Electromagnetic Compatibility Test Report

Tests Performed on a Thomson, Inc.

FM transmitter, Model FM-TX08B

Radiometrics Document RP-5900

ACCREDITED
Certification # 1495.01

Product Detail: FCC ID: G95FM-TX08B IC: 431C-JP4221 Equipment type: FM Transmitter
Test Standards: US CFR Title 47, Chapter I, FCC Part 15 Subpart C FCC Part 15 CFR Title 47: 2006 Industry Canada RSS-210, Issue 6 as required for Category I Equipment This report concerns: Original Grant for Certification FCC Part 15.239 RSS-210 Section A2.8

Tests Performed For: **Thomson, Inc.** 101 West 103rd St Indianapolis, IN 46290	*Test Facility:* **Radiometrics Midwest Corporation** 12 East Devonwood Romeoville, IL 60446

Test Date(s): (Month-Day-Year)
September 15, 2006

Document RP-5900 Revisions:

Rev.	Issue Date	Affected Pages	Revised By
0	October 10, 2006		
1	October 16, 2006	All	Joseph Strzelecki
2	October 18, 2006	4	Joseph Strzelecki
3	November 21, 2006	4 - 9	Joseph Strzelecki

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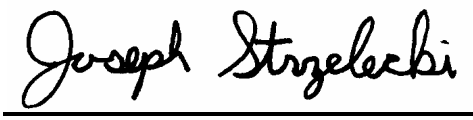
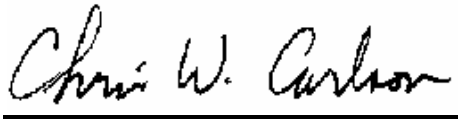
1 ADMINISTRATIVE DATA

Equipment Under Test: A Thomson, Inc., FM transmitter Model: FM-TX08B Serial Number: None This will be referred to as the EUT in this Report	
Date EUT Received at Radiometrics: (Month-Day-Year) 9/15/2006	*Test Date(s): (Month-Day-Year)* September 15, 2006
Test Report Written By: Joseph Strzelecki Senior EMC Engineer	*Test Witnessed By:* Paul Rutkowski Thomson, Inc.
Radiometrics' Personnel Responsible for Test:  Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE	*Test Report Approved By*  Chris W. Carlson Director of Engineering NARTE EMC-000921-NE

2 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a FM transmitter, Model FM-TX08B, manufactured by Thomson, Inc.. The detailed test results are presented in a separate section. The following is a summary of the test results.

Emissions Tests Results

Environmental Phenomena	Frequency Range	Basic Standard	Test Result
RF Radiated Emissions	30-1100 MHz	RSS-210 & FCC Part 15.239	Pass
Occupied Bandwidth Test	Fundamental Freq.	RSS-210 & FCC Part 15.239	Pass

2.1 RF Exposure Compliance Requirements

Since the power output is 12 nW, The EUT meets the FCC requirement for RF exposure. Since the EUT is less than 200 mW, it is exempt from RSS-102. There are no power level adjustments and the antenna is permanently attached. The detailed calculations for RF Exposure are presented in a separate document.

3 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is an FM transmitter, Model FM-TX08B, manufactured by Thomson, Inc. The EUT was in good working condition during the tests, with no known defects.

The RF source is connected to the DC+ input terminal of the device. Since these devices can only be powered from 12-volt cigarette lighter in the car, the user cannot readily change the RF Antenna. There are no means provided to the end use for powering the transmitter, besides the 12 Volt adaptor in a vehicle. Therefore it meets the 15.203 Requirement.

3.2 Related Submittals

Thomson, Inc. is not submitting any other products simultaneously for equipment authorization related to the EUT.

4 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was tested in three different size vehicles, as required by the FCC. Power was supplied by the vehicle power. The EUT was playing music from an RCA MP3 Player. The detected emission levels were maximized by changing the position of the audio cable and MP3 player.

As requested by the FCC, an additional test was performed with the EUT on a table. It was powered by a fully charged 12 Volt lead acid battery. This is refered to as the table top tests.

The identification for all equipment, plus descriptions of all cables used in the tested system, are:

Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	FM transmitter	E	Thomson	FM-TX08B	Sample #7
2	MP3 Player (used in vehicle tests)	P	RCA (Lyra)	RD2765A	HA028F3758V04J
3	Automobile (Station Wagon)	H	Suzuki	Esteem	JS2GB41W3Y5182896
4	Automobile (Sedan)	H	Honda	Accord	1HGCQ56641A080322
5	Automobile (MiniVan)	H	Toyota	Sienna	4T3ZF13C42U485677
6	MP3 Player (used in table top tests)	P	RCA (Lyra)	RD1080	QA001C336QD6VN

* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Vehicle

List of System Cables

QTY	Length (m)	Cable Description	Connected to (Item #)	Shielded?
1	0.5	Audio Cable	#1 and #2	No
1	0.3	DC Cable (used in table top tests)	#1 and 12V Battery	No

4.2 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.3 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5 TEST SPECIFICATIONS AND RELATED DOCUMENTS

Document	Date	Title
FCC CFR Title 47	2006	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices
ANSI C63.4-2003	2003	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
IC RSS-210 Issue 6	2005	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment
IC RSS-212 Issue 1	1999	Test Methods For Radio Equipment
IC RSS-Gen Issue 1	2005	General Requirements and Information for the Certification of Radiocommunication Equipment (RSS-Gen)

The test procedures used are in accordance with the Industry Canada RSS-212 and ANSI document C63.4-2003, "Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The specific procedures are described herein. Radiated testing was performed at an antenna to EUT distance of 3 meters. The antenna was raised and lowered from 1 to 4 meters.

6 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 1999 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during transmitter tests:

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

Open Area Test Site (OATS): Is located on 8625 Helmar Road in Newark, Illinois, USA and measures 56' L X 24' W X 17' H. The entire open field test site has a metal ground screen. The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as file number IC3124.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

9 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-22	Anritsu	Pre-amplifier	MH648A	M23969	0.1-1200MHz	12 Mo.	12/21/05
ANT-44	Impossible Machine	Super Log Antenna	SL-20M2G	1002	20-2000MHz	24 Mo.	12/12/05
REC-03	Anritsu	Spectrum Analyzer	MS2601B	MT94589	0.01-2200MHz	12 Mo.	12/07/05
THM-01	Extech Inst.	Temp/Humid Meter	4465CF	001106557	N/A	24 Mo.	03/31/06

Note: All calibrated equipment is subject to periodic checks.

10 TEST SECTIONS

10.1 Radiated RF Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. Below 1 GHz, when a radiated emission is detected approaching the specification limit, the measurement of the emission is repeated using a tuned dipole antenna with a Roberts Balun.

The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists.

From 30 to 1100 MHz an Anritsu Spectrum analyzer and a preamplifier with a 10 dB attenuator connected to the input. The out of band emissions and the ambient emissions were below the level of input overload (80 dBuV).

Radiated emission tests were performed inside of an anechoic enclosure at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab a test distance of 3 meters. The frequency range from 30 to 1100 MHz was scanned and plotted using the peak detector function. The test antennas were positioned 3 meters from the EUT. Radiated emission measurements are performed with linearly polarized broadband antennas. Measurements were performed using the Average, peak or quasi-peak detector function. The detected emission levels were maximized by rotating the Vehicles, adjusting the positions of the audio cable and MP3 player, and by scanning the measurement antenna from 1 to 4 meters above the ground. The Anechoic chamber has a turntable large enough to handle the vehicles.

As requested by the FCC, an additional test was performed with the EUT on a table. It was powered by a fully charged 12 Volt lead acid battery. The audio cable was retracted for this test. The detected emission levels were maximized by rotating the test table, and adjusting the positions of the DC cable and MP3 player, and by scanning the measurement antenna from 1 to 4 meters above the ground.

The entire frequency range from 30 to 1100 MHz was slowly scanned with particular attention paid to those frequency ranges which appeared high in the preliminary emission scan. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded.

10.1.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

FS = RA + AF + CF - AG

Where: FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

10.1.2 Radiated Emissions Test Results

Test Date	September 15, 2006 and November 17, 2006
Test Distance	3 Meters
Specification	FCC Part 15 Subpart C & RSS-210
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; SA= Spectrum Analyzer

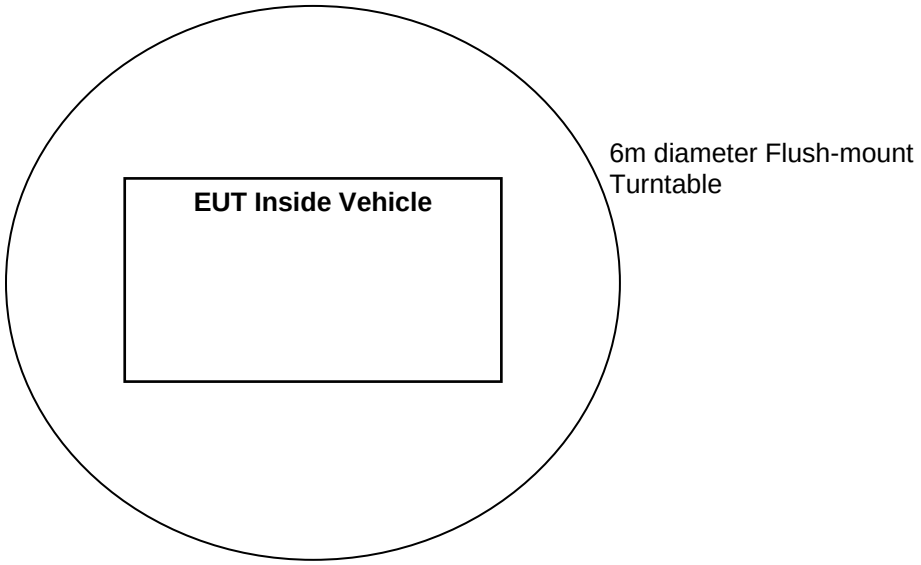
Harm #	Fund Freq MHz	Emission MHz	Ant Pol	Detector Function	SA rdg dBuV	Ant Fact dB	Cable – Amp dB	Total dBuV/m	Limit dBuV/m	Margin dB	Table top or Host Vehicle
1	88.3	88.3	V	Peak	53	8.1	-16.8	44.3	47.96	3.7	Esteem
2	88.3	176.6	V	Peak	30	10	-15.9	24.1	43.50	19.4	Esteem
3	88.3	264.9	V	Peak	28.1	13.2	-15.2	26.1	46.00	19.9	Esteem
1	88.3	88.3	H	Peak	46.9	7.7	-16.8	37.8	47.96	10.2	Esteem
2	88.3	176.6	H	Peak	33.2	10	-15.9	27.3	43.50	16.2	Esteem
3	88.3	264.9	H	Peak	25	13.2	-15.2	23	46.00	23.0	Esteem
1	107.5	107.5	V	Ave	49.8	12.7	-16.6	45.9	47.96	2.1	Esteem
2	107.5	215	V	Peak	30	9.3	-16.8	22.5	43.50	21.0	Esteem
3	107.5	322.5	V	Peak	28	13	-15.9	25.1	46.00	20.9	Esteem

Harm #	Fund Freq MHz	Emission MHz	Ant Pol	Detector Function	SA rdg dBuV	Ant Fact dB	Cable – Amp dB	Total dBuV/m	Limit dBuV/m	Margin dB	Table top or Host Vehicle
1	107.5	107.5	H	Peak	48.5	12	-16.8	43.7	47.96	4.3	Esteem
2	107.5	215	H	Peak	31.5	9.3	-16.8	24	43.50	19.50	Esteem
3	107.5	322.5	H	Peak	28	13	-15.9	25.1	46.00	20.90	Esteem
4	107.5	430	H	Peak	27.5	16.6	-14.2	29.9	46.00	16.10	Esteem
1	88.3	88.3	V	Peak	48.9	8.1	-16.8	40.2	47.96	7.8	Accord
2	88.3	176.6	V	Peak	33.9	10	-15.9	28	43.50	15.5	Accord
3	88.3	264.9	V	Peak	26.3	13.2	-15.2	24.3	46.00	21.7	Accord
1	88.3	88.3	H	Peak	38.9	7.7	-16.8	29.8	47.96	18.2	Accord
2	88.3	176.6	H	Peak	24.9	10	-15.9	19	43.50	24.5	Accord
3	88.3	264.9	H	Peak	27.1	13.2	-15.2	25.1	46.00	20.9	Accord
1	107.5	107.5	V	Peak	43.2	12.7	-16.8	39.1	47.96	8.9	Accord
2	107.5	215	V	Peak	23	9.3	-16.8	15.5	43.50	28.0	Accord
3	107.5	322.5	V	Peak	21.5	13	-15.9	18.6	46.00	27.4	Accord
1	107.5	107.5	H	Peak	41.5	12	-16.8	36.7	47.96	11.3	Accord
2	107.5	215	H	Peak	32.9	9.3	-16.8	25.4	43.50	18.1	Accord
3	107.5	322.5	H	Peak	30	13	-15.9	27.1	46.00	18.9	Accord
1	88.3	88.3	V	Peak	54.6	8.1	-16.8	45.9	47.96	2.1	Sienna
2	88.3	176.6	V	Peak	33.8	10	-15.9	27.9	43.50	15.6	Sienna
1	88.3	88.3	H	Peak	48.9	7.7	-16.8	39.8	47.96	8.2	Sienna
2	88.3	176.6	H	Peak	33.2	10	-15.9	27.3	43.50	16.2	Sienna
1	107.5	107.5	V	Peak	48.9	12.7	-16.8	44.8	47.96	3.2	Sienna
2	107.5	215	V	Peak	39.6	9.3	-16.8	32.1	43.50	11.4	Sienna
1	107.5	107.5	H	Peak	43.3	12	-16.8	38.5	47.96	9.5	Sienna
2	107.5	215	H	Peak	38.7	9.3	-16.8	31.2	43.50	12.3	Sienna
1	88.3	88.3	V	Peak	41.5	8.1	-16.8	32.8	47.96	15.2	Tabletop
2	88.3	176.6	V	Peak	30.8	10	-15.9	24.9	43.50	18.6	Tabletop
3	88.3	264.9	V	Peak	31.5	13.2	-15.2	29.5	46.00	16.5	Tabletop
4	88.3	353.2	V	Peak	25.2	16.6	-14.8	27.00	46.00	19.0	Tabletop
1	88.3	88.3	H	Peak	51	7.7	-16.8	41.90	47.96	6.1	Tabletop
2	88.3	176.6	H	Peak	38.5	10	-15.9	32.60	43.50	10.9	Tabletop
3	88.3	264.9	H	Peak	31.1	13.2	-15.2	29.10	46.00	16.9	Tabletop
4	88.3	353.2	H	Peak	33.5	16.1	-14.8	34.80	46.00	11.2	Tabletop
1	107.5	107.5	V	Peak	38.4	12.7	-16.6	34.50	47.96	13.5	Tabletop
2	107.5	215	V	Peak	34.6	9.3	-16.8	27.10	43.50	16.4	Tabletop
3	107.5	322.5	V	Peak	25.6	13	-14.2	24.40	46.00	21.6	Tabletop
4	107.5	430	V	Peak	20	16.6	-15.9	20.70	46.00	25.3	Tabletop
5	107.5	537.5	V	Peak	29.6	18.2	-13.5	34.30	46.00	11.7	Tabletop
1	107.5	107.5	H	Peak	44.9	12	-16.8	40.10	47.96	7.9	Tabletop
2	107.5	215	H	Peak	33.6	9.3	-16.8	26.10	43.50	17.4	Tabletop
3	107.5	322.5	H	Peak	28.1	13	-15.9	25.20	46.00	20.8	Tabletop
4	107.5	430	H	Peak	26	16.6	-14.2	28.40	46.00	17.6	Tabletop
5	107.5	537.5	H	Peak	31.5	18.8	-13.5	36.80	46.00	9.2	Tabletop

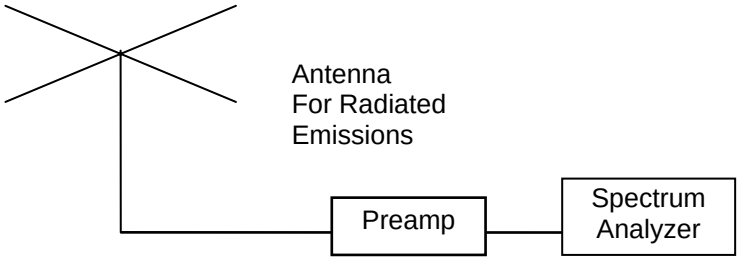
Judgment: Passed by 2.1 dB

No other emissions were detected from 30 to 1100 MHz.

Figure 1. Drawing of Radiated Emissions Setup



Note: A second test was performed with the EUT on a table top.



Notes:
- Antenna height varied from 1 to 4 meters
- Distance from antenna to tested system is 3 meters
- Not to Scale

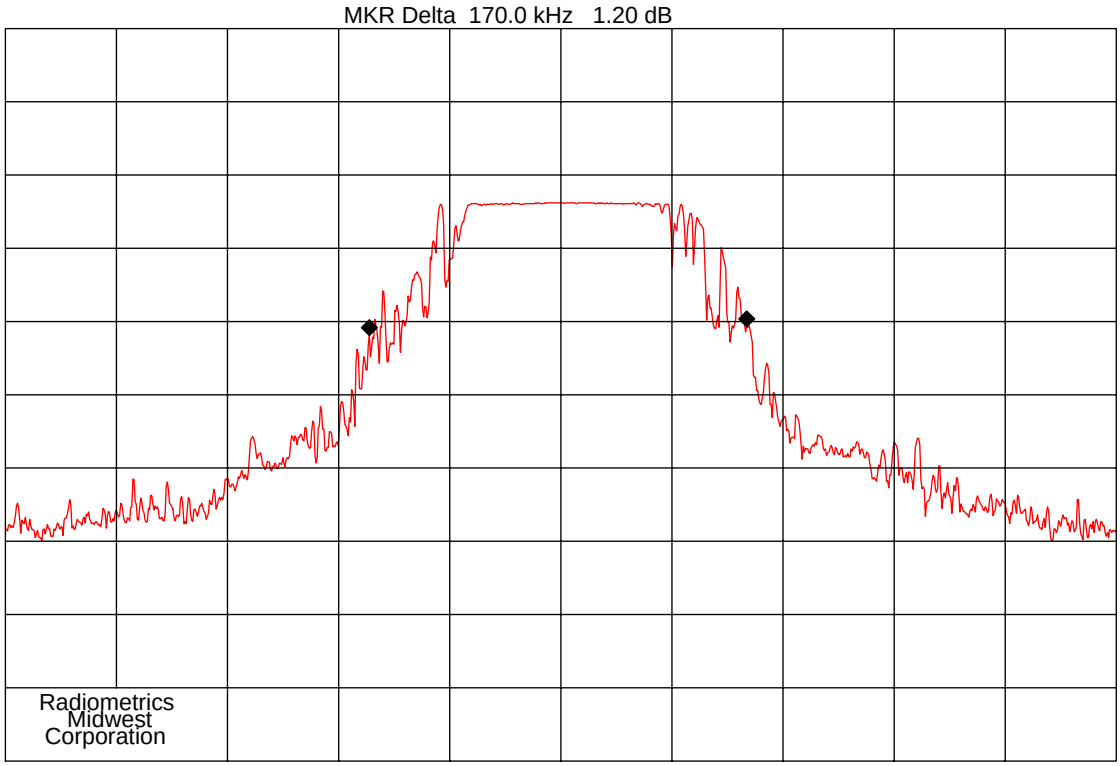
10.2 Occupied Bandwidth Data

The occupied bandwidth of the RF output was measured using a spectrum analyzer. The bandwidth was measured using the peak detector function and a narrow resolution bandwidth.

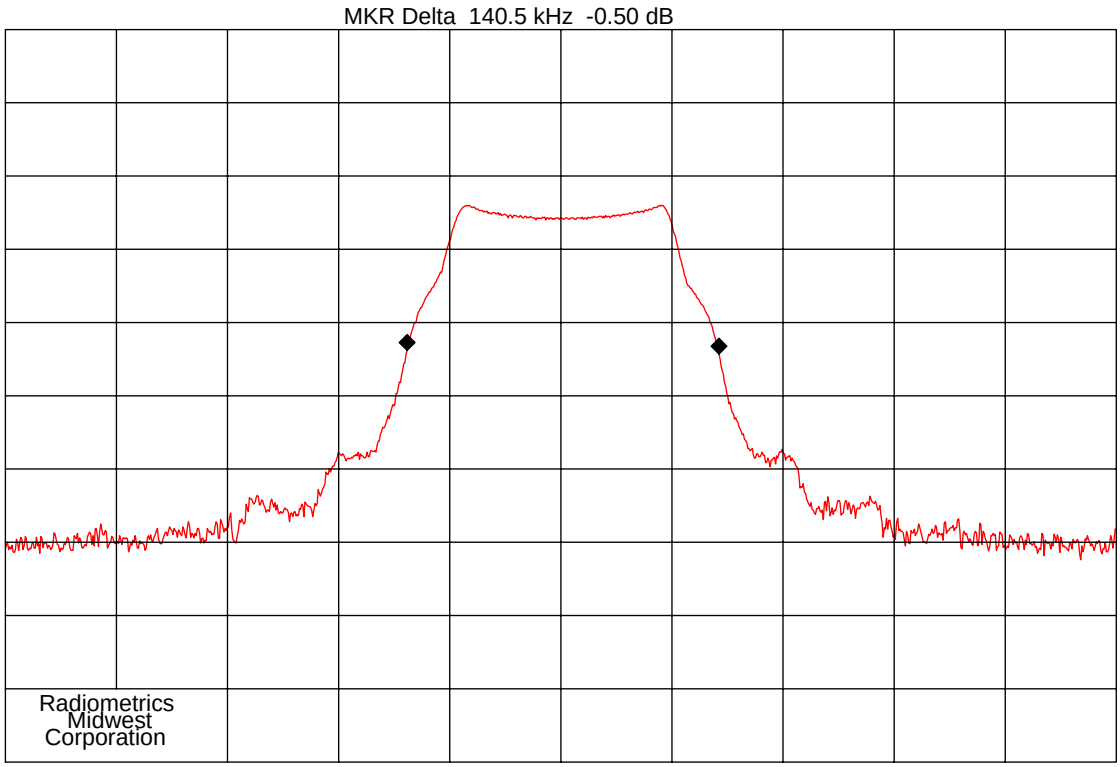
A broadband antenna was used to receive the modulated signal. The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The spectrum analyzer display was digitized and plotted. The plots of the occupied bandwidth for the EUT are supplied on the following page.

The limit is 200 kHz. As can be seen the Occupied bandwidth is 170 kHz.

Figure 2. Occupied Bandwidth Plot



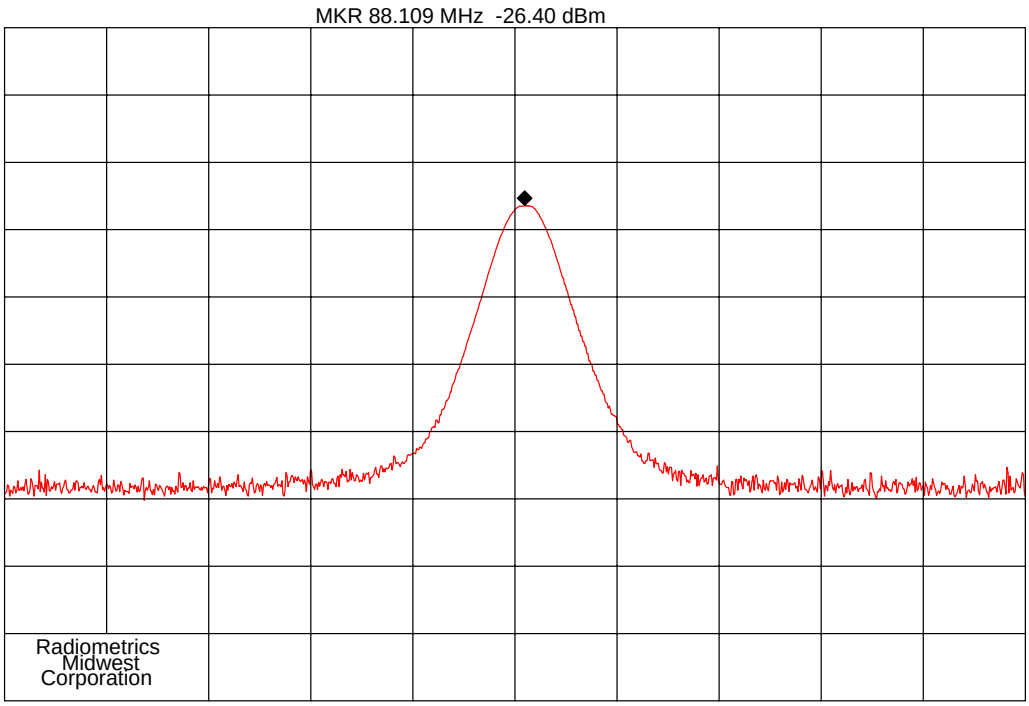
The EUT was transmitting music at maximum volume.

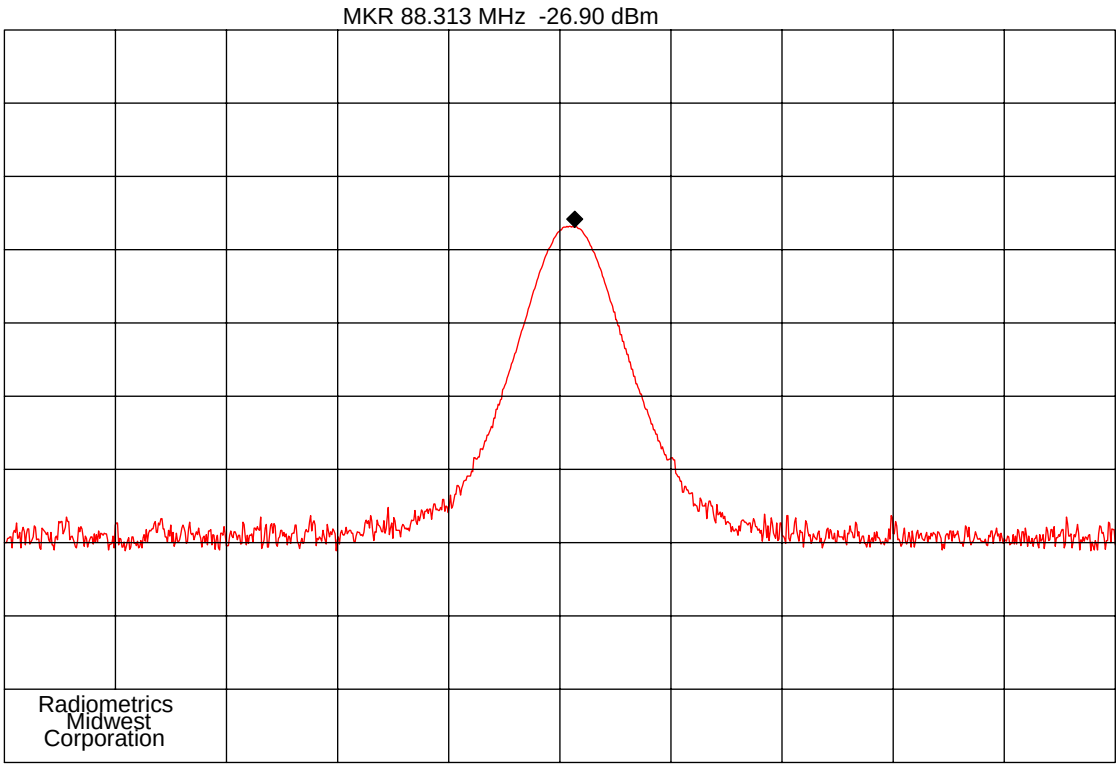


The EUT was transmitting a 1 kHz Sine Wave at maximum volume.

10.3 Tuning Range

This section shows the maximum tuning range of the transmitter. The tuning controls were adjusted manually to each channel. Each Channel was plotted and shown herein.

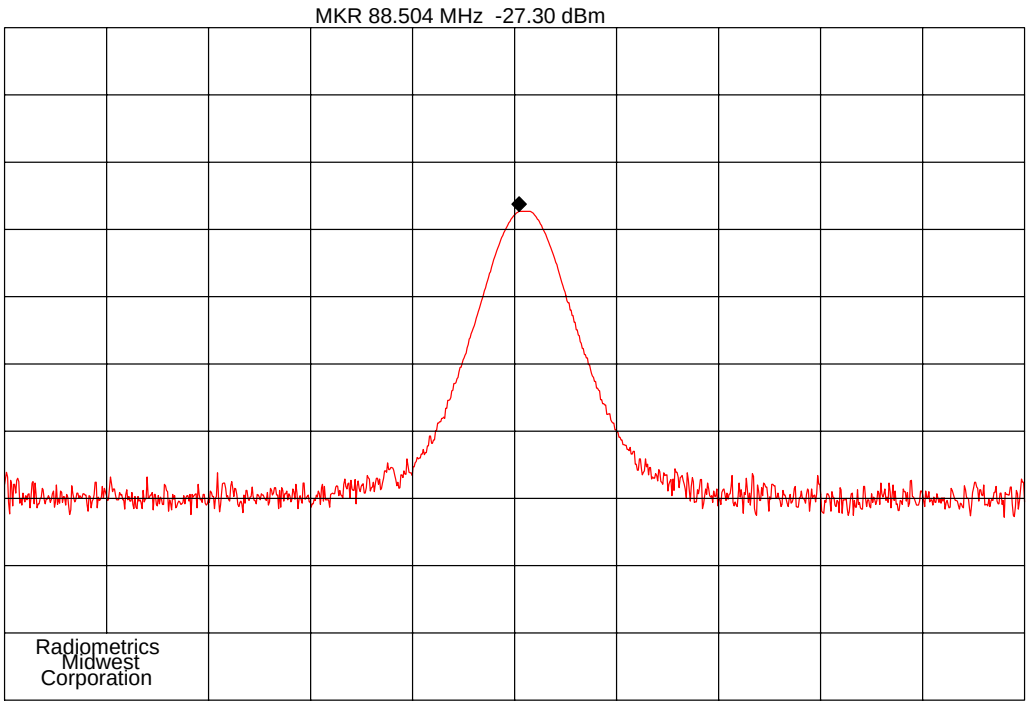

MKR 88.109 MHz -26.40 dBm
Radiometrics
Midwest
Corporation
COMPANY : Thomson
CENTER 88.10 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 1, 88.1 MHz
ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 09:58
DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch1



COMPANY : Thomson
CENTER 88.30 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 2, 88.3 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 09:59

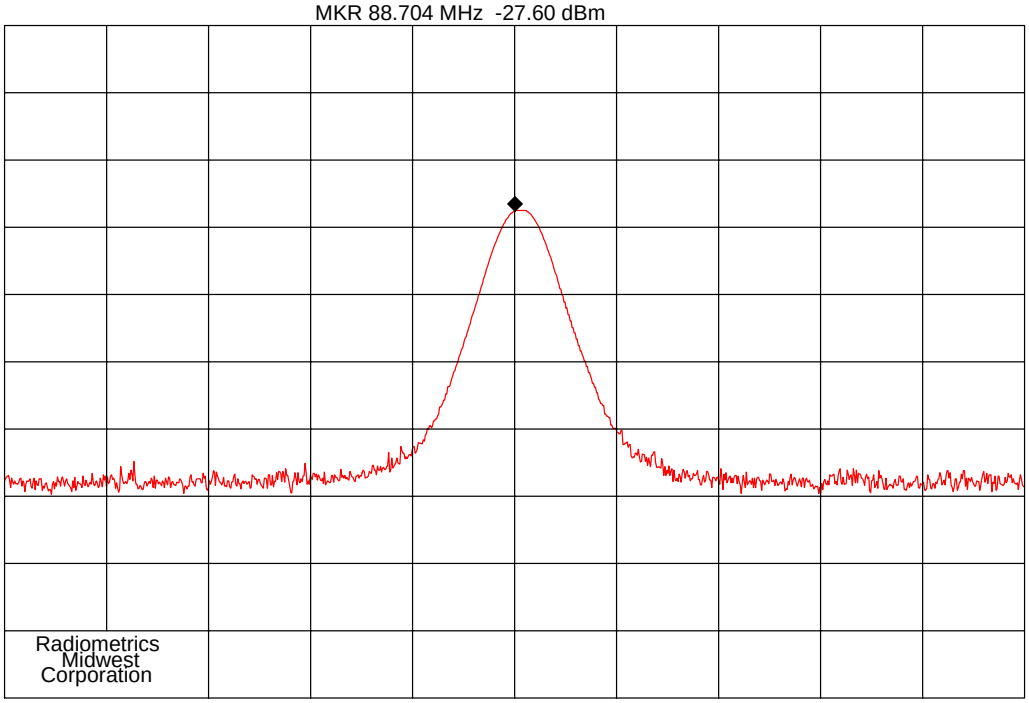
DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch2



COMPANY : Thomson
CENTER 88.50 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 3, 88.5 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:02

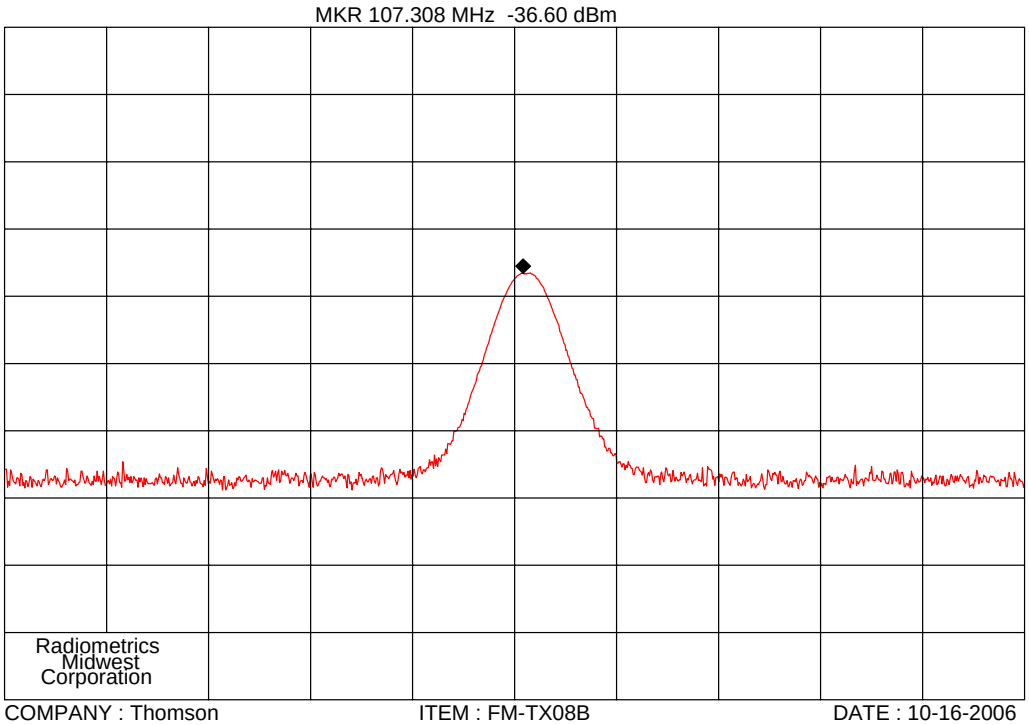
DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch3

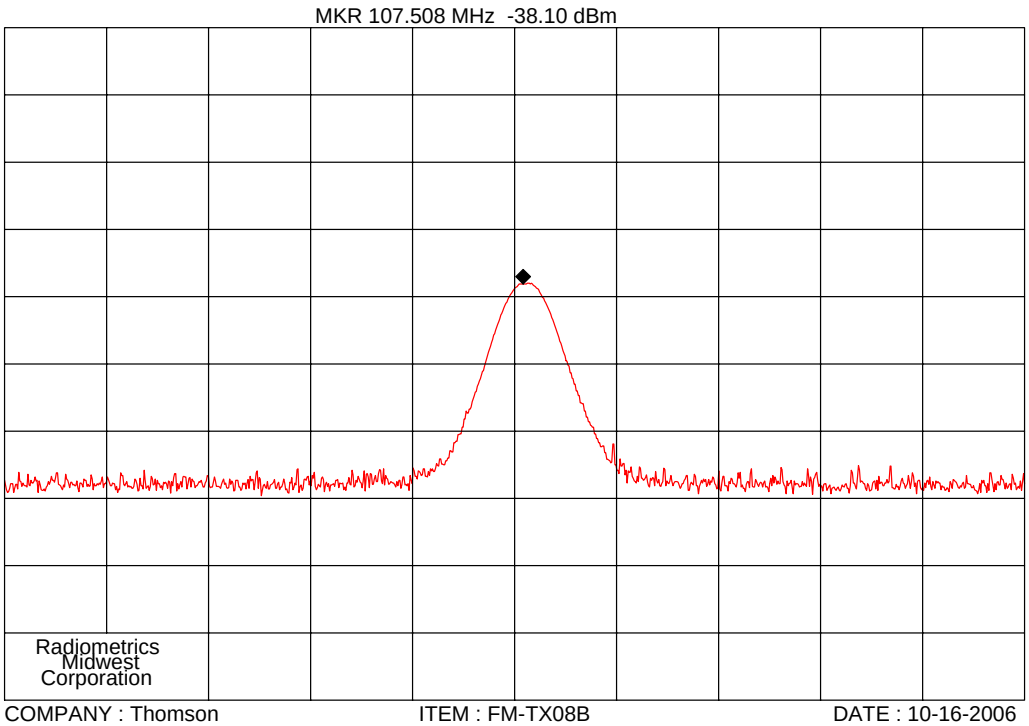


COMPANY : Thomson
CENTER 88.70 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 4, 88.7 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:02

DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch4

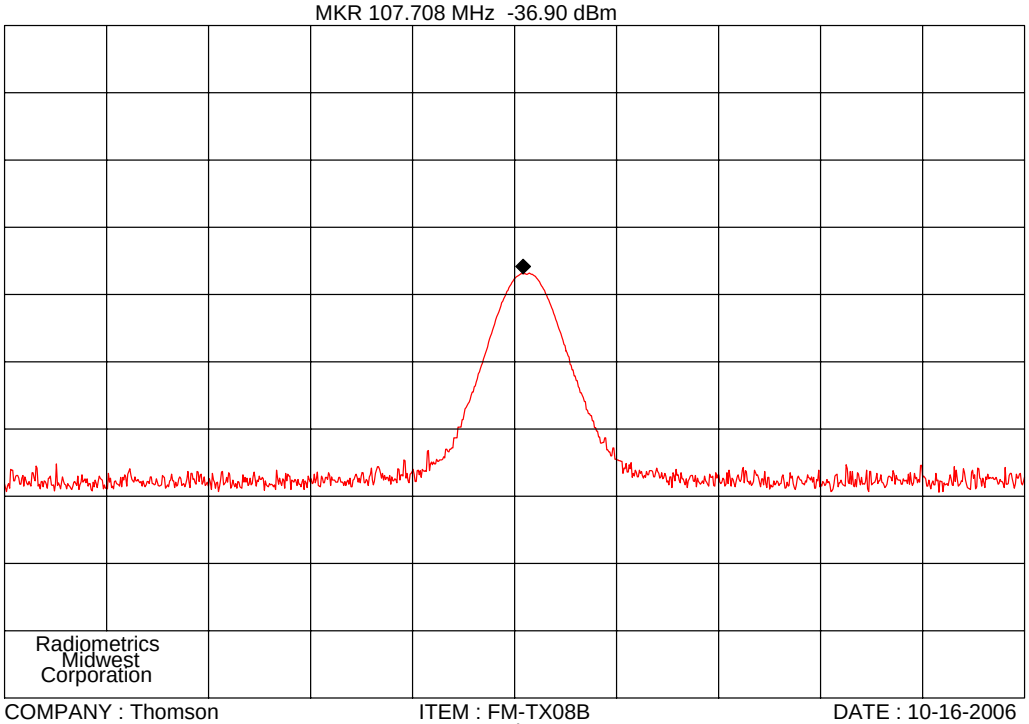

MKR 107.308 MHz -36.60 dBm
Radiometrics
Midwest
Corporation
COMPANY : Thomson
CENTER 107.30 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 5, 107.3 MHz
ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:05
DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch5



COMPANY : Thomson
CENTER 107.50 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 6, 107.5 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:05

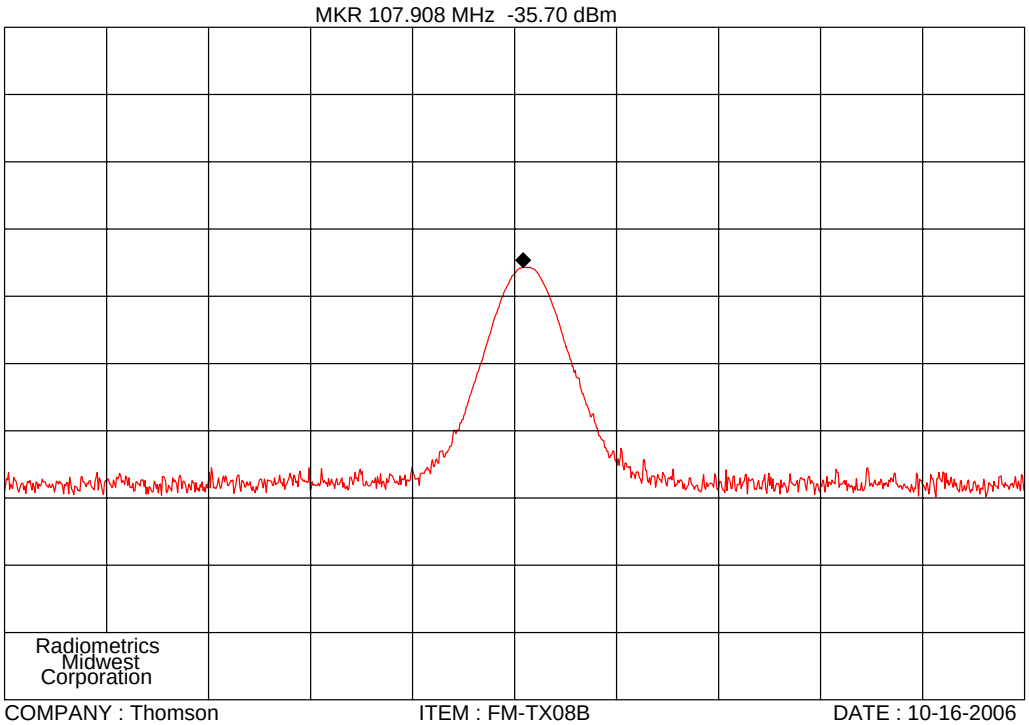
DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch6



COMPANY : Thomson
CENTER 107.70 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 7, 107.7 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:06

DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch7



COMPANY : Thomson
CENTER 107.90 MHz
RES BW 30 kHz
10 dB/
NOTES : Channel 8, 107.9 MHz

ITEM : FM-TX08B
REF 0.0 dBm
VBW 100 kHz
TIME : 10:07

DATE : 10-16-2006
SPAN 1.00 MHz
ATTEN 30 dB
SWP 20.0 msec
ch8