

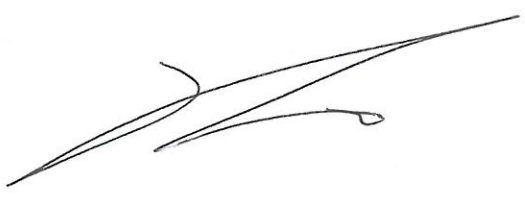

TEST REPORT

Part 15 Subpart C 15.247

Equipment under test Flat Panel Digital X-ray Detector
Model name EXT 1824G
Variant Model name Scansilc 1824 EOD
FCC ID RNHEXT1824G
Applicant DRTECH Corporation
Manufacturer DRTECH Corporation
Date of test(s) 2020.09.01. ~ 2020.09.18
Date of issue 2020.10.12

Issued to
DRTECH Corporation
Suite No.1, 1Floor / Suite No.2 3Floor, 29,
Dunchon-daero 541 beon-gil, Jungwon-gu,
Seongnam-si, Gyeonggi-do, 13216, South Korea
Tel: +82-31-779-7784 / Fax: +82-31-779-7790

Issued by
KES Co., Ltd.
3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,
Gyeonggi-do, 14057, Korea
473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450

Test and report completed by :	Report approval by :
	
Young-Jun, Cho Test engineer	Young-Jin, Lee Technical manager

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Revision history

Revision	Date of issue	Test report No.	Description
-	2020.10.12	KES-RF1-20T0192	Initial



TABLE OF CONTENTS

1.	General information	4
1.1.	EUT description	5
1.2.	Test configuration.....	6
1.3.	Device modifications.....	6
1.4.	Frequency/channel operations	6
1.5.	Worst case data rate	6
1.6.	Accessory information.....	6
1.7.	Information about Variant Model name.....	6
1.8.	Antenna information.....	7
1.9.	Measurement results explanation example.....	7
1.10.	Measurement Uncertainty	7
2.	Summary of tests	8
3.	Test results.....	9
3.1.	Radiated restricted band and emissions.....	9
3.2.	AC conducted emissions	42
Appendix A.	Measurement equipment	44
Appendix B.	Test setup photos	45



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-RF1-20T0192
Page (4) of (45)

1. General information

Applicant: DRTECH Corporation
Applicant address: Suite No.1, 1Floor / Suite No.2 3Floor, 29,
Dunchon-daero 541 beon-gil, Jungwon-gu, Seongnam-si,
Gyeonggi-do, 13216, South Korea
Test site: KES Co., Ltd.
Test site address: 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,
Gyeonggi-do, 14057, Korea
473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Test Facility FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s): 15.247
FCC ID: RNHEXT1824G
Test device serial No.: ☒ Production ☐ Pre-production ☐ Engineering

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

1.1. EUT description

Equipment under test	Flat Panel Digital X-ray Detector		
Frequency range &	2 402 MHz ~ 2 480 MHz (LE) : 40 ch		
Number of channels	2 412 MHz ~ 2 462 MHz (802.11b/g/n_HT20) : 11 ch 2 422 MHz ~ 2 452 MHz (802.11n_HT40) : 7 ch		
	UNII-1	5 180 MHz ~ 5 240 MHz (802.11a/n_HT20) : 4 ch	5 190 MHz ~ 5 230 MHz (802.11n_HT40) : 2 ch
	UNII-2A	5 260 MHz ~ 5 320 MHz (802.11a/n_HT20) : 4 ch	5 270 MHz ~ 5 310 MHz (802.11n_HT40) : 2 ch
	UNII-2C	5 500 MHz ~ 5 700 MHz (802.11a/n_HT20) : 11 ch	5 510 MHz ~ 5 670 MHz (802.11n_HT40) : 5 ch
	UNII-3	5 745 MHz ~ 5 825 MHz (802.11a/n_HT20) : 5 ch	5 755 MHz ~ 5 795 MHz (802.11n_HT40) : 2 ch
Model:	EXT 1824G		
Variant Model name	Scansilc 1824 EOD		
Modulation technique	WIFI : DSSS, OFDM, BT : GFSK		
Antenna specification			
Bluetooth antenna	2.4 GHz	Antenna type : PCB antenna,	Peak gain : -0.23 dBi
WLAN antenna	2.4 GHz	Antenna type : PCB antenna,	Peak gain : -5.6 dBi
ANT0 (Top antenna)	5 GHz	Antenna type : : PCB antenna,	Peak gain(UNII-1) : 0.7 dBi Peak gain(UNII-2A) : 1.7 dBi Peak gain(UNII-2C) : -0.6 dBi Peak gain(UNII-3) : 0.5 dBi
WLAN antenna	2.4 GHz	Antenna type : PCB antenna,	Peak gain : -3.6 dBi
ANT1 (Side antenna)	5 GHz	Antenna type : : PCB antenna,	Peak gain(UNII-1) : -0.4 dBi Peak gain(UNII-2A) : -0.4 dBi Peak gain(UNII-2C) : -1.2 dBi Peak gain(UNII-3) : -1.6 dBi
Power source	AC 120 V (AC/DC adaptor output 12 V) 1. EXT1824_BATTERY_BD_VER0.2 2. EXT1824_CONNECTION_BD_VER0.2 3. EXT1824_GATE_BD_VER0.1A		
H/W version	4. EXT1824_LED_BD_VER0.2 5. EXT1824_SYSTEM_BD_VER0.2 6. 2430NDT_XRAY_FPCB_VER0.1 7. 2430NDT_DATA_FPCB_VER0.2		
S/W version	EXT_1824G_SCA_HW0.01.01_V1_SW0.0.03_202004291		

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

1.2. Test configuration

The **DRTECH Corporation // EXT 1824G // FCC ID: RNHEXT1824G** was tested per the guidance of KDB 558074 D01 v05r02, ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

1.3. Device modifications

N/A

1.4. Frequency/channel operations

Ch.	Frequency (MHz)	Mode
01	2412	802.11b/g/n_HT20
.	.	.
06	2437	802.11b/g/n_HT20
.	.	.
11	2462	802.11b/g/n_HT20

Ch.	Frequency (MHz)	Mode
03	2422	802.11n_HT40
.	.	.
06	2437	802.11n_HT40
.	.	.
09	2452	802.11n_HT40

1.5. Worst case data rate

1. Radiated emission was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
2. Worst-case data rates were:
3. 802.11b: **1 Mbps**
4. 802.11g_HT20: **6 Mbps**
802.11n_HT20: **MCS8**
802.11n_HT40: **MCS8**

1.6. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

1.7. Information about Variant Model name

Model name	Remark
EXT 1824G	There are no external or internal changes, and it is for the purpose of adding a model name.
Scansilc 1824 EOD	

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

1.8. Antenna information

Mode	SISO			MIMO
	Antenna 0	Antenna 1	Antenna 2	Antenna 1 + 2
LE	✓	×	×	×
802.11b 802.11g 802.11n_HT20 802.11n_HT40	×	×	✓	×
802.11a 802.11an_HT20 802.11an_HT40	×	×	×	✓

✓ = Support; × = Not support

Bluetooth Antenna Model : -

Ant0 Gain (dBi)	Ant1 Gain (dBi)	Note
-0.23	-	2 402 to 2 480 MHz

WiFi Antenna Model : APDR-600WT (ANT0), APDR-600WS (ANT1),

Ant0 Gain (dBi)	Ant1 Gain (dBi)	Note
-	-3.6	2 412 to 2 462 MHz
0.7	-0.4	5 180 to 5 240 MHz
1.7	-0.4	5 260 to 5 320 MHz
-0.6	-1.2	5 500 to 5 700 MHz
0.5	-1.6	5 745 to 5 825 MHz

1.9. Measurement results explanation example

For all conducted test items

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 1.01 + 10 = 11.01 \text{ (dB)}\end{aligned}$$

1.10. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.46 dB
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1GHz	4.40 dB
	Above 1GHz	5.94 dB
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		



2. Summary of tests

Reference	Parameter	Test results
15.247(a)(2)	6 dB bandwidth	N/A ⁽¹⁾
15.247(b)(3)	Output power	N/A ⁽¹⁾
15.247(e)	Power spectral density	N/A ⁽¹⁾
15.205 15.209	Radiated restricted band and emission	Pass
15.247(d)	Conducted spurious emission and band edge	N/A ⁽¹⁾
15.207(a)	AC conducted emissions	Pass

Note :

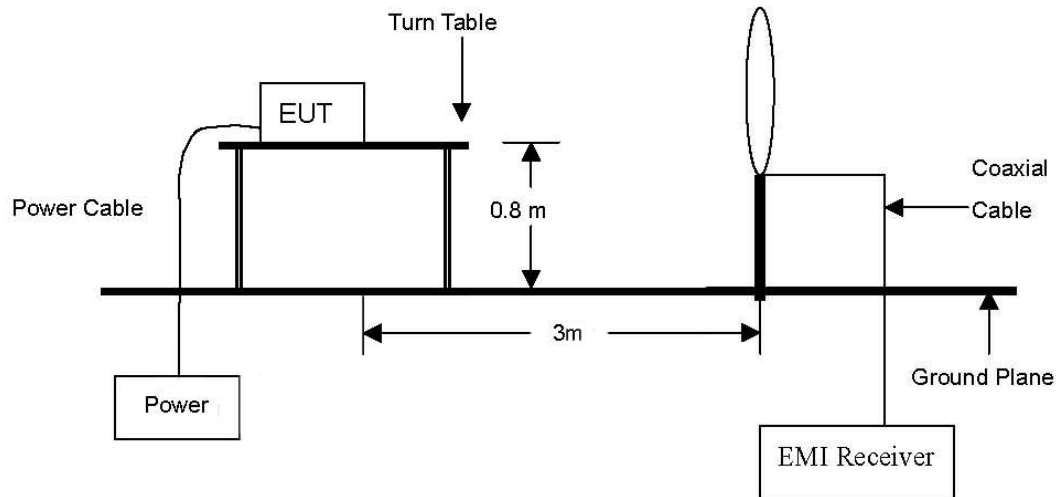
- 1) Please Refer to the approved Module Report (Report No.: FR232843AC) for result of existing test items.
The output power setting is same as original module and confirmed that RF conducted tests of original report remain valid for this filing.

3. Test results

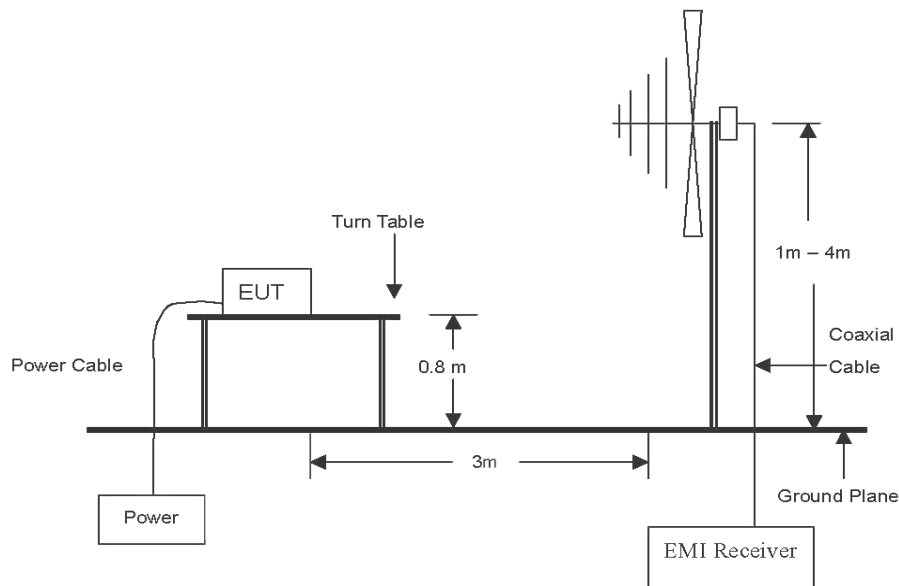
3.1. Radiated restricted band and emissions

Test setup

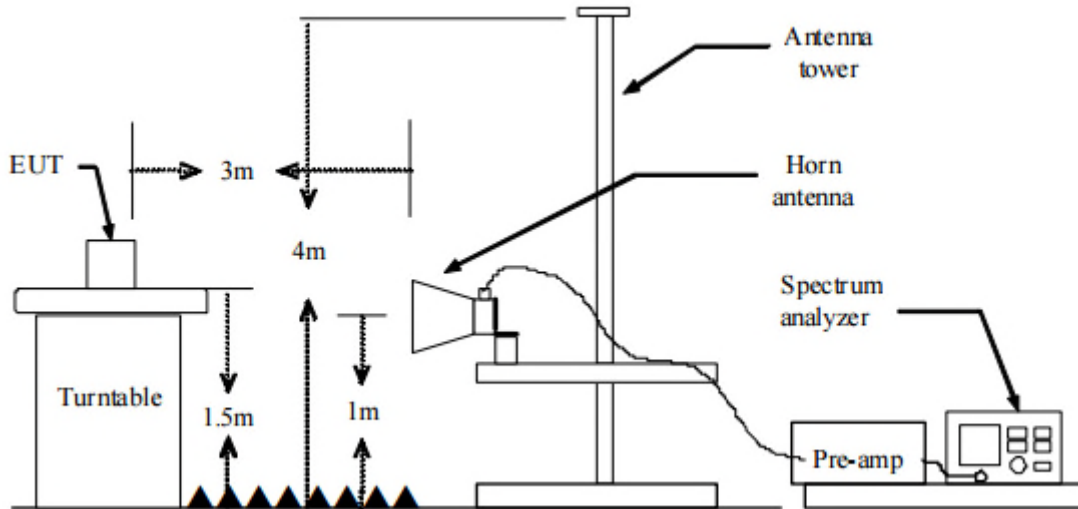
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



Test procedure below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
4. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum hold mode.

Test procedure above 30 MHz

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The antenna is a bi-log antenna, a horn antenna ,and its height are varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
5. Spectrum analyzer settings for $f < 1$ GHz:
 - ① Span = wide enough to fully capture the emission being measured
 - ② RBW = 100 kHz
 - ③ VBW \geq RBW
 - ④ Detector = quasi peak

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

- ⑤ Sweep time = auto
- ⑥ Trace = max hold
- 6. Spectrum analyzer settings for $f \geq 1$ GHz: Peak
 - ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
 - ② RBW = 1 MHz
 - ③ VBW ≥ 3 MHz
 - ④ Detector = peak
 - ⑤ Sweep time = auto
 - ⑥ Trace = max hold
 - ⑦ Trace was allowed to stabilize
- 7. Spectrum analyzer settings for $f \geq 1$ GHz: Average
 - ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
 - ② RBW = 1 MHz
 - ③ VBW $\geq 3 \times$ RBW
 - ④ Detector = RMS, if span/(# of points in sweep) \leq (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
 - ⑤ Averaging type = power(i.e., RMS)
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
 - ⑥ Sweep = auto
 - ⑦ Trace = max hold
 - ⑧ Perform a trace average of at least 100 traces.
 - ⑨ A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step ⑤, then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step ⑤, then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Note.

1. $f < 30$ MHz, extrapolation factor of 40 dB/decade of distance. $F_d = 40\log(D_m/D_s)$
 $f \geq 30$ MHz, extrapolation factor of 20 dB/decade of distance. $F_d = 20\log(D_m/D_s)$
 Where:
 F_d = Distance factor in dB
 D_m = Measurement distance in meters
 D_s = Specification distance in meters
3. CF(Correction factors(dB)) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d (dB)
8. Field strength(dB μ V/m) = Level(dB μ V) + CF (dB) + or DCF(dB)
9. Margin(dB) = Limit(dB μ V/m) - Field strength(dB μ V/m)
10. Emissions below 18 GHz were measured at a 3 meter test distance while emissions above 18 GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that **X orientation** was worst-case orientation; therefore, all final radiated testing was performed with the EUT in **X orientation**.
8. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
9. All channels, modes (e.g. 802.11b/g/n (20 MHz BW)), and modulations/data rates were investigated among DTS band. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
10. According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (μ V/m)
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

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



Duty cycle

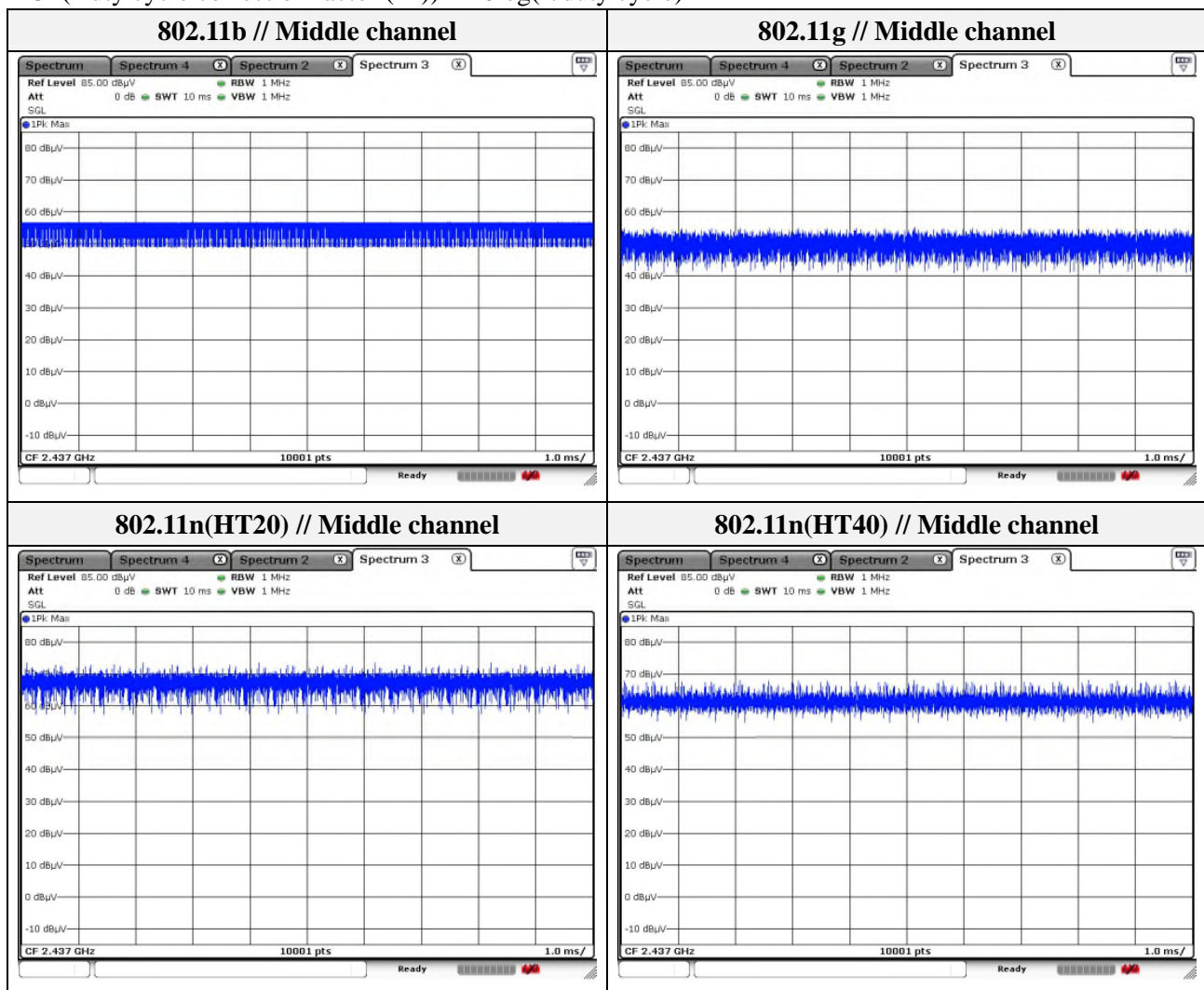
Regarding to KDB 558074 D01_v04, 6.0, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.

Set RBW \geq OBW if possible; otherwise, set RBW to the largest available value. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100.

Test mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11b	10	10	1	100	0.00
802.11g	10	10	1	100	0.00
802.11n(HT20)	10	10	1	100	0.00
802.11n(HT40)	10	10	1	100	0.00

Duty cycle (Linear) = T_{on} time/Period

DCF(Duty cycle correction factor (dB)) = 10log(1/duty cycle)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

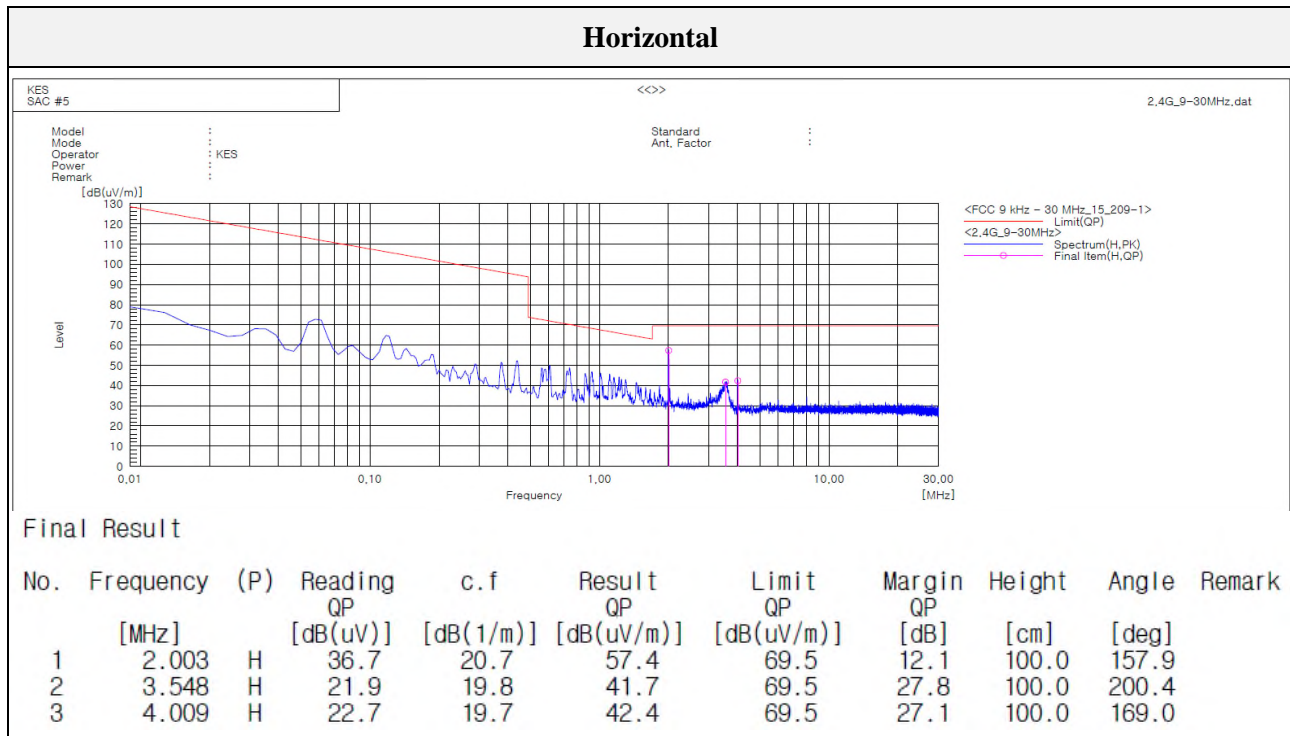
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Test results (Below 30 MHz)

Mode: 802.11b (Worst case)
Distance of measurement: 3 meter
Channel: 1 (Worst case)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

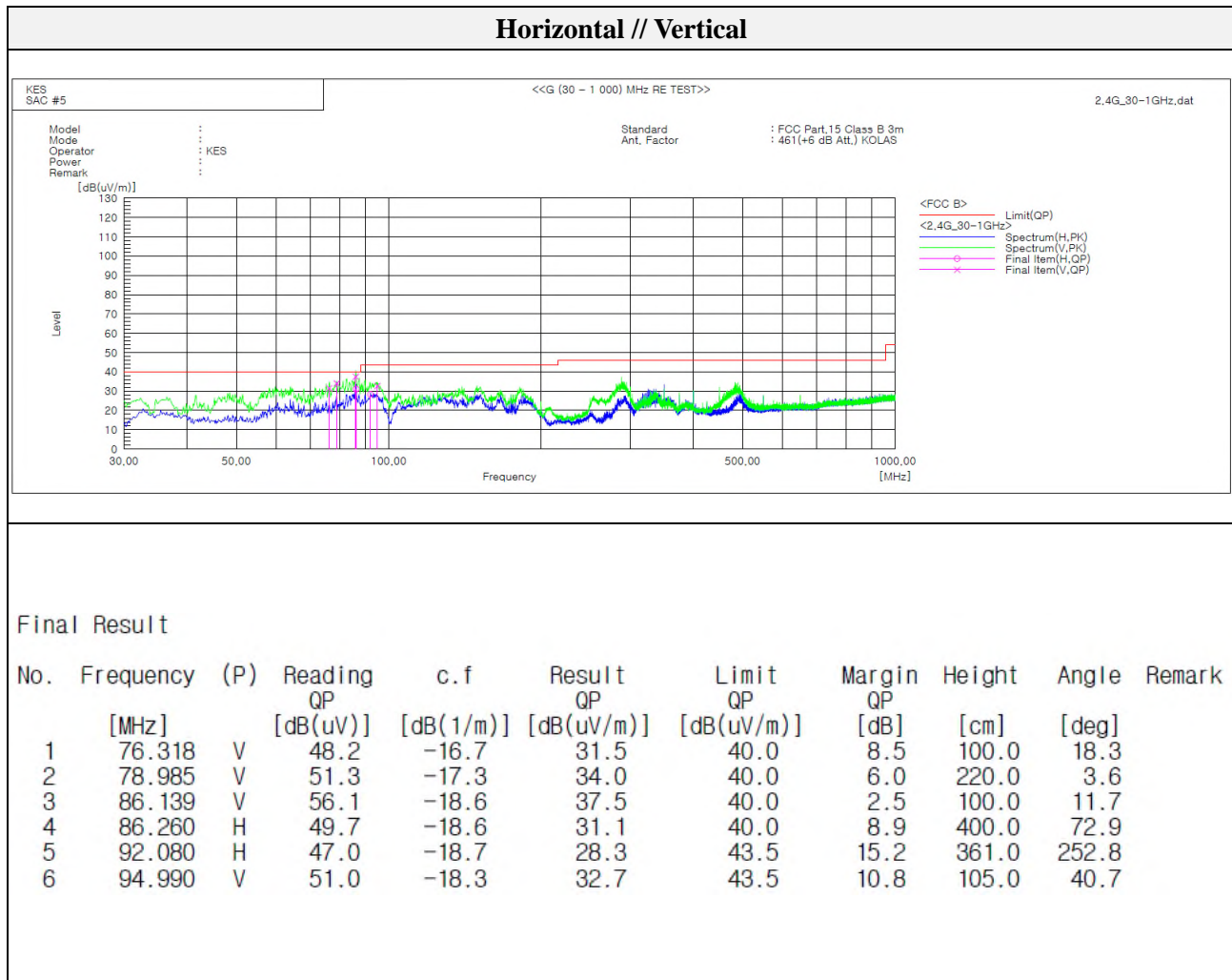
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Test results (Below 1 000 MHz) – Worst case

Mode: 802.11b (Worst case)
Distance of measurement: 3 meter
Channel: 1 (Worst case)





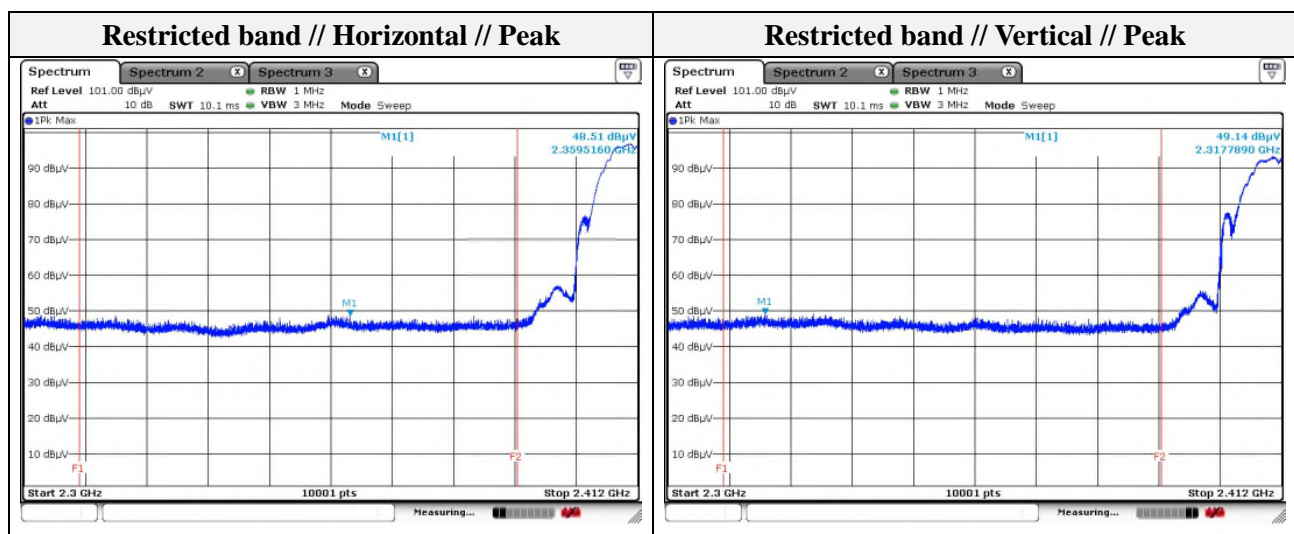
Mode: 802.11b
Distance of measurement: 3 meter
Channel: 01

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1159.28	50.75	Peak	H	-11.26	-	39.49	74.00	34.51
1159.68	48.04	Peak	V	-11.27	-	36.77	74.00	37.23

- Band edge

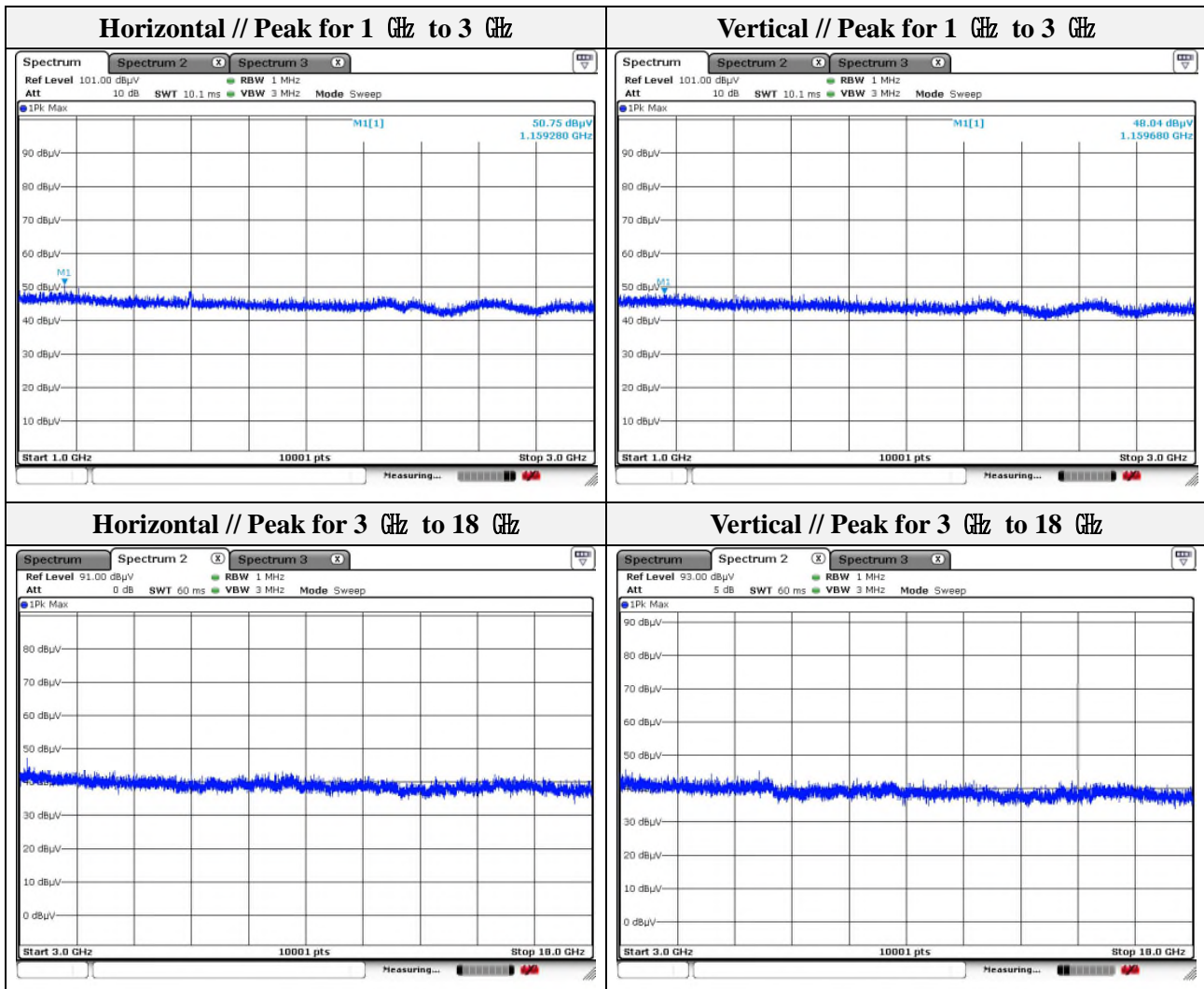
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2359.52	48.51	Peak	H	-6.97	-	41.54	74.00	32.46
2317.79	49.14	Peak	V	-6.79	-	42.35	74.00	31.65



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Note.

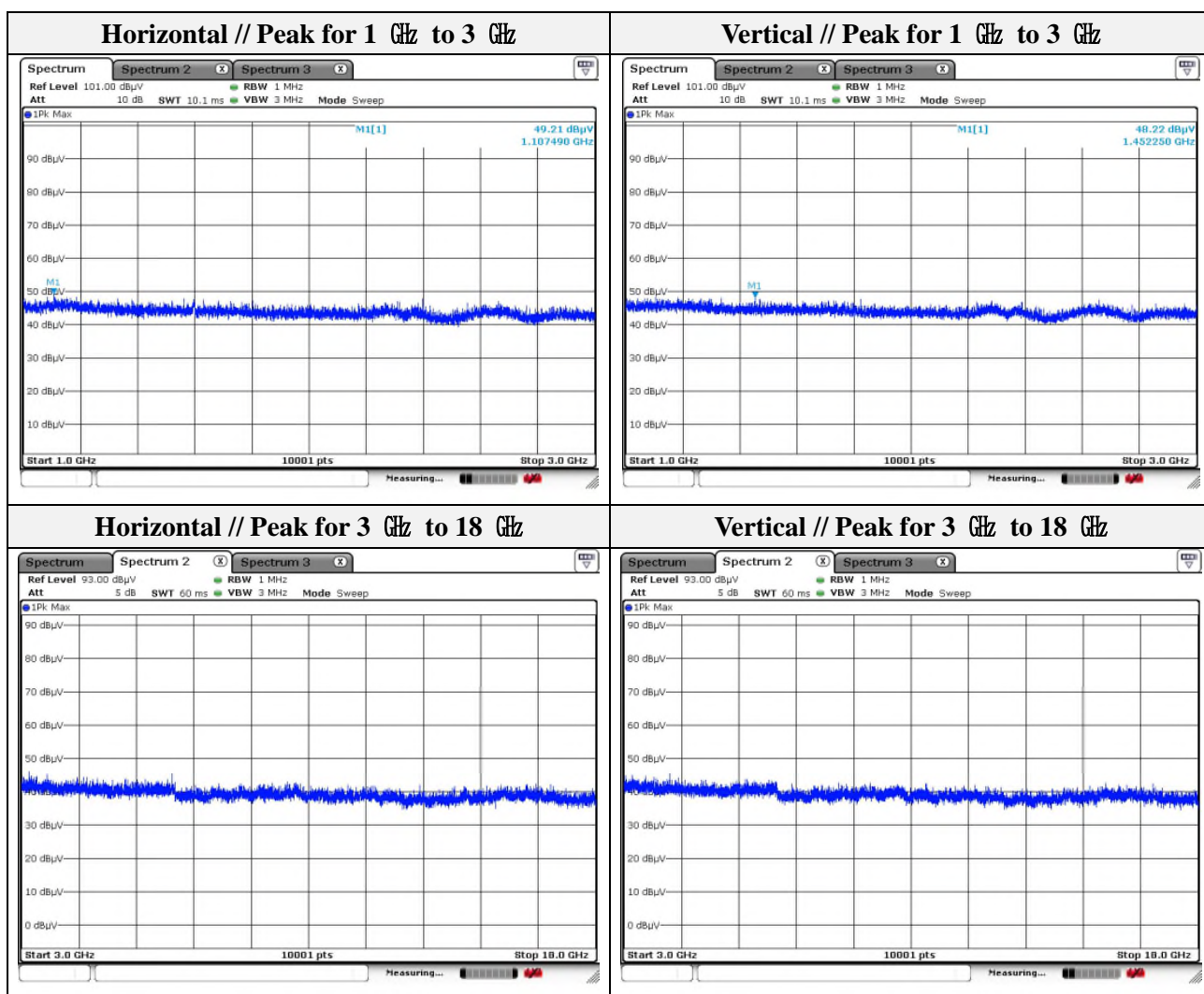
1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Mode: 802.11b
Distance of measurement: 3 meter
Channel: 06

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1107.49	49.21	Peak	H	-11.28	-	37.93	74.00	36.07
1452.25	48.22	Peak	V	-11.15	-	37.07	74.00	36.93



Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



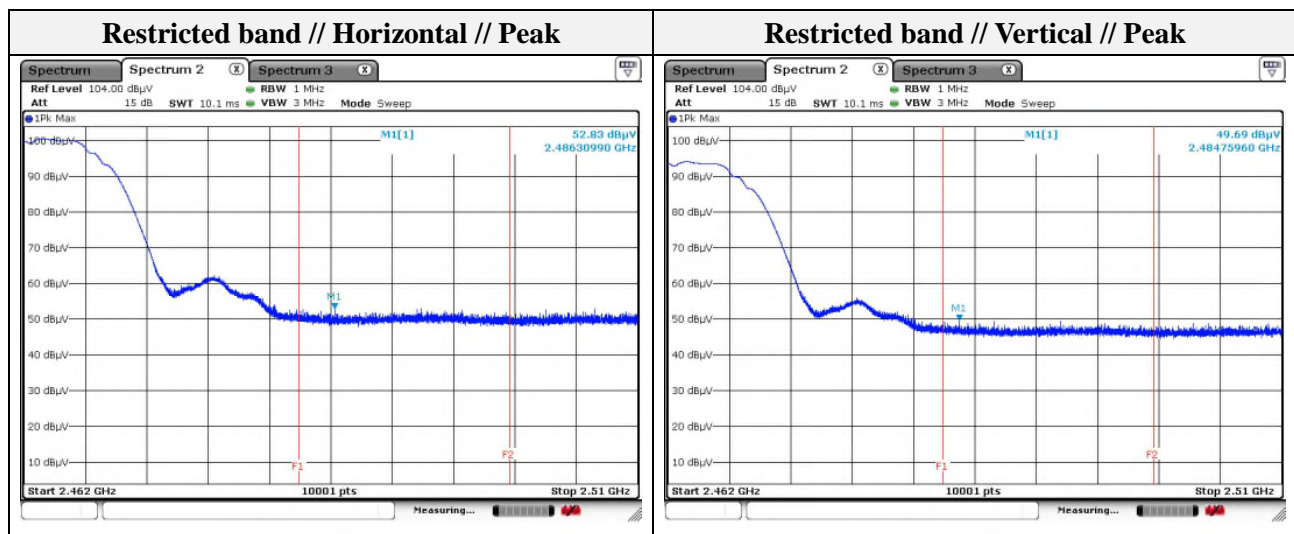
Mode: 802.11b
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1171.08	49.34	Peak	H	-11.26	-	38.08	74.00	35.92
1072.89	48.09	Peak	V	-11.29	-	36.80	74.00	37.20

- Band edge

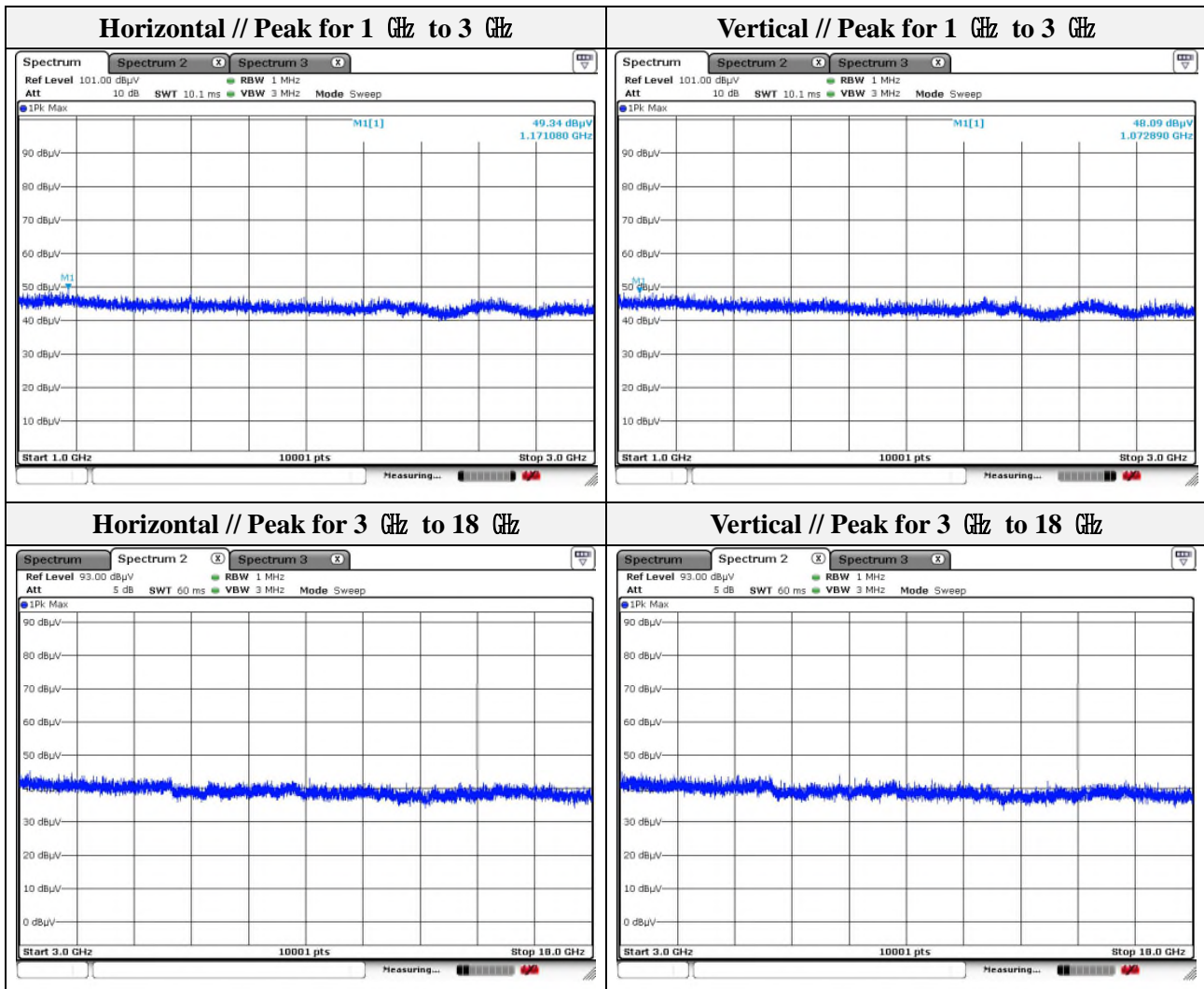
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2486.31	52.83	Peak	H	-7.56	-	45.27	74.00	28.73
2484.76	49.69	Peak	V	-7.56	-	42.13	74.00	31.87



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



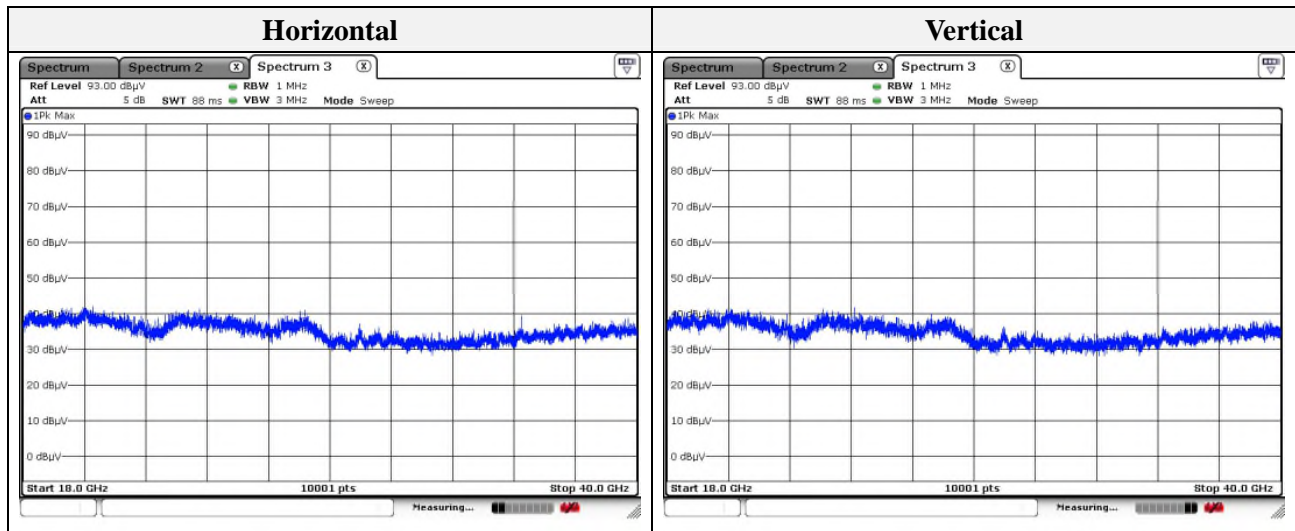
Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Test results (18 GHz to 30 GHz) – Worst case

Mode: 802.11b
Distance of measurement: 3 meter
Channel: 1 (Worst case)



Note.

1. No spurious emission were detected above 18 GHz.



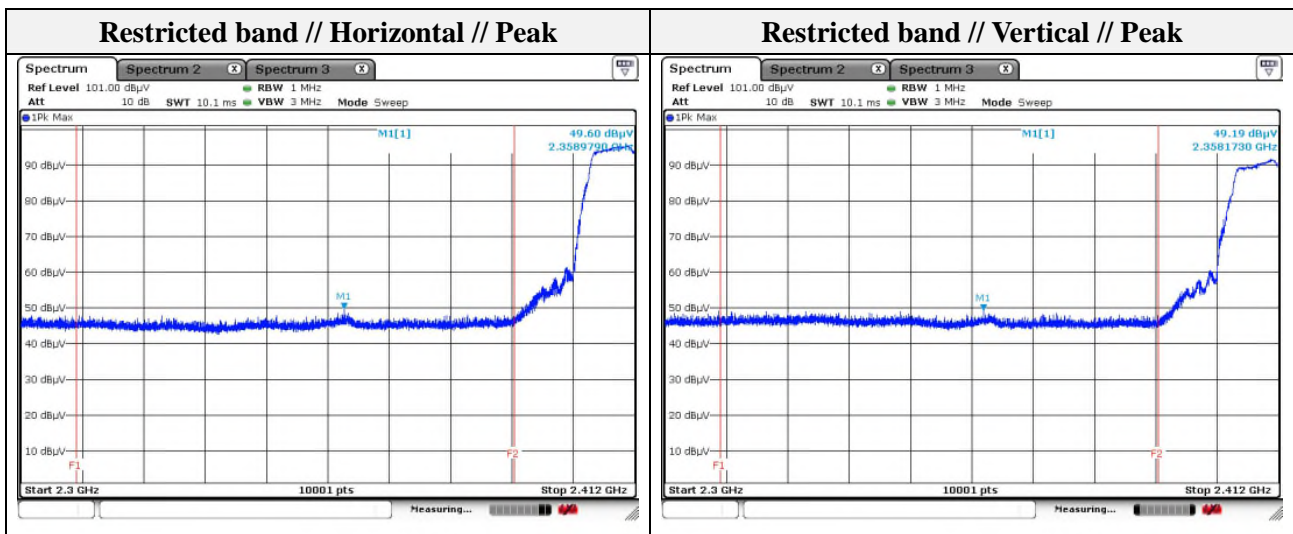
Mode: 802.11g
Distance of measurement: 3 meter
Channel: 01

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1181.28	48.74	Peak	H	-11.26	-	37.48	74.00	36.52
1022.30	48.80	Peak	V	-11.31	-	37.49	74.00	36.51

- Band edge

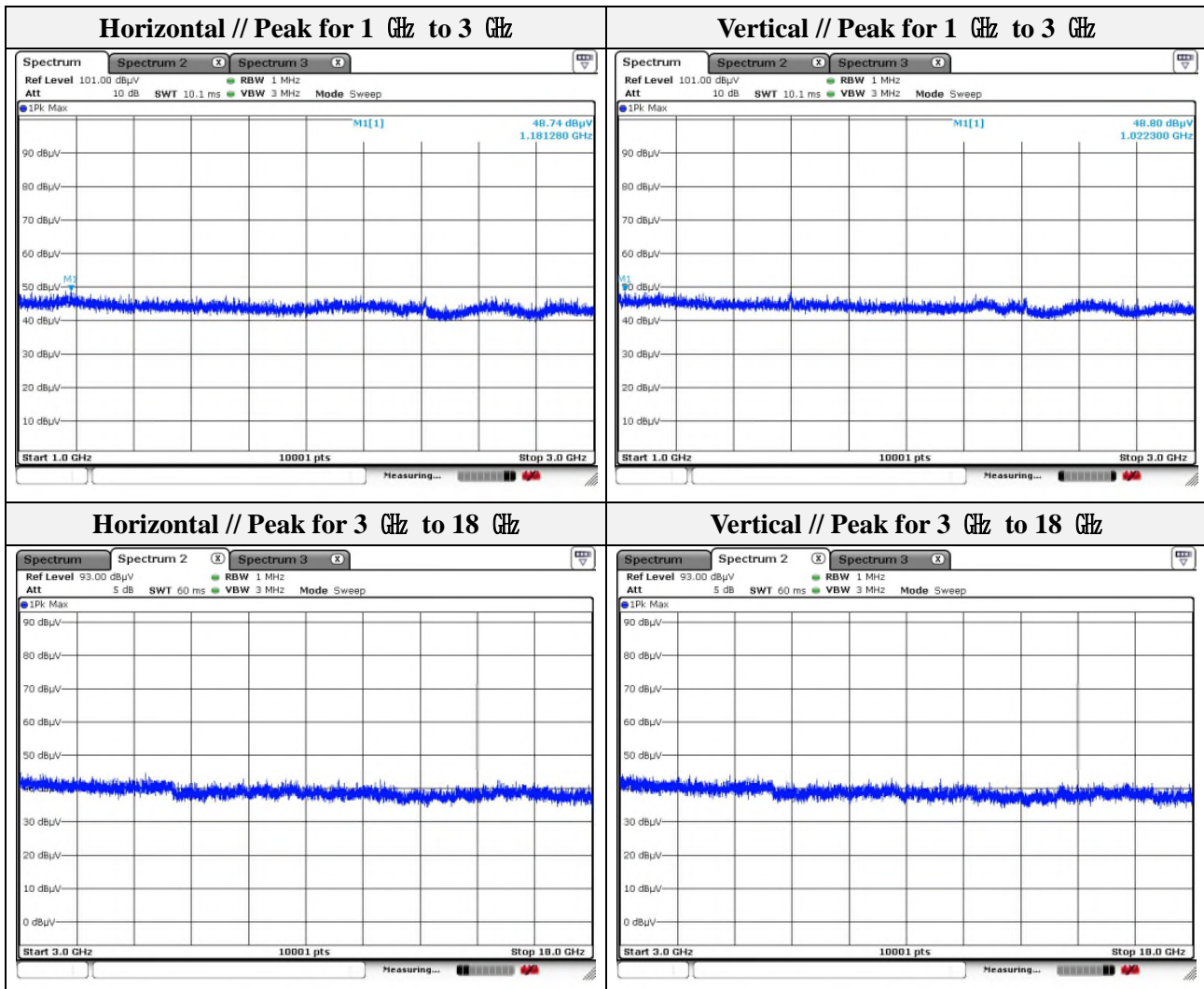
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2358.98	49.60	Peak	H	-6.96	-	42.64	74.00	31.36
2358.17	49.19	Peak	V	-6.97	-	42.22	74.00	31.78



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



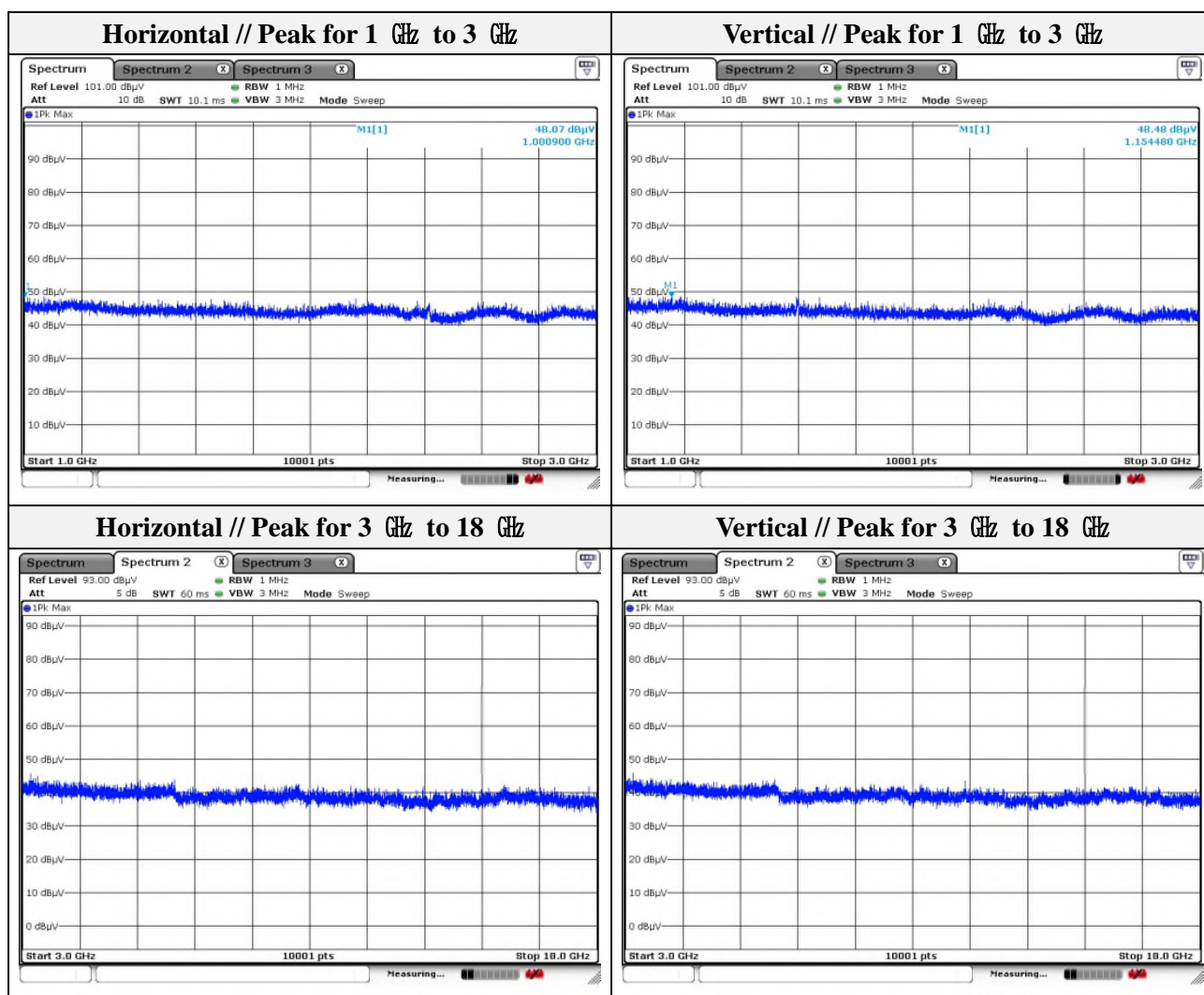
Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.

Mode: 802.11g
Distance of measurement: 3 meter
Channel: 06

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1000.90	48.07	Peak	H	-11.32	-	36.75	74.00	37.25
1154.48	48.48	Peak	V	-11.27	-	37.21	74.00	36.79



Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



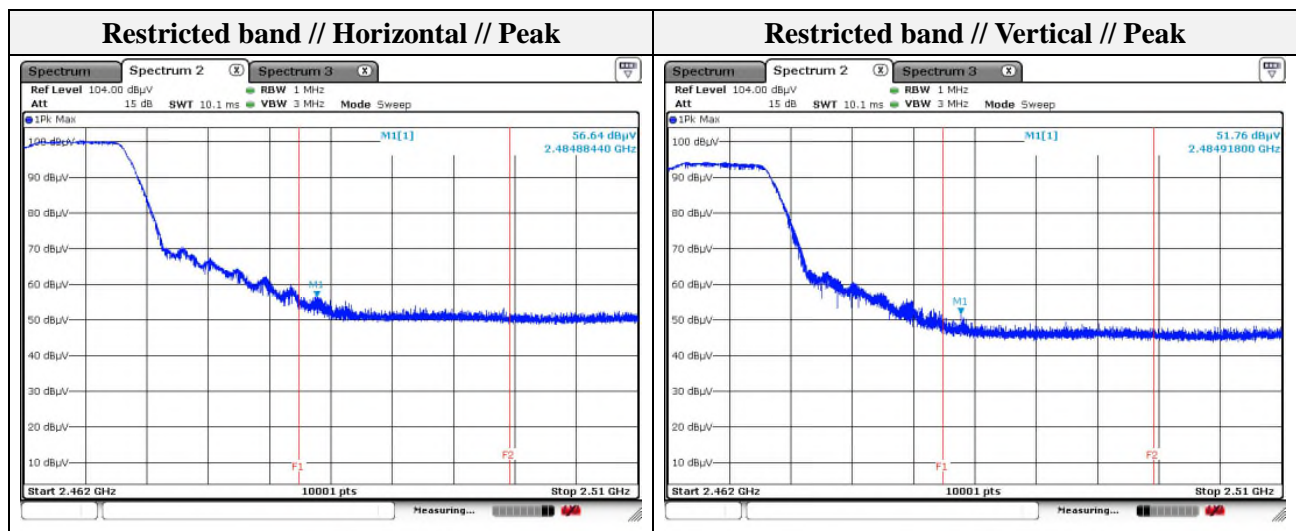
Mode: 802.11g
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1139.89	48.13	Peak	H	-11.27	-	36.86	74.00	37.14
1128.89	48.14	Peak	V	-11.28	-	36.86	74.00	37.14

- Band edge

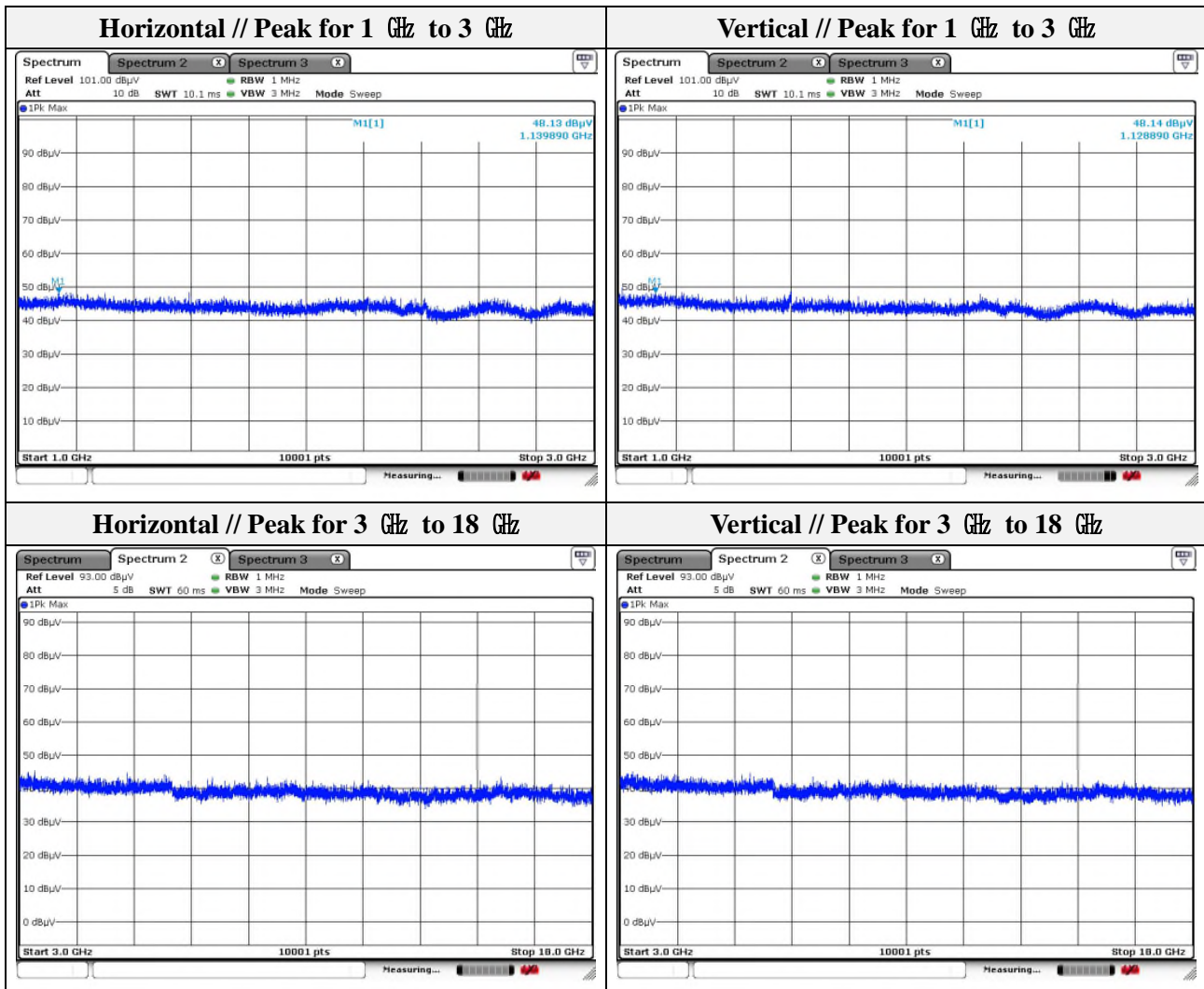
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2484.88	56.64	Peak	H	-7.56	-	49.08	74.00	24.92
2484.88	41.86	Peak	V	-7.56	-	34.30	74.00	39.70



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



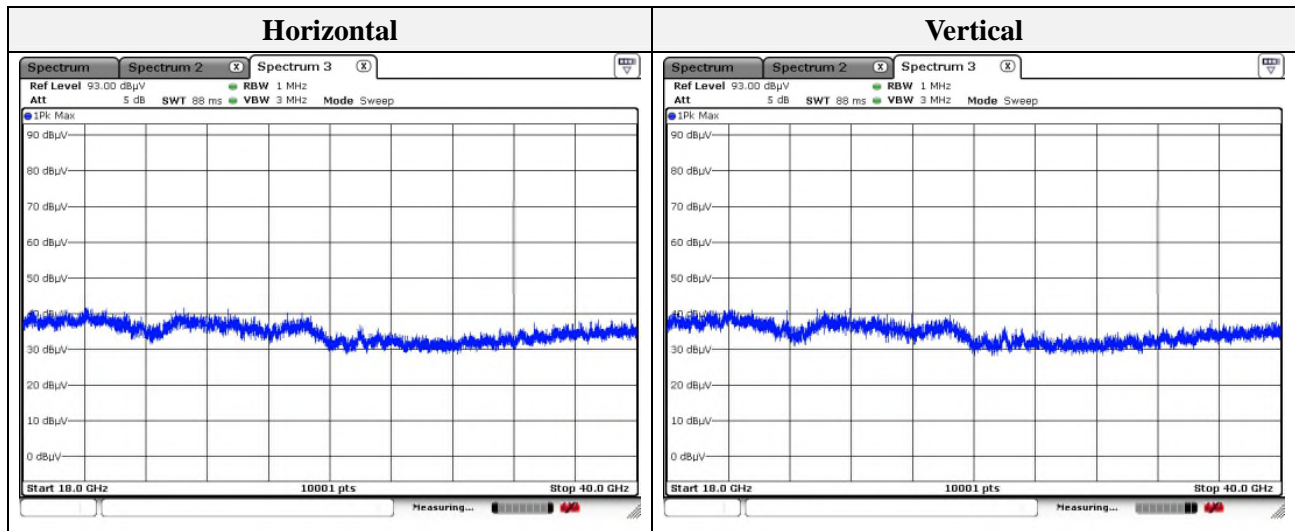
Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Test results (18 GHz to 30 GHz) – Worst case

Mode: 802.11g
Distance of measurement: 3 meter
Channel: 1 (Worst case)



Note.

1. No spurious emission were detected above 18 GHz.



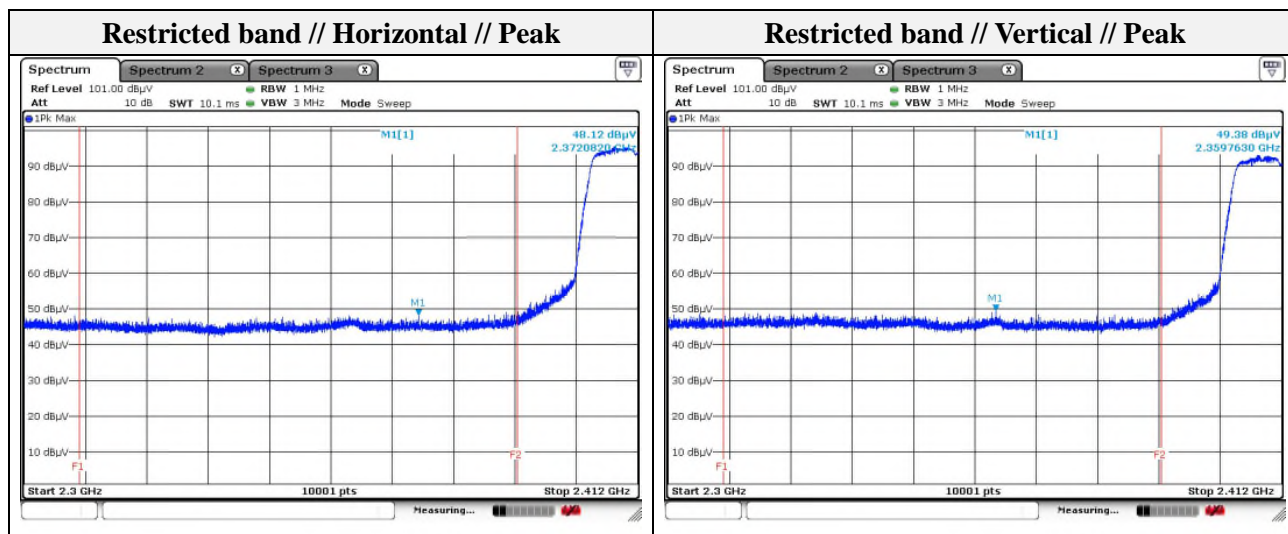
Mode: 802.11n(HT20)
Distance of measurement: 3 meter
Channel: 01

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1071.89	49.27	Peak	H	-11.29	-	37.98	74.00	36.02
1016.30	49.03	Peak	V	-11.31	-	37.72	74.00	36.28

- Band edge

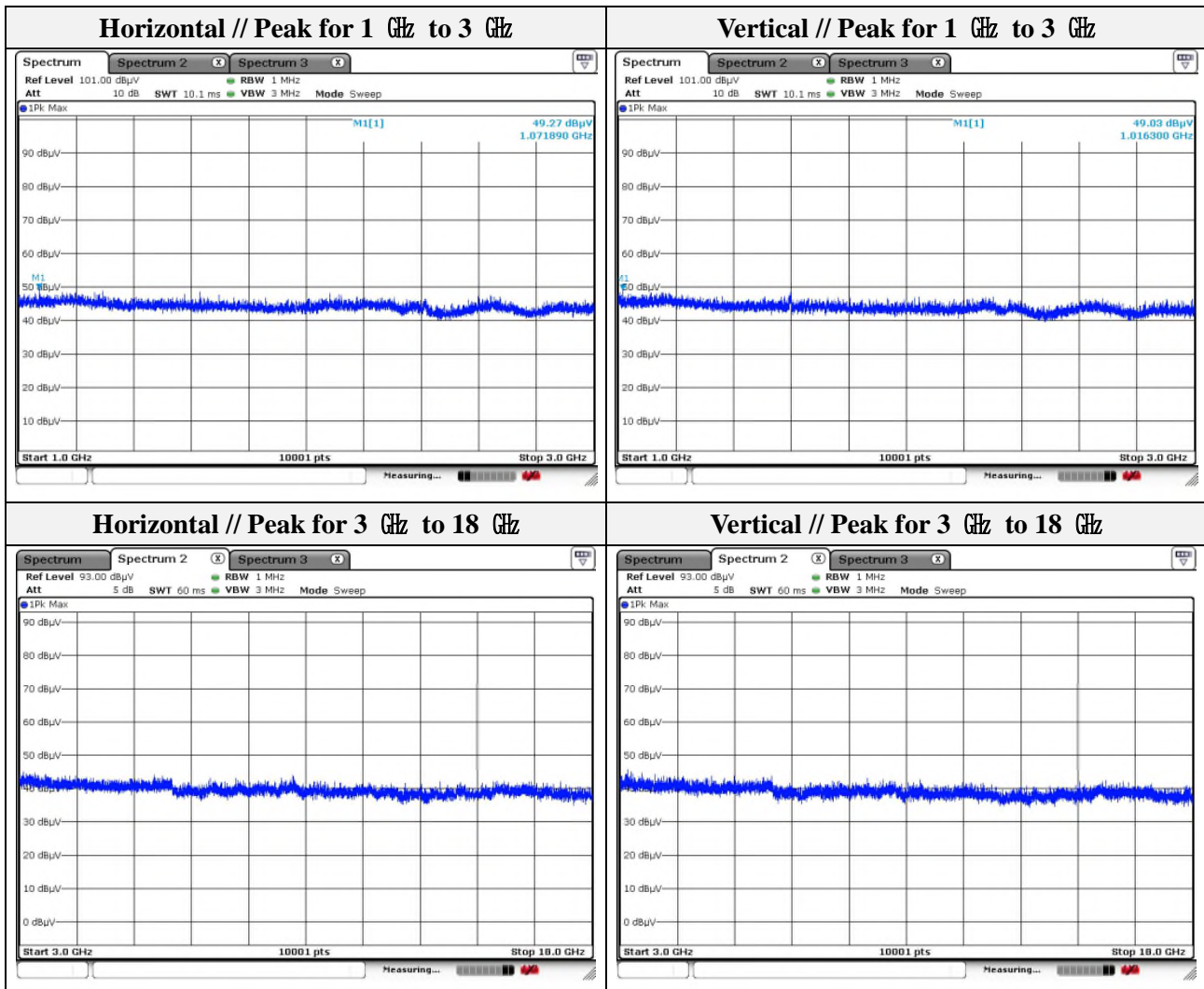
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2372.08	48.12	Peak	H	-7.02	-	41.10	74.00	32.90
2359.76	49.38	Peak	V	-6.97	-	42.41	74.00	31.59



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Note.

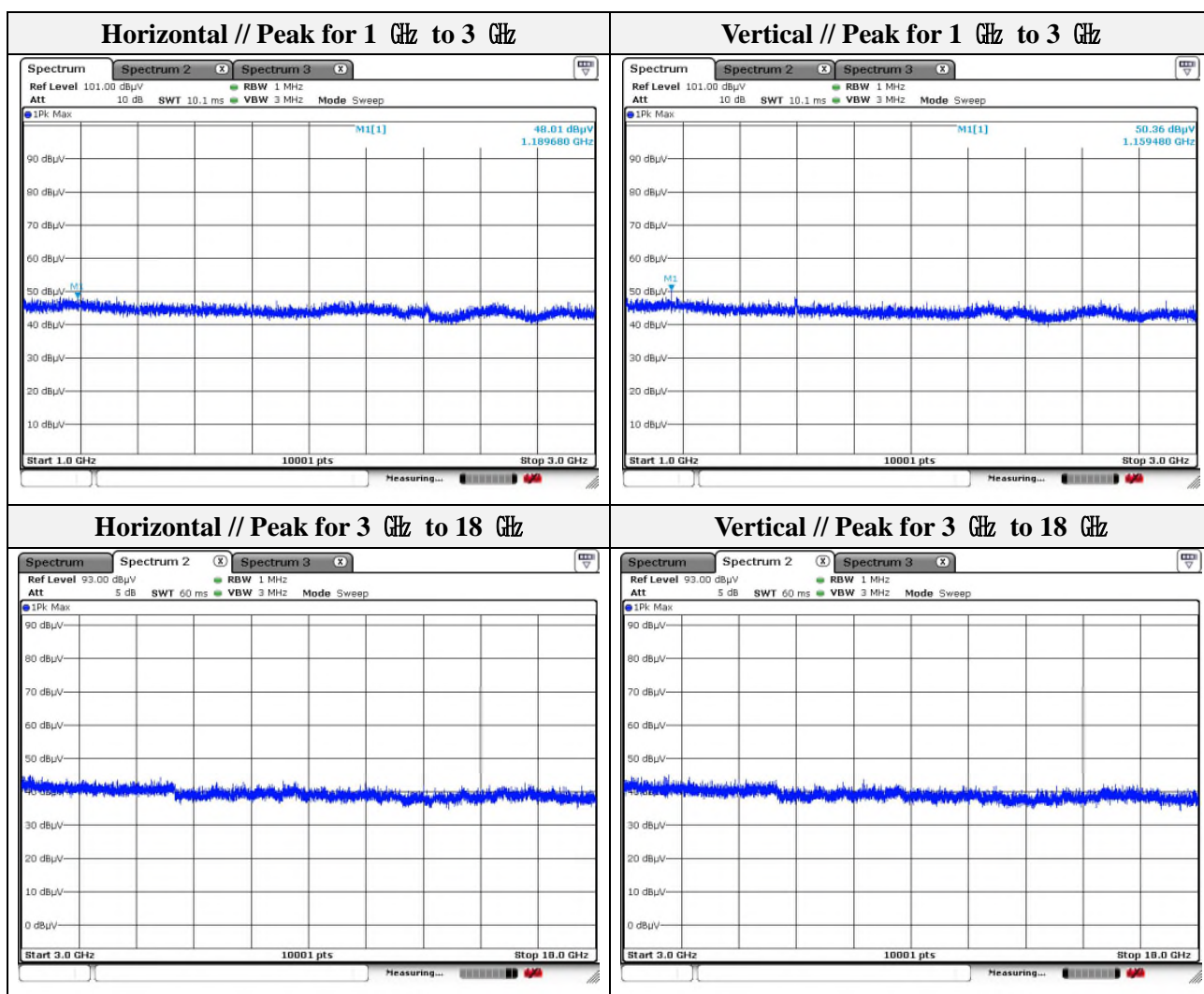
1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Mode: 802.11n(HT20)
Distance of measurement: 3 meter
Channel: 06

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1189.68	48.01	Peak	H	-11.25	-	36.76	74.00	37.24
1159.48	50.36	Peak	V	-11.27	-	39.09	74.00	34.91



Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



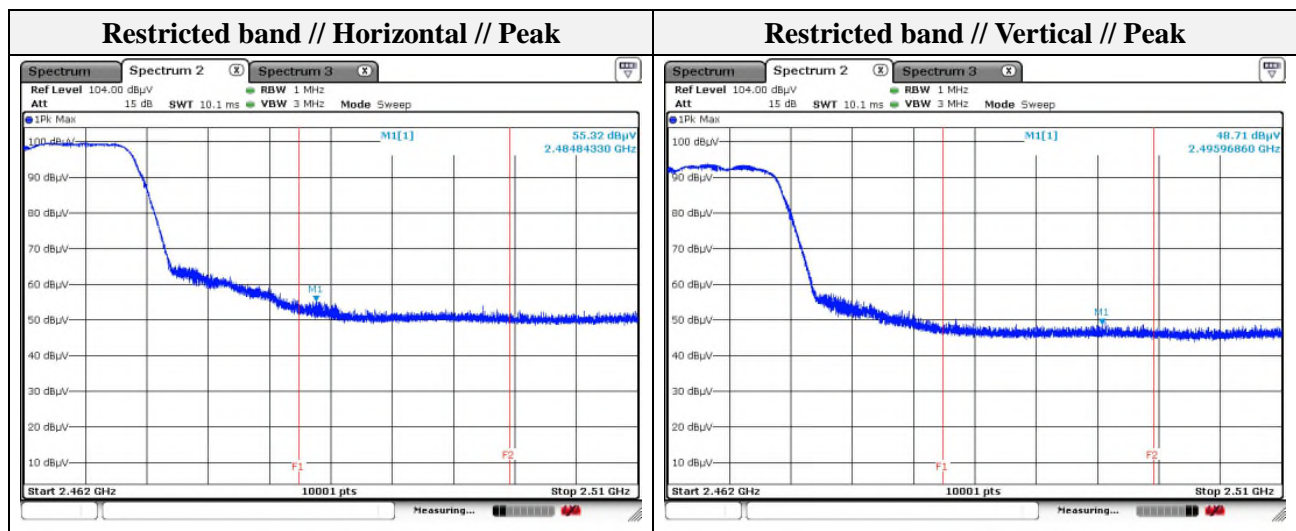
Mode: 802.11n(HT20)
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1163.68	48.80	Peak	H	-11.26	-	37.54	74.00	36.46
1182.48	48.37	Peak	V	-11.26	-	37.11	74.00	36.89

- Band edge

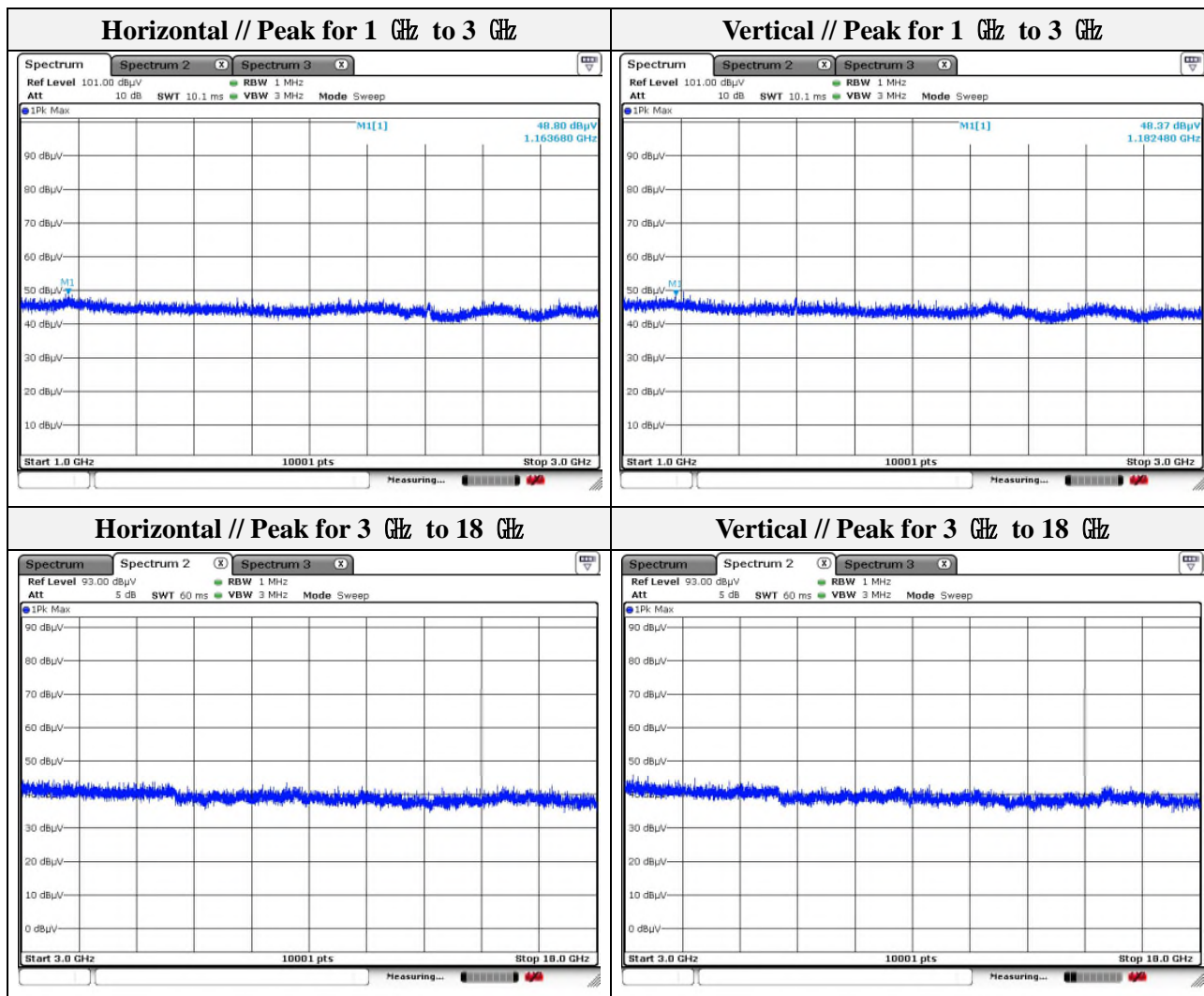
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2484.84	55.32	Peak	H	-7.56	-	47.76	74.00	26.24
2495.97	48.71	Peak	V	-7.60	-	41.11	74.00	32.89



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



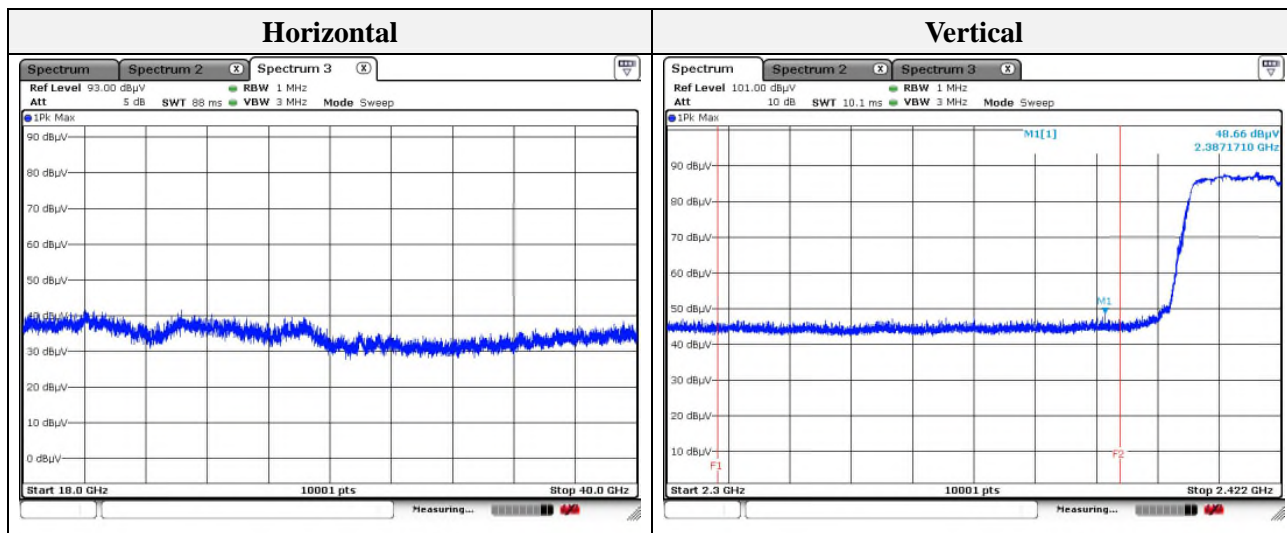
Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Test results (18 GHz to 30 GHz) – Worst case

Mode: 802.11n_HT20
Distance of measurement: 3 meter
Channel: 1 (Worst case)



Note.

1. No spurious emission were detected above 18 GHz.



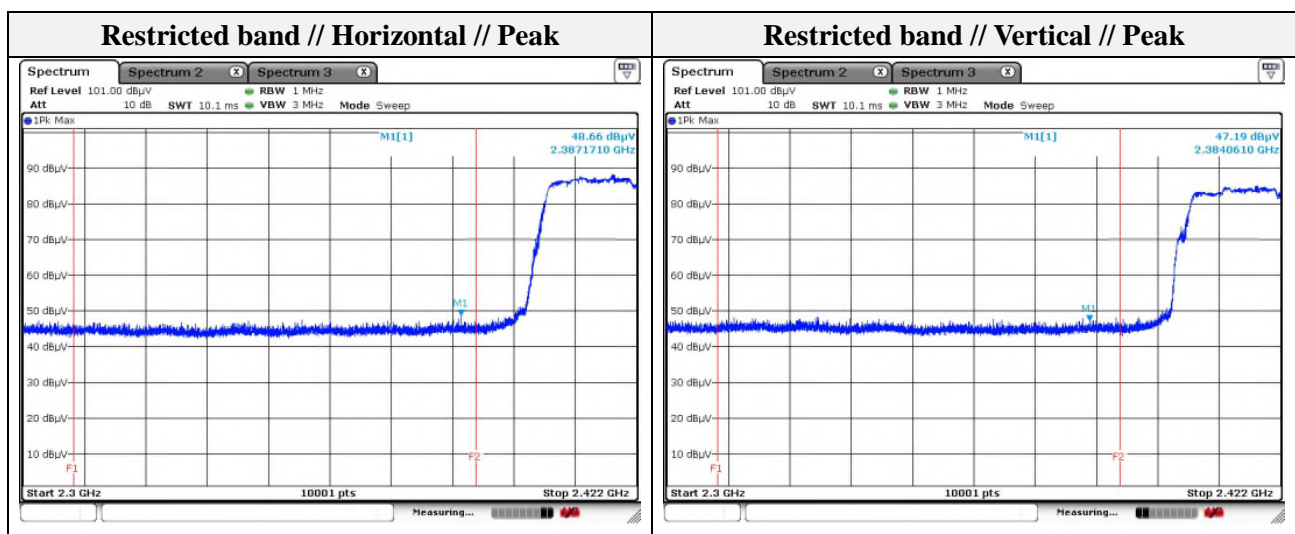
Mode: 802.11n(HT40)
Distance of measurement: 3 meter
Channel: 03

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1214.08	48.62	Peak	H	-11.25	-	37.37	74.00	36.63
1152.88	48.62	Peak	V	-11.26	-	37.36	74.00	36.64

- Band edge

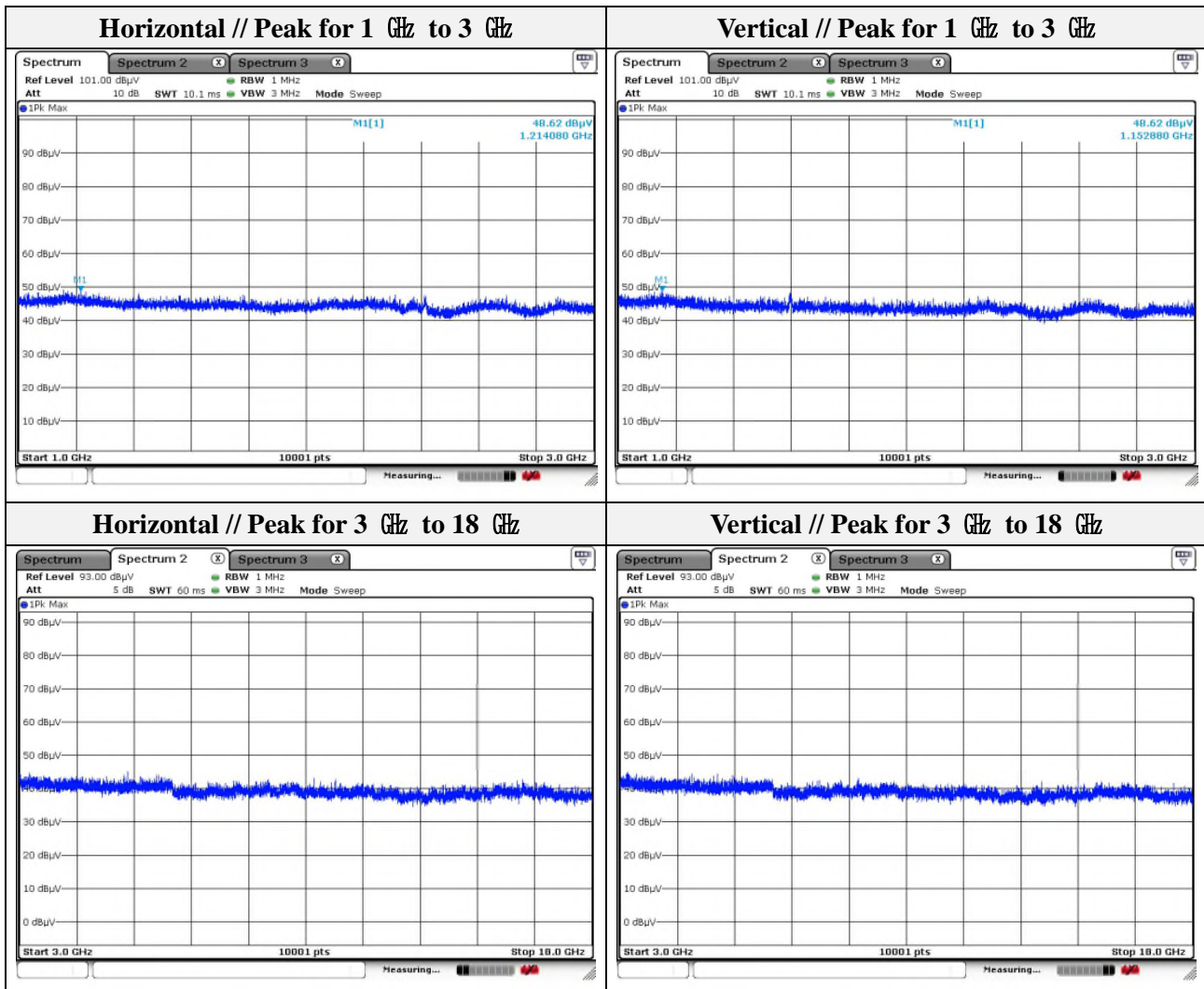
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2387.17	48.66	Peak	H	-7.09	-	41.57	74.00	32.43
2384.06	47.19	Peak	V	-7.08	-	40.11	74.00	33.89



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Note.

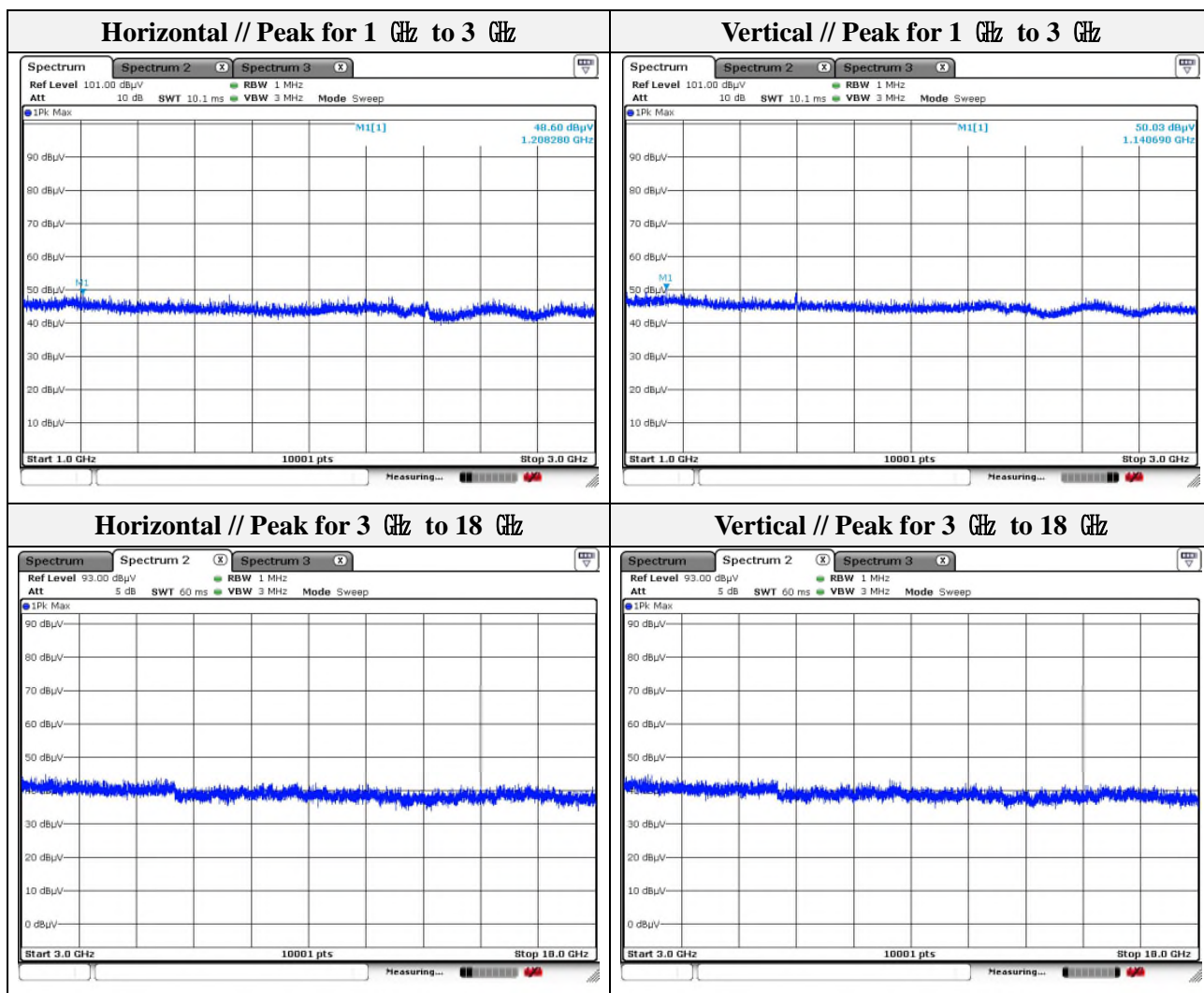
1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Mode: 802.11n(HT40)
Distance of measurement: 3 meter
Channel: 06

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1208.28	48.60	Peak	H	-11.24	-	37.36	74.00	36.64
1140.69	50.03	Peak	V	-11.27	-	38.76	74.00	35.24



Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



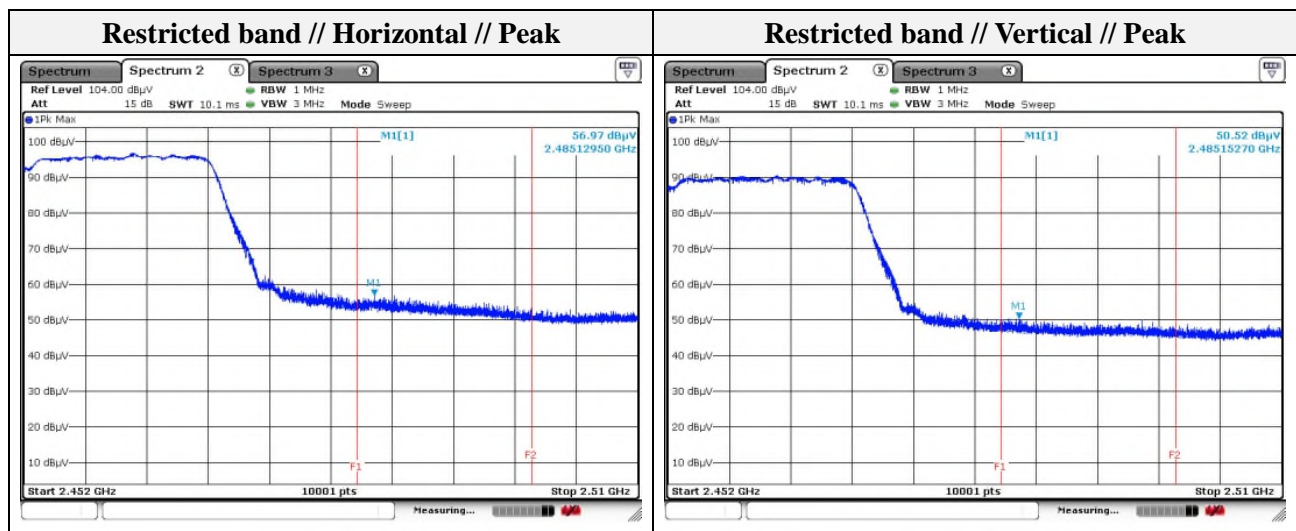
Mode: 802.11n(HT40)
Distance of measurement: 3 meter
Channel: 09

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1130.09	49.27	Peak	H	-11.27	-	38.00	74.00	36.00
1071.09	49.17	Peak	V	-11.29	-	37.88	74.00	36.12

- Band edge

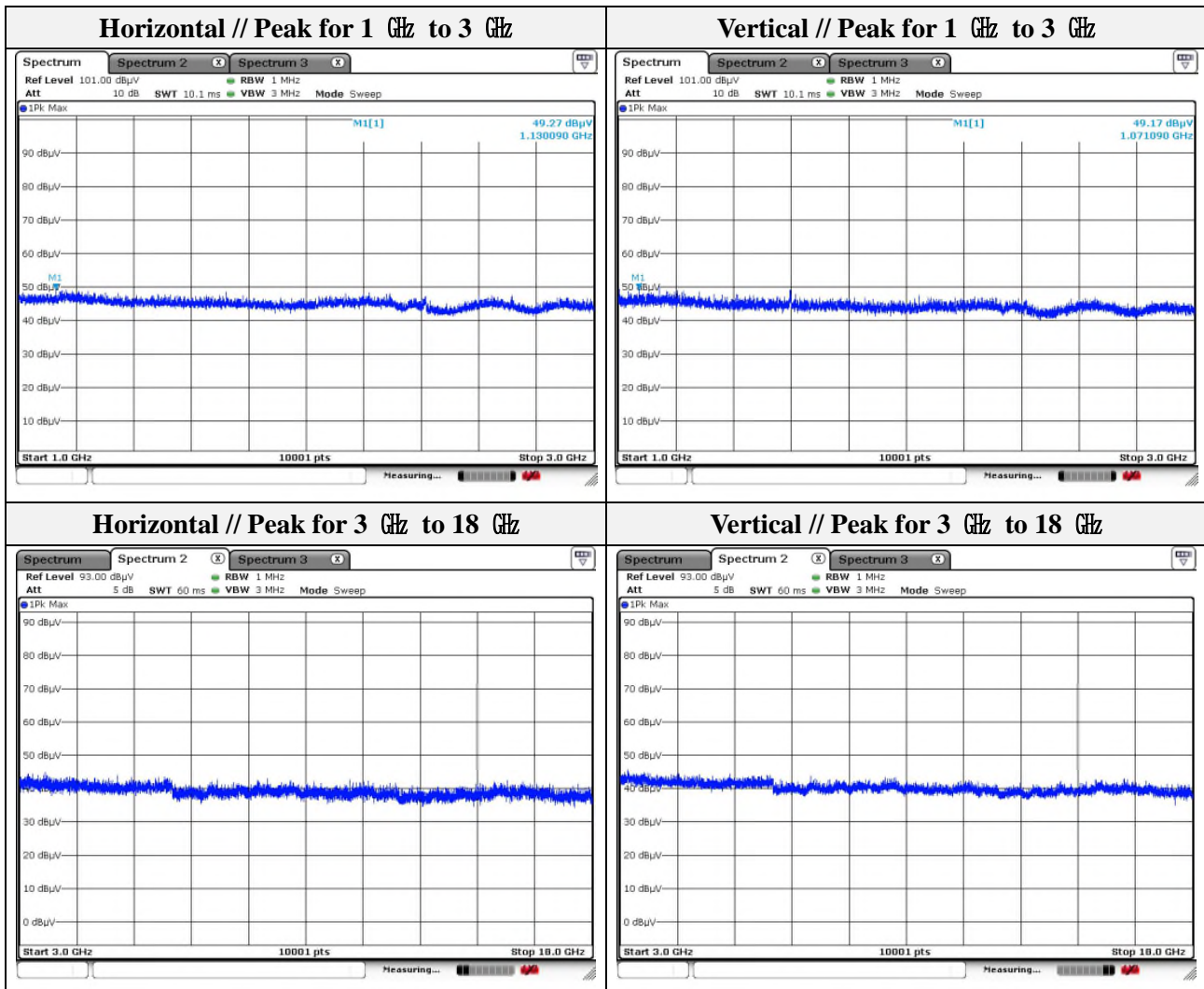
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2485.13	56.97	Peak	H	-7.55	-	49.42	74.00	24.58
2485.15	50.52	Peak	V	-7.55	-	42.97	74.00	31.03



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



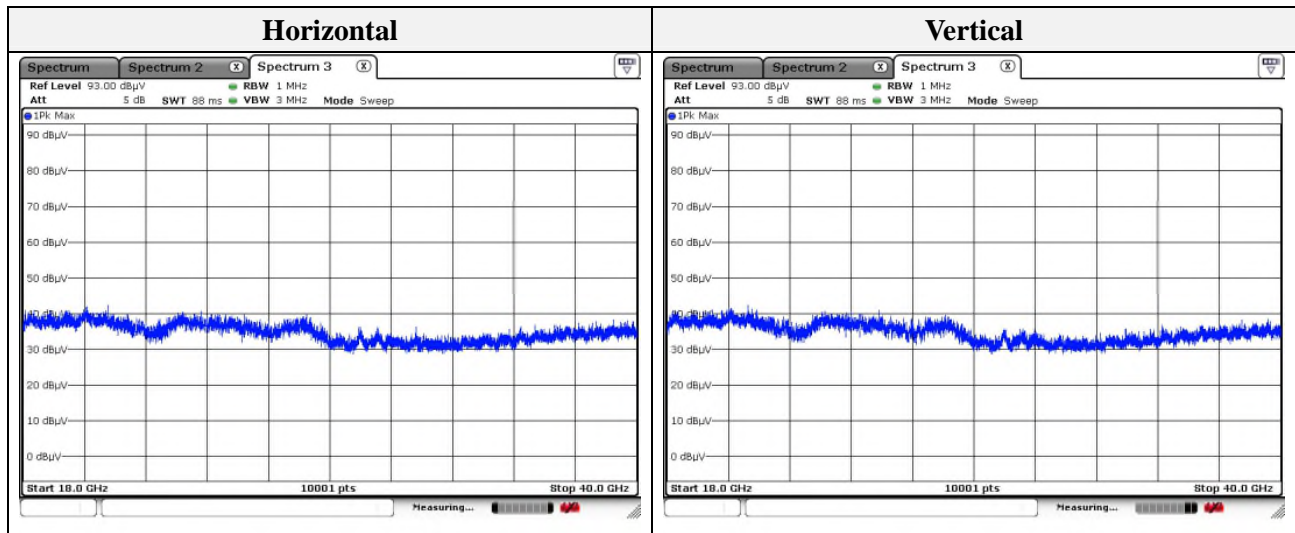
Note.

1. No spurious emission were detected above 3 GHz.
2. Average test would be performed if the peak result were greater than the average limit.



Test results (18 GHz to 30 GHz) – Worst case

Mode: 802.11n_HT40
Distance of measurement: 3 meter
Channel: 09 (Worst case)



Note.

1. No spurious emission were detected above 18 GHz.



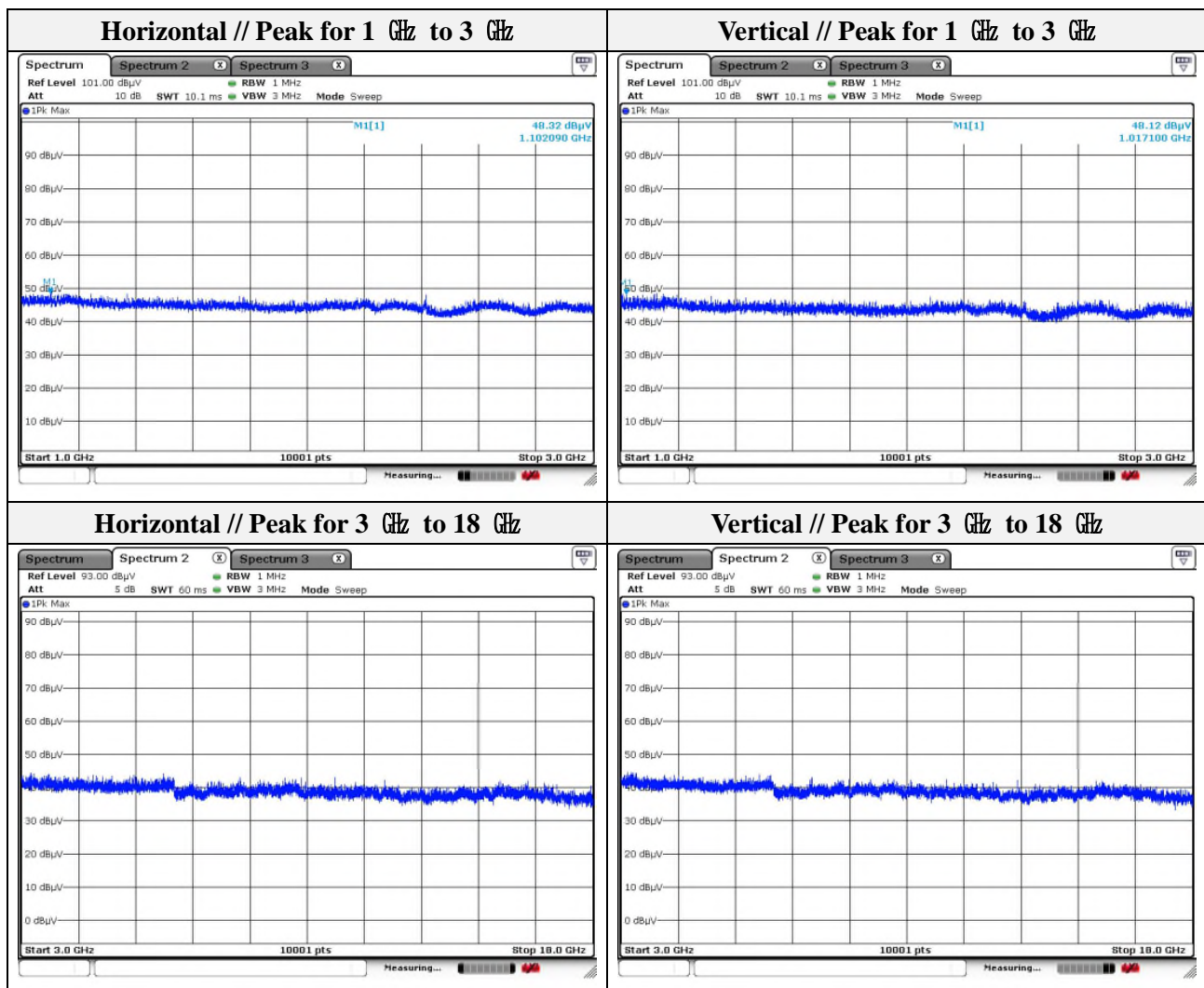
Test results (Above 1 000 MHz)

Mode: LE + WLAN

Distance of measurement: 3 meter

- Spurious

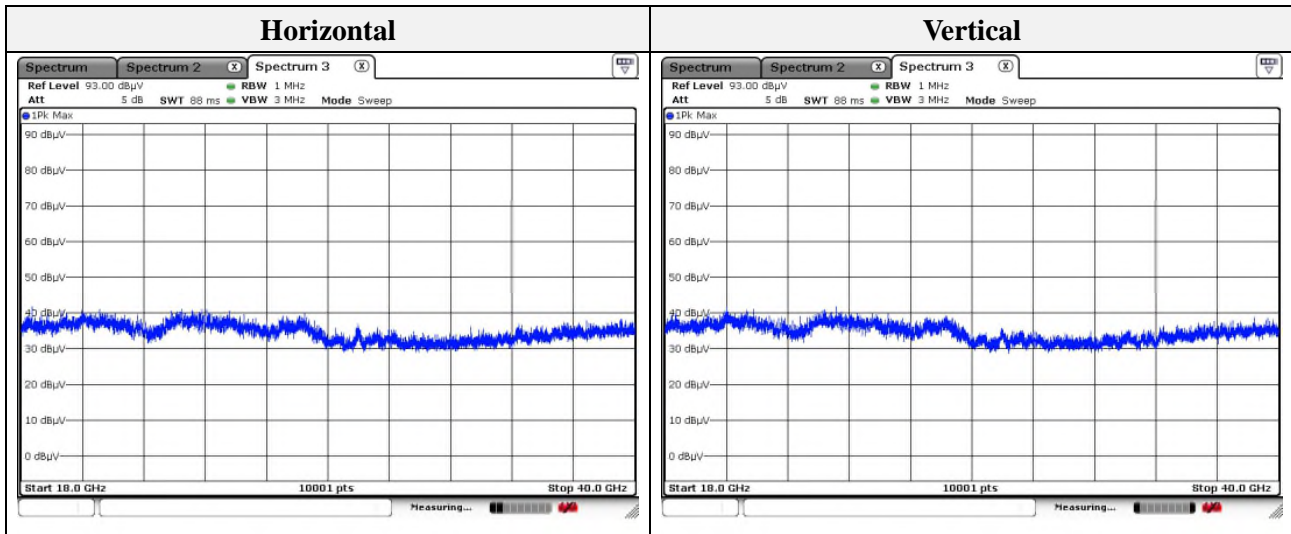
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1150.68	48.80	Peak	H	-11.27	-	37.53	74.00	36.47
1093.89	49.57	Peak	V	-11.28	-	38.29	74.00	35.71



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

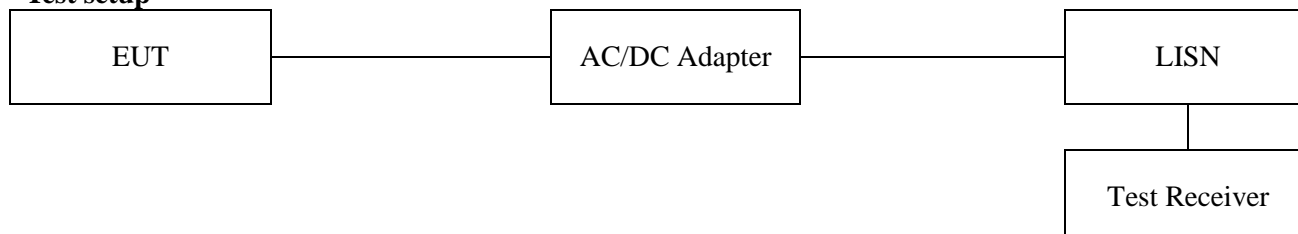


Note.

1. This product can operate both bluetooth and wlan at the same time, so it additionally performs spurious measurements in the simultaneous operation state.
2. No spurious emission were detected above 3 GHz.
3. No spurious emission were detected above 18 GHz.
4. Average test would be performed if the peak result were greater than the average limit.

3.2 AC conducted emissions

Test setup



Limit

According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dBμV/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Note:

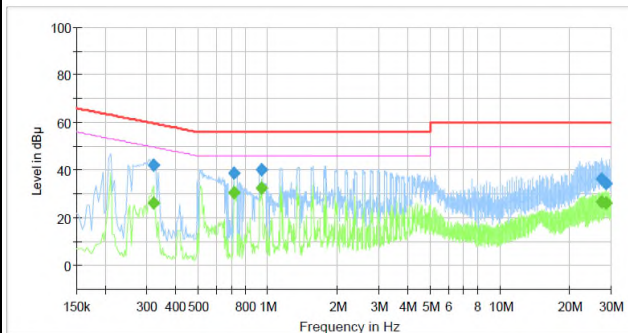
1. All AC line conducted spurious emission are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and the appropriate frequencies. All data rates and modes were investigated for conducted spurious emission. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.
2. Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).



Test results

Mode: 802.11b (Worst case)
Distance of measurement: 3 meter
Channel: 1 (Worst case)

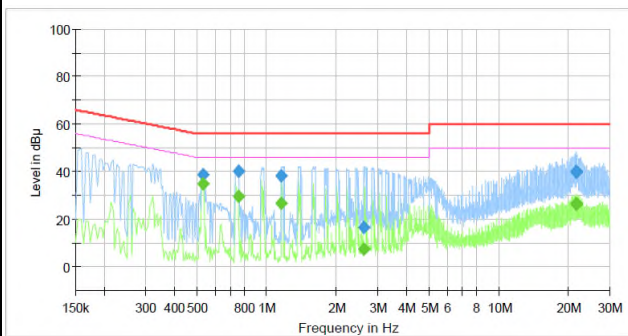
Hot Line



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.322000	---	26.32	49.66	23.34	1000.0	9.000	L1	19.7
0.322000	41.99	---	59.66	17.67	1000.0	9.000	L1	19.7
0.718000	---	30.53	46.00	15.47	1000.0	9.000	L1	20.0
0.718000	38.88	---	56.00	17.12	1000.0	9.000	L1	20.0
0.942000	---	32.33	46.00	13.67	1000.0	9.000	L1	20.2
0.942000	40.11	---	56.00	15.89	1000.0	9.000	L1	20.2
27.542000	---	26.44	50.00	23.56	1000.0	9.000	L1	21.3
27.542000	36.20	---	60.00	23.80	1000.0	9.000	L1	21.3
28.810000	---	26.34	50.00	23.66	1000.0	9.000	L1	21.3
28.810000	34.36	---	60.00	25.64	1000.0	9.000	L1	21.3

Neutral Line



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.530000	---	34.79	46.00	11.21	1000.0	9.000	N	19.9
0.530000	38.56	---	56.00	17.44	1000.0	9.000	N	19.9
0.754000	---	29.39	46.00	16.61	1000.0	9.000	N	20.1
0.754000	40.19	---	56.00	15.81	1000.0	9.000	N	20.1
1.158000	---	26.49	46.00	19.51	1000.0	9.000	N	20.2
1.158000	38.38	---	56.00	17.62	1000.0	9.000	N	20.2
2.626000	---	7.48	46.00	38.52	1000.0	9.000	N	20.3
2.626000	16.72	---	56.00	39.28	1000.0	9.000	N	20.3
21.438000	---	26.68	50.00	23.32	1000.0	9.000	N	21.1
21.438000	39.95	---	60.00	20.05	1000.0	9.000	N	21.1
21.630000	---	26.02	50.00	23.98	1000.0	9.000	N	21.1
21.630000	39.84	---	60.00	20.16	1000.0	9.000	N	21.1

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	1 year	2021.04.01
SPECTRUM ANALYZER	R&S	FSV40	101725	1 year	2021.06.22
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2021.01.15
SIGNAL GENERATOR	KEYSIGHT	N5182B	MY59100115	1 year	2021.05.12
Power Meter	Anritsu	ML2495A	1438001	1 year	2021.05.12
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2021.05.12
DC POWER SUPPLY	SORENSEN	DCS40-75E	1408A02745	1 year	2021.01.15
ATTENUATOR	Mini-Circuits	BW-S10-2W263+	1	1 year	2021.01.17
Loop Antenna	Schwarzbeck	FMZB1513	225	2 years	2021.02.15
BILOG ANTENNA	VULB 9168	SCHWARZBECK	9168-461	2 years	2022.05.26
HORN ANTENNA	A.H.	SAS-571	414	1 years	2021.01.31
BAND REJECT FILTER	MICRO-TRONICS	BRM50702	G272	1 year	2021.01.15
BAND REJECT FILTER	MICRO-TRONICS	BRM50716	G199	1 year	2021.01.15
AMPLIFIER	310N	SONOMA INSTRUMENT	401123	1 year	2021.06.08
PREAMPLIFIER	8449B	AGILENT	8008A01640	1 year	2021.04.01
ATTENUATOR	F04-C1206-01	SRT	20022403	1 year	2021.05.06
EMI Test Receiver	R&S	ESR3	101781	1 year	2021.01.20
EMI Test Receiver	R&S	ESU26	100552	1 year	2021.04.01
Pulse Limiter	R&S	ESH3-Z2	101915	1 year	2021.01.02
LISN	R&S	ENV216	101787	1 year	2021.01.02

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook computer	LG Electronics Inc.,	15UD590	904QCSF564006
Test Jig Board	N/A	N/A	N/A