Radio Frequency Exposure Evaluation Report

For

Bot Home Automation,Inc.

Wi-Fi Enabled Doorbell Chime

FCC ID: **2AEUPBHACM001**
IC: **20271- BHACM001**, Model No.: **Chime**

Applied Rules and Standards

CFR Part Part 1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General 24 RF Exposure Guidance v05r02

Industry Canada RSS-102, Issue 5 of March 2015

Report number: **BOTHO-003-15001_MPE**

DATE: 07-17-2015

1 Administrative Data

1.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	6370 Nancy Ridge Drive San Diego, CA 92121 U.S.A.
Telephone:	+1 (858) 362 2400
Fax:	+1 (858) 687-4809
Compliance Manager:	Franz Engert
Responsible Project Leader:	Danh Le

1.2 Identification of the Client / Manufacturer

Applicant's Name:	Bot Home Automation, Inc.
Street Address:	1523 26th Street
City/Zip Code	Santa Monica, CA 90404
Country	USA
Contact Person:	Tim Simons
Phone No.	310-227-2217
e-mail:	tim@ring.com

2 Equipment under Assessment

Product Description:	Wi-Fi Enabled Doorbell Chime
FCC-ID:	2AEUPBHACM001
IC certification no.:	20271- BHACM001
Model Number:	Chime
Technology/ Type(s) of Modulation:	802.11b/g/n with CCK, DQPSK, DBPSK + DSSS QBSK, BPSK, 16 QAM, 64 QAM + OFDM
Channel Bandwidths	Up to 20 MHz
Operating Frequency Ranges (MHz)/ Channels:	Nominal band: 2400 – 2483.5 MHz; 2412 MHz (Ch. 1) – 2462 (Ch.11), 11 channels
Antenna info:	PCB - Inverted F 2.4 GHz: 2.0 dBi
Co-located Transmitters/ Antennas?	☐Yes ■ No
Device Category:	■ Fixed Installation ☐ Mobile (mark mobile if both possible) ☐ Portable ☐ mixed Mobile and Portable
Exposure Category:	☐ Occupational/ Controlled ■ General Population/ Uncontrolled
Power Supply/ Rated Operating Voltage Range:	Input:110-240V~50-60 Hz, 2.0-1.0 A
operating temperature range	Tlow: 0° C/ Tnom: 22° C/ Tmax: 40° C
Test Sample Status:	Production

3 Assessment

This RF Exposure evaluation report provides information about compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 5 under given conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).
In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications.

Company	Description	Model #
Bot Home Automation, Inc.	Wi-Fi Enabled Doorbell Chime	Chime

Report Reviewed By:

Date	Section	Name	Signature
2015-07-17	Compliance	Franz Engert (Compliance Manager)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2015.07.20 09:22:26 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2015-07-17	Compliance	Danh Le (EMC Test Engineer)	Digitally signed by Danh Le DN: cn=Danh Le, o=Cetecom, ou=Compliance, email=danh.le@cetecom.com, c=US Date: 2015.07.18 00:31:12 -07'00'

4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm^2)	Averaging time (minutes)
1500 – 100.000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) $^{0.6834}$	6

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.109(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm;

IC
300MHz ≤ operating frequency < 6 GHz: excluded if EIRP < 0.0131 x f (MHz) $^{0.6834}$

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications.
When categorical exclusion cannot be claimed for mobile applications MPE measurement is required for TCB approval.

RSS-102 of Industry Canada does generally not require RF exposure evaluation for fixed or mobile applications which stay below the given exclusion limits.

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of it's radiating structures from the body of persons according to it's use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm^2 or W/m^2)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

5 Evaluations

5.1 Routine Environmental Evaluation Applicability

Based on the maximum EIRP results from the associate emc report provided with this filing.

Transmission Mode	**Max. EIRP**	**duty cycle**	**Total EIRP simultaneous trans missions intra-band (worst cases only)**	**FCC / IC Limits for** Routine Environmental Evaluation Applicability, EIRP	**excluded?**
	dBm	%	dBm	dBm	
Wi-Fi 2.4 GHz	21.96	44	n.a.	36.9 / 34.3	yes

Result: The equipment is categorically excluded from Routine Environmental Evaluation.

5.2 Compliance with MPE (Power Density) limits

Limits:
Smax @ 1850MHz and @ 2400MHz = 1.0mW/cm$^{2;}$

The highest power density is resulting from the formula: $S = EIRP / 4*\pi*r^2$;

The power density is calculated for the minimum distance r = 20cm;

Highest source base time peak EIRP with WLAN 2.4GHz: 21.96dBm;

Resulting maximum power density at 2400MHz: **S(2400MHz) = 0.031 mW/cm^2**

Result: The equipment fulfills the MPE limits for the minimum distance between the antenna and the human body of 20cm.

5.3 Simultaneous Transmission MPE Test Exclusion (per KDB 447498 D01)

not applicable.

5.4 Maximum allowed Antenna Gain – Gmax

not applicable since fixed internal antenna is used in the product.

6 Revision History

Date	Report Name	Changes to report	Report prepared by
2015-07-17	BOTHO-003-15001_MPE	First Version	Danh Le