

# 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

Report No.:  
CTK-2023-02384  
Page (1) / (31) Pages

## 1. Applicant

- Name : SOLUM CO.,LTD.
- Address : 4,5,6th F, 357 Guseong-ro,Giheung-gu,Yongin-si,Gyeonggi-do,  
Republic of Korea(Zip 16914)
- Date of Receipt : 2023-08-29

## 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 #1 : SOLUM VINA CO., LTD
- Address #1 : Plot B3, Ba Thien 2 Industrial park, Thien Ke Ward, Binh Xuyen District,  
Vinh Phuc Province, 281200., People's Republic of Vietnam
- Name #2 : DONGGUAN SOLUM ELECTRONICS CO., LTD.
- Address #2 : Building 2/4/6, No.35, Tongzhen Road, Tongsha, Dongcheng District,  
Dongguan City, Guangdong Province, 523127 People's Republic of China

**4. Use of Report** : For FCC Certification & Canadian Certification

**5. Test Sample / Model** : LCD Stripe / WA23FO012W0/IT

**6. Date of Test** : 2023-09-26 to 2023-10-12

**7. Test Standard(method) used** : FCC 47 CFR part 15 subpart C 15.247,  
ANSI C63.10-2013, RSS-Gen, RSS-247

**8. Testing Environment** : Temp.: (23 ± 3) °C, Humidity: (48 ± 5) % R.H.

**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.

Approval	Tested by	Technical Manager
	Bong-seok Kim: (Signature)	Young-taek Lee: (Signature)

Remark. This report is not related to KOLAS accreditation and relevant regulation.

2023-10-31

**CTK Co., Ltd.**



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Page (2) / (31)Pages

## REPORT REVISION HISTORY

Date	Revision	Page No
2023-10-31	Issued (CTK-2023-02384)	All

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Report No. :  
CTK-2023-02384  
Page (3) / (31)Pages

## **CONTENTS**

1. General Product Description .....	4
1.1 Applicant Information .....	4
1.2 Product Information.....	4
1.3 Peripheral Devices .....	4
2. Accreditations .....	5
2.1 Laboratory Accreditations and Listings.....	5
2.2 Calibration Details of Equipment Used for Measurement.....	5
3. Test Specifications .....	6
3.1 Standards .....	6
3.2 Mode of operation during the test .....	7
3.3 Maximum Measurement Uncertainty .....	7
3.4 Test Software .....	7
4. Technical Characteristic Test.....	8
4.1 Radiated Emissions.....	8
APPENDIX A – Test Equipment Used For Tests .....	29
APPENDIX B – EUT Photographs .....	30



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CTK-2023-02384  
Page (4) / (31)Pages

## 1. General Product Description

### 1.1 Applicant Information

<b>Company</b>	SOLUM CO., LTD.
<b>Contact Point</b>	4,5,6th F, 357 Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
<b>Contact Person</b>	Name : Ki Dong Lee E-mail : kdlee007@solu-m.com Tel : +82-31-8006-7677

### 1.2 Product Information

<b>FCC ID</b>	2AFWN-WA23FO012W0
<b>ISED certification number</b>	22800-WA23FO012W0
<b>Product Description</b>	LCD Stripe
<b>Model name</b>	WA23FO012W0/IT
<b>Variant Model name</b>	WA23FO012U0/IT (Variant models have no technical differences with each model except for the model name and color for marketing purposes.)
<b>Operating Frequency</b>	2 412 MHz - 2 462 MHz (Bandwidth 20 MHz) 2 422 MHz - 2 452 MHz (Bandwidth 40 MHz)
<b>RF Output Power</b>	802.11b : 17.08 dBm (51.050 mW) 802.11g : 16.66 dBm (46.345 mW) 802.11n-HT20 : 16.57 dBm (45.394 mW) 802.11n-HT40 : 14.63 dBm (29.040 mW)
<b>Antenna Specification</b>	Antenna type : FPCB Antenna Peak Gain : 2.5 dBi
<b>Number of channels</b>	Bandwidth 20 MHz (11), Bandwidth 40 MHz (9)
<b>Type of Modulation</b>	802.11b : DSSS 802.11g/n : OFDM
<b>Power Source</b>	DC 12 V
<b>Data Rate</b>	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n: MCS0-7, up to 72.2 Mbps
<b>Firmware Version Id Number(FVIN)</b>	V1.0
<b>RF Power setting in Test SW</b>	Initial value

### 1.3 Peripheral Devices

-For Conducted Measurement and Radiated Measurement

Device	Manufacturer	Model No.	Serial No.
Notebook	HP Inc.	HP Probook 455 G7	5CD0234DWW
AC Adapter	HP Inc.	TPN-LA16	PA-1650-20HL

## 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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Report No.:  
 CTK-2023-02384  
 Page (6) / (31)Pages

### 3. Test Specifications

#### 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	NT(Note 5)	Conducted
15.247(e)	RSS-247 5.2(b)	Transmitter power spectral density	NT(Note 5)	
15.247(b)	RSS-247 5.4(d)	Maximum peak conducted output power	NT(Note 5)	
15.247(d)	RSS-Gen 6.13	Unwanted emission	NT(Note 5)	
-	RSS-Gen 6.7	99 % Bandwidth	NT(Note 5)	
15.209	RSS-Gen 5, RSS-Gen 6.13	Transmitter emission	C	Radiated
15.207(a)	RSS-Gen 8.8	AC Conducted Emission	NT(Note 5)	Line Conducted
<i>Note 1:</i> C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				
<i>Note 2:</i> The data in this test report are traceable to the national or international standards.				
<i>Note 3:</i> The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013, RSS-Gen Issue 5, RSS-247 Issue 2				
<i>Note 4:</i> The tests were performed according to the method of measurements prescribed in KDB No.558074.				
<i>Note 5:</i> The test was performed according to the class II permissive change. This change is not related to the conducted-measurement item.				



### 3.2 Mode of operation during the test

The UUT 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. The results are only attached worst cases.

#### Test mode & Worst case

Mode	Worst case(Data rate)
802.11b	11 Mbps
802.11g	48 Mbps
802.11n-HT20	MCS 0
802.11n-HT40	MCS 0

#### Test Frequency & Bandwidth

Bandwidth	Lowest channel	Middle channel	Highest channel
20 MHz	2 412 MHz	2 437 MHz	2 462 MHz
40 MHz	2 422 MHz	2 437 MHz	2 452 MHz

#### Duty cycle

Mode	Duty cycle (%)
802.11b	99.3
802.11g	93.5
802.11n-HT20	94.3
802.11n-HT40	88.5

### 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	$\pm 1.5$ dB (C.L. : Approx. 95%, $k=2$ )
Power Spectral Density	$\pm 1.5$ dB (C.L. : Approx. 95%, $k=2$ )
Occupied Bandwidth	$\pm 0.1$ MHz (C.L. : Approx. 95%, $k=2$ )
Unwanted Emission(conducted)	$\pm 3.0$ dB (C.L. : Approx. 95%, $k=2$ )
Radiated Emissions ( $f \leq 1$ GHz)	$\pm 5.0$ dB (C.L. : Approx. 95%, $k=2$ )
Radiated Emissions ( $f > 1$ GHz)	$\pm 5.0$ dB (C.L. : Approx. 95%, $k=2$ )

### 3.4 Test Software

Radiated Test	EP5RE Ver. 6.0.10, ES10 Ver. 2022.04.000
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Report No. :  
CTK-2023-02384  
Page (8) / (31)Pages

## 4. Technical Characteristic Test

### 4.1 Radiated Emissions

#### Test Location

- 10 m SAC (test distance :  10 m,  3 m)  
 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 range 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 ~ 26.5 GHz (2.4 GHz 10<sup>th</sup> 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:

**Table 1. Restricted Frequency Bands\***

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
<sup>1</sup> 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	<sup>2</sup> Above 38.6
8.362-8.366	37.5-38.25	322-335.4	2483.5-2500	9300-9500	

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> 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 in 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.

\*Certain frequency bands listed in Table 6 and in band above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in the 200- and 300-series of RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.



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CTK-2023-02384  
Page (10) / (31)Pages

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 :

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

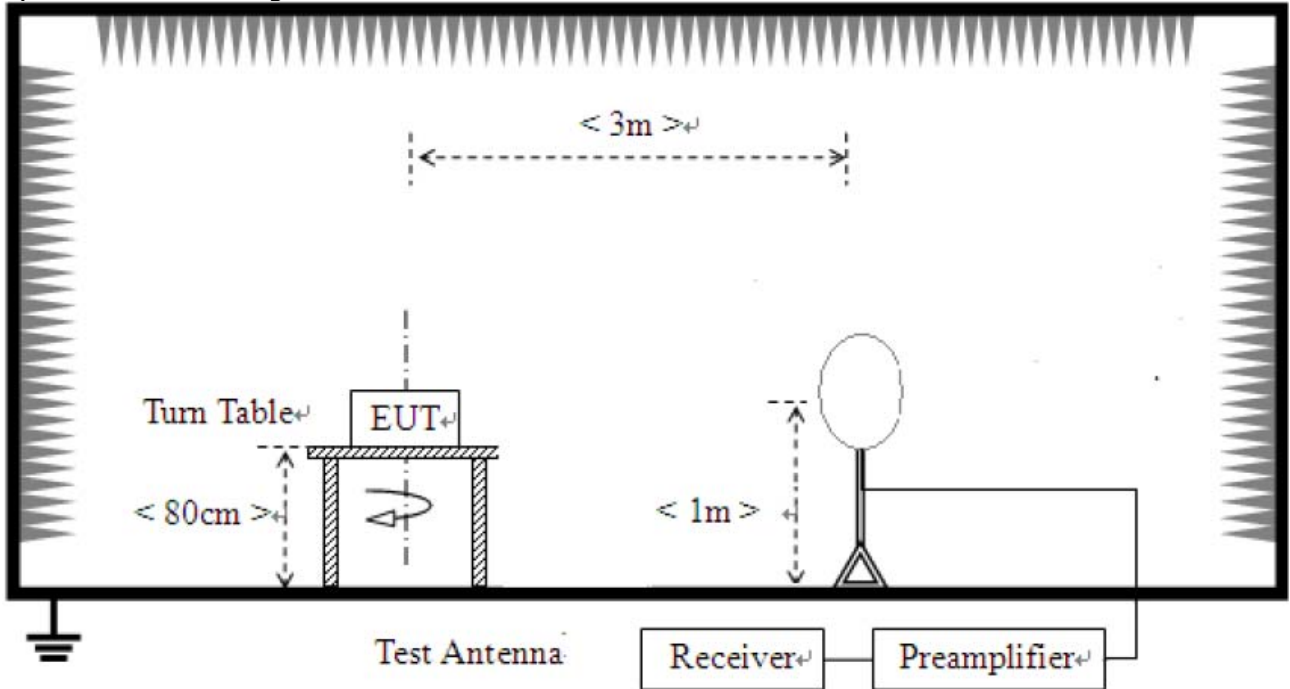
\*\* Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231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

Note :

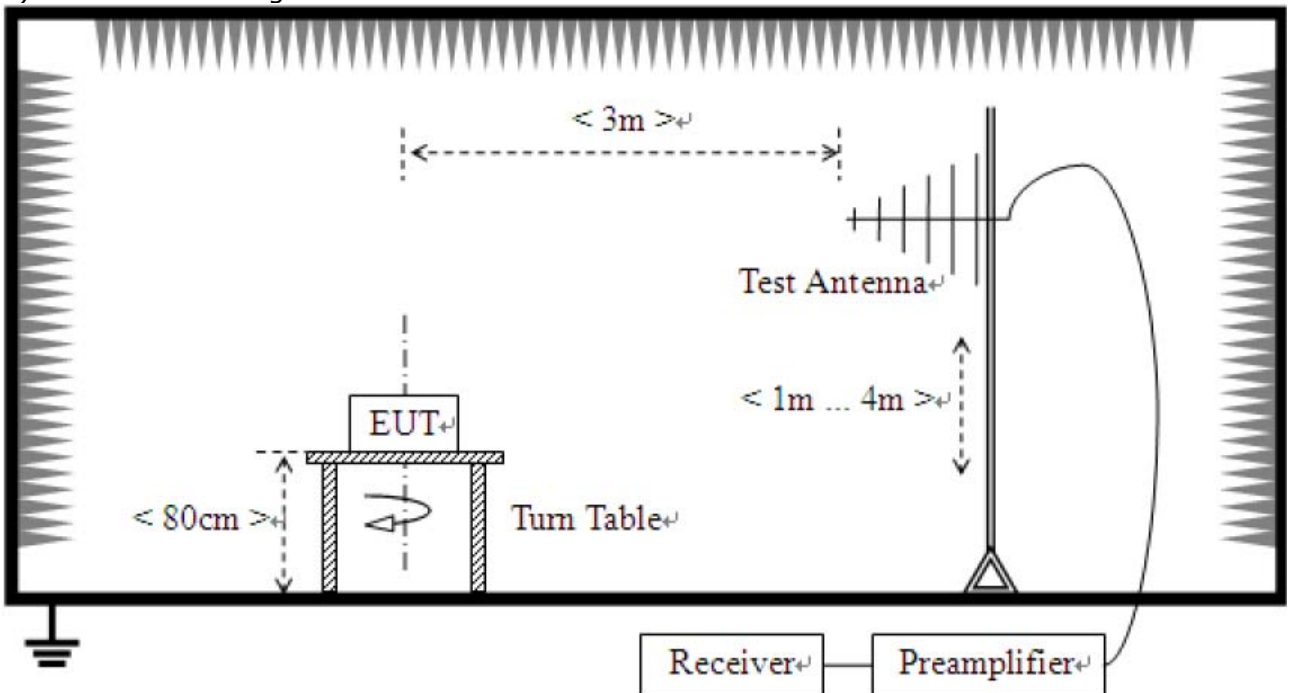
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength 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 for peak measurement.

**Test Setup:**

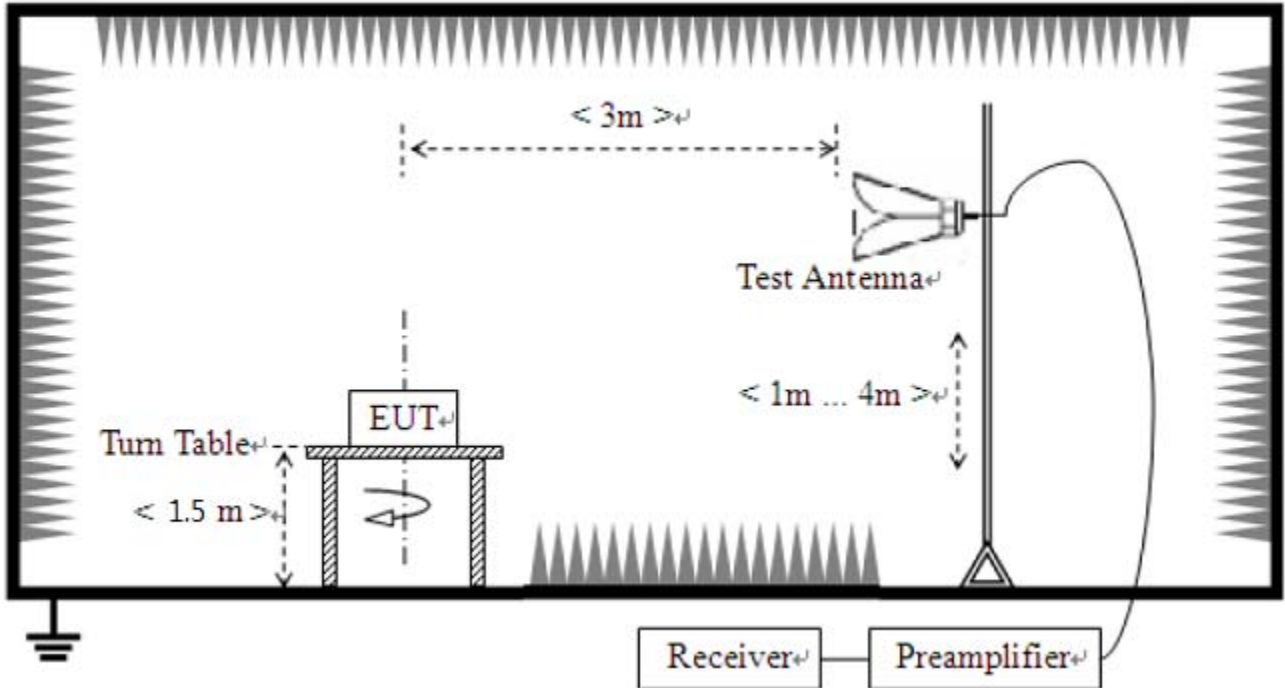
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



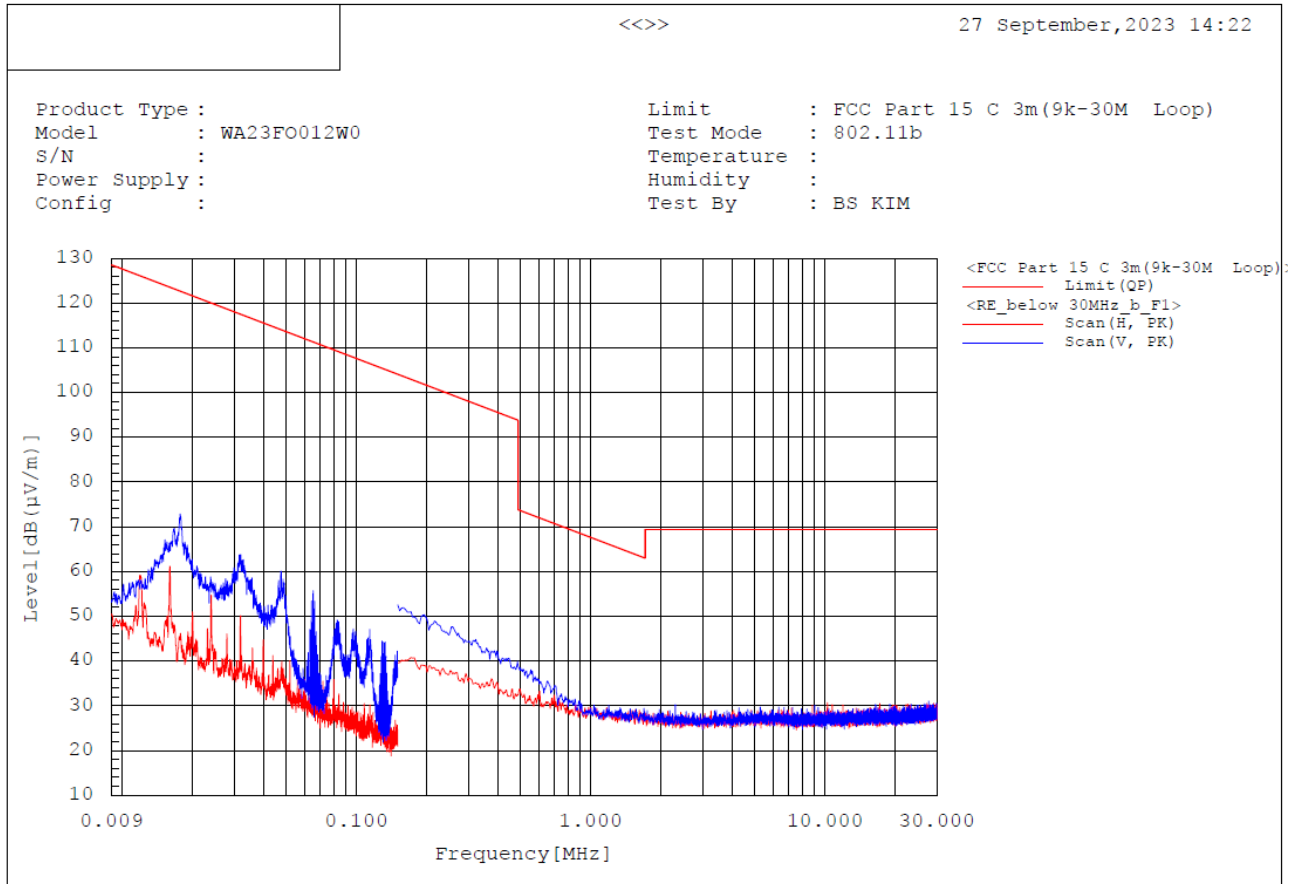
## Test results

### 1. 9 kHz to 30 MHz

Test mode : 802.11b, Low Channel(Worst case)

The requirements are:

Complies



#### Note :

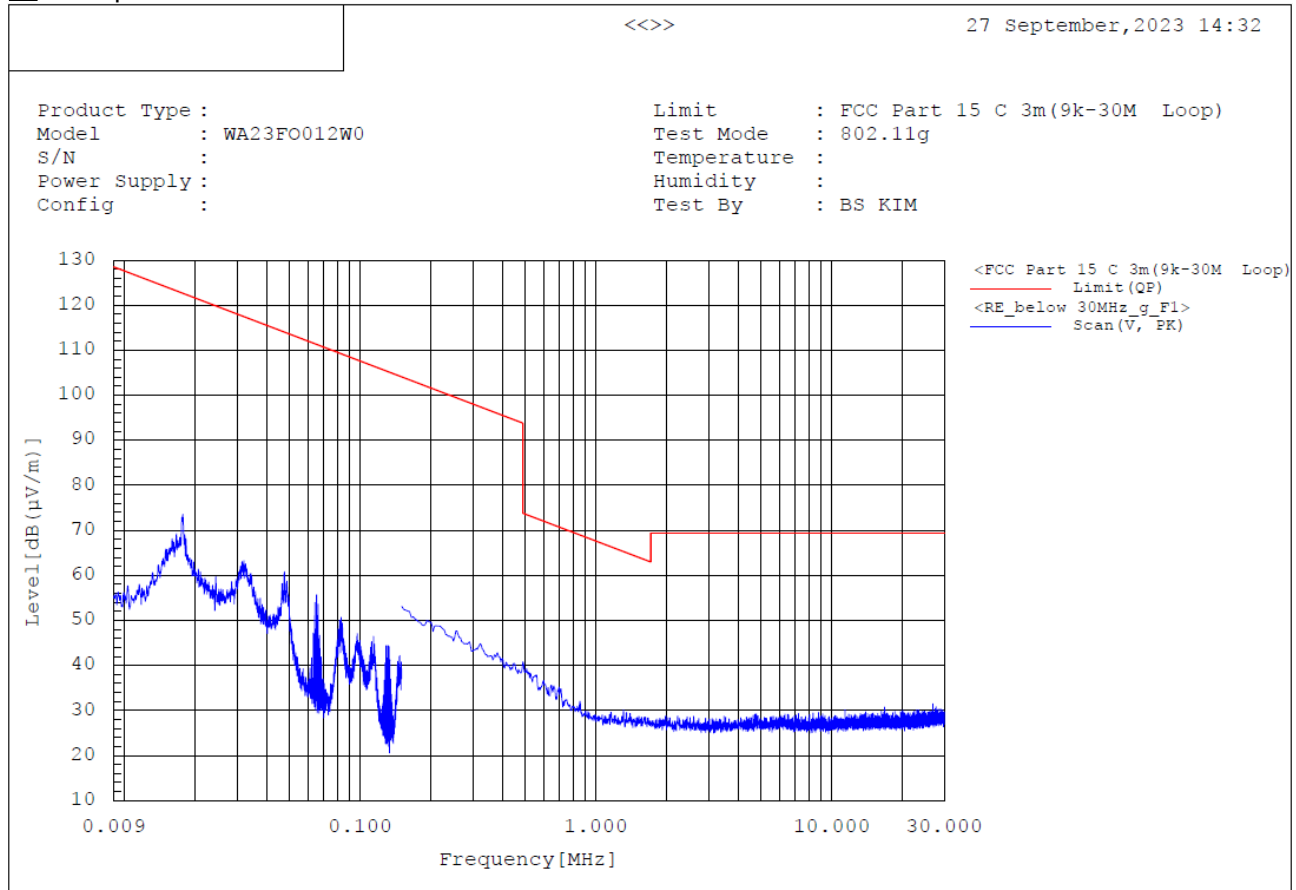
1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor +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

\* Reading data is the peak value.

**Test mode : 802.11g, Low Channel(Worst case)**

The requirements are:

Complies



**Note :**

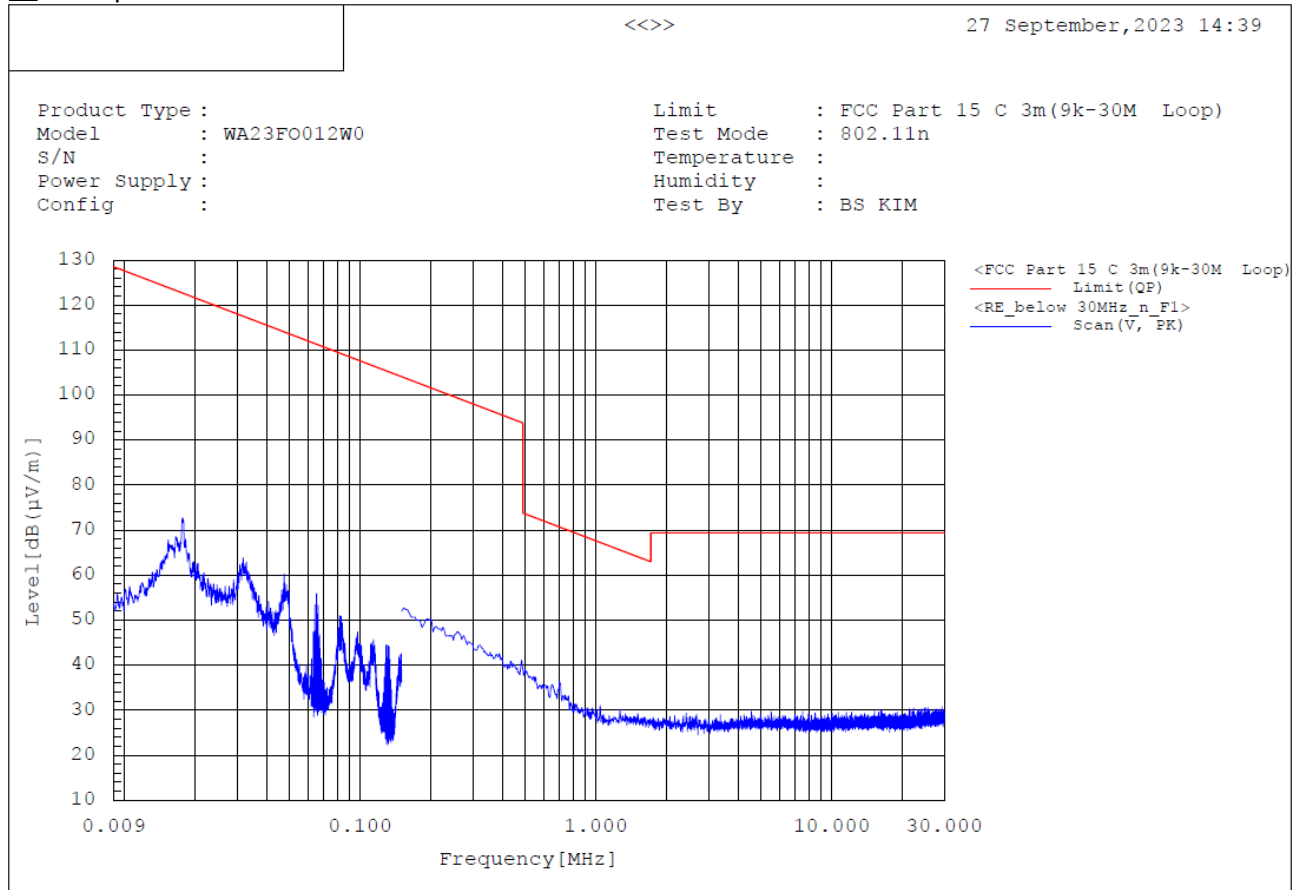
1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor +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

\* Reading data is the peak value.

**Test mode : 802.11n-HT20, Low Channel(Worst case)**

The requirements are:

Complies



**Note :**

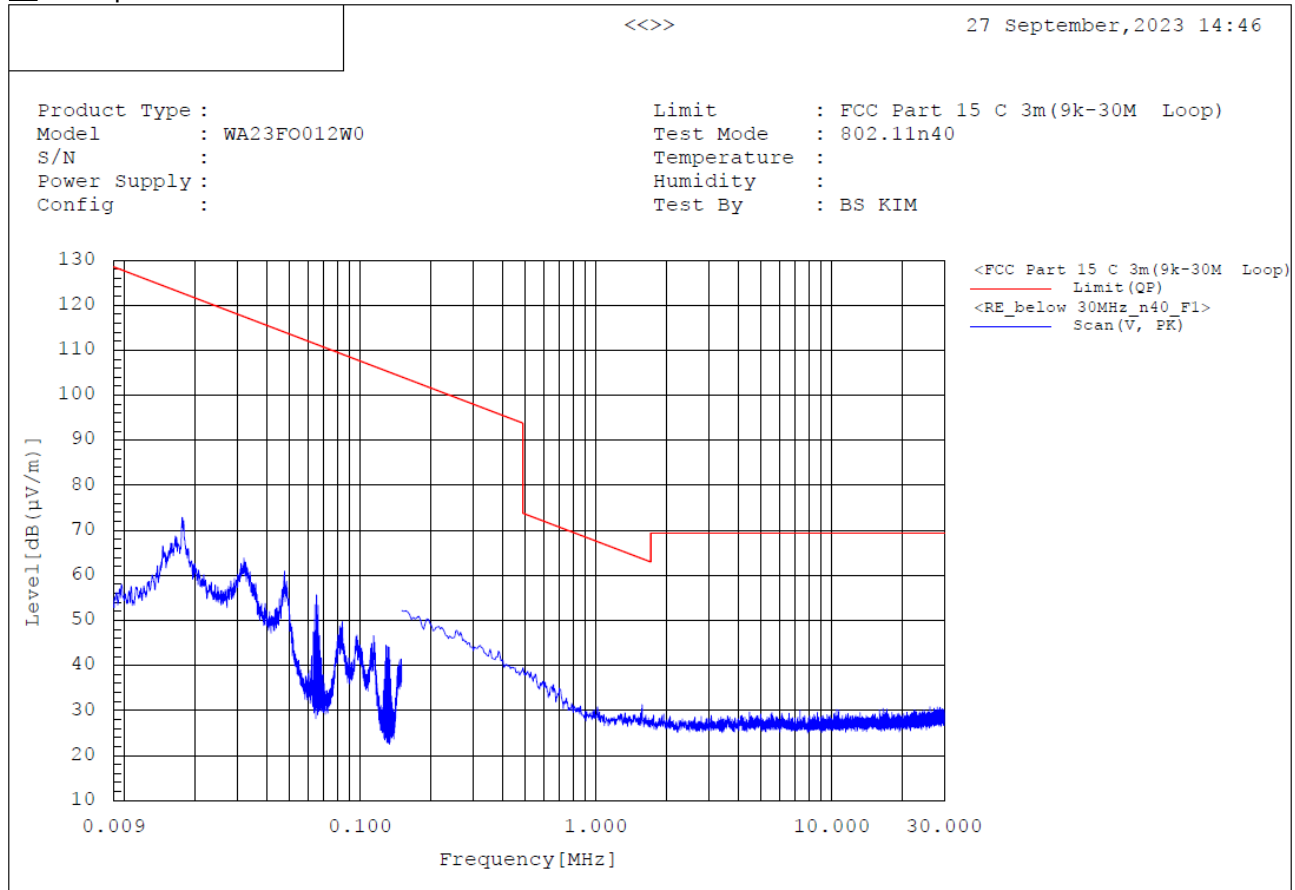
1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Z axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor +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

\* Reading data is the peak value.

**Test mode : 802.11n-HT40, Low Channel(Worst case)**

The requirements are:

Complies



**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.

\* Reading data is the peak value.



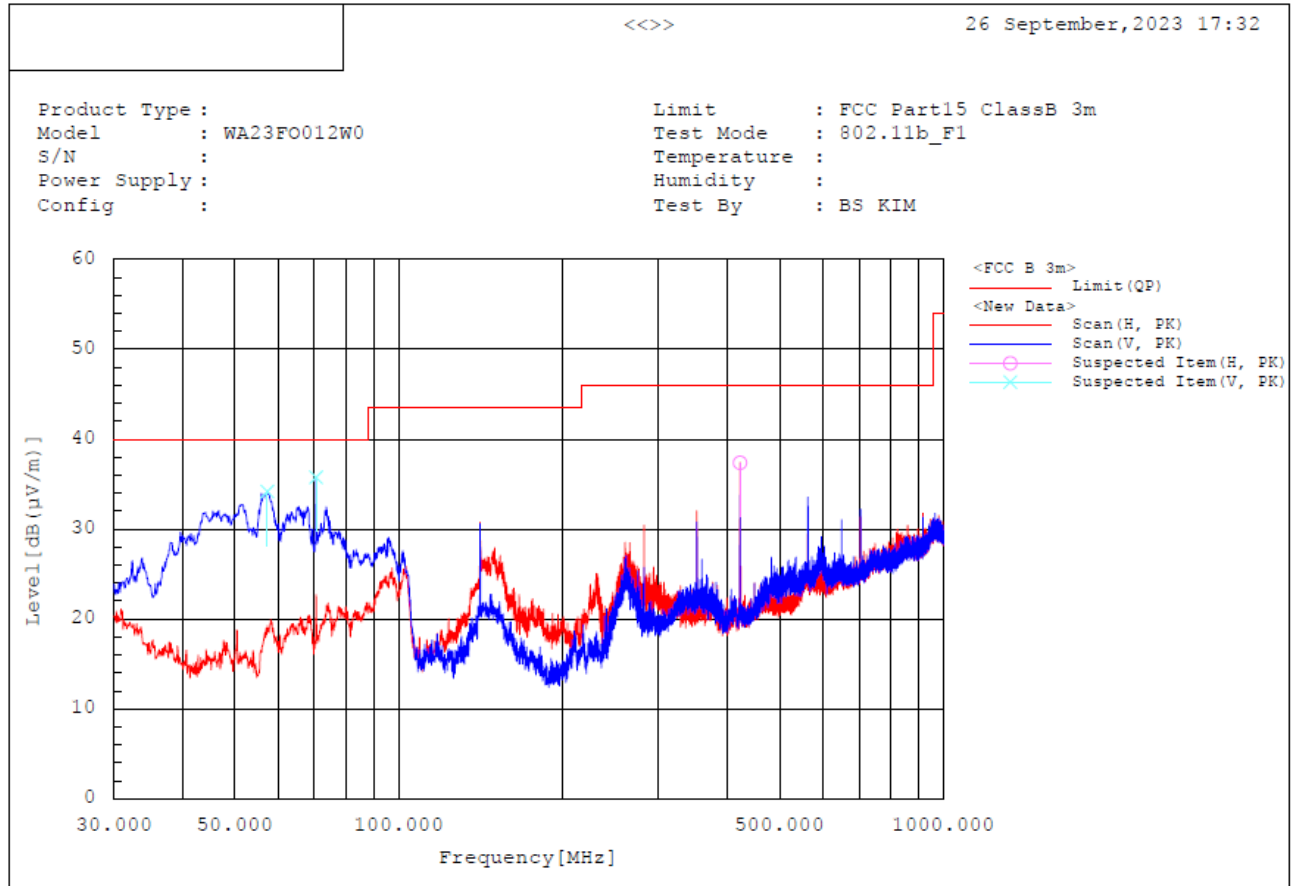
## 2. 30 MHz to 1 GHz

Test mode : 802.11b, Low Channel(Worst case)

The requirements are:

Complies

### Test Data



#### Spectrum Selection

No.	Frequency [MHz]	Pol	Reading PK [dB (µV)]	c.f [dB (1/m)]	Result PK [dB (µV/m)]	Limit QP [dB (µV/m)]	Margin QP-PK [dB]	Height [cm]	Angle [deg]	Remark
1	57.354	V	53.8	-19.6	34.2	40.0	5.8	99.9	81.2	
2	70.449	V	54.4	-18.6	35.8	40.0	4.2	199.9	196.8	
3	423.044	H	43.7	-6.3	37.4	46.0	8.6	99.9	233.9	

### Remark :

- 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.
- Result = Reading + c.f(Correction factor)
- Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

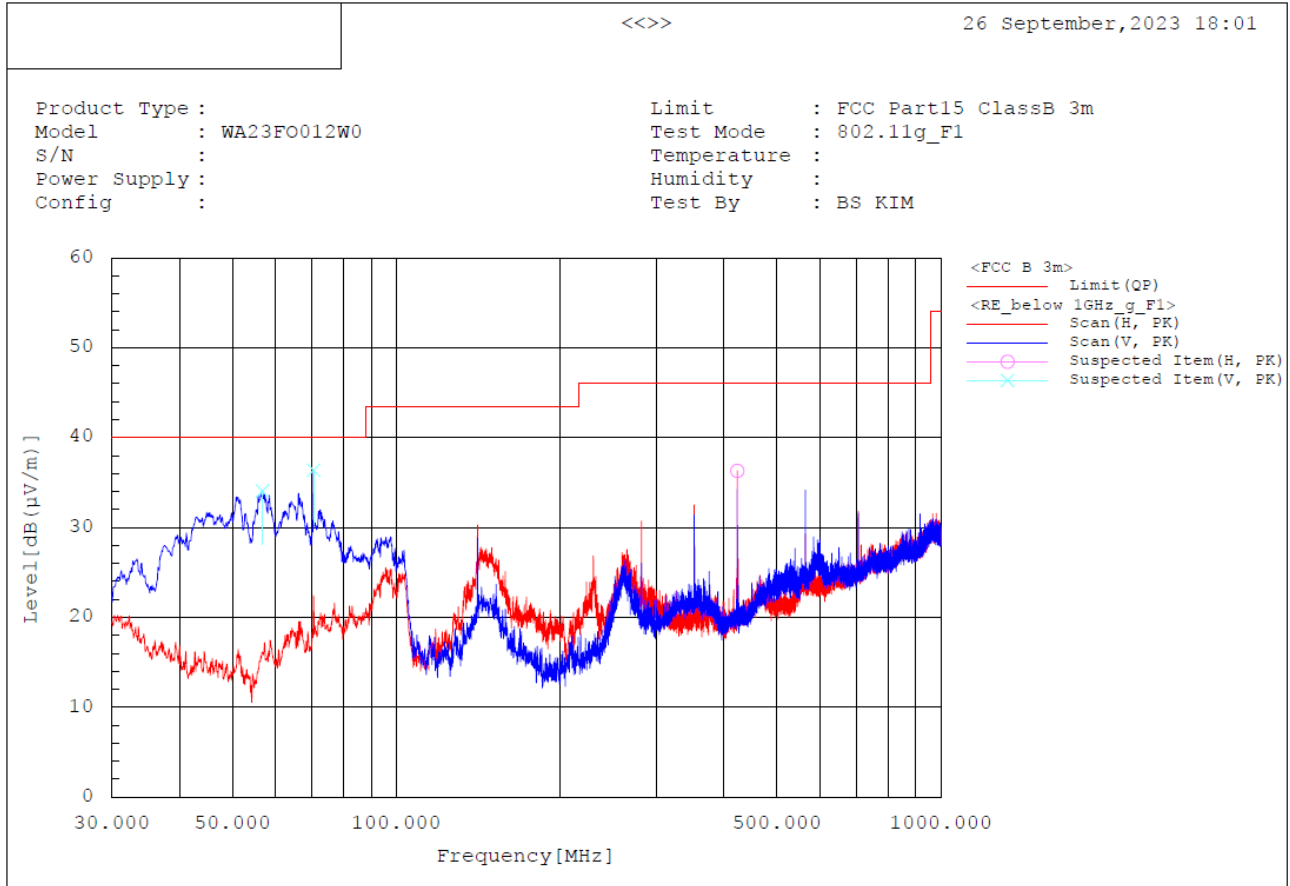
\* Reading data is the peak value.

**Test mode : 802.11g, Low Channel(Worst case)**

The requirements are:

Complies

**Test Data**



Spectrum Selection

No.	Frequency [MHz]	Pol	Reading [dB (µV/m)]	c.f [dB (1/m)]	Result [dB (µV/m)]	Limit [dB (µV/m)]	Margin [dB]	Height [cm]	Angle [deg]	Remark
1	56.772	V	53.6	-19.5	34.1	40.0	5.9	99.9	52.2	
2	70.449	V	55.0	-18.6	36.4	40.0	3.6	200.1	52.3	
3	423.044	H	42.6	-6.3	36.3	46.0	9.7	99.9	241.6	

**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

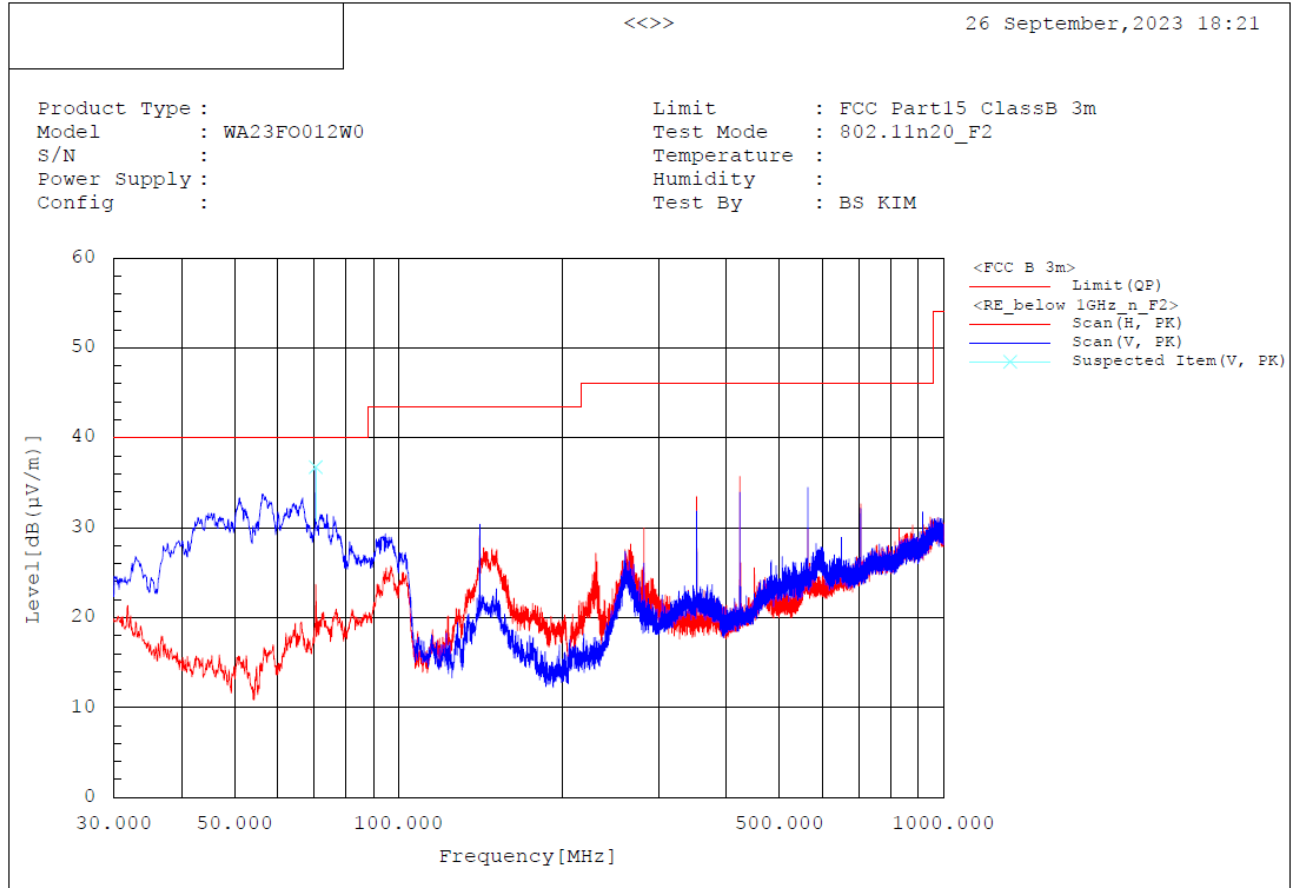
\* Reading data is the peak value.

**Test mode : 802.11n-HT20, Middle Channel(Worst case)**

The requirements are:

Complies

**Test Data**



Spectrum Selection

No.	Frequency [MHz]	Pol	Reading [dB(µV)] PK	c.f [dB(1/m)]	Result [dB(µV/m)] PK	Limit [dB(µV/m)] QP	Margin [dB] QP-PK	Height [cm]	Angle [deg]	Remark
1	70.449	V	55.3	-18.6	36.7	40.0	3.3	99.9	359.6	

**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

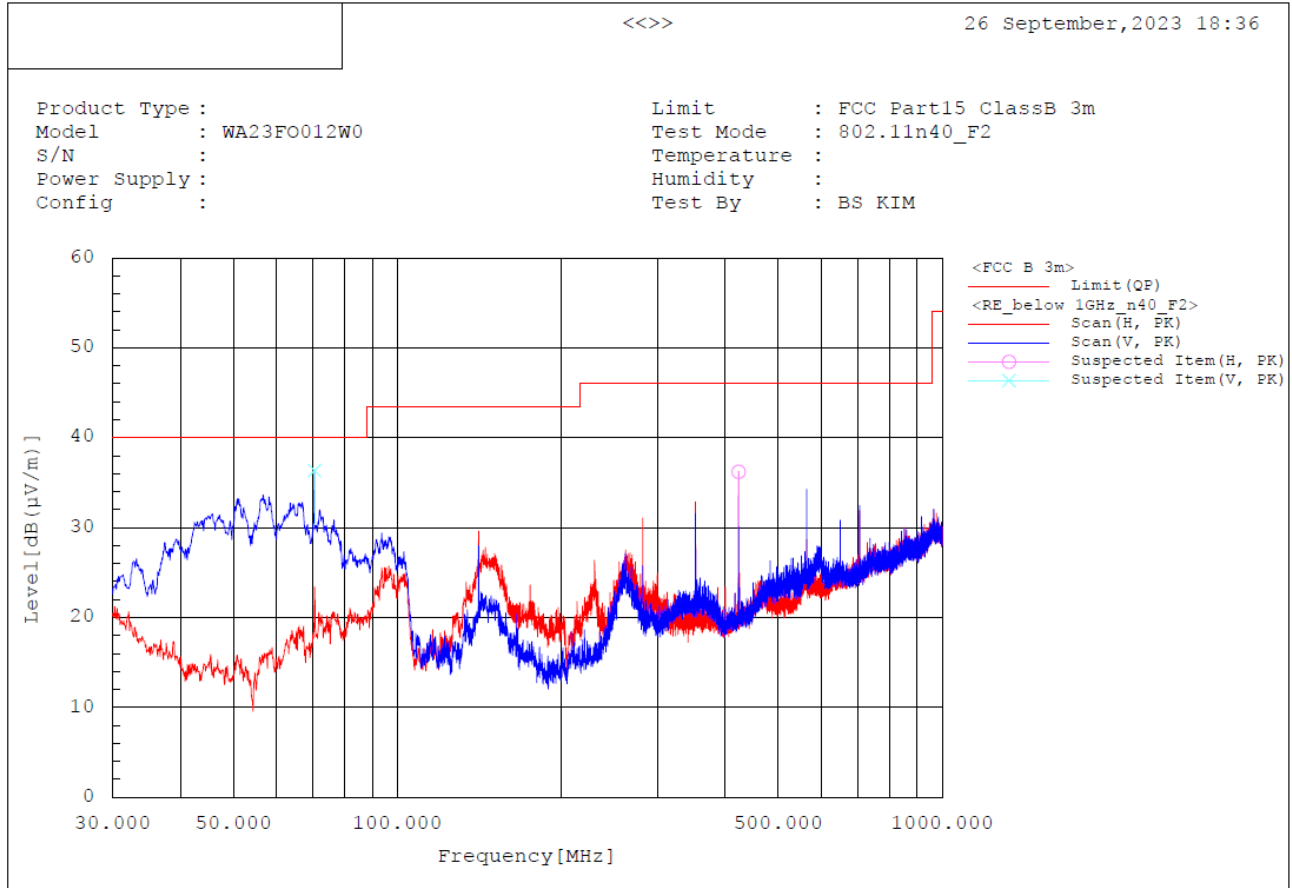
\* Reading data is the peak value.

**Test mode : 802.11n-HT40, Middle Channel(Worst case)**

The requirements are:

Complies

**Test Data**



Spectrum Selection

No.	Frequency [MHz]	Pol	Reading PK [dB(µV)]	c.f [dB(l/m)]	Result PK [dB(µV/m)]	Limit QP [dB(µV/m)]	Margin QP-PK [dB]	Height [cm]	Angle [deg]	Remark
1	70.449	V	54.9	-18.6	36.3	40.0	3.7	99.9	122.2	
2	423.044	H	42.5	-6.3	36.2	46.0	9.8	100.0	235.1	

**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

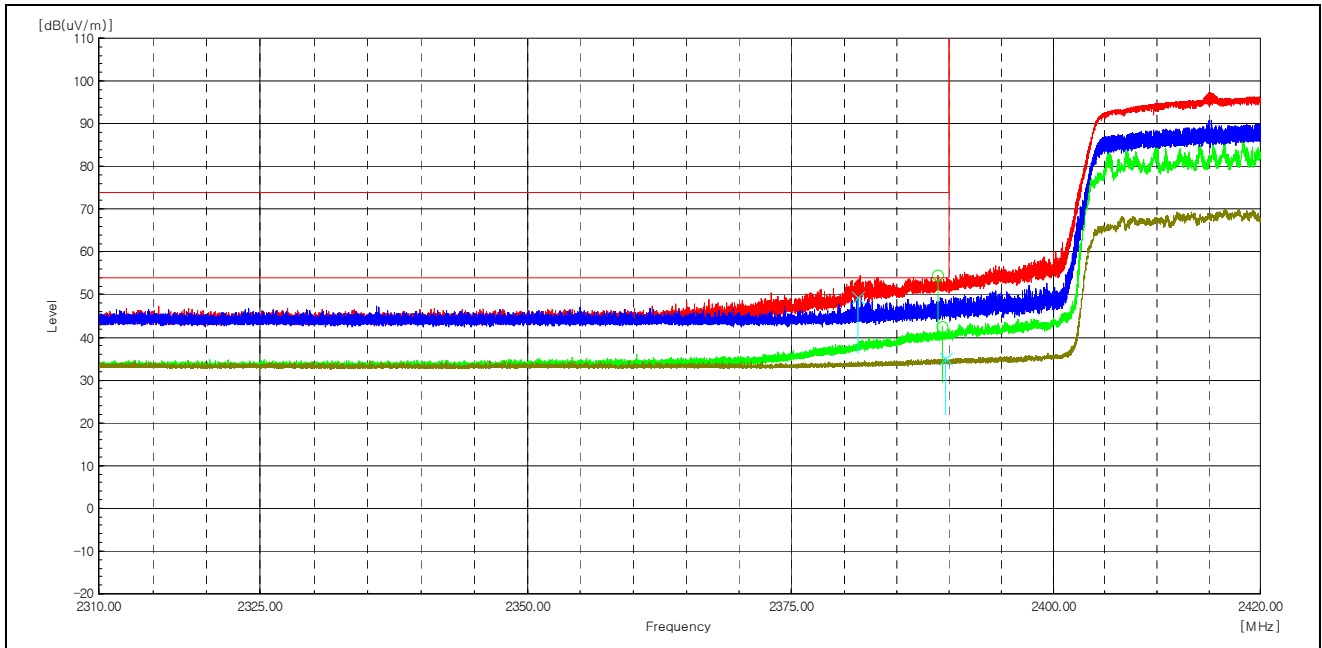
\* Reading data is the peak value.

### 3. 2 310 MHz to 2 390 MHz

The requirements are:

Complies

Test mode : 802.11n-HT40, Low Channel(Worst case)



Test mode : 802.11b, Low Channel

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
2 389.5	H	55.8	-5.8	50.0	-----	74.0	-----	24.0	-----	Peak
2 388.9	H	45.0	-5.8	-----	39.2	-----	54.0	-----	14.8	Average
2 344.6	V	53.7	-5.9	47.8	-----	74.0	-----	26.2	-----	Peak
2 323.2	V	40.9	-6.0	-----	34.9	-----	54.0	-----	19.1	Average

Test mode : 802.11g, Low Channel

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
2 389.9	H	60.1	-5.8	54.3	-----	74.0	-----	19.7	-----	Peak
2 389.9	H	43.2	-5.8	-----	37.4	-----	54.0	-----	16.6	Average
2 363.8	V	52.9	-5.9	47.0	-----	74.0	-----	27.0	-----	Peak
2 386.0	V	40.7	-5.8	-----	34.9	-----	54.0	-----	19.1	Average



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Report No. :  
 CTK-2023-02384  
 Page (22) / (31)Pages

**Test mode : 802.11n-HT20, Low Channel**

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
2 388.4	H	58.0	-5.8	52.2	-----	74.0	-----	21.8	-----	Peak
2 389.8	H	44.9	-5.8	-----	39.1	-----	54.0	-----	14.9	Average
2 326.5	V	53.2	-6.0	47.2	-----	74.0	-----	26.8	-----	Peak
2 319.9	V	40.7	-6.0	-----	34.7	-----	54.0	-----	19.3	Average

**Test mode : 802.11n-HT40, 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
2 389.0	H	60.4	-5.8	54.6	-----	74.0	-----	19.4	-----	Peak
2 389.4	H	48.3	-5.8	-----	42.5	-----	54.0	-----	11.5	Average
2 381.3	V	55.2	-5.8	49.4	-----	74.0	-----	24.6	-----	Peak
2 389.7	V	40.7	-5.8	-----	34.9	-----	54.0	-----	19.1	Average

**Remarks**

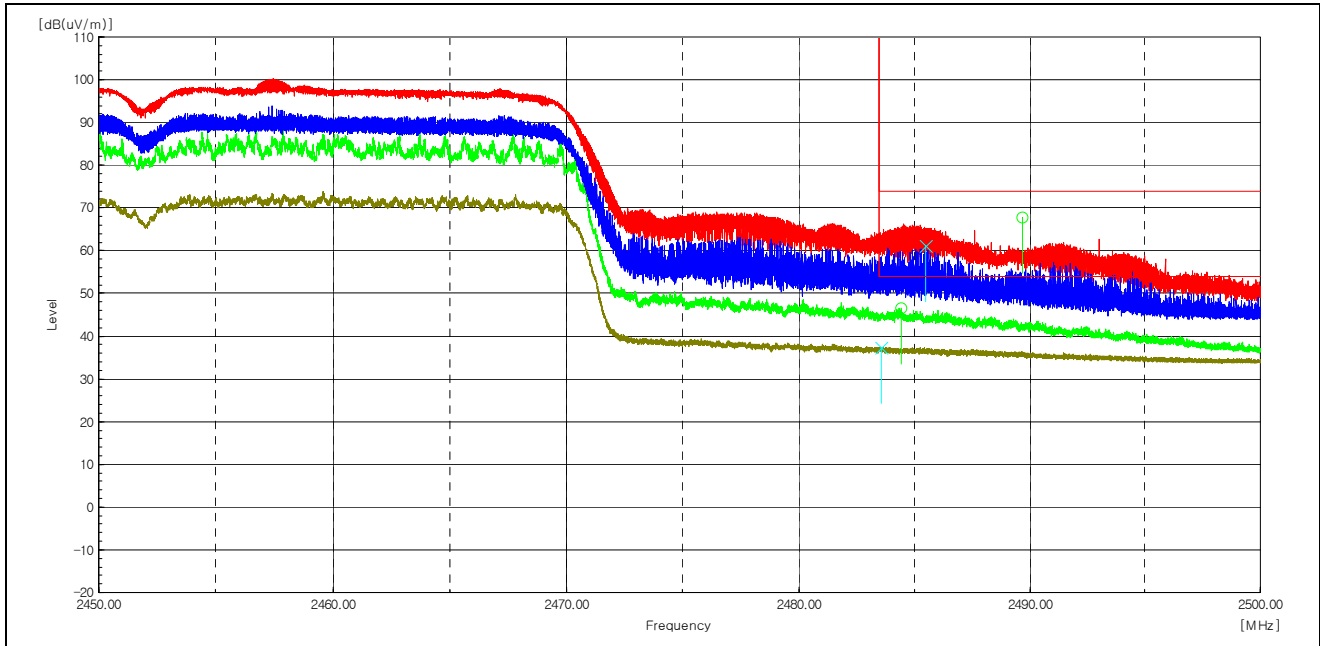
1. The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor +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

#### 4. 2 483.5 MHz – 2 500 MHz

The requirements are:

Complies

Test mode : 802.11n-HT40, High Channel(Worst case)



Test mode : 802.11b, High Channel

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
2 484.8	H	56.1	-5.3	50.8	-----	74.0	-----	23.2	-----	Peak
2 484.4	H	45.1	-5.3	-----	39.8	-----	54.0	-----	14.2	Average
2 485.3	V	53.8	-5.3	48.5	-----	74.0	-----	25.5	-----	Peak
2 493.6	V	40.2	-5.2	-----	35.0	-----	54.0	-----	19.0	Average

Test mode : 802.11g, High Channel

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
2 483.9	H	57.3	-5.3	52.0	-----	74.0	-----	22.0	-----	Peak
2 483.9	H	42.4	-5.3	-----	37.1	-----	54.0	-----	16.9	Average
2 499.2	V	52.7	-5.1	47.6	-----	74.0	-----	26.4	-----	Peak
2 493.7	V	40.0	-5.2	-----	34.8	-----	54.0	-----	19.2	Average



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Report No. :  
 CTK-2023-02384  
 Page (24) / (31)Pages

**Test mode : 802.11n-HT20, High Channel**

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
2 483.6	H	64.4	-5.3	59.1	-----	74.0	-----	14.9	-----	Peak
2 483.8	H	47.6	-5.3	-----	42.3	-----	54.0	-----	11.7	Average
2 483.8	V	58.5	-5.3	53.2	-----	74.0	-----	20.8	-----	Peak
2 483.8	V	40.8	-5.3	-----	35.5	-----	54.0	-----	18.5	Average

**Test mode : 802.11n-HT40, 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
2 489.7	H	73.1	-5.2	67.9	-----	74.0	-----	6.1	-----	Peak
2 484.4	H	51.8	-5.3	-----	46.5	-----	54.0	-----	7.5	Average
2 485.5	V	66.3	-5.3	61.0	-----	74.0	-----	13.0	-----	Peak
2 483.6	V	42.7	-5.3	-----	37.4	-----	54.0	-----	16.6	Average

**Remarks**

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



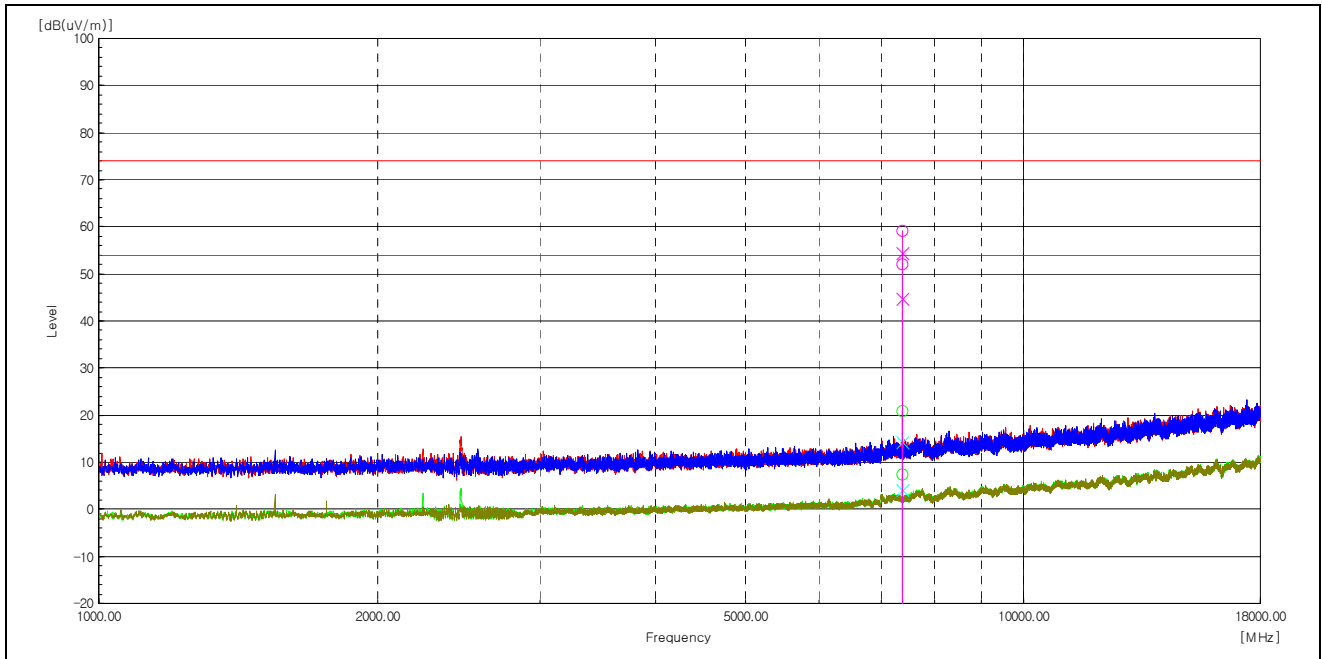


**5. 1 GHz to 18 GHz**

The requirements are:

Complies

**Test mode : 802.11 b, High Channel(Worst case)**



**Test mode : 802.11 b, 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
7 387.5	H	51.9	7.3	59.2	-----	74.0	-----	14.8	-----	Peak
7 386.8	H	44.7	7.3	-----	46.2	-----	54.0	-----	7.8	Average
7 383.4	V	47.1	7.2	54.3	-----	74.0	-----	19.7	-----	Peak
7 386.8	V	37.5	7.3	-----	44.8	-----	54.0	-----	9.2	Average

**Test mode : 802.11g, High Channel**

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
7 384.8	H	55.3	7.3	62.6	-----	74.0	-----	11.4	-----	Peak
7 389.5	H	37.9	7.3	-----	45.2	-----	54.0	-----	8.8	Average
7 392.9	V	48.4	7.3	55.7	-----	74.0	-----	18.3	-----	Peak
7 384.1	V	34.2	7.2	-----	41.4	-----	54.0	-----	12.6	Average



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Report No. :  
 CTK-2023-02384  
 Page (26) / (31)Pages

**Test mode : 802.11n-HT20, High Channel**

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
7 394.3	H	55.2	7.3	62.5	-----	74.0	-----	11.5	-----	Peak
7 390.9	H	38.6	7.3	-----	45.9	-----	54.0	-----	8.1	Average
7 380.0	V	48.9	7.2	56.1	-----	74.0	-----	17.9	-----	Peak
7 384.8	V	34.2	7.3	-----	41.5	-----	54.0	-----	12.5	Average

**Test mode : 802.11n-HT40, Low, Middle, High Channel**

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
The emissions were 20 dB lower than the limit.										

**Remarks**

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

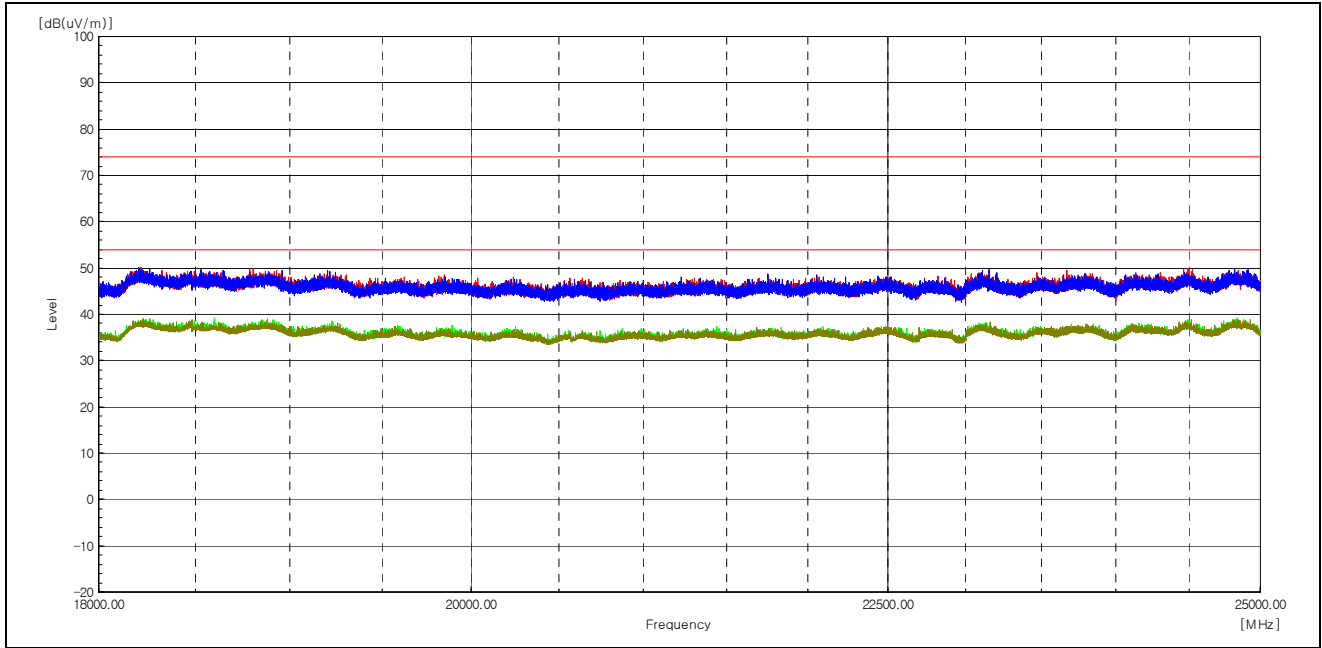


**6. 18.0 GHz to 25.0 GHz**

The requirements are:

Complies

**Test mode : 802.11 b, Low Channel(Worst case)**



**Test mode : 802.11 b, Low, Middle, High Channel**

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
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The emissions were 20 dB lower than the limit.

**Test mode : 802.11g, Low, Middle, High Channel**

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
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The emissions were 20 dB lower than the limit.



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Report No. :  
CTK-2023-02384  
Page (28) / (31)Pages

**Test mode : 802.11n-HT20, Low, Middle, High Channel**

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
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The emissions were 20 dB lower than the limit.

**Test mode : 802.11n-HT40, Low, Middle, High Channel**

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
-----------------	-----	----------------	---------------	---------------------	---------------------	---------------------	---------------------	----------------	----------------	------

The emissions were 20 dB lower than the limit.

**Remarks**

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



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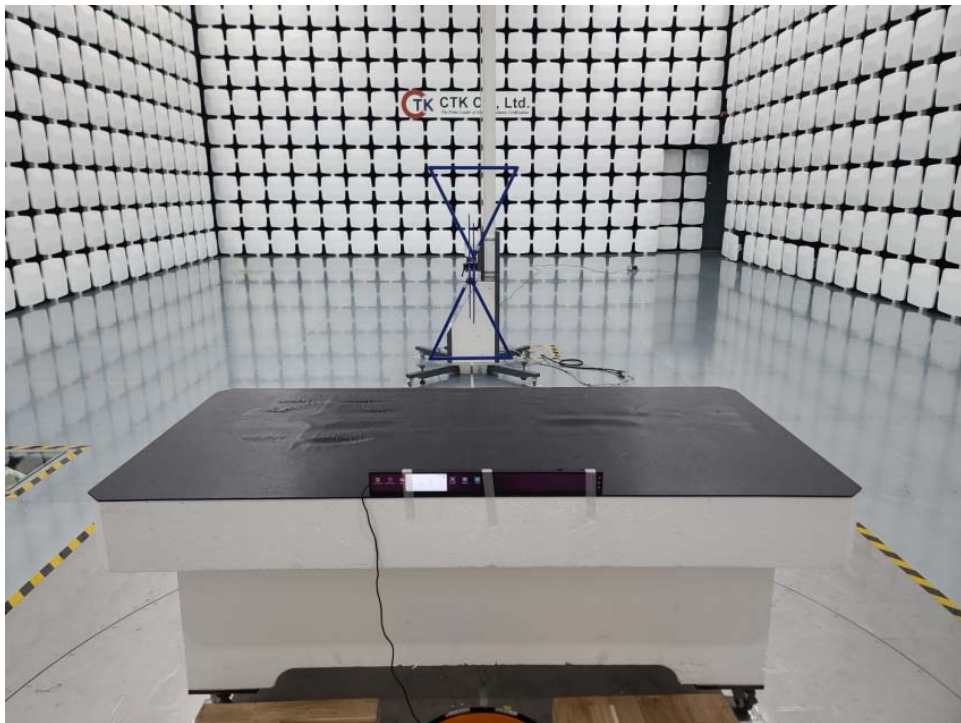
Report No. :  
 CTK-2023-02384  
 Page (29) / (31)Pages

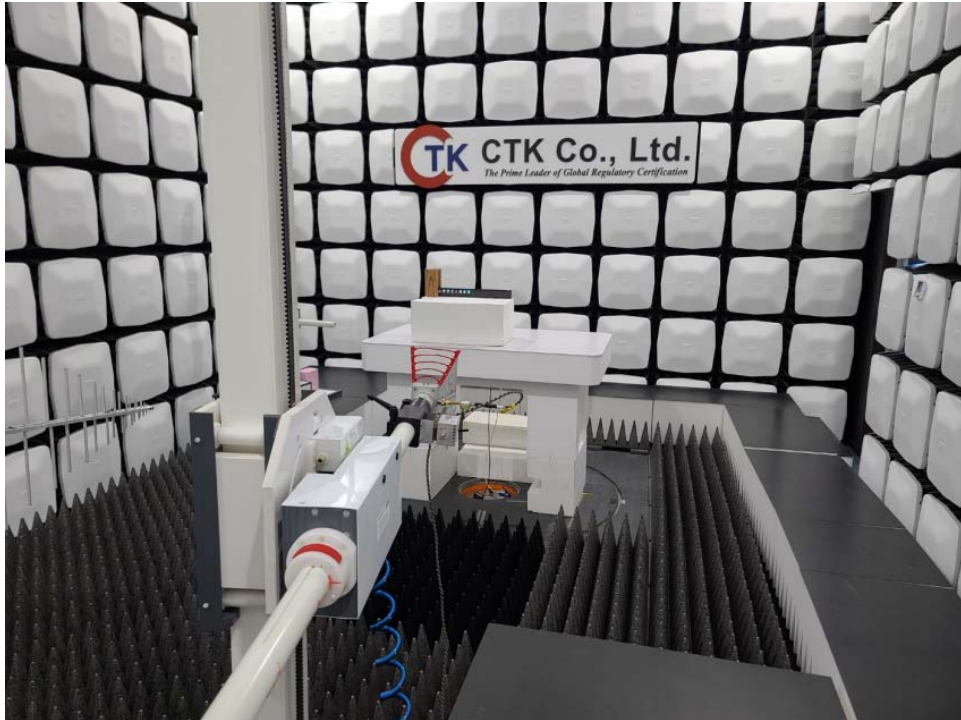
## APPENDIX A – Test Equipment Used For Tests

No.	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2023-05-03	2024-05-03
2	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2023-04-15	2024-04-15
3	Bilog Antenna	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
4	AMPLIFIER	SONOMA INSTRUMENT	310N	411011	2023-08-04	2024-08-04
5	ATTENUATOR	PASTERNAK	PE7AP006-06	L2021050400002 3	2023-08-04	2024-08-04
6	Preamplifier	Agilent	8449B	3008A00620	2023-04-21	2024-04-21
7	Double Ridged Guide Antenna	ETS-Lindgren	3115	00078895	2023-04-13	2024-04-13
8	Horn Antenna	SCHWARZBECK	BBHA9170	01153	2022-10-31	2023-10-31
9	Low Noise Amplifier	TESTEK	TK-PA1840H	210124-L	2022-11-09	2023-11-09
10	Band Reject Filter	Micro Tronics	BRM50702	G233	2023-01-03	2024-01-03
11	Spectrum Analyzer	Rohde & Schwarz	FSV40	101574	2023-01-11	2024-01-11

No.	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable (9kHz-1GHz Radiated)	Canare Corporation	L-5D2W	N/A	2023-09-15
2	RF Cable (9kHz-1GHz Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2023-09-15
3	RF Cable (1GHz-18GHz Radiated)	Junkosha Inc.	MWX221	2008S246	2023-04-14
4	RF Cable (1GHz-18GHz Radiated)	Rosenberger	NONE	1520.9927.00	2023-04-14
5	RF Cable (1GHz-18GHz Radiated)	Sensorview Co., LTD	9S18	TPC2204060007	2023-04-14
6	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY2372/2	2023-04-14
7	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY073/2	2023-04-14
8	RF Cable (18GHz-26.5GHz Radiated)	Sensorview Co., LTD	9S40	TP210713-001	2023-04-14

## APPENDIX B – Test setup photo





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