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Test report

Number	**T251-0501/24**	Project file:	C20241297
		Date:	2025-02-13
		Pages:	6

Product: **Gateway**

Type reference: **KSB Guard Global Gateway GGW-957**

Ratings: 110-240 V a.c.; 50/60 Hz

Trademark:

Applicant: **KSB SE & CO. KGaA**
Johann-Klein-Strasse 9, 67227 Frankenthal, Germany

Manufacturer: SSV Software Systems GmbH
Dünenweg 5, 30419 Hannover, Germany

Place of manufacture: SSV Software Systems GmbH
Dünenweg 5, 30419 Hannover, Germany

Summary of testing

Testing method: 47 CFR FCC Part 1.1307(clause (b)(1)(i)(B) and (b)(3)(ii)(B))

Testing location: SIQ Ljubljana
Mašera-Spasićeva ulica 10, SI-1000 Ljubljana, Slovenia

Remarks: Date of receipt of test items: 2024-03-28
Number of items tested: 1
Date of performance of tests: 2024-07-01
The test results presented in this report relate only to the items tested.
The test items were tested in the condition as received.
The product complies with the requirements of the testing methods.

Tested by: Nik Vončina

Approved by: Luka Tosetto

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1 GENERAL

History sheet			
Date	Report No.	Change	Revision
2025-02-13	T251-0501/24	Initial Test Report issued.	--

1.1 Equipment under test

Gateway
Type: **KSB Guard Global Gateway GGW-957**

Environment: Uncontrolled / General Public
Assessment distance: 20 cm

FCC ID: 2AV3J-GRDGW01
FCC ID of pre-certified built-in LTE module: XMR201903EG25G

Reviewed test reports T251-0554/24 from SIQ Ljubljana, and HR/2019/1001602 from SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch.

2 ASSESSMENT PROCEDURE

MPE EVALUATION OF FIXED DEVICES

According to 47 CFR 1.1307 clause (b)(1)(i)(B):
With respect to the limits on human exposure to RF provided in § 1.1310 of this chapter, applicants to the Commission for the grant or modification of construction permits, licenses or renewals thereof, temporary authorities, equipment authorizations, or any other authorizations for radiofrequency sources must prepare an evaluation of the human exposure to RF radiation pursuant to § 1.1310 and include in the application a statement confirming compliance with the limits in § 1.1310.

Limits:

TABLE 1 - LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* $900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) 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
300-1,500			f/1500	30
1,500-100,000			1.0	30

Calculation:

$$P_d = \frac{P_t}{4 * \pi * R^2}$$

Where:
P_d= Power density in mW/cm2
P_t = EIRP in mW
π = 3.14
R = Evaluation distance

According to 47 CFR 1.1307 clause (b)(3)(ii)(B)):
(ii) For multiple RF sources: Multiple RF sources are exempt if:
(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

Maximum contribution of each technology is calculated with calculated power density compared to the limit.
Maximum contribution = Power density / Power density Limit

3 MEASUREMENTS / CALCULATIONS

Antenna type and gain - Zigbee: External antenna Pulse Larsen W1038, 3.8 dBi
Antenna type and gain - LTE: GSM850: 2.29dBi, GSM1900:1.59dBi, WCDMA BAND II:1.59dBi, WCDMA BAND IV:2dBi, WCDMA BAND V:2.29dBi, LTE BAND 2:1.59dBi, LTE BAND 4:2dBi, LTE BAND 5:2.29dBi, LTE BAND 7: 3dBi, LTE BAND 12: 3.26dBi, LTE BAND 13: 4.45dBi, LTE BAND 25: 1.59dBi, LTE BAND 26: 2.53dBi, LTE BAND 38: 2.06dBi, LTE BAND 41: 3dBi

GSM module works with 1Tx duty cycle when operating (Maximum mode).
Power of GSM850 and GSM1900 measured with continuous transmission are due this lowered to get the actual average power. For other technologies used, 100% duty cycle is taken.

47 CFR FCC Part 1.1307(Clause (b)(3)(ii)(B)):

There is simultaneous transmission.

Standalone contributions LTE module at 20 cm distance:

Band	Maximum average output power with antenna gain and calculated duty cycle (dBm)	Power density (mW/cm2)	Power density Limit (mW/cm2)	Maximum contribution
GSM850	28.1	0.129	0.549	0.233847
GSM1900	24.4	0.055	1	0.054812
WCDMA B2	26.59	0.091	1	0.090772
WCDMA B4	27	0.100	1	0.099759
WCDMA B5	27.29	0.107	0.551	0.194093
LTE B2	26.59	0.091	1	0.090772
LTE B4	27	0.100	1	0.099759
LTE B5	27.29	0.107	0.553	0.194093
LTE B7	28	0.126	1	0.125589
LTE B12	28.23	0.132	0.467	0.286131
LTE B13	29.45	0.175	0.520	0.338548
LTE B25	26.59	0.091	1	0.090772
LTE B26	27.53	0.113	0.543	0.207691
LTE B38	27.06	0.101	1	0.101146
LTE B41	28	0.126	1	0.125589

Standalone Contributions Zigbee module at 20 cm distance:

Band	Maximum average output power with antenna gain and calculated duty cycle (dBm)	Power density (mW/cm2)	Power density Limit (mW/cm2)	Maximum contribution
2.4 GHz	6.2	0.00083	1	0.00083

* Gated power with Duty Cycle calculated in

** tolerance already included

Conclusion: PASS; SAR Evaluation is not required due to SAR Test Exclusion Thresholds are met.

Calculation of maximum simultaneous transmission of both modules:

Frequency band

simultaneous transmission	**Zigbee (Thread) - 2.4 GHz**	**Limit**	**Result**
GSM850	0.234627	1	PASS
GSM1900	0.055592	1	PASS
WCDMA B2	0.091552	1	PASS
WCDMA B4	0.100538	1	PASS
WCDMA B5	0.194873	1	PASS
LTE B2	0.091552	1	PASS
LTE B4	0.100539	1	PASS
LTE B5	0.194873	1	PASS
LTE B7	0.126369	1	PASS
LTE B12	0.286911	1	PASS
LTE B13	0.339329	1	PASS
LTE B25	0.091552	1	PASS
LTE B26	0.207774	1	PASS
LTE B38	0.101927	1	PASS
LTE B41	0.126369	1	PASS

Frequency band

Conclusion: PASS; SAR Evaluation due to simultaneous transmission is not required due to sum of the fractional contributions is in all combinations less than 1.