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FCC Part 15, Subpart C, Section 15.247

Class II Permissive Change Test Report

On

LoRa Propane Transmitter

Customer Name: Senet, Inc.

Customer P.O: 1294

Date of Report: February 26, 2018

Test Report No: R-6289N-1

Test Start Date: January 25, 2018

Test Finish Date: February 1, 2018

Test Technician: M. Seamans

Report Approved By: T. Hannemann

Report Prepared By: J. Ramsey

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Technical Information

Report Number:	R-6289N-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:	0005922-2001AAB2 (Radiated) 0005922-2001AAE9C6 (Conducted)
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(b)(3)	Power Output
15.247(d)	Out of Band/Band Edge Radiated Emissions
FHSS Test Methods Performed	
15.247(b)(3)	Power Output
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
-	February 26, 2018	Original Release

Requirements and Test Results

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 63.24 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.

  The measured peak conducted output power did not exceed the power on the original grant.

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 51.40 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.

  The measured peak conducted output power did not exceed the power on the original grant.

Requirements and Test Results (con't)

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).

EQUIPMENT LISTS

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	10/17/2017	10/31/2018
5134	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	12/6/2017	12/31/2018

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	9/21/2017	3/31/2019
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	10/17/2017	10/31/2018
5188	Cybertron	COMPUTER, CONTROL	N/A	TSVQJA2221	No Calibration Required	

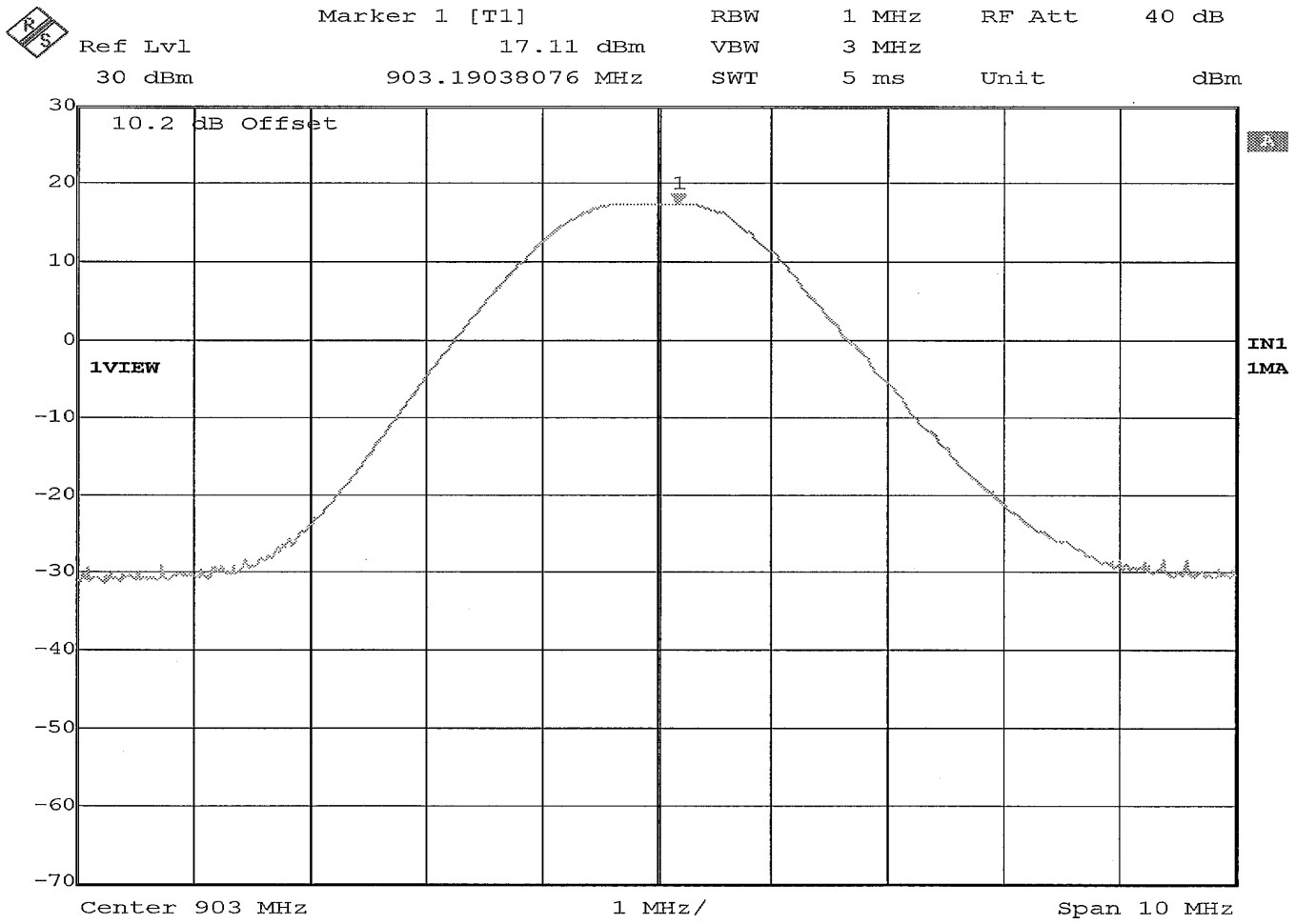
Test Photograph(s)
Power Output
FCC Section 15.247(b)(3)

Test Photograph(s)
Power Output

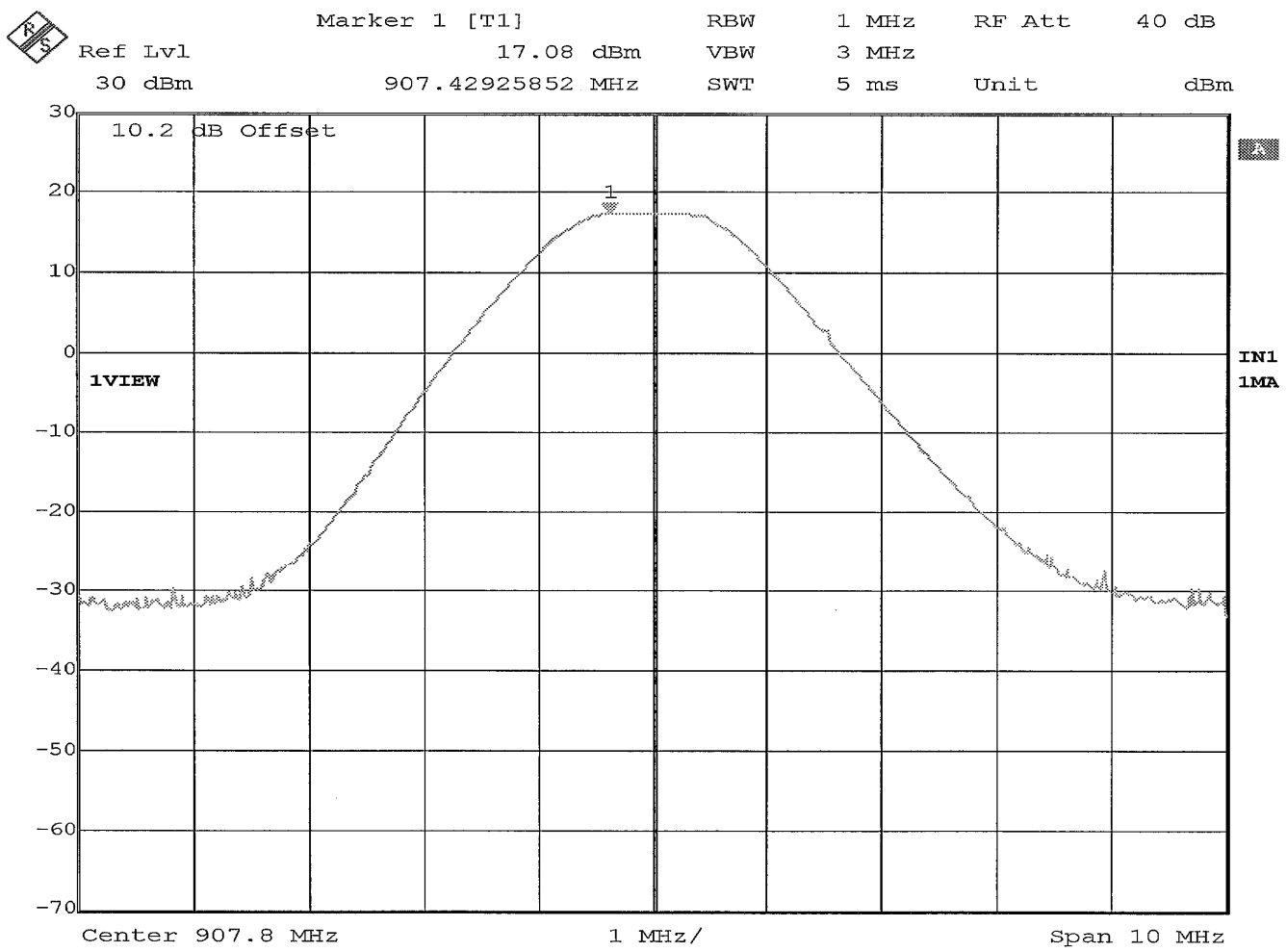
Test Setup, DTS & FHSS

Power Output
DTS Test Data

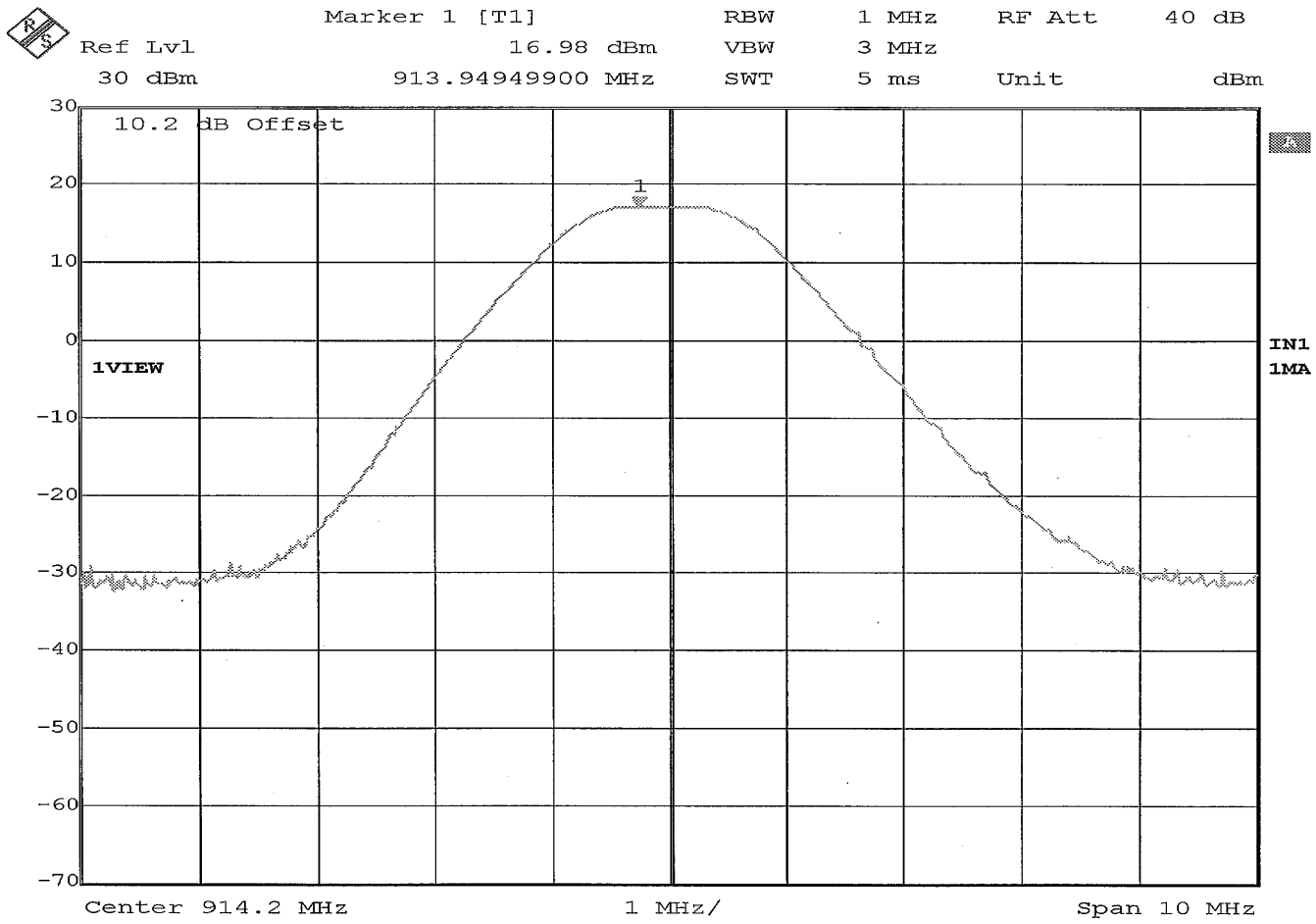
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated(DTS) signal at 903MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Power Output: 17.11 dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated(DTS) signal at 907.8MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Power Output: 17.08 dBm



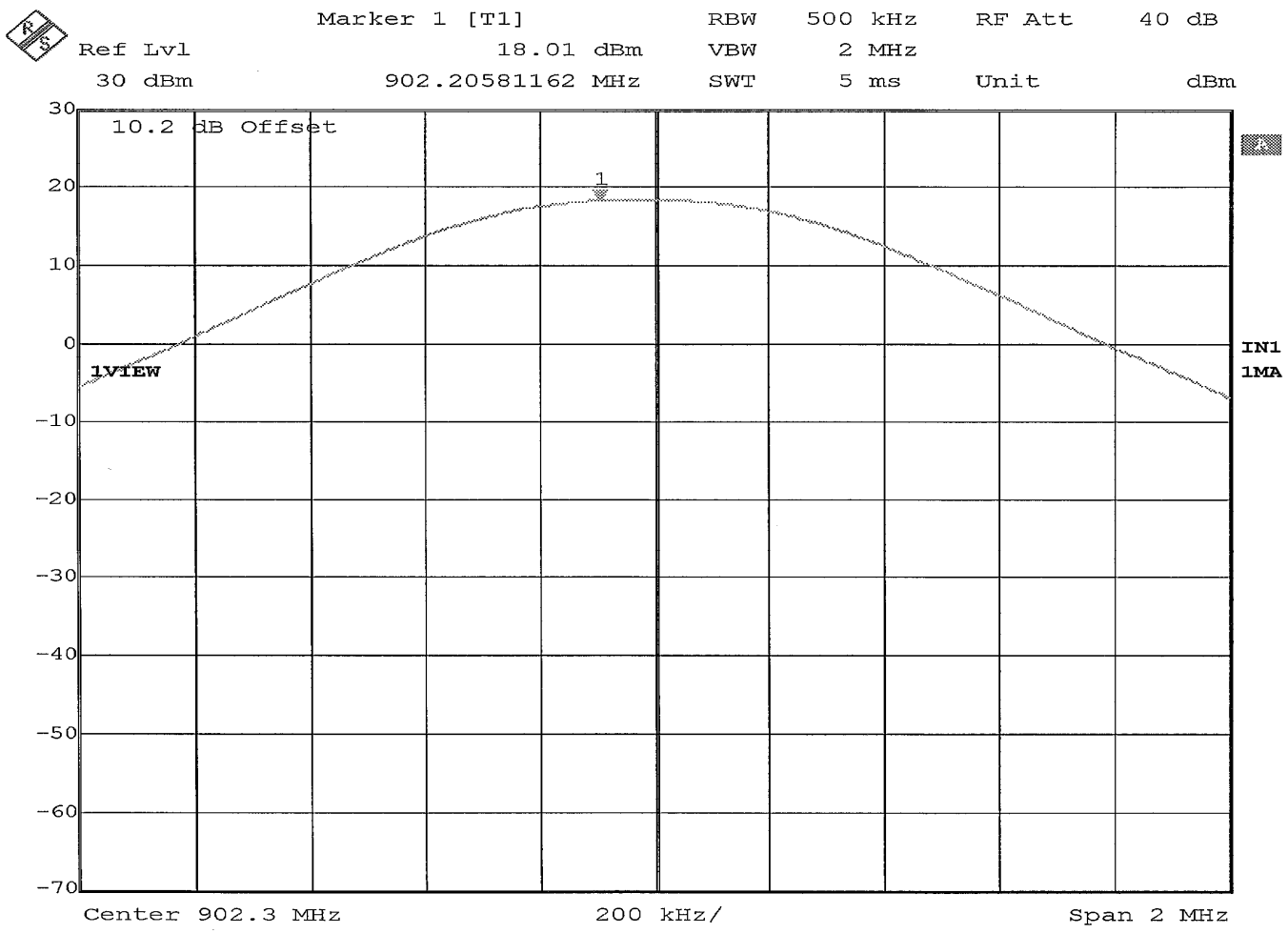
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated(DTS) signal at 914.2MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Power Output: 16.98 dBm



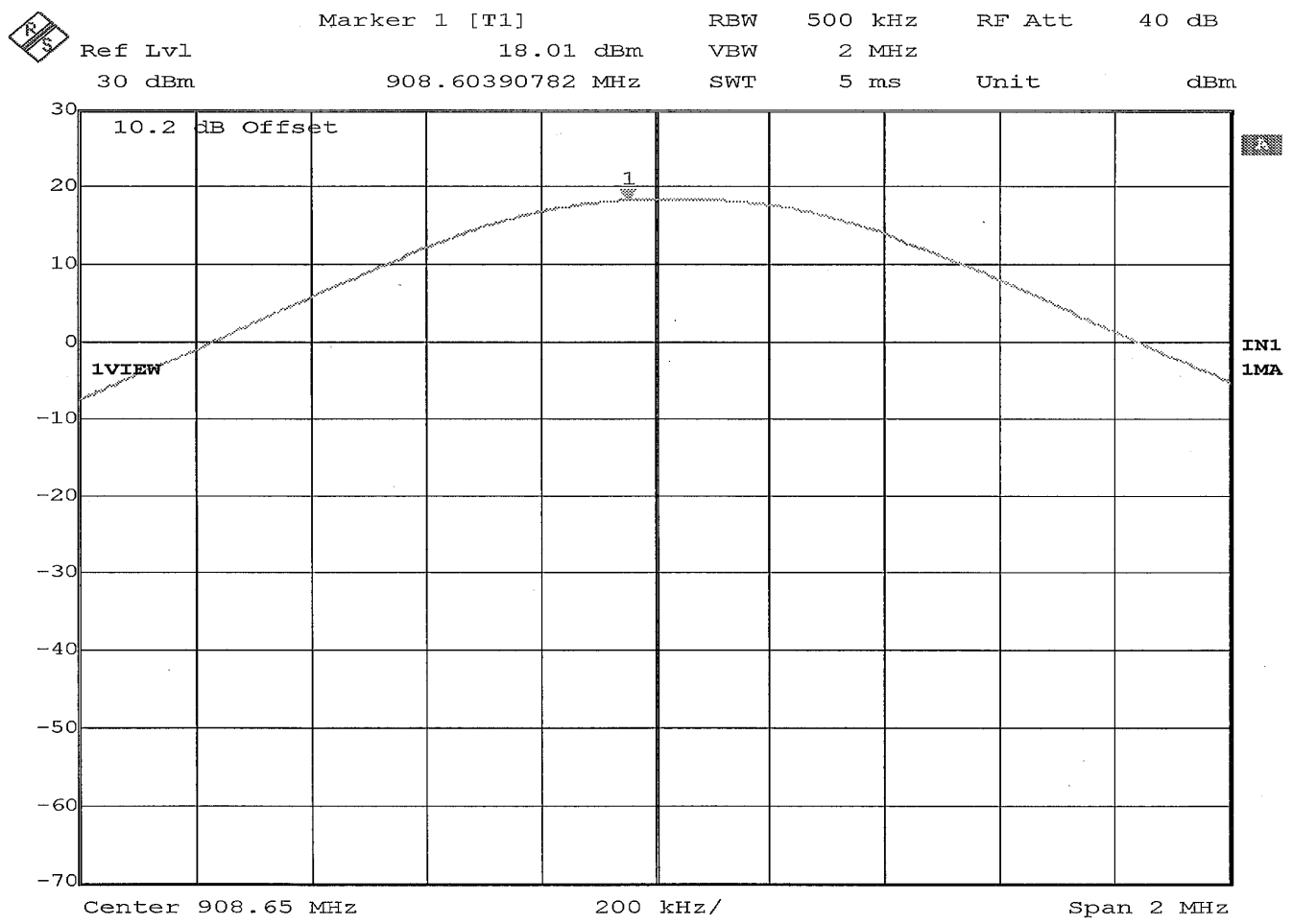
Power Output

FHSS Test Data

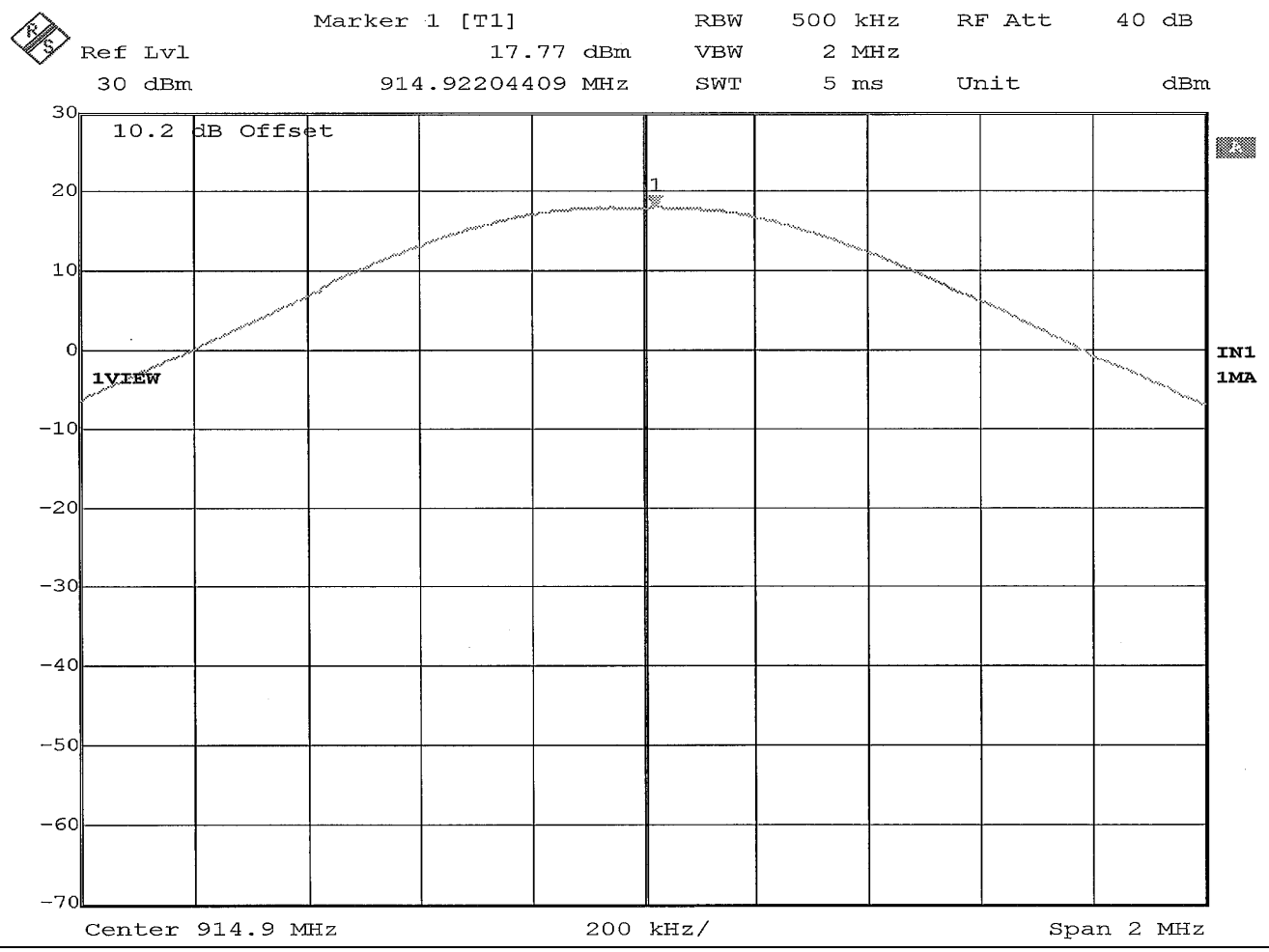
EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated (FHSS) signal at 902.3MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Peak Power Output:18.01 dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated (FHSS) signal at 908.65MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Peak Power Output:18.01 dBm



EMISSIONS TEST DATA SHEET	
Method:	**Peak Power Output**
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-6289N-1
Customer:	Senet, Inc.
Test Sample:	Lora Propane Transmitter
Model Number:	0005922
Serial Number:	0005922-2001AAE9C6
Operating Mode:	Transmitting modulated (FHSS) signal at 914.9MHz
Technician:	M.Seamans
Date(s):	February 1st, 2018
Temp/ Relative Humidity:	21.6 °C / 17.1 %
Notes:	Peak Power Output:17.77 dBm



Test Photograph(s) - DTS
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

Test Photograph(s) - FHSS
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-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	7.38	14.42	21.80			12.30	I
38.25	-	-	-	-			-	100.00
73.00	-	-	-	-			-	100.00
|	74.00*	14.97	8.73	23.70			15.31	I
75.20	-	-	-	-			-	100.00
108.00	-	-	-	-			-	150.00
|	115.00*	8.33	9.87	18.20			8.13	I
121.94	-	-	-	-			-	150.00
123.00	-	-	-	-			-	150.00
|	130.00*	11.18	9.72	20.90			11.09	|
138.00	-	-	-	-			-	150.00
149.90	-	-	-	-			-	150.00
|	150.00*	3.63	11.97	15.60			6.03	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).

Data Sheet 1 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	2.84	12.84	15.30			5.82	|
156.52525	-	-	-	-			-	150.00
156.70	-	-	-	-			-	150.00
|	156.80*	2.23	12.87	15.10			5.69	|
156.90	-	-	-	-			-	150.00
162.0125	-	-	-	-			-	150.00
|	165.00*	4.03	13.57	17.60			7.59	|
167.1700	-	-	-	-			-	150.00
167.72	-	-	-	-			-	150.00
|	170.00*	3.33	13.97	17.30			7.33	|
173.20	-	-	-	-			-	150.00
240.00	-	-	-	-			-	200.00
|	260.00*	-2.92	18.92	16.00			6.31	|
285.00	-	-	-	-			-	200.00
322.00	-	-	-	-			-	200.00
|	330.00*	-4.15	22.05	17.90			7.85	|

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 2 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	-7.10	24.70	17.60			7.59	|
410.00	-	-	-	-			-	200.00
608.00	-	-	-	-			-	200.00
|	611.00*	-7.47	30.97	23.50			14.96	|
614.00	-	-	-	-			-	200.00
960.00	-	-	-	-			-	500.00
|	975.00*	-5.29	36.79	31.50			37.28	|
1240.00	-	-	-	-			-	500.00
1300.00	-	-	-	-			-	500.00
|	1350.00*	31.90	-9.40	22.50			13.34	|
1427.00	-	-	-	-			-	500.00
1435.00	-	-	-	-			-	500.00
|	1500.00*	31.77	-8.64	23.13			14.34	|
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).

Data Sheet 3 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	31.59	-7.85	23.74			15.38	|
1710.00	-	-	-	-			-	500.00
1718.80	-	-	-	-			-	500.00
|	1720.00*	31.20	-7.65	23.55			15.05	|
1722.20	-	-	-	-			-	500.00
2200.00	-	-	-	-			-	500.00
|	2250.00*	30.88	-5.78	25.10			17.99	|
2300.00	-	-	-	-			-	500.00
2310.00	-	-	-	-			-	500.00
|	2360.00*	30.74	-5.46	25.28			18.37	|
2390.00	-	-	-	-			-	500.00
2483.50	-	-	-	-			-	500.00
|	2490.00*	30.60	-5.11	25.49			18.81	|
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).

Data Sheet 4 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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	54.01	-4.54	49.47			297.51	|
|	2723.40	52.57	-4.51	48.06			252.93	|
|	2742.60	50.85	-4.46	46.39			208.69	|
2900.00	-	-	-	-			-	500.00
3260.00	-	-	-	-			-	500.00
|	3263.00*	30.67	-2.88	27.79			24.52	|
3267.00	-	-	-	-			-	500.00
3332.00	-	-	-	-			-	500.00
|	3336.00*	30.77	-2.62	28.15			25.56	|
3339.00	-	-	-	-			-	500.00
3345.80	-	-	-	-			-	500.00
|	3350.00*	30.19	-2.57	27.62			24.04	|
3358.00	-	-	-	-			-	500.00
3600.00	-	-	-	-			-	500.00
|	3612.00	38.81	-1.68	37.13			71.86	|
|	3631.20	38.69	-1.62	37.07			71.37	|
|	3656.80	39.35	-1.53	37.82			77.80	|

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).

Data Sheet 5 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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	43.30	0.02	43.32			146.55	|
|	4539.00	41.25	0.04	41.29			116.01	|
|	4571.00	41.50	0.07	41.57			119.81	|
5150.00	-	-	-	-			-	500.00
5350.00	-	-	-	-			-	500.00
|	5418.00	40.18	0.94	41.12			113.76	|
|	5446.80	39.94	0.98	40.92				
5460.00	-	--	-	-			-	500.00
7250.00	-	-	-	-			-	500.00
|	7262.40	37.57	3.49	41.06			111.17	
|	7313.00	38.98	3.58	42.56				
7750.00	-	-	-	-			-	500.00
8025.00	-	-	-	-			-	500.00
|	8127.00	40.56	4.27	44.83			112.98	|
|	8170.20	39.04	4.32	43.36			147.23	|

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).

Data Sheet 6 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated(DTS) signal	
Technician	M. Seamans	
Date	January 25th, 2018	

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
|	8226.00	38.84	4.37	43.21			144.71	|
8500.00	-	-	-	-			-	500.00
9000.00	-	-	-	-			-	500.00
|	9030.00	42.20	5.03	47.23			229.88	|
|	9142.00	41.54	5.08	46.62			214.29	|
9200.00	-	-	-	-			-	500.00
9300.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
10000.00	-	-	-	-			-	500.00

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).

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-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Model Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	7.38	14.42	21.80			12.30	I
38.25	-	-	-	-			-	100.00
73.00	-	-	-	-			-	100.00
|	74.00*	14.97	8.73	23.70			15.31	I
75.20	-	-	-	-			-	100.00
108.00	-	-	-	-			-	150.00
|	115.00*	8.33	9.87	18.20			8.13	I
121.94	-	-	-	-			-	150.00
123.00	-	-	-	-			-	150.00
|	130.00*	11.18	9.72	20.90			11.09	|
138.00	-	-	-	-			-	150.00
149.90	-	-	-	-			-	150.00
|	150.00*	3.63	11.97	15.60			6.03	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).

Data Sheet 1 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	2.84	12.84	15.30			5.82	|
156.52525	-	-	-	-			-	150.00
156.70	-	-	-	-			-	150.00
|	156.80*	2.23	12.87	15.10			5.69	|
156.90	-	-	-	-			-	150.00
162.0125	-	-	-	-			-	150.00
|	165.00*	4.03	13.57	17.60			7.59	|
167.1700	-	-	-	-			-	150.00
167.72	-	-	-	-			-	150.00
|	170.00*	3.33	13.97	17.30			7.33	|
173.20	-	-	-	-			-	150.00
240.00	-	-	-	-			-	200.00
|	260.00*	-2.92	18.92	16.00			6.31	|
285.00	-	-	-	-			-	200.00
322.00	-	-	-	-			-	200.00
|	330.00*	-4.15	22.05	17.90			7.85	|

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 2 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	-7.10	24.70	17.60			7.59	|
410.00	-	-	-	-			-	200.00
608.00	-	-	-	-			-	200.00
|	611.00*	-7.47	30.97	23.50			14.96	|
614.00	-	-	-	-			-	200.00
960.00	-	-	-	-			-	500.00
|	975.00*	-5.29	36.79	31.50			37.28	|
1240.00	-	-	-	-			-	500.00
1300.00	-	-	-	-			-	500.00
|	1350.00*	31.90	-9.40	22.50			13.34	|
1427.00	-	-	-	-			-	500.00
1435.00	-	-	-	-			-	500.00
|	1500.00*	31.77	-8.64	23.13			14.34	|
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).

Data Sheet 3 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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*	31.59	-7.85	23.74			15.38	|
1710.00	-	-	-	-			-	500.00
1718.80	-	-	-	-			-	500.00
|	1720.00*	31.20	-7.65	23.55			15.05	|
1722.20	-	-	-	-			-	500.00
2200.00	-	-	-	-			-	500.00
|	2250.00*	30.88	-5.78	25.10			17.99	|
2300.00	-	-	-	-			-	500.00
2310.00	-	-	-	-			-	500.00
|	2360.00*	30.74	-5.46	25.28			18.37	|
2390.00	-	-	-	-			-	500.00
2483.50	-	-	-	-			-	500.00
|	2490.00*	30.60	-5.11	25.49			18.81	|
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).

Data Sheet 4 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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	53.75	-4.65	49.10			285.10	|
|	2725.50	55.25	-4.65	50.60			338.84	|
|	2744.70	55.61	-4.65	50.96			353.18	|
2900.00	-	-	-	-			-	500.00
3260.00	-	-	-	-			-	500.00
|	3263.00*	30.67	-2.88	27.79			24.52	|
3267.00	-	-	-	-			-	500.00
3332.00	-	-	-	-			-	500.00
|	3336.00*	30.77	-2.62	28.15			25.56	|
3339.00	-	-	-	-			-	500.00
3345.80	-	-	-	-			-	500.00
|	3350.00*	30.19	-2.57	27.62			24.04	|
3358.00	-	-	-	-			-	500.00
3600.00	-	-	-	-			-	500.00
|	3609.02	45.25	-1.69	43.56			150.66	|
|	3634.00	47.86	-1.61	46.25			205.35	|
|	3659.90	47.91	-1.53	46.38			208.45	|

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).

Data Sheet 5 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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	49.23	0.02	49.25			290.07	|
|	4542.50	48.72	0.05	48.77			274.47	|
|	4574.50	46.93	0.08	47.01			224.13	|
5150.00	-	-	-	-			-	500.00
5350.00	-	-	-	-			-	500.00
|	5413.80	36.07	0.94	37.01			70.88	|
|	5451.00	34.19	0.98	35.17			57.35	
5460.00	-	--	-	-			-	500.00
7250.00	-	-	-	-			-	500.00
|	7268.00*	32.02	3.49	35.51			59.63	
|	7319.20*	32.28	3.58	35.86			62.09	
7750.00	-	-	-	-			-	500.00
8025.00	-	-	-	-			-	500.00
|	8120.70	43.46	4.27	47.73			243.50	|
|	8176.50	44.19	4.32	48.51			266.38	|

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).

Data Sheet 6 of 7

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	**Restricted Band Emissions 25 MHz to 10 GHz**	
Customer	R-6289N-1	
Job Number	Senet, Inc.	
Test Sample	Lora Propane Transmitter	
Part Number	0005922	
Serial Number	0005922-2001AAB2	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting hopping frequency data	
Technician	M. Seamans	
Date	January 25th, 2018	

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	43.75	4.37	48.12			254.68	|
8500.00	-	-	-	-			-	500.00
9000.00	-	-	-	-			-	500.00
|	9023.00	42.50	5.03	47.53			237.96	|
|	9085.00	41.35	5.08	46.43			209.65	|
9200.00	-	-	-	-			-	500.00
9300.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
10000.00	-	-	-	-			-	500.00

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).

Data Sheet 7 of 7