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# **ELECTROMAGNETIC EMISSIONS COMPLIANCE** REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

**Product Name: Digital FM Transmitter** 

**Model Name:** EF-6211

**Model Differences:** N/A

**Brand Name:** N/A

FCC ID: **POSEF-6211** 

ER/2004/C0026 **Report No.:** 

**Issue Date:** Jan. 27, 2005

**FCC Rule Part:** §15.239

Prepared for PROCARE INTERNATION CO.,

11F-6, 410, CHUNG HSIAO E. RD.,

SEC. 5, TAIPEI, TAIWAN.

Prepared by SGS Taiwan Ltd.

No. 134, Wu Kung Rd., Wuku Industrial

Zone, Taipei County, Taiwan.

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### VERIFICATION OF COMPLIANCE

**Applicant:** PROCARE INTERNATION CO.,

11F-6, 410, CHUNG HSIAO E. RD., SEC. 5, TAIPEI, TAIWAN.

**Product Description:** Digital FM Transmitter

FCC ID Number: POSEF-6211

Model No.: EF-6211

**Model Difference:** N/A

**File Number:** ER/2004/C0026

**Date of test:** Dec. 29, 2004 ~ Jan. 13, 2005

Date of EUT Receive: Dec. 28, 2004

# We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.239.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Henk Huang	Date	Jan. 27, 2005	
Approved By	Henk Huang  Timent Su  Vincent Su	Date	Jan. 27, 2005	



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01	Jan. 27, 2005



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#### 1. GENERAL INFORMATION

#### 1.1 Product Description

The PROCARE INTERNATION CO., Model: EF-6211 (referred to as the EUT in this report) is a short range, lower power, audio sender. It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 88.1 107.9 MHz.
- B). Modulation: Frequency Modulation
- C). Antenna Designation: Non-User Replaceable (Fixed)
- D). Power Supply: 12 Vdc from car battery.

### 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: POSEF-6211 filing to comply with Section 15.239 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

### 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Anechoic chamber (3 meters) Registration Number: 573967

#### 1.5 **Special Accessories**

Not available for this EUT intended for grant.

#### 1.6 **Equipment Modifications**

N/A



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# 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

#### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode, the Tx frequency was fixed which was for the purpose of the measurements.

#### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.



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#### 2.4 Limitation

# (1) Conducted Emission (Not applicable in this report)

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range		Limits B (uV)
MHz	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

#### Note

<sup>1.</sup> The lower limit shall apply at the transition frequencies

<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.



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#### (2) Radiated Emission

- a. Emission from the intentional radiator shall be confined with a band 200kHz wide centered on the operation frequency. The 200kHz band shall lie wholly within the frequency range of 88-108 MHz.
- b. The field strength of any emission within the permitted 200kHz band shall not exceed 250 micro volts/meter at 3 meters. (48dBµV at 3m) 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.
- c. The field strength of any emissions radiated on any frequency outside of the specified 200kHz band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength $\mu V/m$	Distance (m)	Field strength at 3m dBµV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

- 2. Measurement was performed at an antenna to the closed point of EUT distance of
- 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of  $\xi$  15.205
- 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of  $\xi$ 15.205, then the general radiated emission limits in  $\xi$ 15.209 apply.



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# 2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



**Table 2-1 Equipment Used in Tested System** 

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	<b>Power Cord</b>
1.	Walkman	Panasonic	SN7878	N/A	N/A		N/A
2.							



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# 3. Summary Of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.239	Radiated Emission	Compliant
§15.239	26 dB Bandwidth	Compliant

# 4. Description of test modes

The frequency 88.1 MHz, 98.1 MHz, 107.9 MHz are chosen with audio signal for full testing. And the EUT stay in continuous transmitting mode.



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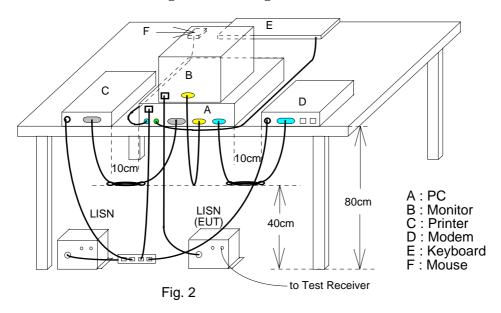


# 5. Conducted Emissions Test (Not applicable in the report)

#### **5.1** Measurement Procedure:

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- **3.** Repeat above procedures until all frequency measured were complete.

# 5.2 Test SET-UP (Block Diagram of Configuration)



## 5.3 Measurement Equipment Used:

Conducted Emission Test Site								
<b>EQUIPMENT</b>	MFR	MFR MODEL		LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EMC Analyzer	HP	8594EM	3624A00203	12/31/2004	12/30/2005			
EMI Test Receiver	R&S	ESCS30	828985/004	01/15/2004	01/14/2005			
LISN	Rolf-Heine	NNB-2/16Z	99012	12/30/2004	12/29/2005			
LISN	Rolf-Heine	NNB-2/16Z	99013	11/06/2004	11/05/2005			

### **5.4** Measurement Result:

N/A

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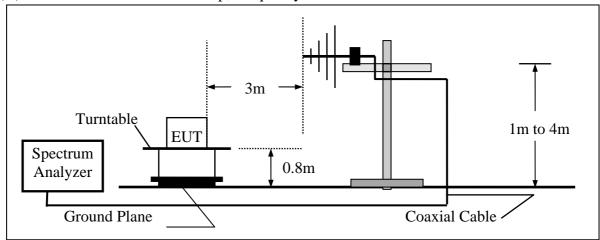
## 6. Radiated Emission Test

#### **6.1** Measurement Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of 3. receiving antenna both horizontal and vertical.
- 4. Repeat above procedures until all frequency measured were complete.

## **6.2** Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz





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# **6.3** Measurement Equipment Used:

966 Chamber								
EQUIPMENT	MFR	MODEL SERIAL		LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2004	05/26/2005			
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2004	08/27/2005			
Loop Antenna	Messtec	FLA30	03/10086	03/06/2004	03/05/2005			
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2004	06/02/2005			
Bilog Antenna	SCHWAZBECK	VULB9160		06/03/2004	06/02/2005			
Pre-Amplifier	HP	8447D	2944A09469	07/19/2004	07/18/2005			
Turn Table	HD	DT420	N/A	N.C.R	N.C.R			
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R			
Controller	HD	HD100	N/A	N.C.R	N.C.R			
Low Loss Cable	HUBER+SUHNE R	SUCOFLEX 104PEA-10M	10m	10/9/2004	10/08/2005			
Low Loss Cable	HUBER+SUHNE R	SUCOFLEX 104PEA-3M	3m	10/9/2004	10/08/2005			
Site NSA	SGS	966 chamber	N/A	11/17/2004	11/16/2005			
Site NSA	SGS	10m Open-Site	N/A	10/02/2004	10/01/2005			

## **6.4 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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#### 6.5 Measurement Result

Operation Mode: Jan.10, 2005 Transmitting Mode Test Date:

Fundamental Frequency: 88.1 MHz Test By: Henk Temperature: Pol: Vertical 25

**Humidity**: 65 %

Freq.	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
88.10	V	Peak	54.45	-18.14	36.31	48.00	-11.69	F
176.20	V	Peak				43.50		Н
264.30	V	Peak				46.00		Н
352.40	V	Peak				46.00		Н
440.50	V	Peak				46.00		Н
528.60	V	Peak				46.00		Н
616.70	V	Peak				46.00		Н
704.80	V	Peak				46.00		Н
114.39	V	Peak	44.91	-16.00	28.91	43.50	-14.59	Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz. VBW= 300KHz



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#### Measurement Result

Operation Mode: Transmitting Mode Test Date: Jan.10, 2005

Fundamental Frequency: 88.1 MHz Test By: Henk Temperature: Pol: Horizontal 25

Humidity: 65 %

		<b>Detector</b>					Safe	
Freq.	Ant.Pol.	Mode	Reading	Factor	<b>Actual FS</b>	Limit@3m	Margin	Note
(MHz)	H/V	(PK/AV/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
88.10	Н	Peak	65.92	-18.14	47.78	48.00	-0.22	F
176.20	Н	Peak	46.46	-15.06	31.40	43.50	-12.10	Н
264.30	Н	Peak	42.88	-14.77	28.11	46.00	-17.89	Н
342.34	Н	Peak	40.79	-12.17	28.62	46.00	-17.38	Н
440.50	Н	Peak				46.00		Н
528.60	Н	Peak				46.00		Н
616.70	Н	Peak				46.00		Н
704.80	Н	Peak				46.00		Н
114.39	Н	Peak	42.70	-16.00	26.70	43.50	-16.80	Н
201.69	Н	Peak	49.53	-16.63	32.90	43.50	-10.60	Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz, VBW=300KHz.



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#### Measurement Result

Operation Mode: Transmitting Mode Test Date: Jan.10, 2005

Fundamental Frequency: 98.1 MHz Test By: Hekn Pol: Temperature: 25 Vertical

65 % Humidity:

		Detector					Safe	
Freq.	Ant.Pol.	Mode	Reading	Factor	<b>Actual FS</b>	Limit@3m	Margin	Note
(MHz)	H/V	(PK/AV/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
98.10	V	Peak	52.87	-17.38	35.49	48.00	-12.51	F
196.20	V	Peak				43.50		Н
294.30	V	Peak				46.00		H
392.40	V	Peak				46.00		H
490.50	V	Peak				46.00		Н
588.60	V	Peak				46.00		H
686.70	V	Peak				46.00		H
784.80	V	Peak				46.00		H
114.39	V	Peak	44.93	-16.00	28.93	43.50	-14.57	Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz. VBW= 300KHz



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#### Measurement Result

Operation Mode: Transmitting Mode Test Date: Jan.10, 2005

Fundamental Frequency: 98.1 MHz Test By: Henk Pol: Horizontal

Temperature: 25 Humidity: 65 %

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
98.10	Н	Peak	59.10	-17.38	41.72	48.00	-6.28	F
196.20	Н	Peak	49.53	-16.44	33.09	43.50	-10.41	Н
114.39	Н	Peak	42.40	-16.00	26.40	43.50	-17.10	Н
196.84	Н	Peak	49.53	-16.44	33.09	43.50	-10.41	Н
227.88	Н	Peak	40.79	-15.90	24.89	46.00	-21.11	Н
293.84	Н	Peak	48.37	-13.62	34.75	46.00	-11.25	Н
342.34	Н	Peak	41.24	-12.17	29.07	46.00	-16.93	Н
523.73	Н	Peak	38.28	-8.89	29.39	46.00	-16.61	Н
784.80	Н	Peak				46.00		Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz, VBW=300KHz.



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Operation Mode: Transmitting Mode Test Date: Jan.10, 2005

Fundamental Frequency: 107.9 MHz Test By: Henk Temperature: Pol: Vertical

Humidity: 65 %

		Detector					Safe	
Freq.	Ant.Pol.	Mode	Reading	Factor	<b>Actual FS</b>	Limit@3m	Margin	Note
(MHz)	H/V	(PK/AV/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
107.90	V	Peak	43.75	-16.57	27.18	48.00	-20.82	F
114.39	V	Peak	44.77	-16.00	28.77	43.50	-14.73	Н
323.70	V	Peak	36.42	-12.66	23.76	46.00	-22.24	Н
431.60	V	Peak				46.00		Н
539.50	V	Peak				46.00		Н
647.40	V	Peak				46.00		Н
755.30	V	Peak				46.00		Н
863.20	V	Peak				46.00		Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge
- (4) Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz. VBW= 300KHz



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#### Measurement Result

Operation Mode: Transmitting Mode Test Date: Jan.10, 2005

Fundamental Frequency: 107.9 MHz Test By: Henk Pol: Horizontal

Temperature: 25 Humidity: 65 %

		<b>Detector</b>					Safe	
Freq.	Ant.Pol.	Mode	Reading	Factor	<b>Actual FS</b>	Limit@3m	Margin	Note
(MHz)	H/V	(PK/AV/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
107.90	Н	Peak	56.79	-16.57	40.22	48.00	-7.78	F
215.80	Н	Peak	42.75	-16.23	26.52	43.50	-16.98	Н
323.70	Н	Peak	51.98	-12.66	39.32	46.00	-6.68	Н
342.34	Н	Peak	41.13	-12.17	28.96	46.00	-17.04	Н
572.23	Н	Peak	34.29	-8.10	26.19	46.00	-19.81	Н
647.40	Н	Peak				46.00		Н
755.30	Н	Peak				46.00		Н
863.20	Н	Peak				46.00		Н

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz, VBW=300KHz.



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# 7. 26dB Occupied Bandwidth

#### 7.1 Measurement Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set EUT as normal operation
- 3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10KHz, Span =500KHz.
- Set SPA Max hold. Mark peak, -26dB.

# 7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

## 7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

#### 7.4 Measurement Results

26dB bandwidth (Low)= 177.0 kHz

26dB bandwidth (Low)= 198.7 kHz

26dB bandwidth (Low)= 194.4 kHz

Refer to attached data chart.

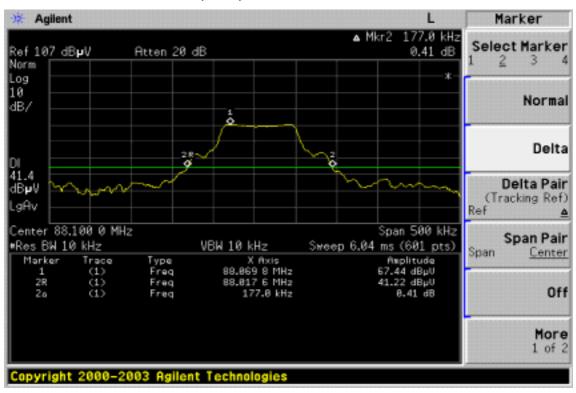


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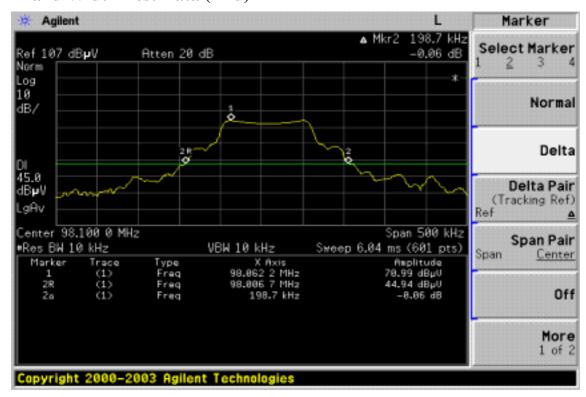
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# 26dB Band Width Test Data (Low)



## 26dB Band Width Test Data (Mid)



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# 26dB Band Width Test Data (High)

