



**FCC CFR47 PART 15 SUBPART C
ISED CANADA RSS-210 ISSUE 10**

TEST REPORT

FOR

MODEL NUMBER: SRF319H

**FCC ID: 2AAJXQS-SRF319H
IC: 11205A-QSSRF319H**

REPORT NUMBER: R14299058-E1

ISSUE DATE: 2022-08-31

**Prepared for
Qolsys Inc.
1919S. Bascom Ave., Suite 600
Campbell, CA 95008, U.S.A**

**Prepared by
UL LLC
12 LABORATORY DR.
RESEARCH TRIANGLE PARK, NC 27709 USA
TEL: (919) 549-1400**



REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2022-07-13	Initial Issue	Eric McCalister
V2	2022-08-09	Added AC Line, DC Plot and other editorial changes	Eric McCalister
V3	2022-08-17	Revised antenna information in section 5.2. Added setup photo reference Added AC mains limits and procedure	Brian Kiewra
V4	2022-08-31	Revised antenna information in section 5.2.	Brian Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Qosys Inc.
1900 The Alameda, Suite 420
San Jose, CA 95126, U.S.A

EUT DESCRIPTION: 319.5MHz Radio Module

MODEL: SRF319H

SERIAL NUMBER: Non-serialized

SAMPLE RECEIVE DATE: 2022-05-24

DATE TESTED: 2022-06-09 to 2022-06-15

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C : 2022	Complies
ISED CANADA RSS-210 Issue 10, Annex A: 2019	Complies
ISED CANADA RSS-GEN Issue 5 + A2: 2019	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST or any agency of the U.S. government.

Approved & Released For
UL LLC. By:

Prepared By:



Mike Antola
Staff Engineer
Consumer Technology Division
UL LLC.

Eric McCalister
Laboratory Supervisor
Consumer Technology Division
UL LLC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2022 RSS-GEN Issue 5 + A2 2019, and RSS-210 Issue 10: 2019.

3. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Certificate Number 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

Uncertainty figures are valid to a confidence level of 95%.

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable} \\ &\text{Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Final Voltage (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor} \\ &\text{(dB)} + \text{LISN Insertion Loss.} \\ 36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} &= 46.6 \text{ dBuV} \end{aligned}$$

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 319.5MHz radio module.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a wire antenna, with a maximum gain of 1.94 dBi.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was msm8953_64-userdebug 9
PKQ1.190723.001

The test utility software used during testing was Android Debug Bridge v29.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT operates only at a single channel. As such, all testing performed at this channel while operating at its highest intended power setting.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	Sure-power	SW-070100AB	-	NA
IQPANEL4	Qolsys	IQPANEL4	QP4004X122201G07563	2AAJXQS-ZB

I/O CABLES

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	1	1	I/O	AC Mains	<3m	None

TEST SETUP

Test software exercised the radio card.

Refer to R14299058-EP1 for setup diagram.

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2021-08-19	2022-08-19
	30-1000 MHz				
AT0081	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-12-08	2022-12-08
	1-18 GHz				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-06-29	2022-06-29
	Gain-Loss Chains				
C4-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2022-05-20	2023-05-20
C4-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2022-05-20	2023-05-20
C4-SAC03	Gain-loss string: 1-18GHz	Various	Various	2022-05-20	2023-05-20
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2022-02-15	2023-02-15
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
s/n 210701942	Environmental Meter	Fisher Scientific	15-077-963	2021-8-16	2023-08-16
HPF009	1GHz high-pass filter, 2W, $F_{high} = 10\text{GHz}$	Micro-Tronics	HPM17672	2022-02-17	2023-02-17

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-24	2023-05-24
SA0020	Spectrum Analyzer	Agilent	E4446A	2022-06-08	2023-06-08
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2022-04-05	2023-04-05
HI0096	Environmental Meter	Fisher Scientific	NA	2021-09-21	2022-09-21
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2021-08-16	2022-08-16
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2021-08-17	2022-08-17
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2022-04-05	2023-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		
	Miscellaneous (if needed)				
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2021-09-13	2022-09-13

7. TEST RESULTS

7.1. 20 dB AND 99% BW

LIMITS

FCC §15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

RSS-210 A1.3

For the purpose of Section A1.1, the 99% Bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

TEST PROCEDURE

ANSI C63.10

The transmitter output is connected to the spectrum analyzer.

99% & 20dB Bandwidth: The RBW is set to 1% to 5% of the 99 % / 20dB bandwidth. The VBW is set to approximately 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth and n dB down functions are utilized.

RESULTS

No non-compliance noted:

20dB Bandwidth

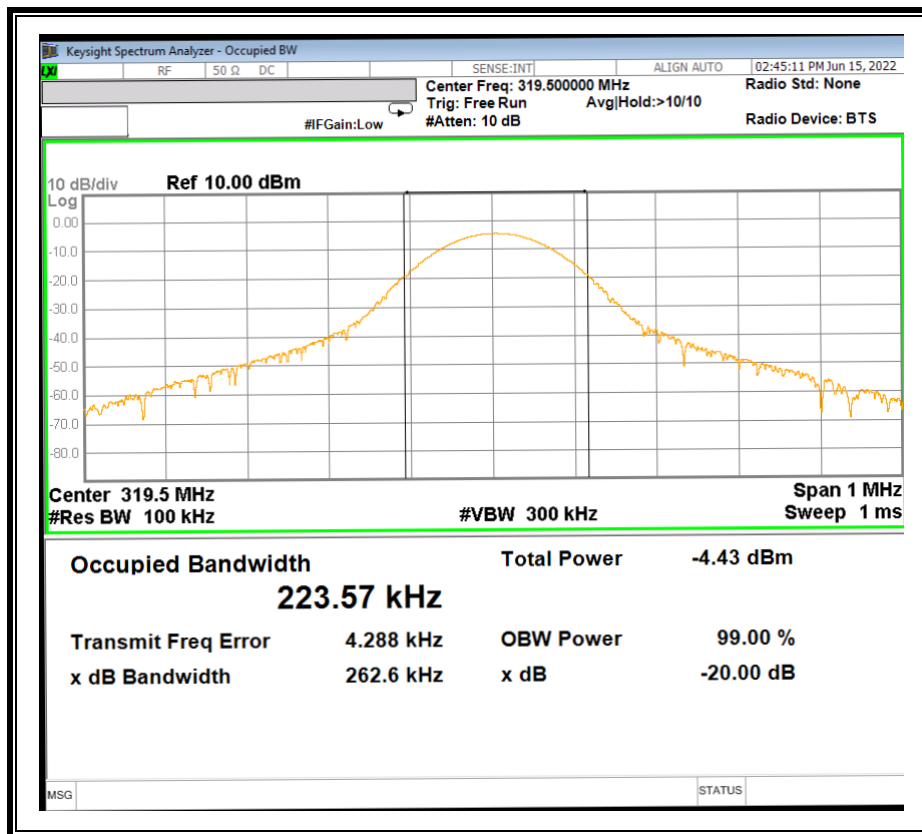
Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	262.60	798.75	-536.15

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	223.57	798.75	-575.18

99% BANDWIDTH AND 20dB BANDWIDTH

Tester:	11993
Date:	2022-06-15



Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since the measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

7.2. DUTY CYCLE

LIMITS

FCC §15.35 (c)

The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

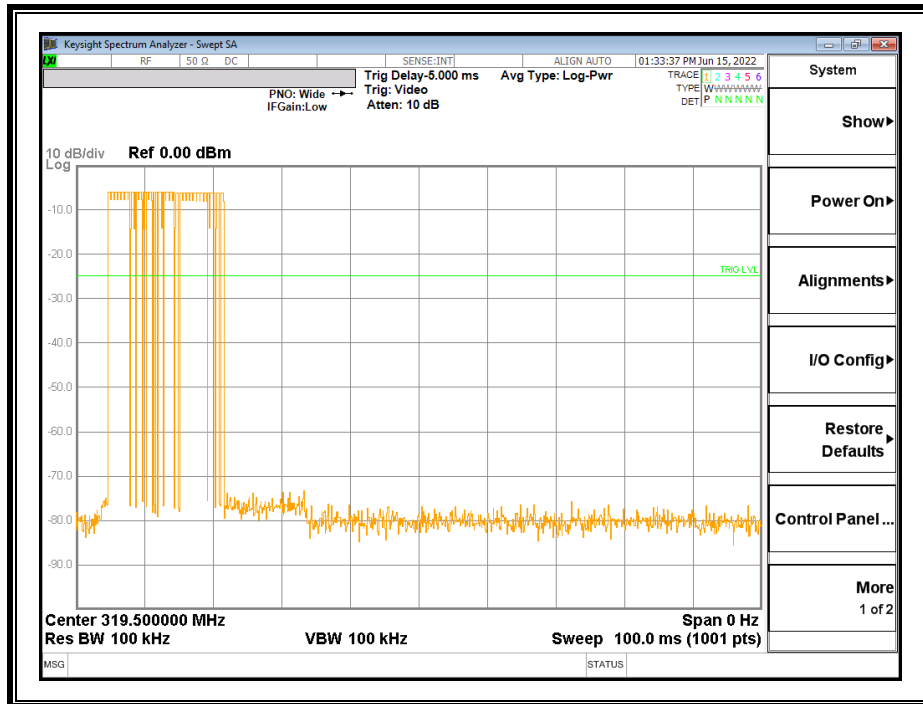
Tester:	11993
Date:	2022-06-15

No non-compliance noted:

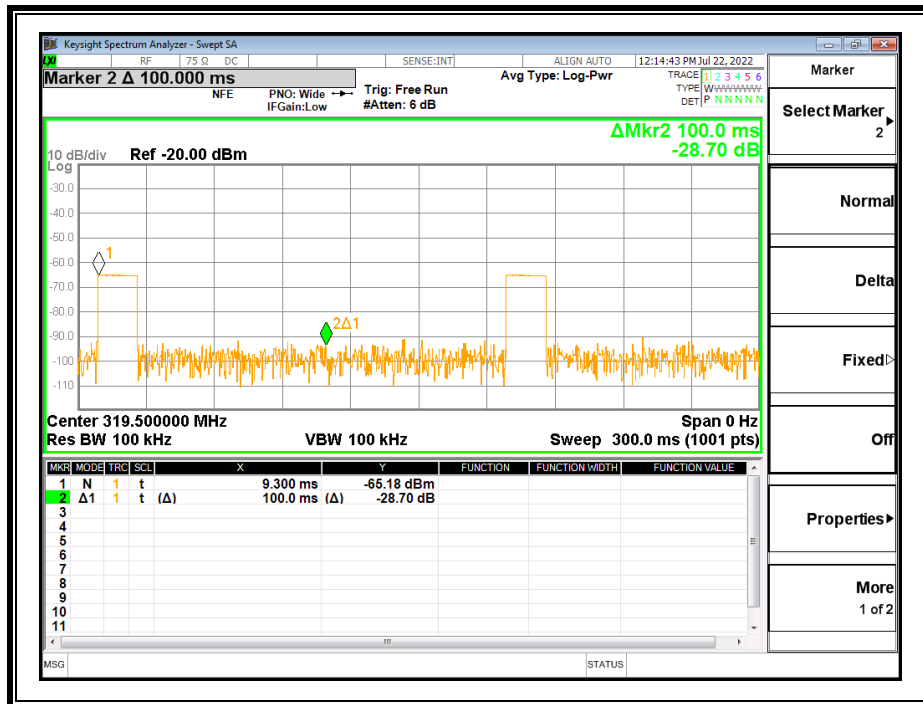
One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	0.497	1	0.116	59	0.073	-22.68

TRANSMISSION IN A 100MS WINDOW

Tester:	11993
Date:	2022-06-15

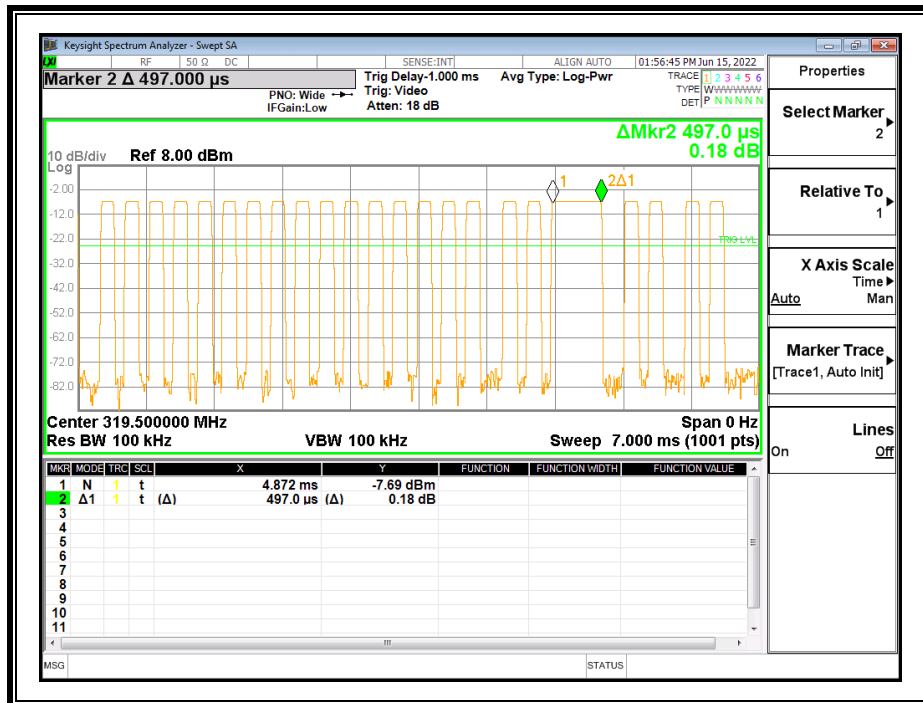


Tester:	11993
Date:	2022-07-22



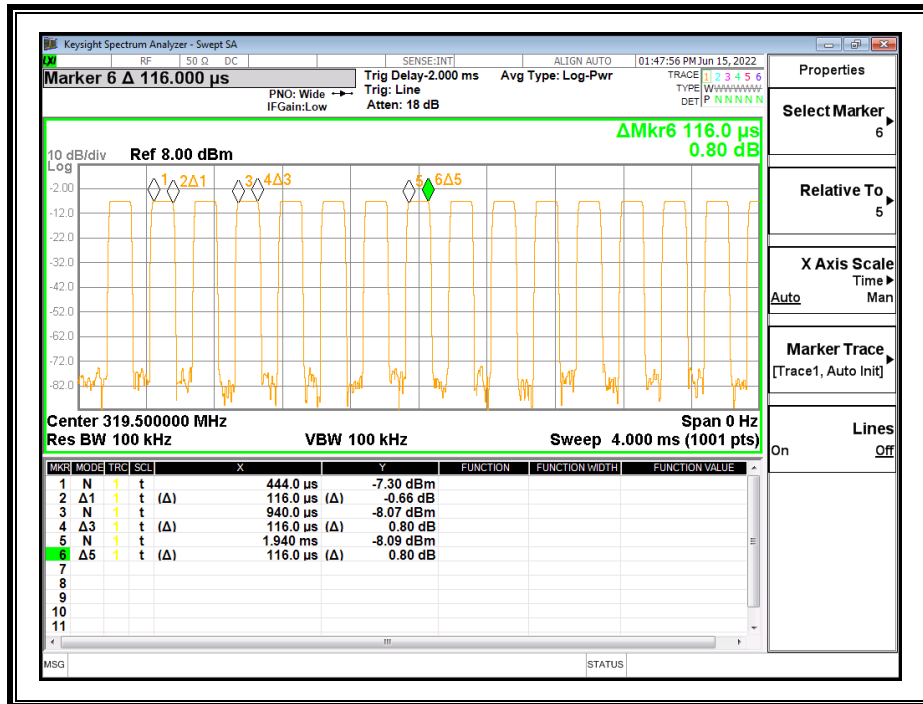
LONG PULSE WIDTH

Tester:	11993
Date:	2022-06-15



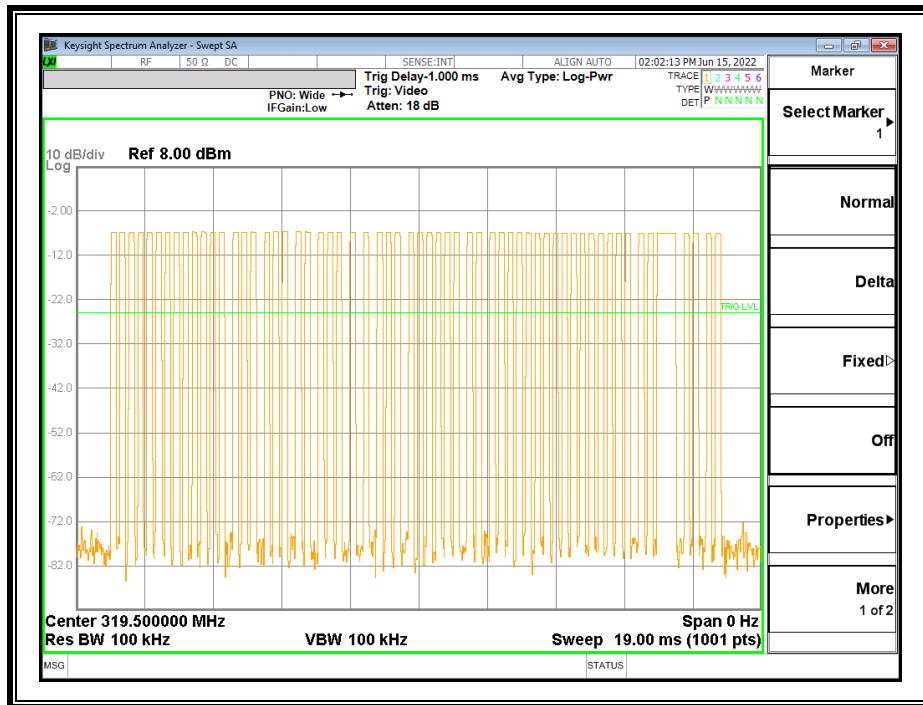
SHORT PULSE WIDTH

Tester:	11993
Date:	2022-06-15



NUMBER OF SHORT/LONG PULSES

Tester:	11993
Date:	2022-06-15



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)
 RSS-210 A1.1 (b)

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

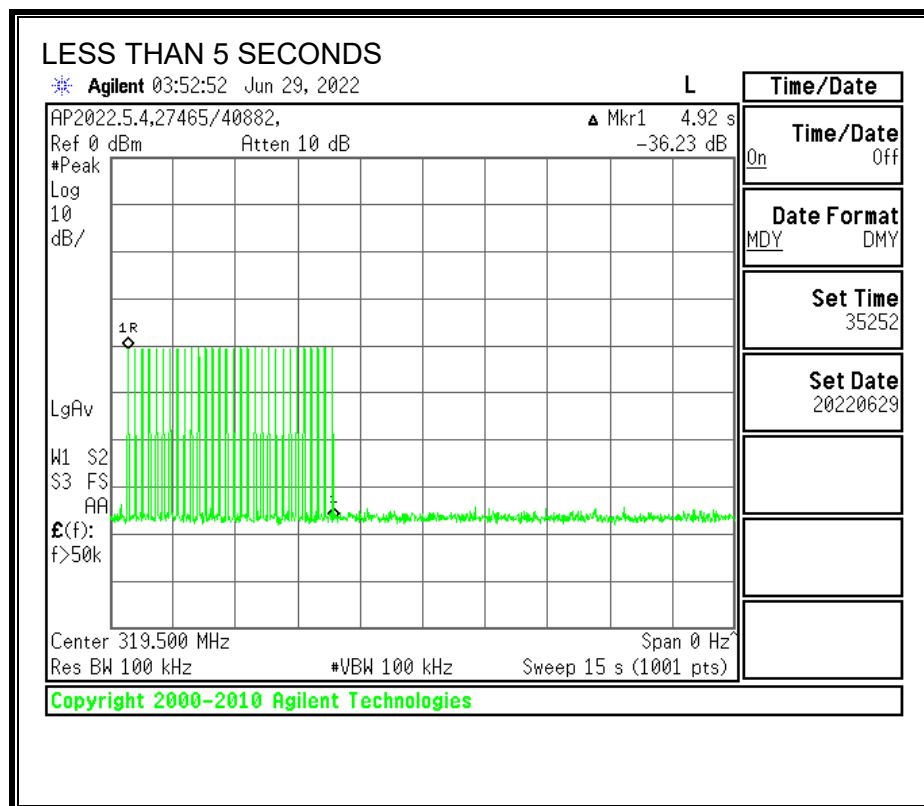
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is set to 10 seconds and the span is set to 0 Hz.

RESULTS

Tester:	11993
Date:	2022-06-29

No non-compliance noted:



7.4. SUPERVISION TRANSMISSIONS

LIMITS

FCC §15.231 (a) (3)

RSS-210 A.1.1 (c)

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Results

Tester:	11993
Date:	2022-06-15

1. According to manufacturer manual, the interval of supervisory signal transmission is once every minute.
2. Total transmission time:

Short Pulse Width (ms)	Number of Short Pulse	Long Pulse Width (ms)	Number of Long Pulse	One Pulse Stream (ms)	Total Pulse Streams per hour	Total Transmission Time per hour (ms)
0.116	59	0.497	1	7.341	60.00	440.46

7.5. RADIATED EMISSION TEST RESULTS

LIMITS

FCC §15.231 (b)
 RSS-210 A.1.2

In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750 ¹	125 to 375 ¹
174 - 260	3,750	375
260 - 470	3,750 to 12,500 ¹	375 to 1,250 ¹
Above 470	12,500	1,250

¹ Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 88	100 **	3
88 216	150 **	3
216 960	200 **	3
Above 960	500	3

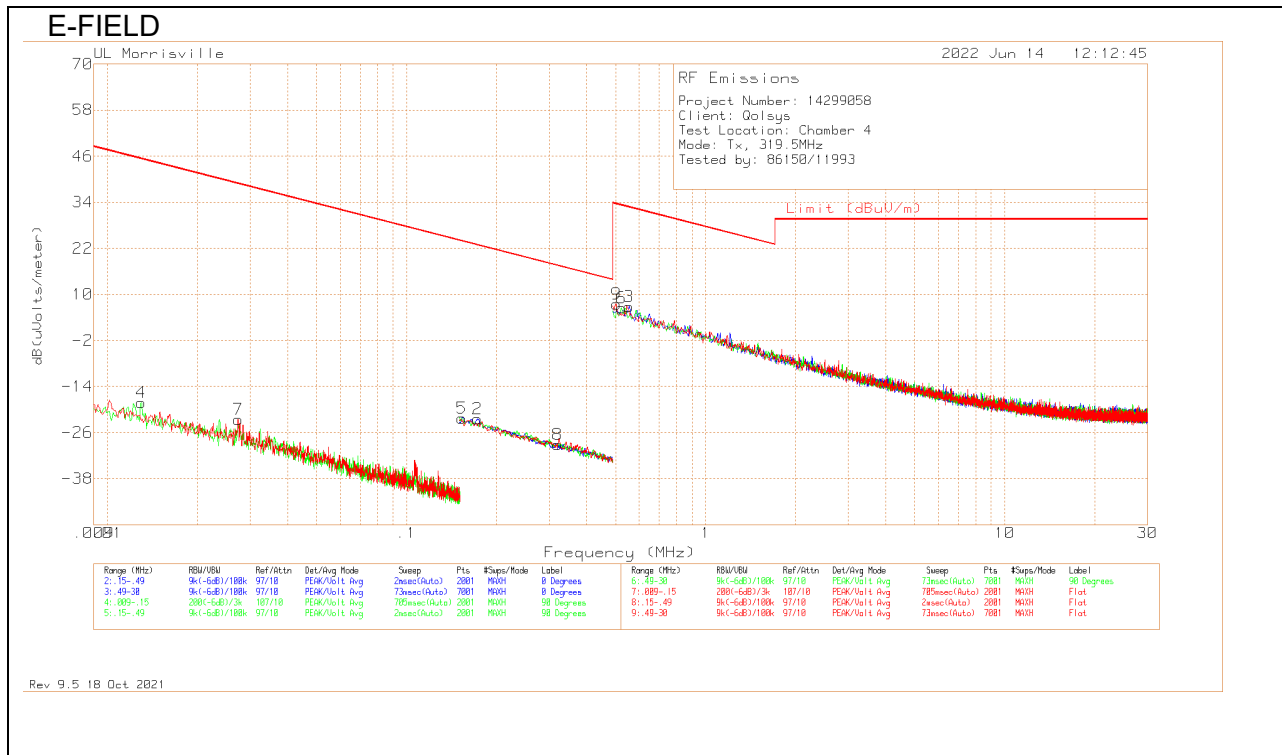
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 72 MHz, 76 88 MHz, 174 216 MHz or 470 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Note: For below 30MHz scans, all measurements were made at a test distance of 3-meters. The measured data was extrapolated from the test distance to the specification distance (300-meter from 9-490kHz, 30-meter from 490kHz-30MHz) to clearly show the relative levels for fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 * \log(\text{test distance} / \text{specification distance})$.

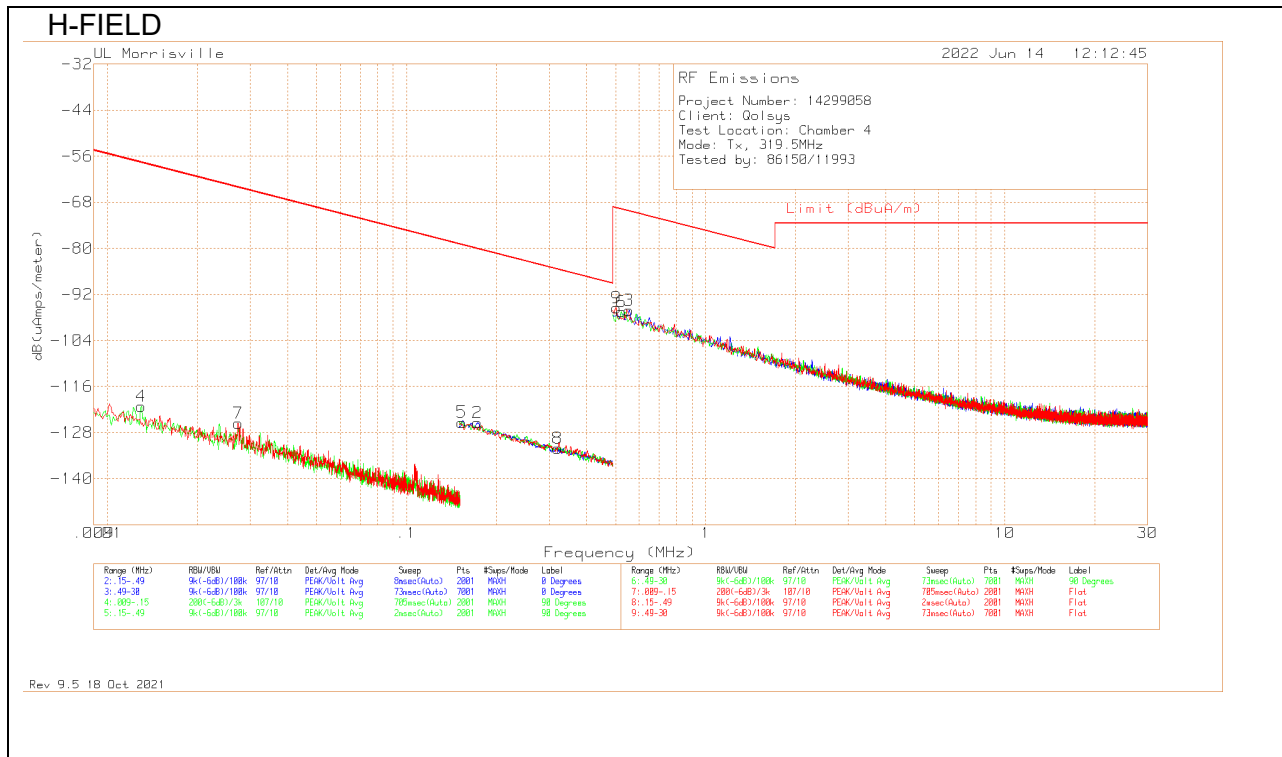
RESULTS

7.5.1. TX SPURIOUS EMISSION (9 kHz - 30 MHz)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 QP/AV Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)	Loop Angle
4	.01298	44.78	Pk	17.1	0	-80	-18.12	45.34	65.34	-63.46	0-360	90 degs
7	.02739	43.99	Pk	13.5	0	-80	-22.51	38.85	58.85	-61.36	0-360	Flat
1	.05685	38.86	Pk	11.7	.1	-80	-29.34	32.51	52.51	-61.85	0-360	0 degs
5	.15323	46.38	Pk	11.2	.1	-80	-22.32	23.9	43.9	-46.22	0-360	90 degs
2	.17295	46.25	Pk	11.2	.1	-80	-22.45	22.85	42.85	-45.3	0-360	0 degs
8	.32051	39.54	Pk	11.2	.1	-80	-29.16	17.49	37.49	-46.65	0-360	Flat
9	.50265	36.23	Pk	11.2	.1	-40	7.53	33.58	-	-26.05	0-360	Flat
6	.52373	35.27	Pk	11.2	.1	-40	6.57	33.22	-	-26.65	0-360	90 degs
3	.55324	35.56	Pk	11.2	.1	-40	6.86	32.75	-	-25.89	0-360	0 degs

Pk - Peak detector



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	RSS-GEN Qp/Av Limit (dBuA/m)	RSS-GEN Pk Limit (dBuA/m)	Worst-Case Margin (dB)	Azimuth (Degs)	Loop Angle
4	.01298	44.78	Pk	-85.9	0	-80	-121.12	-57.66	-37.66	-63.46	0-360	90 degs
7	.02739	43.99	Pk	-89.5	0	-80	-125.51	-64.15	-44.15	-61.36	0-360	Flat
1	.05685	38.86	Pk	-91.3	.1	-80	-132.34	-70.49	-50.49	-61.85	0-360	0 degs
5	.15323	46.38	Pk	-91.8	.1	-80	-125.32	-79.1	-59.1	-46.22	0-360	90 degs
2	.17295	46.25	Pk	-91.8	.1	-80	-125.45	-80.15	-60.15	-45.3	0-360	0 degs
8	.32051	39.54	Pk	-91.8	.1	-80	-132.16	-85.51	-65.51	-46.65	0-360	Flat
9	.50265	36.23	Pk	-91.8	.1	-40	-95.47	-69.42	-	-26.05	0-360	Flat
6	.52373	35.27	Pk	-91.8	.1	-40	-96.43	-69.78	-	-26.65	0-360	90 degs
3	.55324	35.56	Pk	-91.8	.1	-40	-96.14	-70.25	-	-25.89	0-360	0 degs

Pk - Peak detector

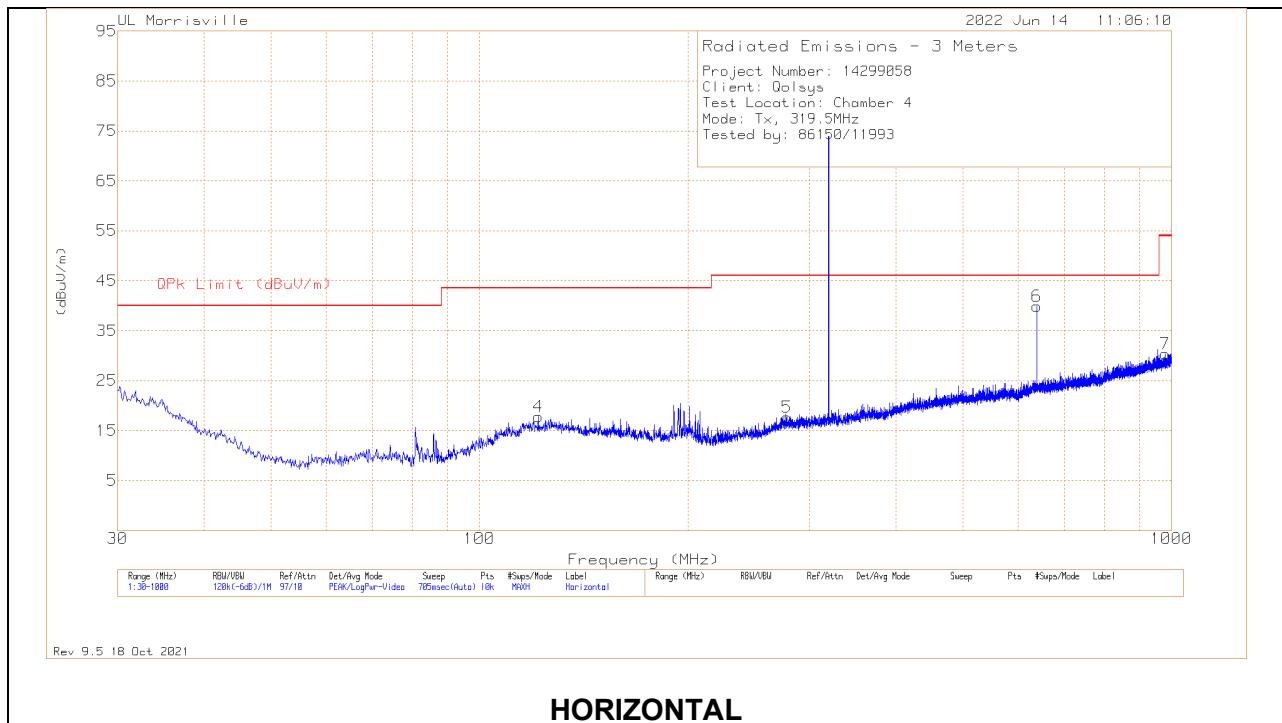
Fundamental

Project Number: 14299058
 Client: Qosys
 Test Location: Chamber 4
 Mode: Tx, 319.5MHz
 Tested by: 86150/11993
 Date: 2022-06-14

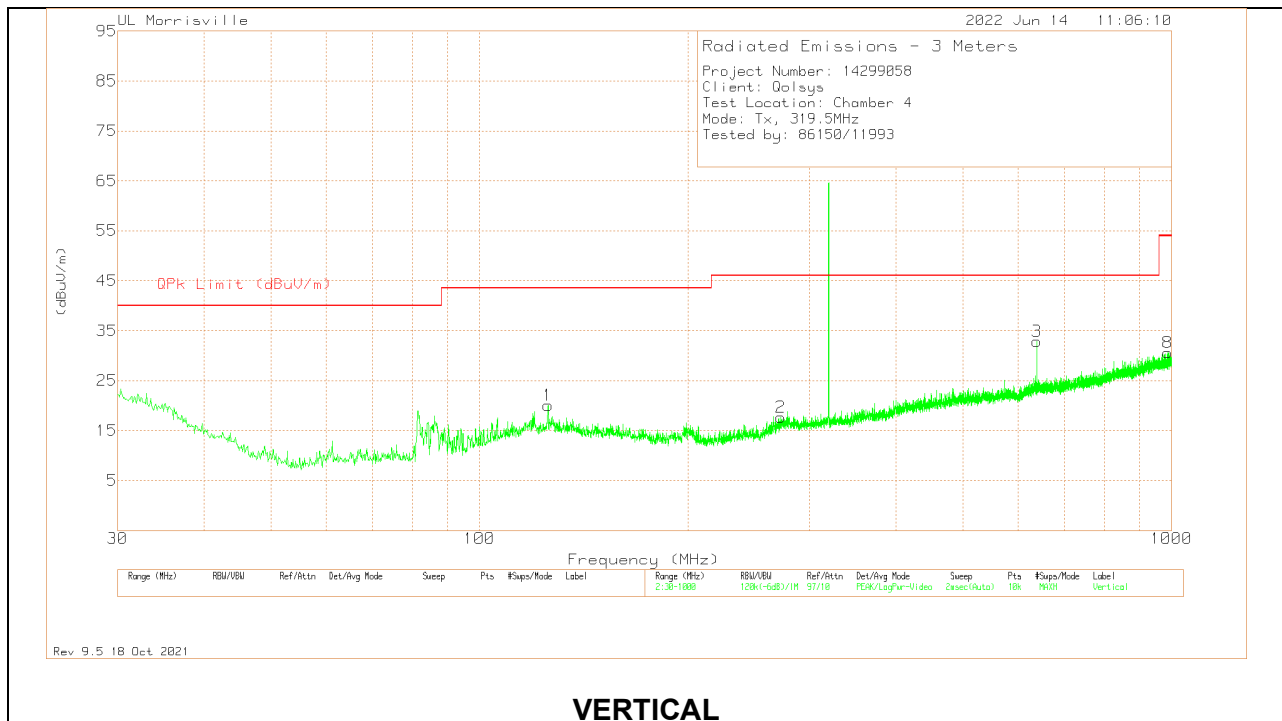
Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
319.502	74.13	Pk	20.3	-29	0	65.43	-	-	95.89	-30.46	20	107	V
319.502	74.13	Pk	20.3	-29	-22.68	42.75	75.89	-33.14	-	-	20	107	V
319.504	82.72	Pk	20.3	-29	0	74.02	-	-	95.89	-21.87	161	110	H
319.504	82.72	Pk	20.3	-29	-22.68	51.34	75.89	-24.55	-	-	161	110	H

Pk - Peak detector

7.5.2. HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)



HORIZONTAL

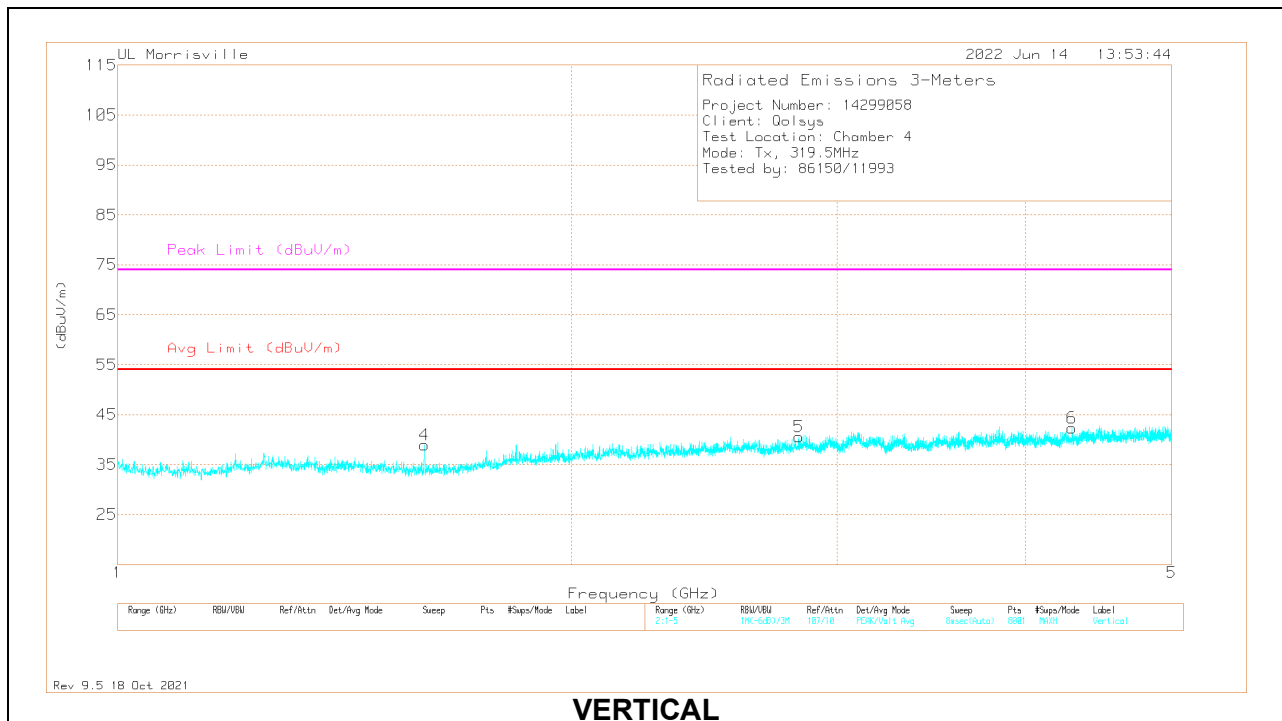
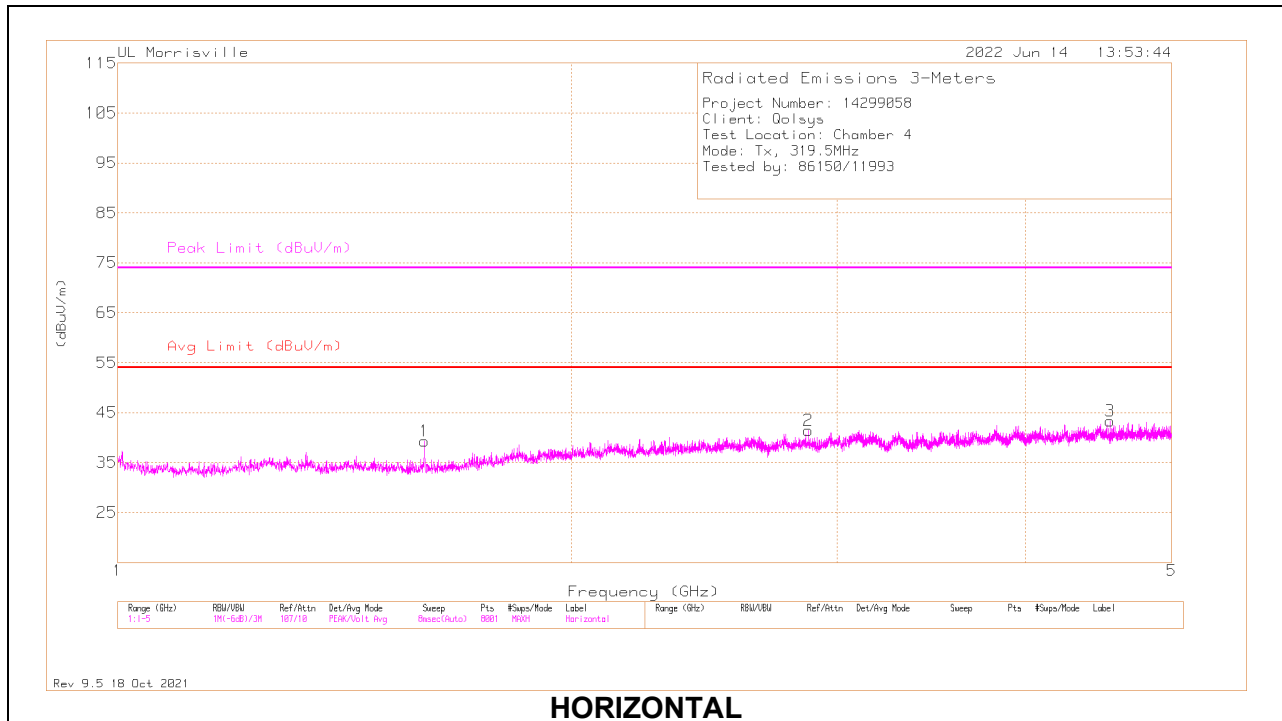


VERTICAL

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* ** 121.665	28.29	Pk	20.1	-30.6	17.79	43.52	-25.73	0-360	100	H
5	* ** 278.32	26.82	Pk	19.8	-29	17.62	46.02	-28.4	0-360	100	H
7	* ** 978.66	24.89	Pk	29.7	-24.2	30.39	53.97	-23.58	0-360	200	H
1	* ** 125.642	30.26	Pk	20.2	-30.4	20.06	43.52	-23.46	0-360	100	V
2	* ** 272.597	27.26	Pk	19.7	-29.3	17.66	46.02	-28.36	0-360	200	V
8	* ** 988.457	25.14	Pk	29.8	-24.3	30.64	53.97	-23.33	0-360	100	V
6	639.063	41.06	Pk	26.3	-27.5	39.86	46.02	-6.16	0-360	200	H
3	639.063	34.08	Pk	26.3	-27.5	32.88	46.02	-13.14	0-360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

7.5.3. HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHZ



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 (dB/m)	Gain/Loss (dB)	Filter (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.5975	46.96	Pk	28.2	-36.3	.5	0	39.36	-	-	75.89	-36.53	0-360	100	H
	* ** 1.5975	46.96	Pk	28.2	-36.3	.5	-22.68	16.68	55.89	-39.21	-	-	0-360	100	H
2	* ** 2.872	44.39	Pk	32.4	-35.8	.5	0	41.49	-	-	75.89	-34.4	0-360	100	H
	* ** 2.872	44.39	Pk	32.4	-35.8	.5	-22.68	18.81	55.89	-37.08	-	-	0-360	100	H
3	* ** 4.5545	41.69	Pk	33.9	-32.4	.1	0	43.29	-	-	75.89	-32.6	0-360	200	H
	* ** 4.5545	41.69	Pk	33.9	-32.4	.1	-22.68	20.61	55.89	-35.28	-	-	0-360	200	H
4	* ** 1.5975	46.58	Pk	28.2	-36.3	.5	0	38.98	-	-	75.89	-36.91	0-360	300	V
	* ** 1.5975	46.58	Pk	28.2	-36.3	.5	-22.68	16.3	55.89	-39.59	-	-	0-360	300	V
5	* ** 2.83	43.45	Pk	32.5	-35.9	.5	0	40.55	-	-	75.89	-35.34	0-360	400	V
	* ** 2.83	43.45	Pk	32.5	-35.9	.5	-22.68	17.87	55.89	-38.02	-	-	0-360	400	V
6	* ** 4.295	41.02	Pk	33.4	-32.4	.3	0	42.32	-	-	75.89	-33.57	0-360	400	V
	* ** 4.295	41.02	Pk	33.4	-32.4	.3	-22.68	19.64	55.89	-36.25	-	-	0-360	400	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

7.6. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

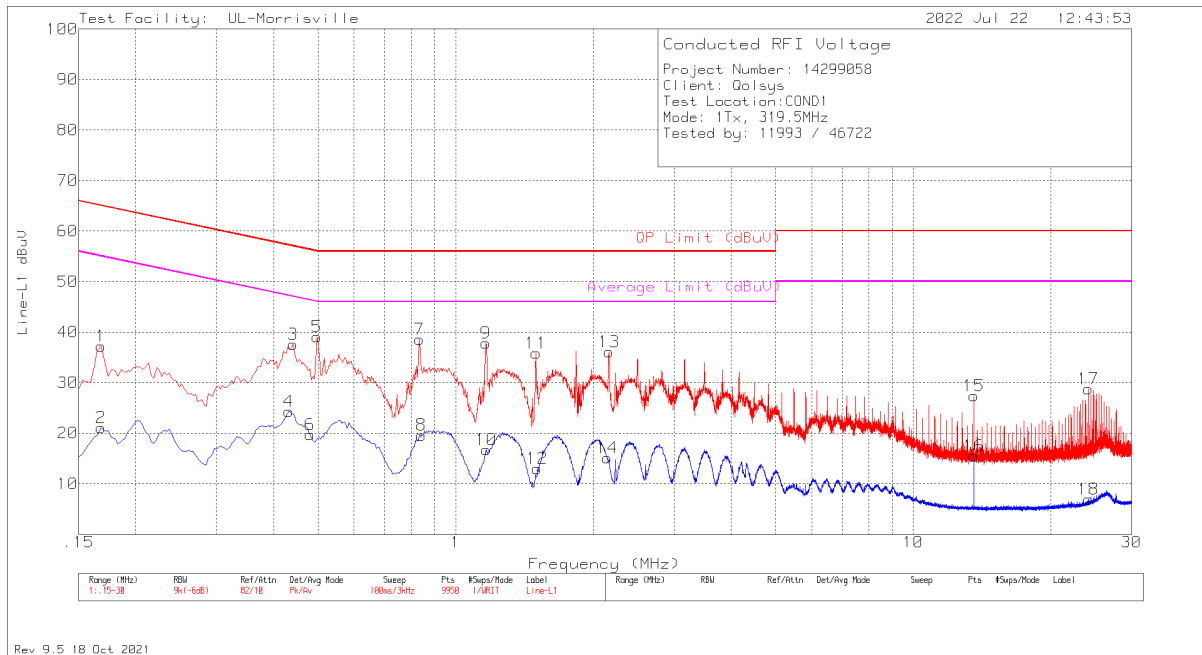
TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both lines.

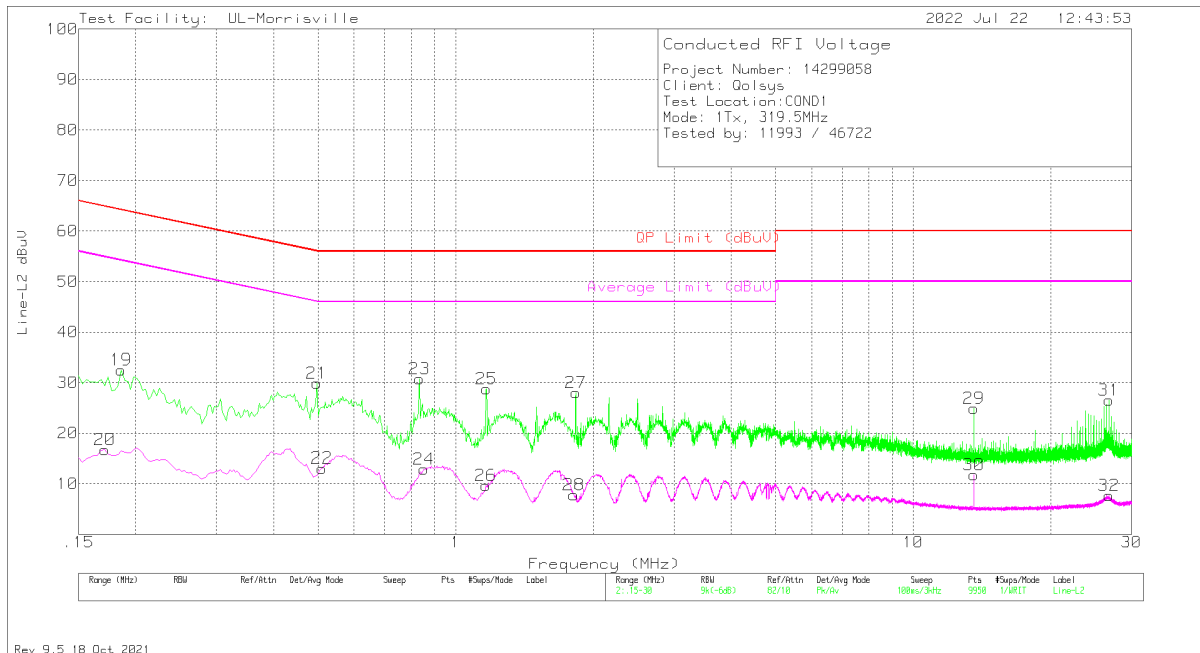
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.168	27.25	Pk	.2	9.8	37.25	65.06	-27.81	-	-
2	.168	11.04	Av	.2	9.8	21.04	-	-	55.06	-34.02
4	.432	14.45	Av	.1	9.8	24.35	-	-	47.21	-22.86
3	.441	27.63	Pk	.1	9.8	37.53	57.04	-19.51	-	-
6	.48	9.92	Av	0	9.8	19.72	-	-	46.34	-26.62
5	.498	29.24	Pk	0	9.8	39.04	56.03	-16.99	-	-
7	.834	28.79	Pk	0	9.8	38.59	56	-17.41	-	-
8	.843	9.84	Av	0	9.8	19.64	-	-	46	-26.36
9	1.164	27.99	Pk	0	9.8	37.79	56	-18.21	-	-
10	1.167	6.95	Av	0	9.8	16.75	-	-	46	-29.25
11	1.5	26.01	Pk	0	9.8	35.81	56	-20.19	-	-
12	1.509	3.24	Av	0	9.8	13.04	-	-	46	-32.96
14	2.145	5.34	Av	0	9.8	15.14	-	-	46	-30.86
13	2.163	26.35	Pk	0	9.8	36.15	56	-19.85	-	-
16	13.56	5.33	Av	.1	10	15.43	-	-	50	-34.57
15	13.563	17.28	Pk	.1	10	27.38	60	-32.62	-	-
17	24.105	18.4	Pk	.2	10.2	28.8	60	-31.2	-	-
18	24.105	-3.46	Av	.2	10.2	6.94	-	-	50	-43.06

Pk - Peak detector
 Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
20	.171	6.69	Av	.2	9.8	16.69	-	-	54.91	-38.22
19	.186	22.55	Pk	.2	9.8	32.55	64.21	-31.66	-	-
21	.498	20.03	Pk	0	9.8	29.83	56.03	-26.2	-	-
22	.51	3.26	Av	0	9.8	13.06	-	-	46	-32.94
23	.834	20.94	Pk	0	9.8	30.74	56	-25.26	-	-
24	.852	3.11	Av	0	9.8	12.91	-	-	46	-33.09
26	1.164	-1.19	Av	0	9.8	9.61	-	-	46	-36.39
25	1.167	18.93	Pk	0	9.8	28.73	56	-27.27	-	-
28	1.812	-1.96	Av	0	9.8	7.84	-	-	46	-38.16
27	1.83	18.27	Pk	0	9.8	28.07	56	-27.93	-	-
29	13.56	14.85	Pk	.1	10	24.95	60	-35.05	-	-
30	13.56	1.64	Av	.1	10	11.74	-	-	50	-38.26
32	26.802	-2.89	Av	.3	10.2	7.61	-	-	50	-42.39
31	26.805	15.98	Pk	.3	10.2	26.48	60	-33.52	-	-

Pk - Peak detector
 Av - Average detection

8. SETUP PHOTOS

Refer to R14299058-EP1 for setup photos.

END OF TEST REPORT