

Test report No:
NIE: 84652RAN.003A2

Assessment report

RF EXPOSURE REPORT ACCORDING TO FCC 47 CFR Part 2.1091; FCC 47 CFR Part 1.1307 FCC 47 CFR Part 1.1310

(*) Identification of item under evaluation	Telematic system with wireless technologies
(*) Trademark	Mercedes-Benz
(*) Model and /or type reference	HERMES 4.0
(*) Other identification of the product	FCC ID : T8GHERMES40 IC ID : 6434A-HERMES40 HW version : D1 SW Version : E900 Version : NAFTA
(*) Features	WLAN, GNSS, 5G-NAD-Module
(*) Manufacturer	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
Test method requested, standard	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices. FCC 47 CFR Part 1.1307: Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared. FCC 47 CFR Part 1.1310 Radiofrequency radiation exposure limits.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Manuel García Antennas Laboratory Manager 74862741H MANUEL GARCÍA (C:A29507456) Firmado digitalmente por 74862741H MANUEL GARCÍA (C:A29507456) Fecha: 2026.10.20 16:58:51 +02'00'
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Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item under evaluation", "Trademark", "Model and/or type reference", "General description of the device", "Other identification of the product").
2. Maximum output power, maximum antenna gain and use distance information.
3. The device under evaluation consists of a hardware for enhanced remote, mobility & emergency services.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY

Document history

Report number	Date	Description
84652RAN.003	2026-05-08	First release
84652RAN.003A1	2026-10-16	Second release. The antenna gain for the NAD antenna has been updated. LTE bands 18, 19, and 38 have been removed, and LTE band 3 has been added. 5G NR band n30 has been removed, and 5G NR bands n3, n13, n66, and n71 have been added. The WWAN component has been specified for the simultaneous transmission configuration. This test report cancels and replaces test report 84652RAN.003
84652RAN.003A2	2026-10-20	Third release. The antenna gain for NAD antenna has been updated. This test report cancels and replaces test report 84652RAN.003A1.

Appendix A: FCC RF Exposure assessment result

General description of the device under evaluation

Table 1 provides details for the RF Evaluation, based on the following declared device specifications:

Description and technologies: the device under evaluation consists of a hardware for enhanced remote, mobility & emergency services and supports the following radios technologies: WLAN, GNSS, 5G-NAD-Module. The RF Exposure evaluation applies only to all transmission technologies supported by the device.

Evaluation Distance: For the purpose of the RF exposure assessment, the separation distance is defined as the minimum distance between the user and the antenna of the device, as applicable. Each separation distance applied during the assessment is clearly identified in this RF exposure technical brief. The separation distances selected for each antenna are based on the device's intended/foreseeable use and the antenna locations; where multiple user interactions are possible, conservative (minimum) separation distances were applied.

Transmitter / Antenna ID	TX Bands	Applied separation distance
NAD Antenna	WWAN	491 mm
NAD Antenna	WWAN	555 mm
Internal PCB Antenna	WLAN	124 mm

Maximum output power:

Values corresponding to maximum output power have been declared by the device manufacturer. These values are stated in module manufacturer's datasheets.

The device manufacturer has declared the maximum output power values, as documented in the official / technical description document.

Antennas: the device supports several antennas for the following transmission technologies:

- "NAD Antenna" for cellular transmissions.
- "Internal PCB Antenna" for Wi-Fi 2.4 GHz and 5GHz transmissions

The manufacturer has declared the maximum peak gain values, as stated in the antenna manufacturer's datasheet.

For GSM 1900, WCDMA Band IV, LTE Bands 4, 48, and 66, and 5G NR Bands n41, n48, n66, n77, and n78, the effective antenna gain values specified in document "HERMES 4.0 / Effektive Antenna Gain for FCC and ISCED" have been used.

The following table shows the information provided above:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Maximum Conducted Output Power (Incl. Tune-Up) (dBm)	Duty Cycle (%)	Time Averaged Conducted Power (dBm)	NAD Antenna (Ant 1) peak gain (dBi)	NAD Antenna (Ant 2) peak gain (dBi)	Internal PCB Antenna peak gain (dBi)	Maximum Averaged E.R.P (dBm)	Maximum Averaged E.R.P (mW)	Maximum Averaged E.I.R.P (dBm)	Maximum Averaged E.I.R.P (mW)
GSM	850	824 - 849	SISO	35.00	12.50	25.97	4.20	4.20	-	28.02	633.74	30.17	1039.70
GPRS 1TX	850	824 - 849	SISO	35.00	12.50	25.97	4.20	4.20	-	28.02	633.74	30.17	1039.70
GPRS 2TX	850	824 - 849	SISO	35.00	25.00	28.98	4.20	4.20	-	31.03	1267.48	33.18	2079.41
GPRS 3TX	850	824 - 849	SISO	35.00	37.50	30.74	4.20	4.20	-	32.79	1901.22	34.94	3119.11
GPRS 4TX	850	824 - 849	SISO	35.00	50.00	31.99	4.20	4.20	-	34.04	2534.95	36.19	4158.82
EGPRS 1TX	850	824 - 849	SISO	30.00	12.50	20.97	4.20	4.20	-	23.02	200.41	25.17	328.78
EGPRS 2TX	850	824 - 849	SISO	30.00	25.00	23.98	4.20	4.20	-	26.03	400.81	28.18	657.57
EGPRS 3TX	850	824 - 849	SISO	30.00	37.50	25.74	4.20	4.20	-	27.79	601.22	29.94	986.35
EGPRS 4TX	850	824 - 849	SISO	30.00	50.00	26.99	4.20	4.20	-	29.04	801.62	31.19	1315.13

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Maximum Conducted Output Power (Incl. Tune-Up) (dBm)	Duty Cycle (%)	Time Averaged Conducted Power (dBm)	NAD Antenna (Ant 1) peak gain (dBi)	NAD Antenna (Ant 2) peak gain (dBi)	Internal PCB Antenna peak gain (dBi)	Maximum Averaged E.R.P (dBm)	Maximum Averaged E.R.P (mW)	Maximum Averaged E.I.R.P (dBm)	Maximum Averaged E.I.R.P (mW)
GSM	1900	1850 - 1910	SISO	32.00	12.50	22.97	0.92	0.92	-	21.74	149.25	23.89	244.86
GPRS 1TX	1900	1850 - 1910	SISO	32.00	12.50	22.97	0.92	0.92	-	21.74	149.25	23.89	244.86
GPRS 2TX	1900	1850 - 1910	SISO	32.00	25.00	25.98	0.92	0.92	-	24.75	298.50	26.90	489.71
GPRS 3TX	1900	1850 - 1910	SISO	32.00	37.50	27.74	0.92	0.92	-	26.51	447.75	28.66	734.57
GPRS 4TX	1900	1850 - 1910	SISO	32.00	50.00	28.99	0.92	0.92	-	27.76	596.99	29.91	979.42
EGPRS 1TX	1900	1850 - 1910	SISO	29.00	12.50	19.97	0.92	0.92	-	18.74	74.80	20.89	122.72
EGPRS 2TX	1900	1850 - 1910	SISO	29.00	25.00	22.98	0.92	0.92	-	21.75	149.60	23.90	245.44
EGPRS 3TX	1900	1850 - 1910	SISO	29.00	37.50	24.74	0.92	0.92	-	23.51	224.40	25.66	368.16
EGPRS 4TX	1900	1850 - 1910	SISO	29.00	50.00	25.99	0.92	0.92	-	24.76	299.21	26.91	490.87
UMTS	II	1850 - 1910	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
UMTS	IV	1710 - 1755	SISO	25.00	100.00	25.00	1.97	1.97	-	24.82	303.39	26.97	497.74
UMTS	V	824 - 849	SISO	25.00	100.00	25.00	4.20	4.20	-	27.05	506.99	29.20	831.76
LTE	2	1850 - 1910	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
LTE	3	1710 - 1785	SISO	25.00	100.00	25.00	5.60	5.60	-	28.45	699.84	30.60	1148.15
LTE	4	1710 - 1755	SISO	25.00	100.00	25.00	1.97	1.97	-	24.82	303.39	26.97	497.74
LTE	5	824 - 849	SISO	25.00	100.00	25.00	4.20	4.20	-	27.05	506.99	29.20	831.76
LTE	7	2500 - 2570	SISO	25.00	100.00	25.00	7.90	7.90	-	30.75	1188.50	32.90	1949.84
LTE	12	699 - 716	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
LTE	13	777 - 787	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
LTE	14	788 - 798	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
LTE	17	704 - 716	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
LTE	25	1850 - 1915	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
LTE	26	814 - 849	SISO	25.00	100.00	25.00	4.20	4.20	-	27.05	506.99	29.20	831.76
LTE	41	2496 - 2690	SISO	28.00	100.00	28.00	8.60	8.60	-	34.45	2786.12	36.60	4570.88
LTE	48	3550 - 3700	SISO	25.00	100.00	25.00	-0.54	-0.54	-	22.85	192.75	25.00	316.23
LTE	66	1710 - 1780	SISO	25.00	100.00	25.00	1.97	1.97	-	24.82	303.39	26.97	497.74
LTE	71	663 - 698	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
5G NR	n2	1850 - 1910	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
5G NR	n3	1710 - 1785	SISO	25.00	100.00	25.00	5.60	5.60	-	28.45	699.84	30.60	1148.15
5G NR	n5	824 - 849	SISO	25.00	100.00	25.00	4.20	4.20	-	27.05	506.99	29.20	831.76
5G NR	n7	2500 - 2570	SISO	25.00	100.00	25.00	7.90	7.90	-	30.75	1188.50	32.90	1949.84
5G NR	n12	699 - 716	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
5G NR	n13	777 - 787	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
5G NR	n14	788 - 798	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95
5G NR	n25	1850 - 1915	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
5G NR	n26	1850 - 1915	SISO	25.00	100.00	25.00	4.80	4.80	-	27.65	582.10	29.80	954.99
5G NR	n38	2570 - 2620	SISO	25.00	100.00	25.00	7.90	7.90	-	30.75	1188.50	32.90	1949.84
5G NR	n41	2496 - 2690	SISO	28.00	100.00	28.00	2.83	2.83	-	28.68	737.90	30.83	1210.60
5G NR	n48	3550 - 3700	SISO	25.00	100.00	25.00	-0.54	-0.54	-	22.85	192.75	25.00	316.23
5G NR	n66	1710 - 1780	SISO	25.00	100.00	25.00	1.97	1.97	-	24.82	303.39	26.97	497.74
5G NR	n71	663 - 698	SISO	25.00	100.00	25.00	3.50	3.50	-	26.35	431.52	28.50	707.95

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Maximum Conducted Output Power (Incl. Tune-Up) (dBm)	Duty Cycle (%)	Time Averaged Conducted Power (dBm)	NAD Antenna (Ant 1) peak gain (dBi)	NAD Antenna (Ant 2) peak gain (dBi)	Internal PCB Antenna peak gain (dBi)	Maximum Averaged E.R.P (dBm)	Maximum Averaged E.R.P (mW)	Maximum Averaged E.I.R.P (dBm)	Maximum Averaged E.I.R.P (mW)
5G NR	n77	3700 - 3980	SISO	28.00	100.00	28.00	0.76	0.76	-	26.61	458.14	28.76	751.62
5G NR	n78	3700 - 3800	SISO	28.00	100.00	28.00	-0.54	-0.54	-	25.85	384.59	28.00	630.96
802.11b/g/n	2.4 GHz	2412 - 2484	SISO	15.00	100.00	15.00	-	-	5.63	18.48	70.47	20.63	115.61
802.11a/n/ac	5 GHz	5150 - 5850	SISO	15.00	100.00	15.00	-	-	4.01	16.86	48.53	19.01	79.62

Table 1: Equipment specifications

Simultaneous Transmission Conditions:

The device supports the following simultaneous transmissions modes:

Simultaneous Transmission Cases	Modes
Case 1	GPRS 4TX 850 + WLAN 2.45 GHz
Case 2	GPRS 4TX 850 + WLAN 5 GHz

Evaluation Results

RF Exposure Exemption evaluation:

NAD Antenna at 491 mm:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Distance (cm)	Maximum Averaged E.R.P (mW)	§1.1307(b)(3).i.(C) Exposure Limit (mW)	Verdict for exemption § 1.1307(b)(3).i
GSM/GPRS	850	824 - 849	SISO	49.10	2534.95	2542.73	MPE required (sim.TX)
GSM/GPRS	1900	1850 - 1910	SISO	49.10	596.99	4628.76	MPE required (sim.TX)
UMTS	II	1850 - 1910	SISO	49.10	582.10	4628.76	MPE required (sim.TX)
UMTS	IV	1710 - 1755	SISO	49.10	303.39	4628.76	MPE required (sim.TX)
LTE	2	1850 - 1910	SISO	49.10	582.10	4628.76	MPE required (sim.TX)
LTE	3	1710 - 1785	SISO	49.10	699.84	4628.76	MPE required (sim.TX)
LTE	4	1710 - 1755	SISO	49.10	303.39	4628.76	MPE required (sim.TX)
LTE	7	2500 - 2570	SISO	49.10	1188.50	4628.76	MPE required (sim.TX)
LTE	25	1850 - 1915	SISO	49.10	582.10	4628.76	MPE required (sim.TX)
LTE	66	1710 - 1780	SISO	49.10	303.39	4628.76	MPE required (sim.TX)
5G NR	n2	1850 - 1910	SISO	49.10	582.10	4628.76	MPE required (sim.TX)
5G NR	n3	1710 - 1785	SISO	49.10	699.84	4628.76	MPE required (sim.TX)
5G NR	n7	2500 - 2570	SISO	49.10	1188.50	4628.76	MPE required (sim.TX)
5G NR	n25	1850 - 1915	SISO	49.10	582.10	4628.76	MPE required (sim.TX)
5G NR	n66	1710 - 1780	SISO	49.10	303.39	4628.76	MPE required (sim.TX)

Table 2: FCC Exemption Evaluation Results

NAD Antenna at 555 mm:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Distance (cm)	Maximum Averaged E.R.P (mW)	§1.1307(b)(3).i.(C) Exposure Limit (mW)	Verdict for exemption § 1.1307(b)(3).i
UMTS	V	824 - 849	SISO	55.50	506.99	3248.80	Pass
LTE	5	824 - 849	SISO	55.50	506.99	3248.80	Pass
LTE	12	699 - 716	SISO	55.50	431.52	2755.96	Pass
LTE	13	777 - 787	SISO	55.50	431.52	3063.49	Pass
LTE	14	788 - 798	SISO	55.50	431.52	3106.86	Pass
LTE	17	704 - 716	SISO	55.50	431.52	2775.67	Pass
LTE	26	814 - 849	SISO	55.50	506.99	3209.37	Pass
LTE	48	3550 - 3700	SISO	55.50	192.75	5914.08	Pass
LTE	71	663 - 698	SISO	55.50	431.52	2614.02	Pass
5G NR	n5	824 - 849	SISO	55.50	506.99	3248.80	Pass
5G NR	n12	699 - 716	SISO	55.50	431.52	2755.96	Pass
5G NR	n13	777 - 787	SISO	55.50	431.52	3063.49	Pass
5G NR	n14	788 - 798	SISO	55.50	431.52	3106.86	Pass
5G NR	n26	1850 - 1915	SISO	55.50	582.10	5914.08	Pass

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Distance (cm)	Maximum Averaged E.R.P (mW)	§1.1307(b)(3).i.(C) Exposure Limit (mW)	Verdict for exemption § 1.1307(b)(3).i
5G NR	n48	3550 - 3700	SISO	55.50	192.75	5914.08	Pass
5G NR	n71	663 - 698	SISO	55.50	431.52	2614.02	Pass
5G NR	n77	3700 - 3980	SISO	55.50	458.14	5914.08	Pass
5G NR	n78	3700 - 3800	SISO	55.50	384.59	5914.08	Pass

Table 3: FCC Exemption Evaluation Results

Internal PCB Antenna at 124 mm:

Tech / Mode	Operating Band	Frequency under evaluation (MHz)	Tx config	Distance (cm)	Time Averaged Conducted Power (mW)	Maximum Averaged E.R.P (mW)	§1.1307(b)(3).i.(A) Exposure Limit (mW)	§1.1307(b)(3).i.(C) Exposure Limit (mW)	§ 1.1307(b)(3).i.(B) Exposure Limit (mW)	Verdict
802.11b/g/n	2.4 GHz	2412 - 2484	SISO	12.4	N/A	70.47	N/A	N/A	1230.83	Pass
802.11a/n/ac	5 GHz	5150 - 5850	SISO	12.4	N/A	48.53	N/A	N/A	1126.11	Pass

Table 4: FCC Exemption Evaluation Results

For NAD antenna at 491 mm the device fails to comply with applicable §1.1307(b)(3).i. exemption limits, so Maximum Permissible Exposure (MPE) evaluation is necessary to demonstrate compliance.

For NAD antenna at 555 mm and Internal antenna PCB at 124 mm the computed value(s) are below the exemption limit(s), so these modes meet the requirements stated in FCC 47 CFR Part 1.1307.

RF Exposure MPE evaluation for NAD Antenna at 491 mm:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Transmitting configuration	Distance (cm)	Power density (mW/cm ²)	FCC General Population Limit (mW/cm ²)	Verdict
GSM/GPRS	850.00	824 - 849	SISO	49.10	0.14	0.55	Pass
GSM/GPRS	1900.00	1850 - 1910	SISO	49.10	0.03	1.00	Pass
UMTS	II	1850 - 1910	SISO	49.10	0.03	1.00	Pass
UMTS	IV	1710 - 1755	SISO	49.10	0.02	1.00	Pass
LTE	2	1850 - 1910	SISO	49.10	0.03	1.00	Pass
LTE	3	1710 - 1785	SISO	49.10	0.04	1.00	Pass
LTE	4	1710 - 1755	SISO	49.10	0.02	1.00	Pass
LTE	7	2500 - 2570	SISO	49.10	0.06	1.00	Pass
LTE	25	1850 - 1915	SISO	49.10	0.03	1.00	Pass
LTE	66	1710 - 1780	SISO	49.10	0.02	1.00	Pass
5G NR	n2	1850 - 1910	SISO	49.10	0.03	1.00	Pass
5G NR	n3	1710 - 1785	SISO	49.10	0.04	1.00	Pass
5G NR	n7	2500 - 2570	SISO	49.10	0.06	1.00	Pass
5G NR	n25	1850 - 1915	SISO	49.10	0.03	1.00	Pass
5G NR	n66	1710 - 1780	SISO	49.10	0.02	1.00	Pass

Table 5: FCC Evaluation Results

The computed value(s) are below the limit(s), so each mode meets the requirements stated in FCC 47 CFR Part 1.1310.

Simultaneous transmission assessment:

The device under evaluation is able to transmit simultaneously using WWAN and WLAN transmitters, therefore the most conservative approach for the evaluation of the simultaneous transmission will be:

Simultaneous technologies and modes	Result (Σ of Pout/Pmax ratios)	Verdict ($\Sigma \leq 1$)
GPRS 4TX 850 + WLAN 2.45 GHz	0.312	Pass
GPRS 4TX 850 + WLAN 5 GHz	0.298	Pass

Table 6: Simultaneous Transmission assessment

As the compliance criteria is fulfilled, simultaneous transmission condition is in compliance with the RF exposure requirements.

Appendix B: FCC RF Exposure information

RF Exposure determination of exemption

According to FCC 47 CFR §1.1307 (b)(3) Determination of exemption:

(i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2), a single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

TABLE 1 TO §1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

(ii) For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

Pi = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

Pth,i = the exemption threshold power (Pth) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERPj = the ERP of fixed, mobile, or portable RF source j.

ERPth,j = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

Evaluated,k = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit,k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.

The available maximum time-averaged power or effective radiated power (ERP), can be calculated using the following formula to assess compliance with the Exemption Limits:

$$P_{E.I.R.P.} = P_T + G_T - L_C$$

Where:

P_T = transmitter time-averaged output power (including Duty Cycle and tune-up tolerance, if applicable)

G_T = gain of the transmitting antenna

L_C = signal attenuation in the connecting cable between the transmitter and the antenna if applicable

$$P_{E.R.P.} = P_{E.I.R.P.} - 2.15 \text{ dB}$$

RF Exposure evaluation

Limits for Maximum Permissible Exposure (MPE) for RF sources are defined in FCC 47 CFR “§1.1310 Radiation Exposure limits, paragraph (e)”:

TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

Each supported transmission technology will be evaluated to determine if it is in compliance with limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

In order to perform the assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst-case" or conservative prediction:

$$\text{Power density: } S[mW/cm^2] = \frac{P_{E.I.R.P.}[mW]}{4\pi R[cm]^2}$$

Where:

S = power density

$P_{E.I.R.P.}$ = Equivalent isotropically radiated power

R = distance to the center of radiation of the antenna (evaluation distance)

The available maximum time-averaged power or effective radiated power (ERP), can be calculated using the following formula to assess compliance with the Exemption Limits:

$$P_{E.I.R.P.} = P_T + G_T - L_C$$

Where:

P_T = transmitter time-averaged output power (including Duty Cycle and tune-up tolerance, if applicable)

G_T = gain of the transmitting antenna

L_C = signal attenuation in the connecting cable between the transmitter and the antenna if applicable