

RF EXPOSURE EVALUATION METHOD

According to KDB 447498 D01 General RF Exposure Guidance v06, Unless specifically required by the *published RF exposure KDB procedures*, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding *SAR Test Exclusion Threshold* condition(s), listed below, is (are) satisfied.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{\text{(GHz)}}}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

$f_{\text{(GHz)}}$ 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

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

EUT Specification

EUT	MOBAPAD CHITU HD MECHANICAL CONTROLLER
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.150GHz ~ 5.250GHz ☐ WLAN: 5.725GHz ~ 5.850GHz ☒ Others BT:2402-2480MHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	1.016dBm (0.001264W)
Antenna gain (Max)	0 dBi
Evaluation applied	☐ MPE Evaluation ☒ SAR Evaluation

RF EXPOSURE EVALUATION METHOD**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	

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:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where $f(\text{GHz})$ 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

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):³³
- 1) For *test separation distances* > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f_{(\text{MHz})})]$
 - 2) For *test separation distances* ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
 - 3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.³⁴

Maximum measured transmitter power.

BR+EDR+BLE

Operating Mode	Frequency	Measured Power	max. power	Antenna Gain	min. test separation distance	[$\sqrt{f}$ (GHz)]	Result	Limit
	(MHz)	(dBm)	(mW)	(dBi)	(mm)			
GFSK	2402	-0.020	0.995	0	5	1.550	0.3085	3
	2441	0.211	1.050	0	5	1.562	0.3280	3
	2480	-0.056	0.987	0	5	1.575	0.3109	3
$\pi/4$ DQPSK	2402	0.543	1.133	0	5	1.550	0.3513	3
	2441	0.782	1.197	0	5	1.562	0.3741	3
	2480	0.528	1.129	0	5	1.575	0.3557	3
8-DPSK	2402	0.790	1.199	0	5	1.550	0.3718	3
	2441	1.016	1.264	0	5	1.562	0.3948	3
	2480	0.725	1.182	0	5	1.575	0.3722	3
BLE (GFSK)	2402	-3.43	0.454	0	5	1.550	0.1407	3
	2440	-4.11	0.388	0	5	1.562	0.1213	3
	2480	-5.02	0.315	0	5	1.575	0.0991	3

Remark: The best case gain of the antenna is 0dBi.

0dBi logarithmic terms convert to numeric result is nearly 1.00

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:

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

For NFC Measurement Data

Frequency	Field strength (dBuV/m@3)	Measured Power	max. power	Result	Limit
(MHz)		(dBm)	(mW)		
13.56	74.83	-16.73	0.021	0.021mW	442.97mW

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$$

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBuV/m

d_{Meas} is the measurement distance, in m

$$\text{EIRP} = E + 20\log(d) - 104.7$$

NFC mode and BT mode cannot transmit and work simultaneously.

Conclusion: No SAR is required.