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MPE Report

Applicant	：	Rajant Corporation
Product Type	：	MiniPCIe Radio Module 11a/n ,2x2 (RJ-1701)
Trade Name	：	VIZMONET
Model Number	：	RJ-1701
Received Date	：	Dec. 06, 2018
Test Period	：	Dec. 14, 2018
Issue Date	：	May 24, 2019
Test Specification	：	ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013
		47 CFR § 2.1091
		47 CFR § 1.1310

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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4. This document may be altered or revised by A Test Lab Techno. Corp. personnel only, and shall be noted in the revision section of the document.

Approved By ： Edison Hu (Edison Hu)　　Tested By ： Kris Pan (Kris Pan)

Contents

1. Description of Equipment under Test (EUT)

Applicant	Rajant Corporation 400 East King Street, Malvern, Pennsylvania, 19355-3258, United States www.rajant.com				
Manufacturer	Vizmonet Pte Ltd 21, Woodlands Close, #02-07, Primz Biz Hub, Singapore 737 854 www.vizmonet.com				
Product Type	MiniPCIe Radio Module 11a/n ,2x2 (RJ-1701)				
Trade Name	VIZMONET				
Model Number	RJ-1701				
FCC ID	VJA-RJ1701				
Frequency Range	Operate Band			Frequency Range (MHz)	
	IEEE 802.11a U-NII Band I			5180 - 5240	
	IEEE 802.11a U-NII Band III			5745 - 5825	
	IEEE 802.11n 5 GHz 20 MHz U-NII Band I			5180 - 5240	
	IEEE 802.11n 5 GHz 20 MHz U-NII Band III			5745 - 5825	
	IEEE 802.11n 5 GHz 40 MHz U-NII Band I			5190 - 5230	
	IEEE 802.11n 5 GHz 40 MHz U-NII Band III			5755 - 5795	
Antenna Information	ANT	Model	Type	Frequency Range (MHz)	Max. Gain (dBi)
	ANT-0 / ANT-1	KMA-5250-7-NM	External type (Omni)	5180 - 5240	7
	ANT-0 / ANT-1	KMA-5800-6-NM	External type (Omni)	5745 - 5825	6
	Note: Antenna connector is N type and this device must be professionally installed.				
Antenna Delivery	IEEE 802.11a: 1TX (Diversity) IEEE 802.11n 5 GHz 20 MHz / 40 MHz: 1TX (SISO) & 2TX (STBC)				
RF Evaluation	0.250 mW/cm^2				
Temperature Range	-40 ~ +85°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. 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 a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to 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 FCC’s 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. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

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. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)	
			ANT-0	ANT-1
IEEE 802.11a Diversity	6	5180.0	20.05	22.44
		5200.0	20.15	22.37
		5220.0	19.97	22.70
		5240.0	20.49	**22.96**
		5745.0	21.35	**23.57**
		5765.0	21.39	23.25
		5785.0	21.82	23.30
		5805.0	21.53	22.90
		5825.0	21.58	22.53
	54	5180.0	19.95	22.35
		5200.0	20.06	22.30
		5220.0	19.90	22.60
		5240.0	20.42	22.89
		5745.0	21.29	23.50
		5765.0	21.32	23.17
		5785.0	21.75	23.19
		5805.0	21.49	22.82
		5825.0	21.50	22.47
IEEE 802.11n 5 GHz 20 MHz SISO	6.5	5180.0	20.03	22.25
		5200.0	20.14	22.14
		5220.0	19.98	22.53
		5240.0	20.49	**22.85**
		5745.0	21.39	**23.41**
		5765.0	21.36	23.12
		5785.0	21.86	23.10
		5805.0	21.52	22.81
		5825.0	21.58	22.42
	72.2	5180.0	19.92	22.17
		5200.0	20.01	22.02
		5220.0	19.90	22.46
		5240.0	20.43	22.76
		5745.0	21.33	23.34
		5765.0	21.28	23.03
		5785.0	21.80	23.01
		5805.0	21.47	22.74
		5825.0	21.49	22.35

Note: The relevant measured result has the offset with cable loss already.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)	
			ANT-0	ANT-1
IEEE 802.11n 5 GHz 40 MHz SISO	13.5	5190.0	16.01	18.48
		5230.0	20.19	**22.69**
		5755.0	21.12	**23.27**
		5795.0	21.61	22.92
	150	5190.0	15.92	18.41
		5230.0	20.07	22.60
		5755.0	21.03	23.19
		5795.0	21.54	22.82

Note: The relevant measured result has the offset with cable loss already.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11n 5 GHz 20 MHz STBC	13	5180.0	17.40	19.31	21.47
		5200.0	17.44	19.71	21.73
		5220.0	17.85	20.04	22.09
		5240.0	18.31	20.40	**22.49**
		5745.0	21.19	22.49	24.90
		5765.0	21.20	22.18	24.73
		5785.0	21.68	22.23	**24.97**
		5805.0	21.38	21.86	24.64
		5825.0	21.42	21.44	24.44
	144.4	5180.0	17.35	19.27	21.43
		5200.0	17.40	19.65	21.68
		5220.0	17.75	19.94	21.99
		5240.0	18.28	19.32	21.84
		5745.0	21.09	22.40	24.80
		5765.0	21.12	22.13	24.66
		5785.0	21.60	22.16	24.90
		5805.0	21.31	21.79	24.57
		5825.0	21.37	21.36	24.38
IEEE 802.11n 5 GHz 40 MHz STBC	27	5190.0	13.93	15.85	18.01
		5230.0	17.93	20.26	**22.26**
		5755.0	19.14	21.01	23.19
		5795.0	19.76	20.82	**23.33**
	300	5190.0	13.87	15.80	17.95
		5230.0	17.86	20.18	22.18
		5755.0	19.06	20.92	23.10
		5795.0	19.69	20.74	23.26

Note: The relevant measured result has the offset with cable loss already.

4. Test Results

Band	Data Rate (Mbps)	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw/cm^2)
IEEE 802.11a Diversity	6	5180.0	1	20	23.00	7.00	5.01	1	999.63	0.199
		5200.0	1	20	23.00	7.00	5.01	1	999.63	0.199
		5220.0	1	20	23.00	7.00	5.01	1	999.63	0.199
		5240.0	1	20	23.00	7.00	5.01	1	999.63	0.199
		5745.0	1	20	23.60	6.00	3.98	1	911.77	0.181
		5765.0	1	20	23.60	6.00	3.98	1	911.77	0.181
		5785.0	1	20	23.60	6.00	3.98	1	911.77	0.181
		5805.0	1	20	23.60	6.00	3.98	1	911.77	0.181
		5825.0	1	20	23.60	6.00	3.98	1	911.77	0.181
IEEE 802.11n 5 GHz 20 MHz SISO	6.5	5180.0	1	20	22.90	7.00	5.01	1	976.87	0.194
		5200.0	1	20	22.90	7.00	5.01	1	976.87	0.194
		5220.0	1	20	22.90	7.00	5.01	1	976.87	0.194
		5240.0	1	20	22.90	7.00	5.01	1	976.87	0.194
		5745.0	1	20	23.50	6.00	3.98	1	891.01	0.177
		5765.0	1	20	23.50	6.00	3.98	1	891.01	0.177
		5785.0	1	20	23.50	6.00	3.98	1	891.01	0.177
		5805.0	1	20	23.50	6.00	3.98	1	891.01	0.177
		5825.0	1	20	23.50	6.00	3.98	1	891.01	0.177
IEEE 802.11n 5 GHz 40 MHz SISO	13.5	5190.0	1	20	22.80	7.00	5.01	1	954.64	0.190
		5230.0	1	20	22.80	7.00	5.01	1	954.64	0.190
		5755.0	1	20	23.30	6.00	3.98	1	850.91	0.169
		5795.0	1	20	23.30	6.00	3.98	1	850.91	0.169
IEEE 802.11n 5 GHz 20 MHz STBC	13	5180.0	1	20	22.60	7.00	5.01	1	911.67	0.181
		5200.0	1	20	22.60	7.00	5.01	1	911.67	0.181
		5220.0	1	20	22.60	7.00	5.01	1	911.67	0.181
		5240.0	1	20	22.60	7.00	5.01	1	911.67	0.181
		5745.0	1	20	25.00	6.00	3.98	1	1258.59	0.250
		5765.0	1	20	25.00	6.00	3.98	1	1258.59	0.250
		5785.0	1	20	25.00	6.00	3.98	1	1258.59	0.250
		5805.0	1	20	25.00	6.00	3.98	1	1258.59	0.250
		5825.0	1	20	25.00	6.00	3.98	1	1258.59	0.250
IEEE 802.11n 5 GHz 40 MHz STBC	27	5190.0	1	20	22.30	7.00	5.01	1	850.82	0.169
		5230.0	1	20	22.30	7.00	5.01	1	850.82	0.169
		5755.0	1	20	23.50	6.00	3.98	1	891.01	0.177
		5795.0	1	20	23.50	6.00	3.98	1	891.01	0.177

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. The Numeric Gain calculated by 10^(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 1TX (Diversity).
6. The device operating IEEE 802.11 n mode is 1TX (SISO) & 2TX (STBC).