41039 Boyce Road
Fremont, CA. 94538
510-578-3500 Phone

Radio Test Report-EAR Controlled Data

FCC Part 80
(216-220 MHz, 50W)
FCC Part 90
(217-220 MHz, 2W and 220-222 MHz, 50W ERP)
FCC Part 95
(218-219 MHz, 20W ERP)

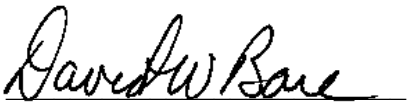
Model: Airlink ACSES

FCC ID:	X27-AS220-1
COMPANY:	Ondas Networks 920 Stewart Drive Sunnyvale, CA 94085
TEST SITE(S):	Element Materials Technology Fremont Newark AKA: NTS Labs LLC 41039 Boyce Road. Fremont, CA. 94538-2435
PROJECT NUMBER:	PR190061
REPORT DATE:	June 13, 2025
RE-ISSUE DATE:	October 22, 2025
FINAL TEST DATES:	May 8, 9, 12, 13 and 22, 2025
TOTAL NUMBER OF PAGES:	87

ACCREDITED
Testing Cert #0214.26

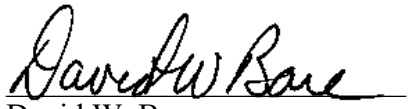
VALIDATING SIGNATORIES

PROGRAM MGR



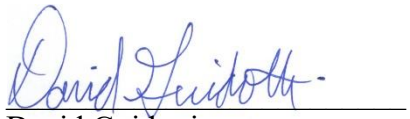
David W. Bare
Chief Engineer

TECHNICAL REVIEWER:



David W. Bare
Chief Engineer

FINAL REPORT PREPARER:



David Guidotti
Senior Technical Writer

QUALITY ASSURANCE DELEGATE

Gary Izard
Senior Technical Writer

REVISION HISTORY

Rev#	Date	Comments	Modified By
0	June 13, 2025	First release	
1	October 22, 2025	Corrected power limit values on pages 9 and 27	dwb

TABLE OF CONTENTS

SCOPE

Tests have been performed on the Ondas Networks model Airlink ACSES, 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
- FCC Part 80 Subpart J
- FCC Part 90 Subparts K and T
- FCC Part 95 Subpart F

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 Element Materials Technology Fremont Newark 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.

Element Materials Technology Fremont Newark 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 Ondas Networks model Airlink ACSES and therefore apply only to the tested sample. The sample was selected and prepared by Bryan Wing of Ondas Networks.

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 Ondas Networks model Airlink ACSES 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 80

FCC	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) §80.385	Frequency range(s)	216.00625 – 219.99375 MHz	216-220 MHz	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 §80.215(h)(5)	RF power output at the antenna terminals	32.7 dBm to 44.6 dBm	47 dBm	Pass
§2.1033 (c) (4) §2.1047 §80.211	Emission types	GMSK	-	-
	Emission mask	within Mask	Mask 80.211(f)	Pass
§2.1049 §80.205	Occupied Bandwidth	9.42 kHz 9.45 kHz	20 kHz	Pass
Transmitter spurious emissions				
§2.1051 §2.1057	At the antenna terminals	All more than 20 dB below the limit	-25 dBm	Pass
§2.1053 §2.1057	Field strength	-25.9 dBuV/m	-25 dBm	Pass
Other details				
§2.1055 §80.209	Frequency stability	0.0 ppm	5 ppm	Pass
§1.1307(b)	RF Exposure	Refer to separate MPE/SAR Exclusion report		
§2.1033 (c) (8)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Voltage / TX / Current 11 V / 25W / 8.56A 11V / 2W / 3.54A 36V / 25W / 2.72A 36V / 2W / 1.087A	Information only	-
-	Antenna Gain	Maximum 16.5 dBi	Any allowed subject to licensing	Complies
Note 1 Pass/Fail criteria defined by standards listed above.				

FCC Part 90 (217-220 MHz, 2W ERP)

FCC	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) § 90.35	Frequency range(s)	217.00625 - 221.99375 MHz	217 – 220 MHz	Pass
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 90.205 § 90.259	RF power output at the antenna terminals	33.0 dBm	33.0 dBm	Pass
§2.1033 (c) (4) § 2.1047 § 90.210	Emission types	GMSK	-	-
	Emission mask	within Mask	Mask C	Pass
§ 2.1049 § 90.209	Occupied Bandwidth	217-220 MHz: 9.45kHz	217-220 MHz: 11.25 kHz	Pass
Transmitter spurious emissions				
§ 2.1051 § 2.1057	At the antenna terminals	All emissions < -25 dBm	-25 dBm	Pass
§ 2.1053 § 2.1057	Field strength	-42.1 dBm	-25 dBm	Pass
Other details				
§ 2.1055 § 90.213	Frequency Stability	0.00 ppm	1 ppm	Pass
§1.1307(b)	RF Exposure	Refer to separate MPE/SAR Exclusion report		
§2.1033 (c) (8)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Voltage / TX / Current 11 V / 25W / 8.56A 11V / 2W / 3.54A 36V / 25W / 2.72A 36V / 2W / 1.087A	Information only	-
-	Antenna Gain	Maximum 16.5 dBi	Any allowed subject to licensing	Complies
Note 1	Pass/Fail criteria defined by standards listed above.			

FCC Part 90 (220-222 MHz, 50W ERP)

FCC	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) § 90.35	Frequency range(s)	220.00625 - 221.99375 MHz	220 – 222 MHz	Pass
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 90.205 § 90.729	ERP	47.0 dBm to 54.3 dBm	220-221 MHz 57 dBm 221-222 MHz 47 dBm	Pass
§2.1033 (c) (4) § 2.1047 § 90.210	Emission types	GMSK	-	-
	Emission mask	within Mask	Mask F[2]	Pass
§ 2.1049 § 90.209	Occupied Bandwidth	220-222 MHz: 4.41 kHz	220-222 MHz: 12.5 kHz[3]	Pass
Transmitter spurious emissions				
§ 2.1051 § 2.1057	At the antenna terminals	All emissions < -25 dBm	-25 dBm	Pass
§ 2.1053 § 2.1057	Field strength	-41.1 dBm	-25 dBm	Pass
Other details				
§ 2.1055 § 90.213	Frequency Stability	0.00 ppm	0.1 ppm	Pass
§1.1307(b)	RF Exposure	Refer to separate MPE/SAR Exclusion report		
§2.1033 (c) (8)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Voltage / TX / Current 11 V / 25W / 8.56A 11V / 2W / 3.54A 36V / 25W / 2.72A 36V / 2W / 1.087A	Information only	-
-	Antenna Gain	Maximum 16.5 dBi	Any allowed subject to licensing	Complies

Note 1 Pass/Fail criteria defined by standards listed above.
Note 2 See derivation of mask for aggregated channels in Appendix A
Note 3 Per FCC 90 and SRSP-512, 5 kHz segments may be aggregated to allow wider bandwidths.

FCC Part 95 (218-219 MHz, 20W ERP)

FCC	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) § 95.1953)	Frequency ranges (Listed for each channel spacing)	218.00625 – 218.99375 MHz	218-219 MHz	Complies
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 § 95.1955	ERP – Total power (Maximum for each channel spacing)	19.8 Watts ERP	20 Watts ERP	Complies
§2.1033 (c) (4) §2.1047 § 95.1957	Emission types	GMSK	Information only	-
	Emission mask	Device complies with spectral mask – refer to test data	Emission must stay in frequency segment	Complies
§2.1049	Occupied (99%) Bandwidth	9.42 kHz	Emission must stay in frequency segment	Complies
Transmitter spurious emissions				
§2.1053 §2.1057 § 95.1957	At the antenna terminals	-26.8 dBm	-25 dBm/MHz	Complies
	Radiated (erp)	-41.7 dBm		Complies
Other details				
§2.1055 §90.213(a)	Frequency stability	0.0 ppm	Not specified, mask performed at worst case stability per 95.1957(c)	-
§1.1307(b)	RF Exposure	Refer to separate MPE/SAR Exclusion report		
§2.1033 (c) (8)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Voltage / TX / Current 11 V / 25W / 8.56A 11V / 2W / 3.54A 36V / 25W / 2.72A 36V / 2W / 1.087A	Information only	-
-	Antenna Gain	This application is submitted for antennas of maximum 12.1 dBi gain.		
Note 1 Pass/Fail criteria defined by standards listed above.				

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were from 11-36 volts based on the rating of the device.

The extremes of temperature were -30°C to +50°C as specified in FCC §2.1055(a)(1).

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
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 Ondas Networks model Airlink ACSES is a data radio transceiver. Since the EUT would be fixed mounted during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 11-36 VDC.

The sample was received on May 8, 2025 and tested on May 8, 9, 12, 13 and 22, 2025. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Ondas Networks	ACSES	Data radio	Pilot-08	X27-AS220-1

OTHER EUT DETAILS

The following EUT details should be noted: Modulation is GMSK.

ENCLOSURE

The EUT enclosure is primarily constructed of aluminum. It measures approximately 13.5 cm wide by 18 cm deep by 5.7 cm high. It weighs 4.5 pounds.

MODIFICATIONS

No modifications were made to the EUT during the testing of the product at Element Materials Technology Fremont Newark.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
MeanWell	RSP-320-13.5	Power Supply	SC216T4747	-
Unknown	None	Attenuator	-	-
Time Microwave	LMR-240 Ultraflex	Cable	-	-

The following equipment was used as remote support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Raspberry	Pi	Single Board Computer	DCA6326CB9A6	-
ASUS	VS228	Display	E2LMTF061607	-
AST	None	Keyboard	None	-
Logitech	M-U0026	Mouse	1844HS04MQF8	-

EUT INTERFACE PORTS

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

EUT

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
DC power	Power Supply	4 wire	Unshielded	1
Ethernet	Pi	Cat 6	Shielded	2
Console	Pi	Flat multiwire	Unshielded	2
RF Output	Load	Coax	Shielded or Unshielded	1

Additional on Support Equipment

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
Remote Pi	Display	Mutiwire	Shielded	1.8
Remote Pi	Keyboard	Mutiwire	Shielded	1.8
Remote Pi	Mouse	Mutiwire	Shielded	1.8

EUT OPERATION

During emissions testing the EUT was commanded to transmit a modulated or unmodulated signal at minimum and maximum power settings.

TESTING

GENERAL INFORMATION

Antenna port measurements were taken at the Element Materials Technology Fremont Newark test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

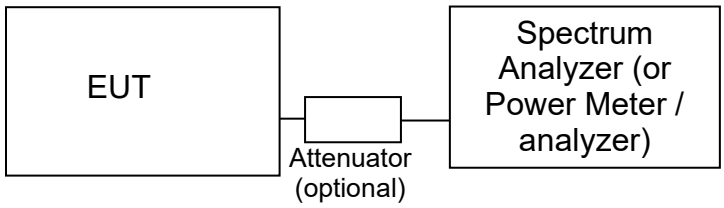
Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 6.2 of RSS-GEN, Element Materials Technology Fremont Newark has been recognized as an accredited test laboratory by the Commission and Innovation, Science and Economic Development Canada. A description of the facilities employed for testing is maintained by Element Materials Technology Fremont Newark.

Site	Registration Numbers	Location
Chamber 3	US1031	41039 Boyce Road Fremont, CA 94538-2435

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Results from testing performed in this chamber have been correlated with results from an open area test site. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

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.

TRANSIENT FREQUENCY BEHAVIOR:

The TIA/EIA 603 procedure is used to determine compliance with transient frequency timing requirements as the radio is keyed on and off.

The EUTs rf output is connected via a combiner/splitter to the test receiver/spectrum analyzer and to a diode detector. The test receiver or spectrum analyzer video output is connected to an oscilloscope, which is triggered by the output from the diode detector.

Plots showing Ton, T1, and T2 are made when turning on the transmitter and showing T3 when turning off the transmitter.

RADIATED EMISSIONS MEASUREMENTS

Receiver radiated spurious emissions measurements are made in accordance with ANSI ANSI C63.4:2003 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 on an OATS or 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:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

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

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radio Antenna Port (Power and Transmit Spurious Emissions), 09-May-25					
National Technical Systems	EMC Lab #4A	None	WC055574	N/A	
Agilent Technologies	PSA Spectrum Analyzer	E4446A	WC055650	11/22/2024	11/22/2025
Inmet	20dB Attenuator	18n50w-20fm	WC068107	N/A	
Pasternak	Cable, Coax	PE365-24	WC081140	2/28/2025	2/28/2026
Radio Antenna Port (Masks and Stability), 12,13-May-25					
National Technical Systems	EMC Lab #4A	None	WC055574	N/A	
Agilent Technologies	PSA Spectrum Analyzer	E4446A	WC055650	11/22/2024	11/22/2025
Semflex Microwave Solutions	N1S3HPT30276, 7m blue	Cable Assembly	WC064764	N/A	
Watlow	Environmental Chamber Controller	F4	WC066185	10/3/2024	10/3/2025
Inmet	20dB Attenuator	18n50w-20fm	WC068107	N/A	
Fluke	True RMS Multimeter	115	WC080980	11/19/2024	11/19/2025
Hewlett Packard	DC Power Supply	6024A	WC081108	N/A	
Radiated Emissions, 30 - 1,000 MHz, 08-May-25					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	WC022452	N/A	
ETS-Lindgren	EMC Chamber #3, Inner Dimensions (LxWxH): 39'6" x 63'1" x 28'	CH 3 (FACT-10)	WC055565	12/4/2023	7/31/2025
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	WC064582	5/2/2025	5/2/2027
Hewlett Packard	Preamp, 9kHz-1300MHz	8447F	WC064718	1/8/2025	1/8/2026
Times Microwave Systems	LMR-400, Coax, 7.5m	Cable Assembly	WC064812	7/16/2024	7/31/2025
Micro-Coax	RF Coaxial Cable, 7.5m, CH 3	UFB311A-1-2950-50U50U	WC072592	2/20/2025	2/20/2026
Micro-Coax	RF Coaxial Cable 96", 18GHz	UFB311A-0-0960-5045GU	WC072599	1/2/2025	1/2/2026
Rohde & Schwarz	EMI Test Receiver, 9kHz-7GHz	ESR 7	WC078725	4/21/2025	4/21/2026
Radiated Emissions, 1,000 - 3,000 MHz, 22-May-25					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	WC022452	N/A	
ETS-Lindgren	EMC Chamber #3, Inner Dimensions (LxWxH): 39'6" x 63'1" x 28'	CH 3 (FACT-10)	WC055565	12/4/2023	7/31/2025
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blue)	3115	WC064442	11/8/2024	4/18/2026
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB 7	WC064989	12/30/2024	12/30/2025
MITEQ	Preamplifier, 1-18GHz	AFS44	WC080962	8/23/2024	8/23/2025
Semflex Microwave Solutions	RF Coaxial Cable, 4.5m blue	N130BFSN10180 (HP 305S)	WC081160	6/26/2024	12/9/2025

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Substitutions, 22-May-25					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	WC022452	N/A	
ETS-Lindgren	EMC Chamber #3, Inner Dimensions (LxWxH): 39'6" x 63'1" x 28'	CH 3 (FACT-10)	WC055565	12/4/2023	7/31/2025
EMCO	Dipole Antenna (set)	3121C-DB1	WC062460	5/17/2024	5/17/2026
EMCO	Dipole Antenna (set)	3121C-DB4	WC062462	5/17/2024	5/17/2026
EMCO	Dipole Antenna (set)	3121C-DB3	WC062463	5/17/2024	5/17/2026
Rohde & Schwarz	Power Meter, Single	NRVS	WC062570	1/10/2025	1/10/2026
Rohde & Schwarz	Peak Power Sensor	NRV-Z31	WC062580	6/18/2024	6/18/2025
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	WC064582	5/2/2025	5/2/2027
Hewlett Packard	Preamp, 9kHz-1300MHz	8447F	WC064718	1/8/2025	1/8/2026
Times Microwave Systems	LMR-400, Coax, 4.0m	Cable Assembly	WC064818	1/2/2025	1/2/2026
Rohde & Schwarz	Signal Generator 100kHz - 12.75GHz	SMB 100A	WC068098	5/14/2024	5/31/2025
Rohde & Schwarz	EMI Test Receiver, 9kHz-7GHz	ESR 7	WC078725	4/21/2025	4/21/2026
Semflex Microwave Solutions	RF Coaxial Cable, 4.5m blue	N130BFSN10180 (HP 305S)	WC081160	6/26/2024	12/9/2025

Appendix B Test Data

TL190061-RA Pages 25 – 84

Client:	Ondas Networks	PR Number:	PR190061
Product	Airlink ACSES	T-Log Number:	TI190061-RA
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Emissions Standard(s):	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver
Immunity Standard(s):	IEC 61000-4-2, IEC 61000-4-5, ISO 16750-2	Environment:	Commercial/Industrial

EMC Test Data

For The

Ondas Networks

Product

Airlink ACSES

Date of Last Test: 7/30/2025

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

FCC Parts 80, 90 and 95F

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 place 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: 20-24 °C

Rel. Humidity: 40-48 %

Summary of Results

Run #	Spacing	Test Performed	Limit	Pass / Fail	Result / Margin
1	12.5 kHz	Output Power	§ 80.215(h)(5) §90.259, §90.729	Pass	44.6 dBm max
1		Radiated Power	§95.1955	Pass	43 dBm (Part 95)
2		Spectral Mask	Within masks	Pass	All within masks
3		99% or Occupied Bandwidth	less than authorized	Pass	4.41 & 9.45 kHz
4		Spurious Emissions (conducted)	-25dBm	Pass	-26.2 dBm @ 243.9 MHz (-1.2 dB)
5		Spurious emissions (radiated)	-25dBm	Pass	-37.4 dBm @ 437.0MHz (-12.4 dB)
6		Frequency Stability	Depends on rule part	Pass	0.0 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.

Test Notes

Power and Mask tests performed at lowest and highest power settings

Part 80 (216-220 MHz, 50W), necessary bandwidth <= 16 kHz, Part 90 (217-220 MHz, 2W and 220-222 MHz, 50W ERP), authorized bandwidths 20/11.25/6 for 217-220 MHz, 4 for 220-222 MHz, Part 95 (218-219 MHz, 20W ERP) 500 kHz segments

Aggregate authorized bandwidth 11.25 kHz for Part 90 (220-222 MHz)

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #1: Output Power

Date of Test: 5/9/2025
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4

Config. Used: 1
Config Change: Replace Times cable with Pasternak PE356-24
EUT Voltage: 13.5VDC

Cable Loss: 0.1 dB
Cable ID(s): WC081140

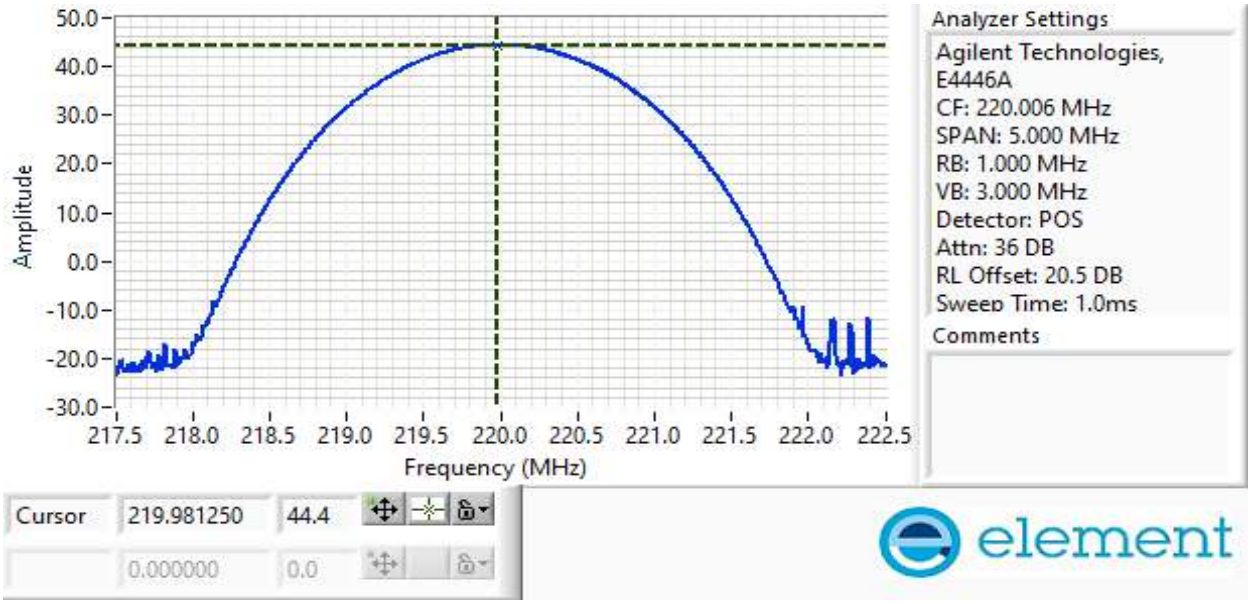
Attenuator: 20.4 dB
Attenuator IDs: WC068107

Total Loss: 20.5 dB

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power W	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W		
Part 80									
Low	216.00625	32.7	1.86	16.5	Pass	49.2	83.18		
High	216.00625	44.6	28.84	12.0	Pass	56.6	457.09		50W
Low	219.99375	32.7	1.86	16.5	Pass	49.2	83.18		
High	219.99375	44.0	25.12	12.0	Pass	56.0	398.11		50W
Part 90									
Low	217.00625	33.0	2.00	16.5	Pass	49.5	89.1	§90.259	
Low	219.99375	32.7	1.86	16.5	Pass	49.2	83.2	§90.259	
Low	220.00625	32.6	1.82	16.5	Pass	49.1	81.3		
High	220.00625	44.4	27.54	12.0	Pass	56.4	436.5	§90.729	500W ERP
Low	221.99375	32.6	1.82	16.5	Pass	49.1	81.3		
Low	221.99375	32.6	1.82	16.5	Pass	49.1	81.3	§90.729	50W ERP
Part 95									
Low	218.5	33.0	2.00	12.1	Pass	45.1	32.4		
High	218.5	44.4	27.54	0.7	Pass	45.1	32.4	§95.1955	20W ERP

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, Peak detector
Note 2:	Power setting - the software power setting used during testing, included for reference only.

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

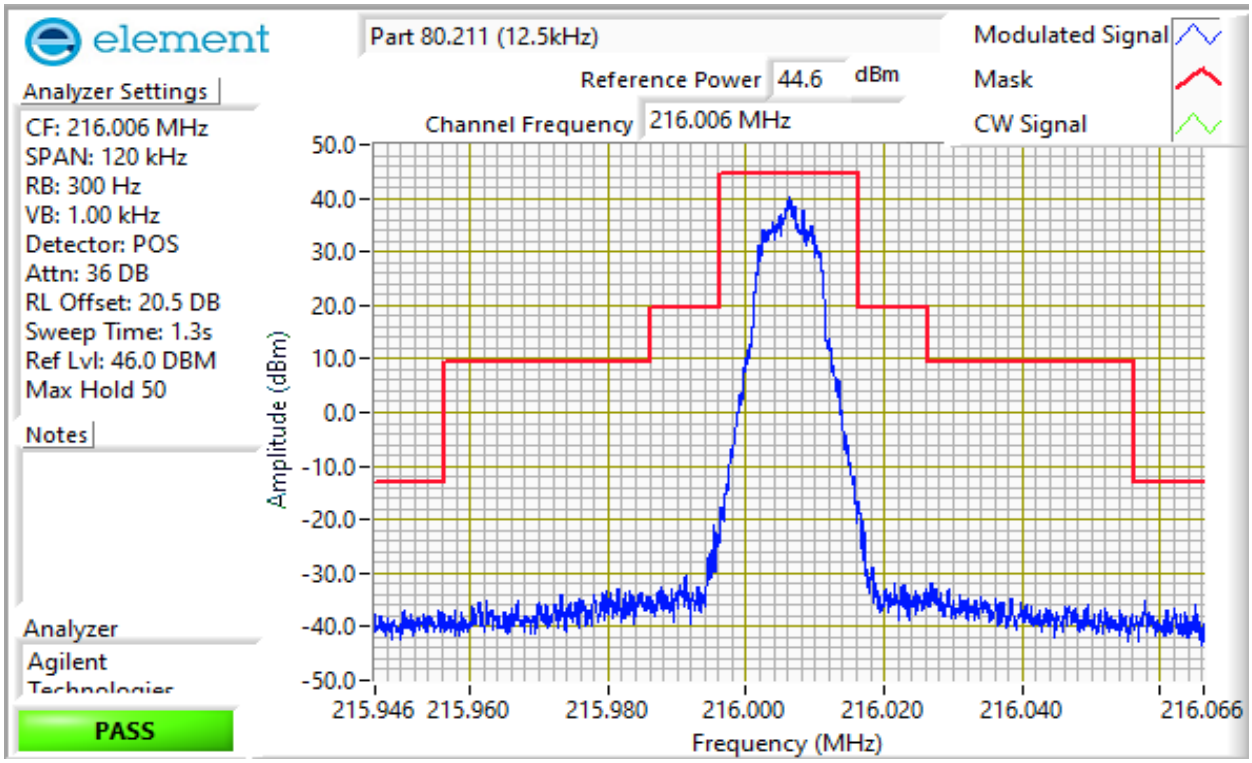
Run #2a: Spectral Mask, FCC Part 80 Mask 80.211(f) (216-220 MHz)

Date of Test: 5/12 & 5/13/2025 Config. Used: 1

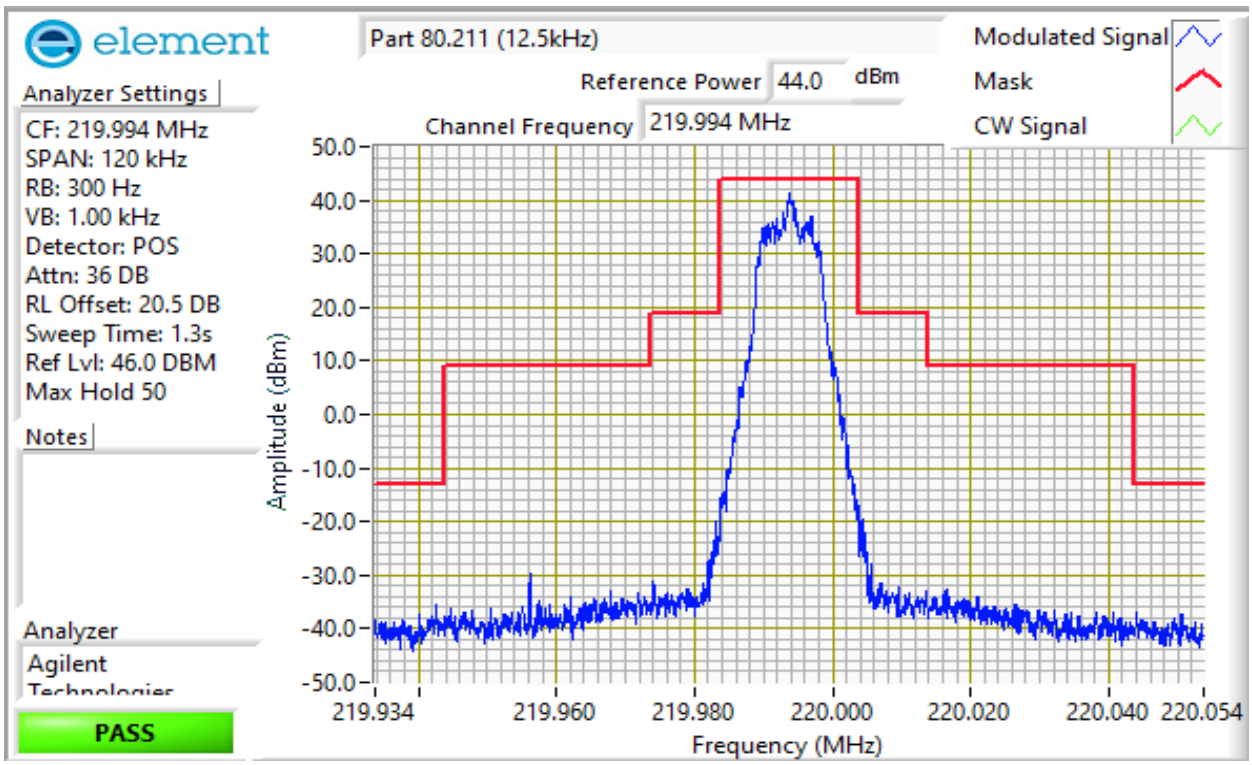
Test Engineer: David Bare Config Change: Replace Times cable with Pasternak PE356-24

Test Location: Fremont EMC Lab #4 EUT Voltage: 13.5VDC

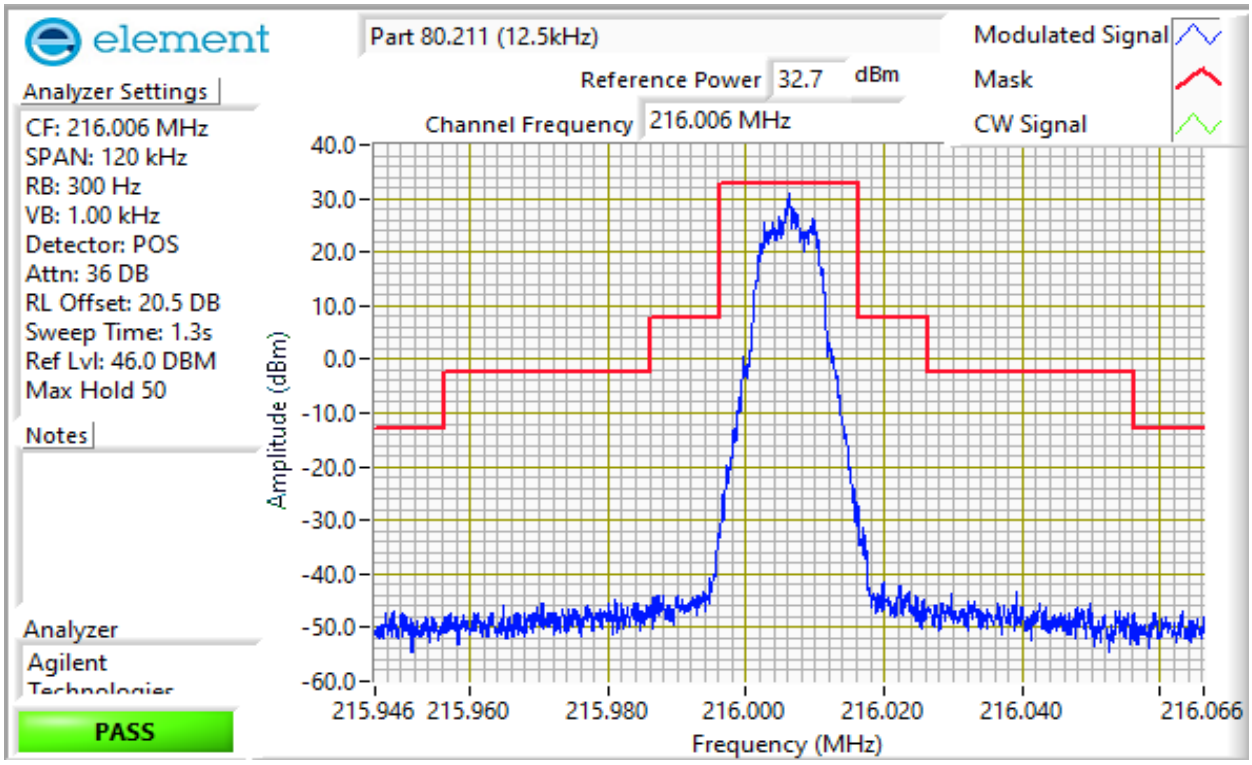
Note 1:	RBW = 300 Hz, VBW = 1 kHz; Mask reference = measured power
Note 2:	Part 80 Mask F performed at temperature with highest frequency error



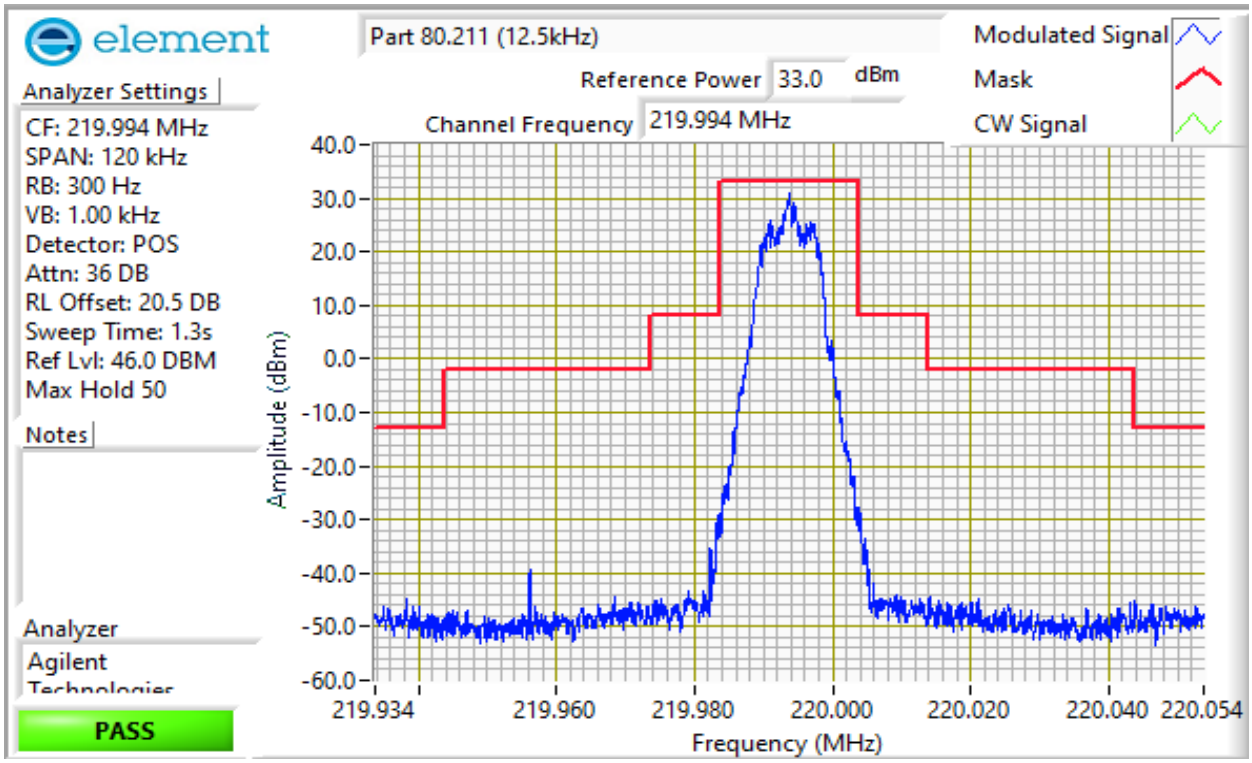
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

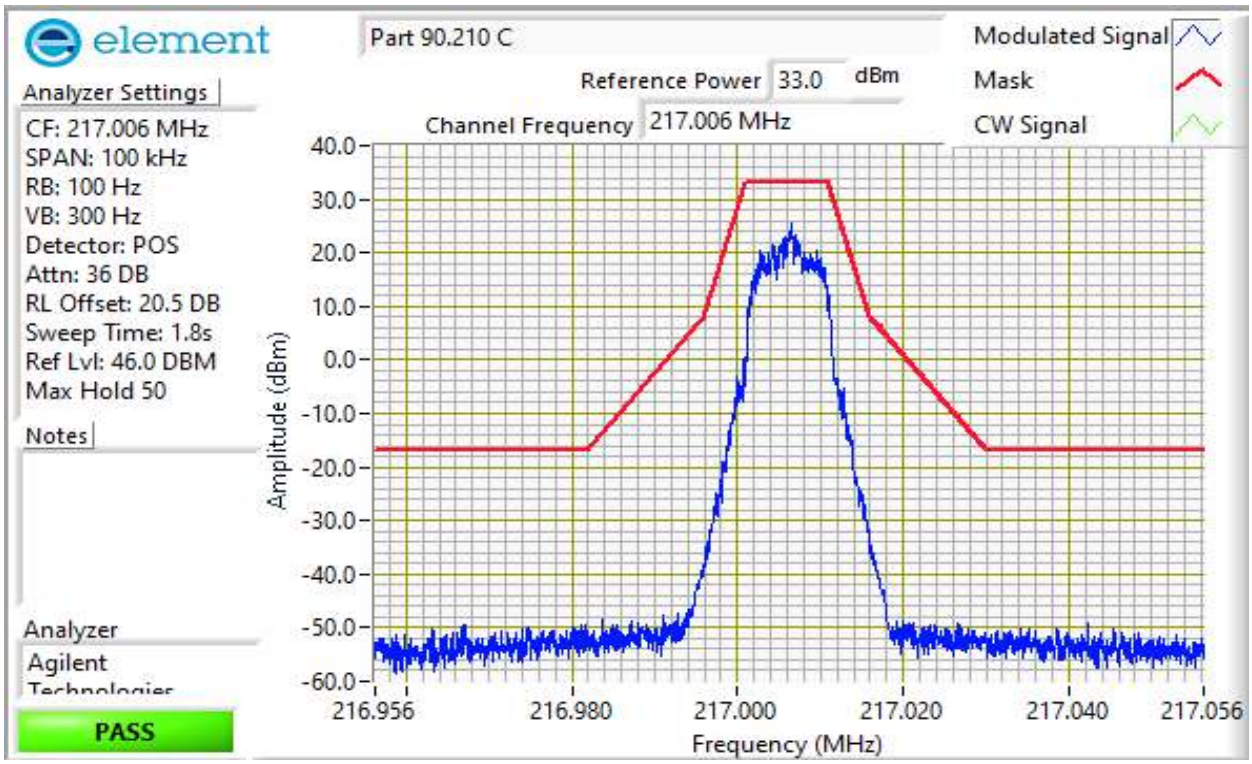
Run #2b: Spectral Mask, Part 90.210 Mask C (217-220 MHz), Mask F (220-222 MHz)

Date of Test: 5/12 & 5/13/2025 Config. Used: 1

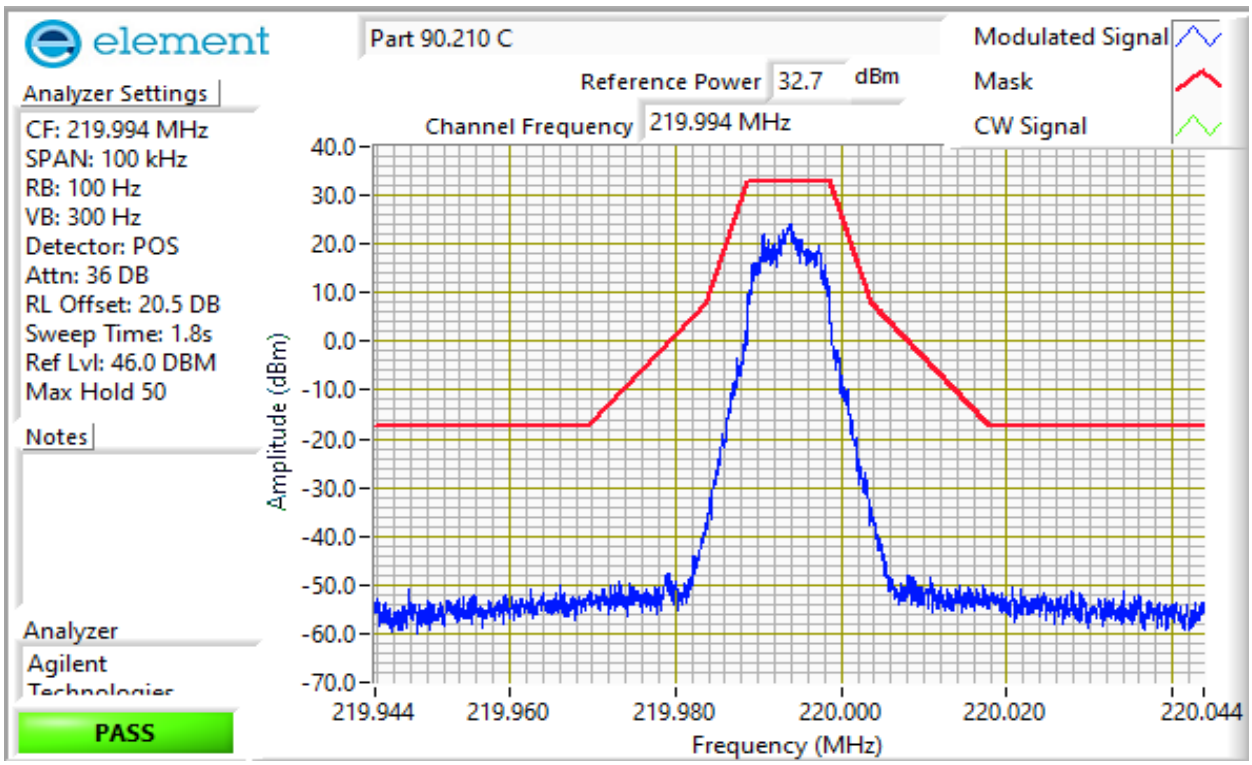
Test Engineer: David Bare Config Change: Replace Times cable with Pasternak PE356-24

Test Location: Fremont EMC Lab #4 EUT Voltage: 13.5VDC

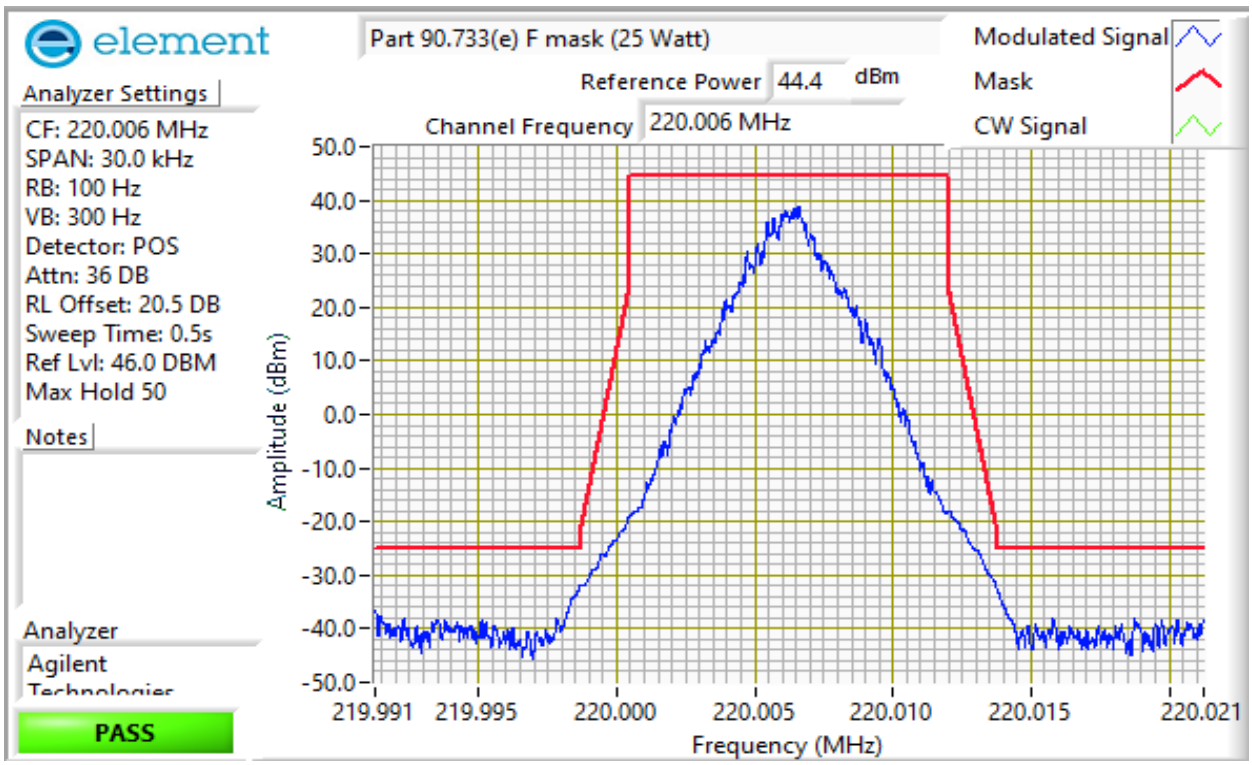
Note 1:	RBW = 100 Hz, VBW = 300 Hz; Mask reference = measured power
Note 2:	Part 90 Mask C and F performed at temperature with highest frequency error
Note 3:	For Mask F, allocation is for an aggregate of 5 channels but this is split in two, so mask is for 2.5 channels. See separate derivation.



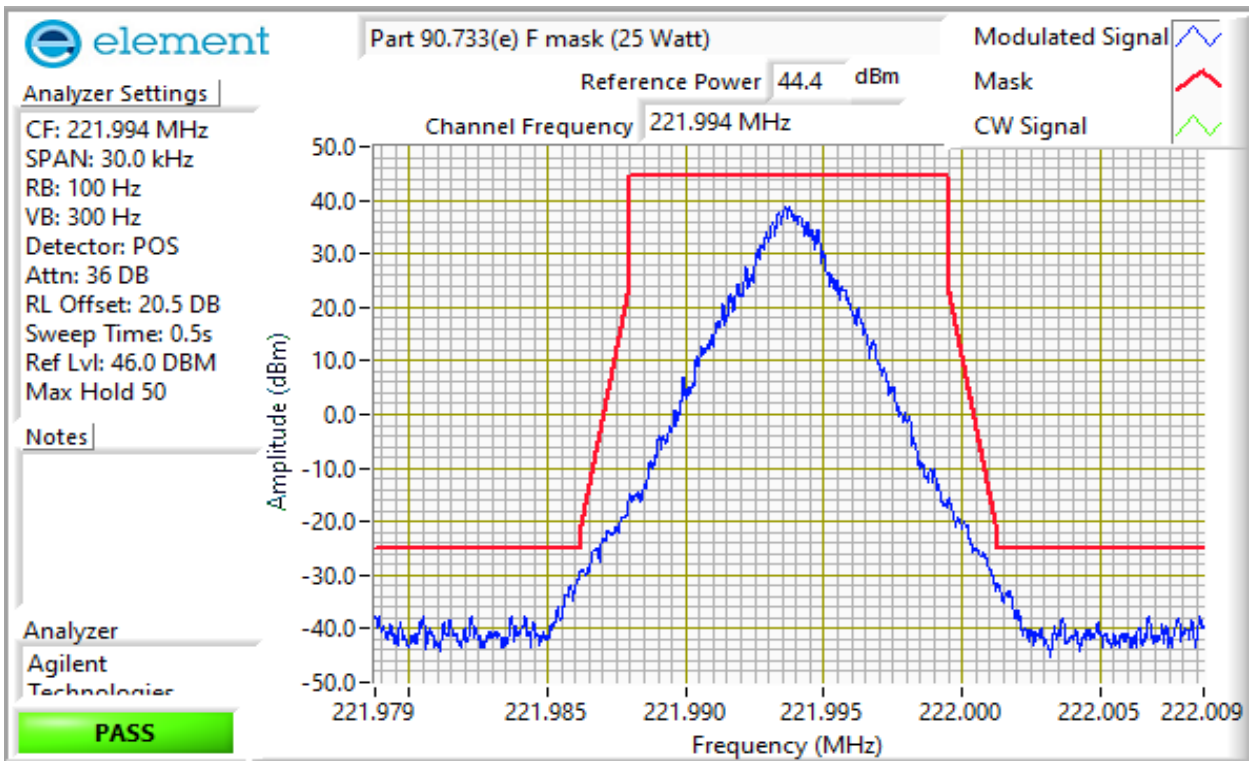
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



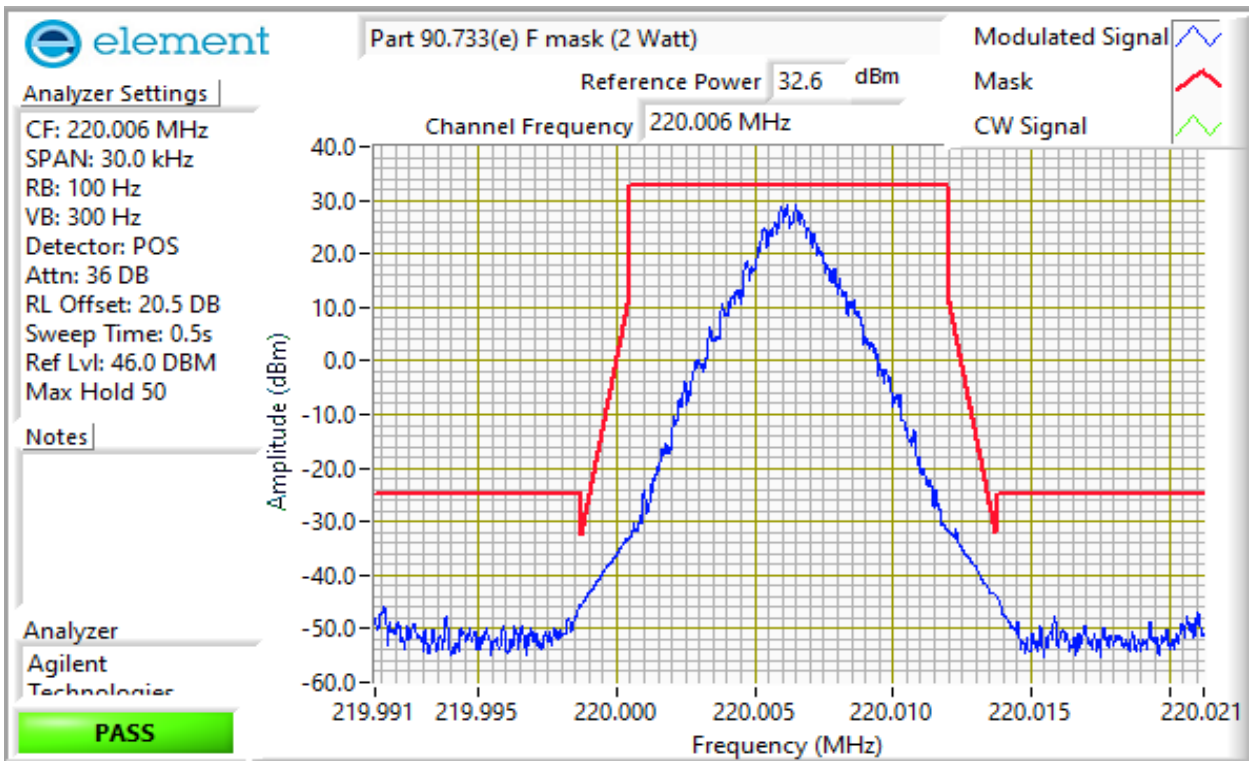
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



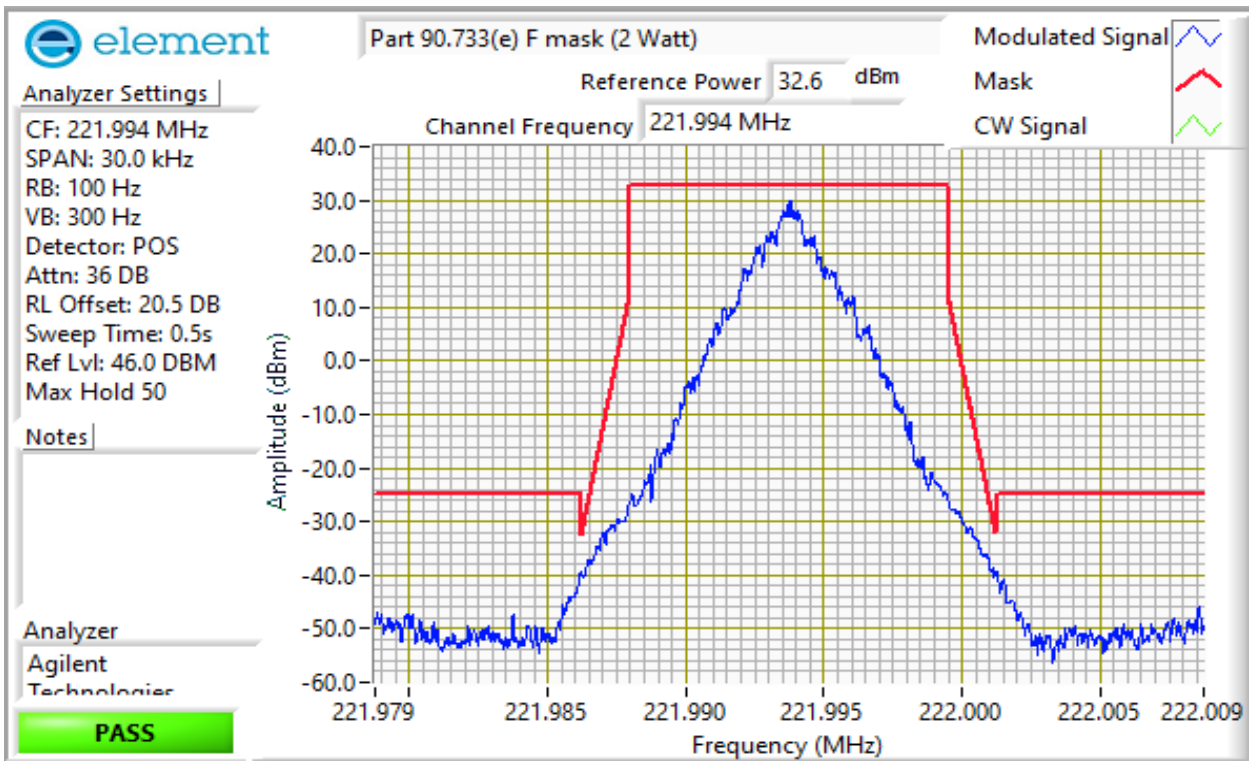
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

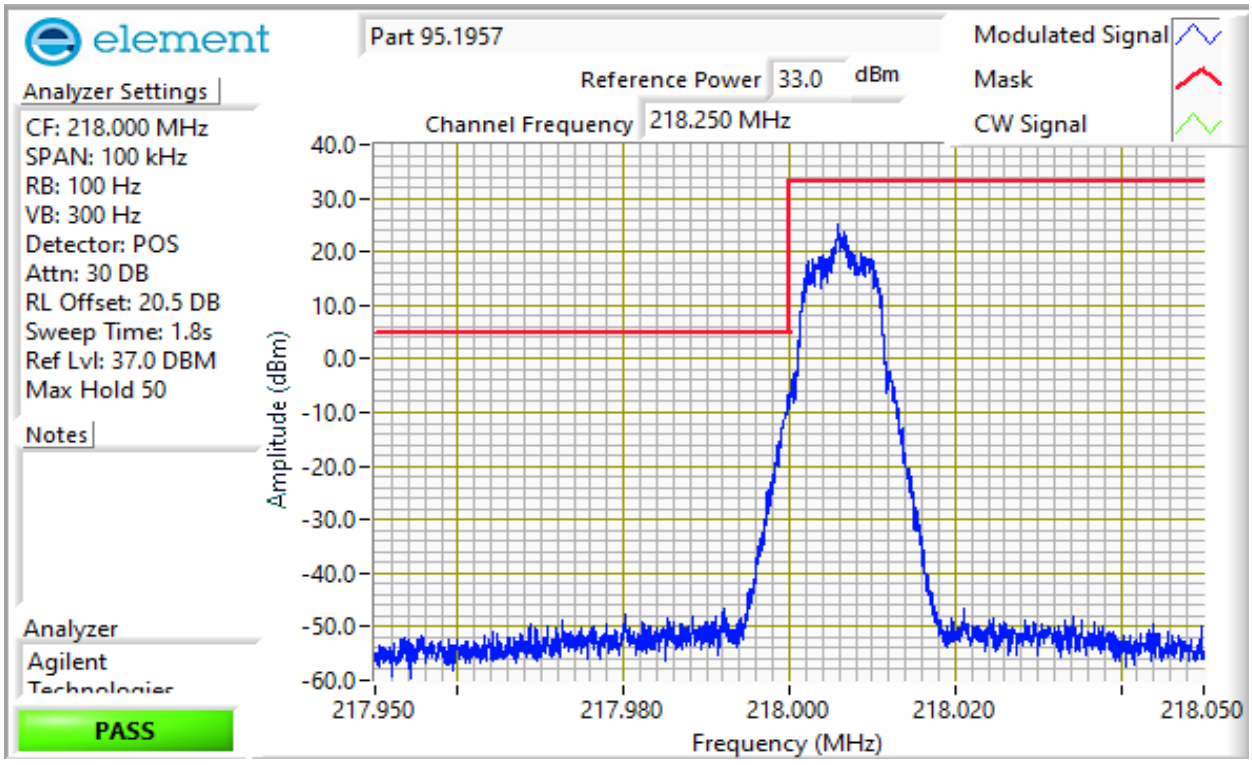
Run #2c: Spectral Mask, FCC Part 95.1957 Mask A (218-219 MHz)

Date of Test: 5/13/2025 Config. Used: 1

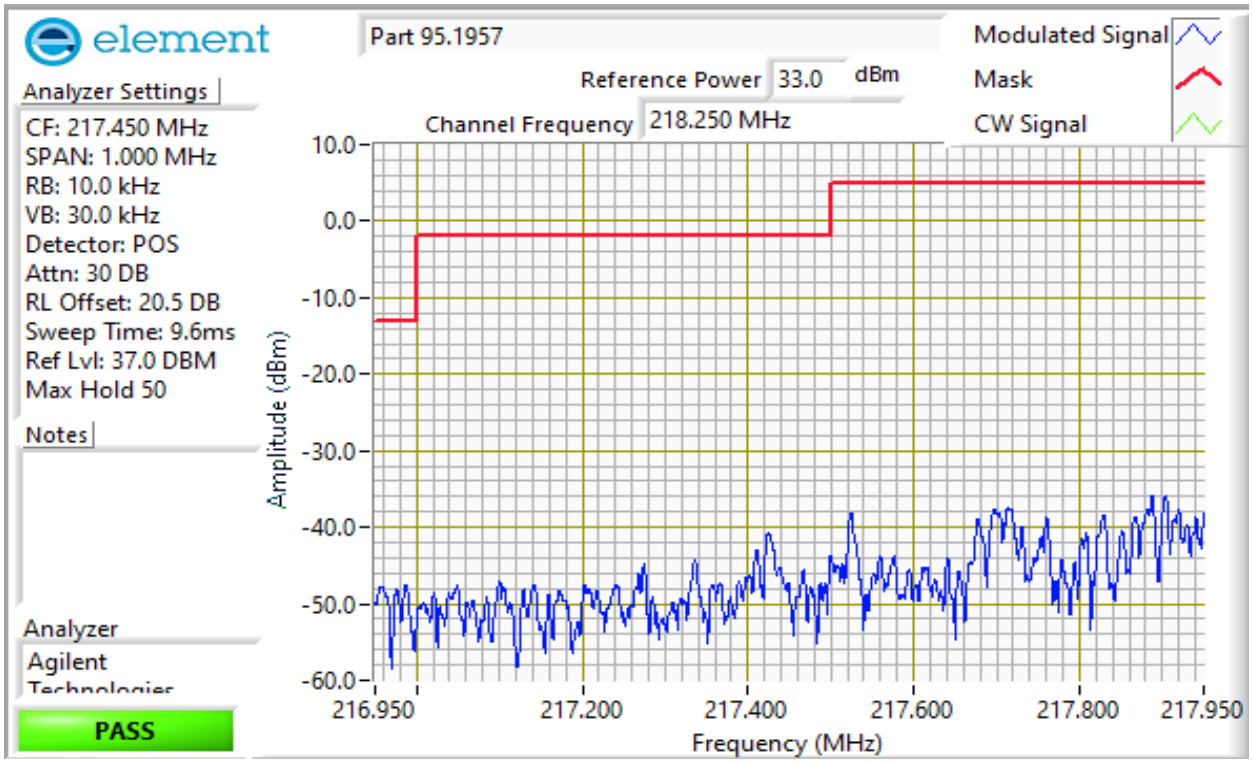
Test Engineer: David Bare Config Change: Replace Times cable with Pasternak PE356-24

Test Location: Fremont EMC Lab #4 EUT Voltage: 13.5VDC

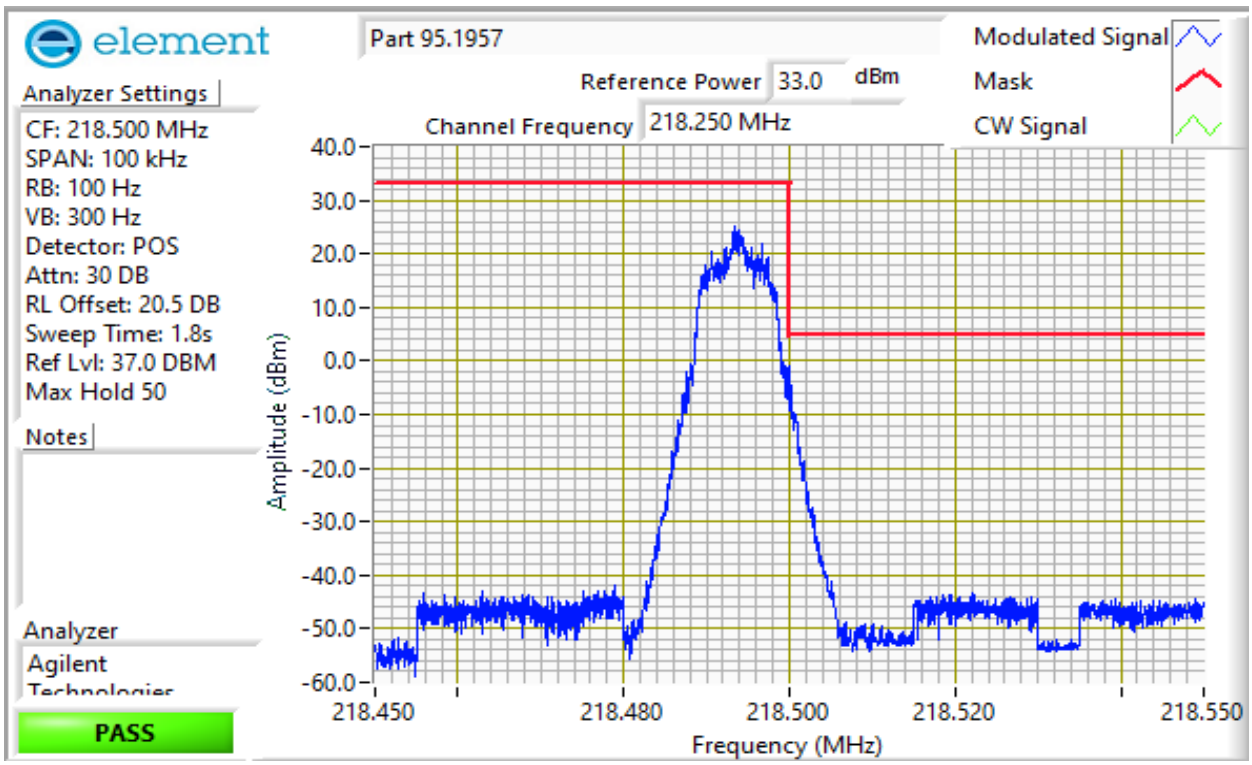
Note 1:	RBW = 100 Hz, VBW = 300Hz inband and RBW = 10 kHz, VBW = 30 kHz below 217.75 MHz and above 219.25 MHz. Mask reference = measured power. Channel frequency in plots refers to the center of the segment. Actual EUT frequencies were 218.00625, 218.49375, 218.50625 and 218.99375 MHz. These are the closest frequencies to the segment edges.
Note 2:	Part 95 Mask A performed at temperature with highest frequency error



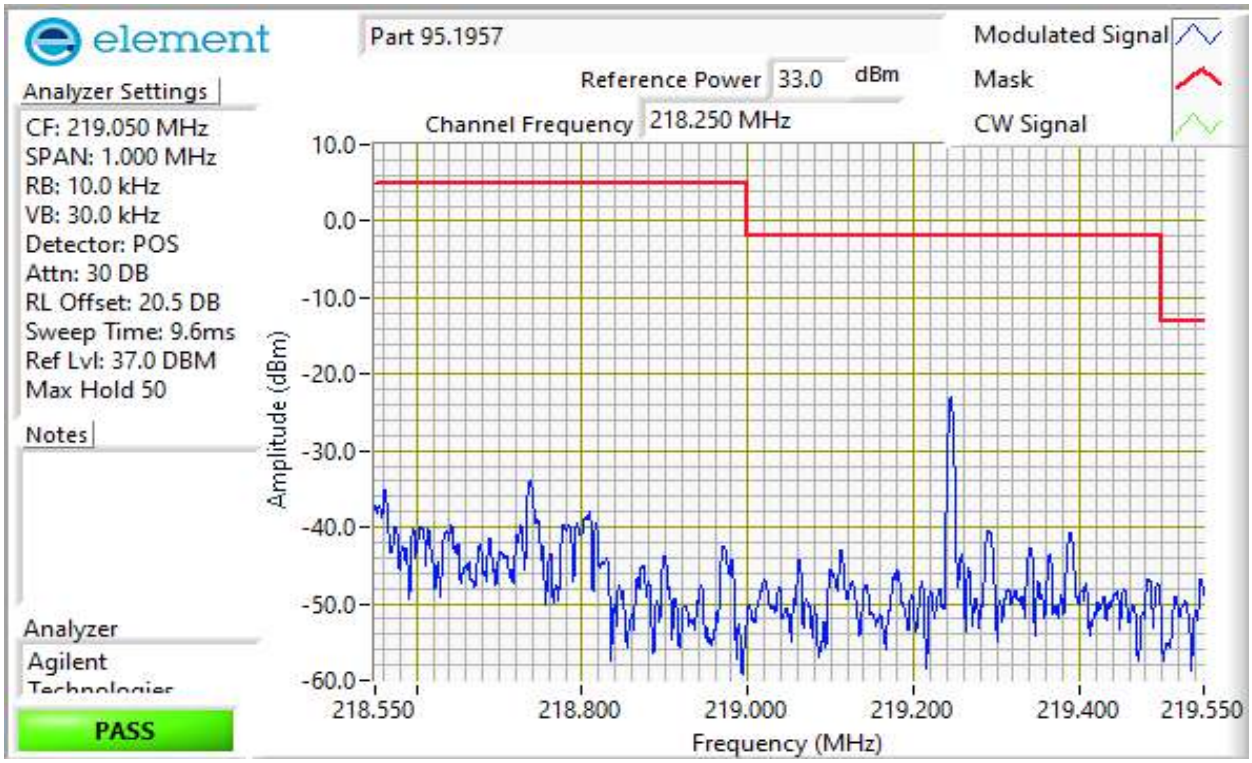
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



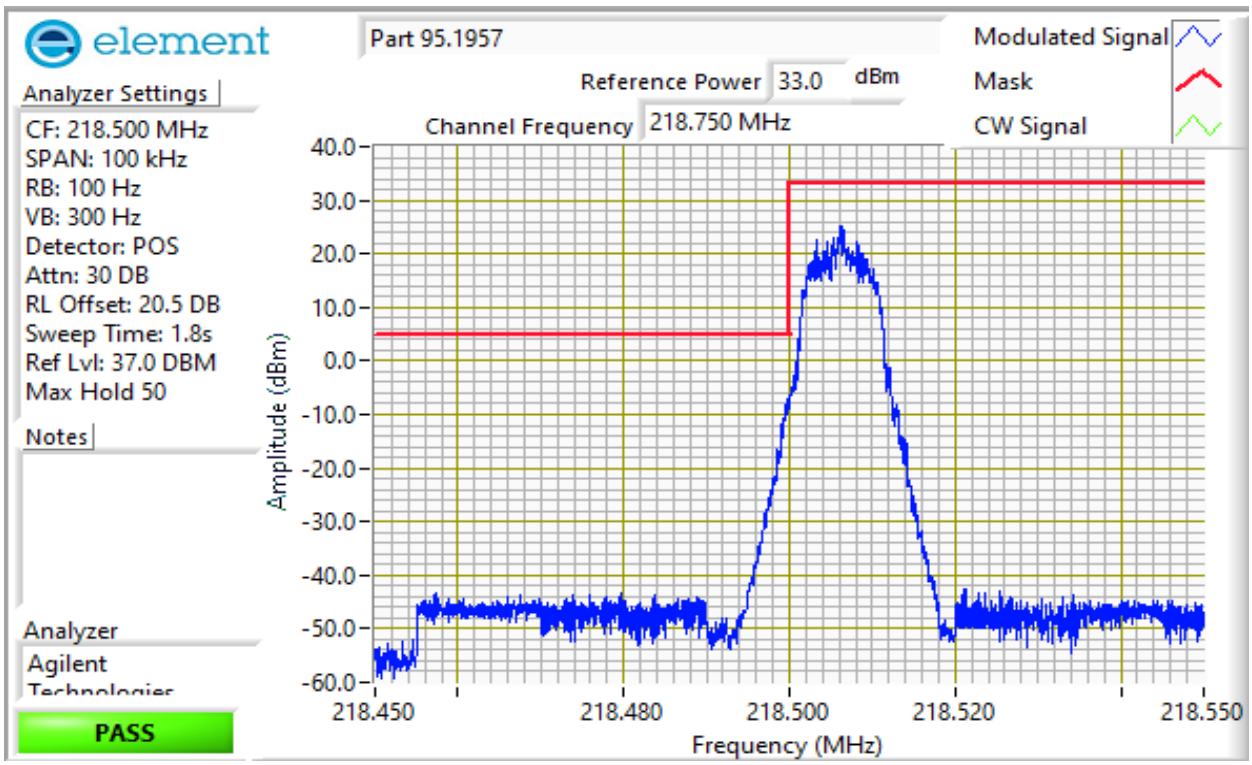
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



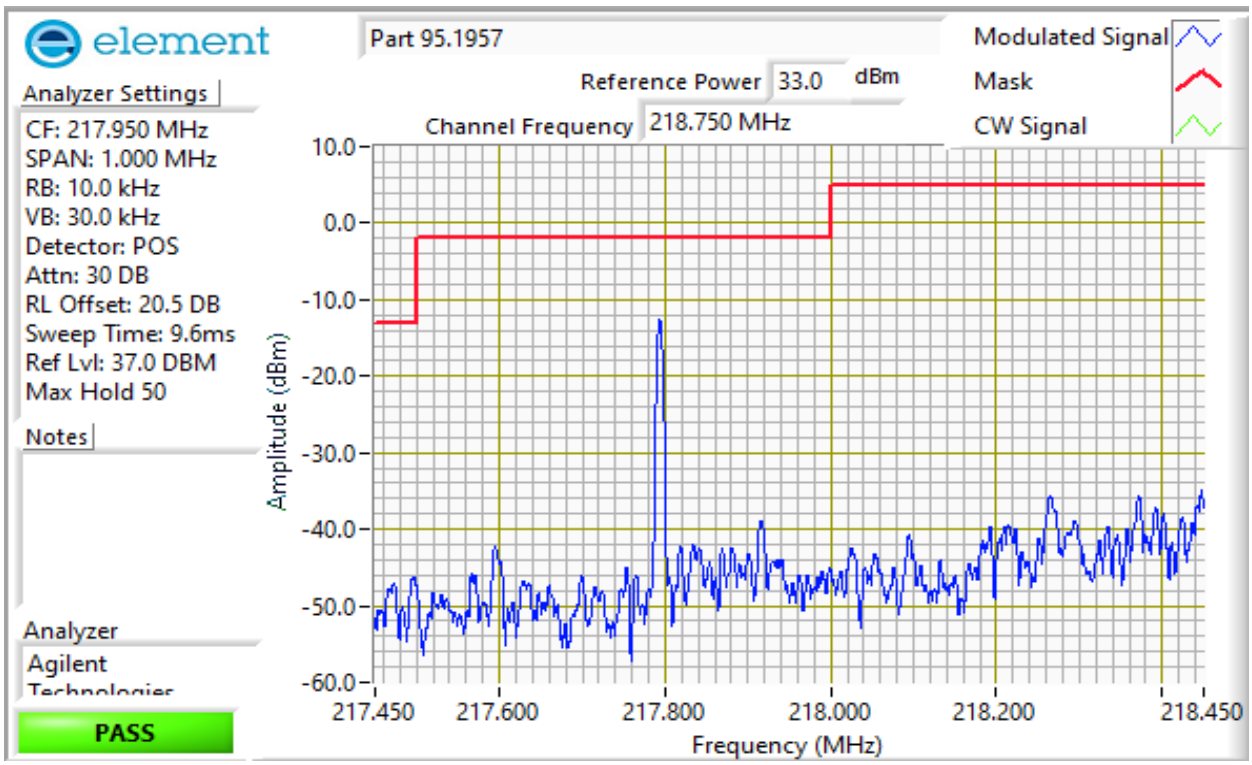
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



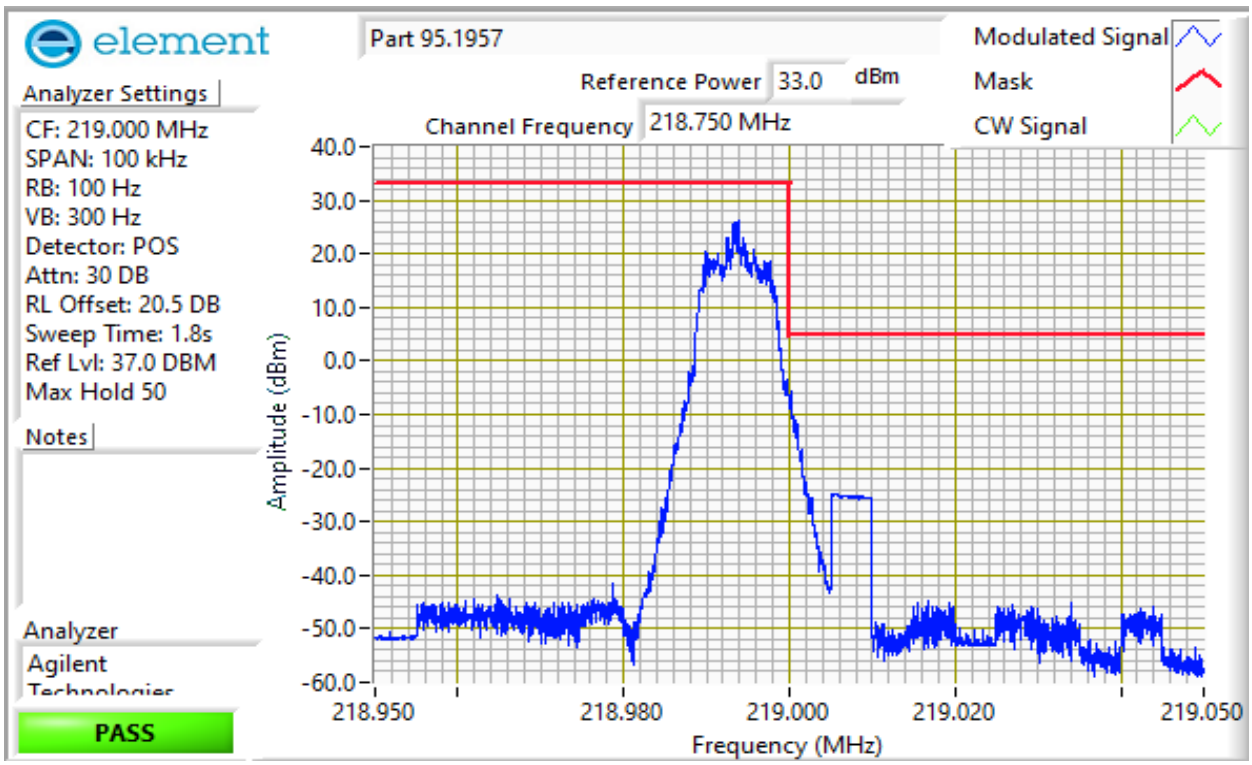
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



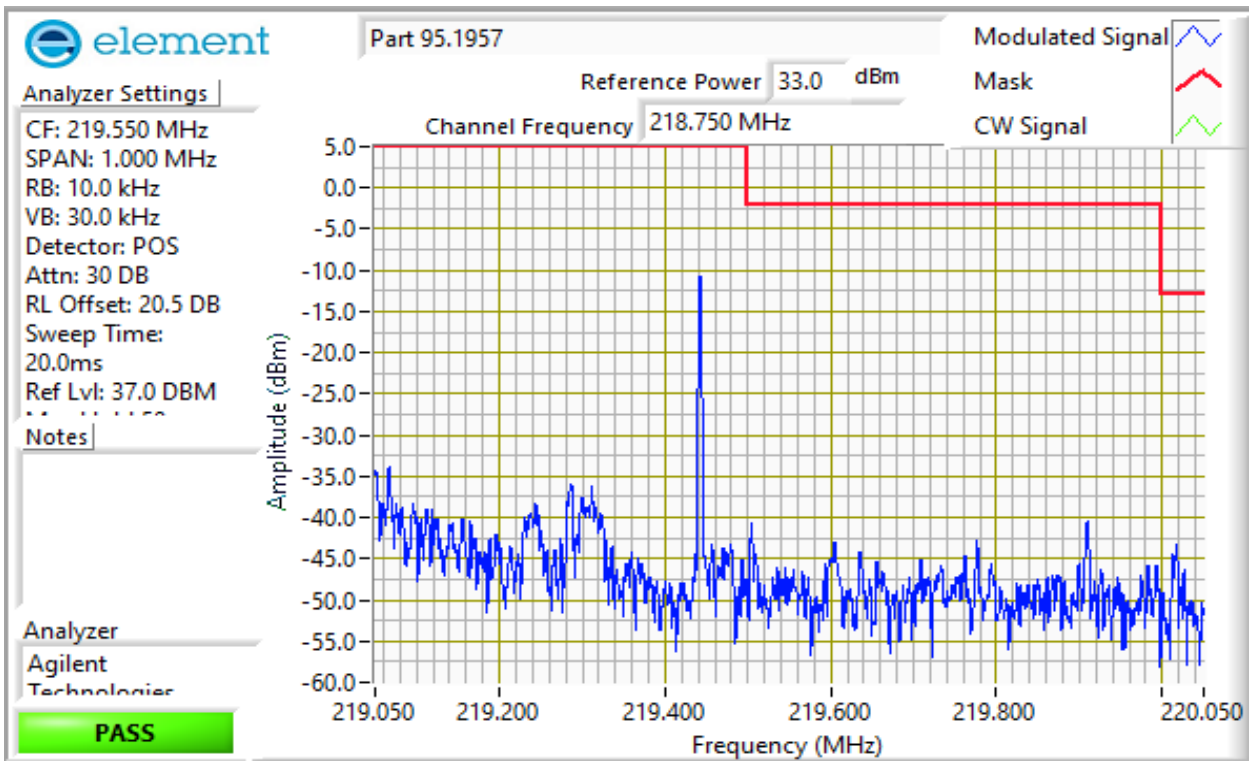
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



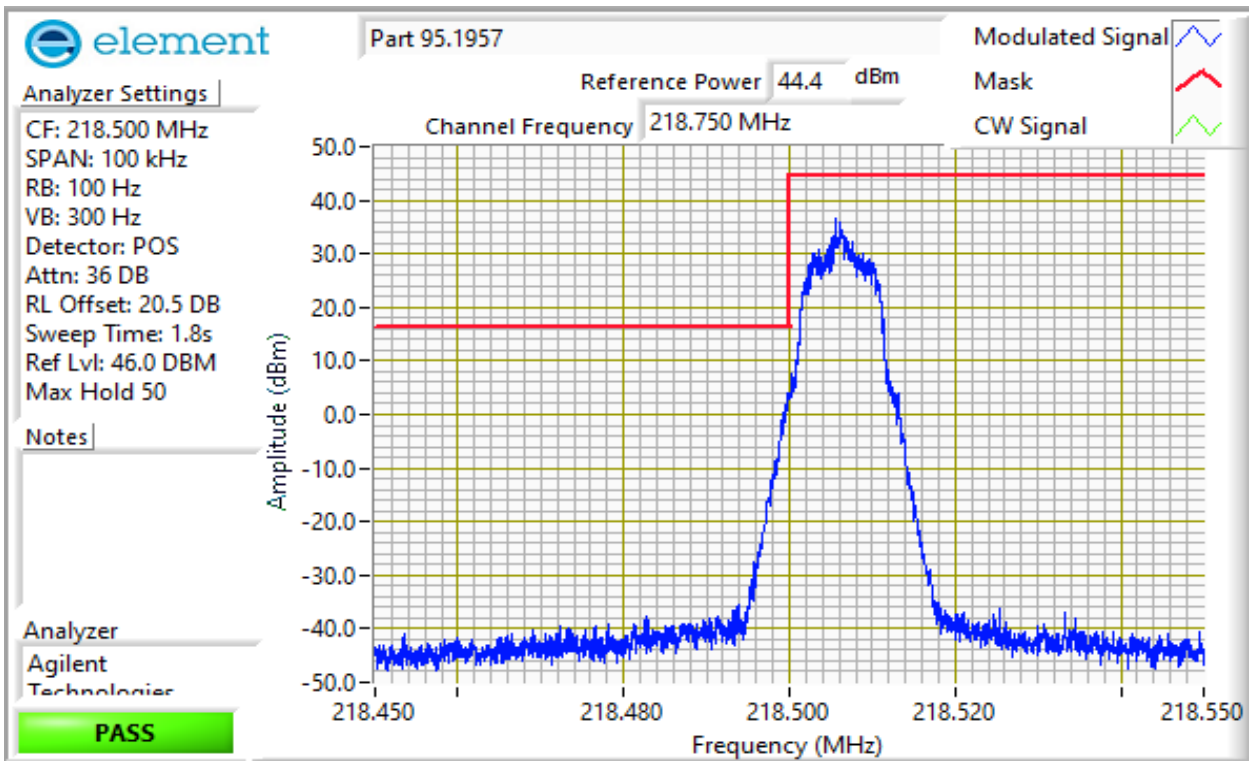
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



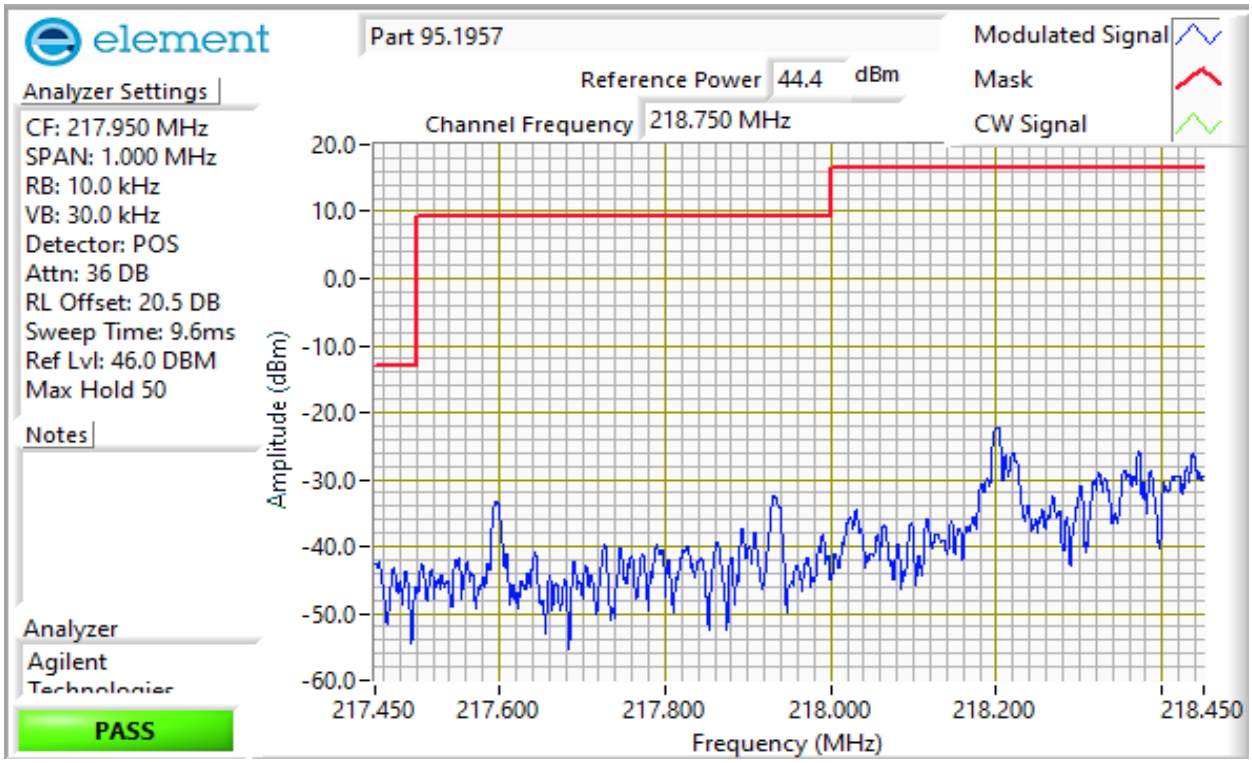
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



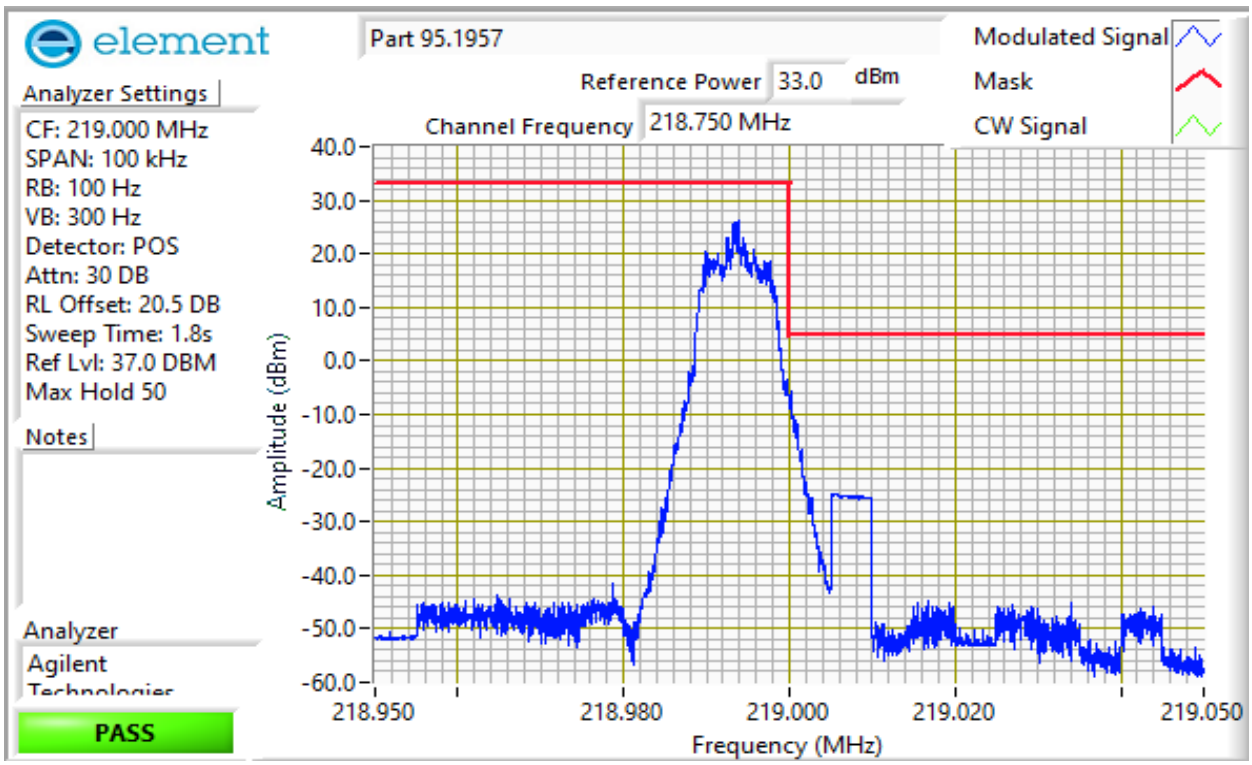
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



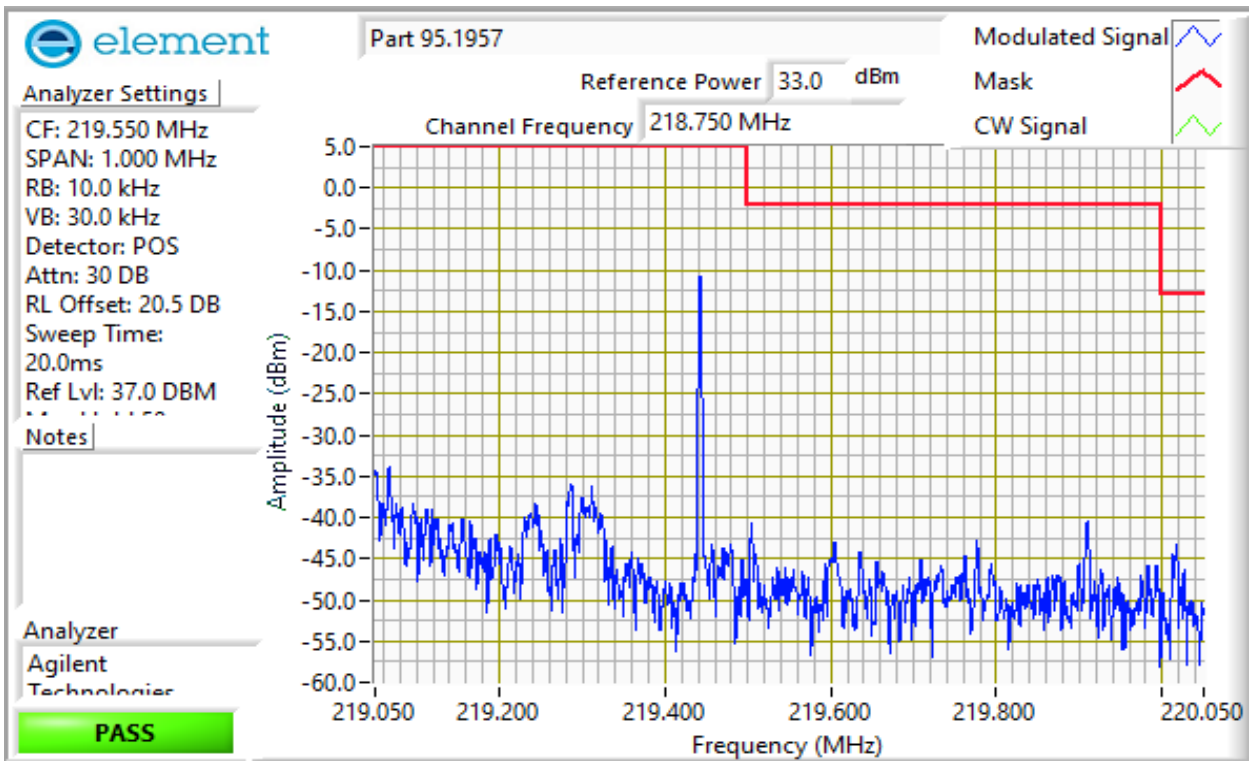
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



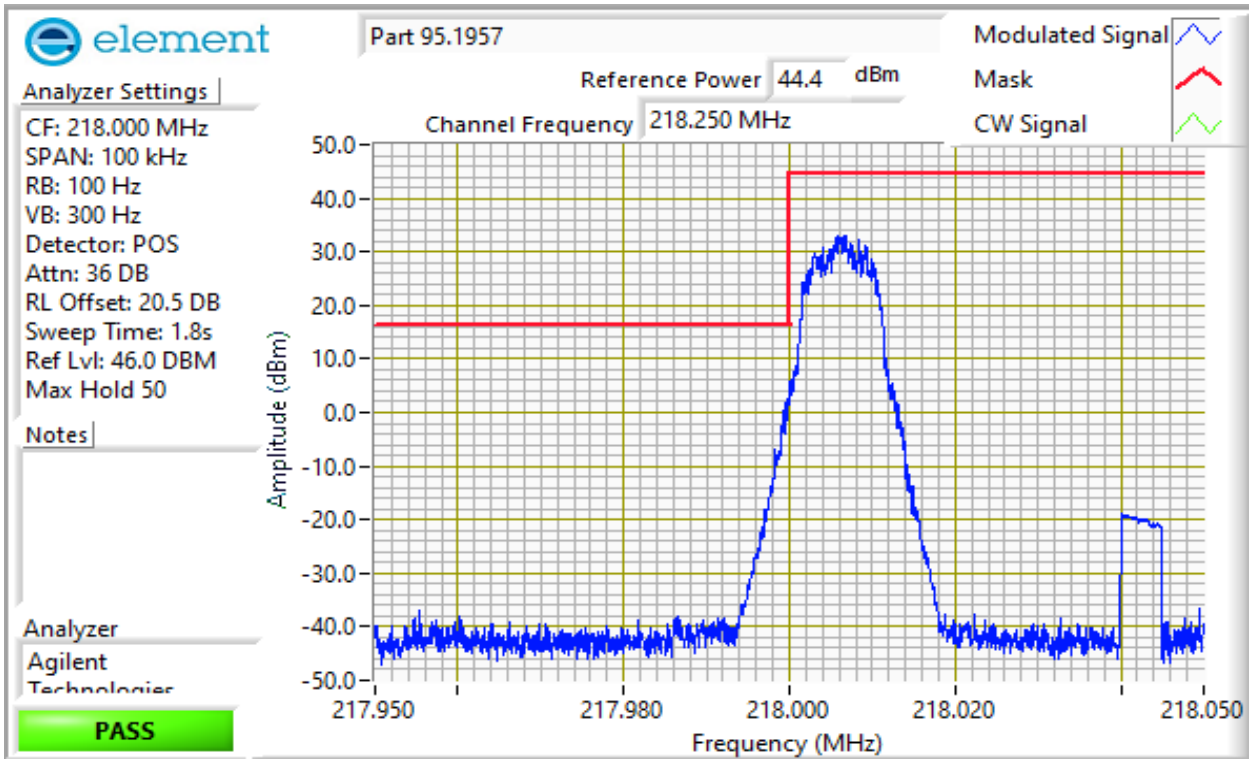
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



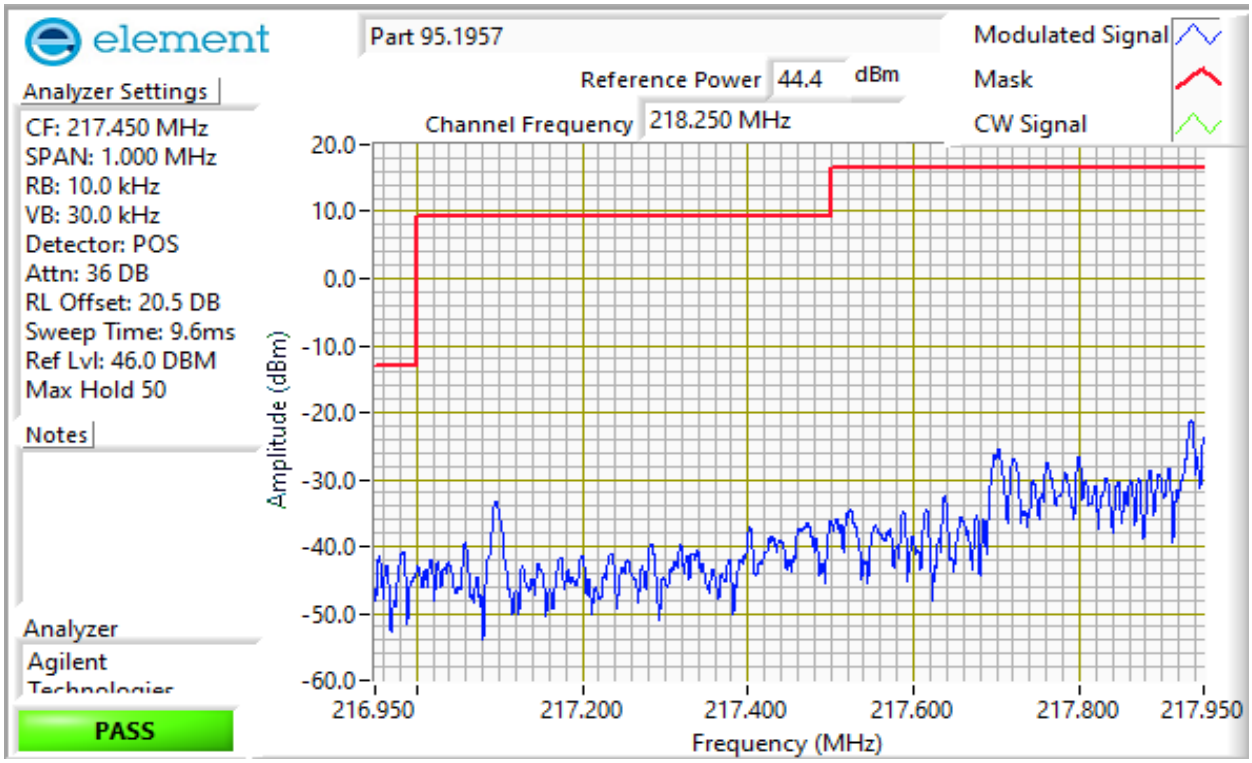
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



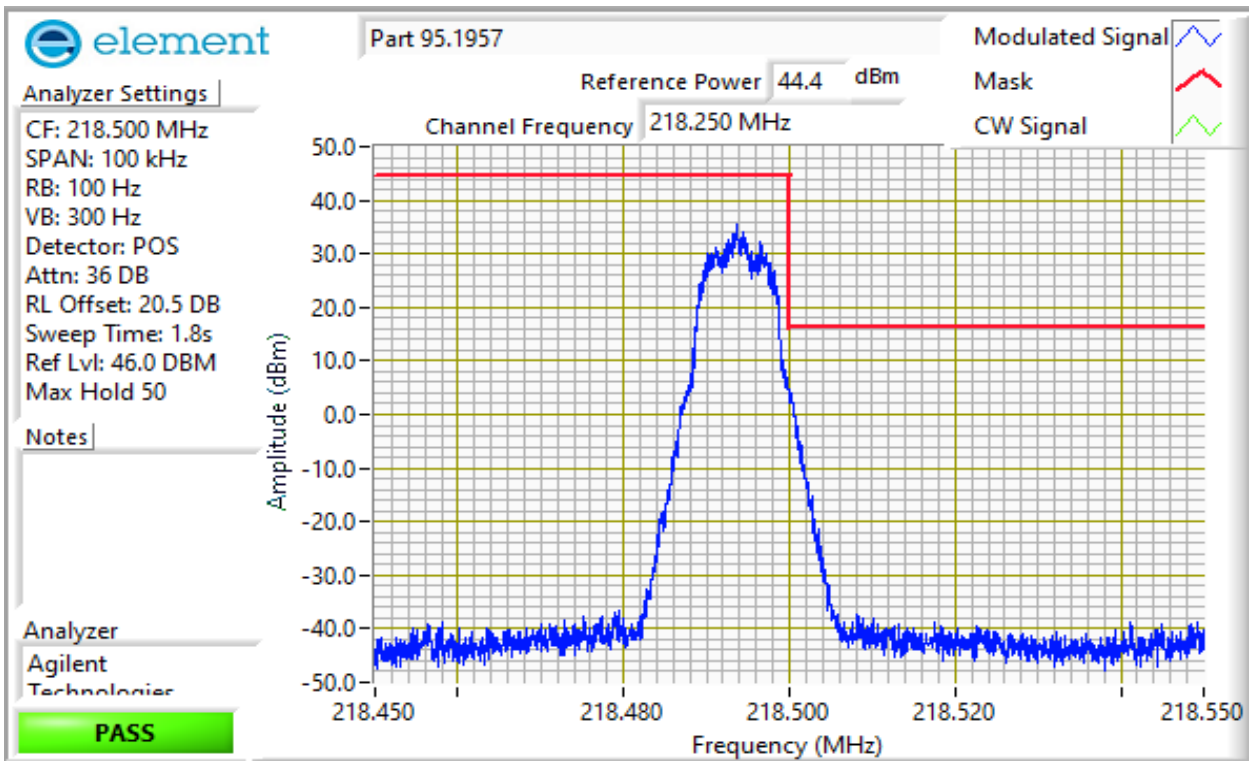
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



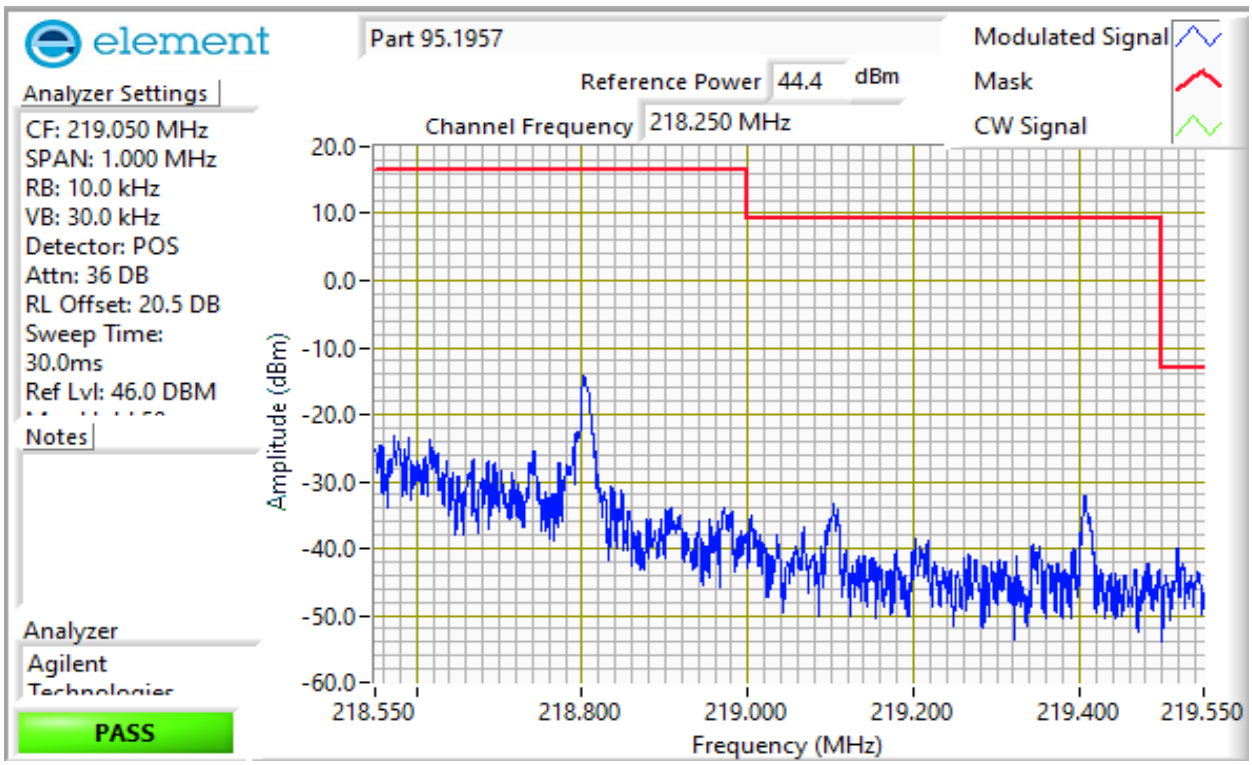
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



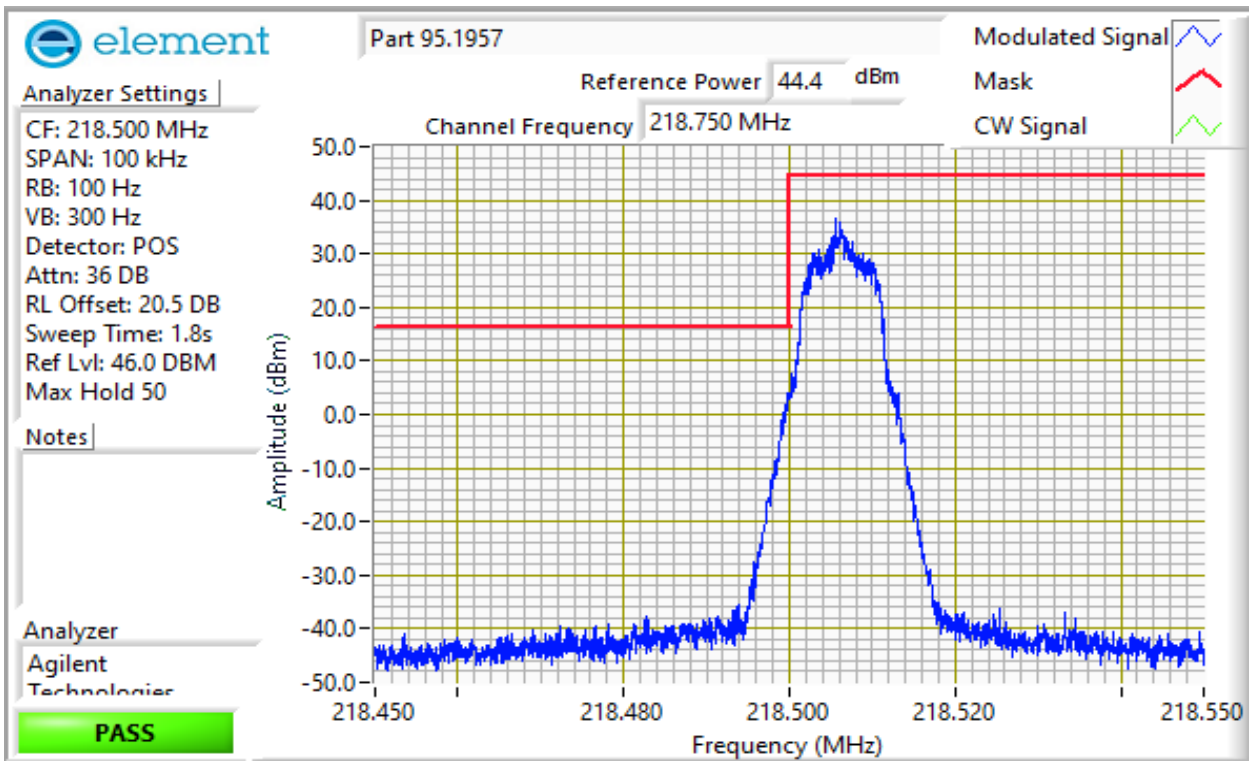
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



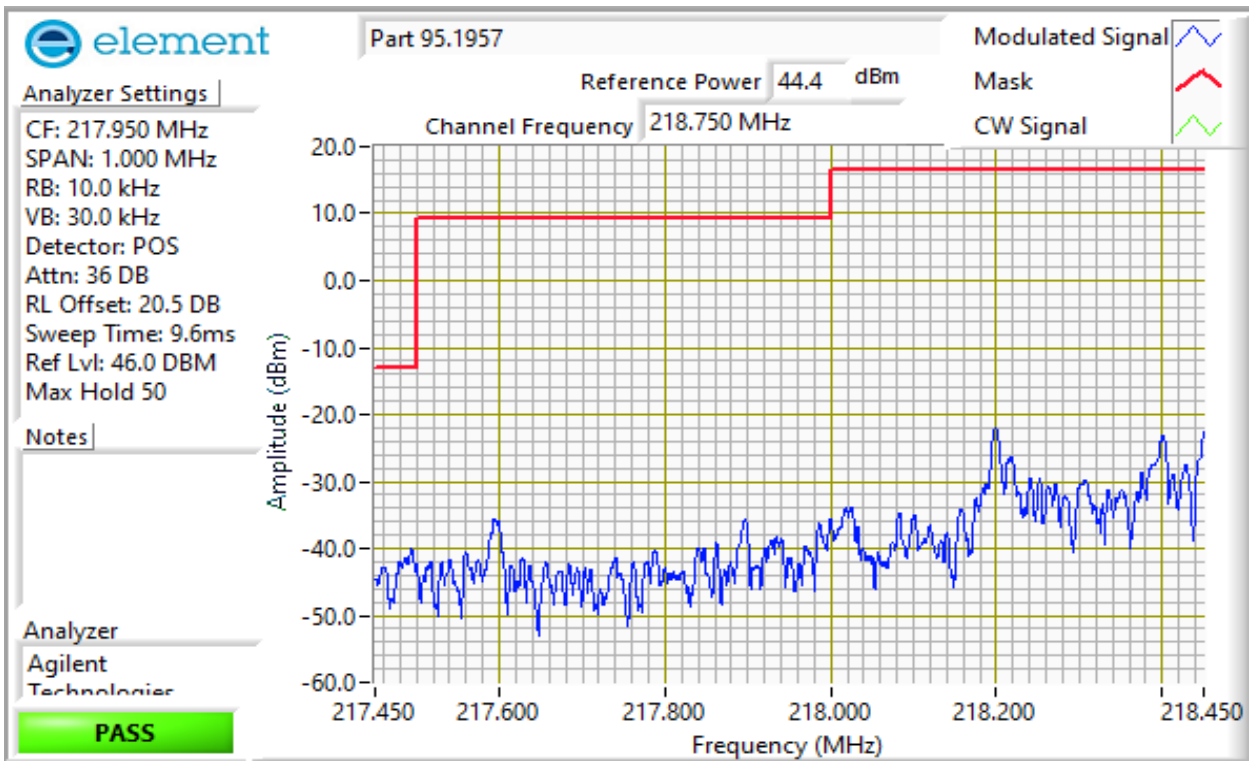
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



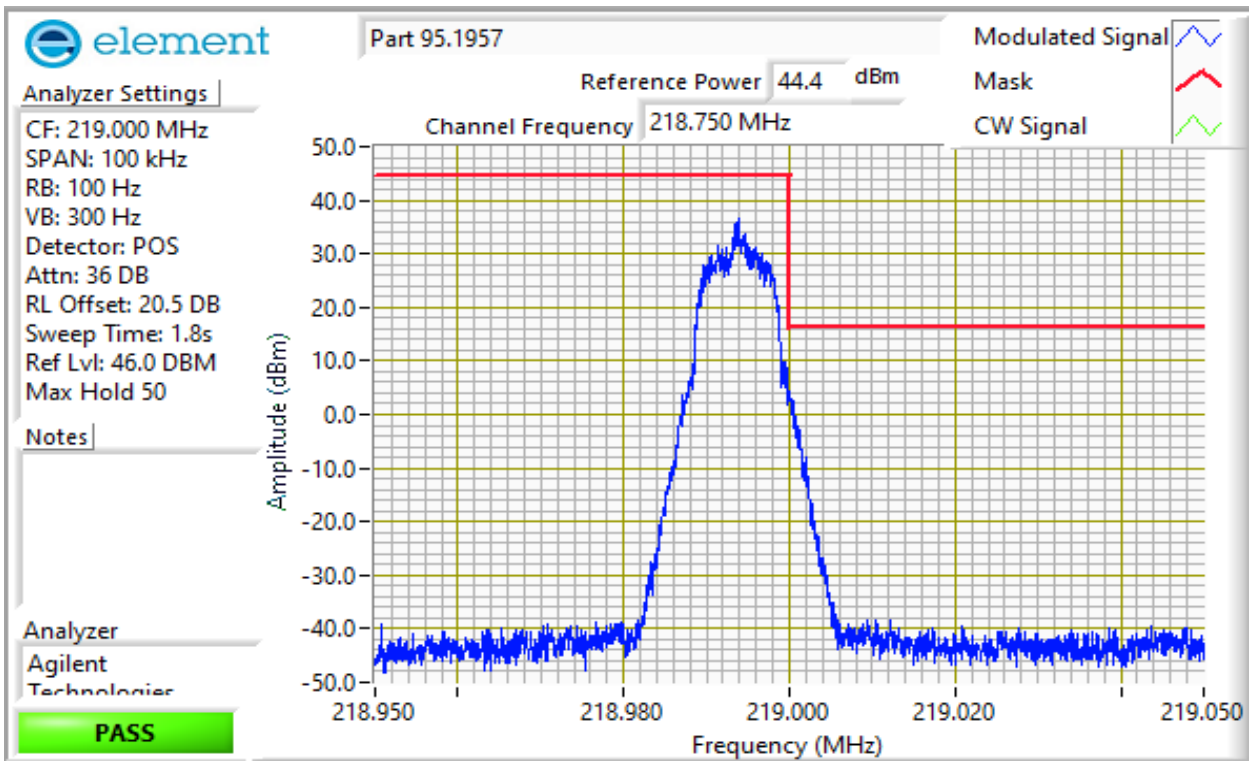
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



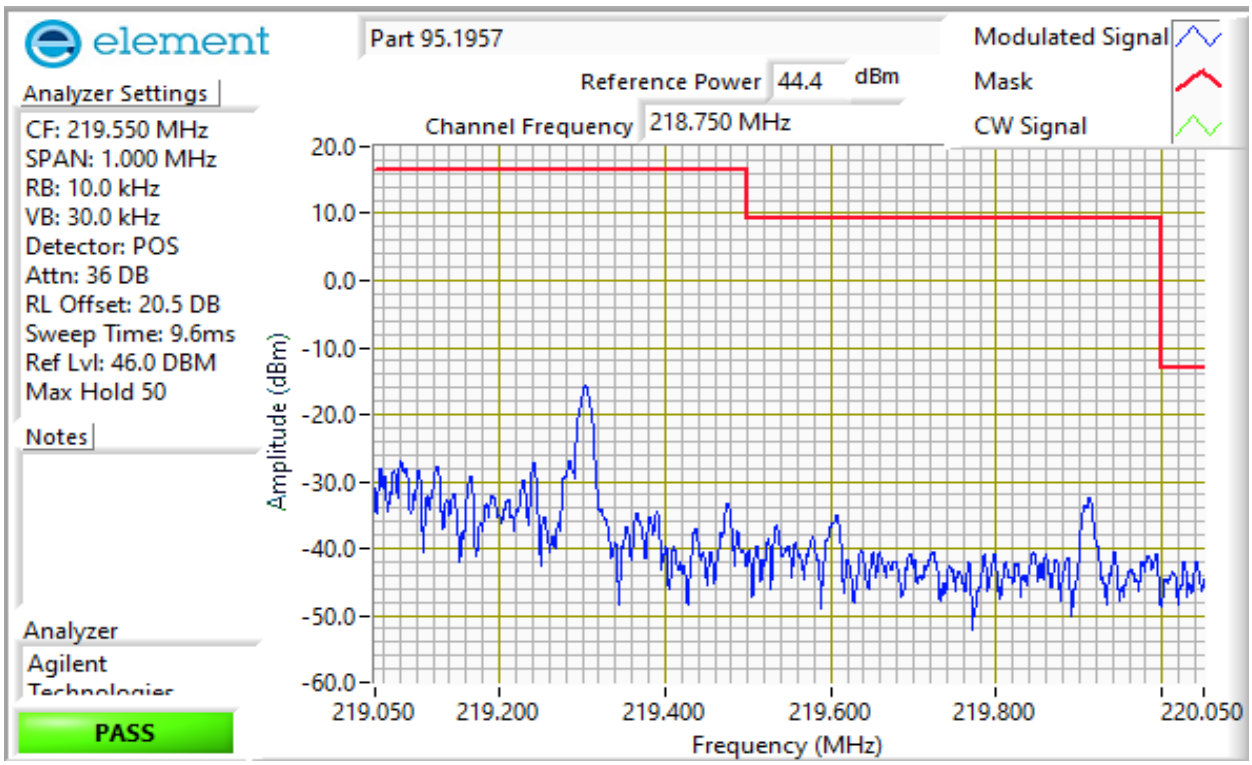
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

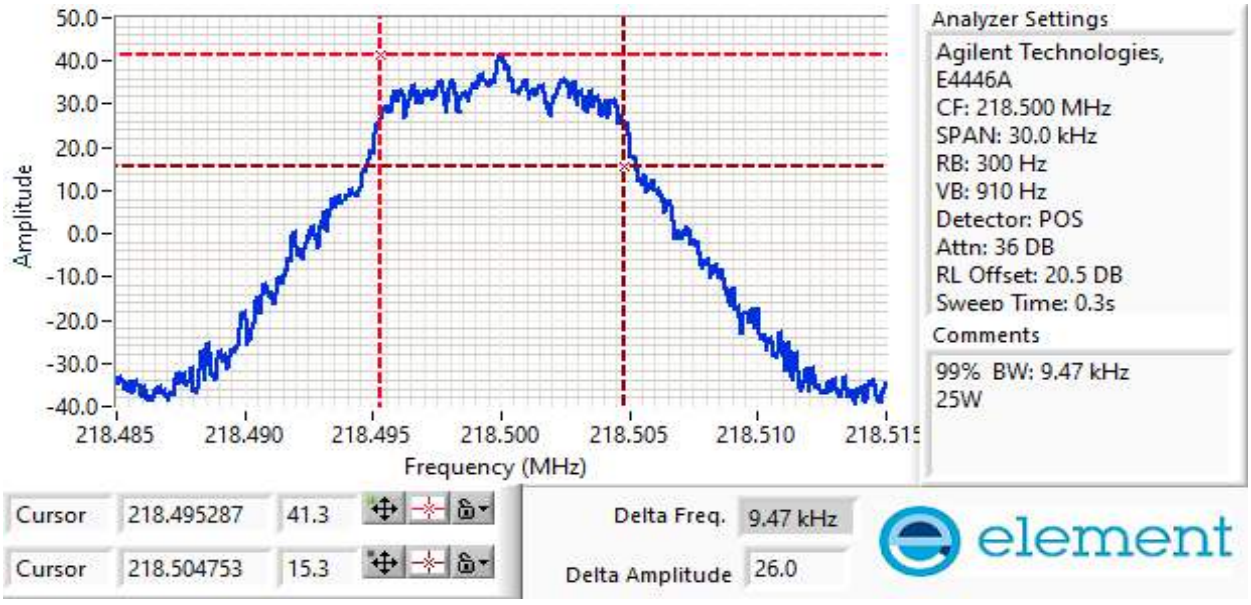
Run #3: Signal Bandwidth

Date of Test: 9-May
Test Engineer: M. Birgani
Test Location: Fremont EMC Lab #4

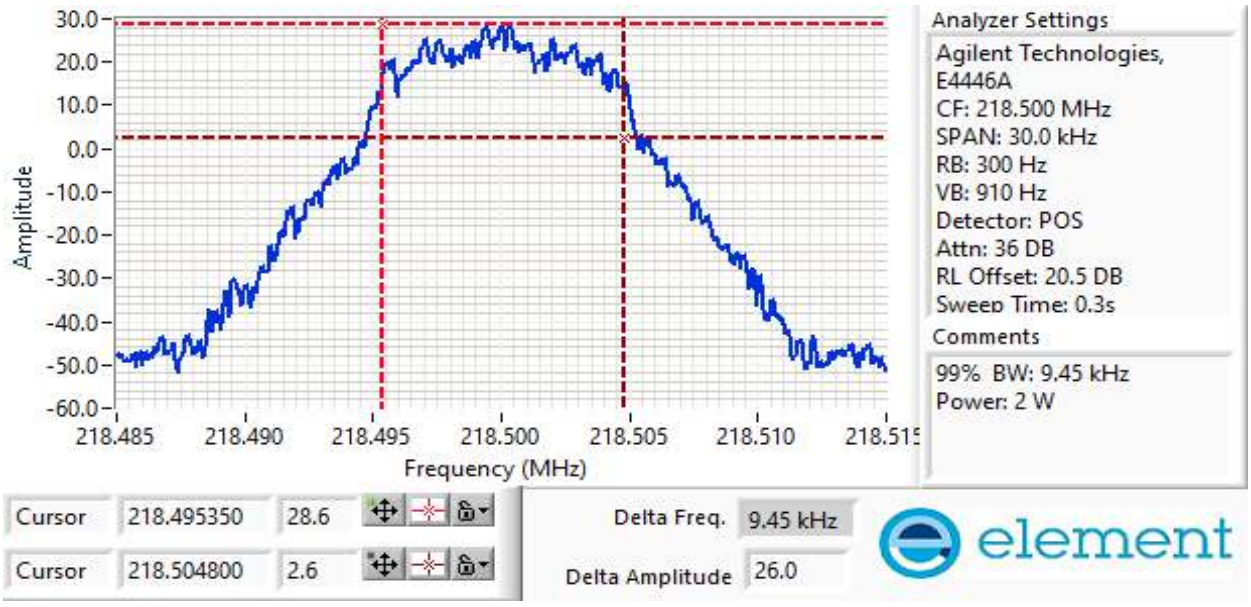
Config. Used: 1
Config Change: Replace Times cable with Pasternak PE356-24
EUT Voltage: 13.5VDC

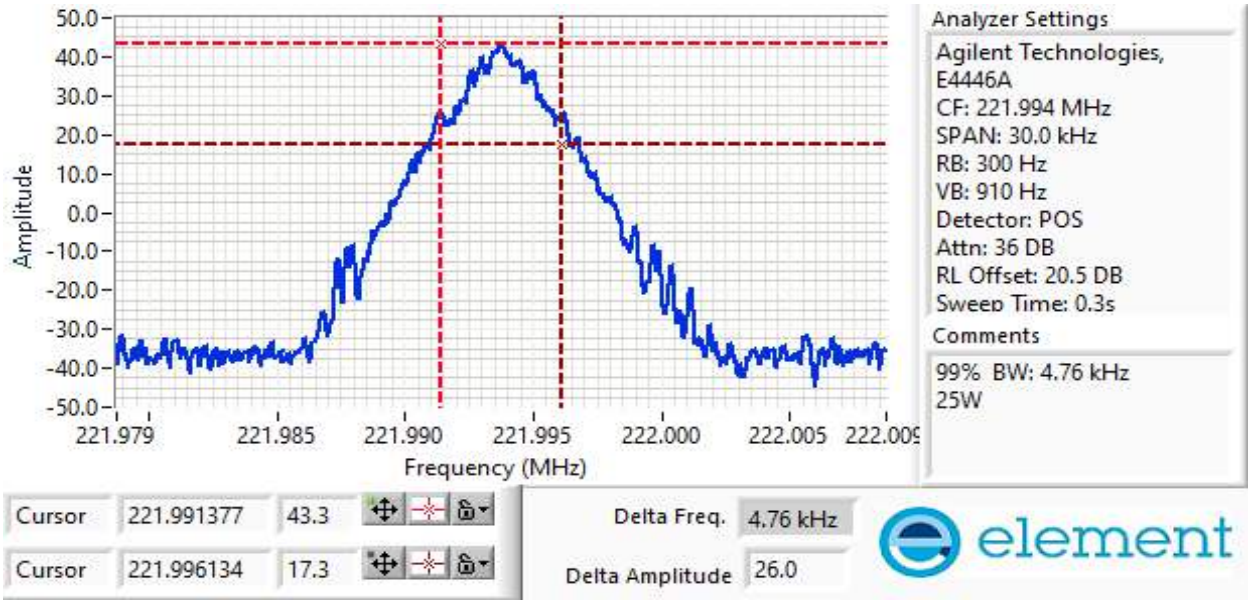
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)		
				99%	
High	218.5	300 Hz		9.42	Part 80 (216-220 MHz band)
Low	218.5	300Hz		9.45	Parts 90 (217-220 MHz band)
High	218.5	300Hz		9.42	Part 95
High	221.99375	200Hz		4.41	Part 90, (220-222 MHz band)

Note 1: 99% bandwidth measured in accordance with ANSI C63.26, with RB between 1% and 5% of the measured bandwidth and VB



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A





Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #4: Out of Band Spurious Emissions, Conducted

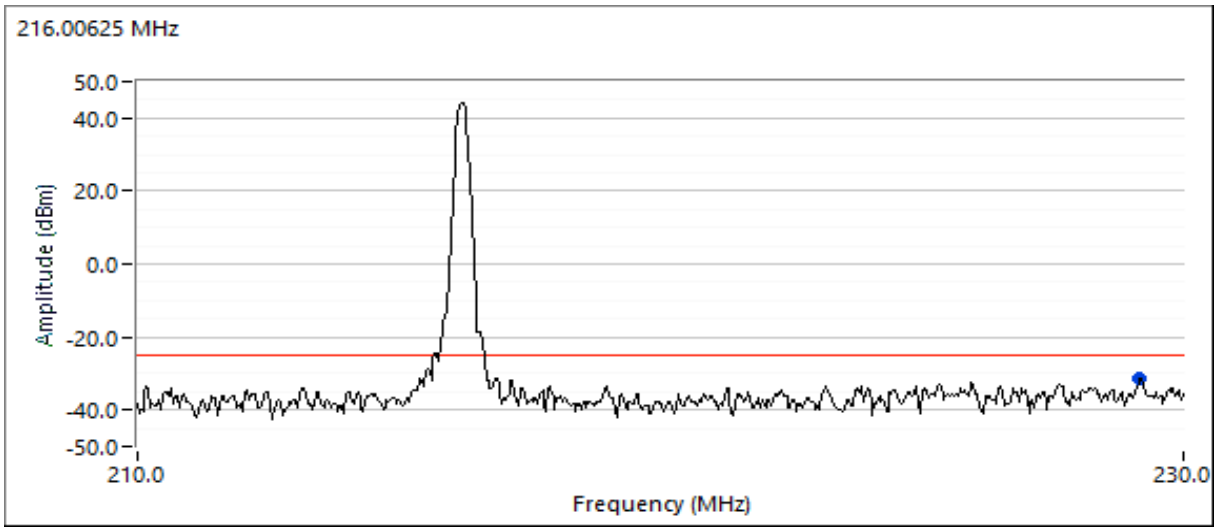
Date of Test: 5/9 & 5/12/2025
Test Engineer: M. Birgani & David Bare
Test Location: Fremont EMC Lab #4

Config. Used: 1
Config Change: Replace Times cable with Pasternak PE356-24
EUT Voltage: 13.5VDC

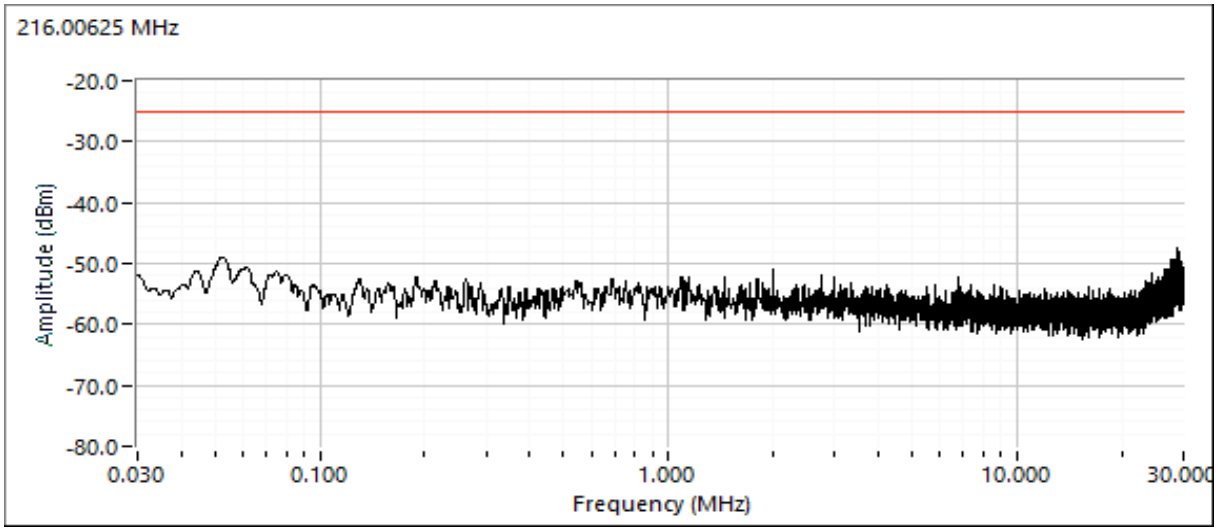
Frequency (MHz)	Limit	Result	
216.00625	-25	Pass	25W
217.00625	-25	Pass	2W
218.5	-25	Pass	25W
219.99375	-25	Pass	25W
221.99375	-25	Pass	25W

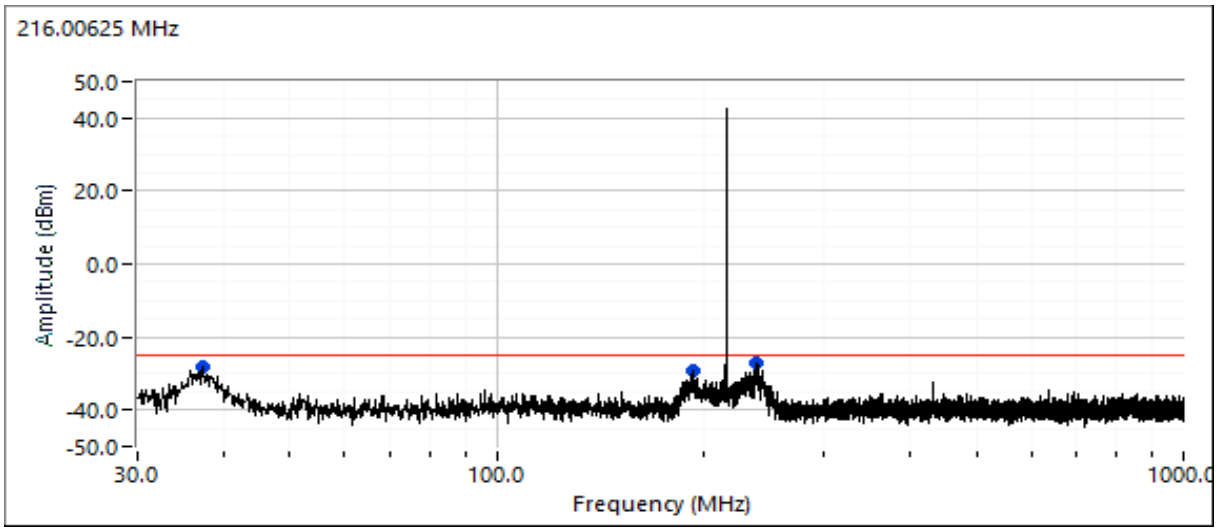
The limit is taken from FCC Part 90 Mask F.
Plots 20 MHz wide centered on the signal frequency also provided for each channel bandwidth/spacing.
Resolution BW = 100 kHz; Video BW = 300 kHz except for measurements below 30 MHz where RBW = 10 kHz and VBW = 30 kHz and above 1 GHz where RBW = 1 MHz. and VBW = 3 MHz.

Plots for 216.00625 MHz, power setting(s) = 25W (High)

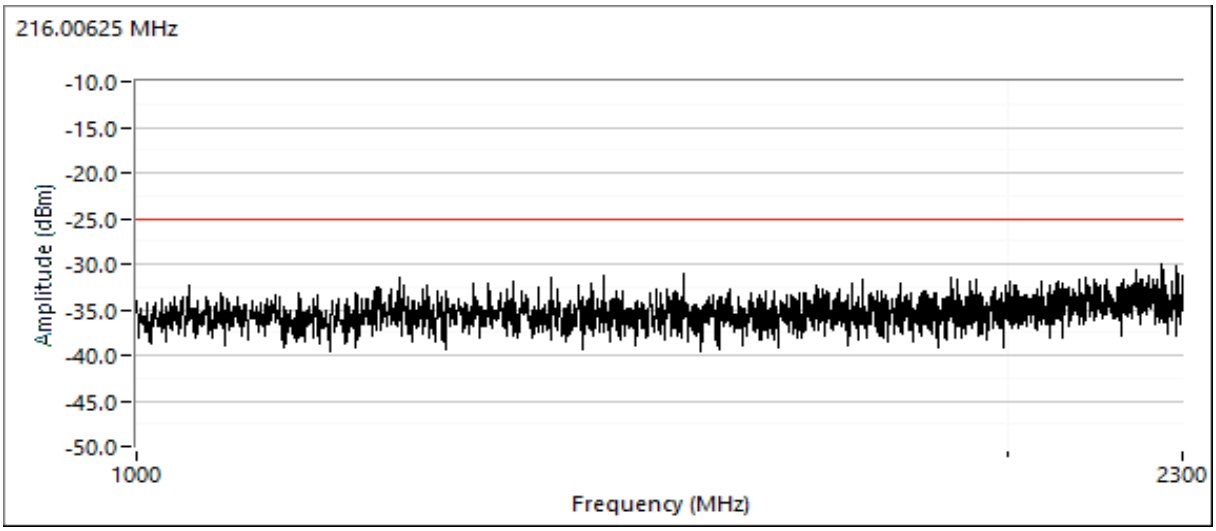


Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



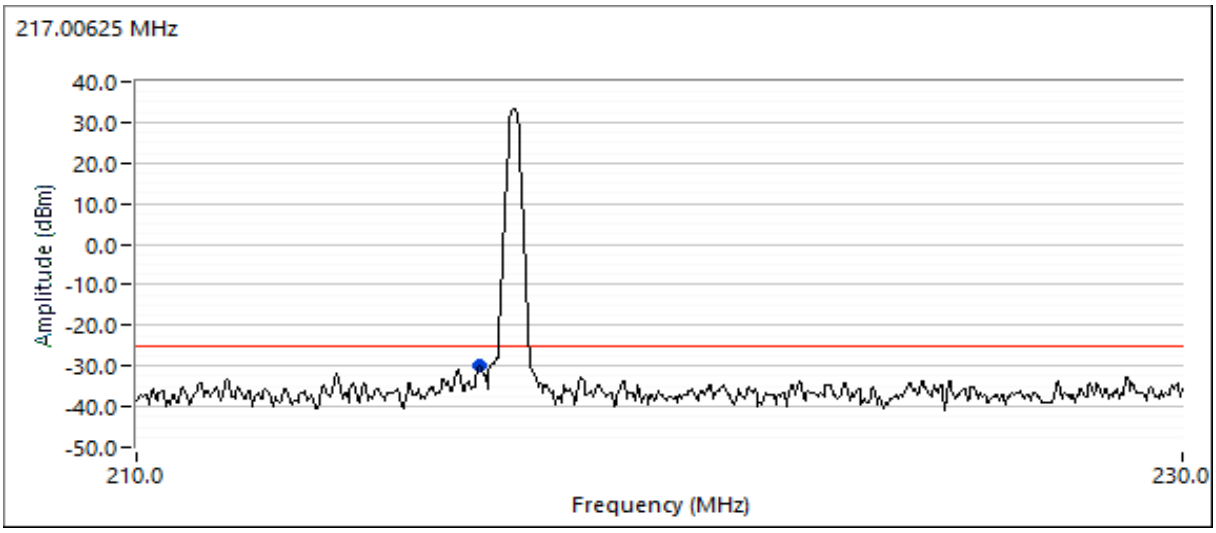


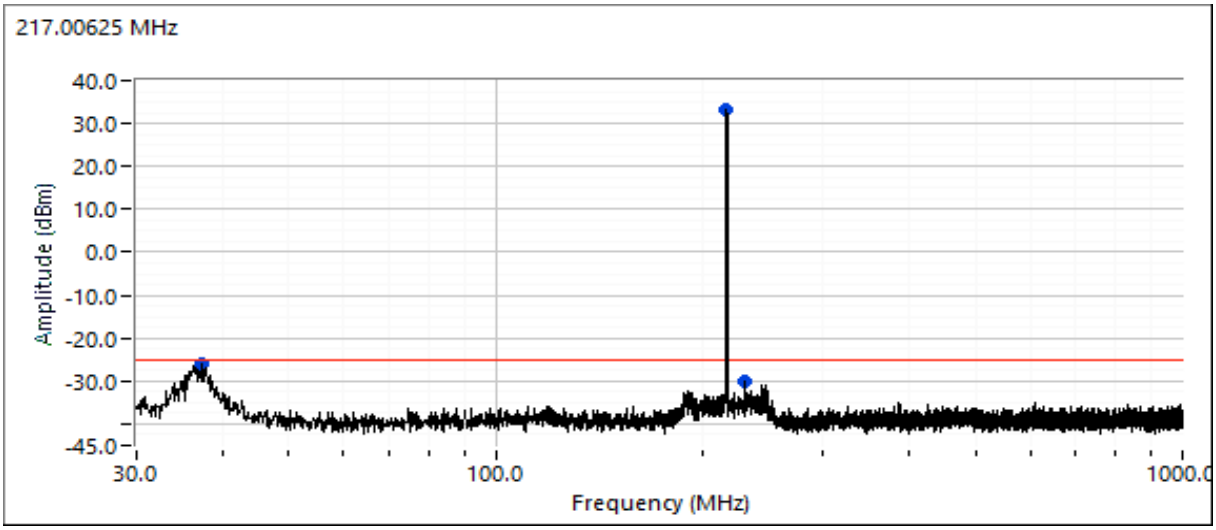
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A



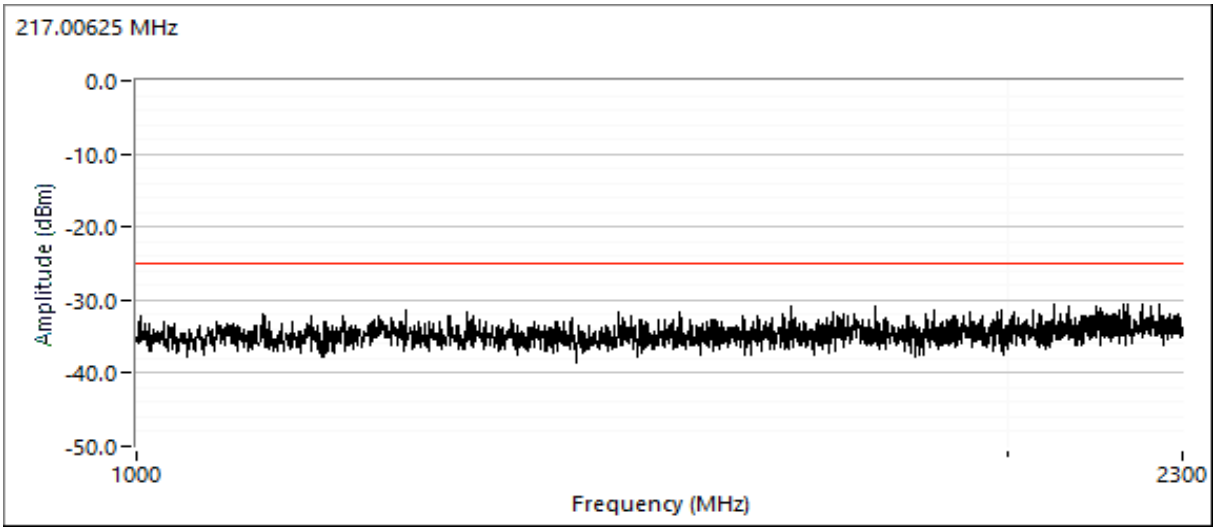
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

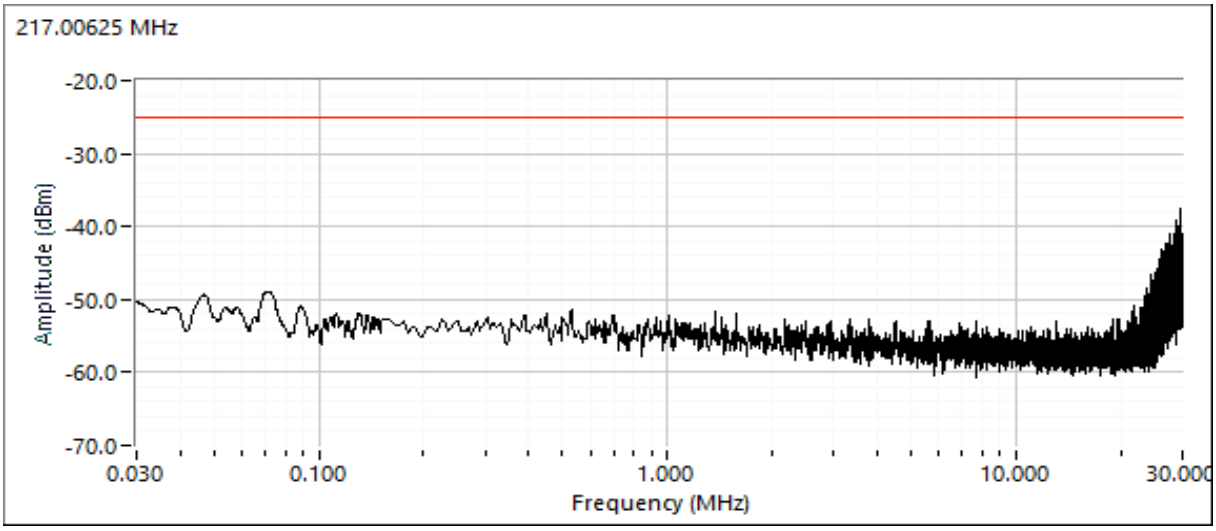
Plots for 217.00625 MHz, power setting(s) = 2W (Low)





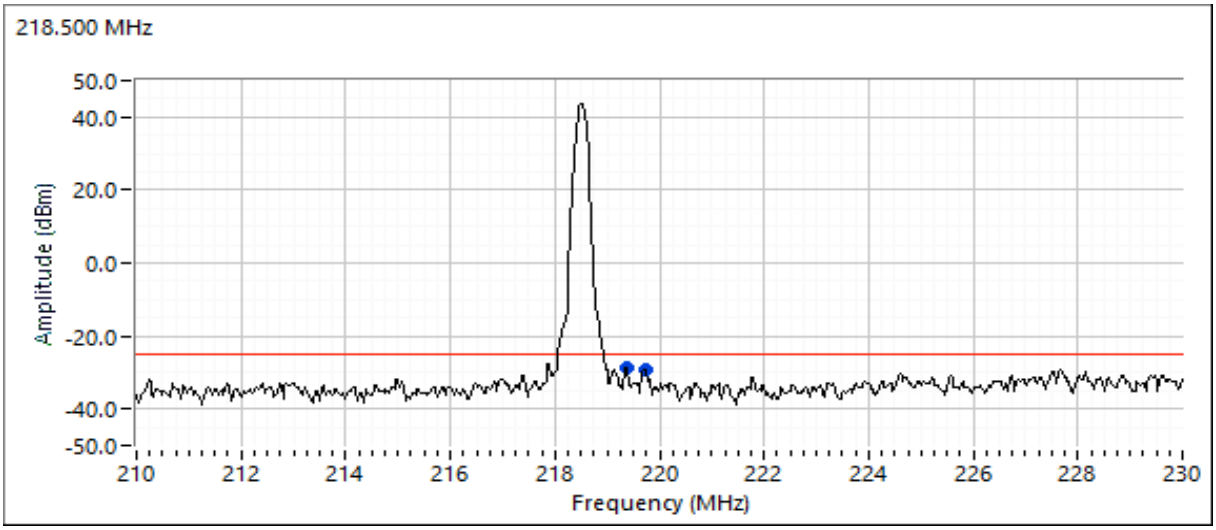
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

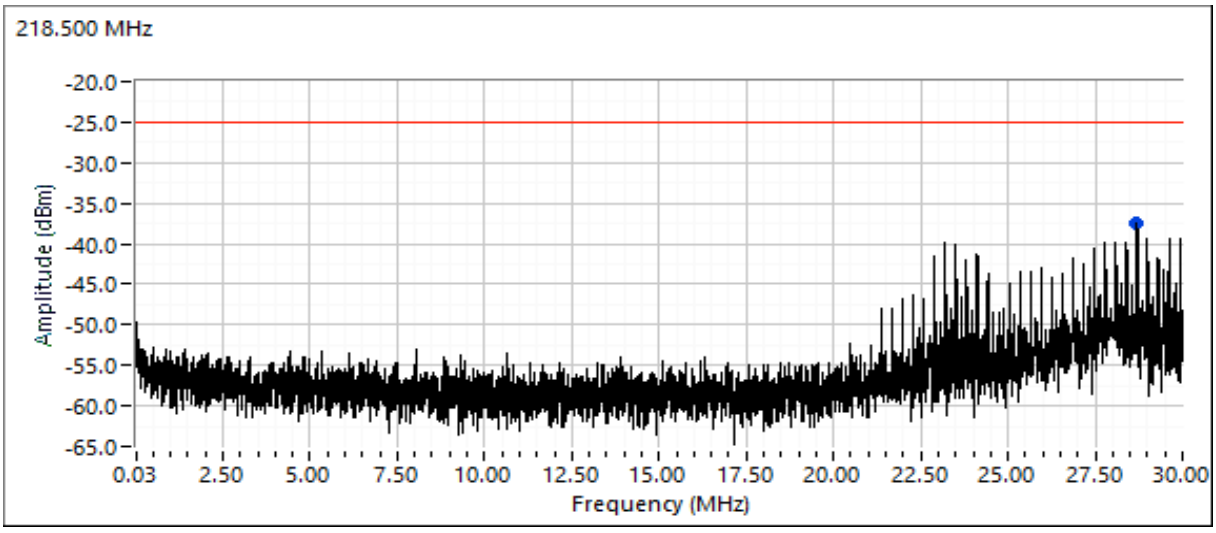




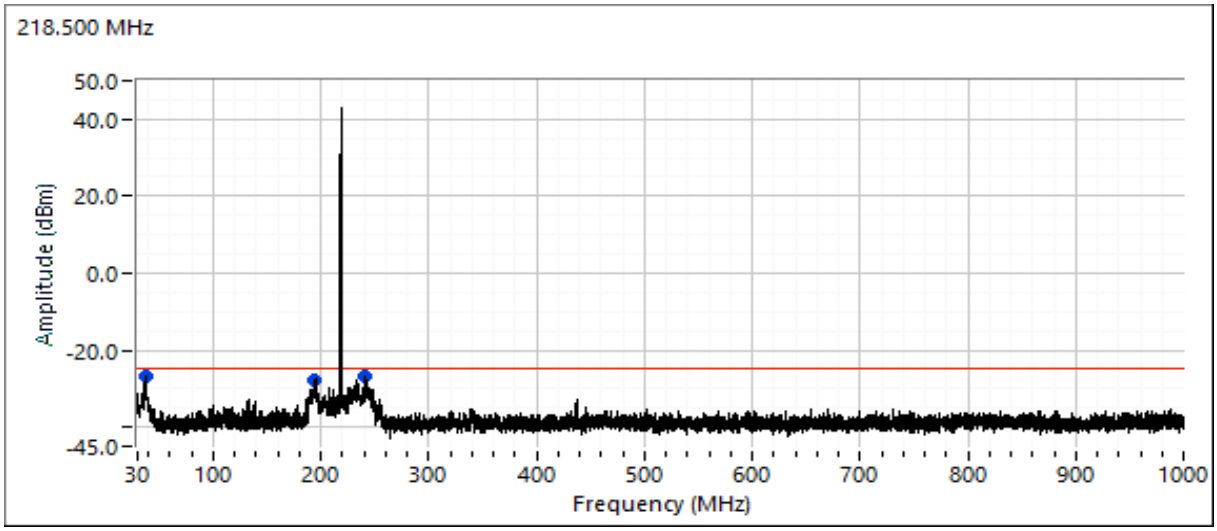
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

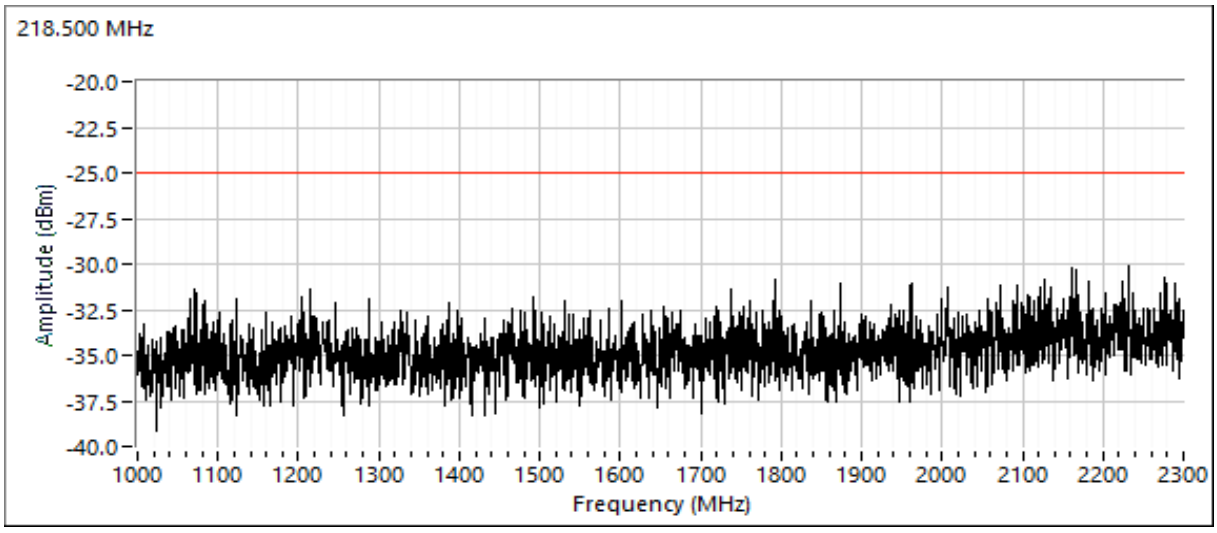
Plots for 218.5 MHz, power setting(s) = 25W (High)





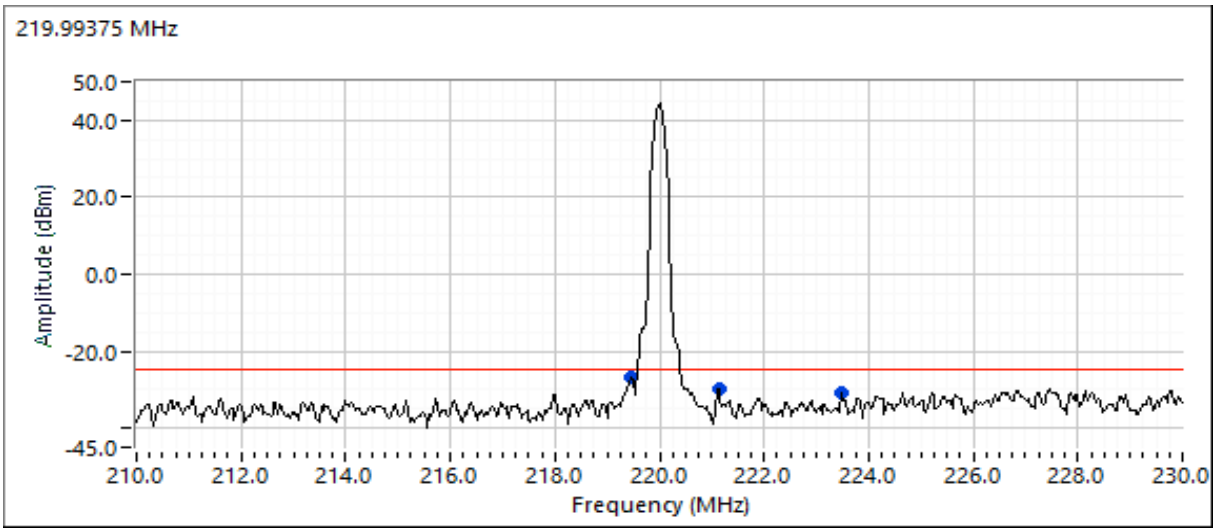
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

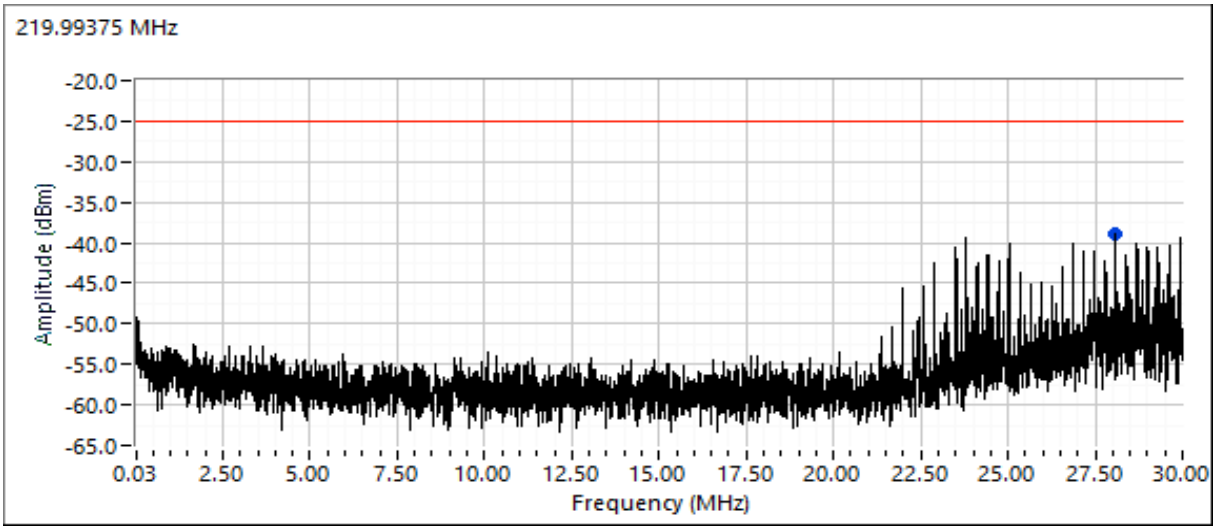




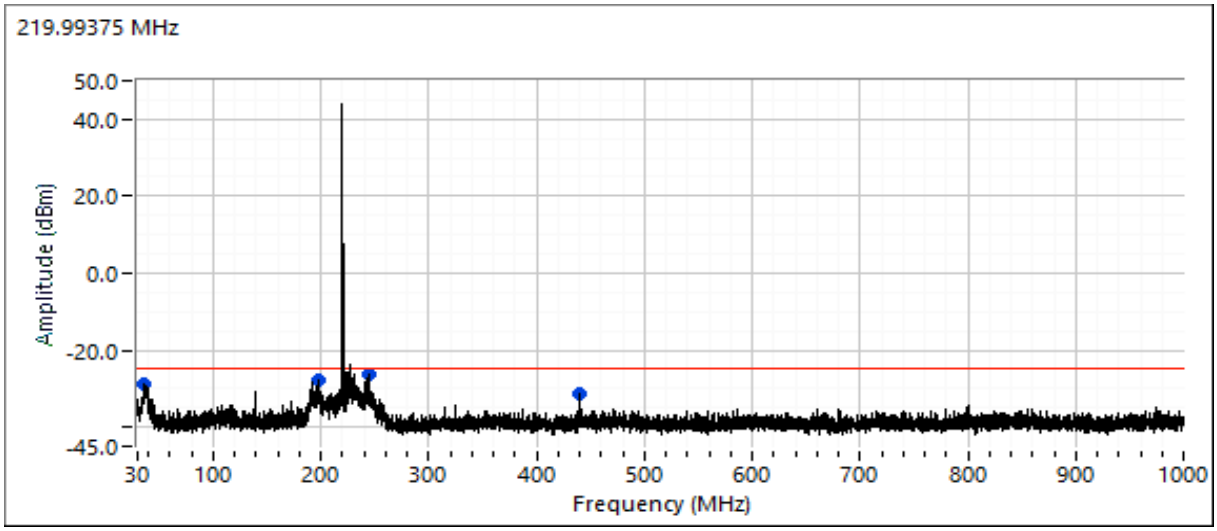
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

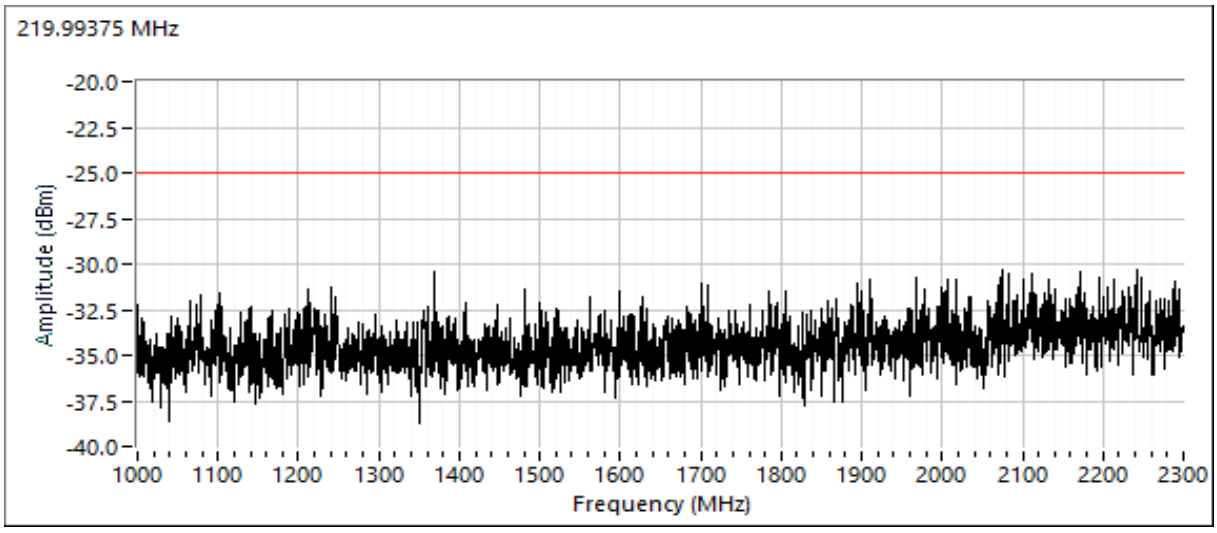
Plots for 219.99375 MHz, power setting(s) = 25W (High)





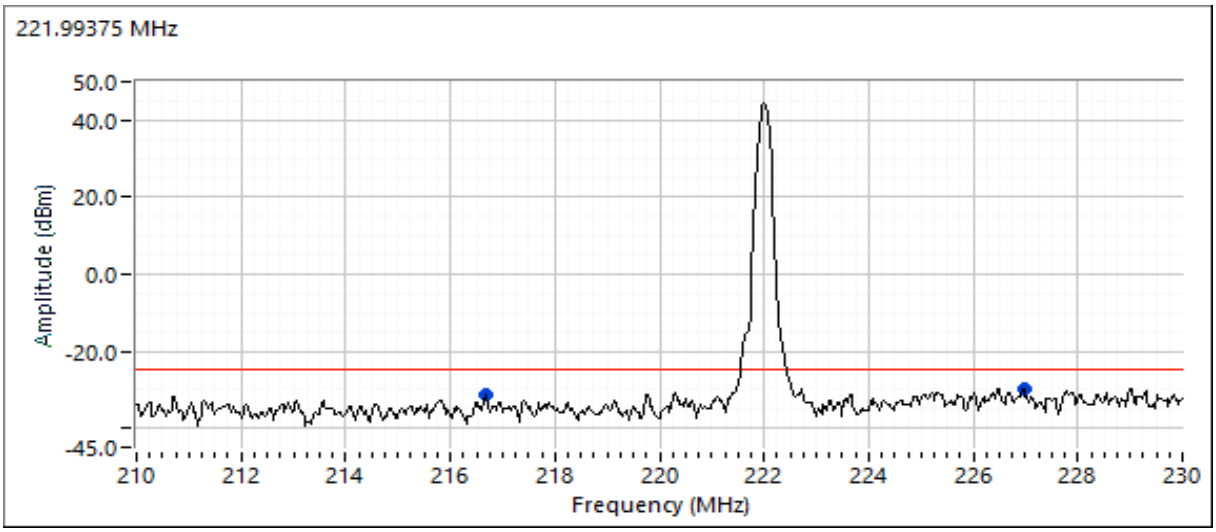
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

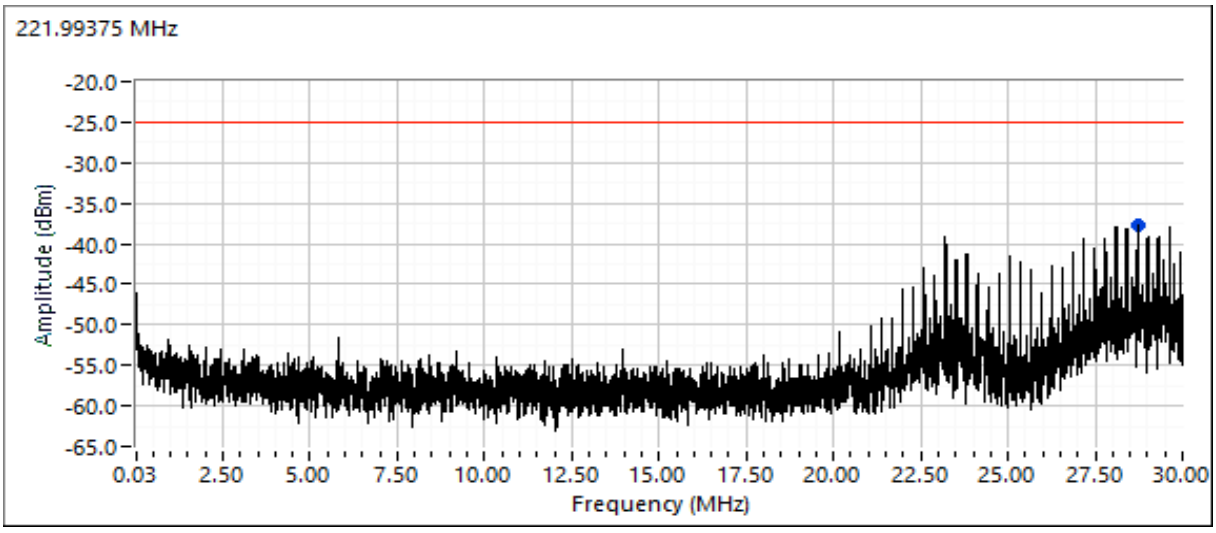




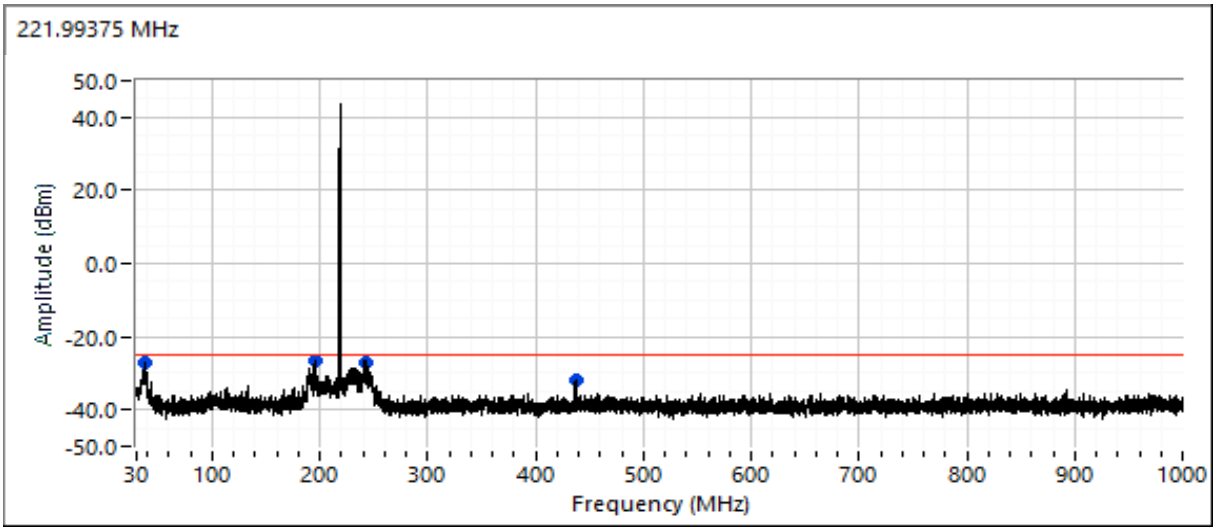
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

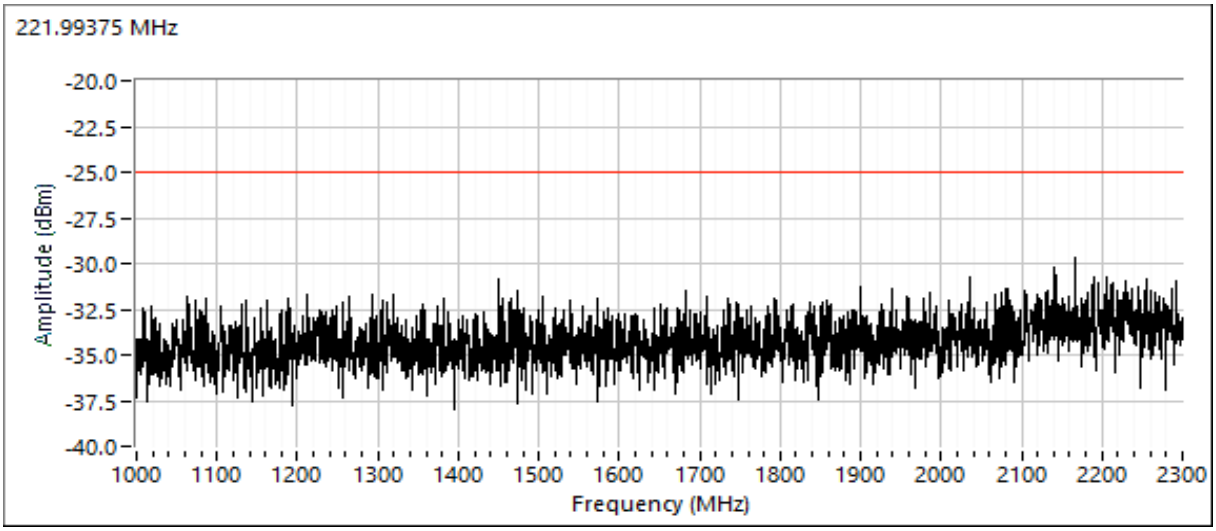
Plots for 221.99375 MHz, power setting(s) = 25W (High)





Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A





Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #4: Out of Band Spurious Emissions, Conducted

Frequency MHz	Level dBm	Port	Limit	Margin	Detector QP/AVG	Comments
37.342	-28.1	RF Port	-25.0	-3.1	Peak	216.00625 MHz
193.068	-29.4	RF Port	-25.0	-4.4	Peak	216.00625 MHz
229.133	-31.4	RF Port	-25.0	-6.4	Peak	216.00625 MHz
239.134	-27.0	RF Port	-25.0	-2.0	Peak	216.00625 MHz
37.224	-25.9	RF Port	-25.0	-0.9	Peak	217.00625 MHz
230.371	-30.3	RF Port	-25.0	-5.3	Peak	217.00625 MHz
28.695	-37.4	RF Port	-25.0	-12.4	Peak	218.5 MHz
36.869	-26.8	RF Port	-25.0	-1.8	Peak	218.5 MHz
194.371	-27.6	RF Port	-25.0	-2.6	Peak	218.5 MHz
219.367	-28.8	RF Port	-25.0	-3.8	Peak	218.5 MHz
219.733	-29.4	RF Port	-25.0	-4.4	Peak	218.5 MHz
241.740	-26.8	RF Port	-25.0	-1.8	Peak	218.5 MHz
28.095	-38.9	RF Port	-25.0	-13.9	Peak	219.99375 MHz
36.040	-28.6	RF Port	-25.0	-3.6	Peak	219.99375 MHz
197.094	-27.7	RF Port	-25.0	-2.7	Peak	219.99375 MHz
219.467	-26.8	RF Port	-25.0	-1.8	Peak	219.99375 MHz
221.133	-29.6	RF Port	-25.0	-4.6	Peak	219.99375 MHz
223.500	-30.9	RF Port	-25.0	-5.9	Peak	219.99375 MHz
243.871	-26.2	RF Port	-25.0	-1.2	Peak	219.99375 MHz
439.979	-31.4	RF Port	-25.0	-6.4	Peak	219.99375 MHz
28.710	-37.6	RF Port	-25.0	-12.6	Peak	221.99375 MHz
37.461	-27.0	RF Port	-25.0	-2.0	Peak	221.99375 MHz
195.318	-26.8	RF Port	-25.0	-1.8	Peak	221.99375 MHz
242.332	-26.9	RF Port	-25.0	-1.9	Peak	221.99375 MHz
437.019	-32.0	RF Port	-25.0	-7.0	Peak	221.99375 MHz

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #5: Out of Band Spurious Emissions, Radiated

Conducted limit (dBm): -25
Approximate field strength limit @ 3m: 70.2

The limit is taken from FCC Part 90 Mask F (worst case for Parts 80, 90 and 95)

Date of Test: 5/8/2025
Test Engineer: David Bare, M. Birgani
Test Location: Fremont EMC Chamber #3

Config. Used: 1
Config Change: None
EUT Voltage: 13.5VDC

Run #5a: Final Field Strength Measurements (Part 80)

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		Frequency (MHz)
30.922	52.0	V	70.2	-18.2	PK	121	1.0	PK (0.10s)	216.00625
432.014	52.9	V	70.2	-17.3	PK	1	1.0	PK (0.10s)	216.00625
39.502	49.3	V	70.2	-20.9	PK	300	1.0	PK (0.10s)	216.00625
252.539	59.0	H	70.2	-11.2	PK	279	1.9	PK (0.10s)	216.00625
301.934	55.4	H	70.2	-14.8	PK	77	1.0	PK (0.10s)	216.00625
320.332	59.1	H	70.2	-11.1	PK	104	1.0	PK (0.10s)	216.00625
30.625	57.0	V	70.2	-13.2	PK	34	1.0	PK (0.10s)	219.99375
439.984	61.6	V	70.2	-8.6	PK	102	1.5	PK (0.10s)	219.99375
659.979	52.2	H	70.2	-18.0	PK	229	1.5	PK (0.10s)	219.99375

Run #5b: Final Field Strength Measurements (Part 90)

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		Frequency (MHz)
34.593	52.9	V	70.2	-17.3	PK	211	1.0	PK (0.10s)	217.00625
260.490	57.2	H	70.2	-13.0	PK	172	1.5	PK (0.10s)	217.00625
349.970	62.8	H	70.2	-7.4	PK	2	1.0	PK (0.10s)	217.00625
434.015	37.8	V	70.2	-32.4	PK	309	1.0	PK (0.10s)	217.00625
30.575	54.1	V	70.2	-16.1	PK	94	1.0	PK (0.10s)	221.99375
252.544	53.1	H	70.2	-17.1	PK	106	1.5	PK (0.10s)	221.99375
443.990	62.2	V	70.2	-8.0	PK	152	3.0	PK (0.10s)	221.99375

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #5c: Final Field Strength Measurements (Part 95)

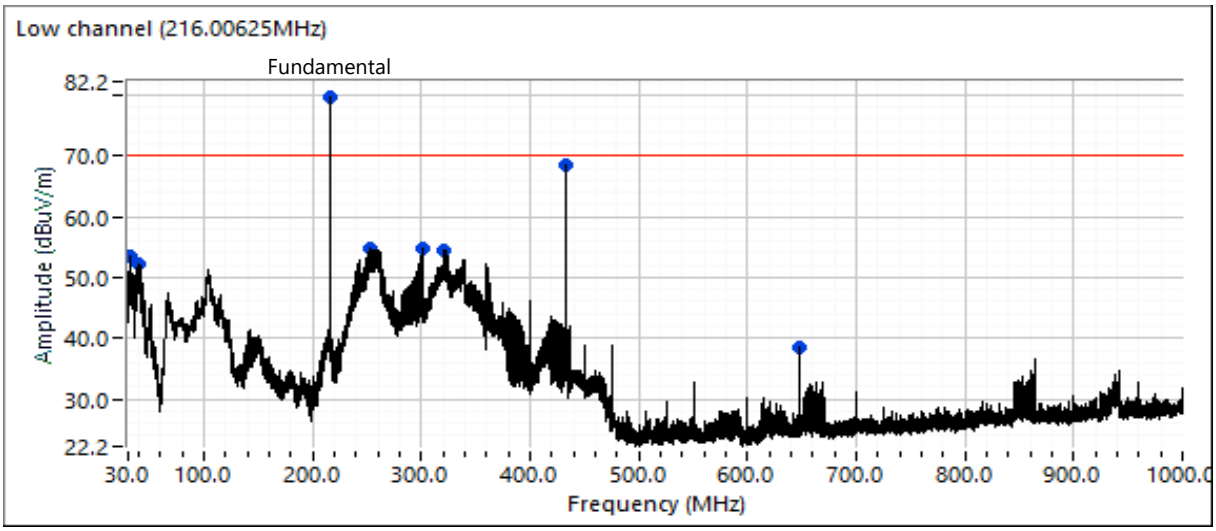
EUT Field Strength

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		Frequency (MHz)
30.615	56.3	V	70.2	-13.9	PK	0	1.0	PK (0.10s)	218.5
342.913	56.7	H	70.2	-13.5	PK	179	1.5	PK (0.10s)	218.5
437.000	66.0	V	70.2	-4.2	PK	102	1.4	PK (0.10s)	218.5

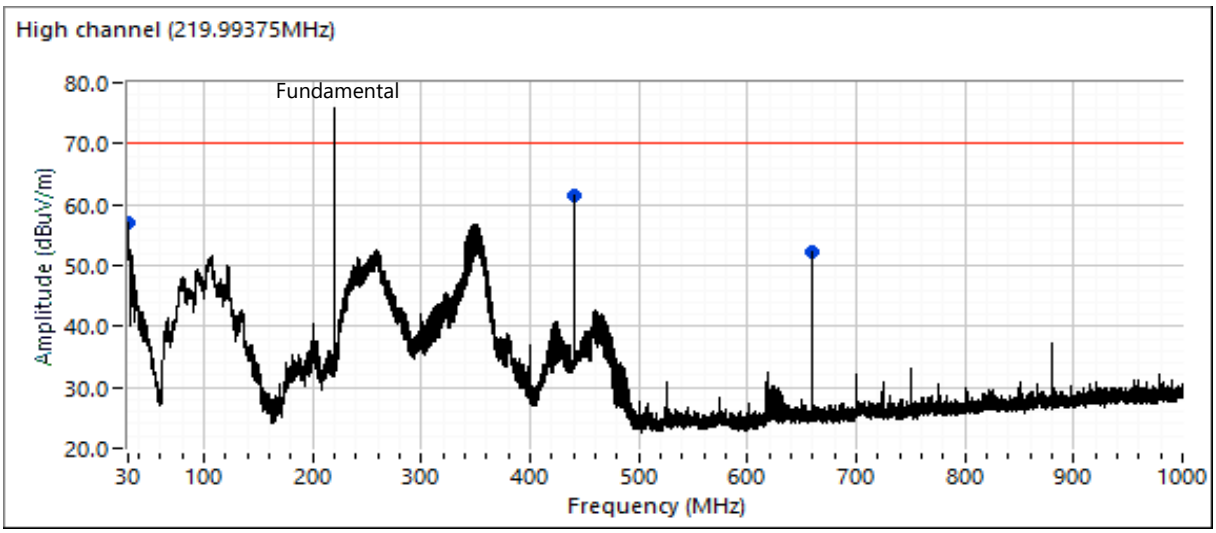
Note 1:	The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: E=√(30PG)/d. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2dBi) has not been included. The erp or eirp for all signals with less than **20dB** of margin relative to this field strength limit is determined using substitution measurements.
Note 2:	Measurements are made with the antenna port terminated.
Note 3:	It was noted that the amplitude of the second harmonic varies with movement of the EUT thus accounting for the higher amplitude found during scanning.

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Plots for part 80, low channel, power setting(s) = 25W

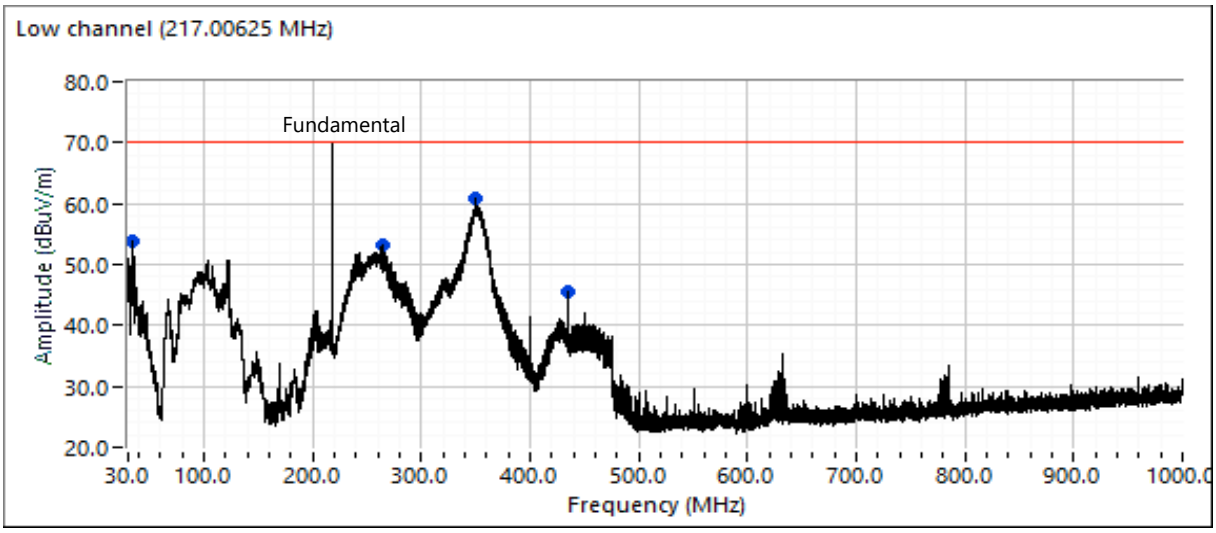


Plots for part 80, high channel, power setting(s) = 25W

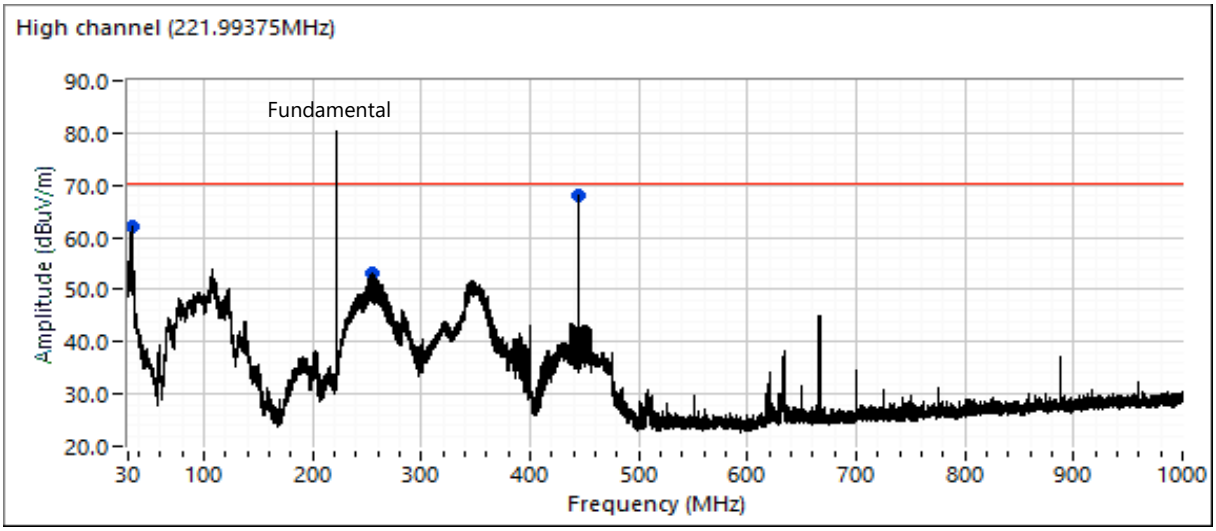


Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Plots for part 90 at low channel, power setting(s) = 2W

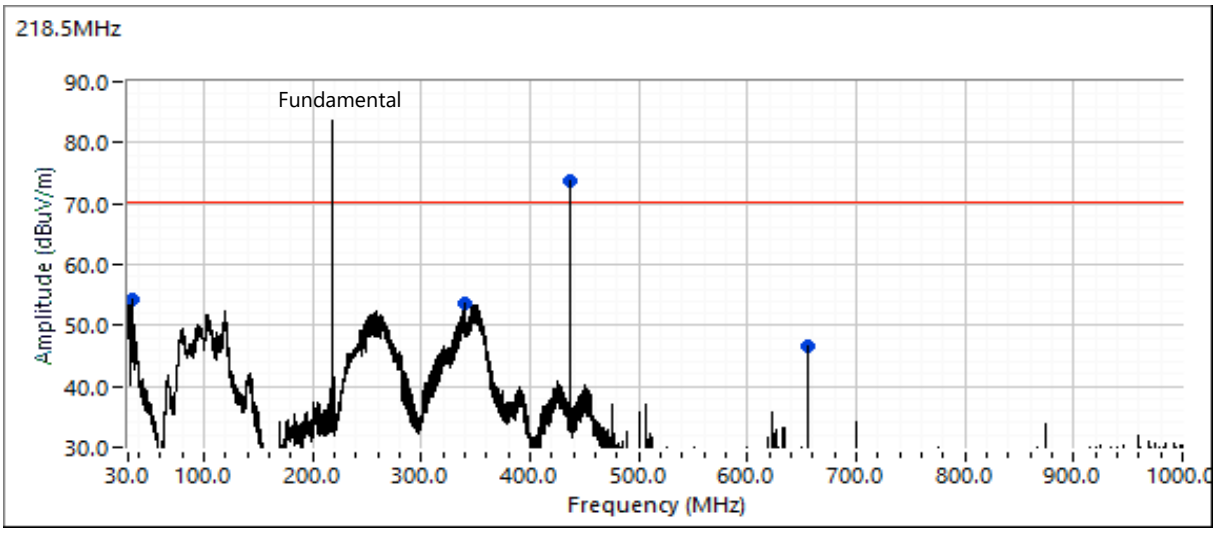


Plots for high channel, power setting(s) = 25W



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Plots for Part 95, power setting(s) = 25W



Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #5d: - Substitution Measurements

Substitution measurements

Horizontal

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
252.539	-36.1	1.9	68.2	102.4	59.0	-43.4	-45.6		-25.0	-20.6
301.934	-36.2	1.7	66.4	100.9	55.4	-45.5	-47.7		-25.0	-22.7
320.332	-36.3	1.8	65.1	99.6	59.1	-40.5	-42.7		-25.0	-17.7
659.979	-37.3	1.0	64.8	101.1	52.2	-48.9	-51.1		-25.0	-26.1
260.490	-36.1	1.9	67.2	101.4	57.2	-44.2	-46.4		-25.0	-21.4
349.970	-36.4	1.7	68.0	102.7	62.8	-39.9	-42.1		-25.0	-17.1
252.544	-36.1	1.9	68.2	102.4	53.1	-49.3	-51.5		-25.0	-26.5
342.913	-36.4	1.9	68.2	102.7	56.7	-46.0	-48.2		-25.0	-23.2

Vertical

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
30.922	-34.9	0.9	63.3	97.3	52.0	-45.3	-47.5		-25.0	-22.5
432.014	-36.7	1.4	63.6	98.9	52.9	-46.0	-48.2		-25.0	-23.2
30.625	-34.9	0.9	63.3	97.3	57.0	-40.3	-42.5		-25.0	-17.5
439.984	-36.7	1.5	65.9	101.1	61.6	-39.5	-41.7		-25.0	-16.7
34.593	-34.9	0.9	63.8	97.8	52.9	-44.9	-47.1		-25.0	-22.1
434.015	-36.7	1.4	65.8	101.1	37.8	-63.3	-65.5		-25.0	-40.5
30.575	-34.9	0.9	63.3	97.3	54.1	-43.2	-45.4		-25.0	-20.4
443.990	-36.7	1.5	65.9	101.1	62.2	-38.9	-41.1		-25.0	-16.1
30.615	-34.9	0.9	63.3	97.3	56.3	-41.0	-43.2		-25.0	-18.2
437.000	-36.7	1.5	66.0	101.2	66.0	-35.2	-37.4		-25.0	-12.4

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.

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	N/A

Run #6: Frequency Stability

Date of Test: 5/12/2025
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4

Config. Used: 1
Config Change: Substituted variable PS for fixed PS
EUT Voltage: Varies

Nominal Frequency: 217.00625 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. The EUT was powered at nominal voltage.

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
-30	217.006250	0	0.0
-20	217.006250	0	0.0
-10	217.006250	0	0.0
0	217.006250	0	0.0
10	217.006250	0	0.0
20	217.006250	0	0.0
30	217.006250	0	0.0
40	217.006250	0	0.0
50	217.006250	0	0.0
Worst case:		0	0.0

Frequency Stability Over Input Voltage

Nominal Voltage is 13.5Vdc. Rated voltage range is 11 - 36 VDC

Voltage	Frequency Measured	Drift	
(DC)	(MHz)	(Hz)	(ppm)
11.0	217.006250	0	0.0
36.0	217.006250	0	0.0
Worst case:		0	0.0

Resolution BW = 1 kHz; Video BW = 30 kHz, Span 50 kHz.

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver

Radiated Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

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.

Date of Test: 5/22/2025
Test Engineer: David Bare
Test Location: Fremont Chamber #3

Config. Used: 1
Config Change: None
EUT Voltage: 13.5VDC

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.
Radiated emissions tests above 1 GHz were performed with floor absorbers in place in accordance with the test methods of ANSI C63.26 and CISPR 16-1-4. All final readings collected at 3 meters test distance, unless otherwise noted.
The EUT was locted 1.5m above the chamber floor.

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 42 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 1 GHz - 3 GHz Maximized	-25 dBm	Pass	All more than 20 dB below the limit

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.

Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver

Run #1: Maximized Readings, 1000 - 3000 MHz

Conducted limit (dBm): -25
Approximate field strength limit @ 3m: 70.2

The limit is taken from FCC Part 90 Mask F (worst case for Parts 80, 90 and 95)

Run #1a: Final Field Strength Measurements (Part 80)

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Frequency (MHz)
1080.050	42.1	H	70.2	-28.1	Peak	161	1.6	216.00625
1854.580	41.4	H	70.2	-28.8	Peak	281	2.0	219.99375

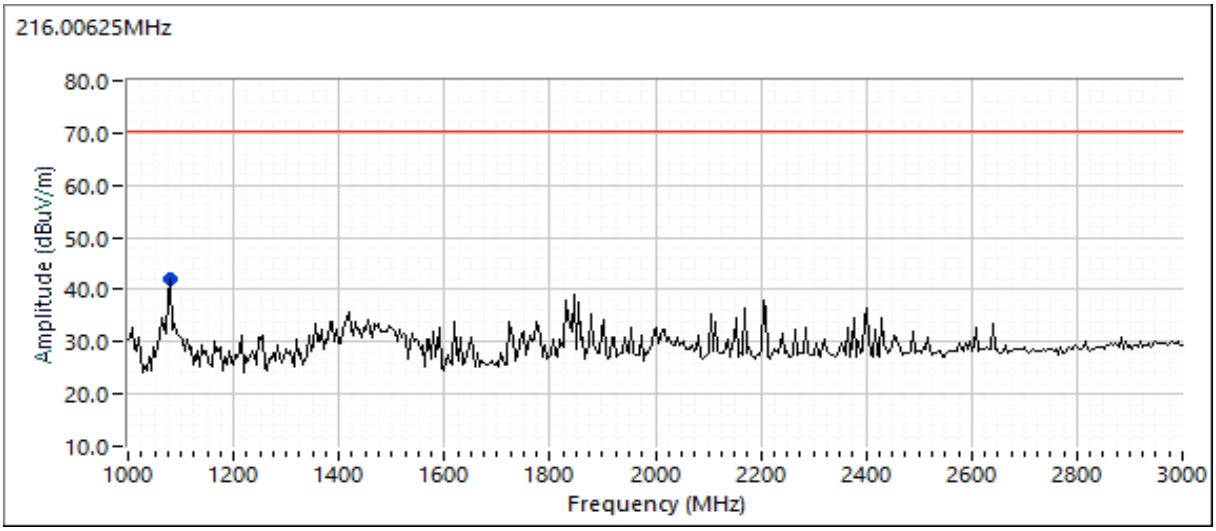
Run #5b: Final Field Strength Measurements (Part 90)

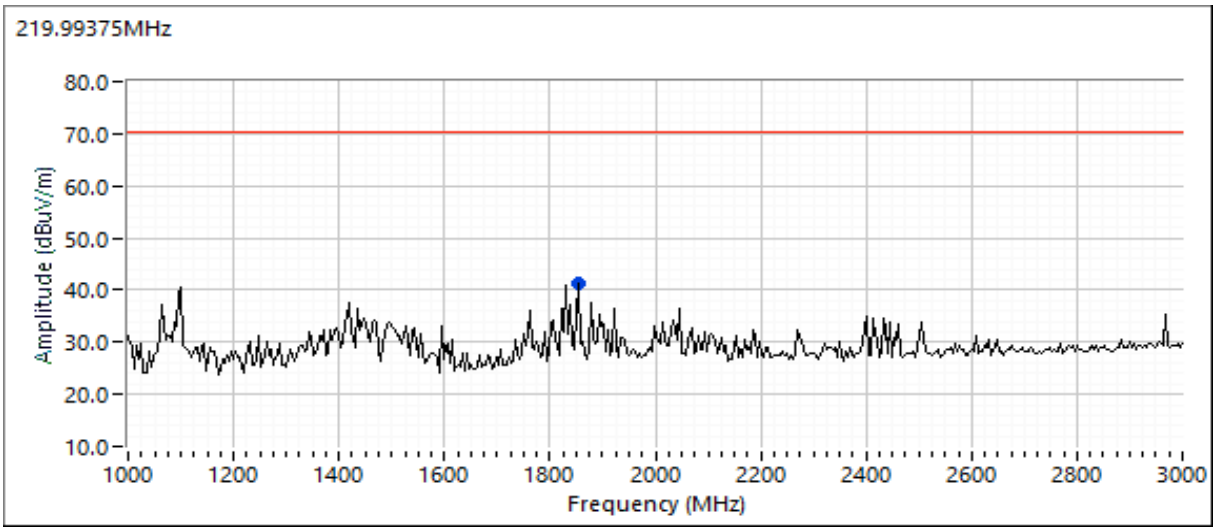
Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Frequency (MHz)
1085.040	41.1	H	70.2	-29.1	Peak	169	1.5	217.00625
1109.960	43.7	H	70.2	-26.5	Peak	159	1.5	221.99375

Run #5c: Final Field Strength Measurements (Part 95)

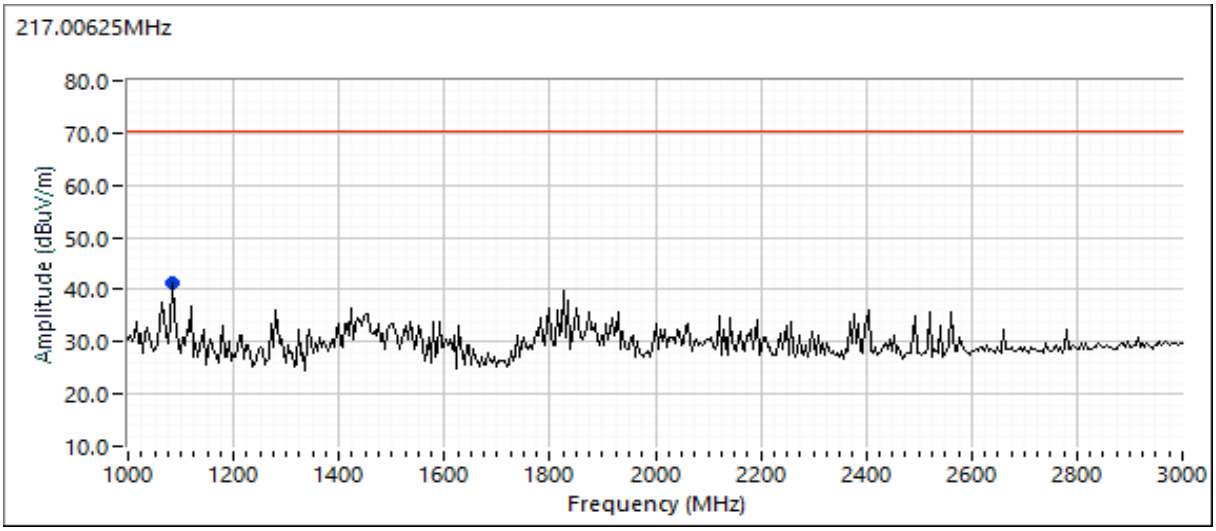
Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Frequency (MHz)
1092.480	41.5	H	70.2	-28.7	Peak	232	2.5	218.49375

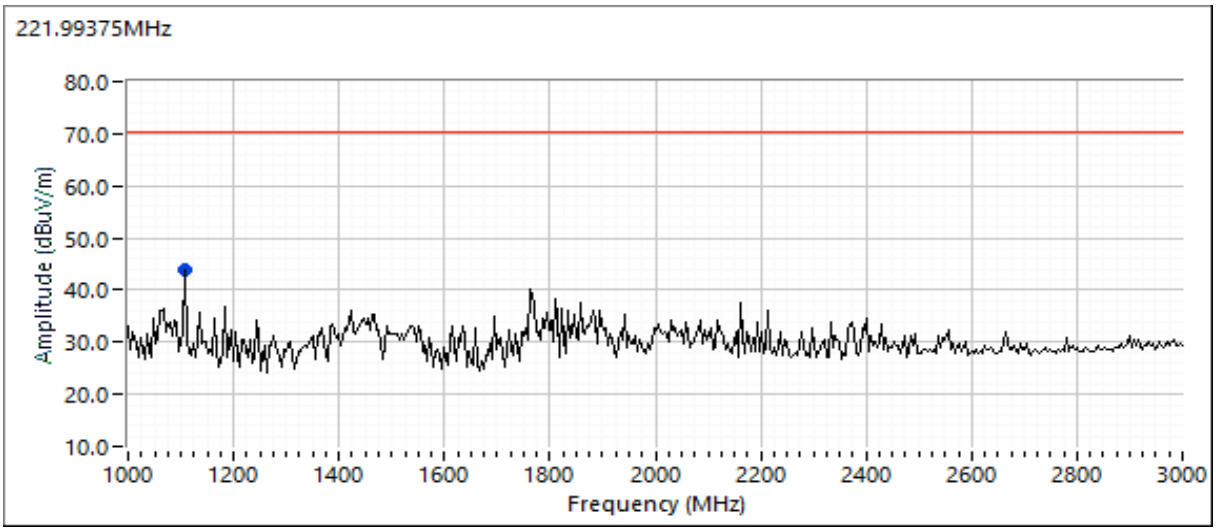
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver



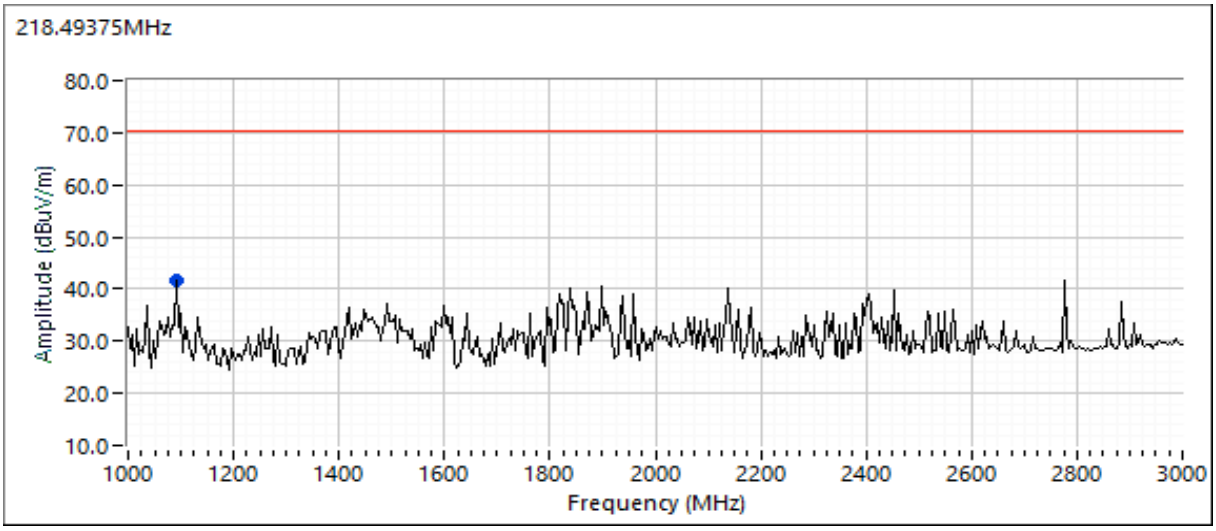


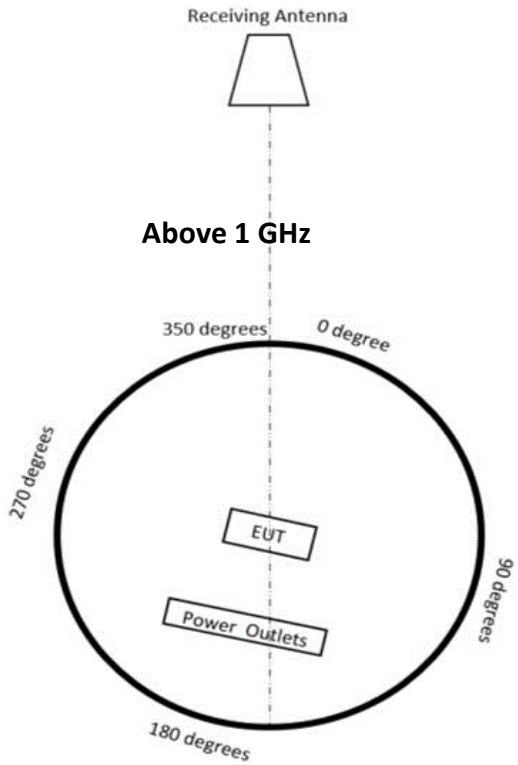
Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver





Client:	Ondas Networks	PR Number:	PR190061
Model:	Airlink ACSES	T-Log Number:	TI190061-RA
		Project Manager:	Christine Krebill
Contact:	Bryan Wing	Project Engineer:	David Bare
Standard:	FCC Parts 15, 80, 90 and 95	Class:	Radio/Receiver





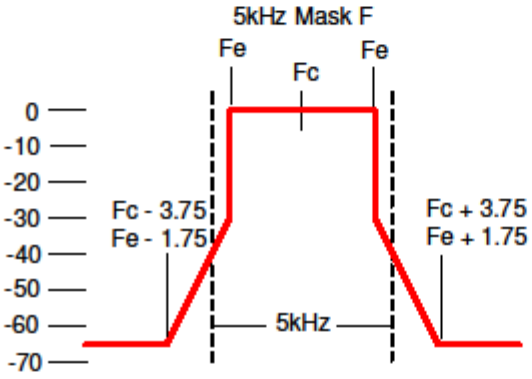
Appendix C Aggregate Mask F

FCC Mask F Calculations:

Part 90.209 states that the channel spacing for 220-222MHz is 5kHz and the authorized BW is 4kHz.

Part 90.210 emission mask F states that any emission must be attenuated below the power (P) as follows:

1. On any freq from the center Fo to the edge of the authorized bw, Fe (2kHz); 0dB.
2. On any frequency removed from the center of the authorized bw by a displacement frequency (Fd in kHz) of more than 2kHz (Fe) up to and including 3.75kHz: 30 + 20(Fd –2) dB or 55 + 10 log (P), or 65 dB whichever is less.
3. On any freq beyond 3.75kHz removed from the center of the authorized bw Fd: At least 55 + 10 log (P)dB.



Subpart T 90.733e states that for aggregated channels in the 220MHz range mask F must be met only at the channel edges. So we will take the edge of the 5kHz mask F and move it to coincide with the edge of the aggregated channels.

For the 5kHz mask F, the channel edge is 2.5kHz from the center and Fe is 2kHz from the center. So Fe is .5kHz from the channel edge.

For a 12.5kHz channel the channel edge is 6.25kHz from the center and Fe will be 6.25 - .5kHz = 5.75kHz from center.

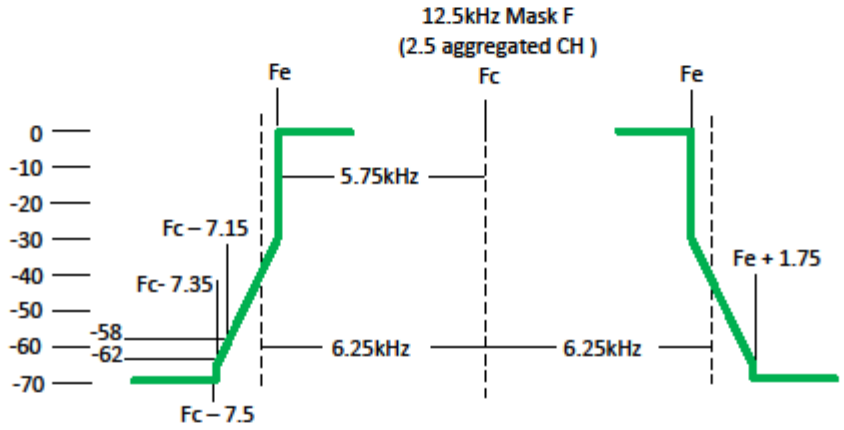
The rules for the mask become:

1. On any freq from the center Fo to the edge, 5.75kHz; 0dB.
2. On any frequency removed from the center of the authorized bw by a displacement frequency (Fd in kHz) of more than 5.75kHz (Fe) up to and including 7.5kHz: 30 + 20(Fd –5.75) dB or 55 + 10 log (P), or 65 dB whichever is less.
3. On any freq beyond 7.5kHz removed from the center of the authorized bw Fd: At least 55 + 10 log (P)dB.

For low power radios the maximum attenuation will be determined by 55 + 10 log (P). (90.210F sub 2)

For a 2 watt radio that equals 55 + 10 log (2). Equals 58dB. Which meets the sloping line when 30 + 20 (Fd –5.75) = 58. At Fd = 7.15kHz
For a 5 watt radio that equals 62dB. Which meets the sloping line when Fd = 7.35kHz
For a 10 watt radio that equals 65dB. Which meets the sloping line when Fd = 7.5kHz
For any higher power radio this is the limit where the sloping line ends.
For Fd > 7.5kHz then 55 + 10 log (P)dB. For 25 watts this is 55 + 10 log (25)dB = 69dB.

The final mask F for a 25 watt radio using 2.5 aggregated channels (12.5kHz) looks like this:



End of Report

This page is intentionally blank and
marks the last page of this test report.