



NTS Silicon Valley
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Radio Test Report

**FCC Part 90
(220 MHz to 222 MHz)**

Model: LN200 Module

FCC ID: E5MDS-LN200

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

PROJECT NUMBER: JD106362 / PR071990

REPORT DATE: December 15, 2017

RE-ISSUED DATE: January 9, 2018

FINAL TEST DATES: December 4, 2017

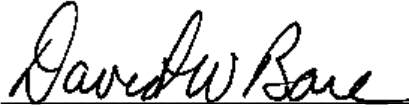
TOTAL NUMBER OF PAGES: 32



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VALIDATING SIGNATORIES

PROGRAM MGR



David W. Bare
Chief Engineer

TECHNICAL REVIEWER:



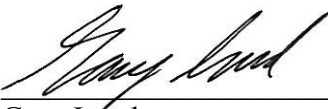
David W. Bare
Chief Engineer

FINAL REPORT PREPARER:



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QUALITY ASSURANCE DELEGATE



Gary Izard
Technical Writer



REVISION HISTORY

Rev#	Date	Comments	Modified By
-	December 15, 2017	First release	
1	January 9, 2018	Revised to change radiated power units incorrectly stated as EIRP to dBm ERP	dwb

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SCOPE

Tests have been performed on the GE MDS LLC model LN200 Module, 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
- CFR 47 Part 90 (Private Land Mobile Radio Service) Subpart T

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 C63.26:2015
ANSI TIA-603-E
TIA-102.CAAA-E
FCC KDB 971168 Licensed Digital Transmitters
RSS-119 Issue 12

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.

National Technical Systems - Silicon Valley is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise.

The test results recorded herein are based on a single type test of the GE MDS LLC model LN200 Module 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 LN200 Module 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
§2.1033 (c) (5) § 90.35		Frequency range(s)	220-222 MHz	220-222 MHz	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 §90.205		RF power output at the antenna terminals	20-40.6 dBm QAM 20-34.7 dBm CPFSK	47 dBm	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 §90.205 §90.729		ERP	25.0 dBm to 50.7 dBm	57 dBm	Pass
§2.1033 (c) (4) § 2.1047 § 90.210		Emission types	F1D, F2D, F3D & D1D ¹	-	-
		Emission mask	F	Within Mask	Pass
§ 2.1049 § 90.209		Occupied Bandwidth	2.7 kHz CPFSK 3.26 kHz QAM	4 kHz	Pass
Transmitter spurious emissions					
§ 2.1051 § 2.1057	RSS-119	At the antenna terminals	Compliance demonstrated via previous testing for other channel bandwidths		
§ 2.1053 § 2.1057	RSS-119	Field strength	Compliance demonstrated via previous testing for other channel bandwidths		
Other details					
§ 2.1055 § 90.213	RSS-119	Frequency stability	Compliance demonstrated via previous testing for other channel bandwidths		
§ 2.1093	RSS-102	RF Exposure	Compliance demonstrated via previous testing for other channel bandwidths		
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	35.5 VDC, 755 mA		
-	-	Antenna Gain	Max 12.2 dBi		
Notes					
1. FCC waiver from original certification applies for use of D1D designator.					

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	1.7×10^{-7}
RF power, conducted	dBm	25 to 7,000 MHz	± 0.52 dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	± 0.7 dB

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

The GE MDS LLC model LN200 Module is a industrial radio module operating in the 216-222 MHz bands and uses CPFSK and QAM 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 December 4, 2017 and tested on December 4, 2017. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
GE MDS LLC	LN200	Industrial Radio Module	2879883	E5MDS-LN200

OTHER EUT DETAILS

The following EUT details should be noted: The host product in which this product will be used "Orbit MCR or ECR" 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 EUT PCB measures approximately 11 by 3.8 by 0.6 centimeters.

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	Probook 6555b	Laptop	CNU0502BCT	-
Mastech	HY6020ES	DC Power Supply	NTS 2317	-

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
DC power	Power Source	two wire	Unshielded	1.2
Com1	RJ45 to DB9 adapter	Cat 5	Unshielded	1.0

Additional on Support Equipment

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
Laptop Serial	RJ45 to DB9 adapter	Multiwire	Shielded	2.0

EUT OPERATION

During emissions testing the EUT was set in continuous transmit mode on the selected channel using various modem and baud settings as noted depending on the test or in receive mode on the selected channel.

TESTING

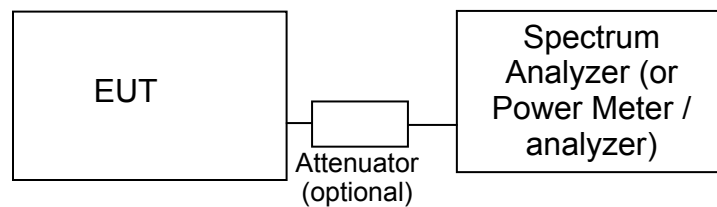
GENERAL INFORMATION

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. 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.

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.



Appendix A Test Equipment Calibration Data

Radio Antenna Port , 04-Dec-17

<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	5/22/2017	5/22/2018



Appendix B Test Data

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EMC Test Data

Client:	GE MDS LLC	Job Number:	PR071990
Product	LN200	T-Log Number:	T106435
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Emissions Standard(s):	FCC part 90	Class:	A
Immunity Standard(s):		Environment:	Radio

EMC Test Data

For The

GE MDS LLC

Product

LN200

Date of Last Test: 12/15/2014



EMC Test Data

Client:	GE MDS LLC	Job Number:	PR071990
Model:	LN200	T-Log Number:	T106435
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC part 90	Project Coordinator:	-
		Class:	N/A

FCC Part 90 Power, Occupied Bandwidth, Mask

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

With the exception of the radiated spurious emissions tests, 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. For frequency stability measurements the EUT was placed inside an environmental chamber.

Radiated measurements are made with the EUT located on a non-conductive table, 3m from the measurement antenna.

Ambient Conditions: Temperature: 20-21 °C
 Rel. Humidity: 30-31 %

Summary of Results

Run #	Spacing	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	Output Power	57.0 dBm ERP	Pass	50.7 dBm ERP
2	5 kHz	Spectral Mask	Masks F	Pass	Within Mask
2	-	Channel Edge	-25dBm	Pass	all signals were below the limit
3	5 kHz	99% or Occupied Bandwidth	5 kHz	-	2.7 kHz (CPFSK) 3.26 kHz (QAM)

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:	PR071990
Model:	LN200	T-Log Number:	T106435
Contact:	Dennis McCarthy	Project Manager:	Christine Krebill
Standard:	FCC part 90	Project Coordinator:	-
		Class:	N/A

Run #1: Output Power

Date of Test: 12/4/2017 Config. Used: 1
 Test Engineer: David Bare Config Change: None
 Test Location: Fremont EMC Lab #4A EUT Voltage: 13.8VDC

Cable Loss: **0.0 dB** Attenuator: **18.8 dB** Total Loss: **18.8 dB**
 Cable ID(s): - Attenuator IDs: 1878

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	ERP		
		(dBm) ¹	mW			dBm	W	
40 (FB21)	220.0025	40.6	11481.5	12.2	Pass	50.7	116.145	QAM
40 (FB21)	221.9975	40.6	11481.5	12.2	Pass	50.7	116.145	QAM
35	220.0025	34.7	2951.2	12.2	Pass	44.8	29.854	CPFSK
35	221.9975	34.7	2951.2	12.2	Pass	44.8	29.854	CPFSK

Note 1: Output power measured using a spectrum analyzer with RBW=1.0MHz, VB=3.0 MHz, Peak detector, max hold

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



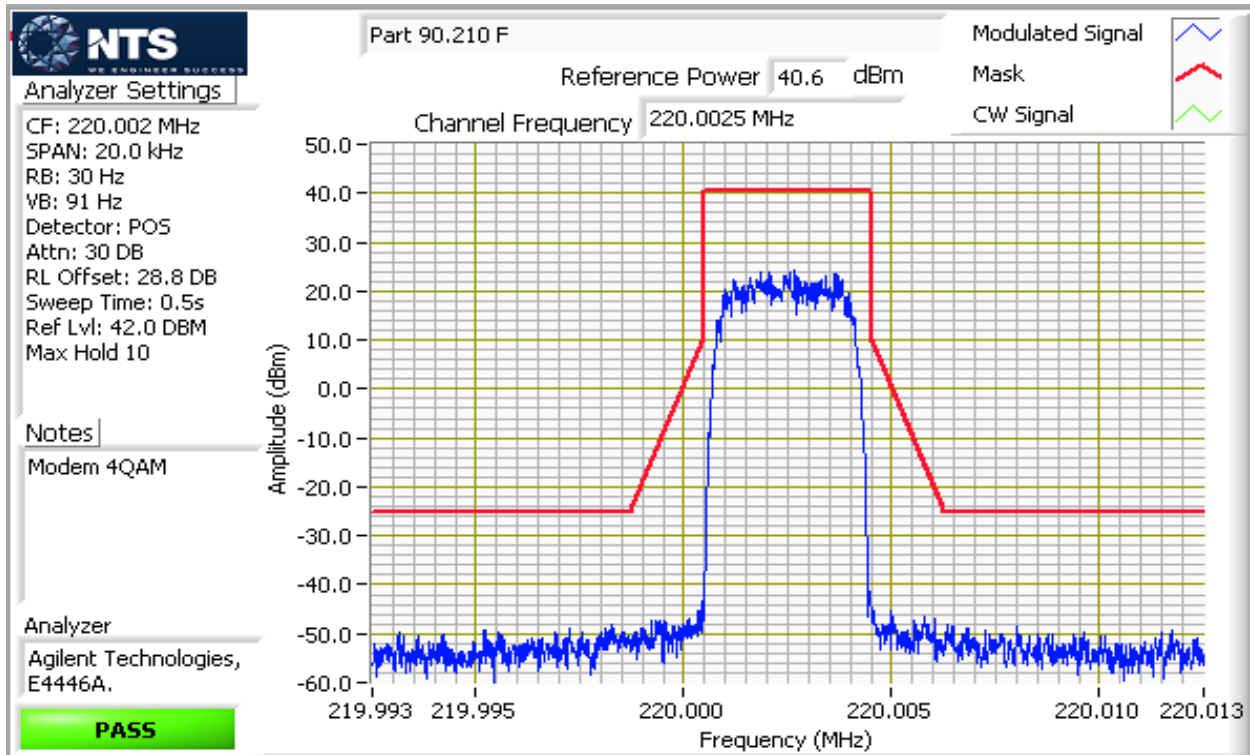
EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

Run #2: Spectral Mask, FCC Part 90 Mask F

Date of Test: 12/4/2017
 Test Engineer: David Bare
 Test Location: Fremont EMC Lab #4A
 Config. Used: 1
 Config Change: None
 EUT Voltage: 13.8VDC

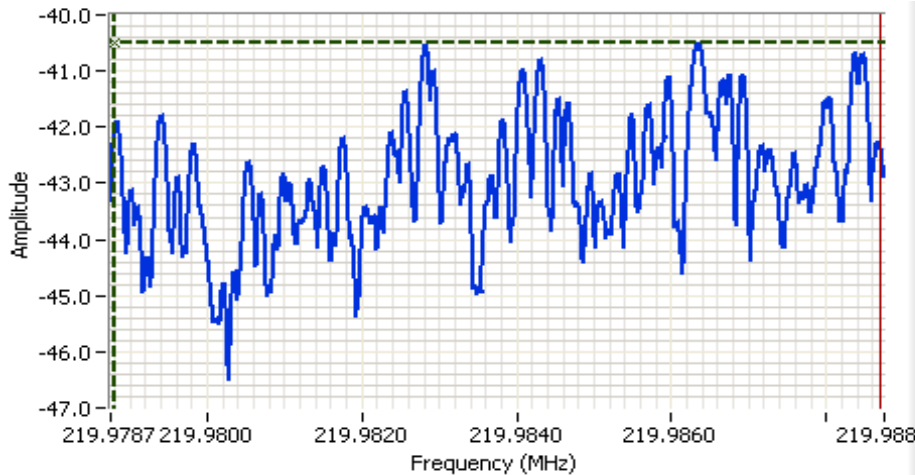
On any frequency less than 3.75 kHz from the center of the channel, the power of any emission shall be attenuated per the FCC §90.210(f) mask limits.
 Compliance with this section is based on the use of measurement instrumentation employing a resolution bandwidth of 30 Hz or greater per section 4.2.2 of RSS-119.
 On any frequency more than 3.75 kHz from the center of the channel, the power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log(P)$ dB (-25 dBm) per FCC §90.210(f).
 Compliance with this section is based on the use of measurement instrumentation employing a resolution bandwidth of 10 kHz or greater for frequencies more than 3.75 kHz from the center frequency per ANSI TIA-603E.





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.984 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 20 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 34.8 DBM

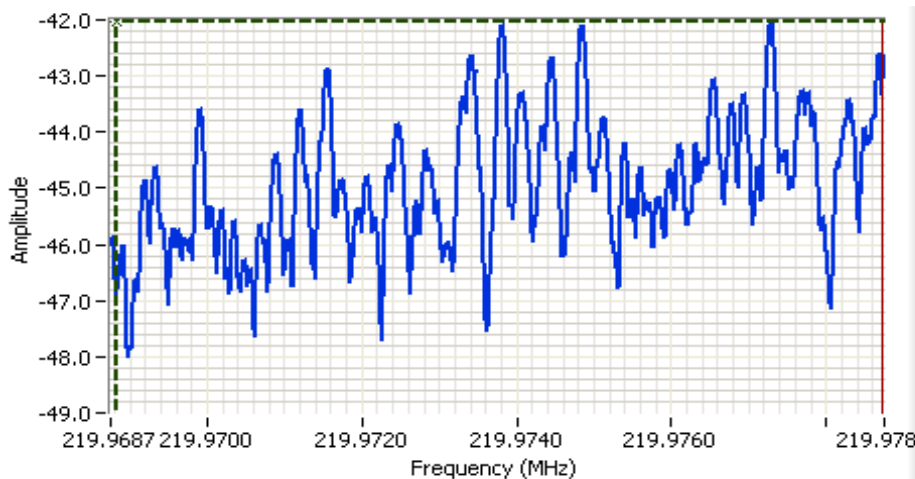
Comments
 Power over span: -27.78dBm
 Modem 4QAM

Cursor 1 219.9788 -40.5

Cursor 2 219.9887 -66.5

Delta Freq. 9.91 kHz

Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.974 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 20 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 34.8 DBM

Comments
 Power over span: -29.76dBm
 Modem 4QAM

Cursor 1 219.9688 -42.0

Cursor 2 219.9787 -68.0

Delta Freq. 9.90 kHz

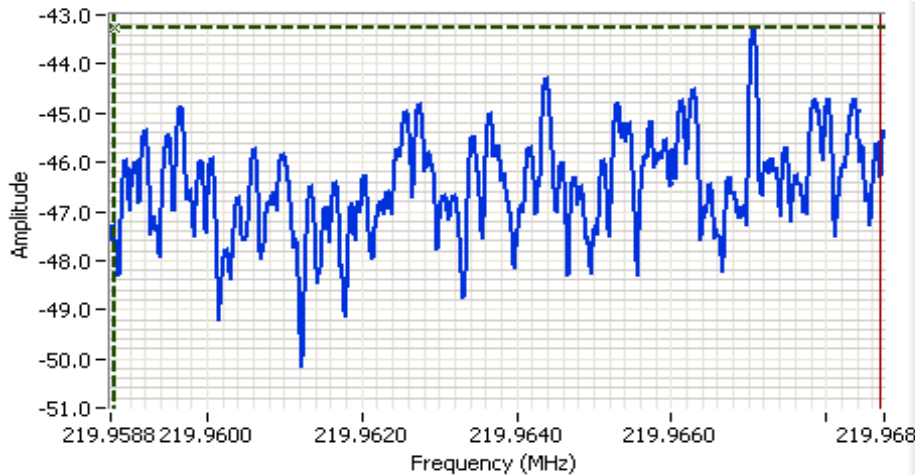
Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.964 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 20 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 34.8 DBM

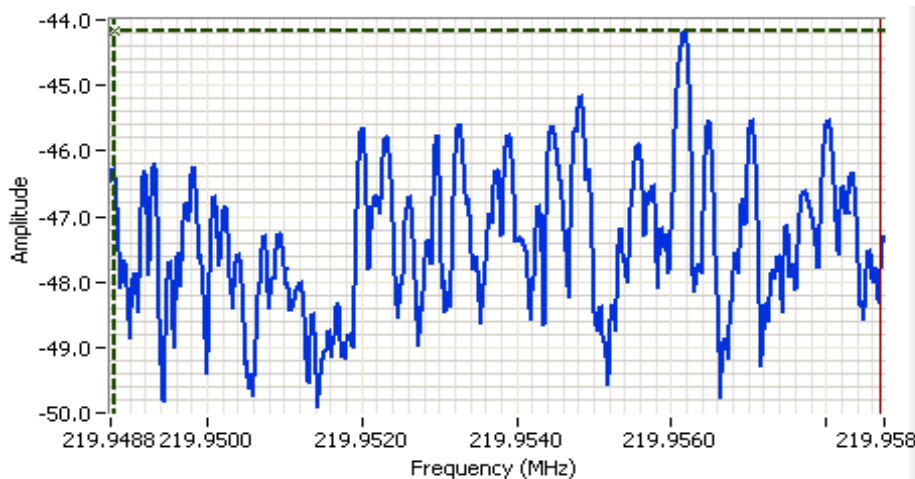
Comments
 Power over span: -31.34dBm
 Modem 4QAM

Cursor 1 219.9588 -43.3

Cursor 2 219.9687 -69.3

Delta Freq. 9.89 kHz

Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.954 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 20 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 34.8 DBM

Comments
 Power over span: -32.25dBm
 Modem 4QAM

Cursor 1 219.9488 -44.2

Cursor 2 219.9587 -70.2

Delta Freq. 9.91 kHz

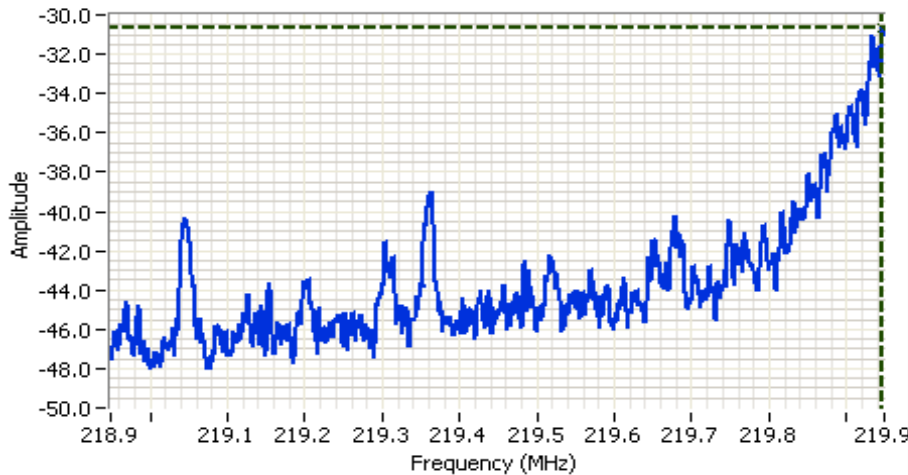
Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
Agilent Technologies, E4446A
CF: 219.449 MHz
SPAN: 1.000 MHz
RB: 10.0 kHz
VB: 30.0 kHz
Detector: POS
Attn: 20 DB
RL Offset: 28.8 DB
Sweep Time: 9.6ms
Ref Lvl: 34.8 DBM

Comments
Modem 4QAM

Cursor 1 219.9474 -30.7
0.0000 0.0

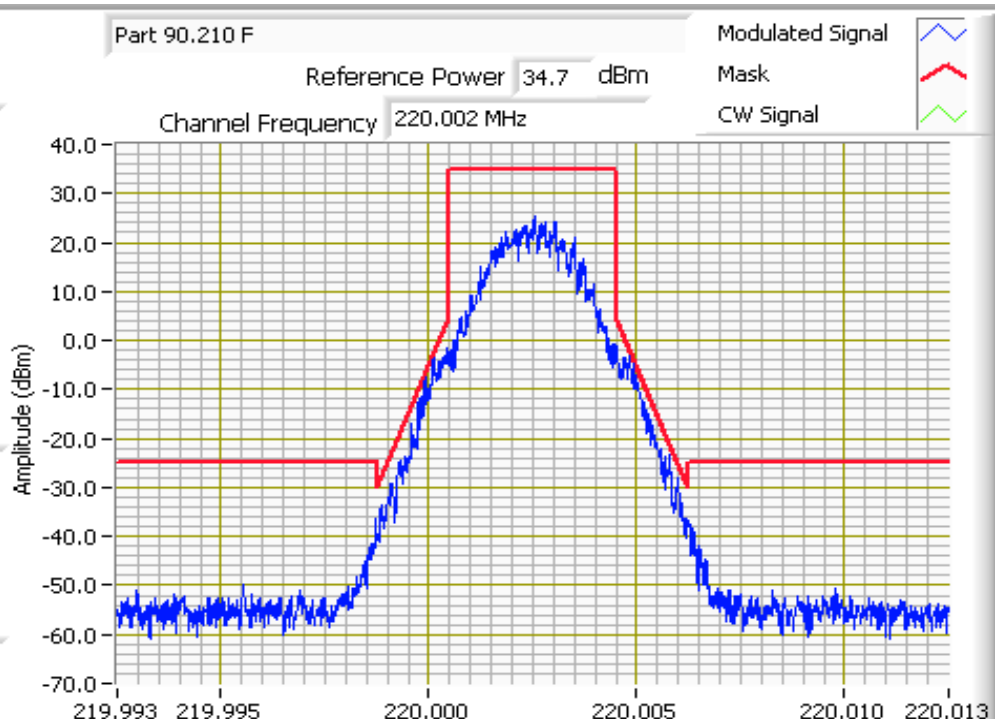


NTS
WE ENGINEER SUCCESS

Analyzer Settings
CF: 220.002 MHz
SPAN: 20.0 kHz
RB: 30 Hz
VB: 91 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 0.5s
Ref Lvl: 42.0 DBM
Max Hold 10

Notes
modem 3200
0xA850

Analyzer
Agilent Technologies,
E4446A.

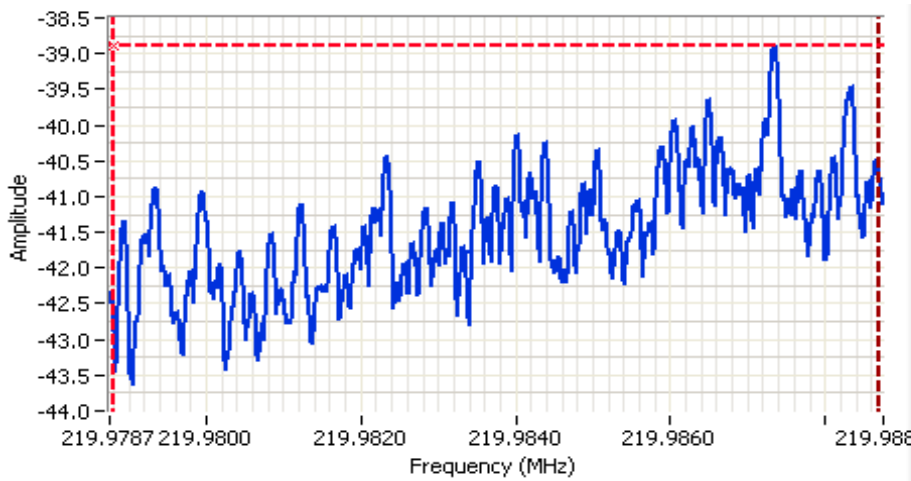




EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

PASS Frequency (MHz)

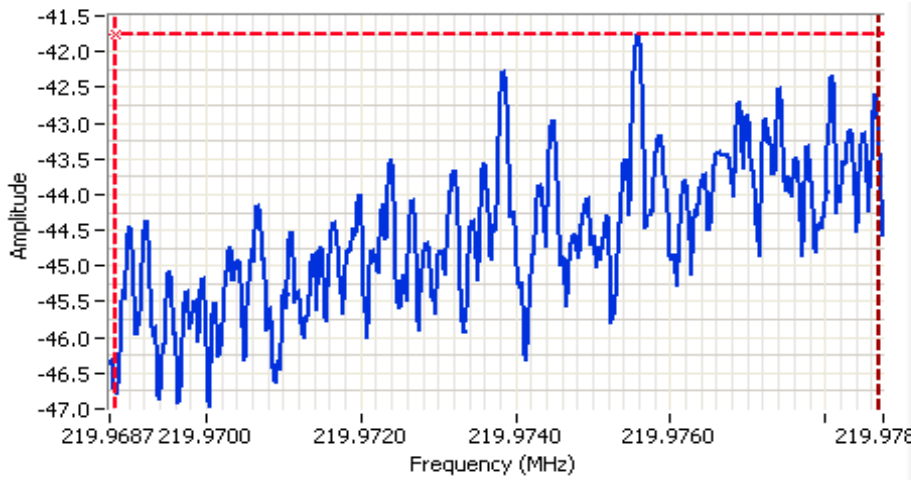


Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.984 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -26.39dBm
 Modem 3200

Cursor 1 219.9788 -38.9
 Cursor 2 219.9887 -64.9

Delta Freq. 9.89 kHz
 Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.974 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -29.43dBm
 Modem 3200

Cursor 1 219.9688 -41.8
 Cursor 2 219.9787 -67.8

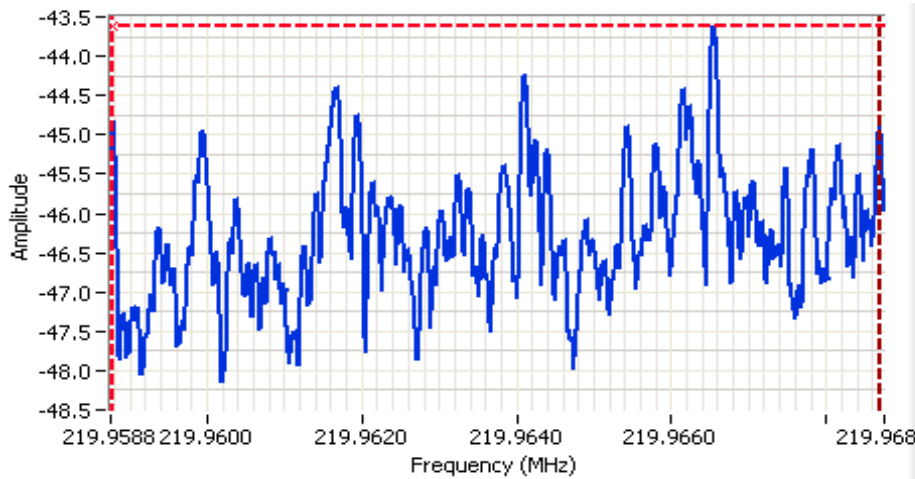
Delta Freq. 9.88 kHz
 Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

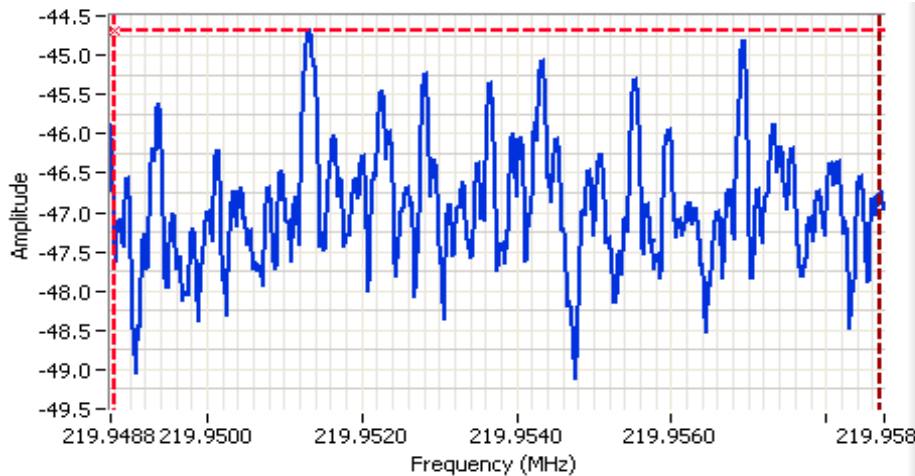


Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.964 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -31.19dBm
 Modem 3200

Cursor 1	219.9588	-43.6	
Cursor 2	219.9687	-69.6	

Delta Freq. 9.92 kHz
 Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 219.954 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -31.85dBm
 Modem 3200

Cursor 1	219.9488	-44.7	
Cursor 2	219.9587	-70.7	

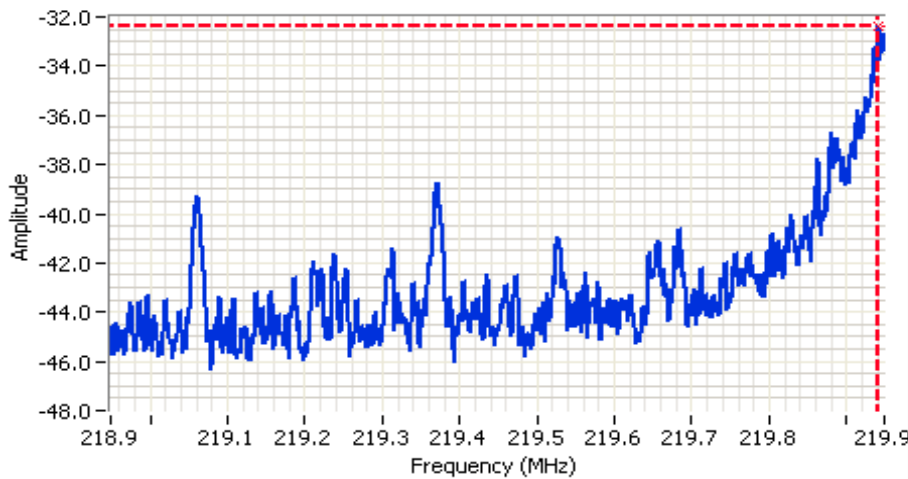
Delta Freq. 9.91 kHz
 Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
Agilent Technologies, E4446A
CF: 219.449 MHz
SPAN: 1.000 MHz
RB: 10.0 kHz
VB: 30.0 kHz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 9.6ms
Ref Lvl: 42.0 DBM

Comments
Modem 3200

Cursor 1 219.9417 -32.4
0.0000 0.0



Analyzer Settings

CF: 221.998 MHz
SPAN: 20.0 kHz
RB: 30 Hz
VB: 91 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 0.5s
Ref Lvl: 42.0 DBM
Max Hold 10

Notes

modem 4QAM

Analyzer

Agilent Technologies,
E4446A.

PASS

Part 90.210 F

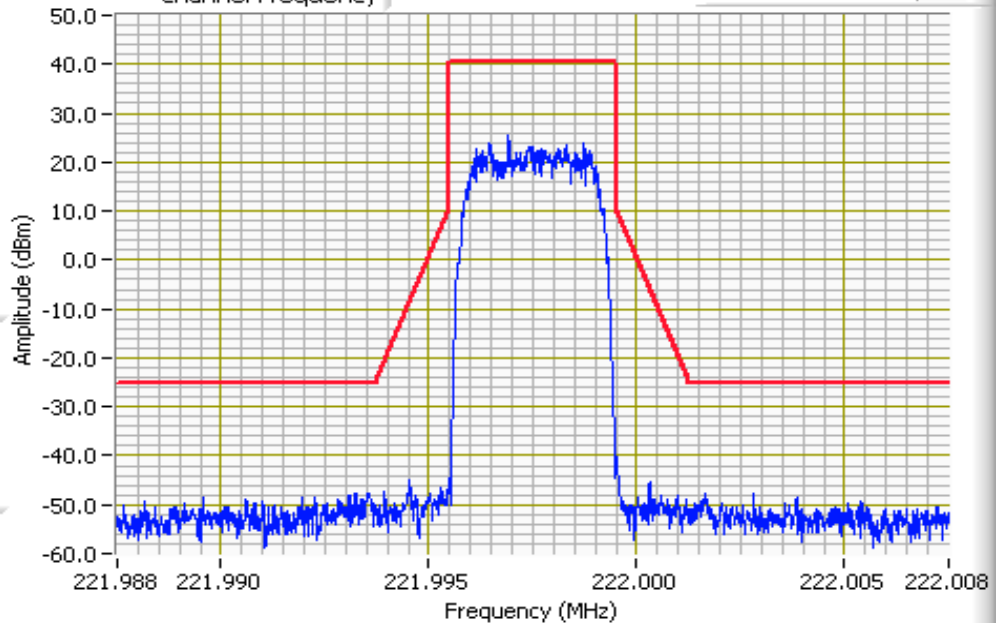
Reference Power 40.6 dBm

Channel Frequency 221.998 MHz

Modulated Signal

Mask

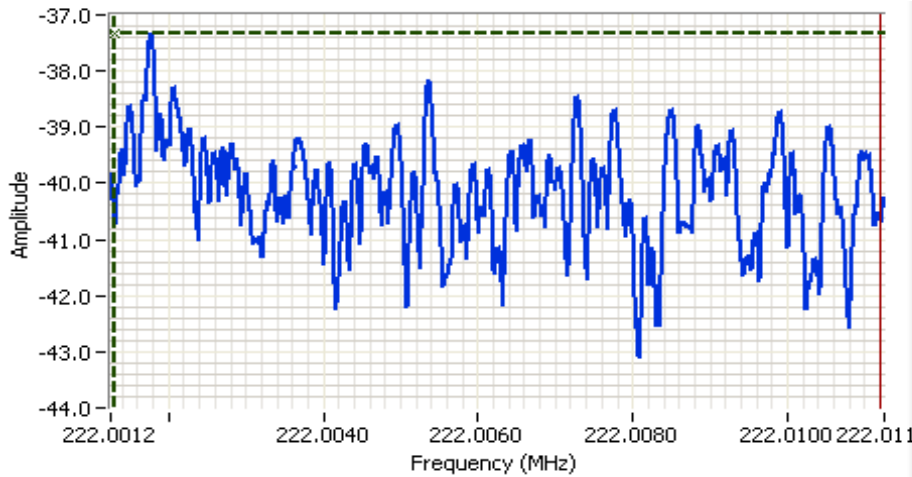
CW Signal





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

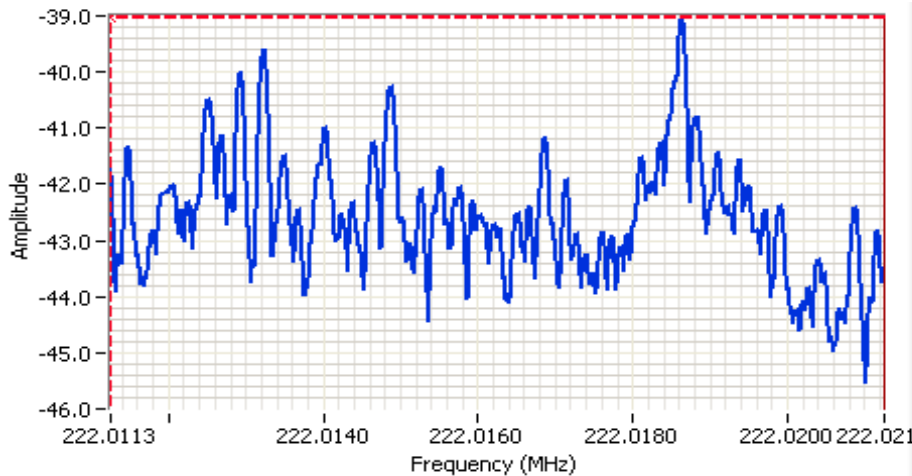


Analyzer Settings
Agilent Technologies, E4446A
CF: 222.006 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 44.8 DBM

Comments
Power over span: -25.04dBm
modem 4QAM

Cursor 1 222.0013 -37.3
Cursor 2 222.0112 -63.3

Delta Freq. 9.90 kHz
Delta Amplitude 26.0



Analyzer Settings
Agilent Technologies, E4446A
CF: 222.016 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 42.0 DBM

Comments
Power over span: -27.44dBm
modem 4QAM

Cursor 1 222.0112 -39.0
Cursor 2 222.0213 -65.0

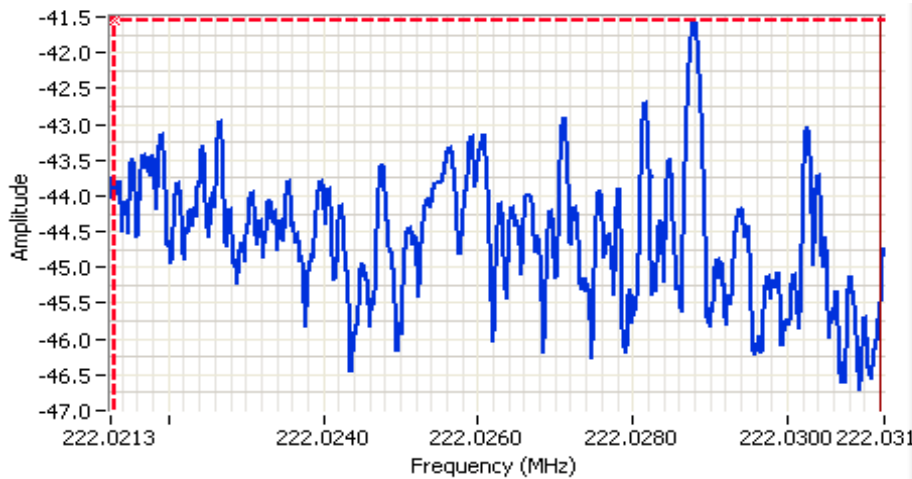
Delta Freq. 10.0 kHz
Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

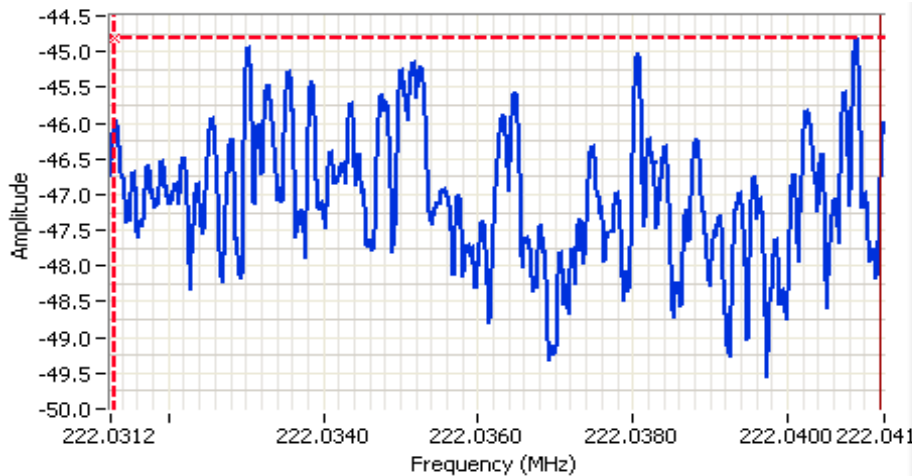


Analyzer Settings
Agilent Technologies, E4446A
CF: 222.026 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 42.0 DBM

Comments
Power over span: -29.47dBm
modem 4QAM

Cursor 1 222.0213 -41.5
Cursor 2 222.0312 -67.5

Delta Freq. 9.90 kHz
Delta Amplitude 26.0



Analyzer Settings
Agilent Technologies, E4446A
CF: 222.036 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 42.0 DBM

Comments
Power over span: -31.94dBm
modem 4QAM

Cursor 1 222.0313 -44.8
Cursor 2 222.0412 -70.8

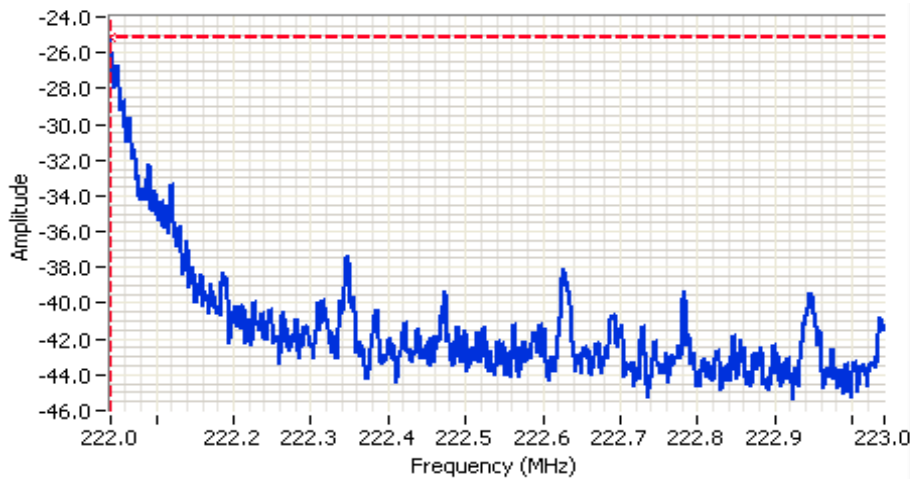
Delta Freq. 9.92 kHz
Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 222.541 MHz
 SPAN: 1.000 MHz
 RB: 10.0 kHz
 VB: 30.0 kHz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 9.6ms
 Ref Lvl: 42.0 DBM

Comments
 modem 4QAM

Cursor 1 222.0412 -25.1

0.0000 0.0



Analyzer Settings

CF: 221.998 MHz
 SPAN: 20.0 kHz
 RB: 30 Hz
 VB: 91 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 0.5s
 Ref Lvl: 42.0 DBM
 Max Hold 10

Notes

modem 3200
 0xA850

Analyzer

Agilent Technologies,
 E4446A.

PASS

Part 90.210 F

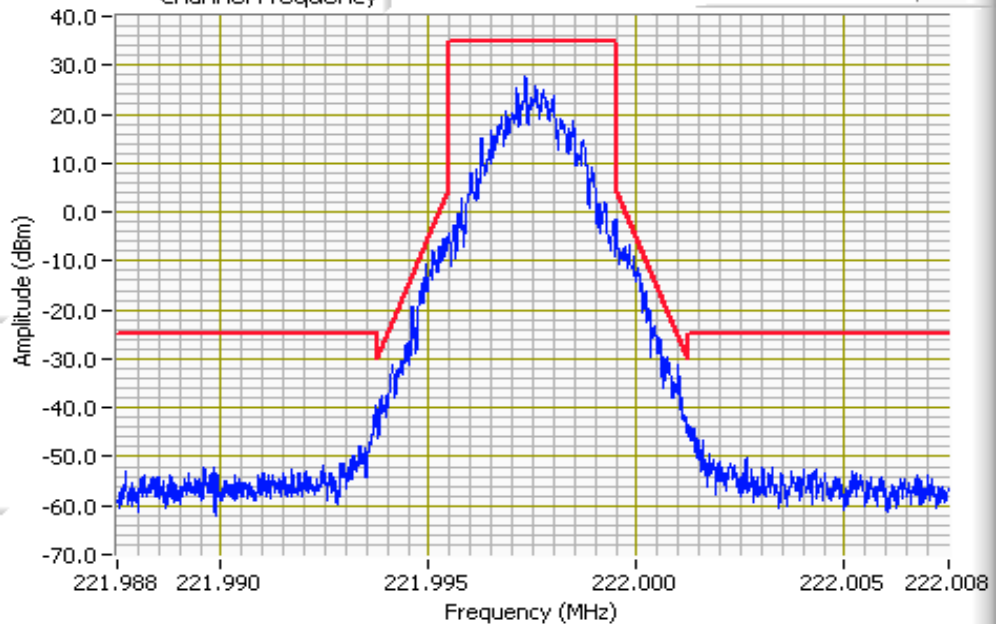
Reference Power 34.7 dBm

Channel Frequency 221.998 MHz

Modulated Signal

Mask

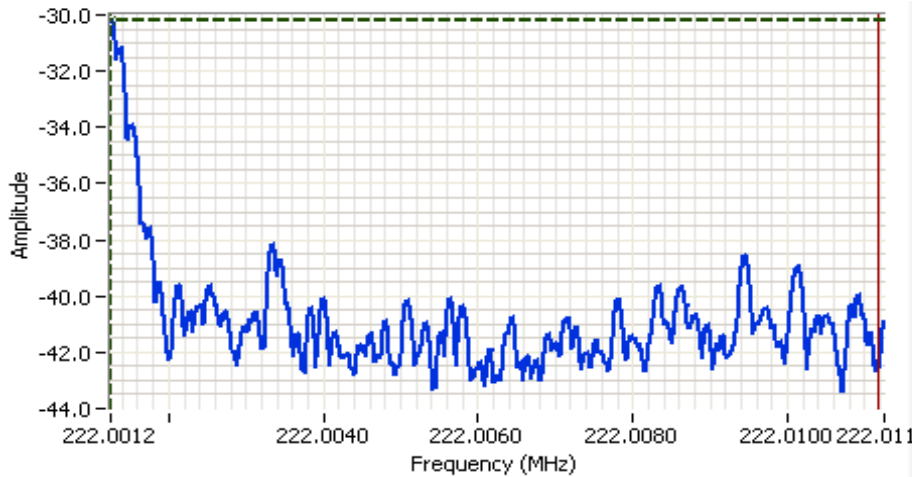
CW Signal





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

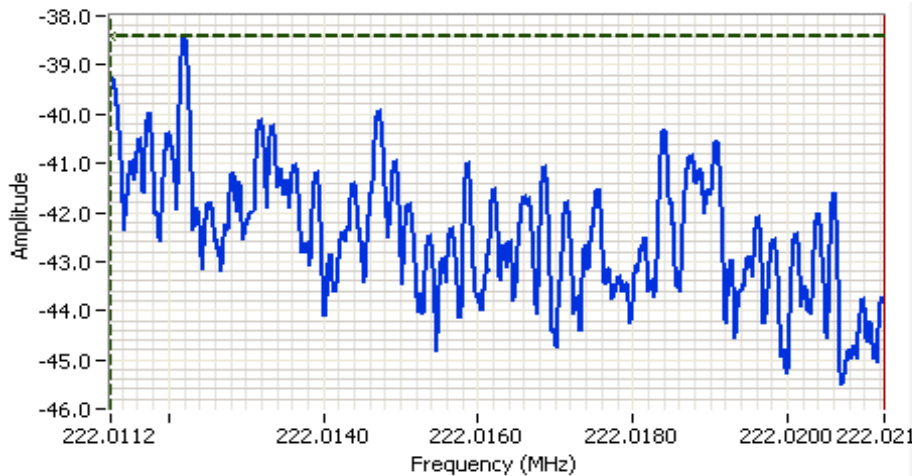


Analyzer Settings
 Agilent Technologies, E4446A
 CF: 222.006 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -25.11dBm
 modem 3200

Cursor 1 222.0013 -30.2 Delta Freq. 9.93 kHz

Cursor 2 222.0112 -56.2 Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 222.016 MHz
 SPAN: 10.0 kHz
 RB: 300 Hz
 VB: 910 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 106.2ms
 Ref Lvl: 42.0 DBM

Comments
 Power over span: -27.25dBm
 modem 3200

Cursor 1 222.0112 -38.4 Delta Freq. 10.0 kHz

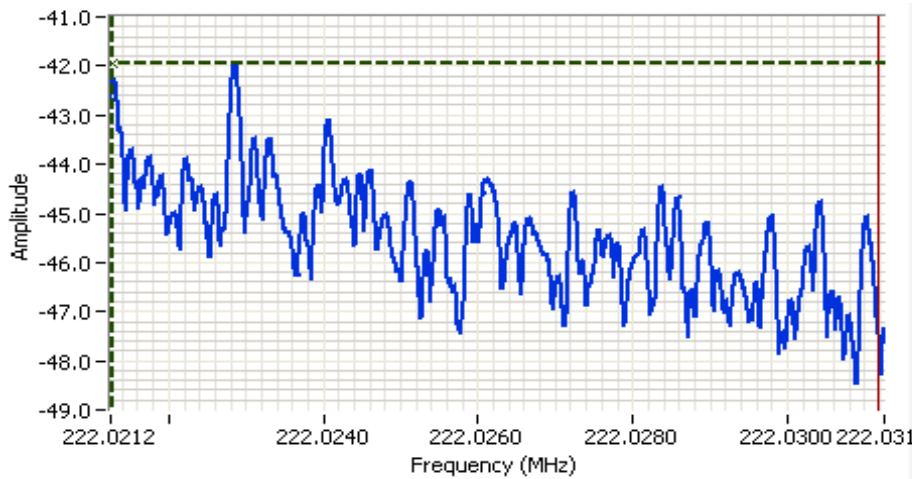
Cursor 2 222.0213 -64.4 Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A

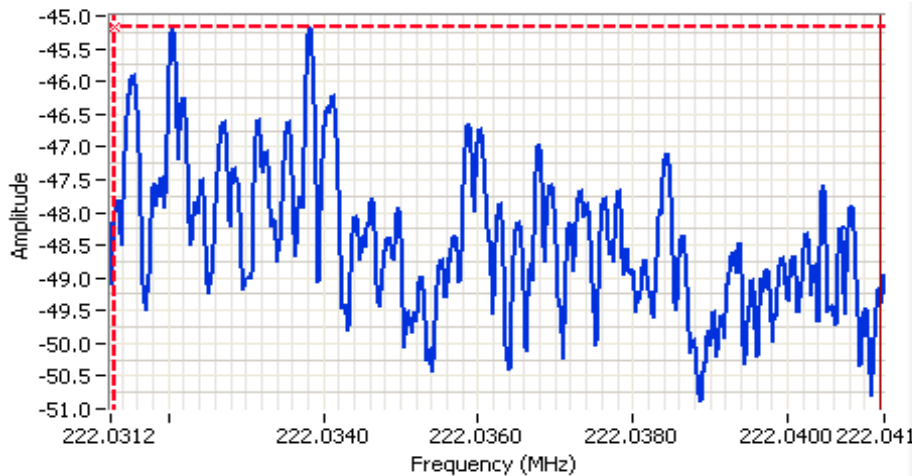


Analyzer Settings
Agilent Technologies, E4446A
CF: 222.026 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 42.0 DBM

Comments
Power over span: -30.35dBm
modem 3200

Cursor 1 222.0213 -41.9
Cursor 2 222.0312 -67.9

Delta Freq. 9.90 kHz
Delta Amplitude 26.0



Analyzer Settings
Agilent Technologies, E4446A
CF: 222.036 MHz
SPAN: 10.0 kHz
RB: 300 Hz
VB: 910 Hz
Detector: POS
Attn: 30 DB
RL Offset: 28.8 DB
Sweep Time: 106.2ms
Ref Lvl: 42.0 DBM

Comments
Power over span: -33.29dBm
modem 3200

Cursor 1 222.0313 -45.2
Cursor 2 222.0412 -71.2

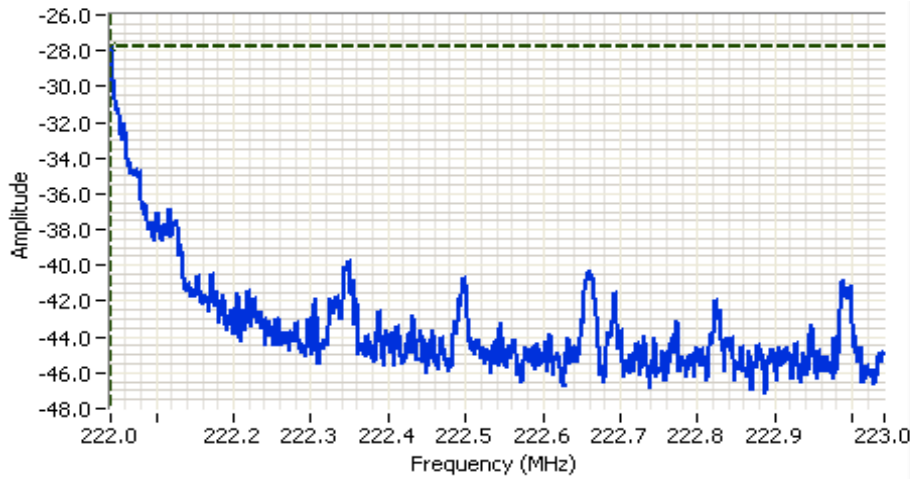
Delta Freq. 9.89 kHz
Delta Amplitude 26.0





EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 222.541 MHz
 SPAN: 1.000 MHz
 RB: 10.0 kHz
 VB: 30.0 kHz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 9.6ms
 Ref Lvl: 42.0 DBM

Comments
 modem 3200

Cursor 1 222.0419 -27.7

0.0000 0.0



Run #3: Signal Bandwidth

Date of Test: 12/1/2017

Test Engineer: David Bare

Test Location: Fremont EMC Lab #4A

Config. Used: 1

Config Change: None

EUT Voltage: 13.8VDC

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)	
				99%
40 (FB21)	220.0025	100 Hz		3.26
35	220.0025	100 Hz		2.70

QAM
 CPMFSK

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

Maximum allowed per FCC §90.209 is 4 kHz



EMC Test Data

Client: GE MDS LLC	Job Number: PR071990
Model: LN200	T-Log Number: T106435
Contact: Dennis McCarthy	Project Manager: Christine Krebill
Standard: FCC part 90	Project Coordinator: -
	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 220.002 MHz
 SPAN: 12.0 kHz
 RB: 30 Hz
 VB: 91 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 0.3s
 Ref Lvl: 48.8 DBM

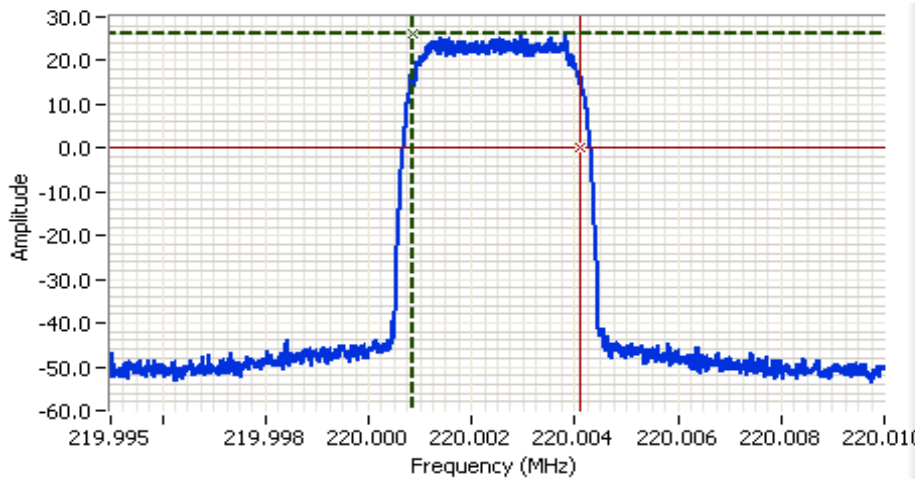
Comments
 99% power BW: 2.70 kHz
 modem 3200

Cursor 1 220.0011 34.7

Cursor 2 220.0038 8.7

Delta Freq. 2.70 kHz

Delta Amplitude 26.0



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 220.002 MHz
 SPAN: 15.0 kHz
 RB: 30 Hz
 VB: 91 Hz
 Detector: POS
 Attn: 30 DB
 RL Offset: 28.8 DB
 Sweep Time: 0.3s
 Ref Lvl: 48.8 DBM

Comments
 99% power BW: 3.26 kHz
 Modem 4QAM

Cursor 1 220.0009 26.0

Cursor 2 220.0041 -0.0

Delta Freq. 3.26 kHz

Delta Amplitude 26.0



End of Report

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