

FCC SAR Test Report

APPLICANT : Bullitt Group
EQUIPMENT : Rugged Smart Phone
BRAND NAME : CAT
MODEL NAME : S48c
FCC ID : ZL5S48C
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Shenzhen) Inc., the test report shall not be reproduced except in full.



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA850804-04	Rev. 01	Initial issue of report	Sep. 27, 2018

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Bullitt Group, Rugged Smart Phone, S48c**, are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.90	0.97	0.71	1.59
		GSM1900	0.15	0.79	0.35	
	WCDMA	Band V	0.59	0.66	0.54	
		Band IV	0.65	0.72	0.36	
		Band II	0.75	1.18	0.47	
	CDMA2000	BC10	0.68	0.72	0.48	
		BC0	0.70	0.59	0.50	
		BC1	0.93	1.14	0.51	
	LTE	Band 12	0.19	0.41	0.33	
		Band 13	0.48	0.61	0.45	
		Band 14	0.57	0.73	0.61	
		Band 26/Band 5	0.61	0.54	0.46	
		Band 66/Band 4	0.79	0.71	0.28	
		Band 25/Band 2	0.93	1.08	0.42	
		Band 7	0.23	1.16	0.99	
		Band 41	0.27	0.78	1.06	
DTS	WLAN	2.4GHz WLAN	0.50	<0.10	<0.10	1.43
NII		5GHz WLAN	0.80	0.40	0.22	1.59
DSS	Bluetooth	2.4GHz Bluetooth	0.13			1.39
Date of Testing:			2018/8/25~2018/9/2			
Remark: This device supports LTE B2 / B4 / B5 and B25 / B66 / B26. Since the supported frequency span for LTE B2 / B4 / B5 falls completely within the supports frequency span for LTE B25 / B66 / B26, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B25 / B66 / B26.						

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Testing Laboratory	
Test Site	Sporton International (Shenzhen) Inc.
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Bullitt Group
Address	One Valpy, Valpy Street, Reading, Berkshire, England RG1 1AR

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Rugged Smart Phone
Brand Name	CAT
Model Name	S48c
FCC ID	ZL5S48C
IMEI Code	358016090018148
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype

Remark:

1. This device supports VoIP in GPRS, EGPRS, CDMA, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
3. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
4. This device does not support DTM operation and supports GRPS/EGPRS mode up to multi-slot class 33.
5. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of CDMA2000 BC1 and LTE B25 / B2 / B7 / B41.
6. The device can adjust uplink/downlink configuration automatically according to the transmitting power class level for LTE band 41, as the following table.

LTE TDD Band	Power Class level	support uplink/downlink
LTE Band 41	> 23	1,2,3,4,5
	=23	0,1,2,3,4,5,6
	< 23	0,1,2,3,4,5,6

7. This is a variant report for S48c. The product equality declaration please refer to appendix E. Based on the similarity between current and previous project, only the worst cases from original test report (Sporton Report Number FA850804-03 and FA850804-02) were verified for the differences.

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05									
FCC ID		ZL5S48C							
Equipment Name		Rugged Smart Phone							
Operating Frequency Range of each LTE transmission band		LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~1779.3 MHz							
Channel Bandwidth		LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66: 1.4MHz, 3MHz,5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used		QPSK / 16QAM / 64QAM							
LTE Voice / Data requirements		Voice and Data							
LTE Release Version		R12, Cat13							
CA Support		Yes, Downlink							
LTE MPR permanently built-in by design		Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3							
		Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})					MPR (dB)	
			1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz		20 MHz
		QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
		16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
		16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
		64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
		64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
		256 QAM					≥ 1	≤ 5	
LTE A-MPR		In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)							
Spectrum plots for RB configuration		A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.							
Power reduction applied to satisfy SAR compliance		Yes, when operating in hotspot mode that CDMA2000 BC1 and LTE B25 / B2 / B7 / B41 power reduction applied to satisfy SAR compliance.							
LTE Carrier Aggregation Combinations		Inter-Band and Intra-Band possible combinations and the detail power verification please referred to section 12.							
LTE Carrier Aggregation Additional Information		This device does not support full CA features on 3GPP Release 12. It supports a maximum of 2 carriers in the downlink. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.							

Transmission (H, M, L) channel numbers and frequencies in each LTE band														
LTE Band 2														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860		
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880		
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900		
LTE Band 4														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720		
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5		
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745		
LTE Band 5														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	20407	824.7	20415	825.5	20425	826.5	20450	829						
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5						
H	20643	848.3	20635	847.5	20625	846.5	20600	844						
LTE Band 7														
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510						
M	21100	2535	21100	2535	21100	2535	21100	2535						
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560						
LTE Band 12														
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	23017	699.7	23025	700.5	23035	701.5	23060	704						
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5						
H	23173	715.3	23165	714.5	23155	713.5	23130	711						
LTE Band 13														
	Bandwidth 5 MHz				Bandwidth 10 MHz									
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)							
L	23205		779.5		23230		782							
M	23230		782											
H	23255		784.5											
LTE Band 14														
	Bandwidth 5 MHz				Bandwidth 10 MHz									
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)							
L	23305		790.5		23330		793							
M	23330		793											
H	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			
	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		
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				
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

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

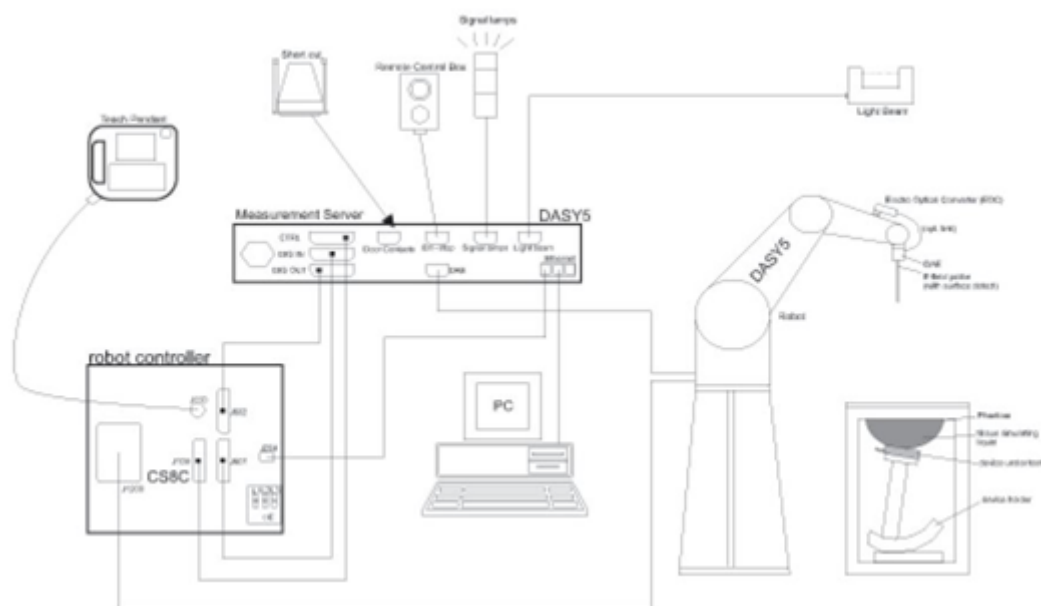
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



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

7.1 E-Field Probe

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

<EX3DV4 Probe>

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

7.2 Data Acquisition Electronics (DAE)

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

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



Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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



Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

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

8.4 Zoom Scan

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

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

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

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

**9. Test Equipment List**

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1099	Dec. 04, 2017	Dec. 03, 2018
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 05, 2017	Dec. 04, 2018
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Jul. 30, 2018	Jul. 29, 2019
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 06, 2017	Dec. 05, 2018
SPEAG	2450MHz System Validation Kit	D2450V2	924	Mar. 22, 2018	Mar. 21, 2019
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 07, 2017	Dec. 06, 2018
SPEAG	5000MHz System Validation Kit	D5GHzV2	1167	Aug. 03, 2018	Aug. 02, 2019
SPEAG	Data Acquisition Electronics	DAE4	1437	Sep. 15, 2017	Sep. 14, 2018
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Jan. 31, 2018	Jan. 30, 2019
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1670	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Jul. 18, 2018	Jul. 17, 2019
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Sep. 12, 2017	Sep. 11, 2018
Agilent	Network Analyzer	E5071C	MY46523671	Oct. 18, 2017	Oct. 17, 2018
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Nov. 28, 2017	Nov. 27, 2018
Agilent	Signal Generator	N5181A	MY50145381	Dec. 26, 2017	Dec. 25, 2018
Anritsu	Power Sensor	MA2411B	1306099	Jul. 30, 2018	Jul. 29, 2019
Anritsu	Power Meter	ML2495A	1349001	Jul. 26, 2018	Jul. 25, 2019
Anritsu	Power Sensor	MA2411B	1207363	Oct. 06, 2017	Oct. 05, 2018
Anritsu	Power Meter	ML2495A	1218006	Oct. 06, 2017	Oct. 05, 2018
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 26, 2017	Dec. 25, 2018
R&S	Spectrum Analyzer	FSP7	100818	Jul. 18, 2018	Jul. 17, 2019
LKM electronic	Hygrometer	DTM3000	3241	Aug. 10, 2018	Jul. 09, 2019
Anymetre	Thermo-Hygrometer	JR593	2015030904	Apr. 19, 2018	Apr. 18, 2019
ARRA	Power Divider	A3200-2	N/A	Note	
PASTERNAK	Dual Directional Coupler	PE2214-10	N/A	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
MCL	Attenuation1	BW-S10W5	N/A	Note	
Weinschel	Attenuation2	3M-20	N/A	Note	
Zhongjilianhe	Attenuation3	MVE2214-03	N/A	Note	
mini-circuits	Amplifier	ZHL-42W+	QA1341002	Note	
mini-circuits	Amplifier	ZVE-3W-83+	599201528	Note	

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.

10. System Verification

10.1 Tissue Simulating Liquids

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

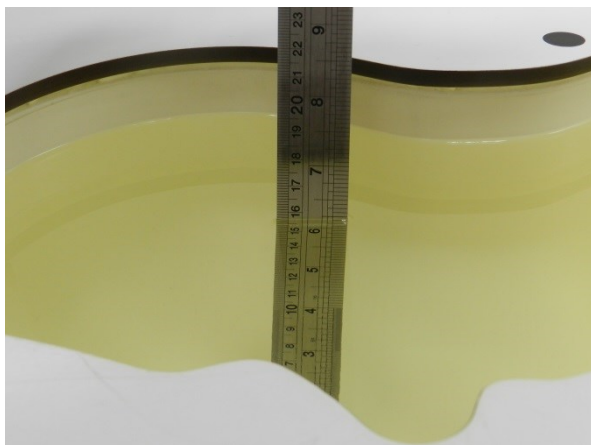


Fig 10.1Photo of Liquid Height for Head SAR



Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
750	Head	22.6	0.896	40.991	0.89	41.90	0.67	-2.17	±5	2018/8/26
835	Head	22.5	0.929	41.793	0.90	41.50	3.22	0.71	±5	2018/8/26
1750	Head	22.8	1.382	41.560	1.37	40.10	0.88	3.64	±5	2018/8/26
1900	Head	22.7	1.455	40.068	1.40	40.00	3.93	0.17	±5	2018/8/26
2450	Head	22.6	1.823	37.953	1.80	39.20	1.28	-3.18	±5	2018/8/28
2600	Head	22.7	1.981	38.254	1.96	39.00	1.07	-1.91	±5	2018/8/28
5250	Head	22.9	4.757	36.931	4.71	35.90	1.00	2.87	±5	2018/8/25
5600	Head	22.6	5.199	36.179	5.07	35.50	2.54	1.91	±5	2018/8/25
5750	Head	22.8	5.173	35.826	5.22	35.40	-0.90	1.20	±5	2018/8/25
750	Body	22.6	0.970	54.642	0.96	55.50	1.04	-1.55	±5	2018/8/29
835	Body	22.4	0.977	54.442	0.97	55.20	0.72	-1.37	±5	2018/8/29
1750	Body	22.5	1.515	55.246	1.49	53.40	1.68	3.46	±5	2018/9/1
1900	Body	22.6	1.543	52.519	1.52	53.30	1.51	-1.47	±5	2018/9/1
2450	Body	22.7	2.001	52.089	1.95	52.70	2.62	-1.16	±5	2018/8/31
2600	Body	22.8	2.165	53.823	2.16	52.50	0.23	2.52	±5	2018/8/31
5250	Body	22.9	5.418	47.824	5.36	48.90	1.08	-2.20	±5	2018/9/2
5600	Body	22.4	5.892	47.208	5.77	48.50	2.11	-2.66	±5	2018/9/2
5750	Body	22.8	6.111	46.899	5.94	48.30	2.88	-2.90	±5	2018/9/2

10.3 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018/8/26	750	Head	250	1099	3819	1437	2.06	8.33	8.24	-1.08
2018/8/26	835	Head	250	4d162	3819	1437	2.40	9.56	9.6	0.42
2018/8/26	1750	Head	250	1137	3819	1437	8.58	36.50	34.32	-5.97
2018/8/26	1900	Head	250	5d182	3819	1437	9.38	40.10	37.52	-6.43
2018/8/28	2450	Head	250	924	3819	1437	12.60	51.80	50.4	-2.70
2018/8/28	2600	Head	250	1070	3819	1437	13.40	58.20	53.6	-7.90
2018/8/25	5250	Head	100	1167	3819	1437	8.02	77.00	80.2	4.16
2018/8/25	5600	Head	100	1167	3819	1437	8.54	80.80	85.4	5.69
2018/8/25	5750	Head	100	1167	3819	1437	7.84	76.90	78.4	1.95
2018/8/29	750	Body	250	1099	3819	1437	2.09	8.64	8.36	-3.24
2018/8/29	835	Body	250	4d162	3819	1437	2.52	9.56	10.08	5.44
2018/9/1	1750	Body	250	1137	3819	1437	8.69	37.00	34.76	-6.05
2018/9/1	1900	Body	250	5d182	3819	1437	9.91	40.40	39.64	-1.88
2018/8/31	2450	Body	250	924	3819	1437	12.70	50.70	50.8	0.20
2018/8/31	2600	Body	250	1070	3819	1437	13.50	55.20	54	-2.17
2018/9/2	5250	Body	100	1167	3819	1437	7.76	74.40	77.6	4.30
2018/9/2	5600	Body	100	1167	3819	1437	8.32	77.10	83.2	7.91
2018/9/2	5750	Body	100	1167	3819	1437	8.01	74.30	80.1	7.81

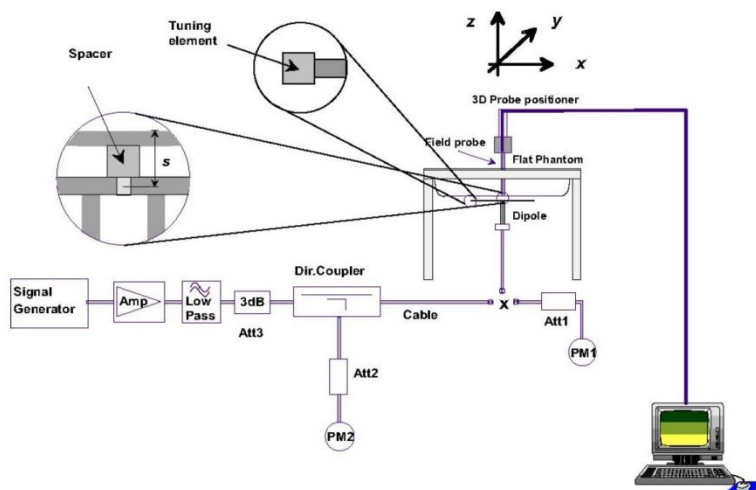


Fig 10.3.1 System Performance Check Setup



Fig 10.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 11.1.1 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 11.1.2. 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 11.1.3). 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 11.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

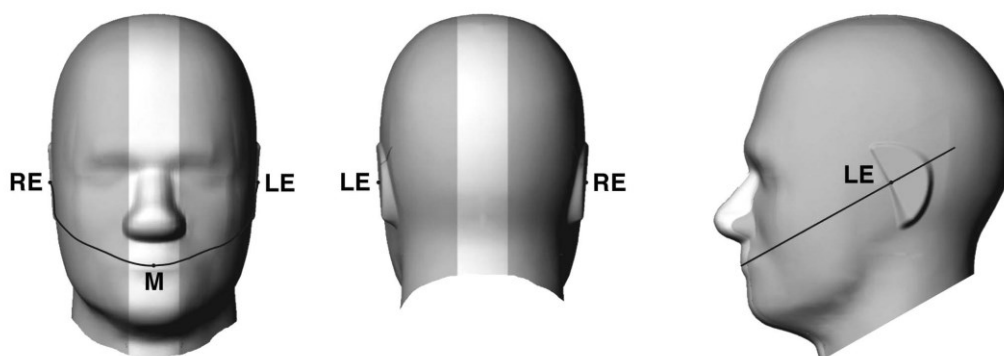


Fig 11.1.1 Front, back, and side views of SAM twin phantom

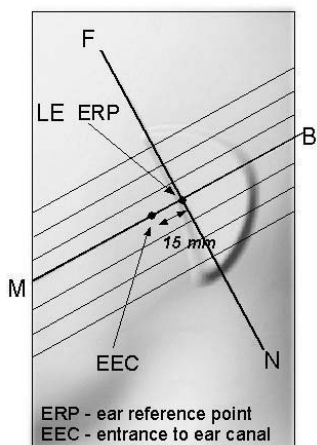


Fig 11.1.2 Close-up side view of phantom showing the ear region.

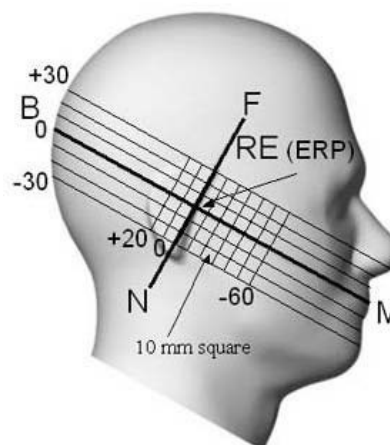


Fig 11.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 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 11.2.1 and Figure 11.2.2), 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 11.2.1). 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 11.2.2), 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 11.2.3), 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 11.2.3. The actual rotation angles should be documented in the test report.

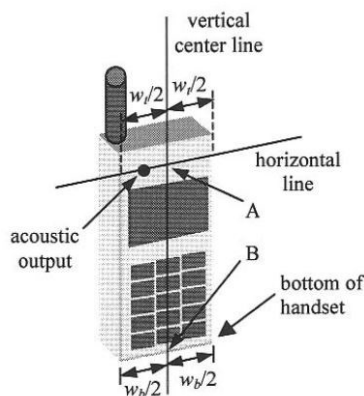


Fig 11.2.1 Handset vertical and horizontal reference lines—"fixed case"

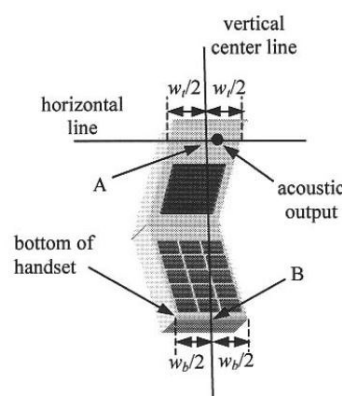


Fig 11.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

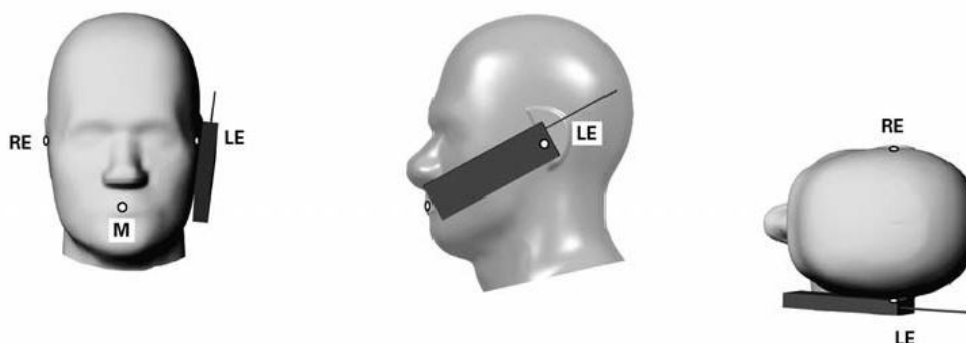


Fig 11.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 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 11.3.1. 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

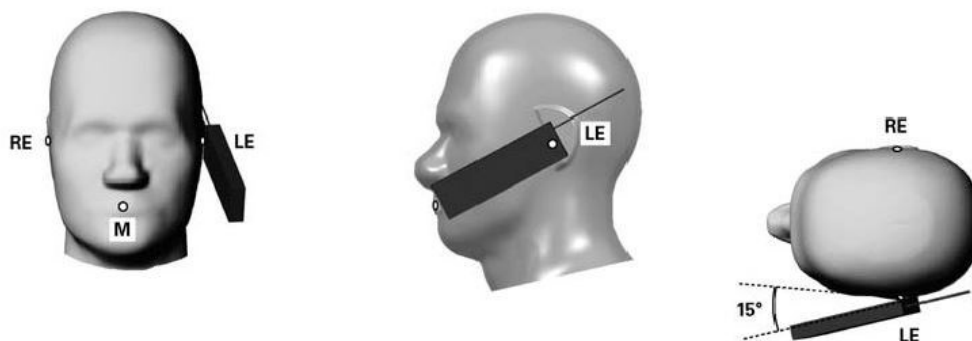


Fig 11.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 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 11.4). 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 D01v06 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.

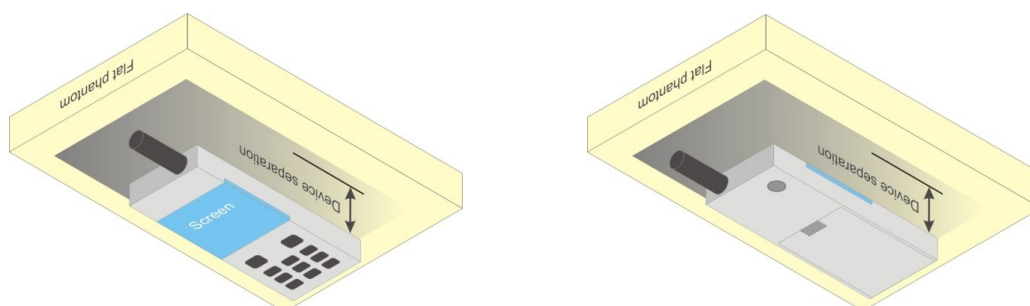


Fig 11.4 Body Worn Position

11.5 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 D01v06 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.

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 3Tx slots for GSM850/GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.

<Full Power Mode>

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Tx Channel	824.2	836.4	848.8		824.2	836.4	848.8	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.57	32.41	32.49	33.50	23.57	23.41	23.49	24.50
GPRS 1 Tx slot	32.56	32.39	32.46	33.50	23.56	23.39	23.46	24.50
GPRS 2 Tx slots	31.31	31.45	31.48	31.50	25.31	25.45	25.48	25.50
GPRS 3 Tx slots	30.16	30.28	30.20	30.50	25.90	26.02	25.94	26.24
GPRS 4 Tx slots	28.45	28.48	28.45	28.50	25.45	25.48	25.45	25.50
EDGE 1 Tx slot	26.64	26.46	26.52	27.50	17.64	17.46	17.52	18.50
EDGE 2 Tx slots	26.41	26.34	26.48	26.50	20.41	20.34	20.48	20.50
EDGE 3 Tx slots	25.45	25.48	25.35	25.50	21.19	21.22	21.09	21.24
EDGE 4 Tx slots	23.42	23.37	23.35	23.50	20.42	20.37	20.35	20.50
GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Tx Channel	1850.2	1880	1909.8		1850.2	1880	1909.8	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.15	29.55	29.31	30.50	20.15	20.55	20.31	21.50
GPRS 1 Tx slot	29.12	29.54	29.29	30.50	20.12	20.54	20.29	21.50
GPRS 2 Tx slots	28.09	28.50	28.22	28.50	22.09	22.50	22.22	22.50
GPRS 3 Tx slots	26.94	27.37	27.09	27.50	22.68	23.11	22.83	23.24
GPRS 4 Tx slots	24.60	25.29	24.99	25.50	21.60	22.29	21.99	22.50
EDGE 1 Tx slot	25.27	25.59	25.23	26.50	16.27	16.59	16.23	17.50
EDGE 2 Tx slots	25.19	25.23	25.17	25.50	19.19	19.23	19.17	19.50
EDGE 3 Tx slots	24.13	24.22	24.05	24.50	19.87	19.96	19.79	20.24
EDGE 4 Tx slots	22.02	22.28	22.12	22.50	19.02	19.28	19.12	19.50

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

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

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

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

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

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

HSUPA Setup Configuration:

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

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

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

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

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

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

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

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

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

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

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

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

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

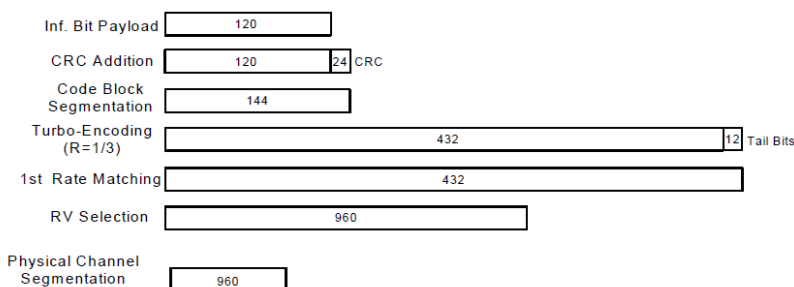


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2E:HSPA+:UL with 16QAM
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.4, quoted from the TS 34.121-1 s5.2E
 - iii. Set Channel Parms
 - iv. Set Cell Power = -86 dBm
 - v. Set Channel Type = HSPA
 - vi. Set UE Target Power =21 dBm
 - vii. Power Ctrl Mode= All Up Bits
 - viii. Set Manual Uplink DPCH Bc/Bd = Manual
 - ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
 - x. Set HSPA Conn DL Channel Levels
 - xi. Set HS-SCCH Configs
 - xii. Set RB Test Mode Setup
 - xiii. Set Common HSUPA Parameters
 - xiv. Set Serving Grant
 - xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note 3)	β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105
Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{fs} = 30/15 * \beta_c$. Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0). Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default. Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value. Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.											

Setup Configuration



<WCDMA Conducted Power>

General Note:

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

<Full Power Mode>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)	WCDMA Band V			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.11	23.15	22.91	24.00	22.64	22.92	23.06	24.00	23.20	23.18	23.20	24.00
3GPP Rel 99	RMC 12.2Kbps	23.14	23.16	22.93	24.00	22.65	22.93	23.08	24.00	23.23	23.21	23.22	24.00
3GPP Rel 6	HSDPA Subtest-1	22.07	22.15	22.11	23.00	21.82	21.92	21.96	23.00	22.22	22.08	22.08	23.00
3GPP Rel 6	HSDPA Subtest-2	22.15	22.16	22.14	23.00	21.85	21.95	22.01	23.00	22.24	22.15	22.13	23.00
3GPP Rel 6	HSDPA Subtest-3	21.65	21.70	21.61	23.00	21.13	21.40	21.51	23.00	21.76	21.62	21.66	23.00
3GPP Rel 6	HSDPA Subtest-4	21.60	21.69	21.61	23.00	21.31	21.42	21.16	23.00	21.75	21.54	21.61	23.00
3GPP Rel 8	DC-HSDPA Subtest-1	22.03	22.09	22.07	23.00	21.73	21.84	21.88	23.00	21.94	21.98	21.95	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.99	22.07	22.02	23.00	21.71	21.83	21.88	23.00	21.91	21.96	21.98	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.51	21.55	21.13	23.00	21.21	21.26	21.27	23.00	21.64	21.49	21.52	23.00
3GPP Rel 8	DC-HSDPA Subtest-4	21.47	21.56	21.11	23.00	21.18	21.21	21.19	23.00	21.62	21.43	21.44	23.00
3GPP Rel 6	HSUPA Subtest-1	22.02	22.11	22.12	23.00	21.81	21.92	21.99	23.00	22.21	22.07	22.10	23.00
3GPP Rel 6	HSUPA Subtest-2	20.06	20.10	20.12	21.00	19.85	19.86	19.98	21.00	20.17	20.07	20.09	21.00
3GPP Rel 6	HSUPA Subtest-3	21.03	21.13	21.12	21.50	20.72	20.90	20.97	21.50	21.21	21.06	21.09	21.50
3GPP Rel 6	HSUPA Subtest-4	19.98	20.15	20.15	21.50	19.87	19.86	19.98	21.50	20.16	20.05	20.09	21.50
3GPP Rel 6	HSUPA Subtest-5	22.00	22.10	22.20	23.00	21.80	21.90	22.00	23.00	22.20	22.10	22.10	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.68	19.78	19.80	21.00	19.62	19.73	19.76	21.00	19.94	19.87	19.90	21.00

<CDMA2000 Conducted Power>
General Note:

1. Per KDB 941225 D01v03r01, SAR for head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

<Full Power Mode>

Band	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC1			Tune-up Limit (dBm)	CDMA2000 BC10			Tune-up Limit (dBm)
Tx Channel	1013	384	777		25	600	1175		476	580	684	
Frequency (MHz)	824.7	836.52	848.31		1851.25	1880	1908.75		817.9	820.5	823.1	
RC1 SO55	23.99	24.06	24.05	25.00	24.04	23.87	23.67	25.00	23.98	24.04	24.10	25.00
RC3 SO55	23.98	24.04	24.03	25.00	24.03	23.86	23.67	25.00	23.97	24.04	24.09	25.00
RC3 SO32 (F+SCH)	23.99	24.05	24.04	25.00	24.03	23.85	23.66	25.00	23.96	24.03	24.09	25.00
RC3 SO32 (+SCH)	23.98	24.04	24.04	25.00	24.02	23.85	23.65	25.00	23.96	24.02	24.08	25.00
RTAP 153.6Kbps	23.98	24.05	24.04	25.00	24.03	23.86	23.66	25.00	23.97	24.03	24.09	25.00
RETAP 4096Bits	23.98	24.05	24.05	25.00	24.02	23.85	23.67	25.00	23.98	24.03	24.08	25.00

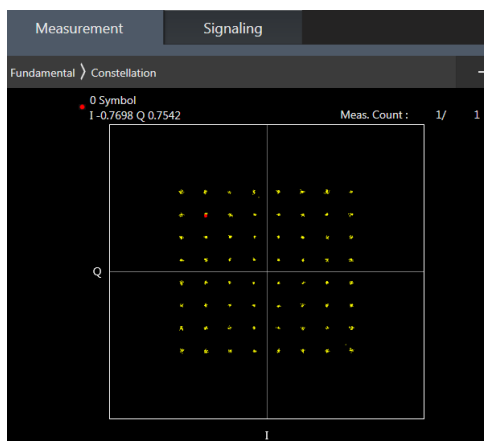
<Reduced Power Mode for Hotspot On>

Band	CDMA2000 BC1			Tune-up Limit (dBm)
Tx Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	22.58	22.57	22.55	23.50
RC3 SO55	22.46	22.53	22.52	23.50
RC3 SO32 (F+SCH)	22.45	22.55	22.53	23.50
RC3 SO32 (+SCH)	22.46	22.54	22.53	23.50
RTAP 153.6Kbps	22.57	22.56	22.54	23.50
RETAP 4096Bits	22.46	22.55	22.52	23.50

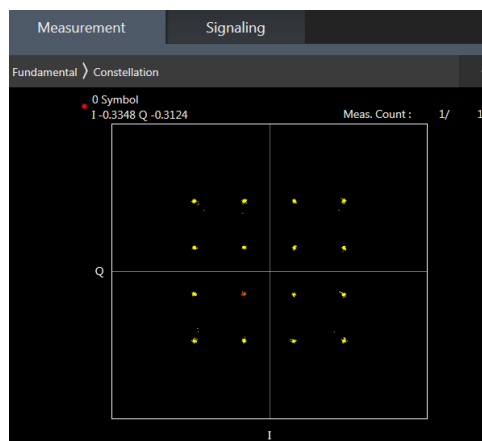
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $> \text{not } \frac{1}{2}$ 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/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $> \text{not } \frac{1}{2}$ 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 / B13 / B14 / B26 / B66 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 B2 / B4 / B5 SAR test was covered by B25 / B66 / B26; 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
10. According to 2017 TCB workshop, for 64QAM and 16QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

11. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
12. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

<Full Power Mode>

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	24.12	24.20	23.98	25	0
20	QPSK	1	49	24.05	24.13	24.04		
20	QPSK	1	99	24.02	24.12	23.90		
20	QPSK	50	0	23.83	23.85	23.63	24	1
20	QPSK	50	24	23.83	23.79	23.61		
20	QPSK	50	50	23.65	23.68	23.56		
20	QPSK	100	0	23.78	23.79	23.60		
20	16QAM	1	0	23.98	23.92	23.84	24	1
20	16QAM	1	49	23.95	23.87	23.82		
20	16QAM	1	99	23.95	23.87	23.76		
20	16QAM	50	0	22.95	22.89	22.70	23	2
20	16QAM	50	24	22.93	22.91	22.71		
20	16QAM	50	50	22.95	22.80	22.75		
20	16QAM	100	0	22.88	22.85	22.65		
20	64QAM	1	0	22.07	22.16	21.97	23	2
20	64QAM	1	49	22.10	21.94	22.01		
20	64QAM	1	99	22.13	22.02	21.97		
20	64QAM	50	0	21.03	20.99	20.83	22	3
20	64QAM	50	24	21.00	20.96	20.86		
20	64QAM	50	50	21.03	20.88	20.88		
20	64QAM	100	0	20.98	20.91	20.79		



Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.80	23.83	23.75	25	0
15	QPSK	1	37	23.86	23.81	23.81		
15	QPSK	1	74	23.75	23.79	23.72		
15	QPSK	36	0	23.91	23.90	23.81	24	1
15	QPSK	36	20	23.94	23.95	23.87		
15	QPSK	36	39	23.83	23.90	23.85		
15	QPSK	75	0	23.88	23.92	23.78	24	1
15	16QAM	1	0	23.85	23.88	23.80		
15	16QAM	1	37	23.95	23.89	23.84		
15	16QAM	1	74	23.85	23.85	23.73	23	2
15	16QAM	36	0	22.86	22.75	22.71		
15	16QAM	36	20	22.86	22.90	22.77		
15	16QAM	36	39	22.78	22.81	22.75	23	2
15	16QAM	75	0	22.79	22.84	22.66		
15	64QAM	1	0	22.01	22.00	21.93		
15	64QAM	1	37	22.00	21.99	22.09	23	2
15	64QAM	1	74	21.85	21.97	21.95		
15	64QAM	36	0	20.92	20.92	20.81		
15	64QAM	36	20	21.01	21.00	20.96	22	3
15	64QAM	36	39	20.96	20.90	20.93		
15	64QAM	75	0	20.96	20.91	20.81		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.91	23.96	23.83	25	0
10	QPSK	1	25	23.87	23.84	23.80		
10	QPSK	1	49	23.85	23.93	23.74		
10	QPSK	25	0	23.97	23.90	23.91	24	1
10	QPSK	25	12	23.99	23.92	23.90		
10	QPSK	25	25	23.87	23.93	23.81		
10	QPSK	50	0	23.93	23.99	23.89	24	1
10	16QAM	1	0	23.92	23.97	23.85		
10	16QAM	1	25	23.98	23.90	23.85		
10	16QAM	1	49	23.95	23.98	23.77	23	2
10	16QAM	25	0	22.85	22.76	22.78		
10	16QAM	25	12	22.85	22.88	22.79		
10	16QAM	25	25	22.79	22.81	22.69	23	2
10	16QAM	50	0	22.84	22.86	22.77		
10	64QAM	1	0	22.09	22.15	22.05		
10	64QAM	1	25	22.04	22.01	22.07	23	2
10	64QAM	1	49	22.01	22.06	21.96		
10	64QAM	25	0	20.94	20.89	20.92		
10	64QAM	25	12	20.91	20.99	20.92	22	3
10	64QAM	25	25	20.85	20.92	20.85		
10	64QAM	50	0	20.87	20.94	20.89		

Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	23.82	23.82	23.80	25	0
5	QPSK	1	12	23.81	23.83	23.78		
5	QPSK	1	24	23.81	23.88	23.71		
5	QPSK	12	0	23.86	23.89	23.84	24	1
5	QPSK	12	7	23.89	23.89	23.88		
5	QPSK	12	13	23.90	23.95	23.80		
5	QPSK	25	0	23.92	23.96	23.84	24	1
5	16QAM	1	0	23.83	23.87	23.83		
5	16QAM	1	12	23.87	23.93	23.83		
5	16QAM	1	24	23.87	23.93	23.72	23	2
5	16QAM	12	0	22.76	22.75	22.75		
5	16QAM	12	7	22.76	22.76	22.77		
5	16QAM	12	13	22.83	22.80	22.73	23	2
5	16QAM	25	0	22.81	22.82	22.71		
5	64QAM	1	0	22.05	22.02	22.05		
5	64QAM	1	12	21.93	22.03	22.10	23	2
5	64QAM	1	24	21.96	22.05	21.95		
5	64QAM	12	0	20.84	20.93	20.98		
5	64QAM	12	7	20.85	20.93	20.98	22	3
5	64QAM	12	13	20.90	20.98	20.92		
5	64QAM	25	0	20.87	20.96	20.89		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	23.90	23.81	23.78	25	0
3	QPSK	1	8	23.89	23.81	23.79		
3	QPSK	1	14	23.86	23.90	23.73		
3	QPSK	8	0	23.93	23.88	23.83	24	1
3	QPSK	8	4	23.90	23.87	23.87		
3	QPSK	8	7	23.80	23.96	23.83		
3	QPSK	15	0	23.86	23.99	23.85	24	1
3	16QAM	1	0	23.80	23.87	23.83		
3	16QAM	1	8	23.86	23.90	23.83		
3	16QAM	1	14	23.80	23.92	23.74	23	2
3	16QAM	8	0	22.79	22.57	22.77		
3	16QAM	8	4	22.80	22.80	22.79		
3	16QAM	8	7	22.77	22.87	22.74	23	2
3	16QAM	15	0	22.75	22.86	22.78		
3	64QAM	1	0	22.00	22.03	22.00		
3	64QAM	1	8	22.02	21.99	22.02	23	2
3	64QAM	1	14	21.97	22.07	21.97		
3	64QAM	8	0	20.93	20.92	20.92		
3	64QAM	8	4	20.94	20.93	20.95	22	3
3	64QAM	8	7	20.89	20.96	20.89		
3	64QAM	15	0	20.88	20.93	20.90		



Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	23.86	23.79	23.70	25	0
1.4	QPSK	1	3	23.93	23.83	23.79		
1.4	QPSK	1	5	23.86	23.76	23.69		
1.4	QPSK	3	0	23.87	23.80	23.76		
1.4	QPSK	3	1	23.87	23.88	23.82		
1.4	QPSK	3	3	23.83	23.79	23.75		
1.4	QPSK	6	0	23.82	23.81	23.79	24	1
1.4	16QAM	1	0	23.91	24.00	23.95	24	1
1.4	16QAM	1	3	23.93	23.97	23.92		
1.4	16QAM	1	5	23.97	24.00	23.89		
1.4	16QAM	3	0	23.84	23.83	23.79		
1.4	16QAM	3	1	23.87	23.90	23.81		
1.4	16QAM	3	3	23.79	23.78	23.75		
1.4	16QAM	6	0	22.97	22.95	22.96	23	2
1.4	64QAM	1	0	21.99	21.95	21.96	23	2
1.4	64QAM	1	3	22.05	22.04	22.04		
1.4	64QAM	1	5	21.97	21.90	21.92		
1.4	64QAM	3	0	21.97	21.96	21.95		
1.4	64QAM	3	1	22.01	22.00	21.99		
1.4	64QAM	3	3	21.96	21.93	21.93		
1.4	64QAM	6	0	20.82	20.77	20.82	22	3

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.78	23.84	23.69	25	0
20	QPSK	1	49	23.81	23.89	23.76		
20	QPSK	1	99	23.62	23.63	23.70		
20	QPSK	50	0	23.48	23.50	23.42	24	1
20	QPSK	50	24	23.42	23.46	23.40		
20	QPSK	50	50	23.35	23.36	23.33		
20	QPSK	100	0	23.45	23.47	23.40	24	1
20	16QAM	1	0	22.56	22.65	22.76		
20	16QAM	1	49	22.45	22.74	22.69		
20	16QAM	1	99	22.56	22.48	22.64	23	2
20	16QAM	50	0	21.72	21.63	21.66		
20	16QAM	50	24	21.66	21.64	21.57		
20	16QAM	50	50	21.68	21.64	21.50	23	2
20	16QAM	100	0	21.65	21.71	21.59		
20	64QAM	1	0	21.46	21.47	21.69		
20	64QAM	1	49	21.62	21.66	21.56	23	2
20	64QAM	1	99	21.38	21.50	21.48		
20	64QAM	50	0	20.58	20.59	20.58		
20	64QAM	50	24	20.56	20.52	20.51	22	3
20	64QAM	50	50	20.48	20.46	20.39		
20	64QAM	100	0	20.53	20.54	20.41		



Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.76	23.74	23.72	25	0
15	QPSK	1	37	23.69	23.79	23.74		
15	QPSK	1	74	23.63	23.61	23.71		
15	QPSK	36	0	23.41	23.51	23.46	24	1
15	QPSK	36	20	23.48	23.50	23.40		
15	QPSK	36	39	23.47	23.37	23.36		
15	QPSK	75	0	23.50	23.43	23.41	24	1
15	16QAM	1	0	22.85	22.67	23.04		
15	16QAM	1	37	22.92	22.57	22.73		
15	16QAM	1	74	22.33	22.38	22.56	23	2
15	16QAM	36	0	21.52	21.67	21.57		
15	16QAM	36	20	21.68	21.75	21.59		
15	16QAM	36	39	21.59	21.69	21.55	23	2
15	16QAM	75	0	21.69	21.64	21.52		
15	64QAM	1	0	21.50	21.54	21.53		
15	64QAM	1	37	21.48	21.66	21.53	23	2
15	64QAM	1	74	21.38	21.42	21.48		
15	64QAM	36	0	20.46	20.57	20.50		
15	64QAM	36	20	20.58	20.59	20.52	22	3
15	64QAM	36	39	20.51	20.48	20.36		
15	64QAM	75	0	20.51	20.48	20.41		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.78	23.74	23.80	25	0
10	QPSK	1	25	23.73	23.83	23.72		
10	QPSK	1	49	23.78	23.71	23.74		
10	QPSK	25	0	23.48	23.49	23.41	24	1
10	QPSK	25	12	23.45	23.47	23.40		
10	QPSK	25	25	23.52	23.42	23.34		
10	QPSK	50	0	23.55	23.45	23.37	24	1
10	16QAM	1	0	22.88	22.97	22.70		
10	16QAM	1	25	22.56	22.88	22.56		
10	16QAM	1	49	22.85	22.99	22.61	23	2
10	16QAM	25	0	21.46	21.62	21.58		
10	16QAM	25	12	21.64	21.66	21.64		
10	16QAM	25	25	21.69	21.65	21.49	23	2
10	16QAM	50	0	21.70	21.69	21.51		
10	64QAM	1	0	21.53	21.57	21.63		
10	64QAM	1	25	21.46	21.65	21.55	23	2
10	64QAM	1	49	21.53	21.55	21.51		
10	64QAM	25	0	20.48	20.53	20.43		
10	64QAM	25	12	20.47	20.55	20.45	22	3
10	64QAM	25	25	20.50	20.47	20.37		
10	64QAM	50	0	20.55	20.51	20.42		



Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.86	23.81	23.74	25	0
5	QPSK	1	12	23.75	23.82	23.74		
5	QPSK	1	24	23.71	23.71	23.75		
5	QPSK	12	0	23.41	23.46	23.39	24	1
5	QPSK	12	7	23.44	23.50	23.38		
5	QPSK	12	13	23.37	23.45	23.36		
5	QPSK	25	0	23.42	23.43	23.38	24	1
5	16QAM	1	0	22.85	22.96	22.86		
5	16QAM	1	12	22.55	22.81	22.84		
5	16QAM	1	24	22.47	22.41	22.54	23	2
5	16QAM	12	0	21.70	21.70	21.66		
5	16QAM	12	7	21.54	21.80	21.57		
5	16QAM	12	13	21.49	21.53	21.61	23	2
5	16QAM	25	0	21.62	21.70	21.51		
5	64QAM	1	0	21.52	21.67	21.53		
5	64QAM	1	12	21.50	21.65	21.48	23	2
5	64QAM	1	24	21.44	21.59	21.53		
5	64QAM	12	0	20.49	20.59	20.40		
5	64QAM	12	7	20.51	20.61	20.44	22	3
5	64QAM	12	13	20.44	20.54	20.38		
5	64QAM	25	0	20.44	20.54	20.38		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.87	23.81	23.71	25	0
3	QPSK	1	8	23.78	23.81	23.82		
3	QPSK	1	14	23.73	23.74	23.78		
3	QPSK	8	0	23.43	23.47	23.36	24	1
3	QPSK	8	4	23.42	23.49	23.48		
3	QPSK	8	7	23.39	23.41	23.42		
3	QPSK	15	0	23.47	23.45	23.37	24	1
3	16QAM	1	0	22.67	22.95	22.64		
3	16QAM	1	8	22.75	22.90	23.04		
3	16QAM	1	14	22.56	23.14	22.59	23	2
3	16QAM	8	0	21.62	21.77	21.42		
3	16QAM	8	4	21.65	21.73	21.61		
3	16QAM	8	7	21.62	21.64	21.66	23	2
3	16QAM	15	0	21.49	21.78	21.53		
3	64QAM	1	0	21.50	21.74	21.51		
3	64QAM	1	8	21.50	21.68	21.58	23	2
3	64QAM	1	14	21.47	21.64	21.50		
3	64QAM	8	0	20.48	20.55	20.40		
3	64QAM	8	4	20.49	20.58	20.52	22	3
3	64QAM	8	7	20.45	20.56	20.48		
3	64QAM	15	0	20.47	20.51	20.37		



Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.61	23.54	23.56	25	0
1.4	QPSK	1	3	23.59	23.62	23.61		
1.4	QPSK	1	5	23.51	23.52	23.55		
1.4	QPSK	3	0	23.56	23.60	23.57		
1.4	QPSK	3	1	23.64	23.60	23.64		
1.4	QPSK	3	3	23.56	23.58	23.58		
1.4	QPSK	6	0	23.62	23.60	23.60	24	1
1.4	16QAM	1	0	22.86	23.06	22.86	24	1
1.4	16QAM	1	3	22.70	22.67	22.45		
1.4	16QAM	1	5	22.82	22.67	22.64		
1.4	16QAM	3	0	22.47	22.61	22.63		
1.4	16QAM	3	1	22.59	22.75	22.59		
1.4	16QAM	3	3	22.33	22.49	22.40		
1.4	16QAM	6	0	21.75	21.67	21.61	23	2
1.4	64QAM	1	0	21.45	21.63	21.53	23	2
1.4	64QAM	1	3	21.51	21.69	21.58		
1.4	64QAM	1	5	21.46	21.56	21.50		
1.4	64QAM	3	0	21.43	21.60	21.51		
1.4	64QAM	3	1	21.51	21.64	21.57		
1.4	64QAM	3	3	21.47	21.59	21.50		
1.4	64QAM	6	0	20.40	20.46	20.43	22	3

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	24.12	24.22	24.00	25	0
10	QPSK	1	25	24.13	24.13	23.97		
10	QPSK	1	49	24.03	24.03	23.83		
10	QPSK	25	0	23.85	23.95	23.56	24	1
10	QPSK	25	12	23.84	23.84	23.54		
10	QPSK	25	25	23.77	23.79	23.48		
10	QPSK	50	0	23.81	23.82	23.54	24	1
10	16QAM	1	0	23.97	23.63	23.93		
10	16QAM	1	25	23.85	23.65	23.70		
10	16QAM	1	49	23.71	23.70	23.49	23	2
10	16QAM	25	0	22.55	22.24	22.14		
10	16QAM	25	12	22.29	22.28	22.10		
10	16QAM	25	25	22.26	22.17	22.17	23	2
10	16QAM	50	0	22.36	22.26	22.26		
10	64QAM	1	0	22.15	22.00	22.22		
10	64QAM	1	25	22.18	22.07	22.05	23	2
10	64QAM	1	49	22.09	22.04	21.84		
10	64QAM	25	0	21.06	20.94	20.83	22	3
10	64QAM	25	12	21.05	20.94	20.79		
10	64QAM	25	25	20.99	20.90	20.93		
10	64QAM	50	0	20.97	20.90	20.84		



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Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	24.09	24.03	24.07	25	0
5	QPSK	1	12	24.18	24.04	23.90		
5	QPSK	1	24	24.09	24.09	23.84		
5	QPSK	12	0	23.74	23.73	23.59	24	1
5	QPSK	12	7	23.87	23.74	23.60		
5	QPSK	12	13	23.82	23.67	23.52		
5	QPSK	25	0	23.82	23.67	23.58	24	1
5	16QAM	1	0	23.66	23.63	23.73		
5	16QAM	1	12	23.29	23.43	23.15		
5	16QAM	1	24	23.35	23.44	23.32	23	2
5	16QAM	12	0	22.39	22.45	22.33		
5	16QAM	12	7	22.53	22.33	22.34		
5	16QAM	12	13	22.38	22.21	22.23	23	2
5	16QAM	25	0	22.40	22.35	22.28		
5	64QAM	1	0	22.16	22.08	22.07		
5	64QAM	1	12	22.26	22.08	21.88	23	2
5	64QAM	1	24	22.10	22.17	21.89		
5	64QAM	12	0	21.10	21.02	20.92		
5	64QAM	12	7	21.21	21.05	20.93	22	3
5	64QAM	12	13	21.15	20.99	20.87		
5	64QAM	25	0	21.05	20.92	20.84		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	24.12	24.05	24.00	25	0
3	QPSK	1	8	24.10	24.04	23.86		
3	QPSK	1	14	24.17	24.08	23.80		
3	QPSK	8	0	23.73	23.66	23.53	24	1
3	QPSK	8	4	23.78	23.70	23.57		
3	QPSK	8	7	23.80	23.66	23.51		
3	QPSK	15	0	23.83	23.70	23.57	24	1
3	16QAM	1	0	23.34	23.51	23.28		
3	16QAM	1	8	23.56	23.31	23.51		
3	16QAM	1	14	23.77	23.83	23.50	23	2
3	16QAM	8	0	22.28	22.33	22.35		
3	16QAM	8	4	22.55	22.22	22.23		
3	16QAM	8	7	22.57	22.37	22.16	23	2
3	16QAM	15	0	22.47	22.21	22.18		
3	64QAM	1	0	22.15	22.05	22.02		
3	64QAM	1	8	22.21	22.07	21.89	23	2
3	64QAM	1	14	22.18	22.17	21.91		
3	64QAM	8	0	21.07	20.99	20.88		
3	64QAM	8	4	21.10	21.01	20.92	22	3
3	64QAM	8	7	21.18	20.78	20.91		
3	64QAM	15	0	21.01	20.89	20.80		

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Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	24.03	23.96	23.90	25	0
1.4	QPSK	1	3	24.08	24.00	23.88		
1.4	QPSK	1	5	24.03	23.92	23.77		
1.4	QPSK	3	0	23.71	23.61	23.45		
1.4	QPSK	3	1	23.73	23.62	23.49		
1.4	QPSK	3	3	23.67	23.59	23.46		
1.4	QPSK	6	0	23.69	23.62	23.50	24	1
1.4	16QAM	1	0	23.69	23.67	23.16	24	1
1.4	16QAM	1	3	23.37	23.69	23.16		
1.4	16QAM	1	5	23.81	23.27	23.24		
1.4	16QAM	3	0	23.26	23.06	23.18		
1.4	16QAM	3	1	23.15	23.04	23.13		
1.4	16QAM	3	3	23.41	23.16	23.02		
1.4	16QAM	6	0	22.25	22.35	22.24	23	2
1.4	64QAM	1	0	22.08	21.97	21.88	23	2
1.4	64QAM	1	3	22.20	22.05	21.96		
1.4	64QAM	1	5	22.10	22.02	21.93		
1.4	64QAM	3	0	22.09	21.96	21.95		
1.4	64QAM	3	1	22.08	22.03	21.96		
1.4	64QAM	3	3	22.08	21.95	21.92		
1.4	64QAM	6	0	20.91	20.82	20.83	22	3

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	21.85	21.95	21.90	23	0
20	QPSK	1	49	21.96	22.12	21.99		
20	QPSK	1	99	22.03	22.16	22.07		
20	QPSK	50	0	21.65	21.69	21.64	22	1
20	QPSK	50	24	21.69	21.74	21.68		
20	QPSK	50	50	21.73	21.75	21.72		
20	QPSK	100	0	21.69	21.73	21.68	22	1
20	16QAM	1	0	20.70	20.37	20.41		
20	16QAM	1	49	20.44	20.75	20.79		
20	16QAM	1	99	20.68	20.34	20.93	21	2
20	16QAM	50	0	19.26	19.34	19.47		
20	16QAM	50	24	19.35	19.45	19.56		
20	16QAM	50	50	19.39	19.46	19.53	21	2
20	16QAM	100	0	19.26	19.38	19.46		
20	64QAM	1	0	19.62	19.60	19.61		
20	64QAM	1	49	19.59	19.65	19.79	21	2
20	64QAM	1	99	19.65	19.75	19.83		
20	64QAM	50	0	18.46	18.53	18.62		
20	64QAM	50	24	18.53	18.60	18.69	20	3
20	64QAM	50	50	18.54	18.63	18.71		
20	64QAM	100	0	18.48	18.58	18.67		



Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.05	21.99	21.96	23	0
15	QPSK	1	37	22.00	22.04	22.01		
15	QPSK	1	74	22.09	21.99	22.09		
15	QPSK	36	0	21.62	21.66	21.64	22	1
15	QPSK	36	20	21.66	21.71	21.71		
15	QPSK	36	39	21.69	21.70	21.68		
15	QPSK	75	0	21.65	21.68	21.66	22	1
15	16QAM	1	0	20.47	20.70	20.74		
15	16QAM	1	37	20.68	20.77	20.94		
15	16QAM	1	74	20.93	20.45	21.03	21	2
15	16QAM	36	0	19.25	19.36	19.43		
15	16QAM	36	20	19.35	19.36	19.50		
15	16QAM	36	39	19.39	19.45	19.55	21	2
15	16QAM	75	0	19.33	19.44	19.55		
15	64QAM	1	0	19.61	19.63	19.72		
15	64QAM	1	37	19.58	19.65	19.80	21	2
15	64QAM	1	74	19.70	19.65	19.90		
15	64QAM	36	0	18.47	18.53	18.64		
15	64QAM	36	20	18.50	18.60	18.71	20	3
15	64QAM	36	39	18.54	18.63	18.74		
15	64QAM	75	0	18.45	18.54	18.66		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.05	22.00	21.94	23	0
10	QPSK	1	25	21.98	22.01	22.00		
10	QPSK	1	49	22.04	21.96	22.08		
10	QPSK	25	0	21.63	21.67	21.64	22	1
10	QPSK	25	12	21.68	21.73	21.68		
10	QPSK	25	25	21.64	21.73	21.71		
10	QPSK	50	0	21.67	21.70	21.69	22	1
10	16QAM	1	0	20.83	20.66	20.80		
10	16QAM	1	25	20.39	20.55	20.78		
10	16QAM	1	49	20.77	20.50	20.69	21	2
10	16QAM	25	0	19.21	19.37	19.47		
10	16QAM	25	12	19.35	19.37	19.51		
10	16QAM	25	25	19.34	19.33	19.46	21	2
10	16QAM	50	0	19.28	19.33	19.55		
10	64QAM	1	0	19.63	19.66	19.75		
10	64QAM	1	25	19.59	19.61	19.73	21	2
10	64QAM	1	49	19.57	19.59	19.81		
10	64QAM	25	0	18.40	18.49	18.63		
10	64QAM	25	12	18.48	18.57	18.67	20	3
10	64QAM	25	25	18.46	18.60	18.68		
10	64QAM	50	0	18.43	18.54	18.67		



Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.07	22.00	22.00	23	0
5	QPSK	1	12	21.99	22.04	22.01		
5	QPSK	1	24	21.98	22.05	22.03		
5	QPSK	12	0	21.60	21.66	21.65	22	1
5	QPSK	12	7	21.67	21.69	21.70		
5	QPSK	12	13	21.67	21.66	21.69		
5	QPSK	25	0	21.64	21.70	21.68	22	1
5	16QAM	1	0	20.40	20.56	20.88		
5	16QAM	1	12	20.68	20.43	20.69		
5	16QAM	1	24	20.37	20.76	20.36	21	2
5	16QAM	12	0	19.23	19.32	19.49		
5	16QAM	12	7	19.28	19.44	19.46		
5	16QAM	12	13	19.26	19.35	19.55	21	2
5	16QAM	25	0	19.32	19.30	19.47		
5	64QAM	1	0	19.63	19.65	19.74		
5	64QAM	1	12	19.53	19.62	19.77	21	2
5	64QAM	1	24	19.54	19.62	19.76		
5	64QAM	12	0	18.43	18.53	18.64		
5	64QAM	12	7	18.48	18.58	18.73	20	3
5	64QAM	12	13	18.48	18.57	18.70		
5	64QAM	25	0	18.40	18.52	18.67		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130	25	0
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	24.20	24.35	24.27		
10	QPSK	1	25	24.38	24.33	24.32	24	1
10	QPSK	1	49	24.30	24.39	24.38		
10	QPSK	25	0	23.87	23.89	23.86		
10	QPSK	25	12	23.85	23.90	23.87	24	1
10	QPSK	25	25	23.81	23.88	23.86		
10	QPSK	50	0	23.81	23.84	23.76		
10	16QAM	1	0	23.69	23.65	23.30	24	1
10	16QAM	1	25	23.75	23.38	23.61		
10	16QAM	1	49	23.70	23.29	23.76		
10	16QAM	25	0	22.40	22.48	22.46	23	2
10	16QAM	25	12	22.52	22.43	22.58		
10	16QAM	25	25	22.51	22.40	22.48		
10	16QAM	50	0	22.57	22.42	22.45	23	2
10	64QAM	1	0	22.13	22.31	22.30		
10	64QAM	1	25	22.30	22.33	22.30		
10	64QAM	1	49	22.28	22.29	22.46	22	3
10	64QAM	25	0	21.14	21.20	21.15		
10	64QAM	25	12	21.24	21.17	21.15		
10	64QAM	25	25	21.21	21.13	21.13	22	3
10	64QAM	50	0	21.24	21.18	21.14		



Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	24.31	24.33	24.37	25	0
5	QPSK	1	12	24.30	24.35	24.29		
5	QPSK	1	24	24.34	24.30	24.35		
5	QPSK	12	0	23.85	23.90	23.82	24	1
5	QPSK	12	7	23.87	23.92	23.87		
5	QPSK	12	13	23.91	23.87	23.80		
5	QPSK	25	0	23.87	23.88	23.84	24	1
5	16QAM	1	0	23.57	23.30	23.31		
5	16QAM	1	12	23.77	23.85	23.77		
5	16QAM	1	24	23.82	23.75	23.89	23	2
5	16QAM	12	0	22.42	22.45	22.33		
5	16QAM	12	7	22.41	22.40	22.42		
5	16QAM	12	13	22.60	22.43	22.41	23	2
5	16QAM	25	0	22.53	22.50	22.36		
5	64QAM	1	0	22.23	22.31	22.29		
5	64QAM	1	12	22.28	22.29	22.22	23	2
5	64QAM	1	24	22.33	22.19	22.47		
5	64QAM	12	0	21.17	21.23	21.11		
5	64QAM	12	7	21.20	21.24	21.19	22	3
5	64QAM	12	13	21.24	21.16	21.17		
5	64QAM	25	0	21.12	21.18	21.10		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	24.31	24.32	24.26	25	0
3	QPSK	1	8	24.19	24.30	24.35		
3	QPSK	1	14	24.27	24.30	24.36		
3	QPSK	8	0	23.88	23.84	23.81	24	1
3	QPSK	8	4	23.87	23.91	23.81		
3	QPSK	8	7	23.86	23.88	23.87		
3	QPSK	15	0	23.87	23.88	23.79	24	1
3	16QAM	1	0	23.72	23.61	23.68		
3	16QAM	1	8	23.22	23.94	23.80		
3	16QAM	1	14	23.78	23.55	23.98	23	2
3	16QAM	8	0	22.38	22.57	22.38		
3	16QAM	8	4	22.54	22.50	22.43		
3	16QAM	8	7	22.47	22.45	22.72	23	2
3	16QAM	15	0	22.48	22.61	22.38		
3	64QAM	1	0	22.25	22.29	22.19		
3	64QAM	1	8	22.13	22.28	22.34	23	2
3	64QAM	1	14	22.26	22.24	22.46		
3	64QAM	8	0	21.16	21.20	21.13		
3	64QAM	8	4	21.18	21.22	21.19	22	3
3	64QAM	8	7	21.14	21.18	21.26		
3	64QAM	15	0	21.15	21.15	21.10		

Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	24.26	24.25	24.26	25	0
1.4	QPSK	1	3	24.23	24.31	24.35		
1.4	QPSK	1	5	24.13	24.22	24.34		
1.4	QPSK	3	0	23.80	23.79	23.82		
1.4	QPSK	3	1	23.86	23.83	23.88		
1.4	QPSK	3	3	23.67	23.80	23.92		
1.4	QPSK	6	0	23.84	23.83	23.84	24	1
1.4	16QAM	1	0	23.80	23.84	23.68	24	1
1.4	16QAM	1	3	23.38	23.87	23.63		
1.4	16QAM	1	5	23.74	23.54	23.56		
1.4	16QAM	3	0	23.30	23.39	23.32		
1.4	16QAM	3	1	23.39	23.44	23.52		
1.4	16QAM	3	3	23.41	23.39	23.49		
1.4	16QAM	6	0	22.53	22.53	22.50	23	2
1.4	64QAM	1	0	22.19	22.18	22.25	23	2
1.4	64QAM	1	3	22.14	22.27	22.47		
1.4	64QAM	1	5	22.08	22.22	22.37		
1.4	64QAM	3	0	22.19	22.17	22.25		
1.4	64QAM	3	1	22.22	22.23	22.31		
1.4	64QAM	3	3	22.06	22.20	22.35		
1.4	64QAM	6	0	21.09	21.08	21.13	22	3

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23230				
Frequency (MHz)				782				
10	QPSK	1	0		24.41		25	0
10	QPSK	1	25		24.33			
10	QPSK	1	49		24.25			
10	QPSK	25	0		23.92		24	1
10	QPSK	25	12		23.91			
10	QPSK	25	25		23.90			
10	QPSK	50	0		23.91		24	1
10	16QAM	1	0		23.35			
10	16QAM	1	25		23.28			
10	16QAM	1	49		23.23		23	2
10	16QAM	25	0		22.41			
10	16QAM	25	12		22.50			
10	16QAM	25	25		22.36		23	2
10	16QAM	50	0		22.40			
10	64QAM	1	0		22.18			
10	64QAM	1	25		22.24		23	2
10	64QAM	1	49		22.28			
10	64QAM	25	0		21.10			
10	64QAM	25	12		21.13		22	3
10	64QAM	25	25		21.13			
10	64QAM	50	0		21.13			

Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	24.34	24.32	24.27	25	0
5	QPSK	1	12	24.36	24.32	24.30		
5	QPSK	1	24	24.32	24.26	24.26		
5	QPSK	12	0	23.91	23.88	23.85	24	1
5	QPSK	12	7	23.96	23.89	23.86		
5	QPSK	12	13	23.92	23.87	23.87		
5	QPSK	25	0	23.93	23.88	23.87	24	1
5	16QAM	1	0	23.57	23.79	23.51		
5	16QAM	1	12	23.47	23.48	23.86		
5	16QAM	1	24	23.50	23.28	23.78	23	2
5	16QAM	12	0	22.53	22.44	22.29		
5	16QAM	12	7	22.50	22.51	22.50		
5	16QAM	12	13	22.49	22.49	22.48	23	2
5	16QAM	25	0	22.44	22.46	22.45		
5	64QAM	1	0	22.22	22.22	22.22		
5	64QAM	1	12	22.28	22.25	22.18	23	2
5	64QAM	1	24	22.25	22.21	22.25		
5	64QAM	12	0	21.20	21.19	21.13		
5	64QAM	12	7	21.22	21.18	21.17	22	3
5	64QAM	12	13	21.17	21.17	21.15		
5	64QAM	25	0	21.12	21.12	21.09		

<LTE Band 14>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23330				
Frequency (MHz)				793				
10	QPSK	1	0		24.17		25	0
10	QPSK	1	25		24.29			
10	QPSK	1	49		24.20			
10	QPSK	25	0		23.83		24	1
10	QPSK	25	12		23.86			
10	QPSK	25	25		23.79			
10	QPSK	50	0		23.84		24	1
10	16QAM	1	0		23.65			
10	16QAM	1	25		23.51			
10	16QAM	1	49		23.37		23	2
10	16QAM	25	0		22.30			
10	16QAM	25	12		22.33			
10	16QAM	25	25		22.36		23	2
10	16QAM	50	0		22.43			
10	64QAM	1	0		22.07			
10	64QAM	1	25		22.21		23	2
10	64QAM	1	49		22.03			
10	64QAM	25	0		21.09		22	3
10	64QAM	25	12		21.11			
10	64QAM	25	25		21.02			
10	64QAM	50	0		21.07			

Channel				23305	23330	23355	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				790.5	793	795.5		
5	QPSK	1	0	24.20	24.27	24.25	25	0
5	QPSK	1	12	24.19	24.27	24.24		
5	QPSK	1	24	24.24	24.24	24.22		
5	QPSK	12	0	23.73	23.82	23.78	24	1
5	QPSK	12	7	23.89	23.82	23.82		
5	QPSK	12	13	23.84	23.81	23.76		
5	QPSK	25	0	23.85	23.84	23.80	24	1
5	16QAM	1	0	23.41	23.38	23.80		
5	16QAM	1	12	23.10	23.40	23.79		
5	16QAM	1	24	23.47	23.13	23.52	23	2
5	16QAM	12	0	22.19	22.35	22.34		
5	16QAM	12	7	22.43	22.49	22.41		
5	16QAM	12	13	22.36	22.43	22.33	23	2
5	16QAM	25	0	22.44	22.32	22.37		
5	64QAM	1	0	22.06	22.12	22.14		
5	64QAM	1	12	22.08	22.16	22.12	23	2
5	64QAM	1	24	22.15	22.14	22.02		
5	64QAM	12	0	20.98	21.09	21.08		
5	64QAM	12	7	21.11	21.12	21.07	22	3
5	64QAM	12	13	21.11	21.05	21.01		
5	64QAM	25	0	21.08	21.06	20.99		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	24.18	24.25	24.11	25	0
20	QPSK	1	49	24.13	24.08	24.05		
20	QPSK	1	99	23.96	23.97	23.90		
20	QPSK	50	0	23.71	23.76	23.66	24	1
20	QPSK	50	24	23.70	23.71	23.64		
20	QPSK	50	50	23.61	23.65	23.57		
20	QPSK	100	0	23.63	23.64	23.62	24	1
20	16QAM	1	0	23.56	23.22	23.47		
20	16QAM	1	49	23.54	23.36	23.23		
20	16QAM	1	99	23.04	23.00	23.08	23	2
20	16QAM	50	0	22.13	22.08	22.17		
20	16QAM	50	24	22.03	22.13	22.12		
20	16QAM	50	50	22.01	21.98	21.99	23	2
20	16QAM	100	0	22.05	22.00	22.05		
20	64QAM	1	0	22.14	22.11	22.10		
20	64QAM	1	49	22.02	22.10	22.03	23	2
20	64QAM	1	99	21.98	21.91	21.82		
20	64QAM	50	0	20.97	20.92	20.90		
20	64QAM	50	24	20.95	20.94	20.90	22	3
20	64QAM	50	50	20.86	20.83	20.82		
20	64QAM	100	0	20.93	20.86	20.84		



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Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	24.15	24.11	24.10	25	0
15	QPSK	1	37	24.12	24.07	24.04		
15	QPSK	1	74	24.00	23.97	23.91		
15	QPSK	36	0	23.69	23.66	23.64	24	1
15	QPSK	36	20	23.75	23.69	23.63		
15	QPSK	36	39	23.65	23.61	23.55		
15	QPSK	75	0	23.65	23.64	23.59	24	1
15	16QAM	1	0	23.14	23.19	23.56		
15	16QAM	1	37	23.13	23.26	23.61		
15	16QAM	1	74	22.80	22.96	23.02	23	2
15	16QAM	36	0	22.09	22.06	22.07		
15	16QAM	36	20	22.06	22.12	22.12		
15	16QAM	36	39	22.09	21.95	22.03	23	2
15	16QAM	75	0	22.09	22.06	22.03		
15	64QAM	1	0	22.16	22.09	22.09		
15	64QAM	1	37	22.14	22.07	22.05	23	2
15	64QAM	1	74	22.01	21.98	21.83		
15	64QAM	36	0	21.01	20.96	20.96		
15	64QAM	36	20	21.02	20.97	20.99	22	3
15	64QAM	36	39	20.94	20.88	20.86		
15	64QAM	75	0	20.97	20.90	20.91		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	24.08	24.04	24.10	25	0
10	QPSK	1	25	24.16	24.13	24.03		
10	QPSK	1	49	24.15	24.09	23.94		
10	QPSK	25	0	23.74	23.68	23.65	24	1
10	QPSK	25	12	23.76	23.69	23.65		
10	QPSK	25	25	23.65	23.62	23.61		
10	QPSK	50	0	23.71	23.65	23.61	24	1
10	16QAM	1	0	23.62	23.32	23.36		
10	16QAM	1	25	23.54	23.22	23.14		
10	16QAM	1	49	23.48	23.08	22.96	23	2
10	16QAM	25	0	22.07	22.10	22.10		
10	16QAM	25	12	22.03	22.08	22.02		
10	16QAM	25	25	21.98	21.96	22.00	23	2
10	16QAM	50	0	22.12	22.07	22.17		
10	64QAM	1	0	22.19	22.20	22.09		
10	64QAM	1	25	22.09	22.12	22.03	23	2
10	64QAM	1	49	22.05	22.04	21.88		
10	64QAM	25	0	20.92	20.99	20.93		
10	64QAM	25	12	20.92	20.96	20.90	22	3
10	64QAM	25	25	20.85	20.92	20.86		
10	64QAM	50	0	20.89	20.94	20.91		

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Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	24.00	24.11	24.05	25	0
5	QPSK	1	12	24.00	24.13	24.05		
5	QPSK	1	24	24.11	24.05	23.99		
5	QPSK	12	0	23.73	23.64	23.59	24	1
5	QPSK	12	7	23.74	23.70	23.62		
5	QPSK	12	13	23.71	23.62	23.58		
5	QPSK	25	0	23.71	23.65	23.61	24	1
5	16QAM	1	0	23.22	23.04	23.31		
5	16QAM	1	12	23.16	23.12	23.10		
5	16QAM	1	24	23.40	23.45	23.21	23	2
5	16QAM	12	0	22.09	22.11	22.04		
5	16QAM	12	7	22.14	22.12	22.03		
5	16QAM	12	13	22.05	22.02	22.02	23	2
5	16QAM	25	0	22.10	22.00	21.99		
5	64QAM	1	0	22.13	22.11	22.09		
5	64QAM	1	12	22.15	22.09	21.92	23	2
5	64QAM	1	24	22.04	22.05	21.86		
5	64QAM	12	0	20.93	21.01	20.93		
5	64QAM	12	7	21.08	21.01	20.91	22	3
5	64QAM	12	13	21.01	20.99	20.89		
5	64QAM	25	0	20.97	20.93	20.84		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	24.17	24.11	24.01	25	0
3	QPSK	1	8	24.17	24.11	24.01		
3	QPSK	1	14	24.16	24.05	24.01		
3	QPSK	8	0	23.71	23.63	23.55	24	1
3	QPSK	8	4	23.75	23.69	23.50		
3	QPSK	8	7	23.70	23.61	23.44		
3	QPSK	15	0	23.72	23.63	23.52	24	1
3	16QAM	1	0	23.49	22.98	23.05		
3	16QAM	1	8	23.27	23.37	23.38		
3	16QAM	1	14	23.13	23.40	22.96	23	2
3	16QAM	8	0	22.10	22.06	22.12		
3	16QAM	8	4	22.25	22.02	22.12		
3	16QAM	8	7	22.00	22.00	22.00	23	2
3	16QAM	15	0	22.11	22.09	21.99		
3	64QAM	1	0	22.14	22.08	21.99		
3	64QAM	1	8	22.07	22.08	21.91	23	2
3	64QAM	1	14	22.06	22.07	21.87		
3	64QAM	8	0	21.05	21.01	20.88		
3	64QAM	8	4	21.07	21.02	20.92	22	3
3	64QAM	8	7	21.04	20.95	20.90		
3	64QAM	15	0	21.00	20.90	20.83		

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Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	24.13	24.05	23.94	25	0
1.4	QPSK	1	3	24.09	24.12	24.03		
1.4	QPSK	1	5	24.13	24.06	23.88		
1.4	QPSK	3	0	23.67	23.58	23.41		
1.4	QPSK	3	1	23.73	23.64	23.44		
1.4	QPSK	3	3	23.68	23.57	23.37		
1.4	QPSK	6	0	23.67	23.59	23.43	24	1
1.4	16QAM	1	0	23.10	22.87	23.25	24	1
1.4	16QAM	1	3	23.16	23.42	23.07		
1.4	16QAM	1	5	23.05	22.91	22.94		
1.4	16QAM	3	0	22.99	22.83	22.99		
1.4	16QAM	3	1	23.04	23.00	22.97		
1.4	16QAM	3	3	23.18	23.05	23.00		
1.4	16QAM	6	0	22.07	22.02	21.94	23	2
1.4	64QAM	1	0	22.05	21.97	21.90	23	2
1.4	64QAM	1	3	22.08	22.02	21.86		
1.4	64QAM	1	5	21.98	21.96	21.84		
1.4	64QAM	3	0	21.99	22.00	21.85		
1.4	64QAM	3	1	22.06	22.02	21.89		
1.4	64QAM	3	3	21.99	21.97	21.85		
1.4	64QAM	6	0	20.85	20.83	20.78	22	3

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	24.12	24.25	24.07	25	0
15	QPSK	1	37	24.20	24.09	24.08		
15	QPSK	1	74	24.10	24.15	24.08		
15	QPSK	36	0	23.74	23.79	23.60	24	1
15	QPSK	36	20	23.72	23.66	23.58		
15	QPSK	36	39	23.75	23.57	23.60		
15	QPSK	75	0	23.61	23.63	23.52	24	1
15	16QAM	1	0	23.39	23.51	23.50		
15	16QAM	1	37	23.17	22.98	23.37		
15	16QAM	1	74	23.38	23.18	23.69	23	2
15	16QAM	36	0	22.21	22.20	22.21		
15	16QAM	36	20	22.31	22.26	22.33		
15	16QAM	36	39	22.30	22.23	22.26	23	2
15	16QAM	75	0	22.39	22.36	22.16		
15	64QAM	1	0	22.17	22.24	22.09		
15	64QAM	1	37	22.17	22.13	22.26	23	2
15	64QAM	1	74	22.17	22.19	22.11		
15	64QAM	36	0	21.08	21.08	20.94	22	3
15	64QAM	36	20	21.15	20.99	21.08		
15	64QAM	36	39	21.12	20.93	20.95		
15	64QAM	75	0	20.97	20.98	21.04		



Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	24.10	24.01	24.06	25	0
10	QPSK	1	25	24.09	24.07	24.10		
10	QPSK	1	49	24.08	23.97	23.98		
10	QPSK	25	0	23.65	23.67	23.61	24	1
10	QPSK	25	12	23.77	23.65	23.61		
10	QPSK	25	25	23.70	23.58	23.64		
10	QPSK	50	0	23.74	23.62	23.59	24	1
10	16QAM	1	0	23.75	23.51	23.36		
10	16QAM	1	25	23.74	23.48	23.39		
10	16QAM	1	49	23.21	23.43	23.19	23	2
10	16QAM	25	0	22.40	22.16	22.15		
10	16QAM	25	12	22.33	22.20	22.10		
10	16QAM	25	25	22.14	22.18	22.22	23	2
10	16QAM	50	0	22.21	22.16	22.31		
10	64QAM	1	0	22.22	22.04	22.12		
10	64QAM	1	25	22.12	22.13	22.15	23	2
10	64QAM	1	49	21.97	22.14	22.03		
10	64QAM	25	0	21.00	20.86	20.93		
10	64QAM	25	12	21.00	20.87	20.91	22	3
10	64QAM	25	25	20.92	20.93	20.94		
10	64QAM	50	0	20.96	20.84	20.87		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	24.10	24.07	24.11	25	0
5	QPSK	1	12	24.08	24.07	24.05		
5	QPSK	1	24	24.05	24.00	24.01		
5	QPSK	12	0	23.64	23.65	23.66	24	1
5	QPSK	12	7	23.67	23.64	23.68		
5	QPSK	12	13	23.63	23.62	23.60		
5	QPSK	25	0	23.67	23.62	23.65	24	1
5	16QAM	1	0	23.87	23.67	23.63		
5	16QAM	1	12	23.79	23.79	23.43		
5	16QAM	1	24	23.57	23.77	23.04	23	2
5	16QAM	12	0	22.25	22.16	22.26		
5	16QAM	12	7	22.43	22.26	22.27		
5	16QAM	12	13	22.36	22.33	22.30	23	2
5	16QAM	25	0	22.25	22.20	22.15		
5	64QAM	1	0	22.17	22.04	22.16		
5	64QAM	1	12	22.09	22.09	22.07	23	2
5	64QAM	1	24	22.08	22.10	22.03		
5	64QAM	12	0	21.06	20.93	21.06		
5	64QAM	12	7	21.06	20.93	21.03	22	3
5	64QAM	12	13	21.04	21.03	21.02		
5	64QAM	25	0	20.99	20.84	20.94		



Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	24.11	24.07	24.06	25	0
3	QPSK	1	8	24.09	24.02	24.06		
3	QPSK	1	14	24.05	24.02	24.05		
3	QPSK	8	0	23.62	23.59	23.59	24	1
3	QPSK	8	4	23.68	23.62	23.61		
3	QPSK	8	7	23.63	23.59	23.58		
3	QPSK	15	0	23.70	23.63	23.62	24	1
3	16QAM	1	0	23.71	23.42	23.36		
3	16QAM	1	8	23.66	23.92	23.32		
3	16QAM	1	14	23.23	23.46	23.72	23	2
3	16QAM	8	0	22.48	22.20	22.22		
3	16QAM	8	4	22.29	22.31	22.36		
3	16QAM	8	7	22.21	22.38	22.33	23	2
3	16QAM	15	0	22.45	22.11	22.23		
3	64QAM	1	0	22.27	21.97	22.02		
3	64QAM	1	8	22.13	22.11	22.01	23	2
3	64QAM	1	14	22.09	22.09	22.01		
3	64QAM	8	0	21.12	20.92	20.97		
3	64QAM	8	4	21.13	20.92	21.04	22	3
3	64QAM	8	7	21.12	21.03	21.01		
3	64QAM	15	0	20.97	20.83	20.94		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	24.03	23.99	23.97	25	0
1.4	QPSK	1	3	24.13	24.02	24.03		
1.4	QPSK	1	5	24.00	23.96	23.92		
1.4	QPSK	3	0	23.57	23.53	23.52		
1.4	QPSK	3	1	23.62	23.57	23.56		
1.4	QPSK	3	3	23.60	23.55	23.53	24	1
1.4	QPSK	6	0	23.60	23.57	23.57		
1.4	16QAM	1	0	23.40	23.54	23.22	24	1
1.4	16QAM	1	3	23.24	23.03	23.54		
1.4	16QAM	1	5	23.32	23.64	23.23		
1.4	16QAM	3	0	22.97	22.96	23.17		
1.4	16QAM	3	1	23.24	23.24	23.19		
1.4	16QAM	3	3	23.33	23.27	23.21	23	2
1.4	16QAM	6	0	22.21	22.15	22.30		
1.4	64QAM	1	0	22.05	21.96	21.95	23	2
1.4	64QAM	1	3	22.05	21.99	22.02		
1.4	64QAM	1	5	22.00	21.92	21.96		
1.4	64QAM	3	0	22.05	22.00	21.97		
1.4	64QAM	3	1	22.05	22.02	22.02		
1.4	64QAM	3	3	22.04	21.97	21.98	22	3
1.4	64QAM	6	0	20.89	20.83	20.84		

<LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	23.89	23.86	23.92	25	0
20	QPSK	1	49	23.98	24.05	23.90		
20	QPSK	1	99	23.79	23.80	23.70		
20	QPSK	50	0	23.49	23.58	23.30	24	1
20	QPSK	50	24	23.42	23.36	23.22		
20	QPSK	50	50	23.40	23.30	23.26		
20	QPSK	100	0	23.45	23.51	23.24	24	1
20	16QAM	1	0	22.71	22.91	23.09		
20	16QAM	1	49	23.15	23.31	22.75		
20	16QAM	1	99	22.72	22.50	22.88	23	2
20	16QAM	50	0	21.72	21.68	21.67		
20	16QAM	50	24	21.72	21.66	21.66		
20	16QAM	50	50	21.75	21.56	21.78	23	2
20	16QAM	100	0	21.65	21.65	21.61		
20	64QAM	1	0	21.58	21.67	21.54		
20	64QAM	1	49	21.71	21.77	21.74	23	2
20	64QAM	1	99	21.53	21.58	21.58		
20	64QAM	50	0	20.50	20.57	20.45	22	3
20	64QAM	50	24	20.46	20.50	20.42		
20	64QAM	50	50	20.42	20.42	20.43		
20	64QAM	100	0	20.44	20.50	20.42		



Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	23.88	23.85	23.76	25	0
15	QPSK	1	37	24.02	23.97	23.90		
15	QPSK	1	74	23.77	23.73	23.74		
15	QPSK	36	0	23.29	23.37	23.20	24	1
15	QPSK	36	20	23.35	23.41	23.35		
15	QPSK	36	39	23.24	23.26	23.20		
15	QPSK	75	0	23.28	23.26	23.16	24	1
15	16QAM	1	0	22.96	23.22	23.01		
15	16QAM	1	37	22.89	23.35	23.27		
15	16QAM	1	74	22.78	22.62	23.18	23	2
15	16QAM	36	0	21.73	21.60	21.60		
15	16QAM	36	20	21.69	21.68	21.72		
15	16QAM	36	39	21.60	21.50	21.64	23	2
15	16QAM	75	0	21.61	21.63	21.57		
15	64QAM	1	0	21.49	21.68	21.52		
15	64QAM	1	37	21.66	21.79	21.77	23	2
15	64QAM	1	74	21.57	21.55	21.62		
15	64QAM	36	0	20.44	20.52	20.40		
15	64QAM	36	20	20.50	20.57	20.56	22	3
15	64QAM	36	39	20.40	20.41	20.44		
15	64QAM	75	0	20.40	20.45	20.32		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	23.89	23.80	23.84	25	0
10	QPSK	1	25	23.96	23.88	23.81		
10	QPSK	1	49	23.76	23.74	23.70		
10	QPSK	25	0	23.40	23.35	23.35	24	1
10	QPSK	25	12	23.40	23.34	23.29		
10	QPSK	25	25	23.33	23.28	23.27		
10	QPSK	50	0	23.37	23.32	23.32	24	1
10	16QAM	1	0	22.92	23.15	22.91		
10	16QAM	1	25	22.80	23.04	22.93		
10	16QAM	1	49	22.62	23.04	22.84	23	2
10	16QAM	25	0	21.61	21.67	21.81		
10	16QAM	25	12	21.75	21.59	21.71		
10	16QAM	25	25	21.72	21.67	21.69	23	2
10	16QAM	50	0	21.74	21.73	21.65		
10	64QAM	1	0	21.51	21.67	21.72		
10	64QAM	1	25	21.59	21.70	21.66	23	2
10	64QAM	1	49	21.50	21.50	21.57		
10	64QAM	25	0	20.48	20.51	20.49		
10	64QAM	25	12	20.49	20.51	20.47	22	3
10	64QAM	25	25	20.45	20.44	20.42		
10	64QAM	50	0	20.49	20.47	20.46		



Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	23.71	23.65	23.76	25	0
5	QPSK	1	12	23.99	23.90	23.78		
5	QPSK	1	24	23.70	23.67	23.60		
5	QPSK	12	0	23.35	23.35	23.28	24	1
5	QPSK	12	7	23.41	23.43	23.33		
5	QPSK	12	13	23.31	23.31	23.22		
5	QPSK	25	0	23.36	23.31	23.26	24	1
5	16QAM	1	0	22.76	22.88	22.92		
5	16QAM	1	12	22.77	22.69	22.82		
5	16QAM	1	24	22.58	22.65	22.69	23	2
5	16QAM	12	0	21.80	21.67	21.66		
5	16QAM	12	7	21.75	21.74	21.85		
5	16QAM	12	13	21.68	21.65	21.77	23	2
5	16QAM	25	0	21.71	21.57	21.69		
5	64QAM	1	0	21.38	21.49	21.61		
5	64QAM	1	12	21.57	21.70	21.69	23	2
5	64QAM	1	24	21.39	21.47	21.49		
5	64QAM	12	0	20.49	20.54	20.50		
5	64QAM	12	7	20.56	20.61	20.58	22	3
5	64QAM	12	13	20.45	20.46	20.45		
5	64QAM	25	0	20.45	20.45	20.43		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	23.79	23.67	23.78	25	0
3	QPSK	1	8	23.88	23.88	23.81		
3	QPSK	1	14	23.85	23.73	23.63		
3	QPSK	8	0	23.39	23.35	23.25	24	1
3	QPSK	8	4	23.45	23.44	23.35		
3	QPSK	8	7	23.46	23.37	23.27		
3	QPSK	15	0	23.51	23.36	23.31	24	1
3	16QAM	1	0	22.63	22.84	22.73		
3	16QAM	1	8	23.04	22.92	23.32		
3	16QAM	1	14	22.58	22.97	22.62	23	2
3	16QAM	8	0	21.63	21.58	21.72		
3	16QAM	8	4	21.68	21.81	21.89		
3	16QAM	8	7	21.73	21.66	21.78	23	2
3	16QAM	15	0	21.76	21.73	21.76		
3	64QAM	1	0	21.41	21.50	21.62		
3	64QAM	1	8	21.51	21.71	21.65	23	2
3	64QAM	1	14	21.47	21.54	21.55		
3	64QAM	8	0	20.41	20.57	20.53		
3	64QAM	8	4	20.46	20.60	20.56	22	3
3	64QAM	8	7	20.50	20.56	20.51		
3	64QAM	15	0	20.51	20.51	20.46		

Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	23.81	23.81	23.81	25	0
1.4	QPSK	1	3	23.90	23.91	23.81		
1.4	QPSK	1	5	23.80	23.77	23.67		
1.4	QPSK	3	0	23.37	23.36	23.29		
1.4	QPSK	3	1	23.43	23.39	23.32		
1.4	QPSK	3	3	23.34	23.36	23.28		
1.4	QPSK	6	0	23.30	23.35	23.30	24	1
1.4	16QAM	1	0	22.60	23.10	22.88	24	1
1.4	16QAM	1	3	22.96	22.96	22.91		
1.4	16QAM	1	5	22.72	22.70	22.95		
1.4	16QAM	3	0	22.62	22.72	22.76		
1.4	16QAM	3	1	22.59	22.74	22.81		
1.4	16QAM	3	3	22.65	22.73	22.59		
1.4	16QAM	6	0	21.70	21.69	21.74	23	2
1.4	64QAM	1	0	21.47	21.62	21.62	23	2
1.4	64QAM	1	3	21.49	21.71	21.74		
1.4	64QAM	1	5	21.40	21.55	21.59		
1.4	64QAM	3	0	21.42	21.60	21.56		
1.4	64QAM	3	1	21.48	21.65	21.63		
1.4	64QAM	3	3	21.45	21.60	21.61		
1.4	64QAM	6	0	20.38	20.48	20.55	22	3



<Reduced Power Mode for Hotspot On>

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.10	22.17	22.03	23	0
20	QPSK	1	49	22.01	22.02	21.96		
20	QPSK	1	99	21.91	21.93	21.88		
20	QPSK	50	0	21.58	21.61	21.49	22	1
20	QPSK	50	24	21.51	21.59	21.45		
20	QPSK	50	50	21.48	21.52	21.37		
20	QPSK	100	0	21.55	21.56	21.43		
20	16QAM	1	0	21.86	21.88	21.71	22	1
20	16QAM	1	49	21.89	21.74	21.81		
20	16QAM	1	99	21.82	21.79	21.75		
20	16QAM	50	0	21.67	21.68	21.52	22	1
20	16QAM	50	24	21.69	21.65	21.54		
20	16QAM	50	50	21.70	21.58	21.62		
20	16QAM	100	0	21.65	21.62	21.51		
20	64QAM	1	0	22.09	22.13	21.95	23	0
20	64QAM	1	49	22.10	22.01	22.11		
20	64QAM	1	99	22.08	22.05	21.99		
20	64QAM	50	0	21.04	21.19	21.09	23	0
20	64QAM	50	24	21.05	21.13	21.06		
20	64QAM	50	50	21.06	21.13	21.10		
20	64QAM	100	0	21.03	21.16	21.03		



Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	21.98	21.92	21.90	23	0
15	QPSK	1	37	22.04	21.92	21.98		
15	QPSK	1	74	21.89	21.94	21.89		
15	QPSK	36	0	21.58	21.48	21.42	22	1
15	QPSK	36	20	21.61	21.59	21.54		
15	QPSK	36	39	21.50	21.50	21.49		
15	QPSK	75	0	21.54	21.57	21.43	22	1
15	16QAM	1	0	21.83	21.74	21.70		
15	16QAM	1	37	21.86	21.81	21.84		
15	16QAM	1	74	21.76	21.76	21.77	22	1
15	16QAM	36	0	21.69	21.58	21.52		
15	16QAM	36	20	21.70	21.67	21.68		
15	16QAM	36	39	21.56	21.59	21.62	22	1
15	16QAM	75	0	21.66	21.64	21.52		
15	64QAM	1	0	21.98	22.02	21.99		
15	64QAM	1	37	22.03	22.02	22.09	23	0
15	64QAM	1	74	21.91	22.01	21.99		
15	64QAM	36	0	21.14	21.12	21.04		
15	64QAM	36	20	21.14	21.25	21.17	23	0
15	64QAM	36	39	21.06	21.14	21.13		
15	64QAM	75	0	21.07	21.19	21.05		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.09	22.07	21.99	23	0
10	QPSK	1	25	22.09	21.95	21.99		
10	QPSK	1	49	22.07	22.03	21.89		
10	QPSK	25	0	21.61	21.49	21.54	22	1
10	QPSK	25	12	21.64	21.63	21.54		
10	QPSK	25	25	21.53	21.55	21.47		
10	QPSK	50	0	21.60	21.60	21.49	22	1
10	16QAM	1	0	21.94	21.85	21.83		
10	16QAM	1	25	21.92	21.80	21.90		
10	16QAM	1	49	21.87	21.83	21.75	22	1
10	16QAM	25	0	21.72	21.57	21.62		
10	16QAM	25	12	21.67	21.66	21.64		
10	16QAM	25	25	21.65	21.60	21.58	22	1
10	16QAM	50	0	21.65	21.69	21.65		
10	64QAM	1	0	22.09	22.16	22.07		
10	64QAM	1	25	22.12	22.06	22.14	23	0
10	64QAM	1	49	22.03	22.07	21.97		
10	64QAM	25	0	21.15	21.10	21.17		
10	64QAM	25	12	21.13	21.22	21.15	23	0
10	64QAM	25	25	21.06	21.14	21.07		
10	64QAM	50	0	21.11	21.19	21.12		

Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.00	21.94	21.98	23	0
5	QPSK	1	12	22.00	21.95	21.98		
5	QPSK	1	24	22.02	21.97	21.91		
5	QPSK	12	0	21.54	21.49	21.52	22	1
5	QPSK	12	7	21.52	21.47	21.54		
5	QPSK	12	13	21.59	21.57	21.50		
5	QPSK	25	0	21.58	21.58	21.47	22	1
5	16QAM	1	0	21.84	21.77	21.85		
5	16QAM	1	12	21.84	21.81	21.86		
5	16QAM	1	24	21.84	21.79	21.73	22	1
5	16QAM	12	0	21.60	21.60	21.65		
5	16QAM	12	7	21.51	21.57	21.67		
5	16QAM	12	13	21.65	21.62	21.62	22	1
5	16QAM	25	0	21.66	21.61	21.57		
5	64QAM	1	0	22.05	22.01	22.09		
5	64QAM	1	12	22.01	22.05	22.08	23	0
5	64QAM	1	24	21.95	22.08	21.95		
5	64QAM	12	0	21.05	21.15	21.17		
5	64QAM	12	7	21.09	21.13	21.19	23	0
5	64QAM	12	13	21.14	21.19	21.14		
5	64QAM	25	0	21.09	21.14	21.10		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	21.89	21.91	21.96	23	0
3	QPSK	1	8	21.98	22.05	22.06		
3	QPSK	1	14	21.82	22.00	21.93		
3	QPSK	8	0	21.45	21.47	21.51	22	1
3	QPSK	8	4	21.46	21.49	21.53		
3	QPSK	8	7	21.39	21.59	21.50		
3	QPSK	15	0	21.40	21.56	21.48	22	1
3	16QAM	1	0	21.71	21.77	21.86		
3	16QAM	1	8	21.79	21.89	21.95		
3	16QAM	1	14	21.65	21.82	21.72	22	1
3	16QAM	8	0	21.55	21.60	21.64		
3	16QAM	8	4	21.58	21.63	21.68		
3	16QAM	8	7	21.49	21.66	21.62	22	1
3	16QAM	15	0	21.51	21.64	21.64		
3	64QAM	1	0	21.94	21.97	22.05		
3	64QAM	1	8	21.93	22.04	22.09	23	0
3	64QAM	1	14	21.86	22.07	21.98		
3	64QAM	8	0	21.03	21.06	21.05		
3	64QAM	8	4	21.05	21.04	21.02	23	0
3	64QAM	8	7	21.05	21.02	21.06		
3	64QAM	15	0	21.02	21.08	21.05		

Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	21.83	21.87	21.88	23	0
1.4	QPSK	1	3	21.93	21.92	21.96		
1.4	QPSK	1	5	21.79	21.87	21.88		
1.4	QPSK	3	0	21.40	21.41	21.45		
1.4	QPSK	3	1	21.41	21.45	21.46		
1.4	QPSK	3	3	21.42	21.44	21.50		
1.4	QPSK	6	0	21.38	21.42	21.41	22	1
1.4	16QAM	1	0	21.67	21.72	21.77	22	1
1.4	16QAM	1	3	21.73	21.81	21.83		
1.4	16QAM	1	5	21.68	21.75	21.73		
1.4	16QAM	3	0	21.46	21.46	21.53		
1.4	16QAM	3	1	21.49	21.53	21.61		
1.4	16QAM	3	3	21.49	21.51	21.58		
1.4	16QAM	6	0	21.50	21.54	21.62	22	1
1.4	64QAM	1	0	21.91	22.00	22.03	23	0
1.4	64QAM	1	3	21.93	22.07	22.03		
1.4	64QAM	1	5	21.85	21.94	21.94		
1.4	64QAM	3	0	21.88	21.97	21.98		
1.4	64QAM	3	1	21.98	22.02	22.04		
1.4	64QAM	3	3	21.90	21.95	21.95		
1.4	64QAM	6	0	21.08	21.06	21.02	23	0

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	18.70	18.77	18.77	20	0
20	QPSK	1	49	18.70	18.83	18.84		
20	QPSK	1	99	18.79	18.97	18.96		
20	QPSK	50	0	18.24	18.42	18.32	19	1
20	QPSK	50	24	18.30	18.48	18.37		
20	QPSK	50	50	18.31	18.50	18.45		
20	QPSK	100	0	18.29	18.45	18.43	19	1
20	16QAM	1	0	18.53	18.57	18.59		
20	16QAM	1	49	18.51	18.65	18.74		
20	16QAM	1	99	18.60	18.73	18.79	19	1
20	16QAM	50	0	18.31	18.43	18.50		
20	16QAM	50	24	18.37	18.51	18.57		
20	16QAM	50	50	18.36	18.53	18.57	19	1
20	16QAM	100	0	18.31	18.48	18.47		
20	64QAM	1	0	18.62	18.58	18.72	19	1
20	64QAM	1	49	18.66	18.68	18.79		
20	64QAM	1	99	18.66	18.77	18.88		
20	64QAM	50	0	18.52	18.56	18.66	19	1
20	64QAM	50	24	18.56	18.63	18.71		
20	64QAM	50	50	18.57	18.67	18.75		
20	64QAM	100	0	18.51	18.61	18.70		



Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	18.73	18.78	18.82	20	0
15	QPSK	1	37	18.68	18.79	18.88		
15	QPSK	1	74	18.77	18.87	18.96		
15	QPSK	36	0	18.22	18.36	18.43	19	1
15	QPSK	36	20	18.27	18.42	18.48		
15	QPSK	36	39	18.27	18.43	18.48		
15	QPSK	75	0	18.24	18.39	18.44	19	1
15	16QAM	1	0	18.57	18.62	18.64		
15	16QAM	1	37	18.53	18.70	18.72		
15	16QAM	1	74	18.67	18.68	18.81	19	1
15	16QAM	36	0	18.32	18.39	18.48		
15	16QAM	36	20	18.34	18.45	18.52		
15	16QAM	36	39	18.33	18.49	18.51	19	1
15	16QAM	75	0	18.30	18.43	18.54		
15	64QAM	1	0	18.68	18.66	18.75		
15	64QAM	1	37	18.65	18.69	18.79	19	1
15	64QAM	1	74	18.73	18.70	18.96		
15	64QAM	36	0	18.45	18.57	18.67		
15	64QAM	36	20	18.55	18.67	18.73	19	1
15	64QAM	36	39	18.57	18.66	18.78		
15	64QAM	75	0	18.49	18.58	18.70		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	18.74	18.79	18.86	20	0
10	QPSK	1	25	18.66	18.84	18.89		
10	QPSK	1	49	18.73	18.80	18.94		
10	QPSK	25	0	18.21	18.40	18.44	19	1
10	QPSK	25	12	18.26	18.44	18.48		
10	QPSK	25	25	18.26	18.43	18.49		
10	QPSK	50	0	18.25	18.40	18.45	19	1
10	16QAM	1	0	18.57	18.57	18.66		
10	16QAM	1	25	18.55	18.61	18.70		
10	16QAM	1	49	18.56	18.58	18.75	19	1
10	16QAM	25	0	18.30	18.39	18.50		
10	16QAM	25	12	18.32	18.48	18.56		
10	16QAM	25	25	18.31	18.48	18.54	19	1
10	16QAM	50	0	18.28	18.45	18.49		
10	64QAM	1	0	18.66	18.67	18.75		
10	64QAM	1	25	18.61	18.68	18.81	19	1
10	64QAM	1	49	18.62	18.66	18.91		
10	64QAM	25	0	18.45	18.52	18.66		
10	64QAM	25	12	18.51	18.61	18.70	19	1
10	64QAM	25	25	18.49	18.62	18.72		
10	64QAM	50	0	18.46	18.56	18.73		

Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	18.73	18.81	18.89	20	0
5	QPSK	1	12	18.69	18.86	18.89		
5	QPSK	1	24	18.67	18.85	18.91		
5	QPSK	12	0	18.20	18.37	18.42	19	1
5	QPSK	12	7	18.21	18.41	18.47		
5	QPSK	12	13	18.20	18.41	18.43		
5	QPSK	25	0	18.21	18.40	18.46	19	1
5	16QAM	1	0	18.59	18.62	18.67		
5	16QAM	1	12	18.49	18.62	18.73		
5	16QAM	1	24	18.54	18.64	18.75	19	1
5	16QAM	12	0	18.28	18.40	18.45		
5	16QAM	12	7	18.29	18.44	18.52		
5	16QAM	12	13	18.29	18.45	18.50	19	1
5	16QAM	25	0	18.26	18.46	18.48		
5	64QAM	1	0	18.70	18.65	18.82		
5	64QAM	1	12	18.57	18.71	18.87	19	1
5	64QAM	1	24	18.61	18.69	18.88		
5	64QAM	12	0	18.51	18.60	18.69		
5	64QAM	12	7	18.51	18.64	18.77	19	1
5	64QAM	12	13	18.50	18.61	18.75		
5	64QAM	25	0	18.48	18.56	18.73		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	22.14	22.22	22.05	23	0
20	QPSK	1	49	22.00	22.10	21.95		
20	QPSK	1	99	21.84	21.89	21.79		
20	QPSK	50	0	21.58	21.63	21.51	22	1
20	QPSK	50	24	21.55	21.58	21.49		
20	QPSK	50	50	21.44	21.50	21.41		
20	QPSK	100	0	21.50	21.53	21.49	22	1
20	16QAM	1	0	21.95	21.85	21.75		
20	16QAM	1	49	21.87	21.85	21.88		
20	16QAM	1	99	21.71	21.71	21.62	22	1
20	16QAM	50	0	21.68	21.62	21.65		
20	16QAM	50	24	21.66	21.69	21.63		
20	16QAM	50	50	21.58	21.59	21.55	22	1
20	16QAM	100	0	21.63	21.62	21.61		
20	64QAM	1	0	22.21	22.10	22.09	23	0
20	64QAM	1	49	22.10	22.12	22.12		
20	64QAM	1	99	21.97	21.94	21.93		
20	64QAM	50	0	21.02	21.08	21.03	23	0
20	64QAM	50	24	21.04	20.99	21.04		
20	64QAM	50	50	21.03	21.05	21.06		
20	64QAM	100	0	20.97	20.91	21.01		



Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	22.04	21.99	21.97	23	0
15	QPSK	1	37	22.01	21.98	21.95		
15	QPSK	1	74	21.85	21.86	21.83		
15	QPSK	36	0	21.57	21.51	21.52	22	1
15	QPSK	36	20	21.56	21.57	21.49		
15	QPSK	36	39	21.50	21.49	21.44		
15	QPSK	75	0	21.54	21.53	21.47	22	1
15	16QAM	1	0	21.88	21.82	21.83		
15	16QAM	1	37	21.86	21.85	21.86		
15	16QAM	1	74	21.69	21.74	21.65	22	1
15	16QAM	36	0	21.71	21.64	21.65		
15	16QAM	36	20	21.65	21.67	21.64		
15	16QAM	36	39	21.58	21.58	21.56	22	1
15	16QAM	75	0	21.61	21.64	21.58		
15	64QAM	1	0	22.15	22.11	22.17		
15	64QAM	1	37	22.14	22.12	22.05	23	0
15	64QAM	1	74	22.00	21.91	21.96		
15	64QAM	36	0	21.05	21.00	21.06		
15	64QAM	36	20	21.03	21.02	21.06	23	0
15	64QAM	36	39	21.04	21.02	21.03		
15	64QAM	75	0	21.06	21.05	21.02		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	22.07	22.11	21.98	23	0
10	QPSK	1	25	21.95	22.01	21.94		
10	QPSK	1	49	21.90	21.98	21.85		
10	QPSK	25	0	21.49	21.55	21.46	22	1
10	QPSK	25	12	21.48	21.56	21.49		
10	QPSK	25	25	21.42	21.50	21.42		
10	QPSK	50	0	21.43	21.52	21.48	22	1
10	16QAM	1	0	21.89	21.94	21.93		
10	16QAM	1	25	21.81	21.86	21.84		
10	16QAM	1	49	21.79	21.84	21.69	22	1
10	16QAM	25	0	21.60	21.68	21.63		
10	16QAM	25	12	21.59	21.66	21.61		
10	16QAM	25	25	21.50	21.60	21.55	22	1
10	16QAM	50	0	21.59	21.62	21.63		
10	64QAM	1	0	22.04	22.19	22.15		
10	64QAM	1	25	22.16	22.06	22.02	23	0
10	64QAM	1	49	22.16	22.11	21.85		
10	64QAM	25	0	21.03	21.06	21.03		
10	64QAM	25	12	21.07	21.08	21.05	23	0
10	64QAM	25	25	21.11	21.09	21.04		
10	64QAM	50	0	21.01	21.03	21.03		



Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	21.94	21.99	21.92	23	0
5	QPSK	1	12	21.97	22.02	21.88		
5	QPSK	1	24	21.87	21.96	21.86		
5	QPSK	12	0	21.52	21.53	21.47	22	1
5	QPSK	12	7	21.50	21.58	21.50		
5	QPSK	12	13	21.47	21.52	21.45		
5	QPSK	25	0	21.46	21.52	21.41	22	1
5	16QAM	1	0	21.75	21.82	21.75		
5	16QAM	1	12	21.77	21.85	21.75		
5	16QAM	1	24	21.72	21.81	21.70	22	1
5	16QAM	12	0	21.61	21.62	21.57		
5	16QAM	12	7	21.60	21.68	21.58		
5	16QAM	12	13	21.55	21.63	21.55	22	1
5	16QAM	25	0	21.53	21.62	21.53		
5	64QAM	1	0	22.14	22.13	22.07	23	0
5	64QAM	1	12	22.14	22.11	21.94		
5	64QAM	1	24	22.11	22.04	21.88		
5	64QAM	12	0	21.04	21.00	21.09	23	0
5	64QAM	12	7	21.05	21.04	20.94		
5	64QAM	12	13	21.06	21.06	21.09		
5	64QAM	25	0	21.05	21.09	21.05	23	0
Channel				26055	26340	26675		
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	21.93	22.00	21.88	23	0
3	QPSK	1	8	22.05	22.10	21.98		
3	QPSK	1	14	21.88	21.97	21.84		
3	QPSK	8	0	21.49	21.52	21.43	22	1
3	QPSK	8	4	21.49	21.56	21.47		
3	QPSK	8	7	21.49	21.53	21.43		
3	QPSK	15	0	21.49	21.53	21.43	22	1
3	16QAM	1	0	21.76	21.81	21.71		
3	16QAM	1	8	21.92	21.99	21.83		
3	16QAM	1	14	21.75	21.82	21.67	22	1
3	16QAM	8	0	21.61	21.67	21.55		
3	16QAM	8	4	21.66	21.70	21.60		
3	16QAM	8	7	21.58	21.67	21.54	22	1
3	16QAM	15	0	21.61	21.65	21.58		
3	64QAM	1	0	22.15	22.08	22.01		
3	64QAM	1	8	22.16	22.14	21.90	23	0
3	64QAM	1	14	22.07	22.03	21.93		
3	64QAM	8	0	21.06	21.03	21.08		
3	64QAM	8	4	21.04	21.02	21.01	23	0
3	64QAM	8	7	21.03	21.06	21.02		
3	64QAM	15	0	21.02	21.04	21.02		

Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	21.98	21.86	21.80	23	0
1.4	QPSK	1	3	22.21	21.95	21.89		
1.4	QPSK	1	5	21.88	21.87	21.79		
1.4	QPSK	3	0	21.41	21.42	21.32		
1.4	QPSK	3	1	21.46	21.47	21.40		
1.4	QPSK	3	3	21.48	21.44	21.39		
1.4	QPSK	6	0	21.40	21.45	21.36	22	1
1.4	16QAM	1	0	21.72	21.75	21.60	22	1
1.4	16QAM	1	3	21.79	21.80	21.68		
1.4	16QAM	1	5	21.71	21.68	21.61		
1.4	16QAM	3	0	21.52	21.54	21.46		
1.4	16QAM	3	1	21.60	21.58	21.50		
1.4	16QAM	3	3	21.54	21.56	21.48		
1.4	16QAM	6	0	21.58	21.59	21.56	22	1
1.4	64QAM	1	0	22.12	22.00	21.92	23	0
1.4	64QAM	1	3	22.11	22.07	21.91		
1.4	64QAM	1	5	22.08	21.98	21.83		
1.4	64QAM	3	0	22.11	22.00	21.86		
1.4	64QAM	3	1	22.14	22.05	21.89		
1.4	64QAM	3	3	22.07	21.99	21.85		
1.4	64QAM	6	0	21.05	21.06	21.04	23	0

<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.

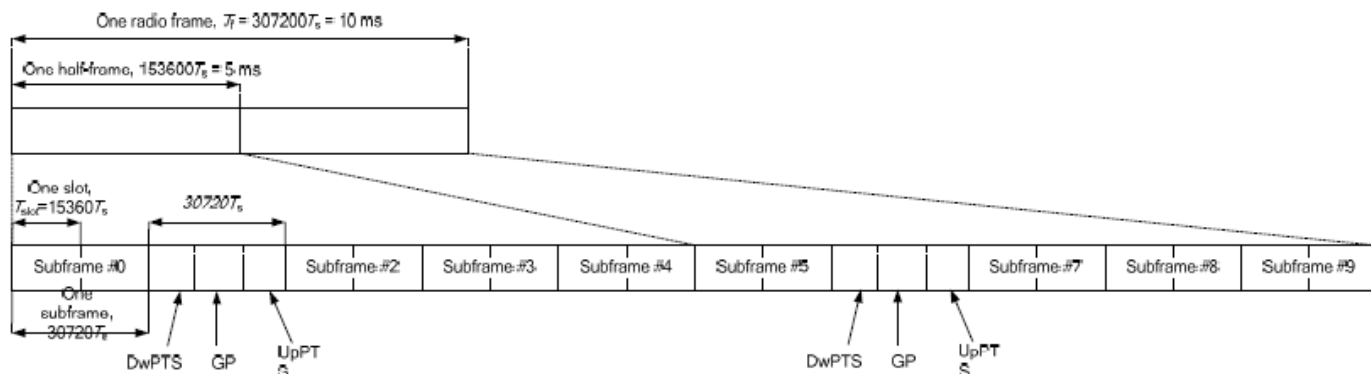


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

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:

For LTE Band 41 Power class 2

- Uplink-downlink configuration: 1. In a half-frame consisted of 5 subframes, uplink operation is in 2 uplink subframes and 1 special subframe.
- special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(2+0.167)/5 = 43.3\%$
- for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(2+0.143)/5 = 42.9\%$
- For TDD LTE SAR measurement, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $43.3\%/42.9\% = 1.009$ 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.

For LTE Band 41 Power class 3

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

The device can adjust uplink/downlink configuration automatically according to the transmitting power class level, as followings:

LTE TDD Band	Power Class level	support uplink/downlink configuration
LTE Band 41	> 23	1,2,3,4,5
	=23	0,1,2,3,4,5,6
	< 23	0,1,2,3,4,5,6

<Full Power Mode>

<LTE Band 41>

Power Class 2:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	25.72	25.92	25.97	25.95	25.89	27	0
20	QPSK	1	49	25.69	25.91	25.91	25.93	25.86		
20	QPSK	1	99	25.76	25.79	25.81	25.91	25.78		
20	QPSK	50	0	25.39	25.54	25.66	25.55	25.65	26	1
20	QPSK	50	24	25.38	25.47	25.41	25.40	25.62		
20	QPSK	50	50	25.34	25.38	25.30	25.29	25.64		
20	QPSK	100	0	25.36	25.37	25.65	25.33	25.60		
20	16QAM	1	0	24.39	24.52	24.56	24.54	24.67	26	1
20	16QAM	1	49	24.26	24.62	24.79	24.70	24.62		
20	16QAM	1	99	24.35	24.65	24.65	24.61	24.50		
20	16QAM	50	0	23.45	23.66	23.49	23.69	23.52	25	2
20	16QAM	50	24	23.35	23.73	23.54	23.65	23.71		
20	16QAM	50	50	23.44	23.75	23.61	23.67	23.68		
20	16QAM	100	0	23.31	23.60	23.53	23.52	23.62		
20	64QAM	1	0	23.40	23.69	23.65	23.89	23.85	25	2
20	64QAM	1	49	23.41	23.83	23.79	23.84	23.80		
20	64QAM	1	99	23.45	23.84	23.80	23.85	23.81		
20	64QAM	50	0	22.46	22.75	22.71	22.89	22.85	24	3
20	64QAM	50	24	22.50	22.82	22.78	22.80	22.76		
20	64QAM	50	50	22.50	22.83	22.79	22.93	22.89		
20	64QAM	100	0	22.47	22.81	22.77	22.92	22.88		



Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	25.80	25.50	25.64	25.63	25.82	27	0
15	QPSK	1	37	25.82	25.56	25.72	25.55	25.93		
15	QPSK	1	74	25.81	25.68	25.66	25.52	25.95		
15	QPSK	36	0	25.38	25.45	25.27	25.53	25.54	26	1
15	QPSK	36	20	25.30	25.40	25.33	25.38	25.54		
15	QPSK	36	39	25.28	25.34	25.30	25.29	25.58		
15	QPSK	75	0	25.32	25.32	25.26	25.27	25.55	26	1
15	16QAM	1	0	24.42	24.67	24.57	24.74	24.68		
15	16QAM	1	37	24.40	24.73	24.80	24.88	24.66		
15	16QAM	1	74	24.40	24.84	24.66	24.63	24.81	25	2
15	16QAM	36	0	23.21	23.53	23.40	23.57	23.55		
15	16QAM	36	20	23.29	23.60	23.54	23.64	23.53		
15	16QAM	36	39	23.21	23.64	23.69	23.63	23.60	25	2
15	16QAM	75	0	23.33	23.65	23.50	23.55	23.58		
15	64QAM	1	0	23.42	23.46	23.70	23.77	23.73		
15	64QAM	1	37	23.50	23.54	23.79	23.86	23.82	25	2
15	64QAM	1	74	23.46	23.50	23.79	23.82	23.78		
15	64QAM	36	0	22.46	22.50	22.70	22.81	22.77		
15	64QAM	36	20	22.42	22.46	22.78	22.81	22.77	24	3
15	64QAM	36	39	22.46	22.50	22.76	22.88	22.84		
15	64QAM	75	0	22.45	22.49	22.73	22.85	22.81		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	25.78	25.46	25.61	25.51	25.40	27	0
10	QPSK	1	25	25.85	25.52	25.68	25.49	25.87		
10	QPSK	1	49	25.75	25.56	25.71	25.45	25.46		
10	QPSK	25	0	25.38	25.58	25.23	25.36	25.67	26	1
10	QPSK	25	12	25.43	25.67	25.32	25.38	25.56		
10	QPSK	25	25	25.30	25.66	25.25	25.43	25.68		
10	QPSK	50	0	25.32	25.53	25.28	25.36	25.71	26	1
10	16QAM	1	0	24.43	24.48	24.61	24.65	24.79		
10	16QAM	1	25	24.38	24.40	24.85	24.60	24.71		
10	16QAM	1	49	24.42	24.57	24.71	24.64	25.16	25	2
10	16QAM	25	0	23.37	23.65	23.66	23.61	23.95		
10	16QAM	25	12	23.34	23.71	23.58	23.70	23.79		
10	16QAM	25	25	23.36	23.71	23.53	23.64	23.72	25	2
10	16QAM	50	0	23.17	23.65	23.69	23.57	23.87		
10	64QAM	1	0	23.49	23.74	23.70	23.53	23.98		
10	64QAM	1	25	23.51	23.87	23.83	23.55	23.80	25	2
10	64QAM	1	49	23.44	23.87	23.83	23.48	23.93		
10	64QAM	25	0	22.57	22.83	22.79	22.61	23.00		
10	64QAM	25	12	22.63	22.90	22.86	22.67	22.92	24	3
10	64QAM	25	25	22.53	22.91	22.87	22.57	23.06		
10	64QAM	50	0	22.43	22.78	22.74	22.47	22.96		

Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	25.77	25.54	25.61	25.54	25.85	27	0
5	QPSK	1	12	25.83	25.53	25.70	25.45	25.91		
5	QPSK	1	24	25.77	25.52	25.68	25.48	25.87		
5	QPSK	12	0	25.38	25.38	25.26	25.33	25.52	26	1
5	QPSK	12	7	25.41	25.31	25.26	25.29	25.57		
5	QPSK	12	13	25.40	25.41	25.26	25.28	25.58		
5	QPSK	25	0	25.39	25.19	25.24	25.20	25.53	26	1
5	16QAM	1	0	24.30	24.71	24.65	24.78	24.76		
5	16QAM	1	12	24.72	24.72	24.74	24.87	24.83		
5	16QAM	1	24	24.47	24.75	24.69	24.81	24.84	25	2
5	16QAM	12	0	23.30	23.64	23.53	23.59	23.49		
5	16QAM	12	7	23.43	23.68	23.51	23.58	23.56		
5	16QAM	12	13	23.34	23.66	23.53	23.59	23.79	25	2
5	16QAM	25	0	23.37	23.65	23.55	23.56	23.60		
5	64QAM	1	0	23.43	23.47	23.69	23.85	23.81		
5	64QAM	1	12	23.50	23.54	23.81	23.88	23.84	25	2
5	64QAM	1	24	23.54	23.58	23.84	23.88	23.84		
5	64QAM	12	0	22.56	22.60	22.78	22.83	22.79		
5	64QAM	12	7	22.59	22.63	22.81	22.87	22.83	24	3
5	64QAM	12	13	22.59	22.63	22.81	22.85	22.81		
5	64QAM	25	0	22.57	22.61	22.79	22.87	22.83		

Power Class 3:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.19	22.17	22.25	21.73	22.09	23	0
20	QPSK	1	49	22.15	22.16	22.21	21.82	22.06		
20	QPSK	1	99	21.92	22.08	22.03	22.01	21.91		
20	QPSK	50	0	21.91	21.99	22.10	22.01	21.90	22.5	0.5
20	QPSK	50	24	21.86	22.06	21.95	21.99	21.85		
20	QPSK	50	50	21.83	22.09	21.93	22.04	21.76		
20	QPSK	100	0	21.82	21.85	21.89	21.78	21.73		
20	16QAM	1	0	22.03	22.09	21.86	22.24	21.68	22.5	0.5
20	16QAM	1	49	21.94	22.17	21.99	22.09	22.22		
20	16QAM	1	99	22.00	22.21	22.02	22.09	22.14		
20	16QAM	50	0	21.95	21.98	21.95	21.81	21.90	22	1
20	16QAM	50	24	21.92	21.94	22.00	21.92	21.96		
20	16QAM	50	50	21.91	21.93	21.94	21.98	21.94		
20	16QAM	100	0	21.98	21.87	21.91	21.93	21.95		
20	64QAM	1	0	21.55	21.61	21.65	21.51	21.68	22	1
20	64QAM	1	49	21.48	21.66	21.70	21.44	21.76		
20	64QAM	1	99	21.57	21.73	21.77	21.53	21.61		
20	64QAM	50	0	20.47	20.41	20.45	20.43	20.36	21	2
20	64QAM	50	24	20.54	20.36	20.40	20.50	20.32		
20	64QAM	50	50	20.50	20.39	20.43	20.46	20.32		
20	64QAM	100	0	20.58	20.31	20.35	20.54	20.38		



FCC SAR Test Report

Report No. : FA850804-04

Channel				39725	40173	40620	41068		Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	21.92	21.99	21.76	21.83	22.01	23	0
15	QPSK	1	37	21.94	22.01	21.80	21.89	22.08		
15	QPSK	1	74	21.95	22.12	21.87	21.97	22.14		
15	QPSK	36	0	21.98	22.05	21.85	21.72	22.15	22.5	0.5
15	QPSK	36	20	21.89	22.11	21.88	21.82	22.17		
15	QPSK	36	39	21.90	22.11	21.91	21.81	22.21		
15	QPSK	75	0	21.89	22.12	21.91	21.74	22.18	22.5	0.5
15	16QAM	1	0	22.02	22.19	21.90	21.98	22.15		
15	16QAM	1	37	21.99	22.17	21.99	22.12	22.23		
15	16QAM	1	74	22.06	22.09	22.00	22.15	22.16	22	1
15	16QAM	36	0	21.99	21.90	21.86	21.78	21.97		
15	16QAM	36	20	21.94	21.93	21.97	21.87	21.88		
15	16QAM	36	39	21.95	21.96	21.96	21.93	21.82	22	1
15	16QAM	75	0	21.97	21.96	21.97	21.88	21.85		
15	64QAM	1	0	20.57	20.65	20.69	20.53	20.72		
15	64QAM	1	37	20.60	20.74	20.78	20.56	20.74	22	1
15	64QAM	1	74	20.61	20.77	20.81	20.57	20.80		
15	64QAM	36	0	19.60	19.69	19.73	19.56	19.77		
15	64QAM	36	20	19.54	19.73	19.77	19.50	19.77	21	2
15	64QAM	36	39	19.55	19.76	19.80	19.51	19.79		
15	64QAM	75	0	19.51	19.74	19.78	19.47	19.77		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	21.90	21.93	21.77	21.83	21.96	23	0
10	QPSK	1	25	21.93	21.98	21.86	21.84	22.10		
10	QPSK	1	49	21.86	22.04	21.95	21.94	21.80		
10	QPSK	25	0	21.92	21.87	21.82	21.74	22.15	22.5	0.5
10	QPSK	25	12	21.96	21.92	21.92	21.80	22.20		
10	QPSK	25	25	21.84	21.93	21.92	21.80	22.21		
10	QPSK	50	0	21.87	21.90	21.90	21.78	22.10	22.5	0.5
10	16QAM	1	0	21.97	22.02	21.97	22.07	21.92		
10	16QAM	1	25	21.99	22.03	22.01	22.10	22.07		
10	16QAM	1	49	21.91	22.10	22.06	22.14	21.95	22	1
10	16QAM	25	0	22.00	21.94	21.96	21.91	21.99		
10	16QAM	25	12	22.00	22.00	21.96	21.94	21.95		
10	16QAM	25	25	21.95	22.00	21.78	21.96	21.92	22	1
10	16QAM	50	0	21.91	21.98	21.91	21.88	21.93		
10	64QAM	1	0	20.51	21.08	20.71	20.67	21.12		
10	64QAM	1	25	20.58	20.77	20.78	20.74	20.81	22	1
10	64QAM	1	49	20.50	21.04	20.84	20.80	21.08		
10	64QAM	25	0	19.62	19.92	19.81	19.77	19.96		
10	64QAM	25	12	19.68	19.86	19.81	19.77	19.90	21	2
10	64QAM	25	25	19.57	19.97	19.83	19.79	20.01		
10	64QAM	50	0	19.51	19.91	19.77	19.73	19.95		

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Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	21.86	21.74	21.79	21.94	22.06	23	0
5	QPSK	1	12	21.92	21.75	21.84	21.95	22.07		
5	QPSK	1	24	21.89	21.74	21.84	21.94	22.08		
5	QPSK	12	0	21.95	21.66	21.85	21.86	22.14	22.5	0.5
5	QPSK	12	7	21.98	21.69	21.89	21.89	22.15		
5	QPSK	12	13	22.00	21.69	21.91	21.89	22.13		
5	QPSK	25	0	21.96	21.67	21.90	21.87	22.12	22.5	0.5
5	16QAM	1	0	21.95	21.78	21.89	21.98	22.21		
5	16QAM	1	12	22.01	21.77	21.94	22.07	22.05		
5	16QAM	1	24	22.01	21.75	22.03	22.05	22.16	22	1
5	16QAM	12	0	21.96	21.62	21.91	21.92	21.97		
5	16QAM	12	7	21.99	21.66	21.96	21.96	21.90		
5	16QAM	12	13	21.91	21.67	21.96	21.97	21.81	22	1
5	16QAM	25	0	21.92	21.65	21.99	21.95	21.84		
5	64QAM	1	0	20.52	21.04	20.72	20.68	20.78	22	1
5	64QAM	1	12	20.60	20.73	20.82	20.78	20.79		
5	64QAM	1	24	20.60	21.00	20.82	20.78	20.78		
5	64QAM	12	0	19.60	19.88	19.74	19.70	19.81	21	2
5	64QAM	12	7	19.63	19.82	19.81	19.77	19.80		
5	64QAM	12	13	19.63	19.93	19.83	19.79	19.81		
5	64QAM	25	0	19.60	19.87	19.78	19.74	19.79		

<Reduced Power Mode for Hotspot On>

<LTE Band 41>

Power Class 2:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	21.64	21.57	21.67	21.54	21.56	22	0
20	QPSK	1	49	21.54	21.48	21.55	21.38	21.52		
20	QPSK	1	99	21.56	21.35	21.49	21.30	21.51		
20	QPSK	50	0	21.28	21.39	21.49	21.35	21.48	22	0
20	QPSK	50	24	21.27	21.36	21.40	21.30	21.42		
20	QPSK	50	50	21.17	21.27	21.39	21.25	21.44		
20	QPSK	100	0	21.25	21.34	21.42	21.29	21.30	22	0
20	16QAM	1	0	21.43	21.38	21.43	21.39	21.42		
20	16QAM	1	49	21.42	21.49	21.42	21.47	21.43		
20	16QAM	1	99	21.47	21.54	21.42	21.57	21.41	22	0
20	16QAM	50	0	21.33	21.35	21.22	21.27	21.46		
20	16QAM	50	24	21.32	21.42	21.33	21.29	21.45		
20	16QAM	50	50	21.36	21.47	21.33	21.34	21.42	22	0
20	16QAM	100	0	21.33	21.39	21.41	21.29	21.48		
20	64QAM	1	0	21.56	21.53	21.63	21.67	21.55		
20	64QAM	1	49	21.56	21.45	21.55	21.59	21.49	22	0
20	64QAM	1	99	21.54	21.46	21.56	21.60	21.48		
20	64QAM	50	0	21.55	21.40	21.50	21.54	21.53		
20	64QAM	50	24	21.58	21.48	21.58	21.62	21.55	22	0
20	64QAM	50	50	21.60	21.50	21.60	21.64	21.49		
20	64QAM	100	0	21.53	21.49	21.59	21.63	21.56		



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Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	21.63	21.48	21.64	21.33	21.64	22	0
15	QPSK	1	37	21.64	21.50	21.60	21.40	21.54		
15	QPSK	1	74	21.60	21.63	21.53	21.54	21.58		
15	QPSK	36	0	21.17	21.28	21.03	21.13	21.37	22	0
15	QPSK	36	20	21.25	21.33	21.31	21.19	21.24		
15	QPSK	36	39	21.26	21.32	21.10	21.22	21.21		
15	QPSK	75	0	21.26	21.32	21.12	21.14	21.37	22	0
15	16QAM	1	0	21.24	21.42	21.32	21.42	21.22		
15	16QAM	1	37	21.42	21.46	21.29	21.51	21.39		
15	16QAM	1	74	21.35	21.57	21.33	21.59	21.40	22	0
15	16QAM	36	0	21.38	21.28	21.29	21.22	21.43		
15	16QAM	36	20	21.33	21.37	21.20	21.30	21.34		
15	16QAM	36	39	21.12	21.37	21.19	21.28	21.42	22	0
15	16QAM	75	0	21.15	21.38	21.24	21.28	21.40		
15	64QAM	1	0	21.55	21.48	21.58	21.44	21.54		
15	64QAM	1	37	21.61	21.45	21.55	21.44	21.54	22	0
15	64QAM	1	74	21.65	21.48	21.58	21.51	21.61		
15	64QAM	36	0	21.59	21.41	21.51	21.45	21.55		
15	64QAM	36	20	21.52	21.45	21.55	21.45	21.55	22	0
15	64QAM	36	39	21.56	21.47	21.57	21.53	21.63		
15	64QAM	75	0	21.52	21.44	21.54	21.46	21.56		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	21.50	21.43	21.56	21.33	21.57	22	0
10	QPSK	1	25	21.53	21.46	21.48	21.37	21.55		
10	QPSK	1	49	21.61	21.53	21.56	21.44	21.59		
10	QPSK	25	0	21.18	21.27	21.17	21.12	21.41	22	0
10	QPSK	25	12	21.24	21.33	21.26	21.22	21.26		
10	QPSK	25	25	21.14	21.33	21.17	21.19	21.40		
10	QPSK	50	0	21.26	21.29	21.09	21.19	21.46	22	0
10	16QAM	1	0	21.22	21.43	21.32	21.49	21.45		
10	16QAM	1	25	21.34	21.43	21.43	21.49	21.47		
10	16QAM	1	49	21.24	21.49	21.05	21.55	21.18	22	0
10	16QAM	25	0	21.23	21.34	21.22	21.31	21.49		
10	16QAM	25	12	21.38	21.39	21.21	21.35	21.44		
10	16QAM	25	25	21.22	21.39	21.23	21.33	21.48	22	0
10	16QAM	50	0	21.21	21.38	21.21	21.30	21.33		
10	64QAM	1	0	21.49	21.41	21.51	21.39	21.40		
10	64QAM	1	25	21.53	21.48	21.58	21.43	21.51	22	0
10	64QAM	1	49	21.50	21.51	21.61	21.40	21.38		
10	64QAM	25	0	21.64	21.48	21.58	21.54	21.60		
10	64QAM	25	12	21.66	21.51	21.61	21.56	21.62	22	0
10	64QAM	25	25	21.58	21.54	21.64	21.48	21.50		
10	64QAM	50	0	21.54	21.55	21.65	21.44	21.65		

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Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	21.59	21.40	21.59	21.33	21.64	22	0
5	QPSK	1	12	21.51	21.47	21.53	21.37	21.60		
5	QPSK	1	24	21.53	21.47	21.45	21.35	21.64		
5	QPSK	12	0	21.28	21.28	21.22	21.13	21.28	22	0
5	QPSK	12	7	21.14	21.31	21.09	21.17	21.25		
5	QPSK	12	13	21.22	21.32	21.10	21.22	21.37		
5	QPSK	25	0	21.13	21.27	21.10	21.14	21.36	22	0
5	16QAM	1	0	21.35	21.39	21.25	21.42	21.44		
5	16QAM	1	12	21.43	21.42	21.39	21.50	21.35		
5	16QAM	1	24	21.29	21.46	21.35	21.52	21.46	22	0
5	16QAM	12	0	21.31	21.33	21.19	21.25	21.34		
5	16QAM	12	7	21.36	21.38	21.21	21.31	21.42		
5	16QAM	12	13	21.26	21.36	21.23	21.31	21.43	22	0
5	16QAM	25	0	21.30	21.35	21.19	21.31	21.45		
5	64QAM	1	0	21.49	21.48	21.58	21.39	21.66		
5	64QAM	1	12	21.54	21.54	21.64	21.44	21.60	22	0
5	64QAM	1	24	21.59	21.44	21.54	21.49	21.62		
5	64QAM	12	0	21.59	21.53	21.63	21.49	21.63		
5	64QAM	12	7	21.63	21.51	21.61	21.53	21.60	22	0
5	64QAM	12	13	21.63	21.53	21.63	21.53	21.62		
5	64QAM	25	0	21.62	21.56	21.66	21.52	21.54		

Power Class 3:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	20.36	20.26	20.48	20.37	20.25	21	0
20	QPSK	1	49	20.25	20.21	20.42	20.29	20.23		
20	QPSK	1	99	20.06	20.02	20.09	20.01	20.21		
20	QPSK	50	0	20.18	20.15	20.25	20.12	20.13	20.5	0.5
20	QPSK	50	24	20.03	20.11	20.19	20.07	20.11		
20	QPSK	50	50	20.07	20.10	20.21	20.01	20.18		
20	QPSK	100	0	20.13	20.08	20.18	19.94	20.16		
20	16QAM	1	0	20.32	20.04	20.17	20.10	20.24	20.5	0.5
20	16QAM	1	49	20.26	20.08	20.25	20.01	20.46		
20	16QAM	1	99	20.23	20.19	20.24	20.08	20.35		
20	16QAM	50	0	20.13	19.95	20.20	19.89	20.41	20.5	0.5
20	16QAM	50	24	20.26	20.03	20.28	19.87	20.41		
20	16QAM	50	50	20.27	20.04	20.31	19.93	20.44		
20	16QAM	100	0	20.27	19.99	20.26	19.87	20.42		
20	64QAM	1	0	19.08	19.12	19.15	19.19	19.33	20.5	0.5
20	64QAM	1	49	19.07	19.11	19.28	19.32	19.21		
20	64QAM	1	99	19.11	19.15	19.30	19.34	19.37		
20	64QAM	50	0	19.00	19.04	19.25	19.29	19.35	20.5	0.5
20	64QAM	50	24	19.04	19.08	19.28	19.32	19.31		
20	64QAM	50	50	19.09	19.13	19.33	19.37	19.40		
20	64QAM	100	0	19.03	19.07	19.29	19.33	19.38		



FCC SAR Test Report

Report No. : FA850804-04

Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	20.09	20.02	20.04	19.92	20.25	21	0
15	QPSK	1	37	20.14	19.98	20.08	19.98	20.29		
15	QPSK	1	74	20.11	19.97	20.09	20.07	20.38		
15	QPSK	36	0	20.13	19.85	20.09	19.85	20.32	20.5	0.5
15	QPSK	36	20	20.06	19.83	20.15	19.93	20.38		
15	QPSK	36	39	20.03	19.80	20.16	19.90	20.40		
15	QPSK	75	0	20.19	19.77	20.17	19.87	20.40	20.5	0.5
15	16QAM	1	0	20.34	20.05	20.19	20.05	20.39		
15	16QAM	1	37	20.38	20.00	20.24	20.10	20.39		
15	16QAM	1	74	20.22	19.99	20.23	20.19	20.46	20.5	0.5
15	16QAM	36	0	20.27	20.00	20.13	19.90	20.36		
15	16QAM	36	20	20.23	19.97	20.18	19.97	20.44		
15	16QAM	36	39	20.21	19.95	20.25	19.95	20.45	20.5	0.5
15	16QAM	75	0	20.25	19.86	20.25	19.96	20.45		
15	64QAM	1	0	19.13	19.26	19.22	19.24	19.19		
15	64QAM	1	37	19.12	19.34	19.30	19.35	19.24	20.5	0.5
15	64QAM	1	74	19.17	19.33	19.29	19.39	19.27		
15	64QAM	36	0	19.12	19.24	19.20	19.29	19.21		
15	64QAM	36	20	19.08	19.34	19.30	19.41	19.28	20.5	0.5
15	64QAM	36	39	19.02	19.34	19.30	19.42	19.31		
15	64QAM	75	0	19.04	19.29	19.25	19.29	19.27		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	20.28	20.26	20.39	20.16	20.22	21	0
10	QPSK	1	25	20.28	20.11	20.08	20.01	20.36		
10	QPSK	1	49	20.14	20.06	20.18	19.99	20.25		
10	QPSK	25	0	20.09	20.12	20.12	20.02	20.42	20.5	0.5
10	QPSK	25	12	20.17	20.08	20.13	20.08	20.45		
10	QPSK	25	25	20.04	20.01	20.06	20.01	20.46		
10	QPSK	50	0	20.01	20.00	20.15	20.01	20.41	20.5	0.5
10	16QAM	1	0	20.21	19.77	20.22	20.07	20.24		
10	16QAM	1	25	20.26	19.81	20.24	20.11	20.30		
10	16QAM	1	49	20.15	19.89	20.29	20.19	20.37	20.5	0.5
10	16QAM	25	0	20.21	19.62	20.22	19.92	20.44		
10	16QAM	25	12	20.24	19.69	20.24	19.99	20.40		
10	16QAM	25	25	20.13	19.70	20.24	20.00	20.40	20.5	0.5
10	16QAM	50	0	20.13	19.67	20.24	19.97	20.26		
10	64QAM	1	0	19.09	19.13	19.20	19.69	19.65		
10	64QAM	1	25	19.16	19.20	19.31	19.29	19.25	20.5	0.5
10	64QAM	1	49	19.25	19.29	19.35	19.54	19.50		
10	64QAM	25	0	19.12	19.16	19.25	19.51	19.47		
10	64QAM	25	12	19.18	19.22	19.37	19.41	19.37	20.5	0.5
10	64QAM	25	25	19.06	19.10	19.38	19.54	19.50		
10	64QAM	50	0	19.00	19.04	19.25	19.47	19.43		

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Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	20.04	19.92	19.93	19.81	20.22	21	0
5	QPSK	1	12	20.09	19.99	19.98	19.86	20.34		
5	QPSK	1	24	20.03	19.94	19.97	19.84	20.27		
5	QPSK	12	0	20.10	19.85	19.98	19.74	20.21	20.5	0.5
5	QPSK	12	7	20.14	19.90	20.02	19.77	20.31		
5	QPSK	12	13	20.14	19.91	20.05	19.77	20.36		
5	QPSK	25	0	20.08	19.90	20.01	19.76	20.39	20.5	0.5
5	16QAM	1	0	20.12	20.03	20.05	19.95	20.43		
5	16QAM	1	12	20.22	20.11	20.23	20.03	20.45		
5	16QAM	1	24	20.26	20.09	20.28	20.04	20.42	20.5	0.5
5	16QAM	12	0	20.15	19.95	20.16	19.86	20.40		
5	16QAM	12	7	20.19	19.99	20.21	19.89	20.42		
5	16QAM	12	13	20.21	20.00	20.20	19.90	20.47	20.5	0.5
5	16QAM	25	0	20.23	19.98	20.23	19.90	20.46		
5	64QAM	1	0	19.09	19.24	19.20	19.26	19.22	20.5	0.5
5	64QAM	1	12	19.14	19.32	19.28	19.28	19.24		
5	64QAM	1	24	19.15	19.37	19.33	19.32	19.28		
5	64QAM	12	0	19.11	19.31	19.27	19.30	19.26	20.5	0.5
5	64QAM	12	7	19.15	19.38	19.34	19.35	19.31		
5	64QAM	12	13	19.16	19.33	19.29	19.35	19.31		
5	64QAM	25	0	19.11	19.33	19.29	19.31	19.27		

<LTE Carrier Aggregation>
General Note:

1. This device supports Carrier Aggregation on downlink for inter and intra band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC#01	CA_2A-5A		No
2CC#02	CA_2A-13A		No
2CC#03	CA_4A-5A		No
2CC#04	CA_4A-13A		No
2CC#05	CA_5A-66A		No
2CC#06	CA_13A-66A		No
2CC#07	CA_5B		No
2CC#08	CA_2A-2A		No
2CC#09	CA_4A-4A		No
2CC#10	CA_5A-5A		No

LTE Carrier Aggregation Conducted Power (Downlink)

General Note:

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

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

Configure		CA List	PCC						SCC				Power		
			LTE	BW	UL	UL	Mod.	UL#	UL	LTE	BW	DL	DL	With CA	Without CA
			Band	(MHz)	Freq.	Channel		RB	Offset	Band	(MHz)	Freq.	Channel	Tx. Power (dBm)	Tx. Power (dBm)
					(MHz)							(MHz)			
Inter-Band		CA_2A-5A	Band 2	20M	1880	18900	QPSK	1	0	Band 5	10M	881.5	2525	24.07	24.20
			Band 5	10M	836.5	20525	QPSK	1	0	Band 2	20M	1960	900	24.00	24.22
		CA_2A-13A	Band 2	20M	1880	18900	QPSK	1	0	Band 13	10M	751	5230	24.02	24.20
			Band 13	10M	782	23230	QPSK	1	0	Band 2	20M	1960	900	24.18	24.41
		CA_4A-5A	Band 4	20M	1732.5	20175	QPSK	1	49	Band 5	10M	881.5	2525	23.77	23.89
			Band 5	10M	836.5	20525	QPSK	1	0	Band 4	20M	2132.5	2175	23.98	24.22
		CA_4A-13A	Band 4	20M	1732.5	20175	QPSK	1	49	Band 13	10M	751	5230	23.76	23.89
			Band 13	10M	782	23230	QPSK	1	0	Band 4	20M	2132.5	2175	24.21	24.41
		CA_5A-66A	Band 5	10M	836.5	20525	QPSK	1	0	Band 66	20M	2155	66886	24.11	24.22
			Band 66	20M	1745	132322	QPSK	1	49	Band 5	10M	881.5	2525	23.88	24.05
		CA_13A-66A	Band 13	10M	782	23230	QPSK	1	0	Band 66	20M	2155	66886	24.20	24.41
			Band 66	20M	1745	132322	QPSK	1	49	Band 13	10M	751	5230	23.91	24.05
Intra-Band	Contiguous	CA_5B	Band 5	10M	836.5	20525	QPSK	1	0	Band 5	10M	891.4	2624	24.00	24.22
	Non-Contiguous	CA_2A-2A	Band 2	20M	1880	18900	QPSK	1	0	Band 2	5M	1987.5	1175	23.99	24.20
		CA_4A-4A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 4	5M	2152.5	2375	23.72	23.89
		CA_5A-5A	Band 5	10M	836.5	20525	QPSK	1	0	Band 5	5M	891.5	2625	24.01	24.22

<WLAN Conducted Power>
General Note:

1. 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.
2. 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).
3. 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.
4. 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	14.15	16.00	98.96
		6	2437	14.05	16.00	
		11	2462	14.00	15.90	
	802.11g 6Mbps	1	2412	14.12	15.90	94.68
		6	2437	14.04	15.90	
		11	2462	14.09	15.90	
	802.11n-HT20 MCS0	1	2412	14.00	15.80	94.33
		6	2437	13.85	15.80	
		11	2462	13.90	15.80	
	802.11n-HT40 MCS0	3	2422	13.78	15.70	90.22
		6	2437	13.87	15.70	
		9	2452	13.77	15.70	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	15.14	17.10	95.00
		40	5200	15.30	17.10	
		44	5220	15.20	17.10	
		48	5240	15.32	17.10	
	802.11n-HT20 MCS0	36	5180	14.96	15.80	94.66
		40	5200	14.94	15.80	
		44	5220	15.09	15.80	
		48	5240	15.19	15.80	
	802.11n-HT40 MCS0	38	5190	15.19	15.70	90.37
		46	5230	15.06	15.70	
	802.11ac-VHT20 MCS0	36	5180	14.95	16.90	95.02
		40	5200	14.91	16.90	
		44	5220	15.01	17.00	
		48	5240	15.14	17.00	
	802.11ac-VHT40 MCS0	38	5190	15.17	17.00	90.00
		46	5230	15.04	17.00	
	802.11ac-VHT80 MCS0	42	5210	14.93	16.90	82.64

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	15.60	17.10	95.00
		56	5280	15.66	17.10	
		60	5300	15.68	17.10	
		64	5320	15.66	17.10	
	802.11n-HT20 MCS0	52	5260	15.40	15.80	94.66
		56	5280	15.50	15.80	
		60	5300	15.52	15.80	
		64	5320	15.51	15.80	
	802.11n-HT40 MCS0	54	5270	15.09	15.70	90.37
		62	5310	15.32	15.70	
	802.11ac-VHT20 MCS0	52	5260	15.35	17.00	95.02
		56	5280	15.45	17.00	
		60	5300	15.46	17.00	
		64	5320	15.47	17.00	
	802.11ac-VHT40 MCS0	54	5270	15.07	17.00	90.00
		62	5310	15.30	17.00	
	802.11ac-VHT80 MCS0	58	5290	15.10	17.00	82.64

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	15.60	17.10	95.00
		116	5580	15.59	17.10	
		124	5620	15.59	17.10	
		132	5660	15.57	17.10	
		140	5700	15.46	17.10	
		144	5720	15.51	17.10	
	802.11n-HT20 MCS0	100	5500	15.51	15.80	94.66
		116	5580	15.42	15.80	
		124	5620	15.50	15.80	
		132	5660	15.48	15.80	
		140	5700	15.29	15.80	
		144	5720	15.36	15.80	
	802.11n-HT40 MCS0	102	5510	15.11	15.70	90.37
		110	5550	15.19	15.70	
		126	5630	15.40	15.70	
		134	5670	15.11	15.70	
		142	5710	15.14	15.70	
	802.11ac-VHT20 MCS0	100	5500	15.45	17.00	95.02
		116	5580	15.38	17.00	
		124	5620	15.44	17.00	
		132	5660	15.42	17.00	
		140	5700	15.25	17.00	
		144	5720	15.32	17.00	
	802.11ac-VHT40 MCS0	102	5510	15.10	17.00	90.00
		110	5550	15.18	17.00	
		126	5630	15.36	17.00	
		134	5670	15.10	17.00	
		142	5710	15.11	17.00	
	802.11ac-VHT80 MCS0	106	5530	15.25	17.00	82.64
		122	5610	15.05	17.00	
		138	5690	15.21	17.00	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	149	5745	15.16	17.10	95.00
		157	5785	15.10	17.10	
		165	5825	14.86	16.80	
	802.11n-HT20 MCS0	149	5745	14.99	15.80	94.66
		157	5785	14.96	15.80	
		165	5825	14.70	15.80	
	802.11n-HT40 MCS0	151	5755	14.74	15.70	90.37
		159	5795	14.77	15.70	
	802.11ac-VHT20 MCS0	149	5745	14.95	16.90	95.02
		157	5785	14.94	16.90	
		165	5825	14.68	16.60	
	802.11ac-VHT40 MCS0	151	5755	14.73	16.70	90.00
		159	5795	14.75	16.70	
	802.11ac-VHT80 MCS0	155	5775	15.08	17.00	82.64

<2.4GHz Bluetooth>
General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.69% as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation

Mode	Channel	Frequency (MHz)	Data Rate
			1Mbps
BR/EDR	CH 00	2402	8.98
	CH 39	2441	8.79
	CH 78	2480	8.43
Tune-up Limit (dBm)			10.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	-0.95
	CH 19	2440	-1.02
	CH 39	2480	-0.84
Tune-up Limit			0.50

13. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)	
	BR/EDR	LE
2.4GHz Bluetooth	10.00	0.50

Note:

Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Frequency (GHz)	Separation Distance (mm)	Exclusion Thresholds
10.00	2.48	10	1.6

Note:

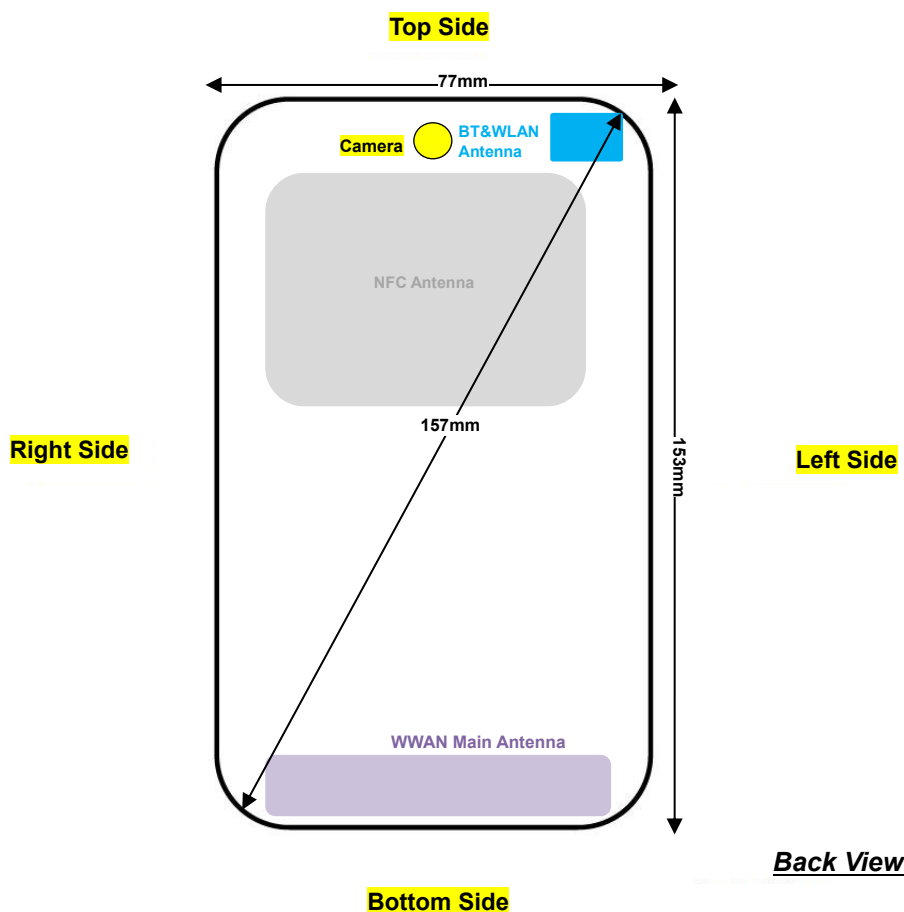
Per KDB 447498 D01v06, a distance of 10 mm is applied to determine 1g SAR test exclusion. The test exclusion threshold is 1.6 which is ≤ 3, Hotspot SAR testing is not required.

Bluetooth Max Power (dBm)	Frequency (GHz)	Separation Distance (mm)	Exclusion Thresholds
10.00	2.48	15	1.1

Note:

Per KDB 447498 D01v06, a distance of 15 mm is applied to determine 1g SAR test exclusion. The test exclusion threshold is 1.1 which is ≤ 3, Body-worn SAR testing is not required.

14. Antenna Location



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

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main Antenna	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN Antenna	Yes	Yes	Yes	No	No	Yes

General Note:

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.

15. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

15.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	GSM 850	GPRS(3 Tx slots)	Right Cheek	Full	128	824.2	30.16	30.50	1.081	0.01	0.830	0.898
	GSM 850	GPRS(3 Tx slots)	Right Cheek	Full	189	836.4	30.28	30.50	1.052	0.03	0.831	0.874
	GSM 850	GPRS(3 Tx slots)	Right Cheek	Full	251	848.8	30.20	30.50	1.072	0.07	0.780	0.836
02	GSM 1900	GPRS(3 Tx slots)	Right Cheek	Full	661	1880	27.37	27.5	1.030	0.07	0.145	0.149

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
03	WCDMA Band V	RMC 12.2Kbps	Left Cheek	Full	4132	826.4	23.23	24.00	1.194	0.05	0.491	0.586
04	WCDMA Band IV	RMC 12.2Kbps	Right Cheek	Full	1513	1752.6	23.08	24.00	1.236	0.04	0.526	0.650
05	WCDMA Band II	RMC 12.2Kbps	Right Cheek	Full	9400	1880	23.16	24.00	1.213	0.05	0.621	0.754

<CDMA2000 SAR>

Plot No.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
06	CDMA2000 BC10	RC3 SO55	Left Cheek	Full	684	823.1	24.09	25.00	1.233	0.17	0.551	0.679
07	CDMA2000 BC0	RC3 SO55	Left Cheek	Full	384	836.52	24.04	25.00	1.247	0.02	0.560	0.699
	CDMA2000 BC1	RC3 SO55	Right Cheek	Full	25	1851.25	24.03	25.00	1.250	0.03	0.695	0.869
08	CDMA2000 BC1	RC3 SO55	Right Cheek	Full	600	1880	23.86	25.00	1.300	0.19	0.717	0.932
	CDMA2000 BC1	RC3 SO55	Right Cheek	Full	1175	1908.75	23.67	25.00	1.358	0.01	0.621	0.844

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
09	LTE Band 12	10M	QPSK	1	49	Left Cheek	Full	23095	707.5	24.39	25.00	1.151	0.05	0.165	0.190
10	LTE Band 13	10M	QPSK	1	0	Left Cheek	Full	23230	782	24.41	25.00	1.146	0.06	0.422	0.483
11	LTE Band 14	10M	QPSK	1	25	Left Cheek	Full	23330	793	24.29	25.00	1.178	0.05	0.481	0.566
12	LTE Band 26	15M	QPSK	1	0	Left Cheek	Full	26865	831.5	24.25	25.00	1.189	0.06	0.510	0.606
13	LTE Band 66	20M	QPSK	1	49	Right Cheek	Full	132572	1770	23.90	25.00	1.288	0.03	0.610	0.786
	LTE Band 25	20M	QPSK	1	0	Right Cheek	Full	26340	1880	24.25	25.00	1.189	0.05	0.719	0.855
14	LTE Band 25	20M	QPSK	1	0	Right Cheek	Full	26140	1860	24.18	25.00	1.208	0.06	0.769	0.929
	LTE Band 25	20M	QPSK	1	0	Right Cheek	Full	26590	1905	24.11	25.00	1.227	0.09	0.636	0.781
15	LTE Band 7	20M	QPSK	1	99	Left Cheek	Full	21100	2535	22.16	23.00	1.213	0.09	0.186	0.226

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Class	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Left Cheek	3	Full	40620	2593	22.25	23.00	1.189	62.9	1.006	0.02	0.135	0.161
16	LTE Band 41	20M	QPSK	1	0	Left Cheek	2	Full	40620	2593	25.97	27.00	1.268	42.9	1.009	0.03	0.213	0.272

<WLAN2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
17	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	1	2412	14.15	16.00	1.533	98.96	1.010	0.05	0.321	0.497

<WLAN5GHz SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
18	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	60	5300	15.68	17.10	1.386	95.00	1.053	-0.02	0.547	0.799
19	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	100	5500	15.60	17.10	1.412	95.00	1.053	-0.05	0.534	0.794
20	WLAN 5.8GHz	802.11a 6Mbps	Left Tilted	149	5745	15.16	17.10	1.562	95.00	1.053	0.07	0.286	0.471

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
21	Bluetooth	1Mbps	Right Cheek	78	2480	8.43	10.00	1.435	76.69	1.086	-0.04	0.082	0.128

15.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
22	GSM850	GPRS(3 Tx slots)	Front	10	Full	128	824.2	30.16	30.50	1.081	0.07	0.898	0.971
	GSM850	GPRS(3 Tx slots)	Front	10	Full	189	836.4	30.28	30.50	1.052	0.03	0.914	0.961
	GSM850	GPRS(3 Tx slots)	Front	10	Full	251	848.8	30.20	30.50	1.072	0.01	0.779	0.835
23	GSM1900	GPRS(3 Tx slots)	Back	10	Full	661	1880	27.37	27.5	1.030	0.02	0.771	0.794

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
24	WCDMA Band V	RMC 12.2Kbps	Back	10	Full	4132	826.4	23.23	24.00	1.194	0.05	0.556	0.664
25	WCDMA Band IV	RMC 12.2Kbps	Back	10	Full	1513	1752.6	23.08	24.00	1.236	-0.03	0.581	0.718
26	WCDMA Band II	RMC 12.2Kbps	Back	10	Full	9538	1907.6	22.93	24.00	1.279	0.01	0.925	1.183
	WCDMA Band II	RMC 12.2Kbps	Back	10	Full	9262	1852.4	23.14	24.00	1.219	0.08	0.719	0.876
	WCDMA Band II	RMC 12.2Kbps	Back	10	Full	9400	1880	23.16	24.00	1.213	0.02	0.833	1.011



<CDMA2000 SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
27	CDMA2000 BC10	RTAP 153.6Kbps	Back	10	Full	684	823.1	24.09	25.00	1.233	0.01	0.581	0.716
28	CDMA2000 BC0	RTAP 153.6Kbps	Front	10	Full	384	836.52	24.05	25.00	1.245	0.09	0.474	0.590
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	600	1880	22.56	23.50	1.242	0.05	0.812	1.008
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	25	1851.25	22.57	23.50	1.239	0.04	0.637	0.789
29	CDMA2000 BC1	RTAP 153.6Kbps	Back	10	Hotspot On	1175	1908.75	22.54	23.50	1.247	0.07	0.917	1.144

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
30	LTE Band 12	10M	QPSK	1	49	Back	10	Full	23095	707.5	24.39	25.00	1.151	0.02	0.355	0.409
31	LTE Band 13	10M	QPSK	1	0	Back	10	Full	23230	782	24.41	25.00	1.146	0.01	0.531	0.608
32	LTE Band 14	10M	QPSK	1	25	Back	10	Full	23330	793	24.29	25.00	1.178	0.06	0.622	0.732
33	LTE Band 26	15M	QPSK	1	0	Back	10	Full	26865	831.5	24.25	25.00	1.189	0.02	0.453	0.538
34	LTE Band 66	20M	QPSK	1	49	Back	10	Full	132572	1770	23.9	25.00	1.288	-0.07	0.551	0.710
35	LTE Band 25	20M	QPSK	1	0	Back	10	Hotspot On	26590	1905	22.05	23.00	1.245	0.04	0.865	1.077
	LTE Band 25	20M	QPSK	1	0	Back	10	Hotspot On	26340	1880	22.22	23.00	1.197	0.11	0.777	0.930
	LTE Band 25	20M	QPSK	1	0	Back	10	Hotspot On	26140	1860	22.14	23.00	1.219	0.13	0.668	0.814
	LTE Band 7	20M	QPSK	1	99	Back	10	Hotspot On	20850	2510	18.79	20.00	1.321	0.06	0.796	1.052
	LTE Band 7	20M	QPSK	1	99	Back	10	Hotspot On	21100	2535	18.97	20.00	1.268	0.01	0.858	1.088
36	LTE Band 7	20M	QPSK	1	99	Back	10	Hotspot On	21350	2560	18.96	20.00	1.271	0.01	0.909	1.155

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Class	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Back	10	3	Hotspot On	40620	2593	20.48	21.00	1.127	62.9	1.006	0.02	0.546	0.619
	LTE Band 41	20M	QPSK	1	0	Back	10	3	Hotspot On	39750	2506	20.36	21.00	1.159	62.9	1.006	0.01	0.469	0.547
	LTE Band 41	20M	QPSK	1	0	Back	10	3	Hotspot On	40185	2549.5	20.26	21.00	1.186	62.9	1.006	0.04	0.541	0.645
	LTE Band 41	20M	QPSK	1	0	Back	10	3	Hotspot On	41055	2636.5	20.37	21.00	1.156	62.9	1.006	0.03	0.474	0.551
	LTE Band 41	20M	QPSK	1	0	Back	10	3	Hotspot On	41490	2680	20.25	21.00	1.189	62.9	1.006	-0.04	0.572	0.684
37	LTE Band 41	20M	QPSK	1	0	Back	10	2	Hotspot On	41490	2680	21.56	22.00	1.107	42.9	1.009	0.02	0.698	0.779
	LTE Band 41	20M	QPSK	1	0	Back	10	2	Hotspot On	39750	2506	21.64	22.00	1.086	42.9	1.009	0.04	0.543	0.595
	LTE Band 41	20M	QPSK	1	0	Back	10	2	Hotspot On	40185	2549.5	21.57	22.00	1.104	42.9	1.009	0.01	0.613	0.683
	LTE Band 41	20M	QPSK	1	0	Back	10	2	Hotspot On	40620	2593	21.67	22.00	1.079	42.9	1.009	0.09	0.647	0.704
	LTE Band 41	20M	QPSK	1	0	Back	10	2	Hotspot On	41055	2636.5	21.54	22.00	1.112	42.9	1.009	0.02	0.540	0.606

<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
38	WLAN 2.4GHz	802.11b 1Mbps	Back	10	1	2412	14.15	16.00	1.533	98.96	1.010	-0.03	0.054	0.084

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
39	WLAN5.2GHz	802.11a 6Mbps	Top Side	10	48	5240	15.32	17.10	1.506	95.00	1.053	-0.03	0.251	0.398
40	WLAN5.8GHz	802.11a 6Mbps	Top Side	10	149	5745	15.16	17.10	1.562	95.00	1.053	0.07	0.189	0.311

15.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
41	GSM850	GPRS(3 Tx slots)	Front	15	Full	189	836.4	30.28	30.50	1.052	0.01	0.678	0.713
42	GSM1900	GPRS(3 Tx slots)	Back	15	Full	661	1880	27.37	27.5	1.030	0.01	0.336	0.346

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
43	WCDMA Band V	RMC 12.2Kbps	Back	15	Full	4132	826.4	23.23	24.00	1.194	0.05	0.453	0.541
44	WCDMA Band IV	RMC 12.2Kbps	Back	15	Full	1513	1732.6	23.08	24.00	1.236	-0.01	0.292	0.361
45	WCDMA Band II	RMC 12.2Kbps	Back	15	Full	9400	1880	23.16	24.00	1.213	0.02	0.390	0.473

<CDMA2000 SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
46	CDMA2000 BC10	RC3 SO32 (F+SCH)	Front	15	Full	684	823.1	24.09	25.00	1.233	0.01	0.386	0.476
47	CDMA2000 BC0	RC3 SO32 (F+SCH)	Front	15	Full	384	836.52	24.05	25.00	1.245	0.08	0.398	0.495
48	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	15	Full	25	1851.25	24.03	25.00	1.250	0.03	0.406	0.508

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
49	LTE Band 12	10M	QPSK	1	49	Back	15	Full	23095	707.5	24.39	25.00	1.151	0.04	0.284	0.327
50	LTE Band 13	10M	QPSK	1	0	Front	15	Full	23230	782	24.41	25.00	1.146	0.07	0.393	0.450
51	LTE Band 14	10M	QPSK	1	25	Back	15	Full	23330	793	24.29	25.00	1.178	0.04	0.516	0.608
52	LTE Band 26	15M	QPSK	1	0	Front	15	Full	26865	831.5	24.25	25.00	1.189	0.07	0.385	0.458
53	LTE Band 66	20M	QPSK	1	49	Back	15	Full	132322	1745	24.05	25.00	1.245	-0.05	0.226	0.281
54	LTE Band 25	20M	QPSK	1	0	Back	15	Full	26340	1880	24.25	25.00	1.189	-0.09	0.352	0.418
	LTE Band 7	20M	QPSK	1	99	Back	15	Full	20850	2510	22.03	23.00	1.250	0.05	0.728	0.910
	LTE Band 7	20M	QPSK	1	99	Back	15	Full	21100	2535	22.16	23.00	1.213	0.01	0.778	0.944
55	LTE Band 7	20M	QPSK	1	99	Back	15	Full	21350	2560	22.07	23.00	1.239	-0.02	0.799	0.990



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Class	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	0	Back	15	3	Full	40620	2593	22.25	23	1.189	62.9	1.006	0.05	0.503	0.601
	LTE Band 41	20M	QPSK	1	0	Back	15	3	Full	39750	2506	22.19	23	1.205	62.9	1.006	0.03	0.449	0.544
	LTE Band 41	20M	QPSK	1	0	Back	15	3	Full	40185	2549.5	22.17	23	1.211	62.9	1.006	0.01	0.490	0.597
	LTE Band 41	20M	QPSK	1	0	Back	15	3	Full	41055	2636.5	21.73	23	1.340	62.9	1.006	0.05	0.412	0.555
	LTE Band 41	20M	QPSK	1	0	Back	15	3	Full	41490	2680	22.09	23	1.233	62.9	1.006	0.06	0.469	0.582
56	LTE Band 41	20M	QPSK	1	0	Back	15	2	Full	40620	2593	25.97	27	1.268	42.9	1.009	0.05	0.825	1.055
	LTE Band 41	20M	QPSK	1	0	Back	15	2	Full	39750	2506	25.72	27	1.343	42.9	1.009	0.07	0.709	0.961
	LTE Band 41	20M	QPSK	1	0	Back	15	2	Full	40185	2549.5	25.92	27	1.282	42.9	1.009	0.02	0.746	0.965
	LTE Band 41	20M	QPSK	1	0	Back	15	2	Full	41055	2636.5	25.95	27	1.274	42.9	1.009	0.01	0.624	0.802
	LTE Band 41	20M	QPSK	1	0	Back	15	2	Full	41490	2680	25.89	27	1.291	42.9	1.009	0.08	0.746	0.972

<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
57	WLAN 2.4GHz	802.11b 1Mbps	Back	15	1	2412	14.15	16.00	1.533	98.96	1.011	-0.05	0.027	0.042

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
58	WLAN5.3GHz	802.11a 6Mbps	Front	15	60	5300	15.68	17.10	1.387	95	1.053	-0.03	0.100	0.146
59	WLAN5.5GHz	802.11a 6Mbps	Back	15	100	5500	15.60	17.10	1.413	95	1.053	-0.03	0.150	0.223
60	WLAN5.8GHz	802.11a 6Mbps	Back	15	149	5745	15.16	17.10	1.562	95	1.053	-0.01	0.066	0.109

15.4 Repeated SAR Measurement

No.	Band	Mode	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	GSM850	GPRS(3 Tx slots)	-	-	-	-	Front	10	Full	189	836.4	30.28	30.50	1.052	-	-	0.03	0.914	1	0.961
2nd	GSM850	GPRS(3 Tx slots)	-	-	-	-	Front	10	Full	189	836.4	30.28	30.50	1.052	-	-	0.06	0.897	1.019	0.944
1st	WCDMA Band II	RMC 12.2Kbps	-	-	-	-	Back	10	Full	9538	1907.6	22.93	24.00	1.279	-	-	0.01	0.925	1	1.183
2nd	WCDMA Band II	RMC 12.2Kbps	-	-	-	-	Back	10	Full	9538	1907.6	22.93	24.00	1.279	-	-	0.01	0.918	1.008	1.174
1st	LTE Band 7	-	20M	QPSK	1	99	Back	10	Hotspot on	21350	2560	18.96	20.00	1.271	-	-	0.01	0.909	1	1.155
2nd	LTE Band 7	-	20M	QPSK	1	99	Back	10	Hotspot on	21350	2560	18.96	20.00	1.271	-	-	0.03	0.885	1.027	1.124

General Note:

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

16. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
4.	CDMA + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
5.	LTE + WLAN2.4GHz	Yes	Yes	Yes	WLAN Hotspot
6.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes		
7.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
8.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
9.	CDMA + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
10.	LTE + WLAN5.3/5.5GHz	Yes	Yes		WLAN Direct (GC only)
11.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes		
12.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
13.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
14.	CDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
15.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
16.	GSM Voice + Bluetooth	Yes	Yes		
17.	GPRS/EDGE + Bluetooth	Yes	Yes	Yes	BT Tethering
18.	WCDMA + Bluetooth	Yes	Yes	Yes	BT Tethering
19.	CDMA + Bluetooth	Yes	Yes	Yes	BT Tethering
20.	LTE + Bluetooth	Yes	Yes	Yes	BT Tethering

General Note:

- For simultaneously transmission SAR analysis, SAR values only considered the worst position which we did perform SAR testing on EA850804-04, and other test results were leverage from the parent model which referred to the test report number EA850804-03 and EA850804-02.
- This device supports VoIP in GPRS, EGPRS, CDMA, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- EUT will choose each GSM, WCDMA, CDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- WLAN and Bluetooth share the same antenna, so can't transmit simultaneously.
- EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
- This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
- This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
- The reported SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/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 $SPLSR \leq 0.04$ for 1g SAR, $SPLSR \leq 0.10$ for 10g SAR 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 16.4.
- For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
 - 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth Max Power (dBm)	Exposure Position	Hotspot	Body worn
	Test separation	10 mm	15 mm
10.0	Estimated 1g SAR (W/kg)	0.210	0.140

16.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3			1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth		Summed 1g SAR (W/kg)	SPLSR	Case No	
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)					
GSM	GSM850	Right Cheek	0.898	0.497	0.799	0.128	1.40	1.70	0.03	#1	1.03
		Left Tilted	0.724	0.161	0.471	0.128	0.89	1.20			0.85
	GSM1900	Right Cheek	0.149	0.497	0.799	0.128	0.65	0.95			0.28
		Left Tilted	0.055	0.161	0.471	0.128	0.22	0.53			0.18
WCDMA	Band V	Right Cheek	0.474	0.497	0.799	0.128	0.97	1.27			0.60
		Left Cheek	0.586	0.195	0.618	0.128	0.78	1.20			0.71
		Left Tilted	0.394	0.161	0.471	0.128	0.56	0.87			0.52
	Band IV	Right Cheek	0.650	0.497	0.799	0.128	1.15	1.45			0.78
		Left Tilted	0.447	0.161	0.471	0.128	0.61	0.92			0.58
	Band II	Right Cheek	0.754	0.497	0.799	0.128	1.25	1.55			0.88
		Left Tilted	0.322	0.161	0.471	0.128	0.48	0.79			0.45
CDMA	BC10	Right Cheek	0.564	0.497	0.799	0.128	1.06	1.36			0.69
		Left Cheek	0.679	0.195	0.618	0.128	0.87	1.30			0.81
		Left Tilted	0.457	0.161	0.471	0.128	0.62	0.93			0.59
	BC0	Right Cheek	0.524	0.497	0.799	0.128	1.02	1.32			0.65
		Left Cheek	0.699	0.195	0.618	0.128	0.89	1.32			0.83
		Left Tilted	0.395	0.161	0.471	0.128	0.56	0.87			0.52
	BC1	Right Cheek	0.932	0.497	0.799	0.128	1.43	1.73	0.02	#2	1.06
		Left Tilted	0.411	0.161	0.471	0.128	0.57	0.88			0.54



WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3			1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth		Summed 1g SAR (W/kg)	SPLSR	Case No	
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)					
LTE	Band 12	Right Cheek	0.297	0.497	0.799	0.128	0.79	1.10			0.43
		Left Cheek	0.190	0.195	0.618	0.128	0.39	0.81			0.32
		Left Tilted	0.212	0.161	0.471	0.128	0.37	0.68			0.34
	Band 13	Right Cheek	0.310	0.497	0.799	0.128	0.81	1.11			0.44
		Left Cheek	0.483	0.195	0.618	0.128	0.68	1.10			0.61
		Left Tilted	0.257	0.161	0.471	0.128	0.42	0.73			0.39
	Band 14	Right Cheek	0.240	0.497	0.799	0.128	0.74	1.04			0.37
		Left Cheek	0.566	0.195	0.618	0.128	0.76	1.18			0.69
		Left Tilted	0.231	0.161	0.471	0.128	0.39	0.70			0.36
	Band 26	Right Cheek	0.516	0.497	0.799	0.128	1.01	1.32			0.64
		Left Cheek	0.606	0.195	0.618	0.128	0.80	1.22			0.73
		Left Tilted	0.401	0.161	0.471	0.128	0.56	0.87			0.53
	Band 66	Right Cheek	0.786	0.497	0.799	0.128	1.28	1.59			0.91
		Left Tilted	0.468	0.161	0.471	0.128	0.63	0.94			0.60
	Band 25	Right Cheek	0.929	0.497	0.799	0.128	1.43	1.73	0.02	#3	1.06
		Left Tilted	0.349	0.161	0.471	0.128	0.51	0.82			0.48
	Band 7	Right Cheek	0.126	0.497	0.799	0.128	0.62	0.93			0.25
		Left Cheek	0.226	0.195	0.618	0.128	0.42	0.84			0.35
		Left Tilted	0.095	0.161	0.471	0.128	0.26	0.57			0.22
	Band 41	Right Cheek	0.111	0.497	0.799	0.128	0.61	0.91			0.24
		Left Cheek	0.272	0.195	0.618	0.128	0.47	0.89			0.40
		Left Tilted	0.102	0.161	0.471	0.128	0.26	0.57			0.23

16.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.971	0.105	0.178	0.210	1.08	1.15	1.18
		Back	0.784	0.084	0.288	0.210	0.87	1.07	0.99
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	GSM1900	Back	0.794	0.084	0.288	0.210	0.88	1.08	1.00
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
WCDMA	Band V	Back	0.664	0.084	0.288	0.210	0.75	0.95	0.87
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band IV	Back	0.718	0.084	0.288	0.210	0.80	1.01	0.93
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band II	Back	1.183	0.084	0.288	0.210	1.27	1.47	1.39
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
CDMA	BC10	Back	0.716	0.084	0.288	0.210	0.80	1.00	0.93
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	BC0	Front	0.590	0.105	0.178	0.210	0.70	0.77	0.80
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	BC1	Back	1.144	0.084	0.288	0.210	1.23	1.43	1.35
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
LTE	Band 12	Back	0.409	0.084	0.288	0.210	0.49	0.70	0.62
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 13	Back	0.608	0.084	0.288	0.210	0.69	0.90	0.82
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 14	Back	0.732	0.084	0.288	0.210	0.82	1.02	0.94
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 26	Back	0.538	0.084	0.288	0.210	0.62	0.83	0.75
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 66	Back	0.710	0.084	0.288	0.210	0.79	1.00	0.92
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 25	Back	1.077	0.084	0.288	0.210	1.16	1.37	1.29
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 7	Back	1.155	0.084	0.288	0.210	1.24	1.44	1.37
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21
	Band 41	Back	0.779	0.084	0.288	0.210	0.86	1.07	0.99
		Top Side		0.076	0.398	0.210	0.08	0.40	0.21

16.3 Body-Worn Accessory Exposure Conditions

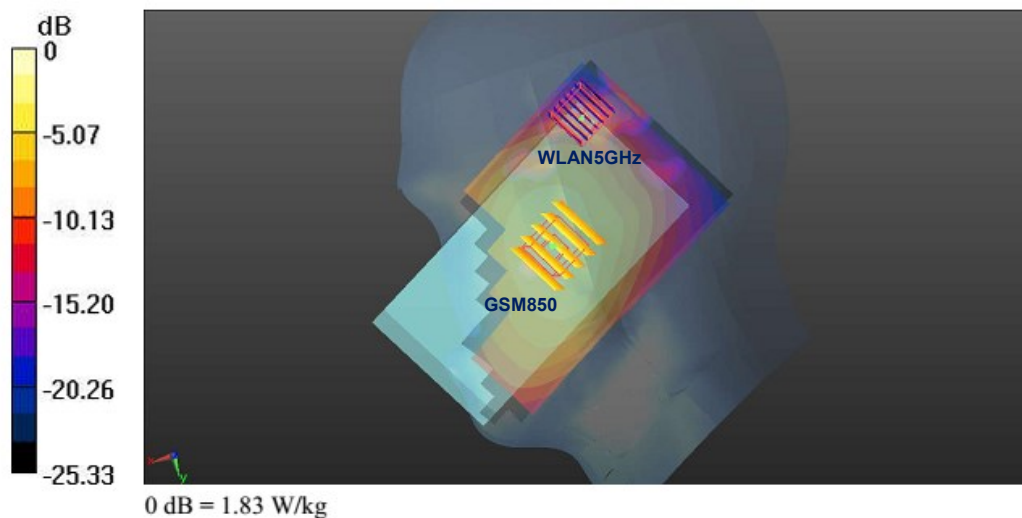
WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.713	0.053	0.146	0.140	0.77	0.86	0.85
		Back	0.587	0.042	0.223	0.140	0.63	0.81	0.73
	GSM1900	Front	0.055	0.053	0.146	0.140	0.11	0.20	0.20
		Back	0.346	0.042	0.223	0.140	0.39	0.57	0.49
WCDMA	Band V	Front	0.540	0.053	0.146	0.140	0.59	0.69	0.68
		Back	0.541	0.042	0.223	0.140	0.58	0.76	0.68
	Band IV	Front	0.382	0.053	0.146	0.140	0.44	0.53	0.52
		Back	0.361	0.042	0.223	0.140	0.40	0.58	0.50
	Band II	Front	0.303	0.053	0.146	0.140	0.36	0.45	0.44
		Back	0.473	0.042	0.223	0.140	0.52	0.70	0.61
CDMA	BC10	Front	0.476	0.053	0.146	0.140	0.53	0.62	0.62
		Back	0.453	0.042	0.223	0.140	0.50	0.68	0.59
	BC0	Front	0.495	0.053	0.146	0.140	0.55	0.64	0.64
		Back	0.480	0.042	0.223	0.140	0.52	0.70	0.62
	BC1	Front	0.381	0.053	0.146	0.140	0.43	0.53	0.52
		Back	0.508	0.042	0.223	0.140	0.55	0.73	0.65
LTE	Band 12	Front	0.480	0.053	0.146	0.140	0.53	0.63	0.62
		Back	0.327	0.042	0.223	0.140	0.37	0.55	0.47
	Band 13	Front	0.450	0.053	0.146	0.140	0.50	0.60	0.59
		Back	0.347	0.042	0.223	0.140	0.39	0.57	0.49
	Band 14	Front	0.359	0.053	0.146	0.140	0.41	0.51	0.50
		Back	0.608	0.042	0.223	0.140	0.65	0.83	0.75
	Band 26	Front	0.458	0.053	0.146	0.140	0.51	0.60	0.60
		Back	0.434	0.042	0.223	0.140	0.48	0.66	0.57
	Band 66	Front	0.385	0.053	0.146	0.140	0.44	0.53	0.53
		Back	0.281	0.042	0.223	0.140	0.32	0.50	0.42
	Band 25	Front	0.382	0.053	0.146	0.140	0.44	0.53	0.52
		Back	0.418	0.042	0.223	0.140	0.46	0.64	0.56
	Band 7	Front	0.313	0.053	0.146	0.140	0.37	0.46	0.45
		Back	0.990	0.042	0.223	0.140	1.03	1.21	1.13
	Band 41	Front	0.279	0.053	0.146	0.140	0.33	0.43	0.42
		Back	1.055	0.042	0.223	0.140	1.10	1.28	1.20

16.4 SPLSR Evaluation and Analysis

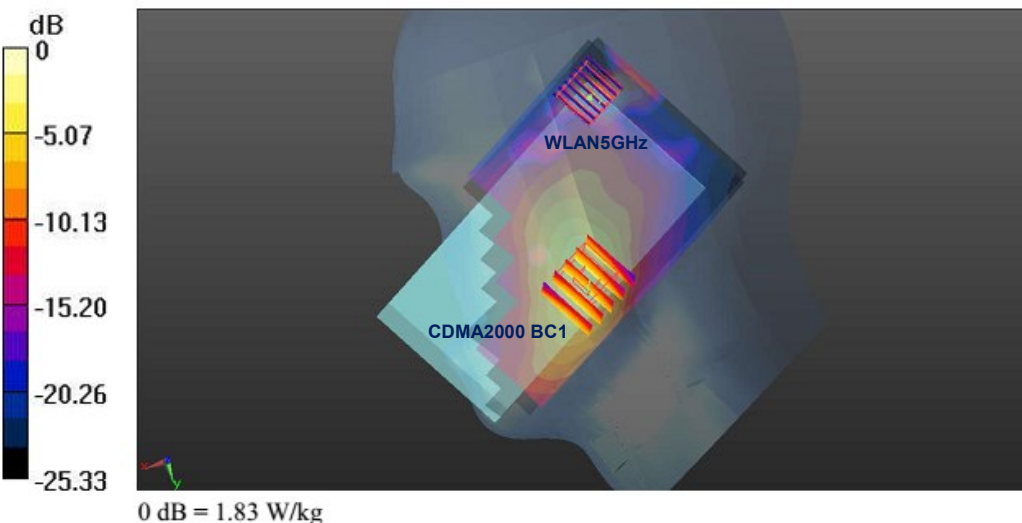
General Note:

- When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
- $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$ for 1g SAR and $SPLSR \leq 0.10$ for 10g SAR, simultaneously transmission SAR measurement is not necessary.

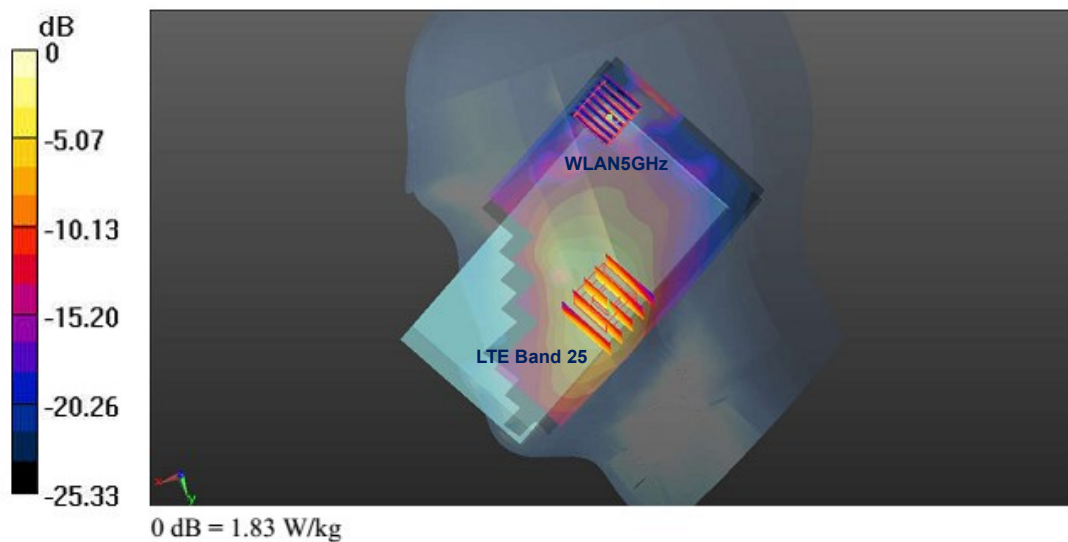
Case #1	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM850	Right Cheek	0.898	0	0.0637	-0.279	-0.174	67.8	1.70	0.03	Not required
	WLAN5GHz		0.799	0	0.0256	-0.335	-0.172				



Case #2	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	CDMA2000 BC1	Right Cheek	0.932	0	0.0612	-0.248	-0.172	94.0	1.73	0.02	Not required
	WLAN5GHz		0.799	0	0.0256	-0.335	-0.172				



Case #3	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (m)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 25	Right Cheek	0.929	0	0.0612	-0.248	-0.172	94.0	1.73	0.02	Not required
	WLAN5GHz		0.799	0	0.0256	-0.335	-0.172				



Test Engineer : Johnny Chen



17. Uncertainty Assessment

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

18. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [6] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.
- [7] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [8] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [9] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [10] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [11] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [12] FCC KDB 941225 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [13] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_750MHz

DUT: D750V3-SN:1099

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL_750_180826 Medium parameters used: $f = 750$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 40.991$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(10.06, 10.06, 10.06); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.58 W/kg

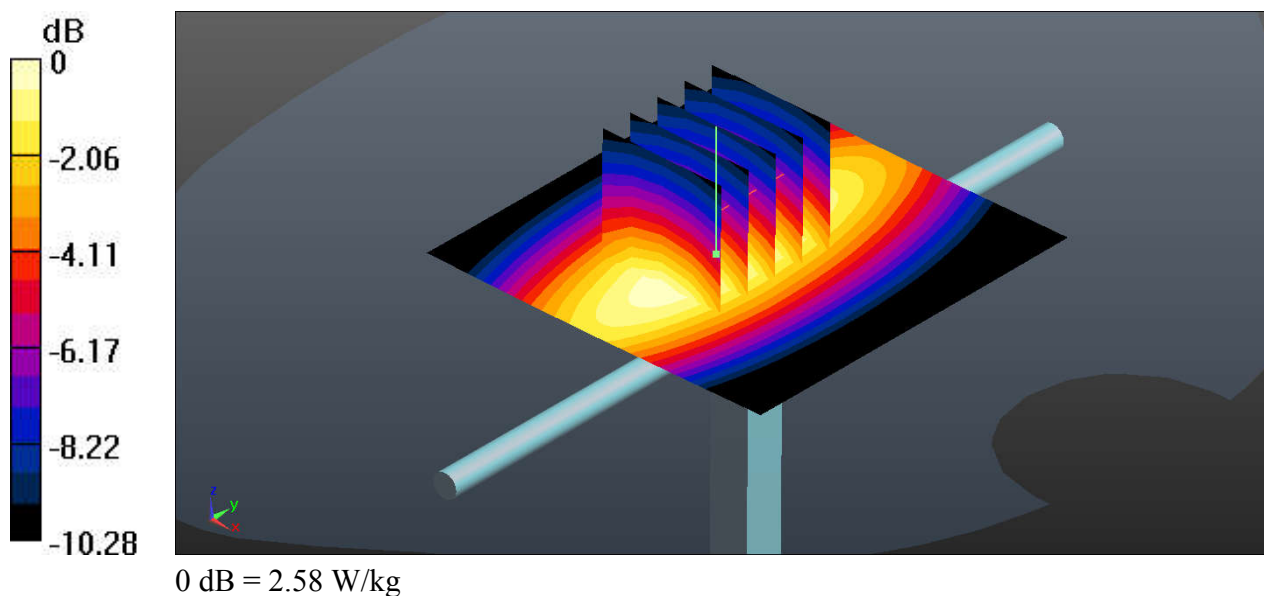
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.84 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 3.03 W/kg

SAR(1 g) = 2.06 W/kg; SAR(10 g) = 1.36 W/kg

Maximum value of SAR (measured) = 2.60 W/kg



System Check_Head_835MHz

DUT: D835V2-SN:4d162

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_835_180826 Medium parameters used: $f = 835$ MHz; $\sigma = 0.929$ S/m; $\epsilon_r = 41.793$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.66, 9.66, 9.66); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 3.03 W/kg

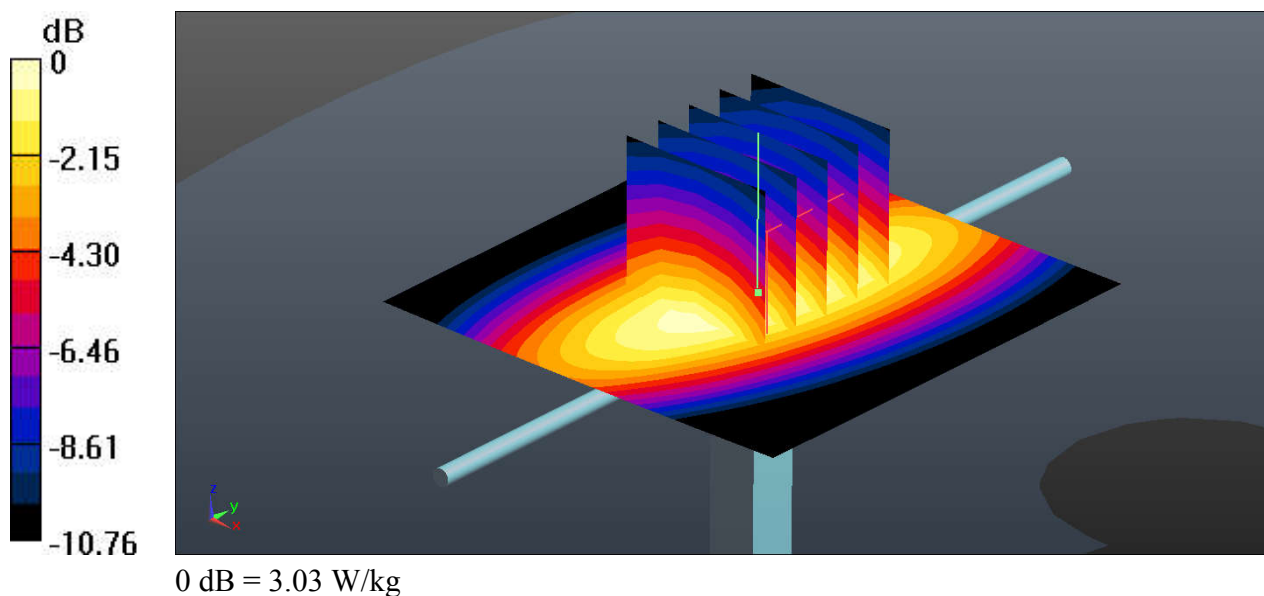
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 58.39 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 3.00 W/kg



System Check_Head_1750MHz

DUT: D1750V2-SN:1137

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: HSL_1750_180826 Medium parameters used: $f = 1750$ MHz; $\sigma = 1.382$ S/m; $\epsilon_r = 41.56$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(8.37, 8.37, 8.37); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.0 W/kg

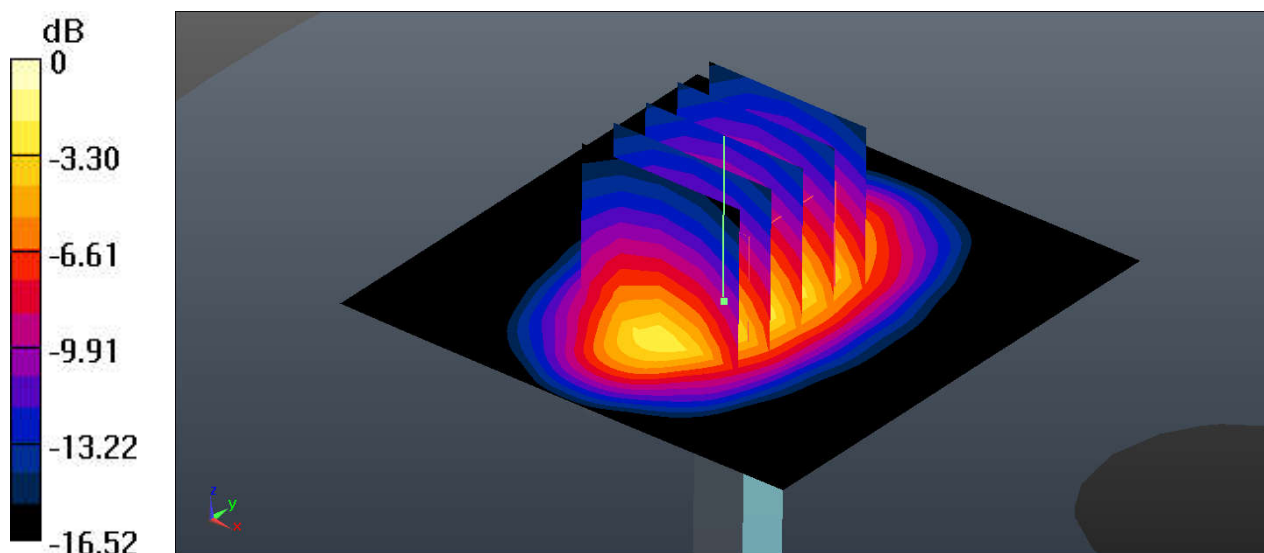
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 93.45 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 14.6 W/kg

SAR(1 g) = 8.58 W/kg; SAR(10 g) = 4.62 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 12.0 W/kg

System Check_Head_1900MHz

DUT: D1900V2-SN:5d182

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL_1900_180826 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.455$ S/m; $\epsilon_r = 40.068$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(8.13, 8.13, 8.13); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 13.4 W/kg

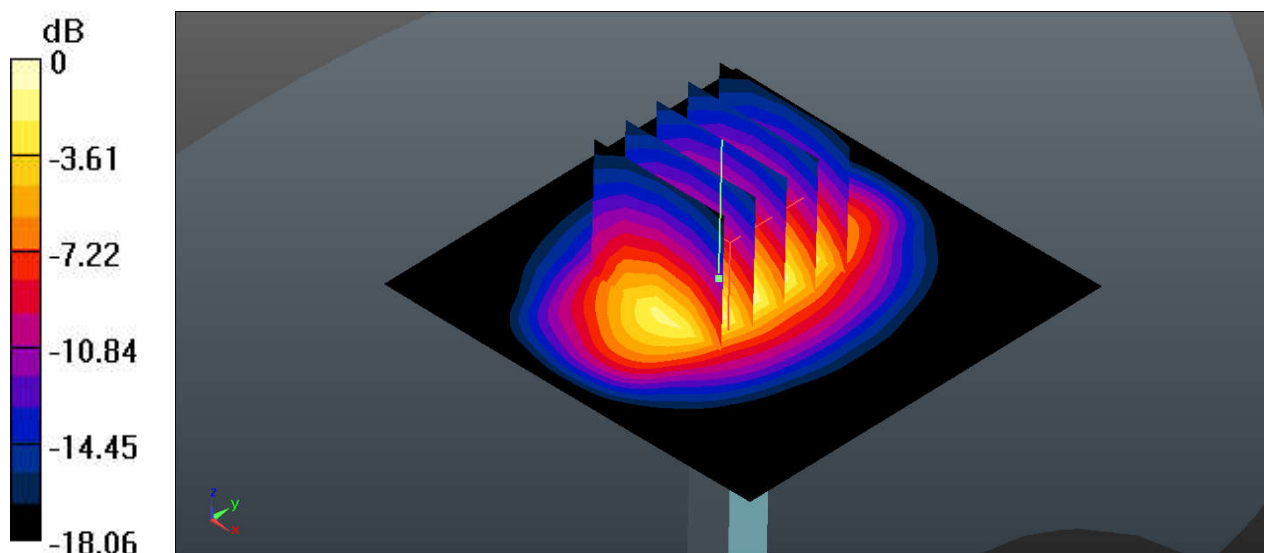
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 92.80 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 9.38 W/kg; SAR(10 g) = 4.88 W/kg

Maximum value of SAR (measured) = 13.2 W/kg



0 dB = 13.4 W/kg

System Check_Head_2450MHz

DUT: D2450V2-SN:924

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL_2450_180828 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.823$ S/m; $\epsilon_r = 37.953$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 19.1 W/kg

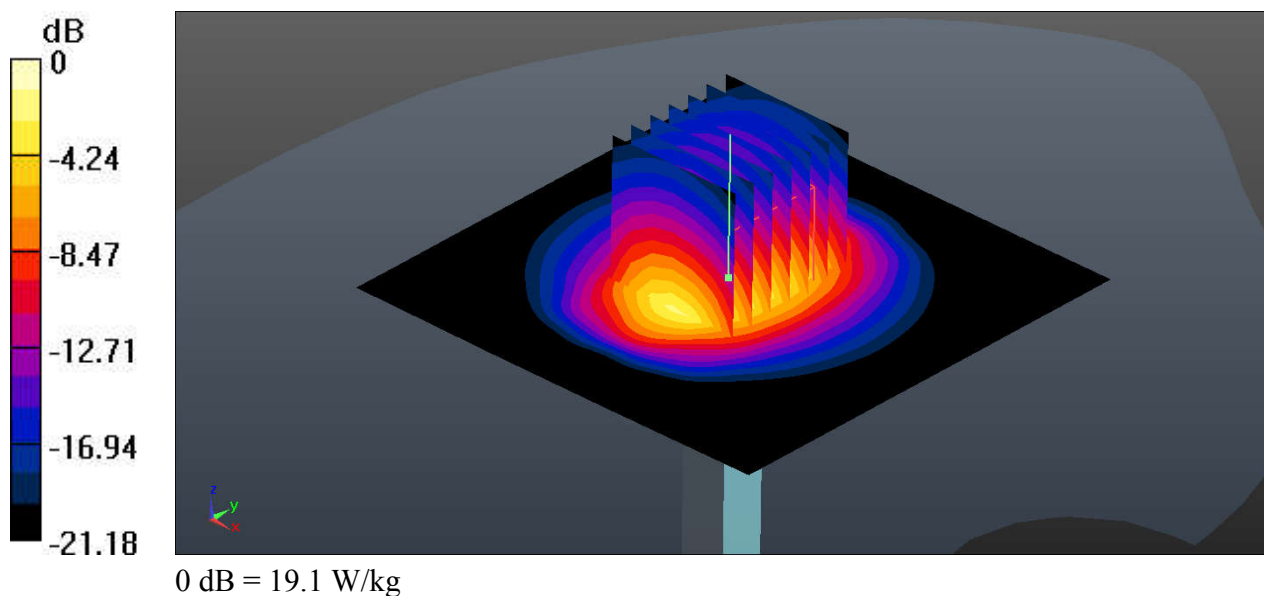
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.28 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 25.1 W/kg

SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.91 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



System Check_Head_2600MHz

DUT: D2600V2-SN:1070

Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL_2600_180828 Medium parameters used: $f = 2600$ MHz; $\sigma = 1.981$ S/m; $\epsilon_r = 38.254$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.21, 7.21, 7.21); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 21.7 W/kg

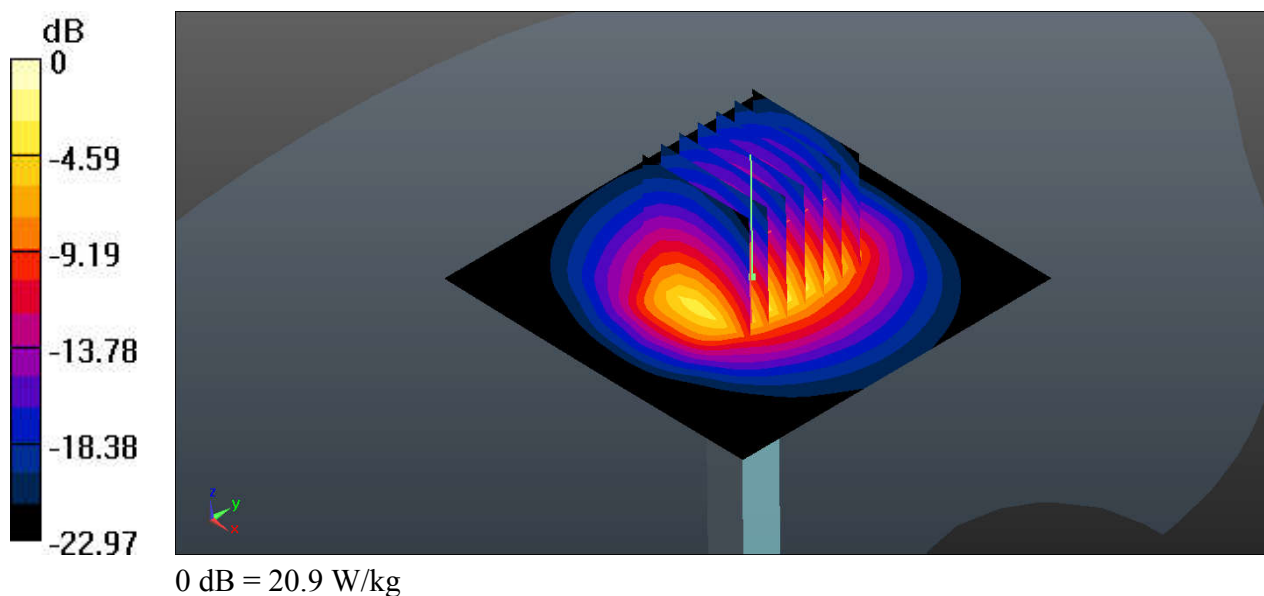
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.4 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 5.97 W/kg

Maximum value of SAR (measured) = 20.9 W/kg



System Check_Head_5250MHz**DUT: D5GHzV2-SN:1167**

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: HSL_5250_180825 Medium parameters used: $f = 5250$ MHz; $\sigma = 4.757$ S/m; $\epsilon_r = 36.931$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(5.15, 5.15, 5.15); Calibrated: 2018.01.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 19.6 W/kg

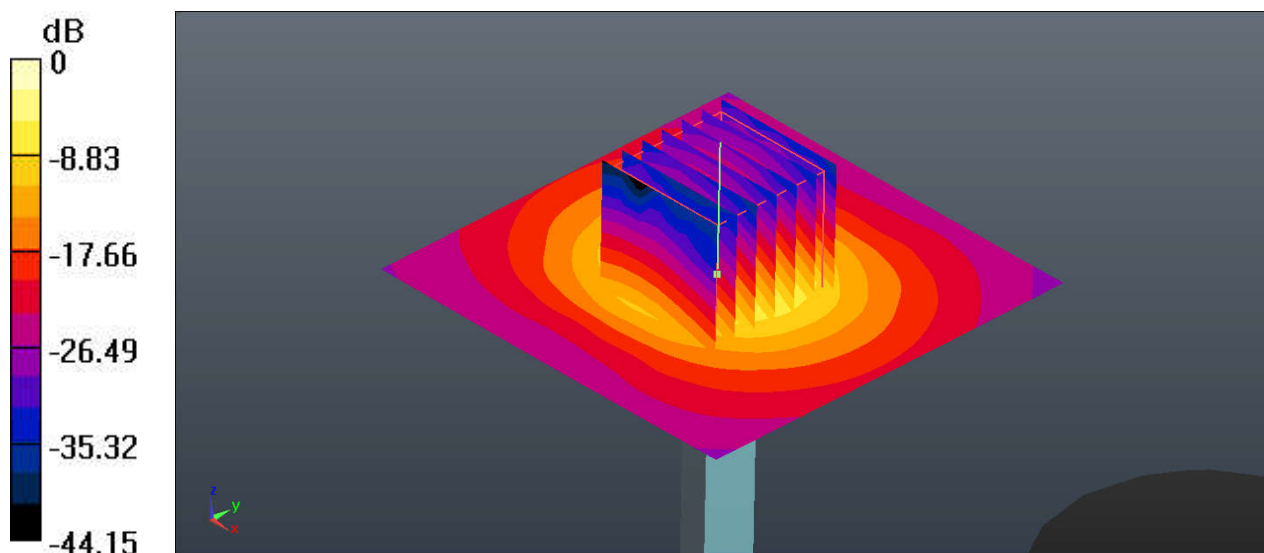
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 57.48 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 34.2 W/kg

SAR(1 g) = 8.02 W/kg; SAR(10 g) = 2.19 W/kg

Maximum value of SAR (measured) = 20.5 W/kg



System Check_Head_5600MHz

DUT: D5GHzV2-SN:1167

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: HSL_5600_180825 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.199$ S/m; $\epsilon_r = 36.179$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.78, 4.78, 4.78); Calibrated: 2018.01.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 21.3 W/kg

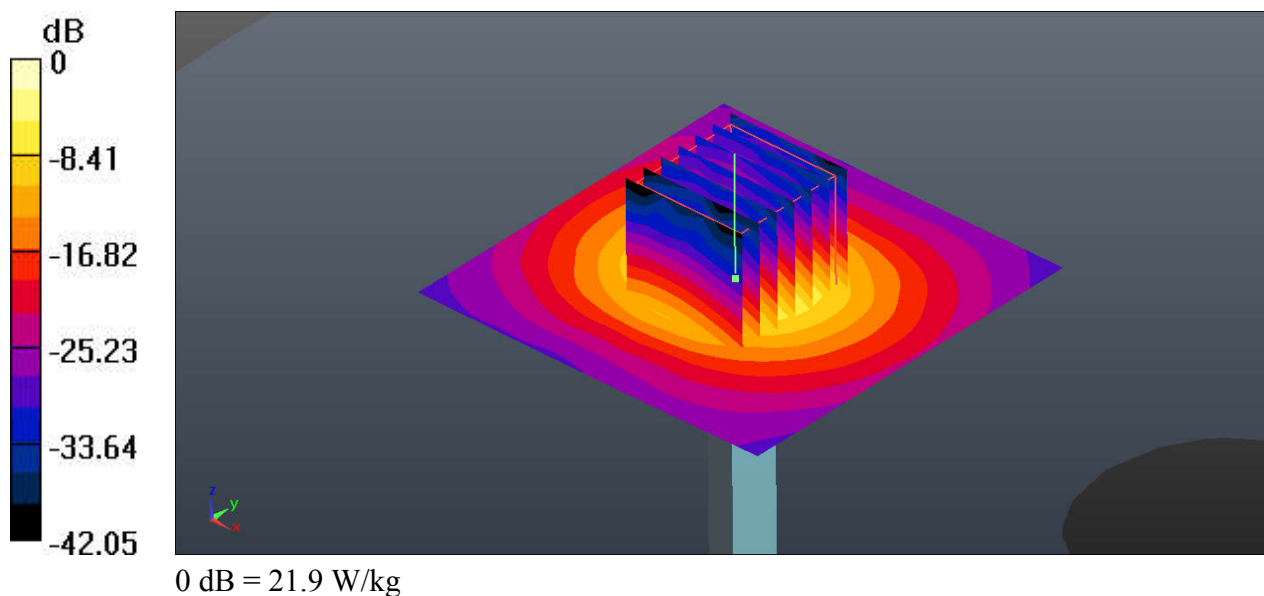
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 56.95 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 36.5 W/kg

SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.32 W/kg

Maximum value of SAR (measured) = 21.9 W/kg



System Check_Head_5750MHz

DUT: D5GHzV2-SN:1167

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL_5750_180825 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.173$ S/m; $\epsilon_r = 35.826$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.8, 4.8, 4.8); Calibrated: 2018.01.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 19.6 W/kg

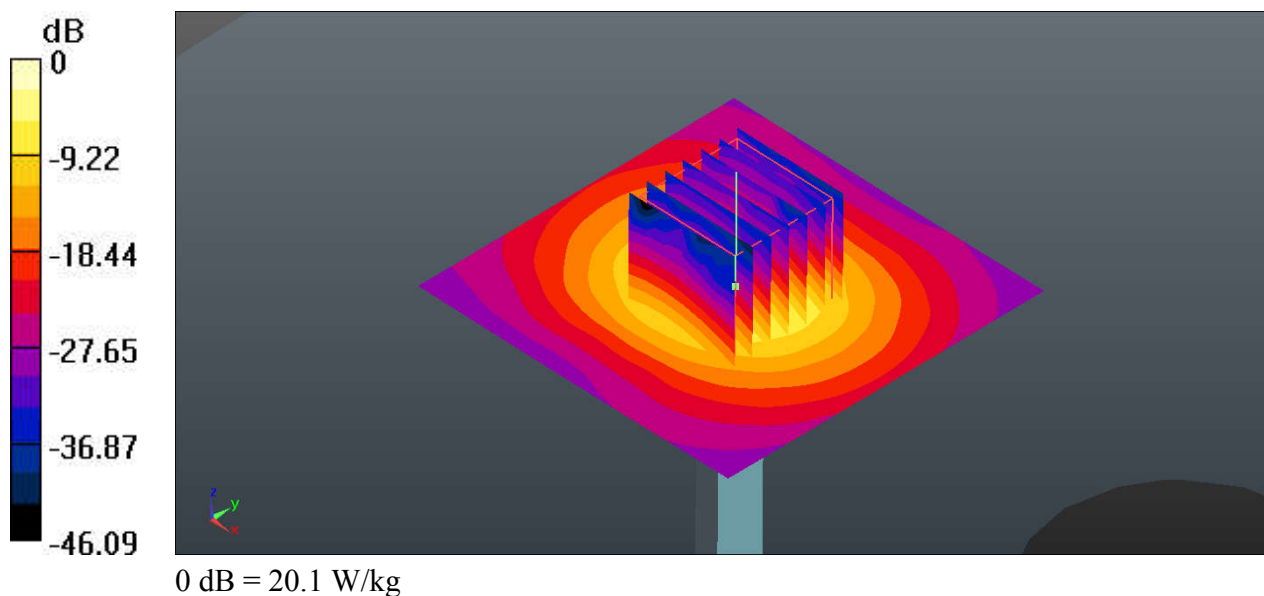
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 54.42 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 34.3 W/kg

SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 20.1 W/kg



System Check_Body_750MHz

DUT: D750V3-SN:1099

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium: MSL_750_180829 Medium parameters used: $f = 750$ MHz; $\sigma = 0.97$ S/m; $\epsilon_r = 54.642$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.7, 9.7, 9.7); Calibrated: 2018.01.31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1437; Calibrated: 2017.09.15
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.60 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.74 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.93 W/kg

SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (measured) = 2.57 W/kg

