Measurement of RF Interference from a Model LRS-760 Transceiver

For	:	Freewave Technologies Inc Boulder, CO 80301
P.O. No.	:	28922
Date Tested	:	October 15 through November 6, 2008
Test Personnel	:	Richard King
Specification	:	FCC "Code of Federal Regulations" Title 47 Part 27, Subpart C

Test Report By : Richard King

Approved By : Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

Elite Electronic Engineering Inc.
1516 Centre Circle
Downers Grove, IL 60515
Tel : (630) 495-9770
Fax: (630) 495-9785
www.elitetest.com

TABLE OF CONTENTS

REVISION HISTORY

Revision	Date	Description
—	Nov. 24, 2008	Initial release

Measurement of RF Emissions from a Transceiver LRS-760 Transmitter

1 INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a model Transceiver, Part No. LRS-760 , Serial No. 700-0047 transmitter, (hereinafter referred to as the test item). The test item was designed to transmit at approximately Transmitter Frequency using an internal. The test item was manufactured and submitted for testing by Freewave Technologies Inc located in Boulder, CO.

1.2 Purpose

The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 27, Subpart C for Miscellaneous Wireless Communications Services. Testing was performed in accordance with ANSI C63.4-2003 and TIA-603-C-2004.

1.3 Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

1.5 Laboratory Conditions

The temperature at the time of the test was 22.5°C and the relative humidity was 29%.

2 APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 27, Subpart C dated 1 October 2007
- ANSI C63.4-2003, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- TIA-603-C-2004, “Land Mobile FM or PM – Communications Equipment – Measurement and Performance Standards”

3 TEST ITEM SETUP AND OPERATION

3.1 General Description

The test item is a Transceiver, Part No. LRS-760. A block diagram of the test item setup is shown as Figure 1.

3.1.1 Power Input

A Sceptre AC Adaptor, P/N: PS-1230APL6A, M/N: SA-036121A-3, was used to provide 12VDC to the test item via a 1.85 meter long 2 wire power cable. The Sceptre AC Adaptor was powered with 115V, 60Hz via a 1.7 meter long 3 wire power cable. Each primary lead was connected through a line impedance stabilization network (LISN) which was located on the copper ground plane. The network complies with the requirements of

Paragraph 4.1.2 of ANSI C63.4-2003.

3.1.2 Peripheral Equipment

The following peripheral equipment was submitted with the test item:

Item	Description
Laptop Computer	Sony Vaio Laptop MN: PCG-8N2L PN: 28398098 SN: 3000478

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the test item:

Item	Description
85 cm long cable harness	10 wire, 85 cm long cable. Eight (8) of those wires went to the serial port of the laptop computer. The other two (2) wires went to the output of the Sceptre AC Adaptor and were used to provide 12VDC power to the test item.

3.1.4 Grounding

The test item was ungrounded during testing.

3.2 Operational Mode

For all tests the test item and all peripheral equipment were placed on an 80cm high non-conductive stand. The test item and all peripheral equipment were energized.

For all transmitter tests, the test item was set to transmit separately at 757.5MHz, and 787.5MHz.

3.3 Test Item Modifications

No modifications were required for compliance to the FCC Part 27.

4 TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1. All equipment was calibrated on a regular basis. All calibrations are traceable to national standards.

4.3 Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

Conducted Emission Measurements		
Combined Standard Uncertainty	1.07	-1.07

Expanded Uncertainty (95% confidence)	2.1	-2.1

Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5 TEST PROCEDURES

5.1 Powerline Conducted Emissions

5.1.1 Requirements

There are no requirements for conducted emissions.

5.2 Output Power

5.2.1 Requirements

Per 27.50 (b)(1), Fixed and base stations transmitting a signal in the 746–747 and 762–764 MHz bands must not exceed an effective radiated power (ERP) of 1000 watts.

5.2.2 Procedures

The test item was set to transmit at 757.5 MHz. The data rate set to 0.

a) The antenna port of the test item was connected to a spectrum analyzer through a 30 dB attenuator.
b) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - center frequency = 757.5MHz and 787.5MHz
   - resolution bandwidth = 1MHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold
c) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
d) Steps (a) through (c) were repeated with the data rate set to 1.
e) Steps (a) through (c) were repeated with the data rate set to 2.
f) Steps (a) through (c) were repeated with the data rate set to 3.
g) Steps (a) through (c) were repeated with the data rate set to 4.
h) Steps (a) through (c) were repeated with the data rate set to 5.
i) The test item was set to transmit at 757.5 MHz. The data rate set to 0.
j) Steps (a) through (c) were repeated with the data rate set to 1.
k) Steps (a) through (c) were repeated with the data rate set to 2.
l) Steps (a) through (c) were repeated with the data rate set to 3.
m) Steps (a) through (c) were repeated with the data rate set to 4.
n) Steps (a) through (c) were repeated with the data rate set to 5.

5.2.3 Results

The conducted output power measurements are presented on page 16. As can be seen from the data, the test item is rated as a 2 watt transmitter and was within 20% of the manufacturer's rating. The ERP limit is 1000 watts however the actual ERP power of the test item will be determined at the time of licensing.

5.3 Emissions Limits

5.3.1 Requirements

Per 27.53, for operations in the 747 to 762 MHz band and the 777 to 792 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(c)(1) On any frequency outside the 747 to 762 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(c)(2) On any frequency outside the 777 to 792 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(c)(3) On all frequencies between 764 to 776 MHz and 794 to 806 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

5.3.2 Procedures

5.3.2.1 Antenna Conducted Emissions

For testing to paragraph (c)(1). The test item was set to transmit at 757.5 MHz. The data rate set to 0.

a) The antenna port of the test item was connected to a spectrum analyzer through a 40 dB attenuator.
b) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - start frequency = 30MHz
   - Stop Frequency = 1000MHz
   - resolution bandwidth = 100kHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold
   - display line set to 43+10 LOG (P).
c) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
d) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - start frequency = 1000MHz
   - Stop Frequency = 8000MHz
   - resolution bandwidth = 1MHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold

- display line set to 43+10 LOG (P).

e) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
f) Steps (a) through (e) were repeated with the data rate set to 1.
g) Steps (a) through (e) were repeated with the data rate set to 2.
h) Steps (a) through (e) were repeated with the data rate set to 3.
i) Steps (a) through (e) were repeated with the data rate set to 4.
j) Steps (a) through (e) were repeated with the data rate set to 5.

For testing to paragraph (c)(2). The test item was set to transmit at 787.5 MHz. The data rate set to 0.

a) The antenna port of the test item was connected to a spectrum analyzer through a 40 dB attenuator.
b) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - start frequency = 30MHz
   - Stop Frequency = 1000MHz
   - resolution bandwidth = 100kHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold
   - display line set to 43+10 LOG (P).
c) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
d) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - start frequency = 1000MHz
   - Stop Frequency = 8000MHz
   - resolution bandwidth = 1MHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold
   - display line set to 43+10 LOG (P).
e) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
f) Steps (a) through (e) were repeated with the data rate set to 1.
g) Steps (a) through (e) were repeated with the data rate set to 2.
h) Steps (a) through (e) were repeated with the data rate set to 3.
i) Steps (a) through (e) were repeated with the data rate set to 4.
j) Steps (a) through (e) were repeated with the data rate set to 5.

For testing to paragraph (c)(3). The test item was set to transmit at 757.5 MHz. The data rate set to 0.

a) The antenna port of the test item was connected to a spectrum analyzer through a 40 dB attenuator.
b) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - start frequency = 764MHz
   - Stop Frequency = 776MHz
   - resolution bandwidth = 10kHz
   - video bandwidth > resolution bandwidth
   - sweep = Auto

- detector function = peak
- trace = max hold
- display line set to 76 + 10 log (P).

c) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
d) The following spectrum analyzer settings were employed:
- trace 1 = on
- start frequency = 794MHz
- Stop Frequency = 806MHz
- resolution bandwidth = 10kHz
- video bandwidth > resolution bandwidth
- sweep = Auto
- detector function = peak
- trace = max hold
- display line set to 76 + 10 log (P).

e) Several sweeps were made with the settings listed above and a plot of the sweeps was recorded.
f) Steps (a) through (e) were repeated with the data rate set to 1.
g) Steps (a) through (e) were repeated with the data rate set to 2.
h) Steps (a) through (e) were repeated with the data rate set to 3.
i) Steps (a) through (e) were repeated with the data rate set to 4.
j) Steps (a) through (e) were repeated with the data rate set to 5.

5.3.2.1.1 Results

The plots of the antenna conducted output measurements are presented on pages 17 through 52. As can be seen from the data, the test item did not produce conducted spurious emissions in excess of the limits under any data rate condition.

5.3.2.2 Field Strength of Spurious Emissions

All tests were performed in a 32 ft. x 20 ft. x 18 ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4 2003 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

1) Preliminary radiated emissions measurements were first performed using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3 meter distance from the test item. The entire frequency range from 30 MHz to 8 GHz was investigated using a peak detector function. All preliminary tests were performed separately with the test item operating in the transmit at 757.5 MHz mode and transmit at 787.5 MHz mode.

2) All significant broadband and narrowband signals found in the preliminary sweeps were then measured using a peak detector at a test distance of 3 meters. The measurements were made with a tuned dipole or double ridged waveguide antenna over the frequency range of 30 MHz to 8 GHz.

3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

1. The test item was rotated so that all of its sides were exposed to the receiving antenna.
2. Since the measuring antennas are linearly polarized, both horizontal and vertical field components were measured.
3. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

4) The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power a tuned dipole or double ridged waveguide antenna was set in place of the test item and connected to a calibrated signal generator. The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and when the double ridged waveguide antenna was used, increased by the difference in gain between the dipole and the waveguide antenna.

5) In instances were it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer and the antenna cannot be raised to 4 meters. The measuring antenna is raised or lowered as much as the cable will allow and the test item is rotated through all axis to ensure the maximum readings are recorded.

5.3.2.2.1 Results

The preliminary radiated emissions plots are presented on pages 53 through 60. Factors for the antennas and cables were added to the data before it was plotted. This data is only presented for a reference, and is not used as official data.

The final radiated levels are presented on pages 61 through 62. The radiated emissions were measured through the 10th harmonic. As can be seen from the data, all emissions measured from the test item were within the specification limits. Photographs of the test configuration are shown on Figure 3.

5.3.2.3 Band Edge Compliance

a) The antenna port of the test item was connected to a spectrum
b) The transmitter was set to transmit at 757MHz.
c) The following spectrum analyzer settings were employed:
   - trace 1 = on
   - center frequency = lower bandedge 757MHz
   - resolution bandwidth = 500Hz for Data Rate 0 and 1
   - resolution bandwidth = 300Hz for Data Rate 2 and 3
   - resolution bandwidth = 200Hz for Data Rate 4 and 5
   - video bandwidth > resolution bandwidth
   - sweep = Auto
   - detector function = peak
   - trace = max hold
   - display line set to 43 + 10 log (P).
d) The transmitter frequency was then adjusted until the entire transmit emission was within the display line at the bandedge.
e) Several sweeps were made with the settings listed above and a plot of the frequency which passed the emissions limit was recorded.
f) Steps (a) through (e) were repeated with the data rate set to 1.
g) Steps (a) through (e) were repeated with the data rate set to 2.
h) Steps (a) through (e) were repeated with the data rate set to 3.
i) Steps (a) through (e) were repeated with the data rate set to 4.
j) Steps (a) through (e) were repeated with the data rate set to 5.

k) Steps (a) through (k) were repeated with the center frequency set to the upper bandedge at 758MHz.
l) The transmitter was set to transmit at 787MHz.
m) Steps (c) through (j) were repeated with the center frequency set to the lower bandedge at 787MHz.
n) Steps (a) through k) were repeated with the center frequency set to the upper bandedge at 788MHz.

5.3.2.3.1 Results

The plots of the antenna conducted output measurements are presented on pages 63 through 86. As can be seen from the data, the test item did not produce spurious emissions in excess of the limits under any data rate condition.

5.4 Frequency Stability

5.4.1 Requirements

Per 27.54 the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

5.4.2 Procedures

The antenna port of the test item was connected to a frequency counter through a 50 dB attenuator. The test item was then placed in a humidity temperature chamber.

a) The nominal frequency was measured at +20ºC.
b) The temperature chamber was then set to -30ºC.
c) Once the temperature chamber had reached -30ºC, the test item was allowed to soak for 30 minutes.
d) After soaking at -30ºC for thirty minutes, the test item was turned on and set to transmit at 757.0125MHz and the transmit frequency was measured and recorded.
e) Steps (a) through (c) were repeated with the temperature chamber was set to -20ºC.
f) Steps (a) through (c) were repeated with the temperature chamber was set to -10ºC.
g) Steps (a) through (c) were repeated with the temperature chamber was set to 0ºC.
h) Steps (a) through (c) were repeated with the temperature chamber was set to 10ºC.
i) Steps (a) through (c) were repeated with the temperature chamber was set to 30ºC.
j) Steps (a) through (c) were repeated with the temperature chamber was set to 40ºC.
k) Steps (a) through (c) were repeated with the temperature chamber was set to 50ºC.
l) Steps (a) through (l) were repeated with the transmitter set to 787.1875MHz.
m) Steps (a) through (l) were repeated with the transmitter set to 757.98125MHz.
n) Steps (a) through (l) were repeated with the transmitter set to 787.9875MHz.
o) The test item was then removed from the temperature chamber and allowed to adjust to nominal room temperature.
p) The supply voltage was checked and adjusted to the nominal level (12.0 VDC). The test item was turned on and set to transmit at 757.0125MHz. The transmit frequency was measured and recorded at ambient temperature.
q) The supply voltage was then varied to 85% of its nominal level (10.2 VDC). The test item was turned on and set to transmit at 757.0125MHz. The transmit frequency was measured and recorded at ambient temperature.
r) The supply voltage was then varied to 115% of its nominal level (13.8 VDC). The test item was turned on and set to transmit at 757.0125MHz. The transmit frequency was measured and recorded at ambient temperature.
s) Steps (p) through (r) were repeated with the test item set to transmit at 787.1875MHz.

t) Steps (p) through (r) were repeated with the test item set to transmit at 757.98125MHz.
u) Steps (p) through (r) were repeated with the test item set to transmit at 787.9875MHz.
v) The frequency change relative to the nominal frequency was then calculated at each temperature and voltage.

5.4.3 Results

The frequency stability measurements are presented on pages 87 through 90. As can be seen from the data, the fundamental emissions stayed within the authorized bands of operation.

6 OTHER TEST CONDITIONS

6.1 Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

6.2 Disposition of the Test Item

The test item and all associated equipment were returned to Freewave Technologies Inc upon completion of the tests.

7 CONCLUSIONS

It was determined that the Freewave Technologies Inc Transceiver, Part No. LRS-760 , Serial No. 700-0047, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 27, Subpart C when tested per TIA-603-C-2004.

8 CERTIFICATION

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the test item at the test date *as operated by Freewave Technologies Inc personnel. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

9 EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	11/30/2007	11/30/2008
CDS2	COMPUTER	GATEWAY	MFATXPNT NMZ 500L	0028483108	1.8GHZ	N/A	
ETD0	ENV Chambers For Auto Dept Use Only	Thermotron	S-8	15461	-70 to 150 degrees C	Note 1	
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	1/7/2008	1/7/2009
HRE1	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB061052	---	N/A	
NDQ1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	313	400-1000MHZ	4/14/2008	4/14/2009
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL6112	2057	0.03-2GHZ	6/11/2008	6/11/2009
NWF2	RIDGED WAVE GUIDE	ELECTRO-METRICS	RGA 180	2521	1-12.4GHZ	10/25/2008	10/25/2009
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	10/25/2008	10/25/2009
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	11/5/2007	12/5/2008
T1EE	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2321	DC-18GHZ	12/4/2007	12/4/2008
T2D1	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-43	AV5814	DC-18GHZ	2/14/2008	2/14/2009
T2S7	20DB 25W ATTENUATOR	WEINSCHEL	46-20-34	BU8139	DC-18GHZ	2/14/2008	2/14/2009

I/O: Initial Only
N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

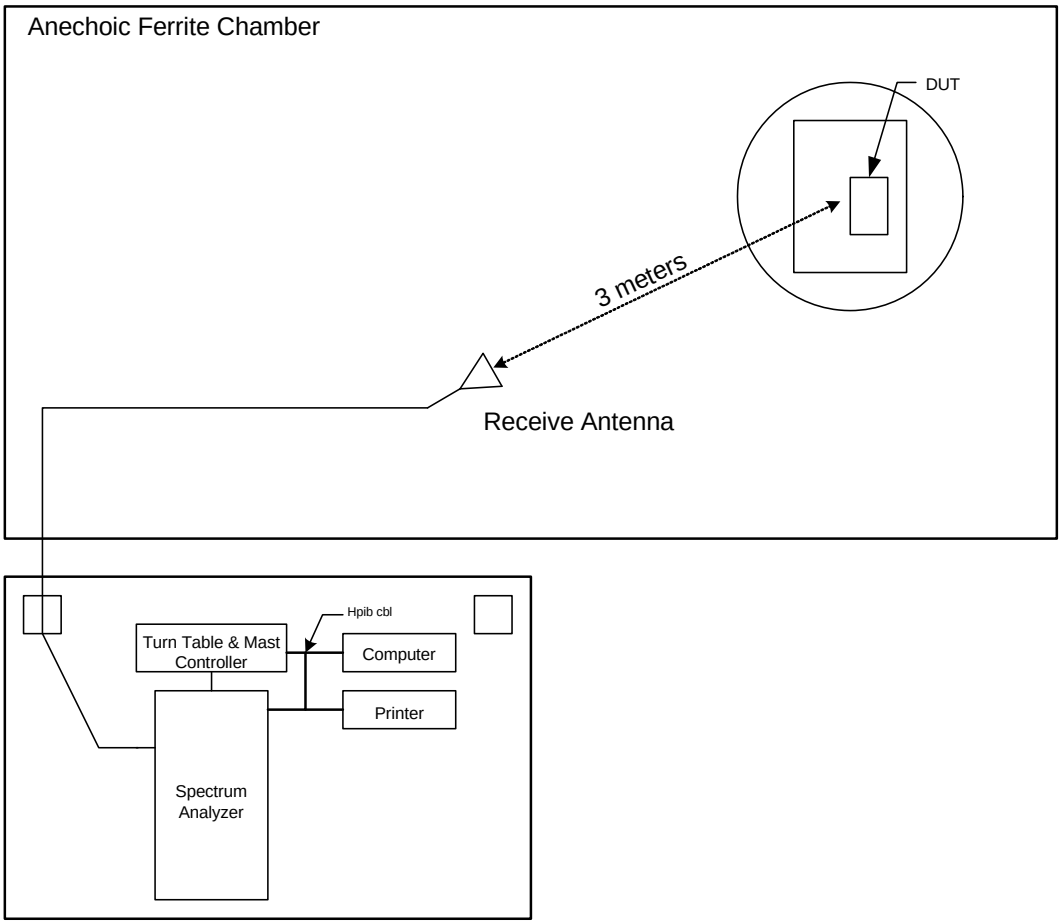
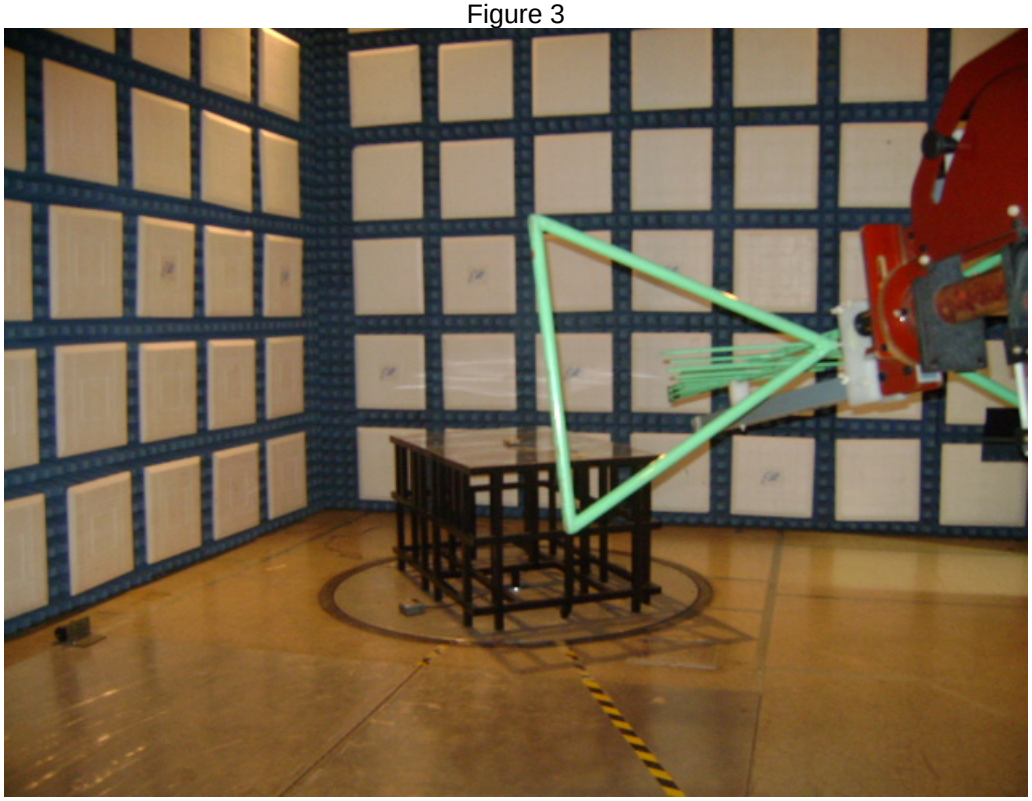
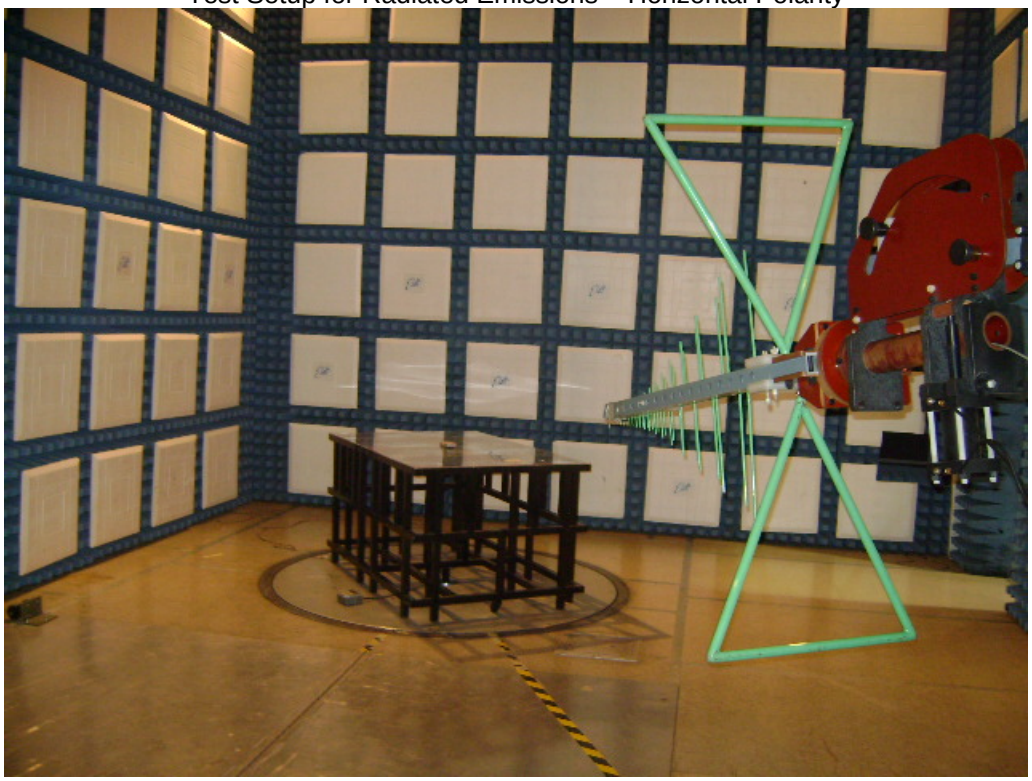


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 3



Test Setup for Radiated Emissions – Horizontal Polarity



Test Setup for Radiated Emissions – Vertical Polarity

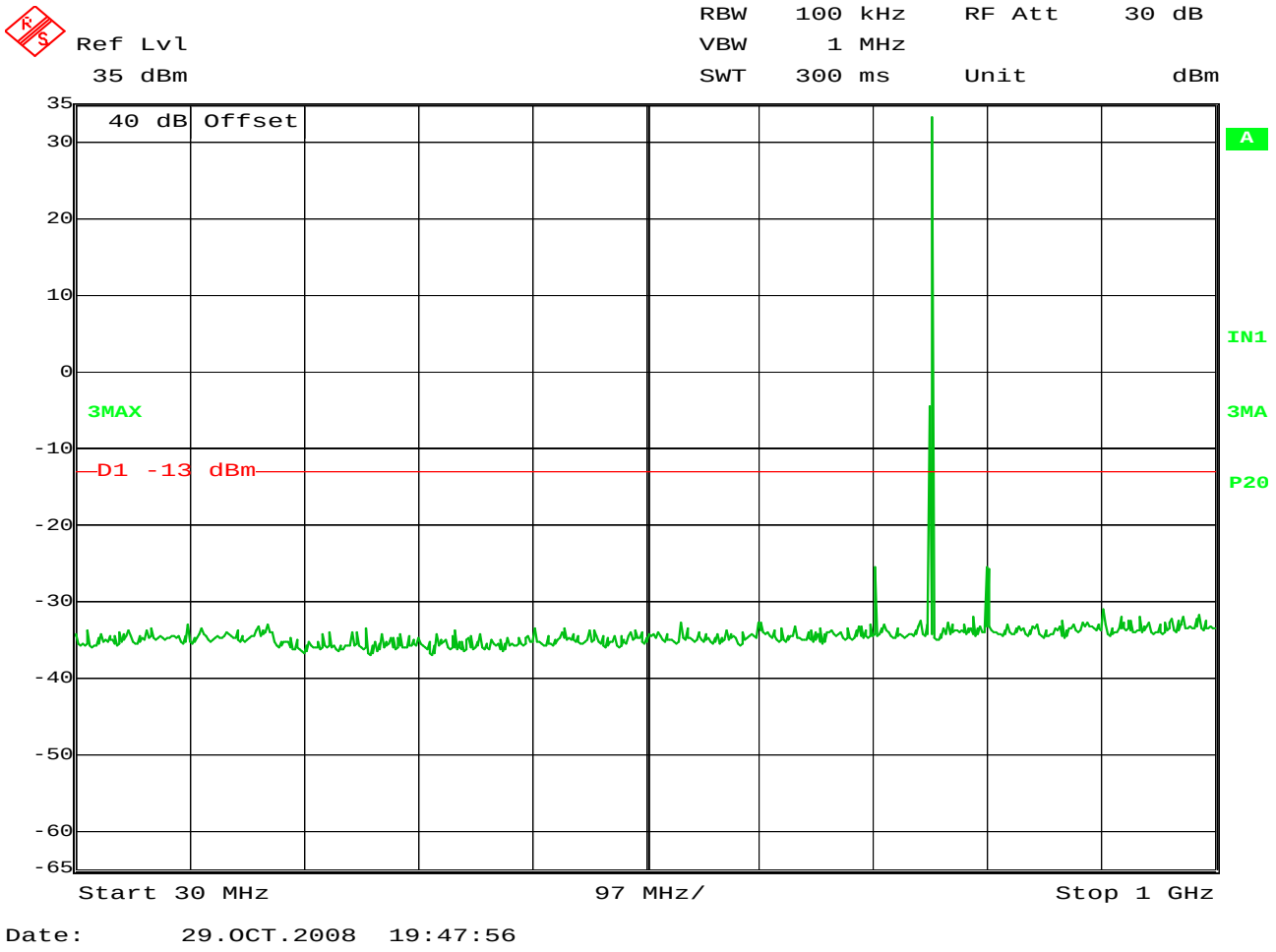
Data Page

MANUFACTURER : Freewave Technologies Inc
MODEL NO. : LRS-760
SERIAL NO. : 700-0047
SPECIFICATION : FCC-27 Output Power
DATE : October 15, 2008
NOTES : Conducted

Frequency MHz	Data Rate	Measured Output Power dBm	Measured Output Power Watts	Manufacturer's Rated Power Watts	Manufacturer's Rated Power + 20% Watts
757.5	0	33.68	2.3	2.0	2.4
757.5	1	33.68	2.3	2.0	2.4
757.5	2	33.68	2.3	2.0	2.4
757.5	3	33.68	2.3	2.0	2.4
757.5	4	33.68	2.3	2.0	2.4
757.5	5	33.68	2.3	2.0	2.4
787.5	0	33.25	2.1	2.0	2.4
787.5	1	33.25	2.1	2.0	2.4
787.5	2	33.25	2.1	2.0	2.4
787.5	3	33.25	2.1	2.0	2.4
787.5	4	33.25	2.1	2.0	2.4
787.5	5	33.25	2.1	2.0	2.4

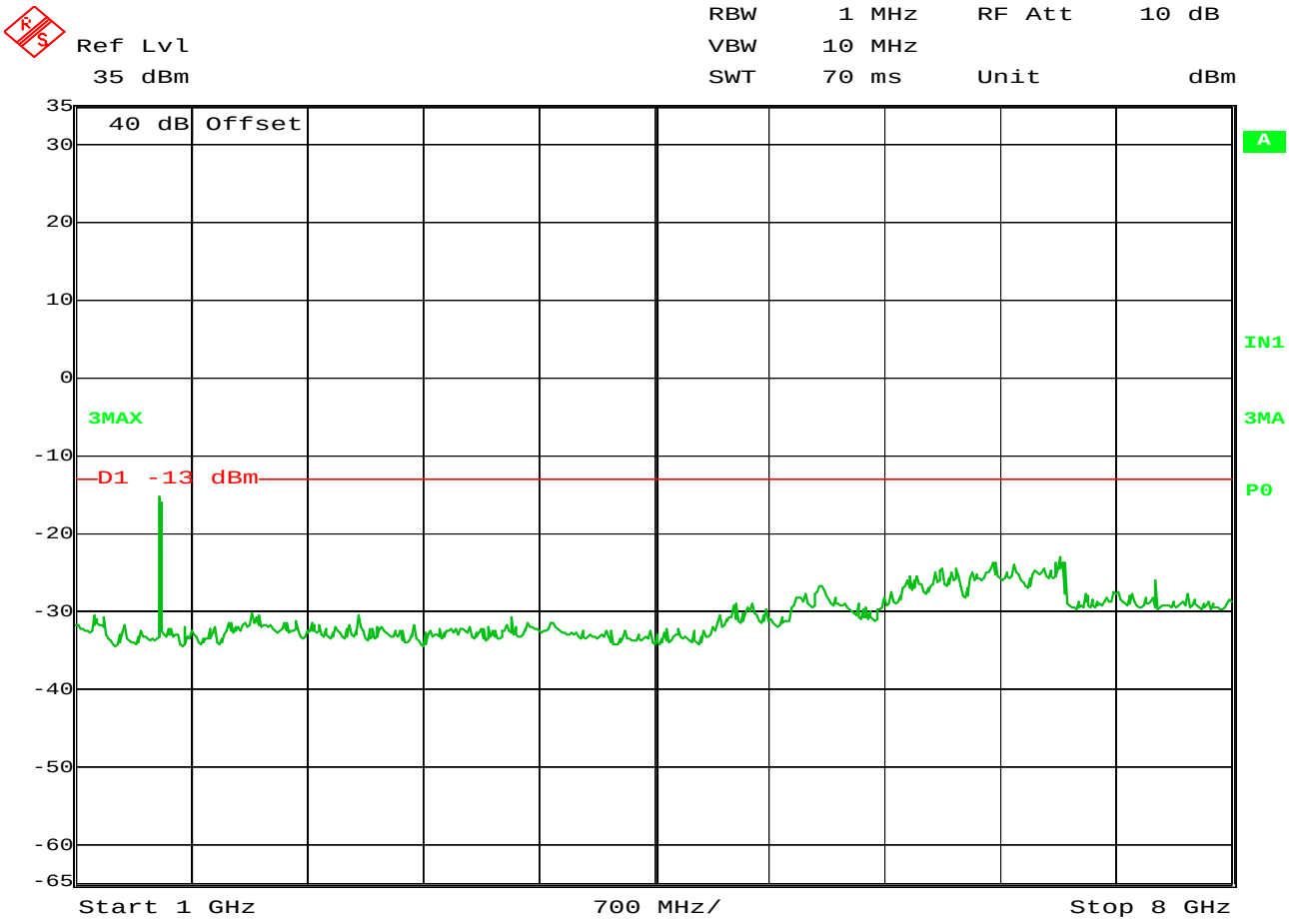
Checked BY : Richard E. King

Richard E. King



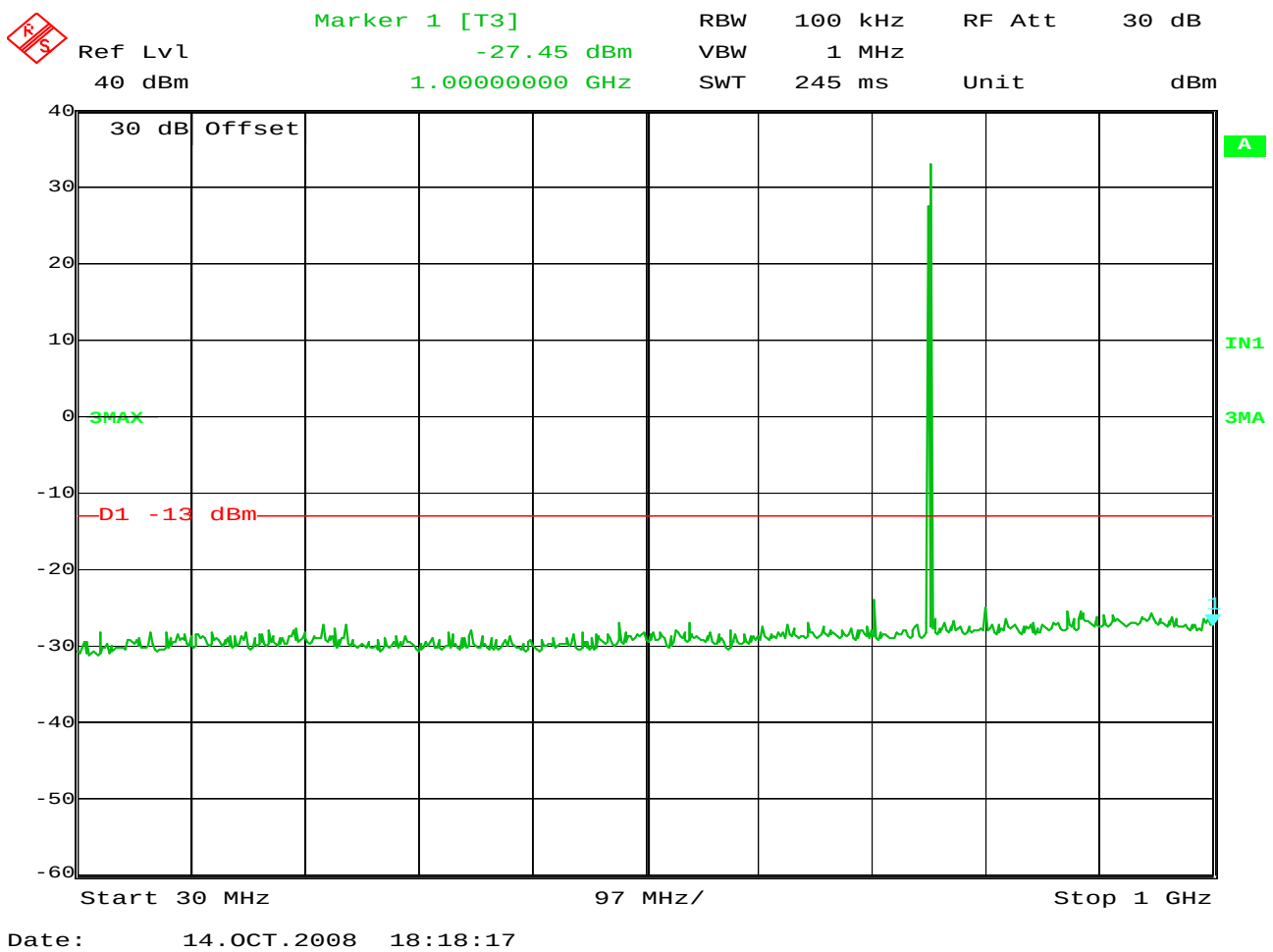
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



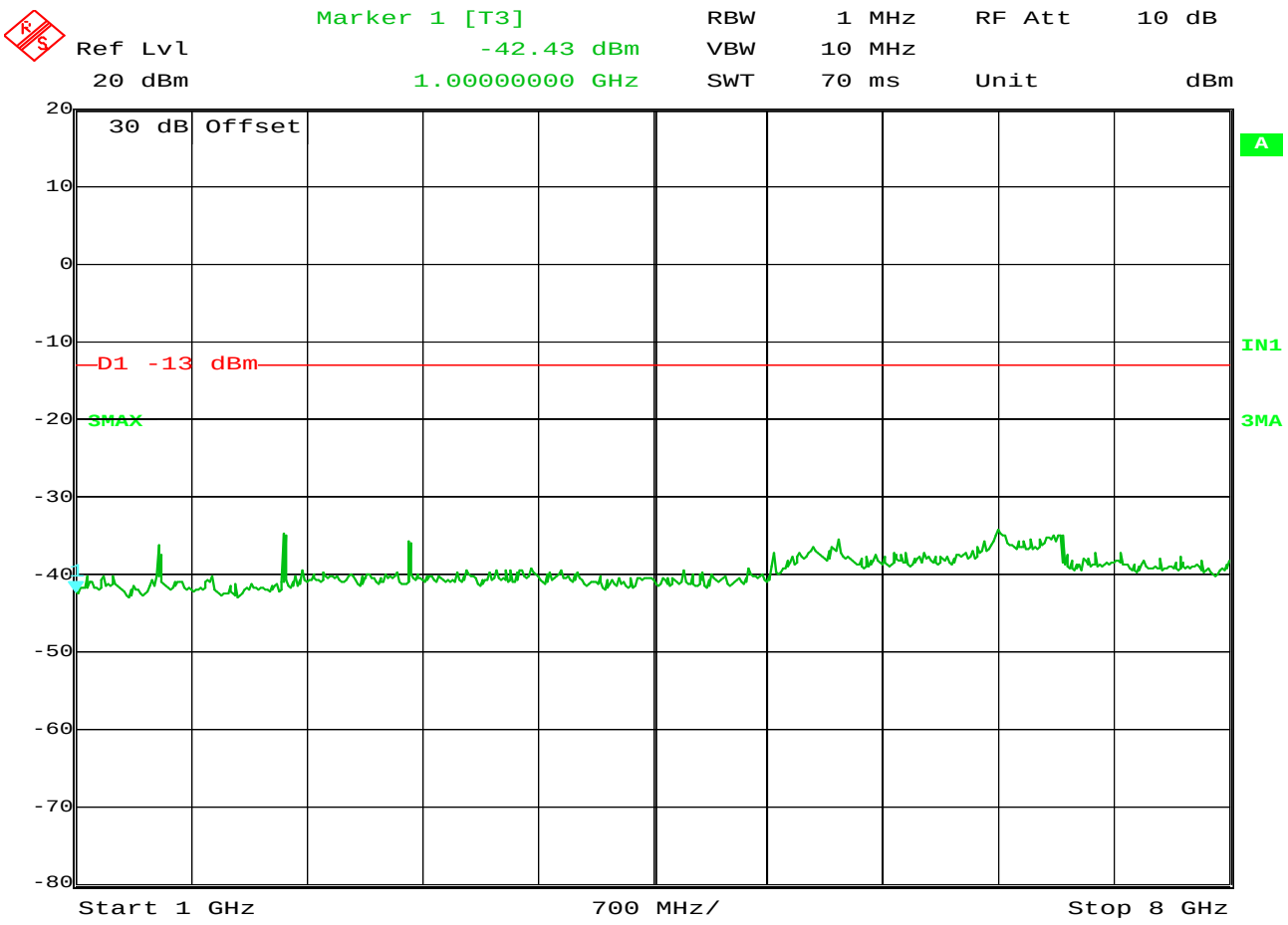
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



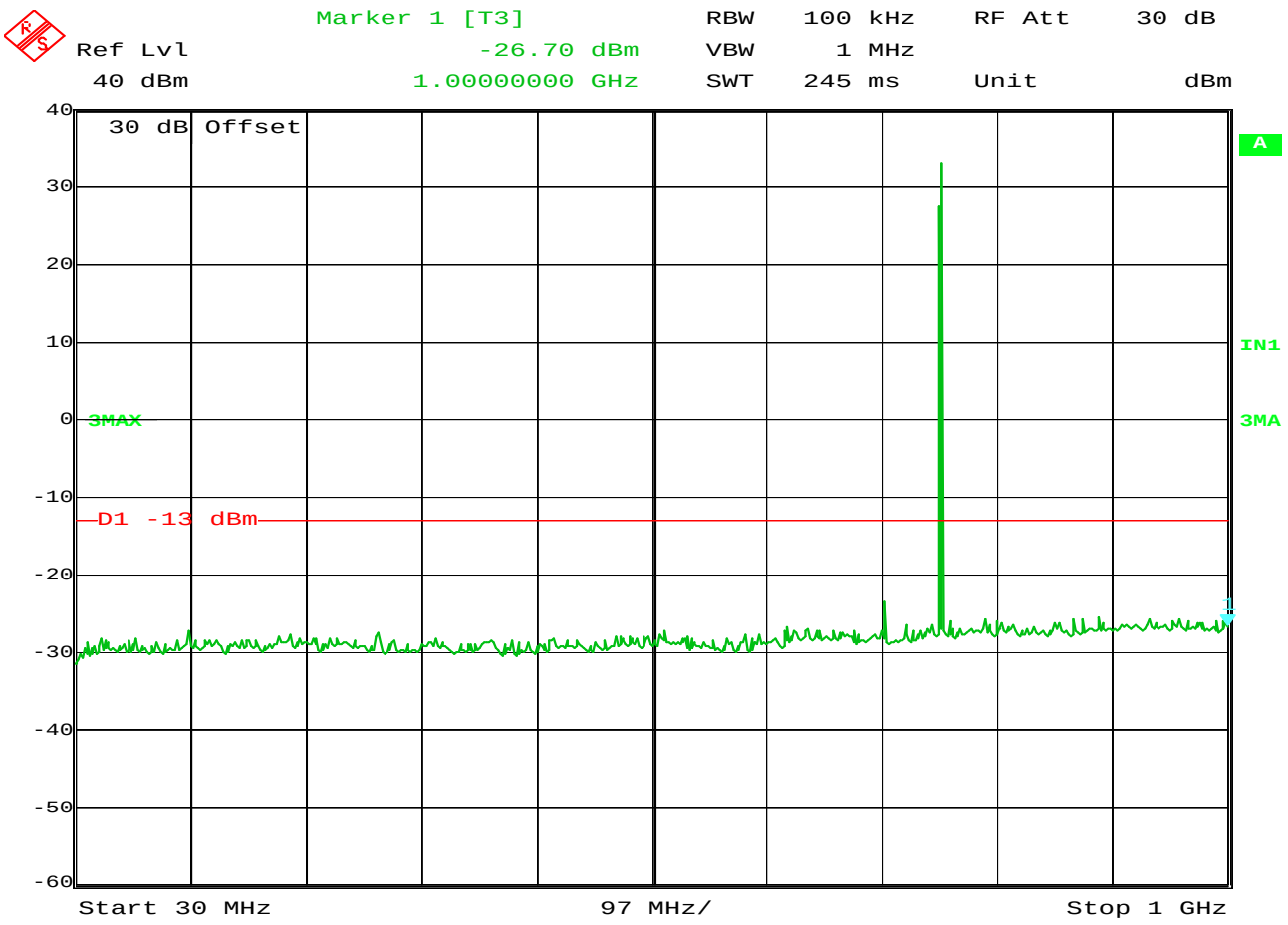
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



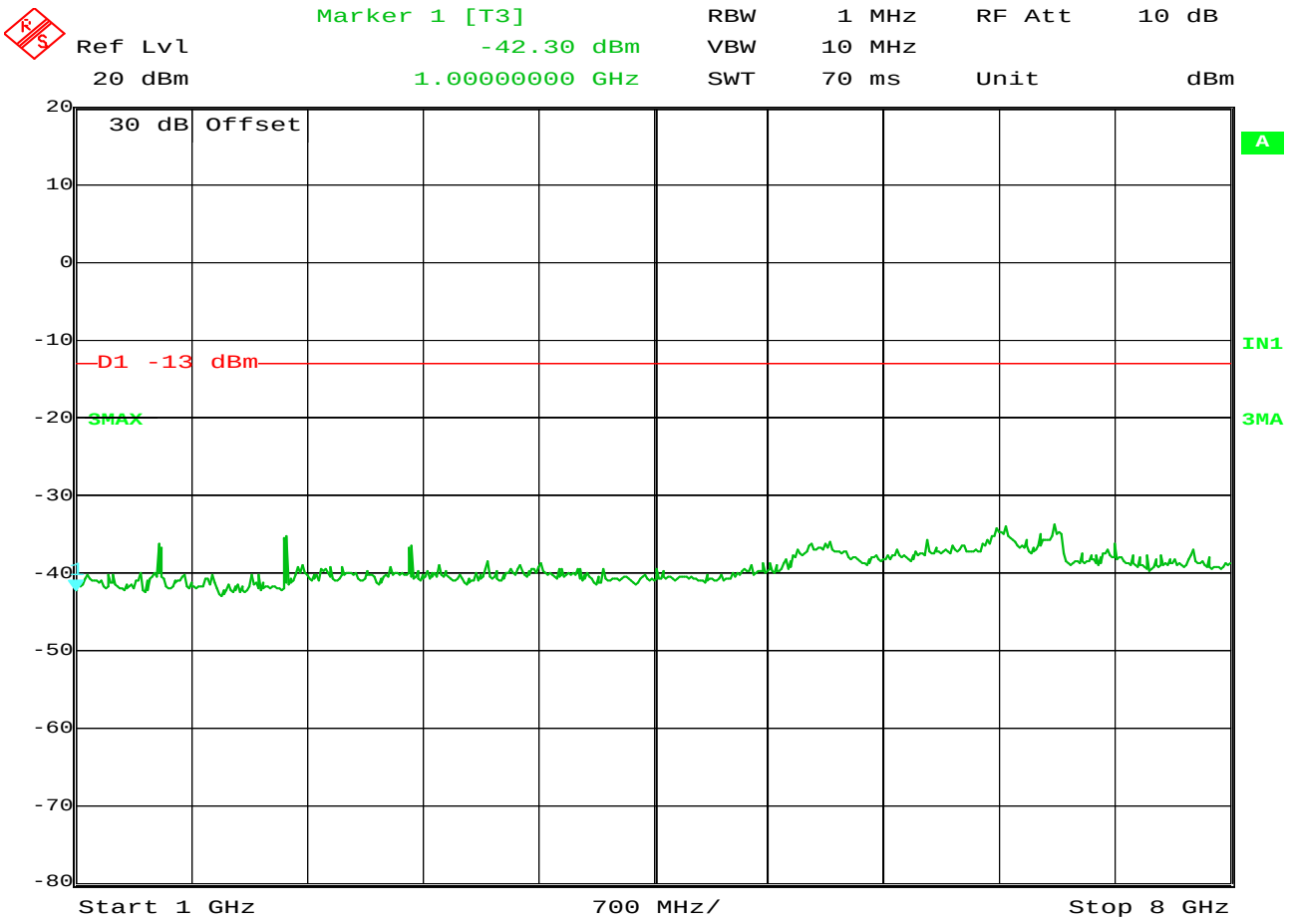
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



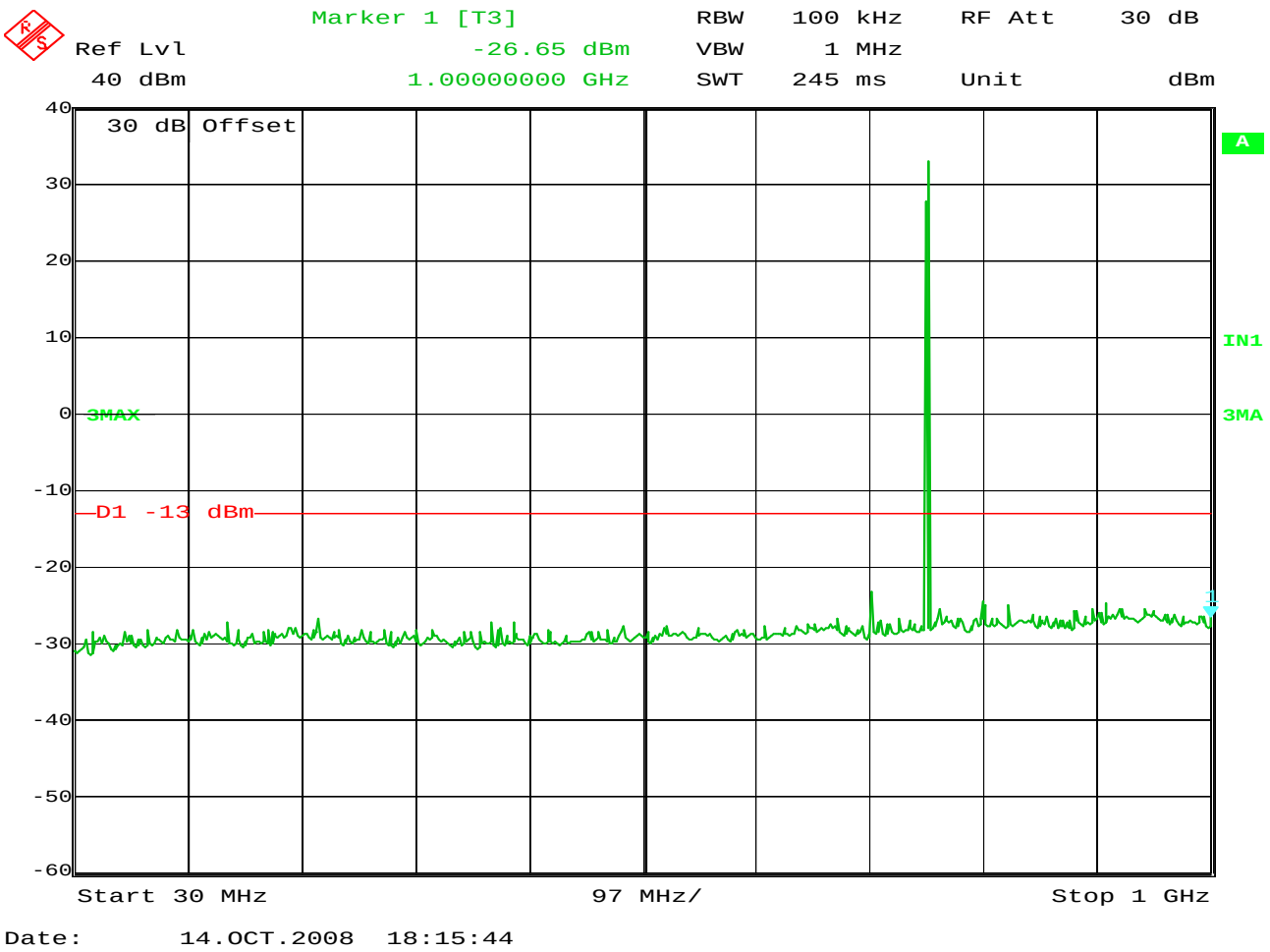
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



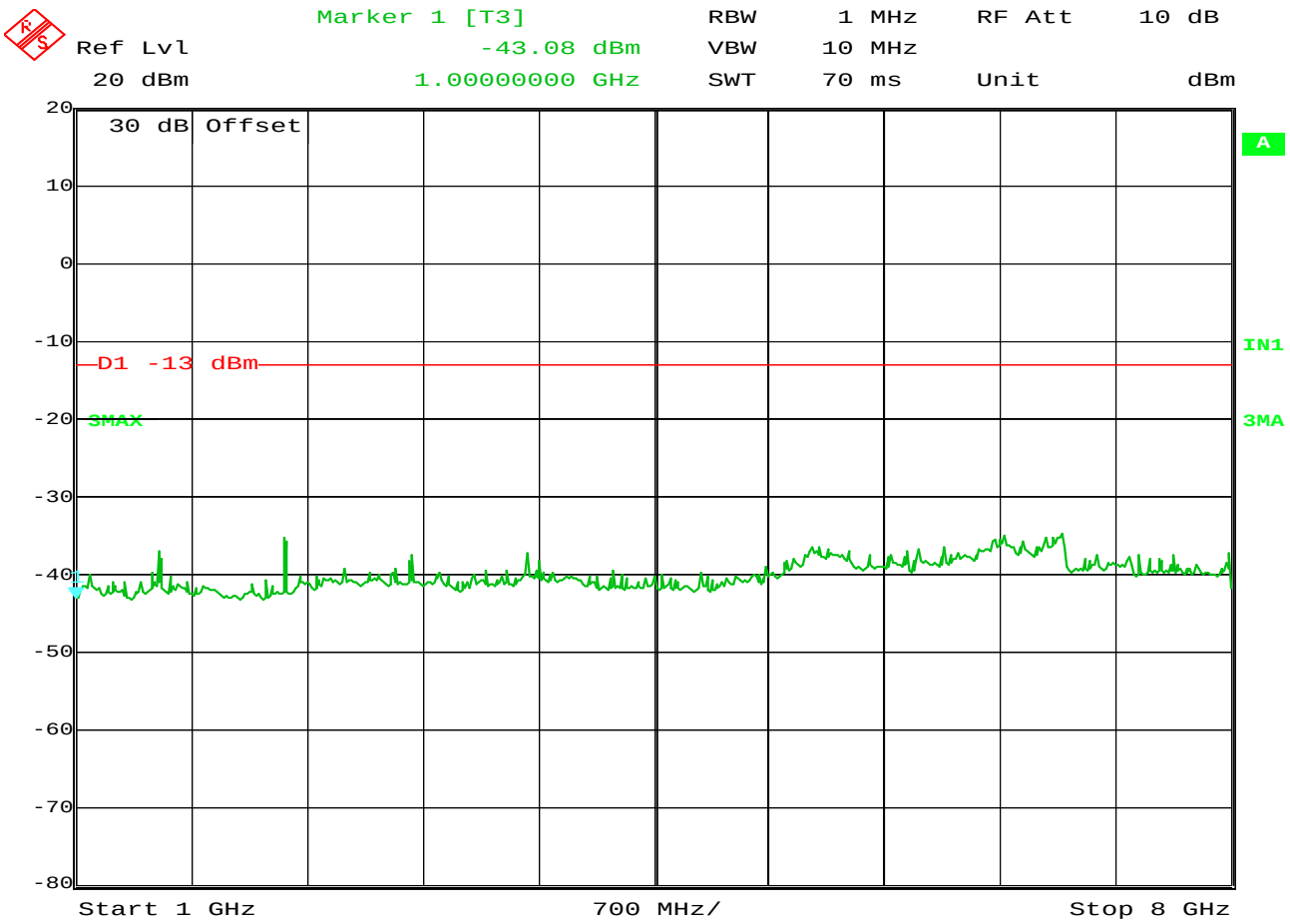
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



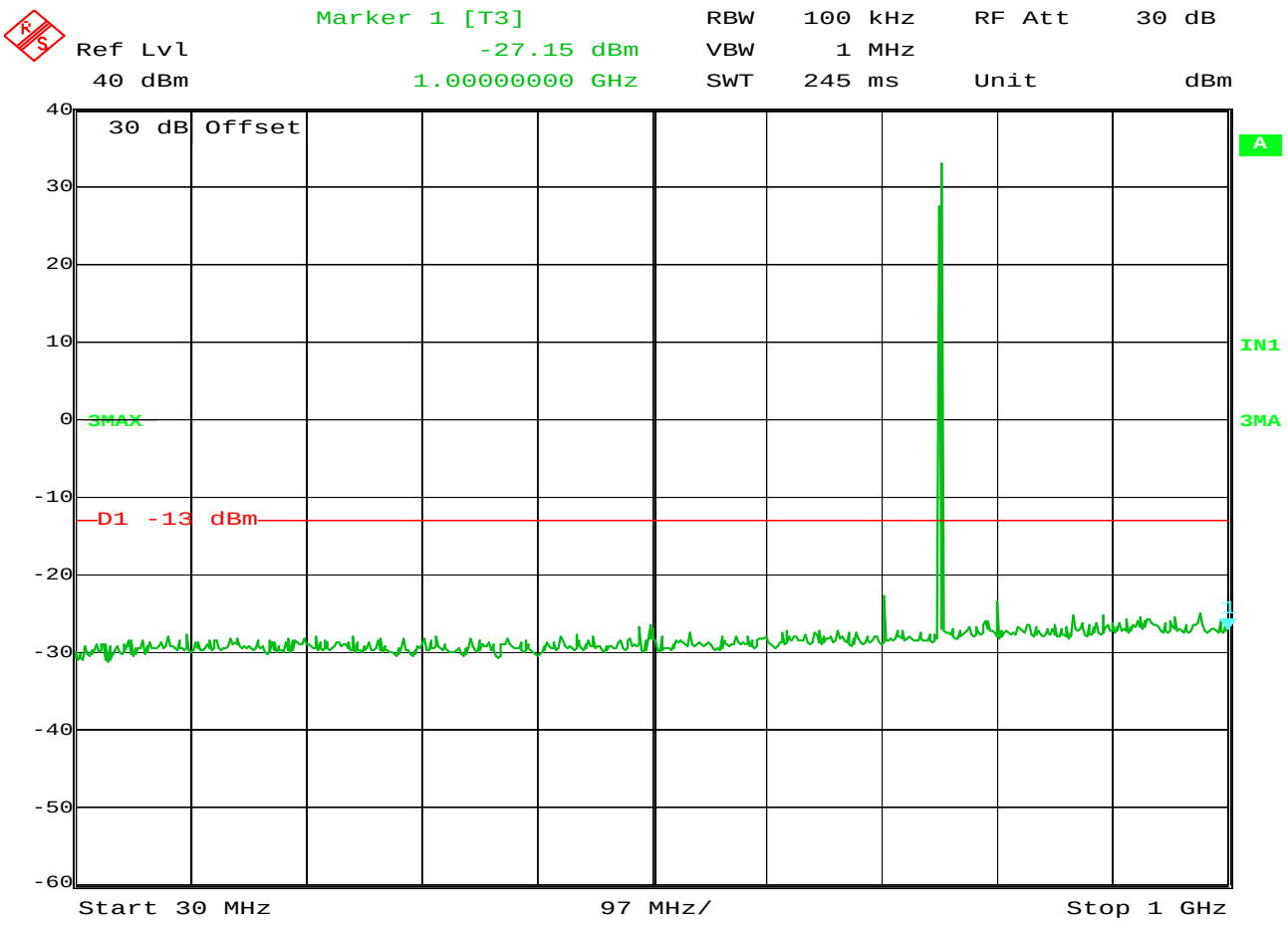
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



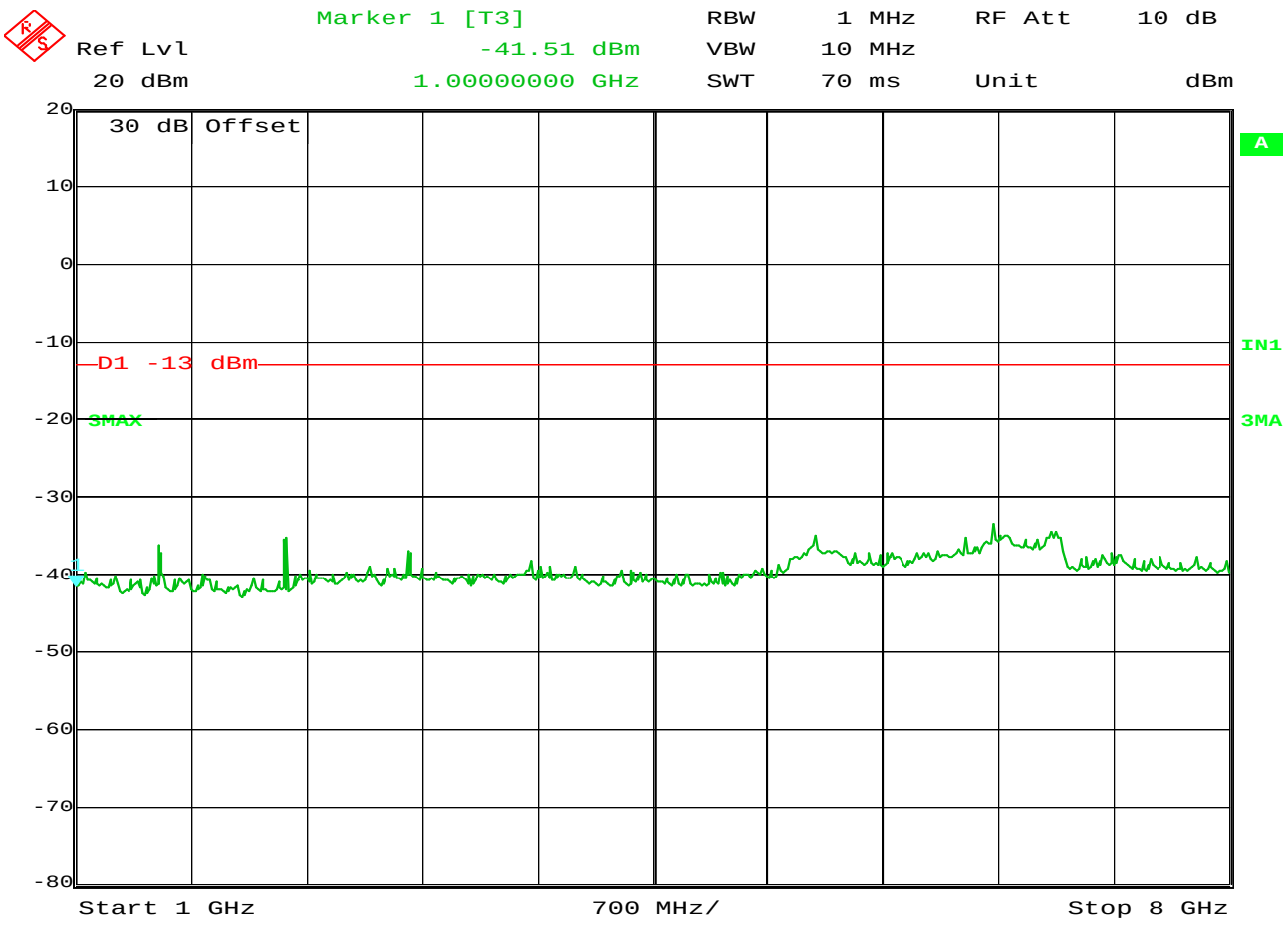
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



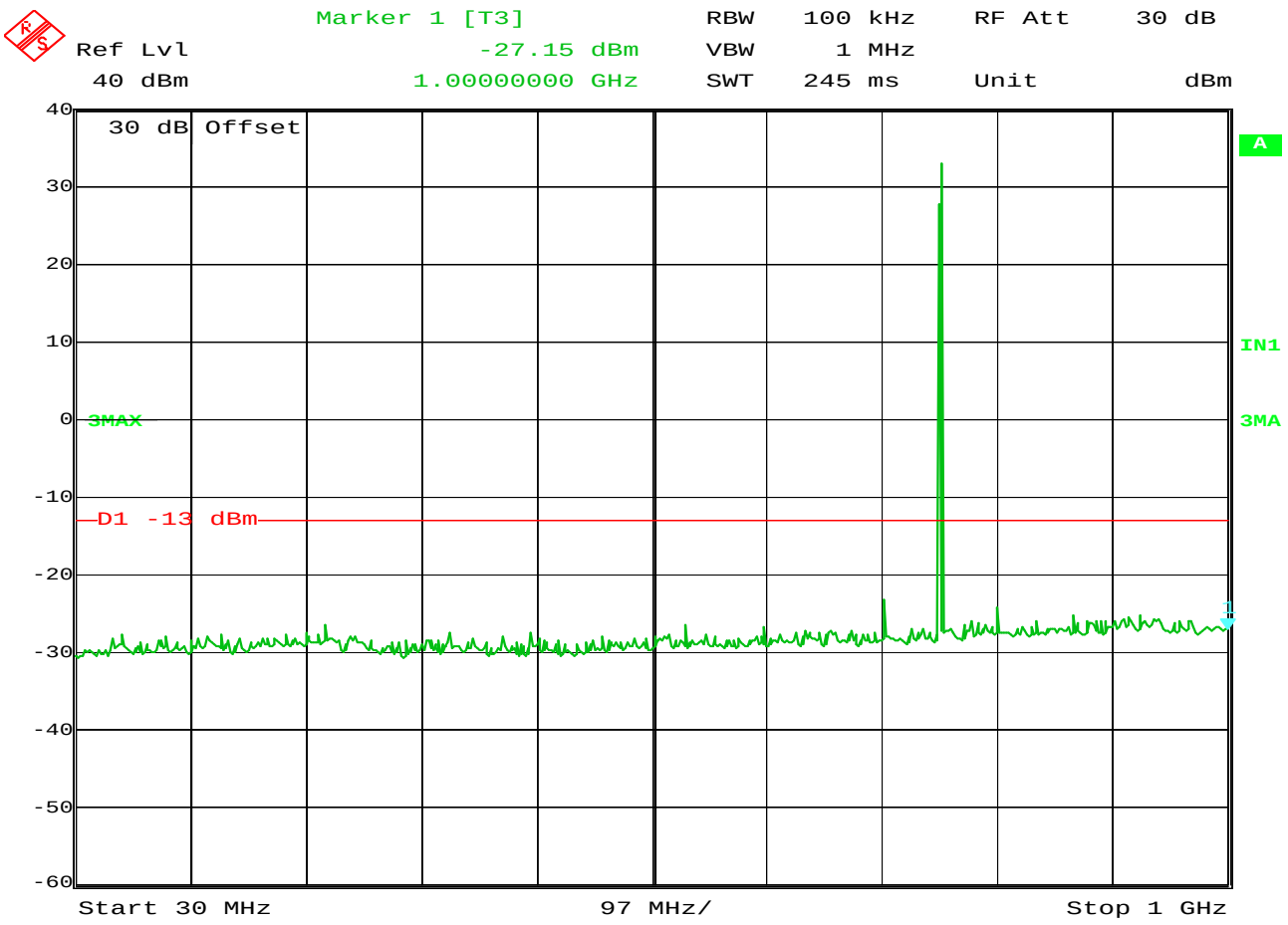
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC PART 27 Antenna Conducted Emissions

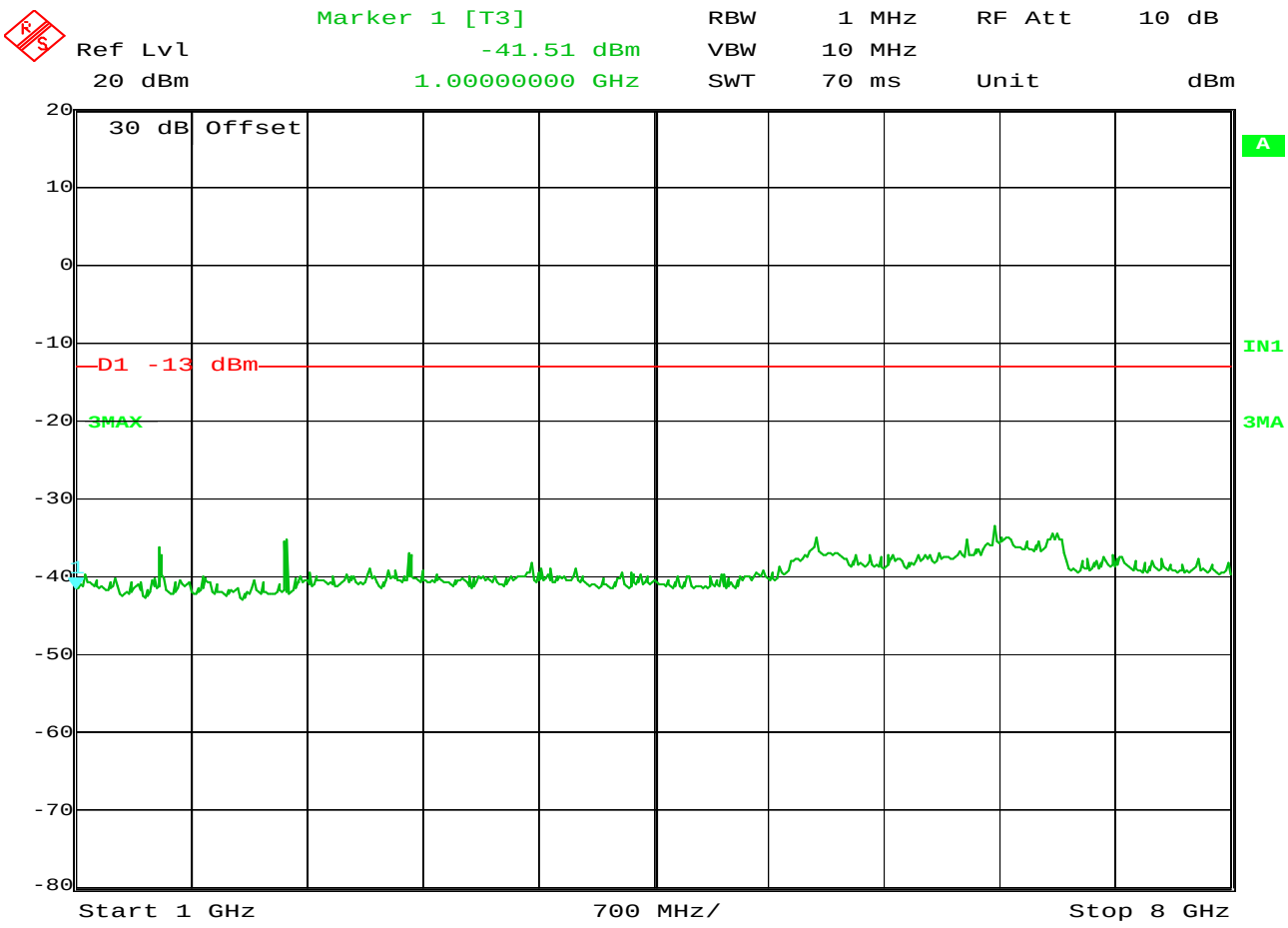
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 14.OCT.2008 18:13:37

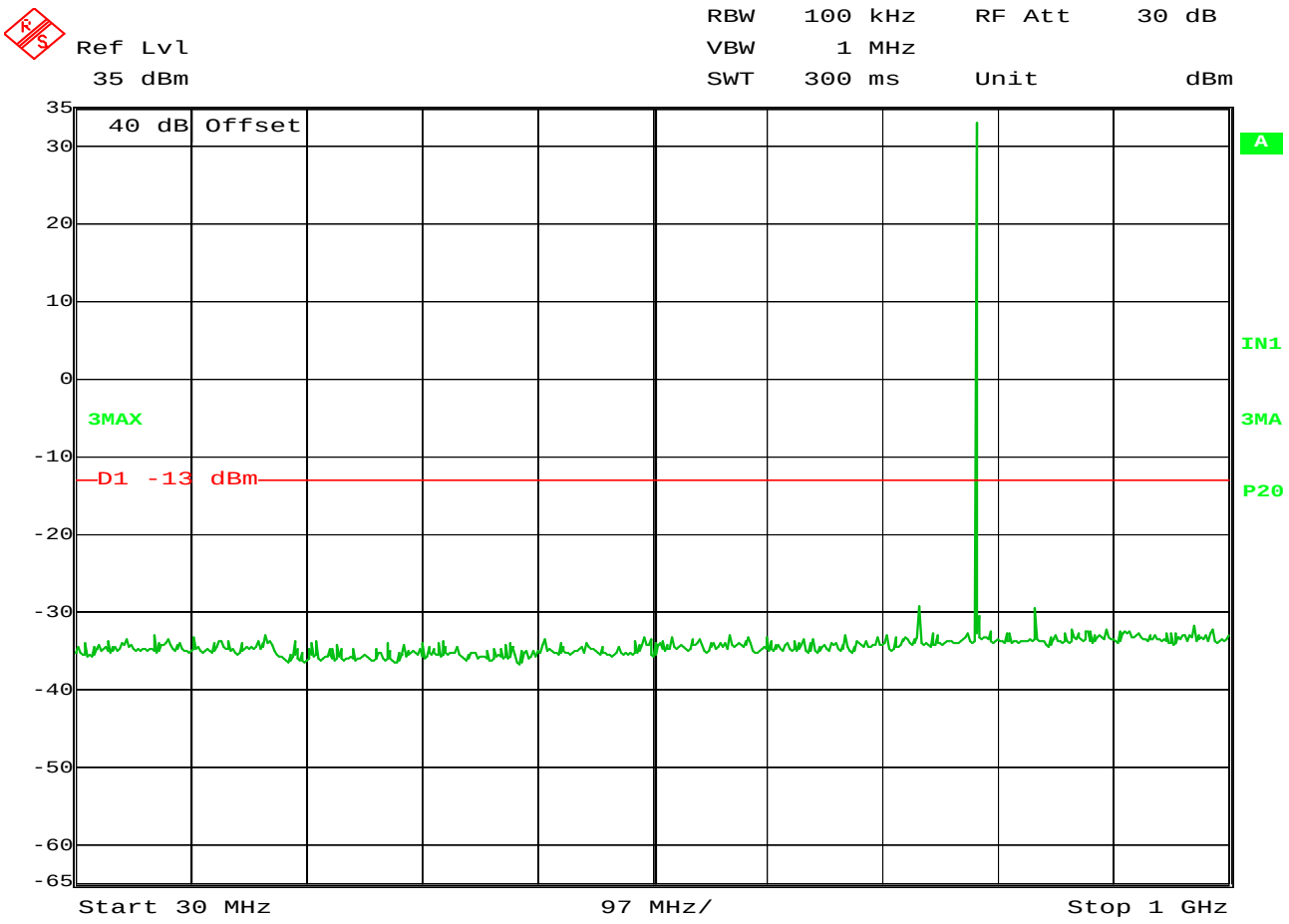
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



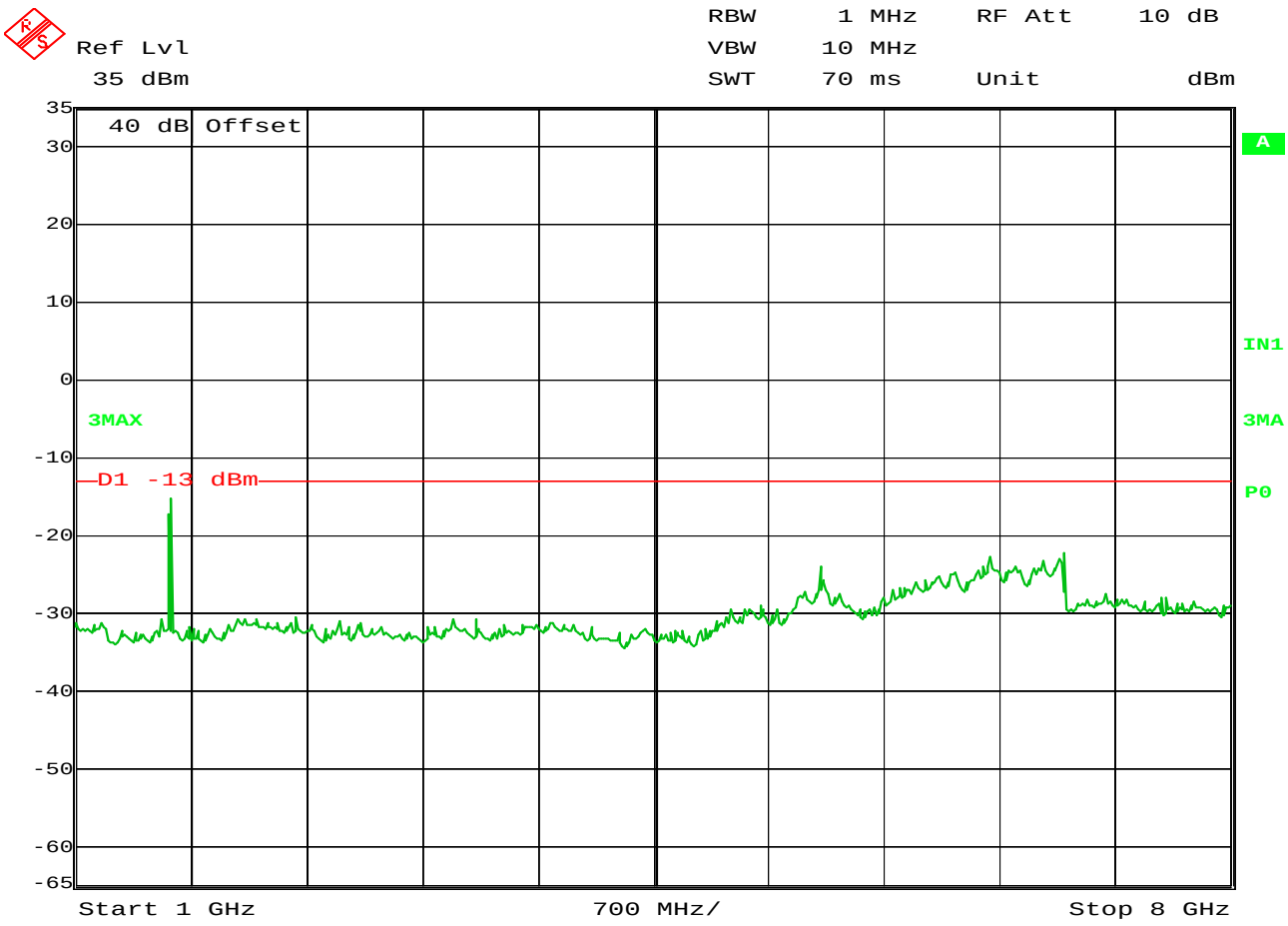
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



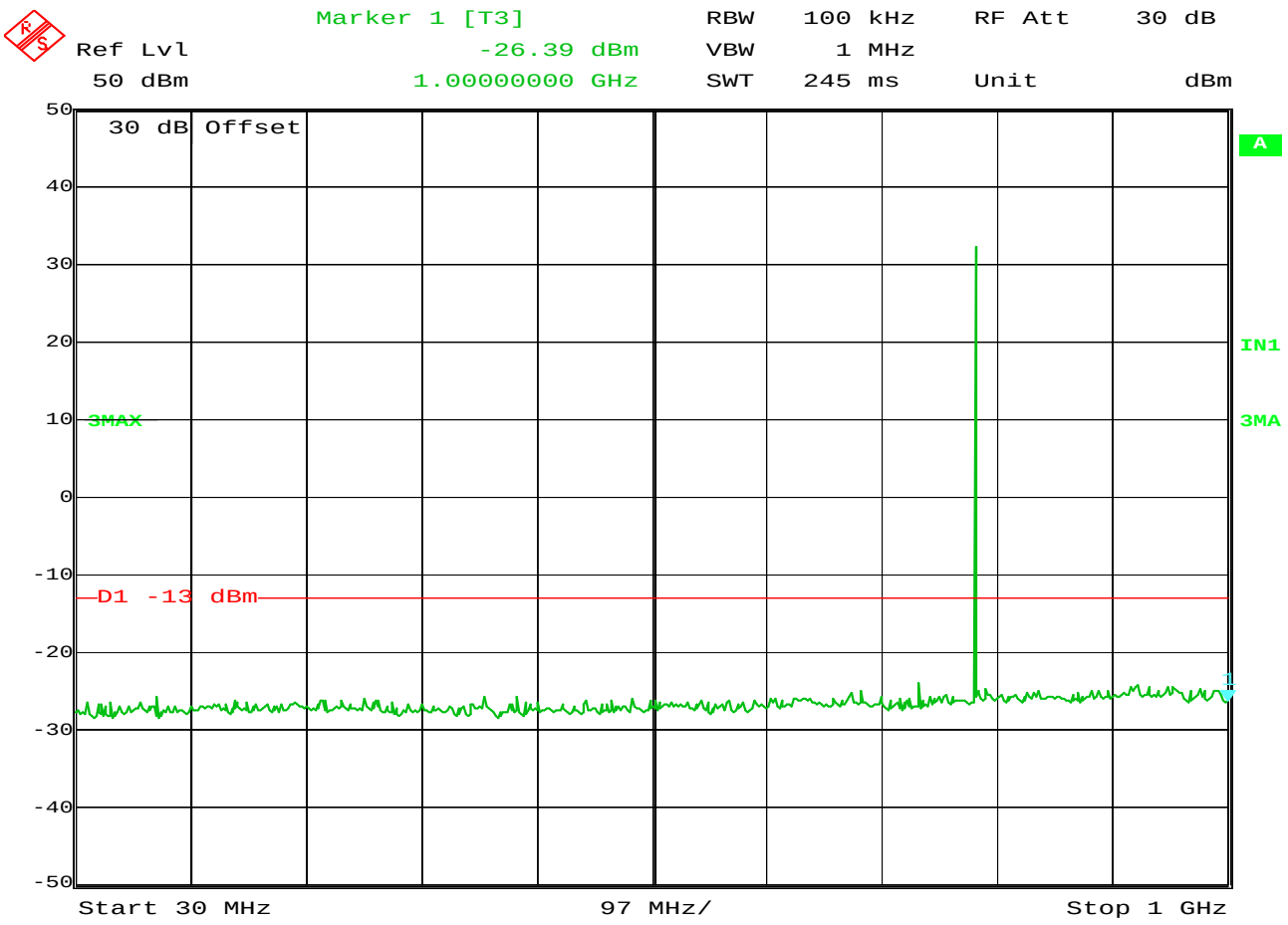
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



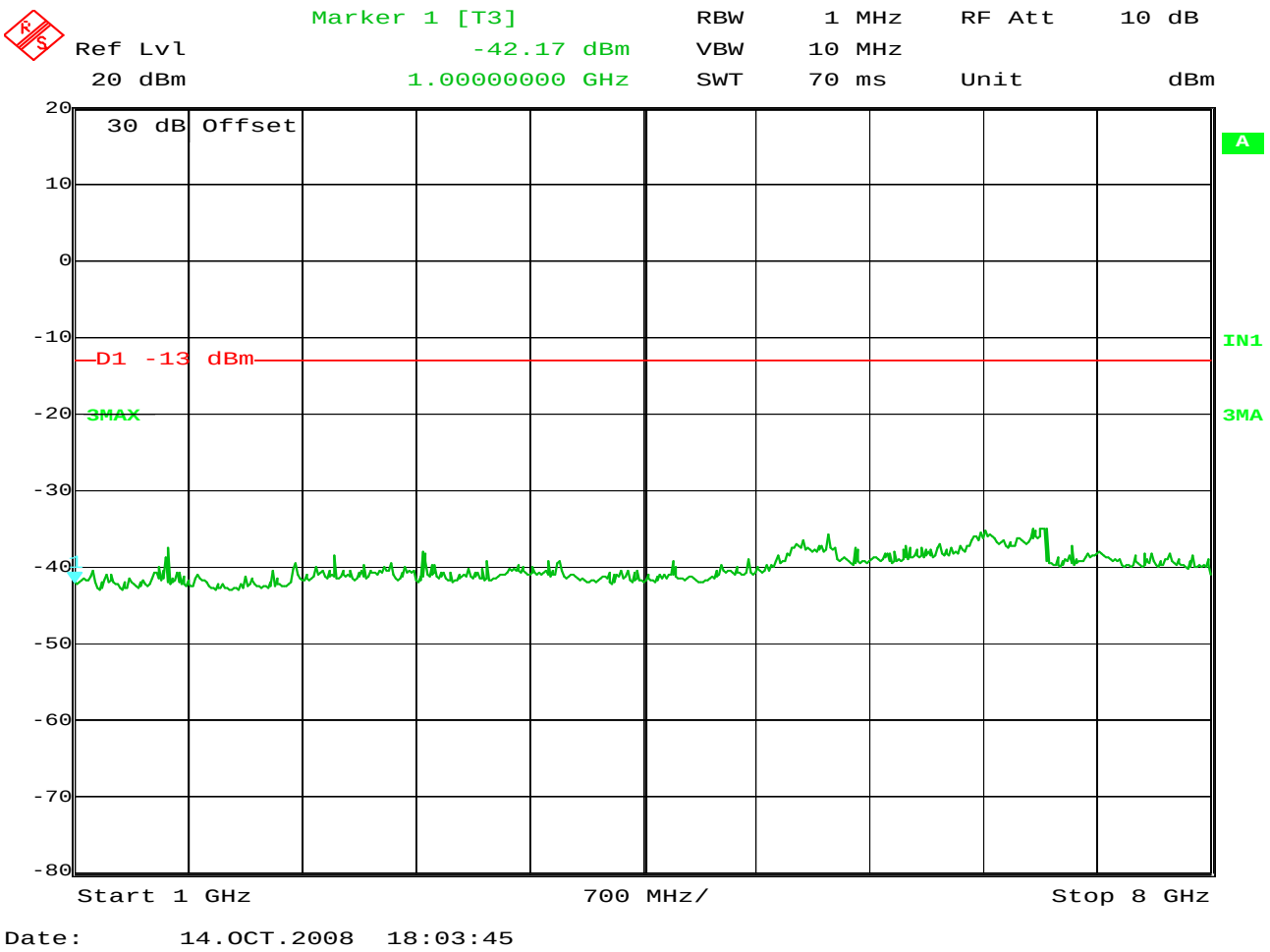
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



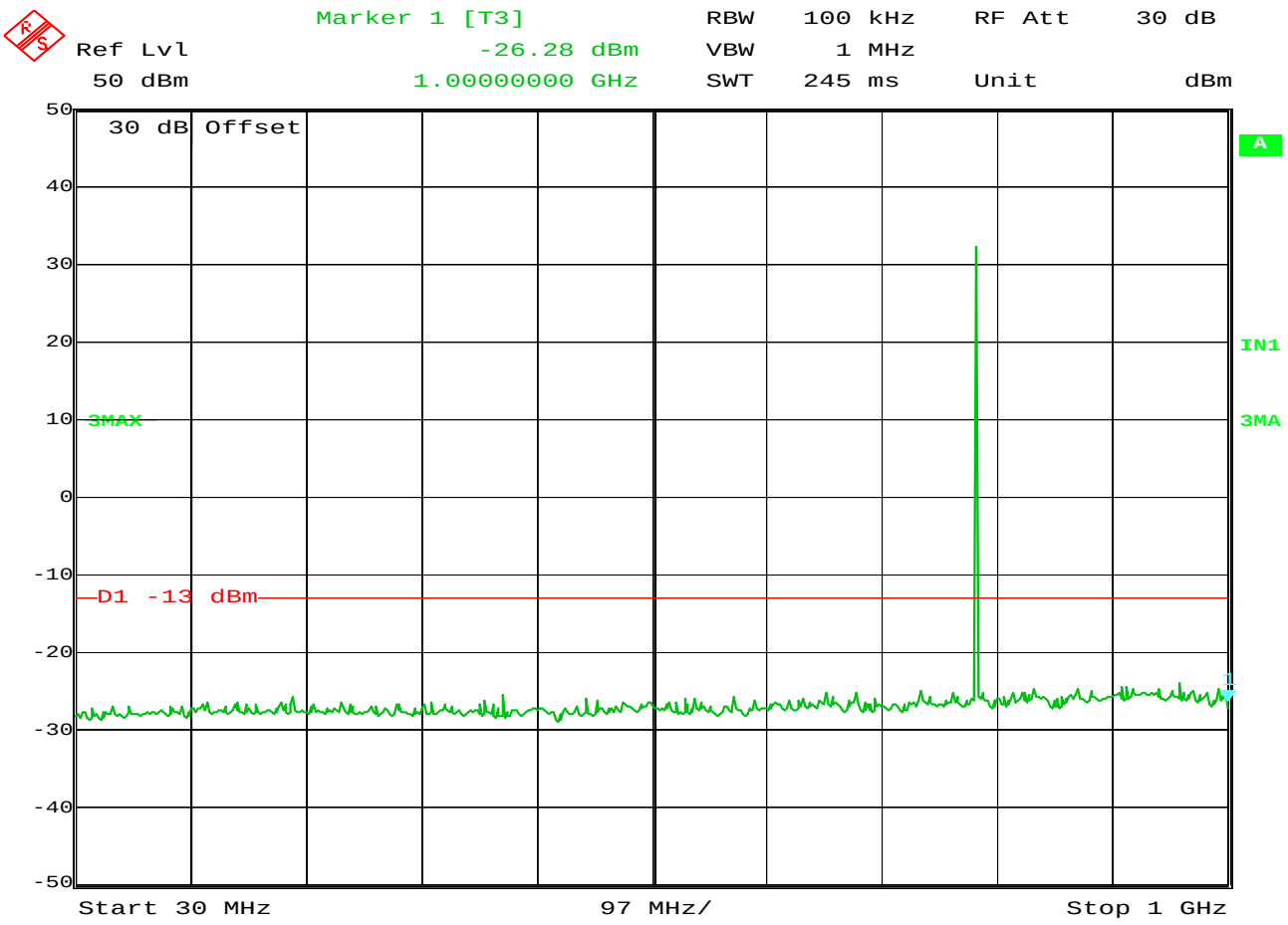
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER : Freewave Technologies Inc
MODEL NUMBER : LRS-760
SERIAL NUMBER : 700-0047
DATA RATE : 1
TEST MODE : Tx @ 787.5MHz
EQUIPMENT USED : RBB0, T2D1, T2S7



FCC PART 27 Antenna Conducted Emissions

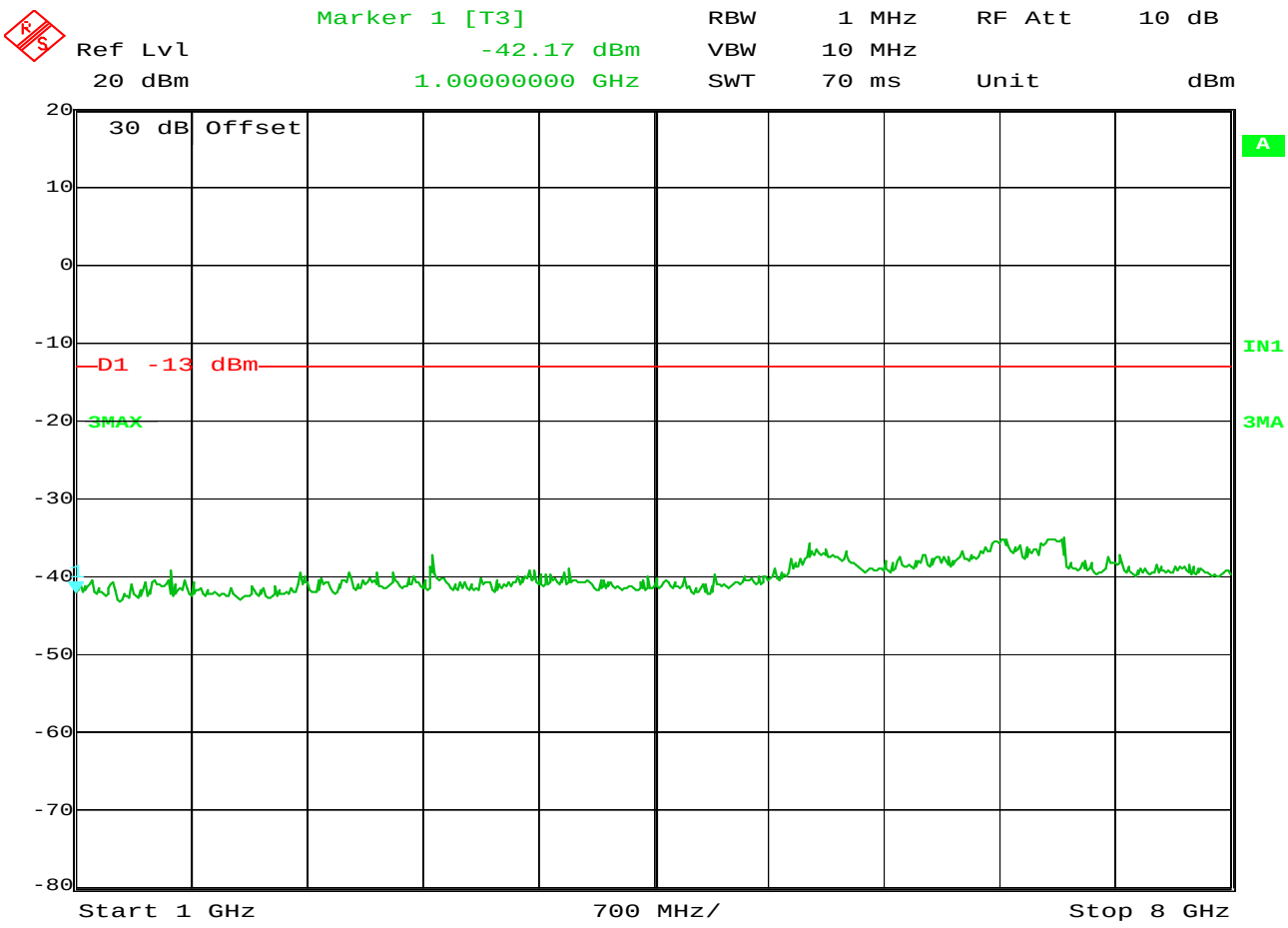
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 14.OCT.2008 17:55:43

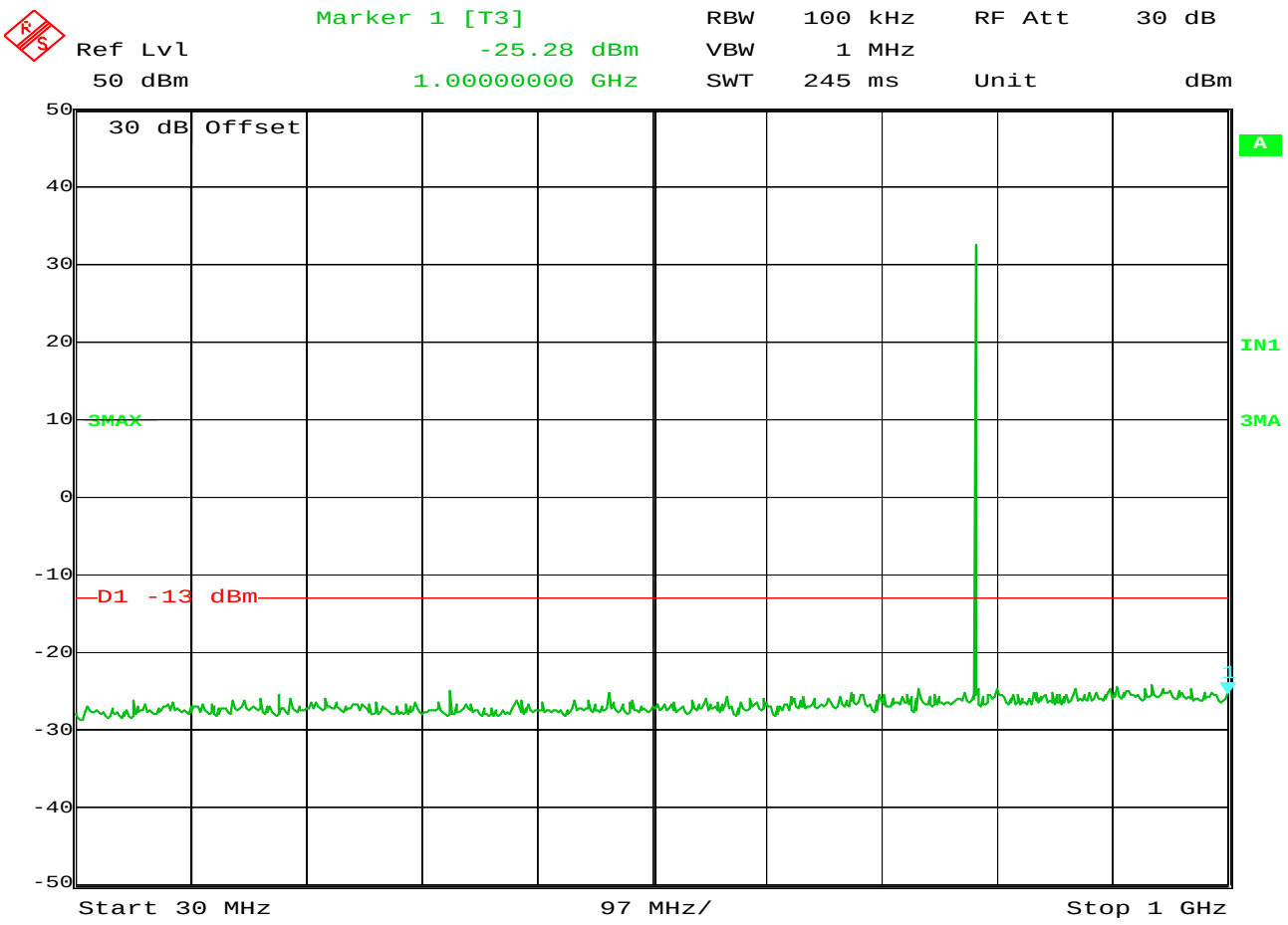
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



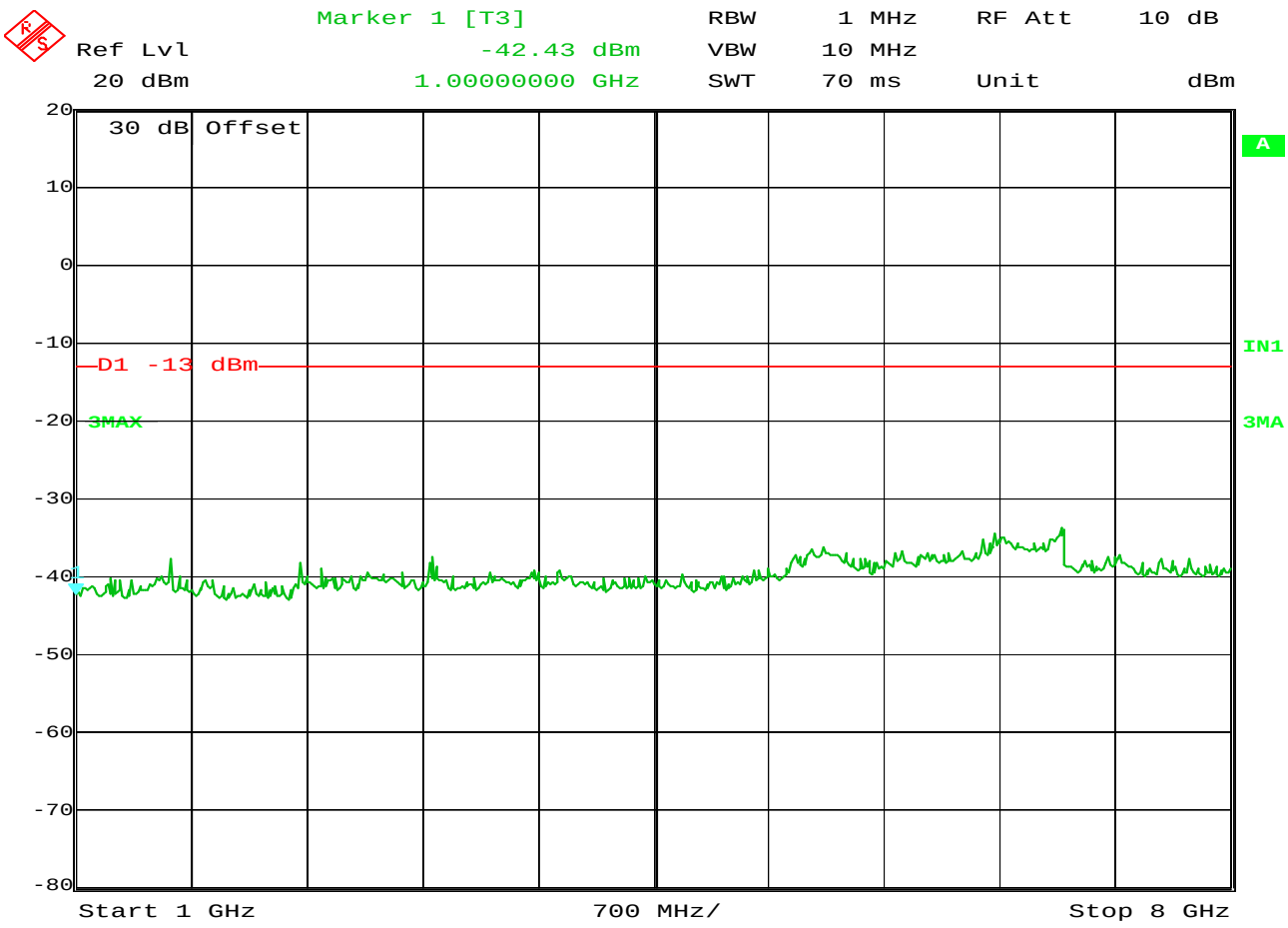
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



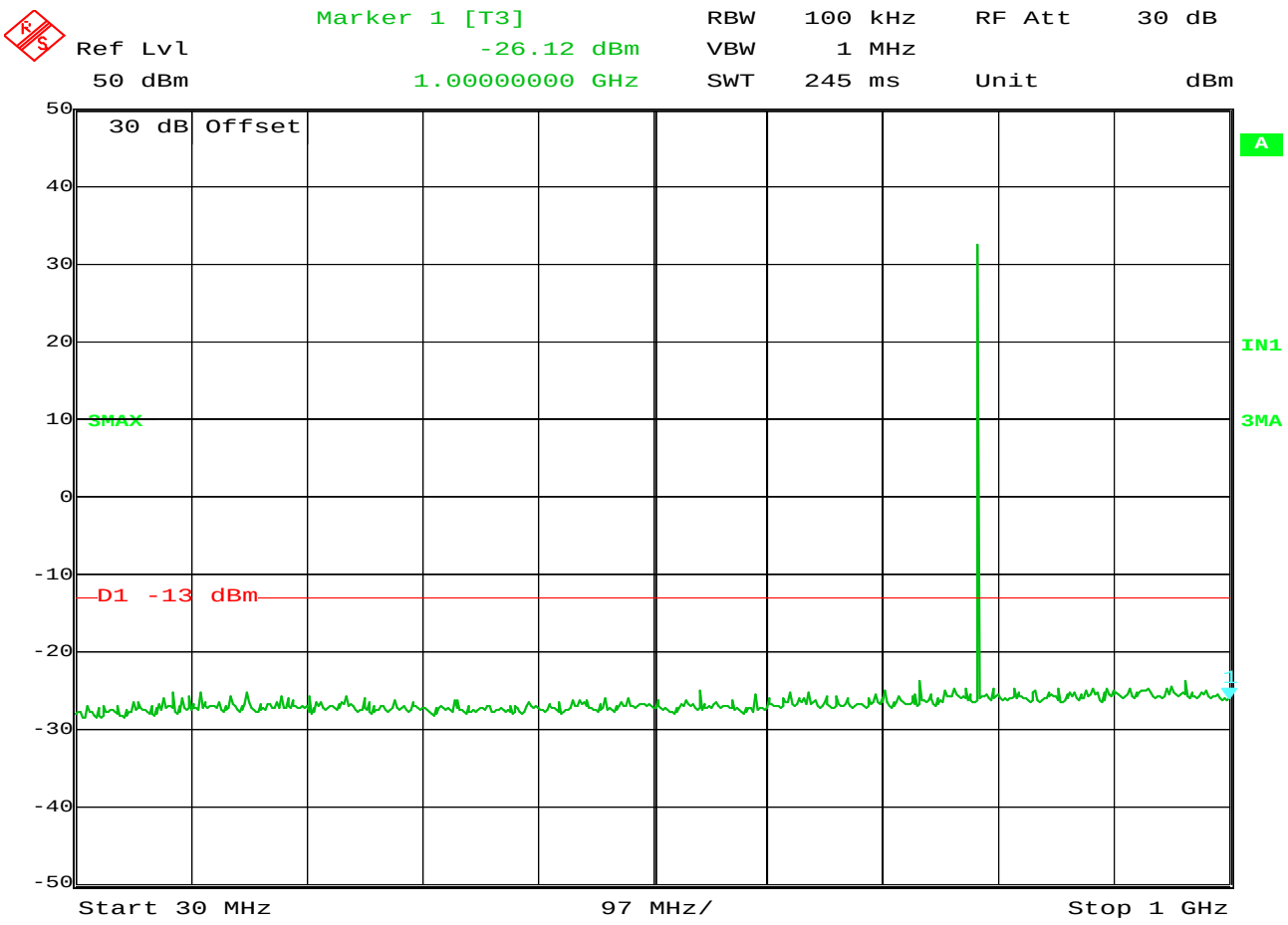
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC PART 27 Antenna Conducted Emissions

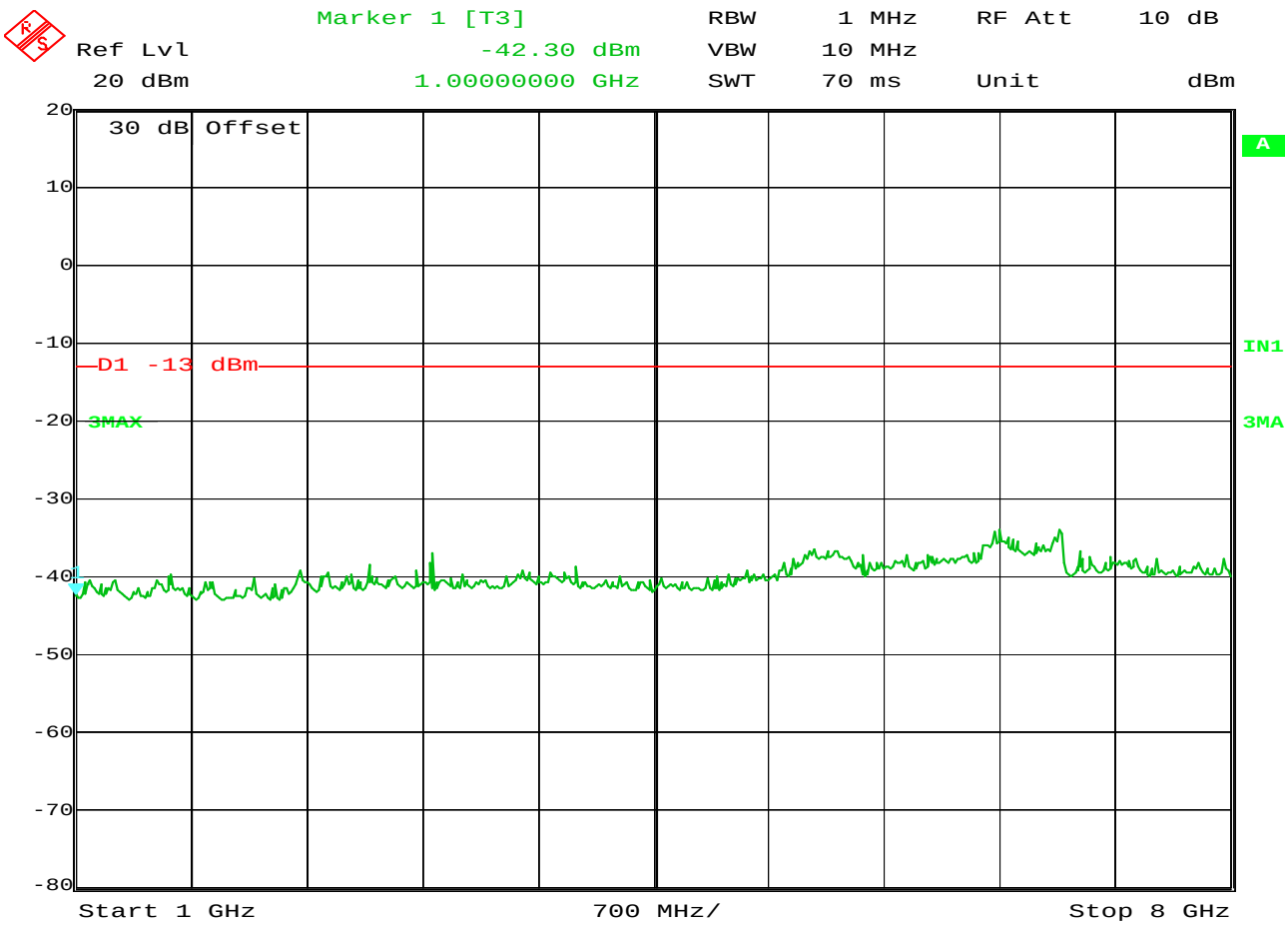
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 14.OCT.2008 17:57:51

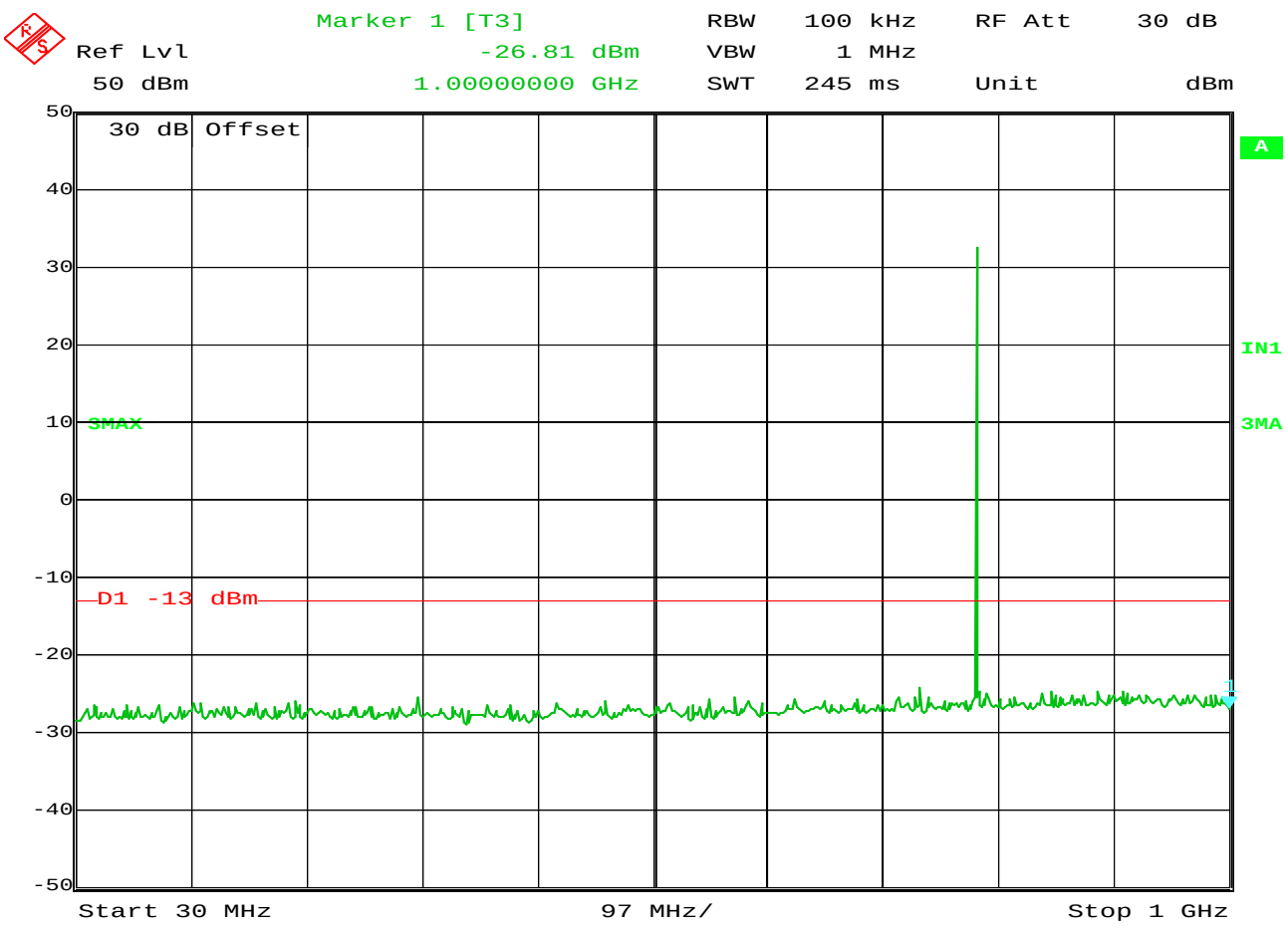
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC PART 27 Antenna Conducted Emissions

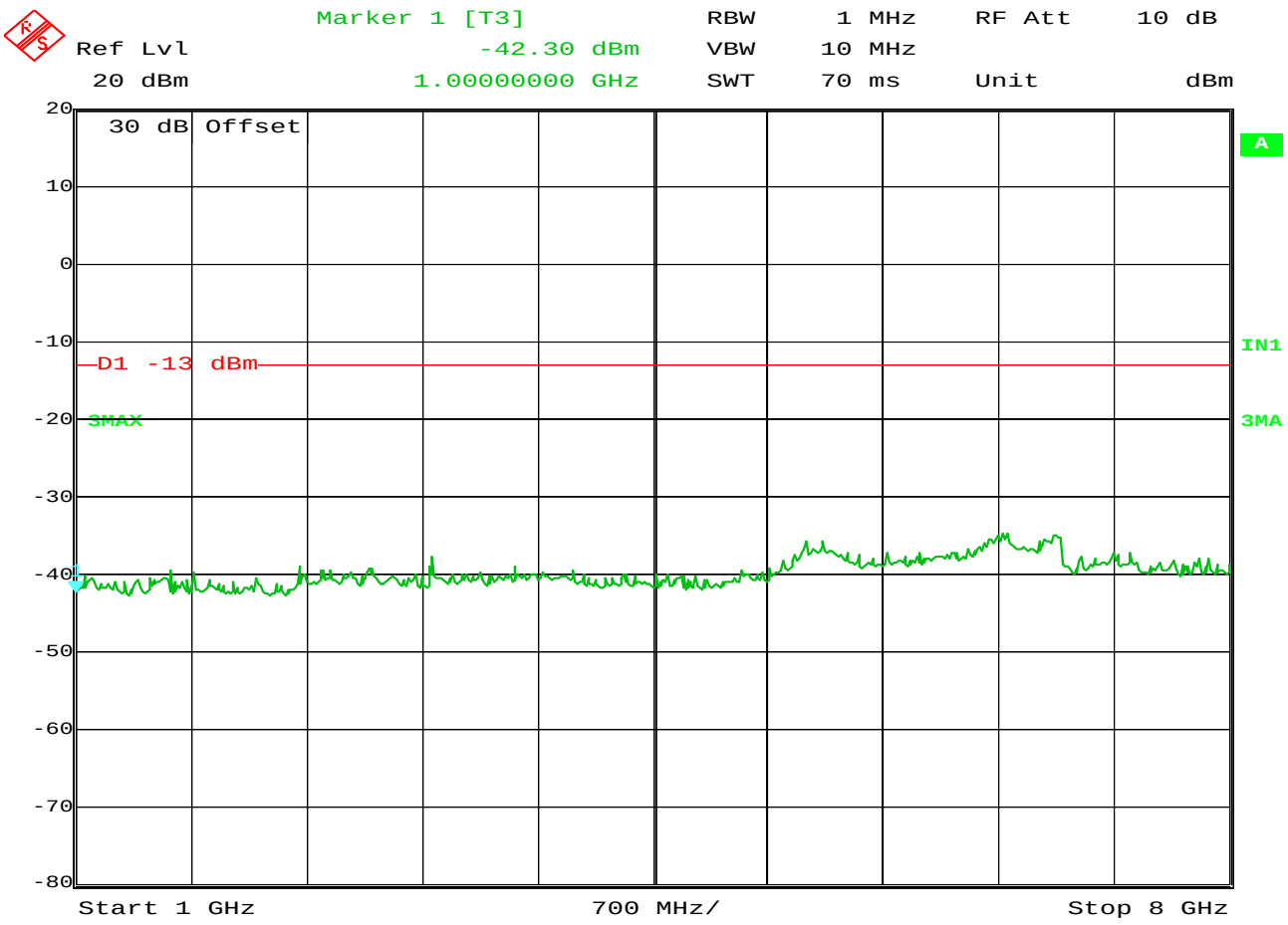
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 14.OCT.2008 17:58:43

FCC PART 27 Antenna Conducted Emissions

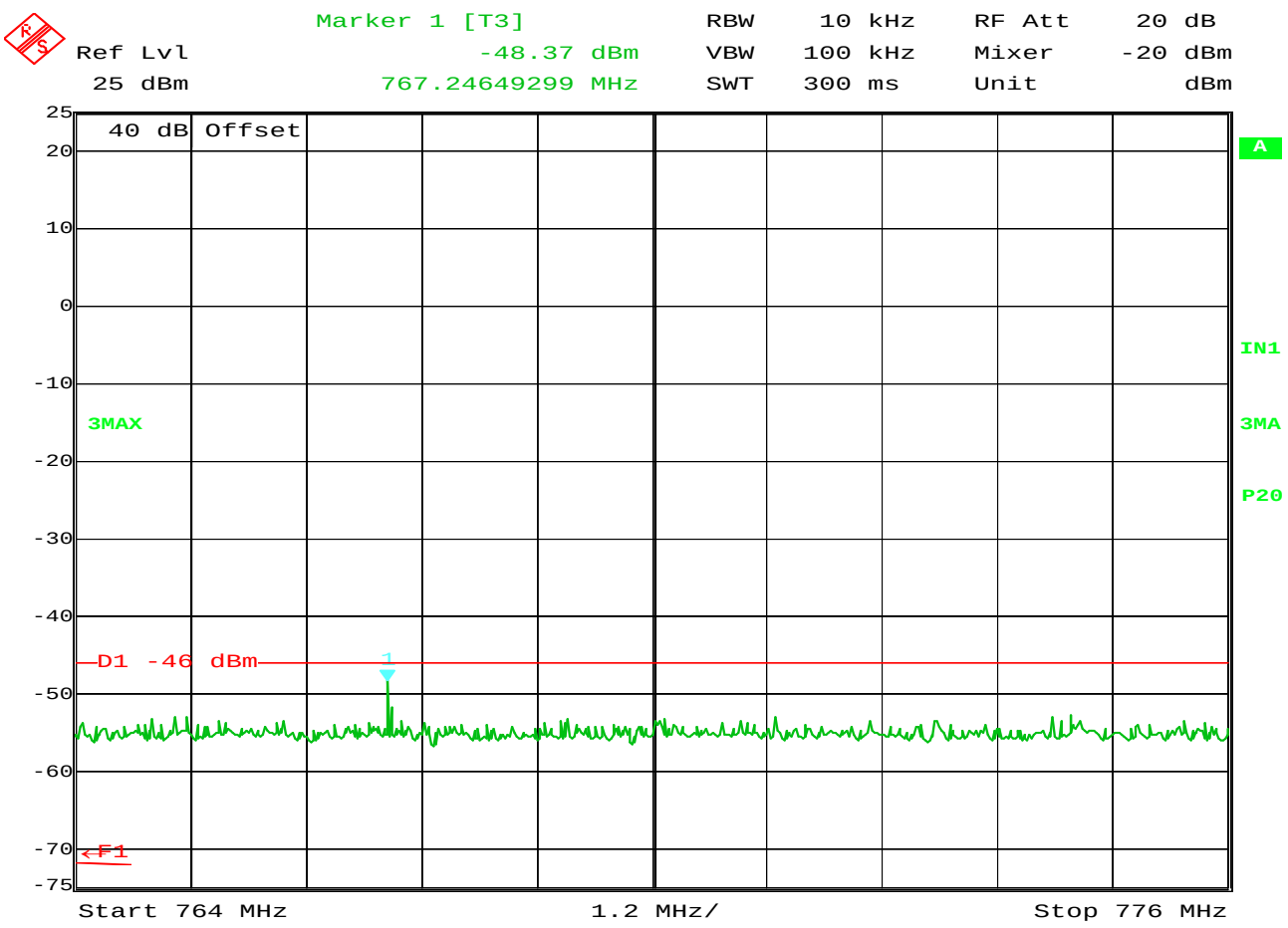
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 14.OCT.2008 17:59:54

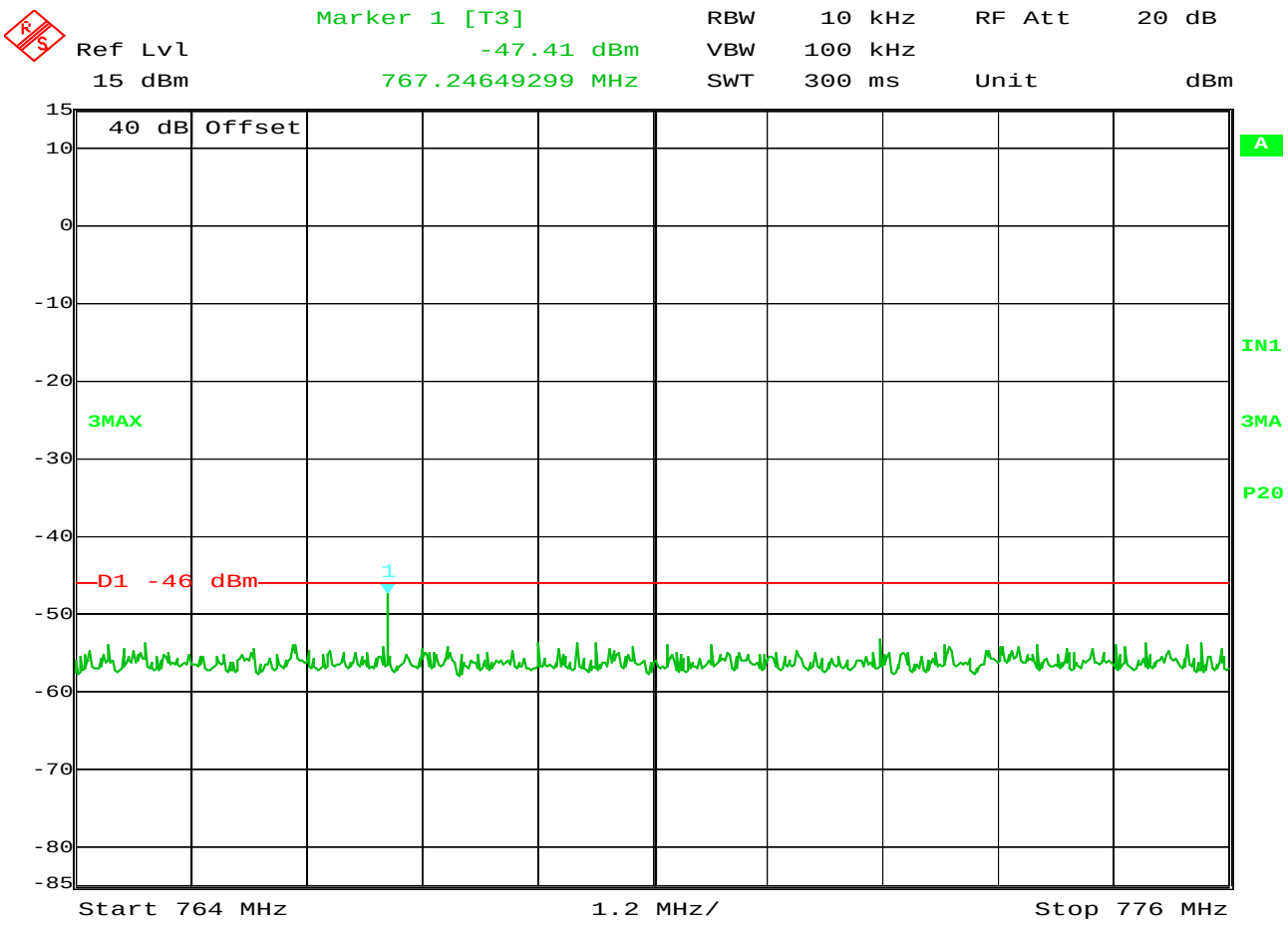
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER : Freewave Technologies Inc
MODEL NUMBER : LRS-760
SERIAL NUMBER : 700-0047
DATA RATE : 5
TEST MODE : Tx @ 787.5MHz
EQUIPMENT USED : RBB0, T2D1, T2S7



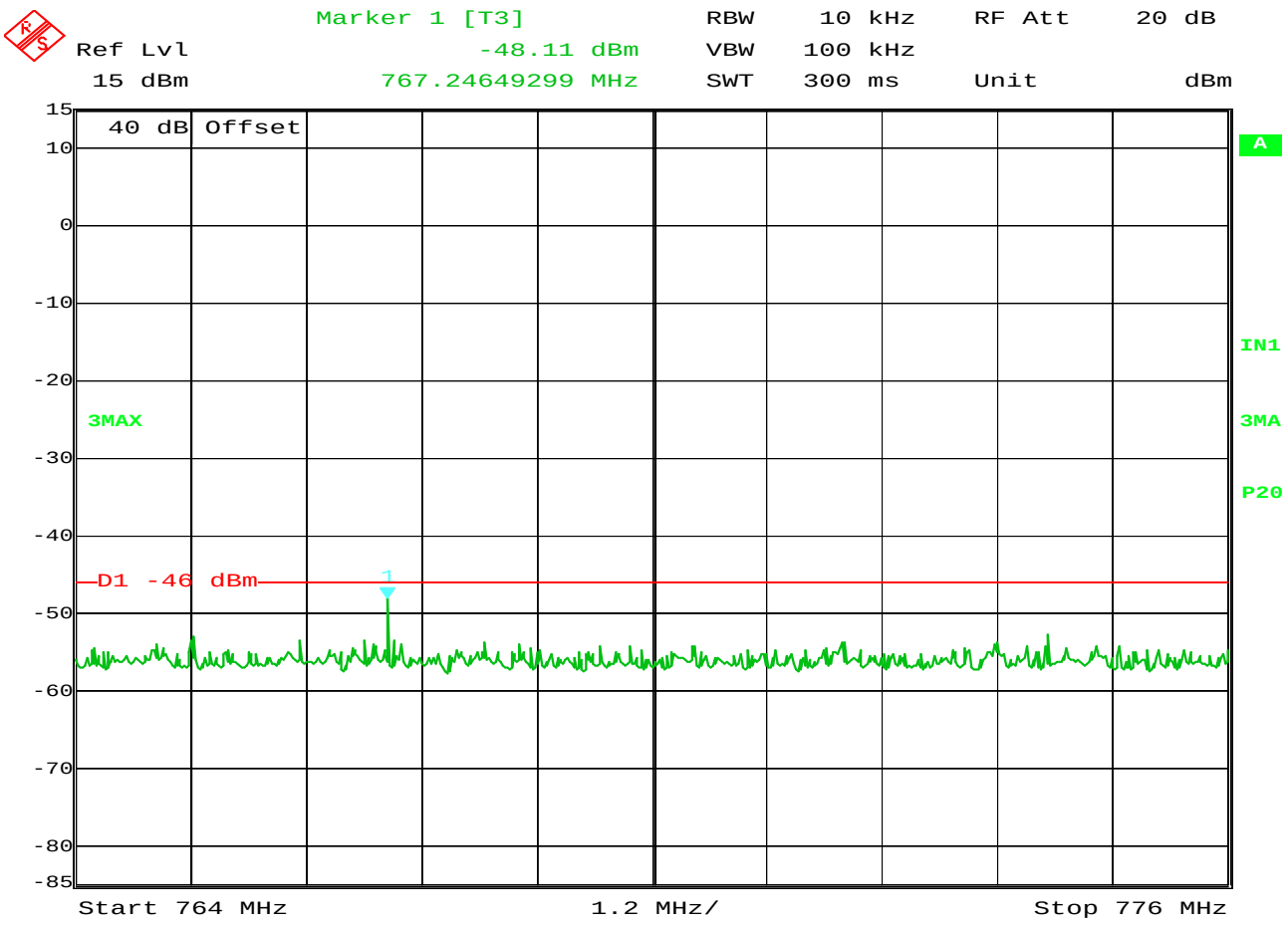
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 0
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



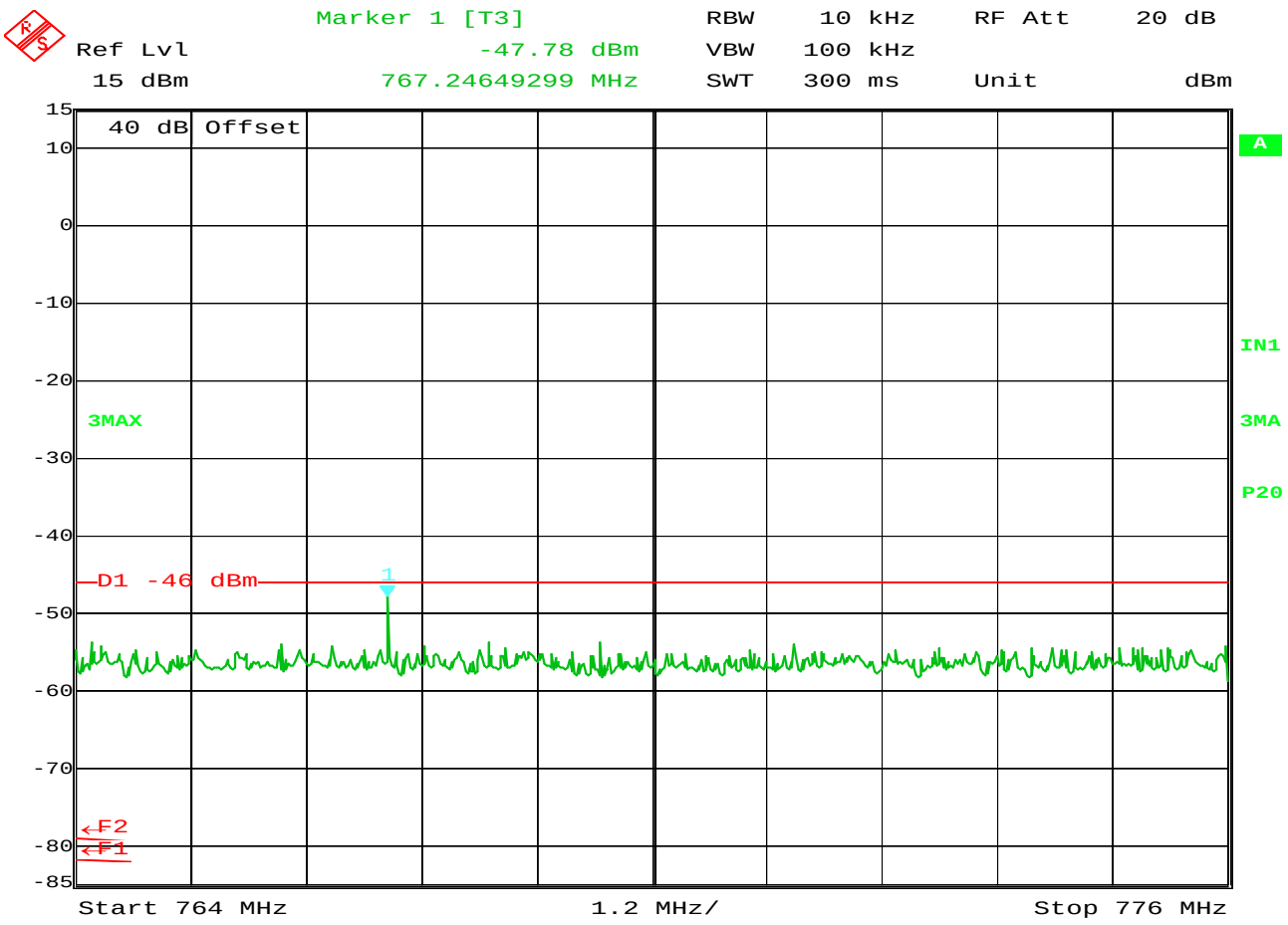
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 1
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC PART 27 Antenna Conducted Emissions

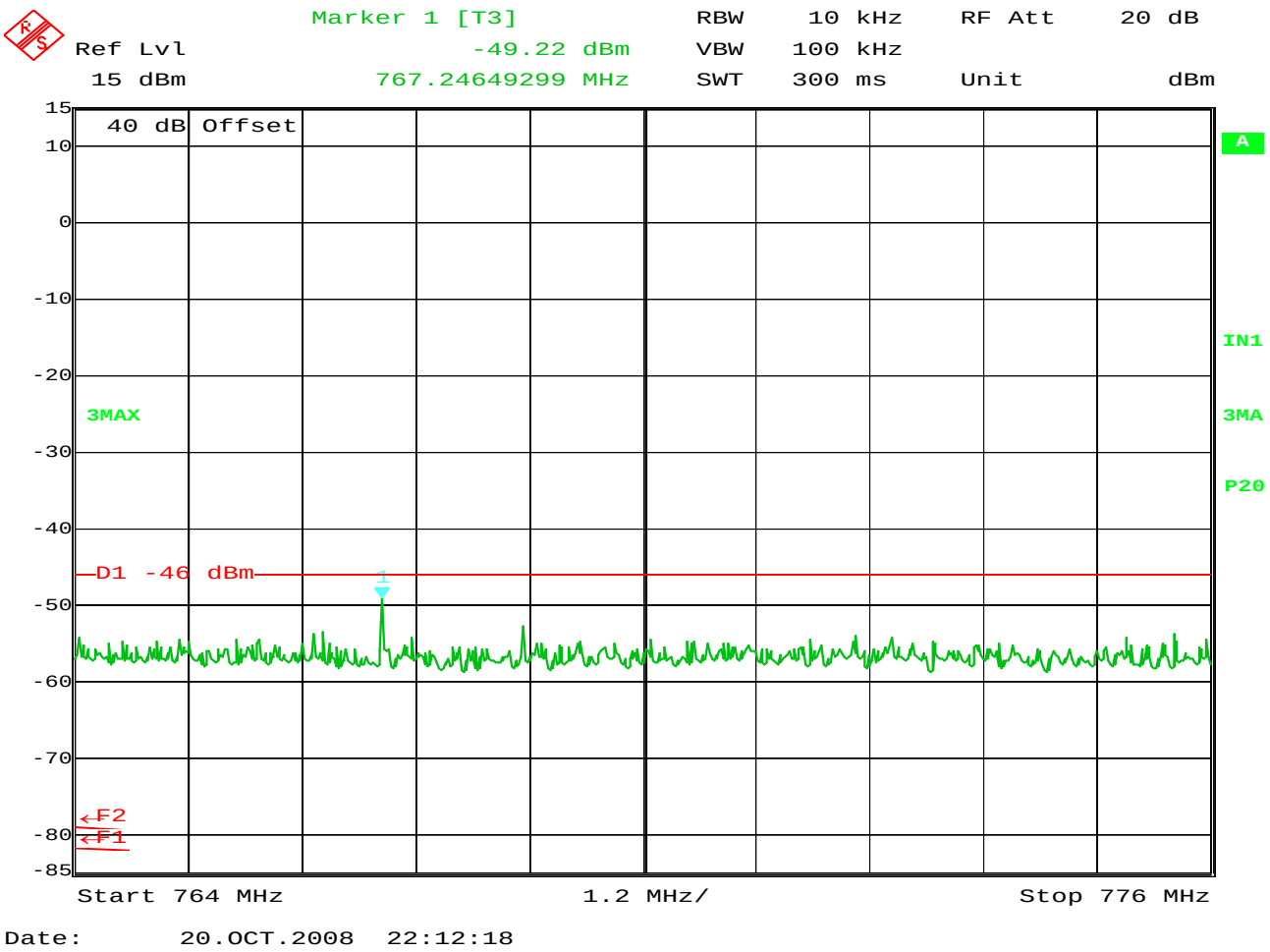
MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 2
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 20.OCT.2008 22:13:44

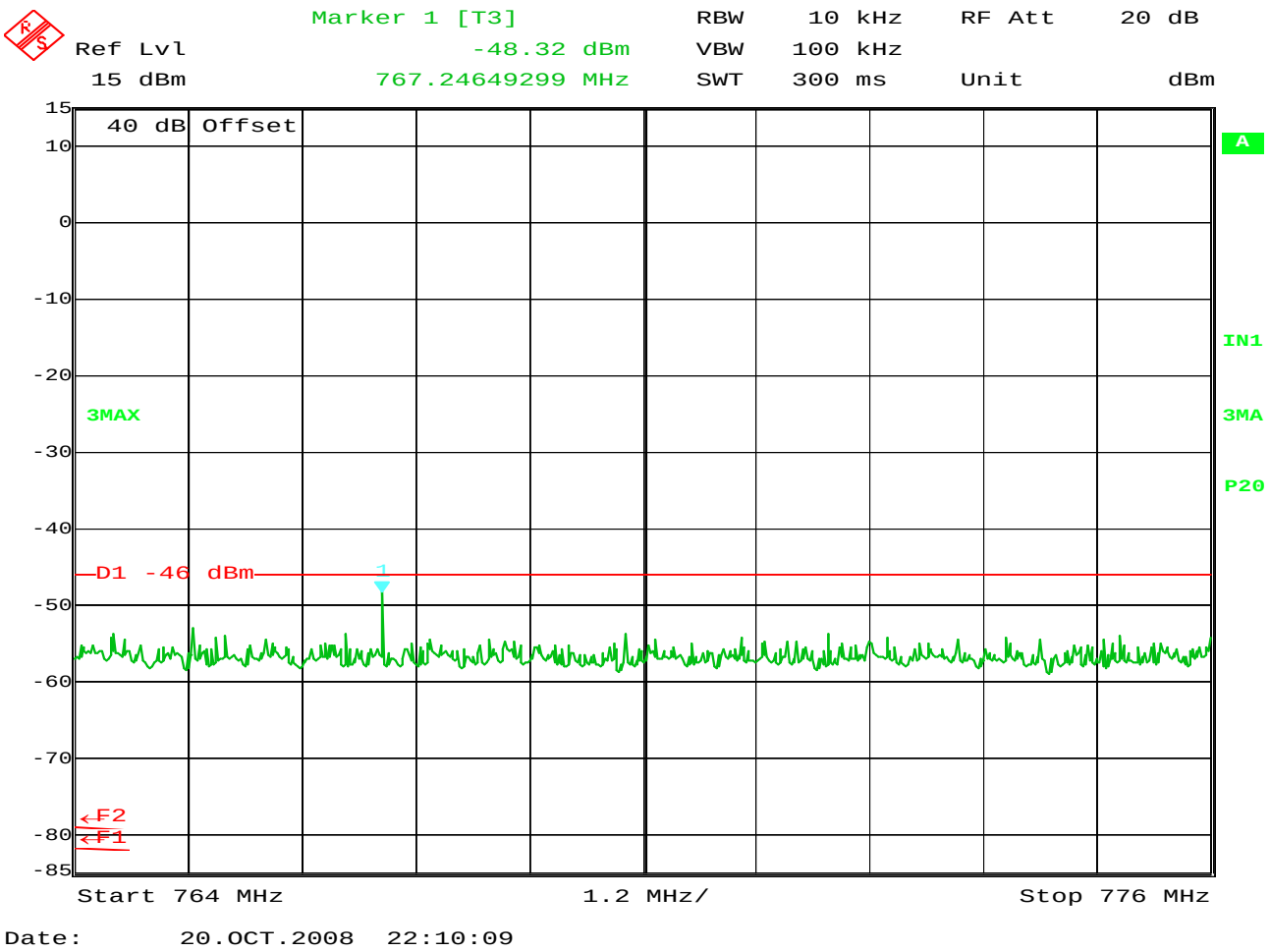
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 3
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



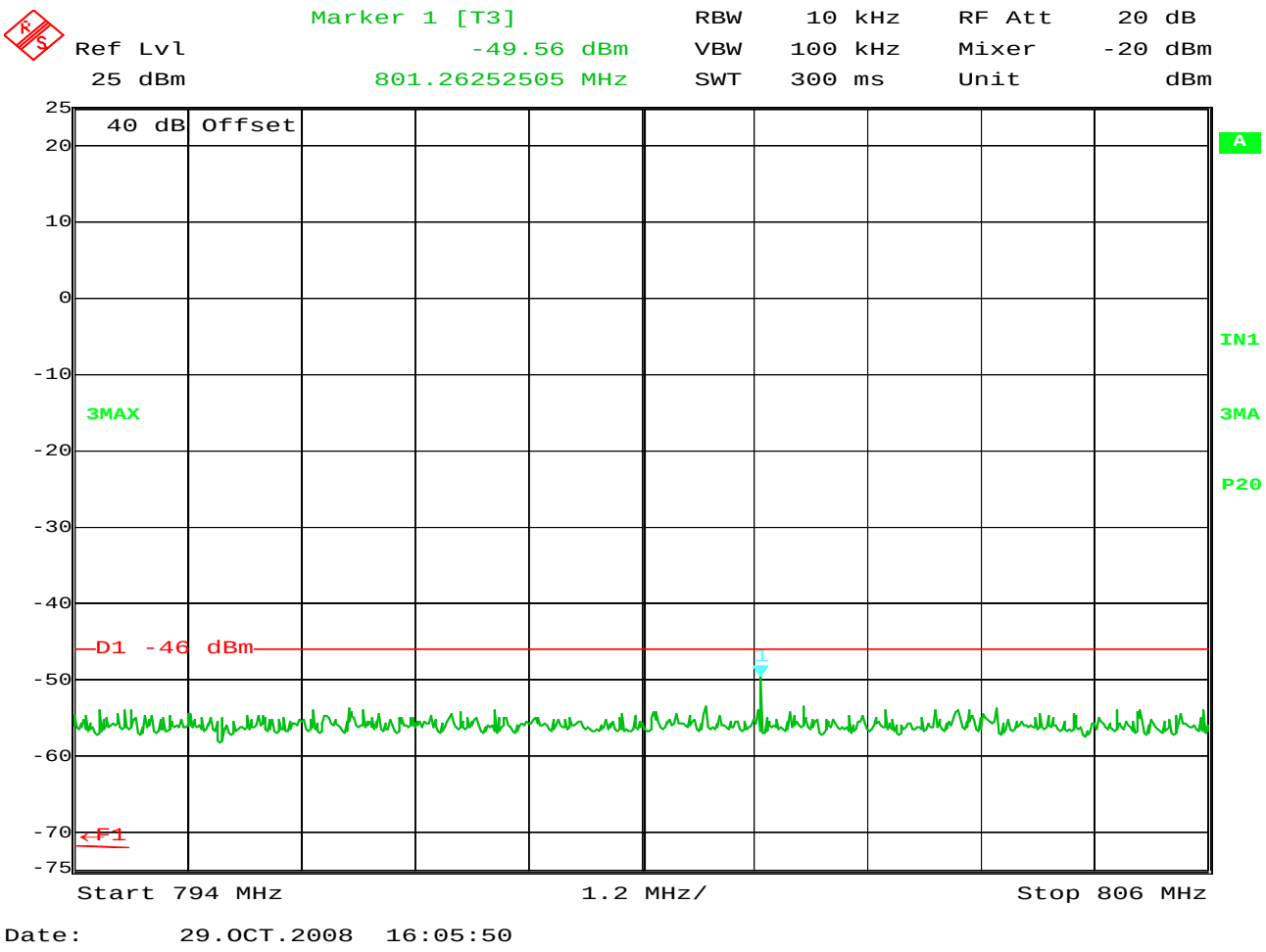
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 4
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



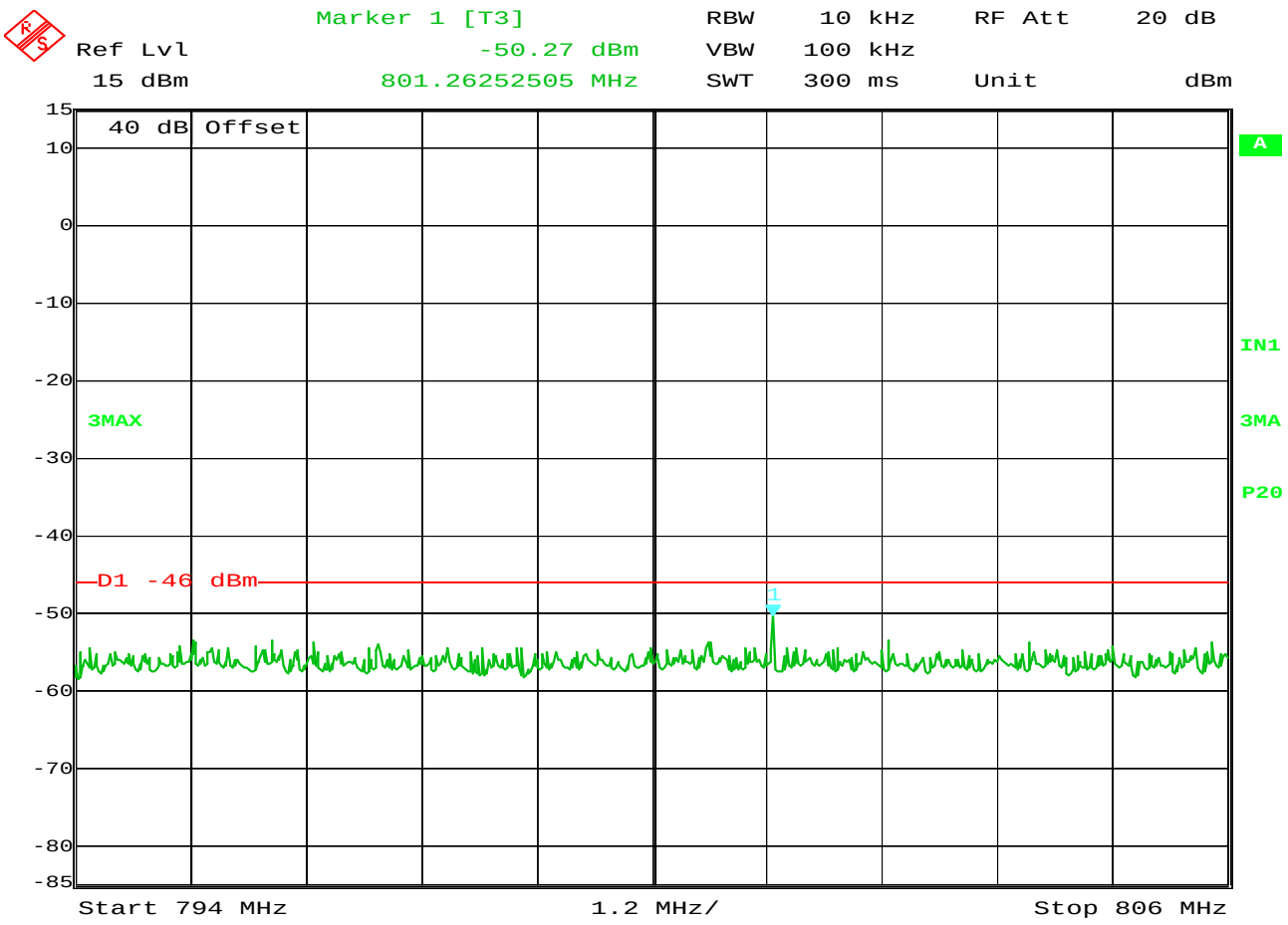
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 5
TEST MODE	: Tx @ 757.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



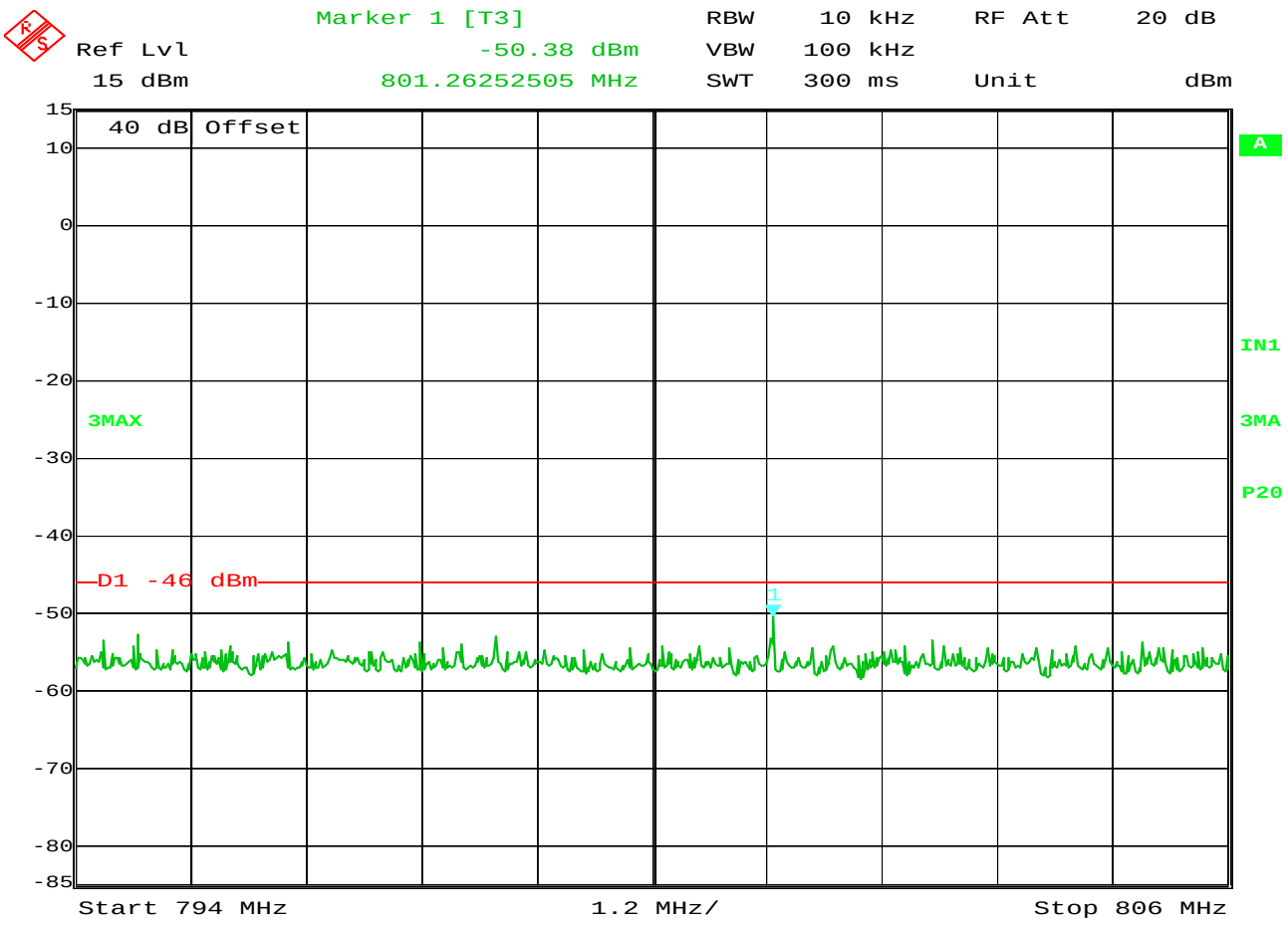
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 0
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



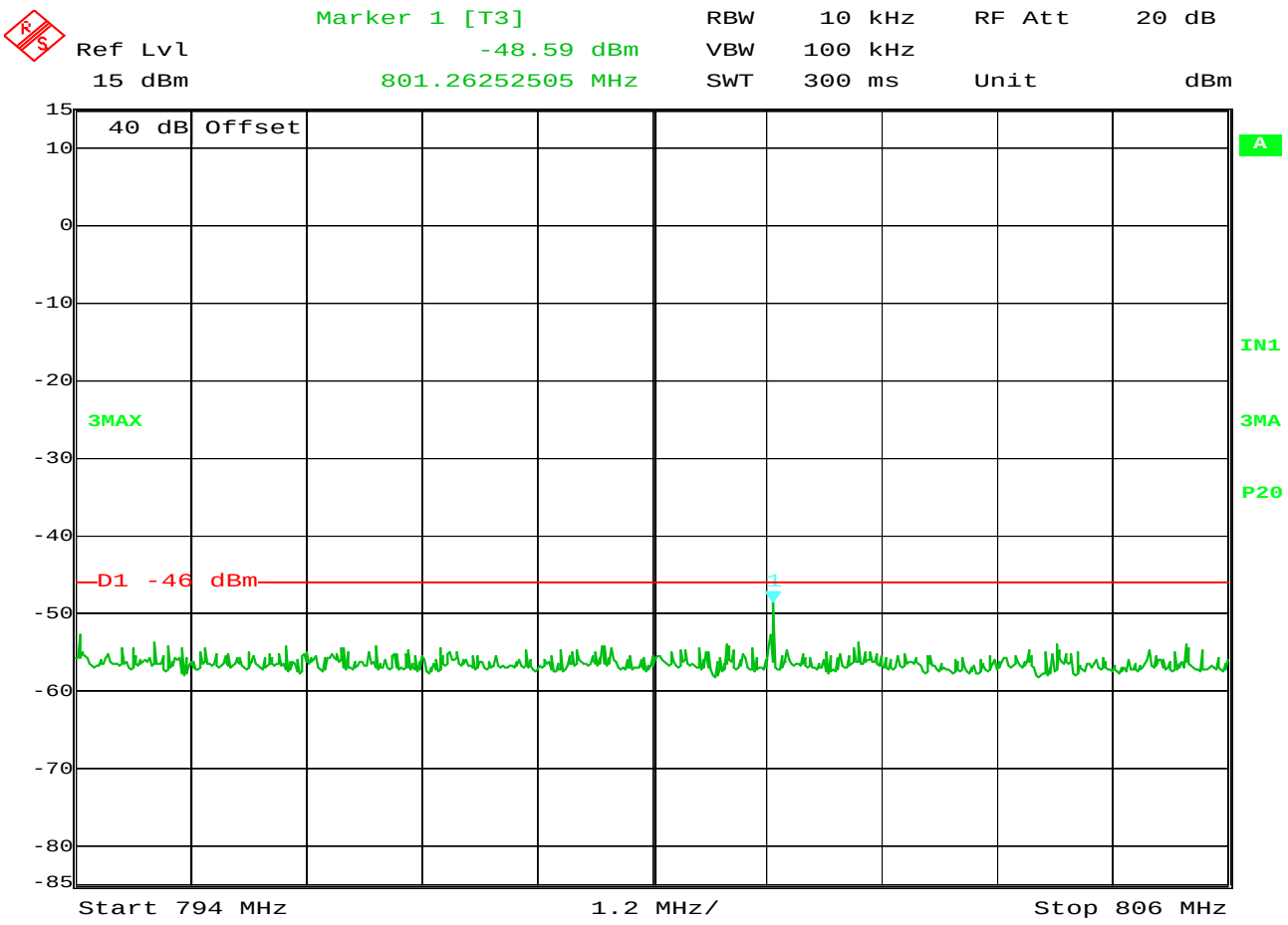
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 1
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



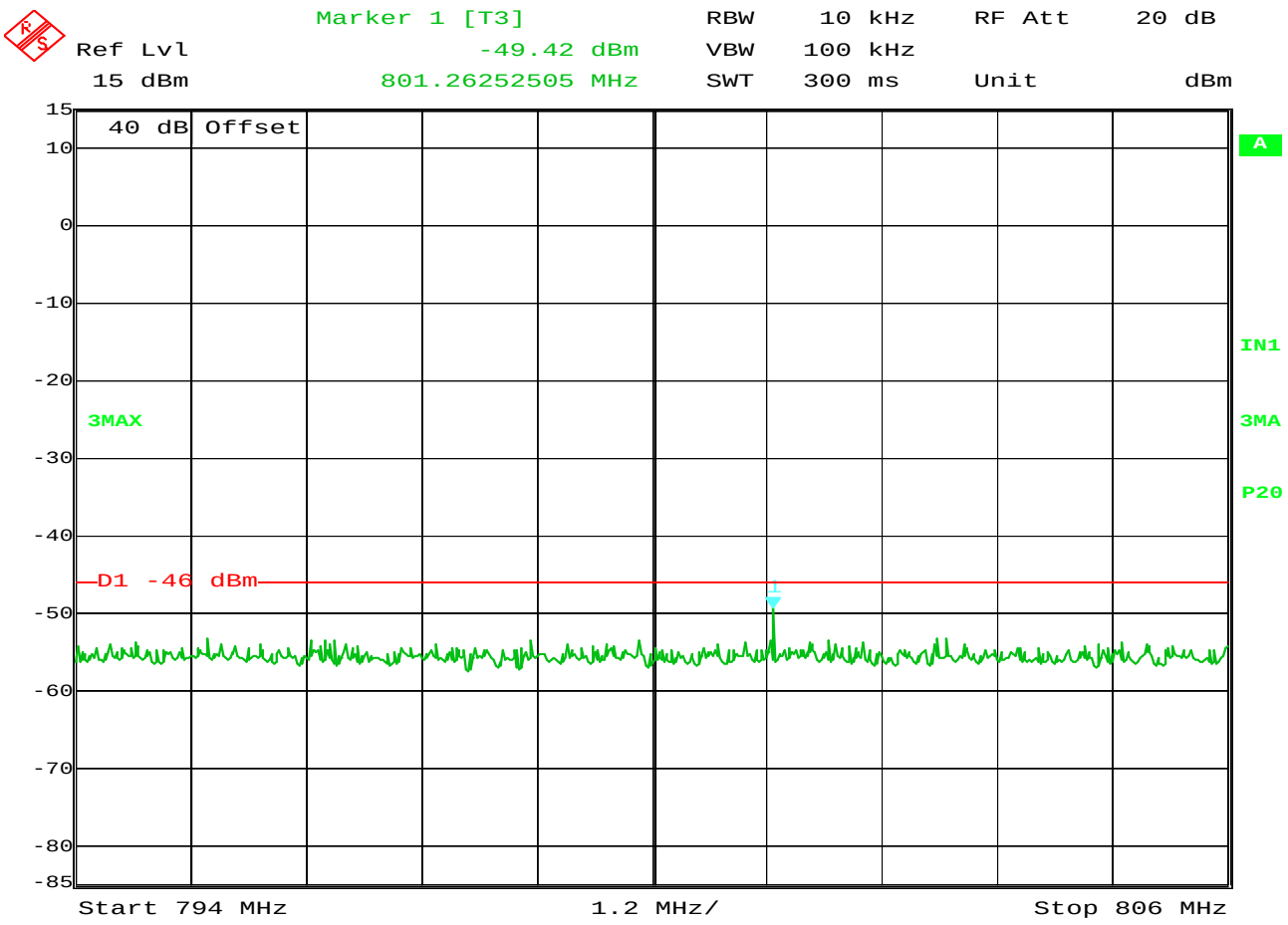
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 2
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



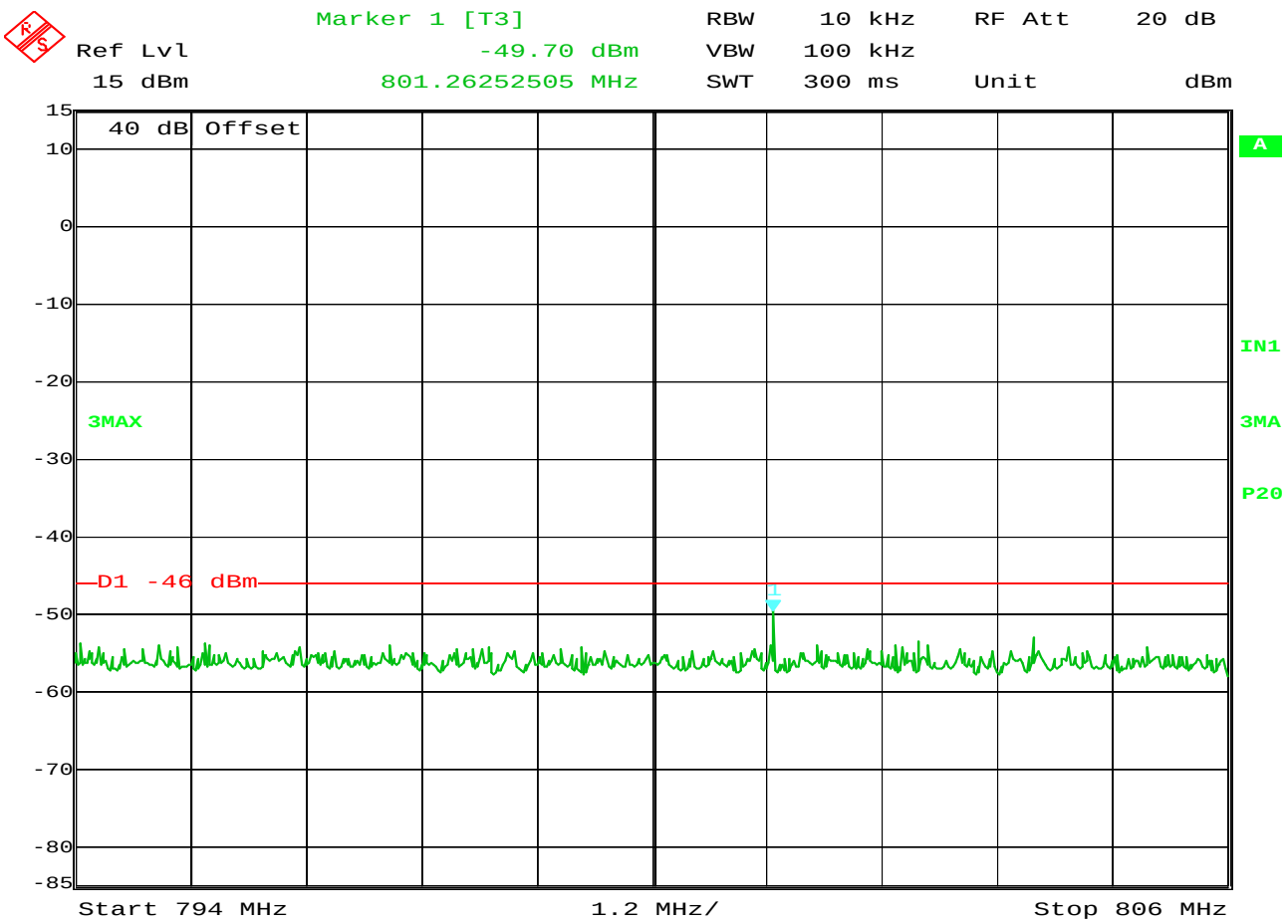
FCC PART 27 Antenna Conducted Emissions

MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 3
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7



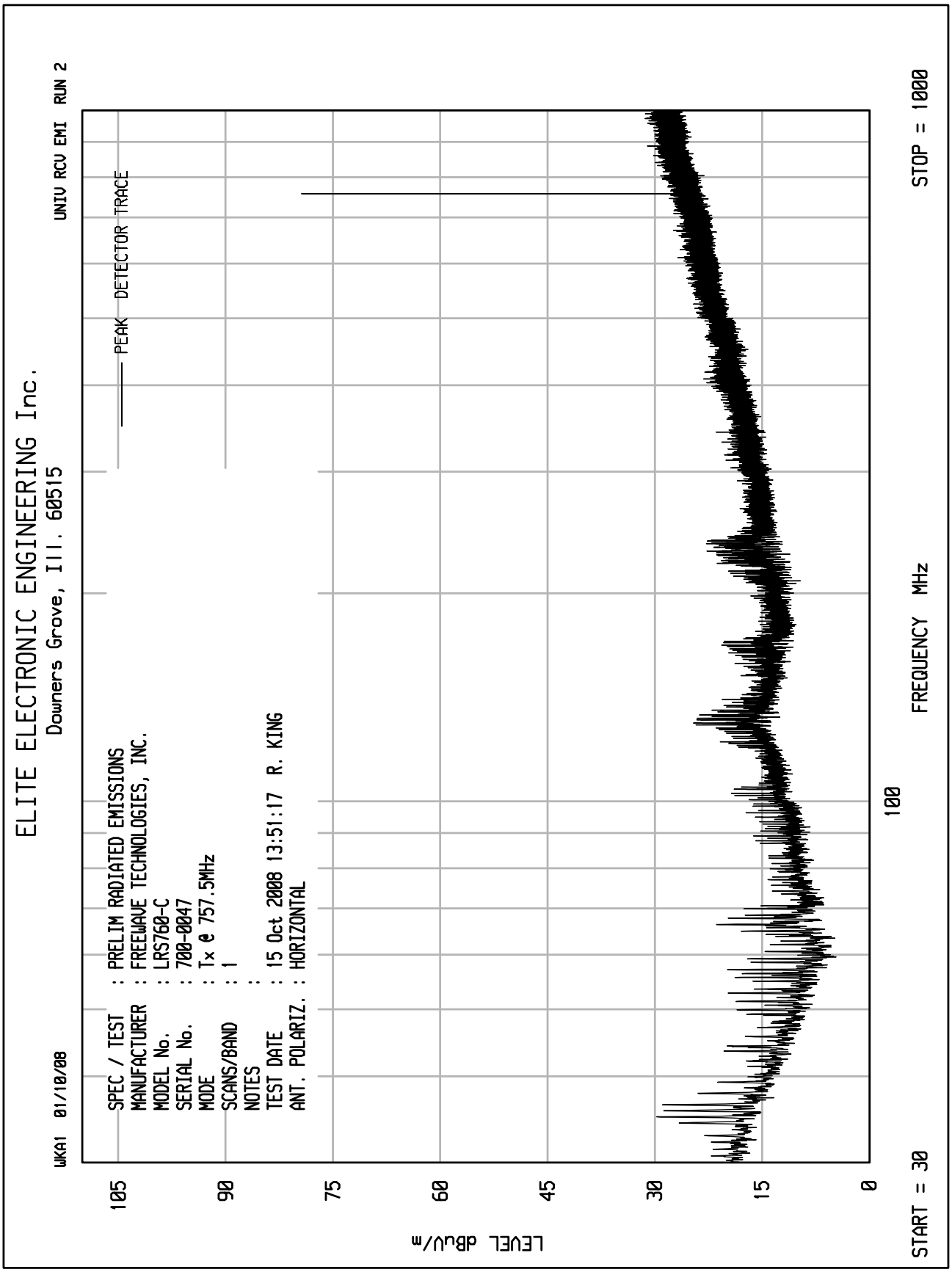
FCC PART 27 Antenna Conducted Emissions

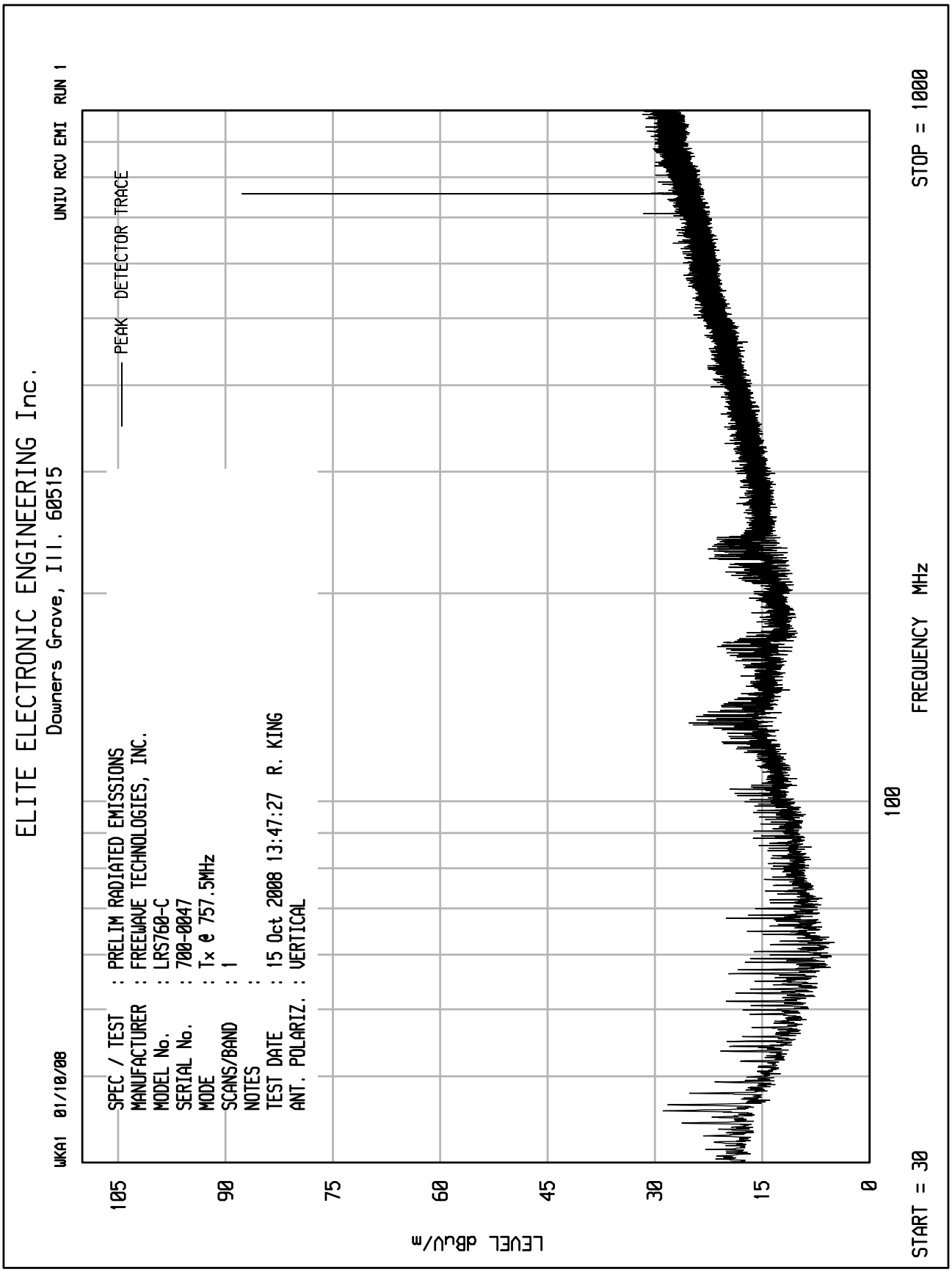
MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 4
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7

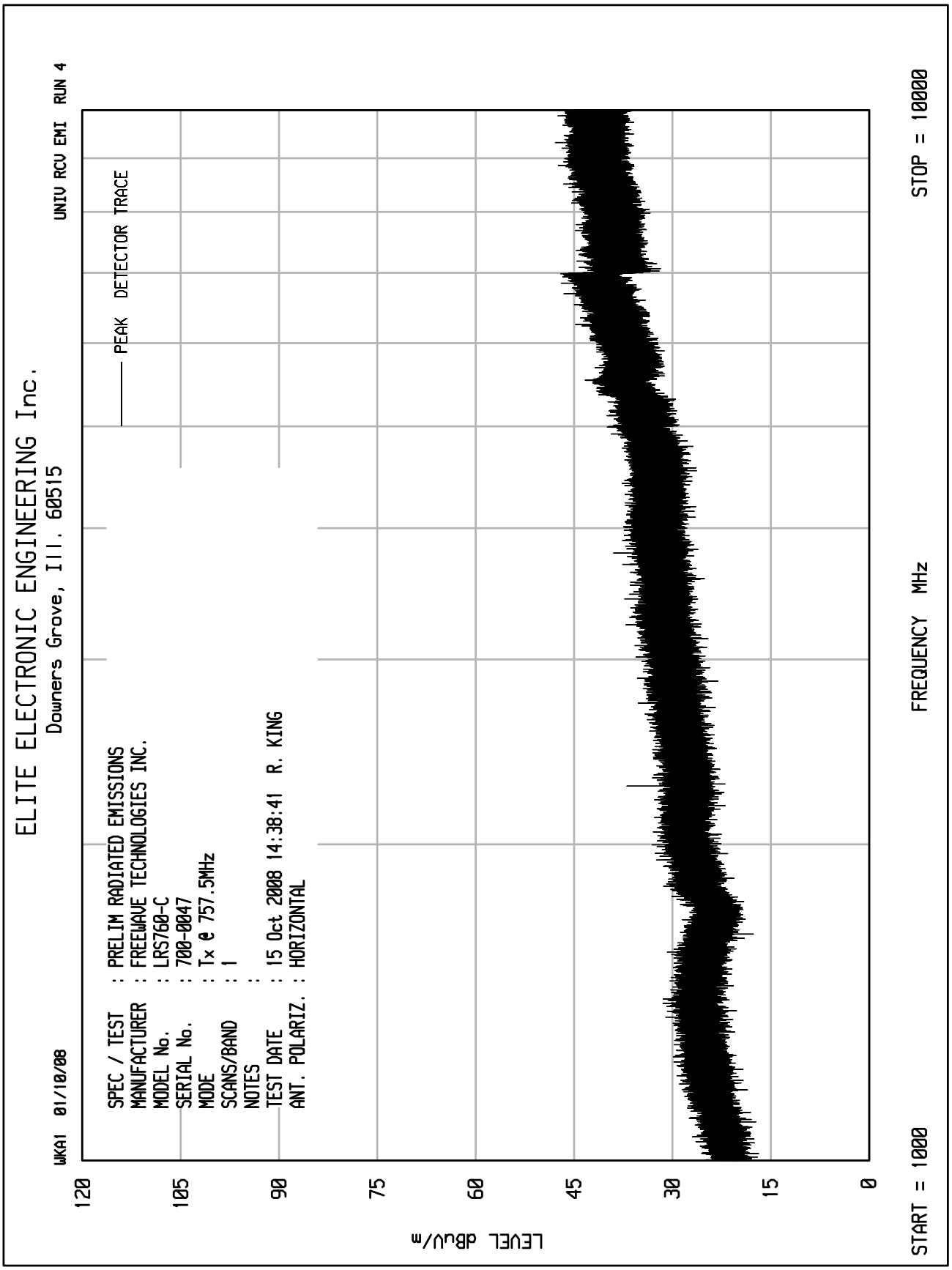


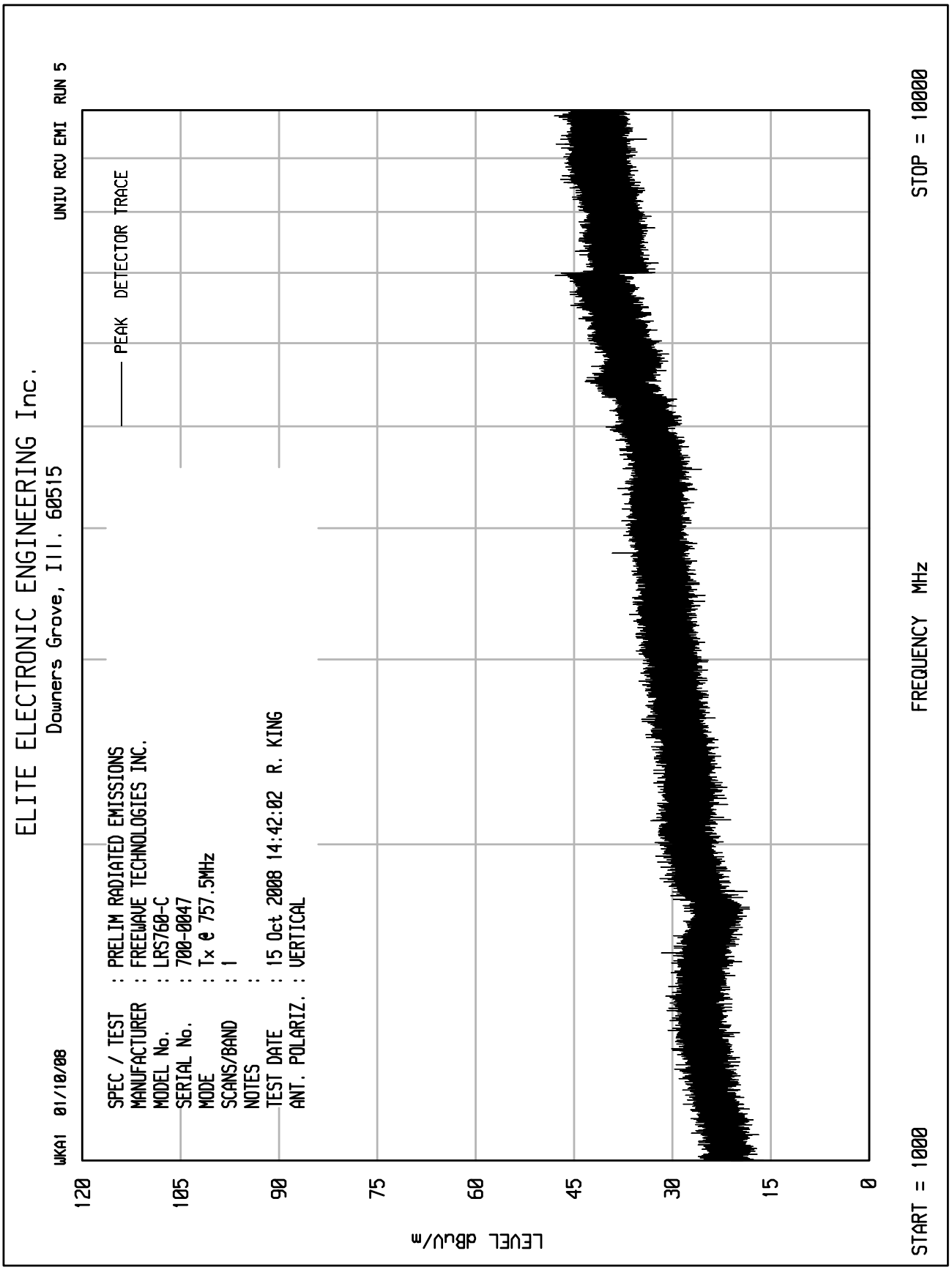
FCC PART 27 Antenna Conducted Emissions

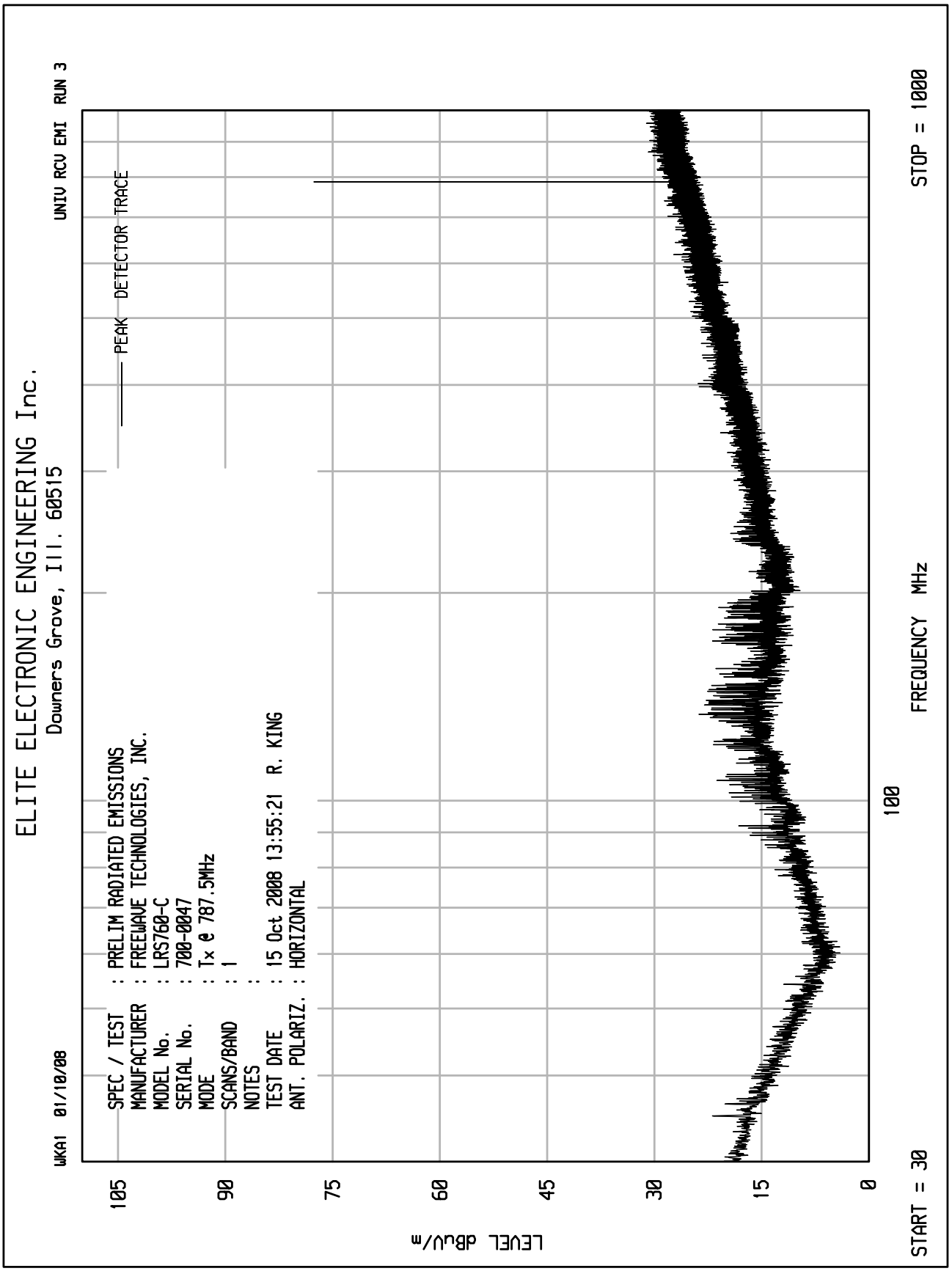
MANUFACTURER	: Freewave
MODEL NUMBER	: LRS760-C
SERIAL NUMBER	: none
DATA RATE	: 5
TEST MODE	: Tx @ 787.5MHz
EQUIPMENT USED	: RBB0, T2D1, T2S7

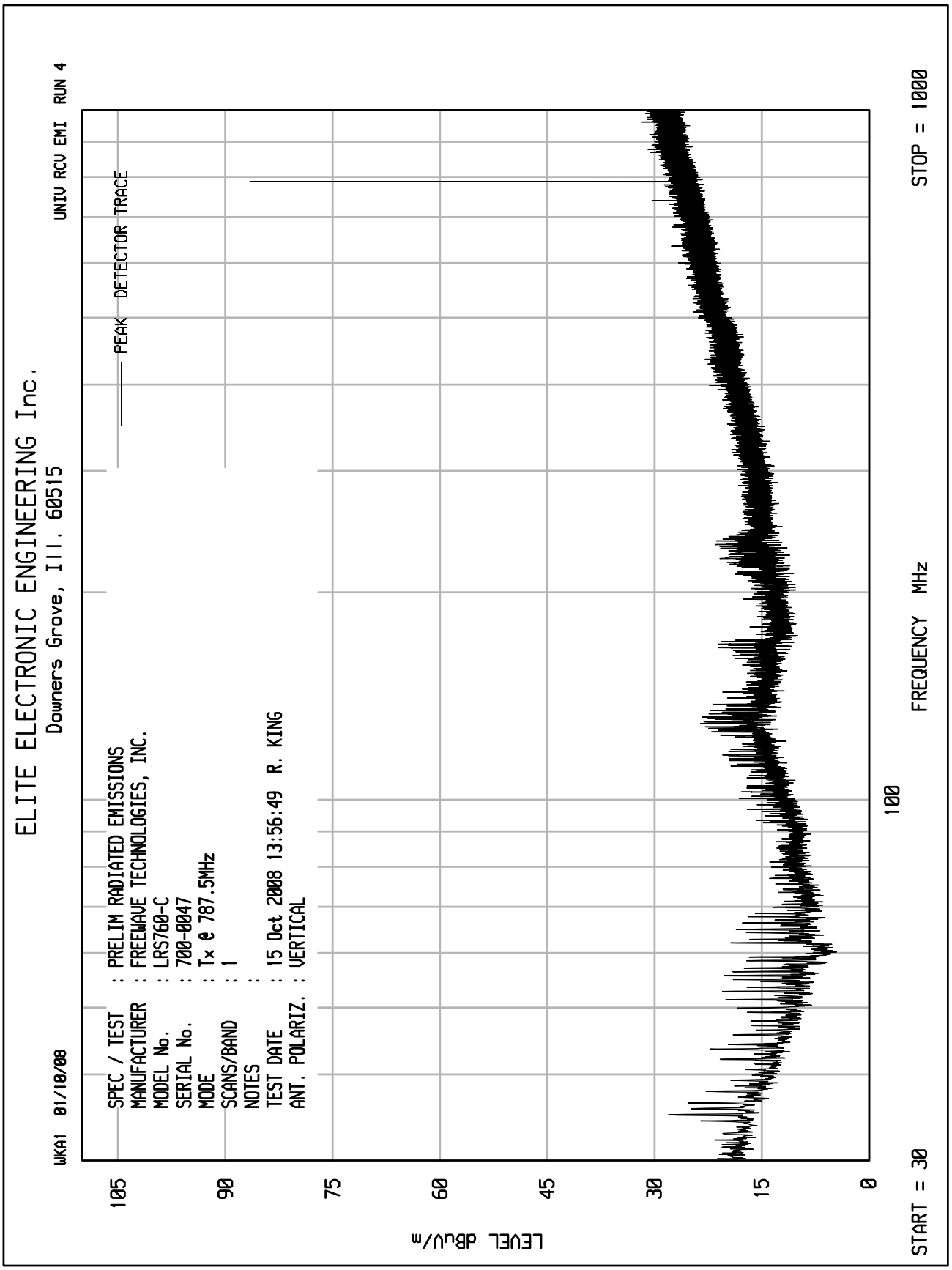

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES, INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 757.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 13:51:17 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

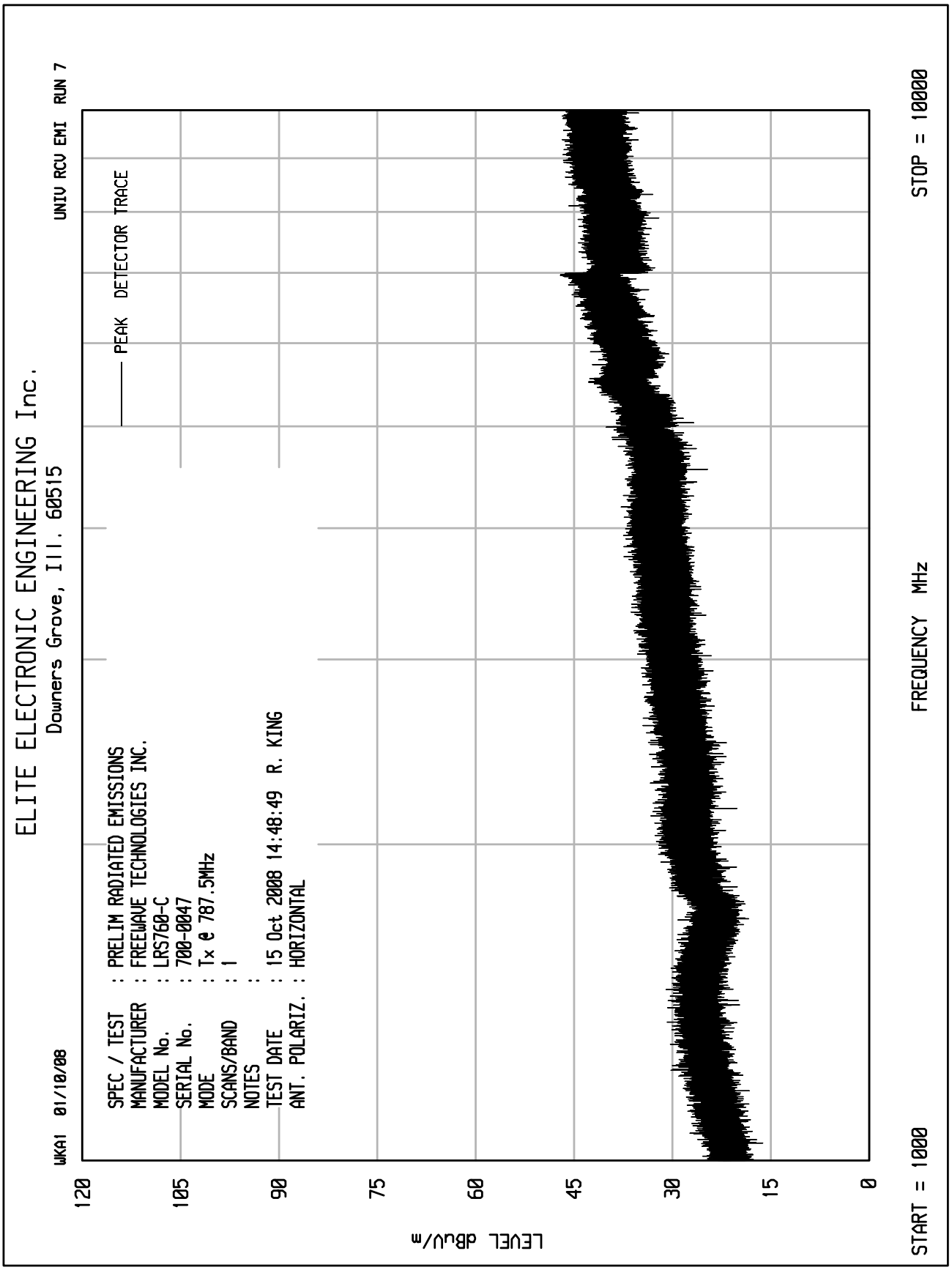

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES, INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 757.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 13:47:27 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

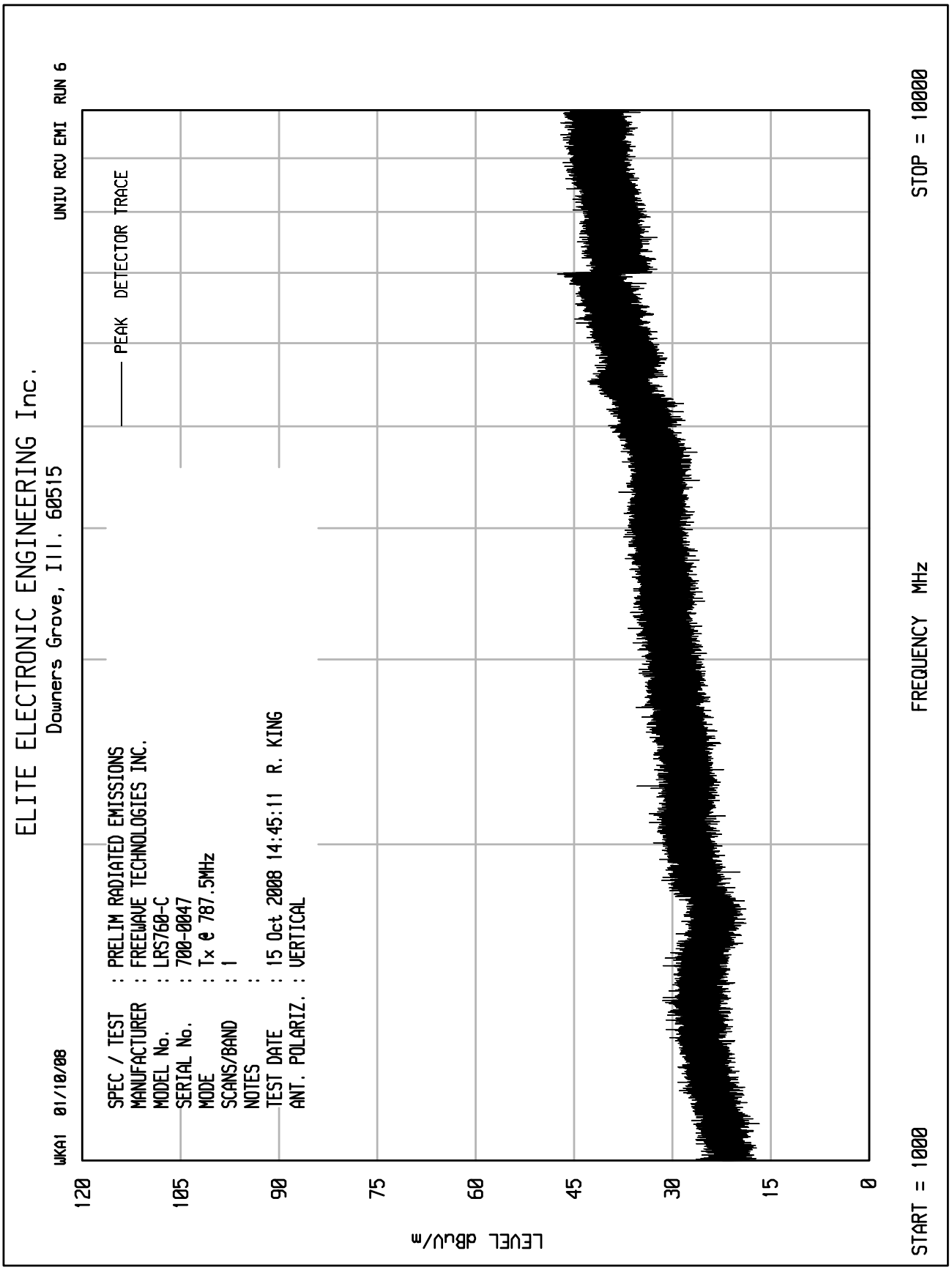

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 757.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 14:38:41 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 757.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 14:42:02 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES, INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 787.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 13:55:21 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKAI 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES, INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 787.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 13:56:49 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 787.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 14:48:49 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 01/10/08
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : FREEWAVE TECHNOLOGIES INC.
MODEL No. : LRS760-C
SERIAL No. : 700-0047
MODE : Tx @ 787.5MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 15 Oct 2008 14:45:11 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000

Data Page

MANUFACTURER : Freewave Technologies Inc
MODEL NO. : LRS-760
SERIAL NO. : 700-0047
SPECIFICATION : FCC-27 Spurious Radiated Emissions
DATE : October 15, 2008
NOTES : Test Distance is 3 Meters

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	Matched SIG. GEN. (dB)	Equilent Ant Gain (dB)	CBL (dB)	Total (dBm)	Limit	Minimum Attenuation
1515.0	H	24.2	*	-72.8	4.9	2.5	-70.4	103.4	46
1515.0	V	24.0	*	-74.6	4.9	2.5	-72.2	105.2	46
2272.5	H	25.2	*	-77.2	5.4	3.0	-74.8	107.8	46
2272.5	V	25.3	*	-71.6	5.4	3.0	-69.2	102.2	46
3030.0	H	24.4	*	-64.6	5.4	3.3	-62.4	95.4	46
3030.0	V	24.1	*	-65.5	5.4	3.3	-63.3	96.3	46
3787.5	H	24.6	*	-62.6	6.9	3.9	-59.6	92.6	46
3787.5	V	24.4	*	-63.0	6.9	3.9	-60.0	93.0	46
4545.0	H	24.8	*	-64.8	8.3	4.4	-60.9	93.9	46
4545.0	V	25.5	*	-63.8	8.3	4.4	-59.9	92.9	46
5302.5	H	27.7	*	-60.7	7.6	4.9	-58.0	91.0	46
5302.5	V	27.7	*	-61.4	7.6	4.9	-58.7	91.7	46
6060.0	H	31.3	*	-64.7	7.7	5.4	-62.3	95.3	46
6060.0	V	31.1	*	-64.7	7.7	5.4	-62.3	95.3	46
6817.5	H	32.2	*	-50.3	8.0	5.9	-48.3	81.3	46
6817.5	V	33.0	*	-50.3	8.0	5.9	-48.2	81.2	46
7575.0	H	28.5	*	-50.3	7.6	6.2	-48.9	81.9	46
7575.0	V	28.5	*	-50.3	7.6	6.2	-48.9	81.9	46

Checked BY : Richard E. King

Richard E. King

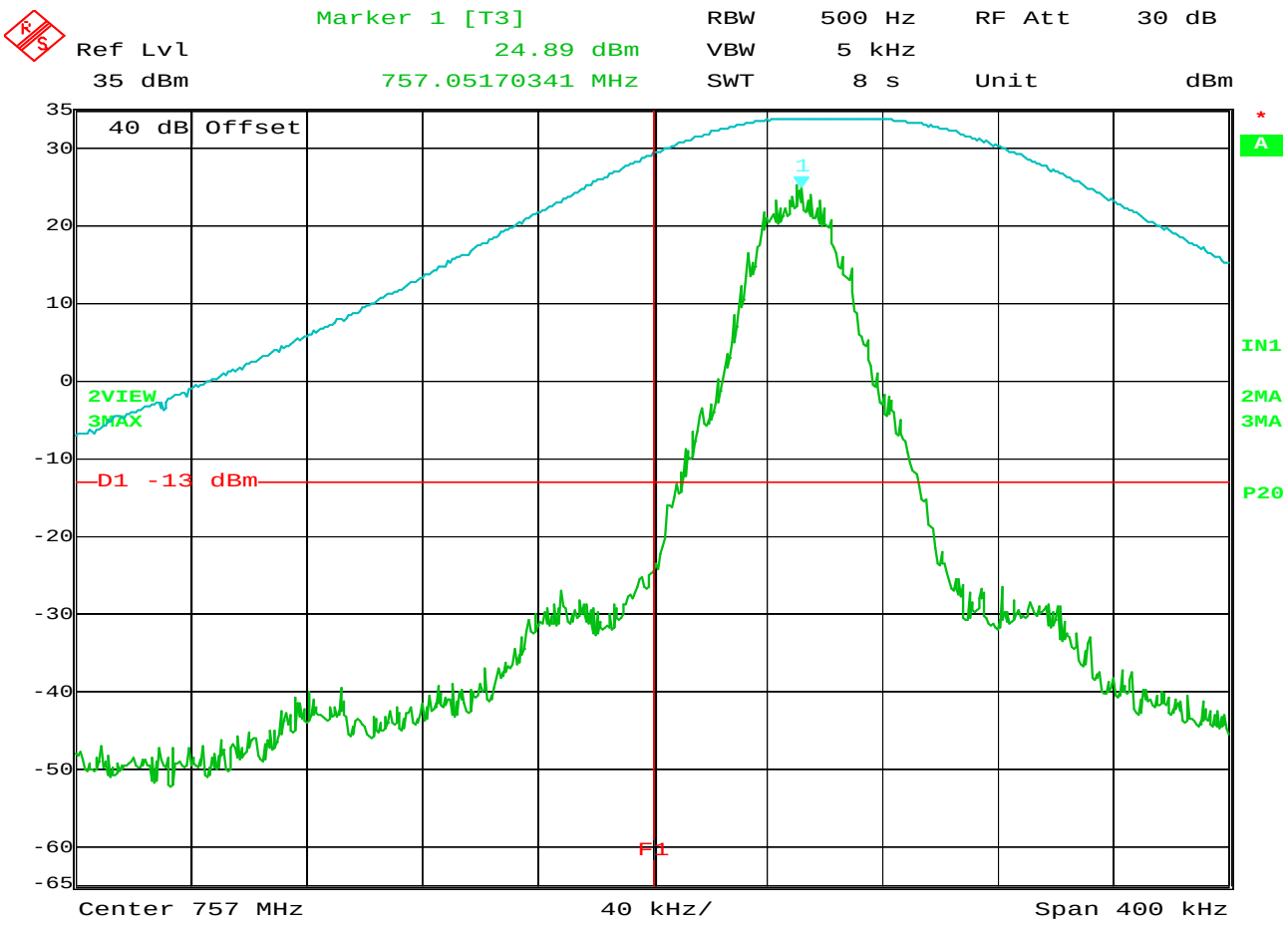
Data Page

MANUFACTURER : Freewave Technologies Inc
MODEL NO. : LRS-760
SERIAL NO. : 700-0047
SPECIFICATION : FCC-27 Spurious Radiated Emissions
DATE : October 15, 2008
NOTES : Test Distance is 3 Meters

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	Matched SIG. GEN. (dB)	Equilent Ant Gain (dB)	CBL (dB)	Total (dBm)	Limit	Minimum Attenuation
1575.0	H	35.6	*	-72.8	5.2	2.5	-70.1	103.1	46
1575.0	V	34.3	*	-74.6	5.2	2.5	-71.9	104.9	46
2362.5	H	23.8	*	-77.2	5.7	3.0	-74.5	107.5	46
2362.5	V	23.5	*	-71.6	5.7	3.0	-68.9	101.9	46
3150.0	H	24.8	*	-64.6	5.7	3.3	-62.1	95.1	46
3150.0	V	24.9	*	-65.5	5.7	3.3	-63.0	96.0	46
3937.5	H	25.1	*	-62.6	7.2	3.9	-59.2	92.2	46
3937.5	V	26.8	*	-63.0	7.2	3.9	-59.6	92.6	46
4725.0	H	25.1	*	-64.8	8.6	4.4	-60.6	93.6	46
4725.0	V	25.2	*	-63.8	8.6	4.4	-59.6	92.6	46
5512.5	H	28.3	*	-60.7	7.9	4.9	-57.6	90.6	46
5512.5	V	26.8	*	-61.4	7.9	4.9	-58.3	91.3	46
6300.0	H	29.1	*	-64.7	8.1	5.4	-62.0	95.0	46
6300.0	V	28.6	*	-64.7	8.1	5.4	-62.0	95.0	46
7087.5	H	29.6	*	-50.3	8.3	5.9	-47.9	80.9	46
7087.5	V	27.9	*	-50.3	8.3	5.9	-47.9	80.9	46
7875.0	H	28.1	*	-50.3	7.9	6.2	-48.6	81.6	46
7875.0	V	28.2	*	-50.3	7.9	6.2	-48.6	81.6	46

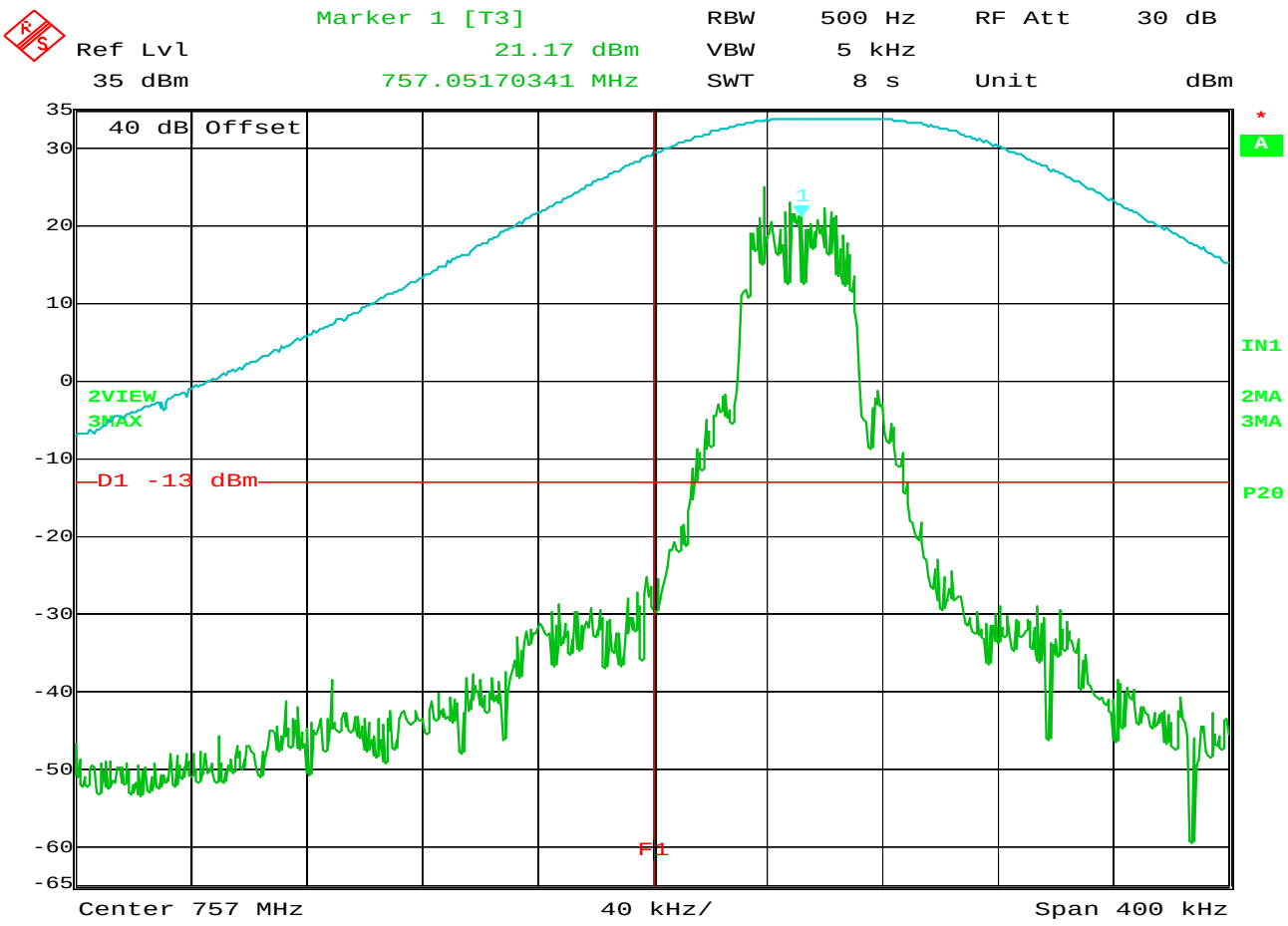
Checked BY : Richard E. King

Richard E. King



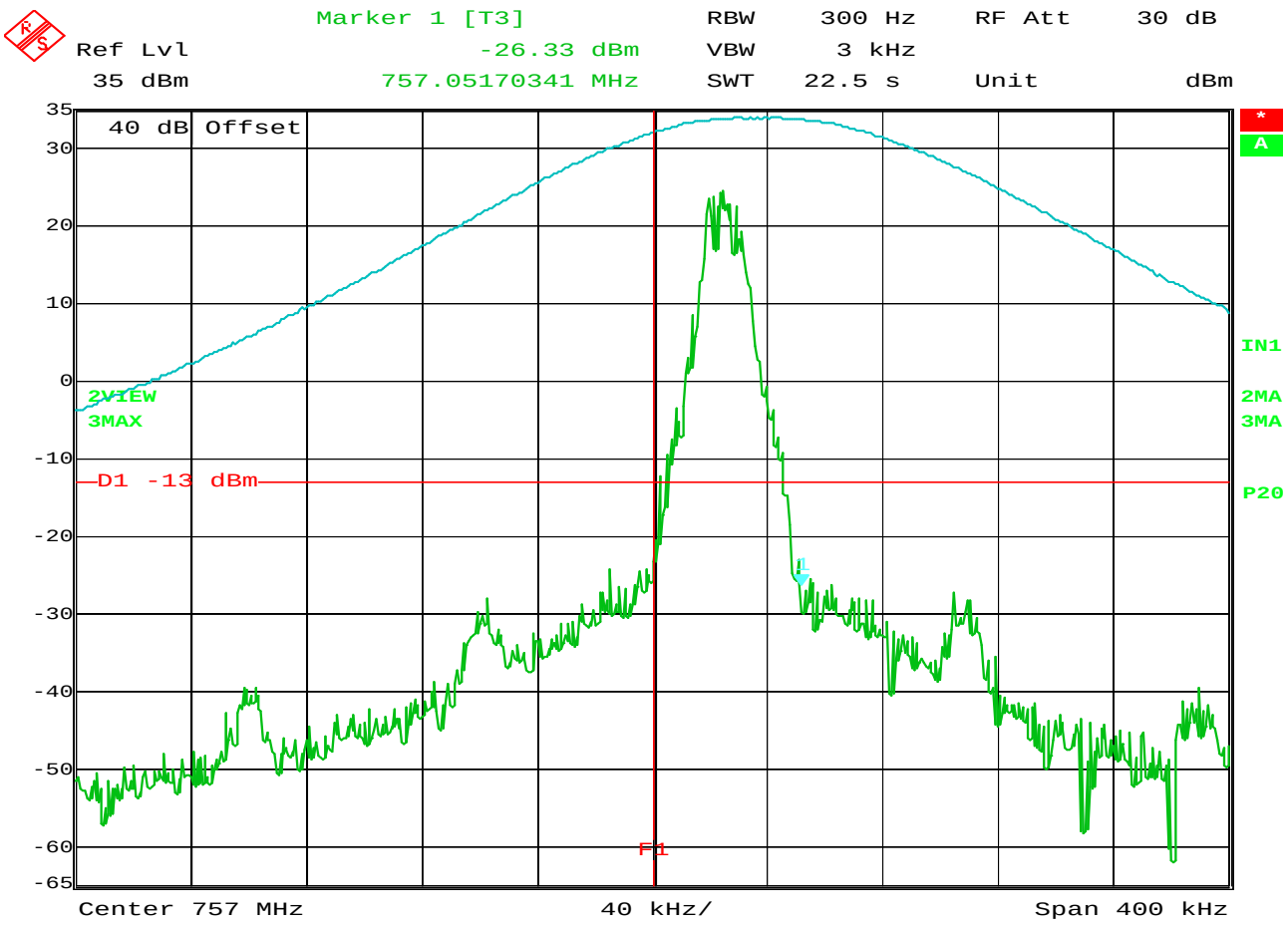
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 757.0500MHz
	: 757+ (8*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



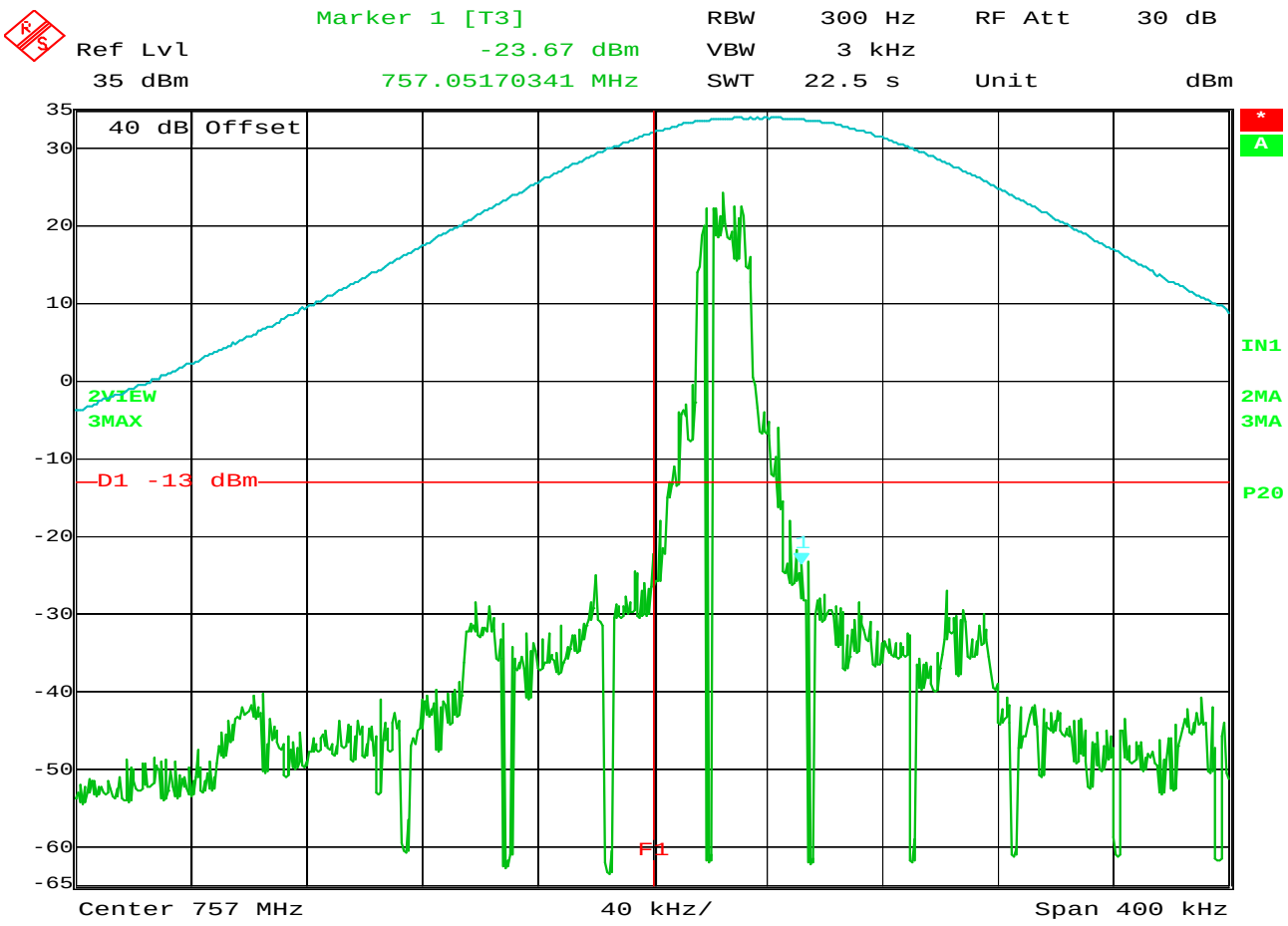
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 757.0500MHz
	: 757+(8*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



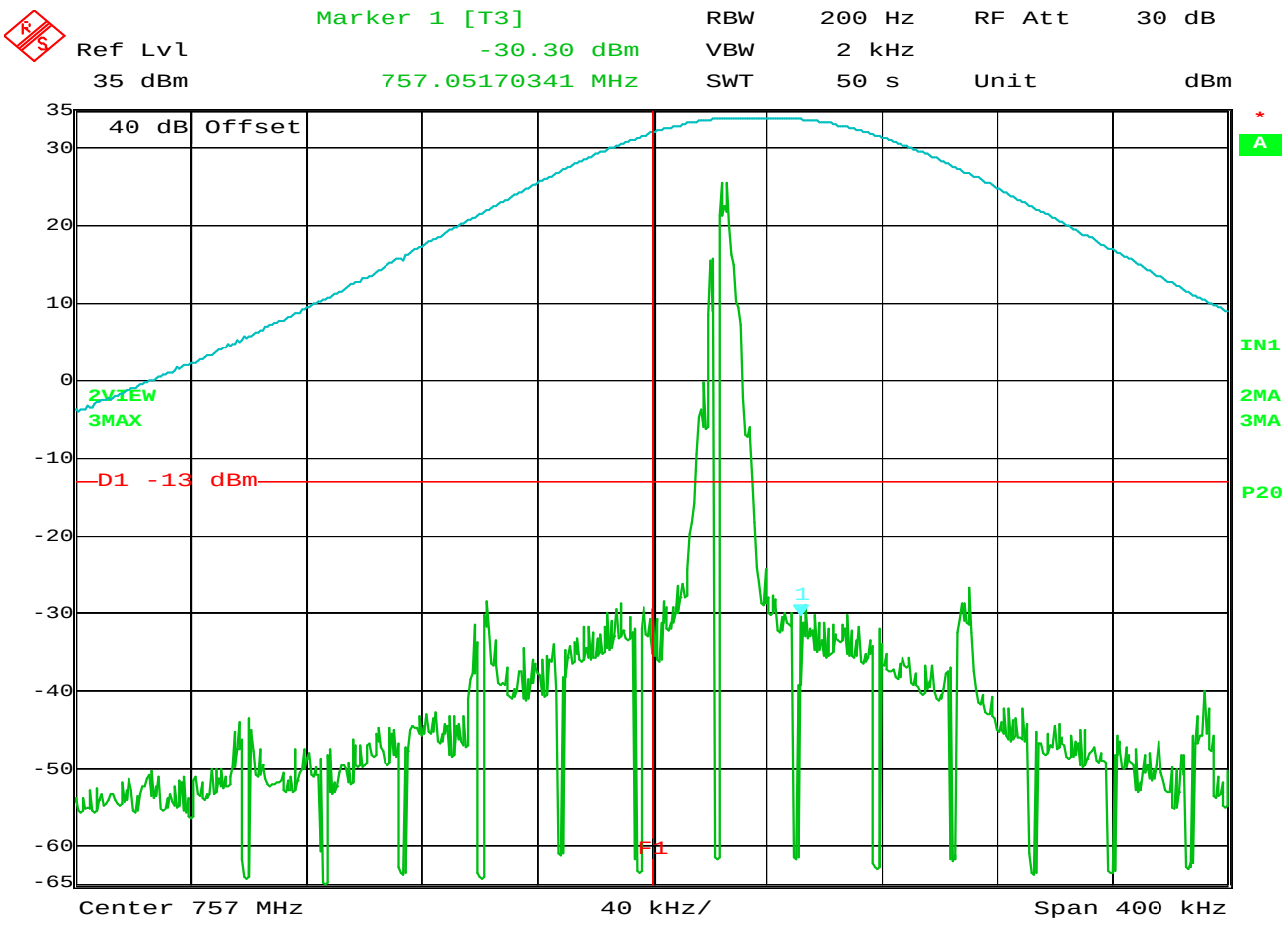
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 757.0250MHz
	: 757+(4*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



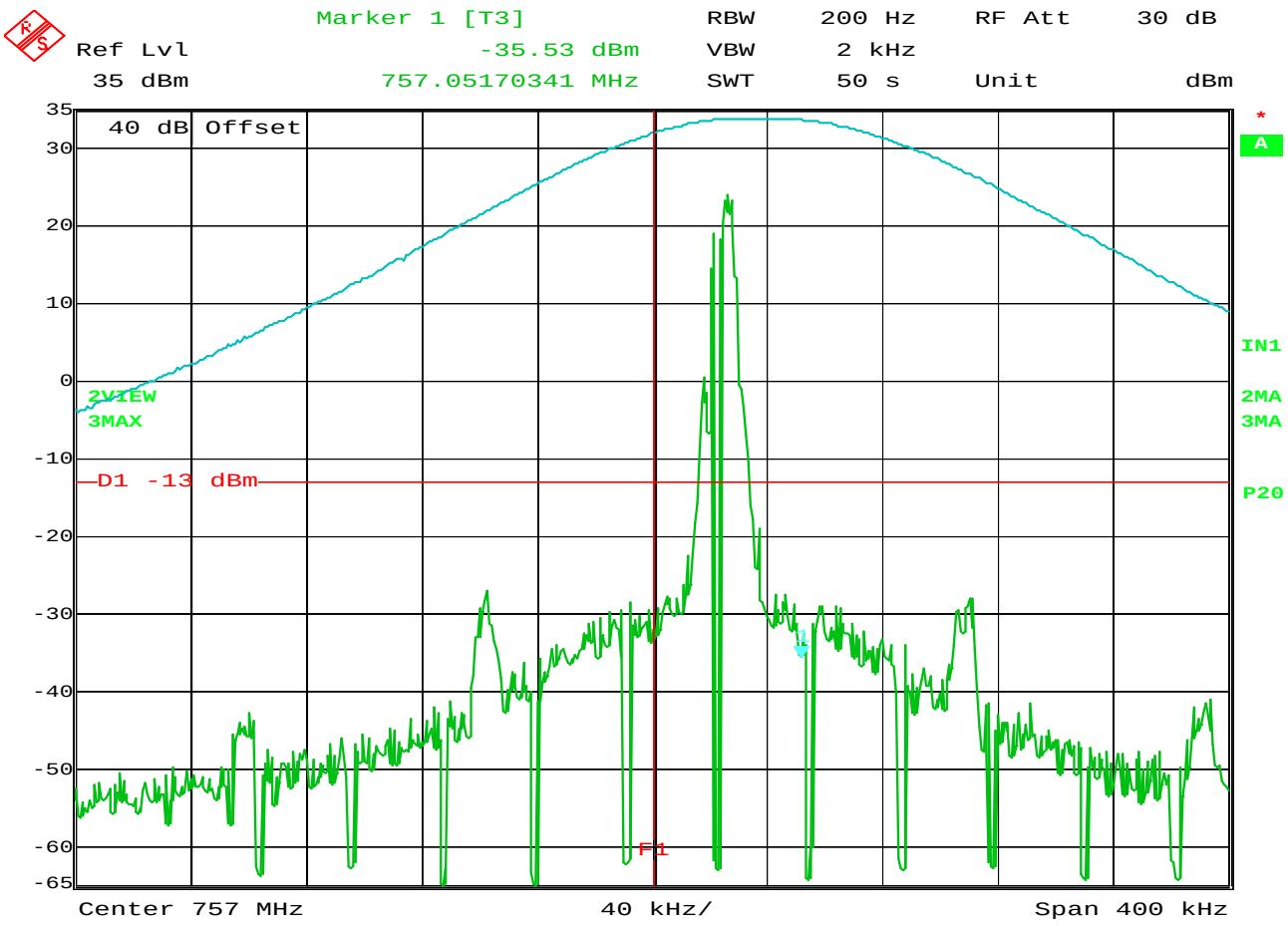
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 757.0250MHz
	: 757+(4*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 757.025MHz
	: 757+(4*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7

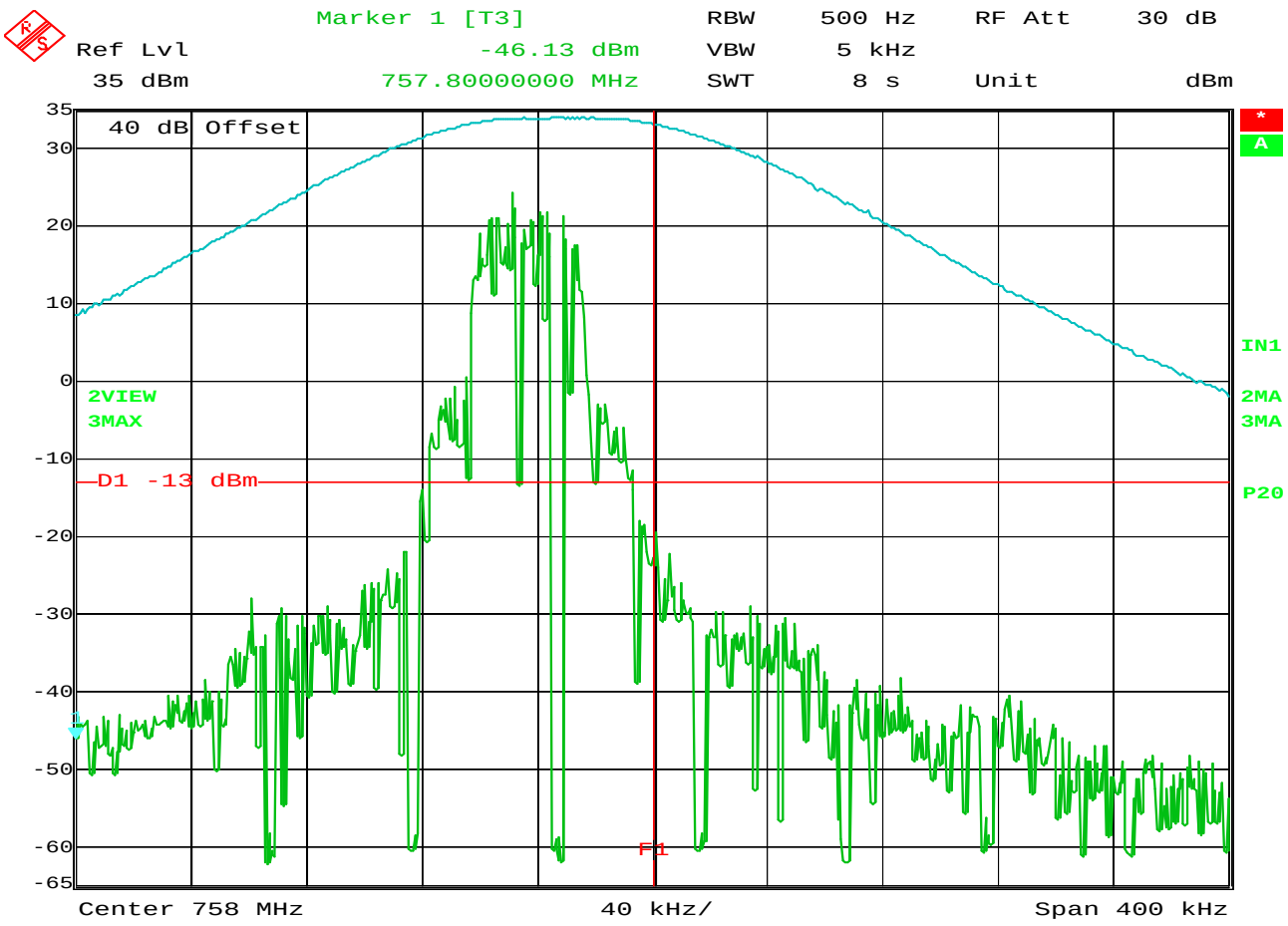


FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 757.025MHz
	: 757+(4*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7

FCC 27 (c) (1)(2) Bandedge Compliance

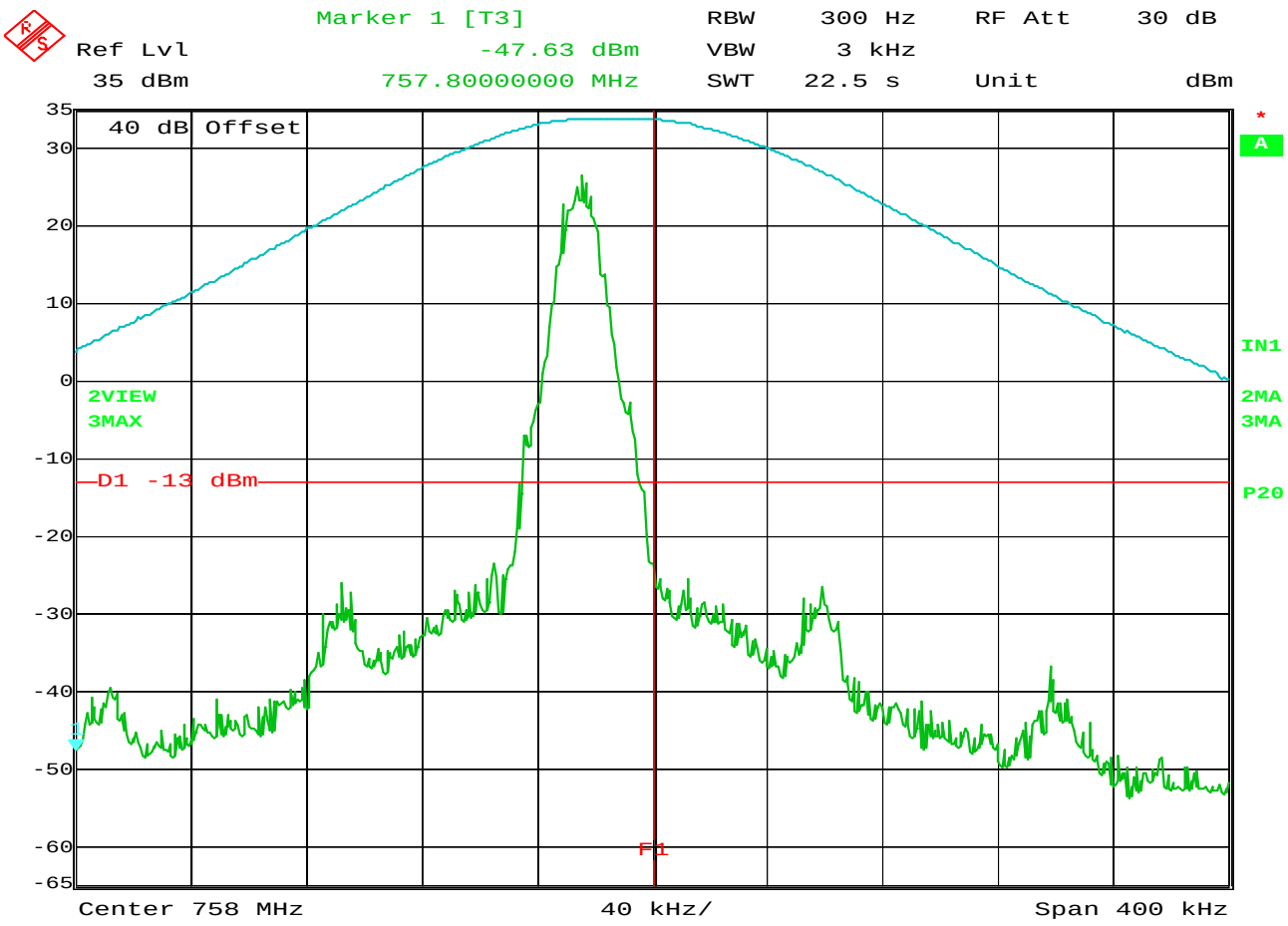
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 757.95625MHz
	: 757+(153*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 5.NOV.2008 20:25:08

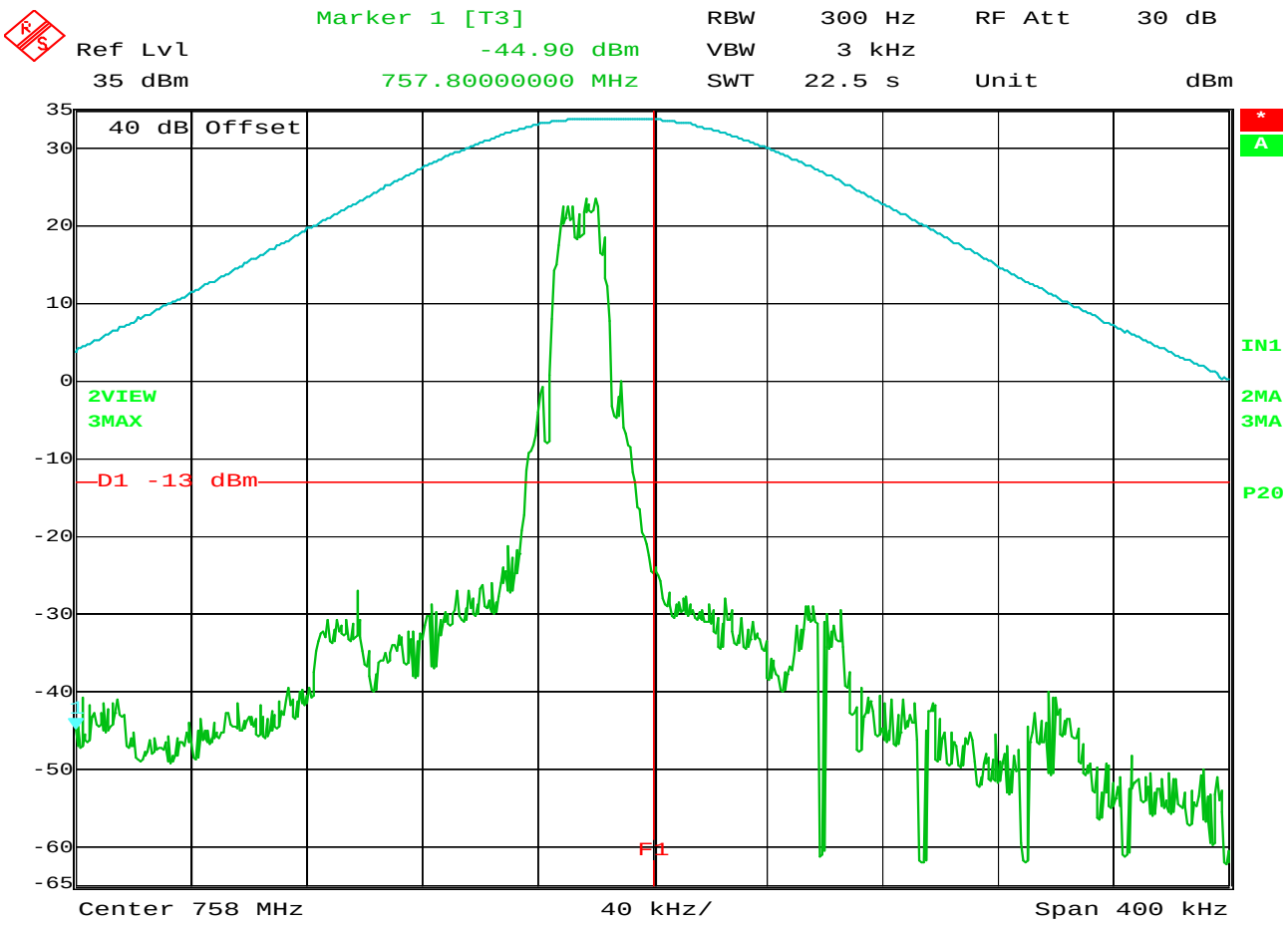
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 757.95625MHz
	: 757+ (153*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



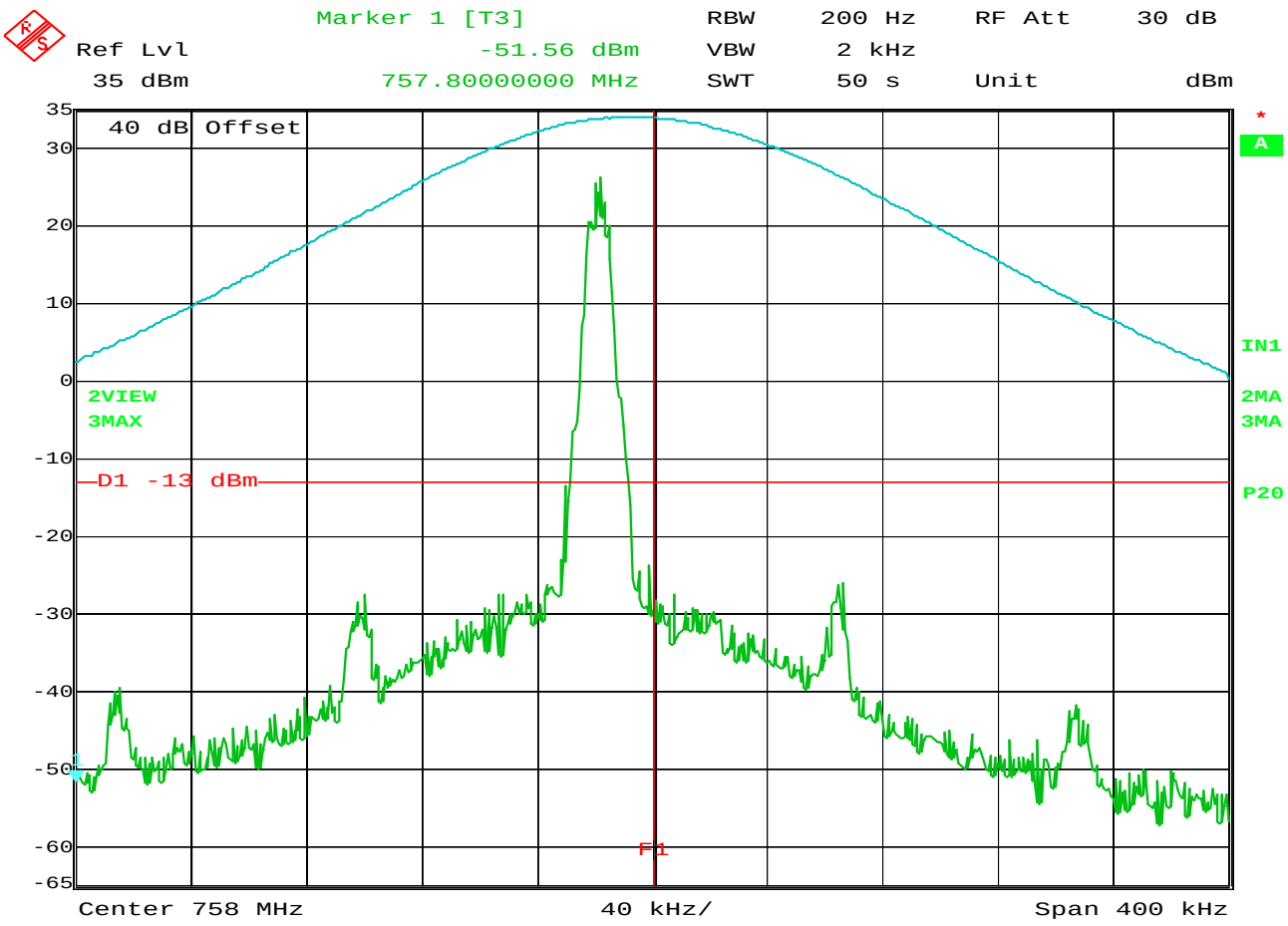
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 757.975MHz
	: 757+(156*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



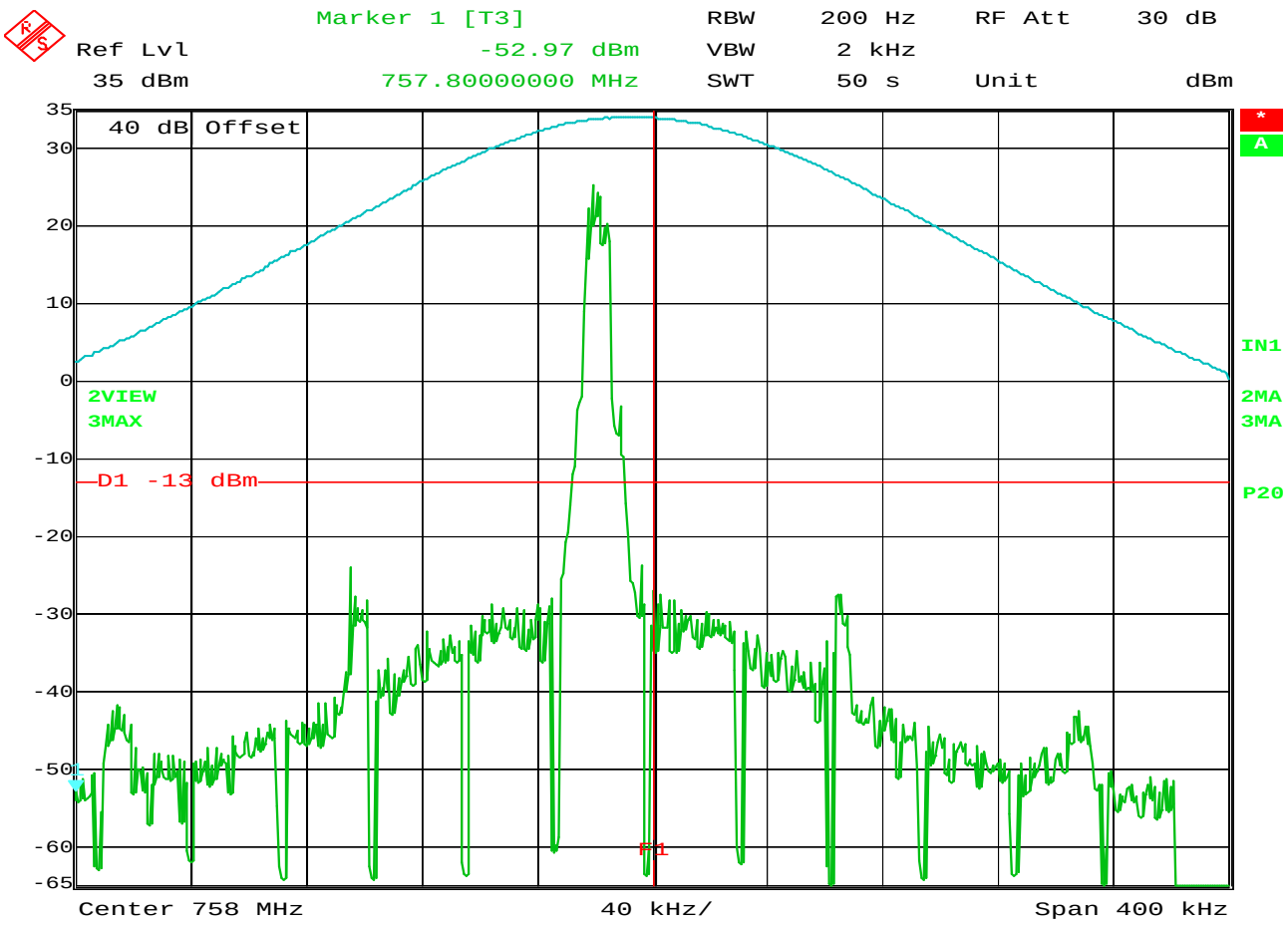
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 757.975MHz
	: 757+ (156*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



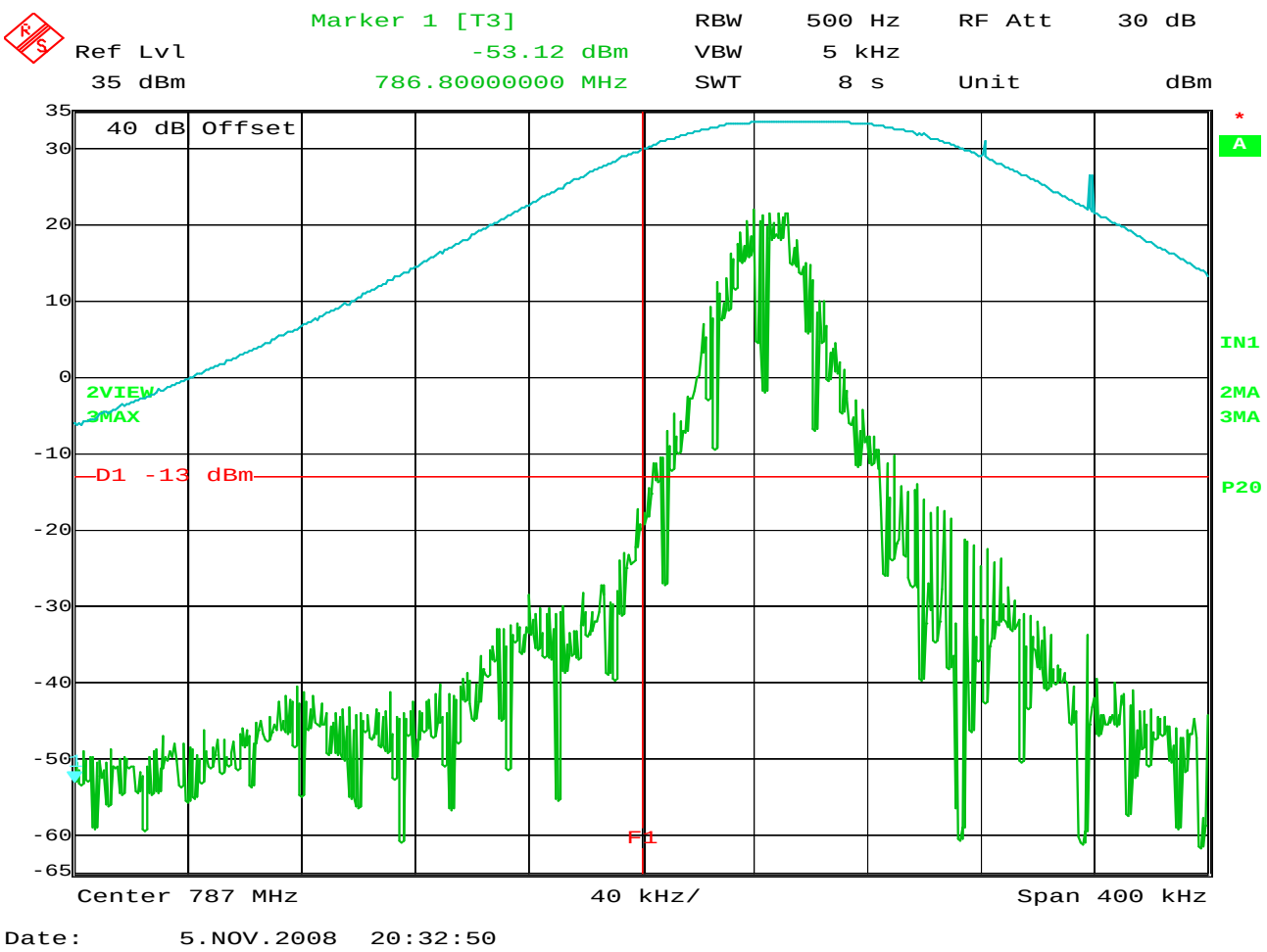
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 757.98125MHz
	: 757+ (157*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



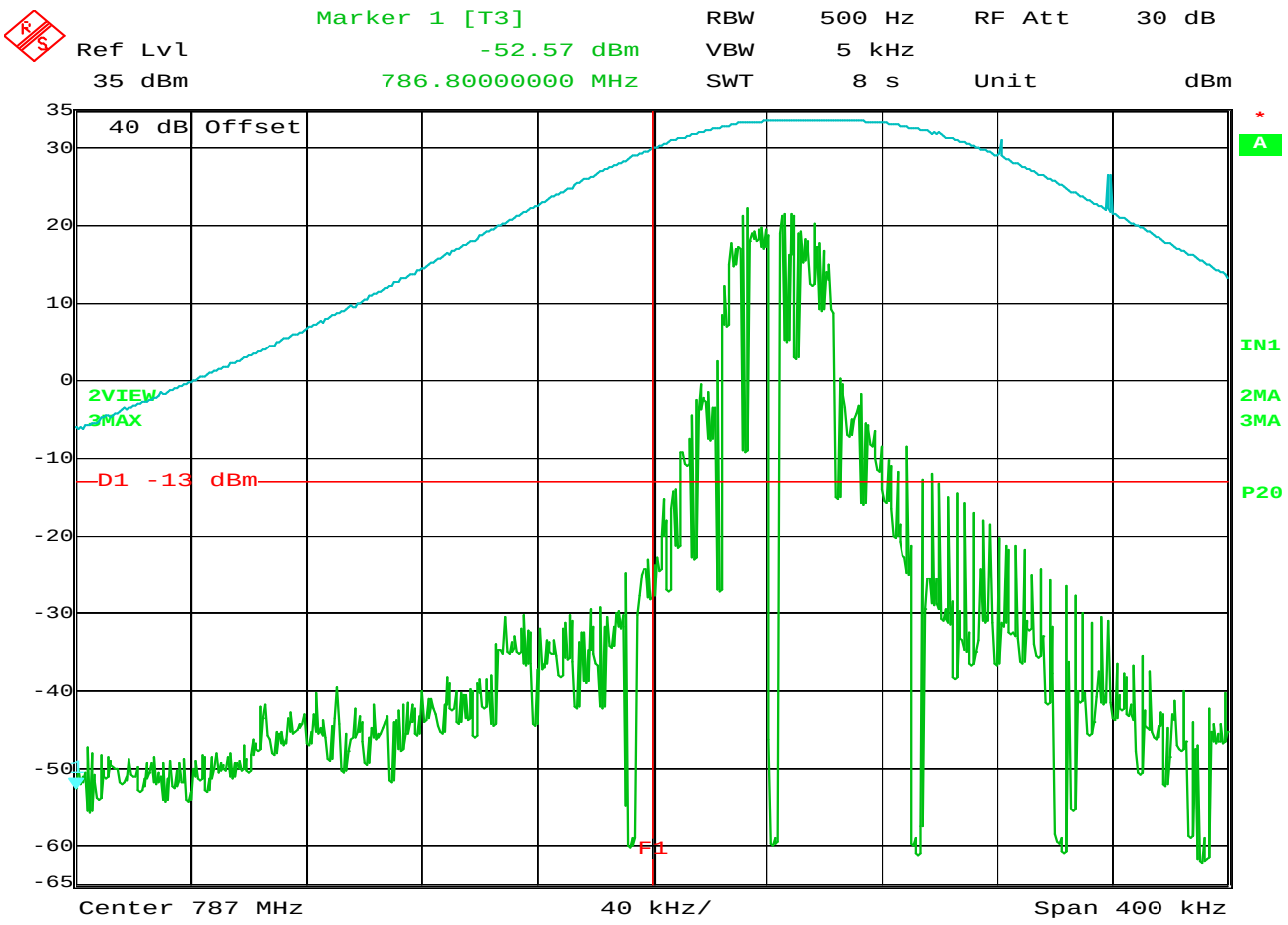
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 757.98125MHz
	: 757+ (157*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



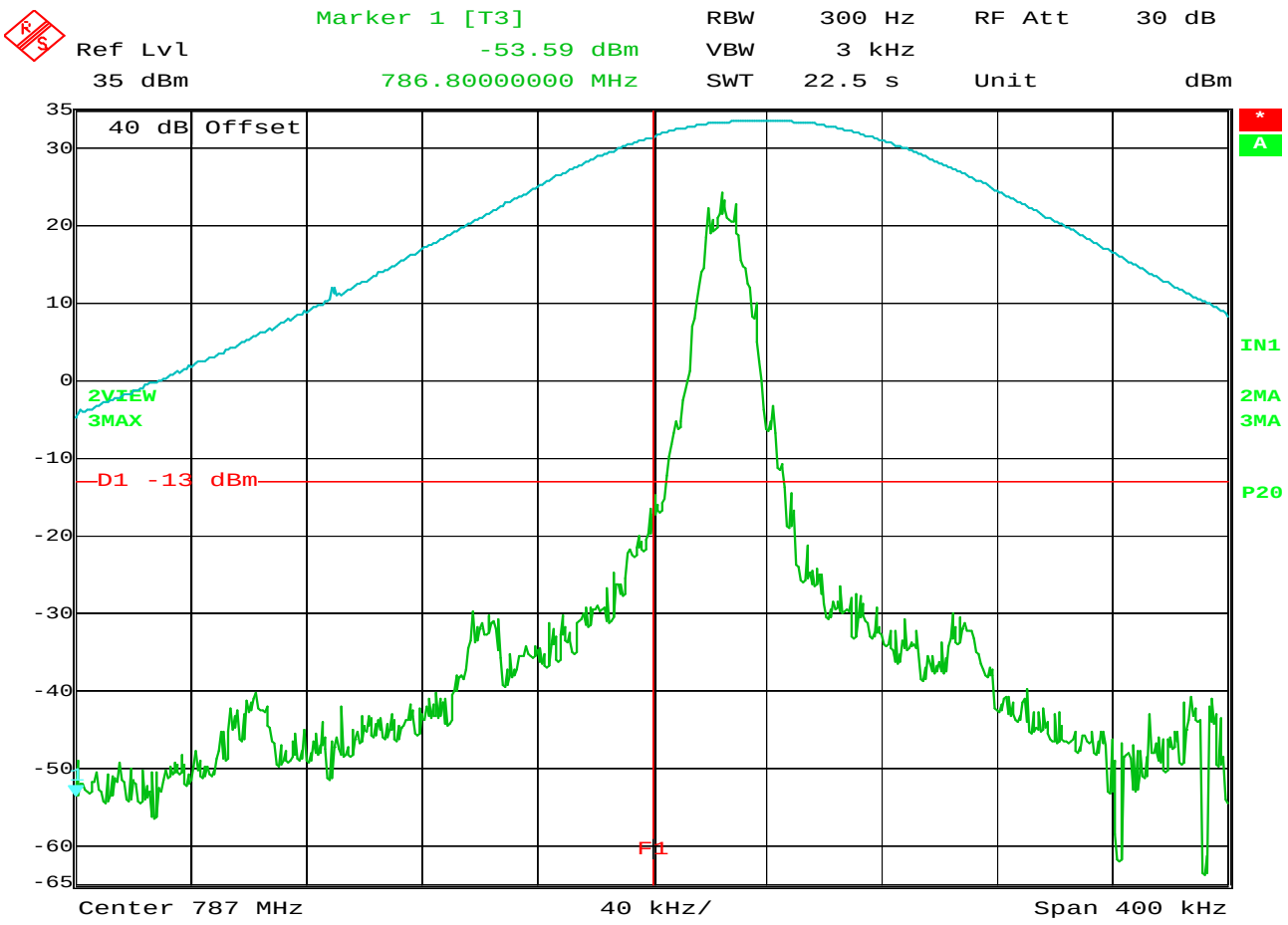
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 787.04375MHz
	: 787+((167-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC 27 (c) (1)(2) Bandedge Compliance

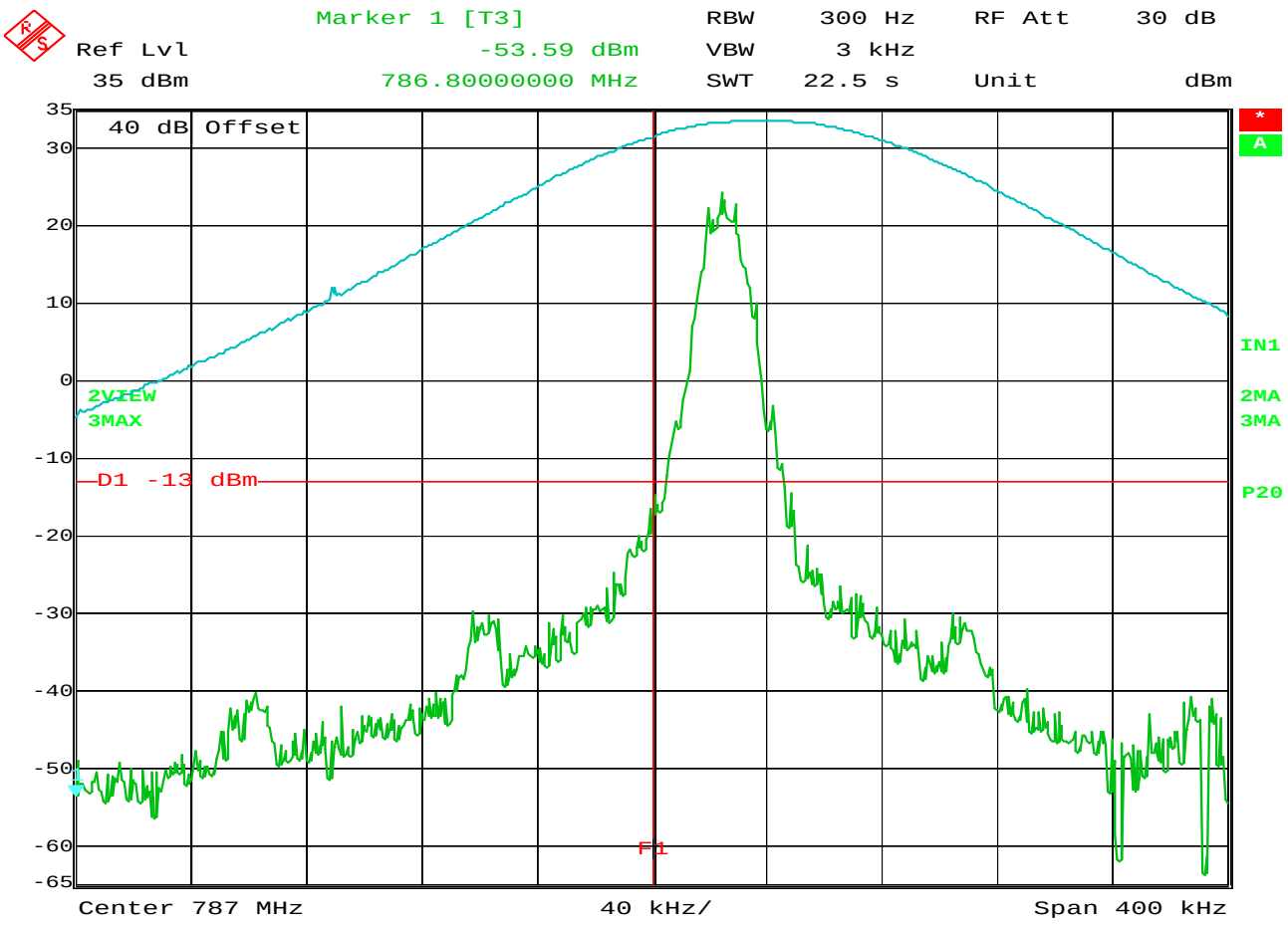
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 787.04375MHz
	: 787+ ((167-160)*.00625)= transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 5.NOV.2008 20:39:20

FCC 27 (c) (1)(2) Bandedge Compliance

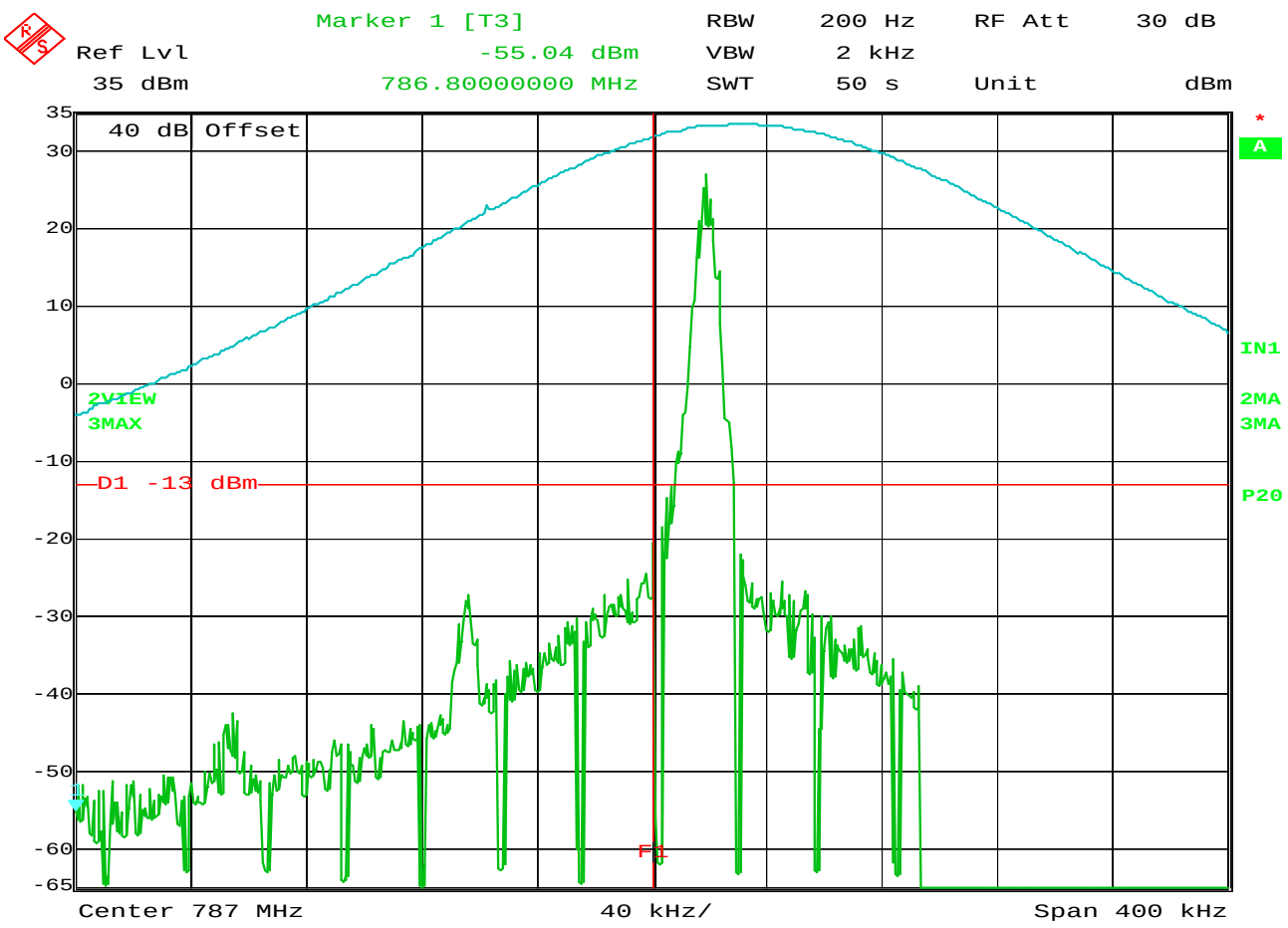
MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 787.025MHz
	: 787+ ((164-160)*.00625)= transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



Date: 5.NOV.2008 20:39:20

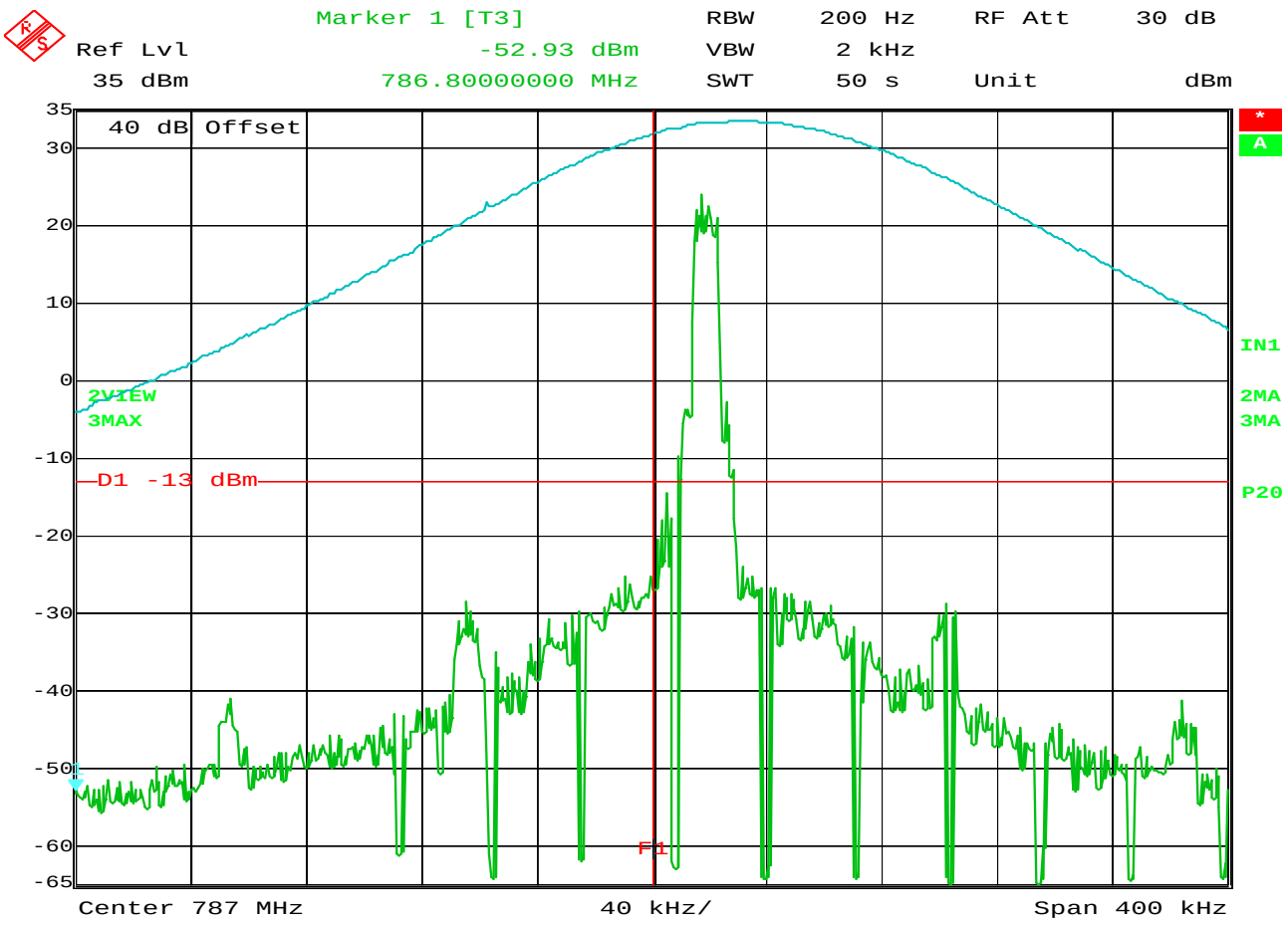
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 787.025MHz
	: 787+ ((164-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



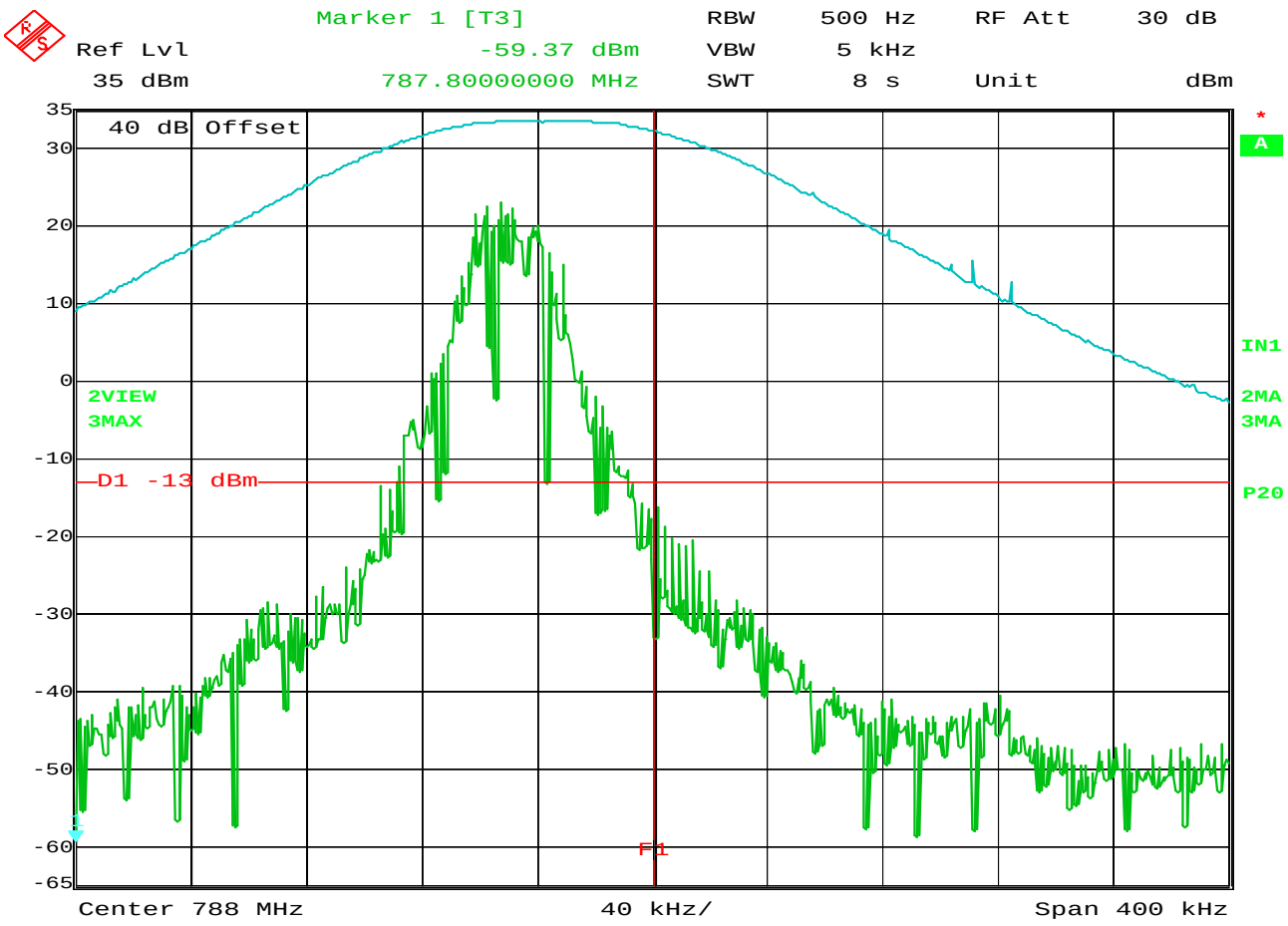
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 787.01875MHz
	: 787+ ((163-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



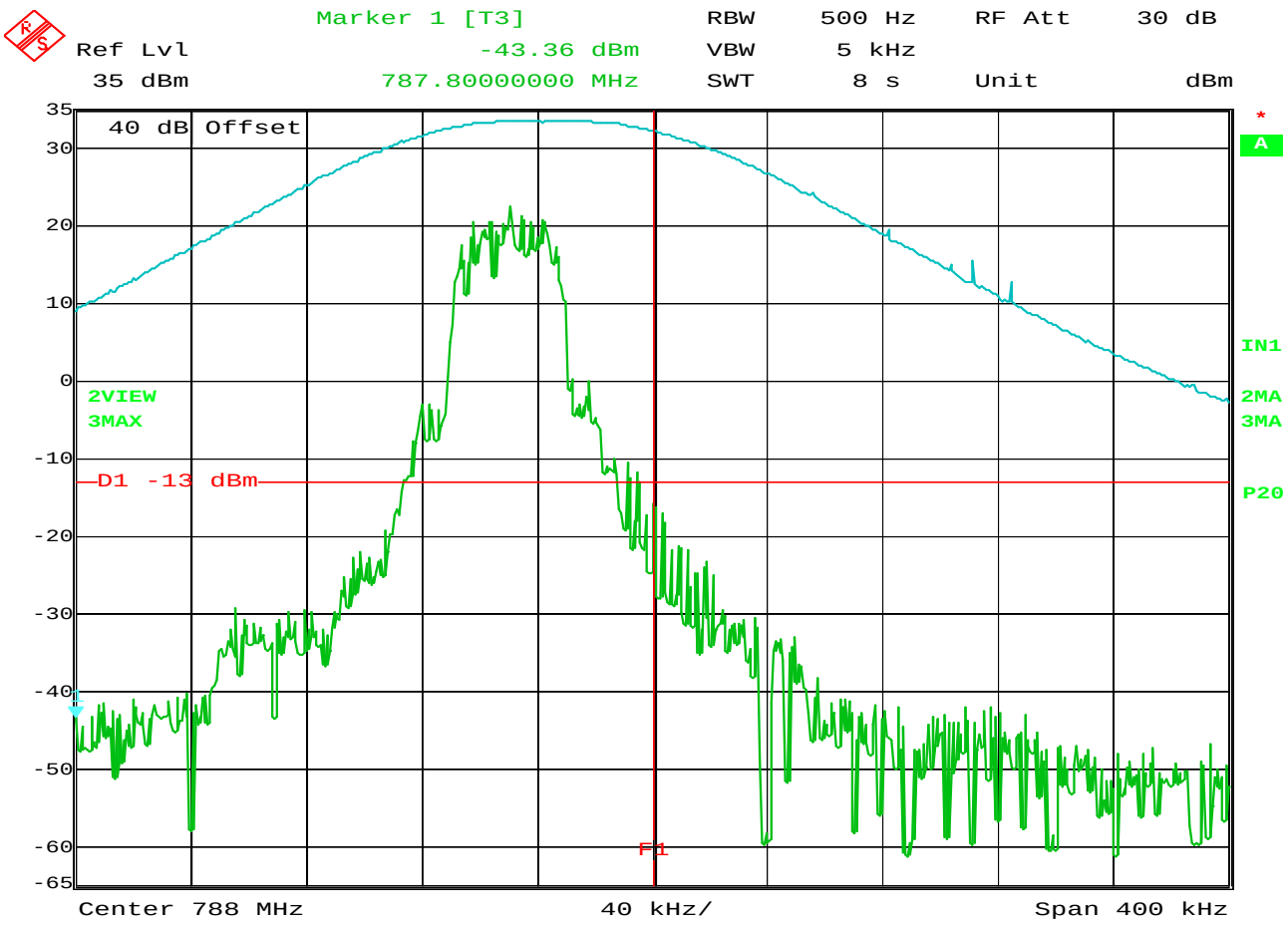
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 787.01875MHz
	: 787+ ((163-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



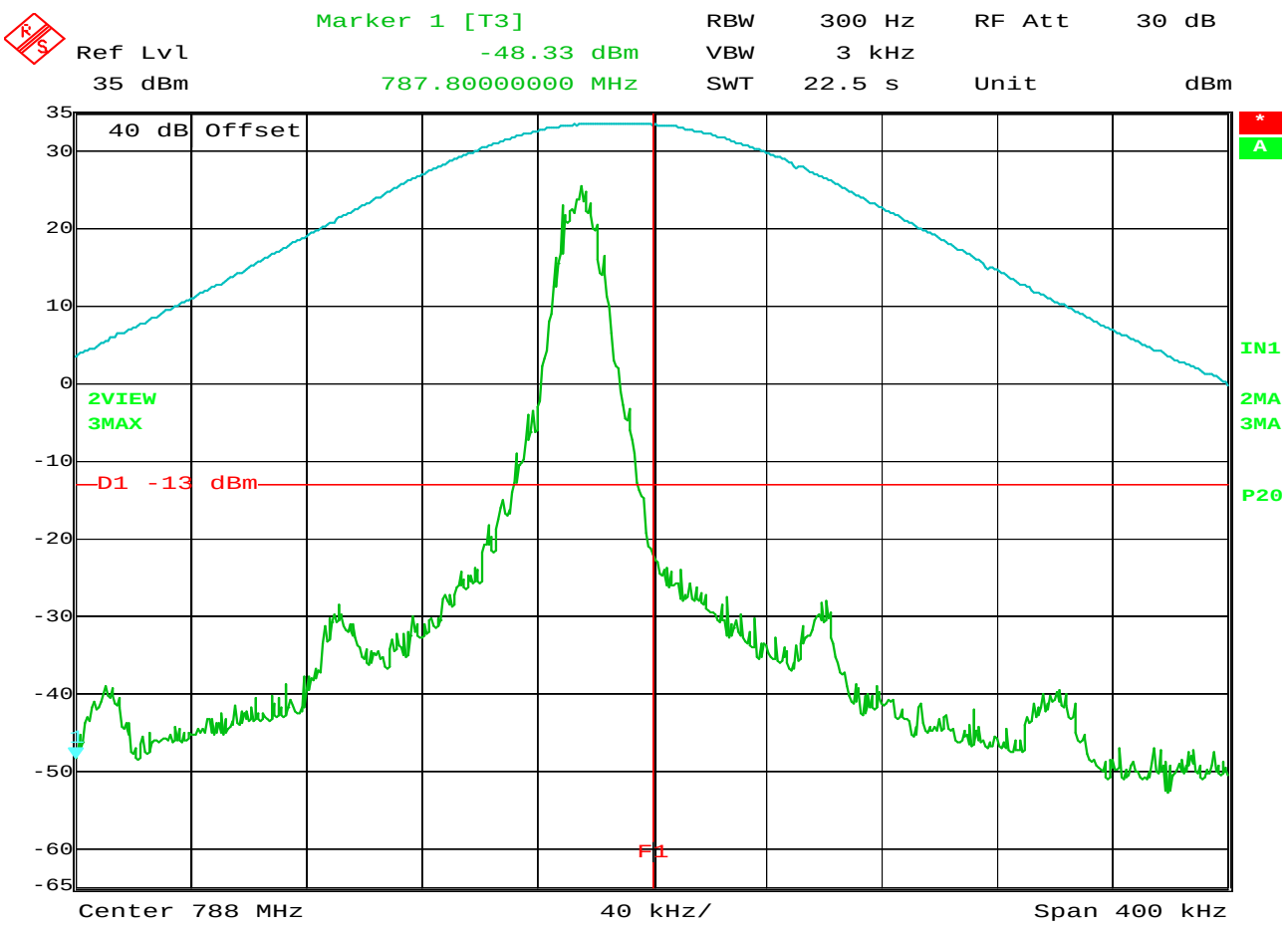
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 0
TEST MODE	: Tx @ 787.950MHz
	: 787+ ((312-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



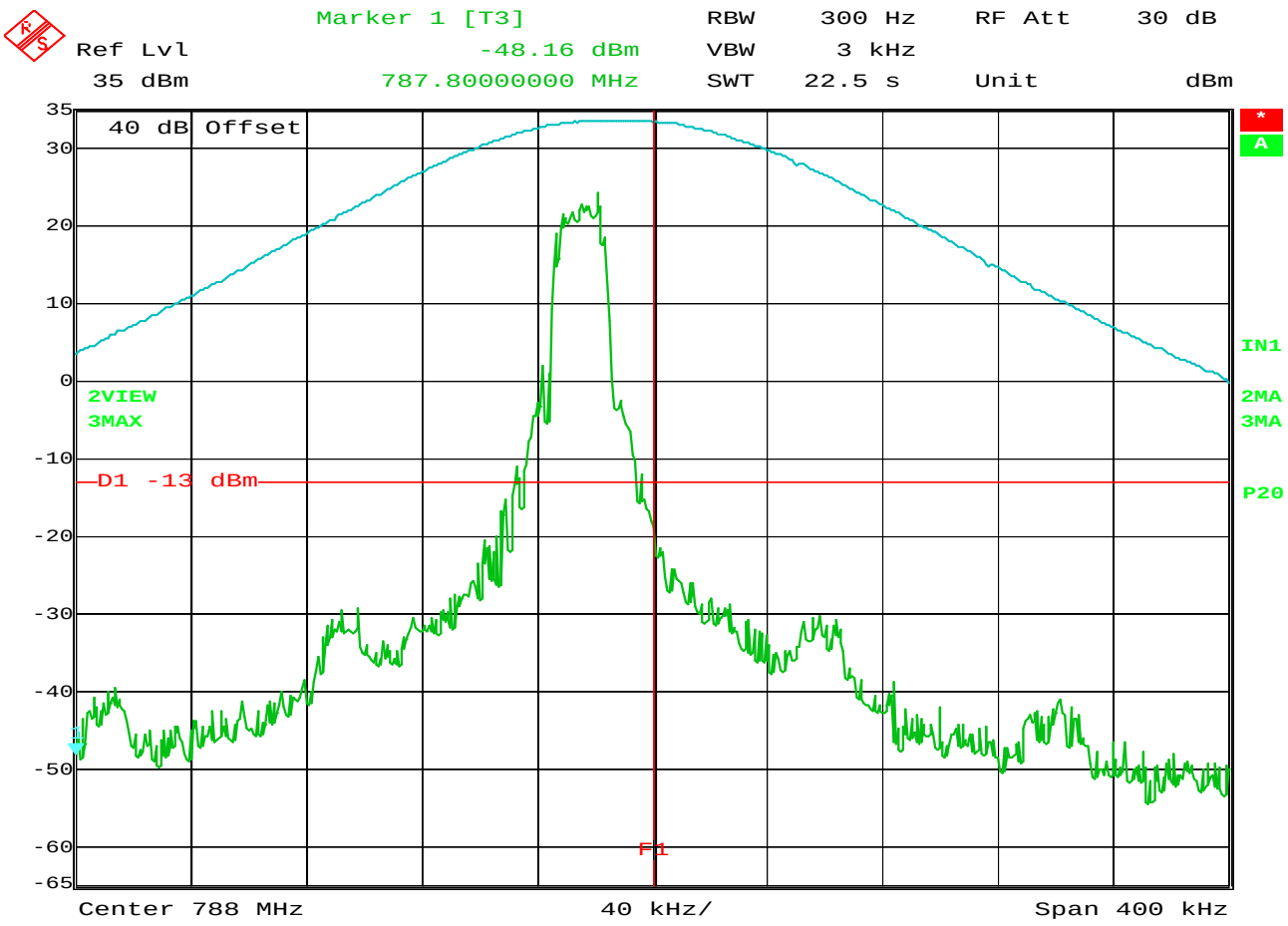
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 1
TEST MODE	: Tx @ 787.950MHz
	: 787+ ((312-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



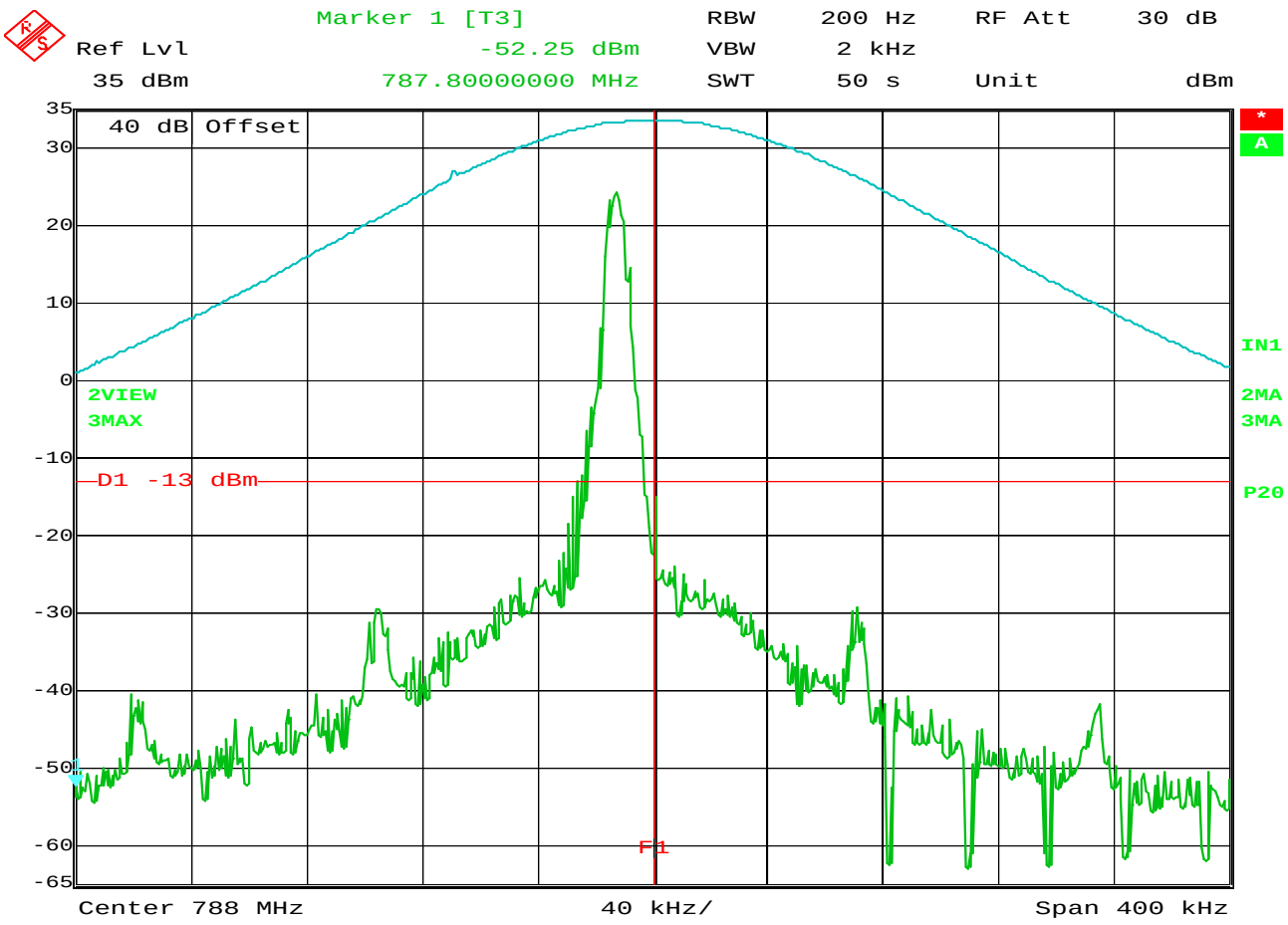
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 2
TEST MODE	: Tx @ 787.975MHz
	: 787+ ((316-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



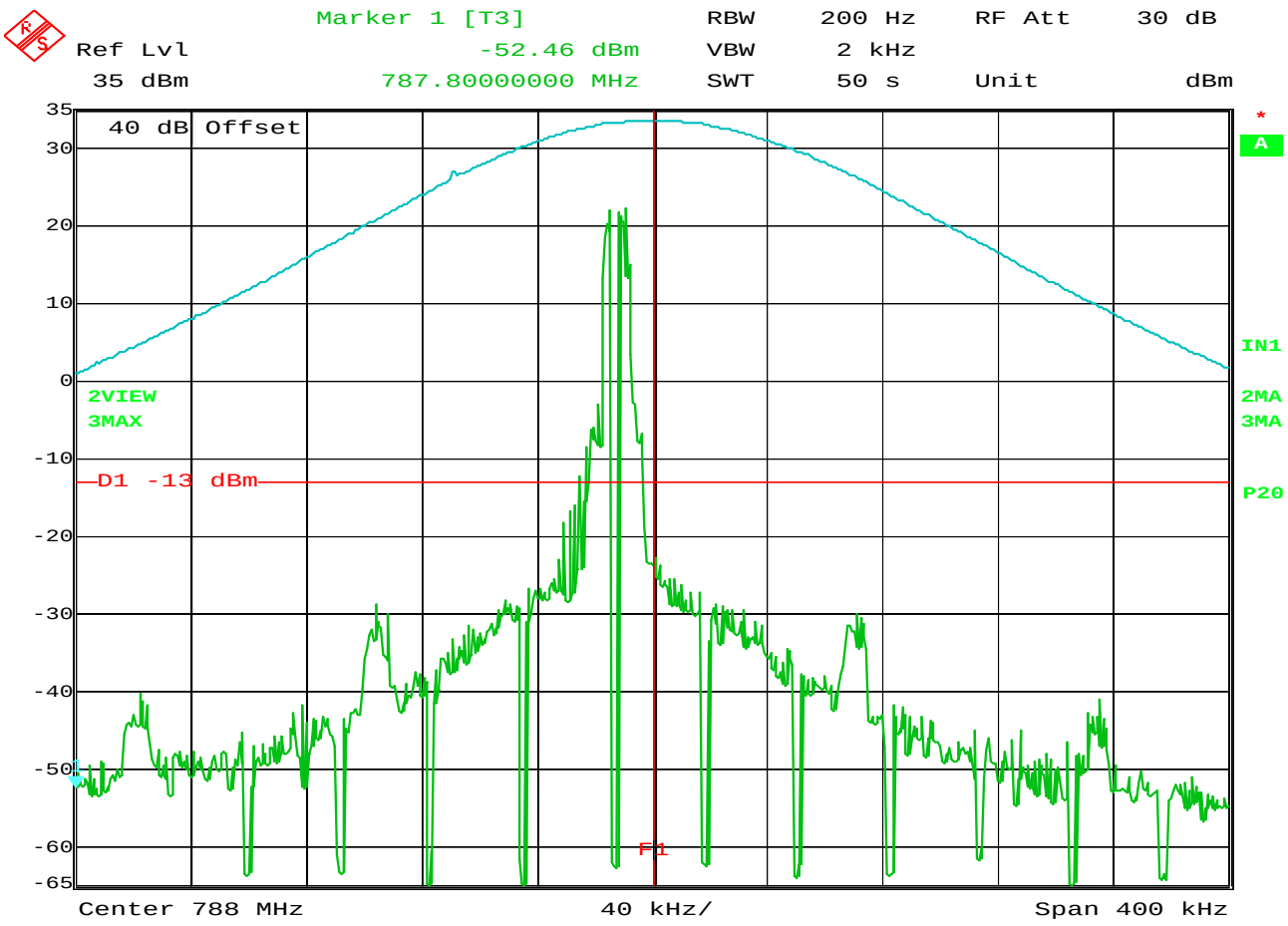
FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 3
TEST MODE	: Tx @ 787.975MHz
	: 787+ ((316-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 4
TEST MODE	: Tx @ 787.9875MHz
	: 787+ ((318-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7



FCC 27 (c) (1)(2) Bandedge Compliance

MANUFACTURER	: Freewave Technologies Inc
MODEL NUMBER	: LRS-760
SERIAL NUMBER	: 700-0047
DATA RATE	: 5
TEST MODE	: Tx @ 787.9875MHz
	: 787+ ((318-160)*.00625) = transmit frequency
EQUIPMENT USED	: RBB0, T2D1, T2S7

Data Page

MANUFACTURER : **Freewave Technologies Inc**
MODEL NO. : **LRS-760**
SERIAL NO. : **700-0047**
SPECIFICATION : **FCC Part 27 Frequency Stability vs. Temperature**
: **FCC Part 27 Frequency Stability vs. Voltage**
DATE : **November 6, 2008**
NOTES : **Lower Band Edge of 757MHz**

Temperature (degrees)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
-30	757012528	757011802	726	757000000	2006
-20	757012528	757012266	262	757000000	2006
-10	757012528	757012290	238	757000000	2006
0	757012528	757012451	77	757000000	2006
10	757012528	757012553	-25	757000000	2006
20	757012528	757012528	0	757000000	2006
30	757012528	757012635	-107	757000000	2006
40	757012528	757012968	-440	757000000	2006
50	757012528	757012747	-219	757000000	2006

Supply Voltage (VDC)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
+12	757012455	757012455	0	757000000	2006
10.2 (85%)	757012455	757012452	3	757000000	2006
13.8 (115%)	757012455	757012452	3	757000000	2006

* The frequency tolerance was determined from the bandedge compliance measurements.

Checked BY : Richard E. King

Richard E. King

Data Page

MANUFACTURER : **Freewave Technologies Inc**
MODEL NO. : **LRS-760**
SERIAL NO. : **700-0047**
SPECIFICATION : **FCC Part 27 Frequency Stability vs. Temperature**
: **FCC Part 27 Frequency Stability vs. Voltage**
DATE : **November 6, 2008**
NOTES : **Lower Band Edge of 787MHz**

Temperature (degrees)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
-30	787187898	787186952	946	787000000	3440
-20	787187898	787187241	657	787000000	3440
-10	787187898	787187278	620	787000000	3440
0	787187898	787187471	427	787000000	3440
10	787187898	787187513	385	787000000	3440
20	787187898	787187898	0	787000000	3440
30	787187898	787187645	253	787000000	3440
40	787187898	787188068	-170	787000000	3440
50	787187898	787187847	-347	787000000	3440

Supply Voltage (VDC)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
+12	787187442	787187442	0	787000000	3440
10.2 (85%)	787187442	787187440	2	787000000	3440
13.8 (115%)	787187442	787187442	0	787000000	3440

* The frequency tolerance was determined from the bandedge compliance measurements.

Checked BY : Richard E. King

Richard E. King

Data Page

MANUFACTURER : **Freewave Technologies Inc**
MODEL NO. : **LRS-760**
SERIAL NO. : **700-0047**
SPECIFICATION : **FCC Part 27 Frequency Stability vs. Temperature**
: **FCC Part 27 Frequency Stability vs. Voltage**
DATE : **November 6, 2008**
NOTES : **Upper Band Edge of 758MHz**

Temperature (degrees)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
-30	757981353	757980418	935	758000000	1300
-20	757981353	757980886	467	758000000	1300
-10	757981353	757980820	533	758000000	1300
0	757981353	757981141	212	758000000	1300
10	757981353	757981403	-50	758000000	1300
20	757981353	757981353	0	758000000	1300
30	757981353	757981535	-182	758000000	1300
40	757981353	757981898	-545	758000000	1300
50	757981353	757981797	-444	758000000	1300

Supply Voltage (VDC)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
+12	757981150	757981150	0	758000000	1300
10.2 (85%)	757981150	757981140	10	758000000	1300
13.8 (115%)	757981150	757981144	6	758000000	1300

* The frequency tolerance was determined from the bandedge compliance measurements.

Checked BY : Richard E. King

Richard E. King

Data Page

MANUFACTURER : **Freewave Technologies Inc**
MODEL NO. : **LRS-760**
SERIAL NO. : **700-0047**
SPECIFICATION : **FCC Part 27 Frequency Stability vs. Temperature**
: **FCC Part 27 Frequency Stability vs. Voltage**
DATE : **November 6, 2008**
NOTES : **Upper Band Edge of 788MHz**

Temperature (degrees)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
-30	787987998	787986766	1232	788000000	2700
-20	787987998	787987081	917	788000000	2700
-10	787987998	787986908	1090	788000000	2700
0	787987998	787987367	631	788000000	2700
10	787987998	787987563	435	788000000	2700
20	787987998	787987998	0	788000000	2700
30	787987998	787988288	-290	788000000	2700
40	787987998	787988376	-378	788000000	2700
50	787987998	787988221	-223	788000000	2700

Supply Voltage (VDC)	Nominal frequency (Hz)	Measured Frequency (Hz)	Frequency Change (Hz)	Limit Bandedge (Hz)	Frequency Tolerance* (Hz)
+12	787987470	787987470	0	788000000	2700
10.2 (85%)	787987470	787987466	4	788000000	2700
13.8 (115%)	787987470	787987471	-1	788000000	2700

* The frequency tolerance was determined from the bandedge compliance measurements.

Checked BY : Richard E. King

Richard E. King