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MPE Report

Test Report No.	: 1805RS11
Applicant	: EnGenius Technologies
Product Type	: WiFi Access Point
Trade Name	: Open Mesh, Inc. Datto, Inc.
Model Number	: A42, AP42
Date of Received	: Apr. 12, 2018
Test Period	: Apr. 14, 2018
Date of Issued	: Jun. 05, 2018
Test Specification	: ANSI / IEEE Std.C95.1-1995 / IEEE Std. 1528-2013 CANADA RSS-102 Issue 5 March 2015 47 CFR § 2.1091 / 47 CFR § 1.1310
Location of Test Lab.	: Chang-an Lab.
Test Firm IC Registration number	: 7381A

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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1. Description of Equipment under Test (EUT)

Applicant	EnGenius Technologies 11-85 Citizen Crt MARKHAM, Ontario L6G 1A8		
Manufacturer	Datto, Inc. 101 Merritt 7 Norwalk, CT 06851, United States		
Product Type	WiFi Access Point		
Trade Name	Open Mesh, Inc. Datto, Inc.		
Model Number	A42, AP42		
Trade Name / Model Number Different Description	Those trade names & model numbers differ from each other in selling region. (A42 for Open Mesh apply, AP42 for Datto apply)		
IC	10103A-OMA42		
Hardware Version	v1.10		
Software Version	v1.0.3		
Frequency Range	Operate Band	Frequency Range (MHz)	
	IEEE 802.11b / 802.11g IEEE 802.11n 2.4GHz 20 MHz (256QAM)	2412 - 2462	
	IEEE 802.11n 2.4GHz 40 MHz (256QAM)	2422 - 2452	
	IEEE 802.11a U-NII Band I	5180 - 5240	
	IEEE 802.11a U-NII Band II-A	Indoor	5260 - 5320
		Outdoor	5280 - 5320
	IEEE 802.11a U-NII Band II-C	5500 - 5700	
	IEEE 802.11a U-NII Band III	5745 - 5825	
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band I	5180 - 5240	
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band II-A	Indoor	5260 - 5320
		Outdoor	5280 - 5320
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band II-C	5500 - 5700	
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band III	5745 - 5825	
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band I	5190 - 5230	
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band II-A	Indoor	5270 - 5310
		Outdoor	5310
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band II-C	5510 - 5670	
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band III	5755 - 5795	
	IEEE 802.11ac 80MHz U-NII Band I	5210	
	IEEE 802.11ac 80MHz U-NII Band II-A	Indoor	5290
		Outdoor	---
	IEEE 802.11ac 80MHz U-NII Band II-C	5530	
	IEEE 802.11ac 80MHz U-NII Band III	5775	

Antenna Information	ANT	Model	Type	Max. Gain (dBi)	
	ANT-0	6525A0046300	PIFA antenna	2.4GHz	4.40
				U-NII Band I	4.70
				U-NII Band II-A	3.10
				U-NII Band II-C	4.70
				U-NII Band III	4.70
	ANT-1	6525A0045300	PIFA antenna	2.4GHz	3.90
				U-NII Band I	4.70
				U-NII Band II-A	4.50
				U-NII Band II-C	4.70
				U-NII Band III	4.70
	MIMO / Beamforming Directional Gain			2.4GHz	7.16
				U-NII Band I	7.71
				U-NII Band II-A	6.84
				U-NII Band II-C	7.71
				U-NII Band III	7.71
Antenna Delivery	2TX (CDD / MIMO / Beamforming on)				
RF Evaluation	7.51 W/m ²				
Temperature Range	0 ~ +40°C				

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310 / CANADA RSS-102 Issue 5. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



2. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product.

Therefore, this product will be evaluated as MPE limits.

Generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna" . Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user.

Exposure evaluation

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

Where

S: power density

P: power input to the antenna

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.

3. Applicable Standard

(A) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

(B) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²³	170	180	-	Instantaneous*
0.1-10	-	1.6/ f	-	6**
1.29-10	193/ $f^{0.5}$	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ $f^{0.25}$	0.3444/ $f^{0.25}$	44.72/ $f^{0.5}$	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 $f^{0.25}$	0.04138 $f^{0.25}$	0.6455 $f^{0.5}$	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ $f^{1.2}$
150000-300000	0.354 $f^{0.5}$	9.40 x 10 ⁻⁴ $f^{0.5}$	3.33 x 10 ⁻⁴ f	616000/ $f^{1.2}$
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

4. Test Result

WLAN Antenna_CDD										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (w)/m ²	Distance (m) [R]	max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (W)	Power Density [S] (w)/m ²
IEEE 802.11b	1	2412.0	5.366	0.2	28.00	4.40	2.75	1	1.735	3.452
		2437.0	5.404	0.2	28.00	4.40	2.75	1	1.735	3.452
		2462.0	5.442	0.2	28.00	4.40	2.75	1	1.735	3.452
IEEE 802.11g	6	2412.0	5.366	0.2	29.50	4.40	2.75	1	2.451	4.876
		2437.0	5.404	0.2	29.50	4.40	2.75	1	2.451	4.876
		2462.0	5.442	0.2	29.50	4.40	2.75	1	2.451	4.876
IEEE 802.11n 2.4G 20MHz (256QAM)	13	2412.0	5.366	0.2	29.50	4.40	2.75	1	2.451	4.876
		2437.0	5.404	0.2	29.50	4.40	2.75	1	2.451	4.876
		2462.0	5.442	0.2	29.50	4.40	2.75	1	2.451	4.876
IEEE 802.11n 2.4G 40MHz (256QAM)	27	2422.0	5.381	0.2	27.00	4.40	2.75	1	1.378	2.741
		2437.0	5.404	0.2	27.00	4.40	2.75	1	1.378	2.741
		2452.0	5.427	0.2	27.00	4.40	2.75	1	1.378	2.741
IEEE 802.11a	6	5180.0	9.047	0.2	24.5	4.70	2.95	1	0.831	1.653
		5200.0	9.071	0.2	24.5	4.70	2.95	1	0.831	1.653
		5220.0	9.095	0.2	24.5	4.70	2.95	1	0.831	1.653
		5240.0	9.119	0.2	24.5	4.70	2.95	1	0.831	1.653
		5260.0	9.142	0.2	21	4.50	2.82	1	0.355	0.706
		5280.0	9.166	0.2	21	4.50	2.82	1	0.355	0.706
		5300.0	9.19	0.2	21	4.50	2.82	1	0.355	0.706
		5320.0	9.213	0.2	21	4.50	2.82	1	0.355	0.706
		5500.0	9.425	0.2	19.5	4.70	2.95	1	0.263	0.523
		5520.0	9.449	0.2	19.5	4.70	2.95	1	0.263	0.523
		5540.0	9.472	0.2	19.5	4.70	2.95	1	0.263	0.523
		5560.0	9.496	0.2	19.5	4.70	2.95	1	0.263	0.523
		5580.0	9.519	0.2	19.5	4.70	2.95	1	0.263	0.523
		5660.0	9.612	0.2	19.5	4.70	2.95	1	0.263	0.523
		5680.0	9.635	0.2	19.5	4.70	2.95	1	0.263	0.523
		5700.0	9.658	0.2	19.5	4.70	2.95	1	0.263	0.523
		5745.0	9.71	0.2	24	4.70	2.95	1	0.741	1.474
		5765.0	9.733	0.2	24	4.70	2.95	1	0.741	1.474
		5785.0	9.756	0.2	24	4.70	2.95	1	0.741	1.474
		5805.0	9.78	0.2	24	4.70	2.95	1	0.741	1.474
		5825.0	9.803	0.2	24	4.70	2.95	1	0.741	1.474

WLAN Antenna_CDD										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (w)/m ²	Distance (m) [R]	max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (W)	Power Density [S] (w)/m ²
IEEE 802.11ac 20MHz	13	5180.0	9.047	0.2	26.5	4.70	2.95	1	1.318	2.622
		5200.0	9.071	0.2	26.5	4.70	2.95	1	1.318	2.622
		5220.0	9.095	0.2	26.5	4.70	2.95	1	1.318	2.622
		5240.0	9.119	0.2	26.5	4.70	2.95	1	1.318	2.622
		5260.0	9.142	0.2	21	4.50	2.82	1	0.355	0.706
		5280.0	9.166	0.2	21	4.50	2.82	1	0.355	0.706
		5300.0	9.19	0.2	21	4.50	2.82	1	0.355	0.706
		5320.0	9.213	0.2	21	4.50	2.82	1	0.355	0.706
		5500.0	9.425	0.2	19.5	4.70	2.95	1	0.263	0.523
		5520.0	9.449	0.2	19.5	4.70	2.95	1	0.263	0.523
		5540.0	9.472	0.2	19.5	4.70	2.95	1	0.263	0.523
		5560.0	9.496	0.2	19.5	4.70	2.95	1	0.263	0.523
		5580.0	9.519	0.2	19.5	4.70	2.95	1	0.263	0.523
		5660.0	9.612	0.2	19.5	4.70	2.95	1	0.263	0.523
		5680.0	9.635	0.2	19.5	4.70	2.95	1	0.263	0.523
		5700.0	9.658	0.2	19.5	4.70	2.95	1	0.263	0.523
		5745.0	9.71	0.2	24.5	4.70	2.95	1	0.831	1.653
		5765.0	9.733	0.2	24.5	4.70	2.95	1	0.831	1.653
		5785.0	9.756	0.2	24.5	4.70	2.95	1	0.831	1.653
		5805.0	9.78	0.2	24.5	4.70	2.95	1	0.831	1.653
		5825.0	9.803	0.2	24.5	4.70	2.95	1	0.831	1.653
IEEE 802.11ac 40MHz	27	5190.0	9.059	0.2	24	4.70	2.95	1	0.741	1.474
		5230.0	9.107	0.2	24	4.70	2.95	1	0.741	1.474
		5270.0	9.154	0.2	23.5	4.50	2.82	1	0.631	1.255
		5310.0	9.202	0.2	23.5	4.50	2.82	1	0.631	1.255
		5510.0	9.437	0.2	21.5	4.70	2.95	1	0.417	0.830
		5550.0	9.484	0.2	21.5	4.70	2.95	1	0.417	0.830
		5670.0	9.624	0.2	21.5	4.70	2.95	1	0.417	0.830
		5755.0	9.722	0.2	25	4.70	2.95	1	0.933	1.856
		5795.0	9.768	0.2	25	4.70	2.95	1	0.933	1.856
IEEE 802.11ac 80MHz	58.6	5210.0	9.083	0.2	18	4.70	2.95	1	0.186	0.370
		5290.0	9.178	0.2	20.5	4.50	2.82	1	0.316	0.629
		5530.0	9.46	0.2	20	4.70	2.95	1	0.295	0.587
		5775.0	9.745	0.2	22	4.70	2.95	1	0.468	0.931

WLAN Antenna_MIMO_Beamforming on										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (w)/m ²	Distance (m) [R]	max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (W)	Power Density [S] (w)/m ²
IEEE 802.11n 2.4G 20MHz (256QAM)	13	2412.0	5.366	0.2	26.50	7.16	5.2	1	2.323	4.621
		2437.0	5.404	0.2	26.50	7.16	5.2	1	2.323	4.621
		2462.0	5.442	0.2	26.50	7.16	5.2	1	2.323	4.621
IEEE 802.11n 2.4G 40MHz (256QAM)	27	2422.0	5.381	0.2	24.00	7.16	5.2	1	1.306	2.598
		2437.0	5.404	0.2	24.00	7.16	5.2	1	1.306	2.598
		2452.0	5.427	0.2	24.00	7.16	5.2	1	1.306	2.598
IEEE 802.11ac 20MHz	13	5180.0	9.047	0.2	23.5	7.71	5.9	1	1.321	2.628
		5200.0	9.071	0.2	23.5	7.71	5.9	1	1.321	2.628
		5220.0	9.095	0.2	23.5	7.71	5.9	1	1.321	2.628
		5240.0	9.119	0.2	23.5	7.71	5.9	1	1.321	2.628
		5260.0	9.142	0.2	18	6.84	4.83	1	0.305	0.607
		5280.0	9.166	0.2	18	6.84	4.83	1	0.305	0.607
		5300.0	9.19	0.2	18	6.84	4.83	1	0.305	0.607
		5320.0	9.213	0.2	18	6.84	4.83	1	0.305	0.607
		5500.0	9.425	0.2	16.5	7.71	5.9	1	0.264	0.525
		5520.0	9.449	0.2	16.5	7.71	5.9	1	0.264	0.525
		5540.0	9.472	0.2	16.5	7.71	5.9	1	0.264	0.525
		5560.0	9.496	0.2	16.5	7.71	5.9	1	0.264	0.525
		5580.0	9.519	0.2	16.5	7.71	5.9	1	0.264	0.525
		5660.0	9.612	0.2	16.5	7.71	5.9	1	0.264	0.525
		5680.0	9.635	0.2	16.5	7.71	5.9	1	0.264	0.525
		5700.0	9.658	0.2	16.5	7.71	5.9	1	0.264	0.525
		5745.0	9.71	0.2	21.5	7.71	5.9	1	0.833	1.657
		5765.0	9.733	0.2	21.5	7.71	5.9	1	0.833	1.657
		5785.0	9.756	0.2	21.5	7.71	5.9	1	0.833	1.657
		5805.0	9.78	0.2	21.5	7.71	5.9	1	0.833	1.657
		5825.0	9.803	0.2	21.5	7.71	5.9	1	0.833	1.657
IEEE 802.11ac 40MHz	27	5190.0	9.059	0.2	21	7.71	5.9	1	0.743	1.478
		5230.0	9.107	0.2	21	7.71	5.9	1	0.743	1.478
		5270.0	9.154	0.2	20.5	6.84	4.83	1	0.542	1.078
		5310.0	9.202	0.2	20.5	6.84	4.83	1	0.542	1.078
		5510.0	9.437	0.2	18.5	7.71	5.9	1	0.418	0.832
		5550.0	9.484	0.2	18.5	7.71	5.9	1	0.418	0.832
		5670.0	9.624	0.2	18.5	7.71	5.9	1	0.418	0.832
		5755.0	9.722	0.2	22	7.71	5.9	1	0.935	1.860
IEEE 802.11ac 80MHz	58.6	5795.0	9.768	0.2	22	7.71	5.9	1	0.935	1.860
		5210.0	9.083	0.2	15	7.71	5.9	1	0.187	0.372
		5290.0	9.178	0.2	17.5	6.84	4.83	1	0.272	0.541
		5530.0	9.46	0.2	17	7.71	5.9	1	0.296	0.589
		5775.0	9.745	0.2	19	7.71	5.9	1	0.469	0.933



Note:

1. Mobile or fixed location transmitters, minimum separation distance is 0.2m, even if calculations indicate MPE distance is less.
2. The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.
3. Each band max power which perform MPE of any configurations.
4. The MPE results are evaluated by lowest data rate for WLAN.
5. The device operating IEEE 802.11 a mode is 2TX CDD.
6. The device operating IEEE 802.11 n/ac mode is 2TX MIMO / CDD.
7. The device support simultaneous transmission.
8. The max ANT Gain with Beamforming= $4.7 + 3.01 = 7.71$.
9. We used the maximum antenna gain to provide MPE results.

Simultaneous Transmitting :

$$\text{Total MPE} = 2.4\text{GHz MPE} + 5\text{GHz MPE} = 4.88 + 2.63 = 7.51 \text{ (W)/m}^2 < 10 \text{ (W)/m}^2$$