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Radio Test Report

FCC Part 27
(757 MHz to 758 MHz and 787 to 788 MHz)

Model: LW700

FCC ID:	E5MDS-LW700
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:	JD106230 / PR071587
REPORT DATE:	December 15, 2017
REISSUE DATE:	January 19, 2018
FINAL TEST DATES:	December 4, 5 and 6, 2017
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ACCREDITED
Testing Cert #0214.26

VALIDATING SIGNATORIES

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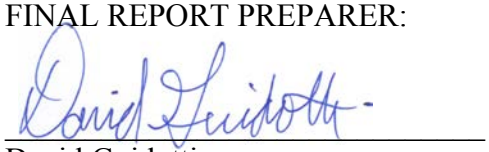

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	December 15, 2017	First release	
1	January 19, 2018	Revised report to correct a typo on page 27	David Guidotti

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SCOPE

Tests have been performed on the GE MDS LLC model LW700, 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 27 Subpart C (Operation in 757–758 MHz and 787–788 MHz Bands)

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

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 LW700 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 LW700 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 27

FCC		Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) §27.5 (b)(1)		Frequency range(s)	757-758 MHz and 787-788 MHz	757-758 MHz 787-788 MHz	Pass
§2.1033 (c) (4) §2.1047		Modulation Type	OFDM using QPSK and 16QAM	Any allowed	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 §27.50(b)(1) & (9)		ERP	44.5 dBm ERP (757-758 MHz) 44.5 dBm ERP (787-788 MHz)	1000 Watt (757-758 MHz) 30 Watt (787-788 MHz)	Pass
§2.1049 §27.53		Occupied Bandwidth	195 - 570 kHz	Remain in Block	Pass
Transmitter spurious emissions[3]					
§2.1051 §2.1053 §2.1057 §27.53(c) & (f)		At the antenna terminals	All < -13 dBm	-13 dBm	Pass
		Field strength	-48.7 dBm @ 1575.0 MHz (-8.7 dB)	-40 dBm/MHz erp	Pass
Other details					
§2.1055 §27.54		Frequency stability	0.7 ppm	1 ppm[1]	
§2.1093		RF Exposure	Refer to separate MPE exhibit	0.86 meters	Pass
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Refer to operational description	-	-
-	-	Antenna Gain	Maximum 16.5 dBi	-	-

Notes
Note 1 – The requirement for frequency stability is that the signal remains within the allocated band. A limit of 1 ppm is being used to ensure the signal remains within the allocated band as defined by the spurious limits at the channel edges.
Note 2 – The measurement at the channel edge is made in a resolution bandwidth of at least 100 kHz. For measurements less than 100 kHz from the edge of the channel the measurement bandwidth is at least 30 kHz. For emissions above 1 GHz, the resolution bandwidth used is at least 1 MHz.

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were 10 to 60 VDC.

The extremes of temperature were -40°C to +70°C as this is the specified operating temperature range for this product.

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
Conducted emission of receiver	dBm	25 to 40,000 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 40,000 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1,000 MHz 1 to 40 GHz	± 3.6 dB ± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The GE MDS LLC model LW700 is a licensed radio module that is designed to operate in the 757-758 MHz and 787-788 MHz bands utilizing OFDM using QPSK or 16QAM modulations. Since the EUT could be placed in any position during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 10-60 Volts DC, 2 Amps.

The samples were received on December 4, 2017 and tested on December 4, 5 and 6, 2017. The following samples were used for testing:

Company	Model	Description	Serial Number	FCC ID
GE MDS LLC	LW700	Radio Module	2871717	E5MDS-LW700
GE MDS LLC	LW700	Radio Module	2871712	E5MDS-LW700

OTHER EUT DETAILS

The following EUT details should be noted: The host product in which this product will be used "Orbit" is rated from -40°C to +70°C, 10-60 VDC input. The output power is variable from 20 – 30 dBm with a tolerance of 1 dB.

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
Mastech	HY6020ES	DC Power Supply	NTS 2317	-
HP	Probook 6555b	Laptop	CNU0502BCT	-
Agilent	E3610A	DC Power Supply	MY40001912	-

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded/Unshielded	Length(m)
RF out	Load	Direct	-	-
DC Power	Power Source	two wire	Unshielded	1.2
Com1	RJ45 to DB9 adapter	Cat 5	Unshielded	1

Additional on Support Equipment

Port	Connected To	Cable(s)		
		Description	Shielded/Unshielded	Length(m)
Laptop Serial	RJ45 to DB9 adapter	Multiwire	Shielded	2

EUT OPERATION

During testing, the EUT was set to transmit a modulated signal at the desired frequency and power level using serial communications software running on a laptop computer.

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.

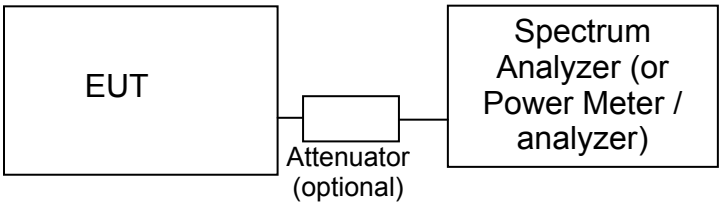
Radiated spurious emissions measurements were taken at the National Technical Systems - Silicon Valley Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2014 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are on file with the FCC and Innovation Science and Economic Development Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	IC 2845B-4	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 RADIATED EMISSIONS MEASUREMENTS). 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 tunes 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.

FREQUENCY STABILITY

The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The temperature is varied across the specified frequency range in 10 degree increments with frequency measurements made at each temperature step. The EUT is allowed enough time to stabilize at each temperature variation.

The spectrum analyzer is configured to give a 5- or 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. Where possible the device is set to transmit an unmodulated signal. Where this is not possible the frequency drift is determined by finding a stable point on the signal (e.g. the null at the centre of an OFDM signal) or by calculating a centre frequency based on the upper and lower XdB points (where X is typically 6dB or 10dB) on the signal’s skirts.

RADIATED EMISSIONS MEASUREMENTS

Receiver radiated spurious emissions measurements are made in accordance with ANSI ANSI C63.26:2015 by measuring the field strength of the emissions from the device at a specific test distance and comparing them to a field strength limit. Where the field strength limit is specified at a longer distance than the measurement distance the measurement is extrapolated to the limit distance.

Transmitter radiated spurious emissions are initially measured as a field strength. The eirp or erp limit as specified in the relevant rule part(s) is converted to a field strength at the test distance and the emissions from the EUT are then compared to that limit. Emissions within 20dB of this limit are the subjected to a substitution measurement.

All radiated emissions measurements are performed in two phases. A preliminary scan of emissions is conducted in either an anechoic chamber or on an OATS during which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed across the complete frequency range of interest and at each operating frequency identified in the reference standard. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. 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).

During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. For transmitter spurious emissions, where the limit is expressed as an effective radiated power, the eirp or erp is converted to a field strength limit.

Final measurements are made in a semi-anechoic chamber at the significant frequencies observed during the preliminary scan(s) using the same process of rotating the EUT and raising/lowering the measurement antenna to find the highest level of the emission. The field strength is recorded and, for receiver spurious emissions, compared to the field strength limit. For the final measurement the appropriate detectors (average, peak, normal, sample, quasi-peak) are used. For receiver measurements below 1GHz the detector is a Quasi-Peak detector, above 1GHz a peak detector is used and the peak value (RB=VB=1MHz) and average value (RB=1MHz, VB=10Hz) are recorded.

For transmitter spurious emissions, the radiated power of all emissions within 20dB of the calculated field strength limit are determined using a substitution measurement. The substitution measurement is made by replacing the EUT with an antenna of known gain (typically a dipole antenna or a double-ridged horn antenna), connected to a signal source. The output power of the signal generator is adjusted until the maximum field strength from the substitution antenna is similar to the field strength recorded from the EUT. The erp of the EUT is then calculated.

INSTRUMENTATION

An EMI receiver as specified in CISPR 16-1-1 is used for radiated emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary.

For measurements above the frequency range of the receivers and for all conducted measurements a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis.

Measurement bandwidths for the test instruments are set in accordance with the requirements of the standards referenced in this document.

Software control is used to correct the measurements for transducer factors (e.g. antenna) and the insertion loss of cables, attenuators and other series elements to obtain the final measurement value. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are exported in a graphic and/or tabular format, as appropriate.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the EUT antenna port or receiving antenna and the test receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A combination of biconical, log periodic or bi-log antennas are used to cover the range from 30 MHz to 1000 MHz. Broadband antennas or tuned dipole antennas are used over the entire 25 to 1000 MHz frequency range as the reference antenna for substitution measurements.

Above 1000 MHz, a dual-ridge guide horn antenna or octave horn antenna are used as reference and measurement antennas.

The antenna calibration factors are included in site factors that are programmed into the test receivers and instrument control software when measuring the radiated field strength.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

Table mounted devices are placed on a non-conductive table at a height of 80 centimeters above the floor. Floor mounted equipment is placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. The EUT is positioned on a motorized turntable to allow it to be rotated during testing to determine the angel with the highest level of emissions.

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:

R_r = Measured value in dBm
S = Specification Limit in dBm
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH

Measurements of radiated field strength are compared directly to the specification limit (decibel form). The receiver and/or control software corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor is sued when measurements are made at a test distance that is different to the specified limit distance by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

The margin of a given emission peak relative to the limit is calculated as follows:

$$Rc = Rr + Fd$$

and

$$M = Rc - Ls$$

where:

R_r = Receiver Reading in dBuV/m
F_d = Distance Factor in dB
R_c = Corrected Reading in dBuV/m
L_s = Specification Limit in dBuV/m
M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS –RADIATED POWER

The erp/eirp limits for transmitter spurious measurements are converted to a field strength in free space using the following formula:

$$E = \frac{\sqrt{30\ P\ G}}{d}$$

where:

E = Field Strength in V/m
P = Power in Watts
G = Gain of isotropic antenna (numeric gain) = 1
D = measurement distance in meters

The field strength limit is then converted to decibel form (dBuV/m) and the margin of a given emission peak relative to the limit is calculated (refer to *SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH*).

When substitution measurements are required (all signals with less than 20dB of margin relative to the calculated field strength limit) the eirp of the spurious emission is calculated using:

$$P_{EUT} = P_S - (E_S - E_{EUT})$$

and

$$P_S = G + P_{in}$$

where:

P_S = effective isotropic radiated power of the substitution antenna (dBm)
P_{in} = power input to the substitution antenna (dBm)
G = gain of the substitution antenna (dBi)
E_S = field strength the substitution antenna (dBm) at eirp P_S
E_{EUT} = field strength measured from the EUT

Where necessary the effective isotropic radiated power is converted to effective radiated power by subtracting the gain of a dipole (2.2dBi) from the eirp value.

Appendix A Test Equipment Calibration Data

Radio Antenna Port (Power, BW and Band Edge), 04, 06-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/22/2017	5/22/2018

Radiated Emissions, 1,000 - 8,000 MHz, 05-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Filtek	Filter, 1 GHz High Pass	HP12/1000-5BA	957	5/10/2017	5/10/2018
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/14/2017	10/14/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/31/2017	8/31/2018
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/24/2017	8/24/2019

Radiated Emissions, 1 - 8 GHz, 05-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Filtek	Filter, 1 GHz High Pass	HP12/1000-5BA	957	5/10/2017	5/10/2018
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/14/2017	10/14/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	8/30/2017	8/30/2018
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/24/2017	8/24/2019

Radiated Emissions, 30 - 1,000 MHz, 06-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	10/12/2016	10/12/2018
Com-Power	Preamplifier, 30-1000 MHz	PA-103	1632	3/8/2017	3/8/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018

Radio Antenna Port (Spurious Emissions), 06-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/22/2017	5/22/2018

Frequency Stability, 04-Dec-17

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	6/24/2017	6/24/2018

Appendix B Test Data

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Client:	GE MDS LLC	Job Number:	JD106230
Product	LW700	T-Log Number:	T016375
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Emissions Standard(s):	FCC Part 27, FCC Part 15	Class:	N/A
Immunity Standard(s):		Environment:	Radio

EMC Test Data

For The

GE MDS LLC

Product

LW700

Date of Last Test: 12/6/2017

Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

FCC Part 27

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

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: 24.4 °C

Rel. Humidity: 38 %

Summary of Results

Run #			Test Performed	Limit	Pass / Fail	Result / Margin
1			Output Power	27.53 (b)(1) or (b)(9) 44.8 or 60 dBm ERP	Pass	44.5 dBm ERP
2			Band Edge / Block Edge	27.53 (c)	Pass	Within block
3			99% or Occupied Bandwidth	1 MHz	Pass	195 - 570 kHz
4			Spurious Emissions (conducted)	-13 dBm	Pass	All < -13 dBm
5			Spurious emissions (radiated)	-13 or -40 dBm	Pass	-48.7 dBm @ 1575.0 MHz (-8.7 dB)
6			Modulation	-	-	OFDM using QPSK and 16QAM
7			Frequency Stability	Sufficient to stay in authorized band	Pass	0.7 ppm

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.

Sample Note

Sample S/N: 2871717 (Antenna port measurements), 2871712 (Radiated measurements)

Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	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: 13.8 VDC

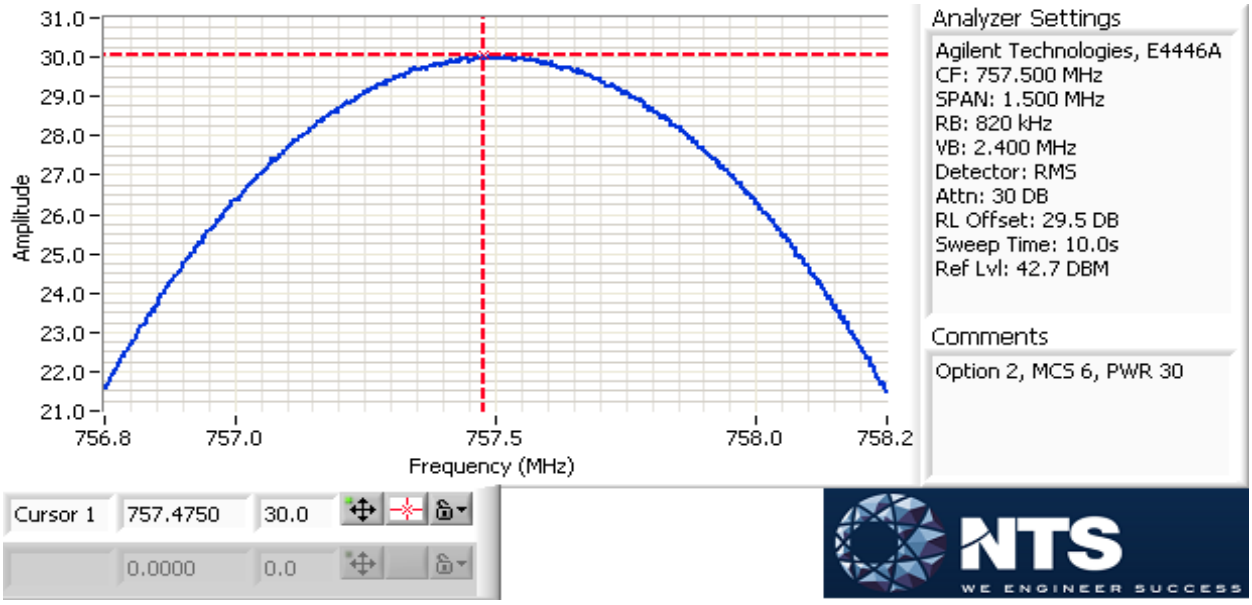
Cable Loss: 0.0 dB Attenuator: 29.5 dB Total Loss: 29.5 dB

Cable ID(s): - Attenuator IDs: 1878 & 1927

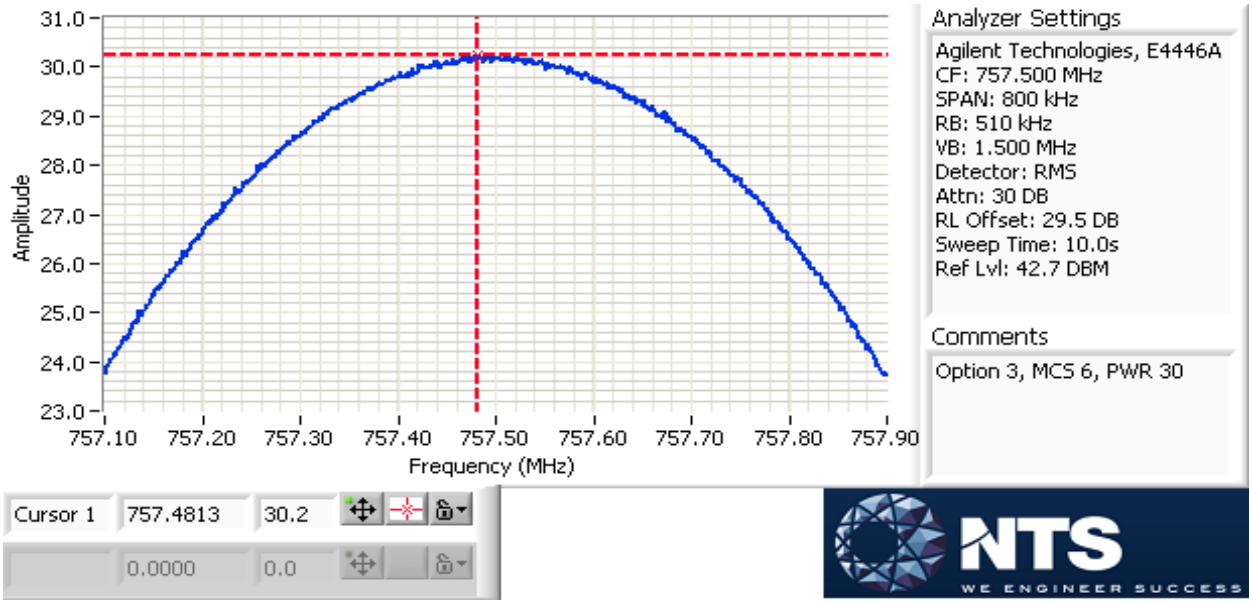
Limt is 30W or 1000W ERP for antenna heights less than 305 m depending on frequency band

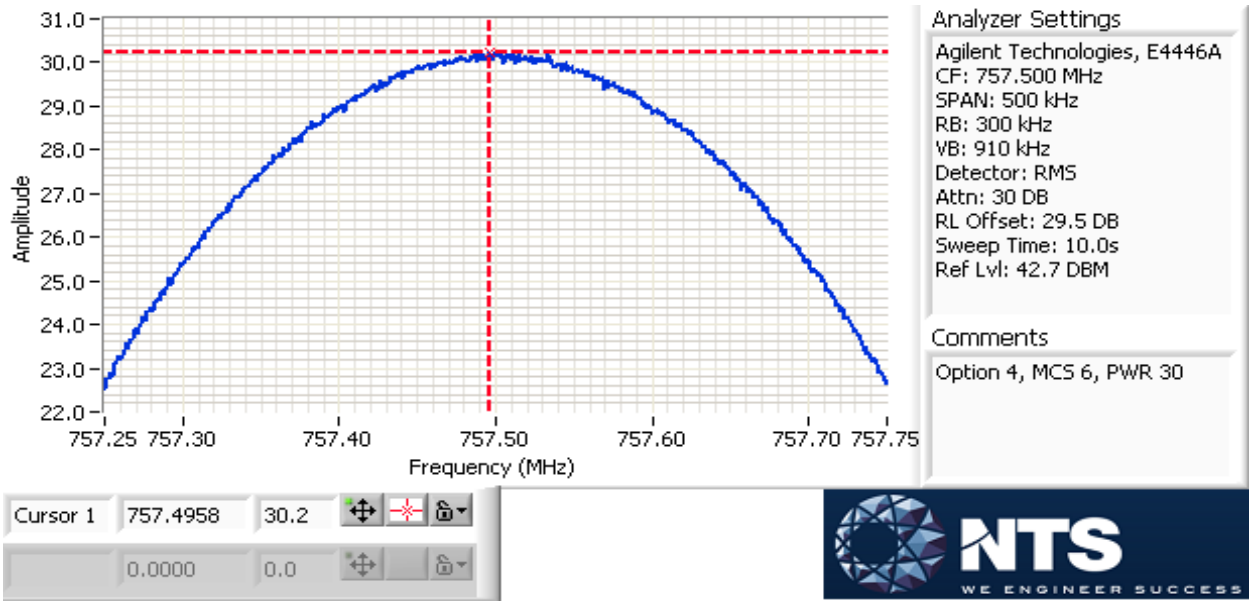
Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBd)	Result	ERP dBm	ERP W	
30	757.5	30.0	1000.0	14.3	Pass	44.3	26.915	Option 2, MCS 6
30	757.5	30.2	1047.1	14.3	Pass	44.5	28.184	Option 3, MCS 6
30	757.5	30.2	1047.1	14.3	Pass	44.5	28.184	Option 4, MCS 6
30	787.5	30.0	1000.0	14.3	Pass	44.3	26.915	Option 2, MCS 6
30	787.5	30.2	1047.1	14.3	Pass	44.5	28.184	Option 3, MCS 6
30	787.5	30.2	1047.1	14.3	Pass	44.5	28.184	Option 4, MCS 6

Note 1:	Output power measured using a spectrum analyzer with RBW=300 kHz, 510 kHz and 1 MHz with corresponding VB=910 kHz, 1.5 MHz and 3 MHz for the three bandwidth options, RMS detector per FCC §27.50(b)(11).
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Typical antennas are 12.2 dBd Yagi and 3 dBd Monopole.



Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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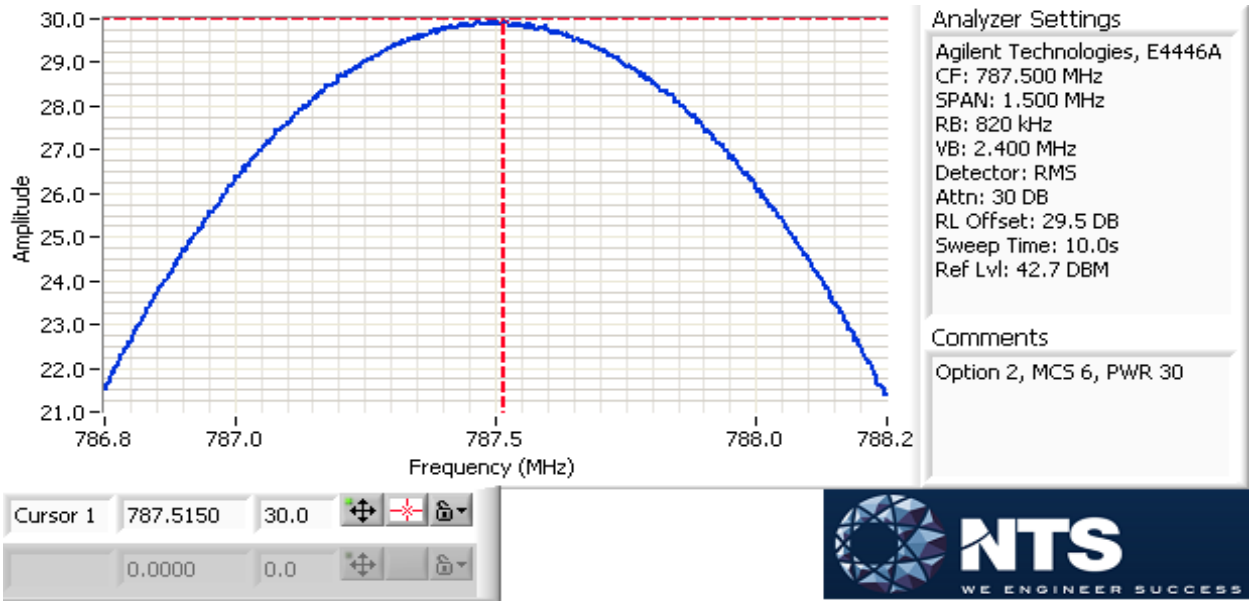
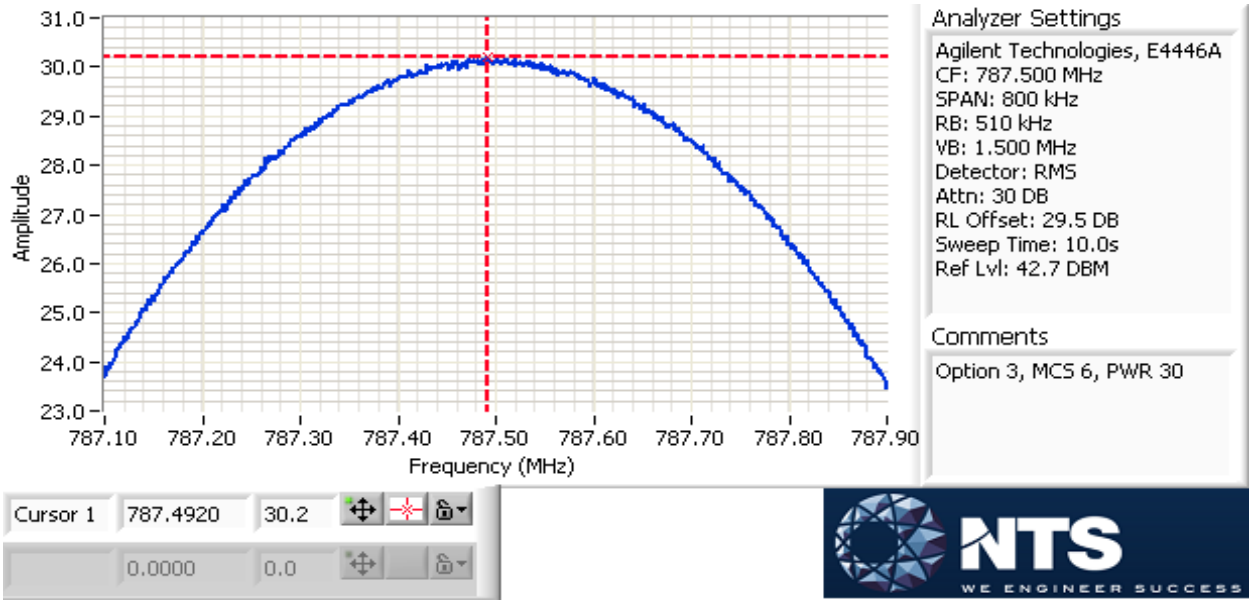
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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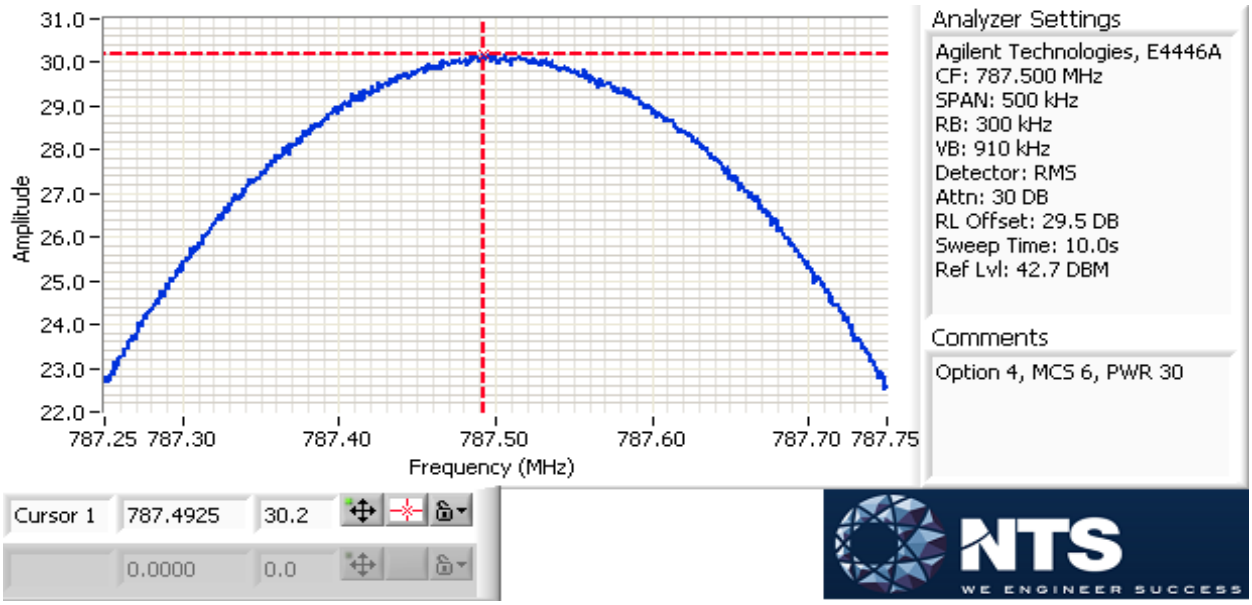
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



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Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #2: Band edge/Block edge, FCC part 27.53 (c1, 2, 3, 4, 5)

Date of Test: 12/4 & 12/6/2017 Config. Used: 1

Test Engineer: David Bare Config Change: None

Test Location: Fremont EMC Lab #4A EUT Voltage: 13.8 VDC

On any frequency outside the 746-758 MHz and 776-788 MHz bands, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB (-13 dBm) (FCC §27.53(c)(1) & (2))

Compliance with this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. (FCC §27.53(c)(5)).

On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations. (FCC §27.53(c)(3))

Compliance with this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

Note 1:	Preliminary tests showed no difference in emissions between OFDM using QPSK and 16QAM modulations. See Run #3
Note 2:	For operation in 787-788 MHz band, first 3 plots for the highest used channel shows complance within 90 kHz of block edge, next plot shows compliance in the 100 kHz band that starts 90 kHz from the block edge, last plot shows compliance in the 793-805 MHz band.
Note 3:	For operation in the 787-788 MHz band, first 3 plots for the lowest used channel shows complance within 90 kHz of block edge, next plot shows compliance in the 100 kHz band that starts 90 kHz from the block edge.
Note 4:	For operation in 757-758 MHz band, first 3 plots for the lowest used channel shows complance within 90 kHz of block edge, next plot shows compliance in the 100 kHz band that starts 90 kHz from the block edge, last plot shows compliance in the 763-775 MHz band.
Note 5:	For operation in 757-758 MHz band, first 3 plots for the highest used channel shows complance within 90 kHz of block edge, next plot shows compliance in the 100 kHz band that starts 90 kHz from the block edge.
Note 6:	Maximum drift of the Tx frequency was less than -100/+600 Hz under any environmental conditions. This variation was found to have an insignificant impact on the OOB measurement at the band edge.
Note 7:	A single channel at 757.5 MHz for the 757-758 MHZ band and 787.5 MHz for the 787-788 MHz band is used for modem option 2 (570 kHz BW)

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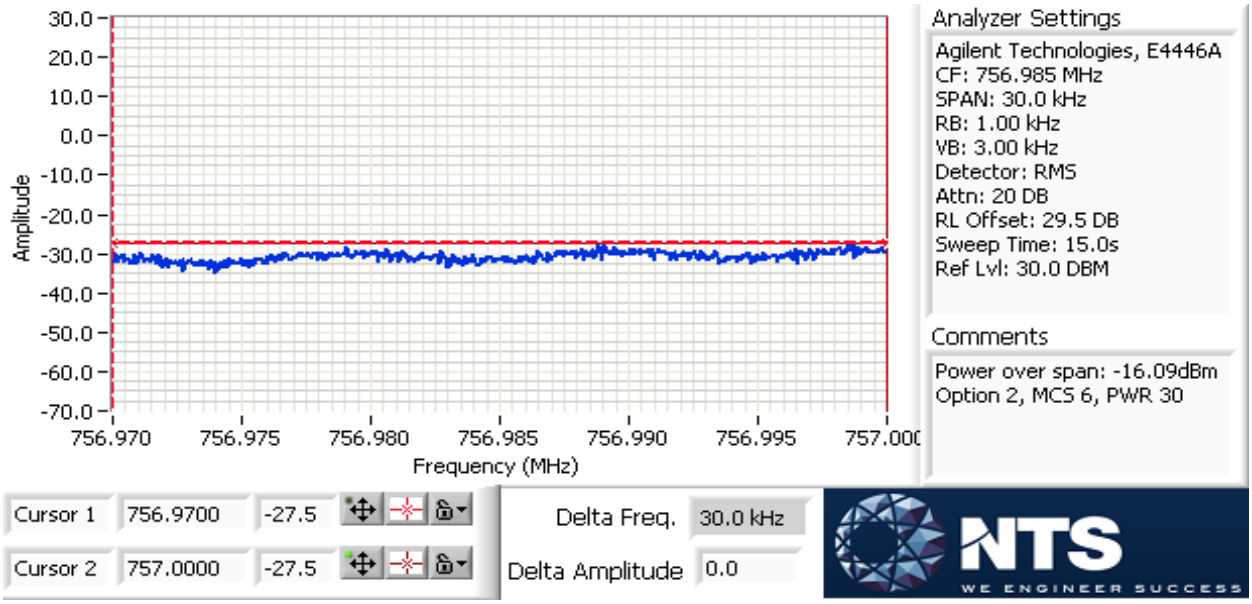
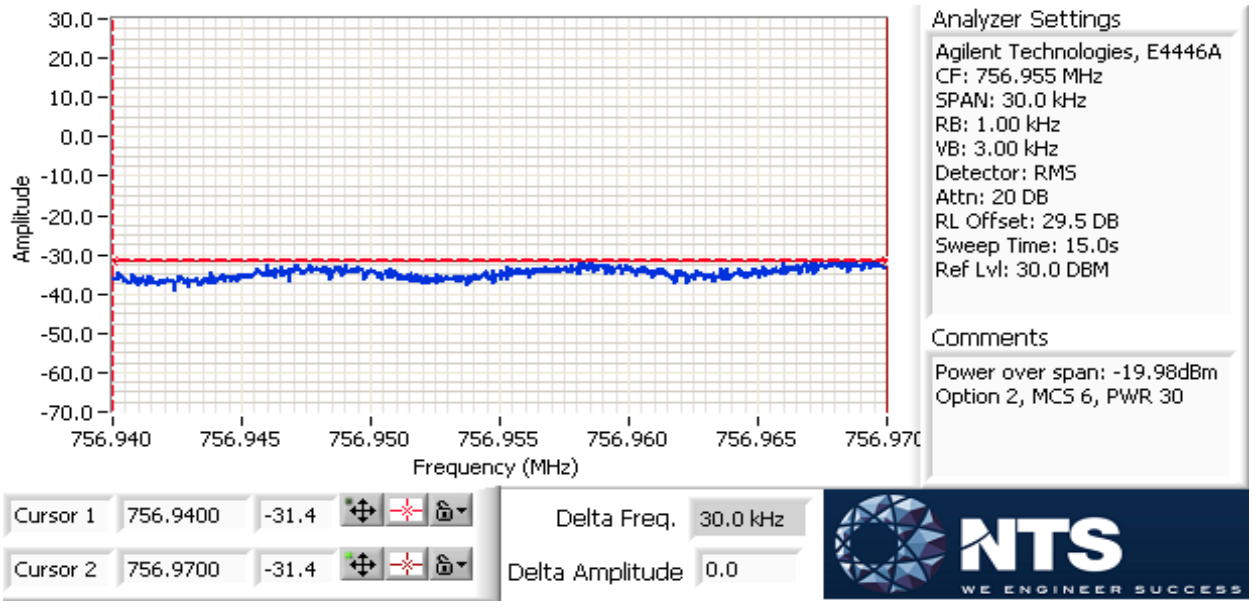
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

757-758 MHz band edge plots





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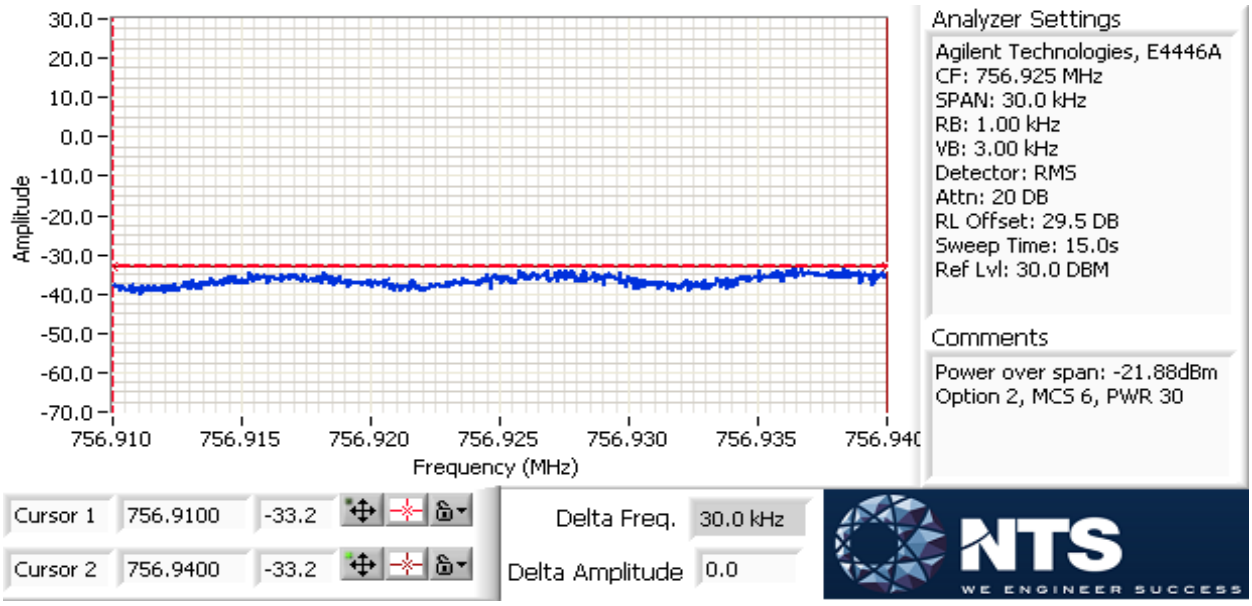
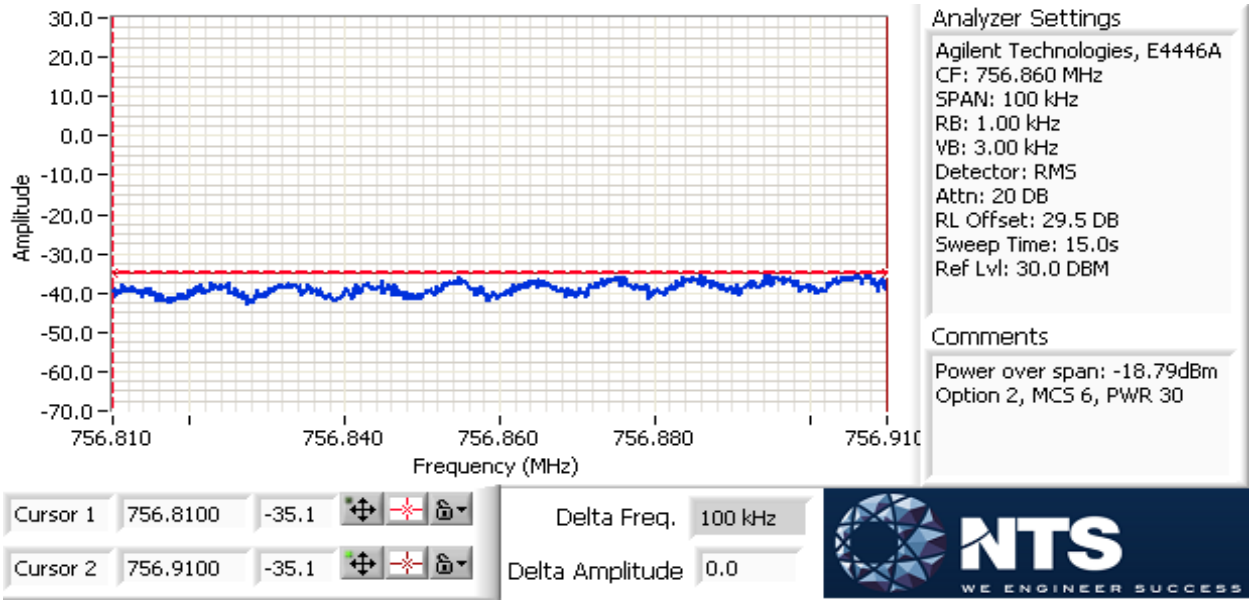
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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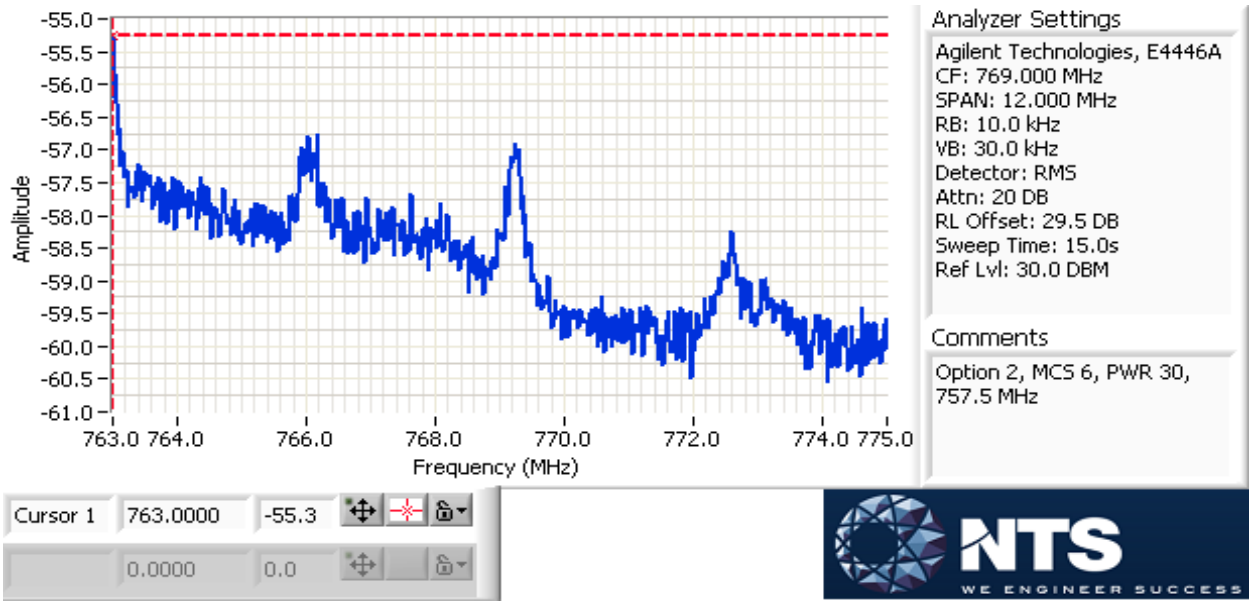
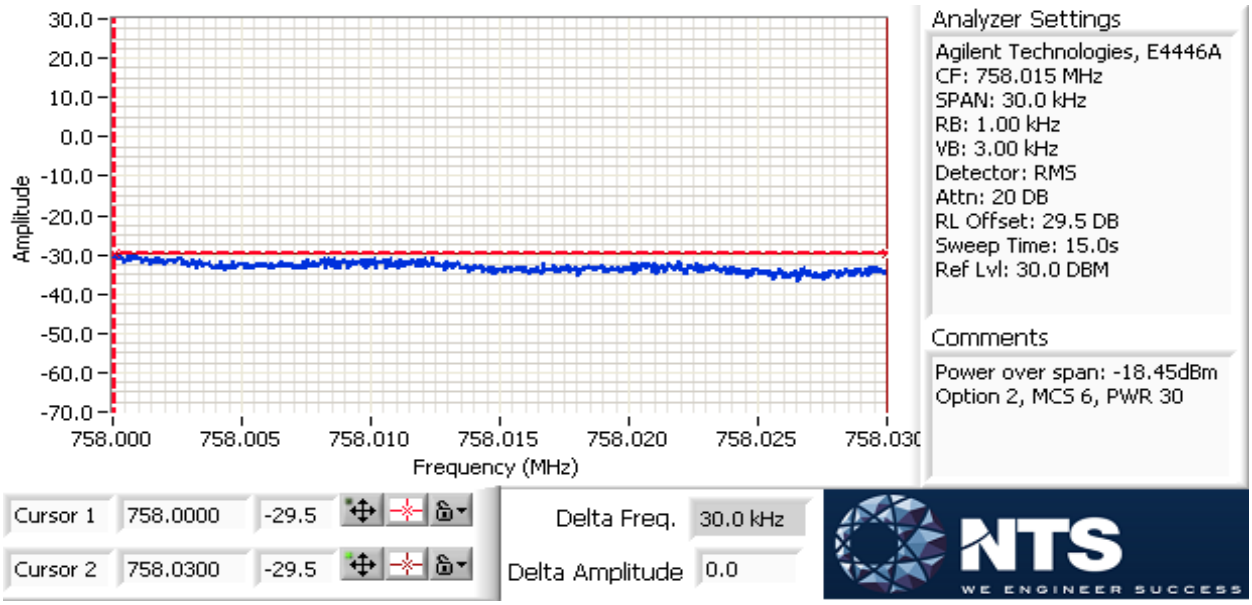
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
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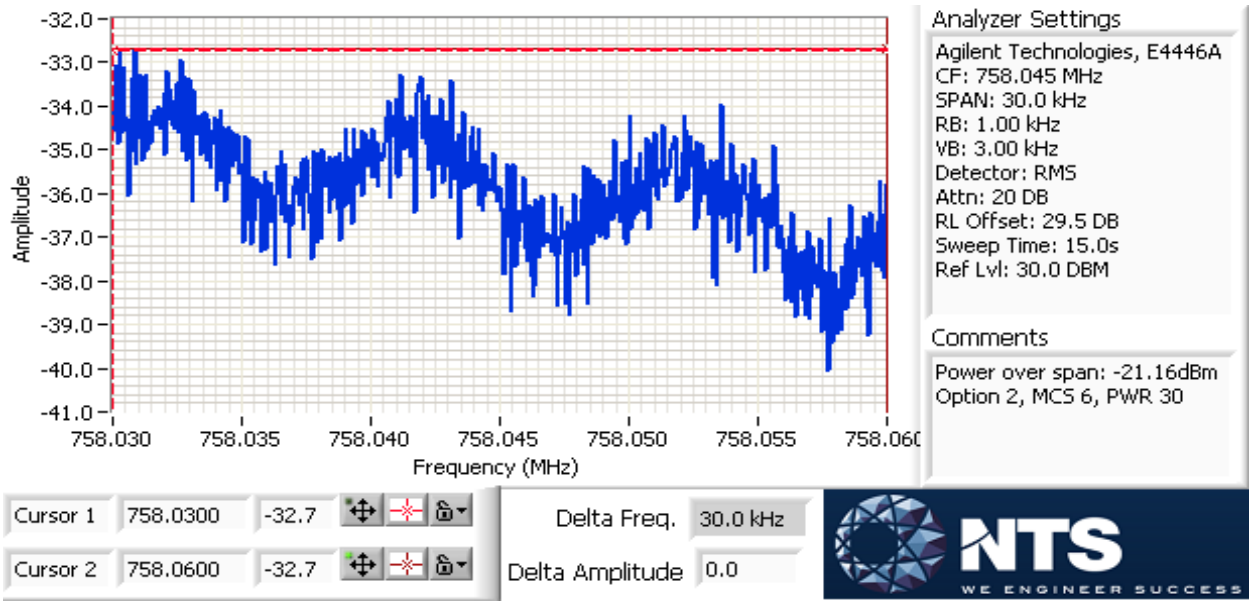

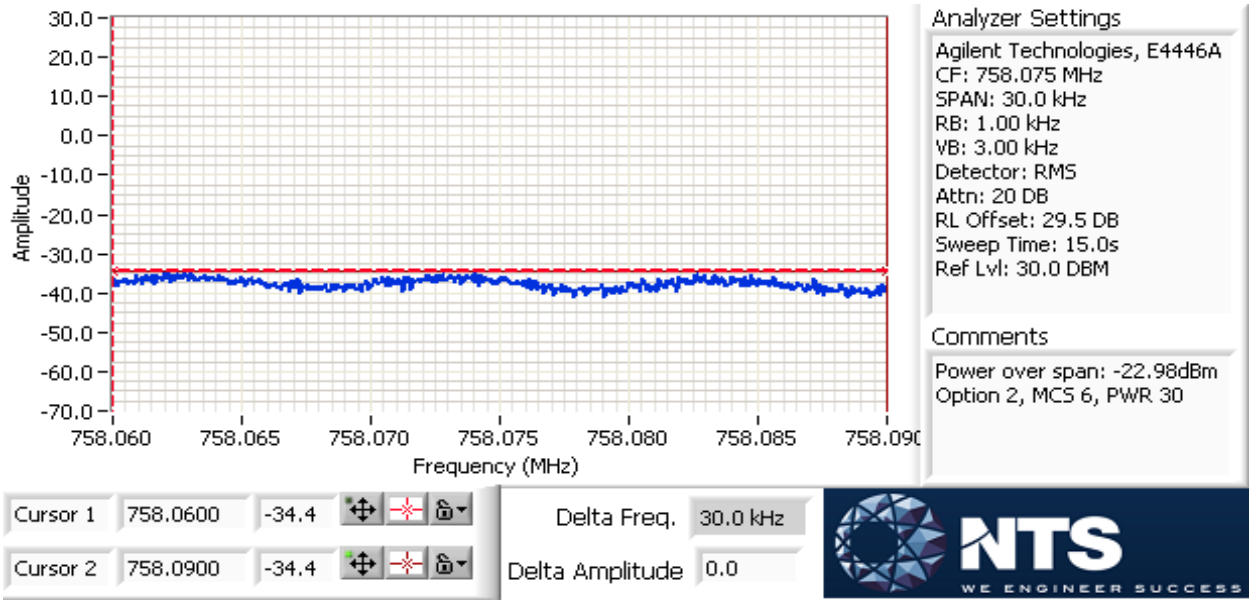

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		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
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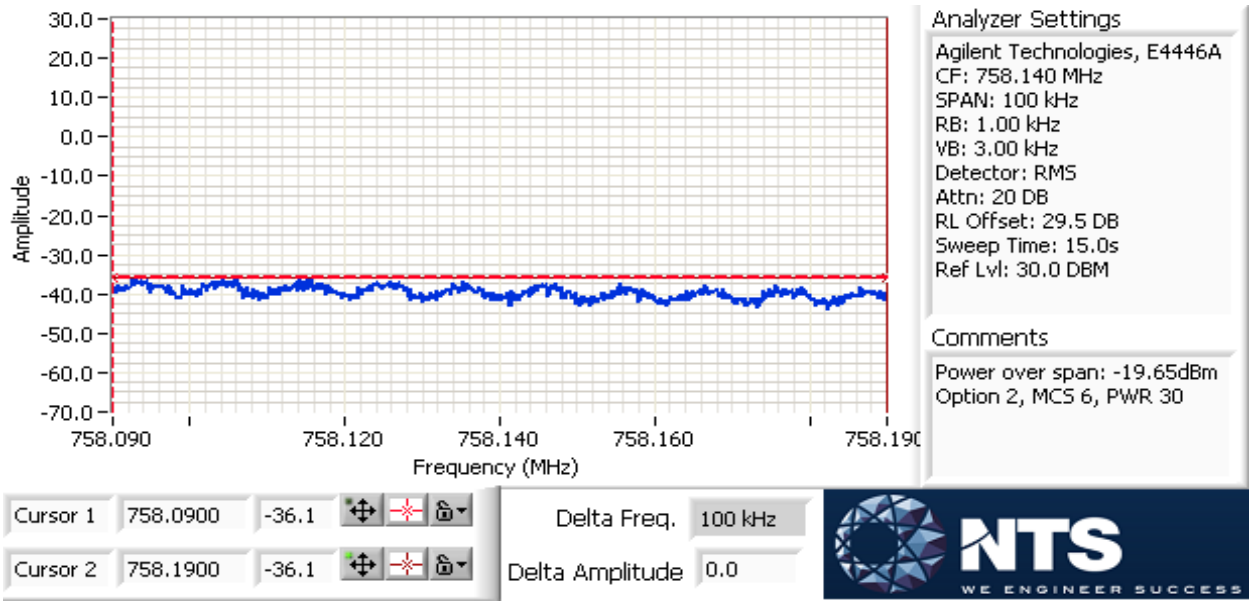

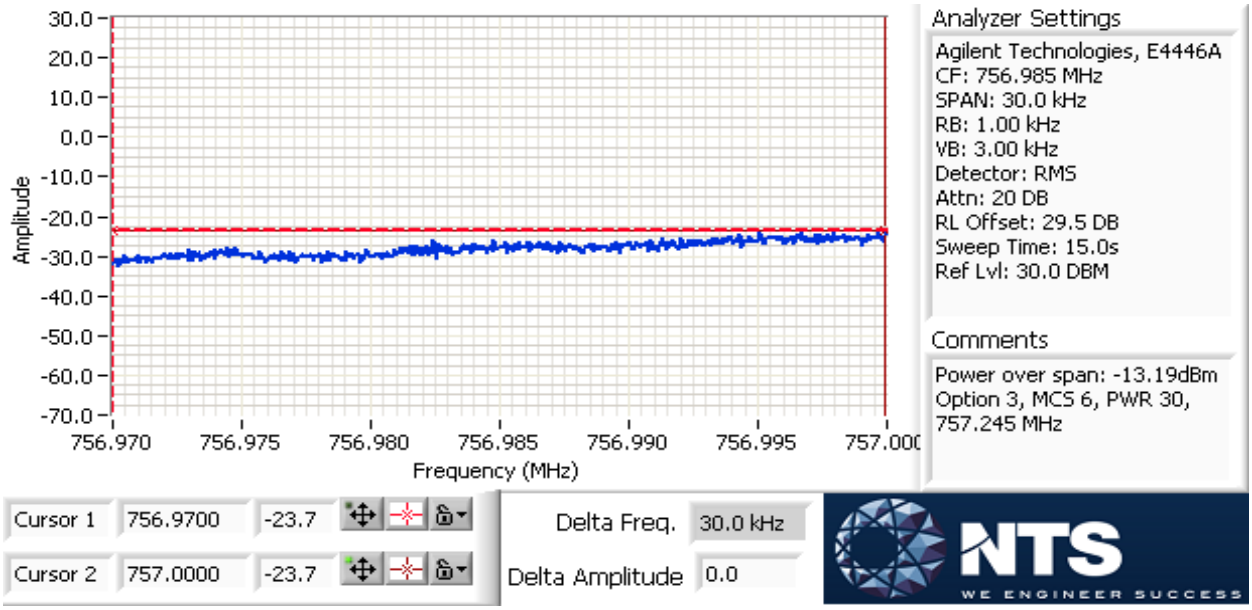

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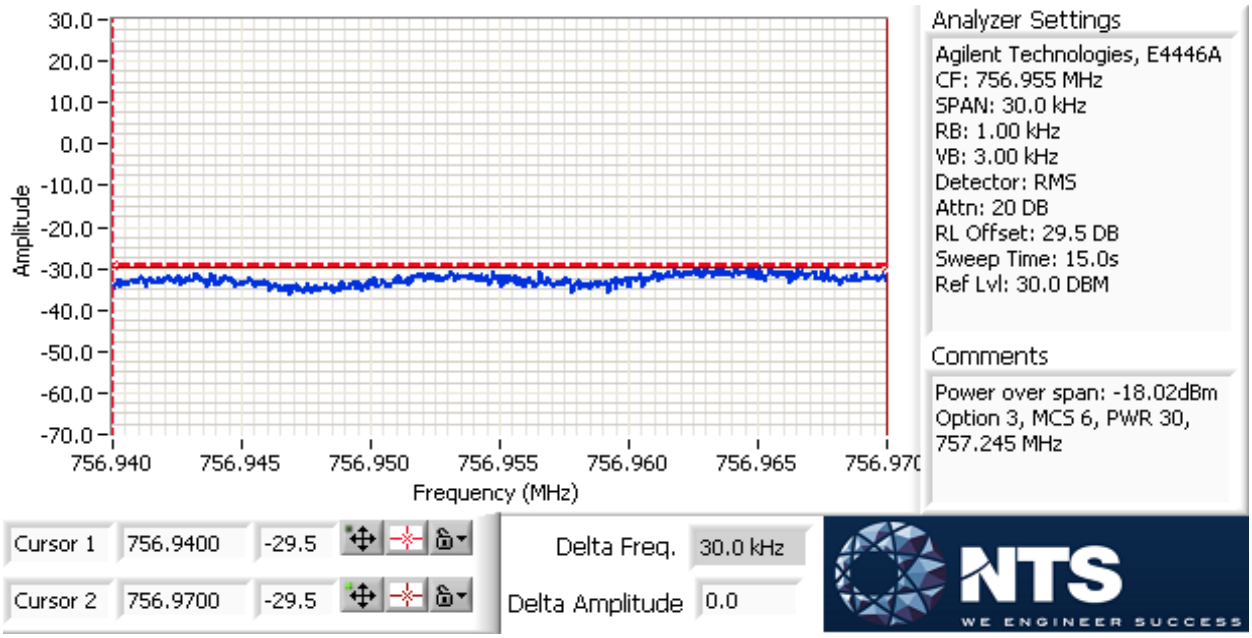
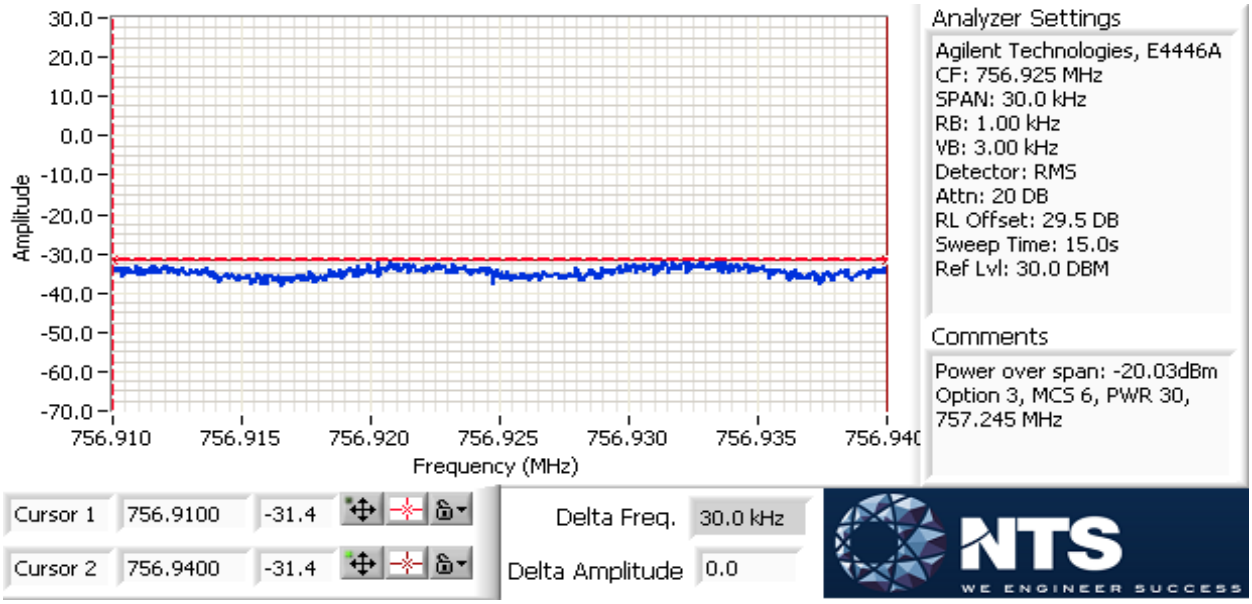
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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Contact:	Dennis McCarthy	Project Coordinator:	-
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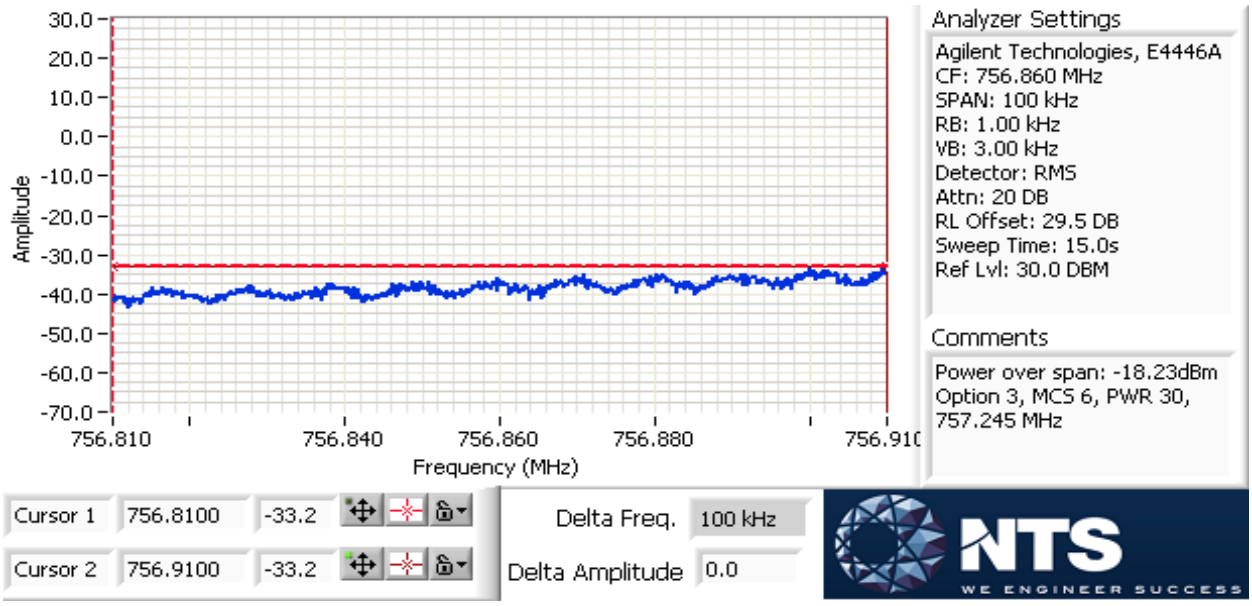

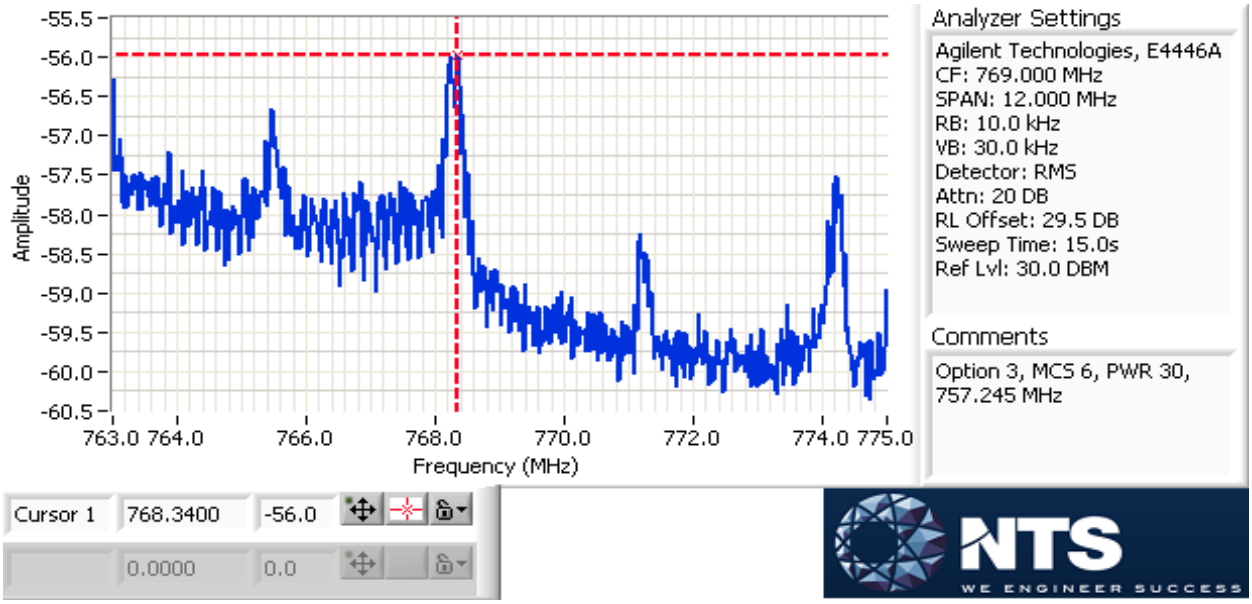

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		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
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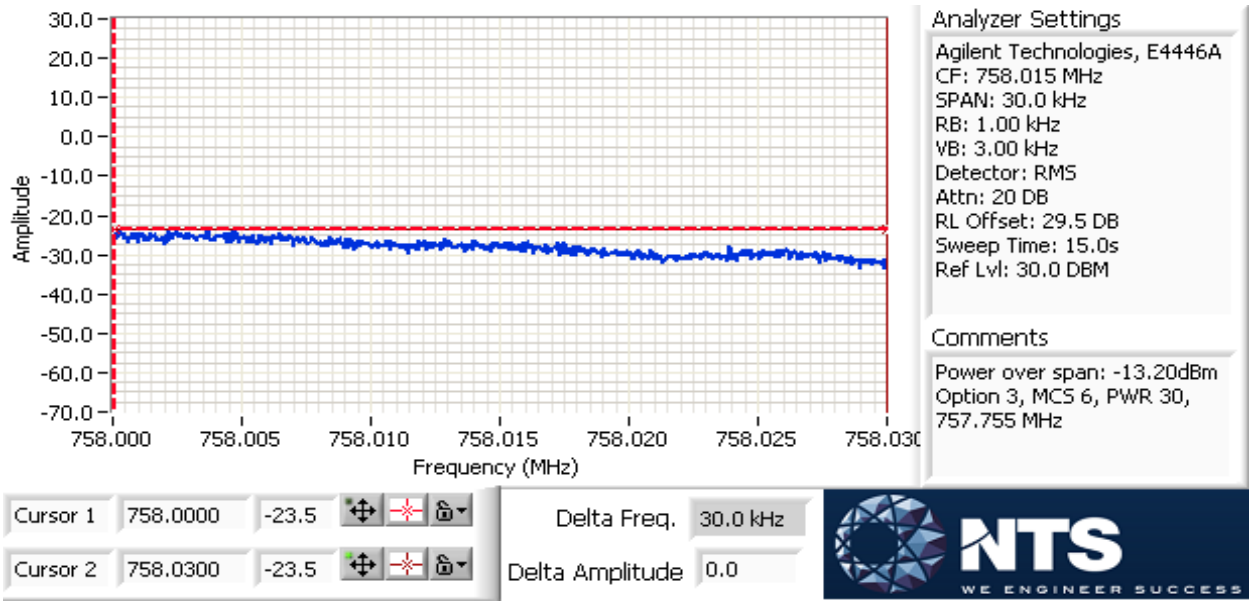

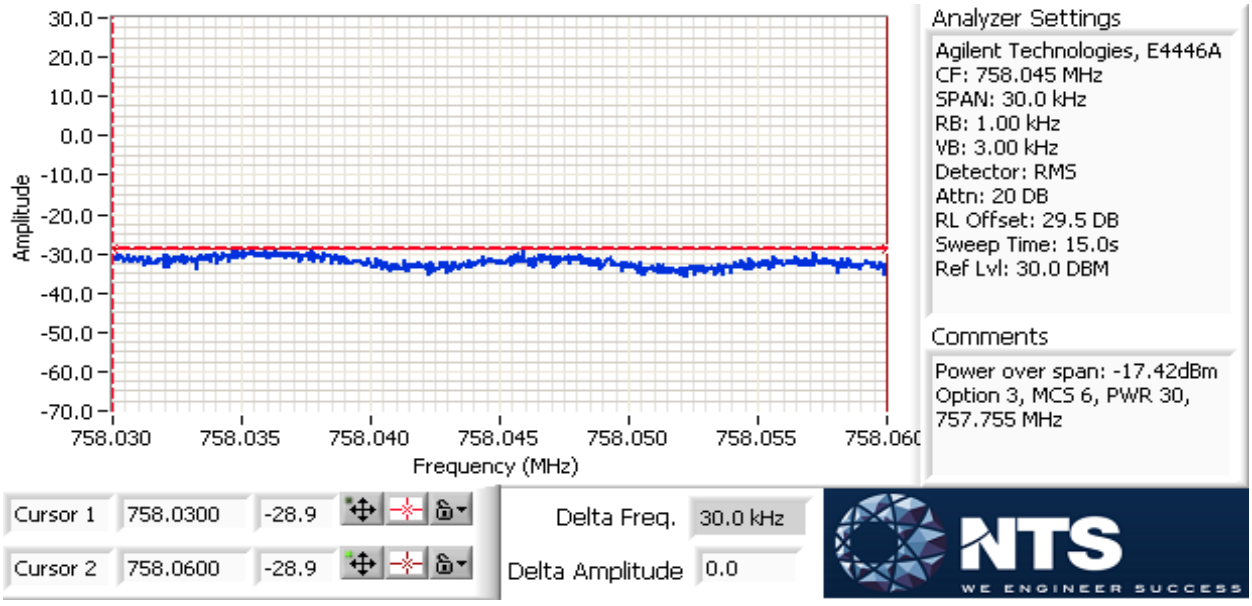

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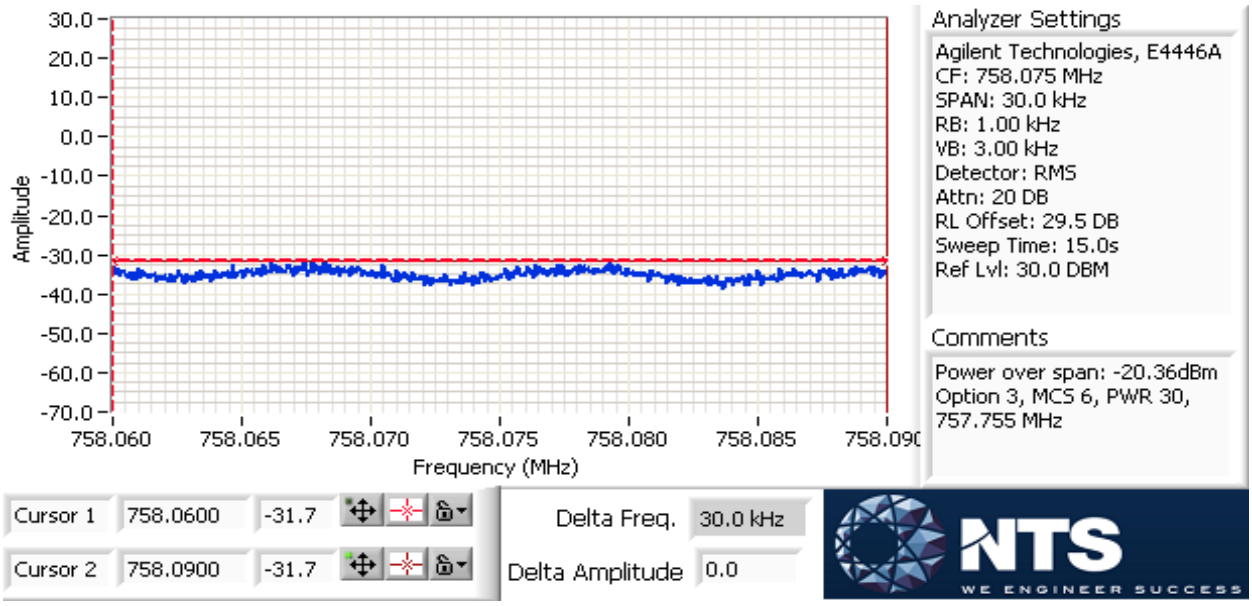

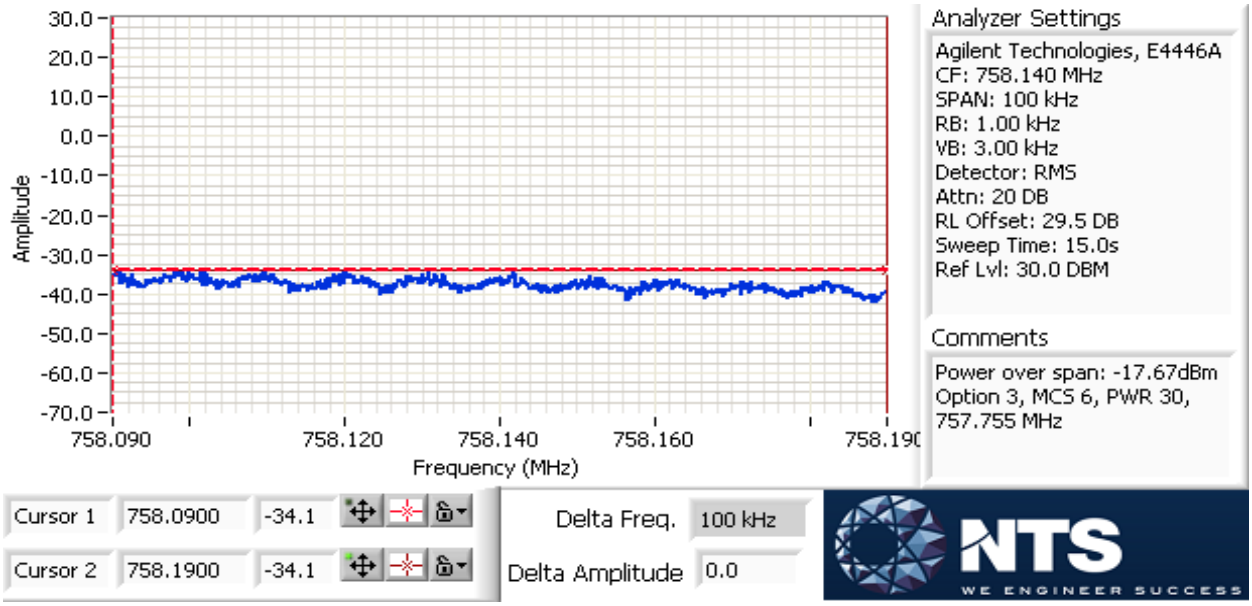

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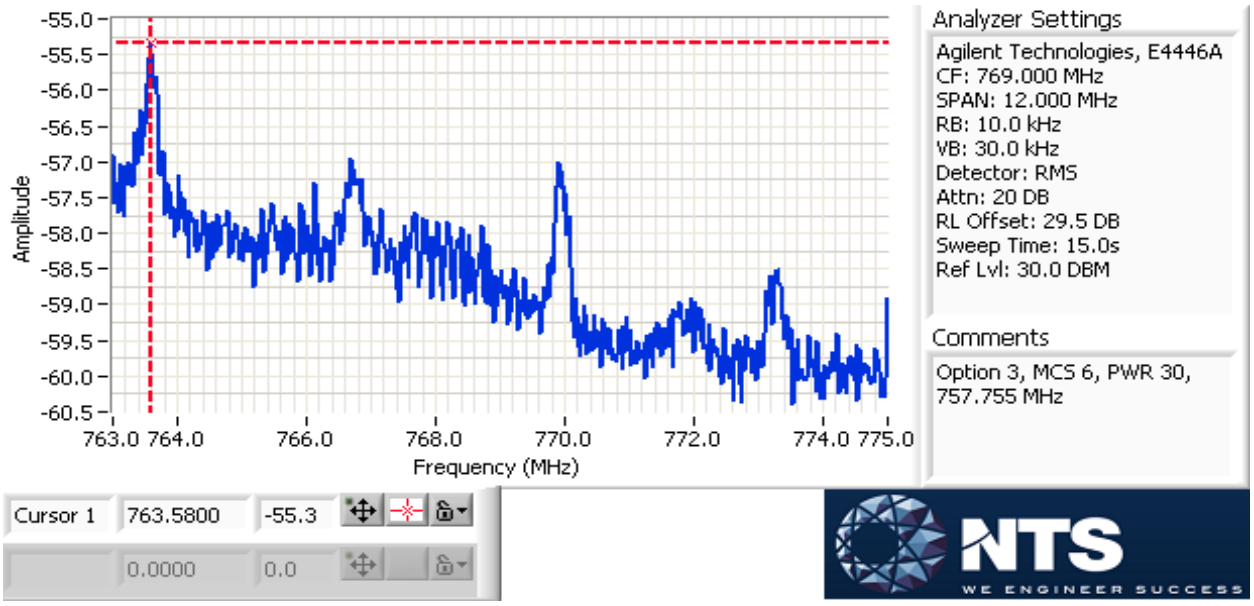

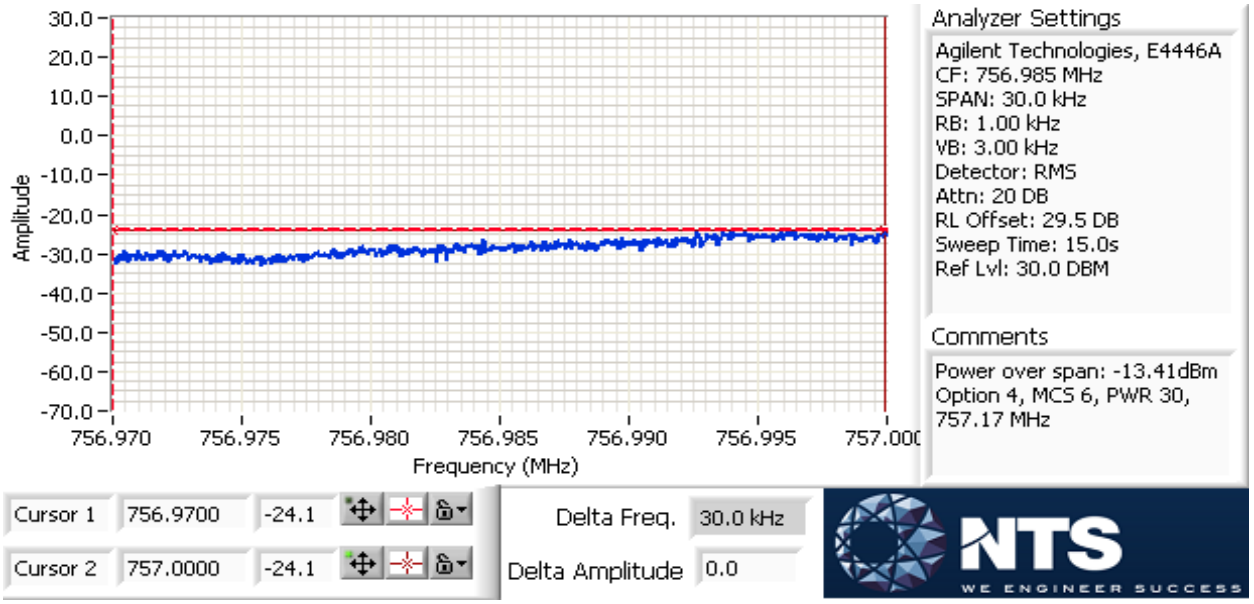

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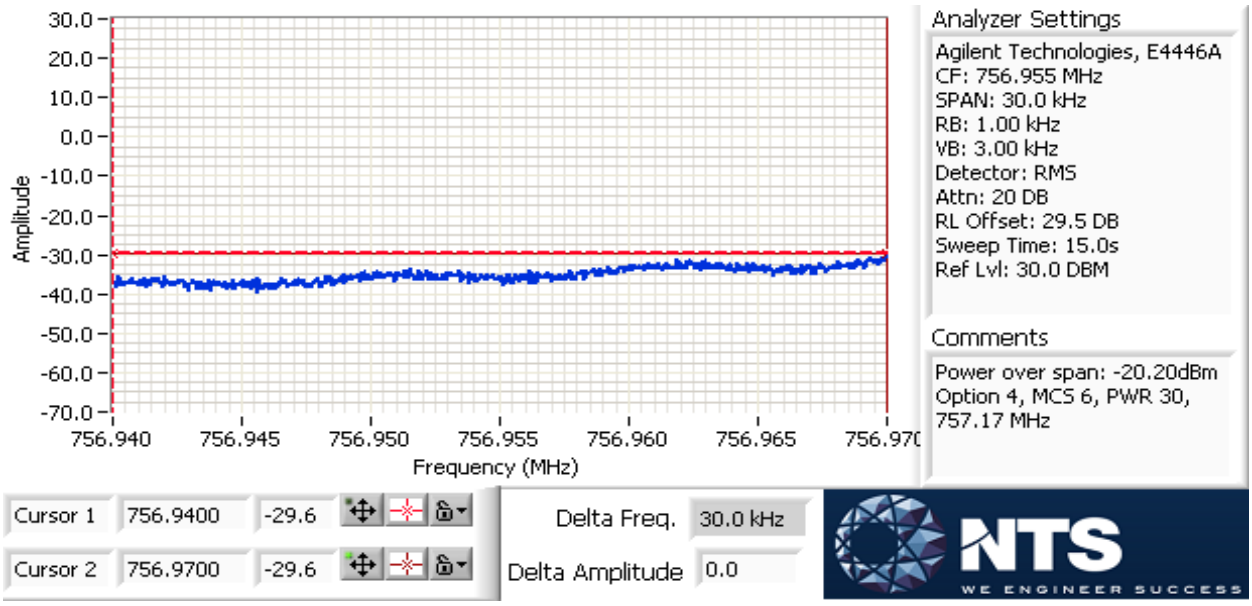

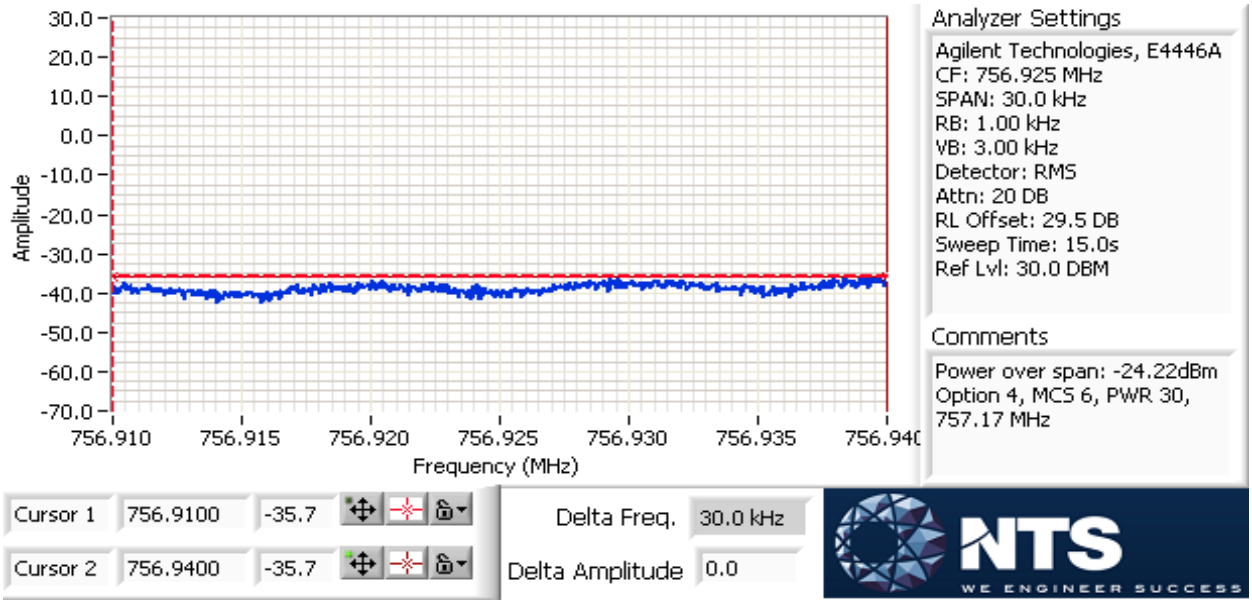

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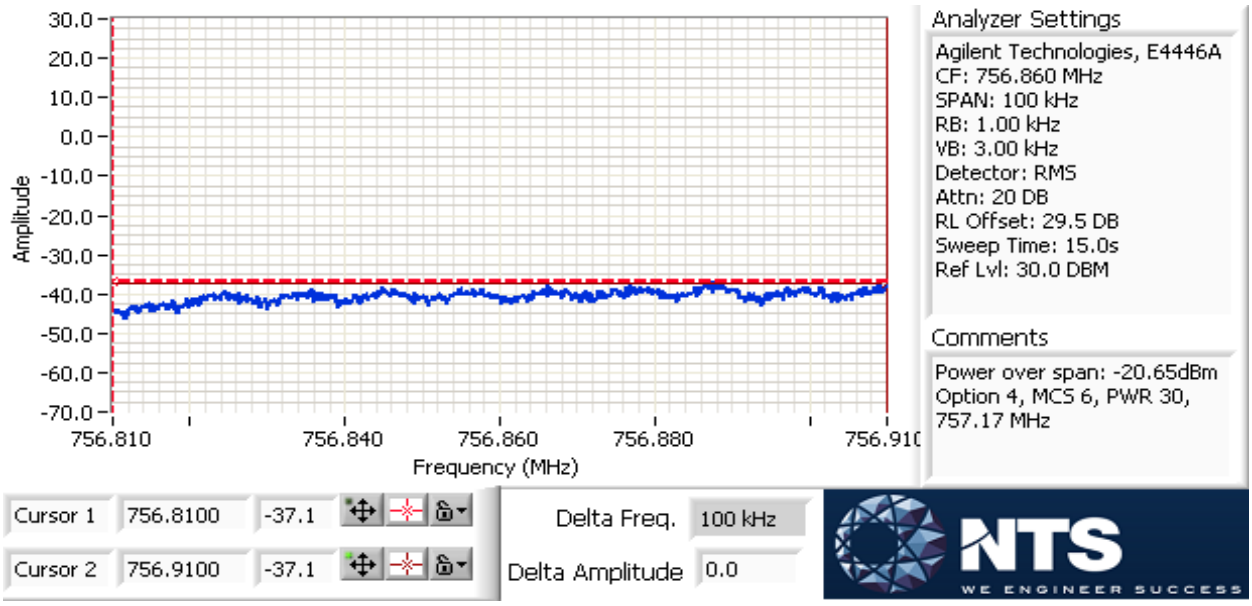

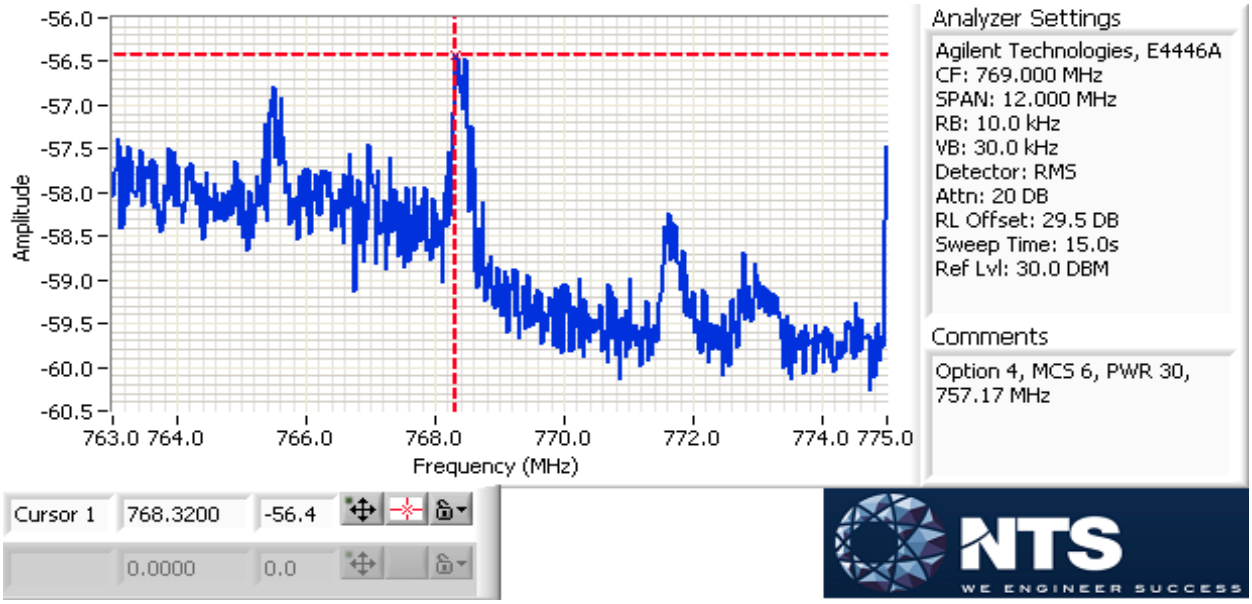

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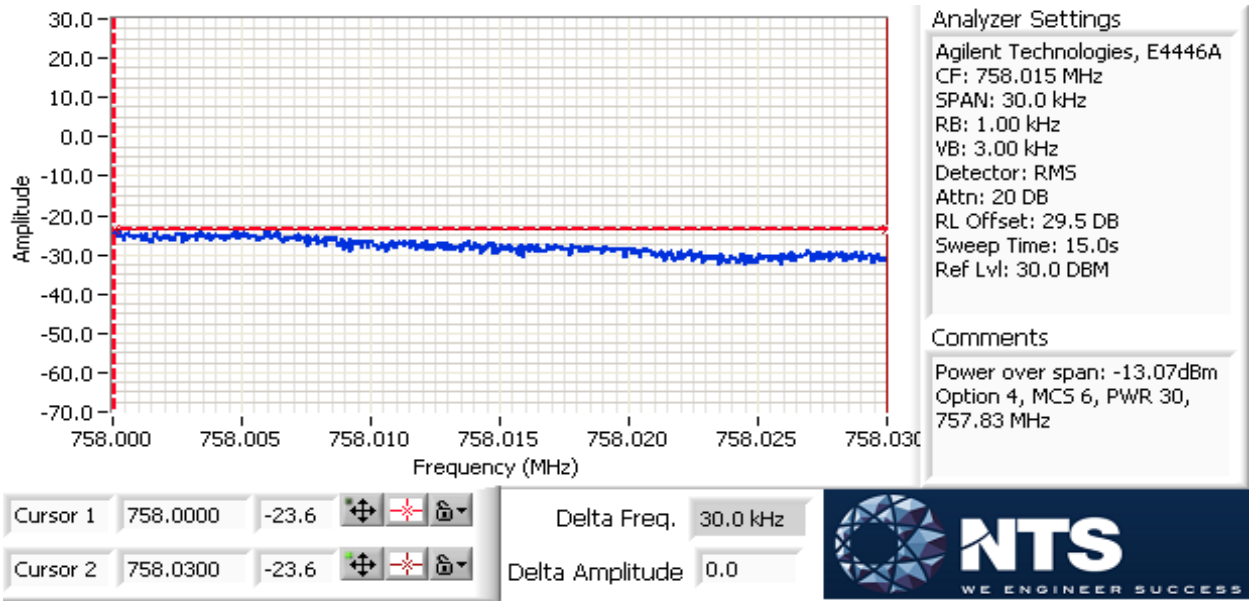

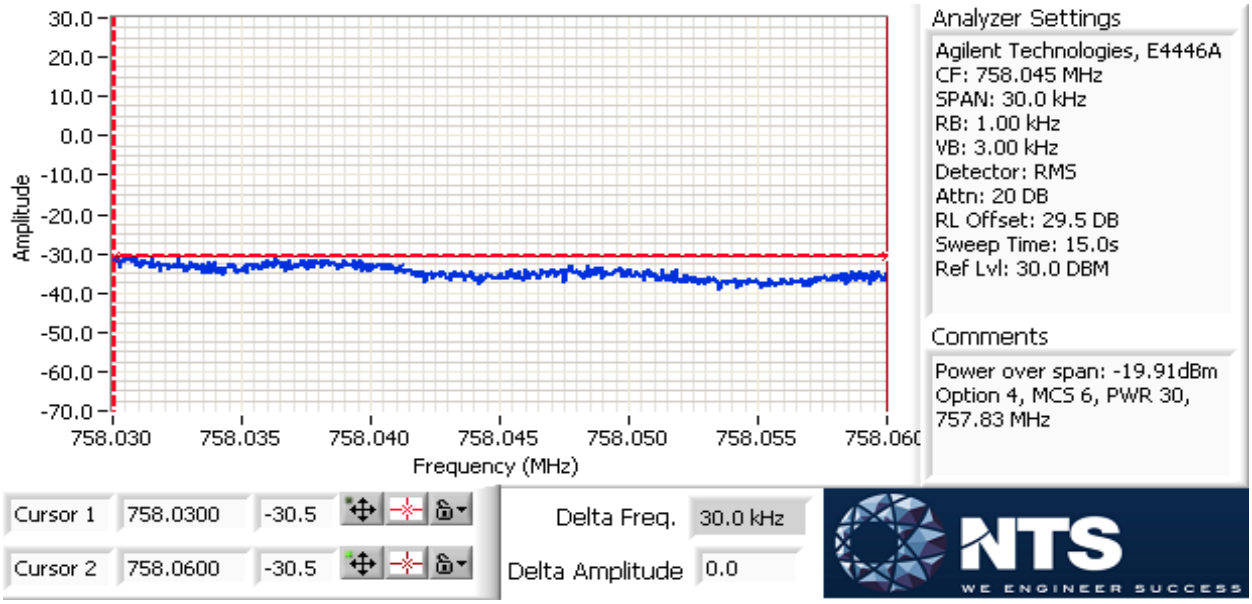

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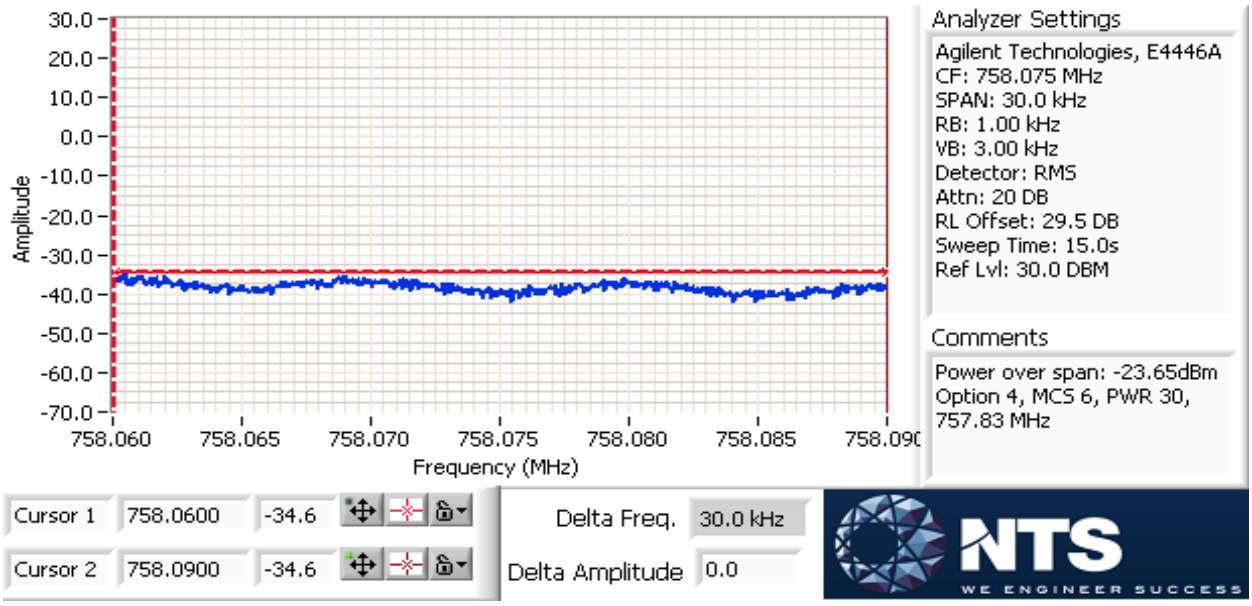

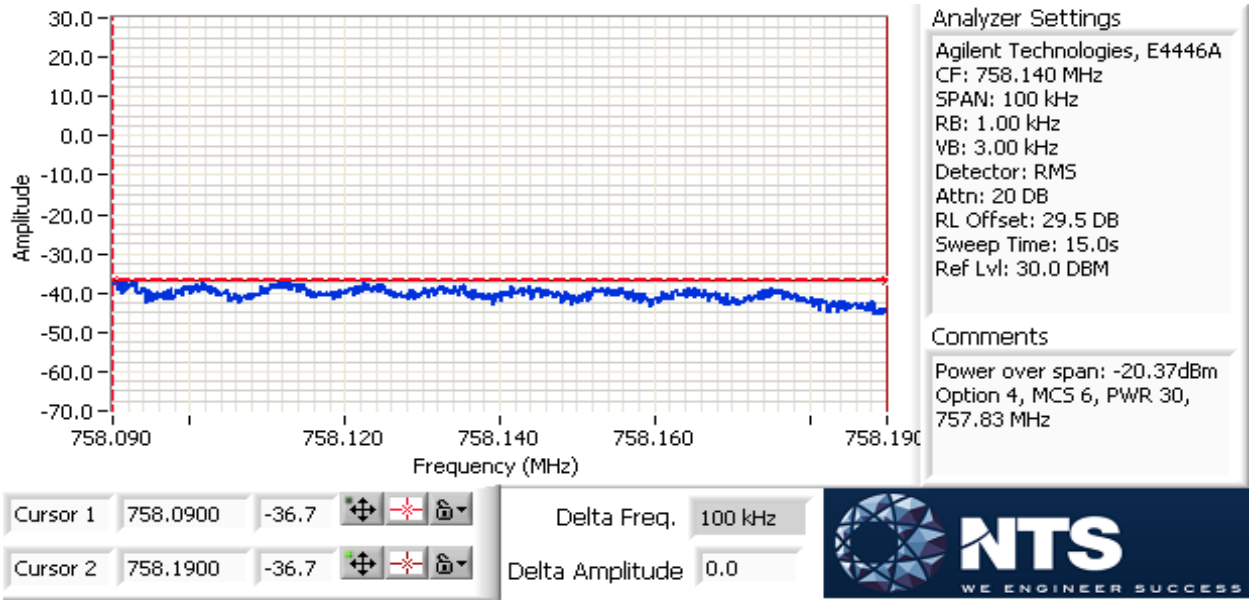

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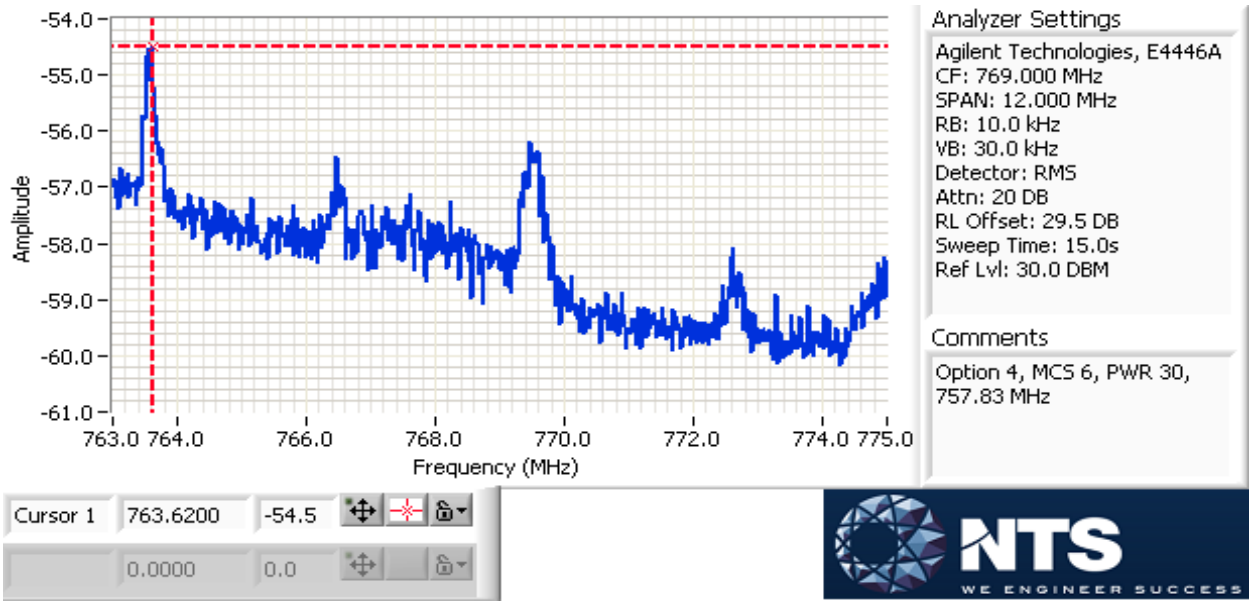
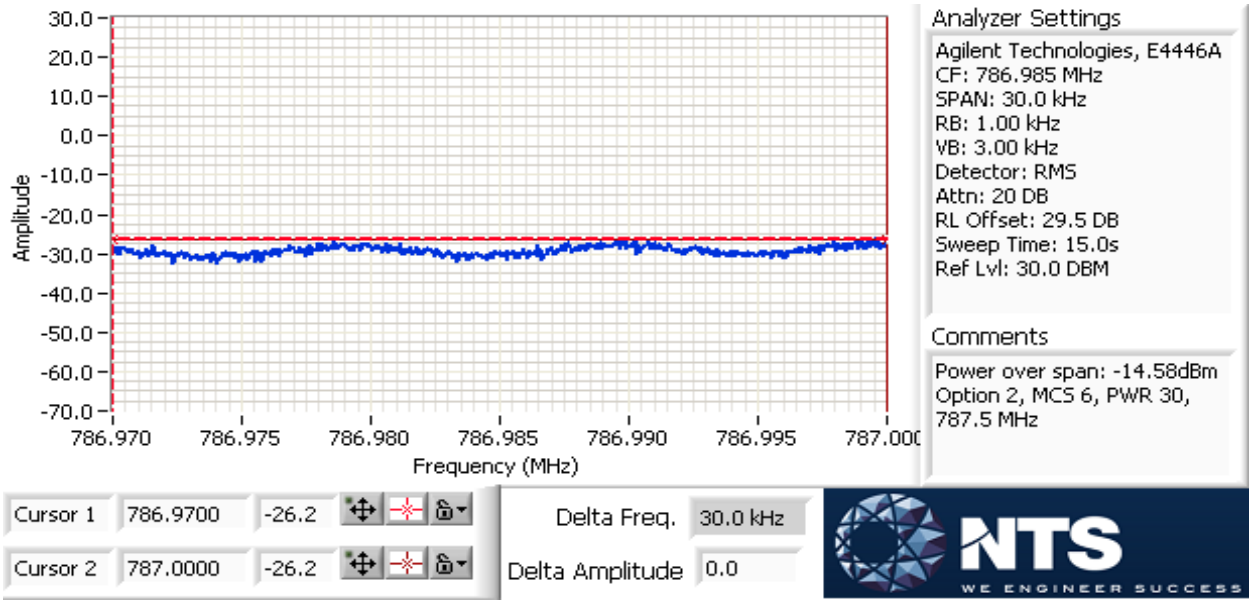


787-788 MHz band edge plots



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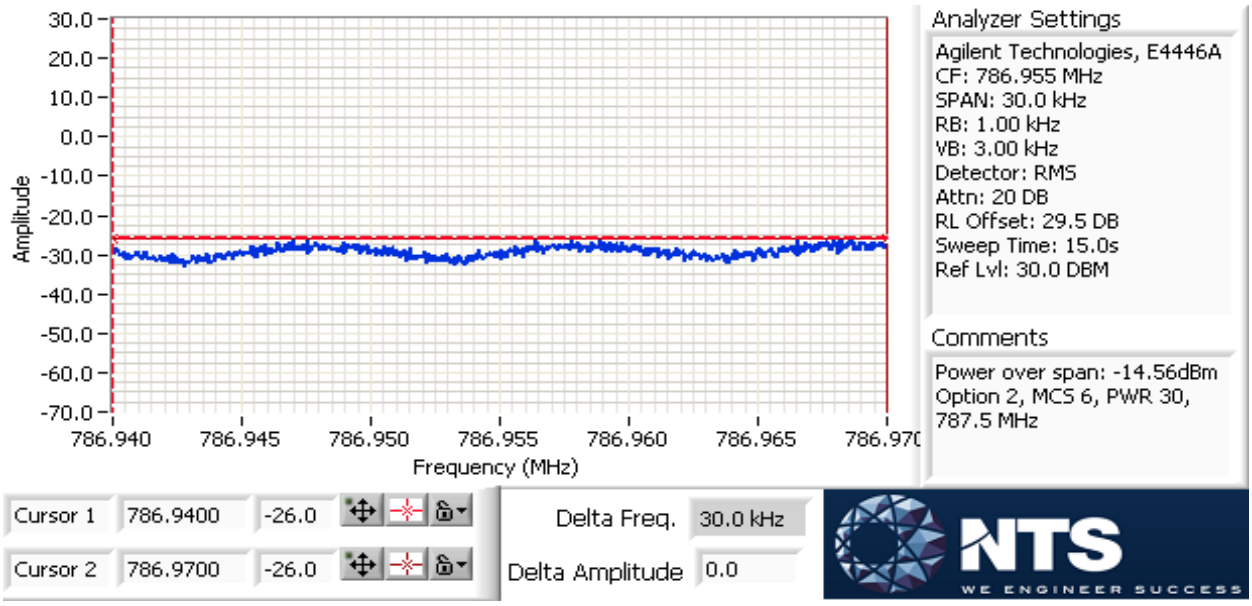

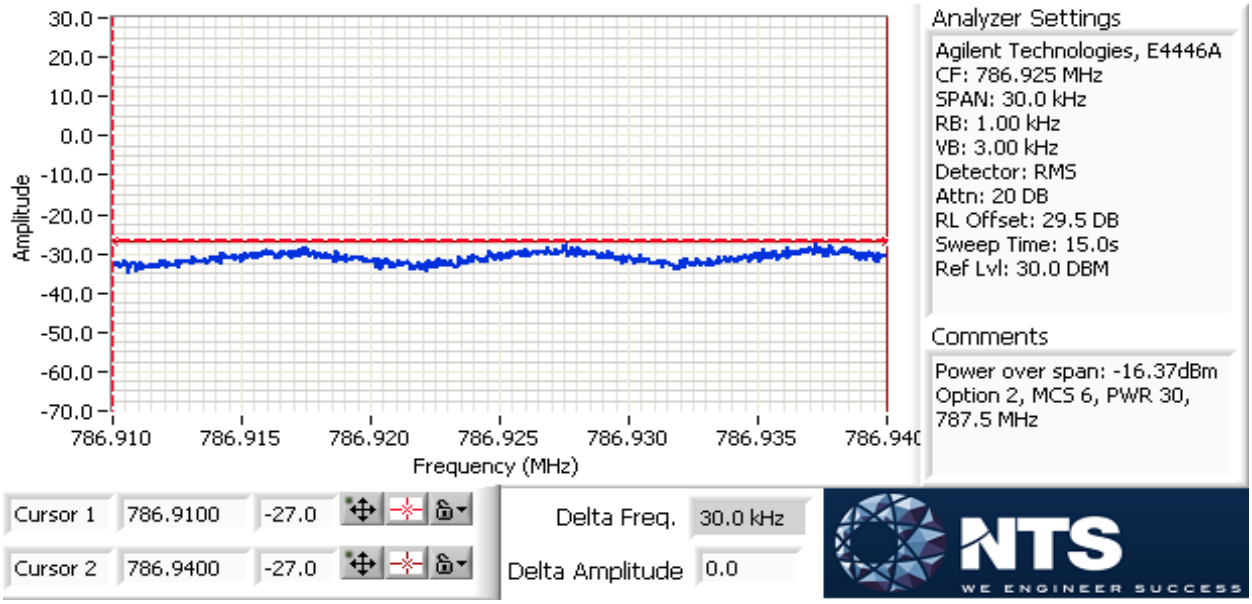

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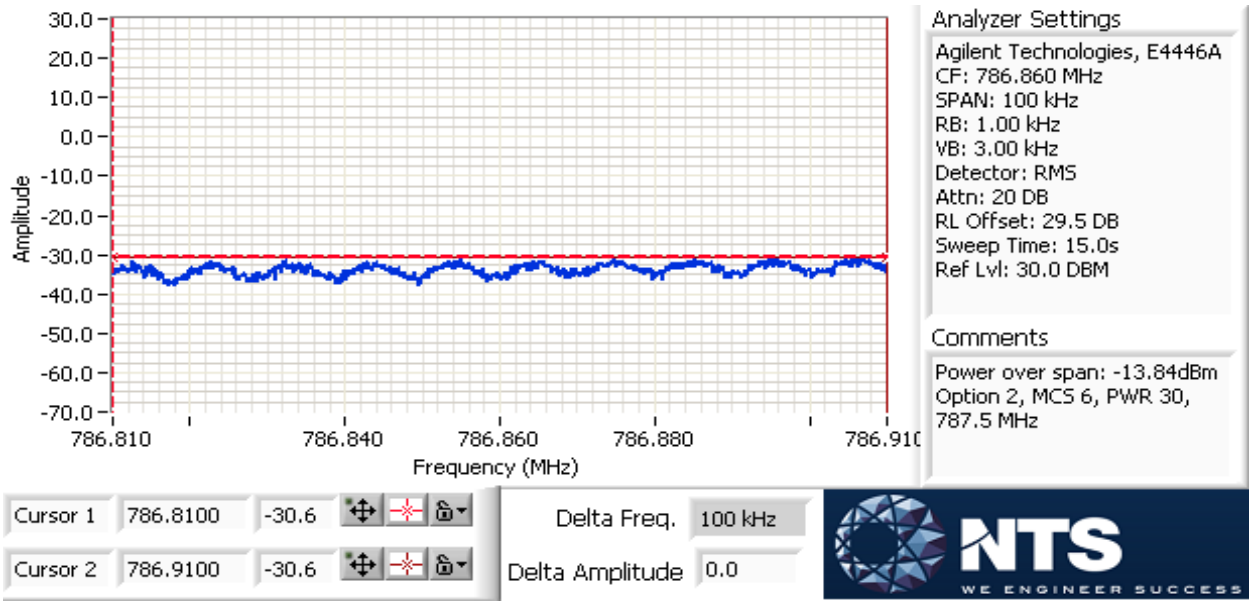
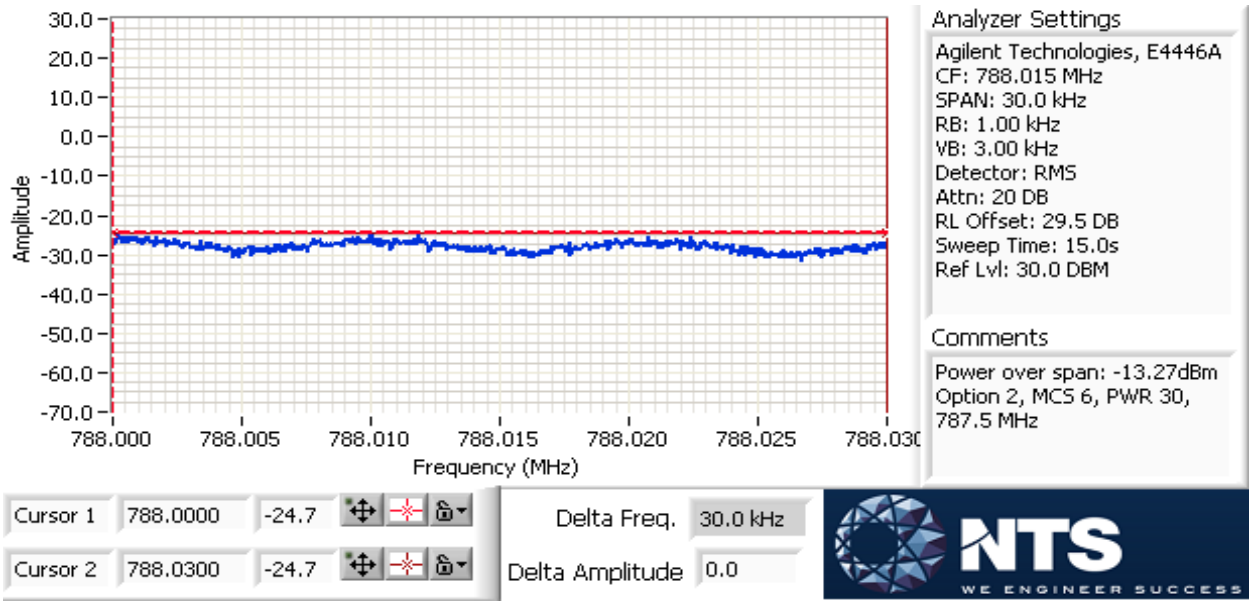
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





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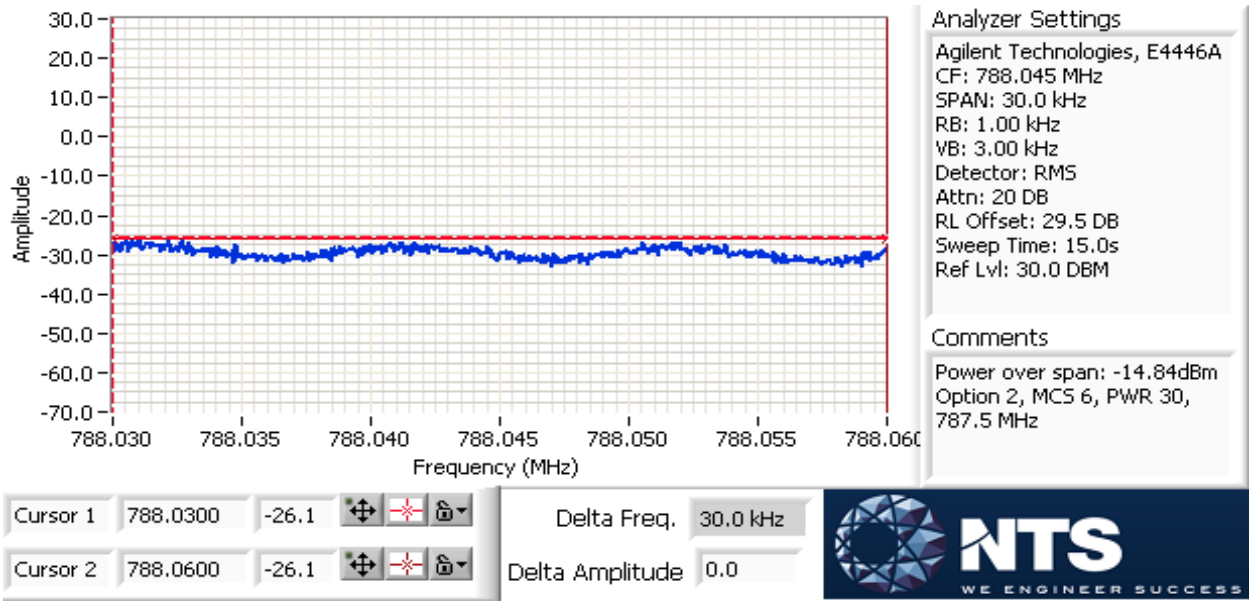

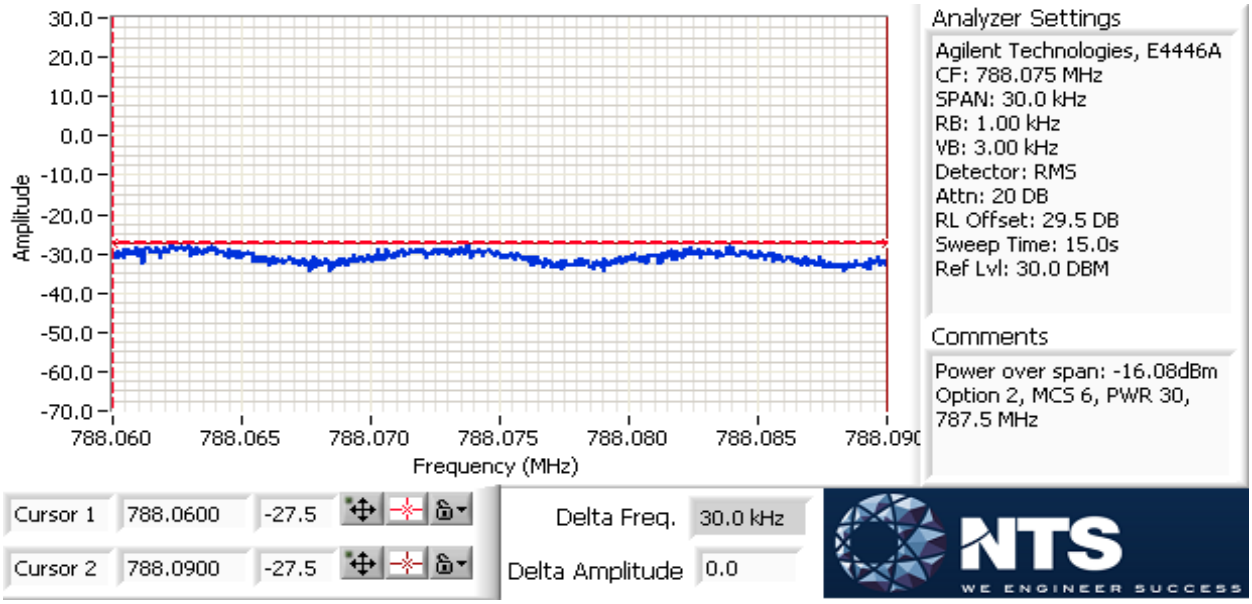

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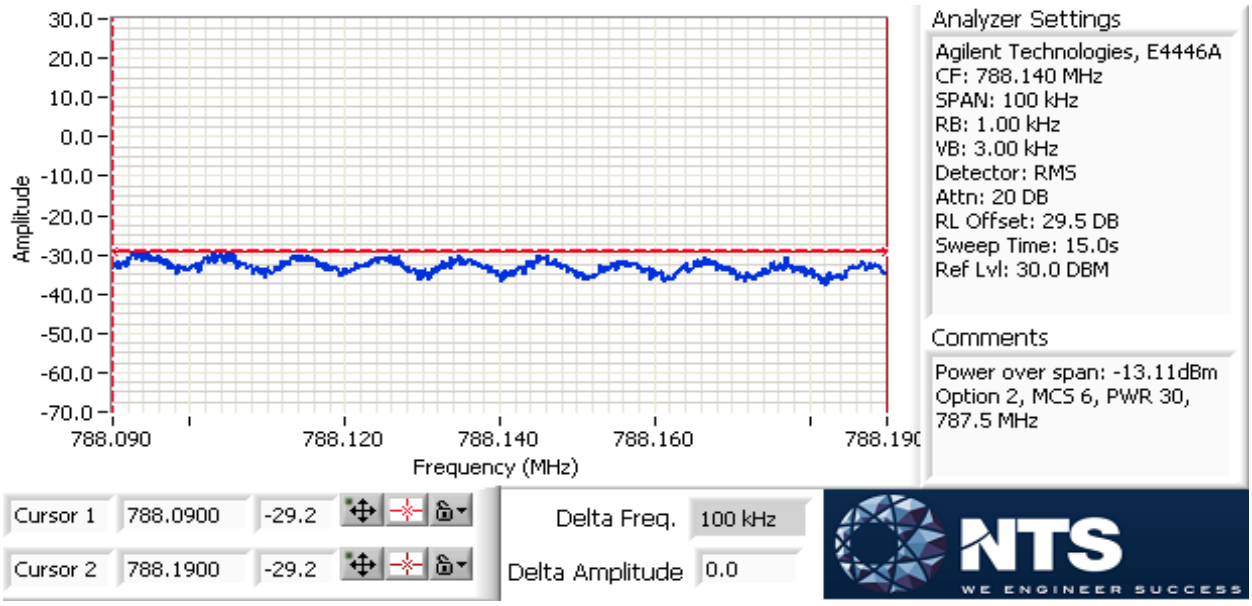
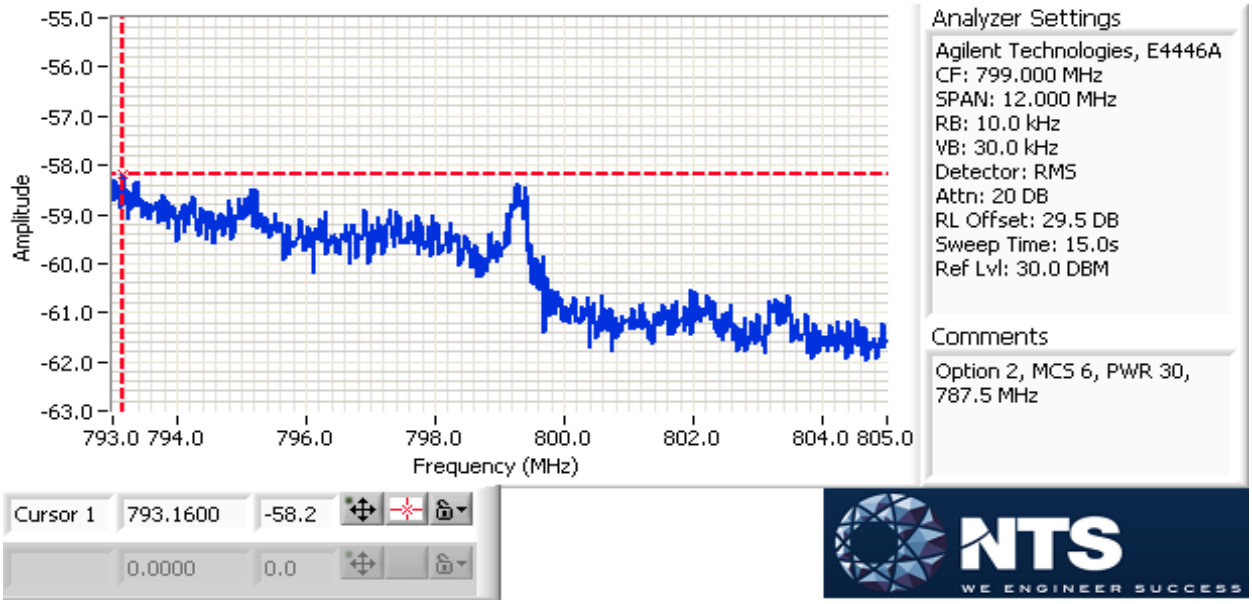
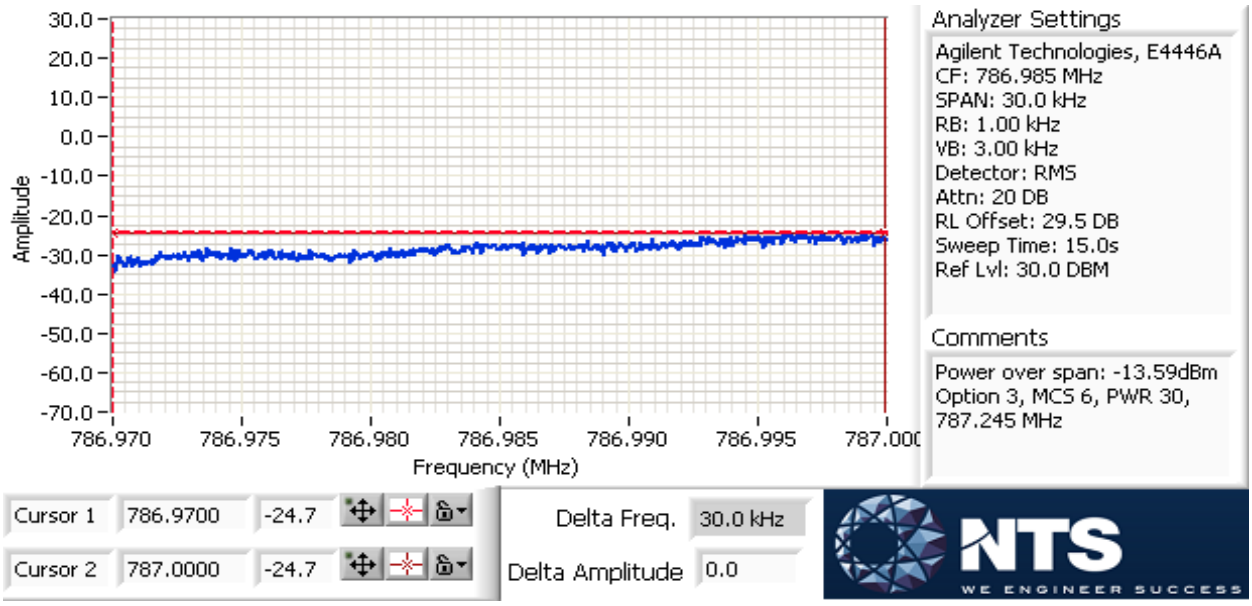
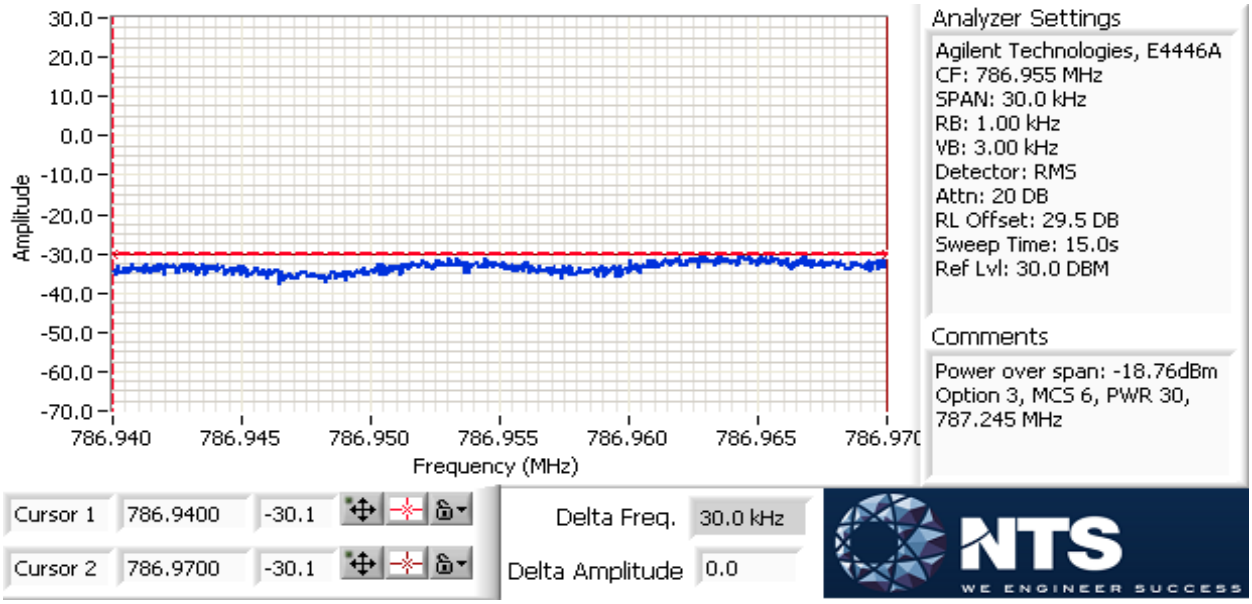
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



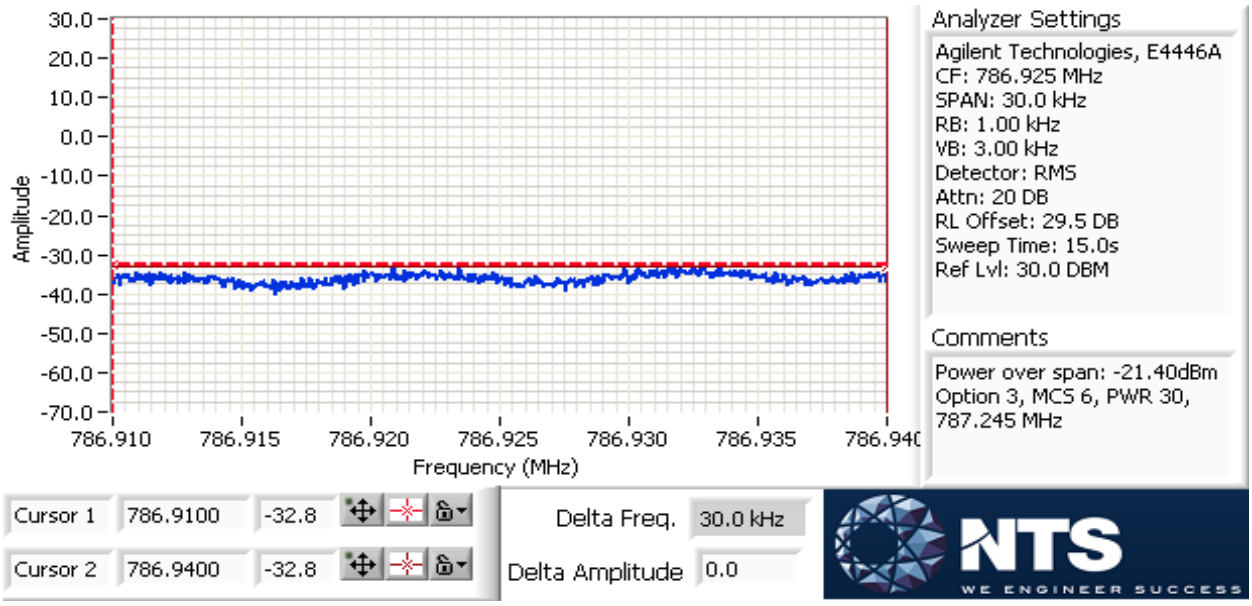


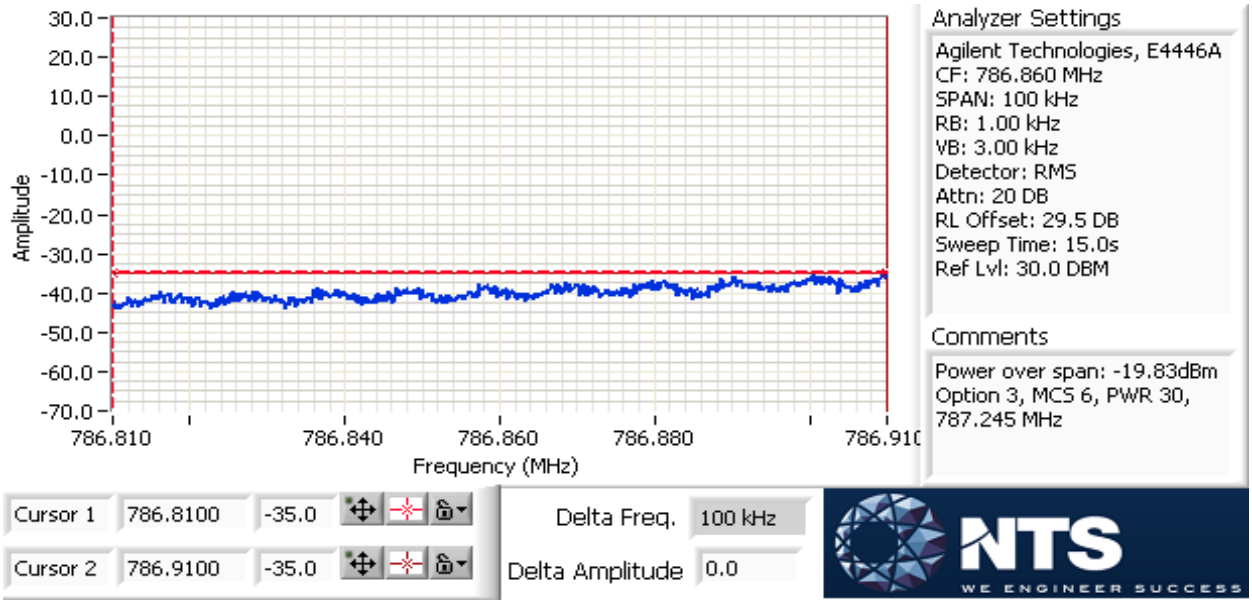
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



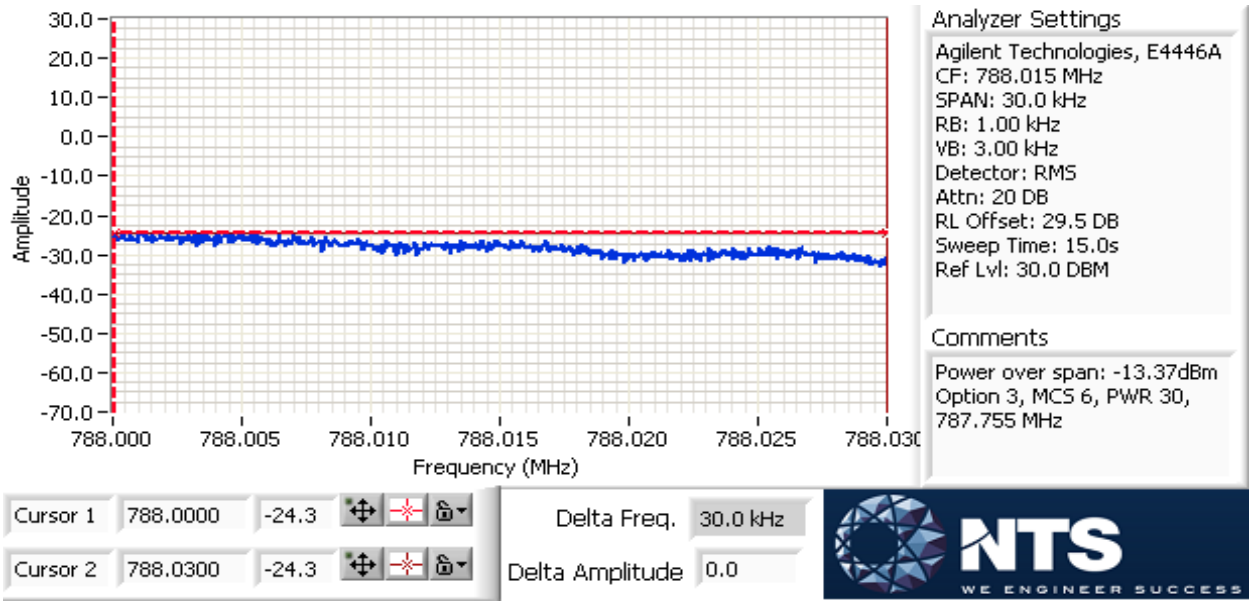


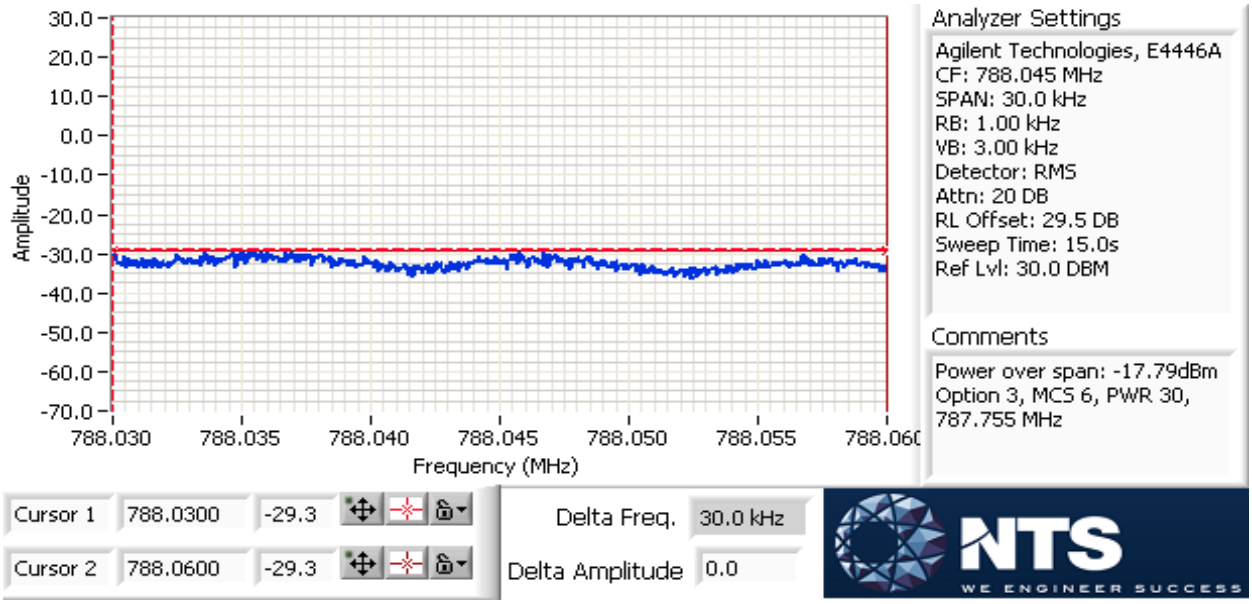
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



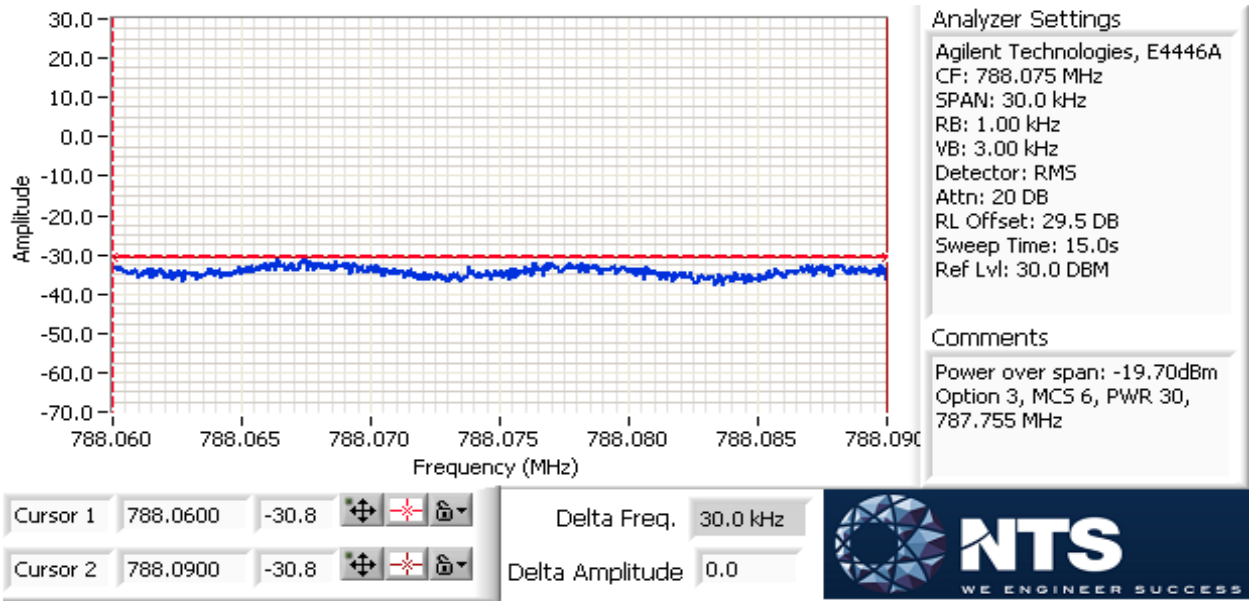


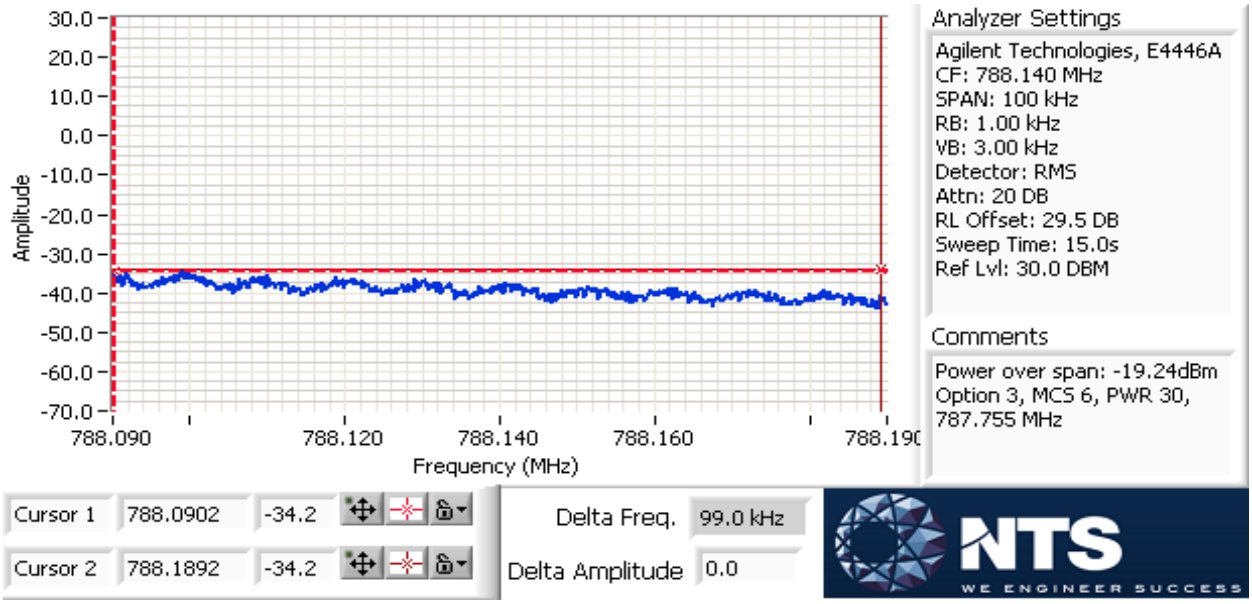
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



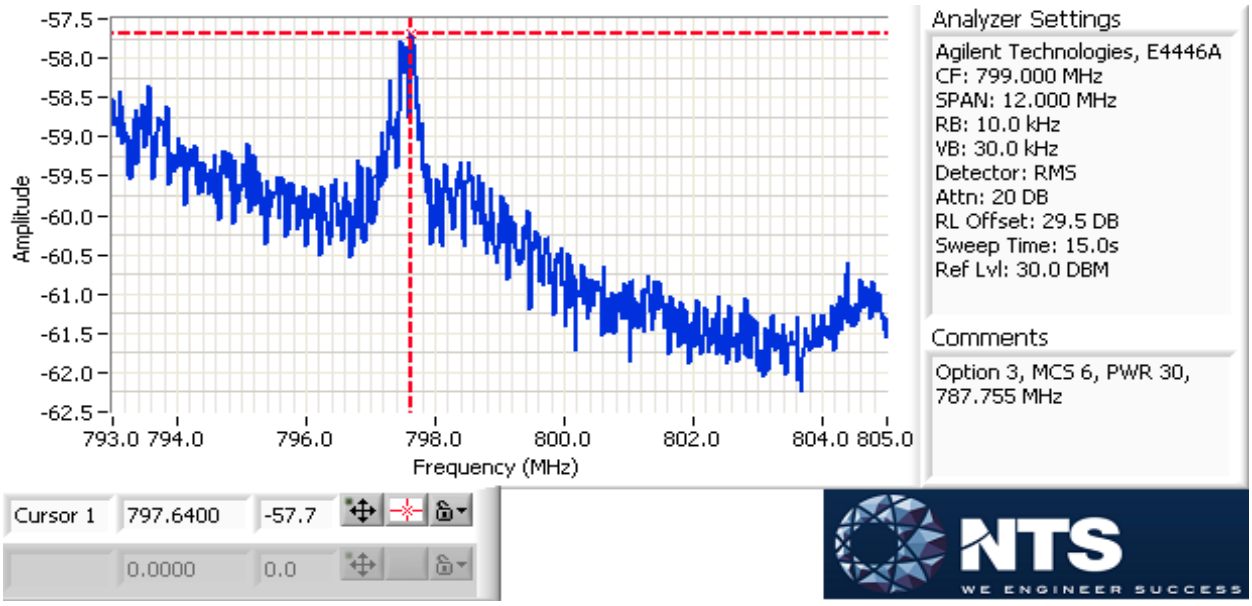


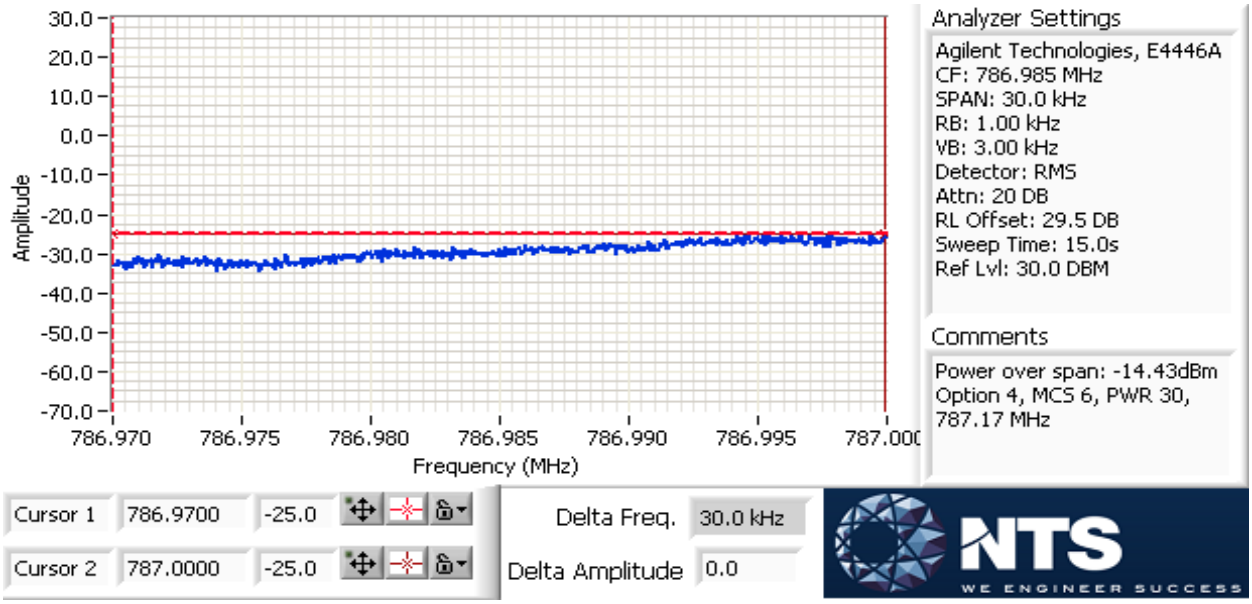
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



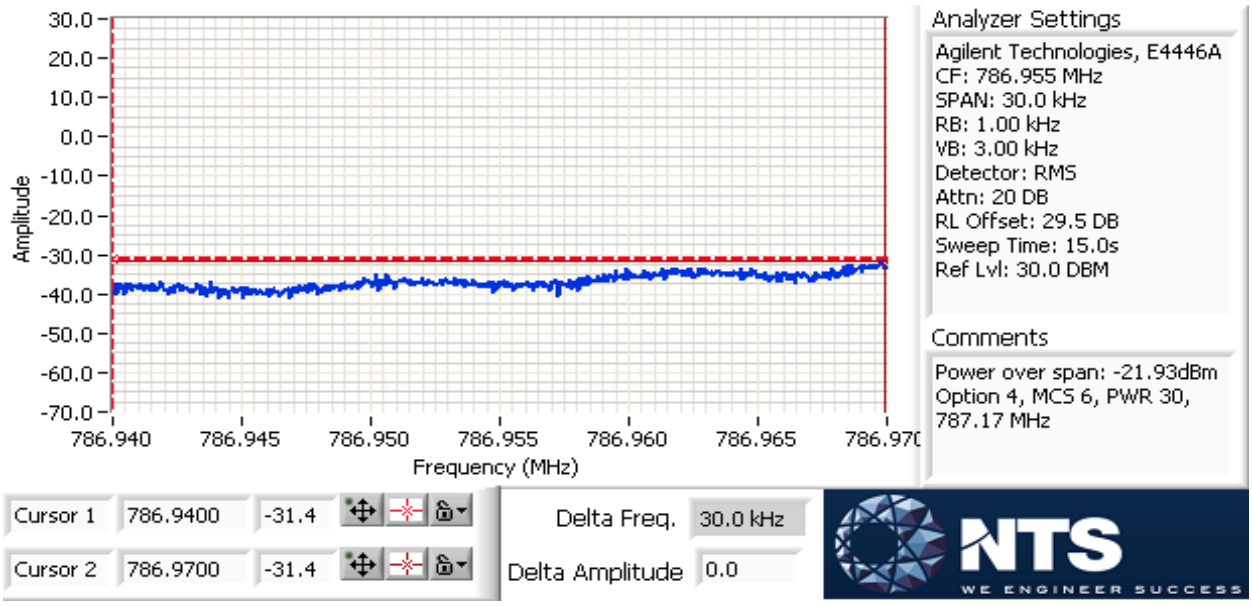


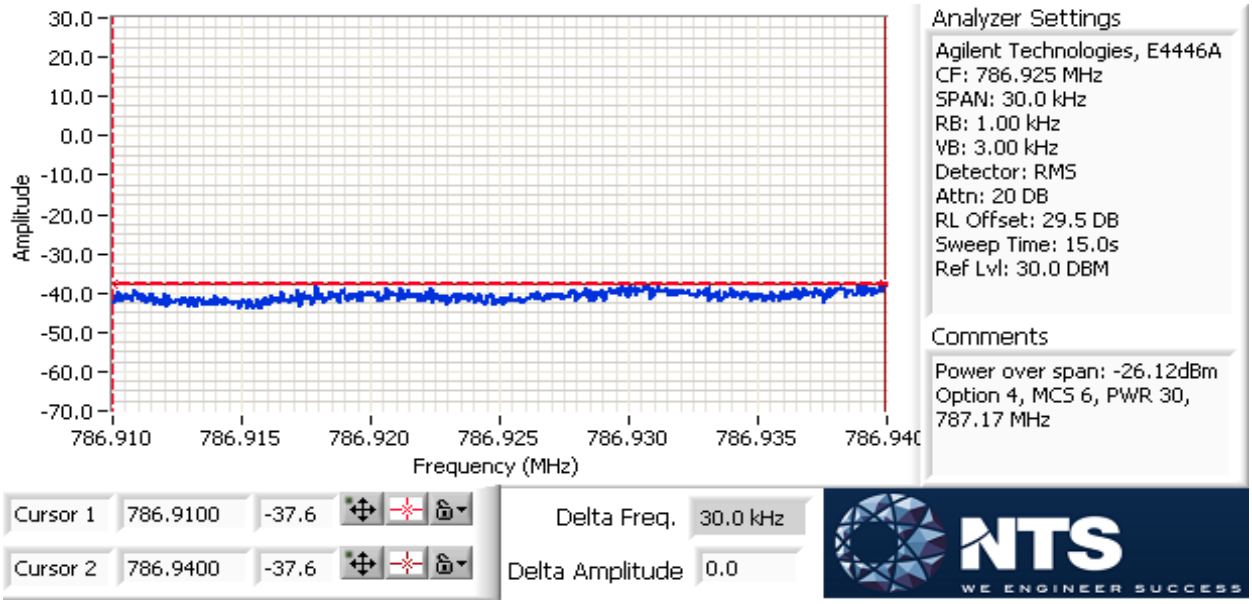
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



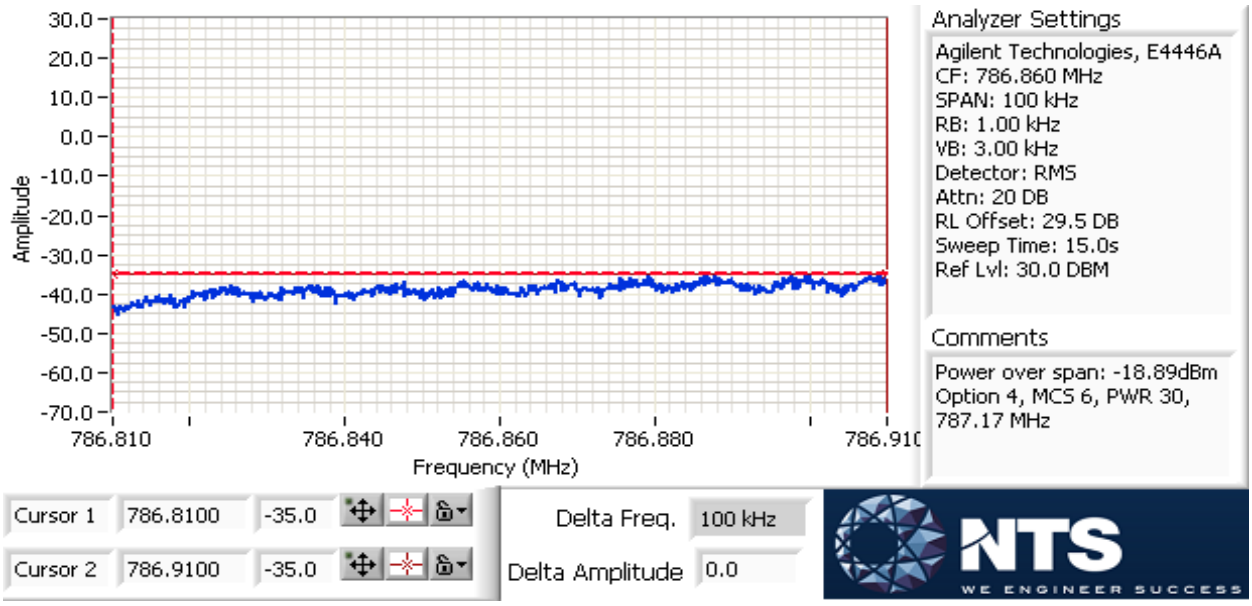


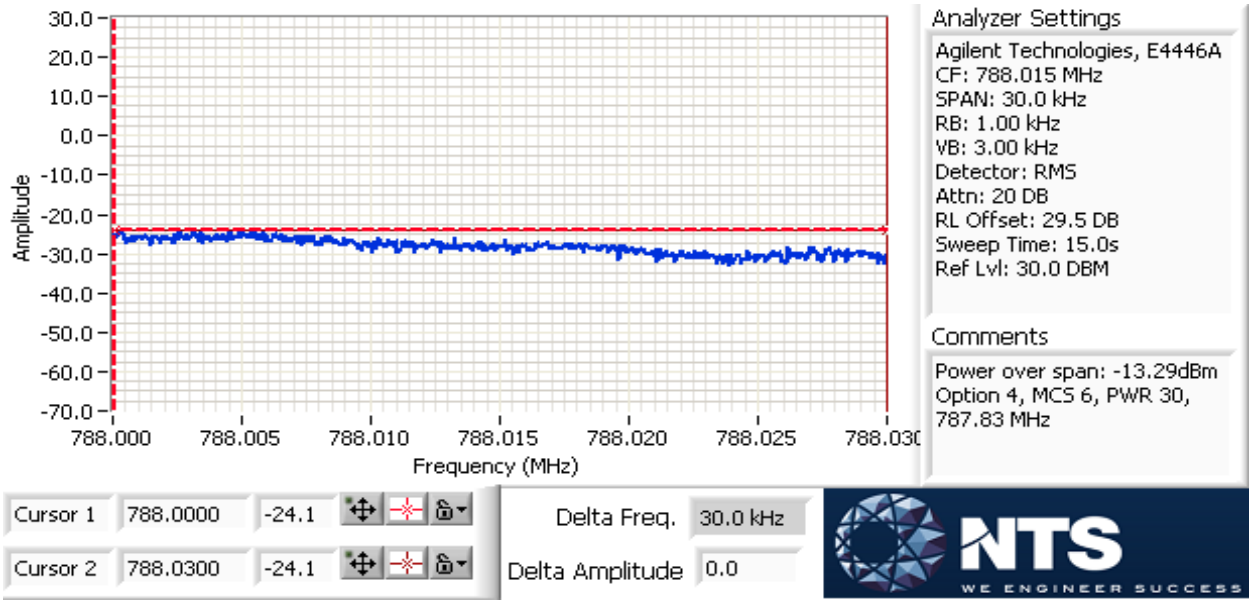
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



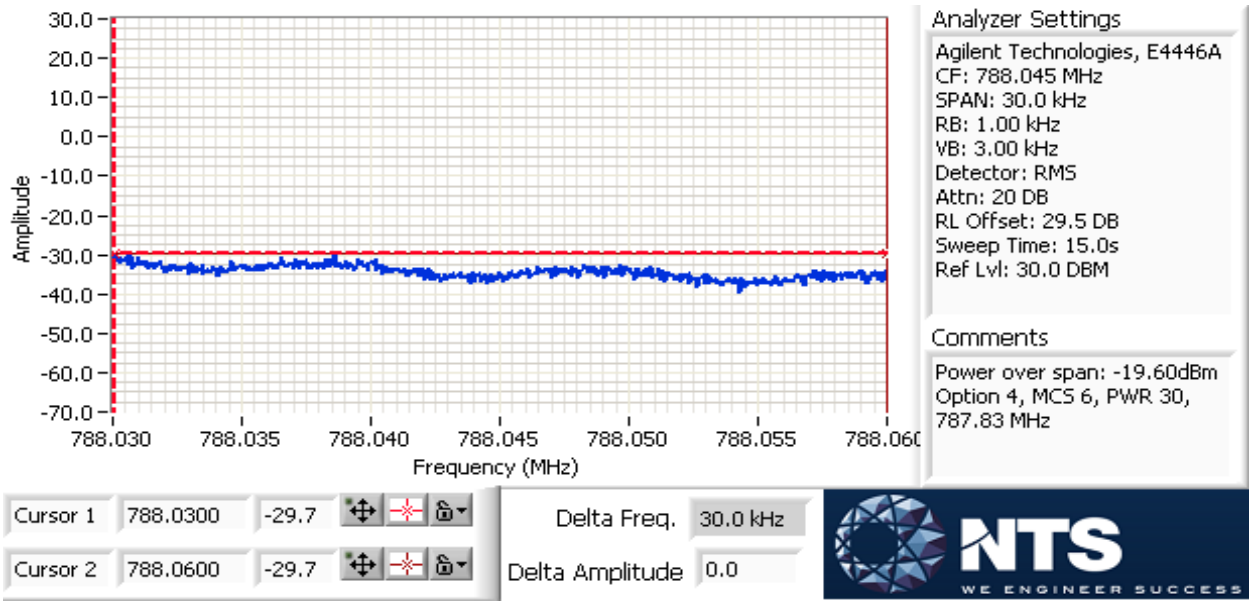


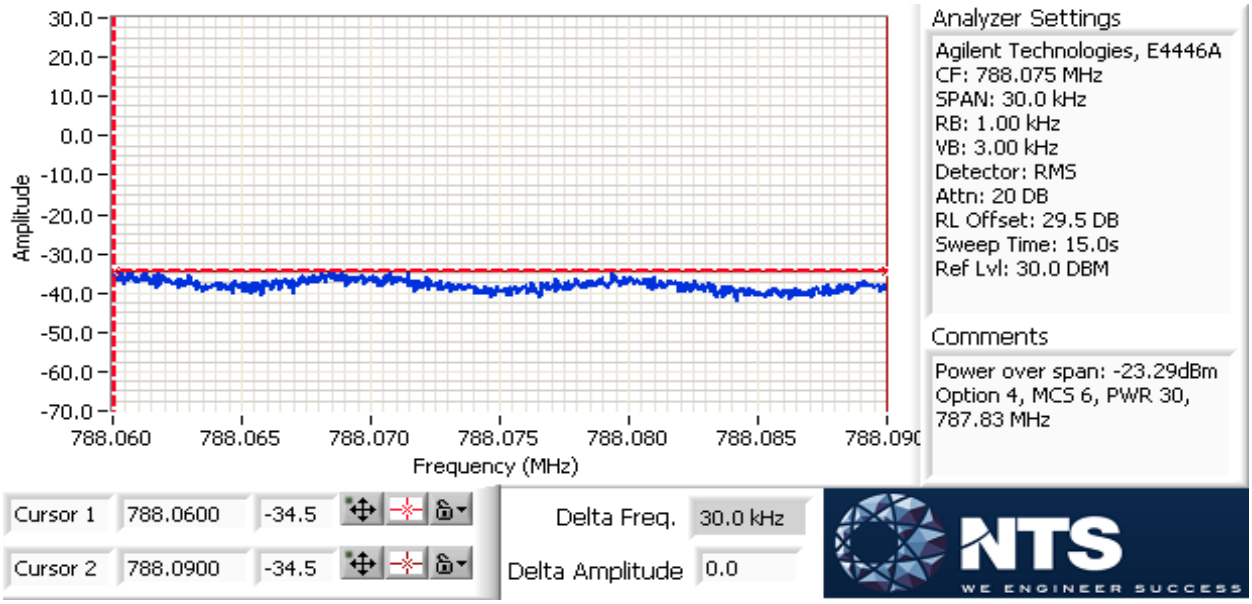
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



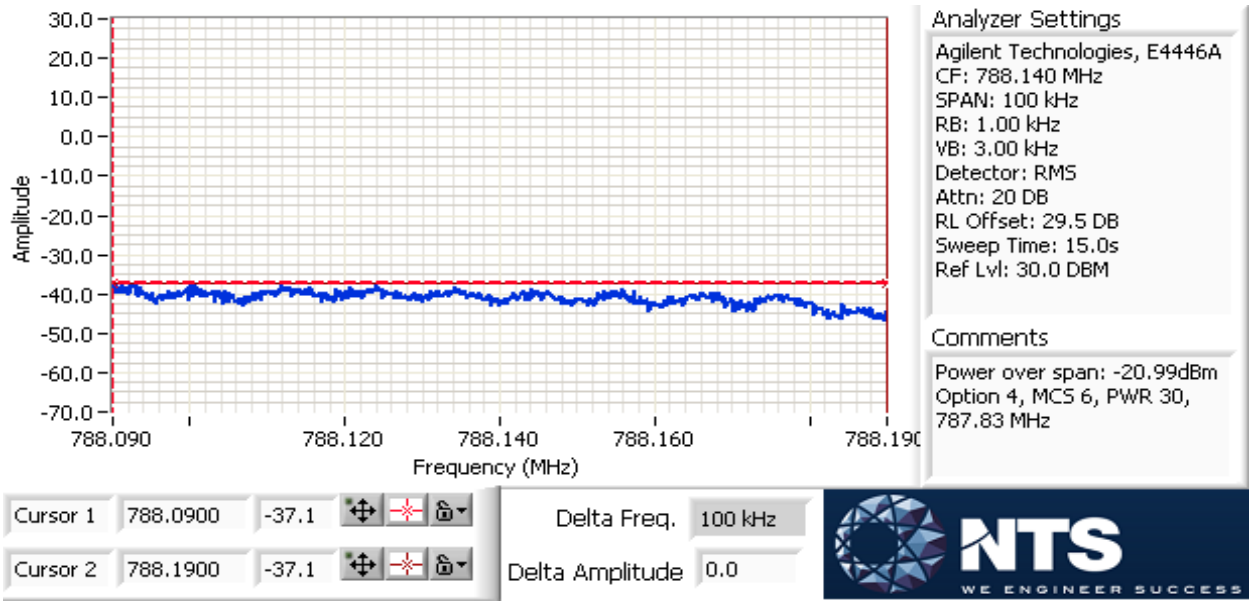


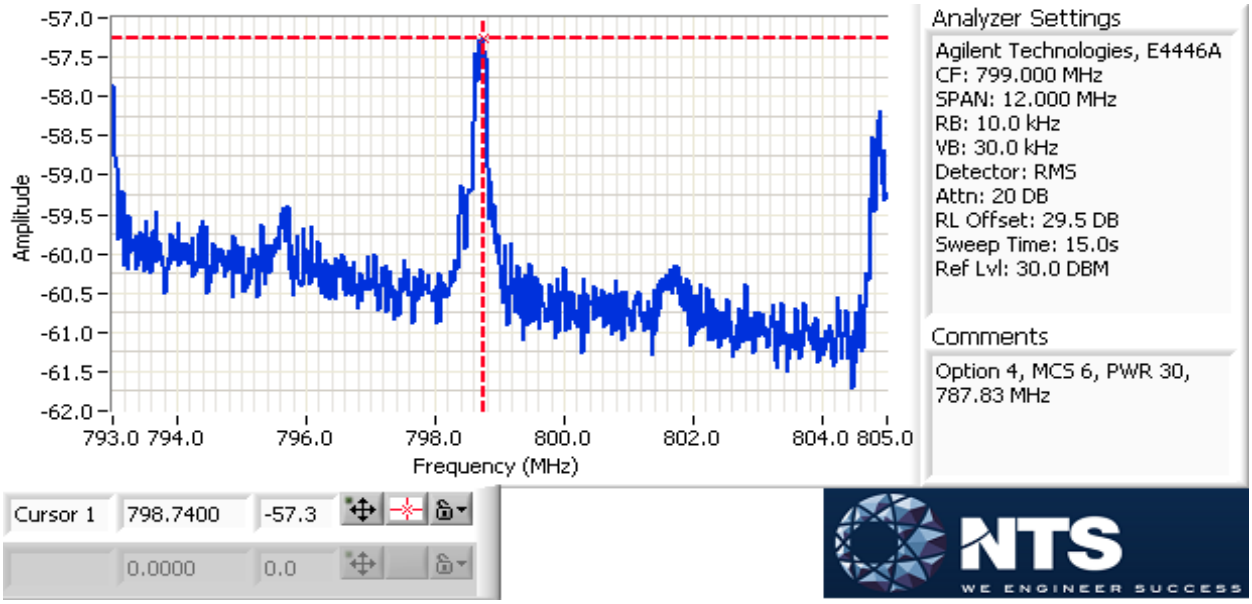
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #3: Signal Bandwidth

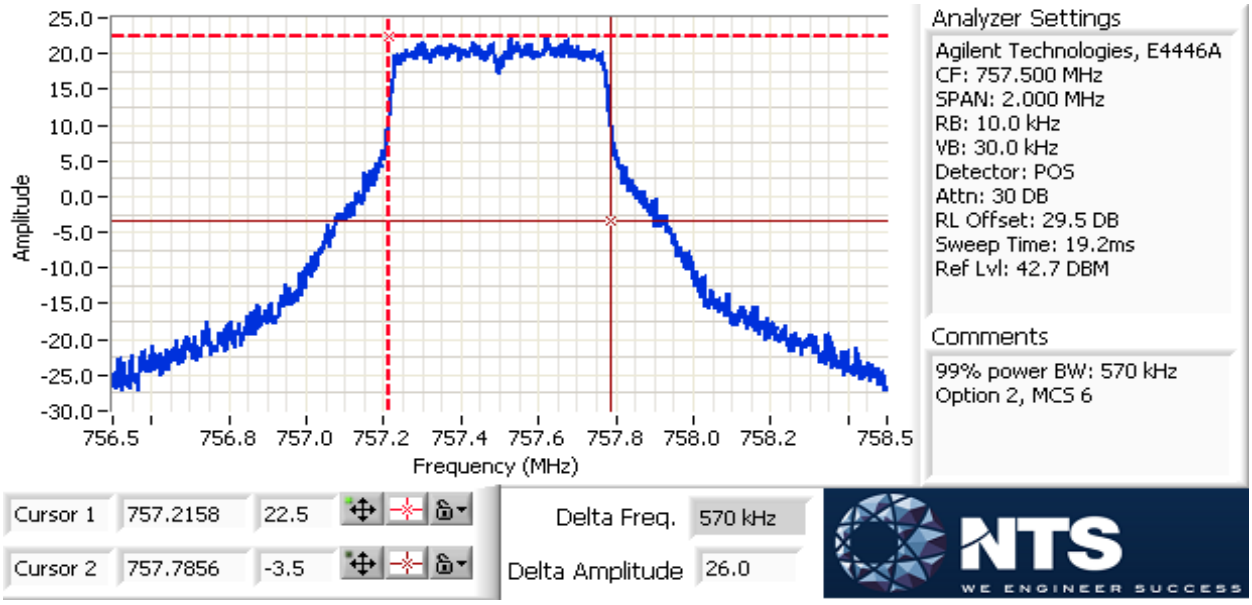
Date of Test: 12/4/2017 Config. Used: 1

Test Engineer: David Bare Config Change: None

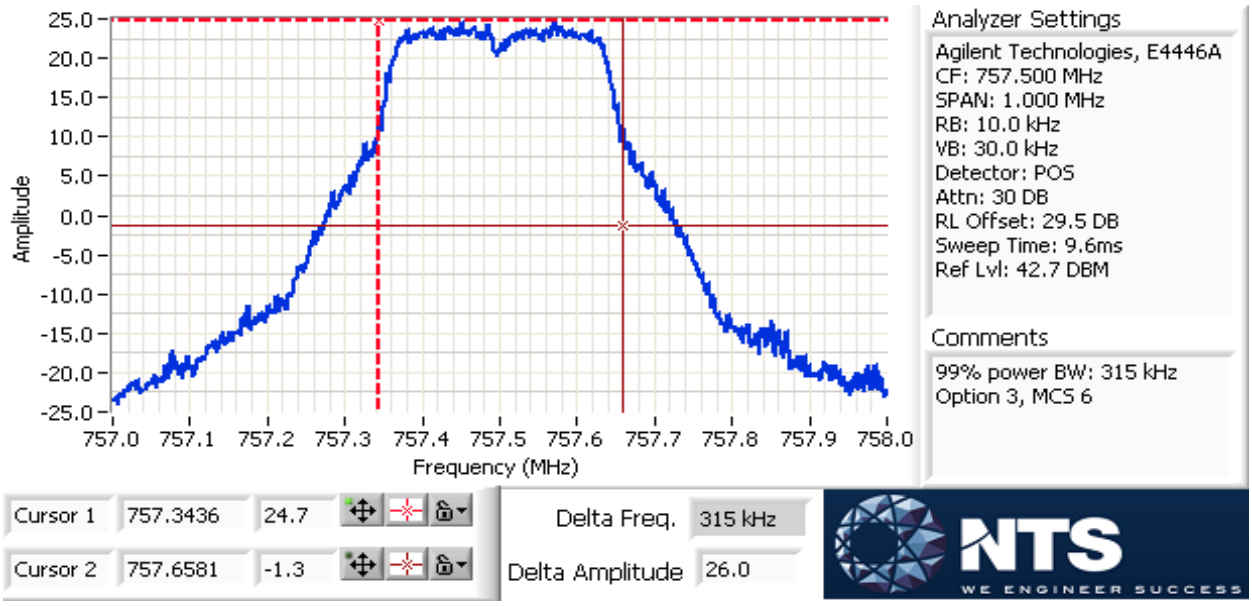
Test Location: Fremont EMC Lab #4A EUT Voltage: 13.8 VDC

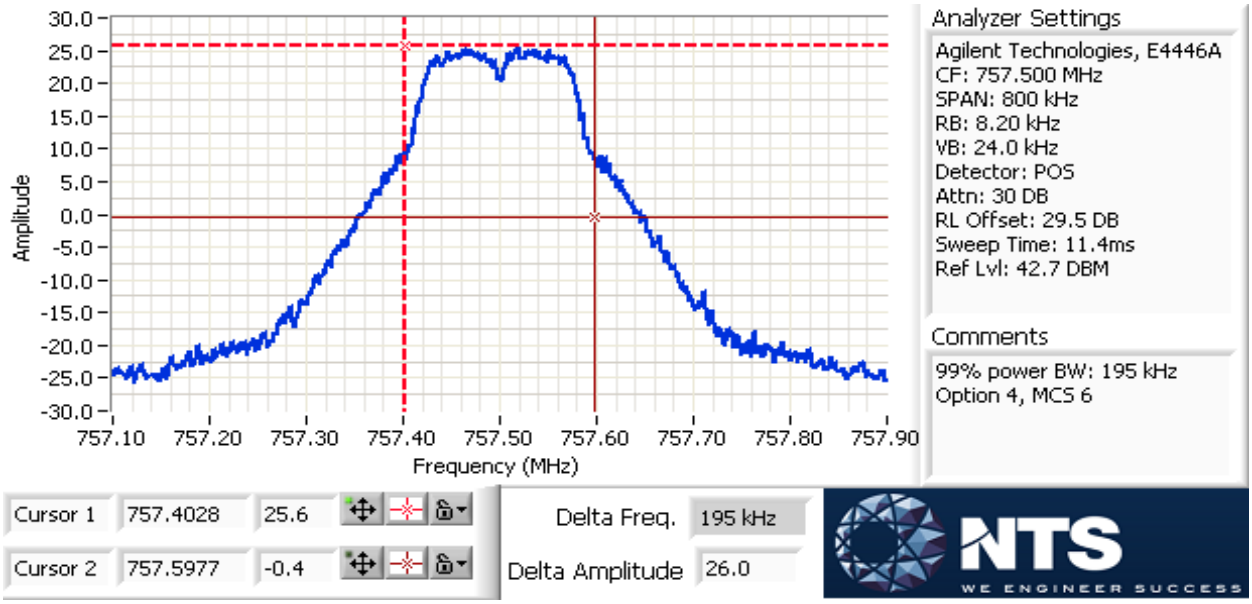
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)	99%		Modem	
30	757.5	10kHz		570.0		Option 2, MCS 2	QPSK
30	757.5	10kHz		570.0		Option 2, MCS 6	16QAM
30	757.5	10KHz		315.0		Option 3, MCS 2	QPSK
30	757.5	10KHz		315.0		Option 3, MCS 6	16QAM
30	757.5	8.2KHz		195.0		Option 4, MCS 2	QPSK
30	757.5	8.2KHz		195.0		Option 4, MCS 6	16QAM
30	787.5	10KHz		565.0		Option 2, MCS 6	16QAM
30	787.5	10KHz		310.0		Option 3, MCS 6	16QAM
30	787.5	8.2KHz		195.0		Option 4, MCS 6	16QAM

Note 1:	99% bandwidth measured in accordance with ANSI C63.10, with RB between 1% and 5% of the measured bandwidth and VB ≥ 3*RB and Span ≥ 1.5x and ≤ 5x of measured bandwidth.
Note 2:	Preliminary testing showed that the 99% BW is the same for OFDM using QPSK or 16QAM modulations.

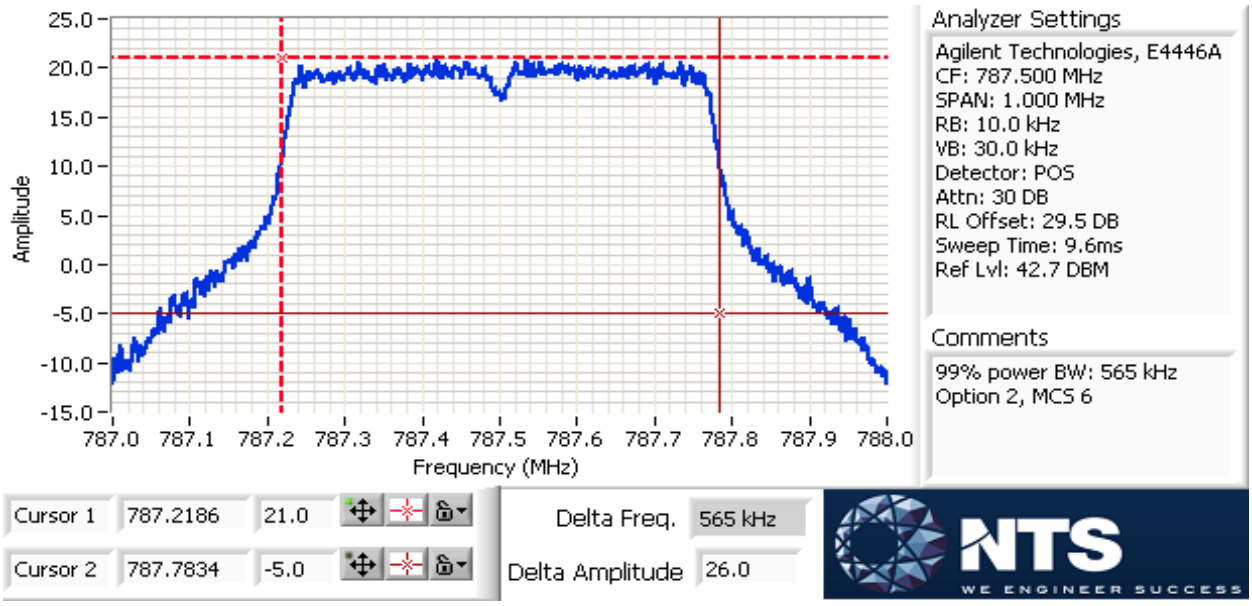


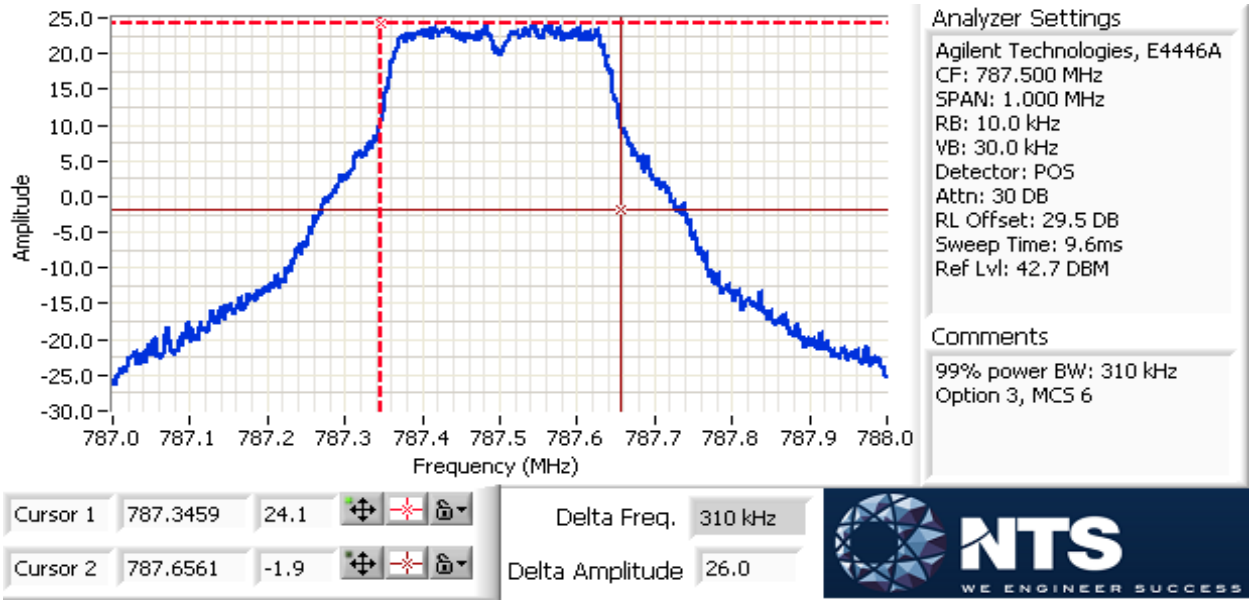
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



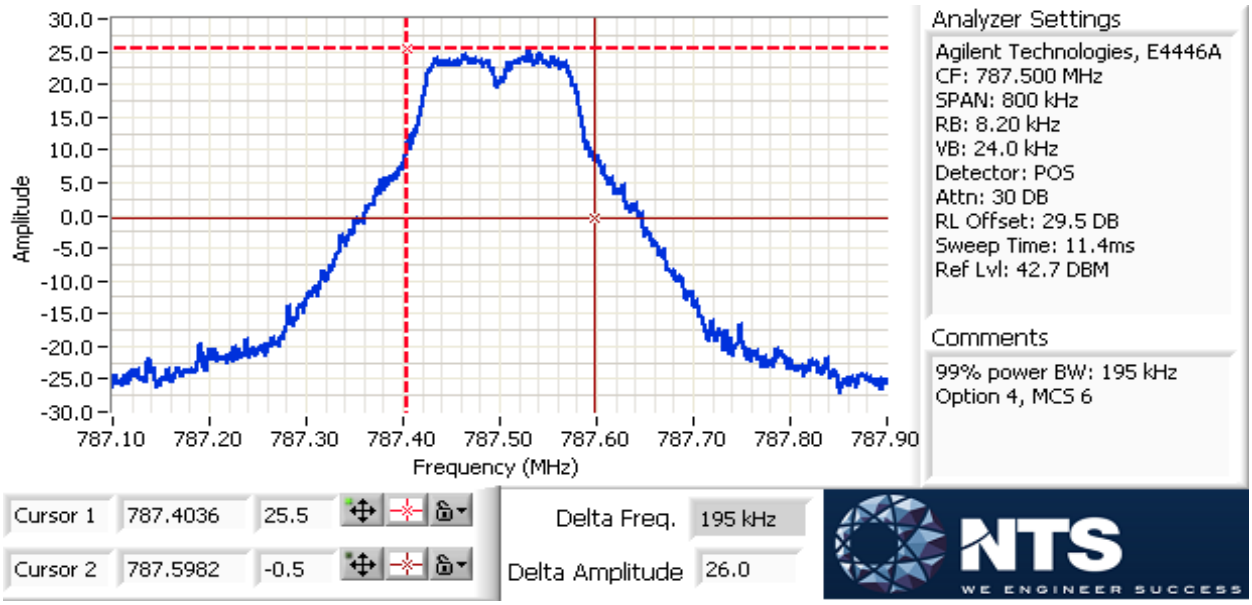


Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #4: Out of Band Spurious Emissions, Conducted

Date of Test: 12/5/2017 Config. Used: 1

Test Engineer: David Bare Config Change: None

Test Location: Fremont EMC Lab #4A EUT Voltage: 13.8 VDC

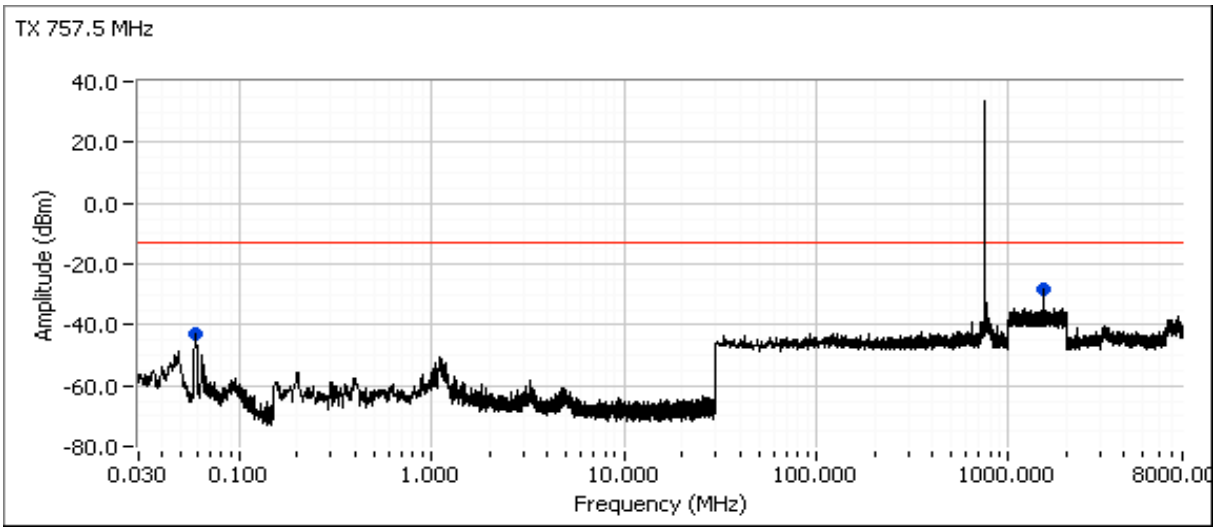
Frequency (MHz)	Limit	Result	
757.5	-13 dBm	Pass	Option 4, MCS 6
787.5	-13 dBm	Pass	Option 4, MCS 6

The limit is taken from FCC Part 27.53(c)(1)

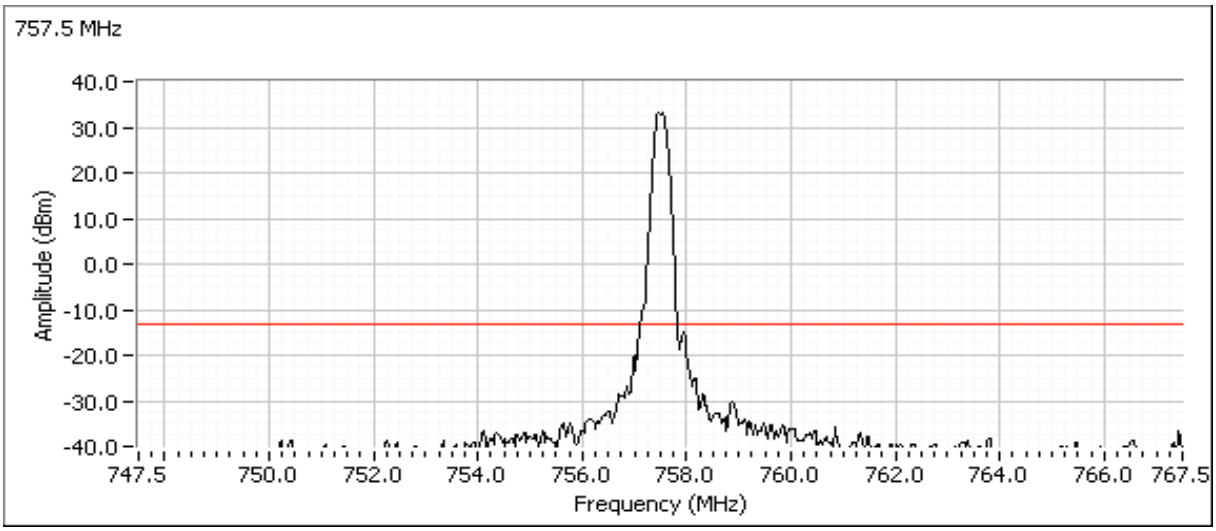
Measurements performed with RBW = 1 kHz below 150 kHz, 10 kHz from 150 kHz to 30 MHz, 100 kHz from 30 MHz to 1 GHz and 1 MHz above 1 GHz. VBW was set to at least 3 x the RBW value.

Plots 20 MHz wide centered on the signal frequency also provided for each channel bandwidth/spacing.

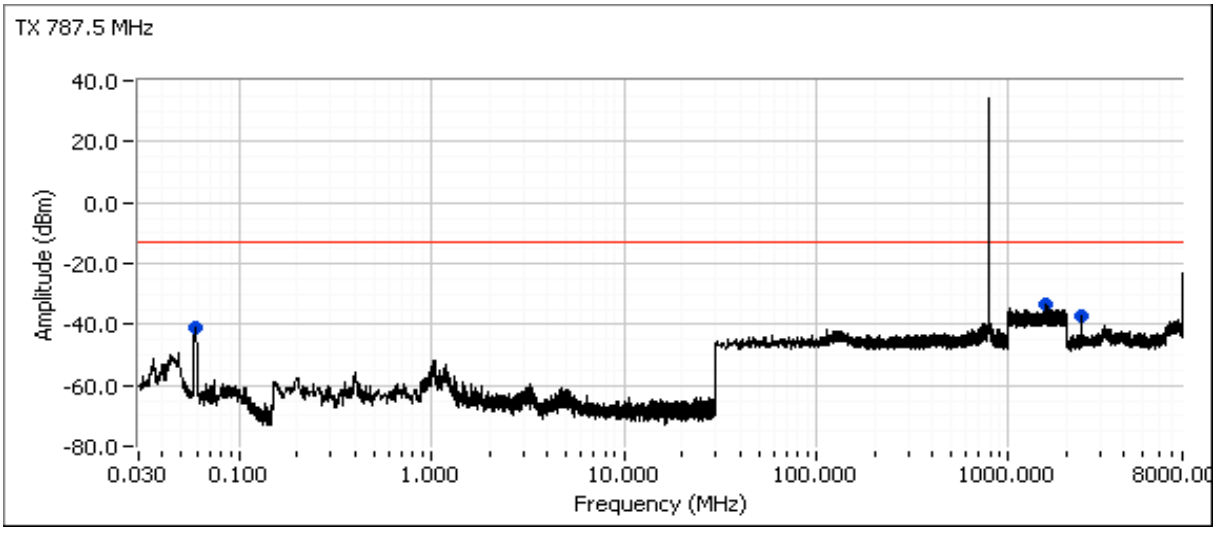
Plots for low channel, power setting(s) = 30



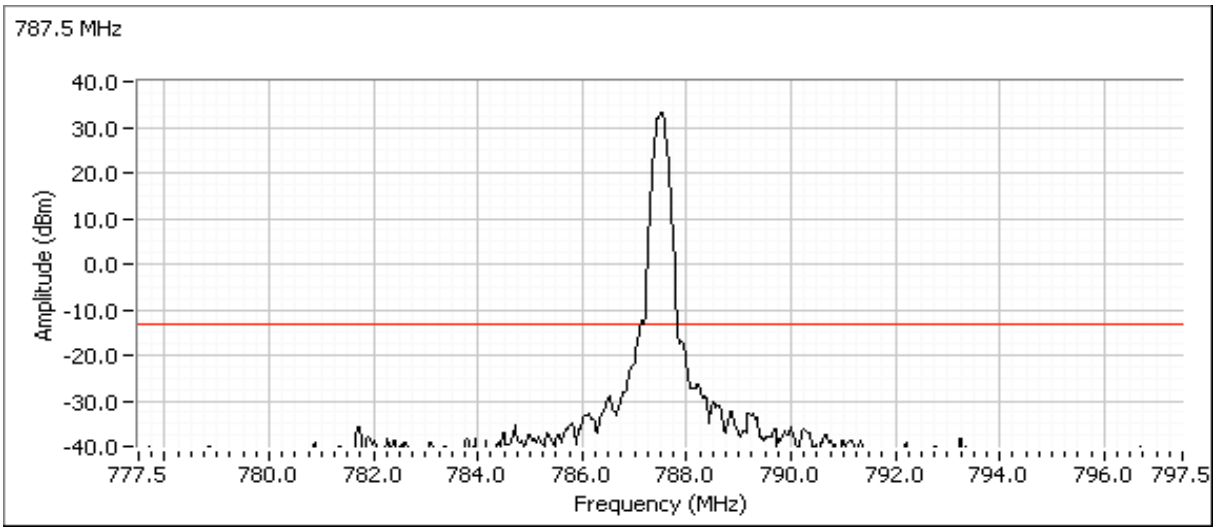
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



Plots for high channel, power setting(s) = 30



Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



Frequency	Level	RF	Part 27		Detector	Comments
MHz	dBm	Port	Limit	Margin	QP/Ave	
0.059	-40.8	RF Port	-13.0	-27.8	Peak	EUT at 787.5 MHz
1575.000	-33.4	RF Port	-13.0	-20.4	Peak	EUT at 787.5 MHz
2362.450	-37.2	RF Port	-13.0	-24.2	Peak	EUT at 787.5 MHz
1515.000	-28.0	RF Port	-13.0	-15.0	Peak	EUT at 757.5 MHz
0.059	-42.9	RF Port	-13.0	-29.9	Peak	EUT at 757.5 MHz

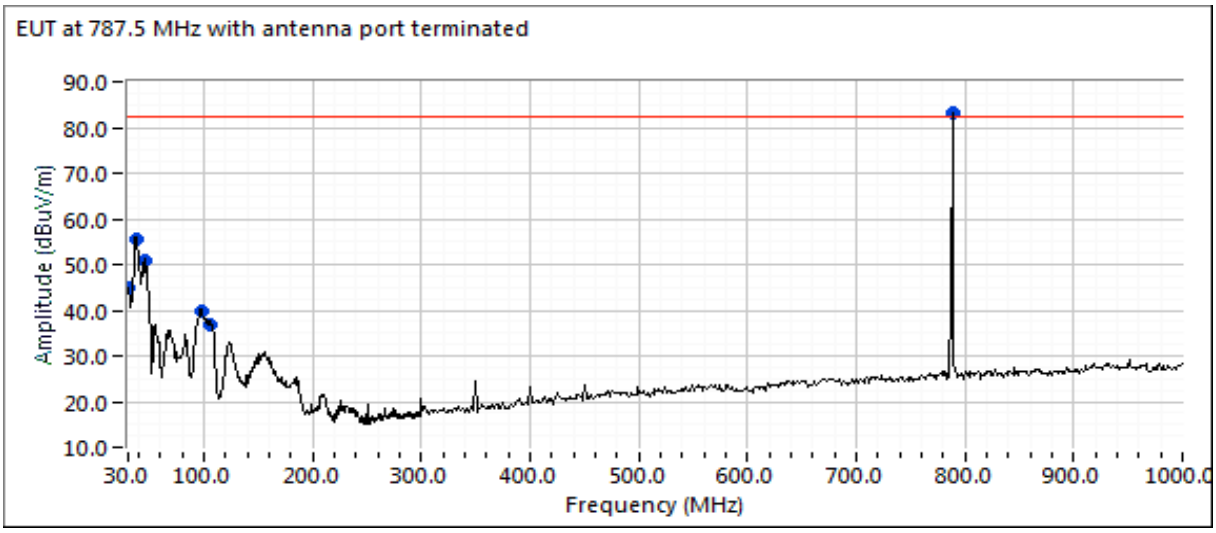
Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #5a: Out of Band Spurious Emissions, Radiated, antenna port terminated
EUT setting, Option 4, MCS 6, power setting 30dBm (lowest bandwidth mode, highest PSD)
sample #2871712

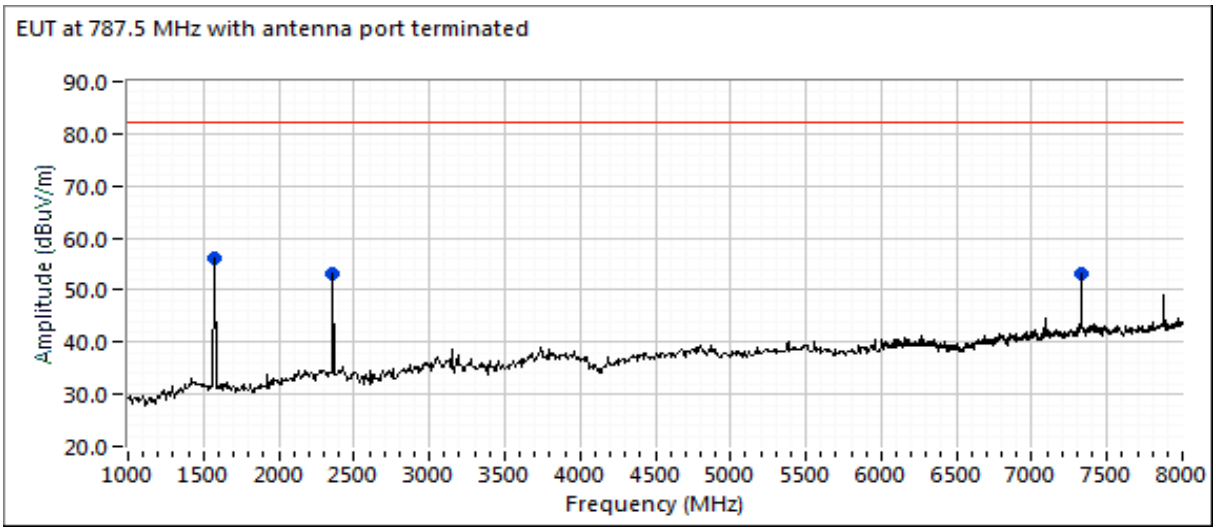
Date of Test: 12/5/2017 Config. Used: 1
Test Engineer: David Bare, Joseph Cadigal Config Change: None
Test Location: Fremont Chamber #4 EUT Voltage: 5.25 VDC and 13.8 VDC

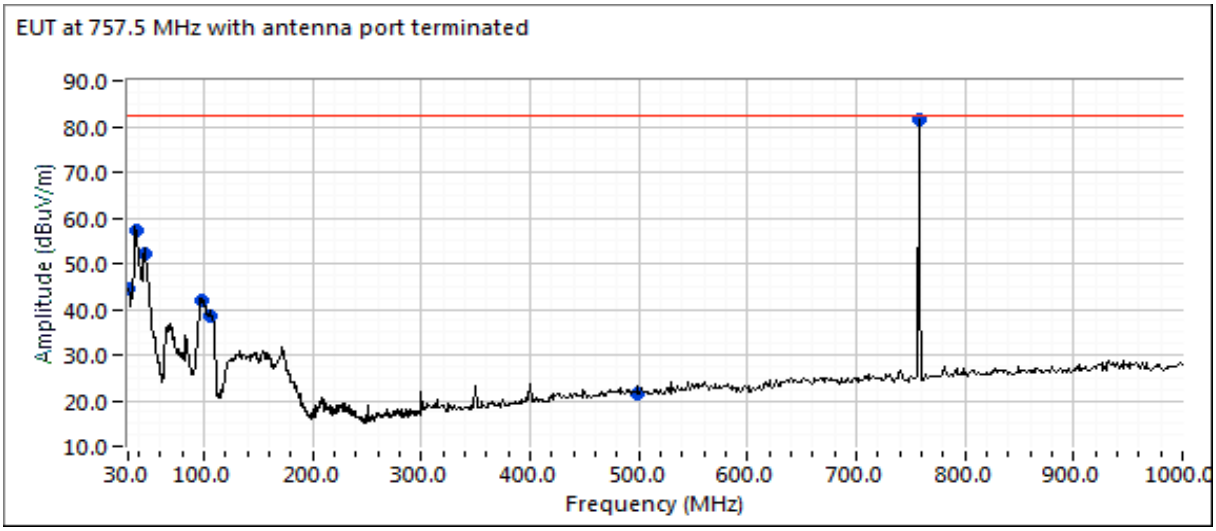
For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions shall be limited to -13 dBm equivalent isotropically radiated power (EIRP) with the antenna port terminated.

limit (dBm): -13
Approximate field strength limit @ 3m: 82.2

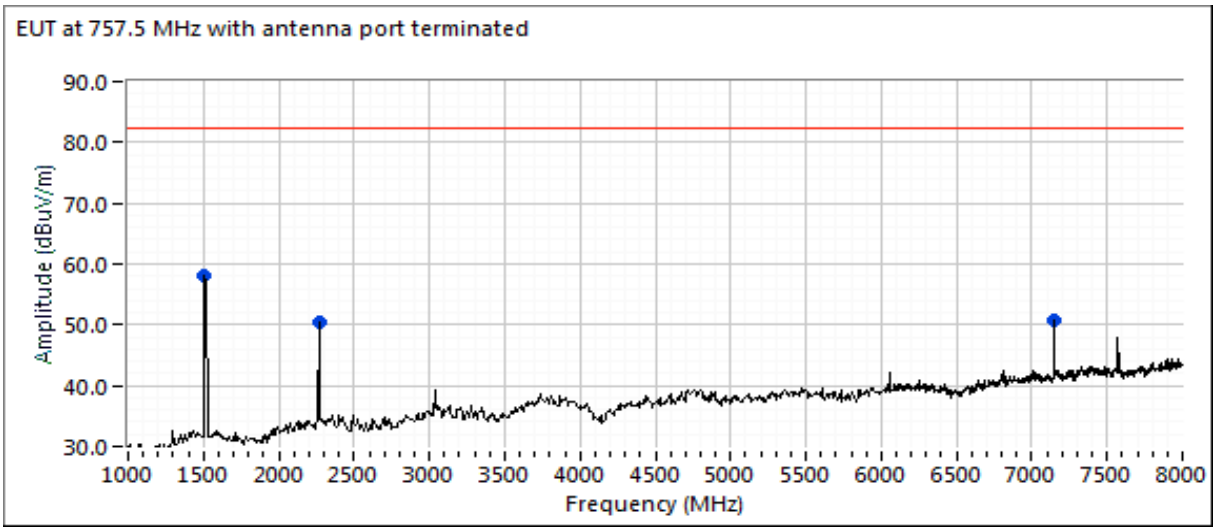


Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A





Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A



Frequency	Level	Pol	FCC Part 27		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
30.659	44.9	V	82.2	-37.3	Peak	21	1.0		787.5 MHz
104.611	36.7	V	82.2	-45.5	Peak	131	1.0		787.5 MHz
96.707	39.8	V	82.2	-42.4	Peak	149	1.0		787.5 MHz
787.520	83.0	H	NA	-	Peak	271	1.0	Fundamental	787.5 MHz
36.621	55.5	V	82.2	-26.7	Peak	325	1.0		787.5 MHz
44.806	50.7	V	82.2	-31.5	Peak	328	1.5		787.5 MHz
1575.000	56.0	V	82.2	-26.2	Peak	195	1.3		787.5 MHz
2362.500	53.2	H	82.2	-29.0	Peak	175	1.9		787.5 MHz
7328.600	53.0	V	82.2	-29.2	Peak	206	2.2		787.5 MHz
104.650	38.6	V	82.2	-43.6	Peak	67	1.0		757.5 MHz
97.992	41.8	V	82.2	-40.4	Peak	120	1.0		757.5 MHz
757.466	81.7	H	NA	-	Peak	163	2.0	Fundamental	757.5 MHz
30.174	44.6	V	82.2	-37.6	Peak	206	1.0		757.5 MHz
44.650	52.0	V	82.2	-30.2	Peak	288	1.0		757.5 MHz
37.742	57.4	V	82.2	-24.8	Peak	294	1.0		757.5 MHz
1515.000	58.0	V	82.2	-24.2	Peak	89	2.5		757.5 MHz
2272.500	50.3	V	82.2	-31.9	Peak	227	1.6		757.5 MHz
7148.600	50.8	V	82.2	-31.4	Peak	53	2.2		757.5 MHz

Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #5b: Spurious Emissions, Radiated 1559-1610 MHz with typical antennas
EUT setting, Option 4, MCS 6, power setting 30dBm (lowest bandwidth mode, highest PSD)

Date of Test: 12/5/2017 Config. Used: 1
Test Engineer: Joseph Cadigal / David Bare Config Change: None
Test Location: Chamber#4 EUT Voltage: 5.25 VDC and 13.8 VDC

For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to -70 dBW/MHz (-40 dBm) equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP (-50 dBm) for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.
For other spurious emisisons, the limit is taken from FCC Part 27.53(c)(1)

limit (dBm):	-40	-50
Approximate field strength limit @ 3m:	55.2	45.2

1559-1610 MHz band, 10 dBd Yagi Antenna

Frequency	Level	Pol	FCC Part 27		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1575.150	62.8	V	N/A	-	Peak	290	1.0	RB 1 MHz;VB 3 MHz;Peak
1575.310	49.0	V	55.2	-6.2	Avg	290	1.0	RB 1 MHz;VB 3 MHz;Sample VAVG 100

1559-1610 MHz band, 3 dBd Monopole Antenna

Frequency	Level	Pol	FCC Part 27		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1575.210	61.0	V	N/A	-	PK	192	2.0	RB 1 MHz;VB 3 MHz;Peak
1575.170	48.2	V	55.2	-7.0	Avg	192	2.0	RB 1 MHz;VB 3 MHz;Sample VAVG 100

1559-1610 MHz band, 14 dBd Sector Antenna

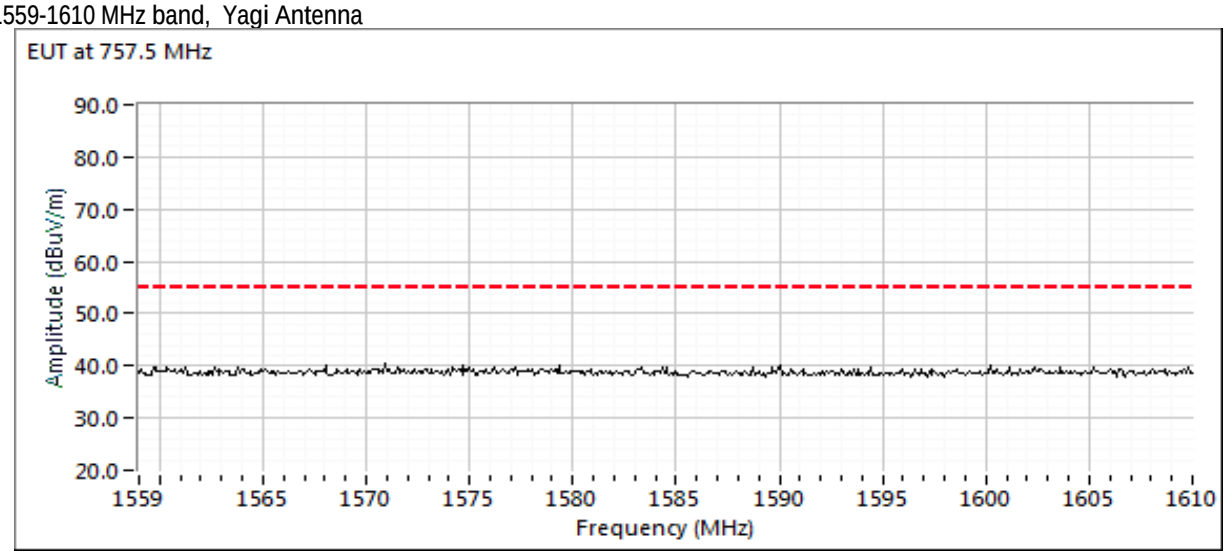
Frequency	Level	Pol	FCC Part 27		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1575.020	60.4	V	N/A	-	PK	177	2.0	RB 1 MHz;VB 3 MHz;Peak
1575.010	45.9	V	55.2	-9.3	Avg	177	2.0	RB 1 MHz;VB 3 MHz;Sample VAVG 100

Note 1:	The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: E=√(30PG)/d. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2 dBi) has not been included. The erp or eirp for all signals with less than 20 dB of margin relative to this field strength limit is determined using substitution measurements.
Note 2:	Emission at 1575 MHz is more than 10 kHz wide
Note 3:	No emissions detected above the test system noise floor in the 1559 -1610 MHz band with the EUT operating at 757.5 MHz. The plot data below was obtained using a peak detector.

Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

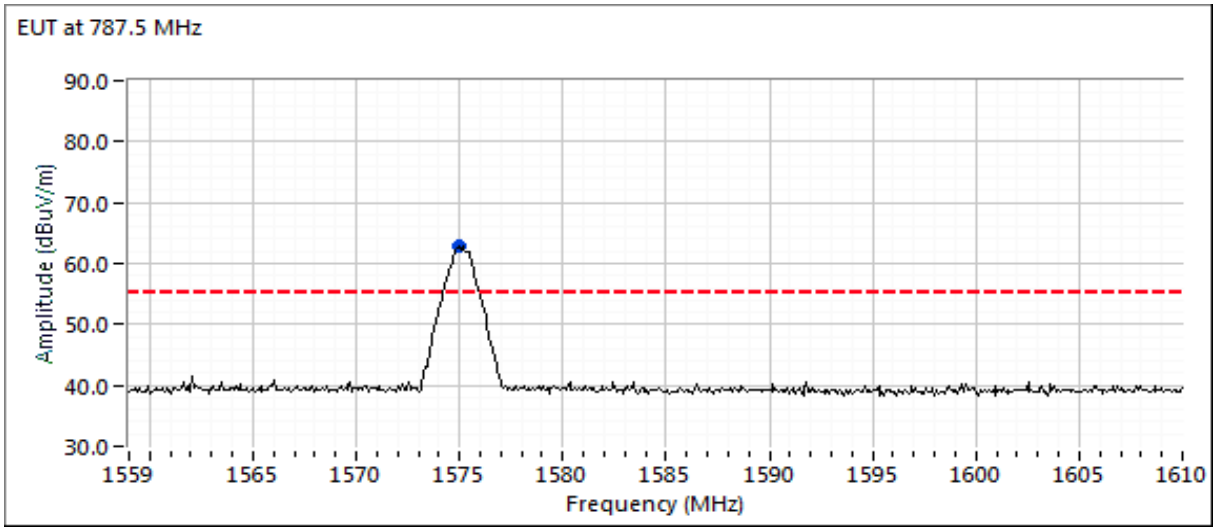
Plots for low channel, power setting(s) = 30

1559-1610 MHz band, Yagi Antenna



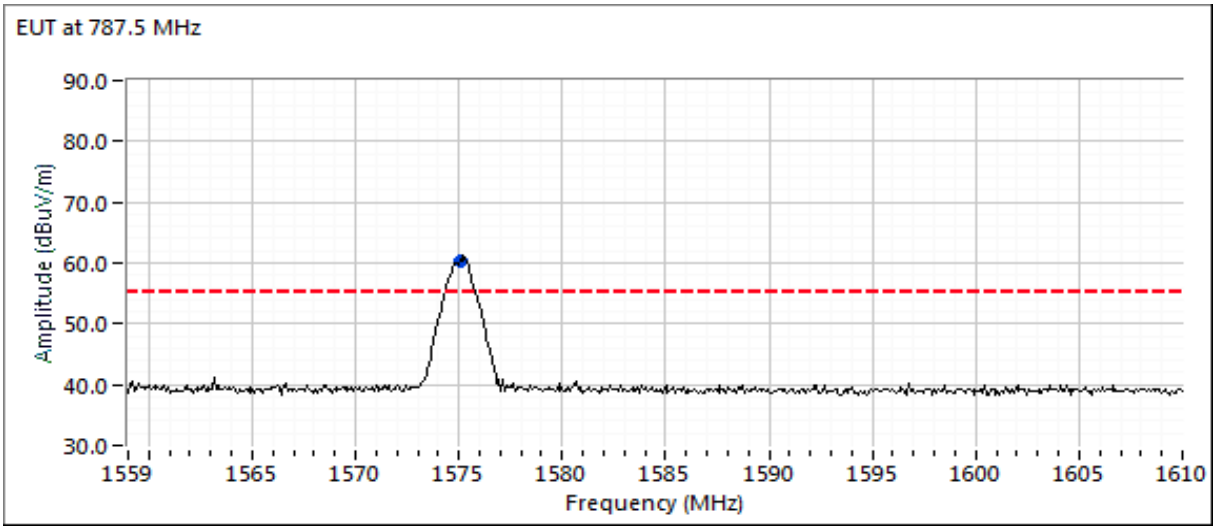
Plots for high channel, power setting(s) = 30

1559-1610 MHz band, Yagi Antenna

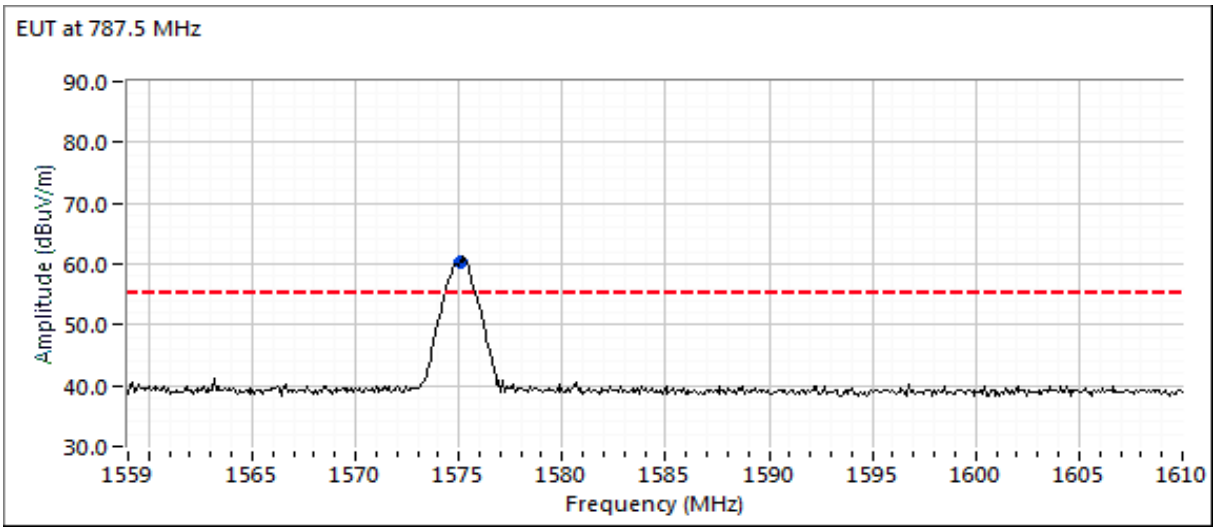


Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

1559-1610 MHz band, Monopole Antenna



1559-1610 MHz band, Sector Antenna



Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #5c: - Substitution Measurements

Date of Test: 12/6/2017 Config. Used: 1

Test Engineer: Joseph Cadigal Config Change: None

Test Location: FT Chamber #4 EUT Voltage: 5.25 VDC and 13.8 VDC

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1575.310	-40.0	8.4	65.3	96.9	49.0	-47.9	-50.1		-40.0	-10.1

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Run #6: Modulation Analysis

OFDM using QPSK and 16QAM

Client:	GE MDS LLC	Job Number:	JD106230
Model:	LW700	T-Log Number:	T016375
		Project Manager:	Christine Krebill
Contact:	Dennis McCarthy	Project Coordinator:	-
Standard:	FCC Part 27, FCC Part 15	Class:	N/A

Run #7: Frequency Stability

Date of Test: 12/4/2017 Config. Used: 1

Test Engineer: David Bare Config Change: None

Test Location: Fremont EMC Lab #4A EUT Voltage: Various (see below)

Nominal Frequency: 757.5 MHz

Frequency Stability Over Temperature

The EUT was soaked at each temperature for a minimum of 30 minutes prior to making the measurements to ensure the EUT and chamber had stabilized at that temperature.

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
-40	757.499929	-71	-0.1
-30	757.500304	304	0.4
-20	757.500378	378	0.5
-10	757.500298	298	0.4
0	757.500125	125	0.2
10	757.499946	-54	-0.1
20	757.499894	-106	-0.1
30	757.500113	113	0.1
40	757.500205	205	0.3
50	757.500404	404	0.5
60	757.500535	535	0.7
70	757.500212	212	0.3
	Worst case:	535	0.7

Frequency Stability Over Input Voltage

Nominal Voltage is from 10 to 60 Vdc.

Voltage	Frequency Measured	Drift	
(DC)	(MHz)	(Hz)	(ppm)
10	757.500040	40	0.1
60	757.500030	30	0.0
	Worst case:	40	0.7

Voltage	Frequency Measured	Drift	
(DC)	(MHz)	(Hz)	(ppm)
8	757.500040	40	0.1

Note 1:	Maximum drift of fundamental frequency before it shut down at 8.0 Vdc.

End of Report

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