



**FCC Part 1 Subpart I
FCC Part 2 Subpart J**

RF EXPOSURE REPORT

FOR

TOOTHBRUSH CHARGING BASE

MODEL NUMBER: 3783

FCC ID: 2AG9A51910

REPORT NUMBER: R13158070-E8

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**Prepared for
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Revision History

Ver.	Issue Date	Revisions	Revised By
1	2020-03-20	Initial Issue	Brian T. Kiewra
2	2020-03-31	Revised declared output power in Section 6.	Brian T. Kiewra
3	2020-05-04	Revised declared output power in Section 6 back to original v1 reading. Revised BT antenna gain in Section 6.	Brian T. Kiewra
4	2020-06-10	Revised declared output power in Section 6 to include the correct tolerance for 2.4GHz band as declared by manufacturer.	Brian T. Kiewra
5	2020-10-06	Added individual, non-simultaneous transmission MPE results.	Jeff Moser
6	2020-10-09	Updated declared power values	Niklas Haydon

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Braun GMBH
T-QTA Frankfurter Strasses 145
Kronberg TS, D-61476
Germany

EUT DESCRIPTION: Wireless Toothbrush Charging Base

MODEL: 3783

SERIAL NUMBER: Charging base: BW012969000010

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I & PART 2 SUBPART J	Complies
RSS 102 ISSUE 5	Complies

UL LLC. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Approved & Released For
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For UL LLC By:



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2. TEST METHODOLOGY

All calculations were made in accordance with FCC Parts 1.1310, 2.1091, 2.1093, KDB 447498 D01 v06, KDB 447498 D03 V01, IEEE Std C95.1-2005, and IEEE Std C95.3-2002.

3. REFERENCES

All measurements were made as documented in test report UL LLC Documents R13158070-E4 and R13158070-E5 for operation in the 2.4 GHz and 5 GHz bands.

Output power, Duty cycle and Antenna gain data is excerpted from the applicable documentation provided by applicant.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0.

5. MAXIMUM PERMISSIBLE EXPOSURE (LIMITS AND EQUATIONS)

5.1. FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 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)
(A) 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
(B) 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

Notes:

- (1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
- (2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

5.2. EQUATIONS

POWER DENSITY

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

Where

S = Power density in mW/cm²

EIRP = Equivalent Isotropic Radiated Power in mW

D = Separation distance in cm

Power density in units of mW/cm² is converted to units of W/m² by multiplying by 10.

DISTANCE

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

Where

D = Separation distance in cm

EIRP = Equivalent Isotropic Radiated Power in mW

S = Power density in mW/cm²

SOURCE-BASED DUTY CYCLE

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

$$\text{Source-based time-averaged EIRP} = (\text{DC} / 100) * \text{EIRP}$$

Where

DC = Duty Cycle in %, as applicable

EIRP = Equivalent Isotropic Radiated Power in mW

MIMO AND COLOCATED TRANSMITTERS (IDENTICAL LIMIT FOR ALL TRANSMITTERS)

For multiple chain devices, and colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the EIRP (in linear units) of each transmitter.

$$\text{Total EIRP} = (\text{EIRP1}) + (\text{EIRP2}) + \dots + (\text{EIRPn})$$

where

EIRPx = Source-based time-averaged EIRP of chain x or transmitter x

The total EIRP is then used to calculate the Power Density or the Distance as applicable.

MIMO AND COLOCATED TRANSMITTERS (NON-IDENTICAL LIMIT FOR ALL TRANSMITTERS)

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply:

The Power Density at the specified separation distance is calculated for each transmitter chain or transmitter.

The fraction of the exposure limit is calculated for each chain or transmitter as
(Power Density of chain or transmitter) / (Limit applicable to that chain or transmitter).

The fractions are summed.

Compliance is established if the sum of the fractions is less than or equal to one.

6. RF EXPOSURE RESULTS

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

Single Chain and non-colocated transmitters										
Band	Mode	FCC Limit (mW/cm ²)	IC Limit (W/m ²)	Output AVG Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Duty Cycle (%)	EIRP (mW)	Separ. Distance FCC (cm)	Separ. Distance ISED (cm)
2.4 GHz	Bluetooth	1.00	5.35	8.50	2.12	10.62	100.0	11.53	0.96	1.31
2.4 GHz	WLAN	1.00	5.35	17.00	2.66	19.66	100.0	92.47	2.71	3.71
5GHz	WLAN	1.00	5.35	21.00	5.77	26.77	100.0	475.34	6.15	8.41

Multiple chain or colocated transmitters								
Band	Mode	Separ. Dist. (cm)	AV Output Power (dBm)	Ant. Gain (dBi)	Duty Cycle (%)	EIRP (mW)	FCC PD (mW/cm ²)	FCC PD Limit (mW/cm ²)
2.4 GHz	BT		8.50	2.12	100.0	11.53		
5 GHz	WLAN		21.00	5.77	100.0	475.34		
Combined		35				486.87	0.03	1.00

Notes:

- 1) Only 2.4GHz or 5GHz WLAN and BT or BLE transmit simultaneously. Therefore used 5GHz WLAN and BT simultaneous as worst-case based on declared power.
- 2) For MPE the new KDB 447498 requires the calculations to use the maximum rated power; that power should be declared by the manufacturer and should not be lower than the measured power. If the power has a tolerance, then we also need to check that the measured power is within the tolerance.
- 3) Tolerance value of +1.5 dB was included in the output power values above to cover the output power tolerance of ± 1.5 dB under extreme conditions in the real filed as declared by the client.
- 4) The manufacturer configures output power so that the maximum power, after accounting for manufacturing tolerances, will never exceed the maximum power level measured.

END OF TEST REPORT