



No.24T04Z200327-010



SAR TEST REPORT

No. 24T04Z200327-010

For

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE Tablet with Bluetooth,WLAN

Model Name: SM-X117U

with

Hardware Version: REV1.0

Software Version: X117U.001

FCC ID: ZCASM117U

Issued Date: 2025-02-18

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
24T04Z200327-010	Rev.0	2025-02-17	Initial creation of test report
24T04Z200327-010	Rev.1	2025-02-18	Update the information for section 13 Update the information for section 14

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1 Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

1.3. Testing Environment

Normal Temperature: 18-25°C

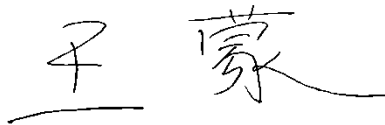
Relative Humidity: 30-70%

1.4. Project data

Testing Start Date: 2025-01-07

Testing End Date: 2025-02-16

1.5. Signature



Wang Meng
(Prepared this test report)



Lin Jun
(Reviewed this test report)



Qi Dianyuan
Deputy Director of the laboratory
(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Samsung Electronics Co., Ltd. Multi-band GSM/WCDMA/LTE Tablet with Bluetooth,WLAN SM-X117U are as follows:

Table 2.1: Highest Reported SAR (1g)

Mode		Antenna	Body SAR 1g (W/kg)	Equipment Class
WCDMA	WCDMA 1900	3	0.65	
	WCDMA 850	3	0.82	
LTE	LTE Band 2	3	0.70	
	LTE Band 4	3	0.59	
	LTE Band 5	3	0.75	
	LTE Band 7	2	1.30	
	LTE Band 12	3	0.65	
	LTE Band 13	3	0.54	
	LTE Band 66	3	0.71	
WLAN 2.4 GHz		6	0.19	DTS
WLAN 5 GHz		6	0.49	NII
BT		6	<0.01	DSS

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 0/13/15/17/18/20/27mm between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report. The highest reported SAR value is obtained at the case of **(Table 2.1)**, and the values are:

Body: 1.30 W/kg(1g)

Table 2.2: The sum of SAR values for Main antenna + WIFI+BT

	Position	Main antenna	WiFi	BT	Sum
Highest SAR value for Body	Rear 0mm	0.82 WCDMA850	0.49 (WIFI 5G)	<0.01	1.31

According to the above tables, the highest sum of reported SAR values is **1.31 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

Conclusion:

According to the above tables, the sum of reported SAR values is <1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

3 Client Information

3.1 Applicant Information

Company Name:	Samsung Electronics Co., Ltd.
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3.2 Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
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Telephone:	+82 - 10 - 2722 - 4159
Fax	/

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Multi-band GSM/WCDMA/LTE Tablet with Bluetooth,WLAN
Model name:	SM-X117U
Tested Band:	WCDMA B4/5 LTE Band2/4/5/7/12/13/66 BT, Wi-Fi(2.4G), Wi-Fi(5G)
Tx Frequency:	824–849 MHz (WCDMA 850 Band V)
	1850–1910 MHz (WCDMA1900 Band II)
	1850 – 1910 MHz(LTE Band 2)
	1710 – 1755 MHz (LTE Band 4)
	824 – 849 MHz (LTE Band 5)
	2500 – 2570 MHz(LTE Band 7)
	699 – 716 MHz (LTE Band 12)
	777 –787 MHz (LTE Band 13)
	1710 – 1780 MHz (LTE Band 66)
	2412 – 2462 MHz (Wi-Fi 2.4G)
	5180 – 5240 MHz (Wi-Fi 5.2G)
	5260 – 5320 MHz (Wi-Fi 5.3G)
	5500 – 5720 MHz (Wi-Fi 5.5G)
	5745 – 5825 MHz (Wi-Fi 5.8G)
	2400 – 2483.5 MHz (Bluetooth)
Test device production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	24T04Z200327UT23a	REV1.0	X117U.001
EUT2	24T04Z200327UT24a	REV1.0	X117U.001
EUT3	24T04Z200327UT25a	REV1.0	X117U.001
EUT4	24T04Z200327UT21a	REV1.0	X117U.001
EUT5	24T04Z200327UT32a	REV1.0	X117U.001

*EUT ID: is used to identify the test sample in the lab internally.

Note: It is performed to test SAR with the EUT1~3 and conducted power with the EUT4~5.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	HQ-6739SDS	/	SCUD (FUJIAN) Electronics Co., Ltd.

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

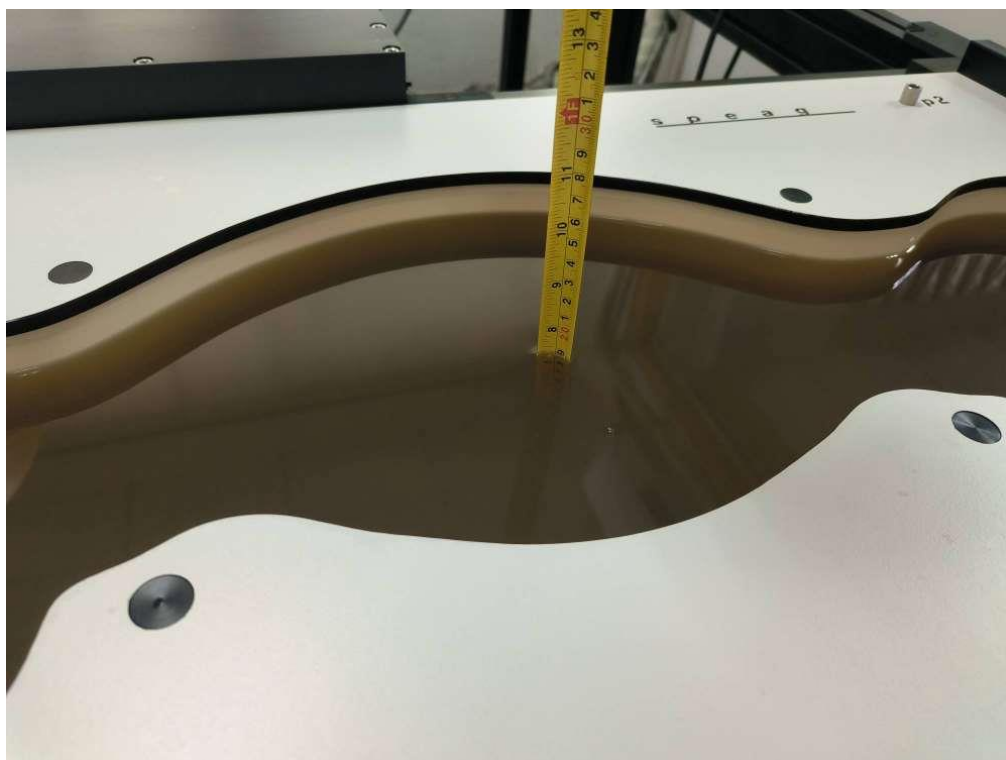
Frequency(MHz)	Liquid Type	Conductivity(σ)	$\pm 5\%$ Range	Permittivity(ϵ)	$\pm 5\%$ Range
750	Head	0.89	0.85~0.93	41.94	39.8~44.0
835	Head	0.90	0.86~0.95	41.5	39.4~43.6
1750	Head	1.37	1.30~1.44	40.08	38.1~42.1
1900	Head	1.40	1.33~1.47	40.0	38.0~42.0
2450	Head	1.80	1.62~1.98	39.2	35.28~43.12
2600	Head	1.96	1.76~2.16	39.01	35.11~42.91
5250	Head	4.71	4.47~4.95	35.93	34.13~37.73
5600	Head	5.07	4.82~5.32	35.53	33.8~37.3
5750	Head	5.22	4.96~5.48	35.36	33.59~37.13

7.2 Dielectric Performance

Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ϵ	Drift (%)	Conductivity σ (S/m)	Drift (%)
2025/1/7	Head	750 MHz	43.23	3.08	0.895	0.56
2025/1/7	Head	835 MHz	42.98	3.57	0.925	2.78
2025/1/19	Head	1750 MHz	41.10	2.54	1.369	-0.07
2025/1/16	Head	1900 MHz	40.77	1.93	1.459	4.21
2025/2/5	Head	2450 MHz	40.00	2.04	1.838	2.11
2025/2/15	Head	2600 MHz	39.77	1.95	1.956	-0.20
2025/2/6	Head	5250 MHz	36.15	0.61	4.621	-1.89
2025/2/6	Head	5600 MHz	35.62	0.25	4.988	-1.62
2025/2/6	Head	5750 MHz	35.34	-0.06	5.209	-0.21

Note: The liquid temperature is 22.0°C

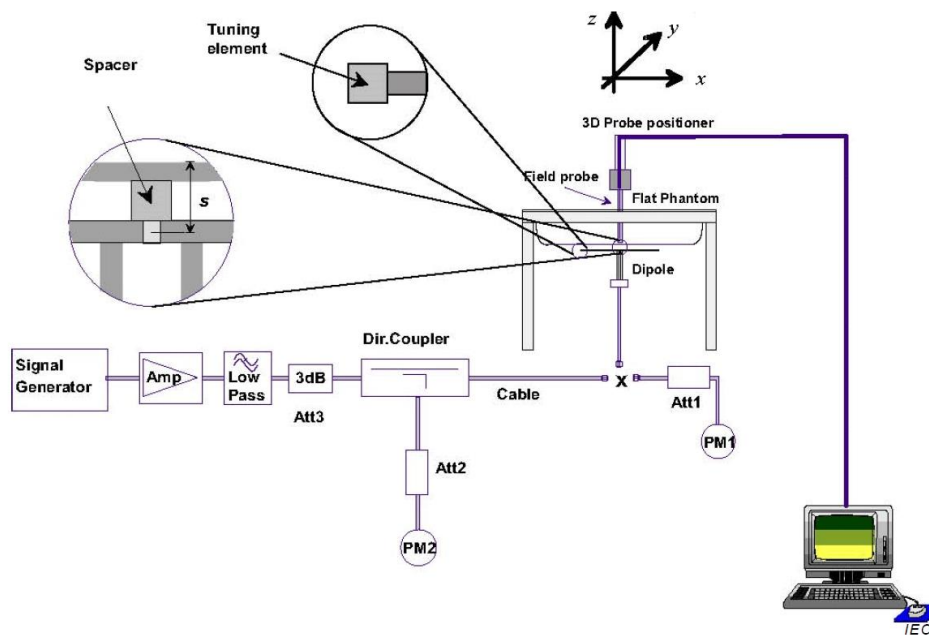


Picture 7-1 Liquid depth in the Flat Phantom

8 System verification

8.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8-1 System Setup for System Evaluation



Picture 8-2 Photo of Dipole Setup

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR.

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2025/1/7	750 MHz	5.53	8.52	5.64	8.44	1.99%	-0.94%
2025/1/7	835 MHz	6.09	9.47	6.48	9.76	6.40%	3.06%
2025/1/19	1750 MHz	19.8	37.2	20.0	36.5	0.81%	-1.94%
2025/1/16	1900 MHz	20.6	39.1	21.2	40.0	2.72%	2.20%
2025/2/5	2450 MHz	24.5	52.2	24.7	52.8	0.90%	1.15%
2025/2/15	2600 MHz	24.8	54.9	25.2	55.2	1.45%	0.55%
2025/2/6	5250 MHz	22.4	78.3	22.3	78.5	-0.45%	0.26%
2025/2/6	5600 MHz	23.2	81.7	23.1	81.2	-0.43%	-0.61%
2025/2/6	5750 MHz	22.8	79.9	21.9	77.9	-3.95%	-2.50%

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

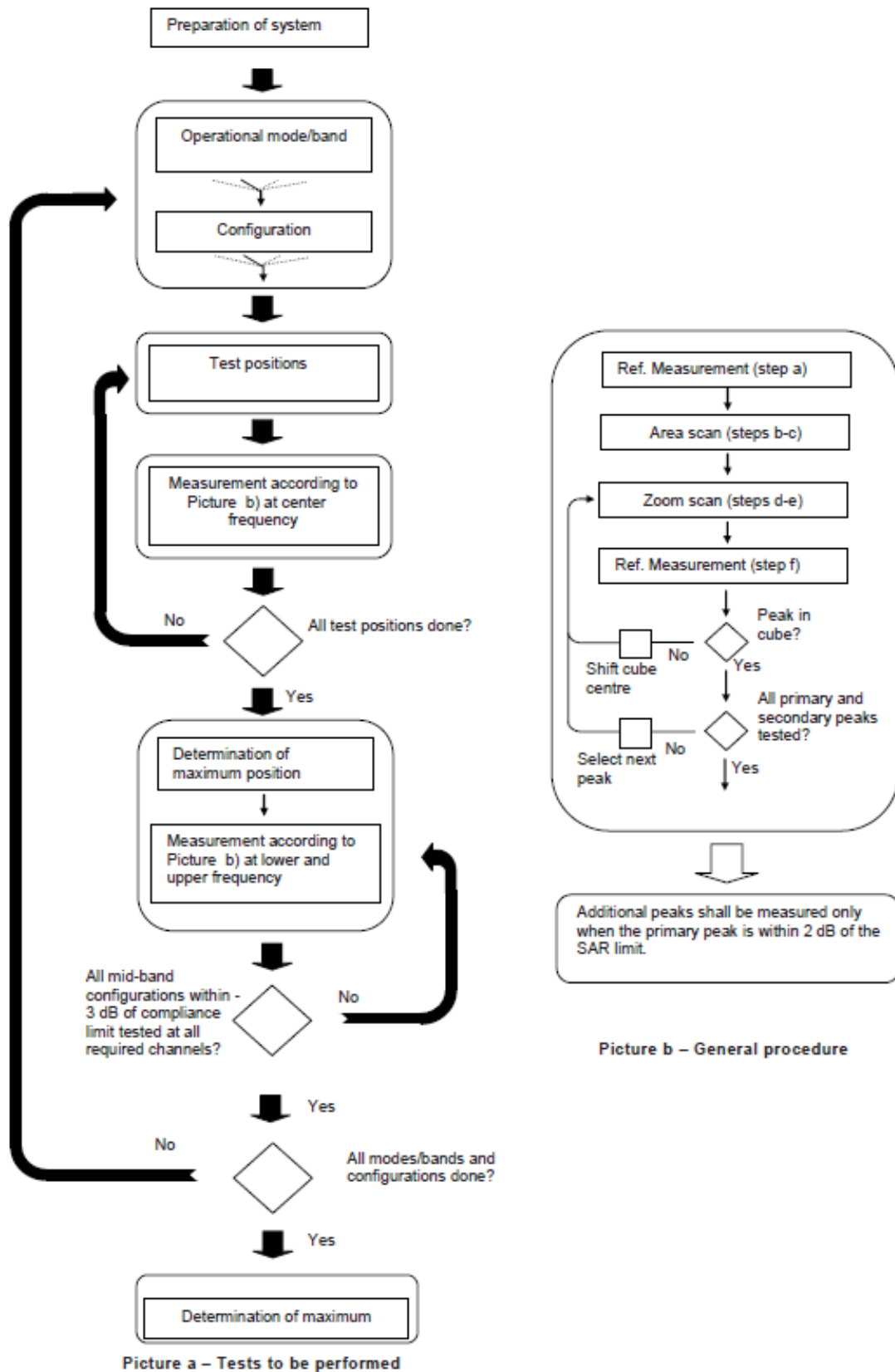
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

- a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
- b) all configurations for each device position in a), e.g., antenna extended and retracted, and
- c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9-1 Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

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

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCH_n), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs}	CM/dB
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/25	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	21	81

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde & Schwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.

It is performed for conducted power and SAR based on the KDB941225 D05.

SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions. The procedures in the following subsections are applied separately to test each LTE frequency band.

1) QPSK with 1 RB allocation

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 among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

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 in 1) and 2) 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.

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-gSAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz) and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11 Conducted Output Power

Sensor on	Sensor off
A	B

11.1 WCDMA Measurement result

WCDMA1900_A

Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	\	11.15	11.21	11.27	12.00
HSUPA	1	8.68	8.79	8.80	10.50
	2	8.77	8.94	8.81	10.50
	3	9.81	9.78	9.91	11.50
	4	8.43	8.39	8.28	10.00
	5	9.87	9.76	9.83	11.50
HSPA+	\	10.62	10.76	10.68	11.50
DC-HSDPA	1	10.66	10.71	10.75	12.50
	2	10.55	10.67	10.65	12.50
	3	10.19	10.15	10.07	12.00
	4	10.07	10.13	10.01	12.00

WCDMA1900_B

Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	\	23.11	23.19	23.33	24.00
HSUPA	1	19.11	19.17	19.21	21.00
	2	19.21	19.16	19.05	21.00
	3	20.08	20.22	20.13	22.00
	4	18.72	18.79	18.67	20.50
	5	20.25	20.13	20.18	22.00
HSPA+	\	20.99	21.06	21.14	22.50
DC-HSDPA	1	21.03	21.18	21.09	23.00
	2	21.01	21.11	21.17	23.00
	3	20.55	20.60	20.66	22.50
	4	20.49	20.52	20.43	22.50

WCDMA850_A

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4183 (836.6MHz)	4132 (826.4MHz)	Tune up
WCDMA	1	17.78	17.82	17.73	18.50
HSUPA	1	13.87	13.98	14.09	15.50
	2	13.96	13.85	14.04	15.50
	3	15.01	15.08	14.94	16.50
	4	13.39	13.57	13.44	15.00
	5	15.05	14.93	14.88	16.50
HSPA+	1	15.61	15.50	15.63	17.00
DC-HSDPA	1	15.98	16.05	16.08	17.50
	2	15.82	15.91	15.87	17.50
	3	15.51	15.45	15.43	17.00
	4	15.39	15.43	15.52	17.00

WCDMA850_B

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4183 (836.6MHz)	4132 (826.4MHz)	Tune up
WCDMA	1	23.79	23.95	24.01	25.50
HSUPA	1	20.96	21.16	20.83	22.50
	2	20.83	21.09	20.92	22.50
	3	21.93	22.08	21.98	23.50
	4	20.52	20.46	20.34	22.00
	5	21.92	22.03	21.94	23.50
HSPA+	1	22.48	22.42	22.32	24.00
DC-HSDPA	1	23.11	22.97	23.01	24.50
	2	22.83	22.87	22.89	24.50
	3	22.38	22.42	22.32	24.00
	4	22.37	22.43	22.48	24.00

11.2 LTE Measurement result

Maximum Target Power for Production Unit

Band	ANT	Tune up (dBm)	
		A	B
Band 2	3	12.5	24.5
Band 4	3	13	25
Band 5	3	18.5	25.5
Band 7	2	10.5	24.5
Band 12	3	18	25
Band 13	3	18	25
Band 66	3	13	25

Maximum Power Reduction (MPR) for LTE

Modulation	1.4	MPR	3	MPR	5	MPR	10	MPR	15	MPR	20	MPR (dB)
	MHz		MHz		MHz		MHz		MHz		MHz	
QPSK	≤ 5	0	≤ 4	0	≤ 8	0	≤ 12	0	≤ 16	0	≤ 18	0
QPSK	> 5	1	> 4	1	> 8	1	> 12	1	> 16	1	> 18	1
16 QAM	≤ 5	1	≤ 4	1	≤ 8	1	≤ 12	1	≤ 16	1	≤ 18	1
16 QAM	> 5	2	> 4	2	> 8	2	> 12	2	> 16	2	> 18	2
64 QAM	≤ 5	2	≤ 4	2	≤ 8	2	≤ 12	2	≤ 16	2	≤ 18	2
64 QAM	> 5	3	> 4	3	> 8	3	> 12	3	> 16	3	> 18	3
256 QAM	≤ 5	5	≤ 4	5	≤ 8	5	≤ 12	5	≤ 16	5	≤ 18	5
256 QAM	> 5	5	> 4	5	> 8	5	> 12	5	> 16	5	> 18	5

LTE Band2_A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	11.54	11.87	11.77
		1880 (18900)	11.50	11.80	11.77
		1850.7 (18607)	11.54	11.75	11.73
	1RB-Middle (3)	1909.3 (19193)	11.58	11.90	11.87
		1880 (18900)	11.59	11.78	11.77
		1850.7 (18607)	11.54	11.83	11.88
	1RB-Low (0)	1909.3 (19193)	11.49	11.82	11.79
		1880 (18900)	11.50	11.68	11.70
		1850.7 (18607)	11.50	11.76	11.82
	3RB-High (3)	1909.3 (19193)	11.62	11.66	11.84
		1880 (18900)	11.61	11.65	11.78
		1850.7 (18607)	11.62	11.64	11.80
	3RB-Middle (1)	1909.3 (19193)	11.64	11.69	11.81
		1880 (18900)	11.64	11.57	11.76
		1850.7 (18607)	11.65	11.67	11.83
	3RB-Low (0)	1909.3 (19193)	11.63	11.66	11.84
		1880 (18900)	11.61	11.56	11.77
		1850.7 (18607)	11.61	11.64	11.79
	6RB (0)	1909.3 (19193)	11.71	11.82	11.72
		1880 (18900)	11.69	11.80	11.71
		1850.7 (18607)	11.71	11.82	11.74
3MHz	1RB-High (14)	1908.5 (19185)	11.43	11.62	11.68
		1880 (18900)	11.38	11.59	11.67
		1851.5 (18615)	11.44	11.60	11.70
	1RB-Middle (7)	1908.5 (19185)	11.50	11.73	11.78
		1880 (18900)	11.50	11.70	11.73
		1851.5 (18615)	11.56	11.85	11.78
	1RB-Low (0)	1908.5 (19185)	11.39	11.65	11.63
		1880 (18900)	11.41	11.69	11.60
		1851.5 (18615)	11.40	11.52	11.61
	8RB-High (7)	1908.5 (19185)	11.64	11.68	11.65
		1880 (18900)	11.62	11.61	11.65
		1851.5 (18615)	11.65	11.67	11.68
	8RB-Middle (4)	1908.5 (19185)	11.67	11.73	11.70
		1880 (18900)	11.66	11.72	11.70
		1851.5 (18615)	11.70	11.74	11.75
	8RB-Low (0)	1908.5 (19185)	11.64	11.69	11.67
		1880 (18900)	11.61	11.66	11.64
		1851.5 (18615)	11.63	11.67	11.67
	15RB (0)	1908.5 (19185)	11.63	11.62	11.63
		1880 (18900)	11.57	11.58	11.63
		1851.5 (18615)	11.60	11.62	11.62

5MHz	1RB-High (24)	1907.5 (19175)	11.65	11.97	11.81
		1880 (18900)	11.61	11.84	11.82
		1852.5 (18625)	11.68	11.92	11.87
	1RB-Middle (12)	1907.5 (19175)	11.77	11.98	11.95
		1880 (18900)	11.76	12.08	11.95
		1852.5 (18625)	11.79	12.11	11.96
	1RB-Low (0)	1907.5 (19175)	11.63	11.90	11.76
		1880 (18900)	11.62	11.89	11.77
		1852.5 (18625)	11.66	11.88	11.80
	12RB-High (13)	1907.5 (19175)	11.68	11.66	11.69
		1880 (18900)	11.69	11.66	11.71
		1852.5 (18625)	11.73	11.70	11.75
	12RB-Middle (6)	1907.5 (19175)	11.76	11.72	11.77
		1880 (18900)	11.76	11.76	11.77
		1852.5 (18625)	11.77	11.75	11.79
	12RB-Low (0)	1907.5 (19175)	11.73	11.72	11.75
		1880 (18900)	11.66	11.65	11.70
		1852.5 (18625)	11.71	11.72	11.74
	25RB (0)	1907.5 (19175)	11.71	11.71	11.75
		1880 (18900)	11.68	11.69	11.71
		1852.5 (18625)	11.71	11.73	11.73
10MHz	1RB-High (49)	1905 (19150)	11.75	11.95	11.96
		1880 (18900)	11.70	11.88	11.89
		1855 (18650)	11.76	11.90	11.94
	1RB-Middle (24)	1905 (19150)	11.78	12.02	11.95
		1880 (18900)	11.79	11.99	11.96
		1855 (18650)	11.83	12.06	11.99
	1RB-Low (0)	1905 (19150)	11.75	12.00	11.94
		1880 (18900)	11.72	12.05	11.90
		1855 (18650)	11.75	12.07	11.87
	25RB-High (25)	1905 (19150)	11.67	11.68	11.70
		1880 (18900)	11.64	11.66	11.67
		1855 (18650)	11.73	11.76	11.79
	25RB-Middle (12)	1905 (19150)	11.75	11.80	11.80
		1880 (18900)	11.74	11.76	11.78
		1855 (18650)	11.80	11.80	11.82
	25RB-Low (0)	1905 (19150)	11.72	11.72	11.71
		1880 (18900)	11.68	11.70	11.71
		1855 (18650)	11.77	11.73	11.77
	50RB (0)	1905 (19150)	11.69	11.69	11.67
		1880 (18900)	11.68	11.67	11.69
		1855 (18650)	11.74	11.74	11.78

15MHz	1RB-High (74)	1902.5 (19125)	11.71	11.92	11.87
		1880 (18900)	11.66	11.89	11.78
		1857.5 (18675)	11.73	11.92	11.83
	1RB-Middle (37)	1902.5 (19125)	11.75	12.13	11.87
		1880 (18900)	11.77	12.09	11.96
		1857.5 (18675)	11.82	12.16	11.93
	1RB-Low (0)	1902.5 (19125)	11.63	11.87	11.77
		1880 (18900)	11.73	11.99	11.89
		1857.5 (18675)	11.71	12.01	11.80
	36RB-High (38)	1902.5 (19125)	11.65	11.67	11.69
		1880 (18900)	11.67	11.67	11.71
		1857.5 (18675)	11.75	11.75	11.79
	36RB-Middle (19)	1902.5 (19125)	11.74	11.76	11.77
		1880 (18900)	11.73	11.73	11.76
		1857.5 (18675)	11.79	11.76	11.85
	36RB-Low (0)	1902.5 (19125)	11.67	11.67	11.70
		1880 (18900)	11.69	11.67	11.74
		1857.5 (18675)	11.77	11.76	11.78
	75RB (0)	1902.5 (19125)	11.65	11.66	11.66
		1880 (18900)	11.70	11.67	11.69
		1857.5 (18675)	11.78	11.75	11.75
20MHz	1RB-High (99)	1900 (19100)	11.64	11.86	11.81
		1880 (18900)	11.60	11.86	11.77
		1860 (18700)	11.64	11.84	11.84
	1RB-Middle (50)	1900 (19100)	11.79	12.05	11.93
		1880 (18900)	11.81	12.04	11.95
		1860 (18700)	11.83	11.99	11.91
	1RB-Low (0)	1900 (19100)	11.58	11.81	11.71
		1880 (18900)	11.62	11.90	11.71
		1860 (18700)	11.59	11.74	11.77
	50RB-High (50)	1900 (19100)	11.69	11.67	11.68
		1880 (18900)	11.71	11.68	11.71
		1860 (18700)	11.85	11.85	11.86
	50RB-Middle (25)	1900 (19100)	11.81	11.77	11.79
		1880 (18900)	11.81	11.78	11.79
		1860 (18700)	11.86	11.81	11.83
	50RB-Low (0)	1900 (19100)	11.67	11.62	11.67
		1880 (18900)	11.74	11.69	11.70
		1860 (18700)	11.76	11.73	11.75
	100RB (0)	1900 (19100)	11.68	11.66	11.67
		1880 (18900)	11.68	11.67	11.68
		1860 (18700)	11.83	11.79	11.80

LTE Band2_B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	23.45	22.34	21.77
		1880 (18900)	23.44	22.34	21.80
		1850.7 (18607)	23.45	22.26	21.82
	1RB-Middle (3)	1909.3 (19193)	23.52	22.29	21.91
		1880 (18900)	23.55	22.41	21.86
		1850.7 (18607)	23.51	22.42	21.90
	1RB-Low (0)	1909.3 (19193)	23.48	22.22	21.79
		1880 (18900)	23.42	22.33	21.84
		1850.7 (18607)	23.46	22.32	21.78
	3RB-High (3)	1909.3 (19193)	23.60	22.15	21.81
		1880 (18900)	23.57	22.11	21.80
		1850.7 (18607)	23.59	22.06	21.80
	3RB-Middle (1)	1909.3 (19193)	23.60	22.18	21.83
		1880 (18900)	23.58	22.17	21.86
		1850.7 (18607)	23.61	22.10	21.85
	3RB-Low (0)	1909.3 (19193)	23.63	22.02	21.84
		1880 (18900)	23.56	22.04	21.83
		1850.7 (18607)	23.57	22.05	21.81
	6RB (0)	1909.3 (19193)	22.71	21.84	20.75
		1880 (18900)	22.66	21.83	20.77
		1850.7 (18607)	22.65	21.81	20.72
3MHz	1RB-High (14)	1908.5 (19185)	23.39	22.20	21.74
		1880 (18900)	23.38	22.12	21.66
		1851.5 (18615)	23.41	22.21	21.75
	1RB-Middle (7)	1908.5 (19185)	23.49	22.38	21.80
		1880 (18900)	23.49	22.37	21.81
		1851.5 (18615)	23.47	22.35	21.86
	1RB-Low (0)	1908.5 (19185)	23.35	22.20	21.70
		1880 (18900)	23.36	22.10	21.71
		1851.5 (18615)	23.31	22.12	21.72
	8RB-High (7)	1908.5 (19185)	22.60	21.67	20.73
		1880 (18900)	22.60	21.68	20.70
		1851.5 (18615)	22.62	21.67	20.72
	8RB-Middle (4)	1908.5 (19185)	22.66	21.74	20.74
		1880 (18900)	22.64	21.75	20.80
		1851.5 (18615)	22.68	21.73	20.74
	8RB-Low (0)	1908.5 (19185)	22.63	21.71	20.70
		1880 (18900)	22.58	21.70	20.74
		1851.5 (18615)	22.60	21.70	20.67
	15RB (0)	1908.5 (19185)	22.63	21.68	20.69
		1880 (18900)	22.58	21.62	20.68
		1851.5 (18615)	22.59	21.59	20.61

5MHz	1RB-High (24)	1907.5 (19175)	23.65	22.54	21.86
		1880 (18900)	23.58	22.39	21.80
		1852.5 (18625)	23.65	22.58	21.89
	1RB-Middle (12)	1907.5 (19175)	23.74	22.57	22.05
		1880 (18900)	23.73	22.58	22.00
		1852.5 (18625)	23.75	22.56	22.07
	1RB-Low (0)	1907.5 (19175)	23.59	22.53	21.87
		1880 (18900)	23.60	22.49	21.89
		1852.5 (18625)	23.60	22.40	21.88
	12RB-High (13)	1907.5 (19175)	22.65	21.69	20.73
		1880 (18900)	22.66	21.69	20.80
		1852.5 (18625)	22.70	21.72	20.77
	12RB-Middle (6)	1907.5 (19175)	22.77	21.80	20.83
		1880 (18900)	22.73	21.74	20.85
		1852.5 (18625)	22.76	21.79	20.84
	12RB-Low (0)	1907.5 (19175)	22.69	21.75	20.78
		1880 (18900)	22.67	21.72	20.79
		1852.5 (18625)	22.70	21.73	20.76
	25RB (0)	1907.5 (19175)	22.71	21.76	20.77
		1880 (18900)	22.67	21.72	20.77
		1852.5 (18625)	22.71	21.75	20.78
10MHz	1RB-High (49)	1905 (19150)	23.73	22.56	22.00
		1880 (18900)	23.68	22.44	21.88
		1855 (18650)	23.74	22.62	21.98
	1RB-Middle (24)	1905 (19150)	23.73	22.58	21.99
		1880 (18900)	23.75	22.59	22.03
		1855 (18650)	23.79	22.70	22.07
	1RB-Low (0)	1905 (19150)	23.69	22.54	21.88
		1880 (18900)	23.70	22.46	21.92
		1855 (18650)	23.71	22.56	21.97
	25RB-High (25)	1905 (19150)	22.64	21.71	20.71
		1880 (18900)	22.65	21.68	20.77
		1855 (18650)	22.72	21.80	20.80
	25RB-Middle (12)	1905 (19150)	22.73	21.81	20.82
		1880 (18900)	22.73	21.79	20.85
		1855 (18650)	22.79	21.83	20.85
	25RB-Low (0)	1905 (19150)	22.65	21.73	20.72
		1880 (18900)	22.66	21.73	20.79
		1855 (18650)	22.72	21.76	20.79
	50RB (0)	1905 (19150)	22.70	21.71	20.71
		1880 (18900)	22.69	21.70	20.76
		1855 (18650)	22.75	21.78	20.79

15MHz	1RB-High (74)	1902.5 (19125)	23.66	22.51	21.93
		1880 (18900)	23.62	22.48	21.88
		1857.5 (18675)	23.68	22.51	21.92
	1RB-Middle (37)	1902.5 (19125)	23.76	22.60	21.95
		1880 (18900)	23.74	22.53	21.97
		1857.5 (18675)	23.81	22.66	22.05
	1RB-Low (0)	1902.5 (19125)	23.59	22.49	21.82
		1880 (18900)	23.72	22.56	21.96
		1857.5 (18675)	23.67	22.51	21.86
	36RB-High (38)	1902.5 (19125)	22.64	21.70	20.71
		1880 (18900)	22.63	21.68	20.77
		1857.5 (18675)	22.75	21.76	20.87
	36RB-Middle (19)	1902.5 (19125)	22.73	21.77	20.83
		1880 (18900)	22.73	21.75	20.85
		1857.5 (18675)	22.78	21.79	20.86
	36RB-Low (0)	1902.5 (19125)	22.66	21.69	20.72
		1880 (18900)	22.69	21.72	20.83
		1857.5 (18675)	22.73	21.74	20.81
	75RB (0)	1902.5 (19125)	22.67	21.67	20.69
		1880 (18900)	22.68	21.70	20.77
		1857.5 (18675)	22.74	21.76	20.80
20MHz	1RB-High (99)	1900 (19100)	23.59	22.40	21.83
		1880 (18900)	23.56	22.32	21.90
		1860 (18700)	23.61	22.50	21.85
	1RB-Middle (50)	1900 (19100)	23.71	22.65	22.01
		1880 (18900)	23.75	22.67	22.05
		1860 (18700)	23.77	22.64	22.05
	1RB-Low (0)	1900 (19100)	23.51	22.47	21.79
		1880 (18900)	23.56	22.35	21.87
		1860 (18700)	23.55	22.30	21.83
	50RB-High (50)	1900 (19100)	22.63	21.66	20.67
		1880 (18900)	22.64	21.67	20.74
		1860 (18700)	22.84	21.85	20.93
	50RB-Middle (25)	1900 (19100)	22.76	21.77	20.79
		1880 (18900)	22.87	21.79	20.84
		1860 (18700)	22.81	21.83	20.84
	50RB-Low (0)	1900 (19100)	22.59	21.62	20.63
		1880 (18900)	22.71	21.73	20.80
		1860 (18700)	22.71	21.73	20.75
	100RB (0)	1900 (19100)	22.63	21.64	20.67
		1880 (18900)	22.68	21.69	20.75
		1860 (18700)	22.79	21.81	20.83

LTE Band4 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1754.3 (20393)	11.91	12.19	12.24
		1732.5 (20175)	11.97	12.21	12.26
		1710.7 (19957)	12.06	12.38	12.32
	1RB-Middle (3)	1754.3 (20393)	12.03	12.27	12.25
		1732.5 (20175)	12.05	12.26	12.32
		1710.7 (19957)	12.09	12.38	12.36
	1RB-Low (0)	1754.3 (20393)	11.96	12.26	12.21
		1732.5 (20175)	11.99	12.19	12.26
		1710.7 (19957)	12.02	12.32	12.33
	3RB-High (3)	1754.3 (20393)	12.07	12.02	12.28
		1732.5 (20175)	12.10	12.11	12.27
		1710.7 (19957)	12.16	12.17	12.36
	3RB-Middle (1)	1754.3 (20393)	12.10	12.11	12.25
		1732.5 (20175)	12.13	12.15	12.35
		1710.7 (19957)	12.22	12.15	12.38
	3RB-Low (0)	1754.3 (20393)	12.08	12.09	12.29
		1732.5 (20175)	12.10	12.03	12.24
		1710.7 (19957)	12.21	12.11	12.40
	6RB (0)	1754.3 (20393)	12.15	12.20	12.19
		1732.5 (20175)	12.17	12.22	12.16
		1710.7 (19957)	12.28	12.40	12.29
3MHz	1RB-High (14)	1753.5 (20385)	11.79	12.05	12.02
		1732.5 (20175)	11.88	12.18	12.14
		1711.5 (19965)	11.86	12.09	12.20
	1RB-Middle (7)	1753.5 (20385)	11.97	12.14	12.18
		1732.5 (20175)	11.93	12.11	12.21
		1711.5 (19965)	12.05	12.28	12.31
	1RB-Low (0)	1753.5 (20385)	11.80	12.09	12.09
		1732.5 (20175)	11.80	12.00	12.11
		1711.5 (19965)	11.93	12.13	12.29
	8RB-High (7)	1753.5 (20385)	12.01	12.07	12.10
		1732.5 (20175)	12.06	12.09	12.10
		1711.5 (19965)	12.12	12.16	12.14
	8RB-Middle (4)	1753.5 (20385)	12.11	12.15	12.14
		1732.5 (20175)	12.10	12.14	12.16
		1711.5 (19965)	12.19	12.24	12.24
	8RB-Low (0)	1753.5 (20385)	12.03	12.09	12.09
		1732.5 (20175)	12.04	12.08	12.10
		1711.5 (19965)	12.10	12.14	12.14
	15RB (0)	1753.5 (20385)	12.05	12.05	12.02
		1732.5 (20175)	12.03	12.06	12.05
		1711.5 (19965)	12.13	12.11	12.14

5MHz	1RB-High (24)	1752.5 (20375)	12.03	12.27	12.20
		1732.5 (20175)	12.03	12.31	12.25
		1712.5 (19975)	12.11	12.31	12.22
	1RB-Middle (12)	1752.5 (20375)	12.19	12.57	12.38
		1732.5 (20175)	12.18	12.54	12.37
		1712.5 (19975)	12.26	12.55	12.40
	1RB-Low (0)	1752.5 (20375)	12.09	12.33	12.30
		1732.5 (20175)	12.08	12.27	12.26
		1712.5 (19975)	12.15	12.38	12.28
	12RB-High (13)	1752.5 (20375)	12.12	12.09	12.12
		1732.5 (20175)	12.10	12.09	12.13
		1712.5 (19975)	12.14	12.16	12.20
	12RB-Middle (6)	1752.5 (20375)	12.18	12.19	12.21
		1732.5 (20175)	12.18	12.16	12.19
		1712.5 (19975)	12.23	12.20	12.25
	12RB-Low (0)	1752.5 (20375)	12.12	12.13	12.14
		1732.5 (20175)	12.12	12.11	12.19
		1712.5 (19975)	12.19	12.20	12.20
	25RB (0)	1752.5 (20375)	12.13	12.13	12.15
		1732.5 (20175)	12.12	12.13	12.15
		1712.5 (19975)	12.20	12.18	12.21
10MHz	1RB-High (49)	1750 (20350)	12.13	12.39	12.33
		1732.5 (20175)	12.16	12.42	12.38
		1715 (20000)	12.23	12.53	12.33
	1RB-Middle (24)	1750 (20350)	12.20	12.44	12.39
		1732.5 (20175)	12.21	12.53	12.28
		1715 (20000)	12.20	12.40	12.32
	1RB-Low (0)	1750 (20350)	12.16	12.42	12.33
		1732.5 (20175)	12.14	12.42	12.29
		1715 (20000)	12.24	12.48	12.42
	25RB-High (25)	1750 (20350)	12.17	12.19	12.20
		1732.5 (20175)	12.11	12.12	12.14
		1715 (20000)	12.17	12.19	12.21
	25RB-Middle (12)	1750 (20350)	12.17	12.19	12.22
		1732.5 (20175)	12.19	12.20	12.21
		1715 (20000)	12.24	12.22	12.25
	25RB-Low (0)	1750 (20350)	12.09	12.11	12.11
		1732.5 (20175)	12.13	12.14	12.14
		1715 (20000)	12.19	12.15	12.19
	50RB (0)	1750 (20350)	12.15	12.14	12.16
		1732.5 (20175)	12.14	12.11	12.14
		1715 (20000)	12.21	12.18	12.20

15MHz	1RB-High (74)	1747.5 (20325)	12.10	12.30	12.18
		1732.5 (20175)	12.11	12.28	12.29
		1717.5 (20025)	12.14	12.46	12.33
	1RB-Middle (37)	1747.5 (20325)	12.22	12.47	12.35
		1732.5 (20175)	12.21	12.35	12.32
		1717.5 (20025)	12.22	12.58	12.44
	1RB-Low (0)	1747.5 (20325)	12.14	12.32	12.27
		1732.5 (20175)	12.10	12.45	12.25
		1717.5 (20025)	12.16	12.51	12.39
	36RB-High (38)	1747.5 (20325)	12.12	12.09	12.14
		1732.5 (20175)	12.09	12.11	12.13
		1717.5 (20025)	12.21	12.18	12.25
	36RB-Middle (19)	1747.5 (20325)	12.15	12.13	12.19
		1732.5 (20175)	12.15	12.14	12.19
		1717.5 (20025)	12.21	12.20	12.22
	36RB-Low (0)	1747.5 (20325)	12.13	12.10	12.13
		1732.5 (20175)	12.13	12.13	12.17
		1717.5 (20025)	12.16	12.11	12.17
	75RB (0)	1747.5 (20325)	12.14	12.13	12.15
		1732.5 (20175)	12.13	12.12	12.10
		1717.5 (20025)	12.18	12.18	12.17
20MHz	1RB-High (99)	1745 (20300)	12.03	12.00	12.23
		1732.5 (20175)	12.03	11.88	12.24
		1720 (20050)	12.05	11.99	12.17
	1RB-Middle (50)	1745 (20300)	12.19	12.51	12.34
		1732.5 (20175)	12.18	12.39	12.29
		1720 (20050)	12.24	12.33	12.38
	1RB-Low (0)	1745 (20300)	12.03	12.22	12.20
		1732.5 (20175)	12.06	12.24	12.24
		1720 (20050)	12.09	12.34	12.19
	50RB-High (50)	1745 (20300)	12.16	12.13	12.17
		1732.5 (20175)	12.10	12.10	12.11
		1720 (20050)	12.34	12.20	12.23
	50RB-Middle (25)	1745 (20300)	12.18	12.16	12.18
		1732.5 (20175)	12.19	12.20	12.19
		1720 (20050)	12.29	12.25	12.26
	50RB-Low (0)	1745 (20300)	12.17	12.17	12.18
		1732.5 (20175)	12.14	12.12	12.13
		1720 (20050)	12.16	12.14	12.14
	100RB (0)	1745 (20300)	12.16	12.12	12.16
		1732.5 (20175)	12.13	12.12	12.12
		1720 (20050)	12.19	12.20	12.18

LTE Band4_B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1754.3 (20393)	23.91	22.82	22.28
		1732.5 (20175)	23.95	22.76	22.18
		1710.7 (19957)	24.00	22.83	22.41
	1RB-Middle (3)	1754.3 (20393)	24.02	22.84	22.29
		1732.5 (20175)	24.04	22.81	22.35
		1710.7 (19957)	24.08	22.78	22.36
	1RB-Low (0)	1754.3 (20393)	23.97	22.72	22.27
		1732.5 (20175)	23.96	22.79	22.29
		1710.7 (19957)	24.06	22.73	22.32
	3RB-High (3)	1754.3 (20393)	24.08	22.55	22.31
		1732.5 (20175)	24.09	22.59	22.29
		1710.7 (19957)	24.15	22.64	22.35
	3RB-Middle (1)	1754.3 (20393)	24.09	22.63	22.27
		1732.5 (20175)	24.12	22.55	22.26
		1710.7 (19957)	24.20	22.73	22.44
	3RB-Low (0)	1754.3 (20393)	24.06	22.50	22.24
		1732.5 (20175)	24.09	22.58	22.25
		1710.7 (19957)	24.17	22.70	22.37
	6RB (0)	1754.3 (20393)	23.16	22.27	21.18
		1732.5 (20175)	23.17	22.27	21.17
		1710.7 (19957)	23.26	22.34	21.25
3MHz	1RB-High (14)	1753.5 (20385)	23.77	22.67	22.11
		1732.5 (20175)	23.84	22.65	22.15
		1711.5 (19965)	23.85	22.57	22.15
	1RB-Middle (7)	1753.5 (20385)	23.94	22.65	22.26
		1732.5 (20175)	23.95	22.80	22.25
		1711.5 (19965)	24.02	22.77	22.27
	1RB-Low (0)	1753.5 (20385)	23.80	22.54	22.13
		1732.5 (20175)	23.82	22.62	22.18
		1711.5 (19965)	23.90	22.65	22.21
	8RB-High (7)	1753.5 (20385)	23.03	22.11	21.08
		1732.5 (20175)	23.06	22.09	21.08
		1711.5 (19965)	23.10	22.14	21.13
	8RB-Middle (4)	1753.5 (20385)	23.10	22.17	21.13
		1732.5 (20175)	23.11	22.18	21.13
		1711.5 (19965)	23.17	22.22	21.23
	8RB-Low (0)	1753.5 (20385)	23.02	22.14	21.10
		1732.5 (20175)	23.05	22.07	21.11
		1711.5 (19965)	23.08	22.17	21.15
	15RB (0)	1753.5 (20385)	23.01	22.04	21.05
		1732.5 (20175)	23.05	22.04	21.05
		1711.5 (19965)	23.09	22.11	21.12

5MHz	1RB-High (24)	1752.5 (20375)	24.02	22.90	22.18
		1732.5 (20175)	24.04	22.87	22.21
		1712.5 (19975)	24.09	22.94	22.30
	1RB-Middle (12)	1752.5 (20375)	24.18	22.97	22.34
		1732.5 (20175)	24.18	23.05	22.33
		1712.5 (19975)	24.25	23.10	22.42
	1RB-Low (0)	1752.5 (20375)	24.07	22.80	22.22
		1732.5 (20175)	24.07	22.87	22.23
		1712.5 (19975)	24.16	22.95	22.40
	12RB-High (13)	1752.5 (20375)	23.11	22.12	21.17
		1732.5 (20175)	23.10	22.11	21.13
		1712.5 (19975)	23.16	22.14	21.21
	12RB-Middle (6)	1752.5 (20375)	23.17	22.21	21.22
		1732.5 (20175)	23.19	22.18	21.23
		1712.5 (19975)	23.23	22.22	21.29
	12RB-Low (0)	1752.5 (20375)	23.11	22.13	21.17
		1732.5 (20175)	23.14	22.15	21.15
		1712.5 (19975)	23.18	22.16	21.19
	25RB (0)	1752.5 (20375)	23.17	22.15	21.18
		1732.5 (20175)	23.12	22.16	21.15
		1712.5 (19975)	23.19	22.21	21.21
10MHz	1RB-High (49)	1750 (20350)	24.12	22.93	22.25
		1732.5 (20175)	24.12	22.92	22.27
		1715 (20000)	24.20	22.94	22.39
	1RB-Middle (24)	1750 (20350)	24.17	23.02	22.35
		1732.5 (20175)	24.19	23.05	22.38
		1715 (20000)	24.19	23.02	22.34
	1RB-Low (0)	1750 (20350)	24.14	22.98	22.28
		1732.5 (20175)	24.11	22.90	22.29
		1715 (20000)	24.23	22.98	22.48
	25RB-High (25)	1750 (20350)	23.14	22.17	21.15
		1732.5 (20175)	23.13	22.15	21.14
		1715 (20000)	23.17	22.20	21.25
	25RB-Middle (12)	1750 (20350)	23.19	22.22	21.21
		1732.5 (20175)	23.19	22.20	21.21
		1715 (20000)	23.22	22.22	21.23
	25RB-Low (0)	1750 (20350)	23.09	22.12	21.13
		1732.5 (20175)	23.12	22.13	21.13
		1715 (20000)	23.13	22.17	21.20
	50RB (0)	1750 (20350)	23.15	22.15	21.14
		1732.5 (20175)	23.15	22.11	21.14
		1715 (20000)	23.22	22.18	21.20

15MHz	1RB-High (74)	1747.5 (20325)	24.05	22.92	22.21
		1732.5 (20175)	24.12	22.93	22.24
		1717.5 (20025)	24.14	22.90	22.29
	1RB-Middle (37)	1747.5 (20325)	24.14	22.94	22.43
		1732.5 (20175)	24.19	23.06	22.37
		1717.5 (20025)	24.24	22.94	22.44
	1RB-Low (0)	1747.5 (20325)	24.11	22.93	22.36
		1732.5 (20175)	24.09	22.85	22.31
		1717.5 (20025)	24.17	22.99	22.30
	36RB-High (38)	1747.5 (20325)	23.11	22.12	21.13
		1732.5 (20175)	23.10	22.08	21.13
		1717.5 (20025)	23.22	22.23	21.26
	36RB-Middle (19)	1747.5 (20325)	23.13	22.13	21.20
		1732.5 (20175)	23.14	22.15	21.17
		1717.5 (20025)	23.18	22.18	21.23
	36RB-Low (0)	1747.5 (20325)	23.11	22.11	21.16
		1732.5 (20175)	23.13	22.11	21.15
		1717.5 (20025)	23.12	22.13	21.18
	75RB (0)	1747.5 (20325)	23.16	22.12	21.15
		1732.5 (20175)	23.13	22.11	21.12
		1717.5 (20025)	23.19	22.18	21.18
20MHz	1RB-High (99)	1745 (20300)	24.00	22.84	22.17
		1732.5 (20175)	24.03	22.87	22.27
		1720 (20050)	24.03	22.75	22.20
	1RB-Middle (50)	1745 (20300)	24.16	22.91	22.34
		1732.5 (20175)	24.17	23.02	22.37
		1720 (20050)	24.25	23.06	22.45
	1RB-Low (0)	1745 (20300)	24.00	22.74	22.13
		1732.5 (20175)	24.03	22.81	22.19
		1720 (20050)	24.06	22.78	22.28
	50RB-High (50)	1745 (20300)	23.15	22.14	21.16
		1732.5 (20175)	23.13	22.11	21.13
		1720 (20050)	23.24	22.23	21.24
	50RB-Middle (25)	1745 (20300)	23.21	22.21	21.19
		1732.5 (20175)	23.22	22.21	21.21
		1720 (20050)	23.27	22.27	21.27
	50RB-Low (0)	1745 (20300)	23.19	22.18	21.16
		1732.5 (20175)	23.13	22.13	21.14
		1720 (20050)	23.15	22.14	21.14
	100RB (0)	1745 (20300)	23.17	22.13	21.14
		1732.5 (20175)	23.14	22.11	21.14
		1720 (20050)	23.23	22.18	21.24

LTE Band5 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	848.3 (20643)	17.35	17.51	17.67
		836.5 (20525)	17.50	17.78	17.78
		824.7 (20407)	17.37	17.72	17.58
	1RB-Middle (3)	848.3 (20643)	17.45	17.65	17.72
		836.5 (20525)	17.57	17.91	17.84
		824.7 (20407)	17.46	17.80	17.70
	1RB-Low (0)	848.3 (20643)	17.37	17.56	17.69
		836.5 (20525)	17.52	17.78	17.82
		824.7 (20407)	17.36	17.68	17.69
	3RB-High (3)	848.3 (20643)	17.48	17.42	17.70
		836.5 (20525)	17.64	17.63	17.76
		824.7 (20407)	17.51	17.45	17.66
	3RB-Middle (1)	848.3 (20643)	17.50	17.44	17.68
		836.5 (20525)	17.64	17.62	17.79
		824.7 (20407)	17.50	17.55	17.72
	3RB-Low (0)	848.3 (20643)	17.48	17.42	17.67
		836.5 (20525)	17.61	17.64	17.80
		824.7 (20407)	17.49	17.53	17.71
	6RB (0)	848.3 (20643)	17.57	17.66	17.55
		836.5 (20525)	17.68	17.77	17.68
		824.7 (20407)	17.58	17.70	17.62
3MHz	1RB-High (14)	847.5 (20635)	17.25	17.49	17.57
		836.5 (20525)	17.36	17.60	17.69
		825.5 (20415)	17.30	17.54	17.47
	1RB-Middle (7)	847.5 (20635)	17.39	17.63	17.71
		836.5 (20525)	17.52	17.78	17.85
		825.5 (20415)	17.37	17.72	17.68
	1RB-Low (0)	847.5 (20635)	17.28	17.46	17.57
		836.5 (20525)	17.35	17.65	17.67
		825.5 (20415)	17.24	17.57	17.48
	8RB-High (7)	847.5 (20635)	17.45	17.50	17.48
		836.5 (20525)	17.59	17.62	17.62
		825.5 (20415)	17.49	17.55	17.51
	8RB-Middle (4)	847.5 (20635)	17.53	17.57	17.57
		836.5 (20525)	17.64	17.69	17.69
		825.5 (20415)	17.55	17.61	17.57
	8RB-Low (0)	847.5 (20635)	17.48	17.51	17.55
		836.5 (20525)	17.58	17.65	17.63
		825.5 (20415)	17.47	17.54	17.50
	15RB (0)	847.5 (20635)	17.45	17.47	17.45
		836.5 (20525)	17.56	17.57	17.58
		825.5 (20415)	17.45	17.49	17.45

5MHz	1RB-High (24)	846.5 (20625)	17.46	17.68	17.67
		836.5 (20525)	17.57	17.87	17.86
		826.5 (20425)	17.54	17.86	17.71
	1RB-Middle (12)	846.5 (20625)	17.65	17.89	17.75
		836.5 (20525)	17.73	18.05	17.98
		826.5 (20425)	17.61	17.98	17.84
	1RB-Low (0)	846.5 (20625)	17.52	17.74	17.66
		836.5 (20525)	17.60	17.92	17.82
		826.5 (20425)	17.52	17.85	17.68
	12RB-High (13)	846.5 (20625)	17.52	17.47	17.53
		836.5 (20525)	17.63	17.62	17.67
		826.5 (20425)	17.59	17.59	17.63
	12RB-Middle (6)	846.5 (20625)	17.62	17.60	17.66
		836.5 (20525)	17.72	17.73	17.73
		826.5 (20425)	17.60	17.63	17.63
	12RB-Low (0)	846.5 (20625)	17.58	17.58	17.63
		836.5 (20525)	17.69	17.64	17.67
		826.5 (20425)	17.55	17.52	17.57
	25RB (0)	846.5 (20625)	17.55	17.58	17.59
		836.5 (20525)	17.65	17.67	17.69
		826.5 (20425)	17.56	17.59	17.57
10MHz	1RB-High (49)	844 (20600)	17.52	17.81	17.73
		836.5 (20525)	17.65	17.95	17.87
		829 (20450)	17.63	17.85	17.87
	1RB-Middle (24)	844 (20600)	17.78	18.04	17.87
		836.5 (20525)	17.76	18.08	17.88
		829 (20450)	17.68	18.01	17.86
	1RB-Low (0)	844 (20600)	17.69	18.02	17.92
		836.5 (20525)	17.66	18.01	17.88
		829 (20450)	17.58	17.89	17.68
	25RB-High (25)	844 (20600)	17.49	17.53	17.53
		836.5 (20525)	17.62	17.64	17.66
		829 (20450)	17.60	17.60	17.62
	25RB-Middle (12)	844 (20600)	17.75	17.69	17.72
		836.5 (20525)	17.73	17.74	17.72
		829 (20450)	17.62	17.63	17.64
	25RB-Low (0)	844 (20600)	17.63	17.65	17.67
		836.5 (20525)	17.64	17.63	17.66
		829 (20450)	17.50	17.52	17.51
	50RB (0)	844 (20600)	17.60	17.59	17.61
		836.5 (20525)	17.68	17.66	17.69
		829 (20450)	17.58	17.54	17.56

LTE Band5 _B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	848.3 (20643)	24.27	23.44	22.60
		836.5 (20525)	24.24	23.52	22.46
		824.7 (20407)	24.25	23.54	22.46
	1RB-Middle (3)	848.3 (20643)	24.33	23.65	22.70
		836.5 (20525)	24.34	23.63	22.60
		824.7 (20407)	24.33	23.58	22.61
	1RB-Low (0)	848.3 (20643)	24.21	23.40	22.52
		836.5 (20525)	24.25	23.48	22.52
		824.7 (20407)	24.26	23.57	22.54
	3RB-High (3)	848.3 (20643)	24.40	23.36	22.57
		836.5 (20525)	24.38	23.35	22.54
		824.7 (20407)	24.37	23.33	22.55
	3RB-Middle (1)	848.3 (20643)	24.38	23.42	22.62
		836.5 (20525)	24.39	23.38	22.55
		824.7 (20407)	24.40	23.39	22.64
	3RB-Low (0)	848.3 (20643)	24.39	23.34	22.57
		836.5 (20525)	24.37	23.36	22.56
		824.7 (20407)	24.41	23.40	22.58
	6RB (0)	848.3 (20643)	23.47	22.61	21.53
		836.5 (20525)	23.47	22.58	21.49
		824.7 (20407)	23.48	22.53	21.49
3MHz	1RB-High (14)	847.5 (20635)	24.12	23.38	22.47
		836.5 (20525)	24.16	23.31	22.44
		825.5 (20415)	24.15	23.29	22.41
	1RB-Middle (7)	847.5 (20635)	24.24	23.53	22.54
		836.5 (20525)	24.29	23.45	22.56
		825.5 (20415)	24.29	23.48	22.55
	1RB-Low (0)	847.5 (20635)	24.10	23.42	22.37
		836.5 (20525)	24.09	23.28	22.39
		825.5 (20415)	24.20	23.30	22.44
	8RB-High (7)	847.5 (20635)	23.37	22.43	21.46
		836.5 (20525)	23.34	22.36	21.47
		825.5 (20415)	23.38	22.41	21.47
	8RB-Middle (4)	847.5 (20635)	23.44	22.50	21.56
		836.5 (20525)	23.40	22.42	21.50
		825.5 (20415)	23.43	22.45	21.51
	8RB-Low (0)	847.5 (20635)	23.35	22.42	21.48
		836.5 (20525)	23.32	22.35	21.43
		825.5 (20415)	23.37	22.43	21.50
	15RB (0)	847.5 (20635)	23.38	22.39	21.48
		836.5 (20525)	23.35	22.35	21.41
		825.5 (20415)	23.37	22.38	21.44

5MHz	1RB-High (24)	846.5 (20625)	24.35	23.61	22.51
		836.5 (20525)	24.32	23.63	22.61
		826.5 (20425)	24.37	23.65	22.48
	1RB-Middle (12)	846.5 (20625)	24.48	23.73	22.71
		836.5 (20525)	24.48	23.80	22.69
		826.5 (20425)	24.48	23.78	22.78
	1RB-Low (0)	846.5 (20625)	24.37	23.64	22.55
		836.5 (20525)	24.34	23.61	22.54
		826.5 (20425)	24.40	23.64	22.67
	12RB-High (13)	846.5 (20625)	23.42	22.40	21.54
		836.5 (20525)	23.44	22.43	21.51
		826.5 (20425)	23.47	22.49	21.54
	12RB-Middle (6)	846.5 (20625)	23.49	22.48	21.58
		836.5 (20525)	23.47	22.48	21.54
		826.5 (20425)	23.52	22.47	21.60
	12RB-Low (0)	846.5 (20625)	23.44	22.43	21.51
		836.5 (20525)	23.41	22.40	21.45
		826.5 (20425)	23.46	22.43	21.53
	25RB (0)	846.5 (20625)	23.47	22.50	21.53
		836.5 (20525)	23.46	22.45	21.54
		826.5 (20425)	23.49	22.46	21.55
10MHz	1RB-High (49)	844 (20600)	24.45	23.69	22.68
		836.5 (20525)	24.45	23.73	22.56
		829 (20450)	24.45	23.67	22.65
	1RB-Middle (24)	844 (20600)	24.50	23.61	22.66
		836.5 (20525)	24.51	23.79	22.67
		829 (20450)	24.50	23.77	22.69
	1RB-Low (0)	844 (20600)	24.48	23.67	22.62
		836.5 (20525)	24.47	23.74	22.57
		829 (20450)	24.52	23.82	22.70
	25RB-High (25)	844 (20600)	23.43	22.42	21.47
		836.5 (20525)	23.49	22.50	21.57
		829 (20450)	23.48	22.50	21.55
	25RB-Middle (12)	844 (20600)	23.52	22.51	21.59
		836.5 (20525)	23.50	22.48	21.55
		829 (20450)	23.53	22.52	21.59
	25RB-Low (0)	844 (20600)	23.46	22.45	21.51
		836.5 (20525)	23.43	22.40	21.48
		829 (20450)	23.42	22.42	21.49
	50RB (0)	844 (20600)	23.47	22.45	21.50
		836.5 (20525)	23.50	22.47	21.49
		829 (20450)	23.49	22.48	21.52

LTE Band7 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
5MHz	1RB-High (24)	2567.5 (21425)	9.63	9.93	9.81
		2535 (21100)	9.48	9.83	9.70
		2502.5 (20775)	9.20	9.47	9.34
	1RB-Middle (12)	2567.5 (21425)	9.76	10.12	9.95
		2535 (21100)	9.62	9.97	9.85
		2502.5 (20775)	9.31	9.65	9.53
	1RB-Low (0)	2567.5 (21425)	9.63	9.91	9.83
		2535 (21100)	9.44	9.79	9.66
		2502.5 (20775)	9.26	9.53	9.35
	12RB-High (13)	2567.5 (21425)	9.70	9.69	9.74
		2535 (21100)	9.57	9.54	9.62
		2502.5 (20775)	9.33	9.32	9.38
	12RB-Middle (6)	2567.5 (21425)	9.77	9.75	9.77
		2535 (21100)	9.59	9.59	9.62
		2502.5 (20775)	9.36	9.34	9.38
	12RB-Low (0)	2567.5 (21425)	9.73	9.70	9.74
		2535 (21100)	9.52	9.51	9.56
		2502.5 (20775)	9.23	9.25	9.27
	25RB (0)	2567.5 (21425)	9.73	9.74	9.74
		2535 (21100)	9.54	9.58	9.59
		2502.5 (20775)	9.32	9.32	9.34
10MHz	1RB-High (49)	2565 (21400)	9.73	9.94	9.95
		2535 (21100)	9.64	9.92	9.79
		2505 (20800)	9.39	9.67	9.55
	1RB-Middle (24)	2565 (21400)	9.76	10.05	9.95
		2535 (21100)	9.61	9.78	9.71
		2505 (20800)	9.34	9.68	9.51
	1RB-Low (0)	2565 (21400)	9.74	9.94	9.84
		2535 (21100)	9.53	9.78	9.72
		2505 (20800)	9.33	9.60	9.42
	25RB-High (25)	2565 (21400)	9.72	9.73	9.75
		2535 (21100)	9.65	9.68	9.71
		2505 (20800)	9.39	9.39	9.42
	25RB-Middle (12)	2565 (21400)	9.77	9.76	9.78
		2535 (21100)	9.61	9.63	9.62
		2505 (20800)	9.36	9.35	9.37
	25RB-Low (0)	2565 (21400)	9.77	9.77	9.79
		2535 (21100)	9.52	9.58	9.60
		2505 (20800)	9.23	9.23	9.25
	50RB (0)	2565 (21400)	9.76	9.78	9.80
		2535 (21100)	9.61	9.64	9.63
		2505 (20800)	9.33	9.32	9.30

15MHz	1RB-High (74)	2562.5 (21375)	9.69	9.97	9.76
		2535 (21100)	9.59	9.79	9.78
		2507.5 (20825)	9.31	9.62	9.49
	1RB-Middle (37)	2562.5 (21375)	9.79	10.06	9.92
		2535 (21100)	9.62	9.90	9.76
		2507.5 (20825)	9.37	9.68	9.56
	1RB-Low (0)	2562.5 (21375)	9.65	9.98	9.83
		2535 (21100)	9.44	9.69	9.68
		2507.5 (20825)	9.27	9.59	9.45
	36RB-High (38)	2562.5 (21375)	9.68	9.69	9.69
		2535 (21100)	9.64	9.61	9.67
		2507.5 (20825)	9.34	9.32	9.39
	36RB-Middle (19)	2562.5 (21375)	9.74	9.77	9.78
		2535 (21100)	9.63	9.61	9.63
		2507.5 (20825)	9.34	9.30	9.35
	36RB-Low (0)	2562.5 (21375)	9.71	9.76	9.74
		2535 (21100)	9.49	9.52	9.55
		2507.5 (20825)	9.21	9.24	9.25
	75RB (0)	2562.5 (21375)	9.75	9.74	9.72
		2535 (21100)	9.59	9.61	9.60
		2507.5 (20825)	9.31	9.31	9.29
20MHz	1RB-High (99)	2560 (21350)	9.61	9.91	9.70
		2535 (21100)	9.55	9.88	9.68
		2510 (20850)	9.30	9.56	9.48
	1RB-Middle (50)	2560 (21350)	9.60	10.01	10.02
		2535 (21100)	9.63	9.84	9.83
		2510 (20850)	9.40	9.72	9.56
	1RB-Low (0)	2560 (21350)	9.56	9.76	9.74
		2535 (21100)	9.35	9.55	9.60
		2510 (20850)	9.16	9.44	9.34
	50RB-High (50)	2560 (21350)	9.70	9.70	9.71
		2535 (21100)	9.68	9.66	9.69
		2510 (20850)	9.35	9.33	9.33
	50RB-Middle (25)	2560 (21350)	9.71	9.80	9.79
		2535 (21100)	9.78	9.65	9.65
		2510 (20850)	9.40	9.36	9.40
	50RB-Low (0)	2560 (21350)	9.77	9.74	9.75
		2535 (21100)	9.51	9.49	9.49
		2510 (20850)	9.16	9.14	9.15
	100RB (0)	2560 (21350)	9.72	9.68	9.72
		2535 (21100)	9.58	9.57	9.55
		2510 (20850)	9.24	9.21	9.21

LTE Band7_B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
5MHz	1RB-High (24)	2567.5 (21425)	23.62	22.80	21.85
		2535 (21100)	23.44	22.83	21.74
		2502.5 (20775)	23.27	22.50	21.49
	1RB-Middle (12)	2567.5 (21425)	23.74	23.01	21.96
		2535 (21100)	23.57	22.94	21.83
		2502.5 (20775)	23.38	22.75	21.64
	1RB-Low (0)	2567.5 (21425)	23.64	22.89	21.86
		2535 (21100)	23.44	22.82	21.66
		2502.5 (20775)	23.29	22.61	21.48
	12RB-High (13)	2567.5 (21425)	22.68	21.72	20.79
		2535 (21100)	22.56	21.59	20.64
		2502.5 (20775)	22.38	21.39	20.48
	12RB-Middle (6)	2567.5 (21425)	22.77	21.79	20.83
		2535 (21100)	22.56	21.63	20.70
		2502.5 (20775)	22.40	21.44	20.47
	12RB-Low (0)	2567.5 (21425)	22.71	21.74	20.78
		2535 (21100)	22.52	21.54	20.60
		2502.5 (20775)	22.36	21.39	20.42
	25RB (0)	2567.5 (21425)	22.74	21.76	20.78
		2535 (21100)	22.55	21.60	20.62
		2502.5 (20775)	22.39	21.42	20.40
10MHz	1RB-High (49)	2565 (21400)	23.70	22.98	21.99
		2535 (21100)	23.60	22.90	21.79
		2505 (20800)	23.38	22.63	21.56
	1RB-Middle (24)	2565 (21400)	23.77	23.09	22.02
		2535 (21100)	23.61	22.97	21.86
		2505 (20800)	23.43	22.62	21.61
	1RB-Low (0)	2565 (21400)	23.73	22.98	21.92
		2535 (21100)	23.49	22.87	21.70
		2505 (20800)	23.38	22.59	21.62
	25RB-High (25)	2565 (21400)	22.70	21.73	20.78
		2535 (21100)	22.63	21.65	20.68
		2505 (20800)	22.40	21.40	20.45
	25RB-Middle (12)	2565 (21400)	22.77	21.80	20.79
		2535 (21100)	22.61	21.65	20.68
		2505 (20800)	22.42	21.46	20.47
	25RB-Low (0)	2565 (21400)	22.78	21.81	20.83
		2535 (21100)	22.53	21.58	20.60
		2505 (20800)	22.31	21.37	20.37
	50RB (0)	2565 (21400)	22.77	21.78	20.81
		2535 (21100)	22.61	21.63	20.68
		2505 (20800)	22.41	21.40	20.44

15MHz	1RB-High (74)	2562.5 (21375)	23.65	22.91	21.87
		2535 (21100)	23.56	22.85	21.76
		2507.5 (20825)	23.35	22.60	21.45
	1RB-Middle (37)	2562.5 (21375)	23.72	23.04	21.98
		2535 (21100)	23.60	22.95	21.86
		2507.5 (20825)	23.37	22.69	21.56
	1RB-Low (0)	2562.5 (21375)	23.70	22.89	21.90
		2535 (21100)	23.47	22.77	21.66
		2507.5 (20825)	23.30	22.69	21.56
	36RB-High (38)	2562.5 (21375)	22.67	21.68	20.72
		2535 (21100)	22.58	21.60	20.67
		2507.5 (20825)	22.36	21.39	20.43
	36RB-Middle (19)	2562.5 (21375)	22.74	21.77	20.81
		2535 (21100)	22.57	21.63	20.69
		2507.5 (20825)	22.36	21.39	20.42
	36RB-Low (0)	2562.5 (21375)	22.75	21.78	20.80
		2535 (21100)	22.50	21.52	20.58
		2507.5 (20825)	22.29	21.33	20.35
	75RB (0)	2562.5 (21375)	22.75	21.74	20.73
		2535 (21100)	22.56	21.60	20.61
		2507.5 (20825)	22.33	21.34	20.36
20MHz	1RB-High (99)	2560 (21350)	23.55	22.83	21.71
		2535 (21100)	23.51	22.88	21.78
		2510 (20850)	23.24	22.52	21.49
	1RB-Middle (50)	2560 (21350)	23.73	23.04	21.95
		2535 (21100)	23.71	22.90	21.88
		2510 (20850)	23.59	22.69	21.55
	1RB-Low (0)	2560 (21350)	23.57	22.82	21.75
		2535 (21100)	23.30	22.66	21.56
		2510 (20850)	23.21	22.55	21.48
	50RB-High (50)	2560 (21350)	22.67	21.67	20.67
		2535 (21100)	22.57	21.61	20.62
		2510 (20850)	22.35	21.35	20.38
	50RB-Middle (25)	2560 (21350)	22.79	21.79	20.80
		2535 (21100)	22.63	21.67	20.67
		2510 (20850)	22.42	21.44	20.43
	50RB-Low (0)	2560 (21350)	22.77	21.76	20.76
		2535 (21100)	22.48	21.50	20.54
		2510 (20850)	22.24	21.23	20.25
	100RB (0)	2560 (21350)	22.66	21.66	20.69
		2535 (21100)	22.55	21.54	20.57
		2510 (20850)	22.29	21.27	20.30

LTE Band12 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	715.3 (23173)	16.97	17.30	17.27
		707.5 (23095)	16.92	17.21	17.20
		699.7 (23017)	16.87	17.12	17.03
	1RB-Middle (3)	715.3 (23173)	17.04	17.30	17.34
		707.5 (23095)	17.03	17.15	17.28
		699.7 (23017)	16.93	17.08	17.20
	1RB-Low (0)	715.3 (23173)	16.97	17.26	17.26
		707.5 (23095)	16.94	17.17	17.15
		699.7 (23017)	16.86	17.20	17.08
	3RB-High (3)	715.3 (23173)	17.12	17.07	17.28
		707.5 (23095)	17.07	17.02	17.22
		699.7 (23017)	16.98	16.86	17.14
	3RB-Middle (1)	715.3 (23173)	17.15	17.06	17.36
		707.5 (23095)	17.08	17.02	17.27
		699.7 (23017)	17.01	16.99	17.18
	3RB-Low (0)	715.3 (23173)	17.12	17.02	17.34
		707.5 (23095)	17.06	16.99	17.21
		699.7 (23017)	17.00	16.90	17.12
	6RB (0)	715.3 (23173)	17.19	17.29	17.20
		707.5 (23095)	17.14	17.23	17.16
		699.7 (23017)	17.06	17.16	17.09
3MHz	1RB-High (14)	714.5 (23165)	16.87	17.18	17.07
		707.5 (23095)	16.79	17.12	17.02
		700.5 (23025)	16.72	16.93	16.90
	1RB-Middle (7)	714.5 (23165)	16.94	17.26	17.27
		707.5 (23095)	16.93	17.20	17.22
		700.5 (23025)	16.85	17.12	17.06
	1RB-Low (0)	714.5 (23165)	16.89	16.98	17.09
		707.5 (23095)	16.80	16.94	17.08
		700.5 (23025)	16.73	16.91	16.99
	8RB-High (7)	714.5 (23165)	17.06	17.07	17.08
		707.5 (23095)	17.02	17.04	17.06
		700.5 (23025)	16.95	16.99	16.97
	8RB-Middle (4)	714.5 (23165)	17.13	17.20	17.18
		707.5 (23095)	17.07	17.13	17.10
		700.5 (23025)	17.02	17.07	17.04
	8RB-Low (0)	714.5 (23165)	17.06	17.14	17.13
		707.5 (23095)	16.99	17.03	17.04
		700.5 (23025)	16.95	16.98	16.94
	15RB (0)	714.5 (23165)	17.05	17.06	17.08
		707.5 (23095)	17.01	17.01	17.03
		700.5 (23025)	16.94	16.92	16.93

5MHz	1RB-High (24)	713.5 (23155)	17.06	17.40	17.33
		707.5 (23095)	17.02	17.34	17.15
		701.5 (23035)	17.01	17.26	17.22
	1RB-Middle (12)	713.5 (23155)	17.23	17.58	17.39
		707.5 (23095)	17.17	17.43	17.35
		701.5 (23035)	17.10	17.36	17.26
	1RB-Low (0)	713.5 (23155)	17.07	17.38	17.20
		707.5 (23095)	17.02	17.24	17.19
		701.5 (23035)	16.99	17.17	17.17
	12RB-High (13)	713.5 (23155)	17.11	17.09	17.12
		707.5 (23095)	17.08	17.07	17.12
		701.5 (23035)	17.04	17.03	17.08
	12RB-Middle (6)	713.5 (23155)	17.20	17.19	17.26
		707.5 (23095)	17.13	17.14	17.14
		701.5 (23035)	17.05	17.02	17.10
	12RB-Low (0)	713.5 (23155)	17.15	17.18	17.20
		707.5 (23095)	17.07	17.01	17.11
		701.5 (23035)	16.97	16.93	16.96
	25RB (0)	713.5 (23155)	17.15	17.16	17.18
		707.5 (23095)	17.07	17.07	17.09
		701.5 (23035)	17.01	17.06	17.06
10MHz	1RB-High (49)	711 (23130)	17.17	17.42	17.34
		707.5 (23095)	17.15	17.40	17.31
		704 (23060)	17.11	17.31	17.26
	1RB-Middle (24)	711 (23130)	17.24	17.46	17.37
		707.5 (23095)	17.23	17.47	17.35
		704 (23060)	17.16	17.52	17.31
	1RB-Low (0)	711 (23130)	17.11	17.38	17.31
		707.5 (23095)	17.10	17.32	17.31
		704 (23060)	17.07	17.28	17.17
	25RB-High (25)	711 (23130)	17.07	17.09	17.10
		707.5 (23095)	17.11	17.13	17.10
		704 (23060)	17.09	17.11	17.12
	25RB-Middle (12)	711 (23130)	17.17	17.17	17.20
		707.5 (23095)	17.13	17.12	17.16
		704 (23060)	17.11	17.12	17.12
	25RB-Low (0)	711 (23130)	17.11	17.13	17.14
		707.5 (23095)	17.01	17.02	17.01
		704 (23060)	16.97	16.98	16.98
	50RB (0)	711 (23130)	17.10	17.08	17.12
		707.5 (23095)	17.07	17.06	17.06
		704 (23060)	17.03	17.03	17.04

LTE Band12 _B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	715.3 (23173)	23.88	23.12	22.13
		707.5 (23095)	23.78	23.08	22.12
		699.7 (23017)	23.80	23.20	22.14
	1RB-Middle (3)	715.3 (23173)	23.96	23.16	22.33
		707.5 (23095)	23.87	23.15	22.18
		699.7 (23017)	23.87	23.15	22.25
	1RB-Low (0)	715.3 (23173)	23.86	23.19	22.10
		707.5 (23095)	23.80	23.03	22.10
		699.7 (23017)	23.83	23.12	22.15
	3RB-High (3)	715.3 (23173)	23.99	23.01	22.24
		707.5 (23095)	23.89	22.95	22.16
		699.7 (23017)	23.99	22.94	22.19
	3RB-Middle (1)	715.3 (23173)	23.98	23.04	22.28
		707.5 (23095)	23.94	22.98	22.21
		699.7 (23017)	23.96	23.02	22.25
	3RB-Low (0)	715.3 (23173)	23.98	22.95	22.20
		707.5 (23095)	23.91	22.96	22.17
		699.7 (23017)	23.95	23.04	22.18
	6RB (0)	715.3 (23173)	23.14	22.24	21.16
		707.5 (23095)	23.04	22.14	21.02
		699.7 (23017)	23.09	22.20	21.08
3MHz	1RB-High (14)	714.5 (23165)	23.73	23.12	22.10
		707.5 (23095)	23.67	22.98	22.03
		700.5 (23025)	23.72	22.98	22.02
	1RB-Middle (7)	714.5 (23165)	23.86	23.20	22.20
		707.5 (23095)	23.80	23.00	22.13
		700.5 (23025)	23.87	23.17	22.18
	1RB-Low (0)	714.5 (23165)	23.69	23.09	22.08
		707.5 (23095)	23.69	23.00	21.97
		700.5 (23025)	23.74	23.04	22.09
	8RB-High (7)	714.5 (23165)	22.98	22.05	21.04
		707.5 (23095)	22.93	22.00	20.99
		700.5 (23025)	23.04	22.06	21.04
	8RB-Middle (4)	714.5 (23165)	23.07	22.15	21.14
		707.5 (23095)	23.00	22.05	21.05
		700.5 (23025)	23.05	22.09	21.12
	8RB-Low (0)	714.5 (23165)	23.00	22.08	21.07
		707.5 (23095)	22.94	22.00	20.99
		700.5 (23025)	22.97	22.05	21.02
	15RB (0)	714.5 (23165)	23.00	21.99	20.97
		707.5 (23095)	22.93	21.92	20.93
		700.5 (23025)	23.00	21.99	20.99

5MHz	1RB-High (24)	713.5 (23155)	23.94	23.31	22.19
		707.5 (23095)	23.91	23.20	22.16
		701.5 (23035)	23.92	23.12	22.17
	1RB-Middle (12)	713.5 (23155)	24.10	23.46	22.36
		707.5 (23095)	24.03	23.35	22.29
		701.5 (23035)	24.07	23.44	22.30
	1RB-Low (0)	713.5 (23155)	23.91	23.18	22.16
		707.5 (23095)	23.94	23.28	22.20
		701.5 (23035)	23.99	23.26	22.26
	12RB-High (13)	713.5 (23155)	23.00	22.01	21.02
		707.5 (23095)	23.05	22.04	21.09
		701.5 (23035)	23.12	22.08	21.12
	12RB-Middle (6)	713.5 (23155)	23.14	22.13	21.18
		707.5 (23095)	23.09	22.11	21.11
		701.5 (23035)	23.11	22.10	21.14
	12RB-Low (0)	713.5 (23155)	23.11	22.06	21.12
		707.5 (23095)	23.04	22.02	21.04
		701.5 (23035)	23.02	22.03	21.05
	25RB (0)	713.5 (23155)	23.08	22.06	21.12
		707.5 (23095)	23.05	22.06	21.06
		701.5 (23035)	23.09	22.10	21.09
10MHz	1RB-High (49)	711 (23130)	24.03	23.36	22.27
		707.5 (23095)	24.01	23.37	22.18
		704 (23060)	23.99	23.21	22.14
	1RB-Middle (24)	711 (23130)	24.09	23.33	22.25
		707.5 (23095)	24.07	23.25	22.27
		704 (23060)	24.07	23.31	22.23
	1RB-Low (0)	711 (23130)	24.01	23.23	22.28
		707.5 (23095)	24.02	23.37	22.16
		704 (23060)	24.06	23.46	22.29
	25RB-High (25)	711 (23130)	22.98	21.99	21.04
		707.5 (23095)	23.04	22.07	21.04
		704 (23060)	23.05	22.07	21.08
	25RB-Middle (12)	711 (23130)	23.12	22.13	21.15
		707.5 (23095)	23.09	22.12	21.12
		704 (23060)	23.09	22.09	21.11
	25RB-Low (0)	711 (23130)	23.06	22.06	21.09
		707.5 (23095)	23.00	21.99	21.01
		704 (23060)	22.95	21.96	20.98
	50RB (0)	711 (23130)	23.05	22.02	21.05
		707.5 (23095)	23.02	22.01	21.02
		704 (23060)	23.01	21.99	21.01

LTE Band13 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
5MHz	1RB-High (24)	784.5 (23255)	17.28	17.60	17.59
		782 (23230)	17.34	17.67	17.57
		779.5 (23205)	17.33	17.62	17.48
	1RB-Middle (12)	784.5 (23255)	17.45	17.78	17.70
		782 (23230)	17.51	17.76	17.72
		779.5 (23205)	17.51	17.90	17.72
	1RB-Low (0)	784.5 (23255)	17.39	17.70	17.68
		782 (23230)	17.40	17.67	17.61
		779.5 (23205)	17.52	17.79	17.67
	12RB-High (13)	784.5 (23255)	17.35	17.34	17.40
		782 (23230)	17.39	17.41	17.41
		779.5 (23205)	17.47	17.46	17.51
	12RB-Middle (6)	784.5 (23255)	17.48	17.50	17.51
		782 (23230)	17.49	17.49	17.52
		779.5 (23205)	17.52	17.53	17.54
	12RB-Low (0)	784.5 (23255)	17.45	17.45	17.48
		782 (23230)	17.42	17.43	17.43
		779.5 (23205)	17.42	17.41	17.45
	25RB (0)	784.5 (23255)	17.45	17.46	17.47
		782 (23230)	17.42	17.45	17.47
		779.5 (23205)	17.44	17.49	17.48
10MHz	1RB-High (49)	782 (23230)	17.35	17.69	17.50
	1RB-Middle (24)	782 (23230)	17.62	17.82	17.73
	1RB-Low (0)	782 (23230)	17.58	17.91	17.71
	25RB-High (25)	782 (23230)	17.38	17.38	17.40
	25RB-Middle (12)	782 (23230)	17.50	17.53	17.54
	25RB-Low (0)	782 (23230)	17.40	17.42	17.42
	50RB (0)	782 (23230)	17.41	17.36	17.38

LTE Band13 _B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
5MHz	1RB-High (24)	784.5 (23255)	23.84	23.10	22.09
		782 (23230)	23.89	23.12	22.14
		779.5 (23205)	23.83	23.04	22.04
	1RB-Middle (12)	784.5 (23255)	23.98	23.29	22.21
		782 (23230)	24.00	23.20	22.18
		779.5 (23205)	24.00	23.10	22.21
	1RB-Low (0)	784.5 (23255)	23.85	23.10	22.12
		782 (23230)	23.88	23.03	22.05
		779.5 (23205)	23.90	23.12	22.07
	12RB-High (13)	784.5 (23255)	22.95	22.02	21.06
		782 (23230)	22.96	22.00	21.06
		779.5 (23205)	22.99	22.00	21.06
	12RB-Middle (6)	784.5 (23255)	22.99	22.02	21.10
		782 (23230)	23.01	22.07	21.10
		779.5 (23205)	23.01	22.03	21.08
	12RB-Low (0)	784.5 (23255)	22.96	21.99	21.06
		782 (23230)	22.93	21.94	20.99
		779.5 (23205)	22.88	21.87	20.93
	25RB (0)	784.5 (23255)	22.97	22.02	21.05
		782 (23230)	22.97	22.01	21.03
		779.5 (23205)	22.95	21.98	20.99
10MHz	1RB-High (49)	782 (23230)	23.94	23.12	22.19
	1RB-Middle (24)	782 (23230)	24.02	23.21	22.27
	1RB-Low (0)	782 (23230)	24.01	23.20	22.13
	25RB-High (25)	782 (23230)	22.97	22.03	20.99
	25RB-Middle (12)	782 (23230)	23.04	22.07	21.11
	25RB-Low (0)	782 (23230)	22.90	21.94	20.94
	50RB (0)	782 (23230)	22.98	21.97	20.97

LTE Band66 _A

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1779.3 (132665)	11.05	11.37	11.26
		1745 (132322)	11.11	11.41	11.33
		1710.7 (131979)	11.24	11.56	11.52
	1RB-Middle (3)	1779.3 (132665)	11.09	11.46	11.32
		1745 (132322)	11.17	11.50	11.43
		1710.7 (131979)	11.34	11.56	11.59
	1RB-Low (0)	1779.3 (132665)	11.03	11.39	11.33
		1745 (132322)	11.10	11.40	11.36
		1710.7 (131979)	11.25	11.47	11.53
	3RB-High (3)	1779.3 (132665)	11.22	11.16	11.39
		1745 (132322)	11.23	11.23	11.37
		1710.7 (131979)	11.38	11.31	11.57
	3RB-Middle (1)	1779.3 (132665)	11.21	11.18	11.40
		1745 (132322)	11.24	11.25	11.40
		1710.7 (131979)	11.40	11.40	11.54
	3RB-Low (0)	1779.3 (132665)	11.18	11.19	11.37
		1745 (132322)	11.18	11.24	11.37
		1710.7 (131979)	11.36	11.28	11.51
	6RB (0)	1779.3 (132665)	11.27	11.36	11.27
		1745 (132322)	11.29	11.40	11.26
		1710.7 (131979)	11.45	11.52	11.48
3MHz	1RB-High (14)	1778.5 (132657)	11.01	11.23	11.25
		1745 (132322)	11.02	11.23	11.26
		1711.5 (131987)	11.15	11.46	11.45
	1RB-Middle (7)	1778.5 (132657)	11.09	11.20	11.39
		1745 (132322)	11.09	11.29	11.41
		1711.5 (131987)	11.24	11.49	11.56
	1RB-Low (0)	1778.5 (132657)	11.03	11.17	11.16
		1745 (132322)	11.03	11.21	11.29
		1711.5 (131987)	11.15	11.46	11.45
	8RB-High (7)	1778.5 (132657)	11.18	11.22	11.19
		1745 (132322)	11.24	11.24	11.25
		1711.5 (131987)	11.34	11.35	11.37
	8RB-Middle (4)	1778.5 (132657)	11.25	11.27	11.25
		1745 (132322)	11.25	11.32	11.31
		1711.5 (131987)	11.45	11.43	11.47
	8RB-Low (0)	1778.5 (132657)	11.19	11.22	11.20
		1745 (132322)	11.26	11.24	11.23
		1711.5 (131987)	11.34	11.37	11.41
	15RB (0)	1778.5 (132657)	11.17	11.15	11.20
		1745 (132322)	11.23	11.19	11.23
		1711.5 (131987)	11.36	11.34	11.38

5MHz	1RB-High (24)	1777.5 (132647)	11.23	11.42	11.40
		1745 (132322)	11.23	11.46	11.35
		1712.5 (131997)	11.38	11.63	11.53
	1RB-Middle (12)	1777.5 (132647)	11.31	11.66	11.49
		1745 (132322)	11.37	11.58	11.51
		1712.5 (131997)	11.48	11.77	11.63
	1RB-Low (0)	1777.5 (132647)	11.21	11.52	11.42
		1745 (132322)	11.22	11.49	11.37
		1712.5 (131997)	11.36	11.66	11.57
	12RB-High (13)	1777.5 (132647)	11.25	11.25	11.26
		1745 (132322)	11.30	11.25	11.30
		1712.5 (131997)	11.45	11.41	11.45
	12RB-Middle (6)	1777.5 (132647)	11.29	11.28	11.32
		1745 (132322)	11.35	11.31	11.36
		1712.5 (131997)	11.46	11.46	11.51
	12RB-Low (0)	1777.5 (132647)	11.23	11.22	11.25
		1745 (132322)	11.27	11.29	11.31
		1712.5 (131997)	11.43	11.42	11.46
	25RB (0)	1777.5 (132647)	11.25	11.26	11.27
		1745 (132322)	11.32	11.32	11.31
		1712.5 (131997)	11.43	11.44	11.44
10MHz	1RB-High (49)	1775 (132622)	11.31	11.57	11.42
		1745 (132322)	11.37	11.52	11.53
		1715 (132022)	11.41	11.68	11.53
	1RB-Middle (24)	1775 (132622)	11.34	11.68	11.47
		1745 (132322)	11.39	11.59	11.49
		1715 (132022)	11.50	11.64	11.61
	1RB-Low (0)	1775 (132622)	11.32	11.58	11.48
		1745 (132322)	11.37	11.61	11.53
		1715 (132022)	11.48	11.64	11.66
	25RB-High (25)	1775 (132622)	11.31	11.28	11.26
		1745 (132322)	11.34	11.35	11.36
		1715 (132022)	11.47	11.45	11.45
	25RB-Middle (12)	1775 (132622)	11.33	11.34	11.34
		1745 (132322)	11.38	11.37	11.38
		1715 (132022)	11.48	11.47	11.50
	25RB-Low (0)	1775 (132622)	11.30	11.29	11.29
		1745 (132322)	11.34	11.36	11.35
		1715 (132022)	11.42	11.40	11.44
	50RB (0)	1775 (132622)	11.31	11.28	11.29
		1745 (132322)	11.35	11.33	11.36
		1715 (132022)	11.46	11.43	11.44

15MHz	1RB-High (74)	1772.5 (132597)	11.25	11.42	11.38
		1745 (132322)	11.29	11.45	11.45
		1717.5 (132047)	11.37	11.69	11.52
	1RB-Middle (37)	1772.5 (132597)	11.38	11.67	11.49
		1745 (132322)	11.41	11.70	11.57
		1717.5 (132047)	11.49	11.83	11.73
	1RB-Low (0)	1772.5 (132597)	11.28	11.52	11.36
		1745 (132322)	11.32	11.50	11.51
		1717.5 (132047)	11.42	11.73	11.60
	36RB-High (38)	1772.5 (132597)	11.28	11.28	11.29
		1745 (132322)	11.33	11.33	11.37
		1717.5 (132047)	11.46	11.44	11.46
	36RB-Middle (19)	1772.5 (132597)	11.34	11.32	11.35
		1745 (132322)	11.40	11.35	11.41
		1717.5 (132047)	11.46	11.42	11.47
	36RB-Low (0)	1772.5 (132597)	11.32	11.29	11.32
		1745 (132322)	11.34	11.31	11.36
		1717.5 (132047)	11.40	11.43	11.45
	75RB (0)	1772.5 (132597)	11.28	11.28	11.27
		1745 (132322)	11.34	11.34	11.34
		1717.5 (132047)	11.45	11.43	11.43
20MHz	1RB-High (99)	1770 (132572)	11.17	11.48	11.37
		1745 (132322)	11.21	11.39	11.31
		1720 (132072)	11.27	11.57	11.34
	1RB-Middle (50)	1770 (132572)	11.44	11.61	11.61
		1745 (132322)	11.38	11.58	11.51
		1720 (132072)	11.39	11.80	11.67
	1RB-Low (0)	1770 (132572)	11.14	11.47	11.32
		1745 (132322)	11.23	11.51	11.35
		1720 (132072)	11.33	11.59	11.44
	50RB-High (50)	1770 (132572)	11.31	11.32	11.30
		1745 (132322)	11.35	11.35	11.36
		1720 (132072)	11.47	11.46	11.47
	50RB-Middle (25)	1770 (132572)	11.48	11.37	11.36
		1745 (132322)	11.44	11.41	11.40
		1720 (132072)	11.41	11.48	11.48
	50RB-Low (0)	1770 (132572)	11.33	11.30	11.31
		1745 (132322)	11.38	11.34	11.38
		1720 (132072)	11.40	11.38	11.39
	100RB (0)	1770 (132572)	11.30	11.27	11.29
		1745 (132322)	11.36	11.31	11.35
		1720 (132072)	11.43	11.37	11.42

LTE Band66 _B

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1779.3 (132665)	23.85	22.54	22.05
		1745 (132322)	23.88	22.58	22.13
		1710.7 (131979)	24.00	22.82	22.32
	1RB-Middle (3)	1779.3 (132665)	23.92	22.76	22.20
		1745 (132322)	23.98	22.61	22.24
		1710.7 (131979)	24.10	22.76	22.37
	1RB-Low (0)	1779.3 (132665)	23.80	22.54	22.15
		1745 (132322)	23.89	22.54	22.17
		1710.7 (131979)	24.03	22.73	22.22
	3RB-High (3)	1779.3 (132665)	23.96	22.49	22.14
		1745 (132322)	24.01	22.44	22.14
		1710.7 (131979)	24.15	22.68	22.35
	3RB-Middle (1)	1779.3 (132665)	23.97	22.51	22.15
		1745 (132322)	24.04	22.51	22.20
		1710.7 (131979)	24.16	22.64	22.38
	3RB-Low (0)	1779.3 (132665)	23.94	22.37	22.19
		1745 (132322)	24.01	22.43	22.18
		1710.7 (131979)	24.12	22.59	22.37
	6RB (0)	1779.3 (132665)	23.05	22.17	21.02
		1745 (132322)	23.09	22.20	21.10
		1710.7 (131979)	23.22	22.32	21.19
3MHz	1RB-High (14)	1778.5 (132657)	23.77	22.50	22.10
		1745 (132322)	23.79	22.52	22.08
		1711.5 (131987)	23.94	22.61	22.13
	1RB-Middle (7)	1778.5 (132657)	23.87	22.65	22.24
		1745 (132322)	23.90	22.72	22.22
		1711.5 (131987)	24.00	22.77	22.32
	1RB-Low (0)	1778.5 (132657)	23.76	22.47	22.02
		1745 (132322)	23.75	22.48	22.00
		1711.5 (131987)	23.92	22.74	22.18
	8RB-High (7)	1778.5 (132657)	22.99	22.02	21.01
		1745 (132322)	22.99	22.04	21.06
		1711.5 (131987)	23.11	22.16	21.15
	8RB-Middle (4)	1778.5 (132657)	23.02	22.06	21.06
		1745 (132322)	23.07	22.13	21.10
		1711.5 (131987)	23.21	22.26	21.22
	8RB-Low (0)	1778.5 (132657)	22.96	22.01	21.01
		1745 (132322)	22.99	22.02	21.03
		1711.5 (131987)	23.13	22.21	21.19
	15RB (0)	1778.5 (132657)	22.95	21.98	20.95
		1745 (132322)	22.99	21.99	21.02
		1711.5 (131987)	23.14	22.16	21.13

5MHz	1RB-High (24)	1777.5 (132647)	23.98	22.81	22.19
		1745 (132322)	24.03	22.79	22.23
		1712.5 (131997)	24.13	22.96	22.28
	1RB-Middle (12)	1777.5 (132647)	24.08	22.90	22.24
		1745 (132322)	24.16	22.82	22.27
		1712.5 (131997)	24.25	23.14	22.47
	1RB-Low (0)	1777.5 (132647)	23.98	22.81	22.13
		1745 (132322)	24.06	22.76	22.27
		1712.5 (131997)	24.19	23.04	22.37
	12RB-High (13)	1777.5 (132647)	23.05	22.03	21.06
		1745 (132322)	23.08	22.09	21.11
		1712.5 (131997)	23.23	22.22	21.26
	12RB-Middle (6)	1777.5 (132647)	23.09	22.09	21.14
		1745 (132322)	23.14	22.11	21.17
		1712.5 (131997)	23.26	22.26	21.27
	12RB-Low (0)	1777.5 (132647)	23.01	22.02	21.04
		1745 (132322)	23.09	22.10	21.10
		1712.5 (131997)	23.24	22.20	21.25
	25RB (0)	1777.5 (132647)	23.04	22.06	21.06
		1745 (132322)	23.10	22.13	21.11
		1712.5 (131997)	23.23	22.23	21.25
10MHz	1RB-High (49)	1775 (132622)	24.08	22.92	22.28
		1745 (132322)	24.14	22.83	22.36
		1715 (132022)	24.19	23.09	22.41
	1RB-Middle (24)	1775 (132622)	24.13	22.94	22.33
		1745 (132322)	24.18	22.90	22.37
		1715 (132022)	24.29	23.11	22.46
	1RB-Low (0)	1775 (132622)	24.09	22.93	22.29
		1745 (132322)	24.17	22.91	22.34
		1715 (132022)	24.25	23.06	22.42
	25RB-High (25)	1775 (132622)	23.05	22.08	21.07
		1745 (132322)	23.14	22.14	21.16
		1715 (132022)	23.21	22.25	21.25
	25RB-Middle (12)	1775 (132622)	23.12	22.13	21.14
		1745 (132322)	23.18	22.19	21.17
		1715 (132022)	23.27	22.27	21.27
	25RB-Low (0)	1775 (132622)	23.07	22.08	21.10
		1745 (132322)	23.14	22.15	21.15
		1715 (132022)	23.19	22.22	21.21
	50RB (0)	1775 (132622)	23.09	22.08	21.09
		1745 (132322)	23.16	22.15	21.17
		1715 (132022)	23.22	22.23	21.24

15MHz	1RB-High (74)	1772.5 (132597)	24.04	22.80	22.22
		1745 (132322)	24.09	22.79	22.23
		1717.5 (132047)	24.12	22.98	22.39
	1RB-Middle (37)	1772.5 (132597)	24.18	22.91	22.33
		1745 (132322)	24.20	22.94	22.39
		1717.5 (132047)	24.28	22.99	22.48
	1RB-Low (0)	1772.5 (132597)	24.05	22.86	22.17
		1745 (132322)	24.09	22.82	22.20
		1717.5 (132047)	24.19	22.91	22.39
	36RB-High (38)	1772.5 (132597)	23.08	22.07	21.11
		1745 (132322)	23.13	22.11	21.17
		1717.5 (132047)	23.25	22.22	21.26
	36RB-Middle (19)	1772.5 (132597)	23.13	22.10	21.15
		1745 (132322)	23.18	22.16	21.20
		1717.5 (132047)	23.22	22.20	21.27
	36RB-Low (0)	1772.5 (132597)	23.09	22.07	21.13
		1745 (132322)	23.13	22.11	21.16
		1717.5 (132047)	23.22	22.21	21.24
	75RB (0)	1772.5 (132597)	23.09	22.06	21.07
		1745 (132322)	23.15	22.13	21.14
		1717.5 (132047)	23.25	22.22	21.22
20MHz	1RB-High (99)	1770 (132572)	23.94	22.60	22.12
		1745 (132322)	23.99	22.82	22.12
		1720 (132072)	24.03	22.84	22.20
	1RB-Middle (50)	1770 (132572)	24.17	23.00	22.34
		1745 (132322)	24.20	23.00	22.41
		1720 (132072)	24.26	23.00	22.43
	1RB-Low (0)	1770 (132572)	23.88	22.76	22.11
		1745 (132322)	24.03	22.87	22.22
		1720 (132072)	24.12	22.83	22.24
	50RB-High (50)	1770 (132572)	23.11	22.08	21.13
		1745 (132322)	23.16	22.16	21.12
		1720 (132072)	23.31	22.24	21.25
	50RB-Middle (25)	1770 (132572)	23.17	22.15	21.16
		1745 (132322)	23.23	22.19	21.21
		1720 (132072)	23.30	22.27	21.29
	50RB-Low (0)	1770 (132572)	23.10	22.07	21.08
		1745 (132322)	23.18	22.14	21.14
		1720 (132072)	23.22	22.18	21.18
	100RB (0)	1770 (132572)	23.07	22.03	21.05
		1745 (132322)	23.16	22.13	21.14
		1720 (132072)	23.21	22.20	21.22

11.3 Wi-Fi and BT Measurement result

The maximum output power for BT

GFSK			Tune up	EDR2M-4_DQPSK			EDR3M-8DPSK		
Channel 0	Channel 39	Channel 78		Channel 0	Channel 39	Channel 78	Channel 0	Channel 39	Channel 78
6.19	5.74	5.25	7.00	4.97	4.74	4.25	4.66	4.17	3.95

Tune up_B

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	tune up (dBm)
	802.11b 1Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11b 2Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11b 5.5Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11b 11Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 6Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 9Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 12Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 18Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 24Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 36Mbps	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11g 48Mbps	1	2412	15.5
		6	2437	15.5

		11	2462	15.5
	802.11g 54Mbps	1	2412	15.5
		6	2437	15.5
		11	2462	15.5
	802.11n-HT20 MCS0	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11n-HT20 MCS1	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11n-HT20 MCS2	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11n-HT20 MCS3	1	2412	16.5
		6	2437	16
		11	2462	16
	802.11n-HT20 MCS4	1	2412	16.5
		6	2437	16.5
		11	2462	16.5
	802.11n-HT20 MCS5	1	2412	16.5
		6	2437	16.5
		11	2462	16.5
	802.11n-HT20 MCS6	1	2412	15.5
		6	2437	15.5
		11	2462	15.5
	802.11n-HT20 MCS7	1	2412	15.5
		6	2437	15.5
		11	2462	15.5

5GHz WLAN	Mode	CHannel	Frequency (MHz)	Tune up (dBm)
	802.11a 6Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 9Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 12Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 18Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 24Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 36Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 48Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11a 54Mbps	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS0	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS1	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS2	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS3	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS4	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS5	36-64	5180-5320	16

		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS6	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT20 MCS7	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11n-HT40 MCS0	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS1	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS2	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS3	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS4	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS5	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS6	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11n-HT40 MCS7	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT20 MCS0	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS1	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS2	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
		36-64	5180-5320	16

	802.11AC-HT20 MCS3	100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS4	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS5	36-64	5180-5320	16
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS6	36-64	5180-5320	15.5
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS7	36-64	5180-5320	15.5
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT20 MCS8	36-64	5180-5320	15
		100-144	5500-5720	14.5
		149-165	5745-5825	14.5
	802.11AC-HT40 MCS0	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS1	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS2	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS3	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS4	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS5	36-64	5180-5320	16
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS6	36-64	5180-5320	15.5
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS7	36-64	5180-5320	15.5
		100-144	5500-5720	14
		149-165	5745-5825	14
		36-64	5180-5320	15

	802.11AC-HT40 MCS8	100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT40 MCS9	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS0	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS1	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS2	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS3	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS4	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS5	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS6	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS7	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS8	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14
	802.11AC-HT80 MCS9	36-64	5180-5320	15
		100-144	5500-5720	14
		149-165	5745-5825	14

Tune up_A

	Mode	Channel	Frequency	tune up
			(MHz)	(dBm)
2.4GHz WLAN	802.11b 1Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11b 2Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11b 5.5Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11b 11Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 6Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 9Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 12Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 18Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 24Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 36Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 48Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11g 54Mbps	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS0	1	2412	8
		6	2437	8

	802.11n-HT20 MCS1	11	2462	8
		1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS2	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS3	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS4	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS5	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS6	1	2412	8
		6	2437	8
		11	2462	8
	802.11n-HT20 MCS7	1	2412	8
		6	2437	8
		11	2462	8

	Mode	CHannel	Frequency (MHz)	Tune up (dBm)
5GHz WLAN	802.11a 6Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 9Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 12Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 18Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 24Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 36Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 48Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11a 54Mbps	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS0	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS1	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS2	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS3	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS4	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS5	36-64	5180-5320	6

		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT20 MCS6	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
	802.11n-HT20 MCS7	100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
	802.11n-HT40 MCS0	149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT40 MCS1	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
	802.11n-HT40 MCS2	100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
	802.11n-HT40 MCS3	149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT40 MCS4	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
	802.11n-HT40 MCS5	100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
	802.11n-HT40 MCS6	149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11n-HT40 MCS7	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
	802.11AC-HT20 MCS0	100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
	802.11AC-HT20 MCS1	149-165	5745-5825	6
		36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS2	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6

	802.11AC-HT20 MCS3	100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS4	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS5	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS6	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS7	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT20 MCS8	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS0	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS1	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS2	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS3	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS4	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS5	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS6	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS7	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
		36-64	5180-5320	6

	802.11AC-HT40 MCS8	100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT40 MCS9	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS0	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS1	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS2	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS3	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS4	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS5	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS6	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS7	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS8	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6
	802.11AC-HT80 MCS9	36-64	5180-5320	6
		100-144	5500-5720	6
		149-165	5745-5825	6

The maximum output power for WiFi 2.4G –A

802.11b(dBm)									
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps					
11(2462MHz)	6.93	/	/	/					
6(2437MHz)	7.22	7.16	7.12	7.10					
1(2412MHz)	7.14	/	/	/					
802.11g(dBm)									
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps	
11(2462MHz)	7.02	/	/	/	/	/	/	/	
6(2437MHz)	7.19	7.16	7.11	7.12	7.11	7.06	6.90	6.89	
1(2412MHz)	7.14								
802.11n(dBm)-20MHz									
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
11(2462MHz)	6.83	/	/	/	/	/	/	/	
6(2437MHz)	7.02	6.96	6.85	6.83	6.80	6.81	6.78	6.76	
1(2412MHz)	6.99	/	/	/	/	/	/	/	

The maximum output power for WiFi 2.4G –B

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps					
11(2462MHz)	15.47								
6(2437MHz)	15.42								
1(2412MHz)	16.03	15.95	15.99	15.83					
802.11g(dBm)									
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps	
11(2462MHz)	15.16								
6(2437MHz)	15.39								
1(2412MHz)	15.88	15.76	15.84	15.86	15.75	15.76	14.51	14.49	
802.11n(dBm)-20MHz									
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
11(2462MHz)	14.96								
6(2437MHz)	15.12								
1(2412MHz)	15.59	15.70	15.68	15.74	15.64	15.61	14.43	14.47	

The maximum output power for WiFi 5G –A

802.11ac(dBm)-80MHz										
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
42(5210 MHz)	4.45	4.31	4.13	4.16	4.12	4.19	4.00	4.12	4.01	4.03
58(5290 MHz)	5.12	5.12	5.06	5.07	5.03	4.99	4.89	4.88	4.85	4.81
106(5530 MHz)	4.46									
122(5610 MHz)	5.23	5.13	5.19	5.19	5.15	5.14	5.14	5.13	5.12	5.04
138(5690 MHz)	4.77									
155(5775 MHz)	5.43	5.21	5.04	5.12	5.14	5.10	5.15	5.06	5.06	4.98

The maximum output power for WiFi 5G –B

802.11n(dBm)-40MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
38(5190 MHz)	14.87	/	/	/	/	/	/	/
46(5230 MHz)	15.17	14.74	14.64	14.75	14.67	14.73	14.71	14.68
54(5270 MHz)	15.04	/	/	/	/	/	/	/
62(5310 MHz)	15.27	14.92	14.81	15.12	14.87	14.94	14.87	14.91
802.11a(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
100(5500 MHz)	13.11							
104(5520 MHz)	13.13							
108(5540 MHz)	12.55							
112(5560 MHz)	12.82							
116(5580 MHz)	13.30							
120(5600 MHz)	13.54							
124(5620 MHz)	14.19	14.18	14.07	13.93	13.93	13.95	13.94	13.70
128(5640 MHz)	13.66							
132(5660 MHz)	13.61							
136(5680 MHz)	13.55							
140(5700 MHz)	13.44							
144(5720 MHz)	13.18							
149(5745 MHz)	13.37							
153(5765 MHz)	13.41							
157(5785 MHz)	13.82							
161(5805 MHz)	14.08							
165(5825 MHz)	14.12	14.06	14.00	13.98	13.98	14.02	13.91	13.96

12 Simultaneous TX SAR Considerations

12.1 Transmit Antenna Separation Distances

The detail for transmit antenna separation distances is described in the additional document:

Appendix to test report No.24T04Z200327-010

The photos of SAR test

12.2 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

Antenna/Sensor-to- DUT sides separation distances						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
Ant.2	Yes	Yes	Yes	No	Yes	No
Ant.3	Yes	Yes	Yes	No	Yes	No
Ant.6	Yes	Yes	No	Yes	Yes	No

13 Evaluation of Simultaneous

Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities are as below:

No.	Antenna combines	Head	Body
1	WWAN + BT	Yes	Yes
2	WWAN + Wi-Fi 2.4G	Yes	Yes
3	WWAN + Wi-Fi 5G	Yes	Yes
4	WWAN + Wi-Fi 5G + BT	Yes	Yes
5	Wi-Fi 5G + BT	Yes	Yes

Note:

- Wi-Fi 2.4GHz & Bluetooth can not transmit simultaneously.
- The reported SAR summation is calculated based on the same configuration and test position.
- For the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR, we determined the SAR of this edges were less than 0.01. For the convenience of simultaneous transmission calculation, all SAR values less than 0.01 are uniformly written as 0.00

Test Position SAR 1g(W/kg)		WCDMA850	WCDMA1900	LTE B2	LTE B4	LTE B5	LTE B7	LTE B12	LTE B13	LTE B66	MAX. SAR 1g
Body	Rear 0mm	0.82	0.65	0.61	0.59	0.75	0.72	0.65	0.54	0.71	0.82
	Left 0mm	0.24	0.04	0.07	0.05	0.20	0.39	0.14	0.15	0.07	0.39
	Right 0mm										0.00
	Top 0mm	0.30	0.29	0.41	0.28	0.31	0.09	0.38	0.38	0.46	0.46
	Rear 18mm										0.00
	Rear 20mm	0.60	0.60	0.70	0.53	0.48	0.73	0.36	0.35	0.46	0.73
	Left 13mm	0.18	0.18	0.20	0.13	0.13	1.30	0.07	0.09	0.12	1.30
	Top 17mm										0.00
	Top 27mm	0.26	0.52	0.58	0.49	0.23	0.12	0.16	0.16	0.42	0.58

Test Position SAR 1g(W/kg)		1	2	3	4	Test Position SAR 1g(W/kg)		simultaneous transmission	
		WWAN	WLAN2.4G	WLAN5G	BT			1+2	1+3+4
Body	Rear 0mm	0.82	0.19	0.49	0.00	Body	Rear 0mm	1.01	1.31
	Left 0mm	0.39			0.00		Left 0mm	0.39	0.39
	Right 0mm	0.00	0.13	0.06	0.00		Right 0mm	0.13	0.06
	Top 0mm	0.46	0.15	0.45	0.00		Top 0mm	0.61	0.91
	Rear 18mm	0.00	0.16	0.17	0.00		Rear 18mm	0.16	0.17
	Rear 20mm	0.73	0.16	0.17	0.00		Rear 20mm	0.89	0.90
	Left 13mm	1.30			0.00		Left 13mm	1.30	1.30
	Top 17mm	0.00	0.14	0.23	0.00		Top 17mm	0.14	0.23
	Top 27mm	0.58	0.14	0.23	0.00		Top 27mm	0.72	0.81

Conclusion:

According to the above tables, the sum of reported SAR values is <1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

Note:

KDB 447498 D01 General RF Exposure Guidance:

For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor

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

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 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.

KDB 941225 D01 SAR test for 3G devices:

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 or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.

When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.

Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.

Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.

Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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; therefore, the requirement for H, M and L channels may not fully apply.

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s).

When the reported SAR for 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 wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.

> 0.4 W/kg, SAR is repeated using the same wireless mode test 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 reported SAR is ≤ 0.8 W/kg or all required test positions are tested.

- For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
- When it is unclear, all equivalent conditions must be tested.

For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.

- The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.

When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

Table 14.1: Duty Cycle

Mode	Duty Cycle
Speech for GSM	1:8.3
WCDMA<E FDD	1:1

14.1 SAR results for 2G/3G/4G

Note1: The data is used for sensor on

Note2: The data is used for sensor off

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Body	WCDMA 850	4233	846.6	RMC	Rear	0mm	\	Note1	17.78	18.50	0.633	0.75	0.288	0.34	-0.12
Body	WCDMA 850	4183	836.6	RMC	Rear	0mm	\	Note1	17.82	18.50	0.639	0.75	0.292	0.34	0.03
Body	WCDMA 850	4132	826.4	RMC	Rear	0mm	FIG A.1	Note1	17.73	18.50	0.689	0.82	0.315	0.38	0.11
Body	WCDMA 850	4183	836.6	RMC	Left	0mm	\	Note1	17.82	18.50	0.205	0.24	0.102	0.12	0.07
Body	WCDMA 850	4183	836.6	RMC	Top	0mm	\	Note1	17.82	18.50	0.254	0.30	0.117	0.14	-0.13
Body	WCDMA 850	4183	846.6	RMC	Rear	20mm	\	Note2	23.95	25.50	0.421	0.60	0.291	0.42	-0.11
Body	WCDMA 850	4183	836.6	RMC	Left	13mm	\	Note2	23.95	25.50	0.126	0.18	0.086	0.12	-0.16
Body	WCDMA 850	4183	836.6	RMC	Top	27mm	\	Note2	23.95	25.50	0.184	0.26	0.124	0.18	0.16
Body	WCDMA 1900	9538	1907.6	RMC	Rear	0mm	FIG A.2	Note1	11.15	12.00	0.532	0.65	0.225	0.27	0.04
Body	WCDMA 1900	9400	1880	RMC	Rear	0mm	\	Note1	11.21	12.00	0.506	0.61	0.215	0.26	-0.14
Body	WCDMA 1900	9262	1852.4	RMC	Rear	0mm	\	Note1	11.27	12.00	0.464	0.55	0.204	0.24	-0.19
Body	WCDMA 1900	9400	1880	RMC	Left	0mm	\	Note1	11.21	12.00	0.033	0.04	0.015	0.02	0.16
Body	WCDMA 1900	9400	1880	RMC	Top	0mm	\	Note1	11.21	12.00	0.239	0.29	0.111	0.13	0.05
Body	WCDMA 1900	9400	1880	RMC	Rear	20mm	\	Note2	23.19	24.00	0.497	0.60	0.211	0.25	0.01
Body	WCDMA 1900	9400	1880	RMC	Left	13mm	\	Note2	23.19	24.00	0.147	0.18	0.089	0.11	-0.12
Body	WCDMA 1900	9400	1880	RMC	Top	27mm	\	Note2	23.19	24.00	0.434	0.52	0.266	0.32	-0.16
Body	LTE Band2	18700	1860	1RB-Middle	Rear	0mm	\	Note1	11.83	12.50	0.522	0.61	0.240	0.28	0.07
Body	LTE Band2	18700	1860	1RB-Middle	Left	0mm	\	Note1	11.83	12.50	0.056	0.07	0.025	0.03	-0.03
Body	LTE Band2	18700	1860	1RB-Middle	Top	0mm	\	Note1	11.83	12.50	0.353	0.41	0.138	0.16	-0.06
Body	LTE Band2	18700	1860	50RB-Middle	Rear	0mm	\	Note1	11.86	12.50	0.472	0.55	0.225	0.26	0.05
Body	LTE Band2	18700	1860	50RB-Middle	Left	0mm	\	Note1	11.86	12.50	0.051	0.06	0.022	0.03	-0.05
Body	LTE Band2	18700	1860	50RB-Middle	Top	0mm	\	Note1	11.86	12.50	0.333	0.39	0.131	0.15	0.08
Body	LTE Band2	18700	1860	1RB-Middle	Rear	20mm	FIG A.3	Note2	23.77	24.50	0.589	0.70	0.351	0.42	-0.01
Body	LTE Band2	18700	1860	1RB-Middle	Left	13mm	\	Note2	23.77	24.50	0.172	0.20	0.105	0.12	-0.14
Body	LTE Band2	18700	1860	1RB-Middle	Top	27mm	\	Note2	23.77	24.50	0.493	0.58	0.303	0.36	-0.17
Body	LTE Band2	18900	1880	50RB-Middle	Rear	20mm	\	Note2	22.87	23.50	0.488	0.56	0.277	0.32	0.09
Body	LTE Band2	18900	1880	50RB-Middle	Left	13mm	\	Note2	22.87	23.50	0.141	0.16	0.089	0.10	0.17
Body	LTE Band2	18900	1880	50RB-Middle	Top	27mm	\	Note2	22.87	23.50	0.388	0.45	0.236	0.27	0.13
Body	LTE Band4	20050	1720	1RB-Middle	Rear	0mm	FIG A.4	Note1	12.24	13.00	0.498	0.59	0.205	0.24	-0.02
Body	LTE Band4	20050	1720	1RB-Middle	Left	0mm	\	Note1	12.24	13.00	0.039	0.05	0.020	0.02	0.14
Body	LTE Band4	20050	1720	1RB-Middle	Top	0mm	\	Note1	12.24	13.00	0.236	0.28	0.096	0.11	-0.16
Body	LTE Band4	20050	1720	50RB-High	Rear	0mm	\	Note1	12.34	13.00	0.484	0.56	0.198	0.23	0.16
Body	LTE Band4	20050	1720	50RB-High	Left	0mm	\	Note1	12.34	13.00	0.036	0.04	0.018	0.02	0.17
Body	LTE Band4	20050	1720	50RB-High	Top	0mm	\	Note1	12.34	13.00	0.230	0.27	0.095	0.11	0.03
Body	LTE Band4	20300	1745	1RB-Middle	Rear	20mm	\	Note2	24.25	25.00	0.447	0.53	0.269	0.32	0.03
Body	LTE Band4	20300	1745	1RB-Middle	Left	13mm	\	Note2	24.25	25.00	0.106	0.13	0.070	0.08	0.17
Body	LTE Band4	20300	1745	1RB-Middle	Top	27mm	\	Note2	24.25	25.00	0.413	0.49	0.256	0.30	-0.12
Body	LTE Band4	20050	1720	50RB-Middle	Rear	20mm	\	Note2	23.27	24.00	0.353	0.42	0.212	0.25	0.15
Body	LTE Band4	20050	1720	50RB-Middle	Left	13mm	\	Note2	23.27	24.00	0.094	0.11	0.065	0.08	0.17
Body	LTE Band4	20050	1720	50RB-Middle	Top	27mm	\	Note2	23.27	24.00	0.356	0.42	0.216	0.26	-0.09
Body	LTE Band5	20600	844	1RB-Middle	Rear	0mm	\	Note1	17.78	18.50	0.565	0.67	0.233	0.28	-0.12
Body	LTE Band5	20600	844	1RB-Middle	Left	0mm	\	Note1	17.78	18.50	0.165	0.19	0.078	0.09	0.13
Body	LTE Band5	20600	844	1RB-Middle	Top	0mm	\	Note1	17.78	18.50	0.244	0.29	0.096	0.11	0.04
Body	LTE Band5	20600	844	25RB-Middle	Rear	0mm	FIG A.5	Note1	17.75	18.50	0.627	0.75	0.285	0.34	0.11
Body	LTE Band5	20600	844	25RB-Middle	Left	0mm	\	Note1	17.75	18.50	0.172	0.20	0.082	0.10	0.15
Body	LTE Band5	20600	844	25RB-Middle	Top	0mm	\	Note1	17.75	18.50	0.265	0.31	0.106	0.13	-0.12
Body	LTE Band5	20450	829	1RB-Low	Rear	20mm	\	Note2	24.52	25.50	0.383	0.48	0.268	0.34	0.09
Body	LTE Band5	20450	829	1RB-Low	Left	13mm	\	Note2	24.52	25.50	0.102	0.13	0.069	0.09	-0.15
Body	LTE Band5	20450	829	1RB-Low	Top	27mm	\	Note2	24.52	25.50	0.186	0.23	0.122	0.15	-0.10
Body	LTE Band5	20450	829	25RB-Middle	Rear	20mm	\	Note2	23.53	24.50	0.332	0.42	0.211	0.26	0.12
Body	LTE Band5	20450	829	25RB-Middle	Left	13mm	\	Note2	23.53	24.50	0.087	0.11	0.061	0.08	0.08
Body	LTE Band5	20450	829	25RB-Middle	Top	27mm	\	Note2	23.53	24.50	0.144	0.18	0.095	0.12	0.07



No.24T04Z200327-010

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Body	LTE Band7	21100	2535	1RB-Middle	Rear	0mm	\	Note1	9.63	10.50	0.591	0.72	0.214	0.26	0.00
Body	LTE Band7	21100	2535	1RB-Middle	Left	0mm	\	Note1	9.63	10.50	0.317	0.39	0.110	0.13	-0.01
Body	LTE Band7	21100	2535	1RB-Middle	Top	0mm	\	Note1	9.63	10.50	0.072	0.09	0.026	0.03	-0.05
Body	LTE Band7	21100	2535	50RB-Middle	Rear	0mm	\	Note1	9.78	10.50	0.448	0.53	0.164	0.19	0.16
Body	LTE Band7	21100	2535	50RB-Middle	Left	0mm	\	Note1	9.78	10.50	0.283	0.33	0.087	0.10	-0.09
Body	LTE Band7	21100	2535	50RB-Middle	Top	0mm	\	Note1	9.78	10.50	0.075	0.09	0.027	0.03	-0.03
Body	LTE Band7	21350	2560	1RB-Middle	Rear	18mm	\	Note2	23.73	24.50	0.613	0.73	0.331	0.40	0.15
Body	LTE Band7	21350	2560	1RB-Middle	Left	13mm	\	Note2	23.73	24.50	0.934	1.12	0.511	0.61	-0.14
Body	LTE Band7	21100	2535	1RB-Middle	Left	13mm	FIG A.6	Note2	23.71	24.50	1.080	1.30	0.588	0.71	0.05
Body	LTE Band7	20850	2510	1RB-Middle	Left	13mm	\	Note2	23.59	24.50	1.030	1.27	0.554	0.68	0.09
Body	LTE Band7	21350	2560	1RB-Middle	Top	17mm	\	Note2	23.73	24.50	0.102	0.12	0.060	0.07	0.12
Body	LTE Band7	21350	2560	50RB-Middle	Rear	18mm	\	Note2	22.79	23.50	0.592	0.70	0.322	0.38	0.19
Body	LTE Band7	21350	2560	50RB-Middle	Left	13mm	\	Note2	22.79	23.50	0.897	1.06	0.498	0.59	-0.15
Body	LTE Band7	21100	2535	50RB-Middle	Left	13mm	\	Note2	22.63	23.50	0.860	1.05	0.465	0.57	0.03
Body	LTE Band7	20850	2510	50RB-Middle	Left	13mm	\	Note2	22.42	23.50	0.803	1.03	0.431	0.55	0.08
Body	LTE Band7	21350	2560	50RB-Middle	Top	17mm	\	Note2	22.79	23.50	0.092	0.11	0.057	0.07	0.11
Body	LTE Band7	21350	2560	100RB	Left	13mm	\	Note2	22.66	23.50	0.781	0.95	0.423	0.51	0.04
Body	LTE Band12	23130	711	1RB-Middle	Rear	0mm	FIG A.7	Note1	17.24	18.00	0.548	0.65	0.262	0.31	0.04
Body	LTE Band12	23130	711	1RB-Middle	Left	0mm	\	Note1	17.24	18.00	0.115	0.14	0.056	0.07	-0.02
Body	LTE Band12	23130	711	1RB-Middle	Top	0mm	\	Note1	17.24	18.00	0.321	0.38	0.153	0.18	-0.18
Body	LTE Band12	23130	711	25RB-Middle	Rear	0mm	\	Note1	17.17	18.00	0.502	0.61	0.140	0.17	0.14
Body	LTE Band12	23130	711	25RB-Middle	Left	0mm	\	Note1	17.17	18.00	0.107	0.13	0.051	0.06	0.16
Body	LTE Band12	23130	711	25RB-Middle	Top	0mm	\	Note1	17.17	18.00	0.294	0.36	0.140	0.17	0.03
Body	LTE Band12	23130	711	1RB-Middle	Rear	20mm	\	Note2	24.09	25.00	0.289	0.36	0.212	0.26	-0.05
Body	LTE Band12	23130	711	1RB-Middle	Left	13mm	\	Note2	24.09	25.00	0.054	0.07	0.036	0.04	-0.14
Body	LTE Band12	23130	711	1RB-Middle	Top	27mm	\	Note2	24.09	25.00	0.129	0.16	0.085	0.10	0.16
Body	LTE Band12	23130	711	25RB-Middle	Rear	20mm	\	Note2	23.12	24.00	0.216	0.26	0.137	0.17	0.12
Body	LTE Band12	23130	711	25RB-Middle	Left	13mm	\	Note2	23.12	24.00	0.052	0.06	0.033	0.04	-0.04
Body	LTE Band12	23130	711	25RB-Middle	Top	27mm	\	Note2	23.12	24.00	0.103	0.13	0.067	0.08	-0.09
Body	LTE Band13	23230	782	1RB-Middle	Rear	0mm	FIG A.8	Note1	17.62	18.00	0.493	0.54	0.234	0.26	0.14
Body	LTE Band13	23230	782	1RB-Middle	Left	0mm	\	Note1	17.62	18.00	0.133	0.15	0.064	0.07	-0.30
Body	LTE Band13	23230	782	1RB-Middle	Top	0mm	\	Note1	17.62	18.00	0.264	0.29	0.121	0.13	0.08
Body	LTE Band13	23230	782	25RB-Middle	Rear	0mm	\	Note1	17.50	18.00	0.473	0.53	0.230	0.26	-0.03
Body	LTE Band13	23230	782	25RB-Middle	Left	0mm	\	Note1	17.50	18.00	0.118	0.13	0.058	0.07	0.14
Body	LTE Band13	23230	782	25RB-Middle	Top	0mm	\	Note1	17.50	18.00	0.341	0.38	0.137	0.15	-0.18
Body	LTE Band13	23230	782	1RB-Middle	Rear	20mm	\	Note2	24.02	25.00	0.278	0.35	0.193	0.24	-0.09
Body	LTE Band13	23230	782	1RB-Middle	Left	13mm	\	Note2	24.02	25.00	0.069	0.09	0.047	0.06	-0.10
Body	LTE Band13	23230	782	1RB-Middle	Top	27mm	\	Note2	24.02	25.00	0.131	0.16	0.085	0.11	-0.14
Body	LTE Band13	23230	782	25RB-Middle	Rear	20mm	\	Note2	23.04	24.00	0.239	0.30	0.153	0.19	-0.19
Body	LTE Band13	23230	782	25RB-Middle	Left	13mm	\	Note2	23.04	24.00	0.061	0.08	0.041	0.05	-0.01
Body	LTE Band13	23230	782	25RB-Middle	Top	27mm	\	Note2	23.04	24.00	0.103	0.13	0.067	0.08	0.13
Body	LTE Band66	132572	1770	1RB-Middle	Rear	0mm	FIG A.9	Note1	11.44	13.00	0.494	0.71	0.216	0.31	0.08
Body	LTE Band66	132572	1770	1RB-Middle	Left	0mm	\	Note1	11.44	13.00	0.048	0.07	0.023	0.03	0.17
Body	LTE Band66	132572	1770	1RB-Middle	Top	0mm	\	Note1	11.44	13.00	0.318	0.46	0.139	0.20	-0.17
Body	LTE Band66	132572	1770	50RB-Middle	Rear	0mm	\	Note1	11.48	13.00	0.438	0.62	0.205	0.29	0.13
Body	LTE Band66	132572	1770	50RB-Middle	Left	0mm	\	Note1	11.48	13.00	0.041	0.06	0.019	0.03	-0.18
Body	LTE Band66	132572	1770	50RB-Middle	Top	0mm	\	Note1	11.48	13.00	0.299	0.42	0.144	0.20	-0.05
Body	LTE Band66	132072	1720	1RB-Middle	Rear	20mm	\	Note2	24.26	25.00	0.386	0.46	0.233	0.28	0.18
Body	LTE Band66	132072	1720	1RB-Middle	Left	13mm	\	Note2	24.26	25.00	0.098	0.12	0.065	0.08	0.13
Body	LTE Band66	132072	1720	1RB-Middle	Top	27mm	\	Note2	24.26	25.00	0.356	0.42	0.221	0.26	-0.16
Body	LTE Band66	132072	1720	50RB-High	Rear	20mm	\	Note2	23.31	24.00	0.319	0.37	0.190	0.22	0.04
Body	LTE Band66	132072	1720	50RB-High	Left	13mm	\	Note2	23.31	24.00	0.082	0.10	0.058	0.07	-0.16
Body	LTE Band66	132072	1720	50RB-High	Top	27mm	\	Note2	23.31	24.00	0.296	0.35	0.184	0.22	0.04

14.2 SAR results for WLAN

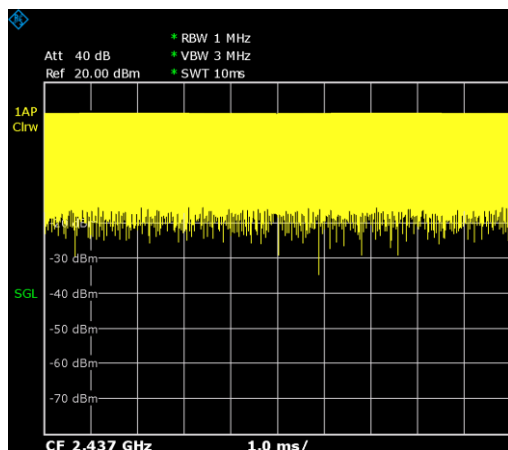
The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.

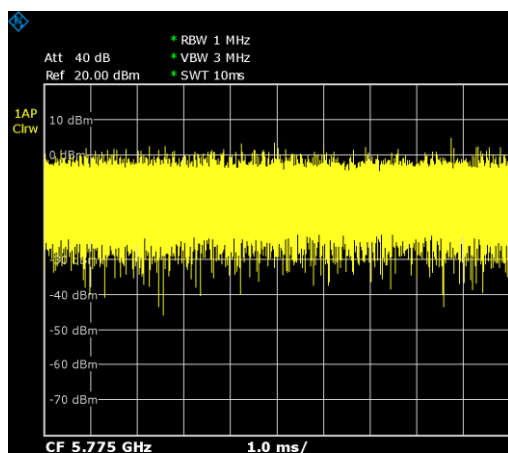
SAR Test reduction was applied from KDB 248227 guidance, when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

Duty factor plot

CH6



CH155



WLAN 2.4G

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode	Test setup	Distance	Figure No.	Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift	Duty Cycle
6	Body	WIFI2.4G	6	2437	11b	Rear	0mm	FIG A.10	Note1	7.22	8.00	0.161	0.19	0.062	0.07	0.19	100.00%
6	Body	WIFI2.4G	6	2437	11b	Top	0mm	\	Note1	7.22	8.00	0.122	0.15	0.051	0.06	0.16	100.00%
6	Body	WIFI2.4G	1	2412	11b	Rear	15mm	\	Note2	16.03	16.50	0.144	0.16	0.076	0.08	0.03	100.00%
6	Body	WIFI2.4G	1	2412	11b	Right	0mm	\	Note2	16.03	16.50	0.114	0.13	0.051	0.06	0.03	100.00%
6	Body	WIFI2.4G	1	2412	11b	Top	17mm	\	Note2	16.03	16.50	0.122	0.14	0.069	0.08	0.13	100.00%

WLAN 5G

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode	Test setup	Distance	Figure No.	Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift	Duty Cycle
6	Body	WIFI5G	42	5210	11ac-80M	Rear	0mm	FIG A.11	Note1	4.45	6.00	0.343	0.49	0.066	0.09	0.19	100.00%
6	Body	WIFI5G	42	5210	11ac-80M	Top	0mm	\	Note1	4.45	6.00	0.312	0.45	0.057	0.08	-0.1	100.00%
6	Body	WIFI5G	58	5290	11ac-80M	Rear	0mm	\	Note1	5.12	6.00	0.165	0.20	0.048	0.06	-0.05	100.00%
6	Body	WIFI5G	58	5290	11ac-80M	Top	0mm	\	Note1	5.12	6.00	0.193	0.24	0.042	0.05	0.17	100.00%
6	Body	WIFI5G	122	5610	11ac-80M	Rear	0mm	\	Note1	5.23	6.00	0.108	0.13	0.034	0.04	-0.07	100.00%
6	Body	WIFI5G	122	5610	11ac-80M	Top	0mm	\	Note1	5.23	6.00	0.159	0.19	0.039	0.05	0.05	100.00%
6	Body	WIFI5G	155	5775	11ac-80M	Rear	0mm	\	Note1	5.43	6.00	0.289	0.33	0.061	0.07	0.14	100.00%
6	Body	WIFI5G	155	5775	11ac-80M	Top	0mm	\	Note1	5.43	6.00	0.317	0.36	0.062	0.07	0.14	100.00%
6	Body	WIFI5G	46	5230	11n-40M	Rear	15mm	\	Note2	15.17	16.00	0.139	0.17	0.048	0.06	-0.18	100.00%
6	Body	WIFI5G	46	5230	11n-40M	Right	0mm	\	Note2	15.17	16.00	0.036	0.04	0.015	0.02	0.14	100.00%
6	Body	WIFI5G	46	5230	11n-40M	Top	17mm	\	Note2	15.17	16.00	0.191	0.23	0.076	0.09	-0.13	100.00%
6	Body	WIFI5G	62	5310	11n-40M	Rear	15mm	\	Note2	15.27	16.00	0.122	0.14	0.041	0.05	0.17	100.00%
6	Body	WIFI5G	62	5310	11n-40M	Right	0mm	\	Note2	15.27	16.00	0.033	0.04	0.012	0.01	0.12	100.00%
6	Body	WIFI5G	62	5310	11n-40M	Top	17mm	\	Note2	15.27	16.00	0.170	0.20	0.066	0.08	-0.08	100.00%
6	Body	WIFI5G	124	5620	11a	Rear	15mm	\	Note2	14.19	14.50	0.091	0.10	0.032	0.03	-0.15	100.00%
6	Body	WIFI5G	124	5620	11a	Right	0mm	\	Note2	14.19	14.50	0.050	0.05	0.011	0.01	0.13	100.00%
6	Body	WIFI5G	124	5620	11a	Top	17mm	\	Note2	14.19	14.50	0.148	0.16	0.057	0.06	-0.09	100.00%
6	Body	WIFI5G	165	5825	11a	Rear	15mm	\	Note2	14.12	14.50	0.104	0.11	0.036	0.04	0.19	100.00%
6	Body	WIFI5G	165	5825	11a	Right	0mm	\	Note2	14.12	14.50	0.054	0.06	0.013	0.01	-0.18	100.00%
6	Body	WIFI5G	165	5825	11a	Top	17mm	\	Note2	14.12	14.50	0.167	0.18	0.062	0.07	0.09	100.00%

14.3 SAR results for BT

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode	Test setup	Distance	Figure No.	Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
6	Body	BT	0	2402	GFSK	Rear	0mm	\	Note2	6.19	7.00	<0.01	<0.01	<0.01	<0.01	/
6	Body	BT	0	2402	GFSK	Left	0mm	\	Note2	6.19	7.00	<0.01	<0.01	<0.01	<0.01	/
6	Body	BT	0	2402	GFSK	Right	0mm	\	Note2	6.19	7.00	<0.01	<0.01	<0.01	<0.01	/
6	Body	BT	0	2402	GFSK	Top	0mm	\	Note2	6.19	7.00	<0.01	<0.01	<0.01	<0.01	/

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Original SAR 1g (W/kg)	First Repeated SAR 1g (W/kg)	The Ratio	Second Repeated SAR 1g (W/kg)
Body	LTE Band7	21350	2560	1RB-Middle	Left	13mm	0.934	0.919	1.02	/
Body	LTE Band7	21100	2535	1RB-Middle	Left	13mm	1.080	1.040	1.04	/
Body	LTE Band7	20850	2510	1RB-Middle	Left	13mm	1.030	1.020	1.01	/
Body	LTE Band7	21350	2560	50RB-Middle	Left	13mm	0.897	0.884	1.01	/
Body	LTE Band7	21100	2535	50RB-Middle	Left	13mm	0.860	0.827	1.04	/
Body	LTE Band7	20850	2510	50RB-Middle	Left	13mm	0.803	0.793	1.01	/

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞

21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞

20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.4	10.3	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.8	20.6	

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5

17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u'_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.5	13.4	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						27.0	26.8	

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	N5239A	MY55491241	May 21, 2024	One year
02	Power sensor	NRP50S	101488	June 5, 2024	One year
03	Power sensor	NRP50S	101489		
04	Signal Generator	MG3700A	6201052605	June 12 2024	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	CMW500	170618	April 8, 2024	One year
07	DAE	SPEAG DAE4	1331	September 13,2024	One year
08	E-field Probe	SPEAG EX3DV4	7673	July 29,2024	One year
09	DAE	SPEAG DAE4	1807	May 14,2024	One year
10	E-field Probe	SPEAG EX3DV4	3846	June 19, 2024	One year
11	Dipole Validation Kit	SPEAG D750V3	1017	July 9,2024	One year
12	Dipole Validation Kit	SPEAG D835V2	4d069	July 9,2024	One year
13	Dipole Validation Kit	SPEAG D1750V2	1003	July 11,2024	One year
14	Dipole Validation Kit	SPEAG D1900V2	5d101	July 8,2024	One year
15	Dipole Validation Kit	SPEAG D2450V2	853	July 10,2024	One year
16	Dipole Validation Kit	SPEAG D2600V2	1012	July 10,2024	One year
17	Dipole Validation Kit	SPEAG D5GHzV2	1060	June 12,2024	One year

END OF REPORT BODY

Appendixes

Refer to separated files for the following appendixes

ANNEX A Graph Results

ANNEX B System Verification Results

ANNEX C SAR Measurement Setup

ANNEX D Position of the wireless device in relation to the phantom

ANNEX E Equivalent Media Recipes

ANNEX F System Validation

ANNEX G Probe Calibration Certificate

ANNEX H Dipole Calibration Certificate

ANNEX I Sensor Triggering Data Summary

ANNEX J Accreditation Certificate