



FCC SAR TEST REPORT

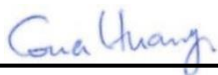
FCC ID : EJE-EM7455D5
Equipment : WWAN Module
Brand Name : Sierra Wireless Inc.
Model Name : EM7455
Applicant : FUJITSU CLIENT COMPUTING LIMITED
1-1-2, Kashimada, Saiwai-Ku, Kawasaki, Kanagawa,
212-0058 Japan
Manufacturer : FUJITSU CLIENT COMPUTING LIMITED
1-1-2, Kashimada, Saiwai-Ku, Kawasaki, Kanagawa,
212-0058 Japan
Standard : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

The product was installed into Tablet Computer (Brand Name FUJITSU, Model Name: 7Q13A1) during test.

The product was received on Apr. 03, 2020 and testing was started from Apr. 04, 2020 and completed on Apr. 15, 2020. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA031013	01	Initial issue of report	May 05, 2020

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for FUJITSU CLIENT COMPUTING LIMITED, WWAN Module, EM7455, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	Highest Simultaneous Transmission 1g SAR (W/kg)
		Body	
		1g SAR (W/kg)	
Licensed	WCDMA II	1.28	1.59
	WCDMA IV	1.36	
	WCDMA V	1.30	
	LTE Band 4	1.33	
	LTE Band 7	1.31	
	LTE Band 12	1.34	
	LTE Band 13	1.34	
	LTE Band 2 / 25	1.35	
	LTE Band 5 / 26	1.26	
	LTE Band 41	1.37	
Date of Testing:		2020/4/4 ~ 2020/4/15	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

Reviewed by: Jason Wang

Report Producer: Wan Liu



2. Guidance Applied

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

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



3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	WWAN Module
Brand Name	Sierra Wireless Inc.
Model Name	EM7455
FCC ID	EJE-EM7455D5
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM
Remark: 1. The Intel AX201D2W WLAN/Bluetooth module is also integrated into this host, WLAN/Bluetooth power and SAR testing data, which can be referred to Intel Test Report, Report No.: 180717-03.TR10 (FCC ID: PD9AX201D2) and these results are used simultaneous transmission analysis. 2. Additional 2.4GHz & 5GHz WLAN ANT 2 and Bluetooth SAR testing for simultaneous transmission analysis. 3. The 60GHz module (FCC ID: EJE-KST001) is also integrated in this device, MPE revaluation refers Appendix E and only when the host insert to the 60GHz charging cradle (FCC ID: EJE-KSC001as Appendix E), the 60GHz feature of host device will be turn on and transmission, in such users scenarios which the device will keep away 20cm distance from human body. Therefore additional evaluate MPE of the WWAN and consider simultaneous transmission analysis with 60GHz and WLAN/BT in the Appendix E.	

Host Information	
Equipment Name	Tablet Computer
Brand Name	FUJITSU
Model Name	7Q13A1
Integrated WLAN Module	Brand Name: Intel Model Name: AX201D2W
Integrated 60GHz Module	Brand Name: Keyssa Model Name: MT104RD
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz 60.48GHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE 60GHz: OOK
EUT Stage	Pre-Production Unit

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05												
FCC ID			EJE-EM7455D5									
Equipment Name			WWAN Module									
Operating Frequency Range of each LTE transmission band			LTE Band 2: 1850 MHz ~ 1910 MHz									
			LTE Band 4: 1710 MHz ~ 1755 MHz									
			LTE Band 5: 824 MHz ~ 849 MHz									
			LTE Band 7: 2500 MHz ~ 2570 MHz									
			LTE Band 12: 699 MHz ~ 716 MHz									
			LTE Band 13: 777 MHz ~ 787 MHz									
			LTE Band 25: 1850 MHz ~ 1915 MHz									
			LTE Band 26: 814 MHz ~ 849 MHz									
			LTE Band 41: 2496 MHz ~ 2690 MHz									
Channel Bandwidth			LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz									
			LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz									
			LTE Band 13: 5MHz, 10MHz									
			LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz									
			LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz									
uplink modulations used			QPSK / 16QAM									
LTE Voice / Data requirements			Data only									
LTE MPR permanently built-in by design			Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3									
			Modulation		Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	
					1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
			QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1		
			16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1		
			16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2		
			64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2		
			64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3		
			256 QAM	≥ 1						≤ 5		
			LTE A-MPR			In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)						
Spectrum plots for RB configuration			A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.									
Power reduction applied to satisfy SAR compliance			1. Yes, Proximity Sensor.									
LTE Carrier Aggregation Combinations			Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to section 12.									
LTE Carrier Aggregation Additional Information			2. This device supports maximum of 3 carriers in the downlink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.									
Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

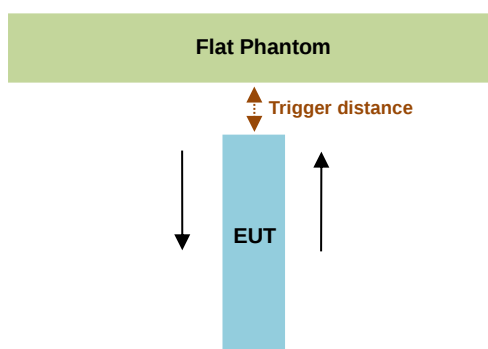
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 12												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704				
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711				
LTE Band 13												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)					
L	23205		779.5		23230		782					
M	23230		782									
H	23255		784.5									
LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5	26790	824.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5	26940	838.5
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593	40620	2593
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				

4. Proximity Sensor Triggering Test

1. The EUT utilizes power reduction technique when WWAN Antenna is in close proximity with objects and human body. The proximity sensor is a single channel sensor chip that has the ability to detect movement of an external object/human in relation to the device. The details of the operation are shown in the confidential exhibit "Technical operational description"
2. In addition to the KDB procedures some additional tests were performed to determine worst case trigger effects against objects like Wood, Metal, and Human. The Tests were performed under the Flat Phantom with prescribed Tissue-equivalent medium and also additionally using Tap Water also. Human and metal yield the highest trigger distances.
3. There are 2 sensor probes on either side of the WWAN Tx Antenna (show this in picture on page 80). Both probes are combined and connected to a single input of the sensor chip. Either of the probe triggers the sensor chip.

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

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed. The details are illustrated in the exhibit "Proximity Sensor operational description", and the shortest triggering distances were reported and used for SAR assessment.
2. According to KDB 616217 section 6.0, due to the triggering variations and hysteresis effect on different frequency bands, therefore provide the distances resulted from phantom liquid for the lowest and highest frequency band used by that particular antenna with proximity and motion detection; and then repeat this using regular tap water to determine trigger distance.
3. In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; and the tissue-equivalent medium for highest frequency (2600MHz) , lowest (750MHz) frequency and water was used for formal proximity sensor triggering testing.
4. For the other materials (e.g. Wood, Hand and Metal) trigger distance test results just only for reference, it would not be determined as final trigger distance, the details of the operation are shown in the confidential exhibit "Technical operational description"



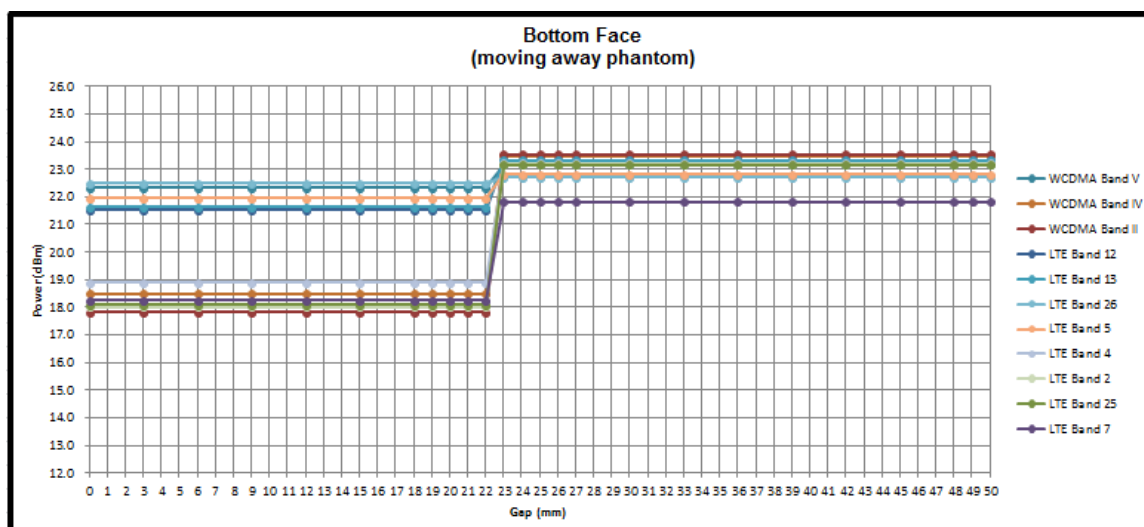
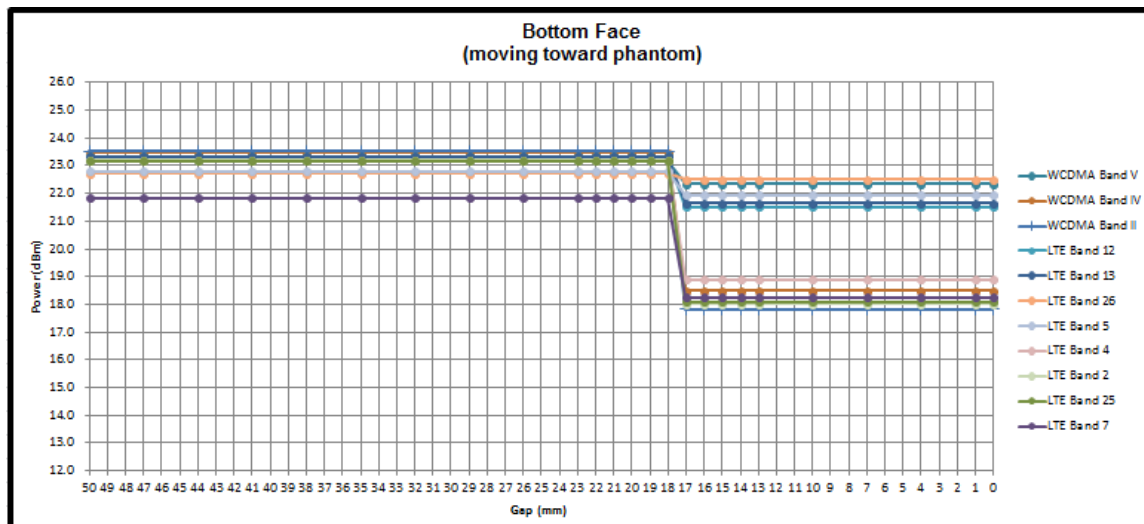
<Summary of the proximity sensor triggers distance>:

Proximity Sensor Trigger Distance (mm)		
Liquid	Bottom Face	Edge 1
Water	19	13
Body 750 MHz	17	13
Body 2600 MHz	17	13
Minimum distance	17	13

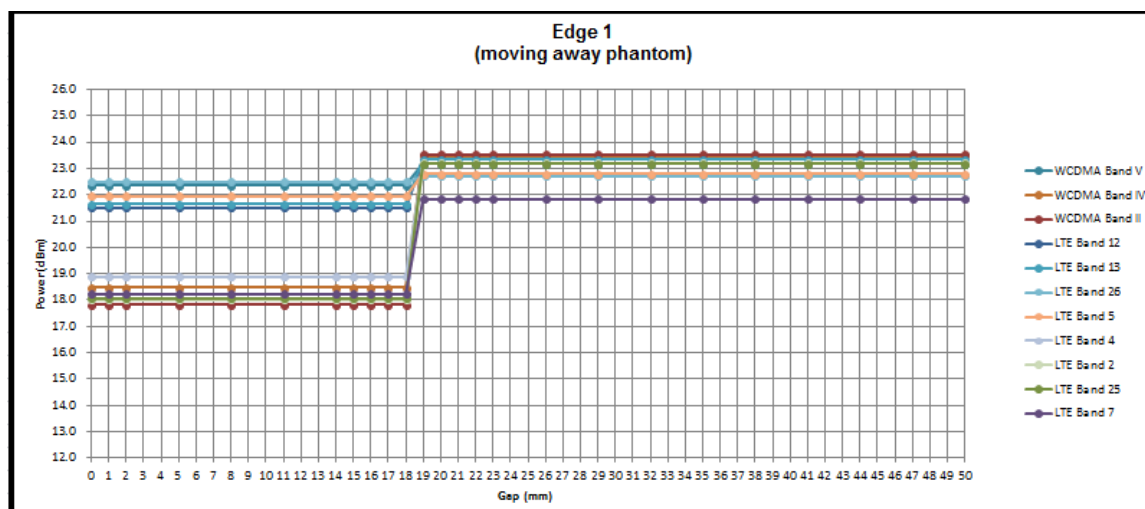
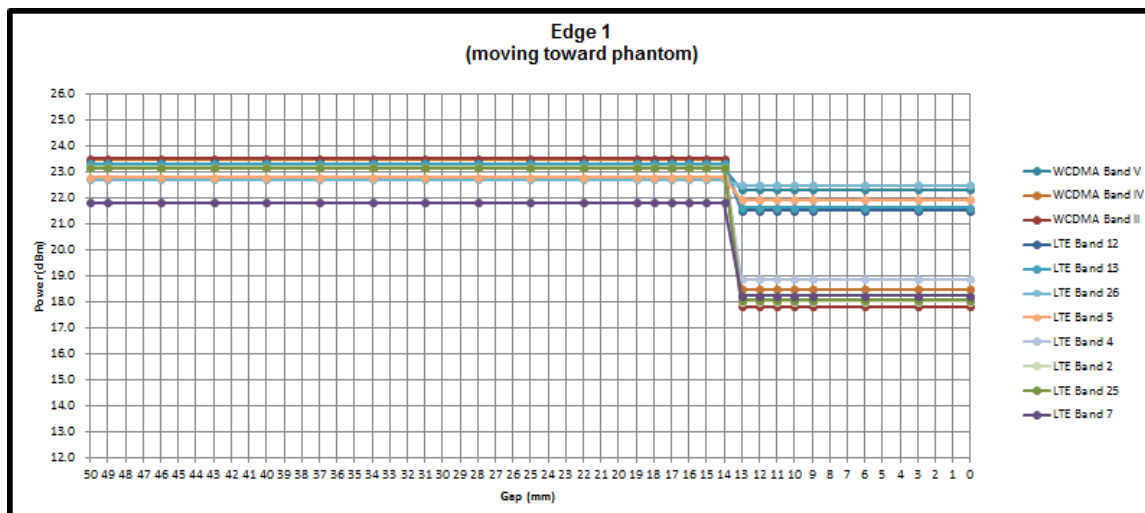
<Liquid: Body 2600MHz simulating liquid>:

Proximity sensor triggering distances

The Sensor Trigger Distance (mm)		
	Bottom Face	
	moving toward the phantom	moving away the phantom
Distance	17	22
Minimum distance	17	

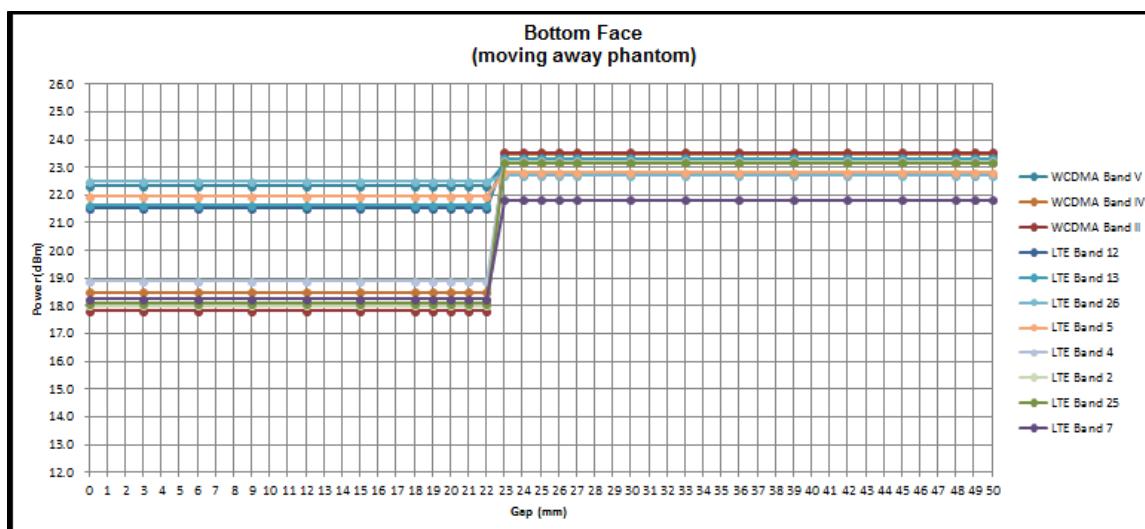
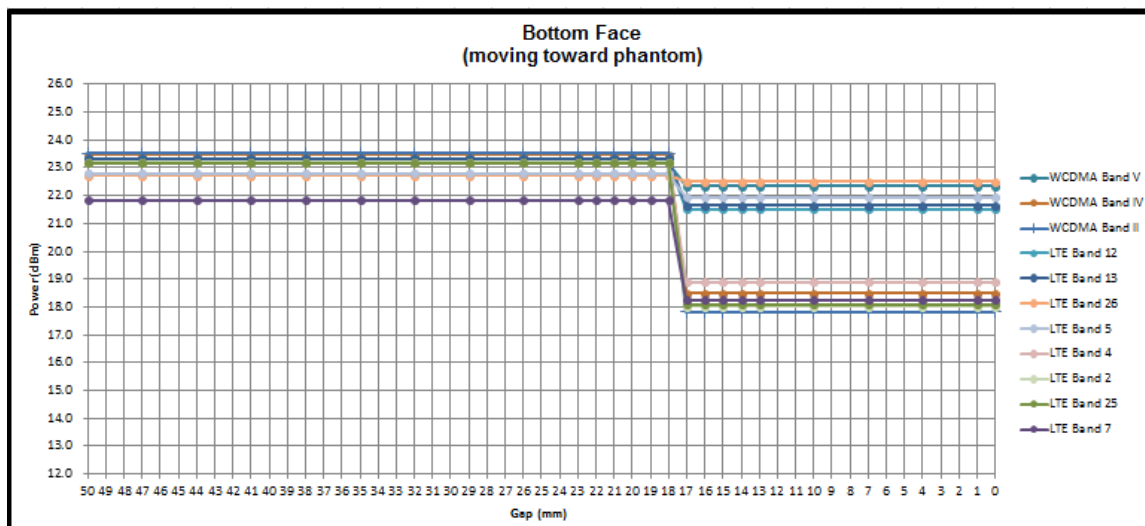


The Sensor Trigger Distance (mm)		
Position	Edge 1	
	moving toward phantom	moving away phantom
Distance	13	18
Minimum distance	13	

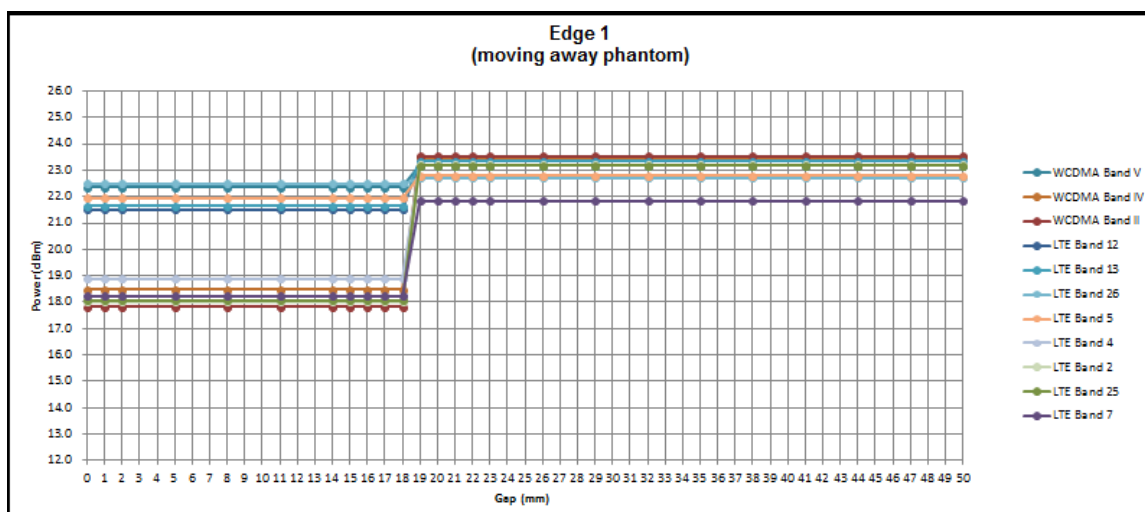
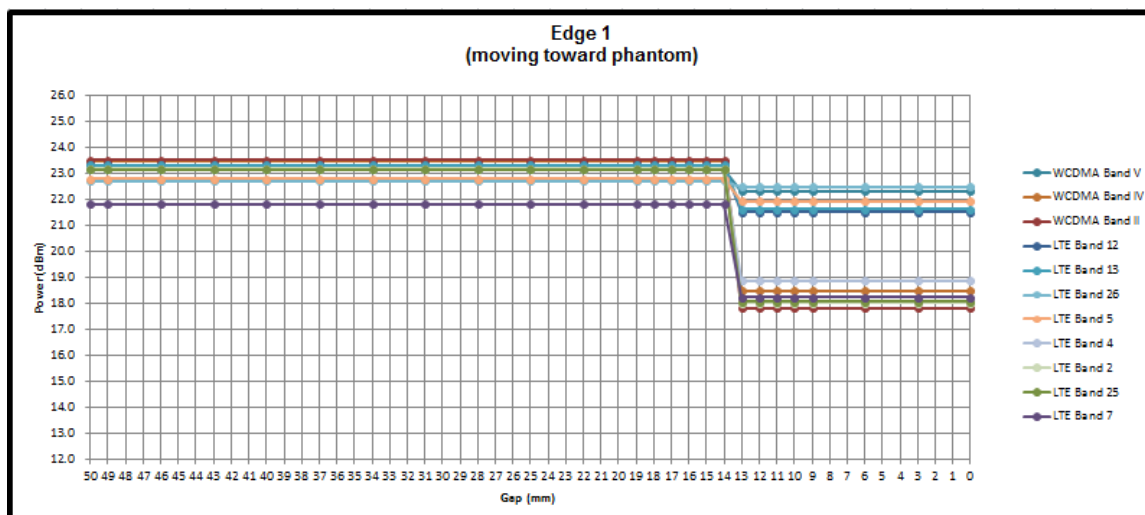


<Liquid: Body 750MHz simulating liquid >:
Proximity sensor triggering distances

The Sensor Trigger Distance (mm)		
Position	Bottom Face	
	moving toward phantom	moving away phantom
Distance	17	22
Minimum distance	17	



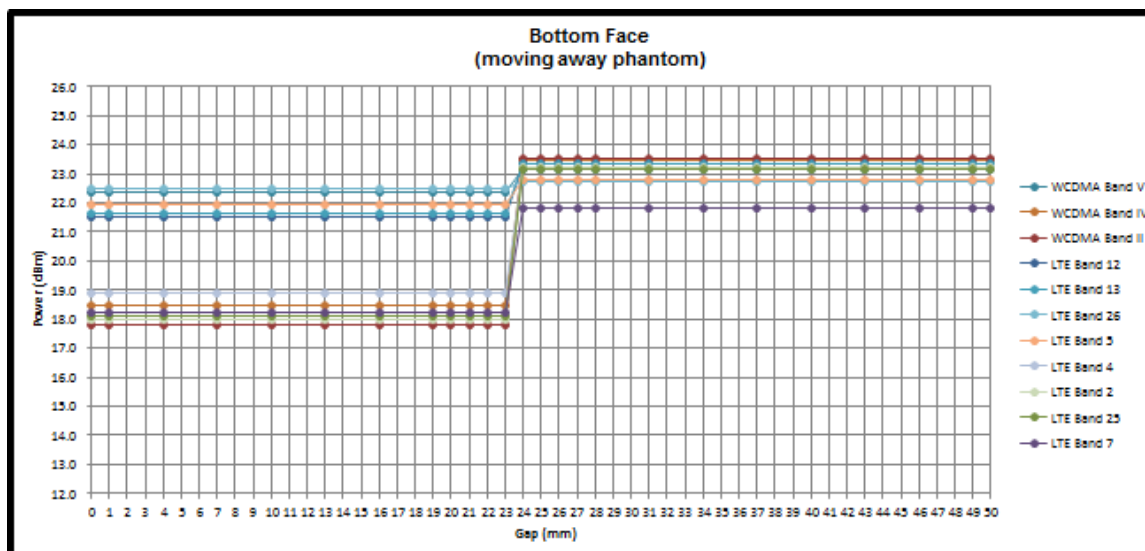
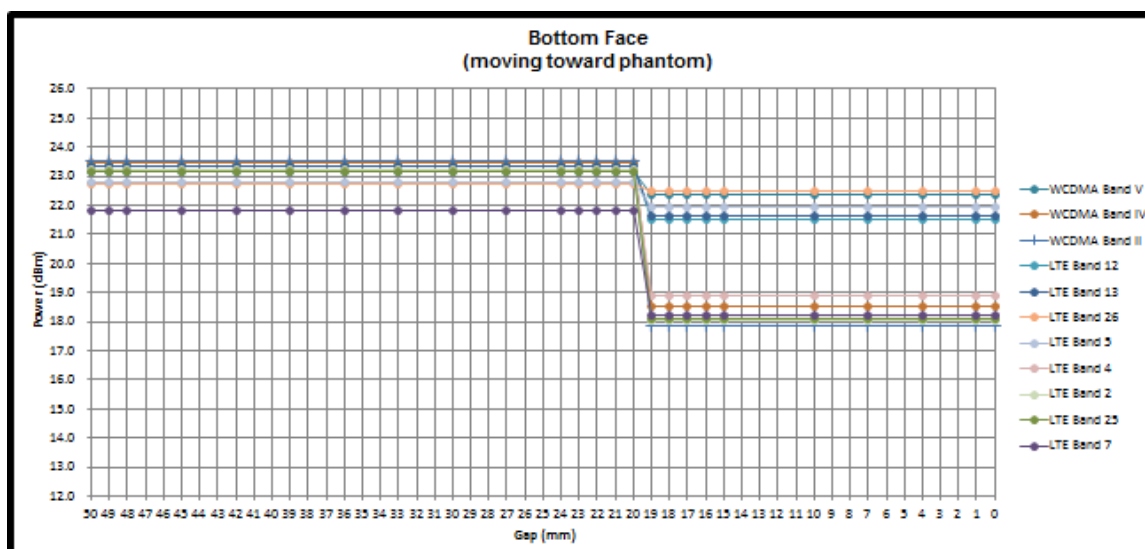
The Sensor Trigger Distance (mm)		
Position	Edge 1	
	moving toward phantom	moving away phantom
Distance	13	18
Minimum distance	13	



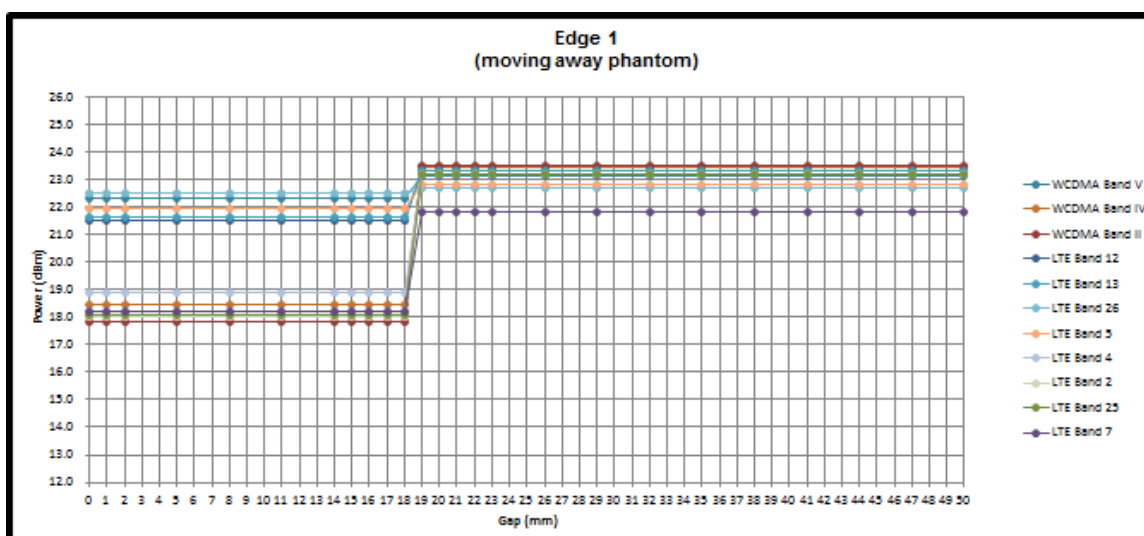
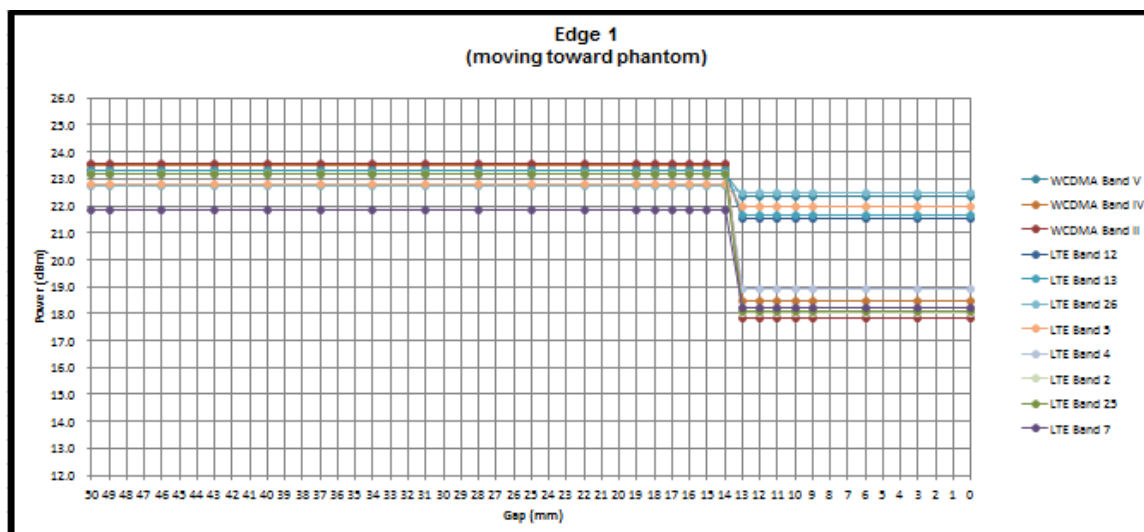
<Liquid: Water>:

<Proximity sensor triggering distances>

The Sensor Trigger Distance (mm)		
Position	Bottom Face	
	moving toward phantom	moving away phantom
Distance	19	23
Minimum distance	19	



The Sensor Trigger Distance (mm)		
Position	Edge 1	
	moving toward phantom	moving away phantom
Distance	13	18
Minimum distance	13	



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

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

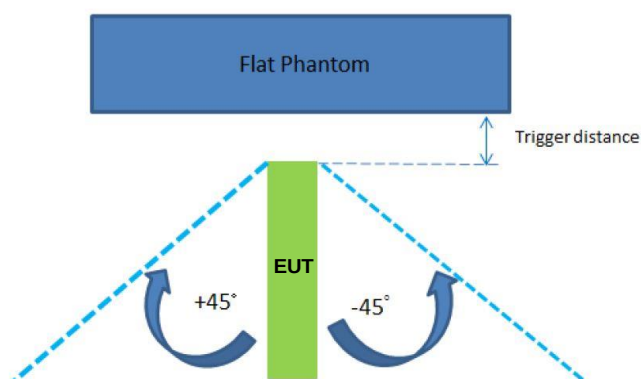
Illustrated in the internal photo exhibit, although the sensor is spatially offset, there is no trigger condition where the antenna is next to the user but the sensor is laterally further away, therefore proximity sensor coverage testing is not required.

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

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

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

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.


<Proximity Sensor Tilt angle assessment>
<Liquid: HSL2600MHz>:

Min trigger distance	Edge 1											
	0 degree	+10 degree	+20 degree	+30 degree	+40 degree	+45 degree	-10 degree	-20 degree	-30 degree	-40 degree	-45 degree	
	13	13	13	13	13	13	13	13	13	13	13	13

<Liquid: HSL750MHz>:

Min trigger distance	Edge 1											
	0 degree	+10 degree	+20 degree	+30 degree	+40 degree	+45 degree	-10 degree	-20 degree	-30 degree	-40 degree	-45 degree	
	13	13	13	13	13	13	13	13	13	13	13	13

<Liquid: Water>:

Min trigger distance	Edge 1											
	0 degree	+10 degree	+20 degree	+30 degree	+40 degree	+45 degree	-10 degree	-20 degree	-30 degree	-40 degree	-45 degree	
	13	13	13	13	13	13	13	13	13	13	13	13

Conclusion:

- According to KDB616217 section 6.2/6.3/6.4, the proximity sensor test minimum trigger distance between highest and lowest frequency tissue liquid and water, for the bottom face is 17 mm, for the Edge 1 is 13 mm.
- For the SAR testing, based on above assessment, a conservative test distance of 16 mm for bottom face and 12 mm for Edge 1 should be sufficient.

<Testing Method for proximity and movement detection>:

According to FCC guidance, the proximity and movement sensor testing method as following, the details of the operation and Movement sensitivity are shown in the confidential exhibit "Technical operational description"

The IQS 231B Movement sensitivity is shown in table below and these results were determined by chip manufacturer referenced in IQS 231B.

Test no.	Movement sensing at trigger distance [mm]*
1	0.8 @15mm
2	0.45 @ 10mm
3	0.13 @ 5mm
4	0.01 @ 0mm

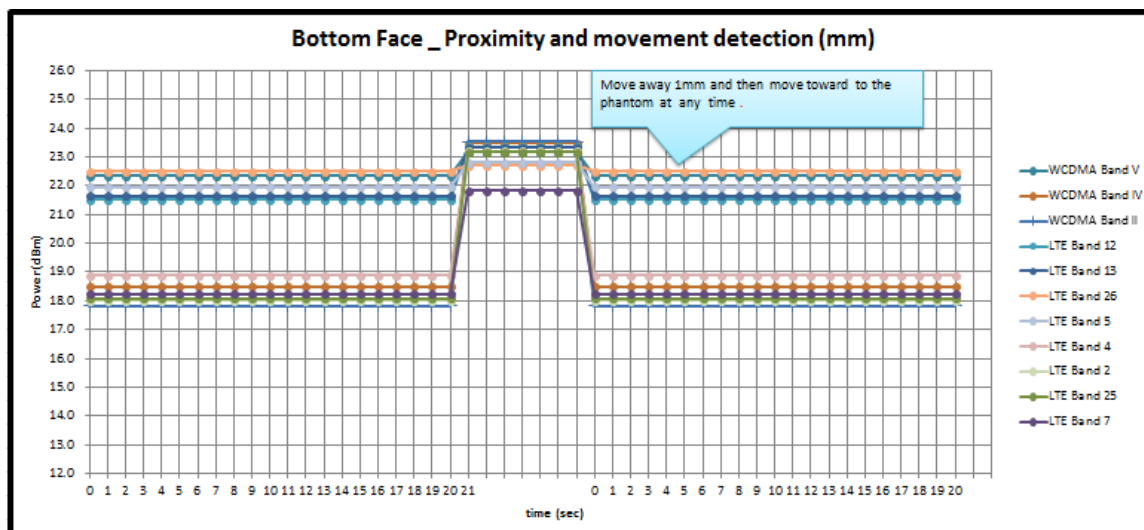
* Movement trigger distance" is the actual change in distance (phantom to EUT) required to trigger a movement event. For example, the DUT is 5mm away from the phantom, a movement of 0,13mm or bigger will trigger a movement event, the Movement sensitivity is shown in in the confidential exhibit "Technical operational description"

Test Procedure:

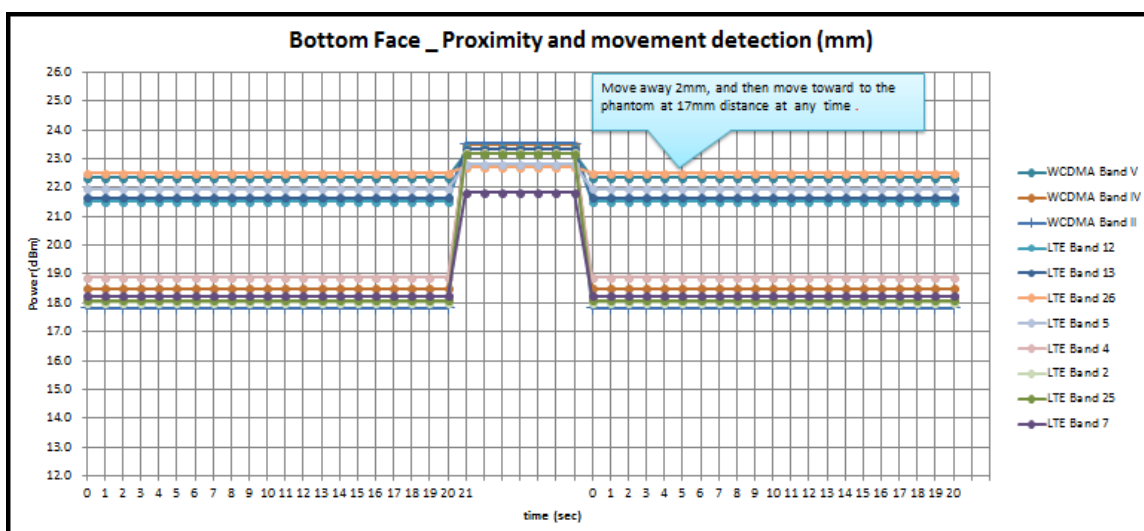
- step 1. Move the tablet towards the SAR Phantom. At 17mm for bottom face, 13mm for Edge1 that the proximity trigger must occur and output state goes Low and DPR would be into low power and hold the tablet in same position for 20 secs to verify the signal would be goes to high and then the DPR would be increase to Full power.
- step 2. Move the tablet closer and now the output state would be into Low and DPR into low power states again. Since the Tablet is already inside the trigger zone, the signal should be Low at any given point inside this trigger zone. But if there is no movement for 20secs, then the signal should go high if the object is stationary. If not stationary like human then the signal will remain Low and hence Power will also remain low.
- step 3. To increase 0mm and 17mm (16mm+1) SAR test distance is just to verify that the sensitivity is consistent with setp1 and step2 rules and the re-trigger movement 1mm away phantom for 0mm and 2mm away phantom for 17mm after bring the device back is just to verify when the device is moving which the movement detection is work or not and meet the rules of step 1 and step 2.
- step 4. And why used the 1mm and 2mm away phantom, due to the movement detection works similar to capacitive proximity sensing technology, capacitive proximity detection uses the signal level to set a threshold and trigger for object proximity. Similarly capacitive movement detection uses a measure of signal variation to trigger for variation in the capacitive E-field from sensor pad to device GND, so in the different test distances would be have different move away distance to meet signal variation to trigger for variation in the capacitive E-field from sensor pad to device GND.
- step 5. Moving tablet away from the object outside the trigger distance will not trigger signal. Moving away and then back to the same position inside the trigger distance, will trigger output signal. Basically any movement within the trigger distance is deemed as movement. Any movement outside the trigger distance is unnoticed by the proximity sensors
- step 6. Testing was carried out in the phantom liquid configurations (highest and lowest frequency) and document.

<Bottom Face_Head simulating liquid 2600MHz>

Bottom Face _ Proximity and movement detection (mm)			
distance	0 mm		
Procedure	<20 sec	at least 20 sec	Move away 1mm and then move toward to the phantom
Power mode	Low	High	Low

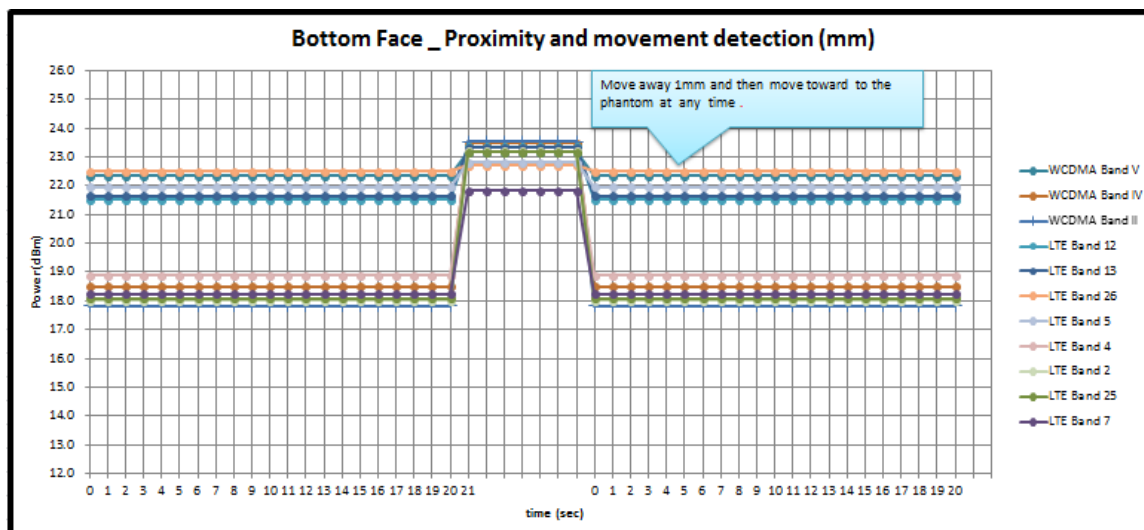


Bottom Face _ Proximity and movement detection (mm)			
distance	17mm		
Procedure	<20 sec	at least 20 sec	Move away 2mm, and then move toward to the phantom at 17mm distance
Power mode	Low	High	Low

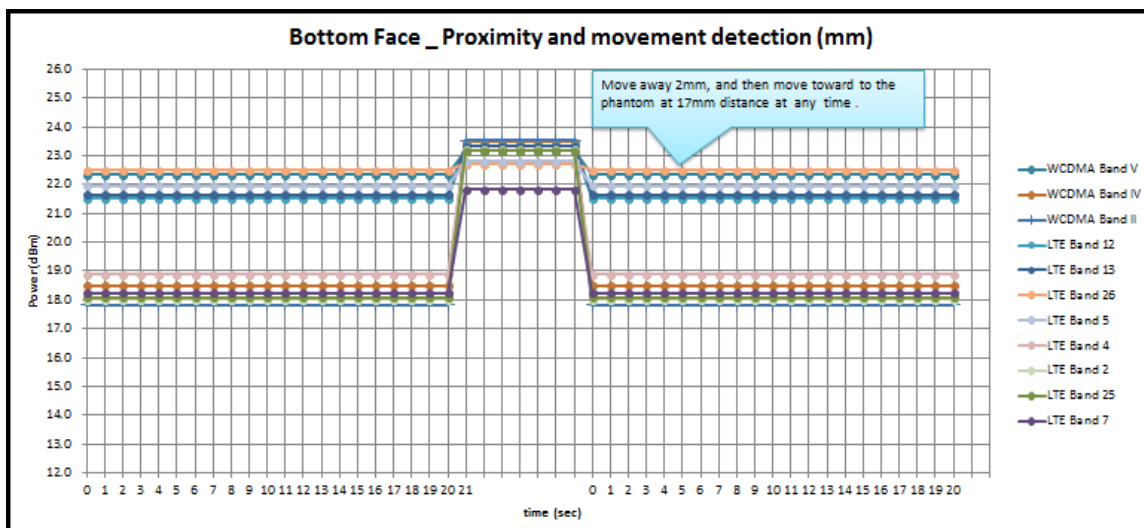


<Bottom Face_ Head simulating liquid 750MHz>

Bottom Face _ Proximity and movement detection (mm)			
distance	0 mm		
Procedure	<20 sec	at least 20 sec	Move away 1mm and then move toward to the phantom
Power mode	Low	High	Low

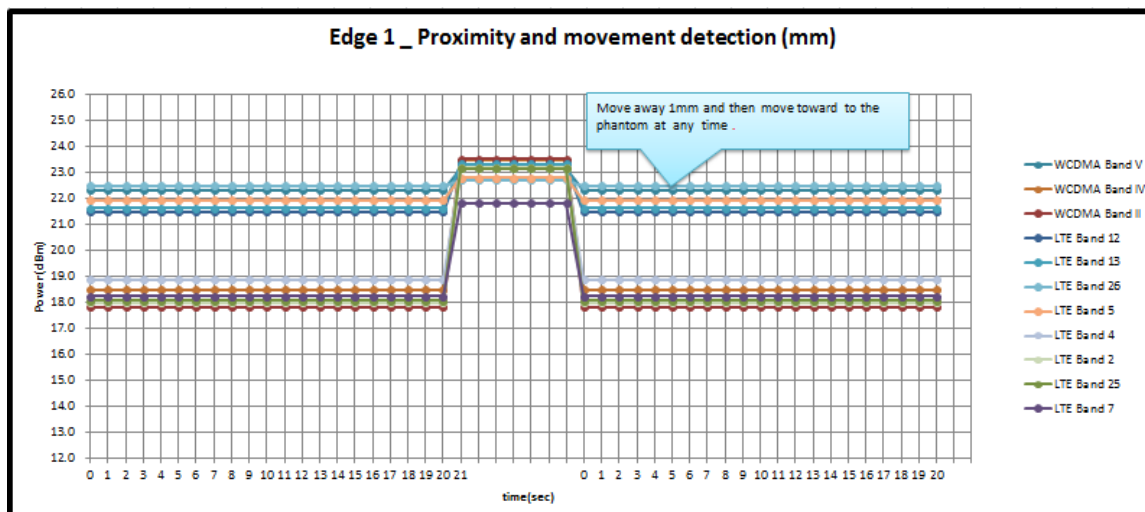


Bottom Face _ Proximity and movement detection (mm)			
distance	17mm		
Procedure	<20 sec	at least 20 sec	Move away 2mm, and then move toward to the phantom at 17mm distance
Power mode	Low	High	Low

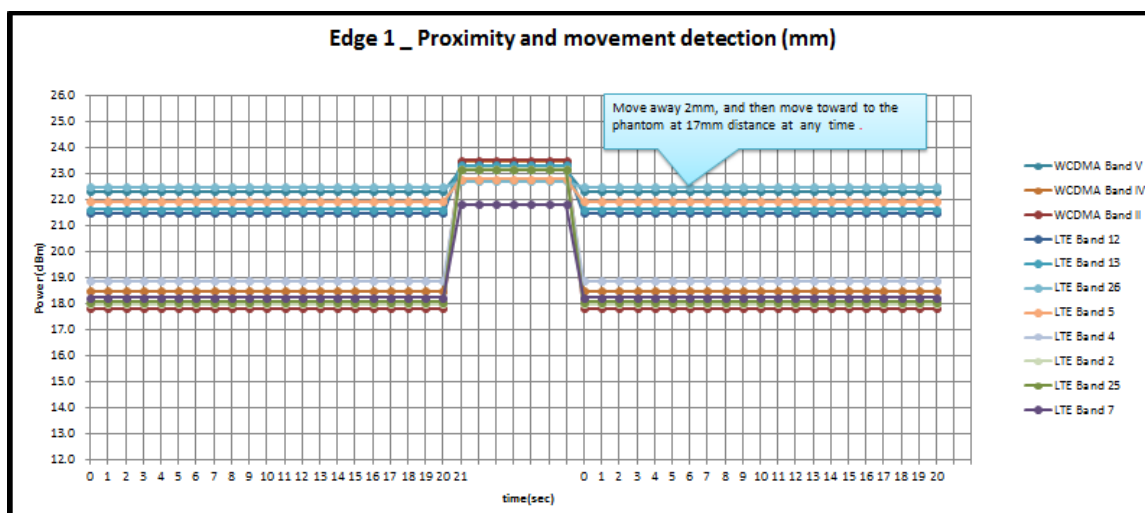


<Edge 1: Head simulating liquid 2600MHz>

Edge 1 _ Proximity and movement detection (mm)			
distance	0 mm		
Procedure	<20 sec	at least 20 sec	Move away 1mm and then move toward to the phantom
Power mode	Low	High	Low

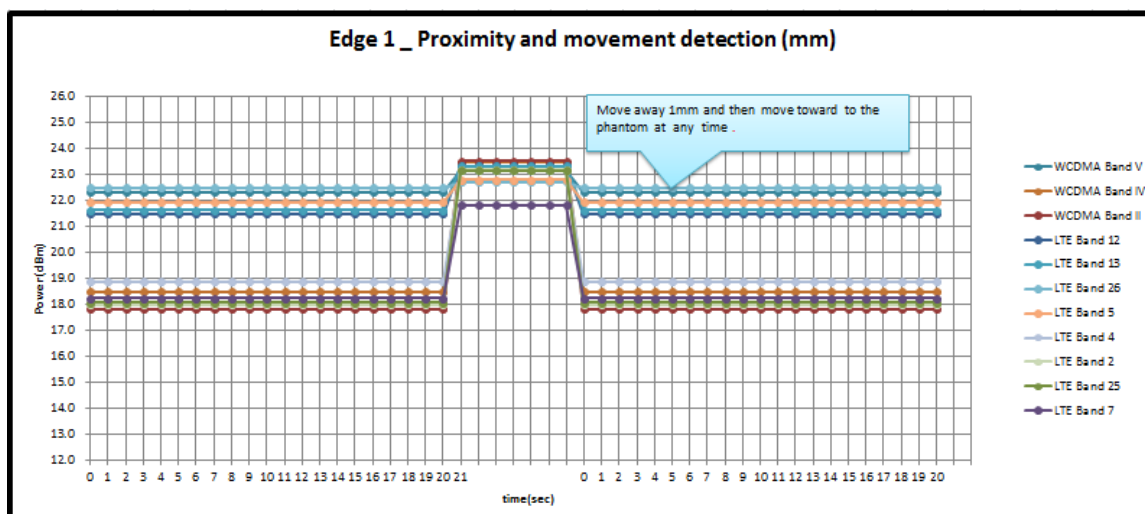


Edge 1 _ Proximity and movement detection (mm)			
distance	13mm		
Procedure	<20 sec	at least 20 sec	Move away 2mm, and then move toward to the phantom at 17mm distance
Power mode	Low	High	Low

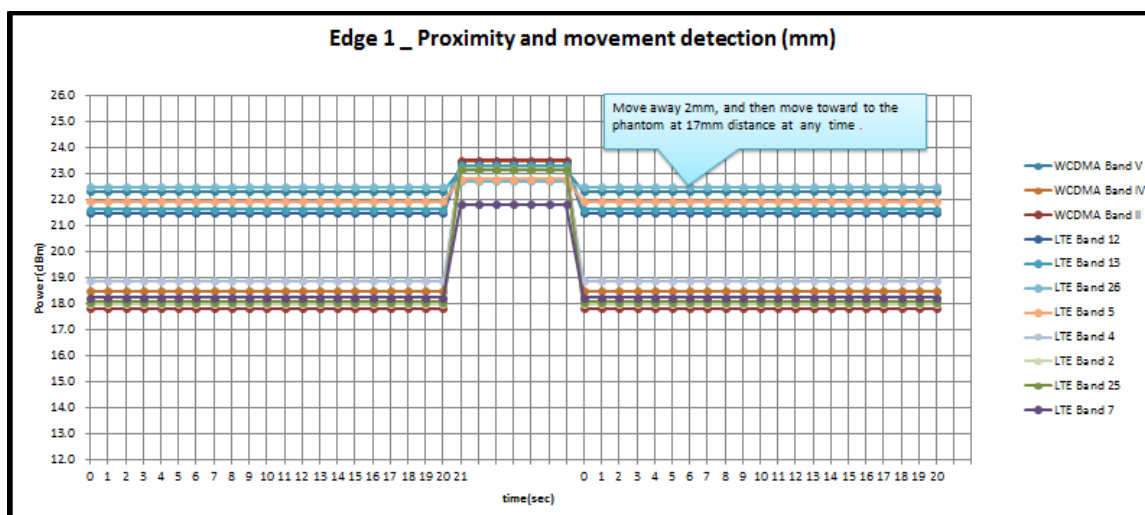


<Edge 1: Head simulating liquid 750MHz>

Edge 1 _ Proximity and movement detection (mm)			
distance	0 mm		
Procedure	<20 sec	at least 20 sec	Move away 1mm and then move toward to the phantom
Power mode	Low	High	Low



Edge 1 _ Proximity and movement detection (mm)			
distance	13mm		
Procedure	<20 sec	at least 20 sec	Move away 2mm, and then move toward to the phantom at 17mm distance
Power mode	Low	High	Low



<Proximity sensor power reduction table>

Exposure Position / wireless mode	Bottom Face ⁽¹⁾	Edge 1 ⁽¹⁾	Edge 2	Edge 3	Edge 4
WCDMA Band II	5.5 dB	5.5 dB	0 dB	0 dB	0 dB
WCDMA Band IV	5 dB	5 dB	0 dB	0 dB	0 dB
WCDMA Band V	0.5 dB	0.5 dB	0 dB	0 dB	0 dB
LTE Band 2/25	5 dB	5 dB	0 dB	0 dB	0 dB
LTE Band 4	4 dB	4 dB	0 dB	0 dB	0 dB
LTE Band 5	1 dB	1 dB	0 dB	0 dB	0 dB
LTE Band 7	4.5 dB	4.5 dB	0 dB	0 dB	0 dB
LTE Band 12	1.5 dB	1.5 dB	0 dB	0 dB	0 dB
LTE Band 13	1.5 dB	1.5 dB	0 dB	0 dB	0 dB
LTE Band 26	0.5 dB	0.5 dB	0 dB	0 dB	0 dB
LTE Band 41	2 dB	2 dB	0 dB	0 dB	0 dB

Remark:

- ⁽¹⁾: Reduced maximum limit applied by activation of proximity sensor.
- Power reduction is not applicable for WLAN and Bluetooth.
- Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5, and according to FCC test guidance for the movement sensor testing and compliant results are shown and described in exhibit "Technical operational description".
- For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:
Bottom Face: [16 mm](#)
Edge1: [12 mm](#)

5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

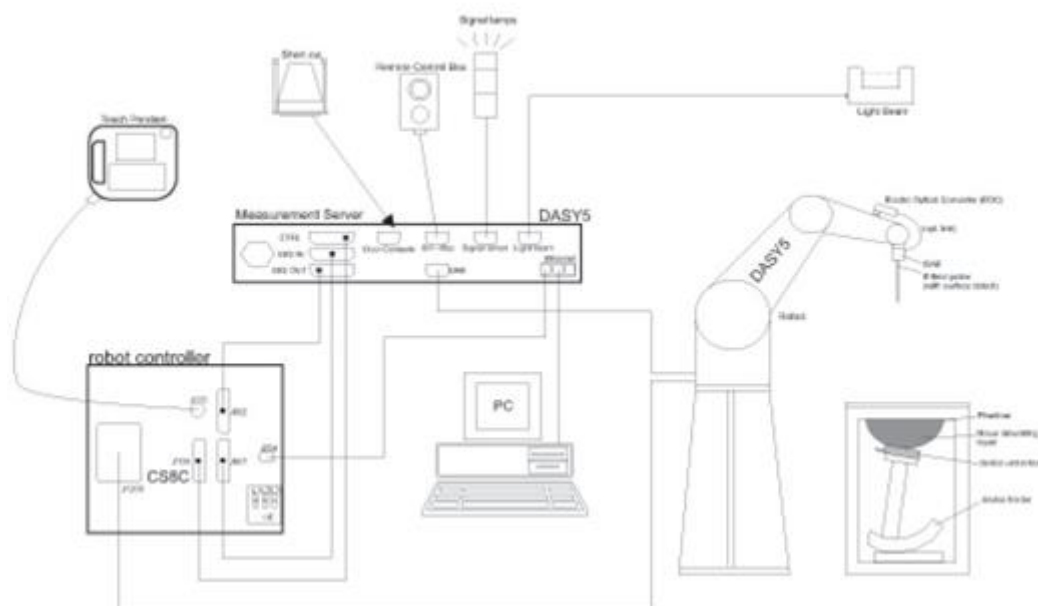
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

7. System Description and Setup

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



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

7.1 E-Field Probe

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

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ± 0.2 dB (30 MHz – 4 GHz)	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g – >100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ± 0.2 dB (30 MHz – 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 – >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	

7.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

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



Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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



Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1107	Mar. 08, 2019	Mar. 06, 2021
SPEAG	835MHz System Validation Kit	D835V2	4d167	Nov. 25, 2019	Nov. 24, 2020
SPEAG	1750MHz System Validation Kit	D1750V2	1112	Mar. 07, 2019	Mar. 05, 2021
SPEAG	1900MHz System Validation Kit	D1900V2	5d185	Mar. 07, 2019	Mar. 05, 2021
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 31, 2018	Aug. 29, 2020
SPEAG	2600MHz System Validation Kit	D2600V2	1078	Mar. 06, 2019	Mar. 04, 2021
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Sep. 27, 2018	Sep. 25, 2020
SPEAG	Data Acquisition Electronics	DAE4	778	May. 21, 2019	May. 20, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	Sep. 20, 2019	Sep. 19, 2020
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2019	Nov. 11, 2020
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 31, 2019	Oct. 30, 2020
Agilent	Wireless Communication Test Set	E5515C	MY50267236	Mar. 18, 2020	Mar. 17, 2021
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 20, 2019	Nov. 19, 2020
Agilent	ENA Network Analyzer	E5071C	MY46104758	Sep. 06, 2019	Sep. 05, 2020
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 18, 2019	Sep. 17, 2020
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3169	Sep. 10, 2019	Sep. 09, 2020
Anritsu	Power Meter	ML2495A	1036004	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Sensor	MA2411B	1027253	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Meter	ML2495A	1419002	May. 29, 2019	May. 28, 2020
Anritsu	Power Sensor	MA2411B	1339124	May. 29, 2019	May. 28, 2020
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 27, 2019	Aug. 26, 2020
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 27, 2019	Jun. 26, 2020
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2019	Oct. 15, 2020
Mini-Circuits	Power Amplifier	ZVE-8G+	6382	Aug. 12, 2019	Aug. 11, 2020
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D750V3, SN: 1107, D1750V2, SN: 1112, D1900V2, SN: 5d185, D2450V2, SN: 736, D2600V2, SN: 1078, D5GHzV2, SN: 1006, can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

10. System Verification

10.1 Tissue Simulating Liquids

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

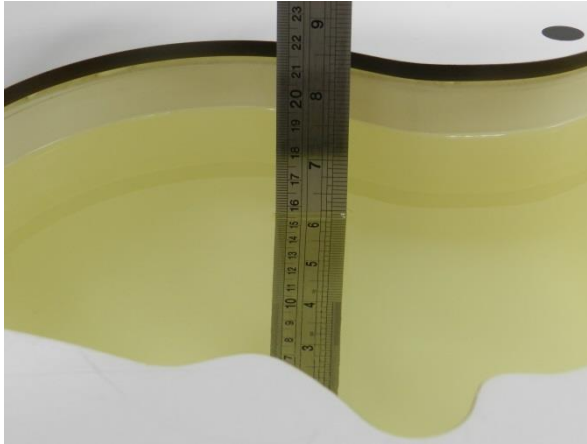


Fig 10.1Photo of Liquid Height for Head SAR

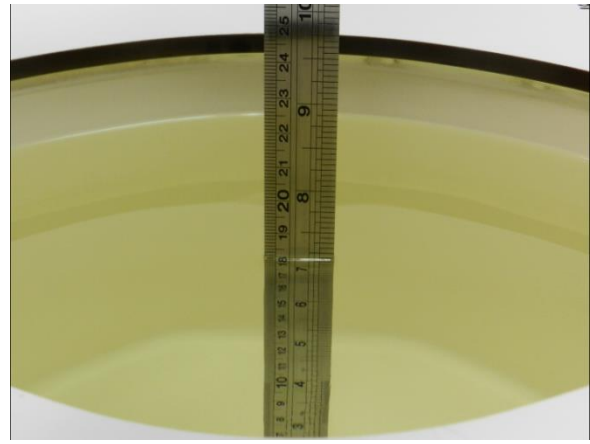


Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
750	22.6	0.899	43.706	0.89	41.90	1.01	4.31	±5	2020/4/5
835	22.6	0.934	43.410	0.90	41.50	3.78	4.60	±5	2020/4/5
1750	22.2	1.369	40.600	1.37	40.10	-0.07	1.25	±5	2020/4/4
1900	22.2	1.415	39.184	1.40	40.00	1.07	-2.04	±5	2020/4/4
2450	22.7	1.859	39.201	1.80	39.20	3.28	0.00	±5	2020/4/15
2600	22.3	2.051	38.553	1.96	39.00	4.64	-1.15	±5	2020/4/6
5250	22.7	4.502	35.631	4.71	35.95	-4.42	-0.89	±5	2020/4/15
5600	22.7	4.835	35.173	5.07	35.50	-4.64	-0.92	±5	2020/4/15
5750	22.7	4.987	34.987	5.22	35.35	-4.46	-1.03	±5	2020/4/15

10.3 System Performance Check Results

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

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2020/4/5	750	250	D750V3-1107	EX3DV4 - SN3925	DAE4 Sn778	2.13	8.32	8.52	2.40
2020/4/5	835	250	D835V2-4d167	EX3DV4 - SN3925	DAE4 Sn778	2.51	9.55	10.04	5.13
2020/4/4	1750	250	D1750V2-1112	EX3DV4 - SN3925	DAE4 Sn778	9.34	36.70	37.36	1.80
2020/4/4	1900	250	D1900V2-5d185	EX3DV4 - SN3925	DAE4 Sn778	9.48	39.40	37.92	-3.76
2020/4/15	2450	250	D2450V2-736	EX3DV4 - SN3925	DAE4 Sn778	12.80	52.70	51.2	-2.85
2020/4/6	2600	250	D2600V2-1078	EX3DV4 - SN3925	DAE4 Sn778	15.40	57.60	61.6	6.94
2020/4/15	5250	100	D5GHzV2-1006-5250	EX3DV4 - SN3925	DAE4 Sn778	7.43	80.70	74.3	-7.93
2020/4/15	5600	100	D5GHzV2-1006-5600	EX3DV4 - SN3925	DAE4 Sn778	8.28	83.30	82.8	-0.60
2020/4/15	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3925	DAE4 Sn778	7.61	80.40	76.1	-5.35

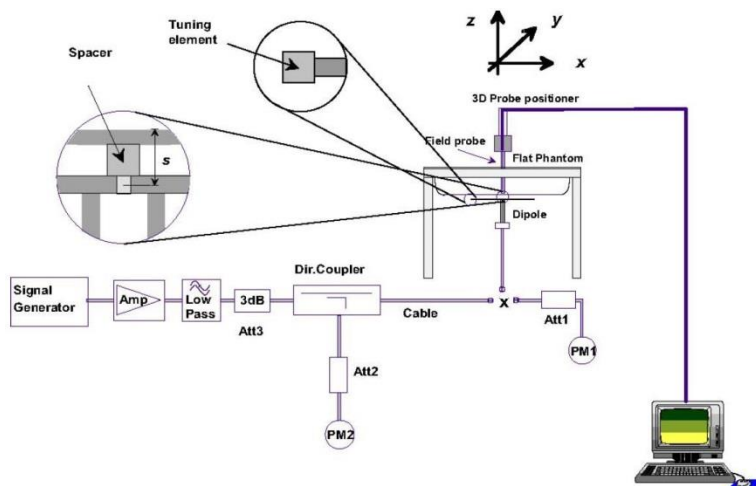


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 SAR Testing for Tablet

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

12. UMTS/CDMA/LTE Output Power (Unit: dBm)

<WCDMA Conducted Power>

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

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

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

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

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

Note 4: For subtest 2 the 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 $\beta_d = 15/15$.

Setup Configuration

HSUPA Setup Configuration:

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

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

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

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

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

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

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

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

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

Setup Configuration

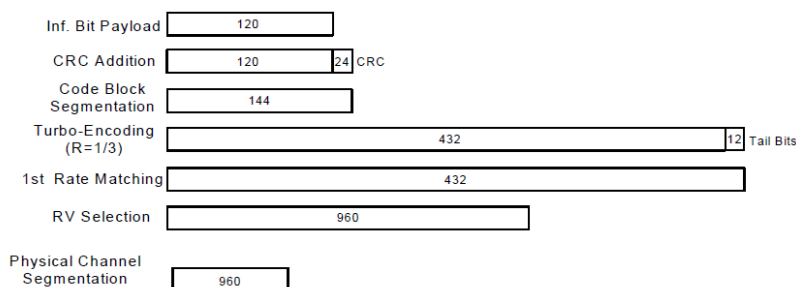
DC-HSDPA 3GPP release 8 Setup Configuration:

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

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

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

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


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

<WCDMA Conducted Power>
General Note:

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

<Default Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	23.53	23.36	23.11	24.00	23.37	23.40	23.47	24.00	22.89	23.05	23.16	24.00
3GPP Rel 6	HSDPA Subtest-1	22.74	22.65	22.63	24.00	22.36	22.40	22.50	24.00	22.10	22.14	22.25	24.00
3GPP Rel 6	HSDPA Subtest-2	22.69	22.67	22.59	24.00	22.41	22.39	22.56	24.00	22.09	22.20	22.26	24.00
3GPP Rel 6	HSDPA Subtest-3	22.22	22.14	22.07	23.50	21.97	21.91	22.04	23.50	21.57	21.71	21.82	23.50
3GPP Rel 6	HSDPA Subtest-4	22.28	22.19	22.06	23.50	21.94	21.89	21.97	23.50	21.54	21.65	21.78	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.64	22.65	22.55	24.00	22.28	22.37	22.46	24.00	22.03	22.14	22.23	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.62	22.60	22.56	24.00	22.36	22.37	22.46	24.00	22.07	22.18	22.23	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.12	22.11	22.01	23.50	21.93	21.82	21.96	23.50	21.66	21.67	21.74	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.23	22.17	21.99	23.50	21.84	21.88	21.93	23.50	21.56	21.63	21.68	23.50
3GPP Rel 6	HSUPA Subtest-1	22.46	22.38	22.33	24.00	22.11	22.04	22.17	24.00	22.09	22.16	22.28	24.00
3GPP Rel 6	HSUPA Subtest-2	21.78	21.73	21.67	22.00	21.51	21.42	21.61	22.00	21.10	21.21	21.31	22.00
3GPP Rel 6	HSUPA Subtest-3	21.02	21.06	21.01	23.00	21.42	21.37	21.54	23.00	21.04	21.02	21.08	23.00
3GPP Rel 6	HSUPA Subtest-4	21.95	21.85	21.68	22.00	21.89	21.74	21.86	22.00	21.74	21.84	21.93	22.00
3GPP Rel 6	HSUPA Subtest-5	22.80	22.75	22.67	24.00	22.62	22.63	22.77	24.00	22.23	22.38	22.48	24.00

<Reduced Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	17.82	17.80	17.65	18.50	18.42	18.43	18.49	19.00	22.07	22.23	22.34	23.50
3GPP Rel 6	HSDPA Subtest-1	17.18	17.12	17.07	18.50	17.28	17.40	17.42	19.00	21.54	21.57	21.66	23.50
3GPP Rel 6	HSDPA Subtest-2	17.19	17.07	17.06	18.50	17.33	17.39	17.49	19.00	21.47	21.58	21.66	23.50
3GPP Rel 6	HSDPA Subtest-3	16.62	16.54	16.55	18.00	16.95	16.90	16.99	18.50	21.05	21.06	21.17	23.00
3GPP Rel 6	HSDPA Subtest-4	16.68	16.63	16.51	18.00	16.84	16.88	16.89	18.50	21.09	21.08	21.18	23.00
3GPP Rel 8	DC-HSDPA Subtest-1	17.14	17.08	17.04	18.50	17.19	17.28	17.37	19.00	21.59	21.52	21.68	23.50
3GPP Rel 8	DC-HSDPA Subtest-2	17.09	17.09	16.99	18.50	17.32	17.29	17.45	19.00	21.52	21.54	21.67	23.50
3GPP Rel 8	DC-HSDPA Subtest-3	16.54	16.58	16.47	18.00	16.93	16.74	16.95	18.50	21.10	21.03	21.17	23.00
3GPP Rel 8	DC-HSDPA Subtest-4	16.73	16.62	16.40	18.00	16.78	16.87	16.85	18.50	21.02	21.01	21.11	23.00
3GPP Rel 6	HSUPA Subtest-1	16.91	16.84	16.80	18.50	17.11	17.07	17.12	19.00	21.59	21.52	21.64	23.50
3GPP Rel 6	HSUPA Subtest-2	16.18	16.18	16.13	16.50	16.42	16.41	16.51	17.00	20.50	20.61	20.66	21.50
3GPP Rel 6	HSUPA Subtest-3	15.50	15.51	15.50	17.50	16.32	16.28	16.54	18.00	20.69	20.61	20.76	22.50
3GPP Rel 6	HSUPA Subtest-4	16.37	16.28	16.18	16.50	16.87	16.71	16.80	17.00	21.15	21.22	21.32	21.50
3GPP Rel 6	HSUPA Subtest-5	17.26	17.15	17.09	18.50	17.57	17.53	17.68	19.00	21.58	21.82	21.83	23.50

<LTE Conducted Power>**General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 2/5 SAR test was covered by Band 25/26; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

<Default Power Mode>
<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	23.18	23.19	22.99	24	0
20	QPSK	1	49	23.13	23.08	23.04		
20	QPSK	1	99	22.86	22.78	22.77		
20	QPSK	50	0	22.18	22.16	21.97	23	1
20	QPSK	50	24	22.13	22.11	21.99		
20	QPSK	50	50	22.07	22.01	21.94		
20	QPSK	100	0	22.10	22.06	22.06	23	1
20	16QAM	1	0	22.50	22.49	22.26		
20	16QAM	1	49	22.39	22.42	22.32		
20	16QAM	1	99	22.13	22.07	22.00	22	2
20	16QAM	50	0	21.16	21.19	20.94		
20	16QAM	50	24	21.15	21.17	20.93		
20	16QAM	50	50	21.07	21.04	20.98	22	2
20	16QAM	100	0	21.12	21.05	21.02		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.18	23.15	22.99	24	0
15	QPSK	1	37	23.04	23.00	22.94		
15	QPSK	1	74	22.79	22.74	22.67		
15	QPSK	36	0	22.08	22.11	21.93	23	1
15	QPSK	36	20	22.06	22.03	21.94		
15	QPSK	36	39	22.03	21.91	21.89		
15	QPSK	75	0	22.07	22.06	22.02	23	1
15	16QAM	1	0	22.41	22.49	22.18		
15	16QAM	1	37	22.38	22.34	22.32		
15	16QAM	1	74	22.06	22.06	21.94	22	2
15	16QAM	36	0	21.15	21.13	20.91		
15	16QAM	36	20	21.06	21.07	20.86		
15	16QAM	36	39	21.02	20.99	20.90	22	2
15	16QAM	75	0	21.02	20.97	20.97		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.18	23.13	22.89	24	0
10	QPSK	1	25	23.12	23.01	22.94		
10	QPSK	1	49	22.83	22.72	22.74		
10	QPSK	25	0	22.14	22.13	21.88	23	1
10	QPSK	25	12	22.12	22.01	21.99		
10	QPSK	25	25	22.06	21.98	21.84		
10	QPSK	50	0	22.01	22.06	21.98	23	1
10	16QAM	1	0	22.46	22.45	22.26		
10	16QAM	1	25	22.34	22.37	22.22		
10	16QAM	1	49	22.03	22.05	22.00	22	2
10	16QAM	25	0	21.10	21.18	20.92		
10	16QAM	25	12	21.08	21.09	20.92		
10	16QAM	25	25	21.05	21.02	20.98	22	2
10	16QAM	50	0	21.10	20.95	20.94		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	23.17	23.11	22.90	24	0
5	QPSK	1	12	23.12	23.03	22.97		



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5	QPSK	1	24	22.86	22.77	22.70	23	1
5	QPSK	12	0	22.07	22.13	21.97		
5	QPSK	12	7	22.07	22.09	21.91		
5	QPSK	12	13	22.00	21.98	21.87		
5	QPSK	25	0	22.01	22.05	21.98		
5	16QAM	1	0	22.48	22.46	22.16	23	1
5	16QAM	1	12	22.29	22.33	22.31		
5	16QAM	1	24	22.09	21.97	21.99		
5	16QAM	12	0	21.11	21.13	20.89	22	2
5	16QAM	12	7	21.06	21.09	20.83		
5	16QAM	12	13	21.05	21.04	20.94		
5	16QAM	25	0	21.02	20.95	21.00		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	23.09	23.12	22.98	24	0
3	QPSK	1	8	23.12	23.05	23.04		
3	QPSK	1	14	22.83	22.77	22.75		
3	QPSK	8	0	22.13	22.12	21.95	23	1
3	QPSK	8	4	22.08	22.06	21.93		
3	QPSK	8	7	22.01	21.93	21.85		
3	QPSK	15	0	22.06	22.03	22.00		
3	16QAM	1	0	22.48	22.47	22.16	23	1
3	16QAM	1	8	22.39	22.39	22.29		
3	16QAM	1	14	22.10	22.07	22.00		
3	16QAM	8	0	21.11	21.14	20.90	22	2
3	16QAM	8	4	21.12	21.15	20.91		
3	16QAM	8	7	20.99	20.95	20.92		
3	16QAM	15	0	21.12	21.01	21.01		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	23.17	23.17	22.95	24	0
1.4	QPSK	1	3	23.03	23.02	22.94		
1.4	QPSK	1	5	22.84	22.68	22.73		
1.4	QPSK	3	0	23.13	23.13	22.87		
1.4	QPSK	3	1	22.99	23.01	22.85		
1.4	QPSK	3	3	22.84	22.65	22.71		
1.4	QPSK	6	0	22.00	22.03	21.96	23	1
1.4	16QAM	1	0	22.42	22.44	22.20	23	1
1.4	16QAM	1	3	22.39	22.41	22.22		
1.4	16QAM	1	5	22.07	22.05	21.98		
1.4	16QAM	3	0	22.36	22.36	22.15		
1.4	16QAM	3	1	22.34	22.35	22.15		
1.4	16QAM	3	3	22.02	21.99	21.97		
1.4	16QAM	6	0	21.03	21.04	20.93	22	2

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300	24	0
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.19	23.20	23.16		
20	QPSK	1	49	23.13	23.14	23.18	23	1
20	QPSK	1	99	23.03	22.89	22.99		
20	QPSK	50	0	22.20	22.25	22.11		
20	QPSK	50	24	22.14	22.14	22.18	23	1
20	QPSK	50	50	22.11	22.06	22.12		
20	QPSK	100	0	22.14	22.18	22.15		
20	16QAM	1	0	22.46	22.38	22.38	23	1
20	16QAM	1	49	22.45	22.43	22.45		
20	16QAM	1	99	22.20	22.17	22.28		
20	16QAM	50	0	21.10	21.13	21.12	22	2
20	16QAM	50	24	21.11	21.11	21.20		
20	16QAM	50	50	21.01	21.06	21.07		
20	16QAM	100	0	21.07	21.08	21.12	24	0
Channel				20025	20175	20325		
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.13	23.15	23.06	24	0
15	QPSK	1	37	23.04	23.08	23.17		
15	QPSK	1	74	23.00	22.80	22.94		
15	QPSK	36	0	22.19	22.16	22.03	23	1
15	QPSK	36	20	22.06	22.05	22.12		
15	QPSK	36	39	22.03	22.05	22.08		
15	QPSK	75	0	22.14	22.12	22.13	23	1
15	16QAM	1	0	22.36	22.34	22.32		
15	16QAM	1	37	22.41	22.35	22.39		
15	16QAM	1	74	22.17	22.12	22.18	22	2
15	16QAM	36	0	21.08	21.04	21.07		
15	16QAM	36	20	21.06	21.03	21.20		
15	16QAM	36	39	21.01	21.00	20.99	24	0
15	16QAM	75	0	21.06	21.01	21.04		
Channel				20000	20175	20350		
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.15	23.15	23.11	24	0
10	QPSK	1	25	23.09	23.05	23.13		
10	QPSK	1	49	22.98	22.79	22.89		
10	QPSK	25	0	22.20	22.13	22.08	23	1
10	QPSK	25	12	22.07	22.08	22.18		
10	QPSK	25	25	22.07	22.02	22.04		
10	QPSK	50	0	22.14	22.09	22.12	23	1
10	16QAM	1	0	22.36	22.35	22.28		
10	16QAM	1	25	22.38	22.40	22.42		
10	16QAM	1	49	22.12	22.08	22.27	22	2
10	16QAM	25	0	21.06	21.06	21.11		
10	16QAM	25	12	21.08	21.08	21.18		
10	16QAM	25	25	20.91	21.03	21.06	24	0
10	16QAM	50	0	21.04	20.99	21.08		
Channel				19975	20175	20375		
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.12	23.12	23.08	24	0
5	QPSK	1	12	23.04	23.05	23.13		
5	QPSK	1	24	23.01	22.83	22.98		



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5	QPSK	12	0	22.18	22.12	22.06	23	1
5	QPSK	12	7	22.12	22.04	22.08		
5	QPSK	12	13	22.02	21.96	22.10		
5	QPSK	25	0	22.14	22.10	22.13		
5	16QAM	1	0	22.37	22.37	22.36	23	1
5	16QAM	1	12	22.38	22.41	22.43		
5	16QAM	1	24	22.20	22.08	22.24		
5	16QAM	12	0	21.03	21.04	21.08	22	2
5	16QAM	12	7	21.05	21.05	21.12		
5	16QAM	12	13	20.98	21.06	21.01		
5	16QAM	25	0	21.02	20.98	21.03		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.12	23.11	23.16	24	0
3	QPSK	1	8	23.11	23.04	23.09		
3	QPSK	1	14	22.97	22.84	22.98		
3	QPSK	8	0	22.14	22.10	22.01	23	1
3	QPSK	8	4	22.05	22.14	22.18		
3	QPSK	8	7	22.07	22.03	22.09		
3	QPSK	15	0	22.12	22.14	22.06		
3	16QAM	1	0	22.38	22.34	22.37	23	1
3	16QAM	1	8	22.39	22.34	22.35		
3	16QAM	1	14	22.12	22.11	22.25		
3	16QAM	8	0	21.05	21.12	21.09	22	2
3	16QAM	8	4	21.05	21.06	21.18		
3	16QAM	8	7	20.96	20.98	20.98		
3	16QAM	15	0	21.04	21.06	21.03		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.18	23.12	23.10	24	0
1.4	QPSK	1	3	23.07	23.13	23.17		
1.4	QPSK	1	5	22.97	22.85	22.96		
1.4	QPSK	3	0	23.15	23.09	23.04		
1.4	QPSK	3	1	23.04	23.08	23.12		
1.4	QPSK	3	3	22.91	22.80	22.94		
1.4	QPSK	6	0	22.09	22.07	22.08	23	1
1.4	16QAM	1	0	22.41	22.28	22.31	23	1
1.4	16QAM	1	3	22.35	22.39	22.35		
1.4	16QAM	1	5	22.15	22.11	22.19		
1.4	16QAM	3	0	22.41	22.26	22.31		
1.4	16QAM	3	1	22.31	22.30	22.31		
1.4	16QAM	3	3	22.09	22.03	22.16		
1.4	16QAM	6	0	21.01	20.98	21.04	22	2

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600	24	0
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.49	22.80	22.74		
10	QPSK	1	25	22.59	22.78	22.77	23	1
10	QPSK	1	49	22.36	22.68	22.68		
10	QPSK	25	0	21.39	21.75	21.66		
10	QPSK	25	12	21.46	21.70	21.73	23	1
10	QPSK	25	25	21.48	21.63	21.70		
10	QPSK	50	0	21.45	21.70	21.50		
10	16QAM	1	0	21.93	21.99	22.12	23	1
10	16QAM	1	25	21.77	21.95	21.93		
10	16QAM	1	49	21.76	22.00	21.99		
10	16QAM	25	0	20.41	20.63	20.67	22	2
10	16QAM	25	12	20.44	20.71	20.72		
10	16QAM	25	25	20.44	20.60	20.72		
10	16QAM	50	0	20.46	20.62	20.72		
Channel				20425	20525	20625	24	0
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.45	22.57	22.69		
5	QPSK	1	12	22.58	22.74	22.70	23	1
5	QPSK	1	24	22.36	22.66	22.61		
5	QPSK	12	0	21.32	21.57	21.56		
5	QPSK	12	7	21.46	21.69	21.69	23	1
5	QPSK	12	13	21.38	21.61	21.66		
5	QPSK	25	0	21.37	21.50	21.67		
5	16QAM	1	0	21.85	21.91	22.02	23	1
5	16QAM	1	12	21.77	21.87	21.87		
5	16QAM	1	24	21.68	21.96	21.95		
5	16QAM	12	0	20.34	20.56	20.58	22	2
5	16QAM	12	7	20.34	20.67	20.63		
5	16QAM	12	13	20.41	20.58	20.69		
5	16QAM	25	0	20.43	20.59	20.70		
Channel				20415	20525	20635	24	0
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.48	22.50	22.72		
3	QPSK	1	8	22.53	22.70	22.75	23	1
3	QPSK	1	14	22.33	22.58	22.62		
3	QPSK	8	0	21.33	21.60	21.58		
3	QPSK	8	4	21.43	21.62	21.68	23	1
3	QPSK	8	7	21.48	21.57	21.66		
3	QPSK	15	0	21.40	21.50	21.66		
3	16QAM	1	0	21.90	21.91	22.07	23	1
3	16QAM	1	8	21.74	21.92	21.86		
3	16QAM	1	14	21.71	21.98	21.90		
3	16QAM	8	0	20.37	20.61	20.57	22	2
3	16QAM	8	4	20.37	20.64	20.62		
3	16QAM	8	7	20.42	20.55	20.71		
3	16QAM	15	0	20.43	20.56	20.71		
Channel				20407	20525	20643	24	0
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.46	22.50	22.66		
1.4	QPSK	1	3	22.52	22.78	22.79	24	0
1.4	QPSK	1	5	22.35	22.61	22.63		



1.4	QPSK	3	0	22.41	22.42	22.66		
1.4	QPSK	3	1	22.42	22.68	22.69		
1.4	QPSK	3	3	22.30	22.55	22.59		
1.4	QPSK	6	0	21.41	21.54	21.65	23	1
1.4	16QAM	1	0	21.92	21.94	22.06	23	1
1.4	16QAM	1	3	21.75	21.85	21.83		
1.4	16QAM	1	5	21.73	21.90	21.95		
1.4	16QAM	3	0	21.85	21.94	22.02		
1.4	16QAM	3	1	21.67	21.75	21.82		
1.4	16QAM	3	3	21.63	21.80	21.95		
1.4	16QAM	6	0	20.44	20.54	20.68	22	2



<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350	23	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	21.79	21.83	21.70		
20	QPSK	1	49	21.72	21.77	21.50	22	1
20	QPSK	1	99	21.59	21.58	21.40		
20	QPSK	50	0	20.69	20.78	20.67		
20	QPSK	50	24	20.65	20.77	20.55	22	1
20	QPSK	50	50	20.61	20.75	20.58		
20	QPSK	100	0	20.66	20.73	20.53		
20	16QAM	1	0	21.10	20.98	20.73	22	1
20	16QAM	1	49	21.04	21.05	20.76		
20	16QAM	1	99	20.89	20.87	20.69		
20	16QAM	50	0	19.70	19.81	19.47	21	2
20	16QAM	50	24	19.83	19.81	19.55		
20	16QAM	50	50	19.72	19.78	19.57		
20	16QAM	100	0	19.79	19.75	19.55		
Channel				20825	21100	21375	23	0
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	21.73	21.65	21.44		
15	QPSK	1	37	21.70	21.70	21.50	22	1
15	QPSK	1	74	21.58	21.50	21.30		
15	QPSK	36	0	20.64	20.68	20.47		
15	QPSK	36	20	20.83	20.70	20.47	22	1
15	QPSK	36	39	20.66	20.70	20.56		
15	QPSK	75	0	20.65	20.68	20.51		
15	16QAM	1	0	21.04	20.90	20.70	22	1
15	16QAM	1	37	21.01	20.97	20.66		
15	16QAM	1	74	20.82	20.84	20.60		
15	16QAM	36	0	19.68	19.76	19.40	21	2
15	16QAM	36	20	19.77	19.80	19.49		
15	16QAM	36	39	19.72	19.73	19.49		
15	16QAM	75	0	19.76	19.74	19.53		
Channel				20800	21100	21400	23	0
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	21.72	21.67	21.45		
10	QPSK	1	25	21.71	21.75	21.48	22	1
10	QPSK	1	49	21.58	21.52	21.33		
10	QPSK	25	0	20.65	20.67	20.40		
10	QPSK	25	12	20.79	20.68	20.55	22	1
10	QPSK	25	25	20.71	20.68	20.51		
10	QPSK	50	0	20.69	20.73	20.46		
10	16QAM	1	0	21.03	20.93	20.66	22	1
10	16QAM	1	25	21.04	21.03	20.66		
10	16QAM	1	49	20.88	20.77	20.59		
10	16QAM	25	0	19.69	19.80	19.41	21	2
10	16QAM	25	12	19.73	19.73	19.52		
10	16QAM	25	25	19.70	19.75	19.47		
10	16QAM	50	0	19.75	19.70	19.48		
Channel				20775	21100	21425	23	0
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	21.77	21.73	21.41		
5	QPSK	1	12	21.64	21.69	21.50	23	0
5	QPSK	1	24	21.57	21.51	21.38		



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5	QPSK	12	0	20.62	20.76	20.45	22	1
5	QPSK	12	7	20.78	20.71	20.48		
5	QPSK	12	13	20.63	20.65	20.51		
5	QPSK	25	0	20.71	20.73	20.45		
5	16QAM	1	0	21.06	20.94	20.68	22	1
5	16QAM	1	12	20.96	21.04	20.66		
5	16QAM	1	24	20.87	20.82	20.69		
5	16QAM	12	0	19.68	19.79	19.43	21	2
5	16QAM	12	7	19.83	19.81	19.50		
5	16QAM	12	13	19.65	19.70	19.52		
5	16QAM	25	0	19.75	19.66	19.45		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130	24	0
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	23.10	23.33	23.19		
10	QPSK	1	25	23.25	23.26	23.26	23	1
10	QPSK	1	49	23.02	23.26	23.03		
10	QPSK	25	0	22.11	22.15	22.10		
10	QPSK	25	12	22.09	22.09	22.11	23	1
10	QPSK	25	25	22.08	22.09	22.10		
10	QPSK	50	0	22.20	22.16	22.11		
10	16QAM	1	0	22.43	22.45	22.47	23	1
10	16QAM	1	25	22.75	22.60	22.58		
10	16QAM	1	49	22.39	22.40	22.42		
10	16QAM	25	0	21.08	21.12	21.07	22	2
10	16QAM	25	12	21.12	21.10	21.09		
10	16QAM	25	25	21.13	21.07	21.10		
10	16QAM	50	0	21.14	21.14	21.10		
Channel				23035	23095	23155	24	0
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.03	23.18	23.15		
5	QPSK	1	12	23.31	23.19	23.26	23	1
5	QPSK	1	24	22.93	23.18	23.02		
5	QPSK	12	0	22.07	22.04	22.06		
5	QPSK	12	7	22.06	22.08	22.06	23	1
5	QPSK	12	13	22.10	22.09	22.07		
5	QPSK	25	0	22.13	22.07	22.06		
5	16QAM	1	0	22.36	22.36	22.46	23	1
5	16QAM	1	12	22.72	22.55	22.50		
5	16QAM	1	24	22.32	22.38	22.36		
5	16QAM	12	0	21.05	21.02	20.98	22	2
5	16QAM	12	7	21.03	21.06	20.99		
5	16QAM	12	13	21.06	21.02	21.07		
5	16QAM	25	0	21.10	21.14	21.02		
Channel				23025	23095	23165	24	0
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.06	23.15	23.15		
3	QPSK	1	8	23.23	23.22	23.16	23	1
3	QPSK	1	14	22.92	23.17	22.99		
3	QPSK	8	0	22.09	22.07	22.10		
3	QPSK	8	4	22.08	22.01	22.02	23	1
3	QPSK	8	7	22.09	22.06	22.00		
3	QPSK	15	0	22.10	22.15	22.09		
3	16QAM	1	0	22.41	22.40	22.39	23	1
3	16QAM	1	8	22.66	22.55	22.52		
3	16QAM	1	14	22.29	22.38	22.38		
3	16QAM	8	0	21.05	21.05	21.07	22	2
3	16QAM	8	4	21.07	21.04	21.03		
3	16QAM	8	7	21.06	21.02	21.03		
3	16QAM	15	0	21.04	21.14	21.06		
Channel				23017	23095	23173	24	0
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	23.08	23.13	23.17		
1.4	QPSK	1	3	23.25	23.24	23.23	24	0
1.4	QPSK	1	5	22.97	23.21	22.94		



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1.4	QPSK	3	0	22.99	23.06	23.11		
1.4	QPSK	3	1	23.17	23.19	23.17		
1.4	QPSK	3	3	22.93	23.19	22.84		
1.4	QPSK	6	0	22.19	22.08	22.05	23	1
1.4	16QAM	1	0	22.37	22.35	22.46	23	1
1.4	16QAM	1	3	22.73	22.57	22.55		
1.4	16QAM	1	5	22.31	22.40	22.42		
1.4	16QAM	3	0	22.35	22.26	22.38		
1.4	16QAM	3	1	22.69	22.51	22.48		
1.4	16QAM	3	3	22.26	22.30	22.37		
1.4	16QAM	6	0	21.04	21.10	21.05	22	2

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23230			24	0
Frequency (MHz)				782				
10	QPSK	1	0		23.32			
10	QPSK	1	25		23.31		23	1
10	QPSK	1	49		23.01			
10	QPSK	25	0		22.17			
10	QPSK	25	12		22.14		23	1
10	QPSK	25	25		22.02			
10	QPSK	50	0		22.19			
10	16QAM	1	0		22.63		23	1
10	16QAM	1	25		22.41			
10	16QAM	1	49		22.34			
10	16QAM	25	0		21.17		22	2
10	16QAM	25	12		21.12			
10	16QAM	25	25		21.01			
10	16QAM	50	0		21.14		22	2
Channel				23205	23230	23255		
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.27	23.03	23.25	24	0
5	QPSK	1	12	23.21	23.08	23.20		
5	QPSK	1	24	22.94	22.91	22.94		
5	QPSK	12	0	22.17	22.00	22.19	23	1
5	QPSK	12	7	22.12	21.93	22.07		
5	QPSK	12	13	21.97	22.03	22.09		
5	QPSK	25	0	22.19	21.93	22.03	23	1
5	16QAM	1	0	22.62	22.36	22.63		
5	16QAM	1	12	22.34	22.33	22.54		
5	16QAM	1	24	22.33	22.19	22.26	22	2
5	16QAM	12	0	21.10	20.99	21.17		
5	16QAM	12	7	21.02	21.02	21.06		
5	16QAM	12	13	20.98	20.97	21.10	22	2
5	16QAM	25	0	21.05	20.93	21.03		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590	24	0
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	23.10	23.16	23.17		
20	QPSK	1	49	22.92	22.98	23.05	23	1
20	QPSK	1	99	22.83	22.78	22.92		
20	QPSK	50	0	22.24	22.22	22.30		
20	QPSK	50	24	21.99	22.03	22.01	23	1
20	QPSK	50	50	22.09	22.04	22.10		
20	QPSK	100	0	22.14	22.13	22.28		
20	16QAM	1	0	22.49	22.43	22.43	23	1
20	16QAM	1	49	22.29	22.29	22.38		
20	16QAM	1	99	22.21	22.01	22.17		
20	16QAM	50	0	21.07	21.13	21.15	22	2
20	16QAM	50	24	21.07	21.11	21.10		
20	16QAM	50	50	21.04	21.01	21.07		
20	16QAM	100	0	21.05	21.09	21.06	Tune-up limit (dBm)	MPR (dB)
Channel				26115	26340	26615		
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	23.06	23.10	23.15	24	0
15	QPSK	1	37	22.90	22.96	22.95		
15	QPSK	1	74	22.80	22.71	22.90		
15	QPSK	36	0	22.01	22.01	22.14	23	1
15	QPSK	36	20	21.94	21.94	21.98		
15	QPSK	36	39	22.01	22.02	22.07		
15	QPSK	75	0	21.97	22.07	22.03	23	1
15	16QAM	1	0	22.44	22.34	22.37		
15	16QAM	1	37	22.26	22.23	22.38		
15	16QAM	1	74	22.13	21.95	22.09	22	2
15	16QAM	36	0	21.02	21.06	21.12		
15	16QAM	36	20	21.07	21.01	21.05		
15	16QAM	36	39	20.94	20.99	20.97	Tune-up limit (dBm)	MPR (dB)
15	16QAM	75	0	20.96	21.02	20.98		
Channel				26090	26340	26640		
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	23.03	23.16	23.12	24	0
10	QPSK	1	25	22.86	22.94	22.98		
10	QPSK	1	49	22.77	22.71	22.84		
10	QPSK	25	0	21.92	21.97	22.09	23	1
10	QPSK	25	12	21.98	21.96	21.97		
10	QPSK	25	25	22.04	21.96	22.02		
10	QPSK	50	0	21.99	22.02	22.09	23	1
10	16QAM	1	0	22.43	22.36	22.37		
10	16QAM	1	25	22.19	22.27	22.36		
10	16QAM	1	49	22.12	21.98	22.15	22	2
10	16QAM	25	0	21.01	21.07	21.06		
10	16QAM	25	12	21.02	21.02	21.04		
10	16QAM	25	25	20.98	21.00	21.05	Tune-up limit (dBm)	MPR (dB)
10	16QAM	50	0	21.05	21.00	20.98		
Channel				26065	26340	26665		
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	23.09	23.07	23.10	24	0
5	QPSK	1	12	22.91	22.95	23.00		
5	QPSK	1	24	22.82	22.77	22.84		



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5	QPSK	12	0	21.99	21.96	22.12	23	1
5	QPSK	12	7	21.91	21.94	21.96		
5	QPSK	12	13	21.99	22.02	22.01		
5	QPSK	25	0	21.99	22.00	22.04		
5	16QAM	1	0	22.46	22.41	22.34	23	1
5	16QAM	1	12	22.28	22.22	22.33		
5	16QAM	1	24	22.19	21.91	22.13		
5	16QAM	12	0	21.00	21.11	21.13	22	2
5	16QAM	12	7	20.97	21.04	21.01		
5	16QAM	12	13	21.04	20.96	21.00		
5	16QAM	25	0	20.96	21.09	21.02		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	23.05	23.15	23.15	24	0
3	QPSK	1	8	22.89	22.91	23.02		
3	QPSK	1	14	22.75	22.74	22.86		
3	QPSK	8	0	22.02	22.00	22.07	23	1
3	QPSK	8	4	21.94	21.95	22.01		
3	QPSK	8	7	22.07	22.02	22.04		
3	QPSK	15	0	21.98	22.08	22.06		
3	16QAM	1	0	22.48	22.40	22.36	23	1
3	16QAM	1	8	22.25	22.20	22.30		
3	16QAM	1	14	22.20	21.93	22.12		
3	16QAM	8	0	21.03	21.11	21.07	22	2
3	16QAM	8	4	21.06	21.06	21.05		
3	16QAM	8	7	21.03	20.94	21.04		
3	16QAM	15	0	21.03	21.05	20.97		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	23.06	23.07	23.08	24	0
1.4	QPSK	1	3	22.85	22.95	23.03		
1.4	QPSK	1	5	22.77	22.74	22.85		
1.4	QPSK	3	0	23.05	23.03	23.00		
1.4	QPSK	3	1	22.78	22.87	22.93		
1.4	QPSK	3	3	22.67	22.65	22.80		
1.4	QPSK	6	0	21.96	22.02	22.07	23	1
1.4	16QAM	1	0	22.44	22.36	22.36	23	1
1.4	16QAM	1	3	22.20	22.26	22.35		
1.4	16QAM	1	5	22.15	21.92	22.16		
1.4	16QAM	3	0	22.40	22.31	22.36		
1.4	16QAM	3	1	22.15	22.20	22.29		
1.4	16QAM	3	3	22.07	21.83	22.13		
1.4	16QAM	6	0	21.01	21.08	20.99	22	2

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965	24	0
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	22.71	22.49	22.42		
15	QPSK	1	37	22.33	22.34	22.35	23	1
15	QPSK	1	74	22.36	22.42	22.46		
15	QPSK	36	0	21.60	21.47	21.46		
15	QPSK	36	20	21.56	21.45	21.49	23	1
15	QPSK	36	39	21.41	21.45	21.49		
15	QPSK	75	0	21.53	21.40	21.51		
15	16QAM	1	0	21.96	21.70	21.63	23	1
15	16QAM	1	37	21.75	21.64	21.74		
15	16QAM	1	74	21.64	21.75	21.71		
15	16QAM	36	0	20.51	20.33	20.43	22	2
15	16QAM	36	20	20.49	20.41	20.46		
15	16QAM	36	39	20.39	20.38	20.42		
15	16QAM	75	0	20.45	20.40	20.47	24	0
Channel				26740	26865	26990		
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	22.61	22.47	22.40	24	0
10	QPSK	1	25	22.23	22.32	22.29		
10	QPSK	1	49	22.27	22.32	22.44		
10	QPSK	25	0	21.56	21.36	21.39	23	1
10	QPSK	25	12	21.48	21.43	21.39		
10	QPSK	25	25	21.41	21.41	21.45		
10	QPSK	50	0	21.38	21.31	21.49	23	1
10	16QAM	1	0	21.93	21.66	21.60		
10	16QAM	1	25	21.66	21.61	21.73		
10	16QAM	1	49	21.59	21.75	21.62	22	2
10	16QAM	25	0	20.43	20.27	20.43		
10	16QAM	25	12	20.46	20.35	20.40		
10	16QAM	25	25	20.32	20.37	20.41	24	0
10	16QAM	50	0	20.39	20.35	20.39		
Channel				26715	26865	27015		
Frequency (MHz)				816.5	831.5	846.5	24	0
5	QPSK	1	0	22.61	22.43	22.35		
5	QPSK	1	12	22.24	22.25	22.28	23	1
5	QPSK	1	24	22.27	22.36	22.38		
5	QPSK	12	0	21.54	21.30	21.37		
5	QPSK	12	7	21.52	21.35	21.42	23	1
5	QPSK	12	13	21.37	21.38	21.40		
5	QPSK	25	0	21.40	21.37	21.48		
5	16QAM	1	0	21.89	21.68	21.58	23	1
5	16QAM	1	12	21.69	21.63	21.73		
5	16QAM	1	24	21.56	21.73	21.61		
5	16QAM	12	0	20.46	20.30	20.40	22	2
5	16QAM	12	7	20.41	20.31	20.37		
5	16QAM	12	13	20.39	20.32	20.42		
5	16QAM	25	0	20.40	20.32	20.43	24	0
Channel				26705	26865	27025		
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	22.63	22.46	22.40	24	0
3	QPSK	1	8	22.28	22.26	22.34		
3	QPSK	1	14	22.28	22.39	22.43		



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3	QPSK	8	0	21.58	21.35	21.36	23	1
3	QPSK	8	4	21.47	21.38	21.40		
3	QPSK	8	7	21.34	21.36	21.40		
3	QPSK	15	0	21.44	21.36	21.51		
3	16QAM	1	0	21.92	21.69	21.55	23	1
3	16QAM	1	8	21.65	21.61	21.68		
3	16QAM	1	14	21.55	21.70	21.61		
3	16QAM	8	0	20.43	20.24	20.40	22	2
3	16QAM	8	4	20.41	20.39	20.36		
3	16QAM	8	7	20.38	20.36	20.35		
3	16QAM	15	0	20.39	20.40	20.37		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	22.65	22.46	22.41	24	0
1.4	QPSK	1	3	22.25	22.32	22.28		
1.4	QPSK	1	5	22.29	22.39	22.43		
1.4	QPSK	3	0	22.57	22.45	22.32		
1.4	QPSK	3	1	22.22	22.25	22.24		
1.4	QPSK	3	3	22.28	22.34	22.33		
1.4	QPSK	6	0	21.39	21.34	21.42	23	1
1.4	16QAM	1	0	21.89	21.67	21.62	23	1
1.4	16QAM	1	3	21.74	21.63	21.72		
1.4	16QAM	1	5	21.55	21.65	21.63		
1.4	16QAM	3	0	21.89	21.65	21.61		
1.4	16QAM	3	1	21.74	21.53	21.72		
1.4	16QAM	3	3	21.50	21.57	21.56		
1.4	16QAM	6	0	20.36	20.31	20.39	22	2

<Reduced Power Mode>
<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	17.95	18.01	17.75	19	0
20	QPSK	1	49	17.85	17.87	17.70		
20	QPSK	1	99	17.64	17.59	17.56		
20	QPSK	50	0	17.70	17.64	17.44	19	0
20	QPSK	50	24	17.69	17.72	17.54		
20	QPSK	50	50	17.59	17.50	17.47		
20	QPSK	100	0	17.62	17.65	17.53	19	0
20	16QAM	1	0	17.72	17.64	17.47		
20	16QAM	1	49	17.56	17.55	17.46		
20	16QAM	1	99	17.32	17.30	17.24	19	0
20	16QAM	50	0	17.67	17.67	17.48		
20	16QAM	50	24	17.64	17.57	17.44		
20	16QAM	50	50	17.56	17.53	17.46	19	0
20	16QAM	100	0	17.62	17.58	17.56		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	17.96	17.90	17.75	19	0
15	QPSK	1	37	17.82	17.82	17.66		
15	QPSK	1	74	17.61	17.54	17.49		
15	QPSK	36	0	17.69	17.55	17.42	19	0
15	QPSK	36	20	17.59	17.62	17.43		
15	QPSK	36	39	17.59	17.40	17.39		
15	QPSK	75	0	17.61	17.53	17.49	19	0
15	16QAM	1	0	17.62	17.63	17.45		
15	16QAM	1	37	17.47	17.52	17.38		
15	16QAM	1	74	17.28	17.23	17.17	19	0
15	16QAM	36	0	17.59	17.64	17.44		
15	16QAM	36	20	17.59	17.57	17.41		
15	16QAM	36	39	17.52	17.48	17.43	19	0
15	16QAM	75	0	17.60	17.53	17.47		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	17.97	17.87	17.66	19	0
10	QPSK	1	25	17.78	17.82	17.68		
10	QPSK	1	49	17.60	17.58	17.49		
10	QPSK	25	0	17.64	17.56	17.43	19	0
10	QPSK	25	12	17.60	17.57	17.41		
10	QPSK	25	25	17.58	17.50	17.45		
10	QPSK	50	0	17.58	17.48	17.53	19	0
10	16QAM	1	0	17.64	17.60	17.43		
10	16QAM	1	25	17.50	17.51	17.42		
10	16QAM	1	49	17.27	17.30	17.24	19	0
10	16QAM	25	0	17.60	17.61	17.38		
10	16QAM	25	12	17.64	17.50	17.40		
10	16QAM	25	25	17.49	17.50	17.46	19	0
10	16QAM	50	0	17.54	17.52	17.56		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	17.97	17.87	17.65	19	0
5	QPSK	1	12	17.82	17.79	17.68		



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5	QPSK	1	24	17.61	17.57	17.48	19	0
5	QPSK	12	0	17.70	17.57	17.42		
5	QPSK	12	7	17.66	17.59	17.40		
5	QPSK	12	13	17.57	17.44	17.46		
5	QPSK	25	0	17.54	17.45	17.47		
5	16QAM	1	0	17.69	17.61	17.42	19	0
5	16QAM	1	12	17.56	17.52	17.44		
5	16QAM	1	24	17.30	17.26	17.18		
5	16QAM	12	0	17.58	17.59	17.47	19	0
5	16QAM	12	7	17.57	17.53	17.38		
5	16QAM	12	13	17.54	17.53	17.39		
5	16QAM	25	0	17.53	17.48	17.46		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	18.00	17.90	17.69	19	0
3	QPSK	1	8	17.78	17.79	17.66		
3	QPSK	1	14	17.59	17.49	17.49		
3	QPSK	8	0	17.60	17.61	17.39	19	0
3	QPSK	8	4	17.60	17.52	17.43		
3	QPSK	8	7	17.57	17.50	17.43		
3	QPSK	15	0	17.56	17.55	17.43		
3	16QAM	1	0	17.64	17.60	17.40	19	0
3	16QAM	1	8	17.49	17.54	17.44		
3	16QAM	1	14	17.27	17.29	17.24		
3	16QAM	8	0	17.67	17.61	17.47	19	0
3	16QAM	8	4	17.57	17.53	17.35		
3	16QAM	8	7	17.54	17.52	17.37		
3	16QAM	15	0	17.62	17.52	17.56		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	17.99	17.92	17.75	19	0
1.4	QPSK	1	3	17.75	17.79	17.69		
1.4	QPSK	1	5	17.61	17.51	17.54		
1.4	QPSK	3	0	17.64	17.58	17.39		
1.4	QPSK	3	1	17.59	17.52	17.42		
1.4	QPSK	3	3	17.49	17.45	17.46		
1.4	QPSK	6	0	17.60	17.53	17.51	19	0
1.4	16QAM	1	0	17.70	17.56	17.45	19	0
1.4	16QAM	1	3	17.46	17.50	17.43		
1.4	16QAM	1	5	17.28	17.29	17.16		
1.4	16QAM	3	0	17.63	17.63	17.47		
1.4	16QAM	3	1	17.59	17.57	17.44		
1.4	16QAM	3	3	17.52	17.47	17.43		
1.4	16QAM	6	0	17.52	17.57	17.47	19	0

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300	20	0
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	18.85	18.89	18.77		
20	QPSK	1	49	18.78	18.76	18.68	20	0
20	QPSK	1	99	18.58	18.61	18.45		
20	QPSK	50	0	18.69	18.85	18.77		
20	QPSK	50	24	18.53	18.73	18.55	20	0
20	QPSK	50	50	18.54	18.51	18.46		
20	QPSK	100	0	18.57	18.77	18.64		
20	16QAM	1	0	18.56	18.51	18.56	20	0
20	16QAM	1	49	18.69	18.54	18.59		
20	16QAM	1	99	18.25	18.18	18.18		
20	16QAM	50	0	18.55	18.41	18.36	20	0
20	16QAM	50	24	18.49	18.34	18.53		
20	16QAM	50	50	18.41	18.31	18.34		
20	16QAM	100	0	18.40	18.43	18.38		
Channel				20025	20175	20325	20	0
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	18.78	18.70	18.66		
15	QPSK	1	37	18.71	18.62	18.64	20	0
15	QPSK	1	74	18.57	18.47	18.45		
15	QPSK	36	0	18.52	18.52	18.47		
15	QPSK	36	20	18.49	18.35	18.45	20	0
15	QPSK	36	39	18.43	18.30	18.31		
15	QPSK	75	0	18.47	18.37	18.29		
15	16QAM	1	0	18.50	18.39	18.30	20	0
15	16QAM	1	37	18.38	18.34	18.36		
15	16QAM	1	74	18.17	18.16	18.16		
15	16QAM	36	0	18.54	18.32	18.28	20	0
15	16QAM	36	20	18.39	18.26	18.52		
15	16QAM	36	39	18.34	18.28	18.28		
15	16QAM	75	0	18.33	18.36	18.31		
Channel				20000	20175	20350	20	0
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	18.77	18.72	18.61		
10	QPSK	1	25	18.77	18.59	18.64	20	0
10	QPSK	1	49	18.54	18.46	18.37		
10	QPSK	25	0	18.45	18.50	18.39		
10	QPSK	25	12	18.43	18.33	18.39	20	0
10	QPSK	25	25	18.40	18.22	18.30		
10	QPSK	50	0	18.40	18.43	18.30		
10	16QAM	1	0	18.54	18.33	18.31	20	0
10	16QAM	1	25	18.29	18.33	18.33		
10	16QAM	1	49	18.15	18.14	18.18		
10	16QAM	25	0	18.51	18.36	18.36	20	0
10	16QAM	25	12	18.45	18.25	18.53		
10	16QAM	25	25	18.33	18.23	18.33		
10	16QAM	50	0	18.36	18.33	18.30		
Channel				19975	20175	20375	20	0
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	18.75	18.68	18.63		
5	QPSK	1	12	18.74	18.64	18.59	20	0
5	QPSK	1	24	18.51	18.49	18.43		



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5	QPSK	12	0	18.45	18.50	18.40	20	0
5	QPSK	12	7	18.49	18.42	18.35		
5	QPSK	12	13	18.36	18.27	18.27		
5	QPSK	25	0	18.47	18.46	18.31		
5	16QAM	1	0	18.46	18.38	18.35	20	0
5	16QAM	1	12	18.32	18.29	18.39		
5	16QAM	1	24	18.24	18.10	18.09		
5	16QAM	12	0	18.54	18.39	18.32	20	0
5	16QAM	12	7	18.42	18.31	18.43		
5	16QAM	12	13	18.35	18.27	18.24		
5	16QAM	25	0	18.34	18.37	18.33		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	18.77	18.65	18.65	20	0
3	QPSK	1	8	18.75	18.56	18.66		
3	QPSK	1	14	18.48	18.48	18.40		
3	QPSK	8	0	18.45	18.50	18.45	20	0
3	QPSK	8	4	18.46	18.35	18.40		
3	QPSK	8	7	18.37	18.29	18.28		
3	QPSK	15	0	18.38	18.45	18.27		
3	16QAM	1	0	18.47	18.33	18.30	20	0
3	16QAM	1	8	18.32	18.30	18.39		
3	16QAM	1	14	18.23	18.11	18.12		
3	16QAM	8	0	18.50	18.33	18.27	20	0
3	16QAM	8	4	18.47	18.33	18.45		
3	16QAM	8	7	18.40	18.28	18.28		
3	16QAM	15	0	18.39	18.38	18.31		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	18.76	18.73	18.64	20	0
1.4	QPSK	1	3	18.78	18.61	18.65		
1.4	QPSK	1	5	18.52	18.49	18.37		
1.4	QPSK	3	0	18.49	18.49	18.44		
1.4	QPSK	3	1	18.45	18.35	18.39		
1.4	QPSK	3	3	18.39	18.30	18.27		
1.4	QPSK	6	0	18.45	18.39	18.25	20	0
1.4	16QAM	1	0	18.46	18.41	18.34	20	0
1.4	16QAM	1	3	18.39	18.34	18.33		
1.4	16QAM	1	5	18.22	18.18	18.10		
1.4	16QAM	3	0	18.53	18.37	18.32		
1.4	16QAM	3	1	18.49	18.28	18.50		
1.4	16QAM	3	3	18.38	18.26	18.26		
1.4	16QAM	6	0	18.37	18.38	18.30	20	0

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600	23	0
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	21.65	21.73	21.94		
10	QPSK	1	25	21.68	21.79	21.88	23	0
10	QPSK	1	49	21.51	21.86	21.81		
10	QPSK	25	0	21.28	21.54	21.69		
10	QPSK	25	12	21.27	21.53	21.59	23	0
10	QPSK	25	25	21.25	21.39	21.55		
10	QPSK	50	0	21.30	21.44	21.54		
10	16QAM	1	0	21.36	21.41	21.55	23	0
10	16QAM	1	25	21.53	21.57	21.73		
10	16QAM	1	49	21.23	21.59	21.53		
10	16QAM	25	0	20.26	20.44	20.52	22	1
10	16QAM	25	12	20.30	20.51	20.57		
10	16QAM	25	25	20.28	20.43	20.57		
10	16QAM	50	0	20.31	20.44	20.57		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	21.56	21.67	21.90	23	0
5	QPSK	1	12	21.64	21.77	21.84		
5	QPSK	1	24	21.44	21.80	21.74		
5	QPSK	12	0	21.18	21.44	21.41	23	0
5	QPSK	12	7	21.17	21.48	21.50		
5	QPSK	12	13	21.16	21.30	21.51		
5	QPSK	25	0	21.30	21.34	21.52		
5	16QAM	1	0	21.26	21.31	21.50	23	0
5	16QAM	1	12	21.44	21.55	21.64		
5	16QAM	1	24	21.22	21.54	21.49		
5	16QAM	12	0	20.19	20.35	20.42	22	1
5	16QAM	12	7	20.26	20.42	20.49		
5	16QAM	12	13	20.26	20.38	20.52		
5	16QAM	25	0	20.28	20.42	20.53		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	21.65	21.71	21.92	23	0
3	QPSK	1	8	21.68	21.77	21.82		
3	QPSK	1	14	21.51	21.79	21.77		
3	QPSK	8	0	21.18	21.38	21.40	23	0
3	QPSK	8	4	21.18	21.46	21.53		
3	QPSK	8	7	21.19	21.31	21.49		
3	QPSK	15	0	21.27	21.36	21.53		
3	16QAM	1	0	21.29	21.38	21.50	23	0
3	16QAM	1	8	21.46	21.47	21.70		
3	16QAM	1	14	21.15	21.49	21.43		
3	16QAM	8	0	20.23	20.40	20.43	22	1
3	16QAM	8	4	20.28	20.42	20.56		
3	16QAM	8	7	20.18	20.42	20.52		
3	16QAM	15	0	20.30	20.39	20.53		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	21.62	21.72	21.87	23	0
1.4	QPSK	1	3	21.63	21.70	21.80		
1.4	QPSK	1	5	21.41	21.81	21.71		



1.4	QPSK	3	0	21.17	21.34	21.41		
1.4	QPSK	3	1	21.27	21.51	21.52		
1.4	QPSK	3	3	21.15	21.30	21.48		
1.4	QPSK	6	0	21.23	21.39	21.54	23	0
1.4	16QAM	1	0	21.34	21.39	21.46	23	0
1.4	16QAM	1	3	21.52	21.48	21.66		
1.4	16QAM	1	5	21.15	21.58	21.48		
1.4	16QAM	3	0	21.32	21.33	21.54		
1.4	16QAM	3	1	21.51	21.47	21.70		
1.4	16QAM	3	3	21.13	21.50	21.44		
1.4	16QAM	6	0	20.25	20.34	20.53	22	1



<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350	18.5	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	18.22	18.24	17.90		
20	QPSK	1	49	18.15	18.21	18.02	18.5	0
20	QPSK	1	99	18.06	18.03	17.97		
20	QPSK	50	0	17.98	18.02	17.88		
20	QPSK	50	24	17.94	17.99	17.78	18.5	0
20	QPSK	50	50	17.86	17.94	17.81		
20	QPSK	100	0	17.88	17.92	17.76		
20	16QAM	1	0	17.84	17.86	17.67	18.5	0
20	16QAM	1	49	17.86	17.94	17.69		
20	16QAM	1	99	17.73	17.76	17.71		
20	16QAM	50	0	17.82	17.94	17.68	18.5	0
20	16QAM	50	24	17.96	17.97	17.79		
20	16QAM	50	50	17.88	17.91	17.78		
20	16QAM	100	0	17.89	17.92	17.73		
Channel				20825	21100	21375	18.5	0
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	18.16	18.12	17.81		
15	QPSK	1	37	18.08	18.20	17.97	18.5	0
15	QPSK	1	74	17.98	18.02	17.95		
15	QPSK	36	0	17.79	17.88	17.65		
15	QPSK	36	20	17.90	17.99	17.75	18.5	0
15	QPSK	36	39	17.78	17.94	17.71		
15	QPSK	75	0	17.82	17.85	17.75		
15	16QAM	1	0	17.75	17.84	17.63	18.5	0
15	16QAM	1	37	17.78	17.92	17.64		
15	16QAM	1	74	17.65	17.75	17.68		
15	16QAM	36	0	17.81	17.89	17.64	18.5	0
15	16QAM	36	20	17.86	17.94	17.76		
15	16QAM	36	39	17.85	17.86	17.69		
15	16QAM	75	0	17.85	17.89	17.72		
Channel				20800	21100	21400	18.5	0
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	18.17	18.11	17.86		
10	QPSK	1	25	18.07	18.19	17.99	18.5	0
10	QPSK	1	49	18.02	18.02	17.92		
10	QPSK	25	0	17.75	17.93	17.68		
10	QPSK	25	12	17.87	17.94	17.69	18.5	0
10	QPSK	25	25	17.78	17.87	17.75		
10	QPSK	50	0	17.82	17.91	17.68		
10	16QAM	1	0	17.79	17.84	17.65	18.5	0
10	16QAM	1	25	17.84	17.90	17.62		
10	16QAM	1	49	17.73	17.75	17.63		
10	16QAM	25	0	17.81	17.87	17.61	18.5	0
10	16QAM	25	12	17.94	17.88	17.74		
10	16QAM	25	25	17.80	17.88	17.69		
10	16QAM	50	0	17.85	17.87	17.64		
Channel				20775	21100	21425	18.5	0
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	18.16	18.16	17.86		
5	QPSK	1	12	18.09	18.23	17.95	18.5	0
5	QPSK	1	24	18.01	17.99	17.93		



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5	QPSK	12	0	17.79	17.92	17.64	18.5	0
5	QPSK	12	7	17.94	17.91	17.72		
5	QPSK	12	13	17.85	17.87	17.74		
5	QPSK	25	0	17.78	17.82	17.73		
5	16QAM	1	0	17.79	17.79	17.64	18.5	0
5	16QAM	1	12	17.78	17.84	17.68		
5	16QAM	1	24	17.65	17.74	17.62		
5	16QAM	12	0	17.80	17.88	17.66	18.5	0
5	16QAM	12	7	17.96	17.90	17.75		
5	16QAM	12	13	17.81	17.82	17.76		
5	16QAM	25	0	17.82	17.92	17.73		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130	22.5	0
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	21.48	21.51	21.39		
10	QPSK	1	25	21.33	21.39	21.29	22.5	0
10	QPSK	1	49	21.03	21.08	21.03		
10	QPSK	25	0	21.34	21.33	21.27		
10	QPSK	25	12	21.07	21.10	21.04	22.5	0
10	QPSK	25	25	21.07	21.03	21.02		
10	QPSK	50	0	21.15	21.28	21.16		
10	16QAM	1	0	21.35	21.46	21.45	22.5	0
10	16QAM	1	25	21.13	21.16	21.07		
10	16QAM	1	49	21.26	21.20	21.24		
10	16QAM	25	0	21.16	21.18	21.14	22	0.5
10	16QAM	25	12	21.01	21.02	21.01		
10	16QAM	25	25	21.10	21.04	21.03		
10	16QAM	50	0	21.11	21.07	21.07		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	21.47	21.48	21.30	22.5	0
5	QPSK	1	12	21.25	21.30	21.21		
5	QPSK	1	24	21.00	21.02	21.01		
5	QPSK	12	0	21.01	21.13	21.06	22.5	0
5	QPSK	12	7	21.02	21.10	20.94		
5	QPSK	12	13	21.07	20.99	20.97		
5	QPSK	25	0	21.00	21.04	21.03	22.5	0
5	16QAM	1	0	21.25	21.42	21.40		
5	16QAM	1	12	21.12	21.14	20.98		
5	16QAM	1	24	21.25	21.19	21.18	22	0.5
5	16QAM	12	0	21.08	21.17	21.07		
5	16QAM	12	7	21.01	20.95	20.98		
5	16QAM	12	13	21.08	21.00	20.95	22	0.5
5	16QAM	25	0	21.10	21.03	21.04		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	21.43	21.47	21.36	22.5	0
3	QPSK	1	8	21.33	21.37	21.25		
3	QPSK	1	14	20.96	20.99	20.97		
3	QPSK	8	0	21.06	21.13	21.06	22.5	0
3	QPSK	8	4	20.99	21.09	20.97		
3	QPSK	8	7	21.01	20.95	20.97		
3	QPSK	15	0	21.02	20.98	20.98	22.5	0
3	16QAM	1	0	21.27	21.36	21.44		
3	16QAM	1	8	21.10	21.12	20.99		
3	16QAM	1	14	21.22	21.14	21.24	22	0.5
3	16QAM	8	0	21.14	21.11	21.06		
3	16QAM	8	4	20.98	20.99	20.95		
3	16QAM	8	7	21.02	20.98	21.01	22	0.5
3	16QAM	15	0	21.08	21.05	20.97		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	21.45	21.41	21.29	22.5	0
1.4	QPSK	1	3	21.32	21.31	21.26		
1.4	QPSK	1	5	21.00	21.08	20.99		



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1.4	QPSK	3	0	20.99	21.10	21.05		
1.4	QPSK	3	1	20.98	21.02	20.98		
1.4	QPSK	3	3	21.03	20.94	20.92		
1.4	QPSK	6	0	20.98	21.08	20.98	22.5	0
1.4	16QAM	1	0	21.34	21.39	21.43	22.5	0
1.4	16QAM	1	3	21.12	21.11	21.00		
1.4	16QAM	1	5	21.24	21.18	21.14		
1.4	16QAM	3	0	21.16	21.18	21.04		
1.4	16QAM	3	1	20.97	21.00	20.92		
1.4	16QAM	3	3	21.03	21.01	20.97		
1.4	16QAM	6	0	21.02	21.04	20.98	22	0.5

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23230				
Frequency (MHz)				782				
10	QPSK	1	0		21.64		22.5	0
10	QPSK	1	25		21.39			
10	QPSK	1	49		21.27			
10	QPSK	25	0		21.60		22.5	0
10	QPSK	25	12		21.21			
10	QPSK	25	25		21.30			
10	QPSK	50	0		21.53		22.5	0
10	16QAM	1	0		21.22			
10	16QAM	1	25		21.26			
10	16QAM	1	49		21.06		22	0.5
10	16QAM	25	0		21.14			
10	16QAM	25	12		21.14			
10	16QAM	25	25		20.99		22	0.5
10	16QAM	50	0		21.15			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	21.51	21.52	21.48	22.5	0
5	QPSK	1	12	21.29	21.36	21.38		
5	QPSK	1	24	21.23	21.17	21.18		
5	QPSK	12	0	21.05	21.02	21.02	22.5	0
5	QPSK	12	7	21.11	21.02	21.06		
5	QPSK	12	13	20.98	20.95	20.93		
5	QPSK	25	0	21.07	21.11	21.15	22.5	0
5	16QAM	1	0	21.22	21.19	21.17		
5	16QAM	1	12	21.16	21.21	21.26		
5	16QAM	1	24	21.04	20.99	20.98	22	0.5
5	16QAM	12	0	21.09	21.14	21.06		
5	16QAM	12	7	21.14	21.09	21.07		
5	16QAM	12	13	20.92	20.89	20.96	22	0.5
5	16QAM	25	0	21.12	21.06	21.15		



<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	17.98	17.94	18.08		
20	QPSK	1	49	17.79	17.84	17.86	19	0
20	QPSK	1	99	17.77	17.59	17.61		
20	QPSK	50	0	17.86	17.84	17.93		
20	QPSK	50	24	17.60	17.58	17.65	19	0
20	QPSK	50	50	17.64	17.57	17.59		
20	QPSK	100	0	17.59	17.62	17.79		
20	16QAM	1	0	17.81	17.69	17.63	19	0
20	16QAM	1	49	17.55	17.80	17.66		
20	16QAM	1	99	17.46	17.28	17.32		
20	16QAM	50	0	17.62	17.63	17.72	19	0
20	16QAM	50	24	17.68	17.50	17.56		
20	16QAM	50	50	17.64	17.56	17.55		
20	16QAM	100	0	17.58	17.60	17.61		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	18.00	17.89	17.88	19	0
15	QPSK	1	37	17.73	17.76	17.83		
15	QPSK	1	74	17.72	17.55	17.61		
15	QPSK	36	0	17.65	17.64	17.61	19	0
15	QPSK	36	20	17.55	17.48	17.60		
15	QPSK	36	39	17.63	17.54	17.59		
15	QPSK	75	0	17.55	17.59	17.50		
15	16QAM	1	0	17.78	17.65	17.63	19	0
15	16QAM	1	37	17.52	17.74	17.65		
15	16QAM	1	74	17.37	17.18	17.28		
15	16QAM	36	0	17.59	17.62	17.64	19	0
15	16QAM	36	20	17.59	17.48	17.55		
15	16QAM	36	39	17.64	17.51	17.49		
15	16QAM	75	0	17.54	17.60	17.61		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	18.06	17.94	17.89	19	0
10	QPSK	1	25	17.72	17.80	17.81		
10	QPSK	1	49	17.76	17.57	17.56		
10	QPSK	25	0	17.64	17.62	17.57	19	0
10	QPSK	25	12	17.58	17.57	17.58		
10	QPSK	25	25	17.62	17.56	17.59		
10	QPSK	50	0	17.49	17.60	17.57		
10	16QAM	1	0	17.74	17.60	17.55	19	0
10	16QAM	1	25	17.49	17.77	17.60		
10	16QAM	1	49	17.43	17.22	17.29		
10	16QAM	25	0	17.62	17.59	17.67	19	0
10	16QAM	25	12	17.64	17.50	17.52		
10	16QAM	25	25	17.56	17.47	17.45		
10	16QAM	50	0	17.49	17.54	17.52		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	18.00	17.88	17.81	19	0
5	QPSK	1	12	17.72	17.77	17.82		
5	QPSK	1	24	17.71	17.49	17.52		



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5	QPSK	12	0	17.58	17.56	17.60	19	0
5	QPSK	12	7	17.60	17.57	17.61		
5	QPSK	12	13	17.55	17.53	17.55		
5	QPSK	25	0	17.53	17.54	17.57		
5	16QAM	1	0	17.71	17.61	17.54	19	0
5	16QAM	1	12	17.55	17.78	17.61		
5	16QAM	1	24	17.38	17.25	17.26		
5	16QAM	12	0	17.62	17.54	17.63	19	0
5	16QAM	12	7	17.62	17.45	17.49		
5	16QAM	12	13	17.57	17.55	17.50		
5	16QAM	25	0	17.49	17.54	17.55		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	18.05	17.91	17.85	19	0
3	QPSK	1	8	17.79	17.80	17.76		
3	QPSK	1	14	17.76	17.58	17.54		
3	QPSK	8	0	17.61	17.57	17.60	19	0
3	QPSK	8	4	17.50	17.50	17.64		
3	QPSK	8	7	17.58	17.57	17.54		
3	QPSK	15	0	17.52	17.60	17.57		
3	16QAM	1	0	17.77	17.60	17.57	19	0
3	16QAM	1	8	17.51	17.70	17.65		
3	16QAM	1	14	17.39	17.26	17.25		
3	16QAM	8	0	17.54	17.58	17.72	19	0
3	16QAM	8	4	17.68	17.50	17.55		
3	16QAM	8	7	17.57	17.51	17.49		
3	16QAM	15	0	17.50	17.59	17.54		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	18.02	17.90	17.86	19	0
1.4	QPSK	1	3	17.75	17.76	17.79		
1.4	QPSK	1	5	17.74	17.53	17.58		
1.4	QPSK	3	0	17.56	17.56	17.55		
1.4	QPSK	3	1	17.52	17.55	17.64		
1.4	QPSK	3	3	17.57	17.57	17.53		
1.4	QPSK	6	0	17.56	17.57	17.50	19	0
1.4	16QAM	1	0	17.81	17.62	17.58	19	0
1.4	16QAM	1	3	17.52	17.79	17.59		
1.4	16QAM	1	5	17.36	17.28	17.28		
1.4	16QAM	3	0	17.53	17.57	17.67		
1.4	16QAM	3	1	17.67	17.43	17.47		
1.4	16QAM	3	3	17.63	17.49	17.47		
1.4	16QAM	6	0	17.58	17.53	17.54	19	0



<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965	23.5	0
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	22.49	22.41	22.19		
15	QPSK	1	37	22.24	22.32	22.33	23	0.5
15	QPSK	1	74	22.18	22.21	22.28		
15	QPSK	36	0	21.57	21.40	21.39		
15	QPSK	36	20	21.49	21.35	21.41	23	0.5
15	QPSK	36	39	21.32	21.38	21.42		
15	QPSK	75	0	21.46	21.38	21.47		
15	16QAM	1	0	21.95	21.61	21.57	23	0.5
15	16QAM	1	37	21.68	21.64	21.68		
15	16QAM	1	74	21.61	21.72	21.62		
15	16QAM	36	0	20.59	20.37	20.49	22	1.5
15	16QAM	36	20	20.54	20.49	20.49		
15	16QAM	36	39	20.39	20.44	20.46		
15	16QAM	75	0	20.48	20.45	20.54	23.5	0
Channel				26740	26865	26990		
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	22.48	22.15	22.11	23.5	0
10	QPSK	1	25	22.14	22.10	22.24		
10	QPSK	1	49	22.14	22.17	22.26		
10	QPSK	25	0	21.56	21.28	21.31	23	0.5
10	QPSK	25	12	21.45	21.35	21.35		
10	QPSK	25	25	21.27	21.32	21.34		
10	QPSK	50	0	21.40	21.35	21.41	23	0.5
10	16QAM	1	0	21.90	21.57	21.47		
10	16QAM	1	25	21.59	21.64	21.63		
10	16QAM	1	49	21.59	21.71	21.54	22	1.5
10	16QAM	25	0	20.53	20.30	20.39		
10	16QAM	25	12	20.48	20.44	20.41		
10	16QAM	25	25	20.39	20.44	20.42	23.5	0
10	16QAM	50	0	20.39	20.41	20.53		
Channel				26715	26865	27015		
Frequency (MHz)				816.5	831.5	846.5	23.5	0
5	QPSK	1	0	22.44	22.16	22.14		
5	QPSK	1	12	22.14	22.02	22.32	23	0.5
5	QPSK	1	24	22.12	22.21	22.21		
5	QPSK	12	0	21.51	21.34	21.29		
5	QPSK	12	7	21.45	21.28	21.31	23	0.5
5	QPSK	12	13	21.31	21.30	21.37		
5	QPSK	25	0	21.36	21.31	21.42		
5	16QAM	1	0	21.94	21.52	21.50	23	0.5
5	16QAM	1	12	21.67	21.57	21.60		
5	16QAM	1	24	21.52	21.69	21.56		
5	16QAM	12	0	20.53	20.28	20.48	22	1.5
5	16QAM	12	7	20.50	20.42	20.39		
5	16QAM	12	13	20.30	20.43	20.46		
5	16QAM	25	0	20.45	20.39	20.52	23.5	0
Channel				26705	26865	27025		
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	22.47	22.17	22.16	23.5	0
3	QPSK	1	8	22.18	22.07	22.32		
3	QPSK	1	14	22.12	22.18	22.23		



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3	QPSK	8	0	21.53	21.27	21.37	23	0.5
3	QPSK	8	4	21.46	21.29	21.33		
3	QPSK	8	7	21.22	21.38	21.38		
3	QPSK	15	0	21.37	21.34	21.41		
3	16QAM	1	0	21.93	21.53	21.57	23	0.5
3	16QAM	1	8	21.68	21.56	21.67		
3	16QAM	1	14	21.61	21.62	21.61		
3	16QAM	8	0	20.55	20.31	20.42	22	1.5
3	16QAM	8	4	20.47	20.40	20.44		
3	16QAM	8	7	20.34	20.35	20.36		
3	16QAM	15	0	20.42	20.37	20.47		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	22.48	22.11	22.10	23.5	0
1.4	QPSK	1	3	22.17	22.03	22.28		
1.4	QPSK	1	5	22.18	22.18	22.28		
1.4	QPSK	3	0	22.15	22.12	22.31		
1.4	QPSK	3	1	22.15	22.16	22.28		
1.4	QPSK	3	3	22.13	21.91	22.06		
1.4	QPSK	6	0	22.02	21.95	22.02	23	0.5
1.4	16QAM	1	0	21.89	21.90	21.86	23	0.5
1.4	16QAM	1	3	21.78	21.90	21.93		
1.4	16QAM	1	5	21.87	21.89	21.85		
1.4	16QAM	3	0	21.85	21.84	21.84		
1.4	16QAM	3	1	21.88	21.84	21.94		
1.4	16QAM	3	3	21.78	21.95	21.86		
1.4	16QAM	6	0	20.39	20.41	20.53	22	1.5

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

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

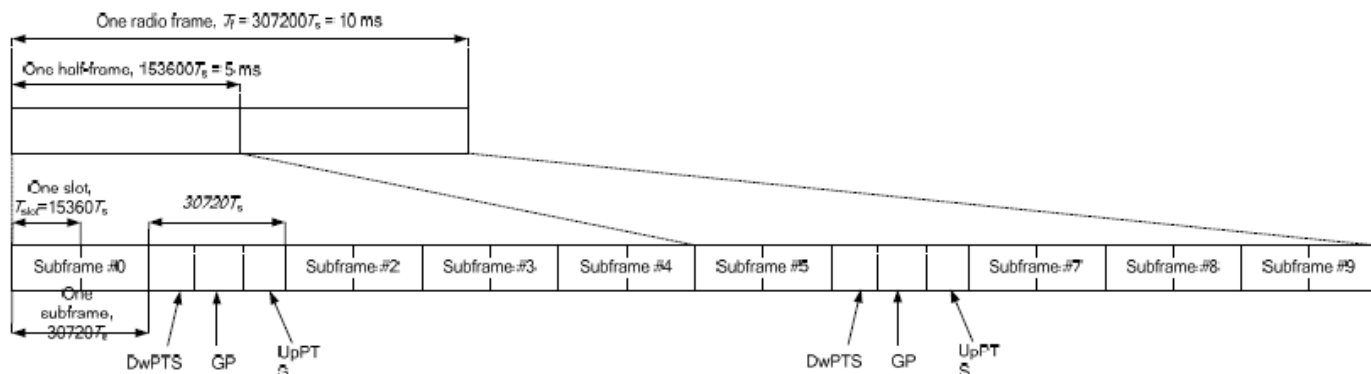


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

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

<Default Power Mode>
<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	21.84	21.57	21.68	21.22	21.64	23	0
20	QPSK	1	49	21.79	21.52	21.61	21.13	21.63		
20	QPSK	1	99	21.51	21.41	21.27	20.96	21.44		
20	QPSK	50	0	20.91	20.75	20.85	20.36	20.79	22	1
20	QPSK	50	24	20.86	20.72	20.84	20.34	20.77		
20	QPSK	50	50	20.83	20.66	20.71	20.35	20.66		
20	QPSK	100	0	20.90	20.69	20.79	20.29	20.70	22	1
20	16QAM	1	0	21.24	21.00	21.09	20.72	21.16		
20	16QAM	1	49	21.31	21.05	21.18	20.69	21.17		
20	16QAM	1	99	20.95	21.00	20.89	20.56	20.75	21	2
20	16QAM	50	0	19.84	19.66	19.69	19.36	19.77		
20	16QAM	50	24	19.96	19.69	19.87	19.36	19.79		
20	16QAM	50	50	19.87	19.65	19.75	19.38	19.66		
20	16QAM	100	0	19.90	19.68	19.78	19.30	19.74		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	21.58	21.38	21.50	21.11	21.56	23	0
15	QPSK	1	37	21.75	21.49	21.59	21.13	21.53		
15	QPSK	1	74	21.50	21.35	21.17	20.94	21.34		
15	QPSK	36	0	20.77	20.61	20.59	20.31	20.68	22	1
15	QPSK	36	20	20.94	20.63	20.83	20.29	20.71		
15	QPSK	36	39	20.82	20.66	20.61	20.26	20.66		
15	QPSK	75	0	20.89	20.62	20.73	20.24	20.64	22	1
15	16QAM	1	0	21.18	21.00	21.09	20.72	21.07		
15	16QAM	1	37	21.29	21.03	21.17	20.69	21.09		
15	16QAM	1	74	20.85	20.94	20.84	20.51	20.70	21	2
15	16QAM	36	0	19.83	19.60	19.66	19.33	19.71		
15	16QAM	36	20	19.91	19.64	19.86	19.34	19.79		
15	16QAM	36	39	19.84	19.58	19.68	19.38	19.62		
15	16QAM	75	0	19.88	19.68	19.77	19.26	19.69		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	21.60	21.46	21.56	21.10	21.49	23	0
10	QPSK	1	25	21.72	21.51	21.56	21.13	21.53		
10	QPSK	1	49	21.50	21.41	21.24	21.09	21.36		
10	QPSK	25	0	20.80	20.65	20.56	20.27	20.76	22	1
10	QPSK	25	12	20.91	20.62	20.76	20.28	20.68		
10	QPSK	25	25	20.80	20.58	20.67	20.26	20.66		
10	QPSK	50	0	20.83	20.66	20.73	20.20	20.62	22	1
10	16QAM	1	0	21.14	20.99	21.09	20.71	21.14		
10	16QAM	1	25	21.24	21.05	21.14	20.61	21.07		
10	16QAM	1	49	20.93	20.97	20.89	20.53	20.68	21	2
10	16QAM	25	0	19.79	19.65	19.62	19.29	19.70		
10	16QAM	25	12	19.91	19.68	19.79	19.27	19.75		
10	16QAM	25	25	19.79	19.64	19.69	19.31	19.62		
10	16QAM	50	0	19.80	19.63	19.78	19.26	19.73		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	21.59	21.41	21.55	21.05	21.56	23	0
5	QPSK	1	12	21.74	21.42	21.56	21.06	21.63		



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5	QPSK	1	24	21.44	21.37	21.27	21.00	21.40		
5	QPSK	12	0	20.77	20.55	20.60	20.25	20.72	22	1
5	QPSK	12	7	20.93	20.72	20.84	20.32	20.72		
5	QPSK	12	13	20.78	20.57	20.70	20.34	20.64		
5	QPSK	25	0	20.88	20.62	20.78	20.21	20.68		
5	16QAM	1	0	21.21	20.94	20.99	20.66	21.06	22	1
5	16QAM	1	12	21.28	20.99	21.11	20.62	21.09		
5	16QAM	1	24	20.91	20.94	20.82	20.49	20.67		
5	16QAM	12	0	19.81	19.59	19.68	19.28	19.75	21	2
5	16QAM	12	7	19.86	19.60	19.87	19.32	19.75		
5	16QAM	12	13	19.77	19.65	19.68	19.28	19.64		
5	16QAM	25	0	19.85	19.60	19.75	19.23	19.73		

<Reduced Power Mode>
<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	20.79	20.60	20.72	20.73	20.77	21	0
20	QPSK	1	49	20.55	20.54	20.54	20.42	20.66		
20	QPSK	1	99	20.45	20.36	20.43	20.46	20.56		
20	QPSK	50	0	20.63	20.41	20.57	20.43	20.57	21	0
20	QPSK	50	24	20.57	20.39	20.56	20.41	20.56		
20	QPSK	50	50	20.47	20.32	20.42	20.42	20.42		
20	QPSK	100	0	20.55	20.34	20.52	20.36	20.51	21	0
20	16QAM	1	0	20.65	20.48	20.67	20.61	20.72		
20	16QAM	1	49	20.24	20.08	20.31	20.38	20.38		
20	16QAM	1	99	20.52	20.18	20.44	20.43	20.43	21	0
20	16QAM	50	0	20.29	20.06	20.17	19.96	20.24		
20	16QAM	50	24	20.46	20.10	20.30	20.01	20.23		
20	16QAM	50	50	20.31	20.06	20.16	19.98	20.12		
20	16QAM	100	0	20.32	20.18	20.25	19.91	20.14		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	20.21	20.05	20.17	19.92	20.23	21	0
15	QPSK	1	37	20.01	19.99	20.00	19.62	20.09		
15	QPSK	1	74	19.90	19.77	19.92	19.70	20.01		
15	QPSK	36	0	19.90	19.71	19.86	19.64	19.94	21	0
15	QPSK	36	20	19.98	19.81	19.97	19.65	19.96		
15	QPSK	36	39	19.93	19.76	19.84	19.70	19.88		
15	QPSK	75	0	19.99	19.83	19.95	19.64	19.96	21	0
15	16QAM	1	0	20.13	19.93	20.13	19.88	20.21		
15	16QAM	1	37	19.67	19.50	19.76	19.62	19.87		
15	16QAM	1	74	20.01	19.65	19.85	19.71	19.87	21	0
15	16QAM	36	0	19.82	19.62	19.66	19.34	19.73		
15	16QAM	36	20	19.89	19.65	19.84	19.30	19.76		
15	16QAM	36	39	19.87	19.64	19.74	19.29	19.57		
15	16QAM	75	0	19.82	19.68	19.73	19.28	19.67		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	20.21	20.03	20.13	19.93	20.26	21	0
10	QPSK	1	25	19.97	19.98	20.03	19.72	20.16		
10	QPSK	1	49	19.93	19.80	19.87	19.74	20.04		
10	QPSK	25	0	19.93	19.73	19.79	19.64	19.97	21	0
10	QPSK	25	12	20.01	19.84	20.05	19.67	19.98		
10	QPSK	25	25	19.90	19.75	19.82	19.72	19.85		
10	QPSK	50	0	19.99	19.77	20.01	19.62	20.00	21	0
10	16QAM	1	0	20.06	19.88	20.12	19.83	20.22		
10	16QAM	1	25	19.68	19.57	19.74	19.68	19.78		
10	16QAM	1	49	19.98	19.58	19.87	19.67	19.91	21	0
10	16QAM	25	0	19.80	19.61	19.64	19.32	19.73		
10	16QAM	25	12	19.93	19.68	19.77	19.27	19.71		
10	16QAM	25	25	19.86	19.55	19.74	19.31	19.62		
10	16QAM	50	0	19.82	19.63	19.69	19.23	19.65		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	20.22	20.10	20.11	19.88	20.19	21	0
5	QPSK	1	12	20.05	20.02	19.94	19.72	20.15		



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5	QPSK	1	24	19.95	19.77	19.90	19.70	19.99		
5	QPSK	12	0	19.86	19.73	19.84	19.68	19.94	21	0
5	QPSK	12	7	20.06	19.87	20.01	19.62	20.06		
5	QPSK	12	13	19.87	19.78	19.86	19.67	19.92		
5	QPSK	25	0	19.97	19.82	19.97	19.64	19.94		
5	16QAM	1	0	20.14	19.96	20.10	19.83	20.13	21	0
5	16QAM	1	12	19.68	19.58	19.74	19.61	19.83		
5	16QAM	1	24	19.97	19.68	19.88	19.69	19.91		
5	16QAM	12	0	19.81	19.58	19.67	19.32	19.73	21	0
5	16QAM	12	7	19.95	19.63	19.83	19.32	19.71		
5	16QAM	12	13	19.86	19.59	19.65	19.30	19.60		
5	16QAM	25	0	19.90	19.61	19.76	19.25	19.70		

<LTE Carrier Aggregation combinations>
General Note:

1. This device supports Carrier Aggregation on downlink only for inter band and intra band, Uplink CA is not supported. For the device supports bands, bandwidth combination set and configurations are provided as follow table was according to 3GPP.
2. All permutations exist. No restrictions on Pcell & Scell combinations. Only LTE Band 29A is limited to Scell.

Inter-Band	
	2 Bands / 2 CC
Band 2	2A-5A (0)(1)
	2A-12A (0)(1)(2)
	2A-13A (0)(1)
	2A-29A (0)(1)(2)
Band 4	4A-5A (0)(1)
	4A-12A (0)(1)(2)(3)(4)(5)
	4A-13A (0)(1)
	4A-29A (0)(1)(2)
Band 5	5A-2A (0)(1)
	5A-4A (0)(1)
Band 12	12A-2A (0)(1)(2)
	12A-4A (0)(1)(2)(3)(4)(5)
Band 13	13A-2A (0)(1)
	13A-4A (0)(1)
Band 29	29A-2A (0)(1)(2)
	29A-4A (0)(1)(2)

	Intra-Band Contiguous	Intra-Band Non-Contiguous
Band 2	2C (0)	2A-2A (0)
Band 4		4A-4A (0)(1)
Band 7	7C (0)(1)(2)	7A-7A (0)(1)
Band 41	41C (0)(1)	41A-41A (0)(1)

<Power verification when LTE Carrier Aggregation Active>
General Note:

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

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

<Two Carrier power verification>

Configure		CA Configuration (BCS)	PCC						SCC				Power		
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band		2A-5A	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	23.33	23.19
		2A-12A	2	20	1880	18900	QPSK	1	0	12	10	737.5	5095	23.25	23.19
		2A-13A	2	20	1880	18900	QPSK	1	0	13	10	751	5230	23.27	23.19
		2A-29A	2	20	1880	18900	QPSK	1	0	29	10	722.5	9715	23.08	23.19
		4A-12A	4	20	1732.5	20175	QPSK	1	0	12	10	737.5	5095	23.21	23.20
		4A-13A	4	20	1732.5	20175	QPSK	1	0	13	10	751	5230	23.34	23.20
		4A-29A	4	20	1732.5	20175	QPSK	1	0	29	10	722.5	9715	23.26	23.20
Intra-Band	Non-Contiguous	2A-2A	2	20	1880	18900	QPSK	1	0	2	5	1932.5	625	23.08	23.19
		4A-4A	4	20	1732.5	20175	QPSK	1	0	4	5	2112.5	1975	23.16	23.20
		7A-7A	7	20	2535	21100	QPSK	1	0	7	5	2622.5	2775	21.77	21.83
		41A-41A	41	20	2506	39750	QPSK	1	0	41	5	2687.5	41565	21.69	21.84
	Contiguous	2C	2	20	1880	18900	QPSK	1	0	2	20	1979.8	1098	23.24	23.19
		7C	7	20	2535	21100	QPSK	1	0	7	20	2674.8	3298	21.79	21.83
		41C	41	20	2506	39750	QPSK	1	0	41	20	2525.8	39948	21.83	21.84

13. WiFi/Bluetooth Output Power (Unit: dBm)

<2.4GHz WLAN ANT 2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	14.98	15.00	100
		6	2437	14.77	15.00	
		11	2462	14.90	15.00	
		12	2467	14.82	15.00	
		13	2472	14.81	15.00	

<5GHz WLAN ANT2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11ac-VHT80 MCS0	58	5290	13.38	13.50	100
	802.11ac-VHT160 MCS0	50	5250	13.41	13.50	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11ac-VHT80 MCS0	106	5530	13.46	13.50	100
		122	5610	13.38	13.50	
		138	5690	13.41	13.50	
	802.11ac-VHT160 MCS0	114	5570	13.50	13.50	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11n-HT40 MCS0	151	5755	13.39	13.50	100
		159	5795	13.41	13.50	
	802.11ac-VHT80 MCS0	155	5775	13.43	13.50	100

<2.4GHz Bluetooth>

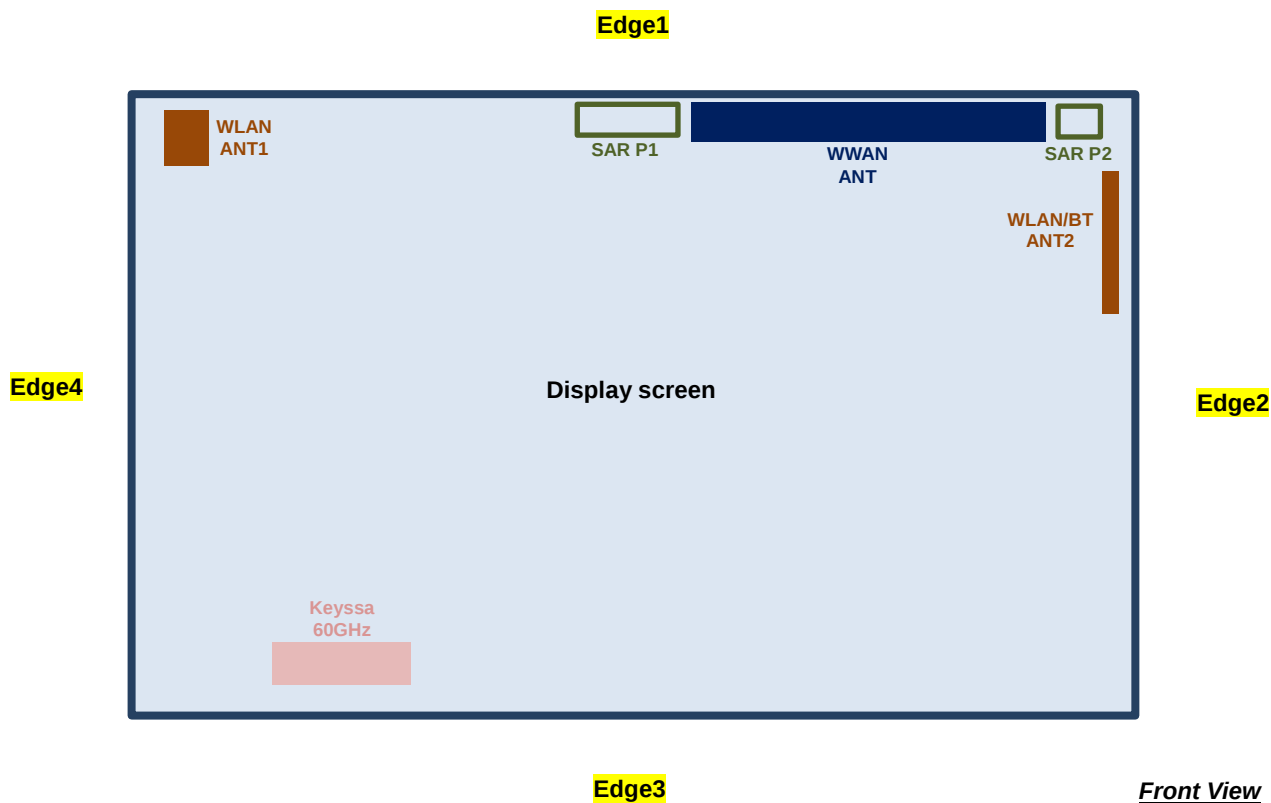
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	10.49		
	CH 39	2441	10.36		
	CH 78	2480	10.38		
Tune-up Limit			10.50		

General Note:

- For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 77.7% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

14. Antenna Location

<For Tablet>

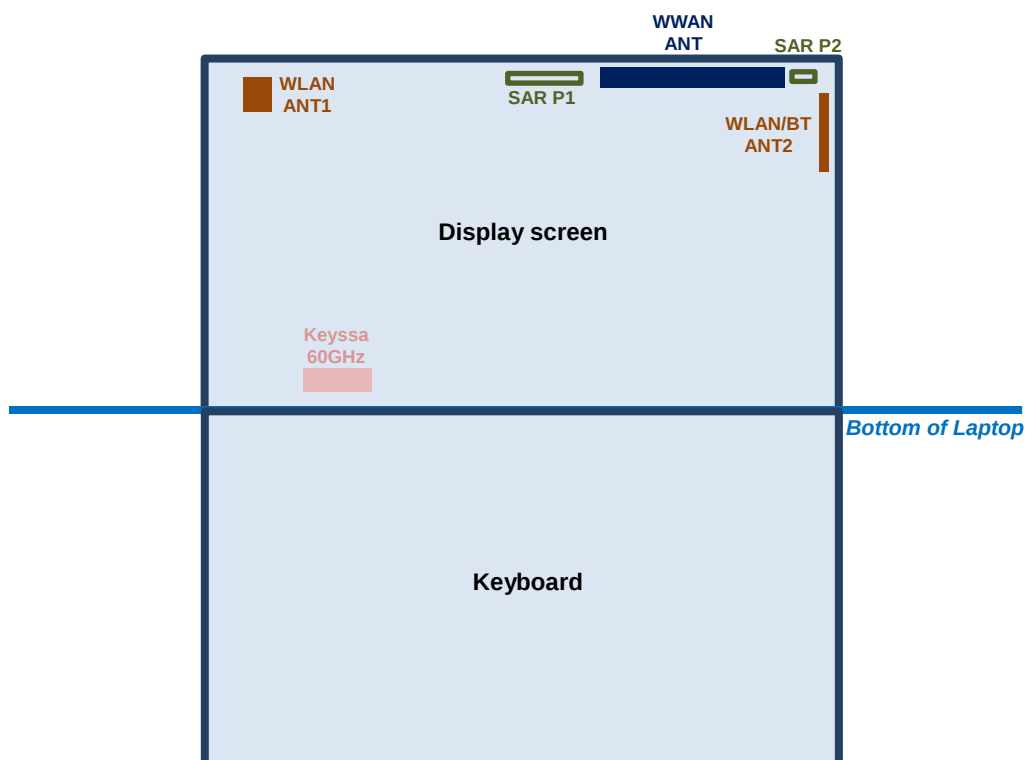


Front View

The separation distance for antenna to edge :

Antenna	To Edge1 (mm)	To Edge2 (mm)	To Edge3 (mm)	To Edge4 (mm)
WWAN Antenna	6.2	66	180	255

<For Laptop>



The separation distance for antenna to edge :

Antenna	To Bottom of Laptop (mm)
WWAN Antenna	255

<SAR test exclusion table>
General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR}$$
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
 - a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
 - b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 13	LTE Band 5	LTE Band 26	LTE Band 4	LTE Band 2	LTE Band 25	LTE Band 7	LTE Band 41
	Calculated Frequency	846MHz	1750MHz	1907MHz	715MHz	784MHz	848MHz	848MHz	1754MHz	1909MHz	1914MHz	2567MHz	2687MHz
	Maximum power (dBm)	24	24	24	24	24	24	24	24	24	24	23	23
	Maximum rated power(mW)	251.0	251.0	251.0	251.0	251.0	251.0	251.0	251.0	251.0	251.0	200.0	200.0
Bottom Face	Separation distance(mm)	5.0											
	exclusion threshold	46.2	66.4	69.3	42.5	44.5	46.2	46.2	66.5	69.4	69.5	64.1	65.6
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	6.2											
	exclusion threshold	37.2	53.6	55.9	34.2	35.9	37.3	37.3	53.6	55.9	56.0	51.7	52.9
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 2	Separation distance(mm)	60.0											
	exclusion threshold	219.0	213.0	209.0	225.0	222.0	219.0	219.0	213.0	209.0	208.0	194.0	192.0
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 3	Separation distance(mm)	180.0											
	exclusion threshold	896.0	1413.0	1409.0	797.0	849.0	898.0	898.0	1413.0	1409.0	1408.0	1394.0	1392.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No
Edge 4	Separation distance(mm)	255.0											
	exclusion threshold	1319.0	2163.0	2159.0	1155.0	1241.0	1322.0	1322.0	2163.0	2159.0	2158.0	2144.0	2142.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No

15. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in normal mode was performed; 16mm for bottom face, 12mm for edge1

UMTS Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 2/5 SAR test was covered by Band 25/26; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

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

15.1 Body SAR
<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	ON	9262	1852.4	17.82	18.50	1.169	0.04	1.090	1.275
	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	ON	9400	1880	17.80	18.50	1.175	-0.09	1.040	1.222
	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	ON	9538	1907.6	17.65	18.50	1.216	-0.09	0.983	1.196
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	ON	9262	1852.4	17.82	18.50	1.169	0.13	1.000	1.169
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	ON	9400	1880	17.80	18.50	1.175	0.14	1.010	1.187
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	ON	9538	1907.6	17.65	18.50	1.216	0.16	0.971	1.181
	WCDMA II	RMC 12.2Kbps	Bottom Face	16mm	OFF	9262	1852.4	23.53	24.00	1.114	-0.18	0.414	0.461
	WCDMA II	RMC 12.2Kbps	Edge 1	12mm	OFF	9262	1852.4	23.53	24.00	1.114	0.15	0.932	1.039
	WCDMA II	RMC 12.2Kbps	Edge 1	12mm	OFF	9400	1880	23.36	24.00	1.159	0.14	0.906	1.050
	WCDMA II	RMC 12.2Kbps	Edge 1	12mm	OFF	9538	1907.6	23.11	24.00	1.227	0.11	0.873	1.072
	WCDMA II	RMC 12.2Kbps	Edge 2	0mm	OFF	9262	1852.4	23.53	24.00	1.114	0.19	0.021	0.023
02	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	ON	1513	1752.6	18.49	19.00	1.125	-0.07	1.210	1.361
	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	ON	1312	1712.4	18.42	19.00	1.143	0.09	0.896	1.024
	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	ON	1413	1732.6	18.43	19.00	1.140	-0.08	1.040	1.186
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	ON	1513	1752.6	18.49	19.00	1.125	0.11	0.934	1.050
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	ON	1312	1712.4	18.42	19.00	1.143	0.11	0.851	0.973
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	ON	1413	1732.6	18.43	19.00	1.140	0.17	0.818	0.933
	WCDMA IV	RMC 12.2Kbps	Bottom Face	16mm	OFF	1513	1752.6	23.47	24.00	1.130	-0.13	0.405	0.458
	WCDMA IV	RMC 12.2Kbps	Edge 1	12mm	OFF	1513	1752.6	23.47	24.00	1.130	0.13	0.989	1.117
	WCDMA IV	RMC 12.2Kbps	Edge 1	12mm	OFF	1312	1712.4	23.37	24.00	1.156	0.12	0.904	1.045
	WCDMA IV	RMC 12.2Kbps	Edge 1	12mm	OFF	1413	1732.6	23.40	24.00	1.148	0.12	0.909	1.044
	WCDMA IV	RMC 12.2Kbps	Edge 2	0mm	OFF	1513	1752.6	23.47	24.00	1.130	-0.17	0.144	0.163
	WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	ON	4233	846.6	22.34	23.50	1.306	-0.11	0.855	1.117
03	WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	ON	4132	826.4	22.07	23.50	1.390	-0.05	0.936	1.301
	WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	ON	4182	836.4	22.23	23.50	1.340	-0.05	0.926	1.241
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	ON	4233	846.6	22.34	23.50	1.306	0.14	0.625	0.816
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	ON	4132	826.4	22.07	23.50	1.390	0.07	0.647	0.899
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	ON	4182	836.4	22.23	23.50	1.340	0.06	0.627	0.840
	WCDMA V	RMC 12.2Kbps	Bottom Face	16mm	OFF	4233	846.6	23.16	24.00	1.213	-0.1	0.254	0.308
	WCDMA V	RMC 12.2Kbps	Edge 1	12mm	OFF	4233	846.6	23.16	24.00	1.213	0.17	0.441	0.535
	WCDMA V	RMC 12.2Kbps	Edge 2	0mm	OFF	4233	846.6	23.16	24.00	1.213	-0.12	0.067	0.081
	WCDMA V	RMC 12.2Kbps	Edge 3	0mm	OFF	4233	846.6	23.16	24.00	1.213	0.01	0.001	0.001



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
04	LTE Band 4	20M	QPSK	1	0	Bottom Face	0mm	ON	20175	1732.5	18.89	20.00	1.291	-0.1	1.030	1.330
	LTE Band 4	20M	QPSK	50	0	Bottom Face	0mm	ON	20175	1732.5	18.85	20.00	1.303	-0.09	1.020	1.329
	LTE Band 4	20M	QPSK	100	0	Bottom Face	0mm	ON	20175	1732.5	18.77	20.00	1.327	-0.09	0.993	1.318
	LTE Band 4	20M	QPSK	1	0	Edge 1	0mm	ON	20175	1732.5	18.89	20.00	1.291	0.15	0.900	1.162
	LTE Band 4	20M	QPSK	50	0	Edge 1	0mm	ON	20175	1732.5	18.85	20.00	1.303	0.19	0.921	1.200
	LTE Band 4	20M	QPSK	100	0	Edge 1	0mm	ON	20175	1732.5	18.77	20.00	1.327	0.1	0.907	1.204
	LTE Band 4	20M	QPSK	1	0	Bottom Face	16mm	OFF	20175	1732.5	23.20	24.00	1.202	-0.11	0.334	0.402
	LTE Band 4	20M	QPSK	50	0	Bottom Face	16mm	OFF	20175	1732.5	22.25	23.00	1.189	-0.15	0.268	0.319
	LTE Band 4	20M	QPSK	1	0	Edge 1	12mm	OFF	20175	1732.5	23.20	24.00	1.202	0.19	0.859	1.033
	LTE Band 4	20M	QPSK	50	0	Edge 1	12mm	OFF	20175	1732.5	22.25	23.00	1.189	0.08	0.684	0.813
	LTE Band 4	20M	QPSK	100	0	Edge 1	12mm	OFF	20175	1732.5	22.18	23.00	1.208	0.09	0.691	0.835
	LTE Band 4	20M	QPSK	1	0	Edge 2	0mm	OFF	20175	1732.5	23.20	24.00	1.202	-0.19	0.141	0.170
	LTE Band 4	20M	QPSK	50	0	Edge 2	0mm	OFF	20175	1732.5	22.25	23.00	1.189	-0.13	0.111	0.132
	LTE Band 7	20M	QPSK	1	0	Bottom Face	0mm	ON	21100	2535	18.24	18.50	1.062	-0.03	0.553	0.587
	LTE Band 7	20M	QPSK	50	0	Bottom Face	0mm	ON	21100	2535	18.02	18.50	1.117	-0.06	0.557	0.622
	LTE Band 7	20M	QPSK	1	0	Edge 1	0mm	ON	21100	2535	18.24	18.50	1.062	0.06	1.110	1.178
	LTE Band 7	20M	QPSK	1	0	Edge 1	0mm	ON	20850	2510	18.22	18.50	1.067	0.02	0.995	1.061
05	LTE Band 7	20M	QPSK	1	0	Edge 1	0mm	ON	21350	2560	17.90	18.50	1.148	0.11	1.140	1.309
	LTE Band 7	20M	QPSK	50	0	Edge 1	0mm	ON	21100	2535	18.02	18.50	1.117	0.17	1.050	1.173
	LTE Band 7	20M	QPSK	50	0	Edge 1	0mm	ON	20850	2510	17.98	18.50	1.127	0.13	0.989	1.115
	LTE Band 7	20M	QPSK	50	0	Edge 1	0mm	ON	21350	2560	17.88	18.50	1.153	0.04	1.090	1.257
	LTE Band 7	20M	QPSK	100	0	Edge 1	0mm	ON	21100	2535	17.92	18.50	1.143	0.06	1.140	1.303
	LTE Band 7	20M	QPSK	1	0	Bottom Face	16mm	OFF	21100	2535	21.83	23.00	1.309	-0.12	0.066	0.086
	LTE Band 7	20M	QPSK	50	0	Bottom Face	16mm	OFF	21100	2535	20.78	22.00	1.324	-0.16	0.052	0.069
	LTE Band 7	20M	QPSK	1	0	Edge 1	12mm	OFF	21100	2535	21.83	23.00	1.309	0.06	0.219	0.287
	LTE Band 7	20M	QPSK	50	0	Edge 1	12mm	OFF	21100	2535	20.78	22.00	1.324	0.12	0.173	0.229
	LTE Band 7	20M	QPSK	1	0	Edge 2	0mm	OFF	21100	2535	21.83	23.00	1.309	0.08	0.033	0.043
	LTE Band 7	20M	QPSK	50	0	Edge 2	0mm	OFF	21100	2535	20.78	22.00	1.324	0.16	0.028	0.037
	LTE Band 12	10M	QPSK	1	0	Bottom Face	0mm	ON	23095	707.5	21.51	22.50	1.256	-0.07	1.010	1.269
	LTE Band 12	10M	QPSK	25	0	Bottom Face	0mm	ON	23095	707.5	21.33	22.50	1.309	-0.08	0.992	1.299
	LTE Band 12	10M	QPSK	50	0	Bottom Face	0mm	ON	23095	707.5	21.28	22.50	1.324	-0.08	1.010	1.338
06	LTE Band 12	10M	QPSK	1	0	Edge 1	0mm	ON	23095	707.5	21.51	22.50	1.256	0.12	1.070	1.344
	LTE Band 12	10M	QPSK	25	0	Edge 1	0mm	ON	23095	707.5	21.33	22.50	1.309	0.19	1.010	1.322
	LTE Band 12	10M	QPSK	50	0	Edge 1	0mm	ON	23095	707.5	21.28	22.50	1.324	0.19	0.994	1.316
	LTE Band 12	10M	QPSK	1	0	Bottom Face	16mm	OFF	23095	707.5	23.33	24.00	1.167	-0.14	0.174	0.203
	LTE Band 12	10M	QPSK	25	0	Bottom Face	16mm	OFF	23095	707.5	22.15	23.00	1.216	-0.12	0.134	0.163
	LTE Band 12	10M	QPSK	1	0	Edge 1	12mm	OFF	23095	707.5	23.33	24.00	1.167	0.16	0.256	0.299
	LTE Band 12	10M	QPSK	25	0	Edge 1	12mm	OFF	23095	707.5	22.15	23.00	1.216	-0.03	0.196	0.238
	LTE Band 12	10M	QPSK	1	0	Edge 2	0mm	OFF	23095	707.5	23.33	24.00	1.167	-0.1	0.073	0.085
	LTE Band 12	10M	QPSK	25	0	Edge 2	0mm	OFF	23095	707.5	22.15	23.00	1.216	-0.16	0.059	0.072
	LTE Band 12	10M	QPSK	1	0	Edge 3	0mm	OFF	23095	707.5	23.33	24.00	1.167	0.01	0.001	0.001
	LTE Band 12	10M	QPSK	25	0	Edge 3	0mm	OFF	23095	707.5	22.15	23.00	1.216	0.01	0.001	0.001



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
07	LTE Band 13	10M	QPSK	1	0	Bottom Face	0mm	ON	23230	782	21.64	22.50	1.219	-0.14	1.100	1.341
	LTE Band 13	10M	QPSK	25	0	Bottom Face	0mm	ON	23230	782	21.60	22.50	1.230	-0.06	1.070	1.316
	LTE Band 13	10M	QPSK	50	0	Bottom Face	0mm	ON	23230	782	21.53	22.50	1.250	-0.02	1.070	1.338
	LTE Band 13	10M	QPSK	1	0	Edge 1	0mm	ON	23230	782	21.64	22.50	1.219	0.11	0.614	0.748
	LTE Band 13	10M	QPSK	25	0	Edge 1	0mm	ON	23230	782	21.60	22.50	1.230	0.14	0.612	0.753
	LTE Band 13	10M	QPSK	1	0	Bottom Face	16mm	OFF	23230	782	23.32	24.00	1.169	-0.13	0.351	0.410
	LTE Band 13	10M	QPSK	25	0	Bottom Face	16mm	OFF	23230	782	22.17	23.00	1.211	-0.12	0.282	0.341
	LTE Band 13	10M	QPSK	1	0	Edge 1	12mm	OFF	23230	782	23.32	24.00	1.169	0.05	0.441	0.516
	LTE Band 13	10M	QPSK	25	0	Edge 1	12mm	OFF	23230	782	22.17	23.00	1.211	0.11	0.357	0.432
	LTE Band 13	10M	QPSK	1	0	Edge 2	0mm	OFF	23230	782	23.32	24.00	1.169	-0.12	0.088	0.103
	LTE Band 13	10M	QPSK	25	0	Edge 2	0mm	OFF	23230	782	22.17	23.00	1.211	-0.11	0.075	0.091
	LTE Band 13	10M	QPSK	1	0	Edge 3	0mm	OFF	23230	782	23.32	24.00	1.169	0.01	0.001	0.001
	LTE Band 13	10M	QPSK	25	0	Edge 3	0mm	OFF	23230	782	22.17	23.00	1.211	0.01	0.001	0.001
08	LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	ON	26590	1905	18.08	19.00	1.236	-0.05	0.969	1.198
	LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	ON	26140	1860	17.98	19.00	1.265	-0.03	1.070	1.353
	LTE Band 25	20M	QPSK	1	0	Bottom Face	0mm	ON	26340	1880	17.94	19.00	1.276	-0.11	1.020	1.302
	LTE Band 25	20M	QPSK	50	0	Bottom Face	0mm	ON	26590	1905	17.93	19.00	1.279	-0.09	0.973	1.245
	LTE Band 25	20M	QPSK	50	0	Bottom Face	0mm	ON	26140	1860	17.86	19.00	1.300	0	1.040	1.352
	LTE Band 25	20M	QPSK	50	0	Bottom Face	0mm	ON	26340	1880	17.84	19.00	1.306	-0.08	1.000	1.306
	LTE Band 25	20M	QPSK	100	0	Bottom Face	0mm	ON	26590	1905	17.79	19.00	1.321	0	0.967	1.278
	LTE Band 25	20M	QPSK	1	0	Edge 1	0mm	ON	26590	1905	18.08	19.00	1.236	0.16	0.920	1.137
	LTE Band 25	20M	QPSK	1	0	Edge 1	0mm	ON	26140	1860	17.98	19.00	1.265	0.12	0.896	1.133
	LTE Band 25	20M	QPSK	1	0	Edge 1	0mm	ON	26340	1880	17.94	19.00	1.276	0.18	0.910	1.162
	LTE Band 25	20M	QPSK	50	0	Edge 1	0mm	ON	26590	1905	17.93	19.00	1.279	0.14	0.915	1.171
	LTE Band 25	20M	QPSK	50	0	Edge 1	0mm	ON	26140	1860	17.86	19.00	1.300	0.17	0.871	1.132
	LTE Band 25	20M	QPSK	50	0	Edge 1	0mm	ON	26340	1880	17.84	19.00	1.306	0.11	0.895	1.169
	LTE Band 25	20M	QPSK	100	0	Edge 1	0mm	ON	26590	1905	17.79	19.00	1.321	0.13	0.913	1.206
	LTE Band 25	20M	QPSK	1	0	Bottom Face	16mm	OFF	26590	1905	23.17	24.00	1.211	-0.15	0.274	0.332
	LTE Band 25	20M	QPSK	50	0	Bottom Face	16mm	OFF	26590	1905	22.30	23.00	1.175	-0.1	0.219	0.257
	LTE Band 25	20M	QPSK	1	0	Edge 1	12mm	OFF	26590	1905	23.17	24.00	1.211	-0.03	0.820	0.993
	LTE Band 25	20M	QPSK	1	0	Edge 1	12mm	OFF	26140	1860	23.10	24.00	1.230	0.1	0.850	1.046
	LTE Band 25	20M	QPSK	1	0	Edge 1	12mm	OFF	26340	1880	23.16	24.00	1.213	0.03	0.831	1.008
	LTE Band 25	20M	QPSK	50	0	Edge 1	12mm	OFF	26590	1905	22.30	23.00	1.175	0.08	0.664	0.780
	LTE Band 25	20M	QPSK	100	0	Edge 1	12mm	OFF	26590	1905	22.28	23.00	1.180	0.06	0.676	0.798
	LTE Band 25	20M	QPSK	1	0	Edge 2	0mm	OFF	26590	1905	23.17	24.00	1.211	-0.17	0.022	0.027
	LTE Band 25	20M	QPSK	50	0	Edge 2	0mm	OFF	26590	1905	22.30	23.00	1.175	-0.17	0.017	0.020
09	LTE Band 26	15M	QPSK	1	0	Bottom Face	0mm	ON	26865	831.5	22.41	23.50	1.285	-0.16	0.982	1.262
	LTE Band 26	15M	QPSK	36	0	Bottom Face	0mm	ON	26865	831.5	21.40	23.00	1.445	-0.12	0.848	1.226
	LTE Band 26	15M	QPSK	75	0	Bottom Face	0mm	ON	26865	831.5	21.38	23.00	1.452	-0.14	0.815	1.183
	LTE Band 26	15M	QPSK	1	0	Edge 1	0mm	ON	26865	831.5	22.41	23.50	1.285	0.14	0.591	0.760
	LTE Band 26	15M	QPSK	36	0	Edge 1	0mm	ON	26865	831.5	21.40	23.00	1.445	0.1	0.579	0.837
	LTE Band 26	15M	QPSK	75	0	Edge 1	0mm	ON	26865	831.5	21.38	23.00	1.452	0.18	0.545	0.791
	LTE Band 26	10M	QPSK	1	0	Bottom Face	16mm	OFF	26865	831.5	22.49	24.00	1.416	-0.12	0.278	0.394
	LTE Band 26	10M	QPSK	36	0	Bottom Face	16mm	OFF	26865	831.5	21.47	23.00	1.422	-0.11	0.211	0.300
	LTE Band 26	15M	QPSK	1	0	Edge 1	12mm	OFF	26865	831.5	22.49	24.00	1.416	0.14	0.510	0.722
	LTE Band 26	15M	QPSK	36	0	Edge 1	12mm	OFF	26865	831.5	21.47	23.00	1.422	0.18	0.401	0.570
	LTE Band 26	15M	QPSK	1	0	Edge 2	0mm	OFF	26865	831.5	22.49	24.00	1.416	-0.15	0.066	0.093
	LTE Band 26	15M	QPSK	36	0	Edge 2	0mm	OFF	26865	831.5	21.47	23.00	1.422	-0.11	0.050	0.071



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	ON	39750	2506	20.79	21.00	1.050	62.9	1.006	-0.11	0.490	0.517
	LTE Band 41	20M	QPSK	50	0	Bottom Face	0mm	ON	39750	2506	20.63	21.00	1.089	62.9	1.006	-0.05	0.497	0.544
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	ON	39750	2506	20.79	21.00	1.050	62.9	1.006	0.17	0.847	0.894
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	ON	40185	2549.5	20.60	21.00	1.096	62.9	1.006	0.14	0.927	1.023
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	ON	40620	2593	20.72	21.00	1.067	62.9	1.006	0.19	1.270	1.363
10	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	ON	41055	2636.5	20.73	21.00	1.064	62.9	1.006	0.13	1.280	1.370
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	ON	41490	2680	20.77	21.00	1.054	62.9	1.006	0.14	1.040	1.103
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	ON	39750	2506	20.63	21.00	1.089	62.9	1.006	0.18	0.897	0.983
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	ON	40185	2549.5	20.41	21.00	1.146	62.9	1.006	0.1	1.010	1.164
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	ON	40620	2593	20.57	21.00	1.104	62.9	1.006	0.18	1.060	1.177
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	ON	41055	2636.5	20.43	21.00	1.140	62.9	1.006	0.16	1.100	1.262
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	ON	41490	2680	20.57	21.00	1.104	62.9	1.006	0.17	1.130	1.255
	LTE Band 41	20M	QPSK	100	0	Edge 1	0mm	ON	39750	2506	20.55	21.00	1.109	62.9	1.006	0.16	0.913	1.019
	LTE Band 41	20M	QPSK	1	0	Bottom Face	16mm	OFF	39750	2506	21.84	23.00	1.306	62.9	1.006	-0.16	0.036	0.047
	LTE Band 41	20M	QPSK	50	0	Bottom Face	16mm	OFF	39750	2506	20.91	22.00	1.285	62.9	1.006	-0.14	0.029	0.037
	LTE Band 41	20M	QPSK	1	0	Edge 1	12mm	OFF	39750	2506	21.84	23.00	1.306	62.9	1.006	0.11	0.130	0.171
	LTE Band 41	20M	QPSK	50	0	Edge 1	12mm	OFF	39750	2506	20.91	22.00	1.285	62.9	1.006	0.14	0.105	0.136
	LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	OFF	39750	2506	21.84	23.00	1.306	62.9	1.006	-0.02	0.033	0.043
	LTE Band 41	20M	QPSK	50	0	Edge 2	0mm	OFF	39750	2506	20.91	22.00	1.285	62.9	1.006	-0.03	0.028	0.036

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
11	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 2	1	2412	14.98	15.00	1.005	100	1.000	-0.08	0.363	0.365
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 2	6	2437	14.77	15.00	1.054	100	1.000	0.06	0.343	0.362
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 2	11	2462	14.90	15.00	1.023	100	1.000	-0.05	0.321	0.328
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 2	12	2467	14.82	15.00	1.042	100	1.000	0.01	0.329	0.343
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 2	13	2472	14.81	15.00	1.045	100	1.000	0.16	0.337	0.352
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0mm	Ant 2	1	2412	14.98	15.00	1.005	100	1.000	-0.02	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Edge 2	0mm	Ant 2	1	2412	14.98	15.00	1.005	100	1.000	0.03	0.352	0.354
	WLAN2.4GHz	802.11b 1Mbps	Edge 3	0mm	Ant 2	1	2412	14.98	15.00	1.005	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT160 MCS0	Bottom Face	0mm	Ant 2	50	5250	13.41	13.50	1.021	100	1.000	0.06	0.619	0.632
	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 1	0mm	Ant 2	50	5250	13.41	13.50	1.021	100	1.000	0	0.001	0.001
12	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	50	5250	13.41	13.50	1.021	100	1.000	0.04	1.140	1.164
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 2	0mm	Ant 2	58	5290	13.38	13.50	1.028	100	1.000	0.09	1.090	1.121
	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 3	0mm	Ant 2	50	5250	13.41	13.50	1.021	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT160 MCS0	Bottom Face	0mm	Ant 2	114	5570	13.50	13.50	1.000	100	1.000	-0.09	0.445	0.445
	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 1	0mm	Ant 2	114	5570	13.50	13.50	1.000	100	1.000	0	0.001	0.001
13	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	114	5570	13.50	13.50	1.000	100	1.000	0.1	1.130	1.130
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 2	0mm	Ant 2	106	5530	13.46	13.50	1.009	100	1.000	0.15	1.030	1.040
	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 3	0mm	Ant 2	114	5570	13.50	13.50	1.000	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 2	155	5775	13.43	13.50	1.016	100	1.000	-0.06	0.625	0.635
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 2	155	5775	13.43	13.50	1.016	100	1.000	0	0.001	0.001
14	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 2	0mm	Ant 2	155	5775	13.43	13.50	1.016	100	1.000	0.15	1.120	1.138
	WLAN5GHz	802.11n-HT40 MCS0	Edge 2	0mm	Ant 2	159	5795	13.41	13.50	1.021	100	1.000	-0.08	1.010	1.031
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 3	0mm	Ant 2	155	5775	13.43	13.50	1.016	100	1.000	0	0.001	0.001

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
15	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	00	2402	10.49	10.50	1.002	77.7	1.072	-0.02	0.119	0.128
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	39	2441	10.36	10.50	1.033	77.7	1.072	0.06	0.095	0.105
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	78	2480	10.38	10.50	1.028	77.7	1.072	-0.04	0.104	0.115
	Bluetooth	1Mbps	Edge 1	0mm	Ant 2	00	2402	10.49	10.50	1.002	77.7	1.072	0.11	0.001	0.001
	Bluetooth	1Mbps	Edge 2	0mm	Ant 2	00	2402	10.49	10.50	1.002	77.7	1.072	0.03	0.096	0.103
	Bluetooth	1Mbps	Edge 3	0mm	Ant 2	00	2402	10.49	10.50	1.002	77.7	1.072	0	0.001	0.001

15.2 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	-	ON	9262	1852.4	17.82	18.50	1.169		1.000	0.04	1.090	-	1.275
2nd	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	-	ON	9262	1852.4	17.82	18.50	1.169		1.000	-0.09	1.010	1.08	1.181
1st	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	-	ON	1513	1752.6	18.49	19.00	1.125		1.000	-0.07	1.210	-	1.361
2nd	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	-	ON	1513	1752.6	18.49	19.00	1.125		1.000	-0.08	1.140	1.06	1.282
1st	LTE Band 13	10M_QPSK_1_0	Bottom Face	0mm	-	ON	23230	782	21.64	22.50	1.219		1.000	-0.14	1.100	-	1.341
2nd	LTE Band 13	10M_QPSK_1_0	Bottom Face	0mm	-	ON	23230	782	21.64	22.50	1.219		1.000	-0.07	1.020	1.08	1.243
1st	LTE Band 26	15M_QPSK_1_0	Bottom Face	0mm	-	ON	26865	831.5	22.41	23.50	1.285		1.000	-0.16	0.982	-	1.262
2nd	LTE Band 26	15M_QPSK_1_0	Bottom Face	0mm	-	ON	26865	831.5	22.41	23.50	1.285		1.000	-0.02	0.939	1.05	1.207
1st	LTE Band 41	20M_QPSK_1_0	Edge 1	0mm	-	ON	41055	2636.5	20.73	21.00	1.064	62.9	1.006	0.13	1.280	-	1.370
2nd	LTE Band 41	20M_QPSK_1_0	Edge 1	0mm	-	ON	41055	2636.5	20.73	21.00	1.064	62.9	1.006	0.18	1.190	1.08	1.274
1st	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	-	50	5250	13.41	13.50	1.021	100	1.000	0.04	1.140	-	1.164
2nd	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	-	50	5250	13.41	13.50	1.021	100	1.000	0.16	1.080	1.06	1.103
1st	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	-	114	5570	13.50	13.50	1.000	100	1.000	0.1	1.130	-	1.130
2nd	WLAN5GHz	802.11ac-VHT160 MCS0	Edge 2	0mm	Ant 2	-	114	5570	13.50	13.50	1.000	100	1.000	0.15	1.120	1.01	1.120
1st	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 2	0mm	Ant 2	-	155	5775	13.43	13.50	1.016	100	1.000	0.15	1.120	-	1.138
2nd	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 2	0mm	Ant 2	-	155	5775	13.43	13.50	1.016	100	1.000	0.04	1.050	1.07	1.067

General Note:

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

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + 2.4GHz WLAN ANT 1 + 2.4GHz WLAN ANT 2	Yes
2.	WWAN + 5GHz WLAN ANT 1 + 5GHz WLAN ANT 2	Yes
3.	WWAN + 2.4GHz WLAN ANT 1 + Bluetooth ANT 2	Yes
4.	WWAN + 5GHz WLAN ANT 1 + Bluetooth ANT 2	Yes
5.	WWAN + 5GHz WLAN ANT 1 + 5GHz WLAN ANT 2 + Bluetooth ANT 2	Yes

General Note:

1. The Intel AX201D2W WLAN/Bluetooth module is also integrated into this host, WLAN/Bluetooth power and WLAN SAR testing data, which can be referred to Intel Test Report, Report No.: 180717-03.TR10 (FCC ID: PD9AX201D2) and these results are used simultaneous transmission analysis.
2. 2.4GHz WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. All licensed modes share the same antenna part and cannot transmit simultaneously.
4. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
5. The Scaled SAR summation is calculated based on the same configuration and test position.
6. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
 - v) The SPLSR calculated results please refer to section 16.2.

**16.1 Body Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	4	5	6	1+2+3 Summed 1g SAR (W/kg)	1+2+6 Summed 1g SAR (W/kg)	1+4+5+6 Summed 1g SAR (W/kg)	1+2+3 SPLSR	1+2+3 Case No	1+2+6 SPLSR	1+2+6 Case No	1+4+5+6 SPLSR	1+4+5+6 Case No	
			WWAN	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2	Bluetooth Ant 2										
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)										
WCDMA	WCDMA II	Bottom Face at 16mm	0.461	0.420	0.365	0.360	0.635	0.128	1.246	1.009	1.584							
		Edge 1 at 12mm	1.072	0.090	0.001	0.380	0.001	0.001	1.163	1.163	1.454							
		Bottom Face at 0mm	1.275	0.420	0.365	0.360	0.635	0.128	2.060	1.823	2.398	0.03	Case 1	0.02	Case 2	0.04	Case 3	
		Edge 1 at 0mm	1.187	0.090	0.001	0.380	0.001	0.001	1.278	1.278	1.569							
		Edge 2 at 0mm	0.023	0.040	0.354	0.010	1.164	0.103	0.417	0.166	1.300							
	WCDMA IV	Bottom Face at 16mm	0.458	0.420	0.365	0.360	0.635	0.128	1.243	1.006	1.581							
		Edge 1 at 12mm	1.117	0.090	0.001	0.380	0.001	0.001	1.208	1.208	1.499							
		Bottom Face at 0mm	1.361	0.420	0.365	0.360	0.635	0.128	2.146	1.909	2.484	0.03	Case 4	0.02	Case 5	0.04	Case 6	
		Edge 1 at 0mm	1.050	0.090	0.001	0.380	0.001	0.001	1.141	1.141	1.432							
		Edge 2 at 0mm	0.163	0.040	0.354	0.010	1.164	0.103	0.557	0.306	1.440							
	WCDMA V	Bottom Face at 16mm	0.308	0.420	0.365	0.360	0.635	0.128	1.093	0.856	1.431							
		Edge 1 at 12mm	0.535	0.090	0.001	0.380	0.001	0.001	0.626	0.626	0.917							
		Bottom Face at 0mm	1.301	0.420	0.365	0.360	0.635	0.128	2.086	1.849	2.424	0.02	Case 7	0.02	Case 8	0.03	Case 9	
		Edge 1 at 0mm	0.899	0.090	0.001	0.380	0.001	0.001	0.990	0.990	1.281							
		Edge 2 at 0mm	0.081	0.040	0.354	0.010	1.164	0.103	0.475	0.224	1.358							
LTE	LTE Band 4	Bottom Face at 16mm	0.402	0.420	0.365	0.360	0.635	0.128	1.187	0.950	1.525							
		Edge 1 at 12mm	1.033	0.090	0.001	0.380	0.001	0.001	1.124	1.124	1.415							
		Bottom Face at 0mm	1.330	0.420	0.365	0.360	0.635	0.128	2.115	1.878	2.453	0.03	Case 10	0.02	Case 11	0.04	Case 12	
		Edge 1 at 0mm	1.204	0.090	0.001	0.380	0.001	0.001	1.295	1.295	1.586							
		Edge 2 at 0mm	0.170	0.040	0.354	0.010	1.164	0.103	0.564	0.313	1.447							
	LTE Band 7	Bottom Face at 16mm	0.086	0.420	0.365	0.360	0.635	0.128	0.871	0.634	1.209							
		Edge 1 at 12mm	0.287	0.090	0.001	0.380	0.001	0.001	0.378	0.378	0.669							
		Bottom Face at 0mm	0.622	0.420	0.365	0.360	0.635	0.128	1.407	1.170	1.745					0.01	Case 13	
		Edge 1 at 0mm	1.309	0.090	0.001	0.380	0.001	0.001	1.400	1.400	1.691					0.04	Case 14	
		Edge 2 at 0mm	0.043	0.040	0.354	0.010	1.164	0.103	0.437	0.186	1.320							
	LTE Band 12	Bottom Face at 16mm	0.203	0.420	0.365	0.360	0.635	0.128	0.988	0.751	1.326							
		Edge 1 at 12mm	0.299	0.090	0.001	0.380	0.001	0.001	0.390	0.390	0.681							
		Bottom Face at 0mm	1.338	0.420	0.365	0.360	0.635	0.128	2.123	1.886	2.461	0.02	Case 15	0.02	Case 16	0.03	Case 17	
		Edge 1 at 0mm	1.344	0.090	0.001	0.380	0.001	0.001	1.435	1.435	1.726					0.04	Case 18	
		Edge 2 at 0mm	0.085	0.040	0.354	0.010	1.164	0.103	0.479	0.228	1.362							
	LTE Band 13	Edge 3 at 0mm	0.001	0.050	0.001	0.040	0.001	0.001	0.052	0.052	0.043							
		Bottom Face at 16mm	0.410	0.420	0.365	0.360	0.635	0.128	1.195	0.958	1.533							
		Edge 1 at 12mm	0.516	0.090	0.001	0.380	0.001	0.001	0.607	0.607	0.898							
		Bottom Face at 0mm	1.341	0.420	0.365	0.360	0.635	0.128	2.126	1.889	2.464	0.02	Case 19	0.02	Case 20	0.03	Case 21	
		Edge 1 at 0mm	0.753	0.090	0.001	0.380	0.001	0.001	0.844	0.844	1.135							
	LTE Band 25	Edge 2 at 0mm	0.103	0.040	0.354	0.010	1.164	0.103	0.497	0.246	1.380							
		Edge 3 at 0mm	0.001	0.050	0.001	0.040	0.001	0.001	0.052	0.052	0.043							
		Bottom Face at 16mm	0.332	0.420	0.365	0.360	0.635	0.128	1.117	0.880	1.455							
		Edge 1 at 12mm	1.046	0.090	0.001	0.380	0.001	0.001	1.137	1.137	1.428							
		Bottom Face at 0mm	1.353	0.420	0.365	0.360	0.635	0.128	2.138	1.901	2.476	0.03	Case 22	0.02	Case 23	0.04	Case 24	
	LTE Band 26	Edge 1 at 0mm	1.206	0.090	0.001	0.380	0.001	0.001	1.297	1.297	1.588							
		Edge 2 at 0mm	0.027	0.040	0.354	0.010	1.164	0.103	0.421	0.170	1.304							
		Bottom Face at 16mm	0.394	0.420	0.365	0.360	0.635	0.128	1.179	0.942	1.517							
		Edge 1 at 12mm	0.722	0.090	0.001	0.380	0.001	0.001	0.813	0.813	1.104							
		Bottom Face at 0mm	1.262	0.420	0.365	0.360	0.635	0.128	2.047	1.810	2.385	0.02	Case 25	0.02	Case 26	0.03	Case 27	
	LTE Band 26	Edge 1 at 0mm	0.840	0.090	0.001	0.380	0.001	0.001	0.931	0.931	1.222							
		Edge 2 at 0mm	0.093	0.040	0.354	0.010	1.164	0.103	0.487	0.236	1.370							
		Edge 3 at 0mm	0.001	0.050	0.001	0.040	0.001	0.001	0.052	0.052	0.043							



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	LTE Band 41	Bottom Face at 16mm	0.047	0.420	0.365	0.360	0.635	0.128	0.832	0.595	1.170						
		Edge 1 at 12mm	0.171	0.090	0.001	0.380	0.001	0.001	0.262	0.262	0.553						
		Bottom Face at 0mm	0.544	0.420	0.365	0.360	0.635	0.128	1.329	1.092	1.667					0.01	Case 28
		Edge 1 at 0mm	1.370	0.090	0.001	0.380	0.001	0.001	1.461	1.461	1.752					0.04	Case 29
		Edge 2 at 0mm	0.043	0.040	0.354	0.010	1.164	0.103	0.437	0.186	1.320						

16.2 SPLSR Evaluation and Analysis

General Note:

- According to section 14 antenna location, the minimum distance between each transmit antenna if used for SPLSR analysis, $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 1	WCDMA II	Bottom Face	1.275	0				155.0	1.70	0.01	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA II	Bottom Face	1.275	0	99.5	95.8	-0.99	74.0	1.64	0.03	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 2	WCDMA II	Bottom Face	1.275	0				155.0	1.70	0.01	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA II	Bottom Face	1.275	0	99.5	95.8	-0.99	75.3	1.40	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 3	WCDMA II	Bottom Face	1.275	0				155.0	1.64	0.01	Not required
	5G_Ant 1		0.36	0							
	WCDMA II	Bottom Face	1.275	0	99.5	95.8	-0.99	75.6	2.04	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 4	WCDMA IV	Bottom Face	1.361	0				155.0	1.78	0.02	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA IV	Bottom Face	1.361	0	99.5	95.9	-0.97	74.0	1.73	0.03	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 5	WCDMA IV	Bottom Face	1.361	0				155.0	1.78	0.02	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA IV	Bottom Face	1.361	0	99.5	95.9	-0.97	75.3	1.49	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 6	WCDMA IV	Bottom Face	1.361	0				155.0	1.72	0.01	Not required
	5G_Ant 1		0.36	0							
	WCDMA IV	Bottom Face	1.361	0	99.5	95.9	-0.97	75.5	2.12	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 7	WCDMA V	Bottom Face	1.301	0				155.0	1.72	0.01	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA V	Bottom Face	1.301	0	99.5	57	0.75	105.1	1.67	0.02	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 8	WCDMA V	Bottom Face	1.301	0				155.0	1.72	0.01	Not required
	2.4G_Ant 1		0.42	0							
	WCDMA V	Bottom Face	1.301	0	99.5	57	0.75	106.8	1.43	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 9	WCDMA V	Bottom Face	1.301	0				155.0	1.66	0.01	Not required
	5G_Ant 1		0.36	0							
	WCDMA V	Bottom Face	1.301	0	99.5	57	0.75	106.5	2.06	0.03	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 10	LTE B4	Bottom Face	1.33	0				155.0	1.75	0.01	Not required
	2.4G_Ant 1		0.42	0							
	LTE B4	Bottom Face	1.33	0	99.5	95.9	-0.29	74.0	1.70	0.03	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 11	LTE B4	Bottom Face	1.33	0				155.0	1.75	0.01	Not required
	2.4G_Ant 1		0.42	0							
	LTE B4	Bottom Face	1.33	0	99.5	95.9	-0.29	75.3	1.46	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

Case 12	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B4	Bottom Face	1.33	0				155.0	1.69	0.01	Not required
	5G_Ant 1		0.36	0							
	LTE B4	Bottom Face	1.33	0	99.5	95.9	-0.29	75.5	2.09	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

Case 13	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B7	Bottom Face	0.622	0				155.0	0.98	0.01	Not required
	5G_Ant 1		0.36	0							
	LTE B7	Bottom Face	0.622	0	99.6	41.8	0.87	119.9	1.39	0.01	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

Case 14	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B7	Edge 1	1.309	0				155.0	1.69	0.01	Not required
	5G_Ant 1		0.38	0							
	LTE B7	Edge 1	1.309	0				38.0	1.31	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.002	0							
	5G_Ant 1	Edge 1	0.38	0				282.0	0.38	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.002	0							

Case 15	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B12	Bottom Face	1.338	0				155.0	1.76	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B12	Bottom Face	1.338	0	99.5	63	-0.13	99.9	1.70	0.02	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

Case 16	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B12	Bottom Face	1.338	0				155.0	1.76	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B12	Bottom Face	1.338	0	99.5	63	-0.13	101.6	1.47	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

Case 17	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE B12	Bottom Face	1.338	0				155.0	1.70	0.01	Not required
	5G_Ant 1		0.36	0							
	LTE B12	Bottom Face	1.338	0	99.5	63	-0.13	101.3	2.10	0.03	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 18	LTE B12	Edge 1	1.344	0				155.0	1.72	0.01	Not required
	5G_Ant 1		0.38	0							
	LTE B12	Edge 1	1.344	0				38.0	1.35	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.002	0							
	5G_Ant 1	Edge 1	0.38	0				282.0	0.38	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.002	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 19	LTE B13	Bottom Face	1.341	0				155.0	1.76	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B13	Bottom Face	1.341	0	99.5	69.5	-0.17	94.4	1.71	0.02	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 20	LTE B13	Bottom Face	1.341	0				155.0	1.76	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B13	Bottom Face	1.341	0	99.5	69.5	-0.17	96.1	1.47	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 21	LTE B13	Bottom Face	1.341	0				155.0	1.70	0.01	Not required
	5G_Ant 1		0.36	0							
	LTE B13	Bottom Face	1.341	0	99.5	69.5	-0.17	95.9	2.10	0.03	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 22	LTE B25	Bottom Face	1.353	0				155.0	1.77	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B25	Bottom Face	1.353	0	99.5	95.9	-0.27	74.0	1.72	0.03	Not required
	2.4G_Ant 2		0.365	0	47	148	-0.14				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.79	0.00	Not required
	2.4G_Ant 2		0.365	0							

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 23	LTE B25	Bottom Face	1.353	0				155.0	1.77	0.02	Not required
	2.4G_Ant 1		0.42	0							
	LTE B25	Bottom Face	1.353	0	99.5	95.9	-0.27	75.3	1.48	0.02	Not required
	BT_Ant 2		0.128	0	47.4	150.2	0.19				
	2.4G_Ant 1	Bottom Face	0.42	0				282.0	0.55	0.00	Not required
	BT_Ant 2		0.128	0							

Case	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
24	LTE B25	Bottom Face	1.353	0				155.0	1.71	0.01	Not required
	5G_Ant 1		0.36	0							
	LTE B25	Bottom Face	1.353	0	99.5	95.9	-0.27	75.5	2.12	0.04	Not required
	5G_Ant 2 + BT Ant 2		0.763	0	46	149	3.16				
	5G_Ant 1	Bottom Face	0.36	0				282.0	1.12	0.00	Not required
	5G_Ant 2 + BT Ant 2		0.763	0							

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17. Uncertainty Assessment

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

18. References

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