



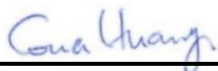
FCC SAR TEST REPORT

FCC ID : 2AD9M-003A
Equipment : Smartphone
Brand Name : LEOMO
Model Name : LEM-TS1
Marketing Name : LEOMO TYPE-S
Applicant : LEOMO, Inc.
7-22-17 Nishi Gotanda TOC Bldg. 7F
Shinagawa-ku, Tokyo, 1410031, Japan
Manufacturer : LEOMO, Inc.
2000 Central Avenue, Suite 150, Boulder CO
80301, USA
Standard : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

The product was received on May 03, 2019 and testing was started from May 14, 2019 and completed on Jun. 21, 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.



Approved by: Cona Huang / Deputy Manager

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Table of Contents

1. Statement of Compliance	4
2. Guidance Applied.....	5
3. Equipment Under Test (EUT) Information.....	6
3.1 General Information	6
3.2 General LTE SAR Test and Reporting Considerations	7
4. RF Exposure Limits.....	9
4.1 Uncontrolled Environment.....	9
4.2 Controlled Environment.....	9
5. Specific Absorption Rate (SAR).....	10
5.1 Introduction	10
5.2 SAR Definition.....	10
6. System Description and Setup	11
6.1 E-Field Probe	12
6.2 Data Acquisition Electronics (DAE)	12
6.3 Phantom.....	13
6.4 Device Holder.....	14
7. Measurement Procedures	15
7.1 Spatial Peak SAR Evaluation.....	15
7.2 Power Reference Measurement.....	16
7.3 Area Scan	16
7.4 Zoom Scan.....	17
7.5 Volume Scan Procedures.....	18
7.6 Power Drift Monitoring.....	18
8. Test Equipment List.....	19
9. System Verification	20
9.1 Tissue Simulating Liquids.....	20
9.2 Tissue Verification	21
9.3 System Performance Check Results.....	22
10. RF Exposure Positions	24
10.1 Ear and handset reference point.....	24
10.2 Definition of the cheek position	25
10.3 Definition of the tilt position	26
10.4 Body Worn Accessory	27
10.5 Extremity Exposure	27
10.6 Wireless Router.....	28
11. Conducted RF Output Power (Unit: dBm).....	29
12. Antenna Location	68
13. SAR Test Results	69
13.1 Head SAR	71
13.2 Hotspot SAR	76
13.3 Body Worn Accessory SAR.....	81
13.4 Extremity SAR.....	85
13.5 Repeated SAR Measurement	88
14. Simultaneous Transmission Analysis.....	89
14.1 Head Exposure Conditions	90
14.2 Hotspot Exposure Conditions.....	91
14.3 Body-Worn Accessory Exposure Conditions	93
14.4 Extremity Exposure Conditions	93
15. Uncertainty Assessment	94
16. References	94
Appendix A. Plots of System Performance Check	
Appendix B. Plots of High SAR Measurement	
Appendix C. DASY Calibration Certificate	
Appendix D. Test Setup Photos	

History of this test report

Report No.	Version	Description	Issued Date
FA942441	01	Initial issue of report	Jul. 05, 2019
FA942441	02	Revised Applicant address	Jul. 15, 2019

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **LEOMO, Inc., Smartphone, LEM-TS1**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	Extremity (Separation 0mm)	
		1g SAR (W/kg)			10g SAR (W/kg)	
Licensed	GSM850	0.76	0.54	0.54	0.50	1.45
	GSM1900	1.14	0.32	0.71	0.31	
	WCDMA II	1.09	1.18	1.19	0.69	
	WCDMA V	0.79	0.60	0.60	0.52	
	LTE Band 2	1.38	0.87	1.20	0.53	
	LTE Band 4	1.13	0.39	0.48	0.22	
	LTE Band 5	0.78	0.53	0.53	0.44	
	LTE Band 7	1.35	1.20	1.20	0.56	
	LTE Band 12 / 17	0.63	0.34	0.34	0.29	
	LTE Band 38 / 41	1.37	0.58	0.70	0.32	
DTS	2.4GHz WLAN	0.06	0.07	0.07	0.06	1.39
NII	5GHz WLAN	0.13	0.16	0.20	0.12	1.45
DSS	Bluetooth	0.04	0.02	0.03	0.02	1.40
Date of Testing:		2019/5/14 ~ 2019/6/21				

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 for Partial-Body 1g SAR, 4.0 W/kg for Extremity 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 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 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Smartphone
Brand Name	LEOMO
Model Name	LEM-TS1
Marketing Name	LEOMO TYPE-S
FCC ID	2AD9M-003A
IMEI Code	355681100007804
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band 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 17: 706.5 MHz ~ 713.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz ANT +: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM, 64QAM WLAN: 802.11a/b/g/n HT20 / HT40 Bluetooth BR/EDR/LE NFC:ASK ANT+: GFSK
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark: 1. This device WLAN 2.4GHz / 5.3GHz / 5.5GHz / 5.8GHz supports Hotspot operation and Bluetooth support tethering applications. 2. Head: the device utilizes independent power reduction mechanisms for SAR compliance for the WCDMA B2, LTE B2 / B7 / B38 / B41 transmitter for held-to-ear exposure and detail descriptions of the power reduction mechanism are included in the operational description. 3. The device with Holster perform extremity SAR tests.	

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05								
FCC ID	2AD9M-003A							
Equipment Name	Smartphone							
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz							
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used	QPSK / 16QAM / 64QAM							
LTE Voice / Data requirements	Voice and Data							
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3							
	Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)
		1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
	256 QAM	≥ 1						≤ 5
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)							
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.							
Power reduction applied to satisfy SAR compliance	1. Yes, when operating in At Head mode that LTE B2 / B7 / B38 / B41 power reduction applied to satisfy SAR compliance.							

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5				
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 12												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704				
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5				
H	23173	715.3	23165	714.5	23155	713.5	23130	711				
LTE Band 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 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				

4. RF Exposure Limits

4.1 Uncontrolled Environment

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

4.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

5. Specific Absorption Rate (SAR)

5.1 Introduction

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

5.2 SAR Definition

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

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

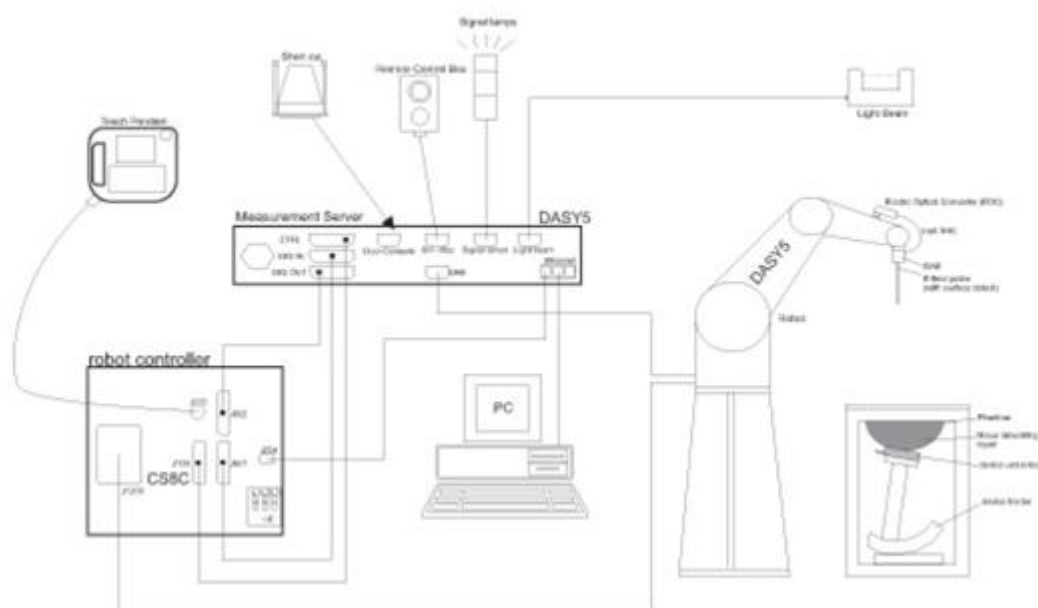
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. System Description and Setup

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



- 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.

6.1 E-Field Probe

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

<ES3DV3 Probe>

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

<EX3DV4 Probe>

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

6.2 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

6.3 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.

6.4 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

7. 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

7.1 Spatial Peak SAR Evaluation

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

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

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

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

7.2 Power Reference Measurement

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

7.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

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

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

7.4 Zoom Scan

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

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

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



7.5 Volume Scan Procedures

The volume scan is used 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.

7.6 Power Drift Monitoring

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

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1107	Mar. 08, 2019	Mar. 07, 2020
SPEAG	835MHz System Validation Kit	D835V2	499	Sep. 06, 2018	Sep. 05, 2019
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 19, 2018	Nov. 18, 2019
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Sep. 11, 2018	Sep. 10, 2019
SPEAG	2450MHz System Validation Kit	D2450V2	929	Mar. 06, 2019	Mar. 05, 2020
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 31, 2018	Aug. 30, 2019
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Sep. 27, 2018	Sep. 26, 2019
SPEAG	Data Acquisition Electronics	DAE3	360	Oct. 29, 2018	Oct. 28, 2019
SPEAG	Data Acquisition Electronics	DAE3	577	Sep. 19, 2018	Sep. 18, 2019
SPEAG	Data Acquisition Electronics	DAE4	316	Jan. 03, 2019	Jan. 02, 2020
SPEAG	Data Acquisition Electronics	DAE4	699	Jan. 03, 2019	Jan. 02, 2020
SPEAG	Data Acquisition Electronics	DAE4	914	Dec. 11, 2018	Dec. 10, 2019
SPEAG	Data Acquisition Electronics	DAE4	1399	Nov. 16, 2018	Nov. 15, 2019
SPEAG	Dosimetric E-Field Probe	ES3DV3	3124	Jan. 15, 2019	Jan. 14, 2020
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 24, 2018	Sep. 23, 2019
SPEAG	Dosimetric E-Field Probe	EX3DV4	3642	Apr. 29, 2019	Apr. 28, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 27, 2018	Sep. 26, 2019
SPEAG	Dosimetric E-Field Probe	EX3DV4	7306	Jul. 26, 2018	Jul. 25, 2019
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	MY50267236	Apr. 01, 2019	Mar. 31, 2020
R&S	BT Base Station	CBT32	100522	Mar. 18, 2019	Mar. 17, 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. 19, 2018	Sep. 18, 2019
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 19, 2018	Sep. 18, 2019
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3169	Sep. 11, 2018	Sep. 10, 2019
Anritsu	Power Meter	ML2495A	1218006	Oct. 08, 2018	Oct. 07, 2019
Anritsu	Power Sensor	MA2411B	1207363	Oct. 08, 2018	Oct. 07, 2019
Anritsu	Power Meter	ML2495A	1240001	Sep. 13, 2018	Sep. 12, 2019
Anritsu	Power Sensor	MA2411B	1207349	Sep. 13, 2018	Sep. 12, 2019
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 28, 2018	Aug. 27, 2019
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 23, 2018	Jun. 22, 2019
Mini-Circuits	Power Amplifier	ZVE-8G+	070501814	Oct. 08, 2018	Oct. 07, 2019
Mini-Circuits	Power Amplifier	ZVE-8G+	6382	Aug. 09, 2018	Aug. 08, 2019
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.

9. System Verification

9.1 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.

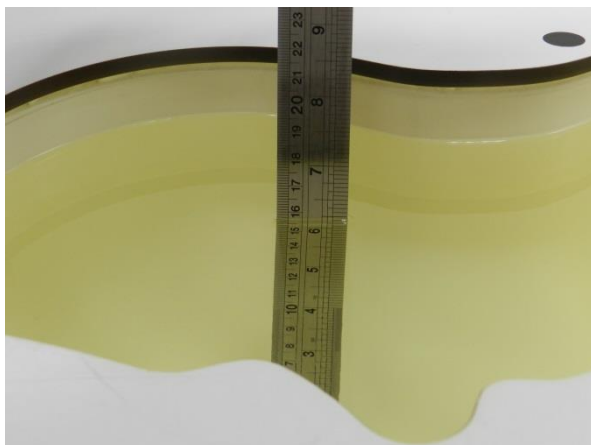


Fig 10.1 Photo of Liquid Height for Head SAR



Fig 10.2 Photo of Liquid Height for Body SAR

9.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
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
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
750	HSL	22.7	0.903	43.070	0.89	41.90	1.46	2.79	±5	2019/6/1
750	HSL	22.3	0.898	43.231	0.89	41.90	0.90	3.18	±5	2019/6/16
835	HSL	22.7	0.886	42.139	0.90	41.50	-1.56	1.54	±5	2019/6/1
835	HSL	22.8	0.884	42.130	0.90	41.50	-1.78	1.52	±5	2019/6/16
1750	HSL	22.9	1.378	40.223	1.37	40.10	0.58	0.31	±5	2019/6/18
1750	HSL	22.6	1.377	40.223	1.37	40.10	0.51	0.31	±5	2019/6/21
1900	HSL	22.6	1.425	39.537	1.40	40.00	1.79	-1.16	±5	2019/6/17
1900	HSL	22.6	1.425	39.537	1.40	40.00	1.79	-1.16	±5	2019/6/17
1900	HSL	22.4	1.424	39.547	1.40	40.00	1.71	-1.13	±5	2019/6/20
2450	HSL	22.5	1.762	38.810	1.80	39.20	-2.11	-0.99	±5	2019/5/14
2450	HSL	22.6	1.797	39.895	1.80	39.20	-0.17	1.77	±5	2019/5/21
2600	HSL	22.5	1.940	37.882	1.96	39.00	-1.02	-2.87	±5	2019/6/18
2600	HSL	22.3	1.948	38.002	1.96	39.00	-0.61	-2.56	±5	2019/6/19
2600	HSL	22.6	1.957	38.122	1.96	39.00	-0.15	-2.25	±5	2019/6/21
5250	HSL	22.4	4.579	36.971	4.71	35.95	-2.78	2.84	±5	2019/5/16
5600	HSL	22.7	4.990	35.797	5.07	35.50	-1.58	0.84	±5	2019/5/22
5750	HSL	22.7	5.153	35.566	5.22	35.35	-1.28	0.61	±5	2019/5/22
5750	HSL	22.6	5.239	35.490	5.22	35.35	0.36	0.40	±5	2019/5/24

9.3 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2019/6/1	750	HSL	250	D750V3-1107	EX3DV4 - SN7306	DAE4 Sn699	2.19	8.32	8.76	5.29
2019/6/16	750	HSL	250	D750V3-1107	ES3DV3 - SN3270	DAE3 Sn577	2.03	8.32	8.12	-2.40
2019/6/1	835	HSL	250	D835V2-499	EX3DV4 - SN7306	DAE4 Sn699	2.42	9.59	9.68	0.94
2019/6/16	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE3 Sn577	2.25	9.59	9	-6.15
2019/6/18	1750	HSL	250	D1750V2-1068	ES3DV3 - SN3270	DAE3 Sn577	8.73	37.10	34.92	-5.88
2019/6/21	1750	HSL	250	D1750V2-1068	ES3DV3 - SN3124	DAE4 Sn316	9.62	37.10	38.48	3.72
2019/6/17	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE3 Sn577	9.79	40.20	39.16	-2.59
2019/6/17	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3124	DAE4 Sn316	10.50	40.20	42	4.48
2019/6/20	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3124	DAE4 Sn316	10.50	40.20	42	4.48
2019/5/14	2450	HSL	250	D2450V2-929	EX3DV4 - SN3931	DAE4 Sn1399	13.00	52.10	52	-0.19
2019/5/21	2450	HSL	250	D2450V2-929	EX3DV4 - SN7306	DAE3 Sn360	12.70	52.10	50.8	-2.50
2019/6/18	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	13.30	56.40	53.2	-5.67
2019/6/19	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	13.40	56.40	53.6	-4.96
2019/6/21	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	13.40	56.40	53.6	-4.96
2019/5/16	5250	HSL	100	D5GHzV2-1006-5250	EX3DV4 - SN3931	DAE4 Sn1399	7.71	80.70	77.1	-4.46
2019/5/22	5600	HSL	100	D5GHzV2-1006-5600	EX3DV4 - SN3642	DAE4 Sn914	8.22	83.30	82.2	-1.32
2019/5/22	5750	HSL	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn914	7.81	80.40	78.1	-2.86
2019/5/24	5750	HSL	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn914	8.47	80.40	84.7	5.35

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2019/6/1	750	HSL	250	D750V3-1107	EX3DV4 - SN7306	DAE4 Sn699	1.47	5.61	5.88	4.81
2019/6/16	750	HSL	250	D750V3-1107	ES3DV3 - SN3270	DAE3 Sn577	1.39	5.61	5.56	-0.89
2019/6/1	835	HSL	250	D835V2-499	EX3DV4 - SN7306	DAE4 Sn699	1.59	6.29	6.36	1.11
2019/6/16	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE3 Sn577	1.49	6.29	5.96	-5.25
2019/6/18	1750	HSL	250	D1750V2-1068	ES3DV3 - SN3270	DAE3 Sn577	4.78	19.50	19.12	-1.95
2019/6/21	1750	HSL	250	D1750V2-1068	ES3DV3 - SN3124	DAE4 Sn316	5.01	19.50	20.04	2.77
2019/6/17	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE3 Sn577	5.10	21.20	20.4	-3.77
2019/6/17	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3124	DAE4 Sn316	5.37	21.20	21.48	1.32
2019/6/20	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3124	DAE4 Sn316	5.37	21.20	21.48	1.32
2019/5/14	2450	HSL	250	D2450V2-929	EX3DV4 - SN3931	DAE4 Sn1399	6.00	24.10	24	-0.41
2019/5/21	2450	HSL	250	D2450V2-929	EX3DV4 - SN7306	DAE3 Sn360	5.86	24.10	23.44	-2.74
2019/6/18	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	5.95	25.30	23.8	-5.93
2019/6/19	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	6.05	25.30	24.2	-4.35
2019/6/21	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3124	DAE4 Sn316	6.07	25.30	24.28	-4.03
2019/5/16	5250	HSL	100	D5GHzV2-1006-5250	EX3DV4 - SN3931	DAE4 Sn1399	2.17	23.20	21.7	-6.47
2019/5/22	5600	HSL	100	D5GHzV2-1006-5600	EX3DV4 - SN3642	DAE4 Sn914	2.25	23.80	22.5	-5.46
2019/5/22	5750	HSL	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn914	2.21	22.90	22.1	-3.49
2019/5/24	5750	HSL	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn914	2.31	22.90	23.1	0.87

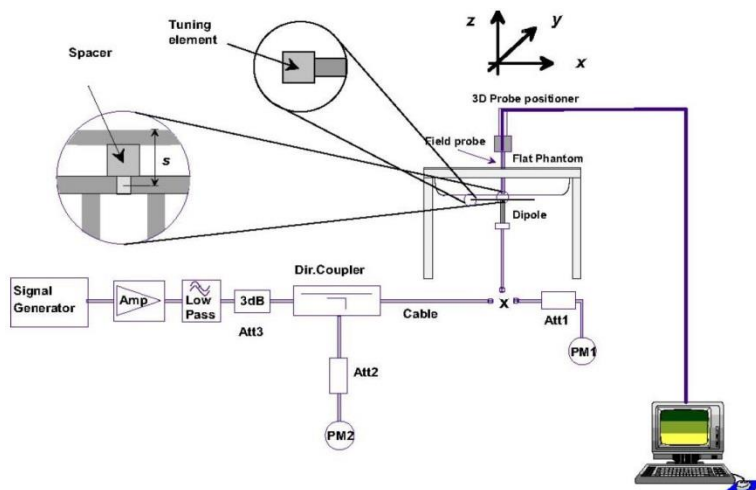

Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 Ear and handset reference point

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

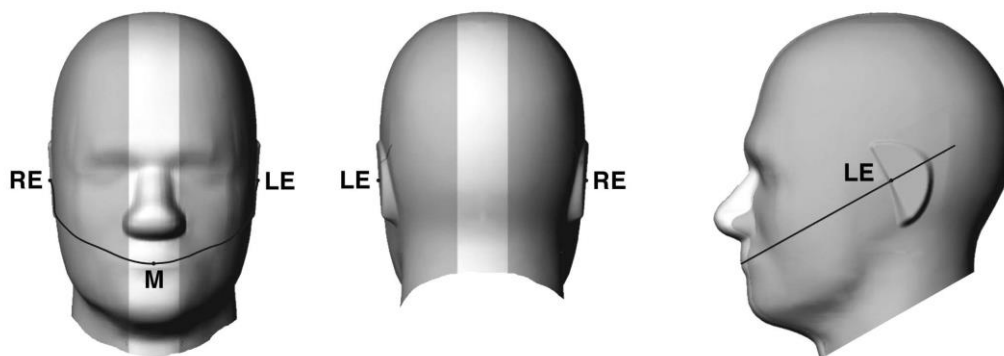


Fig 9.1.1 Front, back, and side views of SAM twin phantom

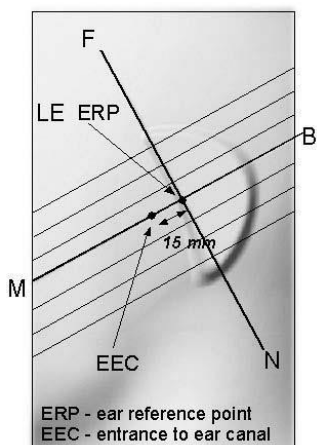


Fig 9.1.2 Close-up side view of phantom showing the ear region.

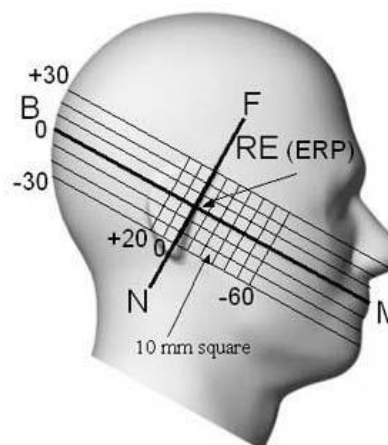


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

10.2 Definition of the cheek position

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

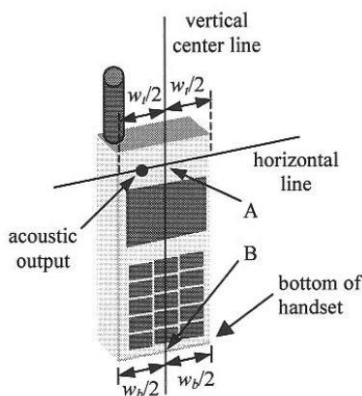


Fig 9.2.1 Handset vertical and horizontal reference lines—“fixed case”

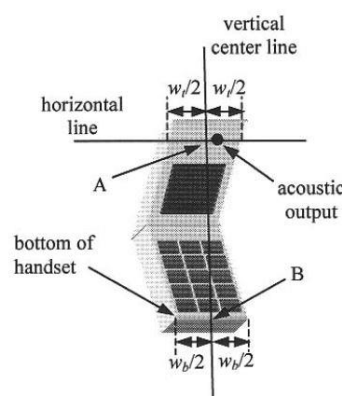


Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”

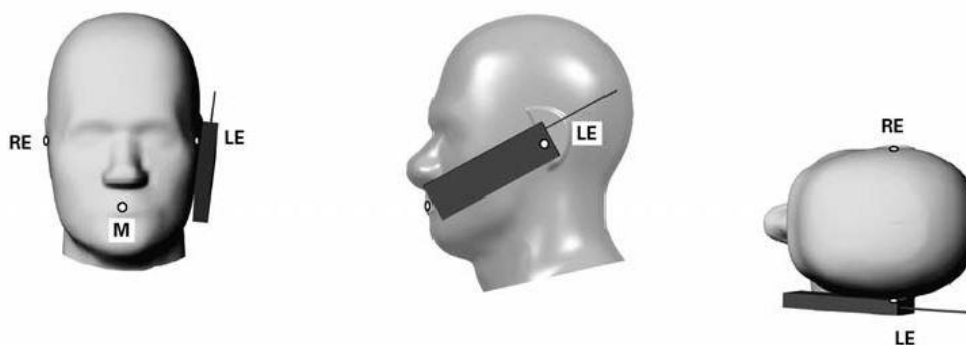


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

10.3 Definition of the tilt position

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

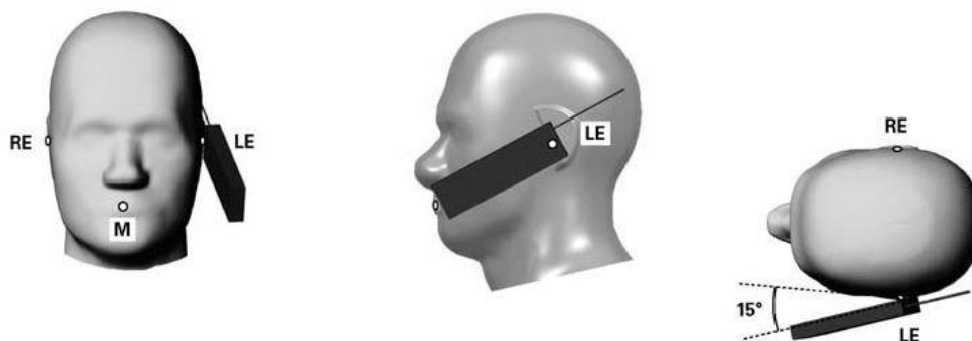


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

10.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

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

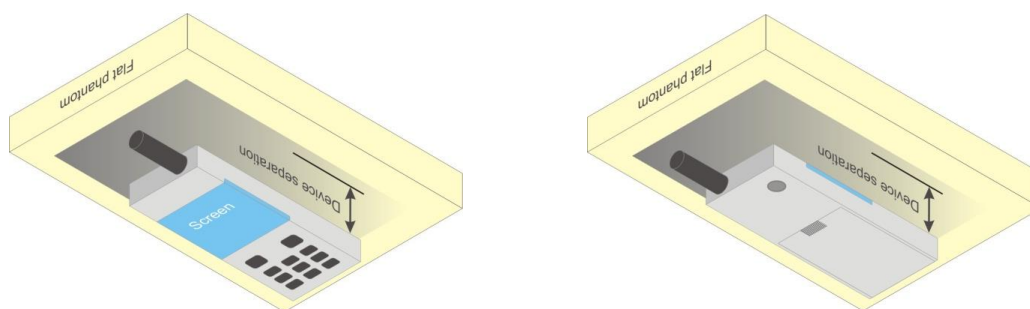


Fig 9.4 Body Worn Position

10.5 Extremity Exposure

For smart phones with a display diagonal dimension $> 15.0 \text{ cm}$ or an overall diagonal dimension $> 16.0 \text{ cm}$ that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at $\leq 25 \text{ mm}$ from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.⁶ The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$.



10.6 Wireless Router

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

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

11. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

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

<Default Power Mode>

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
TX Channel	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	33.50	33.42	33.48	33.50	24.50	24.42	24.48	24.50
GPRS 1 Tx slot	33.50	33.41	33.49	33.50	24.50	24.41	24.49	24.50
GPRS 2 Tx slots	30.41	30.03	30.08	30.50	24.41	24.03	24.08	24.50
GPRS 3 Tx slots	28.25	28.34	28.42	28.80	23.99	24.08	24.16	24.54
GPRS 4 Tx slots	27.04	26.80	26.86	27.50	24.04	23.80	23.86	24.50
EDGE 1 Tx slot	26.61	26.64	26.66	28.00	17.61	17.64	17.66	19.00
EDGE 2 Tx slots	25.57	25.59	25.63	26.50	19.57	19.59	19.63	20.50
EDGE 3 Tx slots	23.88	23.93	23.92	24.80	19.62	19.67	19.66	20.54
EDGE 4 Tx slots	22.24	22.27	22.21	23.50	19.24	19.27	19.21	20.50

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	30.48	30.47	30.46	30.50	21.48	21.47	21.46	21.50
GPRS 1 Tx slot	30.50	30.49	30.47	30.50	21.50	21.49	21.47	21.50
GPRS 2 Tx slots	26.76	26.67	26.55	27.50	20.76	20.67	20.55	21.50
GPRS 3 Tx slots	25.44	25.33	25.20	25.80	21.18	21.07	20.94	21.54
GPRS 4 Tx slots	23.74	23.68	23.56	24.50	20.74	20.68	20.56	21.50
EDGE 1 Tx slot	25.20	25.08	24.95	26.00	16.20	16.08	15.95	17.00
EDGE 2 Tx slots	23.61	23.44	23.33	24.50	17.61	17.44	17.33	18.50
EDGE 3 Tx slots	21.82	21.63	21.51	22.80	17.56	17.37	17.25	18.54
EDGE 4 Tx slots	20.40	20.24	20.11	21.50	17.40	17.24	17.11	18.50

<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.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

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

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

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

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

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

Setup Configuration

HSUPA Setup Configuration:

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

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

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

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

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

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

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

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

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

Setup Configuration

<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 is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA.

<Default Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.21	23.09	23.29	24.00	22.91	22.97	23.07	24.00
3GPP Rel 99	RMC 12.2Kbps	23.23	23.12	23.32	24.00	22.93	23.00	23.12	24.00
3GPP Rel 6	HSDPA Subtest-1	22.06	22.23	22.37	23.50	22.12	22.25	22.37	23.50
3GPP Rel 6	HSDPA Subtest-2	22.11	22.22	22.39	23.50	22.11	22.22	22.31	23.50
3GPP Rel 6	HSDPA Subtest-3	21.63	21.82	21.98	23.00	21.69	21.74	21.81	23.00
3GPP Rel 6	HSDPA Subtest-4	21.61	21.81	21.97	23.00	21.70	21.74	21.81	23.00
3GPP Rel 6	HSUPA Subtest-1	21.89	21.61	21.64	23.50	21.36	21.72	22.10	23.50
3GPP Rel 6	HSUPA Subtest-2	20.60	21.16	21.18	22.50	20.64	21.08	21.19	22.50
3GPP Rel 6	HSUPA Subtest-3	20.68	20.78	20.94	22.50	20.78	20.69	21.21	22.50
3GPP Rel 6	HSUPA Subtest-4	21.22	21.35	21.35	22.50	21.05	21.28	21.78	22.50
3GPP Rel 6	HSUPA Subtest-5	22.10	22.20	22.30	23.50	22.00	22.10	22.10	23.50

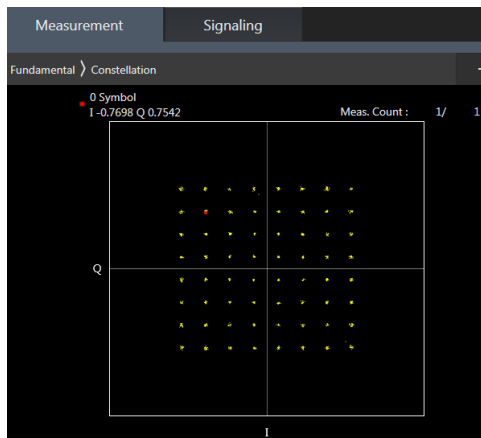
<At Head Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	20.48	20.41	20.72	21.50
3GPP Rel 99	RMC 12.2Kbps	20.50	20.43	20.73	21.50
3GPP Rel 6	HSDPA Subtest-1	19.54	19.77	19.84	21.50
3GPP Rel 6	HSDPA Subtest-2	19.51	19.69	19.85	21.50
3GPP Rel 6	HSDPA Subtest-3	19.07	19.19	19.30	21.00
3GPP Rel 6	HSDPA Subtest-4	19.05	19.22	19.37	21.00
3GPP Rel 6	HSUPA Subtest-1	19.13	19.03	19.56	21.00
3GPP Rel 6	HSUPA Subtest-2	18.13	18.68	18.78	20.00
3GPP Rel 6	HSUPA Subtest-3	18.34	18.64	18.48	20.00
3GPP Rel 6	HSUPA Subtest-4	19.34	19.17	19.00	20.00
3GPP Rel 6	HSUPA Subtest-5	19.61	19.57	19.80	21.00

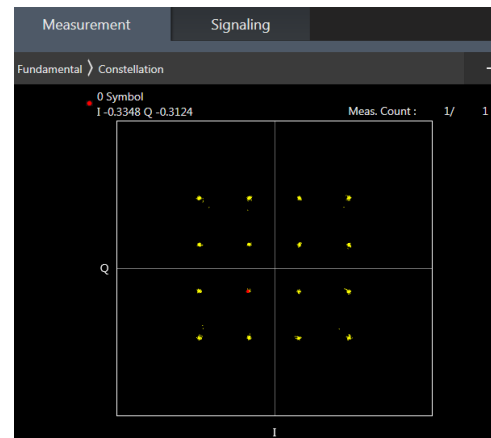
<LTE Conducted Power>

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 $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B17 / B38 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 17 / 38 SAR test was covered by Band 12 / 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

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	22.86	22.89	23.17	24	0
20	QPSK	1	49	23.18	23.14	23.43		
20	QPSK	1	99	22.81	23.18	23.24		
20	QPSK	50	0	21.94	22.06	22.14	23	1
20	QPSK	50	24	21.98	21.99	22.11		
20	QPSK	50	50	22.01	21.94	22.17		
20	QPSK	100	0	21.90	21.97	22.31	23	1
20	16QAM	1	0	21.50	21.33	21.57		
20	16QAM	1	49	22.34	21.68	21.85		
20	16QAM	1	99	21.42	21.37	21.79	22	2
20	16QAM	50	0	21.03	20.99	21.28		
20	16QAM	50	24	21.10	21.02	21.13		
20	16QAM	50	50	21.01	21.04	21.17	22	2
20	16QAM	100	0	20.96	21.00	21.34		
20	64QAM	1	0	20.63	20.91	21.01		
20	64QAM	1	49	21.07	21.38	21.26	22	2
20	64QAM	1	99	21.04	21.26	21.38		
20	64QAM	50	0	19.99	19.91	20.30		
20	64QAM	50	24	20.05	20.05	20.28	21	3
20	64QAM	50	50	20.00	19.95	20.19		
20	64QAM	100	0	20.02	19.84	20.12		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.76	22.89	23.13	24	0
15	QPSK	1	37	23.16	23.20	23.39		
15	QPSK	1	74	22.86	22.97	23.27		
15	QPSK	36	0	21.82	22.07	22.08	23	1
15	QPSK	36	20	21.85	21.97	22.33		
15	QPSK	36	39	21.90	21.86	22.17		
15	QPSK	75	0	21.77	21.96	22.20	23	1
15	16QAM	1	0	21.43	21.39	21.75		
15	16QAM	1	37	21.85	21.79	22.09		
15	16QAM	1	74	21.65	21.71	21.34	22	2
15	16QAM	36	0	20.76	20.94	21.10		
15	16QAM	36	20	21.10	20.99	21.14		
15	16QAM	36	39	21.00	20.89	21.24	22	2
15	16QAM	75	0	20.90	20.99	21.25		
15	64QAM	1	0	20.57	20.76	21.00		
15	64QAM	1	37	21.09	21.10	21.48	22	2
15	64QAM	1	74	20.70	21.00	20.99		
15	64QAM	36	0	19.96	19.96	20.14		
15	64QAM	36	20	19.98	19.99	20.26	21	3
15	64QAM	36	39	19.98	20.00	20.17		
15	64QAM	75	0	19.88	19.78	20.06		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.10	23.10	23.12	24	0
10	QPSK	1	25	23.01	23.23	23.14		
10	QPSK	1	49	22.92	22.86	23.19		
10	QPSK	25	0	21.87	22.07	22.31	23	1
10	QPSK	25	12	21.97	22.06	22.35		
10	QPSK	25	25	21.91	21.96	22.16		
10	QPSK	50	0	21.88	21.91	22.23		
10	16QAM	1	0	21.68	21.92	21.67	23	1
10	16QAM	1	25	22.01	22.14	21.99		
10	16QAM	1	49	21.53	21.51	21.79		
10	16QAM	25	0	20.83	21.05	21.39	22	2
10	16QAM	25	12	20.98	21.02	21.31		
10	16QAM	25	25	21.01	20.95	21.20		
10	16QAM	50	0	20.85	21.09	21.30		
10	64QAM	1	0	20.74	20.50	21.03	22	2
10	64QAM	1	25	21.24	21.00	21.10		
10	64QAM	1	49	20.77	20.52	20.95		
10	64QAM	25	0	19.89	19.87	20.41	21	3
10	64QAM	25	12	20.08	20.10	20.44		
10	64QAM	25	25	19.97	20.07	20.29		
10	64QAM	50	0	19.84	19.94	20.19		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.93	22.89	23.36	24	0
5	QPSK	1	12	23.09	23.08	23.40		
5	QPSK	1	24	22.99	23.09	23.42		
5	QPSK	12	0	21.81	22.03	22.43	23	1
5	QPSK	12	7	21.87	22.05	22.39		
5	QPSK	12	13	21.88	22.02	22.33		
5	QPSK	25	0	21.79	21.98	22.42		
5	16QAM	1	0	22.15	21.48	22.67	23	1
5	16QAM	1	12	21.98	21.83	22.69		
5	16QAM	1	24	21.41	21.35	22.36		
5	16QAM	12	0	20.81	21.02	21.43	22	2
5	16QAM	12	7	20.93	21.12	21.45		
5	16QAM	12	13	20.78	21.01	21.32		
5	16QAM	25	0	20.88	21.10	21.44		
5	64QAM	1	0	20.61	21.07	21.18	22	2
5	64QAM	1	12	21.17	21.30	21.70		
5	64QAM	1	24	20.79	21.02	21.12		
5	64QAM	12	0	19.74	19.90	20.39	21	3
5	64QAM	12	7	19.93	20.03	20.40		
5	64QAM	12	13	19.97	19.93	20.44		
5	64QAM	25	0	19.80	19.93	20.35		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.49	22.81	23.12	24	0
3	QPSK	1	8	22.56	22.72	22.90		
3	QPSK	1	14	22.81	22.89	22.94		
3	QPSK	8	0	21.81	21.84	22.33	23	1
3	QPSK	8	4	21.80	21.89	22.11		
3	QPSK	8	7	21.89	21.83	22.21		
3	QPSK	15	0	21.81	21.82	22.07	23	1
3	16QAM	1	0	21.80	21.46	21.76		
3	16QAM	1	8	21.33	21.78	22.17		
3	16QAM	1	14	21.30	21.54	21.81	22	2
3	16QAM	8	0	20.82	20.84	21.46		
3	16QAM	8	4	20.82	20.99	21.10		
3	16QAM	8	7	20.86	20.98	21.23	22	2
3	16QAM	15	0	20.73	20.79	21.15		
3	64QAM	1	0	20.89	20.62	21.49	22	2
3	64QAM	1	8	20.39	20.58	21.04		
3	64QAM	1	14	20.72	20.80	21.20		
3	64QAM	8	0	19.67	19.79	20.08	21	3
3	64QAM	8	4	19.85	19.79	19.91		
3	64QAM	8	7	19.77	19.76	20.02		
3	64QAM	15	0	19.61	19.87	20.07	21	3
Channel				18607	18900	19193		
Frequency (MHz)				1850.7	1880	1909.3	Tune-up limit (dBm)	MPR (dB)
1.4	QPSK	1	0	22.51	22.64	23.11		
1.4	QPSK	1	3	22.80	22.93	23.01	24	0
1.4	QPSK	1	5	22.62	22.68	23.11		
1.4	QPSK	3	0	22.61	22.86	23.22		
1.4	QPSK	3	1	22.67	22.89	23.18		
1.4	QPSK	3	3	22.71	22.92	23.18		
1.4	QPSK	6	0	21.50	21.86	22.06	23	1
1.4	16QAM	1	0	21.09	22.03	22.30	23	1
1.4	16QAM	1	3	21.21	22.02	22.06		
1.4	16QAM	1	5	21.21	21.65	22.18		
1.4	16QAM	3	0	21.33	21.55	22.07		
1.4	16QAM	3	1	21.35	21.50	22.14		
1.4	16QAM	3	3	21.30	21.58	22.05	22	2
1.4	16QAM	6	0	20.30	20.41	20.97		
1.4	64QAM	1	0	20.25	20.64	21.53		
1.4	64QAM	1	3	20.58	20.67	21.02		
1.4	64QAM	1	5	20.30	20.61	20.88		
1.4	64QAM	3	0	20.07	20.62	20.78	22	2
1.4	64QAM	3	1	20.65	20.52	21.22		
1.4	64QAM	3	3	20.39	20.50	20.97		
1.4	64QAM	6	0	19.54	19.70	19.92	21	3



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	22.07	22.16	23.34	24	0
20	QPSK	1	49	23.41	24.00	23.74		
20	QPSK	1	99	23.38	23.39	22.36		
20	QPSK	50	0	22.67	22.39	23.00	23	1
20	QPSK	50	24	22.47	22.50	22.79		
20	QPSK	50	50	22.58	22.62	22.69		
20	QPSK	100	0	22.45	22.57	22.83	23	1
20	16QAM	1	0	21.00	21.37	22.02		
20	16QAM	1	49	22.35	23.00	22.41		
20	16QAM	1	99	22.09	22.72	21.61	22	2
20	16QAM	50	0	21.47	21.23	21.96		
20	16QAM	50	24	21.55	21.33	21.72		
20	16QAM	50	50	21.63	21.65	21.73	22	2
20	16QAM	100	0	21.40	21.54	21.80		
20	64QAM	1	0	20.00	20.22	21.44	22	2
20	64QAM	1	49	21.19	21.95	21.73		
20	64QAM	1	99	21.23	21.25	20.52		
20	64QAM	50	0	20.36	20.33	20.79	21	3
20	64QAM	50	24	20.60	20.43	20.80		
20	64QAM	50	50	20.74	20.58	20.70		
20	64QAM	100	0	20.56	20.64	20.68		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.24	22.39	23.37	24	0
15	QPSK	1	37	22.28	23.66	23.54		
15	QPSK	1	74	22.08	23.40	22.32		
15	QPSK	36	0	21.84	22.25	23.00	23	1
15	QPSK	36	20	22.27	22.31	22.65		
15	QPSK	36	39	22.28	22.42	22.63		
15	QPSK	75	0	22.06	22.29	22.71	23	1
15	16QAM	1	0	20.48	21.73	22.71		
15	16QAM	1	37	21.56	22.68	22.90		
15	16QAM	1	74	21.34	21.80	21.60	22	2
15	16QAM	36	0	20.85	21.27	22.00		
15	16QAM	36	20	21.30	21.44	21.48		
15	16QAM	36	39	21.32	21.52	21.54	22	2
15	16QAM	75	0	21.10	21.40	21.70		
15	64QAM	1	0	19.38	20.46	21.36		
15	64QAM	1	37	20.44	21.71	21.82	22	2
15	64QAM	1	74	20.28	21.50	20.51		
15	64QAM	36	0	19.89	20.30	20.75		
15	64QAM	36	20	20.32	20.50	20.77	21	3
15	64QAM	36	39	20.34	20.43	20.74		
15	64QAM	75	0	20.11	20.54	20.65		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.31	22.89	23.33	24	0
10	QPSK	1	25	22.20	23.71	23.75		
10	QPSK	1	49	21.50	23.18	22.47		
10	QPSK	25	0	21.88	22.34	23.00	23	1
10	QPSK	25	12	22.12	22.33	22.81		
10	QPSK	25	25	21.96	22.42	22.84		
10	QPSK	50	0	21.91	22.42	22.85	23	1
10	16QAM	1	0	20.51	21.72	22.26		
10	16QAM	1	25	21.49	21.89	22.69		
10	16QAM	1	49	20.85	22.50	21.76	22	2
10	16QAM	25	0	20.93	21.34	22.00		
10	16QAM	25	12	21.18	21.51	21.79		
10	16QAM	25	25	21.02	21.48	21.70	22	2
10	16QAM	50	0	20.97	21.57	21.81		
10	64QAM	1	0	19.44	20.62	21.49		
10	64QAM	1	25	20.43	21.23	21.70	22	2
10	64QAM	1	49	19.71	21.33	20.71		
10	64QAM	25	0	19.94	20.52	21.00		
10	64QAM	25	12	20.21	20.35	20.69	21	3
10	64QAM	25	25	20.05	20.52	20.81		
10	64QAM	50	0	20.02	20.33	20.81		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	21.43	23.29	23.01	24	0
5	QPSK	1	12	21.46	23.64	22.88		
5	QPSK	1	24	21.35	23.57	22.61		
5	QPSK	12	0	21.45	22.47	22.97	23	1
5	QPSK	12	7	21.47	22.59	22.91		
5	QPSK	12	13	21.41	22.49	22.77		
5	QPSK	25	0	21.41	22.46	22.86	23	1
5	16QAM	1	0	20.65	22.40	22.25		
5	16QAM	1	12	20.66	22.13	22.19		
5	16QAM	1	24	20.62	22.14	21.87	22	2
5	16QAM	12	0	20.45	21.34	22.00		
5	16QAM	12	7	20.49	21.53	21.89		
5	16QAM	12	13	20.44	21.45	21.76	22	2
5	16QAM	25	0	20.44	21.49	21.93		
5	64QAM	1	0	19.52	21.14	21.21		
5	64QAM	1	12	19.55	21.66	21.10	22	2
5	64QAM	1	24	19.49	21.41	20.89		
5	64QAM	12	0	19.47	20.40	21.00		
5	64QAM	12	7	19.51	20.58	21.00	21	3
5	64QAM	12	13	19.47	20.52	20.95		
5	64QAM	25	0	19.45	20.50	20.96		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.63	23.27	23.77	24	0
3	QPSK	1	8	22.63	23.25	23.65		
3	QPSK	1	14	22.50	23.31	23.61		
3	QPSK	8	0	22.55	22.45	22.93	23	1
3	QPSK	8	4	22.27	22.43	22.76		
3	QPSK	8	7	22.22	22.55	22.69		
3	QPSK	15	0	22.24	22.45	22.73	23	1
3	16QAM	1	0	21.74	21.73	22.38		
3	16QAM	1	8	21.78	22.57	22.38		
3	16QAM	1	14	21.73	21.66	22.32	22	2
3	16QAM	8	0	21.50	21.46	21.67		
3	16QAM	8	4	21.34	21.50	21.77		
3	16QAM	8	7	21.42	21.63	21.79	22	2
3	16QAM	15	0	21.40	21.52	21.71		
3	64QAM	1	0	20.75	21.46	21.61		
3	64QAM	1	8	20.78	21.30	21.38	22	2
3	64QAM	1	14	20.71	21.25	21.50		
3	64QAM	8	0	20.40	20.46	20.84		
3	64QAM	8	4	20.07	20.50	20.66	21	3
3	64QAM	8	7	20.09	20.53	20.70		
3	64QAM	15	0	20.43	20.47	20.72		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.77	23.42	23.73	24	0
1.4	QPSK	1	3	22.79	23.57	23.78		
1.4	QPSK	1	5	22.69	23.46	23.67		
1.4	QPSK	3	0	22.73	23.49	23.72		
1.4	QPSK	3	1	22.75	23.55	23.74		
1.4	QPSK	3	3	22.69	23.54	23.66		
1.4	QPSK	6	0	22.60	22.58	23.00	23	1
1.4	16QAM	1	0	21.75	22.05	22.23	23	1
1.4	16QAM	1	3	21.96	22.06	22.40		
1.4	16QAM	1	5	21.97	21.64	22.07		
1.4	16QAM	3	0	21.75	22.36	22.41		
1.4	16QAM	3	1	21.77	22.63	22.82		
1.4	16QAM	3	3	21.69	22.59	22.69		
1.4	16QAM	6	0	21.44	21.51	21.66	22	2
1.4	64QAM	1	0	20.93	21.59	21.71	22	2
1.4	64QAM	1	3	21.01	21.42	21.71		
1.4	64QAM	1	5	20.88	21.64	21.95		
1.4	64QAM	3	0	20.84	21.22	21.86		
1.4	64QAM	3	1	20.92	21.42	21.75		
1.4	64QAM	3	3	20.85	21.34	21.45		
1.4	64QAM	6	0	20.76	20.36	20.68	21	3

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.45	22.52	22.53	24	0
10	QPSK	1	25	22.87	22.60	22.96		
10	QPSK	1	49	22.48	22.52	22.62		
10	QPSK	25	0	21.64	21.69	21.72	23	1
10	QPSK	25	12	21.71	21.70	21.81		
10	QPSK	25	25	21.65	21.68	21.79		
10	QPSK	50	0	21.68	21.74	21.77		
10	16QAM	1	0	21.00	21.34	21.06	23	1
10	16QAM	1	25	21.39	21.87	21.46		
10	16QAM	1	49	21.11	21.28	21.23		
10	16QAM	25	0	20.63	20.64	20.88	22	2
10	16QAM	25	12	20.81	20.74	20.77		
10	16QAM	25	25	20.65	20.72	20.87		
10	16QAM	50	0	20.67	20.78	20.83		
10	64QAM	1	0	20.50	20.37	20.23	22	2
10	64QAM	1	25	20.75	20.53	20.95		
10	64QAM	1	49	20.80	20.41	20.78		
10	64QAM	25	0	19.75	19.68	19.85	21	3
10	64QAM	25	12	19.50	19.80	19.54		
10	64QAM	25	25	19.80	19.78	19.53		
10	64QAM	50	0	19.74	19.74	19.68		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.56	22.51	22.68	24	0
5	QPSK	1	12	22.54	22.93	22.77		
5	QPSK	1	24	22.37	22.57	22.52		
5	QPSK	12	0	21.58	21.65	21.71	23	1
5	QPSK	12	7	21.64	21.73	21.77		
5	QPSK	12	13	21.61	21.65	21.67		
5	QPSK	25	0	21.64	21.75	21.71		
5	16QAM	1	0	21.13	21.21	21.06	23	1
5	16QAM	1	12	21.44	21.31	21.56		
5	16QAM	1	24	21.00	21.00	21.10		
5	16QAM	12	0	20.38	20.50	20.58	22	2
5	16QAM	12	7	20.51	21.00	20.70		
5	16QAM	12	13	20.52	20.80	20.69		
5	16QAM	25	0	20.66	20.81	20.66		
5	64QAM	1	0	20.56	20.54	20.80	22	2
5	64QAM	1	12	20.64	20.88	20.92		
5	64QAM	1	24	20.19	20.32	20.73		
5	64QAM	12	0	19.62	19.73	19.67	21	3
5	64QAM	12	7	19.51	20.00	19.88		
5	64QAM	12	13	19.56	19.60	19.89		
5	64QAM	25	0	19.53	19.65	19.58		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.39	22.69	22.69	24	0
3	QPSK	1	8	22.53	22.41	22.53		
3	QPSK	1	14	22.33	22.53	22.33		
3	QPSK	8	0	21.73	21.65	21.68	23	1
3	QPSK	8	4	21.72	21.76	21.65		
3	QPSK	8	7	21.57	21.78	21.66		
3	QPSK	15	0	21.58	21.80	21.62	23	1
3	16QAM	1	0	21.71	21.07	21.07		
3	16QAM	1	8	21.17	21.31	21.83		
3	16QAM	1	14	21.24	21.26	21.57	22	2
3	16QAM	8	0	20.63	20.82	20.79		
3	16QAM	8	4	20.77	20.77	20.74		
3	16QAM	8	7	20.73	20.89	20.75	22	2
3	16QAM	15	0	20.68	20.67	20.69		
3	64QAM	1	0	20.32	20.38	20.50		
3	64QAM	1	8	20.39	20.56	20.69	22	2
3	64QAM	1	14	20.63	20.58	20.55		
3	64QAM	8	0	19.59	19.72	19.65		
3	64QAM	8	4	19.66	19.63	19.62	21	3
3	64QAM	8	7	19.61	19.66	19.53		
3	64QAM	15	0	19.52	19.56	19.57		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.51	22.57	22.67	24	0
1.4	QPSK	1	3	22.60	22.58	22.65		
1.4	QPSK	1	5	22.67	22.55	22.67		
1.4	QPSK	3	0	22.64	22.81	22.86		
1.4	QPSK	3	1	22.70	22.74	22.92		
1.4	QPSK	3	3	22.60	22.75	22.69		
1.4	QPSK	6	0	21.59	21.69	21.66	23	1
1.4	16QAM	1	0	21.69	21.26	21.23	23	1
1.4	16QAM	1	3	21.52	21.63	21.51		
1.4	16QAM	1	5	21.20	21.34	21.21		
1.4	16QAM	3	0	21.55	21.52	21.47		
1.4	16QAM	3	1	21.56	21.69	21.57		
1.4	16QAM	3	3	21.51	21.41	21.45		
1.4	16QAM	6	0	20.67	20.60	20.60	22	2
1.4	64QAM	1	0	20.65	20.61	20.53	22	2
1.4	64QAM	1	3	20.98	20.65	20.62		
1.4	64QAM	1	5	20.63	20.99	20.52		
1.4	64QAM	3	0	20.70	20.73	20.62		
1.4	64QAM	3	1	20.51	20.95	20.40		
1.4	64QAM	3	3	20.42	20.62	20.45		
1.4	64QAM	6	0	19.53	19.44	19.59	21	3



<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	23.80	23.84	23.44	24	0
20	QPSK	1	49	23.98	23.90	23.67		
20	QPSK	1	99	23.74	23.40	23.45		
20	QPSK	50	0	22.99	22.78	22.70	23	1
20	QPSK	50	24	22.98	22.83	22.68		
20	QPSK	50	50	22.84	22.75	22.52		
20	QPSK	100	0	22.81	22.74	22.60		
20	16QAM	1	0	22.55	22.33	22.60	23	1
20	16QAM	1	49	22.99	22.35	22.95		
20	16QAM	1	99	22.97	22.25	22.32		
20	16QAM	50	0	22.04	21.92	21.73	23	1
20	16QAM	50	24	22.14	21.85	21.72		
20	16QAM	50	50	21.84	21.76	21.65		
20	16QAM	100	0	21.81	21.65	21.65		
20	64QAM	1	0	21.90	21.99	21.47	22	2
20	64QAM	1	49	21.97	21.97	21.79		
20	64QAM	1	99	21.85	21.52	21.38		
20	64QAM	50	0	20.89	20.81	20.58	22	2
20	64QAM	50	24	21.02	20.89	20.53		
20	64QAM	50	50	20.86	20.77	20.54		
20	64QAM	100	0	20.92	20.69	20.63		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.87	23.86	23.72	24	0
15	QPSK	1	37	23.97	23.77	23.72		
15	QPSK	1	74	23.80	23.69	23.60		
15	QPSK	36	0	22.95	22.91	22.67	23	1
15	QPSK	36	20	22.82	22.83	22.65		
15	QPSK	36	39	22.85	22.85	22.67		
15	QPSK	75	0	22.91	22.81	22.62		
15	16QAM	1	0	22.90	22.99	22.49	23	1
15	16QAM	1	37	22.98	22.97	22.72		
15	16QAM	1	74	23.00	22.93	22.31		
15	16QAM	36	0	22.16	21.93	21.70	23	1
15	16QAM	36	20	22.03	21.95	21.59		
15	16QAM	36	39	21.96	21.82	21.54		
15	16QAM	75	0	22.29	21.76	21.66		
15	64QAM	1	0	21.97	22.00	21.94	22	2
15	64QAM	1	37	22.00	21.99	21.98		
15	64QAM	1	74	21.96	21.49	21.88		
15	64QAM	36	0	21.24	20.85	20.69	22	2
15	64QAM	36	20	21.15	20.85	20.68		
15	64QAM	36	39	20.96	20.86	20.63		
15	64QAM	75	0	20.90	20.70	20.46		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	23.88	23.57	23.51	24	0
10	QPSK	1	25	23.95	23.77	23.82		
10	QPSK	1	49	23.97	23.74	23.70		
10	QPSK	25	0	22.99	22.77	22.64	23	1
10	QPSK	25	12	23.00	22.70	22.68		
10	QPSK	25	25	22.98	22.72	22.59		
10	QPSK	50	0	22.97	22.77	22.62	23	1
10	16QAM	1	0	22.55	22.52	22.42		
10	16QAM	1	25	22.92	22.67	22.85		
10	16QAM	1	49	22.61	22.53	22.23	23	1
10	16QAM	25	0	22.12	21.86	21.68		
10	16QAM	25	12	22.12	21.62	21.82		
10	16QAM	25	25	22.07	21.90	21.75	22	2
10	16QAM	50	0	21.99	21.90	21.58		
10	64QAM	1	0	21.86	21.89	21.49		
10	64QAM	1	25	21.96	21.91	21.37	22	2
10	64QAM	1	49	21.82	21.69	21.47		
10	64QAM	25	0	21.00	20.75	20.73		
10	64QAM	25	12	21.16	20.64	20.73	22	2
10	64QAM	25	25	21.20	20.51	20.74		
10	64QAM	50	0	21.00	20.60	20.66		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	23.80	23.62	23.46	24	0
5	QPSK	1	12	23.97	23.96	23.64		
5	QPSK	1	24	23.96	23.62	23.42		
5	QPSK	12	0	22.84	22.89	22.63	23	1
5	QPSK	12	7	23.00	22.85	22.63		
5	QPSK	12	13	22.97	22.86	22.62		
5	QPSK	25	0	22.88	22.80	22.62	23	1
5	16QAM	1	0	22.91	22.97	22.45		
5	16QAM	1	12	22.94	22.77	22.80		
5	16QAM	1	24	22.92	22.45	22.64	23	1
5	16QAM	12	0	22.16	21.79	21.61		
5	16QAM	12	7	22.33	21.86	21.65		
5	16QAM	12	13	22.30	21.93	21.72	22	2
5	16QAM	25	0	22.27	21.87	21.70		
5	64QAM	1	0	21.97	21.77	21.27		
5	64QAM	1	12	21.97	21.99	21.89	22	2
5	64QAM	1	24	21.93	21.39	21.49		
5	64QAM	12	0	21.26	20.82	20.71		
5	64QAM	12	7	21.55	20.96	20.92	22	2
5	64QAM	12	13	21.00	20.87	20.34		
5	64QAM	25	0	21.44	20.86	20.66		



<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	22.78	22.76	22.69	24	0
10	QPSK	1	25	23.04	22.91	22.76		
10	QPSK	1	49	22.90	22.91	22.78		
10	QPSK	25	0	21.89	21.95	22.03	23	1
10	QPSK	25	12	21.84	21.93	21.99		
10	QPSK	25	25	21.78	21.86	21.82		
10	QPSK	50	0	21.80	21.83	21.99		
10	16QAM	1	0	21.61	21.67	21.51	23	1
10	16QAM	1	25	22.20	22.16	21.55		
10	16QAM	1	49	21.51	21.04	21.48		
10	16QAM	25	0	20.85	20.84	20.90	22	2
10	16QAM	25	12	20.98	21.02	21.04		
10	16QAM	25	25	20.89	20.95	20.87		
10	16QAM	50	0	21.05	20.88	20.92		
10	64QAM	1	0	21.15	20.96	20.74	22	2
10	64QAM	1	25	20.99	20.70	21.13		
10	64QAM	1	49	20.59	20.75	20.81		
10	64QAM	25	0	19.80	19.80	19.91	21	3
10	64QAM	25	12	19.75	20.11	19.79		
10	64QAM	25	25	19.65	20.02	19.75		
10	64QAM	50	0	19.74	19.79	20.00		
Channel				23035	23095	23155		
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	22.58	22.81	22.77	24	0
5	QPSK	1	12	22.89	22.87	22.73		
5	QPSK	1	24	22.67	22.71	22.50		
5	QPSK	12	0	21.85	21.83	21.88	23	1
5	QPSK	12	7	21.86	21.90	21.83		
5	QPSK	12	13	21.78	21.93	21.67		
5	QPSK	25	0	21.85	21.84	21.78		
5	16QAM	1	0	21.67	21.17	21.77	23	1
5	16QAM	1	12	22.04	21.67	21.80		
5	16QAM	1	24	21.62	21.29	21.33		
5	16QAM	12	0	20.84	20.73	20.72	22	2
5	16QAM	12	7	20.84	20.90	20.73		
5	16QAM	12	13	20.73	20.89	20.66		
5	16QAM	25	0	20.93	20.84	20.70		
5	64QAM	1	0	20.75	20.85	20.83	22	2
5	64QAM	1	12	21.20	21.07	20.93		
5	64QAM	1	24	20.52	20.68	20.45		
5	64QAM	12	0	19.85	19.73	19.69	21	3
5	64QAM	12	7	19.95	19.70	19.60		
5	64QAM	12	13	19.81	19.57	19.50		
5	64QAM	25	0	19.83	19.93	19.57		

Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.03	22.99	22.80	24	0
3	QPSK	1	8	23.02	22.89	22.75		
3	QPSK	1	14	22.77	22.83	22.72		
3	QPSK	8	0	22.24	22.06	22.00	23	1
3	QPSK	8	4	22.22	22.03	21.96		
3	QPSK	8	7	22.23	22.06	21.90		
3	QPSK	15	0	22.14	21.98	21.94	23	1
3	16QAM	1	0	21.92	21.92	21.51		
3	16QAM	1	8	21.91	21.56	21.36		
3	16QAM	1	14	22.00	21.79	21.73	22	2
3	16QAM	8	0	21.25	21.10	20.78		
3	16QAM	8	4	21.34	21.11	21.04		
3	16QAM	8	7	21.34	21.06	21.08	22	2
3	16QAM	15	0	21.19	21.04	20.94		
3	64QAM	1	0	21.25	21.24	20.97		
3	64QAM	1	8	21.29	20.71	20.90	22	2
3	64QAM	1	14	21.19	20.73	20.92		
3	64QAM	8	0	20.01	19.86	19.74		
3	64QAM	8	4	20.05	19.97	19.87	21	3
3	64QAM	8	7	20.14	19.99	19.73		
3	64QAM	15	0	19.98	19.92	19.78		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	22.99	22.99	22.83	24	0
1.4	QPSK	1	3	23.14	23.12	23.06		
1.4	QPSK	1	5	23.05	23.10	22.96		
1.4	QPSK	3	0	23.20	23.05	22.98		
1.4	QPSK	3	1	23.37	23.08	23.00		
1.4	QPSK	3	3	23.20	23.15	22.96		
1.4	QPSK	6	0	22.06	21.97	21.85	23	1
1.4	16QAM	1	0	22.19	22.33	21.68	23	1
1.4	16QAM	1	3	22.47	21.79	21.86		
1.4	16QAM	1	5	21.62	21.50	21.79		
1.4	16QAM	3	0	21.95	22.04	21.71		
1.4	16QAM	3	1	22.21	22.03	22.00		
1.4	16QAM	3	3	21.91	22.02	21.91		
1.4	16QAM	6	0	21.01	20.92	20.72	22	2
1.4	64QAM	1	0	21.08	21.00	21.12	22	2
1.4	64QAM	1	3	21.16	20.86	20.99		
1.4	64QAM	1	5	21.40	20.75	20.92		
1.4	64QAM	3	0	21.03	20.59	20.73		
1.4	64QAM	3	1	21.12	20.66	20.87		
1.4	64QAM	3	3	21.06	20.96	20.89		
1.4	64QAM	6	0	19.98	19.90	19.76	21	3

<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	22.66	22.74	22.70	24	0
10	QPSK	1	25	23.10	22.91	23.09		
10	QPSK	1	49	23.02	22.50	22.54		
10	QPSK	25	0	21.99	22.02	21.95	23	1
10	QPSK	25	12	22.00	21.96	22.00		
10	QPSK	25	25	21.96	21.90	21.94		
10	QPSK	50	0	22.00	21.93	21.89	23	1
10	16QAM	1	0	21.53	21.94	21.68		
10	16QAM	1	25	21.55	22.21	21.67		
10	16QAM	1	49	21.54	21.35	21.29	22	2
10	16QAM	25	0	20.93	20.86	21.12		
10	16QAM	25	12	21.13	20.92	21.06		
10	16QAM	25	25	21.14	20.76	21.01	22	2
10	16QAM	50	0	21.06	20.86	21.12		
10	64QAM	1	0	21.10	20.77	20.53		
10	64QAM	1	25	21.02	21.10	21.09	22	2
10	64QAM	1	49	21.02	20.37	20.80		
10	64QAM	25	0	19.99	19.74	20.04		
10	64QAM	25	12	19.79	19.97	20.07	21	3
10	64QAM	25	25	19.91	19.92	19.95		
10	64QAM	50	0	19.86	19.83	19.90		
Channel				23755	23790	23825		
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	22.77	22.76	22.71	24	0
5	QPSK	1	12	23.06	23.05	22.75		
5	QPSK	1	24	22.92	22.65	22.59		
5	QPSK	12	0	21.81	21.90	21.88	23	1
5	QPSK	12	7	21.92	21.96	21.91		
5	QPSK	12	13	21.90	21.84	21.66		
5	QPSK	25	0	21.80	21.92	21.77	23	1
5	16QAM	1	0	21.22	21.41	21.35		
5	16QAM	1	12	21.55	21.50	21.37		
5	16QAM	1	24	21.94	21.12	21.56	22	2
5	16QAM	12	0	20.89	20.72	20.72		
5	16QAM	12	7	21.09	20.90	20.68		
5	16QAM	12	13	20.99	20.91	20.58	22	2
5	16QAM	25	0	20.90	20.90	20.79		
5	64QAM	1	0	20.75	20.49	20.74		
5	64QAM	1	12	20.87	20.98	20.96	22	2
5	64QAM	1	24	20.67	20.79	20.47		
5	64QAM	12	0	19.69	19.77	19.68		
5	64QAM	12	7	19.64	19.53	19.81	21	3
5	64QAM	12	13	19.78	19.72	19.61		
5	64QAM	25	0	19.84	19.86	19.51		

At Head 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	20.65	20.84	20.98	22.5	0
20	QPSK	1	49	21.04	21.13	21.19		
20	QPSK	1	99	20.74	20.81	21.18		
20	QPSK	50	0	21.00	20.98	21.10	21.5	1
20	QPSK	50	24	20.86	20.95	21.08		
20	QPSK	50	50	20.99	20.90	21.09		
20	QPSK	100	0	20.93	20.96	21.18	21.5	1
20	16QAM	1	0	20.39	20.76	20.74		
20	16QAM	1	49	20.61	20.62	20.81		
20	16QAM	1	99	20.16	20.63	20.74	21.5	1
20	16QAM	50	0	20.47	20.60	20.46		
20	16QAM	50	24	20.60	20.67	20.73		
20	16QAM	50	50	20.59	20.47	20.66	21.5	1
20	16QAM	100	0	20.44	20.42	20.77		
20	64QAM	1	0	20.20	20.03	20.23		
20	64QAM	1	49	20.74	20.47	20.99	21.5	1
20	64QAM	1	99	19.78	20.21	20.84		
20	64QAM	50	0	19.53	19.55	19.71		
20	64QAM	50	24	19.62	19.42	19.70	20.5	2
20	64QAM	50	50	19.54	19.43	19.64		
20	64QAM	100	0	19.48	19.38	19.52		
Channel				18675	18900	19125		
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	20.63	20.76	20.93	22.5	0
15	QPSK	1	37	21.02	21.03	21.09		
15	QPSK	1	74	20.74	20.71	21.11		
15	QPSK	36	0	20.94	20.96	21.09	21.5	1
15	QPSK	36	20	20.78	20.93	21.05		
15	QPSK	36	39	20.89	20.86	21.00		
15	QPSK	75	0	20.86	20.92	21.18	21.5	1
15	16QAM	1	0	20.32	20.69	20.66		
15	16QAM	1	37	20.58	20.55	20.76		
15	16QAM	1	74	20.08	20.62	20.68	21.5	1
15	16QAM	36	0	20.41	20.53	20.38		
15	16QAM	36	20	20.51	20.62	20.69		
15	16QAM	36	39	20.56	20.37	20.66	21.5	1
15	16QAM	75	0	20.34	20.34	20.67		
15	64QAM	1	0	20.11	19.97	20.14		
15	64QAM	1	37	20.66	20.39	20.96	21.5	1
15	64QAM	1	74	19.72	20.17	20.76		
15	64QAM	36	0	19.47	19.45	19.61		
15	64QAM	36	20	19.53	19.37	19.61	20.5	2
15	64QAM	36	39	19.50	19.36	19.62		
15	64QAM	75	0	19.41	19.36	19.45		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	20.64	20.79	20.91	22.5	0
10	QPSK	1	25	20.98	21.07	21.10		
10	QPSK	1	49	20.67	20.75	21.09		
10	QPSK	25	0	20.92	20.98	21.00	21.5	1
10	QPSK	25	12	20.80	20.87	21.05		
10	QPSK	25	25	20.95	20.80	21.00		
10	QPSK	50	0	20.87	20.96	21.17	21.5	1
10	16QAM	1	0	20.36	20.73	20.74		
10	16QAM	1	25	20.57	20.53	20.73		
10	16QAM	1	49	20.15	20.62	20.70	21.5	1
10	16QAM	25	0	20.39	20.53	20.42		
10	16QAM	25	12	20.54	20.58	20.66		
10	16QAM	25	25	20.58	20.44	20.60	21.5	1
10	16QAM	50	0	20.38	20.39	20.75		
10	64QAM	1	0	20.20	19.96	20.21		
10	64QAM	1	25	20.65	20.41	20.92	21.5	1
10	64QAM	1	49	19.71	20.11	20.81		
10	64QAM	25	0	19.53	19.52	19.66		
10	64QAM	25	12	19.55	19.55	19.63	20.5	2
10	64QAM	25	25	19.55	19.53	19.61		
10	64QAM	50	0	19.55	19.55	19.57		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	20.60	20.77	20.93	22.5	0
5	QPSK	1	12	20.96	21.03	21.10		
5	QPSK	1	24	20.67	20.73	21.14		
5	QPSK	12	0	20.90	20.98	21.07	21.5	1
5	QPSK	12	7	20.77	20.94	21.07		
5	QPSK	12	13	20.90	20.88	21.04		
5	QPSK	25	0	20.89	20.88	21.16	21.5	1
5	16QAM	1	0	20.36	20.68	20.69		
5	16QAM	1	12	20.51	20.59	20.77		
5	16QAM	1	24	20.14	20.58	20.70	21.5	1
5	16QAM	12	0	20.43	20.52	20.46		
5	16QAM	12	7	20.54	20.65	20.73		
5	16QAM	12	13	20.53	20.39	20.62	21.5	1
5	16QAM	25	0	20.42	20.35	20.76		
5	64QAM	1	0	20.18	19.96	20.18		
5	64QAM	1	12	20.64	20.40	20.92	21.5	1
5	64QAM	1	24	19.75	20.18	20.74		
5	64QAM	12	0	19.52	19.56	19.68		
5	64QAM	12	7	19.62	19.54	19.66	20.5	2
5	64QAM	12	13	19.54	19.56	19.59		
5	64QAM	25	0	19.56	19.51	19.54		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	20.62	20.83	20.88	22.5	0
3	QPSK	1	8	20.96	21.13	21.18		
3	QPSK	1	14	20.71	20.74	21.14		
3	QPSK	8	0	20.96	20.98	21.09	21.5	1
3	QPSK	8	4	20.78	20.90	21.03		
3	QPSK	8	7	20.93	20.87	21.04		
3	QPSK	15	0	20.91	20.91	21.16		
3	16QAM	1	0	20.30	20.71	20.64	21.5	1
3	16QAM	1	8	20.54	20.59	20.78		
3	16QAM	1	14	20.07	20.63	20.73		
3	16QAM	8	0	20.42	20.58	20.42	21.5	1
3	16QAM	8	4	20.54	20.59	20.63		
3	16QAM	8	7	20.54	20.44	20.59		
3	16QAM	15	0	20.43	20.41	20.68		
3	64QAM	1	0	20.13	19.99	20.13	21.5	1
3	64QAM	1	8	20.66	20.40	20.90		
3	64QAM	1	14	19.74	20.11	20.79		
3	64QAM	8	0	19.57	19.54	19.69	20.5	2
3	64QAM	8	4	19.61	19.54	19.65		
3	64QAM	8	7	19.53	19.53	19.63		
3	64QAM	15	0	19.59	19.53	19.66		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	20.60	20.81	20.93	22.5	0
1.4	QPSK	1	3	21.03	21.03	21.17		
1.4	QPSK	1	5	20.67	20.79	21.10		
1.4	QPSK	3	0	20.91	20.91	21.01		
1.4	QPSK	3	1	20.84	20.94	21.07		
1.4	QPSK	3	3	20.90	20.88	21.06		
1.4	QPSK	6	0	20.89	20.89	21.16	21.5	1
1.4	16QAM	1	0	20.32	20.71	20.67	21.5	1
1.4	16QAM	1	3	20.57	20.52	20.81		
1.4	16QAM	1	5	20.12	20.59	20.66		
1.4	16QAM	3	0	20.44	20.50	20.46		
1.4	16QAM	3	1	20.54	20.58	20.63		
1.4	16QAM	3	3	20.49	20.45	20.57		
1.4	16QAM	6	0	20.37	20.37	20.69	21.5	1
1.4	64QAM	1	0	20.10	19.93	20.19	21.5	1
1.4	64QAM	1	3	20.67	20.44	20.94		
1.4	64QAM	1	5	19.76	20.13	20.76		
1.4	64QAM	3	0	19.50	19.52	19.63		
1.4	64QAM	3	1	19.54	19.56	19.69		
1.4	64QAM	3	3	19.55	19.56	19.57		
1.4	64QAM	6	0	19.58	19.51	19.58	20.5	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	19.64	19.43	19.48	20.5	0
20	QPSK	1	49	20.17	19.80	19.74		
20	QPSK	1	99	19.33	19.57	19.21		
20	QPSK	50	0	19.95	19.78	19.68	20.5	0
20	QPSK	50	24	19.83	19.76	19.62		
20	QPSK	50	50	19.81	19.72	19.48		
20	QPSK	100	0	19.78	19.72	19.57		
20	16QAM	1	0	19.12	19.24	19.05	20.5	0
20	16QAM	1	49	19.34	19.25	19.11		
20	16QAM	1	99	19.45	18.93	18.97		
20	16QAM	50	0	19.96	19.58	19.82	20.5	0
20	16QAM	50	24	19.97	19.80	19.65		
20	16QAM	50	50	19.84	19.65	19.60		
20	16QAM	100	0	19.86	19.66	19.69		
20	64QAM	1	0	19.78	19.91	19.78	20.5	0
20	64QAM	1	49	19.87	20.01	19.90		
20	64QAM	1	99	19.38	19.40	19.74		
20	64QAM	50	0	19.99	19.83	19.74	20.5	0
20	64QAM	50	24	19.91	19.76	19.70		
20	64QAM	50	50	19.77	19.79	19.43		
20	64QAM	100	0	19.92	19.80	19.73		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.60	19.38	19.42	20.5	0
15	QPSK	1	37	20.16	19.78	19.71		
15	QPSK	1	74	19.23	19.51	19.20		
15	QPSK	36	0	19.88	19.74	19.59	20.5	0
15	QPSK	36	20	19.81	19.74	19.56		
15	QPSK	36	39	19.73	19.72	19.47		
15	QPSK	75	0	19.76	19.66	19.53		
15	16QAM	1	0	19.02	19.19	19.03	20.5	0
15	16QAM	1	37	19.31	19.25	19.03		
15	16QAM	1	74	19.35	18.89	18.95		
15	16QAM	36	0	19.92	19.58	19.72	20.5	0
15	16QAM	36	20	19.94	19.80	19.63		
15	16QAM	36	39	19.80	19.64	19.52		
15	16QAM	75	0	19.78	19.63	19.62		
15	64QAM	1	0	19.73	19.87	19.77	20.5	0
15	64QAM	1	37	19.80	20.00	19.87		
15	64QAM	1	74	19.32	19.40	19.73		
15	64QAM	36	0	19.92	19.75	19.70	20.5	0
15	64QAM	36	20	19.86	19.72	19.68		
15	64QAM	36	39	19.71	19.71	19.38		
15	64QAM	75	0	19.87	19.78	19.70		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.59	19.35	19.43	20.5	0
10	QPSK	1	25	20.09	19.78	19.69		
10	QPSK	1	49	19.30	19.56	19.13		
10	QPSK	25	0	19.85	19.76	19.58	20.5	0
10	QPSK	25	12	19.74	19.66	19.52		
10	QPSK	25	25	19.79	19.71	19.47		
10	QPSK	50	0	19.69	19.72	19.47		
10	16QAM	1	0	19.07	19.21	19.00	20.5	0
10	16QAM	1	25	19.32	19.24	19.05		
10	16QAM	1	49	19.45	18.93	18.91		
10	16QAM	25	0	19.95	19.56	19.76	20.5	0
10	16QAM	25	12	19.95	19.73	19.56		
10	16QAM	25	25	19.81	19.62	19.57		
10	16QAM	50	0	19.85	19.66	19.63		
10	64QAM	1	0	19.74	19.83	19.72	20.5	0
10	64QAM	1	25	19.84	19.99	19.90		
10	64QAM	1	49	19.38	19.32	19.70		
10	64QAM	25	0	19.98	19.83	19.73	20.5	0
10	64QAM	25	12	19.81	19.67	19.62		
10	64QAM	25	25	19.71	19.70	19.43		
10	64QAM	50	0	19.92	19.78	19.73		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	19.54	18.50	19.48	20.5	0
5	QPSK	1	12	20.16	19.79	19.74		
5	QPSK	1	24	19.32	19.51	19.19		
5	QPSK	12	0	19.86	19.72	19.66	20.5	0
5	QPSK	12	7	19.73	19.74	19.54		
5	QPSK	12	13	19.75	19.62	19.45		
5	QPSK	25	0	19.68	19.64	19.55		
5	16QAM	1	0	19.06	19.15	19.03	20.5	0
5	16QAM	1	12	19.33	19.17	19.04		
5	16QAM	1	24	19.41	18.87	18.92		
5	16QAM	12	0	19.94	19.54	19.81	20.5	0
5	16QAM	12	7	19.97	19.71	19.63		
5	16QAM	12	13	19.74	19.57	19.59		
5	16QAM	25	0	19.84	19.57	19.66		
5	64QAM	1	0	19.77	19.87	19.76	20.5	0
5	64QAM	1	12	19.77	19.92	19.87		
5	64QAM	1	24	19.38	19.38	19.71		
5	64QAM	12	0	19.99	19.75	19.72	20.5	0
5	64QAM	12	7	19.91	19.75	19.60		
5	64QAM	12	13	19.73	19.70	19.39		
5	64QAM	25	0	19.90	19.72	19.71		

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

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

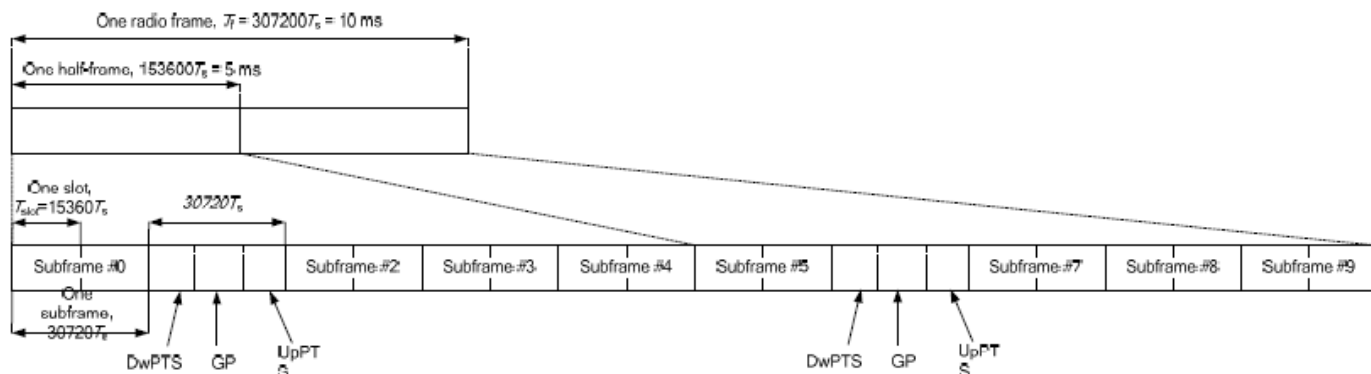


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

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

Default Power Mode
<LTE Band 38>

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				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	23.36	23.29	23.48	24	0
20	QPSK	1	49	23.50	23.77	23.91		
20	QPSK	1	99	23.08	23.30	23.59		
20	QPSK	50	0	22.60	22.83	22.90	23	1
20	QPSK	50	24	22.64	22.67	22.88		
20	QPSK	50	50	22.53	22.76	22.77		
20	QPSK	100	0	22.67	22.78	22.87	23	1
20	16QAM	1	0	22.01	22.30	22.32		
20	16QAM	1	49	22.49	22.54	22.75		
20	16QAM	1	99	21.94	22.14	22.10	22	2
20	16QAM	50	0	21.62	21.88	21.88		
20	16QAM	50	24	21.53	21.84	21.95		
20	16QAM	50	50	21.56	21.62	21.95	22	2
20	16QAM	100	0	21.57	21.85	21.88		
20	64QAM	1	0	20.71	20.95	21.22		
20	64QAM	1	49	21.20	21.13	21.33	22	2
20	64QAM	1	99	20.82	20.97	20.94		
20	64QAM	50	0	20.65	20.88	20.91		
20	64QAM	50	24	20.75	20.83	20.98	21	3
20	64QAM	50	50	20.67	20.76	20.87		
20	64QAM	100	0	20.70	20.73	20.82		
Channel				37825	38000	38175		
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	23.35	23.53	23.74	24	0
15	QPSK	1	37	23.68	23.76	23.88		
15	QPSK	1	74	23.40	23.52	23.64		
15	QPSK	36	0	22.56	22.83	22.98	23	1
15	QPSK	36	20	22.67	22.82	22.99		
15	QPSK	36	39	22.63	22.75	22.79		
15	QPSK	75	0	22.59	22.81	22.80	23	1
15	16QAM	1	0	22.36	22.48	22.47		
15	16QAM	1	37	22.44	22.63	22.71		
15	16QAM	1	74	22.15	22.41	22.34	22	2
15	16QAM	36	0	21.58	21.75	21.80		
15	16QAM	36	20	21.73	21.67	21.94		
15	16QAM	36	39	21.71	21.74	21.91	22	2
15	16QAM	75	0	21.63	21.80	21.88		
15	64QAM	1	0	20.91	21.11	21.19		
15	64QAM	1	37	21.40	21.34	21.81	22	2
15	64QAM	1	74	21.05	21.11	21.07		
15	64QAM	36	0	20.48	20.69	20.74		
15	64QAM	36	20	20.61	20.81	20.89	21	3
15	64QAM	36	39	20.60	20.64	20.67		
15	64QAM	75	0	20.52	20.73	20.84		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	23.40	23.75	23.53	24	0
10	QPSK	1	25	23.50	23.74	23.76		
10	QPSK	1	49	23.33	23.79	23.64		
10	QPSK	25	0	22.66	22.80	22.92	23	1
10	QPSK	25	12	22.66	22.86	22.88		
10	QPSK	25	25	22.65	22.76	22.81		
10	QPSK	50	0	22.64	22.77	22.74	23	1
10	16QAM	1	0	22.18	22.36	22.39		
10	16QAM	1	25	22.46	22.68	22.29		
10	16QAM	1	49	22.21	22.29	22.28	22	2
10	16QAM	25	0	21.51	21.86	22.00		
10	16QAM	25	12	21.79	21.87	21.97		
10	16QAM	25	25	21.72	21.96	21.75	22	2
10	16QAM	50	0	21.57	21.70	21.85		
10	64QAM	1	0	20.87	21.10	21.19		
10	64QAM	1	25	21.04	21.15	21.22	22	2
10	64QAM	1	49	20.94	21.03	21.02		
10	64QAM	25	0	20.59	20.96	20.87		
10	64QAM	25	12	20.91	20.00	20.97	21	3
10	64QAM	25	25	20.69	20.77	20.75		
10	64QAM	50	0	20.62	20.76	20.79		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	23.25	23.47	23.42	24	0
5	QPSK	1	12	23.59	23.70	23.71		
5	QPSK	1	24	23.49	23.58	23.33		
5	QPSK	12	0	22.39	22.77	22.66	23	1
5	QPSK	12	7	22.46	22.86	22.84		
5	QPSK	12	13	22.49	22.66	22.77		
5	QPSK	25	0	22.47	22.62	22.70	23	1
5	16QAM	1	0	21.88	22.56	22.15		
5	16QAM	1	12	22.48	22.73	22.56		
5	16QAM	1	24	22.32	22.35	22.57	22	2
5	16QAM	12	0	21.34	21.76	21.76		
5	16QAM	12	7	21.58	21.66	21.75		
5	16QAM	12	13	21.45	21.74	21.64	22	2
5	16QAM	25	0	21.71	21.67	21.84		
5	64QAM	1	0	20.67	21.04	21.02		
5	64QAM	1	12	21.10	21.44	21.46	22	2
5	64QAM	1	24	20.77	20.94	21.01		
5	64QAM	12	0	20.49	20.77	20.58		
5	64QAM	12	7	20.55	20.42	20.72	21	3
5	64QAM	12	13	20.43	20.70	20.55		
5	64QAM	25	0	20.31	20.76	20.76		

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40340	40600	40870	41140		
Frequency (MHz)				2565	2591	2618	2645		
20	QPSK	1	0	23.31	23.53	23.46	23.37	24	0
20	QPSK	1	49	23.52	23.78	23.92	23.45		
20	QPSK	1	99	23.28	23.82	23.48	22.89		
20	QPSK	50	0	22.72	22.83	23.00	22.51	23	1
20	QPSK	50	24	22.63	22.92	22.87	22.46		
20	QPSK	50	50	22.61	22.86	22.85	22.25		
20	QPSK	100	0	22.63	22.91	22.84	22.43	23	1
20	16QAM	1	0	22.21	22.31	22.41	22.09		
20	16QAM	1	49	22.40	22.74	22.67	22.31		
20	16QAM	1	99	21.84	22.24	21.97	21.96	22	2
20	16QAM	50	0	21.78	21.84	21.91	21.50		
20	16QAM	50	24	21.69	21.88	21.83	21.46		
20	16QAM	50	50	21.59	21.86	21.84	21.36	22	2
20	16QAM	100	0	21.59	21.79	21.74	21.40		
20	64QAM	1	0	20.87	21.12	21.10	20.72	22	2
20	64QAM	1	49	21.12	21.36	21.32	20.85		
20	64QAM	1	99	20.78	21.05	20.80	20.50		
20	64QAM	50	0	20.64	20.86	20.87	20.36	21	3
20	64QAM	50	24	20.65	20.90	20.74	20.31		
20	64QAM	50	50	20.56	20.88	20.66	20.11		
20	64QAM	100	0	20.56	20.91	20.67	20.12		
Channel				40315	40595	40885	41165		
Frequency (MHz)				2562.5	2590.5	2619.5	2647.5	Tune-up limit (dBm)	MPR (dB)
15	QPSK	1	0	23.48	23.60	23.67	23.25	24	0
15	QPSK	1	37	23.63	23.91	23.87	23.41		
15	QPSK	1	74	23.50	23.88	23.59	23.02		
15	QPSK	36	0	22.75	22.91	22.83	22.50	23	1
15	QPSK	36	20	22.74	22.92	22.86	22.34		
15	QPSK	36	39	22.52	22.82	22.79	22.21		
15	QPSK	75	0	22.62	22.78	22.80	22.21	23	1
15	16QAM	1	0	22.48	22.32	22.79	22.02		
15	16QAM	1	37	22.47	22.54	22.64	22.25		
15	16QAM	1	74	22.12	22.38	22.11	22.12	22	2
15	16QAM	36	0	21.65	21.84	21.75	21.42		
15	16QAM	36	20	21.58	21.76	21.79	21.13		
15	16QAM	36	39	21.43	21.67	21.68	21.16	22	2
15	16QAM	75	0	21.62	21.91	21.72	21.35		
15	64QAM	1	0	20.97	21.13	21.22	20.73		
15	64QAM	1	37	21.48	21.52	21.28	20.98	22	2
15	64QAM	1	74	20.91	21.14	20.92	20.53		
15	64QAM	36	0	20.57	20.77	20.91	20.45		
15	64QAM	36	20	20.74	20.80	20.76	20.16	21	3
15	64QAM	36	39	20.64	20.92	20.81	20.05		
15	64QAM	75	0	20.56	20.73	20.76	20.19		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				40290	40590	40890	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2560	2590	2620	2650		
10	QPSK	1	0	23.39	23.42	23.60	23.01	24	0
10	QPSK	1	25	23.73	23.82	23.68	23.27		
10	QPSK	1	49	23.53	23.60	23.50	23.25		
10	QPSK	25	0	22.66	22.85	22.82	22.30	23	1
10	QPSK	25	12	22.67	22.92	22.81	22.20		
10	QPSK	25	25	22.46	22.86	22.76	22.20		
10	QPSK	50	0	22.51	22.97	22.77	22.33	23	1
10	16QAM	1	0	22.22	22.26	22.27	21.93		
10	16QAM	1	25	22.34	22.62	22.70	21.95		
10	16QAM	1	49	21.96	22.22	22.50	21.57	22	2
10	16QAM	25	0	21.81	21.95	21.72	21.48		
10	16QAM	25	12	21.89	21.78	21.97	21.36		
10	16QAM	25	25	21.62	21.79	21.70	21.32	22	2
10	16QAM	50	0	21.60	21.88	21.86	21.33		
10	64QAM	1	0	20.90	21.07	21.20	20.58		
10	64QAM	1	25	21.51	21.30	21.71	20.95	22	2
10	64QAM	1	49	20.90	20.98	20.93	20.50		
10	64QAM	25	0	20.65	20.85	20.80	20.21		
10	64QAM	25	12	20.63	20.86	20.97	20.37	21	3
10	64QAM	25	25	20.84	20.95	20.84	20.10		
10	64QAM	50	0	20.54	20.75	20.74	20.19		
Channel				40265	40585	40905	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2557.5	2589.5	2621.5	2652.5		
5	QPSK	1	0	23.35	23.43	23.60	22.97	24	0
5	QPSK	1	12	23.54	23.91	23.85	23.30		
5	QPSK	1	24	23.34	23.40	23.43	22.85		
5	QPSK	12	0	22.57	22.85	22.74	22.18	23	1
5	QPSK	12	7	22.55	22.86	22.78	22.19		
5	QPSK	12	13	22.42	22.83	22.60	22.02		
5	QPSK	25	0	22.51	22.77	22.70	22.17	23	1
5	16QAM	1	0	22.39	22.56	22.26	21.93		
5	16QAM	1	12	22.30	22.79	22.69	22.09		
5	16QAM	1	24	21.93	22.11	22.59	21.61	22	2
5	16QAM	12	0	21.42	21.74	21.69	21.26		
5	16QAM	12	7	21.63	21.83	21.64	21.15		
5	16QAM	12	13	21.44	21.68	21.69	21.06	22	2
5	16QAM	25	0	21.56	21.91	21.67	21.36		
5	64QAM	1	0	20.75	20.97	20.94	20.50		
5	64QAM	1	12	21.14	21.45	21.26	20.98	22	2
5	64QAM	1	24	20.78	20.92	20.93	20.50		
5	64QAM	12	0	20.56	20.85	20.40	20.16		
5	64QAM	12	7	20.66	20.78	20.66	20.13	21	3
5	64QAM	12	13	20.48	20.77	20.43	20.02		
5	64QAM	25	0	20.51	20.84	20.74	20.17		

At Head Power Mode
<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	21.98	22.14	22.22	23	0
20	QPSK	1	49	22.56	22.50	22.61		
20	QPSK	1	99	22.10	22.02	21.89		
20	QPSK	50	0	22.51	22.52	22.49	23	0
20	QPSK	50	24	22.50	22.44	22.45		
20	QPSK	50	50	22.47	22.30	22.41		
20	QPSK	100	0	22.38	22.49	22.50	23	0
20	16QAM	1	0	21.94	22.02	22.00		
20	16QAM	1	49	22.29	22.25	22.31		
20	16QAM	1	99	21.95	21.76	21.89	22	1
20	16QAM	50	0	21.26	21.57	21.43		
20	16QAM	50	24	21.48	21.31	21.57		
20	16QAM	50	50	21.50	21.40	21.40	22	1
20	16QAM	100	0	21.51	21.50	21.48		
20	64QAM	1	0	20.64	20.74	20.79		
20	64QAM	1	49	21.07	20.90	20.89	22	1
20	64QAM	1	99	20.64	20.65	20.50		
20	64QAM	50	0	20.35	20.55	20.33		
20	64QAM	50	24	20.57	20.37	20.47	21	2
20	64QAM	50	50	20.59	20.29	20.40		
20	64QAM	100	0	20.60	20.48	20.29		
Channel				37825	38000	38175		
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	21.95	22.06	22.21	23	0
15	QPSK	1	37	22.49	22.47	22.55		
15	QPSK	1	74	22.03	21.98	21.89		
15	QPSK	36	0	22.51	22.45	22.39	23	0
15	QPSK	36	20	22.44	22.36	22.42		
15	QPSK	36	39	22.43	22.24	22.33		
15	QPSK	75	0	22.36	22.47	22.46	23	0
15	16QAM	1	0	21.86	21.98	21.95		
15	16QAM	1	37	22.29	22.24	22.29		
15	16QAM	1	74	21.90	21.73	21.79	22	1
15	16QAM	36	0	21.16	21.55	21.41		
15	16QAM	36	20	21.42	21.30	21.53		
15	16QAM	36	39	21.42	21.36	21.38	22	1
15	16QAM	75	0	21.43	21.40	21.40		
15	64QAM	1	0	20.63	20.68	20.74		
15	64QAM	1	37	21.03	20.88	20.82	21	2
15	64QAM	1	74	20.63	20.63	20.45		
15	64QAM	36	0	20.25	20.51	20.33		
15	64QAM	36	20	20.56	20.36	20.38	21	2
15	64QAM	36	39	20.52	20.25	20.36		
15	64QAM	75	0	20.59	20.48	20.19		

Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	21.92	22.04	22.16	23	0
10	QPSK	1	25	22.47	22.50	22.56		
10	QPSK	1	49	22.05	22.02	21.79		
10	QPSK	25	0	22.45	22.45	22.39	23	0
10	QPSK	25	12	22.47	22.37	22.44		
10	QPSK	25	25	22.45	22.23	22.31		
10	QPSK	50	0	22.36	22.42	22.42	23	0
10	16QAM	1	0	21.94	22.00	21.96		
10	16QAM	1	25	22.24	22.25	22.31		
10	16QAM	1	49	21.95	21.66	21.82	22	1
10	16QAM	25	0	21.18	21.57	21.38		
10	16QAM	25	12	21.45	21.29	21.50		
10	16QAM	25	25	21.42	21.35	21.30	22	1
10	16QAM	50	0	21.48	21.41	21.46		
10	64QAM	1	0	20.64	20.64	20.76		
10	64QAM	1	25	21.00	20.87	20.88	22	1
10	64QAM	1	49	20.59	20.55	20.49		
10	64QAM	25	0	20.27	20.52	20.25		
10	64QAM	25	12	20.50	20.31	20.40	21	2
10	64QAM	25	25	20.58	20.26	20.40		
10	64QAM	50	0	20.51	20.46	20.28		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	21.89	22.10	22.15	23	0
5	QPSK	1	12	22.49	22.41	22.60		
5	QPSK	1	24	22.06	21.94	21.88		
5	QPSK	12	0	22.43	22.43	22.43	23	0
5	QPSK	12	7	22.50	22.39	22.37		
5	QPSK	12	13	22.43	22.25	22.41		
5	QPSK	25	0	22.29	22.46	22.43	23	0
5	16QAM	1	0	21.87	21.95	22.00		
5	16QAM	1	12	22.25	22.17	22.30		
5	16QAM	1	24	21.91	21.67	21.88	22	1
5	16QAM	12	0	21.24	21.49	21.43		
5	16QAM	12	7	21.42	21.24	21.55		
5	16QAM	12	13	21.44	21.38	21.35	22	1
5	16QAM	25	0	21.46	21.46	21.44		
5	64QAM	1	0	20.62	20.72	20.77		
5	64QAM	1	12	20.97	20.83	20.89	22	1
5	64QAM	1	24	20.62	20.65	20.49		
5	64QAM	12	0	20.30	20.46	20.23		
5	64QAM	12	7	20.53	20.30	20.44	21	2
5	64QAM	12	13	20.53	20.28	20.35		
5	64QAM	25	0	20.54	20.42	20.23		

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40340	40600	40870	41140		
Frequency (MHz)				2565	2591	2618	2645		
20	QPSK	1	0	22.01	22.14	22.20	21.56	23	0
20	QPSK	1	49	22.45	22.59	22.60	21.90		
20	QPSK	1	99	22.00	22.43	21.80	21.23		
20	QPSK	50	0	22.45	22.59	22.50	21.91	23	0
20	QPSK	50	24	22.42	22.58	22.34	21.84		
20	QPSK	50	50	22.39	22.49	22.31	21.70		
20	QPSK	100	0	22.33	22.37	22.44	21.80	23	0
20	16QAM	1	0	21.76	22.14	22.27	21.52		
20	16QAM	1	49	22.15	22.42	22.13	21.67		
20	16QAM	1	99	22.04	21.88	21.86	21.08	22	1
20	16QAM	50	0	21.32	21.54	21.46	20.88		
20	16QAM	50	24	21.25	21.57	21.33	20.92		
20	16QAM	50	50	21.41	21.47	21.29	20.79	22	1
20	16QAM	100	0	21.23	21.49	21.33	20.75		
20	64QAM	1	0	20.66	20.78	20.77	20.23		
20	64QAM	1	49	20.83	21.10	20.85	20.30	22	1
20	64QAM	1	99	20.50	21.18	20.31	20.03		
20	64QAM	50	0	20.41	20.57	20.41	19.61		
20	64QAM	50	24	20.41	20.60	20.27	19.78	21	2
20	64QAM	50	50	20.39	20.42	20.24	19.65		
20	64QAM	100	0	20.22	20.52	20.40	19.58		
Channel				40315	40595	40885	41165		
Frequency (MHz)				2562.5	2590.5	2619.5	2647.5		
15	QPSK	1	0	21.91	22.13	22.19	21.50	23	0
15	QPSK	1	37	22.41	22.52	22.50	21.89		
15	QPSK	1	74	21.96	22.39	21.73	21.15		
15	QPSK	36	0	22.40	22.52	22.46	21.88	23	0
15	QPSK	36	20	22.34	22.56	22.30	21.75		
15	QPSK	36	39	22.36	22.45	22.22	21.64		
15	QPSK	75	0	22.32	22.27	22.36	21.74	23	0
15	16QAM	1	0	21.75	22.10	22.24	21.49		
15	16QAM	1	37	22.13	22.37	22.10	21.66		
15	16QAM	1	74	21.96	21.85	21.80	21.08	22	1
15	16QAM	36	0	21.23	21.48	21.38	20.81		
15	16QAM	36	20	21.22	21.55	21.28	20.84		
15	16QAM	36	39	21.38	21.40	21.23	20.70	22	1
15	16QAM	75	0	21.16	21.48	21.26	20.75		
15	64QAM	1	0	20.65	20.72	20.75	20.20		
15	64QAM	1	37	20.73	21.08	20.84	20.21	22	1
15	64QAM	1	74	20.41	21.08	20.24	20.04		
15	64QAM	36	0	20.34	20.52	20.37	19.58		
15	64QAM	36	20	20.31	20.50	20.17	19.72	21	2
15	64QAM	36	39	20.30	20.34	20.18	19.59		
15	64QAM	75	0	20.22	20.52	20.35	19.56		



FCC SAR TEST REPORT

Report No. : FA942441

Channel				40290	40590	40890	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2560	2590	2620	2650		
10	QPSK	1	0	21.92	22.10	22.18	21.54	23	0
10	QPSK	1	25	22.38	22.59	22.52	21.80		
10	QPSK	1	49	21.96	22.33	21.80	21.17		
10	QPSK	25	0	22.40	22.54	22.44	21.84	23	0
10	QPSK	25	12	22.32	22.57	22.28	21.82		
10	QPSK	25	25	22.37	22.48	22.23	21.64		
10	QPSK	50	0	22.27	22.29	22.42	21.71	23	0
10	16QAM	1	0	21.74	22.13	22.20	21.44		
10	16QAM	1	25	22.09	22.38	22.04	21.58		
10	16QAM	1	49	22.01	21.84	21.85	21.07	22	1
10	16QAM	25	0	21.32	21.49	21.37	20.86		
10	16QAM	25	12	21.25	21.51	21.27	20.83		
10	16QAM	25	25	21.32	21.44	21.21	20.76	22	1
10	16QAM	50	0	21.20	21.43	21.30	20.67		
10	64QAM	1	0	20.60	20.76	20.69	20.16		
10	64QAM	1	25	20.76	21.03	20.83	20.27	22	1
10	64QAM	1	49	20.43	21.15	20.25	20.03		
10	64QAM	25	0	20.38	20.55	20.35	19.58		
10	64QAM	25	12	20.33	20.53	20.24	19.69	21	2
10	64QAM	25	25	20.33	20.42	20.19	19.65		
10	64QAM	50	0	20.15	20.46	20.38	19.55		
Channel				40265	40585	40905	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2557.5	2589.5	2621.5	2652.5		
5	QPSK	1	0	22.00	22.14	22.11	21.47	23	0
5	QPSK	1	12	22.38	22.56	22.58	21.84		
5	QPSK	1	24	21.99	22.34	21.77	21.19		
5	QPSK	12	0	22.35	22.58	22.40	21.82	23	0
5	QPSK	12	7	22.36	22.49	22.33	21.83		
5	QPSK	12	13	22.31	22.39	22.28	21.65		
5	QPSK	25	0	22.27	22.29	22.38	21.72	23	0
5	16QAM	1	0	21.75	22.12	22.26	21.44		
5	16QAM	1	12	22.14	22.42	22.13	21.64		
5	16QAM	1	24	21.99	21.84	21.78	21.07	22	1
5	16QAM	12	0	21.24	21.47	21.41	20.78		
5	16QAM	12	7	21.16	21.54	21.33	20.90		
5	16QAM	12	13	21.33	21.42	21.29	20.77	22	1
5	16QAM	25	0	21.19	21.44	21.31	20.67		
5	64QAM	1	0	20.59	20.73	20.70	20.22		
5	64QAM	1	12	20.80	21.02	20.79	20.26	22	1
5	64QAM	1	24	20.50	21.16	20.28	20.02		
5	64QAM	12	0	20.34	20.55	20.38	19.57		
5	64QAM	12	7	20.33	20.58	20.20	19.77	21	2
5	64QAM	12	13	20.35	20.37	20.15	19.63		
5	64QAM	25	0	20.15	20.47	20.36	19.53		

<WLAN Conducted Power>
General Note:

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

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.70	16.00	97.52
		6	2437	15.90	16.00	
		11	2462	15.70	16.00	
	802.11g 6Mbps	1	2412	13.70	14.00	86.62
		6	2437	13.60	14.00	
		11	2462	13.70	14.00	
	802.11n-HT20 MCS0	1	2412	10.80	11.00	86.53
		6	2437	10.70	11.00	
		11	2462	10.80	11.00	
	802.11n-HT40 MCS0	3	2422	10.60	11.00	85.02
		6	2437	10.60	11.00	
		9	2452	10.70	11.00	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	12.90	13.00	86.94
		40	5200	12.90	13.00	
		44	5220	12.90	13.00	
		48	5240	12.90	13.00	
	802.11n-HT20 MCS0	36	5180	10.80	11.00	86.45
		40	5200	10.70	11.00	
		44	5220	10.60	11.00	
		48	5240	10.90	11.00	
	802.11n-HT40 MCS0	38	5190	10.90	11.00	86.06
		46	5230	10.60	11.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	12.80	13.00	86.94
		56	5280	12.80	13.00	
		60	5300	12.80	13.00	
		64	5320	12.70	13.00	
	802.11n-HT20 MCS0	52	5260	10.70	11.00	86.45
		56	5280	10.80	11.00	
		60	5300	10.90	11.00	
		64	5320	10.90	11.00	
	802.11n-HT40 MCS0	54	5270	10.90	11.00	86.06
		62	5310	10.90	11.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	12.60	13.00	86.94
		116	5580	12.90	13.00	
		124	5620	12.90	13.00	
		132	5660	12.90	13.00	
		140	5700	12.90	13.00	
	802.11n-HT20 MCS0	100	5500	10.90	11.00	86.45
		116	5580	10.90	11.00	
		124	5620	10.90	11.00	
		132	5660	10.90	11.00	
		140	5700	10.90	11.00	
	802.11n-HT40 MCS0	102	5510	10.90	11.00	86.06
		110	5550	10.60	11.00	
		126	5630	10.80	11.00	
		134	5670	10.90	11.00	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	149	5745	12.90	13.00	86.94
		157	5785	12.90	13.00	
		165	5825	12.80	13.00	
	802.11n-HT20 MCS0	149	5745	10.90	11.00	86.45
		157	5785	10.80	11.00	
		165	5825	10.90	11.00	
	802.11n-HT40 MCS0	151	5755	10.90	11.00	86.06
		159	5795	10.90	11.00	

<ANT + Conducted Power>

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
ANT +	CH 00	2402	-1.6
	CH 38	2440	-1.6
	CH 78	2480	-1.9

<2.4GHz Bluetooth>
General Note:

- For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 77.13% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

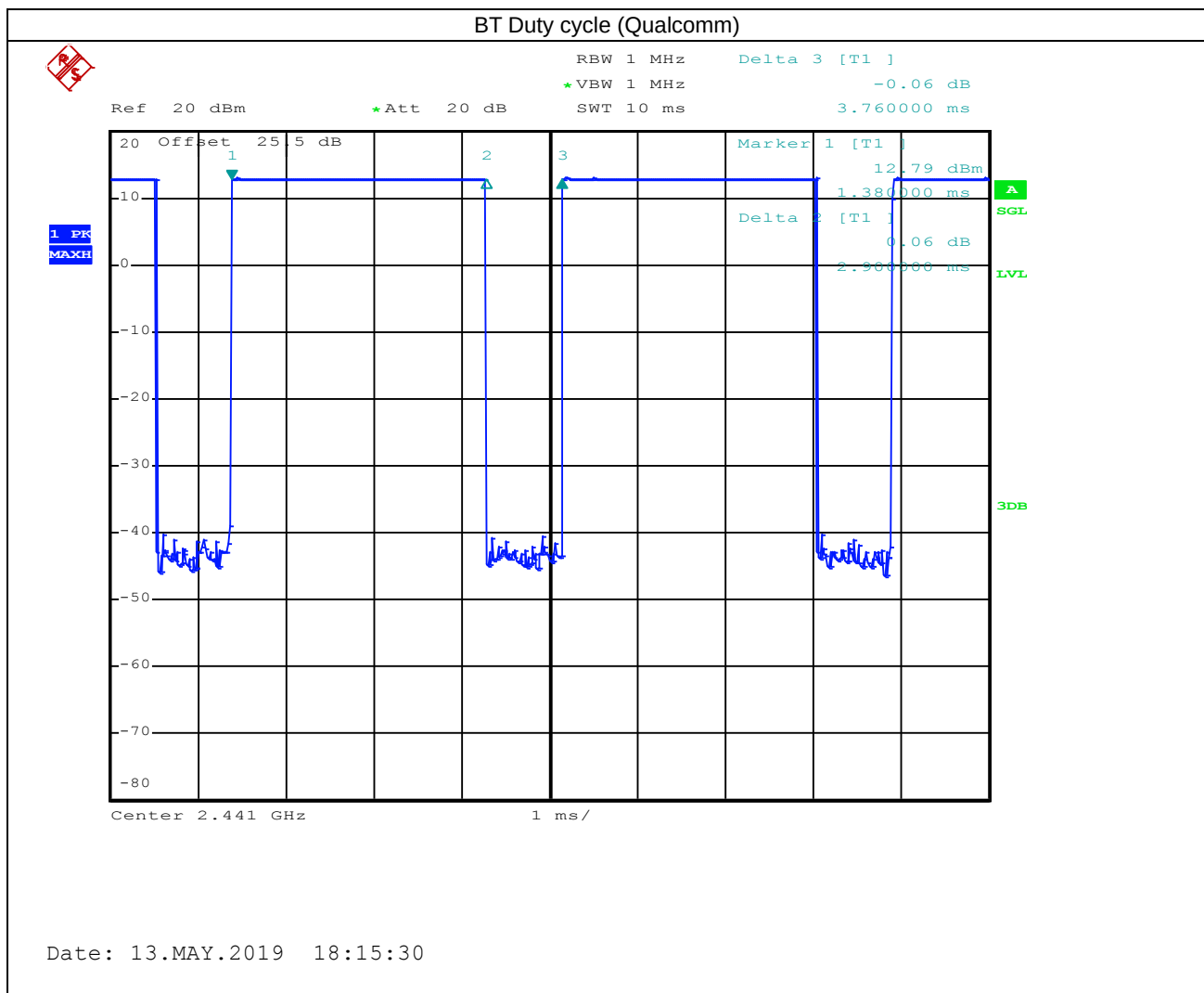
<Antenna 1>

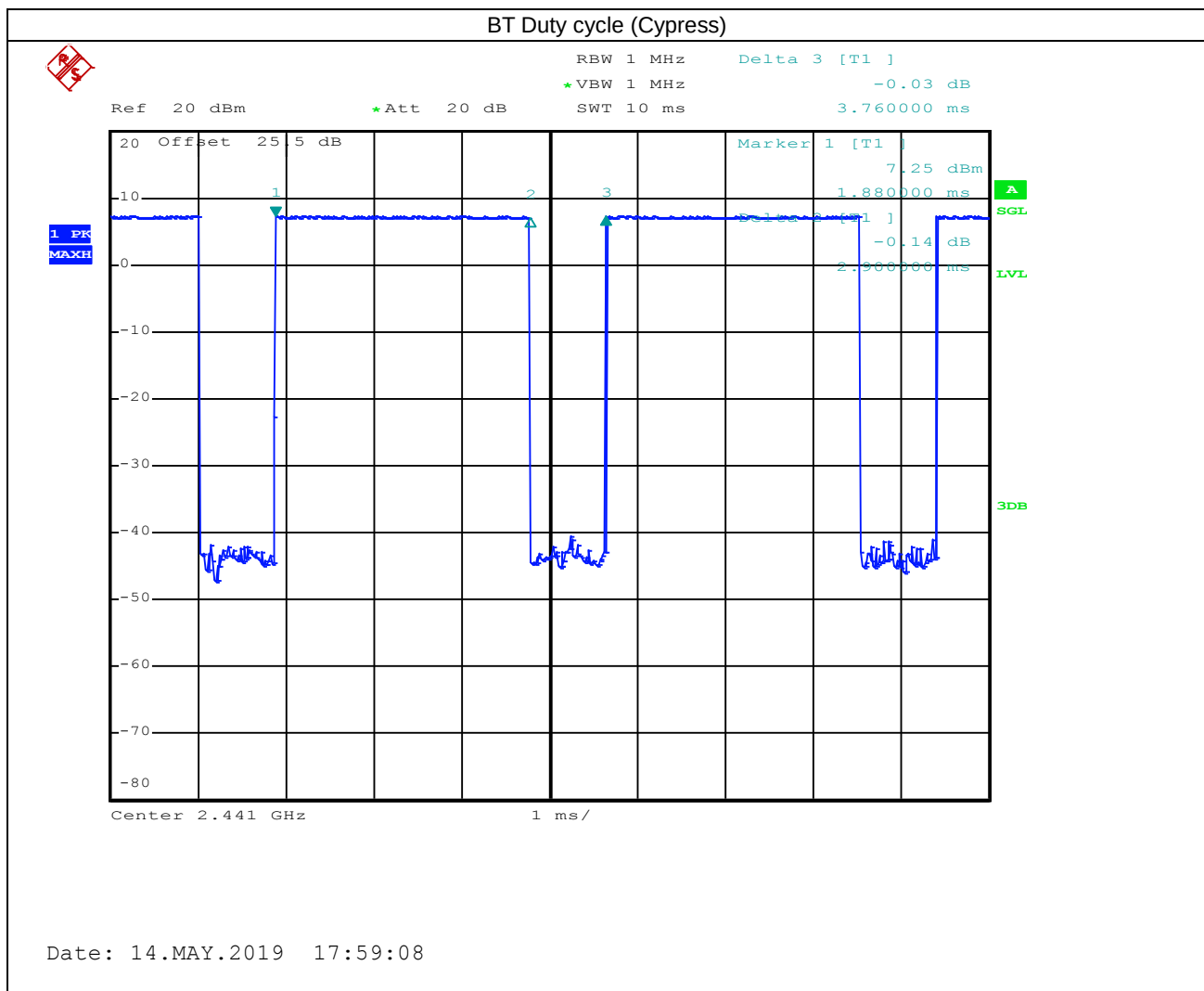
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	12.62	10.63	10.67
	CH 39	2441	13.76	11.73	11.81
	CH 78	2480	12.76	10.71	10.72
Tune-up Limit			14.00	12.00	12.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	2.60
	CH 19	2440	3.60
	CH 39	2480	2.40
Tune-up Limit			4.00

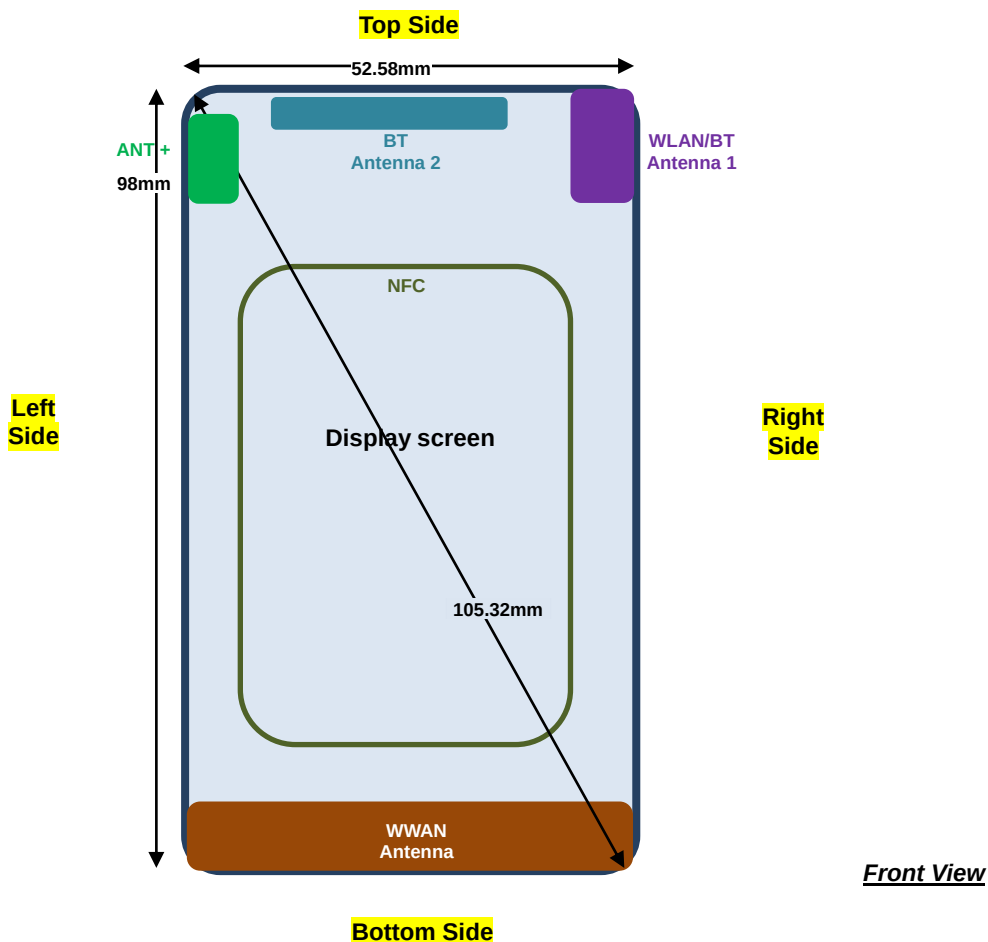
<Antenna 2>

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	7.14	4.09	4.07
	CH 39	2441	8.50	5.42	5.41
	CH 78	2480	7.15	4.02	3.99
Tune-up Limit			9.00	5.50	5.50





12. Antenna Location



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

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

General Note:

- Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

13. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

GSM Note:

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

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 is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 / B17 / B38 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 17/38 SAR test was covered by Band 12/41; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

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

13.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (3 Tx slots)	Right Cheek	0mm	OFF	251	848.8	28.42	28.80	1.091	0.16	0.527	0.575
	GSM850	GPRS (3 Tx slots)	Right Tilted	0mm	OFF	251	848.8	28.42	28.80	1.091	0.07	0.247	0.270
	GSM850	GPRS (3 Tx slots)	Left Cheek	0mm	OFF	251	848.8	28.42	28.80	1.091	-0.02	0.558	0.609
01	GSM850	GPRS (3 Tx slots)	Left Cheek	0mm	OFF	128	824.2	28.25	28.80	1.135	-0.13	0.666	0.756
	GSM850	GPRS (3 Tx slots)	Left Cheek	0mm	OFF	189	836.4	28.34	28.80	1.112	0.02	0.664	0.738
	GSM850	GPRS (3 Tx slots)	Left Tilted	0mm	OFF	251	848.8	28.42	28.80	1.091	0.01	0.260	0.284
	GSM1900	GPRS (3 Tx slots)	Right Cheek	0mm	OFF	512	1850.2	25.44	25.80	1.086	-0.17	0.574	0.624
	GSM1900	GPRS (3 Tx slots)	Right Cheek	0mm	OFF	661	1880	25.33	25.80	1.114	0.03	0.835	0.930
02	GSM1900	GPRS (3 Tx slots)	Right Cheek	0mm	OFF	810	1909.8	25.20	25.80	1.148	0.1	0.995	1.142
	GSM1900	GPRS (3 Tx slots)	Right Tilted	0mm	OFF	512	1850.2	25.44	25.80	1.086	0.12	0.115	0.125
	GSM1900	GPRS (3 Tx slots)	Left Cheek	0mm	OFF	512	1850.2	25.44	25.80	1.086	0.07	0.400	0.435
	GSM1900	GPRS (3 Tx slots)	Left Tilted	0mm	OFF	512	1850.2	25.44	25.80	1.086	-0.03	0.103	0.112

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
03	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	ON	9538	1907.6	20.73	21.50	1.194	0.05	0.915	1.092
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	ON	9262	1852.4	20.50	21.50	1.259	0.04	0.658	0.828
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	ON	9400	1880	20.43	21.50	1.279	-0.04	0.783	1.002
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	ON	9538	1907.6	20.73	21.50	1.194	-0.05	0.207	0.247
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	ON	9538	1907.6	20.73	21.50	1.194	-0.06	0.647	0.773
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	ON	9538	1907.6	20.73	21.50	1.194	-0.16	0.165	0.197
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	OFF	4233	846.6	23.12	24.00	1.225	0.19	0.526	0.644
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	OFF	4233	846.6	23.12	24.00	1.225	0.09	0.204	0.250
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	OFF	4233	846.6	23.12	24.00	1.225	0	0.586	0.718
04	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	OFF	4182	836.4	23.00	24.00	1.259	0.11	0.627	0.789
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	OFF	4132	826.4	22.93	24.00	1.279	0.09	0.598	0.765
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	OFF	4233	846.6	23.12	24.00	1.225	0.06	0.223	0.273



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
05	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm	ON	19100	1900	21.19	22.50	1.352	-0.14	1.020	1.379
	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm	ON	18700	1860	21.04	22.50	1.400	-0.1	0.819	1.146
	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm	ON	18900	1880	21.13	22.50	1.371	-0.08	0.903	1.238
	LTE Band 2	20M	QPSK	50	0	Right Cheek	0mm	ON	19100	1900	21.10	21.50	1.096	0.03	1.010	1.107
	LTE Band 2	20M	QPSK	50	0	Right Cheek	0mm	ON	18700	1860	21.00	21.50	1.122	0.05	0.802	0.900
	LTE Band 2	20M	QPSK	50	0	Right Cheek	0mm	ON	18900	1880	20.98	21.50	1.127	0.02	0.898	1.012
	LTE Band 2	20M	QPSK	100	0	Right Cheek	0mm	ON	19100	1900	21.18	21.50	1.076	-0.05	1.040	1.120
	LTE Band 2	20M	QPSK	1	49	Right Tilted	0mm	ON	19100	1900	21.19	22.50	1.352	-0.16	0.111	0.150
	LTE Band 2	20M	QPSK	50	0	Right Tilted	0mm	ON	19100	1900	21.10	21.50	1.096	0.09	0.100	0.110
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	ON	19100	1900	21.19	22.50	1.352	-0.04	0.700	0.946
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	ON	18700	1860	21.04	22.50	1.400	0.05	0.562	0.787
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm	ON	18900	1880	21.13	22.50	1.371	0.06	0.619	0.849
	LTE Band 2	20M	QPSK	50	0	Left Cheek	0mm	ON	19100	1900	21.10	21.50	1.096	-0.03	0.693	0.760
	LTE Band 2	20M	QPSK	100	0	Left Cheek	0mm	ON	19100	1900	21.18	21.50	1.076	0.09	0.713	0.768
	LTE Band 2	20M	QPSK	1	49	Left Tilted	0mm	ON	19100	1900	21.19	22.50	1.352	0.18	0.094	0.127
	LTE Band 2	20M	QPSK	50	0	Left Tilted	0mm	ON	19100	1900	21.10	21.50	1.096	0.07	0.093	0.102
	LTE Band 4	20M	QPSK	1	49	Right Cheek	0mm	OFF	20175	1732.5	24.00	24.00	1.000	-0.09	0.682	0.682
	LTE Band 4	20M	QPSK	50	50	Right Cheek	0mm	OFF	20175	1732.5	22.62	23.00	1.091	-0.04	0.577	0.630
	LTE Band 4	20M	QPSK	1	49	Right Tilted	0mm	OFF	20175	1732.5	24.00	24.00	1.000	0.12	0.286	0.286
	LTE Band 4	20M	QPSK	50	50	Right Tilted	0mm	OFF	20175	1732.5	22.62	23.00	1.091	0.07	0.238	0.260
06	LTE Band 4	20M	QPSK	1	49	Left Cheek	0mm	OFF	20175	1732.5	24.00	24.00	1.000	0.08	1.130	1.130
	LTE Band 4	20M	QPSK	50	50	Left Cheek	0mm	OFF	20175	1732.5	22.62	23.00	1.091	0.01	0.843	0.920
	LTE Band 4	20M	QPSK	100	0	Left Cheek	0mm	OFF	20175	1732.5	22.57	23.00	1.104	-0.13	0.864	0.954
	LTE Band 4	20M	QPSK	1	49	Left Tilted	0mm	OFF	20175	1732.5	24.00	24.00	1.000	0.05	0.284	0.284
	LTE Band 4	20M	QPSK	50	50	Left Tilted	0mm	OFF	20175	1732.5	22.62	23.00	1.091	-0.03	0.237	0.259
	LTE Band 5	10M	QPSK	1	25	Right Cheek	0mm	OFF	20525	836.5	22.60	24.00	1.380	0.12	0.503	0.694
	LTE Band 5	10M	QPSK	25	12	Right Cheek	0mm	OFF	20525	836.5	21.70	23.00	1.349	0.07	0.417	0.563
	LTE Band 5	10M	QPSK	1	25	Right Tilted	0mm	OFF	20525	836.5	22.60	24.00	1.380	0.18	0.255	0.352
	LTE Band 5	10M	QPSK	25	12	Right Tilted	0mm	OFF	20525	836.5	21.70	23.00	1.349	0.12	0.209	0.282
07	LTE Band 5	10M	QPSK	1	25	Left Cheek	0mm	OFF	20525	836.5	22.60	24.00	1.380	-0.14	0.567	0.783
	LTE Band 5	10M	QPSK	25	12	Left Cheek	0mm	OFF	20525	836.5	21.70	23.00	1.349	-0.04	0.470	0.634
	LTE Band 5	10M	QPSK	1	25	Left Tilted	0mm	OFF	20525	836.5	22.60	24.00	1.380	-0.11	0.236	0.326
	LTE Band 5	10M	QPSK	25	12	Left Tilted	0mm	OFF	20525	836.5	21.70	23.00	1.349	0.02	0.197	0.266



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	ON	20850	2510	20.17	20.50	1.079	-0.12	1.030	1.111
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	ON	21100	2535	19.80	20.50	1.175	0.02	1.070	1.257
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	ON	21350	2560	19.74	20.50	1.191	-0.04	1.040	1.239
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	ON	20850	2510	19.95	20.50	1.135	-0.19	1.070	1.214
08	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	ON	21100	2535	19.78	20.50	1.180	0.02	1.140	1.346
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	ON	21350	2560	19.68	20.50	1.208	-0.18	1.070	1.292
	LTE Band 7	20M	QPSK	100	0	Right Cheek	0mm	ON	20850	2510	19.78	20.50	1.180	0	1.060	1.251
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	ON	20850	2510	20.17	20.50	1.079	0.06	0.225	0.243
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	ON	20850	2510	19.95	20.50	1.135	-0.12	0.245	0.278
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	ON	20850	2510	20.17	20.50	1.079	-0.17	0.733	0.791
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	ON	20850	2510	19.95	20.50	1.135	0.08	0.701	0.796
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	ON	20850	2510	20.17	20.50	1.079	-0.04	0.295	0.318
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	ON	20850	2510	19.95	20.50	1.135	0.13	0.285	0.323
	LTE Band 12	10M	QPSK	1	25	Right Cheek	0mm	OFF	23095	707.5	22.91	24.00	1.285	-0.05	0.474	0.609
	LTE Band 12	10M	QPSK	25	0	Right Cheek	0mm	OFF	23095	707.5	21.95	23.00	1.274	0	0.376	0.479
	LTE Band 12	10M	QPSK	1	25	Right Tilted	0mm	OFF	23095	707.5	22.91	24.00	1.285	0.11	0.160	0.206
	LTE Band 12	10M	QPSK	25	0	Right Tilted	0mm	OFF	23095	707.5	21.95	23.00	1.274	0.17	0.132	0.168
09	LTE Band 12	10M	QPSK	1	25	Left Cheek	0mm	OFF	23095	707.5	22.91	24.00	1.285	-0.13	0.491	0.631
	LTE Band 12	10M	QPSK	25	0	Left Cheek	0mm	OFF	23095	707.5	21.95	23.00	1.274	0.02	0.407	0.518
	LTE Band 12	10M	QPSK	1	25	Left Tilted	0mm	OFF	23095	707.5	22.91	24.00	1.285	-0.09	0.148	0.190
	LTE Band 12	10M	QPSK	25	0	Left Tilted	0mm	OFF	23095	707.5	21.95	23.00	1.274	-0.05	0.122	0.155

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	ON	40870	2618	22.60	23.00	1.096	-0.13	1.130	1.239
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	ON	40340	2565	22.45	23.00	1.135	-0.15	1.200	1.362
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	ON	40600	2591	22.59	23.00	1.099	-0.12	1.200	1.319
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	ON	41140	2645	21.90	23.00	1.288	-0.13	1.040	1.340
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	40600	2591	22.59	23.00	1.099	0.02	1.180	1.297
10	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	40340	2565	22.45	23.00	1.135	-0.13	1.210	1.373
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	40870	2618	22.50	23.00	1.122	-0.09	1.080	1.212
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	41140	2645	21.91	23.00	1.285	-0.03	0.978	1.257
	LTE Band 41	20M	QPSK	100	0	Right Cheek	0mm	ON	40870	2618	22.44	23.00	1.138	-0.12	1.050	1.195
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	ON	40870	2618	22.60	23.00	1.096	0.16	0.267	0.293
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	ON	40600	2591	22.59	23.00	1.099	-0.01	0.273	0.300
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	ON	40870	2618	22.60	23.00	1.096	-0.07	0.683	0.749
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	ON	40600	2591	22.59	23.00	1.099	-0.12	0.701	0.770
	LTE Band 41	20M	QPSK	1	49	Left Tilted	0mm	ON	40870	2618	22.60	23.00	1.096	0	0.277	0.304
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	ON	40600	2591	22.59	23.00	1.099	0.05	0.283	0.311

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	0.12	0.011	0.012
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	0.05	0.019	0.020
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	-0.1	0.043	0.045
11	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1	1	2412	15.70	16.00	1.072	97.52	1.025	0.03	0.053	0.058
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1	11	2462	15.70	16.00	1.072	97.52	1.025	-0.03	0.048	0.053
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	-0.03	0.011	0.012
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	0.01	0.062	0.075
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.08	0.055	0.066
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	0.01	0.084	0.101
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	52	5260	12.80	13.00	1.047	86.94	1.150	0.07	0.093	0.112
12	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	60	5300	12.80	13.00	1.047	86.94	1.150	-0.05	0.107	0.129
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	64	5320	12.70	13.00	1.072	86.94	1.150	-0.02	0.103	0.127
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.03	0.076	0.092
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.13	0.018	0.021
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.16	0.018	0.021
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.07	0.021	0.025
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	100	5500	12.60	13.00	1.096	86.94	1.150	0.18	0.029	0.037
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	124	5620	12.90	13.00	1.023	86.94	1.150	0.17	0.016	0.019
13	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	132	5660	12.90	13.00	1.023	86.94	1.150	-0.17	0.046	0.054
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	140	5700	12.90	13.00	1.023	86.94	1.150	0.13	0.023	0.027
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.03	0.016	0.019
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	0.02	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	-0.17	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	-0.08	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	-0.02	0.009	0.011
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1	149	5745	12.90	13.00	1.023	86.94	1.150	-0.12	0.009	0.011
14	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1	165	5825	12.80	13.00	1.047	86.94	1.150	-0.15	0.012	0.014



<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Right Cheek	0mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	0.1	0.004	0.004
	Bluetooth	1Mbps	Right Tilted	0mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	0.07	0.005	0.006
	Bluetooth	1Mbps	Left Cheek	0mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	0.08	0.015	0.017
	Bluetooth	1Mbps	Left Cheek	0mm	Ant 1	0	2402	12.62	14.00	1.374	77.13	1.080	-0.01	0.015	0.022
	Bluetooth	1Mbps	Left Cheek	0mm	Ant 1	78	2480	12.76	14.00	1.331	77.13	1.080	0.11	0.014	0.020
	Bluetooth	1Mbps	Left Tilted	0mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	0.14	0.006	0.007
	Bluetooth	1Mbps	Right Cheek	0mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.06	0.021	0.025
	Bluetooth	1Mbps	Right Tilted	0mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.1	0.025	0.030
	Bluetooth	1Mbps	Left Cheek	0mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	-0.13	0.024	0.029
	Bluetooth	1Mbps	Left Tilted	0mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.04	0.029	0.035
15	Bluetooth	1Mbps	Left Tilted	0mm	Ant 2	0	2402	7.14	9.00	1.535	77.13	1.080	0.08	0.024	0.040
	Bluetooth	1Mbps	Left Tilted	0mm	Ant 2	78	2480	7.15	9.00	1.531	77.13	1.080	0	0.020	0.033

13.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	GSM850	GPRS (3 Tx slots)	Front	10mm	251	848.8	28.42	28.80	1.091	0.01	0.419	0.457
16	GSM850	GPRS (3 Tx slots)	Front	10mm	128	824.2	28.25	28.80	1.135	0	0.476	0.540
	GSM850	GPRS (3 Tx slots)	Front	10mm	189	836.4	28.34	28.80	1.112	-0.12	0.467	0.519
	GSM850	GPRS (3 Tx slots)	Back	10mm	251	848.8	28.42	28.80	1.091	-0.01	0.382	0.417
	GSM850	GPRS (3 Tx slots)	Left Side	10mm	251	848.8	28.42	28.80	1.091	0.04	0.320	0.349
	GSM850	GPRS (3 Tx slots)	Right Side	10mm	251	848.8	28.42	28.80	1.091	0.03	0.248	0.271
	GSM850	GPRS (3 Tx slots)	Bottom Side	10mm	251	848.8	28.42	28.80	1.091	-0.13	0.165	0.180
	GSM1900	GPRS (3 Tx slots)	Front	10mm	512	1850.2	25.44	25.80	1.086	-0.14	0.252	0.274
	GSM1900	GPRS (3 Tx slots)	Back	10mm	512	1850.2	25.44	25.80	1.086	0.01	0.289	0.314
	GSM1900	GPRS (3 Tx slots)	Left Side	10mm	512	1850.2	25.44	25.80	1.086	0.08	0.057	0.062
	GSM1900	GPRS (3 Tx slots)	Right Side	10mm	512	1850.2	25.44	25.80	1.086	0.07	0.090	0.098
	GSM1900	GPRS (3 Tx slots)	Bottom side	10mm	512	1850.2	25.44	25.80	1.086	0.01	0.353	0.384
	GSM1900	GPRS (3 Tx slots)	Bottom side	10mm	661	1880	25.33	25.80	1.114	0.08	0.488	0.544
17	GSM1900	GPRS (3 Tx slots)	Bottom Side	10mm	810	1909.8	25.20	25.80	1.148	0.01	0.619	0.711

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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	Front	10mm	9538	1907.6	23.32	24.00	1.169	0.03	1.010	1.181
	WCDMA II	RMC 12.2Kbps	Front	10mm	9262	1852.4	23.23	24.00	1.194	-0.08	0.585	0.698
	WCDMA II	RMC 12.2Kbps	Front	10mm	9400	1880	23.12	24.00	1.225	-0.03	0.744	0.911
	WCDMA II	RMC 12.2Kbps	Back	10mm	9538	1907.6	23.32	24.00	1.169	-0.1	0.537	0.628
	WCDMA II	RMC 12.2Kbps	Left Side	10mm	9538	1907.6	23.32	24.00	1.169	0.15	0.173	0.202
	WCDMA II	RMC 12.2Kbps	Right Side	10mm	9538	1907.6	23.32	24.00	1.169	0.05	0.351	0.410
18	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	9538	1907.6	23.32	24.00	1.169	-0.14	1.020	1.193
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	9262	1852.4	23.23	24.00	1.194	0.04	0.800	0.955
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	9400	1880	23.12	24.00	1.225	0.15	0.957	1.172
	WCDMA V	RMC 12.2Kbps	Front	10mm	4233	846.6	23.12	24.00	1.225	-0.11	0.424	0.519
19	WCDMA V	RMC 12.2Kbps	Front	10mm	4132	826.4	22.93	24.00	1.279	0.03	0.466	0.596
	WCDMA V	RMC 12.2Kbps	Front	10mm	4182	836.4	23.00	24.00	1.259	0.15	0.424	0.534
	WCDMA V	RMC 12.2Kbps	Back	10mm	4233	846.6	23.12	24.00	1.225	-0.02	0.378	0.463
	WCDMA V	RMC 12.2Kbps	Left Side	10mm	4233	846.6	23.12	24.00	1.225	-0.05	0.323	0.396
	WCDMA V	RMC 12.2Kbps	Right Side	10mm	4233	846.6	23.12	24.00	1.225	-0.05	0.203	0.249
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm	4233	846.6	23.12	24.00	1.225	0.03	0.134	0.164



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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	49	Front	10mm	19100	1900	23.43	24.00	1.140	-0.04	0.765	0.872
	LTE Band 2	20M	QPSK	1	49	Front	10mm	18700	1860	23.18	24.00	1.208	-0.06	0.580	0.701
	LTE Band 2	20M	QPSK	1	99	Front	10mm	18900	1880	23.18	24.00	1.208	-0.02	0.685	0.827
	LTE Band 2	20M	QPSK	50	50	Front	10mm	19100	1900	22.17	23.00	1.211	-0.02	0.629	0.761
	LTE Band 2	20M	QPSK	100	0	Front	10mm	19100	1900	22.31	23.00	1.172	-0.05	0.615	0.721
	LTE Band 2	20M	QPSK	1	49	Back	10mm	19100	1900	23.43	24.00	1.140	-0.18	0.475	0.542
	LTE Band 2	20M	QPSK	50	50	Back	10mm	19100	1900	22.17	23.00	1.211	0.09	0.352	0.426
	LTE Band 2	20M	QPSK	1	49	Left Side	10mm	19100	1900	23.43	24.00	1.140	0.04	0.142	0.162
	LTE Band 2	20M	QPSK	50	50	Left Side	10mm	19100	1900	22.17	23.00	1.211	-0.06	0.102	0.123
	LTE Band 2	20M	QPSK	1	49	Right Side	10mm	19100	1900	23.43	24.00	1.140	-0.07	0.294	0.335
	LTE Band 2	20M	QPSK	50	50	Right Side	10mm	19100	1900	22.17	23.00	1.211	-0.09	0.215	0.260
20	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	19100	1900	23.43	24.00	1.140	0.05	1.050	1.197
	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	18700	1860	23.18	24.00	1.208	0.03	0.755	0.912
	LTE Band 2	20M	QPSK	1	99	Bottom Side	10mm	18900	1880	23.18	24.00	1.208	0.05	0.925	1.117
	LTE Band 2	20M	QPSK	50	50	Bottom Side	10mm	19100	1900	22.17	23.00	1.211	0	0.854	1.034
	LTE Band 2	20M	QPSK	50	50	Bottom Side	10mm	18700	1860	22.01	23.00	1.256	0.04	0.642	0.806
	LTE Band 2	20M	QPSK	50	0	Bottom Side	10mm	18900	1880	22.06	23.00	1.242	0.02	0.703	0.873
	LTE Band 2	20M	QPSK	100	0	Bottom Side	10mm	19100	1900	22.31	23.00	1.172	-0.04	0.831	0.974
	LTE Band 4	20M	QPSK	1	49	Front	10mm	20175	1732.5	24.00	24.00	1.000	-0.05	0.392	0.392
	LTE Band 4	20M	QPSK	50	50	Front	10mm	20175	1732.5	22.62	23.00	1.091	-0.09	0.332	0.362
	LTE Band 4	20M	QPSK	1	49	Back	10mm	20175	1732.5	24.00	24.00	1.000	0.03	0.243	0.243
	LTE Band 4	20M	QPSK	50	50	Back	10mm	20175	1732.5	22.62	23.00	1.091	0.04	0.199	0.217
	LTE Band 4	20M	QPSK	1	49	Left Side	10mm	20175	1732.5	24.00	24.00	1.000	0.02	0.295	0.295
	LTE Band 4	20M	QPSK	50	50	Left Side	10mm	20175	1732.5	22.62	23.00	1.091	0.02	0.237	0.259
	LTE Band 4	20M	QPSK	1	49	Right Side	10mm	20175	1732.5	24.00	24.00	1.000	0.14	0.122	0.122
	LTE Band 4	20M	QPSK	50	50	Right Side	10mm	20175	1732.5	22.62	23.00	1.091	0.13	0.100	0.109
21	LTE Band 4	20M	QPSK	1	49	Bottom Side	10mm	20175	1732.5	24.00	24.00	1.000	-0.12	0.482	0.482
	LTE Band 4	20M	QPSK	50	50	Bottom Side	10mm	20175	1732.5	22.62	23.00	1.091	0.12	0.389	0.425
22	LTE Band 5	10M	QPSK	1	25	Front	10mm	20525	836.5	22.60	24.00	1.380	-0.01	0.380	0.525
	LTE Band 5	10M	QPSK	25	12	Front	10mm	20525	836.5	21.70	23.00	1.349	0.04	0.311	0.420
	LTE Band 5	10M	QPSK	1	25	Back	10mm	20525	836.5	22.60	24.00	1.380	-0.06	0.340	0.469
	LTE Band 5	10M	QPSK	25	12	Back	10mm	20525	836.5	21.70	23.00	1.349	0.02	0.288	0.389
	LTE Band 5	10M	QPSK	1	25	Left Side	10mm	20525	836.5	22.60	24.00	1.380	0.11	0.313	0.432
	LTE Band 5	10M	QPSK	25	12	Left Side	10mm	20525	836.5	21.70	23.00	1.349	-0.04	0.252	0.340
	LTE Band 5	10M	QPSK	1	25	Right Side	10mm	20525	836.5	22.60	24.00	1.380	0.03	0.210	0.290
	LTE Band 5	10M	QPSK	25	12	Right Side	10mm	20525	836.5	21.70	23.00	1.349	0	0.174	0.235
	LTE Band 5	10M	QPSK	1	25	Bottom Side	10mm	20525	836.5	22.60	24.00	1.380	-0.05	0.139	0.192
	LTE Band 5	10M	QPSK	25	12	Bottom Side	10mm	20525	836.5	21.70	23.00	1.349	-0.15	0.116	0.156



FCC SAR TEST REPORT

Report No. : FA942441

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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 7	20M	QPSK	1	49	Front	10mm	20850	2510	23.98	24.00	1.005	0.19	1.070	1.075
	LTE Band 7	20M	QPSK	1	49	Front	10mm	21100	2535	23.90	24.00	1.023	-0.18	1.100	1.126
23	LTE Band 7	20M	QPSK	1	49	Front	10mm	21350	2560	23.67	24.00	1.079	-0.13	1.110	1.198
	LTE Band 7	20M	QPSK	50	0	Front	10mm	20850	2510	22.99	23.00	1.002	-0.08	0.970	0.972
	LTE Band 7	20M	QPSK	50	24	Front	10mm	21100	2535	22.83	23.00	1.040	0.01	0.996	1.036
	LTE Band 7	20M	QPSK	50	0	Front	10mm	21350	2560	22.70	23.00	1.072	-0.1	1.020	1.093
	LTE Band 7	20M	QPSK	100	0	Front	10mm	20850	2510	22.81	23.00	1.045	-0.1	0.973	1.017
	LTE Band 7	20M	QPSK	1	49	Back	10mm	20850	2510	23.98	24.00	1.005	0.11	0.565	0.568
	LTE Band 7	20M	QPSK	50	0	Back	10mm	20850	2510	22.99	23.00	1.002	-0.05	0.476	0.477
	LTE Band 7	20M	QPSK	1	49	Left Side	10mm	20850	2510	23.98	24.00	1.005	-0.03	0.145	0.146
	LTE Band 7	20M	QPSK	50	0	Left Side	10mm	20850	2510	22.99	23.00	1.002	-0.08	0.113	0.113
	LTE Band 7	20M	QPSK	1	49	Right Side	10mm	20850	2510	23.98	24.00	1.005	-0.02	0.709	0.712
	LTE Band 7	20M	QPSK	50	0	Right Side	10mm	20850	2510	22.99	23.00	1.002	-0.05	0.568	0.569
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	20850	2510	23.98	24.00	1.005	0.11	0.954	0.958
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	21100	2535	23.90	24.00	1.023	-0.13	1.070	1.095
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	21350	2560	23.67	24.00	1.079	-0.13	1.090	1.176
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	20850	2510	22.99	23.00	1.002	-0.15	0.800	0.802
	LTE Band 7	20M	QPSK	50	24	Bottom Side	10mm	21100	2535	22.83	23.00	1.040	-0.02	0.855	0.889
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	21350	2560	22.70	23.00	1.072	-0.11	0.845	0.905
	LTE Band 7	20M	QPSK	100	0	Bottom Side	10mm	20850	2510	22.81	23.00	1.045	-0.1	0.789	0.824
24	LTE Band 12	10M	QPSK	1	25	Front	10mm	23095	707.5	22.91	24.00	1.285	-0.12	0.263	0.338
	LTE Band 12	10M	QPSK	25	0	Front	10mm	23095	707.5	21.95	23.00	1.274	-0.03	0.215	0.274
	LTE Band 12	10M	QPSK	1	25	Back	10mm	23095	707.5	22.91	24.00	1.285	0.02	0.234	0.301
	LTE Band 12	10M	QPSK	25	0	Back	10mm	23095	707.5	21.95	23.00	1.274	-0.1	0.191	0.243
	LTE Band 12	10M	QPSK	1	25	Left Side	10mm	23095	707.5	22.91	24.00	1.285	-0.06	0.137	0.176
	LTE Band 12	10M	QPSK	25	0	Left Side	10mm	23095	707.5	21.95	23.00	1.274	0.01	0.117	0.149
	LTE Band 12	10M	QPSK	1	25	Right Side	10mm	23095	707.5	22.91	24.00	1.285	-0.11	0.105	0.135
	LTE Band 12	10M	QPSK	25	0	Right Side	10mm	23095	707.5	21.95	23.00	1.274	0.14	0.088	0.112
	LTE Band 12	10M	QPSK	1	25	Bottom Side	10mm	23095	707.5	22.91	24.00	1.285	-0.16	0.167	0.215
	LTE Band 12	10M	QPSK	25	0	Bottom Side	10mm	23095	707.5	21.95	23.00	1.274	-0.15	0.138	0.176

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	49	Front	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.09	0.397	0.407
	LTE Band 41	20M	QPSK	50	0	Front	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	0	0.321	0.323
	LTE Band 41	20M	QPSK	1	49	Back	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.04	0.226	0.232
	LTE Band 41	20M	QPSK	50	0	Back	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	-0.08	0.189	0.190
	LTE Band 41	20M	QPSK	1	49	Left Side	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	0.03	0.038	0.039
	LTE Band 41	20M	QPSK	50	0	Left Side	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	0.08	0.031	0.031
	LTE Band 41	20M	QPSK	1	49	Right Side	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	0.05	0.249	0.255
	LTE Band 41	20M	QPSK	50	0	Right Side	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	-0.11	0.210	0.211
	LTE Band 41	20M	QPSK	1	49	Bottom Side	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.12	0.594	0.609
25	LTE Band 41	20M	QPSK	1	49	Bottom Side	10mm	40340	2565	23.52	24.00	1.117	62.9	1.006	0.02	0.623	0.700
	LTE Band 41	20M	QPSK	1	99	Bottom Side	10mm	40600	2591	23.82	24.00	1.042	62.9	1.006	0.12	0.601	0.630
	LTE Band 41	20M	QPSK	1	49	Bottom Side	10mm	41140	2645	23.45	24.00	1.135	62.9	1.006	-0.12	0.580	0.662
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	-0.08	0.464	0.467

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	0.13	0.012	0.013
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	-0.14	0.035	0.037
26	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	1	2412	15.70	16.00	1.072	97.52	1.025	0.09	0.062	0.068
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	11	2462	15.70	16.00	1.072	97.52	1.025	-0.05	0.030	0.033
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	0.15	0.032	0.034
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	-0.17	0.002	0.002
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	0.06	0.015	0.018
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.14	0.132	0.159
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.15	0.144	0.173
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	52	5260	12.80	13.00	1.047	86.94	1.150	-0.18	0.137	0.165
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	60	5300	12.80	13.00	1.047	86.94	1.150	0.07	0.157	0.189
27	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	64	5320	12.70	13.00	1.072	86.94	1.150	-0.12	0.160	0.197
	WLAN5GHz	802.11a 6Mbps	Top Side	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.03	0.025	0.030
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	-0.08	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.11	0.056	0.066
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.14	0.064	0.075
28	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	100	5500	12.60	13.00	1.096	86.94	1.150	0.17	0.092	0.116
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	124	5620	12.90	13.00	1.023	86.94	1.150	0.09	0.053	0.062
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	132	5660	12.90	13.00	1.023	86.94	1.150	0.1	0.060	0.071
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	140	5700	12.90	13.00	1.023	86.94	1.150	0.12	0.044	0.052
	WLAN5GHz	802.11a 6Mbps	Top Side	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	-0.13	0.004	0.005
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	-0.15	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	0.09	0.034	0.040
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	0.16	0.038	0.045
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	149	5745	12.90	13.00	1.023	86.94	1.150	-0.01	0.055	0.065
29	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	Ant 1	165	5825	12.80	13.00	1.047	86.94	1.150	0.14	0.078	0.094
	WLAN5GHz	802.11a 6Mbps	Top Side	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	0.05	0.001	0.001



<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.03	0.005	0.005
	Bluetooth	1Mbps	Back	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.15	0.015	0.017
	Bluetooth	1Mbps	Back	10mm	Ant 1	0	2402	12.62	14.00	1.374	77.13	1.080	-0.02	0.015	0.022
	Bluetooth	1Mbps	Back	10mm	Ant 1	78	2480	12.76	14.00	1.331	77.13	1.080	-0.04	0.016	0.023
	Bluetooth	1Mbps	Right Side	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.09	0.005	0.006
	Bluetooth	1Mbps	Top Side	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.02	0.002	0.002
	Bluetooth	1Mbps	Front	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.09	0.006	0.008
	Bluetooth	1Mbps	Back	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.14	0.005	0.006
	Bluetooth	1Mbps	Left Side	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	-0.14	0.001	0.001
	Bluetooth	1Mbps	Right Side	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0	0.002	0.003
	Bluetooth	1Mbps	Top Side	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	-0.03	0.018	0.022
30	Bluetooth	1Mbps	Top Side	10mm	Ant 2	0	2402	7.14	9.00	1.535	77.13	1.080	-0.12	0.015	0.025
	Bluetooth	1Mbps	Top Side	10mm	Ant 2	78	2480	7.15	9.00	1.531	77.13	1.080	0.17	0.011	0.018

13.3 Body Worn Accessory SAR
<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	GSM850	GPRS (3 Tx slots)	Front	10mm	251	848.8	28.42	28.80	1.091	0.01	0.419	0.457
31	GSM850	GPRS (3 Tx slots)	Front	10mm	128	824.2	28.25	28.80	1.135	0	0.476	0.540
	GSM850	GPRS (3 Tx slots)	Front	10mm	189	836.4	28.34	28.80	1.112	-0.12	0.467	0.519
	GSM850	GPRS (3 Tx slots)	Back	10mm	251	848.8	28.42	28.80	1.091	-0.01	0.382	0.417
	GSM1900	GPRS (3 Tx slots)	Front	10mm	512	1850.2	25.44	25.80	1.086	-0.14	0.252	0.274
	GSM1900	GPRS (3 Tx slots)	Back	10mm	512	1850.2	25.44	25.80	1.086	0.01	0.289	0.314
	GSM1900	GPRS (3 Tx slots)	Back	10mm	661	1880	25.33	25.80	1.114	0.01	0.179	0.199
32	GSM1900	GPRS (3 Tx slots)	Back	10mm	810	1909.8	25.20	25.80	1.148	0	0.274	0.315

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
33	WCDMA II	RMC 12.2Kbps	Front	10mm	9538	1907.6	23.32	24.00	1.169	0.03	1.010	1.181
	WCDMA II	RMC 12.2Kbps	Front	10mm	9262	1852.4	23.23	24.00	1.194	-0.08	0.585	0.698
	WCDMA II	RMC 12.2Kbps	Front	10mm	9400	1880	23.12	24.00	1.225	-0.03	0.744	0.911
	WCDMA II	RMC 12.2Kbps	Back	10mm	9538	1907.6	23.32	24.00	1.169	-0.1	0.537	0.628
	WCDMA V	RMC 12.2Kbps	Front	10mm	4233	846.6	23.12	24.00	1.225	-0.11	0.424	0.519
34	WCDMA V	RMC 12.2Kbps	Front	10mm	4132	826.4	22.93	24.00	1.279	0.03	0.466	0.596
	WCDMA V	RMC 12.2Kbps	Front	10mm	4182	836.4	23.00	24.00	1.259	0.15	0.424	0.534
	WCDMA V	RMC 12.2Kbps	Back	10mm	4233	846.6	23.12	24.00	1.225	-0.02	0.378	0.463

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
35	LTE Band 2	20M	QPSK	1	49	Front	10mm	19100	1900	23.43	24.00	1.140	-0.04	0.765	0.872
	LTE Band 2	20M	QPSK	1	49	Front	10mm	18700	1860	23.18	24.00	1.208	-0.06	0.580	0.701
	LTE Band 2	20M	QPSK	1	99	Front	10mm	18900	1880	23.18	24.00	1.208	-0.02	0.685	0.827
	LTE Band 2	20M	QPSK	50	50	Front	10mm	19100	1900	22.17	23.00	1.211	-0.02	0.629	0.761
	LTE Band 2	20M	QPSK	100	0	Front	10mm	19100	1900	22.31	23.00	1.172	-0.05	0.615	0.721
	LTE Band 2	20M	QPSK	1	49	Back	10mm	19100	1900	23.43	24.00	1.140	-0.18	0.475	0.542
	LTE Band 2	20M	QPSK	50	50	Back	10mm	19100	1900	22.17	23.00	1.211	0.09	0.352	0.426
36	LTE Band 4	20M	QPSK	1	49	Front	10mm	20175	1732.5	24.00	24.00	1.000	-0.05	0.392	0.392
	LTE Band 4	20M	QPSK	50	50	Front	10mm	20175	1732.5	22.62	23.00	1.091	-0.09	0.332	0.362
	LTE Band 4	20M	QPSK	1	49	Back	10mm	20175	1732.5	24.00	24.00	1.000	0.03	0.243	0.243
	LTE Band 4	20M	QPSK	50	50	Back	10mm	20175	1732.5	22.62	23.00	1.091	0.04	0.199	0.217
37	LTE Band 5	10M	QPSK	1	25	Front	10mm	20525	836.5	22.60	24.00	1.380	-0.01	0.380	0.525
	LTE Band 5	10M	QPSK	25	12	Front	10mm	20525	836.5	21.70	23.00	1.349	0.04	0.311	0.420
	LTE Band 5	10M	QPSK	1	25	Back	10mm	20525	836.5	22.60	24.00	1.380	-0.06	0.340	0.469
	LTE Band 5	10M	QPSK	25	12	Back	10mm	20525	836.5	21.70	23.00	1.349	0.02	0.288	0.389
	LTE Band 7	20M	QPSK	1	49	Front	10mm	20850	2510	23.98	24.00	1.005	0.19	1.070	1.075
	LTE Band 7	20M	QPSK	1	49	Front	10mm	21100	2535	23.90	24.00	1.023	-0.18	1.100	1.126
38	LTE Band 7	20M	QPSK	1	49	Front	10mm	21350	2560	23.67	24.00	1.079	-0.13	1.110	1.198
	LTE Band 7	20M	QPSK	50	0	Front	10mm	20850	2510	22.99	23.00	1.002	-0.08	0.970	0.972
	LTE Band 7	20M	QPSK	50	24	Front	10mm	21100	2535	22.83	23.00	1.040	0.01	0.996	1.036
	LTE Band 7	20M	QPSK	50	0	Front	10mm	21350	2560	22.70	23.00	1.072	-0.1	1.020	1.093
	LTE Band 7	20M	QPSK	100	0	Front	10mm	20850	2510	22.81	23.00	1.045	-0.1	0.973	1.017
	LTE Band 7	20M	QPSK	1	49	Back	10mm	20850	2510	23.98	24.00	1.005	0.11	0.565	0.568
	LTE Band 7	20M	QPSK	50	0	Back	10mm	20850	2510	22.99	23.00	1.002	-0.05	0.476	0.477
39	LTE Band 12	10M	QPSK	1	25	Front	10mm	23095	707.5	22.91	24.00	1.285	-0.12	0.263	0.338
	LTE Band 12	10M	QPSK	25	0	Front	10mm	23095	707.5	21.95	23.00	1.274	-0.03	0.215	0.274
	LTE Band 12	10M	QPSK	1	25	Back	10mm	23095	707.5	22.91	24.00	1.285	0.02	0.234	0.301
	LTE Band 12	10M	QPSK	25	0	Back	10mm	23095	707.5	21.95	23.00	1.274	-0.1	0.191	0.243

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	49	Front	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.09	0.397	0.407
40	LTE Band 41	20M	QPSK	1	49	Front	10mm	40340	2565	23.52	24.00	1.117	62.9	1.006	-0.05	0.520	0.584
	LTE Band 41	20M	QPSK	1	99	Front	10mm	40600	2591	23.82	24.00	1.042	62.9	1.006	0.11	0.418	0.438
	LTE Band 41	20M	QPSK	1	49	Front	10mm	41140	2645	23.45	24.00	1.135	62.9	1.006	-0.09	0.318	0.363
	LTE Band 41	20M	QPSK	50	0	Front	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	0	0.321	0.323
	LTE Band 41	20M	QPSK	1	49	Back	10mm	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.04	0.226	0.232
	LTE Band 41	20M	QPSK	50	0	Back	10mm	40870	2618	23.00	23.00	1.000	62.9	1.006	-0.08	0.189	0.190

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	0.13	0.012	0.013
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	6	2437	15.90	16.00	1.023	97.52	1.025	-0.14	0.035	0.037
41	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	1	2412	15.70	16.00	1.072	97.52	1.025	0.09	0.062	0.068
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1	11	2462	15.70	16.00	1.072	97.52	1.025	-0.05	0.030	0.033
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	0.06	0.015	0.018
42	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	56	5280	12.80	13.00	1.047	86.94	1.150	-0.14	0.132	0.159
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	52	5260	12.80	13.00	1.047	86.94	1.150	-0.11	0.090	0.108
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	60	5300	12.80	13.00	1.047	86.94	1.150	-0.07	0.106	0.128
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	64	5320	12.70	13.00	1.072	86.94	1.150	0.01	0.099	0.122
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	-0.08	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	116	5580	12.90	13.00	1.023	86.94	1.150	0.11	0.056	0.066
43	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	100	5500	12.60	13.00	1.096	86.94	1.150	-0.03	0.077	0.097
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	124	5620	12.90	13.00	1.023	86.94	1.150	0.05	0.046	0.054
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	132	5660	12.90	13.00	1.023	86.94	1.150	-0.06	0.045	0.053
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	140	5700	12.90	13.00	1.023	86.94	1.150	-0.18	0.037	0.044
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	-0.15	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	157	5785	12.90	13.00	1.023	86.94	1.150	0.09	0.034	0.040
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	149	5745	12.90	13.00	1.023	86.94	1.150	-0.09	0.049	0.058
44	WLAN5GHz	802.11a 6Mbps	Back	10mm	Ant 1	165	5825	12.80	13.00	1.047	86.94	1.150	0.14	0.061	0.073

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.03	0.005	0.005
	Bluetooth	1Mbps	Back	10mm	Ant 1	39	2441	13.76	14.00	1.057	77.13	1.080	-0.15	0.015	0.017
	Bluetooth	1Mbps	Back	10mm	Ant 1	0	2402	12.62	14.00	1.374	77.13	1.080	-0.02	0.015	0.022
45	Bluetooth	1Mbps	Back	10mm	Ant 1	78	2480	12.76	14.00	1.331	77.13	1.080	-0.04	0.016	0.023
	Bluetooth	1Mbps	Front	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.09	0.006	0.008
	Bluetooth	1Mbps	Back	10mm	Ant 2	39	2441	8.50	9.00	1.122	77.13	1.080	0.14	0.005	0.006
	Bluetooth	1Mbps	Back	10mm	Ant 2	0	2402	7.14	9.00	1.535	77.13	1.080	0.14	0.006	0.010
	Bluetooth	1Mbps	Back	10mm	Ant 2	78	2480	7.15	9.00	1.531	77.13	1.080	0.1	0.004	0.007

13.4 Extremity SAR
<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	GSM850	GPRS (3 Tx slots)	Back	0mm	Holster	251	848.8	28.42	28.80	1.091	0.07	0.350	0.382
46	GSM850	GPRS (3 Tx slots)	Back	0mm	Holster	128	824.2	28.25	28.80	1.135	0.05	0.437	0.496
	GSM850	GPRS (3 Tx slots)	Back	0mm	Holster	189	836.4	28.34	28.80	1.112	0.07	0.426	0.474
	GSM1900	GPRS (3 Tx slots)	Back	0mm	Holster	512	1850.2	25.44	25.80	1.086	0.08	0.127	0.138
	GSM1900	GPRS (3 Tx slots)	Back	0mm	Holster	661	1880	25.33	25.80	1.114	0.07	0.182	0.203
47	GSM1900	GPRS (3 Tx slots)	Back	0mm	Holster	810	1909.8	25.20	25.80	1.148	0.02	0.270	0.310

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
48	WCDMA II	RMC 12.2Kbps	Back	0mm	Holster	9538	1907.6	23.32	24.00	1.169	-0.19	0.589	0.689
	WCDMA II	RMC 12.2Kbps	Back	0mm	Holster	9262	1852.4	23.23	24.00	1.194	0.13	0.409	0.488
	WCDMA II	RMC 12.2Kbps	Back	0mm	Holster	9400	1880	23.12	24.00	1.225	0.04	0.530	0.649
49	WCDMA V	RMC 12.2Kbps	Back	0mm	Holster	4132	826.4	22.93	24.00	1.279	-0.07	0.408	0.522
	WCDMA V	RMC 12.2Kbps	Back	0mm	Holster	4182	836.4	23.00	24.00	1.259	0.02	0.397	0.500
	WCDMA V	RMC 12.2Kbps	Back	0mm	Holster	4233	846.6	23.12	24.00	1.225	-0.17	0.386	0.473

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Back	0mm	Holster	19100	1900	23.43	24.00	1.140	-0.06	0.464	0.529
	LTE Band 2	20M	QPSK	1	49	Back	0mm	Holster	18700	1860	23.18	24.00	1.208	-0.09	0.357	0.431
50	LTE Band 2	20M	QPSK	1	99	Back	0mm	Holster	18900	1880	23.18	24.00	1.208	-0.04	0.442	0.534
	LTE Band 2	20M	QPSK	50	50	Back	0mm	Holster	19100	1900	22.17	23.00	1.211	0	0.401	0.485
51	LTE Band 4	20M	QPSK	1	49	Back	0mm	Holster	20175	1732.5	24.00	24.00	1.000	-0.16	0.224	0.224
	LTE Band 4	20M	QPSK	50	50	Back	0mm	Holster	20175	1732.5	22.62	23.00	1.091	0.07	0.186	0.203
52	LTE Band 5	10M	QPSK	1	25	Back	0mm	Holster	20525	836.5	22.60	24.00	1.380	0.14	0.319	0.440
	LTE Band 5	10M	QPSK	25	12	Back	0mm	Holster	20525	836.5	21.70	23.00	1.349	0.07	0.266	0.359
	LTE Band 7	20M	QPSK	1	49	Back	0mm	Holster	20850	2510	23.98	24.00	1.005	-0.07	0.468	0.470
	LTE Band 7	20M	QPSK	1	49	Back	0mm	Holster	21100	2535	23.90	24.00	1.023	0	0.499	0.511
53	LTE Band 7	20M	QPSK	1	49	Back	0mm	Holster	21350	2560	23.67	24.00	1.079	-0.06	0.516	0.557
	LTE Band 7	20M	QPSK	50	0	Back	0mm	Holster	20850	2510	22.99	23.00	1.002	-0.03	0.385	0.386
54	LTE Band 12	10M	QPSK	1	25	Back	0mm	Holster	23095	707.5	22.91	24.00	1.285	0.18	0.227	0.292
	LTE Band 12	10M	QPSK	25	0	Back	0mm	Holster	23095	707.5	21.95	23.00	1.274	0.13	0.194	0.247

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	49	Back	0mm	Holster	40870	2618	23.92	24.00	1.019	62.9	1.006	-0.03	0.287	0.294
55	LTE Band 41	20M	QPSK	1	49	Back	0mm	Holster	40340	2565	23.52	24.00	1.117	62.9	1.006	0.17	0.283	0.318
	LTE Band 41	20M	QPSK	1	99	Back	0mm	Holster	40600	2591	23.82	24.00	1.042	62.9	1.006	-0.12	0.301	0.316
	LTE Band 41	20M	QPSK	1	49	Back	0mm	Holster	41140	2645	23.45	24.00	1.135	62.9	1.006	-0.18	0.246	0.281
	LTE Band 41	20M	QPSK	50	0	Back	0mm	Holster	40870	2618	23.00	23.00	1.000	62.9	1.006	-0.03	0.227	0.228

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1	Holster	6	2437	15.90	16.00	1.023	97.52	1.025	0.11	0.043	0.045
56	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1	Holster	1	2412	15.70	16.00	1.072	97.52	1.025	0.1	0.053	0.058
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1	Holster	11	2462	15.70	16.00	1.072	97.52	1.025	-0.1	0.047	0.052
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	56	5280	12.80	13.00	1.047	86.94	1.150	0.05	0.090	0.108
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	52	5260	12.80	13.00	1.047	86.94	1.150	0.08	0.084	0.101
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	60	5300	12.80	13.00	1.047	86.94	1.150	0.02	0.095	0.114
57	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	64	5320	12.70	13.00	1.072	86.94	1.150	0.04	0.099	0.122
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	116	5580	12.90	13.00	1.023	86.94	1.150	-0.17	0.050	0.059
58	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	100	5500	12.60	13.00	1.096	86.94	1.150	-0.11	0.059	0.074
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	124	5620	12.90	13.00	1.023	86.94	1.150	0.06	0.034	0.040
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	132	5660	12.90	13.00	1.023	86.94	1.150	0.13	0.032	0.038
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	140	5700	12.90	13.00	1.023	86.94	1.150	0.11	0.031	0.036
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	157	5785	12.90	13.00	1.023	86.94	1.150	-0.13	0.031	0.036
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	149	5745	12.90	13.00	1.023	86.94	1.150	0.11	0.037	0.044
59	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1	Holster	165	5825	12.80	13.00	1.047	86.94	1.150	0.09	0.051	0.061

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Holster	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	Bluetooth	1Mbps	Back	0mm	Ant 1	Holster	39	2441	13.76	14.00	1.057	77.13	1.080	0.18	0.012	0.014
	Bluetooth	1Mbps	Back	0mm	Ant 1	Holster	0	2402	12.62	14.00	1.374	77.13	1.080	0.01	0.009	0.014
60	Bluetooth	1Mbps	Back	0mm	Ant 1	Holster	78	2480	12.76	14.00	1.331	77.13	1.080	0.15	0.011	0.016
	Bluetooth	1Mbps	Back	0mm	Ant 2	Holster	39	2441	8.50	9.00	1.122	77.13	1.080	0.16	0.004	0.005
	Bluetooth	1Mbps	Back	0mm	Ant 2	Holster	0	2402	7.14	9.00	1.535	77.13	1.080	0.15	0.004	0.006
	Bluetooth	1Mbps	Back	0mm	Ant 2	Holster	78	2480	7.15	9.00	1.531	77.13	1.080	-0.13	0.003	0.004



13.5 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 4	20M	QPSK	1	49	Left Cheek	0mm	OFF	20175	1732.5	24.00	24.00	1.000	0.08	1.130		1.130
2nd	LTE Band 4	20M	QPSK	1	49	Left Cheek	0mm	OFF	20175	1732.5	24.00	24.00	1.000	-0.05	1.060	1.07	1.060
1st	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	40340	2565	22.45	23.00	1.135	-0.13	1.210		1.373
2nd	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	ON	40340	2565	22.45	23.00	1.135	-0.09	1.160	1.04	1.317
1st	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	-	19100	1900	23.43	24.00	1.140	0.05	1.050		1.197
2nd	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	-	19100	1900	23.43	24.00	1.140	0.19	0.920	1.14	1.049

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/kg}$, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

14. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product Specific
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		Yes
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes
5.	GSM Voice + Bluetooth Ant 1	Yes	Yes		Yes
6.	GPRS/EDGE + Bluetooth Ant 1	Yes	Yes	Yes	Yes
7.	WCDMA+ Bluetooth Ant 1	Yes	Yes	Yes	Yes
8.	LTE + Bluetooth Ant 1	Yes	Yes	Yes	Yes
9.	GSM Voice + Bluetooth Ant 2	Yes	Yes		Yes
10.	GPRS/EDGE + Bluetooth Ant 2	Yes	Yes	Yes	Yes
11.	WCDMA+ Bluetooth Ant 2	Yes	Yes	Yes	Yes
12.	LTE + Bluetooth Ant 2	Yes	Yes	Yes	Yes
13.	GSM Voice + WLAN5GHz	Yes	Yes		Yes
14.	GPRS/EDGE + WLAN5GHz	Yes	Yes	Yes	Yes
15.	WCDMA + WLAN5GHz	Yes	Yes	Yes	Yes
16.	LTE + WLAN5GHz	Yes	Yes	Yes	Yes

General Note:

1. This device WLAN 2.4GHz / 5.3GHz / 5.5GHz / 5.8GHz supports Hotspot operation and Bluetooth support tethering applications.
2. WLAN and Bluetooth share the same antenna 1, and cannot transmit simultaneously.
3. All licensed modes share the same antenna part and cannot transmit simultaneously
4. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
5. The Scaled SAR summation is calculated based on the same configuration and test position.
6. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

14.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1	Bluetooth Ant 2				
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)				
GSM	GSM850	Right Cheek	0.575	0.012	0.075	0.004	0.025	0.587	0.650	0.579	0.600
		Right Tilted	0.270	0.020	0.066	0.006	0.030	0.290	0.336	0.276	0.300
		Left Cheek	0.756	0.058	0.129	0.022	0.029	0.814	0.885	0.778	0.785
		Left Tilted	0.284	0.012	0.092	0.007	0.040	0.296	0.376	0.291	0.324
	GSM1900	Right Cheek	1.142	0.012	0.075	0.004	0.025	1.154	1.217	1.146	1.167
		Right Tilted	0.125	0.020	0.066	0.006	0.030	0.145	0.191	0.131	0.155
		Left Cheek	0.435	0.058	0.129	0.022	0.029	0.493	0.564	0.457	0.464
		Left Tilted	0.112	0.012	0.092	0.007	0.040	0.124	0.204	0.119	0.152
WCDMA	WCDMA II	Right Cheek	1.092	0.012	0.075	0.004	0.025	1.104	1.167	1.096	1.117
		Right Tilted	0.247	0.020	0.066	0.006	0.030	0.267	0.313	0.253	0.277
		Left Cheek	0.773	0.058	0.129	0.022	0.029	0.831	0.902	0.795	0.802
		Left Tilted	0.197	0.012	0.092	0.007	0.040	0.209	0.289	0.204	0.237
	WCDMA V	Right Cheek	0.644	0.012	0.075	0.004	0.025	0.656	0.719	0.648	0.669
		Right Tilted	0.250	0.020	0.066	0.006	0.030	0.270	0.316	0.256	0.280
		Left Cheek	0.789	0.058	0.129	0.022	0.029	0.847	0.918	0.811	0.818
		Left Tilted	0.273	0.012	0.092	0.007	0.040	0.285	0.365	0.280	0.313
LTE	LTE Band 2	Right Cheek	1.379	0.012	0.075	0.004	0.025	1.391	1.454	1.383	1.404
		Right Tilted	0.150	0.020	0.066	0.006	0.030	0.170	0.216	0.156	0.180
		Left Cheek	0.946	0.058	0.129	0.022	0.029	1.004	1.075	0.968	0.975
		Left Tilted	0.127	0.012	0.092	0.007	0.040	0.139	0.219	0.134	0.167
	LTE Band 4	Right Cheek	0.682	0.012	0.075	0.004	0.025	0.694	0.757	0.686	0.707
		Right Tilted	0.286	0.020	0.066	0.006	0.030	0.306	0.352	0.292	0.316
		Left Cheek	1.130	0.058	0.129	0.022	0.029	1.188	1.259	1.152	1.159
		Left Tilted	0.284	0.012	0.092	0.007	0.040	0.296	0.376	0.291	0.324
	LTE Band 5	Right Cheek	0.694	0.012	0.075	0.004	0.025	0.706	0.769	0.698	0.719
		Right Tilted	0.352	0.020	0.066	0.006	0.030	0.372	0.418	0.358	0.382
		Left Cheek	0.783	0.058	0.129	0.022	0.029	0.841	0.912	0.805	0.812
		Left Tilted	0.326	0.012	0.092	0.007	0.040	0.338	0.418	0.333	0.366
	LTE Band 7	Right Cheek	1.346	0.012	0.075	0.004	0.025	1.358	1.421	1.350	1.371
		Right Tilted	0.278	0.020	0.066	0.006	0.030	0.298	0.344	0.284	0.308
		Left Cheek	0.796	0.058	0.129	0.022	0.029	0.854	0.925	0.818	0.825
		Left Tilted	0.323	0.012	0.092	0.007	0.040	0.335	0.415	0.330	0.363
	LTE Band 12	Right Cheek	0.609	0.012	0.075	0.004	0.025	0.621	0.684	0.613	0.634
		Right Tilted	0.206	0.020	0.066	0.006	0.030	0.226	0.272	0.212	0.236
		Left Cheek	0.631	0.058	0.129	0.022	0.029	0.689	0.760	0.653	0.660
		Left Tilted	0.190	0.012	0.092	0.007	0.040	0.202	0.282	0.197	0.230
	LTE Band 41	Right Cheek	1.373	0.012	0.075	0.004	0.025	1.385	1.448	1.377	1.398
		Right Tilted	0.300	0.020	0.066	0.006	0.030	0.320	0.366	0.306	0.330
		Left Cheek	0.770	0.058	0.129	0.022	0.029	0.828	0.899	0.792	0.799
		Left Tilted	0.311	0.012	0.092	0.007	0.040	0.323	0.403	0.318	0.351

14.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1	Bluetooth Ant 2				
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)				
GSM	GSM850	Front	0.540	0.013	0.018	0.005	0.008	0.553	0.558	0.545	0.548
		Back	0.417	0.068	0.159	0.023	0.006	0.485	0.576	0.440	0.423
		Left side	0.349				0.001	0.349	0.349	0.349	0.350
		Right side	0.271	0.034	0.197	0.006	0.003	0.305	0.468	0.277	0.274
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.180					0.180	0.180	0.180	0.180
	GSM1900	Front	0.274	0.013	0.018	0.005	0.008	0.287	0.292	0.279	0.282
		Back	0.314	0.068	0.159	0.023	0.006	0.382	0.473	0.337	0.320
		Left side	0.062				0.001	0.062	0.062	0.062	0.063
		Right side	0.098	0.034	0.197	0.006	0.003	0.132	0.295	0.104	0.101
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.711					0.711	0.711	0.711	0.711
WCDMA	WCDMA II	Front	1.181	0.013	0.018	0.005	0.008	1.194	1.199	1.186	1.189
		Back	0.628	0.068	0.159	0.023	0.006	0.696	0.787	0.651	0.634
		Left side	0.202				0.001	0.202	0.202	0.202	0.203
		Right side	0.410	0.034	0.197	0.006	0.003	0.444	0.607	0.416	0.413
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	1.193					1.193	1.193	1.193	1.193
	WCDMA V	Front	0.596	0.013	0.018	0.005	0.008	0.609	0.614	0.601	0.604
		Back	0.463	0.068	0.159	0.023	0.006	0.531	0.622	0.486	0.469
		Left side	0.396				0.001	0.396	0.396	0.396	0.397
		Right side	0.249	0.034	0.197	0.006	0.003	0.283	0.446	0.255	0.252
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.164					0.164	0.164	0.164	0.164
LTE	LTE Band 2	Front	0.872	0.013	0.018	0.005	0.008	0.885	0.890	0.877	0.880
		Back	0.542	0.068	0.159	0.023	0.006	0.610	0.701	0.565	0.548
		Left side	0.162				0.001	0.162	0.162	0.162	0.163
		Right side	0.335	0.034	0.197	0.006	0.003	0.369	0.532	0.341	0.338
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	1.197					1.197	1.197	1.197	1.197
	LTE Band 4	Front	0.392	0.013	0.018	0.005	0.008	0.405	0.410	0.397	0.400
		Back	0.243	0.068	0.159	0.023	0.006	0.311	0.402	0.266	0.249
		Left side	0.295				0.001	0.295	0.295	0.295	0.296
		Right side	0.122	0.034	0.197	0.006	0.003	0.156	0.319	0.128	0.125
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.482					0.482	0.482	0.482	0.482
	LTE Band 5	Front	0.525	0.013	0.018	0.005	0.008	0.538	0.543	0.530	0.533
		Back	0.469	0.068	0.159	0.023	0.006	0.537	0.628	0.492	0.475
		Left side	0.432				0.001	0.432	0.432	0.432	0.433
		Right side	0.290	0.034	0.197	0.006	0.003	0.324	0.487	0.296	0.293
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.192					0.192	0.192	0.192	0.192
	LTE Band 7	Front	1.198	0.013	0.018	0.005	0.008	1.211	1.216	1.203	1.206
		Back	0.568	0.068	0.159	0.023	0.006	0.636	0.727	0.591	0.574
		Left side	0.146				0.001	0.146	0.146	0.146	0.147
		Right side	0.712	0.034	0.197	0.006	0.003	0.746	0.909	0.718	0.715
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	1.176					1.176	1.176	1.176	1.176



FCC SAR TEST REPORT

Report No. : FA942441

WWAN Band		Exposure Position	1	2	3	4	5	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1	Bluetooth Ant 2				
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)				
LTE	LTE Band 12	Front	0.338	0.013	0.018	0.005	0.008	0.351	0.356	0.343	0.346
		Back	0.301	0.068	0.159	0.023	0.006	0.369	0.460	0.324	0.307
		Left side	0.176				0.001	0.176	0.176	0.176	0.177
		Right side	0.135	0.034	0.197	0.006	0.003	0.169	0.332	0.141	0.138
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.215					0.215	0.215	0.215	0.215
	LTE Band 41	Front	0.407	0.013	0.018	0.005	0.008	0.420	0.425	0.412	0.415
		Back	0.232	0.068	0.159	0.023	0.006	0.300	0.391	0.255	0.238
		Left side	0.039				0.001	0.039	0.039	0.039	0.040
		Right side	0.255	0.034	0.197	0.006	0.003	0.289	0.452	0.261	0.258
		Top side		0.002	0.030	0.002	0.025	0.002	0.030	0.002	0.025
		Bottom side	0.700					0.700	0.700	0.700	0.700

14.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1	Bluetooth Ant 2				
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)				
GSM	GSM850	Front	0.540	0.013	0.018	0.005	0.008	0.553	0.558	0.545	0.548
		Back	0.417	0.068	0.159	0.023	0.010	0.485	0.576	0.440	0.427
	GSM1900	Front	0.274	0.013	0.018	0.005	0.008	0.287	0.292	0.279	0.282
		Back	0.315	0.068	0.159	0.023	0.010	0.383	0.474	0.338	0.325
WCDMA	WCDMA II	Front	1.181	0.013	0.018	0.005	0.008	1.194	1.199	1.186	1.189
		Back	0.628	0.068	0.159	0.023	0.010	0.696	0.787	0.651	0.638
	WCDMA V	Front	0.596	0.013	0.018	0.005	0.008	0.609	0.614	0.601	0.604
		Back	0.463	0.068	0.159	0.023	0.010	0.531	0.622	0.486	0.473
LTE	LTE Band 2	Front	0.872	0.013	0.018	0.005	0.008	0.885	0.890	0.877	0.880
		Back	0.542	0.068	0.159	0.023	0.010	0.610	0.701	0.565	0.552
	LTE Band 4	Front	0.392	0.013	0.018	0.005	0.008	0.405	0.410	0.397	0.400
		Back	0.243	0.068	0.159	0.023	0.010	0.311	0.402	0.266	0.253
	LTE Band 5	Front	0.525	0.013	0.018	0.005	0.008	0.538	0.543	0.530	0.533
		Back	0.469	0.068	0.159	0.023	0.010	0.537	0.628	0.492	0.479
	LTE Band 7	Front	1.198	0.013	0.018	0.005	0.008	1.211	1.216	1.203	1.206
		Back	0.568	0.068	0.159	0.023	0.010	0.636	0.727	0.591	0.578
	LTE Band 12	Front	0.338	0.013	0.018	0.005	0.008	0.351	0.356	0.343	0.346
		Back	0.301	0.068	0.159	0.023	0.010	0.369	0.460	0.324	0.311
	LTE Band 41	Front	0.584	0.013	0.018	0.005	0.008	0.597	0.602	0.589	0.592
		Back	0.232	0.068	0.159	0.023	0.010	0.300	0.391	0.255	0.242

14.4 Extremity Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)	1+4 Summed 10g SAR (W/kg)	1+5 Summed 10g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1	Bluetooth Ant 2				
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)				
GSM	GSM850	Back with Holster	0.496	0.058	0.122	0.016	0.006	0.554	0.618	0.512	0.502
	GSM1900	Back with Holster	0.310	0.058	0.122	0.016	0.006	0.368	0.432	0.326	0.316
WCDMA	WCDMA II	Back with Holster	0.689	0.058	0.122	0.016	0.006	0.747	0.811	0.705	0.695
	WCDMA V	Back with Holster	0.522	0.058	0.122	0.016	0.006	0.580	0.644	0.538	0.528
LTE	LTE Band 2	Back with Holster	0.534	0.058	0.122	0.016	0.006	0.592	0.656	0.550	0.540
	LTE Band 4	Back with Holster	0.224	0.058	0.122	0.016	0.006	0.282	0.346	0.240	0.230
	LTE Band 5	Back with Holster	0.440	0.058	0.122	0.016	0.006	0.498	0.562	0.456	0.446
	LTE Band 7	Back with Holster	0.557	0.058	0.122	0.016	0.006	0.615	0.679	0.573	0.563
	LTE Band 12	Back with Holster	0.292	0.058	0.122	0.016	0.006	0.350	0.414	0.308	0.298
	LTE Band 41	Back with Holster	0.318	0.058	0.122	0.016	0.006	0.376	0.440	0.334	0.324

Test Engineer : Jay Jian and Willy Yu

15. Uncertainty Assessment

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

16. 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 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [9] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", 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.