



47 CFR PART 15B

# TEST REPORT

of

**RFID active tag**

Trade Name: CSL  
Brand Name: CSL  
Model Name: CS506  
Report No.: SZ10070083E02  
FCC ID.: UB4CS506

prepared for

**Convergence Systems Ltd.**

20/F, Chung Nam Building, No.1 Lockhard Road, Hong Kong

prepared by

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**CTIA Authorized Test Lab**

LAB CODE 20081223-00

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## TABLE OF CONTENTS

<b>1.</b>	<b>TEST CERTIFICATION</b> .....	<b>3</b>
<b>2.</b>	<b>GENERAL INFORMATION</b> .....	<b>4</b>
<b>2.1</b>	<b>EUT Description</b> .....	<b>4</b>
<b>2.2</b>	<b>Test Standards and Results</b> .....	<b>5</b>
<b>2.3</b>	<b>Facilities and Accreditations</b> .....	<b>6</b>
2.3.1	Facilities .....	6
2.3.2	Test Environment Conditions.....	6
2.3.3	Measurement Uncertainty .....	6
<b>3.</b>	<b>TEST CONDITIONS SETTING</b> .....	<b>7</b>
<b>3.1</b>	<b>Test Mode</b> .....	<b>7</b>
<b>3.2</b>	<b>Test Setup and Equipments List</b> .....	<b>8</b>
3.2.1	Conducted Emission.....	8
3.2.2	Radiated Emission.....	9
<b>4.</b>	<b>47 CFR PART 15B REQUIREMENTS</b> .....	<b>10</b>
<b>4.1</b>	<b>Conducted Emission</b> .....	<b>10</b>
4.1.1	Requirement .....	10
4.1.2	Test Description .....	10
4.1.3	Test Result .....	10
4.1.3.1	Test Mode .....	10
<b>4.2</b>	<b>Radiated Emission</b> .....	<b>12</b>
4.2.1	Requirement .....	12
4.2.2	Test Description .....	12
4.2.3	Test Result .....	12

## 1. TEST CERTIFICATION

Equipment under Test: RFID active tag

Brand Name: CSL

Model Name: CS506

FCC ID: UB4CS506

Applicant: Convergence Systems Ltd.

20/F, Chung Nam Building, No.1 Lockhard Road, Hong Kong

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

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

Test Standards: 47 CFR Part 15 Subpart B

Test Date(s): December 20, 2010 – December 27, 2010

Test Result: PASS

### \* We Hereby Certify That:

The equipment under test was tested by Shenzhen Morlab Communications Technology Co., Ltd. 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: .....

2011.1.18

Reviewed by: .....

  
Huang Pulong

Dated: .....

2011.1.18

Approved by: .....

  
Zeng Dexin

Dated: .....

2011.1.18



## 2. GENERAL INFORMATION

### 2.1 EUT Description

EUT Type .....: RFID active tag  
Model Name .....: CS506  
Serial No.....: (n.a, marked #1 by test site)  
Hardware Version .....: v2.4  
Software Version .....: v66  
Modulation Type.....: Chirp Spread Spectrum(CSS)  
Frequency .....: The frequency block is 2400MHz to 2483.5MHz.  
Power Supply .....: The power is provided via the SDIO interface of platform( such as a PDA).

*Note 1:* The EUT is an active RFID tag operating in the 2.4GHz band. The power is provided via the SDIO interface of platform( such as a PDA). The only one channel number of the Module used and tested in this report .

*Note 2:* 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 Morlab Communications Technology Co., Ltd. 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 L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. 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):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

### 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. Test Mode**

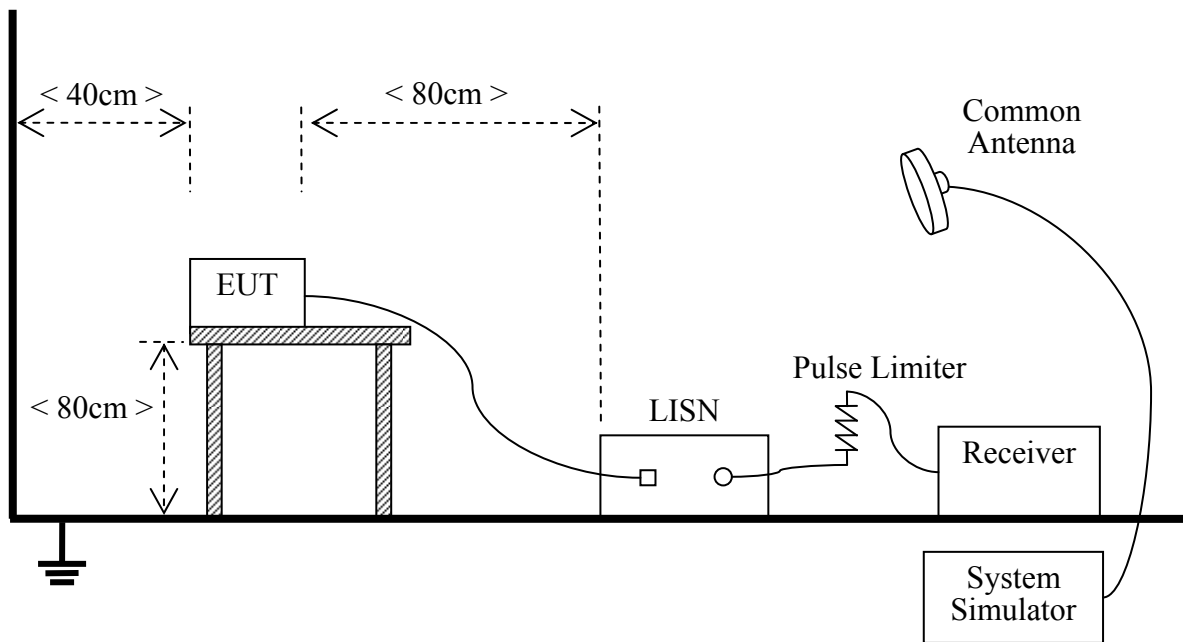
The EUT configuration of the emission tests is EUT + PDA + AC Adapter.

During the measurement the power of the EUT is provided via the SDIO interface of platform( such as a PDA) and working normally.

### 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 50Ω/50μH of coupling impedance for the measuring instrument. The power of the EUT is provided via the SDIO interface of platform( such as a PDA). The PDA with the AC Adapter which is powered by 120V, 60Hz AC mains supply. The factors of the site are calibrated to correct the reading. During the measurement, The EUT was programmed to be in continuously transmit mode.

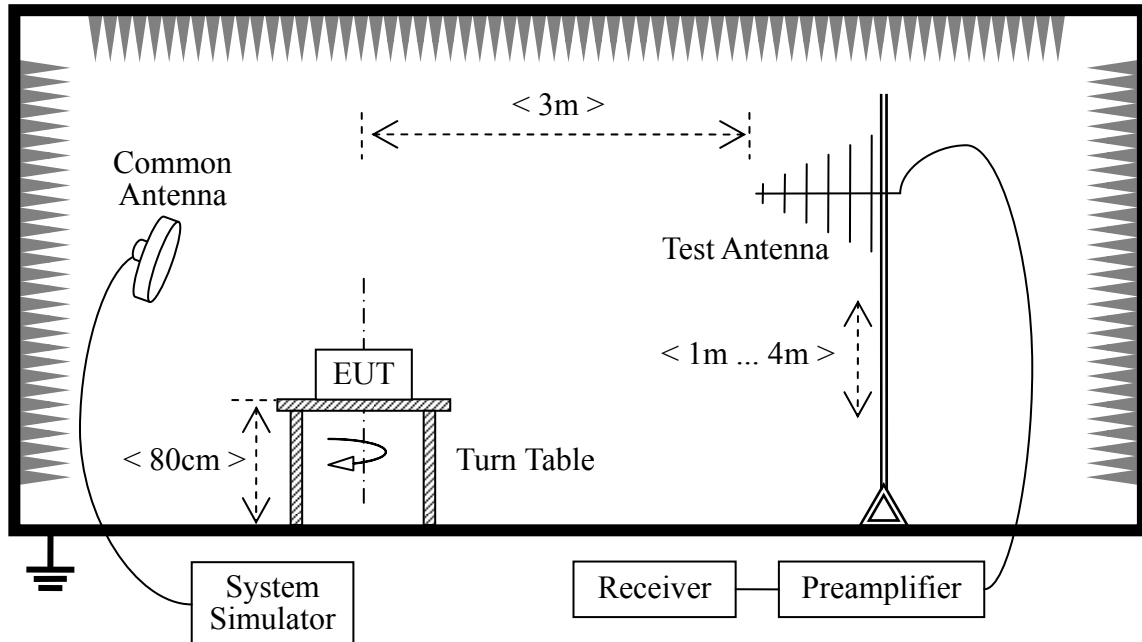
##### B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2009.07	2year
LISN	Schwarzbeck	NSLK 8127	812744	2009.08	2year
Service Supplier	R&S	CMU200	100448	2009.10	2year
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	(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. During the measurement, The EUT was programmed to be in continuously transmit mode.

#### D. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	R&S	CMU200	100448	2009.10	2year
Receiver	Agilent	E7405A	US44210471	2009.07	2year
Semi-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.08	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2009.07	2year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2009.07	2year

## 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 Test Mode

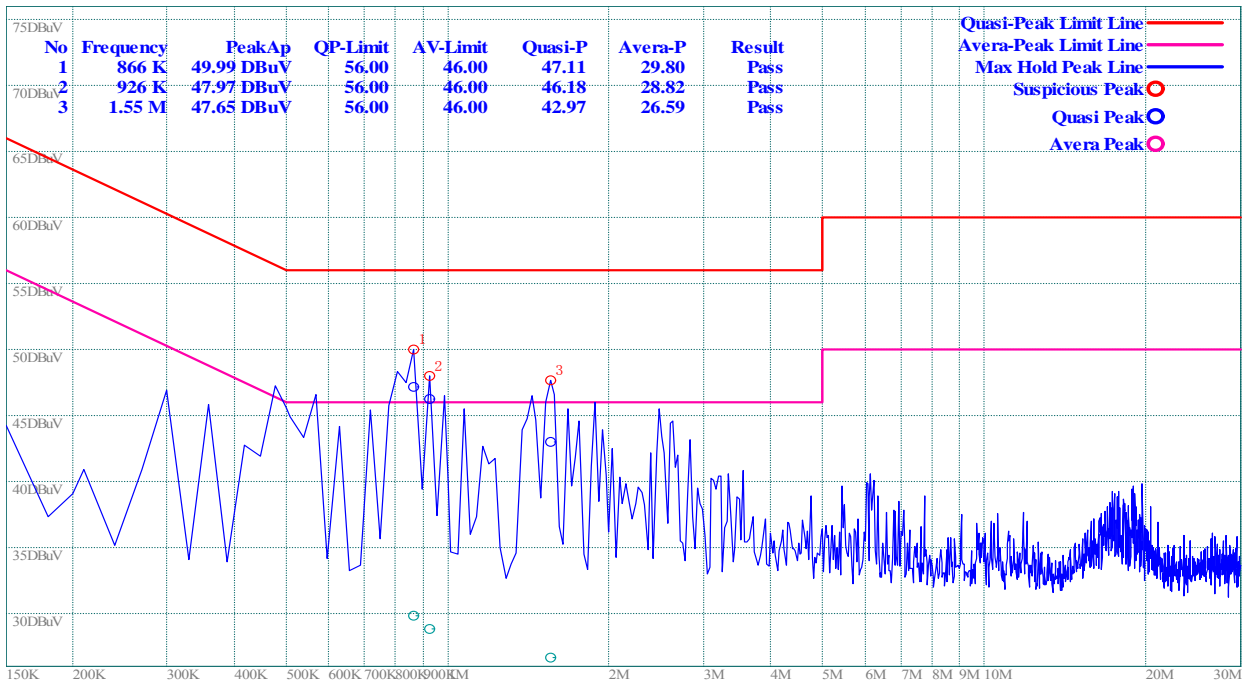
#### A. Test Verdict Recorded for Suspicious Points:

No.	@Frequency (MHz)	Measured Emission Level (dB $\mu$ V)				Limit (dB $\mu$ V)		Verdict
		PK	QP	AV	Phase	QP	AV	
1	0.866	49.99	47.11	29.80	L	56.0	46.0	PASS
2	0.926	47.97	46.18	28.82	L	56.0	46.0	PASS

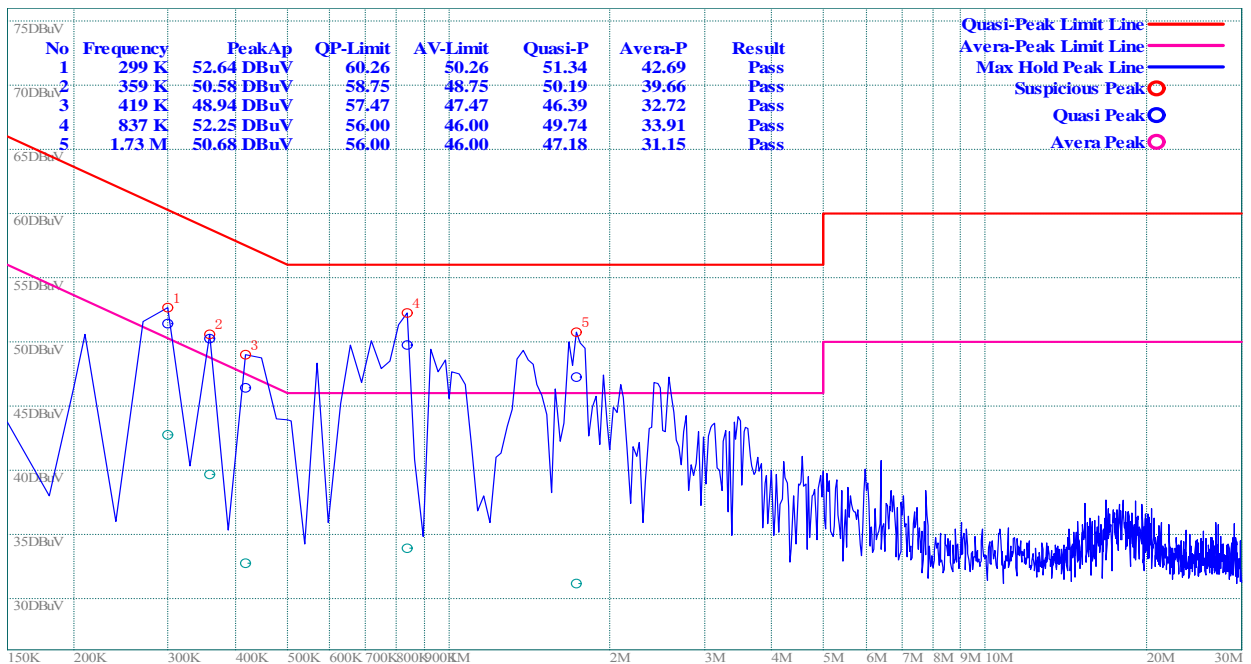


No.	@Frequency (MHz)	Measured Emission Level (dBμV)				Limit (dBμV)		Verdict
		PK	QP	AV	Phase	QP	AV	
3	0.837	52.25	49.74	33.91	N	56.0	46.0	PASS
4	1.730	50.68	47.18	31.15	N	56.0	46.0	PASS

**E. Test Plot:**



(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

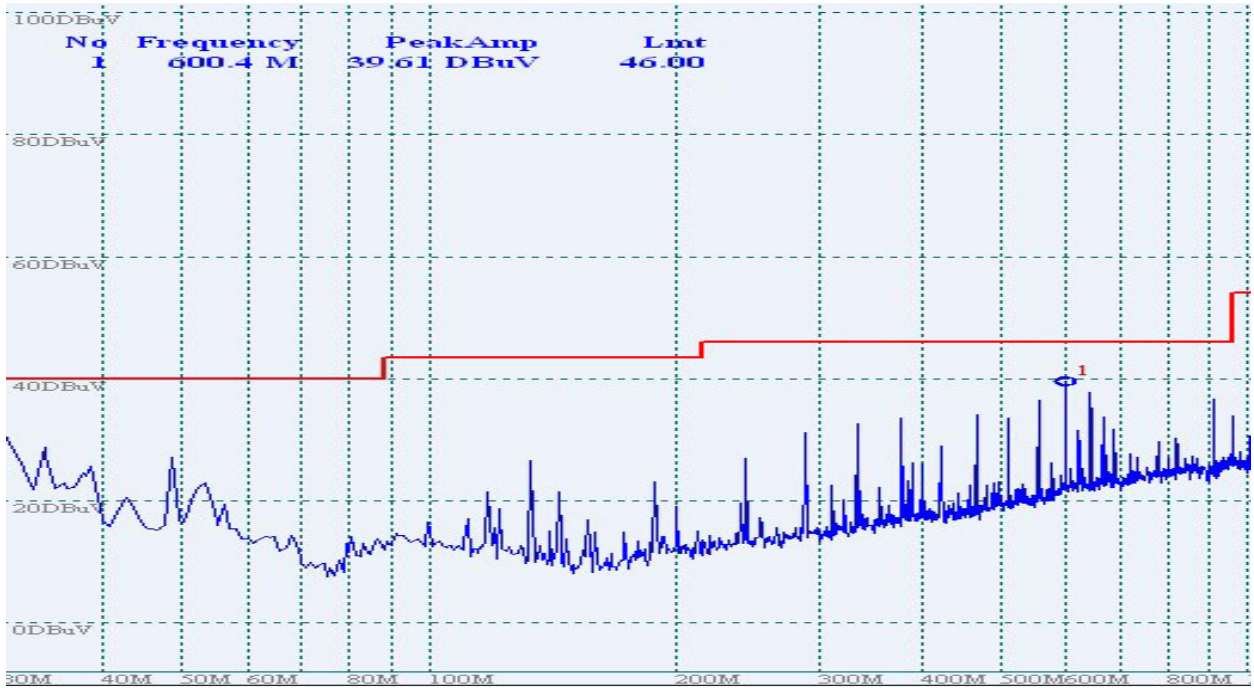
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform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

#### 4.2.3.1 Test Mode

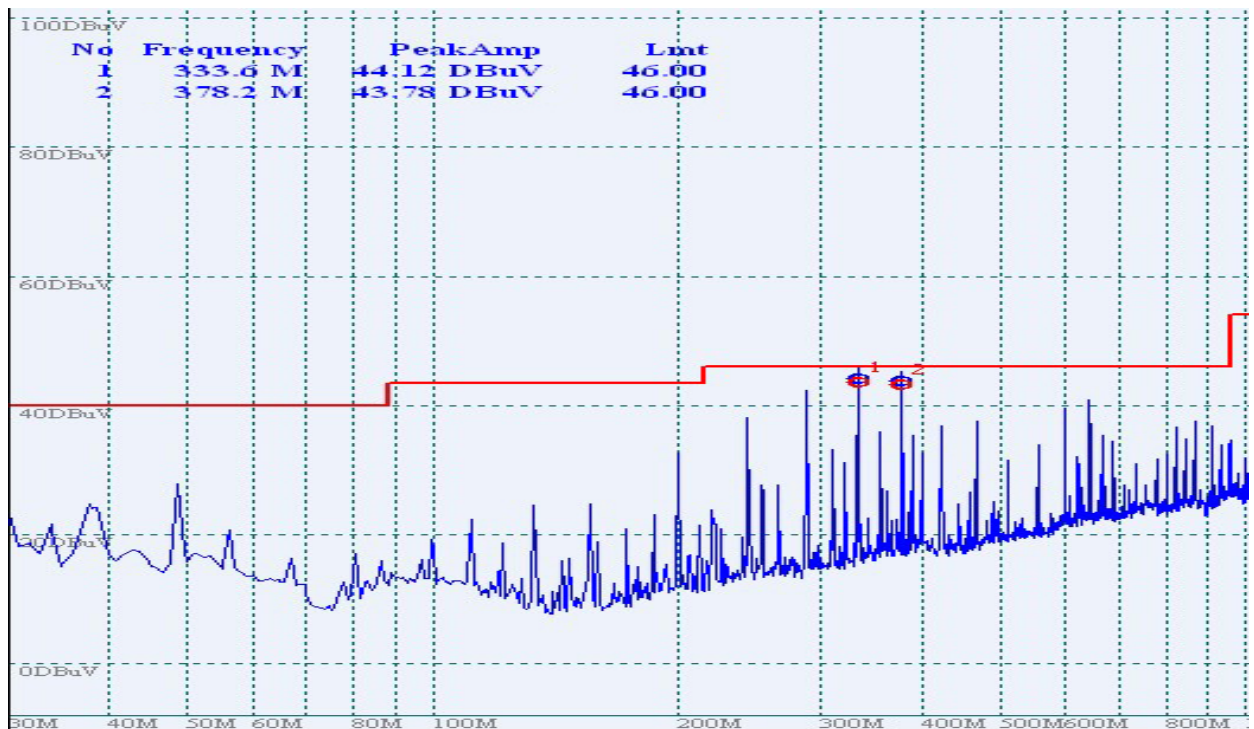
##### A. Test Verdict Recorded for Suspicious Points:

No.	@Frequency (MHz)	Emission Level ( $\text{dB}\mu\text{V/m}$ )			Quasi-Peak Limit ( $\text{dB}\mu\text{V/m}$ )	Result
		PK	QP	Antenna Polarization		
1	600.4	39.61	--	Vertical	46	PASS
2	333.0	--	44.12	Horizontal	46	PASS
3	378.2	--	43.78	Horizontal	46	PASS

##### B. Test Plots



(Plot A: Test Antenna Vertical)



(Plot B: Test Antenna Horizontal)

\*\* END OF REPORT \*\*