FCC CERTIFICATION
On Behalf of
Seatune Electronics Co., Ltd.

FM Transmitter For iPod
Model No.: i703

FCC ID: TZ9I703

Prepared for	:	Seatune Electronics Co., Ltd.
Address	:	No.27, Shuikou Avenue, Shuikou Town, Huizhou City Guangdong, China
Prepared by	:	Accurate Technology Co., Ltd.
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20072574
Date of Test	:	November 02, 2007
Date of Report	:	November 06, 2007

TABLE OF CONTENTS

Description Page

Test Report Certification

Applicant	:	Seatune Electronics Co., Ltd.
Manufacturer	:	Seatune Electronics Co., Ltd.
EUT Description	:	FM Transmitter For iPod
		(A) MODEL NO.: i703
		(B) SERIAL NO.: N/A
		(C) POWER SUPPLY: DC 3.3V (Power By iPod)

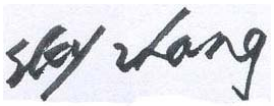
Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.239: 2006& ANSI 63.4: 2003

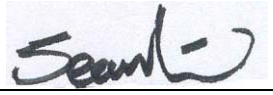
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section15.239 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : November 02, 2007

Prepared by : 

(Engineer)

Reviewer : 

(Quality Manager)

Approved & Authorized Signer : 

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	FM Transmitter For iPod
Model Number	:	i703
Power Supply	:	DC 3.3V (Power By iPod)
Operate Frequency	:	88.1M-107.9MHz
Channel	:	0.1MHz interval
iPod 20G	:	Manufacturer: Apple M/N: A1136 S/N: JQ543GF9SZA
Applicant	:	Seatune Electronics Co., Ltd.
Address	:	5/F., Block 40, Ma Jia Long Industrial Area, Nanshan District, Shenzhen, 518052, Guangdong Province, China
Manufacturer	:	Seatune Electronics Co., Ltd.
Address	:	5/F., Block 40, Ma Jia Long Industrial Area, Nanshan District, Shenzhen, 518052, Guangdong Province, China
Date of sample received	:	October 30, 2007
Date of Test	:	November 02, 2007

1.2.Description of Test Facility

EMC Lab	:	Accredited by CNAS, September 20, 2007 The Certificate Registration Number is CNAS L3193 Listed by FCC, March 20, 2007 The Registration Number is 253065 Listed by Industry Canada, May 3, 2007 The Registration Number is IC 5077A-1
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.3.Measurement Uncertainty

Conducted emission expanded uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty	=	4.12dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

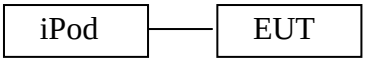
Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	03.31.2008
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.24.2008
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	03.31.2008
Bilog Antenna	Chase	CBL6112B	2591	03.31.2008
Horn Antenna	Rohde&Schwarz	HF906	100013	01.24.2008
Spectrum Analyzer	Anritsu	MS2651B	6200238856	03.31.2008
Pre-Amplifier	Agilent	8447D	2944A10619	03.31.2008
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100305	03.31.2008
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100310	03.31.2008

3. RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(C)

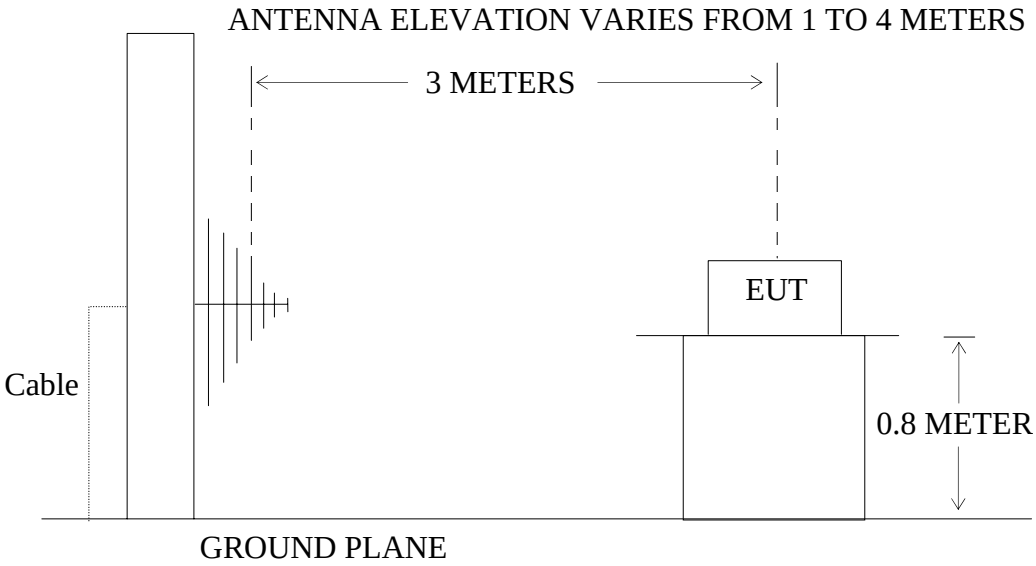
3.1.Block Diagram of Test Setup

3.1.1.Block diagram of connection between the EUT and simulators



(EUT: FM Transmitter For iPod)

3.1.2.Anechoic Chamber Test Setup Diagram



(EUT: FM Transmitter For iPod)

3.2.The Emission Limit for section 15.239(c)

3.2.1 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

Radiation Emission Measurement Limits According to Section 15.209

Frequency (MHz)	Limit,		
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBμV/m)	The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands
30 - 88	100	40	
88 - 216	150	43.5	

216 - 960	200	46	mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
Above 960	500	54	

3.3. Configuration of EUT on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.3.1. FM Transmitter For iPod (EUT)

Model Number : i703
Serial Number : N/A
Manufacturer : Seatune Electronics Co., Ltd.

3.4. Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

3.4.2. Turn on the power of all equipment.

Let the EUT work in TX modes [Plug iPod to EUT 30pin Connector and ipod playing typical audio signal('Highway Blues' from sample music of windows XP) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

3.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESCS30) is set at 120KHz in 30-1000MHz. The frequency range from 30MHz to 1000MHz is checked. The final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

3.6. The Field Strength of Radiation Emission Measurement Results

PASS.

The frequency range 30MHz to 1000MHz is investigated.

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 88.1MHz	Test Engineer:	Andy

Polarization	Frequency (MHz)	Reading(dBμV/m) QP	Factor Corr.(dB)	Result(dBμV/m) QP	Limits(dBμV/m) QP	Margin(dBμV/m) QP
Horizontal	549.920	2.7	17.8	20.5	46.0	25.5
Horizontal	765.260	2.7	20.7	23.4	46.0	22.6
Vertical	640.130	2.4	20.2	22.6	46.0	23.4
Vertical	815.702	2.9	22.8	25.7	46.0	20.3

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 98.1MHz	Test Engineer:	Andy

Polarization	Frequency (MHz)	Reading(dBμV/m) QP	Factor Corr.(dB)	Result(dBμV/m) QP	Limits(dBμV/m) QP	Margin(dBμV/m) QP
Horizontal	761.381	2.3	20.6	22.9	46.0	23.1
Horizontal	866.140	2.4	21.7	24.1	46.0	21.9
Vertical	582.900	2.9	19.2	22.1	46.0	23.9
Vertical	799.210	2.3	22.6	24.9	46.0	21.1

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 107.9MHz	Test Engineer:	Andy

Polarization	Frequency (MHz)	Reading(dBμV/m) QP	Factor Corr.(dB)	Result(dBμV/m) QP	Limits(dBμV/m) QP	Margin(dBμV/m) QP
Horizontal	215.802	10.0	9.7	19.7	43.5	23.8
Horizontal	744.890	3.2	20.4	23.6	46.0	22.4
Horizontal	834.131	2.2	21.4	23.6	46.0	22.4
Vertical	700.270	3.3	21.2	24.5	46.0	21.5
Vertical	897.182	2.5	23.8	26.3	46.0	19.7

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

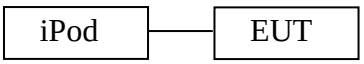
Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

4. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(B)

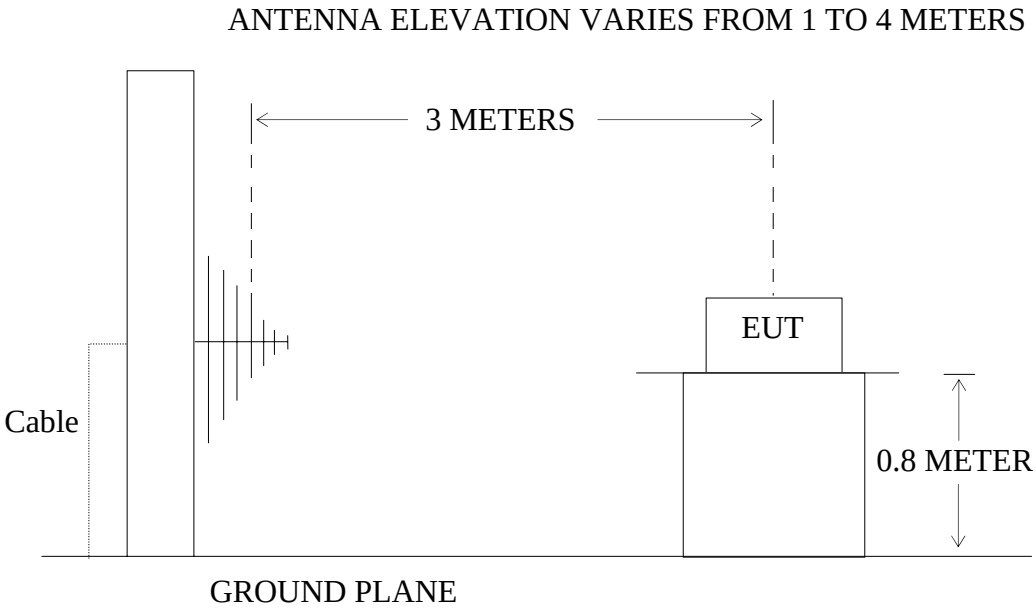
4.1.Block Diagram of Test Setup

4.1.1.Block diagram of connection between the EUT and simulators



(EUT: FM Transmitter For iPod)

4.1.2.Anechoic Chamber Test Setup Diagram



(EUT: FM Transmitter For iPod)

4.2.The Emission Limit For Section 15.239(b)

4.2.1 The field strength of any emission within the permitted 200kHz band shall not exceed 250microvolts/meter at 3 meters. 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.

4.3.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1. FM Transmitter For iPod (EUT)

Model Number	**:**	i703
Serial Number	**:**	N/A
Manufacturer	**:**	Seatune Electronics Co., Ltd.

4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

Let the EUT work in TX modes [Plug iPod to EUT 30pin Connector and ipod playing typical audio signal('Highway Blues' from sample music of windows XP) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

4.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

4.6.The Emission Measurement Result

PASS.

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 88.1MHz	Test Engineer:	Andy

Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
88.1	9.4	11.7	6.3	15.7	18.0	48	68	32.3	50.0	Vertical
88.1	16.2	18.4	8.5	24.7	26.9	48	68	23.3	41.1	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 98.1MHz	Test Engineer:	Andy

Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
98.1	23.9	26.2	6.7	30.6	32.9	48	68	17.4	35.1	Vertical
98.1	31.6	34.0	7.4	39.0	41.4	48	68	9.0	26.6	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Date of Test:	November 02, 2007	Temperature:	24°C
EUT:	FM Transmitter For iPod	Humidity:	48%
Model No.:	i703	Power Supply:	DC 3.3V (Power By iPod)
Test Mode:	TX 107.9MHz	Test Engineer:	Andy

Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
107.9	15.5	17.6	7.0	22.5	24.6	48	68	25.5	43.4	Vertical
107.9	21.6	23.9	7.0	28.6	30.9	48	68	19.4	37.1	Horizontal

The spectral diagrams in appendix I display the measurement of peak values with corrected factors counted.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

5. OCCUPIED BANDWIDTH FOR FCC PART 15 SECTION 15.239(A)

5.1.The Requirement For Section 15.239(a)

5.1.1. Emission from the device shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

5.2.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.2.1. FM Transmitter For iPod (EUT)

Model Number	**:**	i703
Serial Number	**:**	N/A
Manufacturer	**:**	Seatune Electronics Co., Ltd.

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 4.1.

5.3.2.Turn on the power of all equipment.

Let the EUT work in TX modes [Plug iPod to EUT 30pin Connector and ipod playing typical audio signal('Highway Blues' from sample music of windows XP) with maximum audio level] measure it. The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

Note: The EUT is connected to iPod by the base interface of iPod. The input signal of EUT is controlled by iPod. so the volume control of iPod was set to maximum during the test. It means that the test was performed with the maximum audio input.

5.4.Test Procedure

5.4.1. The EUT was placed on a turn table which is 0.8m above ground plane.
5.4.2. Set EUT as normal operation. Playing typical audio signal(the volume control of iPod was set to maximum.)
5.4.3. Set EMI test receiver Center Frequency = fundamental frequency, RBW= 3kHz, VBW= 10kHz, Span=300kHz.
5.4.4. Set EMI test receiver Max hold. Mark peak, -26dB.

5.5.Test Result

The EUT does meet the FCC requirement.

Input signal : play typical audio signal(‘Highway Blues’ from sample music of windows XP)

FM 88.1MHz
-26dB bandwidth = 115.2kHz

FM 98.1 MHz
-26dB bandwidth = 113.4kHz

FM 107.9 MHz
-26dB bandwidth = 141.0kHz

6. TUNING RANGE

6.1.The Requirement For Section 15.239

88-108MHz

6.2.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.2.1. FM Transmitter For iPod (EUT)

Model Number	**:**	i703
Serial Number	**:**	N/A
Manufacturer	**:**	Seatune Electronics Co., Ltd.

6.3.Operating Condition of EUT

6.3.1.Setup the EUT and simulator as shown as Section 4.1.

6.3.2.Turn on the power of all equipment.

Let the EUT work in TX modes(unmodulated carrier). The transmit frequency are 88.1-107.9MHz.We are select 88.1M, 98.1M, 107.9MHz TX frequency to transmitted.

6.4.Test Procedure

6.4.1. The EUT was placed on a turn table which is 0.8m above ground plane.
6.4.2. Set the EUT working on the working frequency.
6.4.3. Set EMI test receiver center frequency = working frequency, RBW=3kHz, VBW= 10kHz, Span=300kHz.
6.4.4. Measuring the working frequency.
6.4.5. The working frequency should be inside 88-108MHz.

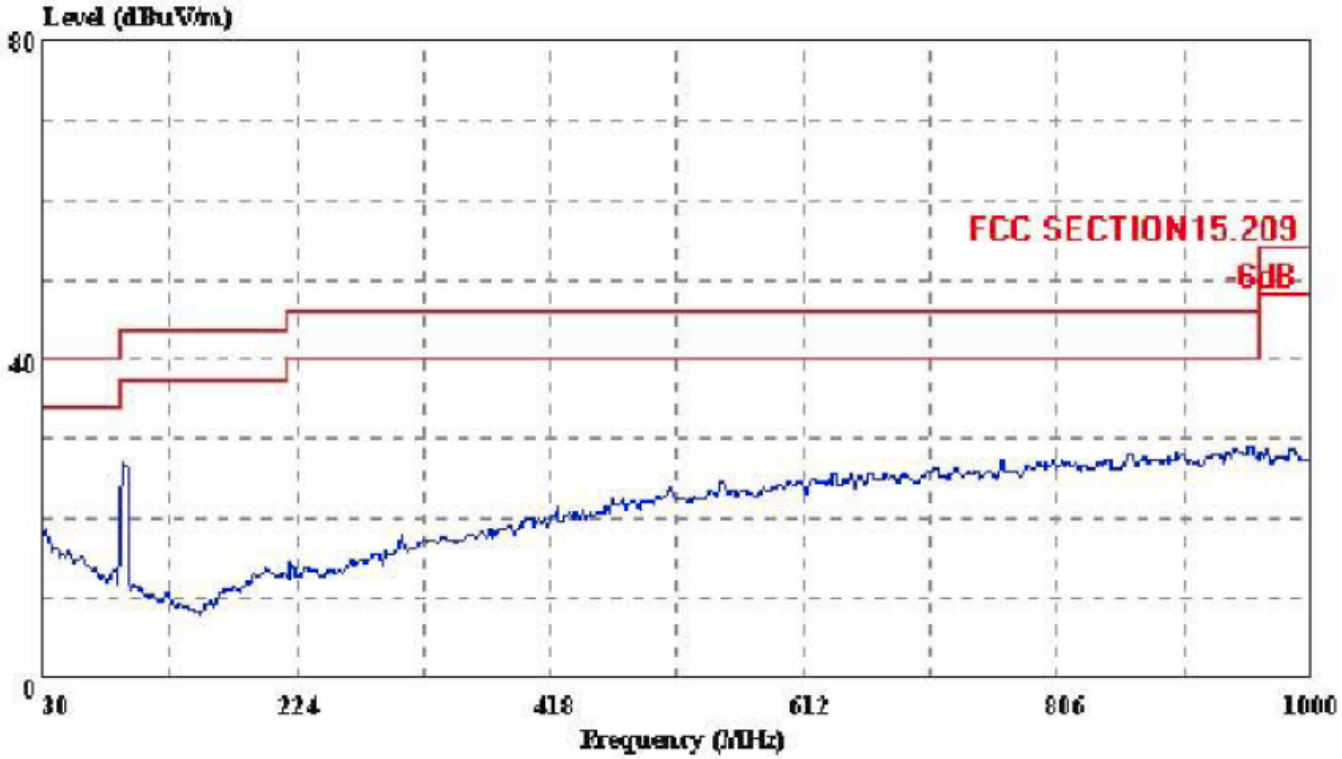
6.5.Test Result

The EUT does meet the FCC requirement.

Low Frequency= 88.0994MHz	EUT screen display 88.1MHz
Mid Frequency= 98.0994MHz	EUT screen display 98.1MHz
High Frequency=107.8994MHz	EUT screen display 107.9MHz

The working frequency rang is from 88.1 to 107.9MHz.

APPENDIX I
(Test Curves)



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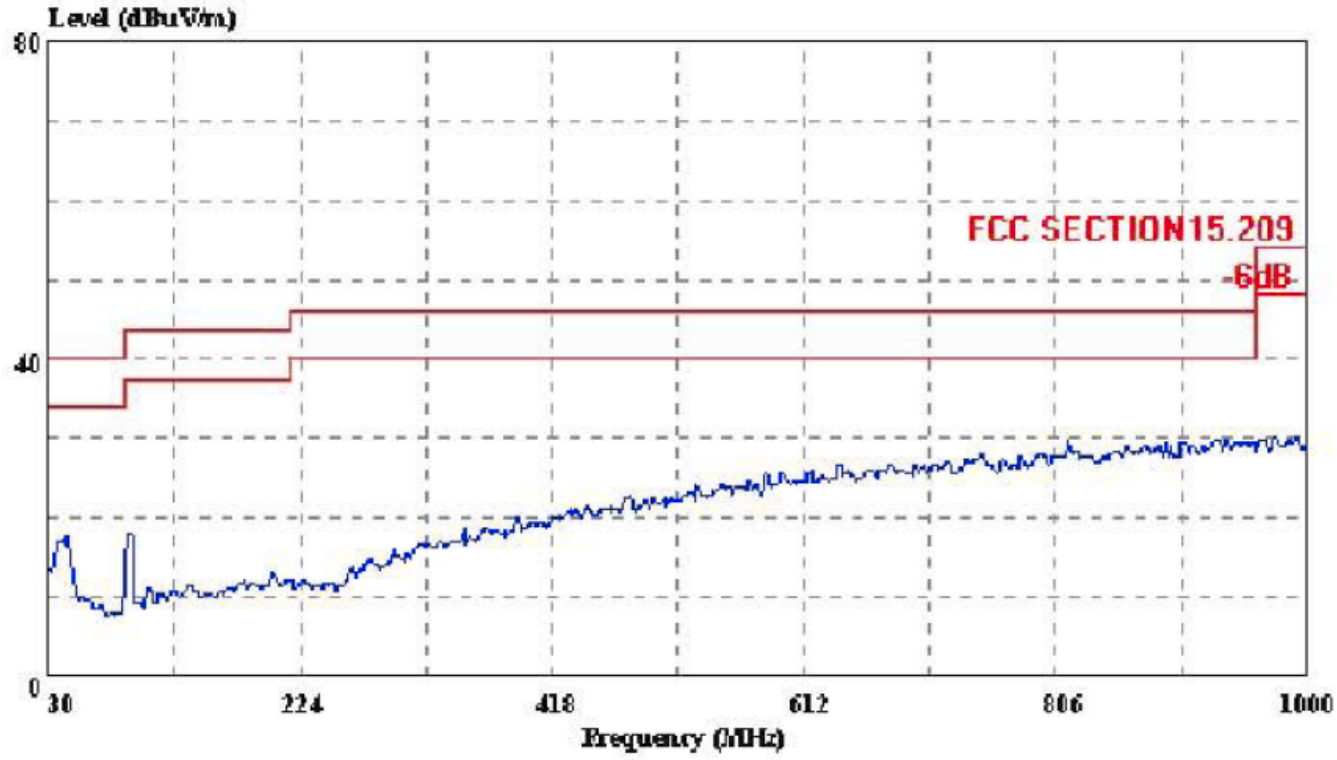
power : DC 3.3V
memo : TX 88.1MHz
manuf : SEATUNE
sample no.: 074807
report no.: ATE20072574



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memo : TX 88.1MHz
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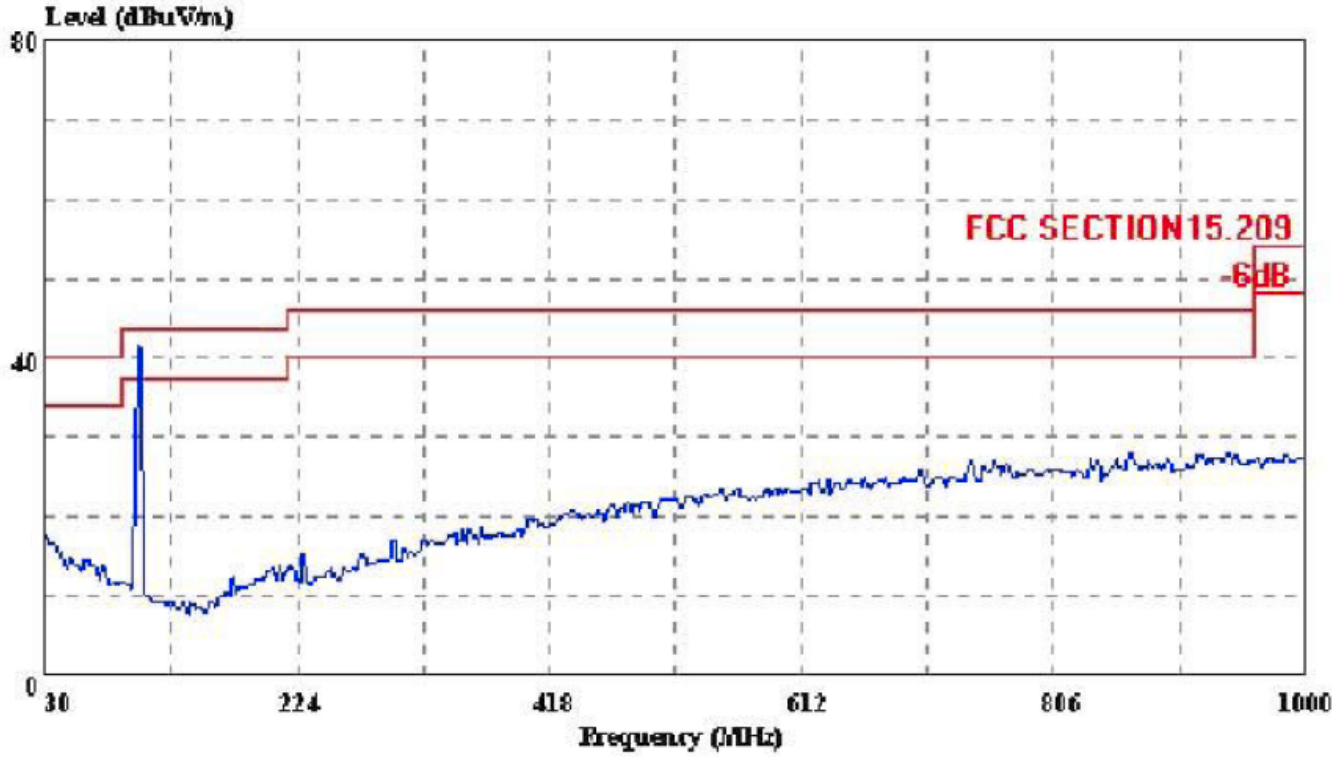
sample no.: 074807
report no.: ATE20072574



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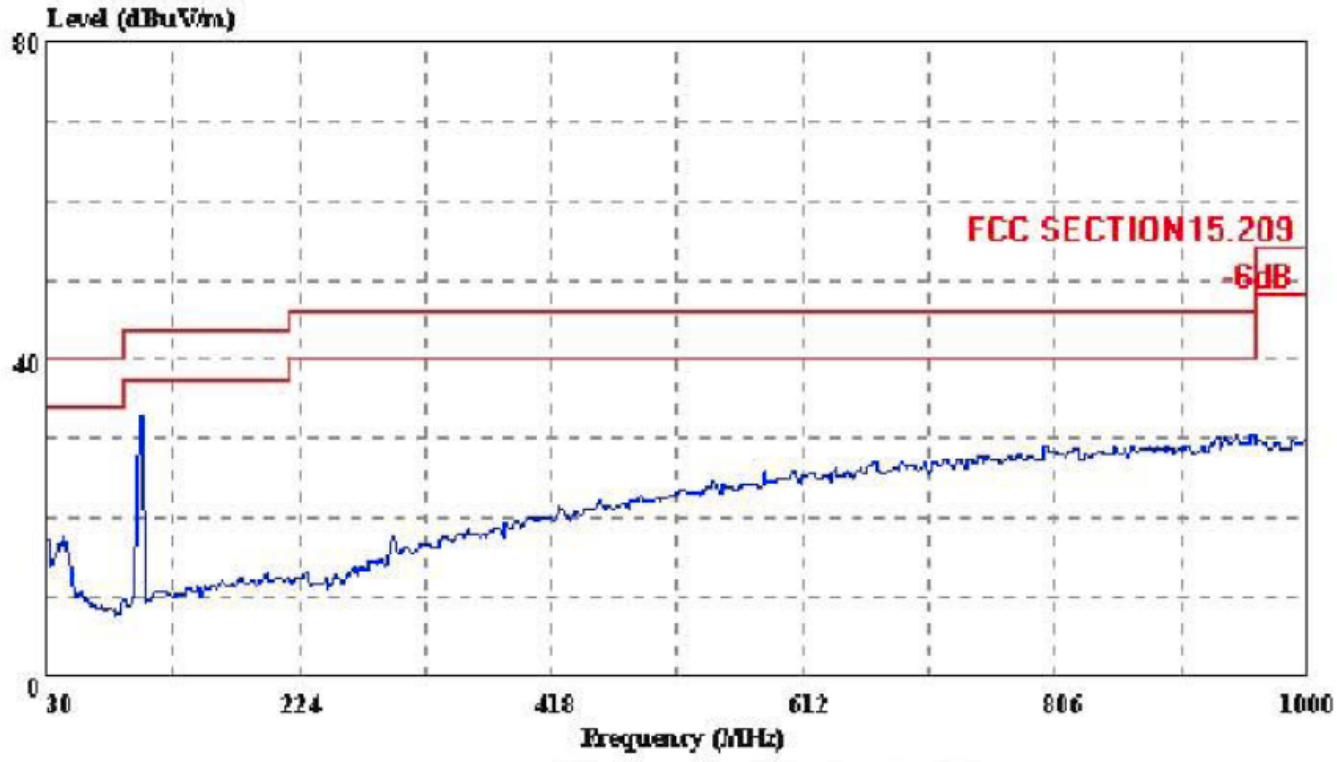

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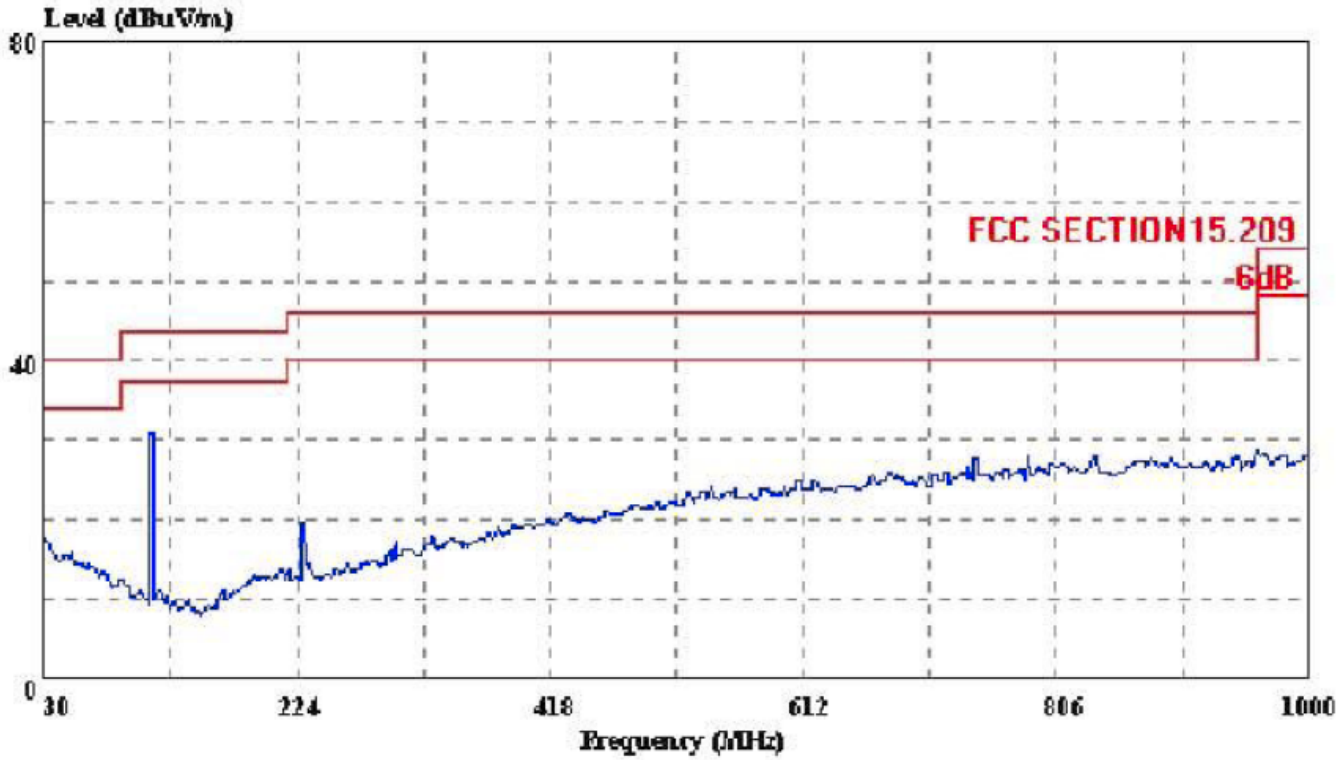
memo : TX 98.1MHz
manuf : SEATUNE
sample no.: 074807
report no.: ATE20072574



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memo : TX 107.9MHz
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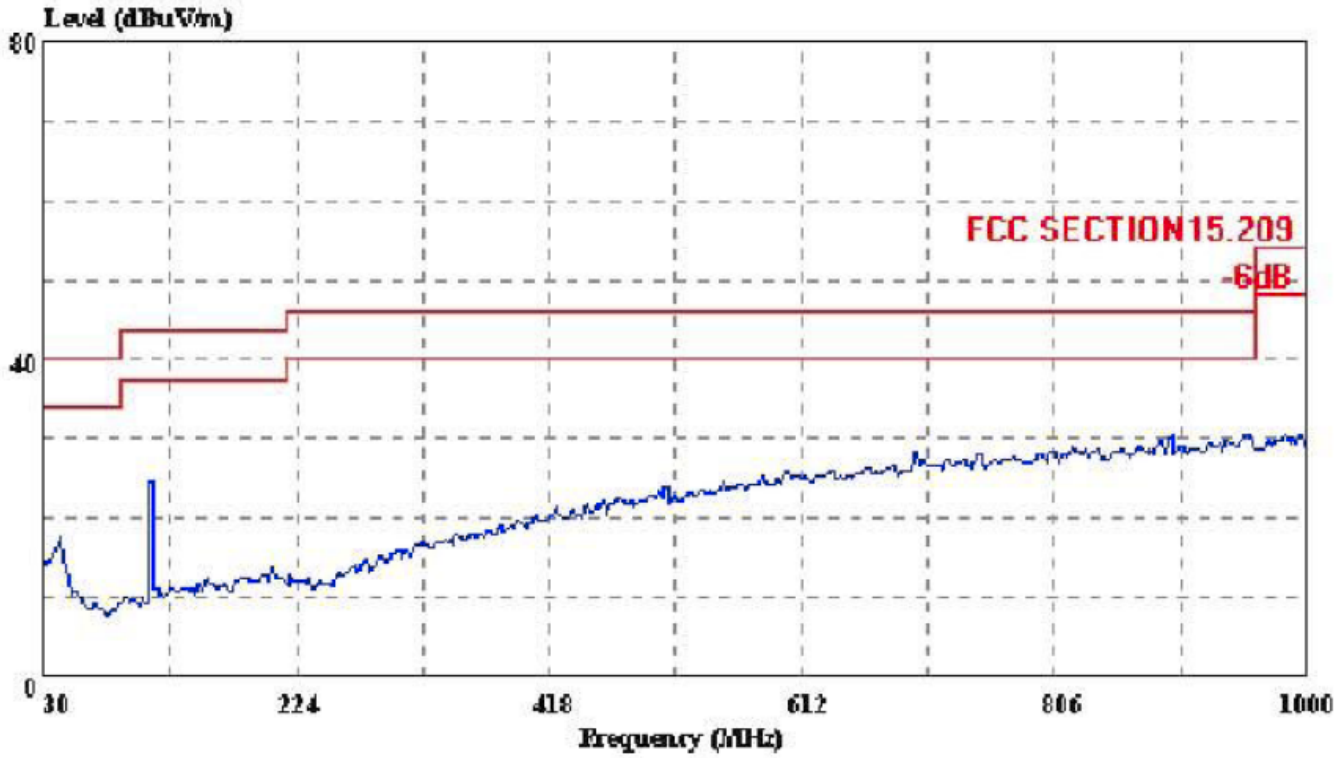
report no.: ATE20072574



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manuf : SEATUNE
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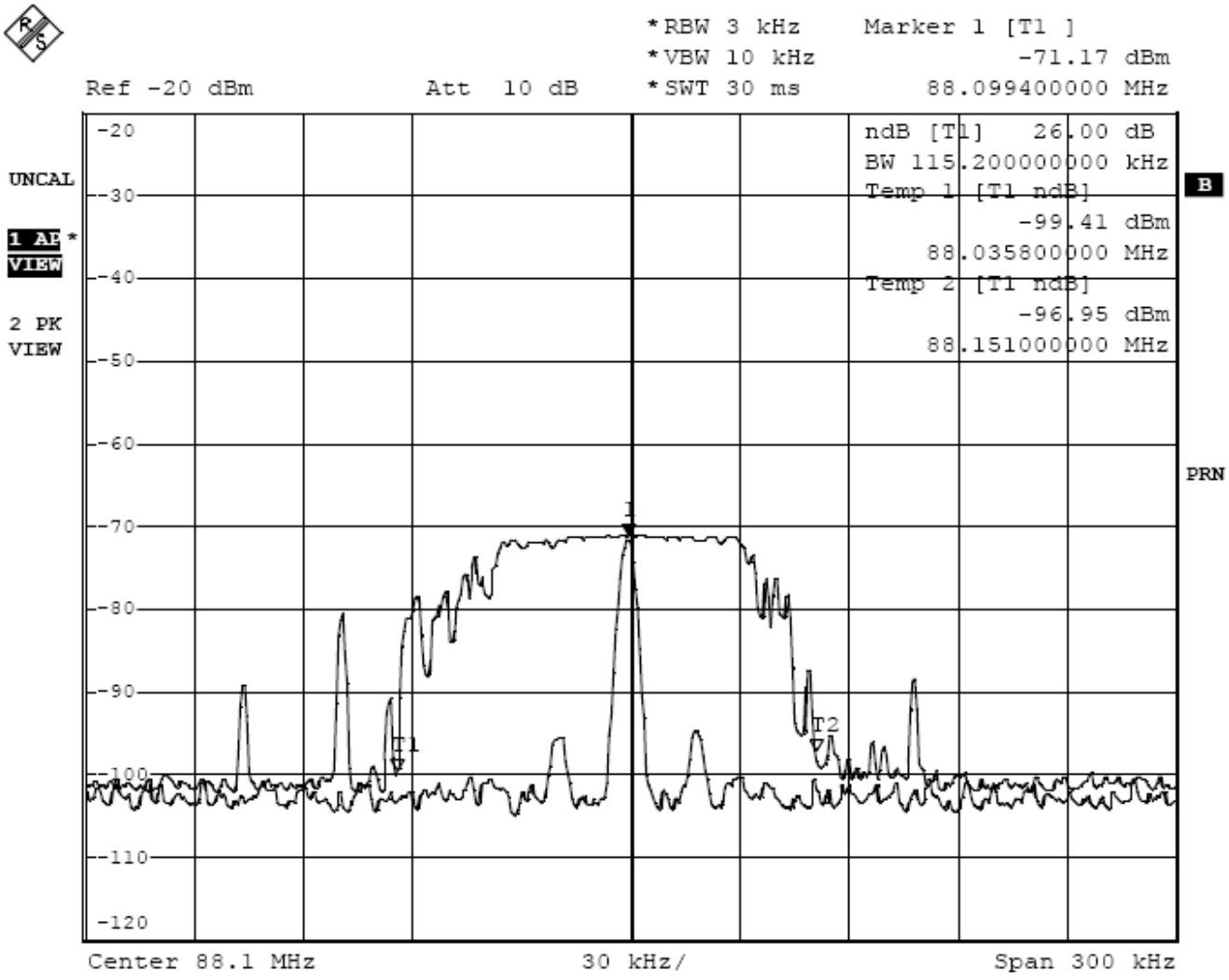
report no.: ATE20072574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*VBW 10 kHz
*SWT 30 ms
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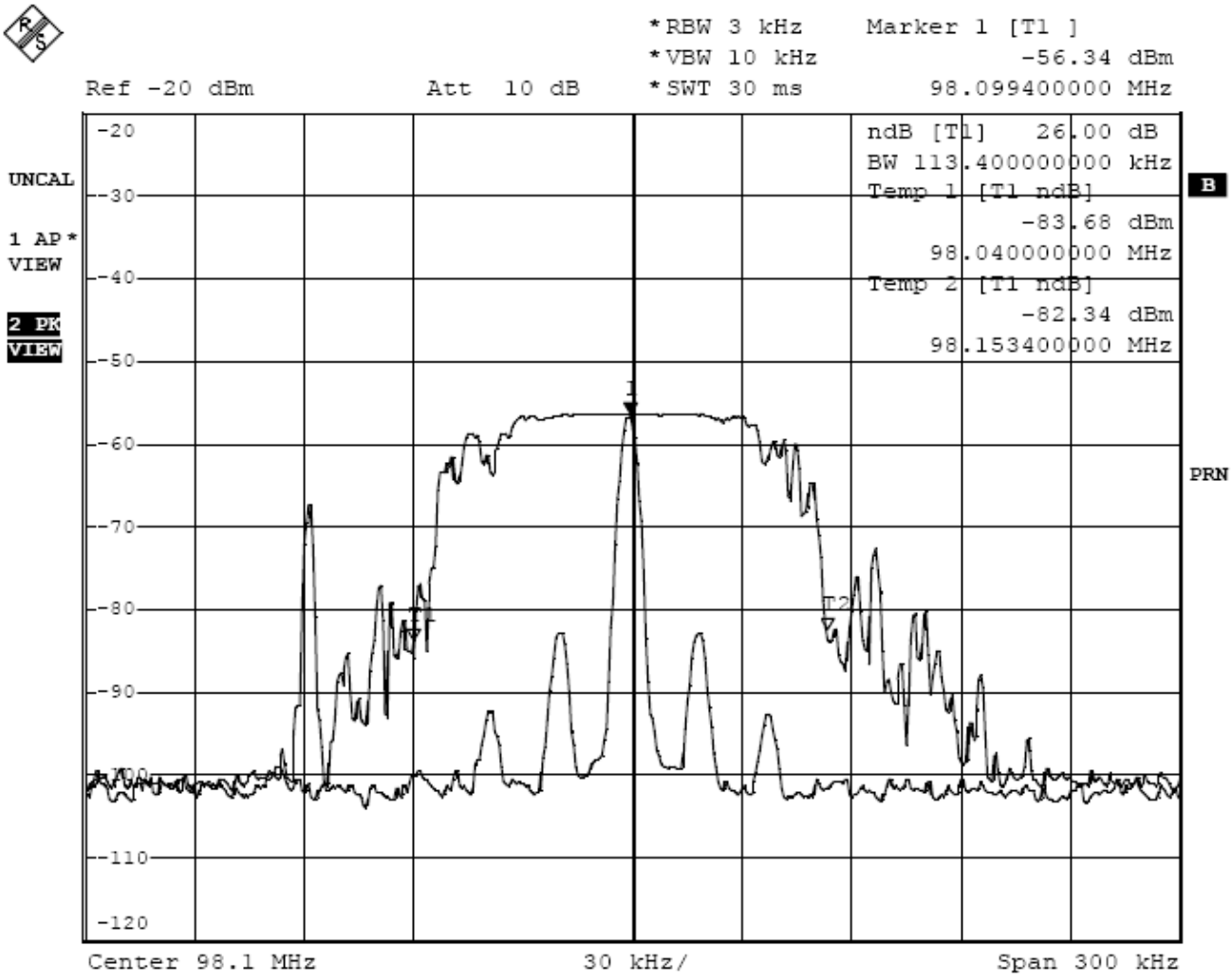
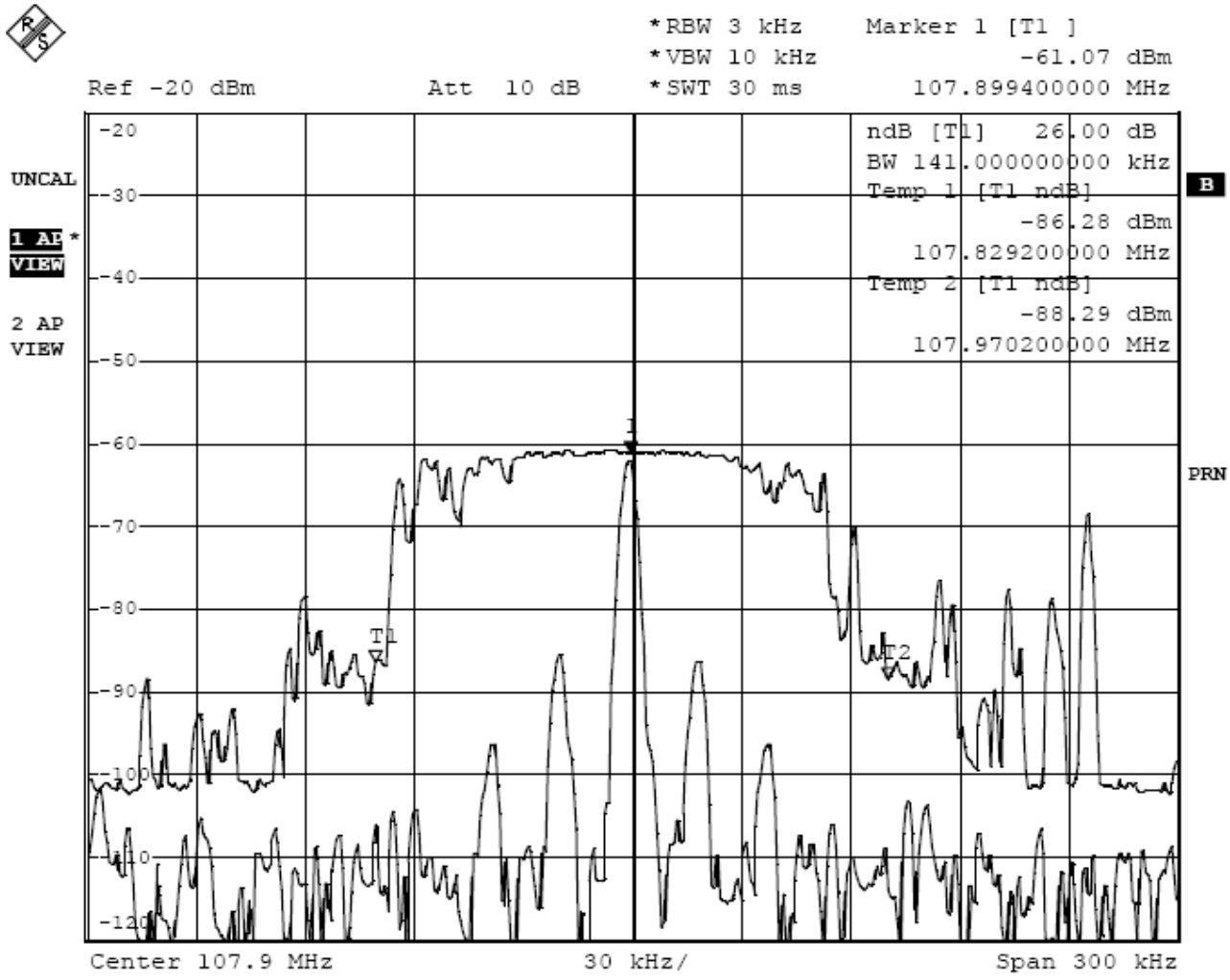
-71.17 dBm
88.099400000 MHz
Ref -20 dBm
Att 10 dB
ndB [T1] 26.00 dB
BW 115.200000000 kHz
Temp 1 [T1 ndB]
-99.41 dBm
88.035800000 MHz
Temp 2 [T1 ndB]
-96.95 dBm
88.151000000 MHz
UNCAL
1 AP *
VIEW
2 PK
VIEW
B
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
T1
T2
Center 88.1 MHz
30 kHz/
Span 300 kHz


*RBW 3 kHz
*VBW 10 kHz
*SWT 30 ms
Marker 1 [T1]
-56.34 dBm
98.099400000 MHz
Ref -20 dBm
Att 10 dB
ndB [T1] 26.00 dB
BW 113.400000000 kHz
Temp 1 [T1 ndB]
-83.68 dBm
98.040000000 MHz
Temp 2 [T1 ndB]
-82.34 dBm
98.153400000 MHz
UNCAL
1 AP*
VIEW
2 PK
VIEW
B
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-110
-120
Center 98.1 MHz
30 kHz/
Span 300 kHz


*RBW 3 kHz
*VBW 10 kHz
*SWT 30 ms
Marker 1 [T1]
-61.07 dBm
107.899400000 MHz
Ref -20 dBm
Att 10 dB
ndB [T1] 26.00 dB
BW 141.000000000 kHz
Temp 1 [T1 ndB]
-86.28 dBm
107.829200000 MHz
Temp 2 [T1 ndB]
-88.29 dBm
107.970200000 MHz
UNCAL
1 AP
VIEW
2 AP
VIEW
B
PRN
T1
T2
Center 107.9 MHz
30 kHz/
Span 300 kHz