

# PARTIAL FCC TEST REPORT

## (PART 24)

**REPORT NO.:** RF140806C22-1

**MODEL NO.:** UCAN 3G

**FCC ID:** RLS-STAVL1432

**RECEIVED:** Aug. 06, 2014

**TESTED:** Jan. 15, 2015

**ISSUED:** Jan. 16, 2015

**APPLICANT:** SYSTEMS & TECHNOLOGY CORP.

**ADDRESS:** 18-5F, No.79, Hsin Tai Wu Road, Sec. 1, Hsichih District, New Taipei City, Taiwan, R.O.C.

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

**LAB ADDRESS:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan ( R.O.C. )

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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## TABLE OF CONTENTS

RELEASE CONTROL RECORD .....	3
1 CERTIFICATION .....	4
2 SUMMARY OF TEST RESULTS.....	5
2.1 MEASUREMENT UNCERTAINTY .....	5
2.2 TEST SITE AND INSTRUMENTS .....	6
3 GENERAL INFORMATION .....	7
3.1 GENERAL DESCRIPTION OF EUT.....	7
3.2 CONFIGURATION OF SYSTEM UNDER TEST .....	8
3.3 DESCRIPTION OF SUPPORT UNITS.....	9
3.4 TEST ITEM AND TEST CONFIGURATION .....	9
3.5 EUT OPERATING CONDITIONS.....	10
3.6 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	10
4 TEST TYPES AND RESULTS.....	11
4.1 OUTPUT POWER MEASUREMENT .....	11
4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT .....	11
4.1.2 TEST PROCEDURES .....	11
4.1.3 TEST SETUP .....	11
4.1.4 TEST RESULTS .....	12
4.2 RADIATED POWER EIRP CALCULATION.....	13
4.3 RADIATED EMISSION MEASUREMENT .....	13
4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	13
4.3.2 TEST PROCEDURES .....	13
4.3.3 DEVIATION FROM TEST STANDARD .....	13
4.3.4 TEST SETUP .....	14
4.3.5 TEST RESULTS .....	15
5 PHOTOGRAPHS OF THE TEST CONFIGURATION .....	21
6 INFORMATION ON THE TESTING LABORATORIES .....	22
7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	23



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140806C22-1	Original release	Jan. 16, 2015



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## 1 CERTIFICATION

**PRODUCT:** GPS Vehicle Tracking Device

**MODEL:** UCAN 3G

**BRAND:** CAREU

**APPLICANT:** SYSTEMS & TECHNOLOGY CORP.

**TESTED:** Jan. 15, 2015

**TEST SAMPLE:** Production Unit

**STANDARDS:** FCC Part 24, Subpart E

The above equipment (model: UCAN 3G) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Gina Liu , **DATE** : Jan. 16, 2015

Gina Liu / Specialist

**APPROVED BY** : Sam chen , **DATE** : Jan. 16, 2015

Sam Chen / Senior Project Engineer

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
2.1046 24.232	Equivalent Isotropically Radiated Power	PASS	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	NA	Refer to Note
2.1049 24.238(b)	Occupied Bandwidth	NA	Refer to Note
24.232(d)	Peak to average ratio	NA	Refer to Note
24.238(b)	Band Edge Measurements	NA	Refer to Note
2.1051 24.238	Conducted Spurious Emissions	NA	Refer to Note
2.1053 24.238	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -33.69dB at 5640MHz.

Note: only E.I.R.P and R.S.E. test were performed for this addendum. Refer to 7 layers report no.: MDE\_UBLOX\_1404\_FCCa for other test data.

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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## 2.2 TEST SITE AND INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2014	Apr. 14, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 10, 2014	Dec. 09, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27, 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Aug. 27, 2014	Aug. 26, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 12, 2014	Dec. 11, 2015
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980071	Feb. 27, 2014	Feb. 26, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2014	Oct. 17, 2015
RF signal cable Worken	RG-213	NA	Nov. 07, 2014	Nov. 06, 2015
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Power Splitter Woken	2-18GHz 2Way SMA Fwd.:30W/Rev.:2W Isolated Power	COM412W5E3	Apr. 17, 2014	Apr. 16, 2015
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Communications Tester-Wireless	E5515C	MY52102544	Sep. 11, 2014	Sep. 10, 2016
Radio Communication Analyzer	MT8820C	6201300640	Aug. 01, 2013	Jul. 31, 2015

- NOTE:** 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC 7450F-10.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	GPS Vehicle Tracking Device	
<b>MODEL NO.</b>	UCAN 3G	
<b>POWER SUPPLY</b>	3.7Vdc (battery)	
<b>MODULATION TYPE</b>	<b>GSM/GPRS</b>	GMSK
	<b>EDGE</b>	GMSK, 8PSK
	<b>WCDMA</b>	BPSK
<b>FREQUENCY RANGE</b>	<b>GSM/GPRS/EDGE</b>	1850.2MHz ~ 1909.8MHz
	<b>WCDMA</b>	1852.4MHz ~ 1907.6MHz
<b>MAX. EIRP POWER</b>	<b>GSM</b>	0.72mW
	<b>WCDMA</b>	0.13mW
<b>ANTENNA TYPE</b>	Fixed Internal Antenna	
<b>I/O PORTS</b>	Refer to users' manual	
<b>DATA CABLE</b>	Refer to NOTE as below	
<b>ACCESSORY DEVICES</b>	Refer to NOTE as below	

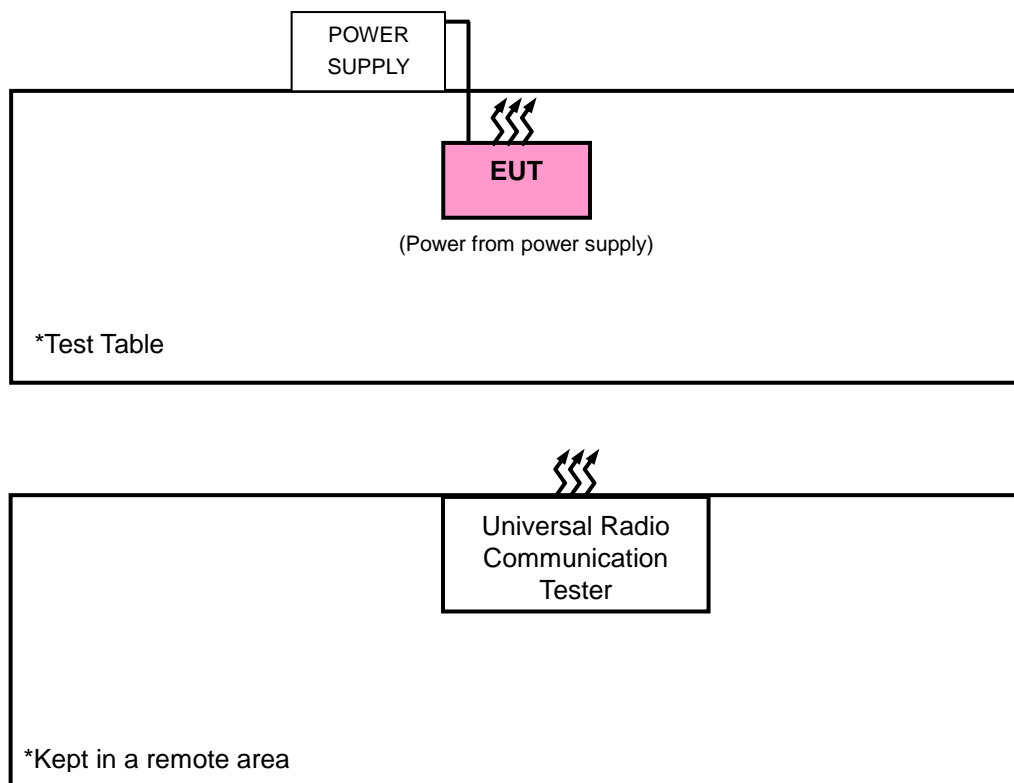
#### NOTE:

- The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Battery 1	AE energy	AE382030P	3.7Vdc, 130mAh
Battery 2	SYNergy	AHB372026PS	3.7Vdc, 145mAh
3G Module	u blox	SARA-U260	--

- The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 CONFIGURATION OF SYSTEM UNDER TEST FOR RADIATION EMISSION TEST







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### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC POWER SUPPLY	Topward	3303D	N/A	NA
2	UNIVERSAL RADIO COMMUNICATION TESTER	R&S	CMU200	123295	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

**NOTE:**

1. All power cords of the above support units are non shielded (1.8m).
2. Item 2 acted as a communication partner to transfer data.

### 3.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Y-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

**GSM MODE**

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	EIRP	512 to 810	-	GSM, EDGE
-	RADIATED EMISSION	512 to 810	661	GSM, EDGE

**WCDMA MODE**

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	EIRP	9262 to 9538	-	WCDMA
-	RADIATED EMISSION	9262 to 9538	9400	WCDMA

**TEST CONDITION:**

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu
RADIATED EMISSION	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu

### **3.5 EUT OPERATING CONDITIONS**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.6 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**ANSI/TIA/EIA-603-C 2004**

**NOTE:** All test items have been performed and recorded as per the above standards.

## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP.

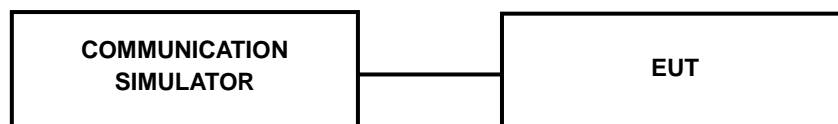
#### 4.1.2 TEST PROCEDURES

##### CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GSM, GPRS, EDGE & WCDMA & LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

#### 4.1.3 TEST SETUP

##### CONDUCTED POWER MEASUREMENT:



#### 4.1.4 TEST RESULTS

##### CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
GPRS 8 (GMSK, 1 slot)	28.57	28.24	27.97
GPRS 10 (GMSK, 2 slot)	28.55	28.23	27.95
GPRS 11 (GMSK, 3 slot)	27.82	27.47	27.18
GPRS 12 (GMSK, 4 slot)	26.79	26.30	26.02
EDGE 8 (GMSK, 1 Uplink)	28.57	28.23	27.96
EDGE 10 (GMSK, 2 Uplink)	28.55	28.22	27.94
EDGE 11 (GMSK, 3 Uplink)	27.81	27.46	27.18
EDGE 12 (GMSK, 4 Uplink)	26.60	26.29	26.00

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	20.85	21.23	20.96
HSDPA Subtest-1	20.81	21.19	20.92
HSDPA Subtest-2	20.55	20.93	20.66
HSDPA Subtest-3	20.37	20.75	20.48
HSDPA Subtest-4	20.06	20.44	20.17
HSUPA Subtest-1	20.66	21.04	20.77
HSUPA Subtest-2	18.86	19.24	18.97
HSUPA Subtest-3	19.63	20.01	19.74
HSUPA Subtest-4	18.57	18.95	18.68
HSUPA Subtest-5	19.81	20.19	19.92

## 4.2 RADIATED POWER EIRP CALCULATION

Pursuant to FCC KDB 412172 D01 Determining ERP and EIRP v01, the ERP and EIRP can be determined from the results of the power measurement of the module, which is integrated into the host.

Based on the maximum conducted power measurement results and the antenna gain in the host, EIRP are determined as below.

Mode	MAX Output Power (dBm)	Ant Gain (dBi)	EIRP (dBm)	EIRP (W)	Part 24.232 Requirement	Result
GSM 1900	28.57	0	28.57	0.72	EIRP<2W	Pass
WCDMA II	21.23	0	21.23	0.13		Pass

## 4.3 RADIATED EMISSION MEASUREMENT

### 4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13dBm.

### 4.3.2 TEST PROCEDURES

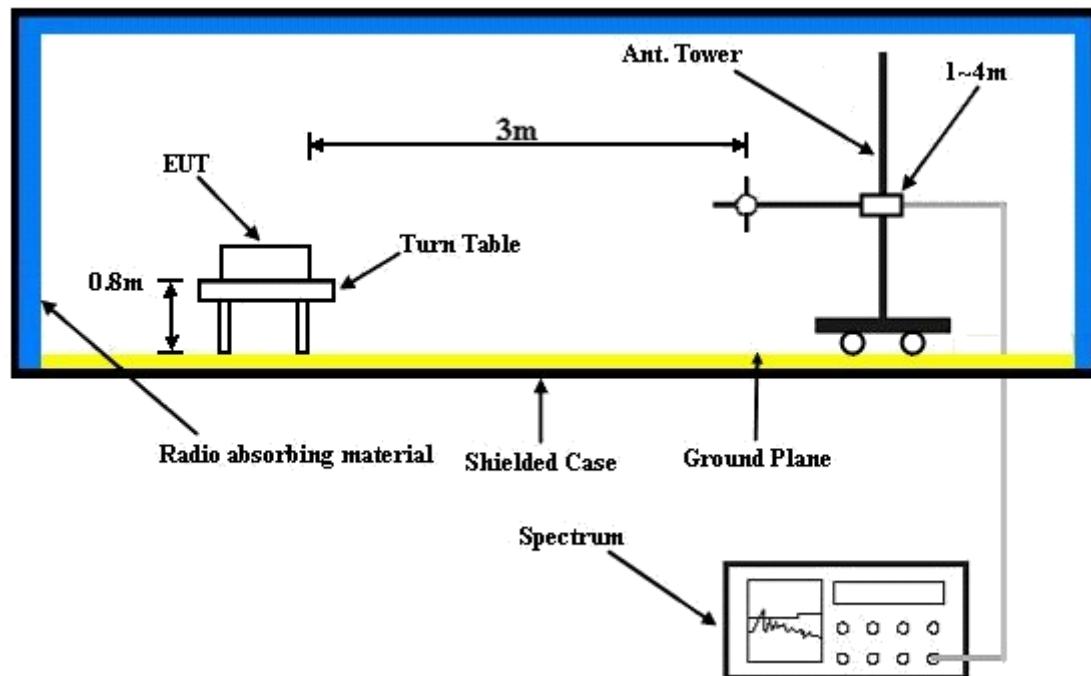
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}.$

**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.3.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.3.5 TEST RESULTS

GSM:

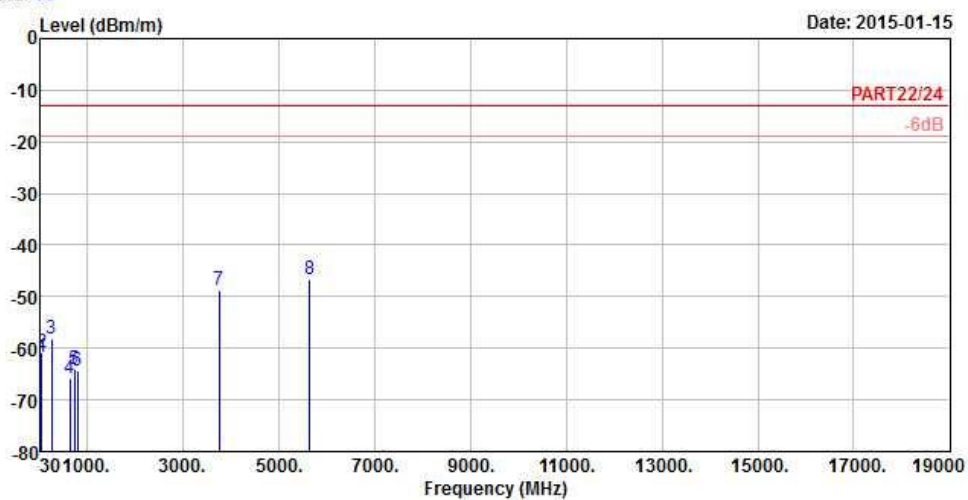


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Data: 13

Date: 2015-01-15



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : GPRS 1900 Link  
Tested by: Gavin Wu  
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	43.77	-61.68	-60.42	-13.00	-48.68	-1.26	Peak
2	56.73	-60.93	-55.28	-13.00	-47.93	-5.65	Peak
3	257.88	-58.11	-52.32	-13.00	-45.11	-5.79	Peak
4	636.70	-65.80	-66.10	-13.00	-52.80	0.30	Peak
5	731.90	-64.13	-65.80	-13.00	-51.13	1.67	Peak
6	792.10	-64.29	-66.37	-13.00	-51.29	2.08	Peak
7	3760.00	-48.77	-40.47	-13.00	-35.77	-8.30	Peak
8 pp	5640.00	-46.69	-44.79	-13.00	-33.69	-1.90	Peak



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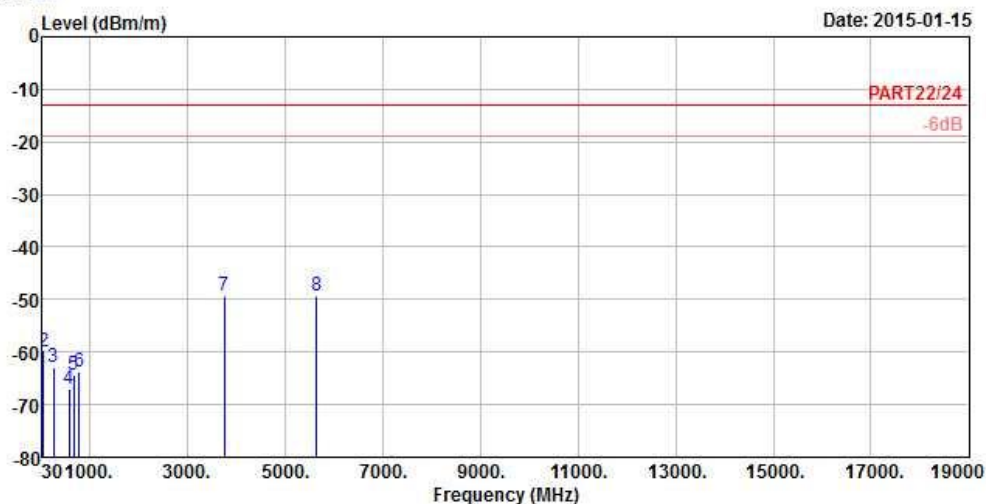


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Data: 14

Date: 2015-01-15



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : GPRS 1900 Link  
Tested by: Gavin Wu  
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	37.56	-63.37	-61.42	-13.00	-50.37	-1.95	Peak
2	56.73	-59.86	-54.21	-13.00	-46.86	-5.65	Peak
3	250.59	-62.92	-57.24	-13.00	-49.92	-5.68	Peak
4	572.30	-66.99	-65.87	-13.00	-53.99	-1.12	Peak
5	678.00	-64.35	-65.40	-13.00	-51.35	1.05	Peak
6	777.40	-63.89	-65.87	-13.00	-50.89	1.98	Peak
7 pp	3760.00	-49.43	-41.13	-13.00	-36.43	-8.30	Peak
8	5640.00	-49.44	-47.54	-13.00	-36.44	-1.90	Peak





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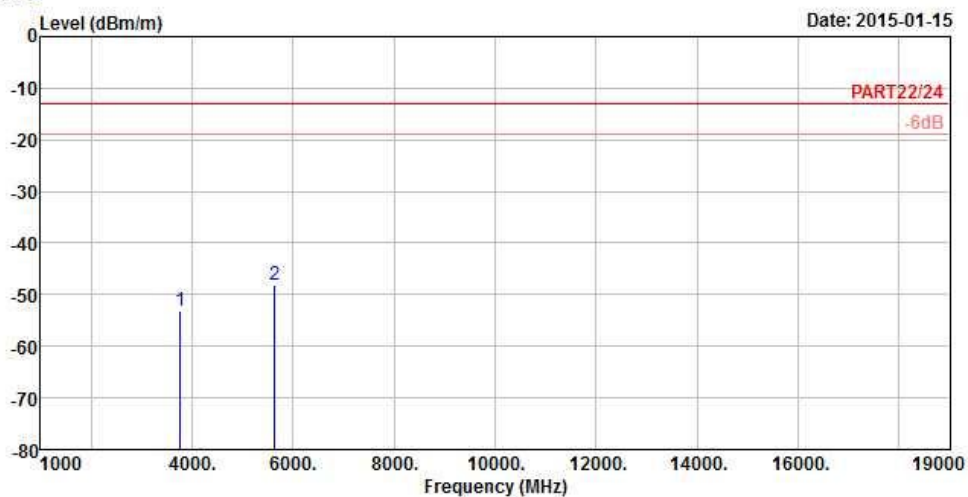
## EDGE:



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Data: 9



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : EDGE 1900 Link  
Tested by: Gavin Wu  
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-53.20	-44.90	-13.00	-40.20	-8.30	Peak
2 pp	5640.00	-48.04	-46.14	-13.00	-35.04	-1.90	Peak



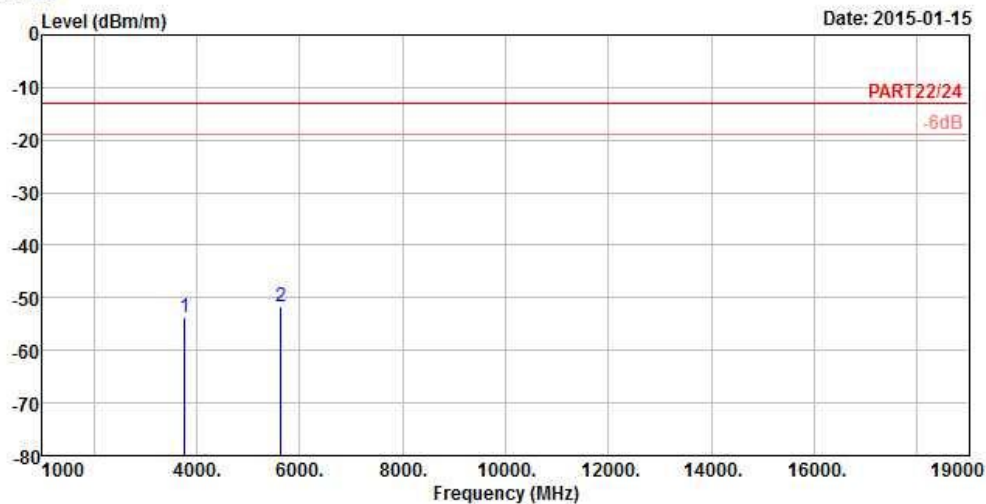
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Data: 10



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : EDGE 1900 Link  
Tested by: Gavin Wu  
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-53.82	-45.52	-13.00	-40.82	-8.30	Peak
2 pp	5640.00	-51.59	-49.69	-13.00	-38.59	-1.90	Peak

# WCDMA:

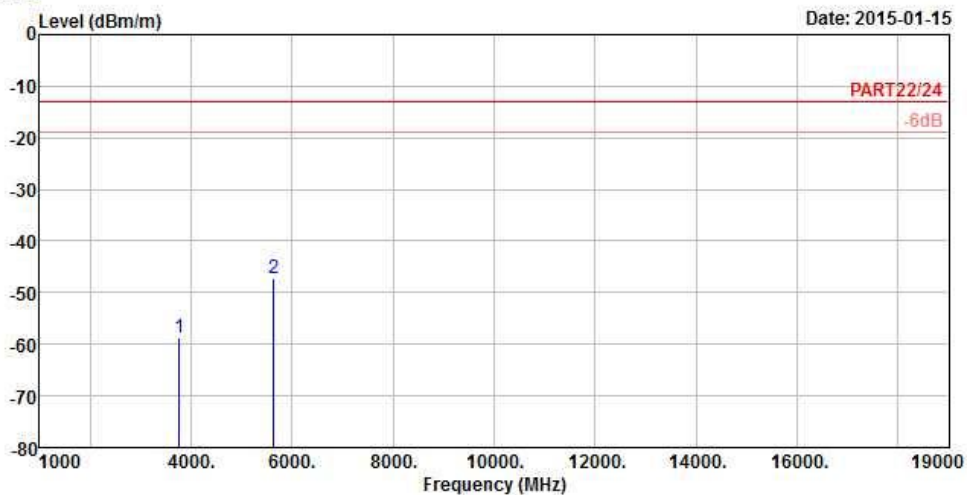


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Data: 9

Date: 2015-01-15



Site : 966 Chamber 5  
Condition: PART22/24 3m HORIZONTAL  
Remark : WCDMA Band II Link  
Tested by: Gavin Wu  
Plane : Y

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-58.71	-50.41	-13.00	-45.71	-8.30	Peak
2 pp	5640.00	-47.16	-45.26	-13.00	-34.16	-1.90	Peak



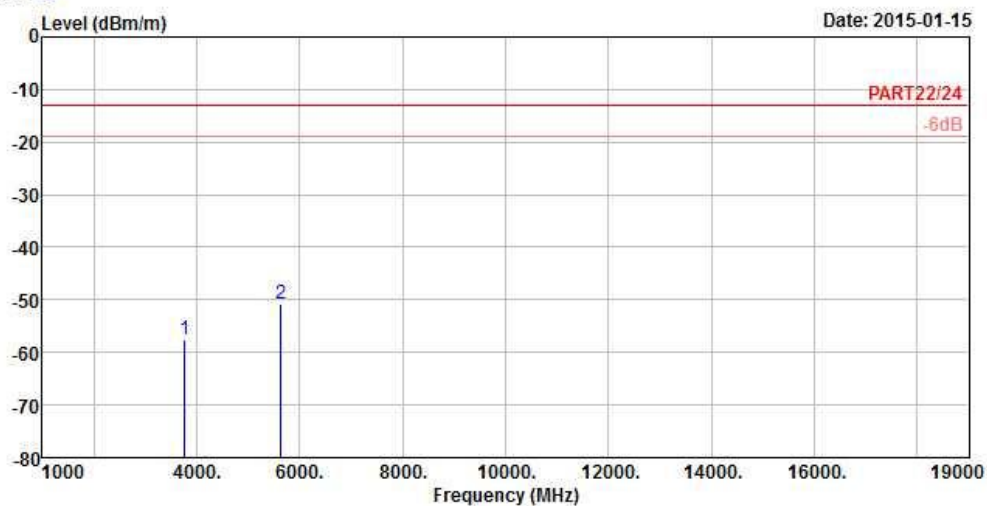
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Data: 10



Site : 966 Chamber 5  
Condition: PART22/24 3m VERTICAL  
Remark : WCDMA Band II Link  
Tested by: Gavin Wu  
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-57.61	-49.31	-13.00	-44.61	-8.30	Peak
2 pp	5640.00	-50.65	-48.75	-13.00	-37.65	-1.90	Peak

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

## 6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Lab:**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.



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## **7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications were made to the EUT by the lab during the test.

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