

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	Netatmo
Address of applicant:	73 rue de Sevres - 92100 Boulogne-Billancourt FRANCE
Manufacturer:	Netatmo
Address of manufacturer:	73 rue de Sevres - 92100 Boulogne-Billancourt FRANCE

General Description of EUT:

Product Name:	Netatmo modulating thermostat
Trade Name	/
Model No.:	NTH01_OTH
Adding Model(s):	/
Rated Voltage:	AC100-240V 50/60Hz; USB DC5V
FCC ID:	N3A-OTP02
Equipment Type:	Fixed

Technical Characteristics of EUT:

Wi-Fi

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n-HT20
RF Output Power:	17.40dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n-HT20
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	-0.3dBi

Bluetooth

Bluetooth Version:	V2.1 (BR/EDR mode)
Frequency Range:	2402-2480MHz
RF Output Power:	0.469dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	-0.3dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,
the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For Wi-Fi

Maximum Tune-Up output power: 18(dBm)

Maximum peak output power at antenna input terminal: 63.10 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2412 (MHz)

Antenna gain: -0.3 (dBi)

Directional gain (numeric gain): 0.93

The worst case is power density at prediction frequency at 20cm: 0.0117 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For Bluetooth

Maximum Tune-Up output power: 1(dBm)

Maximum peak output power at antenna input terminal: 1.26 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2402(MHz)

Antenna gain: -0.3 (dBi)

Directional gain (numeric gain): 0.93

The worst case is power density at prediction frequency at 20cm: 0.0002 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

WIFI and BT is the use the same antenna cannot simultaneous transmission;

Result: Pass