

1 Cover Page

RF MPE REPORT

Application No.: SZCR2104020588AT(SHEM2103002246CR)
FCC ID: 2AWAS-910-00027
Applicant: Mavenir Systems, Inc.
Address of Applicant: 1700 International Parkway, Ste 200, Richardson, Texas 75081 USA
Manufacturer: Mavenir Systems, Inc.
Address of Manufacturer: 1700 International Parkway, Ste 200, Richardson, Texas 75081 USA
Factory: Sunwave Communications Co., Ltd.
Address of Factory: 581 Huoju Avenue, Binjiang District, Hangzhou, P.R.China Zip: 310053
Equipment Under Test (EUT):
EUT Name: Remote Radio Unit
Model No.: DRRU-R3184848
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2021-03-03
Date of Test: 2021-03-05 to 2021-04-07
Date of Issue: 2021-04-15

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager





Revision Record			
Version	Description	Date	Remark
00	Original	2021-04-15	/

Authorized for issue by:			
		<i>Bill Chen</i>	

		Bill Chen / Project Engineer	
		<i>Eric Fu</i>	

		Eric Fu / Reviewer	





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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 48V
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3.2 Technical Specifications

Frequency Band:	Downlink 3550MHz to 3700MHz
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
Channel Bandwidth:	Single carrier: 5MHz, 10MHz, 15MHz, 20MHz; Multi-carrier enabled, up to 40MHz. Detailed Multi-carrier combination please refer to clause 4.2
System Gain:	37dB
MIMO:	2T2R MIMO or 4T4R MIMO
Power Control Method:	ALC
Antenna Gain:	6dBi (Provided by manufacturer)

Note:

The antenna gain value is provided by the customer. The test lab will not be responsible for wrong test result due to incorrect information about antenna gain values.



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3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong,
China. 518057.
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594
No tests were sub-contracted.

3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006. IC#: 4620C.



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4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

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

Note: LTE B48 is 1mW/cm².



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SZCR210402058801.

LTE BAND 48

2 Carriers contiguous

BW Arrangement	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Offset				
5 + 20	LCH	QPSK	25/100	0	41.45	6.00	47.45	55590.43
		16QAM	25/100	0	42.01	6.00	48.01	63241.19
		64QAM	25/100	0	41.92	6.00	47.92	61944.11
		256QAM	25/100	0	41.49	6.00	47.49	56104.80
	MCH	QPSK	25/100	0	41.77	6.00	47.77	59841.16
		16QAM	25/100	0	41.64	6.00	47.64	58076.44
		64QAM	25/100	0	41.39	6.00	47.39	54827.70
		256QAM	25/100	0	41.63	6.00	47.63	57942.87
	HCH	QPSK	25/100	0	41.6	6.00	47.6	57543.99
		16QAM	25/100	0	41.84	6.00	47.84	60813.50
		64QAM	25/100	0	41.53	6.00	47.53	56623.93
		256QAM	25/100	0	41.75	6.00	47.75	59566.21
20 + 5	LCH	QPSK	100/25	0	41.44	6.00	47.44	55462.57
		16QAM	100/25	0	41.71	6.00	47.71	59020.11
		64QAM	100/25	0	41.46	6.00	47.46	55718.57
		256QAM	100/25	0	41.78	6.00	47.78	59979.11
	MCH	QPSK	100/25	0	41.81	6.00	47.81	60394.86
		16QAM	100/25	0	41.52	6.00	47.52	56493.70
		64QAM	100/25	0	41.3	6.00	47.3	53703.18
		256QAM	100/25	0	41.69	6.00	47.69	58748.94
	HCH	QPSK	100/25	0	40.98	6.00	46.98	49888.45
		16QAM	100/25	0	40.93	6.00	46.93	49317.38
		64QAM	100/25	0	41.41	6.00	47.41	55080.77
		256QAM	100/25	0	41.42	6.00	47.42	55207.74





BW Arrangement	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Size				
10 + 20	LCH	QPSK	50/100	0	41.53	6.00	47.53	56623.93
		16QAM	50/100	0	41.18	6.00	47.18	52239.62
		64QAM	50/100	0	41.49	6.00	47.49	56104.80
		256QAM	50/100	0	41.34	6.00	47.34	54200.09
	MCH	QPSK	50/100	0	41.55	6.00	47.55	56885.29
		16QAM	50/100	0	41.68	6.00	47.68	58613.82
		64QAM	50/100	0	41.74	6.00	47.74	59429.22
		256QAM	50/100	0	41.41	6.00	47.41	55080.77
	HCH	QPSK	50/100	0	41.09	6.00	47.09	51168.18
		16QAM	50/100	0	41.64	6.00	47.64	58076.44
		64QAM	50/100	0	41.19	6.00	47.19	52360.04
		256QAM	50/100	0	41.35	6.00	47.35	54325.03
20 + 10	LCH	QPSK	100/50	0	42.43	6.00	48.43	69662.65
		16QAM	100/50	0	41.94	6.00	47.94	62230.03
		64QAM	100/50	0	42.23	6.00	48.23	66527.32
		256QAM	100/50	0	42.28	6.00	48.28	67297.67
	MCH	QPSK	100/50	0	41.61	6.00	47.61	57676.65
		16QAM	100/50	0	41.91	6.00	47.91	61801.64
		64QAM	100/50	0	41.94	6.00	47.94	62230.03
		256QAM	100/50	0	41.94	6.00	47.94	62230.03
	HCH	QPSK	100/50	0	41.42	6.00	47.42	55207.74
		16QAM	100/50	0	41.51	6.00	47.51	56363.77
		64QAM	100/50	0	41.23	6.00	47.23	52844.53
		256QAM	100/50	0	41.69	6.00	47.69	58748.94
15 + 20	LCH	QPSK	75/100	0	42.55	6.00	48.55	71614.34
		16QAM	75/100	0	42.43	6.00	48.43	69662.65
		64QAM	75/100	0	41.93	6.00	47.93	62086.90
		256QAM	75/100	0	42.29	6.00	48.29	67452.80
	MCH	QPSK	75/100	0	41.78	6.00	47.78	59979.11
		16QAM	75/100	0	42.06	6.00	48.06	63973.48
		64QAM	75/100	0	41.61	6.00	47.61	57676.65
		256QAM	75/100	0	42.34	6.00	48.34	68233.87
	HCH	QPSK	75/100	0	42.26	6.00	48.26	66988.46
		16QAM	75/100	0	42.36	6.00	48.36	68548.82
		64QAM	75/100	0	42.32	6.00	48.32	67920.36
		256QAM	75/100	0	41.75	6.00	47.75	59566.21



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BW Arrangement	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Size				
20 + 15	LCH	QPSK	100/75	0	42.48	6.00	48.48	70469.31
		16QAM	100/75	0	42.51	6.00	48.51	70957.78
		64QAM	100/75	0	42.07	6.00	48.07	64120.96
		256QAM	100/75	0	42.47	6.00	48.47	70307.23
	MCH	QPSK	100/75	0	42.24	6.00	48.24	66680.68
		16QAM	100/75	0	41.93	6.00	47.93	62086.90
		64QAM	100/75	0	42.06	6.00	48.06	63973.48
		256QAM	100/75	0	42.04	6.00	48.04	63679.55
	HCH	QPSK	100/75	0	41.63	6.00	47.63	57942.87
		16QAM	100/75	0	42.07	6.00	48.07	64120.96
		64QAM	100/75	0	41.84	6.00	47.84	60813.50
		256QAM	100/75	0	41.81	6.00	47.81	60394.86
20 + 20	LCH	QPSK	100/100	0	41.95	6.00	47.95	62373.48
		16QAM	100/100	0	42.19	6.00	48.19	65917.39
		64QAM	100/100	0	42.09	6.00	48.09	64416.93
		256QAM	100/100	0	42.26	6.00	48.26	66988.46
	MCH	QPSK	100/100	0	42.18	6.00	48.18	65765.78
		16QAM	100/100	0	42.44	6.00	48.44	69823.24
		64QAM	100/100	0	42.07	6.00	48.07	64120.96
		256QAM	100/100	0	42.19	6.00	48.19	65917.39
	HCH	QPSK	100/100	0	41.94	6.00	47.94	62230.03
		16QAM	100/100	0	41.74	6.00	47.74	59429.22
		64QAM	100/100	0	41.55	6.00	47.55	56885.29
		256QAM	100/100	0	41.97	6.00	47.97	62661.39



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2 Carriers non-contiguous								
BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Offset				
5 + 5	LCH	QPSK	25/25	0	42.32	6.00	48.32	67920.36
		16QAM	25/25	0	41.99	6.00	47.99	62950.62
		64QAM	25/25	0	42.1	6.00	48.1	64565.42
		256QAM	25/25	0	42.14	6.00	48.14	65162.84
	HCH	QPSK	25/25	0	41.59	6.00	47.59	57411.65
		16QAM	25/25	0	42	6.00	48	63095.73
		64QAM	25/25	0	41.63	6.00	47.63	57942.87
5 + 10	LCH	QPSK	25/50	0	42.27	6.00	48.27	67142.89
		16QAM	25/50	0	42.08	6.00	48.08	64268.77
		64QAM	25/50	0	42.04	6.00	48.04	63679.55
		256QAM	25/50	0	42.13	6.00	48.13	65012.97
	HCH	QPSK	25/50	0	42.39	6.00	48.39	69023.98
		16QAM	25/50	0	42.15	6.00	48.15	65313.06
		64QAM	25/50	0	42.2	6.00	48.2	66069.34
5 + 15	LCH	QPSK	25/75	0	41.77	6.00	47.77	59841.16
		16QAM	25/75	0	41.67	6.00	47.67	58479.01
		64QAM	25/75	0	42.06	6.00	48.06	63973.48
		256QAM	25/75	0	41.85	6.00	47.85	60953.69
	HCH	QPSK	25/75	0	42.31	6.00	48.31	67764.15
		16QAM	25/75	0	42.4	6.00	48.4	69183.10
		64QAM	25/75	0	42.52	6.00	48.52	71121.35
5 + 20	LCH	QPSK	25/100	0	42.12	6.00	48.12	64863.44
		16QAM	25/100	0	42.17	6.00	48.17	65614.53
		64QAM	25/100	0	42.34	6.00	48.34	68233.87
		256QAM	25/100	0	41.98	6.00	47.98	62805.84
	HCH	QPSK	25/100	0	42.35	6.00	48.35	68391.16
		16QAM	25/100	0	42.41	6.00	48.41	69342.58
		64QAM	25/100	0	42.43	6.00	48.43	69662.65
256QAM	25/100	0	42.3	6.00	48.3	67608.30		



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BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Size				
10 + 10	LCH	QPSK	50/50	0	41.92	6.00	47.92	61944.11
		16QAM	50/50	0	42.14	6.00	48.14	65162.84
		64QAM	50/50	0	41.95	6.00	47.95	62373.48
		256QAM	50/50	0	41.9	6.00	47.9	61659.50
	HCH	QPSK	50/50	0	42.12	6.00	48.12	64863.44
		16QAM	50/50	0	41.91	6.00	47.91	61801.64
		64QAM	50/50	0	41.84	6.00	47.84	60813.50
		256QAM	50/50	0	41.8	6.00	47.8	60255.96
10 + 15	LCH	QPSK	50/75	0	41.99	6.00	47.99	62950.62
		16QAM	50/75	0	40.92	6.00	46.92	49203.95
		64QAM	50/75	0	40.87	6.00	46.87	48640.72
		256QAM	50/75	0	40.9	6.00	46.9	48977.88
	HCH	QPSK	50/75	0	42.44	6.00	48.44	69823.24
		16QAM	50/75	0	42.24	6.00	48.24	66680.68
		64QAM	50/75	0	42.03	6.00	48.03	63533.09
		256QAM	50/75	0	42.2	6.00	48.2	66069.34
10 + 20	LCH	QPSK	50/100	0	41.82	6.00	47.82	60534.09
		16QAM	50/100	0	41.7	6.00	47.7	58884.37
		64QAM	50/100	0	41.76	6.00	47.76	59703.53
		256QAM	50/100	0	41.86	6.00	47.86	61094.20
	HCH	QPSK	50/100	0	42.22	6.00	48.22	66374.31
		16QAM	50/100	0	39.48	6.00	45.48	35318.32
		64QAM	50/100	0	39.54	6.00	45.54	35809.64
		256QAM	50/100	0	42.19	6.00	48.19	65917.39
15 + 20	LCH	QPSK	75/100	0	41.82	6.00	47.82	60534.09
		16QAM	75/100	0	41.64	6.00	47.64	58076.44
		64QAM	75/100	0	41.77	6.00	47.77	59841.16
		256QAM	75/100	0	41.83	6.00	47.83	60673.63
	HCH	QPSK	75/100	0	42.33	6.00	48.33	68076.94
		16QAM	75/100	0	42.39	6.00	48.39	69023.98
		64QAM	75/100	0	42.71	6.00	48.71	74301.91
		256QAM	75/100	0	42.42	6.00	48.42	69502.43



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BW Arrange	Frequency	Modulation	RB Allocation		4x4 MIMO Total Conducted Power (dBm)	Antenna Gain dBi	EIRP (dBm)	E.I.R.P Limit (mW)
			Size	Size				
20 + 20	LCH	QPSK	100/100	0	42.05	6.00	48.05	63826.35
		16QAM	100/100	0	41.89	6.00	47.89	61517.69
		64QAM	100/100	0	42.12	6.00	48.12	64863.44
		256QAM	100/100	0	41.96	6.00	47.96	62517.27
	HCH	QPSK	100/100	0	42.52	6.00	48.52	71121.35
		16QAM	100/100	0	42.41	6.00	48.41	69342.58
		64QAM	100/100	0	42.43	6.00	48.43	69662.65
		256QAM	100/100	0	42.4	6.00	48.4	69183.10



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5.2 MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in centimeter)
- 3) MPE limit = 1mW/cm²

Test Mode	Frequency Band (MHz)	Maximum E.I.R.P (dBm)	Limit of Power Density S(mW/cm ²)	Safety Distance (cm)
TDD Band 48	3550 – 3700	48.71	1	76.8944

The Safety Distance is 76.8944cm.

--End of the Report--

