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FCC Part 15, Subpart C, Section 15.247

Test Report

On

LoRa Propane Transmitter

Customer Name:	Senet, Inc.
Customer P.O:	131
Date of Report:	August 28, 2017
Test Report No:	R-6233N-1
Test Start Date:	August 10, 2017
Test Finish Date:	August 11, 2017
Test Technician:	M. Seamans
Report Approved By:	T. Hannemann
Report Prepared By:	J. Ramsey

Technical Information

Report Number:	R-6233N-1
Customer:	Senet, Inc.
Address:	100 Market St.
	Portsmouth, NH 03801
Test Sample:	LoRa Propane Transmitter
Brand Name:	EnerTrac, Inc.
Model Number:	0005922
Serial Numbers:	0005922-2001A7D2, 0005922-2001A7CB
Manufactured By:	Senet, Inc.
Power Requirements:	3.6 VDC via one lithium ion battery
Frequency Band of Operation:	902.3 MHz to 914.9 MHz
DTS Frequencies Tested (Low, Mid and High):	903 MHz, 907.8 MHz, 914.2 MHz
FHSS Frequencies Tested (Low, Mid and High):	902.3 MHz, 908.65 MHz, 914.9 MHz
Antenna Type:	Spring Antenna; -5 dBi
Equipment Use:	Measures Propane Tank Level and Sends Data
FCC ID:	X94-0005922

Test Specification:
FCC Rules and Regulations, Telecommunications, Part 15, Subpart C, Section 15.247

Test Procedure:
ANSI C63.4:2014, Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ANSI C63.10: 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

558074 D01, FCC Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, April 5, 2017

DA 00-705, FCC Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems (FHSS) Operating Under 15.247, March 30, 2000

EUT Description:

The LoRa Propane Transmitter transmits tank data to a receiver. It is used in homes and businesses for propane tank delivery automation. The EUT has two transmission modes for Tank Data Transmissions as described below:

Tank Data Transmission – FHSS:

The tank information is transmitted over the 915 MHz ISM band using adaptive data rate LoRa modulation; over a channel selected randomly from 64 possible channels. Transmissions are scheduled, usually once an hour, with each transmission lasting less than 400 milliseconds.

Tank Data Transmission – DTS:

An additional operational mode may be configured, in which the device transmits tank information in the 915 MHz ISM band using adaptive data rate LoRa modulation. The Senet Propane Sensor Node will use this mode to enable power-efficient and higher bit rate transmissions in locations with very low concentrations of devices using LoRa modulation.

Tank Data Transmission – Hybrid Mode:

Hybrid mode permits a system to employ a combination of both frequency hopping and digital modulation techniques. As applicable to LoRa, a system operating with eight 125 kHz channels in hybrid operation shall have a channel dwell time in frequency hopping mode not to exceed 400 ms in any 3.2 second time interval (400 ms * 8 channels = 3.2 seconds). In addition, the power spectral density shall not exceed +8 dBm in any 3 kHz bandwidth.

Tests Performed

The test methods performed on the EUT are shown below. Testing was performed in accordance with the applicable FCC requirements for each of the two transmission modes (DTS & FHSS).

FCC Part 15, Subpart C	Test Method
DTS Test Methods Performed	
15.247(a)(2)	6 dB Bandwidth
15.247(b)(3)	Power Output
15.247(d)	Antenna Terminal Out of Band/ Band Edge Conducted Emissions
15.247(d)	Out of Band/Band Edge Radiated Emissions
15.247(e)	Power Density
FHSS Test Methods Performed	
15.247(a)(1)	20 dB Bandwidth
15.247(a)(1) (iii)	Number of Hopping Channels and Time of Occupancy
15.247(a)(1)	Channel Separation
15.247(b)(3)	Power Output
15.247(d)	Antenna Terminal Out of Band/ Band Edge Conducted Emissions
15.247(d)	Out of Band/Band Edge Radiated Emissions

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.

Scott Wentworth
Branch Manager
NVLAP Approved Signatory

Todd Hannemann
Laboratory Supervisor
iNARTE Certified Technician ATL-0255-T

Non-Warranty Provision
The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement
This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Revision History

Revisions to this document are listed below; the latest revised document supersedes all previous issues of this document.

Revision	Date	Pages Affected
-	August 28, 2017	Original Release

Requirements and Test Results

FCC Section 15.247 (a)(2) - DTS Bandwidth

For systems using digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725 – 5850 MHz bands the minimum 6 dB bandwidth shall be at least 500 kHz.

- **Results**:
  The minimum 6dB bandwidth measured was 697.36 kHz and the device was found to meet the requirement of 15.247 (a)(2).

FCC Section 15.247 (b)(3) - Power Output

For frequency hopping systems operating in the 902-928 MHz; 1 Watt for systems employing at least 50 hopping frequencies.

- **Results**:
  The maximum measured peak conducted output power was 64.12 mW. The maximum antenna gain of the antenna is -5.0 dBi. The device was found to meet the power output requirements of 15.247 (b)(3) including de facto EIRP.

FCC Section 15.247 (b)(3) - Power Output

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g.: alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

- **Results**:
  The maximum measured peak conducted output power was 51.76 mW. The maximum antenna gain of the antenna is -5.0 dBi. The device was found to meet the power output requirements of 15.247 (b)(3) including de facto EIRP.

Requirements and Test Results (con't)

FCC Section 15.247(d) – Unwanted Emissions

Antenna Terminal Out of Band/Band Edge Conducted Emissions
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Paragraph (b)(3) of Section 15.247, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

- **Results**:
  All measured out of band/band edge conducted emissions were below the specified limits and the device was found to meet the requirements of 15.247 (d).

FCC Section 15.247(d) – Unwanted Emissions

Radiated Spurious Emissions/Restricted Bands/Band Edge
Emissions which fall into restricted bands, as defined in 15.205(a) must comply with the radiated emissions limits specified in 15.209(a) and shown below in Table 1. Emissions emanating from the EUT cabinet and cables must also comply with the radiated emissions limits. Radiated emissions measurements were also performed at the band edges to ensure band edge compliance.

Table 1 - Radiated Emission Limits

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

- **Results**:
  All spurious emissions were measured and found to be in compliance with the limits specified in 15.209(a). Band edge emissions were also found to be in compliance with the limits specified in 15.209(a).

Requirements and Test Results (con't)

FCC Section 15.247(e) – Power Spectral Density
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

- **Results**:
  The measured power spectral density complied with the specified power density limit and the device was found to meet the requirements of 15.247(e).

Requirement:
FCC Section 15.247 (a)(1)
Channel Separation and 20 dB Bandwidth
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

- **Results**:
  The maximum 20 dB bandwidth of the hopping channel was 166.332 kHz. The carrier frequencies were separated by 220.94 kHz which exceeds the 20 dB bandwidth and complies with the requirements specified above.

FCC Section 15.247 (a)(1)
Number of Channels and Occupancy Time
Frequency hopping systems operating in the 902 – 928 MHz band: If the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

- **Results**:
  The frequency hopping system uses 64 Channels. The average time of occupancy did not exceed 0.4 seconds in a 20 second period which meets the above requirements.

Requirements and Test Results (con't)

FCC Section 15.247(i) – RF Exposure

Transmitters operating under 15.247 must be operated in a manner that ensures the public is not exposed to RF energy levels in access of the commission's guidelines. Based on the transmitter power and maximum antenna gain the separation distance for acceptable MPE power density levels to meet both the Occupational/Controlled Exposure and the General Population/Uncontrolled Exposure requirements of 1.1310 was calculated. The calculation below uses the more stringent General Population MPE Limits.

$$S = \frac{PG}{4\pi Dsq}$$

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cmsq

Per 1.1310 For Frequency of 900 MHz = 0.6mW/cmsq

DTS Transmission Mode:

Power = Max Power Input to Antenna = 51.76 mW

Gain = Max Power Gain of Antenna = -5.0 dBi = 0.32 numeric

$$0.6\text{mW/cmsq} = \frac{51.76 \times 0.32}{4\ (3.14) \times Dsq} = \frac{16.32}{12.56 \times Dsq}$$

$$Dsq = \frac{16.37}{12.56 \times 0.6} = 0.806$$

D = sq. root 0.806 = 0.9 cm

The unit has an internal antenna and the minimum separation distance will always be maintained.

FHSS Transmission Mode:

Power = Max Power Input to Antenna = 64.12 mW

Gain = Max Power Gain of Antenna = -5.0 dBi = 0.32 numeric

$$0.6\text{mW/cmsq} = \frac{64.12 \times 0.32}{4\ (3.14) \times Dsq} = \frac{20.28}{12.56 \times Dsq}$$

Requirements and Test Results (con't)

FCC Section 15.247(i) – RF Exposure

$$Dsq = \frac{20.28}{12.56 \times 0.6} = 0.998$$

D = sq. root 0.998 = 1 cm

The unit has an internal antenna and the minimum separation distance will always be maintained.

EQUIPMENT LISTS

FCC Section 15.247(a)(2) – DTS Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(b)(3) – Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(d) – Antenna Terminal Out of Band/ Band Edge Conducted Emissions, 30 MHz to 25 GHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(d) – Out of Band/Band Edge Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	5/23/2017	5/31/2018
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	10/13/2016	4/30/2018
3427B	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	2/5/2016	8/31/2017
4029B	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3 / 10 Meters	RNH	4/13/2016	4/30/2018
443	ELECTRO-METRICS	ANTENNA, LOG PERIODIC	200 MHz - 1000 MHz	LPA-25	10/6/2016	4/30/2018
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5179C	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-072050U50U	10/7/2016	10/31/2017
5179D	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-240050U50U	10/7/2016	10/31/2017
5188	Cybertron	COMPUTER, CONTROL	N/A	TSVQJA2221	No Calibration Required	

EQUIPMENT LISTS (continued)

FCC Section 15.247(e) – Power Density

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(a)(1) – 20 dB Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(a)(1) -- Channel Separation

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

FCC Section 15.247(a)(1)(iii) – Number of Hopping Channels and Time Occupancy

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017
5229	FLORIDA RS TECHNOLOGY	CABLE, COAXIAL	DC - 40 GHz	FLRST-2.92 (102ö)	2/8/2017	10/31/2017

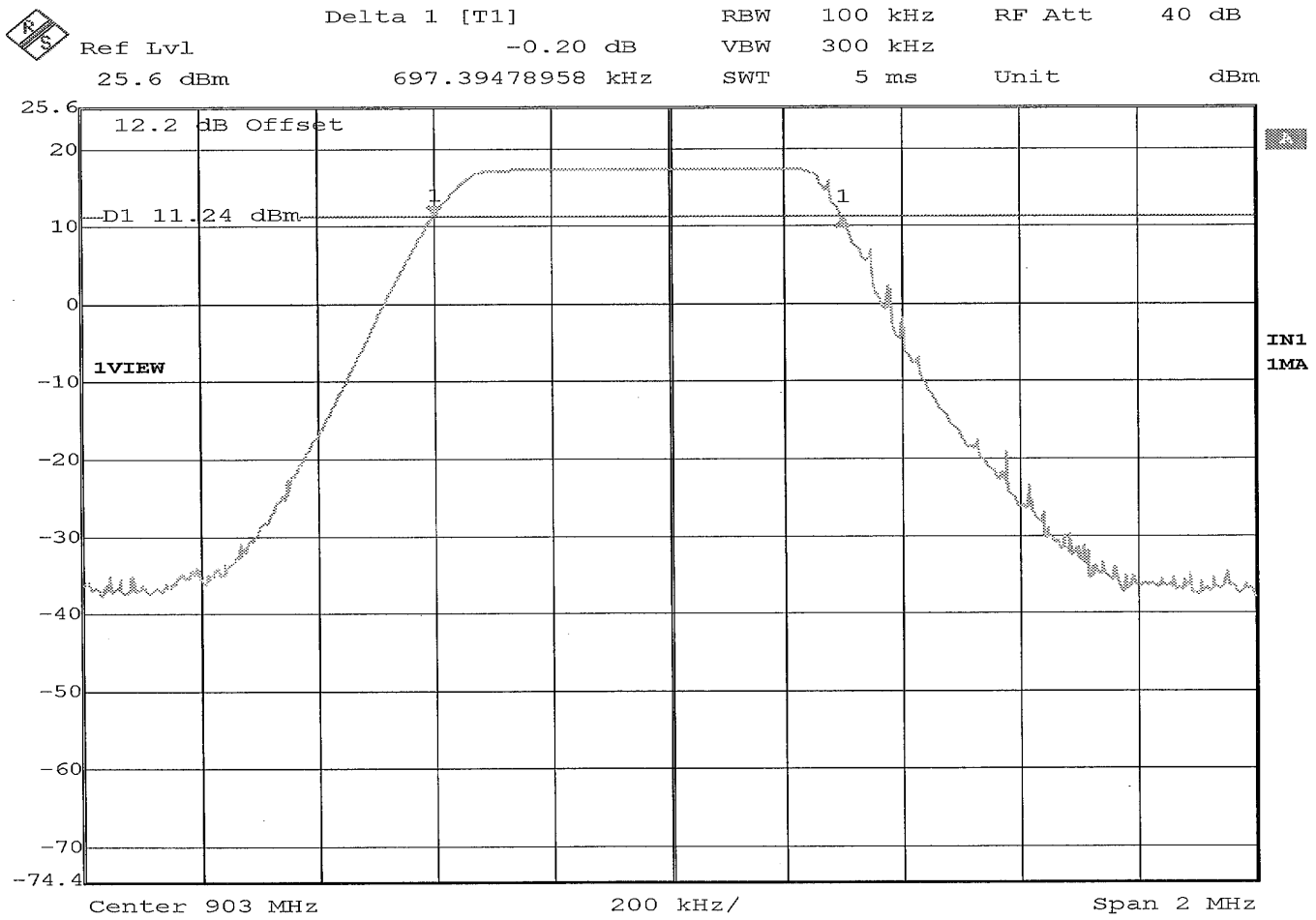
Test Photograph(s)
DTS Bandwidth
6 dB Bandwidth
FCC Section 15.247(a)(2)

Test Photograph(s)
DTS Bandwidth
6 dB Bandwidth

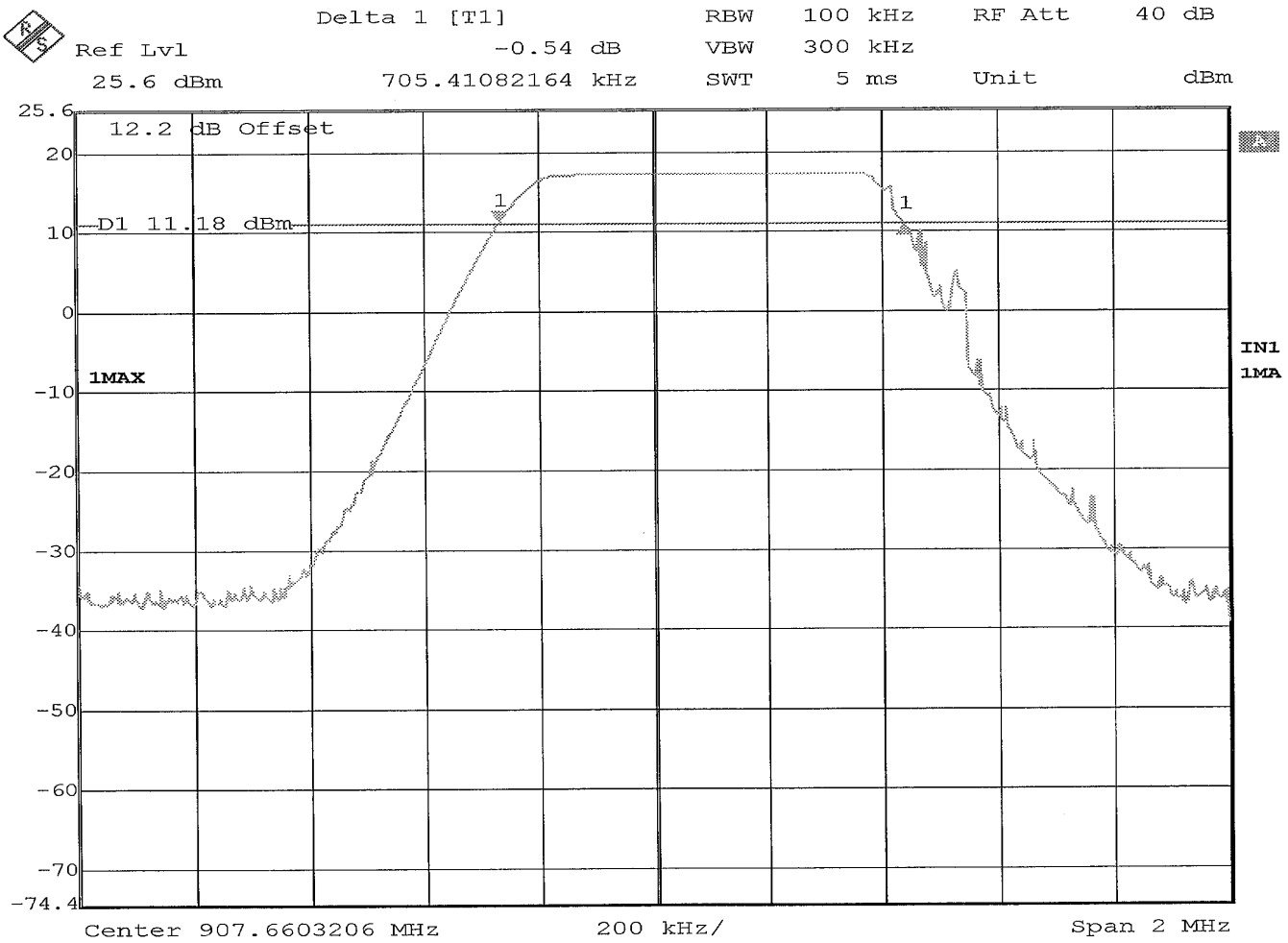
Test Setup

DTS Bandwidth
6 dB Bandwidth
Test Data

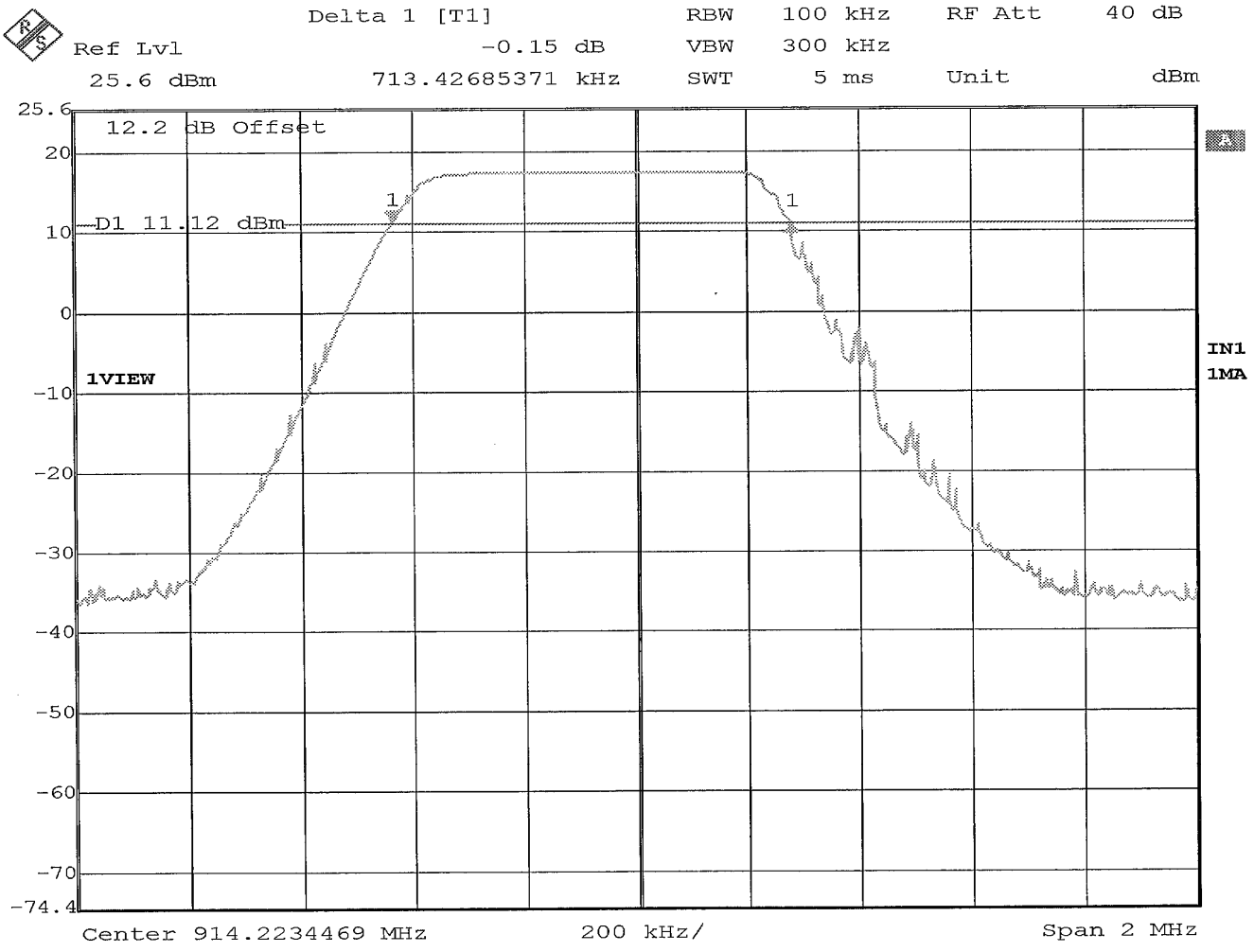
EMISSIONS TEST DATA SHEET	
Method:	**Occupied Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	6dB Bandwidth: 697.394kHz



EMISSIONS TEST DATA SHEET	
Method:	**Occupied Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	6dB Bandwidth: 705.410kHz



EMISSIONS TEST DATA SHEET	
Method:	**Occupied Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	6dB Bandwidth: 713.426kHz



Test Photograph(s)
Power Output
FCC Section 15.247(b)(3)

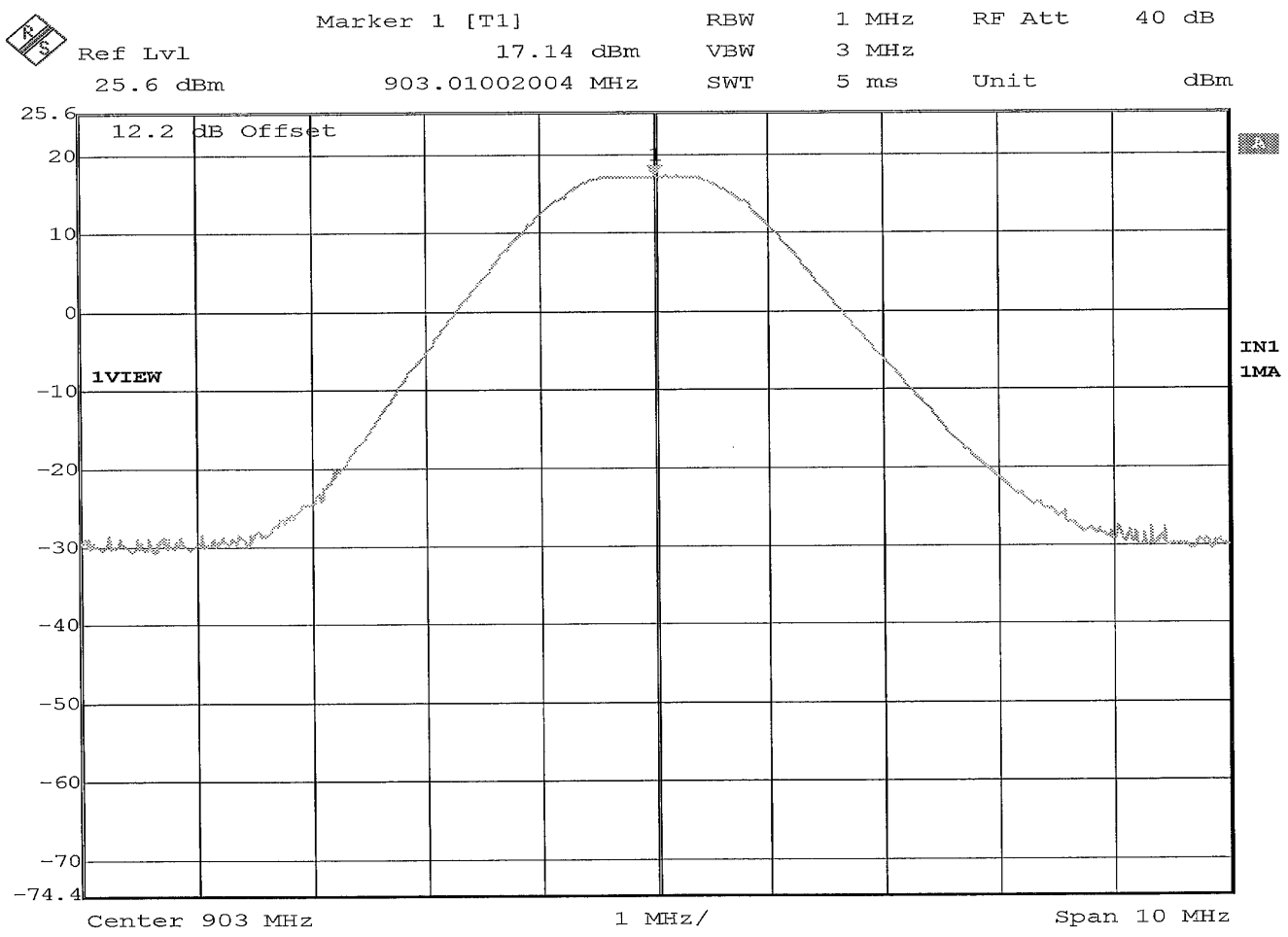
Test Photograph(s)
Power Output

Test Setup, DTS

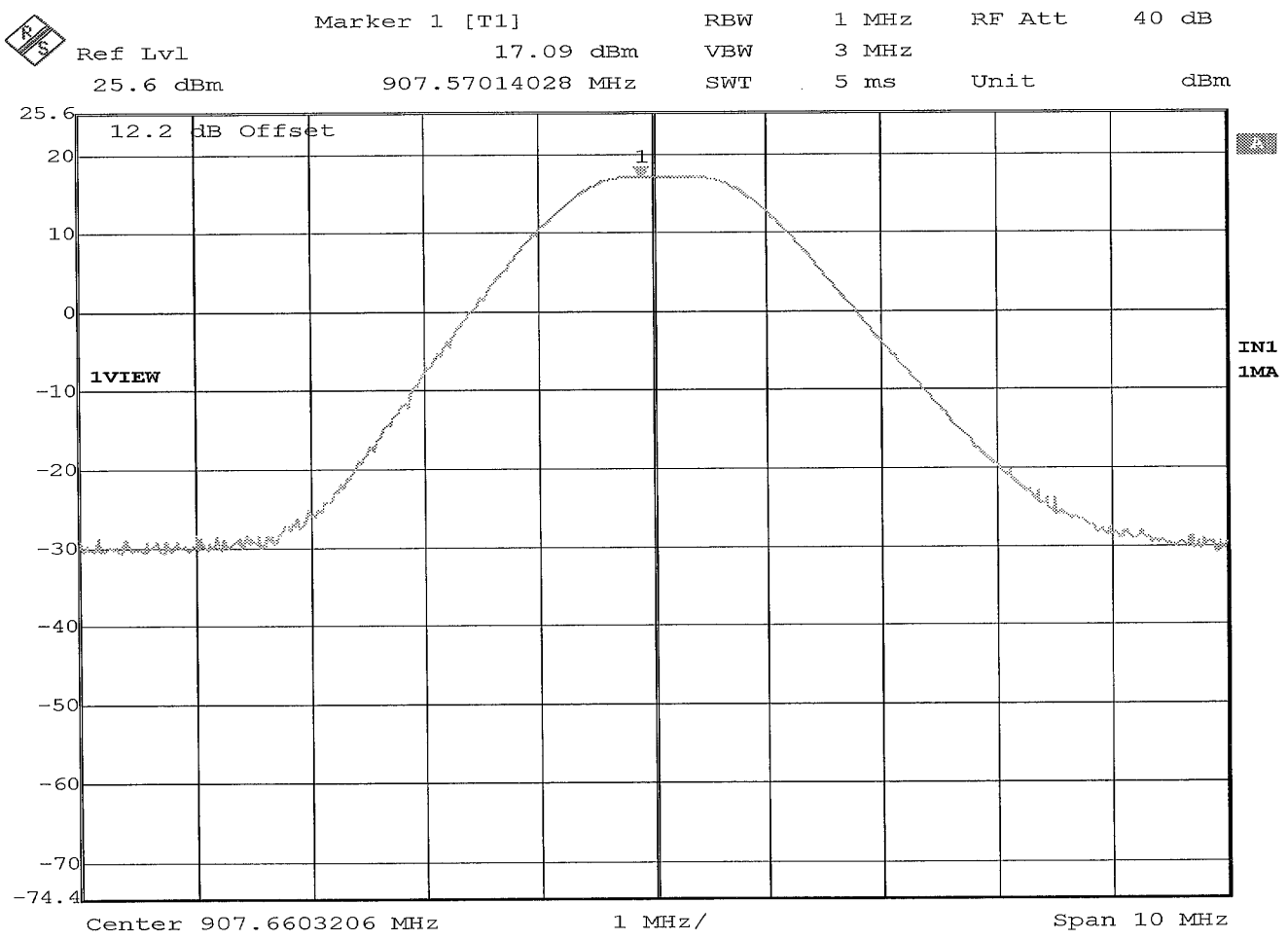
Test Setup, FHSS

Power Output
DTS Test Data

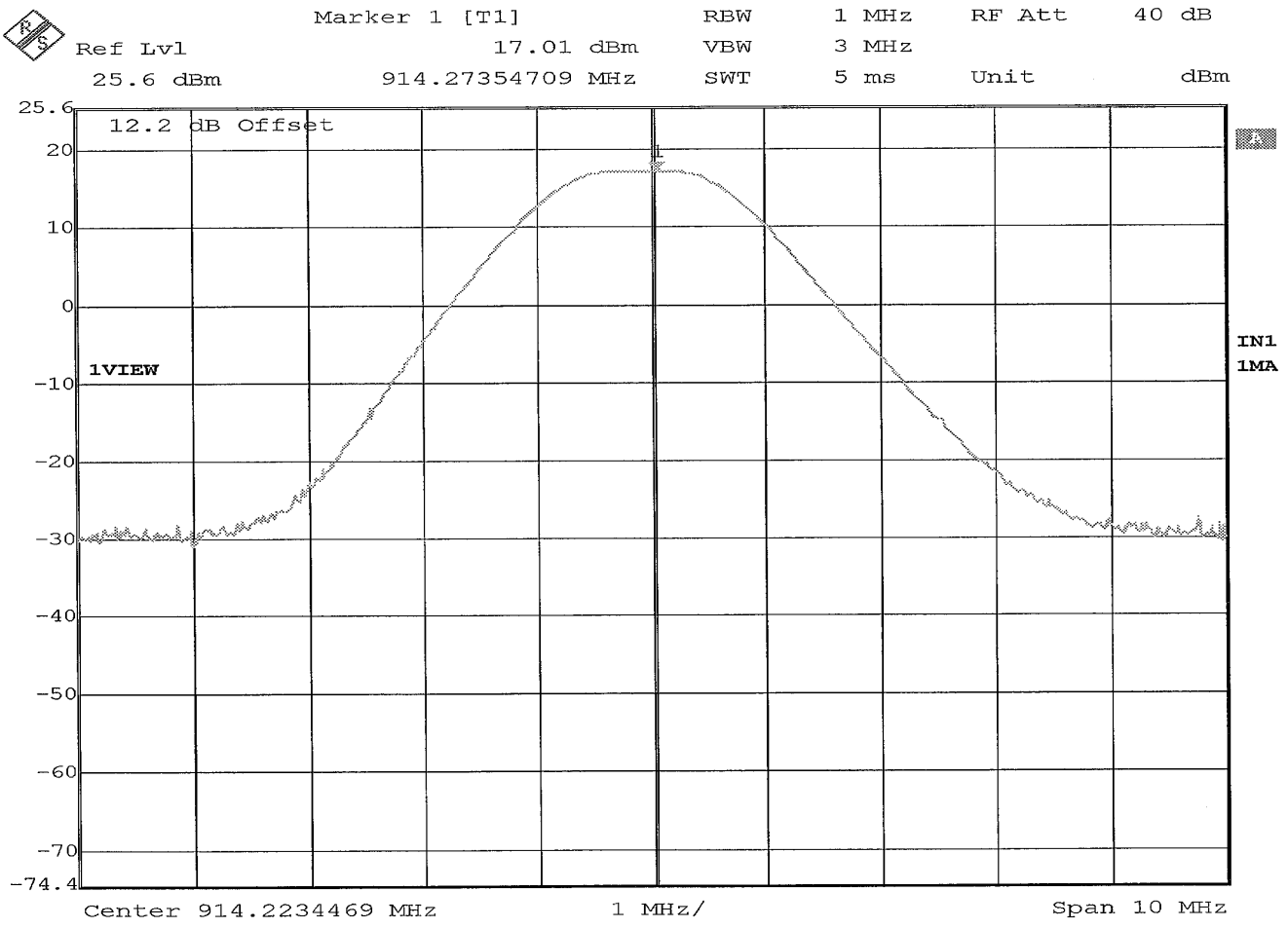
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Power Output: 17.14dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Power Output: 17.09dBm



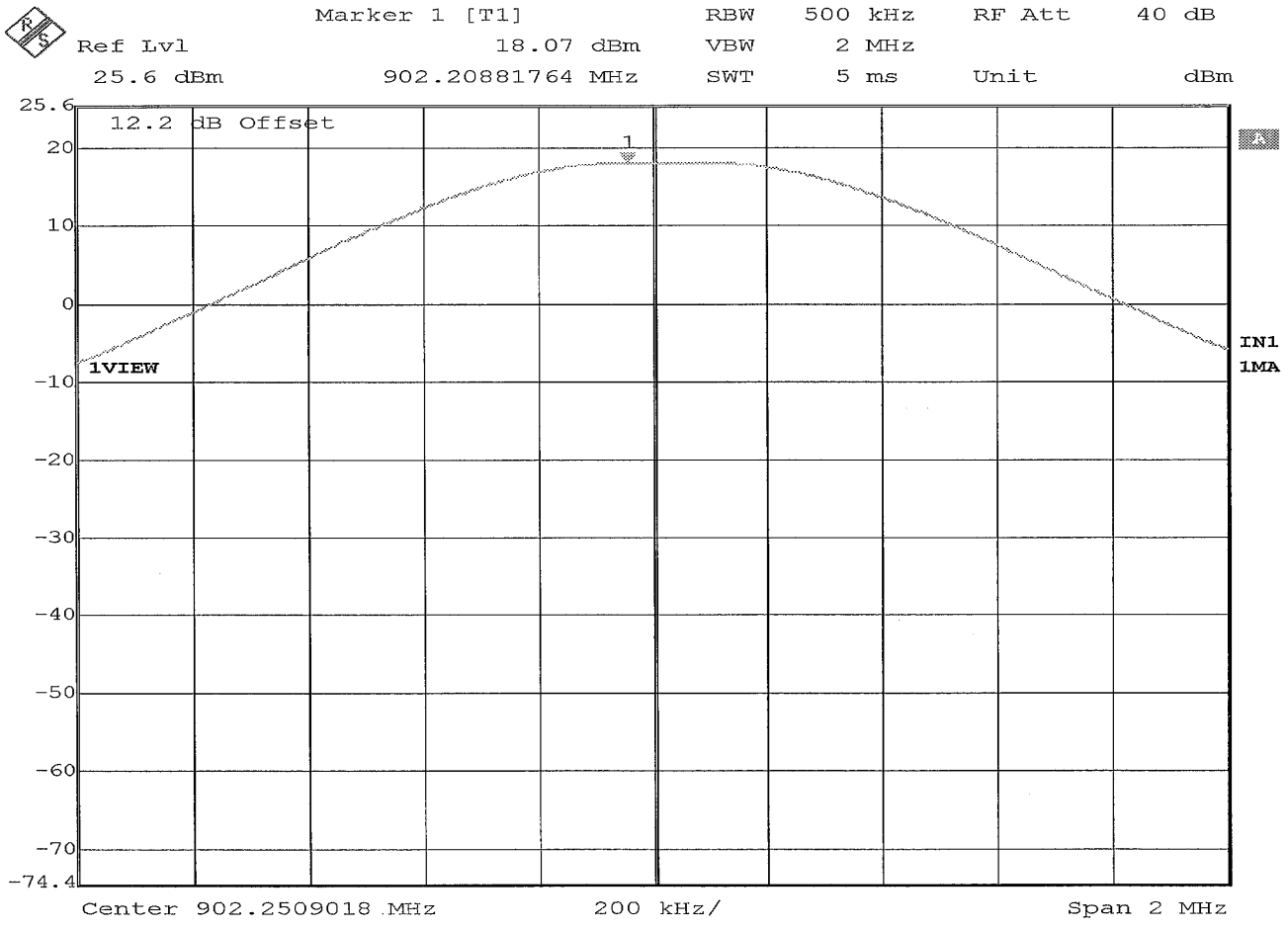
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Power Output: 17.01dBm



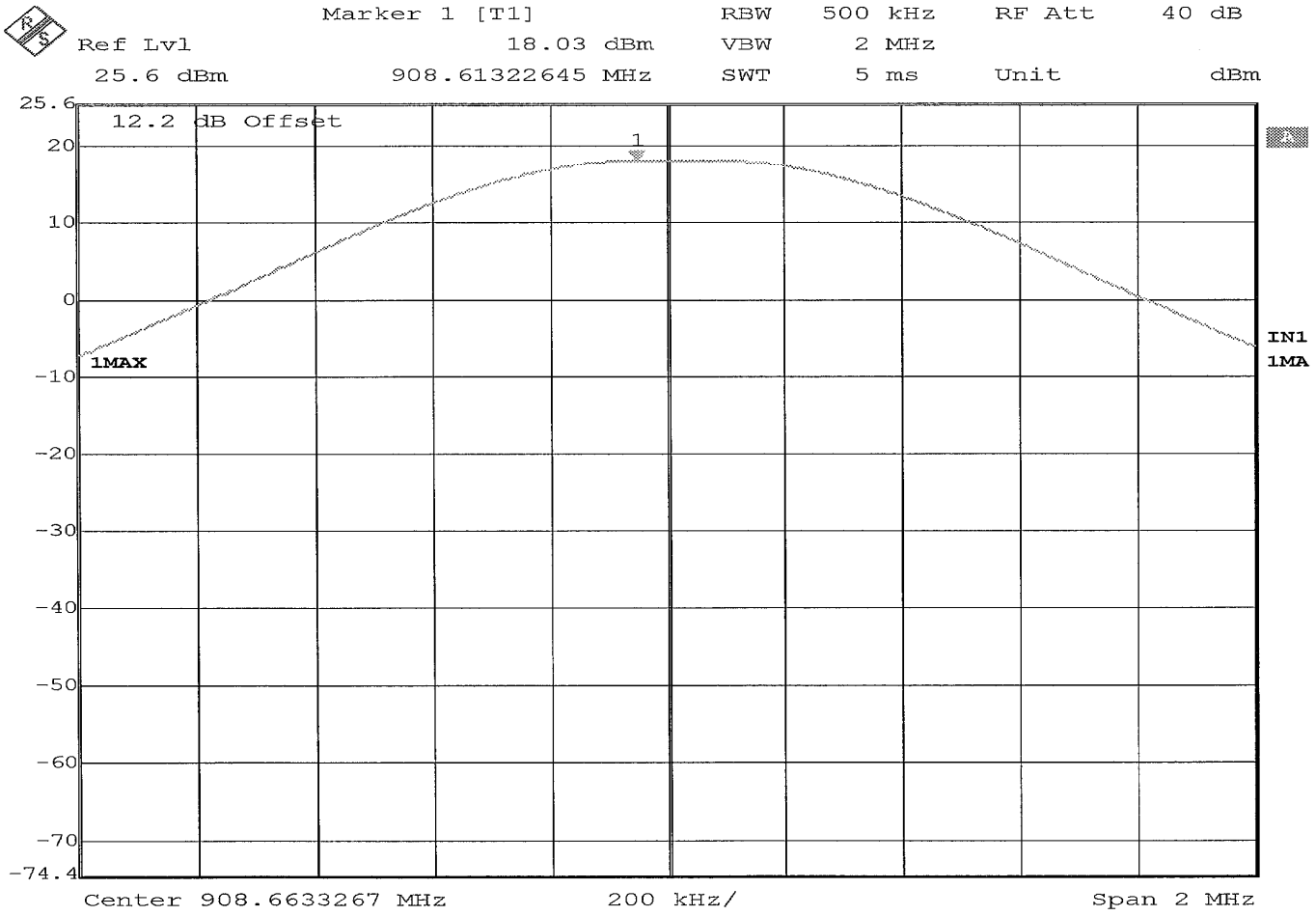
Power Output

FHSS Test Data

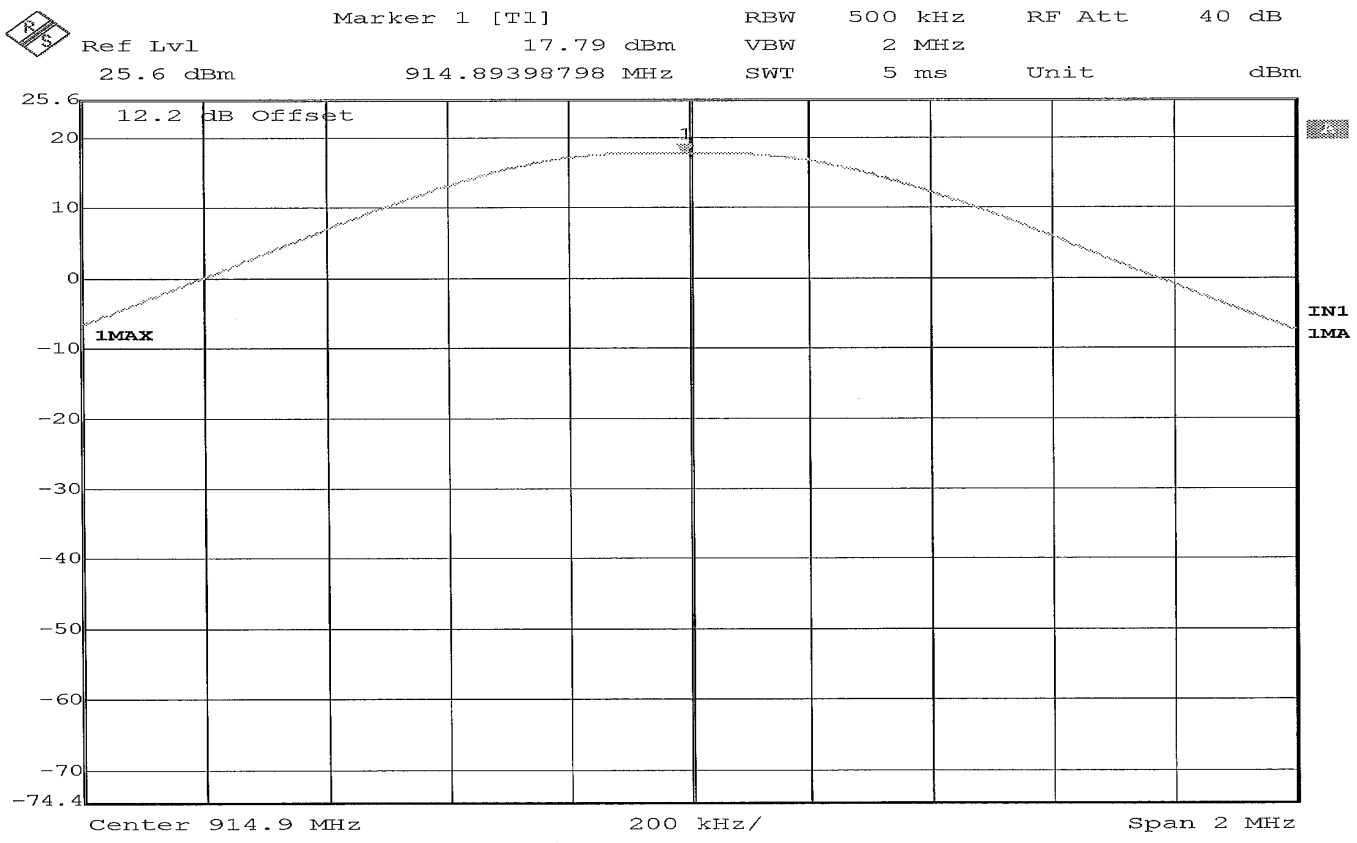
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Peak Power Output:18.07dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 908.65MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Peak Power Output:18.03dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Peak Power Output:17.79dBm



Test Photograph(s)
Antenna Terminal Out of Band/Band Edge Conducted Emissions, 30 MHz to 25 GHz
FCC Section 15.247(d)

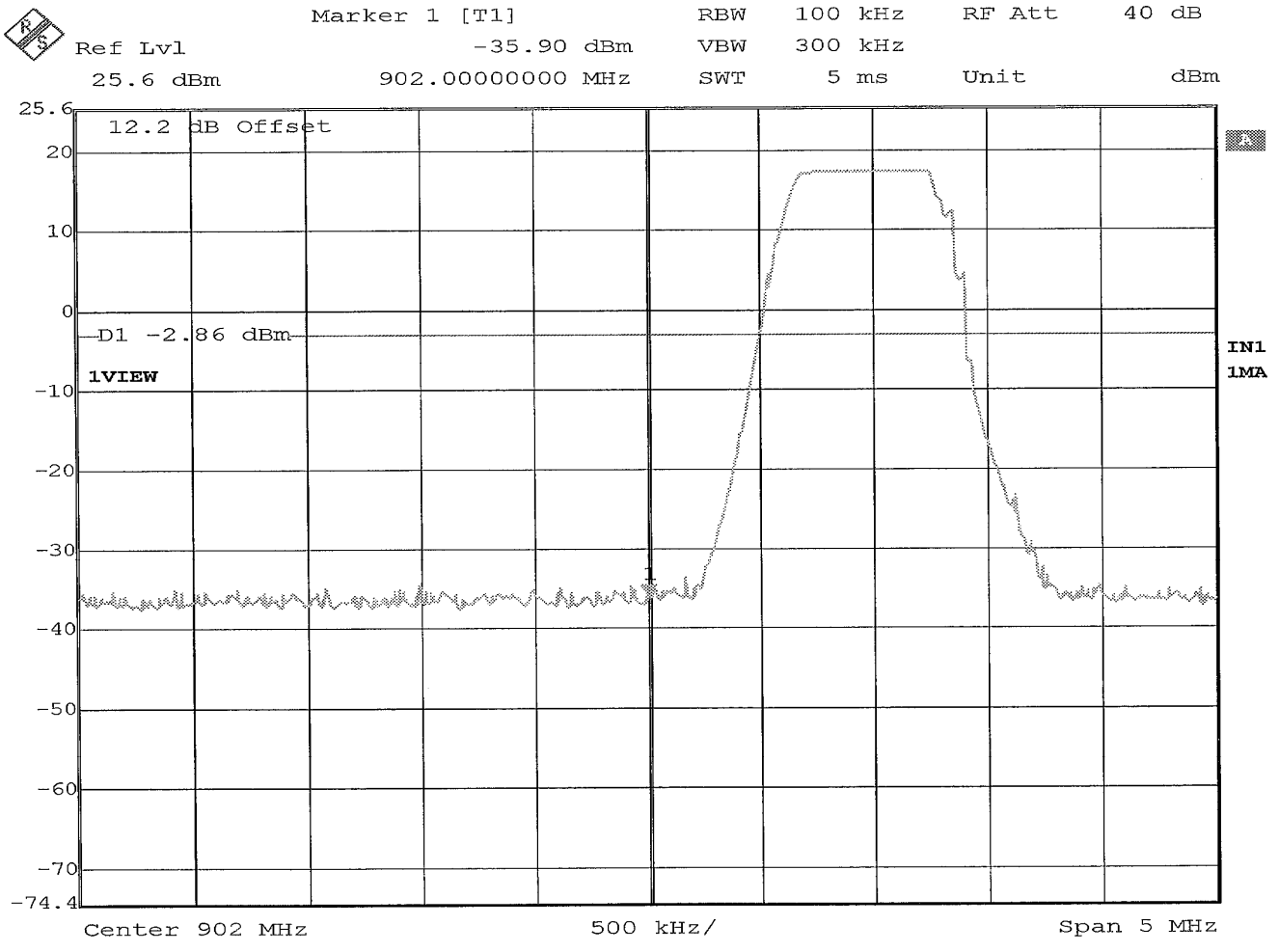
Test Photograph(s)
Antenna Terminal Out of Band/Band Edge Conducted Emissions, 30 MHz to 25 GHz

Test Setup

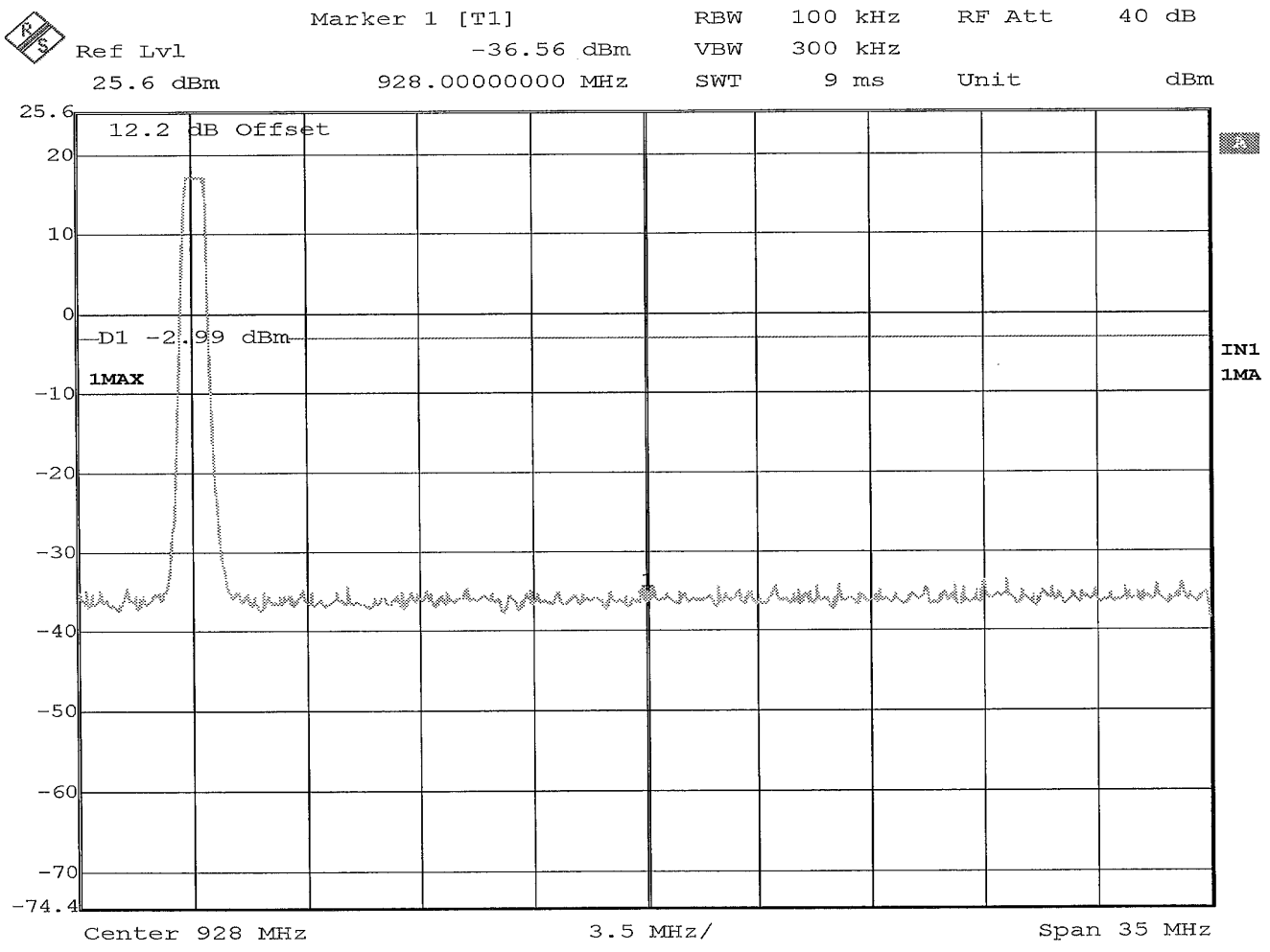
Antenna Terminal Out of Band/Band Edge Conducted Emissions
Test Data

Band Edge Conducted
DTS Test Data

EMISSIONS TEST DATA SHEET	
Method:	**Band Edge**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99

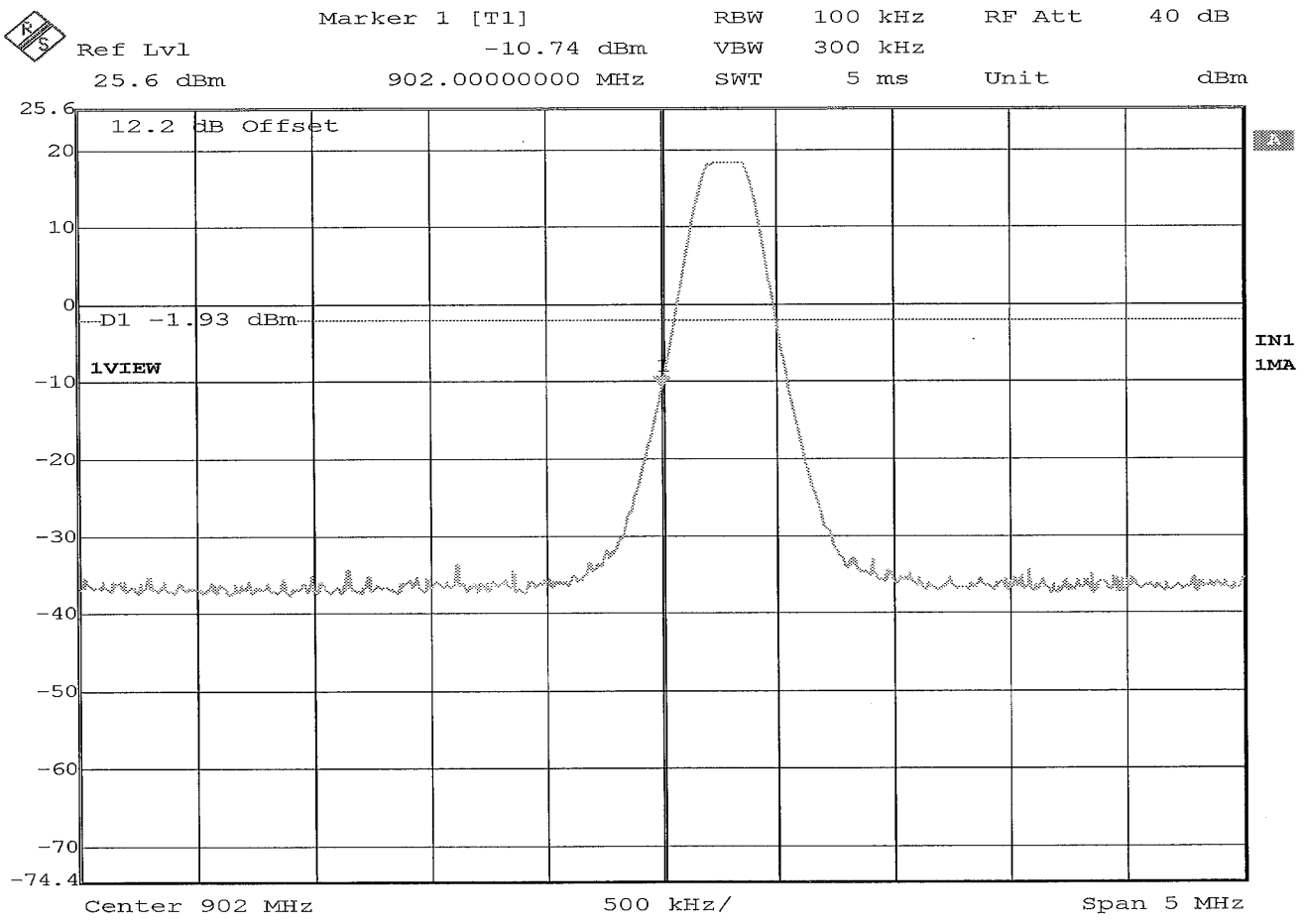


EMISSIONS TEST DATA SHEET	
Method:	**Band Edge**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99

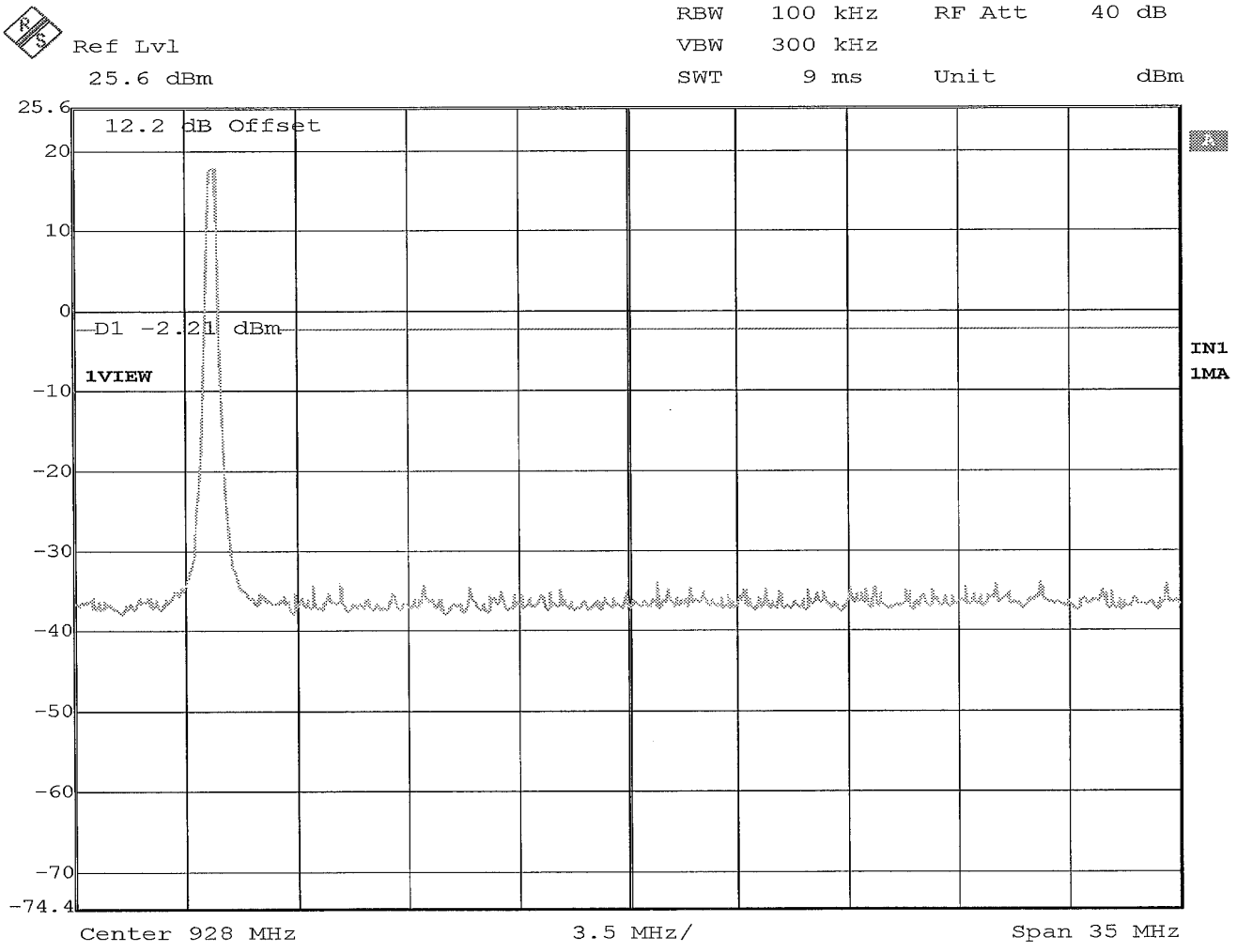


Band Edge
FHSS Test Data

EMISSIONS TEST DATA SHEET	
Method:	**Band Edge**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93

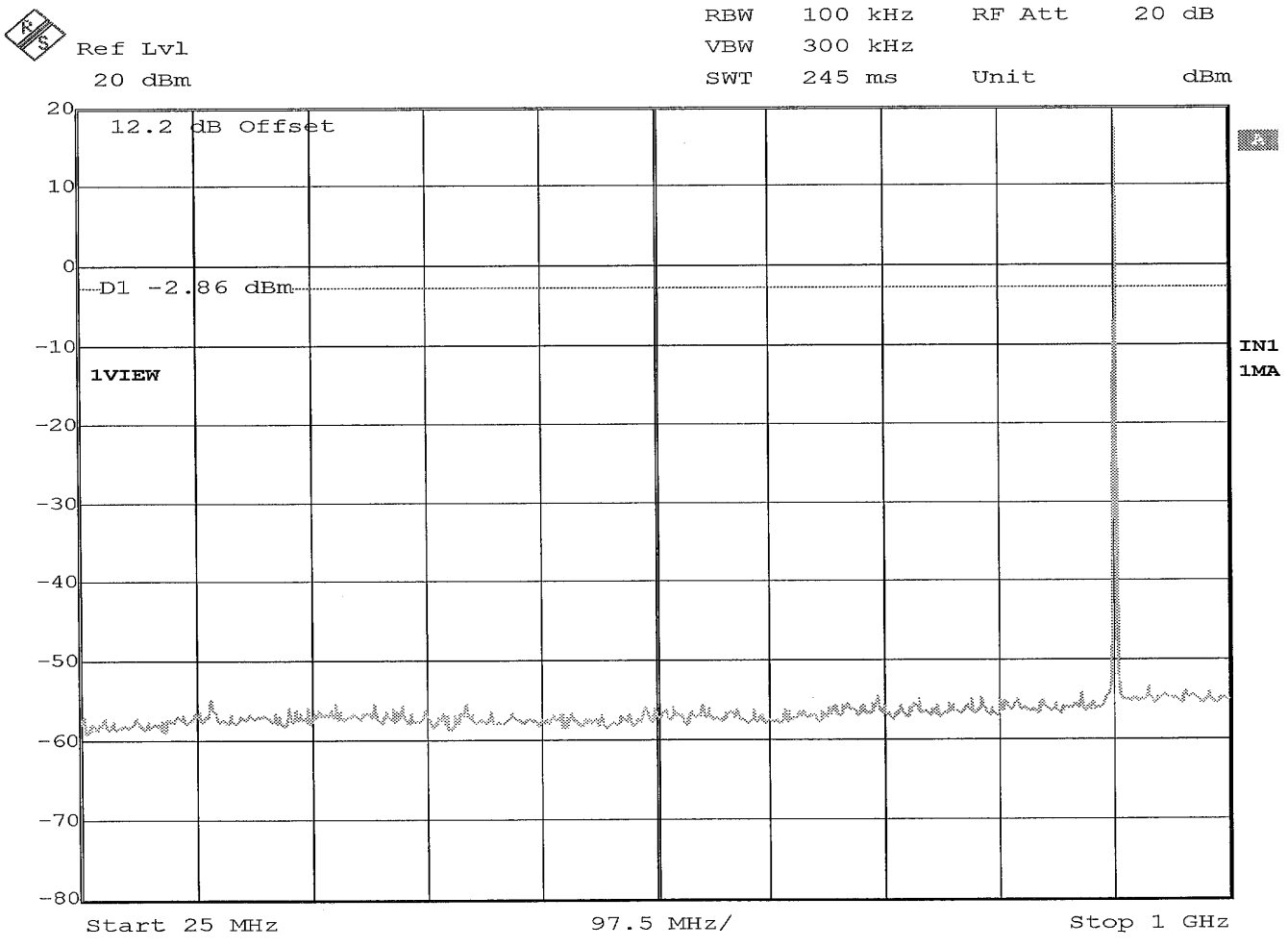


EMISSIONS TEST DATA SHEET	
Method:	**Band Edge**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93

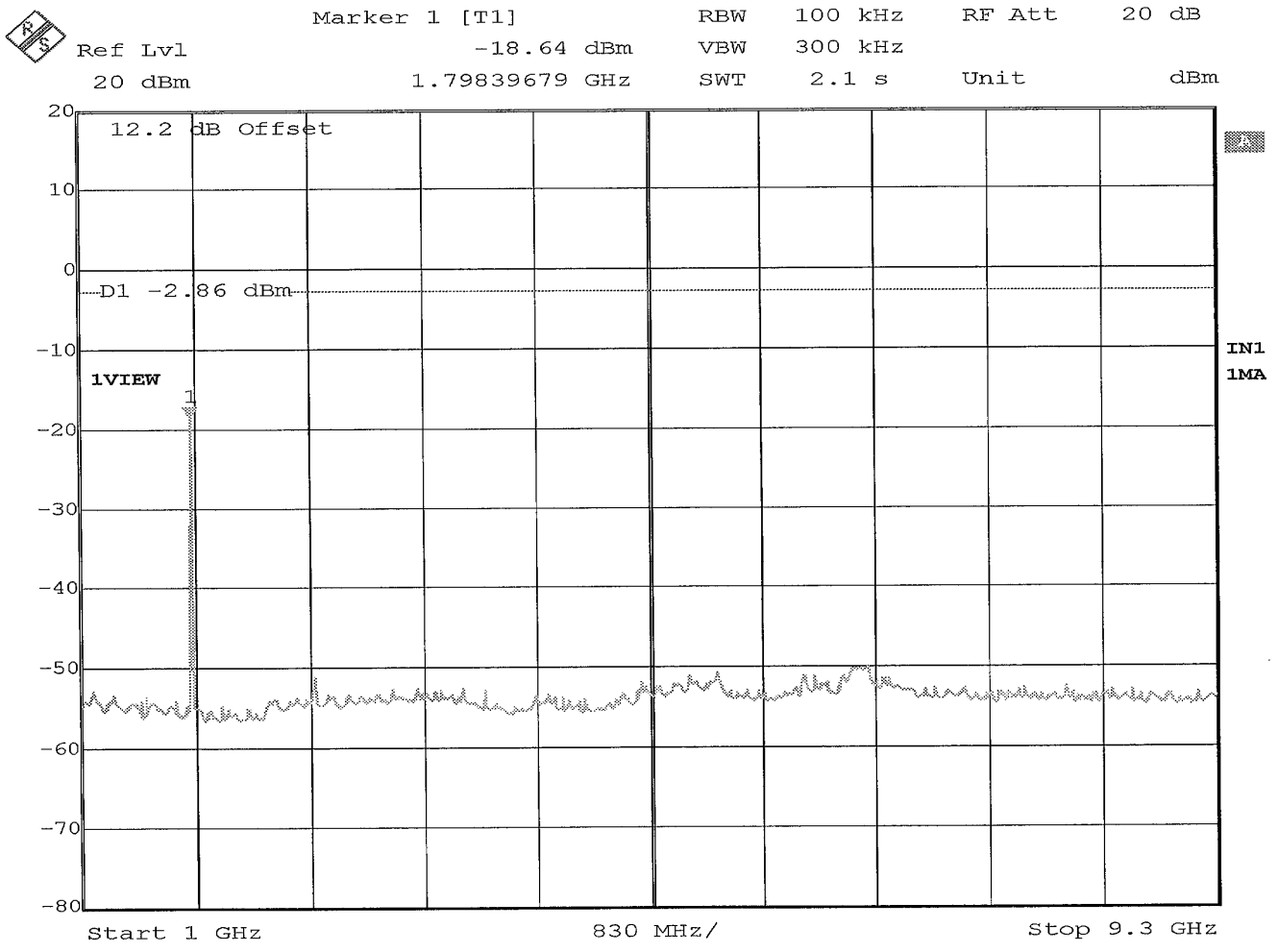


Out of Band Conducted Emissions
DTS Test Data

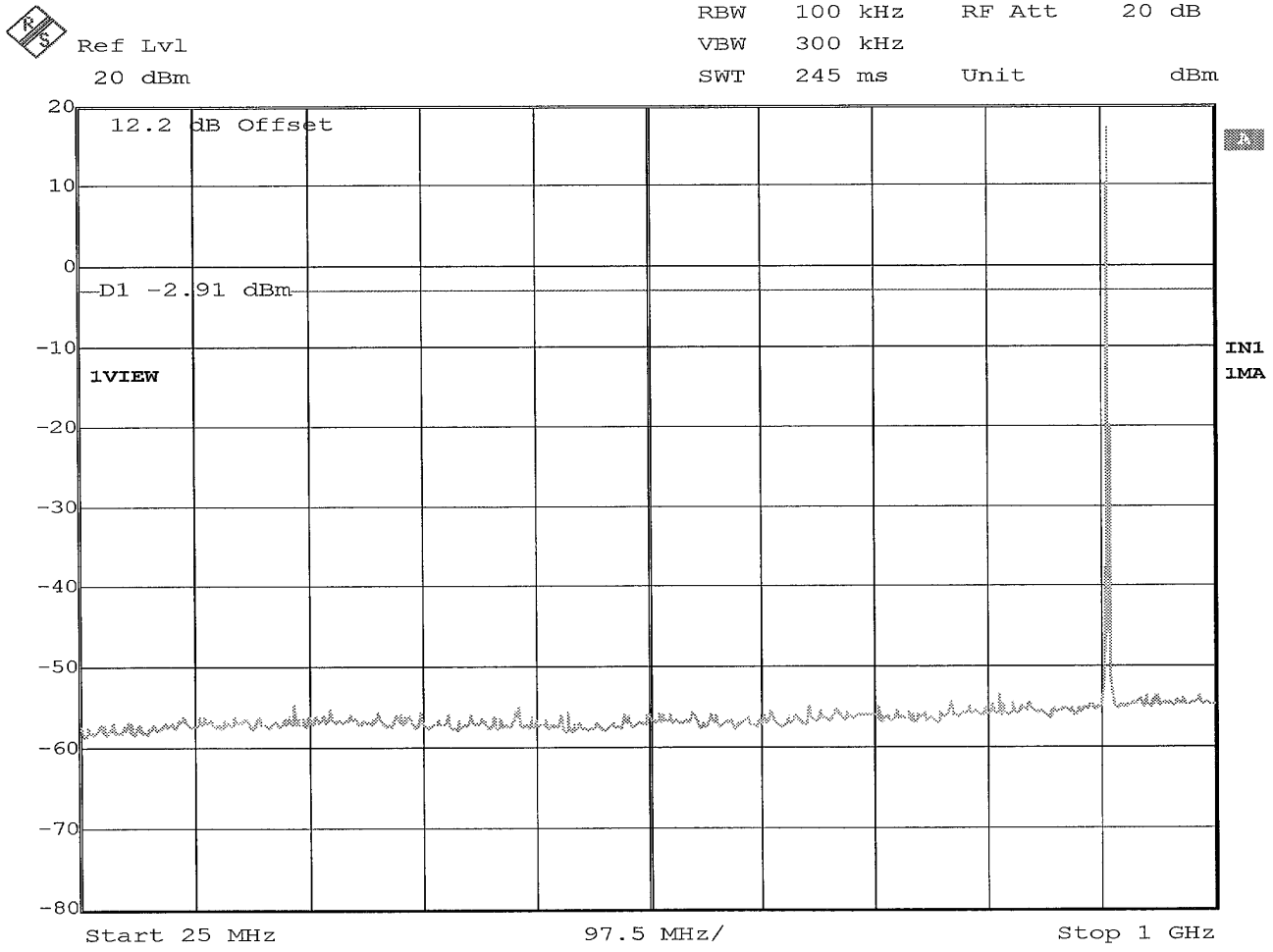
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99



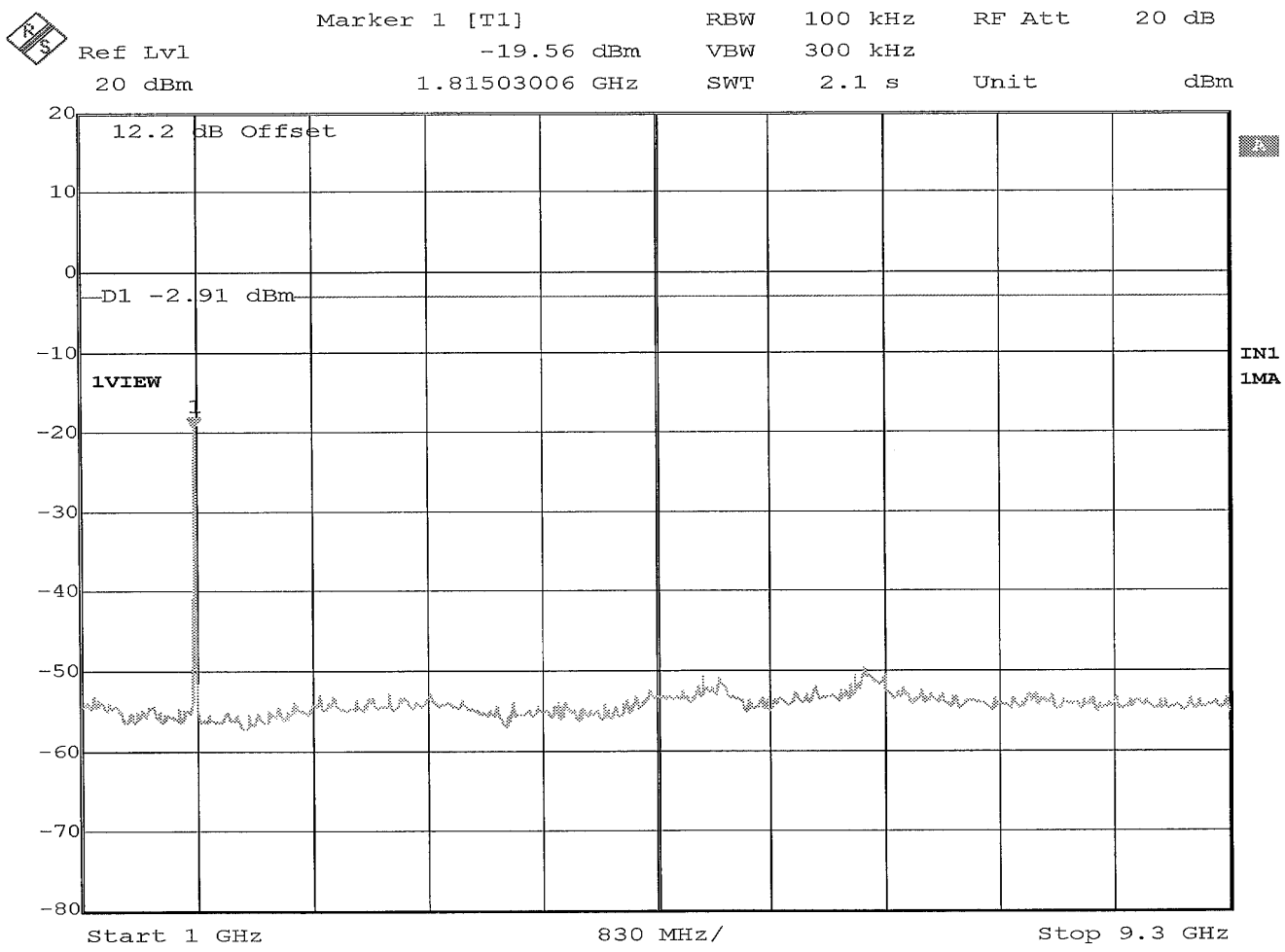
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99



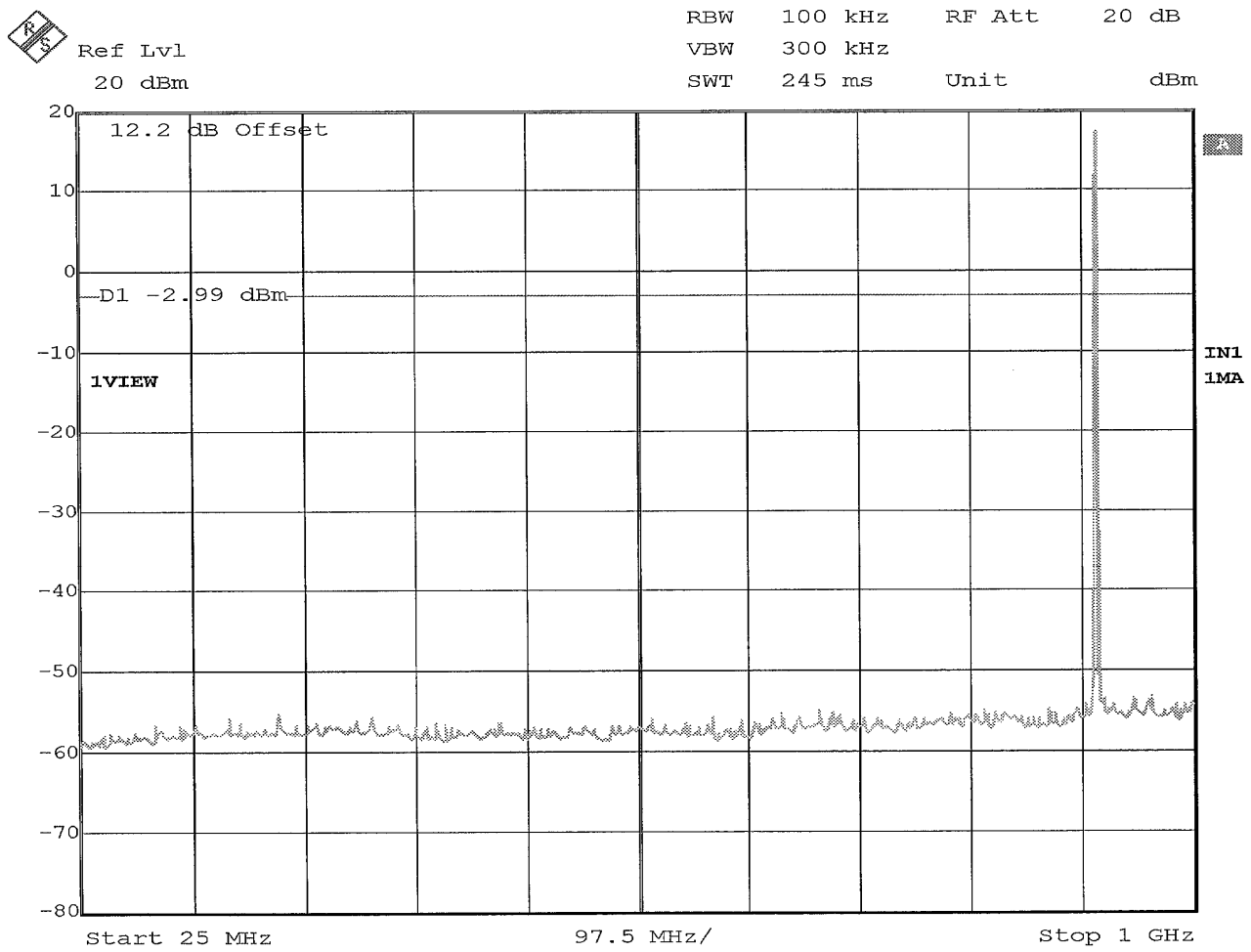
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99



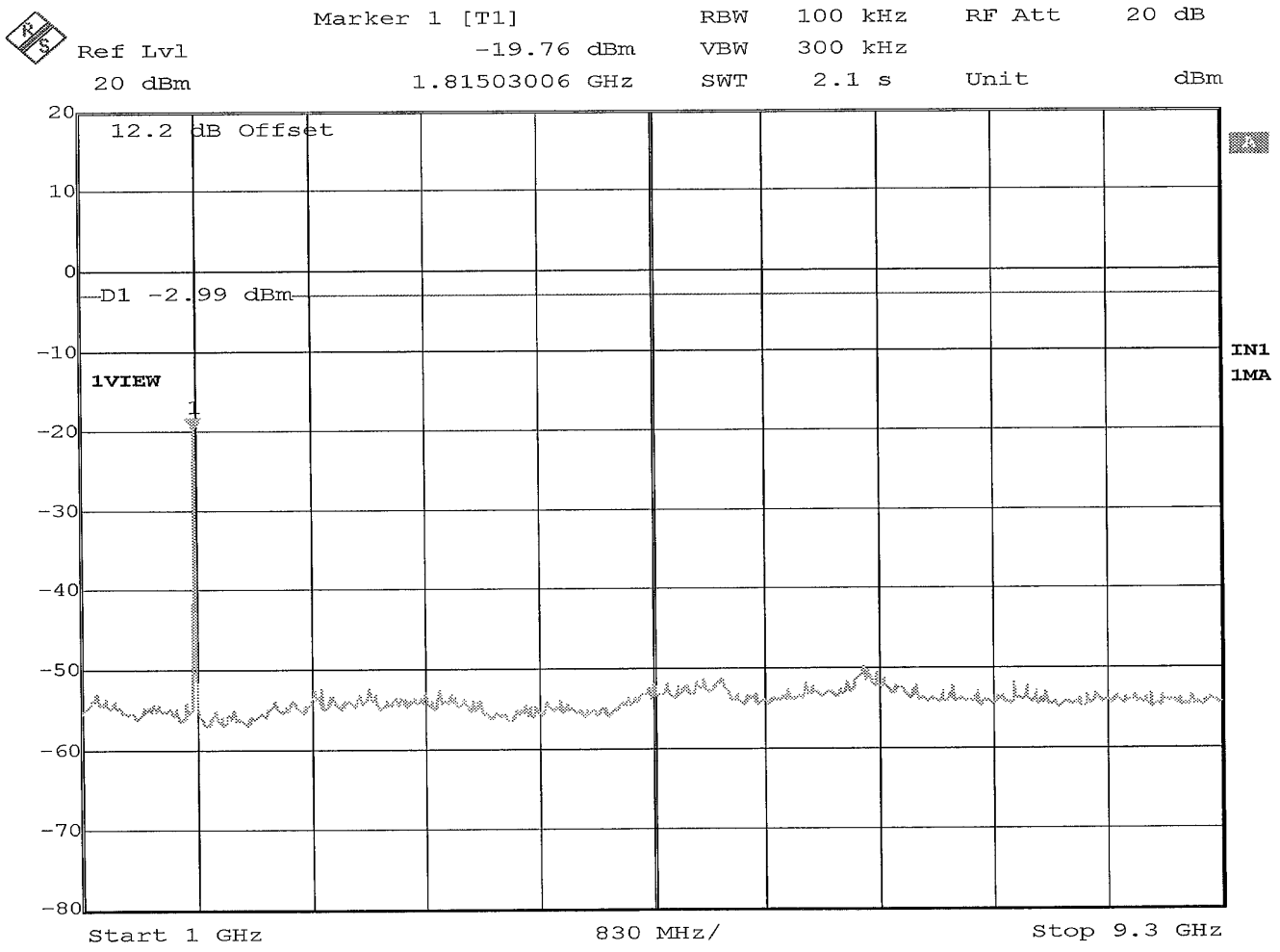
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99



EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99

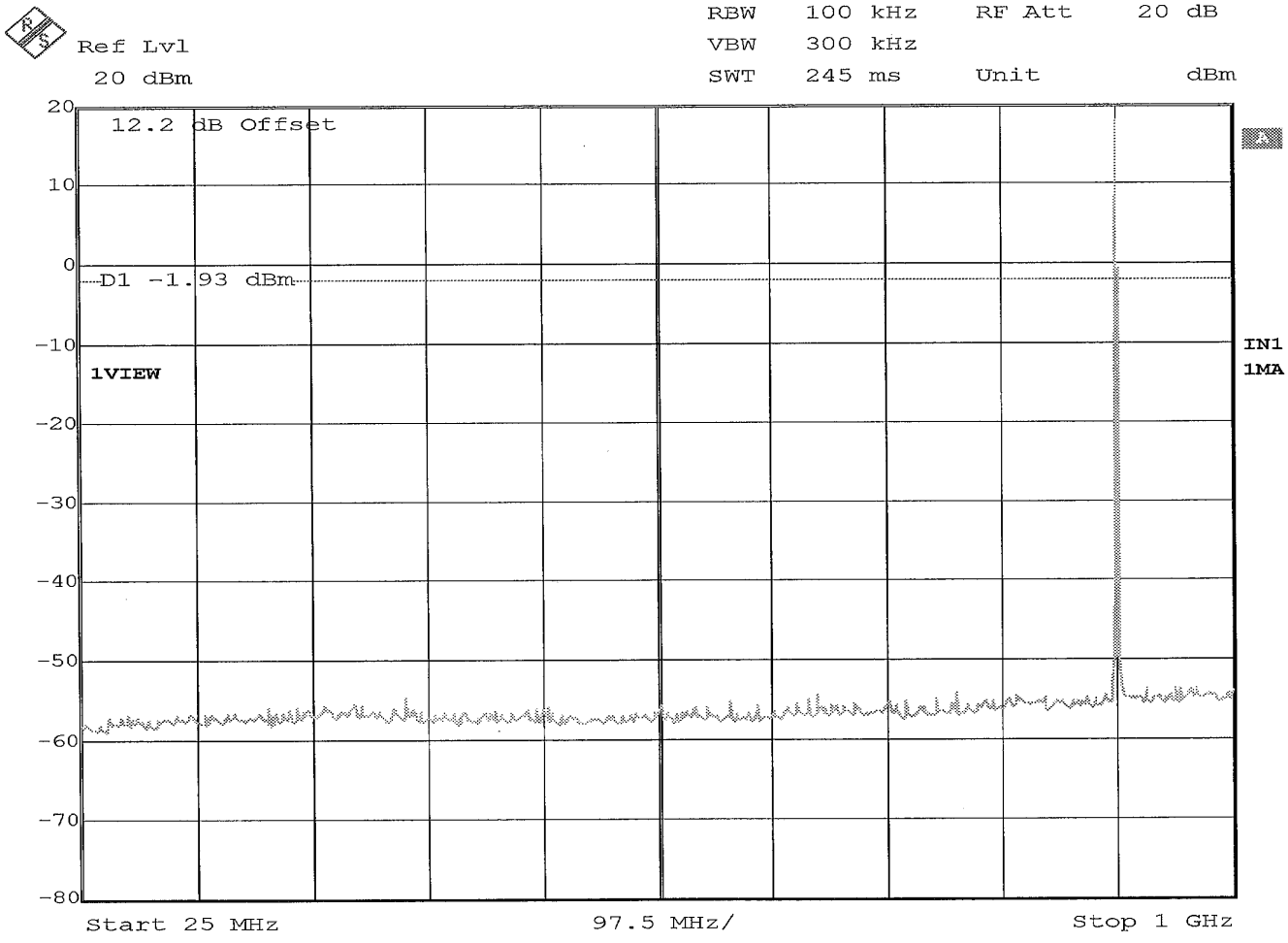


EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 48.5%
Notes:	Limit: -2.99

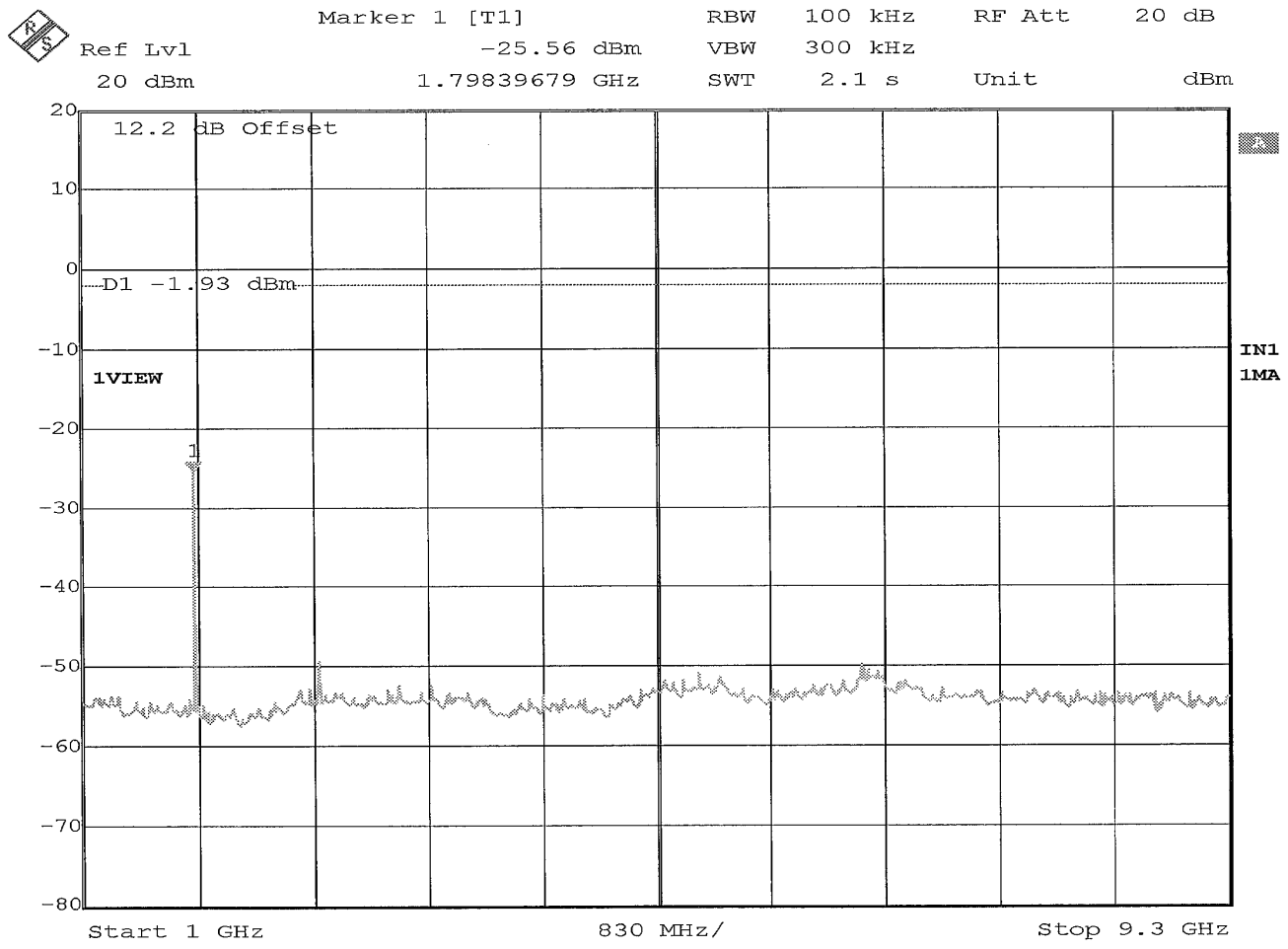


Out of Band Conducted Emissions
FHSS Test Data

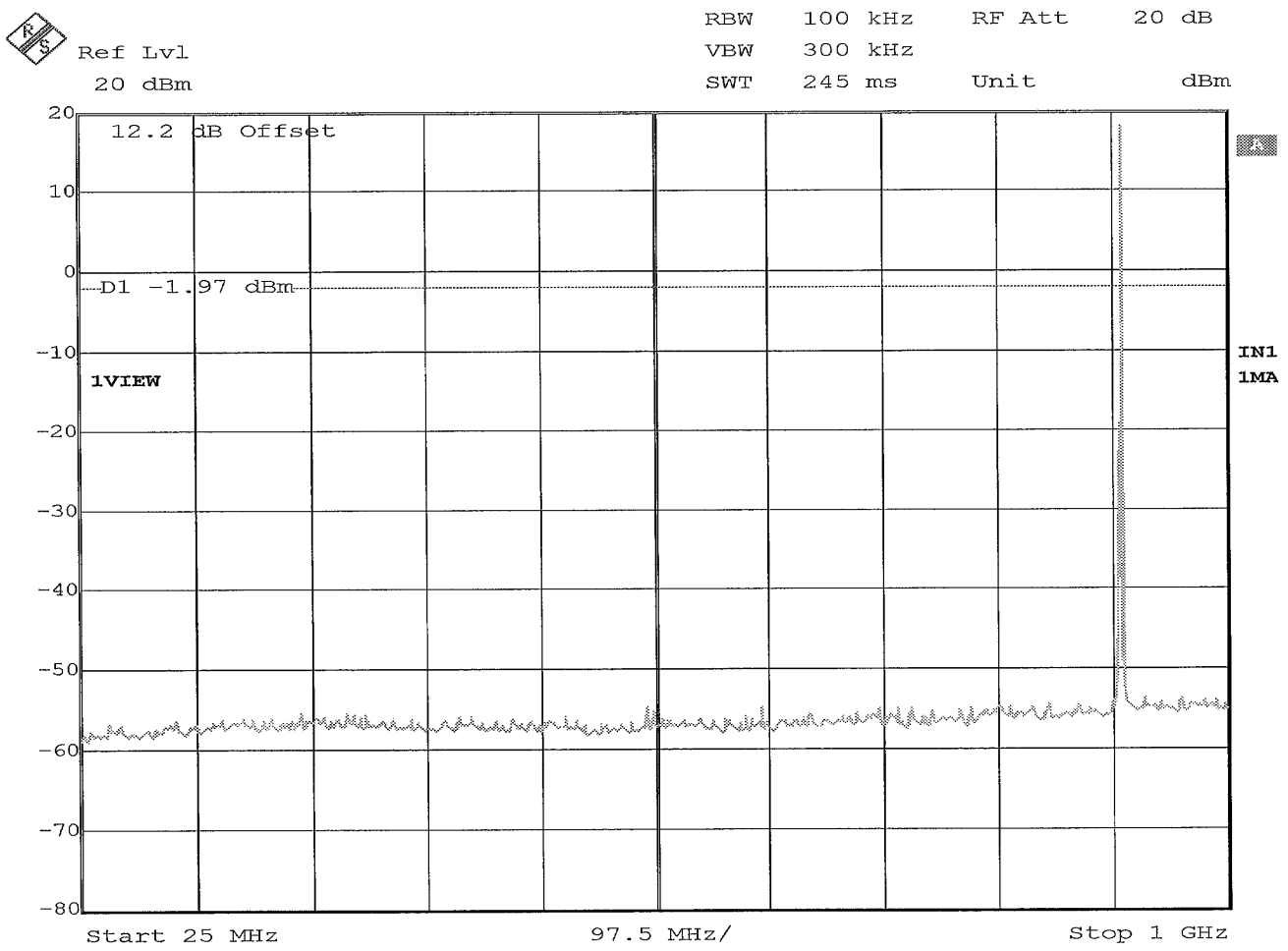
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



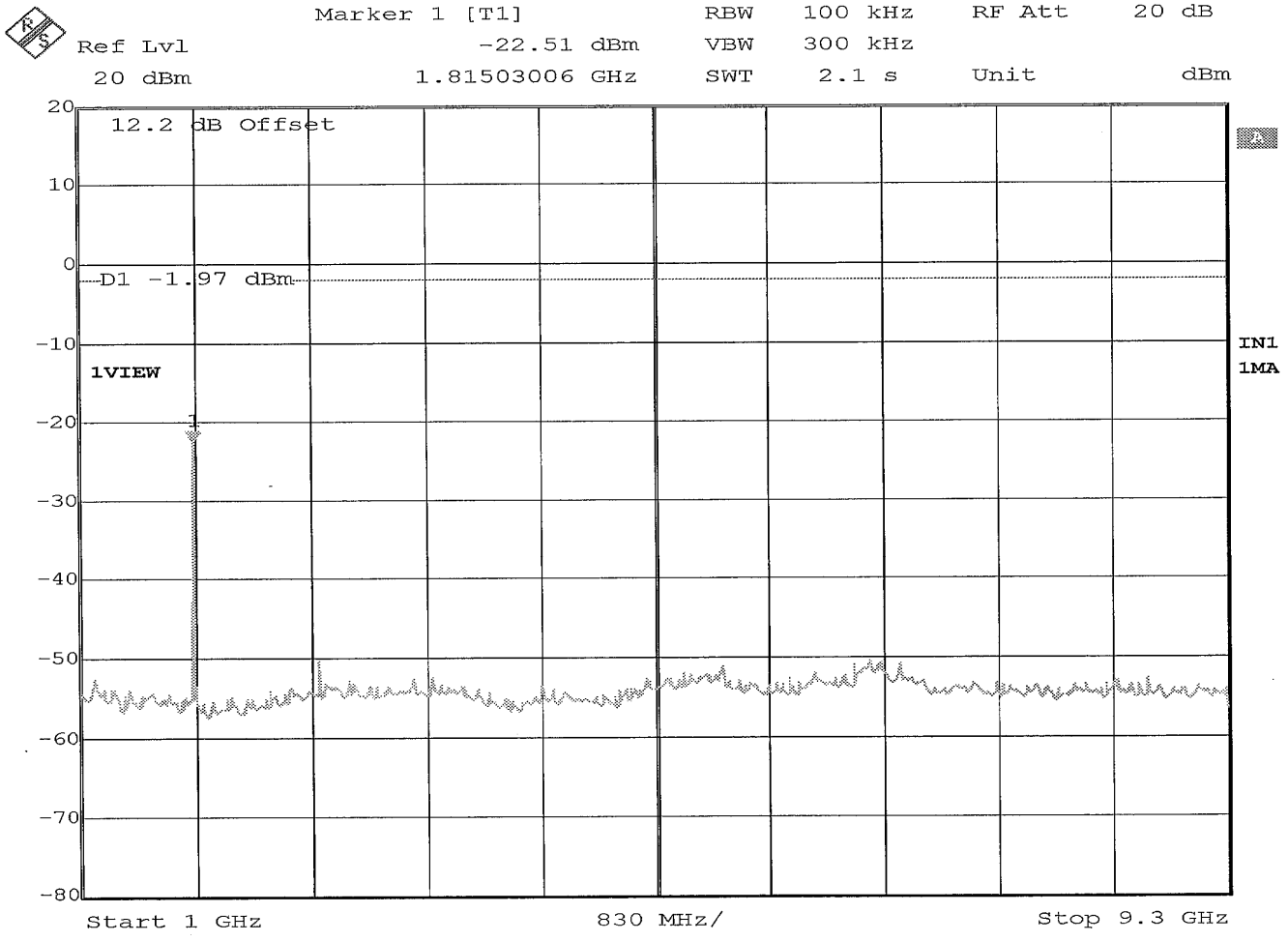
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



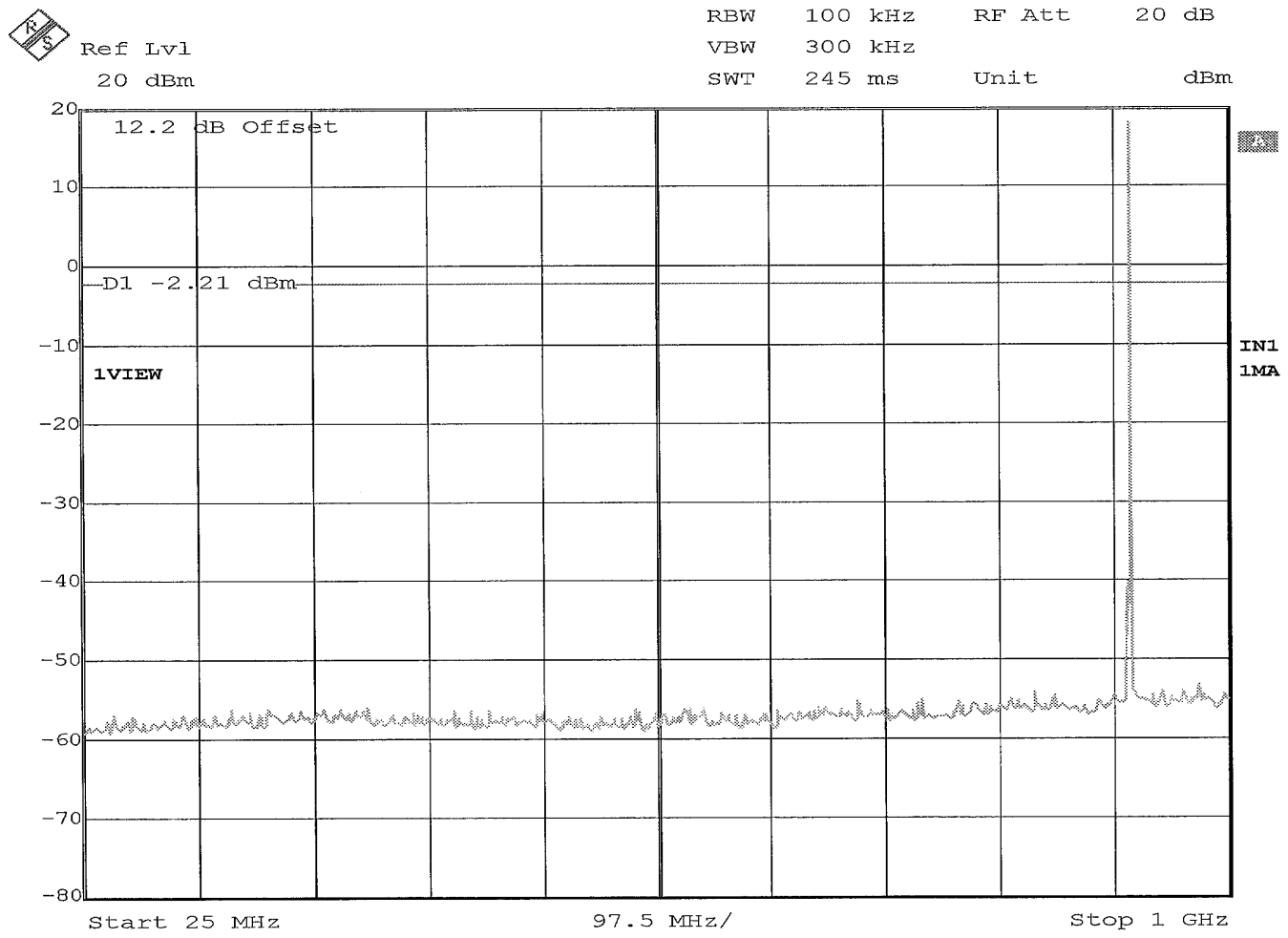
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 908.65MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



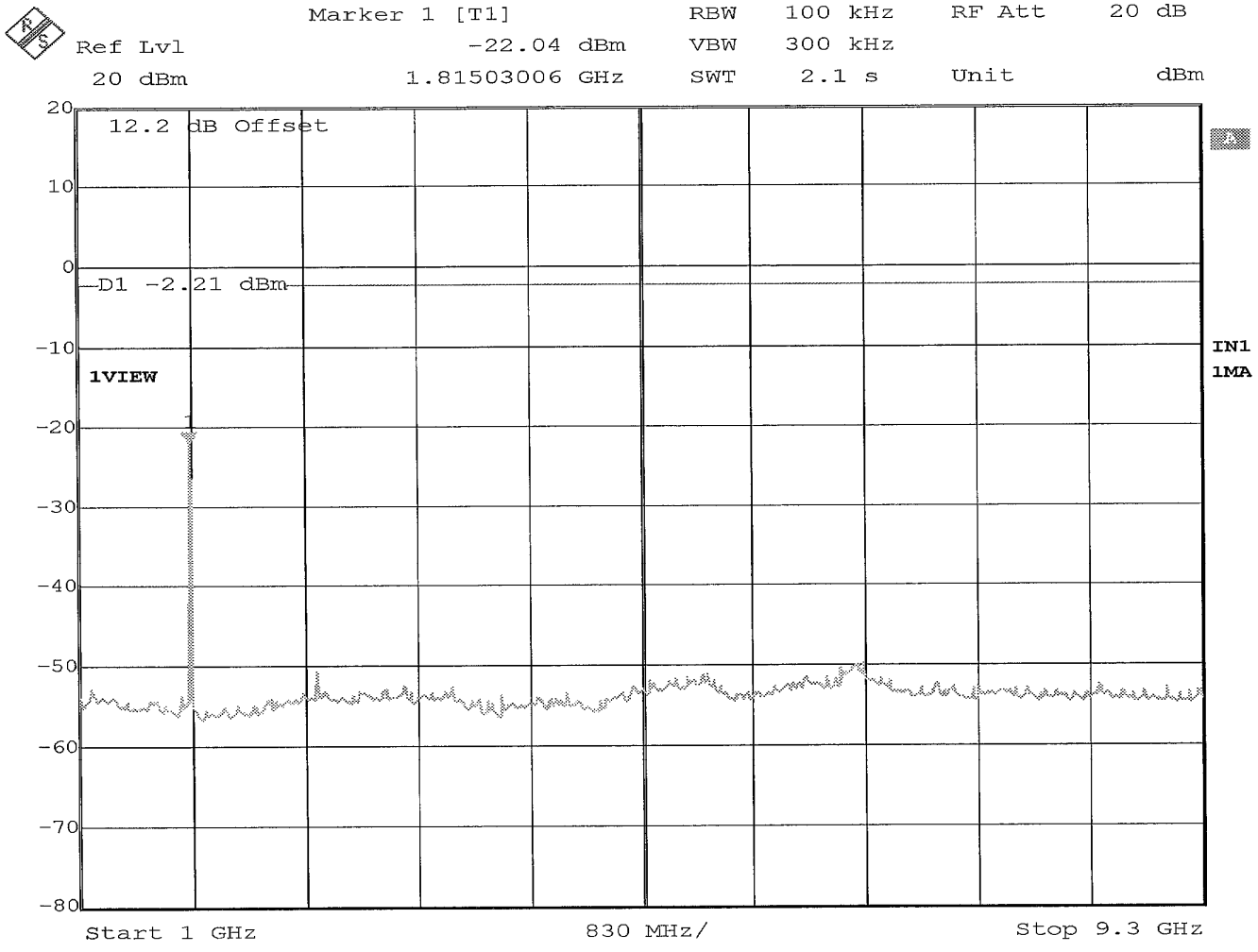
EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 908.65MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



EMISSIONS TEST DATA SHEET	
Method:	**Conducted Out of Band**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Limit: -1.93



Test Photograph(s)
Out of Band/Band Edge Radiated Emissions
FCC Section 15.247(d)

Test Photograph(s)
Out of Band/Band Edge Radiated Emissions

Test Setup

Test Photograph(s)
Out of Band/Band Edge Radiated Emissions

30 MHz – 200 MHz, Horizontal Polarization

30 MHz – 200 MHz, Vertical Polarization

Test Photograph(s)
Out of Band/Band Edge Radiated Emissions

200 MHz to 1 GHz, Horizontal Polarization

200 MHz to 1 GHz, Vertical Polarization

Test Photograph(s)
Out of Band/Band Edge Radiated Emissions

>1 GHz, Horizontal Polarization

>1 GHz, Vertical Polarization

Unwanted Emissions into Restricted Frequency Bands
DTS Test Data

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
37.50	-	-	-	-			-	100.00
|	38.00*	4.88	14.42	19.30			9.23	I
38.25	-	-	-	-			-	100.00
73.00	-	-	-	-			-	100.00
|	74.00*	18.17	8.73	26.90			22.13	I
75.20	-	-	-	-			-	100.00
108.00	-	-	-	-			-	150.00
|	115.00*	7.93	9.87	17.80			7.76	I
121.94	-	-	-	-			-	150.00
123.00	-	-	-	-			-	150.00
|	130.00*	6.58	9.72	16.30			6.53	|
138.00	-	-	-	-			-	150.00
149.90	-	-	-	-			-	150.00
|	150.00*	4.13	11.97	16.10			6.38	I
150.05	-	-	-	-			-	150.00
156.52475	-	-	-	-			-	150.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	156.52500*	5.16	12.84	18.00			7.94	|
156.52525	-	-	-	-			-	150.00
156.70	-	-	-	-			-	150.00
|	156.80*	4.83	12.87	17.70			7.67	|
156.90	-	-	-	-			-	150.00
162.0125	-	-	-	-			-	150.00
|	165.00*	5.33	13.57	18.90			8.81	|
167.1700	-	-	-	-			-	150.00
167.72	-	-	-	-			-	150.00
|	170.00*	6.33	13.97	20.30			10.35	|
173.20	-	-	-	-			-	150.00
240.00	-	-	-	-			-	200.00
|	260.00*	-1.42	18.92	17.50			7.50	|
285.00	-	-	-	-			-	200.00
322.00	-	-	-	-			-	200.00
|	330.00*	-2.55	22.05	19.50			9.44	|

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
335.40	-	-	-	-			-	200.00
399.90	-	-	-	-			-	200.00
|	405.00*	-5.80	24.70	18.90			8.81	|
410.00	-	-	-	-			-	200.00
608.00	-	-	-	-			-	200.00
|	611.00*	-6.97	30.97	24.00			15.85	|
614.00	-	-	-	-			-	200.00
960.00	-	-	-	-			-	500.00
|	975.00*	-4.59	36.79	32.20			40.74	|
1240.00	-	-	-	-			-	500.00
1300.00	-	-	-	-			-	500.00
|	1350.00*	31.58	-9.40	22.18			12.85	|
1427.00	-	-	-	-			-	500.00
1435.00	-	-	-	-			-	500.00
|	1500.00*	31.44	-8.64	22.80			13.80	|
1646.50	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET		
Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
1660.00	-	-	-	-			-	500.00
|	1680.00*	31.15	-7.85	23.30			14.62	|
1710.00	-	-	-	-			-	500.00
1718.80	-	-	-	-			-	500.00
|	1720.00*	31.15	-7.65	23.50			14.96	|
1722.20	-	-	-	-			-	500.00
2200.00	-	-	-	-			-	500.00
|	2250.00*	30.98	-5.78	25.20			18.20	|
2300.00	-	-	-	-			-	500.00
2310.00	-	-	-	-			-	500.00
|	2360.00*	30.86	-5.46	25.39			18.60	|
2390.00	-	-	-	-			-	500.00
2483.50	-	-	-	-			-	500.00
|	2490.00*	30.41	-5.11	25.30			18.41	|
2500.00	-	-	-	-			-	500.00
2690.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	2709.00	52.89	-4.54	48.35			261.52	|
|	2723.40	51.13	-4.51	46.62			214.29	|
|	2742.60	50.81	-4.46	46.35			207.73	|
2900.00	-	-	-	-			-	500.00
3260.00	-	-	-	-			-	500.00
|	3263.00*	30.36	-2.88	27.48			23.66	|
3267.00	-	-	-	-			-	500.00
3332.00	-	-	-	-			-	500.00
|	3336.00*	30.58	-2.62	27.96			25.00	|
3339.00	-	-	-	-			-	500.00
3345.80	-	-	-	-			-	500.00
|	3350.00*	30.22	-2.57	27.65			24.13	|
3358.00	-	-	-	-			-	500.00
3600.00	-	-	-	-			-	500.00
|	3612.00	42.07	-1.68	40.69			108.27	|
|	3631.20	42.45	-1.62	40.83			110.03	|
|	3656.80	42.06	-1.53	40.53			106.29	|

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
4400.00	-	-	-	-			-	500.00
4500.00	-	-	-	-			-	500.00
|	4515.00	43.64	0.02	43.66			152.41	|
|	4539.00	39.65	0.04	39.69			96.49	|
|	4571.00	41.13	0.07	41.20			114.82	|
5150.00	-	-	-	-			-	500.00
5350.00	-	-	-	-			-	500.00
|	5413.80*	36.88	0.94	37.82			87.30	|
|	5451.00*	32.45	0.98	33.43			46.94	
5460.00	-	--	-	-			-	500.00
7250.00	-	-	-	-			-	500.00
|	7268.00*	33.21	3.49	36.70			68.39	
|	7319.20*	32.09	3.58	35.67			60.74	
7750.00	-	-	-	-			-	500.00
8025.00	-	-	-	-			-	500.00
|	8120.70*	33.70	4.27	37.97			79.16	|
|	8176.50*	33.70	4.32	38.02			79.62	|

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	8234.10*	34.79	4.37	39.16			90.78	|
8500.00	-	-	-	-			-	500.00
9000.00	-	-	-	-			-	500.00
|	9023.00*	35.19	5.03	40.22			79.62	|
|	9085.00*	32.85	5.08	37.93			90.78	|
9200.00	-	-	-	-			-	500.00
9300.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
10000.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 7 of 7

Unwanted Emissions into Restricted Frequency Bands
FHSS Test Data

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET		
Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Model Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
37.50	-	-	-	-			-	100.00
|	38.00*	4.88	14.42	19.30			9.23	I
38.25	-	-	-	-			-	100.00
73.00	-	-	-	-			-	100.00
|	74.00*	18.17	8.73	26.90			22.13	I
75.20	-	-	-	-			-	100.00
108.00	-	-	-	-			-	150.00
|	115.00*	7.93	9.87	17.80			7.76	I
121.94	-	-	-	-			-	150.00
123.00	-	-	-	-			-	150.00
|	130.00*	6.58	9.72	16.30			6.53	|
138.00	-	-	-	-			-	150.00
149.90	-	-	-	-			-	150.00
|	150.00*	4.13	11.97	16.10			6.38	I
150.05	-	-	-	-			-	150.00
156.52475	-	-	-	-			-	150.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	156.52500*	5.16	12.84	18.00			7.94	|
156.52525	-	-	-	-			-	150.00
156.70	-	-	-	-			-	150.00
|	156.80*	4.83	12.87	17.70			7.67	|
156.90	-	-	-	-			-	150.00
162.0125	-	-	-	-			-	150.00
|	165.00*	5.33	13.57	18.90			8.81	|
167.1700	-	-	-	-			-	150.00
167.72	-	-	-	-			-	150.00
|	170.00*	6.33	13.97	20.30			10.35	|
173.20	-	-	-	-			-	150.00
240.00	-	-	-	-			-	200.00
|	260.00*	-1.42	18.92	17.50			7.50	|
285.00	-	-	-	-			-	200.00
322.00	-	-	-	-			-	200.00
|	330.00*	-2.55	22.05	19.50			9.44	|

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
335.40	-	-	-	-			-	200.00
399.90	-	-	-	-			-	200.00
|	405.00*	-5.80	24.70	18.90			8.81	|
410.00	-	-	-	-			-	200.00
608.00	-	-	-	-			-	200.00
|	611.00*	-6.97	30.97	24.00			15.85	|
614.00	-	-	-	-			-	200.00
960.00	-	-	-	-			-	500.00
|	975.00*	-4.59	36.79	32.20			40.74	|
1240.00	-	-	-	-			-	500.00
1300.00	-	-	-	-			-	500.00
|	1350.00*	31.58	-9.40	22.18			12.85	|
1427.00	-	-	-	-			-	500.00
1435.00	-	-	-	-			-	500.00
|	1500.00*	31.44	-8.64	22.80			13.80	|
1646.50	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET		
Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
1660.00	-	-	-	-			-	500.00
|	1680.00*	31.15	-7.85	23.30			14.62	|
1710.00	-	-	-	-			-	500.00
1718.80	-	-	-	-			-	500.00
|	1720.00*	31.15	-7.65	23.50			14.96	|
1722.20	-	-	-	-			-	500.00
2200.00	-	-	-	-			-	500.00
|	2250.00*	30.98	-5.78	25.20			18.20	|
2300.00	-	-	-	-			-	500.00
2310.00	-	-	-	-			-	500.00
|	2360.00*	30.86	-5.46	25.39			18.60	|
2390.00	-	-	-	-			-	500.00
2483.50	-	-	-	-			-	500.00
|	2490.00*	30.41	-5.11	25.30			18.41	|
2500.00	-	-	-	-			-	500.00
2690.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	2706.90	56.73	-4.65	52.08			401.79	|
|	2725.50	54.71	-4.65	50.06			318.42	|
|	2744.70	55.84	-4.65	51.19			362.66	|
2900.00	-	-	-	-			-	500.00
3260.00	-	-	-	-			-	500.00
|	3263.00*	30.36	-2.88	27.48			23.66	|
3267.00	-	-	-	-			-	500.00
3332.00	-	-	-	-			-	500.00
|	3336.00*	30.58	-2.62	27.96			25.00	|
3339.00	-	-	-	-			-	500.00
3345.80	-	-	-	-			-	500.00
|	3350.00*	30.22	-2.57	27.65			24.13	|
3358.00	-	-	-	-			-	500.00
3600.00	-	-	-	-			-	500.00
|	3609.02	41.99	-1.69	40.30			103.51	|
|	3634.00	40.75	-1.61	39.14			90.57	|
|	3659.90	43.60	-1.53	42.07			126.91	|

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
4400.00	-	-	-	-			-	500.00
4500.00	-	-	-	-			-	500.00
|	4511.50	49.73	0.02	49.75			307.26	|
|	4542.50	51.19	0.05	51.24			364.75	|
|	4574.50	50.35	0.08	50.43			332.28	|
5150.00	-	-	-	-			-	500.00
5350.00	-	-	-	-			-	500.00
|	5413.80*	36.88	0.94	37.82			87.30	|
|	5451.00*	32.45	0.98	33.43			46.94	
5460.00	-	--	-	-			-	500.00
7250.00	-	-	-	-			-	500.00
|	7268.00*	33.21	3.49	36.70			68.39	
|	7319.20*	32.09	3.58	35.67			60.74	
7750.00	-	-	-	-			-	500.00
8025.00	-	-	-	-			-	500.00
|	8120.70*	33.70	4.27	37.97			79.16	|
|	8176.50*	33.70	4.32	38.02			79.62	|

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6233N	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001A7CA	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	August 11th, 2017	

Notes: Test Antenna Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	8234.10*	34.79	4.37	39.16			90.78	|
8500.00	-	-	-	-			-	500.00
9000.00	-	-	-	-			-	500.00
|	9023.00*	35.19	5.03	40.22			79.62	|
|	9085.00*	32.85	5.08	37.93			90.78	|
9200.00	-	-	-	-			-	500.00
9300.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
10000.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 7 of 7

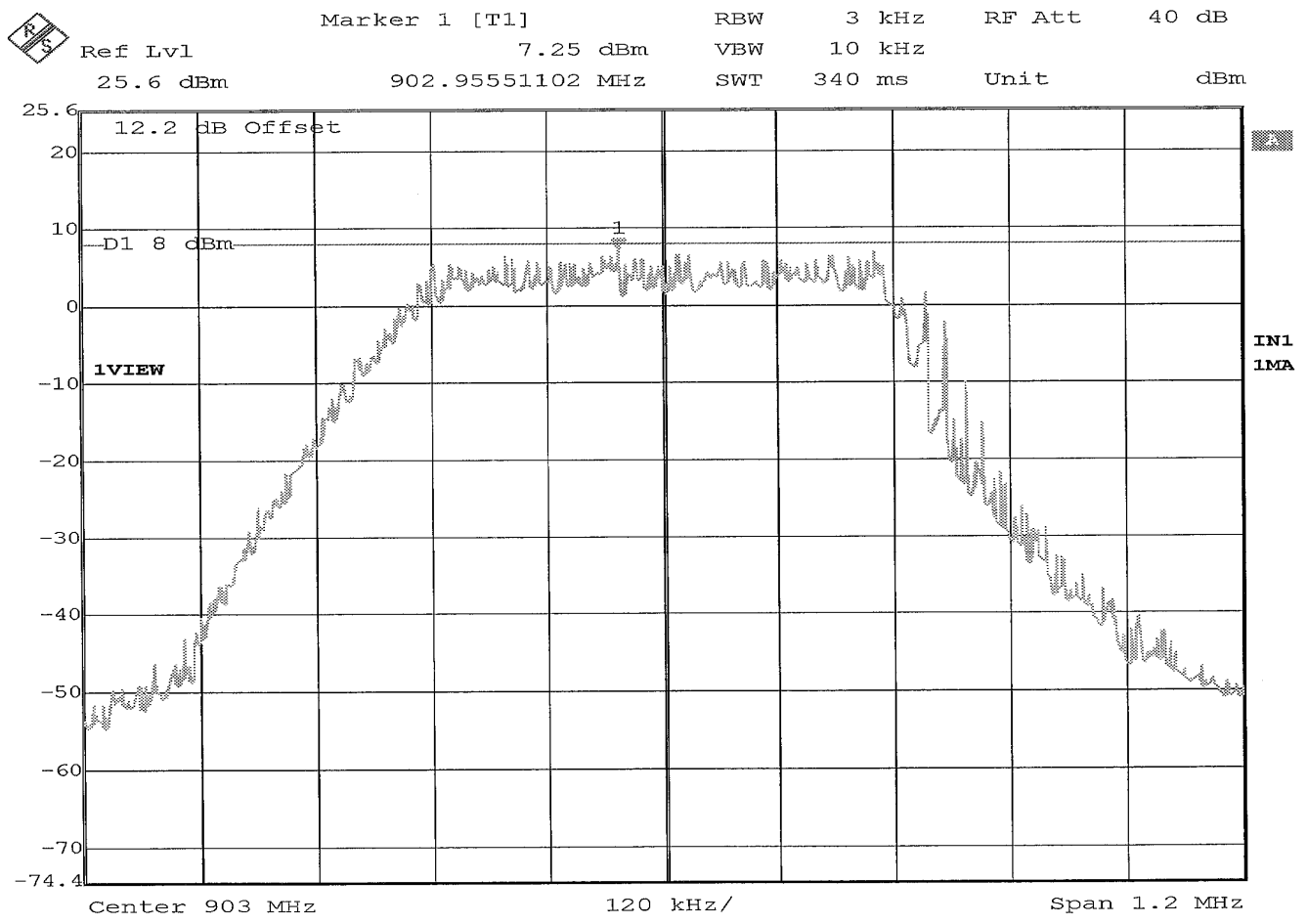
Test Photograph(s)
Power Density
FCC Section 15.247(e)

Test Photograph(s)
Power Density

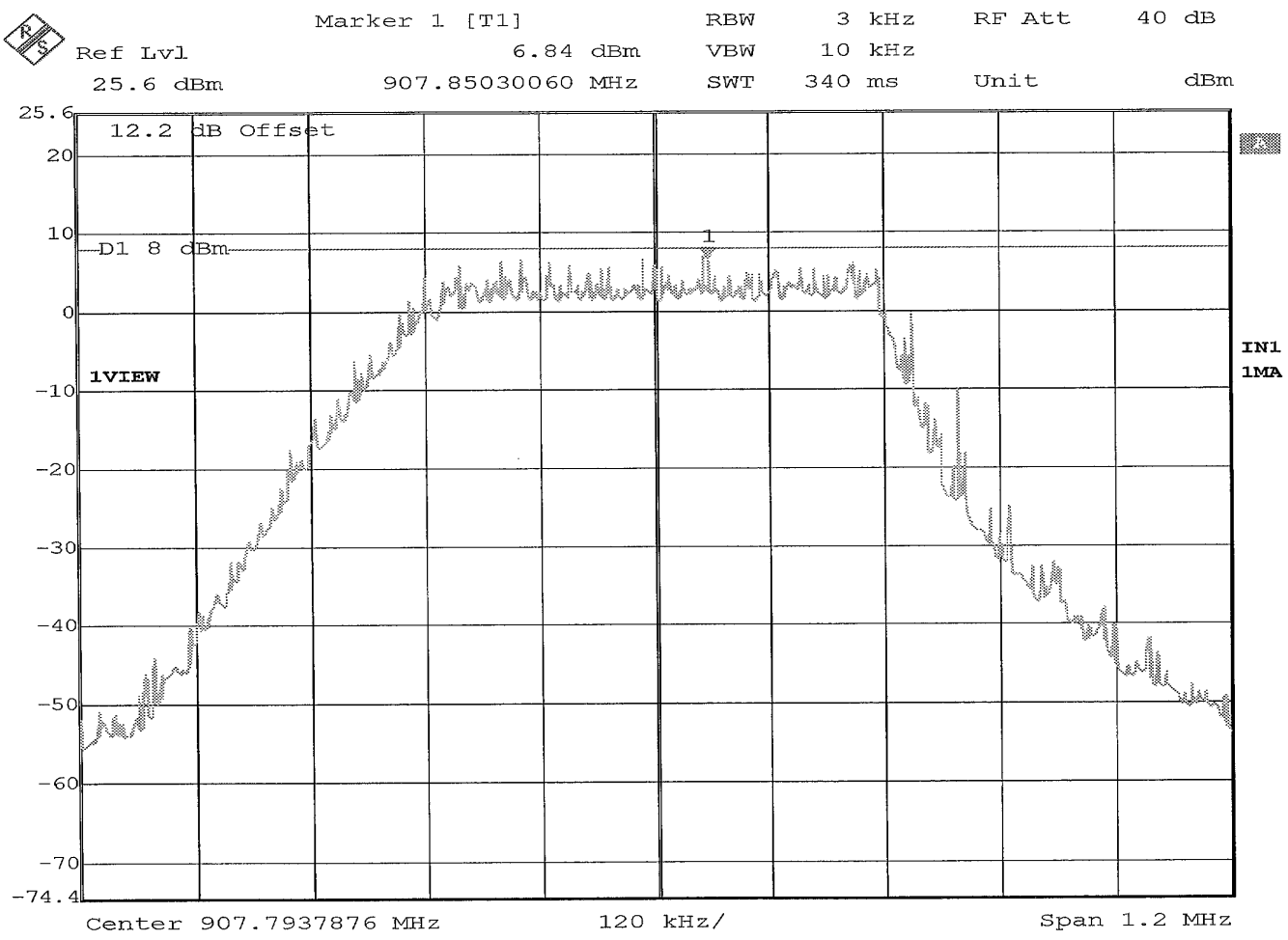
Test Configuration

Power Spectral Density
Test Data

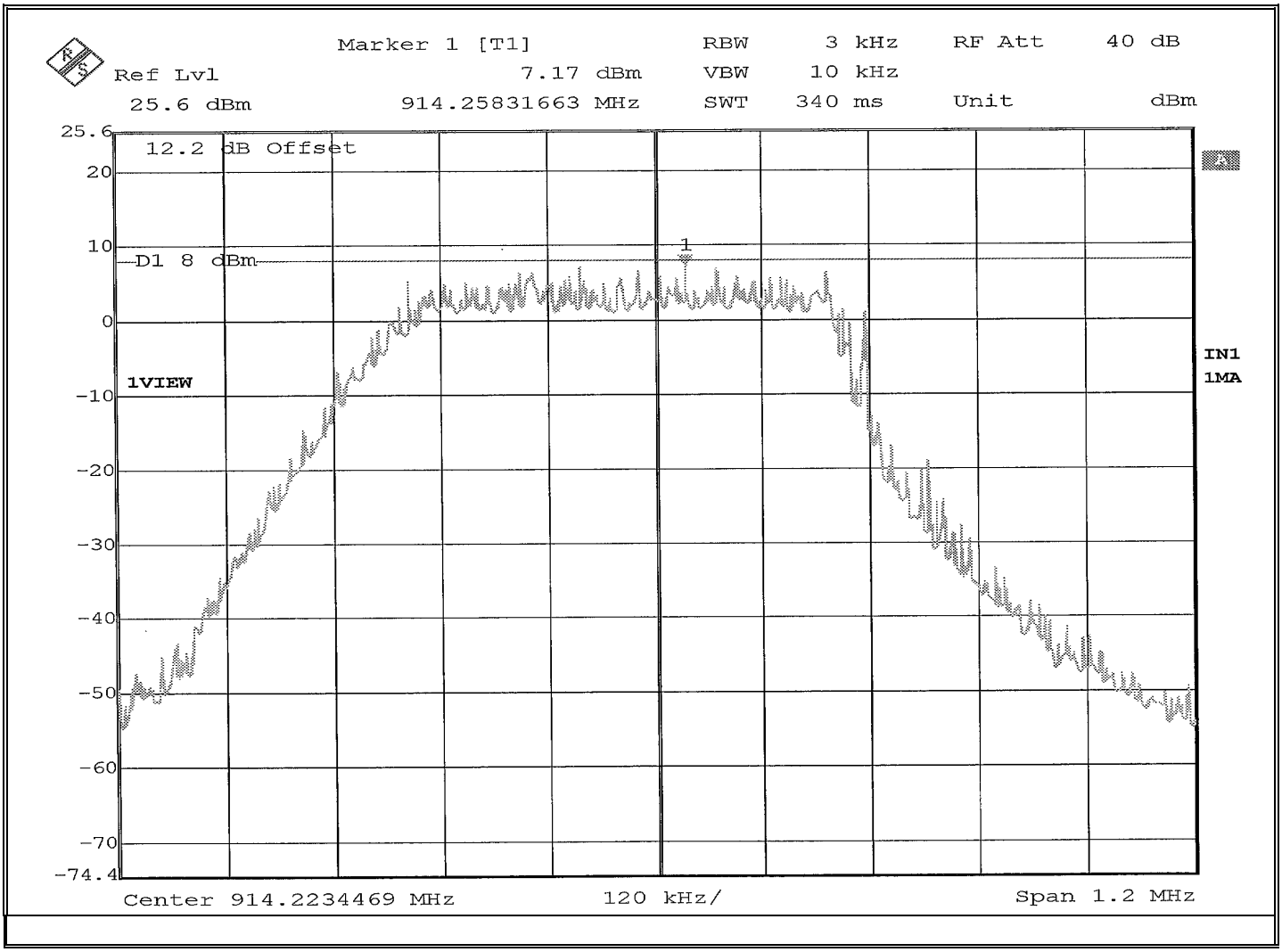
EMISSIONS TEST DATA SHEET	
Method:	**Power Spectral Density**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	Power Spectral Density: 7.25dBm



EMISSIONS TEST DATA SHEET	
Method:	**Power Spectral Density**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	Power Spectral Density: 6.84dBm



EMISSIONS TEST DATA SHEET	
Method:	**Power Spectral Density**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.5°C / 49.5%
Notes:	Power Spectral Density: 7.17dBm



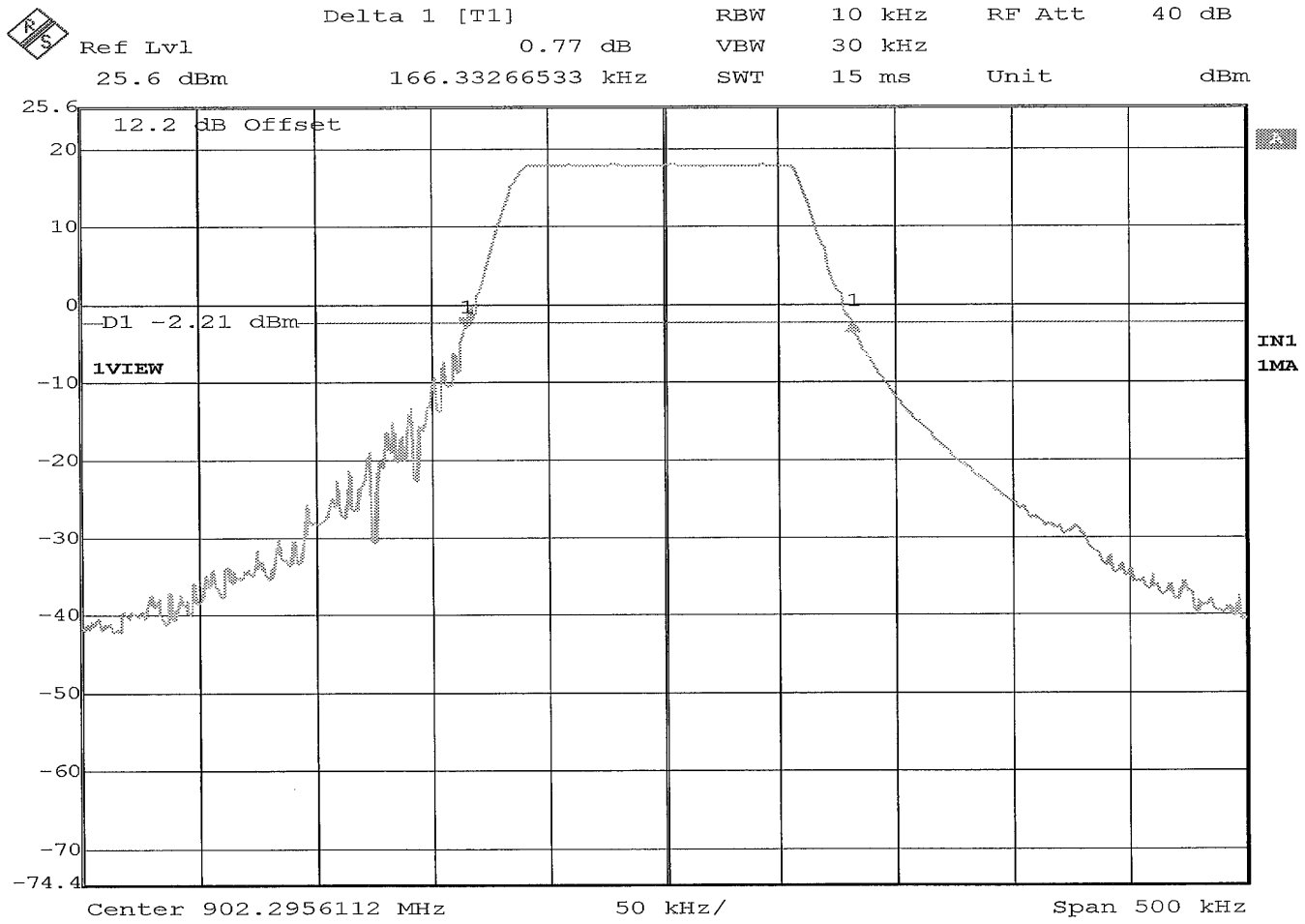
Test Photograph(s)
FHSS Bandwidth
20 dB Bandwidth
FCC Section 15.247(a)(1)

Test Photograph(s)
FHSS Bandwidth
20 dB Bandwidth

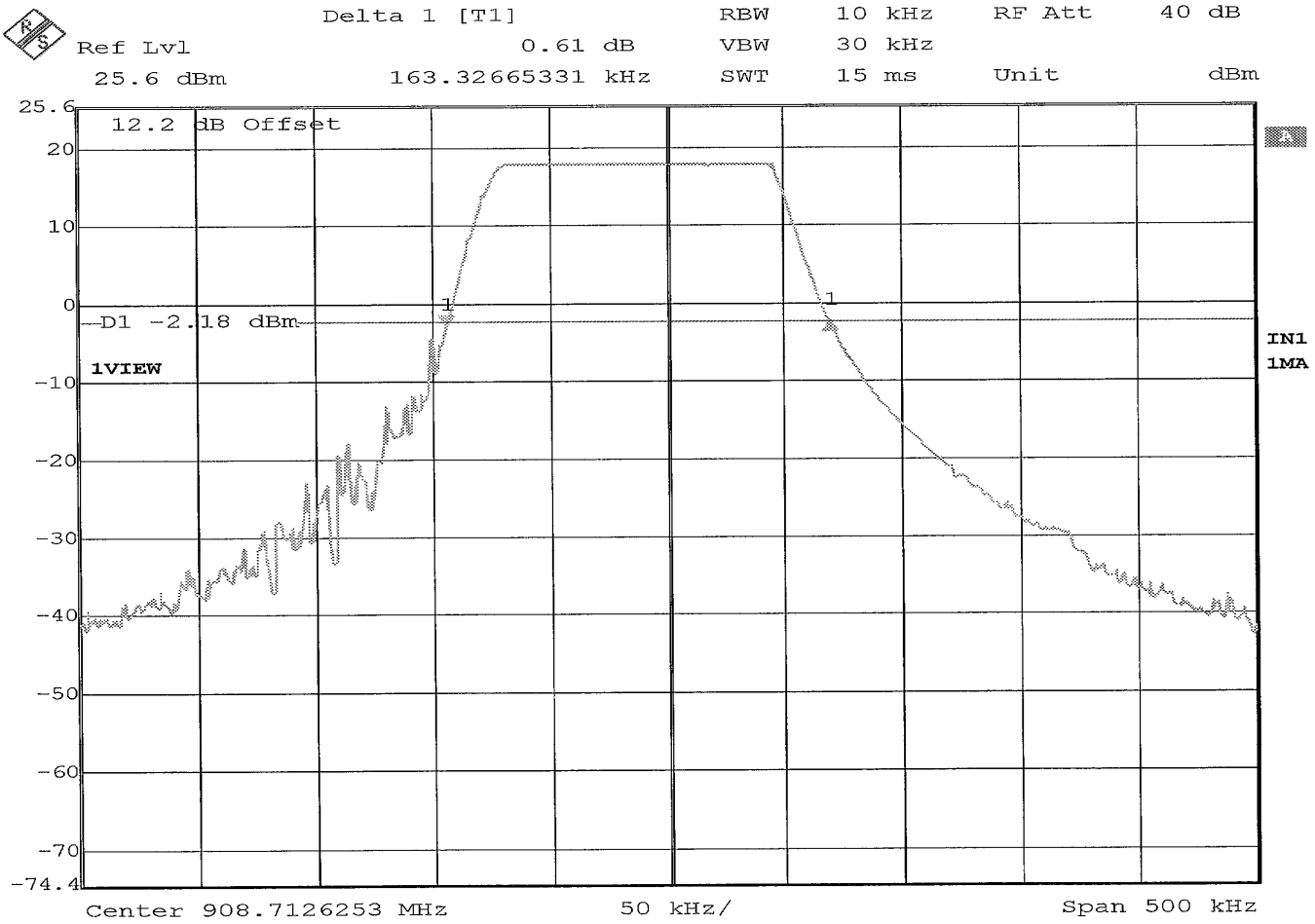
Test Setup

FHSS Bandwidth
20 dB Bandwidth
Test Data

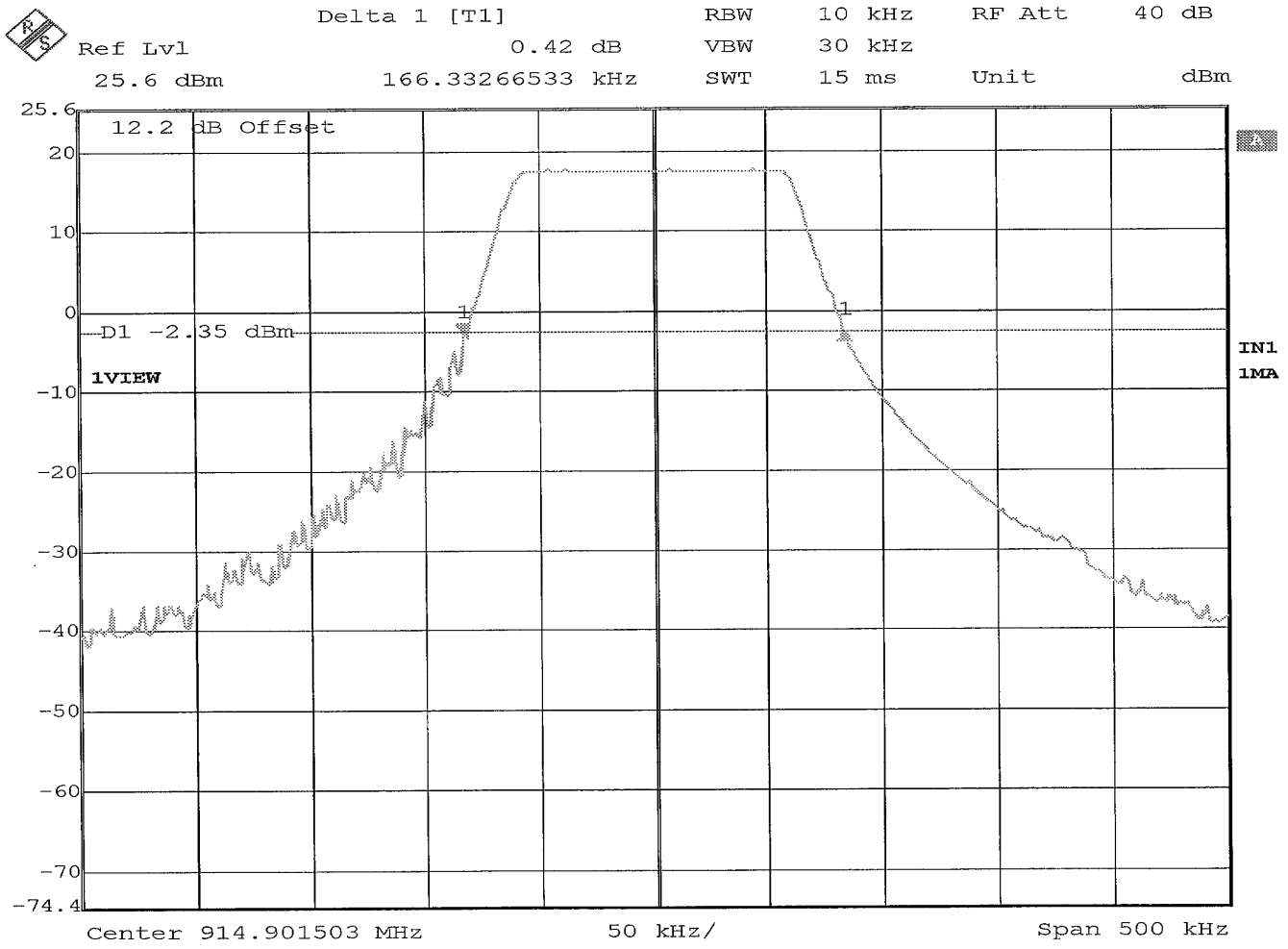
EMISSIONS TEST DATA SHEET	
Method:	**20dB Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	20dB Bandwidth:166.332kHz



EMISSIONS TEST DATA SHEET	
Method:	**20dB Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 908.65MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	20dB Bandwidth:163.326kHz



EMISSIONS TEST DATA SHEET	
Method:	**20dB Bandwidth**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	20dB Bandwidth:166.332kHz



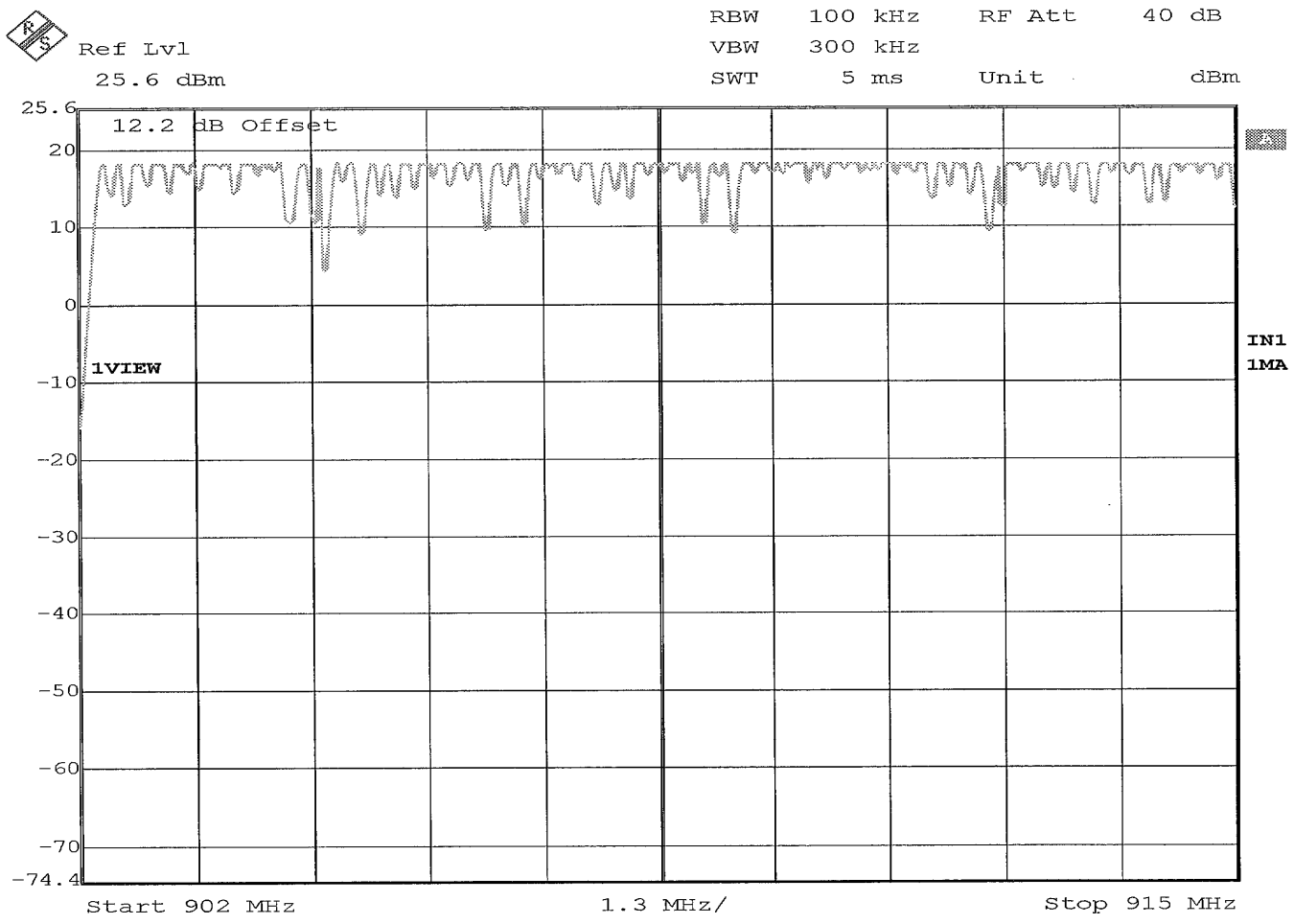
Test Photograph(s)
Number of Hopping Channels and Time of Occupancy
FCC Section 15.247(a)(1)(iii)

Test Photograph(s)
Number of Hopping Channels and Time of Occupancy

Test Setup

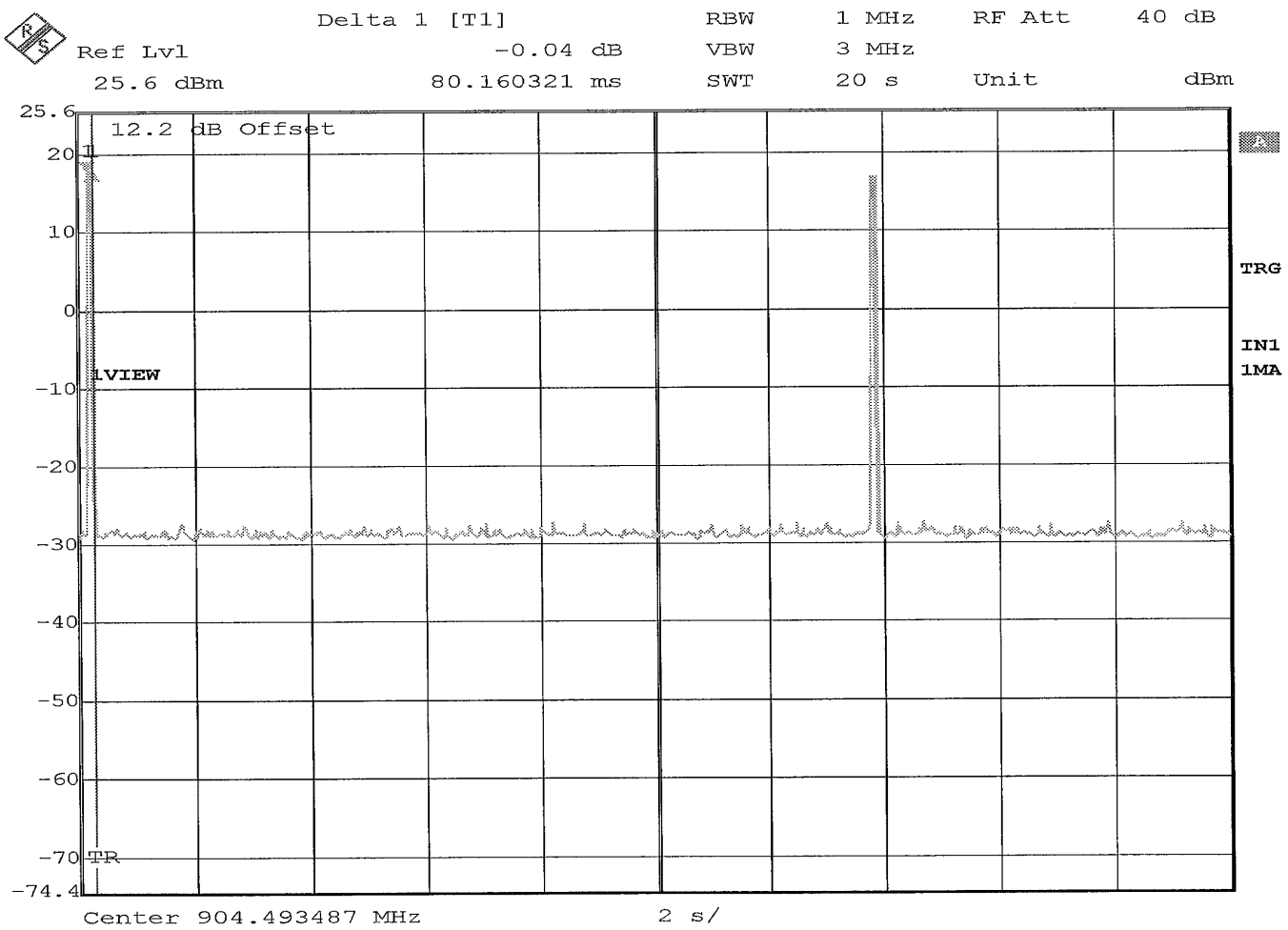
Number of Hopping Channels and Time of Occupancy
Test Data

EMISSIONS TEST DATA SHEET	
Method:	**Number of Hopping Frequencies**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting hopping frequency data
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Number of Hopping Frequencies: 64

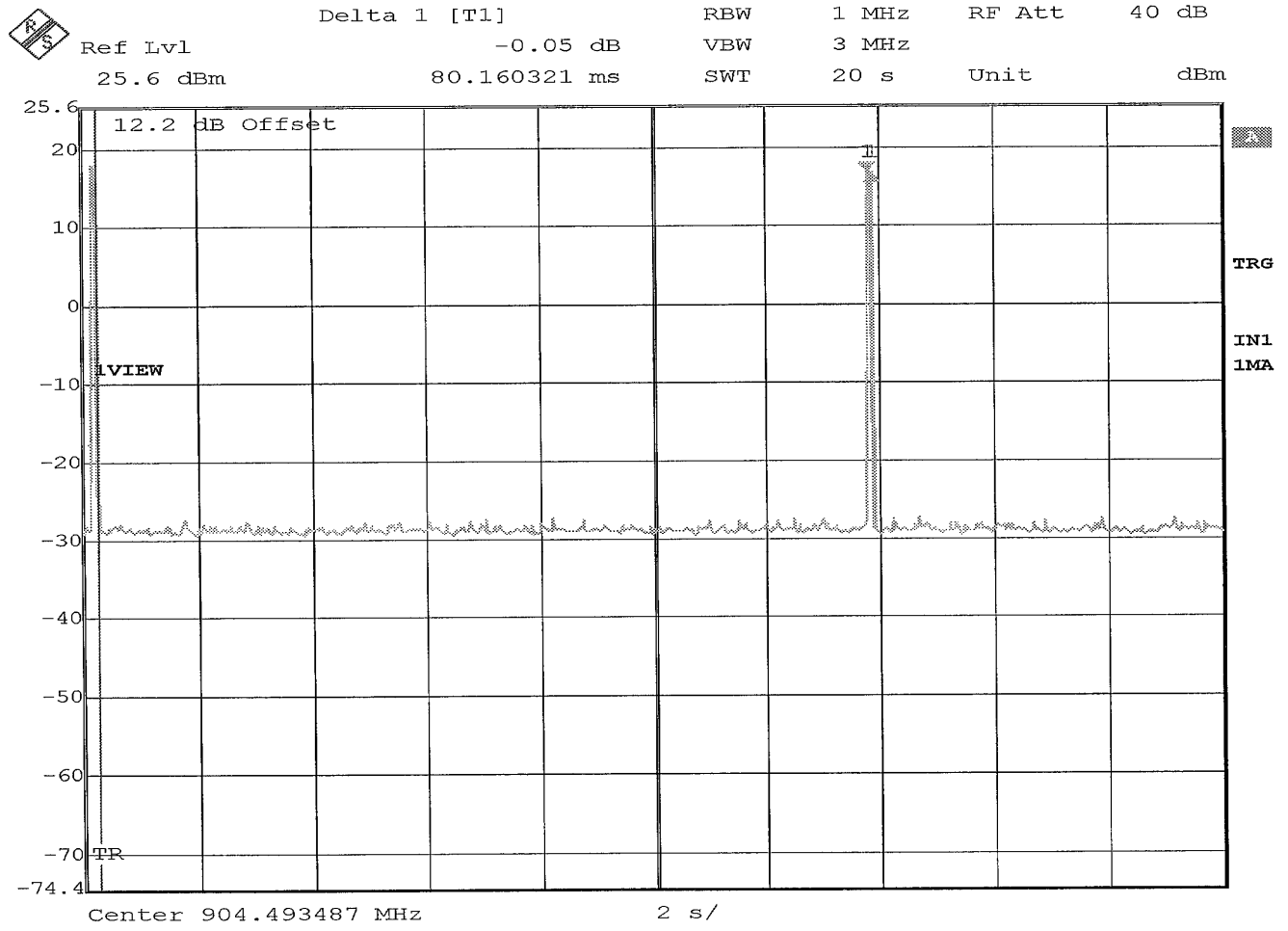


Time of Occupancy
Test Data

EMISSIONS TEST DATA SHEET	
Method:	**Time of Occupancy**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting hopping frequency data
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.6°C / 48.1%
Notes:	Test Frequency: 904.5 MHz Pulse Width: 80.160 ms



EMISSIONS TEST DATA SHEET	
Method:	**Time of Occupancy**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)(i)
Job Number:	R-6233N
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting hopping frequency data
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	23.6°C / 48.1%
Notes:	Test Frequency: 904.5 MHz Pulse Width: 80.160 ms



Test Photograph(s)
Channel Separation
FCC Section 15.247(a)(1)

Test Photograph(s)
Channel Separation

Test Setup

Channel Separation
Test Data

EMISSIONS TEST DATA SHEET	
Method:	**Channel Carrier Frequency Separation**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(1)
Job Number:	R-6233N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001A7D2
Operating Mode:	Transmitting hopping frequency data
Technician:	M.Seamans
Date(s):	August 10th, 2017
Temp/ Relative Humidity:	22.8°C / 56.5%
Notes:	Channel Carrier Frequency Separation: 220.942 kHz