Measurement of RF Emissions from a MSD9 Rev. A Multi-Band Radio Module Transmitter

For	XetaWave, LLC. 1668 Valtec Lane, Suite G Boulder, CO 80301
P.O. Number	120890
Date Tested	August 27th – September 6th, 2012
Test Personnel	Ian Carnegie
Test Specification	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.247 for Frequency Hopping Spread Spectrum Intentional Radiators or Digital Modulation Intentional Radiators Operating within The bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

Test Report By:

Ian Carnegie
EMC Engineer

Requested By: David Greene
XetaWave, LLC.

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

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REVISION HISTORY

Revision	Date	Description
—	26 September 2012	Initial release

Measurement of RF Emissions from a Multi-Band Radio Module, Model No. MSD9 Rev. A Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report represents the results of the series of radio interference measurements performed on a XetaWave, LLC. Multi-Band Radio Module, Model No. MSD9 Rev. A, Serial No. 2 and Serial No. 7, transmitter (hereinafter referred to as the EUT). The EUT is a digital transmission system (DTS) transmitter. The transmitter was designed to transmit in the 902-928 MHz band using an External antenna. The EUT was tested with both a Laird Model FG9026 Omni - Directional antenna with 6dBd of gain and a Radiall-Larsen Model YA5900W Yagi antenna with 12dBd of gain. The EUT was manufactured and submitted for testing by XetaWave, LLC. located in Boulder, CO.

1.2. Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2009.

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 American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

1.5. Laboratory Conditions

The temperature at the time of the test was 23°C and the relative humidity was 43%.

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 15, Subpart C, dated 1 October 2011
- ANSI C63.4-2009, "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"
- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, KDB 558074, January 18, 2012

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a XetaWave, LLC., Multi-Band Radio Module, Model No. MSD9 Rev. A. A block diagram of the EUT setup is shown as Figure 1.

3.1.1.Power Input

For test purposes, the EUT was powered by 4 VDC from a DC power supply. The EUT is typically powered by batteries.

3.1.2.Peripheral Equipment

The following peripheral equipment was submitted with the EUT:

Item	Description
Sony Vaio Laptop	Model PCG-8N2L used to program the EUT

3.1.3.Signal Input/Output Leads

The following interconnect cables were submitted with the EUT:

Item	Description
Interconnect Cable	0.5 meter, 10 wire, unshielded cable to provide power and serial connection to the EUT

3.1.4.Grounding

The EUT was ungrounded during the tests.

3.2. Operational Mode

For all tests, the EUT was placed on an 80cm high non-conductive stand. The EUT was energized. The unit was programmed to operate in one of the following modes:

- Transmit at 903.5MHz
- Transmit at 915.0MHHz
- Transmit at 926.5MHHz

The EUT was also programmed to operate with one of the following modulations:

- 2FSK
- BPSK
- WPSK
- 16QAM
- 64QAM

3.3. EUT Modifications

No modifications were required for compliance to the 15.247 requirements.

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 C63.4-2009 for site attenuation.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for the 1000MHz to

5000MHz radiated emissions data.

4.3. Calibration Traceability

Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4. 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 Emissions Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

Radiated Emissions 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

Since the EUT is typically powered by batteries and not connected to an AC source, no conducted emissions tests are required.

5.2. 6dB Bandwidth

5.2.1.Requirement

Per 15.247(a)(2),the minimum 6dB bandwidth shall be at least 500kHz for all systems using digital modulation techniques.

5.2.2.Procedures

The output of the EUT was connected to the spectrum analyzer through 39.2dB of attenuation.

The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. The resolution bandwidth (RBW) was set to 100kHz and the span was set to greater than the RBW.

The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a 'screen dump' utility.

5.2.3.Results

The plots on pages 20 through 34 show that the minimum 6 dB bandwidth was 649.3kHz which is greater than minimum allowable 6dB bandwidth requirement of 500kHz for systems using digital modulation techniques.

5.3. Output Power

5.3.1.Requirements

Per section 15.247(b)(3), for systems using digital modulation, the average output conducted power shall not be greater than 1.0W (30dBm). Per section 15.247(b)(4), this limit is based on the use of antennas with directional gains that do not exceed 6dBi. Since the limit allows for a 6dBi antenna gain, the maximum EIRP can be increased by 6dB to 4 Watt (36dBm).

5.3.2.Procedures

For the conducted measurements, the output of the EUT was connected to the spectrum analyzer through 39.2dB of attenuation. The maximum averaged output level was recorded for the low, middle and high channels.

For the radiated measurements, the EUT was placed on the non-conductive stand and set to transmit. A bilog antenna was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded. The power output was measured for the low, middle and high channels.

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 antenna was then set in place of the EUT 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 then corrected to compensate for cable loss and antenna gain, as required. The peak power output was calculated for low, middle, and high channels.

5.3.3.Results

The maximum average conducted output power from the transmitter measured 0.93W (29.7 dBm) which is below the 1 Watt limit. The plots for the conducted power measurements are presented on pages 35 through 49.

The EIRP measured from the transmitter with the Radiall Larsen YA5900W antenna measures 35.0 dBm or 3.16 W which is below the 4 Watt limit. The conducted power was reduced to 22.0dBm in order to comply with the 4 Watt requirement.

The EIRP measured from the transmitter with the Laird Technologies FG9026 antenna was 35.8 dBm or 3.8 W which is below the 4 Watt limit. The conducted power was reduced to 26.0dBm in order to comply with the 4 Watt requirement.

The results for EIRP measurements are presented on pages 50 and 51.

5.4. Duty Cycle Factor Measurements

5.4.1.Procedures

The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

The duty cycle factor was calculated from information supplied by the manufacturer. Since this EUT utilizes a rolling code modulation, the duty is calculated based on the worst case. The following procedure was used to measure a representative sample:

a) With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer.

b) This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div.

c) The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec.

d) The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period.

e) The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

f) The duty cycle factor is computed from the duty cycle

5.4.2.Results

The duty cycle factor was computed to be -5.8 dB. The plots of the duty cycle are shown on pages 52 through 55.

5.5. Antenna Conducted Spurious Emissions

5.5.1.Requirements

The spurious emissions in any 100 kHz BW outside the frequency band must be at least 30dB below the highest 100 kHz BW level measured within the band.

5.5.2.Procedures

The output of the EUT was connected to the spectrum analyzer through 39.2dB of attenuation. The resolution bandwidth (RBW) was set to 100kHz. The peak detector and 'Max-Hold' function were engaged. The emissions in the frequency range from 30MHz to 10GHz were observed and plotted separately with the EUT transmitting at low, middle and high channels.

5.5.3.Results

The antenna conducted spurious emissions levels were plotted. These plots are presented on pages 56 through 58. These plots show that the spurious emissions were at least 30 dB below the level of the fundamental.

5.6. Radiated Spurious Emissions Measurements

5.6.1.Requirements

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Paragraph 15.209(a) has the following radiated emission limits:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3

88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

5.6.2.Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. 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 C63.4-2009 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.

Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 10.0GHz was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 10.0GHz.

1) For all emissions in the restricted bands, the following procedure was used:
   a) The field strengths of all emissions below 1 GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
   b) The field strengths of all emissions above 1 GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.
   c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:
      i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
      ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
      iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
      iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer, the measuring antenna was not raised or lowered to ensure maximized readings. Instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
   d) For all radiated emissions measurements below 1 GHz, if the peak reading is below the limits listed in 15.209(a), no further measurements are required. If however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.
   e) For all radiated emissions measurements above 1 GHz, the peak readings must comply with the 15.35(b) limits. 15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits specified in 15.209(a).
   f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.

If the emission is pulsed, the reading can be adjusted by a “duty cycle correction factor” derived from 20*log(on time/100msec). These readings must be no greater than the limits specified in 15.209(a).

5.6.3.Results

Preliminary radiated emissions plots for both antennas with the EUT transmitting at 903.5MHz, 915MHz, and 926.5MHz are shown on pages 59 through 82. Final radiated emissions data are presented on data pages 83 through 94. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest or worst case, radiated emission levels are shown on Figure 3 through Figure 6.

5.7. Band Edge Compliance

5.7.1.Requirement

Per section 15.247(d), the emissions at the band-edges must be at least 30dB below the highest level measured within the band but attenuation below the general limits listed in 15.209(a) is not required.

5.7.2.Procedures

5.7.2.1 Low Band Edge

1) The output of the EUT was connected to the spectrum analyzer through 39.2dB of attenuation.
2) The EUT was set to transmit continuously at the channel closest to the low band-edge.
3) To determine the band edge compliance, the following spectrum analyzer settings were used:

   a. Center frequency = low band-edge frequency.
   b. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
   c. Resolution bandwidth (RBW) ≥ 1% of the span.
   d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
   e. The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.)
   f. The analyzer's display was plotted using a 'screen dump' utility.

5.7.2.2 High Band Edge

1) The output of the EUT was connected to the spectrum analyzer through 39.2dB of attenuation.
2) The EUT was set to transmit continuously at the channel closest to the high band-edge.
3) To determine the band edge compliance, the following spectrum analyzer settings were used:

   g. Center frequency = high band-edge frequency.
   h. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
   i. Resolution bandwidth (RBW) ≥ 1% of the span.
   j. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
   k. The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the right of the center frequency (band-edge) must be below the display line.)
   l. The analyzer's display was plotted using a 'screen dump' utility.

5.7.3.Results

Pages 95 through 104 show the conducted band-edge compliance results. As can be seen from these plots, the emissions at the low end band edge and the high end band edge are within the 20 dB down limits.

5.8. Power Spectral Density

5.8.1.1 Requirement

Per section 15.247(d), the peak power spectral density from the intentional radiator shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.8.1.2 Procedures

1) The output of the EUT was connected to the spectrum analyzer through a 39.2dB pad and the EUT was set to transmit at the low channel.
2) The EUT was then placed in the normal operation mode (for DTS devices)
3) To determine the power spectral density, the following spectrum analyzer settings were used:
    a. Center frequency = transmit frequency
    b. Span = 1.2MHz
    c. Resolution bandwidth (RBW) = 3kHz
    d. Sweep time = ≥ 10 x (number of measurement points in sweep) x (transmission symbol period).
    e. The power average (RMS) detector was engaged.
    f. The marker shows the maximum reading
    g. The analyzer's display was plotted using a 'screen dump' utility.
    h. The test was repeated for all frequencies and modulations.

5.8.1.3 Results

Pages 105 through 119 show the power spectral density results. As can be seen from this plot, the peak power density is less than 8dBm in a 3kHz band during any time interval of continuous transmission

6. Other Test Conditions

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was witnessed by XetaWave, LLC. personnel.

6.2. Disposition of the EUT

The EUT and all associated equipment were returned to XetaWave, LLC. upon completion of the tests.

7. Conclusions

It was determined that the XetaWave, LLC. Multi-Band Radio Module, Model No. MSD9 Rev. A, Serial No. 2 and Serial No. 7 did fully meet the requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, for Intentional Radiators.

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 EUT at the test date as operated by XetaWave, LLC. personnel. Any electrical or mechanical modification made to the EUT 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
CDX2	COMPUTER	ELITE	WORKSTATION	---	---	N/A	
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
CLT3	LAPTOP COMPUTER	SONY	PCG-GRT390ZP	3001143	---	NOTE 1	
GBR6	SIGNAL GENERATOR	HEWLETT PACKARD	8648C	3642U02047	9KHZ-3000MHZ	2/22/2012	2/22/2013
MFB0	FREQUENCY COUNTER	HEWLETT PACKARD	5334A	2426A02162	0-100MHZ	6/27/2012	6/27/2013
NTA3	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	2/16/2012	2/16/2013
NWP1	DOUBLE RIDGED WAVEGUIDE ANTENNA	EATON	3115	2100	1GHZ-12.4GHZ	3/6/2012	3/6/2013
RAKI	RF SECTION	HEWLETT PACKARD	85462A	3411A00181	0.009-6500MHZ	3/15/2012	3/15/2013
RAKJ	RF FILTER SECTION	HEWLETT PACKARD	85460A	3330A00154	---	3/15/2012	3/15/2013
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/8/2012	3/8/2013
RBA1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100146	20HZ-26.5GHZ	11/15/2011	11/15/2012
SHB0	DC POWER SUPPLY	HEWLETT PACKARD	6644A	MY40000115	0-60V/0-3.5A	NOTE 1	
T2D7	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-43	AY9246	DC-18GHZ	8/6/2012	8/6/2013
T2S3	20DB 25W ATTENUATOR	WEINSCHEL	46-20-34	BV3544	DC-18GHZ	1/3/2012	1/3/2013
XLJ1	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	2	DC-2GHZ	8/6/2012	8/6/2013

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.

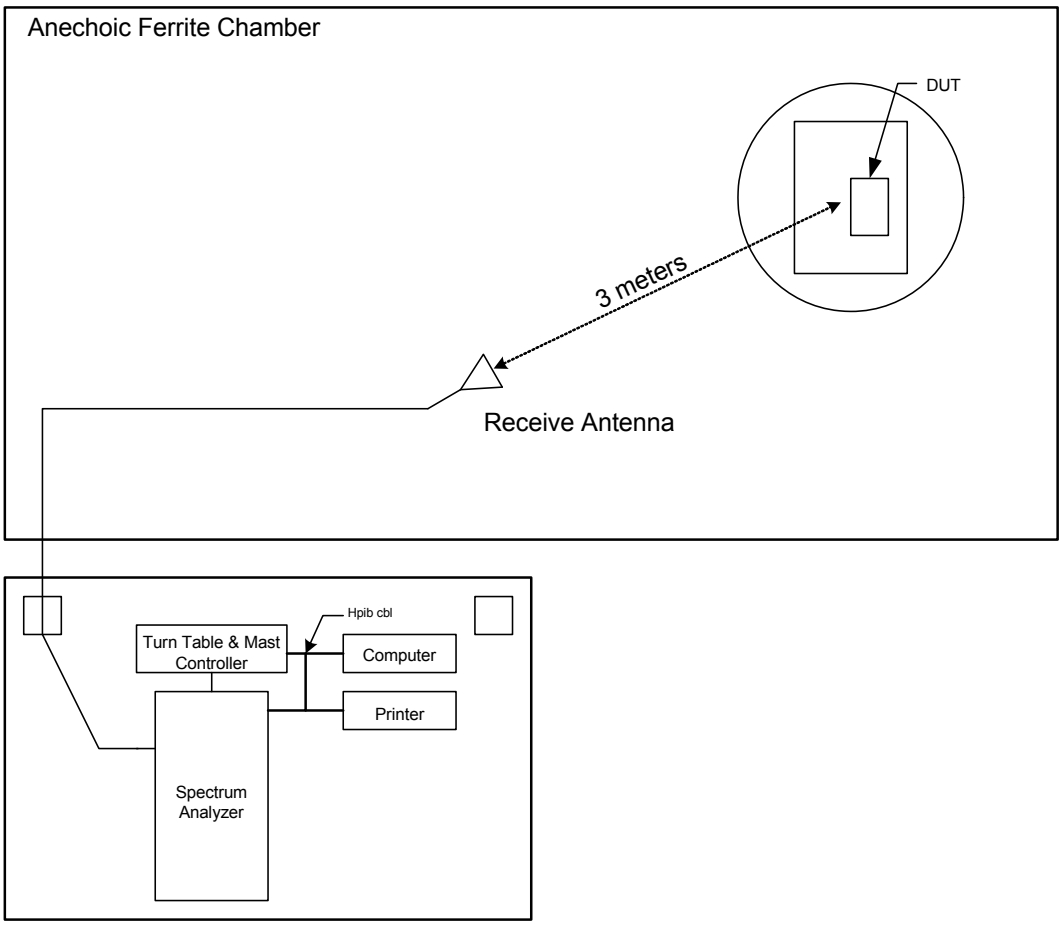


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

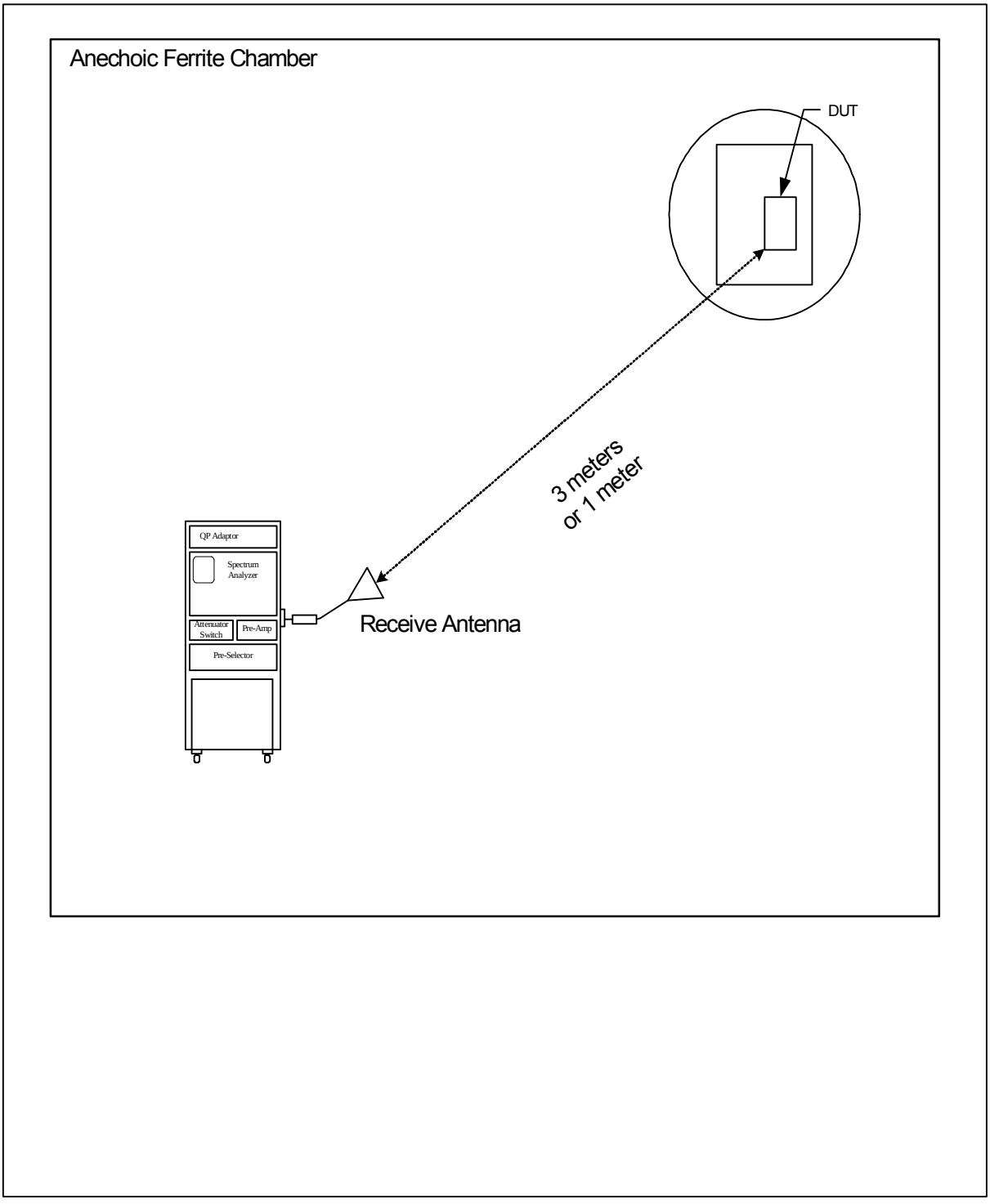
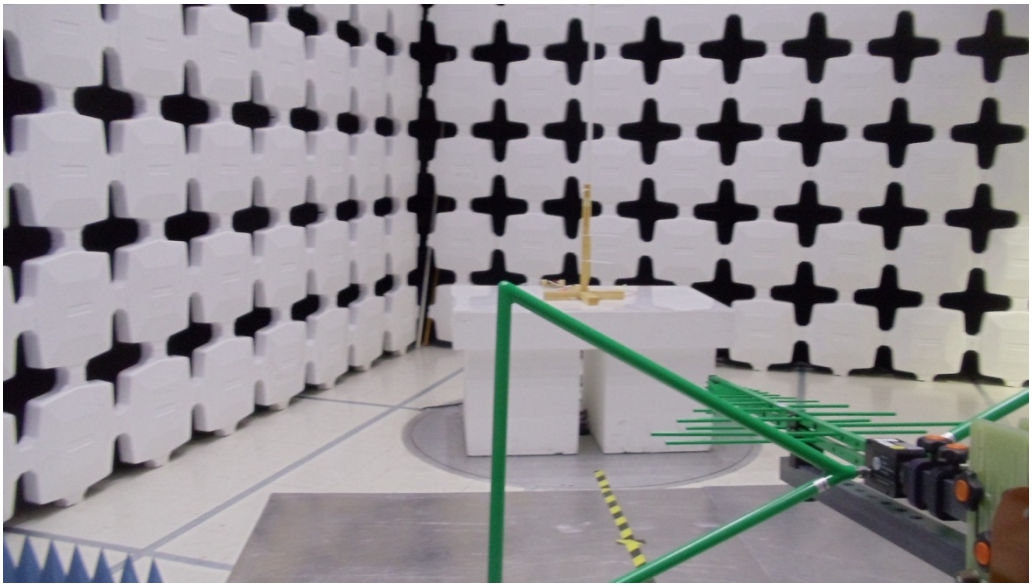
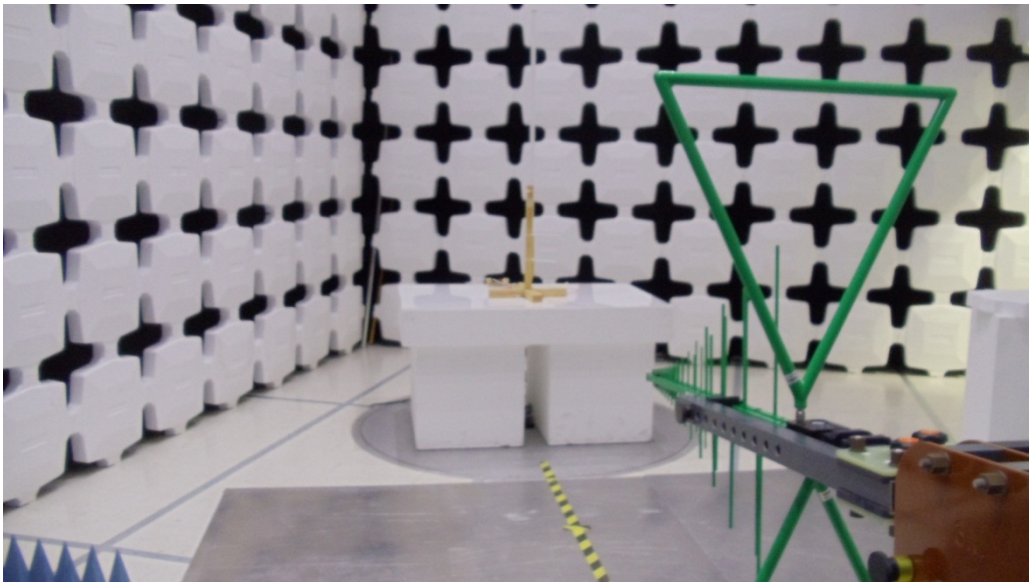

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

Figure 3

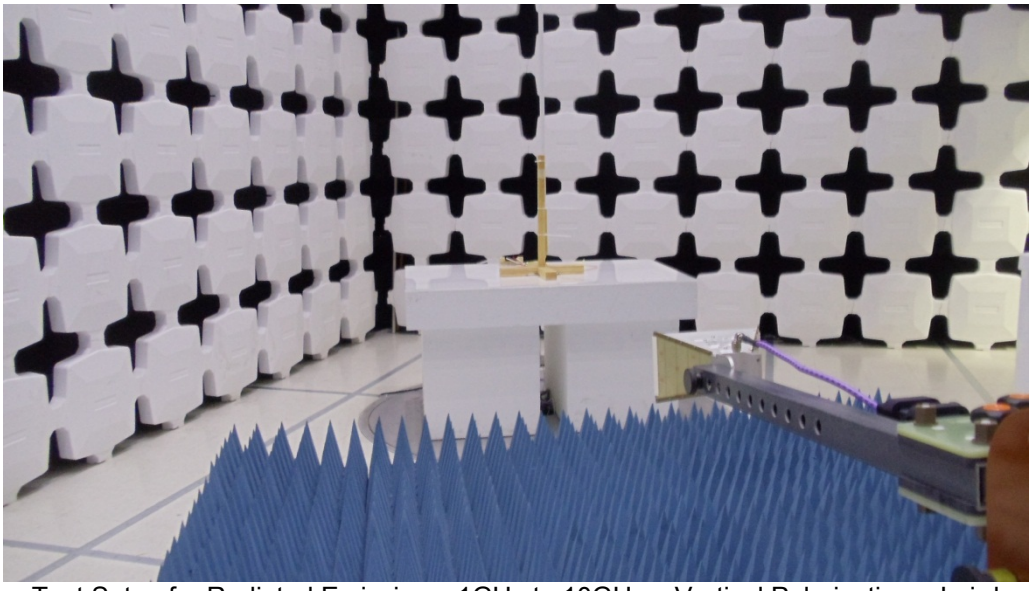


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization – Laird Antenna



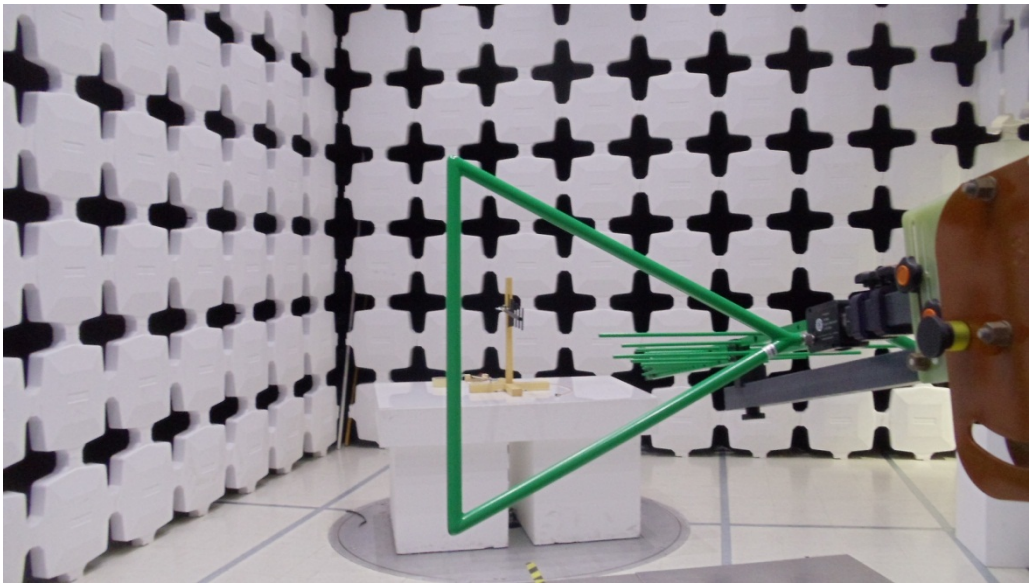
Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization – Laird Antenna
Figure 4

Test Setup for Radiated Emissions, 1GHz to 10GHz – Horizontal Polarization – Laird Antenna

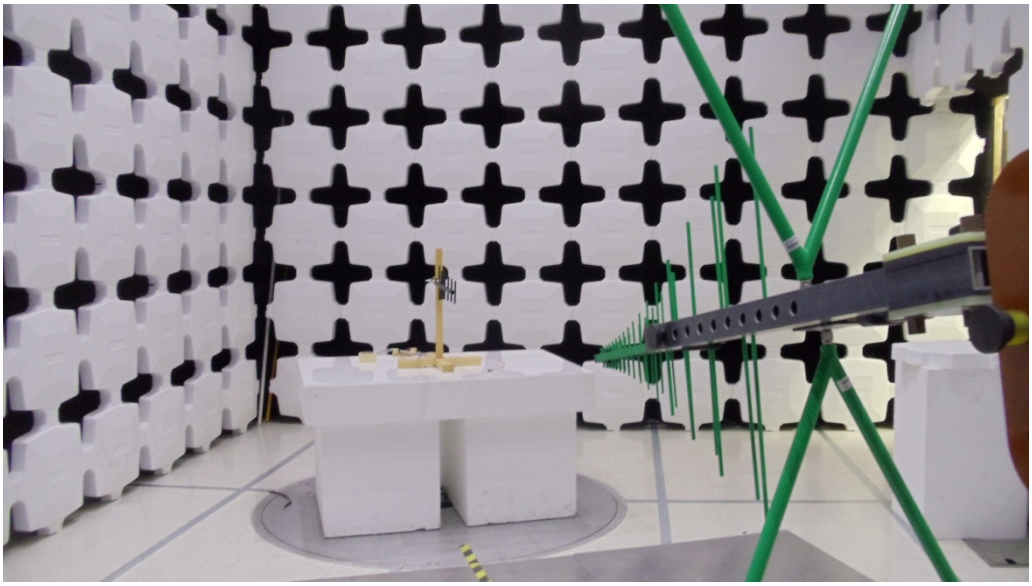


Test Setup for Radiated Emissions, 1GHz to 10GHz – Vertical Polarization – Laird Antenna

Figure 5



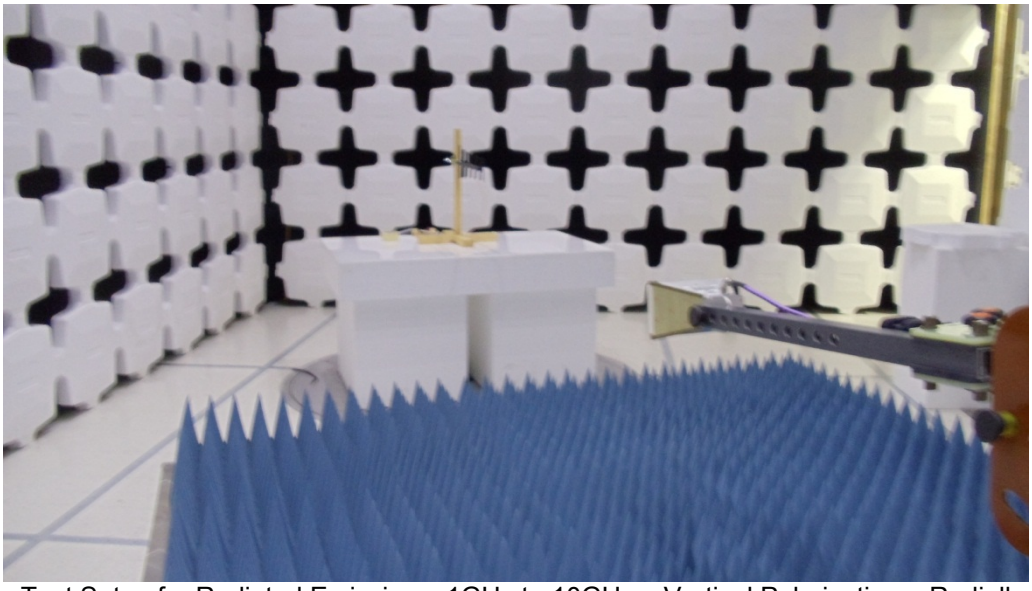
Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization – Radiall Larsen Antenna



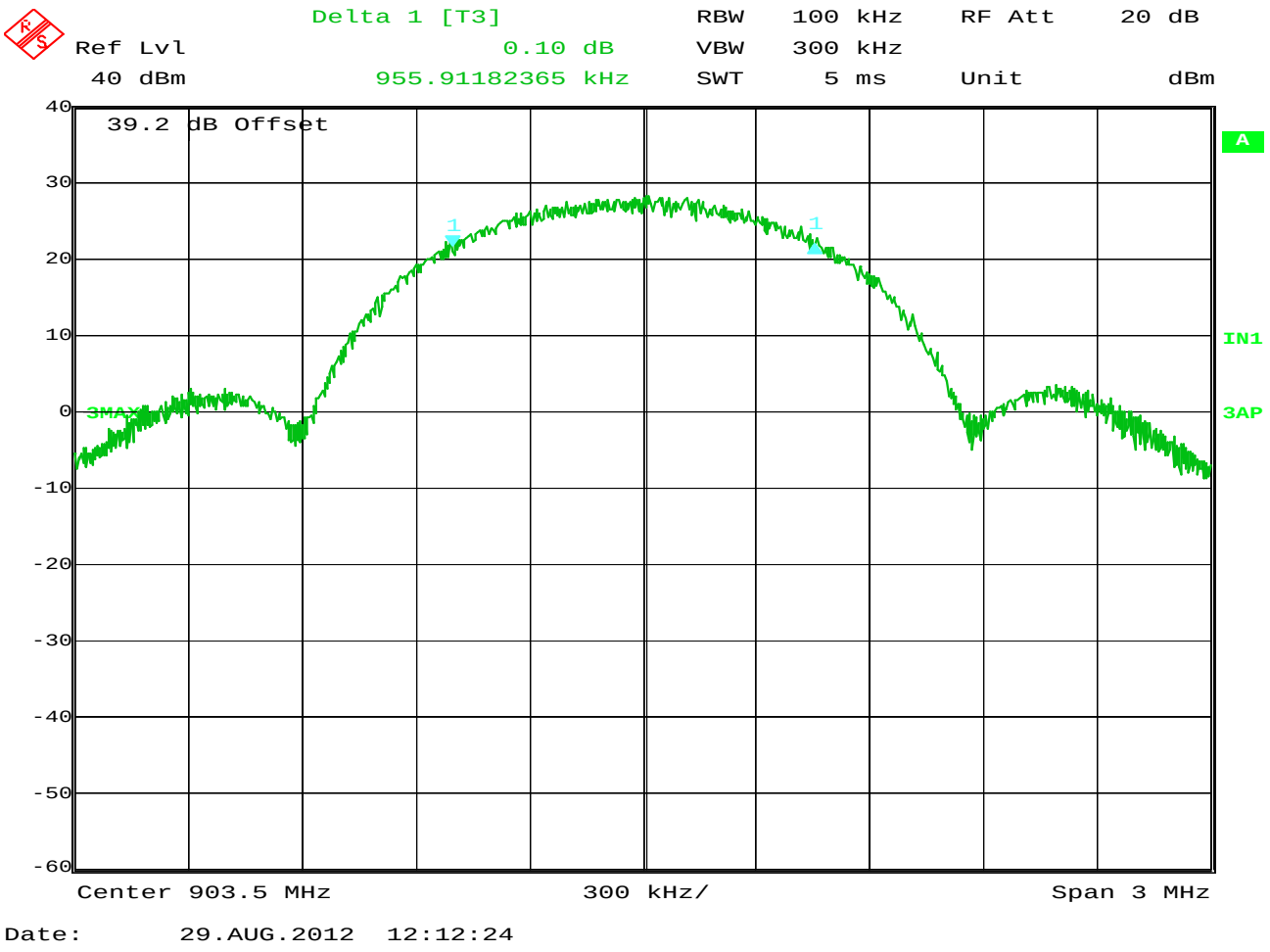
Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization – Radiall Larsen Antenna

Figure 6

Test Setup for Radiated Emissions, 1GHz to 10GHz – Horizontal Polarization – Radiall Larsen Antenna



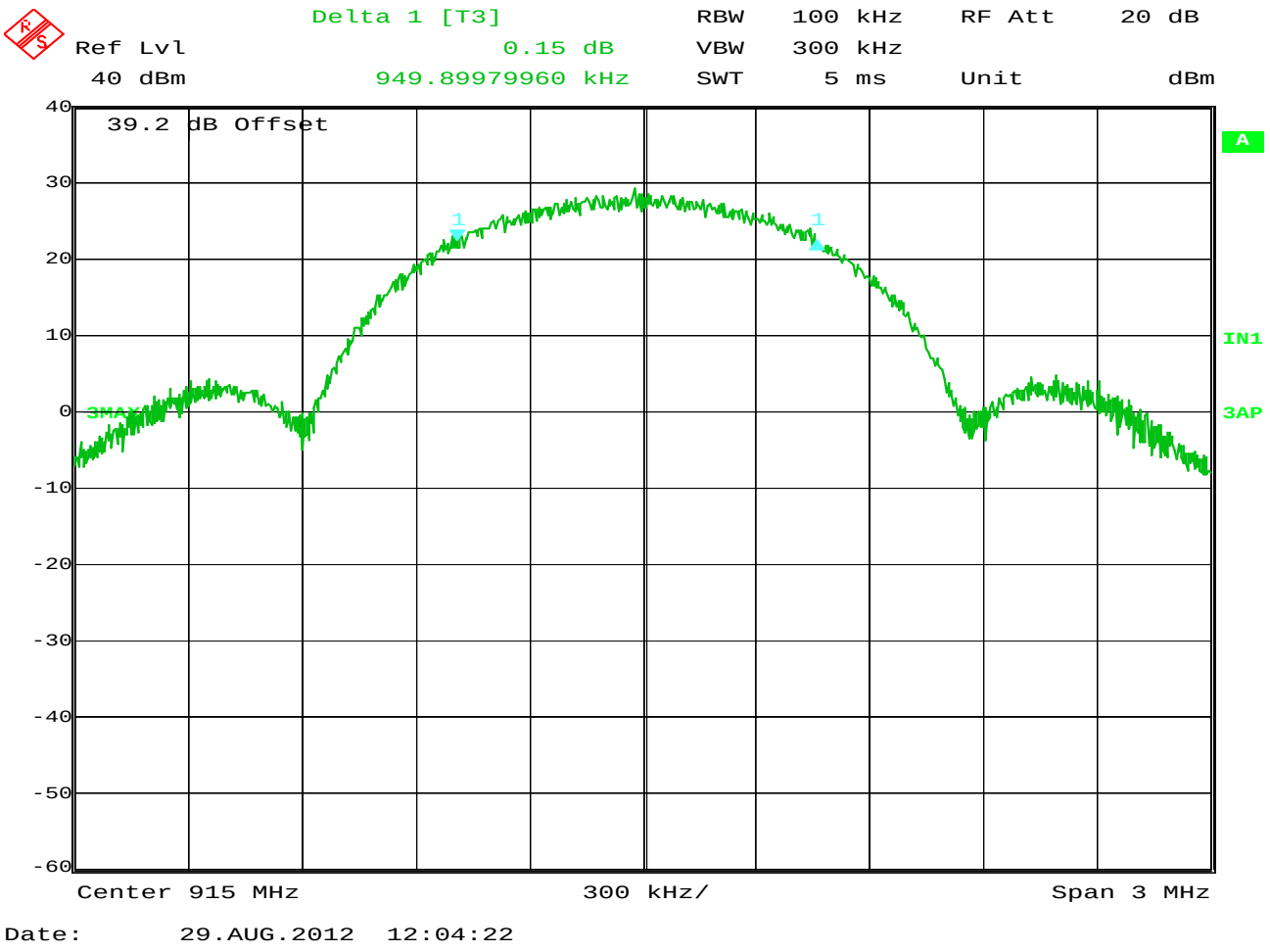
Test Setup for Radiated Emissions, 1GHz to 10GHz – Vertical Polarization – Radiall Larsen Antenna



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	16QAM (Low: 903.5MHz @ 20000 power level)
TEST PARAMETERS	:	minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

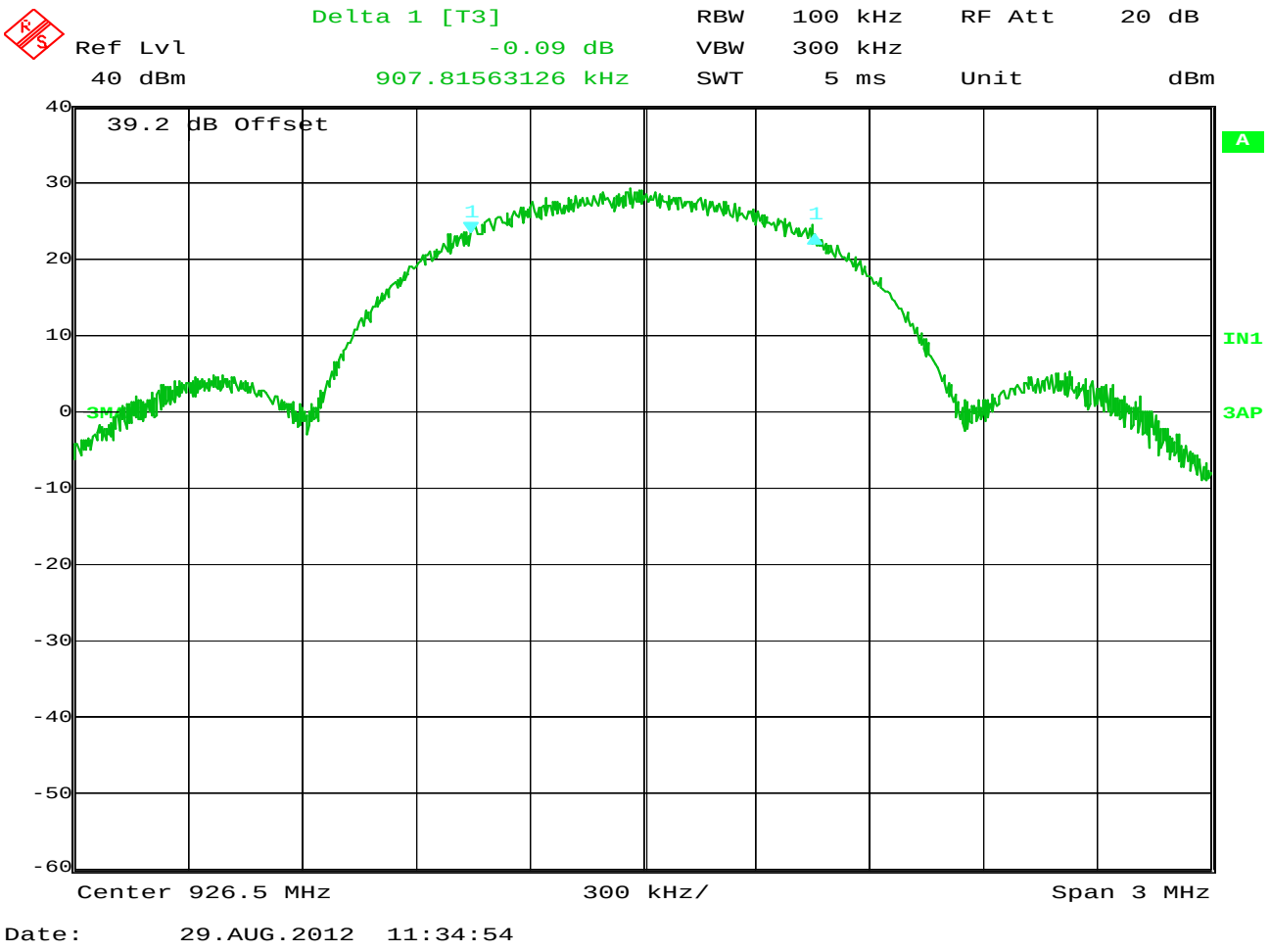
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	16QAM (Medium: 915MHz @ 17000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

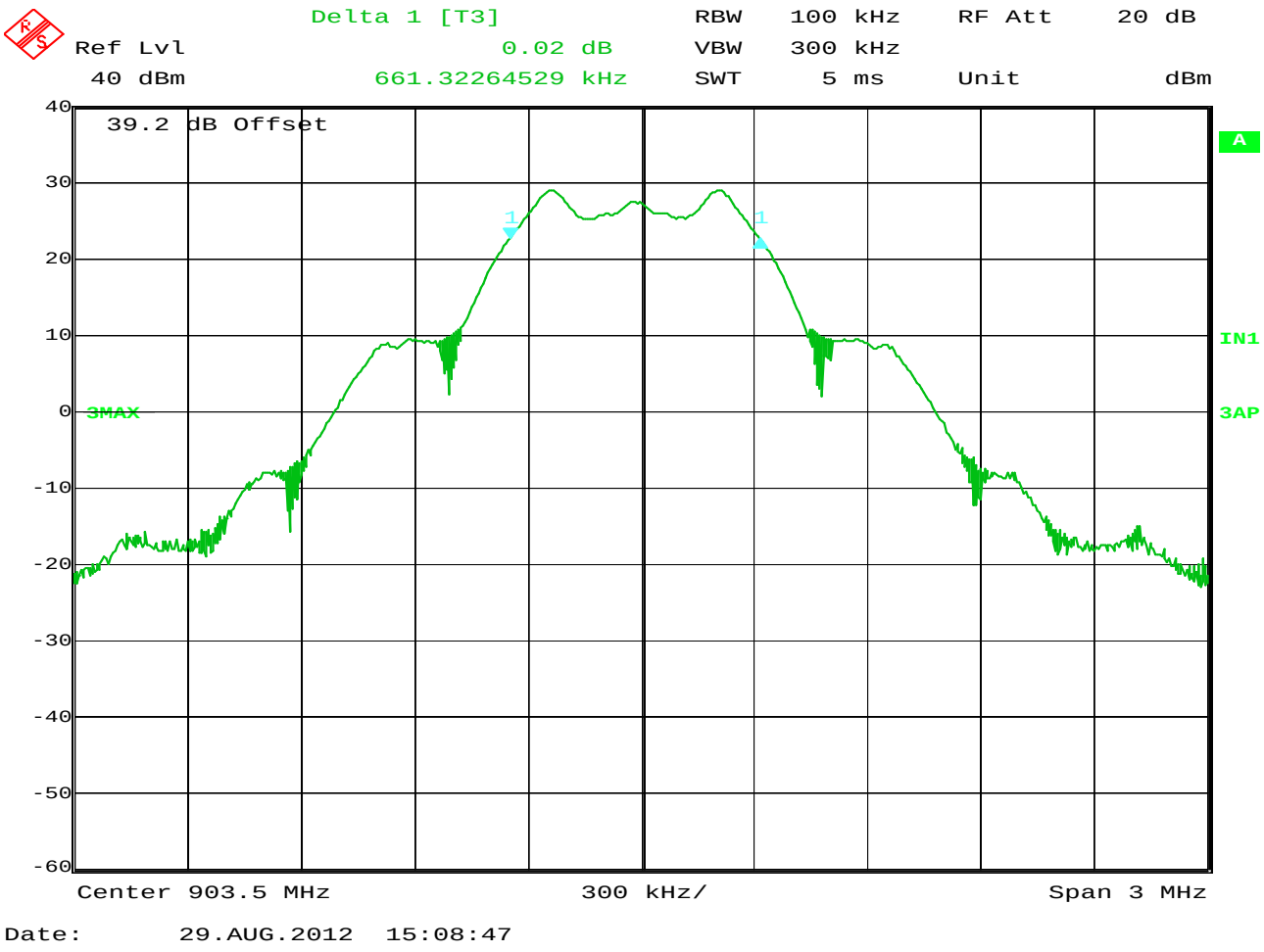
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	16QAM (High: 926.5MHz @ 14000 power level)
TEST PARAMETERS	:	minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

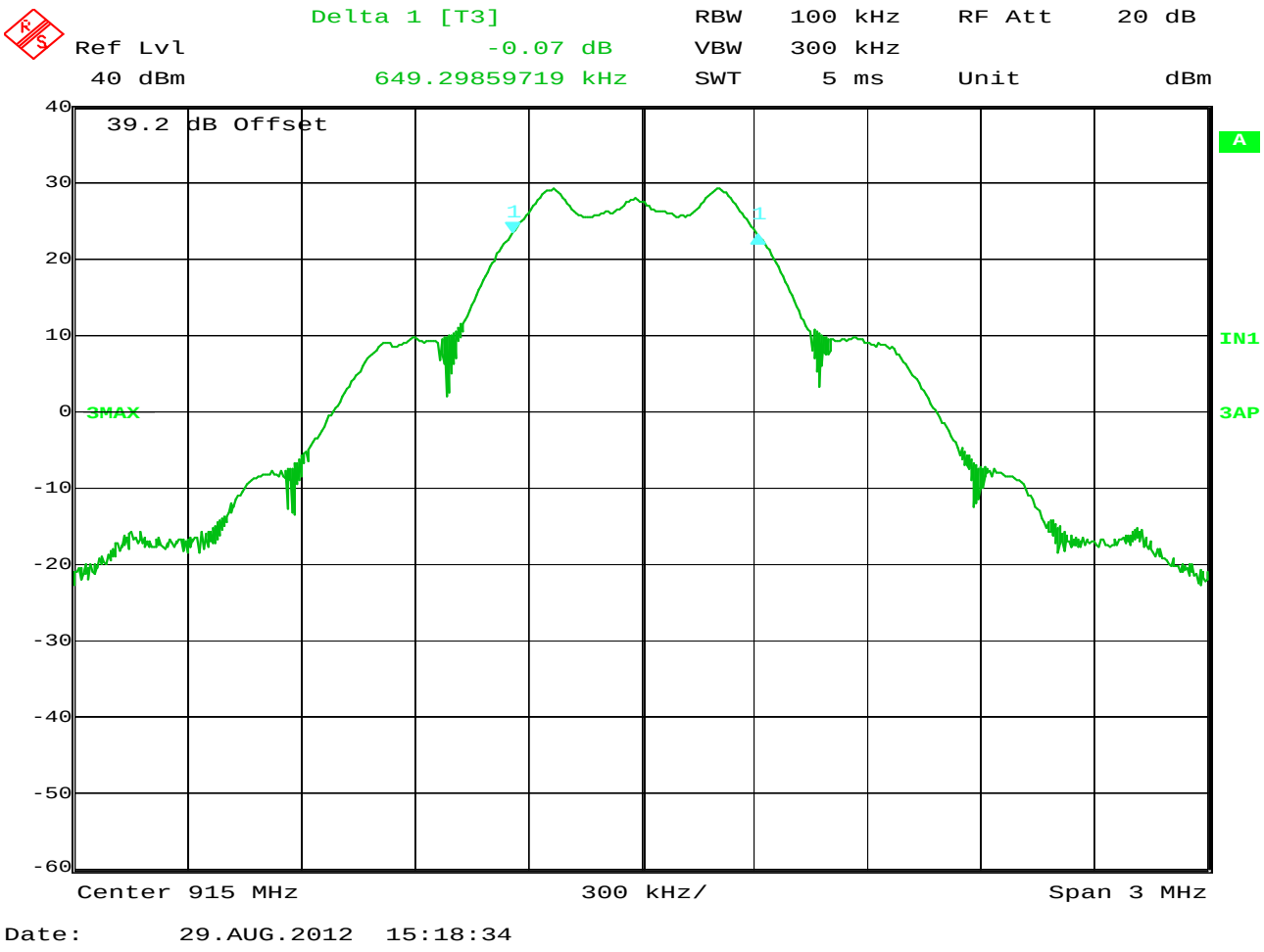
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	2FSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

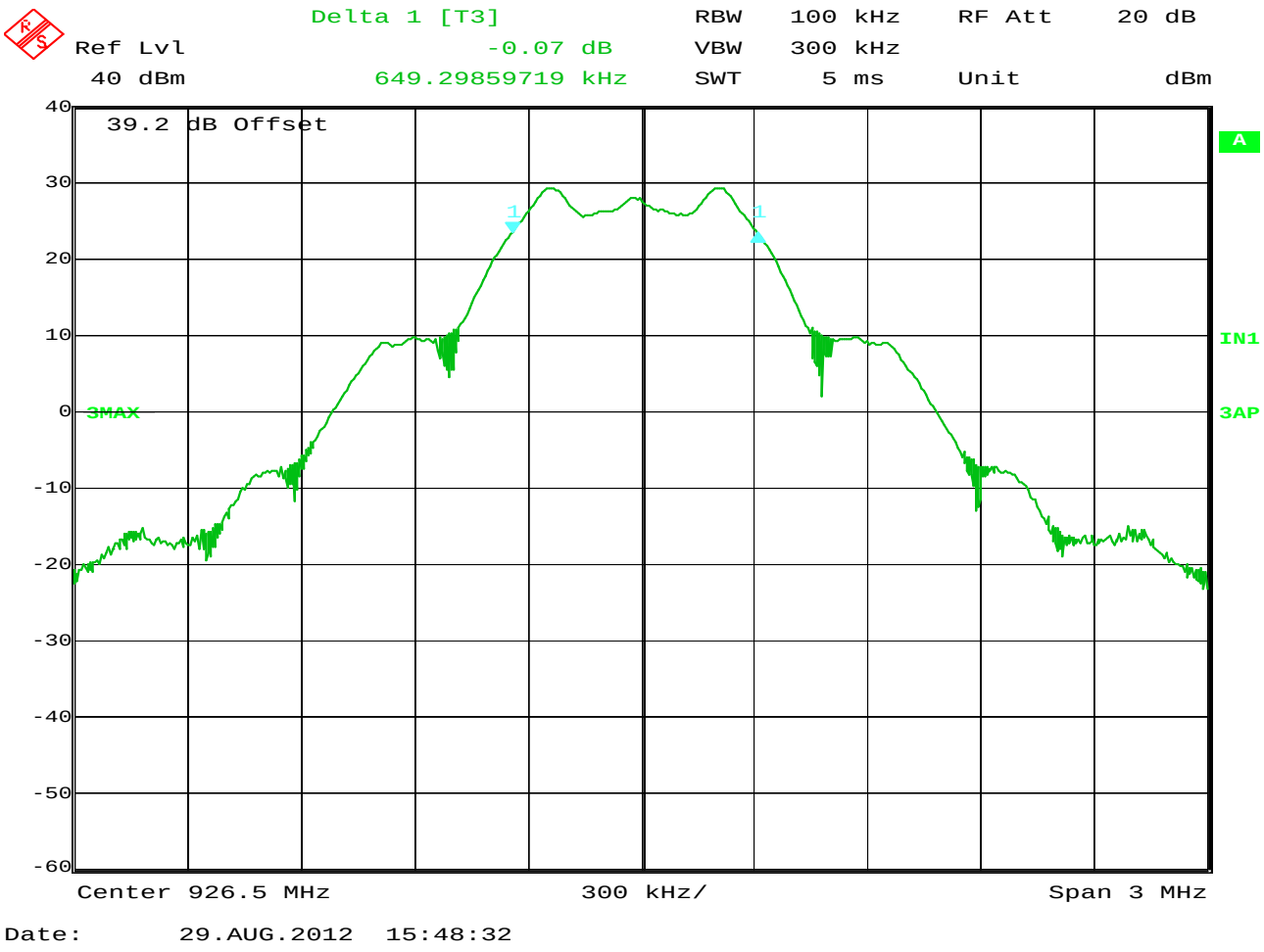
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	2FSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

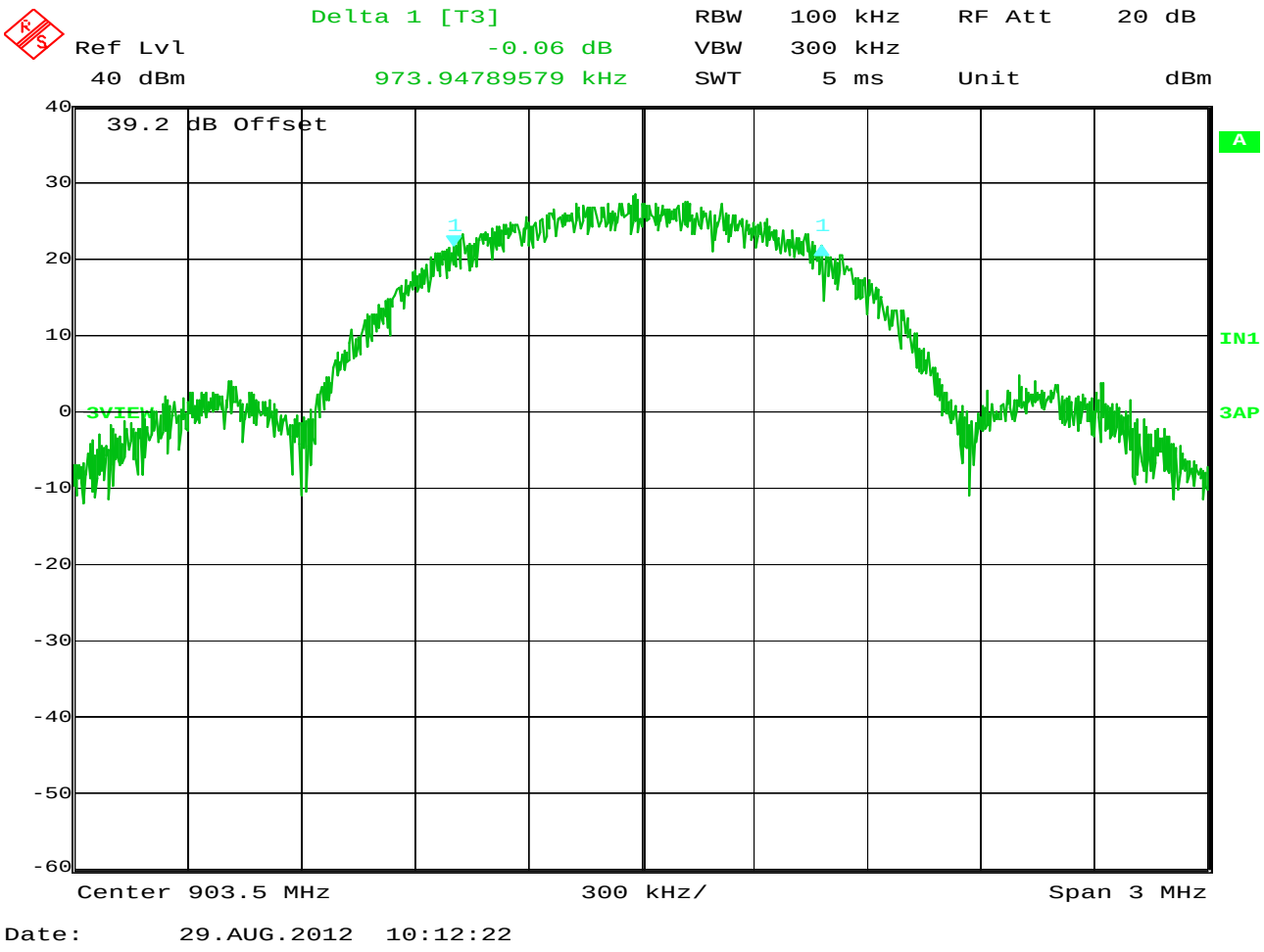
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	2FSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

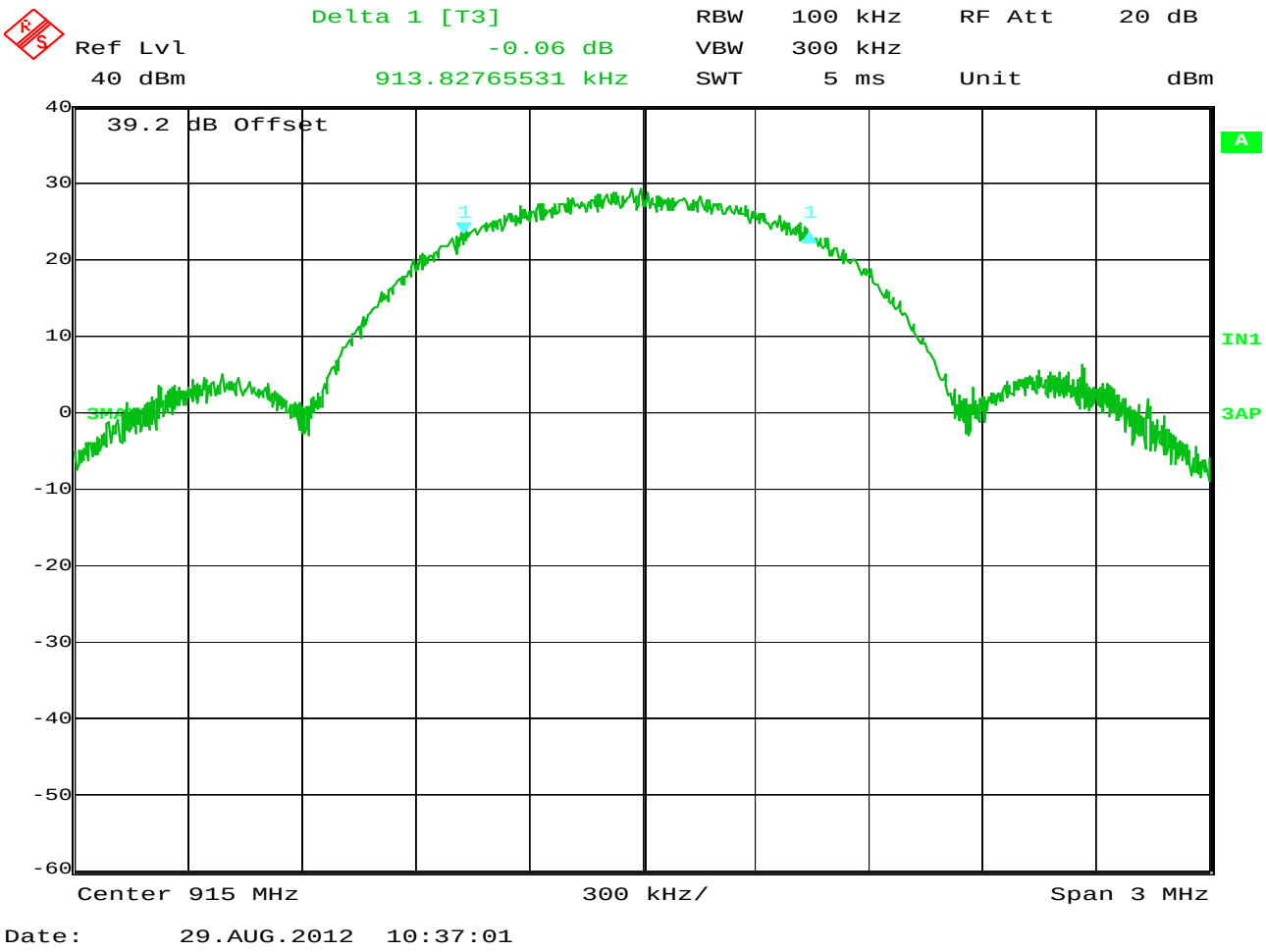
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Low: 903.5MHz @ 26000 power level)
TEST PARAMETERS : Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

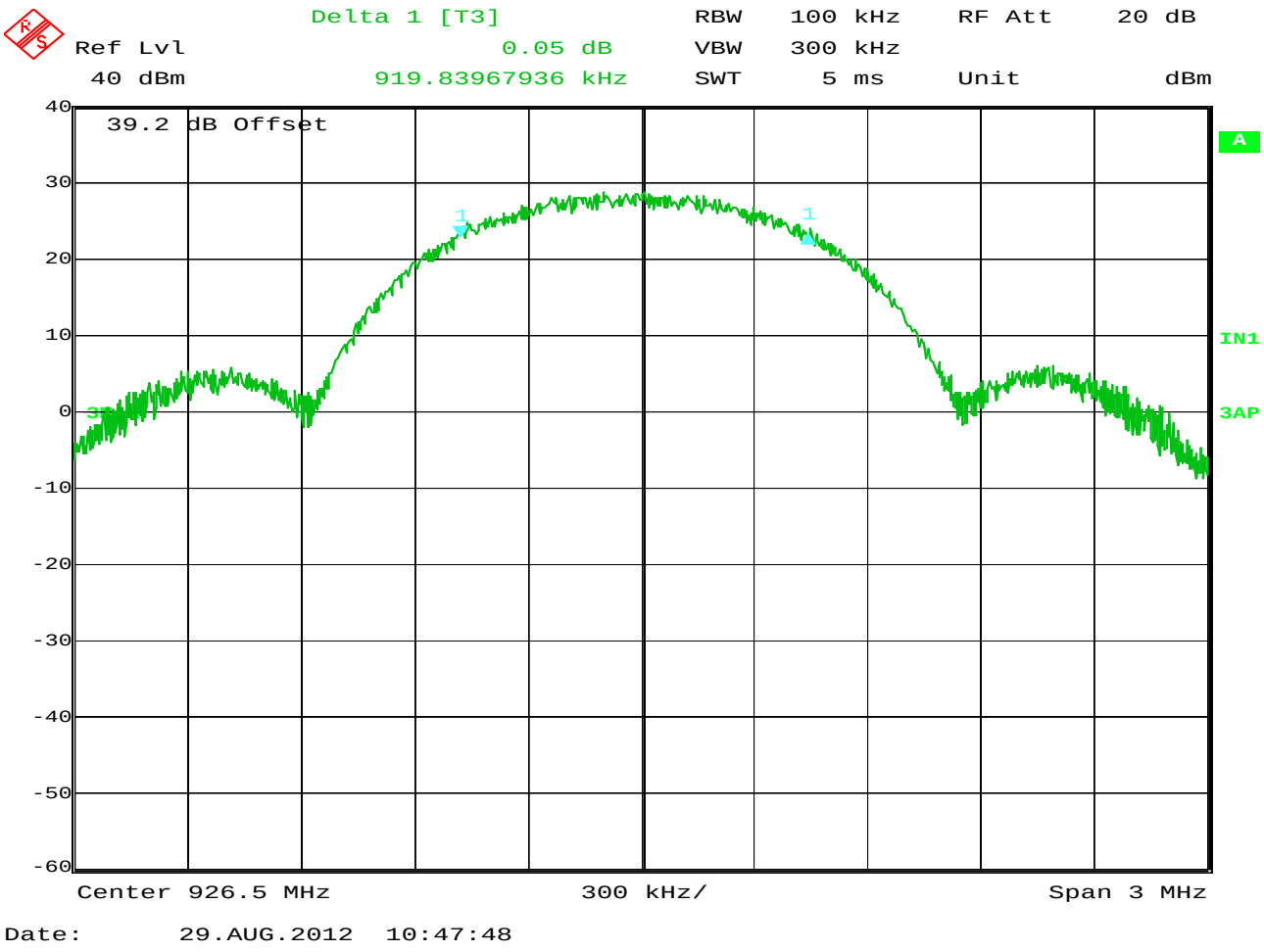
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Low: 915MHz @ 21000 power level)
TEST PARAMETERS : minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

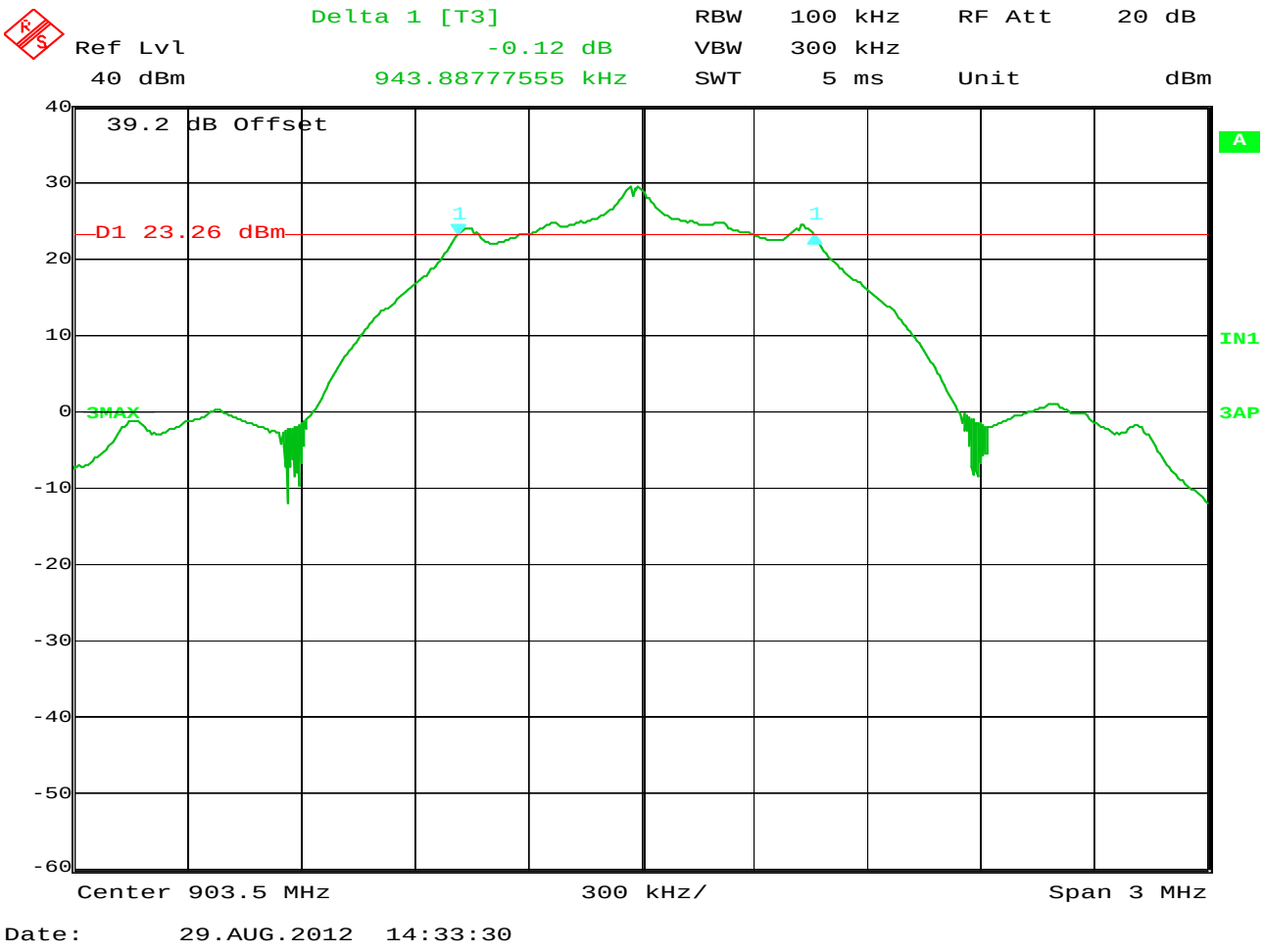
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (High: 926.5MHz @ 17000 power level)
TEST PARAMETERS : minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

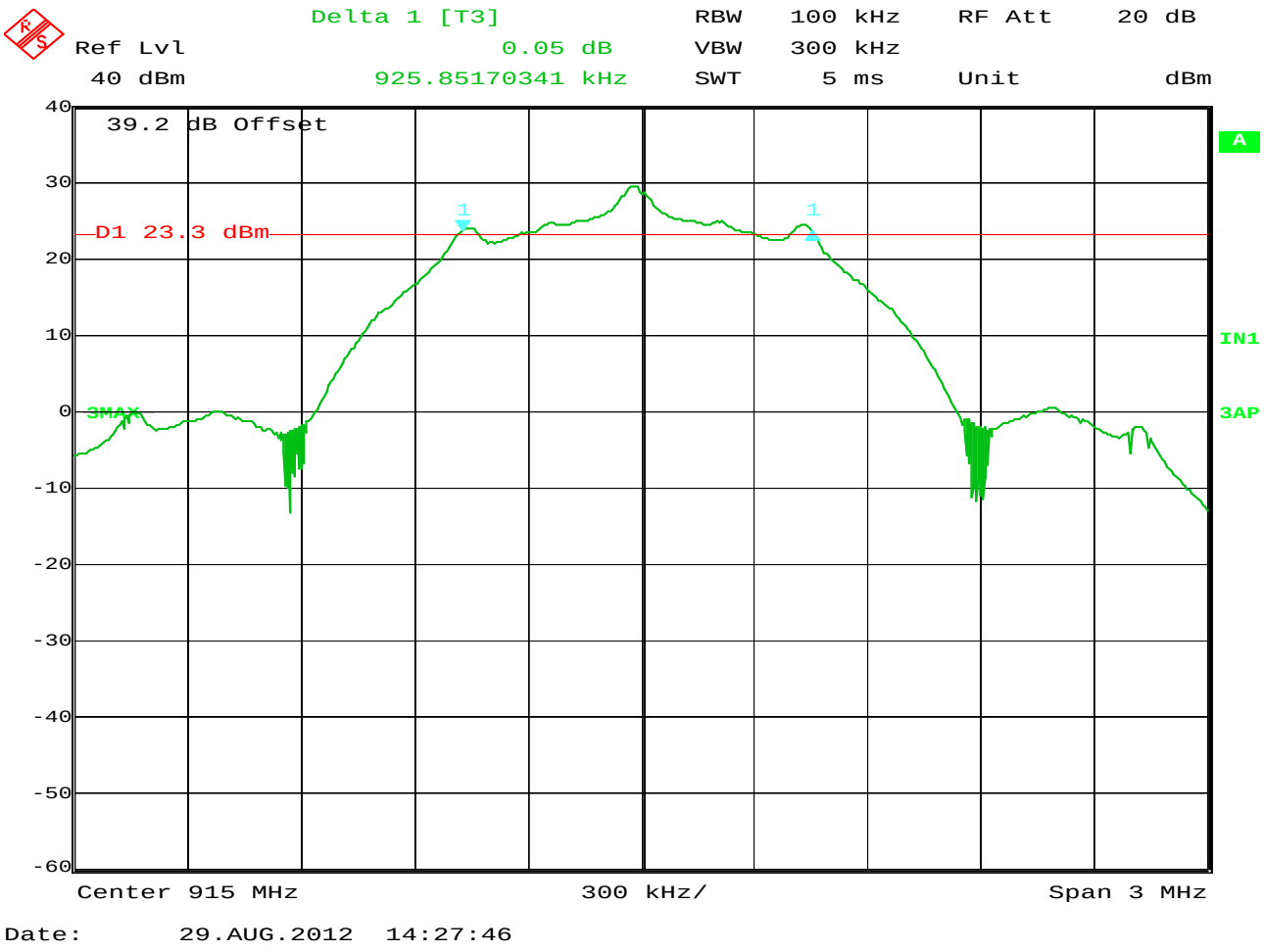
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS : Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

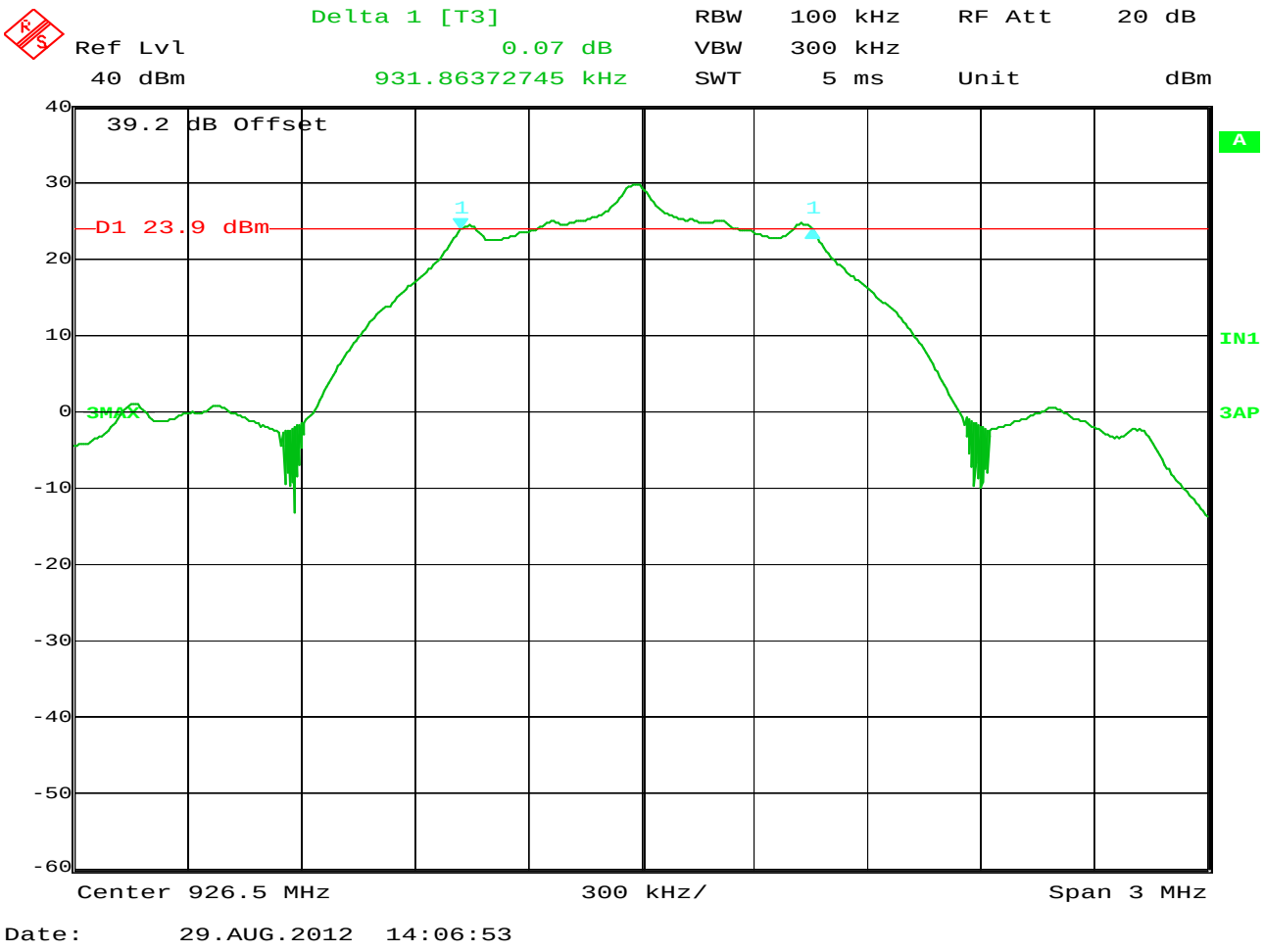
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	BPSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

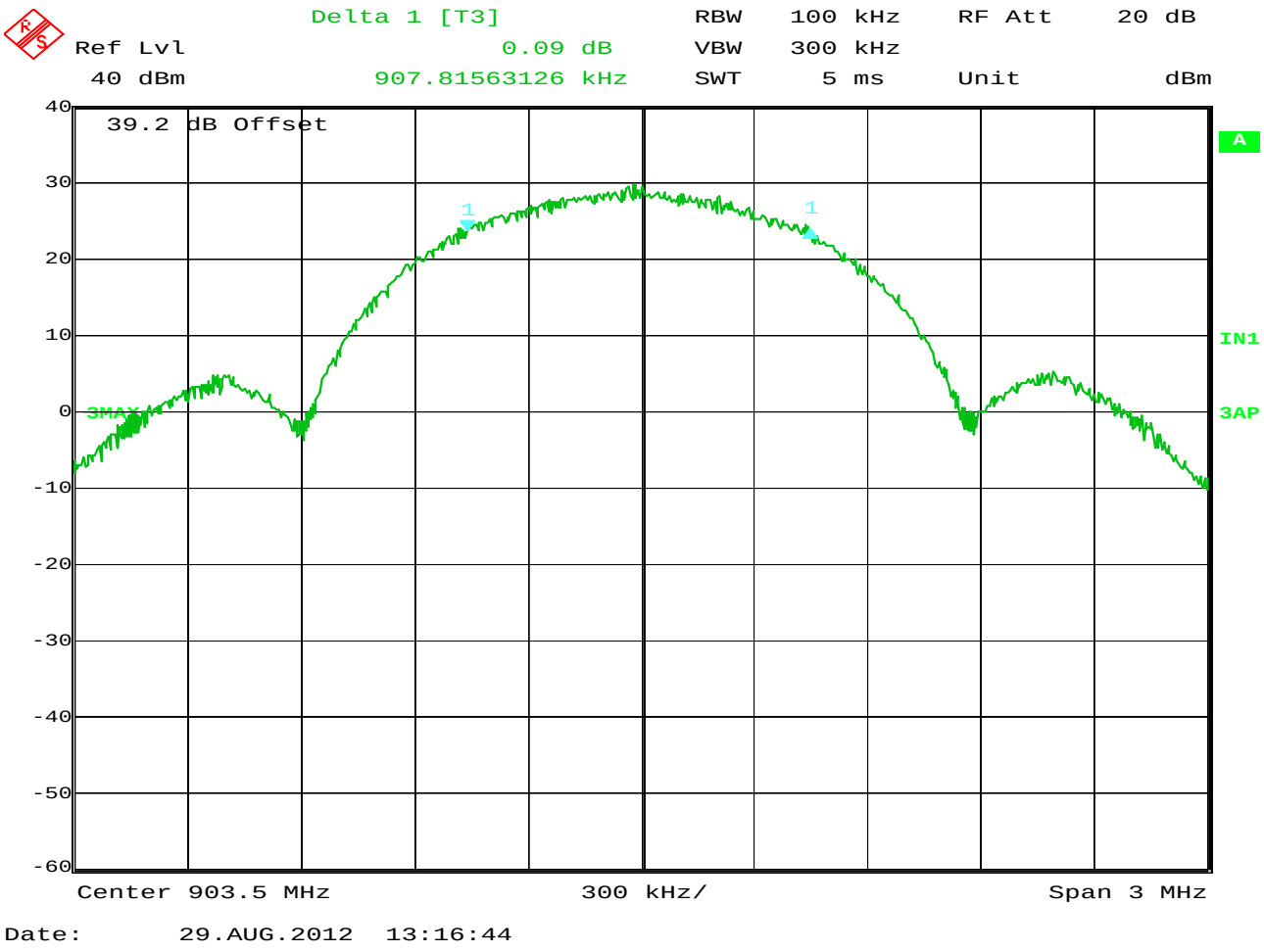
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS : Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

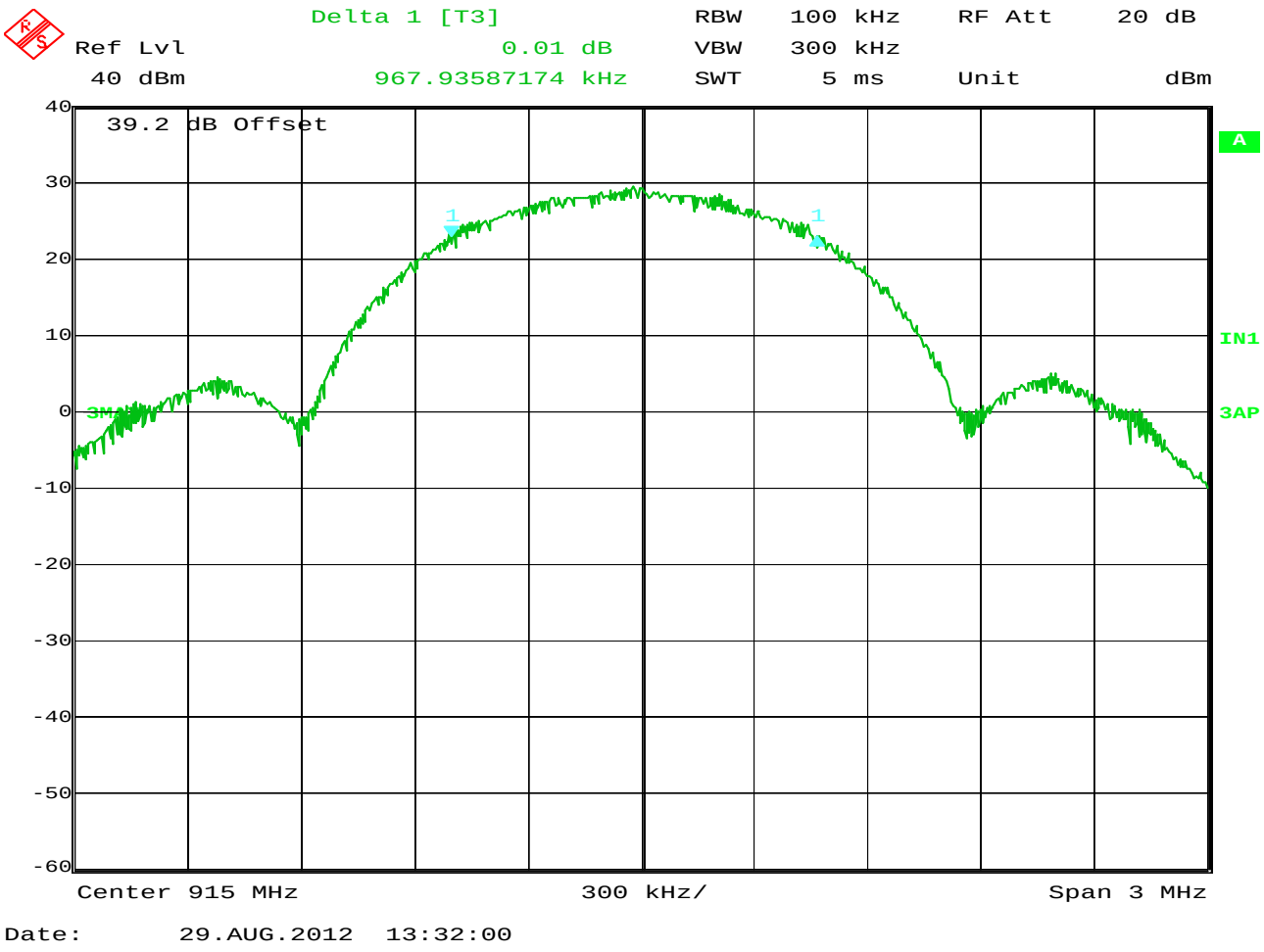
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	QPSK (Low: 903.5MHz @ 19000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

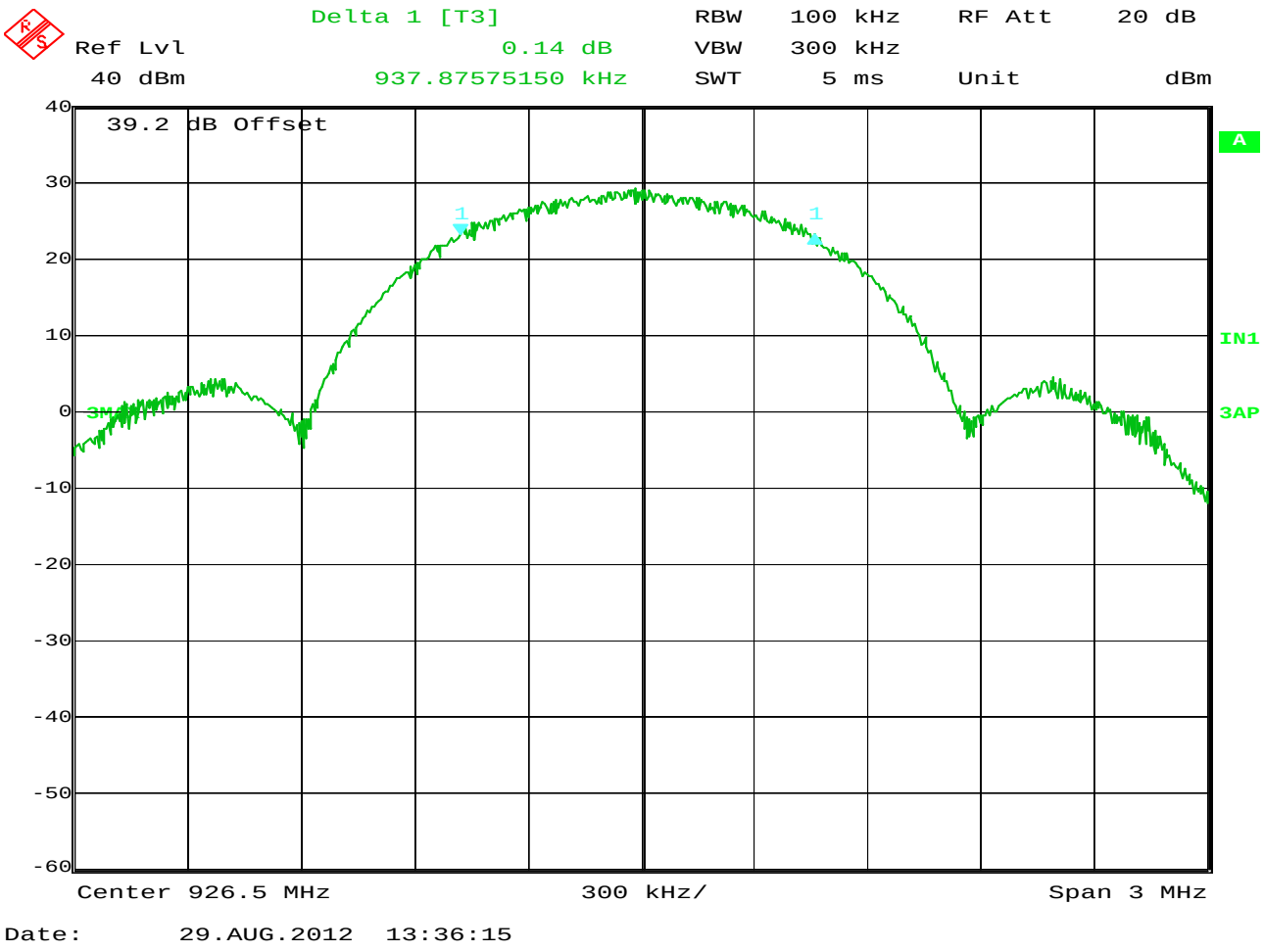
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Medium: 915MHz @ 15500 power level)
TEST PARAMETERS : Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

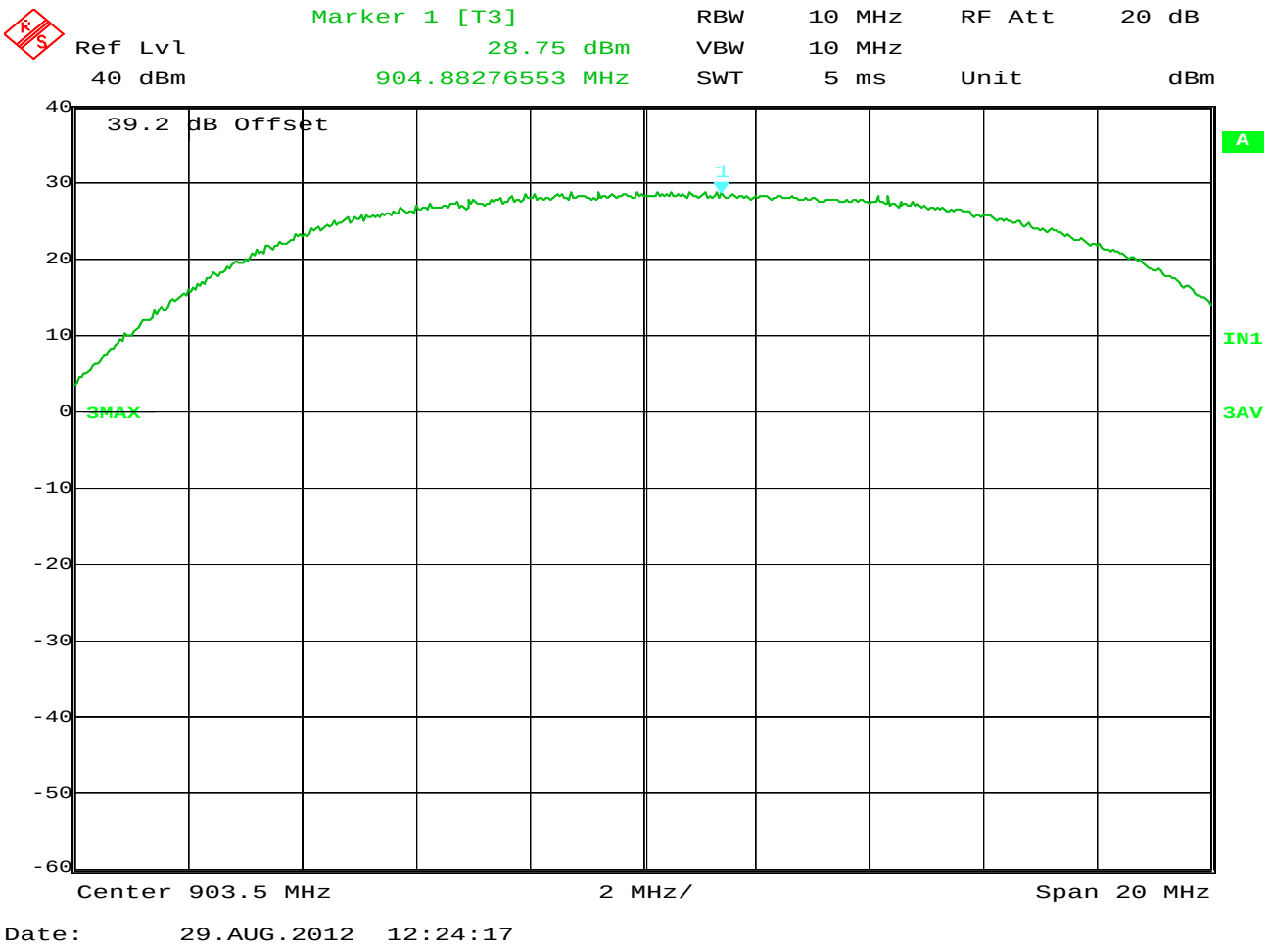
NOTES



FCC 15.247: 6db Bandwidth Measurements

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	QPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS	:	Minimum 6 dB bandwidth from peak shall be at least 500 kHz
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

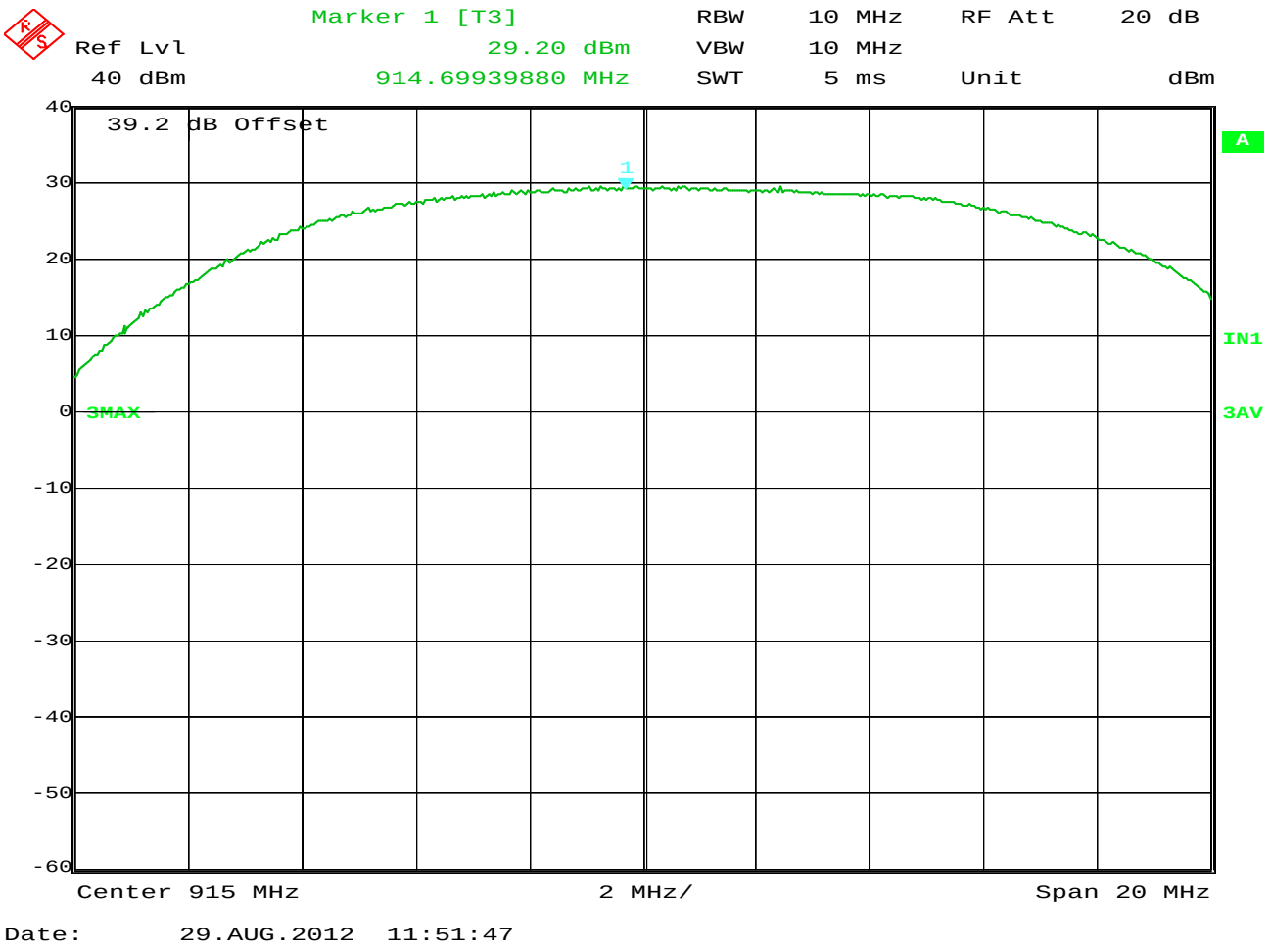
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (Low: 903.5MHz @ 20000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

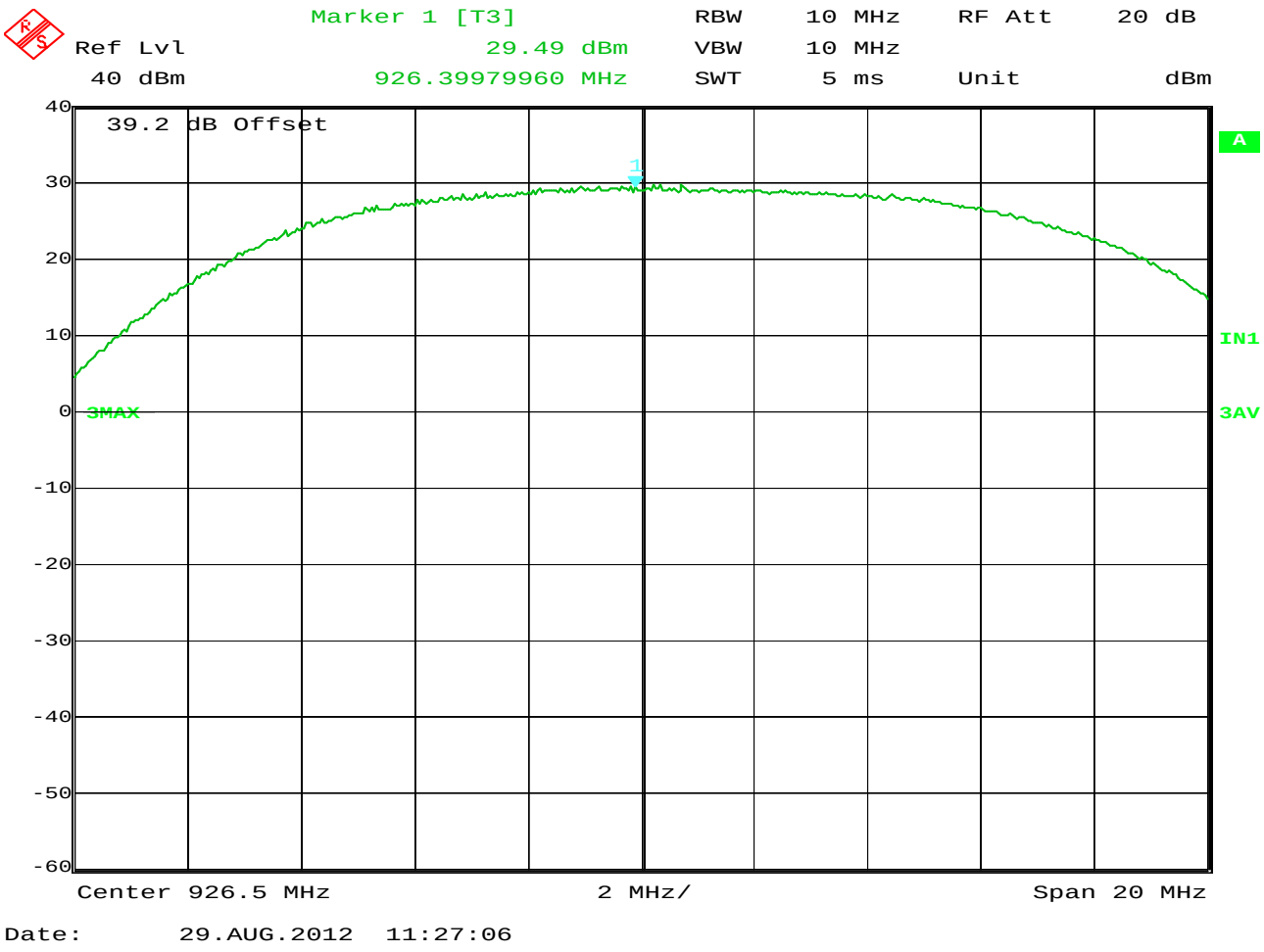
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (Medium: 915MHz @ 17000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

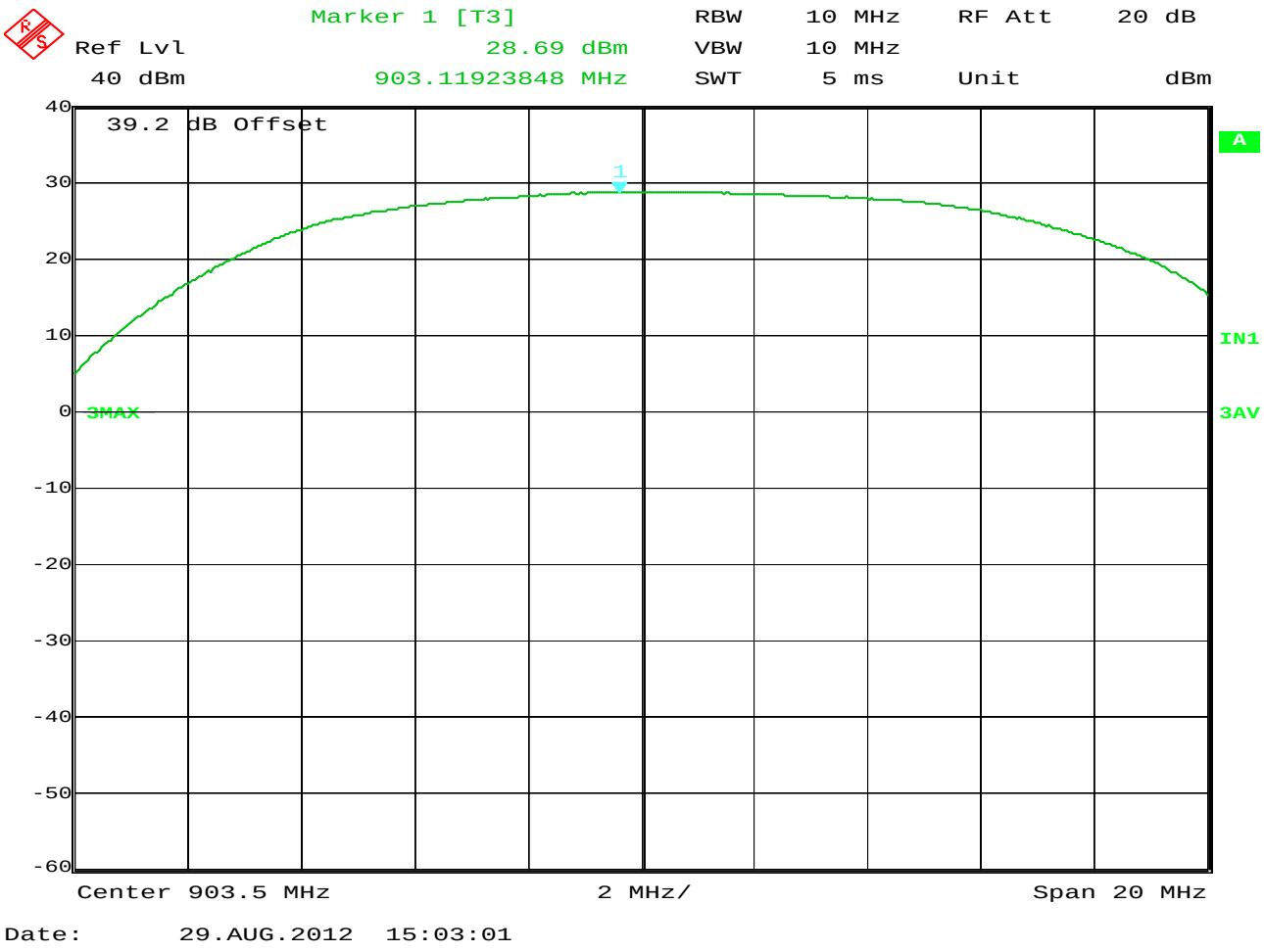
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (High: 926.5MHz @ 14000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

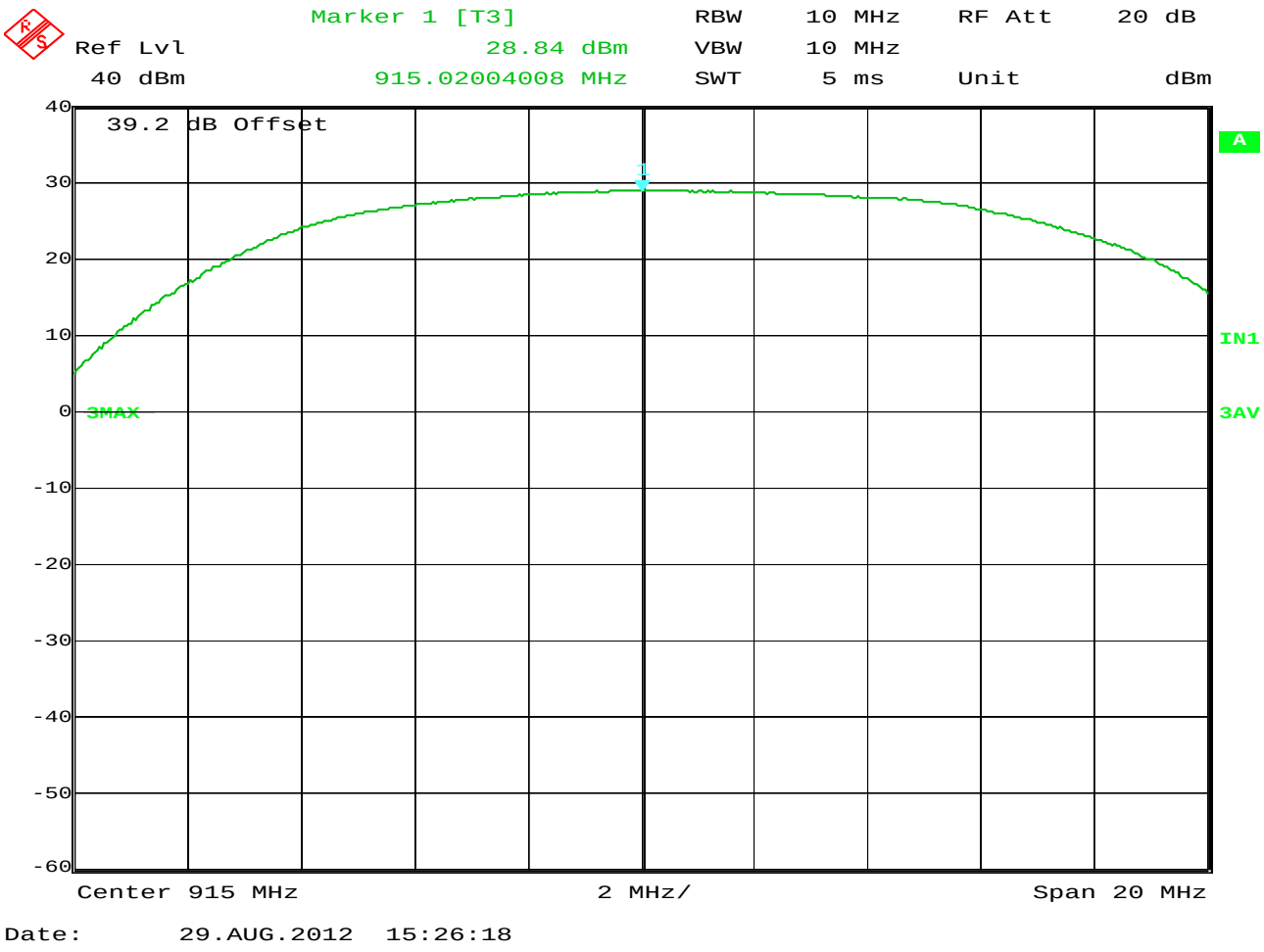
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

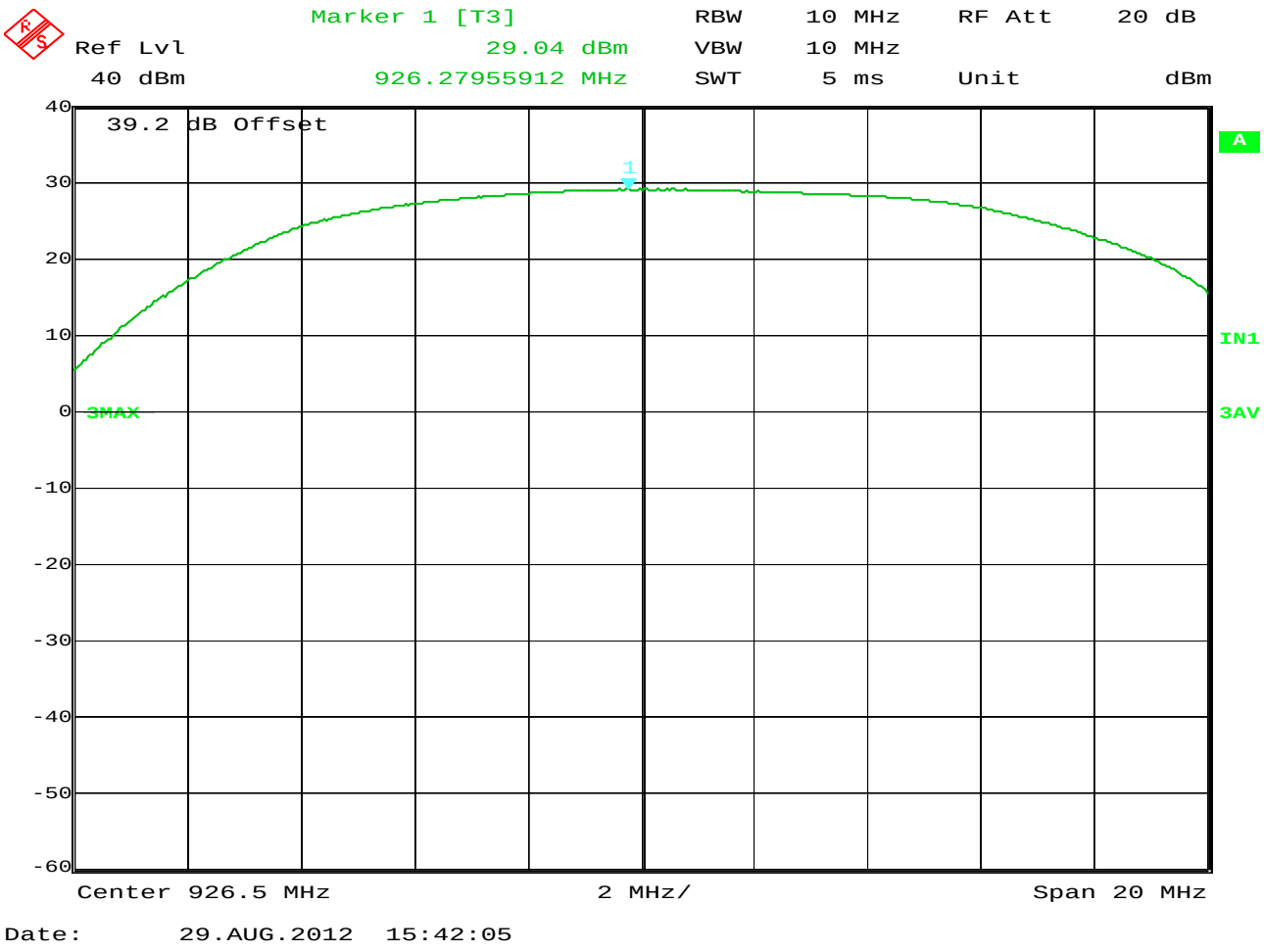
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

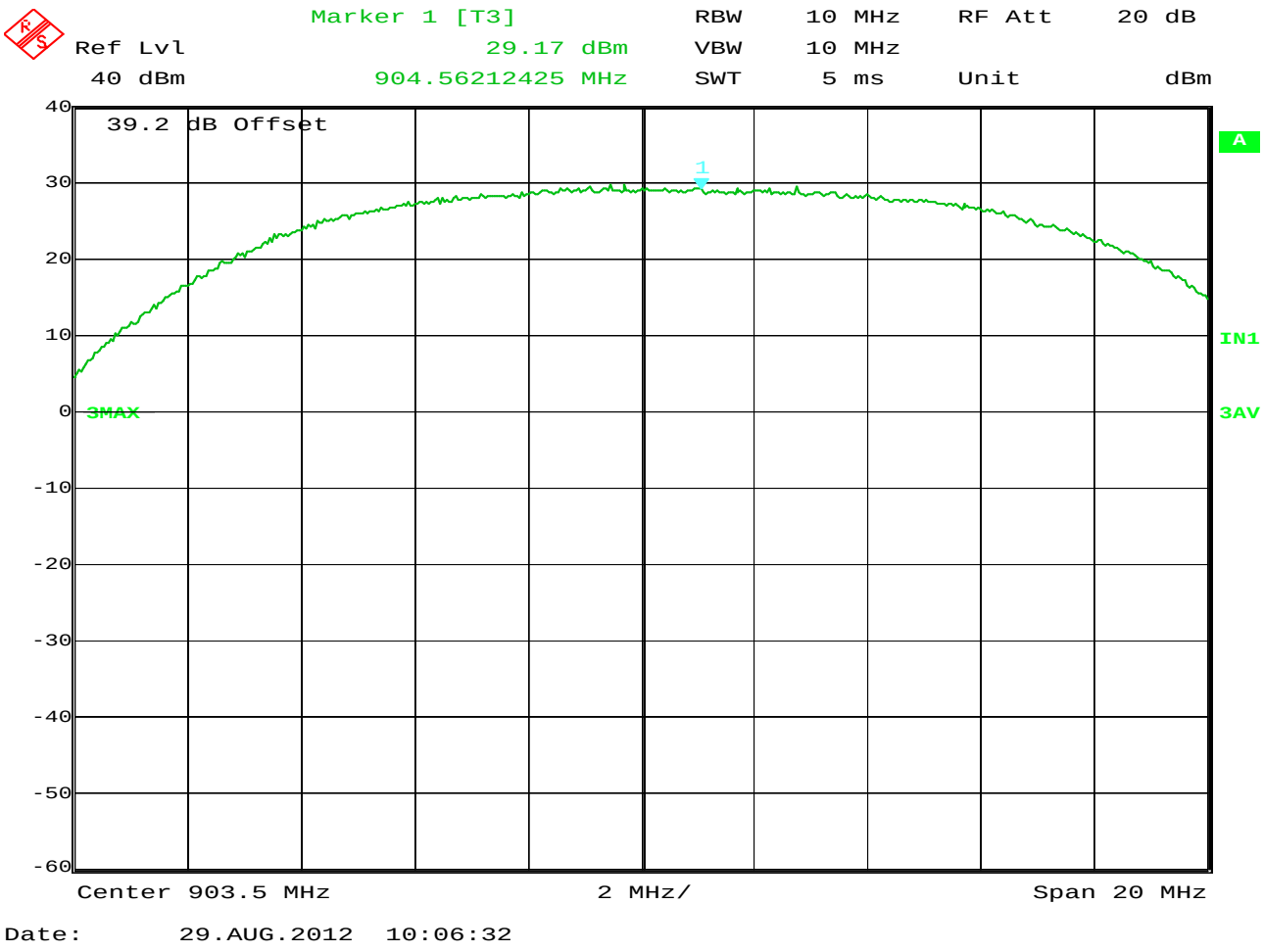
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

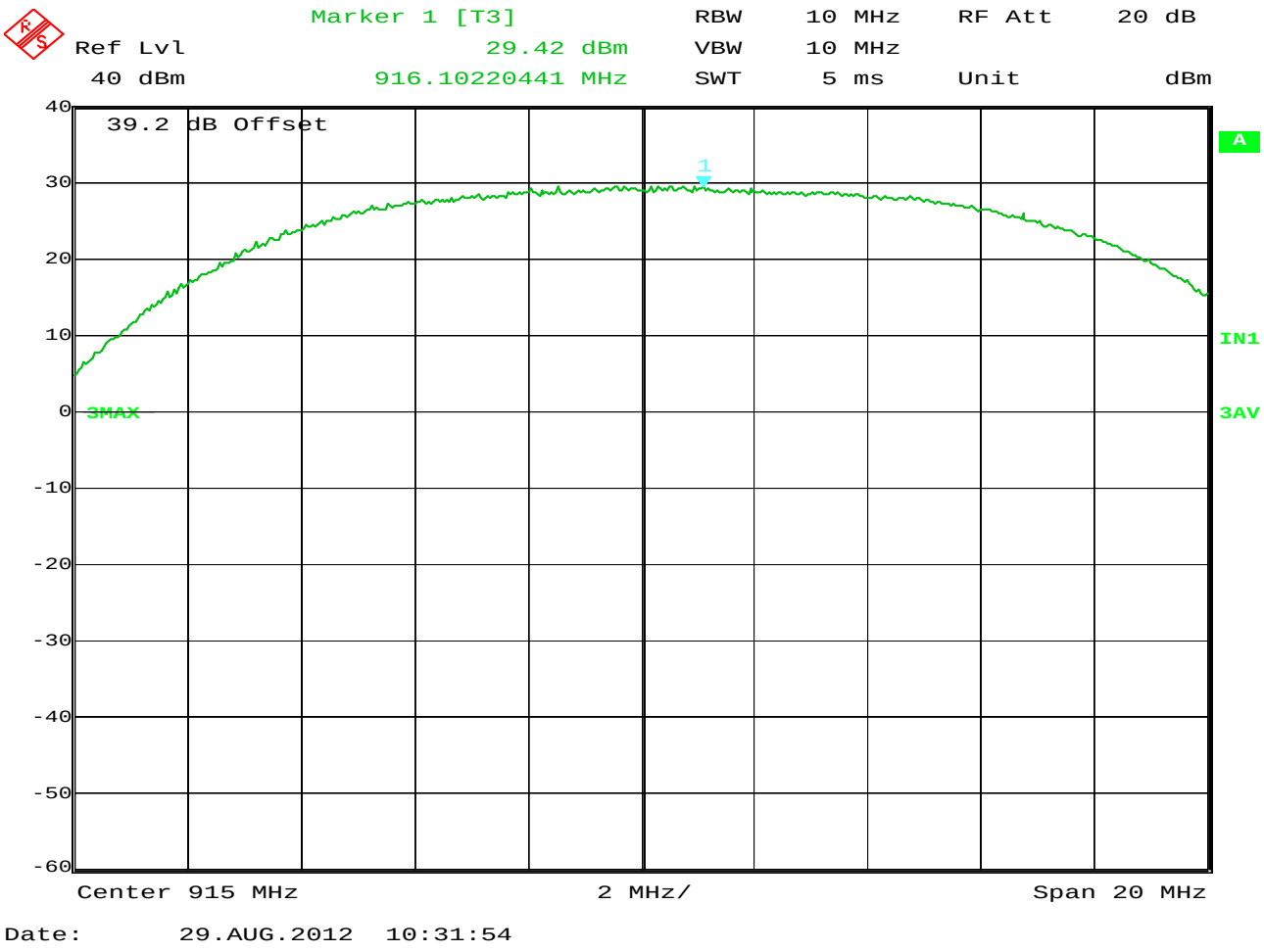
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Low: 903.5MHz @ 26000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

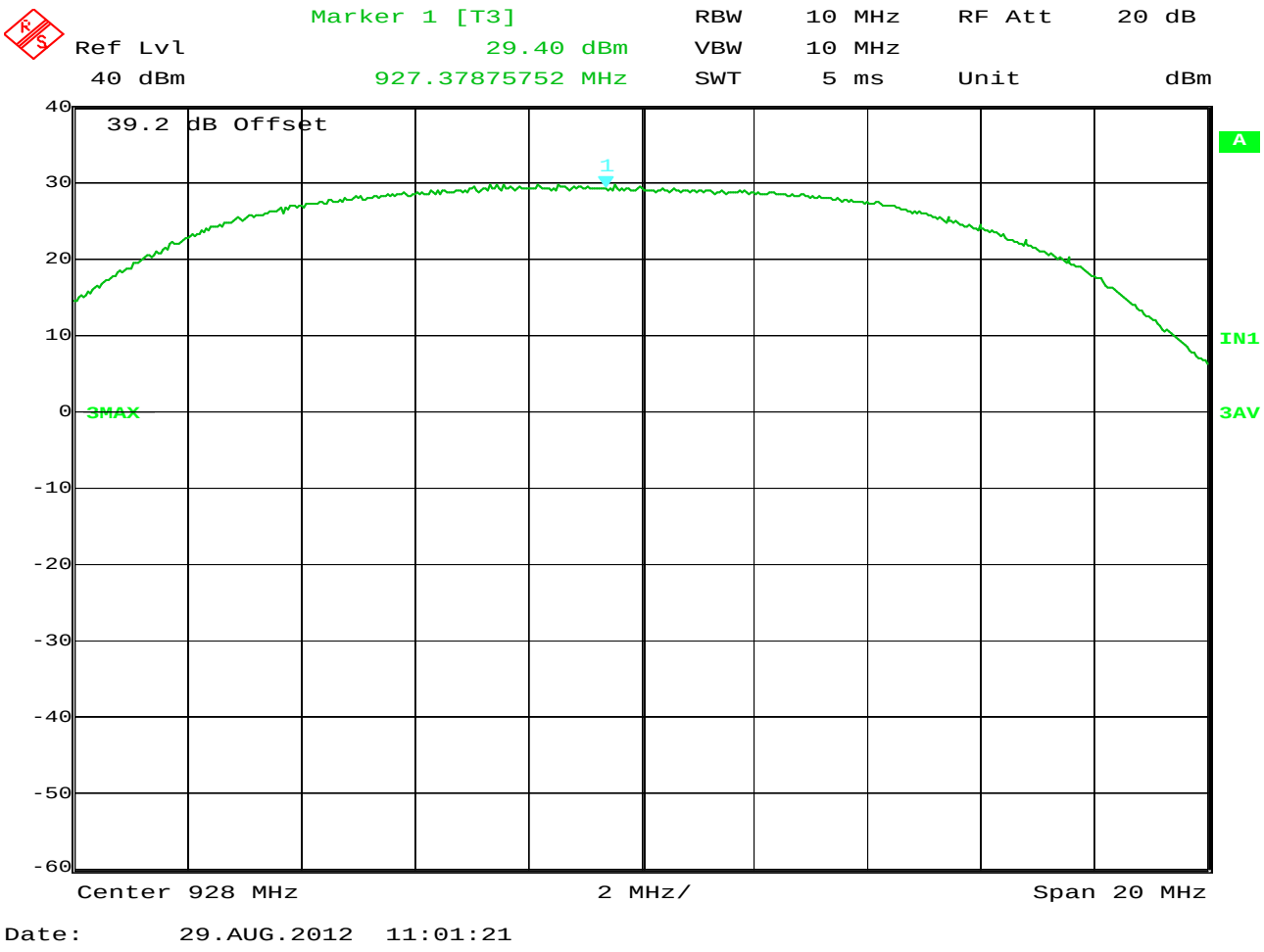
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Med: 915MHz @ 21000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

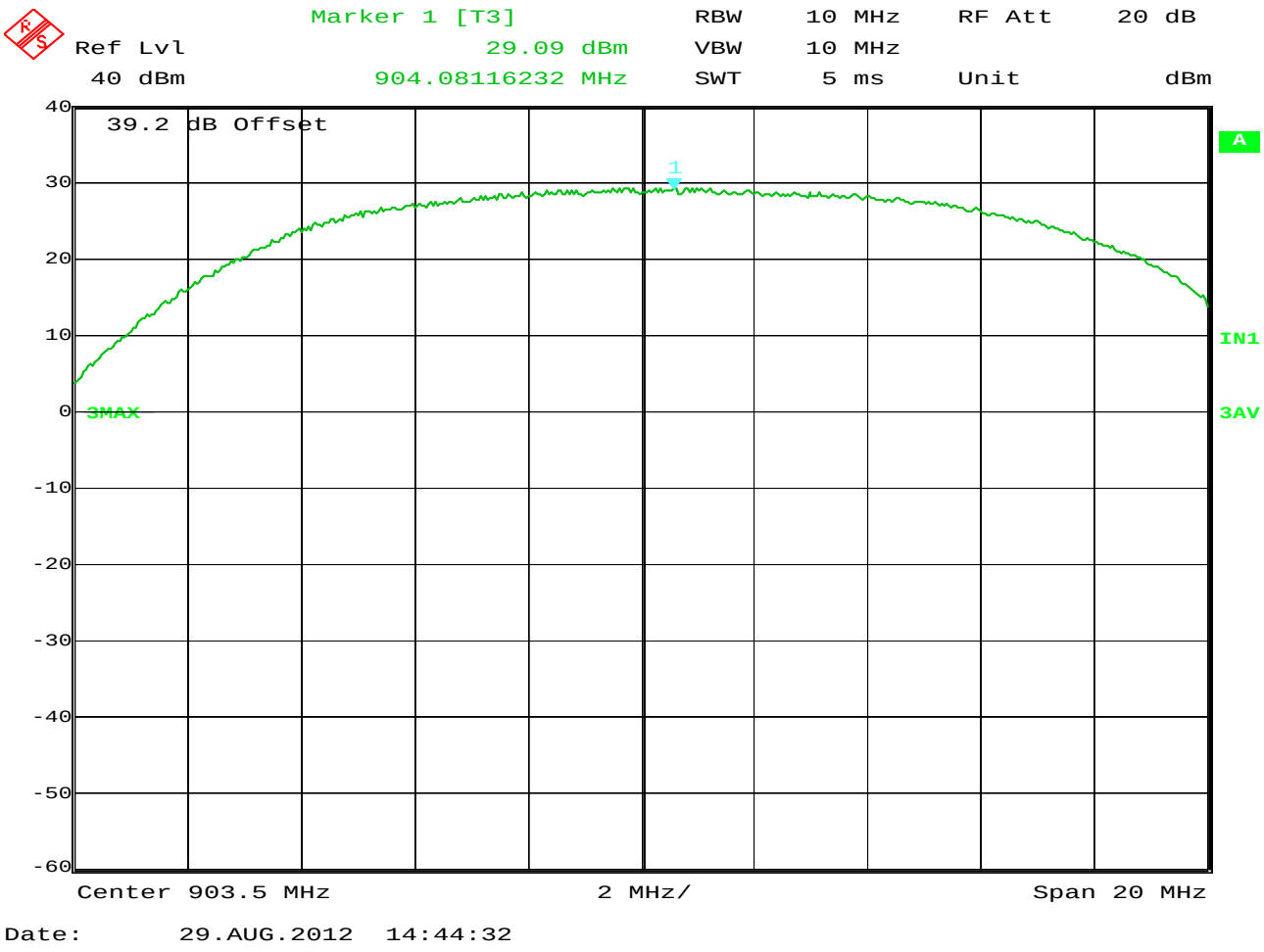
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (High: 926.5MHz @ 17000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

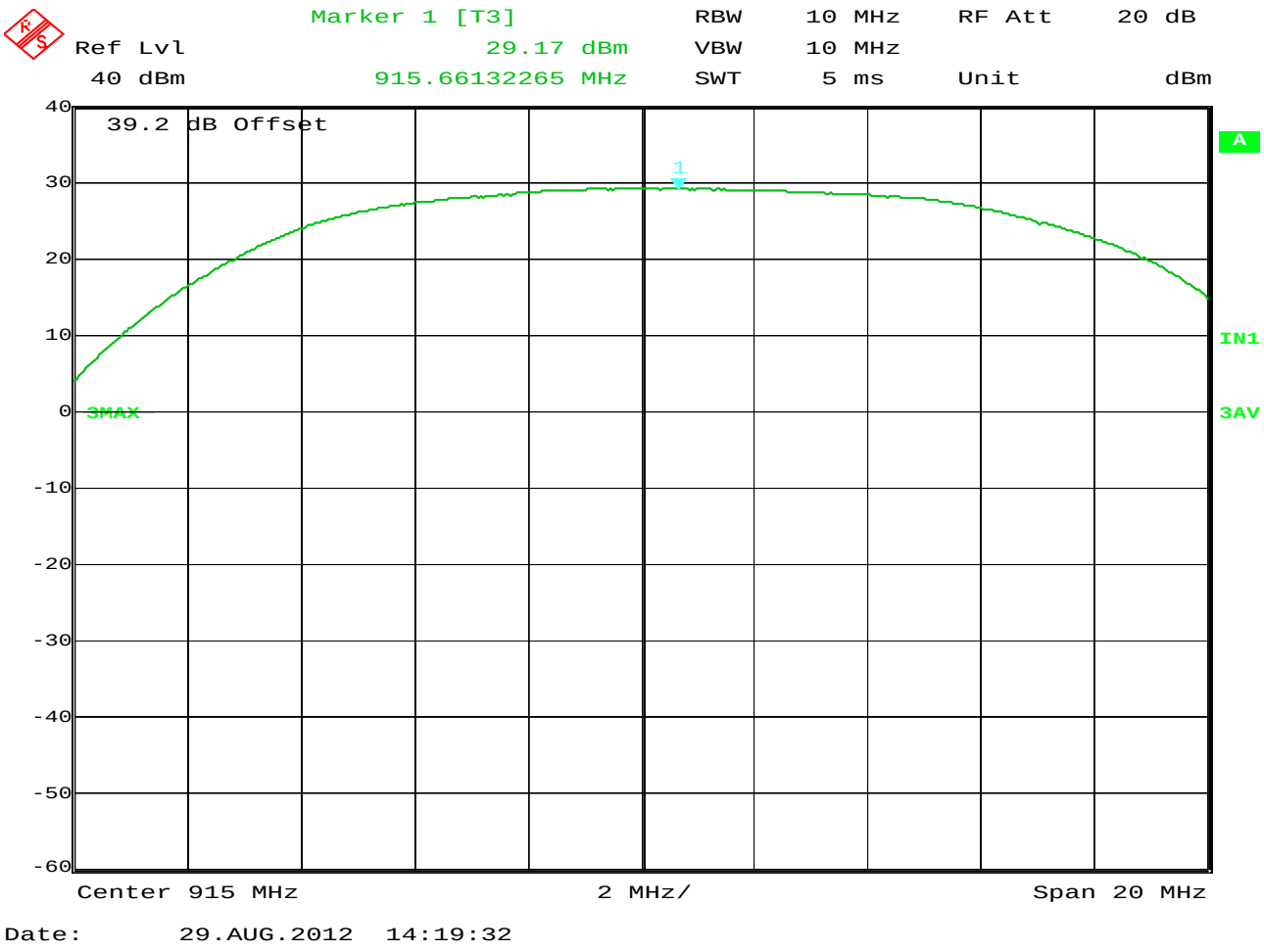
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

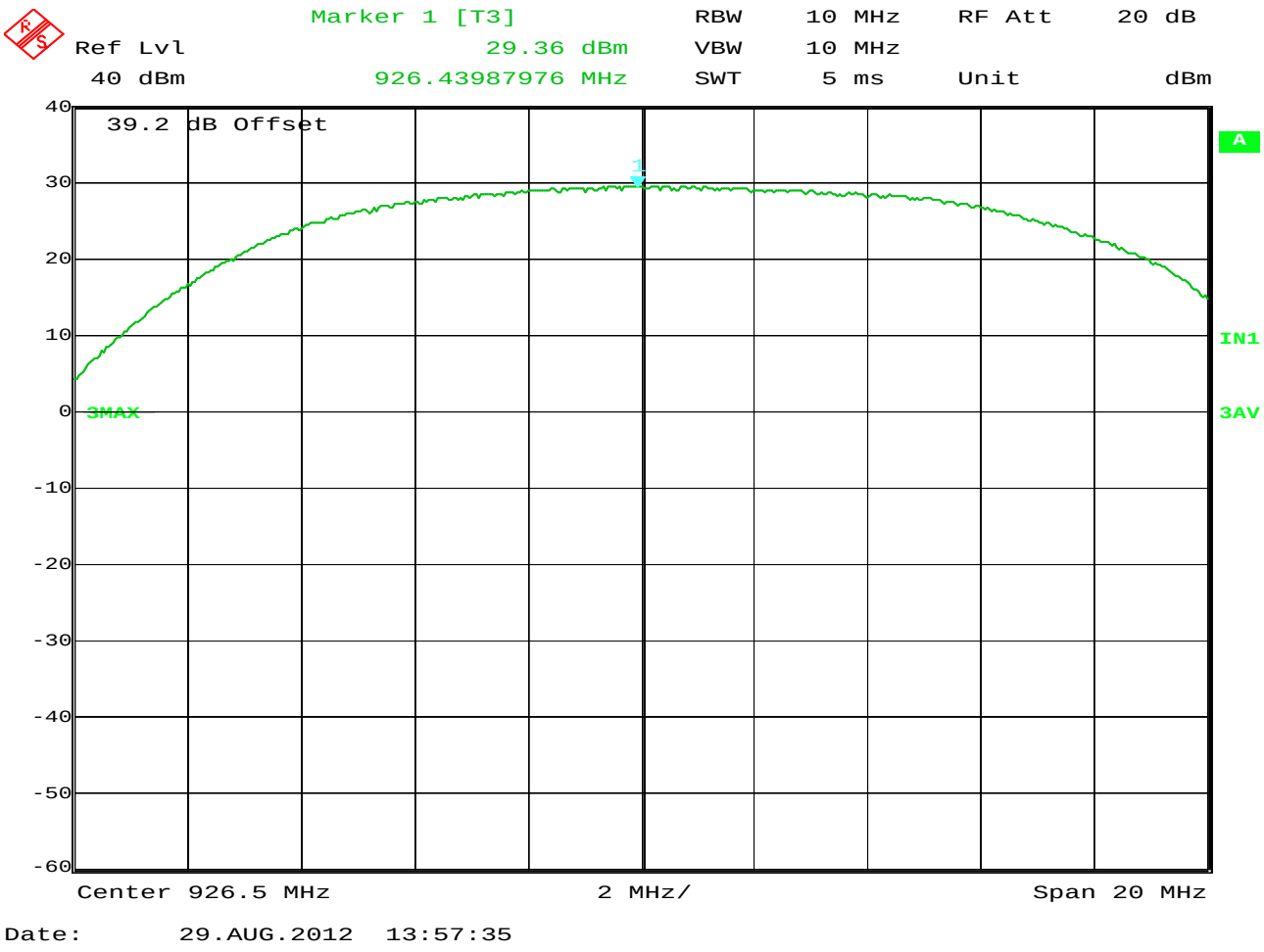
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

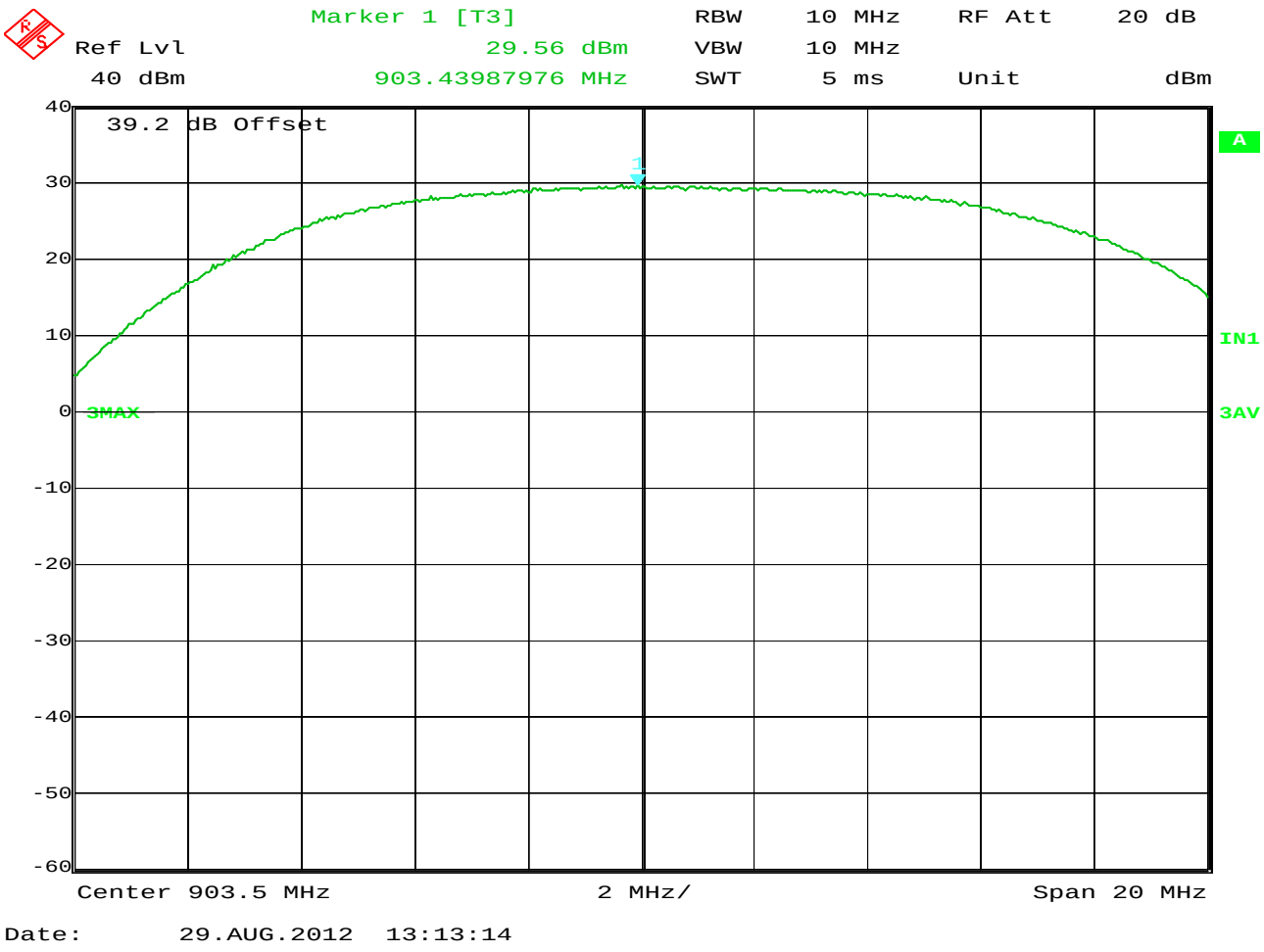
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

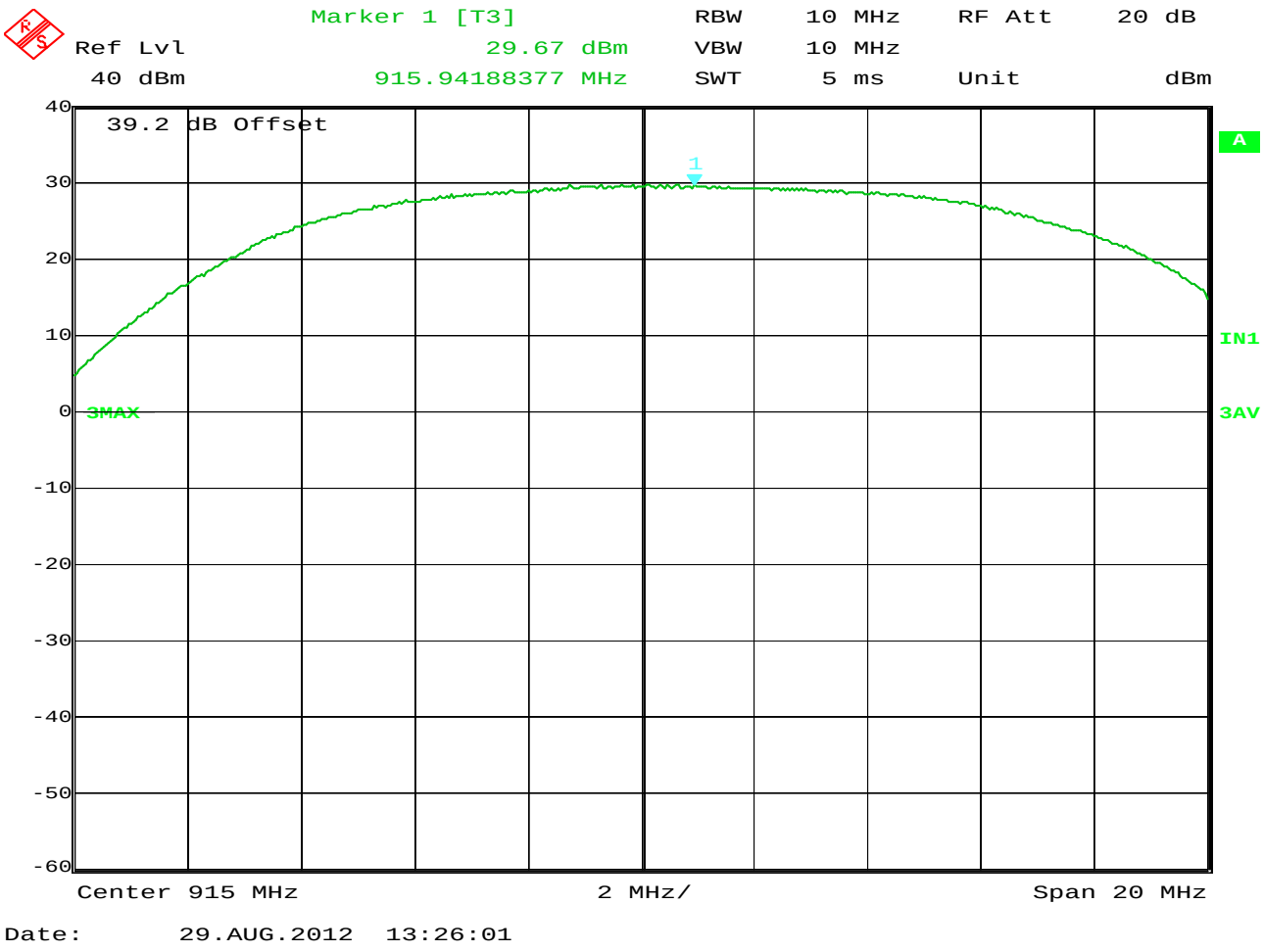
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Low: 903.5MHz @ 19000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

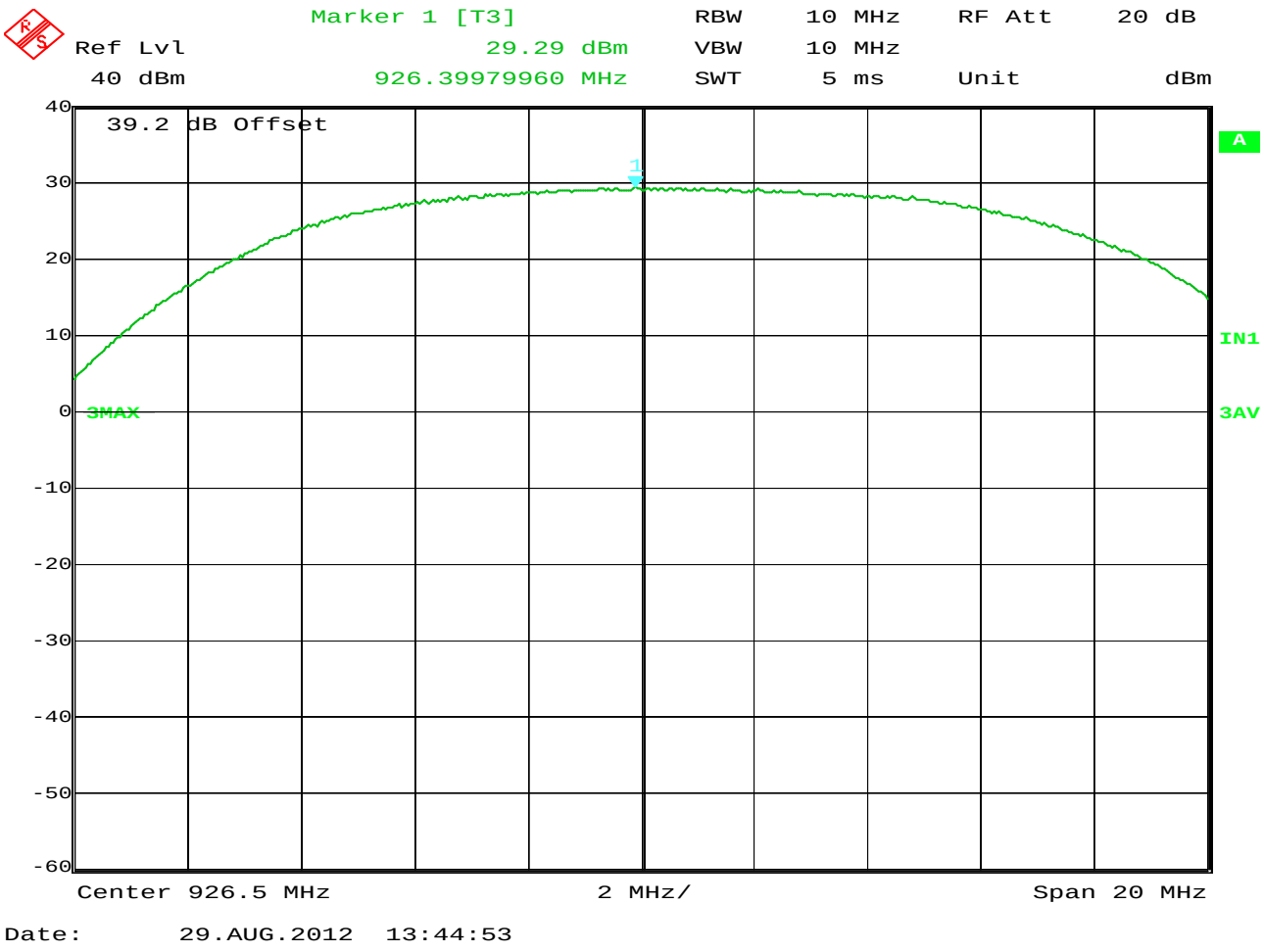
NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Medium: 915MHz @ 15500 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

NOTES



FCC 15.247: Average Power Output

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

NOTES

Manufacturer : XetaWave, LLC.
Test Item : Multi-Band Radio Module
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, EIRP
Date : September 1, 2012
Notes : Laird Omni antenna MN: FG9026

EIRP = Sig. Gen. Reading + Antenna Gain – Cable Loss

Freq.	Ant	Wide BW Meter Reading	Matched Sig. Gen. Reading	Equivalent Antenna Gain	Cable Loss	EIRP	Limit	Margin
(MHz)	Pol	(dBuV)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dB)
903.50	H	95.0	13.9	2.2	2.0	14.1	36.0	-21.9
903.50	V	106.3	34.5	2.2	2.0	34.7	36.0	-1.3
915.00	H	91.5	6.0	2.2	2.0	6.1	36.0	-29.9
915.00	V	106.8	35.0	2.2	2.0	35.2	36.0	-0.8
926.50	H	89.5	14.8	2.2	2.0	14.9	36.0	-21.1
926.50	V	106.4	34.6	2.2	2.0	34.7	36.0	-1.3

Checked BY Richard E. King :

Richard E. King

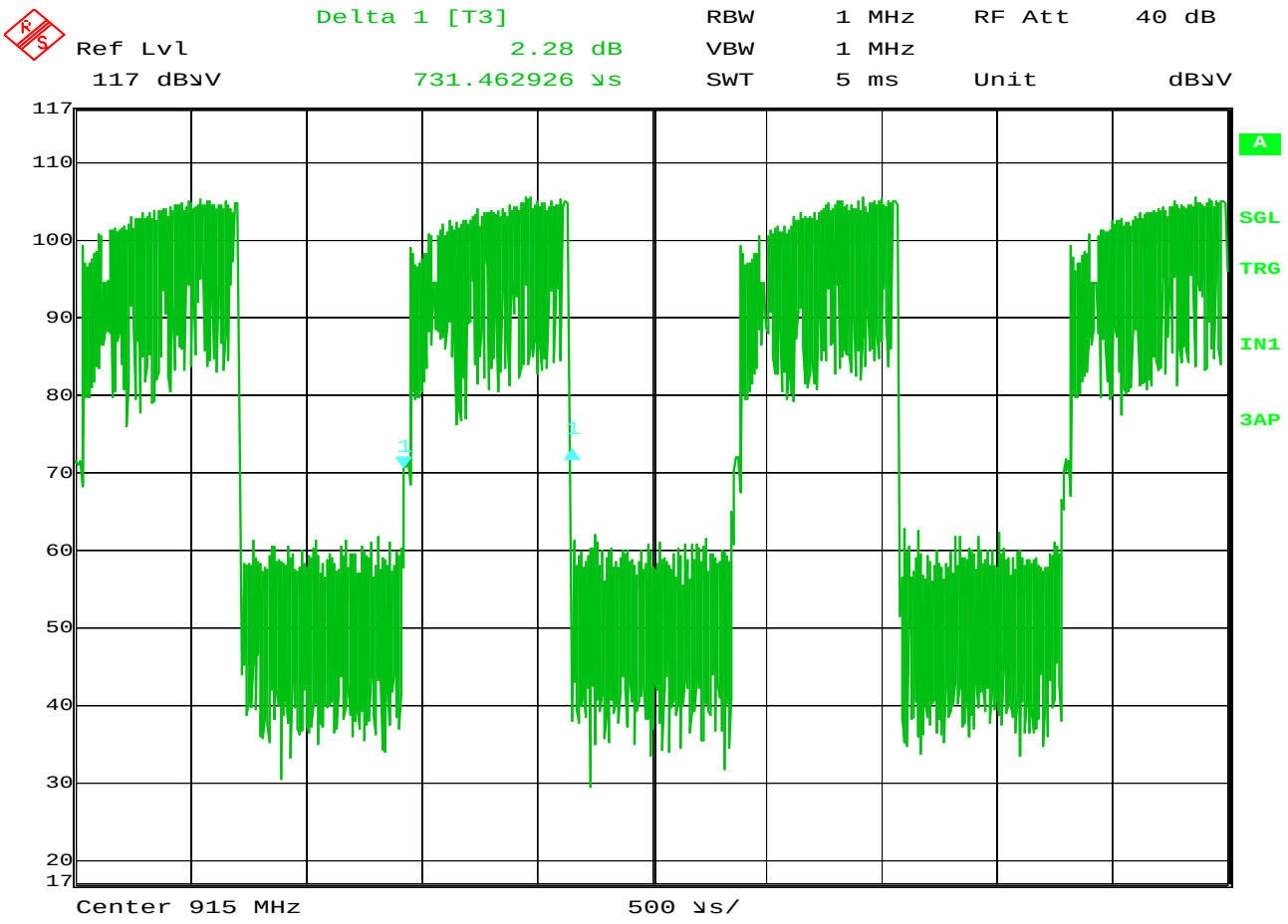
Manufacturer : XetaWave, LLC.
Test Item : Multi-Band Radio Module
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, EIRP
Date : September 1, 2012
Notes : Radiall Larsen YA5900W

EIRP = Sig. Gen. Reading + Antenna Gain – Cable Loss

Freq. (MHz)	Ant Pol	Wide BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dB)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	\Margin (dB)
903.50	H	90.0	13.4	2.2	2.0	13.6	36.0	-22.4
903.50	V	106.2	34.4	2.2	2.0	34.6	36.0	-1.4
915.00	H	81.6	6.0	2.2	2.0	6.1	36.0	-29.9
915.00	V	107.4	35.6	2.2	2.0	35.8	36.0	-0.2
926.50	H	91.4	14.8	2.2	2.0	14.9	36.0	-21.1
926.50	V	106.4	34.6	2.2	2.0	34.7	36.0	-1.3

Checked BY Richard E. King :

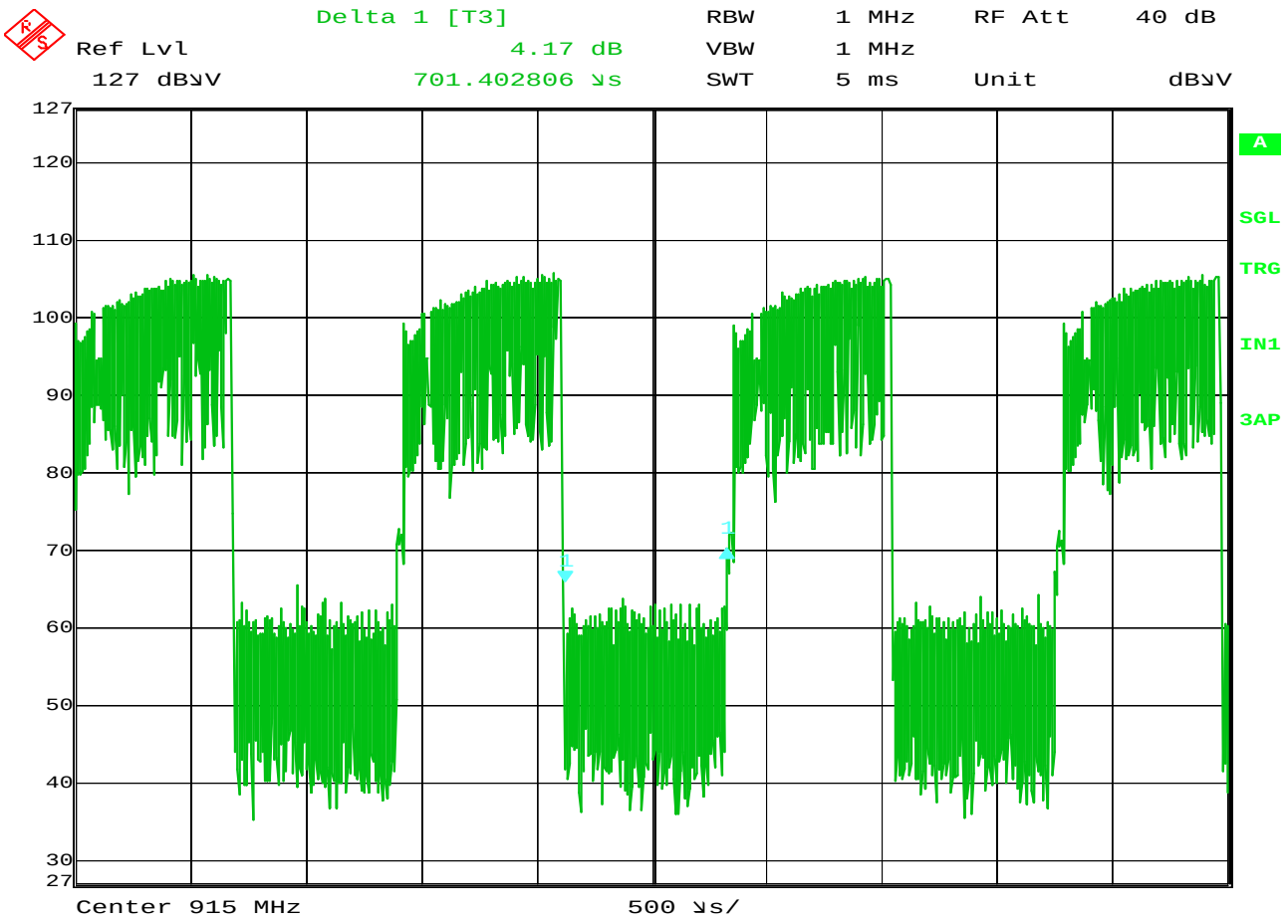
Richard E. King



FCC 15C Duty Cycle Factor

MANUFACTURER	:	XetaWave LLC.
MODEL NUMBER	:	MSD9
SERIAL NUMBER	:	7
TEST MODE	:	Tx @ 915MHz
TEST DATE	:	8/31/2012
TEST PARAMETER	:	16QUAM
	:	Pulse Width = 731.46 uS

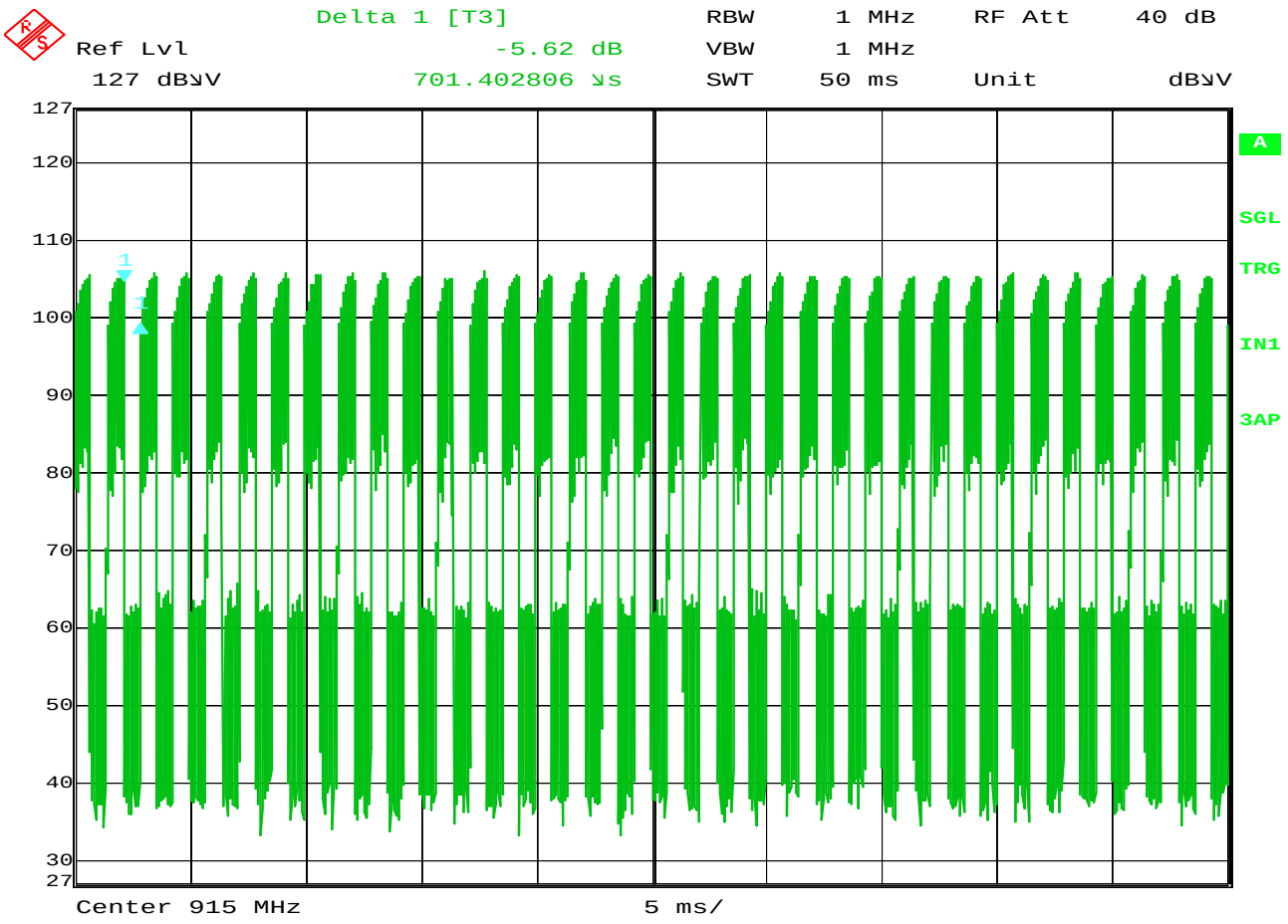
NOTES



FCC 15C Duty Cycle Factor

MANUFACTURER	: XetaWave LLC.
MODEL NUMBER	: MSD9
SERIAL NUMBER	: 7
TEST MODE	: Tx @ 915MHz
TEST DATE	: 8/31/2012
TEST PARAMETER	: 16QUAM
	: OFF Time = 701.4 uS

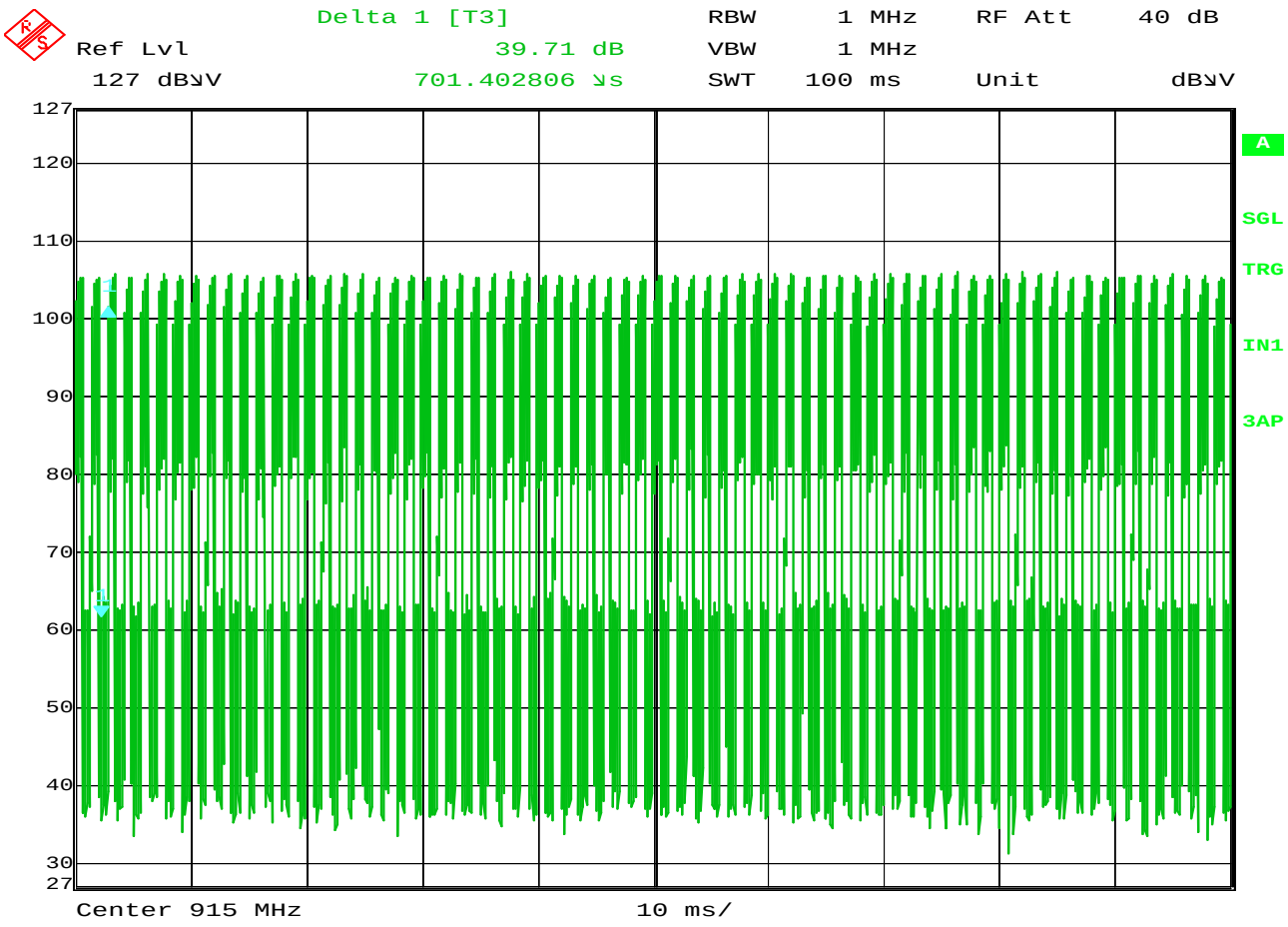
NOTES



FCC 15C Duty Cycle Factor

MANUFACTURER	: XetaWave LLC.
MODEL NUMBER	: MSD9
SERIAL NUMBER	: 7
TEST MODE	: Tx @ 915MHz
TEST DATE	: 8/31/2012
TEST PARAMETER	: 16QUAM
	: Number of pulses in 50mS = 35

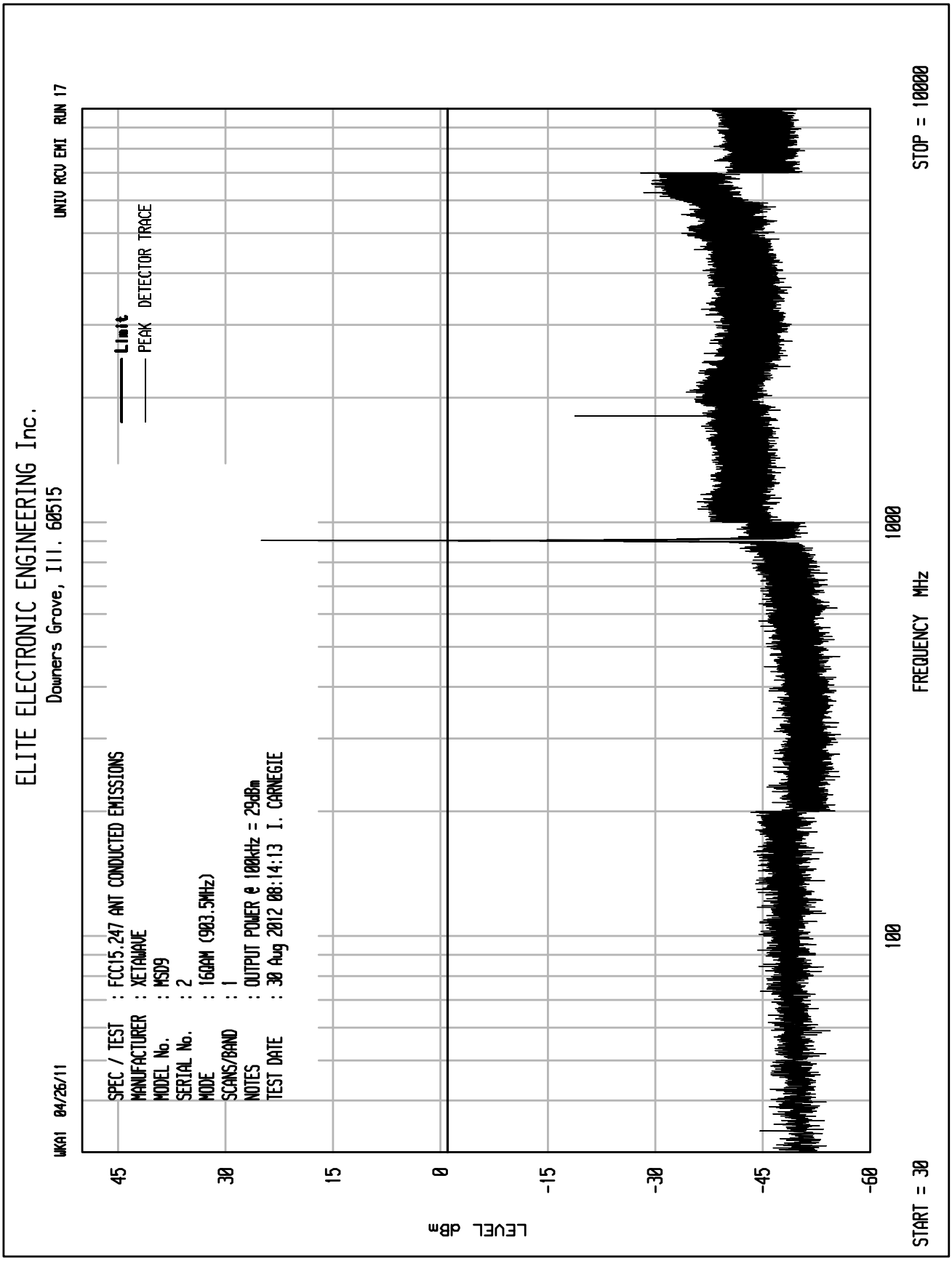
NOTES

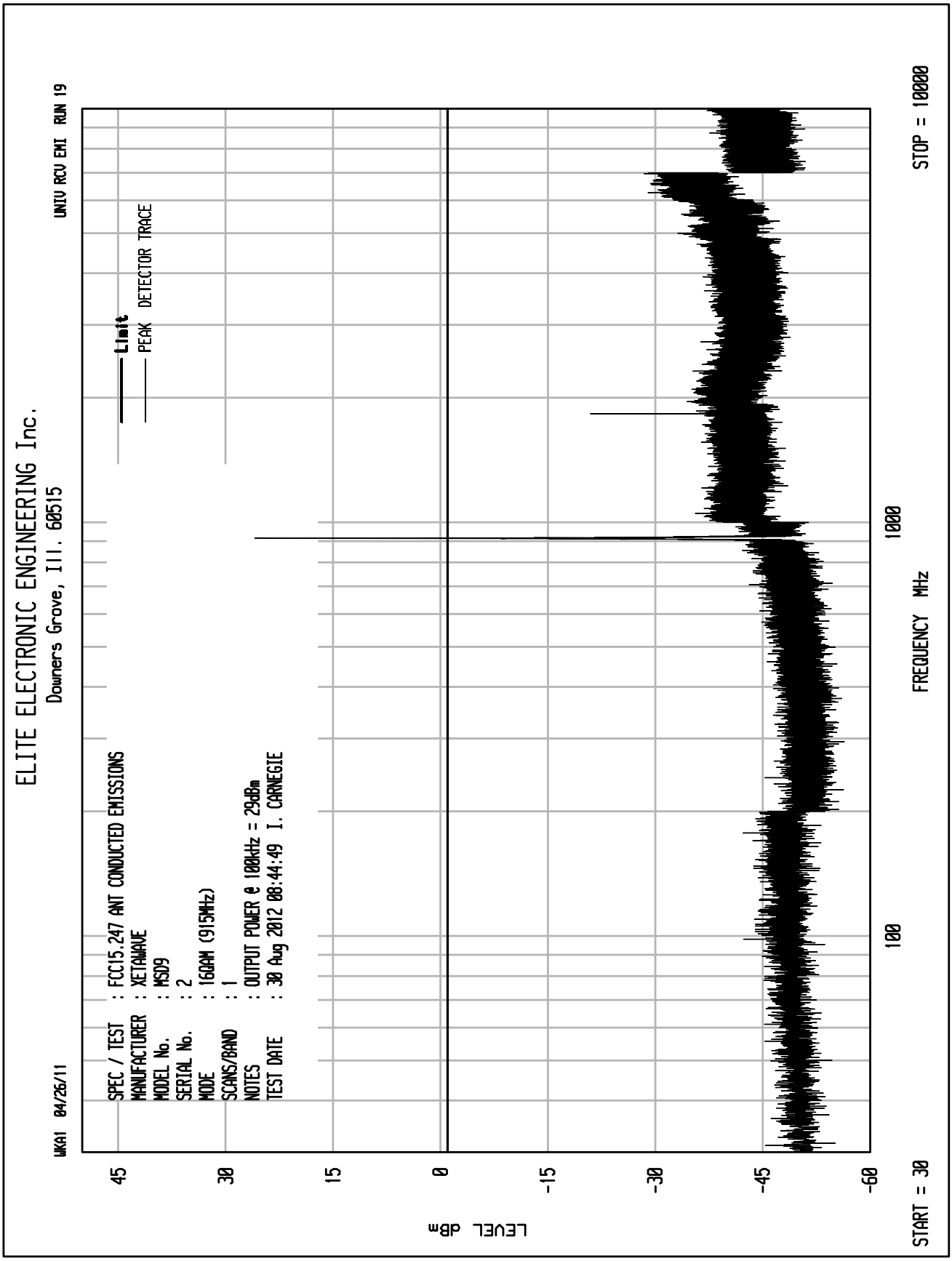


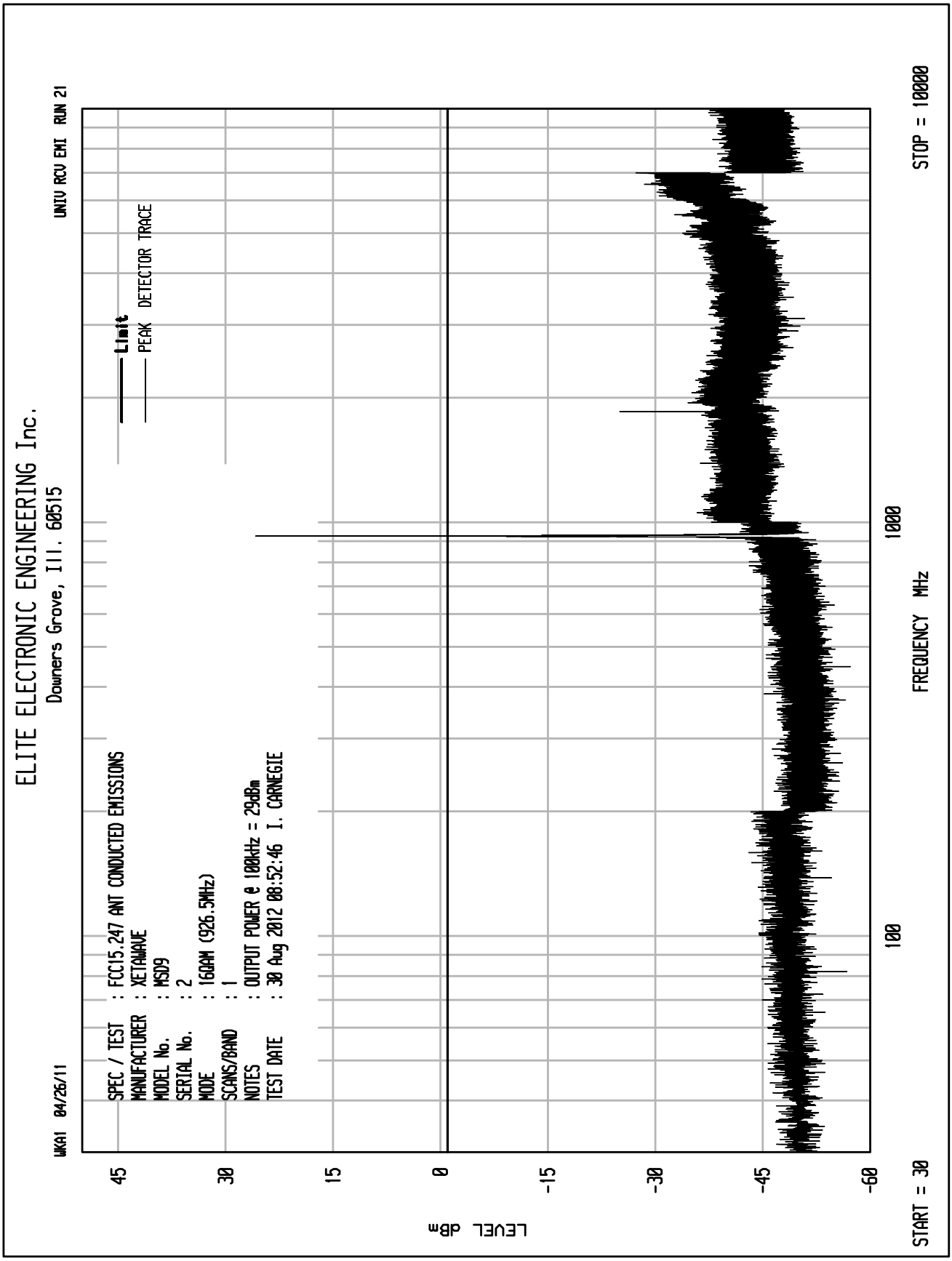
FCC 15C Duty Cycle Factor

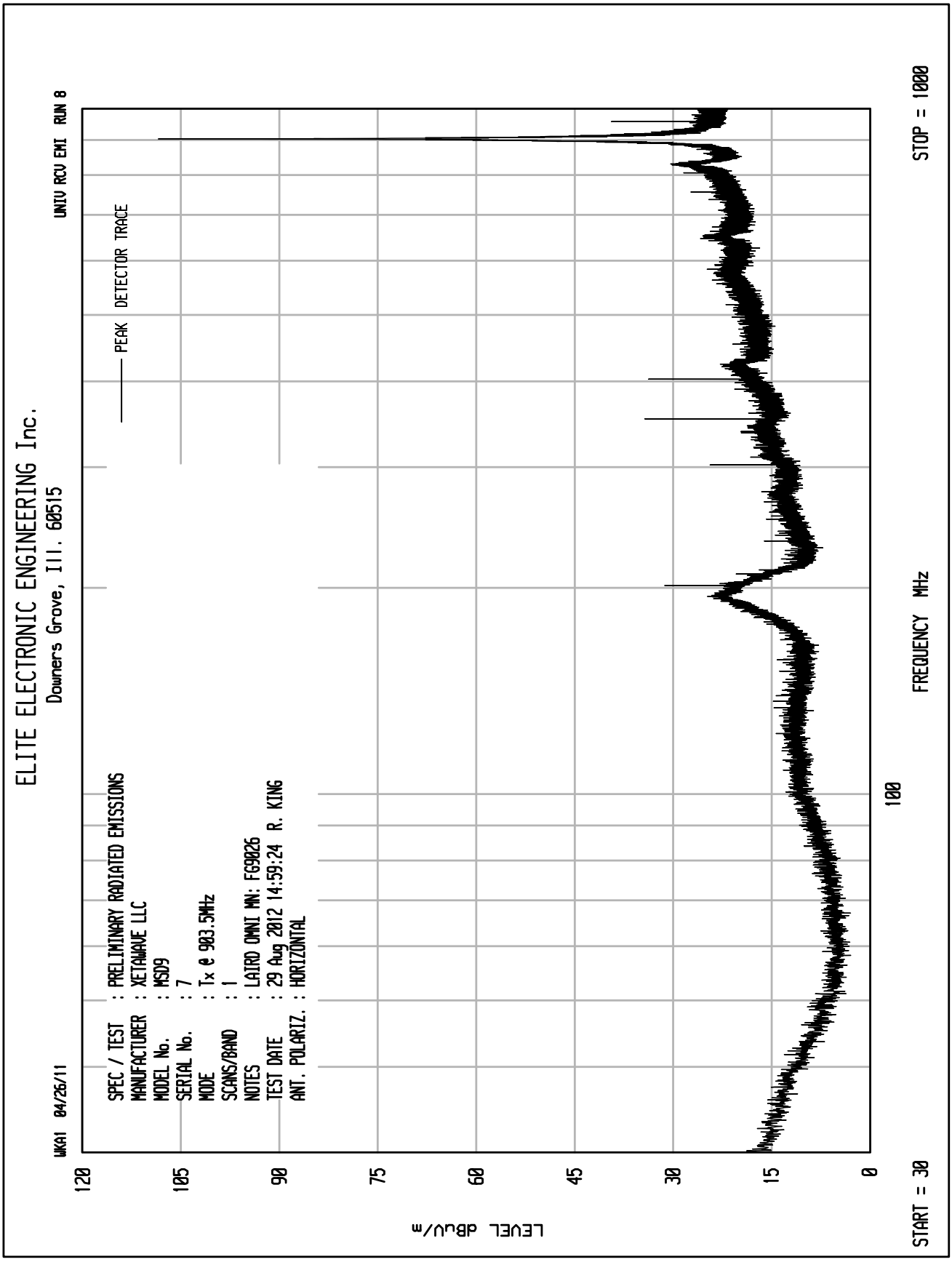
MANUFACTURER	: XetaWave LLC.
MODEL NUMBER	: MSD9
SERIAL NUMBER	: 7
TEST MODE	: Tx @ 915MHz
TEST DATE	: 8/31/2012
TEST PARAMETER	: 16QUAM
	: Number of pulses in 100mS = 70
	: 70 * 731.5uS= 51.2mS
	: 20*log(51.2mS/100mS)= -5.8 dB

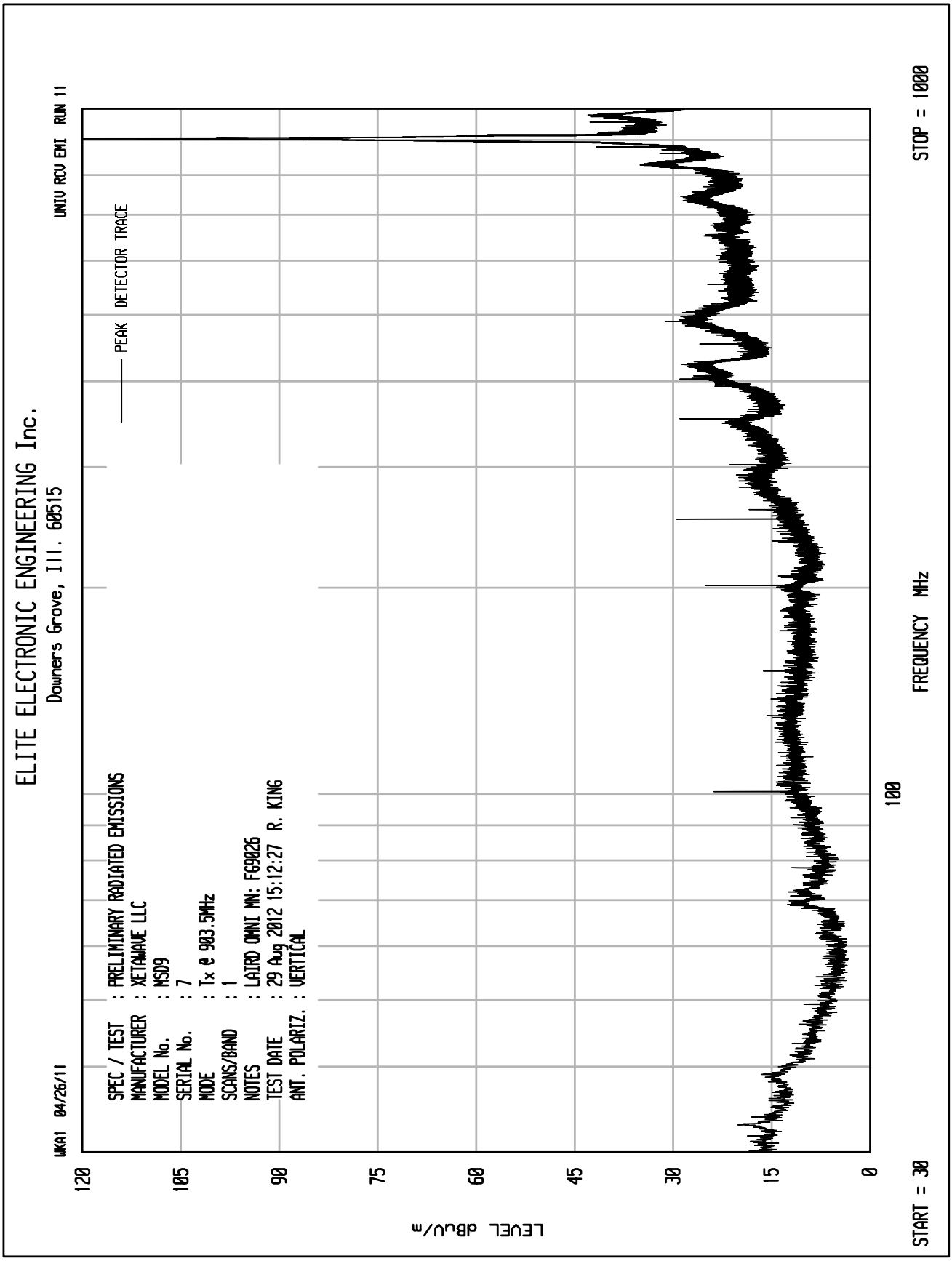
NOTES

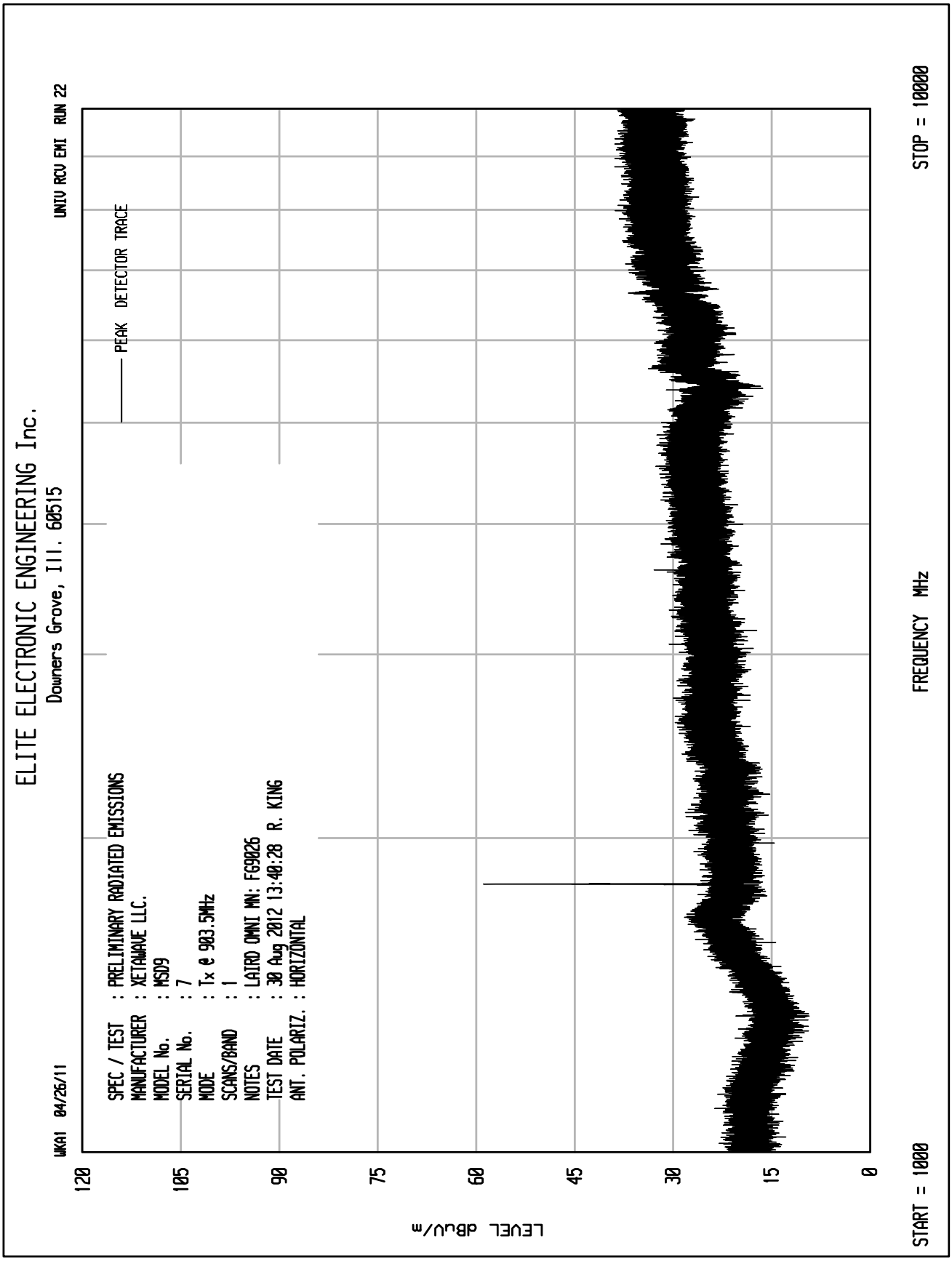

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 17
WKA1 04/26/11
SPEC / TEST : FCC15.247 ANT CONDUCTED EMISSIONS
MANUFACTURER : XETAWAVE
MODEL No. : MSD9
SERIAL No. : 2
MODE : 16QAM (903.5MHz)
SCANS/BAND : 1
NOTES : OUTPUT POWER @ 100kHz = 29dBm
TEST DATE : 30 Aug 2012 08:14:13 I. CARNEGIE
Limit
PEAK DETECTOR TRACE
LEVEL dBm
45
30
15
0
-15
-30
-45
-60
START = 30
100
1000
STOP = 10000
FREQUENCY MHz

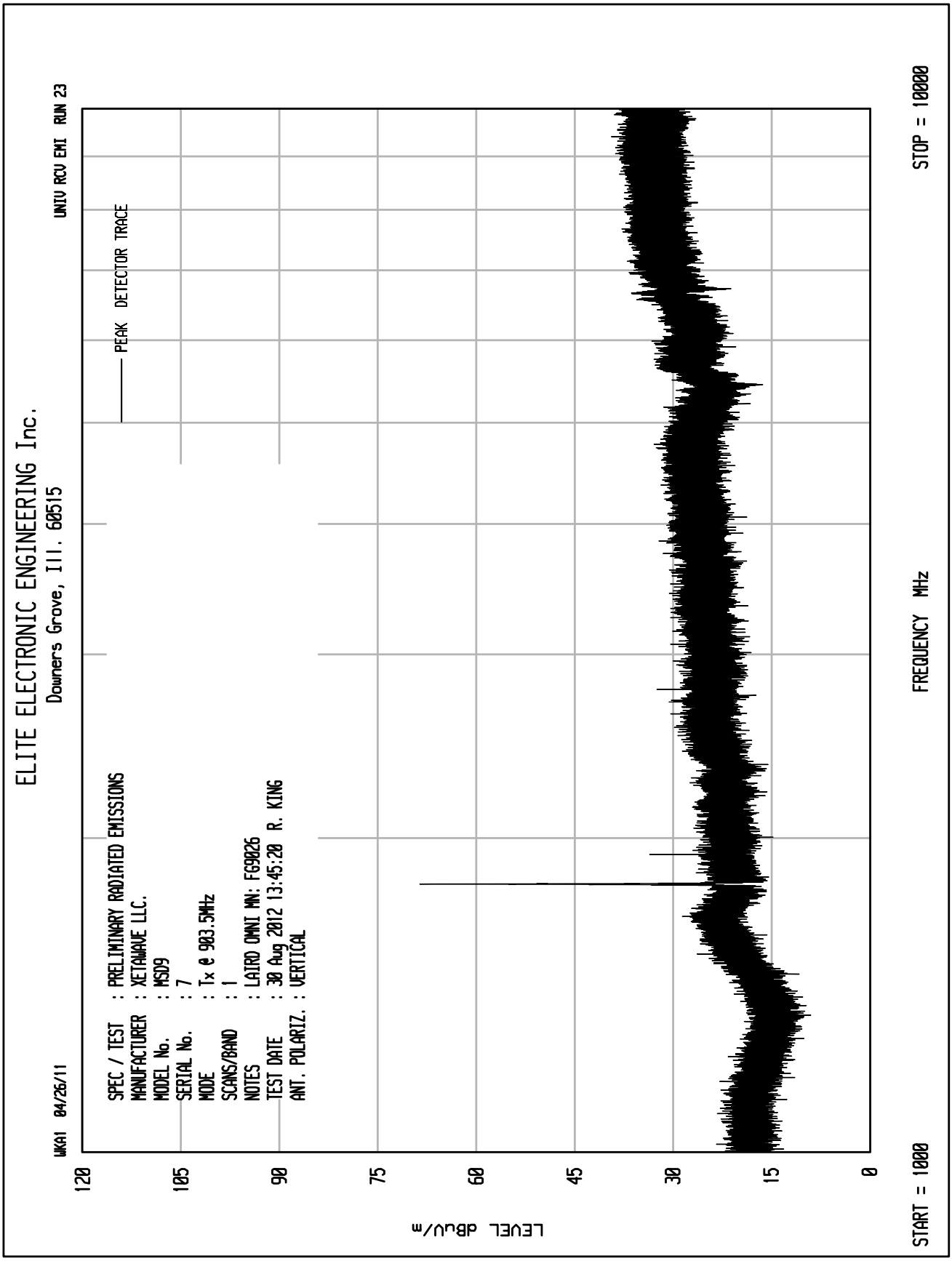

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 19
WKA1 04/26/11
SPEC / TEST : FCC15.247 ANT CONDUCTED EMISSIONS
MANUFACTURER : XETAWAVE
MODEL No. : MSD9
SERIAL No. : 2
MODE : 16QAM (915MHz)
SCANS/BAND : 1
NOTES : OUTPUT POWER @ 100kHz = 29dBm
TEST DATE : 30 Aug 2012 08:44:49 I. CARNEGIE
Limit
PEAK DETECTOR TRACE
LEVEL dBm
45
30
15
0
-15
-30
-45
-60
START = 30
100
1000
STOP = 10000
FREQUENCY MHz

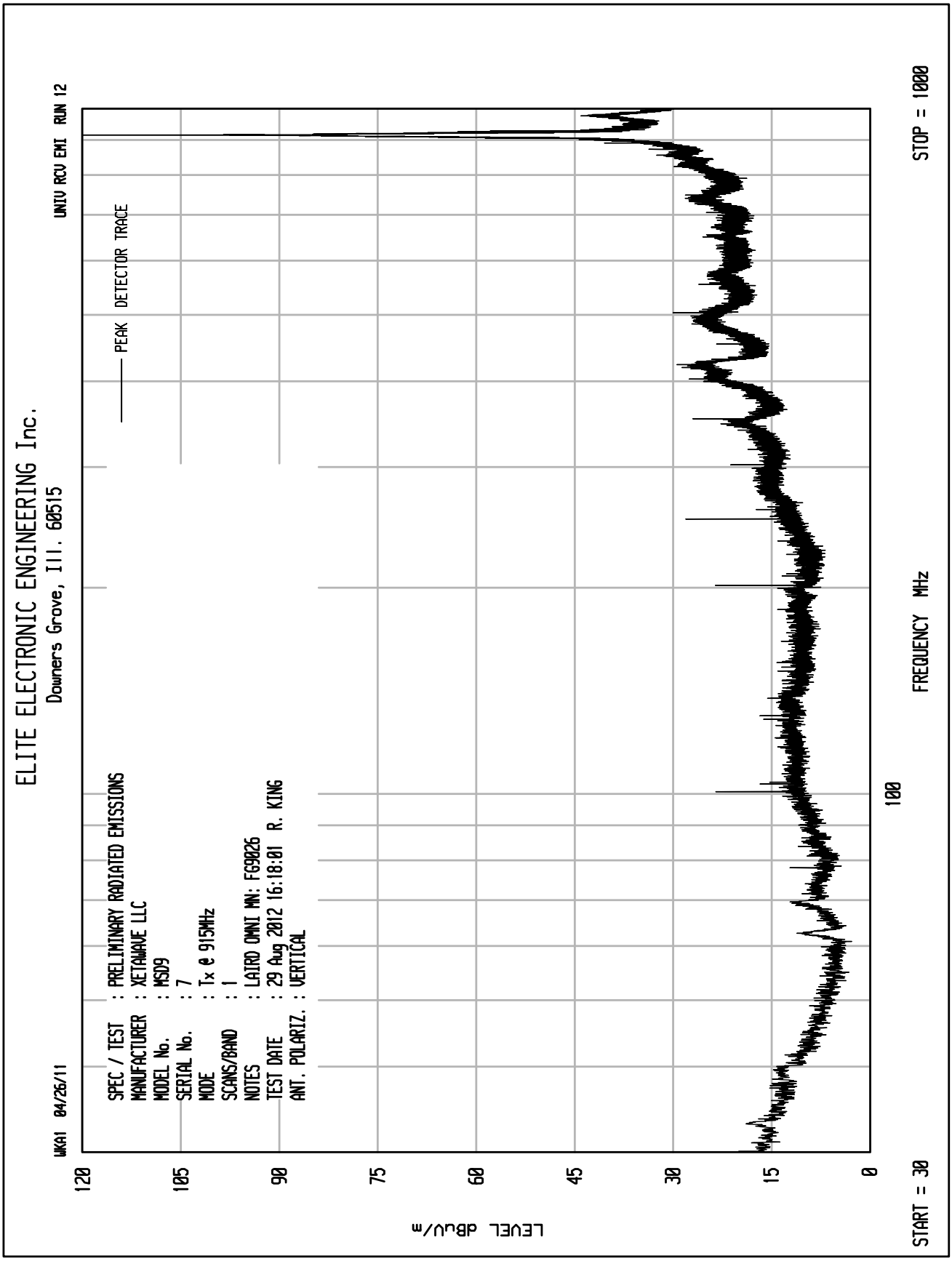

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 21
WKA1 04/26/11
SPEC / TEST : FCC15.247 ANT CONDUCTED EMISSIONS
MANUFACTURER : XETAWAVE
MODEL No. : MSD9
SERIAL No. : 2
MODE : 16QAM (926.5MHz)
SCANS/BAND : 1
NOTES : OUTPUT POWER @ 100kHz = 29dBm
TEST DATE : 30 Aug 2012 08:52:46 I. CARNEGIE
Limit
PEAK DETECTOR TRACE
LEVEL dBm
45
30
15
0
-15
-30
-45
-60
START = 30
100
1000
STOP = 10000
FREQUENCY MHz

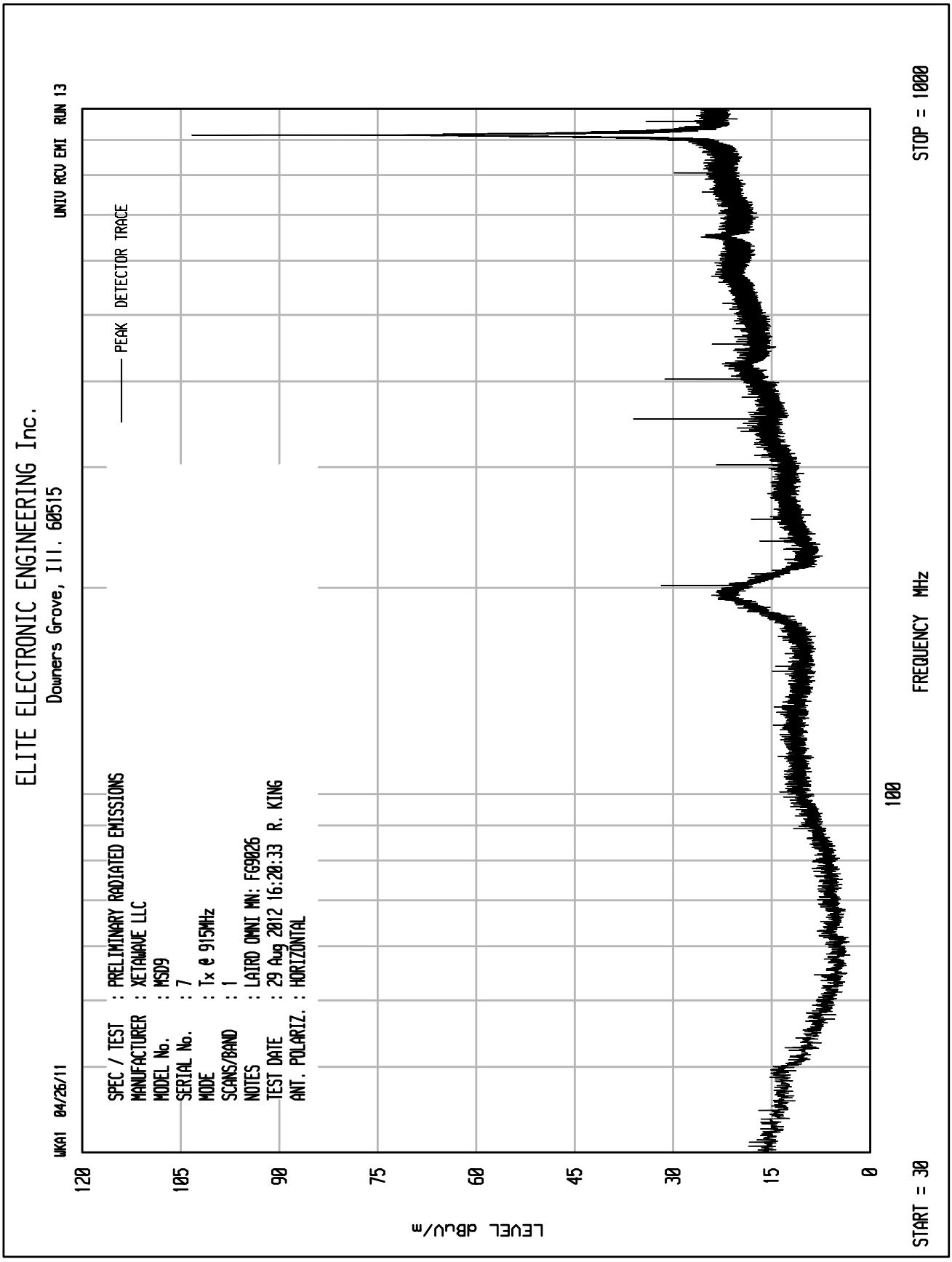

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI PN: FG9026
TEST DATE : 29 Aug 2012 14:59:24 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

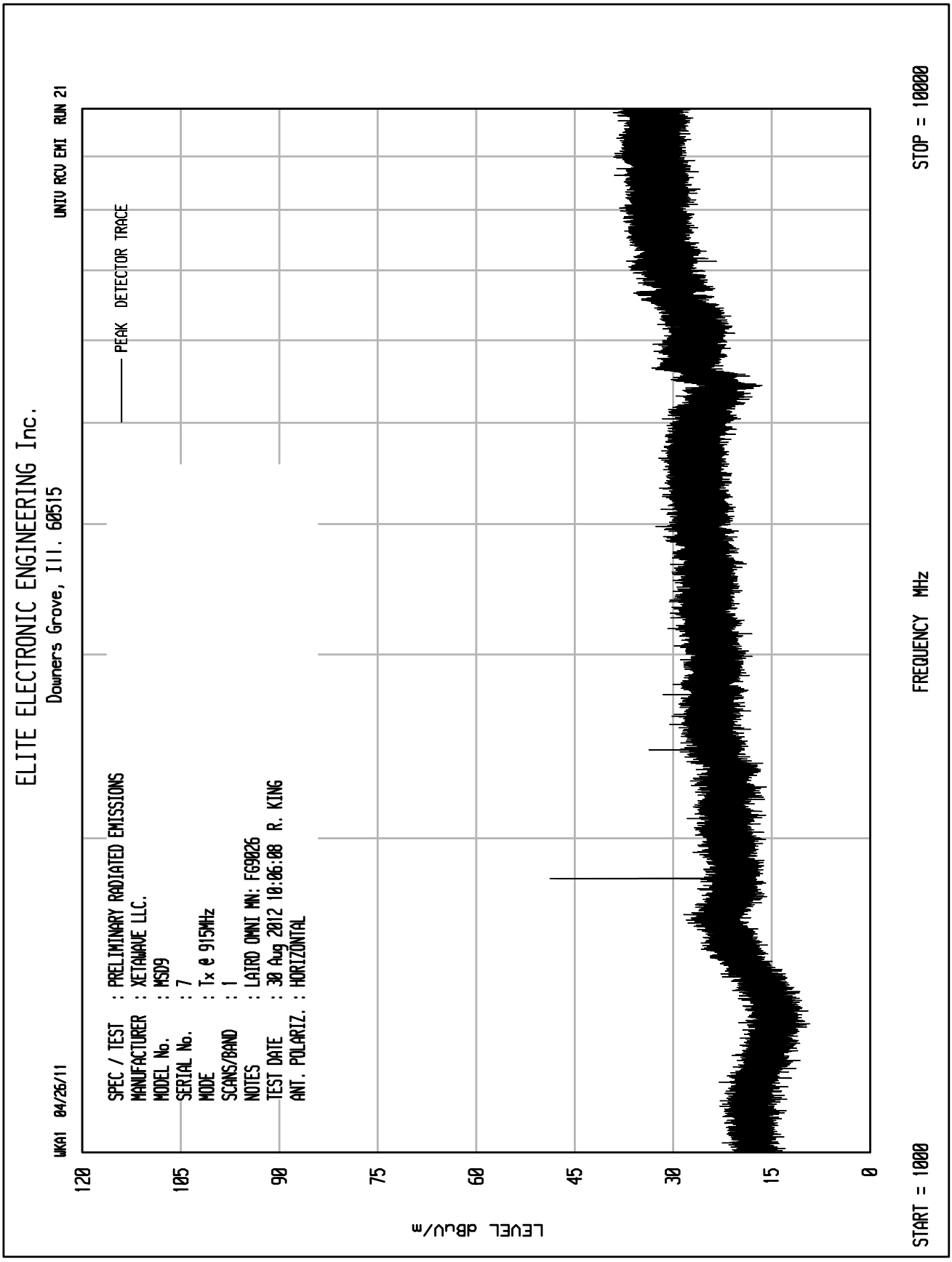

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI PN: FG9026
TEST DATE : 29 Aug 2012 15:12:27 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

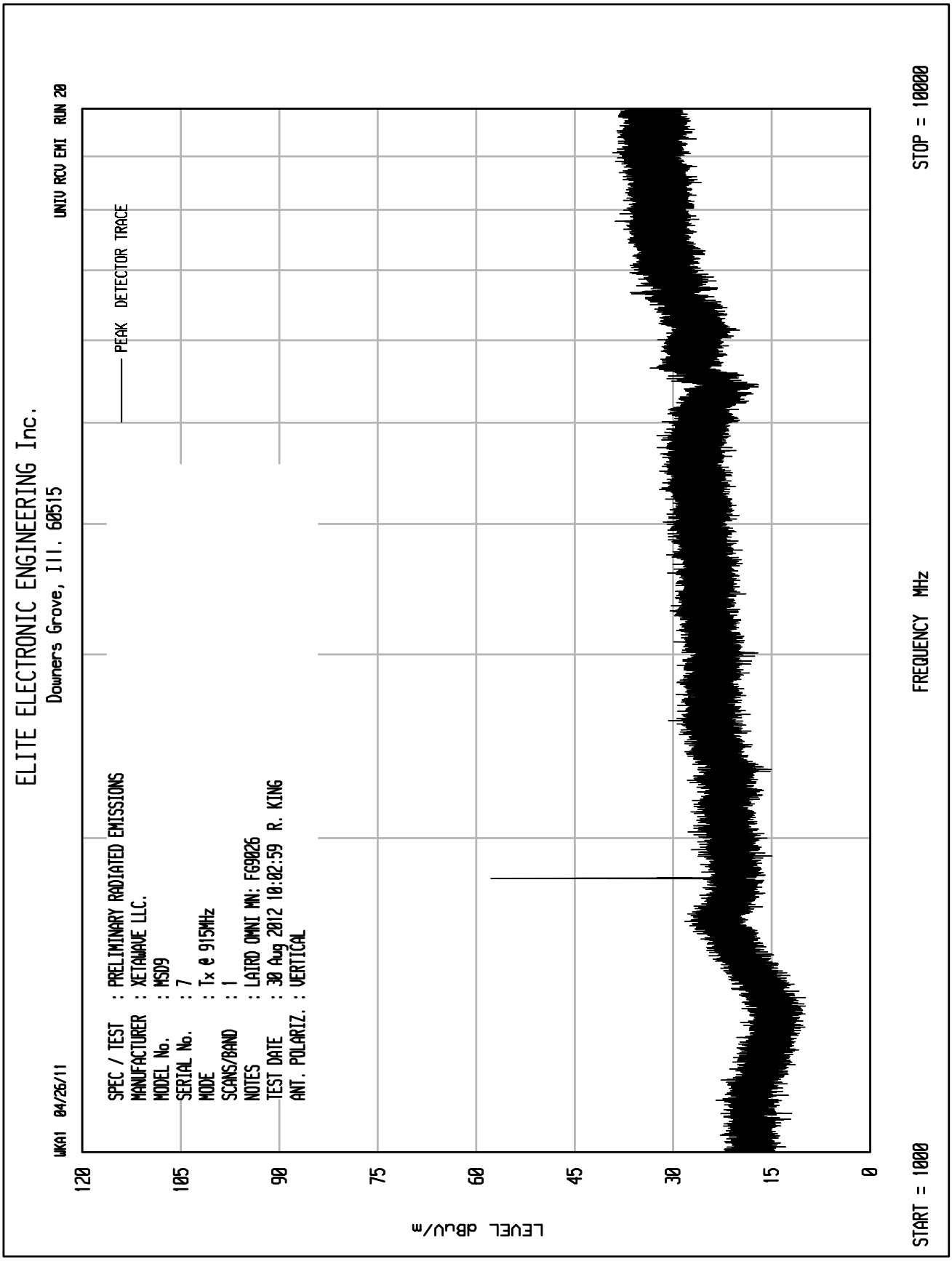

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 22
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI PN: FG9026
TEST DATE : 30 Aug 2012 13:40:28 R. 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

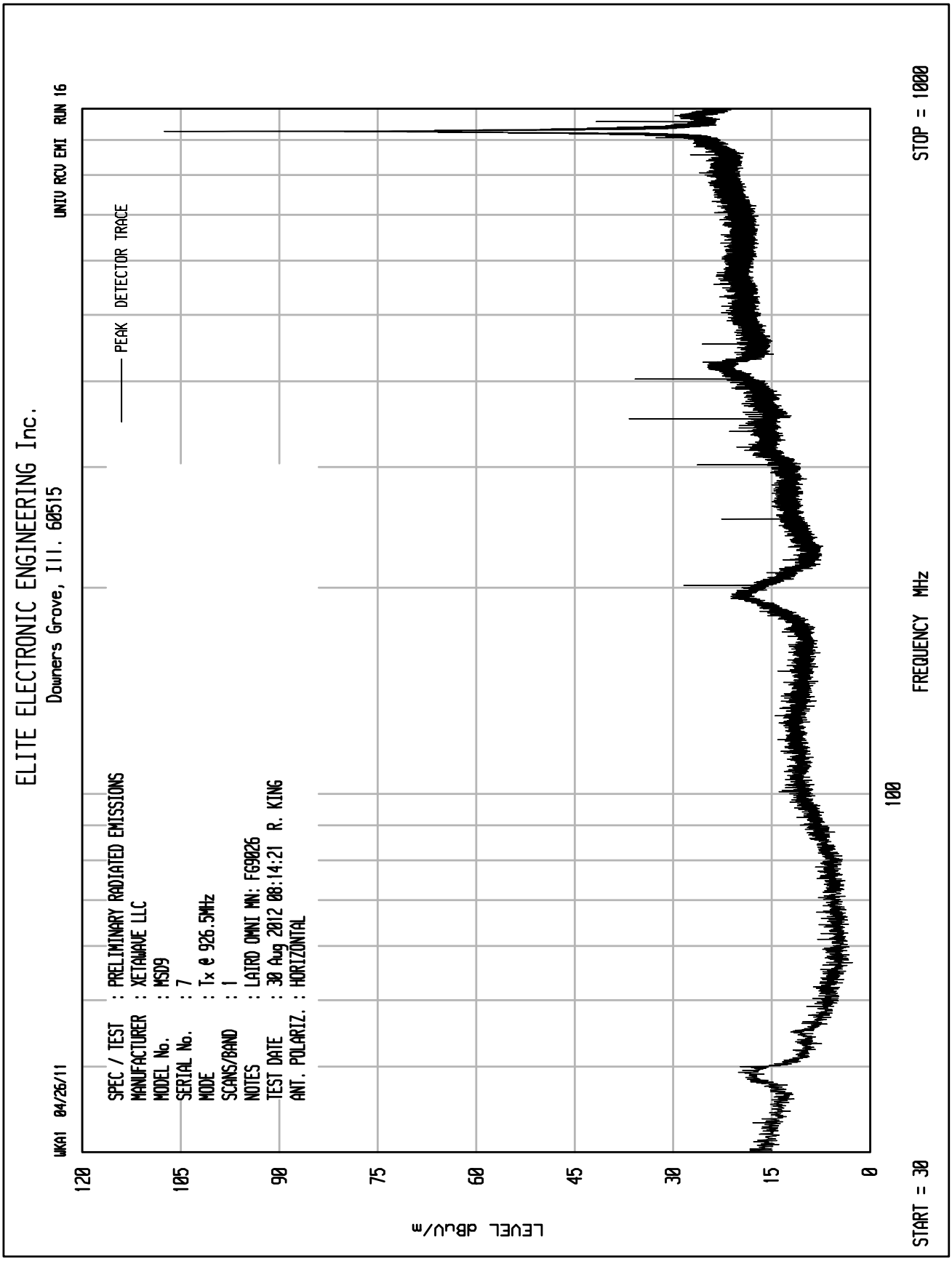

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 23
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 13:45:20 R. 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

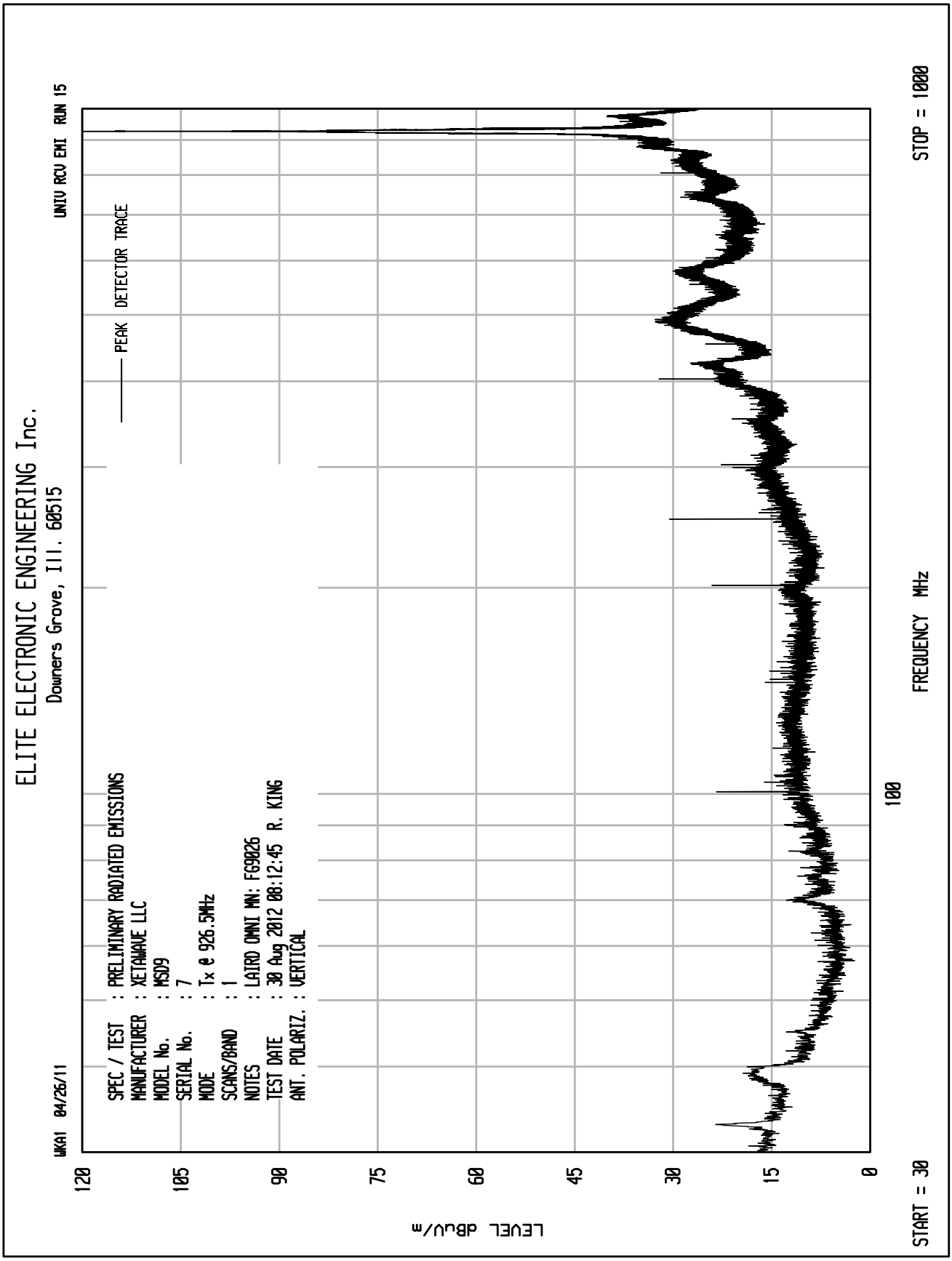

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 29 Aug 2012 16:18:01 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

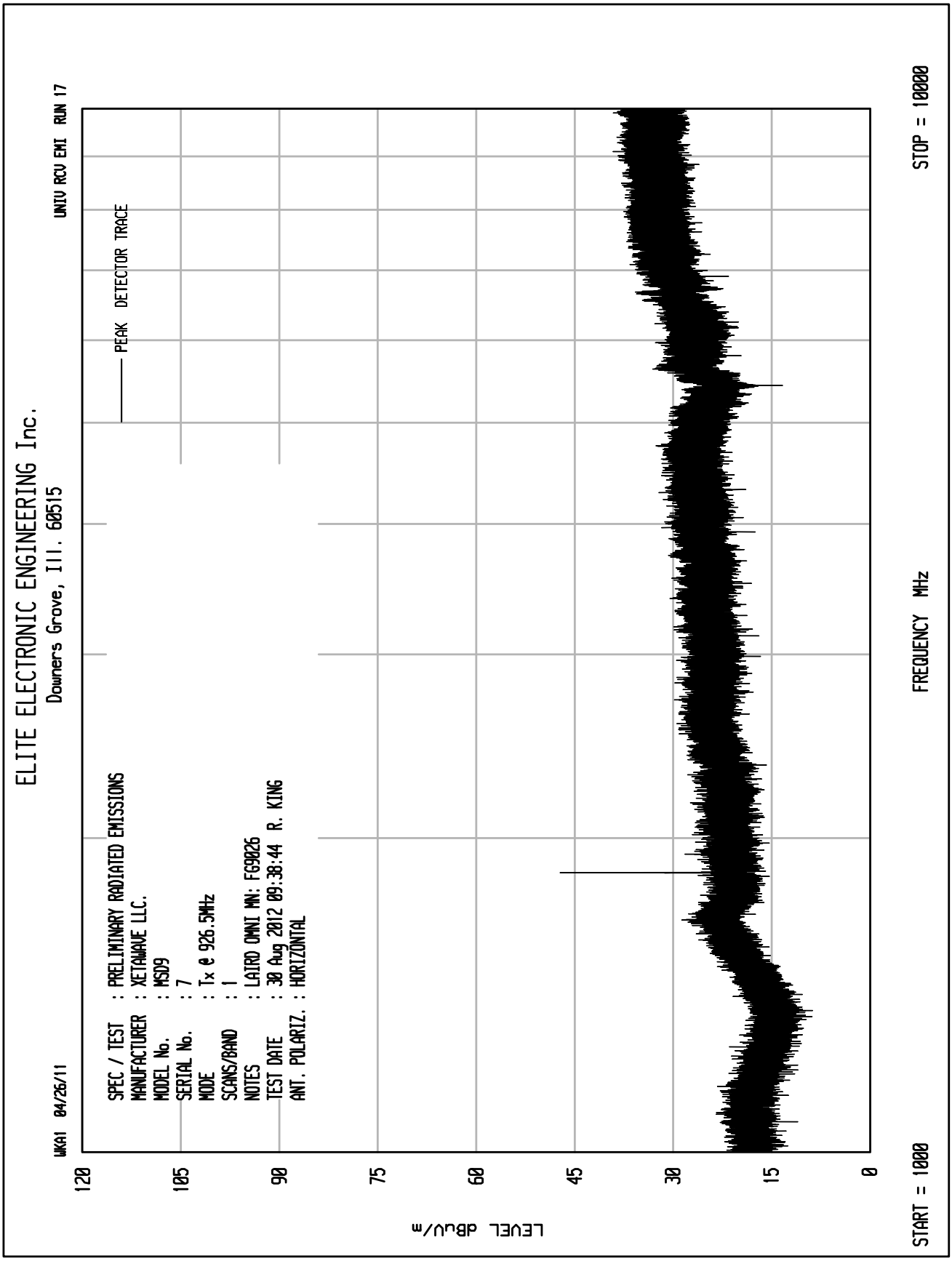

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 29 Aug 2012 16:20:33 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

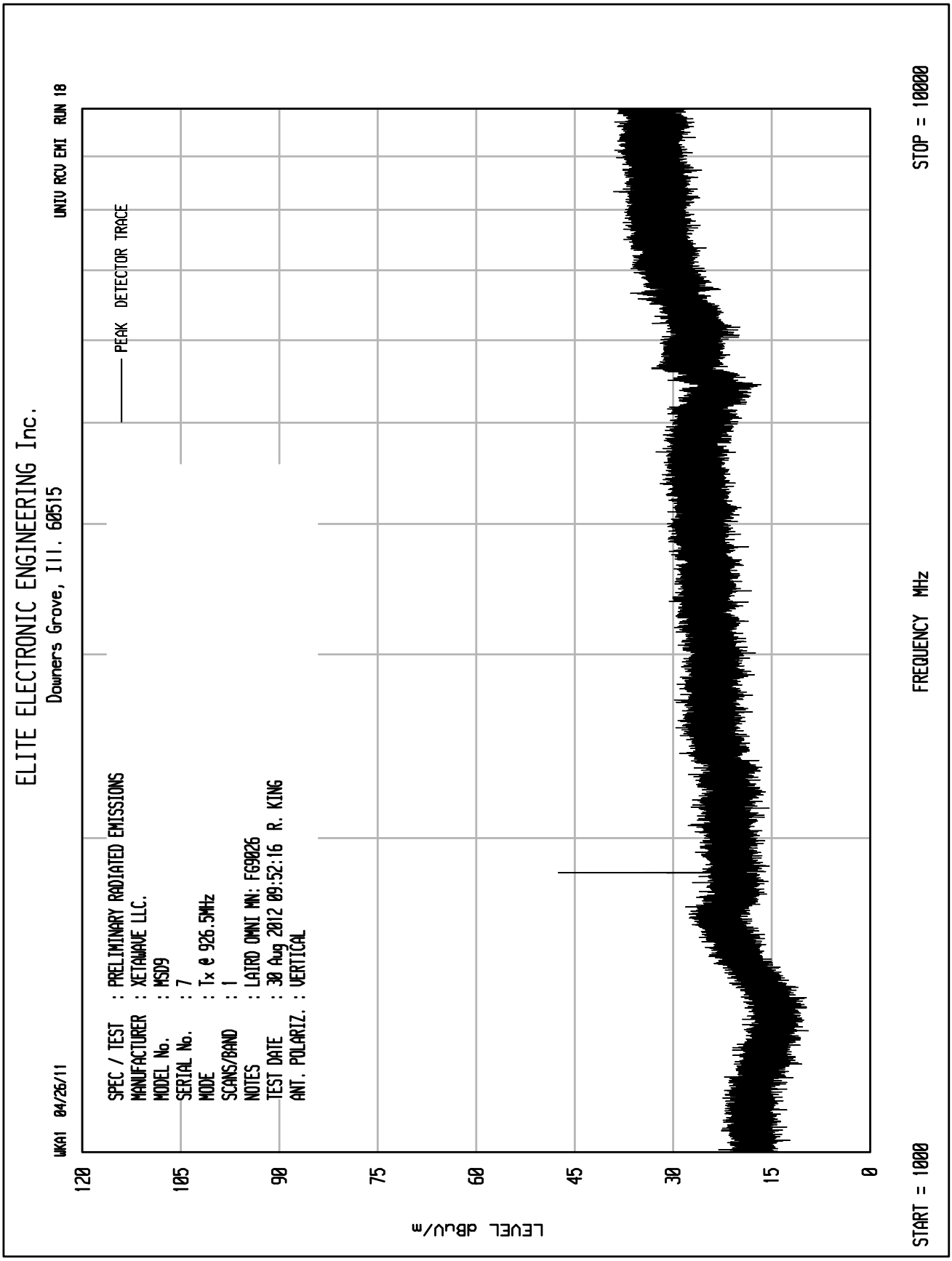

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 21
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 10:06:08 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000

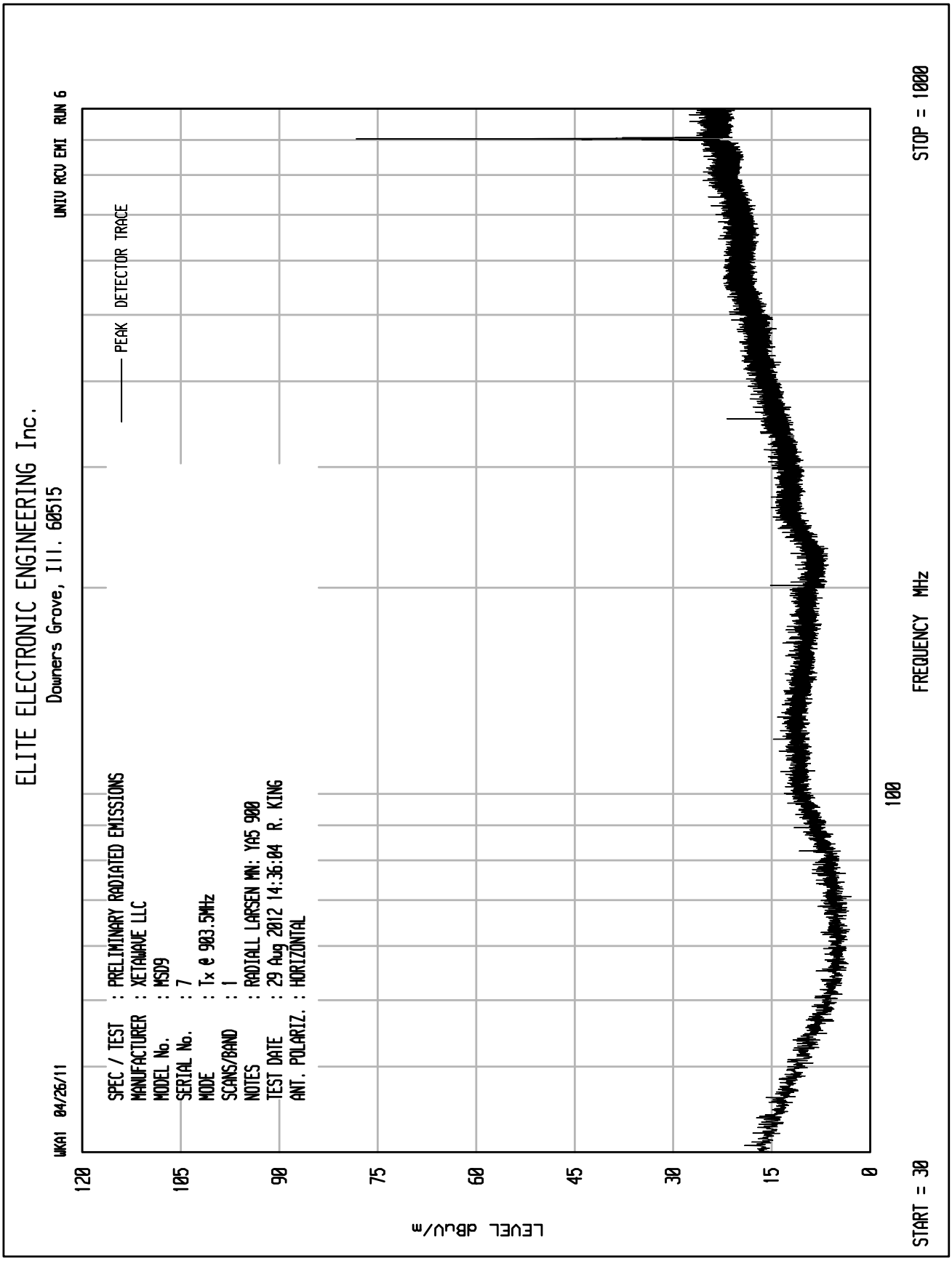

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 20
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 10:02:59 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 10000

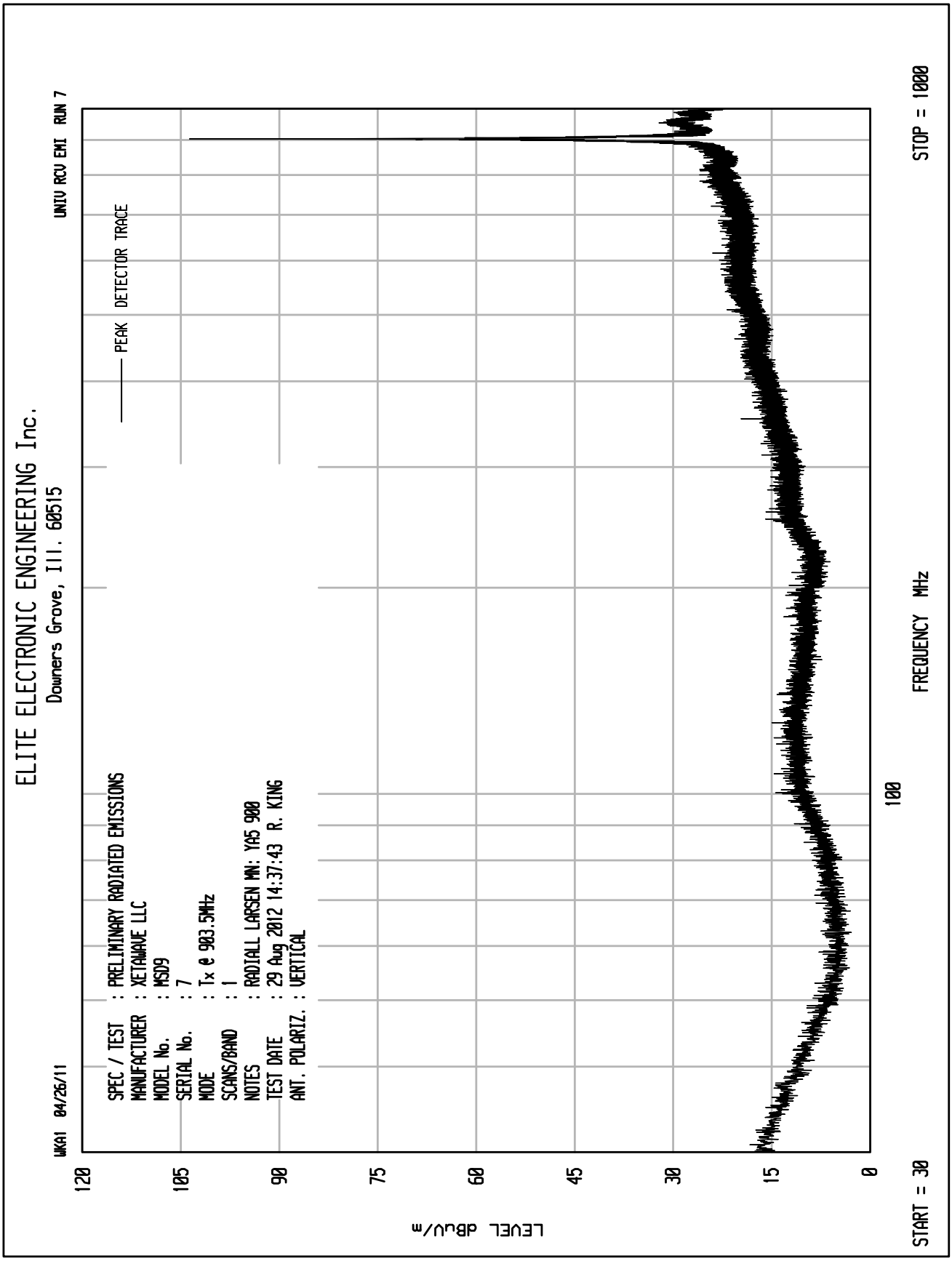

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 16
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 08:14:21 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

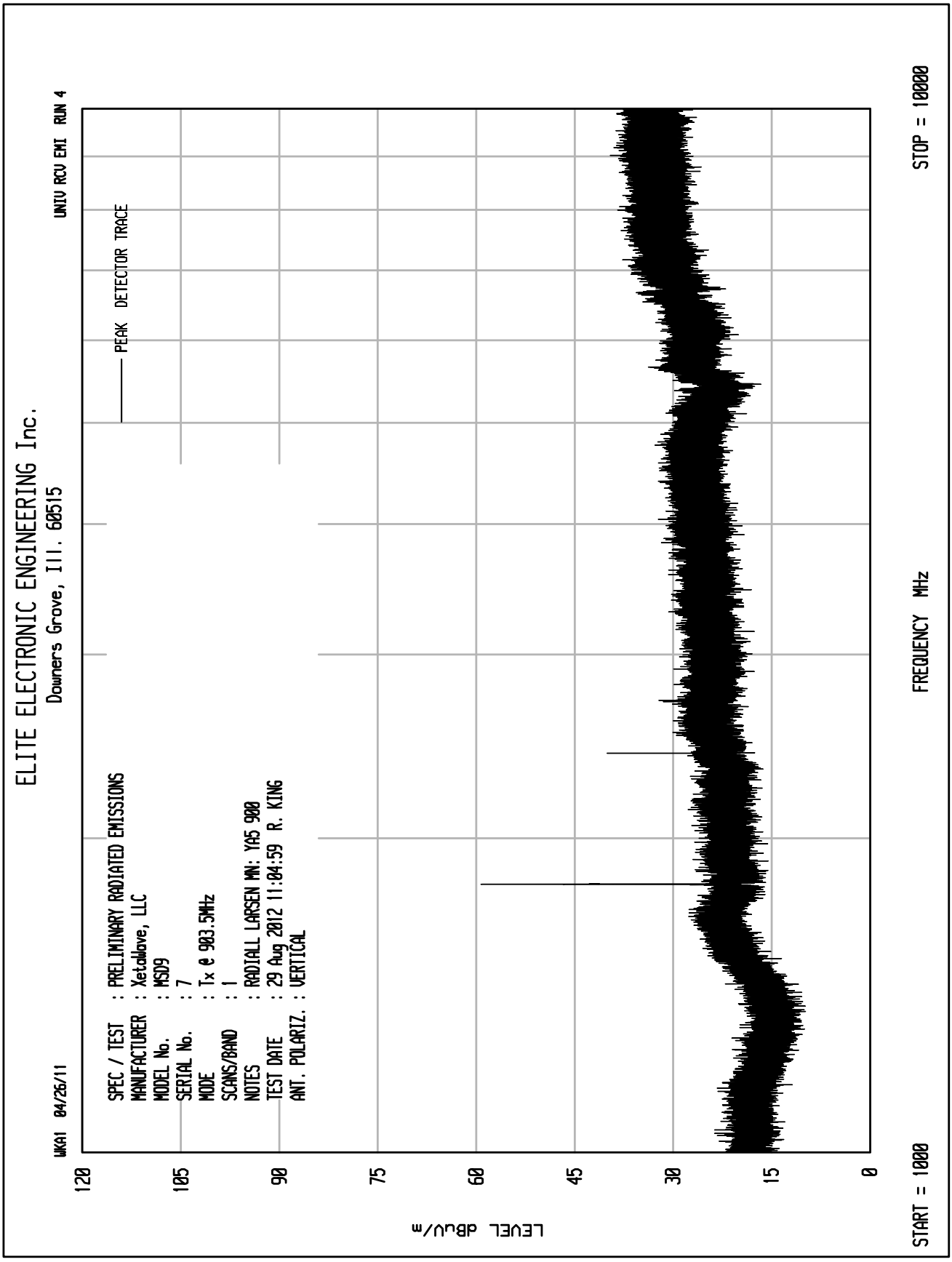

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 15
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 08:12:45 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

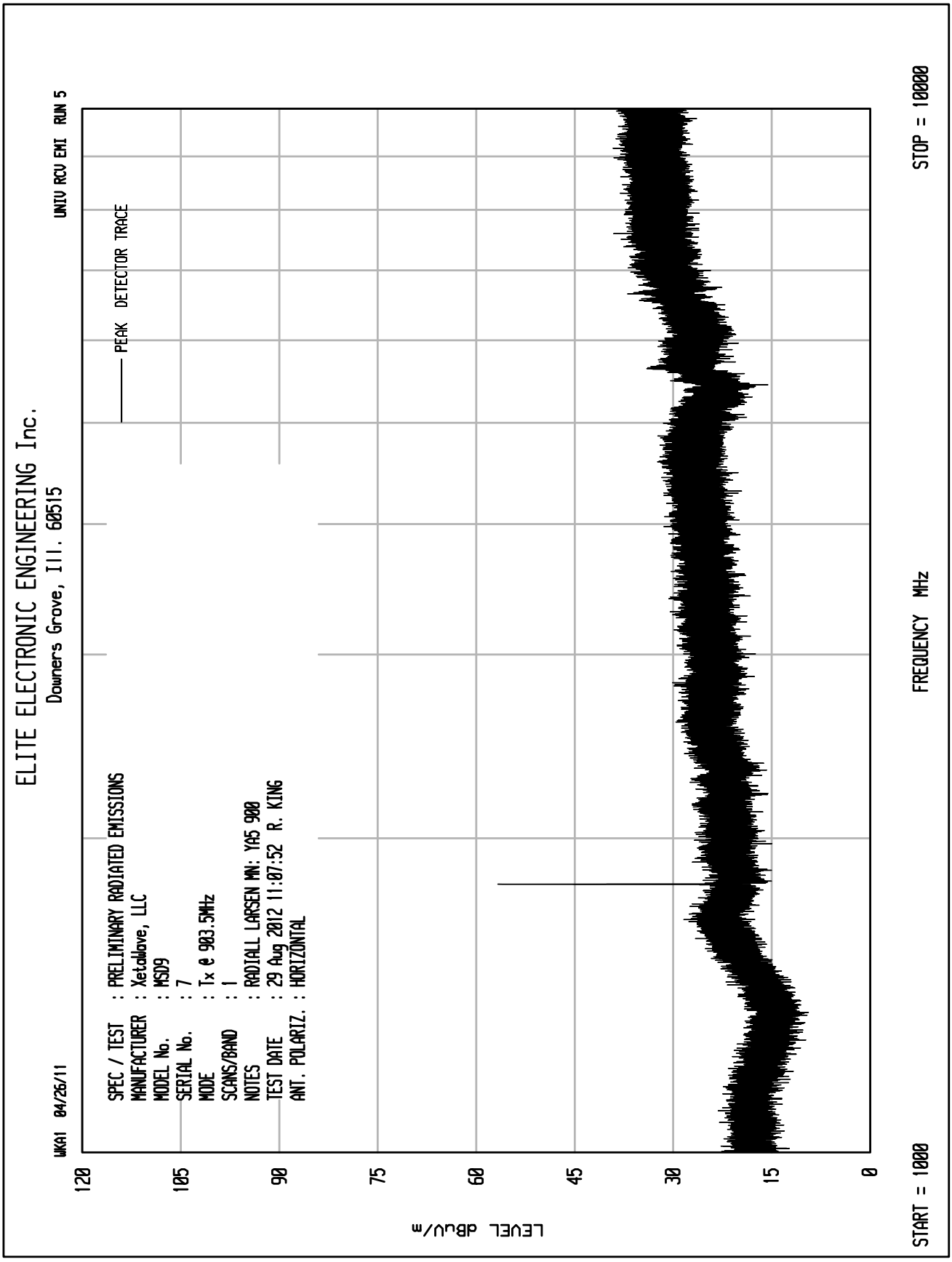

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 17
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 09:38:44 R. 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

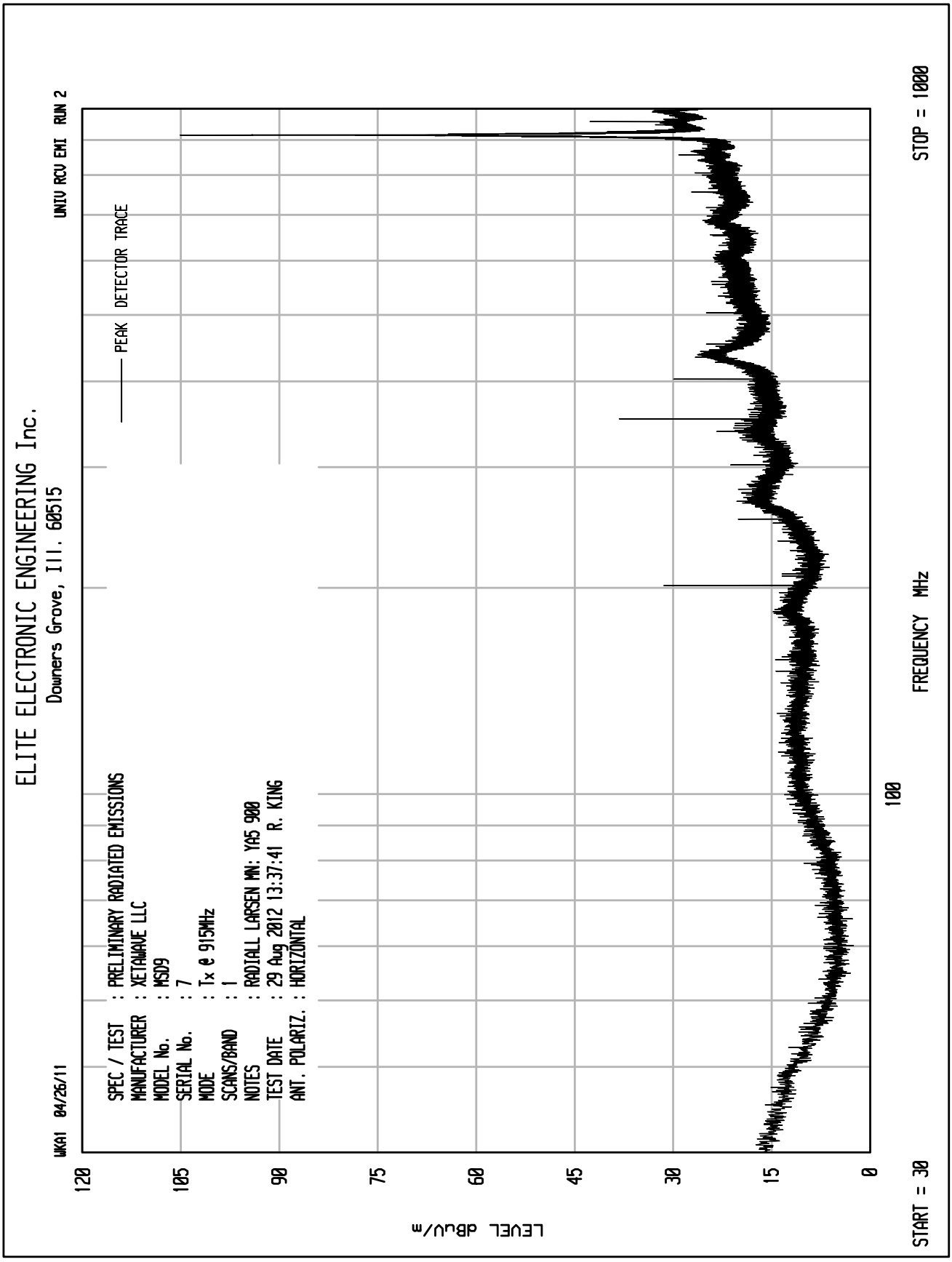

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 18
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC.
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : LAIRD OMNI MN: FG9026
TEST DATE : 30 Aug 2012 09:52:16 R. 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

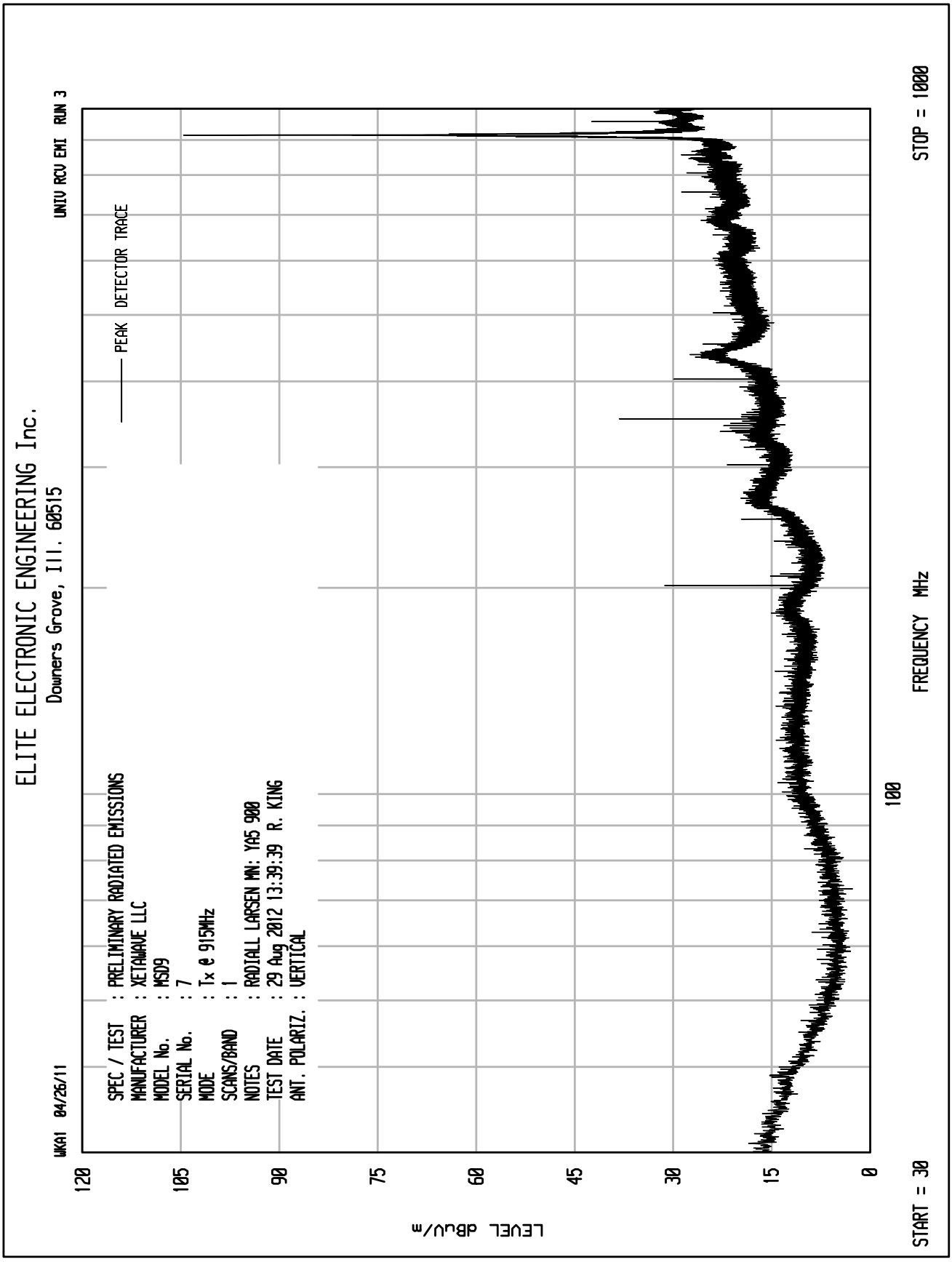

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 14:36:04 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

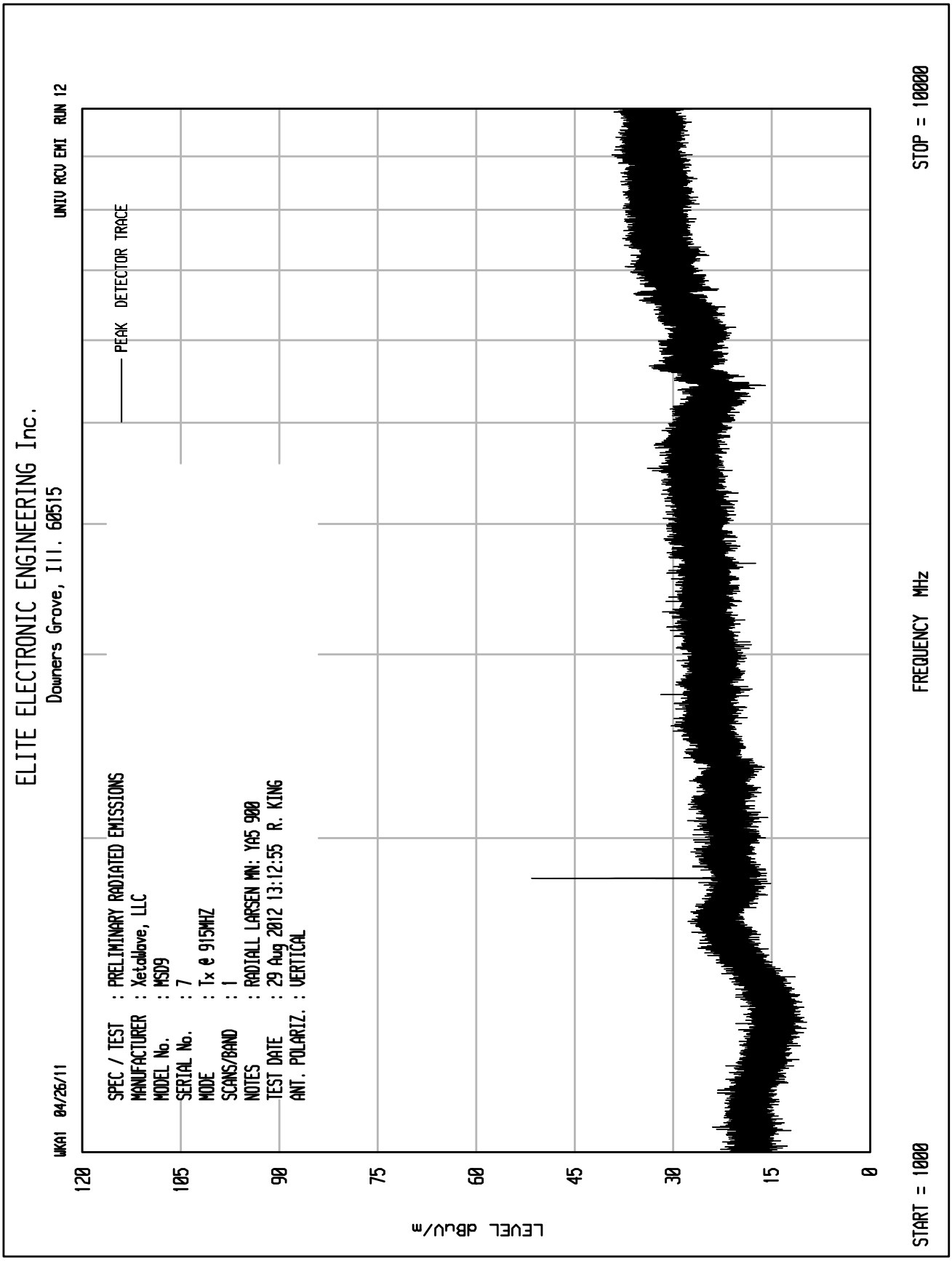

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 14:37:43 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

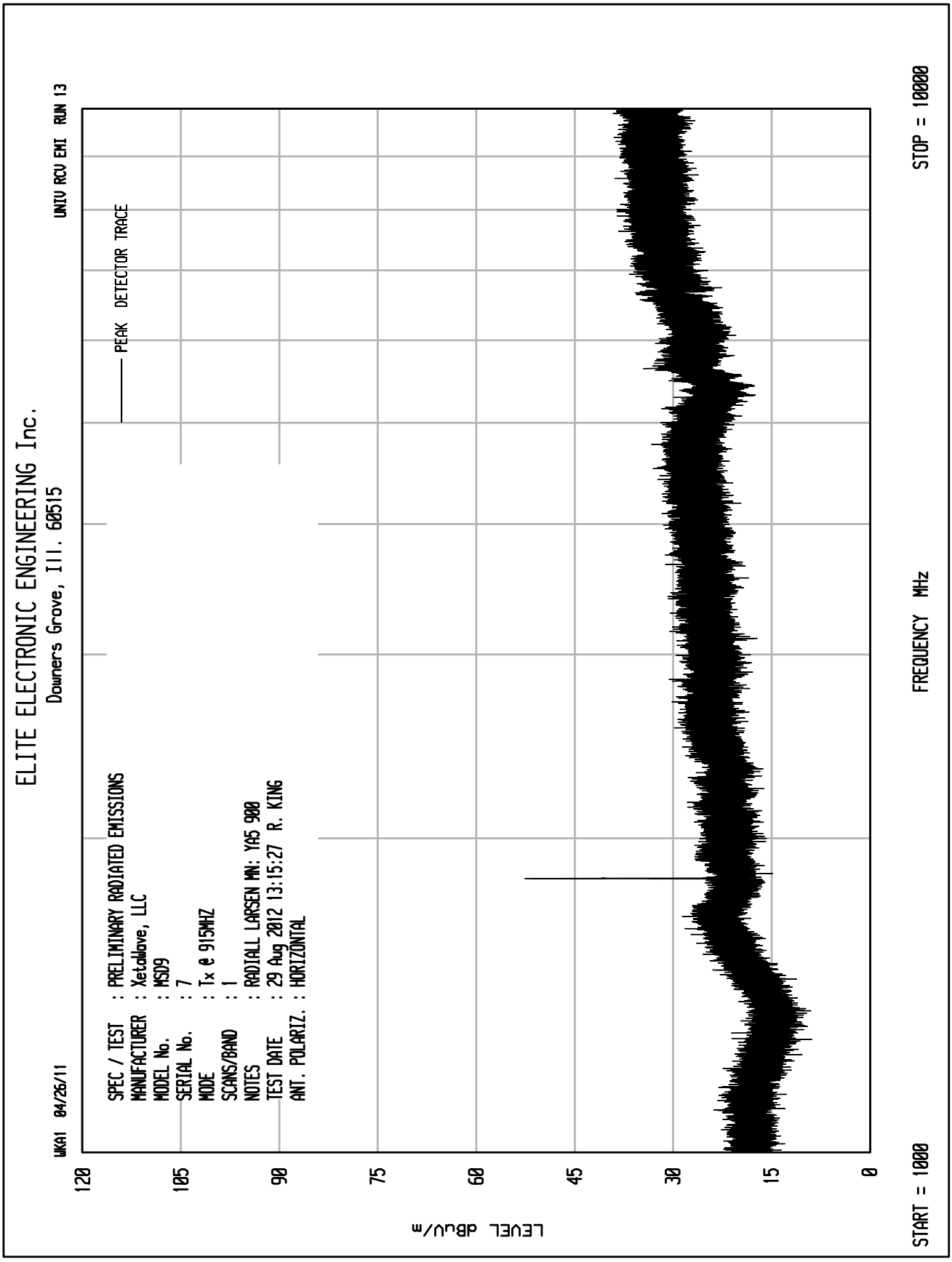

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 11:04:59 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

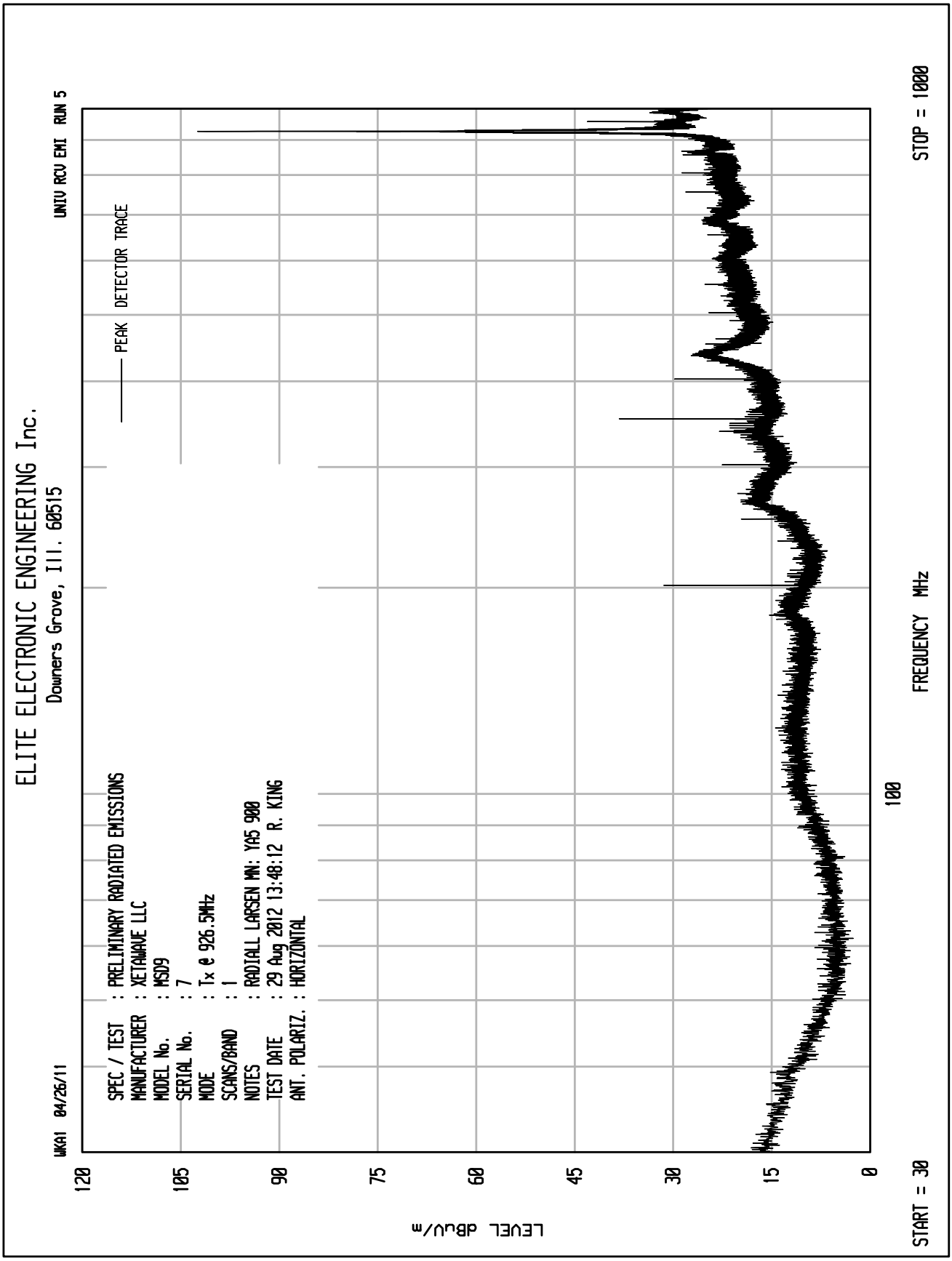

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 903.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN ANT: YA5 900
TEST DATE : 29 Aug 2012 11:07:52 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

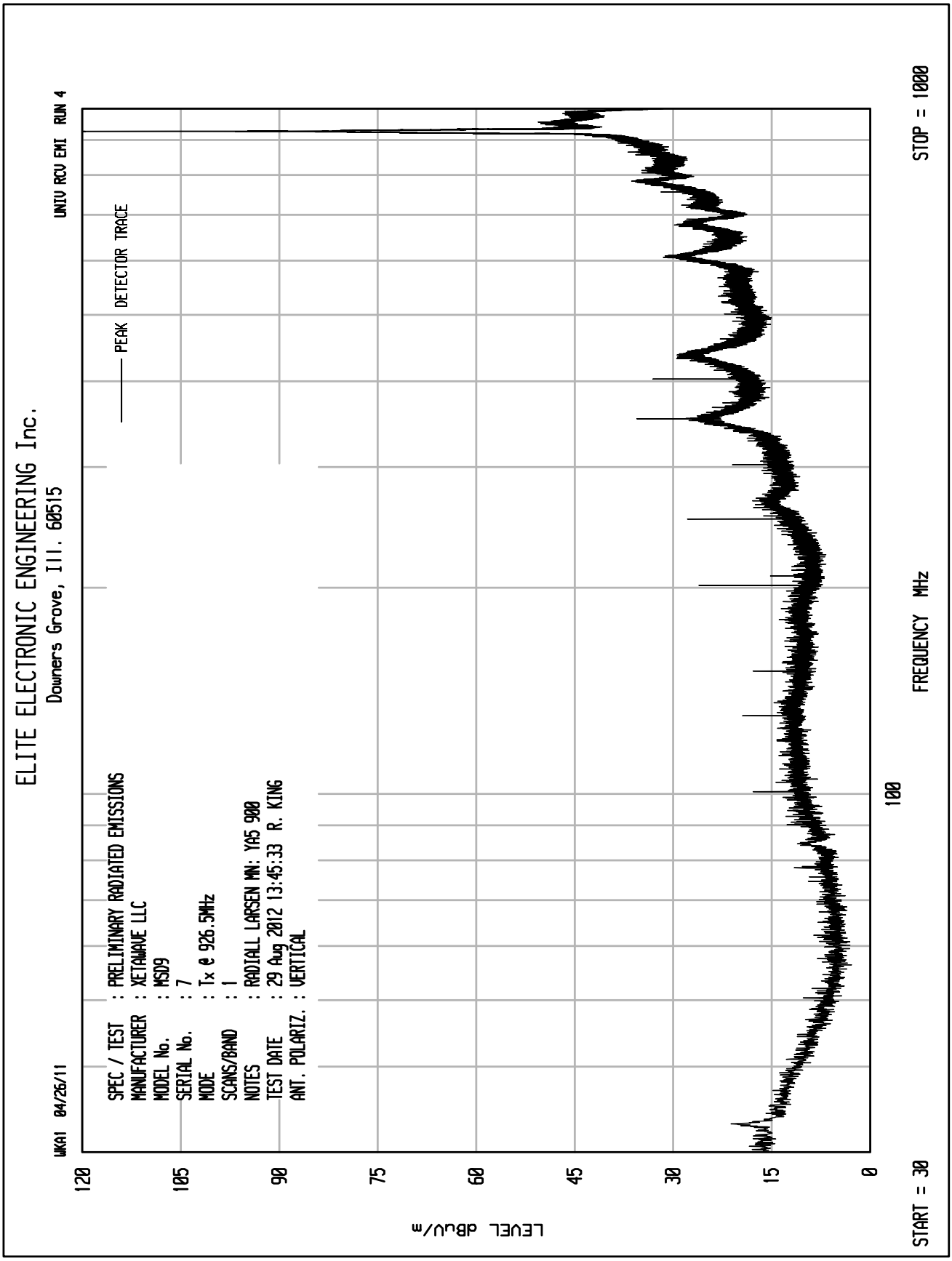

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:37:41 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

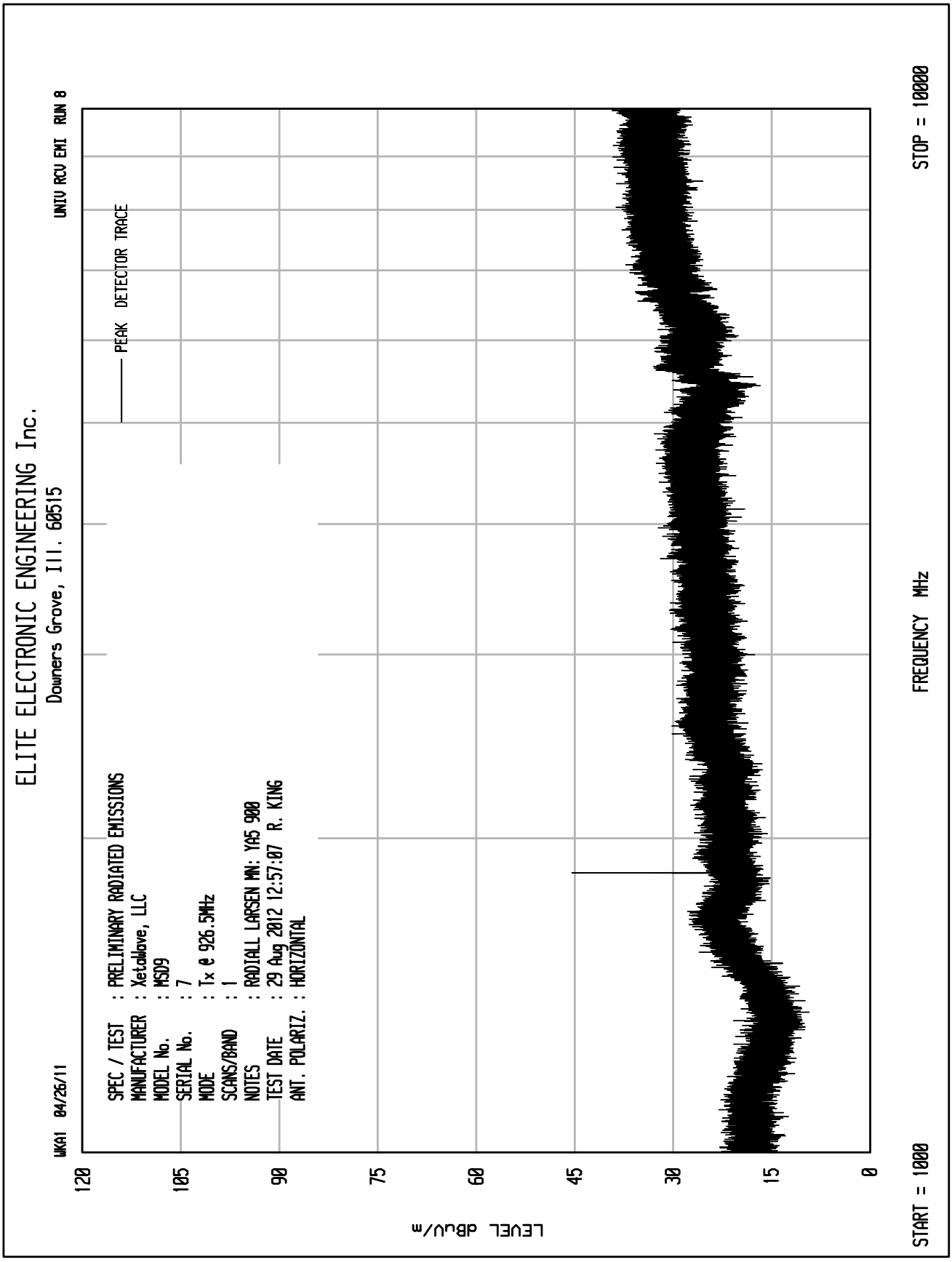

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:39:39 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

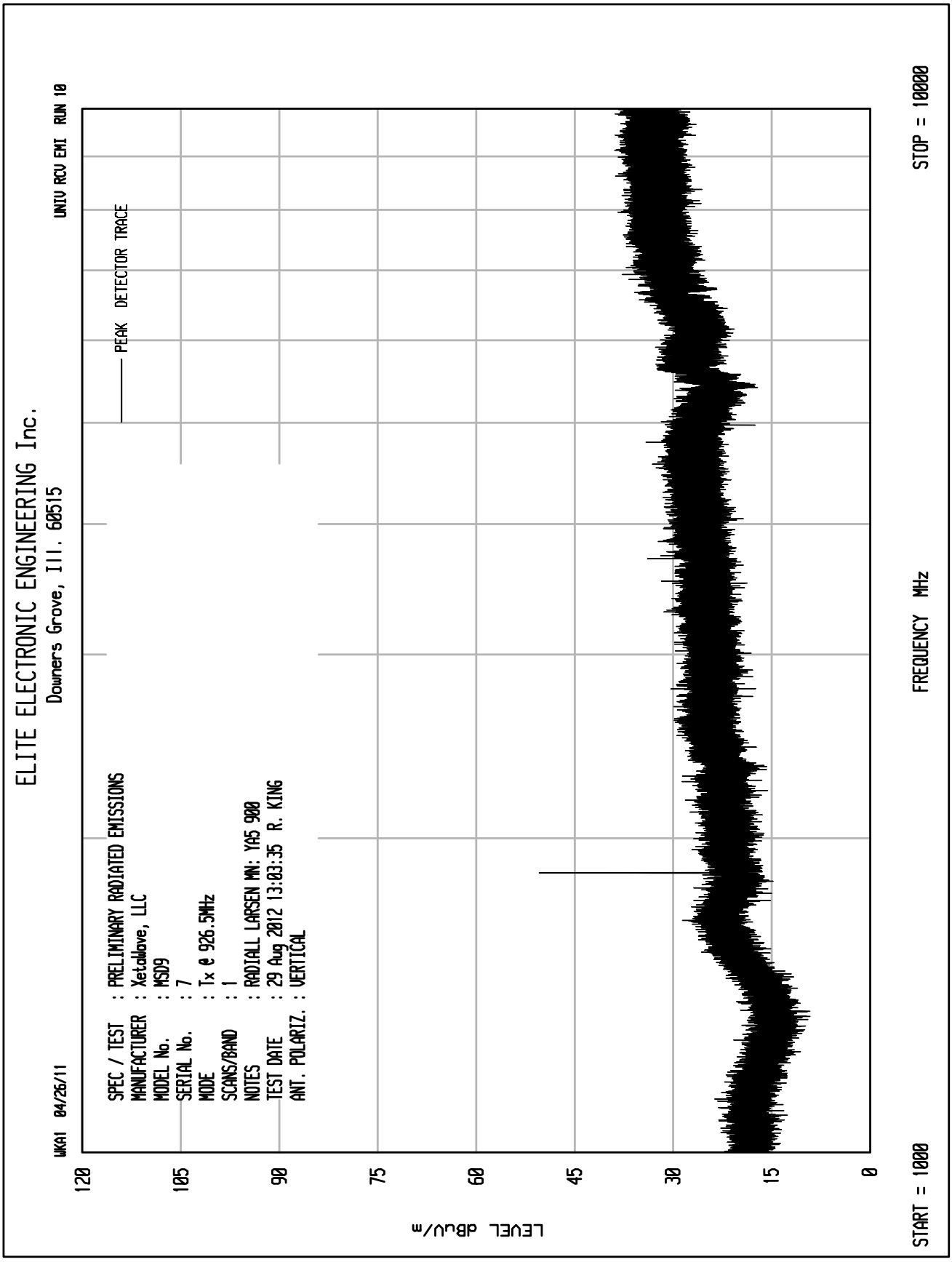

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHZ
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:12:55 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 13
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 915MHZ
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:15:27 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 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:48:12 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
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 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : XETAWAVE LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:45:33 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
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 8
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 12:57:07 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 10
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : Xetawave, LLC
MODEL No. : MSD9
SERIAL No. : 7
MODE : Tx @ 926.5MHz
SCANS/BAND : 1
NOTES : RADIALL LARSEN MN: YA5 900
TEST DATE : 29 Aug 2012 13:03:35 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 : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 903.5MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.0dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2710.50	H	54.6	2.8	31.4	-40.2	48.6	269.7	5000.0	-25.4
2710.50	V	52.7	2.8	31.4	-40.2	46.7	217.2	5000.0	-27.2
3614.00	H	51.9	3.2	33.4	-39.2	49.4	294.6	5000.0	-24.6
3614.00	V	59.0	3.2	33.4	-39.2	56.5	668.7	5000.0	-17.5
4517.50	H	47.3	3.6	34.1	-39.0	45.9	197.3	5000.0	-28.1
4517.50	V	47.0	3.6	34.1	-39.0	45.6	191.2	5000.0	-28.3
5421.00	H	39.9	3.9	36.4	-39.3	40.9	111.3	5000.0	-33.0
5421.00	V	37.7	3.9	36.4	-39.3	38.7	86.2	5000.0	-35.3
8131.50	H	45.9	4.9	39.2	-39.4	50.6	339.3	5000.0	-23.4
8131.50	V	45.0	4.9	39.2	-39.4	49.7	306.3	5000.0	-24.3
9035.00	H	45.0	5.0	40.1	-39.3	50.7	342.2	5000.0	-23.3
9035.00	V	44.3	5.0	40.1	-39.3	50.0	316.8	5000.0	-24.0

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 903.5MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.0dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2710.50	H	54.6	2.8	31.4	-40.2	-5.8	42.8	138.3	500.0	-11.2
2710.50	V	52.7	2.8	31.4	-40.2	-5.8	40.9	111.4	500.0	-13.0
3614.00	H	51.9	3.2	33.4	-39.2	-5.8	43.6	151.1	500.0	-10.4
3614.00	V	59.0	3.2	33.4	-39.2	-5.8	50.7	343.0	500.0	-3.3
4517.50	H	47.3	3.6	34.1	-39.0	-5.8	40.1	101.2	500.0	-13.9
4517.50	V	47.0	3.6	34.1	-39.0	-5.8	39.8	98.1	500.0	-14.1
5421.00	H	39.9	3.9	36.4	-39.3	-5.8	35.1	57.1	500.0	-18.8
5421.00	V	37.7	3.9	36.4	-39.3	-5.8	32.9	44.2	500.0	-21.1
8131.50	H	45.9	4.9	39.2	-39.4	-5.8	44.8	174.0	500.0	-9.2
8131.50	V	45.0	4.9	39.2	-39.4	-5.8	43.9	157.1	500.0	-10.1
9035.00	H	45.0	5.0	40.1	-39.3	-5.8	44.9	175.5	500.0	-9.1
9035.00	V	44.3	5.0	40.1	-39.3	-5.8	44.2	162.5	500.0	-9.8

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 915MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.3dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2745.00	H	53.7	2.8	31.6	-40.1	48.0	250.1	5000.0	-26.0
2745.00	V	52.6	2.8	31.6	-40.1	46.8	219.6	5000.0	-27.1
3660.00	H	51.0	3.3	33.5	-39.1	48.6	268.0	5000.0	-25.4
3660.00	V	50.5	3.3	33.5	-39.1	48.1	253.3	5000.0	-25.9
4575.00	H	46.9	3.6	34.3	-39.0	45.8	194.0	5000.0	-28.2
4575.00	V	45.2	3.6	34.3	-39.0	44.1	160.6	5000.0	-29.9
7320.00	H	45.0	4.7	38.9	-39.4	49.1	286.0	5000.0	-24.9
7320.00	V	45.1	4.7	38.9	-39.4	49.3	290.3	5000.0	-24.7
8235.00	H	45.3	4.9	39.2	-39.4	50.1	318.5	5000.0	-23.9
8235.00	V	46.0	4.9	39.2	-39.4	50.7	344.4	5000.0	-23.2
9150.00	H	46.0	5.0	40.0	-39.3	51.7	385.1	5000.0	-22.3
9150.00	V	44.6	5.0	40.0	-39.3	50.3	326.3	5000.0	-23.7

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 915MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.3dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2745.00	H	53.7	2.8	31.6	-40.1	-5.8	42.2	128.3	500.0	-11.8
2745.00	V	52.6	2.8	31.6	-40.1	-5.8	41.0	112.6	500.0	-12.9
3660.00	H	51.0	3.3	33.5	-39.1	-5.8	42.8	137.4	500.0	-11.2
3660.00	V	50.5	3.3	33.5	-39.1	-5.8	42.3	129.9	500.0	-11.7
4575.00	H	46.9	3.6	34.3	-39.0	-5.8	40.0	99.5	500.0	-14.0
4575.00	V	45.2	3.6	34.3	-39.0	-5.8	38.3	82.4	500.0	-15.7
7320.00	H	45.0	4.7	38.9	-39.4	-5.8	43.3	146.7	500.0	-10.7
7320.00	V	45.1	4.7	38.9	-39.4	-5.8	43.5	148.9	500.0	-10.5
8235.00	H	45.3	4.9	39.2	-39.4	-5.8	44.3	163.3	500.0	-9.7
8235.00	V	46.0	4.9	39.2	-39.4	-5.8	44.9	176.6	500.0	-9.0
9150.00	H	46.0	5.0	40.0	-39.3	-5.8	45.9	197.5	500.0	-8.1
9150.00	V	44.6	5.0	40.0	-39.3	-5.8	44.5	167.3	500.0	-9.5

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 926.5MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.7dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2779.50	H	49.5	2.8	31.7	-40.1	43.9	157.2	5000.0	-30.1
2779.50	V	49.0	2.8	31.7	-40.1	43.4	148.4	5000.0	-30.6
3706.00	H	49.5	3.3	33.5	-39.1	47.2	228.7	5000.0	-26.8
3706.00	V	51.5	3.3	33.5	-39.1	49.2	287.9	5000.0	-24.8
4632.50	H	46.2	3.6	34.6	-39.1	45.4	185.3	5000.0	-28.6
4632.50	V	46.2	3.6	34.6	-39.1	45.4	185.3	5000.0	-28.6
7412.00	H	45.6	4.7	38.9	-39.3	49.9	312.9	5000.0	-24.1
7412.00	V	45.0	4.7	38.9	-39.3	49.3	291.0	5000.0	-24.7
8338.50	H	45.6	4.9	39.2	-39.4	50.4	331.4	5000.0	-23.6
8338.50	V	44.0	4.9	39.2	-39.4	48.8	276.6	5000.0	-25.1

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 926.5MHz
External Antenna : Laird Omni – FG9026
Test Distance : 3 meters
Notes : Conducted output power reduced to 26.7dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2779.50	H	49.5	2.8	31.7	-40.1	-5.8	38.1	80.6	500.0	-15.9
2779.50	V	49.0	2.8	31.7	-40.1	-5.8	37.6	76.1	500.0	-16.4
3706.00	H	49.5	3.3	33.5	-39.1	-5.8	41.4	117.3	500.0	-12.6
3706.00	V	51.5	3.3	33.5	-39.1	-5.8	43.4	147.7	500.0	-10.6
4632.50	H	46.2	3.6	34.6	-39.1	-5.8	39.6	95.0	500.0	-14.4
4632.50	V	46.2	3.6	34.6	-39.1	-5.8	39.6	95.0	500.0	-14.4
7412.00	H	45.6	4.7	38.9	-39.3	-5.8	44.1	160.5	500.0	-9.9
7412.00	V	45.0	4.7	38.9	-39.3	-5.8	43.5	149.3	500.0	-10.5
8338.50	H	45.6	4.9	39.2	-39.4	-5.8	44.6	169.9	500.0	-9.4
8338.50	V	44.0	4.9	39.2	-39.4	-5.8	43.0	141.8	500.0	-10.9

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 903.5MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 22.0dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2710.50	H	53.8	2.8	31.4	-40.2	47.9	247.1	5000.0	-26.1
2710.50	V	60.0	2.8	31.4	-40.2	54.1	505.8	5000.0	-19.9
3614.00	H	54.1	3.2	33.4	-39.2	51.5	377.3	5000.0	-22.4
3614.00	V	59.3	3.2	33.4	-39.2	56.8	689.0	5000.0	-17.2
4517.50	H	45.2	3.6	34.1	-39.0	43.9	156.2	5000.0	-30.1
4517.50	V	46.9	3.6	34.1	-39.0	45.5	188.6	5000.0	-28.5
5421.00	H	39.5	3.9	36.4	-39.3	40.5	106.4	5000.0	-33.4
5421.00	V	37.7	3.9	36.4	-39.3	38.7	86.2	5000.0	-35.3
8131.50	H	44.5	4.9	39.2	-39.4	49.2	289.1	5000.0	-24.8
8131.50	V	43.7	4.9	39.2	-39.4	48.4	263.7	5000.0	-25.6
9035.00	H	45.0	5.0	40.1	-39.3	50.7	343.4	5000.0	-23.3
9035.00	V	44.5	5.0	40.1	-39.3	50.2	323.1	5000.0	-23.8

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 903.5MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 22.0dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2710.50	H	53.81	2.8	31.4	-40.2	-5.8	42.1	126.7	500.0	-11.9
2710.50	V	60.0	2.8	31.4	-40.2	-5.8	48.3	259.4	500.0	-5.7
3614.00	H	54.1	3.2	33.4	-39.2	-5.8	45.7	193.5	500.0	-8.2
3614.00	V	59.3	3.2	33.4	-39.2	-5.8	51.0	353.4	500.0	-3.0
4517.50	H	45.2	3.6	34.1	-39.0	-5.8	38.1	80.1	500.0	-15.9
4517.50	V	46.9	3.6	34.1	-39.0	-5.8	39.7	96.7	500.0	-14.3
5421.00	H	39.5	3.9	36.4	-39.3	-5.8	34.7	54.6	500.0	-19.2
5421.00	V	37.7	3.9	36.4	-39.3	-5.8	32.9	44.2	500.0	-21.1
8131.50	H	44.5	4.9	39.2	-39.4	-5.8	43.4	148.3	500.0	-10.6
8131.50	V	43.7	4.9	39.2	-39.4	-5.8	42.6	135.2	500.0	-11.4
9035.00	H	45.0	5.0	40.1	-39.3	-5.8	44.9	176.1	500.0	-9.1
9035.00	V	44.5	5.0	40.1	-39.3	-5.8	44.4	165.7	500.0	-9.6

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 915MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 23.6dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2745.00	H	54.4	2.8	31.6	-40.1	48.6	270.1	5000.0	-25.3
2745.00	V	60.5	2.8	31.6	-40.1	54.8	550.3	5000.0	-19.2
3660.00	H	50.1	3.3	33.5	-39.1	47.6	240.5	5000.0	-26.4
3660.00	V	48.9	3.3	33.5	-39.1	46.5	210.2	5000.0	-27.5
4575.00	H	47.3	3.6	34.3	-39.0	46.2	204.5	5000.0	-27.8
4575.00	V	47.0	3.6	34.3	-39.0	45.9	197.1	5000.0	-28.1
7320.00	H	45.0	4.7	38.9	-39.4	49.2	286.9	5000.0	-24.8
7320.00	V	45.7	4.7	38.9	-39.4	49.9	311.0	5000.0	-24.1
8235.00	H	46.1	4.9	39.2	-39.4	50.9	349.6	5000.0	-23.1
8235.00	V	45.8	4.9	39.2	-39.4	50.6	338.9	5000.0	-23.4
9150.00	H	46.2	5.0	40.0	-39.3	52.0	395.9	5000.0	-22.0
9150.00	V	44.5	5.0	40.0	-39.3	50.2	322.6	5000.0	-23.8

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 915MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 23.6dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2745.00	H	54.4	2.8	31.6	-40.1	-5.8	42.8	138.5	500.0	-11.1
2745.00	V	60.5	2.8	31.6	-40.1	-5.8	49.0	282.2	500.0	-5.0
3660.00	H	50.1	3.3	33.5	-39.1	-5.8	41.8	123.3	500.0	-12.2
3660.00	V	48.9	3.3	33.5	-39.1	-5.8	40.7	107.8	500.0	-13.3
4575.00	H	47.3	3.6	34.3	-39.0	-5.8	40.4	104.9	500.0	-13.6
4575.00	V	47.0	3.6	34.3	-39.0	-5.8	40.1	101.1	500.0	-13.9
7320.00	H	45.0	4.7	38.9	-39.4	-5.8	43.4	147.2	500.0	-10.6
7320.00	V	45.7	4.7	38.9	-39.4	-5.8	44.1	159.5	500.0	-9.9
8235.00	H	46.1	4.9	39.2	-39.4	-5.8	45.1	179.3	500.0	-8.9
8235.00	V	45.8	4.9	39.2	-39.4	-5.8	44.8	173.8	500.0	-9.2
9150.00	H	46.2	5.0	40.0	-39.3	-5.8	46.2	203.1	500.0	-7.8
9150.00	V	44.5	5.0	40.0	-39.3	-5.8	44.4	165.4	500.0	-9.6

DATA PAGE

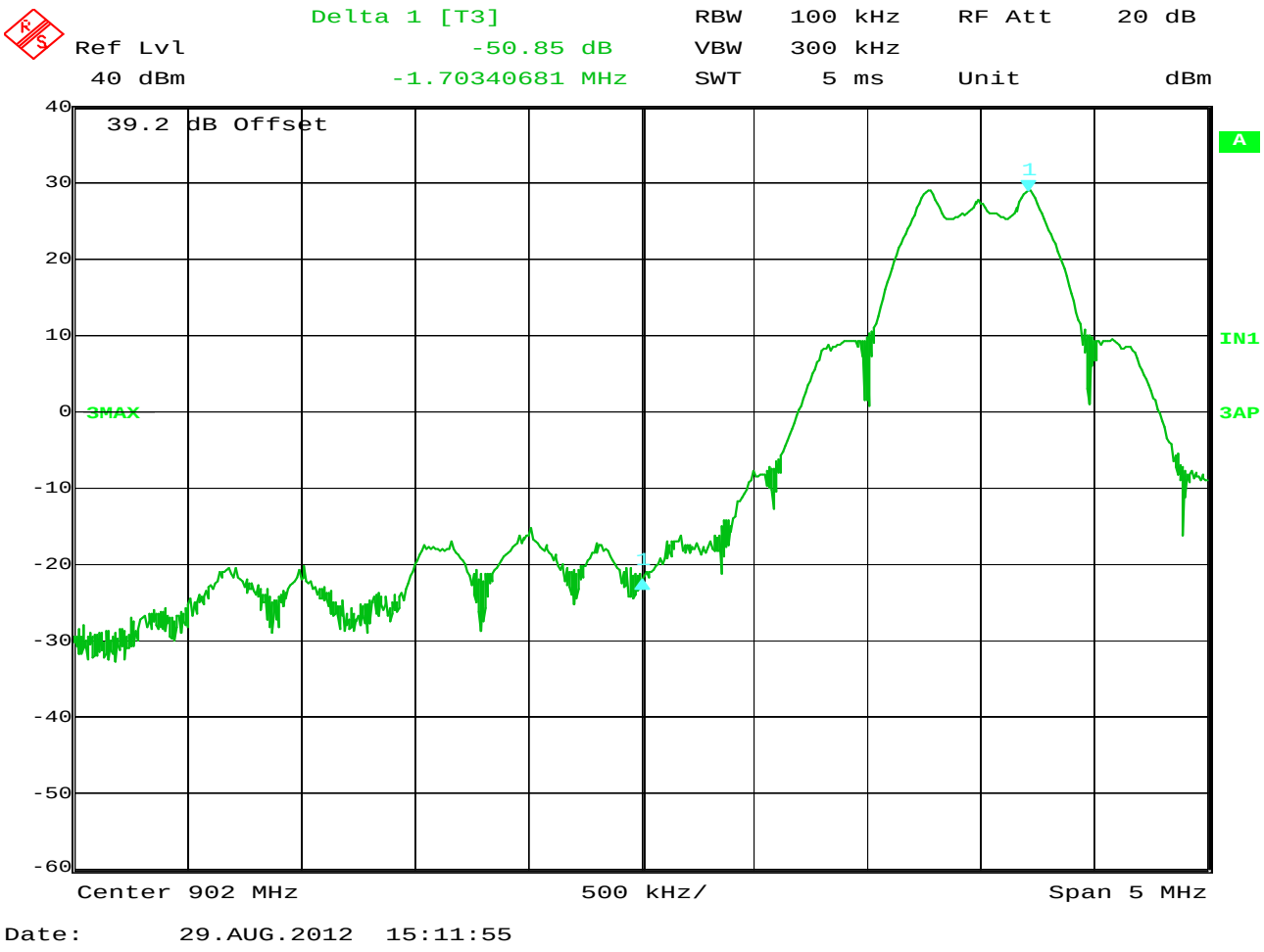
Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 926.5MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 22.3dBm
Notes : Peak Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2779.50	H	48.9	2.8	31.7	-40.1	43.3	146.3	5000.0	-30.7
2779.50	V	53.4	2.8	31.7	-40.1	47.8	246.8	5000.0	-26.1
3706.00	H	51.0	3.3	33.5	-39.1	48.7	270.9	5000.0	-25.3
3706.00	V	48.9	3.3	33.5	-39.1	46.6	213.0	5000.0	-27.4
4632.50	H	44.4	3.6	34.6	-39.1	43.6	150.6	5000.0	-30.4
4632.50	V	45.0	3.6	34.6	-39.1	44.1	160.3	5000.0	-29.9
7412.00	H	45.1	4.7	38.9	-39.3	49.4	295.4	5000.0	-24.6
7412.00	V	44.0	4.7	38.9	-39.3	48.3	261.2	5000.0	-25.6
8338.50	H	44.0	4.9	39.2	-39.4	48.8	276.6	5000.0	-25.1
8338.50	V	44.2	4.9	39.2	-39.4	49.0	280.7	5000.0	-25.0

DATA PAGE

Manufacturer : XetaWave, LLC.
Model No. : MSD9 Rev. A
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : September 1, 2012
Mode : Transmit @ 926.5MHz
External Antenna : Radiall Larsen – YA5900W
Test Distance : 3 meters
Notes : Conducted output power reduced to 22.3dBm
Notes : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

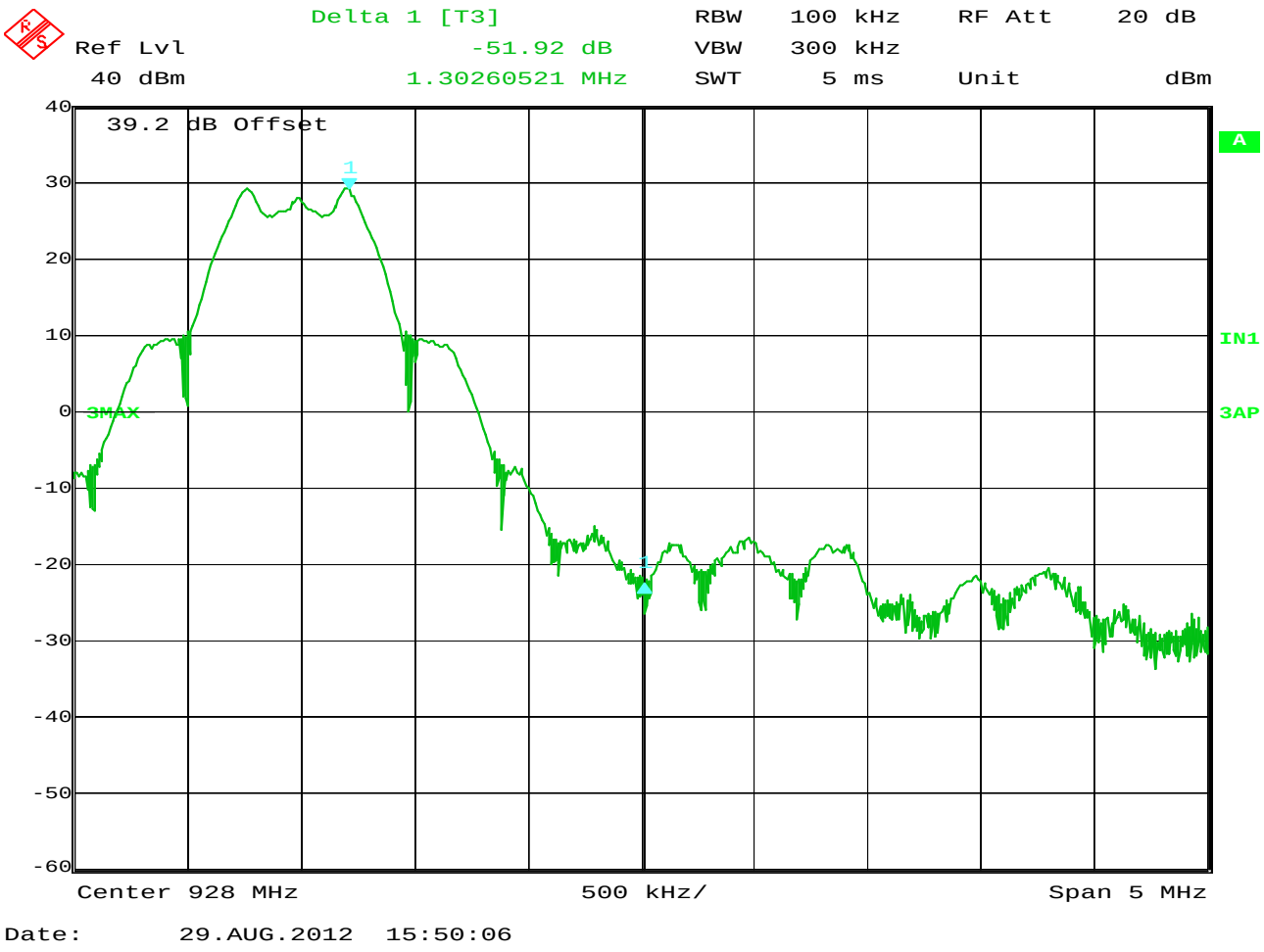
Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2779.50	H	48.90	2.8	31.7	-40.1	-5.8	37.5	75.0	500.0	-16.5
2779.50	V	53.4	2.8	31.7	-40.1	-5.8	42.0	126.6	500.0	-11.9
3706.00	H	51.0	3.3	33.5	-39.1	-5.8	42.9	138.9	500.0	-11.1
3706.00	V	48.9	3.3	33.5	-39.1	-5.8	40.8	109.2	500.0	-13.2
4632.50	H	44.4	3.6	34.6	-39.1	-5.8	37.8	77.2	500.0	-16.2
4632.50	V	45.0	3.6	34.6	-39.1	-5.8	38.3	82.2	500.0	-15.7
7412.00	H	45.1	4.7	38.9	-39.3	-5.8	43.6	151.5	500.0	-10.4
7412.00	V	44.0	4.7	38.9	-39.3	-5.8	42.5	133.9	500.0	-11.4
8338.50	H	44.0	4.9	39.2	-39.4	-5.8	43.0	141.8	500.0	-10.9
8338.50	V	44.2	4.9	39.2	-39.4	-5.8	43.2	144.0	500.0	-10.8



FCC 15.247: Band Edge

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS : 30 dBm down from band edge
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

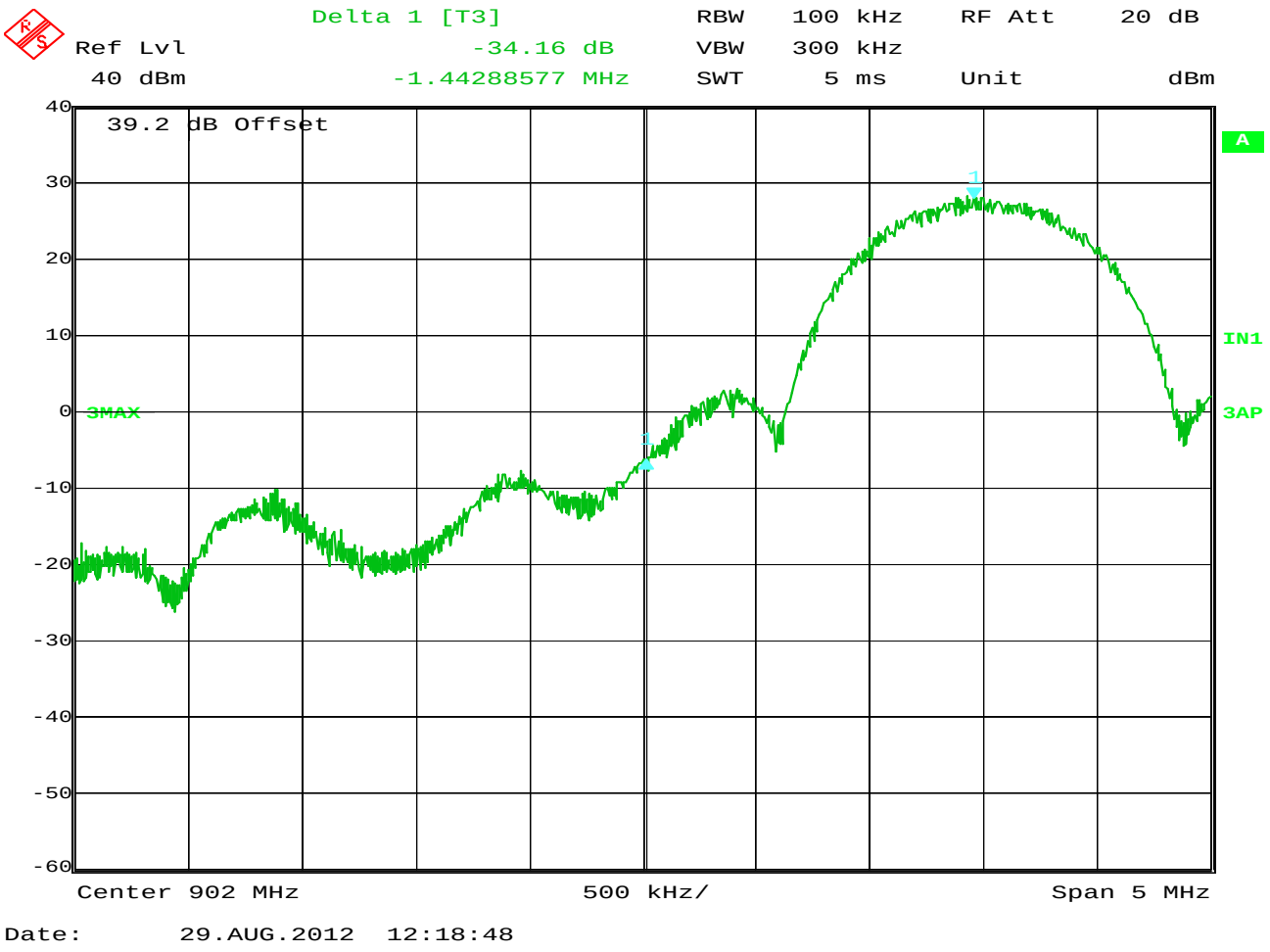
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	2FSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

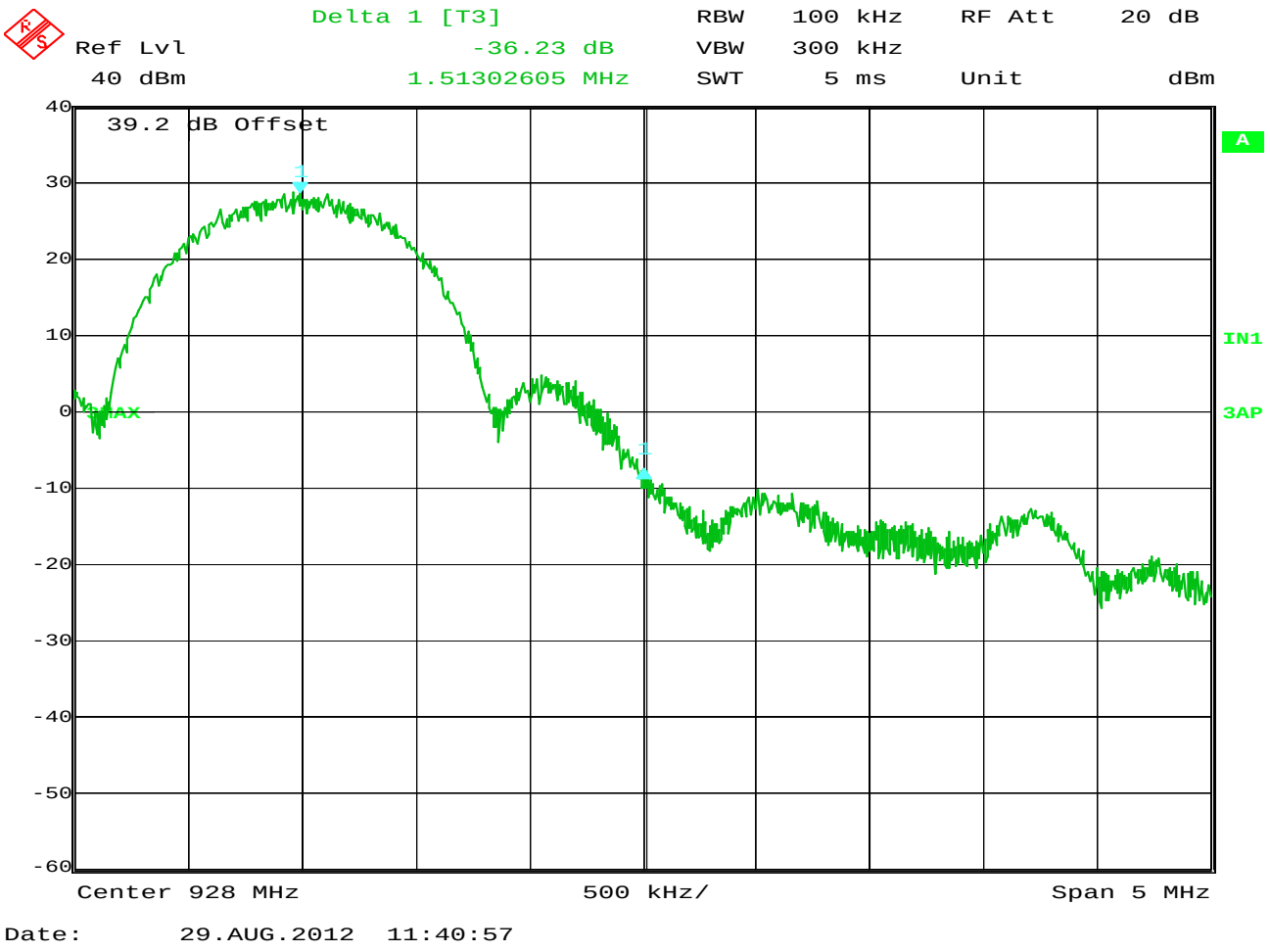
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	16QAM (Low: 903.5MHz @ 20000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

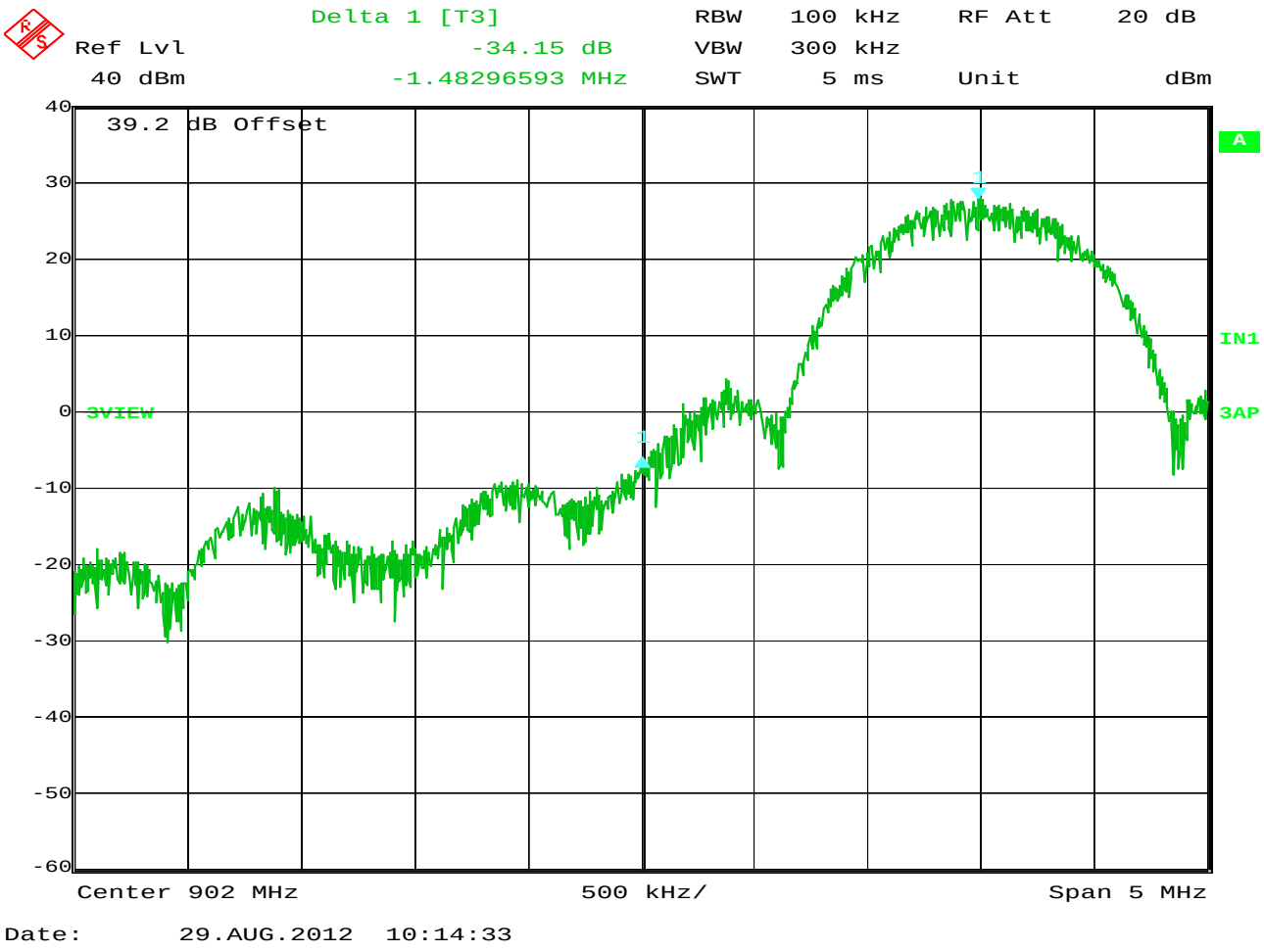
NOTES



FCC 15.247: Band Edge

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (High: 926.5MHz @ 14000 power level)
TEST PARAMETERS : 30 dBm down from band edge
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

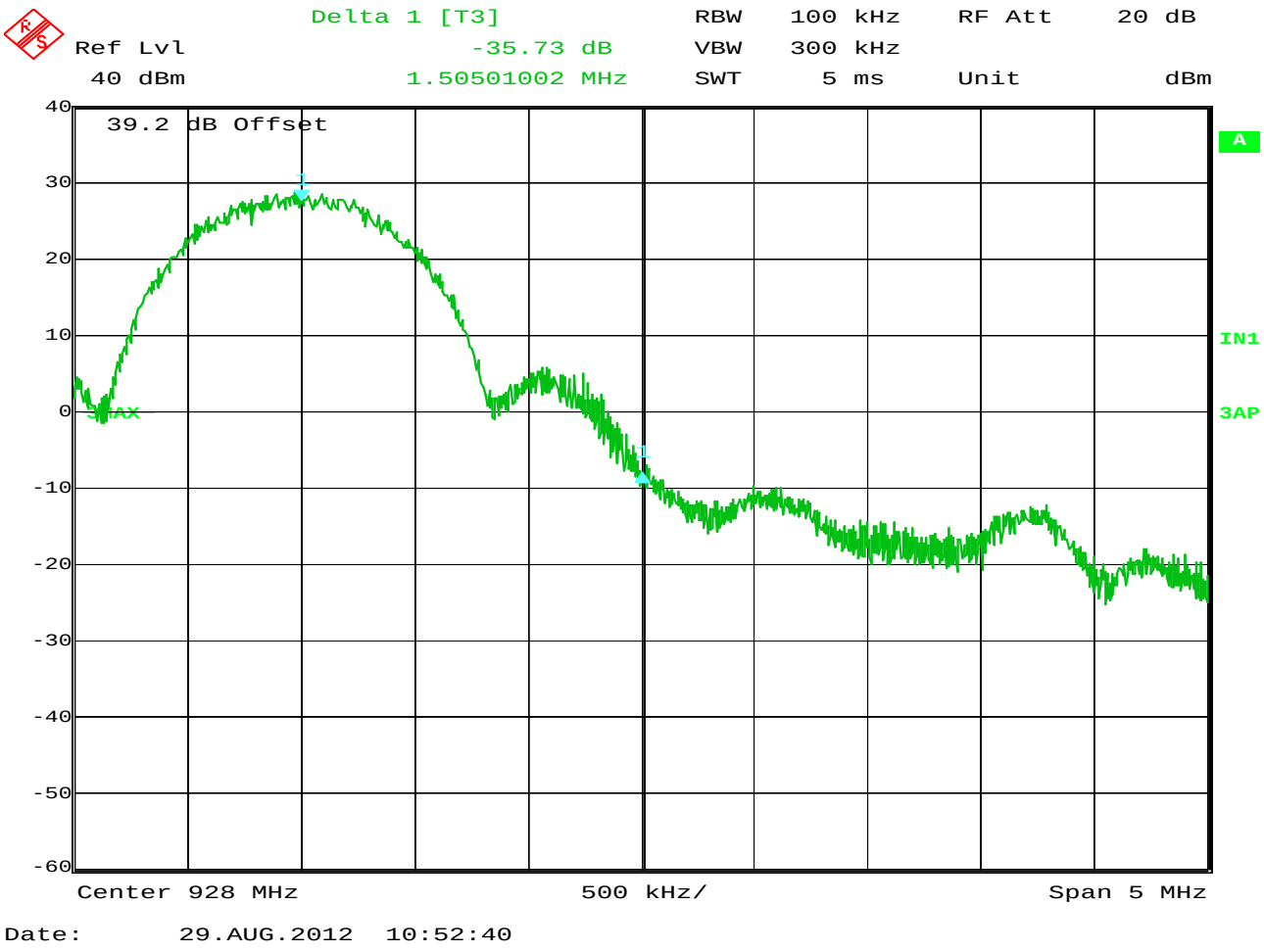
NOTES



FCC 15.247: Band Edge

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (High: 903.5MHz @ 26000 power level)
TEST PARAMETERS : 30 dBm down from band edge
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

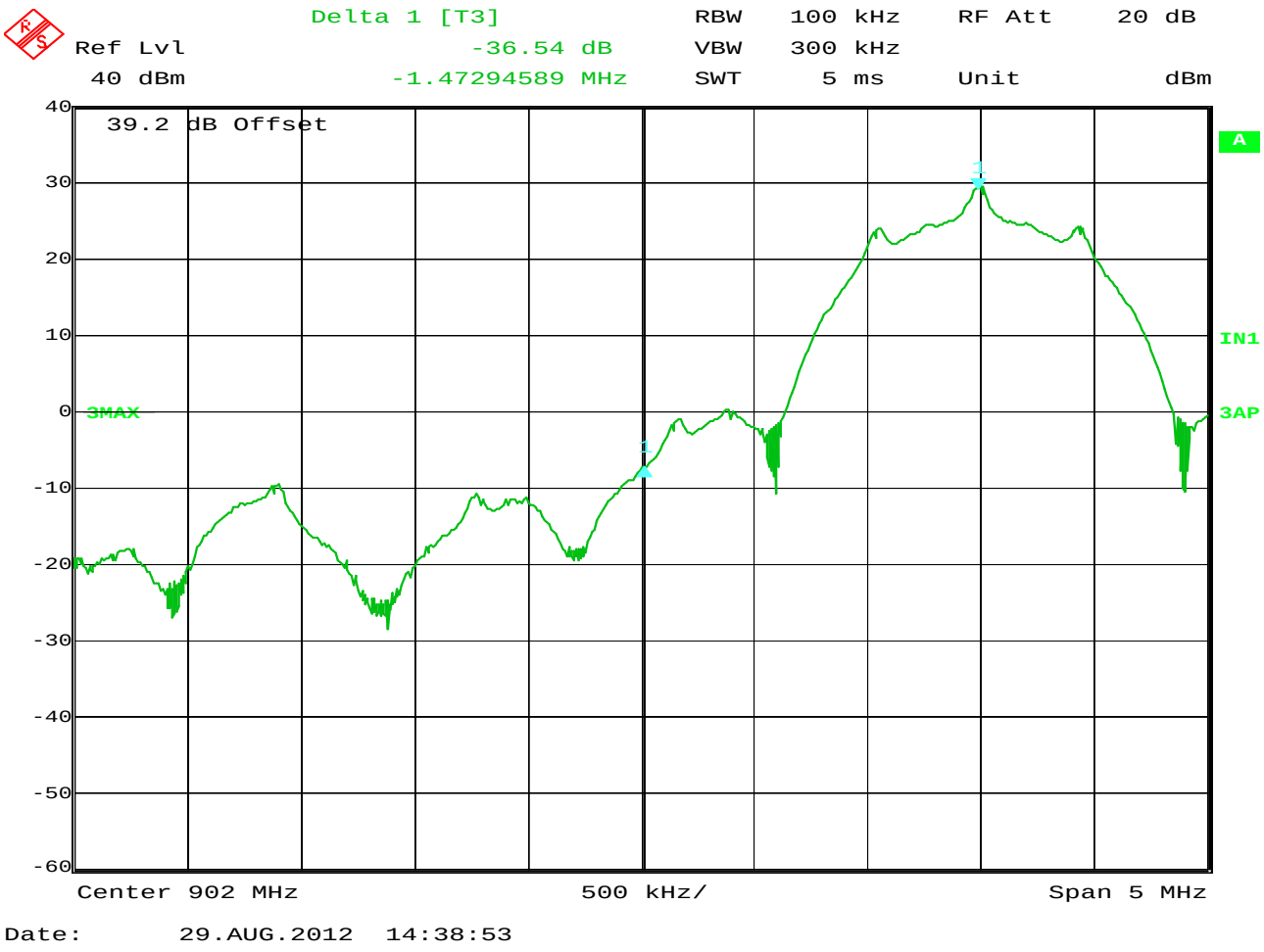
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	64QAM (High: 903.5MHz @ 17000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

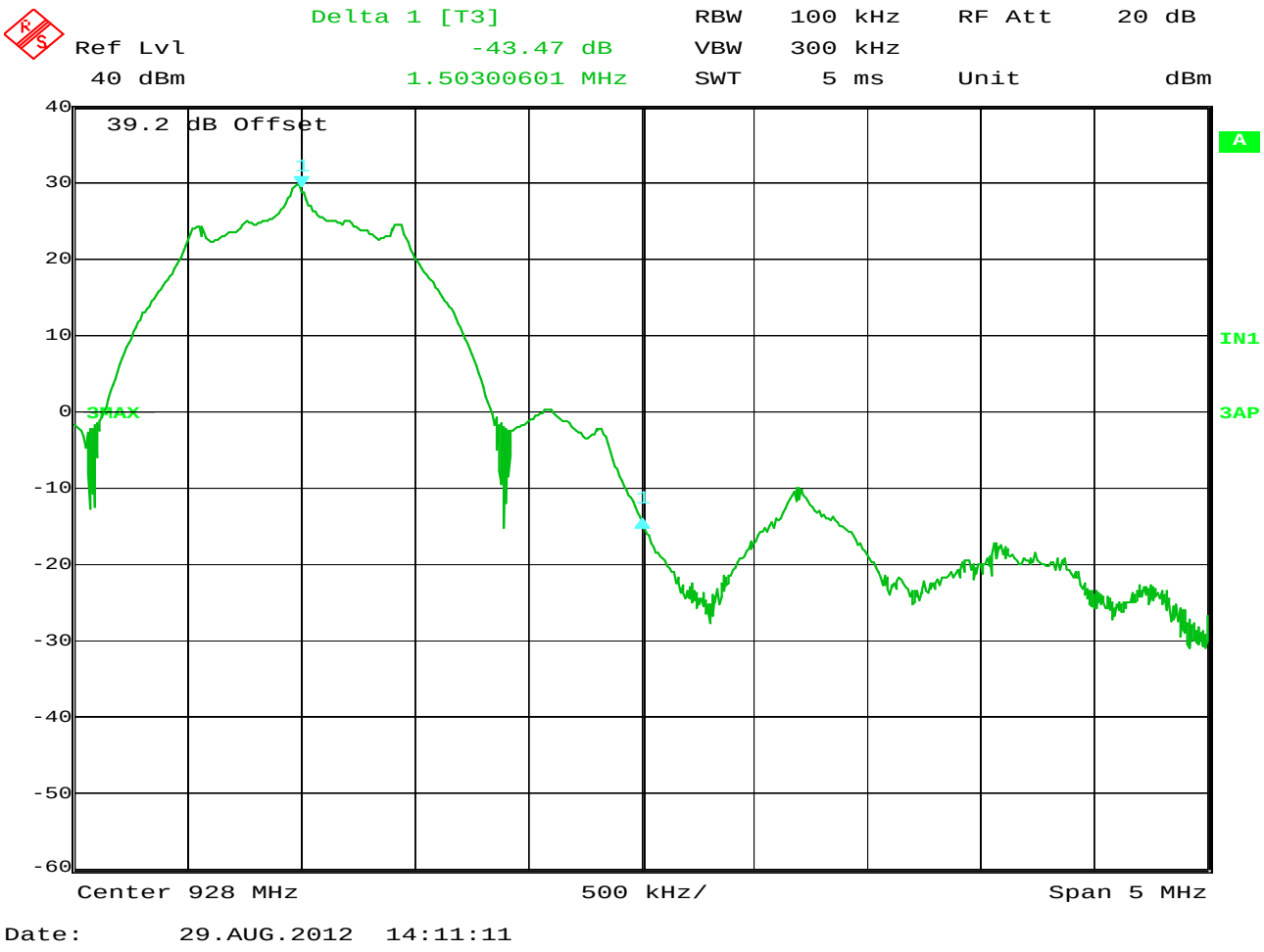
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	BPSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

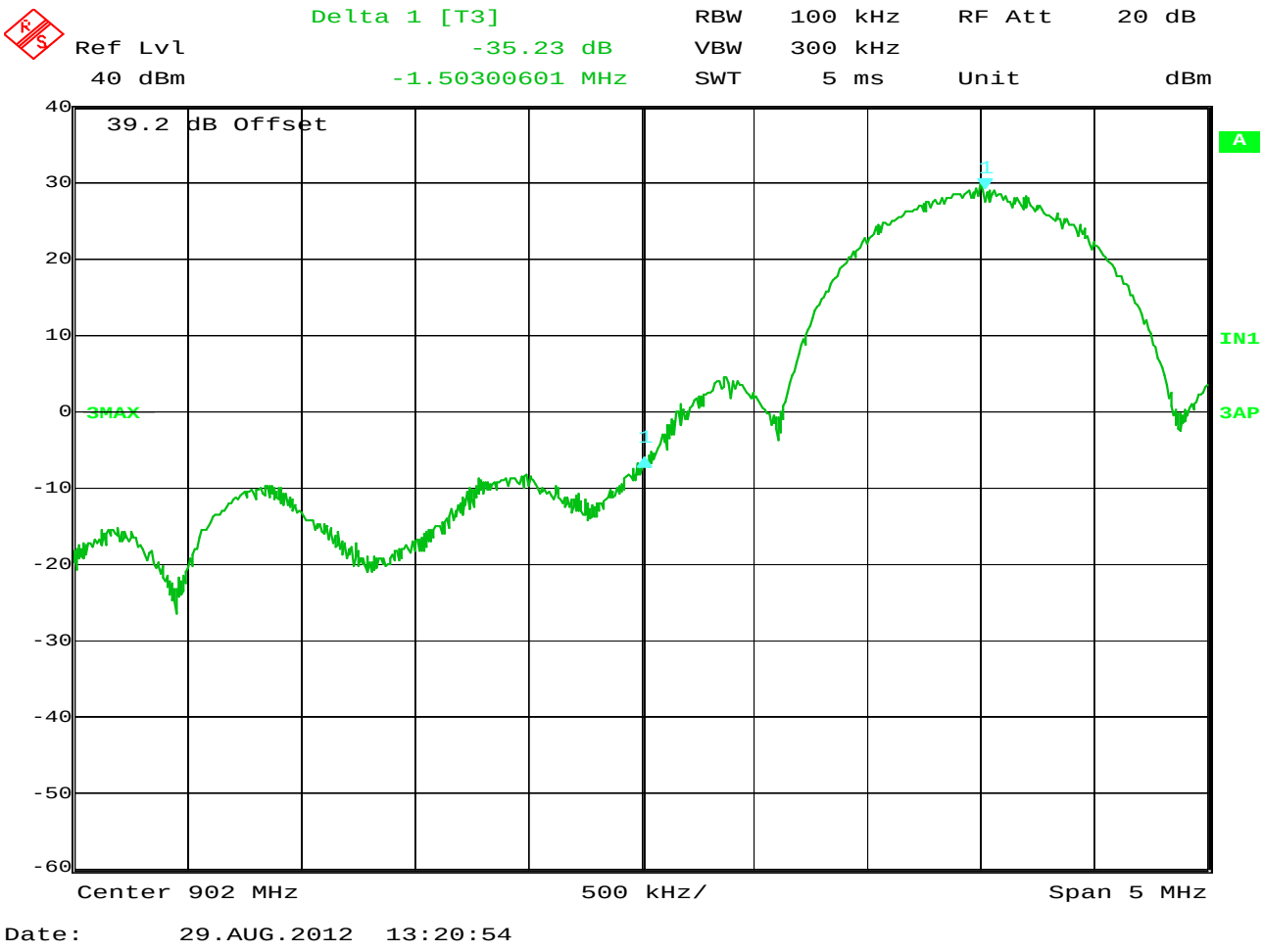
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	BPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

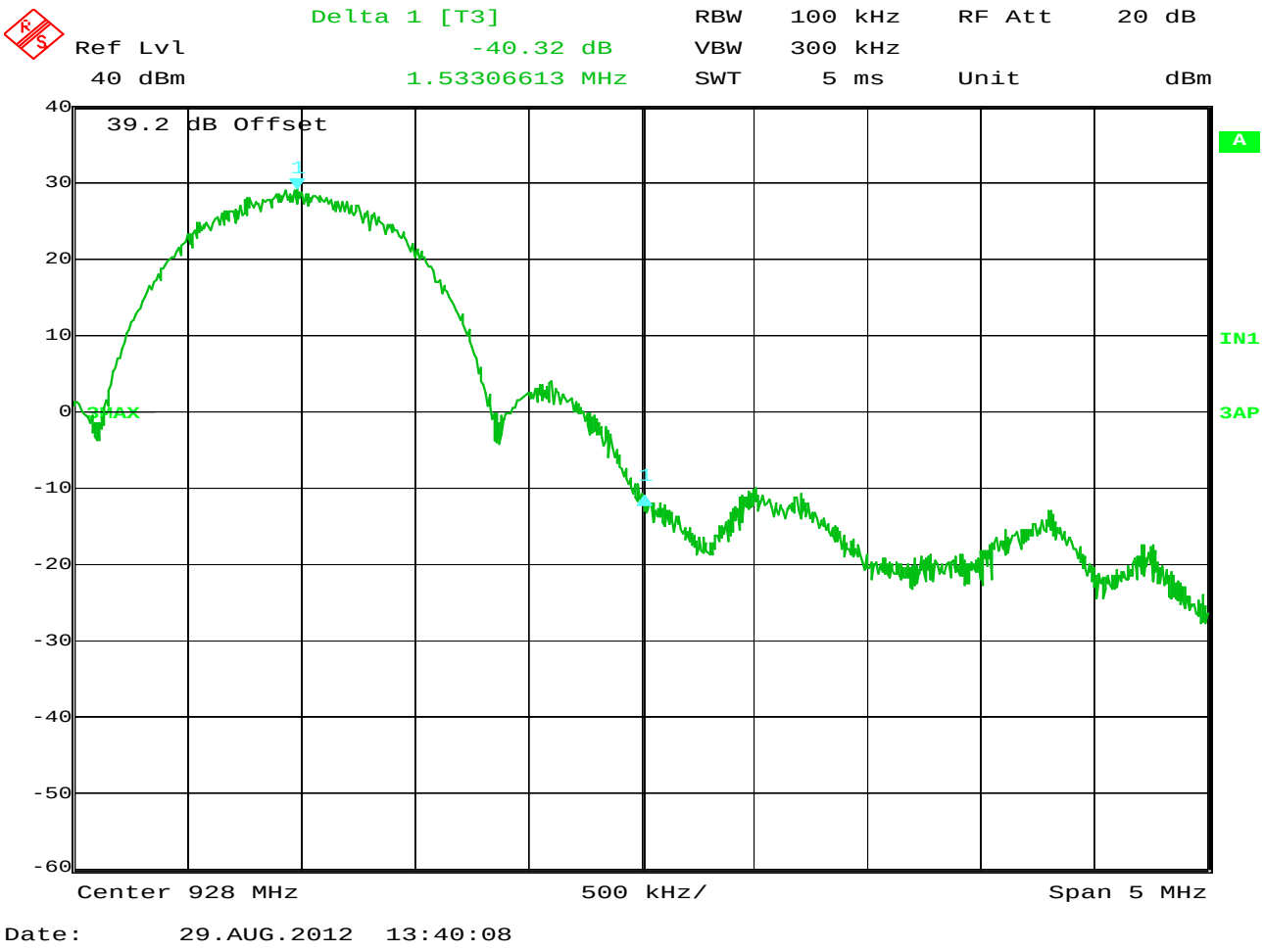
NOTES



FCC 15.247: Band Edge

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Low: 903.5MHz @ 19000 power level)
TEST PARAMETERS : 30 dBm down from band edge
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

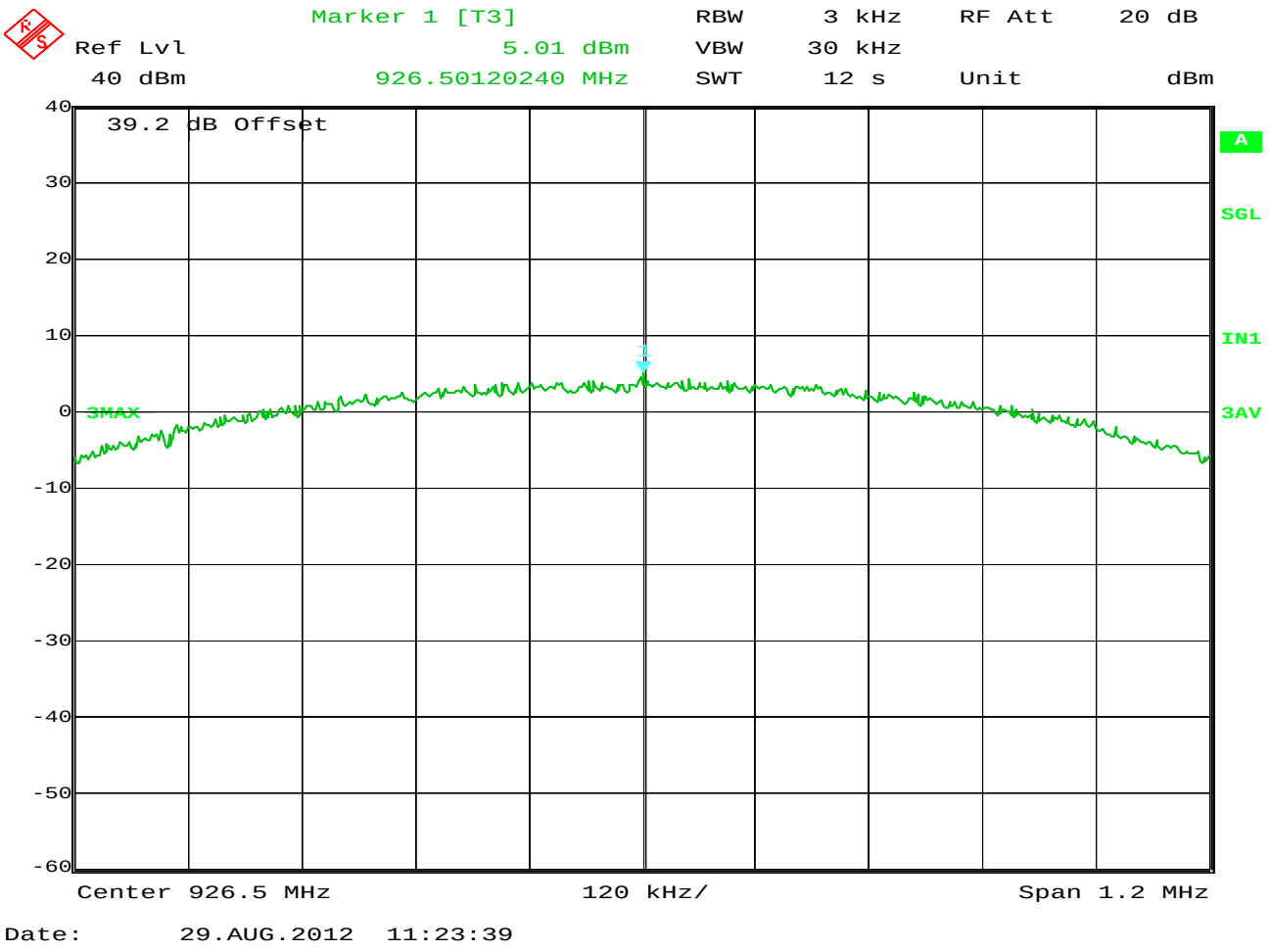
NOTES



FCC 15.247: Band Edge

MANUFACTURER	:	XetaWave
MODEL NUMBER	:	MSD9 Rev. A
SERIAL NUMBER	:	2
TEST MODE	:	QPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS	:	30 dBm down from band edge
EQUIPMENT USED	:	RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

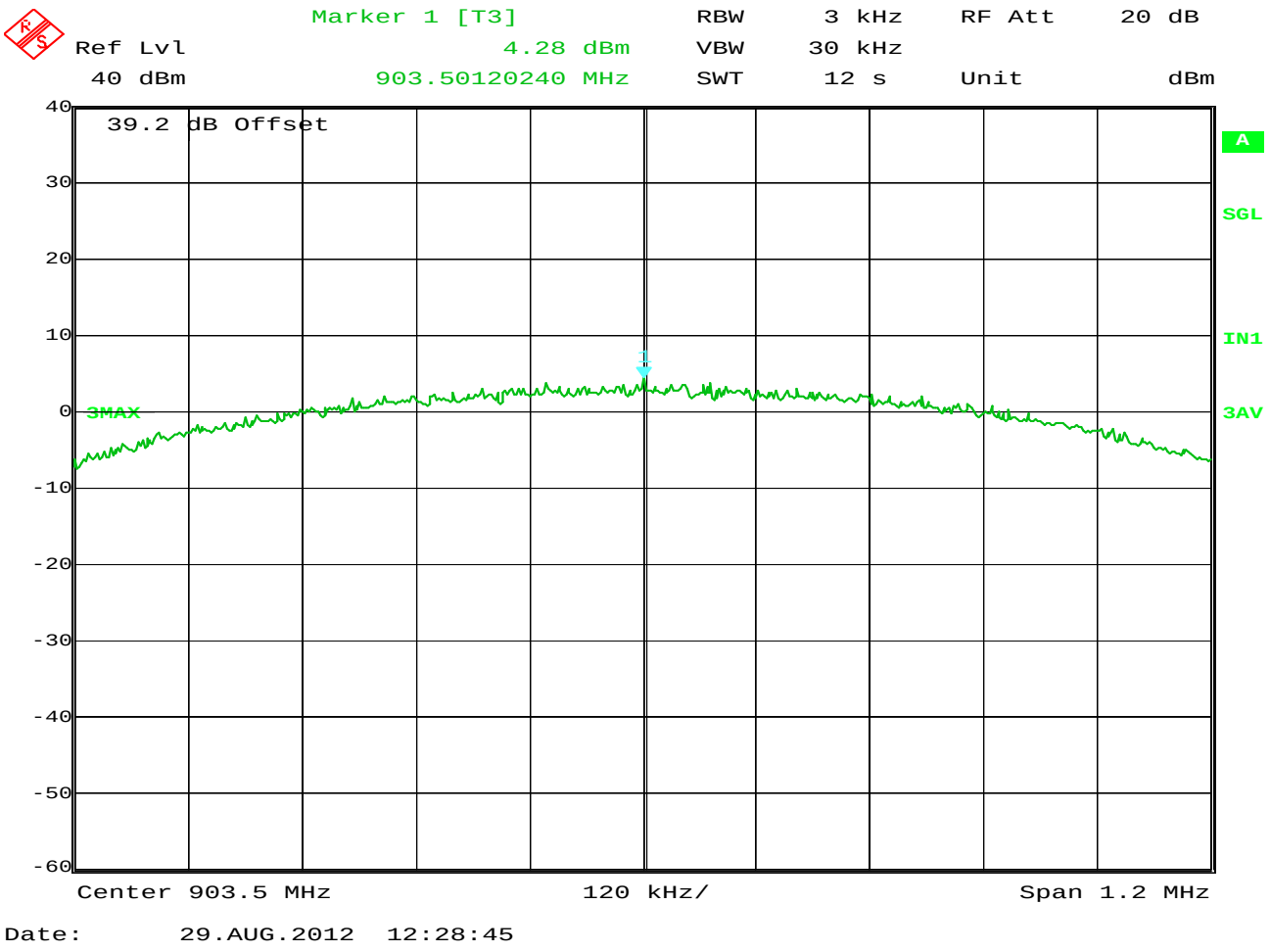
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (High: 926.5MHz @ 20000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

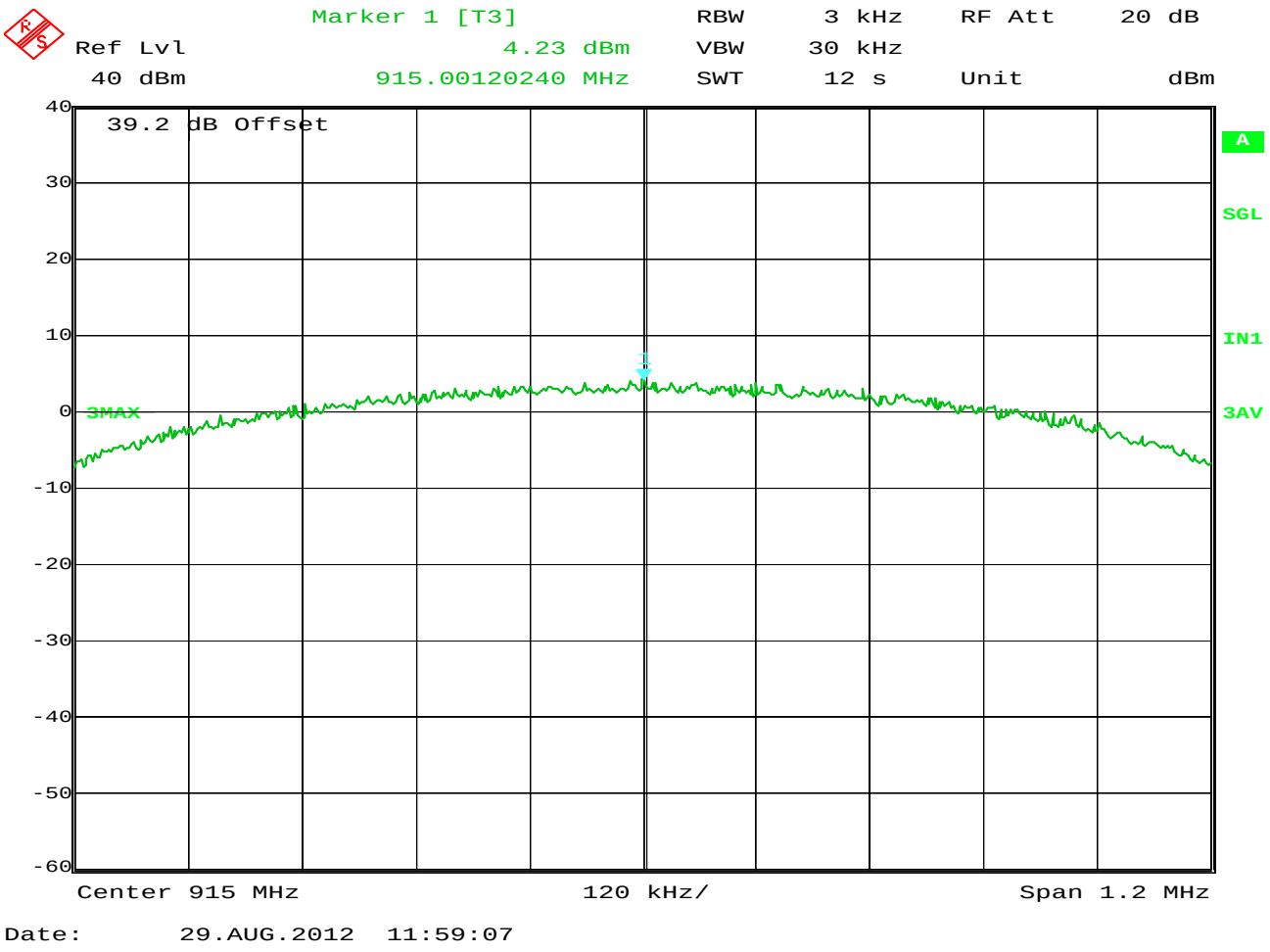
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (Low: 903.5MHz @ 20000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

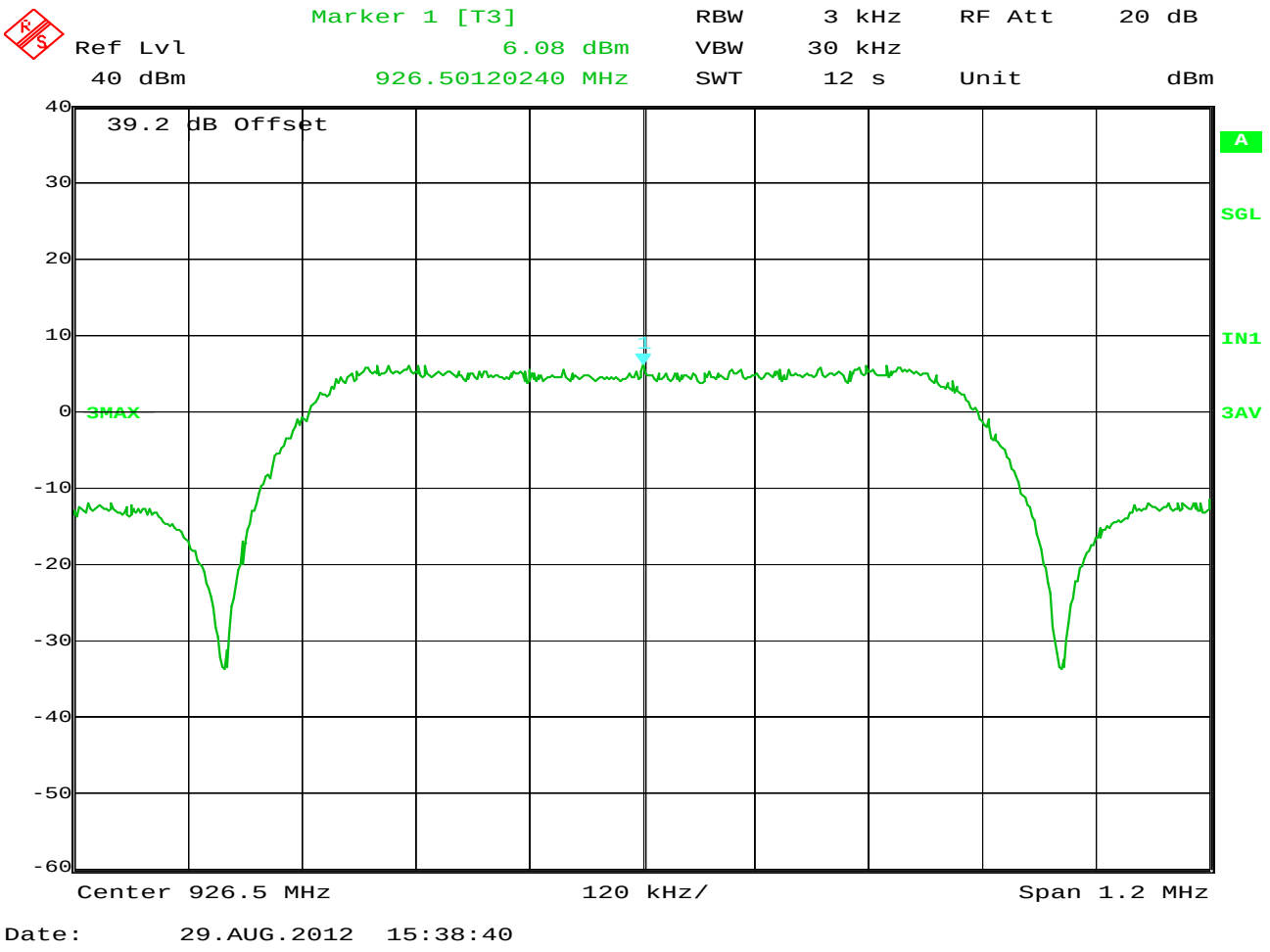
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 16QAM (Medium: 915MHz @ 17000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

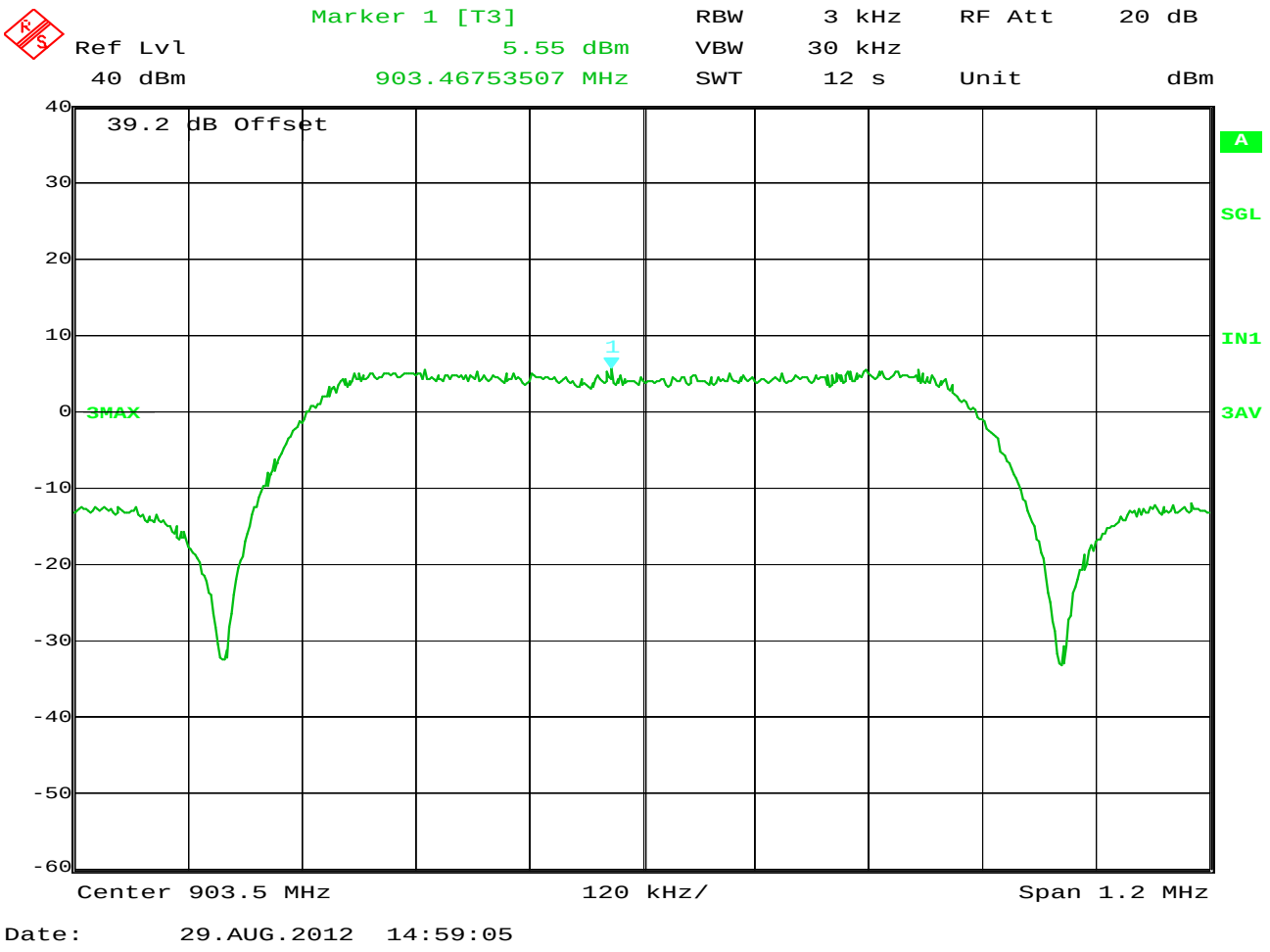
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

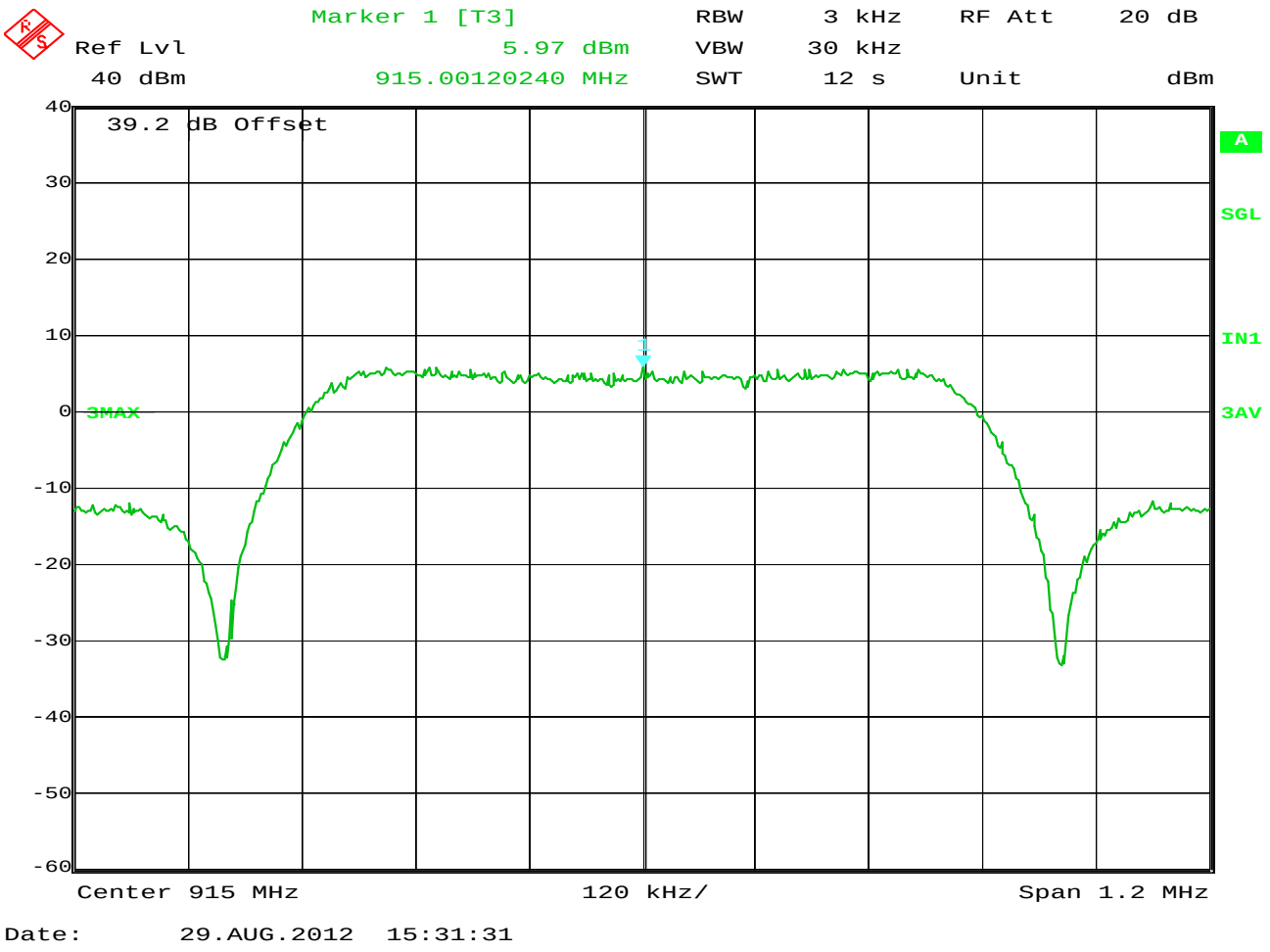
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

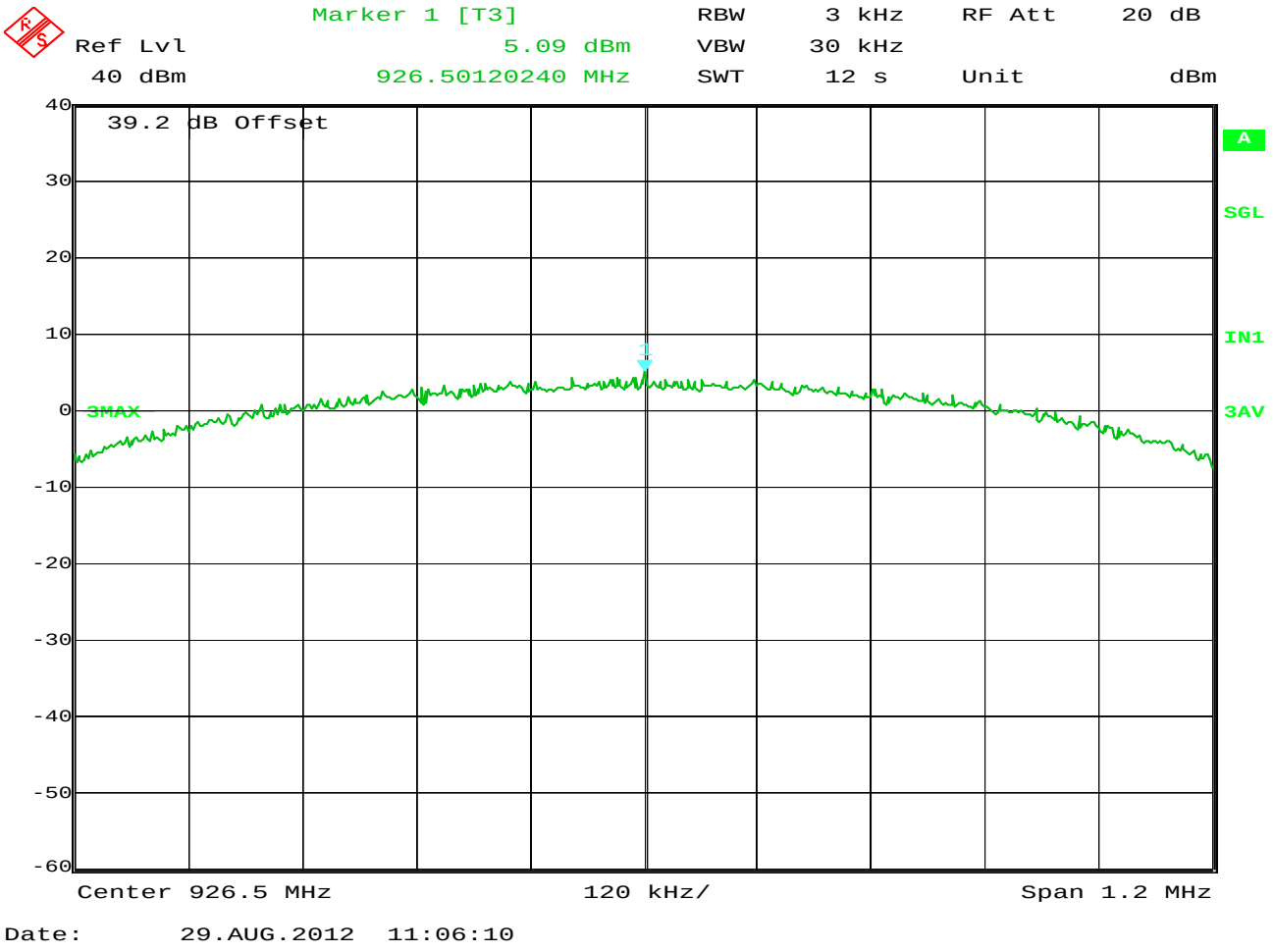
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 2FSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

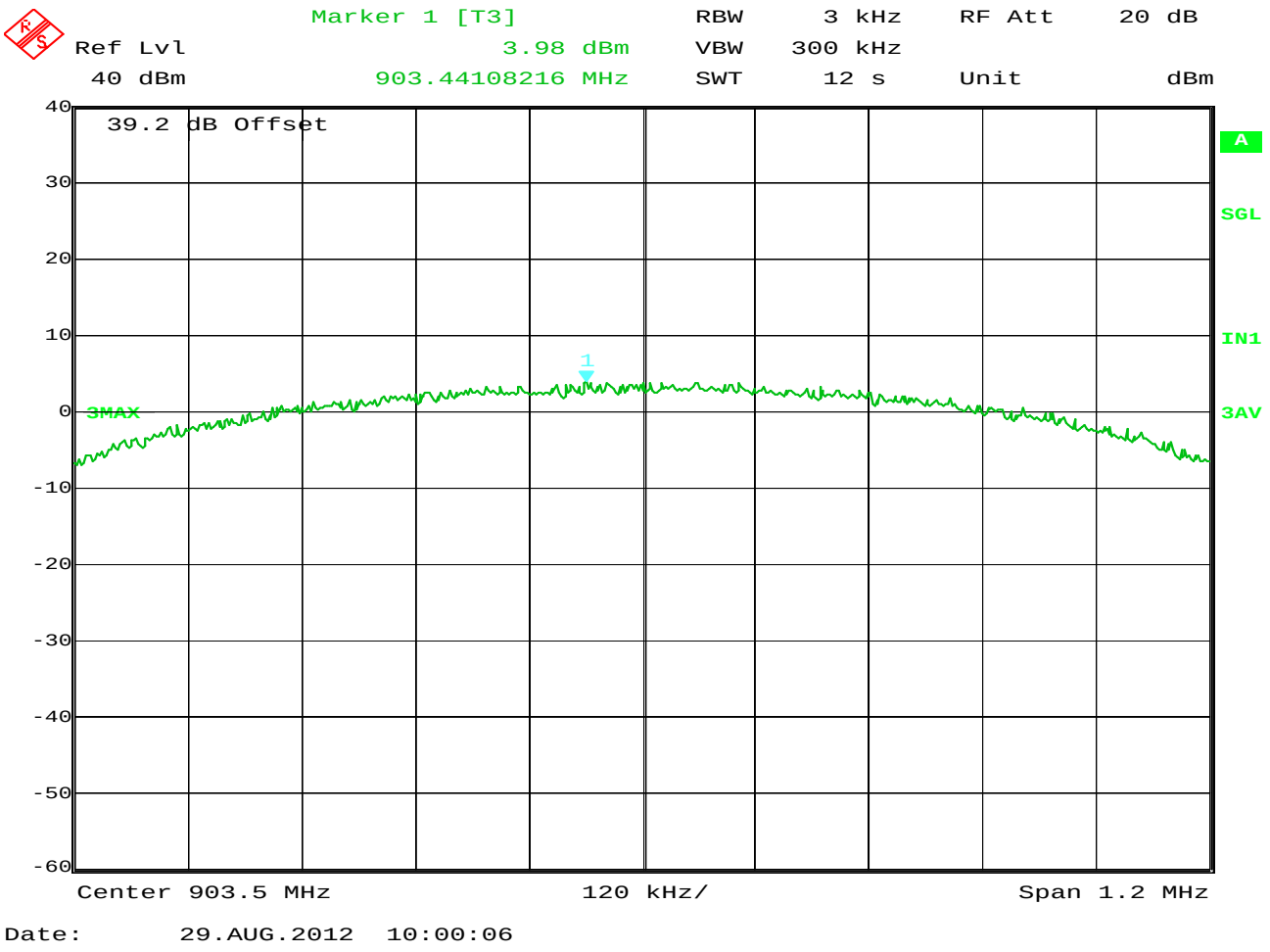
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (High: 926.5MHz @ 17000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

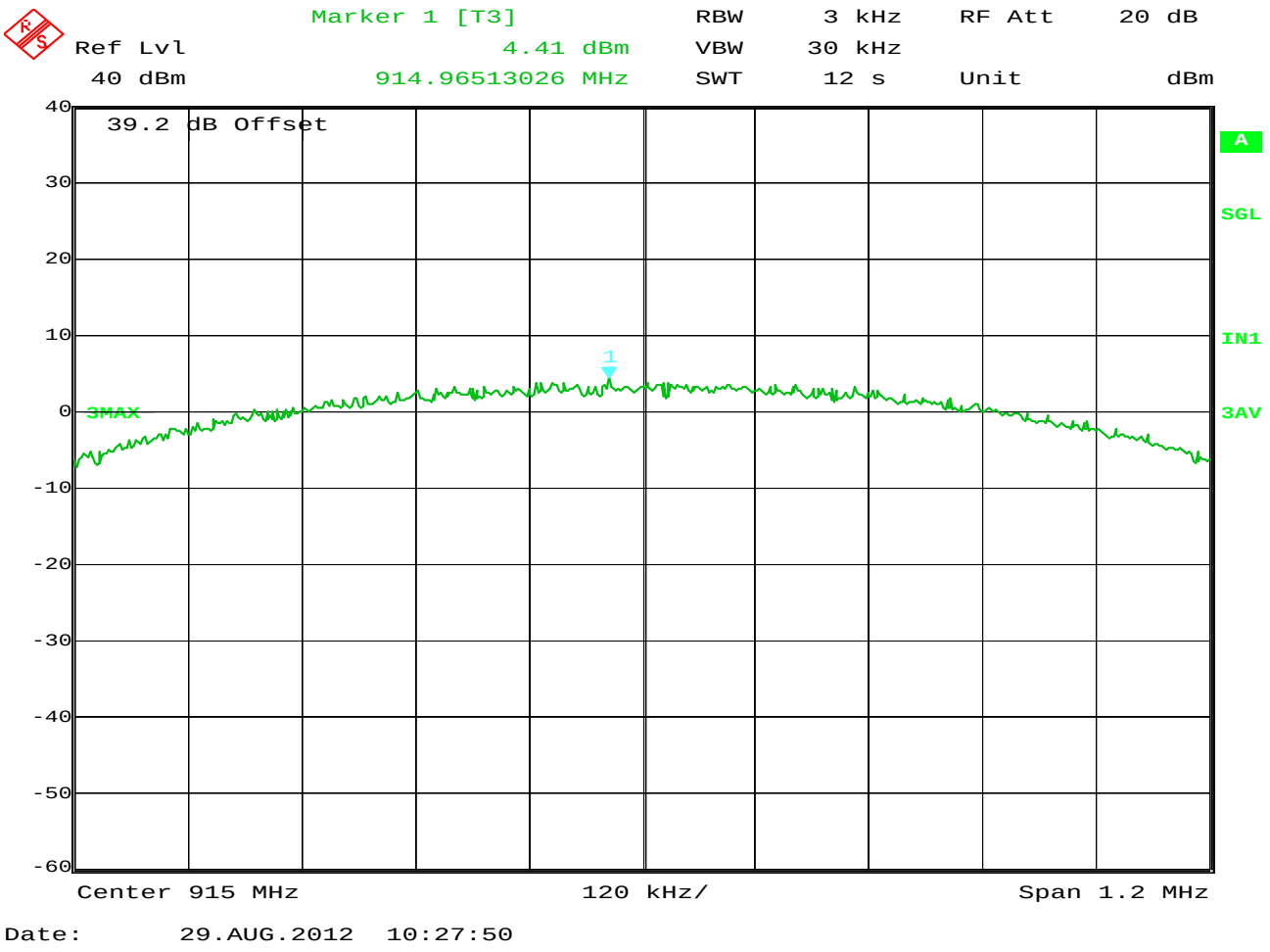
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Low: 902.8MHz)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

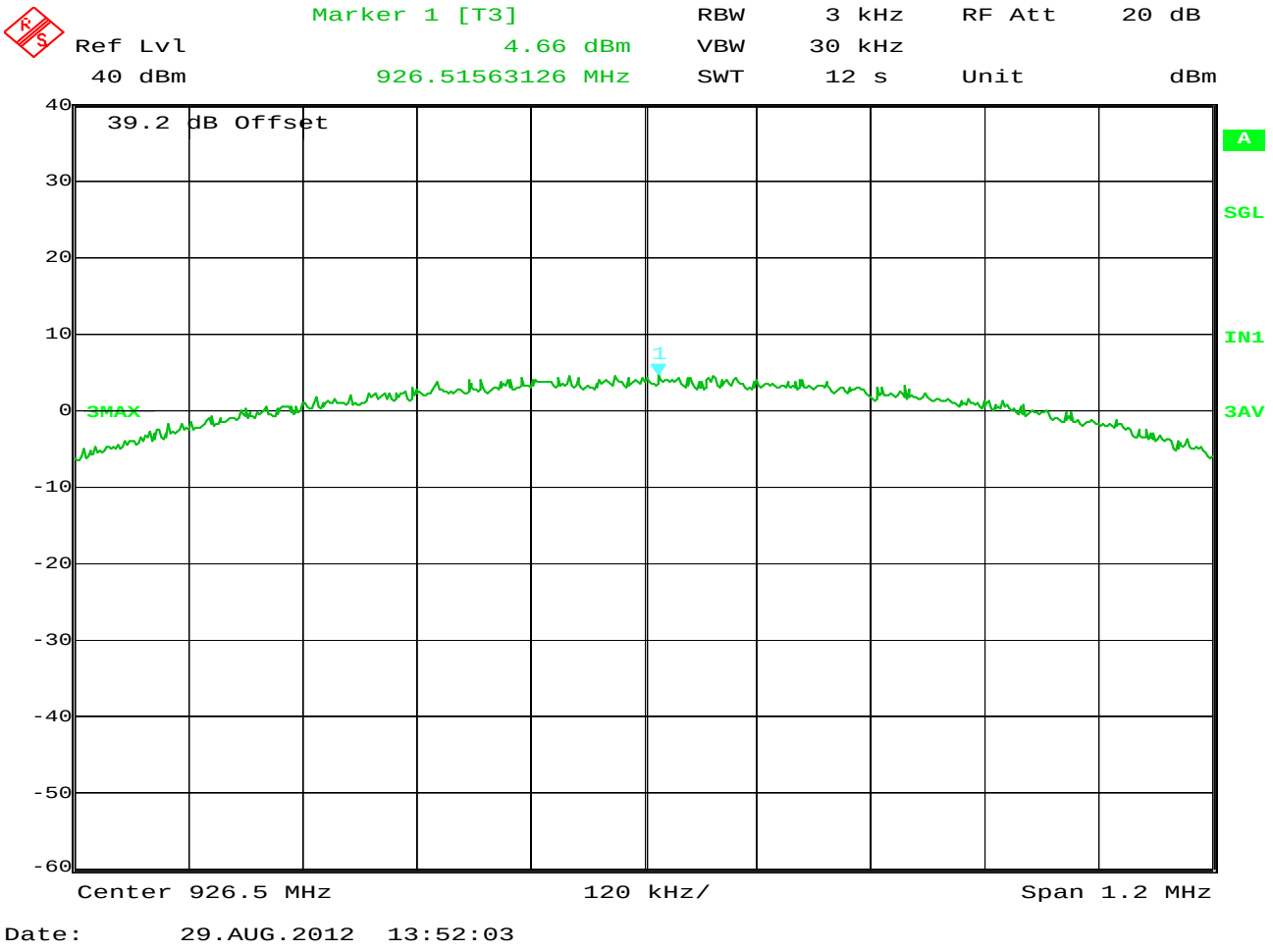
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : 64QAM (Med: 915MHz)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

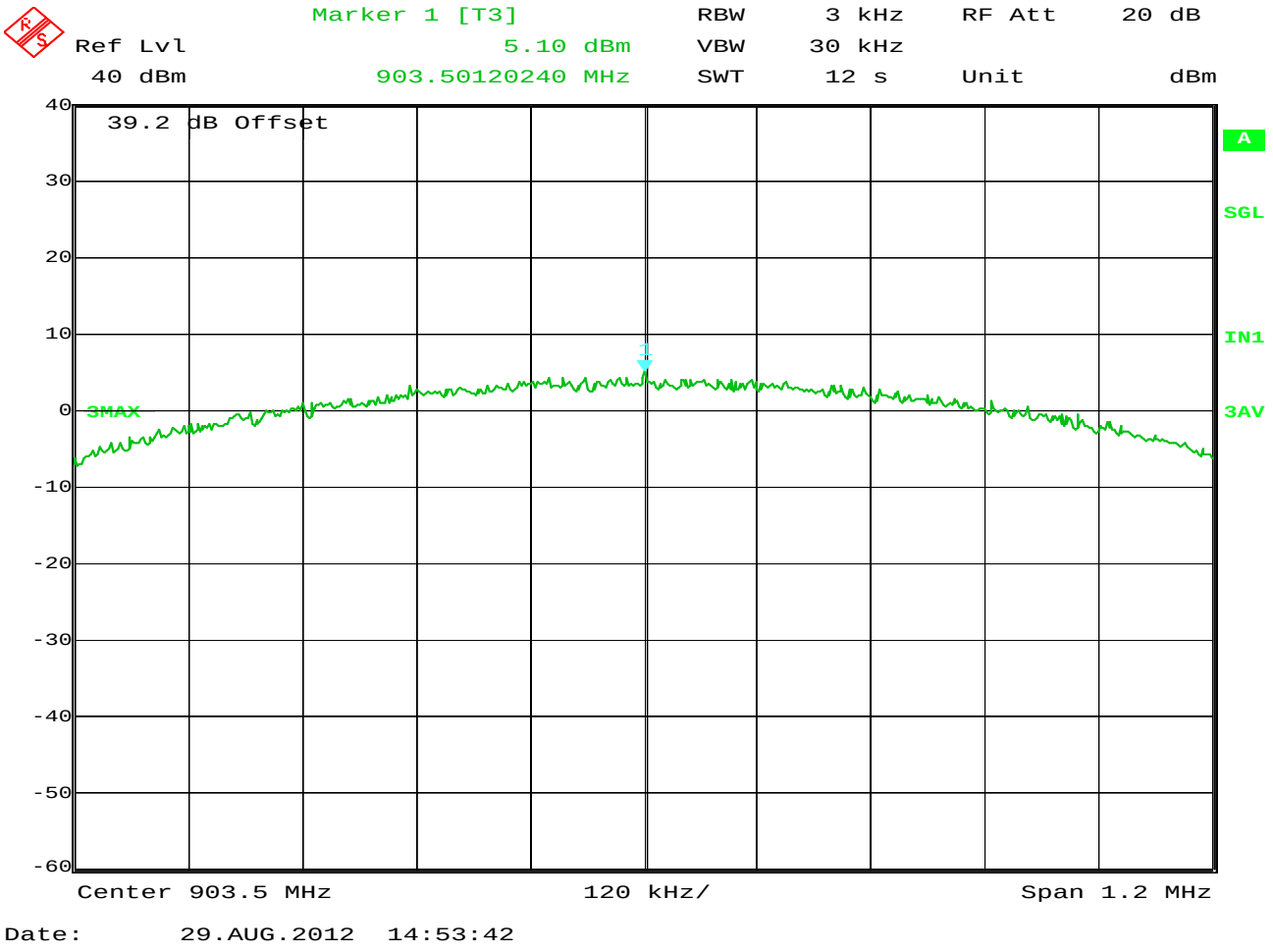
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

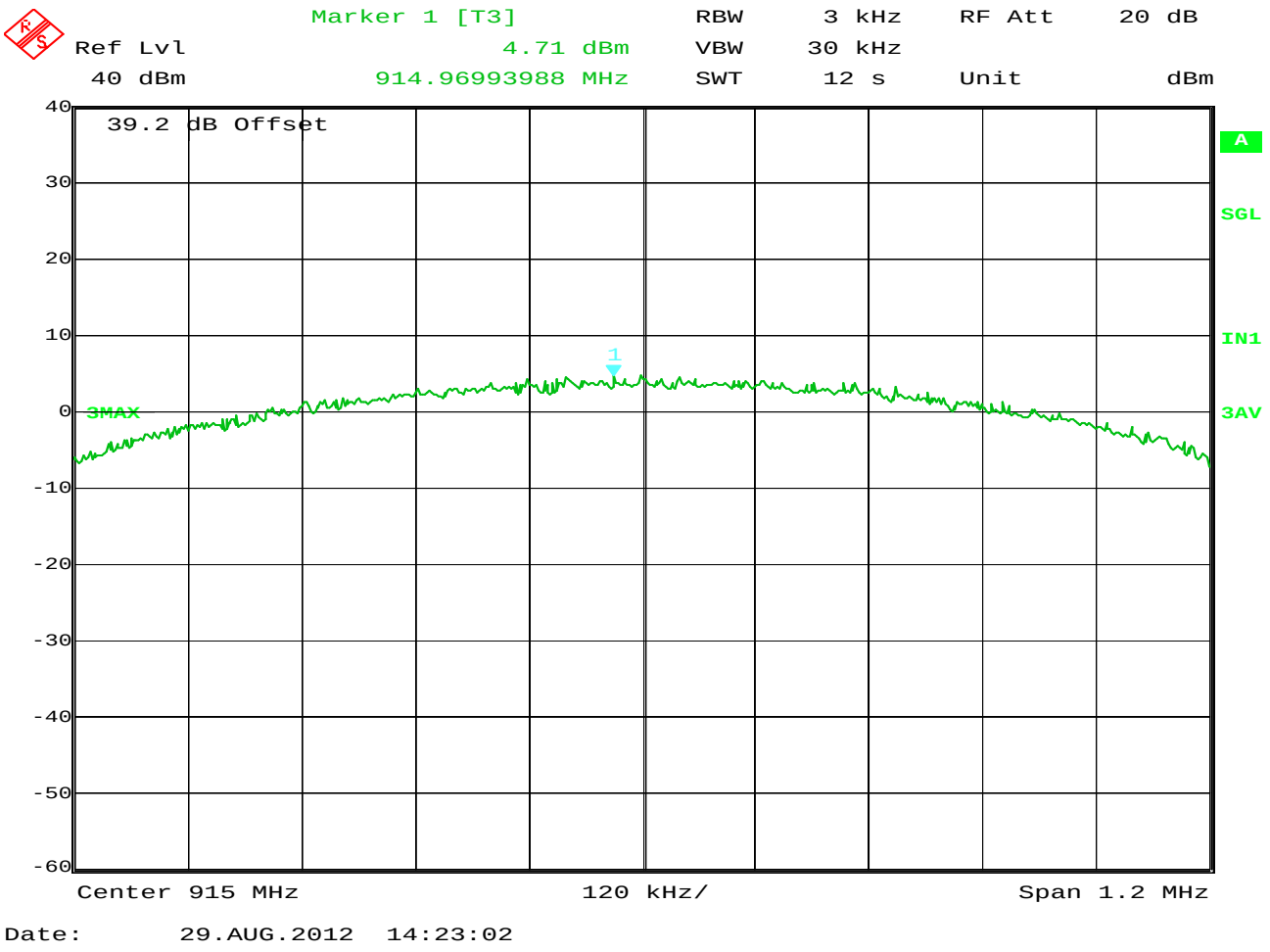
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (Low: 903.5MHz @ 18000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

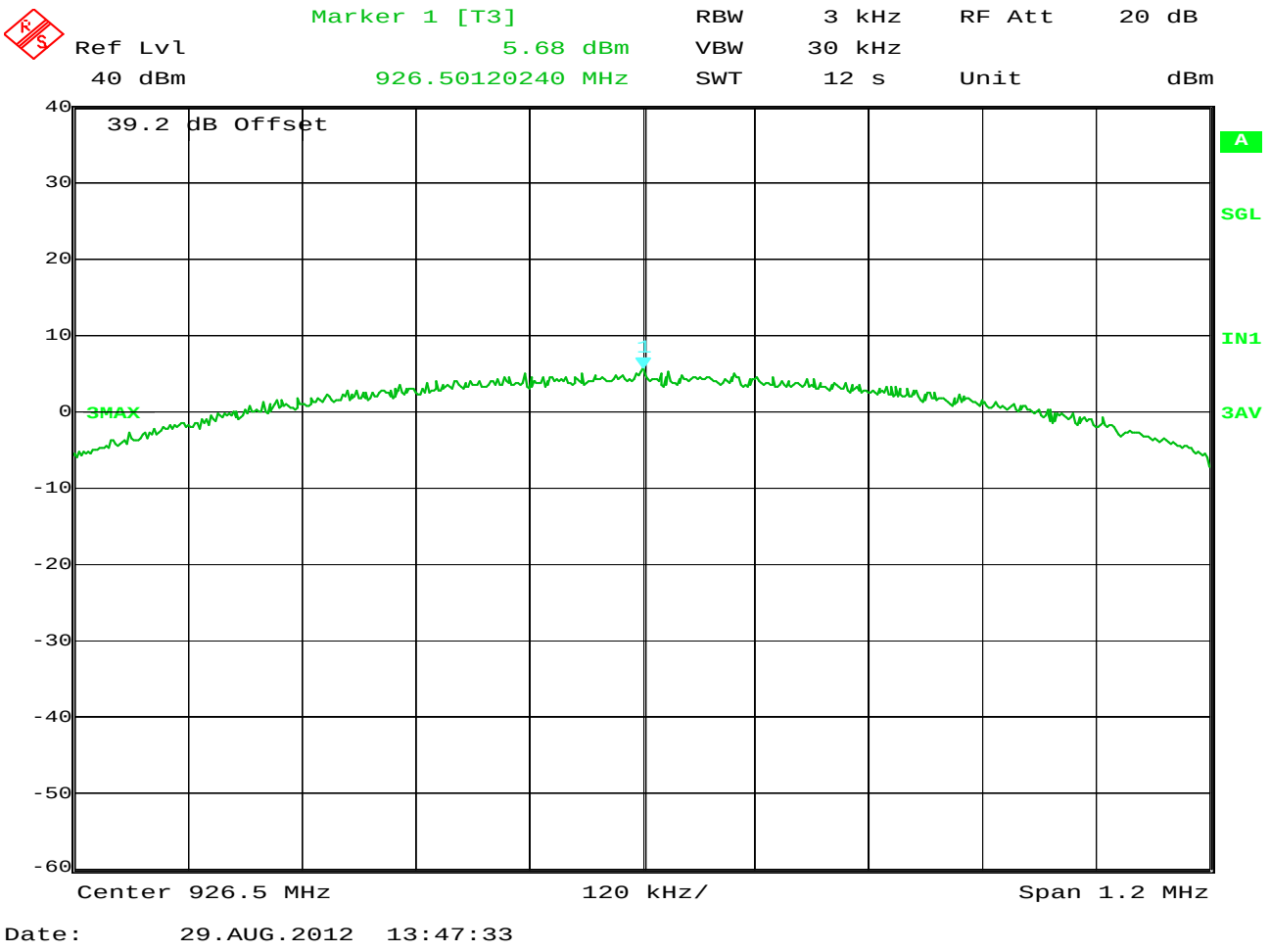
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : BPSK (Medium: 915MHz @ 15000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

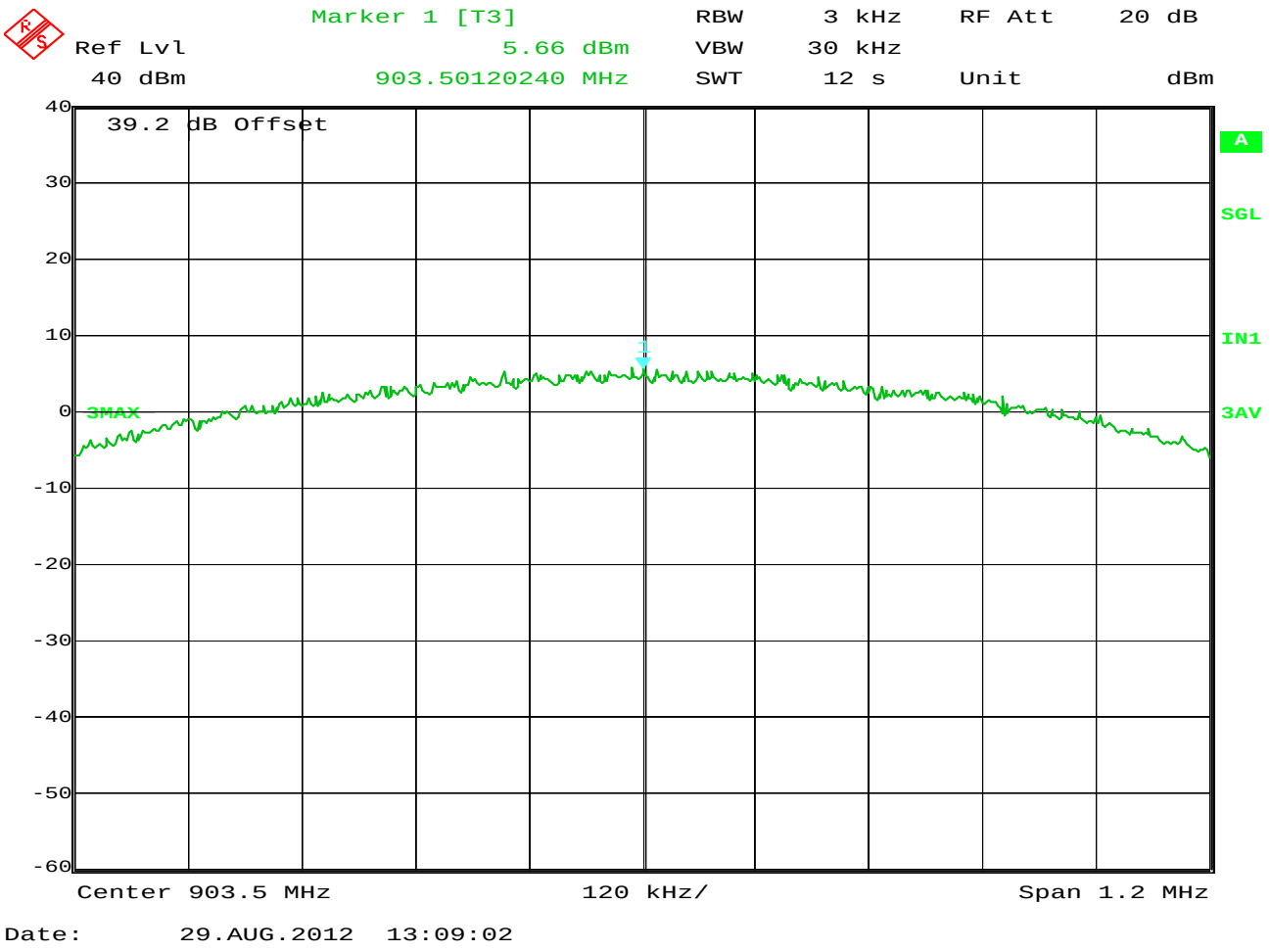
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (High: 926.5MHz @ 12000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

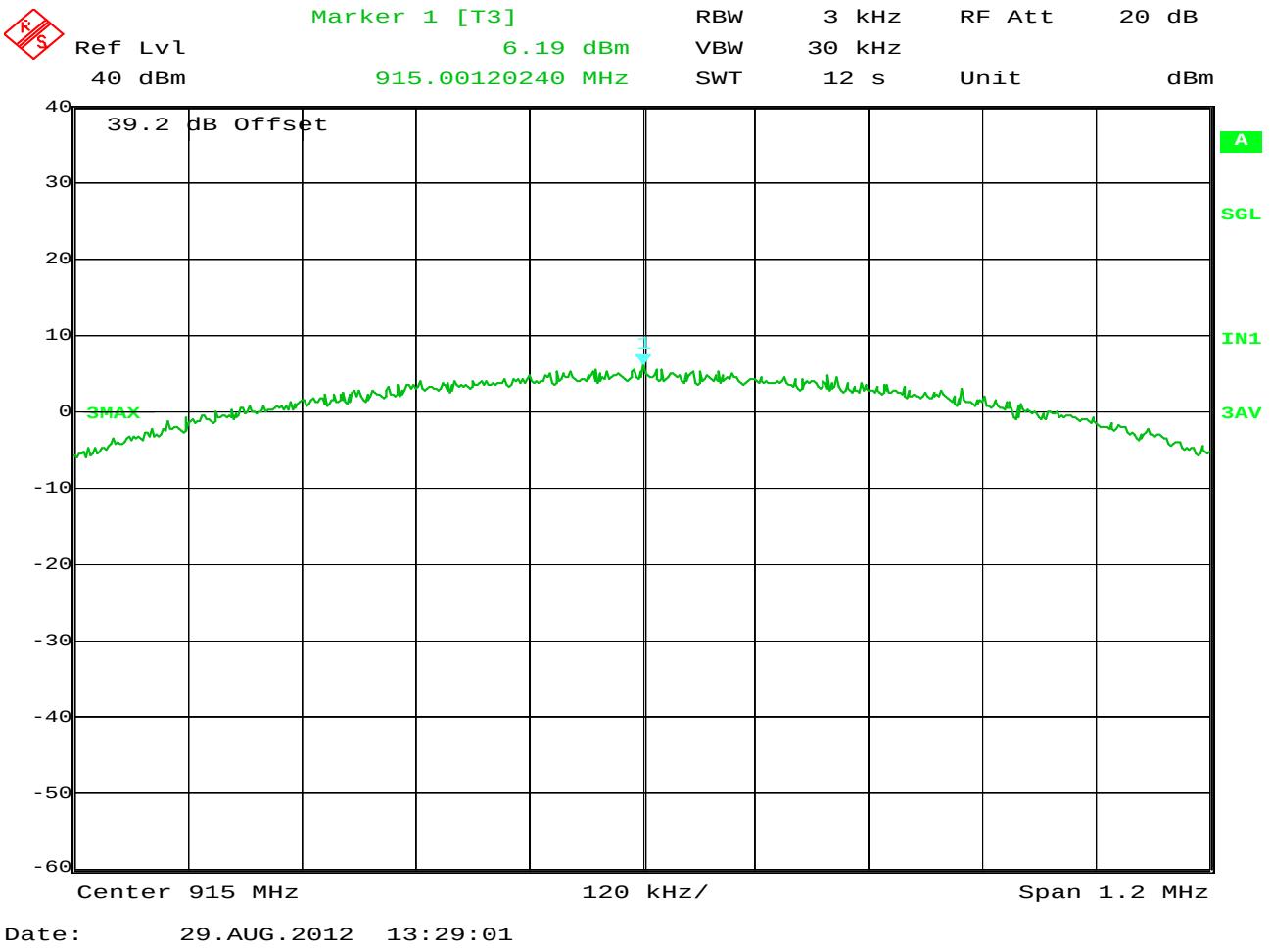
NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Low: 903.5MHz @ 19000 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

NOTES



FCC 15.247: Power Spectral Density

MANUFACTURER : XetaWave
MODEL NUMBER : MSD9 Rev. A
SERIAL NUMBER : 2
TEST MODE : QPSK (Medium: 915MHz @ 15500 power level)
TEST PARAMETERS :
EQUIPMENT USED : RBA1, T2S3, T2D7, GBR6, CLT3, SHB0

NOTES