

FCC SAR TEST REPORT

FCC ID : 2A7DJ-2346766867652
Equipment : Smart Radio LTE with Walkie-Talkie
Brand Name : weavix
Model Name : walt
Marketing Name : weavix
Applicant : PK Solutions LLC
10811 E Harry St. Wichita, KS 67207, USA
Manufacturer : Arima Communications (Jiangsu) Co., Ltd
No.168, Jiaotong Notrh Road, Economic and Technological
Development Zone, Wujiang District Suzhou City, Jiangsu
Province, P.R.China
Standard : FCC 47 CFR Part 2 (2.1093)

The product was received on Jun. 21, 2022 and testing was started from Jul. 07, 2022 and completed on Sep. 13, 2022. 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



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History of this test report

Report No.	Version	Description	Issued Date
FA261611	01	Initial issue of report	Sep. 26, 2022

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for PK Solutions LLC, Smart Radio LTE with Walkie-Talkie, walt, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)
			Next to mouth (Separation 10mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	Extremity (Separation 0mm)	
			1g SAR (W/kg)			10g SAR (W/kg)	
Licensed	FDD LTE	LTE Band 7	0.71	0.71	0.71		1.46
		LTE Band 12	0.03	0.10	0.10		
		LTE Band 13	0.03	0.16	0.16		
		LTE Band 14	0.03	0.19	0.19		
		LTE Band 2/25	0.31	0.91	0.91		
		LTE Band 5/26	0.05	0.30	0.30		
		LTE Band 30	0.36	0.58	0.68		
		LTE Band4/66	0.03	0.36	0.36		
	TDD LTE	LTE Band 38	0.15	0.15	0.29		
		LTE Band 41	0.26	0.26	0.38		
		LTE Band 42	0.15	0.30	0.30		
		LTE Band 48	0.14	0.33	0.33		
DTS	WLAN	2.4GHz WLAN	0.29	0.41	0.41		1.46
NII		5GHz WLAN	0.04	0.33	0.14		1.46
DSS	2.4GHz Band	Bluetooth	< 0.01	< 0.01	< 0.01		0.41
DXX	NFC	13.56MHz				< 0.01	
Date of Testing:			2022/7/7 ~ 2022/9/13				

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 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, 4.0 W/kg for Product Specific 10g 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, IEC/IEEE 62209-1528:2020 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
- IEC/IEEE 62209-1528:2020
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D04 Interim General RF Exposure Guidance v01
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Smart Radio LTE with Walkie-Talkie
Brand Name	weavix
Model Name	walt
Marketing Name	weavix
FCC ID	2A7DJ-2346766867652
IMEI Code	350434830401110
S / N	A30AF2D60201
Wireless Technology and Frequency Range	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 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3550 MHz ~ 3600 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 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 Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz
Mode	LTE: QPSK, 16QAM, 64QAM WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC: ASK
EUT Stage	Identical Prototype
Remark: - The device support VoLTE and VoWiFi operation via the speaker, therefore, consider next to mouth 10mm SAR is required. - SAR for body-worn condition was tested at 10mm separation, and it is more conservative than the condition when device is affixed on the clip which is provided to the users. - The device also support push to talk (PTT) operation, the RF exposure assessment will include in another report. And the push to talk operation will not transmit with the LTE/WiFi/BT at the same time. - The PTT antenna can be removed; the RF exposure selects w/o PTT Antenna to test all exposure position and w/ PTT Antenna spot check worst case to ensure the PPT antenna does not affect the other transmit antenna RF exposure results. - LTE Band 42 operate in 3550 MHz – 3600MHz is covered by LTE Band 48 in SAR testing.	

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05												
FCC ID			2A7DJ-2346766867652									
Equipment Name			Smart Radio LTE with Walkie-Talkie									
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 25: 1850 MHz ~ 1915 MHz									
			LTE Band 26: 814 MHz ~ 849 MHz									
			LTE Band 30: 2305 MHz ~ 2315 MHz									
			LTE Band 38: 2570 MHz ~ 2620 MHz									
			LTE Band 41: 2496 MHz ~ 2690 MHz									
			LTE Band 42: 3550 MHz ~ 3600 MHz									
			LTE Band 42: 3450 MHz ~ 3550 MHz									
			LTE Band 48: 3550 MHz ~ 3700 MHz									
Channel Bandwidth			LTE Band 66: 1710 MHz ~ 1780 MHz									
			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 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz									
			LTE Band 30: 5MHz, 10MHz									
			LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz									
			LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz									
uplink modulations used			QPSK / 16QAM / 64QAM									
LTE Voice / Data requirements			Data only / Voice and Data									
LTE MPR permanently built-in by design			Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3									
			Modulation		Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	
					1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
			QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1		
			16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1		
			16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2		
			64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2		
			64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3		
			256 QAM	≥ 1						≤ 5		
			LTE A-MPR			In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)						
Spectrum plots for RB configuration			A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.									
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 25 MHz		Bandwidth 30 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			
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23205		779.5		23230		782		23255		784.5	
M	23230		782		23230		782		23255		784.5	
H	23255		784.5		23230		782		23255		784.5	
LTE Band 14												
	Bandwidth 5 MHz				Bandwidth 10 MHz				Bandwidth 15 MHz			
	Channel #		Channel #		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	23305		790.5		23330		793		23355		795.5	
M	23330		793		23330		793		23355		795.5	
H	23355		795.5		23330		793		23355		795.5	
LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5	26790	823.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5	26940	838.5
LTE Band 30												
	Bandwidth 5 MHz				Bandwidth 10 MHz				Bandwidth 15 MHz			
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)		Channel #		Freq.(MHz)	
L	27685		2307.5		27710		2310		27735		2312.5	
M	27710		2310		27710		2310		27735		2312.5	
H	27735		2312.5		27710		2310		27735		2312.5	

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)	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)	Ch. #	Freq. (MHz)		
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
	40620	2593	40620	2593	40620	2593	40620	2593				
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
	41565	2687.5	41540	2685	41515	2682.5	41490	2680				
LTE Band 42(Part 96)												
	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)		
L	43315	3552.5	43140	3555	43165	3557.5	43190	3560				
M	43340	3575	43340	3575	43340	3575	43340	3575				
H	43565	3597.5	43540	3595	43515	3592.5	43490	3590				
LTE Band 42(Part 27Q)												
	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)		
L	42115	3452.5	42140	3455	42165	3457.5	42190	3460				
M	42590	3500	42590	3500	42590	3500	42590	3500				
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540				
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)	Ch. #	Freq. (MHz)		
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560				
LM	55810	3607	55815	3607.5	55820	3608	55830	3609				
	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

4. RF Exposure Limits

4.1 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.

4.2 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.

5. Specific Absorption Rate (SAR)

5.1 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.

5.2 SAR Definition

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

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

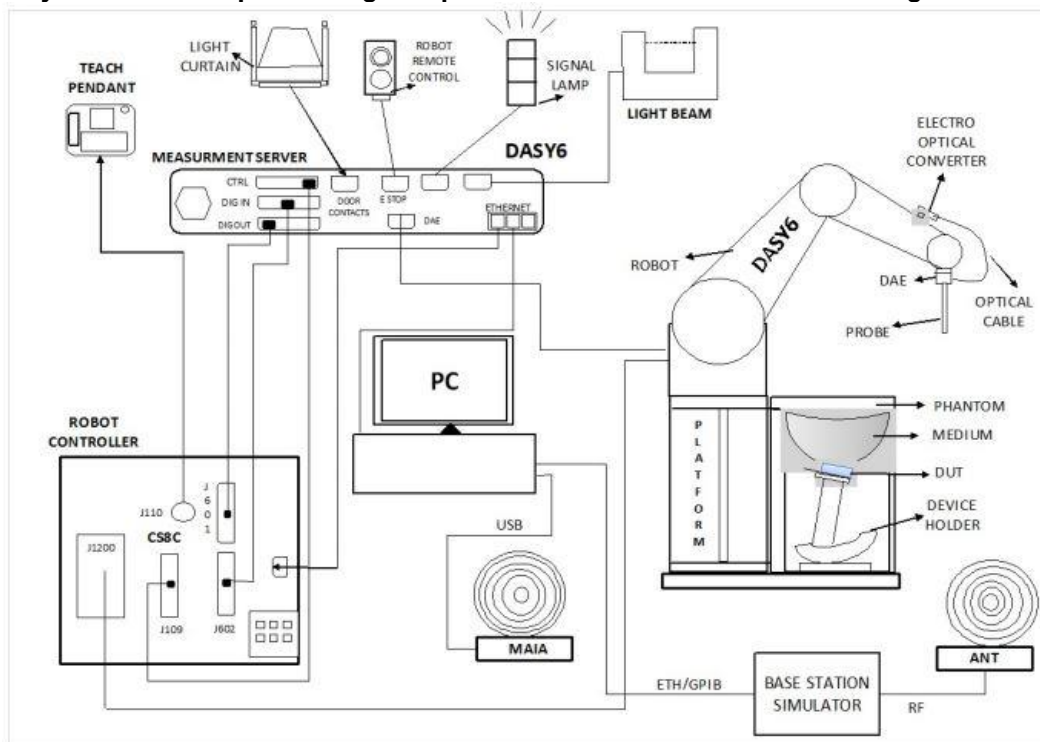
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. 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.

6.1 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	
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	

6.2 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>

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

<EX3DV4 Probe>

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

6.3 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

6.4 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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

6.5 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

7. 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

7.1 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

7.2 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.

7.3 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 dB0) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

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

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

7.4 Zoom Scan

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

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

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

7.5 Volume Scan Procedures

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

7.6 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.

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1117	Mar. 24, 2022	Mar. 23, 2023
SPEAG	835MHz System Validation Kit ⁽²⁾	D835V2	4d167	Nov. 25, 2019	Nov. 22, 2022
SPEAG	1750MHz System Validation Kit	D1750V2	1120	Mar. 25, 2022	Mar. 24, 2023
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Aug. 19, 2021	Aug. 18, 2022
SPEAG	2450MHz System Validation Kit ⁽²⁾	D2450V2	929	Nov. 21, 2019	Nov. 18, 2022
SPEAG	2600MHz System Validation Kit	D2600V2	1089	Mar. 24, 2022	Mar. 23, 2023
SPEAG	3500MHz System Validation Kit	D3500V2	1014	Jan. 17, 2022	Jan. 16, 2023
SPEAG	3700MHz System Validation Kit	D3700V2	1006	Jun. 20, 2022	Jun. 19, 2023
SPEAG	5GHz System Validation Kit ⁽²⁾	D5GHZV2	1128	Dec. 16, 2019	Dec. 13, 2022
SPEAG	13MHz System Validation Kit ⁽²⁾	CLA13	1011	Jul. 08, 2020	Jul. 05, 2023
SPEAG	Data Acquisition Electronics	DAE4	1399	Feb. 28, 2022	Feb. 27, 2023
SPEAG	Data Acquisition Electronics	DAE4	1647	Jan. 19, 2022	Jan. 18, 2023
SPEAG	Data Acquisition Electronics	DAE4	1707	Jan. 12, 2022	Jan. 11, 2023
SPEAG	Dosimetric E-Field Probe	EX3DV4	3728	Mar. 02, 2022	Mar. 01, 2023
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Oct. 21, 2021	Oct. 20, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7700	Jan. 11, 2022	Jan. 10, 2023
Testo	Hygro meter	608-H1	45196600	Oct. 22, 2021	Oct. 21, 2022
Testo	Hygro meter	608-H1	45207528	Oct. 22, 2021	Oct. 21, 2022
RCPTWN	Thermometer	HTC-1	TM685-1	Jun. 27, 2022	Jun. 26, 2023
RCPTWN	Thermometer	HTC-1	TM560-2	Mar. 15, 2022	Mar. 14, 2023
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 21, 2021	Oct. 20, 2022
Keysight	Wireless Communication Test Set	E5515C	MY50266977	May. 10, 2022	May. 09, 2023
R&S	BT Base Station	CBT32	101136	Oct. 17, 2021	Oct. 16, 2022
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Oct. 24, 2021	Oct. 23, 2022
Keysight	ENA Network Analyzer	E5071C	MY46104758	Sep. 19, 2021	Sep. 18, 2022
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 24, 2021	Sep. 23, 2022
SPEAG	Dielectric Probe Kit	DAK-12	1156	Jul. 28, 2022	Jul. 27, 2023
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Oct. 26, 2021	Oct. 25, 2022
Anritsu	Power Meter	ML2495A	1804003	Oct. 09, 2021	Oct. 08, 2022
Anritsu	Power Meter	ML2496A	2119003	Jun. 22, 2022	Jun. 21, 2023
Anritsu	Power Sensor	MA2411B	1726150	Oct. 09, 2021	Oct. 08, 2022
Anritsu	Power Sensor	MA2411B	1911334	Jun. 22, 2022	Jun. 21, 2023
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Jan. 12, 2022	Jan. 11, 2023
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 19, 2021	Aug. 17, 2023
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 12, 2021	Oct. 11, 2022
Mini-Circuits	Power Amplifier	ZHL-42W+	715701915	May. 12, 2022	May. 11, 2023
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:

- 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.
- 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.

9. System Verification

9.1 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 $\pm 2^\circ\text{C}$ 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>

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
13	22.5	0.726	54.435	0.75	55.00	-3.20	-1.03	± 5	2022/8/12
750	22.5	0.891	42.500	0.89	41.90	0.11	1.43	± 5	2022/7/22
835	22.5	0.925	42.100	0.90	41.50	2.78	1.45	± 5	2022/7/22
1750	22.5	1.380	40.700	1.37	40.10	0.73	1.50	± 5	2022/7/7
1900	22.5	1.450	39.200	1.40	40.00	3.57	-2.00	± 5	2022/7/7
1900	22.5	1.430	38.900	1.40	40.00	2.14	-2.75	± 5	2022/7/22
2450	22.5	1.790	38.700	1.80	39.20	-0.56	-1.28	± 5	2022/9/13
2600	22.5	1.960	38.100	1.96	39.00	0.00	-2.31	± 5	2022/7/8
2600	22.5	1.960	38.000	1.96	39.00	0.00	-2.56	± 5	2022/9/13
3500	22.5	3.000	38.500	2.91	37.90	3.09	1.58	± 5	2022/9/13
3700	22.5	3.210	38.300	3.12	37.70	2.88	1.59	± 5	2022/9/13
5250	22.5	4.710	36.700	4.71	35.95	0.00	2.09	± 5	2022/9/13
5600	22.5	5.060	36.200	5.07	35.50	-0.20	1.97	± 5	2022/9/13
5750	22.5	5.220	36.000	5.22	35.35	0.00	1.84	± 5	2022/9/13

9.2 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.

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Power Drift (dB)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
SAR12	2022/8/12	13	250	CLA13-1011	EX3DV4 - SN3931	DAE4 Sn1399	-0.17					0.088	0.343	0.352	3.53
SAR15	2022/7/22	750	50	D750V3-1117	EX3DV4 - SN7700	DAE4 Sn1707	0.01	0.386	8.52	7.72	-9.39				
SAR15	2022/7/22	835	50	D835V2-4d167	EX3DV4 - SN7700	DAE4 Sn1707	0.04	0.465	9.55	9.3	-2.62				
SAR15	2022/7/7	1750	50	D1750V2-1120	EX3DV4 - SN7700	DAE4 Sn1707	0.05	1.730	36.40	34.6	-4.95				
SAR15	2022/7/7	1900	50	D1900V2-5d041	EX3DV4 - SN7700	DAE4 Sn1707	0	1.940	40.60	38.8	-4.43				
SAR15	2022/7/22	1900	50	D1900V2-5d041	EX3DV4 - SN7700	DAE4 Sn1707	0	1.920	40.60	38.4	-5.42				
SAR16	2022/9/13	2450	50	D2450V2-929	EX3DV4 - SN3728	DAE4 Sn1647	-0.01	2.480	53.10	49.6	-6.59				
SAR15	2022/7/8	2600	50	D2600V2-1089	EX3DV4 - SN7700	DAE4 Sn1707	0	2.660	55.40	53.2	-3.97				
SAR16	2022/9/13	2600	50	D2600V2-1089	EX3DV4 - SN3728	DAE4 Sn1647	0.01	2.620	55.40	52.4	-5.42				
SAR16	2022/9/13	3500	50	D3500V2-1014	EX3DV4 - SN3728	DAE4 Sn1647	-0.02	3.110	67.20	62.2	-7.44				
SAR16	2022/9/13	3700	50	D3700V2-1006	EX3DV4 - SN3728	DAE4 Sn1647	-0.02	3.300	65.60	66	0.61				
SAR16	2022/9/13	5250	50	D5GHZV2-1128-5250	EX3DV4 - SN3728	DAE4 Sn1647	-0.02	3.620	80.00	72.4	-9.50				
SAR16	2022/9/13	5600	50	D5GHZV2-1128-5600	EX3DV4 - SN3728	DAE4 Sn1647	-0.01	3.890	82.40	77.8	-5.58				
SAR16	2022/9/13	5750	50	D5GHZV2-1128-5750	EX3DV4 - SN3728	DAE4 Sn1647	0.01	3.560	79.10	71.2	-9.99				

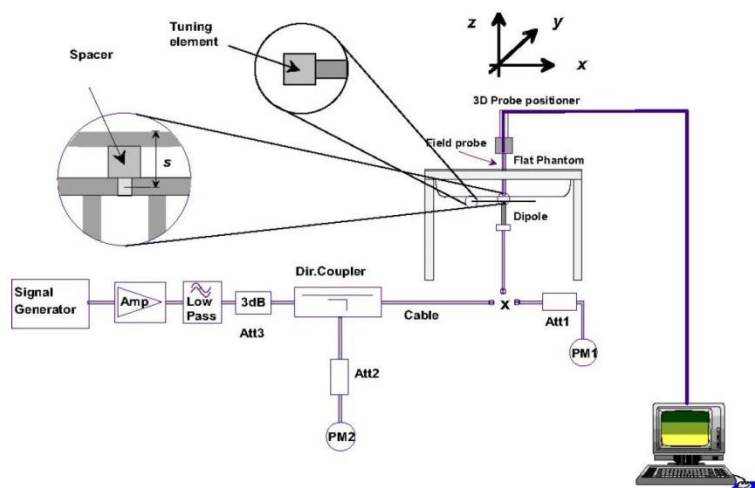


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

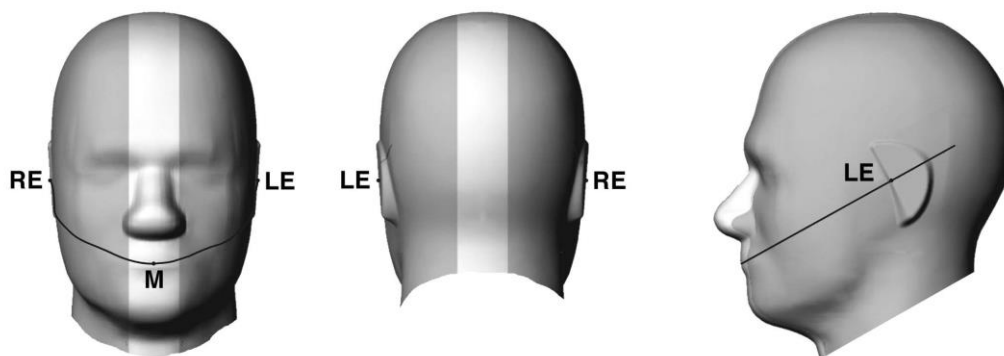


Fig 9.1.1 Front, back, and side views of SAM twin phantom

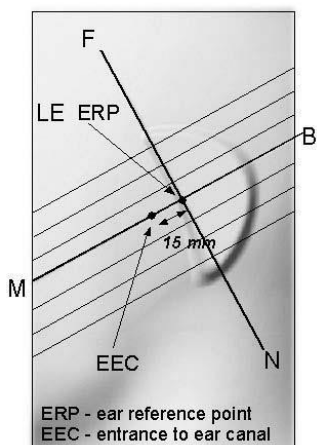


Fig 9.1.2 Close-up side view of phantom showing the ear region.

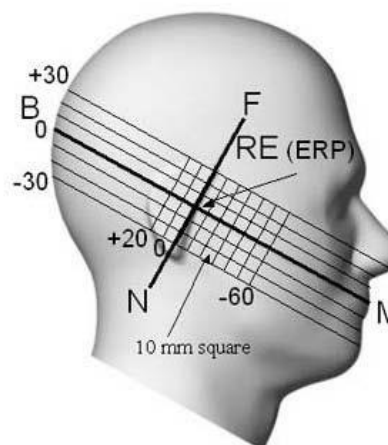


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

10.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

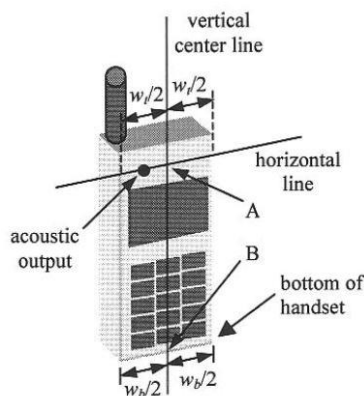


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case"

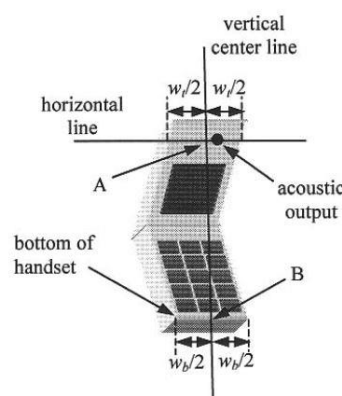


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

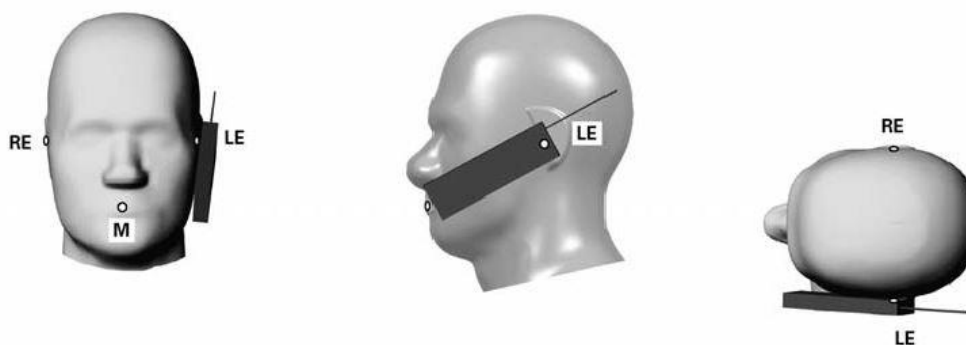


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

10.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15° .
3. Rotate the handset around the horizontal line by 15° .
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

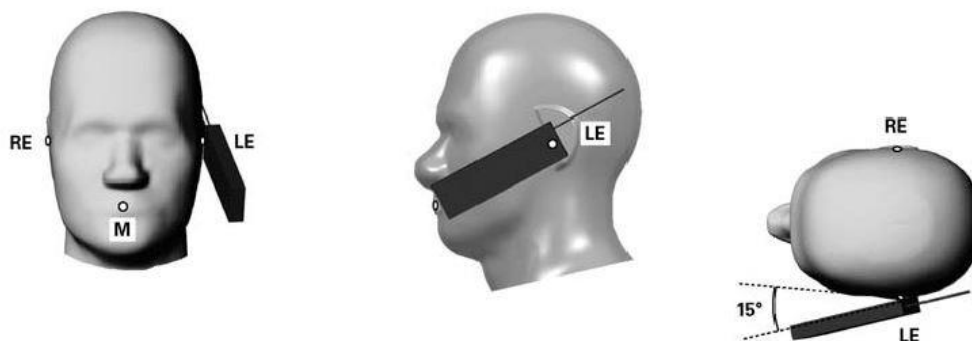


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

10.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

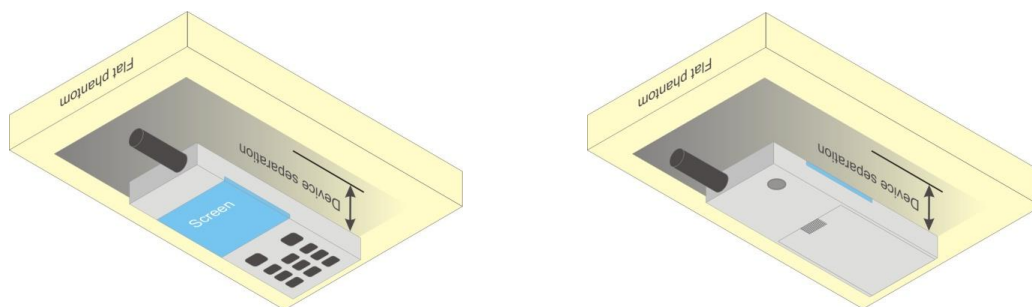


Fig 9.4 Body Worn Position

10.5 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

11. LTE Output Power (Unit: dBm)

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B5/B12/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 2/4/5/38 SAR test was covered by Band 25/66/26/41; 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 Ant 1>

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	23.29	23.15	23.06	24
20	QPSK	1	49	23.23	23.07	23.15	
20	QPSK	1	99	23.10	23.01	23.04	
20	QPSK	50	0	22.33	22.19	22.13	23
20	QPSK	50	24	22.29	22.16	22.20	
20	QPSK	50	50	22.28	22.09	22.17	
20	QPSK	100	0	22.32	22.15	22.08	
20	16QAM	1	0	22.57	22.47	22.38	23
20	16QAM	1	49	22.59	22.38	22.40	
20	16QAM	1	99	22.42	22.36	22.39	
20	16QAM	50	0	21.43	21.24	21.19	22
20	16QAM	50	24	21.39	21.23	21.30	
20	16QAM	50	50	21.38	21.19	21.27	
20	16QAM	100	0	21.41	21.20	21.16	
20	64QAM	1	0	21.55	21.39	21.30	22
20	64QAM	1	49	21.50	21.29	21.36	
20	64QAM	1	99	21.37	21.21	21.29	
20	64QAM	50	0	20.44	20.26	20.18	21
20	64QAM	50	24	20.40	20.22	20.34	
20	64QAM	50	50	20.39	20.22	20.31	
20	64QAM	100	0	20.43	20.24	20.19	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.25	23.07	22.99	24
15	QPSK	1	37	23.23	23.03	23.10	
15	QPSK	1	74	23.09	22.92	23.01	
15	QPSK	36	0	22.25	22.14	22.08	23
15	QPSK	36	20	22.26	22.16	22.11	
15	QPSK	36	39	22.26	22.09	22.08	
15	QPSK	75	0	22.28	22.06	22.05	
15	16QAM	1	0	22.56	22.44	22.36	23
15	16QAM	1	37	22.55	22.33	22.38	
15	16QAM	1	74	22.36	22.26	22.38	
15	16QAM	36	0	21.35	21.23	21.18	22
15	16QAM	36	20	21.34	21.15	21.24	
15	16QAM	36	39	21.38	21.18	21.21	
15	16QAM	75	0	21.32	21.14	21.15	
15	64QAM	1	0	21.49	21.33	21.25	22
15	64QAM	1	37	21.47	21.22	21.33	
15	64QAM	1	74	21.28	21.21	21.19	
15	64QAM	36	0	20.35	20.26	20.14	21
15	64QAM	36	20	20.31	20.13	20.30	
15	64QAM	36	39	20.30	20.22	20.25	
15	64QAM	75	0	20.34	20.15	20.12	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	23.27	23.14	23.05	24
10	QPSK	1	25	23.19	23.07	23.10	
10	QPSK	1	49	23.03	22.96	22.95	
10	QPSK	25	0	22.33	22.17	22.11	23
10	QPSK	25	12	22.28	22.16	22.20	



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10	QPSK	25	25	22.22	22.01	22.08	
10	QPSK	50	0	22.27	22.10	22.05	
10	16QAM	1	0	22.56	22.42	22.32	
10	16QAM	1	25	22.52	22.32	22.34	23
10	16QAM	1	49	22.39	22.31	22.38	
10	16QAM	25	0	21.41	21.18	21.18	
10	16QAM	25	12	21.37	21.16	21.22	22
10	16QAM	25	25	21.37	21.09	21.22	
10	16QAM	50	0	21.39	21.13	21.06	
10	64QAM	1	0	21.52	21.34	21.22	22
10	64QAM	1	25	21.41	21.24	21.36	
10	64QAM	1	49	21.36	21.21	21.29	
10	64QAM	25	0	20.44	20.16	20.12	21
10	64QAM	25	12	20.39	20.17	20.28	
10	64QAM	25	25	20.32	20.20	20.27	
10	64QAM	50	0	20.43	20.20	20.12	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.24	23.05	23.03	24
5	QPSK	1	12	23.20	23.07	23.05	
5	QPSK	1	24	23.04	22.94	23.00	
5	QPSK	12	0	22.25	22.15	22.07	23
5	QPSK	12	7	22.26	22.13	22.13	
5	QPSK	12	13	22.26	22.05	22.11	
5	16QAM	1	0	22.47	22.43	22.30	23
5	16QAM	1	12	22.58	22.29	22.40	
5	16QAM	1	24	22.33	22.28	22.36	
5	16QAM	12	0	21.33	21.22	21.09	22
5	16QAM	12	7	21.38	21.17	21.29	
5	16QAM	12	13	21.29	21.16	21.17	
5	16QAM	25	0	21.34	21.12	21.14	
5	64QAM	1	0	21.49	21.33	21.22	22
5	64QAM	1	12	21.41	21.22	21.36	
5	64QAM	1	24	21.32	21.18	21.24	
5	64QAM	12	0	20.37	20.26	20.17	21
5	64QAM	12	7	20.37	20.19	20.32	
5	64QAM	12	13	20.33	20.22	20.25	
5	64QAM	25	0	20.43	20.22	20.11	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.28	23.07	23.00	24
3	QPSK	1	8	23.15	23.03	23.12	
3	QPSK	1	14	23.03	23.00	22.98	
3	QPSK	8	0	22.23	22.16	22.06	23
3	QPSK	8	4	22.29	22.11	22.14	
3	QPSK	8	7	22.26	22.04	22.12	
3	QPSK	15	0	22.31	22.12	22.04	23
3	16QAM	1	0	22.57	22.40	22.29	
3	16QAM	1	8	22.54	22.34	22.36	
3	16QAM	1	14	22.38	22.30	22.34	22
3	16QAM	8	0	21.37	21.23	21.15	
3	16QAM	8	4	21.38	21.16	21.26	
3	16QAM	8	7	21.28	21.09	21.22	
3	16QAM	15	0	21.40	21.17	21.13	22
3	64QAM	1	0	21.51	21.39	21.20	
3	64QAM	1	8	21.44	21.28	21.27	



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3	64QAM	1	14	21.34	21.14	21.26	
3	64QAM	8	0	20.38	20.20	20.14	21
3	64QAM	8	4	20.40	20.13	20.25	
3	64QAM	8	7	20.33	20.15	20.28	
3	64QAM	15	0	20.43	20.18	20.16	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	23.22	23.10	22.96	24
1.4	QPSK	1	3	23.22	23.01	23.08	
1.4	QPSK	1	5	23.03	22.96	22.95	
1.4	QPSK	3	0	23.27	23.14	23.00	
1.4	QPSK	3	1	23.14	23.07	23.13	
1.4	QPSK	3	3	23.10	22.94	22.98	
1.4	QPSK	6	0	22.32	22.12	21.98	23
1.4	16QAM	1	0	22.55	22.45	22.36	23
1.4	16QAM	1	3	22.57	22.28	22.34	
1.4	16QAM	1	5	22.33	22.35	22.36	
1.4	16QAM	3	0	22.55	22.37	22.35	
1.4	16QAM	3	1	22.56	22.33	22.39	
1.4	16QAM	3	3	22.41	22.35	22.38	
1.4	16QAM	6	0	21.37	21.12	21.14	22
1.4	64QAM	1	0	21.55	21.33	21.27	22
1.4	64QAM	1	3	21.43	21.19	21.35	
1.4	64QAM	1	5	21.33	21.19	21.19	
1.4	64QAM	3	0	21.55	21.36	21.25	
1.4	64QAM	3	1	21.42	21.25	21.29	
1.4	64QAM	3	3	21.32	21.18	21.29	
1.4	64QAM	6	0	20.36	20.20	20.14	21



<LTE Band 4 Ant 1>

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	23.19	23.29	23.12	24
20	QPSK	1	49	23.11	23.06	23.05	
20	QPSK	1	99	23.01	23.03	23.01	
20	QPSK	50	0	22.27	22.18	22.14	23
20	QPSK	50	24	22.23	22.16	22.08	
20	QPSK	50	50	22.24	22.01	22.07	
20	QPSK	100	0	22.23	22.10	22.07	
20	16QAM	1	0	22.52	22.51	22.37	23
20	16QAM	1	49	22.47	22.34	22.35	
20	16QAM	1	99	22.30	22.23	22.34	
20	16QAM	50	0	21.30	21.27	21.20	22
20	16QAM	50	24	21.37	21.23	21.15	
20	16QAM	50	50	21.30	21.09	21.15	
20	16QAM	100	0	21.29	21.17	21.10	
20	64QAM	1	0	21.45	21.44	21.35	22
20	64QAM	1	49	21.41	21.32	21.33	
20	64QAM	1	99	21.25	21.16	21.29	
20	64QAM	50	0	20.30	20.29	20.22	21
20	64QAM	50	24	20.37	20.26	20.18	
20	64QAM	50	50	20.31	20.10	20.19	
20	64QAM	100	0	20.30	20.18	20.15	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	23.14	23.06	22.96	24
15	QPSK	1	37	23.18	23.06	23.10	
15	QPSK	1	74	23.01	22.93	22.99	
15	QPSK	36	0	22.26	22.17	22.07	23
15	QPSK	36	20	22.23	22.07	22.18	
15	QPSK	36	39	22.18	22.00	22.12	
15	QPSK	75	0	22.27	22.06	22.04	
15	16QAM	1	0	22.55	22.43	22.38	23
15	16QAM	1	37	22.56	22.34	22.36	
15	16QAM	1	74	22.35	22.33	22.39	
15	16QAM	36	0	21.41	21.21	21.18	22
15	16QAM	36	20	21.39	21.13	21.25	
15	16QAM	36	39	21.31	21.18	21.23	
15	16QAM	75	0	21.39	21.16	21.14	
15	64QAM	1	0	21.51	21.29	21.28	22
15	64QAM	1	37	21.46	21.29	21.32	
15	64QAM	1	74	21.34	21.18	21.20	
15	64QAM	36	0	20.34	20.16	20.15	21
15	64QAM	36	20	20.34	20.14	20.27	
15	64QAM	36	39	20.33	20.14	20.28	
15	64QAM	75	0	20.40	20.16	20.17	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	23.15	23.09	22.98	24
10	QPSK	1	25	23.23	22.97	23.09	
10	QPSK	1	49	23.01	23.00	23.01	
10	QPSK	25	0	22.26	22.11	22.09	23
10	QPSK	25	12	22.24	22.07	22.14	

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10	QPSK	25	25	22.18	22.02	22.17	
10	QPSK	50	0	22.27	22.11	22.04	
10	16QAM	1	0	22.47	22.41	22.37	
10	16QAM	1	25	22.54	22.35	22.35	23
10	16QAM	1	49	22.41	22.35	22.37	
10	16QAM	25	0	21.39	21.23	21.16	
10	16QAM	25	12	21.29	21.20	21.27	22
10	16QAM	25	25	21.30	21.09	21.23	
10	16QAM	50	0	21.38	21.12	21.07	
10	64QAM	1	0	21.49	21.29	21.29	22
10	64QAM	1	25	21.50	21.21	21.33	
10	64QAM	1	49	21.32	21.20	21.27	
10	64QAM	25	0	20.44	20.19	20.18	21
10	64QAM	25	12	20.38	20.12	20.28	
10	64QAM	25	25	20.34	20.13	20.23	
10	64QAM	50	0	20.33	20.16	20.09	
Channel				19975	20175	20375	
Frequency (MHz)				1712.5	1732.5	1752.5	Tune-up limit (dBm)
5	QPSK	1	0	23.10	23.12	23.05	24
5	QPSK	1	12	23.21	22.98	23.12	
5	QPSK	1	24	23.07	22.95	23.01	
5	QPSK	12	0	22.33	22.09	22.04	23
5	QPSK	12	7	22.27	22.14	22.12	
5	QPSK	12	13	22.24	22.01	22.11	
5	16QAM	1	0	22.50	22.40	22.30	23
5	16QAM	1	12	22.53	22.36	22.39	
5	16QAM	1	24	22.37	22.36	22.30	
5	16QAM	12	0	21.35	21.18	21.14	22
5	16QAM	12	7	21.34	21.15	21.30	
5	16QAM	12	13	21.29	21.12	21.24	
5	16QAM	25	0	21.41	21.16	21.13	
5	64QAM	1	0	21.55	21.33	21.27	
5	64QAM	1	12	21.47	21.19	21.26	22
5	64QAM	1	24	21.33	21.11	21.27	
5	64QAM	12	0	20.40	20.24	20.08	
5	64QAM	12	7	20.33	20.13	20.27	21
5	64QAM	12	13	20.36	20.15	20.24	
5	64QAM	25	0	20.34	20.24	20.19	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	23.14	23.09	23.05	24
3	QPSK	1	8	23.13	23.05	23.07	
3	QPSK	1	14	23.01	22.94	22.95	
3	QPSK	8	0	22.23	22.10	22.07	23
3	QPSK	8	4	22.23	22.11	22.14	
3	QPSK	8	7	22.26	22.01	22.12	
3	QPSK	15	0	22.23	22.09	22.00	23
3	16QAM	1	0	22.48	22.38	22.31	
3	16QAM	1	8	22.53	22.28	22.35	
3	16QAM	1	14	22.41	22.32	22.36	22
3	16QAM	8	0	21.39	21.21	21.09	
3	16QAM	8	4	21.34	21.14	21.20	
3	16QAM	8	7	21.38	21.15	21.19	
3	16QAM	15	0	21.35	21.10	21.09	
3	64QAM	1	0	21.50	21.37	21.29	22
3	64QAM	1	8	21.50	21.28	21.26	



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3	64QAM	1	14	21.31	21.18	21.23	
3	64QAM	8	0	20.40	20.17	20.08	21
3	64QAM	8	4	20.36	20.13	20.24	
3	64QAM	8	7	20.31	20.17	20.30	
3	64QAM	15	0	20.36	20.14	20.16	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	23.09	23.21	23.09	24
1.4	QPSK	1	3	23.02	23.03	22.96	
1.4	QPSK	1	5	23.01	23.01	22.94	
1.4	QPSK	3	0	23.11	23.21	23.09	
1.4	QPSK	3	1	23.02	22.97	22.95	
1.4	QPSK	3	3	22.96	23.02	22.95	
1.4	QPSK	6	0	22.14	22.01	22.02	23
1.4	16QAM	1	0	22.43	22.50	22.27	23
1.4	16QAM	1	3	22.45	22.34	22.34	
1.4	16QAM	1	5	22.27	22.19	22.26	
1.4	16QAM	3	0	22.44	22.50	22.34	
1.4	16QAM	3	1	22.38	22.24	22.27	
1.4	16QAM	3	3	22.25	22.19	22.32	
1.4	16QAM	6	0	21.25	21.12	21.00	22
1.4	64QAM	1	0	21.40	21.42	21.26	22
1.4	64QAM	1	3	21.39	21.26	21.32	
1.4	64QAM	1	5	21.25	21.14	21.25	
1.4	64QAM	3	0	21.36	21.44	21.32	
1.4	64QAM	3	1	21.41	21.32	21.30	
1.4	64QAM	3	3	21.23	21.12	21.28	
1.4	64QAM	6	0	20.29	20.13	20.11	21



<LTE Band 5 Ant 1>

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	23.32	23.37	23.32	24
10	QPSK	1	25	23.30	23.31	23.27	
10	QPSK	1	49	23.34	23.26	23.22	
10	QPSK	25	0	22.35	22.38	22.37	23
10	QPSK	25	12	22.46	22.38	22.33	
10	QPSK	25	25	22.43	22.33	22.30	
10	QPSK	50	0	22.46	22.39	22.33	
10	16QAM	1	0	22.63	22.60	22.66	23
10	16QAM	1	25	22.60	22.63	22.60	
10	16QAM	1	49	22.66	22.55	22.52	
10	16QAM	25	0	21.44	21.46	21.47	22
10	16QAM	25	12	21.50	21.47	21.42	
10	16QAM	25	25	21.48	21.42	21.41	
10	16QAM	50	0	21.49	21.43	21.43	
10	64QAM	1	0	21.54	21.60	21.60	22
10	64QAM	1	25	21.51	21.57	21.52	
10	64QAM	1	49	21.60	21.47	21.49	
10	64QAM	25	0	20.43	20.49	20.49	21
10	64QAM	25	12	20.54	20.45	20.45	
10	64QAM	25	25	20.50	20.40	20.36	
10	64QAM	50	0	20.55	20.48	20.46	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	23.23	23.33	23.30	24
5	QPSK	1	12	23.27	23.30	23.21	
5	QPSK	1	24	23.25	23.25	23.22	
5	QPSK	12	0	22.34	22.30	22.36	23
5	QPSK	12	7	22.44	22.38	22.25	
5	QPSK	12	13	22.37	22.26	22.27	
5	QPSK	25	0	22.45	22.39	22.24	
5	16QAM	1	0	22.53	22.60	22.62	23
5	16QAM	1	12	22.54	22.62	22.52	
5	16QAM	1	24	22.56	22.48	22.45	
5	16QAM	12	0	21.42	21.36	21.46	22
5	16QAM	12	7	21.43	21.46	21.34	
5	16QAM	12	13	21.44	21.42	21.38	
5	16QAM	25	0	21.39	21.39	21.37	
5	64QAM	1	0	21.51	21.59	21.54	22
5	64QAM	1	12	21.49	21.53	21.45	
5	64QAM	1	24	21.57	21.39	21.47	
5	64QAM	12	0	20.34	20.39	20.42	21
5	64QAM	12	7	20.45	20.44	20.40	
5	64QAM	12	13	20.41	20.32	20.33	
5	64QAM	25	0	20.55	20.42	20.40	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	23.27	23.29	23.30	24
3	QPSK	1	8	23.22	23.23	23.20	
3	QPSK	1	14	23.32	23.21	23.14	
3	QPSK	8	0	22.28	22.30	22.30	23
3	QPSK	8	4	22.40	22.28	22.26	



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3	QPSK	8	7	22.40	22.23	22.26	
3	QPSK	15	0	22.44	22.31	22.24	
3	16QAM	1	0	22.56	22.57	22.65	
3	16QAM	1	8	22.59	22.59	22.60	23
3	16QAM	1	14	22.58	22.45	22.45	
3	16QAM	8	0	21.34	21.37	21.41	
3	16QAM	8	4	21.48	21.44	21.42	22
3	16QAM	8	7	21.47	21.37	21.40	
3	16QAM	15	0	21.40	21.41	21.43	
3	64QAM	1	0	21.53	21.51	21.58	22
3	64QAM	1	8	21.50	21.47	21.51	
3	64QAM	1	14	21.58	21.44	21.49	
3	64QAM	8	0	20.41	20.43	20.43	21
3	64QAM	8	4	20.48	20.36	20.36	
3	64QAM	8	7	20.44	20.38	20.30	
3	64QAM	15	0	20.51	20.48	20.42	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	23.23	23.27	23.26	24
1.4	QPSK	1	3	23.20	23.27	23.20	
1.4	QPSK	1	5	23.30	23.18	23.13	
1.4	QPSK	3	0	23.27	23.33	23.27	
1.4	QPSK	3	1	23.20	23.22	23.21	
1.4	QPSK	3	3	23.28	23.24	23.13	
1.4	16QAM	1	0	22.57	22.56	22.62	23
1.4	16QAM	1	3	22.60	22.56	22.58	
1.4	16QAM	1	5	22.66	22.49	22.48	
1.4	16QAM	3	0	22.60	22.60	22.66	
1.4	16QAM	3	1	22.60	22.54	22.54	
1.4	16QAM	3	3	22.64	22.48	22.42	
1.4	16QAM	6	0	21.46	21.34	21.37	22
1.4	64QAM	1	0	21.50	21.50	21.51	22
1.4	64QAM	1	3	21.50	21.55	21.45	
1.4	64QAM	1	5	21.56	21.47	21.44	
1.4	64QAM	3	0	21.49	21.59	21.50	
1.4	64QAM	3	1	21.50	21.51	21.47	
1.4	64QAM	3	3	21.50	21.39	21.48	
1.4	64QAM	6	0	20.48	20.45	20.37	21



<LTE Band 7 Ant 1>

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	22.28	22.37	22.18	24
20	QPSK	1	49	22.32	22.29	22.25	
20	QPSK	1	99	22.32	22.37	22.36	
20	QPSK	50	0	21.35	21.34	21.25	23
20	QPSK	50	24	21.46	21.34	21.30	
20	QPSK	50	50	21.35	21.39	21.36	
20	QPSK	100	0	21.34	21.36	21.30	
20	16QAM	1	0	21.59	21.58	21.54	23
20	16QAM	1	49	21.68	21.65	21.55	
20	16QAM	1	99	21.69	21.69	21.66	
20	16QAM	50	0	20.46	20.44	20.35	22
20	16QAM	50	24	20.53	20.45	20.40	
20	16QAM	50	50	20.44	20.50	20.45	
20	16QAM	100	0	20.41	20.43	20.38	
20	64QAM	1	0	20.51	20.46	20.42	22
20	64QAM	1	49	20.62	20.55	20.51	
20	64QAM	1	99	20.63	20.68	20.58	
20	64QAM	50	0	19.48	19.45	19.36	21
20	64QAM	50	24	19.56	19.48	19.42	
20	64QAM	50	50	19.45	19.53	19.47	
20	64QAM	100	0	19.43	19.44	19.42	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	22.28	22.27	22.13	24
15	QPSK	1	37	22.26	22.23	22.17	
15	QPSK	1	74	22.30	22.29	22.35	
15	QPSK	36	0	21.34	21.26	21.22	23
15	QPSK	36	20	21.44	21.34	21.21	
15	QPSK	36	39	21.28	21.31	21.34	
15	QPSK	75	0	21.33	21.34	21.26	
15	16QAM	1	0	21.57	21.49	21.47	23
15	16QAM	1	37	21.59	21.57	21.45	
15	16QAM	1	74	21.64	21.62	21.56	
15	16QAM	36	0	20.37	20.43	20.31	22
15	16QAM	36	20	20.53	20.41	20.39	
15	16QAM	36	39	20.35	20.45	20.38	
15	16QAM	75	0	20.31	20.43	20.28	
15	64QAM	1	0	20.41	20.45	20.42	22
15	64QAM	1	37	20.57	20.55	20.43	
15	64QAM	1	74	20.63	20.67	20.52	
15	64QAM	36	0	19.48	19.40	19.36	21
15	64QAM	36	20	19.50	19.45	19.38	
15	64QAM	36	39	19.36	19.47	19.46	
15	64QAM	75	0	19.42	19.40	19.32	
Channel				20800	21100	21400	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	QPSK	1	0	22.19	22.36	22.17	24
10	QPSK	1	25	22.25	22.24	22.22	
10	QPSK	1	49	22.29	22.37	22.29	
10	QPSK	25	0	21.27	21.27	21.19	23
10	QPSK	25	12	21.42	21.24	21.22	



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10	QPSK	25	25	21.35	21.35	21.31	
10	QPSK	50	0	21.24	21.27	21.30	
10	16QAM	1	0	21.54	21.55	21.54	
10	16QAM	1	25	21.59	21.62	21.47	23
10	16QAM	1	49	21.63	21.66	21.56	
10	16QAM	25	0	20.37	20.40	20.28	
10	16QAM	25	12	20.43	20.43	20.32	22
10	16QAM	25	25	20.40	20.45	20.36	
10	16QAM	50	0	20.40	20.37	20.36	
10	64QAM	1	0	20.47	20.39	20.38	22
10	64QAM	1	25	20.52	20.47	20.48	
10	64QAM	1	49	20.54	20.63	20.55	
10	64QAM	25	0	19.43	19.36	19.36	21
10	64QAM	25	12	19.51	19.45	19.38	
10	64QAM	25	25	19.44	19.48	19.45	
10	64QAM	50	0	19.35	19.39	19.34	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	22.23	22.34	22.12	24
5	QPSK	1	12	22.29	22.21	22.17	
5	QPSK	1	24	22.31	22.30	22.31	
5	QPSK	12	0	21.32	21.30	21.15	23
5	QPSK	12	7	21.44	21.31	21.28	
5	QPSK	12	13	21.27	21.35	21.26	
5	16QAM	1	0	21.52	21.56	21.44	23
5	16QAM	1	12	21.60	21.57	21.50	
5	16QAM	1	24	21.64	21.62	21.66	
5	16QAM	12	0	20.38	20.43	20.33	22
5	16QAM	12	7	20.45	20.39	20.31	
5	16QAM	12	13	20.43	20.41	20.42	
5	16QAM	25	0	20.36	20.42	20.38	
5	64QAM	1	0	20.51	20.38	20.33	22
5	64QAM	1	12	20.55	20.54	20.51	
5	64QAM	1	24	20.62	20.61	20.55	
5	64QAM	12	0	19.38	19.45	19.35	21
5	64QAM	12	7	19.50	19.45	19.42	
5	64QAM	12	13	19.36	19.50	19.42	
5	64QAM	25	0	19.38	19.41	19.32	



<LTE Band 12 Ant 1>

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	23.41	23.36	23.49	24
10	QPSK	1	25	23.39	23.33	23.40	
10	QPSK	1	49	23.35	23.40	23.48	
10	QPSK	25	0	22.44	22.36	22.32	23
10	QPSK	25	12	22.43	22.36	22.33	
10	QPSK	25	25	22.41	22.36	22.41	
10	QPSK	50	0	22.42	22.37	22.31	
10	16QAM	1	0	22.84	22.78	22.68	23
10	16QAM	1	25	22.79	22.74	22.79	
10	16QAM	1	49	22.75	22.84	22.86	
10	16QAM	25	0	21.54	21.48	21.43	22
10	16QAM	25	12	21.57	21.51	21.47	
10	16QAM	25	25	21.51	21.47	21.53	
10	16QAM	50	0	21.53	21.48	21.44	
10	64QAM	1	0	21.74	21.72	21.62	22
10	64QAM	1	25	21.72	21.66	21.74	
10	64QAM	1	49	21.68	21.75	21.81	
10	64QAM	25	0	20.58	20.49	20.46	21
10	64QAM	25	12	20.57	20.53	20.49	
10	64QAM	25	25	20.53	20.48	20.57	
10	64QAM	50	0	20.56	20.52	20.44	
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	23.35	23.35	23.45	24
5	QPSK	1	12	23.32	23.23	23.38	
5	QPSK	1	24	23.25	23.37	23.44	
5	QPSK	12	0	22.40	22.28	22.32	23
5	QPSK	12	7	22.35	22.28	22.32	
5	QPSK	12	13	22.41	22.27	22.41	
5	QPSK	25	0	22.37	22.30	22.27	
5	16QAM	1	0	22.82	22.78	22.67	23
5	16QAM	1	12	22.69	22.73	22.76	
5	16QAM	1	24	22.66	22.77	22.84	
5	16QAM	12	0	21.45	21.39	21.35	22
5	16QAM	12	7	21.56	21.47	21.46	
5	16QAM	12	13	21.47	21.46	21.43	
5	16QAM	25	0	21.51	21.42	21.42	
5	64QAM	1	0	21.64	21.66	21.56	22
5	64QAM	1	12	21.68	21.64	21.67	
5	64QAM	1	24	21.60	21.69	21.81	
5	64QAM	12	0	20.48	20.40	20.37	21
5	64QAM	12	7	20.56	20.53	20.48	
5	64QAM	12	13	20.52	20.38	20.55	
5	64QAM	25	0	20.53	20.42	20.42	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	23.33	23.33	23.45	24
3	QPSK	1	8	23.39	23.24	23.35	
3	QPSK	1	14	23.31	23.39	23.45	
3	QPSK	8	0	22.43	22.33	22.26	23
3	QPSK	8	4	22.41	22.28	22.33	



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3	QPSK	8	7	22.40	22.27	22.40	
3	QPSK	15	0	22.38	22.36	22.28	
3	16QAM	1	0	22.79	22.70	22.63	
3	16QAM	1	8	22.79	22.73	22.77	23
3	16QAM	1	14	22.66	22.74	22.85	
3	16QAM	8	0	21.45	21.44	21.38	
3	16QAM	8	4	21.48	21.49	21.43	22
3	16QAM	8	7	21.50	21.46	21.52	
3	16QAM	15	0	21.46	21.48	21.44	
3	64QAM	1	0	21.68	21.69	21.61	22
3	64QAM	1	8	21.63	21.65	21.68	
3	64QAM	1	14	21.62	21.67	21.76	
3	64QAM	8	0	20.51	20.43	20.42	21
3	64QAM	8	4	20.53	20.46	20.45	
3	64QAM	8	7	20.51	20.40	20.49	
3	64QAM	15	0	20.56	20.49	20.42	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	23.34	23.36	23.44	24
1.4	QPSK	1	3	23.29	23.33	23.31	
1.4	QPSK	1	5	23.28	23.35	23.42	
1.4	QPSK	3	0	23.32	23.33	23.41	
1.4	QPSK	3	1	23.32	23.27	23.34	
1.4	QPSK	3	3	23.31	23.40	23.45	
1.4	16QAM	1	0	22.77	22.76	22.68	23
1.4	16QAM	1	3	22.74	22.69	22.78	
1.4	16QAM	1	5	22.70	22.78	22.80	
1.4	16QAM	3	0	22.77	22.70	22.67	
1.4	16QAM	3	1	22.70	22.72	22.74	
1.4	16QAM	3	3	22.70	22.80	22.78	
1.4	16QAM	6	0	21.53	21.39	21.43	22
1.4	64QAM	1	0	21.70	21.69	21.54	22
1.4	64QAM	1	3	21.66	21.64	21.71	
1.4	64QAM	1	5	21.68	21.68	21.76	
1.4	64QAM	3	0	21.65	21.62	21.58	
1.4	64QAM	3	1	21.68	21.61	21.72	
1.4	64QAM	3	3	21.62	21.74	21.71	
1.4	64QAM	6	0	20.49	20.42	20.39	21



<LTE Band 13 Ant 1>

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		23.34		24
10	QPSK	1	25		23.31		
10	QPSK	1	49		23.33		
10	QPSK	25	0		22.36		23
10	QPSK	25	12		22.35		
10	QPSK	25	25		22.30		
10	QPSK	50	0		22.33		
10	16QAM	1	0		22.41		23
10	16QAM	1	25		22.59		
10	16QAM	1	49		22.63		
10	16QAM	25	0		21.46		22
10	16QAM	25	12		21.45		
10	16QAM	25	25		21.38		
10	16QAM	50	0		21.43		
10	64QAM	1	0		21.34		22
10	64QAM	1	25		21.52		
10	64QAM	1	49		21.57		
10	64QAM	25	0		20.44		21
10	64QAM	25	12		20.49		
10	64QAM	25	25		20.41		
10	64QAM	50	0		20.46		
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	23.18	23.10	23.12	24
5	QPSK	1	12	23.13	23.12	23.06	
5	QPSK	1	24	23.16	23.18	23.13	
5	QPSK	12	0	22.31	22.35	22.29	23
5	QPSK	12	7	22.34	22.30	22.26	
5	QPSK	12	13	22.24	22.20	22.24	
5	QPSK	25	0	22.32	22.30	22.26	
5	16QAM	1	0	22.38	22.36	22.35	23
5	16QAM	1	12	22.55	22.58	22.51	
5	16QAM	1	24	22.59	22.62	22.61	
5	16QAM	12	0	21.37	21.40	21.44	22
5	16QAM	12	7	21.36	21.36	21.40	
5	16QAM	12	13	21.35	21.35	21.38	
5	16QAM	25	0	21.36	21.41	21.36	
5	64QAM	1	0	21.28	21.28	21.29	22
5	64QAM	1	12	21.49	21.47	21.50	
5	64QAM	1	24	21.52	21.52	21.54	
5	64QAM	12	0	20.34	20.38	20.37	21
5	64QAM	12	7	20.49	20.43	20.49	
5	64QAM	12	13	20.40	20.37	20.37	
5	64QAM	25	0	20.41	20.44	20.42	



<LTE Band 14 Ant 1>

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			
Frequency (MHz)				793			
10	QPSK	1	0		23.19		24
10	QPSK	1	25		23.17		
10	QPSK	1	49		23.14		
10	QPSK	25	0		22.21		23
10	QPSK	25	12		22.21		
10	QPSK	25	25		22.21		
10	QPSK	50	0		22.23		23
10	16QAM	1	0		22.60		
10	16QAM	1	25		22.42		
10	16QAM	1	49		22.50		22
10	16QAM	25	0		21.31		
10	16QAM	25	12		21.32		
10	16QAM	25	25		21.29		22
10	16QAM	50	0		21.33		
10	64QAM	1	0		21.52		
10	64QAM	1	25		21.41		22
10	64QAM	1	49		21.38		
10	64QAM	25	0		20.32		
10	64QAM	25	12		20.35		21
10	64QAM	25	25		20.30		
10	64QAM	50	0		20.31		
Channel				23305	23330	23355	Tune-up limit (dBm)
Frequency (MHz)				790.5	793	795.5	
5	QPSK	1	0	23.16	23.18	23.14	24
5	QPSK	1	12	23.09	23.11	23.17	
5	QPSK	1	24	23.14	23.14	23.13	
5	QPSK	12	0	22.11	22.20	22.14	23
5	QPSK	12	7	22.13	22.21	22.14	
5	QPSK	12	13	22.15	22.21	22.17	
5	QPSK	25	0	22.22	22.21	22.20	23
5	16QAM	1	0	22.54	22.60	22.52	
5	16QAM	1	12	22.42	22.38	22.36	
5	16QAM	1	24	22.45	22.45	22.44	22
5	16QAM	12	0	21.28	21.22	21.26	
5	16QAM	12	7	21.29	21.27	21.25	
5	16QAM	12	13	21.29	21.23	21.28	22
5	16QAM	25	0	21.24	21.31	21.33	
5	64QAM	1	0	21.50	21.50	21.42	
5	64QAM	1	12	21.37	21.36	21.39	22
5	64QAM	1	24	21.29	21.31	21.28	
5	64QAM	12	0	20.26	20.28	20.32	
5	64QAM	12	7	20.29	20.25	20.34	21
5	64QAM	12	13	20.26	20.20	20.20	
5	64QAM	25	0	20.21	20.28	20.22	



<LTE Band 25 Ant 1>

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	
Frequency (MHz)				1860	1880	1905	
20	QPSK	1	0	23.51	23.37	23.37	24
20	QPSK	1	49	23.45	23.29	23.28	
20	QPSK	1	99	23.32	23.23	23.26	
20	QPSK	50	0	22.55	22.41	22.35	23
20	QPSK	50	24	22.51	22.38	22.42	
20	QPSK	50	50	22.50	22.31	22.39	
20	QPSK	100	0	22.54	22.37	22.30	23
20	16QAM	1	0	22.79	22.69	22.60	
20	16QAM	1	49	22.81	22.60	22.62	
20	16QAM	1	99	22.64	22.58	22.61	22
20	16QAM	50	0	21.65	21.46	21.41	
20	16QAM	50	24	21.61	21.45	21.52	
20	16QAM	50	50	21.60	21.41	21.49	22
20	16QAM	100	0	21.63	21.42	21.38	
20	64QAM	1	0	21.77	21.61	21.52	
20	64QAM	1	49	21.72	21.51	21.58	22
20	64QAM	1	99	21.59	21.43	21.51	
20	64QAM	50	0	20.66	20.48	20.40	21
20	64QAM	50	24	20.62	20.44	20.56	
20	64QAM	50	50	20.61	20.44	20.53	
20	64QAM	100	0	20.65	20.46	20.41	
Channel				26115	26340	26615	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1907.5	
15	QPSK	1	0	23.42	23.33	23.19	24
15	QPSK	1	37	23.40	23.21	23.35	
15	QPSK	1	74	23.20	23.22	23.07	
15	QPSK	36	0	22.47	22.25	22.18	23
15	QPSK	36	20	22.40	22.33	22.33	
15	QPSK	36	39	22.43	22.16	22.31	
15	QPSK	75	0	22.40	22.24	22.11	23
15	16QAM	1	0	22.62	22.62	22.53	
15	16QAM	1	37	22.66	22.45	22.52	
15	16QAM	1	74	22.62	22.53	22.45	22
15	16QAM	36	0	21.56	21.26	21.21	
15	16QAM	36	20	21.60	21.32	21.33	
15	16QAM	36	39	21.50	21.30	21.33	22
15	16QAM	75	0	21.48	21.32	21.36	
15	64QAM	1	0	21.58	21.56	21.45	
15	64QAM	1	37	21.66	21.31	21.45	22
15	64QAM	1	74	21.57	21.31	21.42	
15	64QAM	36	0	20.57	20.28	20.27	21
15	64QAM	36	20	20.43	20.33	20.54	
15	64QAM	36	39	20.43	20.41	20.35	
15	64QAM	75	0	20.61	20.46	20.29	
Channel				26090	26340	26640	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1910	
10	QPSK	1	0	23.49	23.18	23.09	24
10	QPSK	1	25	23.27	23.15	23.23	
10	QPSK	1	49	23.22	23.11	23.21	
10	QPSK	25	0	22.54	22.28	22.19	23
10	QPSK	25	12	22.40	22.29	22.38	

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10	QPSK	25	25	22.36	22.15	22.21	
10	QPSK	50	0	22.36	22.35	22.29	
10	16QAM	1	0	22.66	22.55	22.46	
10	16QAM	1	25	22.70	22.56	22.55	23
10	16QAM	1	49	22.57	22.46	22.61	
10	16QAM	25	0	21.46	21.39	21.38	
10	16QAM	25	12	21.57	21.27	21.49	22
10	16QAM	25	25	21.53	21.41	21.49	
10	16QAM	50	0	21.55	21.33	21.21	
10	64QAM	1	0	21.59	21.52	21.39	22
10	64QAM	1	25	21.62	21.47	21.46	
10	64QAM	1	49	21.39	21.30	21.31	
10	64QAM	25	0	20.49	20.36	20.34	21
10	64QAM	25	12	20.56	20.38	20.50	
10	64QAM	25	25	20.53	20.25	20.38	
10	64QAM	50	0	20.65	20.34	20.34	
Channel				26065	26340	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1912.5	
5	QPSK	1	0	23.39	23.26	23.10	24
5	QPSK	1	12	23.31	23.15	23.27	
5	QPSK	1	24	23.27	23.22	23.06	
5	QPSK	12	0	22.53	22.36	22.20	23
5	QPSK	12	7	22.48	22.24	22.28	
5	QPSK	12	13	22.36	22.21	22.29	
5	16QAM	1	0	22.59	22.58	22.58	23
5	16QAM	1	12	22.78	22.41	22.42	
5	16QAM	1	24	22.63	22.47	22.53	
5	16QAM	12	0	21.56	21.35	21.24	22
5	16QAM	12	7	21.50	21.25	21.44	
5	16QAM	12	13	21.46	21.21	21.39	
5	16QAM	25	0	21.48	21.42	21.33	
5	64QAM	1	0	21.62	21.60	21.39	22
5	64QAM	1	12	21.54	21.43	21.55	
5	64QAM	1	24	21.45	21.36	21.46	
5	64QAM	12	0	20.55	20.45	20.24	21
5	64QAM	12	7	20.43	20.41	20.40	
5	64QAM	12	13	20.52	20.42	20.36	
5	64QAM	25	0	20.58	20.44	20.39	
Channel				26055	26340	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1913.5	
3	QPSK	1	0	23.40	23.37	23.12	24
3	QPSK	1	8	23.33	23.23	23.21	
3	QPSK	1	14	23.15	23.03	23.17	
3	QPSK	8	0	22.52	22.33	22.18	23
3	QPSK	8	4	22.39	22.24	22.41	
3	QPSK	8	7	22.31	22.21	22.22	
3	QPSK	15	0	22.43	22.17	22.19	23
3	16QAM	1	0	22.69	22.69	22.43	
3	16QAM	1	8	22.75	22.41	22.45	
3	16QAM	1	14	22.46	22.39	22.60	22
3	16QAM	8	0	21.53	21.44	21.27	
3	16QAM	8	4	21.60	21.26	21.38	
3	16QAM	8	7	21.52	21.38	21.44	
3	16QAM	15	0	21.48	21.40	21.30	22
3	64QAM	1	0	21.70	21.54	21.45	
3	64QAM	1	8	21.62	21.33	21.52	



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3	64QAM	1	14	21.47	21.43	21.49	
3	64QAM	8	0	20.50	20.35	20.32	21
3	64QAM	8	4	20.43	20.33	20.49	
3	64QAM	8	7	20.61	20.33	20.34	
3	64QAM	15	0	20.54	20.45	20.25	
Channel				26047	26340	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1914.3	
1.4	QPSK	1	0	23.50	23.33	23.09	24
1.4	QPSK	1	3	23.28	23.22	23.25	
1.4	QPSK	1	5	23.21	23.18	23.06	
1.4	QPSK	3	0	22.54	22.37	22.26	
1.4	QPSK	3	1	22.49	22.33	22.40	
1.4	QPSK	3	3	22.46	22.16	22.26	
1.4	QPSK	6	0	22.41	22.32	22.14	23
1.4	16QAM	1	0	22.76	22.65	22.60	23
1.4	16QAM	1	3	22.79	22.41	22.51	
1.4	16QAM	1	5	22.59	22.42	22.54	
1.4	16QAM	3	0	21.65	21.37	21.36	
1.4	16QAM	3	1	21.56	21.42	21.32	
1.4	16QAM	3	3	21.40	21.29	21.33	
1.4	16QAM	6	0	21.49	21.27	21.21	22
1.4	64QAM	1	0	21.63	21.42	21.50	22
1.4	64QAM	1	3	21.70	21.47	21.42	
1.4	64QAM	1	5	21.50	21.33	21.49	
1.4	64QAM	3	0	20.65	20.48	20.20	
1.4	64QAM	3	1	20.52	20.31	20.38	
1.4	64QAM	3	3	20.49	20.41	20.45	
1.4	64QAM	6	0	20.49	20.42	20.29	21



<LTE Band 26 Ant 1>

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	23.36	23.20	23.13	24
15	QPSK	1	37	23.20	23.24	23.22	
15	QPSK	1	74	23.35	23.23	23.08	
15	QPSK	36	0	22.32	22.26	22.18	23
15	QPSK	36	20	22.32	22.24	22.18	
15	QPSK	36	39	22.36	22.27	22.20	
15	QPSK	75	0	22.31	22.25	22.14	23
15	16QAM	1	0	22.50	22.73	22.76	
15	16QAM	1	37	22.73	22.44	22.48	
15	16QAM	1	74	22.70	22.44	22.20	22
15	16QAM	36	0	21.32	21.32	21.23	
15	16QAM	36	20	21.32	21.31	21.26	
15	16QAM	36	39	21.45	21.32	21.28	22
15	16QAM	75	0	21.35	21.36	21.24	
15	64QAM	1	0	21.47	21.11	21.07	
15	64QAM	1	37	21.48	21.55	21.38	21
15	64QAM	1	74	21.61	21.56	21.20	
15	64QAM	36	0	20.46	20.49	20.35	
15	64QAM	36	20	20.41	20.35	20.27	21
15	64QAM	36	39	20.46	20.34	20.37	
15	64QAM	75	0	20.32	20.33	20.22	
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	23.33	23.15	23.13	24
10	QPSK	1	25	23.17	23.16	23.14	
10	QPSK	1	49	23.35	23.23	23.08	
10	QPSK	25	0	22.31	22.18	22.13	23
10	QPSK	25	12	22.29	22.16	22.18	
10	QPSK	25	25	22.30	22.17	22.15	
10	QPSK	50	0	22.31	22.22	22.14	23
10	16QAM	1	0	22.43	22.65	22.72	
10	16QAM	1	25	22.68	22.37	22.46	
10	16QAM	1	49	22.67	22.39	22.17	22
10	16QAM	25	0	21.26	21.25	21.16	
10	16QAM	25	12	21.22	21.24	21.24	
10	16QAM	25	25	21.41	21.32	21.22	22
10	16QAM	50	0	21.34	21.29	21.24	
10	64QAM	1	0	21.44	21.05	21.04	
10	64QAM	1	25	21.38	21.51	21.36	21
10	64QAM	1	49	21.55	21.55	21.10	
10	64QAM	25	0	20.44	20.43	20.25	
10	64QAM	25	12	20.32	20.34	20.24	21
10	64QAM	25	25	20.39	20.30	20.29	
10	64QAM	50	0	20.32	20.25	20.18	
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	23.30	23.15	23.08	24
5	QPSK	1	12	23.11	23.17	23.22	
5	QPSK	1	24	23.29	23.19	23.04	
5	QPSK	12	0	22.29	22.19	22.16	23
5	QPSK	12	7	22.26	22.19	22.16	



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5	QPSK	12	13	22.35	22.26	22.14	
5	QPSK	25	0	22.29	22.21	22.09	
5	16QAM	1	0	22.45	22.63	22.66	
5	16QAM	1	12	22.73	22.34	22.43	23
5	16QAM	1	24	22.67	22.37	22.12	
5	16QAM	12	0	21.25	21.22	21.23	
5	16QAM	12	7	21.24	21.24	21.26	22
5	16QAM	12	13	21.43	21.30	21.25	
5	16QAM	25	0	21.34	21.30	21.15	
5	64QAM	1	0	21.42	21.09	21.03	22
5	64QAM	1	12	21.38	21.48	21.38	
5	64QAM	1	24	21.56	21.48	21.19	
5	64QAM	12	0	20.46	20.39	20.25	21
5	64QAM	12	7	20.34	20.26	20.26	
5	64QAM	12	13	20.46	20.31	20.33	
5	64QAM	25	0	20.30	20.31	20.17	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	23.31	23.18	23.05	24
3	QPSK	1	8	23.20	23.23	23.22	
3	QPSK	1	14	23.33	23.19	23.08	
3	QPSK	8	0	22.27	22.25	22.18	23
3	QPSK	8	4	22.24	22.15	22.18	
3	QPSK	8	7	22.34	22.23	22.16	
3	16QAM	1	0	22.47	22.64	22.69	23
3	16QAM	1	8	22.67	22.39	22.48	
3	16QAM	1	14	22.64	22.39	22.16	
3	16QAM	8	0	21.23	21.24	21.20	22
3	16QAM	8	4	21.28	21.23	21.25	
3	16QAM	8	7	21.40	21.23	21.22	
3	16QAM	15	0	21.27	21.28	21.19	22
3	64QAM	1	0	21.44	21.07	21.07	
3	64QAM	1	8	21.43	21.50	21.32	
3	64QAM	1	14	21.60	21.46	21.10	21
3	64QAM	8	0	20.43	20.42	20.35	
3	64QAM	8	4	20.41	20.31	20.20	
3	64QAM	8	7	20.41	20.25	20.33	21
3	64QAM	15	0	20.26	20.25	20.13	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	23.28	23.18	23.11	24
1.4	QPSK	1	3	23.14	23.22	23.20	
1.4	QPSK	1	5	23.27	23.17	22.99	
1.4	QPSK	3	0	23.27	23.14	23.11	24
1.4	QPSK	3	1	23.13	23.18	23.13	
1.4	QPSK	3	3	23.28	23.21	23.02	
1.4	QPSK	6	0	22.31	22.24	22.13	23
1.4	16QAM	1	0	22.42	22.66	22.67	23
1.4	16QAM	1	3	22.63	22.37	22.41	
1.4	16QAM	1	5	22.60	22.37	22.19	
1.4	16QAM	3	0	22.48	22.66	22.67	23
1.4	16QAM	3	1	22.72	22.38	22.38	
1.4	16QAM	3	3	22.68	22.35	22.10	
1.4	16QAM	6	0	21.35	21.33	21.24	22
1.4	64QAM	1	0	21.47	21.06	21.03	22
1.4	64QAM	1	3	21.38	21.54	21.30	

1.4	64QAM	1	5	21.53	21.46	21.12	
1.4	64QAM	3	0	21.41	21.01	21.07	
1.4	64QAM	3	1	21.39	21.47	21.36	
1.4	64QAM	3	3	21.55	21.53	21.20	
1.4	64QAM	6	0	20.23	20.23	20.17	21

<LTE Band 30 Ant 1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				27710			
Frequency (MHz)				2310			
10	QPSK	1	0		23.07		24
10	QPSK	1	25		23.00		
10	QPSK	1	49		23.02		
10	QPSK	25	0		22.04		23
10	QPSK	25	12		22.02		
10	QPSK	25	25		22.03		
10	QPSK	50	0		22.03		
10	16QAM	1	0		22.23		23
10	16QAM	1	25		22.22		
10	16QAM	1	49		22.28		
10	16QAM	25	0		21.12		22
10	16QAM	25	12		21.11		
10	16QAM	25	25		21.04		
10	16QAM	50	0		21.08		
10	64QAM	1	0		21.18		22
10	64QAM	1	25		21.15		
10	64QAM	1	49		21.18		
10	64QAM	25	0		20.12		21
10	64QAM	25	12		20.13		
10	64QAM	25	25		20.08		
10	64QAM	50	0		20.08		
Channel				27685	27710	27735	Tune-up limit (dBm)
Frequency (MHz)				2307.5	2310	2312.5	
5	QPSK	1	0	22.87	23.05	22.81	24
5	QPSK	1	12	22.86	22.90	22.92	
5	QPSK	1	24	22.97	22.93	23.00	
5	QPSK	12	0	22.04	21.96	21.95	23
5	QPSK	12	7	21.92	21.92	21.94	
5	QPSK	12	13	21.95	22.01	22.00	
5	QPSK	25	0	21.96	21.99	22.03	
5	16QAM	1	0	22.21	22.16	22.22	23
5	16QAM	1	12	22.12	22.19	22.16	
5	16QAM	1	24	22.20	22.20	22.21	
5	16QAM	12	0	21.04	21.02	21.07	22
5	16QAM	12	7	21.01	21.03	21.03	
5	16QAM	12	13	20.96	20.98	21.02	
5	16QAM	25	0	20.99	21.05	21.00	
5	64QAM	1	0	21.10	21.18	21.14	22
5	64QAM	1	12	21.13	21.10	21.07	
5	64QAM	1	24	21.16	21.08	21.13	
5	64QAM	12	0	20.09	20.08	20.03	21
5	64QAM	12	7	20.11	20.07	20.11	
5	64QAM	12	13	20.01	19.98	20.04	
5	64QAM	25	0	20.07	20.03	20.06	



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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	23.38	23.26	23.17	24
20	QPSK	1	49	23.31	23.25	23.10	
20	QPSK	1	99	23.16	23.01	23.11	
20	QPSK	50	0	22.48	22.44	22.27	23
20	QPSK	50	24	22.41	22.37	22.32	
20	QPSK	50	50	22.39	22.25	22.21	
20	QPSK	100	0	22.39	22.34	22.30	23
20	16QAM	1	0	22.69	22.48	22.47	
20	16QAM	1	49	22.64	22.56	22.38	
20	16QAM	1	99	22.43	22.36	22.40	22
20	16QAM	50	0	21.59	21.51	21.33	
20	16QAM	50	24	21.49	21.43	21.41	
20	16QAM	50	50	21.44	21.32	21.29	22
20	16QAM	100	0	21.42	21.39	21.34	
20	64QAM	1	0	21.65	21.43	21.37	
20	64QAM	1	49	21.61	21.53	21.39	22
20	64QAM	1	99	21.37	21.25	21.34	
20	64QAM	50	0	20.61	20.52	20.36	
20	64QAM	50	24	20.51	20.45	20.42	21
20	64QAM	50	50	20.50	20.34	20.31	
20	64QAM	100	0	20.47	20.43	20.35	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	23.35	23.26	23.14	24
15	QPSK	1	37	23.24	23.22	23.00	
15	QPSK	1	74	23.13	22.96	23.03	
15	QPSK	36	0	22.44	22.36	22.26	23
15	QPSK	36	20	22.38	22.29	22.22	
15	QPSK	36	39	22.35	22.22	22.17	
15	QPSK	75	0	22.39	22.30	22.24	23
15	16QAM	1	0	22.61	22.44	22.41	
15	16QAM	1	37	22.56	22.48	22.36	
15	16QAM	1	74	22.38	22.31	22.36	22
15	16QAM	36	0	21.51	21.44	21.28	
15	16QAM	36	20	21.47	21.35	21.33	
15	16QAM	36	39	21.39	21.24	21.20	22
15	16QAM	75	0	21.38	21.36	21.28	
15	64QAM	1	0	21.56	21.43	21.27	
15	64QAM	1	37	21.55	21.51	21.30	22
15	64QAM	1	74	21.35	21.21	21.27	
15	64QAM	36	0	20.53	20.42	20.28	
15	64QAM	36	20	20.46	20.36	20.35	21
15	64QAM	36	39	20.46	20.24	20.26	
15	64QAM	75	0	20.47	20.39	20.29	
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	23.35	23.26	23.15	24
10	QPSK	1	25	23.28	23.25	23.03	
10	QPSK	1	49	23.11	22.99	23.08	
10	QPSK	25	0	22.40	22.34	22.18	23
10	QPSK	25	12	22.37	22.29	22.32	

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10	QPSK	25	25	22.37	22.22	22.11	
10	QPSK	50	0	22.33	22.26	22.28	
10	16QAM	1	0	22.60	22.42	22.44	
10	16QAM	1	25	22.58	22.54	22.37	23
10	16QAM	1	49	22.43	22.30	22.31	
10	16QAM	25	0	21.53	21.45	21.28	
10	16QAM	25	12	21.47	21.34	21.36	22
10	16QAM	25	25	21.41	21.25	21.27	
10	16QAM	50	0	21.32	21.34	21.26	
10	64QAM	1	0	21.55	21.36	21.35	22
10	64QAM	1	25	21.56	21.50	21.36	
10	64QAM	1	49	21.31	21.22	21.27	
10	64QAM	25	0	20.61	20.48	20.32	21
10	64QAM	25	12	20.43	20.41	20.40	
10	64QAM	25	25	20.44	20.31	20.31	
10	64QAM	50	0	20.40	20.33	20.32	
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	23.35	23.25	23.16	24
5	QPSK	1	12	23.27	23.25	23.06	
5	QPSK	1	24	23.15	23.00	23.08	
5	QPSK	12	0	22.42	22.40	22.18	23
5	QPSK	12	7	22.32	22.33	22.25	
5	QPSK	12	13	22.30	22.21	22.13	
5	16QAM	1	0	22.63	22.48	22.45	23
5	16QAM	1	12	22.58	22.55	22.38	
5	16QAM	1	24	22.41	22.32	22.33	
5	16QAM	12	0	21.51	21.48	21.24	22
5	16QAM	12	7	21.48	21.34	21.32	
5	16QAM	12	13	21.39	21.28	21.28	
5	16QAM	25	0	21.32	21.37	21.33	22
5	64QAM	1	0	21.60	21.34	21.32	
5	64QAM	1	12	21.53	21.49	21.30	
5	64QAM	1	24	21.30	21.18	21.29	21
5	64QAM	12	0	20.59	20.50	20.36	
5	64QAM	12	7	20.49	20.43	20.32	
5	64QAM	12	13	20.40	20.26	20.27	21
5	64QAM	25	0	20.43	20.37	20.31	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	23.37	23.24	23.12	24
3	QPSK	1	8	23.27	23.24	23.01	
3	QPSK	1	14	23.09	23.01	23.03	
3	QPSK	8	0	22.42	22.37	22.19	23
3	QPSK	8	4	22.31	22.27	22.28	
3	QPSK	8	7	22.29	22.19	22.13	
3	QPSK	15	0	22.38	22.34	22.30	23
3	16QAM	1	0	22.61	22.45	22.43	
3	16QAM	1	8	22.59	22.49	22.30	
3	16QAM	1	14	22.40	22.26	22.30	22
3	16QAM	8	0	21.49	21.47	21.28	
3	16QAM	8	4	21.39	21.33	21.35	
3	16QAM	8	7	21.39	21.26	21.20	22
3	16QAM	15	0	21.40	21.35	21.33	
3	64QAM	1	0	21.63	21.35	21.35	
3	64QAM	1	8	21.53	21.45	21.36	



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3	64QAM	1	14	21.31	21.24	21.31	
3	64QAM	8	0	20.60	20.46	20.33	21
3	64QAM	8	4	20.45	20.37	20.40	
3	64QAM	8	7	20.48	20.31	20.28	
3	64QAM	15	0	20.41	20.33	20.31	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	23.32	23.22	23.15	24
1.4	QPSK	1	3	23.22	23.20	23.09	
1.4	QPSK	1	5	23.15	22.96	23.11	
1.4	QPSK	3	0	23.32	23.16	23.12	
1.4	QPSK	3	1	23.21	23.23	23.08	
1.4	QPSK	3	3	23.09	22.91	23.02	
1.4	QPSK	6	0	22.39	22.29	22.30	23
1.4	16QAM	1	0	22.64	22.47	22.44	23
1.4	16QAM	1	3	22.64	22.48	22.37	
1.4	16QAM	1	5	22.37	22.26	22.40	
1.4	16QAM	3	0	22.66	22.39	22.41	
1.4	16QAM	3	1	22.63	22.46	22.28	
1.4	16QAM	3	3	22.36	22.32	22.31	
1.4	16QAM	6	0	21.40	21.31	21.26	22
1.4	64QAM	1	0	21.59	21.42	21.32	22
1.4	64QAM	1	3	21.51	21.53	21.37	
1.4	64QAM	1	5	21.28	21.19	21.32	
1.4	64QAM	3	0	21.65	21.34	21.32	
1.4	64QAM	3	1	21.54	21.43	21.32	
1.4	64QAM	3	3	21.33	21.23	21.29	
1.4	64QAM	6	0	20.47	20.35	20.30	21

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

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

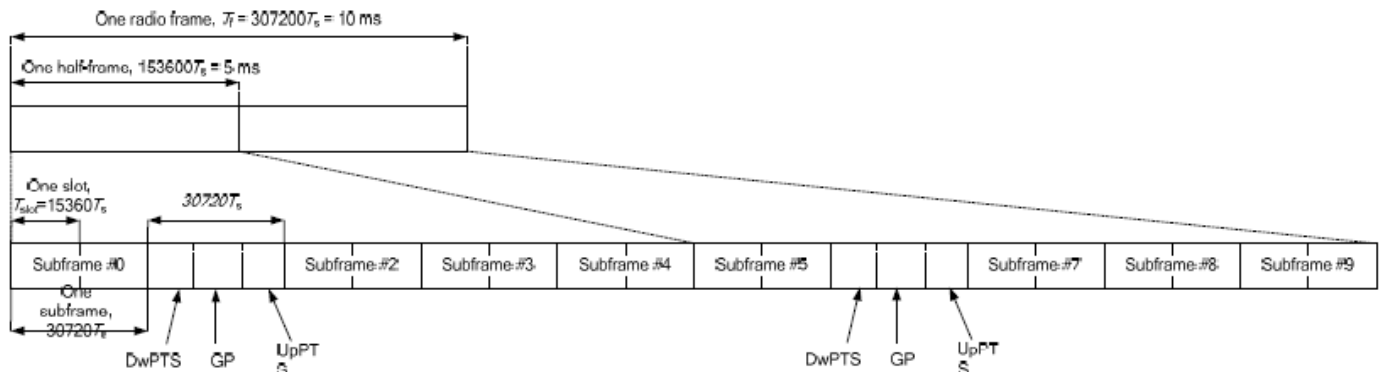


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

- 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.

**<LTE Band 38 Ant 1>**

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	23.59	23.67	23.59	24
20	QPSK	1	49	23.59	23.61	23.61	
20	QPSK	1	99	23.62	23.66	23.66	
20	QPSK	50	0	22.71	22.67	22.67	23
20	QPSK	50	24	22.64	22.69	22.69	
20	QPSK	50	50	22.66	22.70	22.70	
20	QPSK	100	0	22.68	22.72	22.72	23
20	16QAM	1	0	22.74	22.64	22.64	
20	16QAM	1	49	22.72	22.74	22.74	
20	16QAM	1	99	22.74	22.79	22.79	22
20	16QAM	50	0	21.80	21.75	21.75	
20	16QAM	50	24	21.72	21.77	21.77	
20	16QAM	50	50	21.74	21.81	21.81	22
20	16QAM	100	0	21.76	21.81	21.81	
20	64QAM	1	0	21.49	21.40	21.40	
20	64QAM	1	49	21.47	21.44	21.44	22
20	64QAM	1	99	21.51	21.51	21.51	
20	64QAM	50	0	20.79	20.76	20.76	21
20	64QAM	50	24	20.72	20.79	20.79	
20	64QAM	50	50	20.74	20.83	20.83	
20	64QAM	100	0	20.67	20.84	20.84	
Channel				37825	38000	38175	Tune-up limit (dBm)
Frequency (MHz)				2577.5	2595	2612.5	
15	QPSK	1	0	23.52	23.67	23.53	24
15	QPSK	1	37	23.52	23.51	23.55	
15	QPSK	1	74	23.57	23.57	23.62	
15	QPSK	36	0	22.70	22.62	22.61	23
15	QPSK	36	20	22.60	22.67	22.69	
15	QPSK	36	39	22.59	22.61	22.67	
15	QPSK	75	0	22.60	22.66	22.72	23
15	16QAM	1	0	22.65	22.60	22.62	
15	16QAM	1	37	22.70	22.71	22.72	
15	16QAM	1	74	22.67	22.73	22.72	22
15	16QAM	36	0	21.77	21.73	21.73	
15	16QAM	36	20	21.71	21.75	21.72	
15	16QAM	36	39	21.65	21.77	21.75	22
15	16QAM	75	0	21.75	21.81	21.81	
15	64QAM	1	0	21.41	21.39	21.36	
15	64QAM	1	37	21.41	21.36	21.39	22
15	64QAM	1	74	21.45	21.44	21.47	
15	64QAM	36	0	20.76	20.72	20.71	21
15	64QAM	36	20	20.69	20.73	20.70	
15	64QAM	36	39	20.68	20.79	20.76	
15	64QAM	75	0	20.65	20.78	20.78	
Channel				37800	38000	38200	Tune-up limit (dBm)
Frequency (MHz)				2575	2595	2615	
10	QPSK	1	0	23.58	23.61	23.54	24
10	QPSK	1	25	23.57	23.51	23.53	
10	QPSK	1	49	23.60	23.66	23.65	
10	QPSK	25	0	22.62	22.66	22.63	23
10	QPSK	25	12	22.60	22.61	22.62	



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10	QPSK	25	25	22.66	22.67	22.64	
10	QPSK	50	0	22.67	22.64	22.65	
10	16QAM	1	0	22.74	22.63	22.61	23
10	16QAM	1	25	22.65	22.72	22.73	
10	16QAM	1	49	22.68	22.70	22.72	
10	16QAM	25	0	21.80	21.72	21.69	22
10	16QAM	25	12	21.72	21.68	21.71	
10	16QAM	25	25	21.64	21.76	21.76	
10	16QAM	50	0	21.66	21.78	21.71	
10	64QAM	1	0	21.39	21.39	21.32	22
10	64QAM	1	25	21.47	21.38	21.39	
10	64QAM	1	49	21.42	21.51	21.45	
10	64QAM	25	0	20.76	20.74	20.69	21
10	64QAM	25	12	20.65	20.72	20.70	
10	64QAM	25	25	20.73	20.82	20.80	
10	64QAM	50	0	20.65	20.77	20.84	
Channel				37775	38000	38225	Tune-up limit (dBm)
Frequency (MHz)				2572.5	2595	2617.5	
5	QPSK	1	0	23.55	23.66	23.52	24
5	QPSK	1	12	23.52	23.51	23.59	
5	QPSK	1	24	23.52	23.62	23.59	
5	QPSK	12	0	22.71	22.63	22.58	23
5	QPSK	12	7	22.56	22.59	22.59	
5	QPSK	12	13	22.63	22.66	22.69	
5	QPSK	25	0	22.62	22.70	22.68	
5	16QAM	1	0	22.68	22.57	22.61	23
5	16QAM	1	12	22.69	22.74	22.66	
5	16QAM	1	24	22.72	22.71	22.76	
5	16QAM	12	0	21.71	21.67	21.73	22
5	16QAM	12	7	21.63	21.71	21.77	
5	16QAM	12	13	21.64	21.80	21.71	
5	16QAM	25	0	21.66	21.76	21.76	
5	64QAM	1	0	21.45	21.33	21.30	22
5	64QAM	1	12	21.39	21.44	21.37	
5	64QAM	1	24	21.42	21.49	21.48	
5	64QAM	12	0	20.73	20.68	20.73	21
5	64QAM	12	7	20.63	20.70	20.73	
5	64QAM	12	13	20.67	20.83	20.81	
5	64QAM	25	0	20.63	20.82	20.84	



<LTE Band 41 Ant 1>

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	22.23	22.14	22.22	22.31	22.07	23
20	QPSK	1	49	22.25	22.12	22.08	22.14	22.08	
20	QPSK	1	99	22.21	22.23	22.24	22.17	22.15	
20	QPSK	50	0	21.18	21.20	21.25	21.18	21.17	22
20	QPSK	50	24	21.22	21.26	21.30	21.34	21.10	
20	QPSK	50	50	21.17	21.30	21.21	21.20	21.21	
20	QPSK	100	0	21.25	21.34	21.18	21.28	21.09	22
20	16QAM	1	0	21.27	21.28	21.23	21.29	21.24	
20	16QAM	1	49	21.39	21.40	21.32	21.43	21.29	
20	16QAM	1	99	21.30	21.19	21.39	21.33	21.31	21
20	16QAM	50	0	20.35	20.31	20.35	20.29	20.18	
20	16QAM	50	24	20.42	20.37	20.35	20.38	20.29	
20	16QAM	50	50	20.36	20.43	20.33	20.33	20.34	21
20	16QAM	100	0	20.33	20.37	20.29	20.40	20.31	
20	64QAM	1	0	20.00	20.05	20.07	20.06	20.00	
20	64QAM	1	49	20.10	20.17	20.06	20.08	20.05	21
20	64QAM	1	99	20.12	19.96	20.04	20.00	20.09	
20	64QAM	50	0	19.32	19.42	19.35	19.31	19.30	
20	64QAM	50	24	19.42	19.40	19.36	19.41	19.30	20
20	64QAM	50	50	19.33	19.35	19.33	19.35	19.26	
20	64QAM	100	0	19.30	19.39	19.29	19.43	19.33	
Channel				39725	40173	40620	41068	41515	
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	
15	QPSK	1	0	22.28	22.23	22.07	22.18	22.23	23
15	QPSK	1	37	22.08	22.26	22.24	22.11	22.08	
15	QPSK	1	74	22.28	22.20	22.28	22.27	22.14	
15	QPSK	36	0	21.22	21.24	21.21	21.21	21.15	22
15	QPSK	36	20	21.30	21.27	21.24	21.24	21.18	
15	QPSK	36	39	21.27	21.22	21.21	21.19	21.18	
15	QPSK	75	0	21.31	21.20	21.23	21.26	21.18	22
15	16QAM	1	0	21.25	21.39	21.37	21.27	21.22	
15	16QAM	1	37	21.43	21.33	21.39	21.37	21.14	
15	16QAM	1	74	21.42	21.37	21.33	21.33	21.20	21
15	16QAM	36	0	20.27	20.22	20.27	20.28	20.22	
15	16QAM	36	20	20.37	20.26	20.31	20.32	20.26	
15	16QAM	36	39	20.34	20.31	20.30	20.28	20.28	21
15	16QAM	75	0	20.33	20.33	20.35	20.39	20.21	
15	64QAM	1	0	20.01	20.07	20.02	20.06	19.89	21
15	64QAM	1	37	19.98	20.10	20.15	20.05	19.91	
15	64QAM	1	74	20.06	20.14	20.19	20.11	20.08	
15	64QAM	36	0	19.31	19.28	19.31	19.35	19.28	20
15	64QAM	36	20	19.40	19.31	19.36	19.38	19.32	
15	64QAM	36	39	19.37	19.27	19.35	19.35	19.24	
15	64QAM	75	0	19.32	19.35	19.36	19.32	19.33	
Channel				39700	40160	40620	41080	41540	
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	22.28	22.11	22.10	22.16	22.04	23
10	QPSK	1	25	22.17	22.21	22.19	22.16	22.19	
10	QPSK	1	49	22.26	22.26	22.22	22.15	22.16	
10	QPSK	25	0	21.12	21.12	21.14	21.26	21.16	22
10	QPSK	25	12	21.18	21.15	21.21	21.30	21.22	



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10	QPSK	25	25	21.16	21.23	21.20	21.26	21.17	
10	QPSK	50	0	21.21	21.20	21.24	21.32	21.23	
10	16QAM	1	0	21.22	21.29	21.36	21.40	21.20	22
10	16QAM	1	25	21.32	21.29	21.35	21.32	21.36	
10	16QAM	1	49	21.27	21.30	21.34	21.29	21.30	
10	16QAM	25	0	20.25	20.25	20.28	20.30	20.30	21
10	16QAM	25	12	20.31	20.30	20.34	20.41	20.36	
10	16QAM	25	25	20.28	20.27	20.33	20.30	20.31	
10	16QAM	50	0	20.32	20.32	20.26	20.35	20.36	
10	64QAM	1	0	20.07	20.07	20.11	20.10	19.98	21
10	64QAM	1	25	20.16	20.06	20.11	20.09	19.93	
10	64QAM	1	49	20.13	20.08	20.11	19.98	20.08	
10	64QAM	25	0	19.39	19.32	19.33	19.36	19.25	20
10	64QAM	25	12	19.35	19.36	19.39	19.47	19.33	
10	64QAM	25	25	19.32	19.34	19.39	19.43	19.28	
10	64QAM	50	0	19.32	19.25	19.27	19.37	19.28	
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	22.15	22.17	22.20	22.14	22.08	23
5	QPSK	1	12	22.17	22.18	22.16	22.28	22.19	
5	QPSK	1	24	22.02	22.14	22.19	22.12	22.14	
5	QPSK	12	0	21.13	21.14	21.24	21.26	21.25	22
5	QPSK	12	7	21.16	21.16	21.24	21.24	21.18	
5	QPSK	12	13	21.19	21.19	21.22	21.32	21.10	
5	QPSK	25	0	21.09	21.20	21.17	21.27	21.20	
5	16QAM	1	0	21.28	21.22	21.33	21.37	21.31	22
5	16QAM	1	12	21.33	21.24	21.41	21.35	21.17	
5	16QAM	1	24	21.32	21.34	21.29	21.33	21.34	
5	16QAM	12	0	20.20	20.23	20.22	20.24	20.14	21
5	16QAM	12	7	20.25	20.25	20.22	20.33	20.17	
5	16QAM	12	13	20.27	20.28	20.30	20.31	20.19	
5	16QAM	25	0	20.33	20.25	20.30	20.42	20.26	
5	64QAM	1	0	20.06	20.01	19.99	20.06	20.11	21
5	64QAM	1	12	19.98	20.01	20.08	20.03	20.04	
5	64QAM	1	24	19.99	20.03	20.06	20.02	20.04	
5	64QAM	12	0	19.25	19.31	19.38	19.31	19.31	20
5	64QAM	12	7	19.30	19.32	19.38	19.40	19.25	
5	64QAM	12	13	19.42	19.35	19.26	19.38	19.27	
5	64QAM	25	0	19.26	19.29	19.35	19.37	19.31	

**<LTE Band 42 Part 27Q Ant 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				42190	42590	42990	
Frequency (MHz)				3460	3500	3540	
20	QPSK	1	0	21.07	21.16	21.30	21.5
20	QPSK	1	49	20.87	20.93	21.06	
20	QPSK	1	99	20.88	20.87	21.09	
20	QPSK	50	0	20.00	20.03	20.39	20.5
20	QPSK	50	24	19.95	20.04	20.27	
20	QPSK	50	50	19.88	20.08	20.20	
20	QPSK	100	0	19.96	20.06	20.26	20.5
20	16QAM	1	0	20.21	20.31	20.46	
20	16QAM	1	49	20.00	20.20	20.20	
20	16QAM	1	99	20.02	20.11	20.24	19.5
20	16QAM	50	0	19.11	19.21	19.47	
20	16QAM	50	24	19.05	19.23	19.37	
20	16QAM	50	50	19.00	19.26	19.29	19.5
20	16QAM	100	0	19.06	19.24	19.35	
20	64QAM	1	0	19.17	19.20	19.18	
20	64QAM	1	49	18.87	18.91	18.94	19.5
20	64QAM	1	99	18.88	18.85	18.98	
20	64QAM	50	0	18.16	18.22	18.47	18.5
20	64QAM	50	24	18.29	18.22	18.37	
20	64QAM	50	50	18.22	18.26	18.30	
20	64QAM	100	0	18.21	18.23	18.38	
Channel				42165	42590	43015	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3500	3542.5	
15	QPSK	1	0	21.02	21.07	21.22	21.5
15	QPSK	1	37	20.83	20.91	21.02	
15	QPSK	1	74	20.80	20.77	21.08	
15	QPSK	36	0	19.94	19.94	20.36	20.5
15	QPSK	36	20	19.88	20.01	20.22	
15	QPSK	36	39	19.81	20.00	20.17	
15	QPSK	75	0	19.90	19.99	20.20	20.5
15	16QAM	1	0	20.21	20.30	20.41	
15	16QAM	1	37	19.92	20.18	20.10	
15	16QAM	1	74	19.96	20.11	20.14	19.5
15	16QAM	36	0	19.01	19.20	19.37	
15	16QAM	36	20	18.95	19.17	19.32	
15	16QAM	36	39	18.90	19.24	19.21	19.5
15	16QAM	75	0	19.00	19.17	19.25	
15	64QAM	1	0	19.10	19.20	19.16	
15	64QAM	1	37	18.80	18.87	18.84	19.5
15	64QAM	1	74	18.80	18.75	18.94	
15	64QAM	36	0	18.12	18.22	18.38	18.5
15	64QAM	36	20	18.26	18.13	18.32	
15	64QAM	36	39	18.17	18.17	18.27	
15	64QAM	75	0	18.13	18.13	18.34	
Channel				42140	42590	43040	Tune-up limit (dBm)
Frequency (MHz)				3455	3500	3545	
10	QPSK	1	0	21.05	21.08	21.21	21.5
10	QPSK	1	25	20.77	20.88	21.01	
10	QPSK	1	49	20.79	20.81	21.04	
10	QPSK	25	0	19.91	20.03	20.31	20.5
10	QPSK	25	12	19.93	19.97	20.25	



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10	QPSK	25	25	19.84	19.98	20.13	
10	QPSK	50	0	19.86	19.96	20.17	
10	16QAM	1	0	20.21	20.29	20.44	
10	16QAM	1	25	19.91	20.10	20.20	20.5
10	16QAM	1	49	19.92	20.09	20.20	
10	16QAM	25	0	19.07	19.11	19.45	
10	16QAM	25	12	19.05	19.16	19.30	19.5
10	16QAM	25	25	18.99	19.23	19.19	
10	16QAM	50	0	19.06	19.20	19.27	
10	64QAM	1	0	19.17	19.18	19.12	19.5
10	64QAM	1	25	18.80	18.91	18.94	
10	64QAM	1	49	18.82	18.81	18.88	
10	64QAM	25	0	18.11	18.13	18.47	18.5
10	64QAM	25	12	18.29	18.18	18.32	
10	64QAM	25	25	18.22	18.25	18.27	
10	64QAM	50	0	18.15	18.18	18.35	
Channel				42115	42590	43065	Tune-up limit (dBm)
Frequency (MHz)				3452.5	3500	3547.5	
5	QPSK	1	0	21.04	21.09	21.21	21.5
5	QPSK	1	12	20.82	20.84	21.06	
5	QPSK	1	24	20.84	20.82	21.05	
5	QPSK	12	0	19.92	20.00	20.31	20.5
5	QPSK	12	7	19.92	19.94	20.23	
5	QPSK	12	13	19.78	19.98	20.14	
5	QPSK	25	0	19.90	19.97	20.17	20.5
5	16QAM	1	0	20.16	20.29	20.44	
5	16QAM	1	12	19.93	20.10	20.12	
5	16QAM	1	24	19.95	20.01	20.24	19.5
5	16QAM	12	0	19.11	19.17	19.42	
5	16QAM	12	7	18.96	19.15	19.34	
5	16QAM	12	13	18.91	19.23	19.29	19.5
5	16QAM	25	0	19.04	19.14	19.28	
5	64QAM	1	0	19.09	19.18	19.10	
5	64QAM	1	12	18.83	18.88	18.93	19.5
5	64QAM	1	24	18.78	18.82	18.94	
5	64QAM	12	0	18.16	18.17	18.45	
5	64QAM	12	7	18.25	18.14	18.33	18.5
5	64QAM	12	13	18.19	18.17	18.22	
5	64QAM	25	0	18.13	18.16	18.29	



<LTE Band 42 Part 96 Ant 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				43190	43340	43490	
Frequency (MHz)				3560	3575	3590	
20	QPSK	1	0	21.21	21.24	21.30	
20	QPSK	1	49	20.98	21.07	21.14	21.5
20	QPSK	1	99	21.00	21.00	20.98	
20	QPSK	50	0	20.23	20.25	20.26	
20	QPSK	50	24	20.16	20.15	20.17	20.5
20	QPSK	50	50	20.06	20.05	20.10	
20	QPSK	100	0	20.17	20.17	20.16	
20	16QAM	1	0	20.34	20.40	20.41	20.5
20	16QAM	1	49	20.10	20.22	20.25	
20	16QAM	1	99	20.12	20.11	20.11	
20	16QAM	50	0	19.36	19.36	19.37	19.5
20	16QAM	50	24	19.26	19.25	19.27	
20	16QAM	50	50	19.17	19.16	19.20	
20	16QAM	100	0	19.30	19.26	19.26	19.5
20	64QAM	1	0	19.10	19.14	19.16	
20	64QAM	1	49	18.87	18.96	18.98	
20	64QAM	1	99	18.87	18.86	18.85	18.5
20	64QAM	50	0	18.38	18.36	18.36	
20	64QAM	50	24	18.27	18.26	18.27	
20	64QAM	50	50	18.18	18.17	18.19	
20	64QAM	100	0	18.30	18.27	18.25	
Channel				43165	43340	43515	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3575	3592.5	
15	QPSK	1	0	21.11	21.20	21.21	
15	QPSK	1	37	20.93	21.02	21.10	21.5
15	QPSK	1	74	20.90	20.99	20.89	
15	QPSK	36	0	20.21	20.23	20.21	20.5
15	QPSK	36	20	20.07	20.05	20.13	
15	QPSK	36	39	20.00	20.05	20.06	
15	QPSK	75	0	20.17	20.10	20.15	20.5
15	16QAM	1	0	20.33	20.30	20.39	
15	16QAM	1	37	20.02	20.18	20.16	
15	16QAM	1	74	20.09	20.02	20.03	19.5
15	16QAM	36	0	19.30	19.32	19.34	
15	16QAM	36	20	19.25	19.23	19.20	
15	16QAM	36	39	19.09	19.12	19.14	19.5
15	16QAM	75	0	19.26	19.17	19.23	
15	64QAM	1	0	19.10	19.11	19.07	
15	64QAM	1	37	18.77	18.93	18.98	18.5
15	64QAM	1	74	18.86	18.78	18.84	
15	64QAM	36	0	18.36	18.28	18.34	
15	64QAM	36	20	18.24	18.17	18.18	
15	64QAM	36	39	18.10	18.10	18.09	
15	64QAM	75	0	18.28	18.18	18.22	
Channel				43140	43340	43540	Tune-up limit (dBm)
Frequency (MHz)				3555	3575	3595	
10	QPSK	1	0	21.16	21.23	21.25	
10	QPSK	1	25	20.95	20.99	21.11	21.5
10	QPSK	1	49	20.90	20.91	20.95	
10	QPSK	25	0	20.23	20.24	20.22	20.5
10	QPSK	25	12	20.13	20.10	20.16	



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10	QPSK	25	25	20.02	20.04	20.05	
10	QPSK	50	0	20.07	20.16	20.09	
10	16QAM	1	0	20.31	20.37	20.39	
10	16QAM	1	25	20.00	20.20	20.22	20.5
10	16QAM	1	49	20.08	20.11	20.09	
10	16QAM	25	0	19.35	19.30	19.28	
10	16QAM	25	12	19.21	19.22	19.23	19.5
10	16QAM	25	25	19.15	19.10	19.19	
10	16QAM	50	0	19.22	19.21	19.17	
10	64QAM	1	0	19.05	19.08	19.16	19.5
10	64QAM	1	25	18.83	18.88	18.92	
10	64QAM	1	49	18.79	18.84	18.78	
10	64QAM	25	0	18.30	18.30	18.36	18.5
10	64QAM	25	12	18.20	18.24	18.17	
10	64QAM	25	25	18.14	18.15	18.16	
10	64QAM	50	0	18.30	18.25	18.20	
Channel				43115	43340	43565	Tune-up limit (dBm)
Frequency (MHz)				3552.5	3575	3597.5	
5	QPSK	1	0	21.17	21.20	21.23	21.5
5	QPSK	1	12	20.94	21.02	21.07	
5	QPSK	1	24	20.96	20.96	20.96	
5	QPSK	12	0	20.19	20.24	20.18	20.5
5	QPSK	12	7	20.12	20.12	20.14	
5	QPSK	12	13	19.97	19.97	20.00	
5	QPSK	25	0	20.15	20.11	20.10	20.5
5	16QAM	1	0	20.32	20.39	20.32	
5	16QAM	1	12	20.00	20.14	20.22	
5	16QAM	1	24	20.05	20.01	20.03	19.5
5	16QAM	12	0	19.30	19.33	19.37	
5	16QAM	12	7	19.20	19.20	19.27	
5	16QAM	12	13	19.11	19.11	19.13	19.5
5	16QAM	25	0	19.30	19.19	19.23	
5	64QAM	1	0	19.00	19.11	19.11	
5	64QAM	1	12	18.87	18.94	18.98	19.5
5	64QAM	1	24	18.86	18.78	18.83	
5	64QAM	12	0	18.32	18.32	18.34	
5	64QAM	12	7	18.20	18.23	18.21	18.5
5	64QAM	12	13	18.18	18.11	18.11	
5	64QAM	25	0	18.26	18.24	18.22	

**<LTE Band 48 Ant 2>**

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	21.00	21.24	21.31	21.29	21.5
20	QPSK	1	49	20.77	20.88	20.93	21.03	
20	QPSK	1	99	20.76	20.83	20.99	21.01	
20	QPSK	50	0	19.93	20.03	20.31	20.28	20.5
20	QPSK	50	24	19.91	19.98	20.19	20.11	
20	QPSK	50	50	19.83	19.89	20.09	20.11	
20	QPSK	100	0	19.93	19.91	20.18	20.16	20.5
20	16QAM	1	0	20.15	20.37	20.45	20.43	
20	16QAM	1	49	19.90	20.03	20.07	20.16	
20	16QAM	1	99	19.87	19.98	20.11	20.12	19.5
20	16QAM	50	0	19.00	19.11	19.40	19.36	
20	16QAM	50	24	18.99	19.07	19.28	19.21	
20	16QAM	50	50	18.94	18.97	19.17	19.22	19.5
20	16QAM	100	0	19.03	19.00	19.29	19.24	
20	64QAM	1	0	18.89	19.10	19.19	19.16	
20	64QAM	1	49	18.65	18.77	18.82	18.90	19.5
20	64QAM	1	99	18.63	18.70	18.84	18.87	
20	64QAM	50	0	18.01	18.13	18.39	18.36	
20	64QAM	50	24	17.99	18.08	18.28	18.22	18.5
20	64QAM	50	50	17.93	17.99	18.17	18.20	
20	64QAM	100	0	18.02	18.00	18.26	18.23	
Channel				55315	55820	56160	56665	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3608	3642	3692.5	
15	QPSK	1	0	20.92	21.19	21.21	21.25	21.5
15	QPSK	1	37	20.75	20.84	20.85	21.00	
15	QPSK	1	74	20.74	20.83	20.89	20.95	
15	QPSK	36	0	19.87	19.98	20.29	20.21	20.5
15	QPSK	36	20	19.81	19.95	20.17	20.05	
15	QPSK	36	39	19.76	19.85	20.02	20.04	
15	QPSK	75	0	19.92	19.89	20.13	20.15	20.5
15	16QAM	1	0	20.08	20.32	20.38	20.33	
15	16QAM	1	37	19.90	19.96	20.03	20.07	
15	16QAM	1	74	19.84	19.98	20.05	20.03	19.5
15	16QAM	36	0	18.94	19.02	19.37	19.27	
15	16QAM	36	20	18.89	19.06	19.28	19.18	
15	16QAM	36	39	18.90	18.89	19.15	19.19	19.5
15	16QAM	75	0	19.01	18.96	19.21	19.16	
15	64QAM	1	0	18.83	19.05	19.09	19.07	
15	64QAM	1	37	18.65	18.76	18.80	18.89	19.5
15	64QAM	1	74	18.54	18.66	18.76	18.81	
15	64QAM	36	0	18.01	18.07	18.29	18.32	
15	64QAM	36	20	17.92	17.98	18.24	18.20	18.5
15	64QAM	36	39	17.92	17.98	18.14	18.12	
15	64QAM	75	0	17.92	17.98	18.26	18.22	
Channel				55290	55815	56165	56690	Tune-up limit (dBm)
Frequency (MHz)				3555	3607.5	3642.5	3695	
10	QPSK	1	0	20.94	21.15	21.21	21.25	21.5
10	QPSK	1	25	20.74	20.88	20.85	21.00	
10	QPSK	1	49	20.69	20.73	20.93	20.91	
10	QPSK	25	0	19.83	20.01	20.28	20.20	20.5
10	QPSK	25	12	19.81	19.88	20.12	20.01	



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10	QPSK	25	25	19.78	19.82	20.03	20.01	
10	QPSK	50	0	19.87	19.83	20.08	20.12	
10	16QAM	1	0	20.15	20.36	20.35	20.37	20.5
10	16QAM	1	25	19.89	19.95	19.98	20.07	
10	16QAM	1	49	19.82	19.94	20.06	20.06	
10	16QAM	25	0	18.97	19.10	19.30	19.29	19.5
10	16QAM	25	12	18.95	18.98	19.22	19.15	
10	16QAM	25	25	18.88	18.88	19.07	19.20	
10	16QAM	50	0	18.94	19.00	19.19	19.18	
10	64QAM	1	0	18.88	19.02	19.10	19.15	19.5
10	64QAM	1	25	18.60	18.77	18.78	18.88	
10	64QAM	1	49	18.63	18.61	18.84	18.77	
10	64QAM	25	0	17.91	18.04	18.33	18.30	18.5
10	64QAM	25	12	17.89	17.98	18.21	18.16	
10	64QAM	25	25	17.86	17.89	18.14	18.14	
10	64QAM	50	0	17.94	17.96	18.26	18.15	
Channel				55265	55810	56170	56715	Tune-up limit (dBm)
Frequency (MHz)				3552.5	3607	3643	3697.5	
5	QPSK	1	0	20.94	21.20	21.22	21.25	21.5
5	QPSK	1	12	20.70	20.86	20.85	20.98	
5	QPSK	1	24	20.75	20.78	20.94	20.95	
5	QPSK	12	0	19.83	20.02	20.30	20.21	20.5
5	QPSK	12	7	19.90	19.96	20.19	20.08	
5	QPSK	12	13	19.76	19.83	20.01	20.05	
5	QPSK	25	0	19.83	19.86	20.11	20.11	
5	16QAM	1	0	20.10	20.30	20.40	20.38	20.5
5	16QAM	1	12	19.86	19.93	20.05	20.08	
5	16QAM	1	24	19.79	19.90	20.07	20.03	
5	16QAM	12	0	18.97	19.03	19.37	19.36	19.5
5	16QAM	12	7	18.97	19.04	19.20	19.19	
5	16QAM	12	13	18.91	18.91	19.13	19.22	
5	16QAM	25	0	18.99	18.98	19.19	19.16	
5	64QAM	1	0	18.83	19.05	19.19	19.14	19.5
5	64QAM	1	12	18.57	18.76	18.75	18.88	
5	64QAM	1	24	18.63	18.69	18.79	18.86	
5	64QAM	12	0	17.97	18.13	18.29	18.35	18.5
5	64QAM	12	7	17.94	17.99	18.27	18.21	
5	64QAM	12	13	17.84	17.91	18.15	18.17	
5	64QAM	25	0	18.00	17.96	18.18	18.19	

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

General Note:

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, additional output power measurements were not necessary.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	17.50	18.00	99.00
		6	2437	18.00	18.00	
		11	2462	17.70	18.00	
	802.11g 6Mbps	1	2412	Not Required	17.50	Not Required
		6	2437		17.50	
		11	2462		17.50	
	802.11n-HT20 MCS0	1	2412		15.50	
		6	2437		15.50	
		11	2462		15.50	
	802.11n-HT40 MCS0	3	2422		17.50	
		6	2437		17.50	
		9	2452		17.50	
	802.11ac-VHT20 MCS0	1	2412		15.50	
		6	2437		15.50	
		11	2462		15.50	
	802.11ac-VHT40 MCS0	3	2422		17.50	
		6	2437		17.50	
		9	2452		17.50	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	14.00	Not Required
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11n-HT20 MCS0	36	5180		11.50	
		40	5200		16.50	
		44	5220		16.00	
		48	5240		16.00	
	802.11n-HT40 MCS0	38	5190		16.00	
		46	5230		16.50	
	802.11ac-VHT20 MCS0	36	5180		11.50	
		40	5200		16.50	
		44	5220		16.50	
		48	5240		16.50	
	802.11ac-VHT40 MCS0	38	5190		16.00	
		46	5230		16.50	
	802.11ac-VHT80 MCS0	42	5210		16.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	16.00	Not Required
		56	5280		16.00	
		60	5300		16.00	
		64	5320		10.00	
	802.11n-HT20 MCS0	52	5260		16.50	
		56	5280		16.50	
		60	5300		16.50	
		64	5320		7.50	
	802.11n-HT40 MCS0	54	5270		16.50	
		62	5310		14.00	
	802.11ac-VHT20 MCS0	52	5260		16.50	
		56	5280		16.50	
		60	5300		16.50	
		64	5320		7.50	
	802.11ac-VHT40 MCS0	54	5270	16.55	17.00	96.30
		62	5310	13.75	14.00	
	802.11ac-VHT80 MCS0	58	5290	Not Required	13.00	Not Required

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	16.50	Not Required
		116	5580		16.50	
		124	5620		16.50	
		132	5660		16.50	
		140	5700		17.00	
	802.11n-HT20 MCS0	100	5500		16.50	
		116	5580		16.50	
		124	5620		16.50	
		132	5660		17.00	
		140	5700		17.00	
	802.11n-HT40 MCS0	102	5510	16.55	17.00	96.30
		110	5550	16.85	17.00	
		126	5630	17.15	17.50	
		134	5670	17.25	17.50	
	802.11ac-VHT20 MCS0	100	5500	Not Required	16.50	Not Required
		116	5580		16.50	
		124	5620		16.50	
		132	5660		17.00	
		140	5700		17.00	
	802.11ac-VHT40 MCS0	102	5510		17.00	
		110	5550		17.00	
		126	5630		17.50	
		134	5670		17.50	
	802.11ac-VHT80 MCS0	106	5530		15.50	

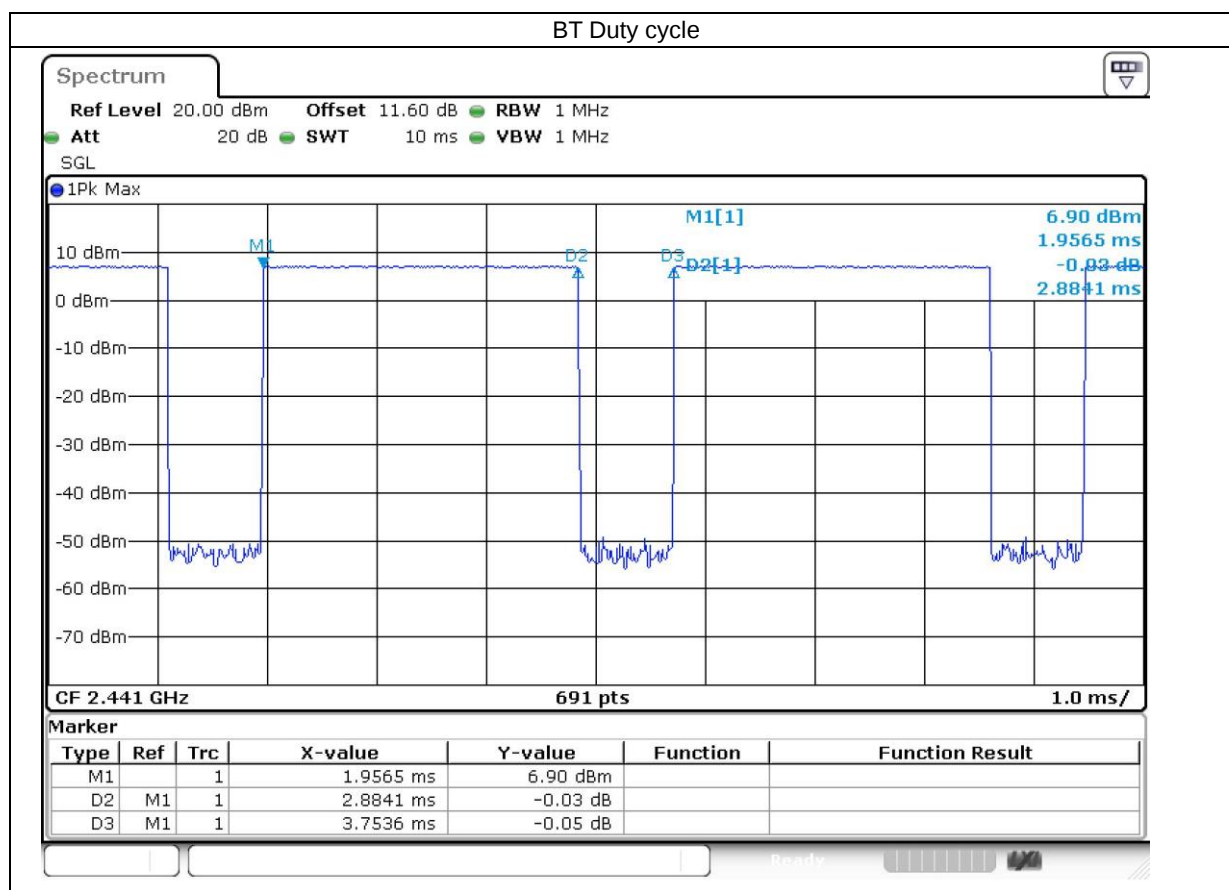
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	17.50	Not Required
		157	5785		17.50	
		165	5825		17.50	
	802.11n-HT20 MCS0	149	5745		17.50	
		157	5785		17.50	
		165	5825		17.50	
	802.11n-HT40 MCS0	151	5755		17.50	
		159	5795		17.50	
	802.11ac-VHT20 MCS0	149	5745		17.50	
		157	5785		17.50	
		165	5825		17.50	
	802.11ac-VHT40 MCS0	151	5755		18.00	
		159	5795		18.00	
	802.11ac-VHT80 MCS0	155	5775	17.25	18.00	92.70

<2.4GHz Bluetooth>
General Note:

- For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 76.83% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	6.37	Not Required	Not Required
	CH 39	2441	6.35		
	CH 78	2480	6.24		
Tune-up Limit			7	3.5	3.5

Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	Not Required	Not Required
	CH 19	2440		
	CH 39	2480		
Tune-up Limit			1	1



13. Exposure Position Consideration

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant. 1	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WWAN Ant. 2	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant. 1	Yes	Yes	No	Yes	Yes	Yes
WWAN Ant. 2	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN	Yes	Yes	Yes	No	Yes	Yes

General Note:

1. Detail antenna location refers to Appendix D.
2. Referring to KDB 941225 D06 v02r01, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

14. SAR Test Results

General Note:

1. Per KDB 447498 D04, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D4, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

LTE Note:

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

**WLAN Note:**

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, WLAN5.2GHz SAR testing is not required when the WLAN5.3GHz band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for WLAN5.2GHz band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

NFC Note:

1. NFC mainly operate in hand-held extremity exposure conditions and NFC sensing distance with other device or reading tag is about 20cm, therefore Standalone 10-g extremity SAR testing for NFC will be performed with active mode and max power mode, with 100% duty cycle at 0mm separation distance.
2. NFC SAR is measured for all edges and surfaces of the device.
3. NFC SAR test tissue-simulating liquid parameter: refer to IEC/IEEE 62209-1528 2020.
4. NFC SAR testing is by test software with 100% duty cycle.



14.1 Next to mouth SAR

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Cap (mm)	Ch.	Freq. (MHz)	PTT Antenna	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	-0.01	0.485	0.706
	LTE Band 7_Ant 1	20M	QPSK	50	24	Front	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	-0.11	0.357	0.509
	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/ PTT Ant	22.37	24.00	1.455	0.08	0.473	0.688
02	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	0	0.029	0.034
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	0.02	0.023	0.027
	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	23095	707.5	w/ PTT Ant	23.36	24.00	1.159	0.04	0.027	0.031
03	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	0.12	0.024	0.028
	LTE Band 13_Ant 1	10M	QPSK	25	0	Front	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	0.08	0.023	0.027
	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	23230	782	w/ PTT Ant	23.34	24.00	1.164	0.01	0.022	0.026
04	LTE Band 14_Ant 1	10M	QPSK	1	0	Front	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	-0.14	0.023	0.028
	LTE Band 14_Ant 1	10M	QPSK	25	0	Front	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	-0.05	0.022	0.026
	LTE Band 14_Ant 1	10M	QPSK	1	0	Front	10mm	23330	793	w/ PTT Ant	23.19	24.00	1.205	0.03	0.021	0.025
05	LTE Band 25_Ant 1	20M	QPSK	1	0	Front	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	-0.14	0.274	0.307
	LTE Band 25_Ant 1	20M	QPSK	50	0	Front	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	0.05	0.223	0.247
	LTE Band 25_Ant 1	20M	QPSK	1	0	Front	10mm	26140	1860	w/ PTT Ant	23.51	24.00	1.119	0.06	0.271	0.303
06	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	-0.01	0.045	0.054
	LTE Band 26_Ant 1	15M	QPSK	36	39	Front	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	-0.02	0.040	0.047
	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	26865	831.5	w/ PTT Ant	23.20	24.00	1.202	0.06	0.044	0.053
07	LTE Band 30_Ant 1	10M	QPSK	1	0	Front	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	0.04	0.293	0.363
	LTE Band 30_Ant 1	10M	QPSK	25	0	Front	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	-0.01	0.202	0.252
	LTE Band 30_Ant 1	10M	QPSK	1	0	Front	10mm	27710	2310	w/ PTT Ant	23.07	24.00	1.239	-0.09	0.289	0.358
08	LTE Band 66_Ant 1	20M	QPSK	1	0	Front	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	-0.05	0.024	0.028
	LTE Band 66_Ant 1	20M	QPSK	50	0	Front	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	-0.14	0.020	0.023
	LTE Band 66_Ant 1	20M	QPSK	1	0	Front	10mm	132072	1720	w/ PTT Ant	23.38	24.00	1.153	0.11	0.020	0.023

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
09	LTE Band 38_Ant 1	20M	QPSK	1	0	Front	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	0.09	0.136	0.148
	LTE Band 38_Ant 1	20M	QPSK	50	0	Front	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.02	0.106	0.115
	LTE Band 38_Ant 1	20M	QPSK	1	0	Front	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	-0.1	0.117	0.127
10	LTE Band 41_Ant 1	20M	QPSK	1	0	Front	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.06	0.223	0.263
	LTE Band 41_Ant 1	20M	QPSK	50	24	Front	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	0.03	0.167	0.196
	LTE Band 41_Ant 1	20M	QPSK	1	0	Front	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	0.04	0.219	0.258
11	LTE Band 42_Ant 2	20M	QPSK	1	0	Front	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.12	0.138	0.145
	LTE Band 42_Ant 2	20M	QPSK	50	0	Front	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	-0.01	0.112	0.116
	LTE Band 42_Ant 2	20M	QPSK	1	0	Front	10mm	42990	3540	w/ PTT Ant	21.30	21.50	1.047	62.9	1.006	0.03	0.135	0.142
12	LTE Band 48_Ant 2	20M	QPSK	1	0	Front	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.02	0.134	0.141
	LTE Band 48_Ant 2	20M	QPSK	50	0	Front	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.05	0.111	0.117
	LTE Band 48_Ant 2	20M	QPSK	1	0	Front	10mm	56150	3641	w/ PTT Ant	21.31	21.50	1.045	62.9	1.006	0.09	0.131	0.138

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
13	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	-0.07	0.283	0.286
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	6	2437	w/ PTT Ant	18.00	18.00	1.000	99	1.010	0.03	0.276	0.279
14	WLAN5GHz	802.11ac-VHT40 MCS0	Front	10mm	54	5270	w/o PTT Ant	16.55	17.00	1.109	96.3	1.038	0.04	0.030	0.035
	WLAN5GHz	802.11ac-VHT40 MCS0	Front	10mm	54	5270	w/ PTT Ant	16.55	17.00	1.109	96.3	1.038	0.01	0.027	0.031
15	WLAN5GHz	802.11n-HT40 MCS0	Front	10mm	134	5670	w/o PTT Ant	17.25	17.50	1.059	96.3	1.038	0.06	0.038	0.042
	WLAN5GHz	802.11n-HT40 MCS0	Front	10mm	134	5670	w/ PTT Ant	17.25	17.50	1.059	96.3	1.038	0.01	0.025	0.027
16	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.07	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	155	5775	w/ PTT Ant	17.25	18.00	1.189	92.7	1.079	0.02	0.001	0.001

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
17	Bluetooth	1Mbps	Front	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.17	0.001	0.001
	Bluetooth	1Mbps	Front	10mm	0	2402	w/ PTT Ant	6.37	7.00	1.157	76.83	1.084	0.06	0.001	0.001

**14.2 Hotspot SAR****<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
18	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	1.000	-0.01	0.485	0.706
	LTE Band 7_Ant 1	20M	QPSK	50	24	Front	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	1.000	-0.11	0.357	0.509
	LTE Band 7_Ant 1	20M	QPSK	1	0	Back	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	1.000	0.05	0.300	0.437
	LTE Band 7_Ant 1	20M	QPSK	50	24	Back	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	1.000	-0.05	0.217	0.309
	LTE Band 7_Ant 1	20M	QPSK	1	0	Left Side	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	1.000	0.01	0.061	0.089
	LTE Band 7_Ant 1	20M	QPSK	50	24	Left Side	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	1.000	0.01	0.048	0.068
	LTE Band 7_Ant 1	20M	QPSK	1	0	Right Side	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	1.000	0.11	0.329	0.479
	LTE Band 7_Ant 1	20M	QPSK	50	24	Right Side	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	1.000	0.04	0.289	0.412
	LTE Band 7_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	1.000	0.15	0.379	0.552
	LTE Band 7_Ant 1	20M	QPSK	50	24	Bottom Side	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	1.000	0.12	0.323	0.460
	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/ PTT Ant	22.37	24.00	1.455	1.000	0.08	0.473	0.688
	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	1.000	0	0.029	0.034
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	1.000	0.02	0.023	0.027
19	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	1.000	-0.01	0.090	0.104
	LTE Band 12_Ant 1	10M	QPSK	25	0	Back	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	1.000	0.04	0.074	0.086
	LTE Band 12_Ant 1	10M	QPSK	1	0	Left Side	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	1.000	0.06	0.009	0.010
	LTE Band 12_Ant 1	10M	QPSK	25	0	Left Side	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	1.000	-0.01	0.007	0.008
	LTE Band 12_Ant 1	10M	QPSK	1	0	Right Side	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	1.000	-0.13	0.050	0.058
	LTE Band 12_Ant 1	10M	QPSK	25	0	Right Side	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	1.000	0.04	0.036	0.042
	LTE Band 12_Ant 1	10M	QPSK	1	0	Bottom Side	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	1.000	0.07	0.068	0.079
	LTE Band 12_Ant 1	10M	QPSK	25	0	Bottom Side	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	1.000	-0.12	0.043	0.050
	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	10mm	23095	707.5	w/ PTT Ant	23.36	24.00	1.159	1.000	0.09	0.087	0.101
	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	1.000	0.12	0.024	0.028
	LTE Band 13_Ant 1	10M	QPSK	25	0	Front	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	1.000	0.08	0.023	0.027
20	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	1.000	0.11	0.135	0.157
	LTE Band 13_Ant 1	10M	QPSK	25	0	Back	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	1.000	-0.06	0.134	0.155
	LTE Band 13_Ant 1	10M	QPSK	1	0	Left Side	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	1.000	0.06	0.107	0.125
	LTE Band 13_Ant 1	10M	QPSK	25	0	Left Side	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	1.000	0.18	0.070	0.081
	LTE Band 13_Ant 1	10M	QPSK	1	0	Right Side	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	1.000	-0.18	0.053	0.062
	LTE Band 13_Ant 1	10M	QPSK	25	0	Right Side	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	1.000	0.09	0.103	0.119
	LTE Band 13_Ant 1	10M	QPSK	1	0	Bottom Side	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	1.000	0.13	0.064	0.075
	LTE Band 13_Ant 1	10M	QPSK	25	0	Bottom Side	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	1.000	0.1	0.009	0.010
	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	10mm	23230	782	w/ PTT Ant	23.34	24.00	1.164	1.000	0.03	0.131	0.153
	LTE Band 14_Ant 1	10M	QPSK	1	0	Front	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	1.000	-0.14	0.023	0.028
	LTE Band 14_Ant 1	10M	QPSK	25	0	Front	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	1.000	-0.05	0.022	0.026
21	LTE Band 14_Ant 1	10M	QPSK	1	0	Back	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	1.000	0.06	0.159	0.192
	LTE Band 14_Ant 1	10M	QPSK	25	0	Back	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	1.000	0	0.147	0.176
	LTE Band 14_Ant 1	10M	QPSK	1	0	Left Side	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	1.000	-0.09	0.014	0.017
	LTE Band 14_Ant 1	10M	QPSK	25	0	Left Side	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	1.000	-0.16	0.011	0.013
	LTE Band 14_Ant 1	10M	QPSK	1	0	Right Side	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	1.000	-0.05	0.076	0.092
	LTE Band 14_Ant 1	10M	QPSK	25	0	Right Side	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	1.000	0.09	0.053	0.064
	LTE Band 14_Ant 1	10M	QPSK	1	0	Bottom Side	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	1.000	-0.17	0.100	0.121
	LTE Band 14_Ant 1	10M	QPSK	25	0	Bottom Side	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	1.000	0.1	0.064	0.077
	LTE Band 14_Ant 1	10M	QPSK	1	0	Back	10mm	23330	793	w/ PTT Ant	23.19	24.00	1.205	1.000	0.03	0.156	0.188



FCC SAR TEST REPORT

Report No. : FA261611

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 25_Ant 1	20M	QPSK	1	0	Front	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	1.000	-0.14	0.274	0.307
	LTE Band 25_Ant 1	20M	QPSK	50	0	Front	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	1.000	0.05	0.223	0.247
22	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	1.000	0.08	0.808	0.905
	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26340	1880	w/o PTT Ant	23.37	24.00	1.156	1.000	-0.05	0.760	0.879
	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26590	1905	w/o PTT Ant	23.37	24.00	1.156	1.000	0.02	0.754	0.872
	LTE Band 25_Ant 1	20M	QPSK	50	0	Back	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	1.000	0.05	0.625	0.693
	LTE Band 25_Ant 1	20M	QPSK	100	0	Back	10mm	26140	1860	w/o PTT Ant	22.54	23.00	1.112	1.000	-0.05	0.524	0.583
	LTE Band 25_Ant 1	20M	QPSK	1	0	Left Side	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	1.000	0.05	0.083	0.093
	LTE Band 25_Ant 1	20M	QPSK	50	0	Left Side	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	1.000	-0.07	0.064	0.071
	LTE Band 25_Ant 1	20M	QPSK	1	0	Right Side	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	1.000	0.01	0.452	0.506
	LTE Band 25_Ant 1	20M	QPSK	50	0	Right Side	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	1.000	0.06	0.319	0.354
	LTE Band 25_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	1.000	-0.06	0.614	0.687
	LTE Band 25_Ant 1	20M	QPSK	50	0	Bottom Side	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	1.000	0	0.385	0.427
	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26140	1860	w/ PTT Ant	23.51	24.00	1.119	1.000	0.01	0.800	0.896
	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	1.000	-0.01	0.045	0.054
	LTE Band 26_Ant 1	15M	QPSK	36	39	Front	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	1.000	-0.02	0.040	0.047
23	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	1.000	0	0.251	0.302
	LTE Band 26_Ant 1	15M	QPSK	36	39	Back	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	1.000	0.08	0.160	0.189
	LTE Band 26_Ant 1	15M	QPSK	1	0	Left Side	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	1.000	-0.17	0.018	0.022
	LTE Band 26_Ant 1	15M	QPSK	36	39	Left Side	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	1.000	-0.05	0.014	0.017
	LTE Band 26_Ant 1	15M	QPSK	1	0	Right Side	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	1.000	-0.12	0.100	0.120
	LTE Band 26_Ant 1	15M	QPSK	36	39	Right Side	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	1.000	0.06	0.070	0.083
	LTE Band 26_Ant 1	15M	QPSK	1	0	Bottom Side	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	1.000	0.07	0.014	0.016
	LTE Band 26_Ant 1	15M	QPSK	36	39	Bottom Side	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	1.000	-0.17	0.085	0.101
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	10mm	26865	831.5	w/ PTT Ant	23.20	24.00	1.202	1.000	0.05	0.249	0.299
	LTE Band 30_Ant 1	10M	QPSK	1	0	Front	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	1.000	0.04	0.293	0.363
	LTE Band 30_Ant 1	10M	QPSK	25	0	Front	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	1.000	-0.01	0.202	0.252
	LTE Band 30_Ant 1	10M	QPSK	1	0	Back	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	1.000	-0.07	0.467	0.579
	LTE Band 30_Ant 1	10M	QPSK	25	0	Back	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	1.000	0.13	0.347	0.433
	LTE Band 30_Ant 1	10M	QPSK	1	0	Left Side	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	1.000	-0.15	0.069	0.085
	LTE Band 30_Ant 1	10M	QPSK	25	0	Left Side	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	1.000	-0.1	0.049	0.061
	LTE Band 30_Ant 1	10M	QPSK	1	0	Right Side	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	1.000	0.18	0.096	0.119
	LTE Band 30_Ant 1	10M	QPSK	25	0	Right Side	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	1.000	0.05	0.055	0.069
24	LTE Band 30_Ant 1	10M	QPSK	1	0	Bottom Side	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	1.000	-0.01	0.545	0.675
	LTE Band 30_Ant 1	10M	QPSK	25	0	Bottom Side	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	1.000	-0.11	0.448	0.559
	LTE Band 30_Ant 1	10M	QPSK	1	0	Bottom Side	10mm	27710	2310	w/ PTT Ant	23.07	24.00	1.239	1.000	0.03	0.541	0.670
	LTE Band 66_Ant 1	20M	QPSK	1	0	Front	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	1.000	-0.05	0.024	0.028
	LTE Band 66_Ant 1	20M	QPSK	50	0	Front	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	1.000	-0.14	0.020	0.023
25	LTE Band 66_Ant 1	20M	QPSK	1	0	Back	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	1.000	-0.02	0.310	0.358
	LTE Band 66_Ant 1	20M	QPSK	50	0	Back	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	1.000	0.05	0.284	0.320
	LTE Band 66_Ant 1	20M	QPSK	1	0	Left Side	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	1.000	-0.02	0.001	0.001
	LTE Band 66_Ant 1	20M	QPSK	50	0	Left Side	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	1.000	-0.12	0.001	0.001
	LTE Band 66_Ant 1	20M	QPSK	1	0	Right Side	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	1.000	-0.01	0.028	0.032
	LTE Band 66_Ant 1	20M	QPSK	50	0	Right Side	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	1.000	-0.01	0.024	0.027
	LTE Band 66_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	1.000	0.14	0.056	0.065
	LTE Band 66_Ant 1	20M	QPSK	50	0	Bottom Side	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	1.000	0.02	0.053	0.060
	LTE Band 66_Ant 1	20M	QPSK	1	0	Back	10mm	132072	1720	w/ PTT Ant	23.38	24.00	1.153	1.000	0.08	0.306	0.353

**<TDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 38_Ant 1	20M	QPSK	1	0	Front	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	0.09	0.136	0.148
	LTE Band 38_Ant 1	20M	QPSK	50	0	Front	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.02	0.106	0.115
	LTE Band 38_Ant 1	20M	QPSK	1	0	Back	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	-0.14	0.135	0.147
	LTE Band 38_Ant 1	20M	QPSK	50	0	Back	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.01	0.106	0.115
	LTE Band 38_Ant 1	20M	QPSK	1	0	Left Side	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	0.13	0.041	0.045
	LTE Band 38_Ant 1	20M	QPSK	50	0	Left Side	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.06	0.055	0.060
26	LTE Band 38_Ant 1	20M	QPSK	1	0	Right Side	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	0.04	0.264	0.287
	LTE Band 38_Ant 1	20M	QPSK	50	0	Right Side	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	0.18	0.166	0.180
	LTE Band 38_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	-0.07	0.135	0.147
	LTE Band 38_Ant 1	20M	QPSK	50	0	Bottom Side	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	0.13	0.110	0.119
	LTE Band 38_Ant 1	20M	QPSK	1	0	Right Side	10mm	38000	2595	w/ PTT Ant	23.67	24.00	1.079	62.9	1.006	0.13	0.219	0.238
	LTE Band 41_Ant 1	20M	QPSK	1	0	Front	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.06	0.223	0.263
	LTE Band 41_Ant 1	20M	QPSK	50	24	Front	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	0.03	0.167	0.196
	LTE Band 41_Ant 1	20M	QPSK	1	0	Back	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.07	0.221	0.261
	LTE Band 41_Ant 1	20M	QPSK	50	24	Back	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	-0.01	0.178	0.208
	LTE Band 41_Ant 1	20M	QPSK	1	0	Left Side	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	0.03	0.001	0.001
	LTE Band 41_Ant 1	20M	QPSK	50	24	Left Side	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	-0.06	0.001	0.001
	LTE Band 41_Ant 1	20M	QPSK	1	0	Right Side	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	0.05	0.052	0.061
	LTE Band 41_Ant 1	20M	QPSK	50	24	Right Side	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	-0.07	0.040	0.047
27	LTE Band 41_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.01	0.321	0.379
	LTE Band 41_Ant 1	20M	QPSK	50	24	Bottom Side	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	0.09	0.248	0.290
	LTE Band 41_Ant 1	20M	QPSK	1	0	Bottom Side	10mm	41055	2636.5	w/ PTT Ant	22.31	23.00	1.172	62.9	1.006	0.06	0.319	0.376
	LTE Band 42_Ant 2	20M	QPSK	1	0	Front	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.12	0.138	0.145
	LTE Band 42_Ant 2	20M	QPSK	50	0	Front	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	-0.01	0.112	0.116
28	LTE Band 42_Ant 2	20M	QPSK	1	0	Back	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.02	0.287	0.302
	LTE Band 42_Ant 2	20M	QPSK	50	0	Back	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	0	0.228	0.235
	LTE Band 42_Ant 2	20M	QPSK	1	0	Left Side	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	0.09	0.181	0.191
	LTE Band 42_Ant 2	20M	QPSK	50	0	Left Side	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	0.06	0.135	0.139
	LTE Band 42_Ant 2	20M	QPSK	1	0	Right Side	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.11	0.060	0.063
	LTE Band 42_Ant 2	20M	QPSK	50	0	Right Side	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	0.03	0.040	0.041
	LTE Band 42_Ant 2	20M	QPSK	1	0	Bottom Side	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	0.05	0.223	0.235
	LTE Band 42_Ant 2	20M	QPSK	50	0	Bottom Side	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	0.06	0.175	0.181
	LTE Band 42_Ant 2	20M	QPSK	1	0	Back	10mm	42990	3540	w/ PTT Ant	21.30	21.50	1.047	62.9	1.006	0.04	0.284	0.299
	LTE Band 48_Ant 2	20M	QPSK	1	0	Front	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.02	0.134	0.141
	LTE Band 48_Ant 2	20M	QPSK	50	0	Front	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.05	0.111	0.117
29	LTE Band 48_Ant 2	20M	QPSK	1	0	Back	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.01	0.309	0.325
	LTE Band 48_Ant 2	20M	QPSK	50	0	Back	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	-0.1	0.262	0.275
	LTE Band 48_Ant 2	20M	QPSK	1	0	Left Side	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	0.09	0.175	0.184
	LTE Band 48_Ant 2	20M	QPSK	50	0	Left Side	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.04	0.140	0.147
	LTE Band 48_Ant 2	20M	QPSK	1	0	Right Side	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.05	0.039	0.041
	LTE Band 48_Ant 2	20M	QPSK	50	0	Right Side	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.06	0.054	0.057
	LTE Band 48_Ant 2	20M	QPSK	1	0	Bottom Side	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.03	0.222	0.233
	LTE Band 48_Ant 2	20M	QPSK	50	0	Bottom Side	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.02	0.185	0.194
	LTE Band 48_Ant 2	20M	QPSK	1	0	Back	10mm	56150	3641	w/ PTT Ant	21.31	21.50	1.045	62.9	1.006	0.01	0.300	0.315

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	-0.07	0.283	0.286
30	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	-0.02	0.404	0.408
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	0.01	0.206	0.208
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	0.174	0.149	0.150
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	0.02	0.271	0.274
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	6	2437	w/ PTT Ant	18.00	18.00	1.000	99	1.010	0.01	0.394	0.398
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.07	0.001	0.001
31	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.02	0.111	0.142
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	0.03	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	0.01	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.08	0.041	0.053
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	155	5775	w/ PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.05	0.106	0.136

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
32	Bluetooth	1Mbps	Front	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.17	0.001	0.001
	Bluetooth	1Mbps	Back	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	-0.06	0.001	0.001
	Bluetooth	1Mbps	Left Side	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.03	0.001	0.001
	Bluetooth	1Mbps	Right Side	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.04	0.001	0.001
	Bluetooth	1Mbps	Top Side	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.05	0.001	0.001
	Bluetooth	1Mbps	Front	10mm	0	2402	w/ PTT Ant	6.37	7.00	1.157	76.83	1.084	-0.02	0.001	0.001

**14.3 Body Worn Accessory SAR****<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
33	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	-0.01	0.485	0.706
	LTE Band 7_Ant 1	20M	QPSK	50	24	Front	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	-0.11	0.357	0.509
	LTE Band 7_Ant 1	20M	QPSK	1	0	Back	10mm	21100	2535	w/o PTT Ant	22.37	24.00	1.455	0.05	0.300	0.437
	LTE Band 7_Ant 1	20M	QPSK	50	24	Back	10mm	20850	2510	w/o PTT Ant	21.46	23.00	1.426	-0.05	0.217	0.309
	LTE Band 7_Ant 1	20M	QPSK	1	0	Front	10mm	21100	2535	w/ PTT Ant	22.37	24.00	1.455	0.08	0.473	0.688
	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	0	0.029	0.034
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	0.02	0.023	0.027
34	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	10mm	23095	707.5	w/o PTT Ant	23.36	24.00	1.159	-0.01	0.090	0.104
	LTE Band 12_Ant 1	10M	QPSK	25	0	Back	10mm	23095	707.5	w/o PTT Ant	22.36	23.00	1.159	0.04	0.074	0.086
	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	10mm	23095	707.5	w/ PTT Ant	23.36	24.00	1.159	0.09	0.087	0.101
	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	0.12	0.024	0.028
	LTE Band 13_Ant 1	10M	QPSK	25	0	Front	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	0.08	0.023	0.027
35	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	10mm	23230	782	w/o PTT Ant	23.34	24.00	1.164	0.11	0.135	0.157
	LTE Band 13_Ant 1	10M	QPSK	25	0	Back	10mm	23230	782	w/o PTT Ant	22.36	23.00	1.159	-0.06	0.134	0.155
	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	10mm	23230	782	w/ PTT Ant	23.34	24.00	1.164	0.03	0.131	0.153
	LTE Band 14_Ant 1	10M	QPSK	1	0	Front	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	-0.14	0.023	0.028
	LTE Band 14_Ant 1	10M	QPSK	25	0	Front	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	-0.05	0.022	0.026
36	LTE Band 14_Ant 1	10M	QPSK	1	0	Back	10mm	23330	793	w/o PTT Ant	23.19	24.00	1.205	0.06	0.159	0.192
	LTE Band 14_Ant 1	10M	QPSK	25	0	Back	10mm	23330	793	w/o PTT Ant	22.21	23.00	1.199	0	0.147	0.176
	LTE Band 14_Ant 1	10M	QPSK	1	0	Back	10mm	23330	793	w/ PTT Ant	23.19	24.00	1.205	0.03	0.156	0.188
	LTE Band 25_Ant 1	20M	QPSK	1	0	Front	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	-0.14	0.274	0.307
	LTE Band 25_Ant 1	20M	QPSK	50	0	Front	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	0.05	0.223	0.247
37	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26140	1860	w/o PTT Ant	23.51	24.00	1.119	0.08	0.808	0.905
	LTE Band 25_Ant 1	20M	QPSK	50	0	Back	10mm	26140	1860	w/o PTT Ant	22.55	23.00	1.109	0.05	0.625	0.693
	LTE Band 25_Ant 1	20M	QPSK	1	0	Back	10mm	26140	1860	w/ PTT Ant	23.51	24.00	1.119	0.01	0.800	0.896
	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	-0.01	0.045	0.054
	LTE Band 26_Ant 1	15M	QPSK	36	39	Front	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	-0.02	0.040	0.047
38	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	10mm	26865	831.5	w/o PTT Ant	23.20	24.00	1.202	0	0.251	0.302
	LTE Band 26_Ant 1	15M	QPSK	36	39	Back	10mm	26865	831.5	w/o PTT Ant	22.27	23.00	1.183	0.08	0.160	0.189
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	10mm	26865	831.5	w/ PTT Ant	23.20	24.00	1.202	0.05	0.249	0.299
	LTE Band 30_Ant 1	10M	QPSK	1	0	Front	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	0.04	0.293	0.363
	LTE Band 30_Ant 1	10M	QPSK	25	0	Front	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	-0.01	0.202	0.252
39	LTE Band 30_Ant 1	10M	QPSK	1	0	Back	10mm	27710	2310	w/o PTT Ant	23.07	24.00	1.239	-0.07	0.467	0.579
	LTE Band 30_Ant 1	10M	QPSK	25	0	Back	10mm	27710	2310	w/o PTT Ant	22.04	23.00	1.247	0.08	0.347	0.433
	LTE Band 30_Ant 1	10M	QPSK	1	0	Back	10mm	27710	2310	w/ PTT Ant	23.07	24.00	1.239	0.03	0.463	0.574
	LTE Band 66_Ant 1	20M	QPSK	1	0	Front	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	-0.05	0.024	0.028
	LTE Band 66_Ant 1	20M	QPSK	50	0	Front	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	-0.14	0.020	0.023
40	LTE Band 66_Ant 1	20M	QPSK	1	0	Back	10mm	132072	1720	w/o PTT Ant	23.38	24.00	1.153	-0.02	0.310	0.358
	LTE Band 66_Ant 1	20M	QPSK	50	0	Back	10mm	132072	1720	w/o PTT Ant	22.48	23.00	1.127	0.05	0.284	0.320
	LTE Band 66_Ant 1	20M	QPSK	1	0	Back	10mm	132072	1720	w/ PTT Ant	23.38	24.00	1.153	0.08	0.306	0.353

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
41	LTE Band 38_Ant 1	20M	QPSK	1	0	Front	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	0.09	0.136	0.148
	LTE Band 38_Ant 1	20M	QPSK	50	0	Front	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.02	0.106	0.115
	LTE Band 38_Ant 1	20M	QPSK	1	0	Back	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	-0.14	0.135	0.147
	LTE Band 38_Ant 1	20M	QPSK	50	0	Back	10mm	38000	2595	w/o PTT Ant	22.67	23.00	1.079	62.9	1.006	-0.01	0.106	0.115
	LTE Band 38_Ant 1	20M	QPSK	1	0	Front	10mm	38000	2595	w/o PTT Ant	23.67	24.00	1.079	62.9	1.006	-0.1	0.117	0.127
42	LTE Band 41_Ant 1	20M	QPSK	1	0	Front	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.06	0.223	0.263
	LTE Band 41_Ant 1	20M	QPSK	50	24	Front	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	0.03	0.167	0.196
	LTE Band 41_Ant 1	20M	QPSK	1	0	Back	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	-0.07	0.221	0.261
	LTE Band 41_Ant 1	20M	QPSK	50	24	Back	10mm	41055	2636.5	w/o PTT Ant	21.34	22.00	1.164	62.9	1.006	-0.01	0.178	0.208
	LTE Band 41_Ant 1	20M	QPSK	1	0	Front	10mm	41055	2636.5	w/o PTT Ant	22.31	23.00	1.172	62.9	1.006	0.03	0.219	0.258
	LTE Band 42_Ant 2	20M	QPSK	1	0	Front	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.12	0.138	0.145
	LTE Band 42_Ant 2	20M	QPSK	50	0	Front	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	-0.01	0.112	0.116
43	LTE Band 42_Ant 2	20M	QPSK	1	0	Back	10mm	42990	3540	w/o PTT Ant	21.30	21.50	1.047	62.9	1.006	-0.02	0.287	0.302
	LTE Band 42_Ant 2	20M	QPSK	50	0	Back	10mm	42990	3540	w/o PTT Ant	20.39	20.50	1.026	62.9	1.006	0	0.228	0.235
	LTE Band 42_Ant 2	20M	QPSK	1	0	Back	10mm	42990	3540	w/ PTT Ant	21.30	21.50	1.047	62.9	1.006	0.04	0.284	0.299
	LTE Band 48_Ant 2	20M	QPSK	1	0	Front	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.02	0.134	0.141
	LTE Band 48_Ant 2	20M	QPSK	50	0	Front	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	0.05	0.111	0.117
44	LTE Band 48_Ant 2	20M	QPSK	1	0	Back	10mm	56150	3641	w/o PTT Ant	21.31	21.50	1.045	62.9	1.006	-0.01	0.309	0.325
	LTE Band 48_Ant 2	20M	QPSK	50	0	Back	10mm	56150	3641	w/o PTT Ant	20.31	20.50	1.045	62.9	1.006	-0.1	0.262	0.275
	LTE Band 48_Ant 2	20M	QPSK	1	0	Back	10mm	56150	3641	w/ PTT Ant	21.31	21.50	1.045	62.9	1.006	0.01	0.300	0.315

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	-0.07	0.283	0.286
45	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	6	2437	w/o PTT Ant	18.00	18.00	1.000	99	1.010	-0.02	0.404	0.408
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	6	2437	w/ PTT Ant	18.00	18.00	1.000	99	1.010	0.01	0.394	0.398
	WLAN5GHz	802.11ac-VHT40 MCS0	Front	10mm	54	5270	w/o PTT Ant	16.55	17.00	1.109	96.3	1.038	0.04	0.030	0.035
46	WLAN5GHz	802.11ac-VHT40 MCS0	Back	10mm	54	5270	w/o PTT Ant	16.55	17.00	1.109	96.3	1.038	0.02	0.255	0.294
	WLAN5GHz	802.11ac-VHT40 MCS0	Back	10mm	54	5270	w/ PTT Ant	16.55	17.00	1.109	96.3	1.038	0.01	0.251	0.289
	WLAN5GHz	802.11n-HT40 MCS0	Front	10mm	134	5670	w/o PTT Ant	17.25	17.50	1.059	96.3	1.038	0.06	0.038	0.042
47	WLAN5GHz	802.11n-HT40 MCS0	Back	10mm	134	5670	w/o PTT Ant	17.25	17.50	1.059	96.3	1.038	0.03	0.301	0.331
	WLAN5GHz	802.11n-HT40 MCS0	Back	10mm	134	5670	w/ PTT Ant	17.25	17.50	1.059	96.3	1.038	0.01	0.299	0.329
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.07	0.001	0.001
48	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	155	5775	w/o PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.02	0.111	0.142
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	155	5775	w/ PTT Ant	17.25	18.00	1.189	92.7	1.079	-0.05	0.106	0.136

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	PTT Antenna	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)
49	Bluetooth	1Mbps	Front	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	0.17	0.001	0.001
	Bluetooth	1Mbps	Back	10mm	0	2402	w/o PTT Ant	6.37	7.00	1.157	76.83	1.084	-0.06	0.001	0.001
	Bluetooth	1Mbps	Front	10mm	0	2402	w/ PTT Ant	6.37	7.00	1.157	76.83	1.084	0.03	0.001	0.001

**14.4 Extremity SAR****<NFC SAR>**

Plot No.	Band	Test Position	Gap (mm)	Freq. (MHz)	PTT Antenna	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	NFC	Front	0mm	13.56	w/o PTT Ant	0.02	0.001	0.001
	NFC	Back	0mm	13.56	w/o PTT Ant	-0.05	0.001	0.001
	NFC	Left Side	0mm	13.56	w/o PTT Ant	0.03	0.001	0.001
50	NFC	Right Side	0mm	13.56	w/o PTT Ant	0	0.001	0.001
	NFC	Top Side	0mm	13.56	w/o PTT Ant	0.07	0.001	0.001
	NFC	Bottom Side	0mm	13.56	w/o PTT Ant	-0.09	0.001	0.001
	NFC	Right Side	0mm	13.56	w/ PTT Ant	0.01	0.001	0.001

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Next to Mouth/ Body / Limbs
1.	WWAN + 2.4GHz WLAN + 5GHz WLAN	Yes
2.	2.4GHz WLAN + Bluetooth	Yes
3.	5GHz WLAN + Bluetooth	Yes

General Note:

- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D04, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
 - The SPLSR calculated results please refer to section 15.4.

15.1 Next to mouth Exposure Conditions

Exposure Position	1	2	3	4	1+2+3 Summed 1g SAR (W/kg)	2+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)
	Maximum WWAN 1g SAR (W/kg)	WLAN2.4GHz 1g SAR (W/kg)	WLAN5GHz 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)			
Front	0.706	0.286	0.042	0.001	1.034	0.287	0.043

15.2 Hotspot Exposure Conditions

Exposure Position	1	2	3	4	1+2+3 Summed 1g SAR (W/kg)	2+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)
	Maximum WWAN 1g SAR (W/kg)	WLAN2.4GHz 1g SAR (W/kg)	WLAN5GHz 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)			
Front	0.706	0.286	0.001	0.001	0.993	0.287	0.002
Back	0.905	0.408	0.142	0.001	1.455	0.409	0.143
Left side	0.191	0.208	0.001	0.001	0.400	0.209	0.002
Right side	0.506	0.150	0.001	0.001	0.657	0.151	0.002
Top side		0.274	0.053	0.001	0.327	0.275	0.054
Bottom side	0.687				0.687	0.000	0.000

15.3 Body-Worn Accessory Exposure Conditions

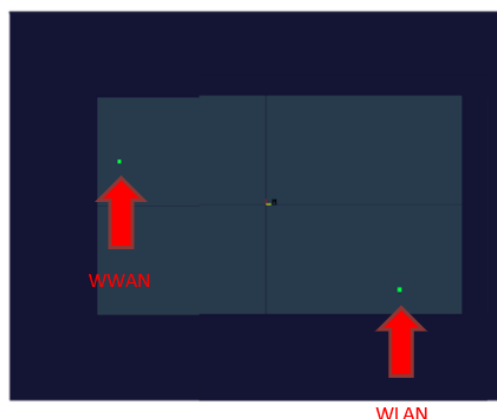
Exposure Position	1	2	3	4	1+2+3 Summed 1g SAR (W/kg)	2+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)	SPLSR	Case No
	Maximum WWAN 1g SAR (W/kg)	WLAN2.4GHz 1g SAR (W/kg)	WLAN5GHz 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)					
Front	0.706	0.286	0.042	0.001	1.034	0.287	0.043		
Back	0.905	0.408	0.331	0.001	1.644	0.409	0.332	0.001	Case 1

15.4 SPLSR Evaluation and Analysis

General Note:

1. Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Therefore, the adjacent transmit antennas will be summed first, and then the SPLSR calculation will be evaluated with the farther transmitted antennas.
2. $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary
3. 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	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)	X	Y	Z				
Case 1	LTE Band 25	Back	0.905	10	-28.1	-46.9	-207	96.4	1.31	0.02	Not required
	WLAN2.4GHz		0.408	10	-11.5	48	-209.1				
	LTE Band 25	Back	0.905	10	-28.1	-46.9	-207	93.7	1.24	0.01	Not required
	WLAN5GHz		0.331	10	3.1	41.4	-209.2				



Test Engineer : Henry Chou, Randy Lin and Kevin Guo

16. Uncertainty Assessment

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.

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	$1/k^{(b)}$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) k is the coverage factor

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.

Uncertainty Budget (4 MHz - 10 GHz range)							
Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	18.60	N	2	1	1	9.3	9.3
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Linearity	4.70	R	1.732	1	1	2.7	2.7
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Boundary Effects	2.00	R	1.732	1	1	1.2	1.2
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	6.70	R	1.732	1	1	3.9	3.9
Post-processing	4.00	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Holder	3.60	N	1	1	1	3.6	3.6
Test sample Positioning	3.03	N	1	1	1	3.0	3.0
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Phantom and Setup							
Phantom Uncertainty	7.60	R	1.732	1	1	4.4	4.4
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.77	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.77	2.3	2.2
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.77	1.1	1.1
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.77	1.7	1.6
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						14.5%	14.2%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.0%	28.4%

17. References

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