RF EXPOSURE EVALUATION

EUT Specification

EUT	Portable payment terminal
Frequency band (Operating)	☐2.408GHz ~ 2.474GHz ☐WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐WLAN: 5.745GHz ~ 5.825GHz ☒Others(Bluetooth: 2.402GHz ~ 2.480GHz) ☒Others(NFC: 13.56MHz)
Device category	☒Portable (<20cm separation) ☐Mobile (>20cm separation) ☐Others ___
Antenna diversity	☒Single antenna ☐Multiple antennas ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Max. output power	BT: 5.484dBm (3.966mW) NFC: -50.96 dBm (8.017e-6mW)
Antenna gain	3.5 dBi for BT function 0 dBi for NFC function
Evaluation applied	☐MPE Evaluation ☒SAR Evaluation

Limits for RF Exposure

Portable device –

When the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in below table.

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Measurement Result

At separation distance ≤5mm

Channel	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Output power (mW)	Threshold Value (mW)
Test Mode: GFSK					
Low	2402	4.124	±0.5	2.900	4.0
Middle	2441	5.041	±0.5	3.582	4.0
High	2480	5.484	±0.5	3.966	4.0
Test Mode: π4/-DQPSK					
Low	2402	3.529	±0.5	2.529	4.0
Middle	2441	4.545	±0.5	3.195	4.0
High	2480	5.372	±0.5	3.865	4.0
Test Mode: 8DPSK					
Low	2402	4.612	±0.5	3.245	4.0
Middle	2441	5.288	±0.5	3.791	4.0
High	2480	5.241	±0.5	3.751	4.0

NFC			
Channel	Channel Frequency (MHz)	Max Output power (dBm)	Max Output power (mW)
-	13.56	-50.96	8.017e-6

$$E = EIRP - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

EIRP= 44.30-104.8+20Log 3= -50.96 dBm

According to RSS-102, separation distance is 5mm, and no SAR measurement is required.