Prüfbericht - Nr.: *Test Report No.:*	**16015128 001**	**Seite 1 von 28** *Page 1 of 28*

Auftraggeber: *Client:*	**Seikaku Technical Group Limited** **Offshore Chambers, P. O. Box 217,** **Apia, Samoa**		
Gegenstand der Prüfung: *Test item:*	**Wireless Microphone Transmitter**		
Bezeichnung: *Identification:*	**WT-201** **WTX201 (PROEL)**	**FCC ID:** *FCC ID*	**H38-WT-201**
Wareneingangs-Nr.: *Receipt No.:*	**173040862**	**Eingangsdatum:** *Date of receipt:*	**30.10.2008**
Prüfort: *Testing location:*	**TÜV Rheinland (Guangdong) Ltd. EMC Laboratory** **Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650** **P. R. China**	**Listed test laboratory according to FCC rules section 2.948 for measuring devices under Parts 74**	
Prüfgrundlage: *Test specification:*	**TIA/EIA-603-C-2004** **FCC "Rules and Regulations", Part 74: 01, Oct., 2008** **Subpart H, Section 74.861**		
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (Guangdong) Ltd.**		

geprüft / *tested by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
20. Oct. 2009	Liangdong Xie Project Manager	

kontrolliert/ *reviewed by:*

Datum *Date*	Name/Stellung *Name/Position*	Unterschrift *Signature*
20. Oct. 2009	Ricky Liu Project Manager	Ricky Liu

Sonstiges/ Other Aspects:

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

TEST SUMMARY

5.1 RADIATED POWER OUTPUT MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1)
RESULT: Pass

5.2 SPURIOUS RADIATION MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(6)(III)
RESULT: Pass

5.3 MODULATION CHARACTERISTICS MEASUREMENT
RESULT: Pass

5.4 OCCUPIED BANDWIDTH FOR FCC PART 74 PER SECTION 74.861(E)(3), 74.861(E)(5) AND 74.861(E)(6)
RESULT: Pass

5.5 FREQUENCY TOLERANCE FOR FCC PART 74 PER SECTION 74.861(E)(4)
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

Guangzhou Auto Market, Yuan Gang Section of Guangshan Road
Guangzhou 510650

P. R. China

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equipment	Manufacturer	Type	Serial No.	Calibrated until
TÜV Rheinland (Guangdong) Ltd.				
EMI Test Receiver	Rohde & Schwarz	ESCI-3	100216	16.Mar.2010
Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	16.Mar.2010
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	209	07.Nov.2009
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	210	26.Jun.2011
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF906	100385	18.Jul.2010
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF906	100407	26.Jun.2011
Pre-amplifier	MITEQ	AFS42-00101800-25-S-42	1101599	31.Jul.2010
Band Reject Filter	Micro-Tronics	BRM50702	023	14.Mar.2010
Standard Gain Horn Antenna	EMCO	3160-09	21642	26.Jun.2014
Standard Gain Horn Antenna	EMCO	3160-09	21645	N/A
Pre-amplifier	MITEQ	AFS33-18002650-30-8P-44	1108282	16.Mar.2010
3m Anechoic Chamber	Albatross Project GmbH	N/A	N/A	16.Apr.2010
Climatic Chamber	ESPEC	EL-04 KA	6107116	16.Mar.2010
Audio analyzer	KENWOOD	10087290	VA-2230A	16.Mar.2010
RF communication test set	HP	8920A	3417A04617	07.Jan.2010

2.3 Trace ability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

Uncertainty for conducted emissions measurements is ± 2.68dB.
Uncertainty for radiated emissions measurements is ± 4.94dB (30MHz-1GHz), ± 4.88dB (>1GHz).

The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor k=2, providing a level of confidence of approximately 95%.

2.6 Location of original data

The original copies of all test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TUV Rheinland (Guangzhou) file for certification follow-up purposes.

2.7 Status of facility used for testing

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 833845.

3 General Product Information

The submitted samples WT-201 and WTX201 (PROEL) are wireless microphone transmitter. They are both single channel equipment.

Model WTX201 (PROEL) is identical with WT-201 except model name and brand name.

All the tests are performed on model WT-201.

3.1 Product Function and Intended Use

For details, refer to technical document and the user manual.

3.2 Ratings and System Details

Frequency range	:	174-216MHz
RF output power	:	15mW(e.r.p)
Channel bandwidth	:	200 kHz
Type of antenna	:	Integral antenna
FCC ID	:	H38-WT-201
Power supply	:	DC 1.5V (1 x AA size battery)
Frequency Response	:	50Hz-15kHz
Frequency Stability	:	0.001%
Emission designator	:	146KF3E
Protection Class	:	III

Refer to the technical document for further information.

3.3 Independent Operation Modes

The basic operation modes are:

Transmitting without modulation
Transmitting with modulation

For further information refer to User Manual

3.4 Submitted Documents

Block Diagram
Circuit Diagram
Components List
PCB layout
FCC label
User Manual
Photo document

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Refer to Test set-up in chapter 5.

4.3 Special Accessories and Auxiliary Equipment

None

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the technical document. No additional measures were employed to achieve compliance.

4.5 Test set-up

Diagram 1 of Measurement Equipment Configuration for Testing Radiated Emission

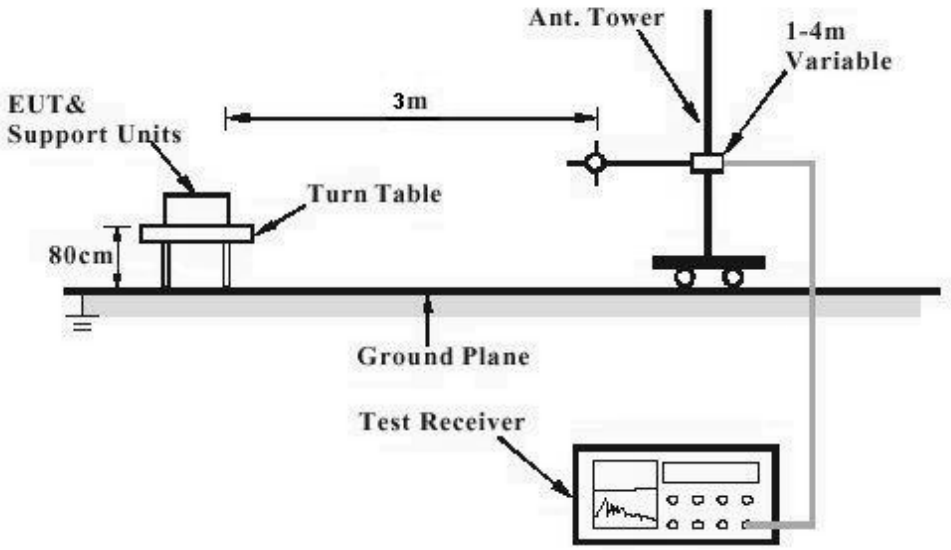


Diagram 2 of Measurement Equipment Configuration for Substitution Method

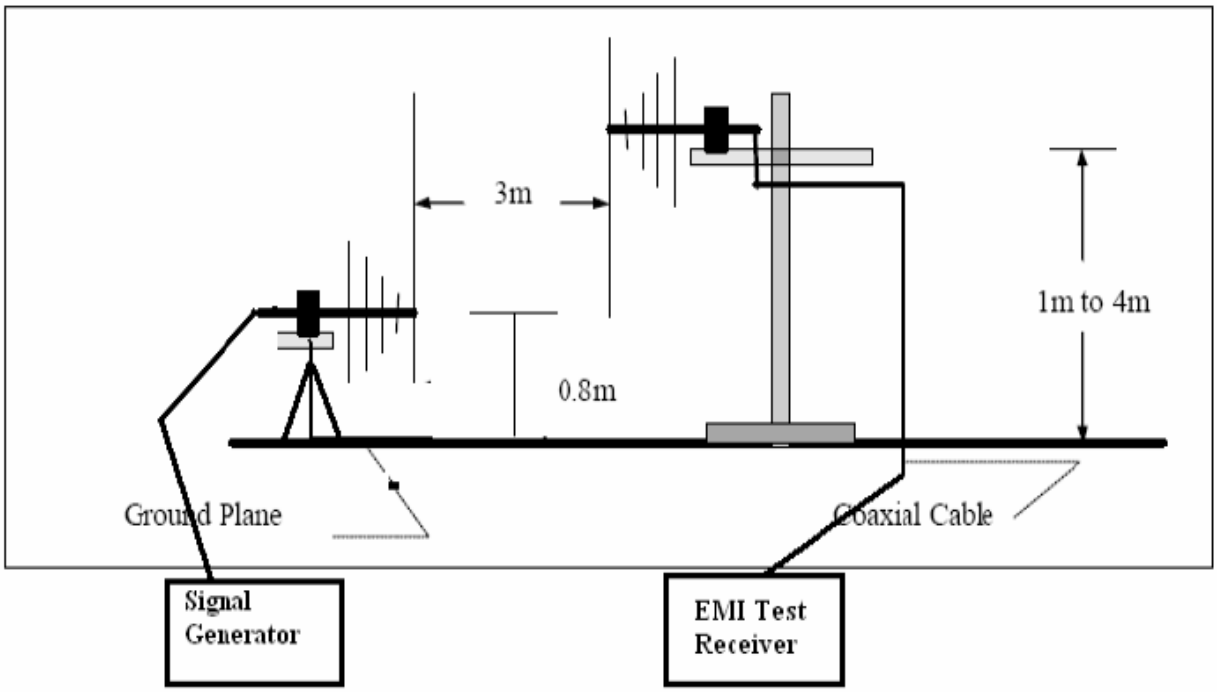
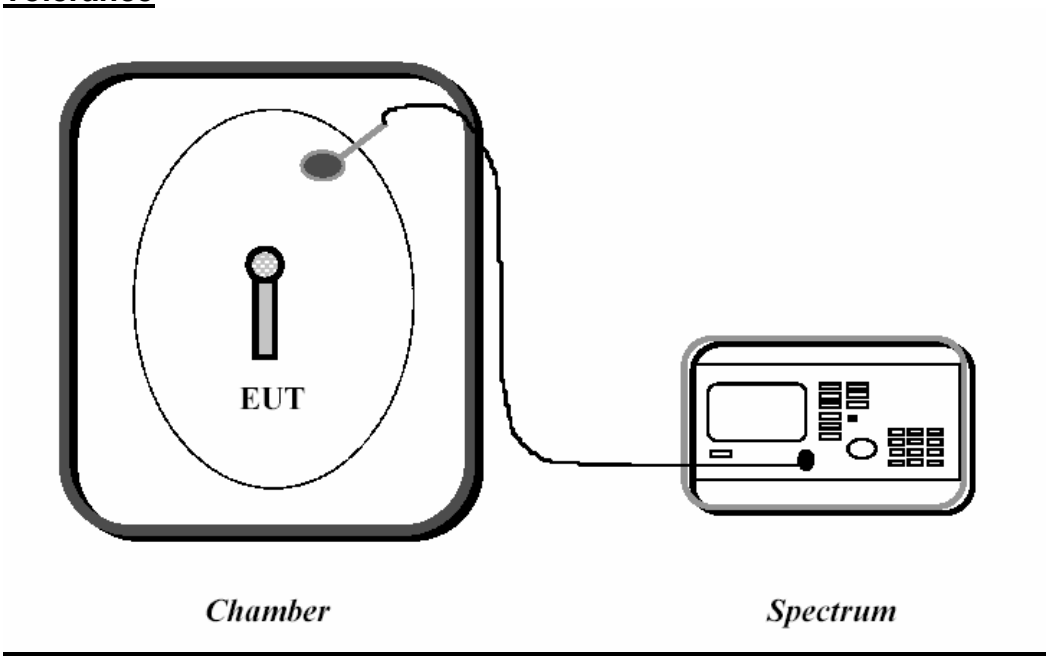
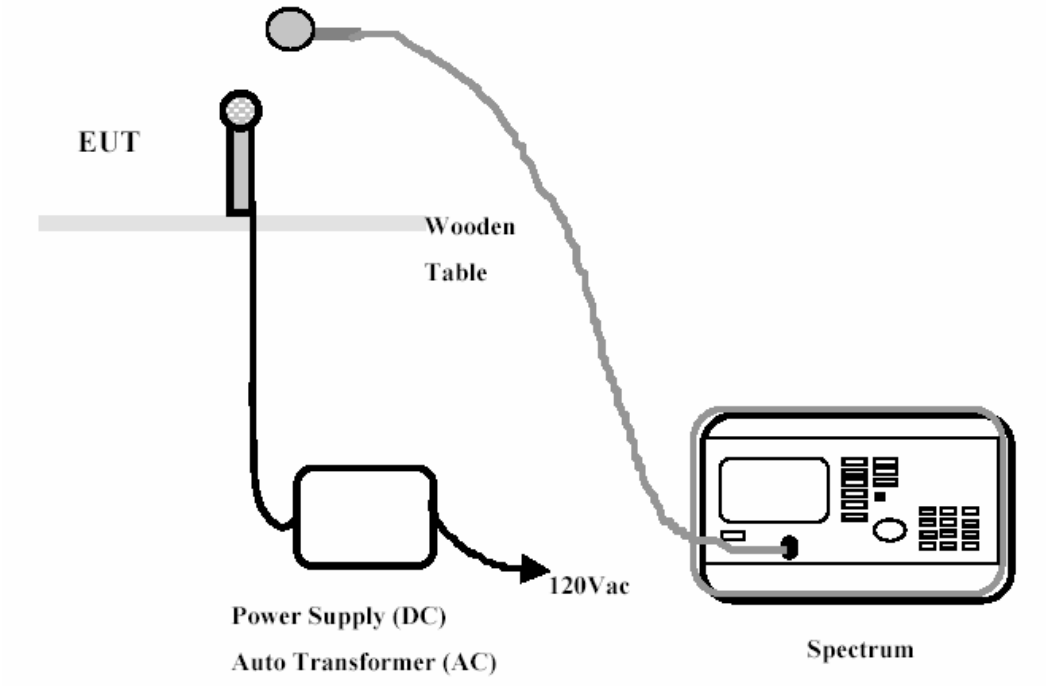


Diagram 3 of Measurement Equipment Configuration for Testing Modulation Characteristics measurement

Diagram 4 of Measurement Equipment Configuration for Testing Frequency Tolerance





5 Test Results E M I S S I O N

5.1 Radiated Power output measurement for FCC part 74 Per Section 74.861(e)(1)

RESULT: **Pass**

Date of testing	:	30.Dec.2008 / 16.Sep.2009
Test specification	:	FCC Part 2 Per Section 2.1046(a)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.17
Limits	:	FCC Part 74 Per Section 74.861(e)(1)
Kind of test site	:	3m Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. The EUT was place on an 0.8 m high turntable in the anechoic chamber.
2. For radiated power output of the EUT, the measuring antenna was raised and lowered to obtain a maximum reading on the spectrum analyzer with the test antenna polarized vertically and horizontally. The turntable was rotated 360 to further searching the maximum reading on the spectrum analyzer. Then the max value on spectrum was recorded.
3. The EUT was removed and be replaced with a substitute dipole antenna. The length of the antenna was adjusted to a half-wave of transmitting frequency measured. The centre of the dipole antenna was placed approximately at the same location as the centre place of the EUT in step 1 and 2.
4. The dipole antenna was connected to a signal generator with a coaxial cable.
5. The signal generator is tuned to the transmitting frequency with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 2.
6. The input RF power in the dipole antenna was calculated from the coaxial cable loss and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 2.

Note: While in Step 2, the EUT was placed in 3 orthogonal planes to find a maximum reading.

Table 2: Measurement Result of output power at low, mid and high channel

Channel	Freq. (MHz)	Polarization (V/H)	Transmit power (dBm) (ERP)	RF power (mW) (ERP)	Limit (mW)
Lowest	174.100	V	-6.837	0.207	50
		H	-27.375	0.002	50
Mid	194.600	V	-2.479	0.565	50
		H	-17.875	0.016	50
High	215.200	V	-3.569	0.440	50
		H	-28.042	0.002	50

5.2 Spurious Radiation Measurement for FCC Part 74 Per Section 74.861(e)(6)(iii)

RESULT: **Pass**

Date of testing	:	30.Dec.2008 / 16.Sep.2009
Test specification	:	FCC Part 2 Per Section 2.1053(a) and 2.1057
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.12
Limits	:	FCC Part 74 Per Section 74.861(e)(6)(iii)
Kind of test site	:	3m Full-Anechoic Chamber
Operation mode	:	Transmitting (unmodulated)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. Adjust the spectrum analyzer for the following settings:

a. RBW = 10kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

b. VBW = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1GHz.

c. Sweep speed slow enough to maintain measurement calibration.

d. Detector Mode = Positive Peak

2. The EUT was turned on and placed on the top of a rotatable table 0.8 m above the ground with 3-orthogonal XYZ direction and be kept close enough to the measurement receiving antenna (especially for the measurement frequency range above 1 GHz). The table was then rotated 360 degrees to detect the suspected emission frequency points. The position of the worst radiation case with both horizontal and vertical receiving antenna polarization was then recorded together with the suspected emission frequency points above-mentioned.

3. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.

4. For each suspected emission frequency point recorded in step 1, the EUT was arranged to its worst case that 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 read the maximum emission.

5. The EUT was removed and be replaced with substitute antenna correspondent to the suspected frequency point mentioned in Step 3 (if necessary, characteristic frequency of the antenna is adjusted to a half-wave of the suspected frequency point). The substitute antenna was then connected to a signal generator with a coaxial cable and its center is placed approximately at the same location as the centre place of the EUT in Step 3.

6. The signal generator is tuned to the suspected frequency point mentioned in Step 3 with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 3.

7. For each suspected frequency point, the input RF power in the substitute antenna was calculated from the coaxial cable loss, antenna factor and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 3, table 4 and table 5.

The allowed emissions for transmitters operating in the 174 MHz to 216 MHz bands are found under Part 74, Section 74.861, Paragraph (e) (6) for Low Power Auxiliary Stations. This paragraph states the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10Log10 (mean output power in watts) dB.

To determine the Limit for Spurious Emissions the following method was used:

Maximum output power in watts:

Maximum output power in Watt: 0.000565 W (see table 2)

The emission must be reduced by:

43+10Log(0.000565) = 10.521 dB

Therefore, the Emission Limit equals:

10Log(0.000565 x1000) – 10.521 dB = –13 dBm

While testing, the EUT was placed in 3 orthogonal planes and the maximum reading was recorded in the following tables.

Table 3: Spurious Emission measured at low channel 174.1 MHz

Freq. (MHz)	Polarization (V/H)	Max Level (dBm) (ERP)	Limit (dBm)
348.20096	V	- 37.6	- 13
522.30144	V	- 32.3	- 13
696.40192	V	- 43.2	- 13
870.50240	V	- 36.8	- 13
1044.60288	V	- 32.1	- 13
1218.70336	V	- 37.5	- 13
1392.80384	V	- 33.6	- 13
1566.90432	V	- 35.3	- 13
1741.0048	V	- 40.6	- 13
348.20096	H	- 48.1	- 13
522.30144	H	- 45.3	- 13
696.40192	H	- 50.2	- 13
870.5024	H	- 45.1	- 13
1044.60288	H	- 41.7	- 13
1218.70336	H	- 41.3	- 13
1392.80384	H	- 42.1	- 13
1566.90432	H	- 43.8	- 13
1741.0048	H	*	- 13
*)			

Table 4: Spurious Emission measured at middle channel 194.6 MHz

Freq. (MHz)	Polarization (V/H)	Max Level (dBm) (ERP)	Limit (dBm)
389.20952	V	- 37.1	- 13
583.81428	V	- 28.8	- 13
778.41904	V	- 41.5	- 13
973.0238	V	- 39.9	- 13
1167.62856	V	- 26.3	- 13
1362.23332	V	- 36.5	- 13
1556.83808	V	- 35.1	- 13
1751.44284	V	- 35.3	- 13
1946.04760	V	- 25.8	- 13
389.20952	H	- 50.2	- 13
583.81428	H	- 37.4	- 13
778.41904	H	- 50.2	- 13
973.0238	H	- 48.3	- 13
1167.62856	H	- 25.1	- 13
1362.23332	H	- 37.6	- 13
1556.83808	H	- 45.2	- 13
1751.44284	H	- 37.4	- 13
1946.04760	H	- 28.5	- 13
*)			

Table 5: Spurious Emission measured at high channel 215.2 MHz

Freq. (MHz)	Polarization (V/H)	Max Level (dBm) (ERP)	Limit (dBm)
430.3964	V	- 24.6	- 13
645.5946	V	- 45.1	- 13
860.7928	V	- 40.4	- 13
1075.991	V	- 46.3	- 13
1291.1892	V	- 36.1	- 13
1506.3874	V	- 35.1	- 13
1721.5856	V	- 36.2	- 13
1936.7838	V	- 31.1	- 13
2151.9820	V	- 29.1	- 13
430.3964	H	- 45.3	- 13
645.5946	H	- 43.9	- 13
860.7928	H	- 43.5	- 13
1075.9910	H	- 48.3	- 13
1291.1892	H	- 43.2	- 13
1506.3874	H	- 41.1	- 13
1721.5856	H	- 43.6	- 13
1936.7838	H	- 36.4	- 13
2151.9820	H	- 33.1	- 13
*)			

*) means disturbances are far below the limit.

Please refer to the Appendix 1 for the measured noise floor at high, mid and low channels.

5.3 Modulation Characteristics measurement

RESULT: **Pass**

Date of testing	:	31.Aug.2009
Test specification	:	FCC Part 2 Per Section 2.1047(a) and (b)
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.3
Limits	:	FCC Part 2 Per Section 2.1047(a) and (b)
Operation mode	:	Transmitting
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

Audio frequency response:

1) Configure the EUT as shown in diagram 3.

2) Adjust the audio input for 30% of rated system deviation at 1 kHz using this level as a reference (0 dB).

3) Vary the Audio frequency from 200 Hz to 20 kHz and record the frequency deviation

Modulation limit:

1). Configure the EUT as shown in diagram 3, adjust the audio input to produce 60 percent modulation at 1 kHz, this level is as a reference (0dB) and then vary the input level from –20dB to +20dB. Record the frequency deviation obtained as a function of the input level.

2). Repeat step 1 with input frequency changing to 400Hz, 800Hz, 2kHz, 5kHz, 8kHz, 19kHz and 14kHz in sequence.

Refer to appendix for curves.

5.4 Occupied Bandwidth for FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)

RESULT: **Pass**

Date of testing	:	30.Dec.2008
Test specification	:	FCC Part 2 Per Section 2.1049(c)1
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.11
Limits	:	FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)
Operation mode	:	Transmitting (modulated)
Temperature	:	22°C
Humidity	:	50%

Measurement procedure:

1. Connect the EUT as diagram 3 in Section 4.5.

2. Plot the unmodulated chart shows on spectrum.

3. Set to 2500 Hz tone at an input level to produce the 50 percent modulation.

4. According to the result of Modulation Characteristics, set 800Hz, 1 kHz, 2 kHz, 5 kHz, 8 kHz, 9 kHz and 14 kHz to the input level 16 dB greater than that necessary to produce 50 percent modulation, until maximum modulation is shown on the spectrum analyzer.

5. The Occupied Bandwidth was measured in appendix of this report

According to modulation limit of Modulation Characteristics, the maximum deviation and operation bandwidth are list in the following table, the rule for operation bandwidth is according to part 2.202(g).

Table 6: Maximum Deviation

Reading:	66.1kHz
Limit:	± 75kHz

Table 7: Operation Bandwidth (Bn)

Parameter:	M	D
Reading	9kHz	63.8kHz
Bn:	146kHz	
Limit:	200kHz	
Emission Designator:	146KF3E	
Bn=2M+2D*K Bn: operation bandwidth M: Max. Modulation Frequency D: Peak Frequency Deviation K=1		

Refer for appendix for measurements.

5.5 Frequency tolerance for FCC Part 74 Per Section 74.861(e)(4)

RESULT: **Pass**

Date of testing	:	18.Aug.2009
Test specification	:	FCC Part 2 Per Section 2.1055
Guide	:	ANSI/TIA-603-C-2004, clause 2.2.2
Limits	:	FCC Part 74 Per Section 74.861(e)(4)
Operation mode	:	Transmitting (unmodulated)
Temperature	:	-30°C to 50°C
Humidity	:	50%

Measurement procedure:

A. Frequency stability versus environmental temperature

1. Setup the configuration as diagram 4 in section 4.5 for frequency measured inside an environment chamber and install new battery in the EUT.

2. Turn on EUT and set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz and Frequency Span to 50kHz.Record this frequency as reference frequency.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

B. Frequency stability versus input voltage

1. Setup the configuration as diagram 4 for frequencies measurement at temperature range from15 ℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used.

2. Set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz. Record this frequency as reference frequency.

3. Set the supply voltage to the nominal voltage of the EUT.

4. Turn the EUT on and measure the EUT operating frequency

5. Repeat step 4 with decreased supply voltage, record all measured frequencies on each voltage step.

6. Stop the test until the lowest voltage specified by the manufacturer is reached or the EUT case to emission radio signal.

Table 8: the measurement of Frequency tolerance (temperature)

Test condition	Power supply (VDC)	Low Frequency (MHz) (174.100)	Mid Frequency (MHz) (194.600)	High Frequency (MHz) (215.200)
-30°C	1.5	174.098360	194.599960	215.197400
-20°C	1.5	174.099200	194.600600	215.198440
-10°C	1.5	174.099940	194.600780	215.199160
0°C	1.5	174.100120	194.600720	215.199400
10°C	1.5	174.100240	194.600540	215.199460
20°C	1.5	174.100180	194.599880	215.199340
30°C	1.5	174.100120	194.599700	215.199220
40°C	1.5	174.099400	194.599340	215.198980
50°C	1.5	174.099820	194.599040	215.198680
Frequency Error:		0.002	0.001	0.003
Frequency tolerance:		0.001%	0.0005%	0.001%
Frequency Tolerance Limit:		0.005%		

Table 9: the measurement of Frequency tolerance (supply voltage)

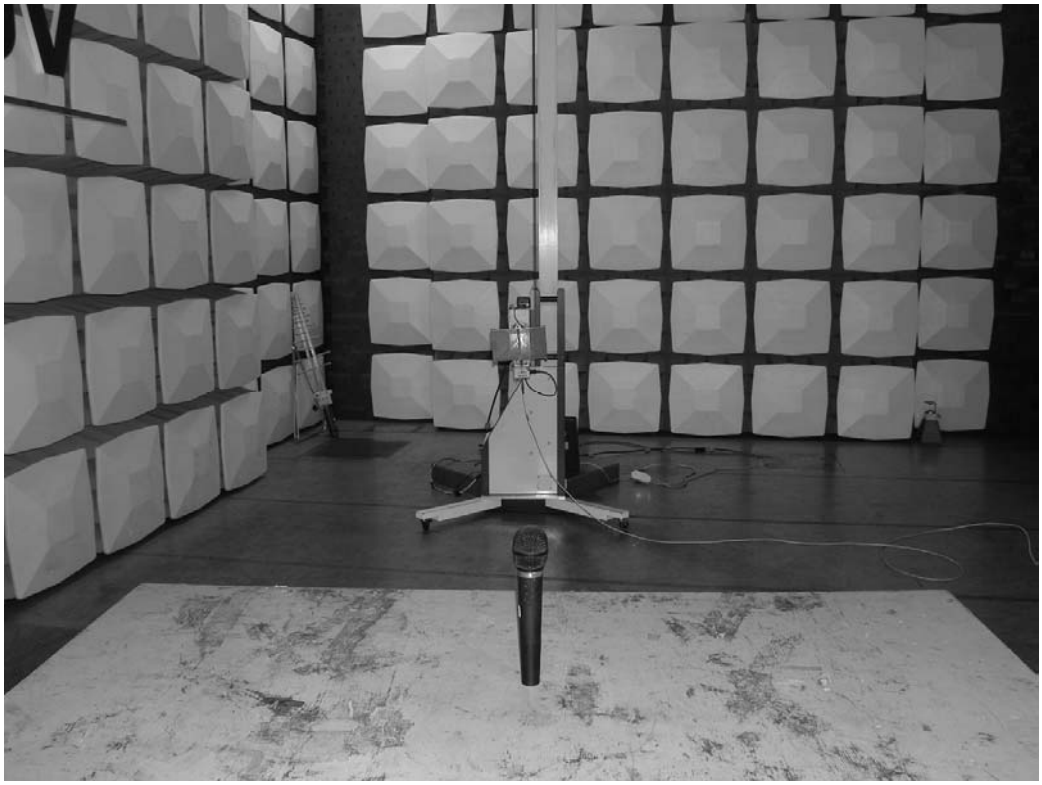
Temperature (°C)	Power supply (VDC)	Low Frequency (MHz) (174.100)	High Frequency (MHz) (194.600)	High Frequency (MHz) (215.200)
25	1.5V	174.100180	194.599800	215.199340
25	1.4V	174.100180	194.599880	215.199342
25	1.3V	174.100120	194.599880	215.199340
25	1.2V	174.100120	194.599820	215.199341
25	1.1V	174.100060	194.599820	215.199337
25	1.0V	174.100060	194.599700	215.199332
25	0.9V	174.100060	194.599460	215.199335
25	0.8V	174.100120	194.599280	215.199320
25	0.7V	No signal	No signal	No signal
Frequency Error:		0.0002	0.0007	0.0007
Frequency tolerance:		0.0001%	0.0003%	0.0003%
Frequency Tolerance Limit:		0.005%		

The equipment remains on channel when the power source was reduced below the lower extreme test voltage limit until zero. The EUT ceases to function at voltage DC 0.7V.

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Radiation Measurement Below 1GHz

Photograph 2: Set-up for Radiation Measurement above 1GHz



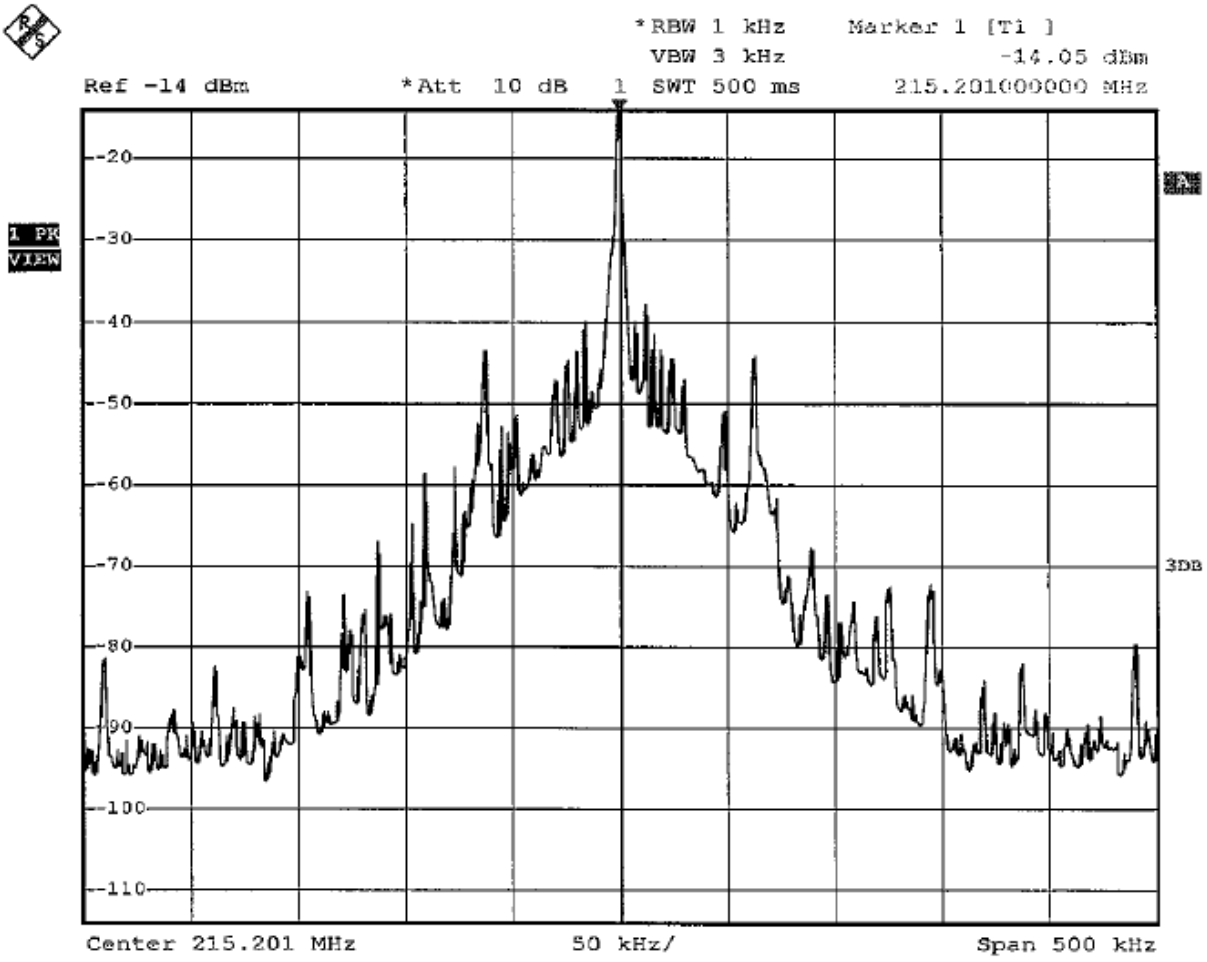
7 List of Tables

8 List of Photographs

Occupied Bandwidth:

High frequency

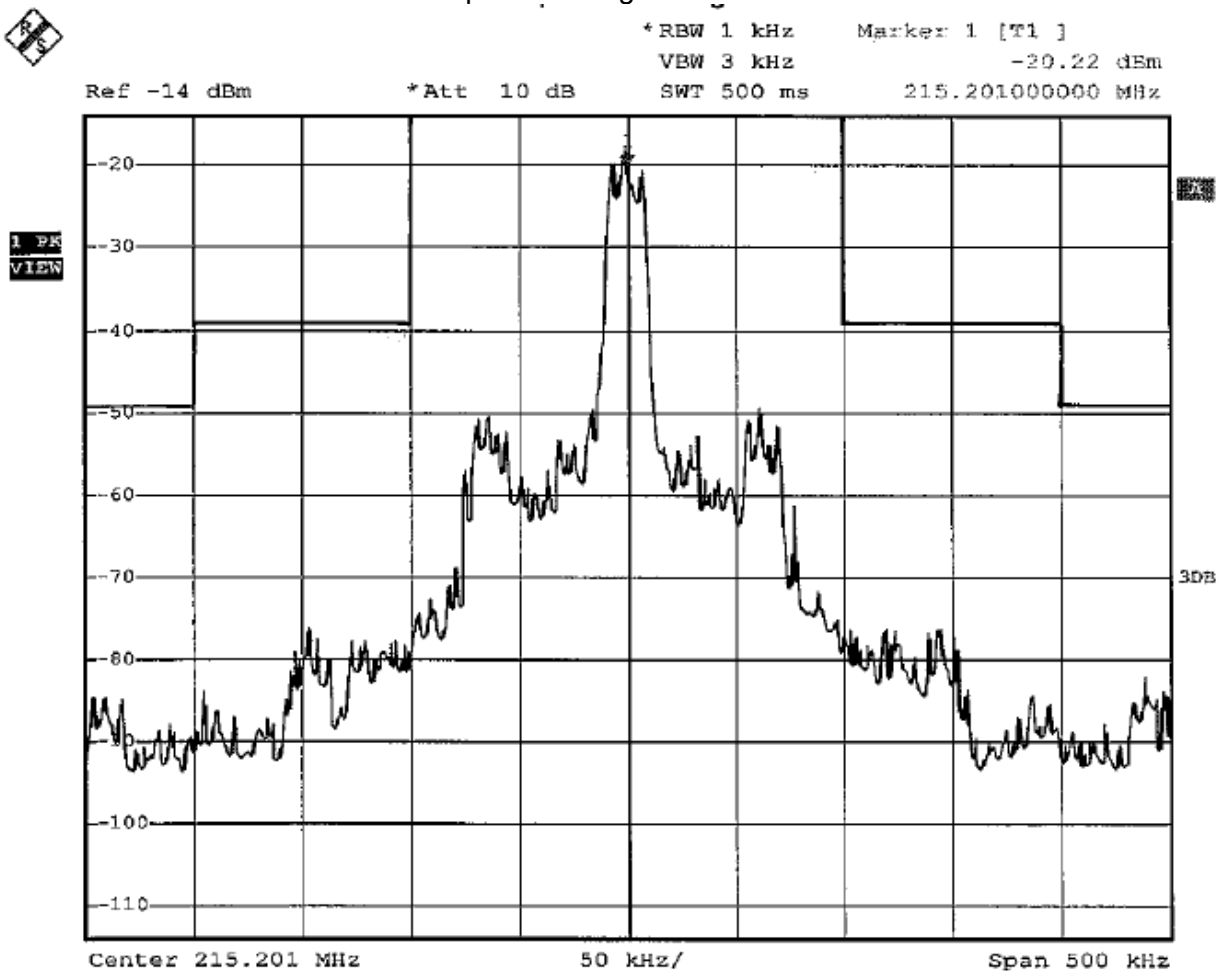
Unmodulated RF carrier



down 3dB

Date: 16.DEC.2008 00:29:47

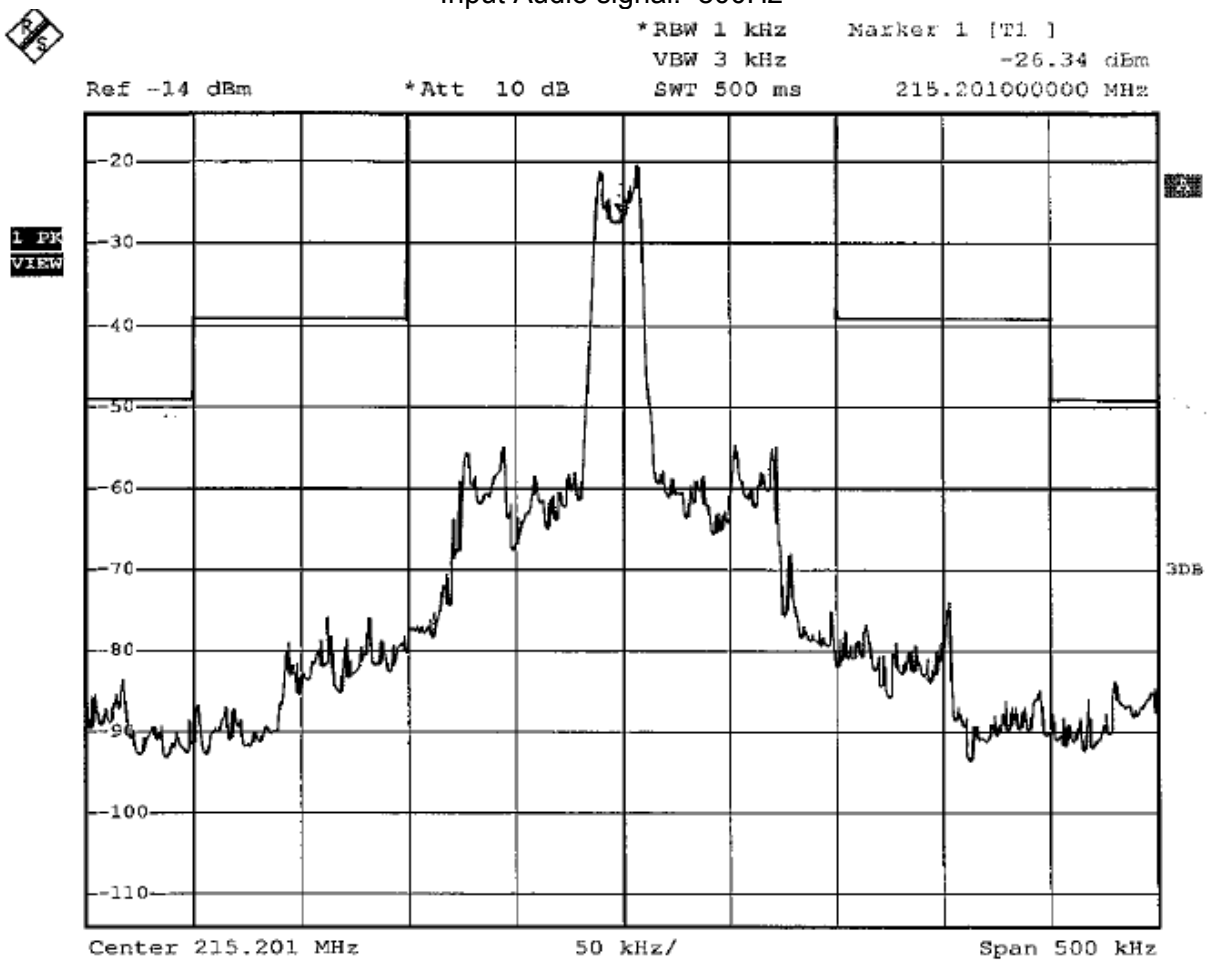
Input Audio signal: 500Hz



down 3dB

Date: 16.DEC.2008 00:33:39

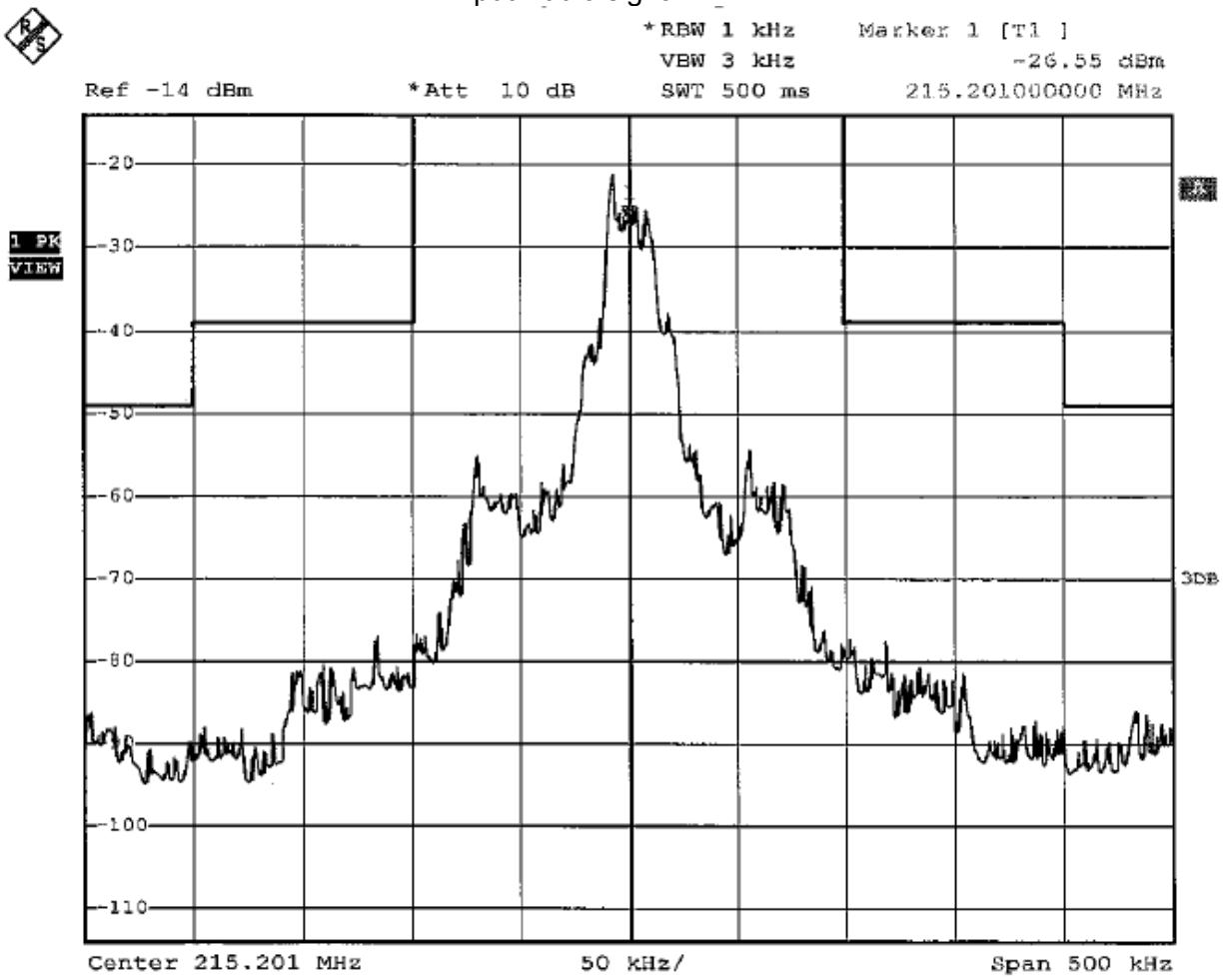
Input Audio signal: 800Hz



down 3dB

Date: 16.DEC.2008 00:34:08

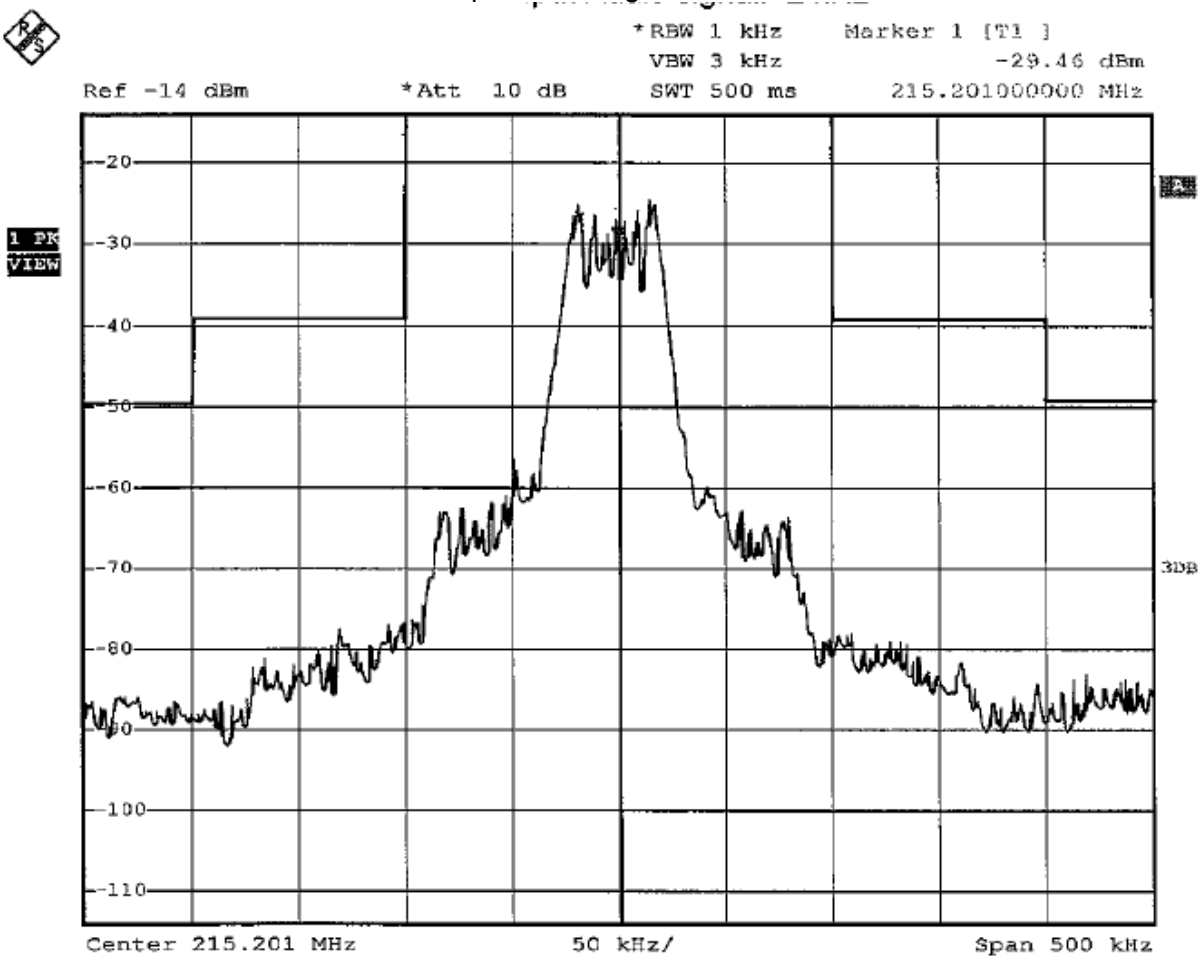
Input Audio signal: 1 kHz



down 3dB

Date: 16.DEC.2008 00:34:45

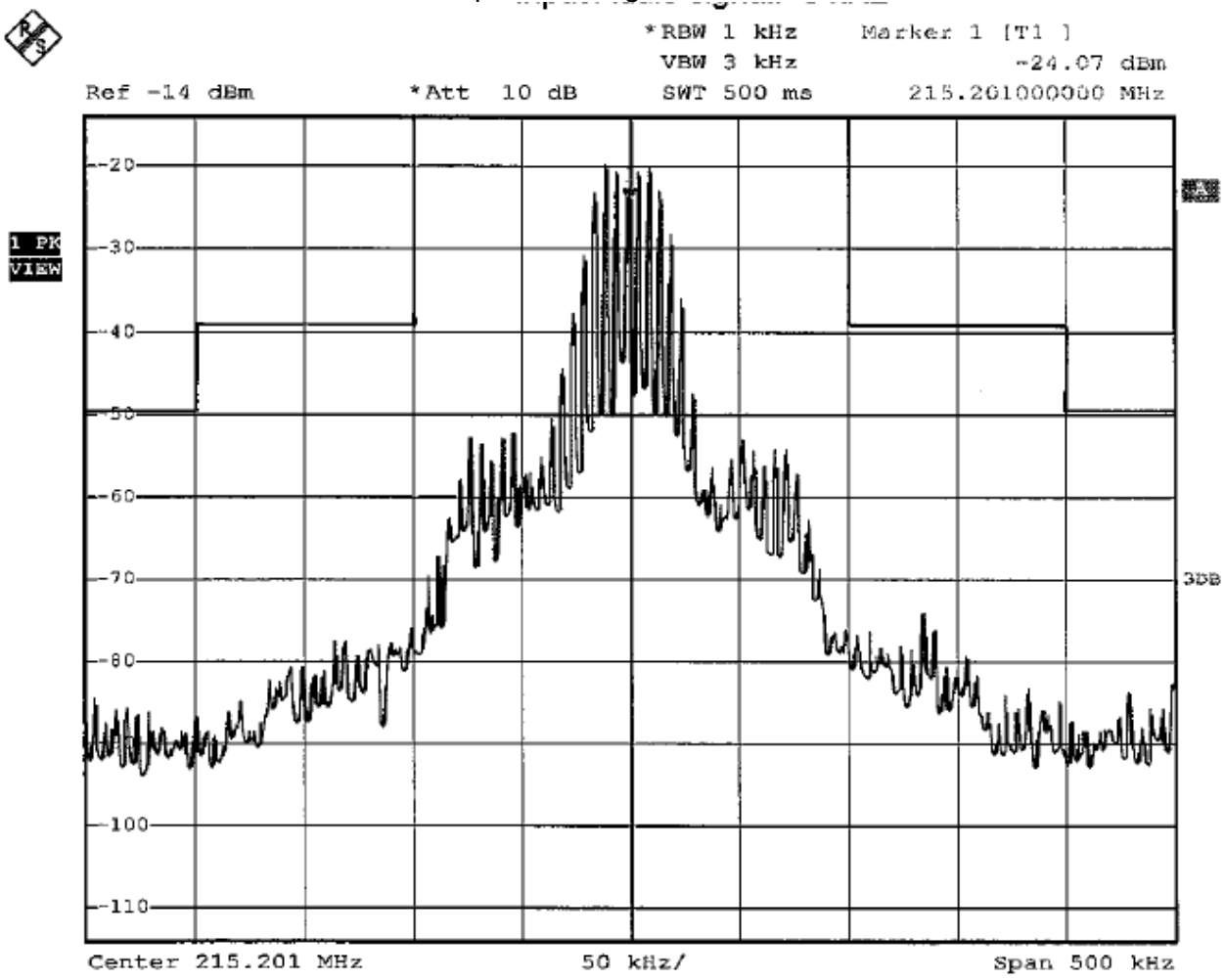
Input Audio signal: 2 kHz



down 3dB

Date: 16.DEC.2008 00:35:22

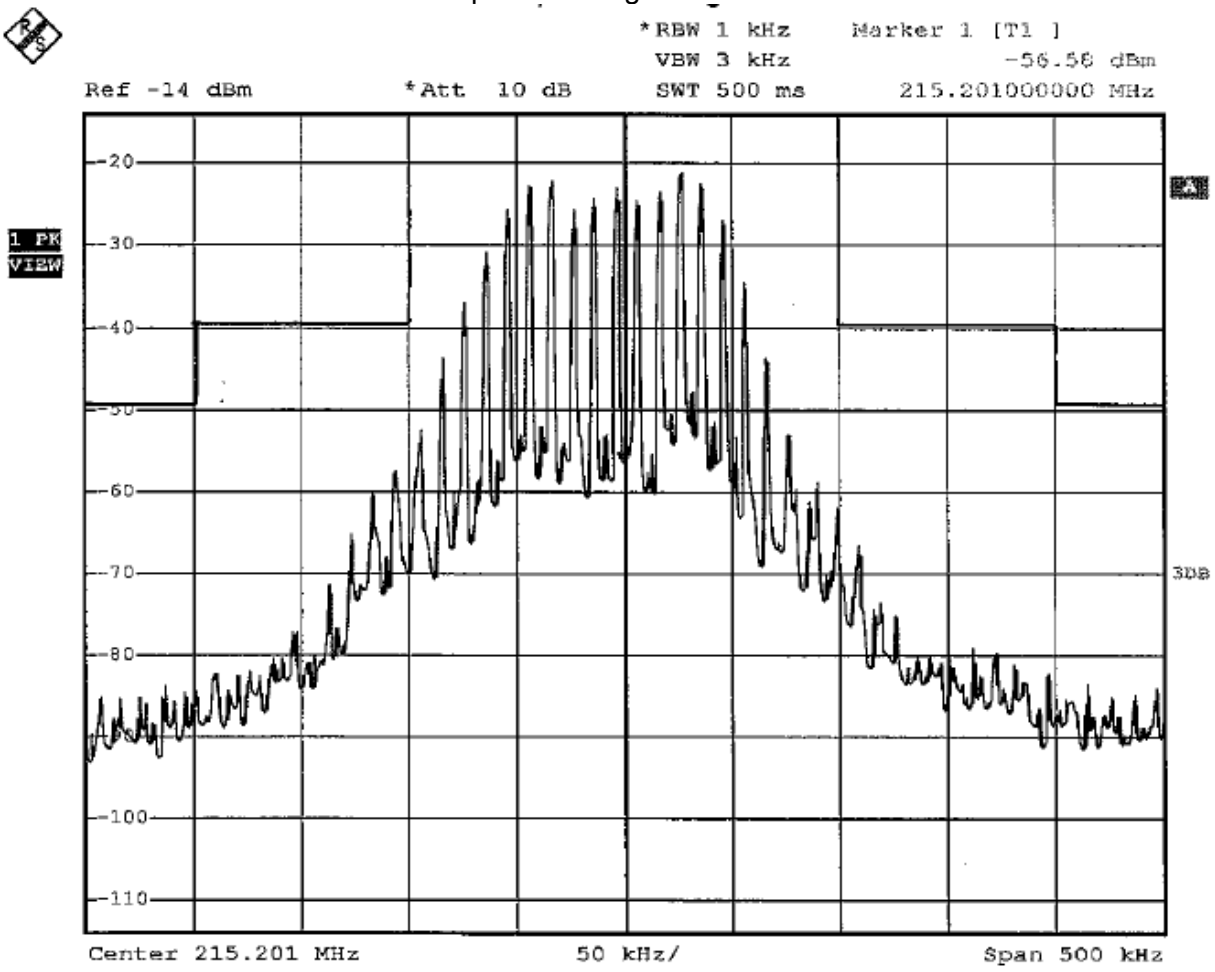
Input Audio signal: 5 kHz



down 3dB

Date: 16.DEC.2008 00:36:28

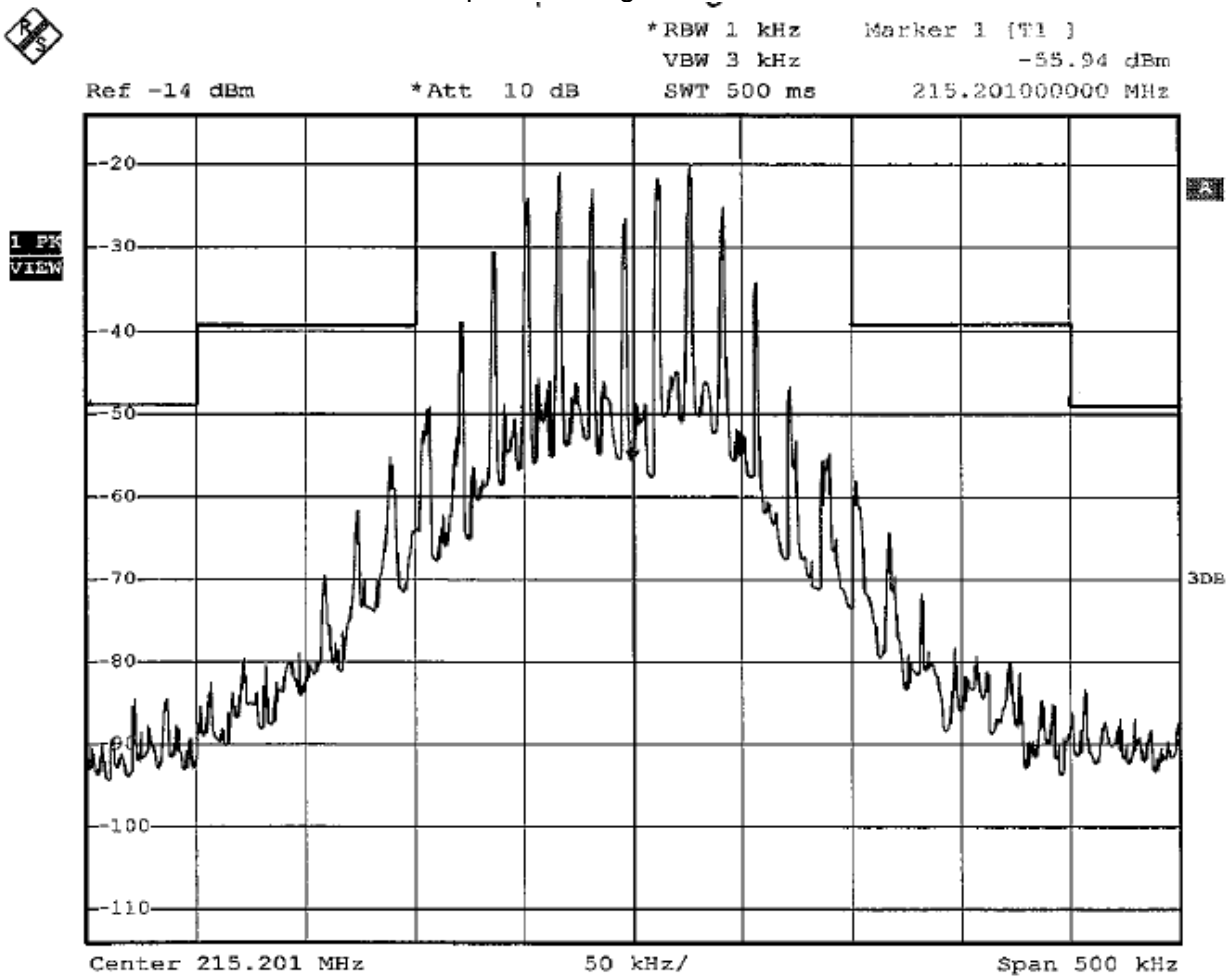
Input Audio signal: 9 kHz



down 3dB

Date: 16.DEC.2008 00:37:34

Input Audio signal: 14 kHz

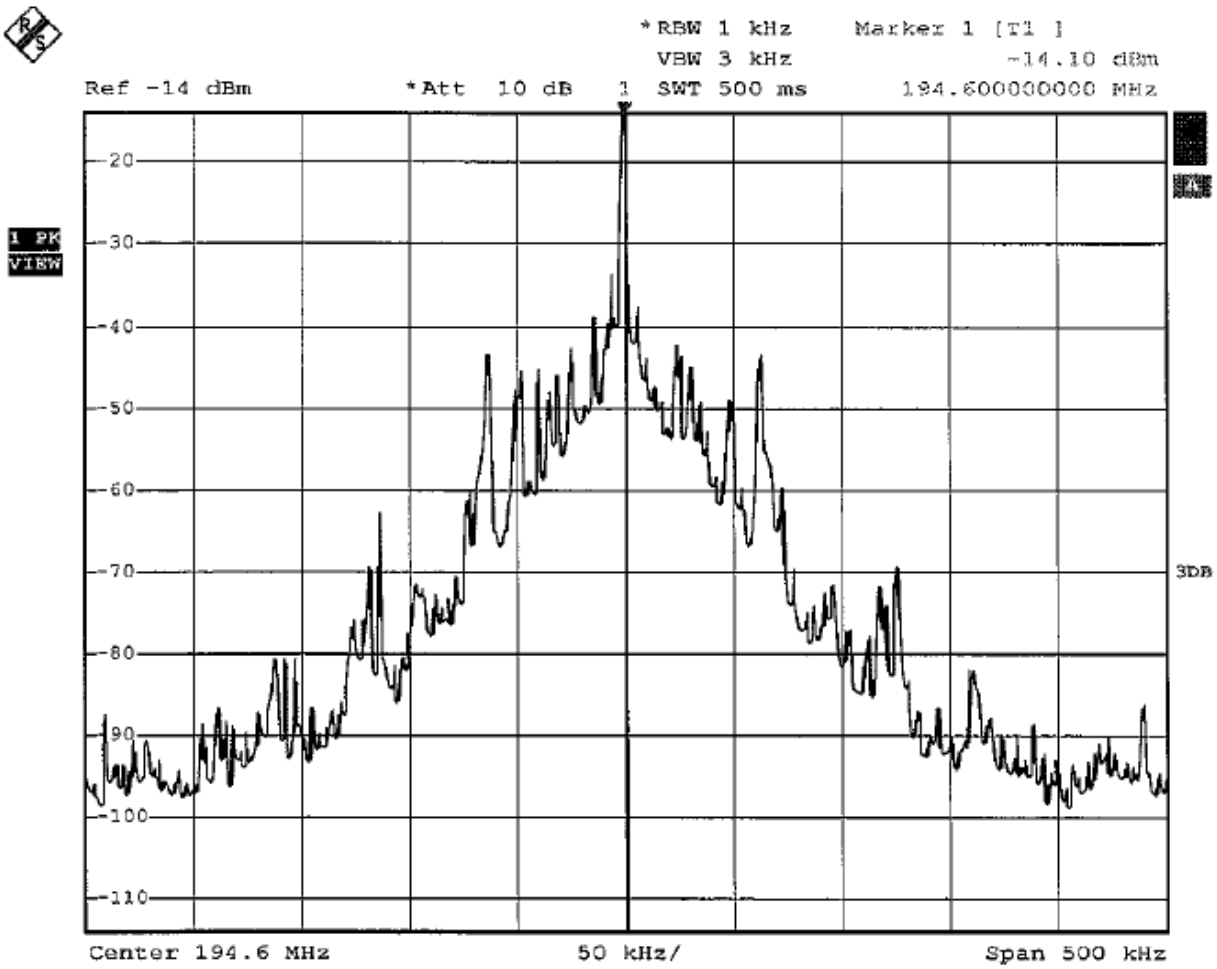


down 3dB

Date: 16.DEC.2008 00:38:12

Middle frequency

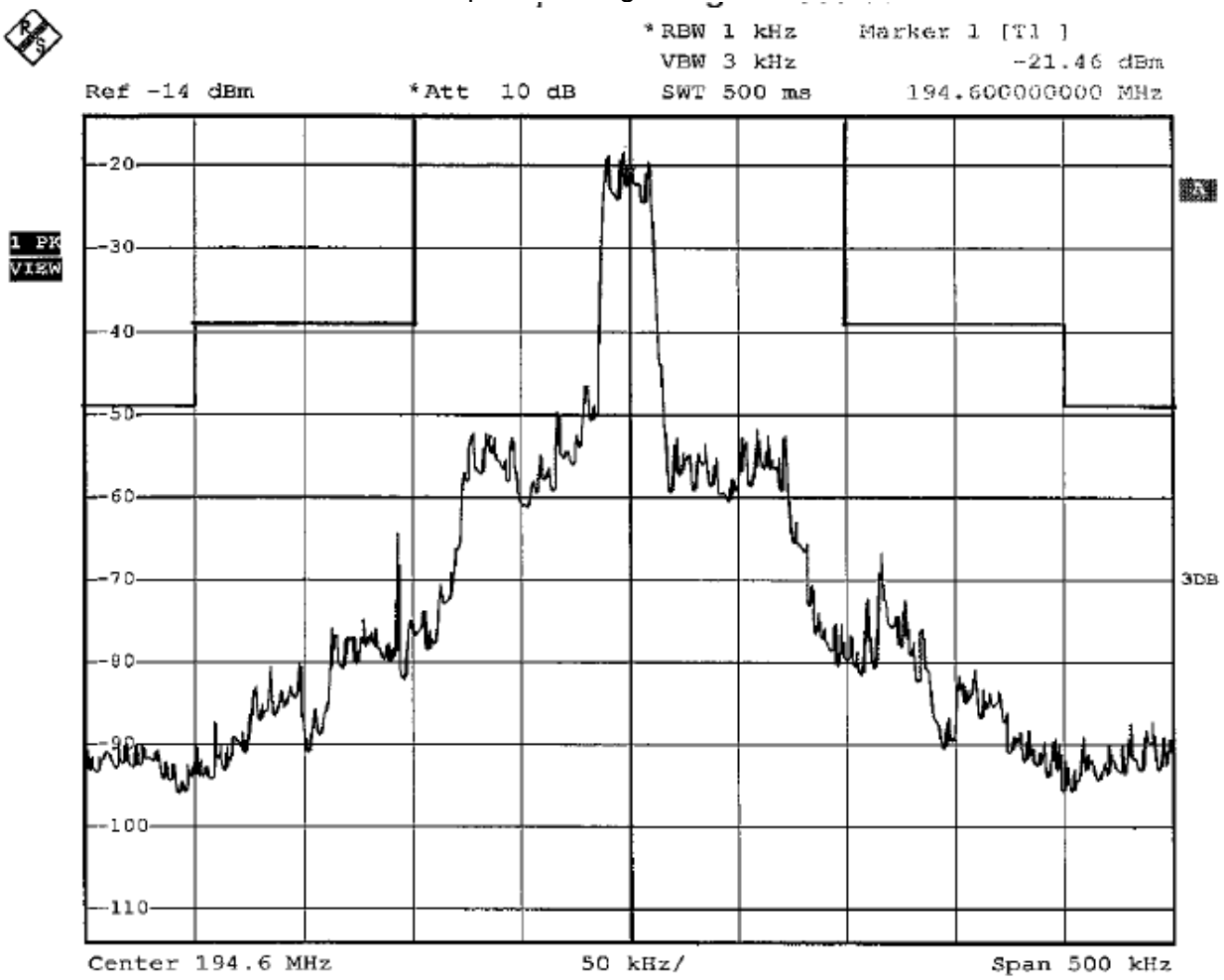
Unmodulated RF carrier



down 3dB

Date: 16.DEC.2008 00:16:55

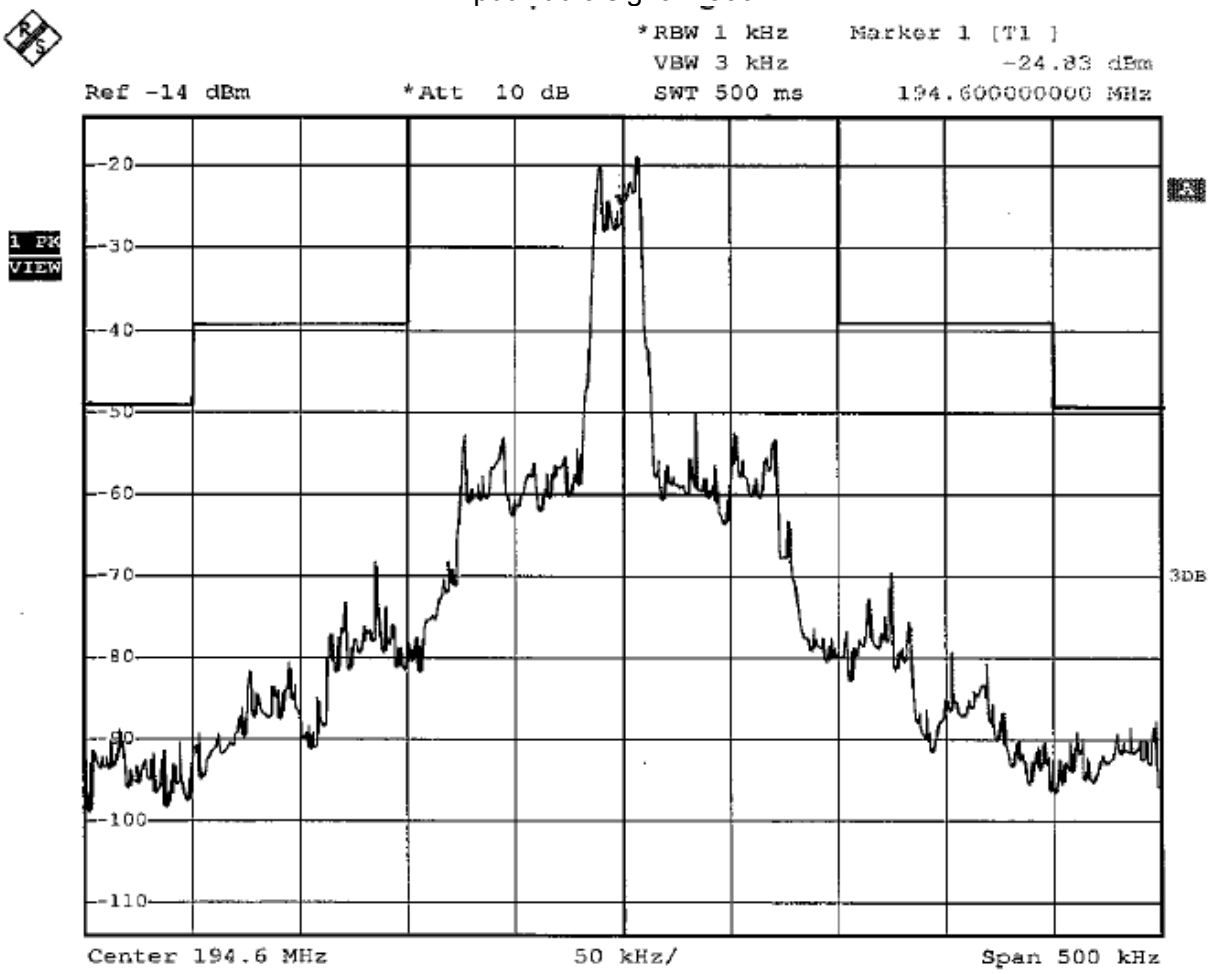
Input Audio signal: 500Hz



down 3dB

Date: 16.DEC.2008 00:22:38

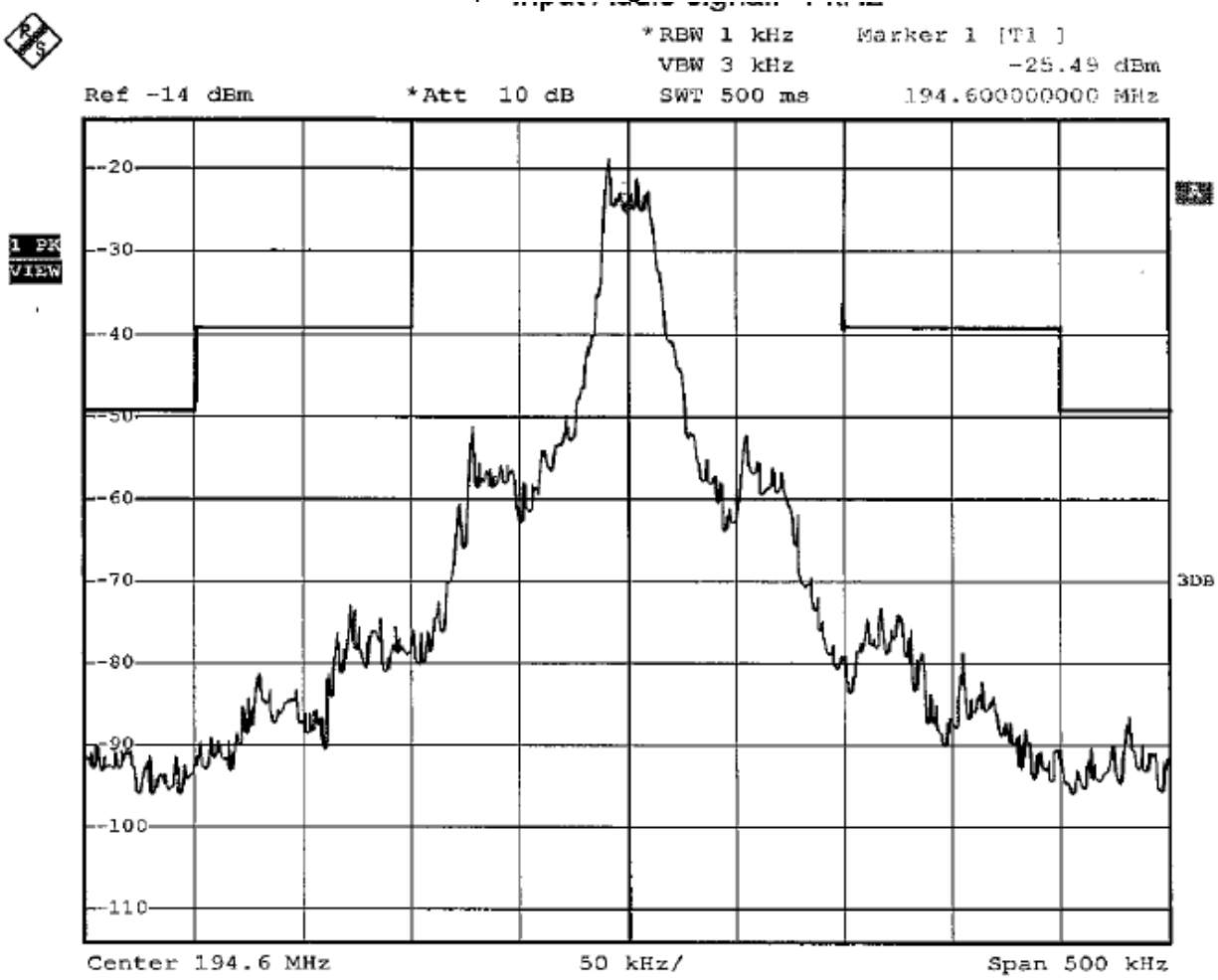
Input Audio signal: 800Hz



down 3dB

Date: 16.DEC.2008 00:22:11

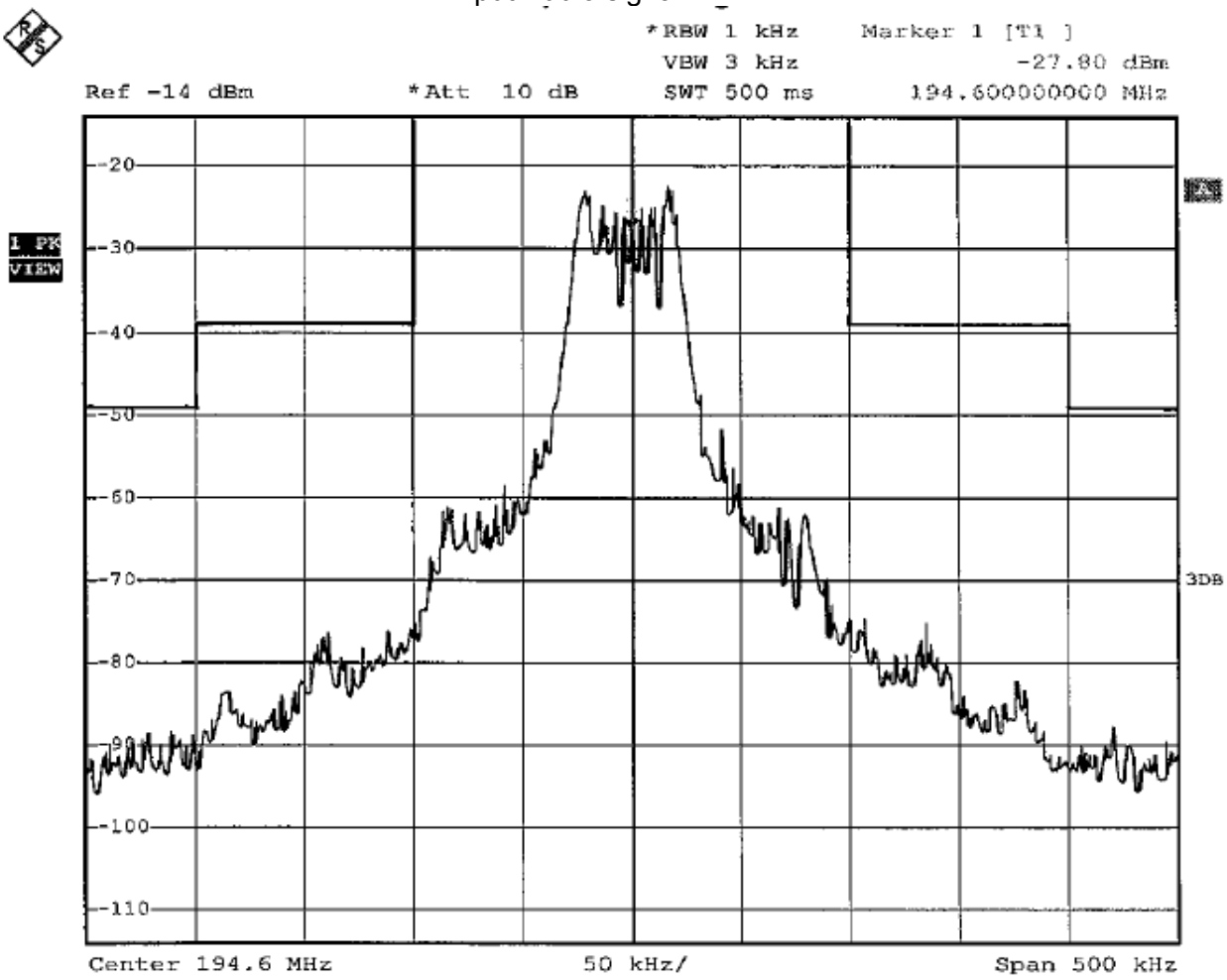
Input Audio signal: 1 kHz



down 3dB

Date: 16.DEC.2008 00:21:41

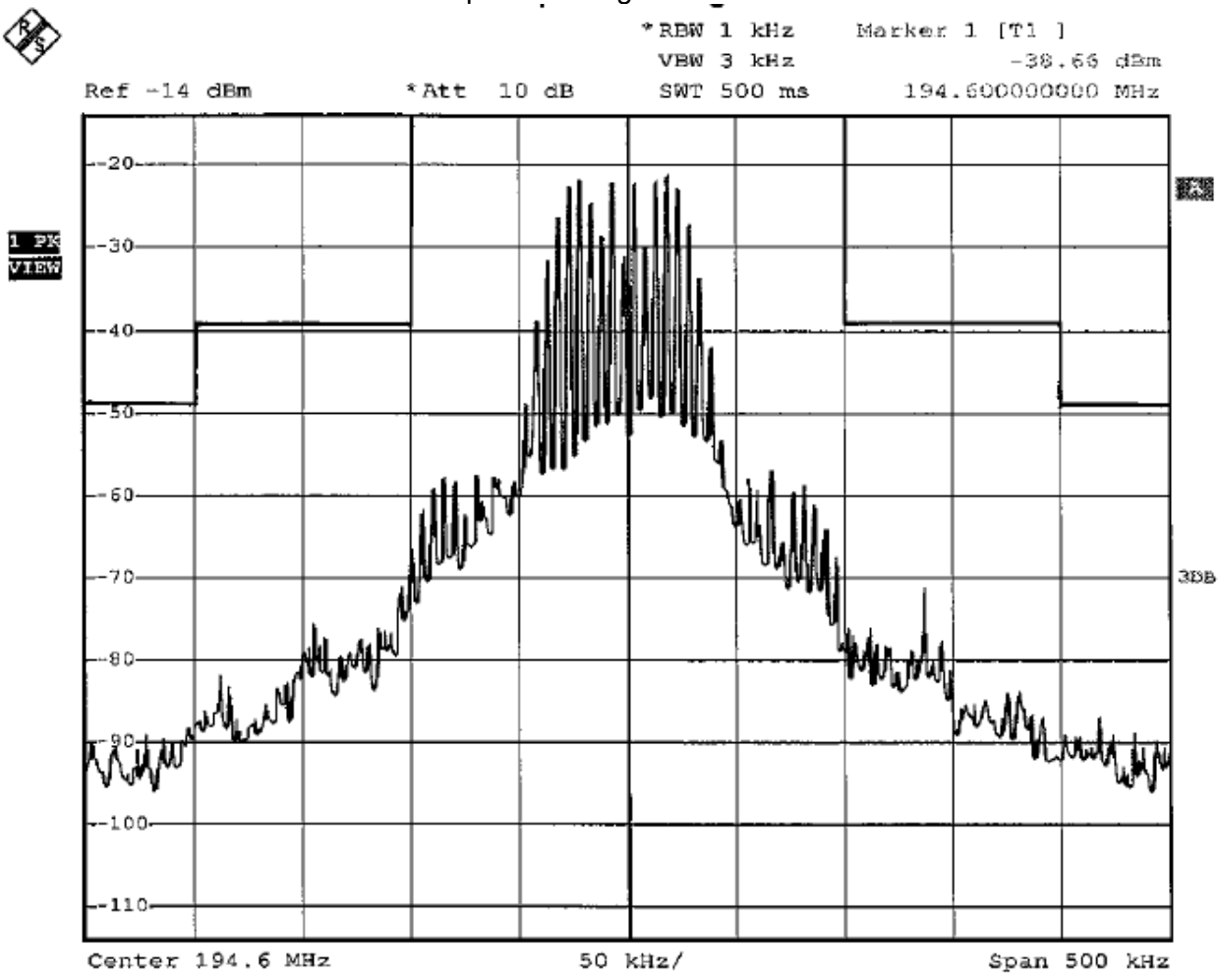
Input Audio signal: 2 kHz



down 3dB

Date: 16.DEC.2008 00:21:17

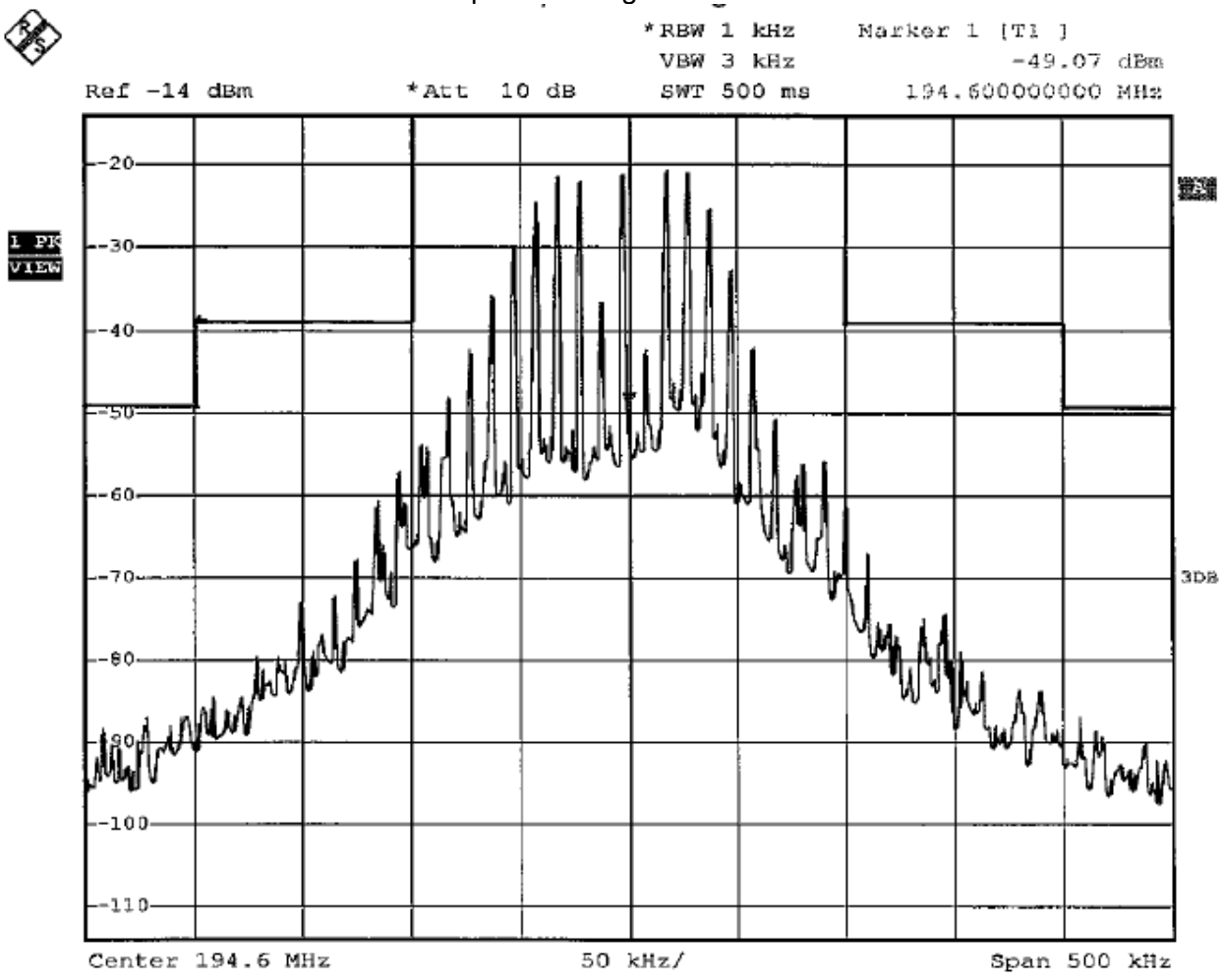
Input Audio signal: 5 kHz



down 3dB

Date: 16.DEC.2008 00:20:23

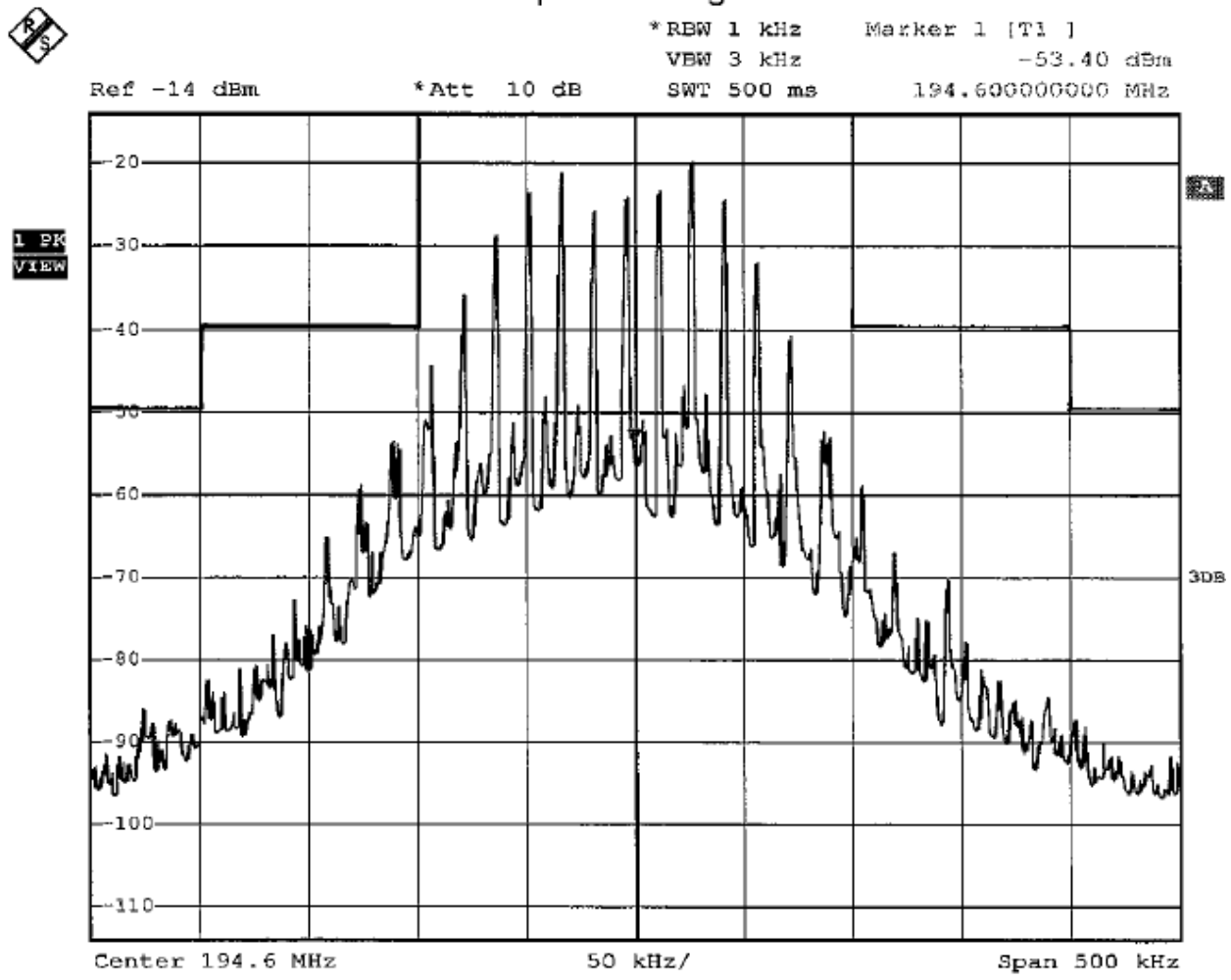
Input Audio signal: 9 kHz



down 3dB

Date: 16.DEC.2008 00:18:40

Input Audio signal: 14 kHz

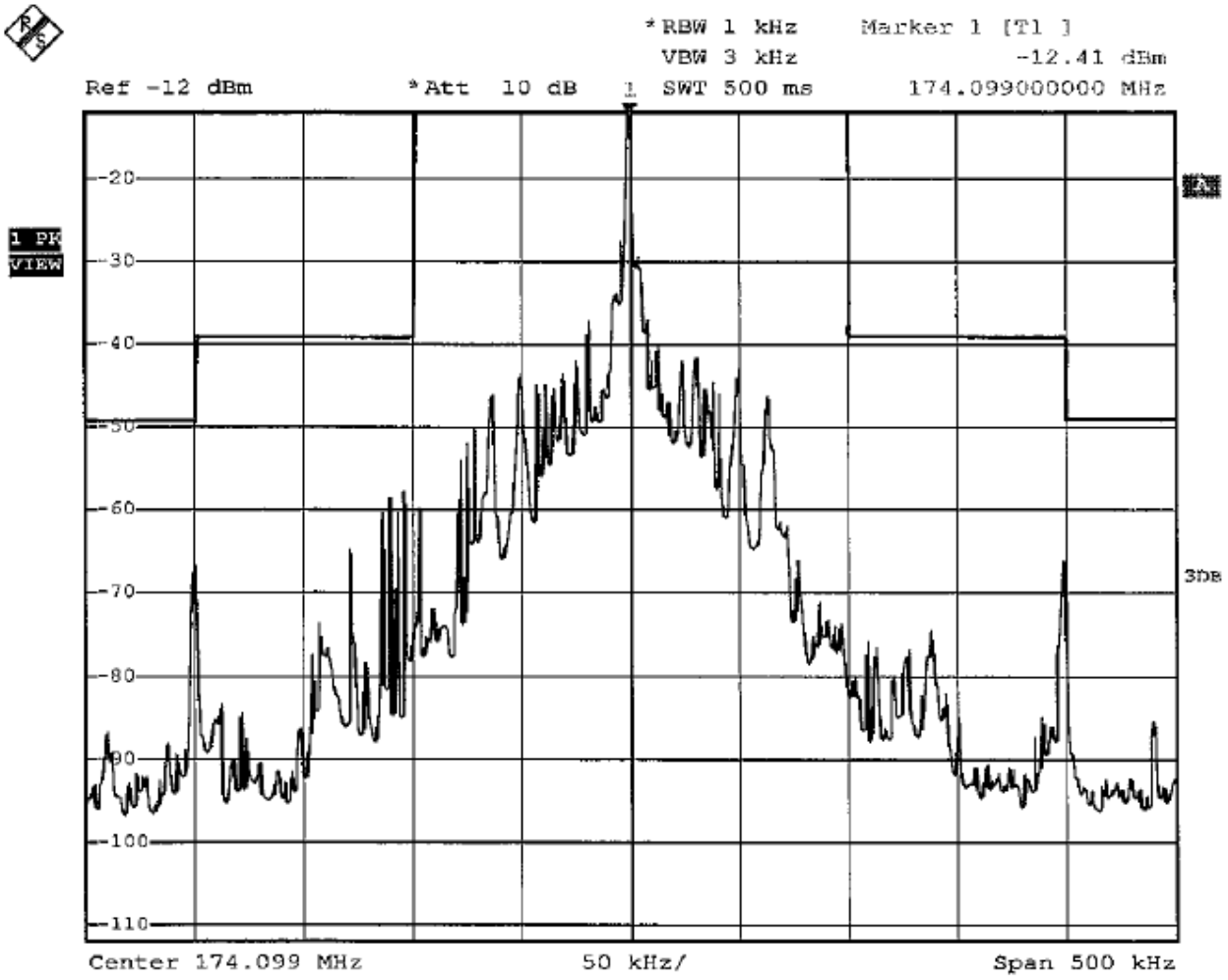


down 3dB

Date: 16.DEC.2008 00:18:12

Low frequency

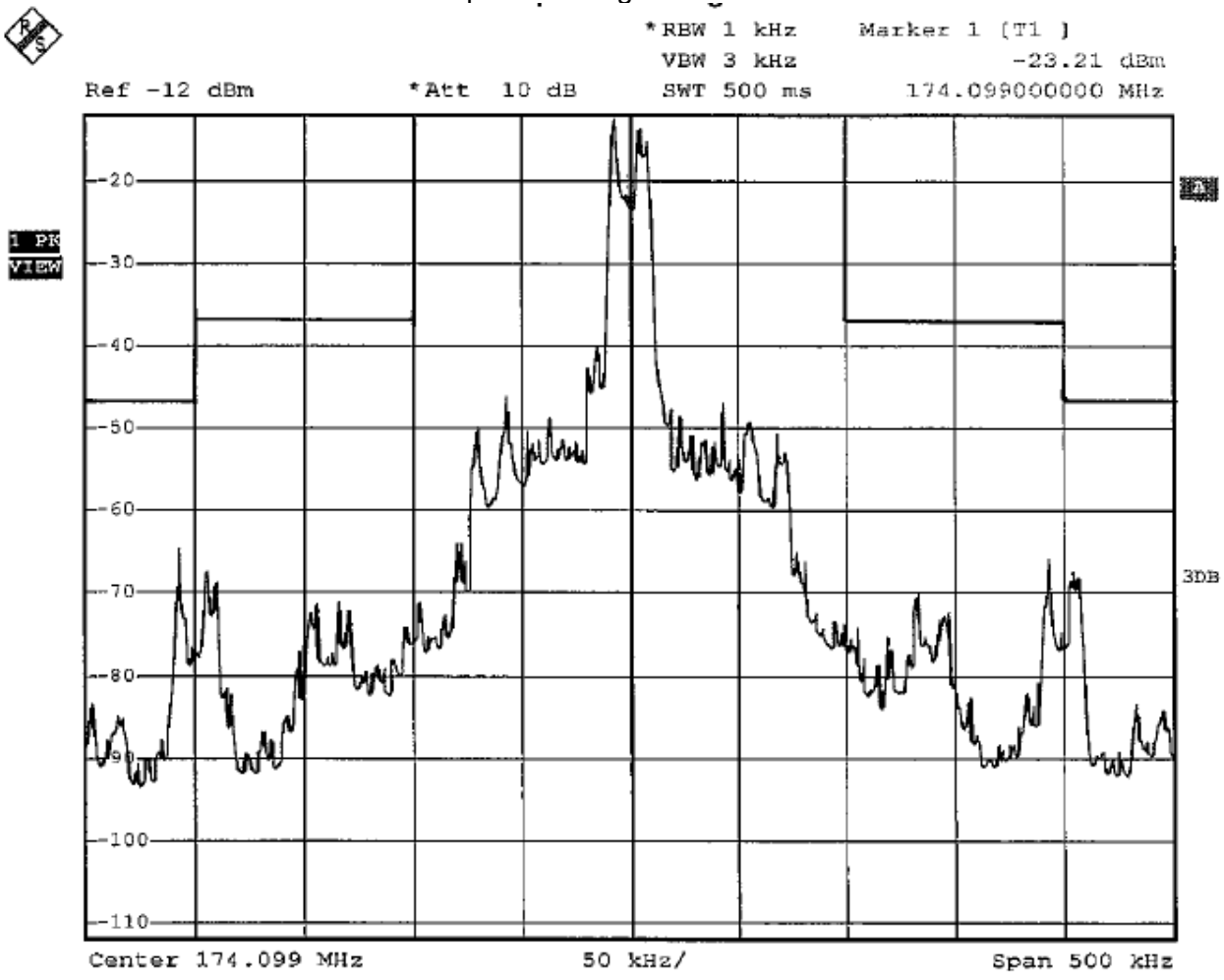
Unmodulated RF carrier



down 3dB

Date: 15.DEC.2008 22:55:39

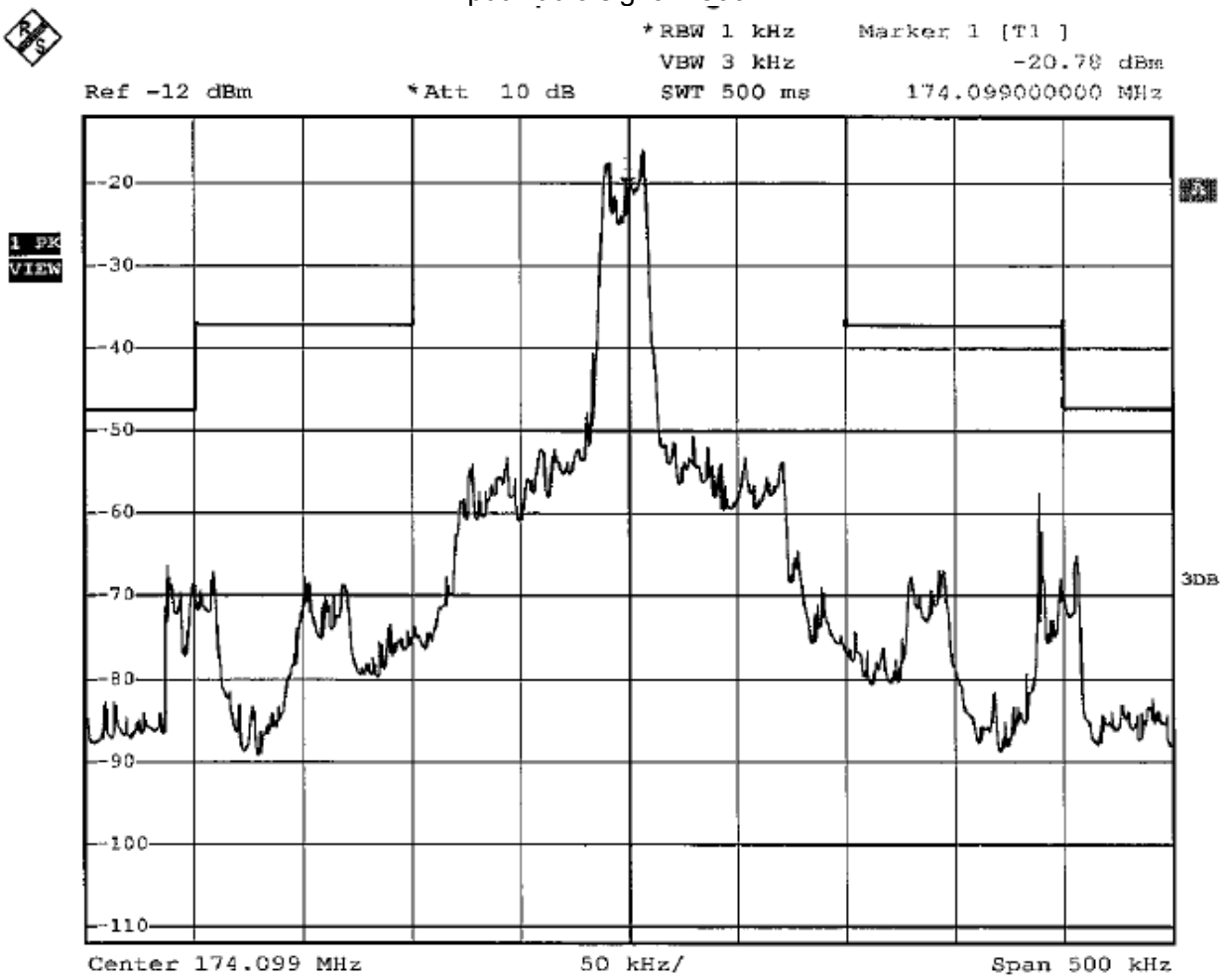
Input Audio signal: 500Hz



down 3dB

Date: 15.DEC.2008 22:58:22

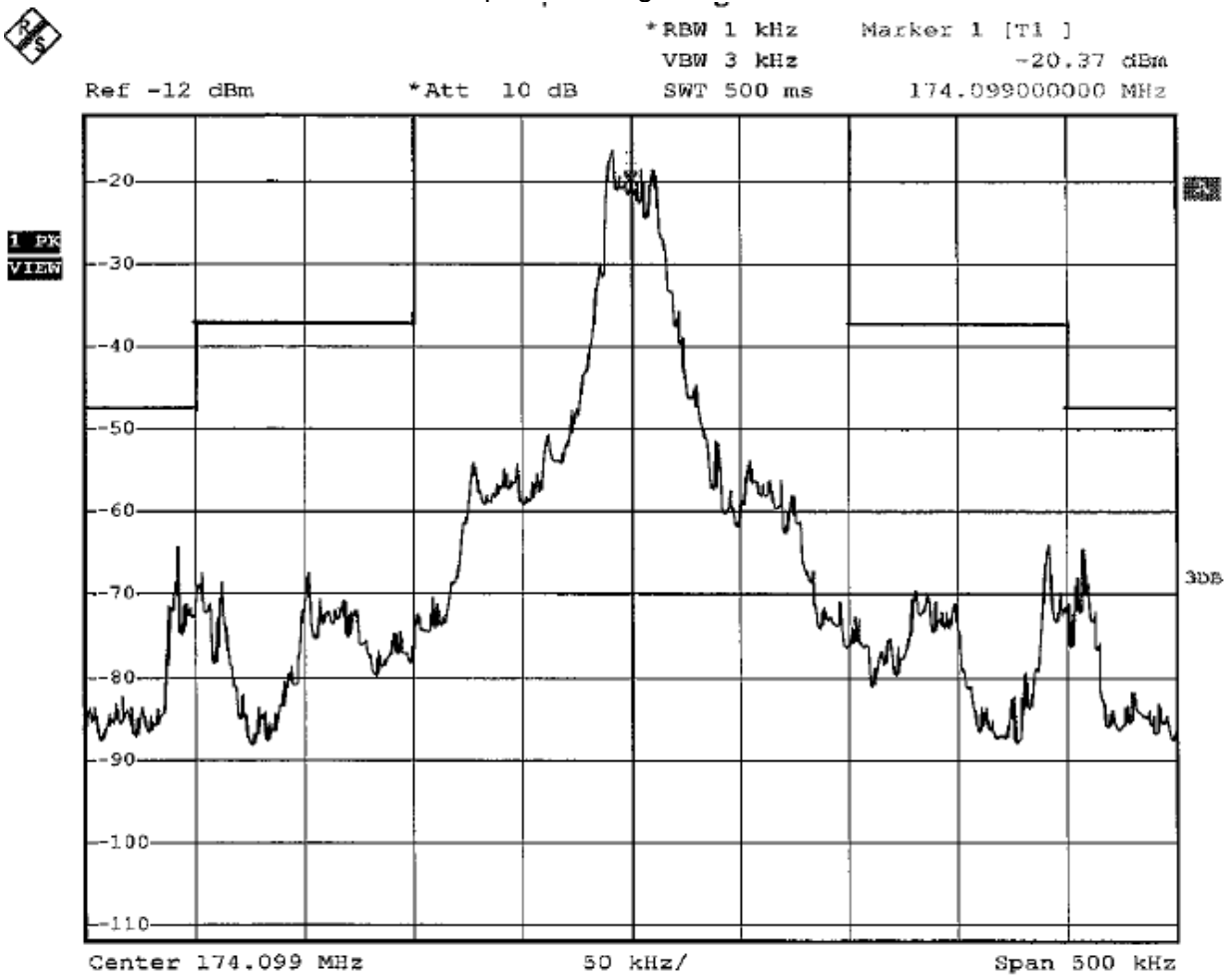
Input Audio signal: 800Hz



down 3dB

Date: 15.DEC.2008 22:59:54

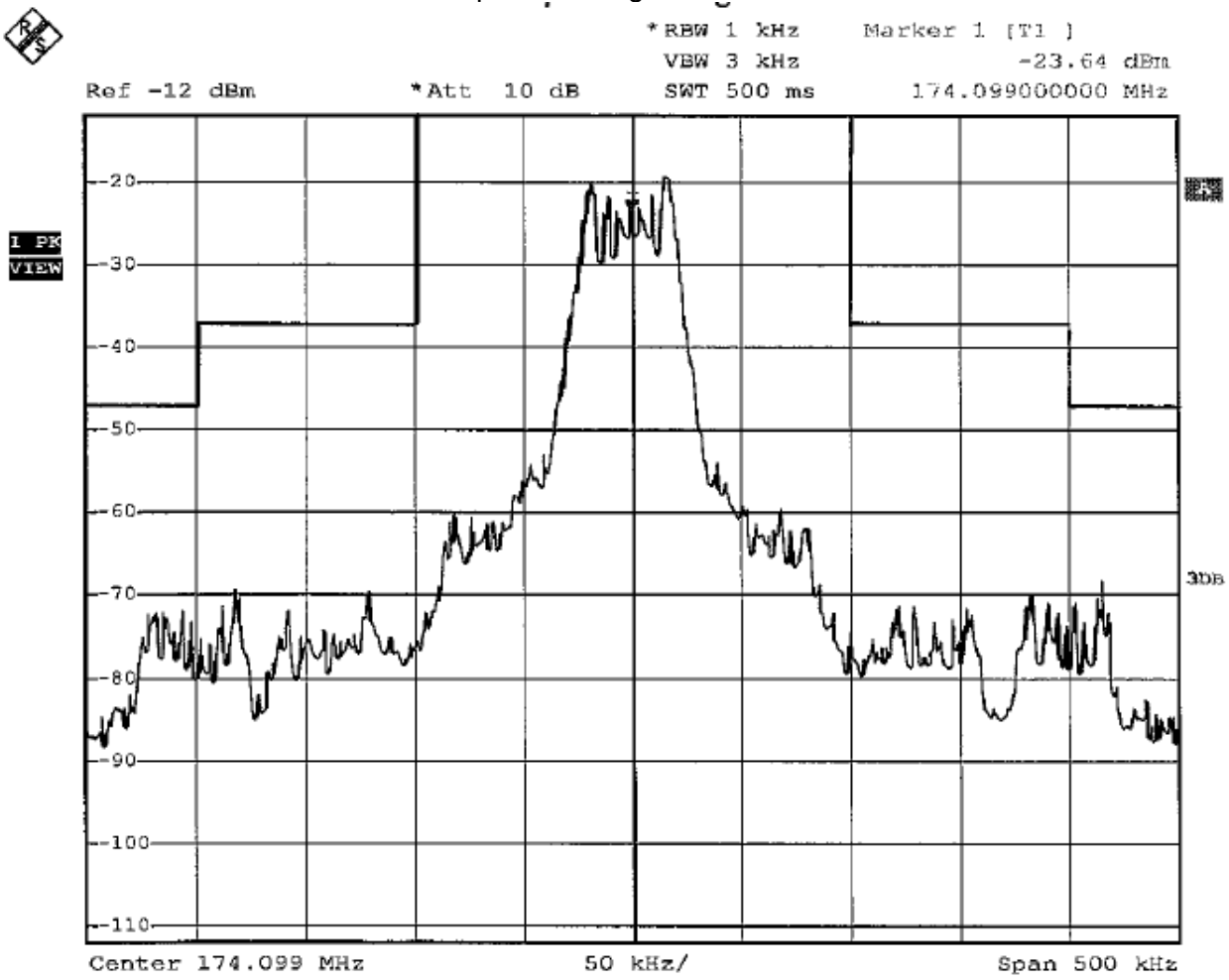
Input Audio signal: 1 kHz



down 3dB

Date: 15.DEC.2008 23:00:29

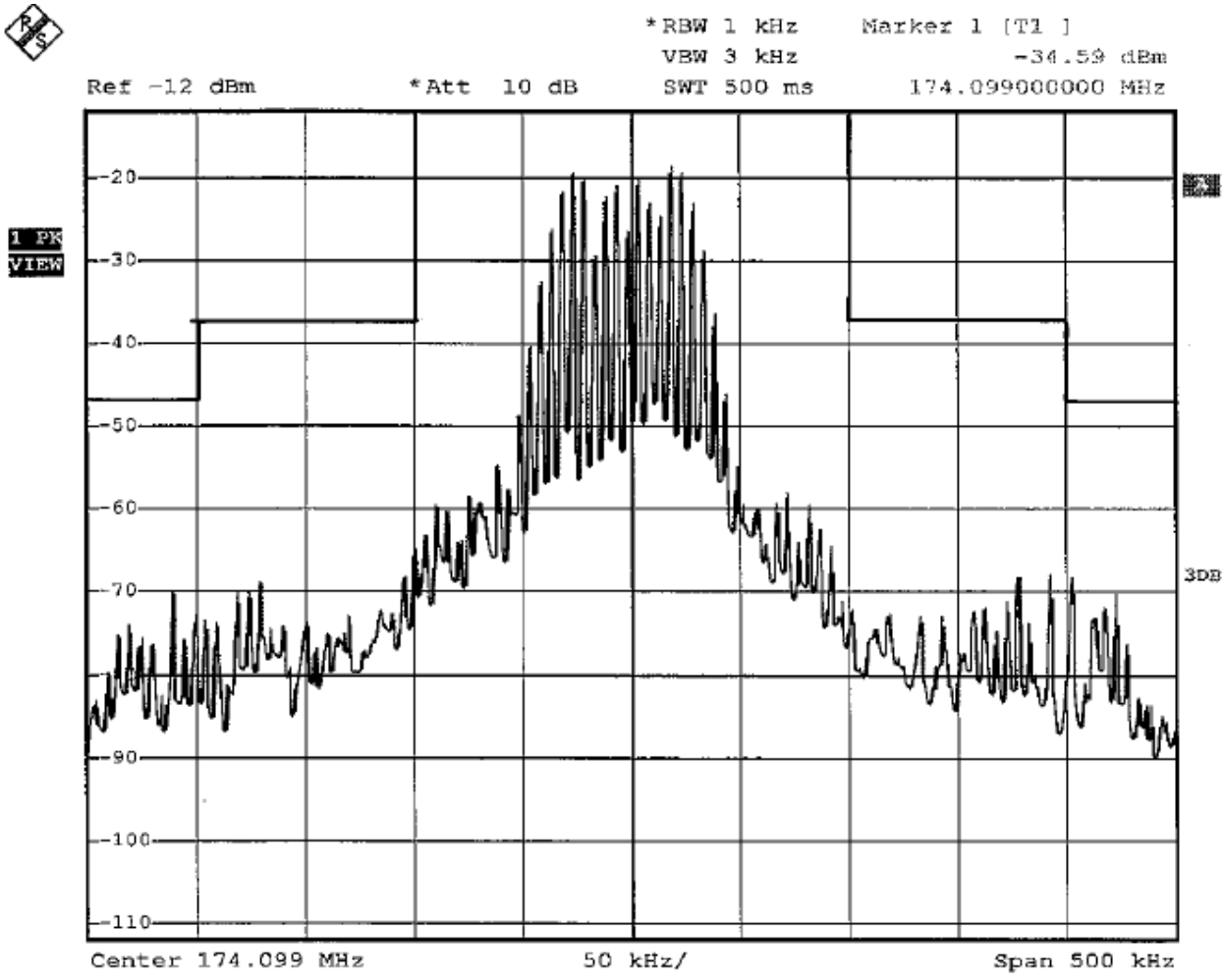
Input Audio signal: 2 kHz



down 3dB

Date: 15.DEC.2008 23:00:59

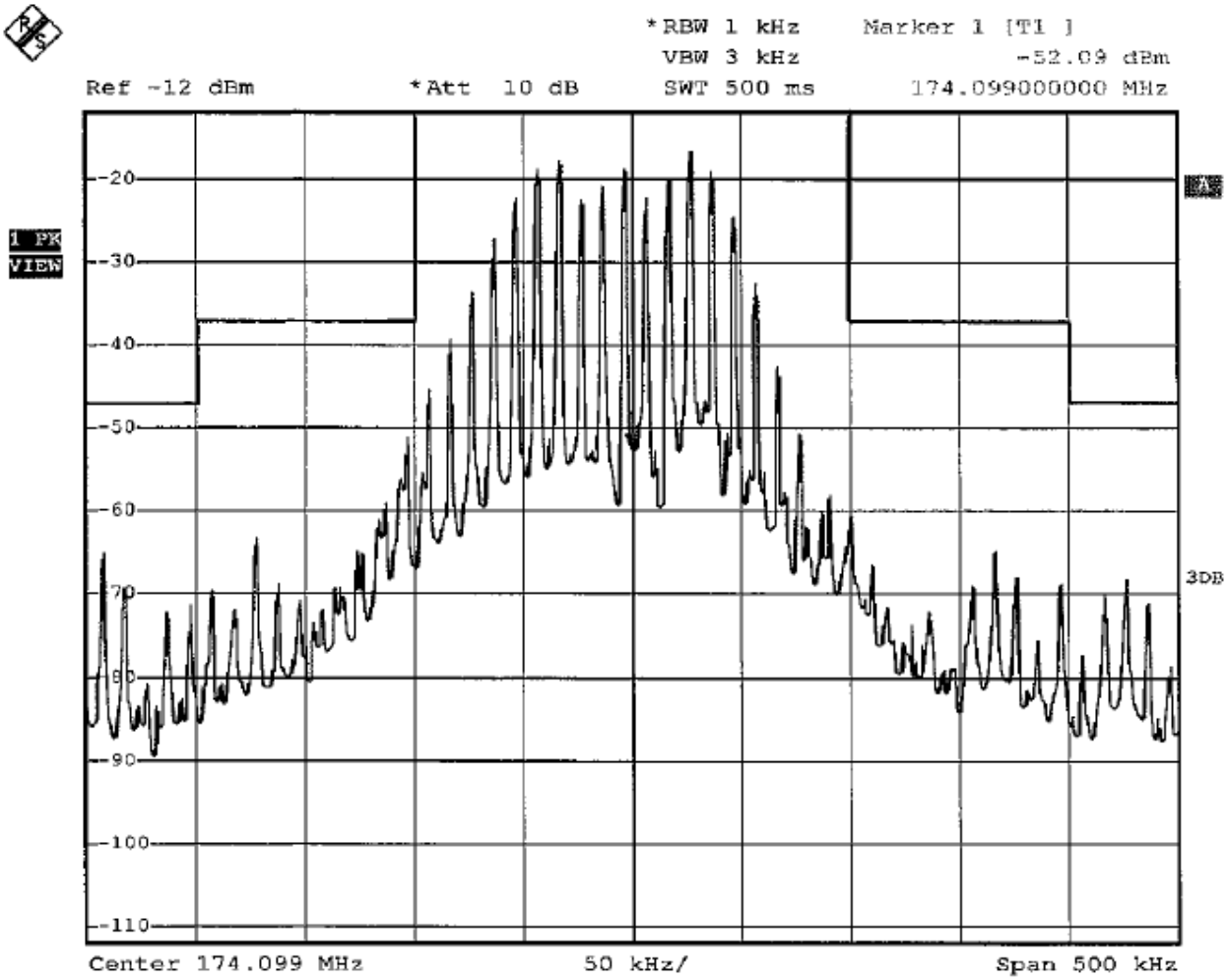
Input Audio signal: 5 kHz



down 3dB

Date: 15.DEC.2008 23:02:21

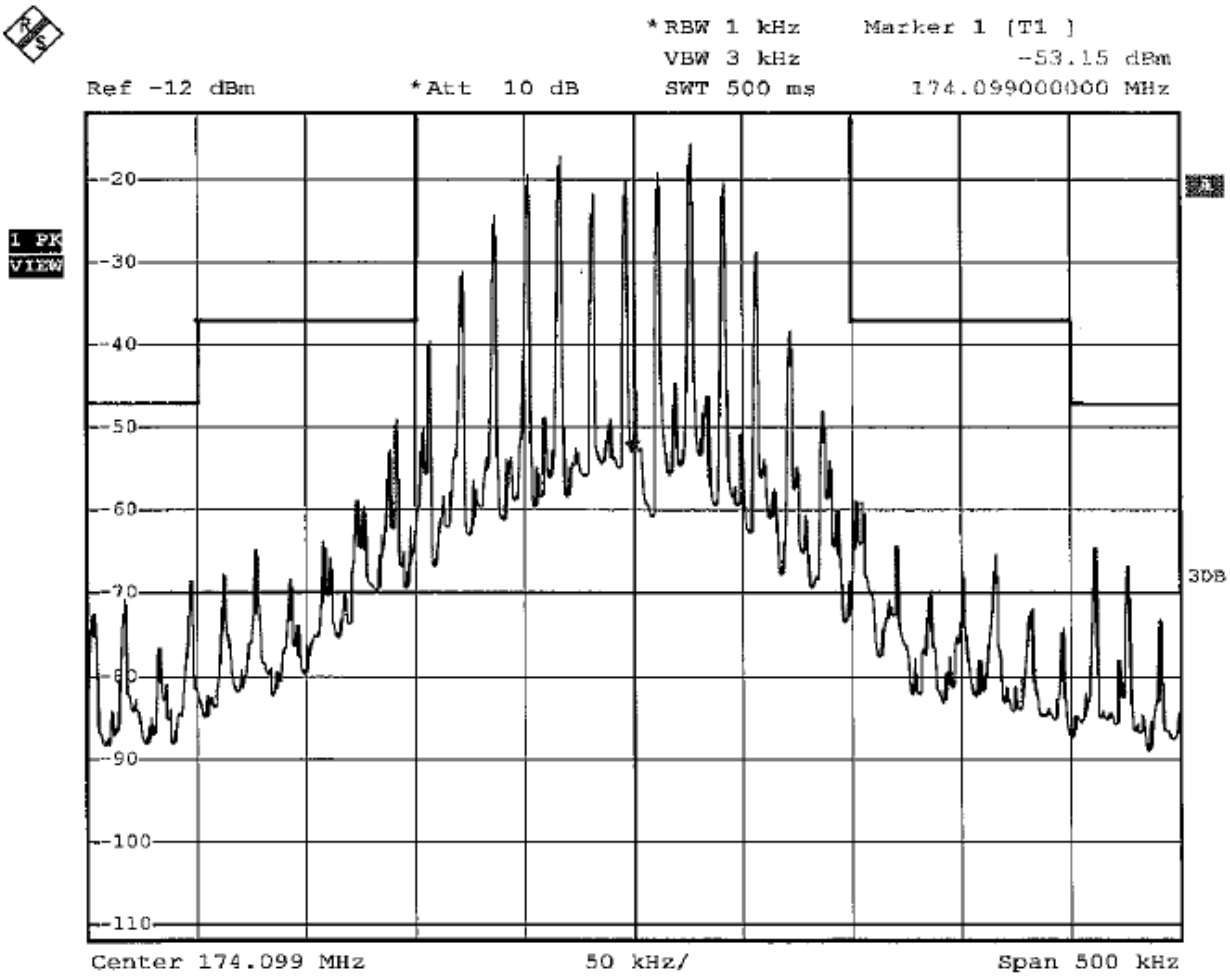
Input Audio signal: 9 kHz



down 3dB

Date: 15.DEC.2008 23:04:04

Input Audio signal: 14 kHz

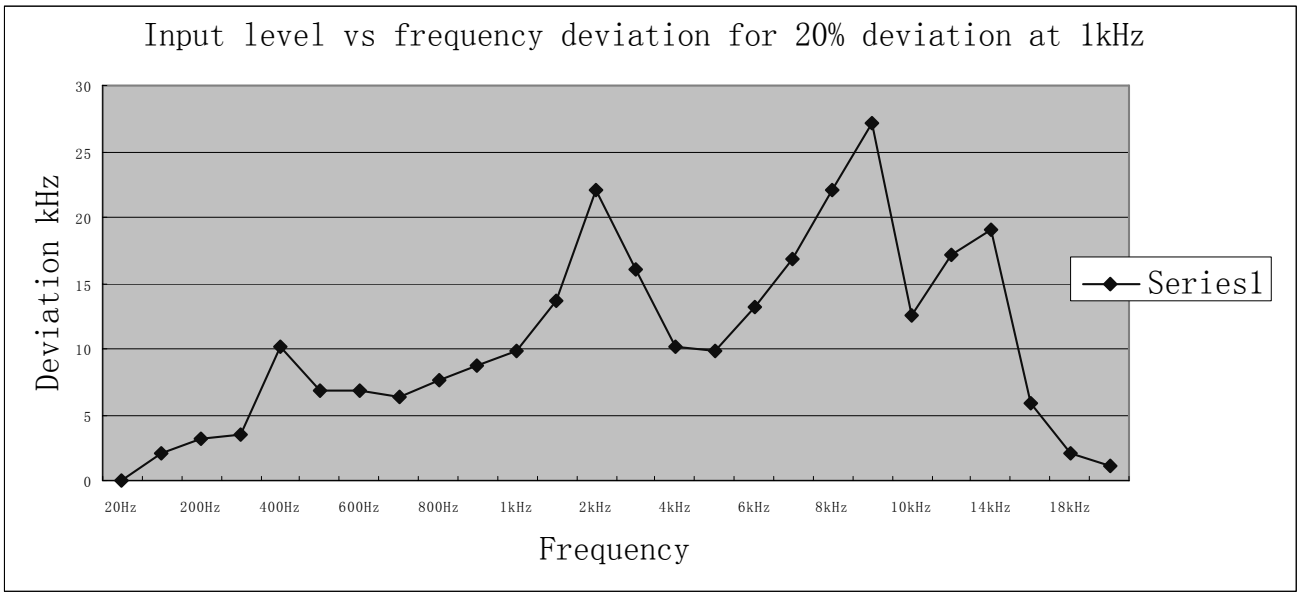


down 3dB

Date: 15.DEC.2008 23:04:40

Modulation characteristics:

Frequency (Hz)	Deviation (kHz)
100	2.1
200	3.1
300	3.5
400	10.1
500	6.8
600	6.8
700	6.4
800	7.6
900	8.7
1000	9.8
1500	13.5
2000	22.1
3000	16.0
4000	10.1
5000	9.8
6000	13.2
7000	16.8
8000	22.1
9000	27.2
10000	12.5
12000	17.1
13000	12.5
14000	19.0
15000	11.1
16000	5.8
17000	3.1
18000	2.1
19000	1.1
20000	1.1


Input level vs frequency deviation for 20% deviation at 1kHz
Deviation kHz
30
25
20
15
10
5
0
20Hz
200Hz
400Hz
600Hz
800Hz
1kHz
2kHz
4kHz
6kHz
8kHz
10kHz
14kHz
18kHz
Frequency
Series1

Modulation (dB)		-20	-10	0	5	15	20
800Hz	kHz	4.1	7.6	11.7	19.1	22.1	22.3
1kHz	kHz	8.2	10.5	17.3	20.5	26.5	28.4
2kHz	kHz	18.3	22.1	37.5	51.2	65.3	66.1
5kHz	kHz	9.5	11.6	19.6	22.8	38.5	39.1
8kHz	kHz	15.2	19.8	36.7	43.4	58.2	59.6
9kHz	kHz	18.5	23.1	39.8	49.2	62.4	63.8
14kHz	kHz	11.9	13.9	25.7	32.6	32.6	32.3