Project 21941-15

Advanced TeleSensors, Inc
ATX2410

Wireless Certification Report

Prepared for:

Advanced TeleSensors, Inc.
3815 Jarrett Way
Suite A100
Austin, TX 78728-1227

By

Professional Testing (EMI), Inc.
1601 North A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

1 Oct 2020

Reviewed by

Larry Finn
Chief Technical Officer

Written by

Eric Lifsey
EMC Engineer

Revision History

Revision Number	Description	Date
Draft 2	Draft for review. Added mains conducted emissions.	2 Oct 2020
Final 1		5 Oct 2020

Errata: None

Table of Contents

Certificate of Compliance

FCC MRA Designation Number: US5270
NVLAP Accreditation Number: 200062-0

Applicant	Device & Test Identification	
Advanced TeleSensors, Inc. 3815 Jarrett Way Suite A100 Austin, TX 78728-1227 Certificate Date: 1 Oct 2020	FCC ID: IC ID: Model(s): Laboratory Project ID:	2AXL8-ATX2410V4P1 Reserved for future use. ATX2410 21941-15

The EUT(s) listed above were tested utilizing the following documents and found to be in compliance with the required criteria.

Standard	Reference	Detail
FCC 47 CFR Part 15 C	15.249(a), 15.209, 15.205, 15.212(a)(1), 15.207	Radiated Power Bandwidth Spurious Emissions Mains Conducted Emissions
IC RSS-310 Issue 10 (RSS-Gen Issue 5)	Clause B.10 24 GHz	Radiated Power Bandwidth Spurious Emissions Mains Conducted Emissions

I, Eric Lifsey, for Professional Testing (EMI), Inc., being familiar with the above requirements and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.

NVLAP TESTING
NVLAP LAB CODE 200062-0

Eric Lifsey
EMC Engineer

This report has been reviewed and accepted by the Applicant**.** The undersigned is responsible for ensuring that this device will continue to comply with the requirements listed above.

_____
Representative of Applicant

1.0 Introduction

1.1 Scope

This report describes the extent to which the equipment under test (EUT) conformed to the intentional radiator requirements of the United States and Canada.

Professional Testing (EMI), Inc., (PTI) follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing.

1.2 EUT Description

Table 1.2.1: EUT Essential Information	
Manufacturer & Model	**Description**
Advanced TeleSensors, Inc ATX2410	Non-contact vital signs monitor.

1.3 EUT Operation

The EUT was exercised in a manner consistent with normal operations.

1.4 Modifications to Equipment

No modifications were made to the EUT during the performance of the test program.

1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. The site is registered with the FCC under Section 2.948 and Industry Canada per RSS-GEN, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas 78758, while the main office is located at 1601 North A.W. Grimes Boulevard, Suite B, Round Rock, Texas, 78665.

1.6 Measurement Correction Methods

Table 1.6 1 Measurement Corrections	
Parameter	**From Sums Of**
Radiated Field Strength	Raw Measured Level + Antenna Factor + Cable Losses – Amplifier Gain
Conducted Antenna Port	Raw Measured Level + Attenuator Factor + Cable Losses
Conducted Mains Port	Raw Measured Level + LISN Factor + Cable/Filter/Limiter Losses
Additionally, measurement distance extrapolation factors (such as 1/d above 30 MHz) are applied and documented where used.	

1.7 Applicable Documents

Table 1.7.1: Applicable Documents	
Document	**Title**
47 CFR	Part 15 – Radio Frequency Devices Subpart C -Intentional Radiators
RSS-210 Issue 10	Licence-Exempt Radio Apparatus: Category I Equipment
RSS-Gen Issue 5	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.10 2013	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.4 2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment

2.0 Fundamental Power, Clause: 15.249(a), RSS-210 B.10 Table B2

2.1 Test Procedure

Power is measured using radiated means and without modulation.

2.2 Test Criteria

Parameter		
Average Detection		
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500
24 GHz Fundamental Power Limit Restated as dBµV/m: 108 dBµV/m at 3 meters		

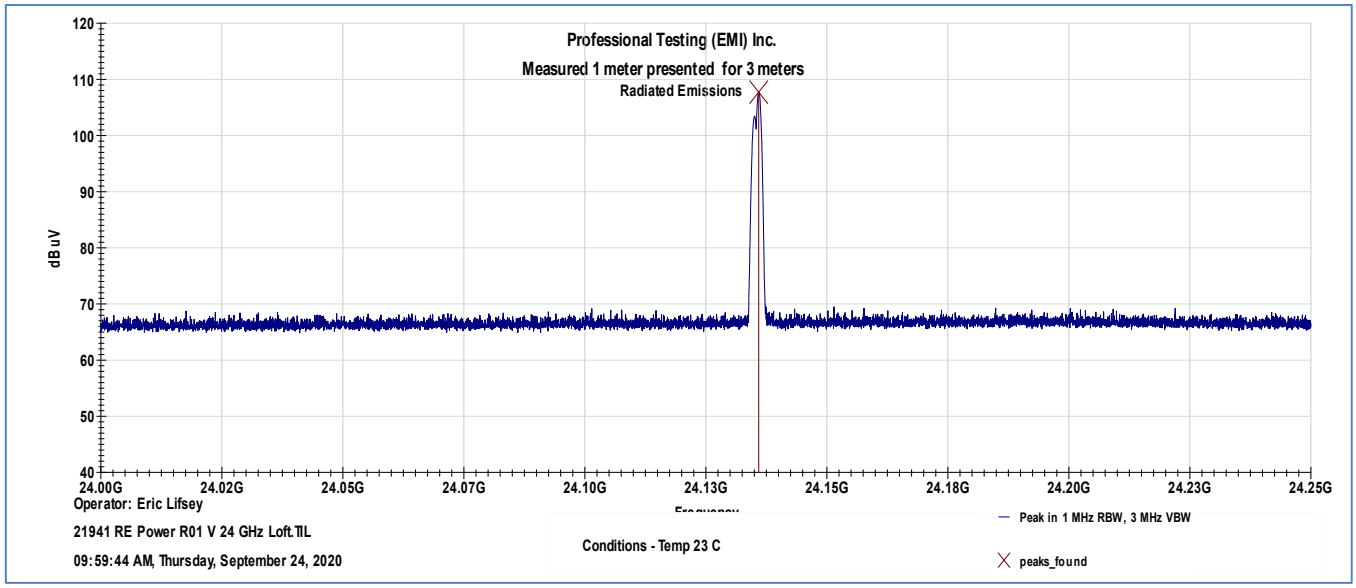
2.3 Test Results

Table 2.3.1: Field Strength of Fundamental; 1 Meter Measurement Distance Corrected to 3 meters

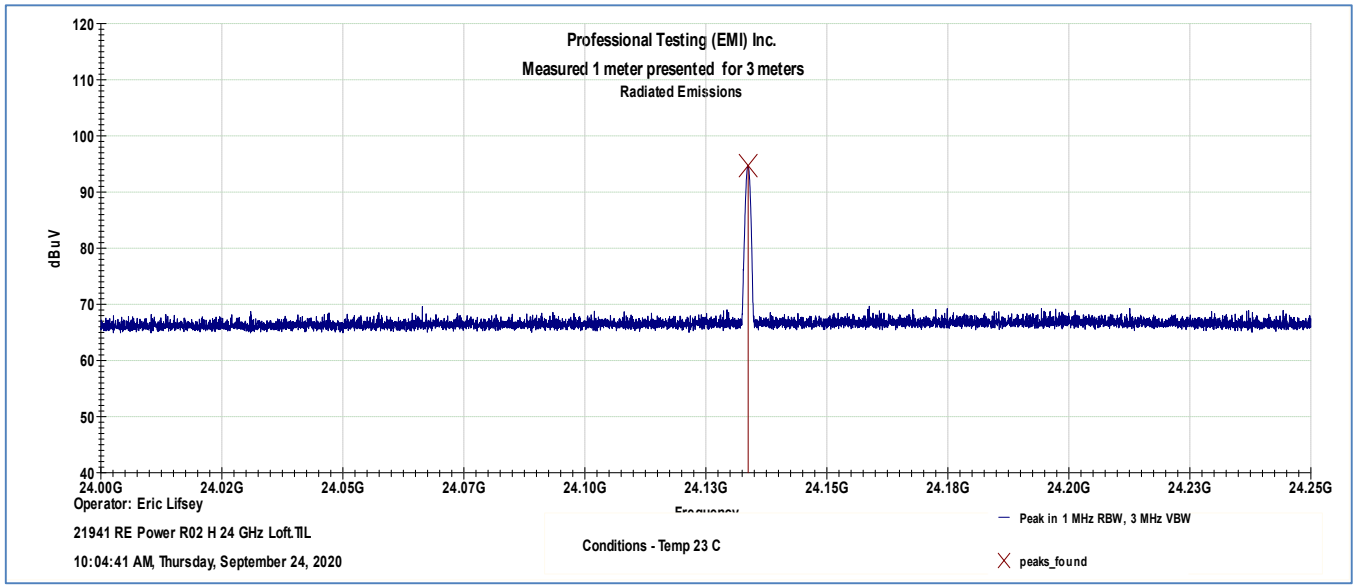
Frequency GHz	Antenna Polarity	Corrected Level* (Measured Peak Level) dBµV/m	Duty Cycle Averaging Factor dB	Calculated Average Level dBµV/m	Margin dB
24.13	V	107.7	0	107.7	-0.3
24.13	H	93.9	0	94.7	-13.3

*Resolution bandwidth 1 MHz, video bandwidth 3 MHz, using peak detection.

The EUT satisfies the criteria.



Power, Vertical Polarity



Power, Horizontal Polarity

3.0 Occupied Bandwidth, Clause: 2.1049, RSS-Gen 6.7

3.1 Test Procedure

Bandwidth is measured by relative radiated means.

3.2 Test Criteria

Parameter
Bandwidth, 99%

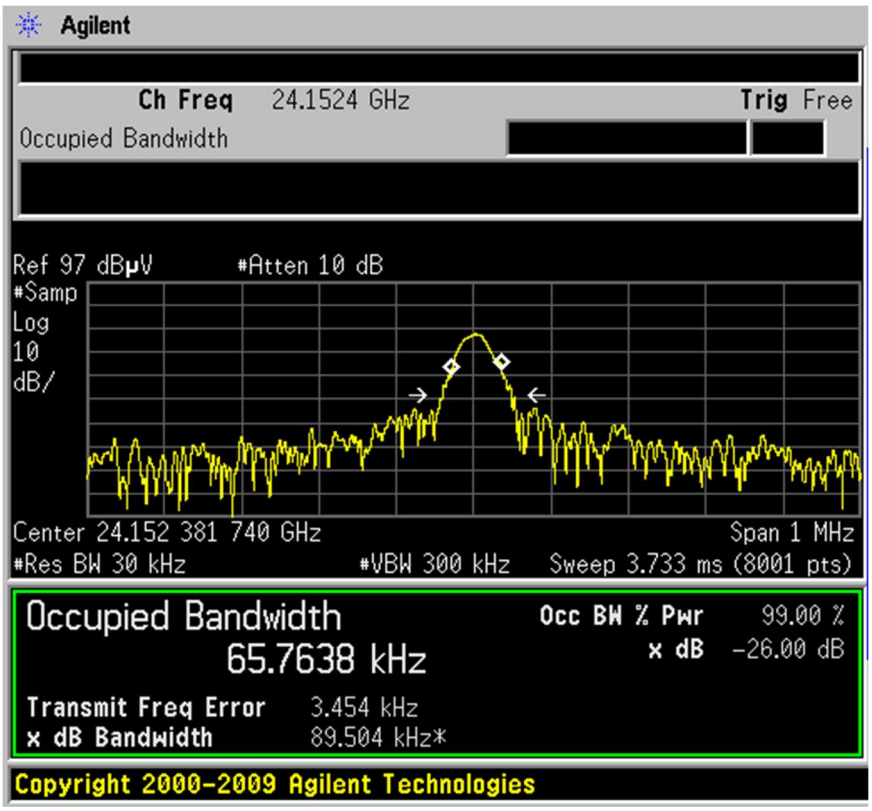
3.3 Test Results

The bandwidth measurement is used for general reporting for agency application and serves to confirm the emission is confined to the designated band.

The EUT satisfied the requirements.

Note that this is an unmodulated Doppler device. Apparent bandwidth is largely due to the resolution bandwidth of the measuring instrument.

Table 3.3.1 Bandwidth 99%, Measure and Report
Measured BW (kHz)
65.8



4.0 Radiated Spurious Emissions, Transmit Mode, Clause: 15.249(a), RSS-210 Table B.2

4.1 Test Procedure

The EUT was placed on a non-conductive table above a ground plane. The EUT was centered on a rotating turntable. Measurements below 1 GHz were taken at a test distance of 10 meters from the measurement antenna. Above 1 GHz the measurement distance was 3 meters or less as needed to overcome path loss and inherent equipment noise.

Spurious emissions below 1 GHz were measured with quasi-peak detection with a resolution bandwidth of 120 kHz. Above 1 GHz peak measurements were taken and average measured where appropriate and 1 MHz resolution bandwidth.

4.2 Test Criteria

Parameter

Average or Peak Detection, Limits for 15.249(a) and RSS-210 B.10:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

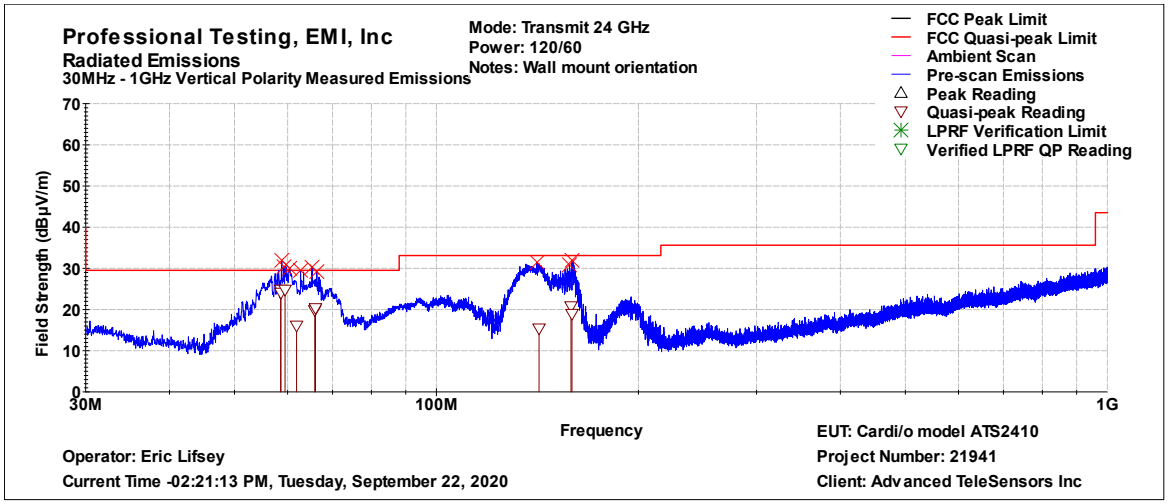
Non-harmonic emission limits: -50 dBc or general emission limits.

4.3 Test Results

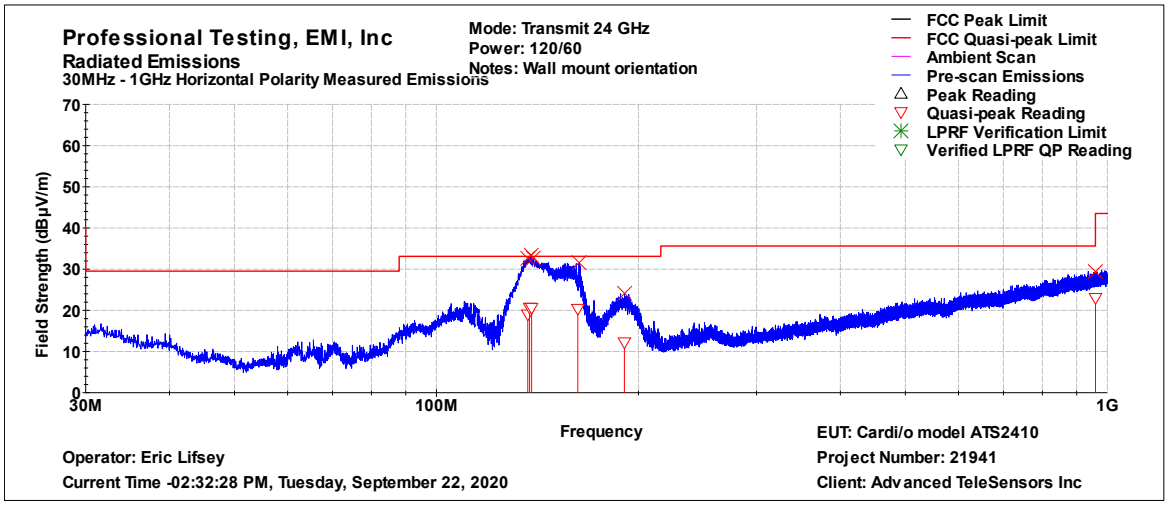
The EUT is a Doppler device, it must transmit to be able to receive. The EUT satisfied the criteria.

Above 26.5 GHz, external harmonic mixers are used. The factors for the mixers are included in the analyzer measurement. The horn is directly attached wave-guide to the harmonic mixer to eliminate any additional loss. The final measurement requires addition of the standard gain octave horn antenna factor (AF).

4.3.1 Up to 1 GHz

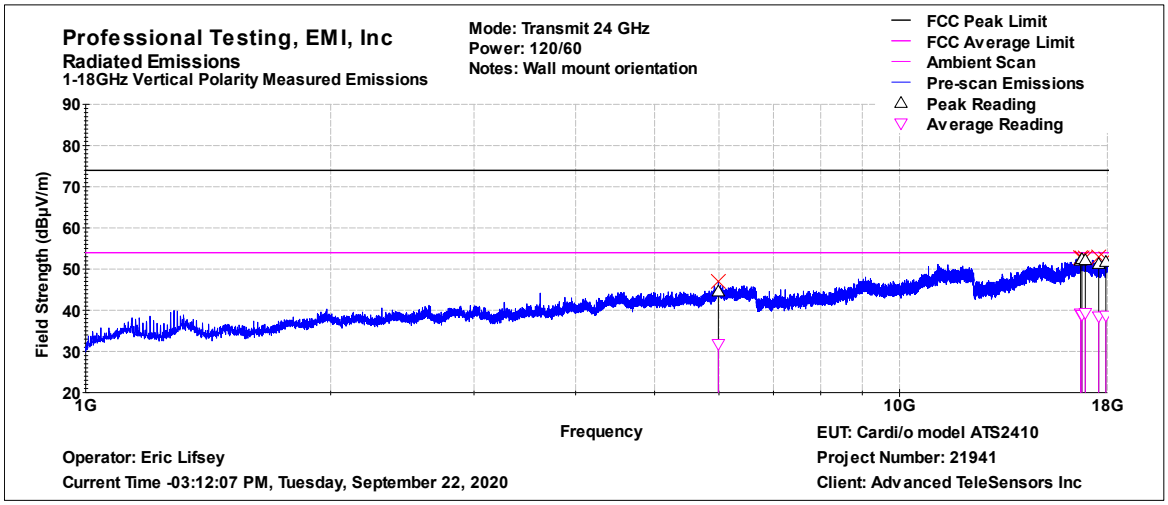


Frequency	Azimuth	Height	QP	QP Limit	QP Margin	QP Results
MHz	(deg)	(cm)	(dBµV)	(dBµV)	(dB)	(P/F)
58.591	126.000	163.000	24.790	29.500	-4.710	PASS
58.636	267.000	243.000	24.051	29.500	-5.449	PASS
59.472	107.000	310.000	24.796	29.500	-4.704	PASS
61.872	202.000	345.000	16.072	29.500	-13.428	PASS
65.853	206.000	168.000	19.811	29.500	-9.689	PASS
66.025	173.000	135.000	20.301	29.500	-9.199	PASS
142.184	230.000	118.000	15.364	33.100	-17.736	PASS
158.697	276.000	141.000	20.763	33.100	-12.337	PASS
159.247	250.000	185.000	18.915	33.100	-14.185	PASS

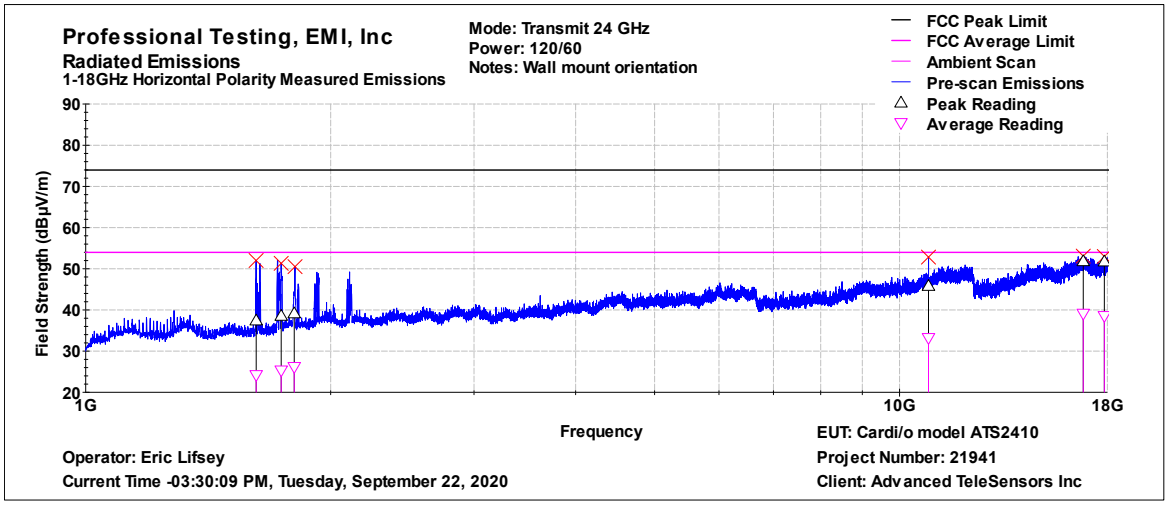


Frequency	Azimuth	Height	QP	QP Limit	QP Margin	QP Results
(MHz)	(deg)	(cm)	(dBµV)	(dBµV)	(dB)	(P/F)
136.792	112.000	328.000	18.959	33.100	-14.141	PASS
137.633	264.000	371.000	20.621	33.100	-12.479	PASS
138.618	250.000	347.000	20.573	33.100	-12.527	PASS
162.414	251.000	349.000	20.325	33.100	-12.775	PASS
190.590	251.000	399.000	12.189	33.100	-20.911	PASS
960.125	47.000	346.000	22.959	43.500	-20.541	PASS

4.3.2 Up to 18 GHz

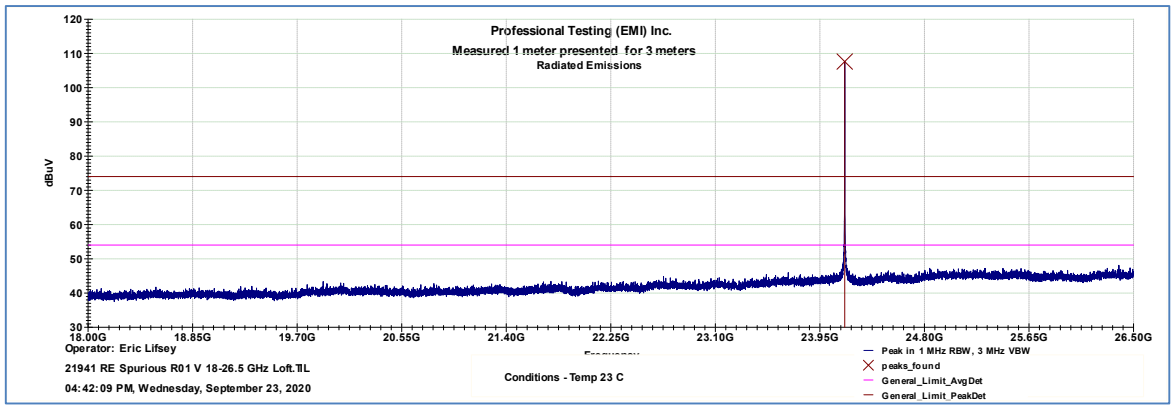


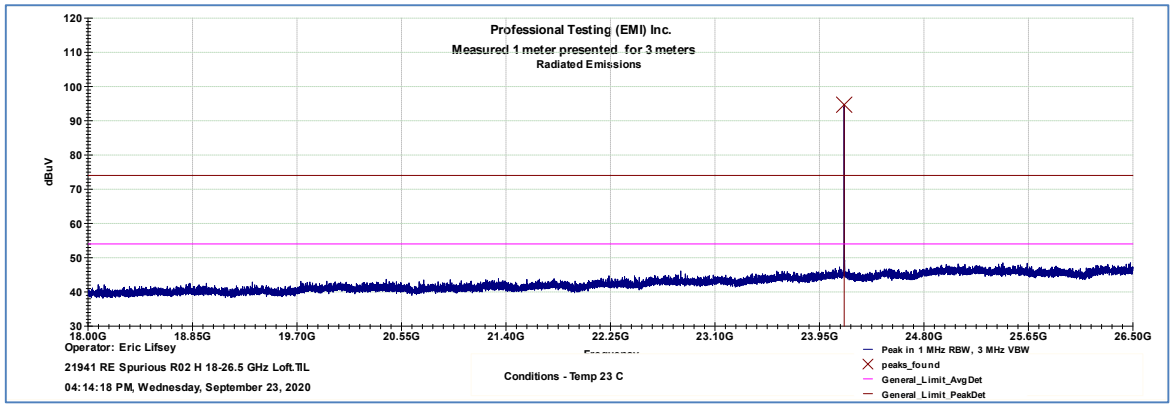
Frequency	Azimuth	Height	Peak	Peak Limit	Peak Margin	Peak Results	Avg	Avg Limit	Avg Margin	Avg Results
(MHz)	(deg)	(cm)	(dBuV)	(dBuV)	(dB)	(P/F)	(dBuV)	(dBuV)	(dB)	(P/F)
5989.01	269	125	44.560	73.958	-29.398	PASS	31.789	53.958	-22.169	PASS
16686.80	174	125	52.067	73.958	-21.891	PASS	39.175	53.958	-14.783	PASS
16753.49	122	246	52.456	73.958	-21.502	PASS	38.835	53.958	-15.123	PASS
16913.26	271	243	52.186	73.958	-21.772	PASS	39.320	53.958	-14.638	PASS
17566.13	18	102	51.255	73.958	-22.703	PASS	38.472	53.958	-15.486	PASS
17924.57	2	243	51.745	73.958	-22.213	PASS	38.667	53.958	-15.291	PASS



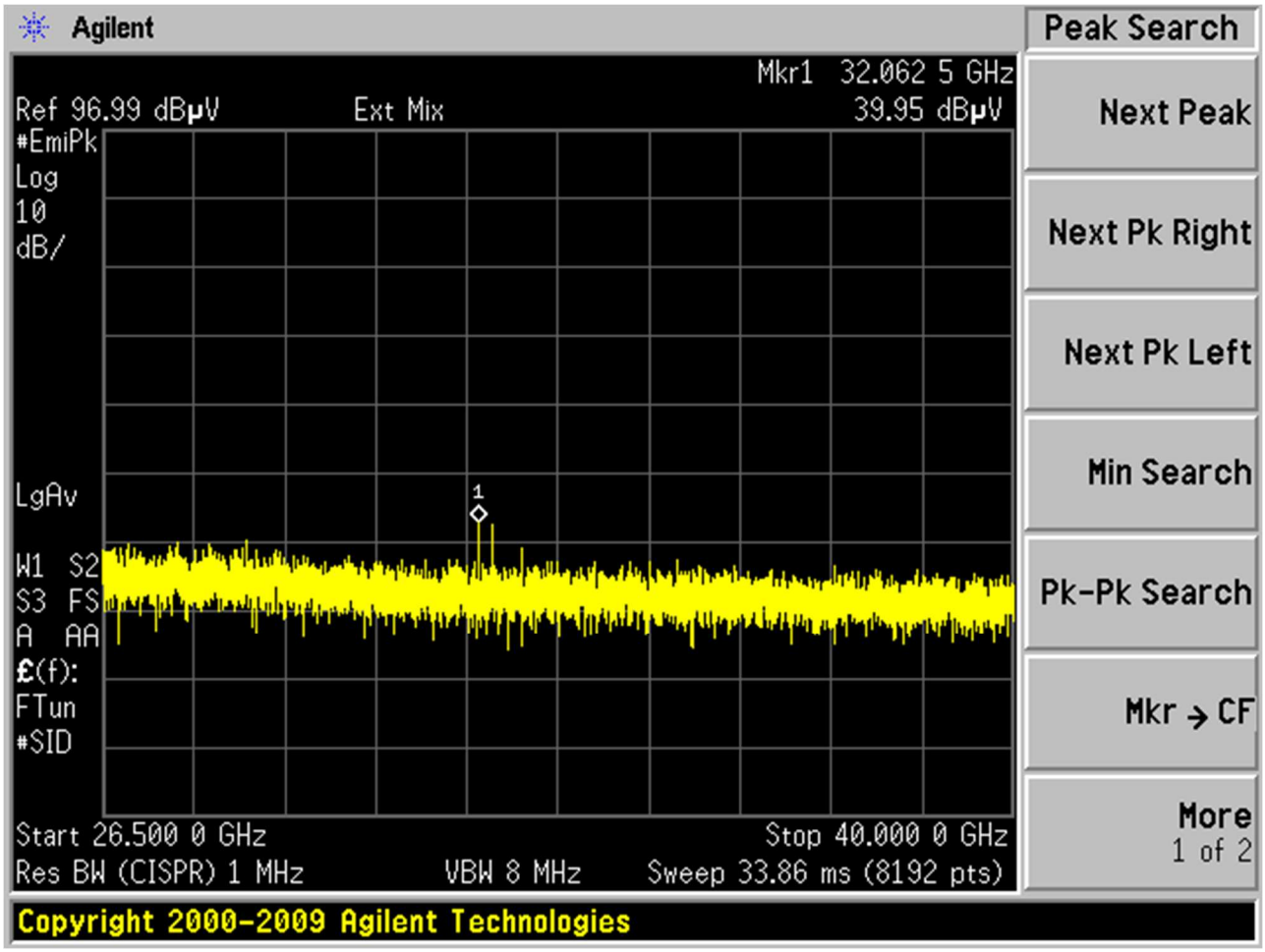
Frequency	Azimuth	Height	Peak	Peak Limit	Peak Margin	Peak Results	Avg	Avg Limit	Avg Margin	Avg Results
(MHz)	(deg)	(cm)	(dBuV)	(dBuV)	(dB)	(P/F)	(dBuV)	(dBuV)	(dB)	(P/F)
1619.98	151	326	37.453	73.958	-36.505	PASS	24.147	53.958	-29.811	PASS
1738.84	2	321	38.575	73.958	-35.383	PASS	25.262	53.958	-28.696	PASS
1804.28	66	329	39.173	73.958	-34.785	PASS	26.108	53.958	-27.850	PASS
10852.35	2	378	45.856	73.958	-28.102	PASS	33.151	53.958	-20.807	PASS
16816.12	22	102	51.841	73.958	-22.117	PASS	39.061	53.958	-14.897	PASS
17849.95	144	366	51.774	73.958	-22.184	PASS	38.484	53.958	-15.474	PASS

4.3.3 Up to 26.5 GHz





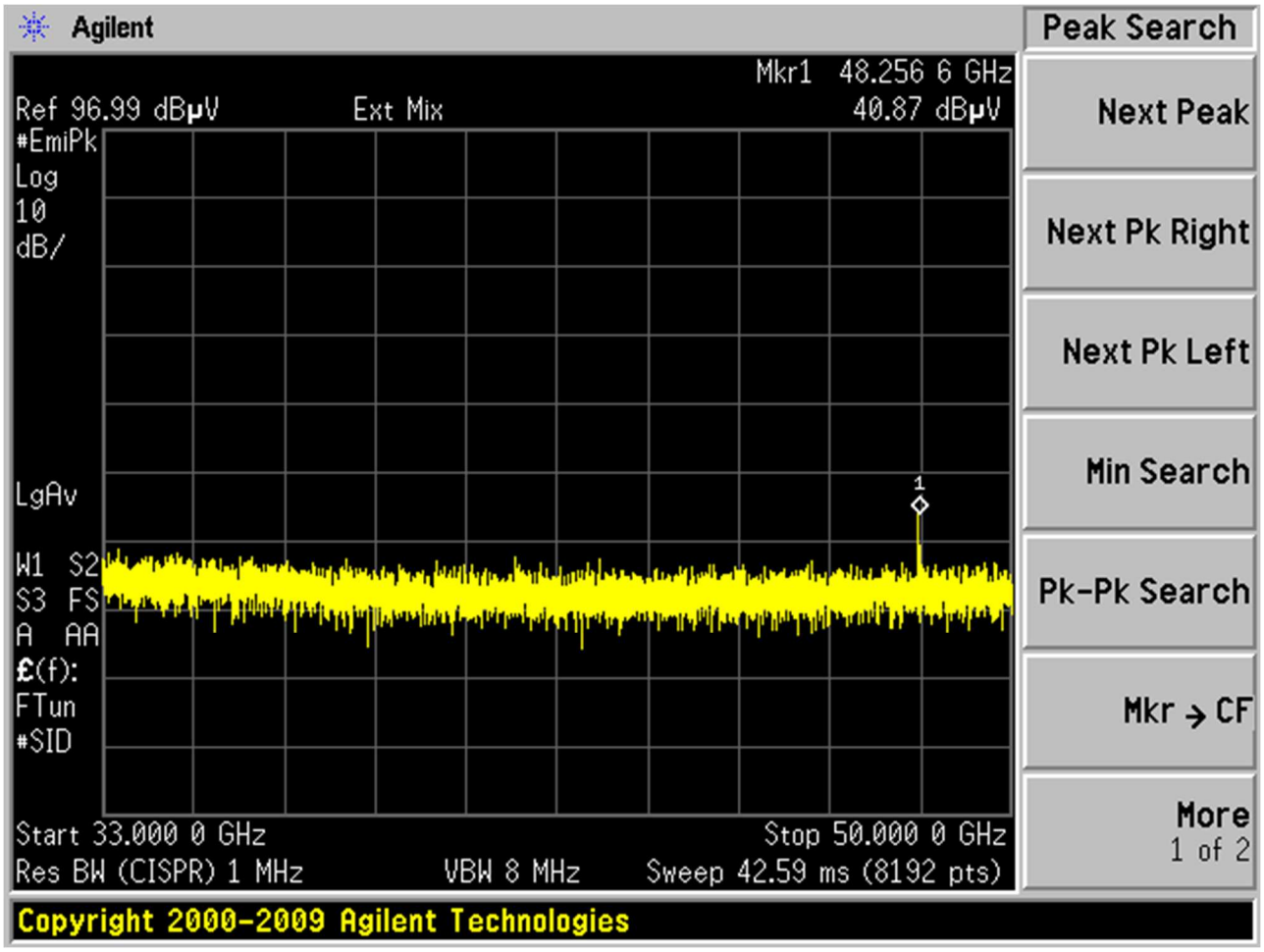
4.3.4 Up to 40 GHz



Highest Recorded for Both Polarities 26.5 to 40 GHz

32.0625 GHz, 39.95 dBuV + AF 40.3 = 80.25, limit 83 dBuV/m @ 10 cm

4.3.1 Up to 50 GHz

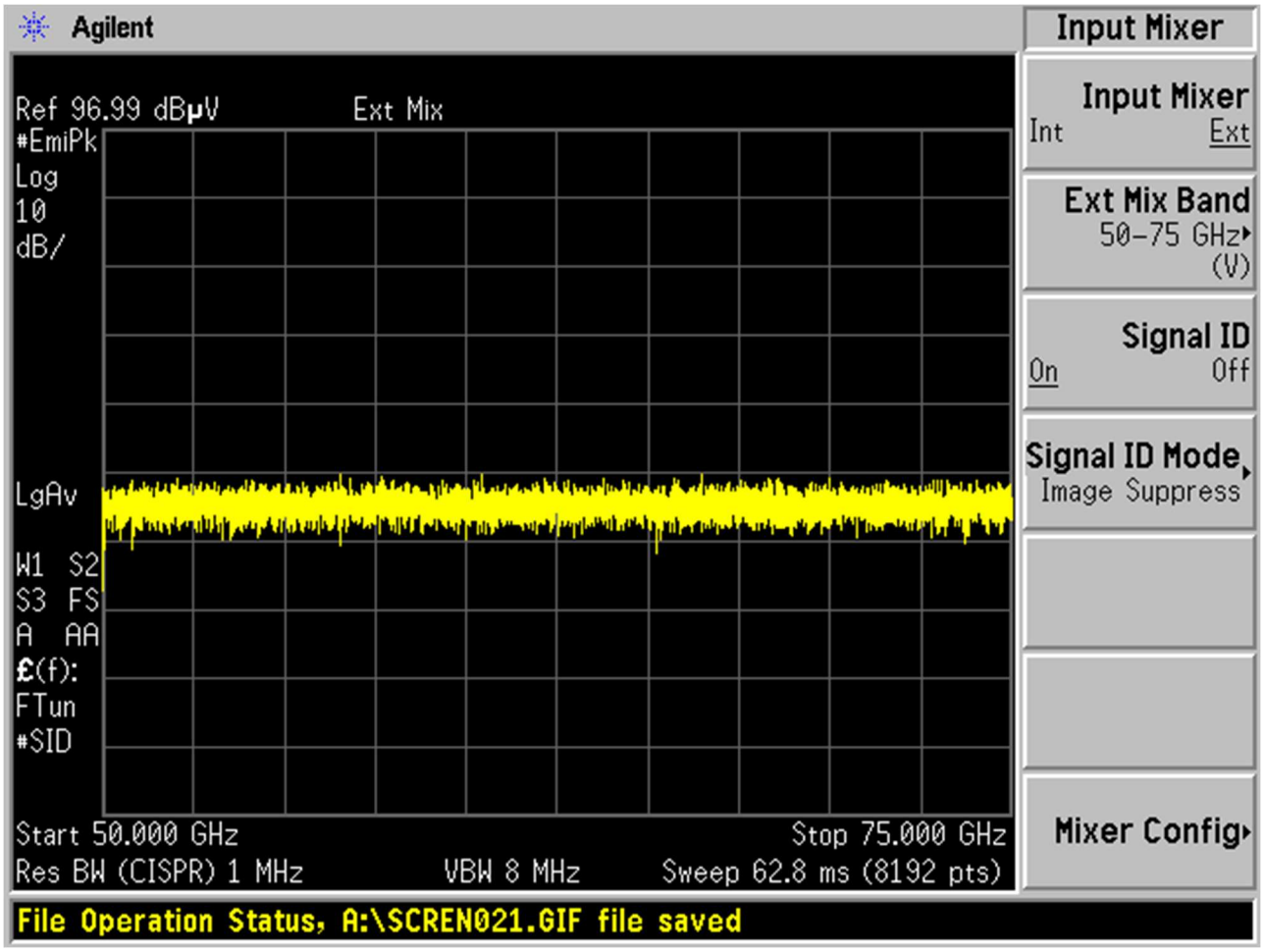


Highest Recorded for Both Polarities 33 to 50 GHz

48.256 GHz, 40.87 dBuV =+ AF 40.2 = 81.07, limit 83 dBuV/m @ 10 cm*

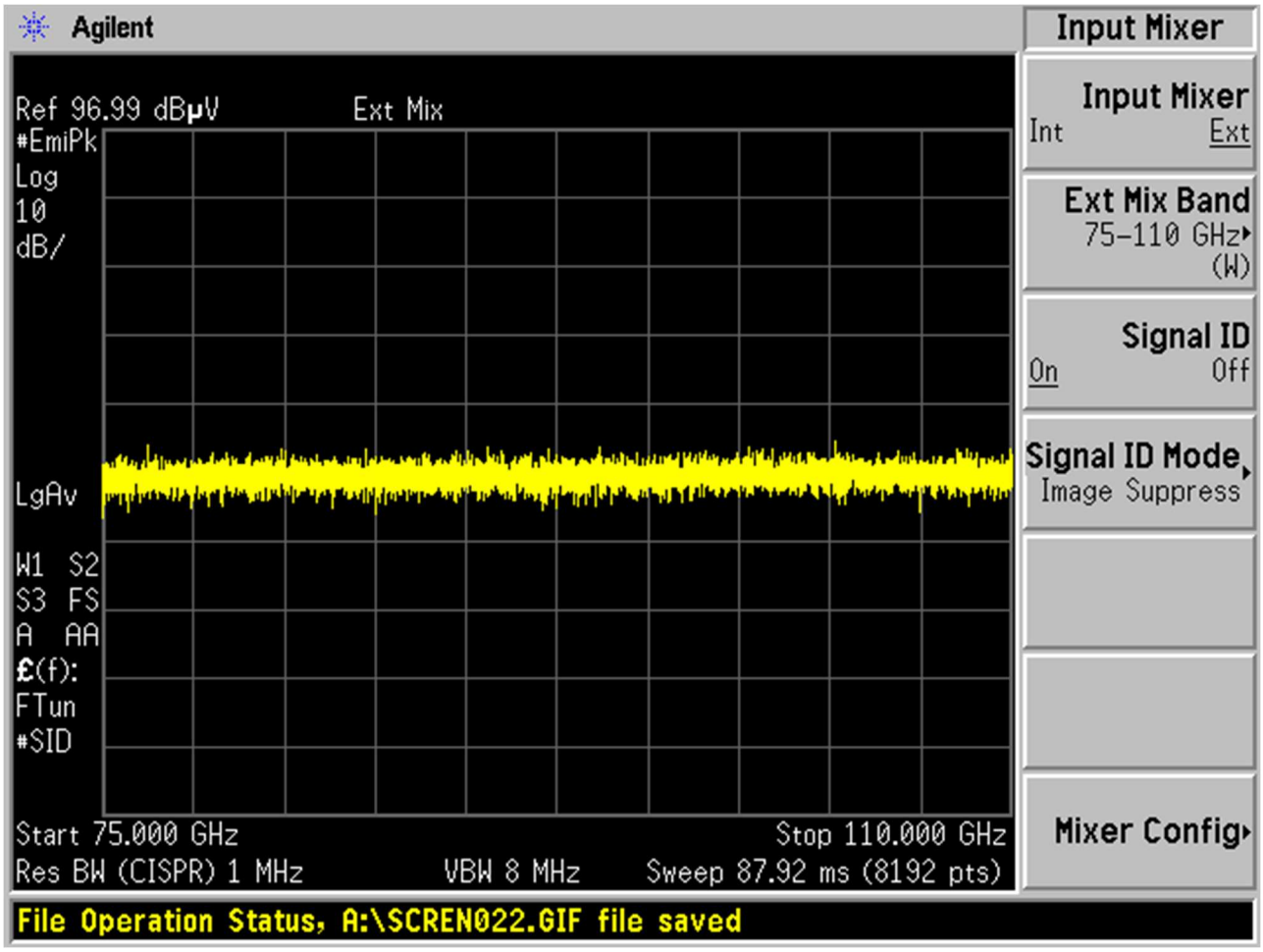
* FCC 15.249 limit for harmonics is actually 98 dBuV/m @ 10 m.

4.3.2 Up to 75 GHz



Highest Recorded for Both Polarities 50 to 75 GHz

4.3.3 Up to 100 GHz



Highest Recorded for Both Polarities 75 to 100 GHz

5.0 Antenna Construction Requirements, Clause: 15.203, RSS-Gen 6.8

5.1 Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevent wireless device antennas from being modified by end users.

5.2 Criteria

Parameter
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.3 Results

Table 5.3.1: Construction Results		
Criteria	**Evaluation**	**Pass/Fail**
Antenna must not be easily substituted by user.	The antenna is a permanent integral antenna (a printed circuit patch array).	Pass
Antenna must use a unique type of connector to attach to the EUT.	There is no antenna connector.	Pass

The EUT and antenna satisfied the requirements.

6.0 Mains Conducted Emissions, Clause: 15.207, RSS-Gen 7.2

6.1 Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevent wireless device antennas from being modified by end users.

6.2 Criteria

Parameter

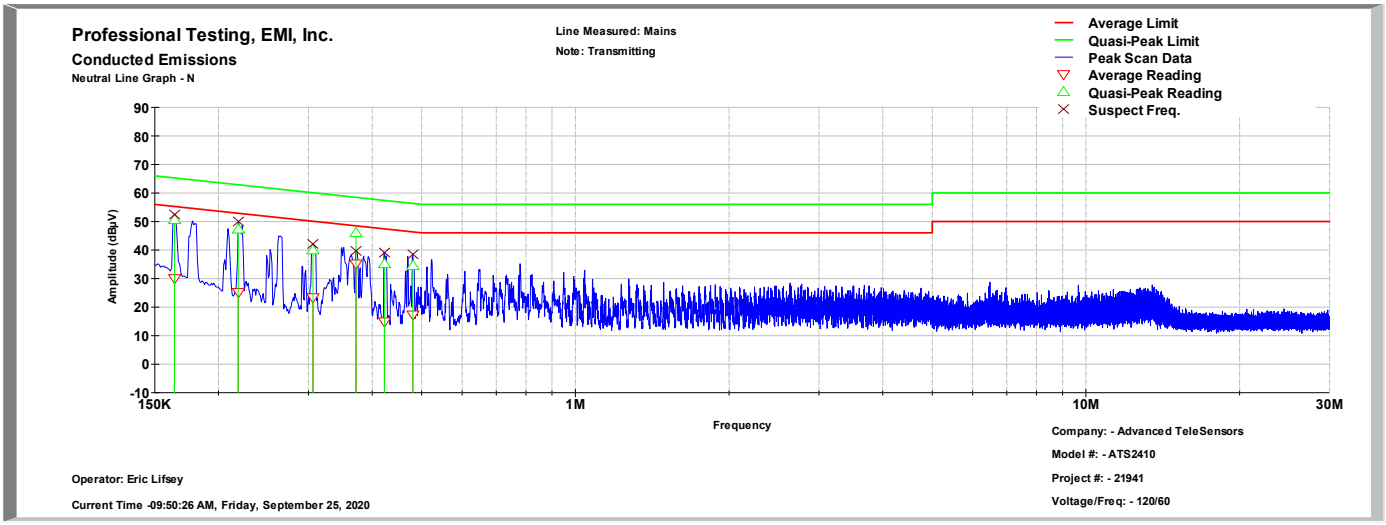
Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

6.3 Results

The EUT satisfied the requirements.

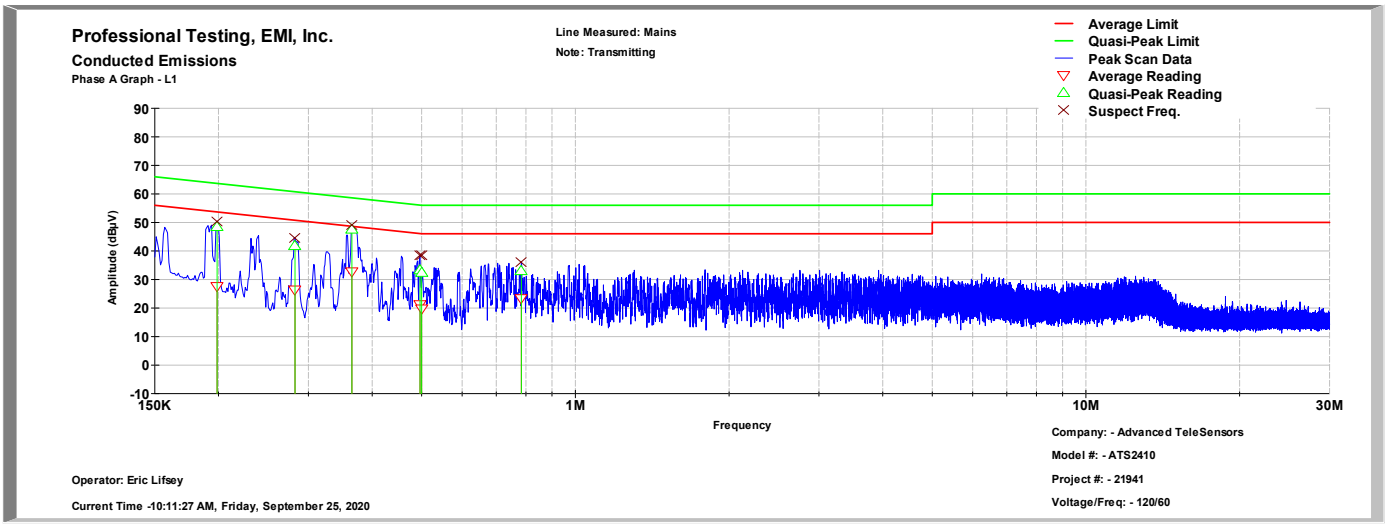
EUT Name	**Cardi/o**		**Model or Serial #**	**ATX2410 S/N 8**	
EUT Line Voltage	**120**	**VAC**	**Frequency**	**60**	**Hz**
Emissions Limit Level	**B**		**EUT Test Mode or Configuration**	**Transmitting**	
Frequency Range			**Line Tested**	**Test Results**	
150kHz to 30MHz			**Neutral Line**	**Pass**	
			Phase A (Line 1)	**Pass**	
Notes:					

Neutral Line Emissions Data



Frequency (MHz)	Quasi-peak Reading (dBµV)	Quasi-peak Limit (dBµV)	Quasi-peak Margin (dB)	Quasi-peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results	Peak Reading (dBµV)
(MHz)	(dBµV)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)
0.164	50.6	65.3	-14.6	PASS	29.9	55.3	-25.4	PASS	58.7
0.219	47.2	62.9	-15.6	PASS	25.3	52.9	-27.6	PASS	53.1
0.306	39.9	60.1	-20.2	PASS	23.3	50.1	-26.8	PASS	48.3
0.372	46.2	58.5	-12.2	PASS	35.2	48.5	-13.3	PASS	49.9
0.423	35.2	57.4	-22.2	PASS	14.8	47.4	-32.6	PASS	42.3
0.480	34.6	56.3	-21.7	PASS	17.4	46.3	-29.0	PASS	41.0

Line 1 Emissions Data



Frequency (MHz)	Quasi-peak Reading (dBµV)	Quasi-peak Limit (dBµV)	Quasi-peak Margin (dB)	Quasi-peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results	Peak Reading (dBµV)
(MHz)	(dBµV)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)
0.199	48.5	63.7	-15.1	PASS	27.7	53.7	-26.0	PASS	54.9
0.282	41.7	60.7	-19.0	PASS	26.3	50.7	-24.5	PASS	46.1
0.365	47.5	58.6	-11.1	PASS	32.6	48.6	-16.0	PASS	50.6
0.496	33.2	56.1	-22.9	PASS	21.2	46.1	-24.8	PASS	37.9
0.500	32.5	56.0	-23.5	PASS	19.8	46.0	-26.2	PASS	38.1
0.784	32.9	56.0	-23.1	PASS	23.3	46.0	-22.7	PASS	36.9

7.0 Equipment

Table 7.0.1 – Radiated Emissions 30 MHz to 26.5 GHz

Radiated Emissions Test Equipment List					
Tile! Software Version:		**Version: 7.1.2.17 (Jan 08, 2016 - 02:12:48 PM) or 4.1.A.0, April 14, 2009, 11:01:00PM**			
Test Profile:		**2020_RE_Unintentional_TILE7_v2.7.til**			
Asset #	**Manufacturer**	**Model**	**Equipment Nomenclature**	**Serial Number**	**Calibration Due Date**
1509A	Braden	TDK 10M	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	9/17/2021
1890	HP	8447F-H64	Preamp/Amp, 9kHz-1300MHz, 28/25dB	3313A05298	1/9/2022
2295	Keysight	E4440A-AYZ	PSA Spectrum Analyzer	MY46186204	11/6/2020
1926	ETS-Lindgren	3142D	Antenna, Biconilog, 26 MHz - 6 GHz	135454	3/11/2021
C027	none	RG214	Cable Coax, N-N, 25m, 25MHz - 1GHz	None	9/8/2021
1327	EMCO	1050	Controller, Antenna Mast	none	N/A
0942	EMCO	11968D	Turntable, 4ft.	9510-1835	N/A
1969	HP	11713A	Attenuator/Switch Driver	3748A04113	N/A
1509B	Braden	TDK 10M	TDK 10M Chamber,sVSWR > 1 GHz	DAC-012915-005	9/21/2021
2004	Miteq	AFS44-00101800-2S-10P-44	Amplifier, 40dB, 100MHz-18GHz	None	1/9/2022
C030	none	none	Cable Coax, N-N, 30m, 1 - 18GHz	None	9/8/2021
1325	EMCO	1050	Controller, Antenna Mast	9003-1461	N/A
1780	ETS-Lindgren	3117	Antenna, Double Ridged Guide Horn, 1 - 18 GHz	110313	3/11/2021
1542	A.H. Systems	SAS-572	Antenna, Horn 18-26.5GHz, 20dB gain	225	N/A
1974	Agilent	83017A	Amplifier, Microwave 0.5-26.5 GHz	MY39500684	11/7/2020

Table 7.0.2 – Radiated Emissions 26.5 GHz to 100 GHz				
Asset #	**Manufacturer**	**Model #**	**Description**	**Calibration Due**
2295	Agilent	E4440A	Spectrum Analyzer	8 Nov 2020
None	Agilent	5061-5458	Agilent harmonic mixer cable 1: IF/LO SN none	NCR
None	Agilent	5061-5458	Agilent harmonic mixer cable 2: IF/LO SN none	NCR
2063	Agilent	11970A	Mixer, Harmonic, 26.5 - 40 GHz SN 3003A08717	NCR
2062	Agilent	11970Q	Mixer, Harmonic, 33 - 50 GHz SN 3003A03234	NCR
2064	Agilent	11970V	Mixer, Harmonic, 50 - 75 GHz SN MY30033017	NCR
2061	Agilent	11970W	Mixer, Harmonic, 75 - 110 GHz SN 2521A00784	NCR
0730	Millitech	SGH-19	Standard Gain Horn (no mixer) SN B020598	NCR
0730	Millitech	SGH-12	Standard Gain Horn (no mixer) SN 035-8344	NCR
0730	Millitech	SGH-10	Standard Gain Horn (no mixer) SN 085-8344	NCR
0730	Millitech	SGH-08	Standard Gain Horn (no mixer) SN 012-8344	NCR

Table 7.0.3 – Mains Conducted Emissions					
Conducted Emissions Test Equipment List					
Tile! Software Version:	**Version: 7.1.2.17 (Jan 08, 2016 - 02:12:48 PM) or 4.1.A.0, April 14, 2009, 11:01:00PM**				
Test Profile:	**2020_CE_TILE7_v4**				
Asset #	**Manufacturer**	**Model**	**Equipment Nomenclature**	**Serial Number**	**Calibration Due Date**
1145	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/7/2021
2113	HP	85662A	Spec Anal Dsply for A/N 1842	2403A07470	N/A
0990	HP	85685A	RF Preselector	3010A01119	7/8/2021
1279	HP	85650A	Quasi Peak Adapter	2521A00935	7/2/2021
C192	HP	none	Cable, RF, BNC-BNC, 0.2032m, Grey	None	1/20/2022
C303	Coleman Cable	RG-58A/U	Cable, BNC-BNC, 0.914m Black	None	2/24/2022
C107	Pomona	RG-223	Cable, BNC-BNC, 2.64m, RG-223 (black)	None	8/3/2022
1185	EMCO	3825/2	LISN, 10kHz-100MHz	1235	8/10/2021
1088	PTI	PTI-ALF4	Attenuator Limiter Filter	none	2/20/2021
1173	PTI	100k HPF	Filter, High Pass, 100kHz	none	2/11/2022

8.0 Measurement Bandwidths

Radiated Emissions Spectrum Analyzer Bandwidth and Measurement Time - Peak Scan				
Frequency Band Start (MHz)	**Frequency Band Stop (MHz)**	**6 dB Bandwidth (kHz)**	**Number of Ranges Used**	**Measurement Time per Range**
0.009	0.15	0.3	2	Multiple Sweeps
0.15	30	9	6	Multiple Sweeps
30	1000	120	2	Multiple 800 mS Sweeps
1000	6000	1000	2	Multiple Sweeps
6000	18000	1000	2	Multiple Sweeps
18000	100000	1000	2	Multiple Sweeps

*Notes:
1. The settings above are specifically calculated for the E4440A series of spectrum analyzers, which have 8,000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.
3. The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.
4. The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1000 MHz.
5. The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with NIST policy. Since PTI operates in accordance with NIST (NVLAP) Handbook 150-11: 2007, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by NIST Handbook 150-11.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at PTI that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of PTI measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties for Site 45

Type of Measurement	Frequency Range	Meas. Dist.	Expanded Uncertainty U, dB (k=2)
Mains Conducted Emissions	150 kHz to 30 MHz	N/A	2.9
Telecom Conducted Emissions	150 kHz to 30 MHz	N/A	2.8
Radiated Emissions	30 to 1,000 MHz	10 m	4.8
	1 to 18 GHz	3 m	5.7

End of Report