

RF EXPOSURE EVALUATION

Applicant	IoTrust Co., Ltd.	
Applicant Address	7th floor, Samsungdang Building, 747, Seolleung-ro , Gangnam-gu, Seoul, Republic of Korea	
FCC ID	2ASN5-DX-R1-SLV	
Product Description	DCENT X(Hardware wallet)	
Basic model	DX-R1-SLV	
Variant Model name	-	
Operating Frequency	NFC	13.56 MHz
	Bluetooth LE	2402 MHz - 2480 MHz
Antenna Specification	NFC	PCB Antenna(Loop Antenna)
	Bluetooth LE	Antenna type : Chip antenna Peak Gain : 1.60 dBi
Power Source	DC 3.70 V (Battery)	

** RF Exposure Evaluation **

Exemption Limits for Routine Evaluation

[NFC]

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

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in Note 1 must be applied to determine SAR test exclusion.

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

[Bluetooth LE]

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, The equation and threshold in Note 2 must be applied to determine SAR test exclusion.

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	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Note 1:

Following FCC KDB 447498D01 "General SAR test exclusion guidance"

The corresponding SAR Exclusion Threshold condition, listed below :

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

- 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 1/2
- 3) SAR measurement procedures are not established below 100 MHz.

Mode	Frequency [MHz]	Measured power (dBuV/m@3m)	Maximum power		SAR Test Exclusion Threshold (mW)
			[dBm]	[mW]	
RFID	13.56	56.1	-39.13	0.000 12	*443

* $[474 \times (1 + \log 100/f(\text{MHz}))]/2 = 443\text{mW}$

Result : As a result of the calculation above, the SAR test is exempt.

Note 2:

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 :

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]^* [\sqrt{f(\text{GHz})}] \leq 3.0$ 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
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

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 according to 4.1f) is applied to determine SAR test exclusion.

Output Power:

Mode	Frequency (MHz)	Measured Max Output Power (dBm)	Power tolerance (dB)	SAR Test Exclusion Threshold (mW)
Bluetooth LE	2 480	-0.077	+2	10

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances ≤ 50 mm is defined by the following equation :

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]^* [\sqrt{f(\text{GHz})}] \leq 3.0$

Base on the maximum conducted power of the antenna to use separation distance, SAR was not required;

Bluetooth LE : $[(1.557 / 5) * \sqrt{2.480}] = 0.49 (\leq 3.0)$

Result : As a result of the calculation above, the SAR test is exempt.

Simultaneous Transmitter Results

Mode	MPE ratios	Limit
NFC	0.000 000 3	-
Bluetooth LE	0.155 7	-
Combined	0.155 700 3	1