9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.
Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 14.2 to Table 14.37 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01 v05, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-g SAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

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

10.2 Fast SAR Algorithms

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

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

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

Both algorithms are implemented in DASY software.

11 Conducted Output Power

11.1 Manufacturing tolerance

Table 11.1: GSM Speech

GSM 850			
Channel	Channel 251	Channel 190	Channel 128
Target (dBm)	32.3	32.3	32.3
Tune-up (dBm)	33	33	33
GSM 1900			
Channel	Channel 810	Channel 661	Channel 512
Target (dBm)	29.5	29.5	29.5
Tune-up (dBm)	30.2	30.2	30.2

Table 11.2: GPRS and EGPRS

GSM 850 GPRS (GMSK)				
Channel		**251**	**190**	**128**
1 Txslot	Target (dBm)	32.3	32.3	32.3
	Tune-up (dBm)	33	33	33
2 Txslots	Target (dBm)	31.6	31.6	31.6
	Tune-up (dBm)	32.6	32.6	32.6
GSM 850 EGPRS (GMSK)				
Channel		**251**	**190**	**128**
1 Txslot	Target (dBm)	32.3	32.3	32.3
	Tune-up (dBm)	33	33	33
2 Txslots	Target (dBm)	31.6	31.6	31.6
	Tune-up (dBm)	32.6	32.6	32.6
GSM 850 EGPRS (8PSK)				
Channel		**251**	**190**	**128**
1 Txslot	Target (dBm)	27	27	27
	Tune-up (dBm)	28	28	28
2 Txslots	Target (dBm)	27	27	27
	Tune-up (dBm)	28	28	28
GSM 1900 GPRS (GMSK)				
Channel		**810**	**661**	**512**
1 Txslot	Target (dBm)	29.5	29.5	29.5
	Tune-up (dBm)	30.2	30.2	30.2
2 Txslots	Target (dBm)	29.5	29.5	29.5
	Tune-up (dBm)	30.2	30.2	30.2
GSM 1900 EGPRS (GMSK)				
Channel		**810**	**661**	**512**
1 Txslot	Target (dBm)	29.5	29.5	29.5
	Tune-up (dBm)	30.2	30.2	30.2

2 Txslots	Target (dBm)	29.5	29.5	29.5
	Tune-up (dBm)	30.2	30.2	30.2
GSM 1900 EGPRS (8PSK)				
Channel		**810**	**661**	**512**
1 Txslot	Target (dBm)	26	26	26
	Tune-up (dBm)	27	27	27
2 Txslots	Target (dBm)	26	26	26
	Tune-up (dBm)	27	27	27

Table 11.3: WCDMA

WCDMA 850 CS			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	23.8	23.8	23.8
Tune-up (dBm)	24.5	24.5	24.5
HSUPA (sub-test 1)			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	22.1	22.3	22.4
Tune-up (dBm)	23.5	23.5	23.5
HSUPA (sub-test 2)			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	21.4	21.6	21.5
Tune-up (dBm)	22.5	22.5	22.5
HSUPA (sub-test 3)			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	21.4	21.3	21.6
Tune-up (dBm)	22.5	22.5	22.5
HSUPA (sub-test 4)			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	21.8	22.1	22
Tune-up (dBm)	23.5	23.5	23.5
HSUPA (sub-test 5)			
Channel	Channel 4233	Channel 4182	Channel 4132
Target (dBm)	22.5	22.6	22.6
Tune-up (dBm)	23.5	23.5	23.5
WCDMA 1900 CS			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	23.5	23.5	23.5
Tune-up (dBm)	24.2	24.2	24.2
HSUPA (sub-test 1)			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	22.3	22.6	22.2
Tune-up (dBm)	23.5	23.5	23.5

HSUPA (sub-test 2)			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	21.6	21.5	21.2
Tune-up (dBm)	22.5	22.5	22.5
HSUPA (sub-test 3)			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	21.3	21.4	21.3
Tune-up (dBm)	22.5	22.5	22.5
HSUPA (sub-test 4)			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	22.1	22.0	21.7
Tune-up (dBm)	23.5	23.5	23.5
HSUPA (sub-test 5)			
Channel	Channel 9538	Channel 9400	Channel 9262
Target (dBm)	22.6	22.4	22.3
Tune-up (dBm)	23.5	23.5	23.5

Table 11.4: LTE

Mode	Target (dBm)	Tune-up (dBm)
LTE Band 4	22.9	23.9
LTE Band 17	23.5	24.2

LTE MPR will follow up 3GPP setting as below:

Modulation	Channel bandwidth / Transmission bandwidth (NRB)						MPR (dB)
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2

Table 11.5: Bluetooth

Bluetooth (GFSK)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	6	6	6
Tune-up (dBm)	7.5	7.5	7.5
Bluetooth (DQPSK)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	7	7	7
Tune-up (dBm)	8.5	8.5	8.5
Bluetooth (8DPSK)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	7	7	7
Tune-up (dBm)	8.5	8.5	9

Table 11.6: WiFi

802.11 b (2.4GHz)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	17	17	17
Tune-up (dBm)	19	19	19
802.11 g (2.4GHz)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	13	12	12
Tune-up (dBm)	15	14	14
802.11 n (2.4GHz HT20)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	12	11	11
Tune-up (dBm)	14	13	13
802.11 a (5GHz)			
Channel	Channel 36~48	Channel 149	Channel 153~165
Target (dBm)	13	13.8	12
Tune-up (dBm)	15	15.8	14
802.11 n (5GHz HT20)			
Channel	Channel 36~48	Channel 149	Channel 153~165
Target (dBm)	12	13.4	11.4
Tune-up (dBm)	14	15.4	13.4
802.11 n (5GHz HT40)			
Channel	Channel 36~48	Channel 151	Channel 159
Target (dBm)	12.5	12.5	12
Tune-up (dBm)	14.5	14.5	14

11.2 GSM Measurement result

During the process of testing, the EUT was controlled via Agilent Digital Radio Communication tester (E5515C) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Table 11.7: The conducted power measurement results for GSM850/1900

GSM 850MHz	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	32.91	32.70	32.51
GSM 1900MHz	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	29.65	29.53	29.80

Table 11.8: The conducted power measurement results for GPRS and EGPRS

GSM 850 GPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	**190**	**128**		**251**	**190**	**128**
1 Txslot	32.92	32.70	32.53	-9.03dB	23.89	23.67	23.50
2 Txslots	32.55	32.33	32.17	-6.02dB	**26.53**	**26.31**	**26.15**
GSM 850 EGPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	**190**	**128**		**251**	**190**	**128**
1 Txslot	32.96	32.72	32.54	-9.03dB	23.93	23.69	23.51
2 Txslots	32.55	32.35	32.25	-6.02dB	**26.53**	**26.33**	**26.23**
GSM 850 EGPRS (8PSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	**190**	**128**		**251**	**190**	**128**
1 Txslot	27.19	27.27	27.37	-9.03dB	18.16	18.24	18.34
2 Txslots	27.00	27.16	27.22	-6.02dB	**20.98**	**21.14**	**21.20**
PCS1900 GPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**
1 Txslot	29.63	29.49	29.78	-9.03dB	20.60	20.46	20.75
2 Txslots	29.60	29.44	29.75	-6.02dB	**23.58**	**23.42**	**23.73**
PCS1900 EGPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**
1 Txslot	29.59	29.48	29.79	-9.03dB	20.56	20.45	20.76
2 Txslots	29.59	29.43	29.75	-6.02dB	**23.57**	**23.41**	**23.73**
PCS1900 EGPRS (8PSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	810	**661**	**512**		**810**	**661**	**512**
1 Txslot	25.83	25.89	26.03	-9.03dB	16.80	16.86	17.00
2 Txslots	25.86	25.92	26.09	-6.02dB	**19.84**	**19.90**	**20.07**

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GPRS and EGPRS.

Note: According to the KDB941225 D03, "when SAR tests for EDGE or EGPRS mode is necessary, GMSK modulation should be used".

11.3 WCDMA Measurement result

Table 11.9: The conducted Power for WCDMA850/1900

Item	band	FDDV result		
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)
WCDMA	\	24.50	24.38	24.01
HSUPA	1	22.96	22.90	22.73
	2	21.74	21.59	21.45
	3	21.37	22.09	21.11
	4	21.99	22.58	21.71
	5	22.86	23.05	22.85
Item	band	FDDII result		
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)
WCDMA	\	23.53	23.56	23.69
HSUPA	1	22.15	22.31	21.85
	2	21.62	21.74	21.25
	3	22.32	21.40	20.82
	4	21.76	22.40	21.50
	5	22.45	22.55	22.12

Note: HSUPA/HSPA+ body SAR for WCDMA850/1900 are not required, because maximum average output power of each RF channel with HSUPA/HSPA+ active is not 1/4 dB higher than that measured without HSUPA/HSPA+ and the maximum SAR for WCDMA850/1900 are not above 75% of the SAR limit.

11.4 LTE Measurement result

Table 11.10: The conducted Power for LTE

Band 4				
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)	
	RB offset		QPSK	16QAM
1.4 MHz	1RB_High	1754.3	23.09	21.94
		1732.5	23.03	21.80
		1710.7	23.32	22.06
	1RB_Middle	1754.3	23.11	21.97
		1732.5	22.91	21.80
		1710.7	23.31	21.98

	1RB_Low	1754.3	23.16	22.02
		1732.5	23.02	21.90
		1710.7	23.27	21.94
	3RB_High	1754.3	23.03	21.92
		1732.5	22.84	21.68
		1710.7	23.28	22.38
	3RB_Middle	1754.3	22.99	21.88
		1732.5	22.89	21.73
		1710.7	23.25	22.41
	3RB_Low	1754.3	22.94	21.93
		1732.5	22.85	21.80
		1710.7	23.18	22.37
	6RB	1754.3	22.08	21.13
		1732.5	21.93	20.99
		1710.7	22.30	21.49
3 MHz	1RB_High	1753.5	22.81	22.35
		1732.5	22.80	22.24
		1711.5	23.24	22.66
	1RB_Middle	1753.5	22.92	22.41
		1732.5	22.67	22.16
		1711.5	23.23	22.69
	1RB_Low	1753.5	22.99	22.43
		1732.5	22.62	22.19
		1711.5	23.06	22.60
	8RB_High	1753.5	22.01	21.10
		1732.5	21.83	20.93
		1711.5	22.31	21.38
	8RB_Middle	1753.5	22.02	21.08
		1732.5	21.83	20.90
		1711.5	22.25	21.27
	8RB_Low	1753.5	22.07	21.10
		1732.5	21.85	20.91
		1711.5	22.18	21.25
	15RB	1753.5	22.04	20.98
		1732.5	21.85	20.78
		1711.5	22.17	21.14
5 MHz	1RB_High	1752.5	22.90	21.59
		1732.5	22.75	21.70
		1712.5	23.25	21.92
	1RB_Middle	1752.5	23.01	21.60
		1732.5	22.69	21.52
		1712.5	23.22	21.80

	1RB_Low	1752.5	22.99	21.54
		1732.5	22.71	21.63
		1712.5	23.13	21.77
	12RB_High	1752.5	21.99	21.01
		1732.5	21.99	21.03
		1712.5	22.21	21.24
	12RB_Middle	1752.5	22.08	21.06
		1732.5	21.90	20.99
		1712.5	22.22	21.20
	12RB_Low	1752.5	22.02	21.04
		1732.5	21.75	20.90
		1712.5	22.11	21.24
	25RB	1752.5	21.90	20.96
		1732.5	21.76	20.79
		1712.5	22.15	21.24
10 MHz	1RB-High	1750	22.88	22.58
		1732.5	22.80	22.55
		1715	23.11	22.81
	1RB-Middle	1750	23.01	22.70
		1732.5	22.74	22.48
		1715	23.15	22.85
	1RB-Low	1750	22.89	22.63
		1732.5	22.80	22.57
		1715	23.14	22.78
	25RB-High	1750	22.01	20.97
		1732.5	21.85	20.90
		1715	22.21	21.26
	25RB-Middle	1750	21.94	20.97
		1732.5	21.82	20.92
		1715	22.18	21.22
	25RB-Low	1750	21.87	20.90
		1732.5	21.75	20.92
		1715	22.14	21.17
	50RB	1750	21.82	20.83
		1732.5	21.71	20.62
		1715	22.10	21.07
15 MHz	1RB-High	1747.5	22.72	22.88
		1732.5	22.88	22.59
		1717.5	22.97	22.73
	1RB-Middle	1747.5	23.01	22.69
		1732.5	22.73	22.44
		1717.5	23.11	22.83

	1RB-Low	1747.5	22.93	22.61
		1732.5	22.74	22.54
		1717.5	22.46	22.90
	36RB-High	1747.5	21.67	21.14
		1732.5	21.59	20.97
		1717.5	21.98	21.27
	36RB-Middle	1747.5	21.65	21.07
		1732.5	21.56	20.93
		1717.5	21.97	21.41
	36RB-Low	1747.5	21.79	20.90
		1732.5	21.70	20.91
		1717.5	22.00	21.11
	75RB	1747.5	21.89	20.89
		1732.5	21.67	20.69
		1717.5	21.89	20.99
20 MHz	1RB-High	1745	23.03	21.94
		1732.5	23.08	21.97
		1720	22.99	21.88
	1RB-Middle	1745	22.99	21.79
		1732.5	22.79	21.71
		1720	23.02	21.94
	1RB-Low	1745	22.71	21.67
		1732.5	22.94	21.87
		1720	22.90	22.02
	50RB-High	1745	21.92	20.93
		1732.5	21.79	20.97
		1720	21.98	21.02
	50RB-Middle	1745	21.89	21.04
		1732.5	21.72	20.90
		1720	22.10	21.10
	50RB-Low	1745	21.73	20.94
		1732.5	21.69	20.94
		1720	22.04	21.05
	100RB	1745	21.81	20.84
		1732.5	21.83	20.75
		1720	22.00	21.02
Band 17				
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)	
	RB offset		QPSK	16QAM
5 MHz	1RB_High	713.5	23.20	22.85
		710	23.41	22.97
		706.5	23.40	22.94

	1RB_Middle	713.5	23.31	22.84
		710	23.24	22.29
		706.5	23.27	22.27
	1RB_Low	713.5	23.27	22.75
		710	23.11	22.06
		706.5	23.41	22.94
	12RB_High	713.5	22.15	21.23
		710	22.21	21.24
		706.5	22.09	21.19
	12RB_Middle	713.5	22.28	21.22
		710	22.22	21.22
		706.5	22.05	21.14
	12RB_Low	713.5	22.26	21.29
		710	22.17	21.25
		706.5	22.11	21.05
	25RB	713.5	22.16	21.12
		710	22.03	20.96
		706.5	21.99	21.08
10 MHz	1RB-High	711	23.23	22.74
		710	23.31	22.02
		709	23.25	22.01
	1RB-Middle	711	23.04	22.75
		710	23.16	22.32
		709	23.33	22.73
	1RB-Low	711	23.09	21.92
		710	22.98	21.78
		709	23.14	21.84
	25RB-High	711	22.05	21.14
		710	22.18	21.11
		709	22.09	21.10
	25RB-Middle	711	22.03	21.07
		710	22.02	21.11
		709	21.92	20.94
	25RB-Low	711	23.04	21.93
		710	23.05	22.14
		709	22.95	22.13
	50RB	711	21.91	20.94
		710	21.95	20.97
		709	21.89	20.90

11.5 Wi-Fi and BT Measurement result

The output power of BT antenna is as following:

Mode	Conducted Power (dBm)		
	Channel 0 (2402MHz)	Channel 39 (2441MHz)	Channel 78 (2480MHz)
GFSK	5.69	5.75	6.51
EDR2M-4_DQPSK	6.72	6.74	7.49
EDR3M-8DPSK	7.13	7.17	7.92

The average conducted power for Wi-Fi is as following:

802.11b（dBm）

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1	18.68	18.59	18.86	18.72
6	18.06	18.07	18.28	18.17
11	17.95	17.92	18.19	18.05

802.11g（dBm）

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
1	13.41	13.39	13.4	13.38	13.36	13.34	13.35	13.31
6	12.83	12.81	12.79	12.77	12.73	12.7	12.66	12.65
11	12.31	12.27	12.24	12.23	12.18	12.16	12.11	12.09

802.11n（dBm）- HT20 (2.4G)

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
1	12.45	12.42	12.42	12.37	12.36	12.32	12.31	12.3
6	11.34	11.32	11.3	11.28	11.25	11.21	11.21	11.19
11	11.3	11.28	11.25	11.22	11.16	11.12	11.14	11.1

802.11a（dBm）

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36(5180 MHz)	13.65	13.63	13.54	13.53	13.56	13.52	13.44	13.42
40(5200 MHz)	13.55	13.49	13.50	13.54	13.48	13.38	13.39	13.45
44(5220 MHz)	13.55	13.47	13.53	13.44	13.39	13.34	13.32	13.30
48(5240 MHz)	13.46	13.42	13.45	13.43	13.41	13.37	13.35	13.29
149(5745 MHz)	15.76	15.69	15.71	15.64	15.27	15.26	15.23	15.11
153(5765 MHz)	14.43	13.90	14.03	14.34	13.93	13.87	14.29	13.89
157(5785 MHz)	13.36	12.94	12.90	12.92	12.83	12.87	12.80	12.83
161(5805 MHz	12.72	12.71	12.69	12.71	12.69	12.62	12.09	12.08
165(5825 MHz)	13.34	13.20	13.27	13.30	13.22	13.14	13.15	13.13

802.11n（dBm）- HT20 (5G)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36(5180 MHz)	12.56	12.49	12.55	12.50	12.46	12.53	12.48	12.45
40(5200 MHz)	13.01	12.92	12.47	12.90	12.84	12.42	12.48	12.41
44(5220 MHz)	12.54	12.51	12.54	12.48	12.46	12.40	12.38	12.45
48(5240 MHz)	12.53	12.49	12.50	12.47	12.44	12.45	12.43	12.39
149(5745 MHz)	14.86	14.84	14.85	14.45	14.79	14.74	14.41	14.35
153(5765 MHz)	13.03	13.01	12.98	12.94	12.91	12.94	12.88	12.85
157(5785 MHz)	11.92	11.96	11.85	11.91	11.88	11.82	11.82	11.80
161(5805 MHz	11.79	11.75	11.75	11.63	11.69	11.62	11.63	11.59
165(5825 MHz)	12.47	12.52	12.48	12.26	12.30	12.27	12.24	12.30

802.11n（dBm）- HT40 (5G)

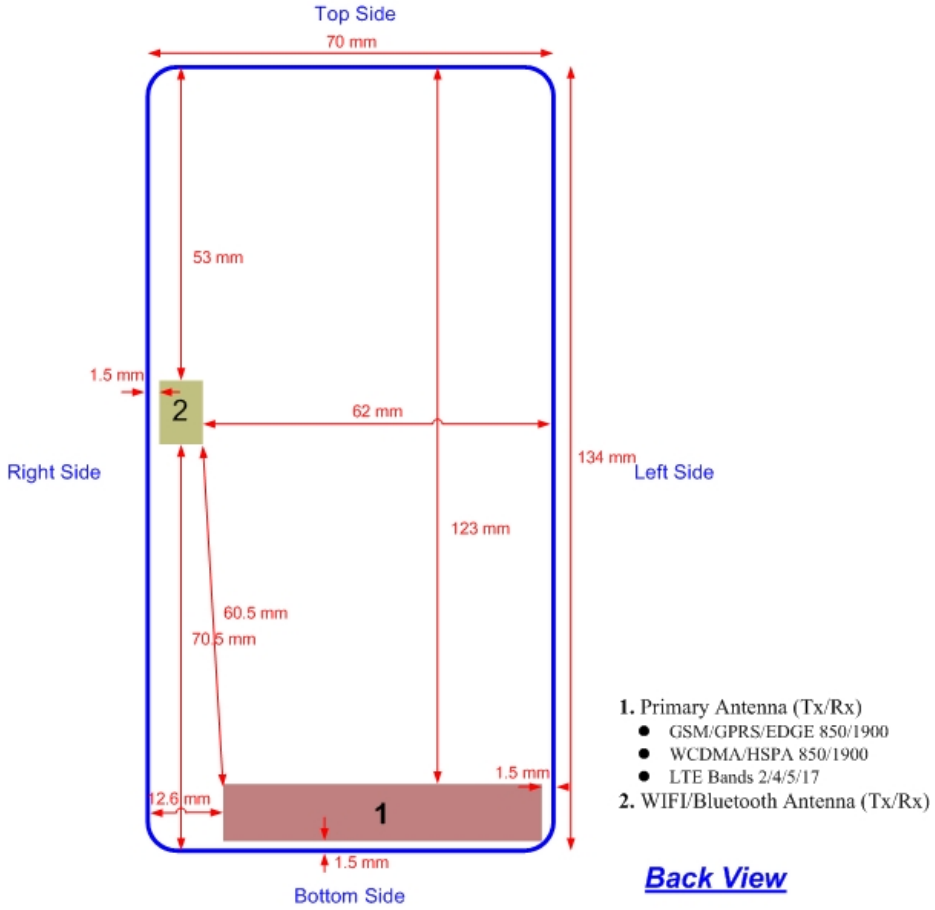
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
38(5190 MHz)	13.10	13.08	13.07	13.04	12.99	13.05	12.91	12.96
46(5230 MHz)	13.27	13.27	13.26	13.17	12.73	13.15	13.10	13.08
151(5755 MHz)	13.62	13.59	13.53	13.47	13.97	13.37	13.33	13.46
159(5795 MHz)	12.66	12.58	12.61	12.54	12.57	12.50	12.49	12.45

12 Simultaneous TX SAR Considerations

12.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

12.2 Transmit Antenna Separation Distances



Picture 12.1 Antenna Locations

12.3 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
Main antenna	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	No	Yes	No	No

12.4 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold 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, 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

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Picture 12.2 Power Thresholds

Table 12.1: Standalone SAR test exclusion considerations

Band/Mode	F(GHz)	SAR test exclusion threshold (mW)	RF output power		SAR test exclusion
			dBm	mW	
Bluetooth	2.441	19	7.92	6.19	Yes
2.4GHz WLAN 802.11 b	2.45	19	18.86	76.91	No
5GHz WLAN 802.11 a	5.745	12	15.76	37.67	No
5GHz WLAN 802.11 n	5.745	12	14.86	30.62	No

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported value for Head	Left hand, Touch cheek	0.67	0.23	**0.90**
	Right hand, Touch cheek	0.53	0.26	**0.79**
Highest reported SAR value for Body	Rear	1.23	0.31	**1.54**

Table 13.2: The sum of reported SAR values for main antenna and Bluetooth

	Position	Main antenna	BT*	Sum
Highest reported value for Head	Left hand, Touch cheek	0.67	0.33	**1.00**
	Right hand, Touch cheek	0.53	0.33	**0.86**
Highest reported SAR value for Body	Rear	1.23	0.17	**1.40**

BT* - Estimated SAR for Bluetooth (see the table 13.3)

Table 13.3: Estimated SAR for Bluetooth

Mode/Band	F (GHz)	Position	Distance (mm)	Upper limit of power *		Estimated$_{1g}$ (W/kg)
				dBm	mW	
Bluetooth	2.441	Head	5	9	7.94	0.33
Bluetooth	2.441	Body	10	9	7.94	0.17

* - Maximum possible output power declared by manufacturer

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

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

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom.
The distance is 10mm and just applied to the condition of body worn accessory.
It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-g SAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.
The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{Target}-P_{Measured})/10}$$

Where P_{Target} is the power of manufacturing upper limit;
$P_{Measured}$ is the measured power in chapter 11.

Table 14.1: Duty Cycle

Mode	Duty Cycle
Speech for GSM850/1900	1:8.3
GPRS&EGPRS for GSM850/1900	1:4
WCDMA850/1900&LTE&WiFi	1:1

14.1 SAR results for Fast SAR

Table 14.2: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.3 °C					Liquid Temperature: 21.8 °C						
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
848.8	251	Left	Touch	/	32.91	33	0.218	**0.22**	0.317	**0.32**	-0.01
836.6	190	Left	Touch	/	32.70	33	0.220	**0.24**	0.319	**0.34**	0.01
824.2	128	Left	Touch	/	32.51	33	0.261	**0.29**	0.337	**0.38**	-0.04
848.8	251	Left	Tilt	/	32.91	33	0.168	**0.17**	0.243	**0.25**	0.04
836.6	190	Left	Tilt	/	32.70	33	0.172	**0.18**	0.247	**0.26**	0.05
824.2	128	Left	Tilt	/	32.51	33	0.222	**0.25**	0.318	**0.36**	0.08
848.8	251	Right	Touch	/	32.91	33	0.239	**0.24**	0.348	**0.36**	0.07
836.6	190	Right	Touch	/	32.70	33	0.254	**0.27**	0.370	**0.40**	-0.18
824.2	128	Right	Touch	Fig.1	32.51	33	0.329	**0.37**	0.422	**0.47**	0.07
848.8	251	Right	Tilt	/	32.91	33	0.154	**0.16**	0.221	**0.23**	0.05
836.6	190	Right	Tilt	/	32.70	33	0.171	**0.18**	0.245	**0.26**	0.01
824.2	128	Right	Tilt	/	32.51	33	0.195	**0.22**	0.279	**0.31**	-0.04

Table 14.3: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.3 °C Liquid Temperature: 21.8 °C											
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
836.6	190	GPRS (2)	Front	/	32.33	32.6	0.537	**0.57**	0.760	**0.81**	0.16
848.8	251	GPRS (2)	Rear	/	32.55	32.6	0.834	**0.84**	1.08	**1.09**	0.19
836.6	190	GPRS (2)	Rear	Fig.2	32.33	32.6	0.896	**0.95**	1.16	**1.23**	-0.18
824.2	128	GPRS (2)	Rear	/	32.17	32.6	0.799	**0.88**	1.03	**1.14**	0.14
836.6	190	GPRS (2)	Left	/	32.33	32.6	0.420	**0.45**	0.622	**0.66**	-0.19
848.8	251	GPRS (2)	Right	/	32.55	32.6	0.549	**0.56**	0.780	**0.79**	0.18
836.6	190	GPRS (2)	Right	/	32.33	32.6	0.582	**0.62**	0.833	**0.89**	-0.08
824.2	128	GPRS (2)	Right	/	32.17	32.6	0.669	**0.74**	0.946	**1.04**	-0.04
836.6	190	GPRS (2)	Bottom	/	32.33	32.6	0.141	**0.15**	0.223	**0.24**	-0.04
848.8	251	EGPRS (2)	Rear	/	32.55	32.6	0.777	**0.79**	0.997	**1.01**	0.07
836.6	190	EGPRS (2)	Rear	/	32.35	32.6	0.693	**0.73**	0.899	**0.95**	-0.16
824.2	128	EGPRS (2)	Rear	/	32.25	32.6	0.870	**0.94**	1.13	**1.22**	0.18

Note1: The distance between the EUT and the phantom bottom is 10mm.

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Table 14.4: SAR Values (GSM 1900 MHz Band - Head)

Ambient Temperature: 22.7 °C Liquid Temperature: 22.2 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1909.8	810	Left	Touch	/	29.65	30.2	0.140	**0.16**	0.242	**0.27**	-0.02
1880	661	Left	Touch	/	29.53	30.2	0.156	**0.18**	0.266	**0.31**	0.17
1850.2	512	Left	Touch	Fig.3	29.80	30.2	0.187	**0.21**	0.303	**0.33**	0.18
1909.8	810	Left	Tilt	/	29.65	30.2	0.059	**0.07**	0.106	**0.12**	0.11
1880	661	Left	Tilt	/	29.53	30.2	0.058	**0.07**	0.100	**0.12**	0.16
1850.2	512	Left	Tilt	/	29.80	30.2	0.063	**0.07**	0.109	**0.12**	-0.13
1909.8	810	Right	Touch	/	29.65	30.2	0.092	**0.10**	0.155	**0.18**	-0.07
1880	661	Right	Touch	/	29.53	30.2	0.101	**0.12**	0.169	**0.20**	0.02
1850.2	512	Right	Touch	/	29.80	30.2	0.121	**0.13**	0.197	**0.22**	-0.10
1909.8	810	Right	Tilt	/	29.65	30.2	0.053	**0.06**	0.095	**0.11**	-0.17
1880	661	Right	Tilt	/	29.53	30.2	0.059	**0.07**	0.104	**0.12**	-0.04
1850.2	512	Right	Tilt	/	29.80	30.2	0.063	**0.07**	0.110	**0.12**	-0.14

Table 14.5: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.7 °C Liquid Temperature: 22.2 °C											
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1909.8	810	GPRS (2)	Front	/	29.60	30.2	0.394	**0.45**	0.619	**0.71**	0.01
1880	661	GPRS (2)	Front	/	29.44	30.2	0.499	**0.59**	0.810	**0.96**	-0.14
1850.2	512	GPRS (2)	Front	/	29.75	30.2	0.563	**0.62**	0.881	**0.98**	-0.01
1909.8	810	GPRS (2)	Rear	/	29.60	30.2	0.487	**0.56**	0.854	**0.98**	-0.06
1880	661	GPRS (2)	Rear	/	29.44	30.2	0.565	**0.67**	0.889	**1.06**	0.11
1850.2	512	GPRS (2)	Rear	Fig.4	29.75	30.2	0.664	**0.74**	1.04	**1.15**	-0.03
1880	661	GPRS (2)	Left	/	29.44	30.2	0.230	**0.27**	0.402	**0.48**	-0.04
1880	661	GPRS (2)	Right	/	29.44	30.2	0.134	**0.16**	0.220	**0.26**	-0.16
1880	661	GPRS (2)	Bottom	/	29.44	30.2	0.407	**0.48**	0.763	**0.91**	-0.08
1850.2	512	EGPRS (2)	Rear	/	29.75	30.2	0.649	**0.72**	1.02	**1.13**	-0.05

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.6: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.3 °C Liquid Temperature: 21.8 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
846.6	4233	Left	Touch	/	24.50	24.5	0.242	**0.24**	0.352	**0.35**	-0.02
836.4	4182	Left	Touch	/	24.38	24.5	0.226	**0.23**	0.328	**0.34**	0.09
826.4	4132	Left	Touch	/	24.01	24.5	0.355	**0.40**	0.455	**0.51**	0.15
846.6	4233	Left	Tilt	/	24.50	24.5	0.185	**0.19**	0.267	**0.27**	-0.01
836.4	4182	Left	Tilt	/	24.38	24.5	0.167	**0.17**	0.239	**0.25**	-0.05
826.4	4132	Left	Tilt	/	24.01	24.5	0.212	**0.24**	0.304	**0.34**	0.19
846.6	4233	Right	Touch	/	24.50	24.5	0.271	**0.27**	0.394	**0.39**	0.06
836.4	4182	Right	Touch	/	24.38	24.5	0.253	**0.26**	0.368	**0.38**	0.04
826.4	4132	Right	Touch	Fig.5	24.01	24.5	0.371	**0.42**	0.473	**0.53**	0.09
846.6	4233	Right	Tilt	/	24.50	24.5	0.201	**0.20**	0.288	**0.29**	0.10
836.4	4182	Right	Tilt	/	24.38	24.5	0.179	**0.18**	0.257	**0.26**	0.08
826.4	4132	Right	Tilt	/	24.01	24.5	0.229	**0.26**	0.329	**0.37**	0.01

Table 14.7: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.3 °C		Liquid Temperature: 21.8 °C								
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
836.4	4182	Front	/	24.38	24.5	0.246	**0.25**	0.348	**0.36**	-0.06
846.6	4233	Rear	/	24.50	24.5	0.483	**0.48**	0.688	**0.69**	-0.08
836.4	4182	Rear	/	24.38	24.5	0.349	**0.36**	0.497	**0.51**	-0.03
826.4	4132	Rear	Fig.6	24.01	24.5	0.768	**0.86**	0.998	**1.12**	-0.02
836.4	4182	Left	/	24.38	24.5	0.212	**0.22**	0.313	**0.32**	0.18
836.4	4182	Right	/	24.38	24.5	0.296	**0.30**	0.438	**0.45**	0.18
836.4	4182	Bottom	/	24.38	24.5	0.058	**0.06**	0.092	**0.09**	0.05

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.8: SAR Values (WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.7 °C			Liquid Temperature: 22.2 °C								
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1907.6	9538	Left	Touch	/	23.53	24.2	0.335	**0.39**	0.574	**0.67**	-0.02
1880	9400	Left	Touch	/	23.56	24.2	0.326	**0.38**	0.554	**0.64**	0.01
1852.4	9262	Left	Touch	Fig.7	23.69	24.2	0.354	**0.40**	0.578	**0.65**	0.05
1907.6	9538	Left	Tilt	/	23.53	24.2	0.112	**0.13**	0.196	**0.23**	0.12
1880	9400	Left	Tilt	/	23.56	24.2	0.108	**0.13**	0.184	**0.21**	0.06
1852.4	9262	Left	Tilt	/	23.69	24.2	0.101	**0.11**	0.170	**0.19**	-0.09
1907.6	9538	Right	Touch	/	23.53	24.2	0.240	**0.28**	0.411	**0.48**	-0.09
1880	9400	Right	Touch	/	23.56	24.2	0.246	**0.29**	0.417	**0.48**	0.11
1852.4	9262	Right	Touch	/	23.69	24.2	0.283	**0.32**	0.459	**0.52**	0.03
1907.6	9538	Right	Tilt	/	23.53	24.2	0.098	**0.11**	0.173	**0.20**	0.13
1880	9400	Right	Tilt	/	23.56	24.2	0.101	**0.12**	0.177	**0.21**	0.03
1852.4	9262	Right	Tilt	/	23.69	24.2	0.101	**0.11**	0.177	**0.20**	-0.10

Table 14.9: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.7°C Liquid Temperature: 22.2°C										
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1880	9400	Front	/	23.56	24.2	0.488	**0.57**	0.764	**0.89**	-0.08
1907.6	9538	Rear	/	23.53	24.2	0.490	**0.57**	0.859	**1.00**	-0.04
1880	9400	Rear	/	23.56	24.2	0.550	**0.64**	0.870	**1.01**	0.14
1852.4	9262	Rear	Fig.8	23.69	24.2	0.617	**0.69**	0.983	**1.11**	0.15
1880	9400	Left	/	23.56	24.2	0.201	**0.23**	0.354	**0.41**	-0.04
1880	9400	Right	/	23.56	24.2	0.131	**0.15**	0.214	**0.25**	0.08
1880	9400	Bottom	/	23.56	24.2	0.393	**0.46**	0.743	**0.86**	-0.15

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.10: SAR Values (LTE Band4 - Head)

Ambient Temperature: 22.3°C Liquid Temperature: 21.8°C												
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
1732.5	20175	1RB_High	Left	Touch	Fig.9	23.08	23.9	0.231	**0.28**	0.354	**0.43**	0.13
1732.5	20175	1RB_High	Left	Tilt	/	23.08	23.9	0.128	**0.15**	0.217	**0.26**	-0.05
1732.5	20175	1RB_High	Right	Touch	/	23.08	23.9	0.199	**0.24**	0.337	**0.41**	0.02
1732.5	20175	1RB_High	Right	Tilt	/	23.08	23.9	0.112	**0.14**	0.196	**0.24**	0.16
1720	20050	50RB_Mid	Left	Touch	/	22.10	22.9	0.198	**0.24**	0.298	**0.36**	0.12
1720	20050	50RB_Mid	Left	Tilt	/	22.10	22.9	0.105	**0.13**	0.176	**0.21**	-0.11
1720	20050	50RB_Mid	Right	Touch	/	22.10	22.9	0.162	**0.19**	0.272	**0.33**	0.16
1720	20050	50RB_Mid	Right	Tilt	/	22.10	22.9	0.098	**0.12**	0.173	**0.21**	0.13

Note1: The LTE mode is QPSK_20MHz.

Table 14.11: SAR Values (LTE Band4 - Body)

Ambient Temperature: 22.3°C Liquid Temperature: 21.8°C												
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1732.5	20175	1RB_High	Front	/	23.08	23.9	0.409	**0.49**	0.658	**0.79**	-0.19
1745	20300	1RB_High	Rear	/	23.03	23.9	0.413	**0.50**	0.655	**0.80**	0.12
1732.5	20175	1RB_High	Rear	/	23.08	23.9	0.468	**0.57**	0.717	**0.87**	0.01
1720	20050	1RB_High	Rear	/	22.99	23.9	0.478	**0.59**	0.734	**0.91**	0.06
1745	20300	1RB_High	Left	/	23.08	23.9	0.133	**0.16**	0.235	**0.28**	0.09
1745	20300	1RB_High	Right	/	23.08	23.9	0.098	**0.12**	0.167	**0.20**	0.01
1745	20300	1RB_High	Bottom	/	23.03	23.9	0.389	**0.48**	0.696	**0.85**	0.00
1732.5	20175	1RB_High	Bottom	Fig.10	23.08	23.9	0.454	**0.55**	0.804	**0.97**	0.03
1720	20050	1RB_High	Bottom	/	22.99	23.9	0.440	**0.54**	0.773	**0.95**	-0.03

1720	20050	50RB_Mid	Front	/	22.10	22.9	0.363	**0.44**	0.583	**0.70**	0.12
1720	20050	50RB_Mid	Rear	/	22.10	22.9	0.410	**0.49**	0.632	**0.76**	0.17
1720	20050	50RB_Mid	Left	/	22.10	22.9	0.103	**0.12**	0.172	**0.21**	0.07
1720	20050	50RB_Mid	Right	/	22.10	22.9	0.087	**0.10**	0.148	**0.18**	0.09
1720	20050	50RB_Mid	Bottom	/	22.10	22.9	0.327	**0.39**	0.575	**0.69**	0.07
1720	20050	100RB	Rear	/	22.00	22.9	0.448	**0.55**	0.713	**0.88**	0.04
1720	20050	100RB	Bottom	/	22.00	22.9	0.318	**0.39**	0.560	**0.69**	0.11

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The LTE mode is QPSK_20MHz.

Table 14.12: SAR Values (LTE Band17 - Head)

Ambient Temperature: 22.6℃ Liquid Temperature: 22.1℃												
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
709	23780	1RB_Mid	Left	Touch	Fig.11	23.33	24.2	0.278	**0.34**	0.347	**0.42**	0.02
709	23780	1RB_Mid	Left	Tilt	/	23.33	24.2	0.173	**0.21**	0.208	**0.25**	0.03
709	23780	1RB_Mid	Right	Touch	/	23.33	24.2	0.252	**0.31**	0.309	**0.38**	0.02
709	23780	1RB_Mid	Right	Tilt	/	23.33	24.2	0.157	**0.19**	0.189	**0.23**	0.03
710	23790	25RB_Low	Left	Touch	/	23.05	23.2	0.213	**0.22**	0.267	**0.28**	0.15
710	23790	25RB_Low	Left	Tilt	/	23.05	23.2	0.130	**0.13**	0.157	**0.16**	0.14
710	23790	25RB_Low	Right	Touch	/	23.05	23.2	0.193	**0.20**	0.237	**0.25**	0.13
710	23790	25RB_Low	Right	Tilt	/	23.05	23.2	0.116	**0.12**	0.140	**0.14**	0.13

Note1: The LTE mode is QPSK_10MHz.

Table 14.13: SAR Values (LTE Band17 - Body)

Ambient Temperature: 22.6℃ Liquid Temperature: 22.1℃											
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
709	23780	1RB_Mid	Front	/	23.33	24.2	0.316	**0.39**	0.400	**0.49**	0.03
709	23780	1RB_Mid	Rear	Fig.12	23.33	24.2	0.467	**0.57**	0.598	**0.73**	-0.12
709	23780	1RB_Mid	Left	/	23.33	24.2	0.234	**0.29**	0.325	**0.40**	0.05
709	23780	1RB_Mid	Right	/	23.33	24.2	0.201	**0.25**	0.276	**0.34**	0.01
709	23780	1RB_Mid	Bottom	/	23.33	24.2	0.030	**0.04**	0.050	**0.06**	0.13
710	23790	25RB_Low	Front	/	23.05	23.2	0.247	**0.26**	0.313	**0.32**	0.05
710	23790	25RB_Low	Rear	/	23.05	23.2	0.390	**0.40**	0.503	**0.52**	0.06
710	23790	25RB_Low	Left	/	23.05	23.2	0.183	**0.19**	0.255	**0.26**	0.10
710	23790	25RB_Low	Right	/	23.05	23.2	0.158	**0.16**	0.217	**0.22**	0.16
710	23790	25RB_Low	Bottom	/	23.05	23.2	0.023	**0.02**	0.037	**0.04**	0.17

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The LTE mode is QPSK_10MHz.

Table 14.14: SAR Values (Wi-Fi 802.11b - Head)

Ambient Temperature: 22.4 °C Liquid Temperature: 21.9 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
2412	1	Left	Touch	/	18.68	19	0.112	**0.12**	0.218	**0.23**	-0.14
2412	1	Left	Tilt	/	18.68	19	0.028	**0.03**	0.055	**0.06**	0.05
2412	1	Right	Touch	Fig.13	18.68	19	0.123	**0.13**	0.244	**0.26**	0.07
2412	1	Right	Tilt	/	18.68	19	0.038	**0.04**	0.077	**0.08**	0.07

Table 14.15: SAR Values (Wi-Fi 802.11b - Body)

Ambient Temperature: 22.4 °C Liquid Temperature: 21.9 °C										
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2412	1	Front	/	18.68	19	0.027	**0.03**	0.051	**0.05**	0.17
2412	1	Rear	Fig.14	18.68	19	0.124	**0.13**	0.287	**0.31**	0.10
2412	1	Right	/	18.68	19	0.077	**0.08**	0.153	**0.16**	-0.04

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.16: SAR Values (Wi-Fi 802.11a - Head)

Ambient Temperature: 22.5 °C Liquid Temperature: 22.0 °C											
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
5180	36	Left	Touch	/	13.65	15	0.00609	**0.01**	0.024	**0.03**	0.12
5180	36	Left	Tilt	/	13.65	15	0.00541	**0.01**	0.00917	**0.01**	-0.09
5180	36	Right	Touch	/	13.65	15	0.017	**0.02**	0.060	**0.08**	0.17
5180	36	Right	Tilt	/	13.65	15	0.00137	**0.00**	0.00211	**0.00**	0.15
5745	149	Left	Touch	/	15.76	15.8	0.00892	**0.01**	0.036	**0.04**	0.10
5745	149	Left	Tilt	/	15.76	15.8	0.010	**0.01**	0.014	**0.01**	0.11
5745	149	Right	Touch	Fig.15	15.76	15.8	0.024	**0.02**	0.088	**0.09**	-0.15
5745	149	Right	Tilt	/	15.76	15.8	0.00151	**0.00**	0.00282	**0.00**	0.12