-07	2019-12-06
☐	Validation Kits	SPEAG	D2300V2	1072	2016-06-21	2019-06-20
☒	Validation Kits	SPEAG	D2450V2	733	2016-12-07	2019-12-06
☒	Validation Kits	SPEAG	D2600V2	1125	2016-06-22	2019-06-21
☒	Agilent Network Analyzer	Agilent	E5071C	MY46523590	2017-03-06	2018-03-05
☒	Dielectric Probe Kit	Agilent	85070E	US01440210	NCR	NCR
☒	Radio Communication Analyzer	Anritsu Corporation	MT8820C	6201465414	2017-04-14	2018-04-13
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	Agilent	N5171B	MY53050736	2017-03-06	2018-03-05
☒	Preamplifier	Mini-Circuits	ZHL-42W	15542	NCR	NCR
☒	Power Meter	Agilent	E4416A	GB41292095	2017-03-06	2018-03-05
☒	Power Sensor	Agilent	8481H	MY41091234	2017-03-05	2018-03-04
☒	Power Sensor	R&S	NRP-Z92	100025	2017-03-06	2018-03-05
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	50 Ω coaxial load	Mini-Circuits	KARN-50+	00850	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
☒	Speed reading thermometer	MingGao	T809	NA	2017-03-08	2018-03-07
☒	Humidity and Temperature Indicator	KIMTOKA	KIMTOKA	NA	2017-03-08	2018-03-07

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10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

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Appendix A: Detailed System Validation Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

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