SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std. 1528-2013

For
WisePOS Pro, 7MD

FCC ID: 2AB7X-WSP7V1

Model Name: WSP74, WSP75, WSP76

Report Number: 4791364876-1-SAR-1
Issue Date: August 15, 2024

Prepared for
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Revision History

Rev.	Date	Revisions	Revised By
V1.0	August 15, 2024	Initial Issue	\

Note:

1. The Measurement result for the sample received is<Pass> according to < IEEE Std. 1528-2013> when < Simple Acceptance > decision rule is applied.
2. This report is only published to and used by the applicant, and it is not for evidence purpose in China.

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1. Attestation of Test Results

Applicant Name	BBPOS Limited			
Address	15F, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, HK			
Manufacturer	BBPOS Limited			
Address	15F, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, HK			
EUT Name	WisePOS Pro, 7MD			
Model	WSP74			
Serial model	WSP75, WSP76			
Model Difference	WSP74 is the product without accessory, WSP75 is the product with hand strap, WSP76 is the product with pistol grip			
Sample Status	Normal			
Sample Received Date	July 13, 2024			
Date of Tested	July 18, 2024 ~ August 7, 2024			
Applicable Standards	FCC 47 CFR § 2.1093 IEEE Std. 1528-2013 KDB publications			
SAR Limits (W/Kg)				
Exposure Category	Peak spatial-average (1g of tissue)		Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure	1.6		4	
Occupational / Controlled exposure	8		20	
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	**Equipment Class**			
	PCB	**DTS**	**NII**	**DSS**
Body (0mm)	1.098	0.393	1.191	0.221
Simultaneous Transmission (1-g)	1.443			
Test Results	Pass			
Prepared By: Burt Hu Burt Hu Laboratory Engineer	Reviewed By: Kebo Zhang Kebo Zhang Senior Project Engineer		Approved By: Stephen Guo Stephen Guo Laboratory Manager	

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2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with IEEE Std.1528-2013, the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02
- 447498 D01 General RF Exposure Guidance v06
- 690783 D01 SAR Listings on Grants v01
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01
- 865664 D02 RF Exposure Reporting v01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02
- 616217 D04 SAR for laptop and tablets v01r02

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3. Facilities and Accreditation

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi-tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules. **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. **VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20192 and R-20202. Shielding Room B, the VCCI registration No. is C-20153 and T-20155.
Description	All measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi-tech Development Zone, Dongguan, 523808, China.

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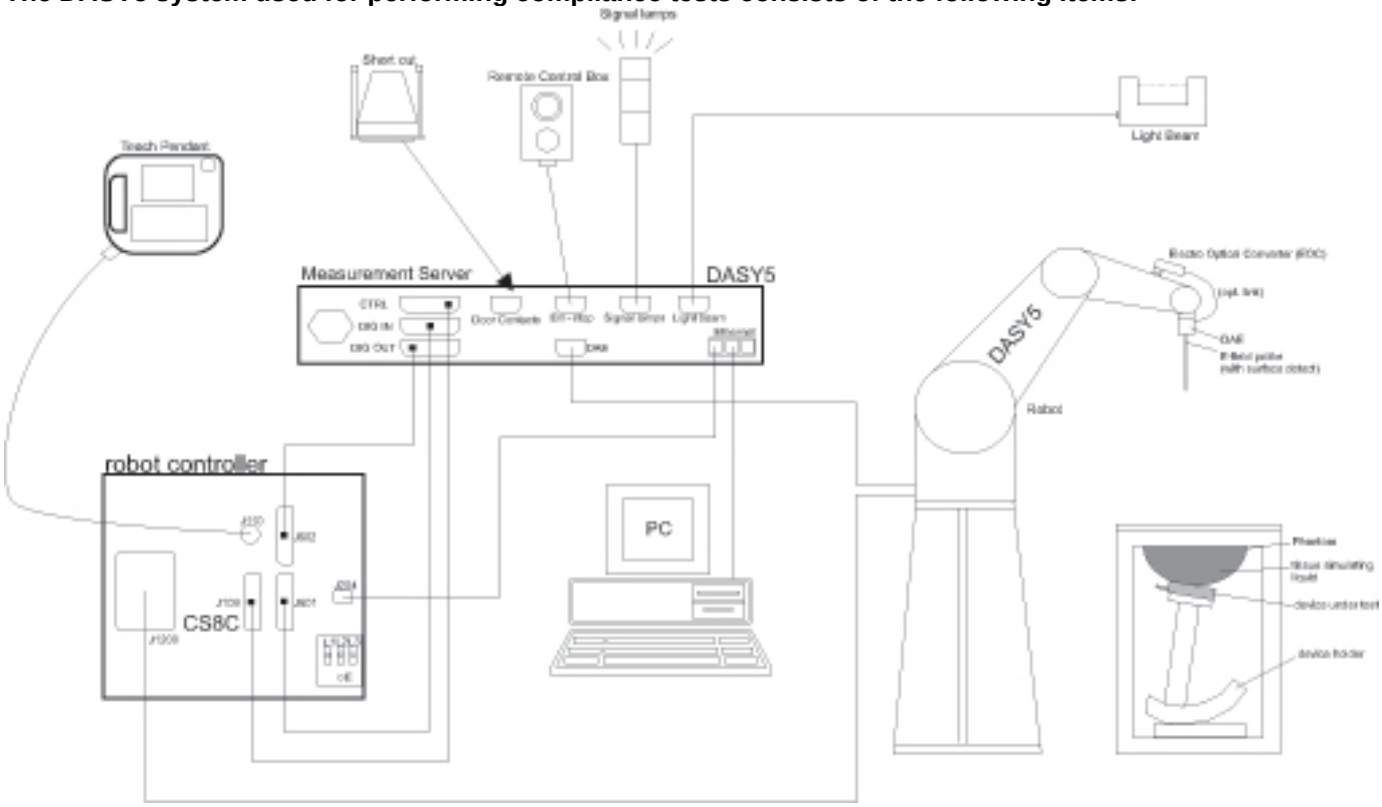
4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 and the DASY52 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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4.2. SAR Scan Procedures

Step 1: Power Reference Measurement
The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.
Area Scan Parameters extracted from KDB 865664 D01 v01r04 SAR Measurement 100 MHz to 6 GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

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Step 3: Zoom Scan

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

Zoom Scan Parameters extracted from KDB 865664 D01 v01r04 SAR Measurement 100 MHz to 6 GHz

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be greater than the step size in Z-direction.

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4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations and is traceable to recognized national standards.

Name of equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
ENA Network Analyzer	Keysight	E5080A	MY55100583	2024.10.11
Dielectric Probe kit	SPEAG	SM DAK 040 SA	1155	2025.02.27
DC power supply	Keysight	E36103A	MY55350020	2024.10.11
Signal Generator	Rohde & Schwarz	SME06	837633\001	2024.08.06
Signal Generator	Rohde & Schwarz	SMB100A	178553	2024.10.11
BI-Directional Coupler	KRYTAR	1850	54733	2024.10.11
Peak and Average Power Sensor	Keysight	E9325A	MY62220002	2024.10.11
Peak and Average Power Sensor	Keysight	E9325A	MY62220003	2024.10.11
Dual Channel PK Power Meter	Keysight	N1912A	MY55416024	2024.10.11
Amplifier	CORAD TECHNOLOGY LTD	AMF-4D-00400600-50-30P	1983561	NCR
Dosimetric E-Field Probe	SPEAG	EX3DV4	7733	2025.02.20
Data Acquisition Electronic	SPEAG	DAE4	1739	2025.01.22
Dipole Kit 750 MHz	SPEAG	D750V3	1153	2024.12.14
Dipole Kit 835 MHz	SPEAG	D835V2	4d206	2024.12.16
Dipole Kit 1800 MHz	SPEAG	D1800V2	2d212	2024.12.20
Dipole Kit 1900 MHz	SPEAG	D1900V2	5d212	2024.12.19
Dipole Kit 2300 MHz	SPEAG	D2300V2	1065	2024.12.20
Dipole Kit 2450 MHz	SPEAG	D2450V2	977	2024.12.16
Dipole Kit 2600 MHz	SPEAG	D2600V2	1117	2024.12.19
Dipole Kit 5 GHz	SPEAG	D5GHzV2	1231	2024.12.15
Software	SPEAG	DASY52	N/A	NCR
Twin Phantom	SPEAG	SAM 5.0	1805	NCR
Thermometer	/	GX-138	150709653	2024.10.18
Thermometer	VICTOR	ITHX-SD-5	18470005	2024.10.18

Note:

1) Per KDB865664D01 v01r04 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.

d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

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5. Measurement Uncertainty

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

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6. Device Under Test (DUT) Information

6.1. DUT Description

The DUT is a WisePOS Pro with GSM/WCDMA/LTE/IEEE 802.11a/b/g/n/ac and Bluetooth, NFC radio.	
Dimension	Overall (Length x Width x Height): 200 mm x 115 mm x 26 mm

6.2. Wireless Technology

Wireless technologies	Frequency bands	Operating mode	
GSM	850 1900	☐ Voice (GMSK) ☒ GPRS (GMSK) ☒ EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☒ Class 12 - 4 Up, 4 Down ☐ Class 33 - 4 Up, 5 Down
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No		
WCDMA (UMTS)	Band II Band IV Band V	☒ UMTS Rel. 99 (Voice & Data) ☒ HSDPA (Rel. 5) ☒ HSUPA (Rel. 6) ☐ DC-HSDPA (Rel. 8) ☐ HSPA+ (Rel. 7)	
LTE	FDD Band2 FDD Band4 FDD Band5 FDD Band7 FDD Band12 FDD Band17 TDD Band38 TDD Band40 TDD Band41	QPSK 16QAM ☐ Rel. 10 Does not support Carrier Aggregation (CA) ☒ Rel. 10 Carrier Aggregation (Downlink only) ☐ Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)	
Wi-Fi	2.4GHz	☒ 802.11b ☒ 802.11g ☒ 802.11n (HT20) ☒ 802.11n (HT40) ☐ 802.11ax (HE20) ☐ 802.11ax (HE40)	
Wi-Fi	5GHz	☒ 802.11a ☒ 802.11n (HT20) ☒ 802.11n (HT40) ☒ 802.11ac (VHT20) ☒ 802.11ac (VHT40) ☐ 802.11ac (VHT80) ☐ 802.11ax (HE20) ☐ 802.11ax (HE40) ☐ 802.11ax (HE80)	
BT/BLE	2.4GHz	V5.0	
NFC	13.56MHz	ASK	

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7. Test Configuration

7.1. 3G SAR Test Reduction Procedure

According to KDB 941225D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ 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. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

7.1.1. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a base station by air link. Using CMW500 the power lever is set to “5”and “0” in SAR of GSM 850 and GSM 1900. The tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode

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7.1.2. UMTS Test Configuration

1. Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the procedures description in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s” for WCDMA/HSDPA or applying the required inner loop power control procedure to maintain maximum output power while HSUPA is active. Result for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) Should be tabulated in the SAR report. All configuration that are not supported by the DUT or cannot be measured due to technical or equipment limitation should be clearly identified.

2. WCDMA

Body SAR Measurements

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1"s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode.

3. HSDPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements"" procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ 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. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

As per KDB941225 D01, the 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures for the highest reported SAR body exposure configuration in 12.2 kbps RMC.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The □c and □d gain factors for DPCCH and DPDCH were set according to the values in the below table, □hs for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of the □c /□d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: △ACK, △NACK and △CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2 : CM=1 for β_c/β_d= 12/15, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

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The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.
Settings of required H-Set 1 QPSK acc. to 3GPP 34.121

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI"s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

HSDPA UE category

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

4. HSUPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements"" procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ 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.

As per KDB941225 D01v03, the 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures for the highest reported body exposure SAR configuration in 12.2 kbps RMC.

Due to inner loop power control requirements in HSDPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset" and „Release 5 HSDPA Data Device" sections of 3G device.

Subtests for WCDMA Release 6 HSUPA

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Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

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

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

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

Note:

1) When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM. (TS25.306-7.3.0).

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7.2. LTE Test Configuration

Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

1) Spectrum Plots for RB configurations

A properly configured base station simulator was used for LTE output power measurements and SAR testing. Therefore, spectrum plots for RB configurations were not required to be included in this report.

2) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3-6.2.5 under Table 6.2.3-1.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

3) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by using Network Signaling Value of “NS=01” on the base station simulator.

4) SAR test requirements

A) Largest channel bandwidth standalone SAR test requirements

i) 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 for 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.

ii) QPSK with 50% RB allocation

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

iii) 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

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SAR for 1 RB and 50% RB allocation in i) and ii) 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.

iv) Higher order modulations

For each modulation besides QPSK e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

B) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

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

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

Table 4.2-2: Uplink-downlink configurations

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

According to Figure 4.2-1, one radio frame is configured by 10 subframes, which consist of Uplink-subframe, Downlink-subframe and Special subframe. For TDD-LTE, the Duty Cycle should be calculated on Uplink-subframes and Special subframes, due to Special subframe containing both Uplink transmissions. So for one radio frame, Duty Cycle can be calculated with formula as below. The count of Uplink subframes are according to Table 4.2-2:

Duty cycle = (30720Ts*Ups + Uplink Component*Specials)/(307200Ts)

About the uplink component of Special subframes, we can figure out by Table 4.2-1:

Uplink Component = UpPTS

In conclusion, for the TDD LTE Band, Duty Cycle can be calculated with formula as below. all these sets are ok when we test, or we can set as below.

Duty cycle =[(30720Ts*Ups) + UpPTS * Specials]/(307200Ts)

And we can get different Duty cycles under different configurations:

Uplink-downlink configuratin	Subframe number			Configuration of special subframe							
				Normal cyclic prefix in downlink				Extended cyclic prefix in downlink			
				Normal cyclic prefix in uplink		Extended cyclic prefix in uplink		Normal cyclic prefix in uplink		Extended cyclic prefix in uplink	
	D	S	U	configuration 0-4	configuration 5-9	configuration 0-4	configuration 5-9	configuration 0-3	configuration 4-7	configuration 0-3	configuration
0	2	2	6	61.43%	62.85%	61.67%	63.33%	61.43%	62.85%	61.67%	63.33%
1	4	2	4	41.43%	42.85%	41.67%	43.33%	41.43%	42.85%	41.67%	43.33%
2	6	2	2	21.43%	22.85%	21.67%	23.33%	21.43%	22.85%	21.67%	23.33%
3	6	1	3	30.71%	31.43%	30.83%	31.67%	30.71%	31.43%	30.83%	31.67%
4	7	1	2	20.71%	21.43%	20.83%	21.67%	20.71%	21.43%	20.83%	21.67%
5	8	1	1	10.71%	11.43%	10.83%	11.67%	10.71%	11.43%	10.83%	11.67%
6	3	2	5	51.43%	52.85%	51.67%	53.33%	51.43%	52.85%	51.67%	53.33%

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For TDD LTE, SAR should be tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7 for Frame structure type 2.

Maximum Output Power for LTE

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

a) The maximum output power for the smaller band must be s the larger band to qualify for the SAR test exclusion.
b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.

LTE Band 17 (704-716 MHz) is covered by LTE Band 12 (699-716 MHz)

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7.3. Wi-Fi Test Configuration

For Wi-Fi SAR testing, a communication link is set up with the testing software for Wi-Fi mode test. During the test, at each test frequency channel, the EUT is operated at the RF continuous emission mode. The test procedures in KDB 248227D01 are applied.

7.3.1. Initial Test Position Procedure

For exposure condition with multiple test position, such as handsets operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4W/kg, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8W/kg or all test position are measured. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

7.3.2. Initial Test Configuration Procedure

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required (see section 5.3.2 of KDB 248227D01). SAR test reduction of subsequent highest output test channels is based on the reported SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the reported SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

7.3.3. Sub Test Configuration Procedure

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units.

When the highest reported SAR for the initial test configuration, according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

7.3.4. 2.4GHz Wi-Fi SAR Test Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

A) 802.11b DSSS SAR Test Requirements

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SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel (section 3.1 of KDB 248227D01) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel i.e., all channels require testing.

B) 2.4GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3 of KDB 248227D01). SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

C) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7.3.5. 5GHz Wi-Fi SAR Test Procedures

U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following:

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures.

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When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.3.6. OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

7.3.7. 2.4GHz BT/BLE SAR Test Requirements

2.4GHz BT operating modes are tested independently according to the service requirements in each frequency band for each antenna. DH5 / 3DH5 / 1M SISO modes are tested on the maximum average output power mode.

7.3.8. Repeated measurements

Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg.18 If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with ≤ 20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.19 The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB Publication 690783.

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.

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8. Conducted Output Power Measurement and tune-up tolerance

8.1. GSM850

GSM850		Channel 128	Channel 190	Channel 251	Tune-up Limit (dBm)	Division Factor	Channel 128	Channel 190	Channel 251	Tune-up Limit (dBm)
GPRS/EGPRS (GMSK)	1 TimeSlot	26.22	26.30	26.32	26.5	-9.03	17.19	17.27	17.29	17.5
	2 TimeSlots	25.99	26.07	26.06	26.5	-6.02	19.97	20.05	20.04	20.5
	3 TimeSlots	25.28	25.33	25.27	25.5	-4.26	21.02	21.07	21.01	21.2
	4 TimeSlots	24.77	24.77	24.74	25.0	-3.01	21.76	21.76	21.73	**22.0**
EGPRS (8PSK)	1 TimeSlot	26.72	26.60	26.59	27.0	-9.03	17.69	17.57	17.56	18.0
	2 TimeSlots	25.65	25.66	25.57	26.0	-6.02	19.63	19.64	19.55	20.0
	3 TimeSlots	23.63	23.61	23.65	24.0	-4.26	19.37	19.35	19.39	19.7
	4 TimeSlots	22.36	22.47	22.40	22.5	-3.01	19.35	19.46	19.39	19.5

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8.2. GSM1900

GSM1900		Channel 512	Channel 661	Channel 810	Tune-up Limit (dBm)	Division Factor	Channel 512	Channel 661	Channel 810	Tune-up Limit (dBm)
GPRS/EGPRS (GMSK)	1 TimeSlot	21.74	21.54	21.31	22.0	-9.03	12.71	12.51	12.28	13.0
	2 TimeSlots	21.01	20.77	20.59	21.5	-6.02	14.99	14.75	14.57	15.5
	3 TimeSlots	19.76	19.49	19.32	20.0	-4.26	15.50	15.23	15.06	15.7
	4 TimeSlots	19.20	18.94	18.65	19.5	-3.01	16.19	15.93	15.64	**16.5**
EGPRS (8PSK)	1 TimeSlot	24.88	24.31	23.81	25.0	-9.03	15.85	15.28	14.78	16.0
	2 TimeSlots	23.73	23.00	22.69	24.0	-6.02	17.71	16.98	16.67	**18.0**
	3 TimeSlots	21.58	21.02	20.67	22.0	-4.26	17.32	16.76	16.41	17.7
	4 TimeSlots	20.40	19.63	19.43	20.5	-3.01	17.39	16.62	16.42	17.5

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8.3. WCDMA Band 2

Band 2		Average Power (dBm)			Tune-up Limit (dBm)
		9262CH	9400CH	9538CH	
WCDMA	12.2kbps RMC	14.52	14.54	14.44	15.0
HSDPA	Subtest 1	13.65	13.68	13.64	14.0
	Subtest 2	13.41	13.44	13.44	13.5
	Subtest 3	13.02	13.05	13.01	13.5
	Subtest 4	13.01	13.04	12.98	13.5
HSUPA	Subtest 1	12.90	12.93	12.88	13.0
	Subtest 2	13.59	13.64	13.59	14.0
	Subtest 3	12.54	12.56	12.53	13.0
	Subtest 4	13.64	13.66	13.60	14.0
	Subtest 5	12.52	12.56	12.52	13.0

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8.4. WCDMA Band 4

Band 4		Average Power (dBm)			Tune-up Limit (dBm)
		1312CH	1413CH	1513CH	
WCDMA	12.2kbps RMC	14.01	14.02	13.99	14.5
HSDPA	Subtest 1	13.10	13.11	13.14	13.5
	Subtest 2	12.88	12.89	12.94	13.0
	Subtest 3	12.49	12.48	12.54	13.0
	Subtest 4	12.46	12.45	12.53	13.0
HSUPA	Subtest 1	12.41	12.38	12.47	12.5
	Subtest 2	13.03	13.06	13.11	13.5
	Subtest 3	11.99	12.01	12.13	12.5
	Subtest 4	13.09	13.11	13.14	13.5
	Subtest 5	11.99	12.00	12.10	12.5

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8.5. WCDMA Band 5

Band 5		Average Power (dBm)			Tune-up Limit (dBm)
		4132CH	4182CH	4233CH	
WCDMA	12.2kbps RMC	21.63	21.71	21.79	22.0
HSDPA	Subtest 1	20.80	20.87	20.95	21.0
	Subtest 2	20.59	20.68	20.74	21.0
	Subtest 3	20.21	20.29	20.37	20.5
	Subtest 4	20.19	20.28	20.36	20.5
HSUPA	Subtest 1	20.10	20.19	20.26	20.5
	Subtest 2	20.75	20.81	20.91	21.0
	Subtest 3	19.72	19.80	19.88	20.0
	Subtest 4	20.79	20.85	20.93	21.0
	Subtest 5	19.71	19.78	19.86	20.0

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8.6. LTE Band 2

Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune-up Limit (dBm)
1.4MHz	QPSK	1	0	16.52	16.67	16.56	17.0
		1	2	**16.68**	**16.67**	**16.87**	
		1	5	16.53	16.53	16.37	
		3	0	16.61	16.53	16.53	17.0
		3	1	**16.77**	**16.67**	**16.96**	
		3	3	16.50	16.57	16.50	
		6	0	15.77	**15.86**	15.70	16.0
	16QAM	1	0	15.62	15.70	15.75	16.0
		1	2	15.68	15.85	15.63	
		1	5	15.60	15.74	15.87	
		3	0	15.49	15.80	15.72	16.0
		3	1	15.49	15.81	15.73	
		3	3	15.62	15.70	15.82	
		6	0	14.51	14.87	14.61	15.0
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune-up Limit (dBm)
3MHz	QPSK	1	0	**16.74**	16.54	16.62	17.0
		1	8	**16.79**	16.70	**16.77**	
		1	14	16.42	**16.83**	16.35	
		8	0	15.43	**15.66**	15.68	16.0
		8	4	**15.55**	15.63	15.76	
		8	7	15.27	15.60	**15.83**	
		15	0	15.74	15.51	**15.98**	16.0
	16QAM	1	0	15.71	16.27	16.03	16.5
		1	8	15.93	16.32	16.48	
		1	14	15.96	15.67	15.72	
		8	0	14.95	14.74	14.86	15.0
		8	4	14.76	14.73	14.76	
		8	7	14.54	14.97	14.49	
		15	0	14.51	14.72	14.60	15.0
Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune-up Limit (dBm)
5MHz	QPSK	1	0	**16.60**	16.50	16.47	17.0
		1	12	**16.75**	**16.72**	**16.86**	
		1	24	16.36	16.71	16.42	
		12	0	**15.53**	15.65	15.57	16.0
		12	6	15.52	**15.69**	15.82	
		12	13	15.37	15.61	**15.88**	
		25	0	15.72	15.61	**15.84**	16.0
	16QAM	1	0	15.78	16.22	16.03	16.5
		1	12	16.00	16.42	16.43	
		1	24	15.96	15.80	15.84	
		12	0	14.83	14.76	14.89	15.0
		12	6	14.78	14.78	14.77	
		12	13	14.55	14.91	14.50	
		25	0	14.64	14.80	14.55	15.0
Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150	Tune-up Limit (dBm)
10MHz	QPSK	1	0	**16.59**	16.46	16.45	17.0
		1	24	**16.75**	**16.80**	**16.94**	
		1	49	16.44	16.56	16.51	
		25	0	**15.63**	15.67	15.50	16.0

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		25	12	15.54	15.60	15.78	
		25	25	15.44	**15.70**	**15.82**	
		50	0	15.69	**15.75**	15.74	16.0
	16QAM	1	0	15.74	16.18	15.99	16.5
		1	24	15.86	16.43	16.42	
		1	49	15.96	15.76	15.99	
		25	0	14.81	14.67	14.97	15.0
		25	12	14.74	14.75	14.66	
		25	25	14.57	14.94	14.53	
		50	0	14.71	14.85	14.61	15.0
Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125	Tune-up Limit (dBm)
15MHz	QPSK	1	0	16.55	**16.56**	16.50	17.0
		1	38	**16.71**	**16.76**	**16.81**	
		1	74	16.38	16.61	16.41	
		36	0	**15.68**	15.71	15.58	16.0
		36	18	15.59	**15.72**	15.66	
		36	37	15.55	15.59	**15.72**	
		75	0	15.72	**15.76**	15.70	16.0
	16QAM	1	0	15.67	16.07	16.07	16.5
		1	38	15.99	16.39	16.40	
		1	74	15.82	15.81	16.09	
		36	0	14.71	14.72	14.85	15.0
		36	18	14.70	14.89	14.75	
		36	37	14.68	14.90	14.68	
		75	0	14.65	14.81	14.75	15.0
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100	Tune-up Limit (dBm)
20MHz	QPSK	1	0	16.53	16.65	16.59	17.0
		1	49	**16.68**	**16.80**	**16.83**	
		1	99	16.47	16.58	16.52	
		50	0	**15.63**	**15.74**	15.72	16.0
		50	25	15.62	15.70	15.69	
		50	50	**15.63**	15.73	**15.74**	
		100	0	15.61	**15.70**	15.64	16.0
	16QAM	1	0	15.76	16.02	16.20	16.5
		1	49	15.94	16.24	16.36	
		1	99	15.70	15.96	16.13	
		50	0	14.67	14.77	14.73	15.0
		50	25	14.67	14.77	14.70	
		50	50	14.66	14.76	14.73	
		100	0	14.61	14.76	14.62	15.0

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8.7. LTE Band 4

Bandwidth	Modulation	RB size	RB offset	Channel 19957	Channel 20175	Channel 20393	Tune-up Limit (dBm)
1.4MHz	QPSK	1	0	14.51	**14.54**	14.42	15.0
		1	2	**14.54**	**14.87**	**14.96**	
		1	5	14.45	14.57	14.64	
		3	0	14.41	14.49	14.47	15.0
		3	1	**14.73**	**14.75**	**14.71**	
		3	3	14.36	14.44	14.61	
		6	0	13.51	13.45	**13.62**	14.0
	16QAM	1	0	13.50	13.48	13.39	14.0
		1	2	13.73	13.55	13.37	
		1	5	13.53	13.70	13.47	
		3	0	13.60	13.52	13.64	14.0
		3	1	13.76	13.60	13.42	
		3	3	13.76	13.60	13.42	
		6	0	12.69	12.79	12.34	13.0
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune-up Limit (dBm)
3MHz	QPSK	1	0	14.28	14.46	14.38	15.0
		1	8	**14.59**	**14.64**	**14.95**	
		1	14	14.35	14.56	14.61	
		8	0	**13.67**	13.55	**13.54**	14.0
		8	4	13.51	13.51	13.38	
		8	7	13.63	**13.73**	13.35	
		15	0	**13.48**	13.46	13.36	14.0
	16QAM	1	0	13.23	13.96	13.62	14.5
		1	8	13.40	14.21	14.12	
		1	14	13.42	13.67	13.59	
		8	0	12.69	12.51	12.50	13.0
		8	4	12.63	12.57	12.62	
		8	7	12.73	12.76	12.75	
		15	0	12.47	12.80	12.58	13.0
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune-up Limit (dBm)
5MHz	QPSK	1	0	14.40	14.49	14.42	15.0
		1	12	**14.61**	**14.85**	**14.83**	
		1	24	14.40	14.66	14.52	
		12	0	13.66	13.41	13.37	14.0
		12	6	**13.80**	**13.70**	**13.67**	
		12	13	13.60	13.60	13.56	
		25	0	13.46	**13.67**	13.40	14.0
	16QAM	1	0	13.39	13.99	13.69	14.5
		1	12	13.40	14.29	13.92	
		1	24	13.30	13.81	13.60	
		12	0	12.60	12.54	12.53	13.0
		12	6	12.82	12.64	12.63	
		12	13	12.82	12.75	12.59	
		25	0	12.48	12.79	12.50	13.0
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350	Tune-up Limit (dBm)
10MHz	QPSK	1	0	14.28	**14.64**	14.39	15.0
		1	24	14.59	**14.80**	**14.69**	
		1	49	14.52	14.47	14.51	
		25	0	13.68	**13.66**	**13.60**	14.0

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		25	12	**13.75**	13.42	13.50	
		25	25	13.54	13.51	13.51	
		50	0	13.53	13.50	**13.56**	14.0
	16QAM	1	0	13.29	13.92	13.75	14.5
		1	24	13.42	14.15	14.02	
		1	49	13.17	13.77	13.63	
		25	0	12.72	12.55	12.54	13.0
		25	12	12.83	12.62	12.78	
		25	25	12.81	12.52	12.46	
		50	0	12.52	12.75	12.35	13.0
Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325	Tune-up Limit (dBm)
15MHz	QPSK	1	0	14.40	14.67	14.52	15.0
		1	38	**14.72**	**14.78**	**14.94**	
		1	74	14.44	14.50	14.66	
		36	0	13.58	13.57	13.52	14.0
		36	18	**13.77**	13.45	**13.60**	
		36	37	13.65	**13.61**	13.53	
		75	0	13.55	13.58	**13.61**	14.0
	16QAM	1	0	13.24	14.00	13.65	14.5
		1	38	13.49	14.06	13.88	
		1	74	13.36	13.95	13.72	
		36	0	12.89	12.75	12.56	13.0
		36	18	12.91	12.50	12.75	
		36	37	12.67	12.62	12.54	
		75	0	12.65	12.53	12.55	13.0
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300	Tune-up Limit (dBm)
20MHz	QPSK	1	0	14.43	14.57	14.50	15.0
		1	49	**14.66**	**14.73**	**14.83**	
		1	99	14.42	14.56	14.52	
		50	0	13.62	13.55	**13.52**	14.0
		50	25	**13.66**	13.57	**13.52**	
		50	50	13.62	**13.58**	13.49	
		100	0	**13.60**	13.59	13.46	14.0
	16QAM	1	0	13.35	13.85	13.70	14.5
		1	49	13.52	14.14	13.99	
		1	99	13.31	13.82	13.66	
		50	0	12.75	12.65	12.61	13.0
		50	25	12.78	12.65	12.66	
		50	50	12.78	12.64	12.61	
		100	0	12.62	12.66	12.49	13.0

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8.8. LTE Band 5

0	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643	Tune-up Limit (dBm)
1.4MHz	QPSK	1	0	23.57	23.82	**24.04**	24.5
		1	2	**23.91**	23.92	24.00	
		1	5	23.88	**24.03**	23.91	
		3	0	23.65	23.76	23.97	24.5
		3	1	**23.96**	**23.98**	**24.08**	
		3	3	23.70	23.92	23.94	
		6	0	22.87	23.17	**23.21**	23.5
	16QAM	1	0	23.03	23.21	23.26	23.5
		1	2	22.82	23.05	23.04	
		1	5	23.03	23.26	23.12	
		3	0	22.94	22.76	22.82	23.5
		3	1	23.05	23.25	23.17	
		3	3	22.69	22.94	23.03	
		6	0	21.89	22.00	22.15	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635	Tune-up Limit (dBm)
3MHz	QPSK	1	0	23.51	23.80	24.10	24.5
		1	8	**23.98**	**24.16**	**24.12**	
		1	14	23.69	24.06	24.01	
		8	0	22.66	23.12	23.09	23.5
		8	4	22.79	**23.17**	**23.22**	
		8	7	**22.86**	23.11	23.14	
		15	0	22.88	23.00	**23.20**	23.5
	16QAM	1	0	22.86	22.81	22.85	23.5
		1	8	23.02	23.21	23.10	
		1	14	22.86	23.16	22.92	
		8	0	21.67	22.10	22.16	22.5
		8	4	21.92	22.22	22.09	
		8	7	22.02	22.06	21.99	
		15	0	21.78	22.05	22.32	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625	Tune-up Limit (dBm)
5MHz	QPSK	1	0	23.64	23.85	24.04	24.5
		1	12	**23.96**	23.90	**24.24**	
		1	24	23.75	**23.99**	24.10	
		12	0	22.76	22.93	22.99	23.5
		12	6	22.89	23.00	23.14	
		12	13	**22.92**	**23.04**	**23.23**	
		25	0	22.91	**23.21**	23.06	23.5
	16QAM	1	0	22.85	22.66	22.91	23.5
		1	12	22.93	23.20	23.30	
		1	24	22.81	23.04	22.89	
		12	0	21.81	22.01	22.17	22.5
		12	6	21.79	22.10	22.37	
		12	13	21.92	21.97	22.07	
		25	0	21.83	22.14	22.16	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600	Tune-up Limit (dBm)
10MHz	QPSK	1	0	23.64	23.79	23.96	24.5
		1	24	**23.91**	**24.03**	**24.14**	
		1	49	23.77	23.94	24.01	
		25	0	22.76	23.02	23.10	23.5

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		25	12	22.89	23.07	**23.13**	
		25	25	**22.94**	**23.11**	23.12	
		50	0	22.90	**23.12**	**23.12**	23.5
	16QAM	1	0	22.79	22.79	22.96	23.5
		1	24	23.04	23.14	23.25	
		1	49	22.83	23.01	23.00	
		25	0	21.81	22.13	22.21	22.5
		25	12	21.93	22.12	22.23	
		25	25	21.95	22.12	22.13	
		50	0	21.90	22.06	22.19	22.5

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8.9. LTE Band 7

Bandwidth	Modulation	RB size	RB offset	Channel 20775	Channel 21100	Channel 21425	Tune-up Limit (dBm)
5MHz	QPSK	1	0	16.92	**16.99**	16.92	17.5
		1	12	**16.99**	16.98	**17.24**	
		1	24	16.79	16.71	16.85	
		12	0	**16.13**	**15.89**	15.74	**16.5**
		12	6	16.06	15.70	15.95	
		12	13	16.07	15.85	**15.96**	
		25	0	15.98	15.76	**16.02**	16.5
	16QAM	1	0	15.83	16.23	16.40	16.5
		1	12	16.33	16.42	16.49	
		1	24	15.85	16.23	16.40	
		12	0	15.08	14.97	14.94	15.5
		12	6	14.95	15.06	14.89	
		12	13	14.96	14.94	15.05	
		25	0	15.05	15.01	14.87	15.5
Bandwidth	Modulation	RB size	RB offset	Channel 20800	Channel 21100	Channel 21400	Tune-up Limit (dBm)
10MHz	QPSK	1	0	16.69	**17.02**	16.85	17.5
		1	24	16.99	**17.06**	**17.23**	
		1	49	16.85	16.87	16.91	
		25	0	**16.08**	15.87	15.89	**16.5**
		25	12	16.05	15.88	15.85	
		25	25	16.01	**15.92**	**16.01**	
		50	0	15.87	16.00	**16.01**	16.5
	16QAM	1	0	15.90	16.43	16.29	16.5
		1	24	16.13	16.43	16.36	
		1	49	16.06	16.20	16.33	
		25	0	15.05	15.01	15.01	15.5
		25	12	15.05	14.98	14.92	
		25	25	15.06	14.85	14.91	
		50	0	14.89	14.96	14.86	15.5
Bandwidth	Modulation	RB size	RB offset	Channel 20825	Channel 21100	Channel 21375	Tune-up Limit (dBm)
15MHz	QPSK	1	0	16.70	16.88	16.89	17.5
		1	38	**17.17**	**17.08**	**17.33**	
		1	74	16.74	16.70	16.91	
		36	0	**16.12**	15.88	15.74	**16.5**
		36	18	15.83	15.71	**15.97**	
		36	37	15.97	**15.90**	15.87	
		75	0	15.79	15.93	**16.03**	16.5
	16QAM	1	0	15.84	16.40	16.45	16.5
		1	38	16.13	16.45	16.45	
		1	74	16.02	16.07	16.25	
		36	0	14.88	14.81	15.02	15.5
		36	18	14.97	14.98	14.80	
		36	37	14.91	14.81	15.04	
		75	0	14.93	14.87	14.91	15.5
Bandwidth	Modulation	RB size	RB offset	Channel 20850	Channel 21100	Channel 21350	Tune-up Limit (dBm)
20MHz	QPSK	1	0	16.78	16.92	16.81	17.5
		1	49	**17.07**	**16.96**	**17.19**	
		1	99	16.75	16.78	16.77	
		50	0	**15.99**	**15.86**	15.87	**16.5**

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		50	25	15.97	15.85	**15.91**	
		50	50	15.98	15.84	15.88	
		100	0	**15.91**	15.90	15.89	16.5
	16QAM	1	0	15.95	16.28	16.32	16.5
		1	49	16.23	16.48	16.49	
		1	99	15.91	16.15	16.26	
		50	0	15.02	14.91	14.93	15.5
		50	25	15.02	14.94	14.93	
		50	50	15.03	14.91	14.91	
		100	0	14.95	14.94	14.92	15.5

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8.10. LTE Band 12

Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173	Tune-up Limit (dBm)
1.4MHz	QPSK	1	0	23.88	23.63	23.79	24.5
		1	2	**23.95**	**23.95**	23.94	
		1	5	23.79	23.89	**24.10**	
		3	0	**23.99**	23.93	23.80	24.5
		3	1	23.88	**24.02**	**24.00**	
		3	3	23.92	23.92	23.91	
		6	0	22.96	**23.11**	22.96	23.5
	16QAM	1	0	22.98	23.08	22.99	23.5
		1	2	22.76	23.24	23.03	
		1	5	22.91	23.10	22.89	
		3	0	22.84	22.80	22.65	23.5
		3	1	22.74	23.28	22.85	
		3	3	22.62	22.94	22.73	
		6	0	21.89	22.11	22.02	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165	Tune-up Limit (dBm)
3MHz	QPSK	1	0	23.80	23.83	23.76	24.5
		1	8	**24.04**	**24.12**	23.88	
		1	14	23.93	23.92	**24.12**	
		8	0	**22.95**	22.85	22.79	23.5
		8	4	22.76	22.96	22.78	
		8	7	22.93	**23.18**	**23.07**	
		15	0	22.78	**23.12**	22.78	23.5
	16QAM	1	0	22.75	22.74	22.70	23.5
		1	8	22.80	23.09	23.01	
		1	14	22.85	23.04	22.91	
		8	0	21.81	22.07	22.05	22.5
		8	4	21.82	21.99	22.10	
		8	7	21.87	22.12	21.91	
		15	0	21.88	22.27	22.02	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155	Tune-up Limit (dBm)
5MHz	QPSK	1	0	**23.99**	23.72	23.87	24.5
		1	12	23.88	23.85	**24.18**	
		1	24	23.78	**23.88**	24.11	
		12	0	22.82	22.94	22.82	23.5
		12	6	22.78	**23.08**	22.92	
		12	13	**22.92**	23.02	**22.94**	
		25	0	22.85	23.02	**23.07**	23.5
	16QAM	1	0	22.54	22.98	22.85	23.5
		1	12	22.89	23.11	22.85	
		1	24	22.86	22.92	22.77	
		12	0	21.76	22.16	22.09	22.5
		12	6	22.09	22.05	22.10	
		12	13	22.02	22.08	21.95	
		25	0	21.99	22.11	22.08	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130	Tune-up Limit (dBm)
10MHz	QPSK	1	0	23.85	23.78	23.82	24.5
		1	24	**23.93**	**24.00**	**24.03**	
		1	49	23.78	23.84	24.01	
		25	0	22.85	22.97	22.90	23.5

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		25	12	**22.86**	22.93	22.91	
		25	25	22.80	**23.14**	**22.97**	
		50	0	22.91	**23.12**	22.93	23.5
	16QAM	1	0	22.69	22.85	22.73	23.5
		1	24	22.86	23.16	22.97	
		1	49	22.72	22.98	22.77	
		25	0	21.86	22.08	22.02	22.5
		25	12	21.94	22.03	21.99	
		25	25	21.89	22.21	21.96	
		50	0	21.93	22.24	21.97	22.5

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8.11. LTE Band 17

Bandwidth	Modulation	RB size	RB offset	Channel 23755	Channel 23790	Channel 23825	Tune-up Limit (dBm)
5MHz	QPSK	1	0	23.68	23.73	23.94	24.5
		1	12	**24.01**	**24.19**	**24.11**	
		1	24	23.85	23.85	24.06	
		12	0	23.19	23.12	22.96	23.5
		12	6	23.15	23.05	**23.07**	
		12	13	**23.26**	**23.15**	22.88	
		25	0	**23.22**	23.03	22.88	23.5
	16QAM	1	0	22.72	22.89	22.82	23.5
		1	12	23.21	22.86	23.14	
		1	24	22.79	22.99	22.88	
		12	0	22.00	22.00	22.01	22.5
		12	6	22.16	21.97	22.12	
		12	13	22.19	21.95	21.98	
		25	0	22.03	22.14	22.13	22.5
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Channel 23780**	**Channel 23790**	**Channel 23800**	**Tune-up Limit (dBm)**
10MHz	QPSK	1	0	23.81	23.83	23.89	24.5
		1	24	**24.01**	**24.05**	**24.07**	
		1	49	23.95	23.95	24.00	
		25	0	23.05	22.97	22.94	23.5
		25	12	23.02	23.02	22.96	
		25	25	**23.19**	**23.14**	**23.00**	
		50	0	**23.09**	23.02	22.97	23.5
	16QAM	1	0	22.72	22.76	22.96	23.5
		1	24	23.06	22.98	23.18	
		1	49	22.79	22.84	22.96	
		25	0	22.11	22.04	22.04	22.5
		25	12	22.02	22.02	21.98	
		25	25	22.18	22.10	22.02	
		50	0	22.14	22.08	22.06	22.5

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8.12. LTE Band 38

Bandwidth	Modulation	RB size	RB offset	Channel 37775	Channel 38000	Channel 38225	Tune-up Limit (dBm)
5MHz	QPSK	1	0	21.78	21.70	21.50	22.5
		1	12	**22.15**	**21.73**	**21.84**	
		1	24	21.59	21.39	21.82	
		12	0	20.88	20.66	20.64	21.0
		12	6	**20.95**	**20.76**	**20.79**	
		12	13	20.70	20.61	20.59	
		25	0	**20.85**	20.80	20.69	21.0
	16QAM	1	0	20.85	20.45	20.56	21.0
		1	12	20.84	20.58	20.64	
		1	24	20.44	20.60	20.52	
		12	0	19.68	19.82	19.57	20.0
		12	6	19.81	19.45	19.82	
		12	13	19.81	19.65	19.84	
		25	0	19.89	19.76	19.69	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 37800	Channel 38000	Channel 38200	Tune-up Limit (dBm)
10MHz	QPSK	1	0	21.82	21.52	21.59	22.5
		1	24	**21.88**	**21.91**	**21.73**	
		1	49	21.54	21.49	21.61	
		25	0	20.70	20.62	20.77	21.0
		25	12	**20.71**	**20.73**	20.58	
		25	25	20.70	20.49	**20.78**	
		50	0	**20.80**	20.65	20.67	21.0
	16QAM	1	0	20.87	20.68	20.37	21.0
		1	24	20.80	20.63	20.81	
		1	49	20.46	20.57	20.41	
		25	0	19.73	19.59	19.60	20.0
		25	12	19.87	19.65	19.80	
		25	25	19.90	19.60	19.74	
		50	0	19.77	19.72	19.81	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 37825	Channel 38000	Channel 38175	Tune-up Limit (dBm)
15MHz	QPSK	1	0	21.73	21.81	21.56	22.5
		1	38	**22.17**	**21.87**	**21.82**	
		1	74	21.69	21.44	21.77	
		36	0	**20.89**	**20.78**	20.48	21.0
		36	18	20.85	20.72	20.65	
		36	37	20.84	20.48	**20.75**	
		75	0	**20.78**	20.71	20.72	21.0
	16QAM	1	0	20.75	20.57	20.38	21.0
		1	38	20.88	20.75	20.75	
		1	74	20.43	20.32	20.61	
		36	0	19.75	19.82	19.61	20.0
		36	18	19.97	19.45	19.72	
		36	37	19.77	19.46	19.64	
		75	0	19.90	19.60	19.78	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 37850	Channel 38000	Channel 38150	Tune-up Limit (dBm)
20MHz	QPSK	1	0	21.84	21.66	21.53	22.5
		1	49	**22.03**	**21.76**	**21.87**	
		1	99	21.61	21.52	21.67	
		50	0	**20.82**	**20.68**	20.63	21.0

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		50	25	**20.82**	20.64	**20.72**	
		50	50	20.76	20.59	20.65	
		100	0	**20.80**	20.65	20.65	21.0
	16QAM	1	0	20.76	20.60	20.43	21.0
		1	49	20.91	20.71	20.75	
		1	99	20.52	20.46	20.54	
		50	0	19.83	19.67	19.72	20.0
		50	25	19.86	19.57	19.74	
		50	50	19.77	19.56	19.73	
		100	0	19.78	19.65	19.70	20.0

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8.13. LTE Band 40

Bandwidth	Modulation	RB size	RB offset	Channel 38675	Channel 39150	Channel 39625	Tune-up Limit (dBm)
5MHz	QPSK	1	0	21.95	21.48	21.45	22.5
		1	12	**22.28**	**22.02**	**21.54**	
		1	24	21.94	21.54	21.30	
		12	0	20.81	20.63	20.33	21.0
		12	6	**20.96**	20.51	**20.49**	
		12	13	20.75	**20.73**	20.37	
		25	0	**20.76**	20.69	20.33	21.0
	16QAM	1	0	20.70	20.44	20.27	21.5
		1	12	21.13	20.80	20.61	
		1	24	20.57	20.28	20.30	
		12	0	19.97	19.43	19.30	20.0
		12	6	19.99	19.55	19.29	
		12	13	19.82	19.56	19.40	
		25	0	19.93	19.72	19.41	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 38700	Channel 39150	Channel 39600	Tune-up Limit (dBm)
10MHz	QPSK	1	0	22.01	21.62	21.37	22.5
		1	24	**22.18**	**21.87**	**21.52**	
		1	49	21.80	21.48	21.30	
		25	0	**20.90**	20.55	**20.42**	21.0
		25	12	**20.90**	20.59	20.41	
		25	25	20.85	**20.61**	20.30	
		50	0	**20.85**	20.55	20.33	21.0
	16QAM	1	0	20.85	20.55	20.20	21.5
		1	24	21.06	20.77	20.51	
		1	49	20.70	20.39	20.16	
		25	0	19.86	19.57	19.43	20.0
		25	12	19.88	19.56	19.39	
		25	25	19.84	19.58	19.27	
		50	0	19.78	19.63	19.29	20.0

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8.14. LTE Band 41

Bandwidth	Modulation	RB size	RB offset	Channel 40315	Channel 40740	Channel 41165	Tune-up Limit (dBm)
5MHz	QPSK	1	0	21.77	21.66	21.78	22.0
		1	12	**21.92**	21.69	**21.79**	
		1	24	21.63	**21.70**	21.51	
		12	0	20.69	**20.86**	**20.81**	21.0
		12	6	20.79	20.67	20.62	
		12	13	**20.89**	20.72	20.66	
		25	0	**20.75**	**20.75**	20.70	21.0
	16QAM	1	0	20.59	20.56	20.60	21.0
		1	12	20.97	20.85	20.80	
		1	24	20.61	20.60	20.49	
		12	0	19.58	19.90	19.67	20.0
		12	6	19.68	19.87	19.64	
		12	13	19.74	19.73	19.61	
		25	0	19.65	19.64	19.65	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 40340	Channel 40740	Channel 41140	Tune-up Limit (dBm)
10MHz	QPSK	1	0	21.64	21.61	21.67	22.0
		1	24	**21.84**	**21.78**	**21.98**	
		1	49	21.82	21.44	21.62	
		25	0	20.56	**20.76**	**20.86**	21.0
		25	12	20.82	20.76	20.58	
		25	25	**20.90**	20.71	20.48	
		50	0	20.61	20.57	**20.73**	21.0
	16QAM	1	0	20.46	20.66	20.77	21.0
		1	24	20.94	20.85	20.69	
		1	49	20.74	20.52	20.41	
		25	0	19.81	19.75	19.70	20.0
		25	12	19.79	19.89	19.77	
		25	25	19.74	19.83	19.41	
		50	0	19.70	19.73	19.55	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 40365	Channel 40740	Channel 41115	Tune-up Limit (dBm)
15MHz	QPSK	1	0	21.81	21.52	21.51	22.0
		1	38	**21.96**	**21.93**	**21.74**	
		1	74	21.66	21.70	21.58	
		36	0	20.54	20.77	**20.67**	21.0
		36	18	**20.78**	20.64	20.64	
		36	37	20.74	**20.80**	20.65	
		75	0	**20.84**	20.63	20.78	21.0
	16QAM	1	0	20.70	20.51	20.72	21.0
		1	38	20.89	20.61	20.89	
		1	74	20.83	20.40	20.35	
		36	0	19.81	19.86	19.79	20.0
		36	18	19.74	19.85	19.79	
		36	37	19.89	19.69	19.70	
		75	0	19.65	19.89	19.69	20.0
Bandwidth	Modulation	RB size	RB offset	Channel 40390	Channel 40740	Channel 41090	Tune-up Limit (dBm)
20MHz	QPSK	1	0	21.67	21.57	21.63	22.0
		1	49	**21.94**	**21.82**	**21.84**	
		1	99	21.76	21.59	21.52	
		50	0	20.65	20.73	**20.77**	21.0

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		50	25	**20.81**	**20.74**	20.70	
		50	50	20.78	20.73	20.57	
		100	0	**20.74**	20.69	20.65	21.0
	16QAM	1	0	20.56	20.55	20.62	21.0
		1	49	20.88	20.75	20.75	
		1	99	20.73	20.52	20.46	
		50	0	19.67	19.78	19.75	20.0
		50	25	19.81	19.80	19.71	
		50	50	19.82	19.80	19.56	
		100	0	19.73	19.78	19.67	20.0

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Body 1-g (0 mm)

8.15. Power measurement result of 2.4GHz Wi-Fi.

Test Mode	Frequency[MHz]	AV Power (dBm)	Tune-up Limit (dBm)
802.11b	2412	13.17	14.0
	2437	13.59	14.0
	2462	13.57	14.0
802.11g	2412	14.51	15.0
	2437	14.94	15.0
	2462	13.80	15.0
802.11n20	2412	14.26	15.0
	2437	14.93	15.0
	2462	14.99	15.0
802.11n40	2422	12.58	13.0
	2437	12.88	13.0
	2452	12.97	13.0

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8.16. Power measurement result of 5GHz Wi-Fi

Test Mode	Antenna	Frequency[MHz]	AV Power (dBm)	Tune-up Limit (dBm)
11A	Ant1	5180	11.76	12.0
		5200	11.77	12.0
		5240	11.66	12.0
		5260	12.15	12.5
		5280	12.12	12.5
		5320	12.16	12.5
		5500	10.93	11.0
		5580	10.97	11.0
		5700	10.86	11.0
		5720_UNII-2C	10.88	11.0
		5720_UNII-3	3.20	4.0
		5745	12.25	12.5
		5785	12.11	12.5
		5825	12.27	12.5
11N20SISO	Ant1	5180	11.60	12.0
		5200	11.67	12.0
		5240	11.58	12.0
		5260	11.53	12.0
		5280	11.65	12.0
		5320	11.50	12.0
		5500	10.75	11.0
		5580	10.83	11.0
		5700	10.92	11.0
		5720_UNII-2C	10.95	11.0
		5720_UNII-3	3.42	4.0
		5745	11.81	12.0
		5785	11.61	12.0
		5825	11.65	12.0
11AC20SISO	Ant1	5180	11.58	12.0
		5200	11.60	12.0
		5240	11.49	12.0
		5260	11.54	12.0
		5280	11.61	12.0
		5320	11.59	12.0
		5500	10.82	11.0
		5580	10.85	11.0
		5700	10.96	11.0
		5720_UNII-2C	10.86	11.0
		5720_UNII-3	3.34	4.0
		5745	11.88	12.0
		5785	11.70	12.0
		5825	11.69	12.0
11N40SISO	Ant1	5190	11.88	12.0
		5230	11.71	12.0
		5270	11.68	12.0
		5310	11.70	12.0
		5510	11.46	11.5
		5550	11.48	11.5
		5670	11.14	11.5
		5710_UNII-2C	10.77	11.0
		5710_UNII-3	-1.92	-1.0
		5755	11.68	12.0
		5795	11.70	12.0
11AC40SISO	Ant1	5190	11.96	12.0
		5230	11.77	12.0
		5270	11.78	12.0
		5310	11.76	12.0

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		5510	11.50	11.5
		5550	11.47	11.5
		5670	11.09	11.5
		5710_UNII-2C	10.86	11.0
		5710_UNII-3	-1.91	-1.0
		5755	11.76	12.0
		5795	11.65	12.0

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8.17. Power measurement result Bluetooth

Test Mode	Frequency[MHz]	AV Power (dBm)	Tune-up Limit (dBm)
DH5	2402	11.34	12.0
	2441	11.25	
	2480	11.03	
2DH5	2402	9.32	9.5
	2441	9.18	
	2480	9.45	
BLE_1M	2402	7.04	8.0
	2440	7.6	
	2480	6.63	

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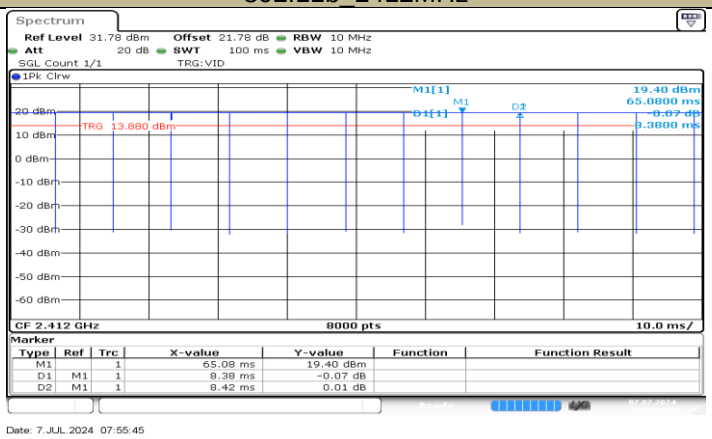
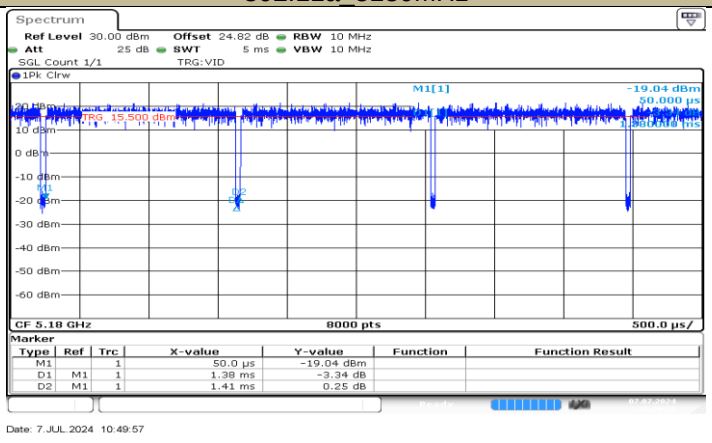
8.18. Duty Cycle

Test Mode	Duty Cycle (%)
802.11b	99.52
802.11a	97.87
802.11n40	94.12
DH5	76.74

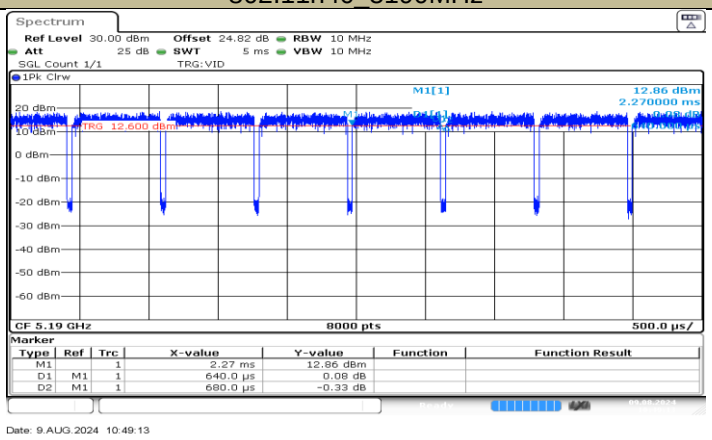
802.11b_2412MHz



802.11a_5180MHz



802.11n40_5190MHz



BT DH5_2402MHz

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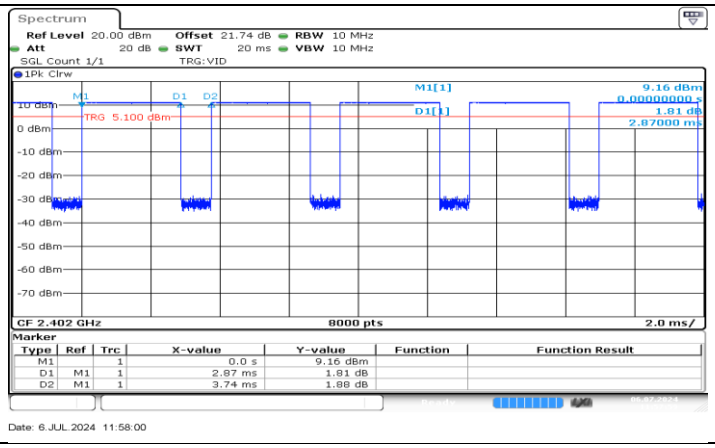

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9. RF Exposure Conditions

Details of antenna to edge distance can be found in attachment 4791364876-1-SAR-1_App A Photo

Per FCC KDB 616217 D04

The overall diagonal dimension of the display section of a tablet is > 20cm, the bottom surface and edges of the tablet should be selected for SAR evaluation at a 0mm separation distance, Exposures from antennas through the front surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary, except for tablets that are designed to require continuous operations with the hand(s) next to the antenna(s)

Per FCC KDB 447498 D01:

1. The 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for product specific 10-g SAR, where:

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

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. The SAR exclusion threshold for distances >50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:
a) at 100 MHz to 1500 MHz
[Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW
b) at > 1500 MHz and ≤ 6 GHz
[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW

3. The test separation distances required for a device to demonstrate SAR or MPE compliance must be sufficiently conservative to support the operational separation distances required by the device and its antennas and radiating structures. For devices such as tablets and transmitters embedded in keyboard sections of laptop computers that are typically used in close proximity to users, the test separation distance is determined by the smallest distance between the outer surface of the device and the user. For larger devices, as the antenna operational separation distance increases to where the SAR characteristics of the device and its antennas are not directly influenced by the user, such as antennas along the top and upper side edges of laptop computer displays or opposite and adjacent edges of tablets, the test separation distance is normally determined by the closest separation between the antenna and the user.

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For GSM 850 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	836.6	25.00	316.23	5.00	57.8	3.0	Required
Left edge	836.6	25.00	316.23	42.00	6.9	3.0	Required
Right edge	836.6	25.00	316.23	5.00	57.8	3.0	Required
Bottom edge	836.6	25.00	316.23	6.00	48.2	3.0	Required

For GSM 850 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	836.6	25.00	316.23	164.00	180	889.05	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For GSM 1900 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	1880	19.50	89.13	5.00	24.4	3.0	Required
Left edge	1880	19.50	89.13	42.00	2.9	3.0	Excluded
Right edge	1880	19.50	89.13	5.00	24.4	3.0	Required
Bottom edge	1880	19.50	89.13	6.00	20.4	3.0	Required

For GSM 1900 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	1880	19.50	89.13	109.40	180.00	1409.40	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For WCDMA B2 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	1880	15.00	31.62	5.00	8.7	3.0	Required
Left edge	1880	15.00	31.62	42.00	1.0	3.0	Excluded
Right edge	1880	15.00	31.62	5.00	8.7	3.0	Required
Bottom edge	1880	15.00	31.62	6.00	7.2	3.0	Required

For WCDMA B2 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	1880	15.00	31.62	109.40	180.00	1409.40	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For WCDMA B4 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	1732.5	14.50	28.18	5.00	7.4	3.0	Required
Left edge	1732.5	14.50	28.18	42.00	0.9	3.0	Excluded
Right edge	1732.5	14.50	28.18	5.00	7.4	3.0	Required
Bottom edge	1732.5	14.50	28.18	6.00	6.2	3.0	Required

For WCDMA B4 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	1732.5	14.5	28.18	113.96	180.00	1413.96	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For WCDMA B5 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	836.4	22.00	158.49	5.00	29.0	3.0	Required
Left edge	836.4	22.00	158.49	42.00	3.5	3.0	Required
Right edge	836.4	22.00	158.49	5.00	29.0	3.0	Required
Bottom edge	836.4	22.00	158.49	6.00	24.2	3.0	Required

For WCDMA B5 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	836.4	22.00	158.49	164.02	180	888.90	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For LTE B2 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	1900	17.00	50.12	5.00	13.8	3.0	Required
Left edge	1900	17.00	50.12	42.00	1.6	3.0	Excluded
Right edge	1900	17.00	50.12	5.00	13.8	3.0	Required
Bottom edge	1900	17.00	50.12	6.00	11.5	3.0	Required

For LTE B2 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	1900	17.00	50.12	108.82	180.00	1408.82	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For LTE B4 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	1745	15.00	31.62	5.00	8.4	3.0	Required
Left edge	1745	15.00	31.62	42.00	1.0	3.0	Excluded
Right edge	1745	15.00	31.62	5.00	8.4	3.0	Required
Bottom edge	1745	15.00	31.62	6.00	7.0	3.0	Required

For LTE B4 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	1745	15.00	31.62	113.55	180.00	1413.55	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For LTE B5 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	844	24.50	281.84	5.00	51.8	3.0	Required
Left edge	844	24.50	281.84	42.00	6.2	3.0	Required
Right edge	844	24.50	281.84	5.00	51.8	3.0	Required
Bottom edge	844	24.50	281.84	6.00	43.2	3.0	Required

For LTE B5 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	844	24.50	281.84	163.28	180	894.74	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For LTE B7 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2560	17.50	56.23	5.00	18.0	3.0	Required
Left edge	2560	17.50	56.23	42.00	2.1	3.0	Excluded
Right edge	2560	17.50	56.23	5.00	18.0	3.0	Required
Bottom edge	2560	17.50	56.23	6.00	15.0	3.0	Required

For LTE B7 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	2560	17.50	56.23	93.75	180.00	1393.75	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For LTE B12 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	711	24.50	281.84	5.00	47.5	3.0	Required
Left edge	711	24.50	281.84	42.00	5.7	3.0	Required
Right edge	711	24.50	281.84	5.00	47.5	3.0	Required
Bottom edge	711	24.50	281.84	6.00	39.6	3.0	Required

For LTE B12 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	711	24.50	281.84	177.89	180	794.09	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For LTE B38 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2580	22.50	177.83	5.00	57.1	3.0	Required
Left edge	2580	22.50	177.83	42.00	6.8	3.0	Required
Right edge	2580	22.50	177.83	5.00	57.1	3.0	Required
Bottom edge	2580	22.50	177.83	6.00	47.6	3.0	Required

For LTE B38 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	2580	22.50	177.83	93.39	180.00	1393.39	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For LTE B40 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2310	22.50	177.83	5.00	54.1	3.0	Required
Left edge	2310	22.50	177.83	42.00	6.4	3.0	Required
Right edge	2310	22.50	177.83	5.00	54.1	3.0	Required
Bottom edge	2310	22.50	177.83	6.00	45.0	3.0	Required

For LTE B40 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	2310	22.50	177.83	98.69	180.00	1398.69	Excluded

Note:
1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For LTE B41 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2570	22.00	158.49	5.00	50.8	3.0	Required
Left edge	2570	22.00	158.49	42.00	6.0	3.0	Required
Right edge	2570	22.00	158.49	5.00	50.8	3.0	Required
Bottom edge	2570	22.00	158.49	6.00	42.3	3.0	Required

For LTE B41 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Top edge	2570	22.00	158.49	93.57	180.00	1393.57	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For 2.4G Wi-Fi 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2437	14.00	25.12	7.00	5.6	3.0	Required
Left edge	2437	14.00	25.12	8.00	4.9	3.0	Required
Bottom edge	2437	14.00	25.12	21.00	1.9	3.0	Excluded

For 2.4G Wi-Fi 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Right edge	2437	14.00	25.12	96.09	107	666.09	Excluded
Top edge	2437	14.00	25.12	96.09	145.00	1046.09	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For U-NII-2A 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	5320	12.50	17.78	7.00	5.9	3.0	Required
Left edge	5320	12.50	17.78	8.00	5.1	3.0	Required
Bottom edge	5320	12.50	17.78	21.00	2.0	3.0	Excluded

For U-NII-2A 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Right edge	5320	12.50	17.78	65.03	107	635.03	Excluded
Top edge	5320	12.50	17.78	65.03	145.00	1015.03	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For U-NII-2C 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	5500	11.50	14.13	7.00	4.7	3.0	Required
Left edge	5500	11.50	14.13	8.00	4.1	3.0	Required
Bottom edge	5500	11.50	14.13	21.00	1.6	3.0	Excluded

For U-NII-2C 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Right edge	5500	11.50	14.13	63.96	107	633.96	Excluded
Top edge	5500	11.50	14.13	63.96	145.00	1013.96	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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For U-NII-3 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	5825	12.50	17.78	7.00	6.1	3.0	Required
Left edge	5825	12.50	17.78	8.00	5.4	3.0	Required
Bottom edge	5825	12.50	17.78	21.00	2.0	3.0	Excluded

For U-NII-3 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Right edge	5825	12.50	17.78	62.15	107	632.15	Excluded
Top edge	5825	12.50	17.78	62.15	145.00	1012.15	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

For BT 1-g SAR (antenna to edges separation distance less than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
Back surface	2402	12.00	15.85	7.00	3.5	3.0	Required
Left edge	2402	12.00	15.85	8.00	3.1	3.0	Required
Bottom edge	2402	12.00	15.85	21.00	1.2	3.0	Excluded

For BT 1-g SAR (antenna to edges separation distance greater than 50mm)

Position	Frequency (MHz)	Power (dBm)	Power (mW)	Power allowed at 50mm	Separation Distance (mm)	Calculation Result (mW)	SAR Test
Right edge	2402	12.00	15.85	96.78	107.00	666.78	Excluded
Top edge	2402	12.00	15.85	96.78	145	1046.78	Excluded

Note:

1) Because the power in mW is less than the calculation result, so SAR evaluation for corresponding position is not required.

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10. SAR exclusion evaluation for NFC

As per KDB447498 D01,For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

Appendix C

SAR Test Exclusion Thresholds for < 100 MHz and < 200 mm

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	mW
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

For 13.56MHz NFC 1-g SAR

Frequency (MHz)	(dBµV/m)	Power (dBm)
13.56	-3.57	-98.87

Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result (mW)	SAR Test
13.56	-98.87	0.0	5.00	459.23	Excluded

Note:

1) NFC antenna guide edge distance is evaluated with the worst case.
2) The threshold of 13.56MHz is calculated in a linear manner based on the values in Appendix C, Calculation Result (mW)=474-(10-50)/(474-308)*(13.56-10)

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11. Dielectric Property Measurements & System Check

11.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Tissue Dielectric Parameters

FCC KDB 865664 D01 v01r04 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

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IEEE Std 1528-2013
Refer to Table 3 within the IEEE Std 1528-2013 Dielectric Property Measurements Results:

Liquid	Freq.	Liquid Parameters				Deviation(%)		Limit (%)	Temp. (℃)	Test Date
		Measured		Target						
		ε_r	σ	ε_r	σ	ε_r	σ			
Head 750	695	42.610	0.865	42.23	0.89	0.90	-2.81	±5	21.3	July 18, 2024
	750	41.940	0.892	41.94	0.89	0.00	0.22			
	790	41.350	0.928	41.73	0.90	-0.91	3.11			
Head 835	805	40.190	0.876	41.66	0.90	-3.53	-2.67	±5	21.3	August 7, 2024
	835	40.100	0.883	41.50	0.90	-3.37	-1.89			
	905	40.120	0.931	41.50	0.97	-3.33	-4.02			
Head 1800	1720	40.650	1.349	40.13	1.35	1.30	-0.07	±5	22.7	July 30, 2024
	1800	39.940	1.425	40.00	1.40	-0.15	1.79			
	1890	39.500	1.462	40.00	1.40	-1.25	4.43			
Head 1900	1850	41.510	1.336	40.00	1.40	3.78	-4.57	±5	22.7	July 30, 2024
	1900	41.230	1.350	40.00	1.40	3.07	-3.57			
	1920	41.150	1.367	40.00	1.40	2.88	-2.36			
Head 2300	2210	39.220	1.588	39.63	1.59	-1.03	-0.13	±5	22.7	July 19, 2024
	2300	38.930	1.683	39.47	1.67	-1.37	0.78			
	2390	38.600	1.776	39.31	1.75	-1.81	1.49			
Head 2450	2400	37.860	1.698	39.29	1.76	-3.64	-3.52	±5	22.3	August 7, 2024
	2450	37.880	1.748	39.20	1.80	-3.37	-2.89			
	2480	37.800	1.765	39.16	1.83	-3.47	-3.55			
Head 2600	2500	38.010	1.879	39.14	1.85	-2.89	1.57	±5	22.7	July 19, 2024
	2600	37.700	1.983	39.01	1.96	-3.36	1.17			
	2700	37.410	2.090	38.88	2.07	-3.78	0.97			
Head 2600	2500	37.950	1.871	39.14	1.85	-3.04	1.14	±5	22.7	July 30, 2024
	2600	37.640	1.975	39.01	1.96	-3.51	0.77			
	2700	37.350	2.082	38.88	2.07	-3.94	0.58			
Head 5250	5160	34.650	4.477	36.03	4.61	-3.83	-2.89	±5	22.3	August 7, 2024
	5250	34.500	4.675	35.93	4.71	-3.98	-0.74			
	5340	34.380	4.650	35.83	4.80	-4.05	-3.12			
Head 5600	5500	34.120	4.796	35.64	4.96	-4.26	-3.31	±5	22.3	August 7, 2024
	5600	33.990	5.092	35.53	5.07	-4.33	0.43			
	5700	33.810	5.249	35.41	5.17	-4.52	1.53			
Head 5750	5660	33.810	5.007	35.46	5.13	-4.65	-2.40	±5	22.3	August 7, 2024
	5750	33.720	5.240	35.36	5.22	-4.64	0.38			
	5840	33.580	5.423	35.27	5.30	-4.79	2.32			

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11.2. System Check

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 same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm (above 1GHZ) and 15mm (below 1GHz) from dipole center to the simulating liquid surface.
- For area scan, standard grid spacing for head measurements is 15 mm in x- and y- dimension(≤2GHz), 12 mm in x- and y-dimension(2-4 GHz) and 10mm in x- and y- dimension(4-6GHz).
- For zoom scan, Δx_{zoom}, Δy_{zoom}≤ 2GHz - ≤8mm, 2-4GHz - ≤5 mm and 4-6 GHz-≤4mm; Δz_{zoom} ≤3GHz - ≤5 mm, 3-4 GHz- ≤4mm and 4-6GHz-≤2mm.
- Distance between probe sensors and phantom surface was set to 3 mm except for 5 GHz band. For 5GHz band, Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was set to 100 mW or 250 mW depend on the certificate of the dipoles.
- The results are normalized to 1 W input power.

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System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

T.S. Liquid		Measured Results		Target (Ref. value)	Delta (%)	Limit (%)	Temp. (℃)	Test Date
		Result of 0.1W input power (W/Kg)	Normalize to 1W (W/Kg)					
Head 750	1-g	0.917	9.17	8.50	7.88	±10	21.3	July 18, 2024
	10-g	0.596	5.96	5.61	6.24			
Head 835	1-g	1.020	10.20	9.64	5.81	±10	22.3	August 7, 2024
	10-g	0.659	6.59	6.26	5.27			
Head 1800	1-g	3.890	38.90	38.70	0.52	±10	22.7	July 30, 2024
	10-g	2.040	20.40	19.90	2.51			
Head 1800	1-g	3.820	38.20	38.70	-1.29	±10	22	July 31, 2024
	10-g	2.010	20.10	19.90	1.01			
Head 1900	1-g	3.670	36.70	39.60	-7.32	±10	22.7	July 30, 2024
	10-g	1.880	18.80	20.20	-6.93			
Head 2300	1-g	5.000	50.00	47.80	4.60	±10	22.7	July 19, 2024
	10-g	2.360	23.60	22.40	5.36			
Head 2450	1-g	5.000	50.00	53.20	-6.02	±10	22.3	August 7, 2024
	10-g	2.340	23.40	24.20	-3.31			
Head 2600	1-g	5.830	58.30	55.40	5.23	±10	22.7	July 19, 2024
	10-g	2.520	25.20	24.50	2.86			
Head 2600	1-g	5.650	56.50	55.40	1.99	±10	22.7	July 30, 2024
	10-g	2.490	24.90	24.50	1.63			
Head 5250	1-g	8.300	83.00	77.90	6.55	±10	22.3	August 7, 2024
	10-g	2.370	23.70	22.60	4.87			
Head 5600	1-g	8.450	84.50	80.90	4.45	±10	22.3	August 7, 2024
	10-g	2.380	23.80	23.30	2.15			
Head 5750	1-g	7.920	79.20	78.30	1.15	±10	22.3	August 7, 2024
	10-g	2.240	22.40	22.40	0.00			

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12. Measured and Reported (Scaled) SAR Results

General Notes:

1) As per KDB447498 D01, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.
2) As per KDB447498 D01, 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:
   ● ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
   ● ≤ 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.
   When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
3) As per KDB865664 D01 for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%, and the measured SAR <1.45W/Kg, only one repeated measurement is required.
4) As per KDB865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing (Refer to appendix B for detailed SAR plots).
5) Additional SAR tests in simultaneous transmission fixed power reduction scenario are also tested in some frequency bands and required test positions for the SAR worst case, which are only used to ensure simultaneous transmission SAR test exclusion. The standalone SAR compliance still uses the SAR results tested at the maximum output power level.

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12.1. SAR Test Results of GSM850

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	GPRS 4 Slots	Back Surface	0	190	25.0	24.77	0.772	-0.16	0.814
Body	GPRS 4 Slots	Back Surface	0	128	25.0	24.77	0.559	-0.14	0.589
Body	GPRS 4 Slots	Back Surface	0	251	25.0	24.74	0.736	0.01	0.782
Body	GPRS 4 Slots	Left Edge	0	190	25.0	24.74	0.126	0.07	0.134
Body	GPRS 4 Slots	Right Edge	0	190	25.0	24.77	0.553	0.06	0.583
Body	GPRS 4 Slots	Bottom Edge	0	190	25.0	24.77	0.810	0.02	0.854
Body	GPRS 4 Slots	Bottom Edge	0	128	25.0	24.77	0.763	0.04	0.804
Body	GPRS 4 Slots	Bottom Edge	0	251	25.0	24.74	0.724	0.03	0.769
Worst mode retest									
Body	GPRS 4 Slots	Bottom Edge	0	190	25.0	24.77	0.802	-0.09	0.846

Note:

1) Due to 0.810/0.802 = 1.01 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.2. SAR Test Results of GSM1900

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	GPRS 4 Slots	Back Surface	0	661	19.5	18.94	0.705	-0.11	0.802
Body	GPRS 4 Slots	Back Surface	0	512	19.5	19.20	0.765	-0.02	0.820
Body	GPRS 4 Slots	Back Surface	0	810	19.5	18.65	0.655	0.00	0.796
Body	GPRS 4 Slots	Right Edge	0	661	19.5	18.94	0.289	-0.16	0.329
Body	GPRS 4 Slots	Bottom Edge	0	661	19.5	18.94	0.373	-0.04	0.424

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12.3. SAR Test Results of WCDMA B2

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	RMC 12.2kbps	Back Surface	0	9400	15.0	14.54	0.530	-0.06	0.590
Body	RMC 12.2kbps	Back Surface	0	9262	15.0	14.52	0.589	0.10	0.658
Body	RMC 12.2kbps	Back Surface	0	9538	15.0	14.44	0.422	0.00	0.480
Body	RMC 12.2kbps	Right Edge	0	9400	15.0	14.54	0.237	-0.01	0.263
Body	RMC 12.2kbps	Bottom Edge	0	9400	15.0	14.54	0.261	-0.08	0.290

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12.4. SAR Test Results of WCDMA B4

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	RMC 12.2kbps	Back Surface	0	1413	14.5	14.02	0.581	0.11	0.649
Body	RMC 12.2kbps	Back Surface	0	1312	14.5	14.01	0.654	-0.06	0.732
Body	RMC 12.2kbps	Back Surface	0	1513	14.5	13.99	0.632	-0.05	0.711
Body	RMC 12.2kbps	Right Edge	0	1413	14.5	14.02	0.213	-0.05	0.238
Body	RMC 12.2kbps	Bottom Edge	0	1413	14.5	14.02	0.634	-0.14	0.708

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12.5. SAR Test Results of WCDMA B5

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	RMC 12.2kbps	Back Surface	0	4182	22.0	21.71	0.447	-0.16	0.478
Body	RMC 12.2kbps	Back Surface	0	4132	22.0	21.63	0.426	0.09	0.464
Body	RMC 12.2kbps	Back Surface	0	4233	22.0	21.79	0.437	-0.14	0.459
Body	RMC 12.2kbps	Left Edge	0	4182	22.0	21.71	0.102	-0.15	0.109
Body	RMC 12.2kbps	Right Edge	0	4182	22.0	21.71	0.344	-0.09	0.368
Body	RMC 12.2kbps	Bottom Edge	0	4182	22.0	21.71	0.413	-0.09	0.442

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12.6. SAR Test Results of LTE B2

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#49	Back Surface	0	19100	17.0	16.83	0.877	0.03	0.912
Body	20M QPSK 1RB#49	Back Surface	0	18700	17.0	16.68	0.815	-0.13	0.877
Body	20M QPSK 1RB#49	Back Surface	0	18900	17.0	16.80	0.794	-0.04	0.832
Body	20M QPSK 50RB#0	Back Surface	0	18900	16.0	15.74	0.610	-0.16	0.647
Body	20M QPSK 50RB#0	Back Surface	0	18700	16.0	16.53	0.666	0.11	0.590
Body	20M QPSK 50RB#0	Back Surface	0	19100	16.0	15.74	0.598	0.01	0.635
Body	20M QPSK 100RB#0	Back Surface	0	19100	16.0	15.70	0.604	0.00	0.647
Body	20M QPSK 1RB#49	Right Edge	0	19100	17.0	16.83	0.240	-0.11	0.250
Body	20M QPSK 50RB#0	Right Edge	0	18900	16.0	15.74	0.200	-0.02	0.212
Body	20M QPSK 1RB#49	Bottom Edge	0	19100	17.0	16.83	0.336	-0.12	0.350
Body	20M QPSK 50RB#0	Bottom Edge	0	18900	16.0	15.74	0.303	-0.01	0.322
Worst mode retest									
Body	20M QPSK 1RB#49	Back Surface	0	19100	17.0	16.83	0.872	-0.02	0.907

Note:

1) Due to 0.877/0.872 = 1.01 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.7. SAR Test Results of LTE B4

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#49	Back Surface	0	20300	15.0	14.83	0.779	0.01	0.810
Body	20M QPSK 1RB#49	Back Surface	0	20050	15.0	14.66	0.657	0.10	0.711
Body	20M QPSK 1RB#49	Back Surface	0	20175	15.0	14.73	0.624	0.06	0.664
Body	20M QPSK 50RB#0	Back Surface	0	20300	14.0	13.66	0.468	-0.13	0.506
Body	20M QPSK 50RB#25	Back Surface	0	20050	14.0	13.58	0.493	-0.12	0.544
Body	20M QPSK 50RB#0	Back Surface	0	20175	14.0	13.52	0.475	-0.14	0.530
Body	20M QPSK 100RB#0	Back Surface	0	20050	14.0	13.60	0.455	0.05	0.498
Body	20M QPSK 1RB#49	Right Edge	0	20300	15.0	14.83	0.222	0.06	0.231
Body	20M QPSK 50RB#0	Right Edge	0	20300	14.0	13.66	0.166	-0.10	0.180
Body	20M QPSK 1RB#49	Bottom Edge	0	20300	15.0	14.83	0.753	-0.16	0.783
Body	20M QPSK 50RB#0	Bottom Edge	0	20300	14.0	13.66	0.583	0.04	0.630

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12.8. SAR Test Results of LTE B5

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#24	Back Surface	0	20600	24.5	24.14	0.721	0.11	0.783
Body	20M QPSK 25RB#12	Back Surface	0	20600	23.5	23.13	0.576	-0.16	0.627
Body	20M QPSK 1RB#24	Left Edge	0	20600	24.5	24.14	0.232	-0.03	0.252
Body	20M QPSK 25RB#12	Left Edge	0	20600	23.5	23.13	0.201	0.02	0.219
Body	20M QPSK 1RB#24	Right Edge	0	20600	24.5	24.14	0.701	-0.11	0.762
Body	20M QPSK 25RB#12	Right Edge	0	20600	23.5	23.13	0.624	0.02	0.679
Body	20M QPSK 1RB#24	Bottom Edge	0	20600	24.5	24.14	0.839	0.01	0.912
Body	20M QPSK 1RB#24	Bottom Edge	0	20450	24.5	23.91	0.786	-0.14	0.900
Body	20M QPSK 1RB#24	Bottom Edge	0	20525	24.5	24.03	0.774	-0.14	0.862
Body	20M QPSK 25RB#12	Bottom Edge	0	20600	23.5	23.13	0.763	0.08	0.831
Body	20M QPSK 25RB#25	Bottom Edge	0	20450	23.5	22.94	0.724	0.08	0.824
Body	20M QPSK 25RB#25	Bottom Edge	0	20525	23.5	23.11	0.714	-0.15	0.781
Body	20M QPSK 50RB#0	Bottom Edge	0	20525	23.5	23.12	0.733	0.09	0.800
Worst mode retest									
Body	20M QPSK 1RB#24	Bottom Edge	0	20600	24.5	24.14	0.801	-0.01	0.870

Note:

1) Due to 0.839/0.801 = 1.05 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.9. SAR Test Results of LTE B7

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#49	Back Surface	0	21350	17.5	17.19	0.576	0.00	0.619
Body	20M QPSK 1RB#49	Back Surface	0	20850	17.5	17.07	0.479	0.06	0.528
Body	20M QPSK 1RB#49	Back Surface	0	21100	17.5	16.96	0.508	0.00	0.576
Body	20M QPSK 50RB#0	Back Surface	0	20850	16.0	15.99	0.382	-0.15	0.383
Body	20M QPSK 50RB#0	Back Surface	0	21100	16.0	15.86	0.358	-0.07	0.370
Body	20M QPSK 50RB#25	Back Surface	0	21350	16.0	15.91	0.398	0.08	0.406
Body	20M QPSK 1RB#49	Right Edge	0	21350	17.5	17.19	0.344	0.04	0.369
Body	20M QPSK 50RB#50	Right Edge	0	23150	16.0	15.99	0.260	-0.13	0.261
Body	20M QPSK 1RB#49	Bottom Edge	0	21350	17.5	17.19	0.205	0.01	0.220
Body	20M QPSK 50RB#50	Bottom Edge	0	23150	16.0	15.99	0.163	-0.04	0.164

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12.10. SAR Test Results of LTE B12

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#24	Back Surface	0	23130	24.5	24.03	0.946	-0.01	1.054
Body	20M QPSK 1RB#24	Back Surface	0	23060	24.5	23.93	0.963	0.03	1.098
Body	20M QPSK 1RB#24	Back Surface	0	23095	24.5	24.00	0.975	-0.04	1.094
Body	20M QPSK 25RB#25	Back Surface	0	23095	23.5	23.14	0.861	-0.16	0.936
Body	20M QPSK 25RB#12	Back Surface	0	23060	23.5	22.86	0.872	0.08	1.010
Body	20M QPSK 25RB#25	Back Surface	0	23130	23.5	22.97	0.795	0.11	0.898
Body	20M QPSK 50RB#0	Back Surface	0	23095	23.5	23.12	0.795	0.11	0.868
Body	20M QPSK 1RB#24	Left Edge	0	23130	24.5	24.03	0.161	0.09	0.179
Body	20M QPSK 25RB#25	Left Edge	0	23095	23.5	23.14	0.138	-0.13	0.150
Body	20M QPSK 1RB#24	Right Edge	0	23130	24.5	24.03	0.170	-0.14	0.190
Body	20M QPSK 25RB#25	Right Edge	0	23095	23.5	23.14	0.131	0.03	0.142
Body	20M QPSK 1RB#24	Bottom Edge	0	23130	24.5	24.03	0.515	-0.02	0.573
Body	20M QPSK 25RB#25	Bottom Edge	0	23095	23.5	23.14	0.413	0.08	0.448
Worst mode retest									
Body	20M QPSK 1RB#24	Back Surface	0	23095	24.5	24.00	0.969	0.03	1.087

Note:

1) Due to 0.975/0.869 = 1.01 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.11. SAR Test Results of LTE B38

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#49	Back Surface	0	37850	22.5	22.03	0.655	-0.01	0.730
Body	20M QPSK 1RB#49	Back Surface	0	38000	22.5	21.76	0.719	-0.09	0.853
Body	20M QPSK 1RB#49	Back Surface	0	38150	22.5	21.87	0.760	0.03	0.879
Body	20M QPSK 50RB#0	Back Surface	0	37850	21.0	20.82	0.485	0.02	0.506
Body	20M QPSK 50RB#0	Back Surface	0	38000	21.0	20.68	0.553	-0.16	0.595
Body	20M QPSK 50RB#25	Back Surface	0	38150	21.0	20.72	0.567	0.11	0.605
Body	20M QPSK 100RB#0	Back Surface	0	37850	21.0	20.80	0.534	-0.15	0.559
Body	20M QPSK 1RB#49	Left Edge	0	37850	22.5	22.03	0.063	0.11	0.070
Body	20M QPSK 50RB#0	Left Edge	0	37850	21.0	20.82	0.052	0.01	0.054
Body	20M QPSK 1RB#49	Right Edge	0	37850	22.5	22.03	0.469	-0.05	0.522
Body	20M QPSK 50RB#0	Right Edge	0	37850	21.0	20.82	0.352	0.09	0.367
Body	20M QPSK 1RB#49	Bottom Edge	0	37850	22.5	22.03	0.274	-0.06	0.305
Body	20M QPSK 50RB#0	Bottom Edge	0	37850	21.0	20.82	0.207	-0.08	0.216

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12.12. SAR Test Results of LTE B40

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	10M QPSK 1RB#24	Back Surface	0	38700	22.5	22.18	0.733	0.01	0.789
Body	10M QPSK 1RB#24	Back Surface	0	39150	22.5	21.87	0.699	-0.05	0.808
Body	10M QPSK 1RB#24	Back Surface	0	39600	22.5	21.52	0.670	-0.07	0.839
Body	10M QPSK 25RB#0	Back Surface	0	38700	21.0	20.90	0.655	-0.14	0.670
Body	10M QPSK 25RB#25	Back Surface	0	39150	21.0	20.61	0.549	-0.06	0.600
Body	10M QPSK 25RB#0	Back Surface	0	39600	21.0	20.42	0.521	-0.01	0.596
Body	10M QPSK 50RB#0	Back Surface	0	38700	21.0	20.85	0.509	0.09	0.527
Body	10M QPSK 1RB#24	Left Edge	0	38700	22.5	22.18	0.059	-0.08	0.064
Body	10M QPSK 25RB#0	Left Edge	0	38700	21.0	20.90	0.046	0.08	0.047
Body	10M QPSK 1RB#24	Right Edge	0	38700	22.5	22.18	0.731	-0.06	0.787
Body	10M QPSK 25RB#0	Right Edge	0	38700	21.0	20.90	0.606	0.09	0.621
Body	10M QPSK 1RB#24	Bottom Edge	0	38700	22.5	22.18	0.420	-0.04	0.452
Body	10M QPSK 25RB#0	Bottom Edge	0	38700	21.0	20.90	0.329	-0.11	0.337

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12.13. SAR Test Results of LTE B41

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up Limit	Meas.	1-g (W/Kg)		
Body	20M QPSK 1RB#49	Back Surface	0	40390	22.0	21.94	0.682	-0.05	0.691
Body	20M QPSK 1RB#49	Back Surface	0	40740	22.0	21.82	0.769	-0.08	0.801
Body	20M QPSK 1RB#49	Back Surface	0	41090	22.0	21.84	0.868	0.00	0.901
Body	20M QPSK 50RB#25	Back Surface	0	40390	21.0	20.81	0.501	0.01	0.524
Body	20M QPSK 50RB#25	Back Surface	0	40740	21.0	20.74	0.595	-0.12	0.632
Body	20M QPSK 50RB#0	Back Surface	0	41090	21.0	20.77	0.661	0.11	0.697
Body	20M QPSK 100RB#0	Back Surface	0	40390	21.0	20.74	0.625	0.03	0.664
Body	20M QPSK 1RB#49	Left Edge	0	40390	22.0	21.94	0.018	-0.06	0.018
Body	20M QPSK 50RB#25	Left Edge	0	40390	21.0	20.81	0.015	0.02	0.016
Body	20M QPSK 1RB#49	Right Edge	0	40390	22.0	21.94	0.481	-0.16	0.488
Body	20M QPSK 50RB#25	Right Edge	0	40390	21.0	20.81	0.352	-0.16	0.367
Body	20M QPSK 1RB#49	Bottom Edge	0	40390	22.0	21.94	0.290	-0.12	0.294
Body	20M QPSK 50RB#25	Bottom Edge	0	40390	21.0	20.81	0.210	-0.15	0.219
Worst mode retest									
Body	20M QPSK 1RB#49	Back Surface	0	41090	22.0	21.84	0.831	-0.03	0.862

Note:

1) Due to 0.868/0.831 = 1.04 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.14. SAR Test Results of 2.4G Wi-Fi

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		DC. (%)	Measured 1-g (W/Kg)	Pwr. Drift	Scaled (W/Kg)
					Tune-up	Meas.				
Body	802.11 b	Back Surface	0	6	14.0	13.59	99.52	0.116	-0.04	0.128
Body	802.11 b	Left Edge	0	6	14.0	13.59	99.52	0.335	-0.07	0.370
Body	802.11 b	Left Edge	0	1	14.0	13.17	99.52	0.300	0.01	0.365
Body	802.11 b	Left Edge	0	11	14.0	13.57	99.52	0.354	0.00	0.393

OFDM mode SAR evaluation exclusion analysis

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported SAR (W/Kg)	Adjusted SAR (W/Kg)	SAR Test
802.11b	14	25.12	0.393	\	\
802.11g	15	31.62	\	0.495	Excluded
802.11n20	15	31.62	\	0.495	Excluded
802.11n40	13	19.95	\	0.312	Excluded

Note:

1) The highest reported SAR for DSSS adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, so SAR evaluation for 802.11g/n is not required.

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12.15. SAR Test Results of U-NII-2A

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		DC. (%)	Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up	Meas.		1-g (W/Kg)		
Body	11a	Back Surface	0	64	12.5	12.16	97.87	0.252	-0.01	0.278
Body	11a	Left Edge	0	64	12.5	12.16	97.87	1.010	0.03	1.116
Body	11a	Left Edge	0	52	12.5	12.01	97.87	0.927	0.04	1.060
Body	11a	Left Edge	0	56	12.5	12.16	97.87	0.996	-0.12	1.101
Worst mode retest										
Body	11a	Left Edge	0	64	12.5	12.16	97.87	0.953	0.03	1.053

Note:

1) Due to 1.010/0.953 = 1.06 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.16. SAR Test Results of U-NII-2C

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		DC. (%)	Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up	Meas.		1-g (W/Kg)		
Body	802.11 n 40M	Back Surface	0	110	11.5	11.48	94.12	0.265	-0.06	0.283
Body	802.11 n 40M	Left Edge	0	110	11.5	11.48	94.12	0.969	-0.17	1.034
Body	802.11 n 40M	Left Edge	0	102	11.5	11.46	94.12	1.110	-0.03	1.190
Body	802.11 n 40M	Left Edge	0	134	11.5	11.14	94.12	0.938	-0.01	1.083
Worst mode retest										
Body	802.11 n 40M	Left Edge	0	102	11.5	11.46	94.12	1.020	-0.03	1.094

Note:

1) Due to 1.110/1.020 = 1.09 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.17. SAR Test Results of U-NII-3

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		DC. (%)	Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up	Meas.		1-g (W/Kg)		
Body	11a	Back Surface	0	165	12.5	12.27	97.87	0.223	-0.01	0.240
Body	11a	Left Edge	0	165	12.5	12.27	97.87	0.929	-0.06	1.001
Body	11a	Left Edge	0	149	12.5	12.25	97.87	1.100	0.07	1.191
Body	11a	Left Edge	0	157	12.5	12.11	97.87	1.060	-0.04	1.185
Accessory										
Body	11a	Left Edge	0	149	12.5	12.25	97.87	1.030	0.01	1.115
Worst mode retest										
Body	11a	Left Edge	0	149	12.5	12.25	97.87	1.010	0.07	1.093

Note:

1) Due to 1.100/1.010 = 1.09 < 1.20, and SAR value of original and repeated measurement is ≤ 1.45 W/kg, so only one repeated measurement is required.

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12.18. SAR Test Results of BT

RF Exposure Condition	Test Mode	Test Position	Dist. (mm)	Channel	Pwr. (dBm)		DC. (%)	Measured	Pwr. Drift	Scaled (W/Kg)
					Tune-up	Meas.		1-g (W/Kg)		
Body	DH5	Back Surface	0	0	12.0	11.34	76.74	0.101	0.03	0.153
Body	DH5	Left Edge	0	0	12.0	11.34	76.74	0.146	0.15	0.221
Body	DH5	Left Edge	0	39	12.0	11.25	76.74	0.113	0.04	0.175
Body	DH5	Left Edge	0	78	12.0	11.03	76.74	0.107	-0.07	0.174

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13. Simultaneous Transmission SAR Analysis

Simultaneous transmission possibilities		
NO	Simultaneous TX Combination	Body- worn
1	WWAN+BT	Y
2	WWAN+2.4GHz WiFi	Y
3	WWAN+5GHz WiFi	Y

13.1. Analysis for WWAN & Wi-Fi & BT

RF Exposure Condition	Test Position	WWAN Max	U-NII Max	2.4G WiFi	BT	WWAN Max+U-NII Max	WWAN Max+2.4G WiFi	WWAN Max+BT
Body	Back Surface	1.098	0.283	0.128	0.153	1.381	1.226	1.251
	Left Edge	0.252	1.191	0.393	0.221	1.443	0.645	0.473
	Right Edge	0.787	/	/	/	0.787	0.787	0.787
	Bottom Edge	0.912	/	/	/	0.912	0.912	0.912

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Appendixes

Refer to separated files for the following appendixes.

4791364876-1-SAR-1_App A Photo

4791364876-1-SAR-1_App B System Check Plots

4791364876-1-SAR-1_App C Highest Test Plots

4791364876-1-SAR-1_App D Cal. Certificates

---------End of Report---------

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