



BUREAU VERITAS

Test Report No.: FC120312N021

# TEST REPORT

To:	Zhongshan Leetac Electronics Co., Ltd.
Address:	No.3 Industrial Estate, South District, Zhongshan City, Guangdong province, P.R. China.

Manufacturer or Supplier	Zhongshan Leetac Electronics Co., Ltd.
Address	No.3 Industrial Estate, South District, Zhongshan City, Guangdong province, P.R. China.
Product:	Wireless Tablet In-Car Entertainment System
Brand Name:	Leetac, Innovative Technology
Model:	E-Z450
Date of tests:	March. 12, 2012~ April. 23, 2012



the tests have been carried out according to the requirements of the following standards:

FCC Part 15, Subpart C (Section 15.239)

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Prepared by Glyn He Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
Date: April.23, 2012	

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



## **TABLE OF CONTENTS**

<b>RELEASE CONTROL RECORD .....</b>	<b>3</b>
<b>1 SUMMARY OF TEST RESULTS .....</b>	<b>4</b>
<b>2 MEASUREMENT UNCERTAINTY.....</b>	<b>4</b>
<b>3 GENERAL INFORMATION.....</b>	<b>5</b>
3.1 GENERAL DESCRIPTION OF EUT .....	5
3.2 DESCRIPTION OF TEST MODES .....	6
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	6
3.4 DESCRIPTION OF SUPPORT UNITS .....	6
<b>4. TEST TYPES AND RESULTS .....</b>	<b>7</b>
4.1 RADIATED EMISSION MEASUREMENT .....	7
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	7
4.2.2 TEST INSTRUMENTS.....	8
4.2.3 TEST PROCEDURES .....	9
4.2.4 DEVIATION FROM TEST STANDARD .....	10
4.2.5 TEST SETUP.....	10
4.2.6 EUT OPERATING CONDITIONS .....	10
4.2.7 TEST RESULTS .....	11
4.3 20dB BANDWIDTH MEASUREMENT.....	13
4.3.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT.....	13
4.3.2 TEST INSTRUMENTS.....	13
4.3.3 TEST PROCEDURE.....	14
4.3.4 DEVIATION FROM TEST STANDARD .....	14
4.3.5 TEST SETUP.....	15
4.3.6 EUT OPERATING CONDITIONS .....	15
4.3.7 TEST RESULTS .....	16
<b>5 PHOTOGRAPHS OF THE TEST CONFIGURATION.....</b>	<b>19</b>
<b>6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT     BY THE LAB.....</b>	<b>20</b>



**BUREAU  
VERITAS**

**Test Report No.: FC120312N021**

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Apr. 23, 2012



# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.239)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	Compliant
§15.207 (a)	Conducted Emission	N/A	N/A
§15.239(b) (c)	Radiated Emission	PASS	Compliant
§15.215(c)	20dB Bandwidth Test	PASS	Compliant

## 2 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
Conducted emissions	9kHz~30MHz	2.44dB
Radiated emissions	30MHz ~ 200MHz	3.19dB
	200MHz ~1000MHz	3.21dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless Tablet In-Car Entertainment System
<b>MODEL NO.</b>	E-Z450
<b>ADDITIONAL MODEL &amp; MODEL DIFFERENCE:</b>	ITIP-444, E-Z45X (X will be replaced by digital 0-9, or letter A-Z) Only differences the Model No.
<b>FCC ID</b>	ZXNLEETACEZ450
<b>NOMINAL VOLTAGE</b>	DC 12V By Battery
<b>MODULATION TYPE</b>	FM
<b>OPERATING FREQUENCY</b>	88.1MHz, 88.7MHz, 106.7MHz, 107.5MHz The device can not operate on any frequency other than this listed.
<b>NUMBER OF CHANNEL</b>	4
<b>ANTENNA TYPE</b>	Integral Antenna,
<b>I/O PORTS</b>	USB Output Port,
<b>DATA CABLE SUPPLIED</b>	Audio Cable: Unshielded, Undetachable, 1.5m

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. The EUT was powered by the following adapters:

<b>ADAPTER</b>	
BRAND:	N/A
MODEL:	N/A
INPUT:	N/A
OUTPUT:	N/A
DC LINE:	N/A



### 3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes' the final worst mode were marked in boldface and recorded in this report.

FREQUENCY	TEST MODES
88.1MHz	Transmitting + DC Output
88.7MHz	Transmitting + DC Output
106.7MHz	Transmitting + DC Output
107.5MHz	Transmitting + DC Output

After estimating all the combination of every test mode, the result shown as below is the worst case

FREQUENCY	TEST MODES
88.1MHz	Transmitting + DC Output

### 3.3 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 Part 15, Subpart C (15.239)**  
**ANSI C63.4-2009**

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

### 3.4 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	iPhone 4	APPLE	A1332	81124KCJA4S	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Cable: Shielded, Detachable, 1.0m



## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

According to §15.239(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [ $\mu\text{V/m}$ ]	Field Strength of Fundamental Emission [Average] [ $\mu\text{V/m}$ ]
88 – 108	2500 (68 dB $\mu\text{V/m}$ )	250 (48 dB $\mu\text{V/m}$ )

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.



**4.1.2 TEST INSTRUMENTS**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E4446A	MY46180622	Apr. 25, 11	Apr. 25, 12
Spectrum Analyzer Agilent	E7405A	MY45118807	May 25, 11	May 25, 12
Test Receiver ROHDE & SCHWARZ	ESVD	847398/003	May 25, 11	May 25, 12
Bilog Antenna TESEQ	CBL 6111D	27089	Jul 24, 11	Jul 24, 12
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	May 02, 11	May 02, 12
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 02, 11	May 02, 12
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 02, 11	May 02, 12
Signal Amplifier EMCI	EMC330	980095	Nov 07, 11	Nov 07, 12
Spectrum Analyzer HP	8593E	3448U00806	May 25, 11	May 25, 12
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 02, 11	May 02, 12
Test software	ADT_Radiated_V7. 6.15	N/A	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.
  2. The test was performed in Dongguan Chamber 10m.





#### 4.1.3 TEST PROCEDURES

The basic test procedure was in accordance with ANSI C63.4 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level.
- g. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

**NOTE:**

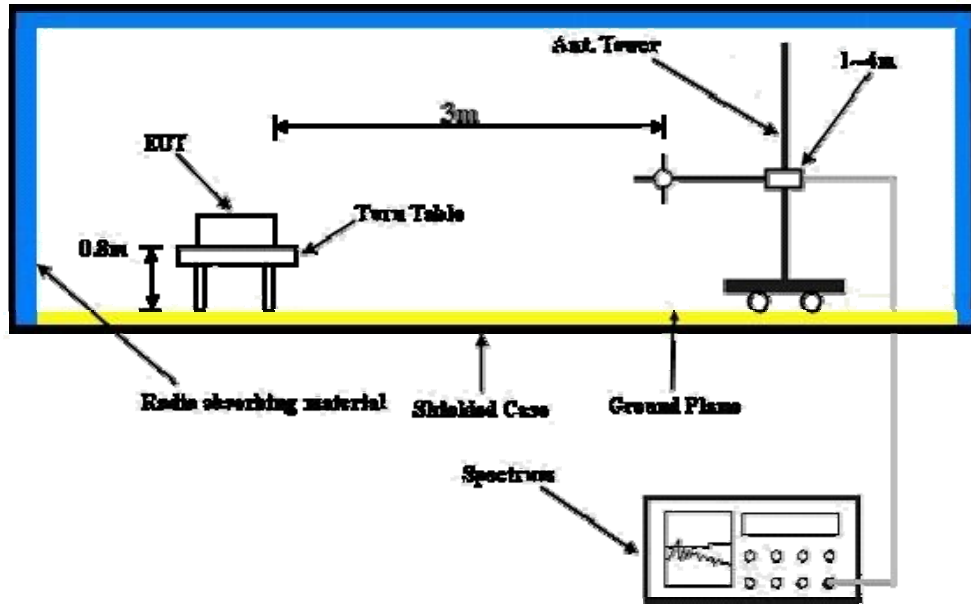
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.



#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



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

#### 4.1.6 EUT OPERATING CONDITIONS

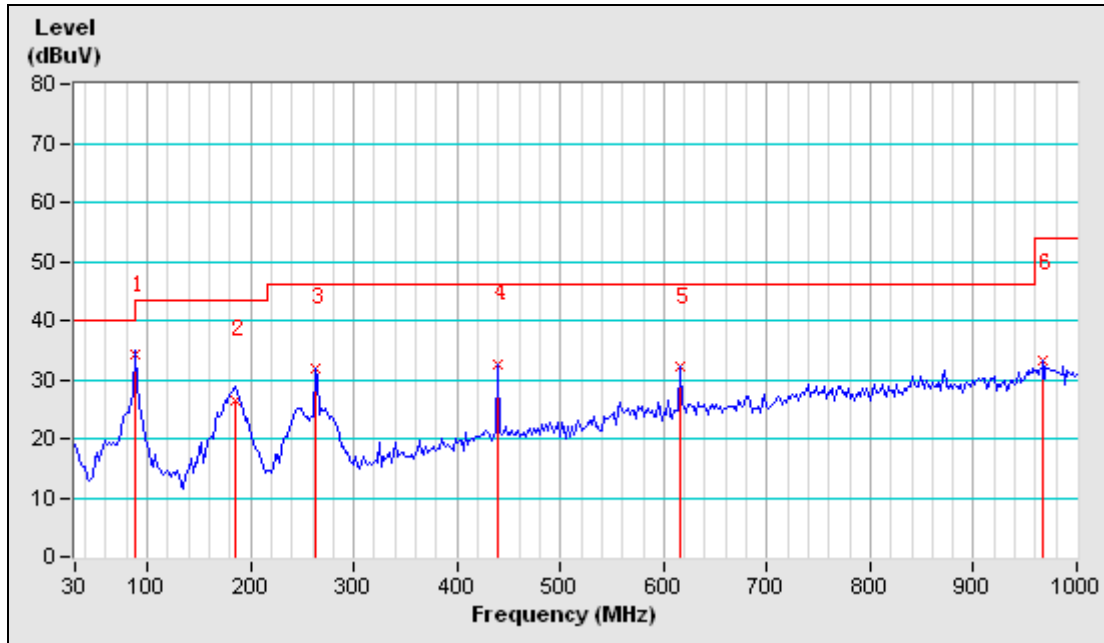
- Placed the EUT on the testing table.
- Playing the music with maximum audio input from the iPhone.
- The iPhone was charged from the DC output port of the EUT.
- Enable EUT under transmission condition continuously at specific channel frequency.



4.1.7 TEST RESULTS

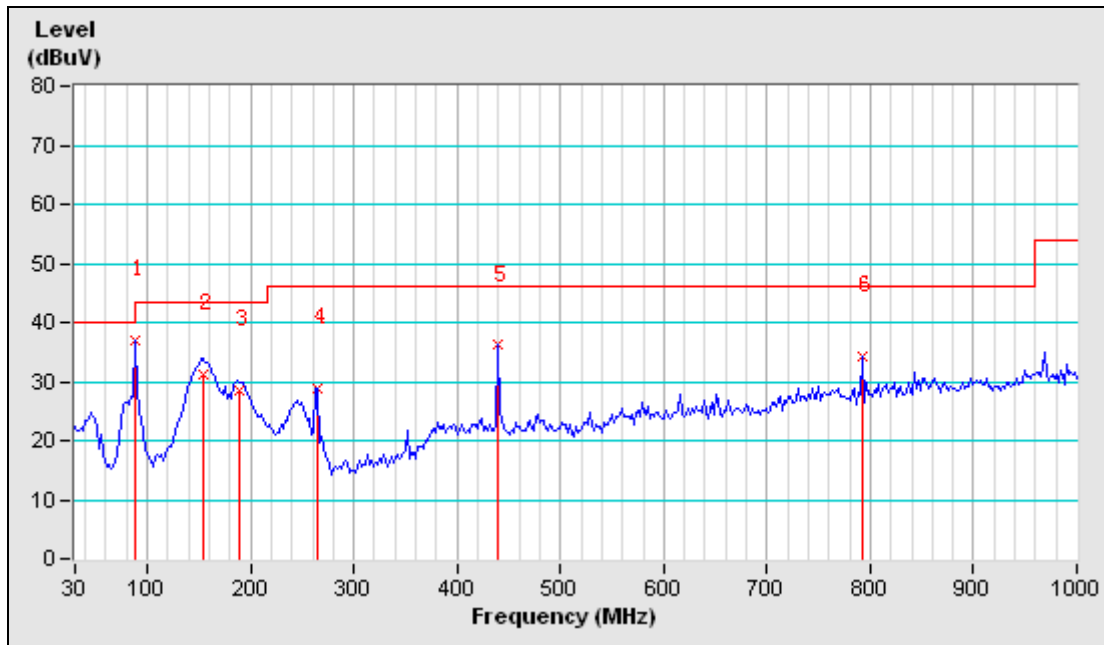
WORST-CASE DATA: Transmitting + DC Output (88.1MHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	88.10(PK)	9.69	25.46	35.15	68	-32.85	322	301
	88.10(AV)	9.69	22.55	32.24	48	-15.76	100	0
2	185.20(PK)	10.83	15.68	26.51	43.5	-16.99	230	36
3	262.80(PK)	15.26	16.62	31.88	46	-14.12	184	230
4	439.34(PK)	20.71	12.00	32.71	46	-13.29	116	329
5	615.88(PK)	24.96	7.11	32.07	46	-13.93	137	299
6	967.02(PK)	31.93	1.84	33.77	54	-20.23	158	269





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	88.10(PK)	9.72	27.34	37.06	68	-30.94	150	44
	88.10(AV)	9.72	25.10	34.82	48	-13.18	159	107
2	154.16(PK)	12.45	18.69	31.14	43.5	-12.36	110	253
3	189.08(PK)	10.92	17.58	28.50	43.5	-15.00	101	194
4	264.74(PK)	15.37	13.40	28.76	46	-17.24	136	140
5	439.34(PK)	20.71	15.42	36.13	46	-9.87	230	36
6	792.42(PK)	28.33	5.93	34.26	46	-11.74	147	307





## 4.2 20dB BANDWIDTH MEASUREMENT

### 4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E7405A	MY45118807	May 25,11	May 25,12
Horn Antenna EMCO	3117	00062558	Nov.07,11	Nov.07,12
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	May 02,11	May 02,12
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 02,11	May 02,12
Signal Amplifier EMCI	EMC0140045	980102	Nov 07,11	Nov 07,12
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 02,11	May 02,12

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA
2. The test was performed in Dongguan Chamber 10m



#### 4.2.3 TEST PROCEDURE

The EUT was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. At the frequency band of 30MHz to 1GHz, The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 to 4 m for horizontal and vertical polarizations.

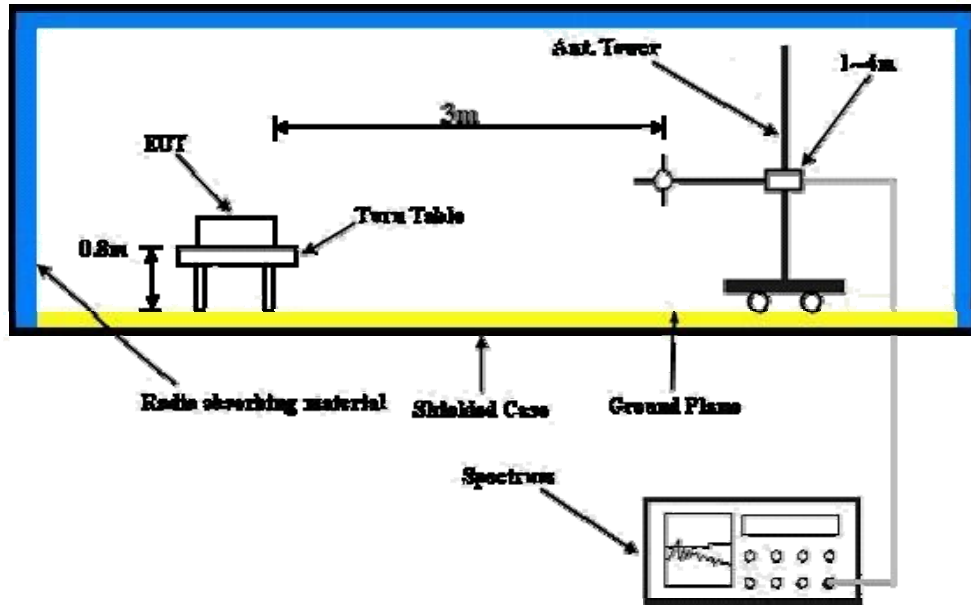
The spectrum analyzer was receiving the maximum emission level. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.2.5 TEST SETUP



#### 4.2.6 EUT OPERATING CONDITIONS

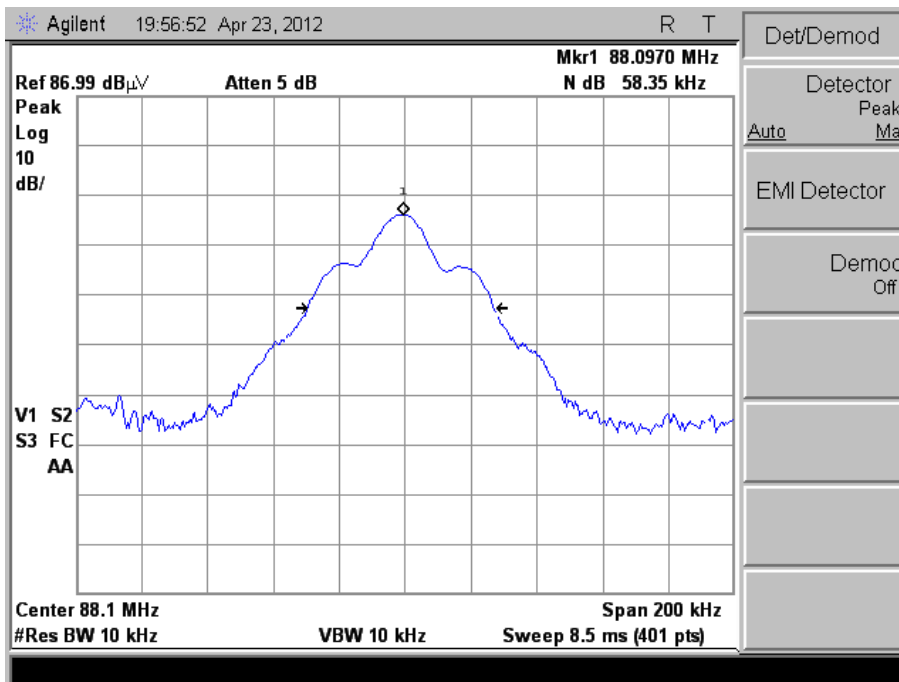
- Placed the EUT on the testing table.
- Playing the music with maximum audio input from the iPhone.
- With the EUT's antenna attached, which was connected to the spectrum analyzer set to the EUT's operation frequencies.



4.2.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (KHz)
1	88.1	58.35
2	88.7	58.35
3	106.7	58.85
4	107.5	58.35

Test Data: 88.1MHz



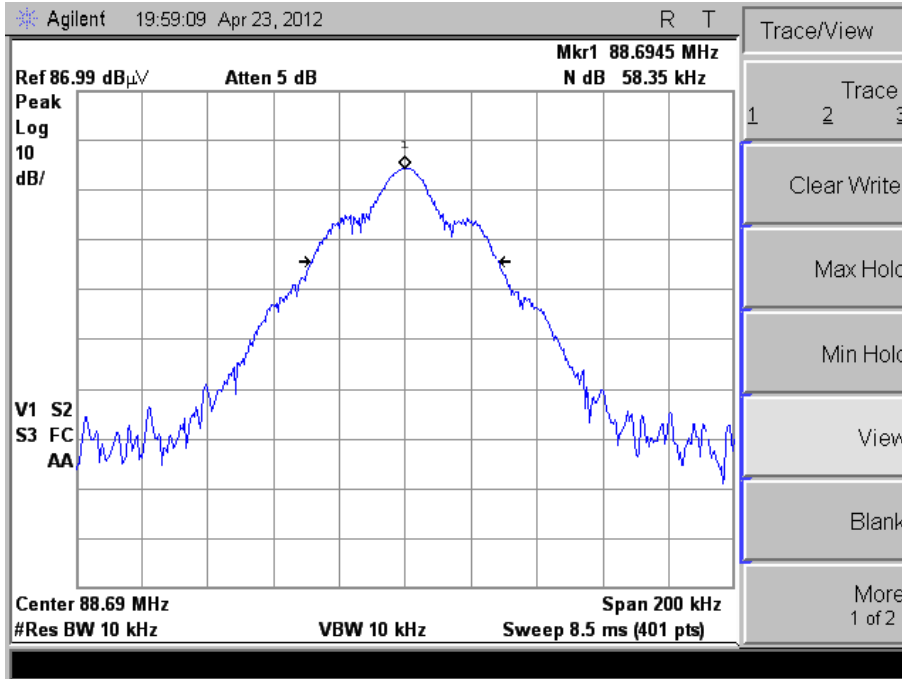




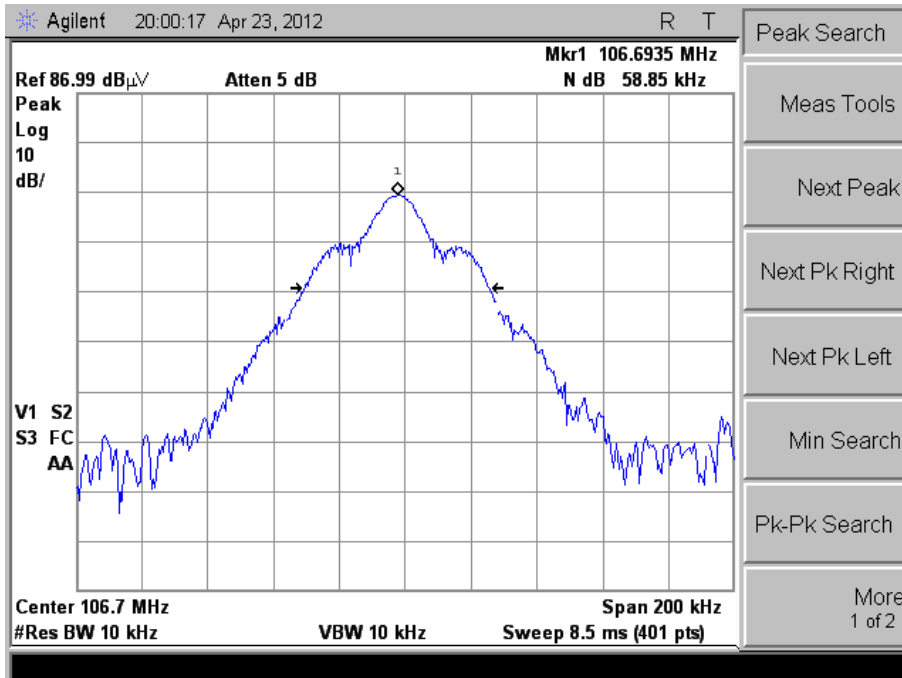
BUREAU VERITAS

# Test Report No.: FC120312N021

Test Data: 88.7MHz



Test Data: 106.7MHz

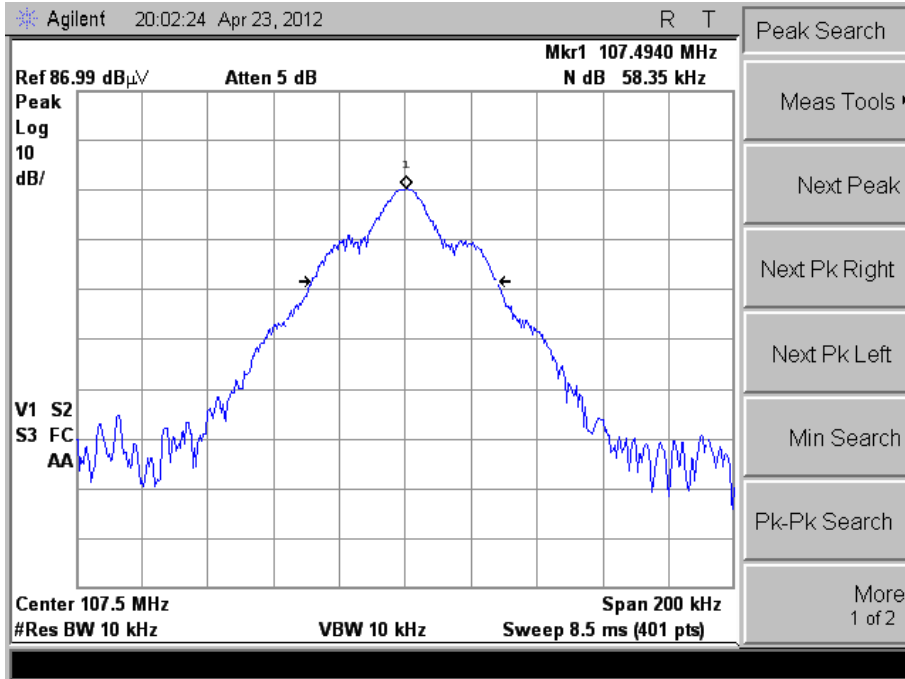




BUREAU VERITAS

# Test Report No.: FC120312N021

Test Data: 107.5MHz





**BUREAU  
VERITAS**

**Test Report No.: FC120312N021**

## **5 PHOTOGRAPHS OF THE TEST CONFIGURATION**

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



**BUREAU  
VERITAS**

**Test Report No.: FC120312N021**

## **6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

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

**---END---**