An IIA Company

Test Report – FCC Part 15C Co-Location
Applicant: OBVIUS Robotics, Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 6/26/2023

Table of Contents

1. Customer Information

Applicant: OBVIUS Robotics, Inc.
Address: 7 Patton Avenue, #1403
Asheville, North Carolina, 28801, United States

1.1 Test Result Summary

The following test procedure was used ANSI C63.10. Full test results are available in this report.

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.

Clauses	Description of the Requirements	Result (Pass, Fail or N/A)
Applicable Clauses from FCC 15 B		
15.207	Conducted Emission Limits	N/A
15.209	Radiated Emission Limits- Co-Location	Pass

2. Location of Testing

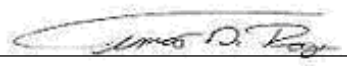
2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780
FCC Designation # US1070
FCC site registration is under A2LA certificate # 0955.01
ISED Canada test site registration # 2056A
EU Notified Body # 1177
For all designations see A2LA scope # 0955.01

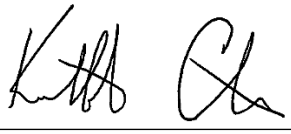
2.2 Testing was performed, reviewed by

Dates of Testing: 7/18/2022 – 7/22/2022

Signature:  Sr. EMC Engineer EMC-003838-NE

Name & Title: Tim Royer, EMC Engineer

Date of Signature 6/26/2023

Signature: 

Name & Title: Kristoffer Costa, EMC Technician

Date of Signature 6/26/2023

3. Test Sample(s) (EUT/DUT)

The test sample was received: 7/18/2022

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2A72J-23782
FCC ID of Certified Module:	XPYEMMYW161
Brief Description	Ultrasound-Guided Needle Positioning System
Model(s) #	CAD-1001
Firmware version	v0.3.0fcc-timco
Software version	v1.0.9-fcc
Serial Number	000008

Technical Characteristics	
Technology	Ultrasound Device
Frequency Range	2400-2483.5 MHz, 5725-5850 MHz
Antenna Connector	N/A
Voltage Rating (AC or Batt.)	12VDC, Battery

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.

3.2 Configuration of EUT

Band (MHz)	Mode	Number of Ant.
2400-2483.5 5725-5850	Transmit	1

Operating conditions during Testing:

No modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT).

Peripherals used during Testing:

No peripherals used.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power-line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance

The measurement was performed as per ANSI 63.10. Full test results are available in this report.

Limits and Regulatory Limits:

1) FCC 15C

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	

7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	2/24/2023
CHAMBER	CHAMBER	Panashield	3M	N/A	3/12/19	12/21/2023
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	2/27/19	9/26/2022
Receiver	EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	5/27/21	5/26/2024

8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Units of measurement

Unless noted otherwise in the referenced standard, the measurements of ac power-line conducted emissions and conducted power output will be reported in units of dBµV. Unless noted otherwise in the referenced standard, the measurements of radiated emissions will be reported in units of decibels, referenced to one microvolt per meter (dBµV/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dBµV if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

Example:

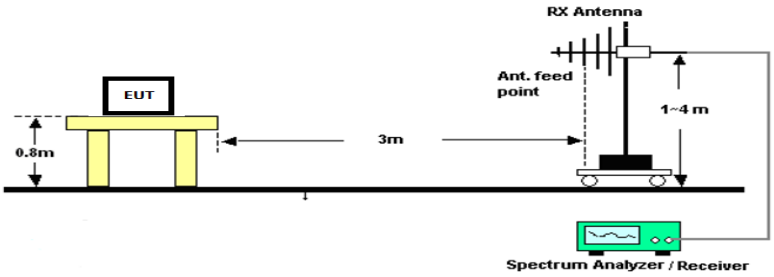
Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBµV	+ 10.36 dB/m	+0.40 dB	=30.36 dBµV/m @ 3m

EIRP = Pcond (dBm) + dBi

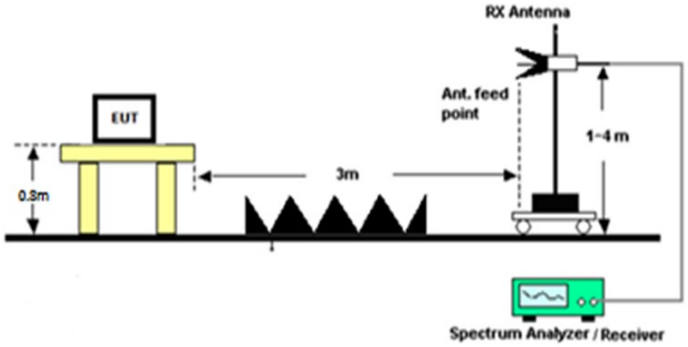
8.1 Radiated Emissions, Co-Location

Limits from FCC 15.209 and test procedure from ANSI C63.10

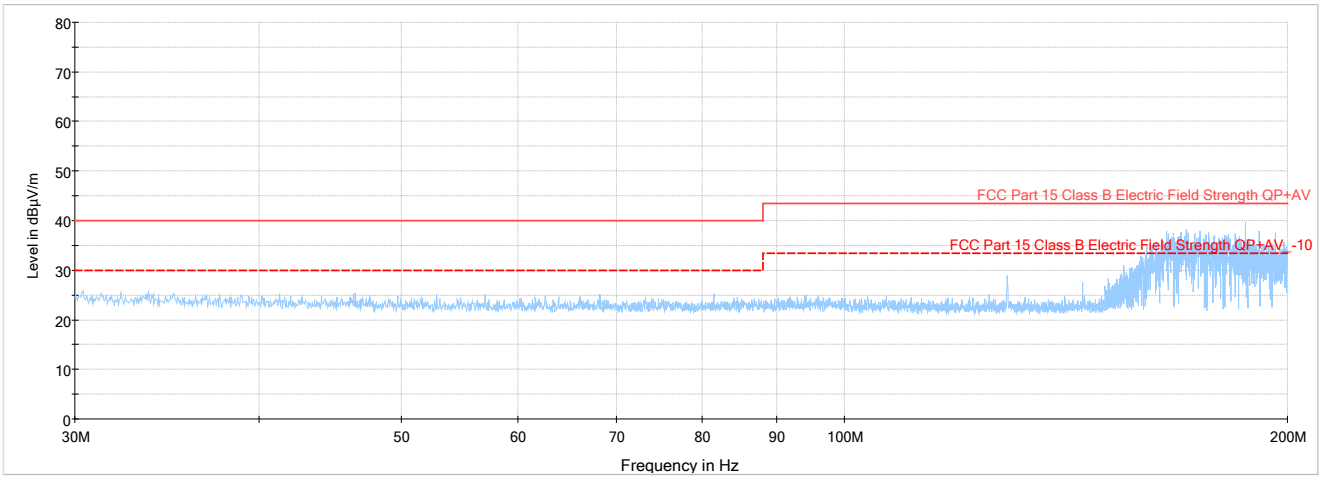
Radiated Test Setup, 30 – 1000 MHz



Radiated Test Setup, Above 1000 MHz



8.1.1 30 MHz to 200 MHz, Co-Location, Horizontal/ Vertical Polarity Plot



8.1.2 30 MHz to 200 MHz, Co-Location, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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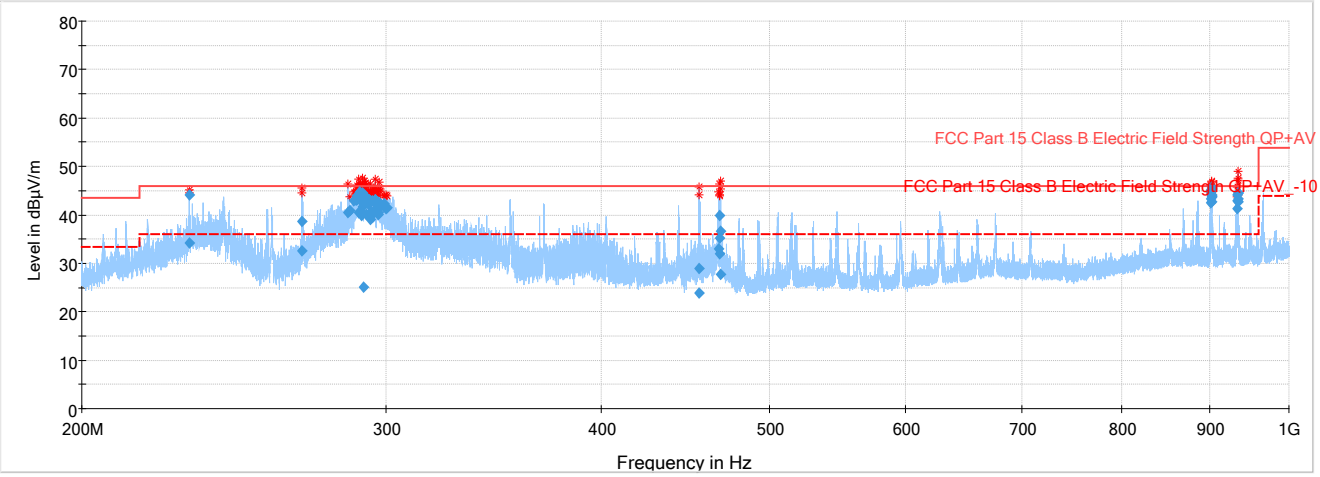
8.1.3 200 MHz to 1000 MHz, Co-Location, Horizontal/ Vertical Polarity Plot



8.1.4 200 MHz to 1000 MHz, Co-Location, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
230.775000	34.14	---	46.00	11.86	10.0	120.000	100.0	H	181.0	11.5	
230.925000	44.19	---	46.00	1.81	10.0	120.000	200.0	H	181.0	11.5	
268.175000	32.52	---	46.00	13.48	10.0	120.000	100.0	V	90.0	13.1	
268.275000	38.69	---	46.00	7.31	10.0	120.000	200.0	V	91.0	13.1	
285.300000	40.57	---	46.00	5.43	10.0	120.000	100.0	H	181.0	13.9	
285.725000	40.93	---	46.00	5.07	10.0	120.000	100.0	H	181.0	13.9	
287.450000	42.93	---	46.00	3.07	10.0	120.000	100.0	H	181.0	14.0	
288.050000	43.10	---	46.00	2.90	10.0	120.000	100.0	H	181.0	14.0	
288.400000	43.12	---	46.00	2.88	10.0	120.000	100.0	H	181.0	14.0	
288.450000	43.21	---	46.00	2.79	10.0	120.000	100.0	H	181.0	14.0	
288.525000	43.54	---	46.00	2.46	10.0	120.000	100.0	H	181.0	14.0	
288.625000	43.86	---	46.00	2.14	10.0	120.000	100.0	H	181.0	14.0	
288.725000	43.94	---	46.00	2.06	10.0	120.000	100.0	H	181.0	14.0	
288.800000	43.86	---	46.00	2.14	10.0	120.000	100.0	H	181.0	14.0	
288.875000	43.74	---	46.00	2.26	10.0	120.000	100.0	H	181.0	14.0	
289.000000	43.69	---	46.00	2.31	10.0	120.000	100.0	H	181.0	14.0	
289.100000	43.64	---	46.00	2.36	10.0	120.000	100.0	H	181.0	14.0	
289.375000	40.42	---	46.00	5.58	10.0	120.000	200.0	H	0.0	14.0	
289.425000	43.53	---	46.00	2.47	10.0	120.000	100.0	H	181.0	14.0	
289.600000	43.87	---	46.00	2.13	10.0	120.000	100.0	H	181.0	14.0	
289.800000	44.72	---	46.00	1.28	10.0	120.000	100.0	H	181.0	14.0	
289.900000	44.57	---	46.00	1.43	10.0	120.000	100.0	H	181.0	14.0	
289.975000	44.30	---	46.00	1.70	10.0	120.000	100.0	H	181.0	14.0	
290.050000	44.19	---	46.00	1.81	10.0	120.000	100.0	H	181.0	14.0	
290.125000	44.23	---	46.00	1.77	10.0	120.000	100.0	H	181.0	14.0	
290.200000	44.20	---	46.00	1.80	10.0	120.000	100.0	H	181.0	14.0	
290.275000	39.94	---	46.00	6.06	10.0	120.000	300.0	H	1.0	14.0	
290.450000	40.58	---	46.00	5.42	10.0	120.000	200.0	H	0.0	14.1	
290.500000	43.50	---	46.00	2.50	10.0	120.000	100.0	H	181.0	14.1	
290.725000	41.62	---	46.00	4.38	10.0	120.000	300.0	V	270.0	14.1	
290.850000	44.18	---	46.00	1.82	10.0	120.000	100.0	H	181.0	14.1	
290.900000	44.55	---	46.00	1.45	10.0	120.000	100.0	H	181.0	14.1	
290.975000	42.46	---	46.00	3.54	10.0	120.000	300.0	V	270.0	14.1	
291.200000	42.21	---	46.00	3.79	10.0	120.000	300.0	V	270.0	14.1	
291.275000	25.17	---	46.00	20.83	10.0	120.000	300.0	V	0.0	14.1	
291.375000	42.36	---	46.00	3.64	10.0	120.000	300.0	V	270.0	14.1	
291.425000	43.70	---	46.00	2.30	10.0	120.000	100.0	H	181.0	14.1	
291.550000	43.09	---	46.00	2.91	10.0	120.000	100.0	H	181.0	14.1	
291.925000	43.48	---	46.00	2.52	10.0	120.000	100.0	H	181.0	14.1	
292.025000	43.65	---	46.00	2.35	10.0	120.000	100.0	H	181.0	14.1	
292.100000	43.75	---	46.00	2.25	10.0	120.000	100.0	H	181.0	14.1	
292.200000	43.45	---	46.00	2.55	10.0	120.000	100.0	H	181.0	14.1	
292.275000	43.39	---	46.00	2.61	10.0	120.000	100.0	H	181.0	14.1	

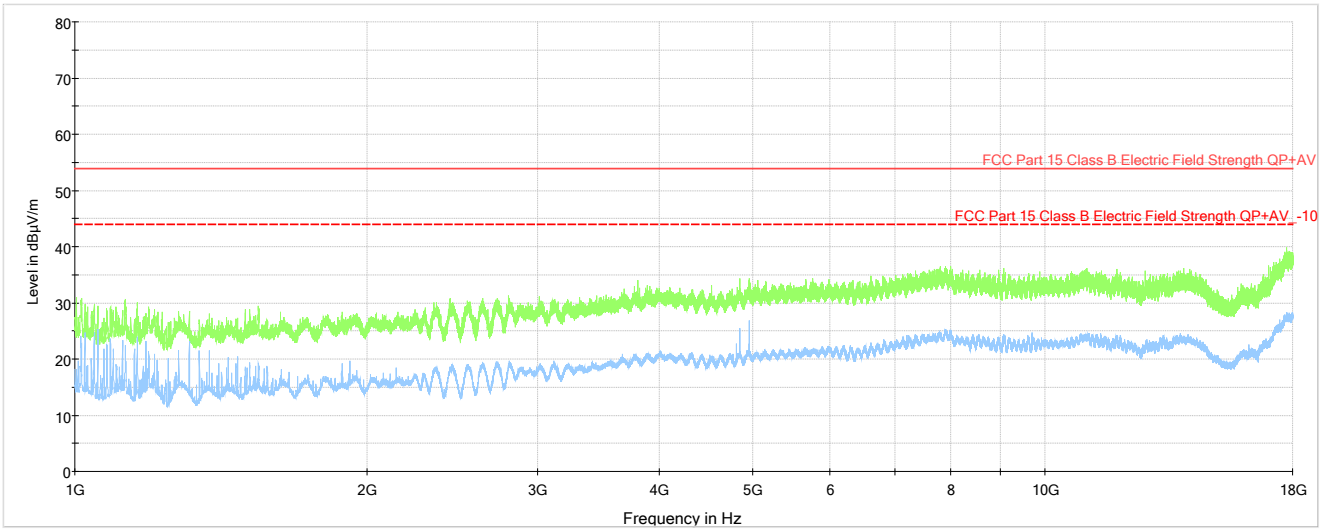
Test

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
292.325000	43.18	---	46.00	2.82	10.0	120.000	100.0	H	181.0	14.1	
292.500000	40.09	---	46.00	5.91	10.0	120.000	300.0	H	1.0	14.1	
292.625000	42.46	---	46.00	3.54	10.0	120.000	100.0	H	181.0	14.1	
293.125000	42.91	---	46.00	3.09	10.0	120.000	300.0	V	270.0	14.1	
293.175000	42.41	---	46.00	3.59	10.0	120.000	100.0	H	181.0	14.1	
293.275000	42.41	---	46.00	3.59	10.0	120.000	100.0	H	181.0	14.2	
293.350000	43.04	---	46.00	2.96	10.0	120.000	300.0	V	270.0	14.2	
293.675000	42.91	---	46.00	3.09	10.0	120.000	300.0	V	270.0	14.2	
293.725000	40.45	---	46.00	5.55	10.0	120.000	200.0	V	181.0	14.2	
293.900000	39.12	---	46.00	6.88	10.0	120.000	200.0	V	271.0	14.2	
294.400000	40.81	---	46.00	5.20	10.0	120.000	200.0	V	181.0	14.2	
294.575000	43.03	---	46.00	2.97	10.0	120.000	300.0	V	270.0	14.2	
294.875000	40.38	---	46.00	5.62	10.0	120.000	200.0	V	181.0	14.2	
295.350000	42.77	---	46.00	3.23	10.0	120.000	300.0	V	270.0	14.2	
295.500000	42.83	---	46.00	3.17	10.0	120.000	300.0	V	270.0	14.3	
295.600000	41.03	---	46.00	4.97	10.0	120.000	200.0	V	271.0	14.3	
295.850000	43.13	---	46.00	2.87	10.0	120.000	300.0	V	270.0	14.3	
295.925000	43.09	---	46.00	2.91	10.0	120.000	300.0	V	270.0	14.3	
296.575000	42.69	---	46.00	3.31	10.0	120.000	300.0	V	270.0	14.3	
296.825000	40.10	---	46.00	5.90	10.0	120.000	200.0	V	181.0	14.3	
296.875000	42.50	---	46.00	3.50	10.0	120.000	300.0	V	270.0	14.3	
297.075000	40.50	---	46.00	5.50	10.0	120.000	200.0	V	181.0	14.4	
297.175000	42.50	---	46.00	3.50	10.0	120.000	300.0	V	270.0	14.4	
297.525000	41.73	---	46.00	4.27	10.0	120.000	300.0	V	270.0	14.4	
297.675000	42.35	---	46.00	3.65	10.0	120.000	300.0	V	270.0	14.4	
299.150000	41.67	---	46.00	4.33	10.0	120.000	300.0	V	270.0	14.5	
299.375000	42.28	---	46.00	3.72	10.0	120.000	300.0	V	270.0	14.5	
300.125000	41.36	---	46.00	4.64	10.0	120.000	300.0	V	270.0	14.5	
300.425000	41.45	---	46.00	4.55	10.0	120.000	300.0	V	270.0	14.6	
455.425000	28.96	---	46.00	17.04	10.0	120.000	100.0	H	1.0	17.1	
455.525000	23.87	---	46.00	22.13	10.0	120.000	100.0	V	1.0	17.1	
467.775000	32.95	---	46.00	13.05	10.0	120.000	100.0	H	90.0	17.4	
467.850000	39.88	---	46.00	6.12	10.0	120.000	100.0	H	90.0	17.4	
468.100000	31.92	---	46.00	14.08	10.0	120.000	100.0	H	1.0	17.4	
468.325000	35.18	---	46.00	10.82	10.0	120.000	200.0	V	0.0	17.4	
468.500000	27.73	---	46.00	18.27	10.0	120.000	100.0	H	271.0	17.4	
468.725000	36.68	---	46.00	9.32	10.0	120.000	100.0	H	1.0	17.4	
901.250000	43.28	---	46.00	2.72	10.0	120.000	100.0	V	271.0	23.1	
901.350000	42.51	---	46.00	3.49	10.0	120.000	100.0	V	271.0	23.1	
901.425000	44.70	---	46.00	1.30	10.0	120.000	100.0	V	271.0	23.1	
901.475000	45.07	---	46.00	0.93	10.0	120.000	100.0	V	271.0	23.1	
901.525000	45.28	---	46.00	0.72	10.0	120.000	100.0	V	271.0	23.1	
901.600000	43.76	---	46.00	2.24	10.0	120.000	100.0	V	271.0	23.1	
901.675000	45.69	---	46.00	0.31	10.0	120.000	100.0	V	271.0	23.1	
901.750000	44.24	---	46.00	1.76	10.0	120.000	100.0	V	271.0	23.1	

Test

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
901.825000	45.57	---	46.00	0.43	10.0	120.000	100.0	V	271.0	23.1	
901.875000	45.41	---	46.00	0.59	10.0	120.000	100.0	V	271.0	23.1	
901.950000	43.68	---	46.00	2.32	10.0	120.000	100.0	V	271.0	23.1	
902.075000	43.92	---	46.00	2.08	10.0	120.000	100.0	V	271.0	23.1	
902.275000	42.67	---	46.00	3.33	10.0	120.000	100.0	V	271.0	23.1	
933.600000	41.37	---	46.00	4.63	10.0	120.000	100.0	V	271.0	23.2	
933.675000	44.21	---	46.00	1.79	10.0	120.000	100.0	V	271.0	23.2	
933.750000	42.84	---	46.00	3.16	10.0	120.000	100.0	V	271.0	23.2	
933.825000	44.49	---	46.00	1.51	10.0	120.000	100.0	V	271.0	23.2	
933.900000	43.29	---	46.00	2.71	10.0	120.000	100.0	V	271.0	23.2	
934.075000	44.50	---	46.00	1.50	10.0	120.000	100.0	V	271.0	23.2	
934.175000	42.66	---	46.00	3.34	10.0	120.000	100.0	V	271.0	23.3	

8.1.5 1 GHz to 18 GHz, Co-Location, Horizontal/ Vertical Polarity Plot



8.1.6 1 GHz to 18 GHz, Co-Location, Horizontal/ Vertical Polarity Table

Test

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
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9. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_3377-21_FCC 15C Co-Location_	1	Initial release	7/26/2022
	2	Updated Page 5	10/25/2022
	3	Updated Cover Page	6/26/2023

END OF TEST REPORT