Project No: CB10401200

Maximum Permissible Exposure

Applicant's company	ZEBRA TECHNOLOGIES CORPORATION
Applicant Address	One Motorola Plaza Holtsville, NY 11742 USA
FCC ID	H9PAP7562
Manufacturer's company	Wistron NeWeb Corporation
Manufacturer Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308 Taiwan

Product Name	802.11 abgn/ac Access Point
Brand Name	ZEBRA
Model Name	AP-7562
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
EUT Freq. Range	2400 ~ 2483.5MHz / 5150 ~ 5250MHz / 5725 ~ 5850MHz
Received Date	Dec. 04, 2014
Final Test Date	Mar. 02, 2015
Submission Type	Original Equipment

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History of This Assessment Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA4D0488	Rev. 01	Initial issue of report	Mar. 26, 2015

1. MAXIMUM PERMISSIBLE EXPOSURE

1.1. Applicable Standard

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(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/ cm²)	Averaging Time |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
1500-100,000			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/ cm²)	Averaging Time |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
1500-100,000			1.0	30

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

1.2. MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

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

From the EUT RF output power, the minimum mobile separation distance, d=0.35m, as well as the gain of the used antenna, the RF power density can be obtained.

1.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 5GHz Band:

Antenna Type : Dipole Antenna

Test Mode: Mode 1 / Band 1

Conducted Power for IEEE 802.11a (3TX): 23.83dBm

Distance (m)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	12.07	16.1110	23.8314	241.6215	0.253006	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{jk}\right\}^2}{N_{ANT}}\right]$ = 12.07dBi

Test Mode: Mode 1 / Band 4

Conducted Power for IEEE 802.11ac VHT20 (3TX): 23.78dBm

Distance (m)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	12.07	16.1110	23.7757	238.5474	0.249787	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{jk}\right\}^2}{N_{ANT}}\right]$ = 12.07dBi

Antenna Type : Panel Antenna

Test Mode: Mode 2 / Band 1

Conducted Power for IEEE 802.11ac VHT20 (3TX): 24.71dBm

Distance (m)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	9.87	9.7078	24.7132	296.0208	0.186775	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{jk}\right\}^2}{N_{ANT}}\right]$ = 9.87dBi

Test Mode: Mode 2 / Band 4

Conducted Power for IEEE 802.11a (3TX): 23.39dBm

Distance (m)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	9.87	9.7078	23.3884	218.1926	0.137669	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{jk}\right\}^2}{N_{ANT}}\right]$ = 9.87dBi

Antenna Type : CROSS-POLARIZED PANEL ANTENNA

Test Mode: Mode 3 / Band 1

Conducted Power for IEEE 802.11a (2TX): 24.72dBm

Distance (m)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	8.30	6.7608	24.7204	296.5107	0.130291	1	Complies

Test Mode: Mode 3 / Band 4

Conducted Power for IEEE 802.11ac VHT20 (2TX): 24.13dBm

Distance (m)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	8.30	6.7608	24.1251	258.5293	0.113602	1	Complies

For 2.4GHz Band:

Antenna Type : Dipole Antenna

Test Mode: Mode 1

Conducted Power for IEEE 802.11g (3TX): 24.20 dBm

Distance (m)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	10.07	10.1653	24.1965	262.8156	0.173639	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 10.07dBi

Antenna Type : Panel Antenna

Test Mode: Mode 2

Conducted Power for IEEE 802.11ac VHT20 (3TX): 24.53 dBm

Distance (m)	Directional Gain	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	11.27	13.4005	24.5333	284.0066	0.247357	1	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 11.27dBi

Antenna Type : CROSS-POLARIZED PANEL ANTENNA

Test Mode: Mode 3

Conducted Power for IEEE 802.11b (3TX): 24.08 dBm

Distance (m)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
			(dBm)	(mW)			
0.35	9.00	7.9433	24.0826	256.0092	0.132169	1	Complies

Conclusion:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously, the formula of calculatedthe MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ...etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.247357 / 1 + 0.253006 / 1 = 0.500363, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.