



47 CFR PART 15B

# TEST REPORT

of

## GSM/GPS/GPRS Module

Trade Name: CSL  
Brand Name: CSL  
Model Name: CS501  
Report No.: SZ10010092E01  
FCC ID.: UB4CS501

*prepared for*

### Convergence Systems Limited

12/F, Chung Nam Building, No. 1 Lockhart Road, Hong Kong



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**Bluetooth®**

**CTIA Authorized Test Lab**

LAB CODE 20081223-00

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Change History		
Issue	Date	Reason for change
1.0	February 03, 2010	First edition

## 1. TEST CERTIFICATION

Equipment under Test: GSM/GPS/GPRS Module

Trade Name: CSL

Brand Name: CSL

Model Name: CS501

FCC ID: UB4CS501

Applicant: Convergence Systems Limited

12/F, Chung Nam Building, No. 1 Lockhart Road, Hong Kong

Manufacturer: Nam Tai Electronics (Shenzhen) Co., Ltd.

No.38 Luogang Road, Luogang Industrial Zone, Bu Ji, Shen Zhen, China

Emission Designator 300KGXW

Test Standards: 47 CFR Part 15 Subpart B

Test Date(s): January 21, 2010 - February 02, 2010

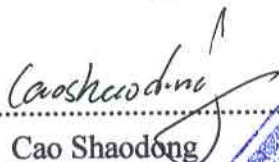
Test Result: PASS

### \* We Hereby Certify That:

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by:

  
Cao Shaodong

Dated:

2010.2.3

Reviewed by:

  
Deng Jiankun

Dated:

2010.2.3

Approved by:

  
Shu Luan

Dated:

2010.2.3



## 2. GENERAL INFORMATION

### 2.1 EUT Description

EUT Type ..... GSM/GPS/GPRS Module  
Model Name..... CS501  
Serial No. .... (n.a, marked #1 by test site)  
Hardware Version..... V2.0  
Software Version ..... N/A  
Modulation Type ..... GMSK  
Power Supply ..... Battery  
Model Name: AE453759P8H  
Brand name: AEenergy  
Capacitance: 1100mAh  
Rated voltage: 3.7V  
Manufacturer: Advanced Electronics Energy Limited  
Manufacturer Address: Unit 7, 12/F, Chevalier Commercial Center, No.8  
Wang Hoi Road, Kowloon Bay, Hong Kong  
Ancillary Equipment 1 ... AC Adapter (Charger for Battery)  
Model Name: YS01-060100U  
Brand Name: YS  
Serial No.: (n.a. marked #1 by test site)  
Rated Input: ~ 100-240, 320mA, 50/60Hz  
Rated Output: = 6.0V, 1000mA  
Manufacturer: YUNSHEN Plastic Electronic Co., Ltd.  
Manufacturer Address: Yunsheng Electronic Tangtou the 3th Industrial Park ,  
Shiyan, Shenzhen

*Note 1:* The EUT is a GSM/GPS/GPRS Module; it supports GSM 850/1900, GPRS and GPS.

*Note 2:* The EUT can be plugged into a PDA via a SD socket and get controlled by the PDA. The PDA can access internet via the GPRS function of the module as well as get the location of the EUT by the GPS function of the module.

*Note 3:* For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

## 2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-05 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.107	Conducted Emission	PASS
2	15.109	Radiated Emission	PASS

NOTE:

The tests were performed according to the method of measurements prescribed in ANSI C63.4 2003.

## 2.3 Facilities and Accreditations

### 2.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 CHINA. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

### 2.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	96

### 2.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	±1.8dB
Uncertainty of Radiated Emission:	±3.1dB

### 3. TEST CONDITIONS SETTING

#### 3.1 Test Mode

##### 1. GSM Test Mode

- (1) The first test mode (GSM900-GPRS + GPS)

The EUT configuration of the emission tests is EUT + Battery + Charger + PDA.

In this test mode, a GPRS link was established between the EUT and a System Simulator (SS); data was transmitted between EUT and System Simulator (SS), and maintained during the measurement. The GPS was working normally and the EUT connected with a PDA.

- (2) The second test mode (GSM1800-GPRS + GPS)

The EUT configuration of the emission tests is EUT + Battery + Charger + PDA.

In this test mode, a GPRS link was established between the EUT and a System Simulator (SS); data was transmitted between EUT and System Simulator (SS), and maintained during the measurement. The GPS was working normally and the EUT connected with a PDA.

- (3) The third test mode (Idle)

The EUT configuration of the emission tests is EUT + Battery + Charger + PDA.

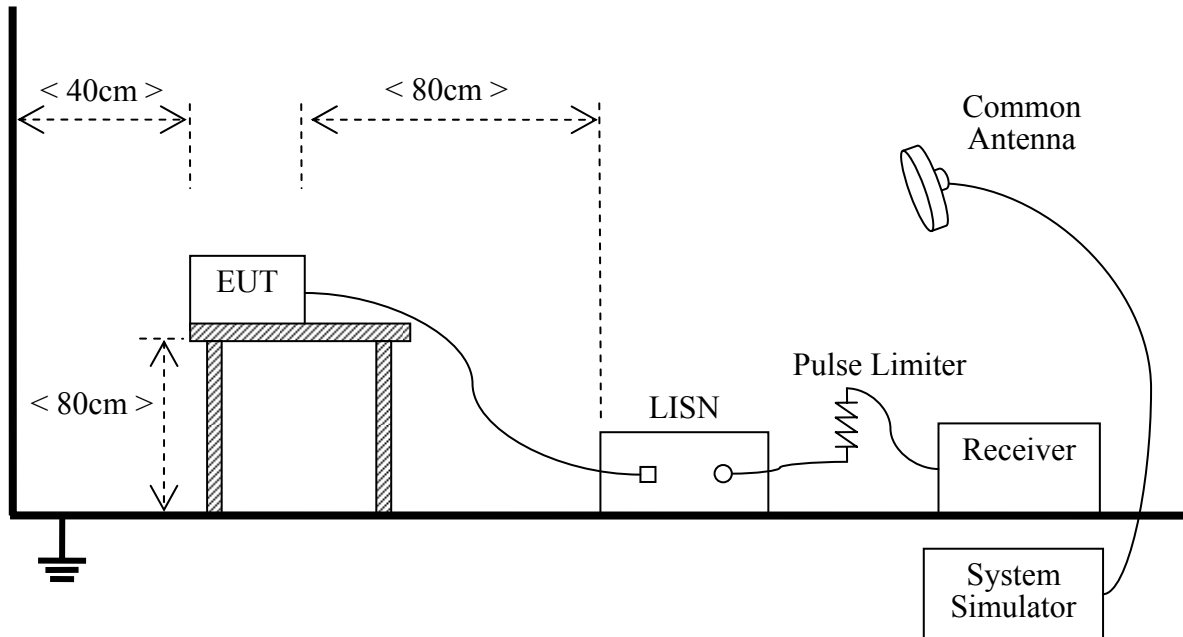
During the test, The EUT was synchronized to the BCCH, listening to the CCCH and able to respond to paging message. Periodic location updating was disabled. The GPS was working normally and the EUT connected with a PDA.

NOTE: All test modes are performed, only the worst cases are recorded in this report.

## 3.2 Test Setup and Equipments List

### 3.2.1 Conducted Emission

#### A. Test Setup:



The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides  $50\Omega/50\mu\text{H}$  of coupling impedance for the measuring instrument. The Common Antenna is used for the call between the EUT and the System Simulator (SS). A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

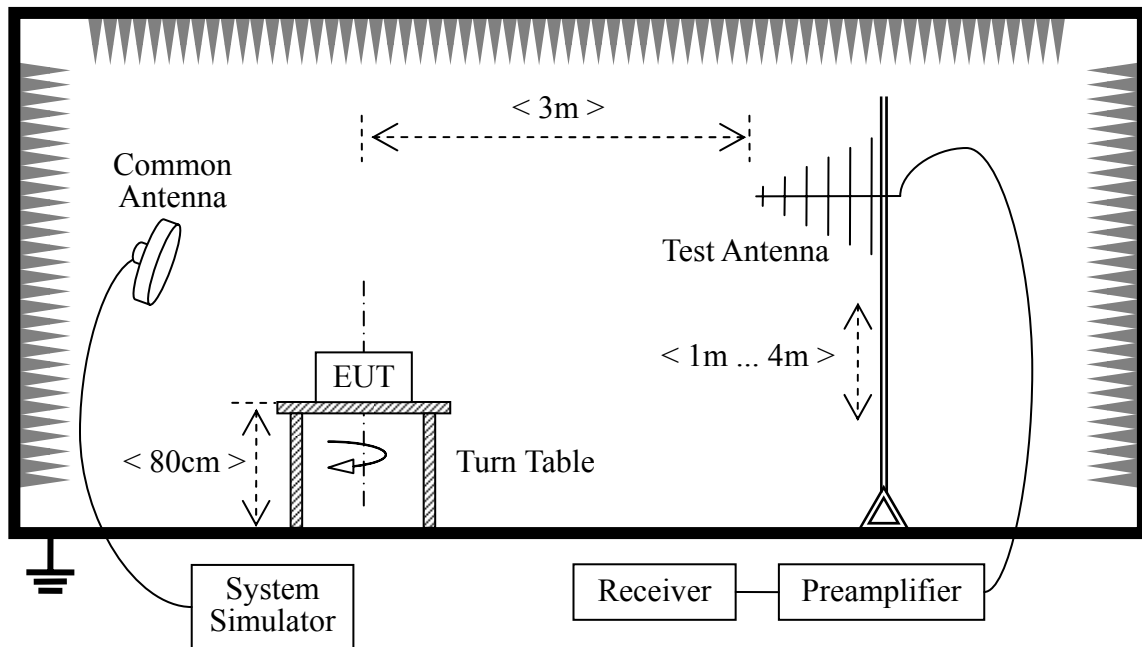
#### B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2009.09	1year
LISN	Schwarzbeck	NSLK 8127	812744	2009.09	1year
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	(n.a.)	(n.a.)
System Simulator	Agilent	E5515C	GB43130131	2009.09	1year
Personal Computer	IBM	IBM_T20	(n.a.)	(n.a.)	(n.a.)
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)	(n.a.)



### 3.2.2 Radiated Emission

#### C. Test Setup:



The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower. The Common Antenna is used for the call between the EUT and the System Simulator (SS).

#### D. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2009.09	1year
Semi-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.09	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2009.09	1year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2009.09	1year
System Simulator	Agilent	E5515C	GB43130131	2009.09	1year
Personal Computer	IBM	IBM_T20	(n.a.)	(n.a.)	(n.a.)
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)	(n.a.)

## 4. 47 CFR PART 15B REQUIREMENTS

### 4.1 Conducted Emission

#### 4.1.1 Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

#### 4.1.2 Test Description

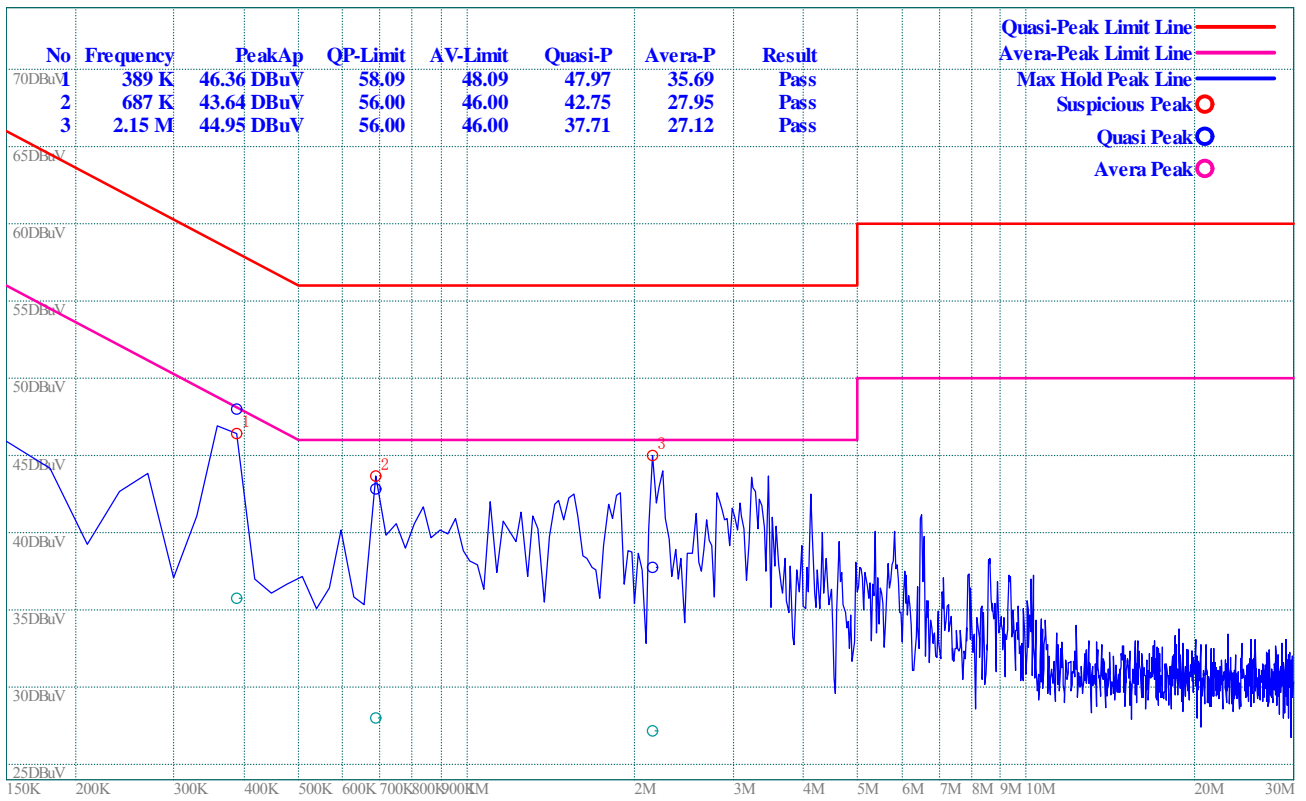
See section 3.2.1 of this report.

#### 4.1.3 Test Result

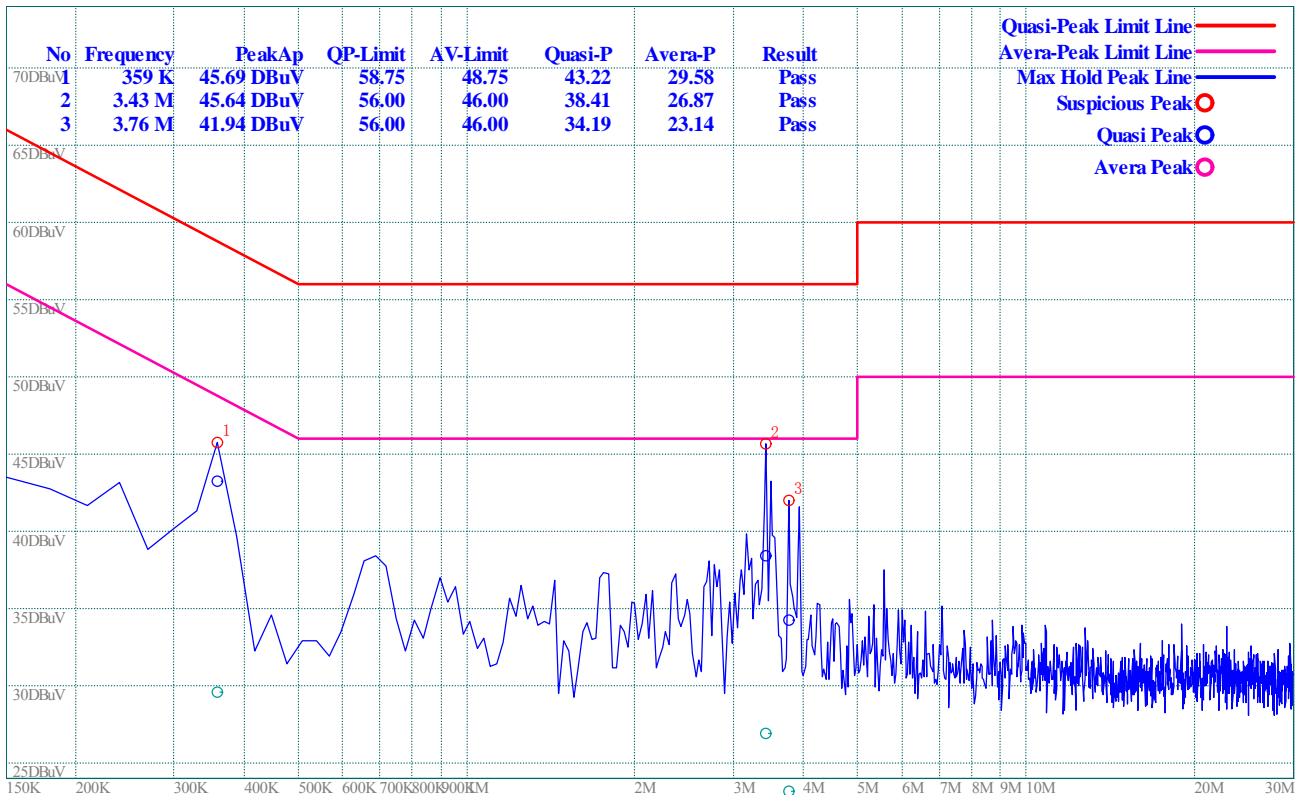
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

##### 4.1.3.1 GSM Test Mode

###### A. Test Plot And Suspicious Points:



(Plot A: L Phase)



(Plot B: N Phase)

## 4.2 Radiated Emission

### 4.2.1 Requirement

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength	
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

NOTE:

- Field Strength ( $\text{dB}\mu\text{V/m}$ ) =  $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$ .
- In the emission tables above, the tighter limit applies at the band edges.

### 4.2.2 Test Description

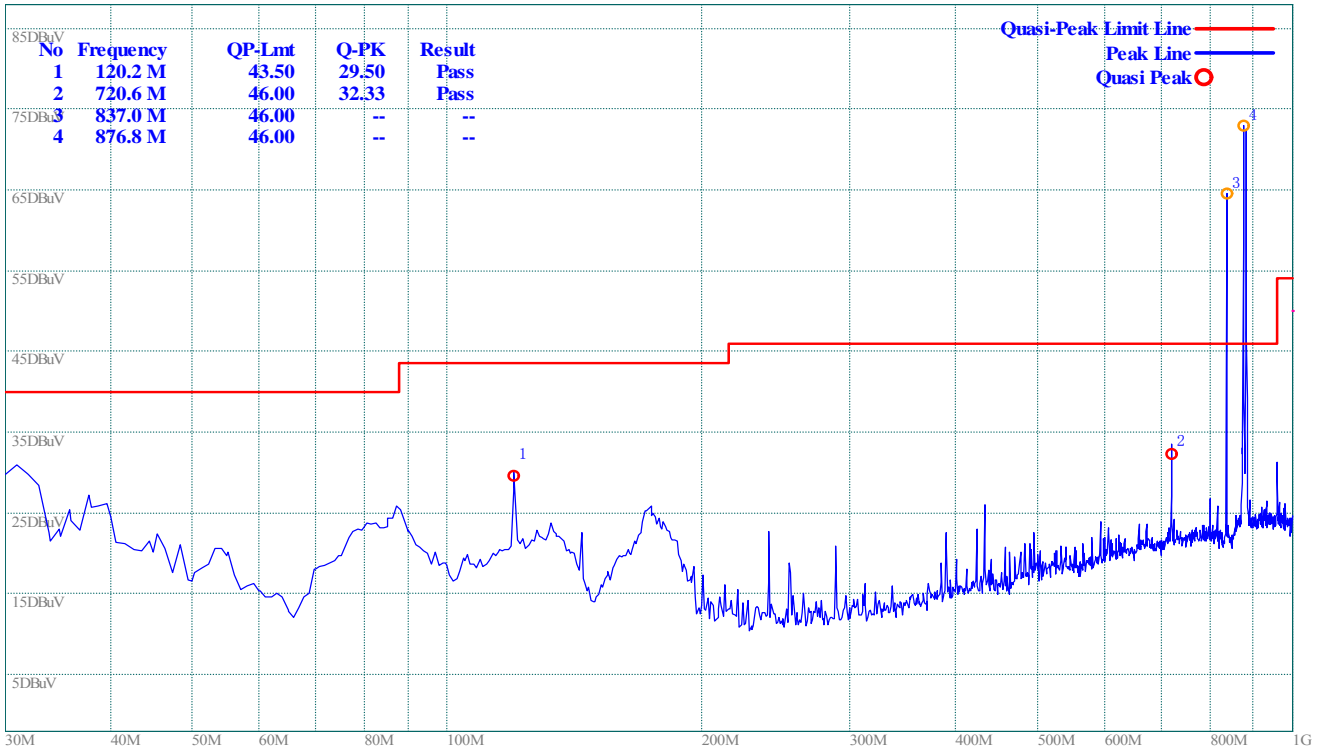
See section 3.2.2 of this report.

### 4.2.3 Test Result

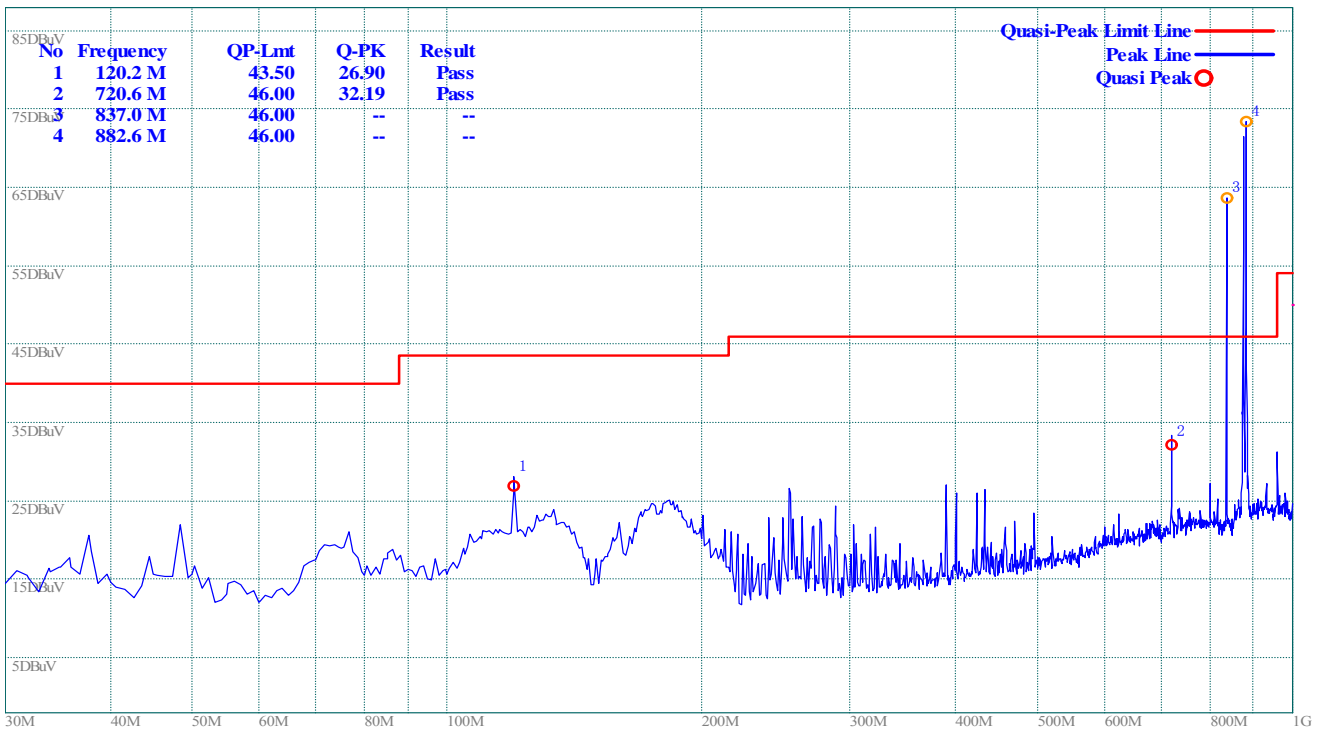
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

#### 4.2.3.1 GSM Test Mode

##### A. Test Plots And Suspicious Points:



(Plot A: Test Antenna Vertical)



(Plot B: Test Antenna Horizontal)

\*\* END OF REPORT \*\*