RF EXPOSURE REPORT

REPORT NO.: SA990701C17A

MODEL NO.: VEN401-XX

(The “X” of model name could be 0~9, A~Z or blank)

FCC ID: MXF-AP990624M

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: Gemtek Technology Co., Ltd.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

LAB ADDRESS: No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

TEST LOCATION (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

RF Exposure Measurement

1. Introduction

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in our lab, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

2. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
300-1500	…	…	F/300	6
1500-100,000	…	…	5	6
(B)Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

3. Friis Formula

Friis transmission formula : $Pd = (Pout*G) / (4*pi*r^2)$

where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm^2. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance 20cm.

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition,
Page 640, Eq. (11-133).

4. EUT Operating condition

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

5. Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

6. TEST RESULTS

6.1 Antenna Gain

There is one set of antenna provided to this EUT, please refer to the following table:

Chain	Antenna Gain			Antenna Type	Connector
	For 5.15~5.25GHz Gain (dBi)	For 5.25~5.35GHz Gain (dBi)	For 5.47~5.725 GHz & 5.725~5.85GHz Gain (dBi)		
0	Peak Gain Top Front Antenna 3.4	Peak Gain Top Front Antenna 3.3	Peak Gain Top Front Antenna 4.3	PIFA	NA
1	Peak Gain Top Middle Antenna 3.9 (Rx only)	Peak Gain Top Middle Antenna 4.0 (Rx only)	Peak Gain Top Middle Antenna 4.5 (Rx only)	PIFA	NA
2	Peak Gain Top Rear Antenna 3.7	Peak Gain Top Rear Antenna 4.3	Peak Gain Top Rear Antenna 4.2	PIFA	NA

6.2 Output Power Into Antenna & RF Exposure value at distance 20cm:

802.11a:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
52	5260	72.4	0.039	1.0
60	5300	74.1	0.040	1.0
64	5320	63.1	0.034	1.0
100	5500	61.7	0.033	1.0
116	5580	70.8	0.038	1.0
132	5660	75.9	0.041	1.0
140	5770	72.4	0.039	1.0

802.11n (20MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
52	5260	133.7	0.072	1.0
60	5300	133.7	0.072	1.0
64	5320	124.8	0.067	1.0
100	5500	129.2	0.069	1.0
116	5580	135.3	0.072	1.0
132	5660	137.0	0.073	1.0
140	5770	140.0	0.075	1.0

802.11n (40MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
54	5270	224.5	0.120	1.0
62	5310	61.1	0.033	1.0
102	5510	93.6	0.050	1.0
110	5550	240.5	0.129	1.0
134	5670	232.3	0.124	1.0

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