

TEST REPORT

Application No.: SZCR2504001472AT
Applicant: Shenzhen RAKwireless Technology Co.,Ltd.
Address of Applicant: Room 506, Building B, New Compark, Pingshan First Road, Taoyuan Street, Nanshan District, Shenzhen, China

Equipment Under Test (EUT):

EUT Name: WisGate Connect
Model No.: RAK7393
Trade Mark: RAK
FCC ID: 2AF6B-RAK7393
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2025-04-14
Date of Test: 2025-04-24 to 2025-05-24
Date of Issue: 2025-06-02

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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Shenzhen Branch EMC Laboratory

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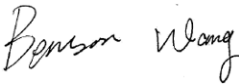
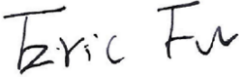
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 2 of 20

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025-06-02		Original

Authorized for issue by:				
				
		Benson Wang/Project Engineer		
				
		Eric Fu/Reviewer		



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2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	15.107(a);Class B	Pass
Radiated Emissions (30MHz-1GHz)		ANSI C63.4:2014	15.109(a);Class B	Pass
Radiated Emissions (Above 1GHz)		ANSI C63.4:2014	15.109(g);Class B	Pass

Declaration of EUT Family Grouping:

Model No.: RAK7393

Only the model RAK7393 (lora US915 16ch/8ch with GPS (RAK5146) + 2.4G (CM4))were performed test, According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference as below:

There are two variants for this gateway series, The other remains the same. the models have two variants, with two RAK5146 lora modules (16ch) or with one RAK5146 module (8ch).

RAK7393: lora US915 16ch* with GPS (RAK5146) + 2.4G (CM4) power by POE or DC source 9-36V

RAK7393: lora US915 8ch* with GPS (RAK5146) + 2.4G (CM4) power by POE or DC source 9-36V



3 Contents

	Page
1 Cover Page	1
2 Test Summary	3
3 Contents	4
4 General Information	5
4.1 Details of E.U.T.	5
4.2 Description of Support Units	5
4.3 Measurement Uncertainty	5
4.4 Test Location	6
4.5 Test Facility	6
4.6 Deviation from Standards	6
4.7 Abnormalities from Standard Conditions	6
5 Equipment List	7
6 Emission Test Results	9
6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)	9
6.1.1 E.U.T. Operation	9
6.1.2 Test Mode Description	9
6.1.3 Test Setup Diagram	9
6.1.4 Measurement Procedure and Data	10
6.2 Radiated Emissions (30MHz-1GHz)	13
6.2.1 E.U.T. Operation	13
6.2.2 Test Mode Description	13
6.2.3 Test Setup Diagram	13
6.2.4 Measurement Procedure and Data	14
6.3 Radiated Emissions (Above 1GHz)	17
6.3.1 E.U.T. Operation	17
6.3.2 Test Mode Description	17
6.3.3 Test Setup Diagram	17
6.3.4 Measurement Procedure and Data	17
7 Test Setup Photo	20
8 EUT Constructional Details (EUT Photos)	20



4 General Information

4.1 Details of E.U.T.

Power supply:	Charging adapter information Model: RP025-4800500YG Input: 100-240VAC, 50/60Hz 0.7A Max Output: 48.0Vdc, 0.5A, 24.0W
Cable(s):	AC cable of adapter:155cm unshielded
Internal source:	Greater than 108MHz

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Network Cable	SGS	N/A	REF. No.SEA11A00
DC power supply	ZHAOXIN	KXN-6020D	REF. No.SEA27B00
Laptop	Lenovo	T430u	REF. No.SEA18B00

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at Mains Terminals (150kHz-30MHz)	$\pm 3.1\text{dB}$
Radiated Emissions (30MHz-1GHz)	$\pm 6.0\text{dB}$ for 3m; $\pm 5.0\text{dB}$ for 10m
Radiated Emissions (Above 1GHz)	$\pm 4.6\text{dB}$

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 6 of 20

4.4 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 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 (Member No. 1937)

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. Shenzhen EMC laboratory 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: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

• 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2025-05-07	2028-05-06
EMI Test Receiver	Rohde&Schwarz	ESR	SZ-WRG-M-047	2025-01-08	2026-01-07
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2024-07-06	2025-07-05
LISN	Rohde&Schwarz	ENV216	SEM007-01	2024-08-15	2025-08-14
LISN	ETS-LINDGREN	3816/2	SEM007-02	2025-03-03	2026-03-02

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2024-08-14	2025-08-13
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2025-03-04	2026-03-03
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05

Radiated Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2025-05-07	2028-05-06
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-04	2026-03-03
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05



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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 8 of 20

General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2024-07-24	2025-07-23
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2024-07-24	2025-07-23
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2025-03-03	2026-03-02



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6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014

Limit:

0.15M-0.5MHz 66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average

0.5M-5MHz 56dB(μV) quasi-peak, 46dB(μV) average

5M-30MHz 60dB(μV) quasi-peak, 50dB(μV) average

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C

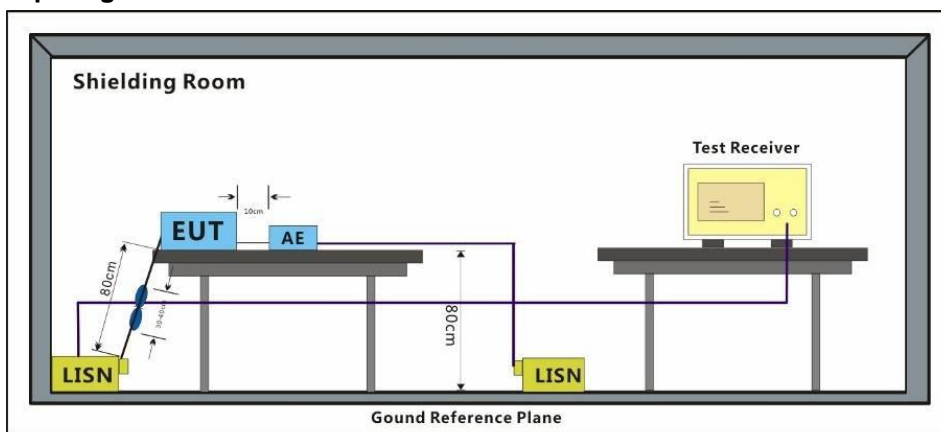
Humidity: 44.5 % RH

Atmospheric Pressure: 1020 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	Normal working(RAK7393)_Keep the EUT powered by POE or DC source and working normally.

6.1.3 Test Setup Diagram



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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 10 of 20

6.1.4 Measurement Procedure and Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Remark : Level= Read Level+ Cable Loss+ LISN Factor



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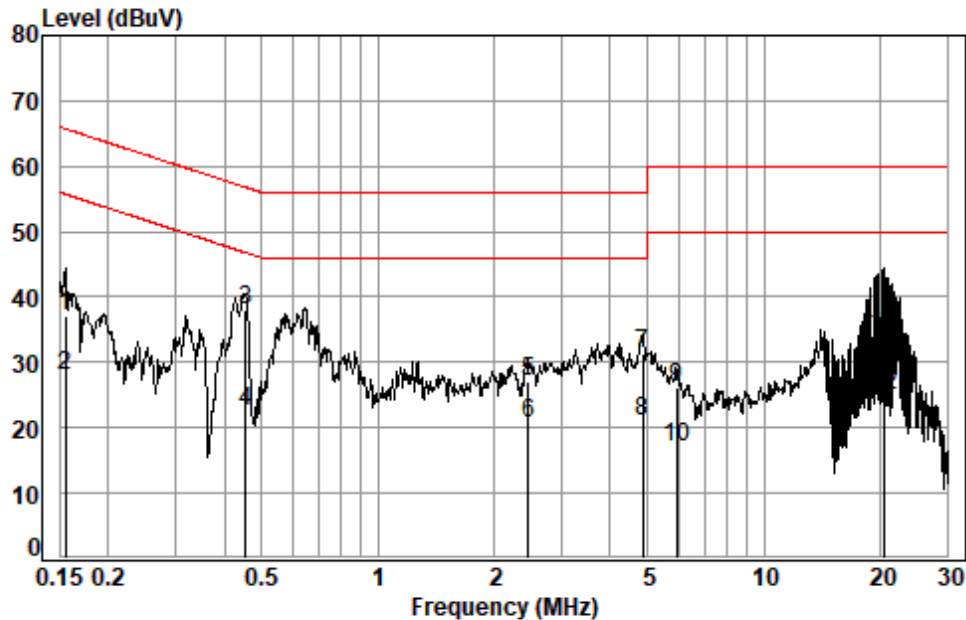
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 11 of 20

Test Mode: 02; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 01472AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1548	0.06	10.19	26.88	37.13	65.74	-28.61	QP
2	0.1548	0.06	10.19	17.64	27.89	55.74	-27.85	Average
3 *	0.4539	0.08	9.60	28.35	38.03	56.80	-18.77	QP
4 *	0.4539	0.08	9.60	12.83	22.51	46.80	-24.29	Average
5	2.4476	0.11	9.61	17.38	27.10	56.00	-28.90	QP
6	2.4476	0.11	9.61	11.07	20.79	46.00	-25.21	Average
7	4.8480	0.12	9.66	21.40	31.18	56.00	-24.82	QP
8	4.8480	0.12	9.66	11.11	20.89	46.00	-25.11	Average
9	5.9608	0.14	9.67	16.41	26.22	60.00	-33.78	QP
10	5.9608	0.14	9.67	7.30	17.11	50.00	-32.89	Average
11	20.3773	0.30	10.18	23.71	34.19	60.00	-25.81	QP
12	20.3773	0.30	10.18	14.48	24.96	50.00	-25.04	Average



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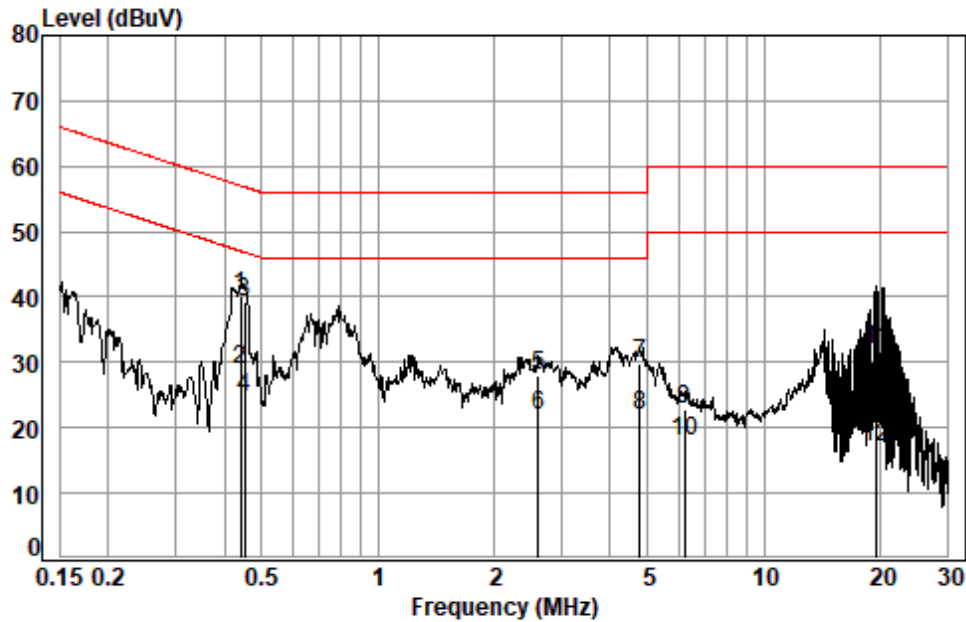
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 12 of 20

Test Mode: 02; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 01472AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.4421	0.08	9.72	30.50	40.30	57.02	-16.72	QP
2 *	0.4421	0.08	9.72	19.11	28.91	47.02	-18.11	Average
3	0.4515	0.08	9.72	29.43	39.23	56.85	-17.62	QP
4	0.4515	0.08	9.72	14.76	24.56	46.85	-22.29	Average
5	2.6082	0.11	9.54	18.44	28.09	56.00	-27.91	QP
6	2.6082	0.11	9.54	12.30	21.95	46.00	-24.05	Average
7	4.7716	0.12	9.56	20.10	29.78	56.00	-26.22	QP
8	4.7716	0.12	9.56	12.11	21.79	46.00	-24.21	Average
9	6.2189	0.15	9.62	13.19	22.96	60.00	-37.04	QP
10	6.2189	0.15	9.62	8.16	17.93	50.00	-32.07	Average
11	19.6354	0.30	10.13	21.58	32.01	60.00	-27.99	QP
12	19.6354	0.30	10.13	6.50	16.93	50.00	-33.07	Average



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6.2 Radiated Emissions (30MHz-1GHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014

Measurement Distance: 3m

Limit:

FREQUENCY (MHz)	dBμV/m (At 10m)	dBμV/m (At 3m)
	Class B	Class B
30MHz -88MHz	29.5	40.0
88MHz-216MHz	33.1	43.5
216MHz-960MHz	35.6	46.0
960MHz-1000MHz	43.5	54.0
Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz		

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C

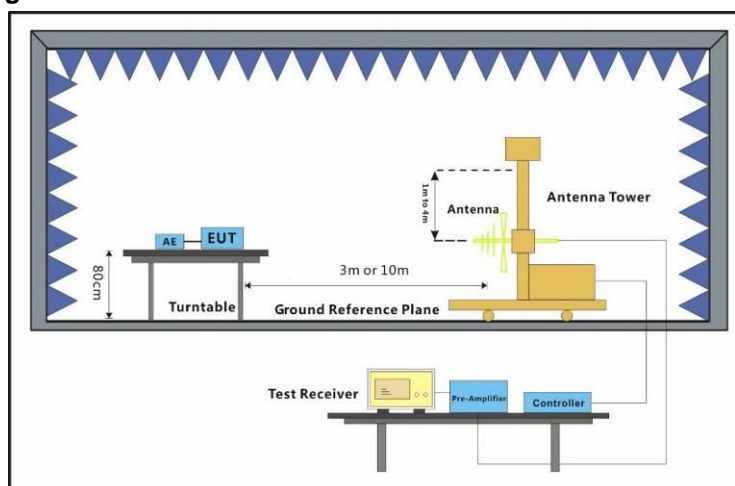
Humidity: 45.1 % RH

Atmospheric Pressure: 1020 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	Normal working(RAK7393)_Keep the EUT powered by POE or DC source and working normally.

6.2.3 Test Setup Diagram



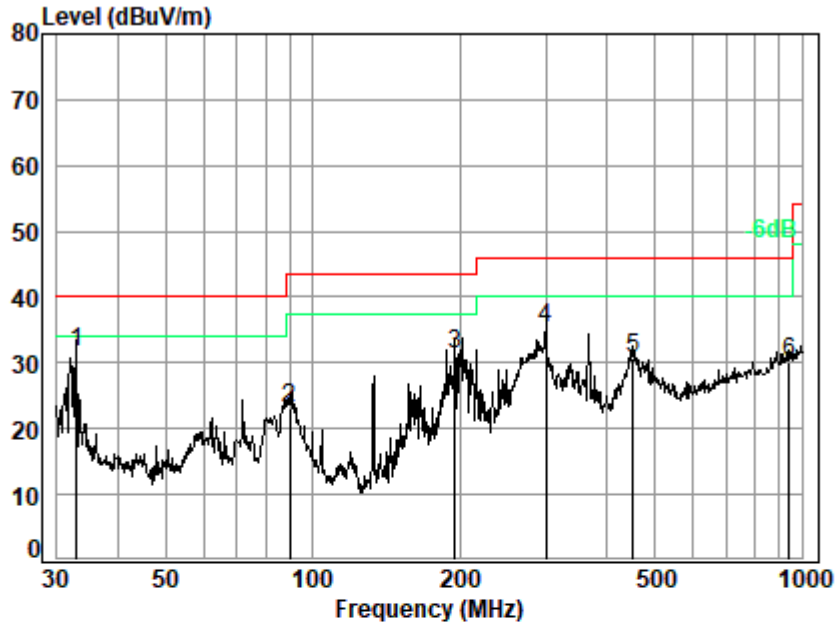
6.2.4 Measurement Procedure and Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



Test Mode: 02; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No. : 01472AT

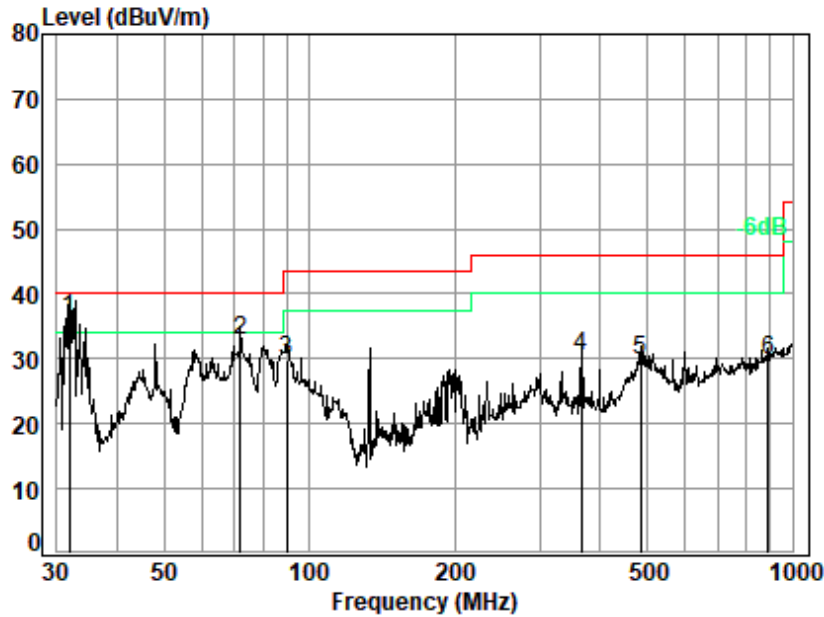
Test Mode: 02

: DC difference

		Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1 q	32.979	19.89	0.71	27.78	38.71	31.53	40.00	-8.47	QP
2	89.905	11.72	1.16	27.62	37.99	23.25	43.50	-20.25	QP
3	195.137	14.13	1.74	27.19	42.73	31.41	43.50	-12.09	QP
4	299.316	17.94	2.20	26.75	41.99	35.38	46.00	-10.62	QP
5	451.135	21.19	2.76	27.36	34.08	30.67	46.00	-15.33	QP
6	942.131	28.19	4.23	26.46	24.12	30.08	46.00	-15.92	QP



Test Mode: 02; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : 01472AT

Test Mode: 02

: DC difference

	Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1 q	31.843	20.34	0.69	27.79	43.00	36.24	40.00	-3.76 QP
2	72.084	10.48	1.04	27.67	49.03	32.88	40.00	-7.12 QP
3	89.905	11.72	1.16	27.62	44.61	29.87	43.50	-13.63 QP
4	365.539	20.31	2.46	27.02	34.58	30.33	46.00	-15.67 QP
5	483.910	22.85	2.87	27.50	31.65	29.87	46.00	-16.13 QP
6	890.728	28.06	4.10	26.83	24.33	29.66	46.00	-16.34 QP



6.3 Radiated Emissions (Above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014

Measurement Distance: 3m

Limit:

Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average at 3m distance
83.54(dBμV/m) peak, 63.54(dBμV/m) average at 1m distance

Detector: Peak for pre-scan (1MHz resolution bandwidth) 1GHz to 40GHz

6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.6 °C

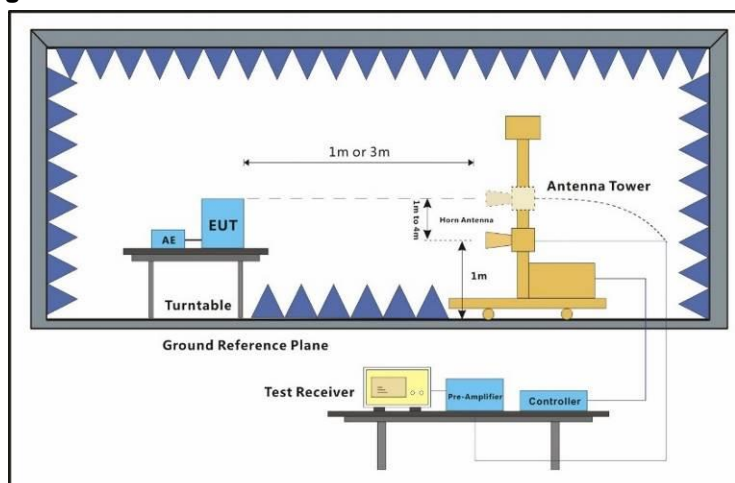
Humidity: 45.1 % RH

Atmospheric Pressure: 1020 mbar

6.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	Normal working(RAK7393)_Keep the EUT powered by POE or DC source and working normally.

6.3.3 Test Setup Diagram



6.3.4 Measurement Procedure and Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



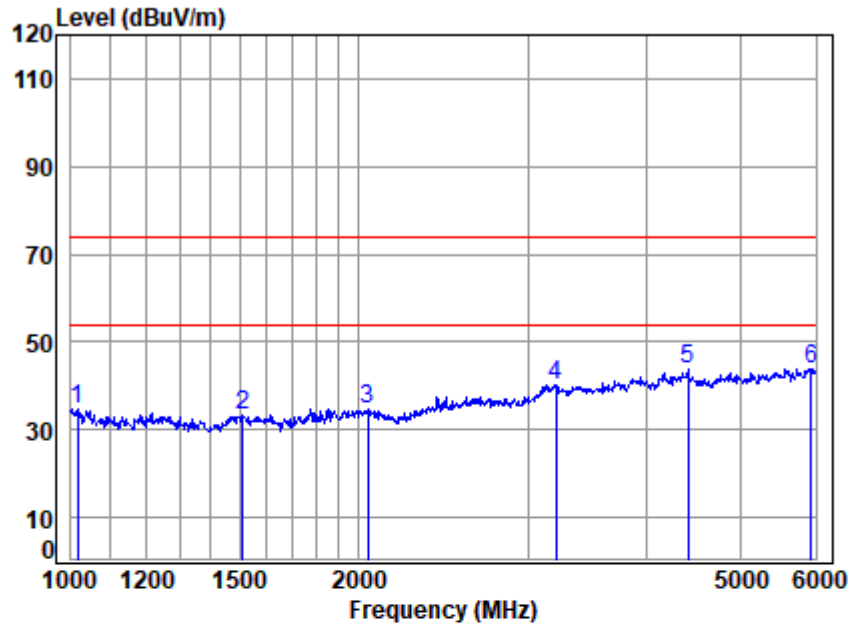
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR250400147202

Page: 18 of 20

Test Mode: 02; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01472AT/01500AT
Mode : 02
POE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1016.257	5.91	25.78	54.61	57.57	34.65	74.00	-39.35	Peak
2	1512.700	4.89	26.85	54.78	56.44	33.40	74.00	-40.60	Peak
3	2044.007	5.10	28.98	54.91	55.34	34.51	74.00	-39.49	Peak
4	3210.528	6.10	32.73	54.83	56.16	40.16	74.00	-33.84	Peak
5	4408.687	7.08	34.70	54.26	56.08	43.60	74.00	-30.40	Peak
6 p	5935.842	8.71	34.67	53.16	53.55	43.77	74.00	-30.23	Peak



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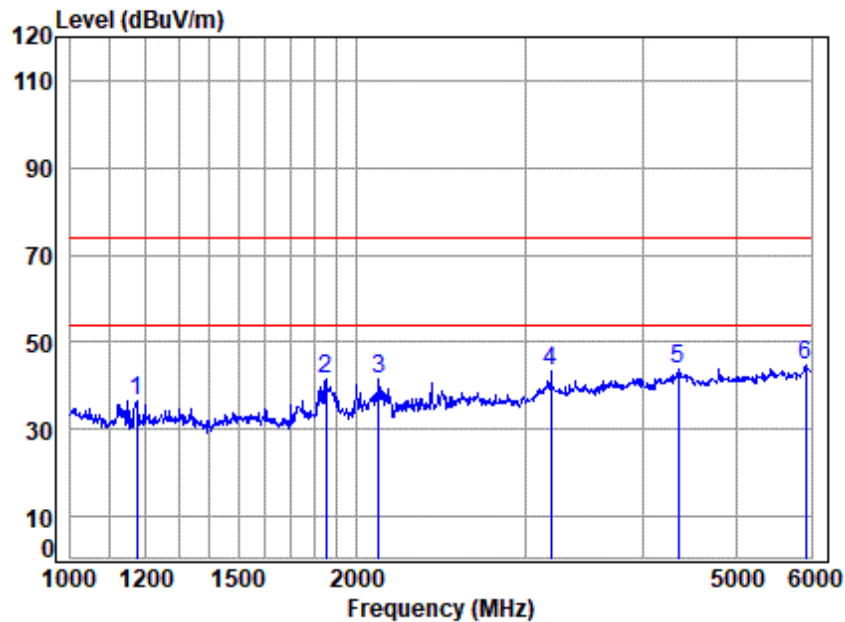
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Report No.: SZCR250400147202

Page: 19 of 20

Test Mode: 02; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 01472AT/01500AT
Mode : 02
: POE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1172.885	5.53	24.13	54.67	61.52	36.51	74.00	-37.49	Peak
2	1855.505	5.02	27.04	54.87	64.28	41.47	74.00	-32.53	Peak
3	2107.225	5.15	28.71	54.91	62.48	41.43	74.00	-32.57	Peak
4	3199.044	6.09	32.89	54.84	59.31	43.45	74.00	-30.55	Peak
5	4345.943	7.03	34.37	54.26	56.60	43.74	74.00	-30.26	Peak
6 p	5925.216	8.70	34.65	53.18	54.37	44.54	74.00	-29.46	Peak



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7 Test Setup Photo

Refer to Appendix 02– Test Setup Photos for SZCR2504001472AT.

8 EUT Constructional Details (EUT Photos)

Refer to Appendix 02- External and Internal photos for SZCR2504001472AT

- End of the Report -

