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Dates of Tests: December 21,2006 ~ January 05, 2007  
 Test Report S/N: LR500190701A  
 Test Site : LTA CO., LTD.

FCC ID

**USNCWF-1X800AA**

APPLICANT

**ACBEL POLYTECH INC.**

## TEST REPORT

### FCC Part 22H Certification

**Classification** : Licensed Non-Broadcast Station Transmitter (TNB)  
**Manufacturing Description** : CDMA Fixed Wireless Phone  
**Manufacturer** : ACBEL POLYTECH INC.  
**Model name** : CWF-1x800AA  
**Test Device Serial No.:** : Identification  
**FCC Rule Part(s)** : §22(H), §2  
**TX Frequency Range** : 824.70 ~ 848.31 MHz  
**RX Frequency Range** : 869.70 ~ 893.31 MHz  
**Max. RF Output Power** : 0.449W ERP CDMA (26.52dBm)  
**Max. SAR Measurement** : 0.846W/kg CDMA Body SAR  
**Emission Designators:** : 1M28F9W  
**Data of issue** : January 09, 2007

This test report is issued under the authority of:

The test was supervised by:

Dong-Min JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

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## 1. General information's

### **1-1 Test Performed**

Company name : LTA Co., Ltd.  
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 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
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 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### **1-2 Accredited agencies**

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2007-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2007-07-13	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

## 2. Information's about test item

### 2-1 Client

Company name : ACBEL POLYTECH INC.  
 Address : No. 159, Sec. 3, Tam-King Rd., Tamsui, Taipei,  
 Country : Taiwan, R.O.C.  
 Telephone : +886-2-26217672  
 Facsimile : +886-2-86318073

### 2-2 Equipment Under Test (EUT)

Classification : Licensed Non-Broadcast Station Transmitter (TNB)  
 Trade name : CDMA Fixed Wireless Phone  
 Model name : CWF-1x800AA  
 Serial number : Identification  
 Date of receipt : December 04, 2006  
 EUT condition : Pre-production, not damaged  
 Antenna type / Gain : Half Wavelength Antenna / Max. 3.5dBi  
 TX Frequency Range : 824.70 ~ 848.31 MHz  
 RX Frequency Range : 869.70 ~ 893.31 MHz  
 Frequency Tolerance :  $\pm 0.00025\%$  (2.5ppm)  
 Emission Designators : 1M28F9W  
 Voltage and Current applied through the final Amplifier : 5.0V / 0.551A / 2.755W  
 Power Source : AC Adaptor (Normal)  
 Input: 110~240VAC, 50~60Hz / Output: 5VDC/1.5A  
 Internal Battery (Emergency)  
 Li-Ion 2000mA

### 2-3 Tested frequency

Frequency (CH)	TX (MHz)
Low (1013)	824.7
Mid (0384)	836.52
High (0777)	848.31

### 3. Test Report

#### 3.1 Summary of tests

Parameter	Status
<b>Transmitter Requirements</b>	
Effective Radiated Power Output	C
Occupied Bandwidth	C
Field Strength of Spurious Radiation	C
Spurious Radiation at Antenna Terminal	C
Frequency Stability	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

#### A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

#### Emission Designator:

EMISSION Designator = 1M28F9W

Calculation : 2M + 2DK

CDMA BW = 1.275MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

## **3.2 DESCRIPTION OF TESTS**

### **3.2.1 Effective Radiated Power Output**

#### **Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:**

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, an average detector is used, with RBW=VBW=3MHz, SPAN=10MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

### **3.2.2 Radiation Spurious and Harmonic Emissions**

#### **Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:**

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. The Spectrum was investigated from 30MHz to the 10<sup>th</sup> Harmonic of the fundamental. A peak detector is used. With RBW=VBW=1MHz. The value that we could measure was only reported. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

### **3.2.3 Occupied Bandwidth**

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

### **3.2.4 Spurious Emission at Antenna Terminal**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz.

### **3.2.5 Occupied Bandwidth Emission Limits**

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB.
- (b) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

### 3.2.6 Frequency Stability/Temperature Variation

The frequency stability of the transmitter is measured by:

- a) **Temperature** :The temperature is varied from -30°C to + 60°C using an environmental chamber.
- b) **Primary Supply Voltage** :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.

Specification –The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

Specification — The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025$ ( $\pm 2.5\text{ppm}$ ) of the center frequency.

#### Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight ”soak” at -30°C(usually 14-16 hours),the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

### 3.3 DESCRIPTION OF TESTS

#### 3.3.1 Effective Radiated Power Output

Supply Voltage: AC 120V

Modulation : CDMA

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	Supplied Power
824.70	-11.72	V	0.418	26.21	Charger
<b>836.52</b>	<b>-11.36</b>	<b>V</b>	<b>0.449</b>	<b>26.52</b>	<b>Charger</b>
848.31	-12.59	V	0.351	25.45	Charger

*Note 1:* Extension Batteries (Standard) are the only options for this phone.

*Note 2:* Radiated measurements at 3 meters by Substitution Method.

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### 3.3.2 Field Strength of spurious Radiation

OPERATING FREQUENCY : 824.7 MHz  
 CHANNEL : 1013(Low)  
 MEASURED OUTPUT POWER : 26.52 dBm = 0.449 W  
 MODULATION : CDMA  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W)$  = 39.52 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.4	-33.45	6.3	-27.15	V	53.67
2474.1	-34.17	9.1	-25.07	V	51.59
-	-	-	-	-	-
-	-	-	-	-	-

*Note1:* Radiated measurements at 3 meters by Substitution Method.

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## 3.3.2 Field Strength of spurious Radiation

--- Continue

OPERATING FREQUENCY : 836.52 MHz

CHANNEL : 0384(Mid)

MEASURED OUTPUT POWER : 26.52 dBm = 0.449 W

MODULATION : CDMA

DISTANCE : 3 meters

LIMIT :  $43 + 10 \log_{10} (W)$  = 39.52 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.4	-33.83	6.3	-27.53	V	54.05
2474.1	-33.37	9.1	-24.27	V	50.79
3298.8	-42.75	9	-33.75	V	60.27
-	-	-	-	-	-
-	-	-	-	-	-

*Note1:* Radiated measurements at 3 meters by Substitution Method.

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## 3.3.2 Field Strength of spurious Radiation

--- Continue

OPERATING FREQUENCY : 848.31 MHz

CHANNEL : 0777(Mid)

MEASURED OUTPUT POWER : 24.46 dBm = 0.279 W

MODULATION : CDMA

DISTANCE : 3 meters

LIMIT :  $43 + 10 \log_{10} (W)$  = 37.46 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.4	-30.33	6.3	-24.03	V	50.55
2474.1	-40.62	9.1	-31.52	V	58.04
3298.8	-33.71	9	-24.71	V	51.23
-	-	-	-	-	-

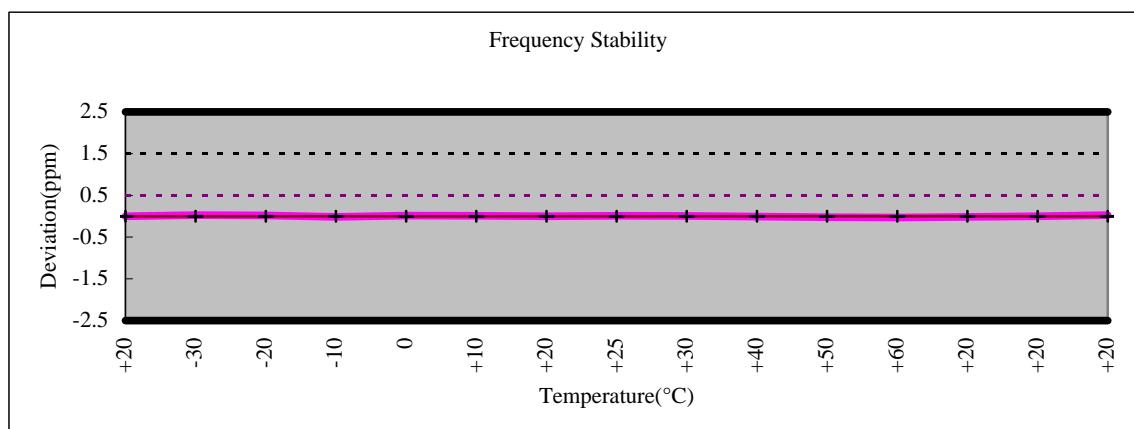
*Note1:* Radiated measurements at 3 meters by Substitution Method.

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### 3.3.3 Frequency Stability

OPERATING FREQUENCY : 836,520,152 Hz  
 CHANNEL : 0384(Mid)  
 REFERENCE VOLTAGE : 120 VAC  
 DEVIATION LIMIT :  $\pm 0.00025$  % or 2.5 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	120	+20(Ref)	836,520,152	0.000000
100%		-30	836,520,174	-0.000003
100%		-20	836,520,169	-0.000002
100%		-10	836,520,165	0.000002
100%		0	836,520,164	-0.000001
100%		+10	836,520,162	-0.000001
100%		+20	836,520,152	0.000000
100%		+25	836,520,163	-0.000001
100%		+30	836,520,157	-0.000001
100%		+40	836,520,145	0.000001
100%		+50	836,520,134	0.000002
100%		+60	836,520,125	0.000003
85%	102	+20	836,520,139	0.000002
115%	138	+20	836,520,152	0.000000
BATT.ENDPOINT	-	-	-	-



### **3.4 CONCLUSION**

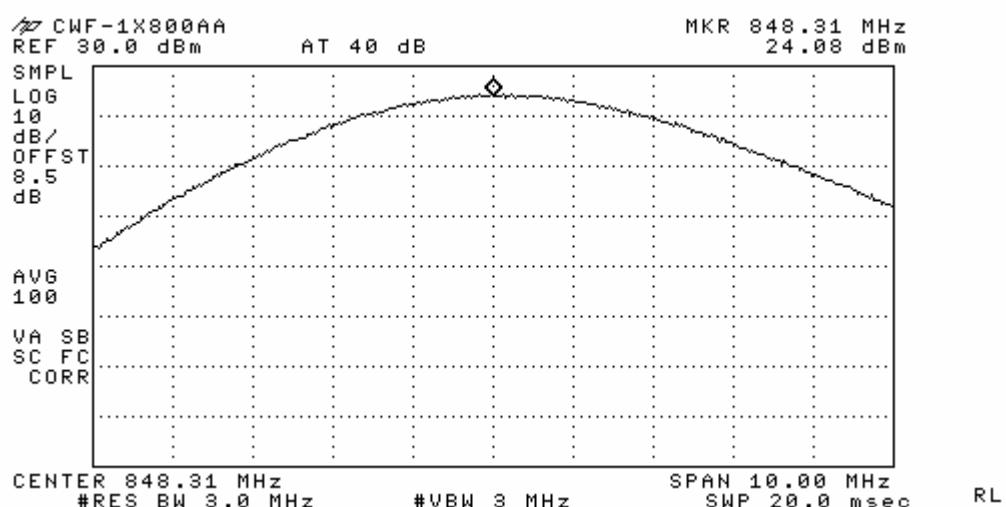
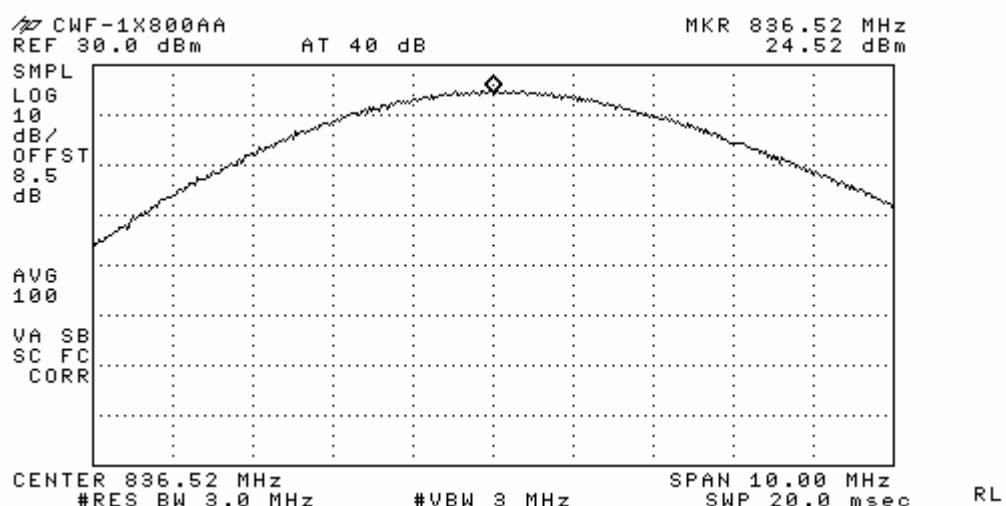
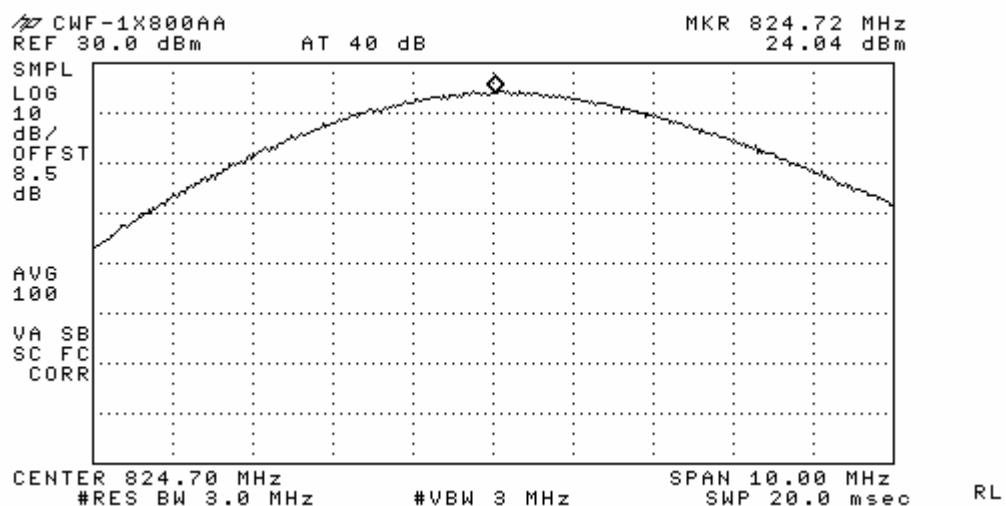
The data collected shows that the **ACBEL POLYTECH INC. CDMA Fixed Wireless Phone FCC ID: USNCWF-1X800AA** complies with all the requirements of Parts 2, 15, 22 of the FCC Rules.

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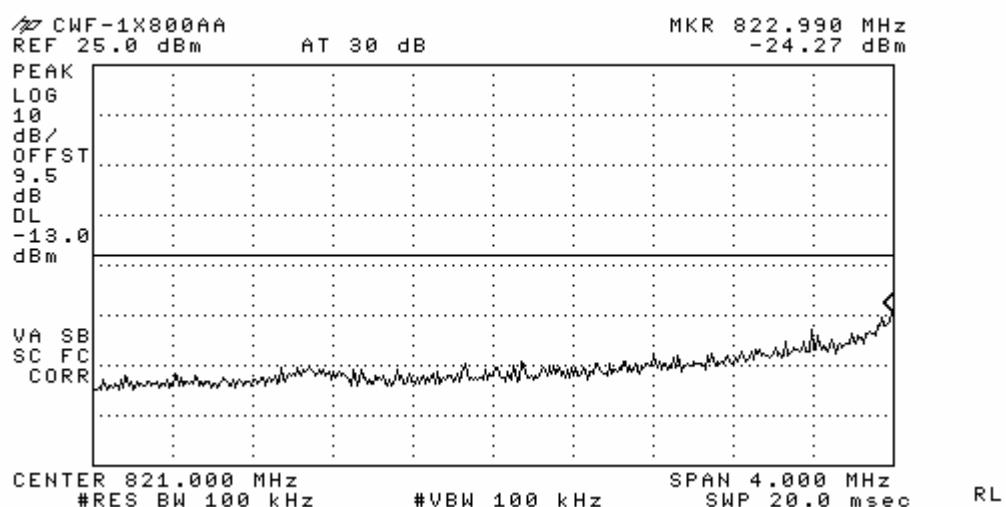
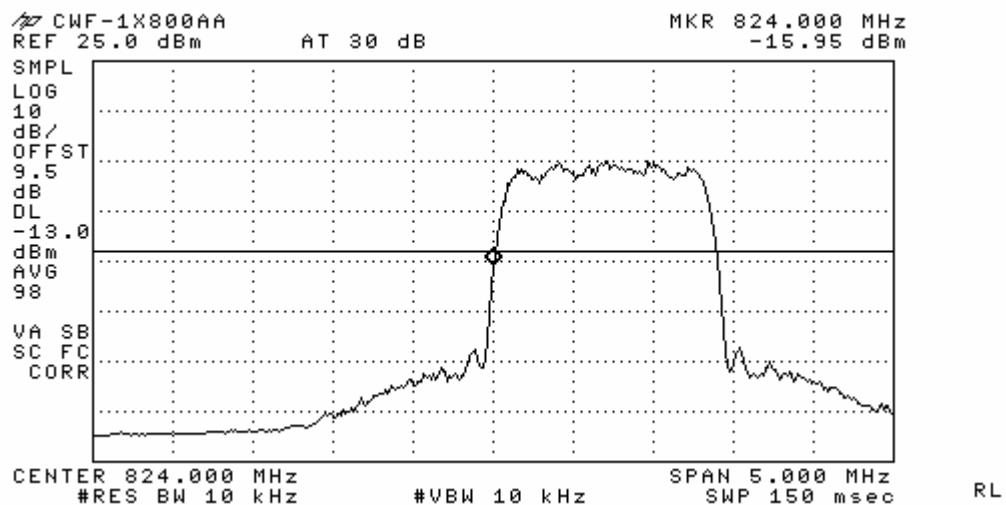
### **3.5 TEST PLOTS**

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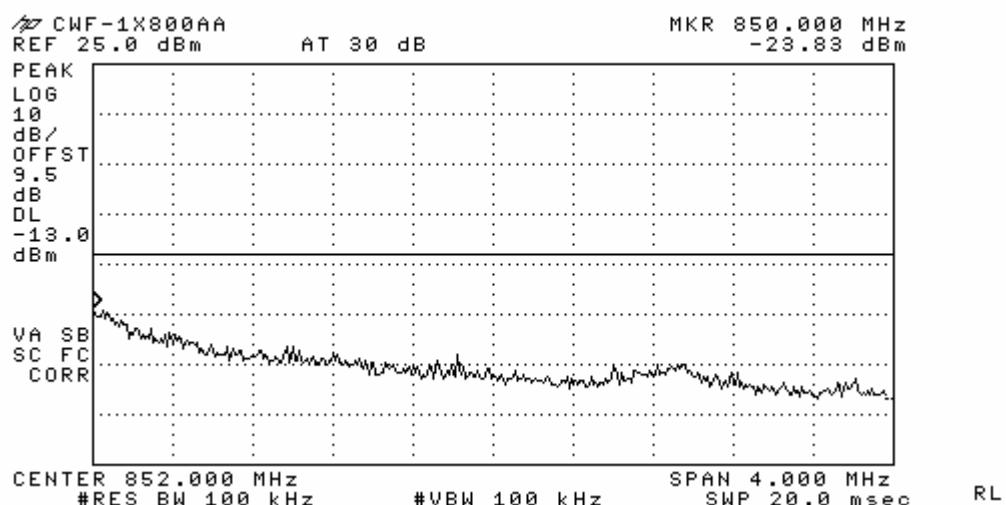
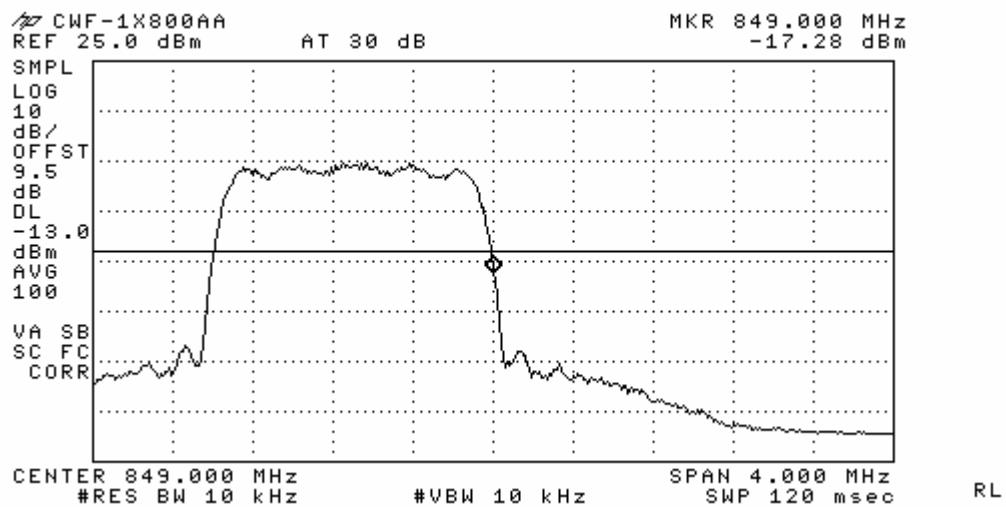
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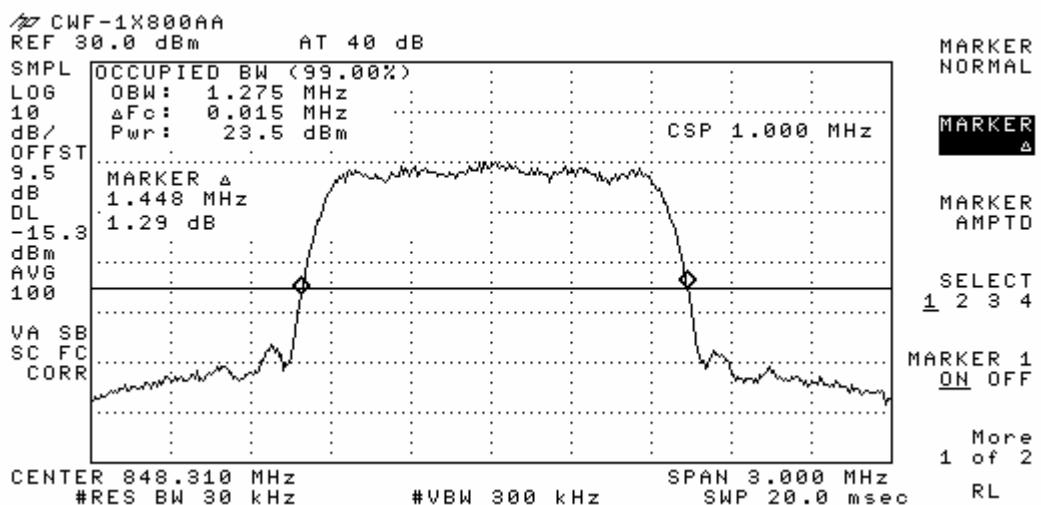
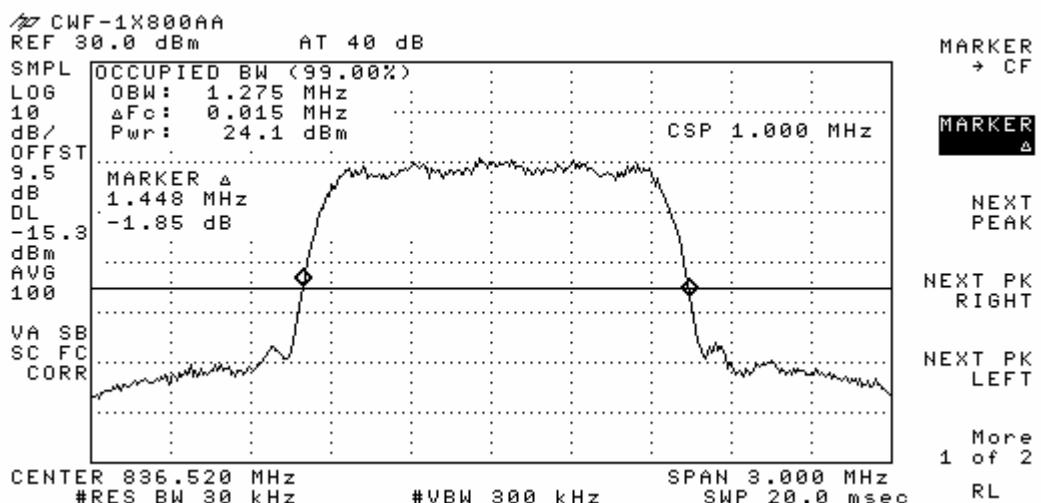
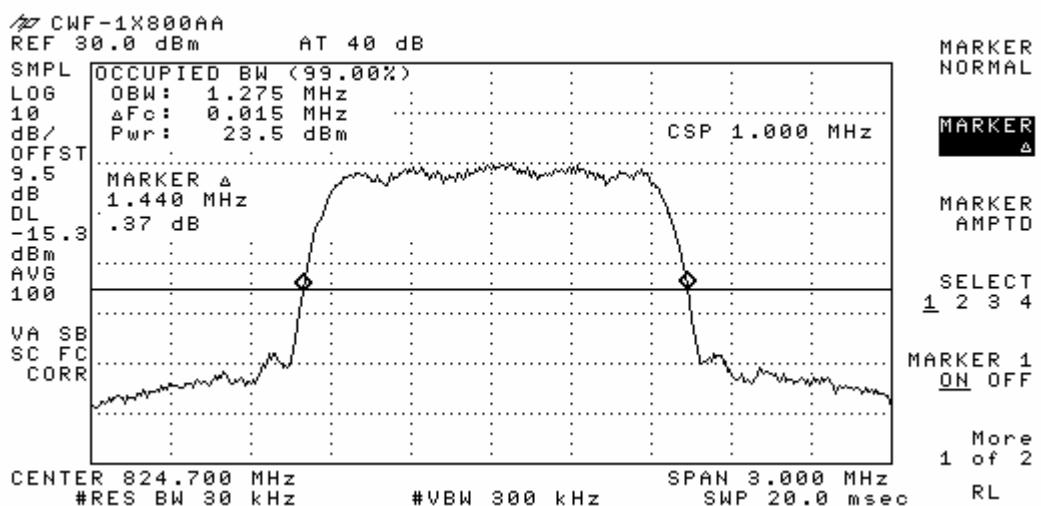
## Band Edge



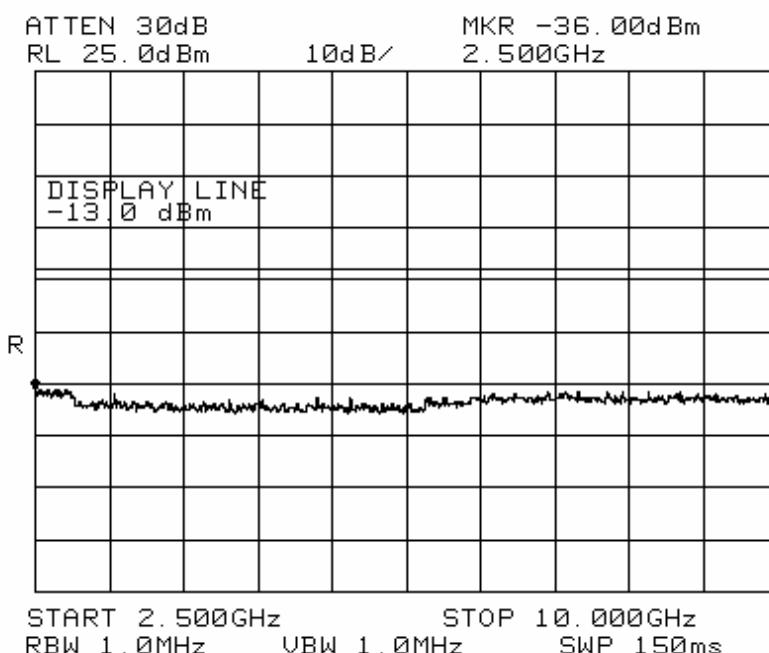
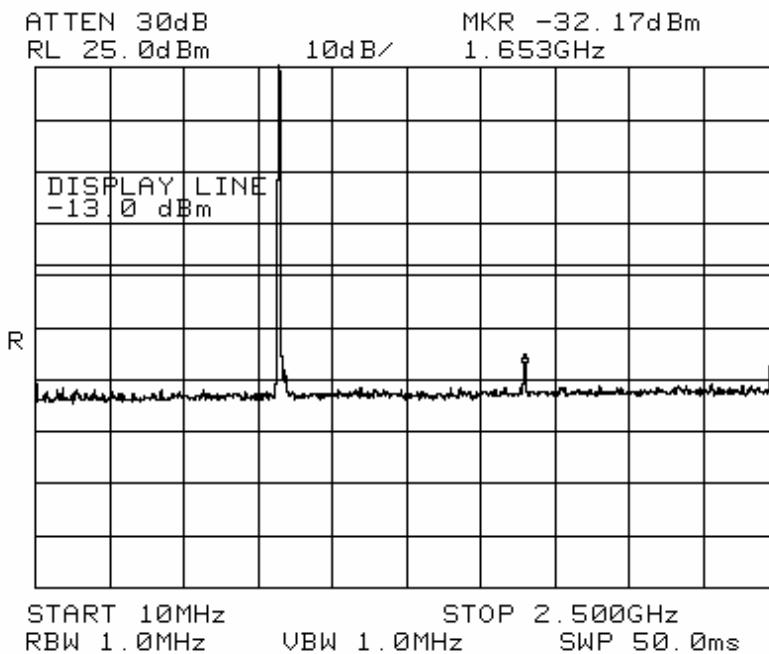
## Band Edge



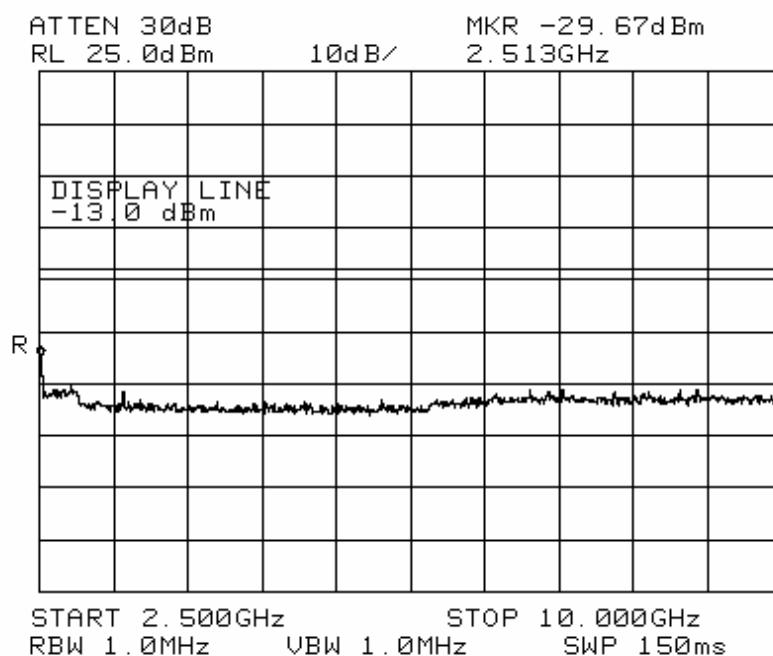
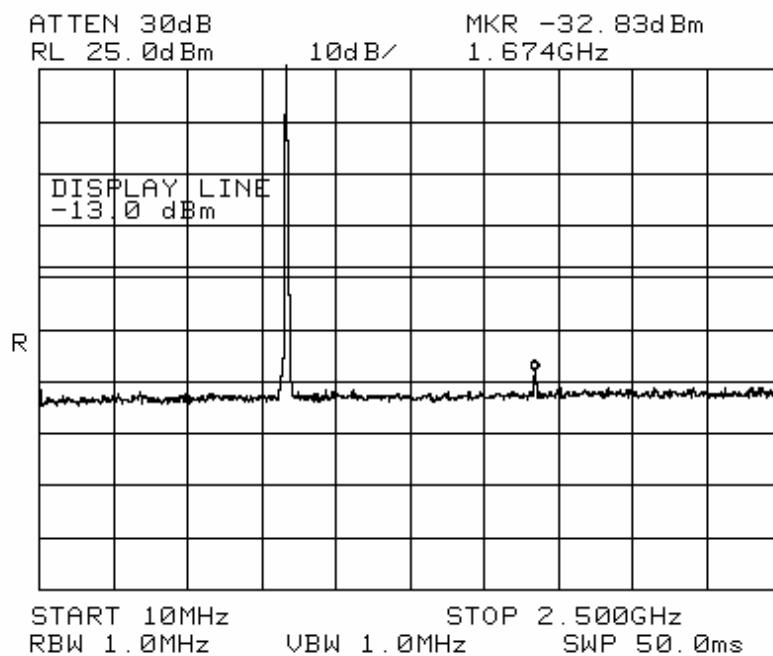
## OCCUPIED BW



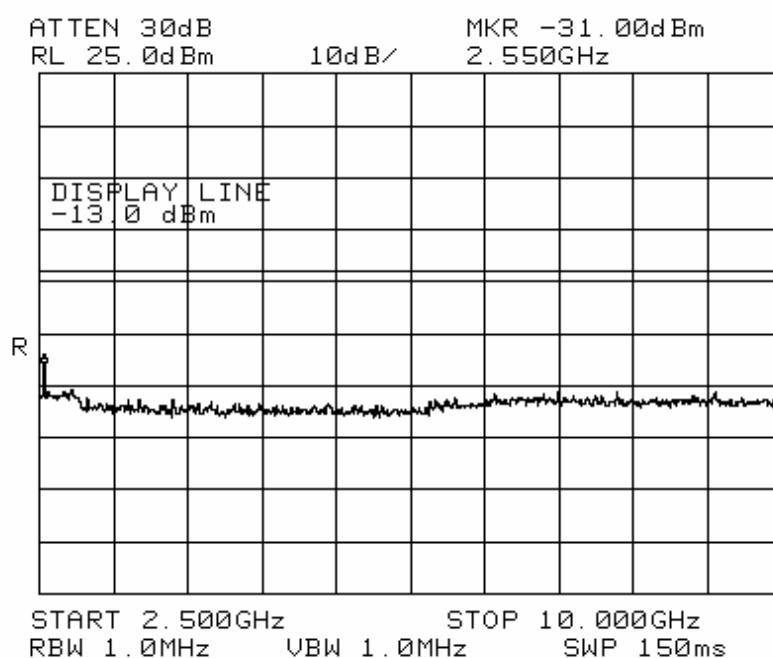
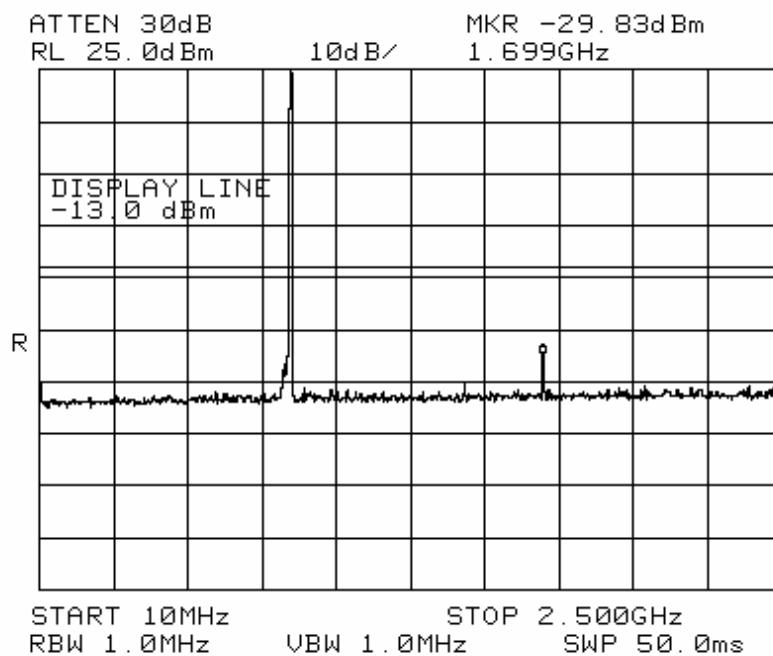
## Spurious CH. 1013



## Spurious CH. 0363



## Spurious CH. 0777



## APPENDIX 1

### TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Mar-07
2	Signal Generator	8657A	3430U02049	HP	Dec-07
3	Attenuator (3dB)	8491A	37822	HP	Nov-07
4	Attenuator (3dB)	8491A	28881	HP	Nov-07
5	EMI Test Receiver	ESVD	843748/001	R&S	Jan-07
6	LISN	KNW-407	8-1430-1	Kyoritsu	Jan-07
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Jan-07
8	RF Amplifier	8447D	2949A02670	HP	Jan-07
9	RF Amplifier	8447D	2439A09058	HP	Jan-07
10	RF Amplifier	8449B	3008A02126	HP	Jun-07
11	Test Receiver	ESHS10	828404009	R&S	Jan-07
12	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	Feb-07
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Feb-07
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Feb-07
15	Horn Antenna	3115	00055005	ETS LINDGREN	Jun-07
16	Horn Antenna	BBHA 9120D	0499	Schwarzbeck	Jun-07
17	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-07
18	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-07
19	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-07
20	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-07
21	Spectrum Analyzer	8591E	3649A05888	HP	Jan-07
22	Spectrum Analyzer	8563E	3425A02505	HP	Jan-07
23	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Feb-07
24	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-07
25	RF Switch	MP59B	6200414971	ANRITSU	Jun-07
26	RF Switch	MP59B	6200438565	ANRITSU	Jun-07
27	Power Divider	11636A	6243	HP	Nov-07
28	DC Power Supply	6622A	3448A03079	HP	Oct-07
29	Attenuator (30dB)	11636A	6243	HP	Nov-07
30	Attenuator (10dB)	8491A	63196	HP	Nov-07
31	Power Meter	EPM-441A	GB32481702	HP	Apr-07
32	Power Sensor	8481A	2702A64048	HP	Apr-07
33	Audio Analyzer	8903B	3729A18901	HP	Nov-07
34	Modulation Analyzer	8901B	3749A05878	HP	Nov-07
35	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-07-

## APPENDIX 2

### **Label and User's Manual Information**

## Certification Labeling Requirements

### **§ 15.19 Labeling requirements.**

(a) In addition to the requirements in part 2 of this chapter, a device subject to **certification, or verification** shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90, etc., shall bear the following statement in a conspicuous location on the device:

*This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.*

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

*This device is verified to comply with part 15 of the FCC Rules for use with cable television service.*

(3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

## **User's Manual Information**

### **§ 15.21 Information to user.**

*The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B - Unintentional Radiators:

### **§ 15.105 Information to the user.**

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

*Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.