

Test Report No:
25A0154R-RFUSV12S-A

TEST REPORT

FCC Rules & Regulations

Product Name	V2X Module
Brand Name	Unex Technology Corporation
Model No.	VTX-352
FCC ID	NUK-VTX352C
Applicant's Name / Address	Unex Technology Corporation 7F-2, No. 100, Sec. 1, Jiafeng 11th Rd., Zhubei City, Hsinchu County 302052, Taiwan, R.O.C.
Manufacturer's Name	Unex Technology Corporation
Test Method Requested, Standard	FCC CFR Title 47 Part 90 Subpart M FCC CFR Title 47 Part 95 Subpart L
Verdict Summary	IN COMPLIANCE
Documented by Genie Chang	<i>Genie Chang</i>
Approved by Will Chen	<i>Will Chen</i>
Date of Receipt	2025/10/09
Date of Issue	2025/11/20
Report Version	V1.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	2025/11/20

Summary of Test Result

Report Clause	Test Items	Result (PASS/FAIL)	Remark
3	Occupied Bandwidth	PASS	-
4	Transmit Power	PASS	-
5	Out-of-Band Emissions (OOBE)	PASS	-
6	Spurious Emissions at Antenna Terminal	PASS	-
7	Radiated Emission	PASS	-
8	Frequency Stability	PASS	-

Comments and Explanations

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1. General Information

1.1. EUT Description

Frequency Range	5895 ~ 5925 MHz	
Operating Frequency /	Bandwidth 10 MHz	5900 / 5910 / 5920 MHz (3 channels)
Channel Number	Bandwidth 20 MHz	5905 / 5915 MHz (2 channels)

Antenna Information				
Item.	Brand Name	Part No.	Type	Gain (dBi)
1	Unex	EX-53	Omni	7.6 dBi
2	Unex	EX-55	Omni	5 dBi
3	TOP-LINK	ZG-OI-596005-NM	Omni	4 dBi

Note: The above EUT information is declared by the manufacturer.

1.2. EUT Information

EUT Power Type	From Host (DC 5V by USB cable)
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1.3. Testing Location Information

USA	FCC Designation Number: TW0033 / FCC Registration Number: 647365
Canada	CAB Identifier Number: TW3023 / Company Number: 26930

Site Description	Accredited by TAF
	Accredited Number: 3023

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
	Linkou Laboratory
Address	No. 85, Wenlin St., Linkou Dist., New Taipei City 244017, Taiwan, R.O.C.
Performed Location	No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.
Phone Number	+886-3-275-7255
Fax Number	+886-3-327-8031

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual	Test Date	Tested By
Radiated Emission	Temperature (°C)	10~40 °C	24.3~24.2 °C	2025/11/04~	Rock Liang
	Humidity (%RH)	10~90 %	73.5~65.3 %	2025/11/13	Ashton Chiu
Conducted testing	Temperature (°C)	10~40 °C	23.8~23.5 °C	2025/10/22~	Leo Chen
	Humidity (%RH)	10~90 %	62.5~60.3 %	2025/11/13	

1.4. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Item	Uncertainty
Occupied Bandwidth	± 1580.61 Hz
Transmit Power (Radiated Method)	± 2.98 dB
Out-of-Band Emissions (OOBE)	± 2.12 dB
Spurious Emissions at Antenna Terminal	± 2.12 dB
Radiated Emission	30 MHz~180 MHz: ± 4.72 dB 180 MHz~1 GHz: ± 2.99 dB 1 GHz~18 GHz: ± 2.98 dB 18 GHz~40 GHz: ± 2.99 dB
Frequency Stability	± 0.52 ppm

1.5. List of Test Equipment

For Conducted Measurements / HY-SR02

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
Spectrum Analyzer	R&S	FSV30	103466	2024/12/18	2025/12/17
Spectrum Analyzer	R&S	FSV40	101147	2025/06/18	2026/06/17
Temperature Chamber	KSON	THS-D4T-100	A0606	2025/02/24	2026/02/23
DC Power Supply	GW Instek	SPD-3606	GEQ820915	2025/07/08	2026/07/07

For Radiated Measurements /HY-CB03

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-0675	2025/08/14	2027/08/13
Horn Antenna	Com-Power	AH-840	101101	2023/12/04	2025/12/03
Horn Antenna	RF SPIN	DRH18-E	210507A18ES	2024/05/15	2026/05/14
Pre-Amplifier	SGH	SGH0301-9	20211007-11	2025/01/10	2026/01/09
Pre-Amplifier	SGH	PRAMP118	20200701	2025/01/10	2026/01/09
Pre-Amplifier	EMCI	EMC184045SE	980369	2025/01/10	2026/01/09
Coaxial Cable	EMCI	EMC102-KM-KM-600	1160311	2025/01/10	2026/01/09
Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242	2025/01/10	2026/01/09
EMI Test Receiver	R&S	ESR3	102793	2024/12/06	2025/12/05
Spectrum Analyzer	R&S	FSV3044	101114	2025/02/26	2026/02/25
Coaxial Cable	SGH	SGH18	2021005-1	2025/01/10	2026/01/09
Coaxial Cable	SGH	SGH18	202108-4	2025/01/10	2026/01/09
Coaxial Cable	SGH	HA800	GD20110223-1	2025/01/10	2026/01/09
Coaxial Cable	SGH	HA800	GD20110222-8	2025/01/10	2026/01/09

Note: Test Software Version: e3 230303 dekra V9.

2. Test Configuration of EUT

2.1. Test Condition

EUT Operational Condition	
Testing Voltage	DC 5V

2.2. Test Frequency Mode

Test Software Version	cmd / Version 10.0.26100.6899
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OBU (Antenna: EX-53)

Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	29	29
	5910	38	38
	5920	37	37
20M	5905	31	31
	5915	39	39

RSU (Antenna: EX-53)

Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	46	46
	5910	46	46
	5920	46	46
20M	5905	46	46
	5915	46	46

OBU (Antenna: EX-55)

Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	30	30
	5910	40	40
	5920	38	38
20M	5905	33	33
	5915	41	41

RSU (Antenna: EX-55)

Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	46	46
	5910	46	46
	5920	46	46
20M	5905	46	46
	5915	46	46

OBU (Antenna: ZG-OI-596005-NM)

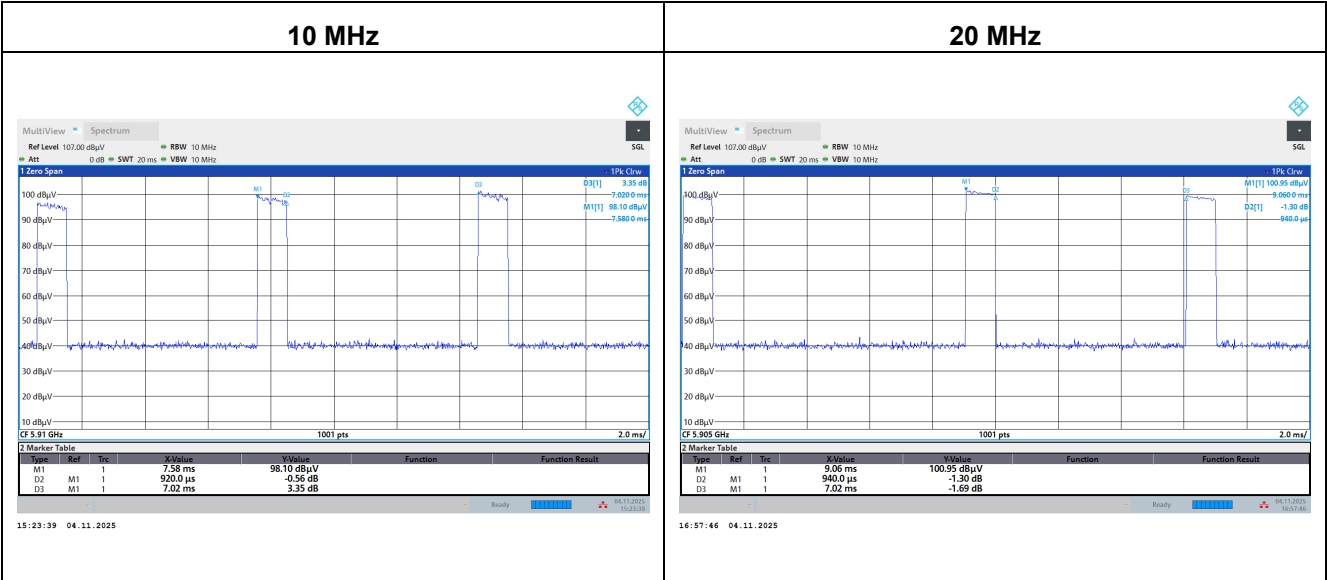
Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	31	31
	5910	40	40
	5920	40	40
20M	5905	32	32
	5915	41	41

RSU (Antenna: ZG-OI-596005-NM)

Bandwidth	Frequency (MHz)	Power Setting	
		MIMO A	MIMO B
10M	5900	46	46
	5910	46	46
	5920	46	46
20M	5905	46	46
	5915	46	46

2.3. Duty Cycle

Bandwidth	On Times (ms)	On+Off Times (ms)	Duty Cycle (%)	Duty Factor (dB)
10 MHz	0.9200	7.0200	13.11	8.83
20 MHz	0.9400	7.0200	13.39	8.73



2.4. Measurement Configuration

Test Mode	Mode 1 (Transmit)	10 MHz
		20 MHz

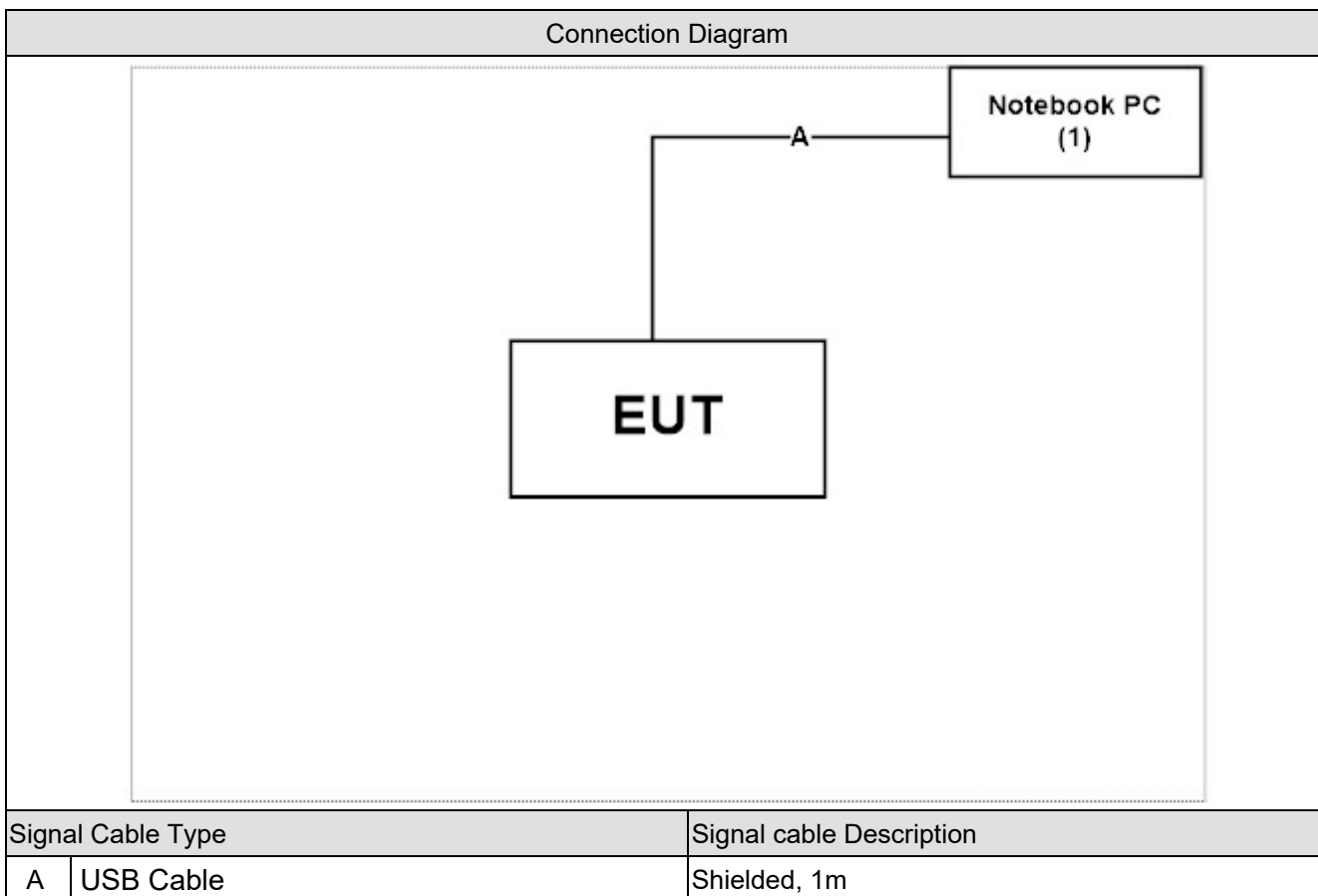
Note:

1. Determining compliance shall be based on the results of the compliance measurement, without taking measurement instrumentation uncertainty into account.
2. OBU test data of Out-of-Band Emissions (OOBE) and Spurious Emissions at Antenna Terminal are covered by RSU since OBU EIRP Power is lower than RSU.
3. The spectrum plot against conducted item only shows the worst case.

2.5. Tested System Details

No.	Equipment	Brand Name	Model No.	Serial No.	Power Cord
1	Notebook PC	ASUS	P2438U	H1NXCV11U083025	N/A

2.6. Configuration of Tested System

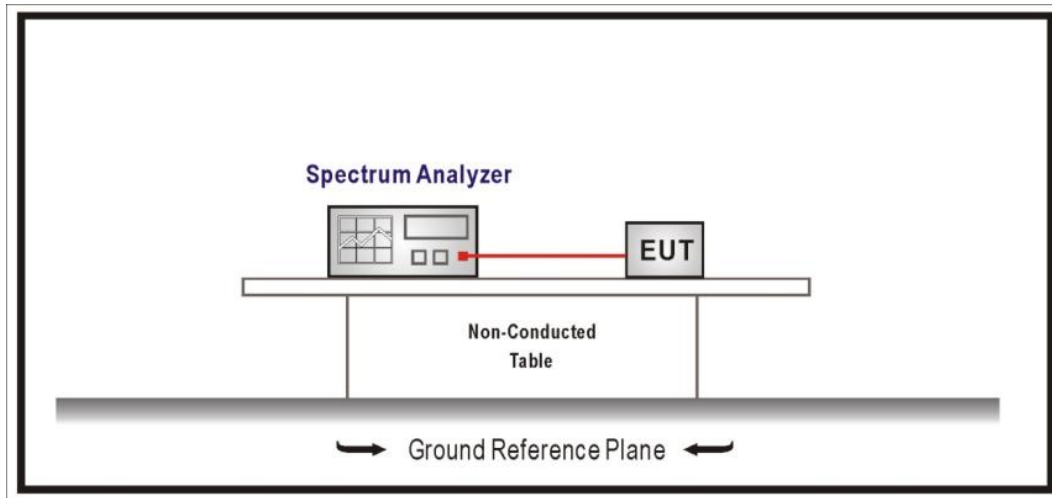


2.7. EUT Operating Procedures

1	Setup the EUT as shown in Section 2.6.
2	Execute software "cmd / Version 10.0.26100.6899" on the Notebook PC.
3	Configure the test mode and the test channel.
4	Verify that the EUT works properly.

3. Occupied Bandwidth

3.1. Test Setup



3.2. Test Limit

N/A

The 26 dB bandwidth and 99% bandwidth within the designated frequency band.

3.3. Test Procedure

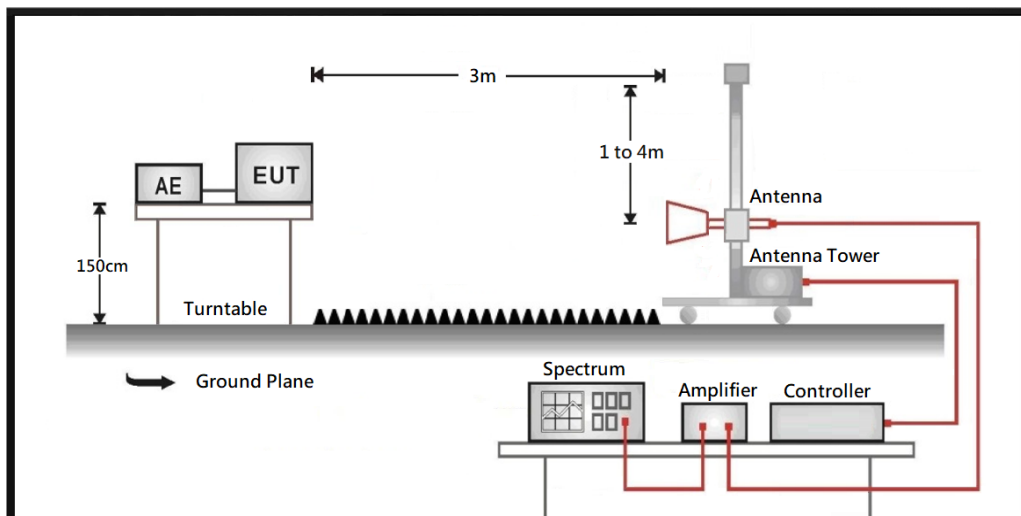
The EUT was setup according to ANSI C63.26-2015 sections 5.4.

3.4. Test Result of Occupied Bandwidth

Refer as Appendix A

4. Transmit Power

4.1. Test Setup



4.2. Test Limit

OBU

Channel (MHz)	Channel Bandwidth (MHz)	EIRP with Geofencing outside zone (dBm/BW)	EIRP with Geofencing operating within zone* or without Geofencing (dBm/BW)
5895-5905	10	33	23
5905-5915	10	33	33 [†]
5915-5925	10	33	33 [†]
5895-5915	20	33	23
5905-5925	20	33	33 [†]
5895-5925	30	33	23
* Coordination zones of §90.387(b) ²			
[†] Reduced to 27dBm within ± 5 degrees of horizontal			

RSU

Channel (MHz)	Channel Bandwidth (MHz)	EIRP* (dBm/BW)
5895-5925	10	33 dBm
5895-5925	20	33 dBm
5895-5925	30	33 dBm

* Up to 8 meters above the roadway surface bed. To operate above 8 and up to 15 meters the EIRP shall be reduced by $20 \cdot \log(H_t/8)$, where H_t is the height of the RSU transmit antenna above the roadway surface bed.

4.3. Test Procedures

The EUT was setup according to ANSI C63.26-2015 sections 5.5 and 5.2.4; tested according to test procedure of KDB 511808 D01 C-V2X v02.

The EUT is placed on a turn table which is 1.5 meter above ground and the turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

Perform a field strength measurement following ANSI C63.10 and record the worse field strength value via spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then convert the measured field strength level to EIRP level.

Following ANSI C63.10 and KDB 412172 D01 v01r01,

$\text{EIRP value (dBm)} = \text{Field strength value (dBuV/m)} + \text{Correction factor (dB) @3m}$

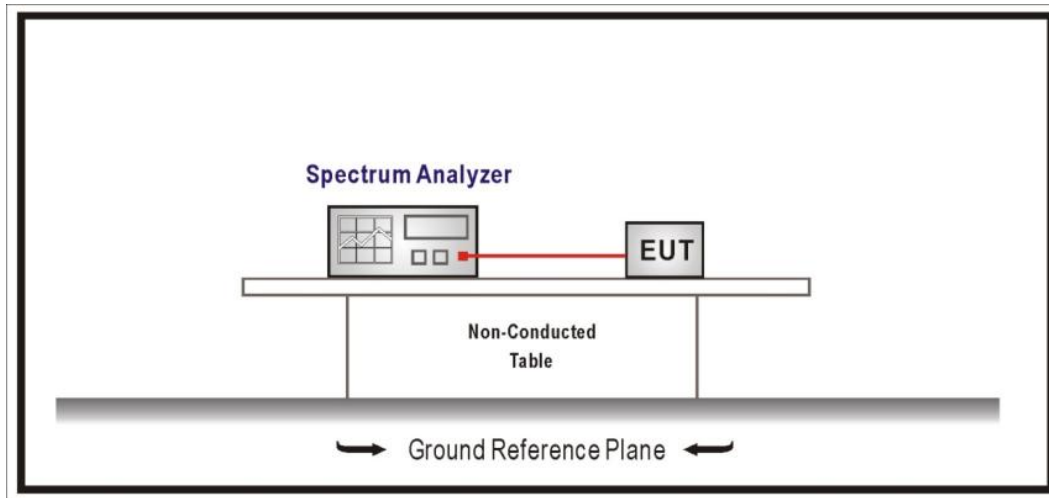
$\text{Correction factor (dB) @3m} = 20 \cdot \log(3) - 104.77 = -95.23\text{dB}$

4.4. Test Result of Transmit Power

Refer as Appendix B

5. Out-of-Band Emission (OOBE)

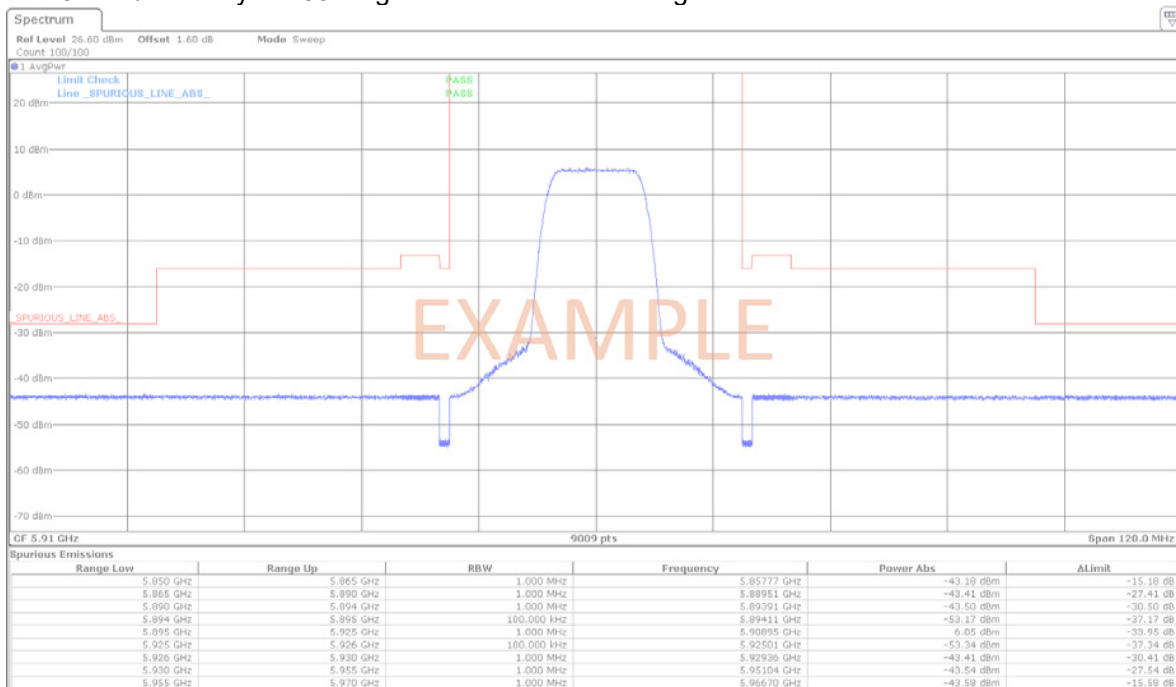
5.1. Test Setup



5.2. Test Limit

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.



Date: 16. Jan. 2025 16:00:55

5.3. Test Procedures

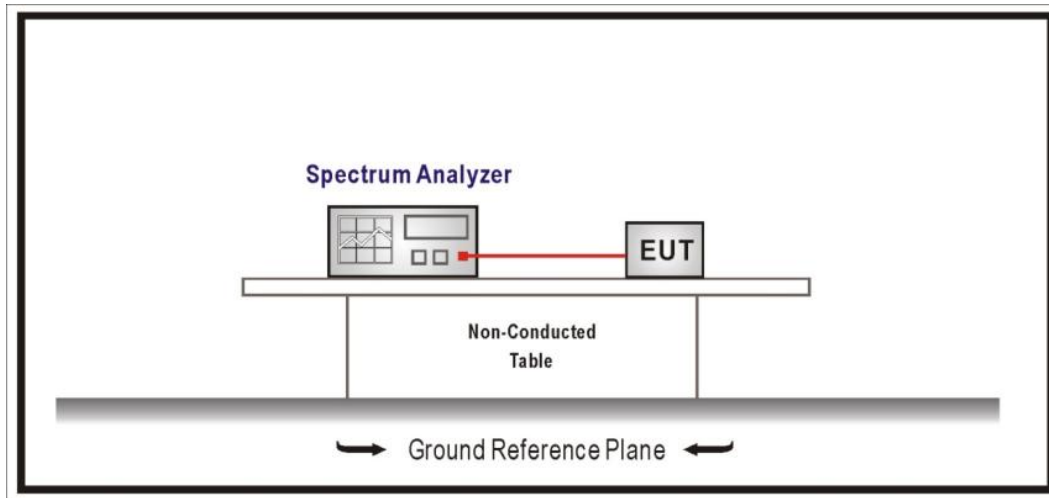
The EUT was setup according to ANSI C63.26-2015 section 5.7.3 and 5.7.4; tested according to test procedure of KDB 511808 D01 C-V2X v02.

5.4. Test Result of Out-of-Band Emission (OOBE)

Refer as Appendix C

6. Spurious Emissions at Antenna Terminal

6.1. Test Setup



6.2. Test Limit

-28 dBm/MHz for 30MHz to 40GHz.

6.3. Test Procedures

The EUT was setup according to ANSI C63.26-2015 section 5.7.3 and 5.7.4; tested according to test procedure of KDB 511808 D01 C-V2X v02.

2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna.

Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spuriousemissions which are attenuated more than 20 dB below the permissible value need not be specified.

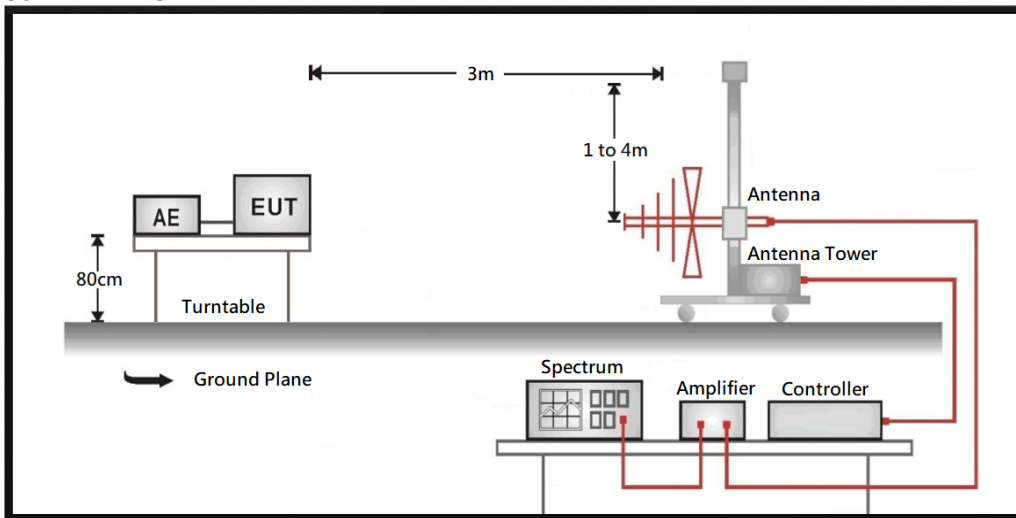
6.4. Test Result of Spurious Emissions at Antenna Terminal

Refer as Appendix D

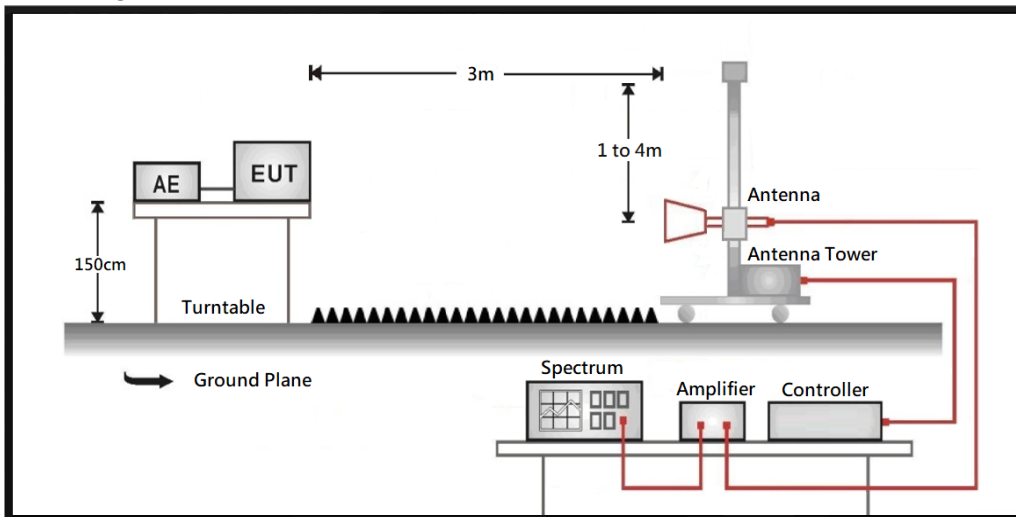
7. Radiated Emission

7.1. Test Setup

30 MHz ~ 1 GHz



Above 1 GHz



7.2. Test Limit

-28 dBm/MHz for 1GHz to 40GHz.

-38 dBm/100kHz for 30MHz to 1GHz

7.3. Test Procedures

§ 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

- (1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.
- (2) All equipment operating on frequencies higher than 25 MHz.
- (3) All equipment where the antenna is an integral part of and attached directly to the transmitter.
- (4) Other types of equipment as required, when deemed necessary by the Commission

The EUT is placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission.

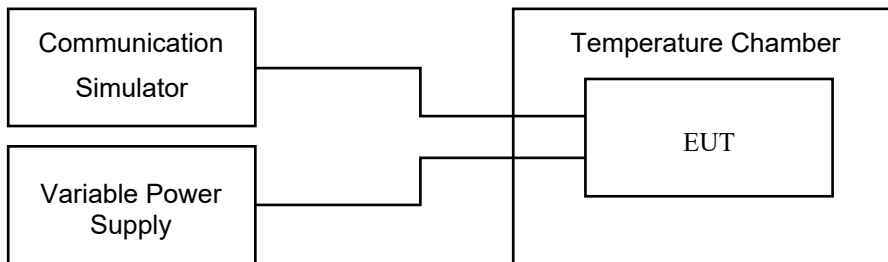
Testing was performed with RF ports terminated with 50 Ohm load.

7.4. Test Result of Radiated Emission

Refer as Appendix E

8. Frequency Stability

8.1. Test Setup



8.2. Test Limit

± 20 ppm

8.3. Test Procedure

Frequency Stability under Temperature Variations:

The EUT under test was connected to an external AC or DC power supply and input rated voltage. The EUT was placed inside the temperature chamber. Set the EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -40°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +85°C reached. (The temperature is declared by the manufacturer)

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC or DC power supply to power the EUT and set the voltage to rated voltage. Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

8.4. Test Result of Frequency Stability

Refer as Appendix F