



Test report No.: 2380757R-RFUSV16S-A

## FCC/ISED TEST REPORT

Product Name	Mesa 4
Trademark	Juniper Systems
Model and /or type reference	MS4W
Contains FCC ID	VSF31102, N7NEM75T, VSF26593, VSF27065
Contains IC	7980A-31102, 2417C-EM75T, 7980A-26593, 7980A-27065
Applicant's name / Address (FCC) Address (IC)	Juniper Systems, Inc. 1132 W 1700 N, Logan, Utah, 84321 United States 1132 W 1700 N, Logan UT 84321, United States
Manufacturer's name	Juniper Systems, Inc.
Test method requested, standard	Simultaneous Transmit (co-location)
Verdict Summary	IN COMPLIANCE
Documented By (Senior Project Specialist / Genie Chang)	<i>Genie Chang</i>
Tested By (Senior Engineer / Ivan Chuang)	<i>Ivan Chuang</i>
Approved By (Senior Engineer / Alan Chen)	<i>Alan Chen</i>
Date of Receipt	2023/08/24
Date of Issue	2023/11/07
Report Version	V1.0

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2380757R-Product Photos-FCC+ISED

## Competences and Guarantees

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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.

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

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## General conditions

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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**

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<b>Report No.</b>	<b>Version</b>	<b>Description</b>	<b>Issued Date</b>
2380757R-RFUSV16S-A	V1.0	Initial issue of report.	2023/11/07

## 1. General Information

### 1.1. EUT Description

Product Name	Mesa 4
Trade Name	Juniper Systems
Main Model and /or type reference	MS4W
EUT Rated Voltage	AC 100-240 V / 50-60 Hz
EUT Test Voltage	AC 120 V / 60 Hz
Contains FCC ID	VSF31102, N7NEM75T, VSF26593, VSF27065
Contains IC	7980A-31102, 2417C-EM75T, 7980A-26593, 7980A-27065
Power Adapter	MFR: Phihong, M/N: PSAA30R-120 Input: AC 100-240V~0.8A 50-60Hz Output: 12V---2.5A 30W Cable out: Non-shielded, 1.5m

Note: The RF specifications of EUT refer to Intel AX211D2W, Sierra EM7590, MS2 MICRO and WT41u-E follow above FCC ID and IC.

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Juniper Systems	PCB Trace (WLAN Main) (For Intel AX211D2W)	PIFA	2.4 dBi for 2.4 GHz 2.4 dBi for 5150-5250MHz 2.4 dBi for 5250-5350MHz 1.6 dBi for 5470-5725MHz 2.4 dBi for 5725-5850MHz
		25249 (WLAN Aux) (For Intel AX211D2W)	PIFA	0.8 dBi for 2.4 GHz 2.8 dBi for 5150-5250MHz 2.5 dBi for 5250-5350MHz 2.8 dBi for 5470-5725MHz 3.3 dBi for 5725-5850MHz
2	Juniper Systems	Extended Range Bluetooth (For WT41u-E)	PIFA	1.5 dBi for 2.4 GHz

Note: The WLAN antenna of EUT is conform to FCC 15.203.

1.2. Test Summary

Simultaneous Transmit (co-location) Requirement

Requirement – Test Item	Result
Radiated Emissions	Pass

Note:

1. The EUT is a Mesa Pro, which contains functions on WWAN and 2.4GHz/5GHz band WIFI with Bluetooth card module transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of transmitter with simultaneous transmit (co-location).
3. There consider simultaneous transmit (co-location) based on KDB 996369 D02 Question 1 and KDB 996369 D04 for Radiated Emission.
4. The antenna gain and output power are both comply with the original certification, the final product complies with the ERP/EIRP rules.
5. The final test results meets all the applicable FCC/ISED rules.

Test Mode (Simultaneous Transmit)	Mode 1: bt3m_2480MHZ+RFID_902.75MHz+LTE_band48_QPSK (1,0)_20MHZ_CH56640 Mode 2: n20_2442MHZ+BT1M_2402MHz+LTE_band48_QPSK (1,0)_20MHZ_CH56640 Mode 3: n20_2442MHZ+RFID_902.75MHz+LTE_band48_QPSK (1,0)_20MHZ_CH56640 Mode 4: ax80_5775MHZ+BT1M_2402MHz+LTE_band48_QPSK (1,0)_20MHZ_CH56640 Mode 5: ax80_5775MHZ+RFID_902.75MHz+LTE_band48_QPSK (1,0)_20MHZ_CH56640
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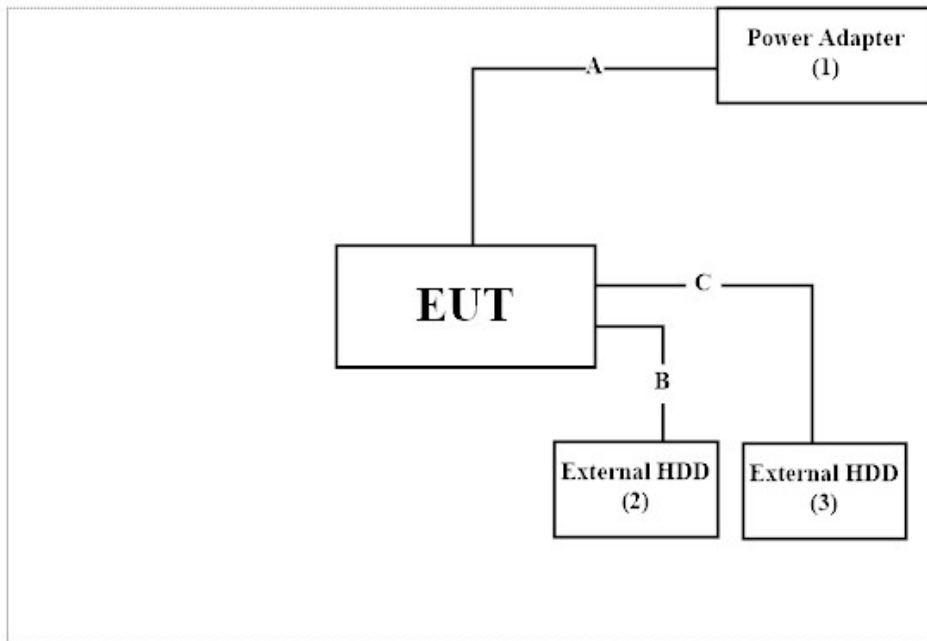
### 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Power Adapter	Phihong	PSAA30R-120	N/A
2	External HDD	Transcend	TS1TSJ25H3P	N/A
3	External HDD	Transcend	TS1TSJ25MC	N/A

Cable Type	Cable Description
A	Power Cable

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

1	Setup the EUT as shown on 1.5.
2	Execute software “DRTU Ver. 04739.22.240.0” on the EUT.
3	The Communication Analyzer (MT8821C) uses in controlling EUT to transmit continuously.
4	Configure the test mode, the test channel, and the data rate.
5	Start the continuous transmission.
6	Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	15~35 °C	21.6 °C
	Humidity (%RH)	20~75 %	61.5 %

Site Description	Accredited by TAF
	Accredited Number: 3023

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
	Linkou Laboratory
Address	No.5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan, R.O.C
Performed Location	No. 6, Lane 75, Wenlin St., Linkou Dist., New Taipei City 24457, Taiwan, R.O.C.
Phone Number	+886-3-275-7255
Fax Number	+886-3-327-8031



## 1.7. List of Test Item and Equipment

**For Radiated Measurements /HY-CB01**

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Loop Antenna	AMETEK	HLA6121	56736	2023/05/23	2024/05/22
V	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-0675	2023/08/09	2025/08/08
V	Horn Antenna	RF SPIN	DRH18-E	210802A18ES	2023/03/23	2024/03/22
V	Horn Antenna	Com-Power	AH-840	101101	2021/11/30	2023/11/29
V	Pre-Amplifier	SGH	0301	20211007-7	2023/01/10	2024/01/09
V	Pre-Amplifier	EMCI	EMC051845SE	980632	2023/01/10	2024/01/09
	Pre-Amplifier	EMCI	EMC05820SE	980362	2023/01/10	2024/01/09
	Pre-Amplifier	EMCI	EMC184045SE	980369	2023/01/10	2024/01/09
V	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314		
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
V	Filter	MICRO TRONICS	BRM50702	G251	2023/01/05	2024/01/04
V	Filter	MICRO TRONICS	BRM50716	067	2023/01/05	2024/01/04
V	EMI Test Receiver	R&S	ESR3	102792	2022/12/29	2023/12/28
V	Spectrum Analyzer	R&S	FSV3044	101115	2023/01/06	2024/01/05
	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6	2023/01/10	2024/01/09
V	Coaxial Cable	SGH	HA800	GD20110222-8		
	Coaxial Cable	SGH	SGH18	2021003-8		
	Coaxial Cable	EMCI	EMC106	151113		
	Universal Radiocommunication tester	R&S	CMU200	113574	2023/07/07	2024/07/06
V	Radio communication test station	Anritsu	MT8821C	6261849043	2023/01/11	2024/01/10

Note:

1. Bi-Log Antenna and Horn Antenna (AH-840) is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: e3 230303 dekra V9.

### 1.8. 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%.

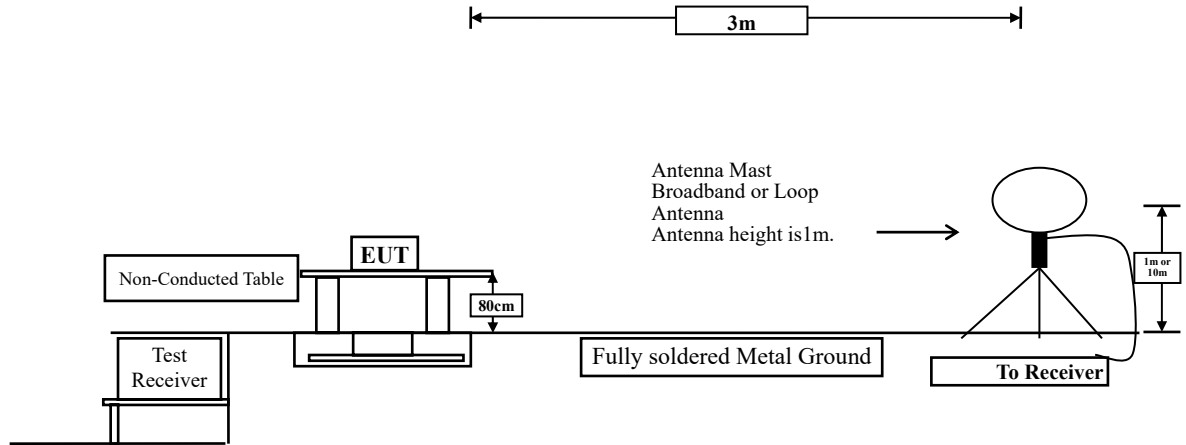
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty
Radiated Emission	9 kHz~30 MHz: $\pm 3.88$ dB 30 MHz~1 GHz: $\pm 4.42$ dB 1 GHz~18 GHz: $\pm 4.28$ dB 18 GHz~40 GHz: $\pm 3.90$ dB

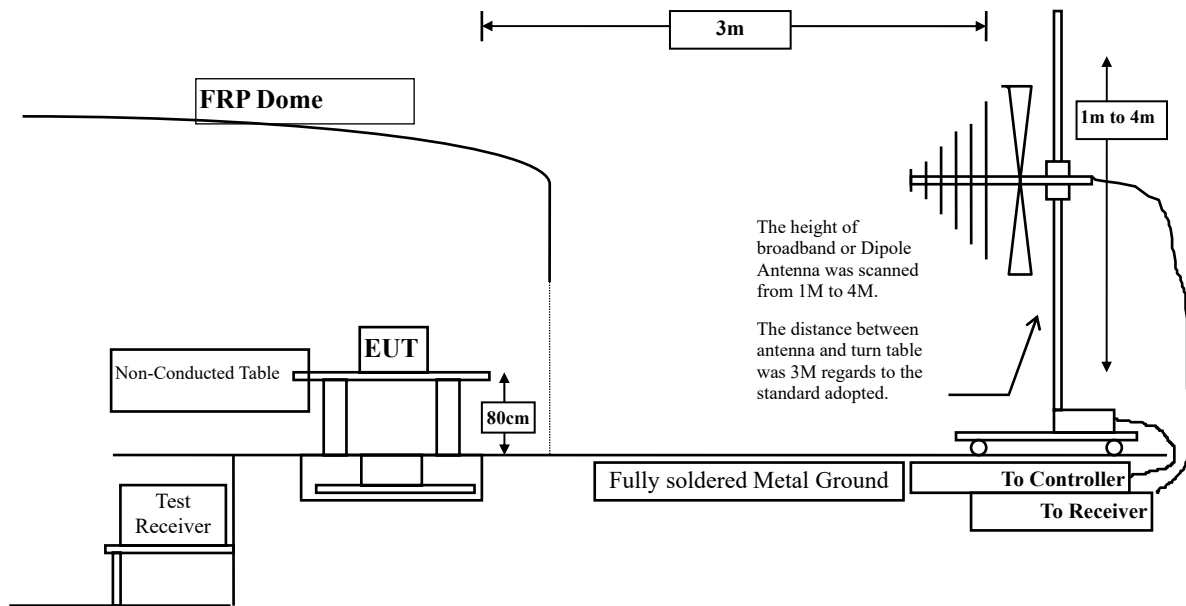
## 2. Radiated Emission

### 2.1. Test Setup

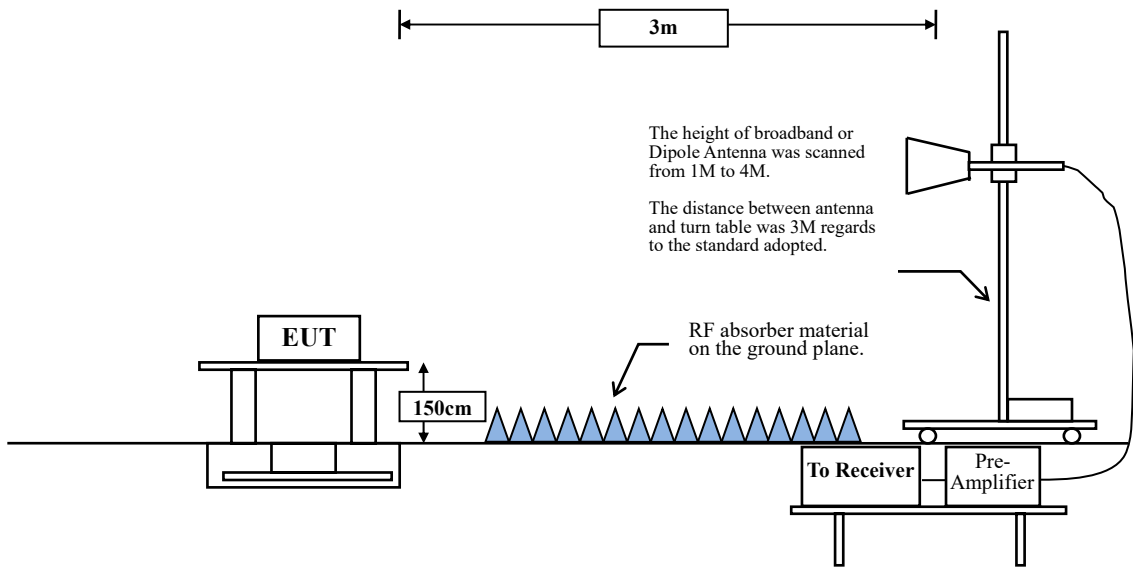
Under 30MHz



Below 1GHz



Above 1GHz



## 2.2. Limits

### ➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dB $\mu$ V) = 20 log RF Voltage ( $\mu$ V)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 2.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

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. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

2.4. Test Result of Radiated Emission

