

**TEST REPORT**

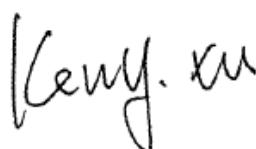
**Application No.:** SZCR2504001472AT  
**Applicant:** Shenzhen RAKwireless Technology Co.,Ltd.  
**Address of Applicant:** Room 506, Building B, New Compark, Pingshan First Road, Taoyuan Street, Nanshan District, Shenzhen, China

**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

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu  
EMC Laboratory Manager



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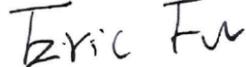
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SZEMC-TRF-01 Rev. A/1

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<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2025-06-02		Original

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

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## 2 Test Summary

<b>Emission Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
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

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## 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)	± 3.1dB
Radiated Emissions (30MHz-1GHz)	± 6.0dB for 3m; ± 5.0dB for 10m
Radiated Emissions (Above 1GHz)	± 4.6dB

Remark:

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{cispr/ETSI}$  (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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### 4.4 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, Nanshan District, Shenzhen, Guangdong, China. 518057.

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

<b>Conducted Emissions at Mains Terminals (150kHz-30MHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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

<b>Radiated Emissions (30MHz-1GHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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

<b>Radiated Emissions (Above 1GHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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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<b>General used equipment</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
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

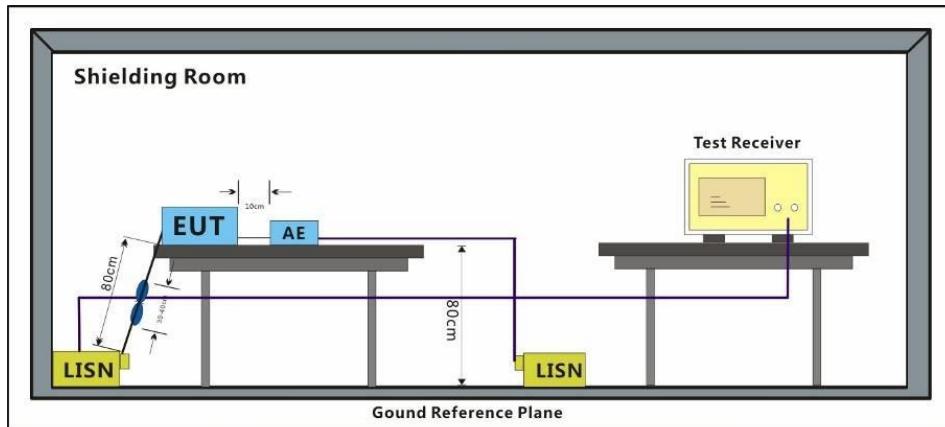
Operating Environment:

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 sourc and working normally.

#### 6.1.3 Test Setup Diagram



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### 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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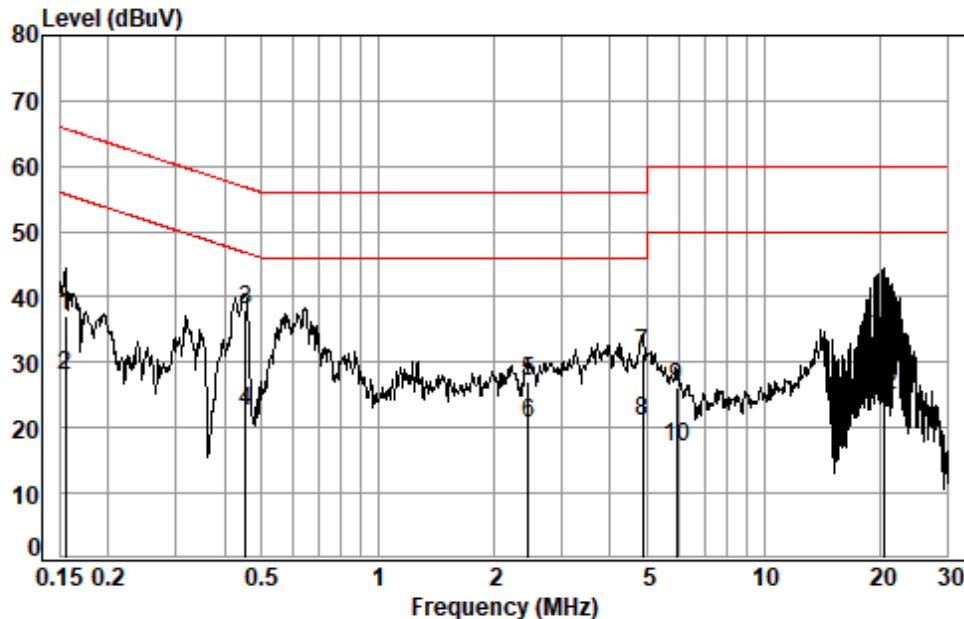
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Test Mode: 02; Line: Live line



Site : Shielding Room

Condition: Line

Job No. : 01472AT

Test mode: 02

Freq	Cable	LISN	Read	Limit	Line	Over	Remark
	Freq	Loss	Factor				
	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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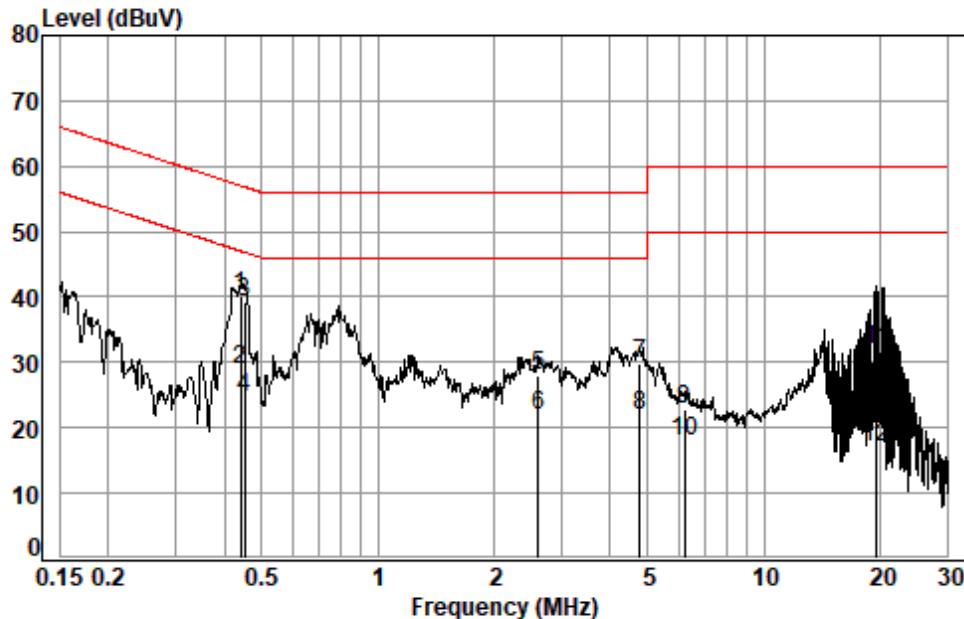
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Test Mode: 02; Line: Neutral Line



Site : Shielding Room

Condition: Neutral

Job No. : 01472AT

Test mode: 02

Freq	Cable	LISN	Read	Limit	Over	Remark	
	Freq	Loss	Factor				
	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)	dB $\mu$ V/m (At 10m)	dB $\mu$ V/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

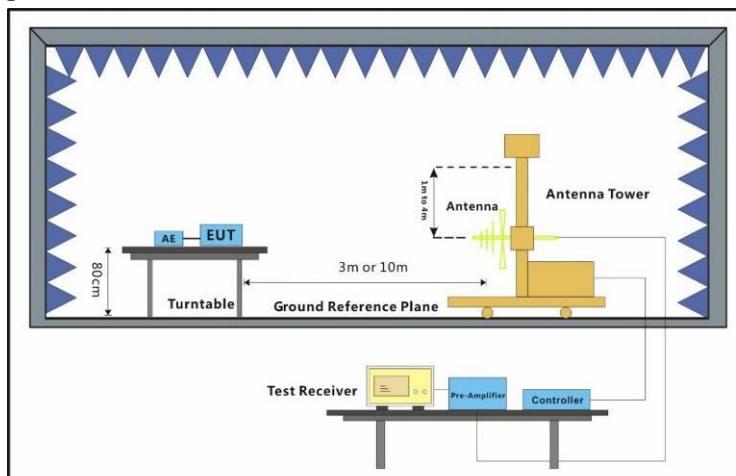
Humidity: 45.1 % RH

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 sourc and working normally.

### 6.2.3 Test Setup Diagram



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**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



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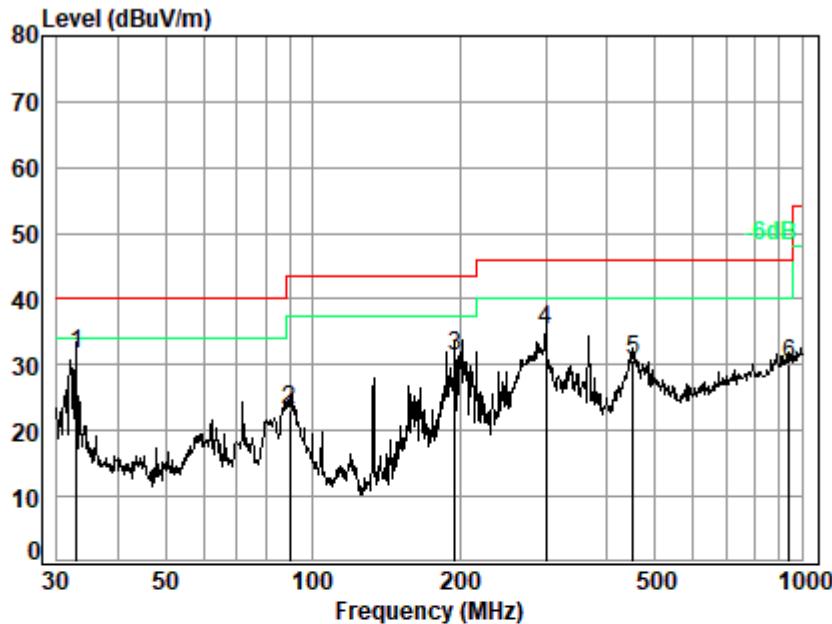
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Test Mode: 02; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No. : 01472AT

Test Mode: 02

: DC difference

Freq	Ant Factor	Cable Loss	Preamp Factor	Read	Limit Level	Line Level	Over Limit	Remark
				dB	dBuV	dBuV/m	dB	
MHz	dB/m							
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

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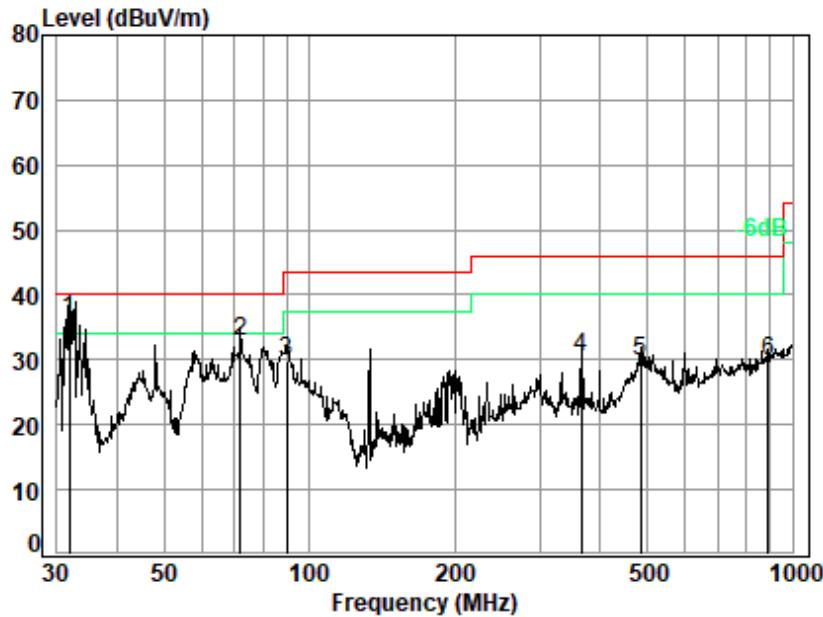
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Test Mode: 02; Polarity: Vertical



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
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

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### 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(dB $\mu$ V/m) peak, 54(dB $\mu$ V/m) average at 3m distance

83.54(dB $\mu$ V/m) peak, 63.54(dB $\mu$ V/m) average at 1m distance

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

#### 6.3.1 E.U.T. Operation

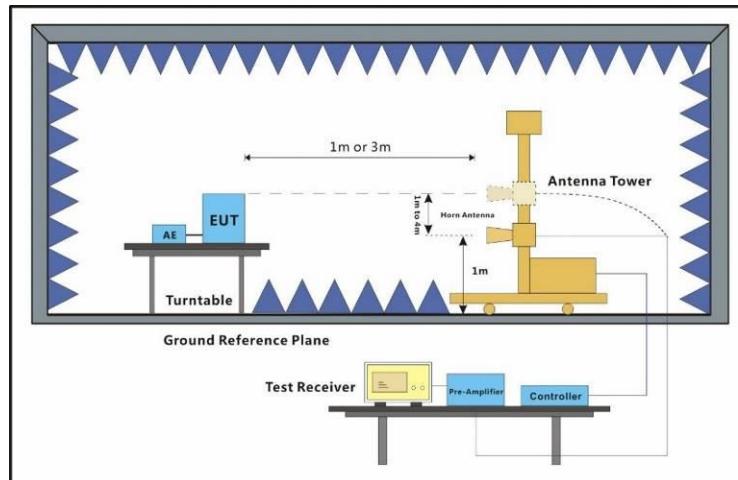
Operating Environment:

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 sourc 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

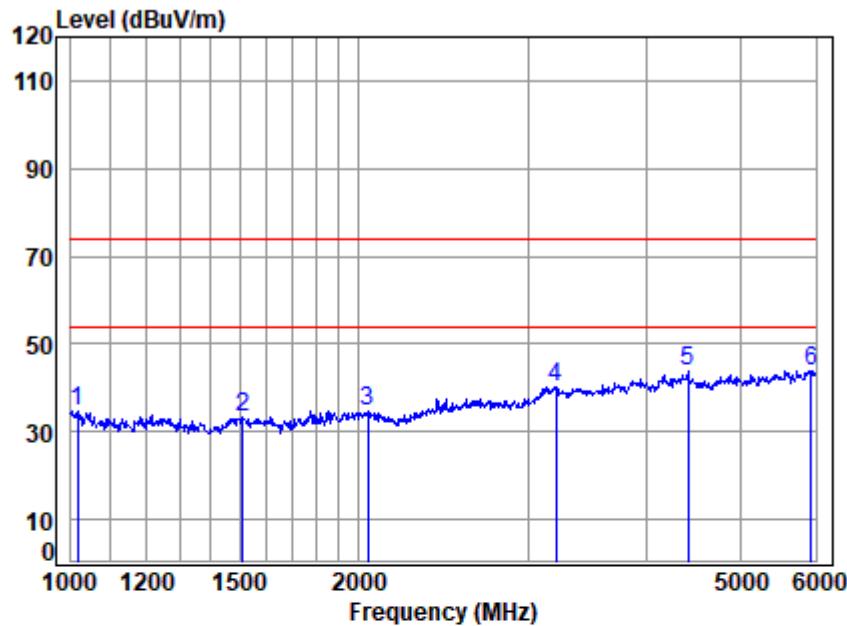


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Test Mode: 02; Polarity: Horizontal

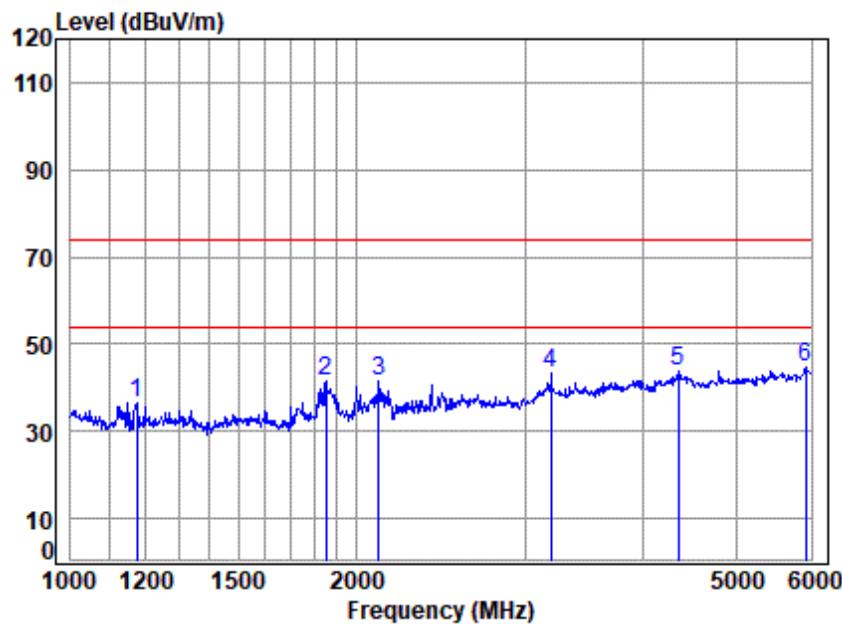


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 01472AT/01500AT  
Mode : 02  
: POE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit	
							dB	Remark
	MHz							
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



Test Mode: 02; Polarity: Vertical



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

Freq	Cable	Ant	Preamp	Read	Limit	Over	Remark
	Loss	Factor	Factor	Level			
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 -



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