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LPT900

RF Exposure Report

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1 Introduction

The LPT900 is a transmitter, it emits electromagnetic radiation. Since this radiation could be generated in the vicinity of human body, any product that contains this module must satisfy all the safety requirements related to RF Exposure.

In a remote system XPD2400 is used inside a remote (controller) operated by a person. The installation inside a remote qualifies as a portable product that is closer to human body than 20 cm.

In a portable product the mechanical design should respect the limits calculated in this RF Exposure Report to be excluded from SAR routine test. If the limits are not respected the SAR test is required.

2 RF Exposure Information

This product is intended for portable installation applications.

As shown in RF Exposure Evaluation section, the time averaged output power is below the threshold power for SAR test exclusion, meaning that any host that contains only LPT900 module is excluded from routine SAR testing. All these products are deemed safe for portable use in any circumstances.

3 EUT, Transceiver Module and Antenna types

The EUT is LPT900, a low power transmitter module, licensed in 900 MHz ISM band, using FHSS transmission, used in portable products.

A picture of the module is presented in fig.1.



Figure 1 LPT900, Top view.

Table 4. EUT

Transceiver module	900 MHz FHSS Transmitter
Manufacturer	Cooper Industries (Electrical) Inc
FCC ID	IA9LPT900A
ISED IC	1338B-LPT900A
Product Marketing Name	LPT900
HVIN (Model)	TPCB-2238-10
FVIN	38335
Serial No	NA

Table 5. EUT RF Information

Product	LPT900A
Frequency	902.2 MHz to 927.7 MHz
Channel Spacing	100 kHz
Max Transmit Power	16 mW
Channel Bandwidth	15 kHz
Method of transmission	Frequency Hopping Digital Modulation
Digital Modulation	2-level FSK
Data Rate	4800 bauds

The module's emissions were measured with only one proprietary antenna, model Number ACAB-2804-03.

The antenna and its characteristics are summarized in the table below.

Item	Description	Manufacturer	Model	Gain
1	900 MHz sleeve antenna	Cooper Industries Electrical Canada, Inc.	ACAB-2804-03	-2.03 dBi

Table 6. Antennas' characteristics

Antenna Information

A picture of the antenna is shown below:



Figure 2 Proprietary Antenna ACAB-2804-03

4 Applicable Standards and Limits

Devices that have a radiating element normally operating at or below 6 GHz, with a separation distance of up to 20 cm between the user and/or bystander and the device, shall undergo a SAR evaluation. Devices that have a radiating element normally operating at or below 6 GHz, with a separation distance greater than 20 cm between the user and/or bystander and the device shall undergo an RF exposure evaluation. For devices that operate at larger distances from persons, where there are minimal RF coupling interactions between a device and the user or nearby persons, the more complex SAR evaluation can be avoided by evaluating RF exposure compliance using MPE limits.

4.1 Exception Limits for Routine Evaluation - SAR Evaluation

4.1.1 FCC

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 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
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	<i>SAR Test Exclusion Threshold (mW)</i>
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: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g *SAR Test Exclusion Thresholds* indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

In KDB447498 is specified: Depending on the operating frequency and required antenna test separation distance, antenna gain usually does not apply to portable exposure conditions. Near-field exposure conditions can be highly dependent on the RF current distribution characteristics of individual transmitters, antennas, and host device configurations, which are not directly related to the far-field antenna gain.

4.1.2 ISED

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

In RSS-102 is specified: 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

5 RF Exposure Evaluation

5.1 Minimum distance for routine SAR testing exclusion

5.1.1 FCC

The maximum time-averaged power is:

$$P_{SAR} = P_{max} * D = 16.37 * 0.77 = 12.6mW$$

If we apply the formula from KDB447498 D01 v06, paragraph 4.3.1 (Standalone SAR test exclusion considerations), we determine the minimum distance from the body as:

$$d_{min} = \frac{P_{SAR} \times \sqrt{f_{(GHz)}}}{3} = \frac{12.6 \times \sqrt{0.928}}{3} = 3.905 \text{ mm}$$

According to the KDB447498 D01 v06, for extremities the minimum distance for SAR exclusion routine test is:

$$d_{min} = \frac{P_{SAR} \times \sqrt{f_{(GHz)}}}{7.5} = \frac{12.6 \times \sqrt{0.928}}{7.5} = 1.562 \text{ mm}$$

As these distances are less than 5 mm, no SAR test is required.

5.1.2 ISED

For ISED we need to consider the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. Because the antenna gain is -2dBi the maximum time-averaged power is:

$$P_{SAR} = P_{max} * D = 16.37 * 0.77 = 12.6mW$$

The exemption limit for SAR evaluation is calculated for distances less than 5mm by linear interpolation from table in 4.1.2.

$$P_{threshold} = P_{835} + \frac{(P_{1900} - P_{835}) * (928 - 835)}{1900 - 835} = 17 + \frac{(7 - 17) * 93}{1065} = 16.043 \text{ mW}$$

As the exemption limit is higher than time average power, no SAR test is required for portable applications of the module.

6 Revision History

Revision	Author	Date	Description
D0.1	Radu Oprea	4 December 2025	Create document.