

## **Radio Test Report**

**FCC Part 90**  
**896-901 MHz, 929-930 MHz & 935-940 MHz**  
**FCC Part 101**  
**928-960 MHz**  
**and RSS-119**  
**896-901MHz, 928-929 MHz, 931-935 MHz, 941-944 MHz, &**  
**952-953 MHz**

**Model: LN900**

COMPANY: GE MDS LLC  
175 Science Parkway  
Rochester, NY 14620

TEST SITE(S): National Technical Systems - Silicon Valley  
41039 Boyce Road.  
Fremont, CA. 94538-2435

REPORT DATE: June 7, 2016

FINAL TEST DATES: May 23, 24 and 26, 2016

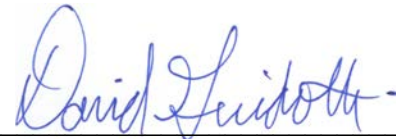
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**REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	June 7, 2016	First release	

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**SCOPE**

Tests have been performed on the GE MDS LLC model LN900, pursuant to the relevant requirements of the following standard(s) in order to obtain device certification against the regulatory requirements of the Federal Communications Commission and Innovation Science and Economic Development Canada.

- Code of Federal Regulations (CFR) Title 47 Part 2
- RSS-Gen Issue 4, November 2014
- CFR 47 Part 90 (Private Land Mobile Radio Service) Subparts P and S
- CFR 47 Part 101 (Fixed Microwave Service) Subpart C
- RSS-119, Issue 12, May 2015 (Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz)

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.4:2014

ANSI TIA-603-D June 2010

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Innovation Science and Economic Development Canada performance and procedural standards.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the GE MDS LLC model LN900 and therefore apply only to the tested sample. The sample was selected and prepared by Dennis McCarthy of GE MDS LLC.

**OBJECTIVE**

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, the device requires certification. Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

**STATEMENT OF COMPLIANCE**

The tested sample of GE MDS LLC model LN900 complied with the requirements of the standards and frequency bands declared in the scope of this test report.

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

**DEVIATIONS FROM THE STANDARDS**

No deviations were made from the published requirements listed in the scope of this report.

## TEST RESULTS

### FCC Part 90

FCC		Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) § 90.35		Frequency range(s)	896-901 MHz, 929-930 MHz & 935-940 MHz	896-901 MHz, 929-930 MHz & 935-940 MHz	Complied
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 90.205 § 90.635		RF power output at the antenna terminals	40.7 dBm	100 Watts (50 dBm)	Complied
§2.1033 (c) (4) § 2.1047 § 90.210		Emission types	F1D, F2D, F3D, 3-Level FSK		
		Emission mask G and J	Within mask	Shall be within mask	Complied
§ 2.1049 § 90.209		Occupied Bandwidth	10.2 kHz 15.4 kHz	11.25 kHz 20 kHz	Complied
Transmitter spurious emissions					
§ 2.1051 § 2.1057		At the antenna terminals	Complies, no change from original filing		
§ 2.1053 § 2.1057		Field strength	Complies, no change from original filing		
Other details					
§ 2.1055 § 90.213	RSS-119	Frequency stability	Complies, No change from original filing		
§ 2.1093	RSS-102	RF Exposure	Complies, no change from original filing		
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	No change from original filing 34.5 VDC, 755 mA		
-	-	Antenna Gain	Maximum 16.5 dbi		
Notes					

**FCC Part 101**

FCC		Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) § 101.101		Frequency range(s)	928-960 MHz	928-960 MHz	Complied
		RF power output at the antenna terminals	40.7 dBm	-	-
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 101.113		EIRP	40.7 dBm to 57.4 dBm	44 to 70 dBm	Complied
§2.1033 (c) (4) § 2.1047 § 101.111		Emission types	F1D, F2D, F3D, 3-Level FSK		
		Emission mask 101.111(a)(5) or (a)(6)	Within Mask	Shall be within mask	Complied
§ 2.1049 § 101.109 § 101.147		Occupied Bandwidth	10.2 kHz 15.4 kHz	12.5 kHz 25 kHz	Complied
Transmitter spurious emissions					
§ 2.1051 § 2.1057 § 101.111		At the antenna terminals	Complies, no change from original filing		
§ 2.1053 § 2.1057 § 101.111		Field strength	Complies, no change from original filing		
Other details					
§ 2.1055 § 101.107		Frequency stability	Complies, No change from original filing		
§ 2.1093		RF Exposure	Complies, no change from original filing		
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	No change from original filing 34.5 VDC, 755 mA		
-	-	Antenna Gain	Maximum 16.5 dBi		
Notes					

**RSS-119**

Canada		Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
RSS-119		Frequency range(s)	896-901 MHz, 935-940 MHz, 928-930 MHz, 931-935 MHz, 952-953 MHz, 941-944 MHz	896-901 MHz, 935-940 MHz, 928-930 MHz, 931-935 MHz, 952-953 MHz, 941-944 MHz	Complied
RSS-119, 5.4SRSP 504, -505, -506, & -507		RF power output at the antenna terminals	40.8 dBm	30 Watts (44.8 dBm)	Complied
RSS-119, 5.8		Emission types	F1D, F2D, F3D, 3-Level FSK		
		Emission mask D, G and J	Within mask	Shall be within mask	Complied
RSS-119, 5.5	896-901/935- 940 MHz	Occupied Bandwidth	10.2 kHz	13.6 kHz	Complied
RSS-119, 5.5	929-930 and 931-932 MHz	Occupied Bandwidth	10.2 and 15.4 kHz	20 kHz	Complied
RSS-119, 5.5	All other bands	Occupied Bandwidth	10.2 and 15.4 kHz	11.25 & 20 kHz	Complied
Transmitter spurious emissions					
RSS-119, 5.8		At the antenna terminals	Complies, no change from original filing		
RSS-119, 5.8		Field strength	Complies, no change from original filing		
Other details					
RSS-119, 5.3		Frequency stability	Complies, No change from original filing		
RSS-102		RF Exposure	Complies, no change from original filing, see separate RSS-102 exhibit		
-		Antenna Gain	Maximum 16.5 dBi		
Notes:					

**MEASUREMENT UNCERTAINTIES**

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7,000 MHz	$1.7 \times 10^{-7}$
RF power, conducted	dBm	25 to 7,000 MHz	$\pm 0.52$ dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	$\pm 0.7$ dB

**EQUIPMENT UNDER TEST (EUT) DETAILS****GENERAL**

The GE MDS LLC model LN900 is an industrial radio module operating in 900 MHz bands and uses QAM and 3-level FSK modulations. Since the EUT could be placed in any position during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 10.0-60.0 Volts DC, 1.5 Amps max.

The sample was received on May 23, 2016 and tested on May 23, 24 and 26, 2016. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
GE MDS LLC	LN900	Industrial Radio Module	2733895	E5MDS-LN900

**OTHER EUT DETAILS**

The following EUT details should be noted: New modulations to add are 9600 (12.5kHz BW) and 19200 (25.0kHz BW) BAUD 3-level FSK modems. Original certification was for 4800 (6.25 kHz BW), 9600 (12.5 kHz BW) and 19200 (25 kHz BW) BAUD QAM modems. The host product in which this product will be used "Orbit MCR" is rated from -40°C to +70°C, 10-60 VDC input.

**ENCLOSURE**

The EUT does not have an enclosure as it is intended to be installed in a complete product. The PCB measures approximately 11 cm wide by 3.8 cm deep 0.6 cm high.

**MODIFICATIONS**

No modifications were made to the EUT during the time the product was at National Technical Systems - Silicon Valley.

**SUPPORT EQUIPMENT**

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
HP	Pavilion dv6000	Laptop	CNF73411TQ	-
HP	6024A	Power Supply	2430A-03013	-

**EUT INTERFACE PORTS**

The I/O cabling configuration during testing was as follows:

Port	Connected To	Description	Cable(s)	Length(m)
			Shielded or Unshielded	
COM1	Laptop	Cat 5	Unshielded	1.0
Power	Power Supply	Single leads	Unshielded	1.2

**EUT OPERATION**

During testing, the EUT was configured to transmit continuously at the selected frequency, power and modulation.

## TESTING

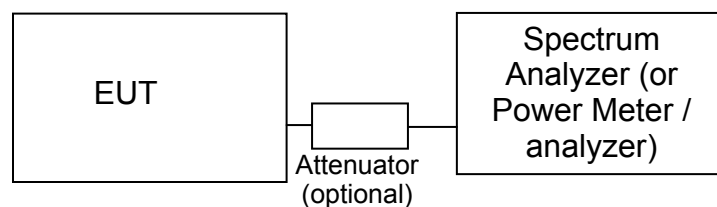
### GENERAL INFORMATION

Antenna port measurements were taken at the National Technical Systems - Silicon Valley test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

### RF PORT MEASUREMENT PROCEDURES

Conducted measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer, power meter or modulation analyzer. When required an attenuator, filter and/or dc block is placed between the EUT and the spectrum analyzer to avoid overloading the front end of the measurement device. Measurements are corrected for the insertion loss of the attenuators and cables inserted between the rf port of the EUT and the measurement equipment.



Test Configuration for Antenna Port Measurements

For devices with an integral antenna the output power and spurious emissions are measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using a substitution measurement (refer to **Error! Reference source not found.**). All other measurements are made as detailed below but with the test equipment connected to a measurement antenna directed at the EUT.

### OUTPUT POWER

Output power is measured using a power meter and an average sensor head, a spectrum analyzer or a power meter and peak power sensor head as required by the relevant rule part(s). Where necessary measurements are gated to ensure power is only measured over periods that the device is transmitting.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

**BANDWIDTH MEASUREMENTS**

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS-GEN. The measurement bandwidth is set to be at least 1% of the instrument's frequency span.

**CONDUCTED SPURIOUS EMISSIONS**

Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode measurements). Where the limits are expressed as an average power the spectrum analyzer is tuned to that frequency with a narrow span (wide enough to capture the emission and its sidebands) and the resolution and video bandwidths are adjusted as required by the reference measurement standards. For transmitter measurements the appropriate detector (average, peak, normal, sample, quasi-peak) is used when making measurements for licensed devices. For receiver conducted spurious measurements the detector is set to peak.

**TRANSMITTER MASK MEASUREMENTS**

The transmitter mask measurements are made using resolution bandwidths as specified in the pertinent rule part(s). Where narrower bandwidths are used the measurement is corrected to account for the reduced bandwidth by either using the adjacent channel power function of the spectrum analyzer to sum the power across the required measurement bandwidth. The frequency span of the analyzer is set to ensure the fundamental signal and all significant sidebands are displayed.

The top of the mask may be set by the total output power of the signal, the power of the unmodulated signal or the peak value of the signal in the reference bandwidth being used for the mask measurement.

**SAMPLE CALCULATIONS****SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS**

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_R - S = M$$

where:

$$\begin{aligned} R_R &= \text{Measured value in dBm} \\ S &= \text{Specification Limit in dBm} \\ M &= \text{Margin to Specification in +/- dB} \end{aligned}$$

**Appendix A Test Equipment Calibration Data****Antenna port measurements, 23-May-16**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	12/17/2015	12/17/2016
Rohde & Schwarz	Peak Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	3/10/2016	3/10/2017
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/6/2016	5/6/2017

**Antenna port measurements, 24, 26-May-16**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/6/2016	5/6/2017

## **Appendix B Test Data**

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## *EMC Test Data*

Client:	GE MDS LLC	Job Number:	JD101659
Product	LN900	T-Log Number:	T101706
System Configuration:	Module	Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Emissions Standard(s):	FCC Parts 90 and 101, RSS-119	Class:	-
Immunity Standard(s):	-	Environment:	Radio

## **EMC Test Data**

For The

**GE MDS LLC**

Product

**LN900**

Date of Last Test: 5/26/2016



## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### RSS 119 and FCC Part 90 Power, Occupied Bandwidth

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

#### General Test Configuration

All measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument.

**Ambient Conditions:**  
 Temperature: 20-22 °C  
 Rel. Humidity: 30-35 %

#### Summary of Results

Run #	Spacing	Data Rate	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	Determined at time of Licensing	Pass	40.8 dBm
2	12.5 kHz, 25.0 kHz	9.6 ksps 19.2 ksps	Spectral Mask	Mask D, G, J	Pass	Within mask
3	12.5 kHz, 25.0 kHz	9.6 ksps 19.2 ksps	99% or Occupied Bandwidth	11.25 kHz 20.0 kHz	Pass	10.2 kHz 15.4 kHz

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

#### Notes

Part 90: 896-901MHz & 935-940MHz, 12.5 & 25 kHz channel spacings, 929-930MHz, 12.5 & 25 kHz channel spacings. RSS-119: 896-901MHz, 928-929 MHz, 931-935 MHz, 941-944 MHz, and 952-953 MHz, 12.5, 25 kHz channel spacings, 929-930 MHz and 931-932 MHz, 25 kHz channel spacing.

Target power: 10 Watts (40 dBm). 3-level FSK modulations; need to know rated power and tolerance which cannot exceed measured power. Power limits in § 90.205 (k), (m), § 90.635 & § 90.494

<sup>1</sup> FCC Part 90.213 (footnote 14) and RSS-119 Section 5.3 allow 1.5 ppm for control station operations.

Limited Modular approval



## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### Run #1: Output Power

Date of Test: 23-May-16  
 Test Engineer: Deniz Demirci  
 Test Location: FT Lab #4

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 13.8 VDC

Cable Loss: 0.0 dB  
 Cable ID(s): -

Attenuator: 20.0 dB  
 Attenuator IDs: 1878.0

Total Loss: 20.0 dB

### FCC Part 90 & RSS-119

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP	
		(dBm) <sup>1</sup>	mW			dBm	W
40 dBm	896.0	40.5	11220.2	16.5	Pass	57.0	501.187
40 dBm	901.0	40.5	11220.2	16.5	Pass	57.0	501.187
40 dBm	929.0	40.6	11481.5	16.5	Pass	57.1	512.861
40 dBm	930.0	40.6	11481.5	16.5	Pass	57.1	512.861
40 dBm	935.0	40.6	11481.5	16.5	Pass	57.1	512.861
40 dBm	940.0	40.7	11749.0	16.5	Pass	57.2	524.807

### RSS-119 only

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP	
		(dBm) <sup>1</sup>	mW			dBm	W
40 dBm	941.0	40.7	11749.0	16.5	Pass	57.2	524.807
40 dBm	944.0	40.8	12022.6	16.5	Pass	57.3	537.032
40 dBm	952.5	40.8	12022.6	16.5	Pass	57.3	537.032

Note 1: Output power measured using a peak power meter

Note 2: Power setting - the software power setting used during testing, included for reference only.

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

Run #2: Spectral Mask, FCC Part 90 Masks C, G for 929-930 MHz and J for 896-901 MHz and 935-940 MHz  
 RSS-119 Mask J for 12.5 KHz channels (896-901 MHz and 935-940 MHz), Mask D for 12.5 kHz channels in all other bands and  
 Mask G for 25 kHz channels

Date of Test: 5/23, 5/24, 5/26/2016  
 Test Engineer: Deniz Demirci  
 Test Location: FT Lab #4

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 13.8 VDC

Note 1: Peak power measurements were used as a spectral mask power reference.

Run #2a: Spectral Mask for 896 - 901 & 935-940 MHz bands (FCC Part 90 and RSS-119)

Power setting	Data rate	Channel BW	Modulation	Frequency (MHz)	Emission mask	Result
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	898.00625	J	Pass
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	898.00625	J	Pass
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	898.00625	G	Pass

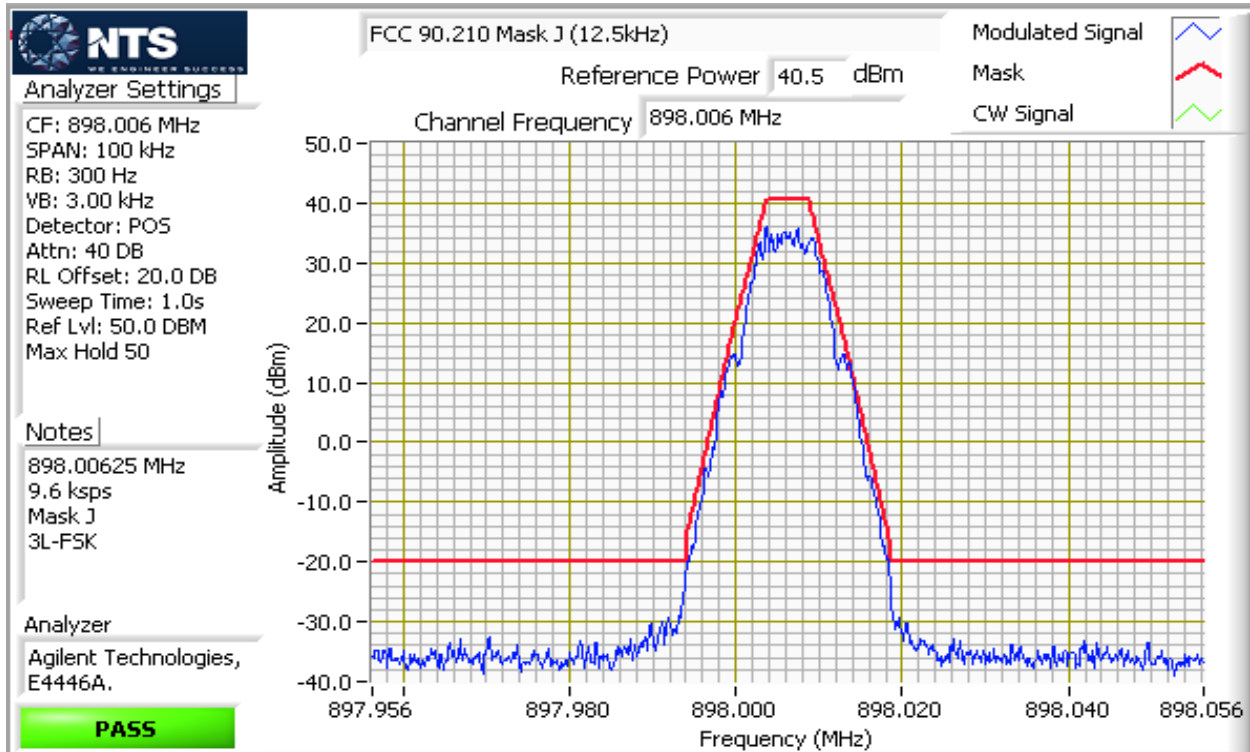
Run #2b: Spectral Mask at 928 - 929, 929 - 930, 932-944 & 952-953 MHz bands (RSS-119)

Power setting	Data rate	Channel BW	Modulation	Frequency (MHz)	Emission mask	Result
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	929.00000	D	Pass
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	929.00000	G	Pass

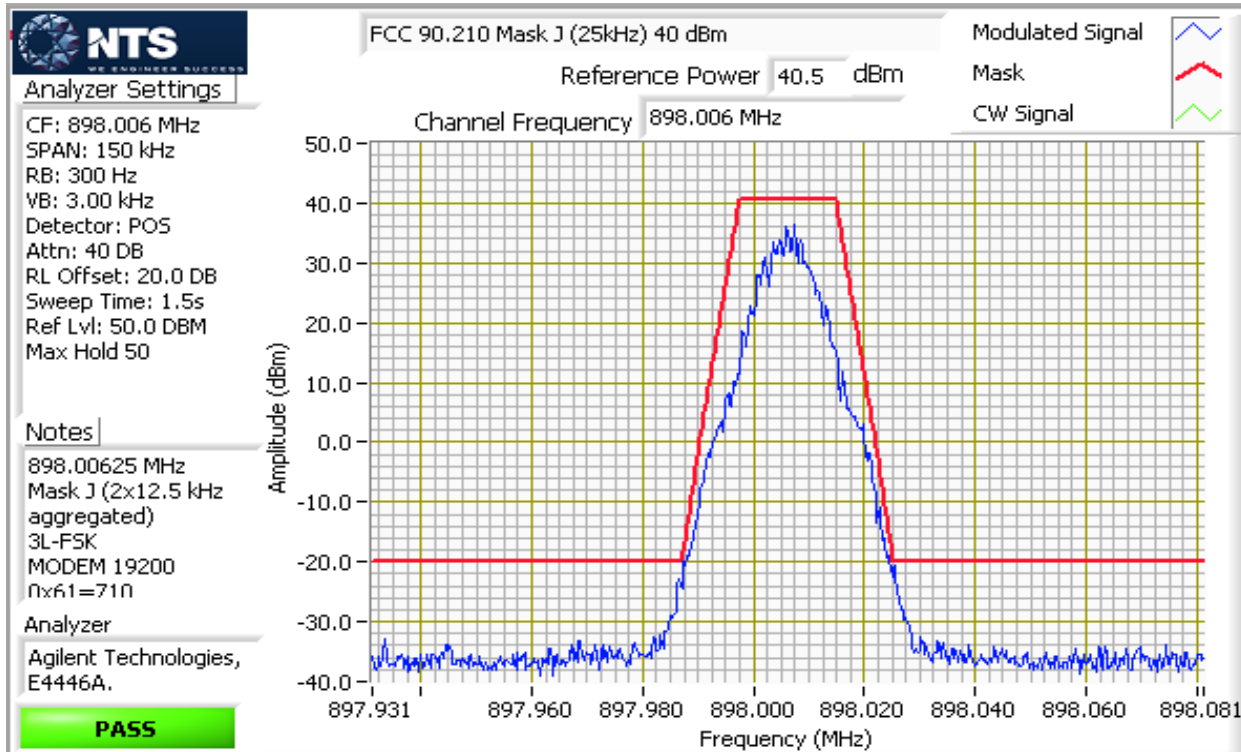
Run #2c: Spectral Mask at 929 - 930 MHz band (FCC Part 90)

Power setting	Data rate	Channel BW	Modulation	Frequency (MHz)	Emission mask	Result
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	929.48750	G	Pass

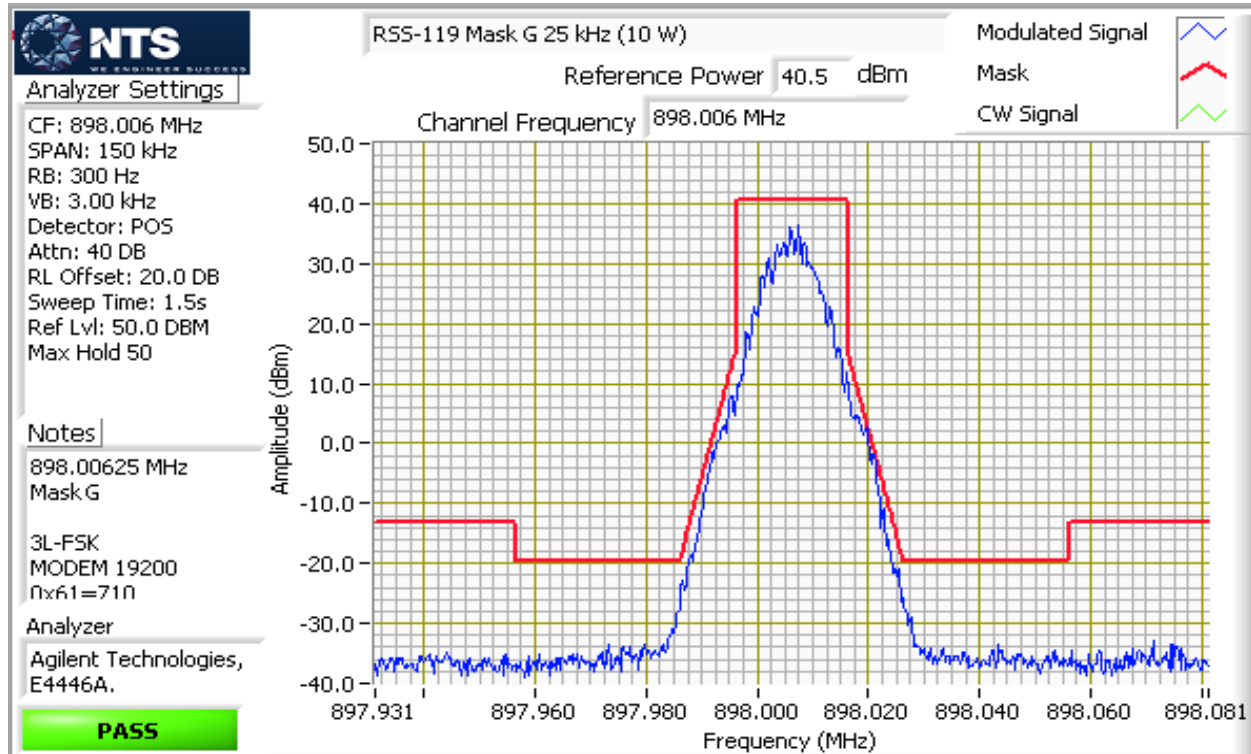
Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A



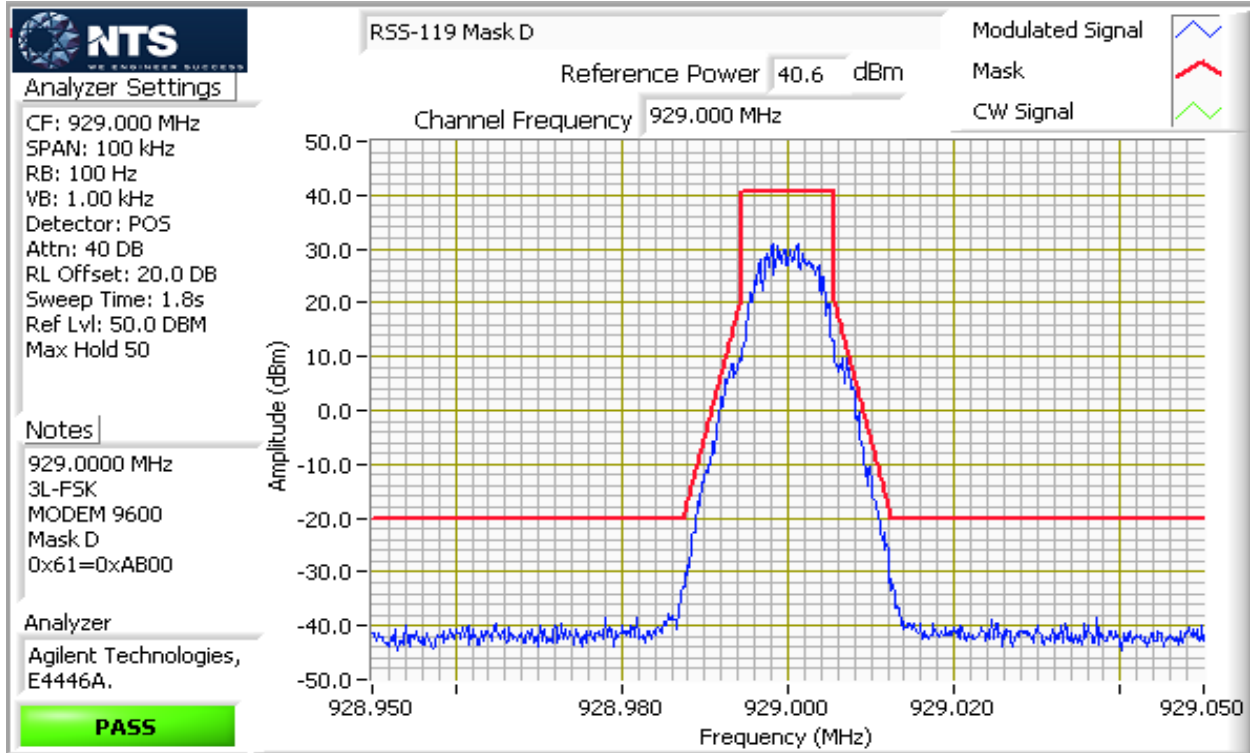
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Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A



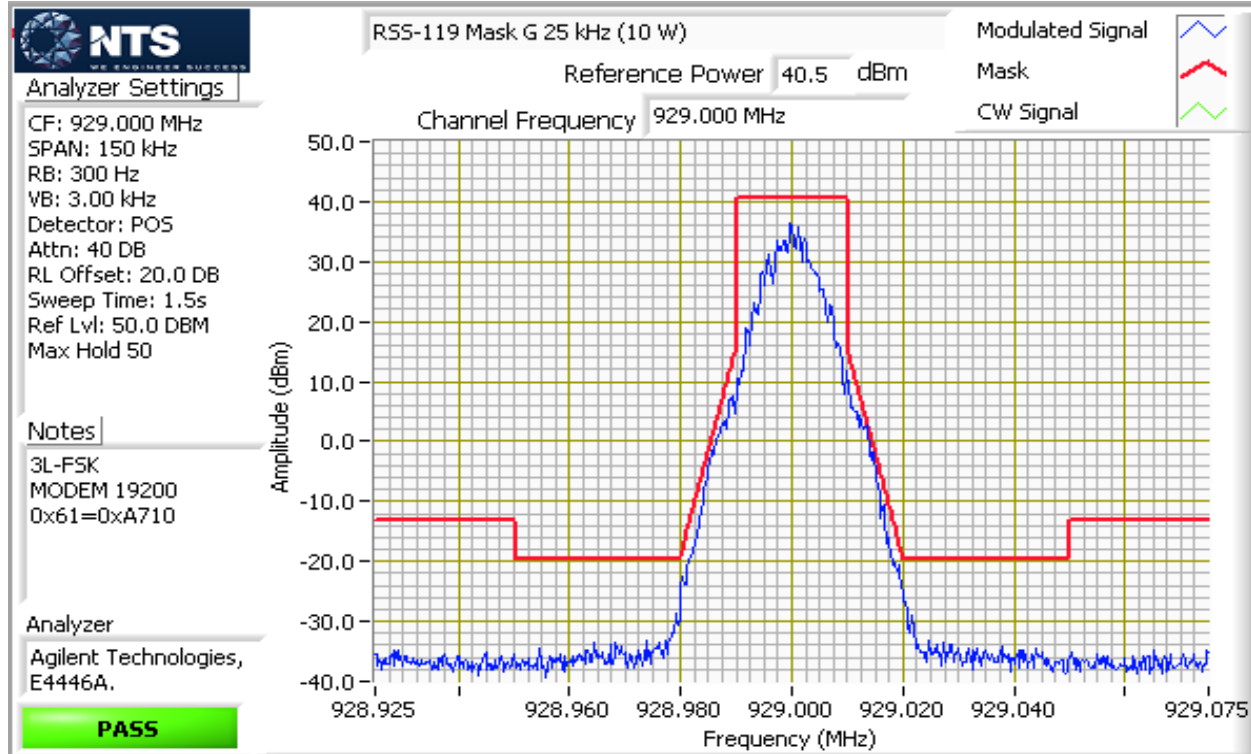
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Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A



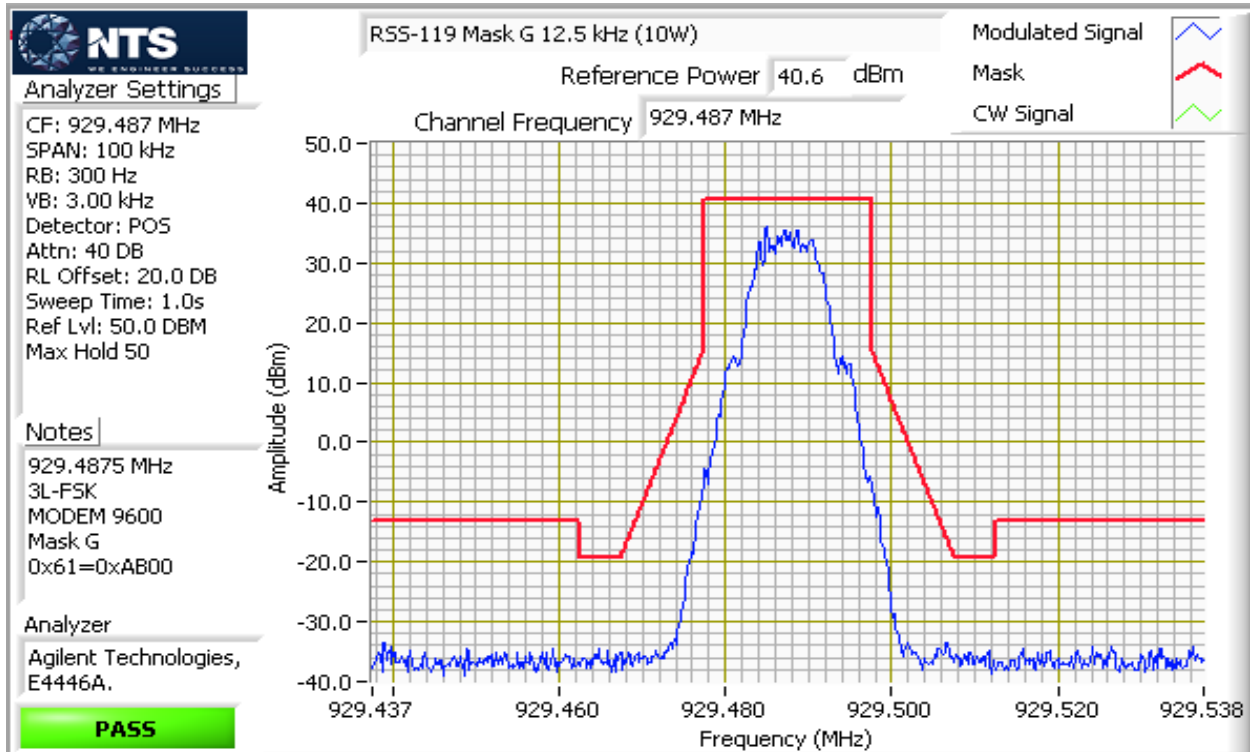
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	Class: N/A



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Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A





## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### Run #3: Signal Bandwidth

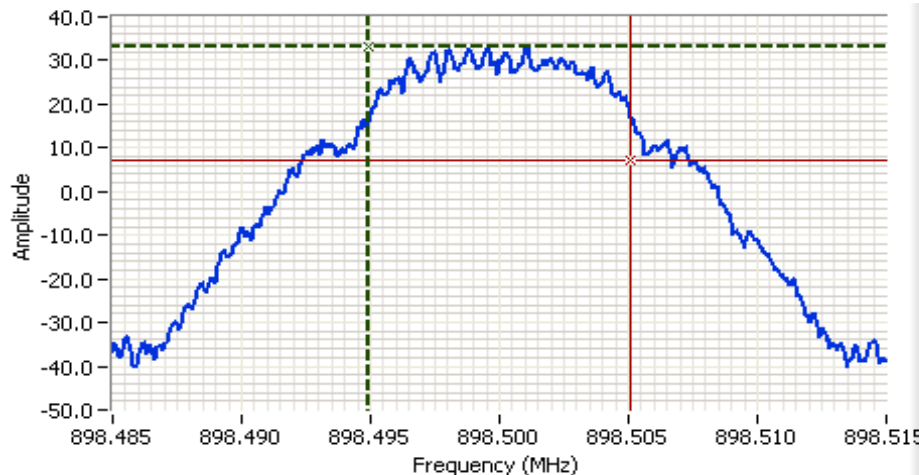
Date of Test: 23-May-16  
 Test Engineer: Deniz Demirci  
 Test Location: FT Lab #4

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 13.8 VDC

Power Setting	Data rate	Channel BW	Modulation	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)	99%
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	898.5	200		10.2
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	898.5	300		15.4

Note 1: 99% bandwidth measured in accordance with ANSI C63.10, with RB between 1% and 5% of the measured bandwidth and VB  $\geq 3 \times RB$  and Span  $\geq 1.5\%$  and  $\leq 5\%$  of measured bandwidth.

Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A



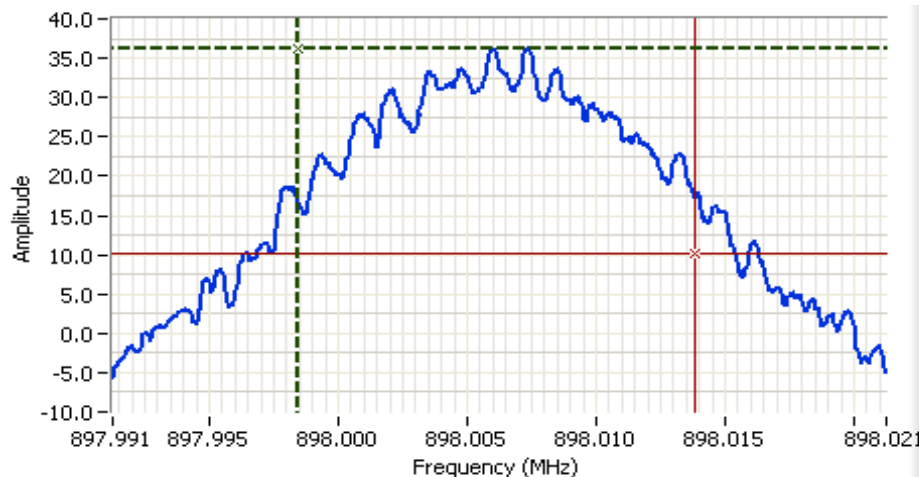
## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 898.500 MHz  
 SPAN: 30.0 kHz  
 RB: 200 Hz  
 VB: 3.00 kHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 20.0 DB  
 Sweep Time: 0.4s  
 Ref Lvl: 50.0 DBM

## Comments

99% power BW: 10.2 kHz  
 3L-FSK, MODEM 9600,  
 0x61=0xAB00

Cursor 1	898.4949	33.3		Delta Freq.	10.2 kHz
Cursor 2	898.5051	7.3		Delta Amplitude	26.0



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 898.006 MHz  
 SPAN: 30.0 kHz  
 RB: 300 Hz  
 VB: 3.00 kHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 20.0 DB  
 Sweep Time: 307.7ms  
 Ref Lvl: 50.0 DBM

## Comments

99% power BW: 15.4 kHz  
 3L-FSK, MODEM 19200,  
 0x61=0x710

Cursor 1	897.9984	36.2		Delta Freq.	15.4 kHz
Cursor 2	898.0138	10.2		Delta Amplitude	26.0



Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

## FCC Part 101

### Power, Occupied Bandwidth, Frequency Stability and Spurious Emissions

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

#### General Test Configuration

All measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument.

#### Ambient Conditions:

Temperature: 20-22 °C  
Rel. Humidity: 30-35 %

#### Summary of Results

Run #	Spacing	Data Rate	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	Determined at time of Licensing	Pass	40.7 dBm
2	12.5 kHz, 25.0 kHz	9.6 ksps 19.2 ksps	Spectral Mask	Part 101.111(a)(5) Part 101.111(a)(6)	Pass	Within mask
3	12.5 kHz, 25.0 kHz	9.6 ksps 19.2 ksps	99% or Occupied Bandwidth	12.5, 25.0 and 200 kHz	Pass	10.2 kHz 15.4 kHz

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### Run #1: Output Power

Date of Test: 23-May-16  
 Test Engineer: Deniz Demirci  
 Test Location: FT Lab #4

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 13.8 VDC

Cable Loss: 0.0 dB  
 Cable ID(s): -

Attenuator: 20.0 dB  
 Attenuator IDs: 1878

Total Loss: 20.0 dB

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP	
		(dBm) <sup>1</sup>	mW			dBm	W
40 dBm	928.0	40.5	11220.2	16.5	Pass	57.0	501.187
40 dBm	944.0	40.6	11481.5	16.5	Pass	57.1	512.861
40 dBm	960.0	40.7	11749.0	16.5	Pass	57.2	524.807

Note 1:	Output power measured using a peak power meter
Note 2:	Power setting - the software power setting used during testing, included for reference only.



## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### Run #2: Spectral Mask, FCC Part 101.111(a)(5) and 101.111(a)(6)

Date of Test: 5/24 & 5/26/2016  
 Test Engineer: Deniz Demirci  
 Test Location: FT Lab #4

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 13.8 VDC

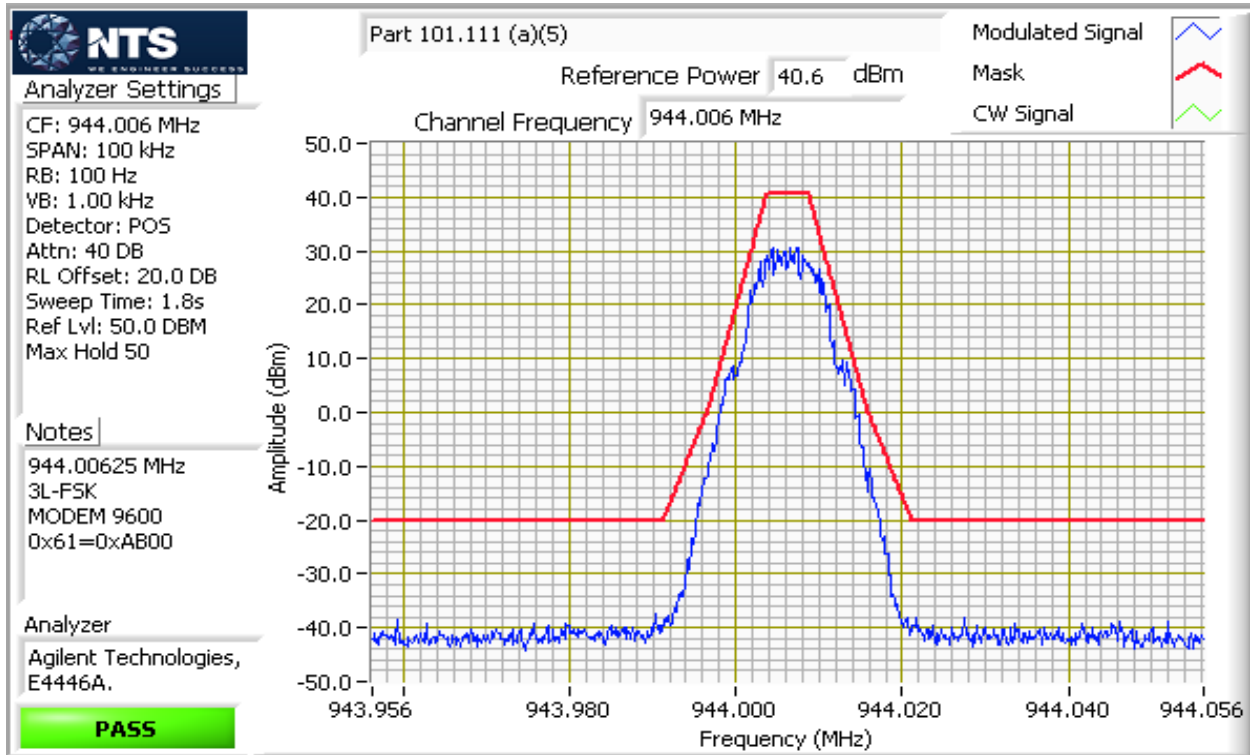
Note 1: EUT does not transmit unmodulated carrier with full power setting. The measured power levels (using peak power meter) are higher than the declared nominal power for every channel frequency. Nominal 40 dBm reference power level used for spectral mask measurements as worst case results.

### Spectral Mask at 928 - 960 MHz band (FCC Part 101)

Power setting	Data rate	Channel plan	Modulation	Frequency (MHz)	Emission mask	Result
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	944.00625	101.111(a)(5)	Pass
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	944.00625	101.111(a)(6)	Pass

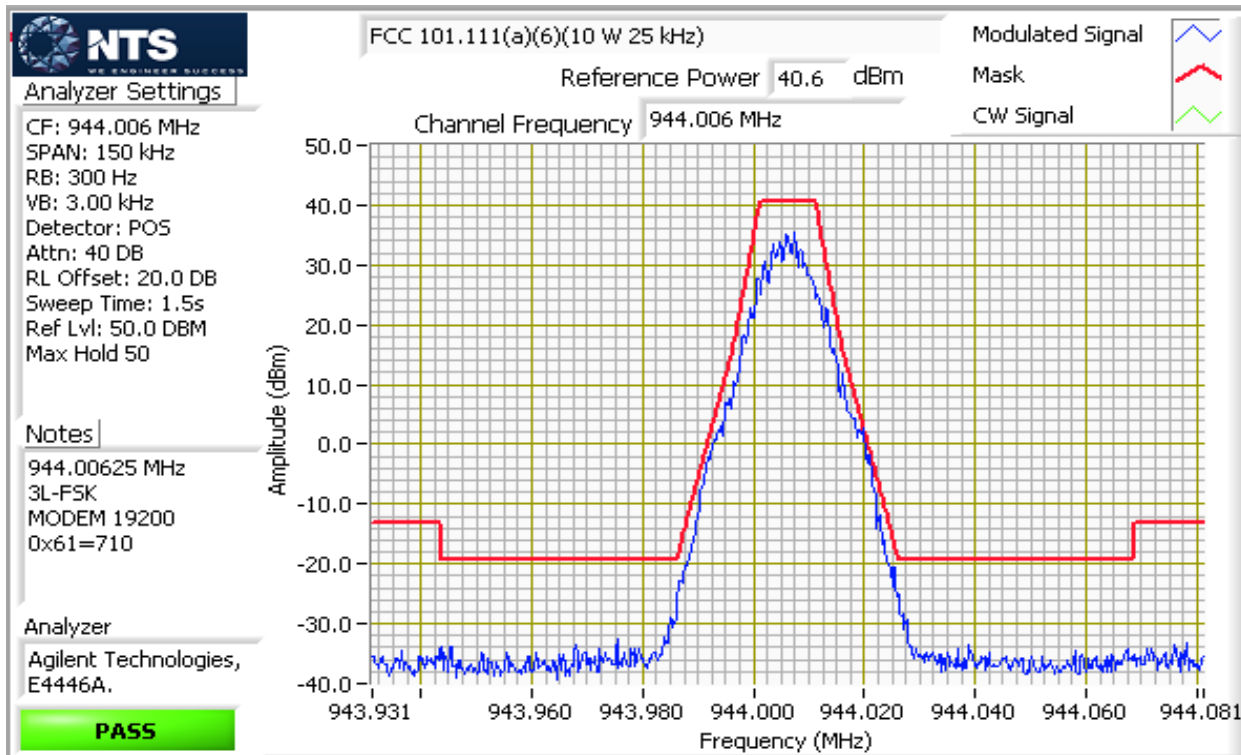
Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A

928 - 960 MHz, 12.5 kHz channel spacing.



Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A

928 - 960 MHz, 25 kHz channel spacing.





## EMC Test Data

Client:	GE MDS LLC	Job Number:	JD101659
Model:	LN900	T-Log Number:	T101706
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC Parts 90 and 101, RSS-119	Project Coordinator:	-
		Class:	N/A

### Run #3: Signal Bandwidth

Date of Test: 5/23 & 5/26/2016

Test Engineer: Deniz Demirci

Test Location: FT Lab #4

Config. Used: 1

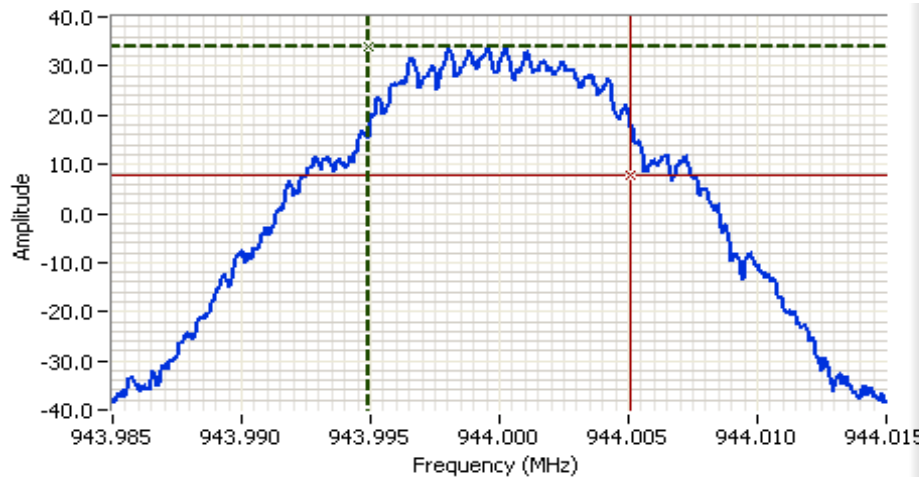
Config Change: none

EUT Voltage: 13.8 VDC

Power setting	Data rate	Channel plan	Modulation	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)	
							99%
40 dBm	9.6 ksps	12.5 kHz	3-level FSK	944.0	200 Hz		10.2
40 dBm	19.2 ksps	25.0 kHz	3-level FSK	944.0	300 Hz		15.4

Note 1: 99% bandwidth measured in accordance with ANSI C63.10, with RB between 1% and 5% of the measured bandwidth and VB  $\geq 3 \times RB$  and Span  $\geq 1.5\%$  and  $\leq 5\%$  of measured bandwidth.

Client: GE MDS LLC	Job Number: JD101659
Model: LN900	T-Log Number: T101706
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC Parts 90 and 101, RSS-119	Project Coordinator: -
	Class: N/A



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 944.000 MHz  
 SPAN: 30.0 kHz  
 RB: 200 Hz  
 VB: 620 Hz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 20.0 DB  
 Sweep Time: 0.4s  
 Ref Lvl: 50.0 DBM

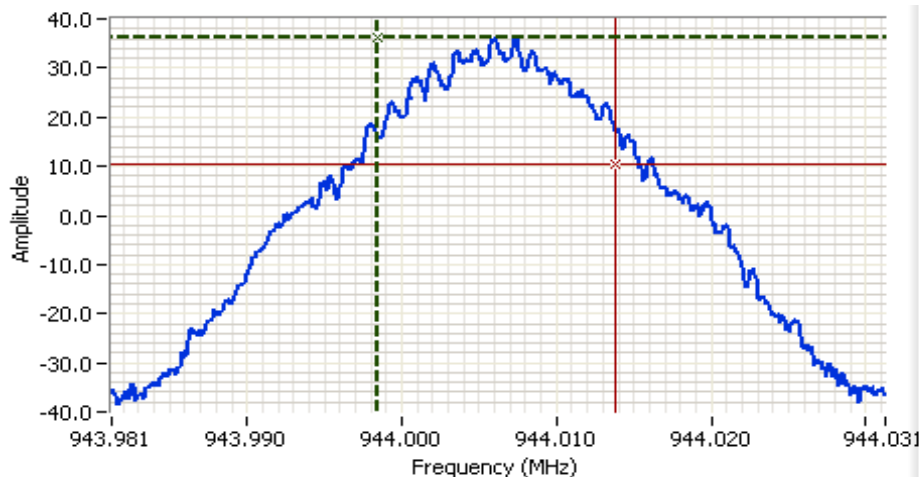
## Comments

99% power BW: 10.2 kHz  
 3L-FSK, 9.6 kps

Cursor 1 943.9949 33.9  
 Cursor 2 944.0051 7.9

Delta Freq. 10.2 kHz

Delta Amplitude 26.0



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 944.006 MHz  
 SPAN: 50.0 kHz  
 RB: 300 Hz  
 VB: 3.00 kHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 20.0 DB  
 Sweep Time: 0.5s  
 Ref Lvl: 50.0 DBM

## Comments

99% power BW: 15.4 kHz  
 3L-FSK, MODEM 19200,  
 0x61=0x710

Cursor 1 943.9984 36.3  
 Cursor 2 944.0138 10.3

Delta Freq. 15.4 kHz

Delta Amplitude 26.0



***End of Report***

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