

# FCC SAR TEST REPORT

**FCC ID** : QYLEM9190F  
**Equipment** : WWAN Module  
**Brand Name** : Getac  
**Model Name** : EM9190  
**Applicant** : Getac Technology Corporation.  
5F., Building A, No. 209, Sec.1, Nangang  
Rd.,Nangang Dist., Taipei City 115018, Taiwan, R.O.C.  
**Standard** : FCC 47 CFR Part 2 (2.1093)

The product was installed into Tablet PC (Brand Name Getac, Model Name: F110, F110G6, F110-Ex, F110-631, F110G7, F110-721, F110-Exc,F110Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, “-“, “\_” or blank for marketing purpose and no impact safety related critical components and constructions.) during test.

The product was received on Aug. 20, 2023 and testing was started from Aug. 31, 2023 and completed on Oct. 20, 2023. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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



Approved by: Cona Huang / Deputy Manager



**Sporton International Inc. EMC & Wireless Communications Laboratory**

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan



**Table of Contents**

**1. Statement of Compliance ..... 4**

**2. Guidance Applied..... 5**

**3. Equipment Under Test (EUT) Information ..... 6**

    3.1 General Information ..... 6

    3.2 General LTE SAR Test and Reporting Considerations ..... 8

    3.3 General 5G NR SAR Test and Reporting Considerations ..... 11

**4. Smart Transmit feature for RF Exposure compliance.....13**

**5. RF Exposure Limits.....15**

    5.1 Uncontrolled Environment.....15

    5.2 Controlled Environment.....15

**6. Specific Absorption Rate (SAR).....16**

    6.1 Introduction ..... 16

    6.2 SAR Definition..... 16

**7. System Description and Setup .....17**

    7.1 Test Site Location ..... 17

    7.2 E-Field Probe ..... 18

    7.3 Data Acquisition Electronics (DAE) ..... 18

    7.4 Phantom..... 19

    7.5 Device Holder..... 20

**8. Measurement Procedures .....21**

    8.1 Spatial Peak SAR Evaluation.....21

    8.2 Power Reference Measurement.....22

    8.3 Area Scan ..... 22

    8.4 Zoom Scan..... 23

    8.5 Volume Scan Procedures ..... 23

    8.6 Power Drift Monitoring..... 23

**9. Test Equipment List.....24**

**10. System Verification .....25**

    10.1 Tissue Verification.....25

    10.2 System Performance Check Results.....26

**11. UMTS/LTE Output Power (Unit: dBm) .....27**

**12. 5G NR Output Power (Unit: dBm) .....74**

**1. Antenna Location .....83**

**2. SAR Test Results .....85**

    2.1 Body SAR .....87

    2.2 Repeated SAR Measurement ..... 92

    2.3 LTE Band 41 Power Class 2 and Power Class 3 Linearity ..... 93

**3. Simultaneous Transmission Analysis.....94**

    3.1 5G NR + LTE + WLAN + BT Sim-Tx analysis ..... 95

    3.2 Body Exposure Conditions..... 95

    3.3 SPLSR Evaluation and Analysis ..... 96

**4. Uncertainty Assessment .....98**

**5. References.....98**

**Appendix A. Plots of System Performance Check**

**Appendix B. Plots of High SAR Measurement**

**Appendix C. DASYS Calibration Certificate**

**Appendix D. Test Setup Photos**



### History of this test report

Report No.	Version	Description	Issued Date
FA182625-12	01	Initial issue of report	Dec. 20, 2023



**1. Statement of Compliance**

The maximum results of Specific Absorption Rate (SAR) for **Getac Technology Corporation., WWAN Module, EM9190**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)
			Body (Separation 0mm)		
			1g SAR (W/kg)		
Licensed	WCDMA	WCDMA II	1.17		1.47
		WCDMA IV	1.18		
		WCDMA V	1.17		
	LTE	LTE Band 7	1.18		
		LTE Band 12/17	1.18		
		LTE Band 13	1.20		
		LTE Band 14	1.19		
		LTE Band 2/25	1.13		
		LTE Band 5/26	1.17		
		LTE Band 38/41	1.19		
		LTE Band 48	1.20		
		LTE Band 4/66	1.17		
		LTE Band 71	1.19		
	FR1	FR1 n2	1.18		
		FR1 n5	1.18		
		FR1 n48	1.17		
		FR1 n66	1.17		
		FR1 n71	1.17		
		FR1 n77	1.19		
	Date of Testing:			2023/8/31 ~ 2023/10/20	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation 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 for Partial-Body 1g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

**Reviewed by: Jason Wang**  
**Report Producer: Daisy Peng**



## **2. Guidance Applied**

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- 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	Getac
Model Name	EM9190
FCC ID	QYLEM9190F
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 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz (Rx only) LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM
Remark:	1. Base on original report No.:FA182625-01. Add two kinds of SKU C/D; the detail comparison as following table, RF exposure evaluation is selected SKU C for main test and SKU D will spot check from SKU C.



Host Information	
Equipment Name	Tablet PC
Brand Name	Getac
Model Name	F110, F110G6, F110-Ex, F110-631, F110G7, F110-721, F110-Exc, F110Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, "-", "_" or blank for marketing purpose and no impact safety related critical components and constructions.)
EUT Stage	Production Unit
Integrated WLAN Module	Brand Name: Intel Model Name: AX211NGW
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz~6525 MHz, 6525 MHz~6875 MHz, 6875 MHz~7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
<b>Remark:</b>	
1. The Intel AX211NGW WLAN/Bluetooth module is also integrated into this host, WLAN/Bluetooth power and WLAN SAR testing data, which can be referred to Sporton SAR Test Report, Report No.: FA381701-02(FCC ID: QYLAX211NG) and these results are used simultaneous transmission analysis.	

Sample List				
	SKU A	SKU B	SKU C	SKU D
CPU	i5-1135G7 (Non Vpro)	i7-1165G7 (Vpro)	i5-1335U	i7-1365U
DDR	Kingston DDR4-3200 32GB	Kingston DDR4-3200 32GB	Kingston 16GB	Kingston 32GB
SSD	512GB	1TB	512GB	1TB
PANEL	Full HD AUO	Full HD AUO	Full FHD AUO	Full FHD AUO
DIGITIZER	N/A	EMRright Digitizer	Support	Support
OPTION BAY	2D Barcode Reader	RS232 + LAN	Barcode Reader	LAN
Expansion Bay	Smart Card	Smart Card	HID RFID	SMART CARD
Right side option	NXP RFID(PN7462)	Finger Print	Not Support	Finger Print
WLAN/BT	Intel AX201	Intel AX201	Intel AX211	Intel AX211
WWAN(4G)	EM9190	EM9190	EM9190	EM9190
GPS/GNS	EM9190	EM9190	EM9190	EM9190
Rear 8M Camera	Support	Support	Support	Support
Webcam FHD	Not Support	Not Support	Not Support	Support
IR Webcam	Support	Support	Support	Support
USB3.2 Gen2 x 1 Type-A	Support	Support	Support	Support
Type-C (thunder bolt)	Support	Support	Support	Support
Audio/MIC	Support	Support	Support	Support
Fischer	Not Support	Not Support	Not Support	Not Support



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

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	QYLEM9190F																																																														
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 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz																																																														
Channel Bandwidth	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz																																																														
uplink modulations used	QPSK / 16QAM / 64QAM																																																														
LTE Voice / Data requirements	Data only																																																														
LTE MPR permanently built-in by design	<p align="center"><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (<math>N_{RB}</math>)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth ( $N_{RB}$ )						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
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.																																																														
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	This device supports maximum of 6 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.																																																														





Transmission (H, M, L) channel numbers and frequencies in each LTE band																
LTE Band 2																
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860				
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880				
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900				
LTE Band 4																
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720				
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5				
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745				
LTE Band 5																
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	20407	824.7	20415	825.5	20425	826.5	20450	829	20450	829	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5				
H	20643	848.3	20635	847.5	20625	846.5	20600	844	20600	844	20600	844				
LTE Band 7																
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510	20850	2510	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560	21350	2560	21350	2560				
LTE Band 12																
	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	23017	699.7	23025	700.5	23035	701.5	23060	704	23060	704	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	23130	711	23130	711				
LTE Band 13																
	Bandwidth 5 MHz				Bandwidth 10 MHz				Bandwidth 15 MHz				Bandwidth 20 MHz			
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23205		779.5		23230		782		23230		782		23230		782	
M	23230		782		23230		782		23230		782		23230		782	
H	23255		784.5		23230		782		23230		782		23230		782	
LTE Band 14																
	Bandwidth 5 MHz				Bandwidth 10 MHz				Bandwidth 15 MHz				Bandwidth 20 MHz			
	Channel #		Channel #		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23305		790.5		23330		793		23330		793		23330		793	
M	23330		793		23330		793		23330		793		23330		793	
H	23355		795.5		23330		793		23330		793		23330		793	
LTE Band 17																
	Bandwidth 5 MHz				Bandwidth 10 MHz				Bandwidth 15 MHz				Bandwidth 20 MHz			
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)		Channel #		Freq. (MHz)		Channel #		Freq. (MHz)	
L	23755		706.5		23780		709		23780		709		23780		709	
M	23790		710		23790		710		23790		710		23790		710	
H	23825		713.5		23800		711		23800		711		23800		711	
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)		
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5		
M	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		
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				
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)				
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				
LTE Band 48												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560				
L	55810	3607	55815	3607.5	55820	3608	55830	3609				
M	56170	3643	56165	3642.5	56160	3642	56150	3641				
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690				
LTE Band 66												
	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	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770
LTE Band 71												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	133147	665.5	133172	668	133197	670.5	133222	673				
M	133297	680.5	133297	680.5	133297	680.5	133297	680.5				
H	133447	695.5	133422	693	133397	690.5	133372	688				



**3.3 General 5G NR SAR Test and Reporting Considerations**

5G NR Information																
FCC ID	QYLEM9190F															
Equipment Name	WWAN Module															
Operating Frequency Range of each 5G NR transmission band	5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n48: 3550 MHz ~ 3700 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n71: 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz															
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n48: 10MHz, 20MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n77: 20MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz															
SCS	FDD: SCS15KHz, TDD: SCS30KHz															
uplink modulations used	DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM CP-OFDM QPSK / 16QAM / 64QAM / 256QAM															
A-MPR (Additional MPR) disabled for SAR Testing?	Yes															
LTE Anchor Bands for n2	LTE B5/12															
LTE Anchor Bands for n5	LTE B2/7/66															
LTE Anchor Bands for n66	LTE B5/12/13															
LTE Anchor Bands for n71	LTE B2/7/66															
NR Band 2																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860								
M	376000	1880	376000	1880	376000	1880	376000	1880								
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900								
NR Band 5																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	165300	826.5	165800	829	166300	831.5	166800	834								
M	167300	836.5	167300	836.5	167300	836.5	167300	836.5								
H	169300	846.5	168800	844	168300	841.5	167800	839								
NR Band 48																
	Bandwidth 10MHz		Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637000	3555	637334	3560.01	638000	3570	638334	3575.01	638668	3580.02	639334	3590.01	639668	3595.02	640000	3600
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99
H	646332	3694.98	646000	3690	645332	3679.98	645000	3675	644666	3669.99	644000	3660	643666	3654.99	643332	3649.98
NR Band 66																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720								
M	349000	1745	349000	1745	349000	1745	349000	1745								
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770								
NR Band 71																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	133100	665.5	133600	668	134100	670.5	134600	673								
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5								
H	139100	695.5	138600	693	138100	690.5	137600	688								



NR Band 77																
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647334	3710.01	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	664666	3969.99	664000	3960	663666	3954.99	663332	3949.98	663000	3945	662666	3939.99	662332	3934.98	662000	3930
NR Band 77(3450MHz ~ 3550MHz)																
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630668	3460.02	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495	633334	3500.01
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98
H	636000	3540	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99	633332	3499.98

### 4. Smart Transmit feature for RF Exposure compliance

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter to ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency ≤ 6GHz). To control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement.

This report describes the procedures for the SAR char generation, and the parameters obtained from SAR characterization (referred to as SAR char, respectively) will be used as input for Smart Transmit. SAR char will be entered via the Embedded File System (EFS) to enable the Smart Transmit Feature.

#### <Terminologies in this report>

P <sub>limit</sub>	The time-averaged RF power which corresponds to SAR <sub>design_target</sub> .
P <sub>max</sub>	Maximum target power level
SAR <sub>design_target</sub> :	The design target for SAR compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
SAR char	P <sub>limit</sub> for all the technologies/bands for all applicable DSI

#### <SAR Characterization>

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz.

#### <SAR design target and uncertainty>

Exposure conditions	SAR design target	W/kg
Bottom of Laptop	1g SAR design target	0.95

Item	Uncertainty dB (k=2)
Total uncertainty	1.0

To account for total uncertainty, SAR<sub>design\_target</sub> should be determined as:

$$SAR_{design\_target} < SAR_{regulatory\_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR\_design\_target, below the predefined time-averaged power limit, for each characterized technology and band.

Smart Transmit allows the device to transmit at higher power instantaneously, as high as P<sub>max</sub>, when needed, but enforces power limiting to maintain time-averaged transmit power to P<sub>limit</sub>. Below table shows P<sub>limit</sub> EFS settings and maximum tune up output power P<sub>max</sub> configured for this EUT for various transmit conditions (Device State Index DSI).

**<P<sub>limit</sub> for supported technologies and bands (P<sub>limit</sub> in EFS file)>**

Band	Antenna	Duty cycle	P limit (dBm) time-average power	P Max* (dBm) time-average power
WCDMA II	Main	100.00%	17.8	23.5
WCDMA IV	Main	100.00%	20.9	23.5
WCDMA V	Main	100.00%	20.1	23.5
LTE B7	Main	100.00%	21.8	23.0
LTE B12/B17	Main	100.00%	21.0	23.0
LTE B13	Main	100.00%	20.7	23.0
LTE B14	Main	100.00%	20.8	23.0
LTE B25/2	Main	100.00%	18.0	23.0
LTE B26/5	Main	100.00%	20.8	23.0
LTE B41/38(PC3)**	Main	63.30%	17.5	20.8
LTE B41 (PC2)**	Main	43.30%		20.7
LTE B48	Main	63.30%	16.0	21.0
LTE B66/4	Main	100.00%	21.1	23.0
LTE B71	Main	100.00%	21.8	23.0
n2	Main	100.00%	20.7	22.5
n5	Main	100.00%	21.4	22.5
n48	Main	100.00%	17.5	22.0
n66	Main	100.00%	21.1	22.5
n71	Main	100.00%	22.2	22.5
n77 PC3	Main	100.00%	14.7	22.0

\*P<sub>max</sub> is used for RF tune up procedure. The maximum allowed output power is equal to P<sub>max</sub> + 1dB uncertainty.

\*\*All P<sub>limit</sub> power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The max allowed output power is the P<sub>limit</sub> + 1dB device uncertainty, and if P<sub>limit</sub> is higher than P<sub>max</sub>, the device output power will be P<sub>max</sub> instead.



**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 ( $\rho$ ). The equation description is as below:

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

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

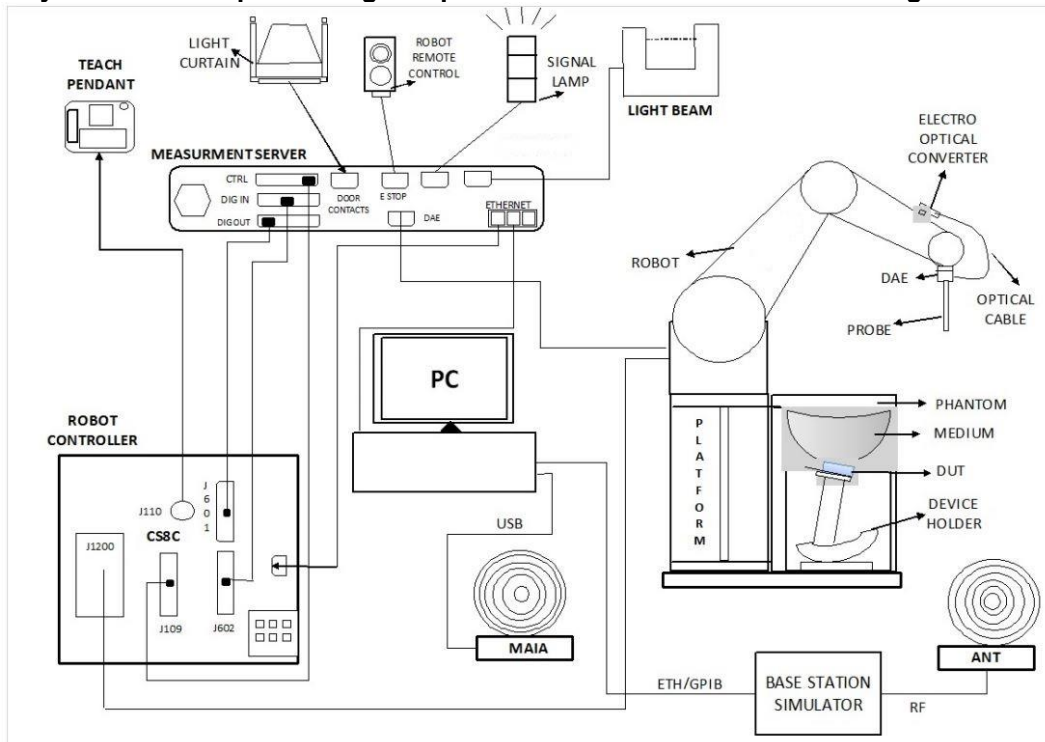
$$SAR = \frac{\sigma |E|^2}{\rho}$$

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



## 7. System Description and Setup

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



- The DASY system in SAR Configuration is shown above
- 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 windows software and the DASY 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 Test Site Location


The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	EMC & Wireless Communications Laboratory		Wensan Laboratory		
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan		
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY


**7.2 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>**

<b>Construction</b>	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	4 MHz – 4 GHz; Linearity: $\pm 0.2$ dB (30 MHz – 4 GHz)	
<b>Directivity</b>	$\pm 0.2$ dB in TSL (rotation around probe axis) $\pm 0.3$ dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	5 $\mu$ W/g – >100 mW/g; Linearity: $\pm 0.2$ dB	
<b>Dimensions</b>	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>**

<b>Construction</b>	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	4 MHz – >6 GHz Linearity: $\pm 0.2$ dB (30 MHz – 6 GHz)	
<b>Directivity</b>	$\pm 0.3$ dB in TSL (rotation around probe axis) $\pm 0.5$ dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 $\mu$ W/g – >100 mW/g Linearity: $\pm 0.2$ dB (noise: typically <1 $\mu$ W/g)	
<b>Dimensions</b>	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

**7.3 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**

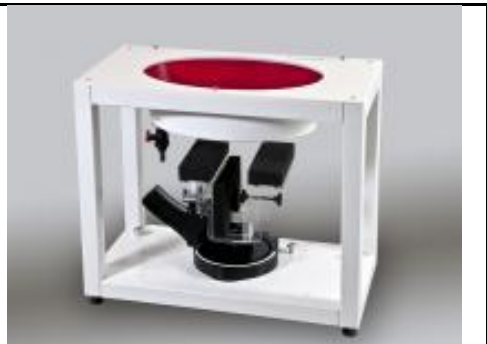
**7.4 Phantom**

**<SAM Twin Phantom>**

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

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

**<ELI Phantom>**

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

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

### **7.5 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:

- (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° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

**8.4 Zoom Scan**

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

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

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

**8.5 Volume Scan Procedures**

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

**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 <sup>(2)</sup>	D750V3	1012	Aug. 18, 2021	Aug. 15, 2024
SPEAG	835MHz System Validation Kit <sup>(2)</sup>	D835V2	499	Aug. 18, 2021	Aug. 15, 2024
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 21, 2022	Nov. 20, 2023
SPEAG	1900MHz System Validation Kit <sup>(2)</sup>	D1900V2	5d093	Mar. 25, 2022	Mar. 23, 2024
SPEAG	2600MHz System Validation Kit <sup>(2)</sup>	D2600V2	1078	Jun. 23, 2022	Jun. 21, 2024
SPEAG	3500MHz System Validation Kit <sup>(2)</sup>	D3500V2	1014	Jan. 17, 2022	Jan. 15, 2024
SPEAG	3700MHz System Validation Kit <sup>(2)</sup>	D3700V2	1006	Jun. 20, 2022	Jun. 18, 2024
SPEAG	3900MHz System Validation Kit <sup>(2)</sup>	D3900V2	1017	Apr. 22, 2022	Apr. 20, 2024
SPEAG	Data Acquisition Electronics	DAE4	853	Jul. 14, 2023	Jul. 13, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7306	Jul. 18, 2023	Jul. 17, 2024
RCPTWN	Thermometer	HTC-1	TM685-1	Mar. 21, 2023	Mar. 20, 2024
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 31, 2022	Oct. 30, 2023
Keysight	5G Wireless Test Platform	E7515B	MY59321826	Apr. 26, 2023	Apr. 25, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 27, 2023	Sep. 26, 2024
Keysight	ENA Network Analyzer	E5071C	MY46104758	Sep. 22, 2022	Sep. 21, 2023
Keysight	ENA Network Analyzer	E5071C	MY46316648	Sep. 07, 2023	Sep. 06, 2024
SPEAG	Dielectric Probe Kit	DAK-3.5	1146	Jul. 11, 2023	Jul. 10, 2024
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 09, 2023	Aug. 08, 2024
Anritsu	Power Meter	ML2495A	1419002	Aug. 17, 2023	Aug. 16, 2024
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2023	Aug. 17, 2024
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 10, 2023	Jul. 09, 2024
Mini-Circuits	Power Amplifier	ZHL-42W+	715701915	May. 19, 2023	May. 18, 2024
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	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. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.





10. System Verification

10.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18°C to 25°C, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.

The liquid tissue depth was at least 15cm in the phantom for all SAR testing

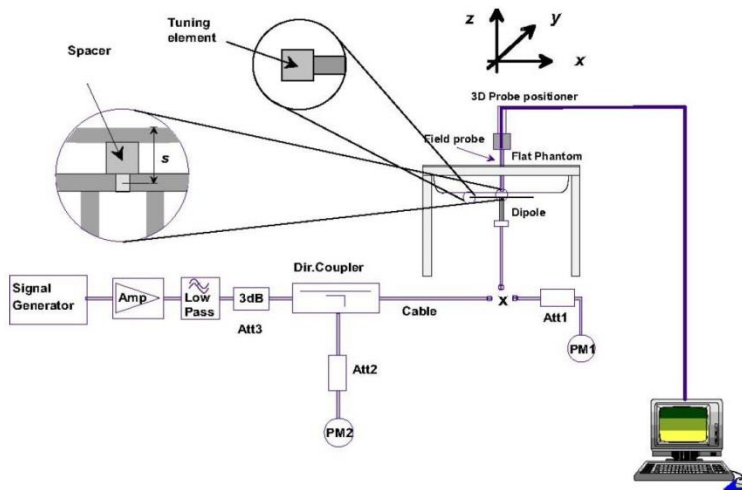
<Tissue Dielectric Parameter Check Results>

Table with 10 columns: Frequency (MHz), Liquid Temp. (°C), Conductivity (σ), Permittivity (εr), Conductivity Target (σ), Permittivity Target (εr), Delta (σ) (%), Delta (εr) (%), Limit (%), Date. It contains 18 rows of measurement data.

**10.2 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 (%)	Test Site
2023/10/1	750	50	D750V3-1012	EX3DV4 - SN7306	DAE4 Sn853	0.440	8.560	8.8	2.80	SAR05
2023/10/3	750	50	D750V3-1012	EX3DV4 - SN7306	DAE4 Sn853	0.445	8.560	8.9	3.97	SAR05
2023/10/1	835	50	D835V2-499	EX3DV4 - SN7306	DAE4 Sn853	0.503	9.680	10.06	3.93	SAR05
2023/9/30	1750	50	D1750V2-1068	EX3DV4 - SN7306	DAE4 Sn853	1.810	36.700	36.2	-1.36	SAR05
2023/10/4	1750	50	D1750V2-1068	EX3DV4 - SN7306	DAE4 Sn853	1.780	36.700	35.6	-3.00	SAR05
2023/9/30	1900	50	D1900V2-5d093	EX3DV4 - SN7306	DAE4 Sn853	1.880	39.900	37.6	-5.76	SAR05
2023/10/4	1900	50	D1900V2-5d093	EX3DV4 - SN7306	DAE4 Sn853	1.850	39.900	37	-7.27	SAR05
2023/10/2	2600	50	D2600V2-1078	EX3DV4 - SN7306	DAE4 Sn853	2.900	55.400	58	4.69	SAR05
2023/8/31	3500	50	D3500V2-1014	EX3DV4 - SN7306	DAE4 Sn853	3.290	67.200	65.8	-2.08	SAR05
2023/9/29	3500	100	D3500V2-1014	EX3DV4 - SN7306	DAE4 Sn853	6.260	67.200	62.6	-6.85	SAR05
2023/10/5	3500	100	D3500V2-1014	EX3DV4 - SN7306	DAE4 Sn853	6.470	67.200	64.7	-3.72	SAR05
2023/10/20	3500	100	D3500V2-1014	EX3DV4 - SN7306	DAE4 Sn853	6.360	67.200	63.6	-5.36	SAR05
2023/8/31	3700	50	D3700V2-1006	EX3DV4 - SN7306	DAE4 Sn853	3.390	65.600	67.8	3.35	SAR05
2023/10/5	3700	100	D3700V2-1006	EX3DV4 - SN7306	DAE4 Sn853	6.150	65.600	61.5	-6.25	SAR05
2023/9/29	3900	50	D3900V2-1017-3900	EX3DV4 - SN7306	DAE4 Sn853	3.160	68.700	63.2	-8.01	SAR05



**Fig 8.3.1 System Performance Check Setup**



**Fig 8.3.2 Setup Photo**

## **11. UMTS/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 ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each
  - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
  - iii. Set RMC 12.2Kbps + HSDPA mode.
  - iv. Set Cell Power = -86 dBm
  - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  - vi. Select HSDPA Uplink Parameters
  - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
  - viii. Set Ack-Nack Repetition Factor to 3
  - ix. Set CQI Feedback Cycle (k) to 4 ms
  - x. Set CQI Repetition Factor to 2
  - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

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

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

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

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

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15, \beta_{HS}/\beta_c = 24/15$ . For all other combinations of 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  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

### **Setup Configuration**

**HSUPA Setup Configuration:**

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

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

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

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

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

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

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

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

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

**Setup Configuration**

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

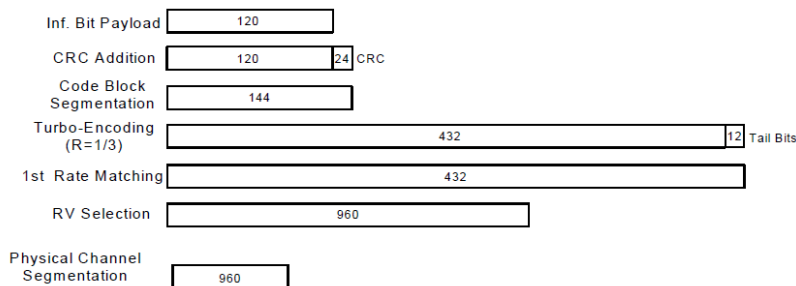
- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set RMC 12.2Kbps + HSDPA mode.
  - ii. Set Cell Power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

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

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

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

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



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

**Setup Configuration**



**<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  $\leq 1.2$  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.

<b>&lt;WCDMA&gt;</b>													
Band		WCDMA II_Ant 1			Tune-up Limit (dBm)	WCDMA IV_Ant 1			Tune-up Limit (dBm)	WCDMA V_Ant 1			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	17.82	17.92	18.80	20.86	20.90	20.92	21.90	20.42	20.40	20.33	21.10
3GPP Rel 6	HSDPA Subtest-1	17.85	17.83	17.79	18.80	19.65	19.88	19.96	20.90	19.44	19.41	19.45	20.10
3GPP Rel 6	HSDPA Subtest-2	17.84	17.87	17.81	18.80	19.84	20.00	20.02	20.90	19.33	19.48	19.48	20.10
3GPP Rel 6	HSDPA Subtest-3	17.89	17.82	17.88	18.80	19.33	19.59	19.58	20.40	18.96	18.90	18.98	19.60
3GPP Rel 6	HSDPA Subtest-4	17.84	17.80	17.83	18.80	19.38	19.58	19.34	20.40	19.00	18.89	18.93	19.60
3GPP Rel 8	DC-HSDPA Subtest-1	17.88	17.86	17.87	18.80	19.71	19.82	20.03	20.90	19.34	19.39	19.45	20.10
3GPP Rel 8	DC-HSDPA Subtest-2	17.79	17.88	17.85	18.80	19.85	19.94	19.99	20.90	19.40	19.41	19.33	20.10
3GPP Rel 8	DC-HSDPA Subtest-3	17.83	17.84	17.86	18.80	19.25	19.62	19.50	20.40	18.96	18.92	18.81	19.60
3GPP Rel 8	DC-HSDPA Subtest-4	17.83	17.85	17.66	18.80	19.11	19.42	19.32	20.40	18.94	18.95	18.86	19.60
3GPP Rel 6	HSUPA Subtest-1	17.84	17.86	17.83	18.80	19.62	19.98	19.91	20.90	19.34	19.47	19.48	20.10
3GPP Rel 6	HSUPA Subtest-2	17.85	17.82	17.81	18.80	17.75	17.89	18.08	18.90	17.19	17.29	17.29	18.10
3GPP Rel 6	HSUPA Subtest-3	17.85	17.87	17.79	18.80	18.69	18.92	18.71	19.90	18.35	18.27	18.36	19.10
3GPP Rel 6	HSUPA Subtest-4	17.83	17.79	17.69	18.80	17.55	17.93	17.85	18.90	17.17	17.31	17.20	18.10
3GPP Rel 6	HSUPA Subtest-5	17.88	17.86	17.80	18.80	19.63	19.72	20.01	20.90	19.36	19.33	19.24	20.10

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

1. A Base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B5/B12/B17/B26/B38/B71 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 2/4/5/17/38 SAR test was covered by Band 25/66/26/12/41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
  - a. the maximum output power, including tolerance, for the smaller band is  $\leq$  the larger band to qualify for the SAR test exclusion
  - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band



<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)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	19.50	19.60	19.44	20.4
20	QPSK	1	49	19.50	19.54	19.43	
20	QPSK	1	99	19.47	19.53	19.37	
20	QPSK	50	0	19.52	19.56	19.40	20.4
20	QPSK	50	24	19.43	19.53	19.37	
20	QPSK	50	50	19.51	19.54	19.37	
20	QPSK	100	0	19.44	19.55	19.43	
20	16QAM	1	0	19.43	19.55	19.41	20.4
20	16QAM	1	49	19.48	19.53	19.42	
20	16QAM	1	99	19.45	19.55	19.38	
20	16QAM	50	0	19.50	19.50	19.38	20.4
20	16QAM	50	24	19.42	19.55	19.43	
20	16QAM	50	50	19.44	19.53	19.44	
20	16QAM	100	0	19.48	19.47	19.46	
20	64QAM	1	0	19.46	19.49	19.43	20.4
20	64QAM	1	49	19.43	19.53	19.40	
20	64QAM	1	99	19.50	19.51	19.39	
20	64QAM	50	0	19.49	19.50	19.45	20.4
20	64QAM	50	24	19.42	19.51	19.39	
20	64QAM	50	50	19.45	19.50	19.37	
20	64QAM	100	0	19.52	19.54	19.46	
20	256QAM	1	0	18.13	18.09	18.14	19
20	256QAM	1	49	18.08	18.08	18.17	
20	256QAM	1	99	18.11	18.07	18.17	
20	256QAM	50	0	18.16	18.11	18.09	19
20	256QAM	50	24	18.17	18.17	18.12	
20	256QAM	50	50	18.13	18.10	18.17	
20	256QAM	100	0	18.07	18.14	18.16	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	19.31	19.46	19.26	20.4
15	QPSK	1	37	19.37	19.43	19.28	
15	QPSK	1	74	19.33	19.39	19.27	
15	QPSK	36	0	19.36	19.43	19.27	20.4
15	QPSK	36	20	19.28	19.37	19.18	
15	QPSK	36	39	19.35	19.39	19.25	
15	QPSK	75	0	19.28	19.38	19.23	20.4
15	16QAM	1	0	19.31	19.40	19.24	
15	16QAM	1	37	19.38	19.40	19.26	
15	16QAM	1	74	19.28	19.38	19.19	20.4
15	16QAM	36	0	19.36	19.35	19.28	
15	16QAM	36	20	19.23	19.42	19.32	
15	16QAM	36	39	19.30	19.42	19.24	
15	16QAM	75	0	19.35	19.31	19.35	20.4
15	64QAM	1	0	19.32	19.33	19.26	
15	64QAM	1	37	19.24	19.35	19.23	
15	64QAM	1	74	19.30	19.34	19.28	20.4
15	64QAM	36	0	19.32	19.31	19.27	
15	64QAM	36	20	19.29	19.35	19.26	
15	64QAM	36	39	19.34	19.34	19.20	
15	64QAM	75	0	19.37	19.44	19.31	19
15	256QAM	1	0	18.02	17.96	17.96	
15	256QAM	1	37	17.96	17.88	18.06	
15	256QAM	1	74	18.01	17.94	18.07	19
15	256QAM	36	0	18.05	17.95	17.97	





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	20	18.05	18.07	17.96	
15	256QAM	36	39	17.97	17.98	17.98	
15	256QAM	75	0	17.93	18.02	17.98	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	19.31	19.45	19.30	20.4
10	QPSK	1	25	19.40	19.42	19.23	
10	QPSK	1	49	19.28	19.34	19.27	
10	QPSK	25	0	19.37	19.46	19.28	20.4
10	QPSK	25	12	19.33	19.42	19.23	
10	QPSK	25	25	19.40	19.43	19.26	
10	QPSK	50	0	19.34	19.39	19.25	20.4
10	16QAM	1	0	19.33	19.37	19.22	
10	16QAM	1	25	19.29	19.36	19.30	
10	16QAM	1	49	19.25	19.41	19.27	20.4
10	16QAM	25	0	19.33	19.36	19.25	
10	16QAM	25	12	19.27	19.38	19.23	
10	16QAM	25	25	19.32	19.40	19.25	20.4
10	16QAM	50	0	19.28	19.28	19.30	
10	64QAM	1	0	19.28	19.31	19.27	
10	64QAM	1	25	19.24	19.43	19.23	20.4
10	64QAM	1	49	19.36	19.35	19.25	
10	64QAM	25	0	19.33	19.34	19.33	
10	64QAM	25	12	19.24	19.33	19.28	20.4
10	64QAM	25	25	19.29	19.40	19.25	
10	64QAM	50	0	19.33	19.43	19.29	
10	256QAM	1	0	17.98	17.93	18.01	19
10	256QAM	1	25	17.97	17.91	17.98	
10	256QAM	1	49	17.94	17.91	18.01	
10	256QAM	25	0	17.98	17.91	17.95	19
10	256QAM	25	12	18.04	18.07	17.93	
10	256QAM	25	25	17.95	17.94	17.98	
10	256QAM	50	0	17.96	18.01	18.00	
Channel				18625	18900	19175	
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	19.32	19.48	19.24	20.4
5	QPSK	1	12	19.40	19.40	19.28	
5	QPSK	1	24	19.36	19.33	19.22	
5	QPSK	12	0	19.41	19.39	19.23	20.4
5	QPSK	12	7	19.27	19.34	19.21	
5	QPSK	12	13	19.38	19.44	19.18	
5	QPSK	25	0	19.26	19.39	19.30	20.4
5	16QAM	1	0	19.27	19.40	19.29	
5	16QAM	1	12	19.37	19.34	19.31	
5	16QAM	1	24	19.35	19.43	19.22	20.4
5	16QAM	12	0	19.32	19.33	19.28	
5	16QAM	12	7	19.31	19.42	19.32	
5	16QAM	12	13	19.27	19.38	19.27	20.4
5	16QAM	25	0	19.30	19.32	19.29	
5	64QAM	1	0	19.29	19.38	19.33	
5	64QAM	1	12	19.27	19.34	19.27	20.4
5	64QAM	1	24	19.36	19.41	19.26	
5	64QAM	12	0	19.31	19.39	19.34	
5	64QAM	12	7	19.25	19.36	19.21	20.4
5	64QAM	12	13	19.31	19.34	19.26	
5	64QAM	25	0	19.35	19.36	19.29	
5	256QAM	1	0	18.01	17.92	18.04	19
5	256QAM	1	12	17.95	17.89	17.99	
5	256QAM	1	24	17.92	17.87	18.02	
5	256QAM	12	0	17.98	17.93	17.89	19
5	256QAM	12	7	18.05	17.97	18.00	
5	256QAM	12	13	17.98	17.91	18.02	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	25	0	17.87	18.00	18.06	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	19.40	19.49	19.26	20.4
3	QPSK	1	8	19.32	19.40	19.31	
3	QPSK	1	14	19.31	19.39	19.20	
3	QPSK	8	0	19.42	19.42	19.28	20.4
3	QPSK	8	4	19.29	19.40	19.23	
3	QPSK	8	7	19.38	19.42	19.17	
3	QPSK	15	0	19.27	19.41	19.28	
3	16QAM	1	0	19.27	19.42	19.28	
3	16QAM	1	8	19.28	19.42	19.32	20.4
3	16QAM	1	14	19.32	19.35	19.25	
3	16QAM	8	0	19.35	19.35	19.27	
3	16QAM	8	4	19.25	19.37	19.31	20.4
3	16QAM	8	7	19.24	19.33	19.27	
3	16QAM	15	0	19.34	19.33	19.33	
3	64QAM	1	0	19.28	19.36	19.26	
3	64QAM	1	8	19.31	19.38	19.26	
3	64QAM	1	14	19.34	19.36	19.27	20.4
3	64QAM	8	0	19.29	19.30	19.29	
3	64QAM	8	4	19.23	19.40	19.27	
3	64QAM	8	7	19.35	19.32	19.22	
3	64QAM	15	0	19.37	19.44	19.32	
3	256QAM	1	0	18.00	17.97	17.98	19
3	256QAM	1	8	17.96	17.95	18.01	
3	256QAM	1	14	17.98	17.90	17.98	
3	256QAM	8	0	18.04	17.93	17.98	19
3	256QAM	8	4	18.05	18.01	17.97	
3	256QAM	8	7	17.93	17.93	18.06	
3	256QAM	15	0	17.90	18.02	18.04	
Channel				18607	18900	19193	
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	19.39	19.42	19.34	20.4
1.4	QPSK	1	3	19.39	19.44	19.30	
1.4	QPSK	1	5	19.32	19.40	19.18	
1.4	QPSK	3	0	19.36	19.41	19.23	
1.4	QPSK	3	1	19.30	19.33	19.20	
1.4	QPSK	3	3	19.41	19.35	19.25	
1.4	QPSK	6	0	19.34	19.37	19.30	20.4
1.4	16QAM	1	0	19.29	19.39	19.28	20.4
1.4	16QAM	1	3	19.33	19.39	19.29	
1.4	16QAM	1	5	19.26	19.35	19.21	
1.4	16QAM	3	0	19.40	19.34	19.21	
1.4	16QAM	3	1	19.27	19.45	19.31	
1.4	16QAM	3	3	19.32	19.34	19.31	
1.4	16QAM	6	0	19.31	19.35	19.28	20.4
1.4	64QAM	1	0	19.36	19.32	19.33	20.4
1.4	64QAM	1	3	19.33	19.38	19.30	
1.4	64QAM	1	5	19.30	19.33	19.20	
1.4	64QAM	3	0	19.36	19.30	19.35	
1.4	64QAM	3	1	19.27	19.41	19.20	
1.4	64QAM	3	3	19.25	19.35	19.19	
1.4	64QAM	6	0	19.36	19.37	19.27	20.4
1.4	256QAM	1	0	17.93	17.92	17.95	19
1.4	256QAM	1	3	17.98	17.96	18.07	
1.4	256QAM	1	5	18.00	17.93	18.07	
1.4	256QAM	3	0	18.00	17.98	17.92	
1.4	256QAM	3	1	18.03	18.05	17.97	
1.4	256QAM	3	3	17.97	17.96	18.06	
1.4	256QAM	6	0	17.89	18.03	18.04	19



<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)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	21.30	21.39	21.51	22.6
20	QPSK	1	49	21.16	21.28	21.33	
20	QPSK	1	99	21.10	21.26	21.38	
20	QPSK	50	0	21.10	21.27	21.36	22.6
20	QPSK	50	24	21.16	21.27	21.41	
20	QPSK	50	50	21.12	21.21	21.41	
20	QPSK	100	0	21.13	21.19	21.32	22.6
20	16QAM	1	0	21.12	21.19	21.32	
20	16QAM	1	49	21.18	21.27	21.39	
20	16QAM	1	99	21.16	21.19	21.31	22
20	16QAM	50	0	21.25	21.39	21.26	
20	16QAM	50	24	20.98	21.22	21.07	
20	16QAM	50	50	20.77	20.87	20.83	22
20	16QAM	100	0	20.90	21.02	21.00	
20	64QAM	1	0	20.73	20.76	20.70	
20	64QAM	1	49	20.52	20.58	20.32	21
20	64QAM	1	99	20.56	20.55	20.49	
20	64QAM	50	0	19.96	20.04	19.95	
20	64QAM	50	24	20.11	20.19	20.00	19
20	64QAM	50	50	19.87	19.97	19.93	
20	64QAM	100	0	19.96	20.24	20.17	
20	256QAM	1	0	17.46	17.48	17.46	19
20	256QAM	1	49	17.45	17.61	17.56	
20	256QAM	1	99	17.59	17.43	17.46	
20	256QAM	50	0	17.54	17.50	17.57	19
20	256QAM	50	24	17.55	17.52	17.44	
20	256QAM	50	50	17.47	17.51	17.51	
20	256QAM	100	0	17.48	17.54	17.50	
Channel				20025	20175	20325	
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	21.11	21.24	21.31	22.6
15	QPSK	1	37	21.05	21.12	21.13	
15	QPSK	1	74	20.96	21.09	21.25	
15	QPSK	36	0	20.92	21.13	21.23	22.6
15	QPSK	36	20	20.98	21.12	21.28	
15	QPSK	36	39	20.93	21.01	21.30	
15	QPSK	75	0	20.98	20.99	21.16	22.6
15	16QAM	1	0	20.93	20.99	21.18	
15	16QAM	1	37	21.07	21.07	21.26	
15	16QAM	1	74	20.99	21.03	21.18	22
15	16QAM	36	0	21.08	21.19	21.13	
15	16QAM	36	20	20.86	21.09	20.88	
15	16QAM	36	39	20.65	20.68	20.65	22
15	16QAM	75	0	20.73	20.90	20.88	
15	64QAM	1	0	20.63	20.63	20.54	
15	64QAM	1	37	20.40	20.48	20.22	21
15	64QAM	1	74	20.46	20.40	20.34	
15	64QAM	36	0	19.79	19.88	19.82	
15	64QAM	36	20	19.98	20.03	19.89	19
15	64QAM	36	39	19.71	19.87	19.76	
15	64QAM	75	0	19.84	20.05	20.06	
15	256QAM	1	0	17.27	17.32	17.32	19
15	256QAM	1	37	17.30	17.49	17.38	
15	256QAM	1	74	17.49	17.27	17.26	
15	256QAM	36	0	17.34	17.31	17.39	19
15	256QAM	36	20	17.35	17.34	17.24	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	39	17.31	17.31	17.37	
15	256QAM	75	0	17.29	17.41	17.32	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	21.19	21.25	21.41	22.6
10	QPSK	1	25	21.00	21.09	21.16	
10	QPSK	1	49	20.97	21.11	21.20	
10	QPSK	25	0	20.91	21.14	21.21	22.6
10	QPSK	25	12	21.05	21.12	21.27	
10	QPSK	25	25	20.95	21.11	21.22	
10	QPSK	50	0	20.98	21.06	21.13	
10	16QAM	1	0	21.01	21.07	21.17	22.6
10	16QAM	1	25	21.07	21.13	21.25	
10	16QAM	1	49	20.97	21.09	21.18	
10	16QAM	25	0	21.11	21.20	21.16	22
10	16QAM	25	12	20.80	21.02	20.95	
10	16QAM	25	25	20.63	20.67	20.72	
10	16QAM	50	0	20.79	20.85	20.82	
10	64QAM	1	0	20.55	20.65	20.53	
10	64QAM	1	25	20.41	20.41	20.12	22
10	64QAM	1	49	20.38	20.40	20.32	
10	64QAM	25	0	19.86	19.85	19.83	
10	64QAM	25	12	19.94	20.07	19.87	21
10	64QAM	25	25	19.77	19.87	19.79	
10	64QAM	50	0	19.86	20.09	20.06	
10	256QAM	1	0	17.36	17.32	17.26	
10	256QAM	1	25	17.29	17.49	17.44	19
10	256QAM	1	49	17.39	17.25	17.27	
10	256QAM	25	0	17.37	17.37	17.39	
10	256QAM	25	12	17.43	17.32	17.27	19
10	256QAM	25	25	17.33	17.34	17.35	
10	256QAM	25	0	17.37	17.43	17.32	
Channel				19975	20175	20375	
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	21.11	21.26	21.33	22.6
5	QPSK	1	12	21.05	21.08	21.19	
5	QPSK	1	24	20.94	21.08	21.24	
5	QPSK	12	0	20.94	21.09	21.16	22.6
5	QPSK	12	7	20.97	21.12	21.25	
5	QPSK	12	13	20.92	21.11	21.24	
5	QPSK	25	0	20.96	20.99	21.15	
5	16QAM	1	0	21.01	21.05	21.17	22.6
5	16QAM	1	12	21.01	21.13	21.27	
5	16QAM	1	24	21.03	21.03	21.15	
5	16QAM	12	0	21.05	21.21	21.14	
5	16QAM	12	7	20.86	21.03	20.94	22
5	16QAM	12	13	20.61	20.67	20.65	
5	16QAM	25	0	20.70	20.92	20.88	
5	64QAM	1	0	20.53	20.63	20.58	
5	64QAM	1	12	20.35	20.40	20.22	22
5	64QAM	1	24	20.38	20.43	20.39	
5	64QAM	12	0	19.82	19.88	19.75	
5	64QAM	12	7	19.94	20.05	19.84	21
5	64QAM	12	13	19.77	19.83	19.79	
5	64QAM	25	0	19.84	20.07	19.99	
5	256QAM	1	0	17.29	17.29	17.28	
5	256QAM	1	12	17.30	17.43	17.41	19
5	256QAM	1	24	17.45	17.25	17.26	
5	256QAM	12	0	17.44	17.36	17.37	
5	256QAM	12	7	17.42	17.37	17.24	19
5	256QAM	12	13	17.34	17.40	17.31	
5	256QAM	25	0	17.35	17.39	17.32	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

Channel				19965	20175	20385	Tune-up limit (dBm)	
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	21.20	21.22	21.41	22.6	
3	QPSK	1	8	20.98	21.17	21.16		
3	QPSK	1	14	20.93	21.10	21.20		
3	QPSK	8	0	20.98	21.16	21.19	22.6	
3	QPSK	8	4	21.02	21.16	21.22		
3	QPSK	8	7	20.98	21.04	21.22		
3	QPSK	15	0	21.02	21.06	21.14	22.6	
3	16QAM	1	0	20.96	21.00	21.14		
3	16QAM	1	8	21.07	21.10	21.23		
3	16QAM	1	14	21.06	21.07	21.16	22	
3	16QAM	8	0	21.09	21.28	21.12		
3	16QAM	8	4	20.79	21.08	20.96		
3	16QAM	8	7	20.58	20.71	20.63	22	
3	16QAM	15	0	20.78	20.84	20.80		
3	64QAM	1	0	20.58	20.64	20.58		
3	64QAM	1	8	20.36	20.40	20.22	21	
3	64QAM	1	14	20.37	20.40	20.31		
3	64QAM	8	0	19.85	19.90	19.78		
3	64QAM	8	4	19.95	20.07	19.84	19	
3	64QAM	8	7	19.72	19.77	19.73		
3	64QAM	15	0	19.86	20.14	19.99		
3	256QAM	1	0	17.28	17.36	17.36	19	
3	256QAM	1	8	17.32	17.43	17.39		
3	256QAM	1	14	17.49	17.26	17.27		
3	256QAM	8	0	17.39	17.37	17.43	19	
3	256QAM	8	4	17.35	17.34	17.28		
3	256QAM	8	7	17.32	17.40	17.38		
3	256QAM	15	0	17.30	17.44	17.36	19	
Channel				19957	20175	20393		Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.13	21.28	21.33	22.6	
1.4	QPSK	1	3	20.97	21.08	21.14		
1.4	QPSK	1	5	20.90	21.13	21.20		
1.4	QPSK	3	0	21.00	21.17	21.18	22.6	
1.4	QPSK	3	1	20.96	21.14	21.28		
1.4	QPSK	3	3	20.92	21.11	21.28		
1.4	QPSK	6	0	20.95	21.00	21.19	22.6	
1.4	16QAM	1	0	20.99	21.03	21.12		
1.4	16QAM	1	3	21.08	21.17	21.24		
1.4	16QAM	1	5	21.00	20.99	21.18	22	
1.4	16QAM	3	0	21.09	21.27	21.10		
1.4	16QAM	3	1	20.85	21.12	20.87		
1.4	16QAM	3	3	20.64	20.75	20.66	22	
1.4	16QAM	6	0	20.72	20.82	20.84		
1.4	64QAM	1	0	20.55	20.59	20.51		
1.4	64QAM	1	3	20.36	20.41	20.14	22	
1.4	64QAM	1	5	20.36	20.35	20.36		
1.4	64QAM	3	0	20.36	20.40	20.34		
1.4	64QAM	3	1	20.42	20.40	20.35	21	
1.4	64QAM	3	3	20.45	20.41	20.33		
1.4	64QAM	6	0	19.86	19.91	19.78		
1.4	256QAM	1	0	17.34	17.36	17.36	19	
1.4	256QAM	1	3	17.33	17.49	17.44		
1.4	256QAM	1	5	17.45	17.33	17.34		
1.4	256QAM	3	0	17.38	17.36	17.39	19	
1.4	256QAM	3	1	17.45	17.33	17.24		
1.4	256QAM	3	3	17.32	17.33	17.34		
1.4	256QAM	6	0	17.28	17.40	17.32	19	



<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)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	20.35	20.41	20.21	22
10	QPSK	1	25	20.30	20.39	20.23	
10	QPSK	1	49	20.31	20.39	20.24	
10	QPSK	25	0	20.32	20.32	20.22	22
10	QPSK	25	12	20.37	20.33	20.21	
10	QPSK	25	25	20.29	20.29	20.27	
10	QPSK	50	0	20.34	20.35	20.26	
10	16QAM	1	0	20.33	20.35	20.20	22
10	16QAM	1	25	20.36	20.38	20.29	
10	16QAM	1	49	20.36	20.36	20.28	
10	16QAM	25	0	20.29	20.30	20.20	22
10	16QAM	25	12	20.32	20.32	20.28	
10	16QAM	25	25	20.39	20.29	20.28	
10	16QAM	50	0	20.29	20.32	20.30	
10	64QAM	1	0	20.39	20.34	20.26	22
10	64QAM	1	25	20.29	20.33	20.25	
10	64QAM	1	49	20.33	20.31	20.24	
10	64QAM	25	0	19.92	19.97	19.99	21
10	64QAM	25	12	19.96	19.90	19.90	
10	64QAM	25	25	19.93	19.96	20.00	
10	64QAM	50	0	19.99	19.91	20.00	
10	256QAM	1	0	17.52	17.55	17.59	19
10	256QAM	1	25	17.52	17.50	17.59	
10	256QAM	1	49	17.52	17.51	17.55	
10	256QAM	25	0	17.51	17.57	17.57	19
10	256QAM	25	12	17.55	17.50	17.51	
10	256QAM	25	25	17.54	17.57	17.56	
10	256QAM	50	0	17.51	17.53	17.58	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	20.22	20.29	20.10	22
5	QPSK	1	12	20.10	20.19	20.06	
5	QPSK	1	24	20.17	20.25	20.12	
5	QPSK	12	0	20.20	20.21	20.03	22
5	QPSK	12	7	20.21	20.17	20.11	
5	QPSK	12	13	20.14	20.19	20.08	
5	QPSK	25	0	20.16	20.24	20.12	
5	16QAM	1	0	20.22	20.21	20.06	22
5	16QAM	1	12	20.16	20.25	20.14	
5	16QAM	1	24	20.26	20.20	20.17	
5	16QAM	12	0	20.14	20.18	20.07	22
5	16QAM	12	7	20.12	20.14	20.14	
5	16QAM	12	13	20.25	20.12	20.16	
5	16QAM	25	0	20.19	20.17	20.15	
5	64QAM	1	0	20.26	20.18	20.09	22
5	64QAM	1	12	20.18	20.22	20.11	
5	64QAM	1	24	20.17	20.14	20.11	
5	64QAM	12	0	19.75	19.81	19.82	21
5	64QAM	12	7	19.83	19.73	19.76	
5	64QAM	12	13	19.82	19.76	19.83	
5	64QAM	25	0	19.82	19.76	19.87	
5	256QAM	1	0	17.36	17.40	17.43	19
5	256QAM	1	12	17.42	17.34	17.46	
5	256QAM	1	24	17.34	17.40	17.45	
5	256QAM	12	0	17.37	17.46	17.38	19



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	12	7	17.37	17.32	17.39		
5	256QAM	12	13	17.38	17.43	17.42		
5	256QAM	25	0	17.37	17.42	17.43		
Channel				20415	20525	20635	Tune-up limit (dBm)	
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	20.16	20.21	20.06	22	
3	QPSK	1	8	20.20	20.19	20.03		
3	QPSK	1	14	20.15	20.23	20.13		
3	QPSK	8	0	20.13	20.20	20.10	22	
3	QPSK	8	4	20.18	20.17	20.04		
3	QPSK	8	7	20.14	20.11	20.10		
3	QPSK	15	0	20.16	20.17	20.09	22	
3	16QAM	1	0	20.17	20.16	20.07		
3	16QAM	1	8	20.25	20.22	20.14		
3	16QAM	1	14	20.21	20.20	20.11	22	
3	16QAM	8	0	20.16	20.20	20.06		
3	16QAM	8	4	20.12	20.16	20.09		
3	16QAM	8	7	20.23	20.17	20.12	22	
3	16QAM	15	0	20.11	20.15	20.11		
3	64QAM	1	0	20.25	20.18	20.16		
3	64QAM	1	8	20.10	20.15	20.05	22	
3	64QAM	1	14	20.17	20.12	20.04		
3	64QAM	8	0	19.80	19.83	19.85		
3	64QAM	8	4	19.82	19.70	19.76	21	
3	64QAM	8	7	19.82	19.78	19.88		
3	64QAM	15	0	19.88	19.77	19.89		
3	256QAM	1	0	17.42	17.41	17.49	19	
3	256QAM	1	8	17.40	17.36	17.43		
3	256QAM	1	14	17.37	17.37	17.40		
3	256QAM	8	0	17.39	17.44	17.42	19	
3	256QAM	8	4	17.36	17.33	17.33		
3	256QAM	8	7	17.37	17.46	17.46		
3	256QAM	15	0	17.41	17.37	17.40	19	
Channel				20407	20525	20643		Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	20.21	20.27	20.06	22	
1.4	QPSK	1	3	20.10	20.24	20.06		
1.4	QPSK	1	5	20.18	20.20	20.11		
1.4	QPSK	3	0	20.16	20.21	20.07	22	
1.4	QPSK	3	1	20.17	20.16	20.06		
1.4	QPSK	3	3	20.19	20.09	20.09		
1.4	QPSK	6	0	20.18	20.24	20.08	22	
1.4	16QAM	1	0	20.22	20.15	20.02	22	
1.4	16QAM	1	3	20.21	20.19	20.19		
1.4	16QAM	1	5	20.24	20.17	20.14		
1.4	16QAM	3	0	20.19	20.17	20.09	22	
1.4	16QAM	3	1	20.16	20.13	20.16		
1.4	16QAM	3	3	20.22	20.18	20.12		
1.4	16QAM	6	0	20.17	20.20	20.18	22	
1.4	64QAM	1	0	20.22	20.15	20.09	22	
1.4	64QAM	1	3	20.14	20.13	20.09		
1.4	64QAM	1	5	20.17	20.15	20.04		
1.4	64QAM	3	0	20.20	20.15	20.16	22	
1.4	64QAM	3	1	20.16	20.20	20.15		
1.4	64QAM	3	3	20.15	20.10	20.11		
1.4	64QAM	6	0	19.80	19.73	19.81	21	
1.4	256QAM	1	0	17.42	17.41	17.41	19	
1.4	256QAM	1	3	17.41	17.39	17.41		
1.4	256QAM	1	5	17.41	17.33	17.36		
1.4	256QAM	3	0	17.34	17.46	17.39	19	
1.4	256QAM	3	1	17.45	17.33	17.39		
1.4	256QAM	3	3	17.35	17.45	17.40		



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

1.4	256QAM	6	0	17.36	17.35	17.41	19
-----	--------	---	---	-------	-------	-------	----

**<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)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	21.39	21.35	21.00	22.8
20	QPSK	1	49	21.07	21.16	20.82	
20	QPSK	1	99	21.09	21.14	20.96	
20	QPSK	50	0	21.27	21.21	20.97	22.8
20	QPSK	50	24	21.10	21.09	20.90	
20	QPSK	50	50	21.12	21.10	20.85	
20	QPSK	100	0	21.16	21.14	20.96	22.8
20	16QAM	1	0	21.17	21.18	20.99	
20	16QAM	1	49	21.13	21.17	20.95	
20	16QAM	1	99	21.08	21.09	20.82	22
20	16QAM	50	0	21.01	20.82	20.61	
20	16QAM	50	24	20.68	20.73	20.52	
20	16QAM	50	50	20.50	20.52	20.48	22
20	16QAM	100	0	20.56	20.51	20.44	
20	64QAM	1	0	20.38	20.24	20.00	
20	64QAM	1	49	20.25	20.05	20.15	22
20	64QAM	1	99	20.21	20.08	20.10	
20	64QAM	50	0	19.63	19.49	19.26	
20	64QAM	50	24	19.80	19.61	19.34	21
20	64QAM	50	50	19.53	19.36	19.27	
20	64QAM	100	0	19.66	19.71	19.49	
20	256QAM	1	0	18.00	18.00	18.00	19
20	256QAM	1	49	18.00	18.00	18.00	
20	256QAM	1	99	18.00	18.00	18.00	
20	256QAM	50	0	18.00	18.00	18.00	19
20	256QAM	50	24	18.00	18.00	18.00	
20	256QAM	50	50	18.00	18.00	18.00	
20	256QAM	100	0	18.00	18.00	18.00	
Channel				20825	21100	21375	
Frequency (MHz)				2507.5	2535	2562.5	Tune-up limit (dBm)
15	QPSK	1	0	21.09	21.25	20.81	22.8
15	QPSK	1	37	20.90	20.96	20.90	
15	QPSK	1	74	20.91	21.00	20.95	
15	QPSK	36	0	21.05	21.04	20.93	22.8
15	QPSK	36	20	20.97	20.97	20.99	
15	QPSK	36	39	20.93	20.90	20.85	
15	QPSK	75	0	21.00	20.96	20.84	22.8
15	16QAM	1	0	21.05	21.05	20.99	
15	16QAM	1	37	21.00	21.01	21.00	
15	16QAM	1	74	20.90	20.94	20.96	22
15	16QAM	36	0	20.91	20.72	20.51	
15	16QAM	36	20	20.52	20.59	20.55	
15	16QAM	36	39	20.65	20.59	20.54	22
15	16QAM	75	0	20.66	20.63	20.52	
15	64QAM	1	0	20.25	20.08	20.10	
15	64QAM	1	37	20.08	20.12	20.00	22
15	64QAM	1	74	20.01	20.10	20.10	
15	64QAM	36	0	19.70	19.50	19.35	
15	64QAM	36	20	19.67	19.43	19.22	21
15	64QAM	36	39	19.42	19.21	19.14	
15	64QAM	75	0	19.52	19.57	19.37	
15	256QAM	1	0	17.83	17.82	17.89	19
15	256QAM	1	37	17.86	17.87	17.86	
15	256QAM	1	74	17.90	17.84	17.90	





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	0	17.80	17.87	17.90	19
15	256QAM	36	20	17.86	17.85	17.81	
15	256QAM	36	39	17.84	17.84	17.88	
15	256QAM	75	0	17.90	17.82	17.84	
Channel				20800	21100	21400	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	QPSK	1	0	21.08	21.22	20.84	22.8
10	QPSK	1	25	20.88	21.03	20.96	
10	QPSK	1	49	20.94	20.94	20.99	
10	QPSK	25	0	21.07	21.01	20.98	22.8
10	QPSK	25	12	21.00	20.91	21.06	
10	QPSK	25	25	20.94	20.99	21.03	
10	QPSK	50	0	21.02	21.02	20.96	22.8
10	16QAM	1	0	20.97	21.04	20.90	
10	16QAM	1	25	21.01	21.06	20.84	
10	16QAM	1	49	20.95	20.98	20.90	
10	16QAM	25	0	20.86	20.72	20.50	22
10	16QAM	25	12	20.57	20.55	20.66	
10	16QAM	25	25	20.60	20.60	20.48	
10	16QAM	50	0	20.40	20.54	20.68	22
10	64QAM	1	0	20.23	20.04	20.10	
10	64QAM	1	25	20.11	20.11	20.13	
10	64QAM	1	49	20.09	20.18	20.16	
10	64QAM	25	0	19.46	19.30	19.12	21
10	64QAM	25	12	19.61	19.50	19.18	
10	64QAM	25	25	19.39	19.21	19.14	
10	64QAM	50	0	19.46	19.60	19.35	19
10	256QAM	1	0	17.85	17.88	17.84	
10	256QAM	1	25	17.83	17.84	17.88	
10	256QAM	1	49	17.88	17.82	17.82	
10	256QAM	25	0	17.88	17.84	17.89	19
10	256QAM	25	12	17.80	17.80	17.87	
10	256QAM	25	25	17.80	17.89	17.86	
10	256QAM	50	0	17.88	17.89	17.81	19
Channel				20775	21100	21425	
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	21.07	21.16	20.90	22.8
5	QPSK	1	12	20.89	21.03	20.93	
5	QPSK	1	24	20.92	21.00	20.99	
5	QPSK	12	0	20.99	21.11	20.96	22.8
5	QPSK	12	7	20.92	20.91	20.87	
5	QPSK	12	13	20.99	20.91	20.89	
5	QPSK	25	0	21.00	20.99	20.90	22.8
5	16QAM	1	0	21.05	20.99	20.99	
5	16QAM	1	12	20.96	21.04	21.03	
5	16QAM	1	24	20.90	20.93	21.01	
5	16QAM	12	0	20.90	20.64	20.47	22
5	16QAM	12	7	20.58	20.56	20.40	
5	16QAM	12	13	20.40	20.53	20.45	
5	16QAM	25	0	20.48	20.60	20.55	22
5	64QAM	1	0	20.22	20.04	20.15	
5	64QAM	1	12	20.14	20.19	20.01	
5	64QAM	1	24	20.05	20.18	20.00	
5	64QAM	12	0	19.51	19.30	19.12	21
5	64QAM	12	7	19.67	19.44	19.19	
5	64QAM	12	13	19.41	19.16	19.10	
5	64QAM	25	0	19.51	19.60	19.29	19
5	256QAM	1	0	17.85	17.82	17.83	
5	256QAM	1	12	17.80	17.82	17.84	
5	256QAM	1	24	17.83	17.84	17.80	
5	256QAM	12	0	17.81	17.88	17.82	19
5	256QAM	12	7	17.83	17.87	17.82	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	12	13	17.90	17.81	17.82	
5	256QAM	25	0	17.83	17.82	17.87	

**<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)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	20.31	20.45	20.42	22
10	QPSK	1	25	20.08	20.24	20.28	
10	QPSK	1	49	20.13	20.20	20.27	
10	QPSK	25	0	20.09	20.30	20.28	22
10	QPSK	25	12	20.06	20.23	20.12	
10	QPSK	25	25	20.12	20.18	20.28	
10	QPSK	50	0	20.14	20.21	20.21	22
10	16QAM	1	0	20.06	20.16	20.24	
10	16QAM	1	25	20.16	20.20	20.21	
10	16QAM	1	49	20.15	20.21	20.24	22
10	16QAM	25	0	20.12	20.26	20.28	
10	16QAM	25	12	20.15	20.26	20.25	
10	16QAM	25	25	20.15	20.20	20.28	22
10	16QAM	50	0	20.08	20.24	20.21	
10	64QAM	1	0	20.12	20.25	20.31	
10	64QAM	1	25	20.11	20.18	20.23	22
10	64QAM	1	49	20.15	20.19	20.15	
10	64QAM	25	0	20.11	20.24	19.99	
10	64QAM	25	12	20.09	20.21	19.97	21
10	64QAM	25	25	20.10	20.16	19.95	
10	64QAM	50	0	20.06	20.16	19.91	
10	256QAM	1	0	18.05	18.05	18.13	19
10	256QAM	1	25	18.06	18.09	18.06	
10	256QAM	1	49	18.12	18.07	18.10	
10	256QAM	25	0	18.06	18.09	18.09	19
10	256QAM	25	12	18.08	18.09	18.04	
10	256QAM	25	25	18.09	18.12	18.09	
10	256QAM	50	0	18.04	18.08	18.05	
Channel				23035	23095	23155	
Frequency (MHz)				701.5	707.5	713.5	Tune-up limit (dBm)
5	QPSK	1	0	20.20	20.32	20.23	22
5	QPSK	1	12	20.05	20.07	20.02	
5	QPSK	1	24	20.10	20.06	20.06	
5	QPSK	12	0	20.00	20.01	20.01	22
5	QPSK	12	7	20.01	20.01	20.05	
5	QPSK	12	13	20.06	20.08	20.04	
5	QPSK	25	0	20.07	20.04	20.07	22
5	16QAM	1	0	20.09	20.03	20.00	
5	16QAM	1	12	20.08	20.09	20.07	
5	16QAM	1	24	20.10	20.09	20.01	22
5	16QAM	12	0	20.05	20.04	20.05	
5	16QAM	12	7	20.04	20.05	20.04	
5	16QAM	12	13	20.04	20.01	20.05	22
5	16QAM	25	0	20.07	20.07	20.10	
5	64QAM	1	0	20.04	20.03	20.08	
5	64QAM	1	12	20.10	20.03	20.10	22
5	64QAM	1	24	20.04	20.00	20.08	
5	64QAM	12	0	19.97	20.12	19.79	
5	64QAM	12	7	19.98	20.09	19.83	21
5	64QAM	12	13	19.92	20.03	19.76	
5	64QAM	25	0	19.87	20.00	19.78	
5	256QAM	1	0	18.09	18.13	18.06	19
5	256QAM	1	12	18.13	18.14	18.04	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	1	24	18.10	18.10	18.10	19
5	256QAM	12	0	18.10	18.06	18.04	
5	256QAM	12	7	18.12	18.06	18.04	
5	256QAM	12	13	18.07	18.10	18.11	
5	256QAM	25	0	18.12	18.09	18.07	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	20.21	20.28	20.26	22
3	QPSK	1	8	20.05	20.08	20.10	
3	QPSK	1	14	20.02	20.03	20.09	
3	QPSK	8	0	20.10	20.01	20.06	22
3	QPSK	8	4	20.00	20.00	20.07	
3	QPSK	8	7	20.05	20.04	20.09	
3	QPSK	15	0	20.07	20.08	20.04	
3	16QAM	1	0	20.05	20.07	20.01	
3	16QAM	1	8	20.03	20.03	20.09	22
3	16QAM	1	14	20.06	20.06	20.04	
3	16QAM	8	0	20.02	20.07	20.05	
3	16QAM	8	4	20.08	20.01	20.10	22
3	16QAM	8	7	20.10	20.04	20.03	
3	16QAM	15	0	20.04	20.05	20.10	
3	64QAM	1	0	20.04	20.04	20.06	
3	64QAM	1	8	20.08	20.03	20.04	
3	64QAM	1	14	20.07	20.08	20.05	21
3	64QAM	8	0	19.99	20.04	19.88	
3	64QAM	8	4	19.99	20.02	19.77	
3	64QAM	8	7	19.98	19.96	19.78	
3	64QAM	15	0	19.87	19.97	19.76	
3	256QAM	1	0	18.07	18.11	18.10	19
3	256QAM	1	8	18.07	18.05	18.05	
3	256QAM	1	14	18.06	18.07	18.13	
3	256QAM	8	0	18.05	18.11	18.11	19
3	256QAM	8	4	18.04	18.09	18.10	
3	256QAM	8	7	18.05	18.14	18.06	
3	256QAM	15	0	18.13	18.04	18.10	
Channel				23017	23095	23173	
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	20.16	20.31	20.27	22
1.4	QPSK	1	3	20.03	20.09	20.06	
1.4	QPSK	1	5	20.05	20.08	20.08	
1.4	QPSK	3	0	20.09	20.09	20.01	
1.4	QPSK	3	1	20.08	20.07	20.04	
1.4	QPSK	3	3	20.00	20.04	20.08	
1.4	QPSK	6	0	20.10	20.00	20.04	22
1.4	16QAM	1	0	20.05	20.06	20.03	22
1.4	16QAM	1	3	20.00	20.09	20.09	
1.4	16QAM	1	5	20.06	20.03	20.09	
1.4	16QAM	3	0	20.07	20.00	20.08	
1.4	16QAM	3	1	20.05	20.05	20.08	
1.4	16QAM	3	3	20.00	20.04	20.03	
1.4	16QAM	6	0	20.04	20.10	20.07	22
1.4	64QAM	1	0	20.02	20.04	20.09	22
1.4	64QAM	1	3	20.07	20.06	20.00	
1.4	64QAM	1	5	20.07	20.07	20.05	
1.4	64QAM	3	0	20.13	20.20	20.16	
1.4	64QAM	3	1	20.18	20.18	20.11	
1.4	64QAM	3	3	20.16	20.20	20.12	
1.4	64QAM	6	0	19.91	20.01	19.72	21
1.4	256QAM	1	0	18.14	18.11	18.09	19
1.4	256QAM	1	3	18.08	18.11	18.12	
1.4	256QAM	1	5	18.12	18.12	18.14	
1.4	256QAM	3	0	18.11	18.09	18.13	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

1.4	256QAM	3	1	18.08	18.05	18.13	
1.4	256QAM	3	3	18.04	18.11	18.14	
1.4	256QAM	6	0	18.04	18.14	18.11	19

**<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)
Channel				23230			
Frequency (MHz)				782			
10	QPSK	1	0		20.06		21.7
10	QPSK	1	25		19.94		
10	QPSK	1	49		19.89		
10	QPSK	25	0		19.95		21.7
10	QPSK	25	12		19.88		
10	QPSK	25	25		19.86		
10	QPSK	50	0		19.95		21.7
10	16QAM	1	0		19.92		
10	16QAM	1	25		19.94		
10	16QAM	1	49		19.94		21.7
10	16QAM	25	0		19.91		
10	16QAM	25	12		19.93		
10	16QAM	25	25		19.93		21.7
10	16QAM	50	0		19.88		
10	64QAM	1	0		19.96		
10	64QAM	1	25		19.86		21.7
10	64QAM	1	49		19.95		
10	64QAM	25	0		19.84		
10	64QAM	25	12		19.84		21
10	64QAM	25	25		19.64		
10	64QAM	50	0		19.89		
10	256QAM	1	0		17.93		19
10	256QAM	1	25		17.92		
10	256QAM	1	49		17.92		
10	256QAM	25	0		18.00		19
10	256QAM	25	12		17.93		
10	256QAM	25	25		17.99		
10	256QAM	50	0		17.91		
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	19.95	19.94	19.91	21.7
5	QPSK	1	12	19.80	19.77	19.83	
5	QPSK	1	24	19.80	19.77	19.79	
5	QPSK	12	0	19.77	19.73	19.72	21.7
5	QPSK	12	7	19.70	19.80	19.76	
5	QPSK	12	13	19.70	19.70	19.70	
5	QPSK	25	0	19.80	19.83	19.81	21.7
5	16QAM	1	0	19.79	19.82	19.80	
5	16QAM	1	12	19.75	19.80	19.75	
5	16QAM	1	24	19.84	19.84	19.77	21.7
5	16QAM	12	0	19.80	19.72	19.79	
5	16QAM	12	7	19.78	19.74	19.80	
5	16QAM	12	13	19.80	19.81	19.82	21.7
5	16QAM	25	0	19.70	19.80	19.76	
5	64QAM	1	0	19.77	19.79	19.85	
5	64QAM	1	12	19.77	19.80	19.73	21.7
5	64QAM	1	24	19.76	19.84	19.75	
5	64QAM	12	0	19.74	19.65	19.73	
5	64QAM	12	7	19.68	19.67	19.66	21
5	64QAM	12	13	19.53	19.48	19.52	
5	64QAM	25	0	19.79	19.76	19.71	
5	256QAM	1	0	17.98	17.91	18.00	19



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	1	12	17.90	17.93	17.95	19
5	256QAM	1	24	17.90	17.92	17.90	
5	256QAM	12	0	17.95	17.92	17.93	
5	256QAM	12	7	17.92	17.93	17.91	
5	256QAM	12	13	17.99	17.96	17.95	
5	256QAM	25	0	17.97	17.91	17.96	

**<LTE Band 14>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23330			Tune-up limit (dBm)
Frequency (MHz)				793			
10	QPSK	1	0		20.18		21.8
10	QPSK	1	25		20.03		
10	QPSK	1	49		20.05		
10	QPSK	25	0		20.15		21.8
10	QPSK	25	12		20.08		
10	QPSK	25	25		19.98		
10	QPSK	50	0		20.03		21.8
10	16QAM	1	0		20.06		
10	16QAM	1	25		20.03		
10	16QAM	1	49		20.08		21.8
10	16QAM	25	0		20.03		
10	16QAM	25	12		20.06		
10	16QAM	25	25		20.01		21.8
10	16QAM	50	0		20.01		
10	64QAM	1	0		19.99		
10	64QAM	1	25		20.06		21.8
10	64QAM	1	49		20.01		
10	64QAM	25	0		19.79		
10	64QAM	25	12		19.58		21
10	64QAM	25	25		19.64		
10	64QAM	50	0		19.75		
10	256QAM	1	0		17.66		19
10	256QAM	1	25		17.65		
10	256QAM	1	49		17.66		
10	256QAM	25	0		17.64		19
10	256QAM	25	12		17.70		
10	256QAM	25	25		17.68		
10	256QAM	50	0		17.70		
Channel				23305	23330	23355	Tune-up limit (dBm)
Frequency (MHz)				790.5	793	795.5	
5	QPSK	1	0	20.00	20.02	20.08	21.8
5	QPSK	1	12	19.90	19.85	19.86	
5	QPSK	1	24	19.91	19.92	19.87	
5	QPSK	12	0	19.90	19.88	19.92	21.8
5	QPSK	12	7	19.95	19.97	19.93	
5	QPSK	12	13	19.84	19.88	19.86	
5	QPSK	25	0	19.87	19.90	19.91	21.8
5	16QAM	1	0	19.91	19.90	19.91	
5	16QAM	1	12	19.85	19.83	19.89	
5	16QAM	1	24	19.91	19.91	19.94	21.8
5	16QAM	12	0	19.88	19.86	19.83	
5	16QAM	12	7	19.88	19.90	19.95	
5	16QAM	12	13	19.83	19.91	19.81	21.8
5	16QAM	25	0	19.90	19.90	19.89	
5	64QAM	1	0	19.89	19.87	19.87	
5	64QAM	1	12	19.87	19.96	19.95	21.8
5	64QAM	1	24	19.88	19.86	19.81	
5	64QAM	12	0	19.65	19.69	19.59	
5	64QAM	12	7	19.40	19.46	19.40	21



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	64QAM	12	13	19.49	19.50	19.54	19
5	64QAM	25	0	19.64	19.62	19.65	
5	256QAM	1	0	17.55	17.46	17.46	
5	256QAM	1	12	17.46	17.49	17.46	
5	256QAM	1	24	17.48	17.48	17.52	19
5	256QAM	12	0	17.50	17.51	17.47	
5	256QAM	12	7	17.54	17.53	17.52	
5	256QAM	12	13	17.53	17.54	17.53	
5	256QAM	25	0	17.58	17.54	17.51	

**<LTE Band 17>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	20.25	20.36	20.20	22
10	QPSK	1	25	20.18	20.20	20.22	
10	QPSK	1	49	20.19	20.22	20.22	
10	QPSK	25	0	20.18	20.17	20.24	22
10	QPSK	25	12	20.17	20.16	20.17	
10	QPSK	25	25	20.24	20.21	20.24	
10	QPSK	50	0	20.22	20.26	20.24	
10	16QAM	1	0	20.19	20.17	20.20	22
10	16QAM	1	25	20.22	20.23	20.21	
10	16QAM	1	49	20.19	20.25	20.26	
10	16QAM	25	0	20.16	20.19	20.18	22
10	16QAM	25	12	20.18	20.26	20.20	
10	16QAM	25	25	20.24	20.25	20.17	
10	16QAM	50	0	20.26	20.24	20.25	
10	64QAM	1	0	20.16	20.18	20.17	22
10	64QAM	1	25	20.17	20.18	20.17	
10	64QAM	1	49	20.23	20.22	20.16	
10	64QAM	25	0	20.16	20.17	20.23	
10	64QAM	25	12	20.25	20.18	20.22	21
10	64QAM	25	25	20.17	20.20	20.20	
10	64QAM	50	0	20.17	20.24	20.20	
10	256QAM	1	0	18.07	18.01	18.04	19
10	256QAM	1	25	18.06	18.06	17.99	
10	256QAM	1	49	18.09	17.99	17.99	
10	256QAM	25	0	18.01	18.06	18.07	19
10	256QAM	25	12	18.07	18.02	18.06	
10	256QAM	25	25	18.07	18.02	18.09	
10	256QAM	50	0	18.09	18.01	18.04	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	20.15	20.20	20.04	22
5	QPSK	1	12	20.08	20.08	20.05	
5	QPSK	1	24	20.04	20.09	20.12	
5	QPSK	12	0	20.06	20.06	20.11	22
5	QPSK	12	7	20.16	20.11	20.13	
5	QPSK	12	13	20.11	20.04	20.13	
5	QPSK	25	0	20.02	20.16	20.10	
5	16QAM	1	0	20.01	20.07	20.00	22
5	16QAM	1	12	20.08	20.12	20.01	
5	16QAM	1	24	20.03	20.15	20.06	
5	16QAM	12	0	20.01	20.07	20.03	22
5	16QAM	12	7	20.04	20.14	20.03	
5	16QAM	12	13	20.12	20.12	20.06	
5	16QAM	25	0	20.09	20.11	20.11	
5	64QAM	1	0	20.05	20.10	20.07	22
5	64QAM	1	12	20.10	20.03	20.01	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	64QAM	1	24	20.09	20.07	20.00	21
5	64QAM	12	0	19.99	20.06	20.12	
5	64QAM	12	7	20.10	20.00	20.10	
5	64QAM	12	13	20.02	20.00	20.07	
5	64QAM	25	0	20.06	20.09	20.05	
5	256QAM	1	0	18.01	18.00	18.01	19
5	256QAM	1	12	18.02	18.06	18.06	
5	256QAM	1	24	17.99	17.99	18.09	
5	256QAM	12	0	18.00	18.00	18.05	19
5	256QAM	12	7	18.03	18.07	18.00	
5	256QAM	12	13	18.06	18.04	18.05	
5	256QAM	25	0	18.08	18.07	18.07	

**<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)
Channel				26140	26340	26590	1905
Frequency (MHz)				1860	1880	1905	
20	QPSK	1	0	18.69	18.84	18.74	19
20	QPSK	1	49	18.62	18.69	18.36	
20	QPSK	1	99	18.56	18.66	18.51	
20	QPSK	50	0	18.47	18.61	18.65	19
20	QPSK	50	24	18.57	18.68	18.54	
20	QPSK	50	50	18.54	18.55	18.41	
20	QPSK	100	0	18.54	18.52	18.64	19
20	16QAM	1	0	18.55	18.66	18.65	
20	16QAM	1	49	18.59	18.55	18.54	
20	16QAM	1	99	18.48	18.73	18.59	19
20	16QAM	50	0	18.54	18.59	18.49	
20	16QAM	50	24	18.57	18.69	18.45	
20	16QAM	50	50	18.49	18.66	18.57	19
20	16QAM	100	0	18.59	18.62	18.47	
20	64QAM	1	0	18.50	18.59	18.44	
20	64QAM	1	49	18.51	18.58	18.55	19
20	64QAM	1	99	18.68	18.59	18.43	
20	64QAM	50	0	18.48	18.74	18.41	
20	64QAM	50	24	18.56	18.57	18.47	19
20	64QAM	50	50	18.62	18.58	18.51	
20	64QAM	100	0	18.54	18.67	18.59	
20	256QAM	1	0	17.23	17.29	17.42	17.6
20	256QAM	1	49	17.26	17.40	17.24	
20	256QAM	1	99	17.39	17.35	17.20	
20	256QAM	50	0	17.25	17.28	17.37	17.6
20	256QAM	50	24	17.21	17.23	17.32	
20	256QAM	50	50	17.18	17.37	17.41	
20	256QAM	100	0	17.26	17.34	17.21	1905
Channel				26115	26340	26615	
Frequency (MHz)				1857.5	1880	1907.5	
15	QPSK	1	0	18.74	18.10	18.64	19
15	QPSK	1	37	18.57	18.68	18.49	
15	QPSK	1	74	18.51	18.67	18.62	
15	QPSK	36	0	18.47	18.66	18.62	19
15	QPSK	36	20	18.49	18.64	18.58	
15	QPSK	36	39	18.49	18.52	18.49	
15	QPSK	75	0	18.65	18.58	18.59	19
15	16QAM	1	0	18.59	18.62	18.59	
15	16QAM	1	37	18.68	18.54	18.57	
15	16QAM	1	74	18.66	18.57	18.56	19
15	16QAM	36	0	18.53	18.57	18.46	
15	16QAM	36	20	18.65	18.65	18.54	
15	16QAM	36	39	18.56	18.53	18.61	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	16QAM	75	0	18.49	18.65	18.56	
15	64QAM	1	0	18.67	18.61	18.49	19
15	64QAM	1	37	18.60	18.54	18.43	
15	64QAM	1	74	18.66	18.51	18.43	
15	64QAM	36	0	18.48	18.66	18.52	19
15	64QAM	36	20	18.67	18.61	18.54	
15	64QAM	36	39	18.52	18.62	18.50	
15	64QAM	75	0	18.65	18.63	18.60	
15	256QAM	1	0	17.19	17.31	17.44	17.6
15	256QAM	1	37	17.26	17.21	17.30	
15	256QAM	1	74	17.38	17.18	17.35	
15	256QAM	36	0	17.39	17.35	17.34	17.6
15	256QAM	36	20	17.35	17.39	17.17	
15	256QAM	36	39	17.15	17.30	17.39	
15	256QAM	75	0	17.22	17.24	17.36	
Channel				26090	26340	26640	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1910	
10	QPSK	1	0	18.65	18.77	18.58	19
10	QPSK	1	25	18.50	18.64	18.56	
10	QPSK	1	49	18.43	18.70	18.53	
10	QPSK	25	0	18.50	18.60	18.52	19
10	QPSK	25	12	18.61	18.56	18.44	
10	QPSK	25	25	18.47	18.48	18.47	
10	QPSK	50	0	18.58	18.54	18.57	
10	16QAM	1	0	18.55	18.66	18.61	19
10	16QAM	1	25	18.62	18.63	18.62	
10	16QAM	1	49	18.57	18.63	18.61	
10	16QAM	25	0	18.55	18.65	18.39	19
10	16QAM	25	12	18.51	18.58	18.46	
10	16QAM	25	25	18.58	18.48	18.52	
10	16QAM	50	0	18.50	18.54	18.60	
10	64QAM	1	0	18.61	18.65	18.41	19
10	64QAM	1	25	18.69	18.50	18.48	
10	64QAM	1	49	18.59	18.58	18.50	
10	64QAM	25	0	18.60	18.70	18.45	19
10	64QAM	25	12	18.51	18.65	18.49	
10	64QAM	25	25	18.63	18.61	18.44	
10	64QAM	50	0	18.66	18.62	18.60	
10	256QAM	1	0	17.19	17.31	17.36	17.6
10	256QAM	1	25	17.41	17.20	17.39	
10	256QAM	1	49	17.21	17.27	17.24	
10	256QAM	25	0	17.28	17.16	17.25	17.6
10	256QAM	25	12	17.17	17.25	17.28	
10	256QAM	25	25	17.26	17.21	17.38	
10	256QAM	50	0	17.30	17.29	17.19	
Channel				26065	26340	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1912.5	
5	QPSK	1	0	18.77	18.78	18.65	19
5	QPSK	1	12	18.55	18.71	18.50	
5	QPSK	1	24	18.51	18.64	18.59	
5	QPSK	12	0	18.54	18.59	18.51	19
5	QPSK	12	7	18.53	18.59	18.46	
5	QPSK	12	13	18.63	18.57	18.50	
5	QPSK	25	0	18.68	18.67	18.62	
5	16QAM	1	0	18.59	18.65	18.65	19
5	16QAM	1	12	18.70	18.66	18.47	
5	16QAM	1	24	18.47	18.61	18.64	
5	16QAM	12	0	18.67	18.64	18.47	19
5	16QAM	12	7	18.60	18.70	18.58	
5	16QAM	12	13	18.52	18.47	18.63	
5	16QAM	25	0	18.66	18.70	18.53	
5	64QAM	1	0	18.57	18.68	18.43	19





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	64QAM	1	12	18.59	18.65	18.54	19
5	64QAM	1	24	18.70	18.57	18.40	
5	64QAM	12	0	18.59	18.67	18.55	
5	64QAM	12	7	18.54	18.61	18.45	
5	64QAM	12	13	18.63	18.61	18.56	
5	64QAM	25	0	18.61	18.61	18.54	
5	256QAM	1	0	17.29	17.27	17.27	17.6
5	256QAM	1	12	17.39	17.40	17.32	
5	256QAM	1	24	17.23	17.30	17.29	
5	256QAM	12	0	17.29	17.27	17.34	17.6
5	256QAM	12	7	17.28	17.33	17.16	
5	256QAM	12	13	17.23	17.26	17.28	
5	256QAM	25	0	17.24	17.27	17.24	
Channel				26055	26340	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1913.5	
3	QPSK	1	0	18.64	18.82	18.64	19
3	QPSK	1	8	18.67	18.64	18.55	
3	QPSK	1	14	18.56	18.68	18.60	
3	QPSK	8	0	18.58	18.58	18.51	19
3	QPSK	8	4	18.55	18.63	18.55	
3	QPSK	8	7	18.48	18.61	18.56	
3	QPSK	15	0	18.56	18.57	18.62	
3	16QAM	1	0	18.66	18.75	18.51	19
3	16QAM	1	8	18.72	18.53	18.55	
3	16QAM	1	14	18.60	18.58	18.62	
3	16QAM	8	0	18.70	18.67	18.51	19
3	16QAM	8	4	18.48	18.65	18.58	
3	16QAM	8	7	18.57	18.62	18.56	
3	16QAM	15	0	18.58	18.67	18.51	
3	64QAM	1	0	18.54	18.58	18.59	19
3	64QAM	1	8	18.52	18.51	18.49	
3	64QAM	1	14	18.55	18.52	18.57	
3	64QAM	8	0	18.49	18.63	18.49	19
3	64QAM	8	4	18.61	18.69	18.43	
3	64QAM	8	7	18.60	18.71	18.39	
3	64QAM	15	0	18.71	18.66	18.46	
3	256QAM	1	0	17.22	17.32	17.25	17.6
3	256QAM	1	8	17.31	17.32	17.22	
3	256QAM	1	14	17.30	17.27	17.22	
3	256QAM	8	0	17.27	17.33	17.34	17.6
3	256QAM	8	4	17.27	17.22	17.26	
3	256QAM	8	7	17.23	17.18	17.31	
3	256QAM	15	0	17.21	17.36	17.32	
Channel				26047	26340	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1914.3	
1.4	QPSK	1	0	18.70	18.66	18.67	19
1.4	QPSK	1	3	18.52	18.67	18.36	
1.4	QPSK	1	5	18.53	18.59	18.55	
1.4	QPSK	3	0	18.57	18.67	18.60	
1.4	QPSK	3	1	18.51	18.66	18.47	
1.4	QPSK	3	3	18.47	18.59	18.59	
1.4	QPSK	6	0	18.53	18.56	18.58	19
1.4	16QAM	1	0	18.61	18.67	18.63	19
1.4	16QAM	1	3	18.65	18.67	18.49	
1.4	16QAM	1	5	18.50	18.66	18.56	
1.4	16QAM	3	0	18.69	18.70	18.49	
1.4	16QAM	3	1	18.57	18.61	18.51	
1.4	16QAM	3	3	18.50	18.50	18.54	
1.4	16QAM	6	0	18.56	18.64	18.48	19
1.4	64QAM	1	0	18.58	18.58	18.49	19
1.4	64QAM	1	3	18.61	18.47	18.59	
1.4	64QAM	1	5	18.62	18.50	18.43	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

1.4	64QAM	3	0	18.63	18.65	18.49	
1.4	64QAM	3	1	18.54	18.62	18.43	
1.4	64QAM	3	3	18.61	18.58	18.53	
1.4	64QAM	6	0	18.69	18.66	18.58	19
1.4	256QAM	1	0	17.35	17.33	17.24	17.6
1.4	256QAM	1	3	17.23	17.30	17.29	
1.4	256QAM	1	5	17.27	17.27	17.28	
1.4	256QAM	3	0	17.21	17.25	17.18	
1.4	256QAM	3	1	17.21	17.40	17.35	
1.4	256QAM	3	3	17.32	17.32	17.39	
1.4	256QAM	6	0	17.18	17.29	17.21	17.6

**<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)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	20.34	20.53	20.23	21.8
15	QPSK	1	37	20.24	20.38	20.12	
15	QPSK	1	74	20.20	20.43	20.03	
15	QPSK	36	0	20.15	20.45	20.06	21.8
15	QPSK	36	20	20.16	20.43	20.08	
15	QPSK	36	39	20.16	20.40	20.06	
15	QPSK	75	0	20.21	20.38	20.13	
15	16QAM	1	0	20.14	20.35	20.05	21.8
15	16QAM	1	37	20.14	20.36	20.07	
15	16QAM	1	74	20.15	20.35	20.11	
15	16QAM	36	0	20.17	20.42	20.09	21.8
15	16QAM	36	20	20.23	20.37	20.07	
15	16QAM	36	39	20.22	20.43	20.03	
15	16QAM	75	0	20.15	20.38	20.11	
15	64QAM	1	0	20.21	20.34	20.13	21.8
15	64QAM	1	37	20.23	20.41	20.09	
15	64QAM	1	74	20.23	20.37	20.04	
15	64QAM	36	0	20.21	20.38	20.13	20.8
15	64QAM	36	20	20.15	20.39	20.11	
15	64QAM	36	39	20.23	20.34	20.13	
15	64QAM	75	0	20.20	20.38	20.07	
15	256QAM	1	0	17.76	17.79	17.72	18.8
15	256QAM	1	37	17.72	17.80	17.78	
15	256QAM	1	74	17.80	17.79	17.72	
15	256QAM	36	0	17.80	17.80	17.76	18.8
15	256QAM	36	20	17.76	17.79	17.75	
15	256QAM	36	39	17.75	17.70	17.74	
15	256QAM	75	0	17.80	17.76	17.80	
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	20.15	20.36	20.22	21.8
10	QPSK	1	25	20.09	20.20	20.06	
10	QPSK	1	49	20.08	20.26	20.10	
10	QPSK	25	0	20.03	20.34	20.10	21.8
10	QPSK	25	12	20.11	20.27	20.04	
10	QPSK	25	25	20.08	20.20	20.08	
10	QPSK	50	0	20.11	20.23	20.03	
10	16QAM	1	0	20.00	20.17	20.05	21.8
10	16QAM	1	25	20.05	20.25	20.10	
10	16QAM	1	49	20.01	20.16	20.04	
10	16QAM	25	0	20.09	20.25	20.04	21.8
10	16QAM	25	12	20.03	20.26	20.10	
10	16QAM	25	25	20.12	20.32	20.11	
10	16QAM	50	0	20.00	20.23	20.03	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

10	64QAM	1	0	20.02	20.15	20.06	21.8
10	64QAM	1	25	20.10	20.31	20.08	
10	64QAM	1	49	20.06	20.23	20.00	
10	64QAM	25	0	20.09	20.24	19.97	20.8
10	64QAM	25	12	20.00	20.29	19.95	
10	64QAM	25	25	20.12	20.20	20.00	
10	64QAM	50	0	20.06	20.27	19.95	
10	256QAM	1	0	17.76	17.79	17.72	18.8
10	256QAM	1	25	17.72	17.80	17.78	
10	256QAM	1	49	17.80	17.79	17.72	
10	256QAM	25	0	17.80	17.80	17.76	18.8
10	256QAM	25	12	17.76	17.79	17.75	
10	256QAM	25	25	17.75	17.70	17.74	
10	256QAM	50	0	17.80	17.76	17.80	
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	20.13	20.11	20.19	21.8
5	QPSK	1	12	20.20	20.11	20.15	
5	QPSK	1	24	20.12	20.19	20.19	
5	QPSK	12	0	20.11	20.12	20.13	21.8
5	QPSK	12	7	20.10	20.14	20.20	
5	QPSK	12	13	20.19	20.18	20.11	
5	QPSK	25	0	20.19	20.20	20.15	
5	16QAM	1	0	20.18	20.10	20.20	21.8
5	16QAM	1	12	20.13	20.12	20.17	
5	16QAM	1	24	20.20	20.16	20.17	
5	16QAM	12	0	20.15	20.15	20.14	21.8
5	16QAM	12	7	20.20	20.15	20.14	
5	16QAM	12	13	20.10	20.11	20.15	
5	16QAM	25	0	20.20	20.18	20.11	
5	64QAM	1	0	20.19	20.11	20.20	21.8
5	64QAM	1	12	20.11	20.12	20.11	
5	64QAM	1	24	20.20	20.12	20.16	
5	64QAM	12	0	20.11	20.10	20.17	20.8
5	64QAM	12	7	20.19	20.14	20.10	
5	64QAM	12	13	20.15	20.12	20.20	
5	64QAM	25	0	20.11	20.17	20.19	
5	256QAM	1	0	17.64	17.59	17.59	18.8
5	256QAM	1	12	17.53	17.67	17.61	
5	256QAM	1	24	17.69	17.67	17.53	
5	256QAM	12	0	17.60	17.62	17.65	18.8
5	256QAM	12	7	17.63	17.67	17.61	
5	256QAM	12	13	17.61	17.52	17.64	
5	256QAM	25	0	17.63	17.61	17.67	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	20.19	20.18	20.14	21.8
3	QPSK	1	8	20.17	20.15	20.17	
3	QPSK	1	14	20.16	20.20	20.14	
3	QPSK	8	0	20.12	20.16	20.17	21.8
3	QPSK	8	4	20.16	20.14	20.16	
3	QPSK	8	7	20.16	20.11	20.12	
3	QPSK	15	0	20.19	20.17	20.11	
3	16QAM	1	0	20.20	20.18	20.18	21.8
3	16QAM	1	8	20.16	20.14	20.19	
3	16QAM	1	14	20.19	20.19	20.16	
3	16QAM	8	0	20.20	20.19	20.18	21.8
3	16QAM	8	4	20.19	20.18	20.12	
3	16QAM	8	7	20.20	20.12	20.17	
3	16QAM	15	0	20.13	20.15	20.18	
3	64QAM	1	0	20.13	20.12	20.12	21.8
3	64QAM	1	8	20.12	20.16	20.12	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

3	64QAM	1	14	20.13	20.11	20.13	20.8
3	64QAM	8	0	20.11	20.17	20.13	
3	64QAM	8	4	20.19	20.19	20.16	
3	64QAM	8	7	20.15	20.16	20.15	
3	64QAM	15	0	20.13	20.19	20.19	18.8
3	256QAM	1	0	17.60	17.68	17.57	
3	256QAM	1	8	17.54	17.64	17.66	
3	256QAM	1	14	17.62	17.68	17.62	18.8
3	256QAM	8	0	17.68	17.61	17.62	
3	256QAM	8	4	17.58	17.59	17.55	
3	256QAM	8	7	17.59	17.57	17.56	
3	256QAM	15	0	17.65	17.60	17.63	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	20.21	20.41	20.26	21.8
1.4	QPSK	1	3	20.05	20.25	20.13	
1.4	QPSK	1	5	20.03	20.23	20.08	
1.4	QPSK	3	0	20.01	20.35	20.11	
1.4	QPSK	3	1	20.16	20.28	20.09	
1.4	QPSK	3	3	20.11	20.23	20.11	
1.4	QPSK	6	0	20.06	20.20	20.23	21.8
1.4	16QAM	1	0	20.11	20.23	20.05	21.8
1.4	16QAM	1	3	20.15	20.25	20.14	
1.4	16QAM	1	5	20.01	20.20	20.11	
1.4	16QAM	3	0	20.04	20.31	20.17	
1.4	16QAM	3	1	20.10	20.25	20.11	
1.4	16QAM	3	3	20.11	20.23	20.03	
1.4	16QAM	6	0	20.10	20.18	20.20	21.8
1.4	64QAM	1	0	20.07	20.21	20.20	21.8
1.4	64QAM	1	3	20.13	20.22	20.18	
1.4	64QAM	1	5	20.10	20.24	20.11	
1.4	64QAM	3	0	20.10	20.28	20.02	
1.4	64QAM	3	1	20.03	20.29	20.01	
1.4	64QAM	3	3	20.09	20.20	20.02	
1.4	64QAM	6	0	20.04	20.26	19.93	20.8
1.4	256QAM	1	0	17.61	17.69	17.61	18.8
1.4	256QAM	1	3	17.59	17.68	17.64	
1.4	256QAM	1	5	17.68	17.67	17.58	
1.4	256QAM	3	0	17.69	17.64	17.57	
1.4	256QAM	3	1	17.64	17.65	17.64	
1.4	256QAM	3	3	17.63	17.56	17.59	
1.4	256QAM	6	0	17.61	17.61	17.62	18.8



<LTE Band 66 >

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	21.20	21.48	21.63	22.1
20	QPSK	1	49	21.10	21.36	21.47	
20	QPSK	1	99	21.04	21.30	21.45	
20	QPSK	50	0	21.10	21.30	21.51	22.1
20	QPSK	50	24	21.01	21.29	21.49	
20	QPSK	50	50	21.08	21.38	21.46	
20	QPSK	100	0	21.08	21.31	21.47	22.1
20	16QAM	1	0	21.09	21.31	21.48	
20	16QAM	1	49	21.02	21.32	21.44	
20	16QAM	1	99	21.03	21.28	21.51	21.5
20	16QAM	50	0	21.37	21.49	21.31	
20	16QAM	50	24	21.05	21.37	21.18	
20	16QAM	50	50	20.75	21.01	20.83	21.5
20	16QAM	100	0	20.92	21.23	21.04	
20	64QAM	1	0	20.81	20.93	20.79	
20	64QAM	1	49	20.58	20.76	20.74	21.5
20	64QAM	1	99	20.55	20.69	20.60	
20	64QAM	50	0	20.06	20.17	19.96	
20	64QAM	50	24	20.24	20.19	20.04	20.5
20	64QAM	50	50	19.85	20.13	20.01	
20	64QAM	100	0	20.10	20.35	20.22	
20	256QAM	1	0	17.82	17.84	17.80	18.5
20	256QAM	1	49	17.81	17.91	17.85	
20	256QAM	1	99	17.75	17.81	17.82	
20	256QAM	50	0	17.78	17.86	17.75	18.5
20	256QAM	50	24	17.81	17.86	17.91	
20	256QAM	50	50	17.76	17.79	17.80	
20	256QAM	100	0	17.80	17.83	17.80	
Channel				132047	132322	132597	
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	21.07	21.36	21.45	22.1
15	QPSK	1	37	20.98	21.20	21.34	
15	QPSK	1	74	20.88	21.19	21.32	
15	QPSK	36	0	20.92	21.19	21.37	22.1
15	QPSK	36	20	20.90	21.19	21.33	
15	QPSK	36	39	20.91	21.24	21.33	
15	QPSK	75	0	20.98	21.21	21.30	22.1
15	16QAM	1	0	20.93	21.18	21.28	
15	16QAM	1	37	20.83	21.19	21.25	
15	16QAM	1	74	20.84	21.16	21.37	21.5
15	16QAM	36	0	21.22	21.32	21.20	
15	16QAM	36	20	20.95	21.27	21.04	
15	16QAM	36	39	20.63	20.81	20.65	21.5
15	16QAM	75	0	20.75	21.05	20.86	
15	64QAM	1	0	20.70	20.73	20.62	
15	64QAM	1	37	20.40	20.62	20.60	21.5
15	64QAM	1	74	20.40	20.53	20.47	
15	64QAM	36	0	19.95	19.99	19.76	
15	64QAM	36	20	20.10	20.00	19.84	20.5
15	64QAM	36	39	19.67	20.02	19.83	
15	64QAM	75	0	19.94	20.18	20.10	
15	256QAM	1	0	17.97	17.95	17.98	18.5
15	256QAM	1	37	18.01	18.02	18.01	
15	256QAM	1	74	17.95	17.94	17.97	
15	256QAM	36	0	17.96	17.97	17.94	18.5



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	20	17.99	17.96	18.04	
15	256QAM	36	39	17.96	17.95	18.00	
15	256QAM	75	0	17.97	18.01	17.95	
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	21.04	21.34	21.44	22.1
10	QPSK	1	25	20.90	21.19	21.35	
10	QPSK	1	49	20.90	21.17	21.25	
10	QPSK	25	0	21.00	21.17	21.34	22.1
10	QPSK	25	12	20.81	21.10	21.29	
10	QPSK	25	25	20.97	21.26	21.28	
10	QPSK	50	0	20.95	21.14	21.33	22.1
10	16QAM	1	0	20.98	21.13	21.29	
10	16QAM	1	25	20.92	21.17	21.26	
10	16QAM	1	49	20.92	21.11	21.39	21.5
10	16QAM	25	0	21.21	21.38	21.15	
10	16QAM	25	12	20.92	21.19	21.08	
10	16QAM	25	25	20.63	20.87	20.64	21.5
10	16QAM	50	0	20.77	21.07	20.91	
10	64QAM	1	0	20.68	20.81	20.60	
10	64QAM	1	25	20.42	20.66	20.54	20.5
10	64QAM	1	49	20.36	20.52	20.44	
10	64QAM	25	0	19.89	20.06	19.83	
10	64QAM	25	12	20.11	20.00	19.94	18.5
10	64QAM	25	25	19.65	20.00	19.91	
10	64QAM	50	0	19.90	20.15	20.06	
10	256QAM	1	0	18.00	17.97	17.95	18.5
10	256QAM	1	25	17.96	17.95	17.95	
10	256QAM	1	49	18.03	17.95	18.04	
10	256QAM	25	0	17.94	18.02	17.98	18.5
10	256QAM	25	12	17.95	17.98	17.95	
10	256QAM	25	25	18.04	18.03	18.04	
10	256QAM	50	0	17.97	18.01	18.01	
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	21.01	21.32	21.45	22.1
5	QPSK	1	12	20.93	21.21	21.28	
5	QPSK	1	24	20.87	21.18	21.31	
5	QPSK	12	0	20.93	21.13	21.39	22.1
5	QPSK	12	7	20.87	21.09	21.35	
5	QPSK	12	13	20.95	21.18	21.30	
5	QPSK	25	0	20.97	21.17	21.36	22.1
5	16QAM	1	0	20.99	21.18	21.30	
5	16QAM	1	12	20.86	21.21	21.27	
5	16QAM	1	24	20.92	21.18	21.32	21.5
5	16QAM	12	0	21.20	21.39	21.16	
5	16QAM	12	7	20.89	21.23	21.03	
5	16QAM	12	13	20.65	20.88	20.68	21.5
5	16QAM	25	0	20.73	21.11	20.92	
5	64QAM	1	0	20.65	20.77	20.64	
5	64QAM	1	12	20.47	20.58	20.55	20.5
5	64QAM	1	24	20.43	20.57	20.46	
5	64QAM	12	0	19.91	20.07	19.84	
5	64QAM	12	7	20.08	20.08	19.89	18.5
5	64QAM	12	13	19.68	19.94	19.89	
5	64QAM	25	0	19.95	20.17	20.04	
5	256QAM	1	0	18.03	17.99	18.01	18.5
5	256QAM	1	12	17.98	18.03	17.94	
5	256QAM	1	24	18.02	18.04	17.95	
5	256QAM	12	0	17.96	17.99	18.03	18.5
5	256QAM	12	7	17.96	17.96	17.99	
5	256QAM	12	13	17.94	17.97	17.97	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

5	256QAM	25	0	17.97	17.94	17.96	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	21.07	21.35	21.45	22.1
3	QPSK	1	8	21.00	21.26	21.33	
3	QPSK	1	14	20.90	21.10	21.30	
3	QPSK	8	0	20.98	21.10	21.41	22.1
3	QPSK	8	4	20.87	21.19	21.38	
3	QPSK	8	7	20.95	21.21	21.33	
3	QPSK	15	0	20.94	21.20	21.30	
3	16QAM	1	0	20.99	21.13	21.32	22.1
3	16QAM	1	8	20.84	21.22	21.31	
3	16QAM	1	14	20.87	21.14	21.34	
3	16QAM	8	0	21.18	21.36	21.17	21.5
3	16QAM	8	4	20.86	21.18	21.00	
3	16QAM	8	7	20.56	20.83	20.67	
3	16QAM	15	0	20.82	21.03	20.84	
3	64QAM	1	0	20.69	20.78	20.68	21.5
3	64QAM	1	8	20.42	20.60	20.61	
3	64QAM	1	14	20.35	20.52	20.43	
3	64QAM	8	0	19.95	19.98	19.80	20.5
3	64QAM	8	4	20.04	20.04	19.94	
3	64QAM	8	7	19.65	19.96	19.91	
3	64QAM	15	0	19.99	20.22	20.05	
3	256QAM	1	0	17.97	17.94	17.95	18.5
3	256QAM	1	8	17.95	17.97	17.98	
3	256QAM	1	14	18.03	18.02	17.98	
3	256QAM	8	0	18.01	17.95	18.00	18.5
3	256QAM	8	4	18.04	17.96	18.02	
3	256QAM	8	7	18.02	17.94	18.00	
3	256QAM	15	0	17.96	18.02	18.03	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	21.10	21.29	21.52	22.1
1.4	QPSK	1	3	20.95	21.19	21.36	
1.4	QPSK	1	5	20.87	21.17	21.28	
1.4	QPSK	3	0	20.91	21.14	21.39	
1.4	QPSK	3	1	20.89	21.09	21.29	
1.4	QPSK	3	3	20.90	21.27	21.32	
1.4	QPSK	6	0	20.93	21.16	21.30	22.1
1.4	16QAM	1	0	20.96	21.21	21.36	22.1
1.4	16QAM	1	3	20.83	21.18	21.32	
1.4	16QAM	1	5	20.89	21.13	21.37	
1.4	16QAM	3	0	21.24	21.33	21.11	
1.4	16QAM	3	1	20.87	21.22	21.07	
1.4	16QAM	3	3	20.88	20.88	20.63	
1.4	16QAM	6	0	20.78	21.04	20.93	21.5
1.4	64QAM	1	0	20.63	20.83	20.64	21.5
1.4	64QAM	1	3	20.39	20.66	20.54	
1.4	64QAM	1	5	20.45	20.53	20.48	
1.4	64QAM	3	0	20.43	20.71	20.45	
1.4	64QAM	3	1	20.25	20.51	20.41	
1.4	64QAM	3	3	20.34	20.37	20.35	
1.4	64QAM	6	0	19.90	20.17	20.02	20.5
1.4	256QAM	1	0	18.03	17.96	17.98	18.5
1.4	256QAM	1	3	17.97	17.94	18.00	
1.4	256QAM	1	5	17.95	17.98	17.96	
1.4	256QAM	3	0	17.94	17.95	18.00	
1.4	256QAM	3	1	18.04	18.01	17.99	
1.4	256QAM	3	3	17.97	17.95	18.03	
1.4	256QAM	6	0	18.04	17.96	18.02	18.5



<LTE Band 71>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				133222	133297	133372	
Frequency (MHz)				673	680.5	688	
20	QPSK	1	0	22.54	22.45	22.35	22.8
20	QPSK	1	49	22.45	22.44	22.40	
20	QPSK	1	99	22.35	22.47	22.23	
20	QPSK	50	0	21.74	21.74	21.35	22.8
20	QPSK	50	24	21.70	21.66	21.40	
20	QPSK	50	50	21.76	21.78	21.42	
20	QPSK	100	0	21.65	21.72	21.32	22.8
20	16QAM	1	0	22.18	21.93	21.83	
20	16QAM	1	49	21.87	21.90	21.57	
20	16QAM	1	99	21.85	21.90	21.46	22
20	16QAM	50	0	21.49	21.31	20.98	
20	16QAM	50	24	21.21	21.21	20.83	
20	16QAM	50	50	20.92	20.82	20.52	22
20	16QAM	100	0	21.05	21.09	20.77	
20	64QAM	1	0	20.90	20.80	20.43	
20	64QAM	1	49	20.70	20.57	20.44	22
20	64QAM	1	99	20.65	20.55	20.30	
20	64QAM	50	0	20.16	20.05	19.60	
20	64QAM	50	24	20.32	20.05	19.77	21
20	64QAM	50	50	19.98	19.91	19.67	
20	64QAM	100	0	20.19	20.13	19.90	
20	256QAM	1	0	17.71	17.68	17.67	19
20	256QAM	1	49	17.78	17.71	17.66	
20	256QAM	1	99	17.78	17.75	17.69	
20	256QAM	50	0	17.75	17.76	17.68	19
20	256QAM	50	24	17.66	17.64	17.77	
20	256QAM	50	50	17.75	17.81	17.76	
20	256QAM	100	0	17.66	17.72	17.71	
Channel				133197	133297	133397	
Frequency (MHz)				670.5	680.5	690.5	
15	QPSK	1	0	22.44	22.44	22.23	22.8
15	QPSK	1	37	22.27	22.30	22.24	
15	QPSK	1	74	22.31	22.33	22.13	
15	QPSK	36	0	21.73	21.68	21.24	22.8
15	QPSK	36	20	21.51	21.65	21.22	
15	QPSK	36	39	21.69	21.65	21.38	
15	QPSK	75	0	21.57	21.61	21.25	22.8
15	16QAM	1	0	22.18	21.86	21.80	
15	16QAM	1	37	21.87	21.89	21.54	
15	16QAM	1	74	21.73	21.86	21.38	22
15	16QAM	36	0	21.41	21.26	20.89	
15	16QAM	36	20	21.15	21.15	20.82	
15	16QAM	36	39	20.89	20.75	20.32	22
15	16QAM	75	0	20.91	20.89	20.75	
15	64QAM	1	0	20.83	20.66	20.25	
15	64QAM	1	37	20.55	20.39	20.27	22
15	64QAM	1	74	20.47	20.37	20.16	
15	64QAM	36	0	20.14	19.91	19.45	
15	64QAM	36	20	20.19	19.90	19.73	21
15	64QAM	36	39	19.95	19.91	19.64	
15	64QAM	75	0	20.15	19.95	19.82	
15	256QAM	1	0	17.70	17.76	17.75	19
15	256QAM	1	37	17.72	17.68	17.73	
15	256QAM	1	74	17.77	17.72	17.68	
15	256QAM	36	0	17.72	17.69	17.62	19
15	256QAM	36	20	17.66	17.65	17.70	





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

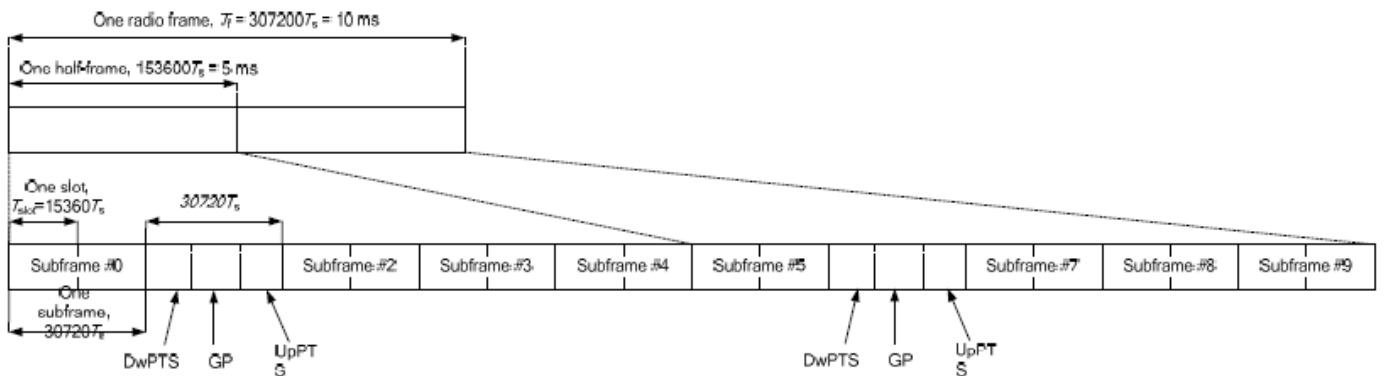
15	256QAM	36	39	17.65	17.77	17.76	
15	256QAM	75	0	17.65	17.66	17.70	
Channel				133172	133297	133422	Tune-up limit (dBm)
Frequency (MHz)				668	680.5	693	
10	QPSK	1	0	22.47	22.43	22.16	22.8
10	QPSK	1	25	22.41	22.29	22.21	
10	QPSK	1	49	22.35	22.38	22.06	
10	QPSK	25	0	21.57	21.82	21.38	22.8
10	QPSK	25	12	21.73	21.53	21.19	
10	QPSK	25	25	21.49	21.75	21.32	
10	QPSK	50	0	21.46	21.55	21.19	
10	16QAM	1	0	22.20	21.93	21.88	22.8
10	16QAM	1	25	21.76	21.76	21.46	
10	16QAM	1	49	21.68	21.94	21.27	
10	16QAM	25	0	21.34	21.26	20.81	22
10	16QAM	25	12	21.06	21.20	20.84	
10	16QAM	25	25	20.82	20.66	20.53	
10	16QAM	50	0	21.08	21.13	20.66	
10	64QAM	1	0	20.92	20.71	20.24	22
10	64QAM	1	25	20.60	20.57	20.25	
10	64QAM	1	49	20.42	20.44	20.11	
10	64QAM	25	0	20.05	20.05	19.60	21
10	64QAM	25	12	20.13	19.83	19.72	
10	64QAM	25	25	19.85	19.71	19.52	
10	64QAM	50	0	20.00	20.05	19.67	
10	256QAM	1	0	17.50	17.57	17.61	19
10	256QAM	1	25	17.59	17.53	17.63	
10	256QAM	1	49	17.58	17.54	17.56	
10	256QAM	25	0	17.58	17.55	17.43	19
10	256QAM	25	12	17.50	17.48	17.52	
10	256QAM	25	25	17.49	17.61	17.64	
10	256QAM	50	0	17.45	17.55	17.60	
Channel				133147	133297	133447	Tune-up limit (dBm)
Frequency (MHz)				665.5	680.5	695.5	
5	QPSK	1	0	22.45	22.46	22.27	22.8
5	QPSK	1	12	22.50	22.33	22.40	
5	QPSK	1	24	22.31	22.48	22.08	
5	QPSK	12	0	21.62	21.77	21.41	22.8
5	QPSK	12	7	21.60	21.39	21.25	
5	QPSK	12	13	21.65	21.83	21.29	
5	QPSK	25	0	21.55	21.45	21.03	
5	16QAM	1	0	22.24	21.82	21.80	22.8
5	16QAM	1	12	21.79	21.87	21.64	
5	16QAM	1	24	21.70	21.93	21.32	
5	16QAM	12	0	21.34	21.31	20.81	22
5	16QAM	12	7	21.22	21.09	20.77	
5	16QAM	12	13	20.75	20.68	20.52	
5	16QAM	25	0	21.03	21.18	20.65	
5	64QAM	1	0	20.90	20.62	20.21	22
5	64QAM	1	12	20.55	20.61	20.43	
5	64QAM	1	24	20.56	20.39	20.27	
5	64QAM	12	0	20.02	19.93	19.47	21
5	64QAM	12	7	20.09	19.97	19.75	
5	64QAM	12	13	19.91	19.87	19.47	
5	64QAM	25	0	20.13	20.03	19.82	
5	256QAM	1	0	17.57	17.60	17.57	19
5	256QAM	1	12	17.54	17.55	17.60	
5	256QAM	1	24	17.62	17.58	17.48	
5	256QAM	12	0	17.56	17.55	17.52	19
5	256QAM	12	7	17.48	17.50	17.51	
5	256QAM	12	13	17.47	17.65	17.66	
5	256QAM	25	0	17.46	17.48	17.51	

**<TDD LTE SAR Measurement>**

TDD LTE configuration setup for SAR measurement

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

- a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Base station simulator 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 · Ts	2192 · Ts	2560 · Ts	7680 · Ts	2192 · Ts	2560 · Ts	
1	19760 · Ts			20480 · Ts			
2	21952 · Ts			23040 · Ts			
3	24144 · Ts			25600 · Ts			
4	26336 · Ts	4384 · Ts	5120 · Ts	7680 · Ts	4384 · Ts	5120 · Ts	
5	6592 · Ts			20480 · Ts			
6	19760 · Ts			23040 · Ts			
7	21952 · Ts			12800 · Ts			
8	24144 · Ts	-	-	-	-	-	
9	13168 · Ts	-	-	-	-	-	



Special subframe (30720·T <sub>s</sub> ): 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 <sub>s</sub> ): 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:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix  $63.3\%/62.9\% = 1.006$  is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)\* Tune-up Scaling Factor\* scaling factor for extended cyclic prefix.
- vi. The device supports Power Class 3 uplink-downlink configurations 0 and 6, and Power Class 2 uplink-downlink configurations 1 to 5 operations for LTE Band 41.
- vii. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1, for Power Class 3 operation is 63.3% using UL-DL configuration 0. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR among all exposure condition.



<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				37850	38000	38150	
Frequency (MHz)				2580	2595	2610	
20	QPSK	1	0	20.28	20.33	20.24	20.5
20	QPSK	1	49	20.16	20.15	20.11	
20	QPSK	1	99	20.17	20.20	20.12	
20	QPSK	50	0	20.10	20.21	20.07	20.5
20	QPSK	50	24	20.08	20.17	20.07	
20	QPSK	50	50	20.13	20.17	20.05	
20	QPSK	100	0	20.16	20.17	20.04	20.5
20	16QAM	1	0	20.09	20.20	20.09	
20	16QAM	1	49	20.15	20.21	20.04	
20	16QAM	1	99	20.11	20.15	20.14	20.5
20	16QAM	50	0	20.15	20.22	20.05	
20	16QAM	50	24	20.17	20.20	20.06	
20	16QAM	50	50	20.12	20.21	20.09	20.5
20	16QAM	100	0	20.10	20.21	20.07	
20	64QAM	1	0	20.14	20.15	20.04	
20	64QAM	1	49	20.18	20.19	20.07	20.5
20	64QAM	1	99	20.10	20.22	20.09	
20	64QAM	50	0	20.16	20.16	20.04	
20	64QAM	50	24	20.17	20.20	20.10	20.5
20	64QAM	50	50	20.11	20.21	20.08	
20	64QAM	100	0	20.16	20.17	20.14	
20	256QAM	1	0	17.78	17.89	17.84	18.8
20	256QAM	1	49	17.84	17.80	17.83	
20	256QAM	1	99	17.76	17.83	17.83	
20	256QAM	50	0	17.88	17.85	17.83	18.8
20	256QAM	50	24	17.81	17.75	17.87	
20	256QAM	50	50	17.79	17.86	17.77	
20	256QAM	100	0	17.81	17.75	17.75	
Channel				37825	38000	38175	Tune-up limit (dBm)
Frequency (MHz)				2577.5	2595	2612.5	
15	QPSK	1	0	20.16	20.19	20.10	20.5
15	QPSK	1	37	20.06	19.95	19.99	
15	QPSK	1	74	20.02	20.01	19.94	
15	QPSK	36	0	19.95	20.05	19.90	20.5
15	QPSK	36	20	19.97	20.06	19.88	
15	QPSK	36	39	19.95	20.04	19.93	
15	QPSK	75	0	19.98	19.99	19.87	20.5
15	16QAM	1	0	19.95	20.08	19.96	
15	16QAM	1	37	20.01	20.04	19.86	
15	16QAM	1	74	20.01	20.05	19.98	20.5
15	16QAM	36	0	19.97	20.05	19.89	
15	16QAM	36	20	20.03	20.00	19.88	
15	16QAM	36	39	20.01	20.01	19.89	20.5
15	16QAM	75	0	19.96	20.01	19.94	
15	64QAM	1	0	20.03	20.03	19.86	
15	64QAM	1	37	20.00	20.08	19.89	20.5
15	64QAM	1	74	19.97	20.11	19.90	
15	64QAM	36	0	19.99	20.03	19.89	
15	64QAM	36	20	20.03	20.01	19.96	20.5
15	64QAM	36	39	19.97	20.11	19.89	
15	64QAM	75	0	19.97	20.03	20.02	
15	256QAM	1	0	17.84	17.80	17.80	18.8
15	256QAM	1	37	17.83	17.75	17.78	
15	256QAM	1	74	17.71	17.81	17.85	
15	256QAM	36	0	17.87	17.79	17.80	18.8
15	256QAM	36	20	17.81	17.74	17.88	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	39	17.83	17.87	17.78	
15	256QAM	75	0	17.82	17.74	17.82	
Channel				37800	38000	38200	Tune-up limit (dBm)
Frequency (MHz)				2575	2595	2615	
10	QPSK	1	0	20.15	20.19	20.06	20.5
10	QPSK	1	25	20.02	19.95	19.91	
10	QPSK	1	49	20.02	20.05	19.92	
10	QPSK	25	0	19.96	20.02	19.92	20.5
10	QPSK	25	12	19.93	19.98	19.89	
10	QPSK	25	25	19.98	19.99	19.90	
10	QPSK	50	0	20.05	20.01	19.88	
10	16QAM	1	0	19.97	20.08	19.98	
10	16QAM	1	25	20.04	20.03	19.90	20.5
10	16QAM	1	49	19.93	20.00	19.98	
10	16QAM	25	0	20.00	20.11	19.94	20.5
10	16QAM	25	12	19.99	20.01	19.90	
10	16QAM	25	25	19.98	20.07	19.92	
10	16QAM	50	0	19.98	20.05	19.95	
10	64QAM	1	0	20.04	20.03	19.91	
10	64QAM	1	25	20.06	20.01	19.93	20.5
10	64QAM	1	49	20.00	20.02	19.94	
10	64QAM	25	0	20.04	20.03	19.91	
10	64QAM	25	12	20.06	20.02	19.92	20.5
10	64QAM	25	25	19.97	20.05	19.91	
10	64QAM	50	0	20.03	19.97	20.03	
10	256QAM	1	0	17.83	17.83	17.81	
10	256QAM	1	25	17.79	17.72	17.83	
10	256QAM	1	49	17.76	17.89	17.77	18.8
10	256QAM	25	0	17.80	17.84	17.78	
10	256QAM	25	12	17.88	17.80	17.84	
10	256QAM	25	25	17.80	17.82	17.79	18.8
10	256QAM	25	0	17.82	17.73	17.79	
10	256QAM	50	0	17.82	17.73	17.79	
Channel				37775	38000	38225	Tune-up limit (dBm)
Frequency (MHz)				2572.5	2595	2617.5	
5	QPSK	1	0	20.15	20.19	20.13	20.5
5	QPSK	1	12	19.99	19.96	19.92	
5	QPSK	1	24	20.03	20.04	20.00	
5	QPSK	12	0	19.91	20.04	19.92	20.5
5	QPSK	12	7	19.90	19.99	19.91	
5	QPSK	12	13	19.99	19.99	19.86	
5	QPSK	25	0	20.03	20.05	19.89	
5	16QAM	1	0	19.97	20.03	19.97	
5	16QAM	1	12	20.05	20.01	19.84	20.5
5	16QAM	1	24	19.97	19.96	19.99	
5	16QAM	12	0	20.03	20.03	19.86	
5	16QAM	12	7	20.07	20.02	19.92	20.5
5	16QAM	12	13	20.00	20.03	19.93	
5	16QAM	25	0	19.91	20.09	19.87	
5	64QAM	1	0	20.03	19.97	19.84	
5	64QAM	1	12	20.05	20.08	19.92	
5	64QAM	1	24	19.99	20.05	19.89	20.5
5	64QAM	12	0	19.98	19.97	19.86	
5	64QAM	12	7	20.07	20.09	19.92	
5	64QAM	12	13	19.98	20.11	19.98	20.5
5	64QAM	25	0	20.05	19.99	20.00	
5	256QAM	1	0	17.82	17.88	17.76	
5	256QAM	1	12	17.81	17.78	17.84	
5	256QAM	1	24	17.81	17.80	17.84	
5	256QAM	12	0	17.80	17.77	17.79	18.8
5	256QAM	12	7	17.79	17.74	17.80	
5	256QAM	12	13	17.77	17.88	17.77	
5	256QAM	25	0	17.74	17.80	17.76	



<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)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	19.45	19.30	19.61	19.24	19.34	20.5
20	QPSK	1	49	19.19	19.18	19.41	19.02	19.22	
20	QPSK	1	99	19.21	19.35	19.41	19.27	19.37	
20	QPSK	50	0	19.22	19.31	19.33	19.11	19.10	20.5
20	QPSK	50	24	19.26	19.36	19.36	19.31	19.23	
20	QPSK	50	50	19.22	19.11	19.40	19.11	19.15	
20	QPSK	100	0	19.06	19.25	19.15	19.13	19.07	20.5
20	16QAM	1	0	19.35	19.13	19.31	19.32	19.06	
20	16QAM	1	49	19.21	19.34	19.35	19.05	19.21	
20	16QAM	1	99	19.19	19.29	19.26	19.04	19.01	20.5
20	16QAM	50	0	19.11	19.28	19.35	19.18	19.29	
20	16QAM	50	24	19.11	19.18	19.33	19.27	19.20	
20	16QAM	50	50	19.33	19.28	19.25	19.03	19.13	20.5
20	16QAM	100	0	19.28	19.32	19.38	19.22	19.25	
20	64QAM	1	0	19.08	19.09	19.19	19.17	19.12	
20	64QAM	1	49	19.07	19.37	19.30	19.08	19.02	20.5
20	64QAM	1	99	19.27	19.26	19.39	19.13	19.20	
20	64QAM	50	0	18.77	18.39	18.78	18.95	18.43	
20	64QAM	50	24	18.67	18.53	18.92	18.69	18.55	20
20	64QAM	50	50	18.74	18.32	18.70	18.71	18.48	
20	64QAM	100	0	18.95	18.60	18.86	19.00	18.69	
20	256QAM	1	0	17.24	17.00	17.19	17.23	17.29	18.8
20	256QAM	1	49	17.32	17.05	17.09	17.23	17.01	
20	256QAM	1	99	17.06	17.15	17.11	17.03	17.22	
20	256QAM	50	0	17.12	17.32	17.13	17.14	17.09	18.8
20	256QAM	50	24	17.08	17.07	17.21	17.06	17.21	
20	256QAM	50	50	17.13	17.08	17.27	17.27	17.01	
20	256QAM	100	0	17.18	17.03	17.21	17.17	17.04	
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	
15	QPSK	1	0	19.32	19.31	19.59	19.30	19.27	20.50
15	QPSK	1	37	19.21	19.37	19.43	19.00	19.23	
15	QPSK	1	74	19.13	19.24	19.41	19.01	19.29	
15	QPSK	36	0	19.36	19.46	19.50	19.36	19.14	20.5
15	QPSK	36	20	19.15	19.28	19.31	19.08	19.20	
15	QPSK	36	39	19.24	19.12	19.40	19.24	19.17	
15	QPSK	75	0	19.11	19.27	19.21	19.27	19.17	20.5
15	16QAM	1	0	19.30	19.09	19.17	19.24	19.22	
15	16QAM	1	37	19.21	19.39	19.27	19.05	19.09	
15	16QAM	1	74	19.18	19.13	19.23	19.08	19.23	20.5
15	16QAM	36	0	19.19	19.28	19.23	19.15	19.05	
15	16QAM	36	20	19.37	19.29	19.17	19.15	19.21	
15	16QAM	36	39	19.25	19.08	19.19	19.02	19.02	20.5
15	16QAM	75	0	19.24	19.30	19.39	19.27	19.03	
15	64QAM	1	0	19.33	19.29	19.42	19.10	19.34	
15	64QAM	1	37	19.29	19.35	19.35	19.25	19.18	20.5
15	64QAM	1	74	19.18	19.20	19.17	19.21	19.25	
15	64QAM	36	0	18.84	18.43	18.73	18.87	18.29	
15	64QAM	36	20	18.70	18.64	18.93	18.64	18.75	20
15	64QAM	36	39	18.48	18.57	18.68	18.50	18.44	
15	64QAM	75	0	18.90	18.80	18.96	18.93	18.67	
15	256QAM	1	0	16.94	17.03	17.08	17.12	17.11	18.8
15	256QAM	1	37	17.19	17.15	17.07	17.20	17.17	
15	256QAM	1	74	17.19	17.09	17.27	17.05	17.22	
15	256QAM	36	0	17.00	17.31	17.06	17.30	17.05	18.8



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	20	17.13	17.19	17.10	17.23	17.13	
15	256QAM	36	39	17.25	17.30	17.06	17.26	17.22	
15	256QAM	75	0	17.05	17.27	17.12	17.28	17.22	
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	19.37	19.43	19.47	19.29	19.25	20.50
10	QPSK	1	25	19.28	19.23	19.20	19.11	19.00	
10	QPSK	1	49	19.07	19.20	19.34	19.04	19.37	
10	QPSK	25	0	19.19	19.44	19.22	19.15	19.28	20.5
10	QPSK	25	12	19.08	19.15	19.16	19.14	19.29	
10	QPSK	25	25	19.05	19.14	19.35	19.19	19.23	
10	QPSK	50	0	19.29	19.09	19.20	19.17	19.07	20.5
10	16QAM	1	0	19.21	19.29	19.35	19.33	19.19	
10	16QAM	1	25	19.17	19.38	19.45	19.17	19.28	
10	16QAM	1	49	19.39	19.35	19.30	19.17	19.19	20.5
10	16QAM	25	0	19.15	19.20	19.17	19.12	19.10	
10	16QAM	25	12	19.19	19.18	19.42	19.33	19.12	
10	16QAM	25	25	19.21	19.13	19.25	19.10	19.22	20.5
10	16QAM	50	0	19.25	19.05	19.27	19.08	19.03	
10	64QAM	1	0	19.17	19.13	19.29	19.10	19.28	
10	64QAM	1	25	19.33	19.31	19.35	19.06	19.22	20.5
10	64QAM	1	49	19.33	19.14	19.12	19.14	19.26	
10	64QAM	25	0	18.84	18.34	18.97	18.86	18.30	
10	64QAM	25	12	18.71	18.58	18.93	18.67	18.47	20
10	64QAM	25	25	18.53	18.32	18.61	18.51	18.52	
10	64QAM	50	0	18.93	18.70	18.98	18.89	18.90	
10	256QAM	1	0	17.08	17.12	17.05	17.23	17.30	18.8
10	256QAM	1	25	17.23	16.99	17.10	17.15	17.07	
10	256QAM	1	49	17.15	17.11	17.24	17.27	17.00	
10	256QAM	25	0	17.23	17.15	17.11	17.27	17.06	18.8
10	256QAM	25	12	17.28	17.26	17.00	17.03	17.24	
10	256QAM	25	25	17.17	17.06	17.16	17.21	17.16	
10	256QAM	50	0	17.19	17.27	17.31	17.03	17.04	
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5	
5	QPSK	1	0	19.53	19.39	19.55	19.18	19.46	20.50
5	QPSK	1	12	19.24	19.33	19.18	19.04	19.12	
5	QPSK	1	24	19.12	19.14	19.30	19.28	19.15	
5	QPSK	12	0	19.30	19.36	19.35	19.08	19.20	20.5
5	QPSK	12	7	19.27	19.41	19.16	19.06	19.15	
5	QPSK	12	13	19.05	19.16	19.43	19.28	19.05	
5	QPSK	25	0	19.23	19.16	19.43	19.21	19.20	20.5
5	16QAM	1	0	19.14	19.26	19.34	19.30	19.28	
5	16QAM	1	12	19.19	19.23	19.23	19.09	19.23	
5	16QAM	1	24	19.28	19.08	19.24	19.27	19.23	20.5
5	16QAM	12	0	19.30	19.27	19.20	19.28	19.21	
5	16QAM	12	7	19.09	19.32	19.23	19.33	19.13	
5	16QAM	12	13	19.31	19.11	19.13	19.23	19.08	20.5
5	16QAM	25	0	19.42	19.10	19.26	19.29	19.03	
5	64QAM	1	0	19.08	19.35	19.17	19.25	19.26	
5	64QAM	1	12	19.30	19.15	19.10	19.25	19.01	20.5
5	64QAM	1	24	19.15	19.25	19.31	19.22	19.10	
5	64QAM	12	0	18.79	18.41	18.88	18.98	18.47	
5	64QAM	12	7	18.86	18.59	18.92	18.87	18.62	20
5	64QAM	12	13	18.70	18.38	18.56	18.48	18.51	
5	64QAM	25	0	18.99	18.55	18.71	19.04	18.80	
5	256QAM	1	0	17.05	17.06	17.15	17.00	17.09	18.8
5	256QAM	1	12	17.27	17.15	17.12	17.11	17.29	
5	256QAM	1	24	17.29	17.24	17.16	17.32	17.06	
5	256QAM	12	0	17.11	17.19	17.17	17.19	17.30	18.8
5	256QAM	12	7	17.21	17.25	17.13	17.01	16.97	
5	256QAM	12	13	17.17	17.22	17.04	17.14	16.95	



# FCC SAR TEST REPORT

Report No. : FA182625-12

5	256QAM	25	0	17.16	17.15	17.19	17.24	16.99	
---	--------	----	---	-------	-------	-------	-------	-------	--

<LTE Band 41\_HPUE>

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)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	20.62	20.63	20.64	20.60	20.59	22.1
20	QPSK	1	49	20.51	20.56	20.58	20.50	20.58	
20	QPSK	1	99	20.51	20.60	20.59	20.50	20.50	
20	QPSK	50	0	20.58	20.55	20.61	20.54	20.60	22.1
20	QPSK	50	24	20.50	20.53	20.60	20.52	20.59	
20	QPSK	50	50	20.56	20.54	20.56	20.52	20.52	
20	QPSK	100	0	20.51	20.59	20.61	20.54	20.59	22.1
20	16QAM	1	0	20.50	20.51	20.50	20.55	20.60	
20	16QAM	1	49	20.57	20.50	20.59	20.58	20.56	
20	16QAM	1	99	20.51	20.60	20.60	20.54	20.57	22.1
20	16QAM	50	0	20.54	20.60	20.55	20.51	20.60	
20	16QAM	50	24	20.58	20.56	20.55	20.51	20.60	
20	16QAM	50	50	20.53	20.59	20.58	20.50	20.57	22.1
20	16QAM	100	0	20.52	20.53	20.51	20.53	20.58	
20	64QAM	1	0	20.51	20.57	20.58	20.55	20.60	
20	64QAM	1	49	20.58	20.55	20.56	20.57	20.60	22.1
20	64QAM	1	99	20.52	20.55	20.54	20.54	20.55	
20	64QAM	50	0	20.52	20.58	20.60	20.52	20.51	
20	64QAM	50	24	20.54	20.54	20.50	20.60	20.55	22.1
20	64QAM	50	50	20.57	20.52	20.54	20.56	20.59	
20	64QAM	100	0	20.51	20.58	20.51	20.55	20.53	
20	256QAM	1	0	19.41	19.42	19.37	19.43	19.31	21
20	256QAM	1	49	19.40	19.37	19.36	19.47	19.44	
20	256QAM	1	99	19.48	19.31	19.37	19.42	19.31	
20	256QAM	50	0	19.40	19.36	19.40	19.33	19.41	21
20	256QAM	50	24	19.42	19.35	19.40	19.46	19.40	
20	256QAM	50	50	19.42	19.47	19.44	19.40	19.46	
20	256QAM	100	0	19.44	19.43	19.38	19.40	19.36	
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	
15	QPSK	1	0	20.41	20.37	20.39	20.42	20.36	22.10
15	QPSK	1	37	20.40	20.39	20.43	20.30	20.43	
15	QPSK	1	74	20.41	20.48	20.44	20.34	20.37	
15	QPSK	36	0	20.46	20.40	20.40	20.40	20.42	22.1
15	QPSK	36	20	20.36	20.34	20.45	20.36	20.49	
15	QPSK	36	39	20.38	20.43	20.37	20.41	20.38	
15	QPSK	75	0	20.31	20.46	20.40	20.42	20.40	22.1
15	16QAM	1	0	20.31	20.41	20.40	20.36	20.48	
15	16QAM	1	37	20.43	20.30	20.48	20.48	20.40	
15	16QAM	1	74	20.36	20.46	20.49	20.41	20.41	22.1
15	16QAM	36	0	20.44	20.48	20.45	20.33	20.49	
15	16QAM	36	20	20.44	20.36	20.41	20.38	20.47	
15	16QAM	36	39	20.40	20.41	20.47	20.34	20.39	22.1
15	16QAM	75	0	20.37	20.36	20.39	20.34	20.38	
15	64QAM	1	0	20.34	20.47	20.41	20.45	20.50	
15	64QAM	1	37	20.44	20.45	20.43	20.40	20.50	22.1
15	64QAM	1	74	20.39	20.37	20.42	20.43	20.42	
15	64QAM	36	0	20.37	20.42	20.47	20.37	20.33	
15	64QAM	36	20	20.34	20.36	20.36	20.45	20.41	22.1
15	64QAM	36	39	20.37	20.32	20.39	20.43	20.39	
15	64QAM	75	0	20.33	20.47	20.31	20.45	20.36	
15	256QAM	1	0	19.25	19.22	19.18	19.31	19.15	21
15	256QAM	1	37	19.30	19.21	19.22	19.30	19.27	
15	256QAM	1	74	19.36	19.11	19.17	19.28	19.13	





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	36	0	19.29	19.22	19.24	19.15	19.26	21
15	256QAM	36	20	19.26	19.16	19.22	19.27	19.25	
15	256QAM	36	39	19.27	19.29	19.28	19.23	19.26	
15	256QAM	75	0	19.34	19.26	19.26	19.21	19.25	
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	20.37	20.41	20.42	20.47	20.33	22.10
10	QPSK	1	25	20.35	20.38	20.48	20.30	20.43	
10	QPSK	1	49	20.33	20.48	20.40	20.30	20.30	
10	QPSK	25	0	20.43	20.40	20.38	20.39	20.44	22.1
10	QPSK	25	12	20.37	20.40	20.41	20.36	20.47	
10	QPSK	25	25	20.37	20.44	20.40	20.41	20.34	
10	QPSK	50	0	20.32	20.49	20.34	20.41	20.42	22.1
10	16QAM	1	0	20.31	20.40	20.38	20.41	20.40	
10	16QAM	1	25	20.38	20.31	20.44	20.48	20.37	
10	16QAM	1	49	20.32	20.40	20.48	20.37	20.44	22.1
10	16QAM	25	0	20.38	20.43	20.35	20.34	20.46	
10	16QAM	25	12	20.46	20.39	20.39	20.34	20.50	
10	16QAM	25	25	20.35	20.41	20.38	20.39	20.37	22.1
10	16QAM	50	0	20.36	20.41	20.38	20.42	20.48	
10	64QAM	1	0	20.36	20.41	20.41	20.40	20.50	
10	64QAM	1	25	20.39	20.35	20.42	20.46	20.42	22.1
10	64QAM	1	49	20.36	20.45	20.40	20.36	20.43	
10	64QAM	25	0	20.36	20.43	20.41	20.36	20.37	
10	64QAM	25	12	20.39	20.42	20.34	20.50	20.44	22.1
10	64QAM	25	25	20.41	20.41	20.37	20.38	20.39	
10	64QAM	50	0	20.40	20.46	20.35	20.37	20.38	
10	256QAM	1	0	19.22	19.30	19.27	19.25	19.18	21
10	256QAM	1	25	19.23	19.22	19.17	19.32	19.34	
10	256QAM	1	49	19.31	19.19	19.19	19.32	19.13	
10	256QAM	25	0	19.20	19.25	19.29	19.15	19.24	21
10	256QAM	25	12	19.26	19.18	19.30	19.32	19.28	
10	256QAM	25	25	19.29	19.28	19.32	19.21	19.27	
10	256QAM	50	0	19.24	19.31	19.20	19.30	19.20	Tune-up limit (dBm)
Channel				39675	40148	40620	41093	41565	
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5	
5	QPSK	1	0	20.42	20.46	20.36	20.44	20.36	22.10
5	QPSK	1	12	20.32	20.42	20.39	20.40	20.42	
5	QPSK	1	24	20.38	20.40	20.46	20.37	20.39	
5	QPSK	12	0	20.47	20.41	20.43	20.38	20.41	22.1
5	QPSK	12	7	20.36	20.42	20.50	20.35	20.48	
5	QPSK	12	13	20.36	20.37	20.36	20.38	20.40	
5	QPSK	25	0	20.40	20.45	20.33	20.34	20.40	22.1
5	16QAM	1	0	20.31	20.32	20.37	20.40	20.44	
5	16QAM	1	12	20.47	20.39	20.45	20.42	20.43	
5	16QAM	1	24	20.31	20.43	20.46	20.41	20.42	22.1
5	16QAM	12	0	20.42	20.45	20.43	20.35	20.40	
5	16QAM	12	7	20.42	20.43	20.38	20.35	20.47	
5	16QAM	12	13	20.39	20.47	20.45	20.40	20.40	22.1
5	16QAM	25	0	20.39	20.34	20.33	20.43	20.45	
5	64QAM	1	0	20.39	20.37	20.38	20.37	20.50	
5	64QAM	1	12	20.47	20.38	20.43	20.46	20.41	22.1
5	64QAM	1	24	20.35	20.35	20.42	20.42	20.41	
5	64QAM	12	0	20.32	20.38	20.44	20.32	20.31	
5	64QAM	12	7	20.36	20.43	20.35	20.43	20.35	22.1
5	64QAM	12	13	20.40	20.35	20.38	20.46	20.47	
5	64QAM	25	0	20.33	20.46	20.34	20.45	20.43	
5	256QAM	1	0	19.21	19.22	19.26	19.25	19.11	21
5	256QAM	1	12	19.26	19.21	19.19	19.27	19.25	
5	256QAM	1	24	19.37	19.18	19.24	19.23	19.17	
5	256QAM	12	0	19.22	19.18	19.28	19.20	19.23	21
5	256QAM	12	7	19.29	19.16	19.29	19.30	19.22	



**FCC SAR TEST REPORT**

Report No. : FA182625-12

5	256QAM	12	13	19.27	19.34	19.34	19.22	19.36	
5	256QAM	25	0	19.29	19.24	19.22	19.23	19.17	

<LTE Band 48 FCC Part 96>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				55340	55830	56150	56640	
Frequency (MHz)				3560	3609	3641	3690	
20	QPSK	1	0	18.65	18.70	18.67	18.44	19
20	QPSK	1	49	18.50	18.56	18.55	18.33	
20	QPSK	1	99	18.45	18.60	18.52	18.29	
20	QPSK	50	0	18.55	18.60	18.58	18.31	19
20	QPSK	50	24	18.50	18.50	18.52	18.28	
20	QPSK	50	50	18.54	18.50	18.56	18.25	
20	QPSK	100	0	18.49	18.51	18.50	18.30	
20	16QAM	1	0	18.45	18.59	18.56	18.25	19
20	16QAM	1	49	18.46	18.54	18.50	18.34	
20	16QAM	1	99	18.48	18.57	18.52	18.30	
20	16QAM	50	0	18.52	18.56	18.51	18.27	19
20	16QAM	50	24	18.45	18.51	18.48	18.25	
20	16QAM	50	50	18.53	18.53	18.50	18.33	
20	16QAM	100	0	18.48	18.55	18.52	18.32	
20	64QAM	1	0	18.48	18.54	18.47	18.32	19
20	64QAM	1	49	18.45	18.53	18.57	18.33	
20	64QAM	1	99	18.54	18.59	18.52	18.29	
20	64QAM	50	0	18.50	18.53	18.51	18.32	19
20	64QAM	50	24	18.46	18.57	18.53	18.32	
20	64QAM	50	50	18.49	18.55	18.48	18.29	
20	64QAM	100	0	18.47	18.55	18.56	18.26	
20	256QAM	1	0	17.72	17.74	17.68	17.65	18.1
20	256QAM	1	49	17.76	17.82	17.78	17.75	
20	256QAM	1	99	17.72	17.76	17.67	17.69	
20	256QAM	50	0	17.73	17.72	17.70	17.69	18.1
20	256QAM	50	24	17.72	17.81	17.78	17.71	
20	256QAM	50	50	17.75	17.83	17.74	17.80	
20	256QAM	100	0	17.74	17.73	17.76	17.75	
Channel				55315	55820	56160	56665	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3608	3642	3692.5	
15	QPSK	1	0	18.51	18.55	18.56	18.34	19
15	QPSK	1	37	18.31	18.45	18.45	18.17	
15	QPSK	1	74	18.25	18.44	18.34	18.09	
15	QPSK	36	0	18.32	18.30	18.40	18.21	19
15	QPSK	36	20	18.35	18.37	18.36	18.15	
15	QPSK	36	39	18.36	18.36	18.45	18.07	
15	QPSK	75	0	18.32	18.33	18.40	18.13	
15	16QAM	1	0	18.33	18.42	18.43	18.09	19
15	16QAM	1	37	18.28	18.38	18.33	18.15	
15	16QAM	1	74	18.31	18.44	18.32	18.10	
15	16QAM	36	0	18.33	18.41	18.41	18.13	19
15	16QAM	36	20	18.32	18.40	18.30	18.14	
15	16QAM	36	39	18.42	18.33	18.38	18.15	
15	16QAM	75	0	18.29	18.39	18.40	18.20	
15	64QAM	1	0	18.31	18.37	18.27	18.16	19
15	64QAM	1	37	18.35	18.41	18.47	18.14	
15	64QAM	1	74	18.35	18.46	18.35	18.14	
15	64QAM	36	0	18.33	18.34	18.31	18.22	19
15	64QAM	36	20	18.26	18.46	18.42	18.13	
15	64QAM	36	39	18.39	18.44	18.35	18.19	
15	64QAM	75	0	18.27	18.44	18.45	18.07	
15	256QAM	1	0	17.54	17.56	17.48	17.48	18.1
15	256QAM	1	37	17.59	17.67	17.64	17.62	



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

15	256QAM	1	74	17.53	17.58	17.54	17.54	18.1
15	256QAM	36	0	17.61	17.57	17.53	17.58	
15	256QAM	36	20	17.54	17.64	17.63	17.60	
15	256QAM	36	39	17.62	17.72	17.63	17.61	
15	256QAM	75	0	17.58	17.59	17.57	17.62	
Channel				55290	55815	56165	56690	Tune-up limit (dBm)
Frequency (MHz)				3555	3607.5	3642.5	3695	
10	QPSK	1	0	18.50	18.60	18.47	18.24	19
10	QPSK	1	25	18.34	18.36	18.45	18.23	
10	QPSK	1	49	18.27	18.48	18.42	18.12	
10	QPSK	25	0	18.29	18.40	18.44	18.18	19
10	QPSK	25	12	18.33	18.30	18.42	18.17	
10	QPSK	25	25	18.43	18.33	18.43	18.07	
10	QPSK	50	0	18.36	18.31	18.36	18.13	
10	16QAM	1	0	18.33	18.42	18.42	18.09	
10	16QAM	1	25	18.33	18.36	18.36	18.20	19
10	16QAM	1	49	18.33	18.46	18.34	18.17	
10	16QAM	25	0	18.34	18.44	18.32	18.11	
10	16QAM	25	12	18.27	18.36	18.30	18.15	19
10	16QAM	25	25	18.40	18.34	18.35	18.13	
10	16QAM	50	0	18.28	18.37	18.36	18.22	
10	64QAM	1	0	18.33	18.42	18.32	18.18	
10	64QAM	1	25	18.35	18.36	18.46	18.18	
10	64QAM	1	49	18.38	18.41	18.36	18.11	19
10	64QAM	25	0	18.36	18.40	18.36	18.22	
10	64QAM	25	12	18.31	18.39	18.39	18.17	
10	64QAM	25	25	18.33	18.39	18.37	18.18	
10	64QAM	50	0	18.32	18.44	18.39	18.16	
10	256QAM	1	0	17.58	17.61	17.49	17.54	18.1
10	256QAM	1	25	17.60	17.69	17.65	17.63	
10	256QAM	1	49	17.56	17.59	17.48	17.55	
10	256QAM	25	0	17.59	17.61	17.58	17.55	18.1
10	256QAM	25	12	17.62	17.64	17.60	17.53	
10	256QAM	25	25	17.61	17.73	17.60	17.64	
10	256QAM	50	0	17.57	17.54	17.61	17.62	
Channel				55265	55810	56170	56715	
Frequency (MHz)				3552.5	3607	3643	3697.5	
5	QPSK	1	0	18.52	18.55	18.50	18.32	19
5	QPSK	1	12	18.30	18.40	18.44	18.14	
5	QPSK	1	24	18.27	18.48	18.42	18.18	
5	QPSK	12	0	18.37	18.30	18.44	18.11	19
5	QPSK	12	7	18.33	18.32	18.40	18.09	
5	QPSK	12	13	18.37	18.31	18.44	18.15	
5	QPSK	25	0	18.32	18.39	18.31	18.12	
5	16QAM	1	0	18.32	18.40	18.39	18.14	
5	16QAM	1	12	18.34	18.44	18.39	18.24	19
5	16QAM	1	24	18.31	18.44	18.35	18.15	
5	16QAM	12	0	18.41	18.41	18.31	18.17	
5	16QAM	12	7	18.26	18.39	18.31	18.13	19
5	16QAM	12	13	18.33	18.42	18.38	18.13	
5	16QAM	25	0	18.35	18.45	18.42	18.21	
5	64QAM	1	0	18.30	18.41	18.28	18.14	
5	64QAM	1	12	18.32	18.40	18.47	18.21	
5	64QAM	1	24	18.40	18.42	18.34	18.09	19
5	64QAM	12	0	18.31	18.36	18.33	18.17	
5	64QAM	12	7	18.29	18.43	18.39	18.17	
5	64QAM	12	13	18.29	18.35	18.30	18.19	
5	64QAM	25	0	18.35	18.42	18.40	18.16	
5	256QAM	1	0	17.60	17.61	17.56	17.53	18.1
5	256QAM	1	12	17.65	17.66	17.64	17.59	
5	256QAM	1	24	17.58	17.63	17.57	17.51	
5	256QAM	12	0	17.63	17.55	17.55	17.49	18.1



5	256QAM	12	7	17.52	17.70	17.64	17.56
5	256QAM	12	13	17.59	17.71	17.62	17.67
5	256QAM	25	0	17.61	17.54	17.64	17.60

**<LTE Carrier Aggregation combinations>**

**General Note:**

1. This device supports Carrier Aggregation on downlink only for inter and intra band, Uplink CA is not supported. For the device supports combination bands and configurations are according to 3GPP.
2. In applying the existing power measurement procedure of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of the frequency band and CCs in each row need consideration, and that configurations require power measurement should be highlighted in the below table.

2CC Downlink Carrier Aggregation			3CC Downlink Carrier Aggregation			4CC Downlink Carrier Aggregation			5CC Downlink Carrier Aggregation		
Number	Combination	Covered by Measurement Superset	Number	Combination	Covered by Measurement Superset	Number	Combination	Covered by Measurement Superset	Number	Combination	Covered by Measurement Superset
1	CA_2C	388	67	CA_41D	346	188	CA_41E	346	331	CA_48F	389
2	CA_5B	383	68	CA_42D	346	189	CA_42E	346	332	CA_41C-41D	346
3	CA_7B	384	69	CA_48D	389	190	CA_48E	389	333	CA_48C-48D	389
4	CA_7C	384	70	CA_66D	389	191	CA_41A-41A-41C	346	334	CA_2A-48A-48D	387
5	CA_12B	385	71	CA_25A-25A-25A	344	192	CA_41A-41D	346	335	CA_2A-48C-48C	387
6	CA_38C	44	72	CA_41A-41A-41A	346	193	CA_41C-41C	346	336	CA_2A-48E	387
7	CA_41C	346	73	CA_41A-41C	346	194	CA_42A-42D	346	337	CA_4A-48E	
8	CA_42C	346	74	CA_42A-42C	346	195	CA_42C-42C	346	338	CA_5A-48A-48D	375
9	CA_48C	389	75	CA_48A-48C	389	196	CA_48A-48D	389	339	CA_5B-66A-66B	383
10	CA_66B	389	76	CA_66A-66A-66A	389	197	CA_48C-48C	389	340	CA_5B-66A-66C	383
11	CA_66C	389	77	CA_66A-66B	389	198	CA_2A-2A-4A-4A	381	341	CA_13A-48A-48D	389
12	CA_2A-2A	388	78	CA_66A-66C	389	199	CA_2A-2A-5B	383	342	CA_13A-48C-48C	389
13	CA_4A-4A	381	79	CA_2A-2A-4A	381	200	CA_2A-2A-12A-12A	385	343	CA_13A-48E	389
14	CA_5A-5A	383	80	CA_2A-2A-5A	383	201	CA_2A-2A-12B	385	344	CA_25A-25A-41D	
15	CA_7A-7A	384	81	CA_2A-2A-7A	384	202	CA_2A-2A-66A-66A	388	345	CA_41A-42C-42C	346
16	CA_12A-12A	385	82	CA_2A-2A-12A	385	203	CA_2A-2A-66B	388	346	CA_41D-42C	
17	CA_25A-25A	344	83	CA_2A-2A-13A	387	204	CA_2A-2A-66C	388	347	CA_48A-48C-66B	389
18	CA_41A-41A	346	84	CA_2A-2A-14A	388	205	CA_2A-48A-48C	387	348	CA_48A-48C-66C	389
19	CA_42A-42A	346	85	CA_2A-2A-30A	388	206	CA_2A-48D	387	349	CA_48A-48D-66A	389
20	CA_48A-48A	389	86	CA_2A-2A-66A	388	207	CA_2A-66A-66A-66A	388	350	CA_48C-48C-66A	389
21	CA_66A-66A	389	87	CA_2A-2A-71A	302	208	CA_2A-66A-66B	388	351	CA_48E-66A	389
22	CA_2A-4A	381	88	CA_2A-4A-4A	381	209	CA_2A-66A-66C	388	352	CA_2A-2A-5A-66A-66A	383
23	CA_2A-5A	383	89	CA_2A-5B	383	210	CA_2C-66A-66A	388	353	CA_2A-2A-5A-66B	383
24	CA_2A-7A	384	90	CA_2C-5A	383	211	CA_2A-66D	388	354	CA_2A-2A-5A-66C	383
25	CA_2A-12A	385	91	CA_2A-7A-7A	384	212	CA_4A-4A-5B	381	355	CA_2A-2A-12A-66A-66A	385
26	CA_2A-13A	387	92	CA_2A-7C	384	213	CA_4A-4A-12A-12A	323	356	CA_2A-2A-12B-66A	385
27	CA_2A-14A	388	93	CA_2A-12A-12A	385	214	CA_4A-4A-12B	323	357	CA_2A-2A-14A-66A-66A	388
28	CA_2A-17A		94	CA_2A-12B	385	215	CA_4A-48A-48C	337	358	CA_2C-5B-30A	383
29	CA_2A-30A	388	95	CA_2C-12A	385	216	CA_4A-48D	337	359	CA_2A-5B-66A-66A	383
30	CA_2A-48A	387	96	CA_2C-30A	388	217	CA_5A-5A-66A-66A	383	360	CA_2A-5B-66B	383
31	CA_2A-66A	388	97	CA_2A-48A-48A	387	218	CA_5A-5A-66B	383	361	CA_2A-5B-66C	383
32	CA_2A-71A	302	98	CA_2A-48C	387	219	CA_5A-5A-66C	383	362	CA_2A-7A-7A-66A-66A	384
33	CA_4A-5A	381	99	CA_2A-66A-66A	388	220	CA_5A-48D	375	363	CA_2A-7C-66A-66A	384
34	CA_4A-12A	323	100	CA_2A-66B	388	221	CA_5A-66A-66B	383	364	CA_2A-12B-66A-66A	385
35	CA_4A-13A	308	101	CA_2A-66C	388	222	CA_5A-66A-66C	383	365	CA_2A-13A-48A-48C	387
36	CA_4A-17A		102	CA_2C-66A	388	223	CA_5B-66A-66A	383	366	CA_2A-13A-48D	387
37	CA_4A-30A	381	103	CA_4A-4A-5A	381	224	CA_5A-66D	383	367	CA_2A-13A-66A-66B	387
38	CA_4A-48A	337	104	CA_4A-4A-7A	322	225	CA_5B-66B	383	368	CA_2A-13A-66A-66C	387
39	CA_4A-71A	254	105	CA_4A-4A-12A	323	226	CA_5B-66C	383	369	CA_2A-13A-66D	387
40	CA_5A-7A	161	106	CA_4A-4A-13A	308	227	CA_7A-7A-66A-66A	384	370	CA_2A-14A-66A-66A-66A	388
41	CA_5A-12A	376	107	CA_4A-4A-30A	381	228	CA_7C-66A-66A	384	371	CA_2A-48A-48C-66A	387



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

42	CA_5A-25A		108	CA_4A-4A-71A	254	229	CA_12B-66A-66A	385	372	CA_2A-48D-66A	387
43	CA_5A-30A	383	109	CA_4A-5B	381	230	CA_13A-48A-48C	389	373	CA_4A-4A-5B-30A	381
44	CA_5A-38A		110	CA_4A-7A-7A	322	231	CA_13A-48D	389	374	CA_5B-30A-66A-66A	383
45	CA_5A-41A		111	CA_4A-7C	322	232	CA_13A-66A-66A-66A	389	375	CA_5A-48D-66A	
46	CA_5A-48A	375	112	CA_4A-12A-12A	323	233	CA_13A-66A-66B	389	376	CA_2A-2A-5A-12A-66A	
47	CA_5A-66A	383	113	CA_4A-12B	323	234	CA_13A-66A-66C	389	377	CA_2A-2A-5A-30A-66A	383
48	CA_7A-12A	384	114	CA_4A-48C	337	235	CA_13A-66D	389	378	CA_2A-2A-7A-12A-66A	384
49	CA_7A-42A		115	CA_5A-5A-66A	383	236	CA_14A-66A-66A-66A	388	379	CA_2A-2A-12A-30A-66A	385
50	CA_7A-66A	384	116	CA_5A-7A-7A	161	237	CA_25A-25A-41C	344	380	CA_2A-2A-14A-30A-66A	388
51	CA_12A-25A		117	CA_5A-7C	161	238	CA_25A-41D	344	381	CA_2A-4A-5B-30A	
52	CA_12A-30A	385	118	CA_5A-12B	376	239	CA_41A-42D	346	382	CA_2A-5A-30A-66A-66A	383
53	CA_12A-66A	385	119	CA_5B-30A	383	240	CA_41C-42C	346	383	CA_2A-5B-30A-66A	
54	CA_13A-48A	389	120	CA_5A-48A-48A	375	241	CA_41D-42A	346	384	CA_2A-7A-12B-66A	
55	CA_13A-66A	389	121	CA_5A-48C	375	242	CA_48A-48A-66A-66A	389	385	CA_2A-12A-30A-66A-66A	
56	CA_14A-30A	388	122	CA_5A-66A-66A	383	243	CA_48A-48A-66B	389	386	CA_2A-13A-48A-48A-66A	387
57	CA_14A-66A	388	123	CA_5A-66B	383	244	CA_48A-48A-66C	389	387	CA_2A-13A-48C-66A	
58	CA_25A-26A	319	124	CA_5A-66C	383	245	CA_48A-48C-66A	389	388	CA_2A-14A-30A-66A-66A	
59	CA_25A-41A	344	125	CA_5B-66A	383	246	CA_48A-66A-66A-66A	389			
60	CA_26A-41A	319	126	CA_7A-7A-13A	283	247	CA_48C-66A-66A	389			
61	CA_30A-66A	388	127	CA_7A-12B	384	248	CA_48C-66B	389	6CC Downlink Carrier Aggregation		
62	CA_41A-42A	346	128	CA_7A-66A-66A	384	249	CA_48C-66C	389	Number	Combination	Covered by Measurement Superset
63	CA_41A-48A		129	CA_7C-66A	384	250	CA_48D-66A	389			
64	CA_48A-66A	389	130	CA_12A-48C		251	CA_2A-2A-4A-5A	381	389	CA_13A-48E-66A	
65	CA_48A-71A	152	131	CA_12A-66A-66A	385	252	CA_2A-2A-4A-12A	323			
66	CA_66A-71A	302	132	CA_12A-66C	385	253	CA_2A-2A-4A-13A				
			133	CA_12B-66A	385	254	CA_2A-2A-4A-71A				
			134	CA_13A-66A-66A	389	255	CA_2A-2A-5A-12A	376			
			135	CA_13A-66B	389	256	CA_2A-2A-5A-30A	383			
			136	CA_13A-66C	389	257	CA_2A-2A-5A-66A	383			
			137	CA_14A-66A-66A	388	258	CA_2A-2A-7A-12A	384			
			138	CA_25A-25A-26A	319	259	CA_2A-2A-7A-66A	384			
			139	CA_25A-25A-41A	344	260	CA_2A-2A-12A-30A	385			
			140	CA_25A-41C	344	261	CA_2A-2A-12A-66A	385			
			141	CA_26A-41C	319	262	CA_2A-2A-13A-66A	387			
			142	CA_30A-66A-66A	388	263	CA_2A-2A-14A-30A	388			
			143	CA_41A-42A-42A	346	264	CA_2A-2A-14A-66A	388			
			144	CA_41A-42C	346	265	CA_2A-2A-30A-66A	388			
			145	CA_41C-42A	346	266	CA_2A-2A-66A-71A	302			
			146	CA_48A-48A-66A	389	267	CA_2A-4A-4A-5A	381			
			147	CA_48A-48A-71A	152	268	CA_2A-4A-4A-12A	323			
			148	CA_48A-66A-66A	389	269	CA_2A-4A-5B	381			
			149	CA_48A-66B	389	270	CA_2A-4A-7A-7A	322			
			150	CA_48A-66C	389	271	CA_2A-4A-7C	322			
			151	CA_48C-66A	389	272	CA_2A-4A-12A-12A	323			
			152	CA_48C-71A		273	CA_2A-4A-12B	323			
			153	CA_66A-66A-71A	302	274	CA_2A-5A-12B	376			
			154	CA_66C-71A	302	275	CA_2A-5B-30A	383			
			155	CA_2A-4A-5A	381	276	CA_2C-5A-30A	383			
			156	CA_2A-4A-7A	322	277	CA_2A-5A-48A-48A	326			
			157	CA_2A-4A-12A	323	278	CA_2A-5A-48C	326			
			158	CA_2A-4A-13A	253	279	CA_2A-5A-66A-66A	383			
			159	CA_2A-4A-30A	381	280	CA_2A-5A-66B	383			
			160	CA_2A-4A-71A	254	281	CA_2A-5A-66C	383			
			161	CA_2A-5A-7A		282	CA_2A-5B-66A	383			
			162	CA_2A-5A-12A	376	283	CA_2A-7A-7A-13A				
			163	CA_2A-5A-30A	383	284	CA_2A-7A-12B	384			



**FCC SAR TEST REPORT**

Report No. : FA182625-12

			164	CA_2A-5A-48A	326	285	CA_2A-7A-66A-66A	384			
			165	CA_2A-5A-66A	383	286	CA_2A-7C-66A	384			
			166	CA_2A-7A-12A	384	287	CA_2C-12A-30A	385			
			167	CA_2A-7A-66A	384	288	CA_2A-12A-66A-66A	385			
			168	CA_2A-12A-30A	385	289	CA_2A-12A-66C	385			
			169	CA_2A-12A-66A	385	290	CA_2A-12B-66A	385			
			170	CA_2A-13A-48A	387	291	CA_2A-13A-48A-48A	387			
			171	CA_2A-13A-66A	387	292	CA_2A-13A-48C	387			
			172	CA_2A-14A-30A	388	293	CA_2A-13A-66A-66A	387			
			173	CA_2A-14A-66A	388	294	CA_2A-13A-66B	387			
			174	CA_2A-30A-66A	388	295	CA_2A-13A-66C	387			
			175	CA_2A-48A-66A	387	296	CA_2A-14A-66A-66A	388			
			176	CA_2A-66A-71A	302	297	CA_2A-30A-66A-66A	388			
			177	CA_4A-5A-12A	320	298	CA_2A-48A-48A-66A	387			
			178	CA_4A-5A-30A	381	299	CA_2A-48A-66A-66A	387			
			179	CA_4A-7A-12A	322	300	CA_2A-48C-66A	387			
			180	CA_4A-12A-30A	323	301	CA_2A-66A-66A-71A	302			
			181	CA_5A-12A-66A	376	302	CA_2A-66C-71A				
			182	CA_5A-30A-66A	383	303	CA_4A-4A-5A-12A	320			
			183	CA_7A-12A-66A	384	304	CA_4A-4A-5A-30A	381			
			184	CA_12A-30A-66A	385	305	CA_4A-4A-12A-30A	323			
			185	CA_13A-48A-66A	389	306	CA_4A-5A-12B	320			
			186	CA_14A-30A-66A	388	307	CA_4A-5B-30A	381			
			187	CA_25A-26A-41A	319	308	CA_4A-13A-48C				
						309	CA_5A-30A-66A-66A	383			
						310	CA_5B-30A-66A	383			
						311	CA_5A-48A-48A-66A	375			
						312	CA_7A-12B-66A	384			
						313	CA_12A-30A-66A-66A	385			
						314	CA_13A-48A-48A-66A	389			
						315	CA_13A-48A-66B	389			
						316	CA_13A-48A-66C	389			
						317	CA_13A-48C-66A	389			
						318	CA_14A-30A-66A-66A	388			
						319	CA_25A-26A-41C				
						320	CA_2A-4A-5A-12A				
						321	CA_2A-4A-5A-30A	381			
						322	CA_2A-4A-7A-12A				
						323	CA_2A-4A-12A-30A				
						324	CA_2A-5A-12A-66A	376			
						325	CA_2A-5A-30A-66A	383			
						326	CA_2A-5A-48A-66A				
						327	CA_2A-7A-12A-66A	384			
						328	CA_2A-12A-30A-66A	385			
						329	CA_2A-13A-48A-66A	387			
						330	CA_2A-14A-30A-66A	388			

**<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	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	2	20	1880	18900	QPSK	1	0	17	10	740	5790	22.58	22.70
	4	20	1745	20300	QPSK	1	0	17	10	740	5790	22.63	22.80
	5	10	836.5	20525	QPSK	1	0	25	20	1960	8340	22.31	22.45
	5	10	836.5	20525	QPSK	1	0	38	20	2595	38000	22.40	22.45
	5	10	836.5	20525	QPSK	1	0	41	20	2593	40620	22.40	22.45
	7	20	2510	20850	QPSK	1	0	42	20	3500	42590	22.26	22.32
	12	10	707.5	23095	QPSK	1	0	25	20	1960	8340	22.51	22.64
	41	20	2593	40620	QPSK	1	0	48	20	3609	55830	22.30	22.33

**<Three Carrier power verification>**

Configure	PCC							SCC1				SCC2				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	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	12	10	707.5	23095	QPSK	1	0	48	20	3609	55830	48	20	3628.8	56028	22.47	22.64
	48	20	3609	55830	QPSK	1	0	48	20	3628.8	56028	71	20	634.5	68761	22.41	22.53
	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	7	20	2655	3100	22.62	22.70

**<Four Carrier power verification>**

Configure	PCC							SCC1				SCC2				SCC3				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	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	2	20	1880	18900	QPSK	1	0	2	5	1987.5	1175	4	20	2132.5	2175	13	10	751	5230	22.58	22.70
	2	20	1880	18900	QPSK	1	0	2	5	1987.5	1175	4	20	2132.5	2175	71	20	634.5	68761	22.47	22.70
	2	20	1880	18900	QPSK	1	0	7	20	2655	3100	7	5	2687.5	3425	13	10	751	5230	22.53	22.70
	2	20	1880	18900	QPSK	1	0	66	20	2155	66886	66	20	2174.8	67084	71	20	634.5	68761	22.55	22.70
	4	20	1745	20300	QPSK	1	0	13	10	751	5230	48	20	3609	55830	48	20	3628.8	56028	22.62	22.80
	25	20	1880	26340	QPSK	1	0	26	15	876.5	8865	41	20	2593	40620	41	20	2612.8	40818	22.64	22.74
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	5	10	881.5	2525	12	10	737.5	5095	22.59	22.70
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	7	20	2655	3100	12	10	737.5	5095	22.51	22.70
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	12	10	737.5	5095	30	10	2355	9820	22.53	22.70
	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	48	20	3609	55830	66	20	2155	66886	22.55	22.70

**<Five Carrier power verification>**

Configure	PCC							SCC1				SCC2				SCC3				SCC4				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	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	4	20	1745	20300	QPSK	1	0	48	20	3560	55340	48	20	3579.8	55538	48	20	3599.6	55736	48	20	3619.4	55934	22.62	22.80
	25	20	1880	26340	QPSK	1	0	25	5	1992.5	8665	41	20	2593	40620	41	20	2612.8	40818	41	20	2632.6	41016	22.58	22.74
	41	20	2593	40620	QPSK	1	0	41	20	2612.8	40818	41	20	2632.6	41016	41	20	2652.4	41214	42	20	3500	42590	22.30	22.33
	5	10	836.5	20525	QPSK	1	0	48	20	3560	55340	48	20	3579.8	55538	48	20	3599.6	55736	66	20	2155	66886	22.36	22.45
	2	20	1880	18900	QPSK	1	0	2	20	1960	900	5	10	881.5	2525	12	10	737.5	5095	66	20	2155	66886	22.52	22.70
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	5	10	874	2450	5	5	881.2	2522	30	10	2355	9820	22.63	22.70
	2	20	1880	18900	QPSK	1	0	5	10	874	2450	5	5	881.2	2522	30	10	2355	9820	66	20	2155	66886	22.58	22.70
	2	20	1880	18900	QPSK	1	0	7	20	2655	3100	12	10	734	5060	12	5	741.2	5132	66	20	2155	66886	22.58	22.70
	2	20	1880	18900	QPSK	1	0	12	10	737.5	5095	30	10	2355	9820	66	20	2155	66886	66	5	2197.5	67311	22.34	22.70
	2	20	1880	18900	QPSK	1	0	13	10	751	5230	48	20	3560	55340	48	20	3579.8	55538	66	20	2155	66886	22.41	22.70
2	20	1880	18900	QPSK	1	0	14	10	763	5330	30	10	2355	9820	66	20	2155	66886	66	5	2197.5	67311	22.48	22.70	

**<Six Carrier power verification>**

Configure	PCC							SCC1				SCC2				SCC3				SCC4				SCC5		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	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	13	10	782	23230	QPSK	1	0	48	20	3560	55340	48	20	3579.8	55538	48	20	3599.6	55736	48	20	3619.4	55934	66	20	2155	66886	22.18	22.37



**<LTE Uplink carrier aggregation>**

2CC Uplink Carrier Aggregation	
Number	Combination
1	7C
2	41C
3	48C

**<Intra-band>**

**General Note:**

- i. The device supports intra-band uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.
- ii. The device supports uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.
- iii. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- iv. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- v. Additional SAR measurement for LTE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

CA_7C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	0	0	0	1	0	21.31	22.8
21100	20902	QPSK	1	0	1	99	2	0	21.03	22.8
21350	21152	QPSK	1	0	1	99	2	0	20.86	22.8

CA_41C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	0	0	0	1	0	18.93	20.5
40185	39987	QPSK	1	0	1	99	2	0	18.75	20.5
40620	40422	QPSK	1	0	1	99	2	0	18.99	20.5
41055	40857	QPSK	1	0	1	99	2	0	19.01	20.5
41490	41292	QPSK	1	0	1	99	2	0	19.1	20.5

CA_48C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	18.43	19
55830	55632	QPSK	1	0	1	99	2	0	18.26	19
56150	55952	QPSK	1	0	1	99	2	0	18.17	19
56640	56442	QPSK	1	0	1	99	2	0	18.3	19

## 12. 5G NR Output Power (Unit: dBm)

**General Note:**

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below
  - a. For DFT-OFDM output power measurement, full measurement was done for Pi/2 BPSK and QPSK and for the largest supported bandwidth, repeat test for 16QAM/64QAM/256QAM under 1RB 1Offset configuration. For smaller bandwidth, measure conducted power for Pi/2 BPSK and 1RB 1Offset configuration.
  - b. According to the tune-up, CP-OFDM output power is not ½ dB higher than DFT-OFDM mode, and the reported SAR of DFT-OFDM mode reported SAR is ≤ 1.45 W/kg, SAR test and thus conducted power for CP-OFDM mode is not required.
  - c. To start SAR test for the largest channel bandwidth for PI/2 BPSK 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. Also do SAR test for 50% RB allocation for PI/2 BPSK SAR testing using 1RB PI/2 BPSK allocation procedure
  - d. For PI/2 BPSK with 100% RB allocation, SAR test 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.
  - e. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
  - f. Smaller bandwidth output power for each RB allocation configuration for this device is not ½ 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, smaller bandwidth SAR testing is not required for this device
2. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.

**<3GPP 38.101 MPR for EN-DC>**

**Table 6.2.2-1 Maximum power reduction (MPR) for power class 3**

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$	$\leq 0.5^2$	0 <sup>2</sup>
	QPSK	$\leq 1$		0
	16 QAM	$\leq 2$		$\leq 1$
	256 QAM		$\leq 2.5$	
CP-OFDM	QPSK	$\leq 3$		$\leq 1.5$
	16 QAM	$\leq 3$		$\leq 2$
	64 QAM		$\leq 3.5$	
	256 QAM		$\leq 6.5$	
	NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability <i>powerBoosting-pi2BPSK</i> and if the IE <i>powerBoostPi2BPSK</i> is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0 dB MPR is 26 dBm.			
NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE <i>powerBoostPi2BPSK</i> is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.				

**Table 6.2.2-2 Maximum power reduction (MPR) for power class 2**

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5$	$\leq 0.5$	0
	QPSK	$\leq 3.5$	$\leq 1$	0
	16 QAM	$\leq 3.5$	$\leq 2$	$\leq 1$
	64 QAM	$\leq 3.5$		$\leq 2.5$
	256 QAM		$\leq 4.5$	
CP-OFDM	QPSK	$\leq 3.5$	$\leq 3$	$\leq 1.5$
	16 QAM	$\leq 3.5$	$\leq 3$	$\leq 2$
	64 QAM		$\leq 3.5$	
	256 QAM		$\leq 6.5$	

**<EN-DC combination>**

Exposure position	NR Band	Combination
Body	n2	DC_12A_n2A/DC_5A_n2A
	n5	DC_2A_n5A/DC_7A_n5A/DC_66A_n5A
	n66	DC_13A_n66A/DC_5A_n66A/DC_12A_n66A
	n71	DC_2A_n71A/DC_7A_n71A/DC_66A_n71A



<FR1 n2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				372000	376000	380000	
Frequency (MHz)				1860	1880	1900	
20	PI/2 BPSK	1	1	20.83	20.97	20.71	21.7
20	PI/2 BPSK	1	53	20.64	20.74	20.49	
20	PI/2 BPSK	1	104	20.66	20.86	20.54	
20	PI/2 BPSK	50	0	20.60	20.80	20.41	21.7
20	PI/2 BPSK	50	28	20.58	20.75	20.46	21.7
20	PI/2 BPSK	50	56	20.76	20.88	20.63	21.7
20	PI/2 BPSK	100	0	20.76	20.86	20.56	
20	QPSK	1	1	20.74	20.87	20.64	21.7
20	QPSK	1	53	20.60	20.73	20.40	
20	QPSK	1	104	20.56	20.69	20.43	
20	QPSK	50	0	20.70	20.81	20.57	21.7
20	QPSK	50	28	20.63	20.75	20.46	21.7
20	QPSK	50	56	20.56	20.69	20.44	21.7
20	QPSK	100	0	20.49	20.66	20.39	
20	16QAM	1	1	20.50	20.67	20.34	21.7
20	64QAM	1	1	20.72	20.87	20.55	21.7
20	256QAM	1	1	19.36	19.48	19.23	19.9
Channel				371500	376000	380500	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	PI/2 BPSK	1	1	20.75	20.81	20.63	21.7
Channel				371000	376000	381000	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	PI/2 BPSK	1	1	20.80	20.85	20.66	21.7
Channel				370500	376000	381500	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	PI/2 BPSK	1	1	20.77	20.79	20.70	21.7



<FR1 n5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				166800	167300	167800	
Frequency (MHz)				834	836.5	839	
20	PI/2 BPSK	1	1	21.63	21.82	21.72	22.4
20	PI/2 BPSK	1	53	21.42	21.57	21.39	
20	PI/2 BPSK	1	104	21.24	21.37	21.20	
20	PI/2 BPSK	50	0	21.31	21.49	21.29	22.4
20	PI/2 BPSK	50	28	21.41	21.60	21.40	22.4
20	PI/2 BPSK	50	56	21.48	21.63	21.47	22.4
20	PI/2 BPSK	100	0	21.32	21.47	21.29	
20	QPSK	1	1	21.45	21.64	21.44	22.4
20	QPSK	1	53	21.42	21.55	21.43	
20	QPSK	1	104	21.21	21.37	21.18	
20	QPSK	50	0	21.23	21.40	21.26	22.4
20	QPSK	50	28	21.29	21.39	21.27	22.4
20	QPSK	50	56	21.31	21.48	21.33	22.4
20	QPSK	100	0	21.39	21.55	21.39	
20	16QAM	1	1	21.34	21.50	21.35	22.4
20	64QAM	1	1	21.20	21.35	21.19	21.5
20	256QAM	1	1	19.54	19.72	19.61	20.0
Channel				166300	167300	168300	Tune-up limit (dBm)
Frequency (MHz)				831.5	836.5	841.5	
15	PI/2 BPSK	1	1	21.46	21.62	21.54	22.4
Channel				165800	167300	168800	Tune-up limit (dBm)
Frequency (MHz)				829	836.5	844	
10	PI/2 BPSK	1	1	21.53	21.68	21.52	22.4
Channel				165300	167300	169300	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	PI/2 BPSK	1	1	21.50	21.59	21.48	22.4



<FR1 n66>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				344000	349000	354000	
Frequency (MHz)				1720	1745	1770	
20	PI/2 BPSK	1	1	21.54	21.90	21.80	
20	PI/2 BPSK	1	53	21.06	21.25	21.11	22.1
20	PI/2 BPSK	1	104	21.12	21.17	21.00	
20	PI/2 BPSK	50	0	21.24	21.18	21.00	22.1
20	PI/2 BPSK	50	28	21.14	21.31	21.12	22.1
20	PI/2 BPSK	50	56	21.05	21.17	21.22	22.1
20	PI/2 BPSK	100	0	21.24	21.22	21.09	
20	QPSK	1	1	21.24	21.20	21.09	22.1
20	QPSK	1	53	21.13	21.29	21.16	
20	QPSK	1	104	21.28	21.27	21.25	
20	QPSK	50	0	20.56	20.72	20.49	22.1
20	QPSK	50	28	21.20	21.32	21.30	22.1
20	QPSK	50	56	21.61	21.73	21.64	22.1
20	QPSK	100	0	21.60	21.64	21.58	
20	16QAM	1	1	21.52	21.52	21.45	22.1
20	64QAM	1	1	20.15	20.18	20.14	21.0
20	256QAM	1	1	18.61	18.72	18.62	20.0
Channel				343500	349000	354500	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	PI/2 BPSK	1	1	21.69	21.84	21.79	22.1
Channel				343000	349000	355000	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	PI/2 BPSK	1	1	21.71	21.85	21.63	22.1
Channel				342500	349000	355500	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	PI/2 BPSK	1	1	21.66	21.87	21.81	22.1



<FR1 n71>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				134600	136100	137600	
Frequency (MHz)				673	680.5	688	
20	PI/2 BPSK	1	1	21.99	22.03	21.86	23.2
20	PI/2 BPSK	1	53	21.81	21.91	21.84	
20	PI/2 BPSK	1	104	21.85	21.94	21.89	
20	PI/2 BPSK	50	0	21.87	21.90	21.85	23.2
20	PI/2 BPSK	50	28	21.86	21.93	21.90	23.2
20	PI/2 BPSK	50	56	21.81	21.86	21.84	23.2
20	PI/2 BPSK	100	0	21.80	21.84	21.90	
20	QPSK	1	1	21.86	21.97	21.82	
20	QPSK	1	53	21.84	21.98	21.83	23.2
20	QPSK	1	104	21.89	21.99	21.86	
20	QPSK	50	0	21.83	21.93	21.88	
20	QPSK	50	28	21.90	21.99	21.84	23.2
20	QPSK	50	56	21.80	21.85	21.81	22.5
20	QPSK	100	0	21.89	21.90	21.90	
20	16QAM	1	1	21.79	21.95	21.81	
20	64QAM	1	1	20.41	20.59	20.48	21.0
20	256QAM	1	1	18.98	18.81	18.97	19.0
Channel				134100	136100	138100	Tune-up limit (dBm)
Frequency (MHz)				670.5	680.5	690.5	
15	PI/2 BPSK	1	1	21.84	21.88	21.80	23.2
Channel				133600	136100	138600	Tune-up limit (dBm)
Frequency (MHz)				668	680.5	693	
10	PI/2 BPSK	1	1	21.80	21.85	21.76	23.2
Channel				133100	136100	139100	Tune-up limit (dBm)
Frequency (MHz)				665.5	680.5	695.5	
5	PI/2 BPSK	1	1	21.79	21.89	21.85	23.2



<FR1 n48>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				640000	641666	643332	
Frequency (MHz)				3600	3624.99	3649.98	
100	PI/2 BPSK	1	1	16.83	17.08	16.91	18.5
100	PI/2 BPSK	1	137	16.57	16.70	16.60	
100	PI/2 BPSK	1	271	16.92	16.69	16.95	
100	PI/2 BPSK	135	0	16.75	16.76	16.50	18.5
100	PI/2 BPSK	135	69	16.62	16.55	16.55	18.5
100	PI/2 BPSK	135	138	16.51	16.60	16.51	18.5
100	PI/2 BPSK	270	0	16.59	16.70	16.59	
100	QPSK	1	1	16.99	17.05	17.02	18.5
100	QPSK	1	137	16.58	16.54	16.61	
100	QPSK	1	271	16.70	16.96	16.91	
100	QPSK	135	0	16.82	16.79	16.65	18.5
100	QPSK	135	69	16.54	16.59	16.57	
100	QPSK	135	138	16.54	16.57	16.58	
100	QPSK	270	0	16.55	16.64	16.63	18.5
100	16QAM	1	1	16.50	16.78	16.66	18.5
100	64QAM	1	1	16.59	16.58	16.51	18.5
100	256QAM	1	1	16.58	16.55	16.54	18.5
Channel				639668	641666	643666	Tune-up limit (dBm)
Frequency (MHz)				3595.02	3624.99	3654.99	
90	PI/2 BPSK	1	1	16.57	16.60	16.50	18.5
Channel				639334	641666	644000	Tune-up limit (dBm)
Frequency (MHz)				3590.01	3624.99	3660	
80	PI/2 BPSK	1	1	16.56	16.57	16.52	18.5
Channel				638668	641666	644666	Tune-up limit (dBm)
Frequency (MHz)				3580.02	3624.99	3669.99	
60	PI/2 BPSK	1	1	16.52	16.58	16.50	18.5
Channel				638334	641666	645000	Tune-up limit (dBm)
Frequency (MHz)				3575.01	3624.99	3675	
50	PI/2 BPSK	1	1	16.75	16.56	16.52	18.5
Channel				638000	641666	645332	Tune-up limit (dBm)
Frequency (MHz)				3570	3624.99	3679.98	
40	PI/2 BPSK	1	1	16.57	16.53	16.55	18.5
Channel				637334	641666	646000	Tune-up limit (dBm)
Frequency (MHz)				3560.01	3624.99	3690	
20	PI/2 BPSK	1	1	16.52	16.52	16.50	18.5
Channel				637000	641666	646332	Tune-up limit (dBm)
Frequency (MHz)				3555	3624.99	3694.98	
10	PI/2 BPSK	1	1	16.59	16.51	16.50	18.5





<FR1 n77>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	15.00	14.81	14.60	15.7
100	PI/2 BPSK	1	137	14.80	14.79	14.53	
100	PI/2 BPSK	1	271	14.88	14.77	14.51	
100	PI/2 BPSK	135	0	14.84	14.74	14.52	15.7
100	PI/2 BPSK	135	69	14.88	14.79	14.56	15.7
100	PI/2 BPSK	135	138	14.87	14.70	14.53	15.7
100	PI/2 BPSK	270	0	14.82	14.75	14.60	
100	QPSK	1	1	14.85	14.78	14.54	15.7
100	QPSK	1	137	14.87	14.70	14.50	
100	QPSK	1	271	14.82	14.74	14.54	
100	QPSK	135	0	14.88	14.70	14.54	15.7
100	QPSK	135	69	14.85	14.71	14.60	
100	QPSK	135	138	14.87	14.79	14.51	
100	QPSK	270	0	14.86	14.76	14.55	15.7
100	16QAM	1	1	14.90	14.74	14.51	15.7
100	64QAM	1	1	14.84	14.70	14.51	15.7
100	256QAM	1	1	14.82	14.70	14.53	15.7
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	14.80	14.72	14.55	15.7
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	14.89	14.62	14.40	15.7
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	14.82	14.67	14.40	15.7
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	14.88	14.70	14.46	15.7
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	14.80	14.63	14.50	15.7
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	14.88	14.67	14.49	15.7
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	14.88	14.63	14.43	15.7



<FR1 n77>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		15.07		15.7
100	PI/2 BPSK	1	137		14.87		
100	PI/2 BPSK	1	271		14.88		
100	PI/2 BPSK	135	0		14.90		15.7
100	PI/2 BPSK	135	69		14.97		15.7
100	PI/2 BPSK	135	138		14.92		15.7
100	PI/2 BPSK	270	0		14.96		
100	QPSK	1	1		14.87		15.7
100	QPSK	1	137		14.89		
100	QPSK	1	271		14.96		
100	QPSK	135	0		14.95		15.7
100	QPSK	135	69		14.96		
100	QPSK	135	138		14.94		
100	QPSK	270	0		14.95		15.7
100	16QAM	1	1		14.92		15.7
100	64QAM	1	1		14.89		15.7
100	256QAM	1	1		14.97		15.7
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	14.83	14.81	14.87	15.7
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	14.88	14.85	14.87	15.7
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	14.84	14.86	14.82	15.7
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	14.86	14.84	14.89	15.7
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	14.88	14.87	14.85	15.7
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	14.90	14.87	14.90	15.7
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	14.88	14.87	14.90	15.7





**<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:
  - $[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] \cdot [\sqrt{f(GHz)}] \leq 3.0$  for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
  - f(GHz) is the RF channel transmit frequency in GHz
  - Power and distance are rounded to the nearest mW and mm before calculation
  - The result is rounded to one decimal place for comparison
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
7. The below table, exemption limits for routine evaluation based on frequency and separation distance was according to SAR-based Exemption – §1.1307(b)(3)(i)(B).

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 71/n71	LTE Band 12	LTE Band 13	LTE Band 14	LTE Band 17	LTE Band 5/n5	LTE Band 26	LTE Band 4	LTE Band 66/n66	LTE Band 2/n2	LTE Band 25	LTE Band 7	LTE Band 38	LTE Band 41	LTE Band 42	LTE Band 48	FR1 n48	LTE Band n77/n78
	Calculated Frequency (MHz)	846	1750	1907	695	715	784	795	713	848	848	1754	1779	1909	1914	2567	2617	2687	3597	3597	3624.99	3650
Maximum power (dBm)	24.5	24.5	24.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.8	26.0	23.0	24.0	23.0	23.0	
Maximum rated power(mW)	281.84	281.84	281.84	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	251.19	239.88	398.11	199.53	251.19	199.53	199.53	
Bottom Face	Separation distance(mm)	5.0																				
	exclusion threshold	51.9	74.6	77.8	41.9	42.5	44.5	44.8	42.4	46.3	46.3	66.5	67.0	69.4	69.5	80.5	77.6	130.5	75.7	95.3	76.0	76.2
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	5.0																				
	exclusion threshold	51.9	74.6	77.8	41.9	42.5	44.5	44.8	42.4	46.3	46.3	66.5	67.0	69.4	69.5	80.5	77.6	130.5	75.7	95.3	76.0	76.2
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 2	Separation distance(mm)	35.0																				
	exclusion threshold	7.4	10.7	11.1	6.0	6.1	6.4	6.4	6.1	6.6	6.6	9.5	9.6	9.9	9.9	11.5	11.1	18.7	10.8	13.6	10.9	10.9
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 3	Separation distance(mm)	190.0																				
	exclusion threshold	953.0	1513.0	1509.0	829.0	845.0	901.0	910.0	843.0	954.0	954.0	1513.0	1512.0	1509.0	1508.0	1494.0	1493.0	1492.0	1479.0	1479.0	1479.0	1479.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Edge 4	Separation distance(mm)	205.0																				
	exclusion threshold	1037.0	1663.0	1659.0	898.0	916.0	980.0	990.0	914.0	1039.0	1039.0	1663.0	1662.0	1659.0	1658.0	1644.0	1643.0	1642.0	1629.0	1629.0	1629.0	1629.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No



## 2. 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 WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)\*Tune-up Scaling Factor
  - c. 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:
  - $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
  - $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
  - $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.

### 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  $\leq \frac{1}{4}$  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  $\leq 1.2$  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.

### LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B5/B12/B17/B26/B38/B71 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 2/4/5/17/38 SAR test was covered by Band 25/66/26/12/41; 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.

**5G NR Note:**

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below:
  - a. To start SAR test for the largest channel bandwidth for PI/2 BPSK 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. Also do SAR test for 50% RB allocation for PI/2 BPSK SAR testing using 1RB PI/2 BPSK allocation procedure
  - b. For PI/2 BPSK with 100% RB allocation, SAR test is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
  - c. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not  $\frac{1}{2}$  dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
  - d. Smaller bandwidth output power for each RB allocation configuration for this device is not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg, smaller bandwidth SAR testing is not required for this device
  - e. For 5G FR1 n5/n71, the maximum channel bandwidth does not support three non-overlapping channels in the frequency band, the middle channel of the group of overlapping channels were selected for testing.
  - f. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission. And only for TDD power class2 was performed using Factory Test Mode software to establish the connection and perform SAR with 50% transmission



2.1 Body SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Bottom Face	0mm	9538	1907.6	SKU C	17.92	18.80	1.225	0.03	0.366	0.448
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9400	1880	SKU C	17.82	18.80	1.253	0.16	0.930	1.165
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9262	1852.4	SKU C	17.82	18.80	1.253	-0.15	0.925	1.159
01	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9538	1907.6	SKU C	17.92	18.80	1.225	-0.03	0.958	1.173
	WCDMA II	RMC 12.2Kbps	Edge 2	0mm	9538	1907.6	SKU C	17.92	18.80	1.225	-0.02	0.166	0.203
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9538	1907.6	SKU D	17.92	18.80	1.225	0.11	0.954	1.168
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9262	1852.4	SKU D	17.82	18.80	1.253	0.06	0.872	1.093
	WCDMA II	RMC 12.2Kbps	Edge 1	0mm	9400	1880	SKU D	17.82	18.80	1.253	0.19	0.933	1.169
	WCDMA IV	RMC 12.2Kbps	Bottom Face	0mm	1513	1752.6	SKU C	20.92	21.90	1.253	-0.08	0.625	0.783
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1513	1752.6	SKU C	20.92	21.90	1.253	-0.09	0.825	1.034
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1312	1712.4	SKU C	20.86	21.90	1.271	-0.19	0.804	1.022
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1413	1732.6	SKU C	20.90	21.90	1.259	0.02	0.771	0.971
	WCDMA IV	RMC 12.2Kbps	Edge 2	0mm	1513	1752.6	SKU C	20.92	21.90	1.253	-0.06	0.130	0.163
02	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1513	1752.6	SKU D	20.92	21.90	1.253	0.08	0.941	1.179
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1312	1712.4	SKU D	20.86	21.90	1.271	-0.03	0.853	1.084
	WCDMA IV	RMC 12.2Kbps	Edge 1	0mm	1413	1732.6	SKU D	20.90	21.90	1.259	0.06	0.883	1.112
	WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	4132	826.4	SKU C	20.42	21.10	1.169	0.12	0.443	0.518
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4132	826.4	SKU C	20.42	21.10	1.169	0.19	0.928	1.085
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4182	836.4	SKU C	20.40	21.10	1.175	0.05	0.926	1.088
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4233	846.6	SKU C	20.33	21.10	1.194	-0.06	0.964	1.151
	WCDMA V	RMC 12.2Kbps	Edge 2	0mm	4132	826.4	SKU C	20.42	21.10	1.169	-0.04	0.099	0.116
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4233	846.6	SKU D	20.33	21.10	1.194	0.02	0.975	1.164
03	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4132	826.4	SKU D	20.42	21.10	1.169	0.14	1.000	1.169
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	4182	836.4	SKU D	20.40	21.10	1.175	-0.04	0.988	1.161



<LTE SAR>

Table with 18 columns: Plot No., Band, BW (MHz), Modulation, RB Size, RB offset, Test Position, Gap (mm), Ch., Freq. (MHz), Sample, Average Power (dBm), Tune-Up Limit (dBm), Tune-up Scaling Factor, Duty Cycle %, Duty Cycle Scaling Factor, Power Drift (dB), Measured 1g SAR (W/kg), Reported 1g SAR (W/kg). Rows include LTE Bands 7, 12, 13, 14, and 25 with various test parameters and SAR values.





**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

	LTE Band 25	20M	QPSK	1	0	Edge 1	0mm	26590	1905	SKU D	18.74	19.00	1.062			0.12	0.637	0.676
	LTE Band 26	15M	QPSK	1	0	Bottom Face	0mm	26865	831.5	SKU C	20.53	21.80	1.340			0.03	0.394	0.528
	LTE Band 26	15M	QPSK	36	0	Bottom Face	0mm	26865	831.5	SKU C	20.45	21.80	1.365			0.18	0.381	0.520
	LTE Band 26	15M	QPSK	1	0	Edge 1	0mm	26865	831.5	SKU C	20.53	21.80	1.340			0.12	0.870	1.166
	LTE Band 26	15M	QPSK	36	0	Edge 1	0mm	26865	831.5	SKU C	20.45	21.80	1.365			-0.1	0.845	1.153
	LTE Band 26	15M	QPSK	75	0	Edge 1	0mm	26865	831.5	SKU C	20.38	21.80	1.387			0.01	0.839	1.163
	LTE Band 26	15M	QPSK	1	0	Edge 2	0mm	26865	831.5	SKU C	20.53	21.80	1.340			-0.02	0.200	0.268
	LTE Band 26	15M	QPSK	36	0	Edge 2	0mm	26865	831.5	SKU C	20.45	21.80	1.365			-0.15	0.190	0.259
09	LTE Band 26	15M	QPSK	1	0	Edge 1	0mm	26865	831.5	SKU D	20.53	21.80	1.340			0.13	0.873	1.170
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	40620	2593	SKU C	19.61	20.50	1.227	62.9	1.006	0.18	0.348	0.430
	LTE Band 41	20M	QPSK	50	50	Bottom Face	0mm	40620	2593	SKU C	19.40	20.50	1.288	62.9	1.006	-0.18	0.323	0.419
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	40620	2593	SKU C	19.61	20.50	1.227	62.9	1.006	-0.03	0.790	0.975
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	39750	2506	SKU C	19.45	20.50	1.274	62.9	1.006	0.06	0.537	0.688
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	40185	2549.5	SKU C	19.30	20.50	1.318	62.9	1.006	-0.13	0.613	0.813
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	41055	2636.5	SKU C	19.24	20.50	1.337	62.9	1.006	-0.05	0.877	1.179
10	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	41490	2680	SKU C	19.34	20.50	1.306	62.9	1.006	-0.01	0.903	1.187
	LTE Band 41	20M	QPSK	50	50	Edge 1	0mm	40620	2593	SKU C	19.40	20.50	1.288	62.9	1.006	0.03	0.752	0.975
	LTE Band 41	20M	QPSK	50	50	Edge 1	0mm	39750	2506	SKU C	19.22	20.50	1.343	62.9	1.006	-0.15	0.522	0.705
	LTE Band 41	20M	QPSK	50	50	Edge 1	0mm	40185	2549.5	SKU C	19.11	20.50	1.377	62.9	1.006	0.11	0.581	0.805
	LTE Band 41	20M	QPSK	50	50	Edge 1	0mm	41055	2636.5	SKU C	19.11	20.50	1.377	62.9	1.006	-0.08	0.792	1.097
	LTE Band 41	20M	QPSK	50	50	Edge 1	0mm	41490	2680	SKU C	19.15	20.50	1.365	62.9	1.006	-0.17	0.852	1.170
	LTE Band 41	20M	QPSK	100	0	Edge 1	0mm	40185	2549.5	SKU C	19.25	20.50	1.334	62.9	1.006	-0.08	0.836	1.122
	LTE Band 41	20M	QPSK	1	0	Edge 2	0mm	40620	2593	SKU C	19.61	20.50	1.227	62.9	1.006	-0.05	0.060	0.074
	LTE Band 41	20M	QPSK	50	50	Edge 2	0mm	40620	2593	SKU C	19.40	20.50	1.288	62.9	1.006	-0.04	0.055	0.071
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	41490	2680	SKU D	19.34	20.50	1.306	62.9	1.006	0.05	0.776	1.020
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	40620	2593	SKU D	19.61	20.50	1.227	62.9	1.006	0.09	0.687	0.848
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	39750	2506	SKU D	19.45	20.50	1.274	62.9	1.006	-0.17	0.476	0.610
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	40185	2549.5	SKU D	19.30	20.50	1.318	62.9	1.006	0.08	0.481	0.638
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	41055	2636.5	SKU D	19.24	20.50	1.337	62.9	1.006	0.18	0.812	1.092
	LTE Band 41_HPUE	20M	QPSK	1	0	Edge 1	0mm	40620	2593	SKU C	20.64	22.10	1.400	42.9	1.009	0.02	0.825	1.165
	LTE Band 41C	20M	QPSK	1	0	Edge 1	0mm	41490	2680	SKU D	19.10	20.50	1.380	62.9	1.006	0.09	0.831	1.154
	LTE Band 48	20M	QPSK	1	0	Bottom Face	0mm	55830	3609	SKU C	18.70	19.00	1.072	62.9	1.006	0.12	0.084	0.091
	LTE Band 48	20M	QPSK	50	0	Bottom Face	0mm	55830	3609	SKU C	18.60	19.00	1.096	62.9	1.006	0.08	0.077	0.085
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	55830	3609	SKU C	18.70	19.00	1.072	62.9	1.006	0.12	0.750	0.808
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	55340	3560	SKU C	18.65	19.00	1.084	62.9	1.006	0.03	1.050	1.145
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	56150	3641	SKU C	18.67	19.00	1.079	62.9	1.006	-0.06	0.801	0.869
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	56640	3690	SKU C	18.44	19.00	1.138	62.9	1.006	-0.01	0.847	0.969
	LTE Band 48	20M	QPSK	50	0	Edge 1	0mm	55830	3609	SKU C	18.60	19.00	1.096	62.9	1.006	0.01	0.763	0.842
	LTE Band 48	20M	QPSK	50	0	Edge 1	0mm	55340	3560	SKU C	18.55	19.00	1.109	62.9	1.006	0.03	0.752	0.839
	LTE Band 48	20M	QPSK	50	0	Edge 1	0mm	56150	3641	SKU C	18.58	19.00	1.102	62.9	1.006	-0.08	0.770	0.853
	LTE Band 48	20M	QPSK	50	0	Edge 1	0mm	56640	3690	SKU C	18.31	19.00	1.172	62.9	1.006	-0.08	0.784	0.925
	LTE Band 48	20M	QPSK	1	0	Edge 2	0mm	55830	3609	SKU C	18.70	19.00	1.072	62.9	1.006	0.15	0.001	0.001
	LTE Band 48	20M	QPSK	50	0	Edge 2	0mm	55830	3609	SKU C	18.60	19.00	1.096	62.9	1.006	0.08	0.001	0.001
11	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	55340	3560	SKU D	18.65	19.00	1.084	62.9	1.006	-0.05	1.100	1.199
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	55830	3609	SKU D	18.70	19.00	1.072	62.9	1.006	0.04	0.331	0.357
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	56150	3641	SKU D	18.67	19.00	1.079	62.9	1.006	0.17	0.860	0.933
	LTE Band 48	20M	QPSK	1	0	Edge 1	0mm	56640	3690	SKU D	18.44	19.00	1.138	62.9	1.006	0.04	0.859	0.983
	LTE Band 48C	20M	QPSK	1	0	Edge 1	0mm	55340	3560	SKU D	18.43	19.00	1.140	62.9	1.006	-0.01	0.903	1.036
	LTE Band 66	20M	QPSK	1	0	Bottom Face	0mm	132572	1770	SKU C	21.63	22.10	1.114			0.11	0.613	0.683
	LTE Band 66	20M	QPSK	50	0	Bottom Face	0mm	132572	1770	SKU C	21.51	22.10	1.146			0.05	0.581	0.666
12	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132572	1770	SKU C	21.63	22.10	1.114			0.04	1.050	1.170
	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132072	1720	SKU C	21.20	22.10	1.230			0.04	0.796	0.979
	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132322	1745	SKU C	21.48	22.10	1.153			-0.06	0.843	0.972
	LTE Band 66	20M	QPSK	50	0	Edge 1	0mm	132572	1770	SKU C	21.51	22.10	1.146			0.06	0.862	0.987
	LTE Band 66	20M	QPSK	50	0	Edge 1	0mm	132072	1720	SKU C	21.10	22.10	1.259			-0.09	0.793	0.998
	LTE Band 66	20M	QPSK	50	0	Edge 1	0mm	132322	1745	SKU C	21.30	22.10	1.202			-0.08	0.809	0.973



**FCC SAR TEST REPORT**

**Report No. : FA182625-12**

	LTE Band 66	20M	QPSK	100	0	Edge 1	0mm	132572	1770	SKU C	21.47	22.10	1.156			0.13	0.803	0.928
	LTE Band 66	20M	QPSK	1	0	Edge 2	0mm	132572	1770	SKU C	21.63	22.10	1.114			0.04	0.169	0.188
	LTE Band 66	20M	QPSK	50	0	Edge 2	0mm	132572	1770	SKU C	21.51	22.10	1.146			0.12	0.170	0.195
	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132572	1770	SKU D	21.63	22.10	1.114			-0.01	0.936	1.043
	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132072	1720	SKU D	21.20	22.10	1.230			0.08	0.829	1.020
	LTE Band 66	20M	QPSK	1	0	Edge 1	0mm	132322	1745	SKU D	21.48	22.10	1.153			-0.09	0.881	1.016
	LTE Band 71	20M	QPSK	1	0	Bottom Face	0mm	133297	680.5	SKU C	22.45	22.80	1.084			-0.17	0.553	0.599
	LTE Band 71	20M	QPSK	50	50	Bottom Face	0mm	133297	680.5	SKU C	21.78	22.80	1.265			0.1	0.445	0.563
	LTE Band 71	20M	QPSK	1	0	Edge 1	0mm	133297	680.5	SKU C	22.45	22.80	1.084			-0.03	1.090	1.181
	LTE Band 71	20M	QPSK	50	50	Edge 1	0mm	133297	680.5	SKU C	21.78	22.80	1.265			-0.17	0.910	1.151
	LTE Band 71	20M	QPSK	100	0	Edge 1	0mm	133297	680.5	SKU C	21.72	22.80	1.282			0.06	0.890	1.141
	LTE Band 71	20M	QPSK	1	0	Edge 2	0mm	133297	680.5	SKU C	22.45	22.80	1.084			0.02	0.249	0.270
	LTE Band 71	20M	QPSK	50	50	Edge 2	0mm	133297	680.5	SKU C	21.78	22.80	1.265			0.04	0.210	0.266
	LTE Band 71	20M	QPSK	1	0	Edge 3	0mm	133297	680.5	SKU C	22.45	22.80	1.084			0.15	0.001	0.001
	LTE Band 71	20M	QPSK	50	50	Edge 3	0mm	133297	680.5	SKU C	21.78	22.80	1.265			-0.01	0.001	0.001
	LTE Band 71	20M	QPSK	1	0	Edge 4	0mm	133297	680.5	SKU C	22.45	22.80	1.084			0.06	0.001	0.001
	LTE Band 71	20M	QPSK	50	50	Edge 4	0mm	133297	680.5	SKU C	21.78	22.80	1.265			-0.08	0.001	0.001
13	LTE Band 71	20M	QPSK	1	0	Edge 1	0mm	133297	680.5	SKU D	22.45	22.80	1.084			0.12	1.100	1.192



<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n2	20M	BPSK	1	1	Bottom Face	0mm	376000	1880	SKU C	20.97	21.70	1.183	0.12	0.271	0.321
	FR1 n2	20M	BPSK	50	56	Bottom Face	0mm	376000	1880	SKU C	20.88	21.70	1.208	-0.03	0.232	0.280
	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	376000	1880	SKU C	20.97	21.70	1.183	0.09	0.863	1.021
	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	372000	1860	SKU C	20.83	21.70	1.222	0.14	0.816	0.997
	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	380000	1900	SKU C	20.71	21.70	1.256	0.11	0.812	1.020
	FR1 n2	20M	BPSK	50	56	Edge 1	0mm	376000	1880	SKU C	20.88	21.70	1.208	-0.05	0.799	0.965
	FR1 n2	20M	BPSK	50	56	Edge 1	0mm	372000	1860	SKU C	20.76	21.70	1.242	0.18	0.803	0.997
	FR1 n2	20M	BPSK	50	56	Edge 1	0mm	380000	1900	SKU C	20.63	21.70	1.279	0.14	0.784	1.003
	FR1 n2	20M	BPSK	100	0	Edge 1	0mm	376000	1880	SKU C	20.86	21.70	1.213	-0.17	0.792	0.961
	FR1 n2	20M	BPSK	1	1	Edge 2	0mm	376000	1880	SKU C	20.97	21.70	1.183	0.14	0.001	0.001
	FR1 n2	20M	BPSK	50	56	Edge 2	0mm	376000	1880	SKU D	20.88	21.70	1.208	-0.16	0.001	0.001
14	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	376000	1880	SKU D	20.97	21.70	1.183	0.14	1.000	1.183
	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	372000	1860	SKU D	20.83	21.70	1.222	0.17	0.960	1.173
	FR1 n2	20M	BPSK	1	1	Edge 1	0mm	380000	1900	SKU D	20.71	21.70	1.256	-0.05	0.923	1.159
	FR1 n5	20M	BPSK	1	1	Bottom Face	0mm	167300	836.5	SKU C	21.82	22.40	1.143	0.17	0.338	0.386
	FR1 n5	20M	BPSK	50	56	Bottom Face	0mm	167300	836.5	SKU C	21.63	22.40	1.194	0.01	0.308	0.368
	FR1 n5	20M	BPSK	1	1	Edge 1	0mm	167300	836.5	SKU C	21.82	22.40	1.143	-0.11	0.899	1.027
	FR1 n5	20M	BPSK	50	56	Edge 1	0mm	167300	836.5	SKU C	21.63	22.40	1.194	0.1	0.816	0.974
	FR1 n5	20M	BPSK	100	0	Edge 1	0mm	167300	836.5	SKU D	21.47	22.40	1.239	-0.08	0.801	0.992
	FR1 n5	20M	BPSK	1	1	Edge 2	0mm	167300	836.5	SKU C	21.82	22.40	1.143	0.04	0.110	0.126
	FR1 n5	20M	BPSK	50	56	Edge 2	0mm	167300	836.5	SKU C	21.63	22.40	1.194	-0.17	0.102	0.122
	FR1 n5	20M	BPSK	1	1	Edge 3	0mm	167300	836.5	SKU C	21.82	22.40	1.143	-0.05	0.001	0.001
	FR1 n5	20M	BPSK	50	56	Edge 3	0mm	167300	836.5	SKU C	21.63	22.40	1.194	0.04	0.001	0.001
	FR1 n5	20M	BPSK	1	1	Edge 4	0mm	167300	836.5	SKU C	21.82	22.40	1.143	0.02	0.001	0.001
	FR1 n5	20M	BPSK	50	56	Edge 4	0mm	167300	836.5	SKU C	21.63	22.40	1.194	-0.01	0.001	0.001
15	FR1 n5	20M	BPSK	1	1	Edge 1	0mm	167300	836.5	SKU D	21.82	22.40	1.143	0.17	1.030	1.177
	FR1 n48	100M	BPSK	1	1	Bottom Face	0mm	641666	3624.99	SKU C	17.08	18.50	1.387	-0.17	0.062	0.086
	FR1 n48	100M	BPSK	135	0	Bottom Face	0mm	641666	3624.99	SKU C	16.76	18.50	1.493	-0.12	0.064	0.096
	FR1 n48	100M	BPSK	1	1	Edge 1	0mm	641666	3624.99	SKU C	17.08	18.50	1.387	0.06	0.788	1.093
	FR1 n48	100M	BPSK	135	0	Edge 1	0mm	641666	3624.99	SKU C	16.76	18.50	1.493	-0.04	0.645	0.963
	FR1 n48	100M	BPSK	270	0	Edge 1	0mm	641666	3624.99	SKU C	16.70	18.50	1.514	0.01	0.708	1.072
	FR1 n48	100M	BPSK	1	1	Edge 2	0mm	641666	3624.99	SKU C	17.08	18.50	1.387	-0.03	0.001	0.001
	FR1 n48	100M	BPSK	135	0	Edge 2	0mm	641666	3624.99	SKU C	16.76	18.50	1.493	-0.12	0.001	0.001
16	FR1 n48	100M	BPSK	1	1	Edge 1	0mm	641666	3624.99	SKU D	17.08	18.50	1.387	0.08	0.845	1.172
	FR1 n66	20M	BPSK	1	1	Bottom Face	0mm	349000	1745	SKU C	21.90	22.10	1.047	0.12	0.621	0.650
	FR1 n66	20M	BPSK	50	28	Bottom Face	0mm	349000	1745	SKU C	21.31	22.10	1.199	0.08	0.529	0.635
	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	349000	1745	SKU C	21.90	22.10	1.047	-0.07	0.981	1.027
	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	344000	1720	SKU C	21.54	22.10	1.138	0.05	0.858	0.976
	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	354000	1770	SKU C	21.80	22.10	1.072	-0.11	0.892	0.956
	FR1 n66	20M	BPSK	50	28	Edge 1	0mm	349000	1745	SKU C	21.31	22.10	1.199	0.03	0.824	0.988
	FR1 n66	20M	BPSK	50	28	Edge 1	0mm	344000	1720	SKU C	21.14	22.10	1.247	0.18	0.802	1.000
	FR1 n66	20M	BPSK	50	28	Edge 1	0mm	354000	1770	SKU C	21.12	22.10	1.253	0.01	0.809	1.014
	FR1 n66	20M	BPSK	100	0	Edge 1	0mm	349000	1745	SKU C	21.22	22.10	1.225	0.07	0.823	1.008
	FR1 n66	20M	BPSK	1	1	Edge 2	0mm	349000	1745	SKU C	21.90	22.10	1.047	0.19	0.132	0.138
	FR1 n66	20M	BPSK	50	28	Edge 2	0mm	349000	1745	SKU C	21.31	22.10	1.199	-0.05	0.117	0.140
17	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	349000	1745	SKU D	21.90	22.10	1.047	0.01	1.120	1.173
	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	344000	1720	SKU D	21.54	22.10	1.138	0.09	0.971	1.105
	FR1 n66	20M	BPSK	1	1	Edge 1	0mm	354000	1770	SKU D	21.80	22.10	1.072	0.03	0.990	1.061
	FR1 n71	20M	BPSK	1	1	Bottom Face	0mm	136100	680.5	SKU C	22.03	23.20	1.309	0.19	0.407	0.533
	FR1 n71	20M	BPSK	50	28	Bottom Face	0mm	136100	680.5	SKU C	21.93	23.20	1.340	0.03	0.387	0.518
	FR1 n71	20M	BPSK	1	1	Edge 1	0mm	136100	680.5	SKU C	22.03	23.20	1.309	-0.16	0.813	1.064



	FR1 n71	20M	BPSK	50	28	Edge 1	0mm	136100	680.5	SKU C	21.93	23.20	1.340	-0.09	0.772	1.034
	FR1 n71	20M	BPSK	100	0	Edge 1	0mm	136100	680.5	SKU C	21.84	23.20	1.368	0.02	0.753	1.030
	FR1 n71	20M	BPSK	1	1	Edge 2	0mm	136100	680.5	SKU C	22.03	23.20	1.309	-0.03	0.039	0.051
	FR1 n71	20M	BPSK	50	28	Edge 2	0mm	136100	680.5	SKU C	21.93	23.20	1.340	0.05	0.033	0.044
18	FR1 n71	20M	BPSK	1	1	Edge 1	0mm	136100	680.5	SKU D	22.03	23.20	1.309	0.16	0.893	1.169
	FR1 n77	100M	BPSK	1	1	Bottom Face	0mm	656000	3840	SKU C	14.81	15.70	1.227	0.09	0.092	0.113
	FR1 n77	100M	BPSK	135	69	Bottom Face	0mm	656000	3840	SKU C	14.79	15.70	1.233	-0.05	0.096	0.118
	FR1 n77	100M	BPSK	1	1	Edge 1	0mm	656000	3840	SKU C	14.81	15.70	1.227	0.03	0.688	0.844
	FR1 n77	100M	BPSK	135	69	Edge 1	0mm	656000	3840	SKU C	14.79	15.70	1.233	0.07	0.534	0.658
	FR1 n77	100M	BPSK	270	0	Edge 1	0mm	656000	3840	SKU C	14.75	15.70	1.245	-0.08	0.671	0.835
	FR1 n77	100M	BPSK	1	1	Edge 2	0mm	656000	3840	SKU C	14.81	15.70	1.227	-0.15	0.083	0.102
	FR1 n77	100M	BPSK	135	69	Edge 2	0mm	656000	3840	SKU C	14.79	15.70	1.233	0.19	0.075	0.092
	FR1 n77	100M	BPSK	1	1	Edge 1	0mm	656000	3840	SKU D	14.81	15.70	1.227	0.08	0.651	0.799
	FR1 n77	100M	BPSK	1	1	Bottom Face	0mm	633332	3499.98	SKU C	15.07	15.70	1.156	0.02	0.107	0.124
	FR1 n77	100M	BPSK	135	69	Bottom Face	0mm	633332	3499.98	SKU C	14.97	15.70	1.183	0.05	0.105	0.124
	FR1 n77	100M	BPSK	1	1	Edge 1	0mm	633332	3499.98	SKU C	15.07	15.70	1.156	0.07	0.938	1.084
	FR1 n77	100M	BPSK	135	69	Edge 1	0mm	633332	3499.98	SKU C	14.97	15.70	1.183	0.06	0.891	1.054
	FR1 n77	100M	BPSK	270	0	Edge 1	0mm	633332	3499.98	SKU C	14.96	15.70	1.186	-0.09	0.862	1.022
	FR1 n77	100M	BPSK	1	1	Edge 2	0mm	633332	3499.98	SKU C	15.07	15.70	1.156	0.05	0.068	0.079
	FR1 n77	100M	BPSK	135	69	Edge 2	0mm	633332	3499.98	SKU C	14.97	15.70	1.183	0.01	0.053	0.063
19	FR1 n77	100M	BPSK	1	1	Edge 1	0mm	633332	3499.98	SKU D	15.07	15.70	1.156	0.11	1.030	1.191

**2.2 Repeated SAR Measurement**

No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 25	20M_QPSK_1_0	Edge 1	0mm	26590	1905	SKU C	18.74	19.00	1.062	-	1.000	0.08	1.060	-	1.125
2nd	LTE Band 25	20M_QPSK_1_0	Edge 1	0mm	26590	1905	SKU C	18.74	19.00	1.062	-	1.000	0.04	0.990	1.07	1.051
1st	LTE Band 41	20M_QPSK_1_0	Edge 1	0mm	41490	2680	SKU C	19.34	20.50	1.306	62.9	1.006	-0.01	0.903	-	1.187
2nd	LTE Band 41	20M_QPSK_1_0	Edge 1	0mm	41490	2680	SKU C	19.34	20.50	1.306	62.9	1.006	0.08	0.881	1.02	1.158
1st	LTE Band 48	20M_QPSK_1_0	Edge 1	0mm	55340	3560	SKU D	18.65	19.00	1.084	62.9	1.006	-0.05	1.100	-	1.199
2nd	LTE Band 48	20M_QPSK_1_0	Edge 1	0mm	55340	3560	SKU D	18.65	19.00	1.084	62.9	1.006	0.05	1.010	1.09	1.101
1st	LTE Band 48	20M_QPSK_1_0	Edge 1	0mm	56150	3641	SKU D	18.67	19.00	1.079	62.9	1.006	0.17	0.860	-	0.933
2nd	LTE Band 48	20M_QPSK_1_0	Edge 1	0mm	56150	3641	SKU D	18.67	19.00	1.079	62.9	1.006	-0.06	0.851	1.01	0.924
1st	LTE Band 71	20M_QPSK_1_0	Edge 1	0mm	133297	680.5	SKU D	22.45	22.80	1.084	-	1.000	0.12	1.100	-	1.192
2nd	LTE Band 71	20M_QPSK_1_0	Edge 1	0mm	133297	680.5	SKU D	22.45	22.80	1.084	-	1.000	0.02	1.020	1.08	1.106
1st	FR1 n5	20M_BPSK_1_1	Edge 1	0mm	167300	836.5	SKU D	21.82	22.40	1.143	-	1.000	0.17	1.030	-	1.177
2nd	FR1 n5	20M_BPSK_1_1	Edge 1	0mm	167300	836.5	SKU D	21.82	22.40	1.143	-	1.000	0.08	0.993	1.04	1.135
1st	FR1 n66	20M_BPSK_1_1	Edge 1	0mm	349000	1745	SKU D	21.90	22.10	1.047	-	1.000	0.01	1.120	-	1.173
2nd	FR1 n66	20M_BPSK_1_1	Edge 1	0mm	349000	1745	SKU D	21.90	22.10	1.047	-	1.000	0.06	0.999	1.12	1.046

**General Note:**

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



### 2.3 LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device support Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each LTE configuration and exposure condition combination, according to the highest time averaged power for all applicable uplink-downlink configurations in Power Class 2. When the reported SAR vs. output power is linearly scaled with < 10% discrepancy between power classes and all reported SAR are < 1.4 W/kg, Separate SAR testing for Power Class 2 is not required

Use PC3 power level and SAR to estimated PC2 SAR linearly, and check if the deviation from the measured PC2 SAR is <10%

	LTE Band 41_Ant 1	LTE Band 41_Ant 1
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	20.5	22.1
Reported 1g SAR (W/kg)	1.187	1.165
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	71.02	70.22
Linearity SAR(W/kg)	1.17	
% deviation from expected linearity		-0.74%



### 3. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + FR1 + 2.4GHz WLAN Ant 1 + 2.4GHz WLAN Ant 2	Yes
2.	WWAN + FR1 + 2.4GHz WLAN Ant 1 + Bluetooth Ant 2	Yes
3.	WWAN + FR1 +5GHz WLAN Ant 1+ 5GHz WLAN Ant 2+ Bluetooth Ant 2	Yes

**General Note:**

1. The Intel AX211NGW WLAN/Bluetooth module is also integrated into this host, WLAN/Bluetooth power and WLAN SAR testing data, which can be referred to Sporton SAR Test Report, Report No.: FA381701-02(FCC ID: QYLAX211NG) and these results are used simultaneous transmission analysis.
2. The Scaled SAR summation is calculated based on the same configuration and test position.
3. 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 16.3.



**3.1 5G NR + LTE + WLAN + BT Sim-Tx analysis**

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \leq 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and  $A \leq 1.0$ ; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for 5G FR2 or SAR exposure for 5G FR1), and  $B \leq 1.0$ .

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \leq 1.0 \quad (1)$$

$$x\% * A + (100-x)\% * B \leq x\% * \max(A, B) + (100-x)\% * \max(A, B) \leq \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \leq \max(A, B) + C \leq 1.0 \quad (2)$$

if  $A + C \leq 1.0$  and  $B + C \leq 1.0$  can be proven, then “ $x\% * A + (100-x)\% * B + C \leq 1.0$ ”. Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1

Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

**3.2 Body Exposure Conditions**

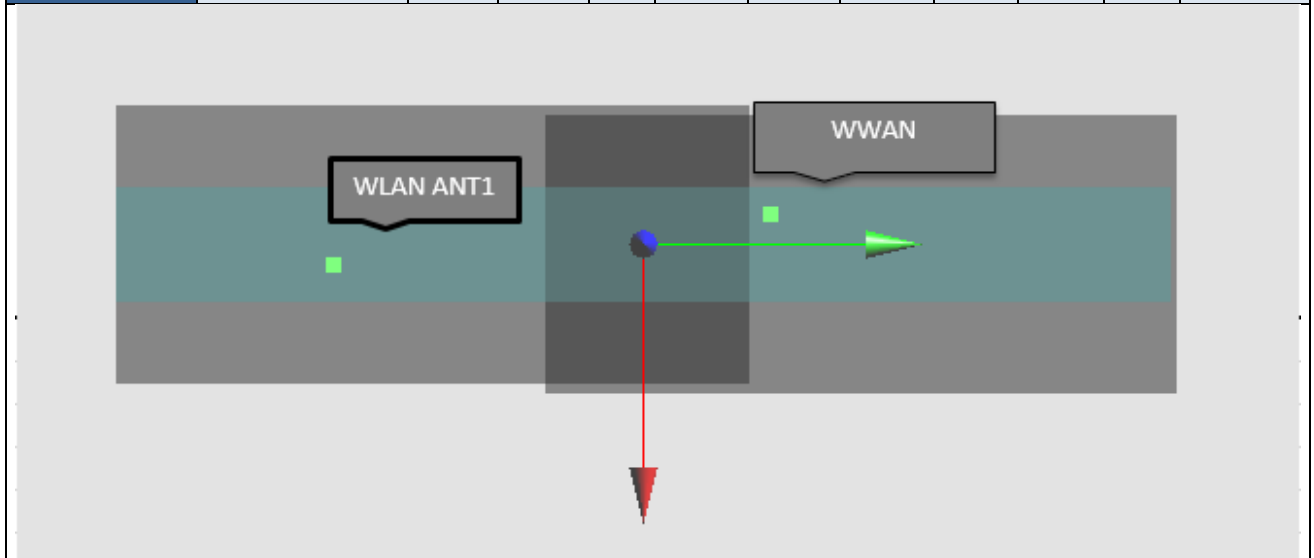
Exposure Position	1	2	3	4	5	6	1+2+3	1+2+6	1+4+5+6	SPLSR	Case No
	Maximum WWAN 1g SAR (W/kg)	WLAN2.4GHz Ant 1 1g SAR (W/kg)	WLAN2.4GHz Ant 2 1g SAR (W/kg)	WLAN5/6GHz Ant 1 1g SAR (W/kg)	WLAN5/6GHz Ant 2 1g SAR (W/kg)	Bluetooth Ant 2 1g SAR (W/kg)	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)		
Bottom Face at 0mm	0.783	0.042	0.090	0.041	0.126	0.014	<b>0.915</b>	<b>0.839</b>	<b>0.964</b>		
Edge 1 at 0mm	1.199	0.674		0.642			<b>1.873</b>	<b>1.873</b>	<b>1.841</b>	<b>0.020</b>	<b>Case 1</b>
Edge 2 at 0mm	0.289		1.179		1.171	0.167	<b>1.468</b>	<b>0.456</b>	<b>1.627</b>	<b>0.010</b>	<b>Case 2</b>

**3.3 SPLSR Evaluation and Analysis**

**General Note:**

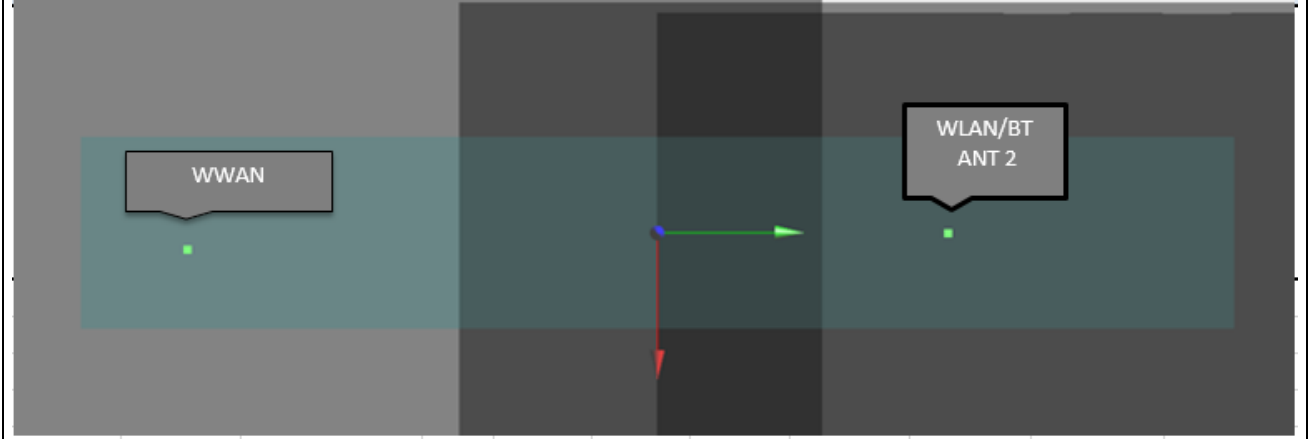
1.  $SPLSR = (SAR_1 + SAR_2)^{1.5} / (min. \text{ separation distance, mm})$ . If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary
2. The detail hotspot point for each transmitter in each exposure condition are showing as below figure and the minimum 3D distance for each sum combination is used for SPLSR analysis.

Case 1	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 48	Edge 1	1.199	0mm	-8.99	39.38	0.79	149.6	1.87	0.02	Not required
	WLAN 2.4G_Ant 1		0.674	0mm	10	-109.01	1.06				
	LTE Band 48	Edge 1	1.199	0mm	-8.99	39.38	0.79	156.7	1.84	0.02	Not required
	WLAN 5G_Ant 1		0.642	0mm	6.22	-116.61	1.24				





Case 2	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 12	Edge 2	0.289	0mm	3	-85.5	0.2	138.5	1.63	0.01	Not required
	WLAN 5G+BT_Ant 2		1.338	0mm	0.05	53	0.21				



**Test Engineer :** Bevis Chang, Jimmy Lee, Jay Chien and Rain Chiu



## **4. 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.

Declaration of Conformity:

The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

## **5. 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 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [6] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [7] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [8] FCC KDB 941225 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [9] FCC KDB 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", Oct 2015
- [10] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [11] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.