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Report No.: SZEM130600343105

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# RF Exposure Evaluation Report

**Application No.:** SZEM1306003431RF

**Applicant:** Vignet Incorporated

**Manufacturer:** IDT Technology Limited

**Factory** IDT Technology Limited

**Product Name:** The Hub device

**Model No.(EUT):** AD802

**Add Model No.:** AD803, AD8XX where(X=0,1,2,...9)

**FCC ID:** 2AAS3VHUBI

**Standards:** 47 CFR Part 1.1307(2012)

47 CFR Part 1.1310(2012)

**Date of Receipt:** 2013-07-19

**Date of Test:** 2013-07-25 to 2013-09-05

**Date of Issue:** 2013-11-01

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 3 General Information

### 3.1 Client Information

Applicant:	Vignet Incorporated
Address of Applicant:	1616 Anderson Road, Mclean, VA USA
Manufacturer:	IDT Technology Limited
Address of Manufacturer:	Block C, 9/F., Kaiser Estate, Phase 1, 41 Man YueStreet, HungHom, Kowloon, Hong Kong.
Factory:	IDT Technology Limited
Address of Factory:	Chentian Industrial Estate Xixiang, BaoAn, Shenzhen, P.R.C.

### 3.2 General Description of EUT

Product Name:	The Hub device	
Model No.:	AD802,AD803,AD8XX where(X=0,1,2,...9) (Only the Model AD802 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models. Only different on exterior.)	
Trade Mark:	Vignet	
Power Supply:	Adapter:	MODEL NO.:SCE0501500P INPUT:100-240V~50-60Hz 300mA OUTPUT:5V 1500mA
	Battery:	Li-Ion Battery, 3.7V 480mAh
Test Voltage:	AC 120V~ 60Hz	
DC cable:	141cm	

#### BT2.1:

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V2.1+EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Sample Type:	fixed production
Test Software of EUT:	N/A(manufacturer declare )
Antenna Type	Integral
Antenna Gain	1.15dBi

<b>BT4.0:</b>	
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	4.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Sample Type:	fixed production
Test Software of EUT:	N/A(manufacturer declare )
Antenna Type	Integral
Antenna Gain	2.31dBi
<b>Wi-Fi:</b>	
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Modulation Type:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(T20) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Number of Channel:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Sample Type:	fixed production
Test Software of EUT:	N/A(manufacturer declare )
Antenna Type	Integral
Antenna Gain	1.15dBi
<b>GSM:</b>	
Frequency Band:	GSM 850: Tx:824.20 -848.80MHz;Rx: 869.20 – 893.80MHz GSM 1900: Tx:1850.20 – 1909.80MHz;Rx:1930.20 – 1989.80MHz WCDMA/HSDPA 850 Band V: Tx:826.40 -846.60MHz;Rx: 871.40 – 891.60MHz WCDMA/HSDPA 1900 Band II: Tx:1852.40 – 1907.60MHz;Rx:1932.40 – 1987.60MHz
Type of Emission:	GSM/GPRS(GMSK):300KGXW EDGE(8PSK):300KG7W WCDMA(QPSK):4M20F9W
Modulation Type:	GSM/GPRS Mode with GMSK Modulation EDGE Mode with 8-PSK Modulation WCDMA Mode with QPSK Modulation
Power class:	5
Sample Type:	fixed production
Antenna Type:	Integral
Antenna Gain:	850MHz: 0.53dBi, 900MHz: 0.64dBi, 1800MHz: 1.45dBi, 1900MHz: 1.53dBi

### **3.3 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

### **3.4 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

### **3.5 Deviation from Standards**

None.

### **3.6 Abnormalities from Standard Conditions**

None.

### **3.7 Other Information Requested by the Customer**

None.

## 4 RF Exposure Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

#### 4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## 4.2 4.1.3 EUT RF Exposure Evaluation

### BT 2.1:

Antenna Gain: 1.15dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.303 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Highest test	2480	9.30	8.551	0.001956	1.0	PASS

Note: Refer to report No. SZEM130600343101 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

### BT 4.0:

Antenna Gain: 2.31dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.702 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
lowest test	2402	5.02	3.177	0.00146	1.0	PASS

Note: Refer to report No. SZEM130600343102 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**Wi-Fi:**

Antenna Gain: 1.15dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.303 in linear scale.

Output Power Into Antenna &amp; RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Highest test	2480	23.73	236.048	0.0540	1.0	PASS

Note: Refer to report No. SZEM130600343103 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**GSM:**

Antenna Gain: 0.53dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.1298 in linear scale.

Output Power Into Antenna &amp; RF Exposure Evaluation Distance:

Timeslot	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
GSM ONLY 850						
Slot1	848.8	32.5	1778.28	0.3997	0.57	Pass
GPRS(GMSK) 850						
Slot1	848.8	32.5	1778.28	0.3997	0.57	Pass
Slot2	848.8	32.5	1778.28	0.3997	0.57	Pass
EGPRS(GMSK) 850						
Slot1	848.8	32.5	1778.28	0.3997	0.57	Pass
Slot2	848.8	32.5	1778.28	0.3997	0.57	Pass
EGPRS(8PSK) 850						
Slot1	848.8	27.0	501.19	0.1127	0.57	Pass
Slot2	848.8	27.0	501.19	0.1127	0.57	Pass
Slot3	848.8	27.0	501.19	0.1127	0.57	Pass
Slot4	848.8	27.0	501.19	0.1127	0.57	Pass
WCDMA 850						
RMC	826.4	24.0	251.19	0.0565	0.55	Pass

Antenna Gain: 1.53dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.4223 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Timeslot	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
GSM ONLY 1900						
Slot1	1850.2	27.5	562.34	0.4379	1.0	Pass
GPRS(GMSK) 1900						
Slot1	1850.2	27.5	562.34	0.4379	1.0	Pass
Slot2	1850.2	27.5	562.34	0.4379	1.0	Pass
EGPRS(GMSK) 1900						
Slot1	1850.2	27.5	562.34	0.4379	1.0	Pass
Slot2	1850.2	27.5	562.34	0.4379	1.0	Pass
EGPRS(8PSK) 1900						
Slot1	1850.2	25.0	316.23	0.0895	1.0	Pass
Slot2	1850.2	25.0	316.23	0.0895	1.0	Pass
Slot3	1850.2	25.0	316.23	0.0895	1.0	Pass
Slot4	1850.2	25.0	316.23	0.0895	1.0	Pass
WCDMA 1900						
RMC	1950.0	22.0	158.49	0.0448	1.0	Pass

Note: Refer to report No. SZEM130600343104 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Friis transmission formula is far greater than 20 cm separation requirement.

In simultaneous transmission system, the sum of max Power Density at R = 20 cm of BT2.1, BT4.0, WiFi and GSM 1900 is less than 1(mW/cm<sup>2</sup>)

BT2.1	BT4.0	WiFi	GSM1900	The total Power Density
0.01956	0.00146	0.0540	0.4379	0.51292

The sum of the MPE ratios for all simultaneous transmitting antennas incorporated is 0.51292 mW/cm<sup>2</sup> less than 1 mW/cm<sup>2</sup>, so the SAR is not required.

NOTE: According to the 7.2 section of KDB 447498.