A Test Lab Techno Corp.

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MPE Report

Test Report No.	:	1608FS16
Applicant	:	MitraStar Technology Corporation
Product Type	:	Adaptador Wifi+ Dual
Trade Name	:	MitraStar
Model Number	:	HGW-500BNA-QC v2
Date of Received	:	Aug. 11, 2016
Test Period	:	Aug. 18, 2016
Date of Issued	:	Aug. 31, 2016
Test Specification	:	ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013
		47 CFR § 2.1091
		47 CFR § 1.1310
Location of Test Lab.	:	Chang-an Lab.

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 : _____
(Bill Hu)

Tested By : _____
(Mark Duan)

Contents

1. Description of Equipment under Test (EUT)

Applicant	MitraStar Technology Corporation No. 6, Innovation Rd II, Science-Based Industrial, Hsin-Chu, Taiwan
Manufacturer(1)	MitraStar Technology Corporation No. 6, Innovation Rd II, Hsinchu Science Park, Hsinchu 30076, Taiwan
Manufacturer(2)	WuXi MitraStar Technology Co. Ltd 60#-E, Minshan Road, Wuxi New district Jangsu, P.R.C.
Product Type	Adaptador Wifi+ Dual
Trade Name	MitraStar
Model Number	HGW-500BNA-QC v2
FCC ID	ZMYHGW500BNAQCV2
Module Used	WLAN Module: DTB-120GN-KE
Frequency Range	IEEE 802.11b / 802.11g / 802.11n 2.4GHz 20MHz : 2412 - 2462 MHz IEEE 802.11n 2.4GHz 40MHz : 2422 - 2452 MHz

Antenna information	Type	Max. Gain (dBi)
	PCB Dipole Antenna	0.10

Directional Gain	3.11 dBi (please refer to RF report)
Antenna Delivery	IEEE 802.11b / 802.11g:2TX+ 2RX (Diversity) IEEE 802.11n 2.4GHz 20MHz / 40MHz: 2TX+ 2RX (MIMO / Diversity)
Temperature Range	0~ +55°C
RF Evaluation	0.204 mW/cm^2

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	CH	Frequency (MHz)	Average Conducted power (dBm)		
				ANT-0	ANT-1	ANT-0+1
IEEE 802.11b (Diversity)	1M	1	2412.0	22.13	21.53	---
		6	2437.0	**23.18**	22.84	---
		11	2462.0	23.18	23.08	---
	2M	6	2437.0	23.08	22.80	---
	5.5M	6	2437.0	23.10	22.81	---
	11M	6	2437.0	23.03	22.77	---
IEEE 802.11g (Diversity)	6M	1	2412.0	17.91	17.33	---
		6	2437.0	**22.01**	21.88	---
		11	2462.0	18.24	17.84	---
	9M	6	2437.0	21.95	21.80	---
	12M	6	2437.0	21.90	21.77	---
	18M	6	2437.0	21.92	21.79	---
	24M	6	2437.0	21.88	21.75	---
	36M	6	2437.0	21.86	21.71	---
	48M	6	2437.0	21.81	21.66	---
	54M	6	2437.0	21.78	21.64	---
IEEE 802.11n 2.4GHz 20MHz (MIMO)	13M	1	2412.0	17.49	17.44	20.48
		6	2437.0	23.26	23.12	26.20
		11	2462.0	18.25	17.76	21.02
	26M	6	2437.0	23.20	23.10	26.16
	39M	6	2437.0	23.17	23.05	26.12
	52M	6	2437.0	23.10	23.02	26.07
	78M	6	2437.0	23.14	23.04	**26.10**
	104M	6	2437.0	23.08	22.99	26.05
	117M	6	2437.0	23.02	22.96	26.00
	130M	6	2437.0	22.98	22.91	25.96
IEEE 802.11n 2.4GHz 40MHz (MIMO)	27M	3	2422.0	17.42	17.57	20.51
		6	2437.0	19.27	19.66	**22.48**
		9	2452.0	17.57	17.05	20.33
	54M	6	2437.0	19.20	19.60	22.41
	81M	6	2437.0	19.17	19.58	22.39
	108M	6	2437.0	19.13	19.51	22.33
	162M	6	2437.0	19.10	19.48	22.30
	216M	6	2437.0	19.12	19.50	22.32
	243M	6	2437.0	19.08	19.46	22.28
	135M	6	2437.0	19.06	19.41	22.25

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)		
				ANT-0	ANT-1	ANT-0+1
IEEE 802.11n 2.4GHz 20MHz MCS0 (Diversity)	13M	1	2412.0	18.39	18.28	---
		6	2437.0	**23.06**	23.04	---
		11	2462.0	18.86	18.71	---
	26M	6	2437.0	23.02	23.00	---
	39M	6	2437.0	23.00	22.96	---
	52M	6	2437.0	22.97	22.91	---
	78M	6	2437.0	22.92	22.88	---
	104M	6	2437.0	22.94	22.90	---
	117M	6	2437.0	22.90	22.86	---
	130M	6	2437.0	22.86	22.82	---
IEEE 802.11n 2.4GHz 40MHz MCS0 (Diversity)	27M	3	2422.0	18.09	17.59	---
		6	2437.0	**20.62**	20.48	---
		9	2452.0	18.41	17.98	---
	54M	6	2437.0	20.58	20.50	---
	81M	6	2437.0	20.55	20.48	---
	108M	6	2437.0	20.52	20.45	---
	162M	6	2437.0	20.50	20.41	---
	216M	6	2437.0	20.53	20.44	---
	243M	6	2437.0	20.48	20.40	---
	135M	6	2437.0	20.42	20.38	---

4. Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm²)
IEEE 802.11b (Diversity) ANT-0	1M	2412	1	20	24.00	0.10	1.02	1	256.210	0.051
		2437	1	20	24.00	0.10	1.02	1	256.210	0.051
		2462	1	20	24.00	0.10	1.02	1	256.210	0.051
IEEE 802.11g (Diversity) ANT-0	6M	2412	1	20	18.00	0.10	1.02	1	64.360	0.013
		2437	1	20	23.00	0.10	1.02	1	203.520	0.040
		2462	1	20	19.00	0.10	1.02	1	81.020	0.016
IEEE 802.11n 2.4GHz 20MHz (MIMO)	13M	2412	1	20	22.00	3.11	2.05	1	324.900	0.065
		2437	1	20	27.00	3.11	2.05	1	1027.430	0.204
		2462	1	20	22.00	3.11	2.05	1	324.900	0.065
IEEE 802.11n 2.4GHz 40MHz (MIMO)	27M	2422	1	20	21.00	3.11	2.05	1	258.080	0.051
		2437	1	20	24.00	3.11	2.05	1	514.940	0.102
		2452	1	20	22.00	3.11	2.05	1	324.900	0.065
IEEE 802.11n 2.4GHz 20MHz (Diversity) ANT-0	13M	2412	1	20	19.00	0.10	1.02	1	81.020	0.016
		2437	1	20	24.00	0.10	1.02	1	256.210	0.051
		2462	1	20	19.00	0.10	1.02	1	81.020	0.016
IEEE 802.11n 2.4GHz 40MHz (Diversity) ANT-0	27M	2422	1	20	19.00	0.10	1.02	1	81.020	0.016
		2437	1	20	21.00	0.10	1.02	1	128.410	0.026
		2452	1	20	19.00	0.10	1.02	1	81.020	0.016

Note:

1. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).

2. Each band max power which perform MPE of any configurations.

3. The device operating IEEE 802.11b/g mode is Diversity with transmit signals to 2TX.

4. The device operating IEEE 802.11n mode is MIMO/Diversity with transmit signals to 2TX