FCC SAR TEST REPORT

FCC ID	:	ZMOL850GLL
Equipment	:	LTE Module
Brand Name	:	Fibocom
Model Name	:	L850-GL
Applicant	:	Fibocom Wireless Inc. 5/F, Tower A, Technology Building II, 1057 Nanhai Blvd, Nanshan, Shenzhen, China
Standard	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

Equipment：Fibocom L850-GL tested inside of Lenovo Notebook.

The product was received on Oct. 18, 2019 and testing was started from Oct. 26, 2019 and completed on Nov. 06, 2019. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

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

Cona Huang

Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA9O1135-02	01	Initial issue of report	Dec. 24, 2019

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Fibocom Wireless Inc., LTE Module, L850-GL**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary Body 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA II	1.16	1.59
	WCDMA IV	1.09	
	WCDMA V	1.08	
	LTE Band 2	1.07	
	LTE Band 7	1.07	
	LTE Band 12 / 17	1.01	
	LTE Band 13	1.15	
	LTE Band 5 / 26	1.14	
	LTE Band 30	1.13	
	LTE Band 41	1.19	
	LTE Band 4 / 66	1.04	
Date of Testing:		2019/10/26 ~ 2019/11/6	

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

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

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

- 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 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	LTE Module
Brand Name	Fibocom
Model Name	L850-GL
FCC ID	ZMOL850GLL
Wireless Technology and Frequency Range	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 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 17: 706.5 MHz ~ 713.5 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 30: 2307.5 MHz ~ 2312.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM
Remark: 1. For WWAN RF exposure evaluation is selected antenna vendor of “Amphenol” as the main tested and spot check antenna vendor of “Speedwire” to ensure both antenna vendors are compliant.	

WWAN Antenna Information				
Antenna 1	Manufacturer	Amphenol	Peak gain (dbi)	CE:1.17 FCC:1.12
	Part number	LXA113-16-000-C	Type	PIFA
Antenna 2	Manufacturer	SPEEDWIRE	Peak gain (dbi)	CE:1.25 FCC:1.63
	Part number	F.0G.ZV-0009-001-00	Type	PIFA

Host Information	
Equipment Name	Notebook Computer
Brand Name	Lenovo
Model Name	TP00109B
Integrated WLAN Module	Brand Name: Intel Model Name: AX201D2W
Integrated NFC Module	Brand Name: FOXCONN Model Name: T77H747
Wireless Technology and Frequency Range	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 ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20 / HT40 / VHT20 / VHT40 / VHT80 / VHT160 / HE20 / HE40 / HE80 / HE160 Bluetooth BR/EDR/LE/HS NFC:ASK
EUT Stage	Production Unit
Remark: 1. The Intel AX201D2W WLAN/BT module integrated in this host, the 2.4GHz/5 GHz WLAN and Bluetooth SAR results are referenced from the report of FCC ID: PD9AX201D2 (SAR Report No. 180717-03.TR11) , and these SAR results are also used to perform simultaneous transmission analysis.	

3.2 General LTE SAR Test and Reporting Considerations

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>ZMOL850GLL</td></tr>
<tr><td>Equipment Name</td><td>LTE Module</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>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 17: 706.5 MHz ~ 713.5 MHz
LTE Band 26: 814.7 MHz ~ 848.3 MHz
LTE Band 30: 2307.5 MHz ~ 2312.5 MHz
LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
LTE Band 66: 1710.7 MHz ~ 1779.3 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 13: 5MHz, 10MHz
LTE Band 17: 5MHz, 10MHz
LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
LTE Band 30: 5MHz, 10MHz
LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK / 16QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Data only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table>
</td></tr>
<tr><td>LTE A-MPR</td><td>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)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>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.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>Yes, Proximity Sensor and G-sensor</td></tr>
<tr><td>LTE Carrier Aggregation Combinations</td><td>Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to section 11.</td></tr>
<tr><td>LTE Carrier Aggregation Additional Information</td><td>This device supports maximum of 3 carriers in the downlink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.</td></tr>
</table>

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)
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)
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)
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 17								
	Bandwidth 5 MHz				Bandwidth 10 MHz			
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)	
L	23755		706.5		23780		709	
M	23790		710		23790		710	
H	23825		713.5		23800		711	
LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 30				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	27685	2307.5	27710	2310
M	27710	2310		
H	27735	2312.5		

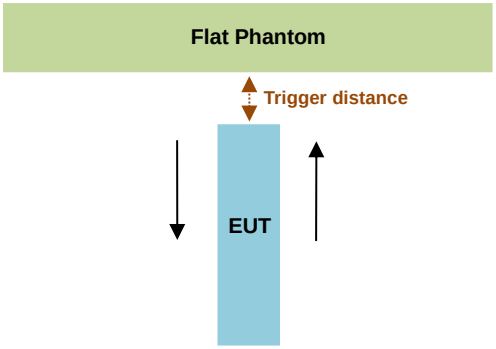
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	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

4. Proximity Sensor Triggering Test

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

Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed. The details are illustrated in the exhibit “P-Sensor operational description”, and the shortest triggering distances were reported and used for SAR assessment.
In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; no other frequency bands tissue-equivalent medium was found to result in shortest triggering distance than that for 1900MHz, and the tissue-equivalent medium for 1900MHz was used for formal proximity sensor triggering testing.



Proximity Sensor Trigger Distance (mm)		
Position	Bottom of Laptop	
Position	Moving towards	Moving away
Minimum	11	12

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

If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and “along the direction of maximum antenna and sensor offset”.
Illustrated in the internal photo exhibit, although the senor is spatially offset, there is no trigger condition where the antenna is next to the user but the sensor is laterally further away, therefore proximity sensor coverage testing is not required.
This procedure is not required because antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

Proximity sensor power reduction

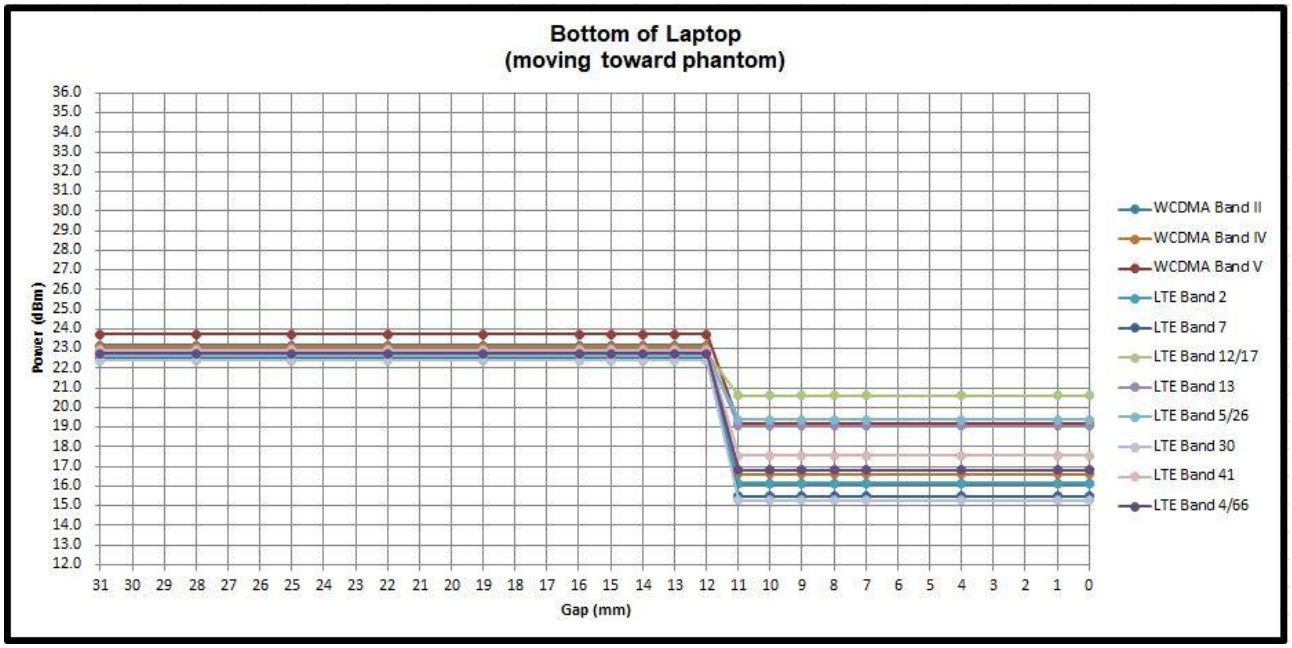
Exposure Position / wireless mode	Bottom of Laptop[(1)]
WCDMA Band V	4.5 dB
WCDMA Band II	7.5 dB
WCDMA Band IV	7.0 dB
LTE Band 2	7.0 dB
LTE Band 4	6.5 dB
LTE Band 5	4.0 dB
LTE Band 7	8.0 dB
LTE Band 12	2.5 dB
LTE Band 13	3.5 dB
LTE Band 17	2.5 dB
LTE Band 26	4.0 dB
LTE Band 30	8.0 dB
LTE Band 41	4.5 dB
LTE Band 66	6.5 dB

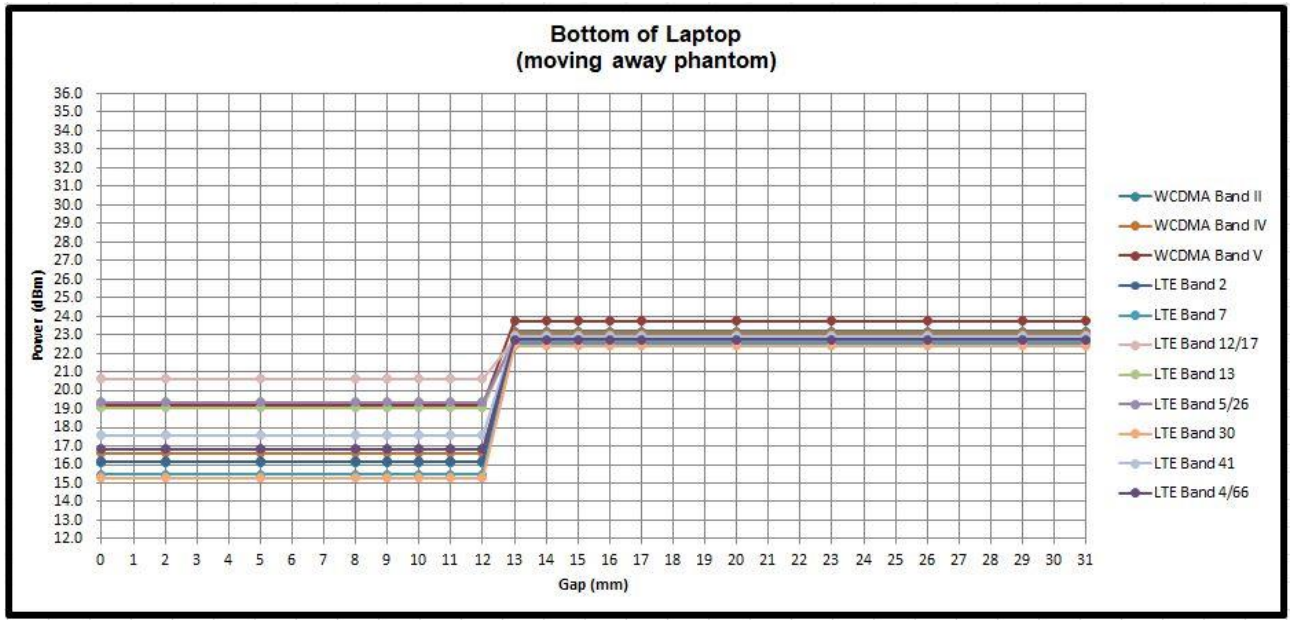
Remark:

1. [(1)]: Reduced maximum limit applied by activation of proximity sensor and G-sensor.
2. Power reduction is not applicable for WLAN and Bluetooth.
3. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown and described in exhibit “operational description”
4. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:

- Bottom of Laptop: 10 mm

Power Measurement during Sensor Trigger distance testing





5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

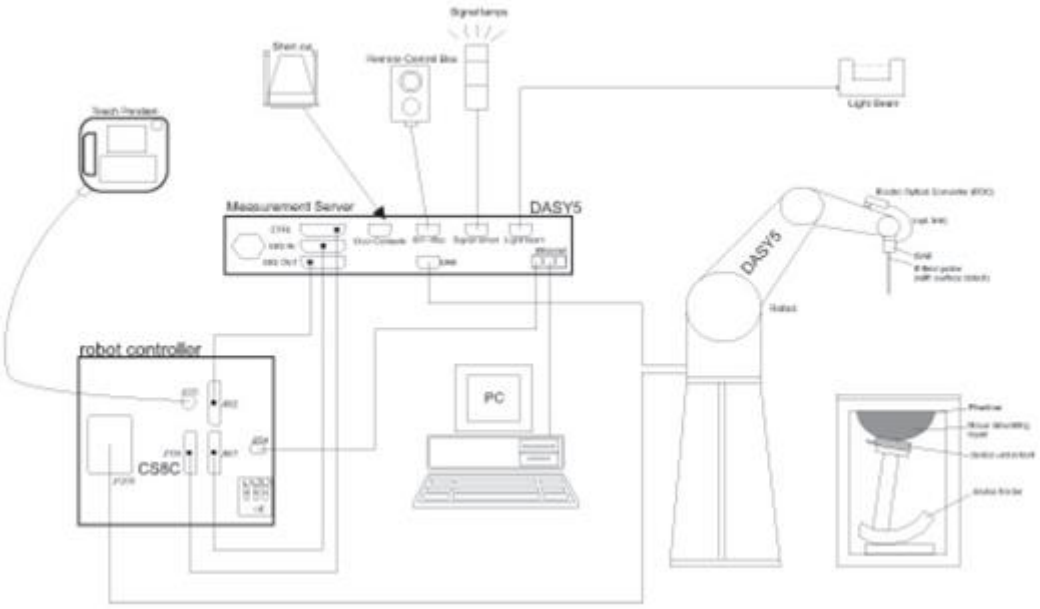
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



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

7.1 E-Field Probe

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

<ES3DV3 Probe>

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

<EX3DV4 Probe>

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

7.2 Data Acquisition Electronics (DAE)

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

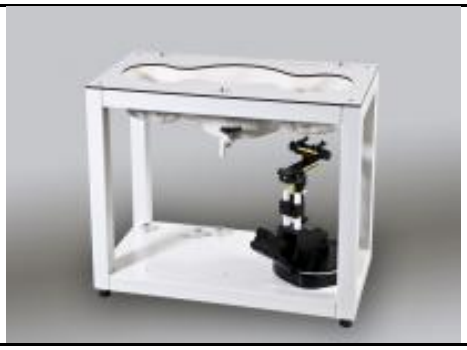
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

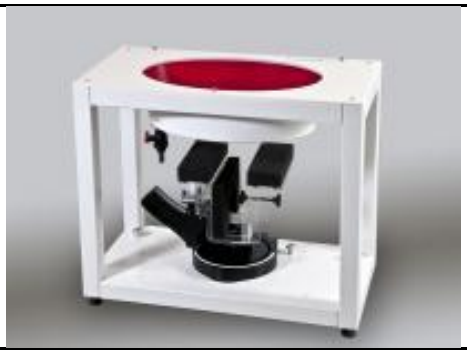
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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

<ELI Phantom>

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



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

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form 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 dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

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

<table>
<tr><td></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
</table>

8.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
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 *reported* SAR from the *area scan based 1-g SAR estimation* 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 for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1117	Mar. 13, 2019	Mar. 12, 2020
SPEAG	835MHz System Validation Kit	D835V2	499	Sep. 06, 2018	Sep. 05, 2020
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 19, 2018	Nov. 18, 2019
SPEAG	1900MHz System Validation Kit	D1900V2	5d185	Mar. 07, 2019	Mar. 06, 2020
SPEAG	2300MHz System Validation Kit	D2300V2	1088	Jul. 06, 2018	Jul. 05, 2020
SPEAG	2600MHz System Validation Kit	D2600V2	1089	Mar. 14, 2019	Mar. 13, 2020
SPEAG	Data Acquisition Electronics	DAE3	577	Sep. 17, 2019	Sep. 16, 2020
SPEAG	Data Acquisition Electronics	DAE4	778	May. 21, 2019	May. 20, 2020
SPEAG	Data Acquisition Electronics	DAE4	1424	Jan. 24, 2019	Jan. 23, 2020
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 25, 2019	Sep. 24, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 26, 2019	Sep. 25, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3976	Jan. 29, 2019	Jan. 28, 2020
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 12, 2018	Nov. 11, 2019
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2018	Nov. 11, 2019
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Apr. 21, 2019	Apr. 20, 2020
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 27, 2019	May. 26, 2020
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Dec. 11, 2018	Dec. 10, 2019
Agilent	ENA Network Analyzer	E5071C	MY46104758	Sep. 06, 2019	Sep. 05, 2020
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 18, 2019	Sep. 17, 2020
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3169	Sep. 10, 2019	Sep. 09, 2020
Anritsu	Power Meter	ML2495A	1036004	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Sensor	MA2411B	1027253	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Meter	ML2495A	1419002	May. 29, 2019	May. 28, 2020
Anritsu	Power Sensor	MA2411B	1339124	May. 29, 2019	May. 28, 2020
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 27, 2019	Aug. 26, 2020
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 27, 2019	Jun. 26, 2020
Mini-Circuits	Power Amplifier	ZHL-42W+	321501827	Aug. 12, 2019	Aug. 11, 2020
Mini-Circuits	Power Amplifier	ZHL-42W+	715701915	May. 10, 2019	May. 09, 2020
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D835V2, SN: 499, D2300, SN:1088 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

10. System Verification

10.1 Tissue Simulating Liquids

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

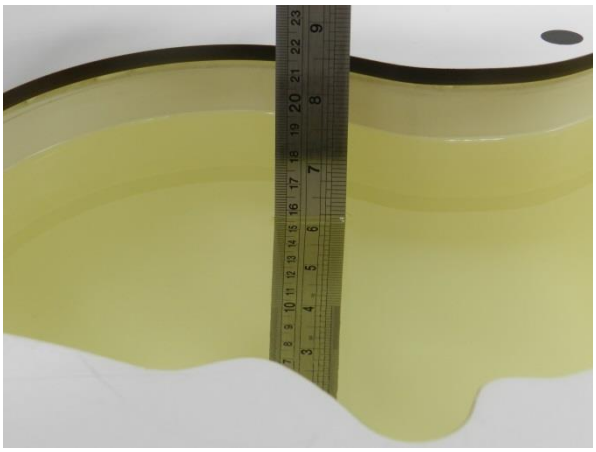


Fig 10.1Photo of Liquid Height for Head SAR

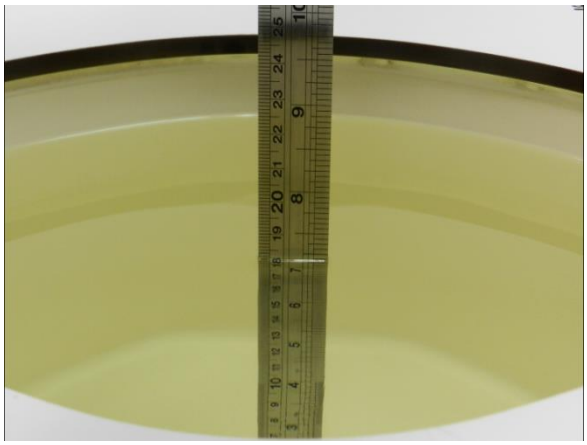


Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

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

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	22.2	0.897	43.471	0.89	41.90	0.79	3.75	±5	2019/11/6
835	22.6	0.882	41.938	0.90	41.50	-2.00	1.06	±5	2019/11/2
1750	22.5	1.371	40.165	1.37	40.10	0.07	0.16	±5	2019/10/26
1750	22.5	1.368	40.275	1.37	40.10	-0.15	0.44	±5	2019/10/27
1900	22.5	1.414	40.422	1.40	40.00	1.00	1.05	±5	2019/10/26
1900	22.5	1.420	39.030	1.40	40.00	1.43	-2.43	±5	2019/10/27
2300	22.4	1.703	39.153	1.67	39.50	1.98	-0.88	±5	2019/11/4
2300	22.6	1.695	39.846	1.67	39.50	1.50	0.88	±5	2019/11/6
2600	22.4	2.055	37.975	1.96	39.00	4.85	-2.63	±5	2019/11/4
2600	22.6	2.047	38.661	1.96	39.00	4.44	-0.87	±5	2019/11/6

10.3 System Performance Check Results

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

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2019/11/6	750	250	D750V3_1117	EX3DV4 - SN3976	DAE4 Sn1424	2.12	8.25	8.48	2.79
2019/11/2	835	250	D835V2-499	ES3DV3 - SN3270	DAE3 Sn577	2.25	9.59	9	-6.15
2019/10/26	1750	250	D1750V2-1068	EX3DV4 - SN3931	DAE4 Sn778	9.20	37.10	36.8	-0.81
2019/10/27	1750	250	D1750V2-1068	EX3DV4 - SN3931	DAE4 Sn778	9.19	37.10	36.76	-0.92
2019/10/26	1900	250	D1900V2-5d185	EX3DV4 - SN3931	DAE4 Sn778	10.00	39.40	40	1.52
2019/10/27	1900	250	D1900V2-5d185	EX3DV4 - SN3931	DAE4 Sn778	9.95	39.40	39.8	1.02
2019/11/4	2300	250	D2300V2_1088	EX3DV4 - SN3976	DAE4 Sn1424	12.70	48.20	50.8	5.39
2019/11/6	2300	250	D2300V2_1088	EX3DV4 - SN3976	DAE4 Sn1424	12.20	48.20	48.8	1.24
2019/11/4	2600	250	D2600V2_1089	EX3DV4 - SN3976	DAE4 Sn1424	15.11	55.50	60.44	8.90
2019/11/6	2600	250	D2600V2_1089	EX3DV4 - SN3976	DAE4 Sn1424	15.00	55.50	60	8.11

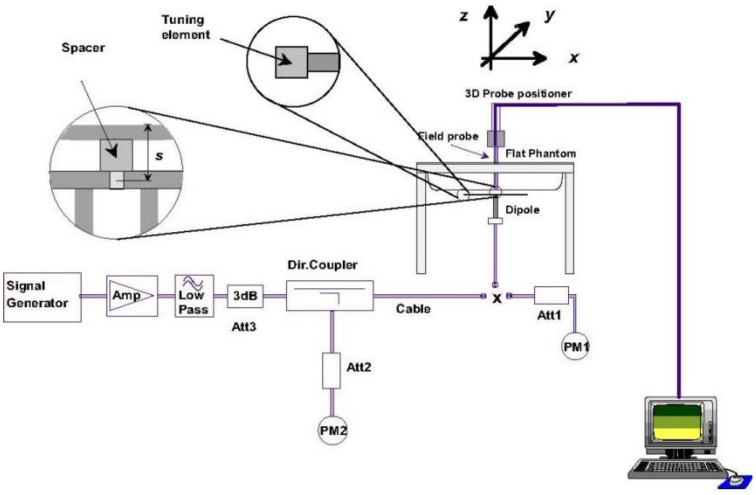


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. Conducted RF Output Power (Unit: dBm)

<WCDMA Conducted Power>

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

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, 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 Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_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 Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

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

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	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	209/225	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	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 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 Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 10/15 and β_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: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_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	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

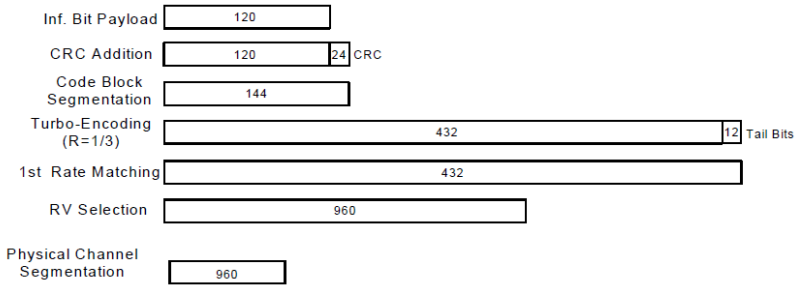


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Default Power Mode

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	23.15	23.16	23.04	24.50	22.92	23.09	23.16	24.50	23.66	23.72	23.69	24.50
3GPP Rel 6	HSDPA Subtest-1	22.78	23.00	22.90	23.50	22.84	22.70	22.97	23.50	23.39	23.20	23.36	23.50
3GPP Rel 6	HSDPA Subtest-2	21.69	22.01	21.88	23.50	22.00	21.84	22.14	23.50	22.35	22.78	22.42	23.50
3GPP Rel 6	HSDPA Subtest-3	21.39	21.50	21.52	23.00	21.42	21.37	21.47	23.00	21.90	21.76	21.98	23.00
3GPP Rel 6	HSDPA Subtest-4	21.18	21.21	21.11	23.00	21.31	21.05	21.30	23.00	21.59	21.80	21.70	23.00
3GPP Rel 8	DC-HSDPA Subtest-1	22.59	22.78	22.61	23.50	22.81	22.70	22.91	23.50	23.25	23.17	23.37	23.50
3GPP Rel 8	DC-HSDPA Subtest-2	21.75	22.03	21.72	23.50	21.95	21.84	21.93	23.50	22.15	22.46	22.31	23.50
3GPP Rel 8	DC-HSDPA Subtest-3	21.10	21.37	21.22	23.00	21.42	21.20	21.39	23.00	21.83	21.99	21.90	23.00
3GPP Rel 8	DC-HSDPA Subtest-4	21.08	21.11	21.09	23.00	21.07	21.02	21.20	23.00	21.55	21.80	21.74	23.00
3GPP Rel 6	HSUPA Subtest-1	21.81	22.02	21.83	23.50	21.97	21.73	21.91	23.50	22.36	22.68	22.37	23.50
3GPP Rel 6	HSUPA Subtest-2	19.57	19.76	19.65	21.50	19.64	19.68	19.78	21.50	20.17	20.54	20.13	21.50
3GPP Rel 6	HSUPA Subtest-3	20.53	20.52	20.54	22.50	20.50	20.58	20.70	22.50	20.88	21.32	20.94	22.50
3GPP Rel 6	HSUPA Subtest-4	19.70	20.06	20.05	21.50	19.98	19.76	20.16	21.50	20.41	20.74	20.51	21.50
3GPP Rel 6	HSUPA Subtest-5	21.66	21.92	21.94	23.50	22.02	21.88	22.03	23.50	22.28	22.75	22.45	23.50

Reduced Power Mode

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	16.08	16.13	15.92	17.00	16.63	16.62	16.64	17.50	19.14	19.16	19.15	20.00
3GPP Rel 6	HSDPA Subtest-1	16.07	16.12	15.91	17.00	16.51	16.57	16.60	17.50	19.11	19.03	18.96	20.00
3GPP Rel 6	HSDPA Subtest-2	16.07	16.10	15.90	17.00	16.51	16.57	16.57	17.50	19.13	19.03	18.98	20.00
3GPP Rel 6	HSDPA Subtest-3	16.06	16.07	15.88	17.00	16.49	16.54	16.50	17.50	19.11	19.02	18.95	20.00
3GPP Rel 6	HSDPA Subtest-4	16.05	16.07	15.88	17.00	16.49	16.52	16.43	17.50	19.10	19.02	18.95	20.00
3GPP Rel 8	DC-HSDPA Subtest-1	16.02	16.06	15.88	17.00	16.47	16.47	16.56	17.50	19.09	19.02	18.93	20.00
3GPP Rel 8	DC-HSDPA Subtest-2	15.99	16.03	15.84	17.00	16.51	16.55	16.54	17.50	19.11	19.01	18.95	20.00
3GPP Rel 8	DC-HSDPA Subtest-3	16.05	16.00	15.83	17.00	16.40	16.47	16.47	17.50	19.12	19.02	18.93	20.00
3GPP Rel 8	DC-HSDPA Subtest-4	16.04	16.00	15.84	17.00	16.44	16.42	16.38	17.50	19.13	19.00	18.90	20.00
3GPP Rel 6	HSUPA Subtest-1	16.06	16.11	15.87	17.00	16.44	16.46	16.48	17.50	19.11	18.99	18.90	20.00
3GPP Rel 6	HSUPA Subtest-2	16.03	16.12	15.89	17.00	16.59	16.57	16.60	17.50	19.10	19.03	18.94	20.00
3GPP Rel 6	HSUPA Subtest-3	16.02	16.09	15.87	17.00	16.38	16.48	16.52	17.50	19.10	19.00	18.95	20.00
3GPP Rel 6	HSUPA Subtest-4	16.06	16.10	15.83	17.00	16.54	16.55	16.57	17.50	19.12	18.99	18.99	20.00
3GPP Rel 6	HSUPA Subtest-5	16.04	16.04	15.84	17.00	16.54	16.54	16.56	17.50	19.11	19.02	18.98	20.00

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B12 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 4 / 5 / 17 SAR test was covered by Band 66 / 26 / 12; 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 ≤ the larger band to qualify for the SAR test exclusion
    b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

Default Power Mode

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.79	22.86	22.58	24	0
20	QPSK	1	49	22.50	22.45	22.38		
20	QPSK	1	99	22.64	22.67	22.54		
20	QPSK	50	0	21.66	21.74	21.50	23	1
20	QPSK	50	24	21.56	21.73	21.39		
20	QPSK	50	50	21.54	21.69	21.49		
20	QPSK	100	0	21.68	21.86	21.66		
20	16QAM	1	0	22.00	21.92	21.81	23	1
20	16QAM	1	49	21.76	21.97	21.55		
20	16QAM	1	99	21.87	22.00	21.75		
20	16QAM	50	0	20.68	20.77	20.44	22	2
20	16QAM	50	24	20.57	20.82	20.43		
20	16QAM	50	50	20.55	20.75	20.53		
20	16QAM	100	0	20.70	20.92	20.70		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.73	22.68	22.42	24	0
15	QPSK	1	37	22.57	22.80	22.43		
15	QPSK	1	74	22.50	22.76	22.49		
15	QPSK	36	0	21.65	21.73	21.45	23	1
15	QPSK	36	20	21.61	21.80	21.52		
15	QPSK	36	39	21.52	21.78	21.57		
15	QPSK	75	0	21.61	21.81	21.66		
15	16QAM	1	0	21.97	21.90	21.64	23	1
15	16QAM	1	37	21.81	21.92	21.68		
15	16QAM	1	74	21.71	21.92	21.74		
15	16QAM	36	0	20.71	20.76	20.51	22	2
15	16QAM	36	20	20.65	20.83	20.57		
15	16QAM	36	39	20.57	20.81	20.60		
15	16QAM	75	0	20.65	20.82	20.68		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.70	22.85	22.55	24	0
10	QPSK	1	25	22.77	22.80	22.56		
10	QPSK	1	49	22.72	22.75	22.63		
10	QPSK	25	0	21.90	21.87	21.57	23	1
10	QPSK	25	12	21.82	21.90	21.55		
10	QPSK	25	25	21.80	21.88	21.58		
10	QPSK	50	0	21.80	21.86	21.53		
10	16QAM	1	0	21.98	21.83	21.68	23	1
10	16QAM	1	25	21.86	21.84	21.69		
10	16QAM	1	49	22.00	21.95	21.76		
10	16QAM	25	0	20.94	20.90	20.55	22	2
10	16QAM	25	12	20.84	20.96	20.56		

10	16QAM	25	25	20.81	20.97	20.58		
10	16QAM	50	0	20.82	20.94	20.54		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.72	22.85	22.49	24	0
5	QPSK	1	12	22.72	22.76	22.54		
5	QPSK	1	24	22.62	22.72	22.70		
5	QPSK	12	0	21.91	21.89	21.52	23	1
5	QPSK	12	7	21.90	21.94	21.64		
5	QPSK	12	13	21.90	21.83	21.57		
5	QPSK	25	0	21.85	21.91	21.57		
5	16QAM	1	0	21.93	21.90	21.70	23	1
5	16QAM	1	12	21.87	21.77	21.64		
5	16QAM	1	24	21.93	21.93	21.82		
5	16QAM	12	0	20.94	20.89	20.60	22	2
5	16QAM	12	7	20.79	20.98	20.64		
5	16QAM	12	13	20.73	20.99	20.56		
5	16QAM	25	0	20.87	20.84	20.48		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.72	22.55	22.53	24	0
3	QPSK	1	8	22.45	22.64	22.31		
3	QPSK	1	14	22.62	22.60	22.50		
3	QPSK	8	0	21.60	21.57	21.33	23	1
3	QPSK	8	4	21.50	21.66	21.29		
3	QPSK	8	7	21.50	21.69	21.43		
3	QPSK	15	0	21.68	21.78	21.62		
3	16QAM	1	0	21.99	21.86	21.72	23	1
3	16QAM	1	8	21.76	21.93	21.55		
3	16QAM	1	14	21.78	21.92	21.68		
3	16QAM	8	0	20.59	20.71	20.34	22	2
3	16QAM	8	4	20.57	20.74	20.34		
3	16QAM	8	7	20.52	20.67	20.52		
3	16QAM	15	0	20.70	20.87	20.61		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.69	22.58	22.56	24	0
1.4	QPSK	1	3	22.48	22.67	22.28		
1.4	QPSK	1	5	22.64	22.63	22.45		
1.4	QPSK	3	0	22.67	22.51	22.64		
1.4	QPSK	3	1	22.55	22.75	22.32		
1.4	QPSK	3	3	22.74	22.72	22.40		
1.4	QPSK	6	0	21.64	21.79	21.56	23	1
1.4	16QAM	1	0	22.00	21.83	21.78	23	1
1.4	16QAM	1	3	21.69	21.97	21.50		
1.4	16QAM	1	5	21.86	21.96	21.72		
1.4	16QAM	3	0	22.07	21.87	21.71		
1.4	16QAM	3	1	21.61	21.94	21.48		
1.4	16QAM	3	3	21.80	21.91	21.79		
1.4	16QAM	6	0	20.61	20.88	20.64	22	2

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	22.67	22.81	22.80	24	0
20	QPSK	1	49	22.57	22.53	22.45		
20	QPSK	1	99	22.60	22.37	22.72		
20	QPSK	50	0	21.66	21.69	21.65	23	1
20	QPSK	50	24	21.50	21.54	21.43		
20	QPSK	50	50	21.66	21.44	21.58		
20	QPSK	100	0	21.75	21.82	21.64		
20	16QAM	1	0	21.70	21.95	21.69	23	1
20	16QAM	1	49	21.84	21.78	21.58		
20	16QAM	1	99	21.78	21.61	21.95		
20	16QAM	50	0	20.74	20.64	20.42	22	2
20	16QAM	50	24	20.74	20.60	20.48		
20	16QAM	50	50	20.73	20.49	20.75		
20	16QAM	100	0	20.84	20.68	20.75		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.51	22.76	22.40	24	0
15	QPSK	1	37	22.70	22.55	22.66		
15	QPSK	1	74	22.69	22.39	22.79		
15	QPSK	36	0	21.60	21.60	21.44	23	1
15	QPSK	36	20	21.75	21.59	21.70		
15	QPSK	36	39	21.73	21.49	21.76		
15	QPSK	75	0	21.78	21.59	21.75		
15	16QAM	1	0	21.70	21.90	21.68	23	1
15	16QAM	1	37	21.89	21.76	21.83		
15	16QAM	1	74	21.91	21.62	21.98		
15	16QAM	36	0	20.65	20.66	20.48	22	2
15	16QAM	36	20	20.81	20.63	20.75		
15	16QAM	36	39	20.86	20.53	20.80		
15	16QAM	75	0	20.84	20.61	20.77		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.51	22.71	22.55	24	0
10	QPSK	1	25	22.69	22.66	22.59		
10	QPSK	1	49	22.78	22.55	22.65		
10	QPSK	25	0	21.65	21.74	21.55	23	1
10	QPSK	25	12	21.65	21.67	21.54		
10	QPSK	25	25	21.77	21.61	21.66		
10	QPSK	50	0	21.69	21.58	21.61		
10	16QAM	1	0	21.78	21.92	21.65	23	1
10	16QAM	1	25	21.87	21.79	21.87		
10	16QAM	1	49	21.82	21.73	21.95		
10	16QAM	25	0	20.60	20.73	20.71	22	2
10	16QAM	25	12	20.61	20.67	20.67		
10	16QAM	25	25	20.85	20.64	20.69		

10	16QAM	50	0	20.76	20.62	20.66		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.44	22.69	22.45	24	0
5	QPSK	1	12	22.61	22.47	22.44		
5	QPSK	1	24	22.53	22.36	22.75		
5	QPSK	12	0	21.68	21.51	21.30	23	1
5	QPSK	12	7	21.69	21.47	21.43		
5	QPSK	12	13	21.64	21.44	21.62		
5	QPSK	25	0	21.72	21.56	21.61		
5	16QAM	1	0	21.66	21.90	21.69	23	1
5	16QAM	1	12	21.83	21.73	21.48		
5	16QAM	1	24	21.78	21.60	21.89		
5	16QAM	12	0	20.68	20.64	20.33	22	2
5	16QAM	12	7	20.67	20.57	20.41		
5	16QAM	12	13	20.72	20.46	20.66		
5	16QAM	25	0	20.81	20.61	20.68		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.43	22.72	22.48	24	0
3	QPSK	1	8	22.61	22.46	22.38		
3	QPSK	1	14	22.51	22.33	22.73		
3	QPSK	8	0	21.60	21.52	21.29	23	1
3	QPSK	8	4	21.59	21.47	21.38		
3	QPSK	8	7	21.63	21.42	21.60		
3	QPSK	15	0	21.80	21.51	21.55		
3	16QAM	1	0	21.67	21.90	21.64	23	1
3	16QAM	1	8	21.78	21.69	21.57		
3	16QAM	1	14	21.69	21.59	21.93		
3	16QAM	8	0	20.66	20.60	20.36	22	2
3	16QAM	8	4	20.74	20.56	20.44		
3	16QAM	8	7	20.64	20.42	20.66		
3	16QAM	15	0	20.79	20.66	20.73		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.47	22.67	22.50	24	0
1.4	QPSK	1	3	22.63	22.52	22.37		
1.4	QPSK	1	5	22.51	22.27	22.72		
1.4	QPSK	3	0	22.42	22.68	22.50		
1.4	QPSK	3	1	22.60	22.49	22.44		
1.4	QPSK	3	3	22.59	22.34	22.68		
1.4	QPSK	6	0	21.79	21.54	21.59	23	1
1.4	16QAM	1	0	21.61	21.85	21.59	23	1
1.4	16QAM	1	3	21.79	21.78	21.48		
1.4	16QAM	1	5	21.76	21.54	21.93		
1.4	16QAM	3	0	21.65	21.78	21.53		
1.4	16QAM	3	1	21.82	21.72	21.41		
1.4	16QAM	3	3	21.66	21.57	21.98		
1.4	16QAM	6	0	20.84	20.67	20.65	22	2

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.47	22.55	22.49	24	0
10	QPSK	1	25	22.29	22.09	22.47		
10	QPSK	1	49	22.35	22.34	22.48		
10	QPSK	25	0	21.42	21.65	21.64	23	1
10	QPSK	25	12	21.22	21.58	21.54		
10	QPSK	25	25	21.40	21.62	21.57		
10	QPSK	50	0	21.27	21.79	21.60		
10	16QAM	1	0	21.12	21.96	21.80	23	1
10	16QAM	1	25	21.34	21.89	21.54		
10	16QAM	1	49	21.63	21.75	21.61		
10	16QAM	25	0	20.09	20.66	20.47	22	2
10	16QAM	25	12	20.17	20.65	20.43		
10	16QAM	25	25	20.35	20.62	20.51		
10	16QAM	50	0	20.21	20.65	20.54		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.03	22.25	22.61	24	0
5	QPSK	1	12	22.19	22.07	22.39		
5	QPSK	1	24	22.46	22.26	22.50		
5	QPSK	12	0	21.13	21.36	21.60	23	1
5	QPSK	12	7	21.18	21.76	21.50		
5	QPSK	12	13	21.32	21.65	21.55		
5	QPSK	25	0	21.25	21.78	21.53		
5	16QAM	1	0	21.06	21.91	21.72	23	1
5	16QAM	1	12	21.29	21.84	21.47		
5	16QAM	1	24	21.60	21.68	21.60		
5	16QAM	12	0	20.00	20.57	20.42	22	2
5	16QAM	12	7	20.10	20.61	20.35		
5	16QAM	12	13	20.28	20.62	20.49		
5	16QAM	25	0	20.11	20.55	20.49		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.07	22.28	22.59	24	0
3	QPSK	1	8	22.29	22.09	22.42		
3	QPSK	1	14	22.37	22.33	22.57		
3	QPSK	8	0	21.11	21.38	21.58	23	1
3	QPSK	8	4	21.19	21.67	21.48		
3	QPSK	8	7	21.40	21.64	21.57		
3	QPSK	15	0	21.18	21.75	21.50		
3	16QAM	1	0	21.02	21.92	21.79	23	1
3	16QAM	1	8	21.34	21.85	21.54		
3	16QAM	1	14	21.55	21.66	21.61		
3	16QAM	8	0	20.05	20.60	20.46	22	2
3	16QAM	8	4	20.11	20.61	20.37		
3	16QAM	8	7	20.35	20.53	20.42		

3	16QAM	15	0	20.11	20.60	20.51		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.09	22.26	22.67	24	0
1.4	QPSK	1	3	22.22	22.01	22.37		
1.4	QPSK	1	5	22.40	22.30	22.48		
1.4	QPSK	3	0	22.19	22.34	22.75		
1.4	QPSK	3	1	22.22	22.10	22.28		
1.4	QPSK	3	3	22.40	22.23	22.38		
1.4	QPSK	6	0	21.02	21.55	21.33	23	1
1.4	16QAM	1	0	21.10	21.87	21.72	23	1
1.4	16QAM	1	3	21.33	21.87	21.44		
1.4	16QAM	1	5	21.57	21.74	21.52		
1.4	16QAM	3	0	21.09	21.86	21.77		
1.4	16QAM	3	1	21.31	21.87	21.52		
1.4	16QAM	3	3	21.48	21.80	21.44		
1.4	16QAM	6	0	20.14	20.62	20.53	22	2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.01	22.04	22.18	24	0
20	QPSK	1	49	22.06	22.08	22.13		
20	QPSK	1	99	22.16	22.51	22.27		
20	QPSK	50	0	21.15	21.15	21.20	23	1
20	QPSK	50	24	21.18	21.18	21.25		
20	QPSK	50	50	21.18	21.33	21.31		
20	QPSK	100	0	21.28	21.33	21.35		
20	16QAM	1	0	21.24	21.36	21.40	23	1
20	16QAM	1	49	21.38	21.36	21.35		
20	16QAM	1	99	21.43	21.65	21.47		
20	16QAM	50	0	20.16	20.20	20.21	22	2
20	16QAM	50	24	20.19	20.22	20.25		
20	16QAM	50	50	20.18	20.39	20.30		
20	16QAM	100	0	20.29	20.37	20.36		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.05	22.07	22.09	24	0
15	QPSK	1	37	22.16	22.12	22.15		
15	QPSK	1	74	22.18	22.31	22.20		
15	QPSK	36	0	21.18	21.15	21.20	23	1
15	QPSK	36	20	21.23	21.20	21.21		
15	QPSK	36	39	21.26	21.31	21.24		
15	QPSK	75	0	21.26	21.23	21.25		
15	16QAM	1	0	21.23	21.27	21.30	23	1
15	16QAM	1	37	21.37	21.34	21.37		
15	16QAM	1	74	21.35	21.53	21.44		
15	16QAM	36	0	20.24	20.19	20.27	22	2
15	16QAM	36	20	20.29	20.23	20.27		
15	16QAM	36	39	20.33	20.34	20.30		
15	16QAM	75	0	20.29	20.24	20.27		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.32	22.33	22.43	24	0
10	QPSK	1	25	22.40	22.33	22.36		
10	QPSK	1	49	22.49	22.34	22.47		
10	QPSK	25	0	21.49	21.40	21.50	23	1
10	QPSK	25	12	21.47	21.42	21.51		
10	QPSK	25	25	21.50	21.47	21.54		
10	QPSK	50	0	21.45	21.42	21.47		
10	16QAM	1	0	21.48	21.65	21.63	23	1
10	16QAM	1	25	21.59	21.61	21.65		
10	16QAM	1	49	21.68	21.78	21.71		
10	16QAM	25	0	20.48	20.47	20.51	22	2
10	16QAM	25	12	20.51	20.47	20.51		
10	16QAM	25	25	20.56	20.51	20.55		

10	16QAM	50	0	20.48	20.45	20.51		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.03	22.05	22.16	24	0
5	QPSK	1	12	22.00	22.08	22.06		
5	QPSK	1	24	22.13	22.24	22.20		
5	QPSK	12	0	21.12	21.07	21.17	23	1
5	QPSK	12	7	21.09	21.16	21.25		
5	QPSK	12	13	21.12	21.32	21.21		
5	QPSK	25	0	21.21	21.32	21.27		
5	16QAM	1	0	21.18	21.27	21.35	23	1
5	16QAM	1	12	21.30	21.36	21.34		
5	16QAM	1	24	21.37	21.60	21.46		
5	16QAM	12	0	20.13	20.11	20.19	22	2
5	16QAM	12	7	20.14	20.16	20.17		
5	16QAM	12	13	20.14	20.37	20.25		
5	16QAM	25	0	20.23	20.32	20.29		

<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		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	22.16	22.44	22.53	24	0
10	QPSK	1	25	22.45	22.45	22.69		
10	QPSK	1	49	22.51	22.76	22.70		
10	QPSK	25	0	21.51	21.49	21.60	23	1
10	QPSK	25	12	21.49	21.74	21.70		
10	QPSK	25	25	21.59	21.73	21.73		
10	QPSK	50	0	21.54	21.78	21.68		
10	16QAM	1	0	21.53	21.78	21.77	23	1
10	16QAM	1	25	21.70	21.76	21.94		
10	16QAM	1	49	21.72	21.95	21.95		
10	16QAM	25	0	20.57	20.64	20.67	22	2
10	16QAM	25	12	20.65	20.69	20.77		
10	16QAM	25	25	20.74	20.75	20.78		
10	16QAM	50	0	20.65	20.75	20.91		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	22.06	22.37	22.52	24	0
5	QPSK	1	12	22.44	22.39	22.68		
5	QPSK	1	24	22.41	22.66	22.68		
5	QPSK	12	0	21.45	21.42	21.58	23	1
5	QPSK	12	7	21.49	21.55	21.73		
5	QPSK	12	13	21.51	21.65	21.70		
5	QPSK	25	0	21.52	21.64	21.77		
5	16QAM	1	0	21.43	21.75	21.67	23	1
5	16QAM	1	12	21.66	21.68	21.91		
5	16QAM	1	24	21.71	21.91	21.88		
5	16QAM	12	0	20.55	20.61	20.57	22	2
5	16QAM	12	7	20.55	20.59	20.76		
5	16QAM	12	13	20.71	20.69	20.75		
5	16QAM	25	0	20.61	20.68	20.83		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	22.10	22.35	22.52	24	0
3	QPSK	1	8	22.39	22.38	22.63		
3	QPSK	1	14	22.42	22.70	22.66		
3	QPSK	8	0	21.51	21.44	21.60	23	1
3	QPSK	8	4	21.42	21.59	21.71		
3	QPSK	8	7	21.54	21.69	21.71		
3	QPSK	15	0	21.46	21.62	21.80		
3	16QAM	1	0	21.53	21.78	21.77	23	1
3	16QAM	1	8	21.60	21.68	21.89		
3	16QAM	1	14	21.68	21.87	21.88		
3	16QAM	8	0	20.51	20.54	20.66	22	2
3	16QAM	8	4	20.60	20.65	20.70		
3	16QAM	8	7	20.64	20.68	20.77		

3	16QAM	15	0	20.61	20.69	20.87		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	22.10	22.36	22.48	24	0
1.4	QPSK	1	3	22.35	22.43	22.68		
1.4	QPSK	1	5	22.41	22.69	22.66		
1.4	QPSK	3	0	22.06	22.30	22.48		
1.4	QPSK	3	1	22.40	22.44	22.69		
1.4	QPSK	3	3	22.50	22.71	22.75		
1.4	QPSK	6	0	21.50	21.60	21.80	23	1
1.4	16QAM	1	0	21.44	21.73	21.75	23	1
1.4	16QAM	1	3	21.64	21.75	21.86		
1.4	16QAM	1	5	21.63	21.91	21.86		
1.4	16QAM	3	0	21.50	21.69	21.80		
1.4	16QAM	3	1	21.62	21.66	21.84		
1.4	16QAM	3	3	21.70	21.84	21.95		
1.4	16QAM	6	0	20.64	20.72	20.89	22	2

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					23230			
Frequency (MHz)					782			
10	QPSK	1	0		22.79		24	0
10	QPSK	1	25		22.83			
10	QPSK	1	49		22.92			
10	QPSK	25	0		21.94		23	1
10	QPSK	25	12		21.83			
10	QPSK	25	25		21.82			
10	QPSK	50	0		22.00			
10	16QAM	1	0		22.01		23	1
10	16QAM	1	25		22.08			
10	16QAM	1	49		22.17			
10	16QAM	25	0		20.89		22	2
10	16QAM	25	12		20.84			
10	16QAM	25	25		20.85			
10	16QAM	50	0		21.05			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	22.85	22.82	22.75	24	0
5	QPSK	1	12	22.77	22.83	22.70		
5	QPSK	1	24	22.84	22.91	22.82		
5	QPSK	12	0	21.90	21.92	21.79	23	1
5	QPSK	12	7	21.75	21.94	21.67		
5	QPSK	12	13	21.87	21.96	21.69		
5	QPSK	25	0	21.88	22.10	21.86		
5	16QAM	1	0	22.02	22.20	22.06	23	1
5	16QAM	1	12	21.99	22.11	21.94		
5	16QAM	1	24	22.00	22.20	21.93		
5	16QAM	12	0	20.94	20.91	20.93	22	2
5	16QAM	12	7	20.80	20.93	20.73		
5	16QAM	12	13	21.00	21.02	20.82		
5	16QAM	25	0	20.87	21.10	20.80		

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	22.69	22.51	22.44	24	0
10	QPSK	1	25	22.83	22.52	22.49		
10	QPSK	1	49	22.79	22.89	22.68		
10	QPSK	25	0	21.75	21.79	21.72	23	1
10	QPSK	25	12	21.73	21.58	21.63		
10	QPSK	25	25	21.72	21.73	21.71		
10	QPSK	50	0	22.00	21.66	21.70		
10	16QAM	1	0	21.91	21.70	21.64	23	1
10	16QAM	1	25	21.98	21.70	21.70		
10	16QAM	1	49	21.97	21.94	21.91		
10	16QAM	25	0	20.89	20.65	20.63	22	2
10	16QAM	25	12	20.84	20.62	20.64		
10	16QAM	25	25	20.85	20.80	20.71		
10	16QAM	50	0	20.95	20.70	20.75		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	22.69	22.50	22.37	24	0
5	QPSK	1	12	22.78	22.44	22.48		
5	QPSK	1	24	22.83	22.73	22.60		
5	QPSK	12	0	21.88	21.48	21.49	23	1
5	QPSK	12	7	21.74	21.49	21.57		
5	QPSK	12	13	21.80	21.72	21.68		
5	QPSK	25	0	21.95	21.66	21.60		
5	16QAM	1	0	21.83	21.62	21.63	23	1
5	16QAM	1	12	21.96	21.66	21.67		
5	16QAM	1	24	21.87	21.93	21.83		
5	16QAM	12	0	20.83	20.58	20.60	22	2
5	16QAM	12	7	20.74	20.62	20.59		
5	16QAM	12	13	20.75	20.73	20.70		
5	16QAM	25	0	20.93	20.62	20.69		

<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	22.06	22.07	22.35	24	0
15	QPSK	1	37	22.47	22.64	22.37		
15	QPSK	1	74	22.20	22.33	22.22		
15	QPSK	36	0	21.21	21.26	21.35	23	1
15	QPSK	36	20	21.44	21.52	21.36		
15	QPSK	36	39	21.32	21.44	21.30		
15	QPSK	75	0	21.31	21.70	21.45		
15	16QAM	1	0	21.45	21.45	21.65	23	1
15	16QAM	1	37	21.45	21.84	21.59		
15	16QAM	1	74	21.79	21.72	21.58		
15	16QAM	36	0	20.32	20.38	20.49	22	2
15	16QAM	36	20	20.28	20.64	20.40		
15	16QAM	36	39	20.46	20.55	20.40		
15	16QAM	75	0	20.42	20.73	20.55		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	22.09	22.02	22.41	24	0
10	QPSK	1	25	22.18	22.46	22.21		
10	QPSK	1	49	22.57	22.31	22.17		
10	QPSK	25	0	21.12	21.34	21.41	23	1
10	QPSK	25	12	21.25	21.58	21.35		
10	QPSK	25	25	21.40	21.44	21.25		
10	QPSK	50	0	21.40	21.67	21.35		
10	16QAM	1	0	21.44	21.45	21.66	23	1
10	16QAM	1	25	21.43	21.94	21.54		
10	16QAM	1	49	21.75	21.73	21.48		
10	16QAM	25	0	20.22	20.43	20.54	22	2
10	16QAM	25	12	20.35	20.68	20.37		
10	16QAM	25	25	20.40	20.55	20.47		
10	16QAM	50	0	20.34	20.71	20.52		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	22.10	22.16	22.26	24	0
5	QPSK	1	12	22.07	22.50	22.23		
5	QPSK	1	24	22.57	22.43	22.25		
5	QPSK	12	0	21.23	21.34	21.38	23	1
5	QPSK	12	7	21.18	21.48	21.37		
5	QPSK	12	13	21.34	21.41	21.30		
5	QPSK	25	0	21.38	21.60	21.44		
5	16QAM	1	0	21.42	21.47	21.64	23	1
5	16QAM	1	12	21.45	21.83	21.51		
5	16QAM	1	24	21.86	21.76	21.59		
5	16QAM	12	0	20.37	20.46	20.52	22	2
5	16QAM	12	7	20.31	20.65	20.37		
5	16QAM	12	13	20.54	20.55	20.44		

5	16QAM	25	0	20.33	20.80	20.47		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	22.02	22.15	22.40	24	0
3	QPSK	1	8	22.20	22.55	22.19		
3	QPSK	1	14	22.46	22.35	22.18		
3	QPSK	8	0	21.12	21.33	21.37	23	1
3	QPSK	8	4	21.11	21.60	21.30		
3	QPSK	8	7	21.40	21.53	21.33		
3	QPSK	15	0	21.33	21.63	21.38		
3	16QAM	1	0	21.47	21.46	21.72	23	1
3	16QAM	1	8	21.39	21.84	21.67		
3	16QAM	1	14	21.86	21.75	21.57		
3	16QAM	8	0	20.37	20.44	20.51	22	2
3	16QAM	8	4	20.20	20.67	20.49		
3	16QAM	8	7	20.39	20.57	20.41		
3	16QAM	15	0	20.39	20.66	20.51		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	22.15	22.07	22.35	24	0
1.4	QPSK	1	3	22.10	22.61	22.25		
1.4	QPSK	1	5	22.37	22.37	22.24		
1.4	QPSK	3	0	22.11	22.09	22.33		
1.4	QPSK	3	1	22.08	22.47	22.17		
1.4	QPSK	3	3	22.46	22.42	22.24		
1.4	QPSK	6	0	21.24	21.79	21.38	23	1
1.4	16QAM	1	0	21.54	21.51	21.62	23	1
1.4	16QAM	1	3	21.53	21.92	21.56		
1.4	16QAM	1	5	21.89	21.68	21.66		
1.4	16QAM	3	0	21.52	21.54	21.70		
1.4	16QAM	3	1	21.50	21.85	21.57		
1.4	16QAM	3	3	21.79	21.75	21.70		
1.4	16QAM	6	0	20.48	20.63	20.64	22	2

<LTE Band 30>

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					27710			
Frequency (MHz)					2310			
10	QPSK	1	0		22.40		24	0
10	QPSK	1	25		22.20			
10	QPSK	1	49		22.21			
10	QPSK	25	0		21.20		23	1
10	QPSK	25	12		21.21			
10	QPSK	25	25		21.16			
10	QPSK	50	0		21.24			
10	16QAM	1	0		21.60		23	1
10	16QAM	1	25		21.42			
10	16QAM	1	49		21.39			
10	16QAM	25	0		20.23		22	2
10	16QAM	25	12		20.23			
10	16QAM	25	25		20.22			
10	16QAM	50	0		20.29			
Channel				27685	27710	27735	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2307.5	2310	2312.5		
5	QPSK	1	0	22.28	22.31	22.28	24	0
5	QPSK	1	12	22.30	22.29	22.31		
5	QPSK	1	24	22.33	22.34	22.23		
5	QPSK	12	0	21.38	21.22	21.39	23	1
5	QPSK	12	7	21.34	21.18	21.38		
5	QPSK	12	13	21.36	21.20	21.36		
5	QPSK	25	0	21.43	21.28	21.45		
5	16QAM	1	0	21.44	21.56	21.48	23	1
5	16QAM	1	12	21.44	21.51	21.44		
5	16QAM	1	24	21.43	21.37	21.40		
5	16QAM	12	0	20.40	20.35	20.39	22	2
5	16QAM	12	7	20.41	20.32	20.39		
5	16QAM	12	13	20.34	20.24	20.37		
5	16QAM	25	0	20.42	20.32	20.40		

<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	22.27	22.23	22.52	24	0
20	QPSK	1	49	22.32	22.35	22.33		
20	QPSK	1	99	22.35	22.74	22.55		
20	QPSK	50	0	21.35	21.17	21.55	23	1
20	QPSK	50	24	21.45	21.30	21.37		
20	QPSK	50	50	21.50	21.62	21.59		
20	QPSK	100	0	21.59	21.60	21.59		
20	16QAM	1	0	21.48	21.72	22.00	23	1
20	16QAM	1	49	21.71	21.59	21.63		
20	16QAM	1	99	21.63	22.03	21.85		
20	16QAM	50	0	20.28	20.26	20.54	22	2
20	16QAM	50	24	20.39	20.31	20.33		
20	16QAM	50	50	20.34	20.55	20.33		
20	16QAM	100	0	20.65	20.58	20.60		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	22.35	22.19	22.48	24	0
15	QPSK	1	37	22.44	22.11	22.18		
15	QPSK	1	74	22.49	22.33	22.41		
15	QPSK	36	0	21.33	21.20	21.32	23	1
15	QPSK	36	20	21.33	21.01	21.24		
15	QPSK	36	39	21.49	21.27	21.28		
15	QPSK	75	0	21.48	21.17	21.40		
15	16QAM	1	0	21.53	21.49	21.80	23	1
15	16QAM	1	37	21.58	21.42	21.52		
15	16QAM	1	74	21.62	21.61	21.75		
15	16QAM	36	0	20.12	20.10	20.23	22	2
15	16QAM	36	20	20.16	20.07	20.15		
15	16QAM	36	39	20.21	20.25	20.18		
15	16QAM	75	0	20.24	20.16	20.31		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	22.39	22.33	22.41	24	0
10	QPSK	1	25	22.50	22.38	22.37		
10	QPSK	1	49	22.73	22.58	22.53		
10	QPSK	25	0	21.48	21.27	21.28	23	1
10	QPSK	25	12	21.47	21.36	21.25		
10	QPSK	25	25	21.51	21.46	21.36		
10	QPSK	50	0	21.59	21.46	21.41		
10	16QAM	1	0	21.72	21.65	21.70	23	1
10	16QAM	1	25	21.79	21.71	21.68		
10	16QAM	1	49	21.94	21.92	21.85		
10	16QAM	25	0	20.33	20.15	20.21	22	2
10	16QAM	25	12	20.31	20.20	20.20		
10	16QAM	25	25	20.36	20.32	20.30		

10	16QAM	50	0	20.47	20.33	20.41		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	22.24	22.16	22.68	24	0
5	QPSK	1	12	22.42	22.16	22.30		
5	QPSK	1	24	22.33	22.56	22.51		
5	QPSK	12	0	21.33	21.08	21.47	23	1
5	QPSK	12	7	21.36	21.27	21.30		
5	QPSK	12	13	21.28	21.61	21.39		
5	QPSK	25	0	21.59	21.52	21.53		
5	16QAM	1	0	21.43	21.71	21.99	23	1
5	16QAM	1	12	21.64	21.51	21.57		
5	16QAM	1	24	21.62	21.95	21.77		
5	16QAM	12	0	20.20	20.18	20.48	22	2
5	16QAM	12	7	20.37	20.28	20.28		
5	16QAM	12	13	20.33	20.46	20.31		
5	16QAM	25	0	20.61	20.56	20.50		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	22.20	22.19	22.64	24	0
3	QPSK	1	8	22.38	22.10	22.28		
3	QPSK	1	14	22.26	22.65	22.55		
3	QPSK	8	0	21.27	21.11	21.49	23	1
3	QPSK	8	4	21.42	21.22	21.34		
3	QPSK	8	7	21.34	21.62	21.33		
3	QPSK	15	0	21.50	21.49	21.49		
3	16QAM	1	0	21.39	21.66	21.93	23	1
3	16QAM	1	8	21.61	21.51	21.56		
3	16QAM	1	14	21.63	22.00	21.85		
3	16QAM	8	0	20.24	20.22	20.53	22	2
3	16QAM	8	4	20.37	20.26	20.24		
3	16QAM	8	7	20.25	20.47	20.25		
3	16QAM	15	0	20.65	20.56	20.50		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	22.19	22.13	22.67	24	0
1.4	QPSK	1	3	22.38	22.17	22.23		
1.4	QPSK	1	5	22.30	22.63	22.55		
1.4	QPSK	3	0	22.09	22.15	22.64		
1.4	QPSK	3	1	22.33	22.17	22.16		
1.4	QPSK	3	3	22.34	22.60	22.52		
1.4	QPSK	6	0	21.59	21.50	21.58	23	1
1.4	16QAM	1	0	21.39	21.62	21.99	23	1
1.4	16QAM	1	3	21.70	21.53	21.57		
1.4	16QAM	1	5	21.63	22.00	21.79		
1.4	16QAM	3	0	22.09	22.05	22.57		
1.4	16QAM	3	1	22.33	22.12	22.14		
1.4	16QAM	3	3	22.35	22.56	22.55		
1.4	16QAM	6	0	20.64	20.55	20.50	22	2

Reduced Power Mode

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	16.17	16.07	16.11	17	0
20	QPSK	1	49	16.02	16.05	16.08		
20	QPSK	1	99	16.00	16.02	16.02		
20	QPSK	50	0	16.13	16.11	15.93	17	0
20	QPSK	50	24	15.98	16.08	15.82		
20	QPSK	50	50	15.91	16.06	15.80		
20	QPSK	100	0	16.11	16.08	16.08		
20	16QAM	1	0	16.04	16.02	16.02	17	0
20	16QAM	1	49	16.07	16.07	15.96		
20	16QAM	1	99	16.01	16.01	16.04		
20	16QAM	50	0	16.12	16.07	15.88	17	0
20	16QAM	50	24	16.01	16.00	15.86		
20	16QAM	50	50	16.03	16.12	15.98		
20	16QAM	100	0	16.12	16.03	16.11		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	16.10	16.04	15.78	17	0
15	QPSK	1	37	16.06	16.07	15.72		
15	QPSK	1	74	15.99	15.95	16.05		
15	QPSK	36	0	16.13	16.13	15.81	17	0
15	QPSK	36	20	16.14	16.15	15.83		
15	QPSK	36	39	16.08	16.08	15.92		
15	QPSK	75	0	16.16	16.16	15.98		
15	16QAM	1	0	16.12	16.16	16.09	17	0
15	16QAM	1	37	16.08	16.15	16.01		
15	16QAM	1	74	16.10	16.11	16.14		
15	16QAM	36	0	16.08	16.08	15.87	17	0
15	16QAM	36	20	16.08	16.10	15.87		
15	16QAM	36	39	16.11	16.13	16.00		
15	16QAM	75	0	16.07	16.09	16.04		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	16.08	16.09	15.77	17	0
10	QPSK	1	25	16.04	16.05	15.76		
10	QPSK	1	49	16.01	16.08	16.07		
10	QPSK	25	0	16.15	16.14	15.81	17	0
10	QPSK	25	12	16.10	16.11	15.83		
10	QPSK	25	25	16.11	16.10	16.03		
10	QPSK	50	0	16.08	16.11	15.90		
10	16QAM	1	0	16.16	16.09	16.08	17	0
10	16QAM	1	25	16.08	16.15	16.10		
10	16QAM	1	49	16.16	16.15	16.11		
10	16QAM	25	0	16.12	16.08	15.82	17	0
10	16QAM	25	12	16.15	16.07	15.86		

10	16QAM	25	25	16.07	16.14	16.08		
10	16QAM	50	0	16.09	16.12	15.93		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	16.15	16.10	15.79	17	0
5	QPSK	1	12	16.11	16.04	15.93		
5	QPSK	1	24	16.06	16.15	16.00		
5	QPSK	12	0	16.12	16.08	15.87	17	0
5	QPSK	12	7	16.13	16.10	15.97		
5	QPSK	12	13	16.07	16.14	16.01		
5	QPSK	25	0	16.14	16.11	16.00		
5	16QAM	1	0	16.16	16.10	16.11	17	0
5	16QAM	1	12	16.12	16.08	16.14		
5	16QAM	1	24	16.09	16.16	16.13		
5	16QAM	12	0	16.19	16.14	15.91	17	0
5	16QAM	12	7	16.21	16.15	16.01		
5	16QAM	12	13	16.13	16.20	16.06		
5	16QAM	25	0	16.20	16.15	16.01		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	16.06	15.96	15.89	17	0
3	QPSK	1	8	16.05	16.02	15.97		
3	QPSK	1	14	16.05	16.02	15.95		
3	QPSK	8	0	16.09	16.04	15.98	17	0
3	QPSK	8	4	16.10	16.03	15.99		
3	QPSK	8	7	16.11	16.06	16.03		
3	QPSK	15	0	16.11	16.05	16.01		
3	16QAM	1	0	16.13	16.07	16.12	17	0
3	16QAM	1	8	16.14	16.13	16.09		
3	16QAM	1	14	16.13	16.14	16.07		
3	16QAM	8	0	16.10	16.08	16.00	17	0
3	16QAM	8	4	16.14	16.08	16.02		
3	16QAM	8	7	16.15	16.10	16.05		
3	16QAM	15	0	16.11	16.06	16.00		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	16.10	16.03	15.95	17	0
1.4	QPSK	1	3	16.01	16.00	15.97		
1.4	QPSK	1	5	16.07	16.04	15.96		
1.4	QPSK	3	0	16.09	16.03	15.97		
1.4	QPSK	3	1	16.03	16.02	15.97		
1.4	QPSK	3	3	16.05	16.05	15.96		
1.4	QPSK	6	0	16.05	16.06	16.01	17	0
1.4	16QAM	1	0	16.11	16.13	16.11	17	0
1.4	16QAM	1	3	16.14	16.13	16.09		
1.4	16QAM	1	5	16.12	16.11	16.12		
1.4	16QAM	3	0	16.08	16.11	16.08		
1.4	16QAM	3	1	16.12	16.12	16.07		
1.4	16QAM	3	3	16.14	16.13	16.09		
1.4	16QAM	6	0	16.10	16.12	16.07	17	0

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	16.81	16.86	16.80	17.5	0
20	QPSK	1	49	16.80	16.66	16.74		
20	QPSK	1	99	16.73	16.68	16.61		
20	QPSK	50	0	16.66	16.78	16.69	17.5	0
20	QPSK	50	24	16.65	16.69	16.68		
20	QPSK	50	50	16.60	16.68	16.66		
20	QPSK	100	0	16.49	16.82	16.75		
20	16QAM	1	0	16.50	16.62	16.59	17.5	0
20	16QAM	1	49	16.77	16.45	16.42		
20	16QAM	1	99	16.66	16.45	16.63		
20	16QAM	50	0	16.84	16.82	16.72	17.5	0
20	16QAM	50	24	16.39	16.70	16.70		
20	16QAM	50	50	16.40	16.72	16.71		
20	16QAM	100	0	16.51	16.77	16.85		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	16.72	16.71	16.74	17.5	0
15	QPSK	1	37	16.77	16.69	16.71		
15	QPSK	1	74	16.85	16.71	16.83		
15	QPSK	36	0	16.76	16.80	16.78	17.5	0
15	QPSK	36	20	16.84	16.73	16.77		
15	QPSK	36	39	16.77	16.72	16.79		
15	QPSK	75	0	16.72	16.70	16.84		
15	16QAM	1	0	16.71	16.83	16.78	17.5	0
15	16QAM	1	37	16.72	16.72	16.71		
15	16QAM	1	74	16.75	16.75	16.80		
15	16QAM	36	0	16.81	16.78	16.83	17.5	0
15	16QAM	36	20	16.70	16.79	16.81		
15	16QAM	36	39	16.71	16.79	16.76		
15	16QAM	75	0	16.76	16.74	16.76		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	16.69	16.83	16.74	17.5	0
10	QPSK	1	25	16.74	16.68	16.69		
10	QPSK	1	49	16.76	16.70	16.78		
10	QPSK	25	0	16.77	16.73	16.77	17.5	0
10	QPSK	25	12	16.74	16.72	16.74		
10	QPSK	25	25	16.83	16.69	16.83		
10	QPSK	50	0	16.79	16.69	16.73		
10	16QAM	1	0	16.76	16.84	16.82	17.5	0
10	16QAM	1	25	16.81	16.81	16.85		
10	16QAM	1	49	16.84	16.82	16.76		
10	16QAM	25	0	16.83	16.83	16.85	17.5	0
10	16QAM	25	12	16.79	16.79	16.81		
10	16QAM	25	25	16.79	16.75	16.80		

10	16QAM	50	0	16.84	16.72	16.77		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	16.59	16.74	16.67	17.5	0
5	QPSK	1	12	16.61	16.64	16.69		
5	QPSK	1	24	16.62	16.64	16.82		
5	QPSK	12	0	16.62	16.67	16.73	17.5	0
5	QPSK	12	7	16.64	16.63	16.74		
5	QPSK	12	13	16.62	16.63	16.80		
5	QPSK	25	0	16.66	16.66	16.78		
5	16QAM	1	0	16.83	16.80	16.78	17.5	0
5	16QAM	1	12	16.80	16.81	16.84		
5	16QAM	1	24	16.84	16.81	16.80		
5	16QAM	12	0	16.66	16.70	16.81	17.5	0
5	16QAM	12	7	16.69	16.69	16.83		
5	16QAM	12	13	16.68	16.66	16.78		
5	16QAM	25	0	16.70	16.68	16.83		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	16.54	16.69	16.67	17.5	0
3	QPSK	1	8	16.60	16.68	16.78		
3	QPSK	1	14	16.62	16.64	16.79		
3	QPSK	8	0	16.65	16.69	16.77	17.5	0
3	QPSK	8	4	16.63	16.65	16.80		
3	QPSK	8	7	16.70	16.65	16.83		
3	QPSK	15	0	16.67	16.66	16.80		
3	16QAM	1	0	16.80	15.85	16.76	17.5	0
3	16QAM	1	8	16.77	16.77	16.80		
3	16QAM	1	14	16.76	16.80	16.78		
3	16QAM	8	0	16.73	16.72	16.81	17.5	0
3	16QAM	8	4	16.69	16.69	16.85		
3	16QAM	8	7	16.77	16.73	16.77		
3	16QAM	15	0	16.70	16.69	16.82		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	16.62	16.72	16.79	17.5	0
1.4	QPSK	1	3	16.65	16.68	16.78		
1.4	QPSK	1	5	16.67	16.71	16.84		
1.4	QPSK	3	0	16.62	16.71	16.82		
1.4	QPSK	3	1	16.60	16.71	16.79		
1.4	QPSK	3	3	16.67	16.71	16.81		
1.4	QPSK	6	0	16.67	16.72	16.82	17.5	0
1.4	16QAM	1	0	16.79	16.85	16.85	17.5	0
1.4	16QAM	1	3	16.80	16.82	16.84		
1.4	16QAM	1	5	16.85	16.83	16.79		
1.4	16QAM	3	0	16.70	16.84	16.80		
1.4	16QAM	3	1	16.68	16.83	16.78		
1.4	16QAM	3	3	16.72	16.84	16.80		
1.4	16QAM	6	0	16.77	16.83	16.77	17.5	0

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	19.34	19.41	19.35	20	0
10	QPSK	1	25	19.26	19.29	19.27		
10	QPSK	1	49	19.14	19.18	19.34		
10	QPSK	25	0	19.16	19.33	19.32	20	0
10	QPSK	25	12	19.26	19.30	19.24		
10	QPSK	25	25	19.25	19.14	19.29		
10	QPSK	50	0	19.27	19.34	19.31		
10	16QAM	1	0	19.31	19.36	19.33	20	0
10	16QAM	1	25	19.34	19.38	19.34		
10	16QAM	1	49	19.37	19.31	19.30		
10	16QAM	25	0	19.25	19.34	19.38	20	0
10	16QAM	25	12	19.35	19.37	19.27		
10	16QAM	25	25	19.34	19.24	19.33		
10	16QAM	50	0	19.35	19.31	19.38		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	19.34	19.40	19.28	20	0
5	QPSK	1	12	19.19	19.25	19.19		
5	QPSK	1	24	19.05	19.13	19.27		
5	QPSK	12	0	19.09	19.30	19.25	20	0
5	QPSK	12	7	19.16	19.29	19.14		
5	QPSK	12	13	19.21	19.06	19.28		
5	QPSK	25	0	19.23	19.32	19.24		
5	16QAM	1	0	19.30	19.27	19.33	20	0
5	16QAM	1	12	19.30	19.35	19.31		
5	16QAM	1	24	19.37	19.29	19.26		
5	16QAM	12	0	19.21	19.33	19.30	20	0
5	16QAM	12	7	19.35	19.32	19.27		
5	16QAM	12	13	19.31	19.18	19.28		
5	16QAM	25	0	19.26	19.30	19.29		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	19.24	19.36	19.35	20	0
3	QPSK	1	8	19.19	19.26	19.19		
3	QPSK	1	14	19.09	19.14	19.29		
3	QPSK	8	0	19.10	19.24	19.29	20	0
3	QPSK	8	4	19.23	19.28	19.19		
3	QPSK	8	7	19.21	19.06	19.24		
3	QPSK	15	0	19.24	19.29	19.27		
3	16QAM	1	0	19.21	19.27	19.31	20	0
3	16QAM	1	8	19.29	19.31	19.29		
3	16QAM	1	14	19.29	19.25	19.22		
3	16QAM	8	0	19.22	19.24	19.35	20	0
3	16QAM	8	4	19.28	19.28	19.17		
3	16QAM	8	7	19.34	19.18	19.24		

3	16QAM	15	0	19.27	19.31	19.29		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	19.28	19.39	19.27	20	0
1.4	QPSK	1	3	19.24	19.21	19.27		
1.4	QPSK	1	5	19.10	19.11	19.34		
1.4	QPSK	3	0	19.10	19.31	19.26		
1.4	QPSK	3	1	19.17	19.26	19.24		
1.4	QPSK	3	3	19.17	19.04	19.22		
1.4	QPSK	6	0	19.17	19.24	19.27	20	0
1.4	16QAM	1	0	19.27	19.27	19.33	20	0
1.4	16QAM	1	3	19.29	19.29	19.28		
1.4	16QAM	1	5	19.33	19.23	19.24		
1.4	16QAM	3	0	19.16	19.32	19.32		
1.4	16QAM	3	1	19.32	19.28	19.21		
1.4	16QAM	3	3	19.29	19.21	19.28		
1.4	16QAM	6	0	19.27	19.30	19.36	20	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	15.31	15.11	15.39	16	0
20	QPSK	1	49	15.29	15.14	15.35		
20	QPSK	1	99	15.40	15.38	15.47		
20	QPSK	50	0	15.23	15.25	15.38	16	0
20	QPSK	50	24	15.32	15.26	15.37		
20	QPSK	50	50	15.34	15.36	15.34		
20	QPSK	100	0	15.42	15.43	15.30		
20	16QAM	1	0	15.45	15.40	15.32	16	0
20	16QAM	1	49	15.39	15.36	15.43		
20	16QAM	1	99	15.33	15.42	15.44		
20	16QAM	50	0	15.27	15.28	15.31	16	0
20	16QAM	50	24	15.35	15.24	15.31		
20	16QAM	50	50	15.37	15.37	15.39		
20	16QAM	100	0	15.44	15.44	15.34		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	15.28	15.12	15.31	16	0
15	QPSK	1	37	15.33	15.15	15.39		
15	QPSK	1	74	15.36	15.34	15.37		
15	QPSK	36	0	15.29	15.25	15.34	16	0
15	QPSK	36	20	15.39	15.24	15.38		
15	QPSK	36	39	15.43	15.31	15.41		
15	QPSK	75	0	15.35	15.27	15.42		
15	16QAM	1	0	15.37	15.37	15.30	16	0
15	16QAM	1	37	15.31	15.37	15.34		
15	16QAM	1	74	15.31	15.32	15.37		
15	16QAM	36	0	15.29	15.27	15.37	16	0
15	16QAM	36	20	15.39	15.26	15.37		
15	16QAM	36	39	15.44	15.37	15.38		
15	16QAM	75	0	15.38	15.32	15.38		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	15.30	15.23	15.38	16	0
10	QPSK	1	25	15.23	15.21	15.37		
10	QPSK	1	49	15.39	15.36	15.37		
10	QPSK	25	0	15.30	15.28	15.46	16	0
10	QPSK	25	12	15.29	15.30	15.46		
10	QPSK	25	25	15.39	15.34	15.41		
10	QPSK	50	0	15.30	15.30	15.37		
10	16QAM	1	0	15.38	15.40	15.43	16	0
10	16QAM	1	25	15.31	15.38	15.37		
10	16QAM	1	49	15.41	15.37	15.40		
10	16QAM	25	0	15.35	15.28	15.43	16	0
10	16QAM	25	12	15.36	15.30	15.42		
10	16QAM	25	25	15.46	15.33	15.46		

10	16QAM	50	0	15.29	15.29	15.40		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	15.31	15.20	15.41	16	0
5	QPSK	1	12	15.22	15.19	15.41		
5	QPSK	1	24	15.27	15.26	15.37		
5	QPSK	12	0	15.33	15.21	15.32	16	0
5	QPSK	12	7	15.26	15.21	15.33		
5	QPSK	12	13	15.28	15.22	15.36		
5	QPSK	25	0	15.28	15.22	15.35		
5	16QAM	1	0	15.32	15.35	15.43	16	0
5	16QAM	1	12	15.43	15.37	15.44		
5	16QAM	1	24	15.35	15.40	15.43		
5	16QAM	12	0	15.34	15.21	15.35	16	0
5	16QAM	12	7	15.30	15.18	15.36		
5	16QAM	12	13	15.30	15.22	15.39		
5	16QAM	25	0	15.25	15.20	15.35		

<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		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	20.46	20.50	20.42	21.5	0
10	QPSK	1	25	20.49	20.48	20.41		
10	QPSK	1	49	20.54	20.61	20.50		
10	QPSK	25	0	20.46	20.55	20.41	21.5	0
10	QPSK	25	12	20.48	20.56	20.39		
10	QPSK	25	25	20.48	20.53	20.53		
10	QPSK	50	0	20.57	20.51	20.48		
10	16QAM	1	0	20.57	20.54	20.57	21.5	0
10	16QAM	1	25	20.57	20.52	20.60		
10	16QAM	1	49	20.60	20.59	20.59		
10	16QAM	25	0	20.53	20.58	20.48	21.5	0
10	16QAM	25	12	20.60	20.59	20.43		
10	16QAM	25	25	20.60	20.57	20.56		
10	16QAM	50	0	20.60	20.59	20.60		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	20.37	20.42	20.35	21.5	0
5	QPSK	1	12	20.42	20.43	20.41		
5	QPSK	1	24	20.46	20.55	20.42		
5	QPSK	12	0	20.38	20.49	20.31	21.5	0
5	QPSK	12	7	20.45	20.52	20.36		
5	QPSK	12	13	20.39	20.51	20.49		
5	QPSK	25	0	20.50	20.51	20.42		
5	16QAM	1	0	20.52	20.45	20.54	21.5	0
5	16QAM	1	12	20.56	20.44	20.57		
5	16QAM	1	24	20.51	20.52	20.54		
5	16QAM	12	0	20.47	20.58	20.48	21.5	0
5	16QAM	12	7	20.54	20.56	20.42		
5	16QAM	12	13	20.53	20.53	20.56		
5	16QAM	25	0	20.60	20.59	20.51		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	20.37	20.45	20.34	21.5	0
3	QPSK	1	8	20.40	20.44	20.31		
3	QPSK	1	14	20.52	20.60	20.42		
3	QPSK	8	0	20.41	20.46	20.40	21.5	0
3	QPSK	8	4	20.47	20.50	20.34		
3	QPSK	8	7	20.45	20.49	20.53		
3	QPSK	15	0	20.54	20.43	20.48		
3	16QAM	1	0	20.55	20.44	20.56	21.5	0
3	16QAM	1	8	20.54	20.47	20.60		
3	16QAM	1	14	20.59	20.49	20.59		
3	16QAM	8	0	20.50	20.58	20.48	21.5	0
3	16QAM	8	4	20.52	20.57	20.39		
3	16QAM	8	7	20.52	20.49	20.47		

3	16QAM	15	0	20.54	20.56	20.53		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	20.44	20.41	20.41	21.5	0
1.4	QPSK	1	3	20.46	20.44	20.39		
1.4	QPSK	1	5	20.51	20.55	20.40		
1.4	QPSK	3	0	20.36	20.46	20.31		
1.4	QPSK	3	1	20.48	20.47	20.39		
1.4	QPSK	3	3	20.39	20.47	20.49		
1.4	QPSK	6	0	20.49	20.41	20.41	21.5	0
1.4	16QAM	1	0	20.55	20.49	20.55	21.5	0
1.4	16QAM	1	3	20.53	20.44	20.60		
1.4	16QAM	1	5	20.60	20.51	20.49		
1.4	16QAM	3	0	20.47	20.51	20.42		
1.4	16QAM	3	1	20.54	20.52	20.37		
1.4	16QAM	3	3	20.54	20.50	20.49		
1.4	16QAM	6	0	20.51	20.54	20.57	21.5	0

<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		18.93		20.5	0
10	QPSK	1	25		18.86			
10	QPSK	1	49		19.06			
10	QPSK	25	0		19.04		20.5	0
10	QPSK	25	12		18.89			
10	QPSK	25	25		19.03			
10	QPSK	50	0		19.01			
10	16QAM	1	0		19.03		20.5	0
10	16QAM	1	25		19.03			
10	16QAM	1	49		19.03			
10	16QAM	25	0		19.05		20.5	0
10	16QAM	25	12		18.92			
10	16QAM	25	25		18.98			
10	16QAM	50	0		19.04			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	18.83	18.90	18.86	20.5	0
5	QPSK	1	12	18.83	18.78	18.85		
5	QPSK	1	24	19.02	18.96	18.99		
5	QPSK	12	0	18.95	18.97	19.04	20.5	0
5	QPSK	12	7	18.88	18.89	18.80		
5	QPSK	12	13	19.02	18.99	18.96		
5	QPSK	25	0	18.99	18.94	18.99		
5	16QAM	1	0	19.00	18.96	18.95	20.5	0
5	16QAM	1	12	18.96	18.93	19.03		
5	16QAM	1	24	19.01	19.01	18.95		
5	16QAM	12	0	19.00	19.04	19.03	20.5	0
5	16QAM	12	7	18.92	18.90	18.88		
5	16QAM	12	13	18.90	18.91	18.90		
5	16QAM	25	0	18.97	19.04	19.03		

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	20.45	20.51	20.44	21.5	0
10	QPSK	1	25	20.42	20.39	20.41		
10	QPSK	1	49	20.53	20.62	20.49		
10	QPSK	25	0	20.42	20.46	20.42	21.5	0
10	QPSK	25	12	20.45	20.59	20.40		
10	QPSK	25	25	20.50	20.44	20.55		
10	QPSK	50	0	20.45	20.45	20.49		
10	16QAM	1	0	20.54	20.59	20.55	21.5	0
10	16QAM	1	25	20.58	20.52	20.55		
10	16QAM	1	49	20.61	20.61	20.61		
10	16QAM	25	0	20.52	20.54	20.48	21.5	0
10	16QAM	25	12	20.51	20.47	20.46		
10	16QAM	25	25	20.57	20.53	20.58		
10	16QAM	50	0	20.56	20.56	20.55		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	20.41	20.49	20.35	21.5	0
5	QPSK	1	12	20.42	20.39	20.41		
5	QPSK	1	24	20.53	20.60	20.49		
5	QPSK	12	0	20.33	20.38	20.35	21.5	0
5	QPSK	12	7	20.35	20.55	20.36		
5	QPSK	12	13	20.42	20.41	20.45		
5	QPSK	25	0	20.39	20.38	20.39		
5	16QAM	1	0	20.45	20.53	20.48	21.5	0
5	16QAM	1	12	20.48	20.50	20.50		
5	16QAM	1	24	20.55	20.61	20.58		
5	16QAM	12	0	20.51	20.49	20.39	21.5	0
5	16QAM	12	7	20.50	20.44	20.43		
5	16QAM	12	13	20.49	20.49	20.48		
5	16QAM	25	0	20.56	20.53	20.45		

<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	19.28	19.32	19.11	20	0
15	QPSK	1	37	19.32	19.37	19.27		
15	QPSK	1	74	19.17	19.30	19.30		
15	QPSK	36	0	19.25	19.27	19.30	20	0
15	QPSK	36	20	19.14	19.31	19.30		
15	QPSK	36	39	19.22	19.28	19.23		
15	QPSK	75	0	19.27	19.32	19.32		
15	16QAM	1	0	19.24	19.27	19.29	20	0
15	16QAM	1	37	19.28	19.27	19.24		
15	16QAM	1	74	19.24	19.26	19.24		
15	16QAM	36	0	19.32	19.27	19.28	20	0
15	16QAM	36	20	19.19	19.30	19.36		
15	16QAM	36	39	19.28	19.34	19.29		
15	16QAM	75	0	19.33	19.27	19.29		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	19.25	19.23	19.09	20	0
10	QPSK	1	25	19.23	19.29	19.21		
10	QPSK	1	49	19.08	19.30	19.28		
10	QPSK	25	0	19.22	19.21	19.27	20	0
10	QPSK	25	12	19.08	19.24	19.21		
10	QPSK	25	25	19.22	19.18	19.18		
10	QPSK	50	0	19.26	19.22	19.23		
10	16QAM	1	0	19.17	19.19	19.27	20	0
10	16QAM	1	25	19.27	19.18	19.20		
10	16QAM	1	49	19.20	19.26	19.14		
10	16QAM	25	0	19.27	19.26	19.27	20	0
10	16QAM	25	12	19.17	19.23	19.28		
10	16QAM	25	25	19.25	19.27	19.28		
10	16QAM	50	0	19.30	19.17	19.26		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	19.26	19.26	19.03	20	0
5	QPSK	1	12	19.22	19.27	19.27		
5	QPSK	1	24	19.14	19.29	19.22		
5	QPSK	12	0	19.23	19.18	19.26	20	0
5	QPSK	12	7	19.11	19.31	19.29		
5	QPSK	12	13	19.13	19.27	19.17		
5	QPSK	25	0	19.23	19.23	19.24		
5	16QAM	1	0	19.15	19.19	19.28	20	0
5	16QAM	1	12	19.18	19.22	19.19		
5	16QAM	1	24	19.14	19.19	19.17		
5	16QAM	12	0	19.31	19.20	19.28	20	0
5	16QAM	12	7	19.09	19.29	19.32		
5	16QAM	12	13	19.23	19.32	19.26		

5	16QAM	25	0	19.24	19.24	19.28		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	19.20	19.32	19.05	20	0
3	QPSK	1	8	19.22	19.36	19.27		
3	QPSK	1	14	19.14	19.27	19.21		
3	QPSK	8	0	19.20	19.27	19.29	20	0
3	QPSK	8	4	19.08	19.31	19.20		
3	QPSK	8	7	19.18	19.18	19.17		
3	QPSK	15	0	19.18	19.26	19.32		
3	16QAM	1	0	19.24	19.19	19.21	20	0
3	16QAM	1	8	19.23	19.26	19.20		
3	16QAM	1	14	19.23	19.23	19.20		
3	16QAM	8	0	19.22	19.24	19.26	20	0
3	16QAM	8	4	19.13	19.27	19.28		
3	16QAM	8	7	19.28	19.27	19.27		
3	16QAM	15	0	19.28	19.26	19.22		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	19.22	19.32	19.07	20	0
1.4	QPSK	1	3	19.29	19.30	19.24		
1.4	QPSK	1	5	19.10	19.23	19.21		
1.4	QPSK	3	0	19.21	19.21	19.21		
1.4	QPSK	3	1	19.09	19.26	19.25		
1.4	QPSK	3	3	19.20	19.22	19.19		
1.4	QPSK	6	0	19.26	19.28	19.25	20	0
1.4	16QAM	1	0	19.22	19.19	19.26	20	0
1.4	16QAM	1	3	19.23	19.18	19.16		
1.4	16QAM	1	5	19.23	19.17	19.16		
1.4	16QAM	3	0	19.32	19.24	19.19		
1.4	16QAM	3	1	19.14	19.22	19.34		
1.4	16QAM	3	3	19.22	19.29	19.27		
1.4	16QAM	6	0	19.28	19.22	19.27	20	0

<LTE Band 30>

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					27710			
Frequency (MHz)					2310			
10	QPSK	1	0		15.27		16	0
10	QPSK	1	25		15.26			
10	QPSK	1	49		15.19			
10	QPSK	25	0		15.26		16	0
10	QPSK	25	12		15.24			
10	QPSK	25	25		15.18			
10	QPSK	50	0		15.12			
10	16QAM	1	0		15.20		16	0
10	16QAM	1	25		15.10			
10	16QAM	1	49		15.26			
10	16QAM	25	0		15.19		16	0
10	16QAM	25	12		15.17			
10	16QAM	25	25		15.11			
10	16QAM	50	0		15.21			
Channel				27685	27710	27735	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2307.5	2310	2312.5		
5	QPSK	1	0	15.20	15.24	15.19	16	0
5	QPSK	1	12	15.21	15.25	15.22		
5	QPSK	1	24	15.24	15.25	15.22		
5	QPSK	12	0	15.18	15.25	15.25	16	0
5	QPSK	12	7	15.23	15.21	15.25		
5	QPSK	12	13	15.24	15.26	15.24		
5	QPSK	25	0	15.17	15.24	15.17		
5	16QAM	1	0	15.21	15.18	15.24	16	0
5	16QAM	1	12	15.25	15.26	15.26		
5	16QAM	1	24	15.18	15.25	15.20		
5	16QAM	12	0	15.25	15.26	15.25	16	0
5	16QAM	12	7	15.20	15.19	15.24		
5	16QAM	12	13	15.23	15.25	15.16		
5	16QAM	25	0	15.25	15.23	15.26		

<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	16.66	16.72	16.82	17.5	0
20	QPSK	1	49	16.64	16.63	16.68		
20	QPSK	1	99	16.58	16.43	16.66		
20	QPSK	50	0	16.75	16.64	16.80	17.5	0
20	QPSK	50	24	16.71	16.62	16.64		
20	QPSK	50	50	16.55	16.54	16.59		
20	QPSK	100	0	16.58	16.76	16.80		
20	16QAM	1	0	16.54	16.71	16.81	17.5	0
20	16QAM	1	49	16.72	16.56	16.62		
20	16QAM	1	99	16.75	16.71	16.60		
20	16QAM	50	0	16.60	16.53	16.73	17.5	0
20	16QAM	50	24	16.72	16.46	16.60		
20	16QAM	50	50	16.68	16.54	16.56		
20	16QAM	100	0	16.55	16.72	16.75		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	16.48	16.61	16.79	17.5	0
15	QPSK	1	37	16.61	16.53	16.56		
15	QPSK	1	74	16.64	16.55	16.58		
15	QPSK	36	0	16.54	16.55	16.66	17.5	0
15	QPSK	36	20	16.67	16.57	16.56		
15	QPSK	36	39	16.68	16.56	16.57		
15	QPSK	75	0	16.81	16.69	16.68		
15	16QAM	1	0	16.77	16.78	16.76	17.5	0
15	16QAM	1	37	16.70	16.70	16.76		
15	16QAM	1	74	16.76	16.77	16.79		
15	16QAM	36	0	16.46	16.48	16.61	17.5	0
15	16QAM	36	20	16.60	16.50	16.50		
15	16QAM	36	39	16.62	16.48	16.49		
15	16QAM	75	0	16.78	16.63	16.60		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	16.54	16.61	16.63	17.5	0
10	QPSK	1	25	16.55	16.50	16.48		
10	QPSK	1	49	16.79	16.55	16.57		
10	QPSK	25	0	16.54	16.48	16.47	17.5	0
10	QPSK	25	12	16.53	16.40	16.48		
10	QPSK	25	25	16.61	16.42	16.54		
10	QPSK	50	0	16.67	16.59	16.61		
10	16QAM	1	0	16.76	16.78	16.77	17.5	0
10	16QAM	1	25	16.77	16.77	16.70		
10	16QAM	1	49	16.81	16.79	16.68		
10	16QAM	25	0	16.42	16.42	16.37	17.5	0
10	16QAM	25	12	16.43	16.33	16.38		
10	16QAM	25	25	16.50	16.36	16.42		

10	16QAM	50	0	16.61	16.53	16.54		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	16.51	16.50	16.45	17.5	0
5	QPSK	1	12	16.49	16.42	16.46		
5	QPSK	1	24	16.54	16.43	16.51		
5	QPSK	12	0	16.40	16.36	16.41	17.5	0
5	QPSK	12	7	16.41	16.36	16.39		
5	QPSK	12	13	16.39	16.37	16.47		
5	QPSK	25	0	16.54	16.48	16.53		
5	16QAM	1	0	16.78	16.79	16.72	17.5	0
5	16QAM	1	12	16.78	16.74	16.78		
5	16QAM	1	24	16.81	16.74	16.74		
5	16QAM	12	0	16.32	16.29	16.38	17.5	0
5	16QAM	12	7	16.32	16.27	16.35		
5	16QAM	12	13	16.31	16.30	16.41		
5	16QAM	25	0	16.42	16.36	16.39		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	16.41	16.41	16.55	17.5	0
3	QPSK	1	8	16.43	16.41	16.57		
3	QPSK	1	14	16.42	16.42	16.52		
3	QPSK	8	0	16.33	16.31	16.43	17.5	0
3	QPSK	8	4	16.35	16.35	16.46		
3	QPSK	8	7	16.40	16.33	16.44		
3	QPSK	15	0	16.46	16.45	16.56		
3	16QAM	1	0	16.76	16.78	16.72	17.5	0
3	16QAM	1	8	16.78	16.74	16.72		
3	16QAM	1	14	16.81	16.72	16.77		
3	16QAM	8	0	16.27	16.30	16.35	17.5	0
3	16QAM	8	4	16.31	16.29	16.36		
3	16QAM	8	7	16.33	16.30	16.36		
3	16QAM	15	0	16.36	16.36	16.47		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	16.40	16.45	16.59	17.5	0
1.4	QPSK	1	3	16.35	16.38	16.51		
1.4	QPSK	1	5	16.42	16.52	16.49		
1.4	QPSK	3	0	16.33	16.34	16.52		
1.4	QPSK	3	1	16.30	16.34	16.50		
1.4	QPSK	3	3	16.36	16.38	16.50		
1.4	QPSK	6	0	16.30	16.34	16.46	17.5	0
1.4	16QAM	1	0	16.73	16.75	16.81	17.5	0
1.4	16QAM	1	3	16.74	16.72	16.76		
1.4	16QAM	1	5	16.75	16.77	16.81		
1.4	16QAM	3	0	16.42	16.29	16.57		
1.4	16QAM	3	1	16.41	16.29	16.51		
1.4	16QAM	3	3	16.39	16.31	16.50		
1.4	16QAM	6	0	16.29	16.31	16.40	17.5	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.

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

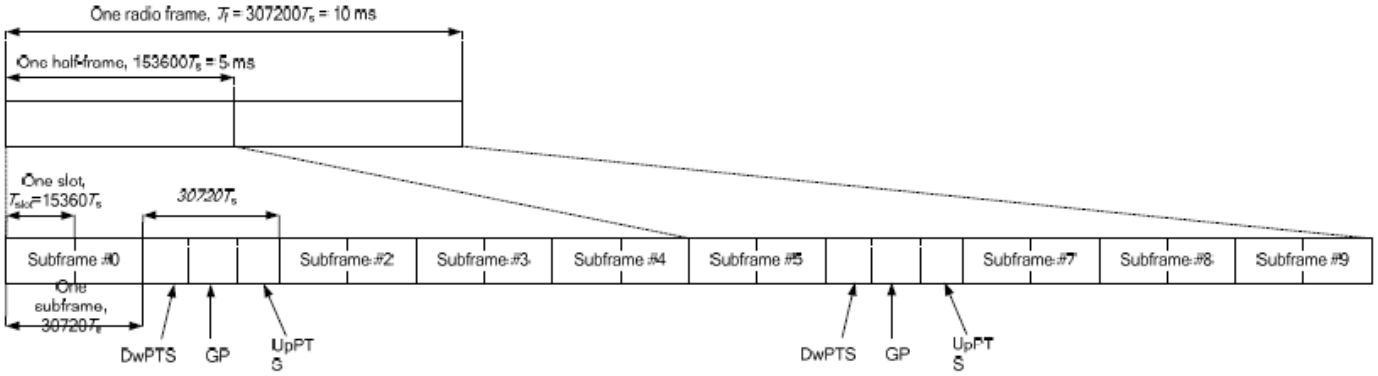


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

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	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

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

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

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

Default Power Mode

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.48	22.76	22.77	22.77	22.78	23	0
20	QPSK	1	49	22.44	22.69	22.74	22.66	22.68		
20	QPSK	1	99	22.61	22.79	22.91	22.72	22.78		
20	QPSK	50	0	21.39	21.64	21.61	21.62	21.62	22	1
20	QPSK	50	24	21.37	21.61	21.60	21.54	21.59		
20	QPSK	50	50	21.40	21.61	21.65	21.56	21.67		
20	QPSK	100	0	21.46	21.63	21.61	21.53	21.67		
20	16QAM	1	0	21.50	21.75	21.75	21.73	21.80	22	1
20	16QAM	1	49	21.44	21.67	21.70	21.64	21.71		
20	16QAM	1	99	21.59	21.77	21.89	21.71	21.81		
20	16QAM	50	0	20.53	20.74	20.69	20.71	20.69	21	2
20	16QAM	50	24	20.55	20.72	20.70	20.63	20.66		
20	16QAM	50	50	20.57	20.72	20.79	20.66	20.76		
20	16QAM	100	0	20.59	20.69	20.74	20.62	20.76		
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	22.41	22.66	22.69	22.67	22.70	23	0
15	QPSK	1	37	22.34	22.69	22.64	22.63	22.63		
15	QPSK	1	74	22.54	22.77	22.83	22.62	22.69		
15	QPSK	36	0	21.32	21.60	21.52	21.53	21.57	22	1
15	QPSK	36	20	21.33	21.53	21.52	21.44	21.53		
15	QPSK	36	39	21.34	21.54	21.56	21.48	21.57		
15	QPSK	75	0	21.41	21.60	21.60	21.47	21.62		
15	16QAM	1	0	21.48	21.71	21.73	21.63	21.72	22	1
15	16QAM	1	37	21.34	21.59	21.64	21.58	21.63		
15	16QAM	1	74	21.55	21.74	21.81	21.71	21.80		
15	16QAM	36	0	20.50	20.70	20.61	20.66	20.65	21	2
15	16QAM	36	20	20.51	20.65	20.63	20.62	20.61		
15	16QAM	36	39	20.54	20.64	20.73	20.58	20.67		
15	16QAM	75	0	20.52	20.69	20.73	20.58	20.70		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.42	22.76	22.77	22.67	22.75	23	0
10	QPSK	1	25	22.35	22.59	22.67	22.61	22.64		
10	QPSK	1	49	22.59	22.77	22.90	22.70	22.77		
10	QPSK	25	0	21.29	21.60	21.55	21.61	21.61	22	1
10	QPSK	25	12	21.27	21.53	21.55	21.52	21.51		
10	QPSK	25	25	21.31	21.59	21.63	21.54	21.59		
10	QPSK	50	0	21.40	21.63	21.60	21.50	21.67		
10	16QAM	1	0	21.44	21.67	21.66	21.71	21.70	22	1
10	16QAM	1	25	21.40	21.67	21.67	21.64	21.62		
10	16QAM	1	49	21.55	21.68	21.85	21.65	21.80		

10	16QAM	25	0	20.48	20.70	20.66	20.65	20.63	21	2
10	16QAM	25	12	20.52	20.72	20.60	20.60	20.59		
10	16QAM	25	25	20.57	20.63	20.74	20.61	20.67		
10	16QAM	50	0	20.58	20.59	20.71	20.52	20.71		
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	22.40	22.70	22.75	22.74	22.77	23	0
5	QPSK	1	12	22.42	22.69	22.70	22.65	22.65		
5	QPSK	1	24	22.59	22.71	22.87	22.63	22.78		
5	QPSK	12	0	21.38	21.62	21.53	21.62	21.53	22	1
5	QPSK	12	7	21.32	21.61	21.51	21.45	21.57		
5	QPSK	12	13	21.38	21.59	21.60	21.49	21.60		
5	QPSK	25	0	21.43	21.61	21.52	21.50	21.61		
5	16QAM	1	0	21.41	21.75	21.69	21.70	21.74	22	1
5	16QAM	1	12	21.35	21.67	21.66	21.57	21.61		
5	16QAM	1	24	21.53	21.67	21.85	21.61	21.78		
5	16QAM	12	0	20.53	20.64	20.60	20.62	20.69	21	2
5	16QAM	12	7	20.46	20.67	20.60	20.57	20.56		
5	16QAM	12	13	20.53	20.70	20.76	20.63	20.74		
5	16QAM	25	0	20.50	20.60	20.67	20.55	20.69		

Reduced Power Mode

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	16.77	17.12	17.24	17.56	17.53	18.5	0
20	QPSK	1	49	16.79	17.18	17.36	17.48	17.45		
20	QPSK	1	99	17.11	17.11	17.26	17.56	17.57		
20	QPSK	50	0	17.16	17.05	17.20	17.44	17.48	18.5	0
20	QPSK	50	24	16.75	17.01	17.17	17.43	17.46		
20	QPSK	50	50	16.75	16.96	17.16	17.42	17.45		
20	QPSK	100	0	16.82	17.01	17.23	17.45	17.47		
20	16QAM	1	0	16.78	16.98	17.12	17.44	17.43	18.5	0
20	16QAM	1	49	16.62	16.97	17.08	17.42	17.39		
20	16QAM	1	99	16.65	17.04	17.20	17.45	17.51		
20	16QAM	50	0	16.82	17.00	17.18	17.49	17.51	18.5	0
20	16QAM	50	24	16.73	17.04	17.19	17.49	17.51		
20	16QAM	50	50	16.77	17.07	17.24	17.53	17.47		
20	16QAM	100	0	16.82	17.06	17.24	17.53	17.55		
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	16.90	17.01	17.21	17.55	17.53	18.5	0
15	QPSK	1	37	16.68	17.03	17.15	17.49	17.52		
15	QPSK	1	74	16.75	17.08	17.26	17.43	17.38		
15	QPSK	36	0	16.84	16.96	17.11	17.42	17.46	18.5	0
15	QPSK	36	20	16.71	16.94	17.15	17.42	17.44		
15	QPSK	36	39	16.73	17.01	17.17	17.42	17.41		
15	QPSK	75	0	16.75	16.98	17.20	17.40	17.37		
15	16QAM	1	0	16.77	16.97	17.03	17.42	17.36	18.5	0
15	16QAM	1	37	16.53	16.93	16.99	17.35	17.32		
15	16QAM	1	74	16.63	17.01	17.14	17.40	17.45		
15	16QAM	36	0	16.72	16.95	17.18	17.47	17.49	18.5	0
15	16QAM	36	20	16.67	17.04	17.16	17.49	17.50		
15	16QAM	36	39	16.76	17.00	17.23	17.51	17.39		
15	16QAM	75	0	16.75	17.00	17.20	17.48	17.46		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	16.88	16.99	17.18	17.51	17.47	18.5	0
10	QPSK	1	25	16.63	16.94	17.15	17.45	17.49		
10	QPSK	1	49	16.68	17.04	17.16	17.38	17.32		
10	QPSK	25	0	16.74	16.96	17.09	17.42	17.39	18.5	0
10	QPSK	25	12	16.69	16.92	17.11	17.32	17.34		
10	QPSK	25	25	16.73	16.91	17.11	17.38	17.41		
10	QPSK	50	0	16.68	16.93	17.15	17.34	17.27		
10	16QAM	1	0	16.72	16.88	16.96	17.33	17.36	18.5	0
10	16QAM	1	25	16.52	16.88	16.93	17.31	17.24		
10	16QAM	1	49	16.60	16.95	17.14	17.37	17.40		
10	16QAM	25	0	16.62	16.87	17.15	17.41	17.47	18.5	0

10	16QAM	25	12	16.57	17.02	17.10	17.48	17.41		
10	16QAM	25	25	16.70	16.91	17.23	17.41	17.34		
10	16QAM	50	0	16.70	16.97	17.20	17.40	17.44		
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	16.80	16.93	17.10	17.48	17.41	18.5	0
5	QPSK	1	12	16.53	16.84	17.05	17.38	17.49		
5	QPSK	1	24	16.66	17.03	17.15	17.35	17.30		
5	QPSK	12	0	16.72	16.87	17.03	17.34	17.30	18.5	0
5	QPSK	12	7	16.68	16.87	17.02	17.24	17.32		
5	QPSK	12	13	16.71	16.83	17.06	17.32	17.34		
5	QPSK	25	0	16.63	16.89	17.14	17.29	17.25		
5	16QAM	1	0	16.71	16.80	16.90	17.31	17.33	18.5	0
5	16QAM	1	12	16.52	16.80	16.88	17.31	17.17		
5	16QAM	1	24	16.59	16.87	17.09	17.37	17.40		
5	16QAM	12	0	16.53	16.84	17.12	17.37	17.43	18.5	0
5	16QAM	12	7	16.59	16.92	17.07	17.46	17.33		
5	16QAM	12	13	16.68	16.91	17.22	17.38	17.34		
5	16QAM	25	0	16.63	16.91	17.19	17.35	17.42		

<LTE Carrier Aggregation combinations>

General Note:

1. This device supports Carrier Aggregation on downlink only for inter and intra band, Uplink CA is not supported. For the device supports combination bands and configurations are according to 3GPP.
2. In applying the existing power measurement procedure of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of the frequency band and CCs in each row need consideration, and that configurations require power measurement should be highlighted in the below table.
3. LTE Band 29A is limited to Scell.

2CC Downlink Carrier Aggregation				3CC Downlink Carrier Aggregation			
Number	Combination	Restriction	Covered by Measurement Superset	Number	Combination	Restriction	Covered by Measurement Superset
1	CA_2A-4A		3CC-49	44	CA_2A-2A-5A		3CC-49
2	CA_2A-5A		3CC-49	45	CA_2A-2A-13A		3CC-50
3	CA_2A-12A		3CC-53	46	CA_2A_66B		3CC-52
4	CA_2A-13A		3CC-45	47	CA_2A_66C		3CC-52
5	CA_2A-17A			48	CA_2C-5A		3CC-49
6	CA_2A-29A		3CC-55	49	CA_2A-4A-5A		
7	CA_2A-30A		3CC-55	50	CA_2A-4A-13A		
8	CA_2A-66A		3CC-46	51	CA_2A-5A-30A		
9	CA_4A-2A		3CC-58	52	CA_2A-5A-66A		
10	CA_4A_5A		3CC-56	53	CA_2A-12A-30A		
11	CA_4A_12A		3CC-61	54	CA_2A_13A_66A		
12	CA_4A_13A		3CC-57	55	CA_2A_29A_30A		
13	CA_4A_17A			56	CA_4A_4A_5A		3CC-49
14	CA_4A_29A		3CC-62	57	CA_4A_4A_13A		3CC-50
15	CA_4A_30A		3CC-62	58	CA_4A-2A-5A		3CC-49
16	CA_5A_2A		3CC-63	59	CA_4A-2A-13A		3CC-50
17	CA_5A_4A		3CC-64	60	CA_4A_5A_30A		
18	CA_5A_7A			61	CA_4A_12A_30A		
19	CA_5A_30A		3CC-69	62	CA_4A_29A_30A		
20	CA_5A_66A		3CC-67	63	CA_5A-2A-2A		3CC-49
21	CA_7A_5A		2CC-18	64	CA_5A_4A_4A		3CC-49
22	CA_12A-2A		3CC-71	65	CA_5A_66A_66A		3CC-52
23	CA_12A_4A		3CC-72	66	CA_5A_66B		3CC-52
24	CA_12A_30A		3CC-72	67	CA_5A_66C		3CC-52
25	CA_13A-2A		3CC-73	68	CA_5A-2A-4A		3CC-49
26	CA_13A_4A		3CC-74	69	CA_5A-2A-30A		3CC-51
27	CA_13A_66A		3CC-76	70	CA_5A_4A_30A		3CC-60
28	CA_17A-2A		2CC-5	71	CA_12A-2A-30A		3CC-53
29	CA_17A_4A		2CC-13	72	CA_12A_4A_30A		3CC-61
30	CA_30A-2A		3CC-55	73	CA_13A-2A-2A		3CC-50
31	CA_30A_4A		3CC-62	74	CA_13A_4A_4A		3CC-59
32	CA_30A_5A		3CC-69	75	CA_13A_66A_66A		3CC-54
33	CA_30A_12A		3CC-83	76	CA_13A_66B		3CC-54
34	CA_30A_29A		3CC-82	77	CA_13A_66C		3CC-54
35	CA_66A-2A		3CC-87	78	CA_13A-2A-4A		3CC-50
36	CA_66A_5A		3CC-88	79	CA_13A_2A_66A		3CC-54
37	CA_66A_13A		3CC-89	80	CA_30A-2A-5A		3CC-51
38	CA_2C			81	CA_30A-2A-12A		3CC-61
39	CA_2A_2A			82	CA_30A_2A_29A		3CC-55
40	CA_4A_4A			83	CA_30A_4A_12A		3CC-61
41	CA_7B			84	CA_30A_4A_29A		3CC-62
42	CA_7C			85	CA_66A_66A_5A		3CC-66
43	CA_7A_7A			86	CA_66A_66A_13A		3CC-76
95	CA_41C			87	CA_66B_2A		3CC-52
96	CA_41A_41A			88	CA_66B_5A		3CC-52
				89	CA_66B_13A		3CC-54
				90	CA_66C_2A		3CC-52
				91	CA_66C_5A		3CC-52
				92	CA_66C_13A		3CC-54
				93	CA_66A_2A_13A		3CC-54
				94	CA_66D		

<Power verification when LTE Carrier Aggregation Active>

General Note:

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. The device supports downlink two carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.

vi. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

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

<Two Carrier power verification>

Configure		CA Configuration (BCS)	PCC							SCC				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band		2A-17A	2	10	1880	18900	QPSK	1	0	17	10	740	5790	22.62	22.73
		4A-17A	4	10	1732.5	20175	QPSK	1	0	17	10	740	5790	23.02	22.96
		5A-7A	5	10	836.5	20525	QPSK	1	0	7	20	2655	3100	22.41	22.43
Intra-Band	Non-Contiguous	2A-2A	2	20	1880	18900	QPSK	1	0	2	5	1987.5	1175	22.76	22.83
		4A-4A	4	20	1732.5	20175	QPSK	1	0	4	5	2112.5	1975	22.98	22.96
		7A-7A	7	20	2535	21100	QPSK	1	0	7	5	2622.5	2775	22.82	22.81
		41A-41A	41	20	2549.5	40185	QPSK	1	0	41	5	41565	2687.5	22.61	22.39
	Contiguous	2C	2	20	1880	18900	QPSK	1	0	2	20	1940.2	702	22.62	22.81
		7B	7	15	2535	21100	QPSK	1	0	7	5	2645.7	3007	22.58	22.78
		7C	7	20	2535	21100	QPSK	1	0	7	20	2635.2	2902	22.71	22.82
		41C	41	20	2549.5	40185	QPSK	1	0	41	20	2569.3	40383	22.36	22.41

<Three Carrier power verification>

Configure		CA Configuration (BCS)	PCC							SCC				SCC2				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band		2C-5A	2	20	1880	18900	QPSK	1	0	2	20	1960	900	5	10	881.5	2525	22.91	22.84
		2A-66C	2	20	1880	18900	QPSK	1	0	66	20	2155	66886	66	20	2185.8	67194	22.84	22.83
		5A-66C	5	10	836.5	20525	QPSK	1	0	66	20	2155	66886	66	20	2185.8	67194	22.42	22.41
		13A-66C	13	10	782	23230	QPSK	1	0	66	20	2155	66886	66	20	2185.8	67194	22.62	22.61
Inter-Band		2A-4A-5A	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	5	10	881.5	2525	22.84	22.85
		2A-4A-13A	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	13	10	751	5230	22.71	22.84
		2A-5A-30A	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	30	10	2355	9820	22.83	22.83
		2A-5A-66A	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	66	20	2155	66886	22.86	22.81
		2A-12A-30A	2	20	1880	18900	QPSK	1	0	12	10	737.5	5095	30	10	2355	9820	22.74	22.88
		2A-13A-66A	2	20	1880	18900	QPSK	1	0	13	10	751	5230	66	20	2155	66886	22.83	22.91
		2A-29A-30A	2	20	1880	18900	QPSK	1	0	29	10	722.5	9715	30	10	2355	9820	22.81	22.86
		4A-5A-30A	4	20	1732.5	20175	QPSK	1	0	5	10	881.5	2525	30	10	2355	9820	22.75	22.98
		4A-12A-30A	4	20	1732.5	20175	QPSK	1	0	12	10	737.5	5095	30	10	2355	9820	22.92	22.96
Intra-Band	Contiguous	66D	66	20	1770	132572	QPSK	1	0	66	20	2150.2	66838	66	20	2130.4	66640	22.77	22.84

12. 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 TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in normal mode was performed; 10mm for bottom of Laptop.
5. The proximity sensor is used to detect the human proximity, and the G-sensor is used to detect EUT motion and determine whether the proximity sensor is triggered by human or fixed objects such as the table. During SAR test for EUT at the power reduction mode, the EUT positioning was stationary for stable measurement, and G-sensor was manually set not enabled to successfully set EUT in the power reduction mode

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B12 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 4 / 5 / 17 SAR test was covered by Band 66 / 26 / 12; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   c. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   d. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

12.1 Body SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	9400	1880	23.16	24.50	1.361	0.13	0.851	1.159
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	9262	1852.4	23.15	24.50	1.365	0.13	0.839	1.145
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	9538	1907.6	23.04	24.50	1.400	0.12	0.780	1.092
01	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	9400	1880	16.13	17.00	1.222	0.03	0.953	1.164
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	9262	1852.4	16.08	17.00	1.236	0.07	0.923	1.141
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	9538	1907.6	15.92	17.00	1.282	0.02	0.852	1.093
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	9400	1880	16.13	17.00	1.222	0.03	0.852	1.041
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	9262	1852.4	16.08	17.00	1.236	0.01	0.860	1.063
	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	9538	1907.6	15.92	17.00	1.282	0.02	0.844	1.082
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	1513	1752.6	23.16	24.50	1.361	0.11	0.793	1.080
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	1312	1712.4	22.92	24.50	1.439	0.17	0.753	1.083
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	1413	1732.6	23.09	24.50	1.384	0.14	0.782	1.082
02	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	1513	1752.6	16.64	17.50	1.219	0.03	0.893	1.089
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	1312	1712.4	16.63	17.50	1.222	0.03	0.789	0.964
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	1413	1732.6	16.62	17.50	1.225	0.02	0.842	1.031
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	1513	1752.6	16.64	17.50	1.219	0.17	0.724	0.883
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	1312	1712.4	16.63	17.50	1.222	0.12	0.675	0.825
	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	1413	1732.6	16.62	17.50	1.225	0.15	0.703	0.861
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	4182	836.4	23.72	24.50	1.197	0.16	0.901	1.078
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	4132	826.4	23.66	24.50	1.213	-0.02	0.885	1.074
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	10mm	AMP	OFF	4233	846.6	23.69	24.50	1.205	0.05	0.891	1.074
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	4182	836.4	19.16	20.00	1.213	-0.07	0.887	1.076
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	4132	826.4	19.14	20.00	1.219	-0.09	0.876	1.068
03	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	4233	846.6	19.15	20.00	1.216	-0.02	0.889	1.081
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	4182	836.4	19.16	20.00	1.213	-0.03	0.739	0.897
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	4132	826.4	19.14	20.00	1.219	0.08	0.736	0.897
	WCDMA V	RMC 12.2Kbps	Bottom of Laptop	0mm	Speed	ON	4233	846.6	19.15	20.00	1.216	-0.04	0.695	0.845

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	10mm	AMP	OFF	18900	1880	22.86	24.00	1.300	0.15	0.732	0.952
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	10mm	AMP	OFF	18700	1860	22.79	24.00	1.321	0.1	0.743	0.982
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	10mm	AMP	OFF	19100	1900	22.58	24.00	1.387	0.06	0.690	0.957
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	10mm	AMP	OFF	18900	1880	21.74	23.00	1.337	0.12	0.591	0.790
	LTE Band 2	20M	QPSK	100	0	Bottom of Laptop	10mm	AMP	OFF	18900	1880	21.86	23.00	1.300	0.17	0.621	0.807
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	18700	1860	16.17	17.00	1.211	0.16	0.863	1.045
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	18900	1880	16.07	17.00	1.239	0.01	0.859	1.064
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	19100	1900	16.11	17.00	1.227	0.03	0.830	1.019
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	18700	1860	16.13	17.00	1.222	0.1	0.872	1.065
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	18900	1880	16.11	17.00	1.227	0.01	0.871	1.069
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	19100	1900	15.93	17.00	1.279	0.01	0.800	1.024
04	LTE Band 2	20M	QPSK	100	0	Bottom of Laptop	0mm	AMP	ON	18700	1860	16.11	17.00	1.227	0.1	0.874	1.073
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	18700	1860	16.17	17.00	1.211	0.12	0.855	1.035
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	18900	1880	16.07	17.00	1.239	0.08	0.842	1.043
	LTE Band 2	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	19100	1900	16.11	17.00	1.227	0.15	0.812	0.997
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	18700	1860	16.13	17.00	1.222	0.12	0.857	1.047
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	18900	1880	16.11	17.00	1.227	0.01	0.845	1.037
	LTE Band 2	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	19100	1900	15.93	17.00	1.279	0.09	0.815	1.043
	LTE Band 2	20M	QPSK	100	0	Bottom of Laptop	0mm	Speed	ON	18700	1860	16.11	17.00	1.227	0.13	0.869	1.067
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	21100	2535	22.51	24.00	1.409	-0.1	0.682	0.961
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	20850	2510	22.16	24.00	1.528	-0.02	0.696	1.063
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	21350	2560	22.27	24.00	1.489	-0.14	0.703	1.047
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	10mm	AMP	OFF	21100	2535	21.33	23.00	1.469	0.01	0.558	0.820
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	10mm	AMP	OFF	20850	2510	21.18	23.00	1.521	-0.05	0.575	0.874
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	10mm	AMP	OFF	21350	2560	21.31	23.00	1.476	-0.05	0.602	0.888
	LTE Band 7	20M	QPSK	100	0	Bottom of Laptop	10mm	AMP	OFF	21350	2560	21.35	23.00	1.462	-0.1	0.611	0.893
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	21350	2560	15.47	16.00	1.130	-0.08	0.750	0.847
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	20850	2510	15.40	16.00	1.148	-0.11	0.887	1.018
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	21100	2535	15.38	16.00	1.153	-0.15	0.799	0.922
	LTE Band 7	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	21350	2560	15.38	16.00	1.153	-0.14	0.803	0.926
05	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	0mm	AMP	ON	20850	2510	15.34	16.00	1.164	-0.04	0.916	1.066
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	0mm	AMP	ON	21100	2535	15.36	16.00	1.159	-0.16	0.831	0.963
	LTE Band 7	20M	QPSK	100	0	Bottom of Laptop	0mm	AMP	ON	21100	2535	15.43	16.00	1.140	-0.12	0.862	0.983
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	21350	2560	15.47	16.00	1.130	0.02	0.754	0.852
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	20850	2510	15.40	16.00	1.148	-0.12	0.842	0.967
	LTE Band 7	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	21100	2535	15.38	16.00	1.153	-0.13	0.780	0.900
	LTE Band 7	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	21350	2560	15.38	16.00	1.153	-0.05	0.806	0.930
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	0mm	Speed	ON	20850	2510	15.34	16.00	1.164	-0.09	0.867	1.009
	LTE Band 7	20M	QPSK	50	50	Bottom of Laptop	0mm	Speed	ON	21100	2535	15.36	16.00	1.159	-0.11	0.789	0.914
	LTE Band 7	20M	QPSK	100	0	Bottom of Laptop	0mm	Speed	ON	21100	2535	15.43	16.00	1.140	-0.1	0.829	0.945

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 12	10M	QPSK	1	49	Bottom of Laptop	10mm	AMP	OFF	23095	707.5	22.76	24.00	1.330	0.09	0.369	0.491
	LTE Band 12	10M	QPSK	25	12	Bottom of Laptop	10mm	AMP	OFF	23095	707.5	21.74	23.00	1.337	-0.04	0.286	0.382
06	LTE Band 12	10M	QPSK	1	49	Bottom of Laptop	0mm	AMP	ON	23095	707.5	20.61	21.50	1.227	0.1	0.826	1.014
	LTE Band 12	10M	QPSK	25	12	Bottom of Laptop	0mm	AMP	ON	23095	707.5	20.56	21.50	1.242	-0.03	0.792	0.983
	LTE Band 12	10M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	23095	707.5	20.51	21.50	1.256	-0.02	0.800	1.005
	LTE Band 12	10M	QPSK	1	49	Bottom of Laptop	0mm	Speed	ON	23095	707.5	20.61	21.50	1.227	-0.11	0.784	0.962
	LTE Band 12	10M	QPSK	25	12	Bottom of Laptop	0mm	Speed	ON	23095	707.5	20.56	21.50	1.242	-0.09	0.723	0.898
	LTE Band 12	10M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	23095	707.5	20.51	21.50	1.256	-0.03	0.719	0.903
	LTE Band 13	10M	QPSK	1	49	Bottom of Laptop	10mm	AMP	OFF	23230	782	22.92	24.00	1.282	-0.11	0.512	0.657
	LTE Band 13	10M	QPSK	25	0	Bottom of Laptop	10mm	AMP	OFF	23230	782	21.94	23.00	1.276	0.02	0.410	0.523
	LTE Band 13	10M	QPSK	1	49	Bottom of Laptop	0mm	AMP	ON	23230	782	19.06	20.50	1.393	0	0.801	1.116
	LTE Band 13	10M	QPSK	25	0	Bottom of Laptop	0mm	AMP	ON	23230	782	19.04	20.50	1.400	-0.04	0.821	1.149
07	LTE Band 13	10M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	23230	782	19.01	20.50	1.409	-0.06	0.816	1.150
	LTE Band 13	10M	QPSK	1	49	Bottom of Laptop	0mm	Speed	ON	23230	782	19.06	20.50	1.393	0.05	0.770	1.073
	LTE Band 13	10M	QPSK	25	0	Bottom of Laptop	0mm	Speed	ON	23230	782	19.04	20.50	1.400	-0.06	0.777	1.087
	LTE Band 13	10M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	23230	782	19.01	20.50	1.409	-0.03	0.801	1.129
	LTE Band 26	15M	QPSK	1	37	Bottom of Laptop	10mm	AMP	OFF	26865	831.5	22.64	24.00	1.368	-0.06	0.715	0.978
	LTE Band 26	15M	QPSK	36	20	Bottom of Laptop	10mm	AMP	OFF	26865	831.5	21.52	23.00	1.406	0.04	0.580	0.816
	LTE Band 26	15M	QPSK	75	0	Bottom of Laptop	10mm	AMP	OFF	26865	831.5	21.70	23.00	1.349	0.02	0.603	0.813
	LTE Band 26	15M	QPSK	1	37	Bottom of Laptop	0mm	AMP	ON	26865	831.5	19.37	20.00	1.156	0.16	0.927	1.072
	LTE Band 26	15M	QPSK	36	20	Bottom of Laptop	0mm	AMP	ON	26865	831.5	19.31	20.00	1.172	0.02	0.937	1.098
08	LTE Band 26	15M	QPSK	75	0	Bottom of Laptop	0mm	AMP	ON	26865	831.5	19.32	20.00	1.169	0.03	0.973	1.138
	LTE Band 26	15M	QPSK	1	37	Bottom of Laptop	0mm	Speed	ON	26865	831.5	19.37	20.00	1.156	-0.05	0.864	0.999
	LTE Band 26	15M	QPSK	36	20	Bottom of Laptop	0mm	Speed	ON	26865	831.5	19.31	20.00	1.172	-0.06	0.875	1.026
	LTE Band 26	15M	QPSK	75	0	Bottom of Laptop	0mm	Speed	ON	26865	831.5	19.32	20.00	1.169	0.02	0.911	1.065
	LTE Band 30	10M	QPSK	1	0	Bottom of Laptop	10mm	AMP	OFF	27710	2310	22.40	24.00	1.445	-0.05	0.618	0.893
	LTE Band 30	10M	QPSK	25	12	Bottom of Laptop	10mm	AMP	OFF	27710	2310	21.21	23.00	1.510	0	0.508	0.767
	LTE Band 30	10M	QPSK	50	0	Bottom of Laptop	10mm	AMP	OFF	27710	2310	21.24	23.00	1.500	-0.03	0.524	0.786
	LTE Band 30	10M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	27710	2310	15.27	16.00	1.183	-0.07	0.912	1.079
	LTE Band 30	10M	QPSK	25	0	Bottom of Laptop	0mm	AMP	ON	27710	2310	15.26	16.00	1.186	-0.08	0.921	1.092
09	LTE Band 30	10M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	27710	2310	15.12	16.00	1.225	-0.08	0.921	1.128
	LTE Band 30	10M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	27710	2310	15.27	16.00	1.183	-0.09	0.821	0.971
	LTE Band 30	10M	QPSK	25	0	Bottom of Laptop	0mm	Speed	ON	27710	2310	15.26	16.00	1.186	-0.05	0.809	0.959
	LTE Band 30	10M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	27710	2310	15.12	16.00	1.225	-0.01	0.838	1.026

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 66	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	132322	1745	22.74	24.00	1.337	0.12	0.680	0.909
	LTE Band 66	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	132072	1720	22.35	24.00	1.462	0.17	0.659	0.964
	LTE Band 66	20M	QPSK	1	99	Bottom of Laptop	10mm	AMP	OFF	132572	1770	22.55	24.00	1.396	0	0.655	0.915
	LTE Band 66	20M	QPSK	50	50	Bottom of Laptop	10mm	AMP	OFF	132322	1745	21.62	23.00	1.374	0.1	0.530	0.728
	LTE Band 66	20M	QPSK	100	0	Bottom of Laptop	10mm	AMP	OFF	132322	1745	21.60	23.00	1.380	0.14	0.542	0.748
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	132572	1770	16.82	17.50	1.169	0.18	0.841	0.984
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	132072	1720	16.66	17.50	1.213	0.01	0.798	0.968
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	AMP	ON	132322	1745	16.72	17.50	1.197	0.01	0.800	0.957
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	132572	1770	16.80	17.50	1.175	0.02	0.861	1.012
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	132072	1720	16.75	17.50	1.189	0.03	0.824	0.979
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	132322	1745	16.64	17.50	1.219	0.02	0.798	0.973
10	LTE Band 66	20M	QPSK	100	0	Bottom of Laptop	0mm	AMP	ON	132572	1770	16.80	17.50	1.175	0.01	0.887	1.042
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	132572	1770	16.82	17.50	1.169	0.17	0.787	0.920
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	132072	1720	16.66	17.50	1.213	0.02	0.792	0.961
	LTE Band 66	20M	QPSK	1	0	Bottom of Laptop	0mm	Speed	ON	132322	1745	16.72	17.50	1.197	0.09	0.782	0.936
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	132572	1770	16.80	17.50	1.175	0.17	0.798	0.938
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	132072	1720	16.75	17.50	1.189	0.13	0.795	0.945
	LTE Band 66	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	132322	1745	16.64	17.50	1.219	-0.06	0.765	0.933
	LTE Band 66	20M	QPSK	100	0	Bottom of Laptop	0mm	Speed	ON	132572	1770	16.80	17.50	1.175	0.14	0.820	0.963

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	10mm	Speed	OFF	40620	2593	22.91	23.00	1.021	62.9	1.006	-0.07	0.402	0.413
	LTE Band 41	20M	QPSK	50	50	Bottom of Laptop	10mm	Speed	OFF	41490	2680	21.67	22.00	1.079	62.9	1.006	-0.11	0.297	0.322
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	41490	2680	17.57	18.50	1.239	62.9	1.006	-0.06	0.685	0.854
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	39750	2506	17.11	18.50	1.377	62.9	1.006	-0.1	0.745	1.032
	LTE Band 41	20M	QPSK	1	49	Bottom of Laptop	0mm	AMP	ON	40185	2549.5	17.18	18.50	1.355	62.9	1.006	-0.03	0.708	0.965
	LTE Band 41	20M	QPSK	1	49	Bottom of Laptop	0mm	AMP	ON	40620	2593	17.36	18.50	1.300	62.9	1.006	-0.04	0.695	0.909
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	AMP	ON	41055	2636.5	17.56	18.50	1.242	62.9	1.006	0.02	0.721	0.901
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	41490	2680	17.48	18.50	1.265	62.9	1.006	-0.13	0.722	0.919
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	39750	2506	17.16	18.50	1.361	62.9	1.006	-0.13	0.764	1.046
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	40185	2549.5	17.05	18.50	1.396	62.9	1.006	-0.13	0.716	1.006
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	40620	2593	17.20	18.50	1.349	62.9	1.006	-0.14	0.709	0.962
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	AMP	ON	41055	2636.5	17.44	18.50	1.276	62.9	1.006	-0.13	0.730	0.937
	LTE Band 41	20M	QPSK	100	0	Bottom of Laptop	0mm	AMP	ON	41490	2680	17.47	18.50	1.268	62.9	1.006	-0.15	0.654	0.834
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	41490	2680	17.57	18.50	1.239	62.9	1.006	0.14	0.644	0.803
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	39750	2506	17.11	18.50	1.377	62.9	1.006	-0.06	0.855	1.185
	LTE Band 41	20M	QPSK	1	49	Bottom of Laptop	0mm	Speed	ON	40185	2549.5	17.18	18.50	1.355	62.9	1.006	-0.1	0.772	1.052
	LTE Band 41	20M	QPSK	1	49	Bottom of Laptop	0mm	Speed	ON	40620	2593	17.36	18.50	1.300	62.9	1.006	-0.03	0.705	0.922
	LTE Band 41	20M	QPSK	1	99	Bottom of Laptop	0mm	Speed	ON	41055	2636.5	17.56	18.50	1.242	62.9	1.006	-0.07	0.678	0.847
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	41490	2680	17.48	18.50	1.265	62.9	1.006	-0.04	0.660	0.840
11	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	39750	2506	17.16	18.50	1.361	62.9	1.006	-0.05	0.871	1.193
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	40185	2549.5	17.05	18.50	1.396	62.9	1.006	-0.01	0.786	1.104
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	40620	2593	17.20	18.50	1.349	62.9	1.006	-0.05	0.715	0.970
	LTE Band 41	20M	QPSK	50	0	Bottom of Laptop	0mm	Speed	ON	41055	2636.5	17.44	18.50	1.276	62.9	1.006	-0.04	0.686	0.881
	LTE Band 41	20M	QPSK	100	0	Bottom of Laptop	0mm	Speed	ON	41490	2680	17.47	18.50	1.268	62.9	1.006	-0.06	0.623	0.794

12.2 Repeated SAR Measurement

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna Vendor	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	9400	1880	16.13	17.00	1.222	0.03	0.953	-	1.164
2nd	WCDMA II	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	9400	1880	16.13	17.00	1.222	0.11	0.924	1.03	1.129
1st	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	1513	1752.6	16.64	17.50	1.219	0.03	0.893	-	1.089
2nd	WCDMA IV	RMC 12.2Kbps	Bottom of Laptop	0mm	AMP	ON	1513	1752.6	16.64	17.50	1.219	0.07	0.849	1.05	1.035
1st	LTE Band 7	20M_QPSK_50_50	Bottom of Laptop	0mm	AMP	ON	20850	2510	15.34	16.00	1.164	-0.04	0.916	-	1.066
2nd	LTE Band 7	20M_QPSK_50_50	Bottom of Laptop	0mm	AMP	ON	20850	2510	15.34	16.00	1.164	-0.14	0.893	1.03	1.040
1st	LTE Band 12	10M_QPSK_1_49	Bottom of Laptop	0mm	AMP	ON	23095	707.5	20.61	21.50	1.227	0.1	0.826	-	1.014
2nd	LTE Band 12	10M_QPSK_1_49	Bottom of Laptop	0mm	AMP	ON	23095	707.5	20.61	21.50	1.227	0.04	0.811	1.02	0.995
1st	LTE Band 26	15M_QPSK_75_0	Bottom of Laptop	0mm	AMP	ON	26865	831.5	19.32	20.00	1.169	0.03	0.973	-	1.138
2nd	LTE Band 26	15M_QPSK_75_0	Bottom of Laptop	0mm	AMP	ON	26865	831.5	19.32	20.00	1.169	0.06	0.964	1.01	1.127
1st	LTE Band 26	15M_QPSK_75_0	Bottom of Laptop	0mm	AMP	ON	26915	836.5	19.32	20.00	1.169	0.03	0.973	-	1.138
2nd	LTE Band 26	15M_QPSK_75_0	Bottom of Laptop	0mm	AMP	ON	26915	836.5	19.32	20.00	1.169	0.06	0.964	1.01	1.127
1st	LTE Band 30	10M_QPSK_50_0	Bottom of Laptop	0mm	AMP	ON	27710	2310	15.12	16.00	1.225	-0.08	0.921	-	1.128
2nd	LTE Band 30	10M_QPSK_50_0	Bottom of Laptop	0mm	AMP	ON	27710	2310	15.12	16.00	1.225	-0.11	0.838	1.10	1.026

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/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.

13. Simultaneous Transmission Analysis

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

General Note:

1. WLAN and Bluetooth share the same antenna 2, and cannot transmit simultaneously.
2. All licensed modes share the same antenna part and cannot transmit simultaneously
3. 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.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
   v) The SPLSR calculated results please refer to section 13.2.

13.1 Body Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	6	1+2+3 Summed 1g SAR (W/kg)	1+4+5+6 Summed 1g SAR (W/kg)	1+2+6 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2	Bluetooth Ant 2					
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)					
WCDMA	WCDMA II	Bottom of Laptop at 0mm	1.164	0.460	0.490	0.400	0.530	0.070	2.114	2.164	1.694	0.02	1
		Bottom of Laptop at 10mm	1.159	0.460	0.490	0.400	0.530	0.070	2.109	2.159	1.689	0.02	2
	WCDMA IV	Bottom of Laptop at 0mm	1.089	0.460	0.490	0.400	0.530	0.070	2.039	2.089	1.619	0.02	3
		Bottom of Laptop at 10mm	1.083	0.460	0.490	0.400	0.530	0.070	2.033	2.083	1.613	0.02	4
	WCDMA V	Bottom of Laptop at 0mm	1.081	0.460	0.490	0.400	0.530	0.070	2.031	2.081	1.611	0.02	5
		Bottom of Laptop at 10mm	1.078	0.460	0.490	0.400	0.530	0.070	2.028	2.078	1.608	0.02	6
LTE	LTE Band 2	Bottom of Laptop at 0mm	1.073	0.460	0.490	0.400	0.530	0.070	2.023	2.073	1.603	0.02	7
		Bottom of Laptop at 10mm	0.982	0.460	0.490	0.400	0.530	0.070	1.932	1.982	1.512	0.02	8
	LTE Band 7	Bottom of Laptop at 0mm	1.066	0.460	0.490	0.400	0.530	0.070	2.016	2.066	1.596	0.02	9
		Bottom of Laptop at 10mm	1.063	0.460	0.490	0.400	0.530	0.070	2.013	2.063	1.593	0.02	10
	LTE Band 12	Bottom of Laptop at 0mm	1.014	0.460	0.490	0.400	0.530	0.070	1.964	2.014	1.544	0.02	11
		Bottom of Laptop at 10mm	0.491	0.460	0.490	0.400	0.530	0.070	1.441	1.491	1.021		
	LTE Band 13	Bottom of Laptop at 0mm	1.150	0.460	0.490	0.400	0.530	0.070	2.100	2.150	1.680	0.02	12
		Bottom of Laptop at 10mm	0.657	0.460	0.490	0.400	0.530	0.070	1.607	1.657	1.187	0.02	13
	LTE Band 26	Bottom of Laptop at 0mm	1.138	0.460	0.490	0.400	0.530	0.070	2.088	2.138	1.668	0.02	14
		Bottom of Laptop at 10mm	0.978	0.460	0.490	0.400	0.530	0.070	1.928	1.978	1.508	0.02	15
	LTE Band 30	Bottom of Laptop at 0mm	1.128	0.460	0.490	0.400	0.530	0.070	2.078	2.128	1.658	0.02	16
		Bottom of Laptop at 10mm	0.893	0.460	0.490	0.400	0.530	0.070	1.843	1.893	1.423	0.02	17
	LTE Band 41	Bottom of Laptop at 0mm	1.193	0.460	0.490	0.400	0.530	0.070	2.143	2.193	1.723	0.02	18
		Bottom of Laptop at 10mm	0.413	0.460	0.490	0.400	0.530	0.070	1.363	1.413	0.943		
	LTE Band 66	Bottom of Laptop at 0mm	1.042	0.460	0.490	0.400	0.530	0.070	1.992	2.042	1.572	0.02	19
		Bottom of Laptop at 10mm	0.964	0.460	0.490	0.400	0.530	0.070	1.914	1.964	1.494	0.02	20

13.2 SPLSR Evaluation and Analysis

General Note:

1. According to section 12 antenna locations the minimum distance between each transmitter antennas are used for SPLSR analysis.
2. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
3. Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Therefore, the adjacent transmit antennas will be summed first, and then the SPLSR calculation will be evaluated with the farther transmitted antennas.

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 1	WCDMA II	Bottom of Laptop	1.164	0	212.2	1.62	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA II	Bottom of Laptop	1.164	0	178.7	1.65	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA II	Bottom of Laptop	1.164	0	212.2	1.56	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA II	Bottom of Laptop	1.164	0	178.7	1.76	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 2	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II	Bottom of Laptop	1.159	10	212.2	1.62	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA II	Bottom of Laptop	1.159	10	178.7	1.65	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA II	Bottom of Laptop	1.159	10	212.2	1.56	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA II	Bottom of Laptop	1.159	10	178.7	1.76	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 3	WCDMA IV	Bottom of Laptop	1.089	0	212.2	1.55	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA IV	Bottom of Laptop	1.089	0	178.7	1.58	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA IV	Bottom of Laptop	1.089	0	212.2	1.49	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA IV	Bottom of Laptop	1.089	0	178.7	1.69	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 4	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA IV	Bottom of Laptop	1.083	10	212.2	1.54	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA IV	Bottom of Laptop	1.083	10	178.7	1.57	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA IV	Bottom of Laptop	1.083	10	212.2	1.48	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA IV	Bottom of Laptop	1.083	10	178.7	1.68	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 5	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA V	Bottom of Laptop	1.081	0	212.2	1.54	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA V	Bottom of Laptop	1.081	0	178.7	1.57	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA V	Bottom of Laptop	1.081	0	212.2	1.48	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA V	Bottom of Laptop	1.081	0	178.7	1.68	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 6	WCDMA V	Bottom of Laptop	1.078	10	212.2	1.54	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	WCDMA V	Bottom of Laptop	1.078	10	178.7	1.57	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WCDMA V	Bottom of Laptop	1.078	10	212.2	1.48	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	WCDMA V	Bottom of Laptop	1.078	10	178.7	1.68	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 7	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 2	Bottom of Laptop	1.073	0	212.2	1.53	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 2	Bottom of Laptop	1.073	0	178.7	1.56	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 2	Bottom of Laptop	1.073	0	212.2	1.47	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 2	Bottom of Laptop	1.073	0	178.7	1.67	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 8	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 2	Bottom of Laptop	0.982	10	212.2	1.44	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 2	Bottom of Laptop	0.982	10	178.7	1.47	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 2	Bottom of Laptop	0.982	10	212.2	1.38	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 2	Bottom of Laptop	0.982	10	178.7	1.58	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 9	LTE Band 7	Bottom of Laptop	1.066	0	212.2	1.53	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 7	Bottom of Laptop	1.066	0	178.7	1.56	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 7	Bottom of Laptop	1.066	0	212.2	1.47	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 7	Bottom of Laptop	1.066	0	178.7	1.67	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
	Band	**Position**	**SAR (W/kg)**	**Gap (mm)**	**Minimum distance (mm)**	**Summed SAR (W/kg)**	**SPLSR Results**	**Simultaneous SAR**
Case 10	LTE Band 7	Bottom of Laptop	1.063	10	212.2	1.52	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 7	Bottom of Laptop	1.063	10	178.7	1.55	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 7	Bottom of Laptop	1.063	10	212.2	1.46	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 7	Bottom of Laptop	1.063	10	178.7	1.66	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	Band	**Position**	**SAR (W/kg)**	**Gap (mm)**	**Minimum distance (mm)**	**Summed SAR (W/kg)**	**SPLSR Results**	**Simultaneous SAR**
Case 11	LTE Band 12	Bottom of Laptop	1.014	0	212.2	1.47	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 12	Bottom of Laptop	1.014	0	178.7	1.50	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 12	Bottom of Laptop	1.014	0	212.2	1.41	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 12	Bottom of Laptop	1.014	0	178.7	1.61	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 12	LTE Band 13	Bottom of Laptop	1.15	0	212.2	1.61	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 13	Bottom of Laptop	1.15	0	178.7	1.64	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 13	Bottom of Laptop	1.15	0	212.2	1.55	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 13	Bottom of Laptop	1.15	0	178.7	1.75	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
	Band	**Position**	**SAR (W/kg)**	**Gap (mm)**	**Minimum distance (mm)**	**Summed SAR (W/kg)**	**SPLSR Results**	**Simultaneous SAR**
Case 13	LTE Band 13	Bottom of Laptop	0.657	10	212.2	1.12	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 13	Bottom of Laptop	0.657	10	178.7	1.15	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 13	Bottom of Laptop	0.657	10	212.2	1.06	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 13	Bottom of Laptop	0.657	10	178.7	1.26	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	Band	**Position**	**SAR (W/kg)**	**Gap (mm)**	**Minimum distance (mm)**	**Summed SAR (W/kg)**	**SPLSR Results**	**Simultaneous SAR**
Case 14	LTE Band 26	Bottom of Laptop	1.138	0	212.2	1.60	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 26	Bottom of Laptop	1.138	0	178.7	1.63	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 26	Bottom of Laptop	1.138	0	212.2	1.54	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 26	Bottom of Laptop	1.138	0	178.7	1.74	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 15	LTE Band 26	Bottom of Laptop	0.978	10	212.2	1.44	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 26	Bottom of Laptop	0.978	10	178.7	1.47	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 26	Bottom of Laptop	0.978	10	212.2	1.38	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 26	Bottom of Laptop	0.978	10	178.7	1.58	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 16	LTE Band 30	Bottom of Laptop	1.128	0	212.2	1.59	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 30	Bottom of Laptop	1.128	0	178.7	1.62	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 30	Bottom of Laptop	1.128	0	212.2	1.53	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 30	Bottom of Laptop	1.128	0	178.7	1.73	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 17	LTE Band 30	Bottom of Laptop	0.893	10	212.2	1.35	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 30	Bottom of Laptop	0.893	10	178.7	1.38	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 30	Bottom of Laptop	0.893	10	212.2	1.29	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 30	Bottom of Laptop	0.893	10	178.7	1.49	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				

	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 18	LTE Band 41	Bottom of Laptop	1.193	0	212.2	1.65	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 41	Bottom of Laptop	1.193	0	178.7	1.68	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 41	Bottom of Laptop	1.193	0	212.2	1.59	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 41	Bottom of Laptop	1.193	0	178.7	1.79	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.53	0.01	Not required
	BT Ant 2		0.07	0				
Case 19	LTE Band 66	Bottom of Laptop	1.042	0	212.2	1.50	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 66	Bottom of Laptop	1.042	0	178.7	1.53	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 66	Bottom of Laptop	1.042	0	212.2	1.44	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 66	Bottom of Laptop	1.042	0	178.7	1.64	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	Band	Position	SAR (W/kg)	Gap (mm)	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 20	LTE Band 66	Bottom of Laptop	0.964	10	212.2	1.42	0.01	Not required
	WLAN2.4GHz_Ant 1		0.46	0				
	LTE Band 66	Bottom of Laptop	0.964	10	178.7	1.45	0.01	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	LTE Band 66	Bottom of Laptop	0.964	10	212.2	1.36	0.01	Not required
	WLAN5GHz_Ant 1		0.4	0				
	LTE Band 66	Bottom of Laptop	0.964	10	178.7	1.56	0.01	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				
	WLAN2.4GHz_Ant 1	Bottom of Laptop	0.46	0	48.1	0.95	0.02	Not required
	WLAN2.4GHz_Ant 2		0.49	0				
	WLAN5GHz_Ant 1	Bottom of Laptop	0.4	0	48.1	1.00	0.02	Not required
	WLAN5GHz_Ant 2+BT Ant 2		0.6	0				

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14. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 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.

15. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[8] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[9] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[10] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[12] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.