

## MPE exemption letter according Interim procedure KDB 447498 D04

Customer	Product	Model	Type	HW Status	SW status	FCC ID
Actia Nordic AB Datalinjen 3b 58330 Linköping Sweden	Telematic Device	104760201	--	H1	1	2AGKK104760201

Declared minimum distance to human body according to customer  $\geq 20$  cm according customer's document "MPE Information Requirements\_104760201\_US\_Canada\_Ver1.7".

The customer thus declares that the device is not body-worn.

### RF Exposure Test Exemptions for Single Source

According 1.1307(b)(3)(i)(C) Option C – ERP frequencies above 300 kHz but at distances  $R > \lambda/2\pi$  can be exempted as follows:

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES  
SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency		Minimum Distance			Threshold ERP
$f_L$ MHz	$f_H$ MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	– 1.34	159 m	–	35.6 m	1,920 R <sup>2</sup>
1.34	– 30	35.6 m	–	1.6 m	3,450 R <sup>2</sup> /f <sup>2</sup>
30	– 300	1.6 m	–	159 mm	3.83 R <sup>2</sup>
300	– 1,500	159 mm	–	31.8 mm	0.0128 R <sup>2</sup> f
1,500	– 100,000	31.8 mm	–	0.5 mm	19.2R <sup>2</sup>

Subscripts L and H are low and high;  $\lambda$  is wavelength.  
From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

Calculation based on external document "MPE Information Requirements\_104760201\_US\_Canada\_Ver1.7" provided by customer.



MPE exemption letter 21-1-0178701T034a\_C02

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
B02	LTE	1850.0	0.026	0.200	yes	23.0	2.0	1.25	0.75	5.9	100.0	28.9	26.8	0.473	0.768	yes
		1880.0	0.025	0.200	yes							28.9	26.8	0.473	0.768	yes
		1910.0	0.025	0.200	yes							28.9	26.8	0.473	0.768	yes
B04	LTE	1710.0	0.028	0.200	yes	23.0	2.0	0.96	0.44	6.0	100.0	29.6	27.5	0.556	0.768	yes
		1732.5	0.028	0.200	yes							29.6	27.5	0.556	0.768	yes
		1755.0	0.027	0.200	yes							29.6	27.5	0.556	0.768	yes
B05	LTE	824.0	0.058	0.200	yes	23.0	2.0	0.64	0.44	1.4	100.0	25.3	23.2	0.207	0.422	yes
		836.5	0.057	0.200	yes							25.3	23.2	0.207	0.428	yes
		849.0	0.056	0.200	yes							25.3	23.2	0.207	0.435	yes
B07	LTE	2500.0	0.019	0.200	yes	23.0	2.0	1.13	0.44	3.4	100.0	26.8	24.7	0.294	0.768	yes
		2535.0	0.019	0.200	yes							26.8	24.7	0.294	0.768	yes
		2570.0	0.019	0.200	yes							26.8	24.7	0.294	0.768	yes
B12	LTE	699.0	0.068	0.200	yes	23.0	2.0	0.59	0.44	-0.9	100.0	23.1	20.9	0.124	0.358	yes
		707.5	0.067	0.200	yes							23.1	20.9	0.124	0.362	yes
		716.0	0.067	0.200	yes							23.1	20.9	0.124	0.367	yes
B13	LTE	777.0	0.061	0.200	yes	23.0	2.0	0.59	0.44	0.0	100.0	24.0	21.8	0.152	0.398	yes
		782.0	0.061	0.200	yes							24.0	21.8	0.152	0.400	yes
		787.0	0.061	0.200	yes							24.0	21.8	0.152	0.403	yes
B26	LTE	814.0	0.059	0.200	yes	23.0	2.0	0.64	0.44	1.3	100.0	25.2	23.1	0.203	0.417	yes
		831.5	0.057	0.200	yes							25.2	23.1	0.203	0.426	yes
		849.0	0.056	0.200	yes							25.2	23.1	0.203	0.435	yes
B66	LTE	1710.0	0.028	0.200	yes	23.0	2.0	0.96	0.29	5.9	100.0	29.7	27.5	0.562	0.768	yes
		1745.0	0.027	0.200	yes							29.7	27.5	0.562	0.768	yes
		1780.0	0.027	0.200	yes							29.7	27.5	0.562	0.768	yes
B38	LTE	2572.0	0.019	0.200	yes	23.0	2.0	1.30	0.88	2.9	100.0	25.7	23.6	0.228	0.768	yes
		2595.0	0.018	0.200	yes							25.7	23.6	0.228	0.768	yes
		2618.0	0.018	0.200	yes							25.7	23.6	0.228	0.768	yes

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
2.4 GHz	WLAN	2412.0	0.020	0.200	yes	12.0	2.0	0.31	0.875	5.7	100.0	18.5	16.4	0.043	0.768	yes
		2440.0	0.020	0.200	yes							18.5	16.4	0.043	0.768	yes
		2462.0	0.019	0.200	yes							18.5	16.4	0.043	0.768	yes
5 GHz	WLAN	5745.0	0.008	0.200	yes	12.0	2.0	2.55	1.21	9.0	100.0	19.2	17.1	0.051	0.768	yes
		5785.0	0.008	0.200	yes							19.2	17.1	0.051	0.768	yes
		5825.0	0.008	0.200	yes							19.2	17.1	0.051	0.768	yes

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
2.4 GHz	Bluetooth BR	2402.0	0.020	0.200	yes	12.0	2.0	0.31	0.00	0.0	100.0	13.7	11.5	0.014	0.768	yes
		2442.0	0.020	0.200	yes							13.7	11.5	0.014	0.768	yes
		2480.0	0.019	0.200	yes							13.7	11.5	0.014	0.768	yes
2.4 GHz	Bluetooth EDR	2402.0	0.020	0.200	yes	10.0	2.0	0.31	0.00	0.0	100.0	11.7	9.5	0.009	0.768	yes
		2442.0	0.020	0.200	yes							11.7	9.5	0.009	0.768	yes
		2480.0	0.019	0.200	yes							11.7	9.5	0.009	0.768	yes
2.4 GHz	Bluetooth LE	2402.0	0.020	0.200	yes	7.4	2.0	0.31	0.00	0.0	100.0	9.1	6.9	0.005	0.768	yes
		2442.0	0.020	0.200	yes							9.1	6.9	0.005	0.768	yes
		2480.0	0.019	0.200	yes							9.1	6.9	0.005	0.768	yes

Remark: calculation based on internal antenna

MPE exemption letter 21-1-0178701T034a\_C02

Simultaneous Transmission

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

		WLAN 2.4 GHz	WLAN 5 GHz	Bluetooth BR	Bluetooth EDR	Bluetooth LE
	Ratio of Value/Limit	0.056382	0.066702	0.018563	0.011712	0.006436
GSM 850	0.777441	0.833823	0.844143	0.796004	0.789153	0.783877
GSM 1900	0.488212	0.544594	0.554914	0.506775	0.499925	0.494649
WCDMA FDDII	0.616082	0.672464	0.682784	0.634645	0.627795	0.622519
WCDMA FDDIV	0.707357	0.763739	0.774059	0.725920	0.719069	0.713794
WCDMA FDDV	0.490507	0.546888	0.557209	0.509069	0.502219	0.496943
LTE B02	0.616082	0.672464	0.682784	0.634645	0.627795	0.622519
LTE B04	0.723834	0.780215	0.790536	0.742396	0.735546	0.730270
LTE B05	0.491816	0.548198	0.558518	0.510379	0.503528	0.498253
LTE B07	0.382506	0.438888	0.449208	0.401069	0.394219	0.388943
LTE B12	0.345345	0.401727	0.412047	0.363907	0.357057	0.351781
LTE B13	0.382216	0.438598	0.448918	0.400779	0.393928	0.388652
LTE B26	0.486526	0.542907	0.553228	0.505088	0.498238	0.492962
LTE B66	0.732215	0.788597	0.798917	0.750778	0.743927	0.738652
LTE B38	0.296578	0.352960	0.363280	0.315140	0.308290	0.303014

Remark: only maximum value in band / mode is shown

Maximum Value	=	0.844143
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Maximum value for simultaneous transmission with two transmitter is  $0.84 < 1$  = limit fulfilled.

	Cellular	WLAN 2.4 GHz	WLAN 5 GHz	Bluetooth
Maximum Value	0.777441	0.056382	0.066702	0.018563

Total Value	=	0.919087
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Maximum value for simultaneous transmission with all simultaneous possible transmitter is  $0.92 < 1$  = limit fulfilled.



MPE exemption letter 21-1-0178701T034a\_C02

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
B02	LTE	1850.0	0.026	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.768	yes
		1880.0	0.025	0.200	yes							24.6	22.5	0.176	0.768	yes
		1910.0	0.025	0.200	yes							24.6	22.5	0.176	0.768	yes
B04	LTE	1710.0	0.028	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.768	yes
		1732.5	0.028	0.200	yes							24.6	22.5	0.176	0.768	yes
		1755.0	0.027	0.200	yes							24.6	22.5	0.176	0.768	yes
B05	LTE	824.0	0.058	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.422	yes
		836.5	0.057	0.200	yes							24.6	22.5	0.176	0.428	yes
		849.0	0.056	0.200	yes							24.6	22.5	0.176	0.435	yes
B07	LTE	2500.0	0.019	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.768	yes
		2535.0	0.019	0.200	yes							24.6	22.5	0.176	0.768	yes
		2570.0	0.019	0.200	yes							24.6	22.5	0.176	0.768	yes
B12	LTE	699.0	0.068	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.358	yes
		707.5	0.067	0.200	yes							24.6	22.5	0.176	0.362	yes
		716.0	0.067	0.200	yes							24.6	22.5	0.176	0.367	yes
B13	LTE	777.0	0.061	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.398	yes
		782.0	0.061	0.200	yes							24.6	22.5	0.176	0.400	yes
		787.0	0.061	0.200	yes							24.6	22.5	0.176	0.403	yes
B26	LTE	814.0	0.059	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.417	yes
		831.5	0.057	0.200	yes							24.6	22.5	0.176	0.426	yes
		849.0	0.056	0.200	yes							24.6	22.5	0.176	0.435	yes
B66	LTE	1710.0	0.028	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.768	yes
		1745.0	0.027	0.200	yes							24.6	22.5	0.176	0.768	yes
		1780.0	0.027	0.200	yes							24.6	22.5	0.176	0.768	yes
B38	LTE	2572.0	0.019	0.200	yes	23.0	2.0	0.60	0.00	0.2	100.0	24.6	22.5	0.176	0.768	yes
		2595.0	0.018	0.200	yes							24.6	22.5	0.176	0.768	yes
		2618.0	0.018	0.200	yes							24.6	22.5	0.176	0.768	yes

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
2.4 GHz	WLAN	2412.0	0.020	0.200	yes	11.0	2.0	0.31	0.00	1.0	100.0	13.7	11.5	0.014	0.768	yes
		2440.0	0.020	0.200	yes							13.7	11.5	0.014	0.768	yes
		2462.0	0.019	0.200	yes							13.7	11.5	0.014	0.768	yes
5 GHz	WLAN	5745.0	0.008	0.200	yes	12.0	2.0	2.55	0.00	3.0	100.0	14.5	12.3	0.017	0.768	yes
		5785.0	0.008	0.200	yes							14.5	12.3	0.017	0.768	yes
		5825.0	0.008	0.200	yes							14.5	12.3	0.017	0.768	yes

Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION																
Band	Technology	Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	R $\geq \lambda/2\pi$ fulfilled	Maximum Rated Conducted Output Power (dBm)	Maximum Tolerance (dBm)	Minimum Path Loss to Antenna connector (dB)	Minimum Path Loss in Antenna cable (dB)	Maximum Antenna Gain (dBi)	Duty cycle (%)	EIRP (dBm)	ERP (dBm)	ERP (W)	Threshold ERP (W)	MPE Exemption fulfilled
2.4 GHz	Bluetooth BR	2402.0	0.020	0.200	yes	12.0	2.0	0.31	0.00	0.0	100.0	13.7	11.5	0.014	0.768	yes
		2442.0	0.020	0.200	yes							13.7	11.5	0.014	0.768	yes
		2480.0	0.019	0.200	yes							13.7	11.5	0.014	0.768	yes
2.4 GHz	Bluetooth EDR	2402.0	0.020	0.200	yes	10.0	2.0	0.31	0.00	0.0	100.0	11.7	9.5	0.009	0.768	yes
		2442.0	0.020	0.200	yes							11.7	9.5	0.009	0.768	yes
		2480.0	0.019	0.200	yes							11.7	9.5	0.009	0.768	yes
2.4 GHz	Bluetooth LE	2402.0	0.020	0.200	yes	7.4	2.0	0.31	0.00	0.0	100.0	9.1	6.9	0.005	0.768	yes
		2442.0	0.020	0.200	yes							9.1	6.9	0.005	0.768	yes
		2480.0	0.019	0.200	yes							9.1	6.9	0.005	0.768	yes

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Simultaneous Transmission

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

		WLAN 2.4 GHz	WLAN 5 GHz	Bluetooth BR	Bluetooth EDR	Bluetooth LE
	Ratio of Value/Limit	0.018563	0.022113	0.018563	0.011712	0.006436
GSM 850	0.658669	0.677232	0.680782	0.677232	0.670382	0.665106
GSM 1900	0.181388	0.199951	0.203501	0.199951	0.193100	0.187824
WCDMA FDDII	0.228896	0.247459	0.251009	0.247459	0.240609	0.235333
WCDMA FDDIV	0.228896	0.247459	0.251009	0.247459	0.240609	0.235333
WCDMA FDDV	0.415571	0.434133	0.437683	0.434133	0.427283	0.422007
LTE B02	0.228896	0.247459	0.251009	0.247459	0.240609	0.235333
LTE B04	0.228896	0.247459	0.251009	0.247459	0.240609	0.235333
LTE B05	0.416680	0.435243	0.438793	0.435243	0.428392	0.423117
LTE B07	0.228896	0.247459	0.251009	0.247459	0.240609	0.235333
LTE B12	0.491194	0.509756	0.513306	0.509756	0.502906	0.497630
LTE B13	0.441885	0.460447	0.463997	0.460447	0.453597	0.448321
LTE B26	0.486526	0.505088	0.508638	0.505088	0.498238	0.492962
LTE B66	0.732215	0.750778	0.754328	0.750778	0.743927	0.738652
LTE B38	0.296578	0.315140	0.318690	0.315140	0.308290	0.303014

Remark: only maximum value in band / mode is shown

Maximum Value	=	0.754328
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Maximum value for simultaneous transmission with two transmitter is  $0.75 < 1 =$  limit fulfilled.

	Cellular	WLAN 2.4 GHz	WLAN 5 GHz	Bluetooth
Maximum Value	0.732215	0.018563	0.022113	0.018563

Total Value	=	0.791453
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Maximum value for simultaneous transmission with all simultaneous possible transmitter is  $0.79 < 1 =$  limit fulfilled.

MPE exemption letter 21-1-0178701T034a\_C02

**Conclusion:**

MPE-Based Exemption fulfilled

The current version of Test Report 21\_1\_0178701T034a\_C02 replaces the test report 21\_1\_0178701T034a\_C01 dated 2023-May-12. The replaced test report is herewith invalid.

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B.Eng. Martin Nunier

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Dipl.-Ing. Ninovic Perez

Version	Applied changes	Date of release
--	Initial release	2023-Mar-16
C01	Calculation adopted to new tune-up information "MPE Information Requirements_104760201_US_Canada_Ver1.6"	2023-May-12
C02	Results for LTE B40 removed	2023-Jun-06