



Report No.:SZ11090107E02



# FCC TEST REPORT

Issued to

**3M Cogent, Inc**

For

**Mobile Ident IIIc**

Model Name: Mi3c  
 Trade Name: 3M  
 Brand Name: N/A  
 FCC ID: ZYFMI3C  
 Test Rule: 47 CFR Part 15 Subpart C  
 Test date: September 2, 2011 – December 2, 2011  
 Issue date: December 2, 2011

by

**Shenzhen Morlab Communications Technology Co., Ltd.**

Tested by Li Liang  
 Li Liang  
 Date 2011.12.2



Review by Tu Lang  
 Tu Lang  
 Date 2011.12.2



*The report refers only to the sample tested and does not apply to the bulk. This report is issued in confidence to the client and it will be strictly treated as such by the Shenzhen MORLAB Communication Technology Co., Ltd. It may not be reproduced rather in its entirety or in part and it may not be used for advertising. The client to whom the report is issued may, however, show or send it or a certified copy thereof prepared by the Shenzhen MORLAB Telecommunication Co., Ltd to his customer. Supplier or others persons directly concerned. Shenzhen MORLAB Telecommunication Co., Ltd will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report. In the event of the improper use of the report, Shenzhen MORLAB Telecommunication Co., Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.*



### TABLE OF CONTENTS

- 1. GENERAL INFORMATION .....3**
- 1.1 EUT Description .....3**
- 1.2 Test Standards and Results .....4**
- 1.3 Facilities and Accreditations .....5**
- 1.3.1 Facilities .....5
- 1.3.2 Test Environment Conditions .....5
- 1.3.3 Measurement Uncertainty .....5
- 2. 47 CFR PART 15C REQUIREMENTS .....6**
- 2.1 Conducted Emission .....6**
- 2.1.1 Requirement .....6
- 2.1.2 Test Description .....6
- 2.1.3 Test Result .....7
- 2.2 Radiated Emission .....9**
- 2.2.1 Requirement .....9
- 2.2.2 Test Description .....10
- 2.2.3 Test Result .....11
- 2.3 Frequency Tolerance .....14**
- 2.3.1 Requirement .....14
- 2.3.2 Test Description .....14
- 2.3.3 Test Verdict .....14
- 2.4 20dB Bandwidth .....16**
- 2.4.1 Definition .....16
- 2.4.2 Test Description .....16
- 2.4.3 Test Verdict .....17

Change History		
Issue	Date	Reason for change
1.0	December 2, 2011	First edition



# 1. GENERAL INFORMATION

## 1.1 EUT Description

EUT Type..... Mobile Ident IIIc  
Serial No. .... (n.a., marked #1 by test site)  
Hardware Version ..... V5.1  
Software Version..... V2.1.6  
Applicant..... 3M Cogent, Inc  
639N.Rosemead Blvd. Pasadena.CA 91170, USA  
Manufacturer..... 3M Cogent, Inc  
639N.Rosemead Blvd. Pasadena.CA 91170, USA  
Modulation Type..... FHSS, DSSS, ASK, GPRS/GSM Mode with GMSK Modulation,  
WCDMA , HSDPA, HSUPA Mode with QPSK Modulation  
Power supply ..... Battery  
Brand Name: Boston  
Model No.: SONATA 4400  
Serial No.: (n.a. marked #1 by test site)  
Capacitance: 4400mAh  
Rated Voltage: 3.7V  
Charge Limit: 4.2V  
Ancillary Equipment 1.... AC Adapter (Charger for Battery)  
Brand Name: PLPU  
Model No.: GFP241DA-0540-1  
Serial No.: (n.a. marked #1 by test site)  
Rated Input: ~ 100-240V, 550mA, 50/60Hz  
Rated Output: = 5V, 4000mA

### NOTE:

1. The EUT is a handheld multifunction device that integrates with face / fingerprint image capture and identification, it supports GSM 850MHz, 900MHz, 1800MHz, 1900MHz, GPRS, WCDMA 2100MHz, 1900MHz, 850MHz, HSUPA, HSDPA, GPS, NFC, ISM 2.4GHz Bluetooth module and ISM 2.4GHz WiFi module, and only NFC module was tested in this report.
2. The EUT is equipped with a T-Flash card slot; equipped with a special port which can be connected to the ancillary equipments supplied by the manufacturer e.g. the AC Adapter and the USB Adapter Cable.
3. For a more detailed description, please refer to Specification or User’s Manual supplied by the applicant and/or manufacturer.

## 1.2 Test Standards and Results

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

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-09 Edition)	Radio Frequency Devices

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

No.	Section	Description	Result
1	15.207	Conducted Emission	PASS
2	15.225(a)(b)(c)(d)	Radiated Emission	PASS
3	15.225(e)	Frequency Stability	PASS
4	15.215(c)	20dB Bandwidth	PASS

**NOTE:**

The tests were performed according to the method of measurements prescribed in ANSI C63.4 2010.



## 1.3 Facilities and Accreditations

### 1.3.1 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.

### 1.3.2 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

### 1.3.3 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:	$\pm 1.8\text{dB}$
Uncertainty of Radiated Emission:	$\pm 3.1\text{dB}$

## 2. 47 CFR PART 15C REQUIREMENTS

### 2.1 Conducted Emission

#### 2.1.1 Requirement

According to FCC section 15.207, 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).

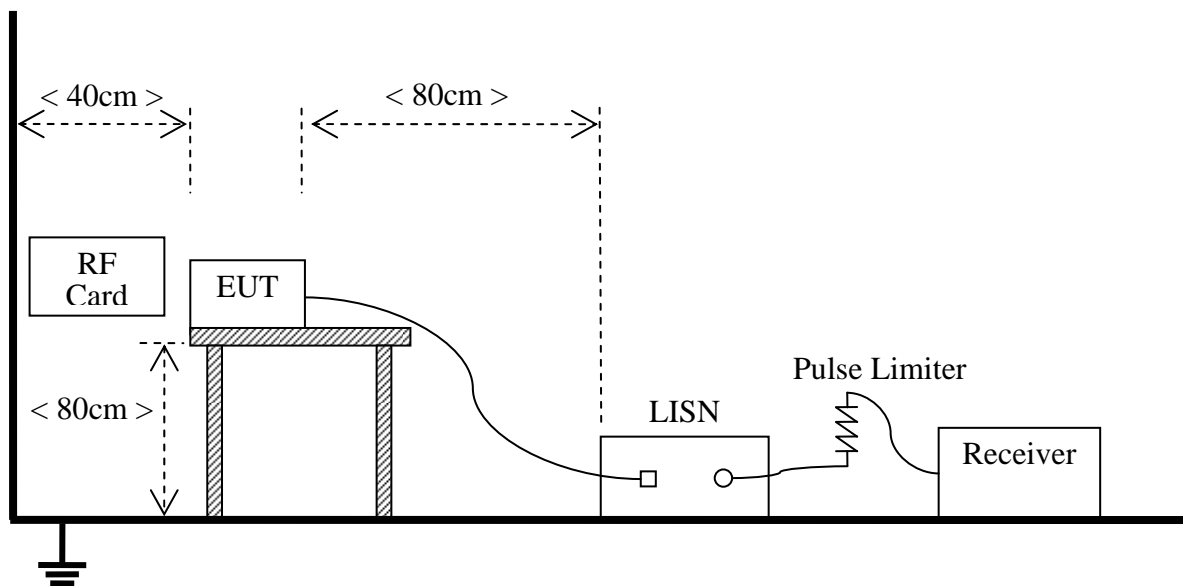
Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.

#### 2.1.2 Test Description

##### 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 RF Card is used for the call between with the EUT, and the EUT was measured by transmitter mode continuously. 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
Receiver	Agilent	E7405A	US44210471	2011.05
LISN	Schwarzbeck	NSLK 8127	812744	2011.05
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	(n.a.)
Spectrum Analyzer	Agilent	E7405A	US44210471	2011.05
Personal Computer	IBM	IBM_T20	(n.a.)	(n.a.)
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)

### 2.1.3 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.

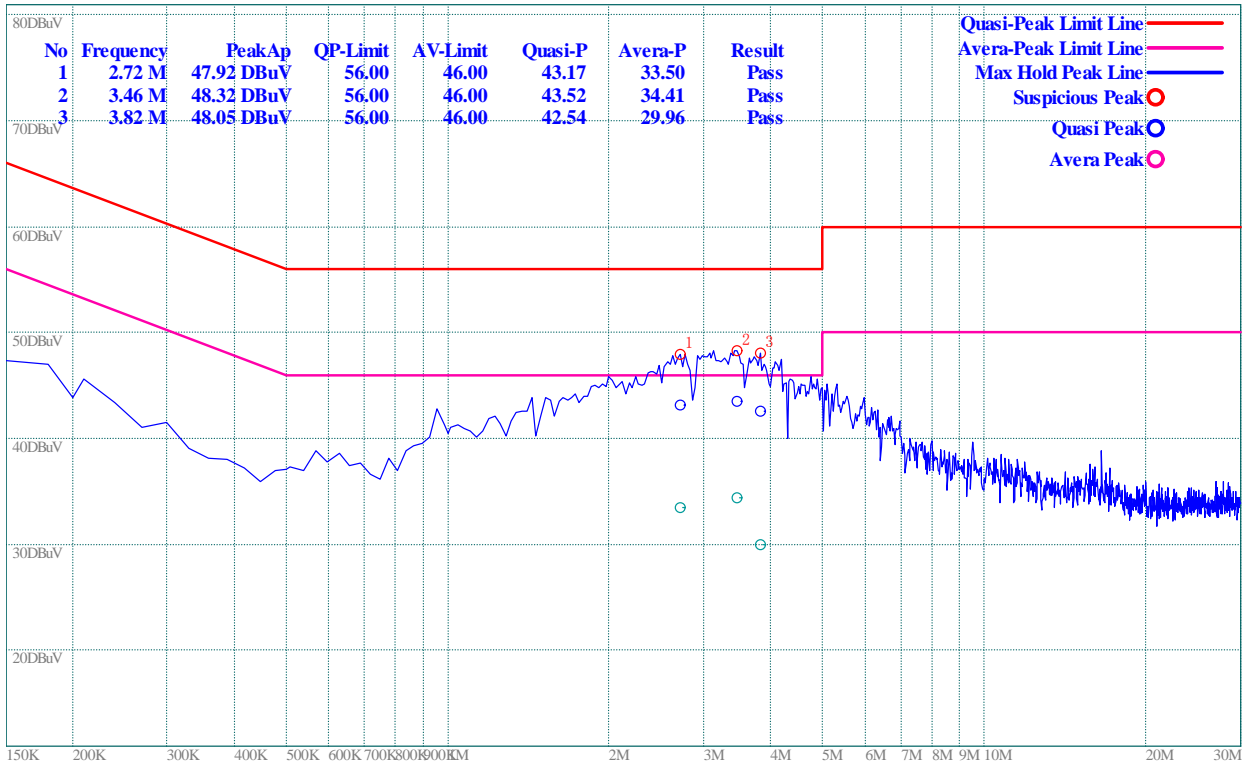
#### 2.1.3.1 Test Mode

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

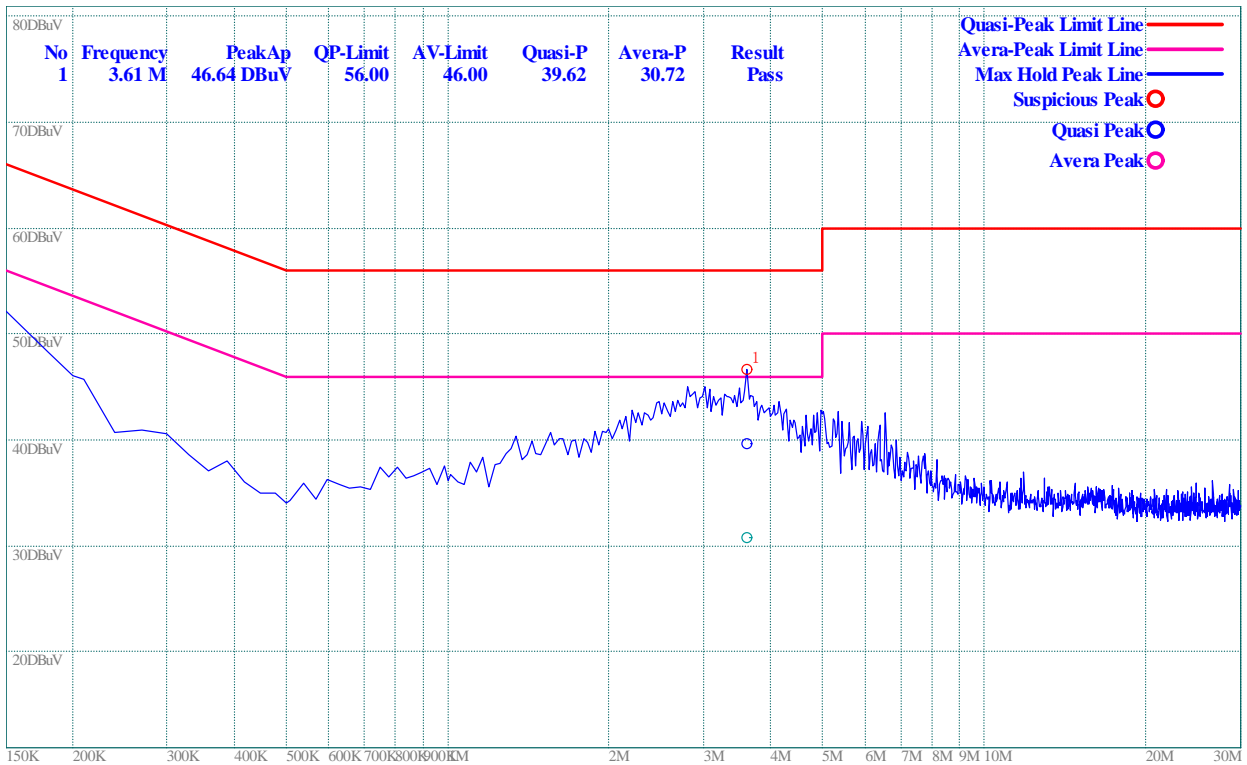
No.	@Frequency (MHz)	Measured Emission Level (dBμV)				Limit (dBμV)		Verdict
		PK	QP	AV	Phase	QP	AV	
1	2.72	47.92	43.17	33.5	L	56.0	46.0	PASS
2	3.46	48.32	43.52	34.41	L	56.0	46.0	PASS
3	3.82	48.05	42.54	39.96	L	56.0	46.0	PASS
4	3.61	46.64	39.62	30.72	N	56.0	46.0	PASS

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





(Plot A: L Phase)



(Plot B: N Phase)

**Result: PASS**





## 2.2 Radiated Emission

### 2.2.1 Requirement

Radiated Emission <30MHz (9KHz-30MHz, H-field)

According to FCC section 15.225, for <30MHz, Radiated emissions were measured according to ANSIC63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10KHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT)

There was no detected Restricted bands and Radiated suprious emission below 30MHz. The 30m limit was converted to 10m Limit using square factor(x) as it was found by measurements as follows;  
 $10\text{ m Limit(dBuV/m)} = 20\log(X)+40\log(30/10)= 20\log(15848)+40\log(30/10) = 103\text{dBuV}$

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency range (MHz)	Field Strength@30m		Field Strength@10m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
Below 13.110	30	29.5	48.6
13.110 ~ 13.410	106	40.5	59.6
13.410 ~ 13.553	334	50.5	69.6
13.553 ~13.567	15848	84	103
13.567 ~ 13.710	334	50.5	69.6
13.710 ~14.010	106	40.5	59.6
Above 14.010	30	29.5	48.6

NOTE:

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

Radiated Emission >30MHz (30MHz-1GHz, E-field)

According to FCC section 15.225, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

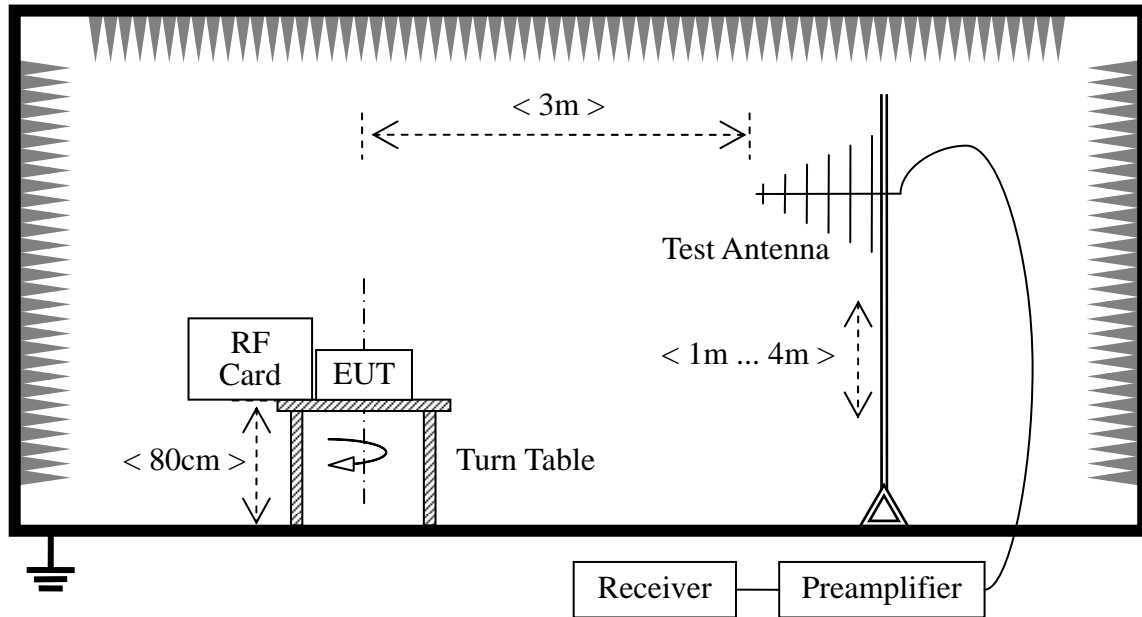
Frequency range (MHz)	Field Strength	
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

**NOTE:**

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

**2.2.2 Test Description**

**A. 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 RF Card is used for the call between with the EUT, and the EUT was measured by transmitter mode continuously.

**B. Equipments List:**

Description	Manufacturer	Model	Serial No.	Cal. Date
Receiver	Agilent	E7405A	US44210471	2011.05
Semi-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2011.05
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2011.05
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2011.05
Test Antenna- Loop	R&S	HFH2-Z2	(n.a.)	2011.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2011.05
Personal Computer	IBM	IBM_T20	(n.a)	(n.a.)

Description	Manufacturer	Model	Serial No.	Cal. Date
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)

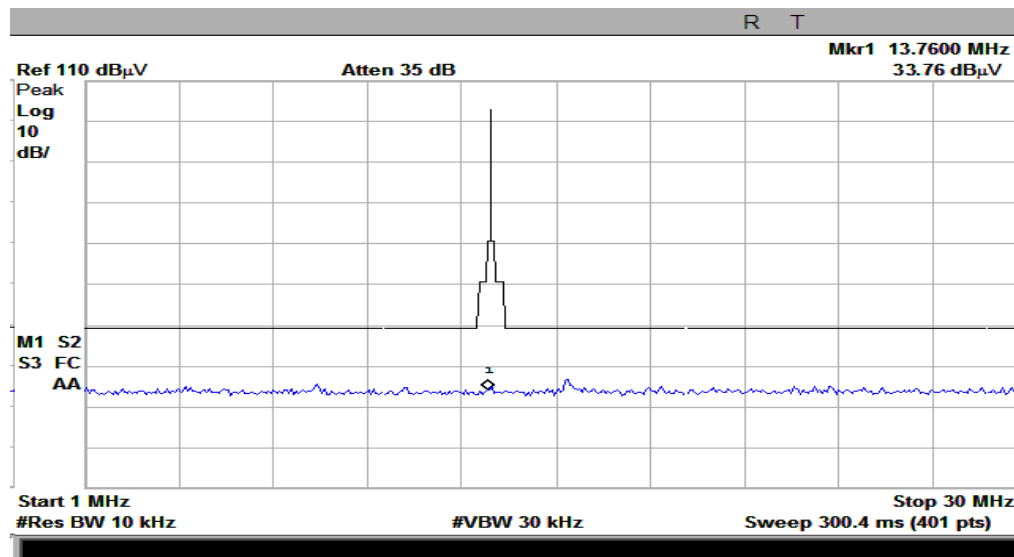
### 2.2.3 Test Result

#### 2.2.3.1 Radiated Emission <30MHz (9KHz-30MHz, H-field)

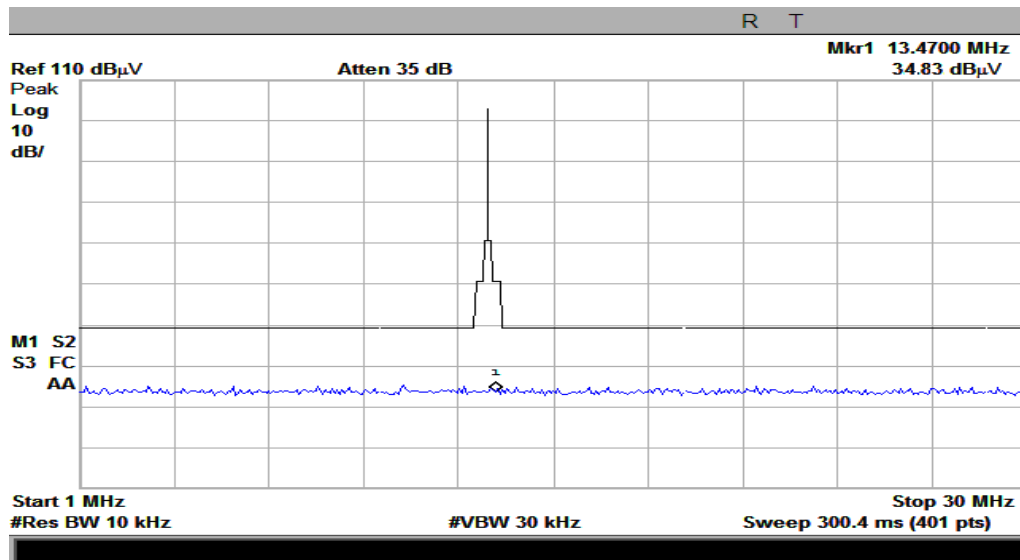
##### A. Test Verdict Recorded for Suspicious Points:

Frequency (MHz)	Field strength (dB $\mu$ V/m)		Limit(dB $\mu$ V/m)	Remark
	Antenna V	Antenna H		
13.56	33.76	33.84	103	fundamental
30.00	32.27	32.84	40	harmonics
33.6	29.76	27.13	40	harmonics

##### B. Test Plots



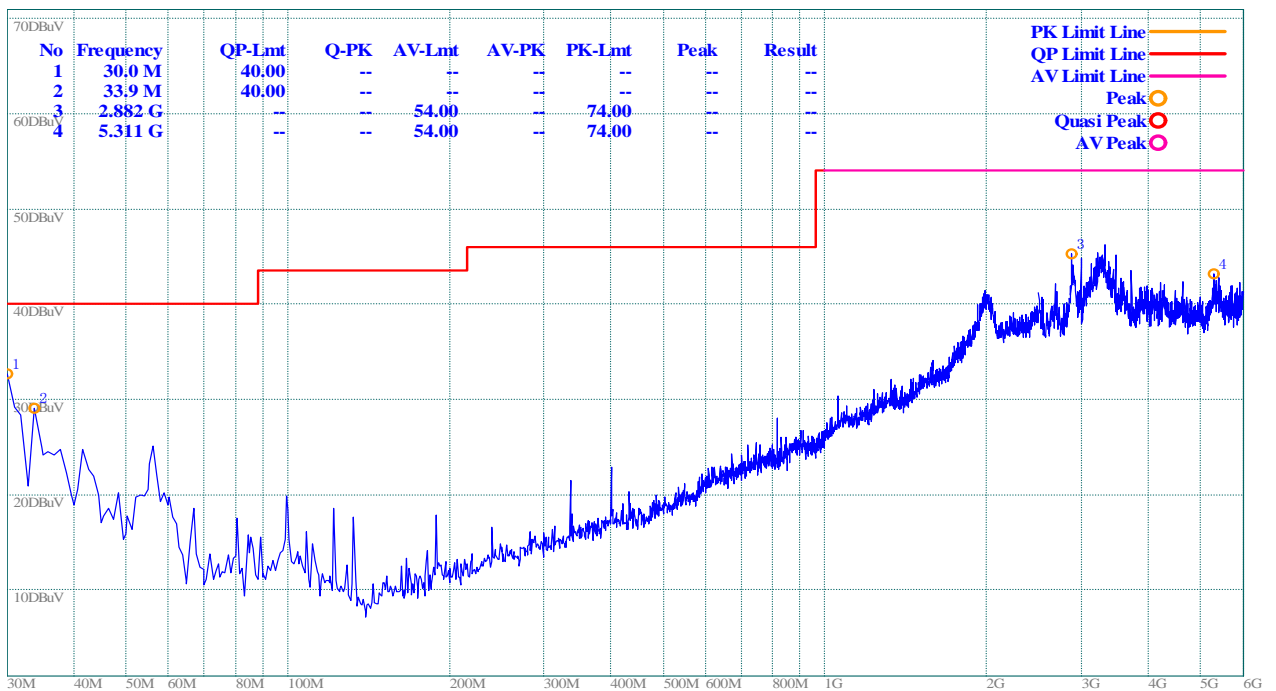
(Plot A: Test Antenna Vertical)



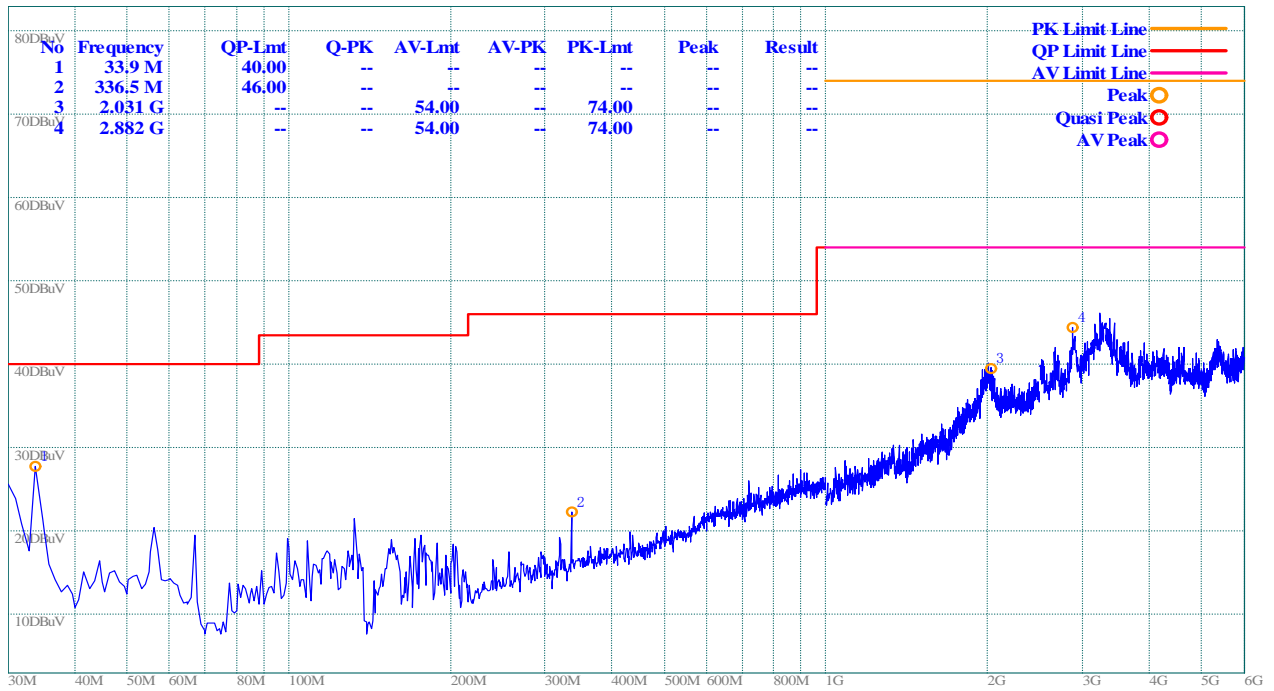
(Plot B: Test Antenna Horizontal)

### 2.2.3.2 Radiated Emission >30MHz (30MHz-1GHz, E-field)

#### A. Test Plots:



(Plot A: Test Antenna Vertical)



(Plot B: Test Antenna Horizontal)

**Result: PASS**

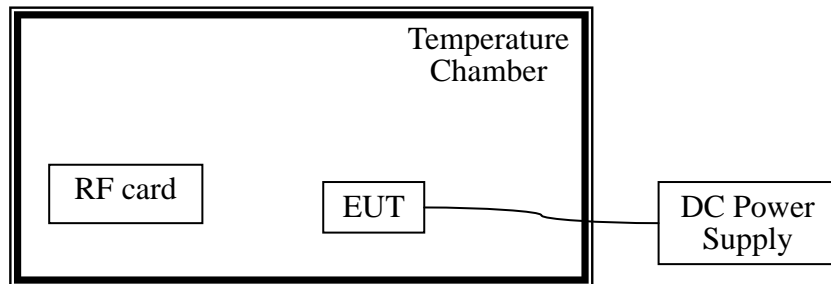
## 2.3 Frequency Tolerance

### 2.3.1 Requirement

According to FCC section 15.225, the devices operating in the 13.553 – 13.567 MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20°C to +50°C using an environmental chamber. The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

### 2.3.2 Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The RF Card is used for the call between with the EUT, and the EUT was measured by transmitter mode continuously.

#### 1. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E7405A	US44210471	2011.05
DC Power Supply	Good Will	GPS-3030DD	EF920938	2011.05
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2011.05

### 2.3.3 Test Verdict

Operating Frequency: 13,560,000 Hz

Deference Voltage: 5.0V

Deviant Limit:  $\pm 0.01\%$



VOLTAGE (%)	Test Conditions		Frequency(Hz)	Deviation	Verdict
	Power (VDC)	Temperature (°C)			
100	4.8	+20°C(Ref)	13,560,315	-0.002317	PASS
100		-20	13,560,612	-0.004535	
100		-10	13,560,648	-0.004738	
100		0	13,560,588	-0.004376	
100		+10	13,560,579	-0.004258	
100		+20	13,560,305	-0.002249	
100		+25	13,560,519	-0.003827	
100		+30	13,560,636	-0.004690	
100		+40	13,560,652	-0.004852	
100		+50	13,560,321	-0.002312	
Battery End Point		5.0	+20	13,560,451	
115	5.2	+20	13,560,351	-0.002553	



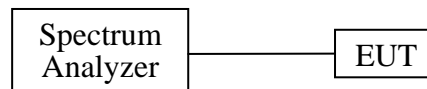
## 2.4 20dB Bandwidth

### 2.4.1 Definition

According to FCC section 15.215(c), the 20dB bandwidth is measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

### 2.4.2 Test Description

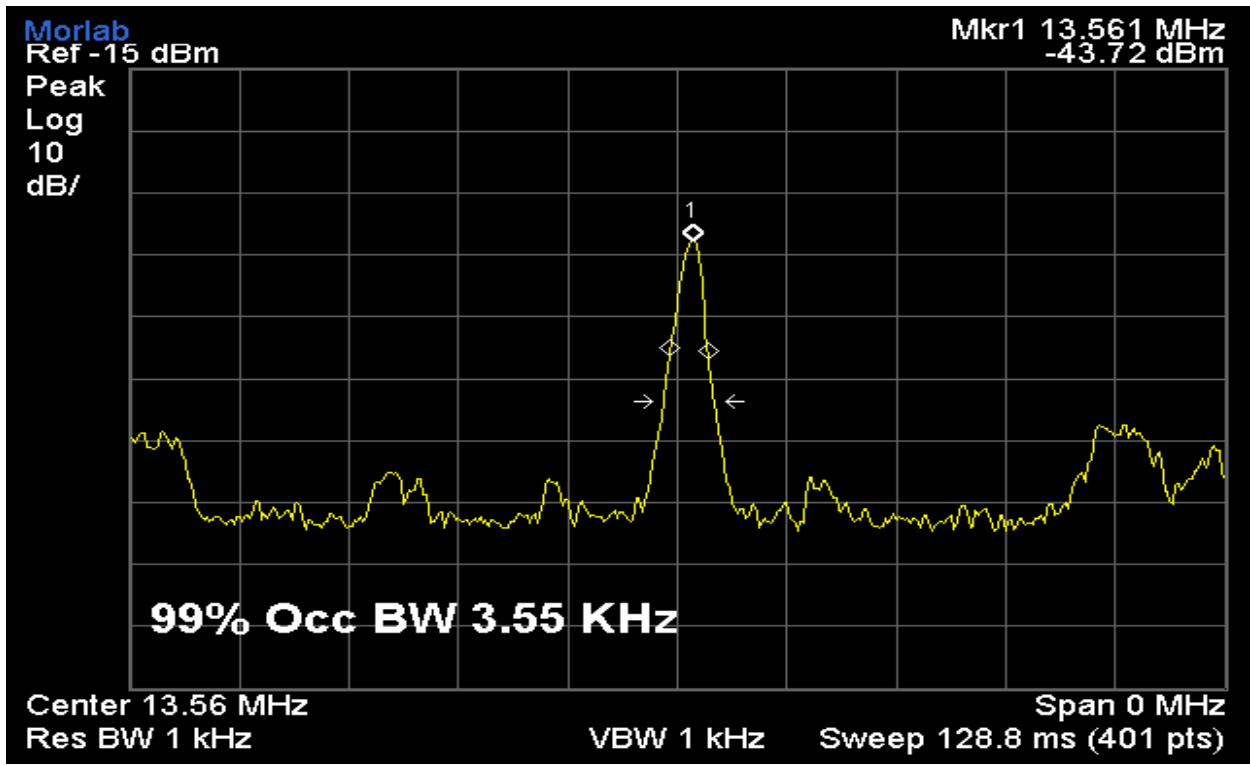
1. Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA).

Description	Manufacturer	Model	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	E7405A	US44210471	2011.05
DC Power Supply	Good Will	GPS-3030DD	EF920938	2011.05

### 2.4.3 Test Verdict



Result: PASS

\*\* END OF REPORT \*\*