

# HCT CO., LTD.



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## EMI REPORT (DoC)

UTStarcom Inc.

555 Wireless Boulevard Hauppauge, NY 11788

Date of Issue: February 04, 2008

Test Report No.: HCT-F08-0202

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

**MODEL:**

**UM100C**

Classification/ Standard(s): FCC PART 15 Subpart B / CISPR 22 CLASS B

Equipment (EUT) Type: Tri-Band CDMA/EVDO USB Modem

Trade Name/Model(s): UTStarcom, Inc. / UM100C

Port/ Connector(s) DC Input Port

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.(See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse of 1988,21 U.S.C.853(a).

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## **1. GENERAL INFORMATION**

### **1.1 Product Description**

The UTStarcom, Inc. UM100C Tri-Band CDMA/EVDO USB Modem. Its basic purpose is used for communications. It transmits from CDMA 835 (824.7 MHz – 848.31 MHz), PCS1900 (1851.25 MHz – 1908.75 MHz), AWS Band (1710 MHz – 1755 MHz) and receives from CDMA 835 (869.70 MHz – 893.31 MHz), PCS1900 (1931.25 MHz – 1988.75 MHz), AWS Band (2110 MHz – 2155 MHz).

MODEL	UM100C
EUT Type	Tri-Band CDMA/EVDO USB Modem
TX Frequency	824.70 MHz – 848.31 MHz (CDMA 835) 1851.25 MHz – 1908.75 MHz (PCS 1900) 1710 MHz – 1755 MHz (AWS Band)
RX Frequency	869.70 MHz – 893.31 MHz (CDMA 835) 1931.25 MHz – 1988.75 MHz (PCS 1900) 2110 MHz – 2155 MHz (AWS Band)

### **1.2 Related Submittal(s) / Grant(s)**

ORIGINAL SUBMITTAL ONLY

### **1.3 Tested System Details**

All equipment descriptions used in the tested system (including inserted cards) are:

DEVICE TYPE	MANUFACTURER	MODEL NUMBER/ PART NUMBER	FCC ID / DoC	CONNECTED TO
<b>Tri-Band CDMA/EVDO USB Modem</b>	<b>UTStarcom, Inc.</b>	<b>UM100C</b>	<b>O6Y-UM100C</b>	<b>Notebook PC</b>
<b>USB Cable</b>	-	-	-	<b>EUT, Notebook PC</b>
<b>Notebook PC</b>	<b>TOSHIBA</b>	<b>PSMA2K-01D002</b>	-	<b>EUT, TA</b>
<b>Notebook PC Adaptor</b>	<b>DELTA</b>	<b>SADP-65KB B</b>	-	<b>Notebook PC</b>
<b>Mouse</b>	<b>DELL</b>	<b>MO56U0</b>	-	<b>Notebook PC</b>

### **1.4 Cable Description**

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
<b>Tri-Band CDMA/EVDO USB Modem</b>	<b>USB</b>	<b>Y</b>	<b>Y</b>	<b>0.9 (P, D)</b>
<b>Notebook PC</b>	<b>USB (Mouse)</b>	<b>N/A</b>	<b>Y</b>	<b>1.8(D)</b>

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

### **1.5 Noise Suppression Parts on Cable. (I/O CABLE)**

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
<b>Tri-Band CDMA/EVDO USB Modem</b>	<b>USB</b>	<b>Y</b>	<b>Both End</b>	<b>Y</b>	<b>Both End</b>
<b>Notebook PC</b>	<b>USB (Mouse)</b>	<b>N</b>	-	<b>Y</b>	<b>Notebook End</b>

## **1.6 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

## **1.7 Test Facility**

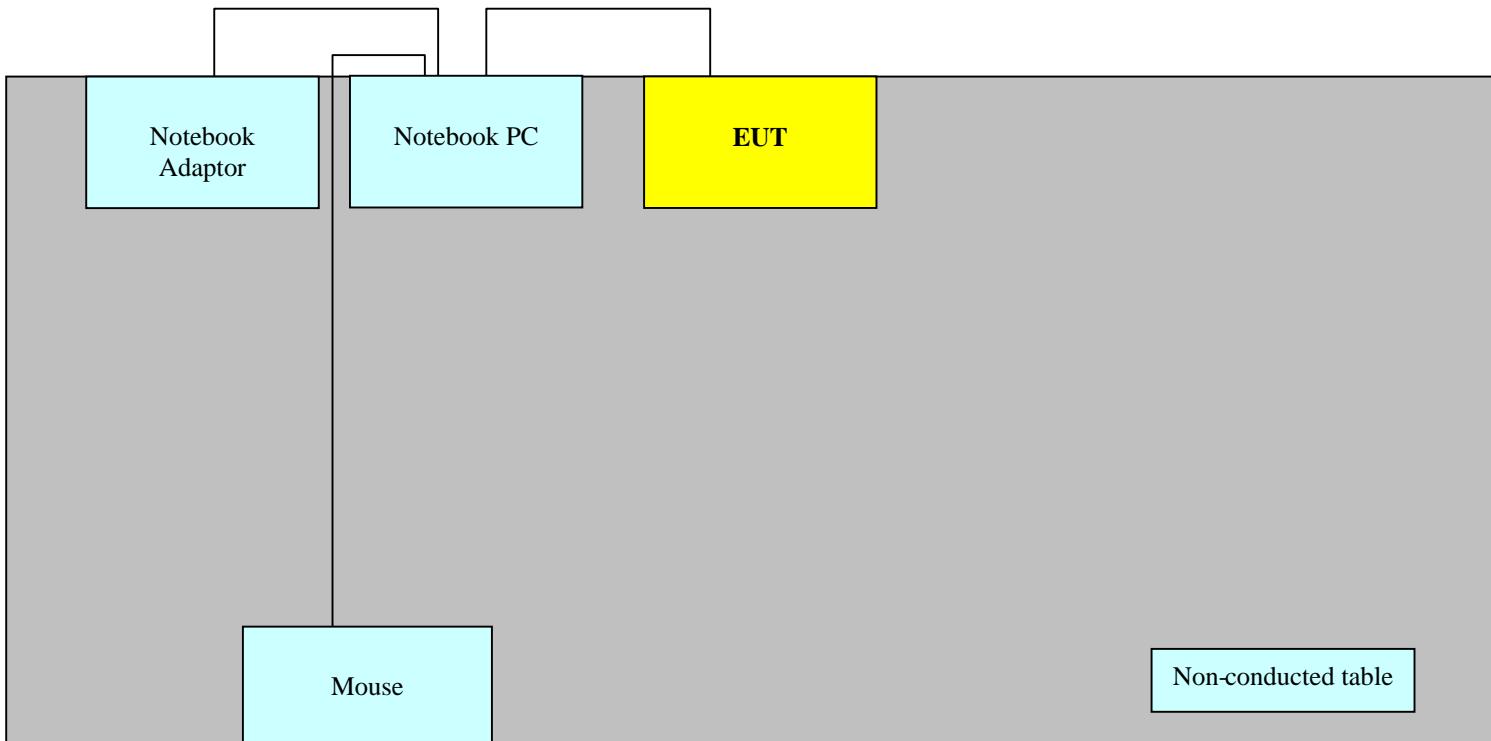
The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

## **2.SYSTEM TEST CONFIGURATION**

### **2.1 Configuration of Test system**

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.

Radiated Emission Test : Preliminary Radiated Emissions tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 meter open area test site.



Power Line: 110V AC

[Configuration of Tested System]

### **3. PRELIMINARY TEST**

#### **3.1 Conducted Emission Test**

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The worst operating condition
Idle (835,1900, AWS) Mode	O

#### **3. 2 Radiated Emission Test**

During Preliminary Test, the Following operation mode was investigated

Operation Mode	The worst operating condition
Idle (835,1900, AWS) Mode	O

## **4. CONDUCTED AND RADIATED EMISSION TESTS SUMMARY**

### **4.1 Conducted Emission Test**

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

---

---

Limit apply to	: CISPR 22 CLASS B
Result	: PASSED BY – 14.4 dB
Operating Condition	: Idle mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 1.0 °C
Humidity Level	: 39.0 %
Test Date	: January 30, 2008

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dBuV)	Conductor	Result	Limit (dBuV)	Margin (dB)
4.9560	39.9	HOT	Quasi-Peak	56.0	-16.1
4.8880	31.6	HOT	Average	46.0	-14.4
4.9520	39.6	NEUTRAL	Quasi-Peak	56.0	-16.4
0.2001	38.7	NEUTRAL	Average	54.0	-14.9

Line Conducted Emission Tabulated Data

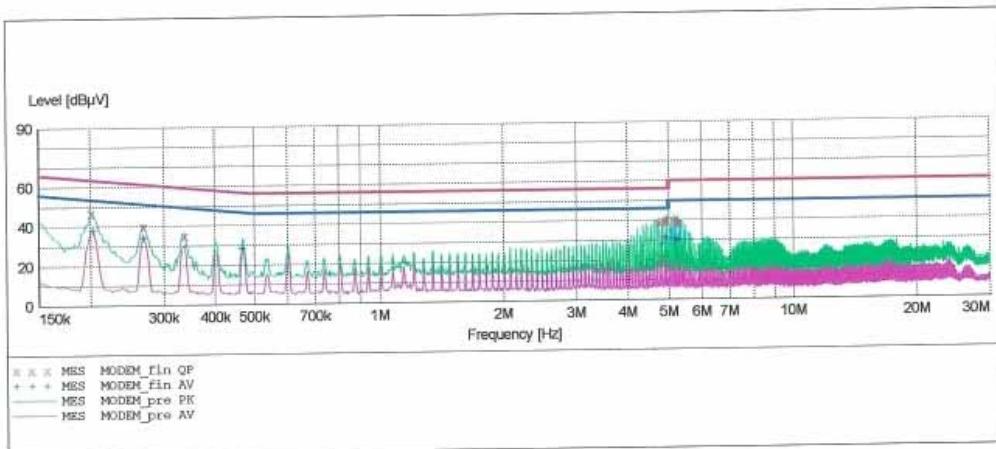
**HCT**

**EMC TEST LAB.**

EUT: UM100C  
 Manufacturer: UTStarcom  
 Operating Condition: IDLE MODE  
 Test Site: SHIELD ROOM  
 Operator: DH.RYU  
 Test Specification: CISPR 22 CLASS B  
 Comment: H

**SCAN TABLE: "CISPR 22 Voltage"**

Short Description:		CISPR 22 Voltage				
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



**MEASUREMENT RESULT: "MODEM\_fin\_QP"**

1/30/2008 5:59PM	Frequency	Level	Transd	Limit	Margin	Line	PE
	MHz	dB $\mu$ V	dB	dB $\mu$ V	dB		
	0.200100	47.00	10.0	64	16.6	---	---
	0.267600	39.90	10.0	61	21.3	---	---
	0.337600	34.90	10.0	59	24.4	---	---
	4.752000	38.70	10.6	56	17.3	---	---
	4.888000	39.30	10.6	56	16.7	---	---
	4.956000	39.90	10.6	56	16.1	---	---
	5.156000	39.80	10.6	60	20.2	---	---
	5.224000	38.70	10.7	60	21.3	---	---
	5.288000	39.20	10.7	60	20.8	---	---

**MEASUREMENT RESULT: "MODEM\_fin AV"**

1/30/2008 5:59PM

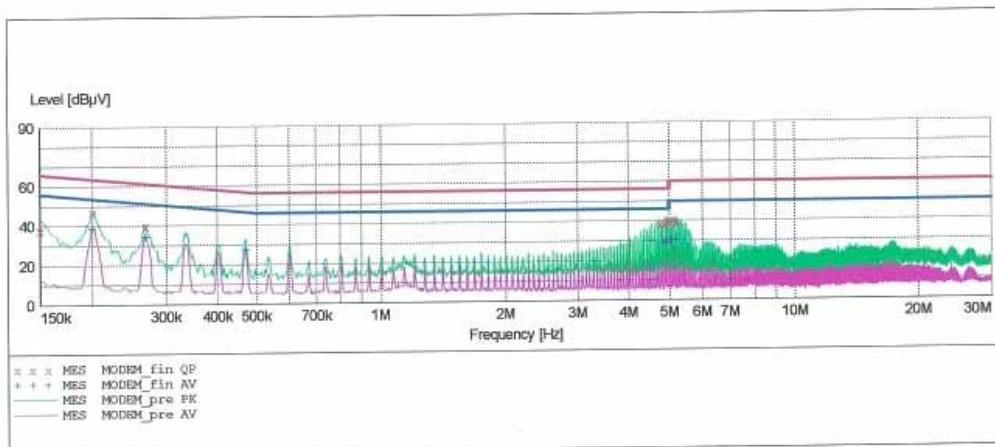
Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.202600	38.00	10.0	54	15.5	---	---
0.267600	34.40	10.0	51	16.8	---	---
0.467600	28.50	10.1	47	18.0	---	---
4.824000	28.40	10.6	46	17.6	---	---
4.888000	31.60	10.6	46	14.4	---	---
4.956000	31.50	10.6	46	14.5	---	---
5.156000	31.00	10.6	50	19.0	---	---
5.224000	29.70	10.7	50	20.3	---	---
5.288000	30.50	10.7	50	19.5	---	---

**HCT****EMC TEST LAB.**

EUT: UM100C  
Manufacturer: UTStarcom  
Operating Condition: IDLE MODE  
Test Site: SHIELD ROOM  
Operator: DH.RYU  
Test Specification: CISPR 22 CLASS B  
Comment: N

**SCAN TABLE: "CISPR 22 Voltage"**

CISPR 22 Voltage						
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			

**MEASUREMENT RESULT: "MODEM\_fin\_QP"**

1/30/2008 6:03PM	Frequency	Level	Transd	Limit	Margin	Line	PE
	MHz	dBμV	dB	dBμV	dB		
	0.150100	37.60	10.0	66	28.4	---	---
	0.200100	46.90	10.0	64	16.7	---	---
	0.267600	39.60	10.0	61	21.6	---	---
	4.752000	38.00	10.6	56	18.0	---	---
	4.888000	38.20	10.6	56	17.8	---	---
	4.952000	39.60	10.6	56	16.4	---	---
	5.020000	39.80	10.6	60	20.2	---	---
	5.156000	38.70	10.6	60	21.3	---	---
	5.216000	39.40	10.6	60	20.6	---	---

**MEASUREMENT RESULT: "MODEM fin AV"**

1/30/2008 6:03PM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.200100	38.70	10.0	54	14.9	---	---
0.267600	34.50	10.0	51	16.7	---	---
0.470100	27.50	10.1	47	19.0	---	---
4.820000	29.20	10.6	46	16.8	---	---
4.888000	28.70	10.6	46	17.3	---	---
4.952000	30.40	10.6	46	15.6	---	---
5.020000	30.20	10.6	50	19.8	---	---
5.084000	30.50	10.6	50	19.5	---	---
5.220000	30.50	10.6	50	19.5	---	---

## **4.2 Radiated Emission Test**

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

---

---

Limit apply to	: FCC PART 15 Subpart B
Result	: PASSED BY – 15.1 dB
Operating Condition	: Idle mode
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Temperature	: 1.0 °C
Humidity Level	: 39.0 %
Test Date	: January 30, 2008

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
102.4	<b>15.1</b>	<b>9.2</b>	<b>2.4</b>	V	<b>26.7</b>	<b>43.5</b>	<b>-16.8</b>
123.8	<b>12.3</b>	<b>11.3</b>	<b>2.6</b>	V	<b>26.2</b>	<b>43.5</b>	<b>-17.3</b>
480.2	<b>9.1</b>	<b>16.6</b>	<b>5.2</b>	H	<b>30.9</b>	<b>46.0</b>	<b>-15.1</b>
498.6	<b>8.0</b>	<b>16.9</b>	<b>5.3</b>	H	<b>30.2</b>	<b>46.0</b>	<b>-15.8</b>

### Radiated Emissions Tabulated Data

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\*\*\* For measurement over 1 GHz, noise level is more than 10 dB below the limit.

## **4.3 Test Setup Photos**

### **4.3.1 Conducted Emission**



#### **4.3.2 Radiated Emission**



## 5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dBuV/m is obtained. The Antenna Factor of 7.4 dB and a Cable Factor of 1.1 dB is added. The 30 dBuV/m value is mathematically converted to its corresponding level in uV/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

### Radiated emission limits

Frequency of emission	Field strength	
	μV / m	dB μV / m
30 ~ 88	100	40.0
88 ~ 216	150	43.5
216 ~ 960	200	46.0
Above 960	500	54.0

## 6. Test Equipment

Type	Manufacture	Model Number	Next CAL Date
EMI Test Receiver	Rohde & Schwarz	ESI40	2008.11.06
EMI Test Receiver	Rohde & Schwarz	ESCI	2008.06.01
LISN	EMCO	3816/2SH	2009.02.01
LISN	Rohde & Schwarz	ESH2-Z5	2008.04.20
LISN	Rohde & Schwarz	ESH3-Z5	2008.06.13
LISN	EMCO	3816/2SH	2008.06.13
Attenuator	Rohde & Schwarz	ESH3-Z2	2008.10.30
TRILOG Antenna	Schwarzbeck	VULB9168	2008.03.19
Communication Antenna	TDK	LPDA-0802	N/A
Antenna Position Tower	HD	240/520/00	N/A
Base Station	Rohde & Schwarz	CMU 200	2008.02.27
Horn Antenna	Schwarzbeck	BBHA 9120D	2008.03.31
RF-Amplifier	MITEQ	AMF-6D-00101800-35.20P.PS	2008.04.25

## **7. Conclusion**

The data collected shows that the UTStarcom, Inc.

Tri-Band CDMA/EVDO USB Modem. MODEL: UM100C Complies with §15.107 and §15.109 of the FCC Rules.