

13.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

13.5 SAR Averaged Methods

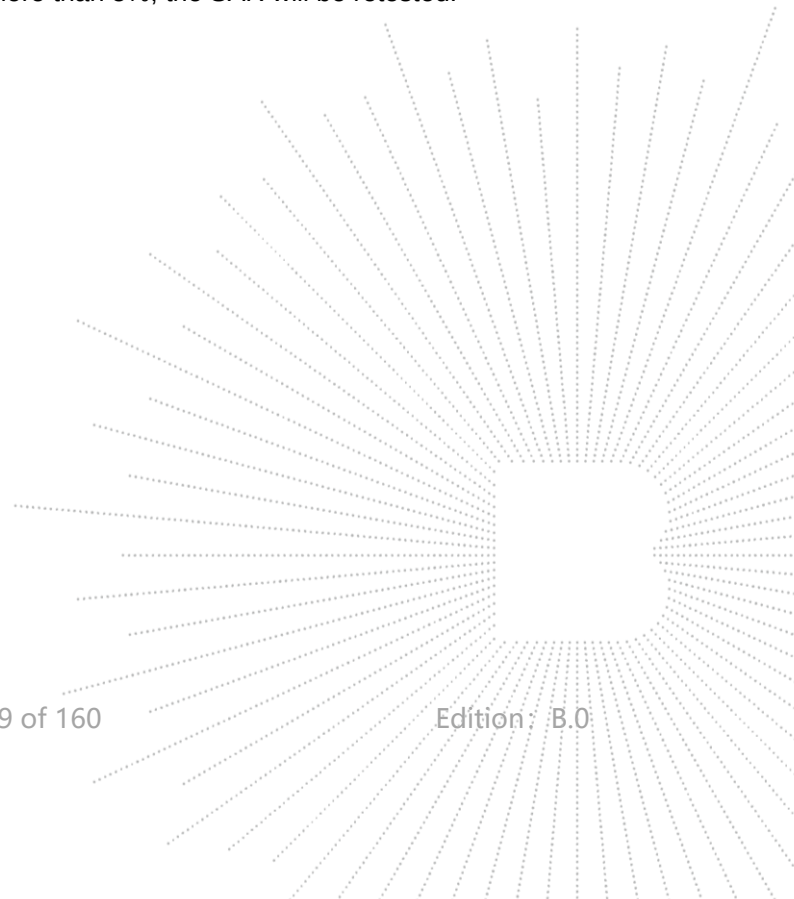
The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

13.6 Power Drift Monitoring

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



14. SAR Test Result

14.1 Conducted RF Output Power

According KDB 447498 D01 General RF Exposure Guidance v06 Section 4.1 2) states that “Unless it is specified differently in the published RF exposure KDB procedures, these requirements also apply to test reduction and test exclusion considerations. Time-averaged maximum conducted output power applies to SAR and, as required by § 2.1091(c), time-averaged ERP applies to MPE. When an antenna port is not available on the device to support conducted power measurement, such as FRS and certain Part 15 transmitters with built-in integral antennas, the maximum output power allowed for production units should be used to determine RF exposure test exclusion and compliance.”

The Tune-up limit already includes component tolerance. KDB 447498 sec.4.1.(d) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

<GSM>

General Note:

1. Per KDB 447498 D01, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 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.
3. Per October 2013 TCB Workshop: When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.

Conducted power measurement results

GSM - Burst Average Power (dBm)								
Band	GSM850			Tune-up	GSM1900			Tune-up
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	31.56	31.35	31.33	32.0	29.05	28.98	28.81	39.5

GSM - Source-Based Time-Average Power (dBm)						
Band	GSM850			GSM1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM	22.56	22.35	22.33	20.05	19.98	19.81

Notes: Per KDB 941225 D01, SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is $\leq 1/4$ dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2 W/kg.

<W-CDMA>

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

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

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

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

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

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

Setup Configuration

HSUPA Setup Configuration:

- The EUT was connected to Base Station R&S CMU200 referred to the Setup Configuration.
- The RF path losses were compensated into the measurements.
- A call was established between EUT and Base Station with following setting * :
 - Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - Set Cell Power = -86 dBm
 - Set Channel Type = 12.2k + HSPA
 - Set UE Target Power
 - Power Ctrl Mode= Alternating bits
 - Set and observe the E-TFCI
 - Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

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

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

General Note

- Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2kbps can be excluded.
- By design, AMR and HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
- It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

Conducted power measurement results

Band	WCDMA Band II				WCDMA Band V			
Channel	9262	9400	9538	Tune-up	4132	4182	4233	Tune-up
Frequency (MHz)	1852.4	1880.0	1907.6		826.4	836.4	846.6	
RMC 12.2K	19.15	19.23	19.09	20.0	20.11	20.24	20.21	21.0
HSDPA Subtest-1	19.38	18.64	18.71	20.0	20.29	20.51	19.93	21.0
HSDPA Subtest-2	19.08	18.22	18.38		19.96	20.30	19.85	
HSDPA Subtest-3	18.8	18.03	18.08		19.51	20.01	19.57	
HSDPA Subtest-4	18.56	17.84	18.81		19.27	19.68	19.32	
HSUPA Subtest-1	19.34	18.77	18.65	20.0	20.21	20.34	19.76	21.0
HSUPA Subtest-2	19.45	18.90	18.74		20.01	20.41	19.92	
HSUPA Subtest-3	19.20	18.83	18.45		19.95	20.00	19.68	
HSUPA Subtest-4	19.52	18.84	18.77		20.18	20.39	19.92	
HSUPA Subtest-5	19.20	18.60	18.43		19.87	20.26	19.43	

Note:

1. Per KDB 941225 D01 v03, the 12.2kbps RMC mode was selected for SAR testing (the primary mode).
2. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4\text{dB}$ higher than the primary mode (RMC12.2kbps) 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 $\leq 1.2\text{ W/kg}$, SAR measurement is not required for the secondary mode.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18607	18900	19193
Band2	1.4	1	#0	QPSK	21.88	21.90	21.92
		1	#Mid		21.93	21.83	21.95
		1	#Max		21.92	21.83	21.94
		3	#0		21.70	21.92	21.87
		3	#Mid		21.73	21.90	21.85
		3	#Max		21.71	21.89	21.87
		6	#0		20.17	20.39	20.43
	1.4	1	#0	QAM16	21.68	20.34	21.06
		1	#Mid		21.76	20.37	21.03
		1	#Max		21.75	20.41	21.01
		3	#0		20.96	20.89	21.22
		3	#Mid		20.98	20.86	21.18
		3	#Max		20.95	20.88	21.18
		6	#0		19.97	20.10	20.07

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18615	18900	19185
Band2	3	1	#0	QPSK	21.78	21.90	21.80
		1	#Mid		21.76	21.93	21.88
		1	#Max		21.78	21.89	21.93
		8	#0		20.42	20.51	20.32
		8	#Mid		20.43	20.43	20.29
		8	#Max		20.23	20.42	20.29
		15	#0		20.40	20.41	20.29
	3	1	#0	QAM16	21.92	20.37	20.79
		1	#Mid		21.92	20.39	20.79
		1	#Max		21.82	20.37	20.78
		8	#0		19.84	19.94	19.87
		8	#Mid		19.81	19.98	19.80
		8	#Max		19.73	19.93	19.83
		15	#0		19.99	19.94	19.87

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18625	18900	19175
Band2	5	1	#0	QPSK	21.75	21.88	21.75
		1	#Mid		21.82	21.86	21.64
		1	#Max		21.83	21.83	21.68
		12	#0		20.40	20.44	20.36
		12	#Mid		20.33	20.43	20.38
		12	#Max		20.34	20.52	20.36
		25	#0		20.35	20.43	20.36
	5	1	#0	QAM16	21.00	21.05	20.92
		1	#Mid		20.90	21.18	20.87
		1	#Max		21.03	21.00	20.86
		12	#0		19.85	19.85	19.93
		12	#Mid		19.74	19.81	19.94
		12	#Max		19.76	19.90	19.92
		25	#0		19.87	20.03	19.83

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18650	18900	19150
Band2	10	1	#0	QPSK	21.85	22.00	21.85
		1	#Mid		21.92	21.90	21.86
		1	#Max		21.98	21.89	21.97
		25	#0		20.38	20.52	20.36
		25	#Mid		20.31	20.49	20.46
		25	#Max		20.37	20.38	20.44
		50	#0		20.39	20.45	20.38
	10	1	#0	QAM16	21.99	21.70	21.17
		1	#Mid		21.97	21.75	21.27
		1	#Max		22.07	21.70	21.08
		25	#0		19.75	20.11	19.91
		25	#Mid		19.82	20.07	19.99
		25	#Max		19.82	20.00	20.01
		50	#0		19.87	20.08	19.93

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18675	18900	19125
Band2	15	1	#0	QPSK	21.91	21.98	21.75
		1	#Mid		21.89	21.95	21.78
		1	#Max		22.03	21.84	21.83
		36	#0		20.45	20.48	20.35
		36	#Mid		20.48	20.46	20.38
		36	#Max		20.50	20.43	20.40
		75	#0		20.46	20.51	20.40
	15	1	#0	QAM16	21.88	21.81	21.69
		1	#Mid		21.93	21.67	21.67
		1	#Max		22.10	21.58	21.70
		36	#0		19.95	20.18	19.91
		36	#Mid		20.06	20.13	19.87
		36	#Max		20.09	20.08	19.90
		75	#0		19.89	19.97	20.01

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					18700	18900	19100
Band2	20	1	#0	QPSK	21.93	22.21	21.87
		1	#Mid		22.07	22.07	21.84
		1	#Max		22.15	22.04	21.96
		50	#0		20.43	20.63	20.44
		50	#Mid		20.47	20.50	20.33
		50	#Max		20.57	20.42	20.44
		100	#0		20.42	20.47	20.35
	20	1	#0	QAM16	20.54	20.61	21.19
		1	#Mid		20.64	20.53	21.15
		1	#Max		20.82	20.52	21.19
		50	#0		20.02	20.02	19.99
		50	#Mid		20.09	20.00	19.98
		50	#Max		20.22	19.96	20.02
		100	#0		19.97	19.97	19.99

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					19957	20175	20393
Band4	1.4	1	#0	QPSK	19.78	19.85	19.66
		1	#Mid		19.75	19.94	19.77
		1	#Max		19.83	19.86	19.65
		3	#0		19.63	19.71	19.52
		3	#Mid		19.66	19.74	19.58
		3	#Max		19.66	19.80	19.52
		6	#0		18.68	18.77	18.58
	1.4	1	#0	QAM16	19.57	18.76	18.11
		1	#Mid		19.62	18.80	18.25
		1	#Max		19.62	18.76	18.16
		3	#0		18.95	18.85	18.48
		3	#Mid		18.92	18.88	18.48
		3	#Max		18.92	18.88	18.49
		6	#0		17.89	17.77	17.66

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					19965	20175	20385
Band4	3	1	#0	QPSK	19.70	19.89	19.75
		1	#Mid		19.71	19.98	19.73
		1	#Max		19.76	19.93	19.70
		8	#0		18.69	18.85	18.57
		8	#Mid		18.76	18.86	18.62
		8	#Max		18.73	18.78	18.59
		15	#0		18.69	18.81	18.59
	3	1	#0	QAM16	19.77	19.55	18.32
		1	#Mid		19.75	19.46	18.26
		1	#Max		19.77	19.52	18.15
		8	#0		17.66	18.07	17.75
		8	#Mid		17.66	18.09	17.80
		8	#Max		17.58	18.07	17.78
		15	#0		17.82	17.81	17.62

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					19975	20175	20375
Band4	5	1	#0	QPSK	19.73	19.77	19.45
		1	#Mid		19.71	19.79	19.36
		1	#Max		19.63	19.74	19.37
		12	#0		18.76	18.87	18.58
		12	#Mid		18.69	18.84	18.60
		12	#Max		18.76	18.86	18.62
		25	#0		18.77	18.82	18.59
	5	1	#0	QAM16	18.83	18.84	19.20
		1	#Mid		18.75	18.82	19.11
		1	#Max		18.80	18.84	19.20
		12	#0		17.64	17.69	17.60
		12	#Mid		17.61	17.65	17.57
		12	#Max		17.65	17.66	17.59
		25	#0		17.88	17.88	17.77

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20000	20175	20350
Band4	10	1	#0	QPSK	19.64	19.76	19.65
		1	#Mid		19.64	19.74	19.62
		1	#Max		19.66	19.76	19.63
		25	#0		18.69	18.75	18.66
		25	#Mid		18.73	18.87	18.53
		25	#Max		18.78	18.77	18.55
		50	#0		18.69	18.89	18.65
	10	1	#0	QAM16	19.69	19.49	19.51
		1	#Mid		19.74	19.56	19.31
		1	#Max		19.81	19.45	19.47
		25	#0		17.74	17.88	17.81
		25	#Mid		17.78	17.88	17.71
		25	#Max		17.77	17.90	17.71
		50	#0		17.82	17.87	17.59

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20025	20175	20325
Band4	15	1	#0	QPSK	19.61	19.76	19.71
		1	#Mid		19.70	19.77	19.65
		1	#Max		19.68	19.70	19.59
		36	#0		18.69	18.93	18.77
		36	#Mid		18.74	18.85	18.69
		36	#Max		18.79	18.87	18.70
		75	#0		18.76	18.89	18.75
	15	1	#0	QAM16	19.76	19.55	19.69
		1	#Mid		19.75	19.52	19.64
		1	#Max		19.83	19.48	19.49
		36	#0		17.75	17.99	17.58
		36	#Mid		17.72	17.98	17.68
		36	#Max		17.76	17.98	17.61
		75	#0		17.82	17.83	17.79

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20050	20175	20300
Band4	20	1	#0	QPSK	19.81	19.96	19.68
		1	#Mid		19.66	19.96	19.60
		1	#Max		19.74	19.86	19.52
		50	#0		18.65	18.67	18.57
		50	#Mid		18.71	18.79	18.46
		50	#Max		18.67	18.70	18.46
		100	#0		18.67	18.72	18.62
	20	1	#0	QAM16	18.67	18.74	19.11
		1	#Mid		18.68	18.82	19.06
		1	#Max		18.77	18.73	18.90
		50	#0		17.73	17.75	17.73
		50	#Mid		17.83	17.76	17.67
		50	#Max		17.84	17.73	17.57
		100	#0		17.74	17.76	17.63

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20775	21100	21425
Band7	5	1	#0	QPSK	19.42	19.23	18.76
		1	#Mid		19.40	19.08	18.68
		1	#Max		19.38	19.12	18.65
		12	#0		18.56	18.36	17.85
		12	#Mid		18.49	18.34	17.80
		12	#Max		18.38	18.30	17.71
		25	#0		18.54	18.22	17.80
	5	1	#0	QAM16	18.22	18.37	17.86
		1	#Mid		18.31	18.39	17.87
		1	#Max		18.52	18.38	17.97
		12	#0		17.46	17.33	16.70
		12	#Mid		17.38	17.32	16.70
		12	#Max		17.37	17.27	17.03
		25	#0		17.55	17.21	17.06

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20800	21100	21400
Band7	10	1	#0	QPSK	19.47	19.39	18.80
		1	#Mid		19.40	19.34	18.79
		1	#Max		19.47	19.40	18.85
		25	#0		18.45	18.24	17.79
		25	#Mid		18.42	18.33	17.71
		25	#Max		18.35	18.23	17.81
		50	#0		18.47	18.40	17.77
	10	1	#0	QAM16	19.60	18.33	17.89
		1	#Mid		19.54	18.29	17.78
		1	#Max		19.47	18.33	17.79
		25	#0		17.45	17.40	17.21
		25	#Mid		17.84	17.39	17.21
		25	#Max		17.35	17.40	16.93
		50	#0		17.84	17.44	17.15

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20825	21100	21375
Band7	15	1	#0	QPSK	19.41	19.30	18.83
		1	#Mid		19.31	19.32	18.72
		1	#Max		19.14	19.35	18.85
		36	#0		18.36	18.25	17.87
		36	#Mid		18.54	18.28	17.85
		36	#Max		18.33	18.27	17.77
		75	#0		18.44	18.31	17.81
	15	1	#0	QAM16	19.63	18.36	18.65
		1	#Mid		19.36	18.38	18.51
		1	#Max		19.34	18.36	18.61
		36	#0		17.92	17.45	16.92
		36	#Mid		17.46	17.51	17.30
		36	#Max		17.49	17.41	16.83
		75	#0		17.45	17.38	17.21

Band	Bandwidth (MHz)	RB Size	RB Position	Modulation	Channel		
					20850	21100	21350
Band7	20	1	#0	QPSK	19.42	19.56	19.04
		1	#Mid		19.22	19.61	18.89
		1	#Max		19.10	19.55	18.87
		50	#0		18.37	18.29	17.94
		50	#Mid		18.42	18.27	17.85
		50	#Max		18.31	18.17	17.78
		100	#0		18.32	18.32	17.82
	20	1	#0	QAM16	18.74	18.21	18.48
		1	#Mid		18.62	18.39	18.25
		1	#Max		18.47	18.26	18.26
		50	#0		17.96	17.43	17.06
		50	#Mid		17.57	17.41	16.94
		50	#Max		17.41	17.29	17.22
		100	#0		17.48	17.29	17.01

WLAN 2.4G			
Mode	Frequency	Maximum Conducted Output Power	Tune-up power
	(MHz)	(dBm)	(dBm)
802.11b	2412	16.78	17.0
	2437	16.80	
	2462	16.19	
802.11g	2412	16.00	17.0
	2437	16.38	
	2462	16.21	
802.11n20	2412	16.14	17.0
	2437	15.41	
	2462	16.49	
802.11n40	2422	15.98	17.0
	2437	16.81	
	2452	16.42	

Note:

1. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 b/g/n modes, the channel in the lower order/sequence 802.11 mode (i.e. g, n) is selected. Therefore the SAR measurements performed for the 802.11b modes, as the lowest order modulation, cover 802.11g/n modes.
2. SAR is not required for the following 2.4 GHz OFDM conditions as 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.
3. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements ,when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. 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.

Bluetooth			
Modulation	Frequency (MHz)	Output Power (dBm)	Tune-up power (dBm)
1-DH1	2402	4.58	5.0
	2441	3.89	
	2480	2.70	
2-DH1	2402	4.74	5.0
	2441	3.90	
	2480	3.01	
3-DH1	2402	5.04	5.5
	2441	4.76	
	2480	3.64	

Note:

Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})}$

≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

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

Bluetooth Turn up Power (dBm)	Bluetooth Turn up Power (mW)	Separation Distance (mm)	Frequency (GHz)	Result	Exclusion Thresholds
2.0	3.55	5	2.48	0.149	3.0

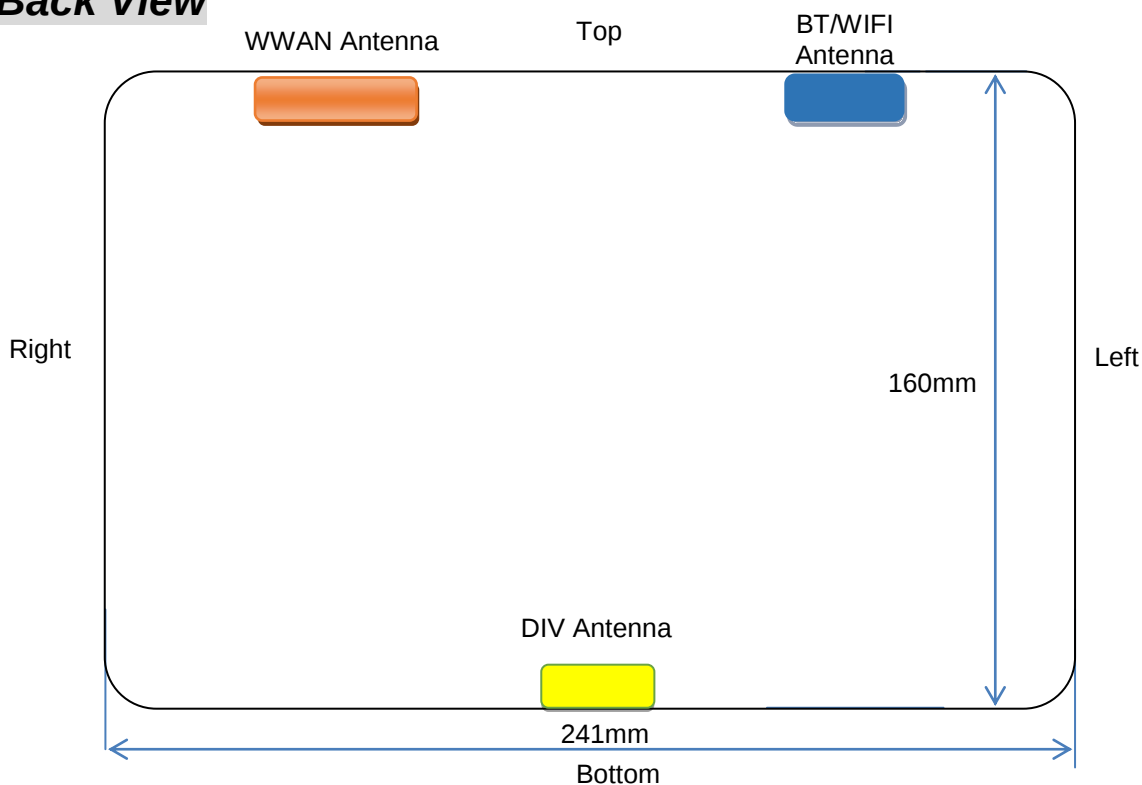
Per KDB 447498 D01v06, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

According to the calculation results in the table above, BT SAR does not need to be tested.

14.2 Transmit Antennas and SAR Measurement Position

EUT Antenna Location:

Back View



Antennas	Support Band
WWAN	GSM 850/1900+WCDMA Band 2/5+LTE Band 2/4/7 TX
DIV	GSM 850/1900+WCDMA Band 2/5+LTE Band 2/4/7 RX
BT/WIFI	BT+2.4G WIFI

Distance of The Antenna to the EUT surface and edge (mm)						
Antennas	Front	Back	Top Side	Bottom Side	Left Side	Right Side
WWAN	<25	<25	<25	158	70	170
BT/WIFI	<25	<25	<25	158	220	40

EUT Testing Location Evaluation:

Positions for SAR tests; Hotspot mode						
Antennas	Front	Back	Top Side	Bottom Side	Left Side	Right Side
WWAN	Yes	Yes	Yes	No	No	No
BT/WIFI	Yes	Yes	Yes	No	No	No

Note:

- According to the KDB 941225 D06 Hot Spot SAR v02, the edges with less than 25 mm distance to the antennas need to be tested for SAR.

14.3 Measured and Reported (Scaled) SAR Results

The calculated SAR is obtained by the following formula:

1. Reported SAR for WWAN=Measured SAR * Tune-up Scaling factor
2. Reported SAR for WLAN and Bluetooth=Measured SAR * Tune-up Scaling factor * Duty Cycle Scaling factor
3. Duty Cycle Scaling factor=1/ Duty Cycle (%)

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 648474 D04 Handset SAR v01r03:

1. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.
2. when the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, using the same wireless mode test configuration for voice and data, such as UMTS, LTE and Wi-Fi, and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface)
3. For Smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

KDB 941225 D01 3G SAR Procedures:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode (RMC12.2kbps) or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

1. Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
2. When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
3. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
4. SAR measurement is not required for the 16QAM and 64QAM. When the highest maximum output power for 16QAM and 64QAM is $\leq \frac{1}{2}$ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.
5. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

KDB 248227 D01 802.11 Wi-Fi SAR

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements.

For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions.

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.¹⁶ The initial test position procedure is described in the following:

- a) When the *reported* SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
- b) When the *reported* SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
- c) 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.

Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

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

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

TCB workshop April 2015:

SAR test exclusion can be applied for testing overlapping LTE bands as follows:

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

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

GSM 850											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	GSM	Back	128	824.2	31.56	32.0	1.107	0.207	0.229	
		GSM	Front	128	824.2	31.56	32.0	1.107	0.129	0.143	
Hotspot	0	GSM	Top Side	128	824.2	31.56	32.0	1.107	0.240	0.266	1

GSM 1900											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	GSM	Back	512	1850.2	29.05	29.5	1.109	0.152	0.169	
		GSM	Front	512	1850.2	29.05	29.5	1.109	0.114	0.126	
Hotspot	0	GSM	Top Side	512	1850.2	29.05	29.5	1.109	0.221	0.245	2

WCDMA Band II											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	RMC*	Back	9400	1880	19.23	20.0	1.194	0.192	0.229	
		RMC*	Front	9400	1880	19.23	20.0	1.194	0.273	0.326	
Hotspot	0	RMC*	Top Side	9400	1880	19.23	20.0	1.194	0.530	0.633	3

WCDMA Band V											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	RMC*	Back	4182	836.4	20.24	21.0	1.191	0.093	0.111	
		RMC*	Front	4182	836.4	20.24	21.0	1.191	0.321	0.382	4
Hotspot	0	RMC*	Top Side	4182	836.4	20.24	21.0	1.191	0.221	0.263	

FDD-LTE Band 2 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	QPSK,1RB	Back	18900	1880	22.21	22.5	1.069	0.294	0.314	
		QPSK,1RB	Front	18900	1880	22.21	22.5	1.069	0.390	0.417	
		QPSK,50%RB	Back	18900	1880	22.21	22.5	1.069	0.197	0.211	
		QPSK,50%RB	Front	18900	1880	22.21	22.5	1.069	0.309	0.330	
Hotspot	0	QPSK,1RB	Top Side	18900	1880	22.21	22.5	1.069	0.821	0.878	
		QPSK,1RB	Top Side	18700	1860	22.21	22.5	1.069	0.807	0.863	
		QPSK,1RB	Top Side	19100	1900	22.21	22.5	1.069	0.862	0.922	5
		QPSK,50%RB	Top Side	18900	1880	22.21	22.5	1.069	0.552	0.590	

FDD-LTE Band 4 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	QPSK,1RB	Back	20175	1732.5	19.98	20.5	1.127	0.262	0.295	
		QPSK,1RB	Front	20175	1732.5	19.98	20.5	1.127	0.344	0.388	
		QPSK,50%RB	Back	20175	1732.5	19.98	20.5	1.127	0.240	0.271	
		QPSK,50%RB	Front	20175	1732.5	19.98	20.5	1.127	0.301	0.339	
Hotspot	0	QPSK,1RB	Top Side	20175	1732.5	19.98	20.5	1.127	0.747	0.842	
		QPSK,1RB	Top Side	20050	1720	19.98	20.5	1.127	0.821	0.925	6
		QPSK,1RB	Top Side	20300	1745	19.98	20.5	1.127	0.782	0.881	
		QPSK,50%RB	Top Side	20175	1732.5	19.98	20.5	1.127	0.574	0.647	

FDD-LTE Band 7 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	QPSK,1RB	Back	21100	2535	19.63	20.0	1.089	0.286	0.311	
		QPSK,1RB	Front	21100	2535	19.63	20.0	1.089	0.567	0.617	
		QPSK,50%RB	Back	21100	2535	19.63	20.0	1.089	0.239	0.260	
		QPSK,50%RB	Front	21100	2535	19.63	20.0	1.089	0.497	0.541	
Hotspot	0	QPSK,1RB	Top Side	21100	2535	19.63	20.0	1.089	0.820	0.893	
		QPSK,1RB	Top Side	20850	2510	19.63	20.0	1.089	0.634	0.690	
		QPSK,1RB	Top Side	21350	2560	19.63	20.0	1.089	0.881	0.959	7
		QPSK,50%RB	Top Side	21100	2535	19.63	20.0	1.089	0.612	0.666	

WLAN 2.4G												
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Duty Cycle (%)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
							Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body & Hotspot	0	802.11b	Back	6	2437	100	16.80	17.0	1.047	0.158	0.165	8
		802.11b	Front	6	2437	100	16.80	17.0	1.047	0.137	0.143	
Hotspot	0	802.11b	Top Side	6	2437	100	16.80	17.0	1.047	0.123	0.129	

Remark:

1. The value with the bold is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels SAR tests are not necessary.

14.4 SAR Measurement Variability

According to KDB865664, Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg. If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with $\leq 20\%$ variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.¹⁹ The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB 690783. Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 2) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 3) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Test Mode	Frequency Band (MHz)	RF Exposure Configuration	Test Position	Repeated SAR (yes/no)	Highest Measured SAR1-g (W/Kg)	First Repeated	
						Measured SAR1-g (W/Kg)	Largest to Smallest SAR Ratio
FDD-LTE Band 2 1RB	1900	Hotspot	Top Side	Yes	0.922	0.909	1.014
FDD-LTE Band 4 1RB	1720	Hotspot	Top Side	Yes	0.925	0.913	1.013
FDD-LTE Band 7 1RB	2560	Hotspot	Top Side	Yes	0.959	0.936	1.025

14.5 Simultaneous Transmission Evaluation

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.

Application Simultaneous Transmission information:

No.	Configurations	Body SAR	Hotspot SAR
1	WWAN+WLAN 2.4G (Data)	Yes	Yes
2	WWAN+ Bluetooth (Data)	Yes	Yes

Remark:

1. WWAN cannot transmit simultaneously.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. WLAN 2.4G and WLAN 5G cannot transmit simultaneously.
3. According to the KDB 447498 D01 v06, 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:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is $> 50 \text{ mm}$

Estimated stand alone SAR						
Communication system	Frequency (MHz)	Maximum Power (dBm)	Maximum Power (mW)	Separation Distance (mm)	X	Estimated SAR1-g (W/kg)
Bluetooth*	2480	5.5	3.55	5	7.5	0.149
Bluetooth*	2480	5.5	3.55	10	7.5	0.075

Note:

1. Bluetooth*- Including Lower power Bluetooth
2. Maximum average power including tune-up tolerance;
3. When the minimum test separation distance is $< 5 \text{ mm}$, a distance of 5 mm is applied to determine SAR test exclusion

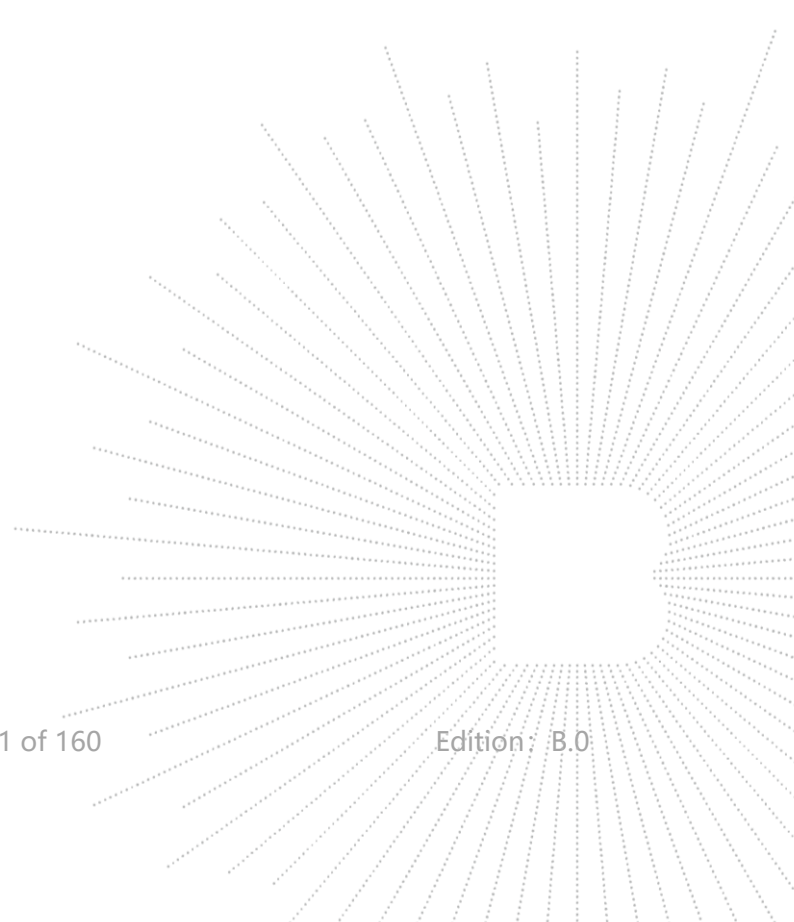
4. Per FCC KD B447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the transmitting antenna in a specific a physical test configuration is $\leq 1.6 \text{ W/Kg}$. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ratio} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{(\text{peak location separation, mm})} < 0.04$$

5. Simultaneous transmission of maximum SAR sum calculation.

RF Exposure Conditions	Test Position	WWAN	WLAN 2.4G	Summed SAR (W/kg)	SAR1-g Limit (W/kg)
		Scaled SAR (W/kg)	Scaled SAR (W/kg)		
Body-worn & Hotspot	Back	0.331	0.165	0.496	1.6
	Front	0.617	0.143	0.760	1.6
Hotspot	Top side	0.959	0.129	1.088	1.6

RF Exposure Conditions	Test Position	WWAN	Bluetooth	Summed SAR (W/kg)	SAR1-g Limit (W/kg)
		Scaled SAR (W/kg)	Scaled SAR (W/kg)		
Body-worn & Hotspot	Back	0.331	0.149	0.480	1.6
	Front	0.617	0.149	0.766	1.6
Hotspot	Top side	0.959	0.149	1.108	1.6



15. Test Plots

15.1 System Performance Check

System check at 835 MHz

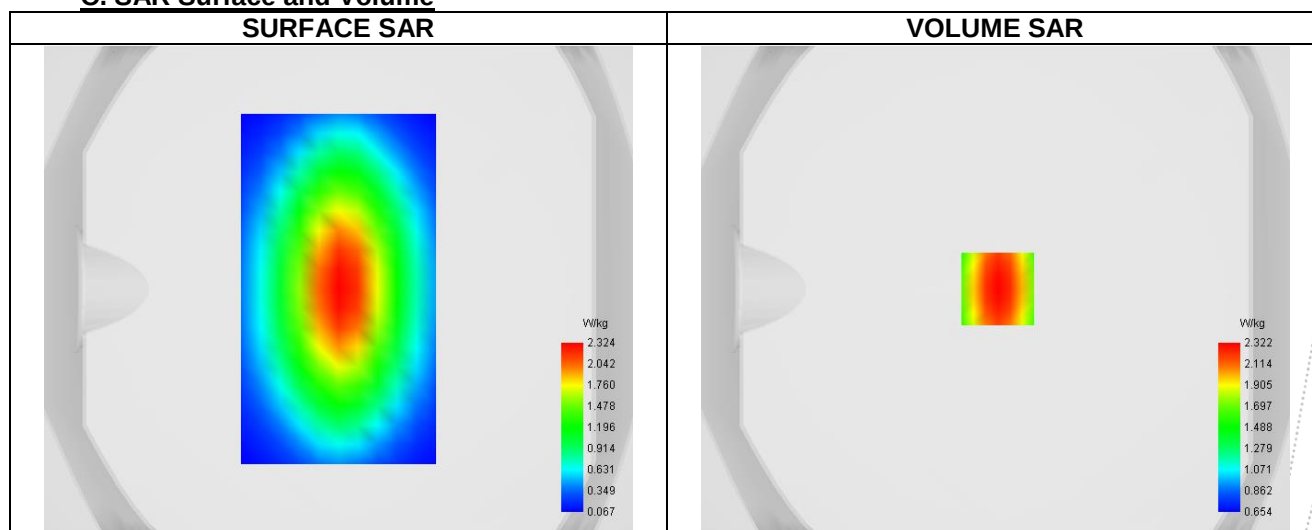
A. Experimental conditions.

Probe	SN 26/23 EPG0420
ConvF	0.81
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	835.000
Relative permittivity (real part)	40.822
Relative permittivity (imaginary part)	20.910
Conductivity (S/m)	0.865

C. SAR Surface and Volume



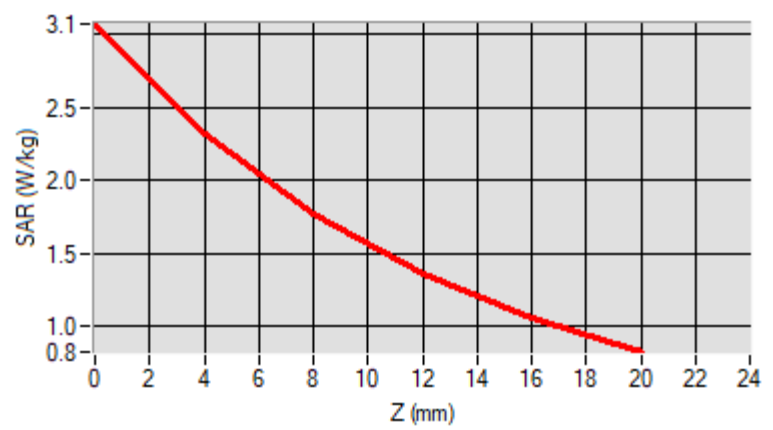
Maximum location: X=1.00, Y=0.00 ; SAR Peak: 5.68 W/kg

D. SAR 1g & 10g

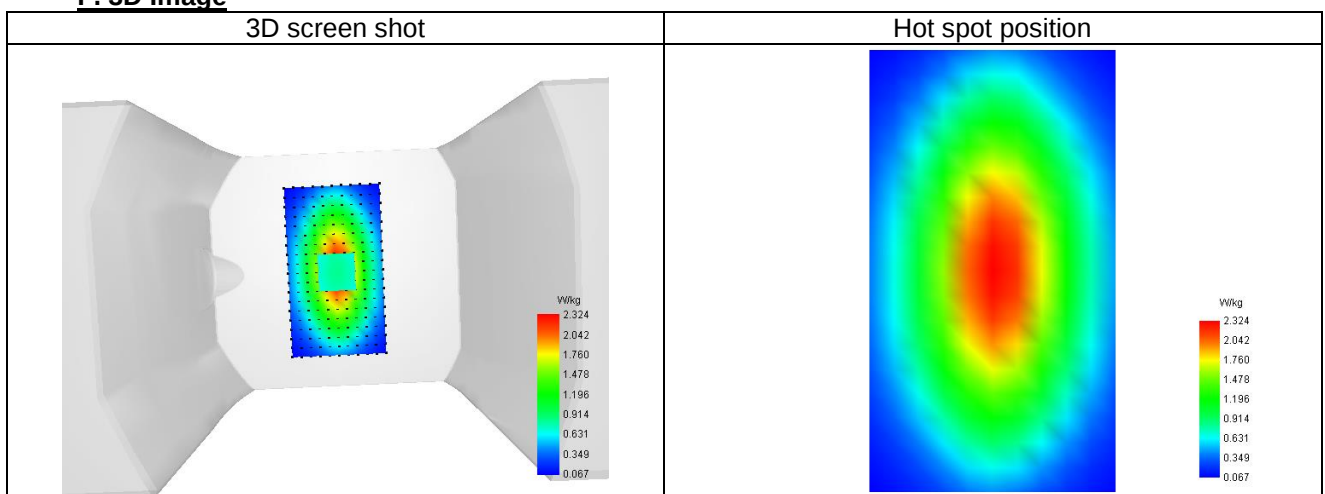
SAR 10g (W/Kg)	1.776
SAR 1g (W/Kg)	2.414
Variation (%)	-2.093
Horizontal validation criteria: minimum distance (mm)	-
Vertical validation criteria: SAR ratio M2/M1 (%)	-

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	3.108	2.344	1.786	1.395	1.109



F. 3D Image



System check at 1800 MHz

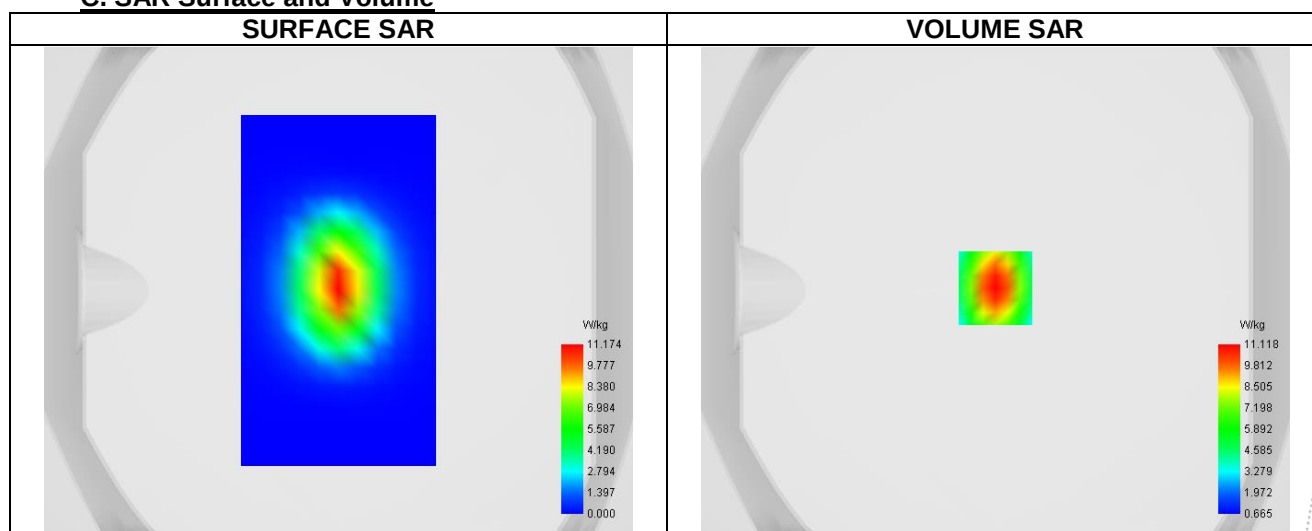
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	0.96
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1800.000
Relative permittivity (real part)	39.641
Relative permittivity (imaginary part)	15.186
Conductivity (S/m)	1.436

C. SAR Surface and Volume



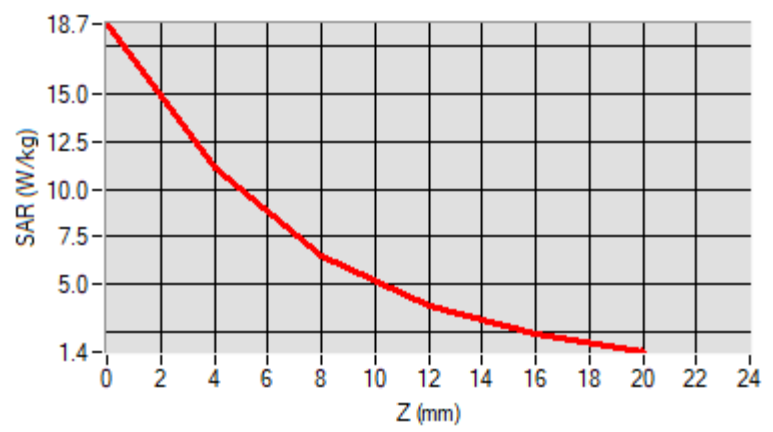
Maximum location: X=0.00, Y=1.00 ; SAR Peak: 22.78 W/kg

D. SAR 1g & 10g

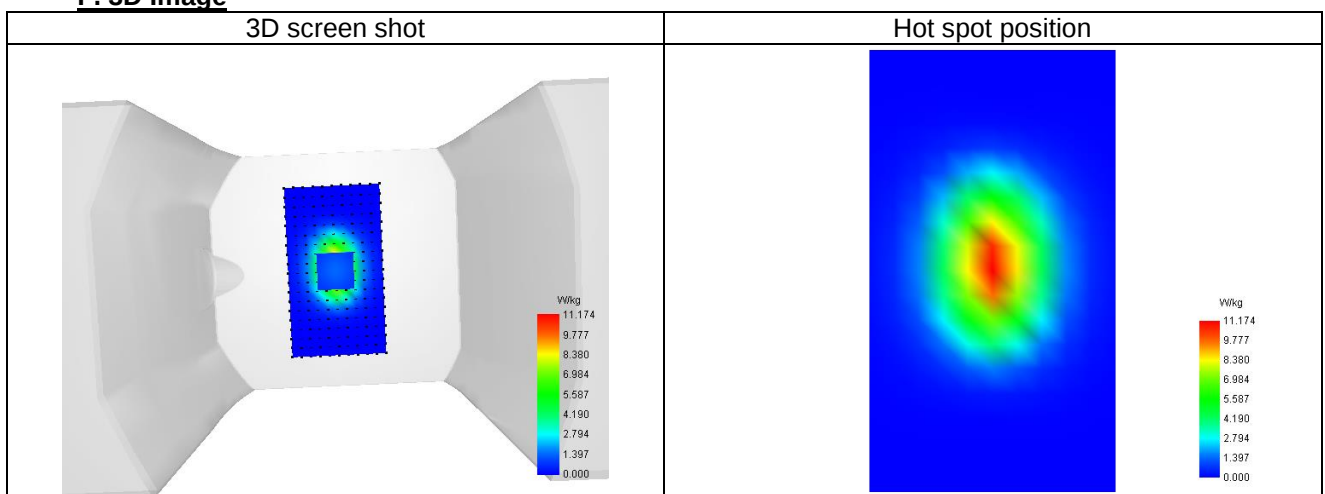
SAR 10g (W/Kg)	6.009
SAR 1g (W/Kg)	9.951
Variation (%)	-0.930
Horizontal validation criteria: minimum distance (mm)	-
Vertical validation criteria: SAR ratio M2/M1 (%)	-

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	18.71+	11.234	6.561	3.924	2.453



F. 3D Image



System check at 1900 MHz

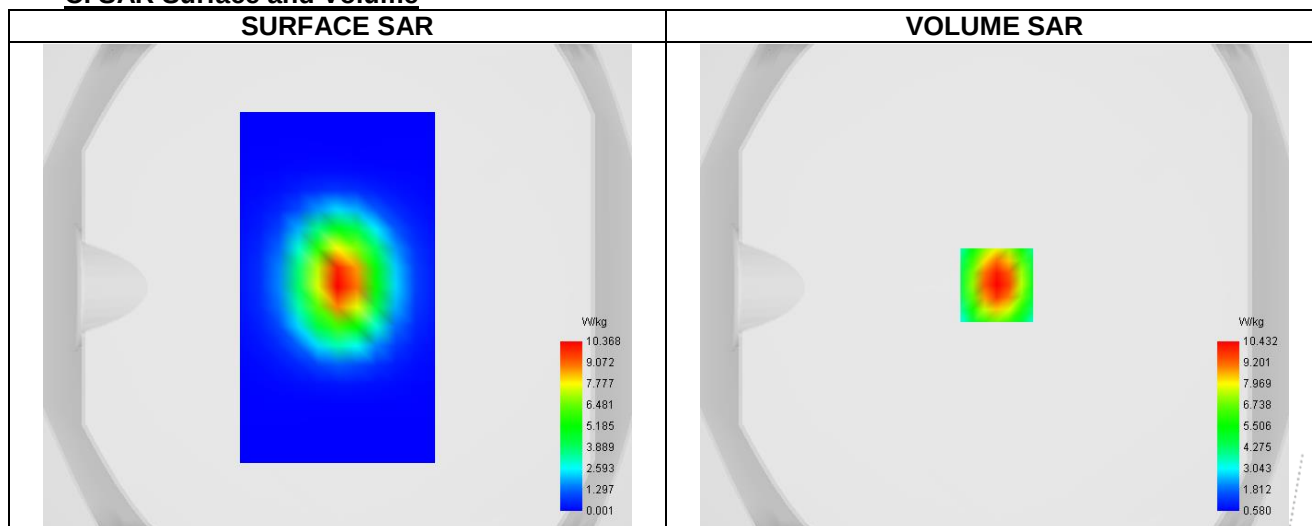
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	1.04
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000
Relative permittivity (real part)	40.809
Relative permittivity (imaginary part)	12.866
Conductivity (S/m)	1.361

C. SAR Surface and Volume



Maximum location: X=1.00, Y=1.00 ; SAR Peak: 22.54 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	6.190
SAR 1g (W/Kg)	10.519
Variation (%)	3.421
Horizontal validation criteria: minimum distance (mm)	-
Vertical validation criteria: SAR ratio M2/M1 (%)	-

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	17.387	10.484	6.206	3.672	2.184