TEST REPORT



CTK Co., Ltd. (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel: +82-31-339-9970 Fax: +82-31-624-9501

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1. Applicant

- ${\scriptstyle \circ}$ Name : SOLUM CO.,LTD.
- $^{\circ}$ Address : 4,5,6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do,

Republic of Korea (Zip 16914)

• Date of Receipt : 2024-05-24

2. Manufacturer

- Name : SOLUM CO.,LTD.
- Address: 4,5,6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea (Zip 16914)

3. Factory

- Name : SOLUM VINA CO., LTD
- Address : Plot B3, Ba Thien 2 Industrial park, Thien Ke Ward, Binh Xuyen District,
 Vinh Phuc Province, 281200., Peple's Republic of Vietnam
- 4. Use of Report : For FCC Certification & Canadian Certification
- 5. Test Sample / Model : ESL Label / EL122H5CRC
- 6. Date of Test : 2024-05-27 to 2024-05-29
- 7. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247,

ANSI C63.10-2013, RSS-247, RSS-Gen

8. Testing Environment : refer to 7 page

- 9. Test Results : Compliance
- 10. Location of Test : 🛛 Permanent Testing Lab 🛛 🗌 On Site Testing

(Address : 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, 17141 Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

	Tested by	. /	Technical Manager
Approval	Seoung-uk Park:	(Signature)	Young-taek Lee: (Signature)

Remark. This report is not related to KOLAS accreditation and relevant regulation. 2024-07-08





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REPORT REVISION HISTORY

Date	Revision	Page No
2024-07-08	Issued (CTK-2024-01950)	all
2024-07-08	Issued (CTK-2024-01950-1) 1. Change the applicant's address 2. Add Variant Model	1 & 4 Page

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APPENDIX A – Test Equipment Used For Tests



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1. General Product Description

1.1 Applicant Information

Company	SOLUM CO.,LTD.	
Contact Point4,5,6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea (Zip 16914)		
Contact Person	Name : Ki Dong Lee E-mail : kdlee007@solu-m.com Tel : +82-31-8006-7677	

1.2 Product Information

FCC ID	2AFWN-EL122H5CRC	
IC	22800-EL122H5CRC	
Product Description	ESL Label	
Model name	EL122H5CRC	
Variant Model name EL122H5WRC, EL122H5BRC, EL122H5C4C, EL122H5W4C, EL122H5B4C (Variant model has no technical differences with each model except for the model name and color for marketing purposes.)		
Operating Frequency	2 401 MHz - 2 480 MHz	
RF Output Power 3.536 dBm(2.257 mW)		
Antenna Specification Antenna type : PCB Antenna Peak Gain : 3.03 dBi		
Number of channels	80	
Channel Spacing	1 MHz	
Type of Modulation GFSK		
Power Source	DC 3.0 V(Battery)	
FVIN	V28	
Test Software(Version)	Tera term (Version 4.8.5)	
RF Power setting in Test SW Power setting input "40"		

1.3 Peripheral Devices

-For Conducted Measurement and Radiated Measurement

Device	Manufacturer	Model No.	Serial No.	
Notebook	HP Inc.	HP Probook 455 G7 5CD0234DWM		
AC Adapter	HP Inc.	PPP012D-S	677777-003	



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2. Accreditations 2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.



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3.1 Standards

Section in FCC	Section in RSS	Requirement(s)	Status (Note 1)	Test Condition	
15.247(a)	RSS-247 5.2(a)	6 dB Bandwidth	С		
15.247(e)	RSS-247 5.2(b)	Transmitter power spectral density	С		
15.247(b)	RSS-247 5.4(d)	Maximum peak conducted output power	С	Conducted	
15.247(d)	RSS-247 5.5	Unwanted emission	С		
15.209	RSS-Gen 6.13	Transmitter emission	С	Radiated	
15.207(a)	RSS-Gen 8.8	AC Conducted Emission	NA(Note 3)	Line Conducted	
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable Note 2: The data in this test report are traceable to the national or international standards. Note 3: The equipment is operated on battery power only. Note 4: The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013, RSS-247 Issue 3, RSS-Gen Issue 5.					
Note 5: The tests were performed according to the method of measurements prescribed in KDB No.558074. Note 6: This equipment has been tested in a 100% duty cycle transmission situation using applicant supplied software.					



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3.2 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments. During at testing, system components were manipulated within the confines of typical usage to maximize each emission. All modulation modes were tests. The results are only attached worst cases.

Test Frequency

Lowest channel	Middle channel	Highest channel
2 401 MHz	2 440 MHz	2 480 MHz

3.3 Maximum Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter. Coverage factor k = 2, Confidence levels of 95 %

Description	Uncertainty	
Conducted RF Output Power	1.5 dB (C.L. : Approx. 95%, <i>k</i> =2)	
Occupied Bandwidth	0.1 MHz (C.L. : Approx. 95%, <i>k</i> =2)	
Unwanted Emission(conducted)	3.0 dB (C.L. : Approx. 95%, <i>k</i> =2)	
Radiated Emissions (f \leq 1 GHz)	3.82 dB (C.L. : Approx. 95%, <i>k</i> =2)	
Radiated Emissions (f > 1 GHz)	4.5 dB (C.L. : Approx. 95%, <i>k</i> =2)	

3.4 Test Software

Conducted Test	Ics Pro Ver. 6.0.3	
Radiated Test	EP5RE Ver. 6.0.10, ES10 Ver. 2022.04.000	

3.5 Testing Environment

Test Item	Test Date	Temperature (℃)	Relative Humidity (%)
6 dB Bandwidth	2024-05-29	24	36
Transmitter power spectral density	2024-05-29	24	36
Maximum peak conducted output power	2024-05-29	24	36
Unwanted emission	2024-05-29	24	36
Transmitter emission	2024-05-27 ~ 2024-05-28	20 ~ 25	30~34



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4. Technical Characteristic Test

4.1 6dB Bandwidth & 99% Bandwidth

Test Procedures(ANSI C63.10-2013 6.9.2)

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Procedures(ANSI C63.10-2013 6.9.3)

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

Test Settings :

Center frequency = the highest, middle and the lowest channels

- a) RBW = 100 kHz(6dB Bandwidth),
- b) VBW ≥ 3 x RBW
- 30 kHz(99% Bandwidth)

d) Trace mode = Max hold

e) Sweep = auto couple

c) Detector = peak

- f) Allow trace to fully stabilize
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Limit :

6 dB Bandwidth > 500 kHz

Test Data :

Channel	Frequency6 dB Bandwidth[MHz][MHz]		99 % Bandwidth [MHz]	Result
Low	2 401	0.733	1.059	Complies
Middle	2 440	0.726	1.065	Complies
High	2 480	0.722	1.067	Complies

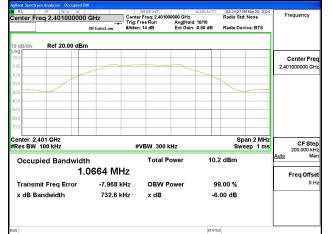
See next pages for actual measured spectrum plots.



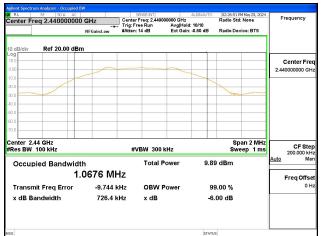
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6 dB Bandwidth[MHz]

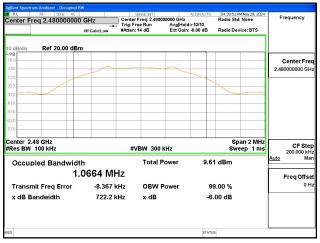
Low channel



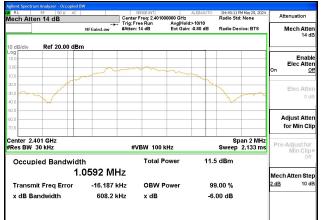
Middle channel



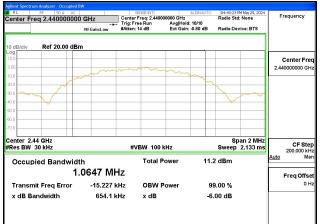
High channel



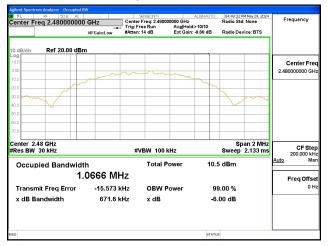
99% Bandwidth[MHz] Low channel



Middle channel



High channel





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4.2 Maximum peak Conducted Output Power

Test Procedures(ANSI C63.10-2013 11.9.1)

The following procedure can be used when the maximum available RBW of the instrument is less than the DTS bandwidth:

Test Settings:

Center frequency = the highest, middle and the lowest channels

a) RBW \geq DTS Bandwidth

c) span \geq 3 x RBW

- b) VBW \geq 3 x RBW
- d) Sweep time = auto couple

e) Detector = peak

f) Trace mode= max hold

- g) Allow trace to fully stabilize
- h) Use peak marker function to determine the peak amplitude level.

Limit :

Maximum Output Power < 1 W (30 dBm)

Test Data :

Channel	Frequency [MHz]	Measurement data [dBm]	Limit [dBm]	Result
Low	2 401	3.536	30	Complies
Middle	2 440	3.270	30	Complies
High	2 480	2.957	30	Complies

See next pages for actual measured spectrum plots.



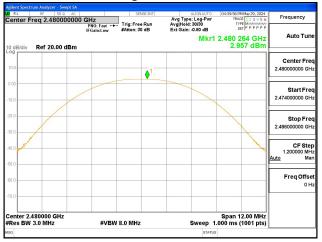
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Low channel enter Freq 2.401000000 GHz FN0: Fast state freq 2.401000000 GHz IFGain:Low #Atten: 30 dB Frequency Aug Type: Log-Pwi Avg[Hold: 30/30 Ext Gain: -0.80 dB TYPE MINIMUM DET P P P P P Auto Tu Mkr1 2.401 108 GHz 3.536 dBm Ref 20.00 dBm Center Free 2.40100000 GH Start Free 2.395000000 GH Stop Fred 2.407000000 GH: CF Step 1.200000 MHz Man uto Freq Offset 0 Hz Span 12.00 MHz Sweep 1.000 ms (1001 pts) Center 2.401000 GHz Res BW 3.0 MHz #VBW 8.0 MHz

Middle channel

Center F	req 2.4400		PNO: Fast	SENSE:INT Trig: Free Run #Atten: 30 dB	Augnauto Avg Type: Log-Pwr Avg Hold: 30/30 Ext Gain: -0.80 dB	02:26:57 PM May 29, 2024 TRACE 1 2 3 4 5 6 TVPE M	Frequency
10 dB/div	Ref 20.00	dBm	IFGain:Low	#Atten: 30 dB		2.439 796 GHz 3.270 dBm	Auto Tur
10.0				♦ ¹			Center Fre 2.440000000 GH
10.00							Start Fre 2.434000000 GH
20.0							Stop Fr 2.446000000 G
40.0 Janet						- Aug	CF Sto 1.200000 M Auto M
80.0							Freq Offs 0
70.0							
	440000 GHz 3.0 MHz		#VBW	8.0 MHz	Sweep 1	Span 12.00 MHz .000 ms (1001 pts)	

High channel



Output Power



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4.3 Power Spectral Density

Test Procedures(ANSI C63.10-2013 11.10.2)

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance.

Test Settings:

Center frequency = the highest, middle and the lowest channels

a) RBW : 3 kHz \leq RBW \leq 100 kHz

b) VBW ≥ 3 x RBW

c) span \geq 1.5 x DTS bandwidth

d) Sweep time = auto couplef) Trace mode= max hold

g) Allow trace to fully stabilize

e) Detector = peak

h) Use the peak marker function to determine the maximum amplitude level within the RBW.

Limit :

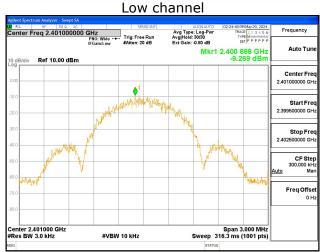
Power Spectral Density < 8 dBm @ 3 kHz BW

Test Data :

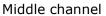
Channel	Frequency [MHz]	Measurement data [dBm]	Limit [dBm]	Result
Low	2 401	-9.269	8	Complies
Middle	2 440	-8.706	8	Complies
High	2 480	-7.922	8	Complies

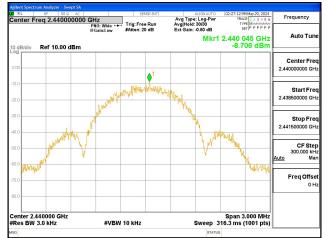
See next pages for actual measured spectrum plots.



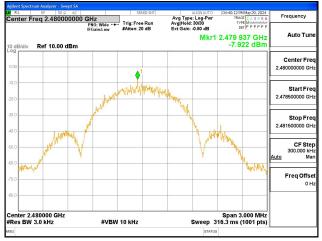


Power Spectral Density





High channel





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4.4 Band Edge & Conducted Spurious emission

Test Procedures(ANSI C63.10-2013 11.11.3)

The Unwanted emission from the EUT were measured according to the dictates PKPSD measurement procedure in section 11.11 of ANSI C63.10-2013.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Test Settings:

Center frequency = the highest, middle and the lowest channels

a) RBW = 100 kHz

b) VBW \geq 3 x RBW

c) Detector = peak

d) Sweep time = auto couple

- e) Trace mode= max hold
- f) Allow trace to fully stabilize
- g) Use the peak marker function to determine the maximum amplitude level.

Limit :

Emission level < 20 dBc

Test results: Complies

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest in-band spectral density. Therefore the applying equipment meets the requirement.

See next pages for actual measured spectrum plots.



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And Section Address and Addres AUGNAUTO Avg Type: Log-Pwr Avg|Hold:>30/30 Ext Gain: -0.80 dB Frequency DET P P P P P Mkr1 2.401 25 GHz 3.180 dBm Auto Tur 10 dB/div Ref 20.00 dBm Center Freq 2.400000000 G ¢1 Start Freq 2.395000000 GHz Stop Free 5000000 GH 2.40 CF Step 1.000000 MHz Man \uto Freq Offset 0 Ha Span 10.00 MHz Sweep 1.000 ms (1001 pts) Center 2.400000 GHz #Res BW 100 kHz #VBW 300 kHz

Conducted Band-Edge





Low channel Henr Spectrum rangers Rt PF 500 AC Harker 1 2.279950000000 GHz PHC Fast ↓ FGalp.Lew #Atten: 26 dB ALIGNAUTO Avg Type: Log-Pwr Avg|Hold: 30/30 Ext Gain: -0.80 dB Peak Search TYPE M MANNAN DET P P P P P NextPeal Mkr1 2.280 GHz -46.868 dBm Ref 16.00 dBm Next Pk Righ Next Pk Left Marker De Mkr→CF Jun. Mkr→RefLv More 1 of 2 Start 30 MHz #Res BW 100 kHz Stop 26.50 GHz Sweep 2.530 s (1001 pts) #VBW 300 kHz

Conducted Spurious Emission

Middle channel

RL RF 50.Ω AC	SENSE:INT	ALIGNAUTO	02:28:42 PM May 29, 2024	
enter Freq 13.2650000		Avg Type: Log-Pwr Avg Hold: 30/30	TRACE 1 2 3 4 5 6 TYPE M (1000000)	Frequency
dB/div Ref 16.00 dBm	PNO: Fast Trig: Free Run IFGain:Low #Atten: 26 dB	Ext Gain: -0.80 dB	Mkr1 2.571 GHz -48.178 dBm	Auto Tur
.00				Center Fre 13.265000000 GH
4.0			-18.25 dBn	Start Fre 30.000000 Mi
4.0				Stop Fre 26.50000000 Gi
4.0			Mar mar Mar	CF Ste 2.647000000 Gi Auto M
4.0 address Manyle address	wannen	aller and a second and a second and	a where	Freq Offs 0 I
4.0 tart 30 MHz			Stop 26.50 GHz	
Res BW 100 kHz	#VBW 300 kHz	Sweep	2.530 s (1001 pts)	

High channel

Agilent Spectrum Analyzer - Swept SA				
Center Freq 13.2650000	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	04:41:41 PM May 29, 2024 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 16.00 dBm	PNO: Fast 🖵 Trig: Free Run IFGain:Low #Atten: 26 dB	Avg Hold: 30/30 Ext Gain: -0.80 dB	Mkr1 4.953 GHz -53.344 dBm	Auto Tune
6.00				Center Fred 13.265000000 GHz
-14.0			-18.20 dDn	Start Free 30.000000 MH:
-24.0				Stop Free 26.50000000 GH
.44.0			m mon	CF Stej 2.64700000 GH <u>Auto</u> Ma
64.0 polanoli alman aline	meter manager and	and and a second and a second of	· · · · · · · · · · · · · · · · · · ·	Freq Offse 0 H
-74.0 Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 26.50 GHz 2.530 s (1001 pts)	
MSG		STATUS		t.

[QF-QP15-07] Ver.02



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4.5 Radiated Emission

Test Location

 \boxtimes 10 m SAC (test distance : \square 10 m, \boxtimes 3 m)

 \boxtimes 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Instrument Settings

Frequency Range = 9 kHz ~ 25 GHz (2.4 GHz 10th harmonic)

- a) RBW = 1 MHz for f \geq 1 GHz, 100 kHz for f < 1 GHz, 9 kHz for f < 30 MHz
- b) VBW \geq RBW
- c) Sweep time = auto couple



Limit :

FCC Part 15 § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	MHz	GHz
0.09-0.11	8.37626-8.38675	73-74.6	399.9-410	2690-2900	10.6-12.7
¹ 0.495-0.505	8.41425-8.41475	74.8-75.2	608-614	3260-3267	13.25-13.4
2.1735-2.1905	12.29-12.293	108-121.94	960-1240	3332-3339	14.47-14.5
4.125-4.128	12.51975-12.52025	123-138	1300-1427	3345.8-3358	15.35-16.2
4.17725-4.17775	12.57675-12.57725	149.9-150.05	1435-1626.5	3600-4400	17.7-21.4
4.20725-4.20775	13.36-13.41	156.52475- 156.52525	1645.5-1646.5	4500-5150	22.01-23.12
6.215-6.218	16.42-16.423	156.7-156.9	1660-1710	5350-5460	23.6-24
6.26775-6.26825	16.69475-16.69525	162.0125-167.17	1718.8-1722.2	7250-7750	31.2-31.8
6.31175-6.31225	16.80425-16.80475	167.72-173.2	2200-2300	8025-8500	36.43-36.5
8.291-8.294	25.5-25.67	240-285	2310-2390	9000-9200	² Above 38.6
8.362-8.366	37.5-38.25	322-335.4	2483.5-2500	9300-9500	

Table 1. Restricted Frequency Bands

 $^{\rm 1}$ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 2 Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Frequency(MHz)	Field Strength (uA/m)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measurement Distance (meters)
0.009-0.490	6.37/F (F in kHz)	2400/F(kHz)	48.5 - 13.8	300
0.490-1.705	63.7/F (F in kHz)	24000/F(kHz)	33.8 - 23	30
1.705-30	0.08	30	29.5	30
30-88	-	100**	40	3
88-216	-	150**	43.5	3
216-960	-	200**	46	3
Above 960	-	500	54	3

Table 2. General Field Strength Limits for Licence-Exempt Transmitters

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

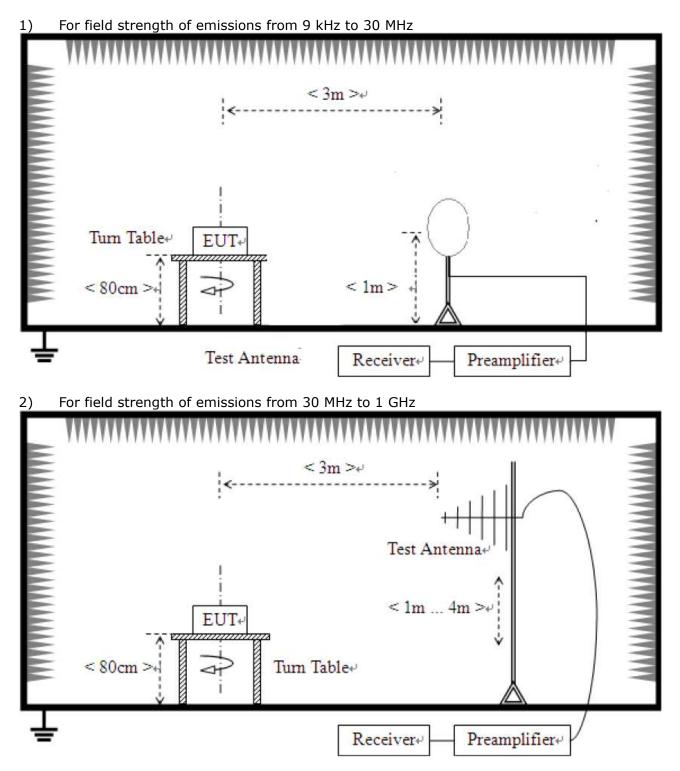
Note :

- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)
- 3) For measurement above 1GHz, the resolution bandwidth is set to 1 MHz and video bandwidth is set to 3 MHz and detector is peak for peak measurement and detector RMS and Trace Averaging type for average measurement.



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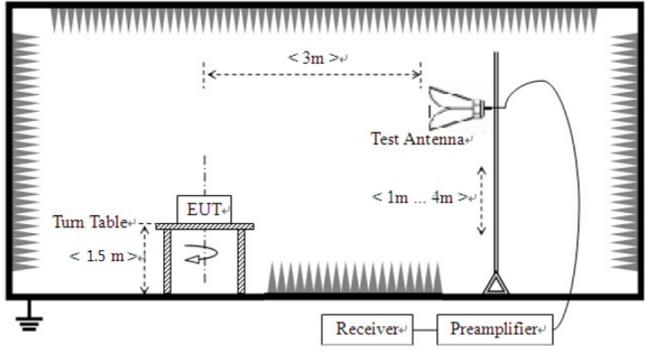
Test Setup:





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3) For field strength of emissions above 1 GHz



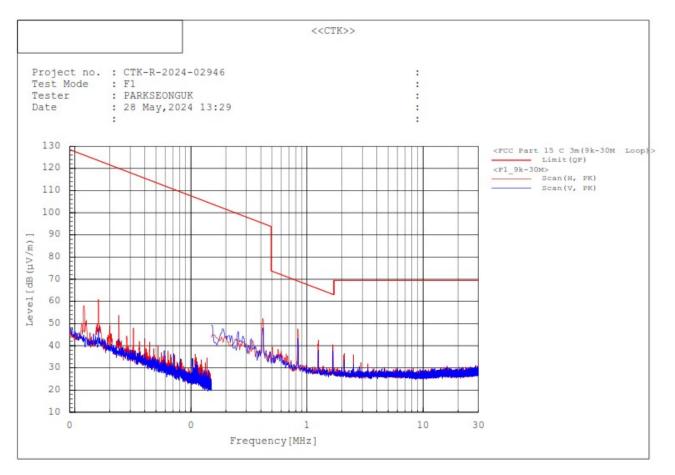


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Test results

1. 9 kHz to 30 MHz

The requirements are: \square Complies



Test mode : Transmit, Low Channel(Worst case)

Note :

- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
- 2. Result = Reading + c.f(correction factor)
- 3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
- 4. The emissions were 20 dB lower than the limit.



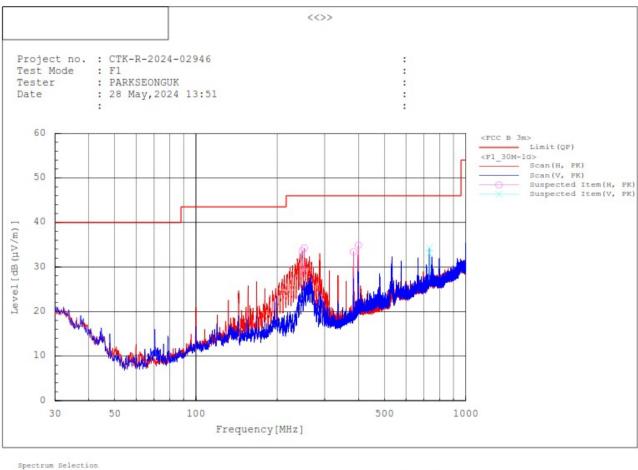
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2. 30 MHz to 1 GHz

The requirements are: \square Complies

Test mode : Transmit, Low Channel(Worst case)

Test Data



No.	Frequency	Pol	Reading PK	c.f	Result PK	Limit QP	Margin QP-PK	Height	Angle	Remark
	[MHz]		[dB(µV)]	[dB(1/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB]	[cm] [c	deg]	
1	247.668	H	45.0	-11.4	33.6	46.0	12.4	100.0	129.5	
2	251.936	н	44.9	-10.7	34.2	46.0	11.8	100.0	132.4	
3	383.565	H	41.4	-8.0	33.4	46.0	12.6	100.0	123.0	
4	399.764	H	42.1	-7.2	34.9	46.0	11.1	100.0	132.4	
5	731.504	V	32.5	0.6	33.1	46.0	12.9	200.0	359.3	
6	732.959	V	33.6	0.7	34.3	46.0	11.7	200.0	209.8	

Remark :

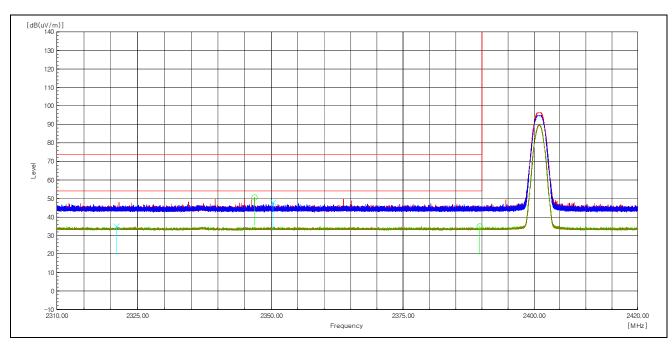
- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
- 2. Result = Reading + c.f(Correction factor)
- 3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator Amp Gain
- * Reading data is the peak value.



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3. 2 310 MHz to 2 390 MHz

The requirements are: \square Complies



Test mode : Transmit, Low Channel(Worst case)

Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Note
2321.1	v	40.7	-5.9		34.8		54.0		19.2	Average
2346.9	н	56.4	-5.8	50.6		74.0		23.4		Peak
2350.3	v	53.5	-5.8	47.7		74.0		26.3		Peak
2389.6	Н	40.6	-5.8		34.8		54.0		19.2	Average

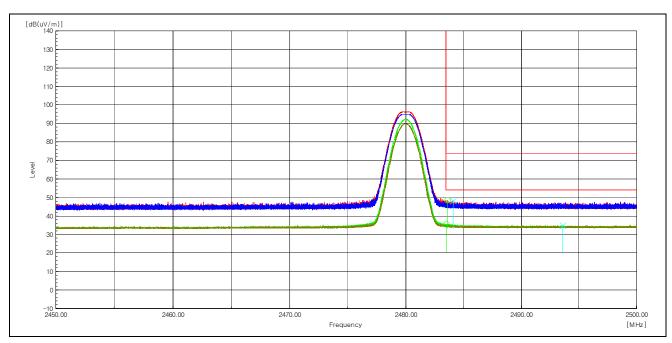
- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
- 2. Result = Reading + c.f(correction factor)
- 3. Correction factor = Antenna factor + Cable loss Amp Gain
- 4. Radiated Emission measured at 100 % duty cycle.



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4. 2 483.5 MHz - 2 500 MHz

The requirements are: \square Complies



Test mode : Transmit, High Channel(Worst case)

Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Note
2483.5	н	40.8	-5.3		35.5		54.0		18.5	Average
2483.6	н	53.8	-5.3	48.5		74.0		25.5		Peak
2484.1	V	53.4	-5.3	48.1		74.0		25.9		Peak
2493.6	V	40.1	-5.2		34.9		54.0		19.1	Average

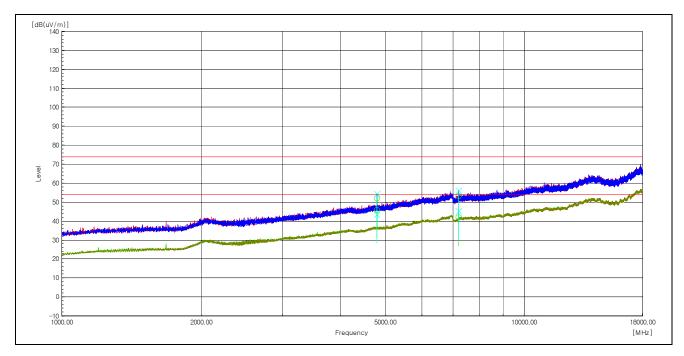
- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
- 2. Result = Reading + c.f(correction factor)
- 3. Correction factor = Antenna factor + Cable loss Amp Gain
- 4. Radiated Emission measured at 100 % duty cycle.



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5. 1 GHz to 18 GHz

The requirements are: \square Complies



Test mode : Transmit, Low Channel(Worst case)

Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Note
4801.4	v	52.1	2.2	54.3		74.0		19.7		Peak
4802.0	Н	43.8	2.2		46.0		54.0		8.0	Average
4802.0	V	41.3	2.2		43.5		54.0		10.5	Average
4802.7	н	49.7	2.2	51.9		74.0		22.1		Peak
7202.5	V	49.1	7.1	56.2		74.0		17.8		Peak
7202.5	н	35.0	7.1		42.1		54.0		11.9	Average
7203.2	V	38.1	7.1		45.2		54.0		8.8	
7203.2	Н	46.1	7.1	53.2		74.0		20.8		Peak

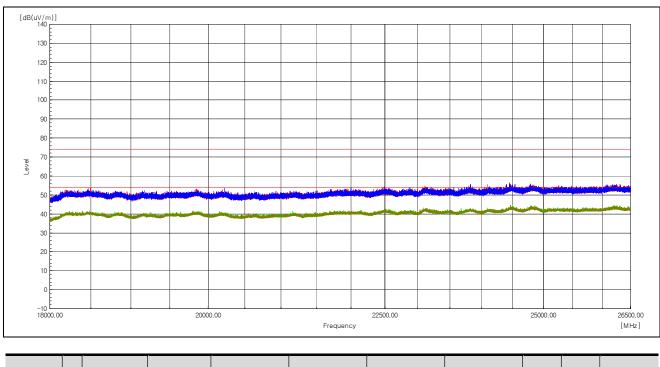
- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
- 2. Result = Reading + c.f(correction factor)
- 3. Correction factor = Antenna factor + Cable loss Amp Gain
- 4. The 18 GHz end had no signal detected. As can be seen from the conducted spurious emission test, no signal was detected in the section.
- 5. Radiated Emission measured at 100 % duty cycle.



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6. 18.0 GHz to 25.0 GHz

The requirements are: \square Complies



Test mode : Transmit, Low Channel(Worst case)

Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Note
No Peak Data										

- 1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
- 2. Result = Reading + c.f(correction factor)
- 3. Correction factor = Antenna factor + Cable loss Amp Gain
- 4. Radiated Emission measured at 100 % duty cycle.



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APPENDIX A – Test Equipment Used For Tests

No.	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY50200512	2023-04-06	2024-04-06
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2023-03-22	2024-03-22
3	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2023-05-03	2024-05-03
4	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2022-04-15	2024-04-15
5	Bilog Antenna	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
6	AMPLIFIER	SONOMA INSTRUMENT	310N	411011	2023-08-04	2024-08-04
7	ATTENUATOR	PASTERNACK	PE7AP006-06	L2021050400002 3	2023-08-04	2024-08-04
8	ATTENUATOR	NONE	6dB	190557	2023-09-25	2024-09-25
9	Preamplifier	Agilent	8449B	3008A00620	2023-04-21	2024-04-21
10	Double Ridged Guide Antenna	ETS-Lindgren	3115	00078895	2023-04-13	2024-04-13
11	Horn Antenna	SCHWARZBECK	BBHA9170	01153	2023-10-19	2024-10-19
12	Low Noise Amplifier	TESTEK	TK-PA1840H	210124-L	2023-10-23	2024-10-23
13	Band Reject Filter	Micro Tronics	BRM50702	G233	2023-12-04	2024-12-04
14	Spectrum Analyzer	Rohde & Schwarz	FSV40	101574	2024-01-15	2025-01-15
15	DC Power Supply	Agilent	E3642A	KR93300203	2023-12-01	2024-12-01

No.	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable(conducted)	Junkosha Inc.	MWX221	20085240	2024-05-27
2	RF Cable (9kHz-1GHz Radiated)	Canare Corporation	L-5D2W	N/A	2024-03-05
3	RF Cable (9kHz-1GHz Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2024-03-05
4	RF Cable (1GHz-18GHz Radiated)	Junkosha Inc.	MWX221	2008S246	2023-06-28
5	RF Cable (1GHz-18GHz Radiated)	Rosenberger	NONE	1520.9927.00	2023-06-28
6	RF Cable (1GHz-18GHz Radiated)	Sensorview Co., LTD	9S18	TPC2204060007	2023-06-28
7	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY2372/2	2023-06-28
8	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY073/2	2023-06-28
9	RF Cable (18GHz-26.5GHz Radiated)	Sensorview Co., LTD	9S40	TP210713-001	2023-06-28

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