SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std. 1528-2013

For
WisePOS 4G

FCC ID: 2AB7X-WISEPOS4G
Model Name: WisePOS 4G

Report Number: 4788704908-SAR-2
Issue Date: December 18, 2018

Prepared for
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Prepared by
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Revision History

Rev.	Date	Revisions	Revised By
V1.0	November 12, 2018	Initial Issue	\
V2.0	December 18, 2018	Report revised based in Reviewer's comments: 1. Sec. 6.1: Updated the device dimension information 2. Sec. 7: Deleted the table of test position selection 3. Sec. 9.11: Added the Wi-Fi duty cycle measurement plot and corresponding data 4. Sec. 11: Added an explanation about the selection of body-worn testing separation distance	James. Qin

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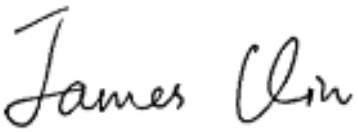
1. Attestation of Test Results

Applicant Name		BBPOS International Limited			
Address		Suite 1903-04, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, Hong Kong			
EUT Name		WisePOS 4G			
Model		WisePOS 4G			
Sample Status		Normal			
Trade Mark		BBPOS			
Sample Received Date		November 2, 2018			
Date of Tested		November 2, 2018 to November 12, 2018			
Applicable Standards		FCC 47 CFR § 2.1093 IEEE Std. 1528-2013 KDB publication			
Exposure Category		**SAR Limits (W/Kg)**			
		Peak spatial-average (1g of tissue)		**Extremity (Hands, wrists, ankles, etc.) (10g of tissue)**	
General population / Uncontrolled exposure		1.6		4	
RF Exposure Conditions		**Equipment Class - Highest Reported SAR (W/kg)**			
		PCE	**DTS**	**U-NII**	**DSS**
Head		\	\	\	\
Body-worn		1.272	0.088	0.724	\
Hotspot		1.272	0.088	\	\
Extremity		1.750	\	1.073	\
Simultaneous Transmission	**Head**	\			
	Body-worn	1.398			
	Hotspot	1.398			
	Extremity	1.842			
Test Results		Pass			

Prepared By:



James Qin
Engineer Project Associate

Approved By:

Stephen Guo
Laboratory Manager

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR
- 447498 D01 General RF Exposure Guidance
- 690783 D01 SAR Listings on Grants
- 865664 D01 SAR measurement 100 MHz to 6 GHz
- 865664 D02 RF Exposure Reporting
- 447498 D03 Supplement C Cross-Reference
- 648474 D04 Handset SAR
- 941225 D01 3G SAR Procedures
- 941225 D05 SAR for LTE Devices
- 941225 D06 Hotspot Mode
- 941225 D07 UMPC Mini Tablet

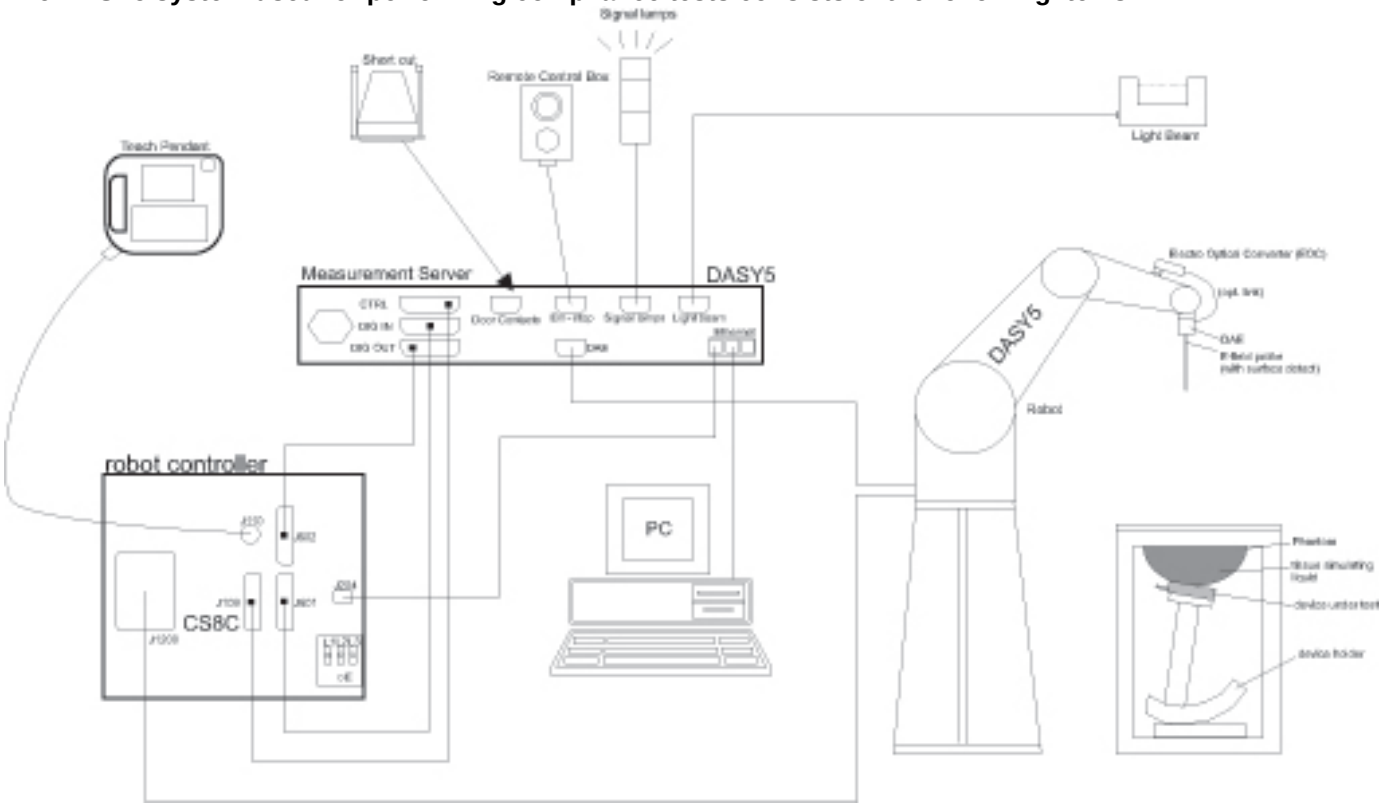
3. Facilities and Accreditation

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 Recognized 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 Declaration of Conformity (DoC) and Certification rules **IC(Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** 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-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011
Description	All measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, People's Republic of China

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 Win 7 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.

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 SAR Measurement 100 MHz to 6 GHz

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

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 SAR Measurement 100 MHz to 6 GHz

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

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

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 larger than the step size in Z-direction.

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	December 11, 2018
Dielectric Probe kit	SPEAG	SM DAK 040 SA	1155	NCR
DC power supply	Keysight	E36103A	MY55350020	December 11, 2018
Signal Generator	Rohde & Schwarz	SME06	837633\001	May 16, 2018
BI-Directional Coupler	WERLATONE	C8060-102	3423	December 11, 2018
Peak and Average Power Sensor	Keysight	E9323A	MY55440013	December 11, 2018
Peak and Average Power Sensor	Keysight	E9323A	MY55420006	December 11, 2018
Dual Channel PK Power Meter	Keysight	N1912A	MY55416024	December 11, 2018
Amplifier	CORAD TECHNOLOGY LTD	AMF-4D-00400600-50-30P	1983561	NCR
Dosimetric E-Field Probe	SPEAG	EX3DV4	7383	December 13, 2018
Data Acquisition Electronic	SPEAG	DAE3	427	December 3, 2018
Dipole Kit 750 MHz	SPEAG	D750V2	1153	January 14, 2019
Dipole Kit 835 MHz	SPEAG	D835V2	4d206	January 14, 2019
Dipole Kit 1800 MHz	SPEAG	D1800V2	2d212	January 10, 2019
Dipole Kit 1900 MHz	SPEAG	D1900V2	5d212	January 13, 2019
Dipole Kit 2450 MHz	SPEAG	D2450V2	977	January 13, 2019
Dipole Kit 2600 MHz	SPEAG	D2600V2	1117	January 13, 2019
Dipole Kit 5 GHz	SPEAG	D5GHzV2	1231	January 12, 2019
Software	SPEAG	DASY52	N/A	NCR
Twin Phantom	SPEAG	SAM V5.0	1805	NCR
ELI Phantom	SPEAG	ELI V5.0	1235	NCR
Thermometer	Control Company	4242	150709653	December 11, 2018
Thermometer	VICTOR	VC230	/	December 11, 2018
Wideband Radio Communication Tester	R&S	CMW500	155523	December 11, 2018

Note:

1) As per KDB865664D01 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.

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.

6. Device Under Test (DUT) Information

6.1. DUT Description

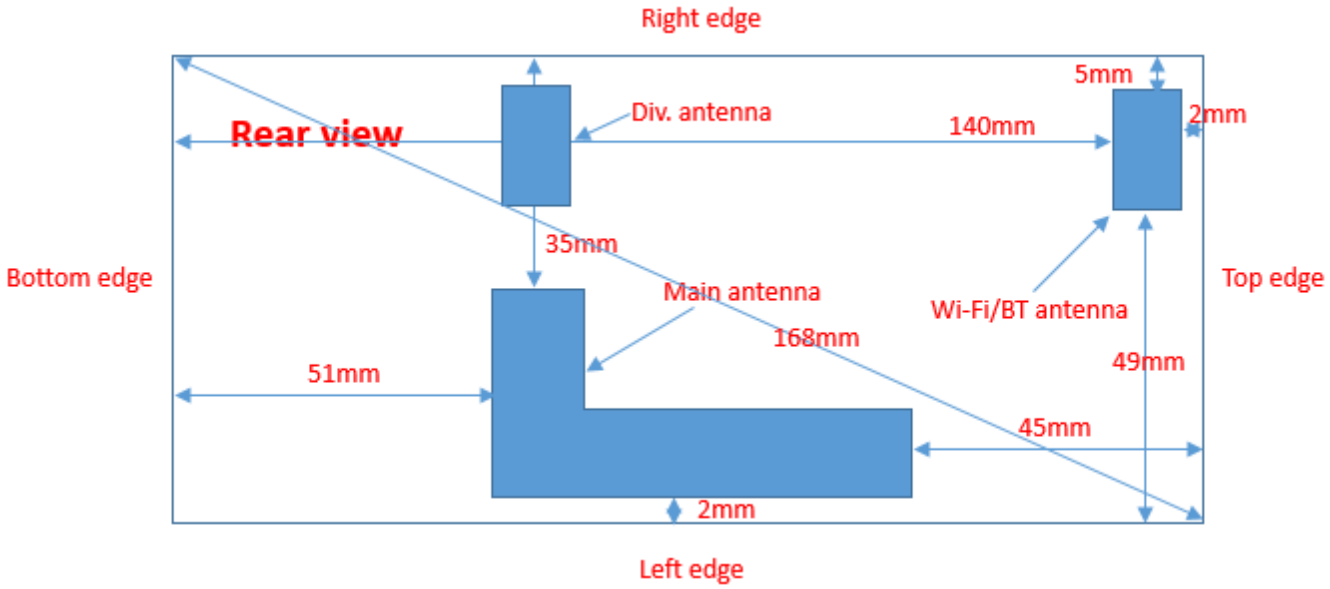
The EUT is a portable POS with GSM/WCDMA/HSDPA//HSUPA/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n radio.	
Device Dimension	Overall (Length x Width x Height): 155 mm x 70.5 mm x 17.8 mm
Accessory	None
Hardware Version	K960_MB_P2_V01
Software Version	960ABR9J1_BB_V001

6.2. Wireless Technology

Wireless technologies	Frequency bands	Operating mode	
GSM	850 1900	GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 ☐ Class 10 ☒ Class 12 ☐ Class 33
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Data) HSDPA (Rel. 7) HSUPA (Rel. 5)	
LTE	FDD Band II FDD Band IV FDD Band V FDD Band VII FDD Band XVII	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)	
Wi-Fi	5GHz	802.11a 802.11n (HT20) 802.11n (HT40)	
BT	2.4GHz	V4.0	

7. RF Exposure Conditions

Refer to the diagram inside the device which attached below for the specific details of the antenna-to-edges distances. As per KDB 941225 D06, when the antenna to-edge-distance is greater than 2.5 cm, SAR evaluation is not required for the corresponding position.



Note:

1) The EUT doesn't support operating next to the ear, so head SAR evaluation isn't considered.

8. Test Configuration

8.1. GSM Test Configuration

SAR tests for GSM850 and GSM1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5”and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 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.

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.

8.2. 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: ΔACK, ΔNACK and ΔCQI = 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, β_{hs}/β_c = 24/15. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 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 β_c = 11/15 and β_d = 15/15

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

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	4	8	10	2SF2&2SF4	11484	5.76
(No DPDCH)	4	4	2		20000	2.00
7	4	8	2	2SF2&2SF4	22996	?
(No DPDCH)	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).

5. DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a Second serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0
Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK

Parameter	Value
Nominal average inf. bit rate	60 kbit/s
Inter-TTI Distance	1 TTI"s
Number of HARQ Processes	6 Processes
Information Bit Payload	120 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	960 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	3200 SMLs
Coding Rate	0.15
Number of Physical Channel Codes	1

Note:

1) The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table above.
2) Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

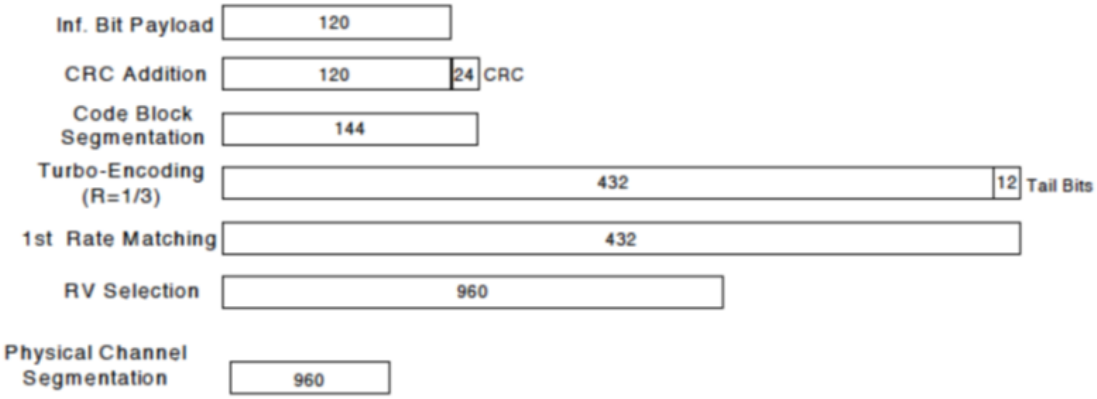


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

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

Note 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 β_c = 11/15 and β_d = 15/15

Up commands are set continuously to set the UE to Max power.

Note:

1) The Dual Carriers transmission only applies to HSDPA physical channels.
2) The Dual Carriers belong to the same Node and are on adjacent carriers.
3) The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation.
4) The Dual Carriers operate in the same frequency band.
5) The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.
6) The device doesn’t support carrier aggregation for it just can operate in Release 8.

8.3. 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.

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 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.

8.4. 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 the each test frequency channel, the EUT is operated at the RF continuous emission mode. The test procedures in KDB 248227D01 are applied.

8.4.1. 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.

8.4.2. 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.

8.4.3. 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.

8.4.4. 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

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.

8.4.5. 5GHz Wi-Fi SAR Test Procedures

A) 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.

B) 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.

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.

C) OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected. When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.

1) The channel closest to mid-band frequency is selected for SAR measurement.
2) For channels with equal separation from mid-band frequency; for example, high and low channels

D) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. 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.

9. Conducted Output Power Measurements

9.1. Power measurement result of GSM850

GSM 850MHz		Burst-Averaged Power (dBm)			Tune-up Limit (dBm)	Division Factors	Frame-Averaged Power (dBm)		
		128CH	190CH	251CH			128CH	190CH	251CH
GPRS /EDGE (GMSK)	1 Tx Slot	31.38	31.41	31.33	33.0	-9.19	22.19	22.22	22.14
	2 Tx Slots	31.33	31.29	31.19	32.0	-6.13	25.20	25.16	25.06
	3 Tx Slots	30.53	30.77	30.66	31.0	-4.42	26.11	26.35	26.24
	4 Tx Slots	29.52	29.81	29.71	30.0	-3.18	26.34	26.63	26.53
EDGE (8PSK)	1 Tx Slot	26.96	27.06	27.17	28.0	-9.19	17.77	17.87	17.98
	2 Tx Slots	26.21	26.29	26.38	27.0	-6.13	20.08	20.16	20.25
	3 Tx Slots	24.54	24.62	24.72	26.0	-4.42	20.12	20.20	20.30
	4 Tx Slots	23.42	23.50	23.60	25.0	-3.18	20.24	20.32	20.42

Note:

1) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2) As per KDB941225 D01v03, 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 selected to perform SAR evaluation in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be selected.

9.2. Power measurement result of GSM1900

GSM 1900MHz		Burst-Averaged Power (dBm)			Tune-up Limit (dBm)	Division Factors	Frame-Averaged Power (dBm)		
		512CH	661CH	810CH			512CH	661CH	810CH
GPRS /EDGE (GMSK)	1 Tx Slot	28.77	28.89	28.57	30.0	-9.19	19.58	19.70	19.38
	2 Tx Slots	28.97	28.75	28.47	29.0	-6.13	22.84	22.62	22.34
	3 Tx Slots	27.42	27.59	27.87	28.0	-4.42	23.00	23.17	23.45
	4 Tx Slots	26.33	26.52	26.80	27.0	-3.18	23.15	23.34	23.62
EDGE (8PSK)	1 Tx Slot	26.21	26.02	25.89	27.0	-9.19	17.02	16.83	16.70
	2 Tx Slots	25.51	25.35	25.27	26.0	-6.13	19.38	19.22	19.14
	3 Tx Slots	23.93	23.78	23.79	25.0	-4.42	19.51	19.36	19.37
	4 Tx Slots	22.72	22.77	22.80	24.0	-3.18	19.54	19.59	19.62

Note:

1) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2) As per KDB941225 D01v03, 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 selected to perform SAR evaluation in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be selected.

9.3. Power measurement result of UMTS Band II

UMTS 1900MHz (Band II)		Average Power (dBm)			Tune-up Limit (dBm)
		9262CH	9400CH	9538CH	
WCDMA	12.2kbps RMC	**22.14**	**22.01**	**22.07**	23.0
	12.2kbps AMR	22.08	21.99	21.99	23.0
HSDPA	Subtest 1	21.47	21.35	21.18	22.0
	Subtest 2	21.41	21.30	21.11	22.0
	Subtest 3	20.92	20.80	20.89	22.0
	Subtest 4	20.89	20.79	20.61	22.0
HSUPA	Subtest 1	19.20	19.18	19.02	21.0
	Subtest 2	19.36	19.06	19.08	21.0
	Subtest 3	20.41	20.28	20.10	21.0
	Subtest 4	18.96	18.80	18.63	21.0
	Subtest 5	20.90	20.92	20.72	21.0
DC-HSDPA	Subtest 1	21.33	20.18	20.03	22.0
	Subtest 2	20.98	21.00	20.80	22.0
	Subtest 3	20.69	20.80	20.39	22.0
	Subtest 4	20.89	20.79	20.61	22.0

Note:

1) The bolded 12.2kbps RMC mode was selected for SAR testing (primary mode).
2) As per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a Second 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 Second to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR evaluation is not required for Second mode.

9.4. Power measurement result of UMTS Band V

UMTS 850MHz (Band V)		Average Power (dBm)			Tune-up Limit (dBm)
		4132CH	4182CH	4233CH	
WCDMA	12.2kbps RMC	**22.56**	**22.55**	**22.50**	23.0
	12.2kbps AMR	22.45	22.46	22.51	23.0
HSDPA	Subtest 1	21.62	21.61	21.56	22.0
	Subtest 2	21.60	21.59	21.52	22.0
	Subtest 3	21.13	21.09	21.03	22.0
	Subtest 4	21.09	21.07	21.03	22.0
HSUPA	Subtest 1	19.51	19.51	19.54	21.5
	Subtest 2	19.51	19.51	19.54	21.5
	Subtest 3	20.54	20.53	20.47	21.5
	Subtest 4	19.04	19.03	18.98	21.5
	Subtest 5	21.13	21.08	21.07	21.5
DC-HSDPA	Subtest 1	21.53	21.52	21.40	22.0
	Subtest 2	21.27	21.27	21.05	22.0
	Subtest 3	21.13	21.09	21.03	22.0
	Subtest 4	21.10	21.07	21.03	22.0

Note:

1) The bolded 12.2kbps RMC mode was selected for SAR testing (primary mode).
2) As per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a Second 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 Second to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR evaluation is not required for Second mode.

9.5. Power measurement result of LTE Band II

Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18607	18900	19193	
1.4MHz	QPSK	1	0	22.37	22.68	22.66	23.0
		1	3	22.51	22.81	22.81	
		1	5	22.38	22.70	22.66	
		3	0	22.40	22.59	22.54	
		3	2	22.46	22.65	22.57	
		3	3	22.47	22.62	22.54	
		6	0	21.52	21.69	21.71	22.0
	16QAM	1	0	21.31	21.51	21.69	22.0
		1	3	21.40	21.61	21.78	
		1	5	21.32	21.52	21.67	
		3	0	21.52	21.53	21.51	
		3	2	21.58	21.58	21.50	
		3	3	21.57	21.55	21.48	
		6	0	20.65	20.67	20.43	21.0
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18615	18900	19185	
3MHz	QPSK	1	0	22.46	22.55	22.46	23.0
		1	7	22.58	22.57	22.27	
		1	14	22.45	22.37	22.17	
		8	0	21.46	21.38	21.11	22.0
		8	4	21.49	21.49	21.15	
		8	7	21.48	21.31	21.13	
		15	0	21.39	21.29	21.01	
	16QAM	1	0	21.36	20.99	21.28	22.0
		1	7	21.48	21.09	21.41	
		1	14	21.29	21.05	21.24	
		8	0	20.49	20.48	20.16	21.0
		8	4	20.55	20.56	20.19	
		8	7	20.52	20.53	20.19	
		15	0	20.42	20.47	20.10	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18625	18900	19175	
5MHz	QPSK	1	0	22.27	22.18	22.36	23.0
		1	13	22.54	22.42	22.55	
		1	24	22.28	22.20	22.37	
		12	0	21.19	21.18	21.32	22.0
		12	6	21.22	21.23	21.36	
		12	13	21.25	21.21	21.33	
		25	0	21.23	21.17	21.28	
	16QAM	1	0	21.26	21.52	21.23	22.0
		1	13	21.49	21.76	21.45	
		1	24	21.24	21.56	21.22	
		12	0	20.35	20.27	20.29	21.0

		12	6	20.39	20.31	20.32	
		12	13	20.41	20.28	20.30	
		25	0	20.29	20.16	20.15	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18650	18900	19150	
10MHz	QPSK	1	0	22.30	22.29	22.38	23.0
		1	25	22.40	22.44	22.58	
		1	49	22.30	22.30	22.47	
		25	0	21.24	21.30	21.38	22.0
		25	13	21.28	21.27	21.36	
		25	25	21.33	21.25	21.34	
		50	0	21.27	21.24	21.34	
	16QAM	1	0	21.19	21.01	21.53	22.0
		1	25	21.27	21.14	21.69	
		1	49	21.17	21.06	21.46	
		25	0	20.38	20.23	20.31	21.0
		25	13	20.43	20.21	20.30	
		25	25	20.47	20.19	20.27	
		50	0	20.36	20.16	20.24	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18675	18900	19125	
15MHz	QPSK	1	0	22.48	22.08	22.16	23.0
		1	38	22.35	22.27	22.33	
		1	74	22.07	22.02	22.10	
		36	0	21.07	21.19	21.32	22.0
		36	18	21.22	21.20	21.32	
		36	39	21.17	21.25	21.30	
		75	0	21.13	21.29	21.29	
	16QAM	1	0	21.15	20.82	21.34	22.0
		1	38	21.41	21.10	21.50	
		1	74	21.18	20.88	21.20	
		36	0	20.02	20.26	20.34	21.0
		36	18	20.13	20.29	20.35	
		36	39	20.26	20.29	20.33	
		75	0	20.22	20.29	20.30	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				18700	18900	19100	
20MHz	QPSK	1	0	22.23	21.90	21.94	23.0
		1	50	22.52	22.33	22.31	
		1	99	21.91	21.93	21.91	
		50	0	20.94	21.13	21.18	22.0
		50	25	21.16	21.14	21.17	
		50	50	21.16	21.12	21.08	
		100	0	21.07	21.13	21.15	
	16QAM	1	0	20.99	21.26	21.22	22.0
		1	50	21.43	21.68	21.54	
		1	99	21.10	21.34	21.08	

		50	0	20.04	20.18	20.24	21.0
		50	25	20.30	20.23	20.23	
		50	50	20.20	20.21	20.13	
		100	0	20.14	20.22	20.19	

9.6. Power measurement result of LTE Band IV

Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				19957	20175	20393	
1.4MHz	QPSK	1	0	22.48	22.71	22.82	23.0
		1	3	22.56	22.84	23.00	
		1	5	22.47	22.71	22.88	
		3	0	22.41	22.49	22.63	
		3	2	22.44	22.53	22.67	
		3	3	22.45	22.53	22.71	
		6	0	21.43	21.72	21.93	22.0
	16QAM	1	0	21.35	21.65	21.51	22.0
		1	3	21.42	21.75	21.56	
		1	5	21.37	21.66	21.51	
		3	0	21.40	21.50	21.66	
		3	2	21.41	21.50	21.70	
		3	3	21.40	21.50	21.70	
		6	0	20.60	20.52	20.89	21.0
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				19965	20175	20385	
3MHz	QPSK	1	0	22.50	22.77	22.90	23.0
		1	7	22.63	22.83	29.99	
		1	14	22.48	22.87	23.06	
		8	0	21.43	21.75	21.82	22.0
		8	4	21.54	21.84	21.95	
		8	7	21.54	21.84	21.95	
		15	0	21.42	21.56	21.73	
	16QAM	1	0	21.37	21.32	21.93	22.0
		1	7	21.54	21.43	21.98	
		1	14	21.35	21.32	21.94	
		8	0	20.64	20.65	20.68	21.0
		8	4	20.74	20.75	20.77	
		8	7	20.73	20.76	20.77	
		15	0	20.47	20.55	20.77	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				19975	20175	20375	
5MHz	QPSK	1	0	22.43	22.76	22.72	23.0
		1	13	22.69	22.94	23.00	
		1	24	22.50	22.80	22.95	
		12	0	21.41	21.54	21.67	22.0
		12	6	21.50	21.59	21.79	
		12	13	21.47	21.56	21.75	
		25	0	21.45	21.53	21.68	
	16QAM	1	0	21.36	21.50	21.89	22.0
		1	13	21.62	21.74	21.95	
		1	24	21.44	21.55	21.93	
		12	0	20.56	20.60	20.84	21.0

		12	6	20.61	20.63	20.95	
		12	13	20.61	20.61	20.91	
		25	0	20.48	20.52	20.78	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20000	20175	20350	
10MHz	QPSK	1	0	22.46	22.74	22.76	23.0
		1	25	22.62	22.94	22.96	
		1	49	22.54	22.80	23.00	
		25	0	21.43	21.61	21.68	22.0
		25	13	21.49	21.57	21.72	
		25	25	21.59	21.56	21.75	
		50	0	21.51	21.52	21.68	
	16QAM	1	0	21.32	21.27	21.90	22.0
		1	25	21.49	21.43	21.91	
		1	49	21.35	21.37	21.86	
		25	0	20.60	20.60	20.72	21.0
		25	13	20.65	20.56	20.80	
		25	25	20.74	20.56	20.84	
		50	0	20.60	20.52	20.75	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20025	20175	20325	
15MHz	QPSK	1	0	22.46	22.69	22.70	23.0
		1	38	22.78	22.84	22.85	
		1	74	22.62	22.47	22.52	
		36	0	21.53	21.75	21.66	22.0
		36	18	21.60	21.85	21.75	
		36	39	21.70	21.78	21.71	
		75	0	21.57	21.79	21.60	
	16QAM	1	0	21.40	21.53	21.01	22.0
		1	38	21.59	21.79	21.30	
		1	74	21.47	21.71	21.09	
		36	0	20.56	20.72	20.70	21.0
		36	18	20.71	20.74	20.79	
		36	39	20.71	20.74	20.73	
		75	0	20.68	20.72	20.82	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20050	20175	20300	
20MHz	QPSK	1	0	22.19	22.37	22.47	23.0
		1	50	22.76	22.96	22.81	
		1	99	22.33	22.42	21.60	
		50	0	21.27	21.54	21.45	22.0
		50	25	21.46	21.57	21.55	
		50	50	21.42	21.50	21.58	
		100	0	21.40	21.53	21.53	
	16QAM	1	0	21.25	21.41	21.24	22.0
		1	50	21.84	21.83	21.86	
		1	99	21.37	21.66	21.54	

		50	0	20.44	20.51	20.49	21.0
		50	25	20.58	20.54	20.58	
		50	50	20.50	20.49	20.64	
		100	0	20.46	20.54	20.60	

9.7. Power measurement result of LTE Band V

Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20407	20525	20643	
1.4MHz	QPSK	1	0	22.03	22.31	22.22	23.0
		1	3	22.18	22.45	22.38	
		1	5	22.08	22.30	22.25	
		3	0	22.10	22.21	22.26	
		3	2	22.14	22.24	22.30	
		3	3	22.15	22.24	22.29	
		6	0	21.14	21.31	21.28	22.0
	16QAM	1	0	20.97	21.12	21.43	22.0
		1	3	21.07	21.24	21.55	
		1	5	21.02	21.12	21.42	
		3	0	21.22	21.12	21.36	
		3	2	21.29	21.19	21.39	
		3	3	21.28	21.18	21.35	
		6	0	20.31	20.38	20.17	21.0
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20415	20525	20635	
3MHz	QPSK	1	0	22.11	22.21	22.24	23.0
		1	7	22.23	22.37	22.38	
		1	14	22.13	22.30	22.29	
		8	0	21.03	21.21	21.16	22.0
		8	4	21.13	21.32	21.21	
		8	7	21.17	21.31	21.26	
		15	0	21.02	21.16	21.17	
	16QAM	1	0	21.04	21.01	21.44	22.0
		1	7	21.16	21.06	21.57	
		1	14	21.02	20.95	21.46	
		8	0	20.18	20.24	20.07	21.0
		8	4	20.30	20.32	20.14	
		8	7	20.33	20.33	20.15	
		15	0	20.01	20.18	20.24	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20425	20525	20625	
5MHz	QPSK	1	0	22.05	22.26	22.12	23.0
		1	13	22.31	22.48	22.36	
		1	24	22.13	22.28	22.19	
		12	0	20.97	21.13	21.14	22.0
		12	6	21.09	21.17	21.17	
		12	13	21.08	21.19	21.15	
		25	0	21.03	21.17	21.11	
	16QAM	1	0	20.99	21.19	21.48	22.0
		1	13	21.26	21.37	21.76	
		1	24	21.12	21.16	21.51	
		12	0	20.11	20.27	20.36	21.0

		12	6	20.21	20.30	20.39	
		12	13	20.21	20.29	20.36	
		25	0	20.04	20.20	20.23	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20450	20525	20600	
10MHz	QPSK	1	0	22.11	22.13	22.24	23.0
		1	25	22.29	22.37	22.32	
		1	49	22.22	22.26	22.25	
		25	0	21.05	21.21	21.09	22.0
		25	13	21.14	21.20	21.18	
		25	25	21.10	21.28	21.12	
		50	0	21.10	21.23	21.11	
	16QAM	1	0	21.28	21.09	20.93	22.0
		1	25	21.51	21.14	21.07	
		1	49	21.43	21.05	20.98	
		25	0	20.18	20.37	20.15	21.0
		25	13	20.24	20.34	20.26	
		25	25	20.19	20.40	20.20	
		50	0	20.15	20.32	20.13	

9.8. Power measurement result of LTE Band VII

Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20775	21100	21425	
5MHz	QPSK	1	0	22.33	22.10	22.21	23.0
		1	13	22.48	22.28	21.93	
		1	24	22.27	22.12	21.71	
		12	0	21.06	21.01	21.08	22.0
		12	6	21.09	21.06	21.15	
		12	13	21.10	21.05	21.12	
		25	0	21.06	21.01	21.08	
	16QAM	1	0	21.37	20.88	20.99	22.0
		1	13	21.55	21.12	21.29	
		1	24	21.40	20.93	21.10	
		12	0	20.12	19.98	20.01	21.0
		12	6	20.18	20.04	20.03	
		12	13	20.19	20.03	20.03	
		25	0	20.06	19.89	19.93	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20800	21100	21400	
10MHz	QPSK	1	0	22.38	22.21	22.41	23.0
		1	25	22.52	22.43	22.04	
		1	49	22.29	22.33	21.59	
		25	0	21.05	21.12	21.22	22.0
		25	13	21.10	21.14	21.15	
		25	25	21.11	21.16	21.17	
		50	0	21.05	21.14	21.12	
	16QAM	1	0	21.20	20.93	21.22	22.0
		1	25	21.33	21.08	21.38	
		1	49	21.23	20.98	21.09	
		25	0	19.98	20.16	20.11	21.0
		25	13	20.06	20.17	20.05	
		25	25	20.08	20.19	20.05	
		50	0	20.01	20.10	20.03	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				20825	21100	21375	
15MHz	QPSK	1	0	22.46	22.27	22.29	23.0
		1	38	22.51	22.50	22.35	
		1	74	22.28	22.34	21.71	
		36	0	21.43	21.31	21.39	22.0
		36	18	21.42	21.33	21.43	
		36	39	21.43	21.33	21.44	
		75	0	21.41	21.35	21.39	
	16QAM	1	0	21.29	21.11	20.81	22.0
		1	38	21.47	21.34	21.01	
		1	74	21.26	21.17	20.94	
		36	0	20.28	20.13	20.17	21.0

		36	18	20.28	20.13	20.22	
		36	39	20.30	20.15	20.19	
		75	0	20.27	20.17	20.19	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel 20850	Channel 21100	Channel 21350	
20MHz	QPSK	1	0	22.27	21.96	22.05	23.0
		1	50	22.61	22.55	22.57	
		1	99	22.04	22.07	21.68	
		50	0	21.08	21.13	21.13	22.0
		50	25	21.16	21.15	21.17	
		50	50	21.15	21.14	20.99	
		100	0	21.09	21.13	21.06	
	16QAM	1	0	21.07	20.99	21.22	22.0
		1	50	21.46	21.44	21.60	
		1	99	21.07	21.13	21.32	
		50	0	20.02	20.03	20.02	21.0
		50	25	20.10	20.06	20.06	
		50	50	20.10	20.07	19.89	
		100	0	20.03	20.08	19.99	

9.9. Power measurement result of LTE Band XVII

Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				23755	23790	23825	
5MHz	QPSK	1	0	22.78	22.61	22.26	23.0
		1	13	22.98	22.82	22.48	
		1	24	22.72	22.38	22.30	
		12	0	21.75	21.51	21.31	22.0
		12	6	21.83	21.45	21.30	
		12	13	21.84	21.28	21.32	
		25	0	21.80	21.27	21.35	
	16QAM	1	0	21.87	21.72	21.31	22.0
		1	13	21.96	21.97	21.44	
		1	24	21.86	21.72	21.21	
		12	0	20.85	20.45	20.38	21.0
		12	6	20.95	20.50	20.36	
		12	13	20.95	20.45	20.36	
		25	0	20.79	20.39	20.26	
Bandwidth	Modulation	RB size	RB offset	Average Power (dBm)			Tune-up Limit (dBm)
				Channel	Channel	Channel	
				23780	23790	23800	
10MHz	QPSK	1	0	22.69	22.29	22.35	23.0
		1	25	22.44	22.36	22.42	
		1	49	22.27	22.33	22.41	
		25	0	21.34	21.40	21.42	22.0
		25	13	21.32	21.34	21.37	
		25	25	21.13	21.18	21.28	
		50	0	21.22	21.29	21.37	
	16QAM	1	0	21.31	21.21	21.65	22.0
		1	25	21.41	21.26	21.72	
		1	49	21.23	21.07	21.54	
		25	0	20.43	20.39	20.42	21.0
		25	13	20.41	20.34	20.41	
		25	25	20.21	20.17	20.29	
		50	0	20.24	20.27	20.35	

9.10. Power measurement result of 2.4 GHz Wi-Fi

Mode	Channel	Frequency (MHz)	Data Rate	Average Power (dBm)	Tune-up Limit (dBm)	SAR Test	Duty Cycle (%)
802.11b	1	2412	1Mbps	13.11	15.0	Required	99.60
	6	2437		14.27	15.0		
	11	2462		14.76	15.0		
802.11g	1	2412	6Mbps	9.41	10.0	Excluded	\
	6	2437		12.19	13.0		
	11	2462		12.56	13.0		
802.11n-HT20	1	2412	MCS0	8.91	10.0	Excluded	\
	6	2437		11.98	13.0		
	11	2462		12.51	13.0		
802.11n-HT40	3	2422	MCS0	11.40	13.0	Excluded	\
	6	2437		11.10	13.0		
	9	2452		11.40	13.0		

9.11. Power measurement result of 5 GHz Wi-Fi

Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-up Limit (dBm)	SAR Test	Duty Cycle (%)
U-NII-1							
802.11a	36	5180	6Mbps	\	9.0	Excluded	\
	40	5200		\	9.0		
	44	5220		\	9.0		
	48	5240		\	9.0		
802.11n-HT20	36	5180	MCS0	\	9.0	Excluded	\
	40	5200		\	9.0		
	44	5220		\	9.0		
	48	5240		\	9.0		
802.11n-HT40	38	5190	MCS0	\	9.0	Excluded	\
	46	5230		\	9.0		
U-NII-2A							
Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-up Limit (dBm)	SAR Test	Duty Cycle (%)
802.11a	52	5260	6Mbps	7.74	9.0	Required	96.99
	56	5280		7.98	9.0		
	60	5300		8.27	9.0		
	64	5320		10.41	11.0		
802.11n-HT20	52	5260	MCS0	\	9.0	Excluded	\
	56	5280		\	9.0		
	60	5300		\	10.0		
	64	5320		\	11.0		
802.11n-HT40	54	5270	MCS0	\	10.0	Excluded	\
	62	5310		\	10.0		

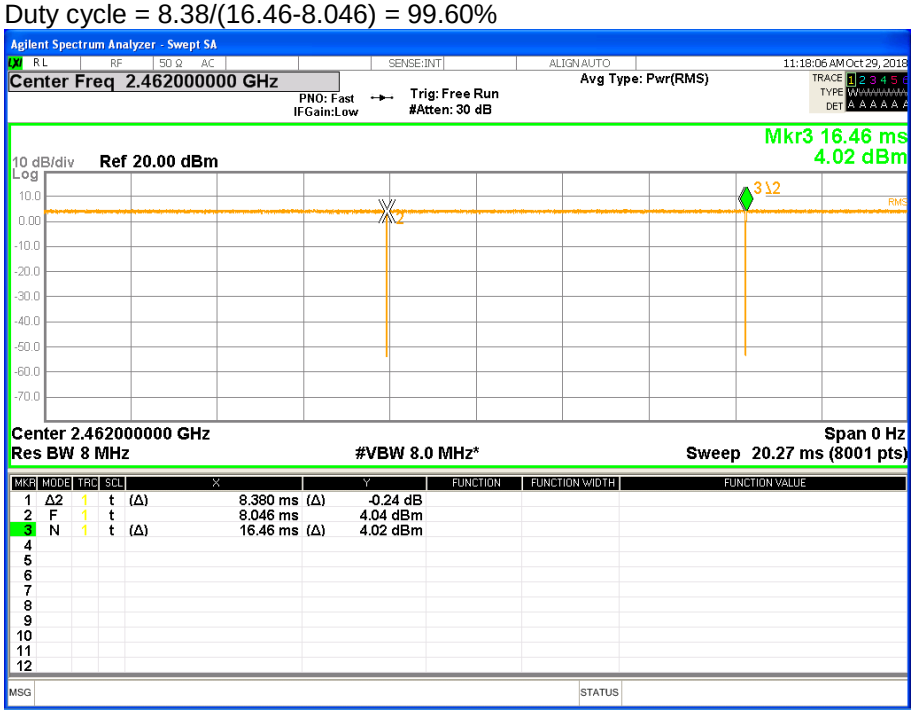
U-NII-2C							
Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-up Limit (dBm)	SAR Test	Duty Cycle (%)
802.11a	100	5500	6Mbps	12.55	14.0	Required	88.80
	104	5520		12.76	14.0		
	108	5540		12.68	14.0		
	112	5560		12.59	14.0		
	116	5580		12.64	14.0		
	120	5600		12.50	14.0		
	124	5620		13.25	14.0		
	128	5640		13.45	14.0		
	132	5660		13.61	14.0		
	136	5680		13.58	14.0		
	140	5700		13.73	14.0		
	144	5720		13.64	14.0		
802.11n-HT20	100	5500	MCS0	\	14.0	Excluded	\
	104	5520		\	14.0		
	108	5540		\	14.0		
	112	5560		\	14.0		
	116	5580		\	14.0		
	120	5600		\	14.0		
	124	5620		\	14.0		
	128	5640		\	14.0		
	132	5660		\	14.0		
	136	5680		\	14.0		
	140	5700		\	14.0		
	144	5720		\	14.0		
802.11n-HT40	102	5510	MCS0	\	13.9	Excluded	\
	110	5550		\	13.9		
	118	5590		\	13.9		
	126	5630		\	13.9		
	134	5670		\	13.9		
	142	5710		\	13.9		

U-NII-3							
Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-up Limit (dBm)	SAR Test	Duty Cycle (%)
802.11a	149	5745	6Mbps	\	14.0	Excluded	\
	153	5765		\	14.0		
	157	5785		\	14.0		
	161	5805		\	14.0		
	165	5825		\	14.0		
802.11n-HT20	149	5745	MCS0	\	14.0	Excluded	\
	153	5765		\	14.0		
	157	5785		\	14.0		
	161	5805		\	14.0		
	165	5825		\	14.0		
802.11n-HT40	151	5755	MCS0	13.59	14.0	Required	94.07
	159	5795		13.45	14.0		

Duty cycle measurement for 2.4GHz Wi-Fi

802.11b

Duty cycle = 8.38/(16.46-8.046) = 99.60%

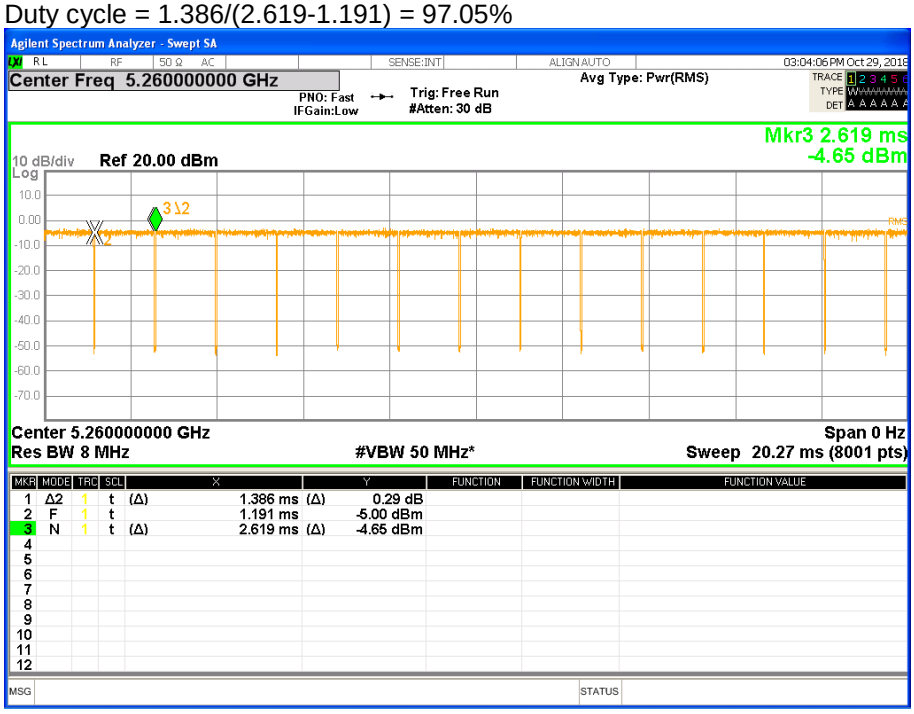


Duty cycle measurement for 5GHz Wi-Fi

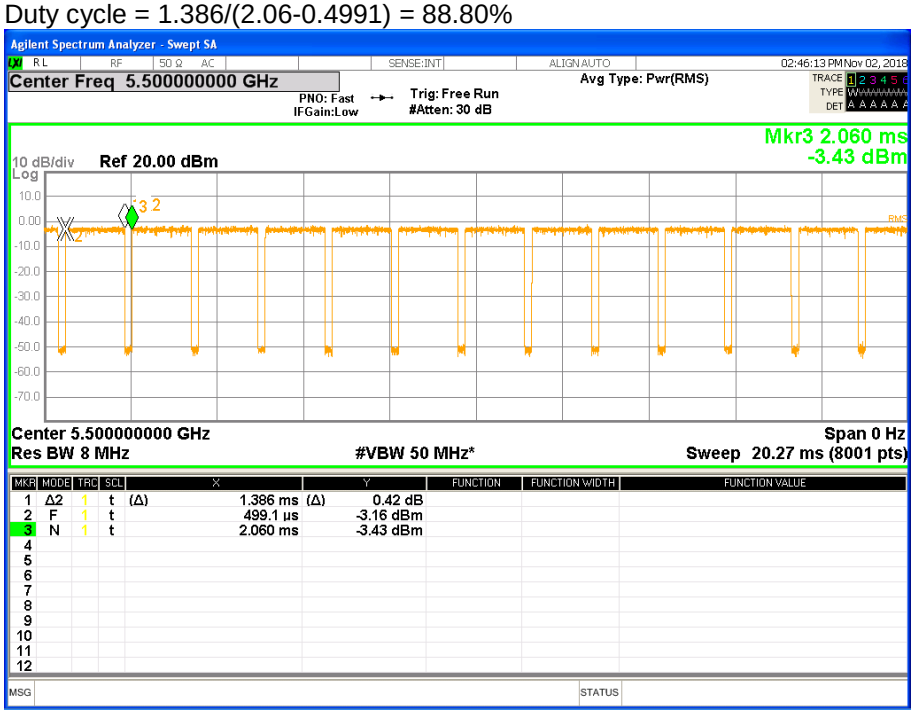
U-NII-2A band

802.11a

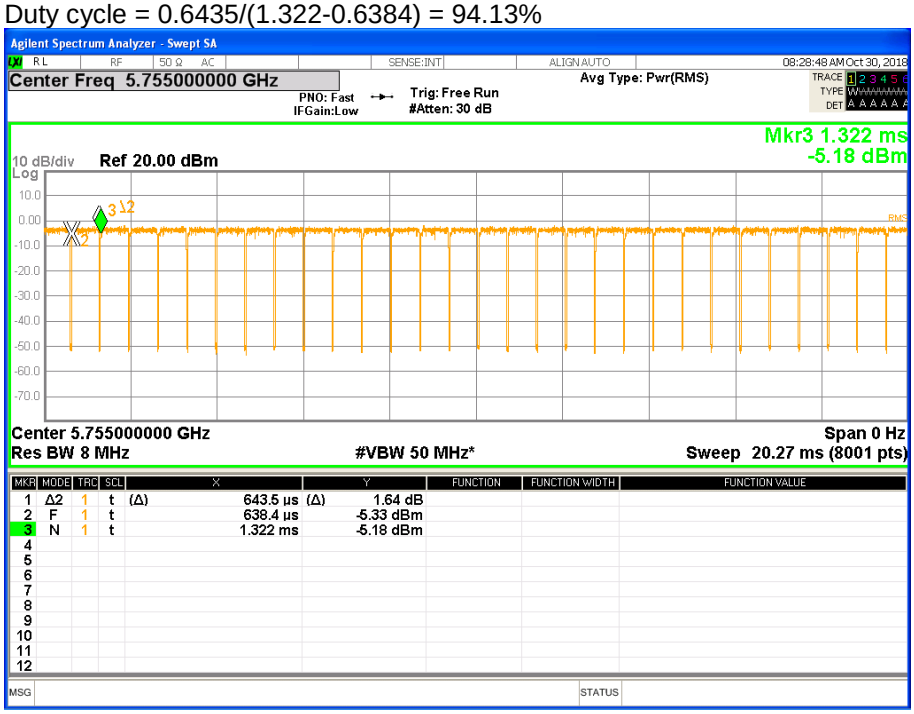
Duty cycle = 1.386/(2.619-1.191) = 97.05%



U-NII-2C band
802.11a
Duty cycle = 1.386/(2.06-0.4991) = 88.80%



U-NII-C band
802.11n HT40
Duty cycle = 0.6435/(1.322-0.6384) = 94.13%



9.12. Power measurement result of BT

BT	Channel	Average Conducted Power (dBm)	Tune-up Limit (dBm)	Duty Cycle (%)
GFSK	0	1.29	4.0	\
	39	3.38	4.0	\
	78	-0.64	4.0	\
8DPSK	0	-1.38	1.0	\
	39	0.52	1.0	\
	78	-2.89	1.0	\

BT	Channel	Average Conducted Power (dBm)	Tune-up Limit (dBm)	Duty Cycle (%)
BLE	0	0.24	2.5	\
	19	1.87	2.5	\
	39	-0.57	2.5	\

10. Dielectric Property Measurements & System Check

10.1. 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.
The dielectric constant (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for εr and σ may be relaxed to ± 10%. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters
FCC KDB 865664 D01 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

Dielectric Property Measurements Results:

Liquid	Freq.	Liquid Parameters				Deviation (%)		Limit. (%)	Temp. (°C)	Test Date
		Measured		Target						
		ϵ_r	σ	ϵ_r	σ	ϵ_r	σ			
Body 750	695	56.11	0.92	55.75	0.96	0.65	-4.23	±5	23.1	November 5, 2018
	750	55.63	0.98	55.53	0.96	0.18	1.70			
	790	55.18	1.02	55.38	0.97	-0.36	4.74			
Body 835	805	55.04	0.94	55.32	0.97	-0.51	-2.75	±5	23.1	November 2, 2018
	835	54.82	0.98	55.20	0.97	-0.69	0.57			
	905	54.08	1.04	55.00	1.05	-1.67	-1.05			
Body 835	805	54.53	0.95	55.32	0.97	-1.43	-2.40	±5	21.8	November 5, 2018
	835	54.83	0.99	55.20	0.97	-0.67	2.41			
	905	53.66	1.03	55.00	1.05	-2.44	-1.81			
Body 1800	1720	52.51	1.45	53.51	1.47	-1.87	-1.50	±5	22.7	November 6, 2018
	1780	52.39	1.50	53.35	1.51	-1.80	-0.79			
	1800	52.38	1.52	53.30	1.52	-1.73	-0.26			
Body 1900	1850	52.27	1.52	53.30	1.52	-1.93	0.26	±5	22.3	November 6, 2018
	1900	52.16	1.57	53.30	1.52	-2.14	3.22			
	1920	52.06	1.59	53.30	1.52	-2.33	4.47			
Body 1900	1850	52.61	1.50	53.30	1.52	-1.29	-1.45	±5	21.5	November 7, 2018
	1900	52.50	1.54	53.30	1.52	-1.50	1.51			
	1920	52.40	1.56	53.30	1.52	-1.69	2.70			
Body 2450	2400	50.63	1.99	52.77	1.90	-4.06	4.84	±5	21.0	November 8, 2018
	2450	50.46	2.04	52.70	1.95	-4.25	4.62			
	2480	50.40	2.08	52.66	1.99	-4.29	4.67			
Body 2600	2500	52.81	2.06	52.64	2.02	0.32	1.73	±5	21.9	November 12, 2018
	2600	52.49	2.19	52.51	2.16	-0.04	1.44			
	2700	52.22	2.31	52.38	2.30	-0.31	0.61			
Body 5250	5160	48.70	5.44	49.07	5.25	-0.75	3.64	±5	22.2	November 8, 2018
	5250	48.52	5.58	48.95	5.36	-0.88	4.10			
	5340	48.33	5.68	48.96	5.46	-1.29	3.94			
Body 5600	5500	48.01	5.85	48.61	5.65	-1.23	3.59	±5	21.0	November 9, 2018
	5600	47.78	5.96	48.47	5.77	-1.42	3.24			
	5700	47.57	6.10	48.34	5.88	-1.59	3.67			
Body 5750	5660	47.55	6.04	48.39	5.84	-1.74	3.48	±5	21.1	November 9, 2018
	5750	47.45	6.17	48.27	5.94	-1.70	3.87			
	5840	47.26	6.30	48.16	6.03	-1.87	4.49			

10.2. 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.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7*7*7 (below 3 GHz) and/or 8*8*7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 1.4 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

System Check Results:

T.S. Liquid		Measured Results		Target (Ref. value)	Delta. (%)	Limit. (%)	Temp. (°C)	Test Date
		Zoom Scan (W/Kg)	Normalize to 1W (W/Kg)					
Body 750	1-g	2.060	8.24	8.73	-5.61	±10	23.1	November 5, 2018
	10-g	1.390	5.56	5.76	-3.47			
Body 835	1-g	2.310	9.24	9.62	-3.95	±10	23.1	November 2, 2018
	10-g	1.530	6.12	6.32	-3.16			
Body 835	1-g	2.300	9.20	9.62	-4.37	±10	21.8	November 5, 2018
	10-g	1.520	6.08	6.32	-3.80			
Body 1800	1-g	9.290	37.16	39.10	-4.96	±10	22.7	November 6, 2018
	10-g	4.900	19.60	20.60	-4.85			
Body 1900	1-g	9.690	38.76	39.60	-2.12	±10	22.3	November 6, 2018
	10-g	5.030	20.12	20.90	-3.73			
Body 1900	1-g	9.600	38.40	39.60	-3.03	±10	21.5	November 7, 2018
	10-g	4.960	19.84	20.90	-5.07			
Body 2600	1-g	13.300	53.20	54.90	-3.10	±10	21.9	November 12, 2018
	10-g	5.930	23.72	24.50	-3.18			
Body 2450	1-g	12.200	48.80	51.70	-5.61	±10	21.0	November 8, 2018
	10-g	5.650	22.60	24.30	-7.00			
Body 5250	1-g	7.230	72.30	76.10	-4.99	±10	22.2	November 8, 2018
	10-g	2.030	20.30	21.40	-5.14			
Body 5600	1-g	7.510	75.10	80.40	-6.59	±10	21.0	November 9, 2018
	10-g	2.080	20.80	22.50	-7.56			
Body 5750	1-g	7.100	71.00	77.00	-7.79	±10	21.1	November 9, 2018
	10-g	1.970	19.70	21.50	-8.37			

Note:

1) 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 value.

11. Measured SAR Results

General Notes:

1) Same mode and same distance is selected to conduct SAR evaluation for body-worn and hotspot scenario.
2) As per KDB447498 D01, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.
3) 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.
4) 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.
5) As per KDB941225 D06, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
6) As per KDB648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤1.2 W/kg, no additional SAR evaluations using a headset are required.
7) 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).
8) 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.
9) As per KDB 648474D04, for handsets with additional batteries, the highest reported SAR for each wireless technology, frequency band, operating mode and applicable exposure condition (head, body-worn accessory, hotspot mode, etc.) must be repeated with the specific accessory attached. In addition, for test cases where the measured SAR for a handset is greater than 1.2 W/kg, these tests should also be repeated with the additional batteries.
10) As per KDB 648474 D04, Phones with built-in NFC functions do not require separate SAR testing and can generally be tested according to the SAR measurement procedures normally required for the phone. Influences of the hardware introduced by the built-in NFC functions are inherently considered through testing of the other transmitters that require SAR.
11) Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.

GSM Notes:

1) As per KDB941225 D01, 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.
2) As per KDB648474 D04, the device does not support DTM function. Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

UMTS Notes:

1) As per KDB941225 D01, when the maximum output power and tune-up tolerance specified for production units in a Second 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 Second to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the Second mode.

LTE Notes:

1) The LTE test configurations are determined according to KDB941225 D05. The general test procedures used for SAR testing can be found in Section 8.3.
2) A-MPR was disabled for all SAR test by setting NS_01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames(maximum TTI)
3) According to KDB 941225 D05, for Time-Division Duplex (TDD) systems, SAR is tested using a fixed periodic duty factor according to the highest transmission duty factor (63.33%) implemented for the device and supported by the defined 3GPP LTE TDD configurations.

Wi-Fi Notes:

As per KDB248227 D01:
1) 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.
2) The highest SAR measured for the initial test position or initial test configuration should be used to determine SAR test exclusion according to the sum of 1-g SAR and SAR peak to location ratio provisions in KDB 447498. In addition, a test lab may also choose to perform standalone SAR measurements for test positions and 802.11 configurations that are not required by the initial test position or initial test configuration procedures and apply the results to determine simultaneous transmission SAR test exclusion, according to sum of 1-g and SAR peak to location ratio requirements to reduce the number of simultaneous transmission SAR measurements.

11.1. SAR measurement Result of GSM850

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
Front Surface	GPRS 4TS	190/836.6	30.0	29.81	0.358	-0.07	0.374
Back Surface	GPRS 4TS	190/836.6	30.0	29.81	0.637	-0.04	0.665
Left Edge	GPRS 4TS	190/836.6	30.0	29.81	0.338	0.08	0.353
Test at worst configuration above with SIM2							
Back Surface	GPRS 4TS	190/836.6	30.0	29.81	0.731	0.01	**0.764**

11.2. SAR measurement Result of GSM1900

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
Front Surface	GPRS 4TS	661/1880	27.0	26.52	0.214	-0.17	0.239
Back Surface	GPRS 4TS	661/1880	27.0	26.52	0.886	-0.01	0.990
Left Edge	GPRS 4TS	661/1880	27.0	26.52	0.253	0.17	0.283
Back Surface	GPRS 4TS	512/1850.2	27.0	26.33	0.887	-0.01	**1.035**
Back Surface	GPRS 4TS	810/1909.8	27.0	26.80	0.910	-0.16	0.953
Test at worst configuration above with SIM2							
Back Surface	GPRS 4TS	512/1850.2	27.0	26.33	0.859	-0.06	1.002
Repeated test at worst measured SAR configuration above							
Back Surface	GPRS 4TS	810/1909.8	27.0	26.80	0.873	-0.10	0.914

11.3. SAR measurement Result of UMTS Band II

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
Front Surface	RMC 12.2kbps	9400/1880	23.0	22.01	0.210	-0.02	0.264
Back Surface	RMC 12.2kbps	9400/1880	23.0	22.01	0.866	-0.03	1.088
Left Edge	RMC 12.2kbps	9400/1880	23.0	22.01	0.320	0.07	0.402
Back Surface	RMC 12.2kbps	9262/1852.4	23.0	22.14	0.904	-0.01	1.102
Back Surface	RMC 12.2kbps	9538/1907.6	23.0	22.07	0.832	-0.03	1.031
Test at worst configuration above with SIM2							
Back Surface	RMC 12.2kbps	9262/1852.4	23.0	22.14	0.896	0.01	1.092
Repeated test at worst measured SAR configuration above							
Back Surface	RMC 12.2kbps	9262/1852.4	23.0	22.14	0.914	-0.03	**1.114**

11.4. SAR measurement Result of UMTS Band V

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
Front Surface	RMC 12.2kbps	4182/836.4	23.0	22.55	0.070	0.07	0.077
Back Surface	RMC 12.2kbps	4182/836.4	23.0	22.55	0.186	0.11	0.206
Left Edge	RMC 12.2kbps	4182/836.4	23.0	22.55	0.097	-0.06	0.108
Test at worst configuration above with SIM2							
Back Surface	RMC 12.2kbps	4182/836.4	23.0	22.55	0.210	-0.08	**0.233**

11.5. SAR measurement Result of LTE Band II

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
1RB							
Front Surface	20M QPSK 1RB#50	18700/1860	23.0	22.52	0.177	-0.13	0.198
Back Surface	20M QPSK 1RB#50	18700/1860	23.0	22.52	1.030	-0.08	1.150
Left Edge	20M QPSK 1RB#50	18700/1860	23.0	22.52	0.335	0.13	0.374
Back Surface	20M QPSK 1RB#50	18900/1880	23.0	22.33	1.090	-0.02	**1.272**
Back Surface	20M QPSK 1RB#50	19100/1900	23.0	22.31	1.080	-0.07	1.266
50%RB							
Front Surface	20M QPSK 50%RB#0	19100/1900	22.0	21.18	0.126	0.01	0.152
Back Surface	20M QPSK 50%RB#0	19100/1900	22.0	21.18	0.765	-0.02	0.924
Left Edge	20M QPSK 50%RB#0	19100/1900	22.0	21.18	0.256	0.11	0.309
Back Surface	20M QPSK 50%RB#25	18900/1880	22.0	21.14	0.811	-0.02	0.989
Back Surface	20M QPSK 50%RB#25	18700/1860	22.0	21.16	0.822	-0.02	0.997
100%RB							
Back Surface	20M QPSK 100%RB#0	19100/1900	22.0	21.15	0.759	-0.14	0.923
Test at worst configuration above with SIM2							
Back Surface	20M QPSK 1RB#50	18900/1880	23.0	22.33	0.996	-0.11	1.162
Test at worst configuration above with headset							
Back Surface	20M QPSK 1RB#50	18900/1880	23.0	22.33	1.080	-0.07	1.260
Repeated test at worst measured SAR configuration above							
Back Surface	20M QPSK 1RB#50	18900/1880	23.0	22.33	0.976	-0.01	1.139

Scenario and Distance (Hotspot 0mm for 10-g SAR)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	10-g (W/Kg)		
Back Surface	20M QPSK 1RB#50	18900/1880	23.0	22.33	1.500	-0.01	1.750

Note:

1) According to measurement result at 10mm separation distance, only back surface is required to perform the 10-g extremity SAR evaluation for this frequency band.

11.6. SAR measurement Result of LTE Band IV

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
1RB							
Front Surface	20M QPSK 1RB#50	20175/1732.5	23.0	22.96	0.302	-0.13	0.305
Back Surface	20M QPSK 1RB#50	20175/1732.5	23.0	22.96	1.050	-0.04	1.060
Left Edge	20M QPSK 1RB#50	20175/1732.5	23.0	22.96	0.370	0.06	0.373
Back Surface	20M QPSK 1RB#50	20050/1720	23.0	22.76	1.040	-0.05	1.099
Back Surface	20M QPSK 1RB#50	20300/1745	23.0	22.81	0.924	0.06	0.965
50%RB							
Front Surface	20M QPSK 50%RB#50	20300/1745	22.0	21.58	0.229	0.02	0.252
Back Surface	20M QPSK 50%RB#50	20300/1745	22.0	21.58	0.757	0.01	0.834
Left Edge	20M QPSK 50%RB#50	20300/1745	22.0	21.58	0.266	0.05	0.293
Back Surface	20M QPSK 50%RB#25	20175/1732.5	22.0	21.57	0.824	0.03	0.910
Back Surface	20M QPSK 50%RB#25	20050/1720	22.0	21.46	0.872	0.02	0.987
100%RB							
Back Surface	20M QPSK 100%RB#0	20175/1732.5	22.0	21.53	0.822	0.01	0.916
Test at worst configuration above with SIM2							
Back Surface	20M QPSK 1RB#50	20050/1720	23.0	22.76	1.050	-0.13	1.110
Repeated test at worst measured SAR configuration above							
Back Surface	20M QPSK 1RB#50	20050/1720	23.0	22.76	1.060	-0.10	1.120

11.7. SAR measurement Result of LTE Band V

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
1RB							
Front Surface	10M QPSK 1RB#25	20525/836.5	23.0	22.37	0.076	0.02	0.088
Back Surface	10M QPSK 1RB#25	20525/836.5	23.0	22.37	0.184	0.05	0.213
Left Edge	10M QPSK 1RB#25	20525/836.5	23.0	22.37	0.077	-0.12	0.089
50%RB							
Front Surface	10M QPSK 50%RB#25	20525/836.5	22.0	21.28	0.073	0.02	0.086
Back Surface	10M QPSK 50%RB#25	20525/836.5	22.0	21.28	0.143	0.11	0.169
Left Edge	10M QPSK 50%RB#25	20525/836.5	22.0	21.28	0.078	0.18	0.093
Test at worst configuration above with SIM2							
Back Surface	10M QPSK 1RB#25	20525/836.5	23.0	22.37	0.205	0.04	**0.237**

11.8. SAR measurement Result of LTE Band VII

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
1RB							
Front Surface	20M QPSK 1RB#50	20850/2510	23.0	22.61	0.089	0.15	0.098
Back Surface	20M QPSK 1RB#50	20850/2510	23.0	22.61	0.384	0.14	**0.420**
Left Edge	20M QPSK 1RB#50	20850/2510	23.0	22.61	0.154	0.10	0.168
50%RB							
Front Surface	20M QPSK 50%RB#25	21350/2560	22.0	21.17	0.060	0.13	0.072
Back Surface	20M QPSK 50%RB#25	21350/2560	22.0	21.17	0.312	0.11	0.378
Left Edge	20M QPSK 50%RB#25	21350/2560	22.0	21.17	0.146	0.00	0.177
Test at worst configuration above with SIM2							
Back Surface	20M QPSK 1RB#50	20850/2510	23.0	22.61	0.359	0.01	0.393

11.9. SAR measurement Result of LTE Band XVII

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)		
1RB							
Front Surface	10M QPSK 1RB#0	23790/710	23.0	22.69	0.377	0.02	0.405
Back Surface	10M QPSK 1RB#0	23790/710	23.0	22.69	0.327	-0.03	0.351
Left Edge	10M QPSK 1RB#0	23790/710	23.0	22.69	0.175	-0.09	0.188
50%RB							
Front Surface	10M QPSK 50%RB#0	23800/711	22.0	21.42	0.343	0.11	0.392
Back Surface	10M QPSK 50%RB#0	23800/711	22.0	21.42	0.224	-0.05	0.256
Left Edge	10M QPSK 50%RB#0	23800/711	22.0	21.42	0.148	-0.16	0.169
Test at worst configuration above with SIM2							
Front Surface	10M QPSK 1RB#0	23790/710	23.0	22.69	0.404	0.02	**0.434**

11.10. SAR measurement Result of 2.4GHz Wi-Fi

Scenario and Distance (Body-worn & Hotspot 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Factor (%)	Scaled (W/Kg)
			Tune-up	Meas.	1-g (Zoom Scan)			
Front Surface	802.11 b	11/2462	15.0	14.76	0.083	-0.18	99.60	**0.088**
Back Surface	802.11 b	11/2462	15.0	14.76	0.022	0.17	99.60	0.023
Right Edge	802.11 b	11/2462	15.0	14.76	0.041	0.09	99.60	0.044
Top Edge	802.11 b	11/2462	15.0	14.76	0.025	-0.09	99.60	0.027

OFDM mode SAR evaluation exclusion analysis.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 1-g SAR (W/Kg)	Adjusted 1-g SAR (W/Kg)	SAR test
802.11b	14	25.12	0.088	\	\
802.11g	13	19.95	\	0.070	Excluded
802.11n (20M)	13	19.95	\	0.070	Excluded
802.11n (40M)	13	19.95	\	0.070	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.

11.11. SAR measurement Result of 5GHz Wi-Fi

Scenario and Distance (Body-worn 10mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Factor (%)	Scaled (W/Kg)
			Tune-up	Meas.	1-g (Zoom Scan)			
U-NII-2A								
Front Surface	802.11a	64/5320	11.0	10.41	0.158	-0.06	97.0	0.186
Back Surface	802.11a	64/5320	11.0	10.41	0.107	0.04	97.0	0.126
U-NII-2C								
Front Surface	802.11a	140/5700	14.0	13.73	0.375	-0.16	88.8	0.449
Back Surface	802.11a	140/5700	14.0	13.73	0.045	0.17	88.8	0.053
U-NII-3								
Front Surface	802.11n-HT40	151/5755	14.0	13.59	0.620	0.15	94.1	0.724
Back Surface	802.11n-HT40	151/5755	14.0	13.59	0.040	0.14	94.1	0.047

Subsequent test configuration SAR evaluation exclusion analysis for U-NII-2A band.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 1-g SAR (W/Kg)	Adjusted 1-g SAR (W/Kg)	SAR test
802.11a	11	12.59	0.187	\	\
802.11n 20M	11	12.59	\	0.186	Excluded
802.11n 40M	10	10.00	\	0.148	Excluded

Note:

1) The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration 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 test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for U-NII-2C band.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 1-g SAR (W/Kg)	Adjusted 1-g SAR (W/Kg)	SAR test
802.11a	14	25.12	0.449	\	\
802.11n 20M	14	25.12	\	0.449	Excluded
802.11n 40M	13.9	24.55	\	0.439	Excluded

Note:

1) The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration 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 test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for U-NII-3 band.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 1-g SAR (W/Kg)	Adjusted 1-g SAR (W/Kg)	SAR test
802.11n-HT40	14	25.12	0.724	\	\
802.11a	14	25.12	\	0.724	Excluded
802.11n-HT20	14	25.12	\	0.724	Excluded

Note:

1) The 802.11n HT40 mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration 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 test for the other 802.11 modes are not required.

Scenario and Distance (10-g extremity SAR 0mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Factor (%)	Scaled (W/Kg)
			Tune-up	Meas.	10-g (Zoom Scan)			
U-NII-2C								
Front Surface	802.11a	140/5700	14.0	13.73	0.848	0.14	88.8	1.016
Back Surface	802.11a	140/5700	14.0	13.73	0.077	0.08	88.8	0.092
Right Edge	802.11a	140/5700	14.0	13.73	0.092	0.19	88.8	0.110
Top Edge	802.11a	140/5700	14.0	13.73	0.131	-0.12	88.8	0.157
U-NII-3								
Front Surface	802.11n-HT40	151/5755	14.0	13.59	0.888	0.15	94.1	1.037
Back Surface	802.11n-HT40	151/5755	14.0	13.59	0.055	0.02	94.1	0.064
Right Edge	802.11n-HT40	151/5755	14.0	13.59	0.037	-0.17	94.1	0.043
Top Edge	802.11n-HT40	151/5755	14.0	13.59	0.110	-0.18	94.1	0.129

Note:

1) Since 5GHz Wi-Fi doesn't support hotspot function, so hotspot SAR evaluation isn't considered, and 10-g extremity SAR 0mm are required.
2) 10-g extremity SAR evaluation for U-NII-2A band meets the test exclusion requirement of KDB 447498 D01, the calculation result is less than the threshold, so 10-g extremity SAR evaluation for U-NII-2A band is not required.

Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
5825	11.00	12.59	5.00	6.1	7.5	Excluded

Subsequent test configuration SAR evaluation exclusion analysis for U-NII-2C band.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 10-g SAR (W/Kg)	Adjusted 10-g SAR (W/Kg)	SAR test
802.11a	14	25.12	1.016	\	\
802.11n-HT20	14	25.12	\	1.016	Excluded
802.11n-HT40	13.9	24.55	\	0.993	Excluded

Note:

1) The equivalent ratio (1.2/1.6) should be applied to extremity exposure conditions.
2) The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 3 W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for U-NII-3 band.

Mode	Tune-up (dBm)	Tune-up (mW)	Highest Reported 10-g SAR (W/Kg)	Adjusted 10-g SAR (W/Kg)	SAR test
802.11n-HT40	14	25.12	1.037	\	\
802.11a	14	25.12	\	1.037	Excluded
802.11n-HT20	14	24.55	\	1.037	Excluded

Note:

1) The equivalent ratio (1.2/1.6) should be applied to extremity exposure conditions.
2) The 802.11n-HT40 mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 3 W/kg, SAR test for the other 802.11 modes are not required.

12. Simultaneous Transmission SAR Analysis

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

12.1. Stand-alone SAR test exclusion

Per FCC KDB 447498D01: 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 10-g extremity 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.

Wireless technologies	Scenario	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Calculation Result	Threshold	SAR Test
BT	Body-worn	2480	4.00	2.51	10.00	0.4	3.0	Excluded
BT	Extremity	2480	4.00	2.51	5.00	0.8	3.0	Excluded

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
1) (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·
[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.
2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied.

Wireless technologies	Scenario	Frequency (GHz)	Power (dBm)	Power (mW)	Separation Distance (mm)	Estimated SAR (W/Kg)
BT	Body-worn	2.48	4.00	2.51	10	0.053
BT	Extremity	2.48	4.00	2.51	5	0.042

12.2. Simultaneous Transmission Possibilities

NO.	Combination	Scenario			
		Head	Body-worn	Hotspot	Extremity
1	GSM+2.4GHz Wi-Fi	×	√	√	√
2	GSM+5GHz Wi-Fi	×	√	×	√
3	GSM+BT	×	√	×	√
4	UMTS+2.4GHz Wi-Fi	×	√	√	√
5	UMTS+5GHz Wi-Fi	×	√	×	√
6	UMTS+BT	×	√	×	√
7	LTE+2.4GHz Wi-Fi	×	√	√	√
8	LTE+5GHz Wi-Fi	×	√	×	√
9	LTE+BT	×	√	×	√

Note:

1) "√" indicates exist, "×" indicates inexistence.

12.3. 1-g SAR summation of GSM850 & 2.4GHz Wi-Fi

Test Position	GSM850	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.374	0.088	0.462	Excluded
Back Surface	0.764	0.023	0.787	Excluded
Left Edge	0.353	\	0.353	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.4. 1-g SAR summation of GSM850 & 5GHz Wi-Fi

Test Position	GSM850	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.374	0.724	1.098	Excluded
Back Surface	0.764	0.126	0.890	Excluded
Left Edge	0.353	\	0.353	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.5. 1-g SAR summation of GSM850 & BT

Test Position	GSM850	BT	SUM 1-g SAR	SPLSR
Front Surface	0.374	0.053	0.427	Excluded
Back Surface	0.764	0.053	0.817	Excluded
Left Edge	0.353	\	0.353	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.6. 1-g SAR summation of GSM1900 & 2.4GHz Wi-Fi

Test Position	GSM1900	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.239	0.088	0.327	Excluded
Back Surface	1.035	0.023	1.058	Excluded
Left Edge	0.283	\	0.283	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.7. 1-g SAR summation of GSM1900 & 5GHz Wi-Fi

Test Position	GSM1900	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.239	0.724	0.963	Excluded
Back Surface	1.035	0.126	1.161	Excluded
Left Edge	0.283	\	0.283	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.8. 1-g SAR summation of GSM1900 & BT

Test Position	GSM1900	BT	SUM 1-g SAR	SPLSR
Front Surface	0.239	0.053	0.292	Excluded
Back Surface	1.035	0.053	1.088	Excluded
Left Edge	0.283	\	0.283	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.9. 1-g SAR summation of UMTS Band II & 2.4GHz Wi-Fi

Test Position	UMTS Band II	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.264	0.088	0.352	Excluded
Back Surface	1.114	0.023	1.137	Excluded
Left Edge	0.402	\	0.402	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.10. 1-g SAR summation of UMTS Band II & 5GHz Wi-Fi

Test Position	UMTS Band II	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.264	0.724	0.988	Excluded
Back Surface	1.114	0.126	1.240	Excluded
Left Edge	0.402	\	0.402	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.11. 1-g SAR summation of UMTS Band II & BT

Test Position	UMTS Band II	BT	SUM 1-g SAR	SPLSR
Front Surface	0.264	0.053	0.317	Excluded
Back Surface	1.114	0.053	1.167	Excluded
Left Edge	0.402	\	0.402	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.12. 1-g SAR summation of UMTS Band V & 2.4GHz Wi-Fi

Test Position	UMTS Band V	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.077	0.088	0.165	Excluded
Back Surface	0.233	0.023	0.256	Excluded
Left Edge	0.108	\	0.108	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.13. 1-g SAR summation of UMTS Band V & 5GHz Wi-Fi

Test Position	UMTS Band V	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.077	0.724	0.801	Excluded
Back Surface	0.233	0.126	0.359	Excluded
Left Edge	0.108	\	0.108	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.14. 1-g SAR summation of UMTS Band V & BT

Test Position	UMTS Band V	BT	SUM 1-g SAR	SPLSR
Front Surface	0.077	0.053	0.130	Excluded
Back Surface	0.233	0.053	0.286	Excluded
Left Edge	0.108	\	0.108	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.15. 1-g SAR summation of LTE Band II & 2.4GHz Wi-Fi

Test Position	LTE Band II	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.198	0.088	0.286	Excluded
Back Surface	1.272	0.023	1.295	Excluded
Left Edge	0.374	\	0.374	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.16. 1-g SAR summation of LTE Band II & 5GHz Wi-Fi

Test Position	LTE Band II	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.198	0.724	0.922	Excluded
Back Surface	1.272	0.126	1.398	Excluded
Left Edge	0.374	\	0.374	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.17. 1-g SAR summation of LTE Band II & BT

Test Position	LTE Band II	BT	SUM 1-g SAR	SPLSR
Front Surface	0.198	0.053	0.251	Excluded
Back Surface	1.272	0.053	1.325	Excluded
Left Edge	0.374	\	0.374	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.18. 1-g SAR summation of LTE Band IV & 2.4GHz Wi-Fi

Test Position	LTE Band IV	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.305	0.088	0.393	Excluded
Back Surface	1.120	0.023	1.143	Excluded
Left Edge	0.373	\	0.373	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.19. 1-g SAR summation of LTE Band IV & 5GHz Wi-Fi

Test Position	LTE Band IV	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.305	0.724	1.029	Excluded
Back Surface	1.120	0.126	1.246	Excluded
Left Edge	0.373	\	0.373	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.20. 1-g SAR summation of LTE Band IV & BT

Test Position	LTE Band IV	BT	SUM 1-g SAR	SPLSR
Front Surface	0.305	0.053	0.358	Excluded
Back Surface	1.120	0.053	1.173	Excluded
Left Edge	0.373	\	0.373	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.21. 1-g SAR summation of LTE Band V & 2.4GHz Wi-Fi

Test Position	LTE Band V	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.088	0.088	0.176	Excluded
Back Surface	0.237	0.023	0.260	Excluded
Left Edge	0.093	\	0.093	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.22. 1-g SAR summation of LTE Band V & 5GHz Wi-Fi

Test Position	LTE Band V	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.088	0.724	0.812	Excluded
Back Surface	0.237	0.126	0.363	Excluded
Left Edge	0.093	\	0.093	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.23. 1-g SAR summation of LTE Band V & BT

Test Position	LTE Band V	BT	SUM 1-g SAR	SPLSR
Front Surface	0.088	0.053	0.141	Excluded
Back Surface	0.237	0.053	0.290	Excluded
Left Edge	0.093	\	0.093	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.24. 1-g SAR summation of LTE Band VII & 2.4GHz Wi-Fi

Test Position	LTE Band VII	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.098	0.088	0.186	Excluded
Back Surface	0.420	0.023	0.443	Excluded
Left Edge	0.177	\	0.177	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.25. 1-g SAR summation of LTE Band VII & 5GHz Wi-Fi

Test Position	LTE Band VII	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.098	0.724	0.822	Excluded
Back Surface	0.420	0.126	0.546	Excluded
Left Edge	0.177	\	0.177	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.26. 1-g SAR summation of LTE Band VII & BT

Test Position	LTE Band VII	BT	SUM 1-g SAR	SPLSR
Front Surface	0.098	0.053	0.151	Excluded
Back Surface	0.420	0.053	0.473	Excluded
Left Edge	0.177	\	0.177	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.27. 1-g SAR summation of LTE Band XVII & 2.4GHz Wi-Fi

Test Position	LTE Band XVII	2.4GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.434	0.088	0.522	Excluded
Back Surface	0.351	0.023	0.374	Excluded
Left Edge	0.188	\	0.188	Excluded
Right Edge	\	0.044	0.044	Excluded
Top Edge	\	0.027	0.027	Excluded
Bottom Edge	\	\	\	Excluded

12.28. 1-g SAR summation of LTE Band XVII & 5GHz Wi-Fi

Test Position	LTE Band XVII	5GHz Wi-Fi	SUM 1-g SAR	SPLSR
Front Surface	0.434	0.724	1.158	Excluded
Back Surface	0.351	0.126	0.477	Excluded
Left Edge	0.188	\	0.188	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.29. 1-g SAR summation of LTE Band XVII & BT

Test Position	LTE Band XVII	BT	SUM 1-g SAR	SPLSR
Front Surface	0.434	0.053	0.487	Excluded
Back Surface	0.351	0.053	0.404	Excluded
Left Edge	0.188	\	0.188	Excluded
Right Edge	\	\	\	Excluded
Top Edge	\	\	\	Excluded
Bottom Edge	\	\	\	Excluded

12.30. 10-g SAR summation of LTE Band II & 5GHz Wi-Fi

Test Position	LTE Band II	5GHz Wi-Fi	SUM 10-g SAR	SPLSR
Front Surface	\	1.037	1.037	Excluded
Back Surface	1.750	0.092	1.842	Excluded
Left Edge	\	\	\	Excluded
Right Edge	\	0.110	0.110	Excluded
Top Edge	\	0.157	0.157	Excluded
Bottom Edge	\	\	\	Excluded

Note:

1) Since the 10-g extremity SAR evaluation is just needed for LTE band II, so only LTE Band II is taken into 10-g extremity SAR simultaneous transmission analysis with 5GHz Wi-Fi.

12.31. 10-g SAR summation of LTE Band II & BT

Test Position	LTE Band II	BT	SUM 10-g SAR	SPLSR
Front Surface	\	0.042	0.042	Excluded
Back Surface	1.750	0.042	1.792	Excluded
Left Edge	\	\	\	Excluded
Right Edge	\	0.042	0.042	Excluded
Top Edge	\	0.042	0.042	Excluded
Bottom Edge	\	\	\	Excluded

Note:

1) Since the 10-g extremity SAR evaluation is just needed for LTE band II, so only LTE Band II is taken into 10-g extremity SAR simultaneous transmission analysis with BT.

Appendixes

Refer to separated files for the following appendixes.

4788407908-SAR-2_App A Photo

4788407908-SAR-2_App B System Check Plots

4788407908-SAR-2_App C Highest Test Plots

4788407908-SAR-2_App D Cal. Certificates

END OF REPORT