

Prüfbericht-Nr.: <i>Test report no.:</i>	CN239SP6 001	Auftrags-Nr.: <i>Order no.:</i>	168424086	Seite 1 von 31 <i>Page 1 of 31</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-04-25	
Auftraggeber: <i>Client:</i>	Shenzhen HAC Telecom Technology Co., LTD Floor 9, Block A, Building 1, Shenzhen International Innovation Valley, Xingke 1st Street, Nanshan District, Shenzhen, China			
Prüfgegenstand: <i>Test item:</i>	LoRaWAN Gateway			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	HAC-GWW1-U (Trademark: HAC)			
Auftrags-Inhalt: <i>Order content:</i>	Type Test			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart B Section 15.107 CFR47 FCC Part 15: Subpart B Section 15.109 ICES-003 Issue 7 October 2020			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2022-02-21	Refer to photos documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003214225, A003214379			
Prüfzeitraum: <i>Testing period:</i>	2022-03-10 – 2022-03-31			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i> 2023-05-09				
	Signed by: Alex Lan		Signed by: Hardy Suo	
Stellung / Position	Project Manager	Stellung / Position	Department Manager	
Sonstiges / Other:	FCC ID: WMUHAC-GWW1-U This report is based on original report CN22LJYU 001 for RAKwireles with FCC ID: 2AF6B-RAK5146, the FCC ID: 2AF6B-RAK5146 for RAK has take a FC ID change procedure to FCC ID: WMUHAC-MLWR for HAC, all the test data are derived from the original report CN22LJYU 001.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: 1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut P(ass) = passed a.m. test specification(s)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht
* Legend: 1 = very good P(ass) = passed a.m. test specification(s)	2 = good	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable	5 = poor N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

V05

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Test Summary

5.1 Conducted emissions
RESULT: Pass
5.2 Radiated emissions
RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:
None.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District,
Shenzhen, Guangdong, China/518110

FCC Registration No.: 694916

IC Registration No.: 25069, CAB identifier: CN0078

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radiated Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
3m SAC	ETS-Lindgren	SAC3	CT001632-Q1362	2024-04-26
EMI Test Receiver	R&S	ESR7	102111	2023-12-01
Horn Antenna	R&S	HF907	102706	2023-08-07
Preamplifier (1-18GHz)	FIT	SCU-18F	180077	2023-08-13
Active magnetic loop antenna	SCHWARZBECK	FMZB1519B	00080	2023-09-08
Trilog-Broadband antenna	SCHWARZBECK	VULB9168	0945	2023-12-12
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A
Conducted Emissions testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102428	2023-07-31
Artificial Mains Network	R&S	ENV216	102333	2023-08-01
Impedance Stabilisation Network	R&S	ENY81	100323	2023-08-01
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Test	Parameters	uncertainty
Conducted Emission	Conducted emission 150kHz-30MHz (AMN)	± 3.70 dB ± 3.30 dB
Radiated Emission (3m SAC)	Radiated emission 30MHz-1GHz	± 4.52 dB
	Radiated emission 1GHz-18GHz	± 4.37 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were at this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China/518110 is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a LoRaWAN Gateway, which supports 2.4GHz Wi-Fi, Lora and LTE functions.

Note: This product contains transmitter modules.

LTE module Model: EG95NA	Contains FCC ID: XMR201807EG95NA
2.4GHz Wi-Fi module	Contains FCC ID: WMUHAC-WF
Lora module	Contains FCC ID: WMUHAC-MLWR

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	LoRaWAN Gateway
Type Designation	HAC-GWW1-U
Trade Mark	HAC
FCC ID	WMUHAC-GWW1-U
Input Voltage	DC 12V via AC/DC Adapter or DC 37 ~57V via POE adapter
Testing Voltage	AC 120V, 60Hz or DC 48V
AC/DC Adapter information	Model #1: AD-0241200200US-1 Model #2: PSY1202000US Model #3: PSYC1202000 Rating for all models: Input: AC 100-240V, 50/60Hz, 0.6A Max Output: DC 12.0V, 2A 24.0W Note: Model #2 is identical with model # 3 except the type of plug.

3.3 Independent Operation Modes

The basic operation modes are:

A, On, WIFI link + LTE link + Lora link , powered by AC adapter

B, On, WIFI link + LTE link + Lora link, powered by POE adapter

C, Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|-----------------|------------------|
| - Block Diagram | - Photo Document |
| - Schematics | - User Manual |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.4: 2014.

According to clause 3.1, all test were applied on model HAC-GWW1-U with AC/DC Adapter #1 & #3.

4.3 Special Accessories and Auxiliary Equipment

Table 3: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial Number or Rating
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	166305
Portable Laptop	Lenovo	ThinkPad T480	10Q67059
POE Adapter	HAC	R012-4800500	Input: AC 100-240V, 50/60Hz, 0.6A Max Output: DC 48.0V, 0.5A 24.0W

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

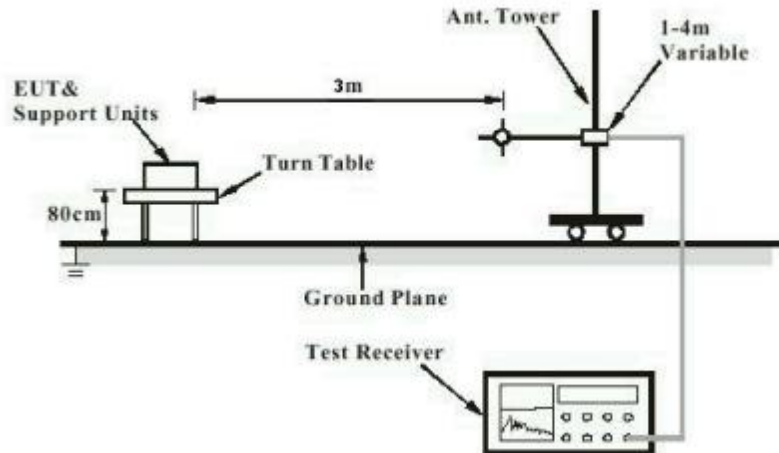


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

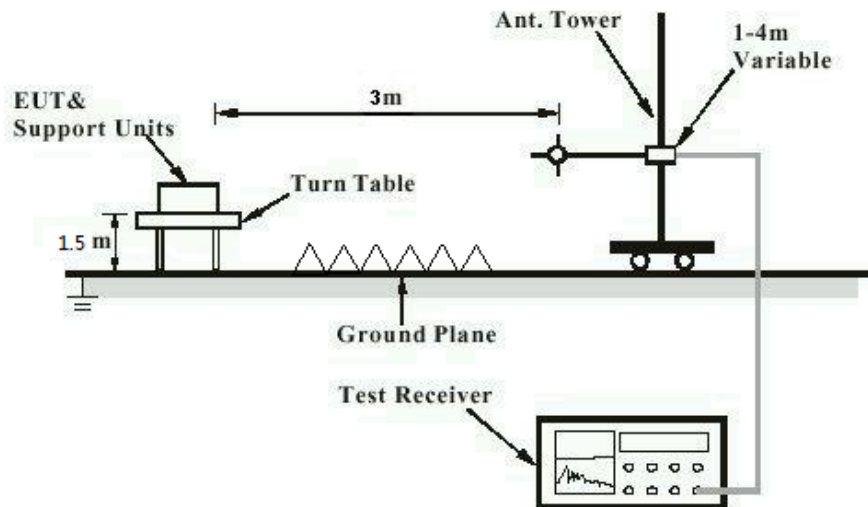
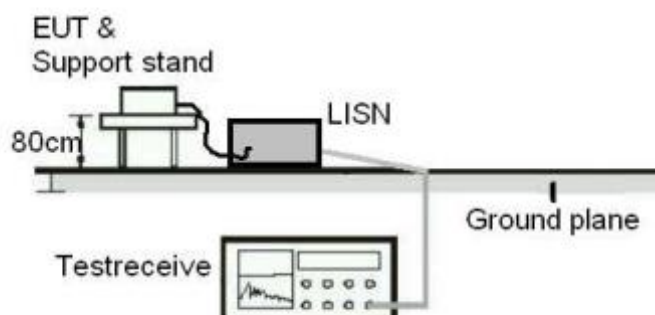


Diagram of Measurement Configuration for Mains Conduction Measurement



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5 Test Results

5.1 Conducted emissions

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.107(a)
	: ICES-003 Issue 7, Clause 3.2.1
Basic standard	: ANSI C63.4: 2014
Frequency range	: 150KHz - 30MHz
Classification	: Class B
Limit	: FCC Part 15.107(a) & ICES-003 Table 1
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2022-03-31
Input voltage	: AC 120V, 60Hz
Operation mode	: A
Earthing	: Not Connected
Ambient temperature	: 24.5 °C
Relative humidity	: 57 %
Atmospheric pressure	: 101 kPa

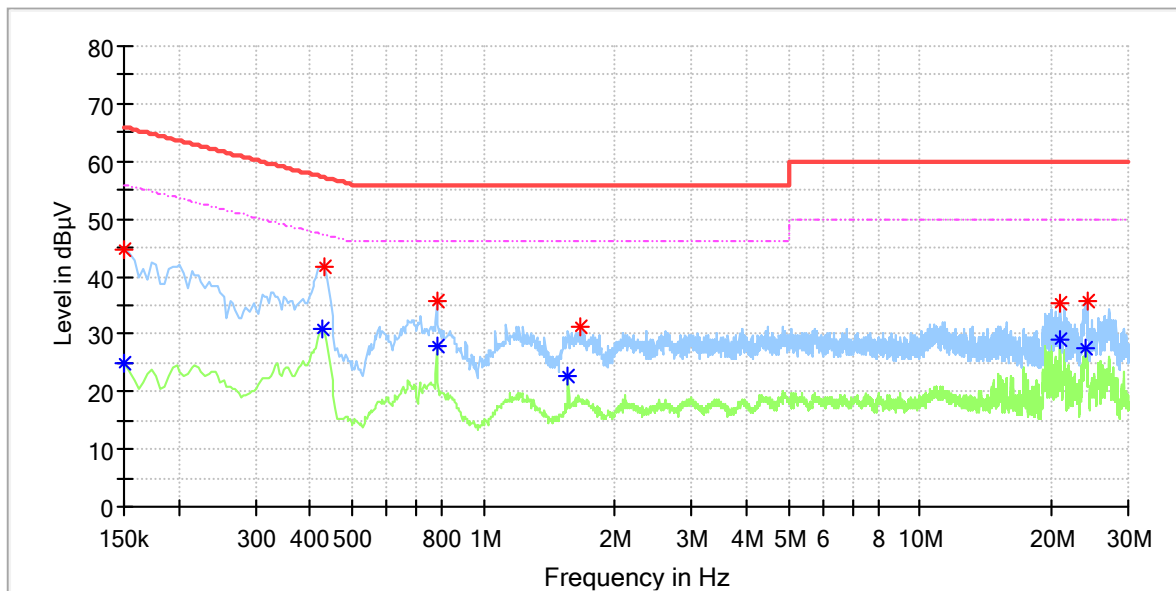
For the measurement records, refer to the following plots, only the worst case mode are shown in this report.

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: SR1
Adapter: AD-0241200200US-1



Critical_Freqs

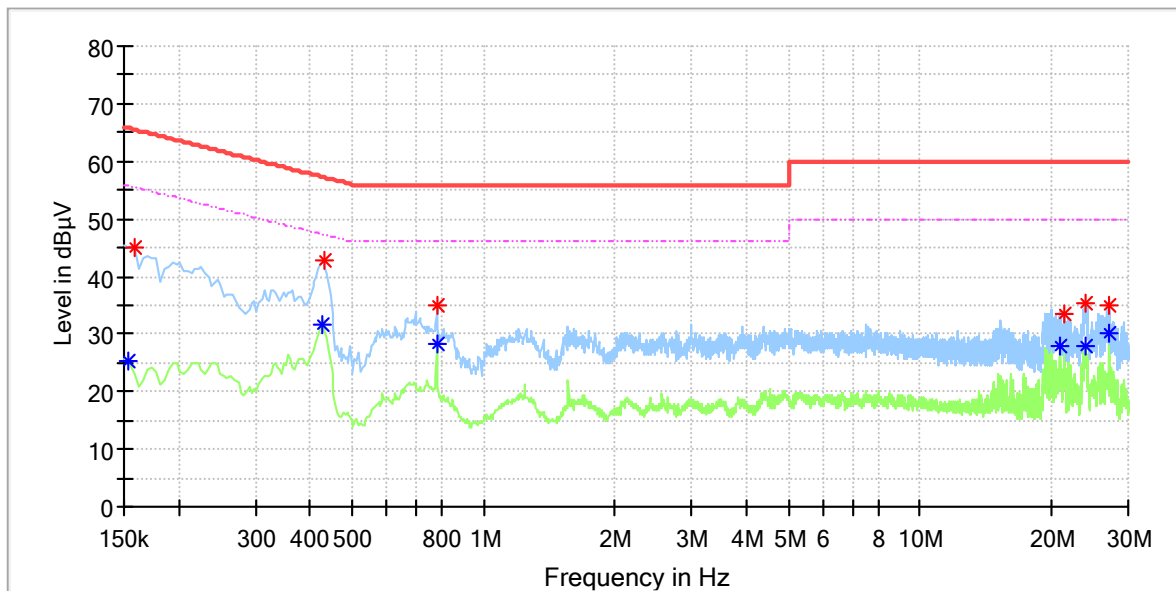
Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.150000	---	25.07	56.00	30.93	L1	9.6
0.150000	44.57	---	66.00	21.43	L1	9.6
0.426000	---	30.99	47.33	16.34	L1	9.7
0.434000	41.78	---	57.18	15.40	L1	9.7
0.780000	35.54	---	56.00	20.46	L1	9.7
0.780000	---	28.03	46.00	17.97	L1	9.7
1.564000	---	22.74	46.00	23.26	L1	9.8
1.664000	31.35	---	56.00	24.65	L1	9.8
20.920000	35.19	---	60.00	24.81	L1	10.3
20.960000	---	29.15	50.00	20.85	L1	10.3
23.880000	---	27.68	50.00	22.32	L1	10.4
24.120000	35.72	---	60.00	24.28	L1	10.4

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: SR1
Adapter: AD-0241200200US-1



Critical_Freqs

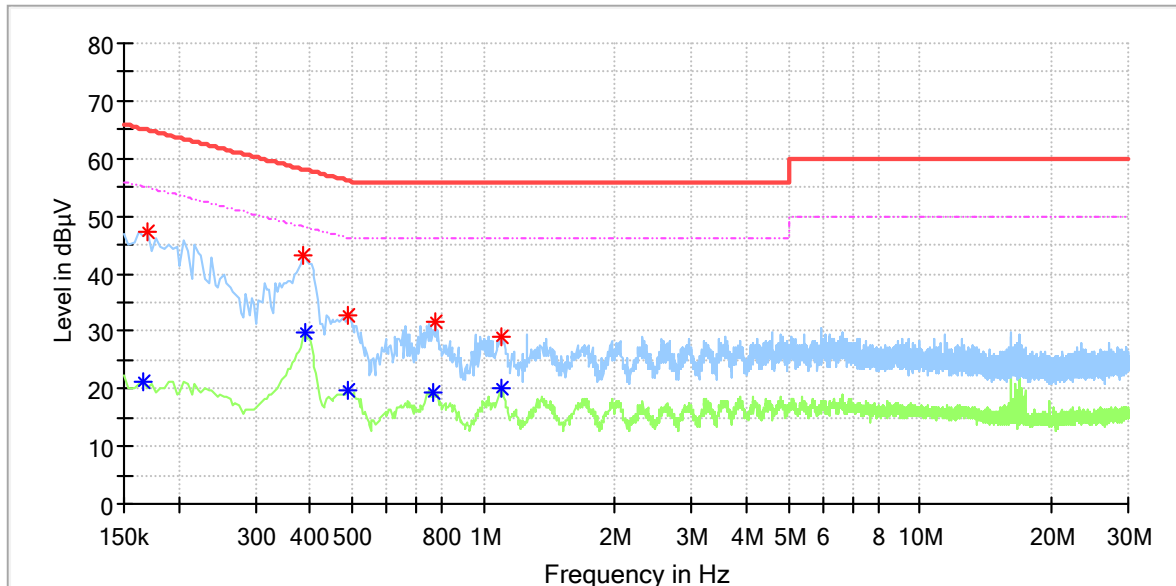
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	---	25.31	55.78	30.47	N	9.6
0.158000	45.15	---	65.57	20.42	N	9.6
0.426000	---	31.52	47.33	15.81	N	9.7
0.430000	42.90	---	57.25	14.35	N	9.7
0.780000	---	28.23	46.00	17.77	N	9.7
0.784000	34.96	---	56.00	21.04	N	9.7
20.920000	---	27.81	50.00	22.19	N	10.3
21.476000	33.61	---	60.00	26.39	N	10.3
23.840000	---	28.09	50.00	21.91	N	10.5
23.872000	35.46	---	60.00	24.54	N	10.5
27.076000	34.87	---	60.00	25.13	N	10.5
27.076000	---	30.18	50.00	19.82	N	10.5

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: SR1
Adapter: PSYC1202000



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	---	21.30	55.16	33.86	L1	9.6
0.170000	47.30	---	64.96	17.66	L1	9.6
0.386000	43.26	---	58.15	14.89	L1	9.7
0.390000	---	29.73	48.06	18.34	L1	9.7
0.486000	---	19.79	46.24	26.45	L1	9.7
0.490000	32.76	---	56.17	23.41	L1	9.7
0.768000	---	19.48	46.00	26.52	L1	9.7
0.776000	31.52	---	56.00	24.48	L1	9.7
1.096000	---	19.94	46.00	26.06	L1	9.7
1.100000	29.19	---	56.00	26.81	L1	9.7

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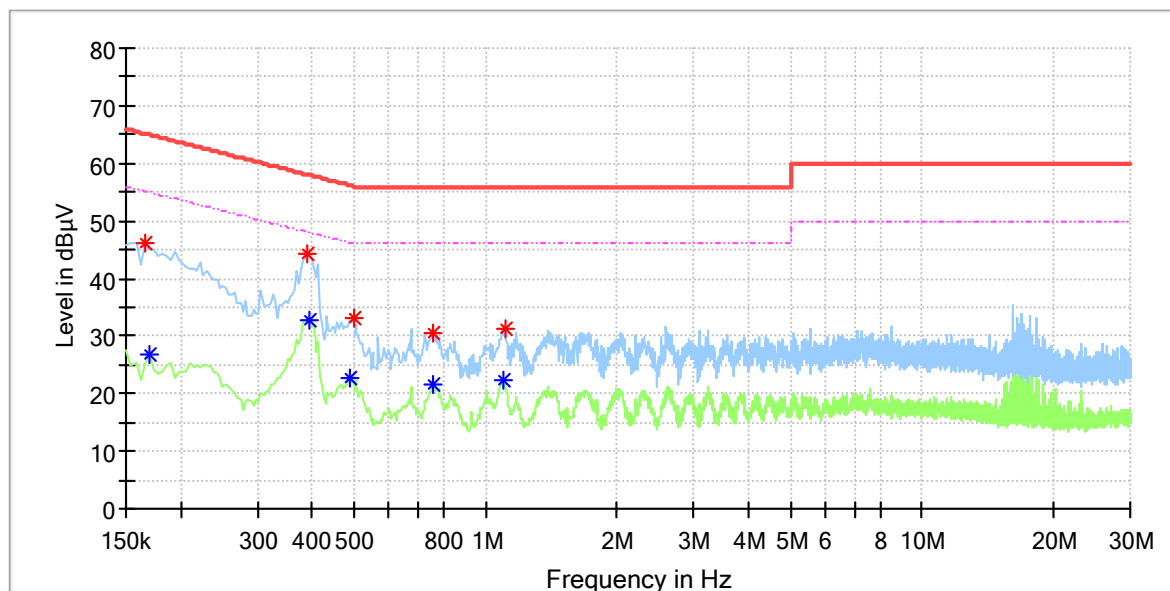
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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: SR1
Adapter: PSYC1202000



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.166000	46.02	---	65.16	19.14	N	9.6
0.170000	---	26.91	54.96	28.05	N	9.6
0.390000	44.28	---	58.06	13.78	N	9.7
0.394000	---	32.71	47.98	15.26	N	9.7
0.490000	---	22.71	46.17	23.45	N	9.7
0.498000	33.15	---	56.03	22.88	N	9.7
0.756000	---	21.45	46.00	24.55	N	9.7
0.756000	30.59	---	56.00	25.41	N	9.7
1.096000	---	22.49	46.00	23.51	N	9.7
1.112000	31.43	---	56.00	24.57	N	9.7

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5.2 Radiated Emission

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.109(a)
	: ICES-003 Issue 7, Clause 3.2.2
Basic standard	: ANSI C63.4: 2014
Frequency range	: 30MHz to 5 th highest fundamental frequency
Classification	: Class B
Limit	: FCC Part 15.109(a)
	: ICES-003 Table 2 & Table 4
Kind of test site	: 3m Semi-anechoic Chamber & 3m Full-anechoic Chamber

Test Setup

Date of testing	: 2022-03-10 to 2022-03-31
Input voltage	: AC 120V, 60Hz or DC 48V
Operation mode	: A, B
Earthing	: Not Connected
Ambient temperature	: 26 °C
Relative humidity	: 54 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the following plots, only the worst case mode are shown in this report.

Remark 1: The limit of below radiated emission test data is from FCC part 15.109, it also meet the limit of ICES-003 issue 7.

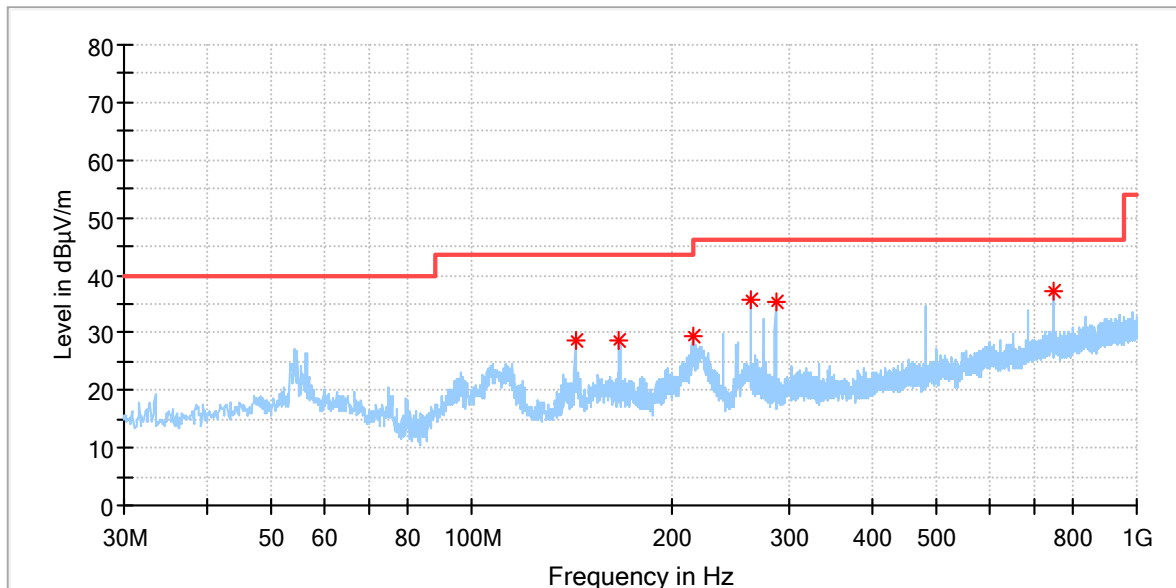
Remark 2: The host has been evaluated according to modular: WisLink LPWAN Concentrator with C2PC (FCC ID: WMUHAC-MLWR) procedure in test report CN239SP6 002, and the Radiated Spurious Emissions was carried out within frequency range 9 kHz to the fifth harmonics, refer to CN239SP6 002for details of measurement results.

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: AD-0241200200US-1



Critical_Freqs

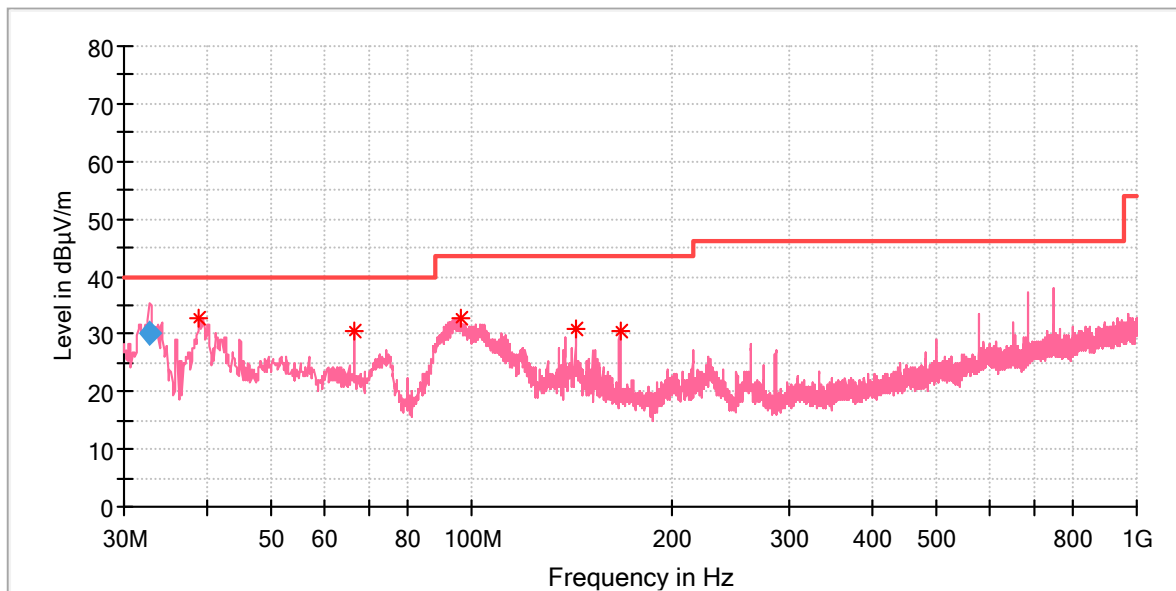
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
143.005000	28.81	43.50	14.69	200.0	H	182.0	20.2
166.867000	28.74	43.50	14.76	200.0	H	320.0	21.4
215.949000	29.24	43.50	14.26	100.0	H	194.0	18.4
262.412000	35.84	46.00	10.16	100.0	H	248.0	20.1
286.274000	35.36	46.00	10.64	100.0	H	232.0	19.9
750.031000	37.11	46.00	8.89	100.0	H	75.0	30.6

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: AD-0241200200US-1



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.873000	553.25	40.00	-513.25	100.0	V	115.0	18.0
38.924000	32.68	40.00	7.32	100.0	V	8.0	19.3
66.569000	30.49	40.00	9.51	100.0	V	246.0	19.6
95.960000	32.93	43.50	10.57	100.0	V	305.0	16.5
143.102000	30.85	43.50	12.65	100.0	V	249.0	20.2
166.964000	30.48	43.50	13.02	100.0	V	265.0	21.4

Final_Result

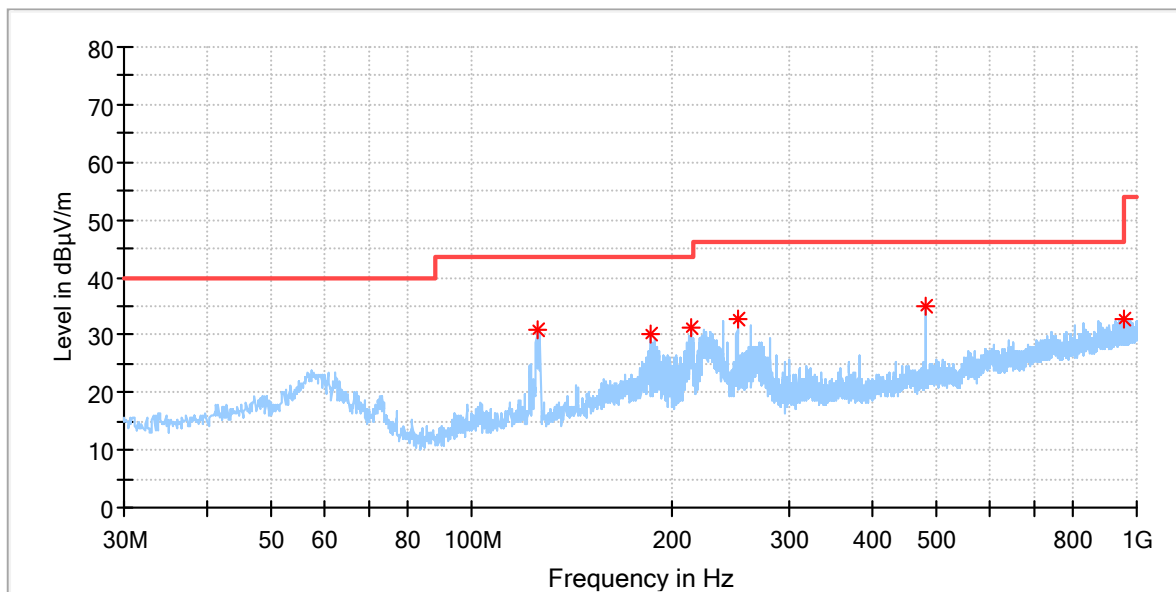
Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.873000	30.15	40.00	9.85	1000.0	120.000	100.0	V	115.0	18.0

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: PSYC1202000



Critical_Freqs

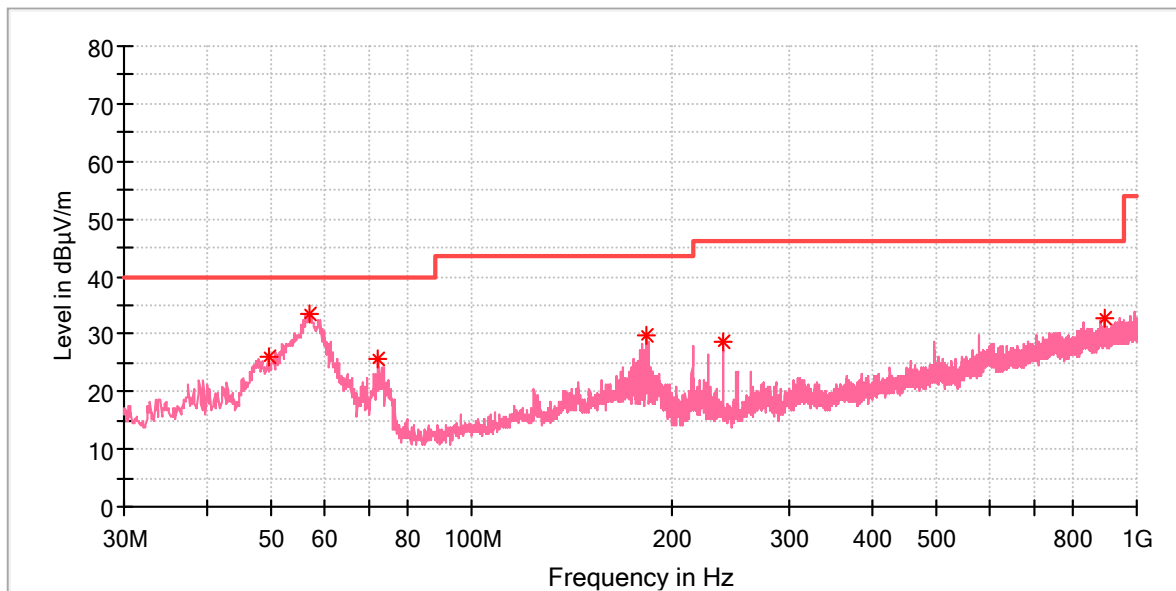
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
126.030000	30.92	43.50	12.58	200.0	H	192.0	19.1
186.073000	30.16	43.50	13.34	100.0	H	347.0	18.1
214.203000	31.20	43.50	12.30	200.0	H	164.0	18.2
250.772000	32.58	46.00	13.42	100.0	H	276.0	19.0
479.983000	34.99	46.00	11.01	100.0	H	174.0	24.5
956.932000	32.80	46.00	13.20	200.0	H	0.0	31.9

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: PSYC1202000



Critical_Freqs

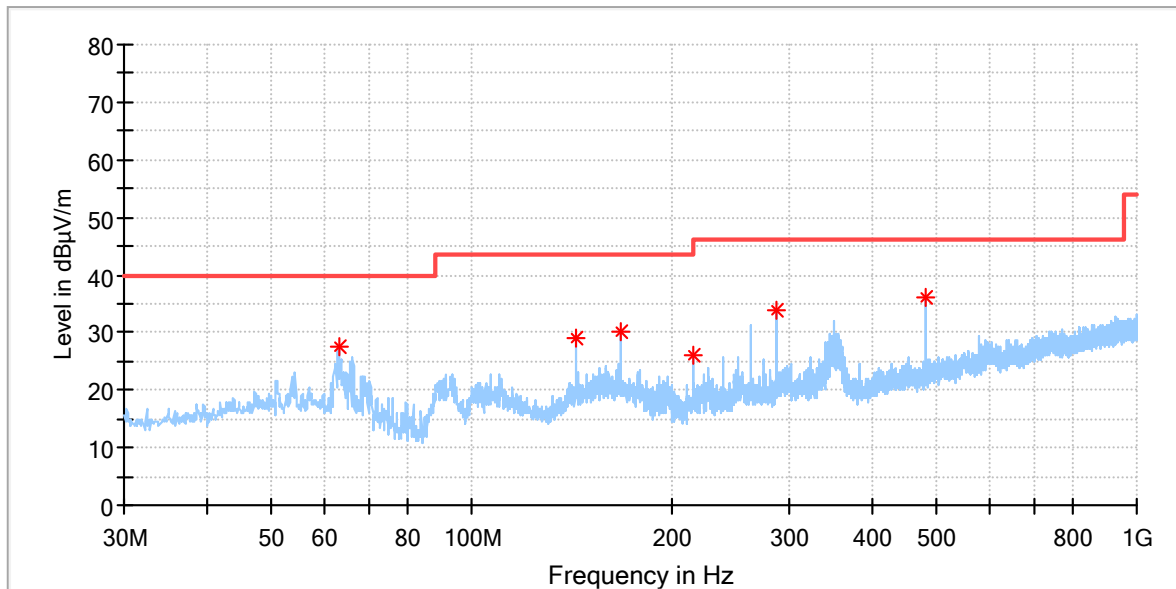
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.400000	25.90	40.00	14.10	100.0	V	354.0	20.9
56.966000	33.41	40.00	6.59	100.0	V	137.0	21.3
72.389000	25.55	40.00	14.45	100.0	V	263.0	17.6
183.454000	29.86	43.50	13.64	100.0	V	173.0	18.6
238.550000	28.81	46.00	17.19	100.0	V	12.0	18.7
892.039000	32.82	46.00	13.18	100.0	V	236.0	31.5

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: Operating, POE
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber



Critical_Freqs

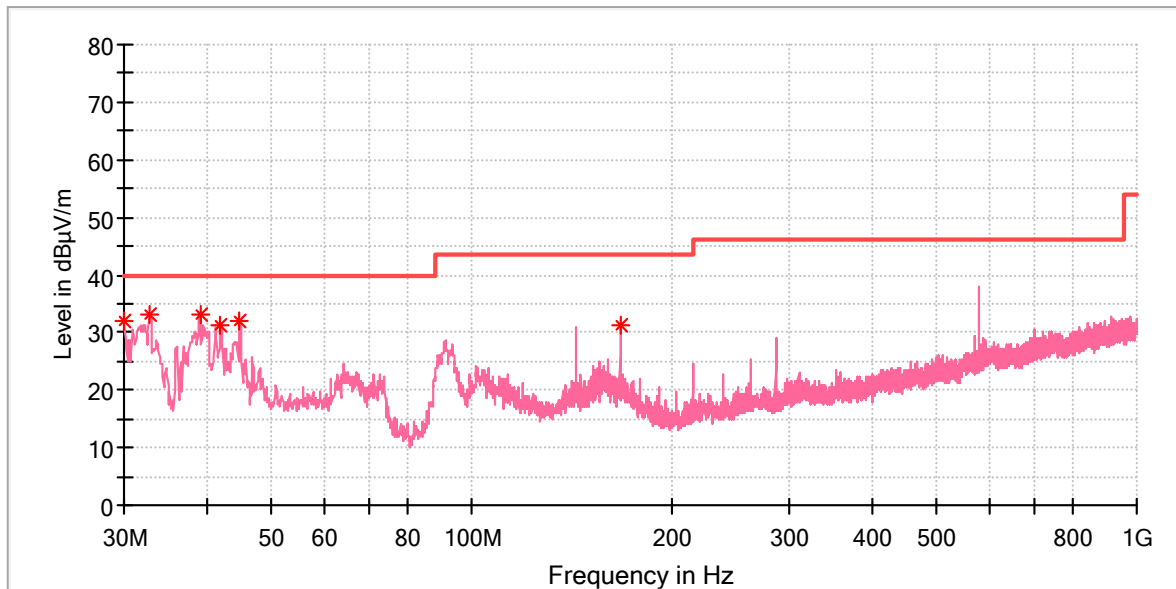
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
63.077000	27.53	40.00	12.47	100.0	H	32.0	20.4
143.393000	28.88	43.50	14.62	200.0	H	356.0	20.2
167.352000	29.98	43.50	13.52	200.0	H	332.0	21.4
215.076000	26.22	43.50	17.28	100.0	H	254.0	18.3
286.856000	33.86	46.00	12.14	100.0	H	254.0	19.9
479.983000	36.02	46.00	9.98	200.0	H	51.0	24.5

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: Operating, POE
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber



Critical_Freqs

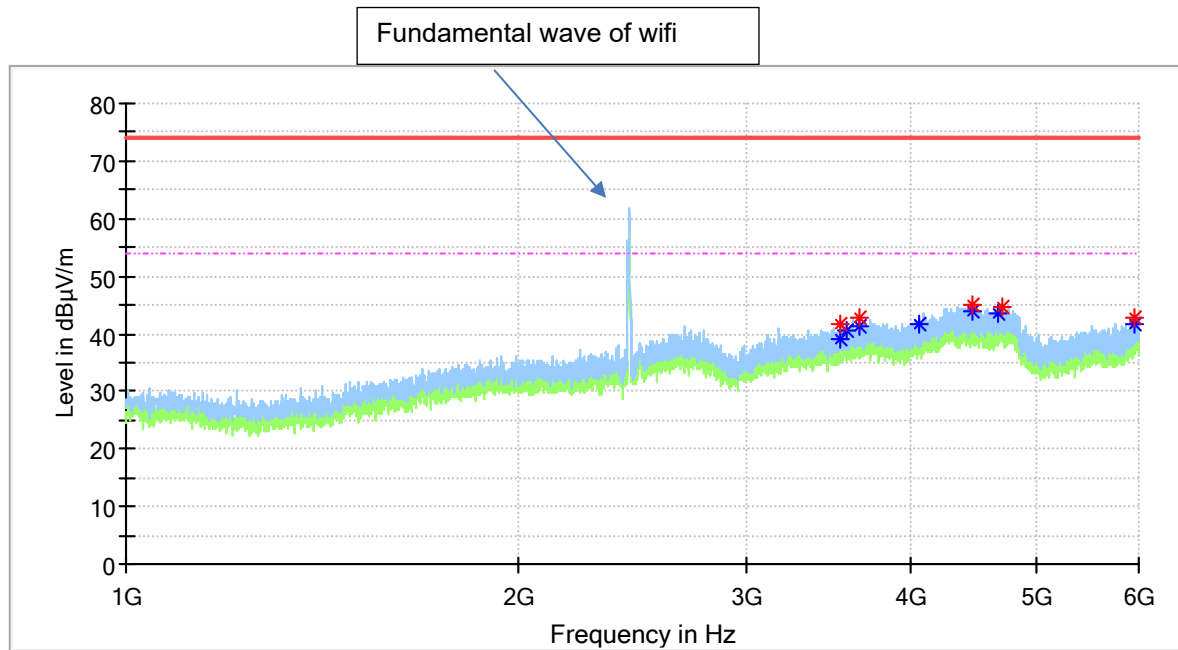
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.000000	32.03	40.00	7.97	200.0	V	352.0	18.3
32.813000	33.23	40.00	6.77	200.0	V	352.0	18.0
39.021000	33.30	40.00	6.70	200.0	V	352.0	19.3
41.931000	31.14	40.00	8.86	200.0	V	352.0	20.0
44.841000	32.05	40.00	7.95	200.0	V	352.0	20.7
167.158000	31.26	43.50	12.24	100.0	V	261.0	21.4

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: Operating, POE
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber



Critical_Freqs

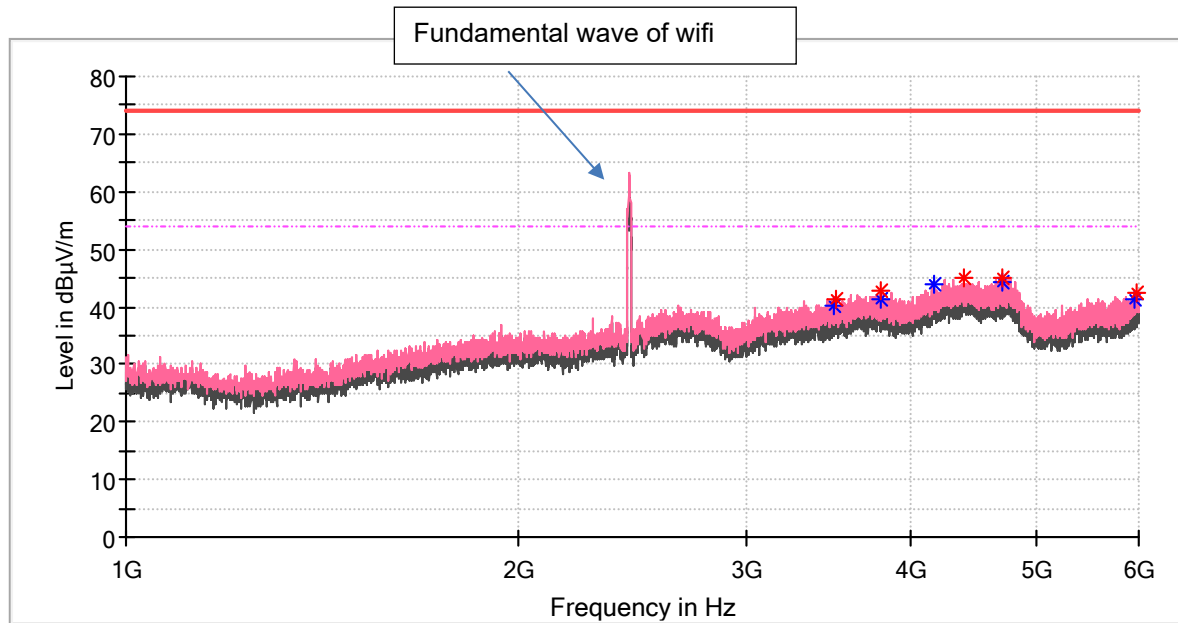
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3543.500000	---	39.12	54.00	14.88	100.0	H	249.0	-0.9
3544.000000	41.70	---	74.00	32.30	100.0	H	249.0	-0.9
3583.000000	---	40.65	54.00	13.35	100.0	H	158.0	-0.7
3662.500000	42.80	---	74.00	31.20	100.0	H	245.0	0.0
3662.500000	---	41.39	54.00	12.61	100.0	H	245.0	0.0
4068.000000	---	41.66	54.00	12.34	100.0	H	153.0	0.7
4469.000000	---	44.00	54.00	10.00	100.0	H	149.0	2.0
4469.000000	44.90	---	74.00	29.10	100.0	H	149.0	2.0
4670.500000	---	43.53	54.00	10.47	100.0	H	347.0	2.4
4720.000000	44.71	---	74.00	29.29	100.0	H	332.0	2.7
5964.500000	42.66	---	74.00	31.34	100.0	H	351.0	2.2
5964.500000	---	41.82	54.00	12.18	100.0	H	351.0	2.2

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: Operating, POE
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber



Critical_Freqs

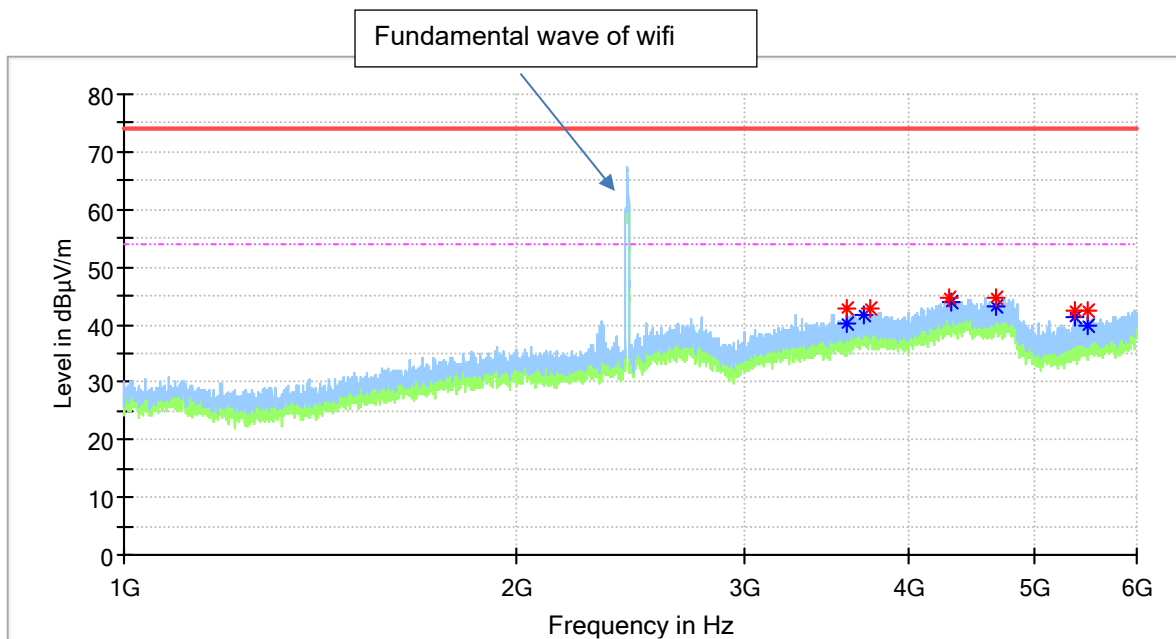
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5970.000000	42.56	---	74.00	31.44	100.0	V	0.0	2.2
5949.000000	---	41.39	54.00	12.61	100.0	V	11.0	2.1
4182.500000	---	43.78	54.00	10.22	100.0	V	16.0	1.2
4400.000000	44.96	---	74.00	29.04	100.0	V	52.0	1.9
4718.000000	---	44.43	54.00	9.57	100.0	V	103.0	2.7
4718.000000	45.14	---	74.00	28.86	100.0	V	103.0	2.7
3499.500000	---	40.09	54.00	13.91	100.0	V	118.0	-1.1
3802.500000	42.66	---	74.00	31.34	100.0	V	242.0	0.0
3802.500000	---	41.40	54.00	12.60	100.0	V	242.0	0.0
3517.000000	41.36	---	74.00	32.64	100.0	V	266.0	-1.0

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: AD-0241200200US-1



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3593.500000	---	40.32	54.00	13.68	100.0	H	0.0	-0.6
3593.500000	42.62	---	74.00	31.38	100.0	H	0.0	-0.6
3707.500000	---	41.74	54.00	12.26	100.0	H	345.0	0.3
3746.500000	42.80	---	74.00	31.20	100.0	H	345.0	0.2
4309.000000	44.73	---	74.00	29.27	100.0	H	303.0	2.2
4321.500000	---	43.86	54.00	10.14	100.0	H	331.0	2.2
4678.000000	44.75	---	74.00	29.25	100.0	H	288.0	2.4
4678.000000	---	43.31	54.00	10.69	100.0	H	288.0	2.4
5378.500000	42.29	---	74.00	31.71	100.0	H	341.0	0.4
5378.500000	---	41.36	54.00	12.64	100.0	H	341.0	0.4
5504.000000	42.56	---	74.00	31.44	100.0	H	0.0	0.9
5504.000000	---	39.66	54.00	14.34	100.0	H	0.0	0.9

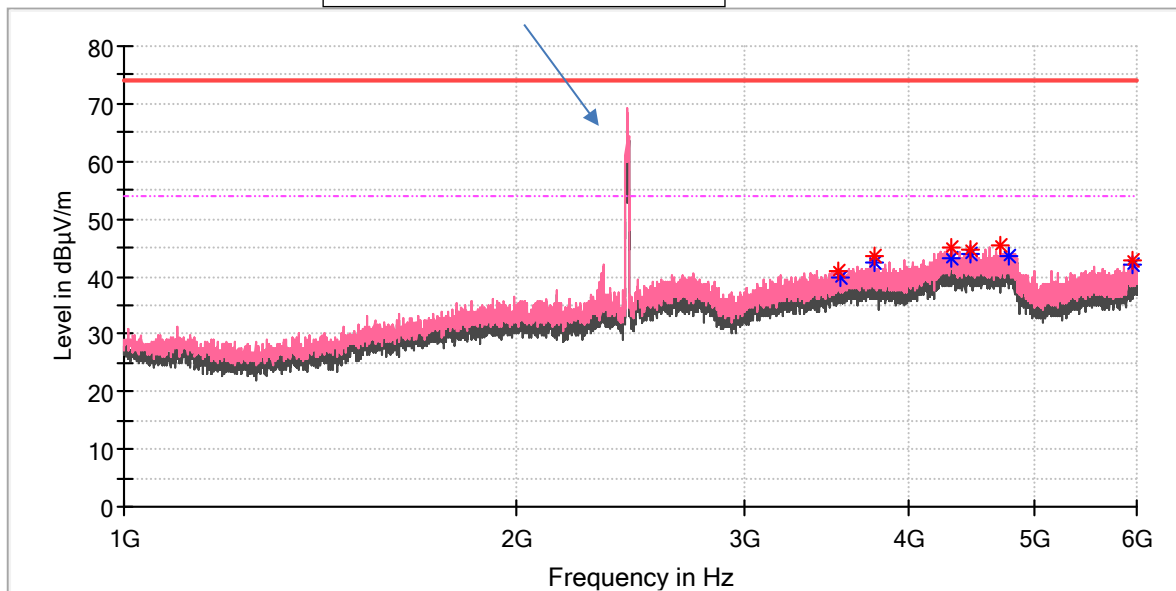
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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: AD-0241200200US-1

Fundamental wave of wifi



Critical_Freqs

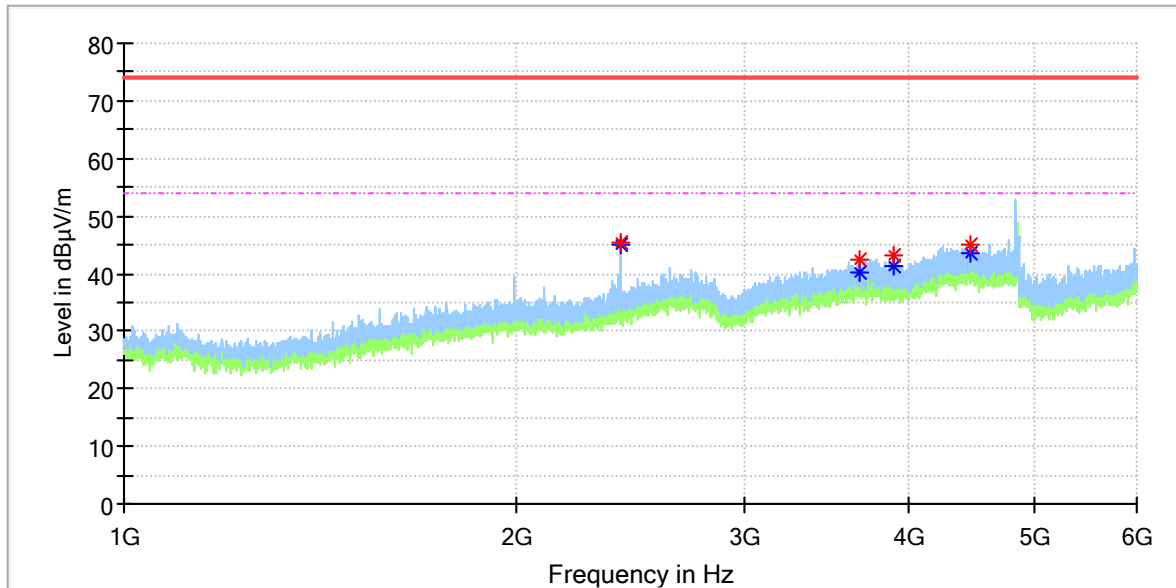
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3545.000000	41.11	---	74.00	32.89	100.0	V	266.0	-0.9
3553.000000	---	40.00	54.00	14.00	100.0	V	213.0	-0.8
3769.500000	43.50	---	74.00	30.50	100.0	V	204.0	0.1
3769.500000	---	42.35	54.00	11.65	100.0	V	204.0	0.1
4314.500000	45.15	---	74.00	28.85	100.0	V	48.0	2.2
4314.500000	---	43.06	54.00	10.94	100.0	V	48.0	2.2
4475.500000	44.50	---	74.00	29.50	100.0	V	87.0	2.0
4475.500000	---	44.06	54.00	9.94	100.0	V	87.0	2.0
4715.500000	45.38	---	74.00	28.62	100.0	V	170.0	2.7
4778.500000	---	43.52	54.00	10.48	100.0	V	98.0	2.7
5961.500000	42.66	---	74.00	31.34	100.0	V	156.0	2.2
5961.500000	---	42.13	54.00	11.87	100.0	V	156.0	2.2

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: PSYC1202000



Critical_Freqs

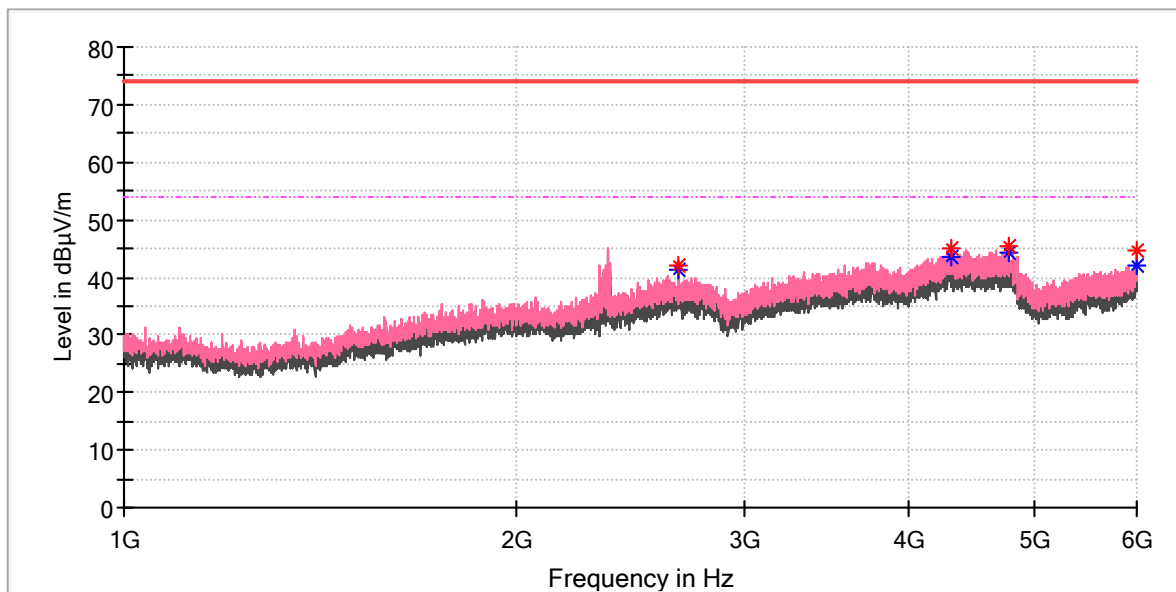
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2407.000000	---	45.17	54.00	8.83	100.0	H	107.0	-5.6
2407.000000	45.53	---	74.00	28.47	100.0	H	107.0	-5.6
3675.000000	---	40.14	54.00	13.86	100.0	H	136.0	0.1
3675.000000	42.39	---	74.00	31.61	100.0	H	136.0	0.1
3898.000000	---	41.32	54.00	12.68	100.0	H	300.0	-0.1
3898.000000	43.09	---	74.00	30.91	100.0	H	300.0	-0.1
4479.000000	---	43.62	54.00	10.38	100.0	H	54.0	2.0
4479.000000	44.93	---	74.00	29.07	100.0	H	54.0	2.0

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EUT Information

EUT Name: LoRaWAN Gateway
Model: HAC-GWW1-U
Test Mode: operating
Test Voltage: AC 120V/60Hz
Test By: Jianhua Lu
Review By: Gary Chen
Remark: 3m Chamber
Adapter: PSYC1202000



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2666.000000	---	41.18	54.00	12.82	100.0	V	255.0	-3.3
2666.000000	41.87	---	74.00	32.13	100.0	V	255.0	-3.3
4319.500000	---	43.39	54.00	10.61	100.0	V	140.0	2.2
4319.500000	45.03	---	74.00	28.97	100.0	V	140.0	2.2
4782.500000	---	44.11	54.00	9.89	100.0	V	341.0	2.7
4782.500000	45.28	---	74.00	28.72	100.0	V	341.0	2.7
5990.500000	---	41.95	54.00	12.05	100.0	V	259.0	2.4
5990.500000	44.56	---	74.00	29.44	100.0	V	259.0	2.4

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