IEEE C95.1

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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

Wireless module

Model: WG7833-B0, WG7833BEM2A, WG7833BEM2B

Trade Name: Jorjin

Issued to

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TAF
Testing Laboratory
1309

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2015/07/20	Initial Issue	ALL	Becca Chen

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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	Wireless module
Model	WG7833-B0, WG7833BEM2A, WG7833BEM2B
RF Module	TI Model: WL1833

Frequency band (Operating)	☒ Bluetooth 2.1 + EDR / 4.0: 2402 ~ 2480 MHz
	    802.11b/g/n HT20: 2.412GHz ~ 2.462GHz
	    802.11n HT40: 2.422GHz ~ 2.452GHz
	    802.11a/n HT20: 5.180GHz ~ 5.240GHz / 5.745 ~ 5.825GHz
	    802.11n HT40: 5.190GHz ~ 5.230GHz / 5.755 ~ 5.795GHz
	☐ Others

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	1. PCB Antenna: Unictron / H2B1BE1A1B0200
	  2.4GHz: Antenna Gain : 4.13 dBi (Numeric gain 2.59)
	    PCB Antenna: Unictron / H2B1BB1A1Q0100
	  5GHz: Antenna Gain : 4.59 dBi (Numeric gain 2.88)
	2. Dipole Antenna: WIESON / GPOT155-002
	  2.4GHz: Antenna Gain : 1.60 dBi (Numeric gain 1.45)
	  5GHz: Antenna Gain : 2.08 dBi (Numeric gain 1.61)

Maximum Average output power	Bluetooth 2.0 Mode : 11.31 dBm (13.521 mW) Bluetooth 4.0 Mode : 8.25 dBm (6.683 mW) IEEE 802.11b Mode: 15.63 dBm (36.559 mW) IEEE 802.11g Mode: 13.76 dBm (23.768 mW) IEEE 802.11n HT 20 Mode: 12.51 dBm (17.824 mW) IEEE 802.11n HT 40 Mode: 11.10 dBm (12.882 mW) IEEE 802.11a Mode: 16.29 dBm (42.560 mW) IEEE 802.11n HT 20 Mode: 15.98 dBm (39.628 mW) IEEE 802.11n HT 40 Mode: 14.08 dBm (25.586 mW)

Maximum Tune up Power	Bluetooth 2.0 Mode : 13.00 dBm (19.953 mW) Bluetooth 4.0 Mode : 10.00 dBm (10.000 mW) IEEE 802.11b Mode: 17.50 dBm (56.234 mW) IEEE 802.11g Mode: 15.50 dBm (35.481 mW) IEEE 802.11n HT 20 Mode: 14.50 dBm (28.184 mW) IEEE 802.11n HT 40 Mode: 13.00 dBm (19.953 mW) IEEE 802.11a Mode: 18.00 dBm (63.096 mW) IEEE 802.11n HT 20 Mode: 17.50 dBm (56.234 mW) IEEE 802.11n HT 40 Mode: 16.00 dBm (39.811 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

3. TEST RESULTS

No non-compliance noted.

__Calculation__

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

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:

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

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

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

Where *d = Distance in cm*
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

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 / cm^2

Bluetooth 2.0 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
40	2441	19.953	2.59	20	0.0103	1

Bluetooth 4.0 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
39	2480	10.000	2.59	20	0.0052	1

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
11	2462	56.234	2.59	20	0.0290	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	35.481	2.59	20	0.0183	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
11	2462	28.184	2.59	20	0.0145	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
9	2452	19.953	2.59	20	0.0103	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
44	5220	63.096	2.88	20	0.0362	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
36	5180	56.234	2.88	20	0.0322	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
38	5190	39.811	2.88	20	0.0228	1

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