



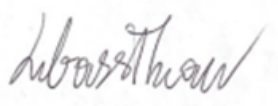
FCC PART 90M TEST REPORT

For

DENSO International America, Inc.

2251 Rutherford Road, Suite 100,
Carlsbad, CA 92008-8815, USA

FCC ID: LXC-V2X-RSU-5941

Report Type: Original Report	Model: MobiQ RSU-5941
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Report Number: R2509264-CV2X	
Report Date: 2025-10-21	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by A2LA*, NIST, or any agency of the Federal Government.

* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" (Rev.2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2509264-CV2X	Original Report	2025-10-21

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report was prepared on behalf of, *DENSO International America, Inc.*, and their product model: *MobiQ RSU-5941* or the “EUT” as referred to in this report. The EUT is a Safety Road Side Unit and operates in the 5905-5925 MHz band.

1.2 Mechanical Description of EUT

The data gathered are from production samples provided by manufacturer with the following information,

The EUT model: *MobiQ RSU-5941*, serial number: *U6Z7P3300024C01* assigned by *DENSO International America, Inc.* measures 25.0 cm (L) x 22.0 cm (W) x 7.5 cm (H), and weigh 6.8 kg

1.3 Objective

This report was prepared on behalf of *DENSO International America, Inc.* in accordance with FCC Part 2, Part 90. The objective was to determine compliance with FCC Part 2, Part 90.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.26-2015.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5%
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48 dB
Unwanted Emissions, conducted	±1.57 dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2°C
Humidity	±5%
DC and low frequency voltages	±1.0%
Time	±2%
Duty Cycle	±3%

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Innovation, Science, and Economic Development Canada (ISED) under Registration Numbers: 3062A.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0428.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02), in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report.

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio/Wireless, RF Exposure, Safety, and Wireline Telecommunications test methods

applicable to a wide range of product categories. These product categories include, but are not limited to: Central Office Telecommunications Equipment [including NEBS – Network Equipment Building Systems], Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial Equipment, Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, Railway Equipment, Marine Equipment, and Energy Efficient Lighting. Additionally, BACL offers comprehensive test capabilities for both Unlicensed and Licensed Wireless and RF Devices, per the requirements of the FCC (USA), ISED Canada (Canada), the EU/EEA/EFTA Nations (per the ETSI Standards applicable under the Radio Equipment Directive), Singapore, MIC (Japan), South Korea, Vietnam, and Taiwan ROC.

B- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03) to certify

- For the USA (Federal Communications Commission):

- 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
- 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
- 3- All Telephone Terminal Equipment within FCC Scope C.

- For the Canada (Innovation, Science and Economic Development Canada):

- 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
- 2 All Scope 2-Licensed Personal Mobile Radio Services;
- 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
- 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
- 5 All Scope 5-Licensed Fixed Microwave Radio Services
- 6 All Broadcasting Equipment Technical Standards (BETS) in the Category I Equipment Standards List.
7. RSS-HAC Radio Scope 6 Hearing Aid Compatibility and Volume Control

- For Singapore (Info-Comm Media Development Authority (IMDA)):

- 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2 IMDA Phase I
2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2 IMDA Phase II

- For the Hong Kong Special Administrative Region & (Office of the Communications Authority-OFCA) – APEC Tel MRA- Phase I and Phase II:

- 1 Radio Equipment, per KHCA 10XX-series Specifications; HKCA 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1010, 1015, 1016, 1019, 1020, 1022, 1026, 1033, 1034, 1035, 1036, 1037, 1039, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1052, 1053, 1054, 1056, 1057, 1061, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1080, 1081
- 2 GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications; HKCA 1218, 1223, 1224, 1225, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1277, 1281, 1282, 1283
- 3 Fixed Network Equipment, per HKCA 20XX-series Specifications; HKCA 2001, 2011, 2014, 2015, 2017, 2026, 2027, 2028, 2029, 2030, 2031

- For Japan:

- 1 MIC Telecommunication Business Law (Terminal Equipment):
 - All Scope A1 - Terminal Equipment for the Purpose of Calls;
 - All Scope A2 - Other Terminal Equipment
- 2 Radio Law (Radio Equipment):
 - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
 - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law

- All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01) to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

- 1 Appliances:
 - for Clothes Washers (ver. 8.1)
 - for Residential Dishwashers (ver. 6.0)
 - for Residential Refrigerators and/or Freezers (ver. 5.0)
- 2 Commercial Food Service Equipment:
 - for Commercial Dishwashers (ver. 3.0)
 - for Commercial Ice Machines (ver. 3.0)
- 3 Data Center Equipment:
 - for Large Network Equipment (ver. 1.1)
- 4 Electronics and Office Equipment:
 - for Audio/Video Equipment (ver. 3.0)
 - for Computers (ver. 8.0)
 - for Data Center Storage (ver. 2.1)
 - for Displays (ver. 8.0)
 - for Enterprise Servers (ver. 4.0)
 - for Imaging Equipment (ver. 3.1)
 - for Set-top Boxes & Cable Boxes (ver. 5.1)
 - for Small Network Equipment (ver. 1.0)
 - for Telephony (ver. 3.0)
 - for Televisions (ver. 9.0), Title 10 Chapter II CFR Part 430 Subpart B –Appendix BB, Title 10 Chapter II CFR Part 430 Subpart B –Appendix DD
- 3 Lighting and Fans
 - for Decorative Light Strings (ver. 1.5)
 - for Downlights (ver. 1.0)
 - for Lamps (Light Bulbs) (ver. 2.1)
 - for Luminaires (including sub-components) (ver. 2.2)
 - for Residential Ceiling Fans (ver. 4.0)
 - for Residential Ventilating Fans (ver. 4.1)
- 4 Other
 - for Residential Ceiling Fans (ver. 4.0)
 - for Electric Vehicle Supply Equipment (ver. 1.2) (Electric Vehicle Supply Equipment Final Test Method for DC-output EVSE Rev March 2021)
 - for Water Coolers (ver. 3.0)
 - for Smart Home Energy Management Systems (ver. 1.1)

D- A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:

1. For the USA (Federal Communications Commission), as a Telecommunications Certification Body (TCB):
 - o a. All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
 - o b. All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;

- c. All Telephone Terminal Equipment within FCC Scope C.
- 2. Canada (ISED Canada) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II:
 - a. Phase I Designation Letter
 - b. Phase II ISED Canada recognition as a Product Certification Body for unlicensed wireless devices, licensed radios, radars, etc.:
- 3. For Singapore (InfoComm Media Development Authority (IMDA)) APEC Tel MRA -Phase I & Phase II:
 - a. All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2 IMDA Phase I
 - b. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2 IMDA Phase II
- 4. For the Hong Kong Special Administrative Region & (Office of the Communications Authority – OFCA) – APEC Tel MRA -Phase I & Phase II:
 - a. NIST Phase I Scope Recognition Letter from OFCA for BACL –US0057
 - b. OFCA Phase II Designation Letter
- 5. For Japan (Ministry of Communications):
 - a. NIST Japan Recognition
 - b. MIC Telecommunication Business Law (Terminal Equipment):
 - 1. All Scope A1 – Terminal Equipment for the Purpose of Calls;
 - 2. All Scope A2 – Other Terminal Equipment
 - c. Radio Law (Radio Equipment):
 - 1. All Scope B1 – Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
 - 2. All Scope B2 – Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
 - 3. All Scope B3 – Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law
 - d. Japan VCCI – Voluntary Control Council for Interference US-Japan Telecom Treaty (VCCI Side Letter)
 - 1. VCCI Certificate
 - d. Japan Registered Certification Body
 - 1. RCB Recognition Letter
- 6. European Union:
 - 1. Radio Equipment Directive [RED] 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
 - 2. EMC Directive [EMCD] 2014/30/EU US-EU EMC & Telecom MRA CAB (NB):
- 7. Australia ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I:
 - 1. Phase I Designation Letter
- 8. Chinese Taipei (Republic of China – Taiwan):
 - 1. NCC (National Communications Commission) APEC Tel MRA -Phase I
- 9. Republic of Korea (Ministry of Communications – Radio Research Laboratory) APEC Tel MRA -Phase I:
 - 1. NIST Phase I Scope Update Notification Letter from Korea for BACL

10. Vietnam APEC Tel MRA -Phase I (page 13)
 1. Vietnam (MIC) NIST Phase I Scope
11. Indonesia SDPPI (page 6)
 1. Phase I Listing
12. Israel Phase I
 1. NIST Phase I Scope Update Recognition Letter from Israel for BACL –US0057
13. UK Radio and EMC NIST Designation Letters
UK website: <https://www.gov.uk/uk-market-conformity-assessment-bodies/bay-area-compliance-laboratories-corp-bacl>
 1. Electromagnetic Compatibility Regulations (SI 2016/1091)
https://assets.publishing.service.gov.uk/media/5fe1e344e90e07452fce4e5a/AB_1313_BACL_UK EMC_Regs_NIST_Designation_Extended.pdf
 2. Radio Equipment Regulations 2017 (SI 2017/1206)
https://assets.publishing.service.gov.uk/media/5fe1e351e90e074525bf7be6/AB_1313_BACL_UK_Radio_Regs_NIST_Designation_Extended.pdf
14. IFT Mexico Phase I
 1. NIST Phase I New Recognition Letter from Mexico for BACL – US0057
15. Taiwan (BSMI) Phase 1 Designation Letter and designation form.
 1. NIST Phase I Scope Update Designation Letter to BSMI for BACL – US0057
 2. NIST Phase I Scope Update Designation Form to BSMI for BACL – US0057

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.26-2015.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test. The power setting used for final formal testing are listed below.

2.2 EUT Exercise Software

The test utilities used were cmd prompt.

C-V2X

Channel	Frequency (MHz)	Power Setting	
		Chain 0	Chain 1
183	5915	48	48

Note: The EUT was configured to transmit in MIMO mode

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Support Equipment

Manufacturer	Description	Model	Serial Number
AMG	Single Port PoE Injector, 48VDC, rated 100-200VAC	AMG155-1GAT-P30	2508260019
Dell	Laptop	Latitude 5401	HCJH3Z2

2.5 Antenna Information

Manufacturer	Description	Model	Antenna Gain (dBi)	Frequency Range (GHz)
MobileMark	5.9GHz Antenna	ECO9-5900-WHT	9	5.9-6

2.6 EUT Internal Configuration Details

None

2.7 External I/O Cabling List and Details

Cable Descriptions	Length (m)	From	To
Ethernet cable	1.5	EUT	POE Switch
Ethernet cable	1.5	POE Switch	Laptop

2.8 EUT External Power Supply List and Details

None

3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
FCC §2.1091	RF Exposure	Compliant
FCC §2.1055	Frequency Stability	Compliant
FCC §90.391	Maximum EIRP	Compliant
FCC §90.392	Transmit Spectrum Mask	Compliant
FCC §2.1049	Emission Bandwidth	Compliant
FCC §90.392	Transmitter Spurious Emission-Radiated	Compliant

BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.

4 FCC §2.1091 - RF Exposure

4.1 Applicable Standard

According to FCC §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

4.3 MPE Results

Worst Case C-V2X

<u>EIRP (dBm):</u>	<u>28.86</u>
<u>Maximum EIRP (mW):</u>	<u>769.13</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5915</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.15</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1</u>

Note: The EIRP value was obtained from section 5.6 of this report. It was measured after configuring the EUT to transmit using MIMO mode.

Conclusion

The device compliances with FCC MPE limit at 20 cm distance.

5 FCC §90.391 – Maximum EIRP

5.1 Applicable Standard

According to FCC §90.391:

(a) C-V2X licensees must limit RSU equivalent isotropically radiated power (EIRP) to 33 dBm. This limit applies to any operation within the 5895-5925 MHz band as follows:

- (1) 33 dBm/10 MHz EIRP;
- (2) 33 dBm/20 MHz EIRP; and
- (3) 33 dBm/30 MHz EIRP.

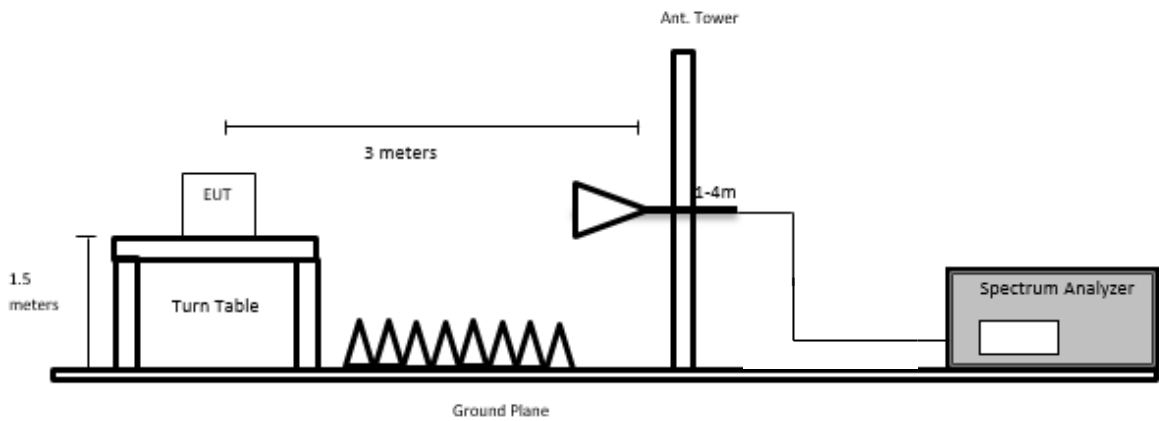
(b) For purposes of this section, the EIRP is root mean squared (RMS) measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam.

5.2 Test Procedure

According to ANSI C63.26 the following test procedure was followed to measure the Output Power:

- a) Set span to $2 \times$ to $3 \times$ the OBW.
- b) Set RBW = 1% to 5% of the OBW.
- c) Set VBW $\geq 3 \times$ RBW.
- d) Set number of measurement points in sweep $\geq 2 \times$ span / RBW.
- e) Sweep time:
 - 1) Set = auto-couple, or
 - 2) Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ for single sweep (automation-compatible) measurement.
- f) Detector = power averaging (rms).
- g) Set sweep trigger to “free run.”
- h) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function with band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- j) Add $10 \log(1/\text{duty cycle})$ to the measured power level to compute the average power during continuous

5.3 Test Setup Block Diagram



5.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/A
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/A
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/A
1432	Keysight Technologies	MXE EMI Receiver, Multi-touch	N9038B	MY60180008	2025-01-03	1 year
1295	Carlisle Interconnected Technologies	10m Coaxial Cable	UFB142A-1-3937-200200	64639890912-001	2024-10-16	1 year
1192	ETS Lindgren	Horn Antenna	3117	00218973	2024-10-23	2 years

Statement of Traceability: *BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 “A2LA Policy on Metrological Traceability”.*

5.5 Test Environmental Conditions

Temperature:	22-26°C
Relative Humidity:	42-46%
ATM Pressure:	101-102 kPa

The testing was performed by Libass Thiaw on 2025-10-02 at RF site.

5.6 Test Results

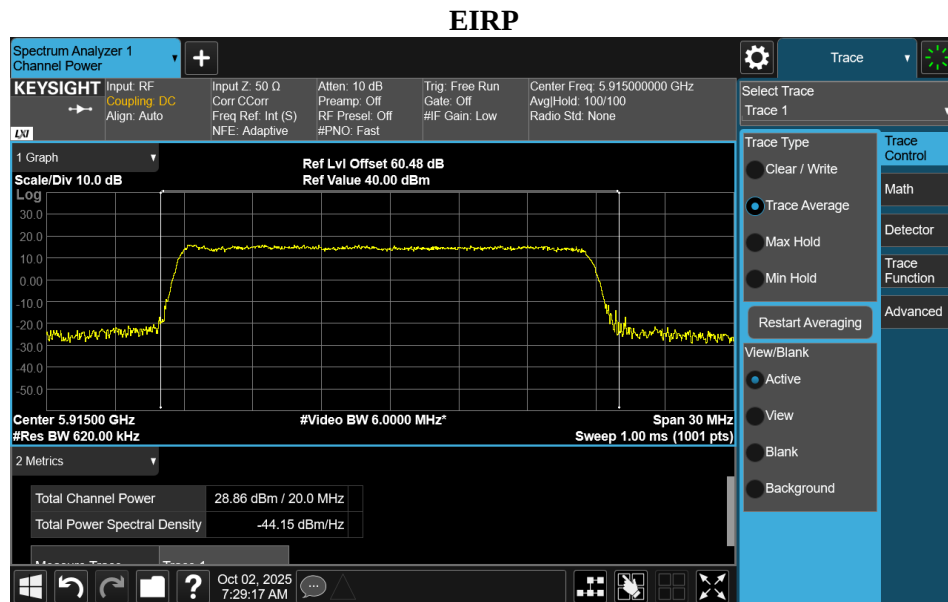
Pre-scan was performed in order to determine worst-case orientation of device with respect to measurement antenna in the X/Y/Z axis. Plots/data shown represent measurements made in worst-case orientation.

Raw Measure (dBm)	AF (dB/m)	Distance Correction Factor (dB)	Cable Loss (dB)	Duty Cycle Correction Factor (dB)	Corrected avg EIRP (dBm)	Limit (dBm)	Margin (dB)
-31.623	35.72	9.54	9.603	3.39	28.86	33	-4.14

Note: $EIRP\ (dBm) = \text{Raw Measurement}\ (dBm) + 106.99 + \text{Cable Loss}\ (dB) + \text{Antenna Factor}\ (dB/m) + \text{Distance Correction Factor}\ (20\log(3)) - 104.76 + \text{Duty Cycle Correction Factor}\ (dB)$

Note: Antennas used for testing have a gain of 9dBi per antenna

Please refer to the following plot for more detailed test results



6 FCC §90.392 - Transmit Spectrum Mask

6.1 Applicable Standard

According to FCC §90.392:

C-V2X Roadside Units (RSUs) must comply with the following out-of-band emissions limits.

- (a) Conducted limits measured at the antenna input must not exceed:
 - (1) -16 dBm/100 kHz within ± 1 megahertz of the band edges;
 - (2) -13 dBm/MHz within ± 1 megahertz to ± 5 megahertz of the band edges;
 - (3) -16 dBm/MHz within ± 5 megahertz to ± 30 megahertz of the band edges; and
 - (4) -28 dBm/MHz beyond 30 megahertz from the band edges

6.2 Test Procedure

According to FCC Part 90M Rules, the following procedure was followed for OOB Mask Test:

1. Connect output of the antenna port to a spectrum analyzer or EMI receiver, with appropriate attenuation, as to not damage the instrumentation.
2. Set the reference level of the measuring equipment in accordance with the general procedures in section 4.2.3 of ANSI C63.26-2015
3. Measure the power spectral density of the OOB Mask using the following procedure.
4. Set instrument center frequency to the frequency of channel being measured.
5. Set the span ± 1 megahertz of the band edges for measurement at the fundamental, and set the span within ± 1 megahertz to ± 5 megahertz and ± 5 megahertz to ± 30 megahertz of the band edges for the left and right side measurements.
6. Set resolution bandwidth (RBW) = to 100kHz within ± 1 megahertz of the band edges, and 1MHz beyond that
7. Set video bandwidth (VBW) $\geq 3 \times$ RBW
8. Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
9. Sweep time = auto.
10. Detector = power averaging (rms)
11. Trace mode = max hold.
12. Allow trace to fully stabilize.

6.3 Test Setup Block Diagram



6.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
1461	Rohde & Schwarz	Analyzer, Spectrum	FSQ26	200103	2025-08-08	1 year
1382	CarlisleIT	SMA 48in RF Cable	UFA210A-0-480-300300	MFR 64639 236164-002	2025-07-17	6 months

Statement of Traceability: **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 “A2LA Policy on Metrological Traceability”.

6.5 Test Environmental Conditions

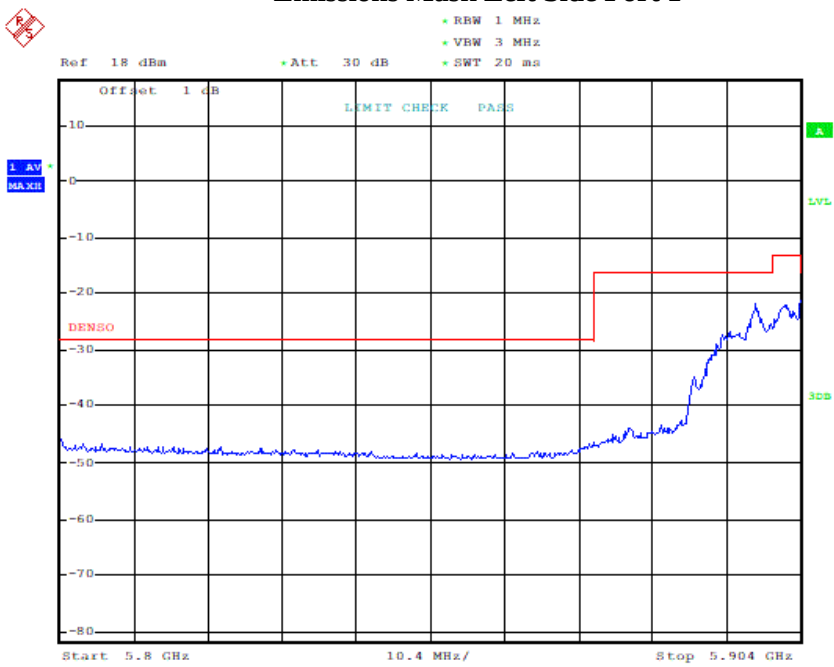
Temperature:	22-26°C
Relative Humidity:	42-46%
ATM Pressure:	101-102 kPa

The testing was performed by Libass Thiaw on 2025-10-03 at RF site.

6.6 Test Results

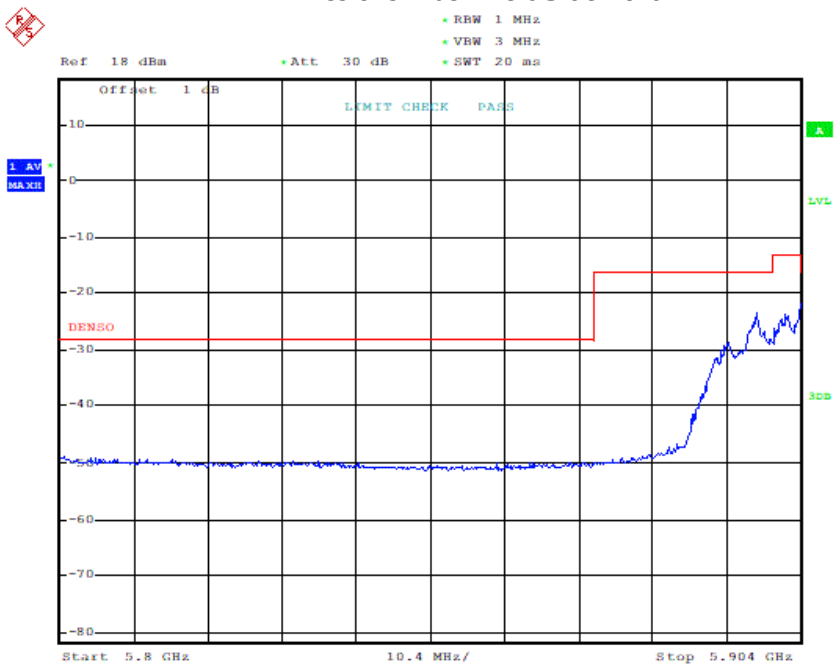
Please refer to the following plots for the test result

Emissions Mask Left Side Port 1

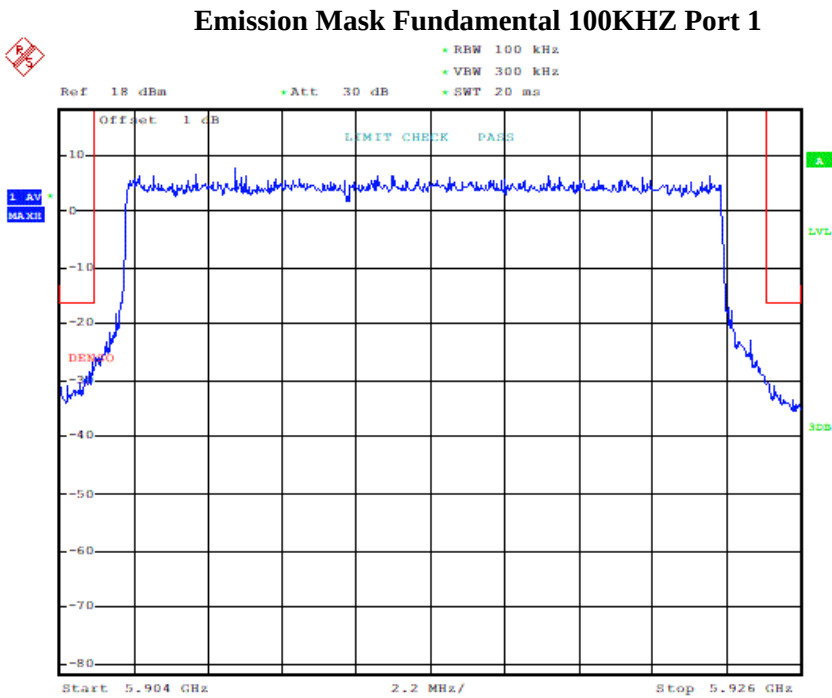


Date: 3.OCT.2025 16:59:06

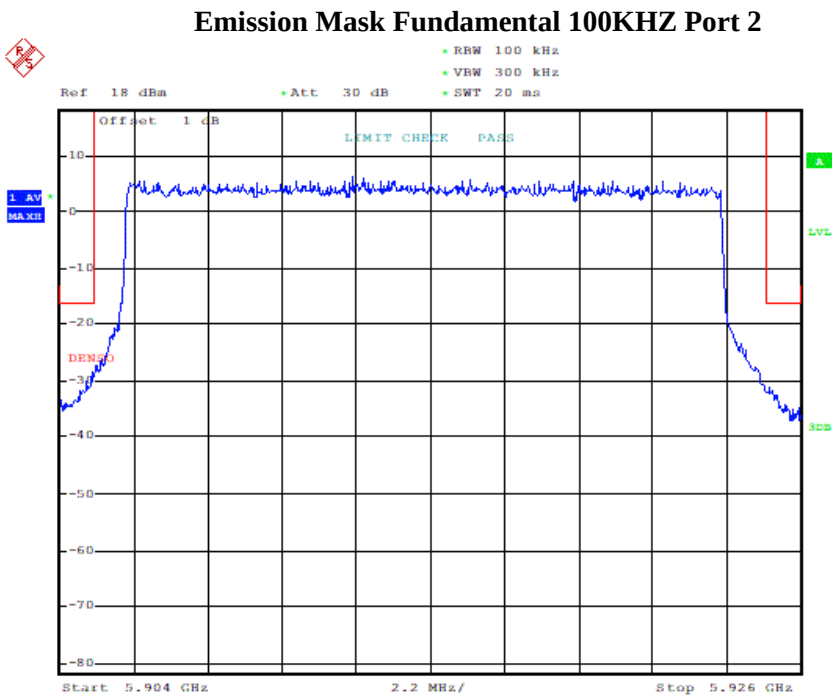
Emissions Mask Left Side Port 2



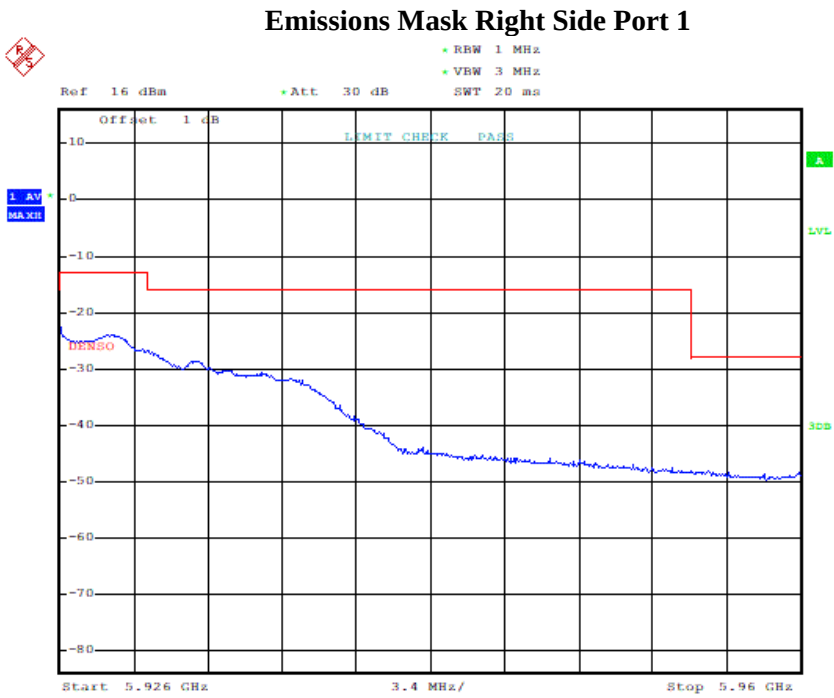
Date: 3.OCT.2025 16:53:54



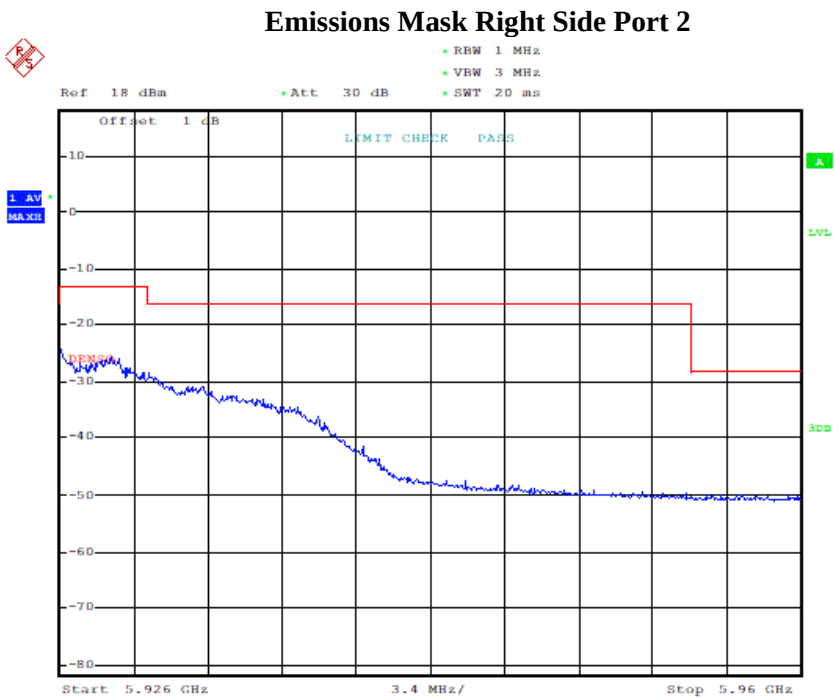
Date: 3.OCT.2025 16:43:45



Date: 3.OCT.2025 16:51:34



Date: 3.OCT.2025 16:42:52



Date: 3.OCT.2025 16:54:25

7 FCC §2.1049 - Emission Bandwidths

7.1 Applicable Standard

According to FCC §2.1049:

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

7.2 Test Procedure

Bandwidth was measured following procedures in ANSI-C63.26-2015 section 5.4.

The following procedure shall be used for measuring (99%) power bandwidth:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

- d) Set the detection mode to peak, and the trace mode to max-hold.

The following procedure shall be used for measuring 26 dB power bandwidth:

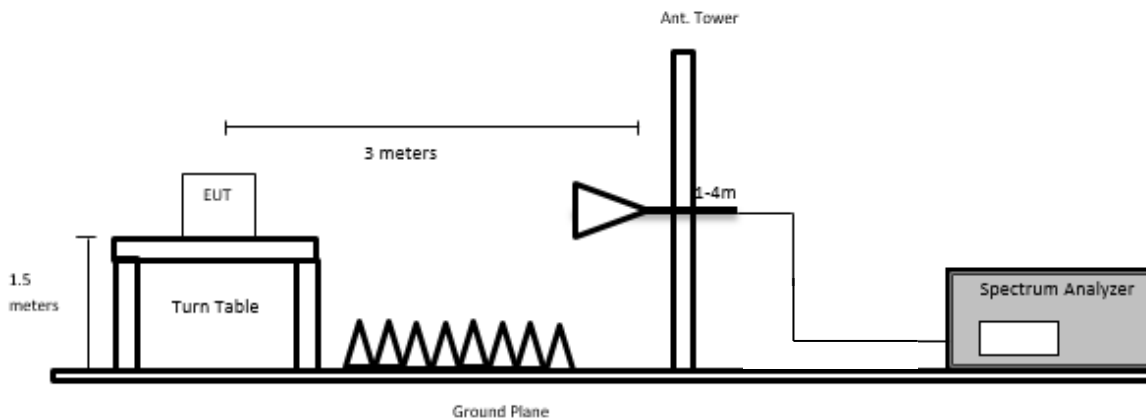
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- f) Determine the reference value by either of the following:
 - 1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
 - 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
- g) Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).

i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.

7.3 Test Setup Block Diagram



7.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/A
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/A
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/A
1432	Keysight Technologies	MXE EMI Receiver, Multi-touch	N9038B	MY60180008	2025-01-03	1 year
1295	Carlisle Interconnected Technologies	10m Coaxial Cable	UFB142A-1-3937-200200	64639890912-001	2024-10-16	1 year
1192	ETS Lindgren	Horn Antenna	3117	00218973	2024-10-23	2 years

Statement of Traceability: **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 “A2LA Policy on Metrological Traceability”.

7.5 Test Environmental Conditions

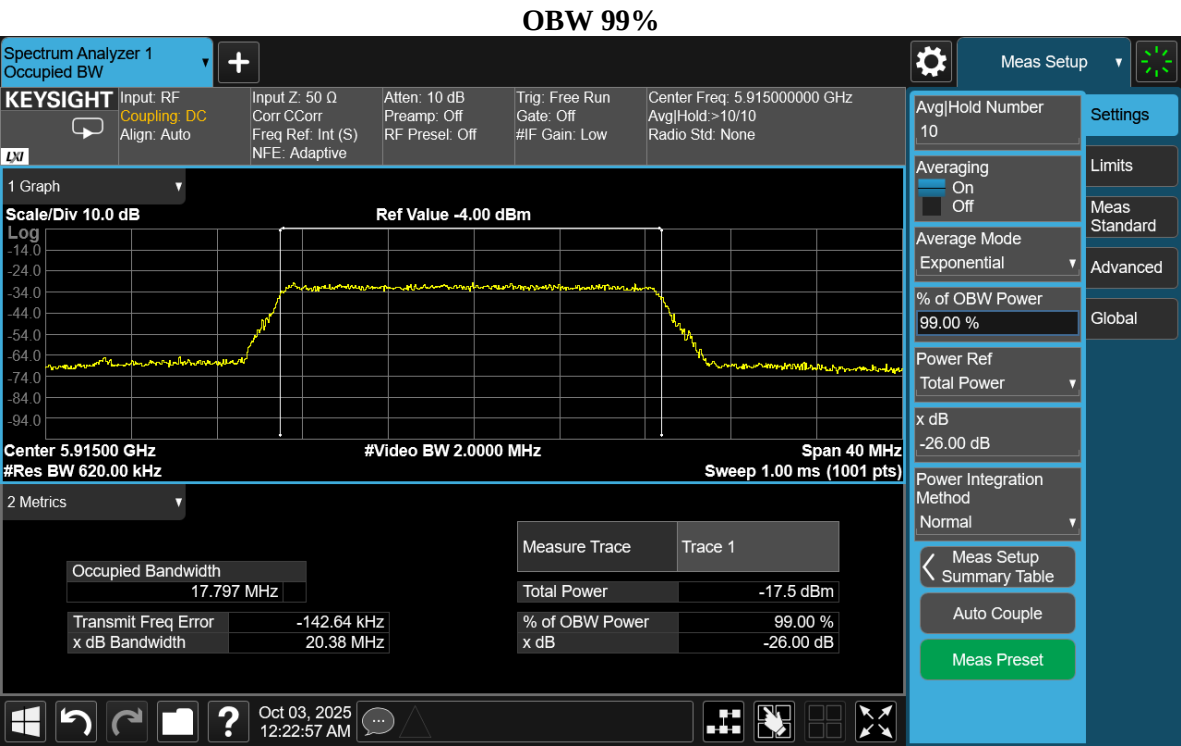
Temperature:	22-26°C
Relative Humidity:	42-46%
ATM Pressure:	101-102 kPa

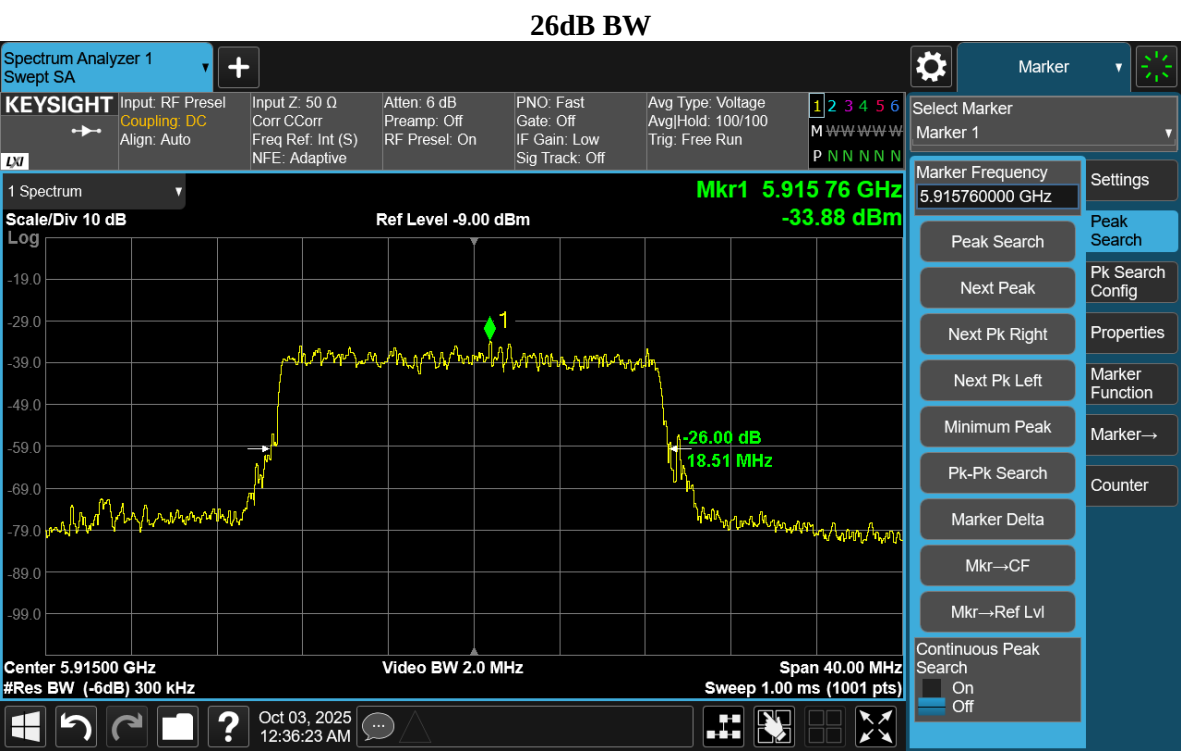
The testing was performed by Libass Thiaw on 2025-10-03 at RF site.

7.6 Test Results

Frequency (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5915	17.797	18.51

Please refer to the following plots for the test results





8 FCC §90.392 – Spurious Radiated Emissions

8.1 Applicable Standard

According to FCC §90.392:

C-V2X Roadside Units (RSUs) must comply with the following out-of-band emissions limits.

(a) Conducted limits measured at the antenna input must not exceed:

- (1) -16 dBm/100 kHz within ± 1 megahertz of the band edges;
- (2) -13 dBm/MHz within ± 1 megahertz to ± 5 megahertz of the band edges;
- (3) -16 dBm/MHz within ± 5 megahertz to ± 30 megahertz of the band edges; and
- (4) -28 dBm/MHz beyond 30 megahertz from the band edges

8.2 Test Procedure

Spurious Emissions were measured following procedures in ANSI-C63.26-2015 section 5.5.4.2:

Final compliance data (i.e., data to be reported to the regulatory agency in support of an application for an equipment authorization) shall be collected in accordance with the procedures provided in 5.5.2, with the EUT transmitting for each frequency specified in 5.1.2. The emission characteristics of the EUT can be identified from the pre-scan measurement information obtained as specified in 5.5.2.5. Final measurements shall be performed for the worst case combination(s) of variable technical parameters that result in the maximum measured emission amplitude as per the guidelines provided in 5.1.2. For each mode selected, record the frequency and amplitude of the highest fundamental emission (if applicable), and the frequency and amplitude data for the six highest-amplitude spurious emissions.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meters, and the EUT was placed on a turntable, which was 0.8 meters and 1.5 meters above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

9 kHz-150 kHz

$$\text{RBW} = 200\text{Hz} / \text{VBW} = 1\text{kHz}$$

150 kHz-30 MHz

$$\text{RBW} = 9\text{kHz} / \text{VBW} = 30\text{kHz}$$

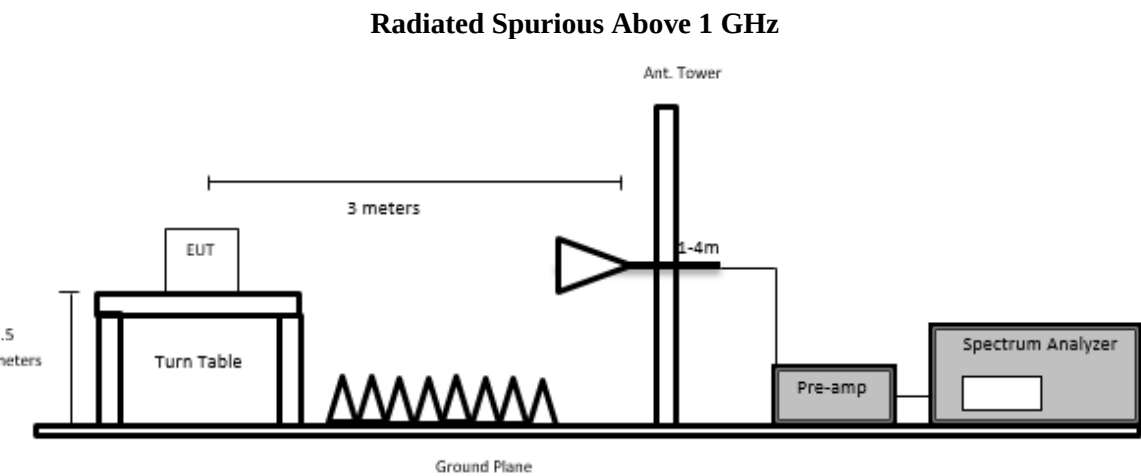
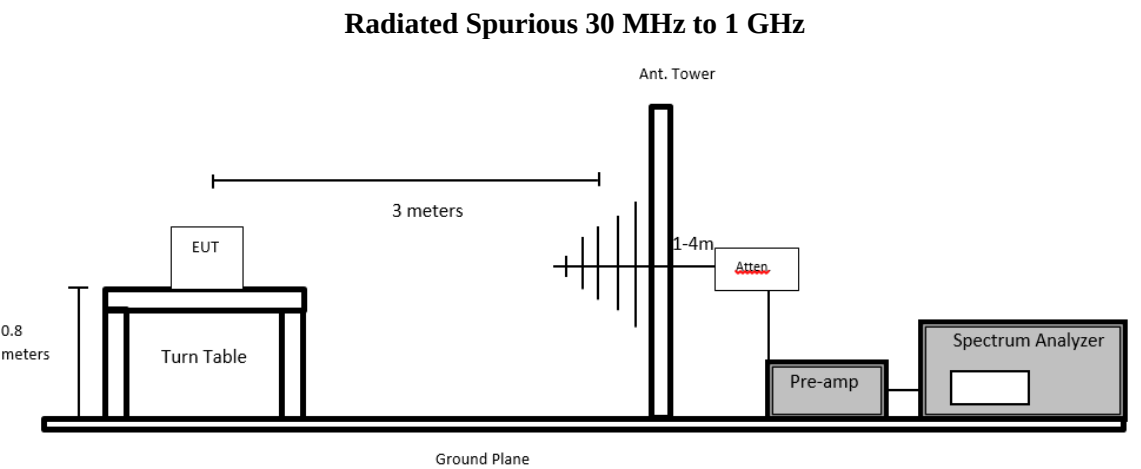
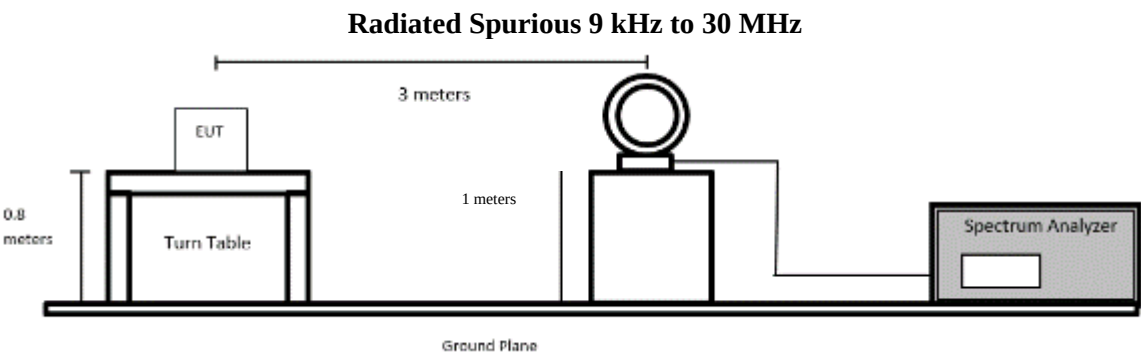
30-1000 MHz:

$$\text{RBW} = 100\text{ kHz} / \text{VBW} = 300\text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

$$\text{RBW} = 1\text{MHz} / \text{VBW} = 3\text{MHz} / \text{Sweep} = \text{Auto}$$

8.3 Test Setup Block Diagram



8.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/R
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/R
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/R
1432	Keysight Technologies	MXE EMI Receiver, Multi-touch	N9038B	MY60180008	2025-01-03	1 year
393	COMPOWER	Active Loop Antenna, 10kHz-30MHz	AL-130	17043	2025-05-06	2 years
321	Sunol Sciences	Biconilog Antenna, 30MHz-1GHz	JB3	A020106-2; 1504	2023-12-18	2 years
1245	-	6dB Attenuator	PE7390-6	01182018A	2023-12-18	2 years
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2025-05-09	6 months
1248	Pasternack	RG214 COAX Cable	PE3062	-	2025-04-02	6 months
1246	Hewlet Packard	RF Limiter	11867A	01734	2025-04-07	1 year
1210	Pasternack	N-type Coax Cable, 50ft RG213	PE3496-0600	2103161	2025-05-09	6 months
1192	ETS Lindgren	Horn Antenna, 1GHz-18GHz	3117	00218973	2024-10-23	2 years
1295	Carlisle	10m Ultra Low Loss Coaxial Cable	UFB142A-1-3937-200200	64639890912-001	2025-04-16	6 months
1449	BACL	Preamplifier, 0.1GHz-18GHz	BACL1313-A100M18G	4052472	2025-08-18	6 months
1546	Megaphase	SMA coax cable	TM26-S1S3-12	20869602 001	2025-08-18	6 months
91	Wisewave	Horn Antenna, 18GHz-26.5GHz	ARH-4223-02	10555-01	2025-05-06	2 years
92	Wisewave	Horn Antenna, 26.5-40GHz	ARH-2823-02	10555-01	2024-06-24	2 years
1451	BACL	Preamplifier 18GHz-40GHz	BACL-1313-A1840	4052432	2025-08-18	6 months
1545	Megaphase	K-type coax cable	TM40-K1K3-12	20869601 001	2025-08-18	6 months

Statement of Traceability: BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".

8.5 Test Environmental Conditions

Temperature:	22-26°C
Relative Humidity:	42-46%
ATM Pressure:	101-102 kPa

The testing was performed by Libass Thiaw from 2025-10-02 in 5 meter Chamber 3.

8.6 Test Results

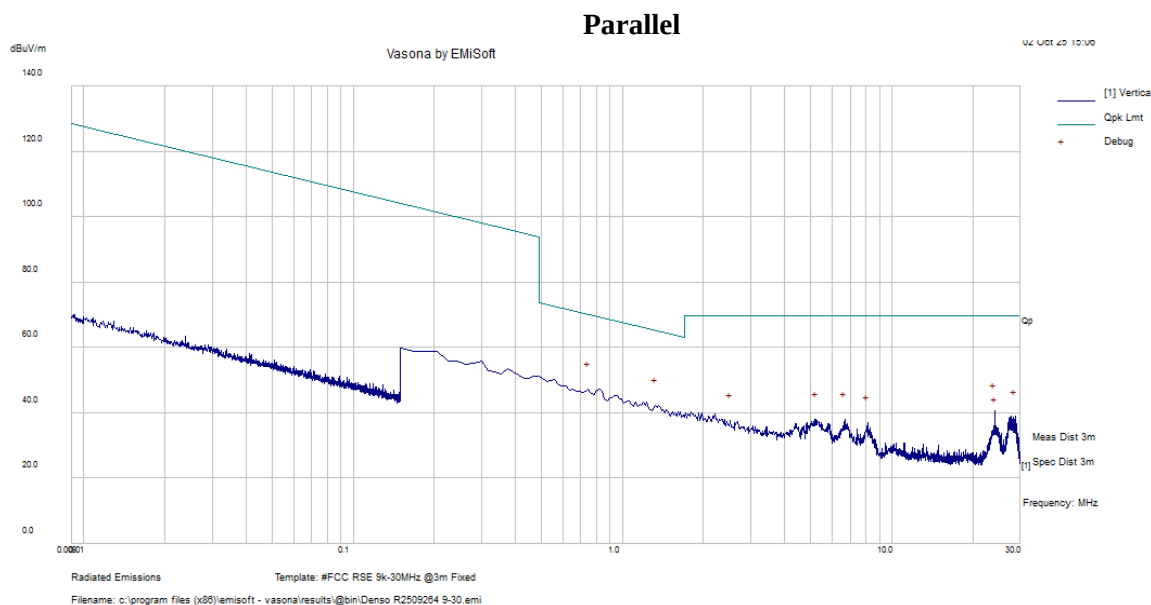
Note: Limits were converted from dBm to dBuV using the following formula
 $\text{dBm to dBuV/m at 3 meters} = \text{dBm} + 95.2$

Note: Pre-scan was performed in order to determine worst-case orientation of device with respect to measurement antenna in the X/Y/Z axis. Plots/data shown represent measurements made in worst-case orientation.

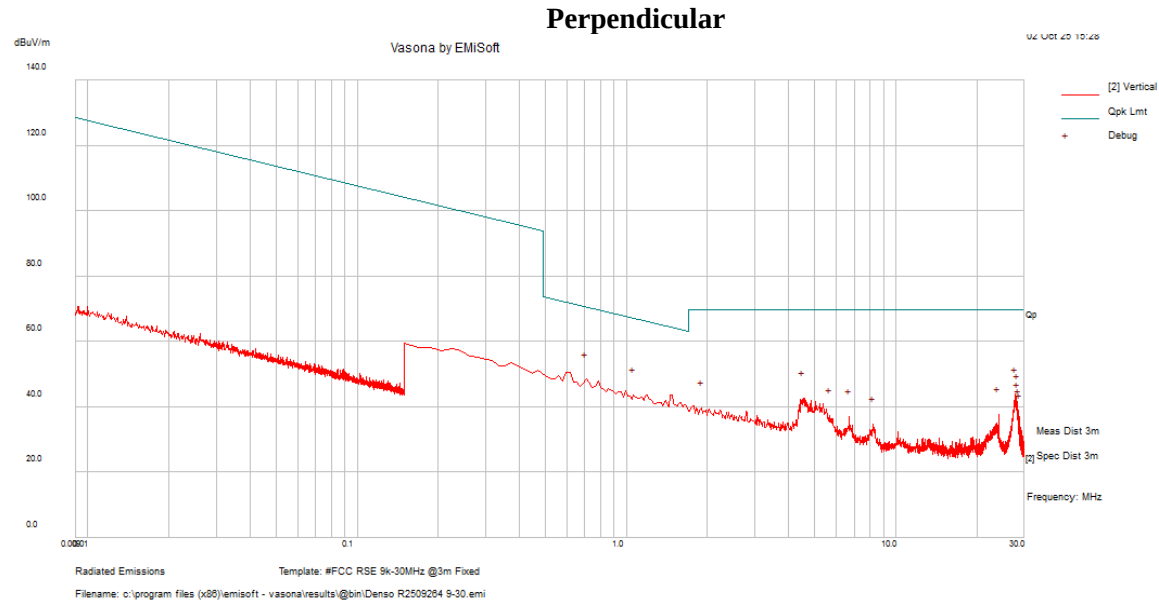
Note: Radiated testing was performed to evaluate cabinet emissions by terminating antenna outputs into loads.

1. 9 kHz – 30 MHz, Measured at 3 meters

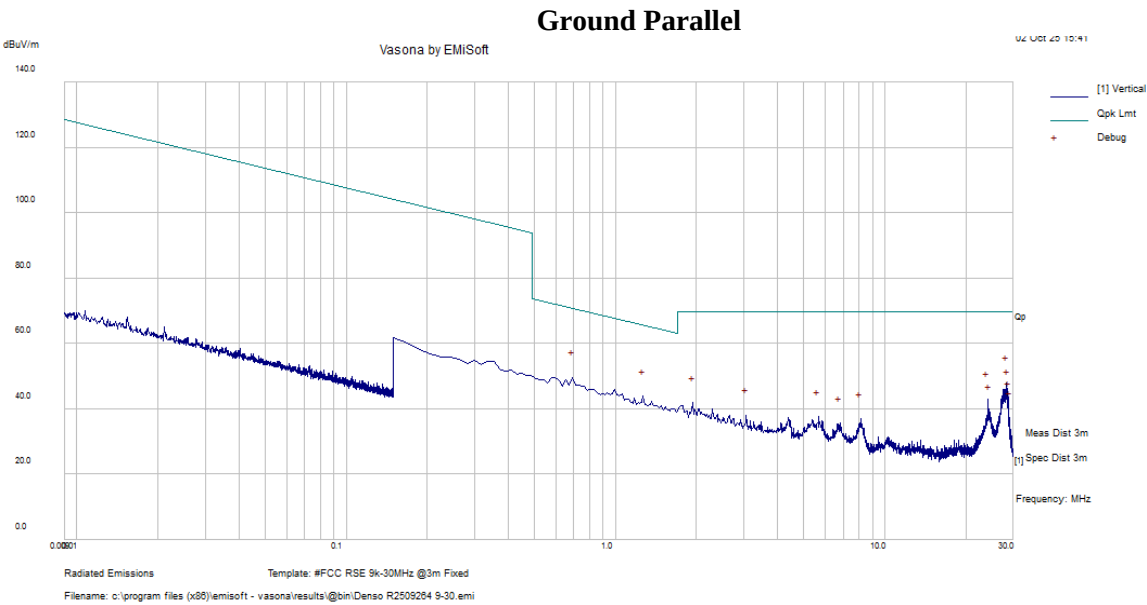
Note: All peak emissions were under the quasi-peak limits



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBuV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBuV/m)	Margin (dB)
1.325344	32.24	10.17	42.41	Peak	V	100	0	67.2	-24.79
0.747	37.25	10.11	47.35	Peak	V	100	0	67.2	-19.85
24.06731	31.58	8.97	40.56	Peak	V	100	0	67.2	-26.64
28.67541	30.93	7.94	38.87	Peak	V	100	0	67.2	-28.33
5.243156	27.74	10.36	38.09	Peak	V	100	0	67.2	-29.11
6.698344	27.5	10.4	37.91	Peak	V	100	0	67.2	-29.29



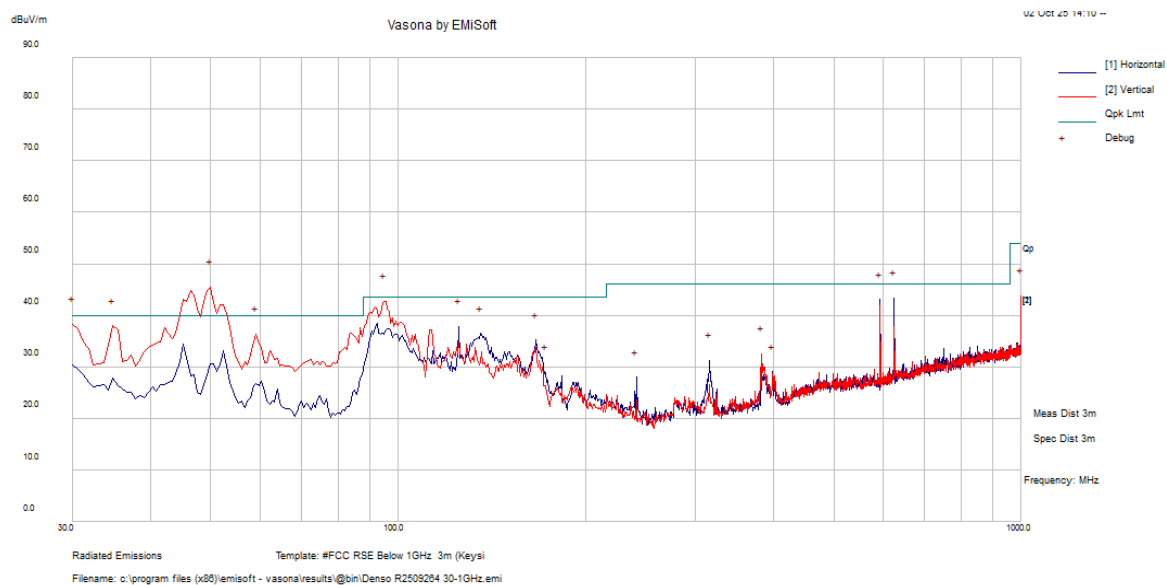
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBuV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBuV/m)	Margin (dB)
0.709688	38.29	10.12	48.41	Peak	V	100	0	67.2	-18.79
1.064156	33.65	10.07	43.72	Peak	V	100	0	67.2	-23.48
27.85453	35.71	8.15	43.85	Peak	V	100	0	67.2	-23.35
4.534219	32.19	10.34	42.53	Peak	V	100	0	67.2	-24.67
28.26497	33.6	8.04	41.64	Peak	V	100	0	67.2	-25.56
1.903688	29.37	10.34	39.71	Peak	V	100	0	67.2	-27.49



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBuV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBuV/m)	Margin (dB)
0.709688	38.29	10.12	48.41	Peak	V	100	0	67.2	-18.79
1.064156	33.65	10.07	43.72	Peak	V	100	0	67.2	-23.48
27.85453	35.71	8.15	43.85	Peak	V	100	0	67.2	-23.35
4.534219	32.19	10.34	42.53	Peak	V	100	0	67.2	-24.67
28.26497	33.6	8.04	41.64	Peak	V	100	0	67.2	-25.56
1.903688	29.37	10.34	39.71	Peak	V	100	0	67.2	-27.49

2. 30 MHz – 1 GHz, Measured at 3 meters

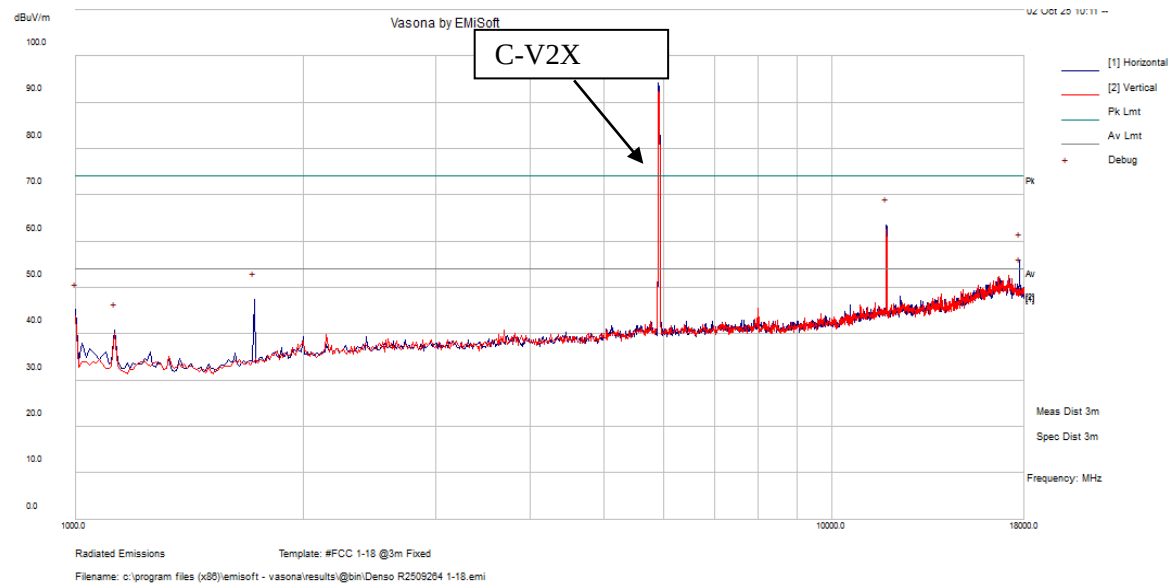
C-V2X



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBuV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBuV/m)	Margin (dB)
50.095	48.45	-23.26	25.19	QP	V	226	242	67.2	-42.01
94.80719	59.63	-21.05	38.58	QP	V	128	229	67.2	-28.62
30	40.99	-10.48	30.51	QP	V	131	145	67.2	-36.69
34.93531	50.04	-13.9	36.15	QP	V	102	310	67.2	-31.05
624.9575	49	-8.42	40.59	QP	H	119	190	67.2	-26.61
594.0075	42.26	-9.68	32.58	QP	H	149	193	67.2	-34.62

3. 1 GHz-18 GHz, Measured at 3 meters

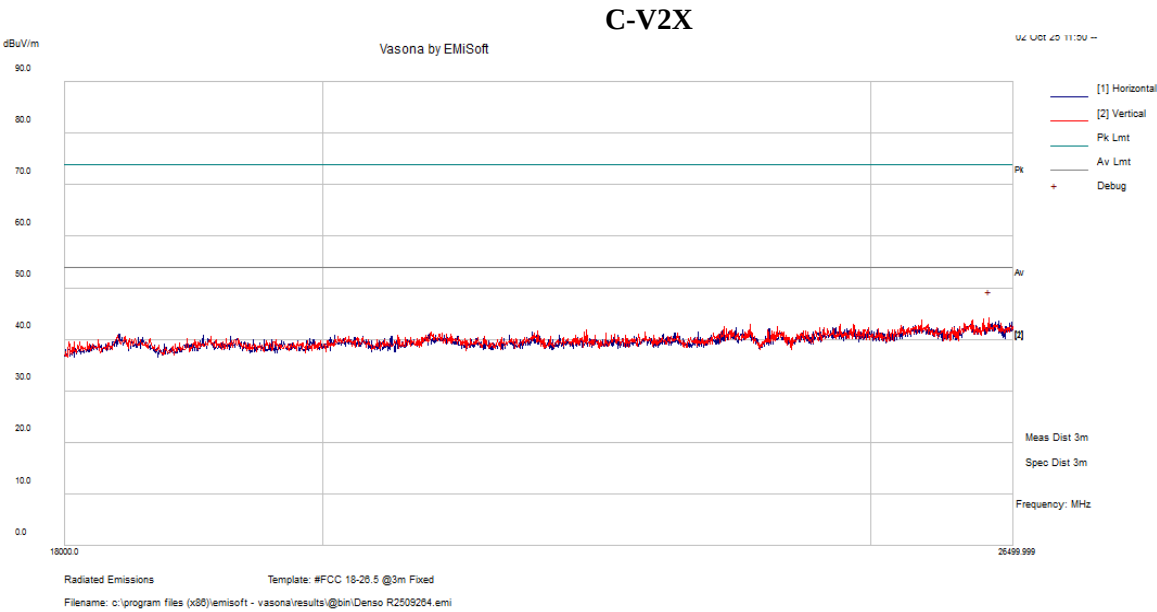
C-V2X



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
11828.85	38.51	10.24	48.75	Average	H	117	146	67.2	-18.45
17746.97	23.08	15.21	38.28	Average	H	121	94	67.2	-28.92

4. 18 GHz to 26.5 GHz, Measured at 3 meters

Note: Peak emissions are under average limits

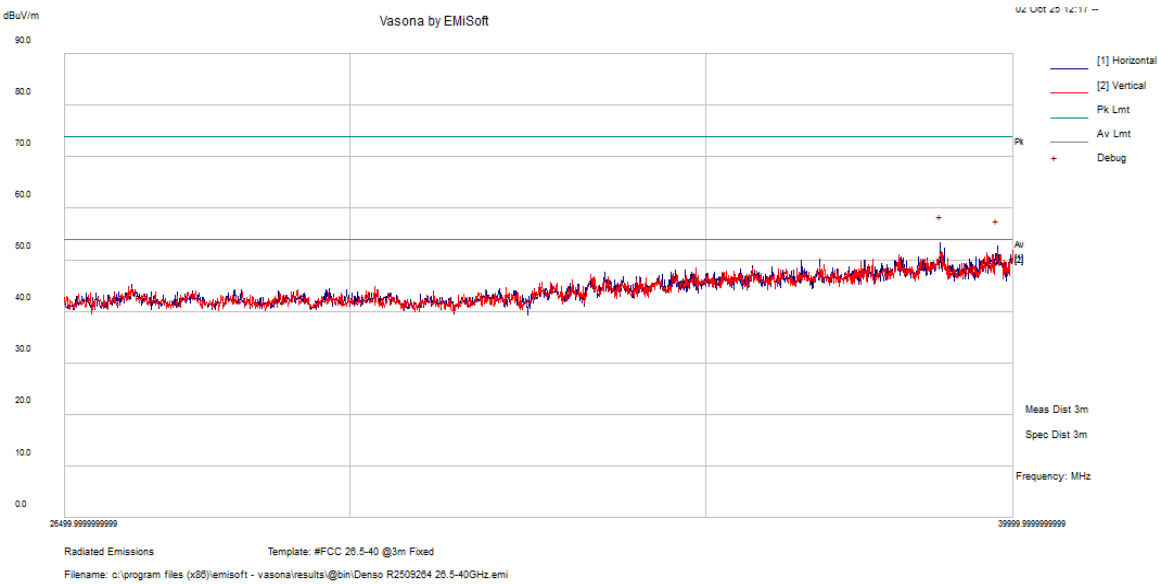


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBuV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBuV/m)	Margin (dB)
26239.69	39.41	4.73	44.14	Peak	V	300	0	67.2	-23.06
22635.85	37.53	1.85	39.38	Peak	V	201	7	67.2	-27.82
22745.55	36.94	1.96	38.9	Peak	V	201	7	67.2	-28.3

5. 26.5 GHz to 40 GHz, Measured at 3 meters

Note: Peak emissions are under average limits

C-V2X



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Detector	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
38751.25	39.33	13.98	53.3	Peak	H	200	0	67.2	-13.9
39721.56	36.67	15.96	52.63	Peak]	H	200	0	67.2	-14.57

9 FCC §2.1055– Frequency Stability

9.1 Applicable Standard

According to FCC §2.1055:

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30° to $+50^{\circ}$ centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

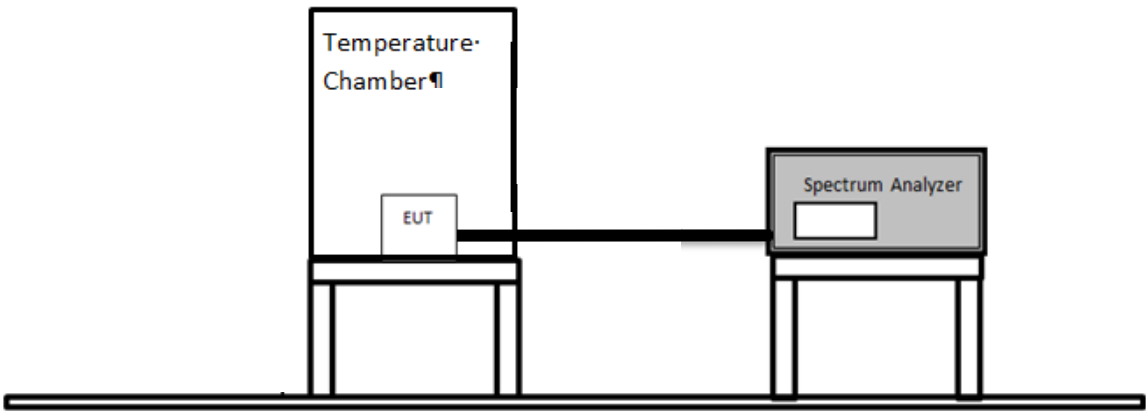
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

9.2 Test Procedure

1. Set instrument center frequency to the frequency of channel being measured.
2. Set the span to at 2times the OBW.
3. Set resolution bandwidth (RBW) = between 1 and 5% of OBW.
4. Set video bandwidth (VBW) $\geq 3 \times \text{RBW}$
5. Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
6. Sweep time = auto.
7. Detector = Peak
8. Trace mode = max hold.
9. Allow trace to fully stabilize.

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
1461	Rohde & Schwarz	Analyzer, Spectrum	FSQ26	200103	2025-08-08	1 year
1382	CarlisleIT	SMA 48in RF Cable	UFA210A-0-480-300300	MFR 64639 236164-002	2025-07-17	6 months
1060	BACL	Temperature Chamber	BTH-150-40	30078	2024-12-03	1 year

Statement of Traceability: **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 “A2LA Policy on Metrological Traceability”.

9.5 Test Environmental Conditions

Temperature:	22-26°C
Relative Humidity:	42-46%
ATM Pressure:	101-102 kPa

The testing was performed by Libass Thiaw from 2025-10-06 to 2025-10-15 at RF site.

9.6 Test Results

Port 1

Voltage	Temperature (°C)	F _L (GHz)	F _H (GHz)	F _{average} (GHz)	ppm
12V	-50	5.90583	5.92375	5.91479	-35.50295858
	-40	5.905814	5.923694	5.914754	-41.58918005
	-30	5.905826	5.92376	5.914793	-34.99577346
	-20	5.905844	5.92374	5.914792	-35.16483516
	-10	5.905846	5.923754	5.9148	-33.8123415
	0	5.90582	5.923756	5.914788	-35.84108199
	10	5.90586	5.923696	5.914778	-37.53169907
	20	5.905808	5.923788	5.914798	-34.15046492
	30	5.905842	5.923728	5.914785	-36.34826712
	40	5.905824	5.92376	5.914792	-35.16483516
	50	5.905796	5.923824	5.91481	-32.12172443
	60	5.905782	5.923744	5.914763	-40.06762468
	70	5.905812	5.923754	5.914783	-36.68639053
	80	5.905788	5.923744	5.914766	-39.56043956
	85	5.905794	5.92369	5.914742	-43.61792054
13.2V	20	5.905822	5.923738	5.91478	-37.19357566
10.8V	20	5.905914	5.923784	5.914849	-25.52831784

Port 2

Voltage	Temperature (°C)	F _L (GHz)	F _H (GHz)	F _{average} (GHz)	ppm
12V	-50	5.90585	5.923756	5.914803	-33.305156
	-40	5.90582	5.923792	5.914806	-32.797971
	-30	5.905864	5.923704	5.914784	-36.51732883
	-20	5.905836	5.923694	5.914765	-39.72950127
	-10	5.905828	5.923774	5.914801	-33.6432798
	0	5.905852	5.92369	5.914771	-38.71513102
	10	5.90595	5.923746	5.914848	-25.69737954
	20	5.905816	5.923784	5.9148	-33.8123415
	30	5.905842	5.92375	5.914796	-34.48858833
	40	5.905818	5.923782	5.9148	-33.8123415
	50	5.905834	5.923728	5.914781	-37.02451395
	60	5.905784	5.923846	5.914815	-31.276416
	70	5.905814	5.92378	5.914797	-34.319527
	80	5.905808	5.92375	5.914779	-37.362637
	85	5.905844	5.923738	5.914791	-35.333897
13.2V	20	5.905822	5.923794	5.914808	-32.45984784
10.8V	20	5.905822	5.923794	5.914808	-32.45984784

Please refer to the plots in Annex A.

10 Annex B (Normative) – Test Setup Photographs

Please refer to the attachment.

11 Annex C (Normative) – External Photographs

Please refer to the attachment.

12 Annex D (Normative) – EUT Internal Photographs

Please refer to the attachment.

13 Annex E (Normative) - A2LA Electrical Testing Certificate**Accredited Laboratory**

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA R222 - Specific Requirements EPA ENERGY STAR Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Presented this 13th day of September 2024.

A handwritten signature in blue ink, appearing to read 'Trace McInturff'.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope.

<https://www.a2la.org/scopepdf/3297-02.pdf>

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