



# TEST REPORT

**Report Number. :** R13694045-E9

**Applicant :** Trek Bicycle Company  
801 West Madison Street  
Waterloo, WI, 53594 U.S.A

**Model :** 5252795

**FCC ID :** 2AHXD-5252795

**IC :** 21334-5252795

**EUT Description :** Trek Commuter Pro RT Bicycle Light

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C: 2021  
ISED RSS-210 Issue 10: 2019  
ISED RSS-GEN ISSUE 5 + A2:2021

**Date Of Issue:**  
2021-11-22

**Prepared by:**  
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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2021-09-30	Initial Issue	Haley Ackun
V2	2021-10-14	Updated report to FCC 15.249	Haley Ackun
V3	2021-10-21	Updated Model Name	Haley Ackun
V4	2021-10-26	Updated report per TCB feedback	Haley Ackun
V5	2021-11-22	Updated Average Fundamental Value	Haley Ackun

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Trek Bicycle Company  
801 West Madison Street  
Waterloo, WI 53594, USA

**EUT DESCRIPTION:** Trek Commuter Pro RT Bicycle Light

**MODEL:** 5252795

**SERIAL NUMBER:** S21260015

**SAMPLE RECEIPT DATE:** 2021-08-16

**DATE TESTED:** 2021-09-01 TO 2021-09-21 & 2021-10-14


APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2021	Refer to Section 2
ISED RSS-210 Issue 10: 2019	Refer to Section 2
ISED RSS-GEN Issue 5 + A2: 2021	Refer to Section 2

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.

Approved & Released For  
UL LLC. By:



Brian T. Kiewra  
Project Engineer  
Consumer Technology Division  
UL LLC.

Prepared By:



Haley Ackun  
Laboratory Engineer  
Consumer Technology Division  
UL LLC.

## 2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW and 20dB Bandwidth	Reporting purposes only	ANSI C63.10 Section 6.9.2
15.249 (a)	RSS-210-B.10(a)	Fundamental Field Strength	Complies	None
15.205, 15.209, 15.249(a) (d)	RSS-GEN 8.9, 8.10, B.10 (a) (b)	Radiated Emissions	Complies	None.
15.207	RSS-GEN 8.8	AC Mains Conducted Emissions	Complies	None.

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

### 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2021, ANSI C63.10-2013, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A2: 2021, and RSS-210 Issue 10: 2019.

### 4. FACILITIES AND ACCREDITATION

UL LLC is accredited by a2La, cert. # 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	703469
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	703469

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. 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.

### 5.2. 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.)

### 5.3. 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%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 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%.

### 5.4. SAMPLE CALCULATION

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Final Voltage (dBuV)} = \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \text{LISN Insertion Loss}$$

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$



## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is a bicycle light, that supports BLE and ANT+. This report covers testing performed for ANT+ only.

### 6.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Pk E-Field (dBuV/m)	AV E-Field (dBuV/m)
2457	ANT+	77.41	77.88

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a wire dipole antenna, with a maximum gain of 0 dBi.

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 0.9.7.  
The test utility software used during testing was nRF Connect V3.6.1.

### 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at 2457 MHz.

Radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at 2457 MHz.

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

The EUT supports one data rate; therefore all final radiated emissions were performed with the EUT transmitting at 12.8 kbps.

All final radiated emissions testing was performed with the EUT connected to a power supply as the worst-case scenario.

## 6.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	ANKER	A2013	AC2LK30B17201280	-
Power Supply	Amazon	B0773J79KC	-	-
Laptop	Lenovo	T450s	PC-OBHFNX	PD97265NGU
Laptop Charger	Lenovo	ADLX65NCC2A	11S36200284ZZ2003CKT9R	-
Laptop	HP	11-ah112dx	5CD8294MZY	-
AC Adapter	iClever	TC02	TC02W0033202400124	-

### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	1	1	I/O	I/O	< 1m	Connects EUT to Power Supply
2	2	1	UART	I/O	<1m	Connects EUT to laptop for programming

### TEST SETUP

Test software exercised the radio card.

### SETUP DIAGRAMS

Please refer to R13694045-EP1 for setup diagrams

## 7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10 Section 11.6

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

20dB Bandwidth: ANSI C63.10-2013 Section 6.9.2

General Radiated Spurious Emissions: ANSI C63.10-2013 Section 6.3-6.6

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

## 8. 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 - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2021-08-19	2022-08-19
	<b>30-1000 MHz</b>				
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2021-02-19	2022-02-19
	<b>1-18 GHz</b>				
AT0078	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-11-19	2021-11-19
	<b>18-40 GHz</b>				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
	<b>Gain-Loss Chains</b>				
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2021-07-20	2022-07-20
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-07-20	2022-07-20
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-07-20	2022-07-20
N-SAC04	Gain-loss string: 18-40GHz	Various	Various	2021-07-20	2022-07-20
	<b>Receiver &amp; Software</b>				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-30	2022-03-30
SOFTEMI	EMI Software	UL	Version 9.5 (09 Aug 2021)		
	<b>Additional Equipment used</b>				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-21	2022-01-21

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	<b>1-18 GHz</b>				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-05-03	2022-05-03
	<b>Gain-Loss Chains</b>				
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-07-09	2022-07-09
	<b>Receiver &amp; Software</b>				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SOFTEMI	EMI Software	UL	Version 9.5 (09 Aug 2021)		
	<b>Additional Equipment used</b>				
s/n 161016511	Environmental Meter	Fisher Scientific	06-662-4	2021-07-12	2022-07-12

Test Equipment Used - Wireless Conducted Measurement Equipment

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
HI0091	Environmental Meter	Fisherbrand	15-077-963	2021-04-12	2022-04-12
SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2021-04-01	2022-04-01
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2021-06-25	2022-06-25
SOFTEMI	Antenna Port Software	UL	Version 2021.8.11, & 2021.9.9	NA	NA

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	2021-04-05	2022-04-05
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
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	2021-04-05	2022-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		
	<b>Miscellaneous (if needed)</b>				
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2021-09-13	2022-09-13

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

**LIMITS**

None; for reporting purposes only.

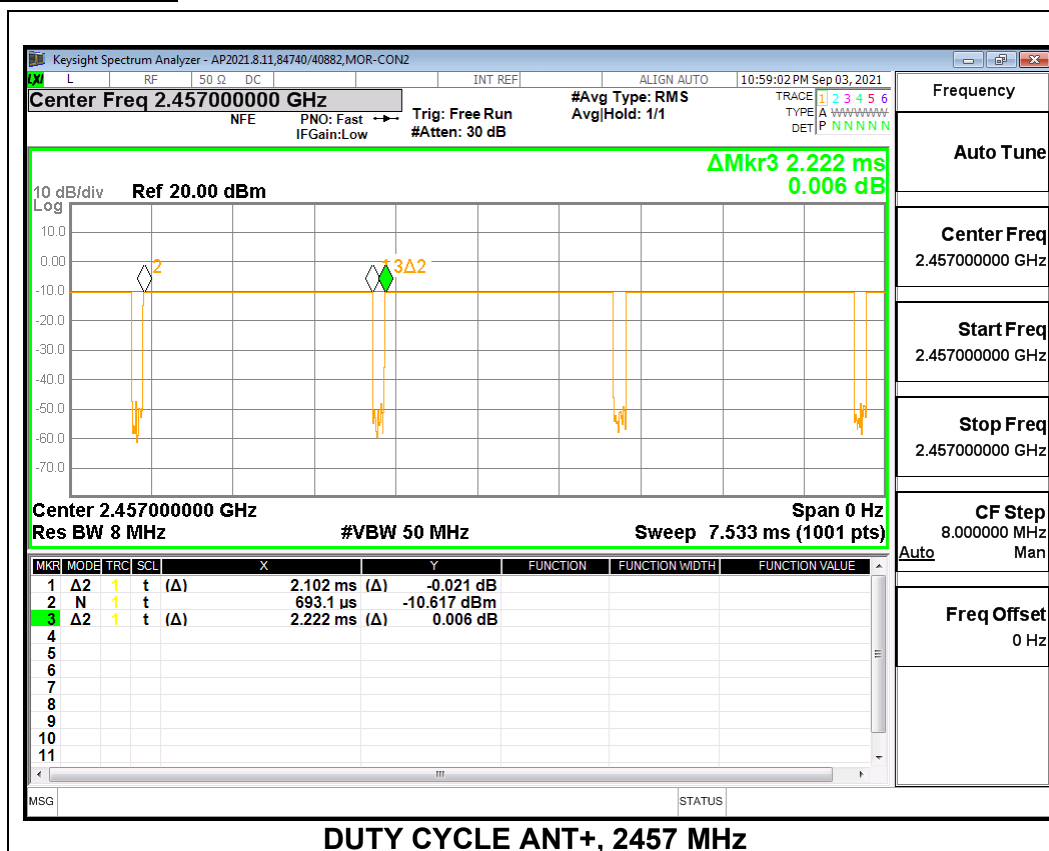
**PROCEDURE**

ANSI C63.10 Section 11.6

**ON TIME AND DUTY CYCLE RESULTS**

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>2.4GHz Band</b>						
ANT+	2.102	2.222	0.946	94.60%	0.48	0.476

**DUTY CYCLE PLOTS**



## 9.2. 99% BANDWIDTH AND 20dB BANDWIDTH

### LIMITS

None; for reporting purposes only.

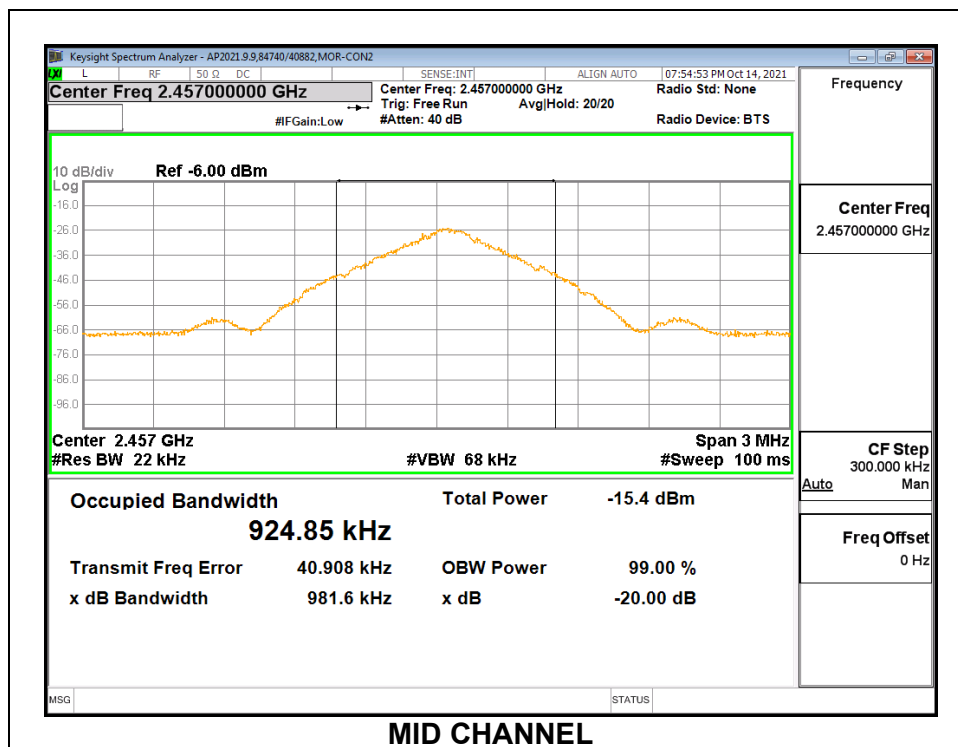
ANSI C63.10 Section 6.9.2

RSS-GEN Section 6.7

### RESULTS

#### 9.2.1. ANT+

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Middle	2457	0.9249	0.9816





## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

FCC §15.249(a)

Frequency Range (MHz)	Field Strength Limit of Fundamental (mV/m) at 3 m	Field Strength Limit of Harmonics (uV/m) at 3 m
2400-2483.5	50	500

FCC §15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is lesser attenuation.

RSS-210 B.10(a)

Frequency Range (MHz)	Field Strength Limit of Fundamental (mV/m) at 3 m	Field Strength Limit of Harmonics (mV/m) at 3 m
2400-2483.5	50	.5

RSS-210 B.10(b)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in RSS-GEN, whichever is less stringent.

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuA/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for linear voltage averaging measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to 2457 MHz. Below 1GHz and above 18GHz emissions were tested at 2457 MHz.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

**KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification**

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

## 10.2. FUNDAMENTAL AND SPURIOUS EMISSIONS

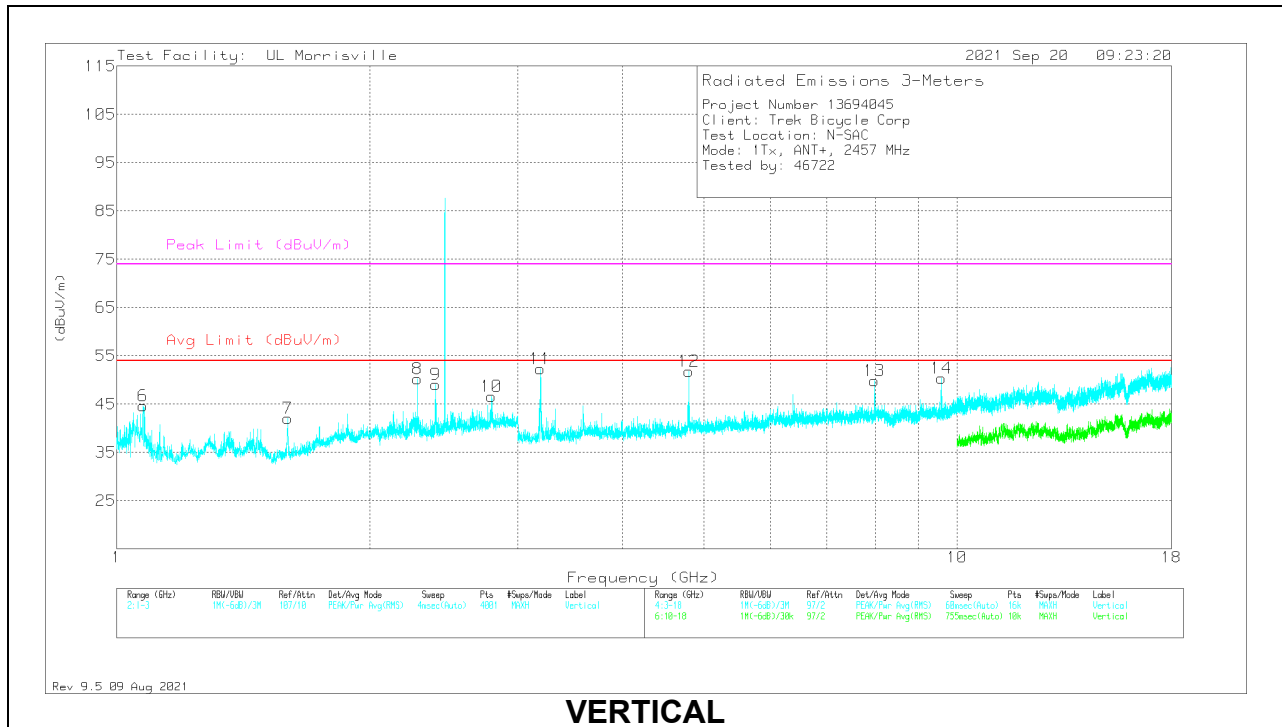
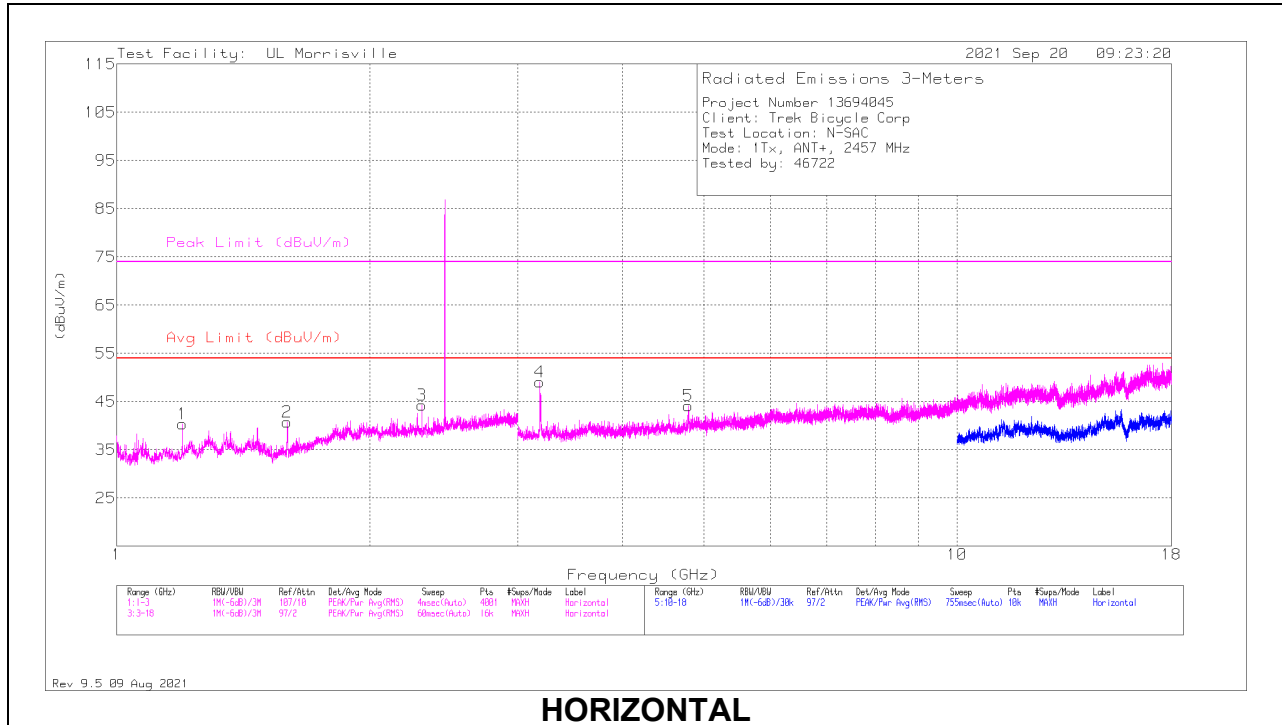
Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.457	69.31	Pk	32.5	-24.4	-	77.41	-	-	114	-36.59	251	381	H
2.457	69.3	Av	32.5	-24.4	0.48	77.88	94	-16.12	-	-	251	381	H
2.45704	53.02	Pk	32.5	-24.4	-	61.12	-	-	114	-27.12	266	179	V
2.45704	51.88	Av	32.5	-24.4	0.48	60.46	94	-33.54	-	-	266	179	V

Pk - Peak detector

Av - Average detection

# HARMONICS AND SPURIOUS EMISSIONS

## MID CHANNEL RESULTS



**RADIATED EMISSIONS**

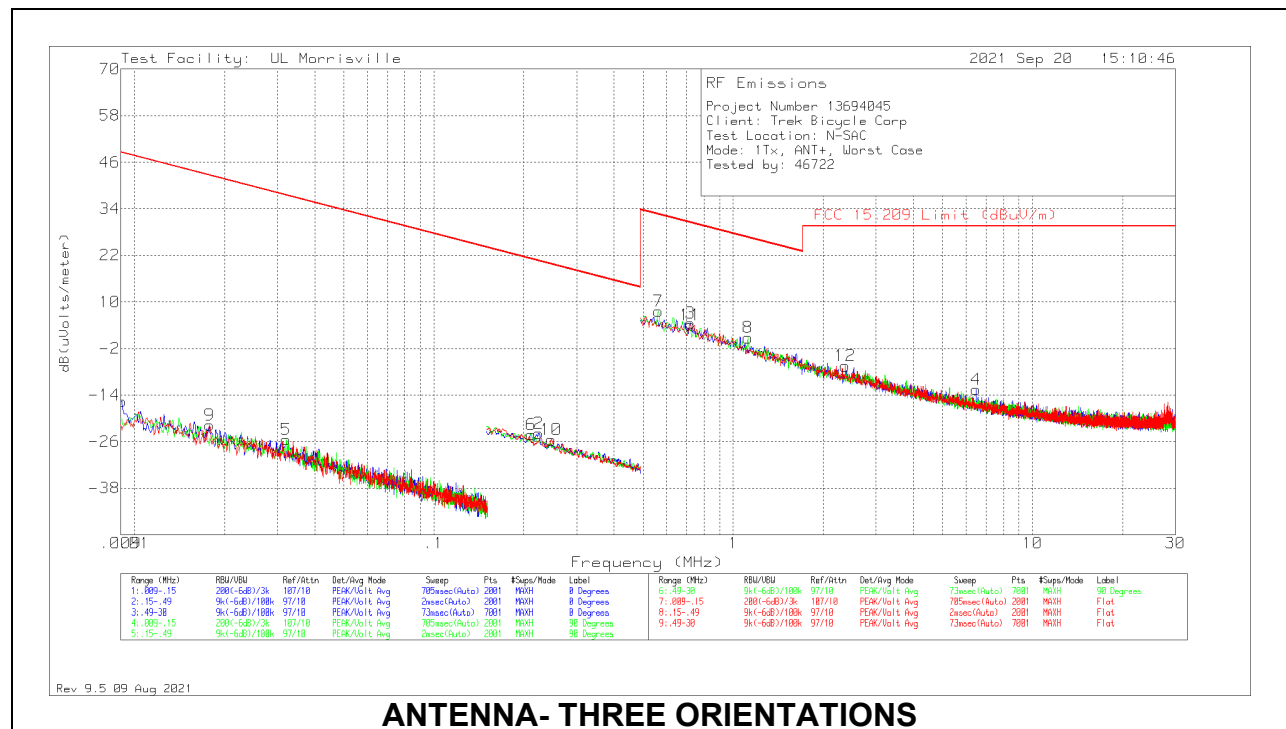
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (db/m)	Amp/Cbl/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.197	37.84	Pk	28.6	-26.1	-	40.34	54	-13.66	74	-33.66	0-360	200	H
2	** 1.5955	37.89	Pk	27.6	-24.7	-	40.79	54	-13.21	74	-33.21	0-360	200	H
6	*** 1.075	44.64	Pk	27.2	-27.2	-	44.64	54	-9.36	74	-29.36	0-360	101	V
7	*** 1.597	38.91	Pk	27.7	-24.6	-	42.01	54	-11.99	74	-31.99	0-360	200	V
8	** 2.2816	44.05	PK2	31.9	-24.4	-	51.55	-	-	74	-22.45	9	107	V
	*** 2.27816	22.34	ADV	31.9	-24.3	0.48	30.42	54	-23.58	-	-	9	107	V
10	** 2.7915	37.82	Pk	32.7	-23.9	-	46.62	54	-7.38	74	-27.38	0-360	200	V
3	2.3085	36.94	Pk	31.7	-24.4	-	44.24	-	-	-	-	0-360	101	H
9	2.3965	41.54	Pk	31.8	-24.3	-	49.04	-	-	-	-	0-360	200	V
5	*** 4.785	41.71	Pk	34	-31.6	-	44.11	54	-9.89	74	-29.89	0-360	101	H
12	*** 4.79365	52.12	PK2	34.1	-31.6	-	54.62	-	-	74	-19.38	327	103	V
	*** 4.79981	29.22	ADV	34.1	-31.9	0.48	31.90	54	-22.10	-	-	327	103	V
4	3.18938	48.83	Pk	32.9	-32.7	-	49.03	-	-	-	-	0-360	101	H
11	3.19313	52.45	Pk	32.9	-33	-	52.35	-	-	-	-	0-360	101	V
13	7.97063	42.13	Pk	35.9	-28.2	-	49.83	-	-	-	-	0-360	101	V
14	9.57656	41.98	Pk	36.4	-28	-	50.38	-	-	-	-	0-360	101	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 PK2 - Maximum Peak  
 ADV - Linear Voltage Average

### 10.3. WORST CASE BELOW 30MHZ

Note for below 30 MHz scans: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of 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 (test distance / specification distance).

#### SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION E-FIELD)



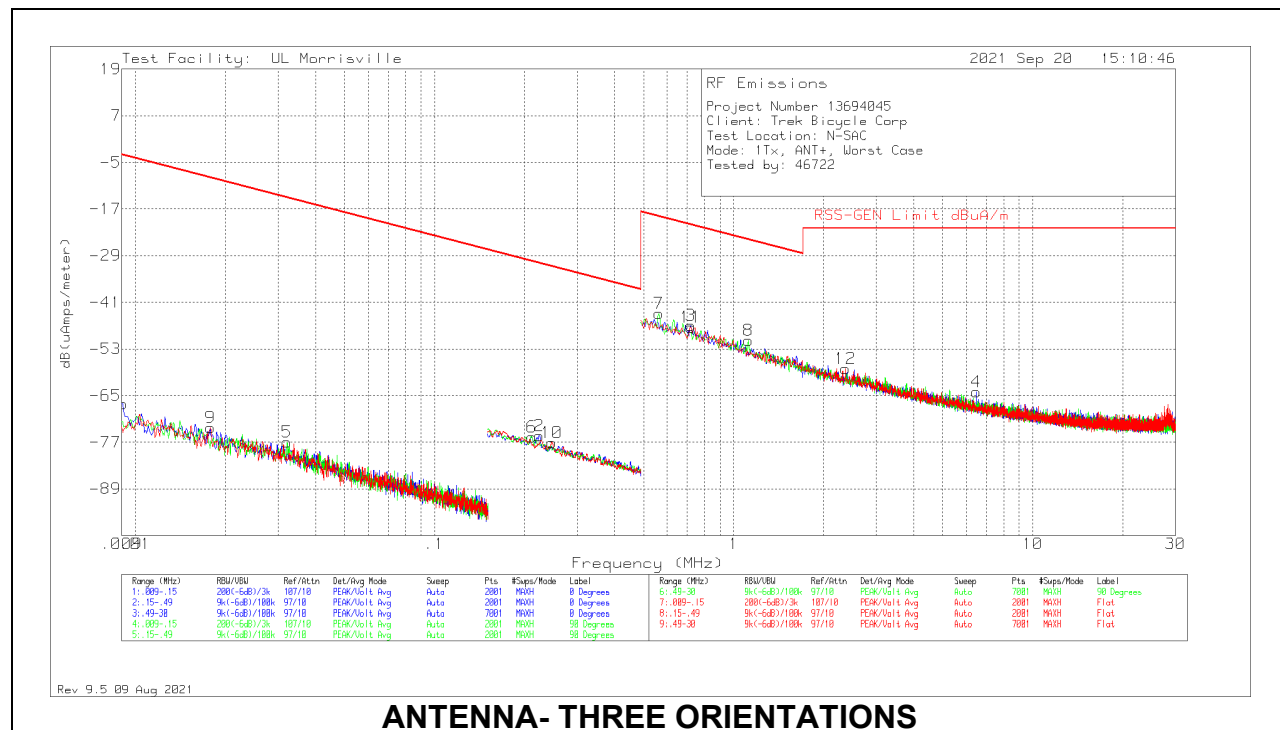
#### ANTENNA- THREE ORIENTATIONS

#### Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (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)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.00907	45.05	Pk	19.2	.1	-80	-15.65	48.45	68.45	-64.1	0-360	404	0 degs
9	.01788	43.09	Pk	15	.1	-80	-21.81	42.56	62.56	-64.37	0-360	404	Flat
5	.03215	41.21	Pk	13.2	.1	-80	-25.49	37.46	57.46	-62.95	0-360	404	90 degs
6	.21154	44.52	Pk	11.2	.1	-80	-24.18	21.1	41.1	-45.28	0-360	404	90 degs
2	.22378	44.88	Pk	11.2	.1	-80	-23.82	20.61	40.61	-44.43	0-360	404	0 degs
10	.24639	43.15	Pk	11.2	.1	-80	-25.55	19.77	39.77	-45.32	0-360	404	Flat
7	.56167	36.25	Pk	11.2	.2	-40	7.65	32.61	-	-24.96	0-360	404	90 degs
3	.71766	32.99	Pk	11.3	.2	-40	4.49	30.49	-	-26	0-360	404	0 degs
11	.71766	32.57	Pk	11.3	.2	-40	4.07	30.49	-	-26.42	0-360	404	Flat
8	1.11818	29.25	Pk	11.3	.2	-40	7.55	26.63	-	-25.88	0-360	404	90 degs
12	2.36612	21.79	Pk	11.4	.3	-40	-6.51	29.54	-	-36.05	0-360	404	Flat
4	6.47672	15.88	Pk	11	.5	-40	-12.62	29.54	-	-42.16	0-360	404	0 degs

Pk - Peak detector

**SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION H-FIELD)**



**ANTENNA- THREE ORIENTATIONS**

**Below 30MHz Data**

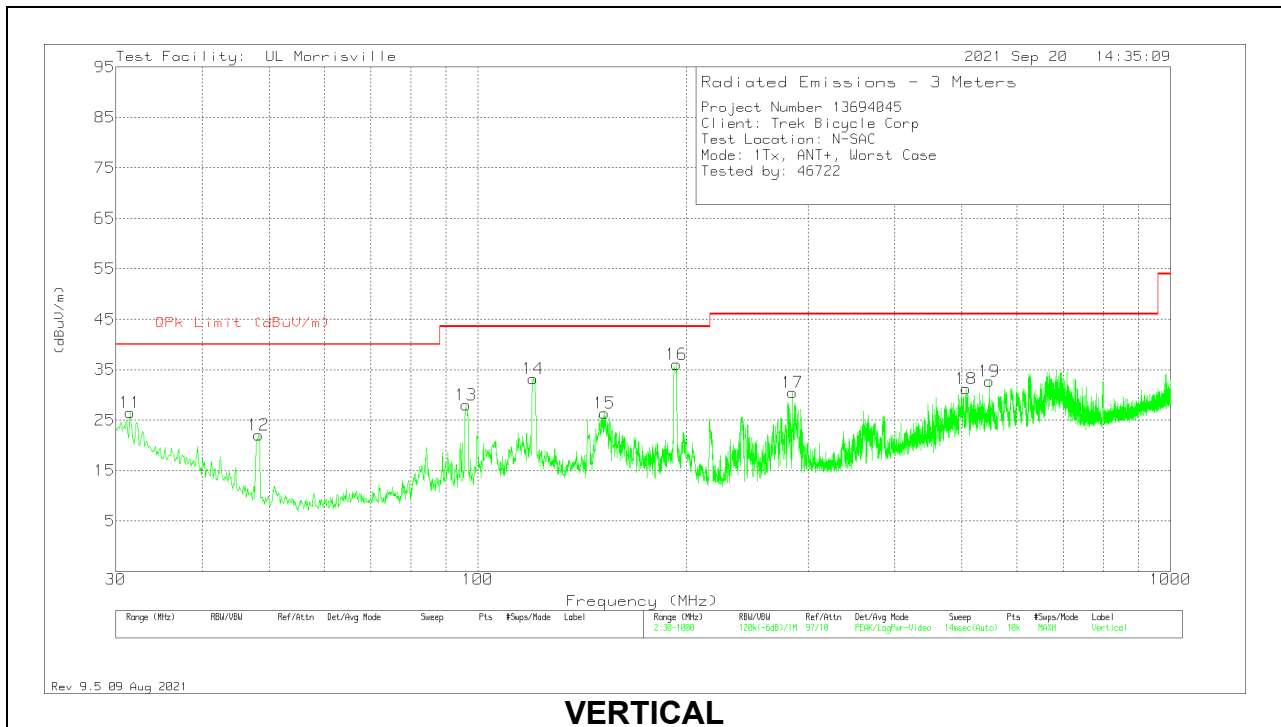
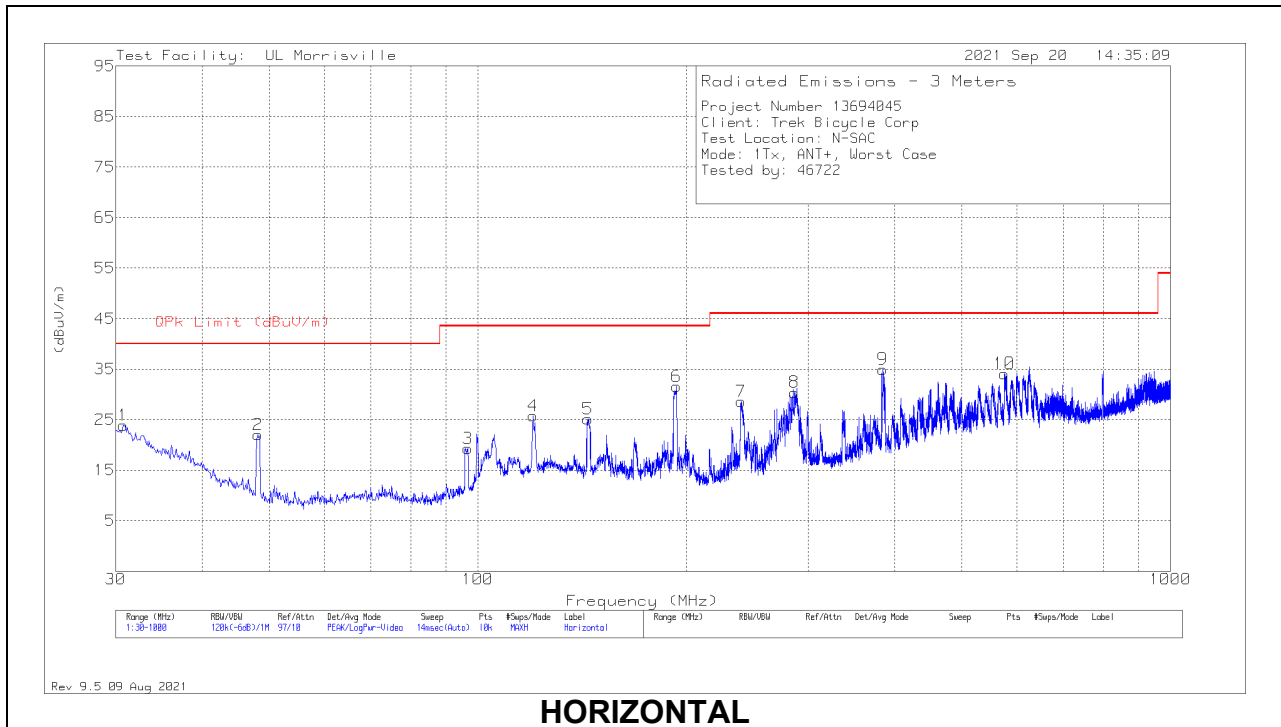
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	RSS-GEN Qp/Av Limit dBuA/m	RSS-GEN Pk Limit dBuA/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.00907	45.05	Pk	-32.3	.1	-80	-67.15	-3.05	16.95	-64.1	0-360	404	0 degs
9	.01788	43.09	Pk	-36.5	.1	-80	-73.31	-8.94	11.06	-64.37	0-360	404	Flat
5	.03215	41.21	Pk	-38.3	.1	-80	-76.99	-14.04	5.96	-62.95	0-360	404	90 degs
6	.21154	44.52	Pk	-40.3	.1	-80	-75.68	-30.4	-10.4	-45.28	0-360	404	90 degs
2	.22378	44.88	Pk	-40.3	.1	-80	-75.32	-30.89	-10.89	-44.43	0-360	404	0 degs
10	.24639	43.15	Pk	-40.3	.1	-80	-77.05	-31.73	-11.73	-45.32	0-360	404	Flat
7	.56167	36.25	Pk	-40.3	.2	-40	-43.85	-18.89	-	-24.96	0-360	404	90 degs
3	.71766	32.99	Pk	-40.2	.2	-40	-47.01	-21.01	-	-26	0-360	404	0 degs
11	.71766	32.57	Pk	-40.2	.2	-40	-47.43	-21.01	-	-26.42	0-360	404	Flat
8	1.11818	29.25	Pk	-40.2	.2	-40	-50.75	-24.87	-	-25.88	0-360	404	90 degs
12	2.36612	21.79	Pk	-40.1	.3	-40	-58.01	-21.96	-	-36.05	0-360	404	Flat
4	6.47672	15.88	Pk	-40.5	.5	-40	-64.12	-21.96	-	-42.16	0-360	404	0 degs

Pk - Peak detector



### 10.4. WORST CASE BELOW 1 GHZ

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



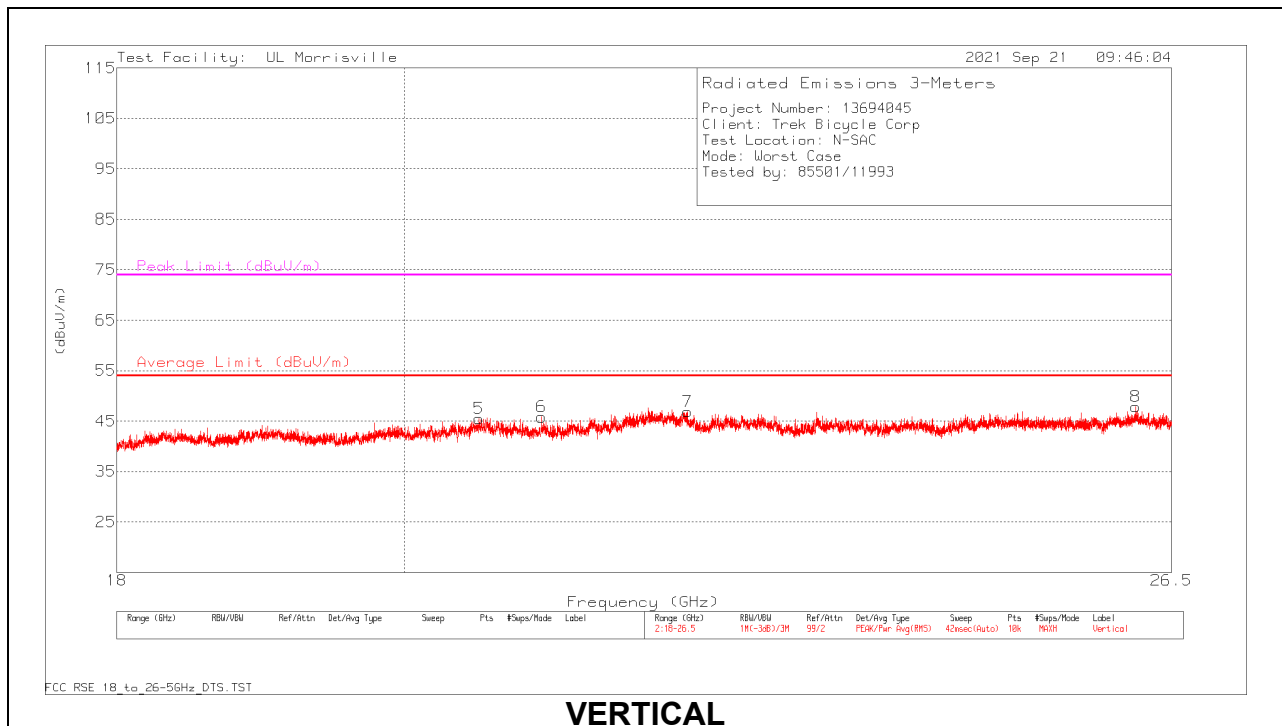
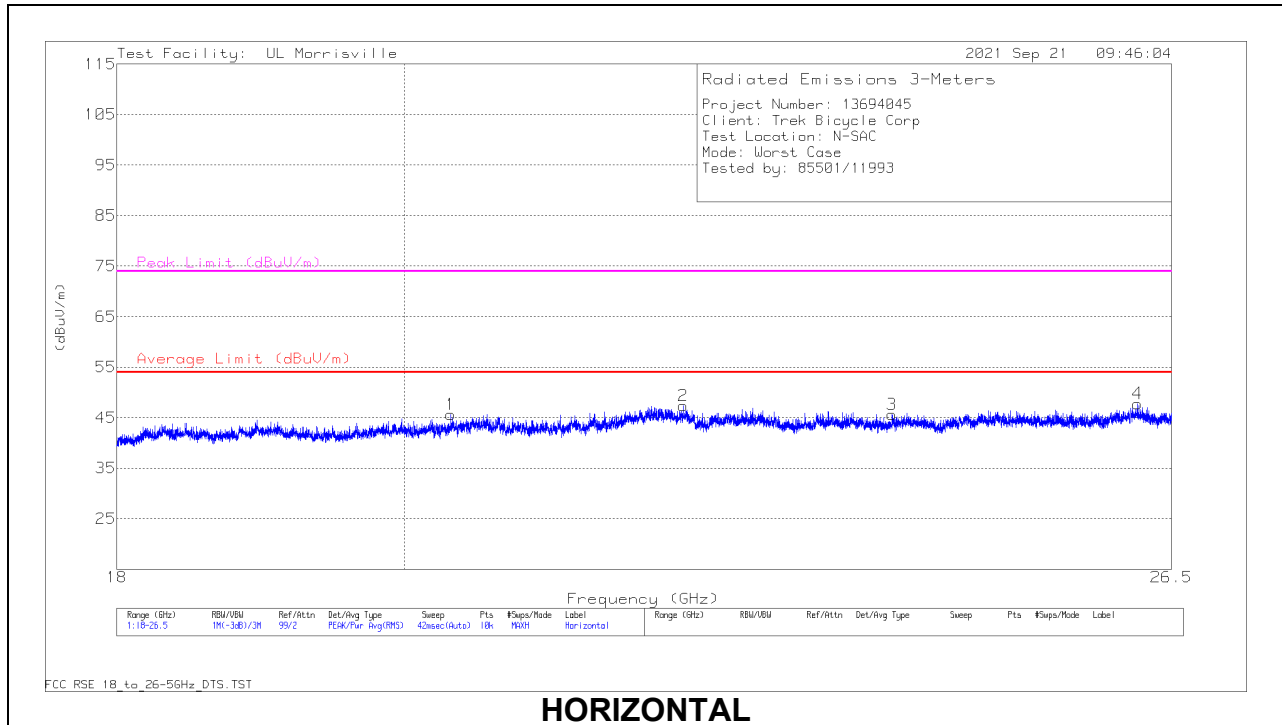
**Below 1GHz Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0066 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* ** 120.113	36.25	Pk	19.5	-30	25.75	43.52	-17.77	0-360	300	H
7	* ** 240.102	40.06	Pk	17.7	-29.1	28.66	46.02	-17.36	0-360	99	H
14	* ** 120.21	43.73	Pk	19.5	-30	33.23	43.52	-10.29	0-360	100	V
17	* ** 284.916	39.5	Pk	19.7	-28.7	30.5	46.02	-15.52	0-360	100	V
18	** 507.434	34.36	Pk	24.1	-27.2	31.26	46.02	-14.76	0-360	100	V
1	30.776	28.31	Pk	26.8	-31.2	23.91	-	-	0-360	400	H
11	31.455	31.4	Pk	26.3	-31.2	26.5	-	-	0-360	100	V
2	48.139	38.48	Pk	14.6	-31.1	21.98	-	-	0-360	400	H
12	48.236	38.52	Pk	14.6	-31.1	22.02	-	-	0-360	100	V
13	96.057	43.23	Pk	15.4	-30.6	28.03	-	-	0-360	100	V
3	96.736	34.26	Pk	15.5	-30.5	19.26	-	-	0-360	300	H
5	144.169	36.11	Pk	18.9	-29.9	25.11	-	-	0-360	199	H
15	152.414	37.89	Pk	18.4	-29.9	26.39	-	-	0-360	100	V
6	193.542	43.54	Pk	17.7	-29.6	31.64	-	-	0-360	99	H
16	193.542	47.99	Pk	17.7	-29.6	36.09	-	-	0-360	100	V
8	286.662	39.51	Pk	19.6	-28.7	30.41	-	-	0-360	99	H
9	384.535	41.6	Pk	21.3	-27.9	35	-	-	0-360	99	H
19	547.107	35.34	Pk	24.6	-27.2	32.74	-	-	0-360	100	V
10	576.207	36.13	Pk	25	-27	34.13	-	-	0-360	99	H

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

### 10.5. WORST CASE 18-26 GHZ

#### SPURIOUS EMISSIONS 18-26 GHZ (WORST-CASE CONFIGURATION)



**18 – 26GHz DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0063 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 20.34662	50.8	Pk	33.9	-39.1	45.6	54	-8.4	74	-28.4	0-360	250	H
2	* ** 22.15523	50.31	Pk	36.7	-39.6	47.41	54	-6.59	74	-26.59	0-360	200	H
3	* ** 23.91881	49.65	Pk	34.9	-38.9	45.65	54	-8.35	74	-28.35	0-360	149	H
5	* ** 20.55824	50.89	Pk	34	-39.4	45.49	54	-8.51	74	-28.51	0-360	300	V
6	* ** 21.03505	50.62	Pk	34.2	-39	45.82	54	-8.18	74	-28.18	0-360	200	V
7	* ** 22.18923	50.27	Pk	36.7	-40.1	46.87	54	-7.13	74	-27.13	0-360	250	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

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

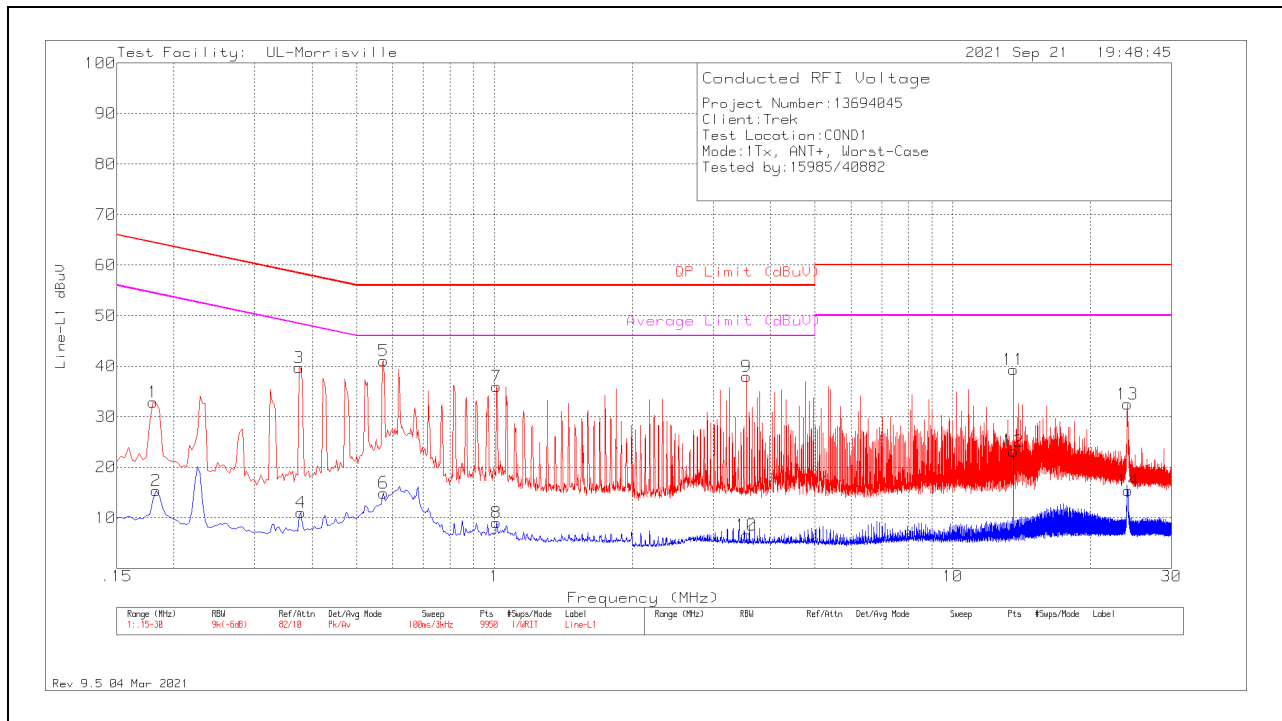
The receiver is set to a resolution bandwidth of 9kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

11.1.1. AC Power Line Norm

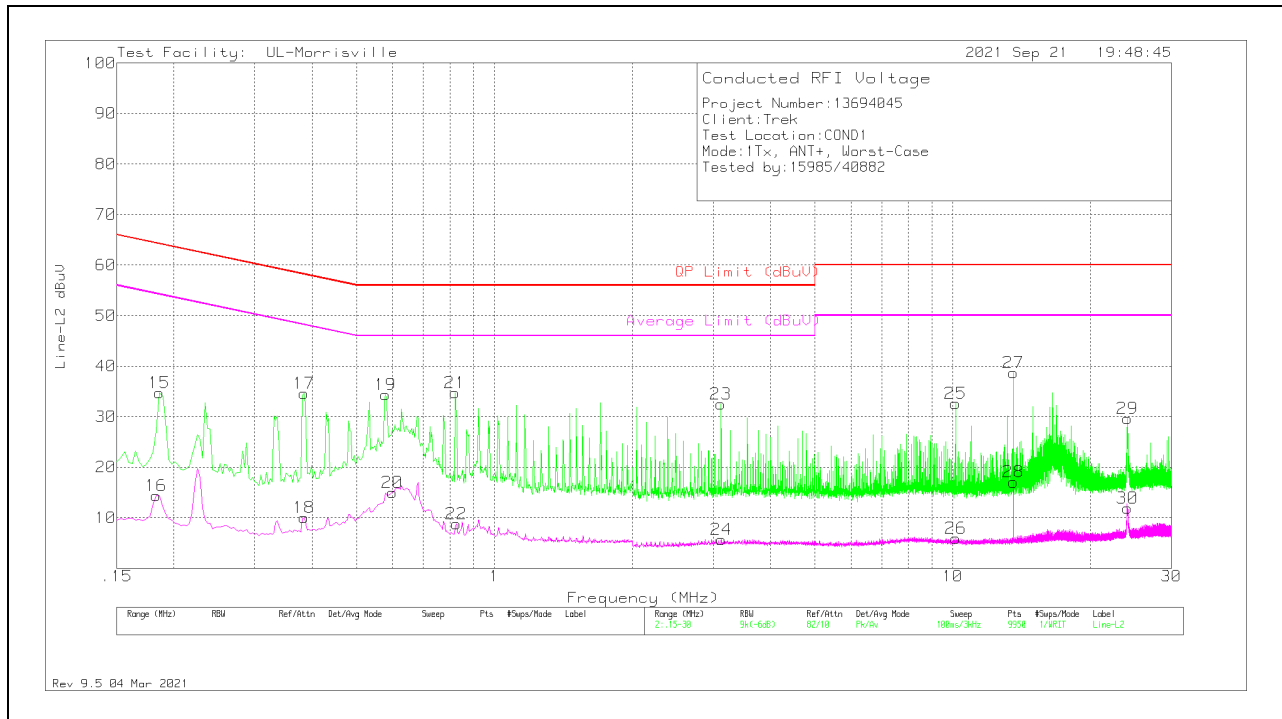
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN_wc_VCF	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.18	22.9	Pk	.2	9.8	32.9	64.49	-31.59	-	-
2	.183	5.37	Av	.2	9.8	15.37	-	-	54.35	-38.98
3	.375	29.82	Pk	.1	9.8	39.72	58.39	-18.67	-	-
4	.378	1.08	Av	.1	9.8	10.98	-	-	48.32	-37.34
5	.573	31.27	Pk	0	9.8	41.07	56	-14.93	-	-
6	.573	5.12	Av	0	9.8	14.92	-	-	46	-31.08
7	1.011	26.2	Pk	0	9.8	36	56	-20	-	-
8	1.011	-82	Av	0	9.8	8.98	-	-	46	-37.02
9	3.546	28.11	Pk	0	9.9	38.01	56	-17.99	-	-
10	3.552	-3.38	Av	0	9.9	6.52	-	-	46	-39.48
11	13.56	29.17	Pk	.1	10.1	39.37	60	-20.63	-	-
12	13.56	13.01	Av	.1	10.1	23.21	-	-	50	-26.79
13	24.096	22.06	Pk	.2	10.2	32.46	60	-27.54	-	-
14	24.105	4.97	Av	.2	10.2	15.37	-	-	50	-34.63

Pk - Peak detector  
 Av - Average detection

### LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN_wc_VCF	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
16	.183	4.41	Av	.2	9.8	14.41	-	-	54.35	-39.94
15	.186	24.74	Pk	.2	9.8	34.74	64.21	-29.47	-	-
17	.384	24.68	Pk	.1	9.8	34.58	58.19	-23.61	-	-
18	.384	.14	Av	.1	9.8	10.04	-	-	48.19	-38.15
19	.579	24.51	Pk	0	9.8	34.31	56	-21.69	-	-
20	.6	5.24	Av	0	9.8	15.04	-	-	46	-30.96
21	.822	24.92	Pk	0	9.8	34.72	56	-21.28	-	-
22	.825	-1.06	Av	0	9.8	8.74	-	-	46	-37.26
23	3.123	22.66	Pk	0	9.8	32.46	56	-23.54	-	-
24	3.126	-4.16	Av	0	9.8	5.64	-	-	46	-40.36
25	10.14	22.49	Pk	.1	10	32.59	60	-27.41	-	-
26	10.143	-4.2	Av	.1	10	5.9	-	-	50	-44.1
28	13.56	6.84	Av	.1	10.1	17.04	-	-	50	-32.96
27	13.563	28.45	Pk	.1	10.1	38.65	60	-21.35	-	-
29	24.057	19.24	Pk	.2	10.2	29.64	60	-30.36	-	-
30	24.057	1.53	Av	.2	10.2	11.93	-	-	50	-38.07

Pk - Peak detector  
 Av - Average detection

## 12. SETUP PHOTOS

Please refer to R13694045-EP1 for setup photos

**END OF TEST REPORT**