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47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091**

RF EXPOSURE REPORT

For

Smart Home Gateway

Model Name	Trade Mark
NA301-ZBxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose)	
G150-ZBxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose)	
VeraEdge-ZBxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose)	
F2-ZB	
	

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Revision History

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1. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

2. EUT SPECIFICATION

EUT	Smart Home Gateway		
Model Number / Trade Name	Model Name	Trade Mark	
	NA301-ZBxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose		
	G150-ZBxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose		
	VeraEdge-ZBxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-" for marketing purpose		
	F2-ZB		
			
Model Discrepancy	All the specification and layout are identical except they come with different model numbers for marketing purposes.		
RF Module	MEDIATEK	Model:	MT7620A
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz 802.11n HT40: 2.422GHz ~ 2.452GHz ☒ Zigbee: 2405~2480MHz		
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others		
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)		
Antenna Specification	PIFA Antenna Zigbee:		

Maximum Average output power	IEEE 802.11b Mode: 19.40 dBm (87.096 mW) IEEE 802.11g Mode: 21.88 dBm (154.170 mW) IEEE 802.11n HT 20 Mode: 21.48 dBm (140.605 mW) IEEE 802.11n HT 40 Mode: 16.23 dBm (41.976 mW) Zigbee: 16.01 dBm (39.902 mW)
Maximum Tune up Power	IEEE 802.11b Mode: 21.00 dBm (125.893 mW) IEEE 802.11g Mode: 23.00 dBm (199.526 mW) IEEE 802.11n HT 20 Mode: 23.00 dBm (199.526 mW) IEEE 802.11n HT 40 Mode: 18.00 dBm (63.096 mW) Zigbee: 18.00 dBm (63.096 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

3. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

4. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	125.893	4.44	20	0.1112	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	199.526	4.44	20	0.1763	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	199.526	4.44	20	0.1763	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	63.096	4.44	20	0.0557	1

Zigbee:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
Mid	2440	63.096	3.1	20	0.0389	1