

TEST REPORT

Part 15 Subpart C 15.247

Equipment under test H901(InHand Watch)

Model name IHP-W01AU

FCC ID 2BCF6-IHP-W01AU

Applicant InHandPlus, Inc.

Manufacturer Shenzhen Huile Intelligent Technology
Limited

Date of test(s) 2023.08.08 ~ 2023.08.16

Date of issue 2023.08.18

Issued to

InHandPlus, Inc.

543, 87, Cheongam-ro, Nam-gu, Pohang-si,
Gyeongsangbuk-do, Republic of Korea
Tel: +82-70-4755-8000

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 :
	
Dong-Uk, Kim Test engineer	Young-Jin, Lee Technical manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS

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 kes@kes.co.kr

**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

Report No.:

KES-RF-23T0111

Page (2) of (75)

Revision history

Revision	Date of issue	Test report No.	Description
-	2023.08.18	KES-RF-23T0111	Initial

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 kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (3) of (75)

TABLE OF CONTENTS

1.	General information	4
1.1.	EUT description	4
1.2.	Test configuration.....	5
1.3.	Information about derivative model	5
1.4.	Accessory information.....	5
1.5.	Sample calculation	5
1.6.	Measurement Uncertainty	5
1.7.	Frequency/channel operations.....	6
2.	Summary of tests.....	7
3.	Test results.....	8
3.1.	6 dB bandwidth	8
3.2.	Output power.....	14
3.3.	Power spectral density	16
3.4.	Radiated restricted band and emissions.....	22
3.5.	Conducted spurious emissions & band edge	59
3.6.	AC conducted emissions	70
3.7.	Antenna Requirement.....	73
Appendix A.	Measurement equipment	74
Appendix B.	Test setup photos	75

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 kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (4) of (75)

1. General information

Applicant: InHandPlus, Inc.
Applicant address: 543, 87, Cheongam-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, Republic of Korea
Test site: KES Co., Ltd.
Test site address: ☐ 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
☒ 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea
Test Facility: FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s): 15.247
FCC ID: 2BCF6-IHP-W01AU
Test device serial No.: ☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test: H901(InHand Watch)
Frequency range: 2 402 MHz ~ 2 480 MHz (LE 1 Mbps)
2 412 MHz ~ 2 462 MHz (802.11b/g/n_HT20)
2 422 MHz ~ 2 452 MHz (802.11n_HT40)
Model: IHP-W01AU
Modulation technique: GFSK, DSSS, OFDM
Number of channels: 2 402 MHz ~ 2 480 MHz (LE 1 Mbps) : 40 ch
2 412 MHz ~ 2 462 MHz (802.11b/g/n_HT20) : 11 ch
2 422 MHz ~ 2 452 MHz (802.11n_HT40) : 7 ch
Antenna specification: LE 1 Mbps : Chip Antenna // Peak gain: 1.2 dBi
WLAN 2.4 GHz : Chip Antenna // Peak gain: 1.2 dBi
Power source: DC 3.70 V (Battery)
H/W version: V 1.0
S/W version: V 1.0

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 kes@kes.co.kr

1.2. Test configuration

The **InHandPlus, Inc. // H901(InHand Watch) // IHP-W01AU // FCC ID: 2BCF6-IHP-W01AU** was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents.

FCC Part 15.247
KDB 558074 D01 v05 r02
ANSI C63.10-2013

1.3. Information about derivative model

N/A

1.4. Accessory information

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

1.5. Sample calculation

Where relevant, the following sample calculation is provided
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.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 1.13 + 10 = 11.13 \text{ (dB)}\end{aligned}$$

For Radiation test :

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) – Amplifier gain (dB)

1.6. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.38 dB (SHIELD ROOM #6)
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1GHz	4.50 dB (SAC #6)
	Above 1GHz	4.90 dB (SAC #5)
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

1.7. Frequency/channel operations

Ch.	Frequency (MHz)	Rate(Mbps)
00	2 402	LE 1 Mbps
.	.	.
20	2 442	LE 1 Mbps
.	.	.
39	2 480	LE 1 Mbps

Ch.	Frequency (MHz)	Rate(Mbps)
01	2 412	802.11b/g/n_HT20
.	.	.
06	2 437	802.11b/g/n_HT20
.	.	.
11	2 462	802.11b/g/n_HT20

Ch.	Frequency (MHz)	Rate(Mbps)
03	2 422	802.11n_HT40
.	.	.
06	2 437	802.11n_HT40
.	.	.
09	2 452	802.11n_HT40

2. Summary of tests

Section in FCC Part 15	Parameter	Test results
15.247(a)(2)	6 dB bandwidth	Pass
15.247(b)(3)	Output power	Pass
15.247(e)	Power spectral density	Pass
15.205, 15.209	Radiated restricted band and emission	Pass
15.247(d)	Conducted spurious emission and band edge	Pass
15.207(a)	AC Conducted emissions	Pass
15.203	Antenna Requirement	Pass

Note.

- Except for the list below, all tests were conducted with default output power.

2.4 GHz WLAN		
Mode	Frequency (MHz)	Setting value
802.11b/g	2 412	11
	2 437	11
	2 462	11
802.11n_HT20	2 412	11
	2 437	10
	2 462	11
802.11n_HT40	2 422	11
	2 437	11
	2 452	11

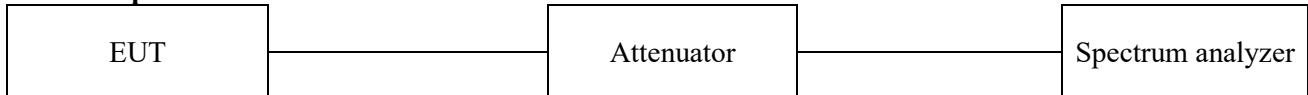
3. Test results

3.1. 6 dB bandwidth

Test procedure

ANSI C63.10-2013 - Section 11.8.2

Test setup



ANSI C63.10-2013 - Section 11.8.2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., $RBW = 100 \text{ kHz}$, $VBW \geq 3 \times RBW$, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geq 6 \text{ dB}$.

Limit

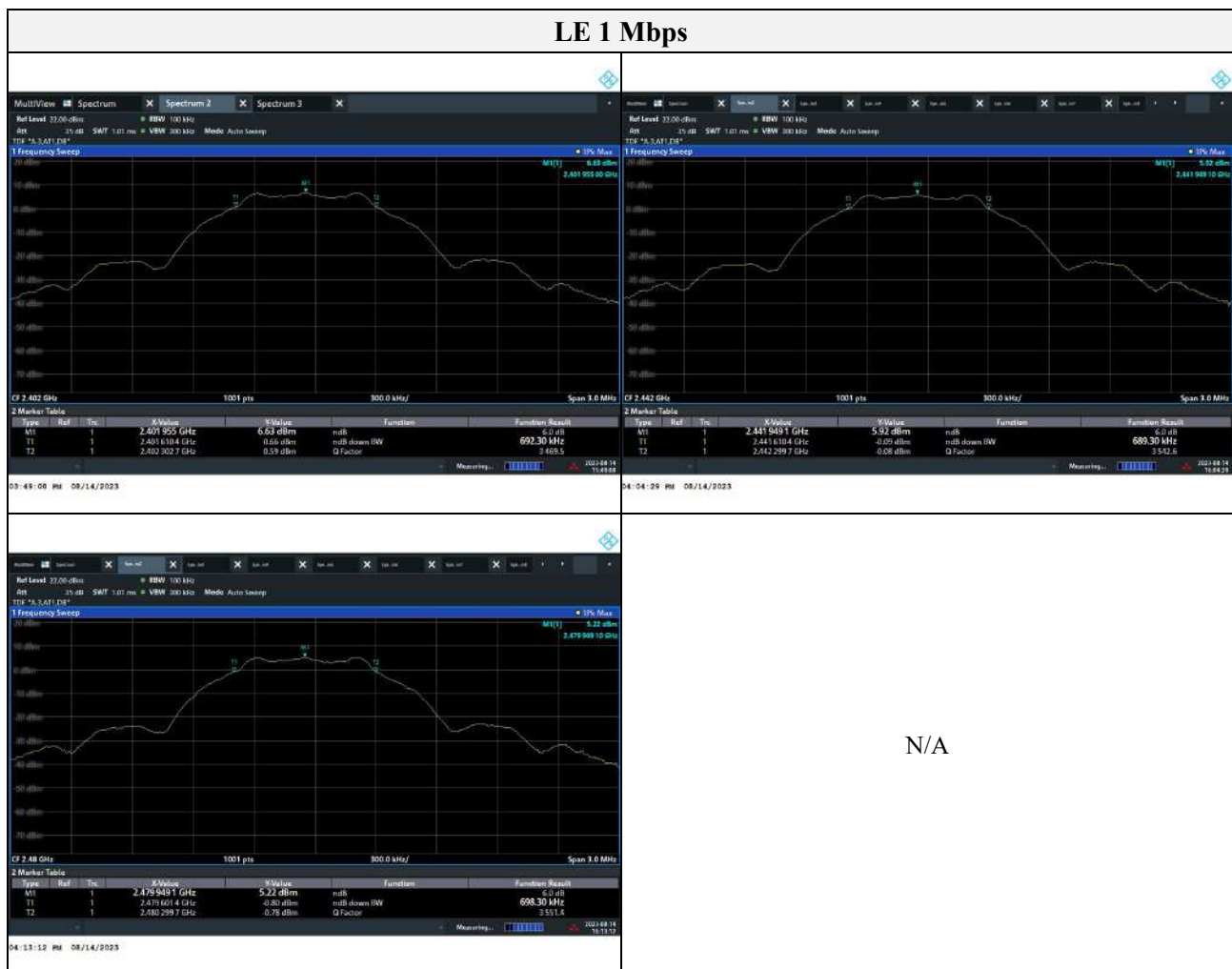
According to §15.247(a)(2), systems using digital modulation techniques may operate 902 ~ 928 MHz, 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.



Test results

Mode : LE 1 Mbps

Frequency(MHz)	6 dB bandwidth(MHz)	Limit(MHz)
2 402	0.692	≥ 0.500
2 442	0.689	
2 480	0.698	



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 kes@kes.co.kr



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

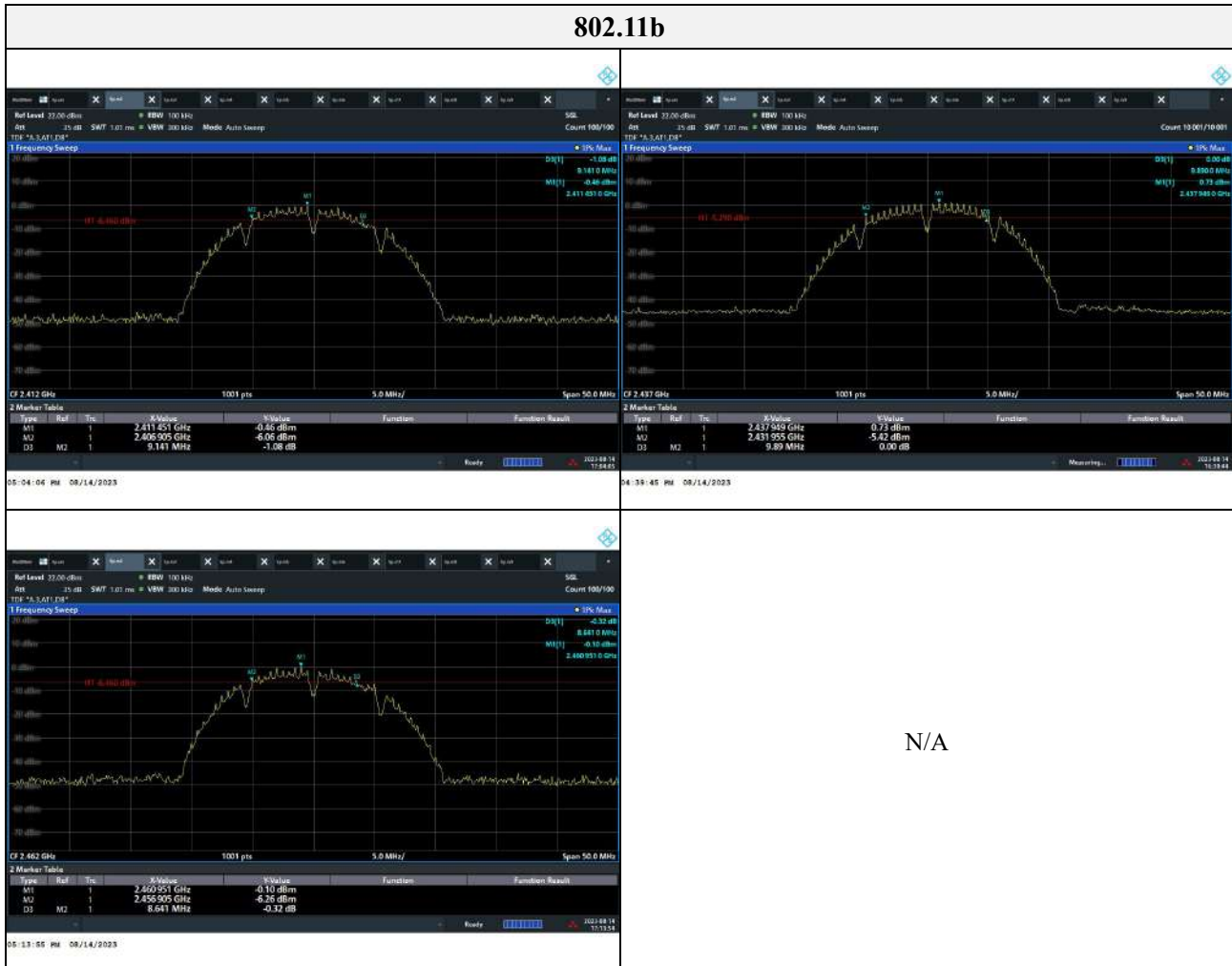
Report No.:

KES-RF-23T0111

Page (10) of (75)

Mode : 802.11b

Frequency(MHz)	6 dB bandwidth(MHz)	Limit(MHz)
2 412	9.141	≥ 0.500
2 437	9.890	
2 462	8.641	

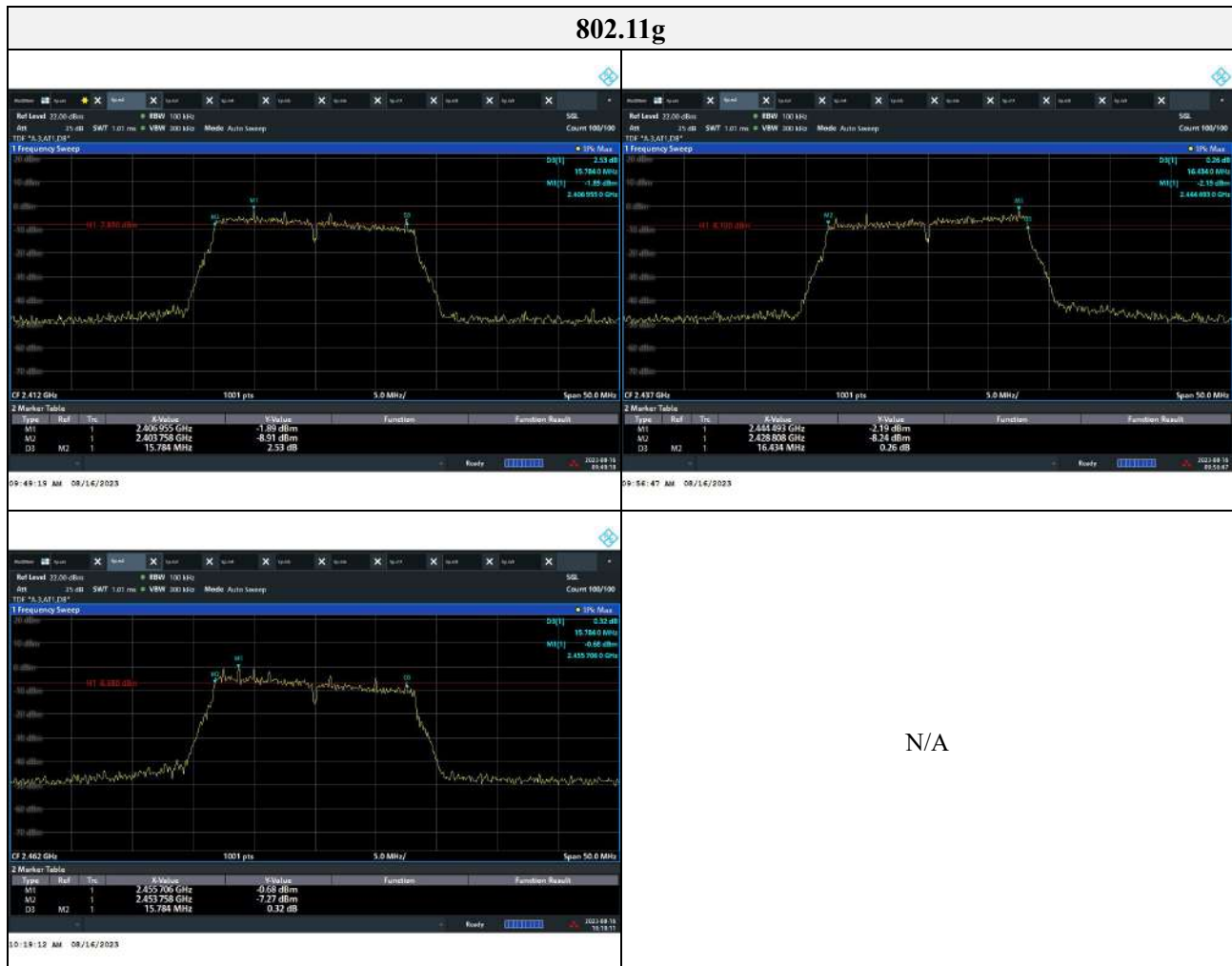


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11g

Frequency(MHz)	6 dB bandwidth(MHz)	Limit(MHz)
2 412	15.784	≥ 0.500
2 437	16.434	
2 462	15.784	

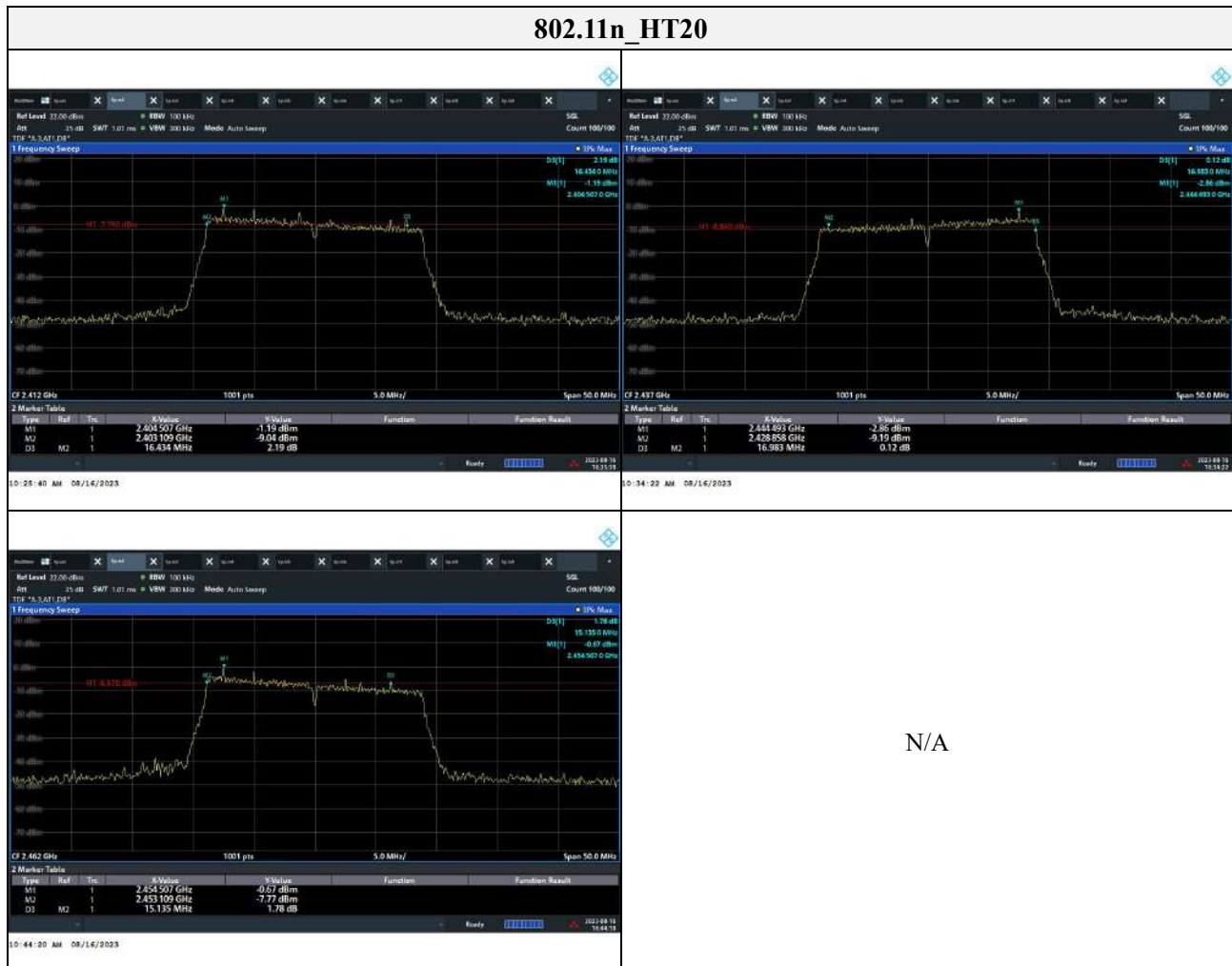


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11n HT20

Frequency(MHz)	6 dB bandwidth(MHz)	Limit(MHz)
2 412	16.434	≥ 0.500
2 437	16.983	
2 462	15.135	

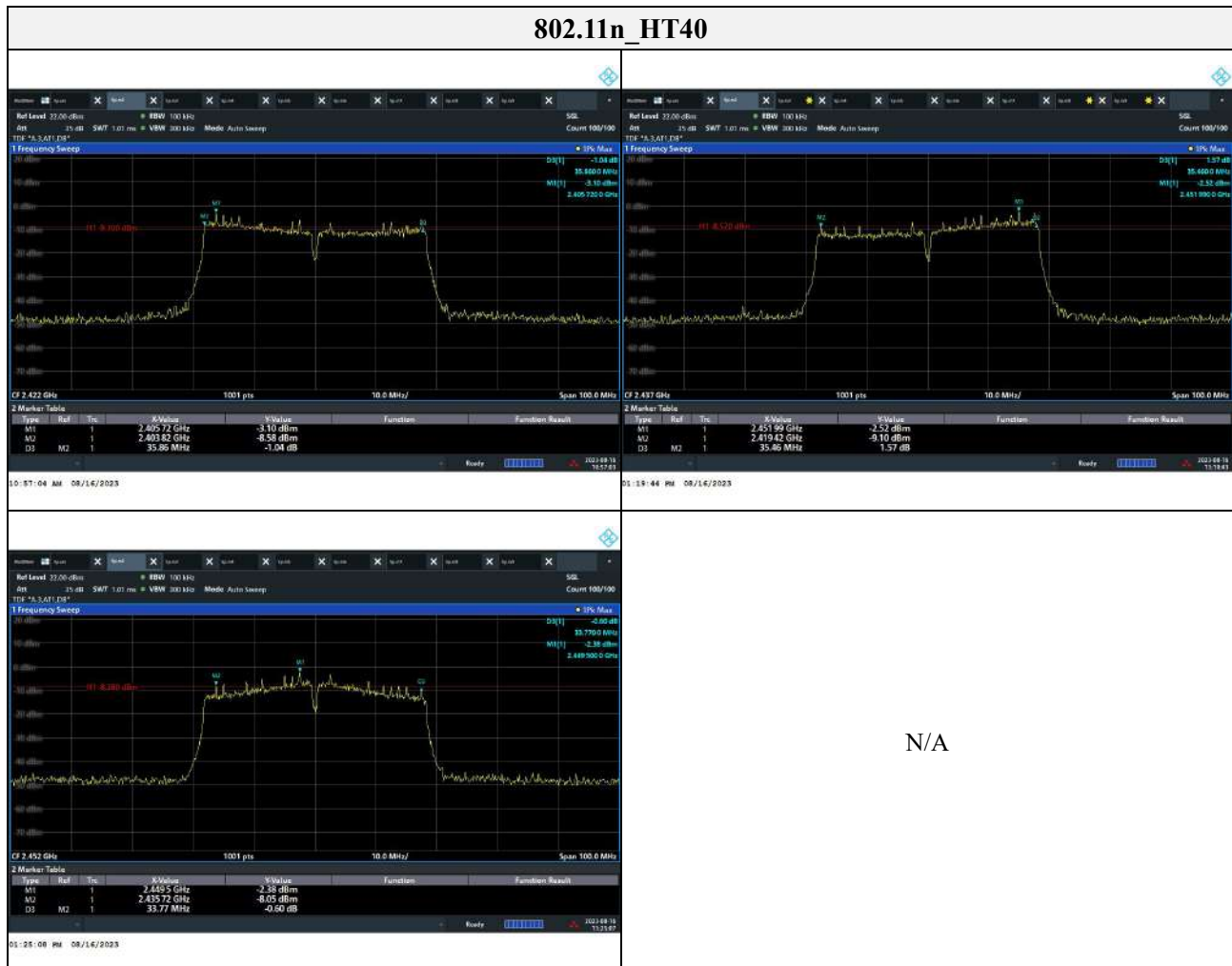


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11n HT40

Frequency(MHz)	6 dB bandwidth(MHz)	Limit(MHz)
2 422	35.860	≥ 0.500
2 437	35.460	
2 452	33.770	



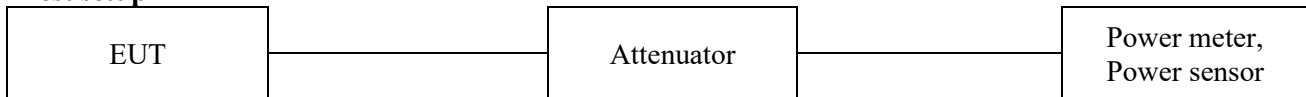
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

3.2. Output power

Test procedure

ANSI C63.10-2013 - Section 11.9.1.3 and 11.9.2.3.2

Test setup



ANSI C63.10-2013 - Section 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

ANSI C63.10-2013 - Section 11.9.2.3.2

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

Limit

According to §15.247(b)(3), For systems using digital modulation in the 902~928 MHz, 2 400~2 483.5 MHz, and 5 725~5 850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted out-put power. Maximum Conducted Out-put Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Limit

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

**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

Report No.:

KES-RF-23T0111

Page (15) of (75)

Test results

Mode	2 402 MHz		2 442 MHz		2 480 MHz	
	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
LE 1 Mbps	6.88	7.14	6.14	6.38	5.35	5.60

Mode	2 412 MHz		2 437 MHz		2 462 MHz	
	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
802.11b	8.28	10.39	8.68	10.64	8.21	10.21

Mode	2 412 MHz		2 437 MHz		2 462 MHz	
	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
802.11g	8.75	17.20	8.96	17.57	8.14	16.97

Mode	2 412 MHz		2 437 MHz		2 462 MHz	
	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
802.11n_HT20	8.82	17.84	8.02	17.45	8.32	17.50

Mode	2 422 MHz		2 437 MHz		2 452 MHz	
	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
802.11n_HT40	8.48	17.47	8.57	17.79	8.94	17.88

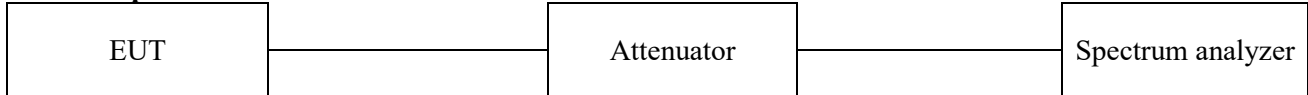
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

3.3. Power spectral density

Test procedure

ANSI C63.10-2013 - Section 11.10.2

Test setup



Section 10.2 & ANSI C63.10-2013 - Section 11.10.2

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Limit

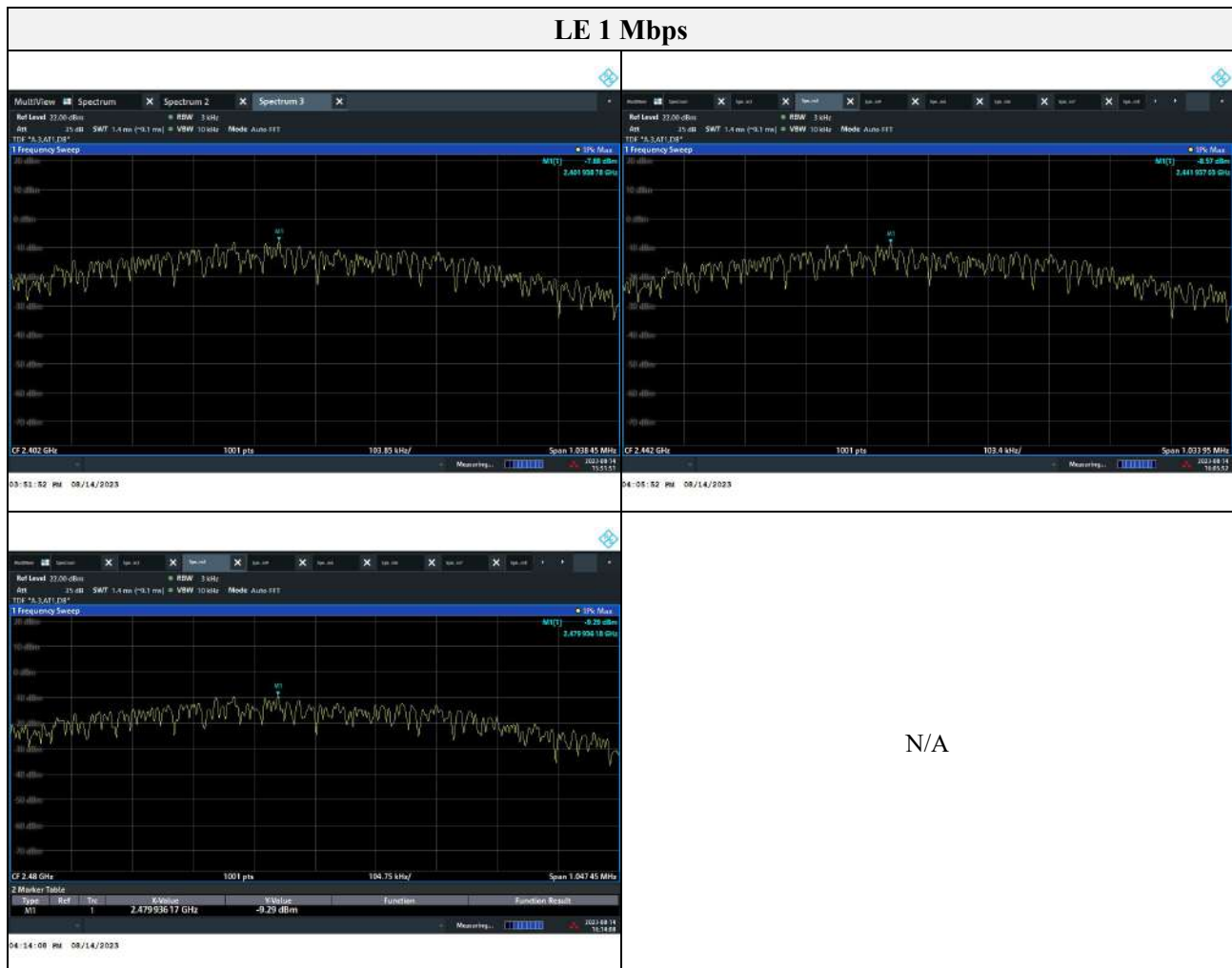
According to §15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.



Results

Mode : LE 1 Mbps

Frequency(MHz)	PSD (dBm/3 kHz)	Limit(dBm/3 kHz)
2 402	-7.88	8
2 442	-8.57	
2 480	-9.29	

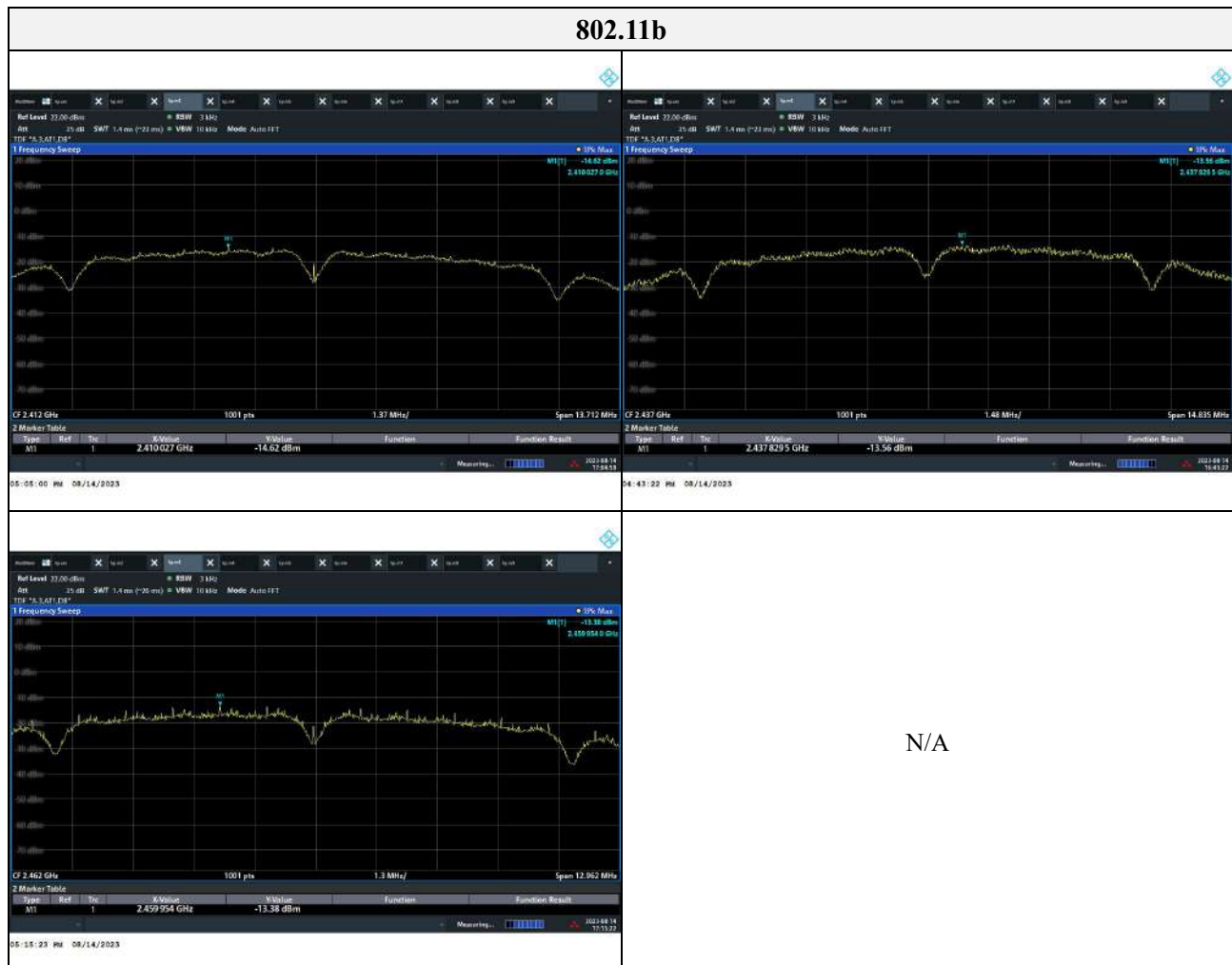


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11b

Frequency(MHz)	PSD (dBm/3 kHz)	Limit(dBm/3 kHz)
2 412	-14.62	8
2 437	-13.56	
2 462	-13.38	

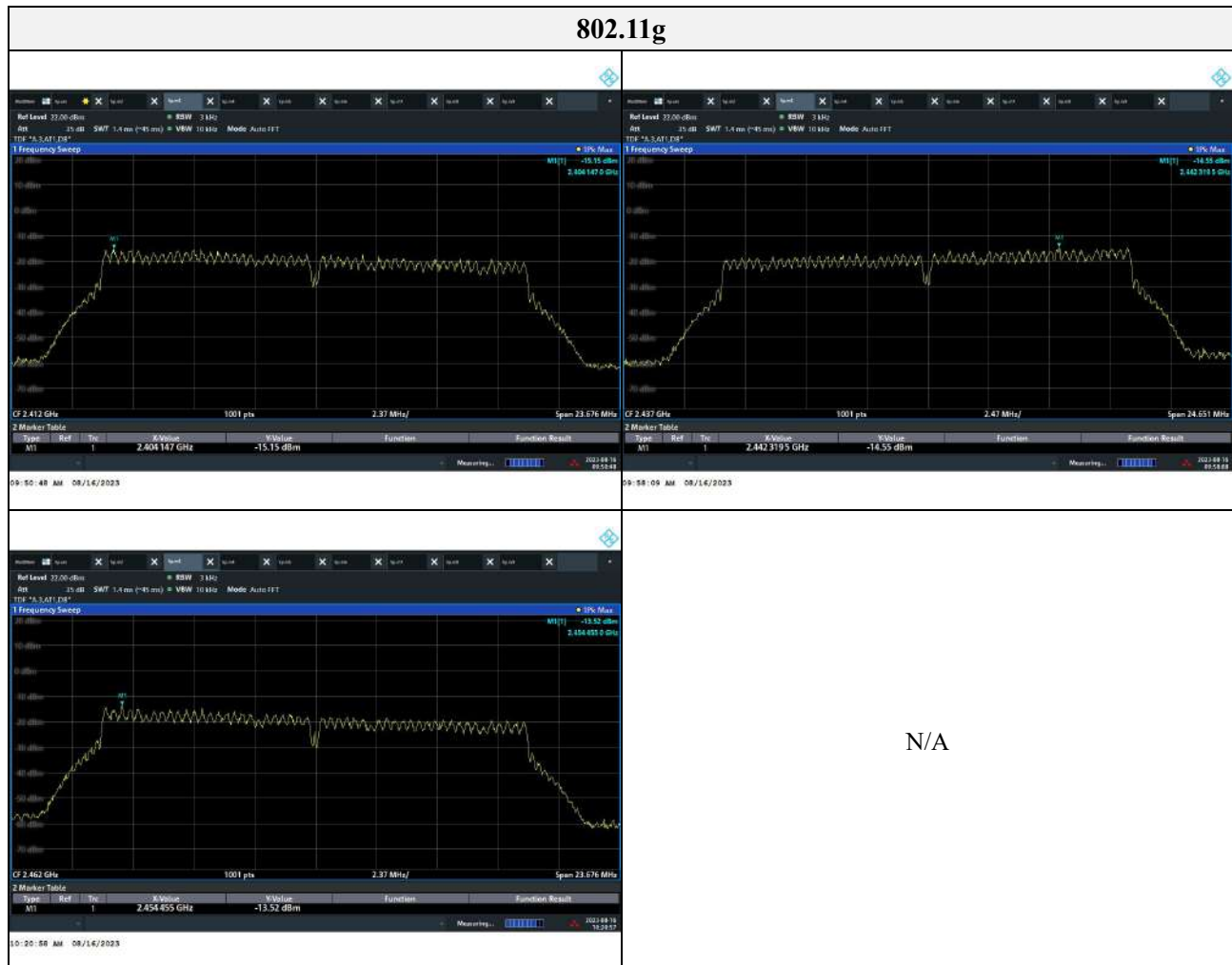


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11g

Frequency(MHz)	PSD (dBm/3 kHz)	Limit(dBm/3 kHz)
2 412	-15.15	8
2 437	-14.55	
2 462	-13.52	

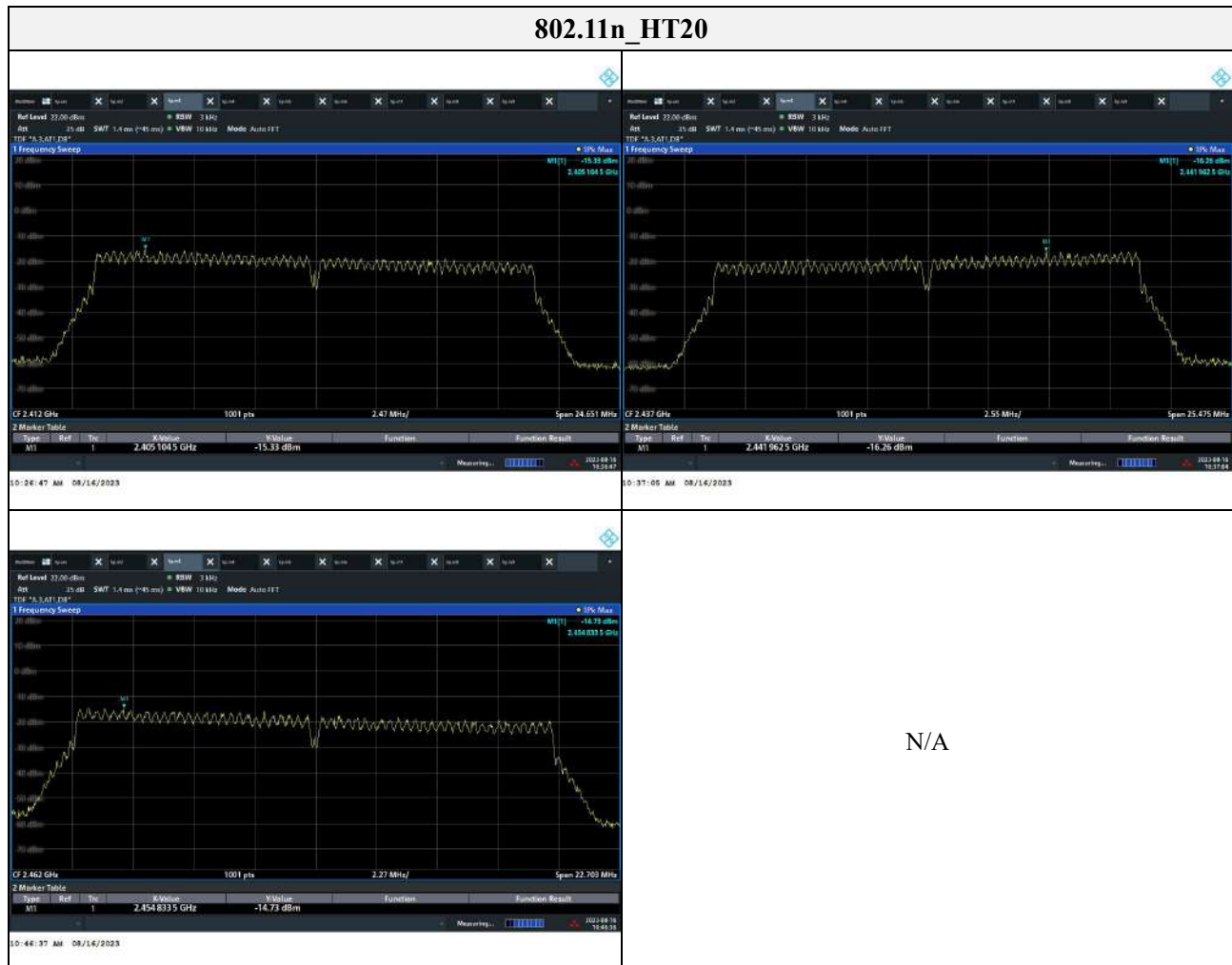


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



Mode : 802.11n HT20

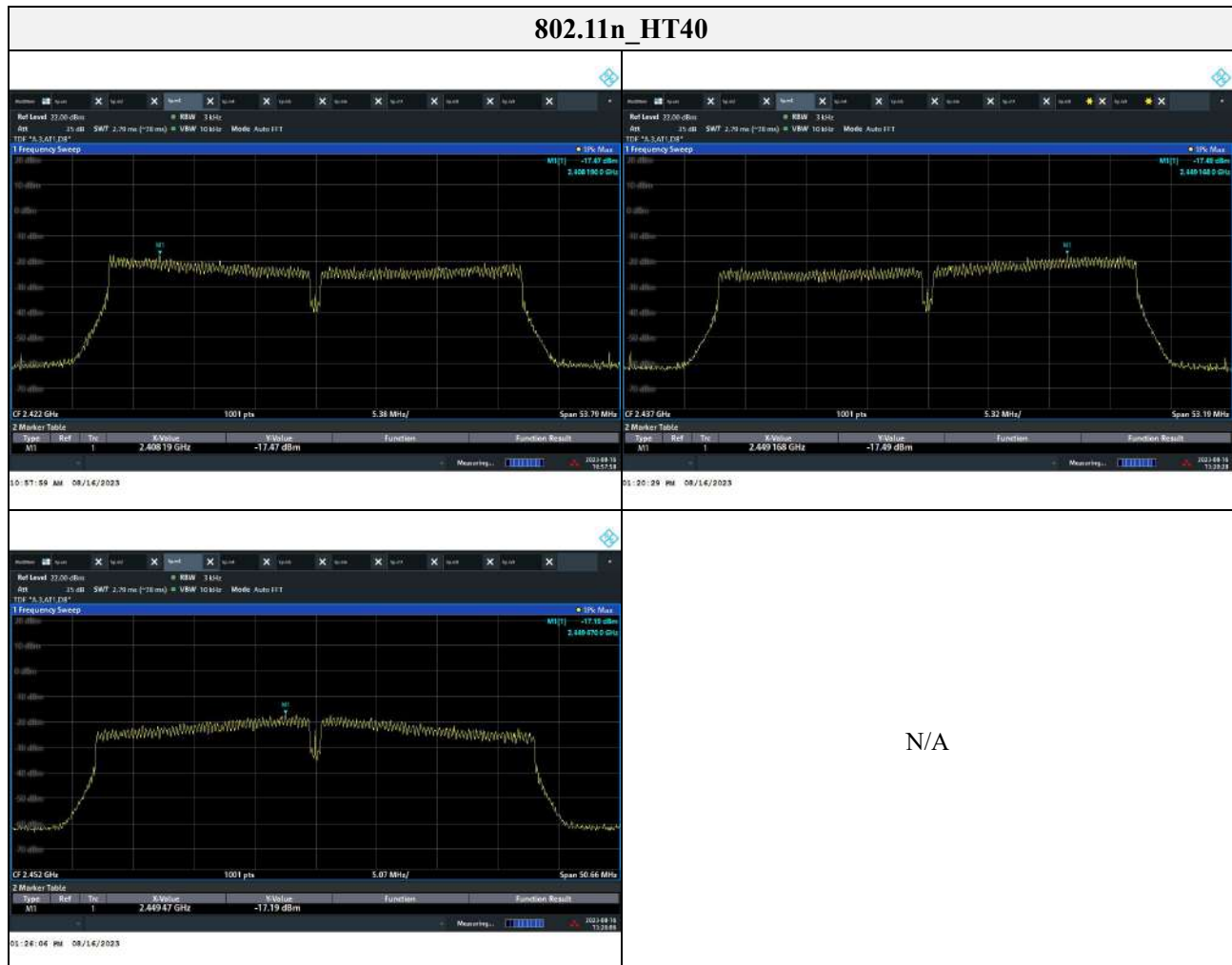
Frequency(MHz)	PSD (dBm/3 kHz)	Limit(dBm/3 kHz)
2 412	-15.33	8
2 437	-16.26	
2 462	-14.73	





Mode : 802.11n HT40

Frequency(MHz)	PSD (dBm/3 kHz)	Limit(dBm/3 kHz)
2 422	-17.47	8
2 437	-17.49	
2 452	-17.19	

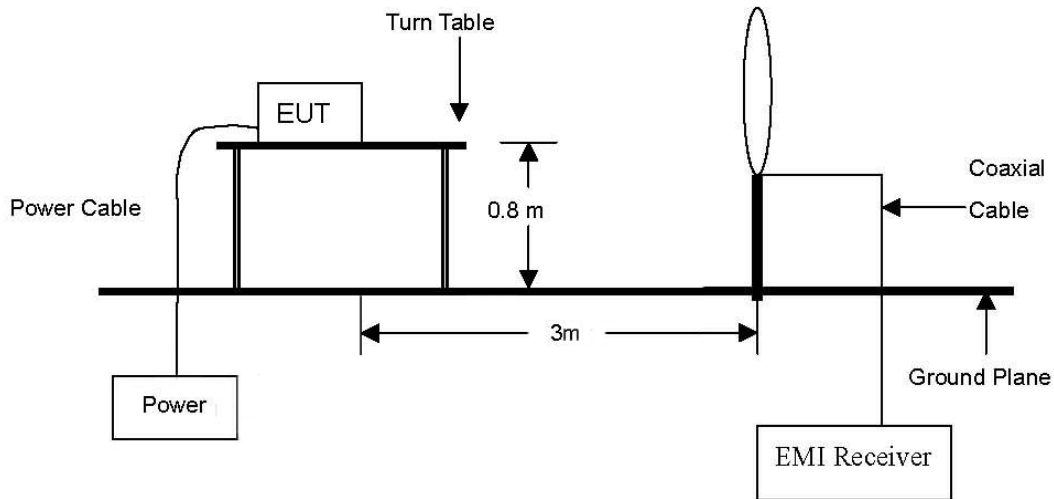


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

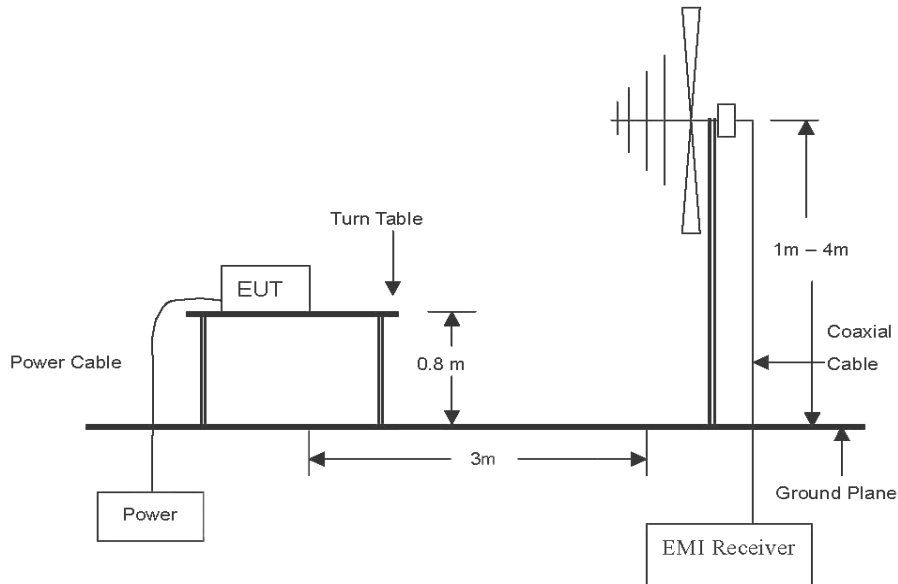
3.4. Radiated restricted band and emissions

Test setup

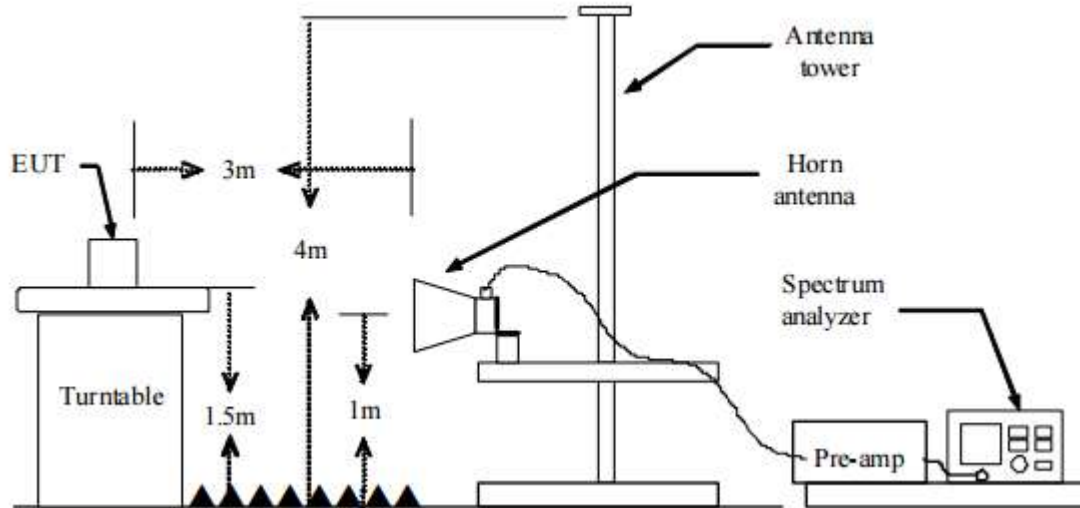
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



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

Radiated emissions from the EUT were measured according to the dictates in section 11.11 & 11.12 of ANSI C63.10-2013.

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, ground parallel and perpendicular of the antenna are set to make the measurement. It was determined that parallel was worst-case orientation; therefore, all final radiated testing was performed with the EUT in parallel.
3. 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.
4. 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 0.8 meters(30-1000MHz) / 1.5 meters(above 1GHz)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
- 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 $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. 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
2. Field strength(dB μ V/m) = Level(dB μ V) + CF (dB) + or DCF(dB)
3. Margin(dB) = Limit(dB μ V/m) - Field strength(dB μ V/m)
4. 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.
5. 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**.
6. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
7. According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field 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_v05 r02, 6. Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on- and off-times of the transmitted signal.
- The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on- and off-times of the transmitted signal.

Mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
LE 1 Mbps	0.40	0.63	0.63	63.20	1.99
802.11b	8.45	8.57	0.99	98.60	0.06
802.11g	1.42	1.57	0.90	90.45	0.43
802.11n_HT20	1.31	1.46	0.90	89.73	0.47
802.11n_HT40	0.66	0.81	0.81	81.48	0.89

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 kes@kes.co.kr



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

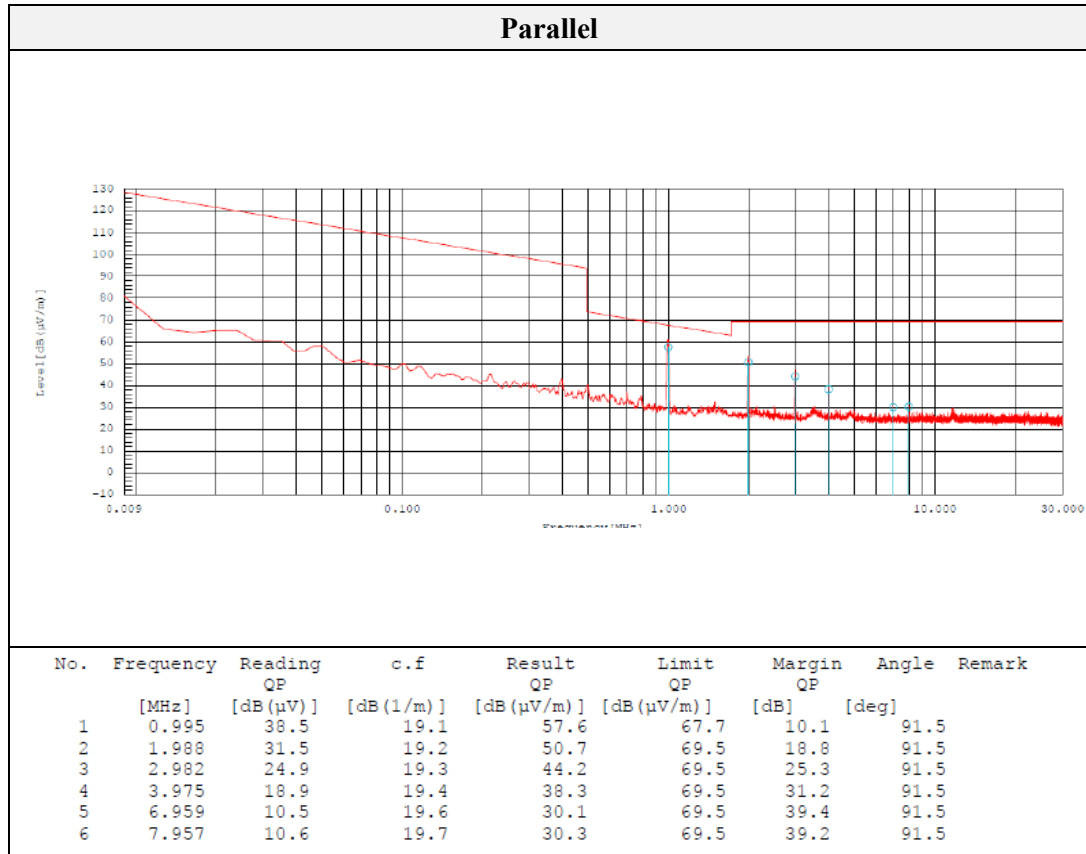
Report No.:

KES-RF-23T0111

Page (28) of (75)

Test results (Below 30 MHz)

Mode: LE 1 Mbps
Distance of measurement: 3 meter
Channel: 00 (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 kes@kes.co.kr



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

Report No.:

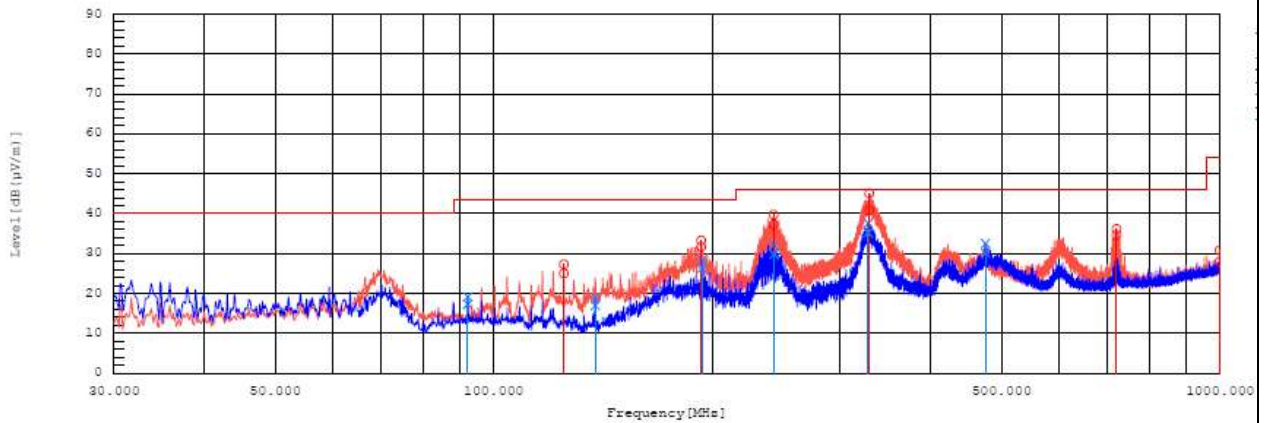
KES-RF-23T0111

Page (29) of (75)

Test results (Below 1 000 MHz)

Mode: LE 1 Mbps
Distance of measurement: 3 meter
Channel: 00 (Worst case)

Horizontal // Vertical

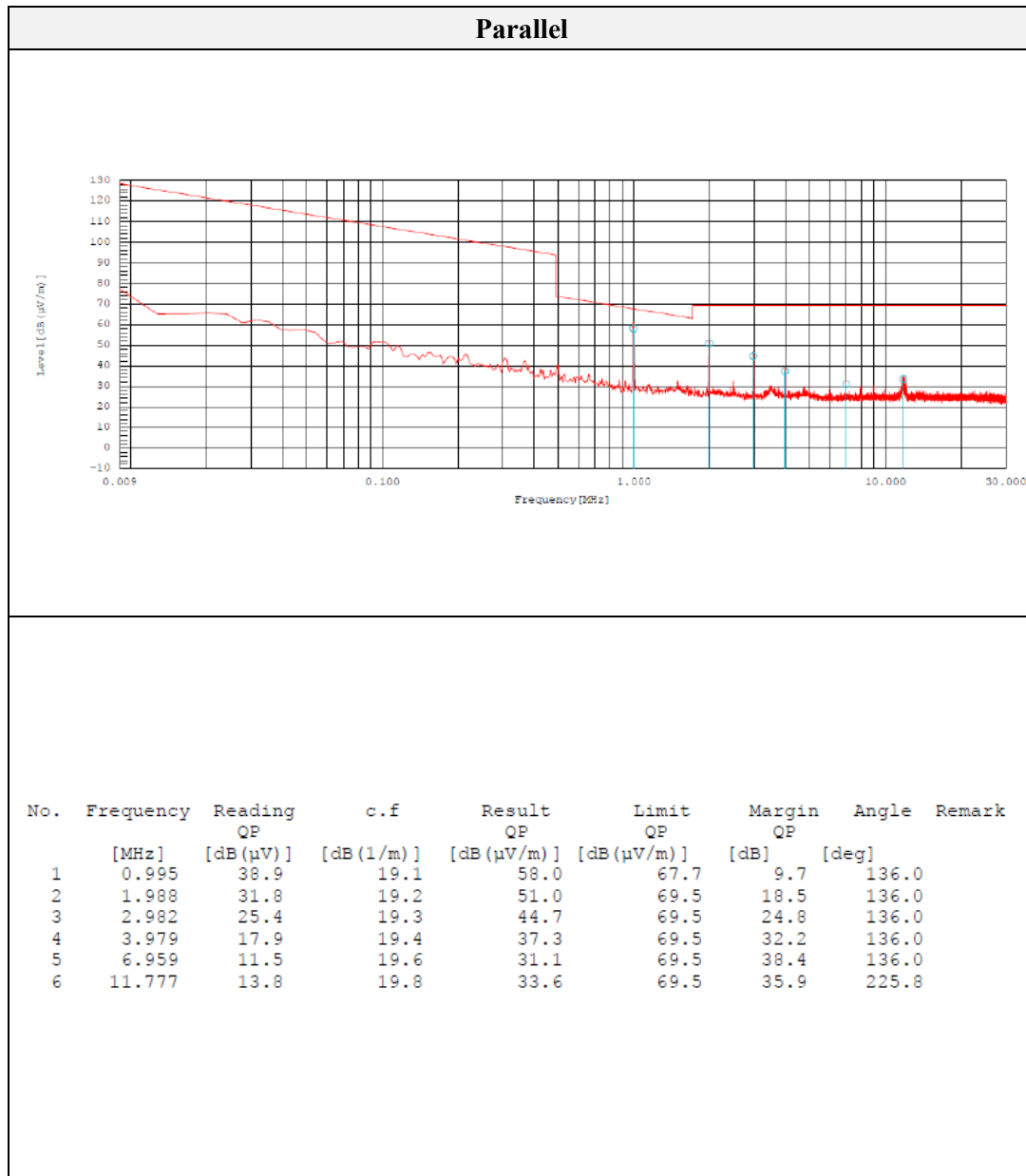


No.	Frequency [MHz]	Pol	Reading QP [dB (μV)]	c.f [dB (1/m)]	Result QP [dB (μV/m)]	Limit QP [dB (μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	92.080	V	31.8	-14.6	17.2	43.5	26.3	100.0	117.7	
2	124.939	H	40.3	-15.3	25.0	43.5	18.5	200.0	118.8	
3	138.034	V	32.8	-15.9	16.9	43.5	26.6	100.0	0.1	
4	193.081	H	44.7	-13.0	31.7	43.5	11.8	100.0	134.0	
5	193.445	V	39.3	-13.0	26.3	43.5	17.2	150.0	244.4	
6	242.915	H	48.3	-11.0	37.3	46.0	8.7	100.0	336.2	
7	243.279	V	40.8	-11.0	29.8	46.0	16.2	100.0	137.2	
8	327.911	V	43.8	-8.6	35.2	46.0	10.8	100.0	160.3	
9	328.881	H	49.4	-8.6	40.8	46.0	5.2	100.0	66.8	
10	475.594	V	35.8	-5.7	30.1	46.0	15.9	150.0	91.2	
11	720.761	H	37.5	-2.9	34.6	46.0	11.4	100.0	179.7	
12	998.424	H	25.4	2.5	27.9	54.0	26.1	100.0	202.8	

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 kes@kes.co.kr

Test results (Below 30 MHz)

Mode: 802.11g
 Distance of measurement: 3 meter
 Channel: 6 (Worst case)



Note.

1. No spurious emission were detected under 30 MHz, the above test result is the peak result.



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

Report No.:

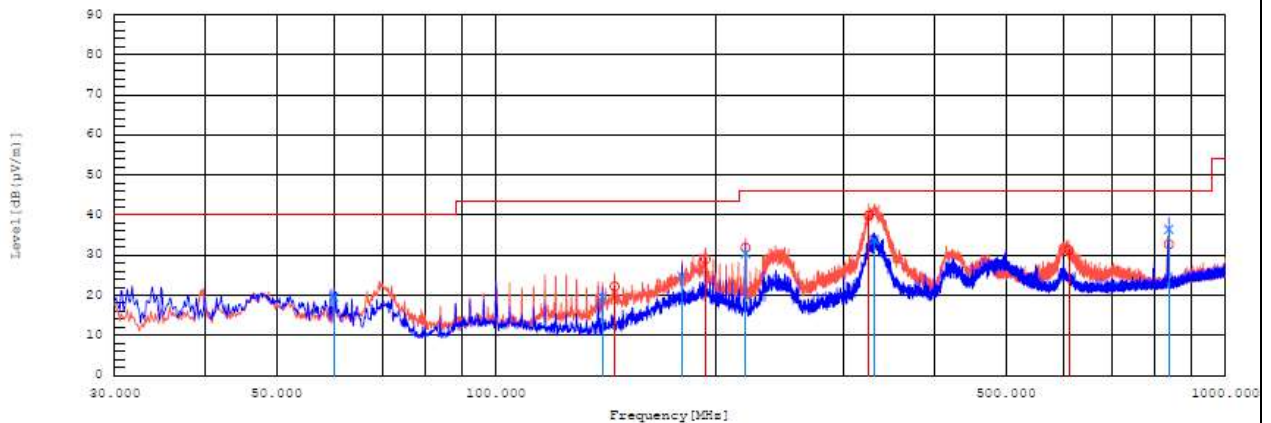
KES-RF-23T0111

Page (31) of (75)

Test results (Below 1 000 MHz)

Mode: 802.11g
Distance of measurement: 3 meter
Channel: 6 (Worst case)

Horizontal // Vertical



No.	Frequency [MHz]	Pol	Reading QP [dB (μV)]	c.f [dB (1/m)]	Result QP [dB (μV/m)]	Limit QP [dB (μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	59.949	V	32.1	-12.6	19.5	40.0	20.5	100.0	22.7	
2	139.974	V	35.6	-16.0	19.6	43.5	23.9	400.0	263.1	
3	145.430	H	38.4	-16.2	22.2	43.5	21.3	200.0	88.9	
4	179.986	V	38.5	-13.9	24.6	43.5	18.9	100.0	46.3	
5	193.809	H	41.9	-12.9	29.0	43.5	14.5	100.0	291.5	
6	219.999	H	43.7	-11.8	31.9	46.0	14.1	100.0	337.2	
7	219.999	V	42.2	-11.8	30.4	46.0	15.6	100.0	22.7	
8	324.516	H	48.7	-8.8	39.9	46.0	6.1	100.0	98.7	
9	330.336	V	42.3	-8.5	33.8	46.0	12.2	100.0	46.3	
10	610.181	H	34.8	-3.5	31.3	46.0	14.7	100.0	142.1	
11	837.040	V	37.9	-1.5	36.4	46.0	9.6	150.0	122.0	
12	837.404	H	34.2	-1.5	32.7	46.0	13.3	400.0	337.3	

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (32) of (75)

Test results (Above 1 000 MHz)

Mode: LE 1 Mbps

Distance of measurement: 3 meter

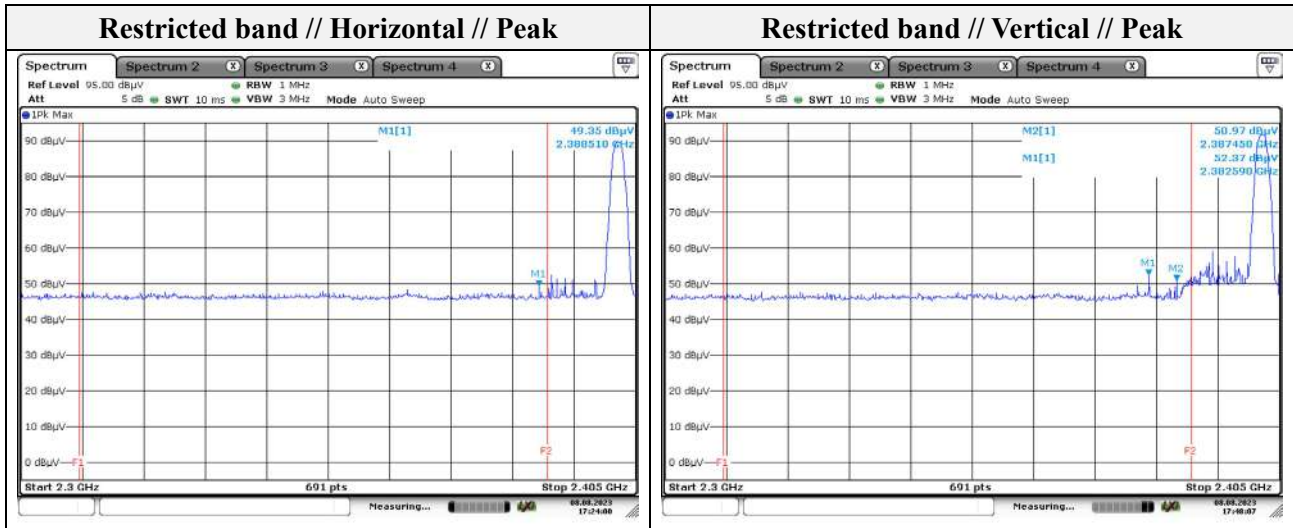
Channel: 00

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 383.50	48.40	Peak	H	-7.18	-	41.22	74.00	32.78
2 066.60	47.77	Peak	V	-2.39	-	45.38	74.00	28.62
2 393.60	50.08	Peak	V	-0.68	-	49.40	74.00	24.60
2 900.10	47.85	Peak	H	0.98	-	48.83	74.00	25.17

- 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)
2 382.59	52.37	Peak	V	-0.74	-	51.63	74.00	22.37
2 387.45	50.97	Peak	V	-0.71	-	50.26	74.00	23.74
2 388.51	49.35	Peak	H	-0.71	-	48.64	74.00	25.36



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 kes@kes.co.kr



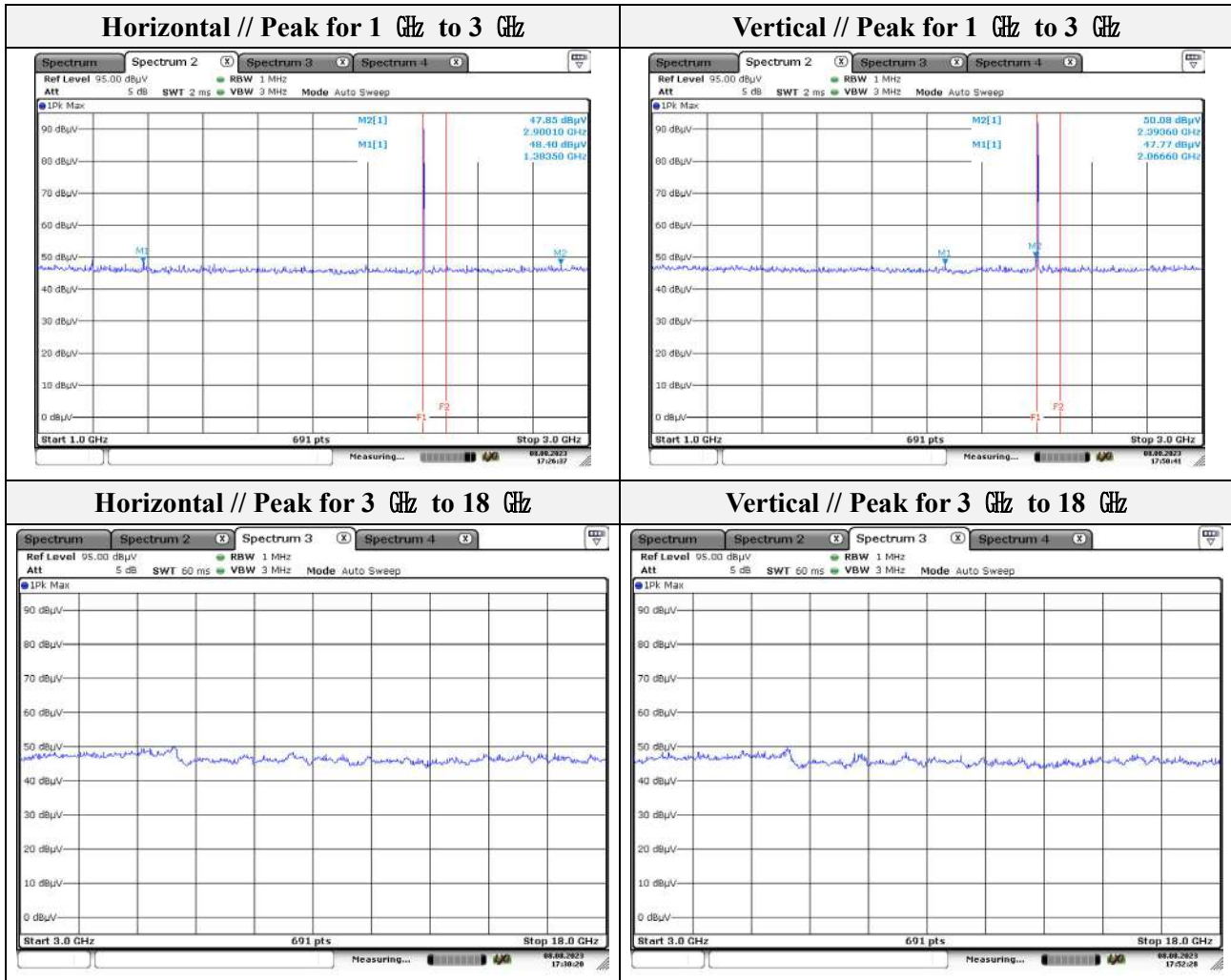
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (33) of (75)



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.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (34) of (75)

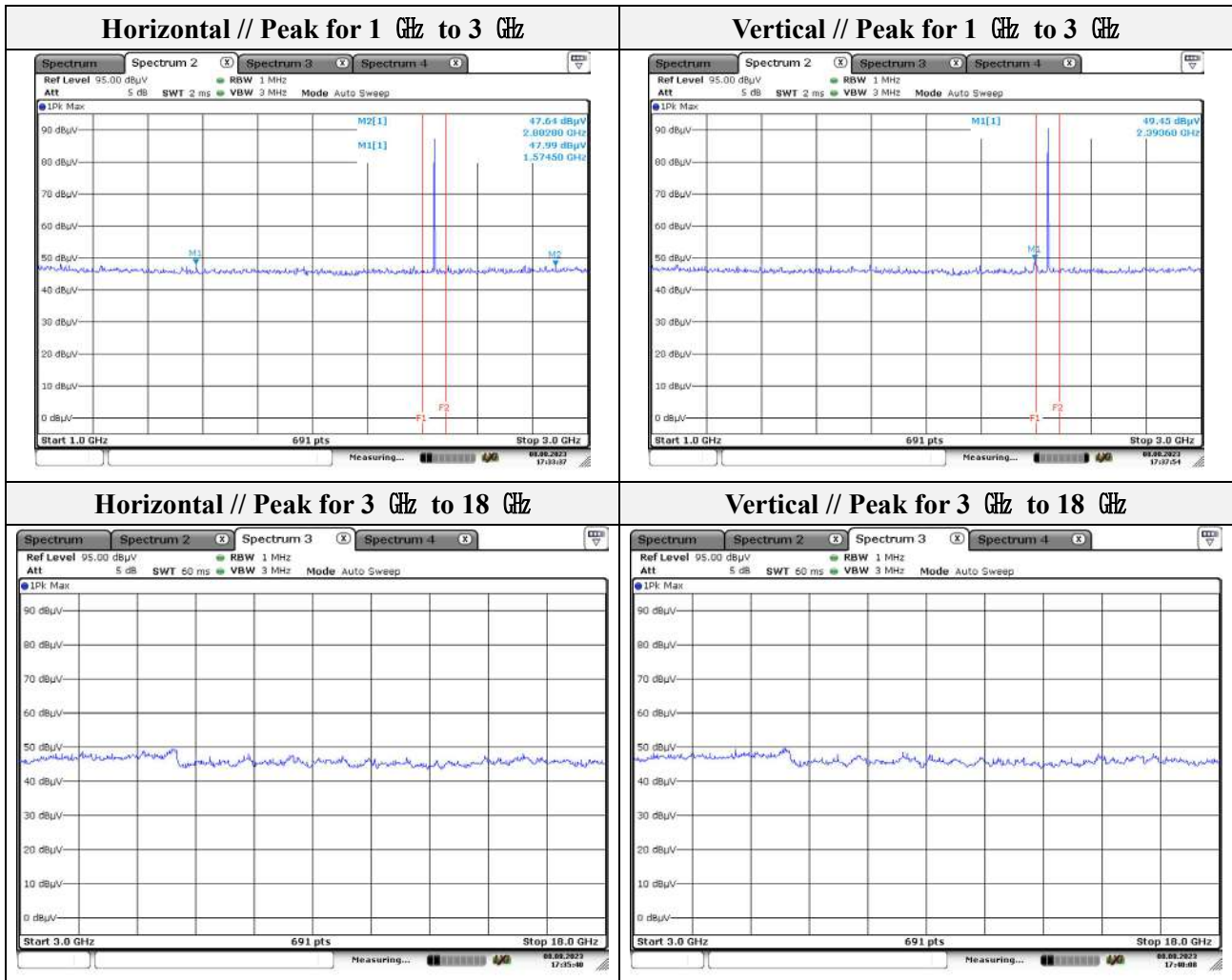
Mode: LE 1 Mbps

Distance of measurement: 3 meter

Channel: 20

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 574.50	47.99	Peak	H	-6.16	-	41.83	74.00	32.17
2 393.60	49.45	Peak	V	-0.68	-	48.77	74.00	25.23
2 882.80	47.64	Peak	H	1.01	-	48.65	74.00	25.35



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr

**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

Report No.:

KES-RF-23T0111

Page (35) of (75)

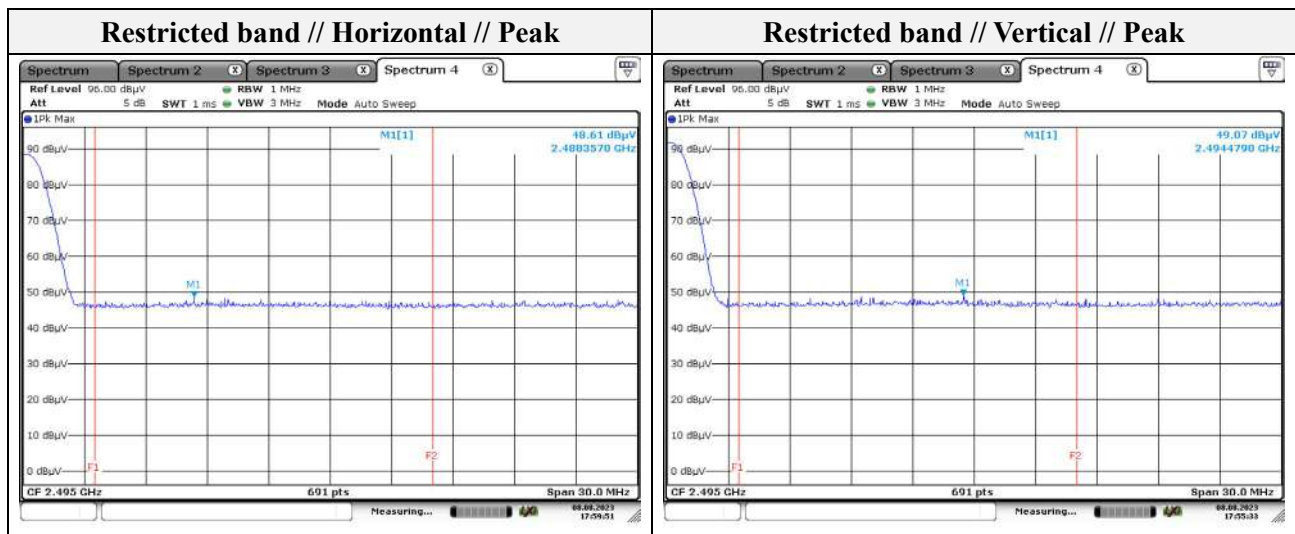
Mode: LE 1 Mbps
Distance of measurement: 3 meter
Channel: 39

- Spurious

Frequency (MHz)	Level (dB μ V)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1 522.40	47.75	Peak	H	-6.48	-	41.27	74.00	32.73
2 390.70	51.17	Peak	V	-0.69	-	50.48	74.00	23.52
2 908.80	47.52	Peak	H	0.97	-	48.49	74.00	25.51

- Band edge

Frequency (MHz)	Level (dB μ V)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2 488.36	48.61	Peak	H	-0.03	-	48.58	74.00	25.42
2 494.48	49.07	Peak	V	0.01	-	49.08	74.00	24.92



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 kes@kes.co.kr



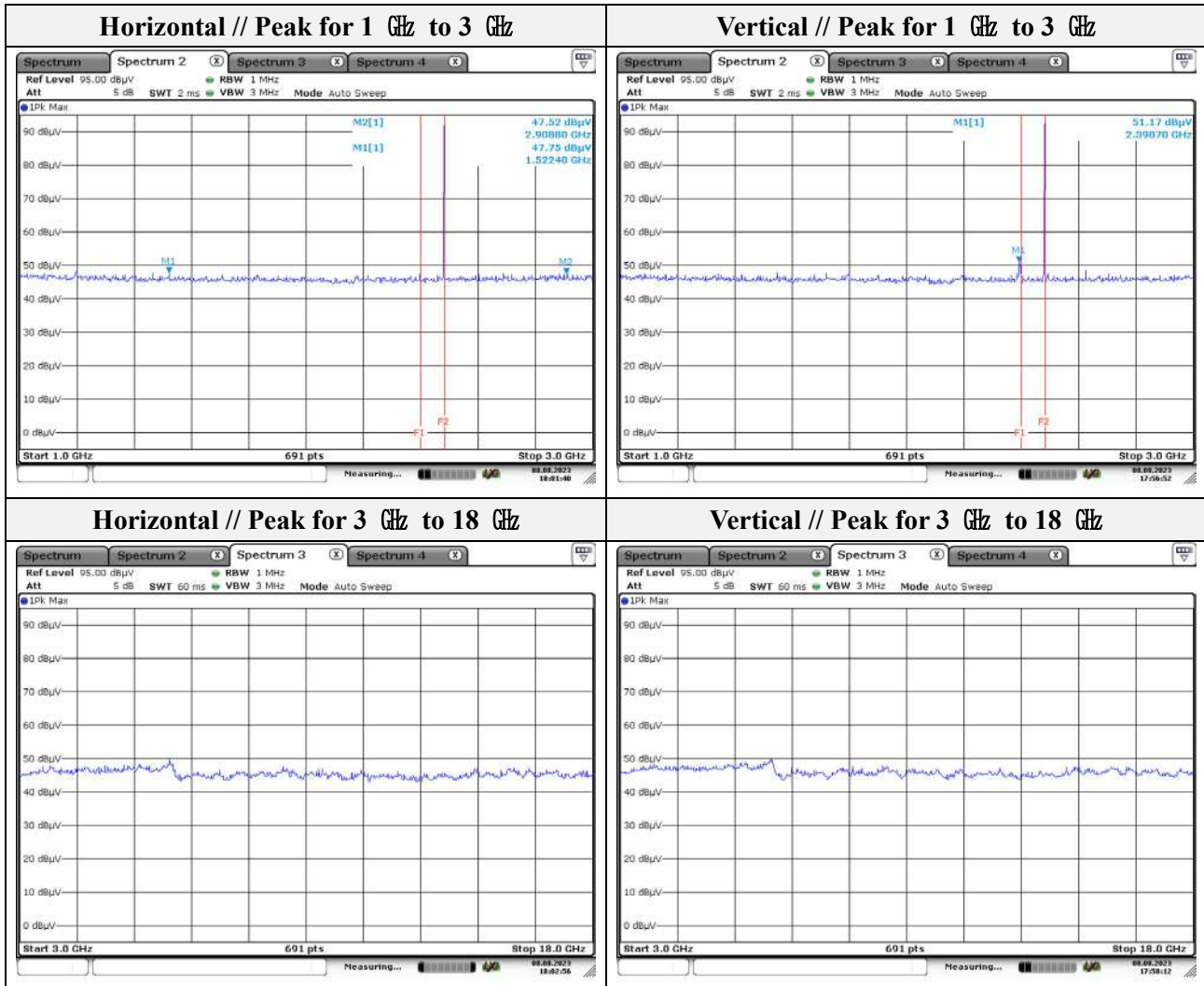
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (36) of (75)



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.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (37) of (75)

Test results (Above 1 000 MHz)

Mode: 802.11b

Distance of measurement: 3 meter

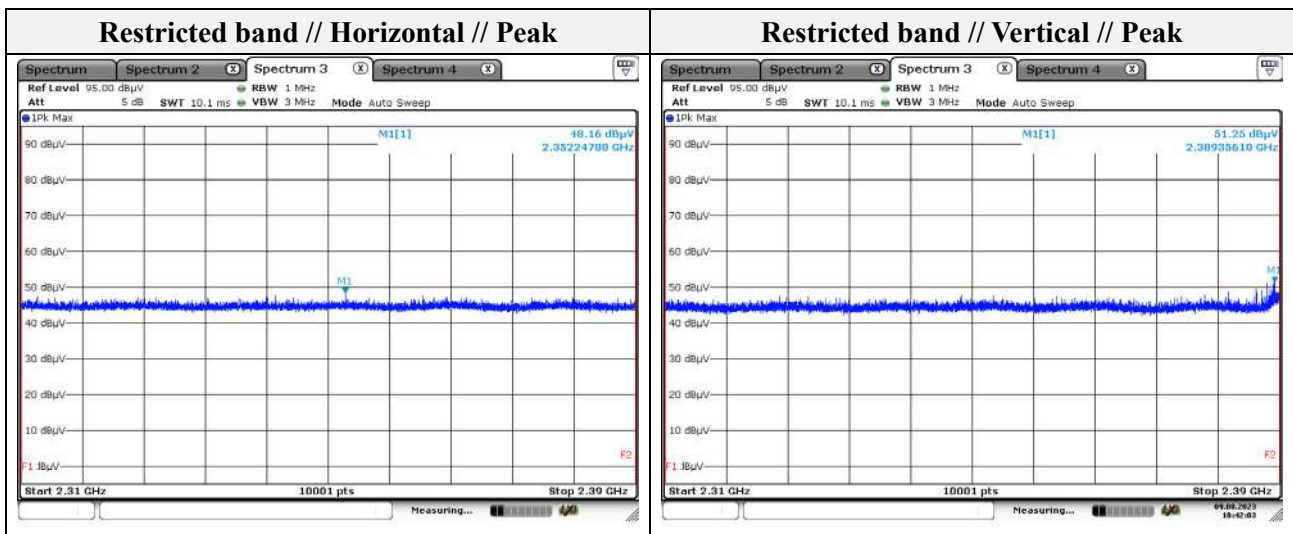
Channel: 1

- Spurious

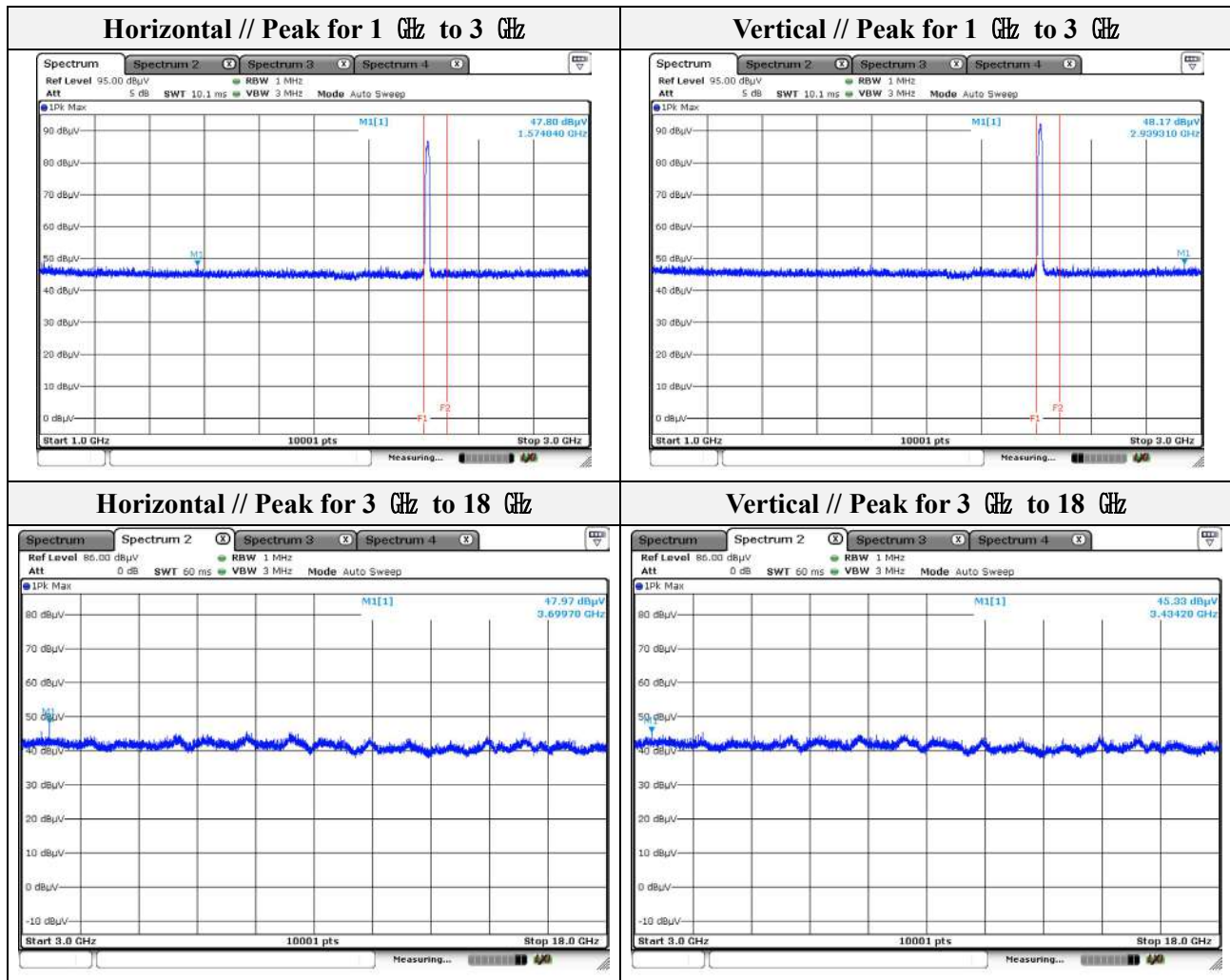
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 574.84	47.80	Peak	H	-6.16	-	41.64	74.00	32.36
2 939.31	48.17	Peak	V	0.93	-	49.10	74.00	24.90
3 434.20	45.33	Peak	V	1.61	-	46.94	74.00	27.06
3 699.70	47.97	Peak	H	2.50	-	50.47	74.00	23.53

- 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)
2 352.22	48.16	Peak	H	-0.90	-	47.26	74.00	26.74
2 389.36	51.25	Peak	V	-0.70	-	50.55	74.00	23.45



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 kes@kes.co.kr



Note.

1. Average test would be performed if the peak result were greater than the average limit.



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

Report No.:

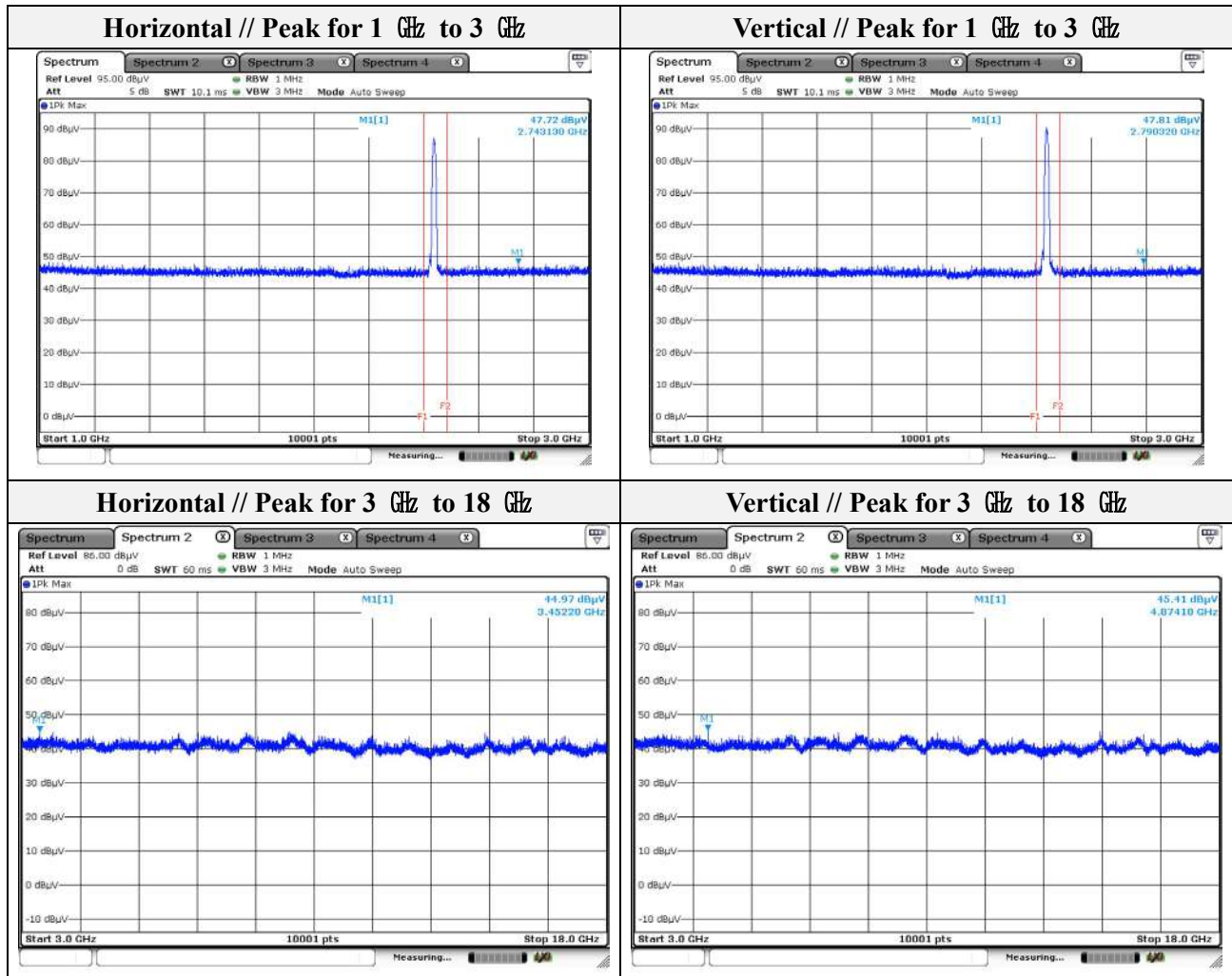
KES-RF-23T0111

Page (39) of (75)

Mode: 802.11b
Distance of measurement: 3 meter
Channel: 6

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 743.13	47.72	Peak	H	0.91	-	48.63	74.00	25.37
2 790.32	47.81	Peak	V	1.08	-	48.89	74.00	25.11
3 452.20	44.97	Peak	H	1.60	-	46.57	74.00	27.43
4 874.10	45.41	Peak	V	6.77	-	52.18	74.00	21.82



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (40) of (75)

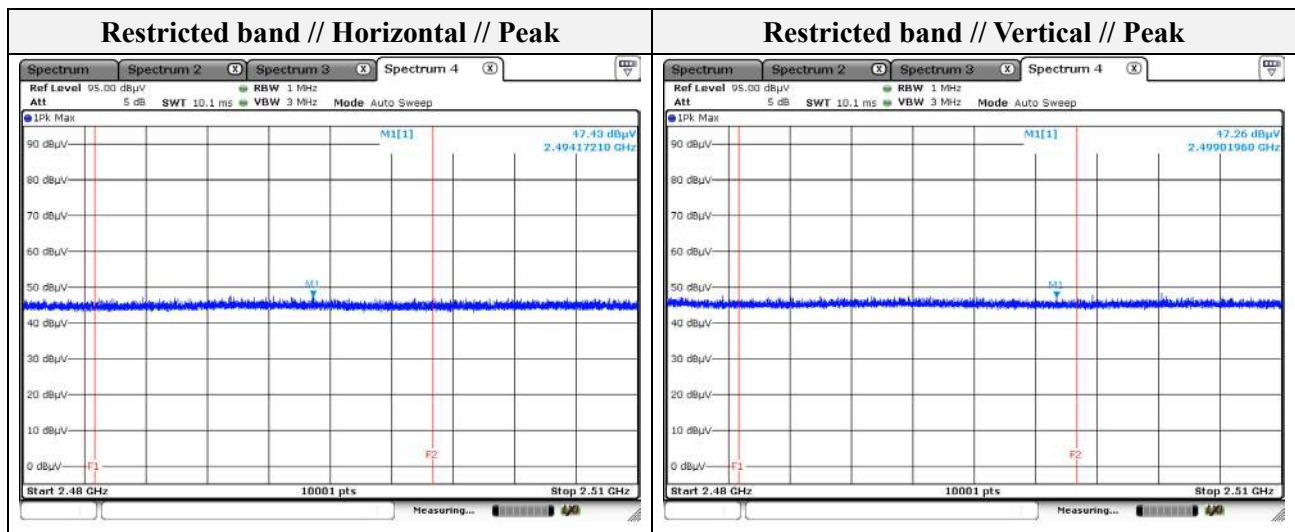
Mode: 802.11b
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 828.12	48.06	Peak	H	1.08	-	49.14	74.00	24.86
2 866.11	47.56	Peak	V	1.03	-	48.59	74.00	25.41
3 699.70	47.55	Peak	V	2.50	-	50.05	74.00	23.95

- 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)
2 494.17	47.43	Peak	H	0.01	-	47.44	74.00	26.56
2 499.02	47.26	Peak	V	0.04	-	47.30	74.00	26.70



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 kes@kes.co.kr



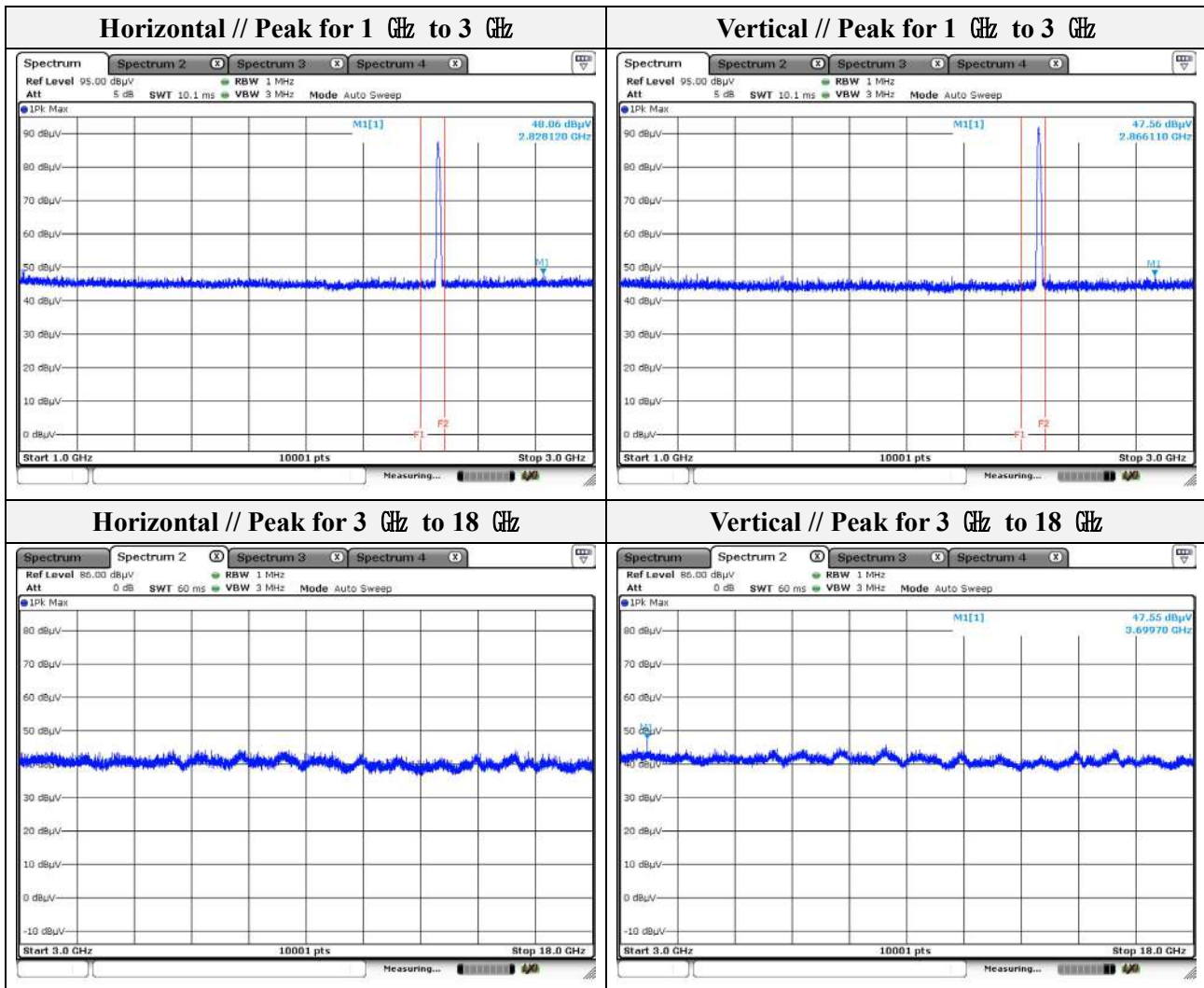
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (41) of (75)



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (42) of (75)

Test results (Above 1 000 MHz)

Mode: 802.11g

Distance of measurement: 3 meter

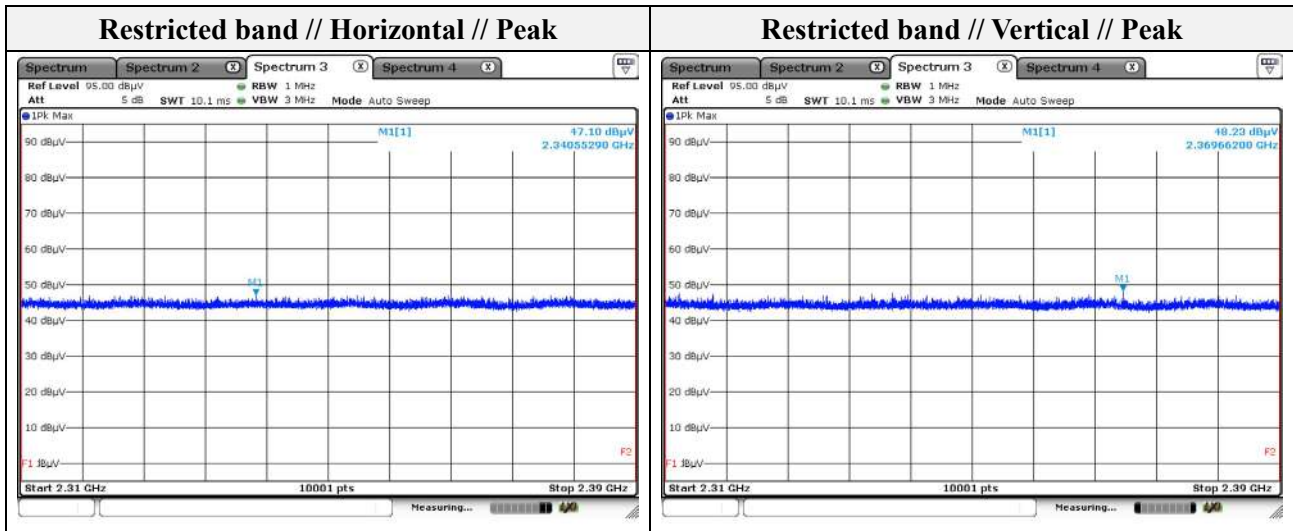
Channel: 1

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 399.36	53.66	Peak	V	-0.65	-	53.01	74.00	20.99
2 946.71	47.52	Peak	H	0.92	-	48.44	74.00	25.56

- 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)
2 340.55	47.10	Peak	H	-0.96	-	46.14	74.00	27.86
2 369.66	48.23	Peak	V	-0.81	-	47.42	74.00	26.58



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 kes@kes.co.kr



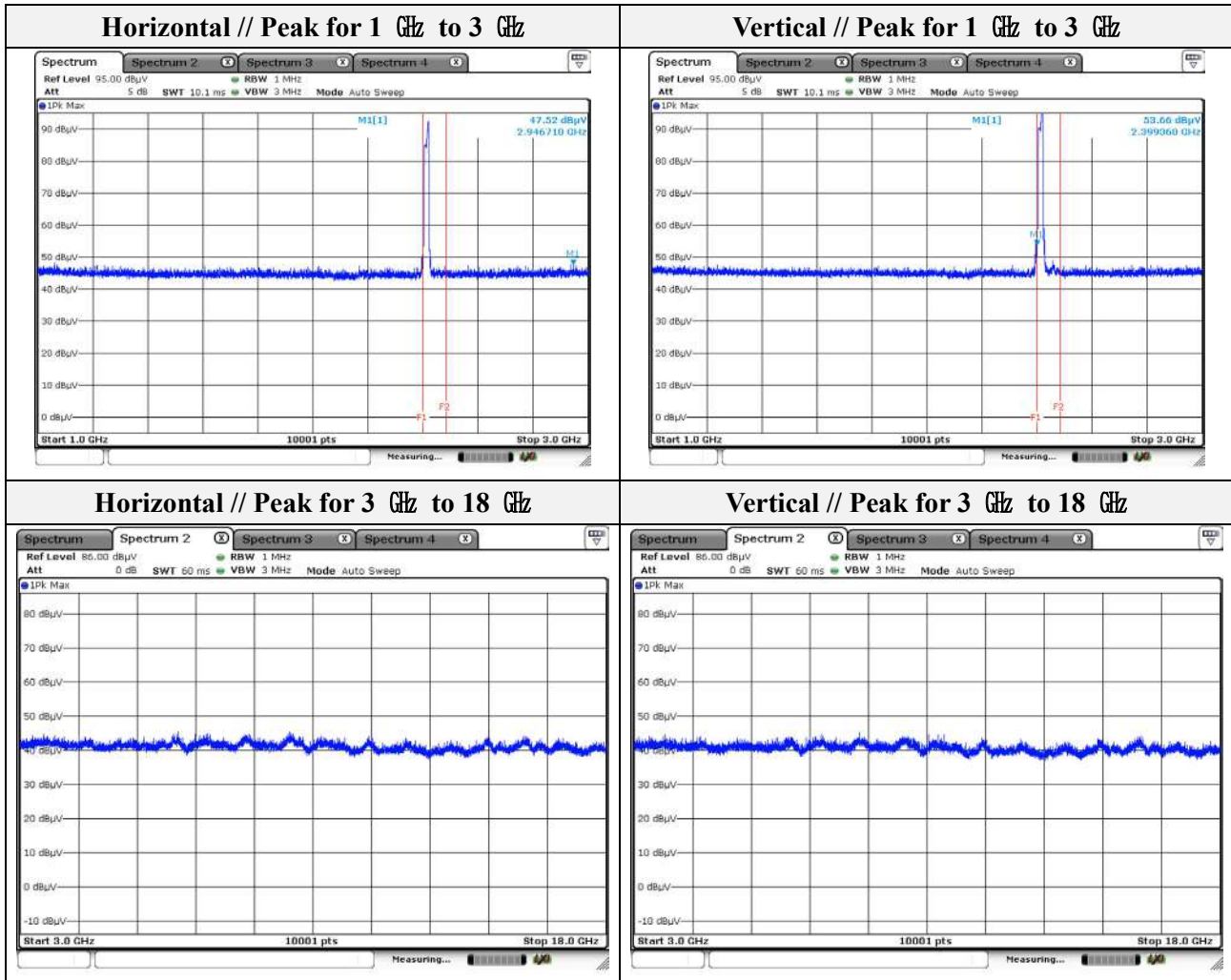
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (43) of (75)



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.

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 kes@kes.co.kr



KES Co., Ltd.

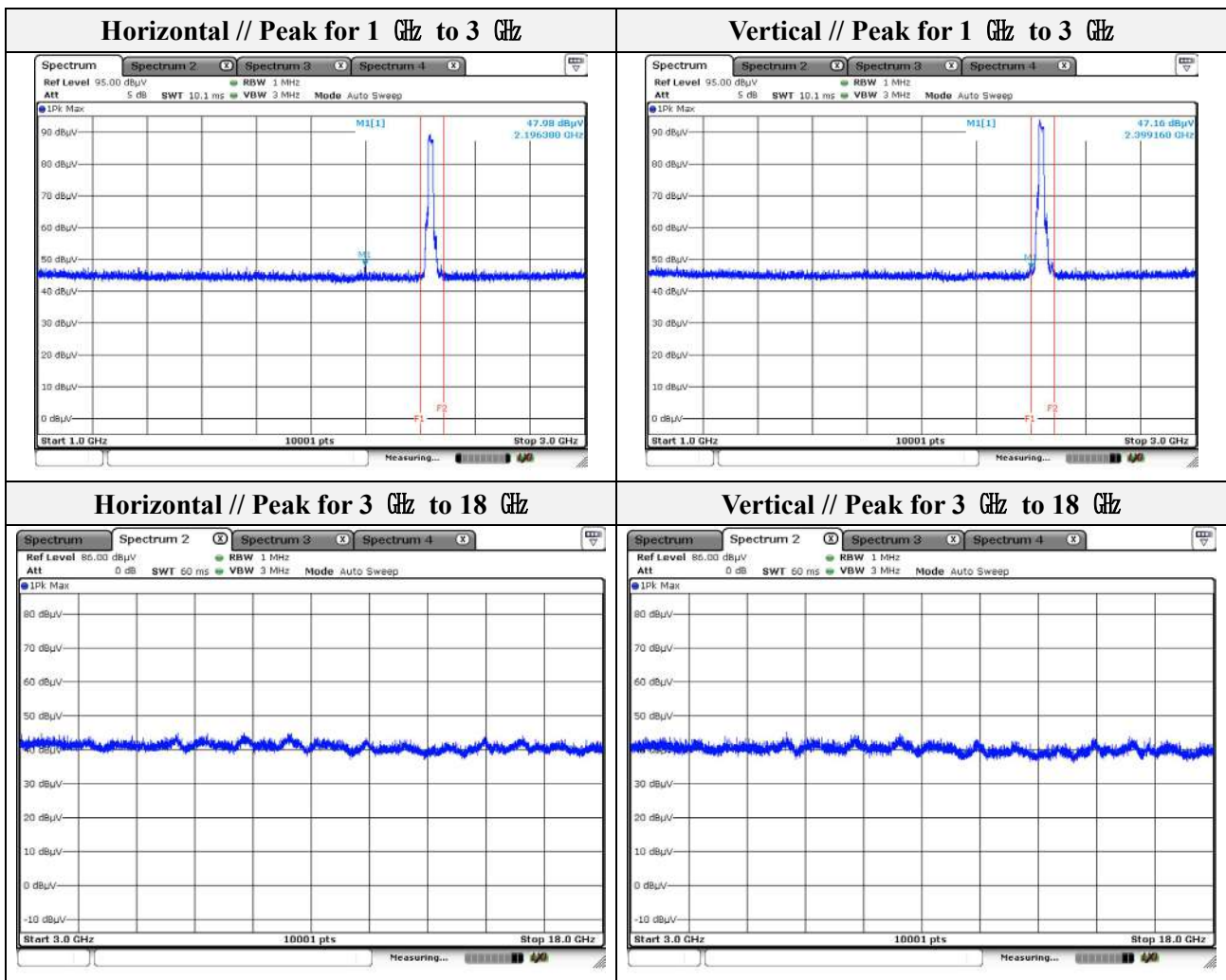
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-RF-23T0111
Page (44) of (75)

Mode: 802.11g
Distance of measurement: 3 meter
Channel: 6

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 196.38	47.98	Peak	H	-1.72	-	46.26	74.00	27.74
2 399.16	47.16	Peak	V	-0.65	-	46.51	74.00	27.49



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.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (45) of (75)

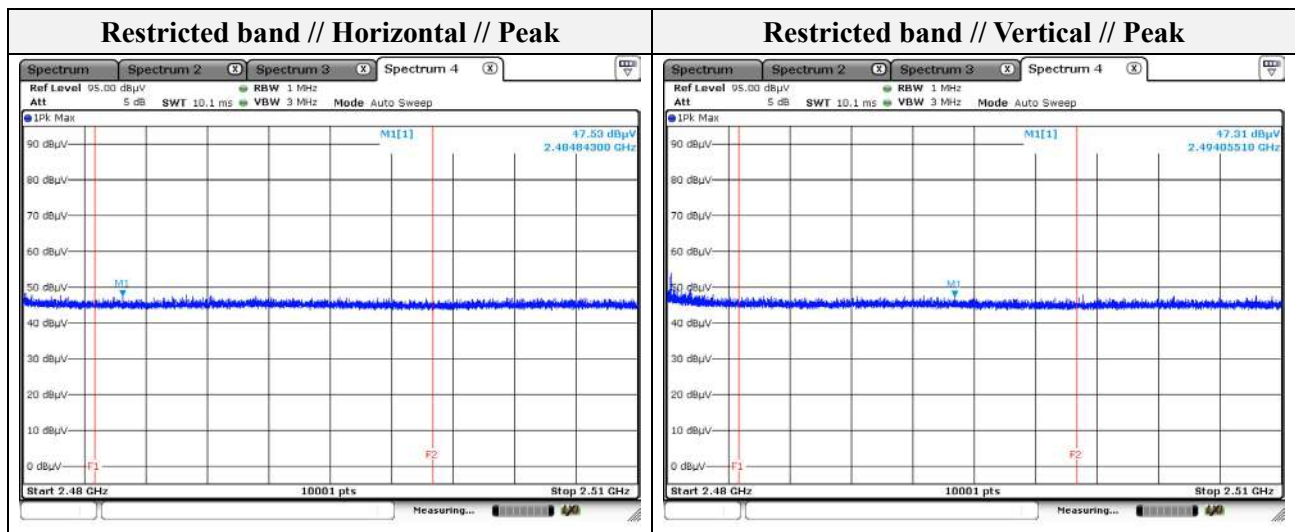
Mode: 802.11g
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 049.20	47.08	Peak	V	-2.48	-	44.60	74.00	29.40
2 572.54	47.60	Peak	H	0.29	-	47.89	74.00	26.11
4 925.10	45.76	Peak	H	7.20	-	52.96	74.00	21.04

- 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)
2 484.84	47.53	Peak	H	-0.06	-	47.47	74.00	26.53
2 494.06	47.31	Peak	V	0.01	-	47.32	74.00	26.68



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 kes@kes.co.kr



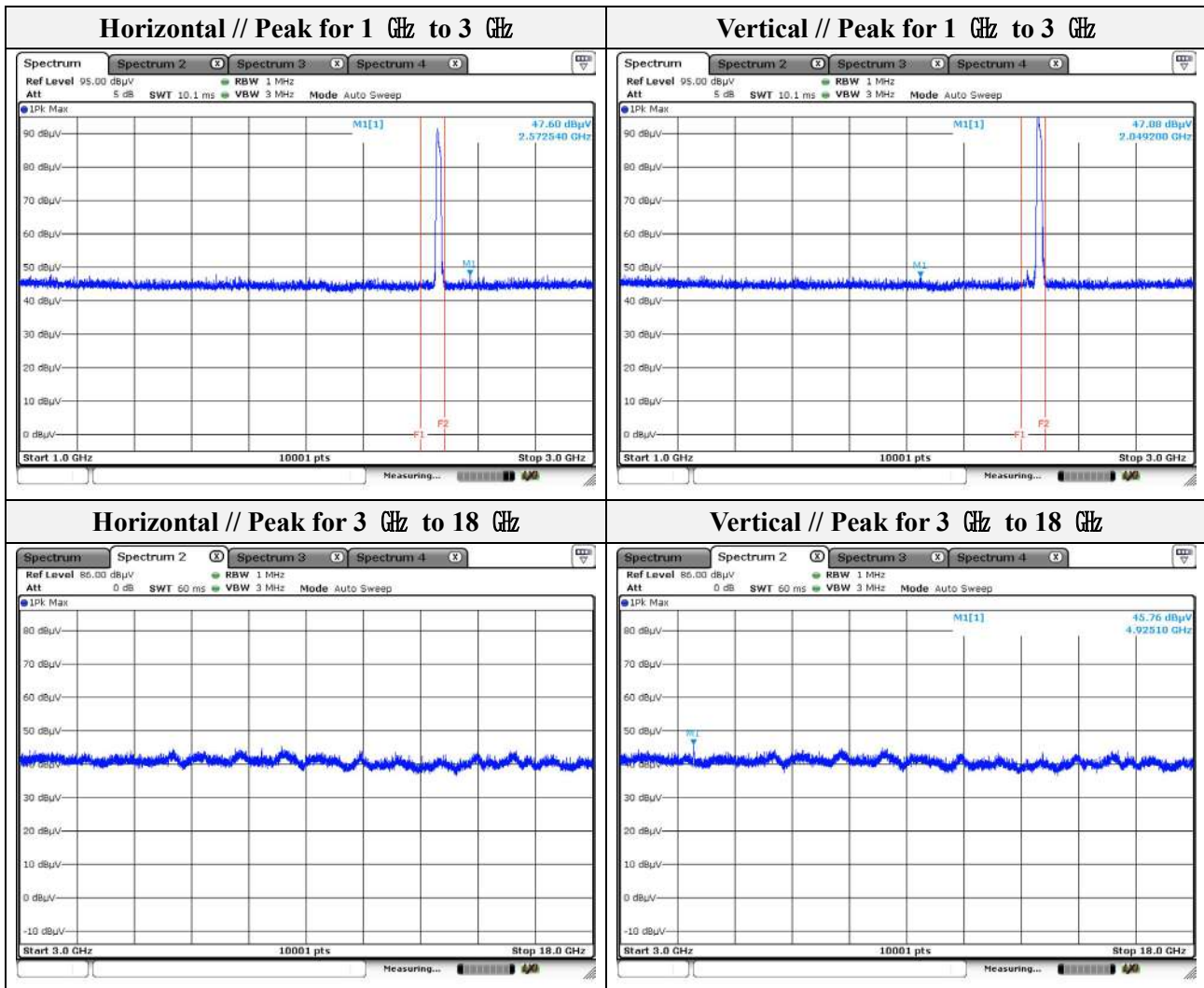
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (46) of (75)



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (47) of (75)

Mode: 802.11n_HT20

Distance of measurement: 3 meter

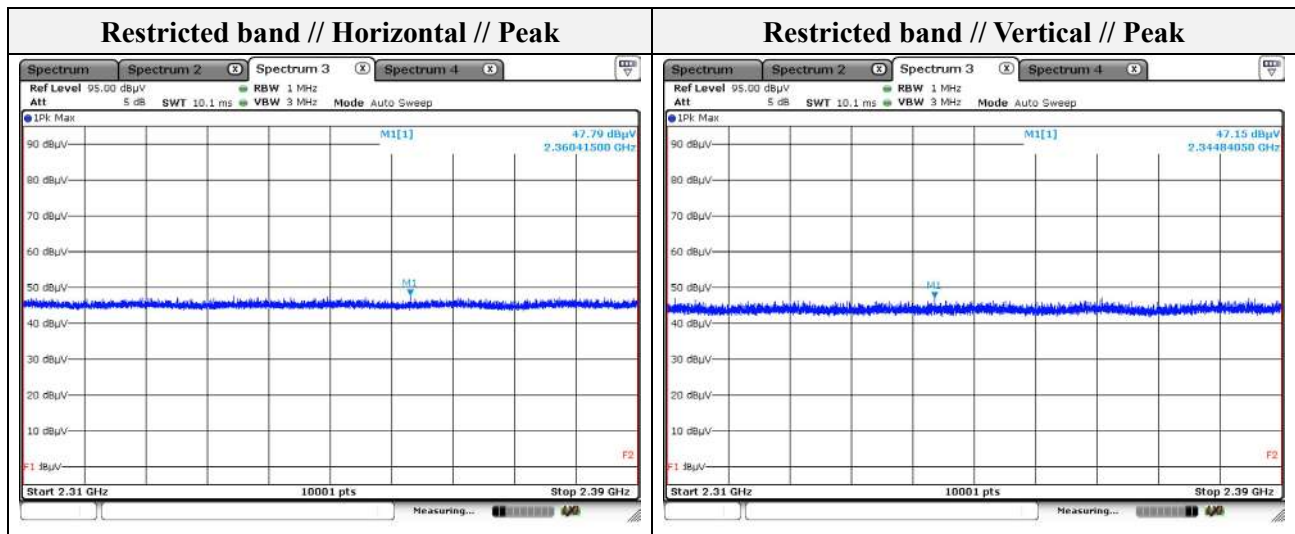
Channel: 1

- Spurious

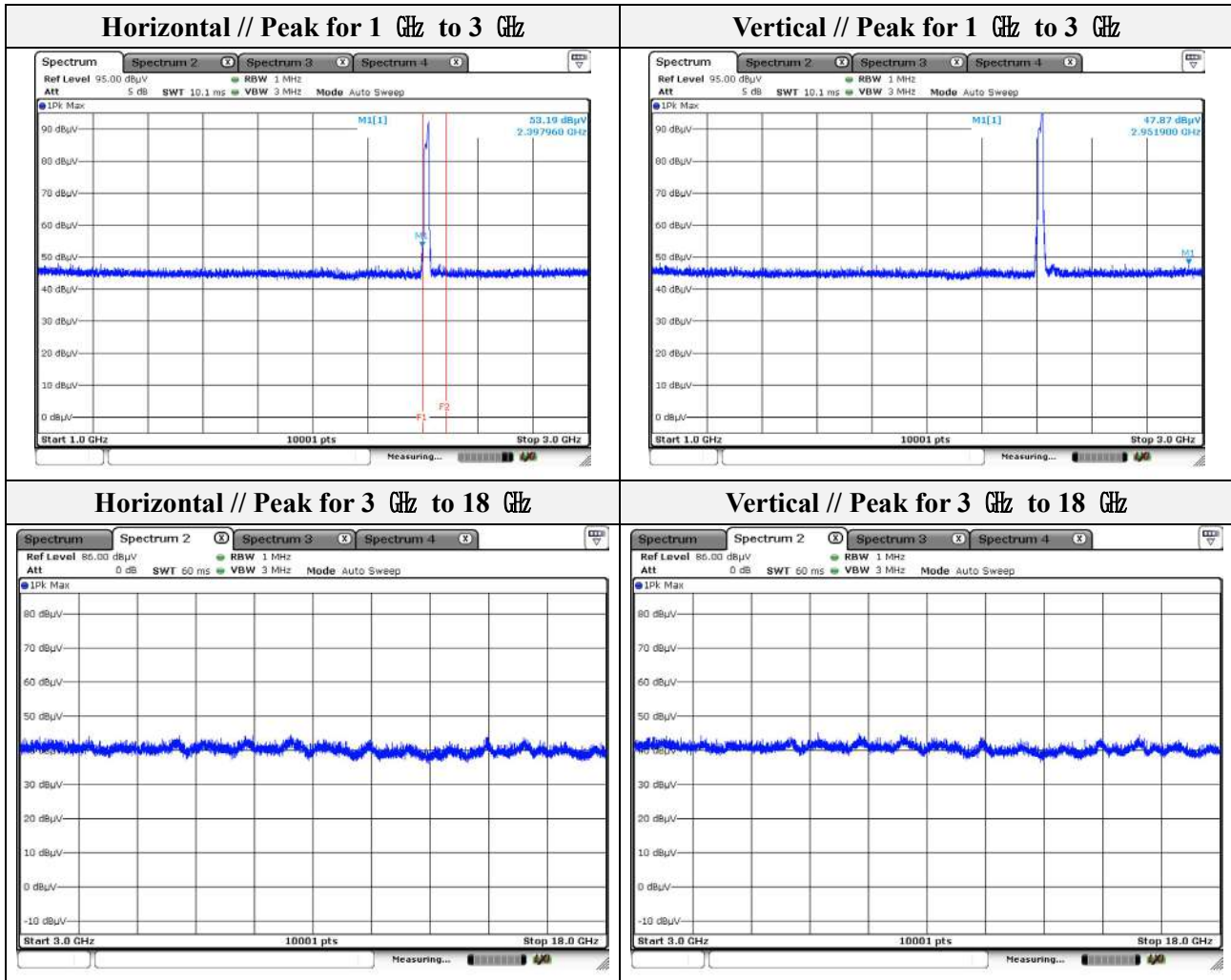
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 397.96	53.19	Peak	H	-0.65	-	52.54	74.00	21.46
2 951.90	47.87	Peak	V	0.92	-	48.79	74.00	25.21

- 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)
2 344.84	47.15	Peak	V	-0.94	-	46.21	74.00	27.79
2 360.42	47.79	Peak	H	-0.85	-	46.94	74.00	27.06



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 kes@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.



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

Report No.:

KES-RF-23T0111

Page (49) of (75)

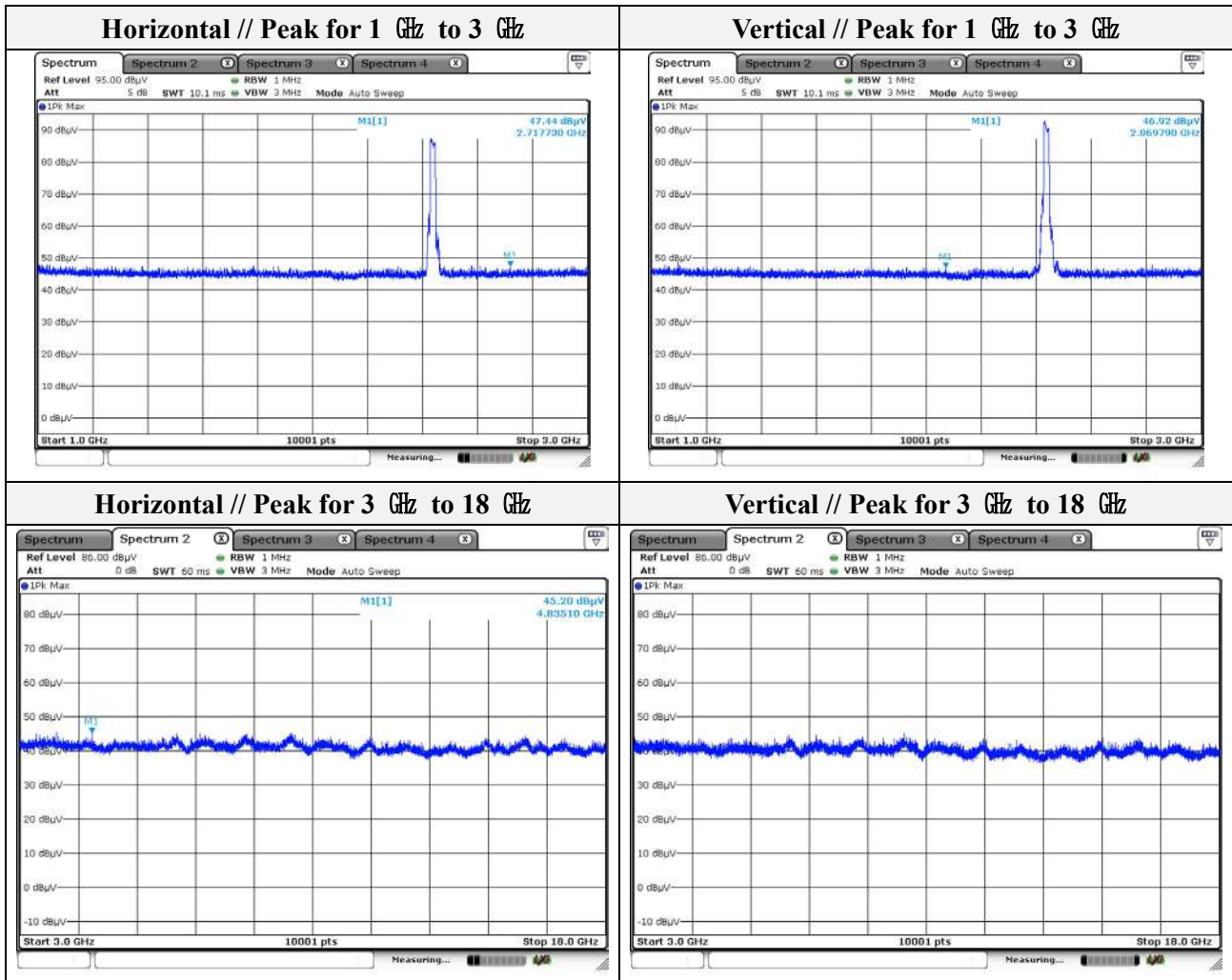
Mode: 802.11n_HT20

Distance of measurement: 3 meter

Channel: 6

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 069.79	46.92	Peak	V	-2.38	-	44.54	74.00	29.46
2 717.73	47.44	Peak	H	0.81	-	48.25	74.00	25.75
4 835.10	45.20	Peak	H	6.44	-	51.64	74.00	22.36



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (50) of (75)

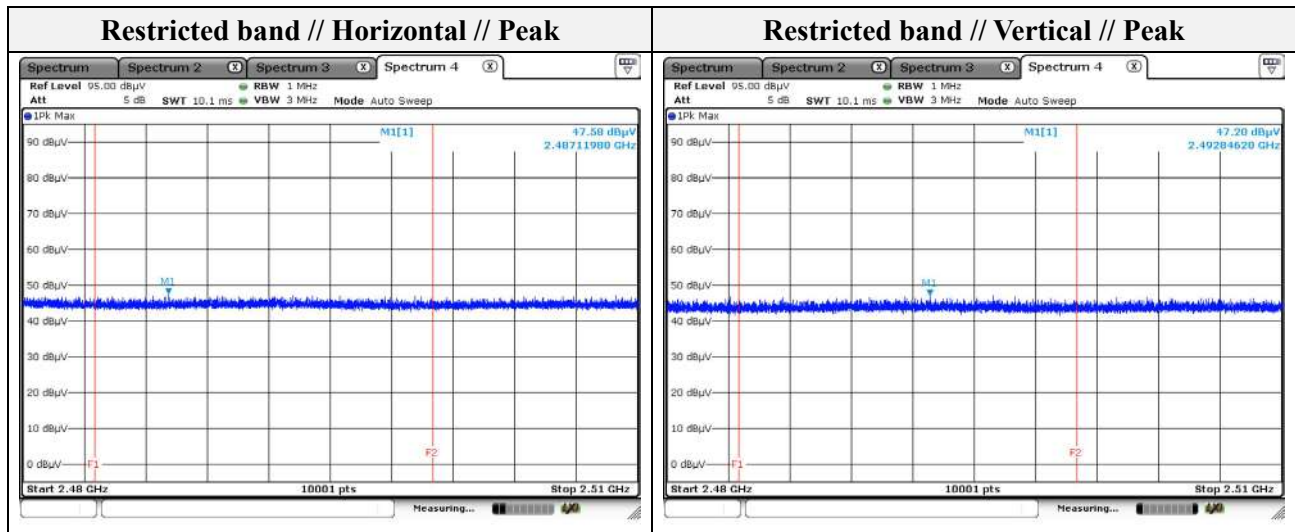
Mode: 802.11n_HT20
Distance of measurement: 3 meter
Channel: 11

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 225.98	47.47	Peak	V	-1.57	-	45.90	74.00	28.10
2 882.91	47.46	Peak	H	1.01	-	48.47	74.00	25.53
4 596.60	44.38	Peak	H	4.97	-	49.35	74.00	24.65

- 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)
2 487.12	47.58	Peak	H	-0.04	-	47.54	74.00	26.46
2 492.85	47.20	Peak	V	0.00	-	47.20	74.00	26.80



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 kes@kes.co.kr



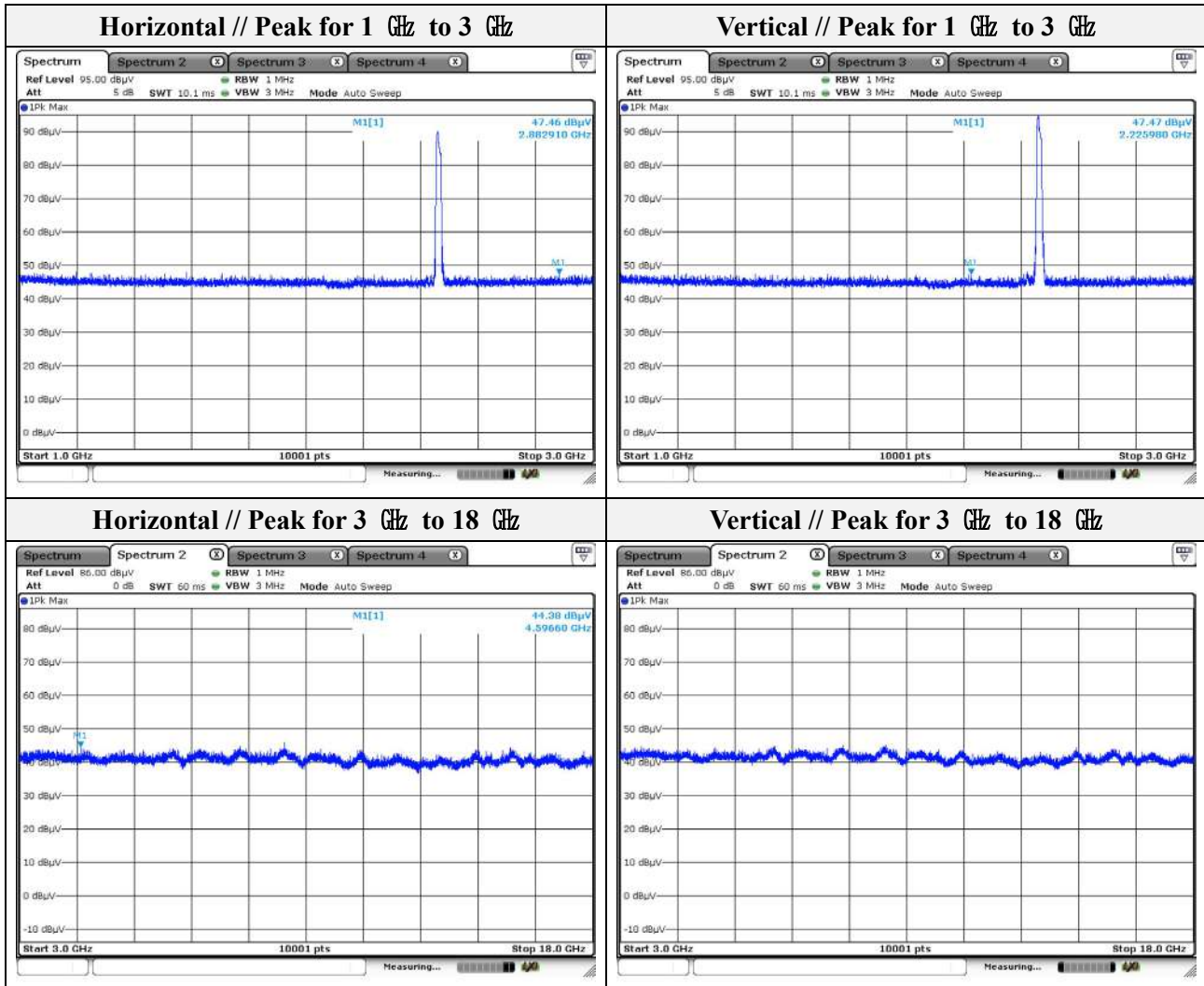
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (51) of (75)



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (52) of (75)

Mode: 802.11n_HT40

Distance of measurement: 3 meter

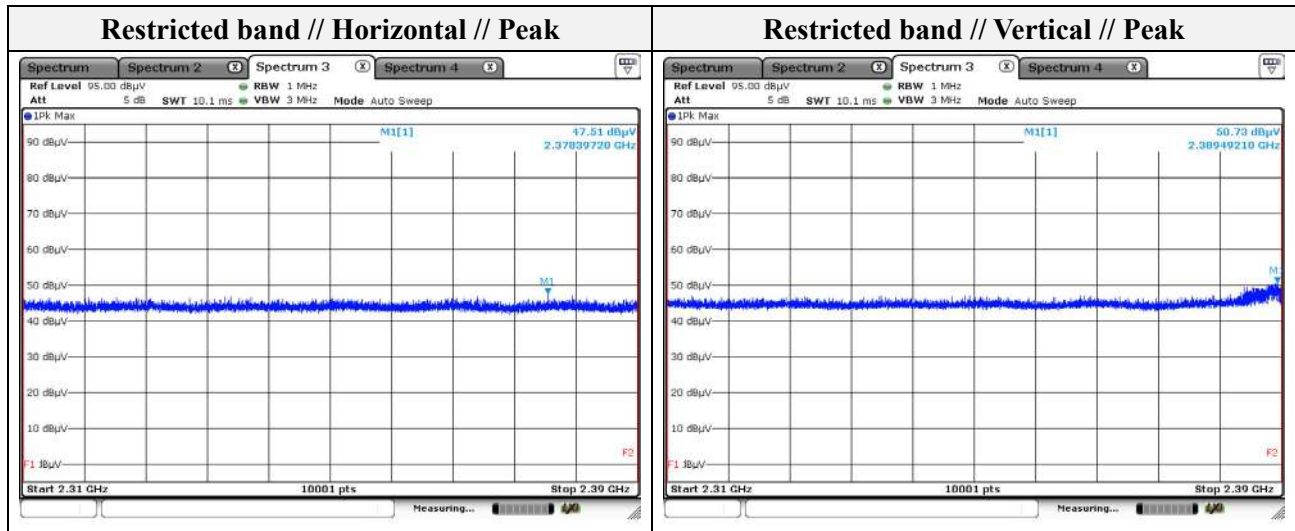
Channel: 3

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 508.65	47.98	Peak	H	-6.56	-	41.42	74.00	32.58
2 873.51	47.54	Peak	V	1.02	-	48.56	74.00	25.44
3 467.20	45.27	Peak	V	1.59	-	46.86	74.00	27.14
3 885.70	44.40	Peak	H	3.71	-	48.11	74.00	25.89

- 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)
2 378.40	47.51	Peak	H	-0.76	-	46.75	74.00	27.25
2 389.49	50.73	Peak	V	-0.70	-	50.03	74.00	23.97



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 kes@kes.co.kr



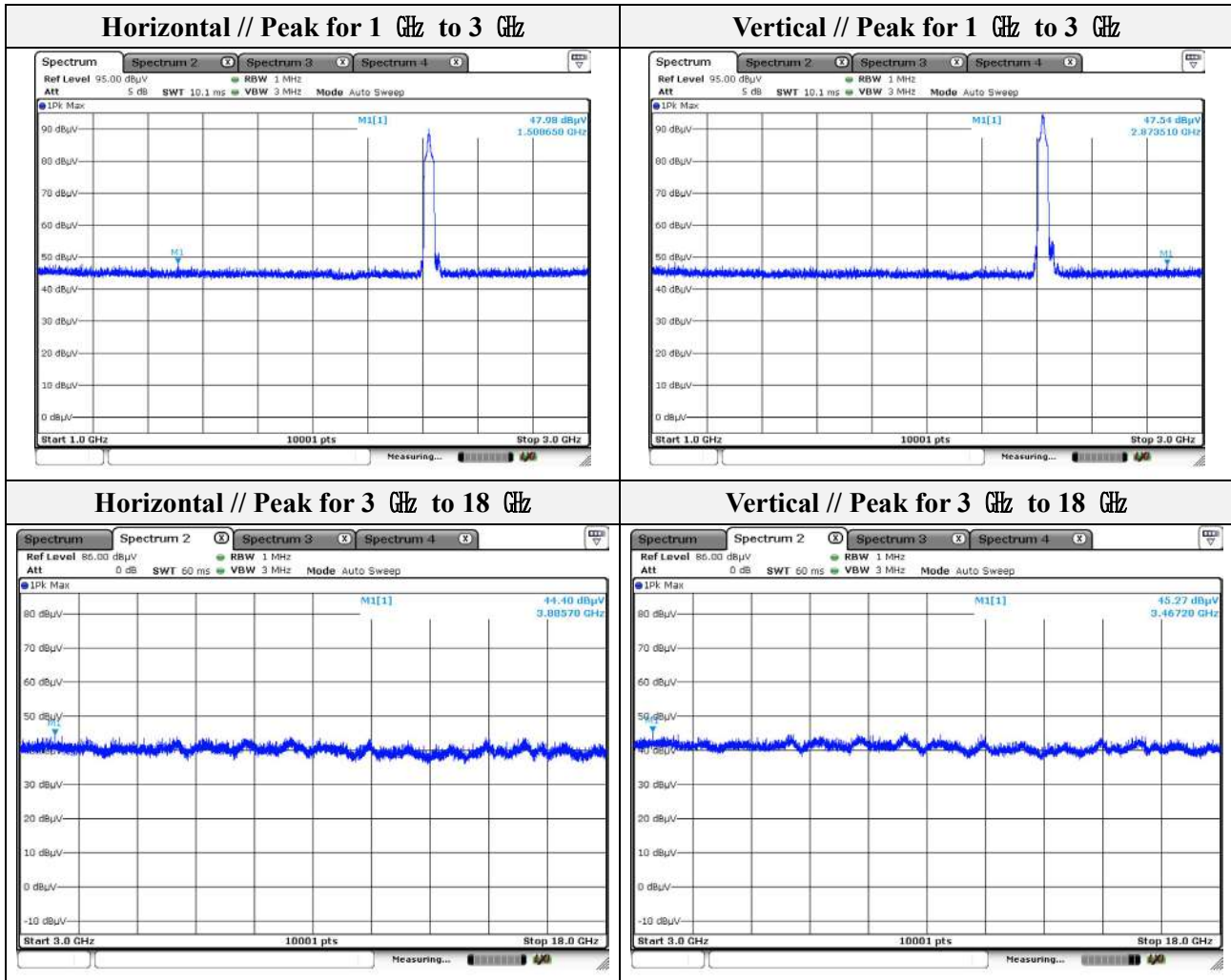
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (53) of (75)



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (54) of (75)

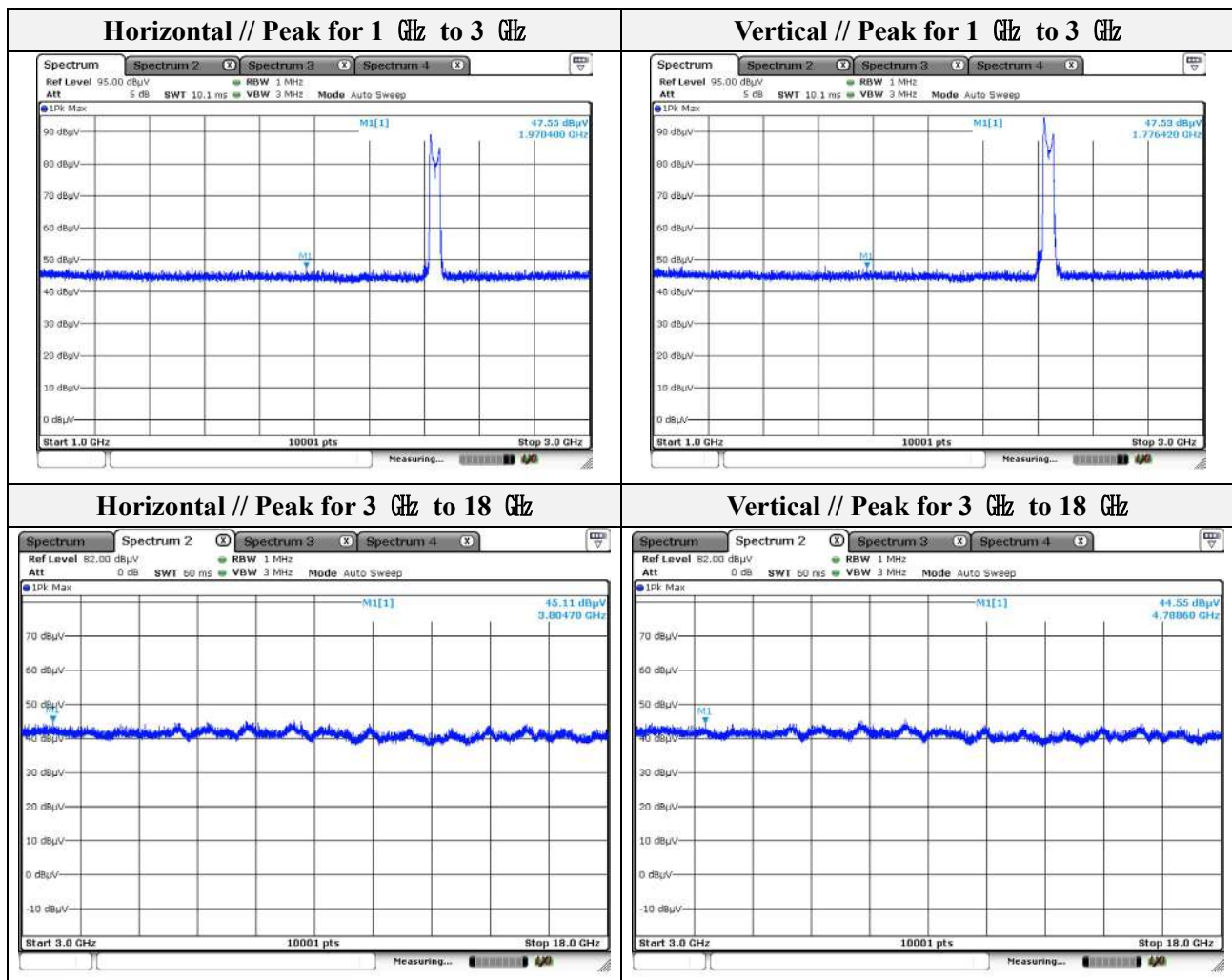
Mode: 802.11n_HT40

Distance of measurement: 3 meter

Channel: 6

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 776.42	47.53	Peak	V	-4.45	-	43.08	74.00	30.92
1 970.40	47.55	Peak	H	-2.96	-	44.59	74.00	29.41
3 804.70	45.11	Peak	H	3.04	-	48.15	74.00	25.85
4 788.60	44.55	Peak	V	6.08	-	50.63	74.00	23.37



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (55) of (75)

Mode: 802.11n_HT40

Distance of measurement: 3 meter

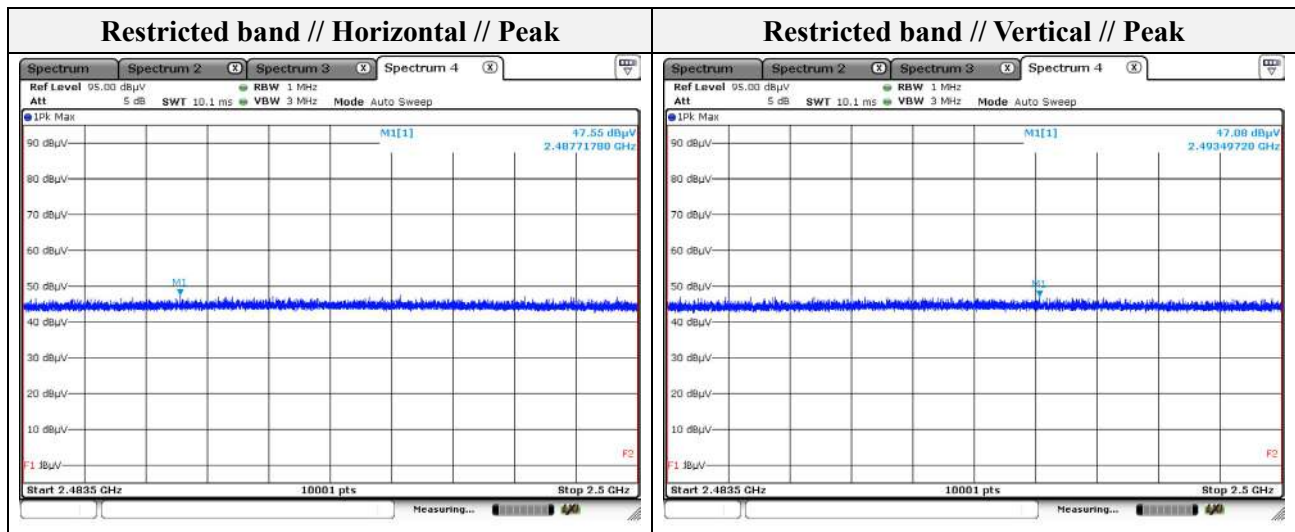
Channel: 9

- Spurious

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 194.58	47.71	Peak	V	-1.73	-	45.98	74.00	28.02
2 866.91	47.72	Peak	H	1.03	-	48.75	74.00	25.25
3 693.70	46.74	Peak	H	2.47	-	49.21	74.00	24.79
3 698.20	46.57	Peak	V	2.50	-	49.07	74.00	24.93

- 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)
2 487.72	47.55	Peak	H	-0.04	-	47.51	74.00	26.49
2 493.50	47.08	Peak	V	0.00	-	47.08	74.00	26.92



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 kes@kes.co.kr



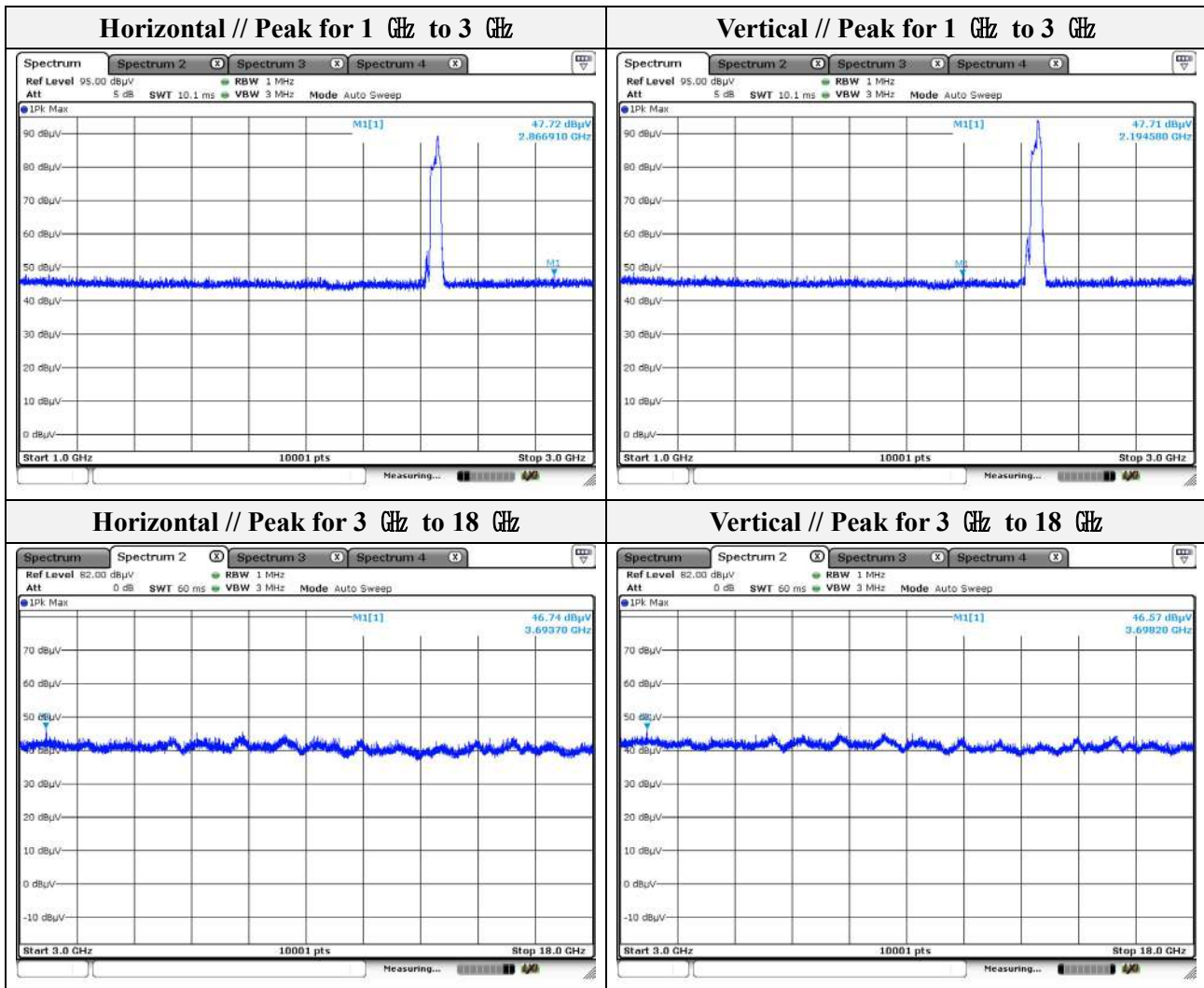
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (56) of (75)



Note.

1. Average test would be performed if the peak result were greater than the average limit.

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 kes@kes.co.kr



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

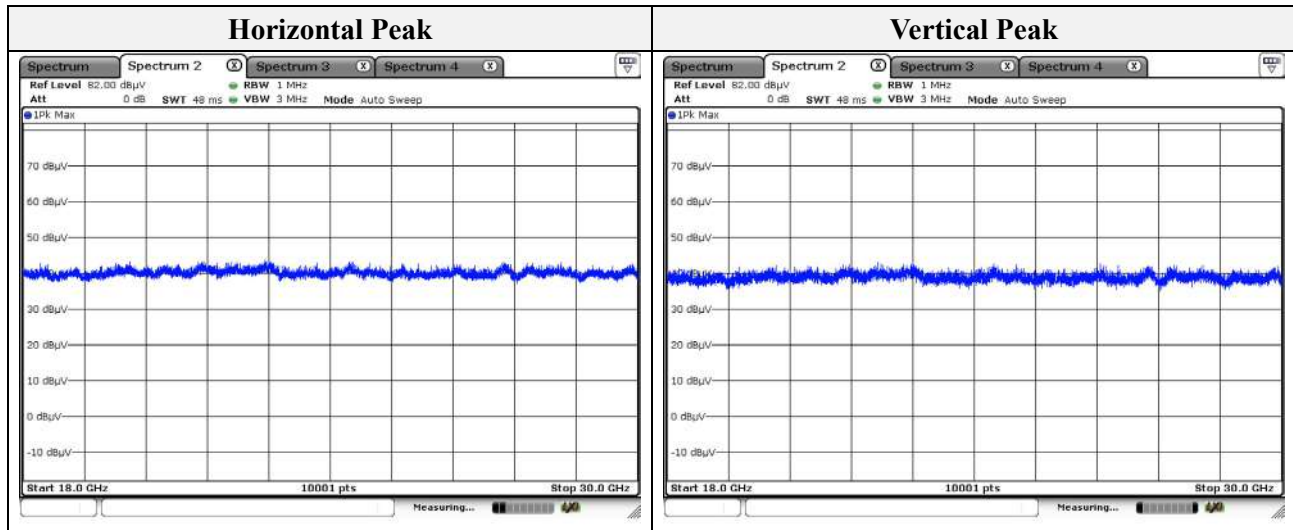
Report No.:

KES-RF-23T0111

Page (57) of (75)

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

Mode: LE 1 Mbps
Distance of measurement: 3 meter
Channel: 00 (Worst case)



Note.

No spurious emission were detected above 18 GHz.

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 kes@kes.co.kr



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

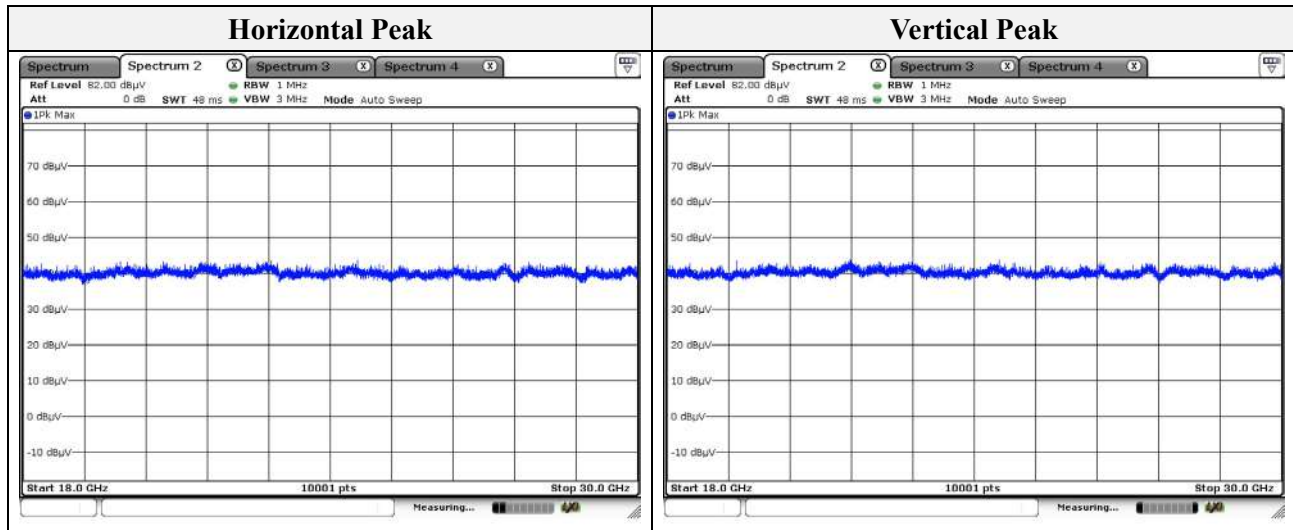
Report No.:

KES-RF-23T0111

Page (58) of (75)

Test results (18 GHz to 30 GHz)

Mode: 802.11g
Distance of measurement: 3 meter
Channel: 6 (Worst case)



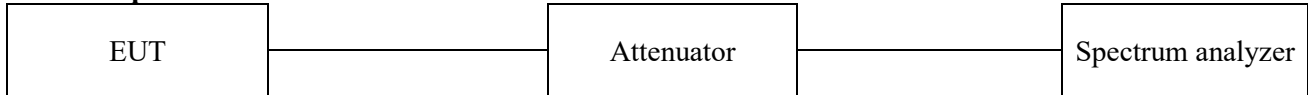
Note.

1. No spurious emission were detected above 18 GHz.

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 kes@kes.co.kr

3.5. Conducted spurious emissions & band edge

Test setup



Test procedure

Band edge

ANSI C63.10-2013 - Section 11.11

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. Set the RBW = 100 kHz
4. Set the VBW = $[3 \times \text{RBW}]$.
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow trace to fully stabilize.

Out of band emissions

ANSI C63.10-2013 - Section 11.11

1. Start frequency was set to 30 MHz and stop frequency was set to 25 GHz for 2.4 GHz frequencies and 40 GHz for 5 GHz frequencies
2. Set the RBW = 100 kHz
3. Set the VBW = $[3 \times \text{RBW}]$.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow trace to fully stabilize.

Limit

According to 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section 15.205(a), must also comply the radiated emission limits specified in section 15.209(a) (see section 15.205(c))



Test results

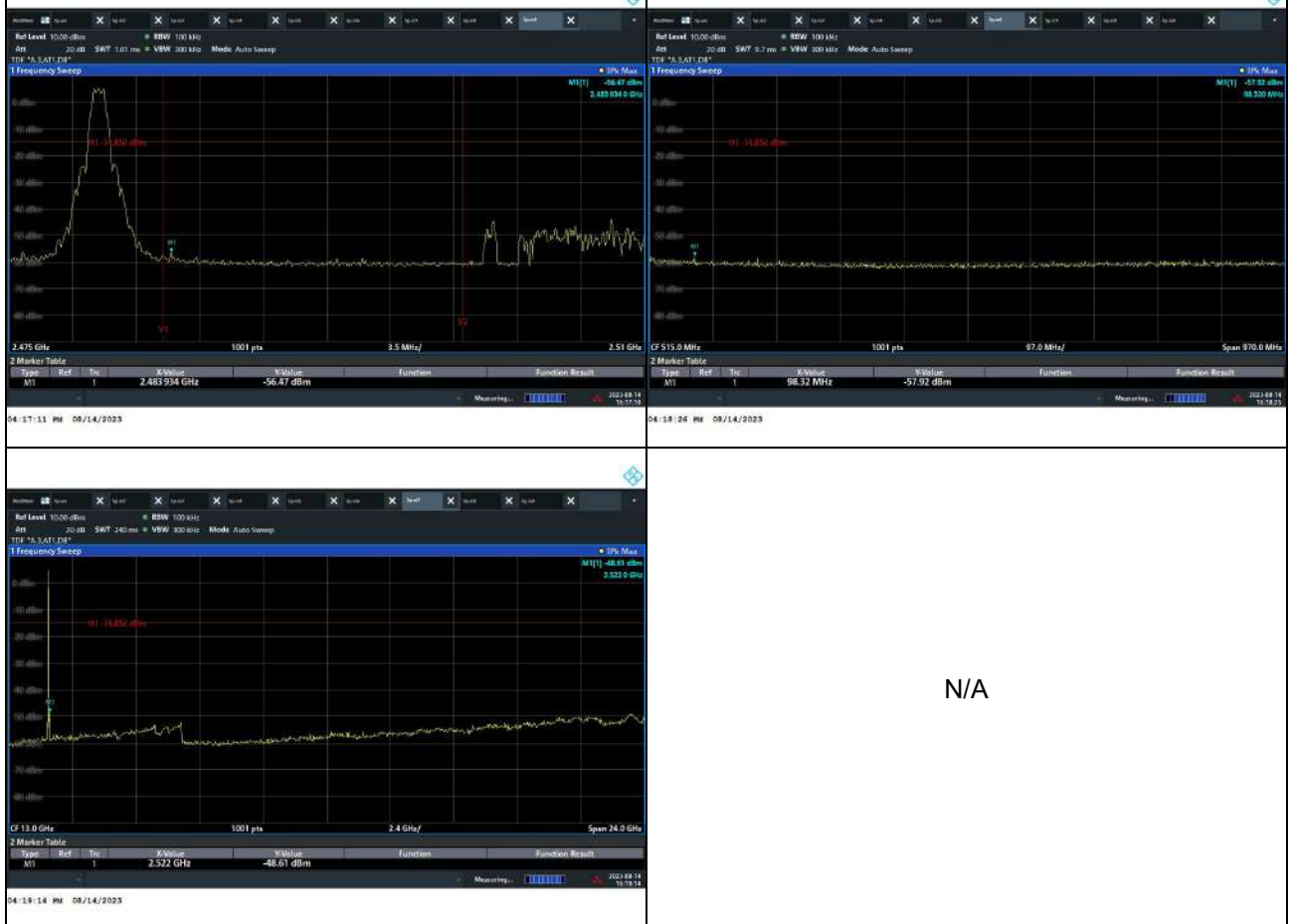


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



LE 1Mbps

2 480 Mhz



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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (62) of (75)

Test results



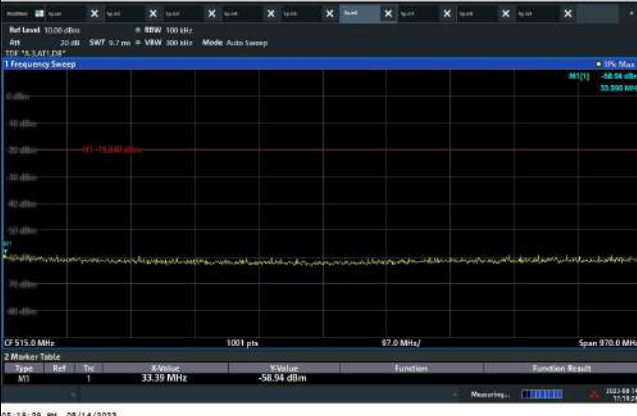
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (63) of (75)

802.11b	
2 462 MHz	-
	N/A
	N/A
	N/A

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 kes@kes.co.kr



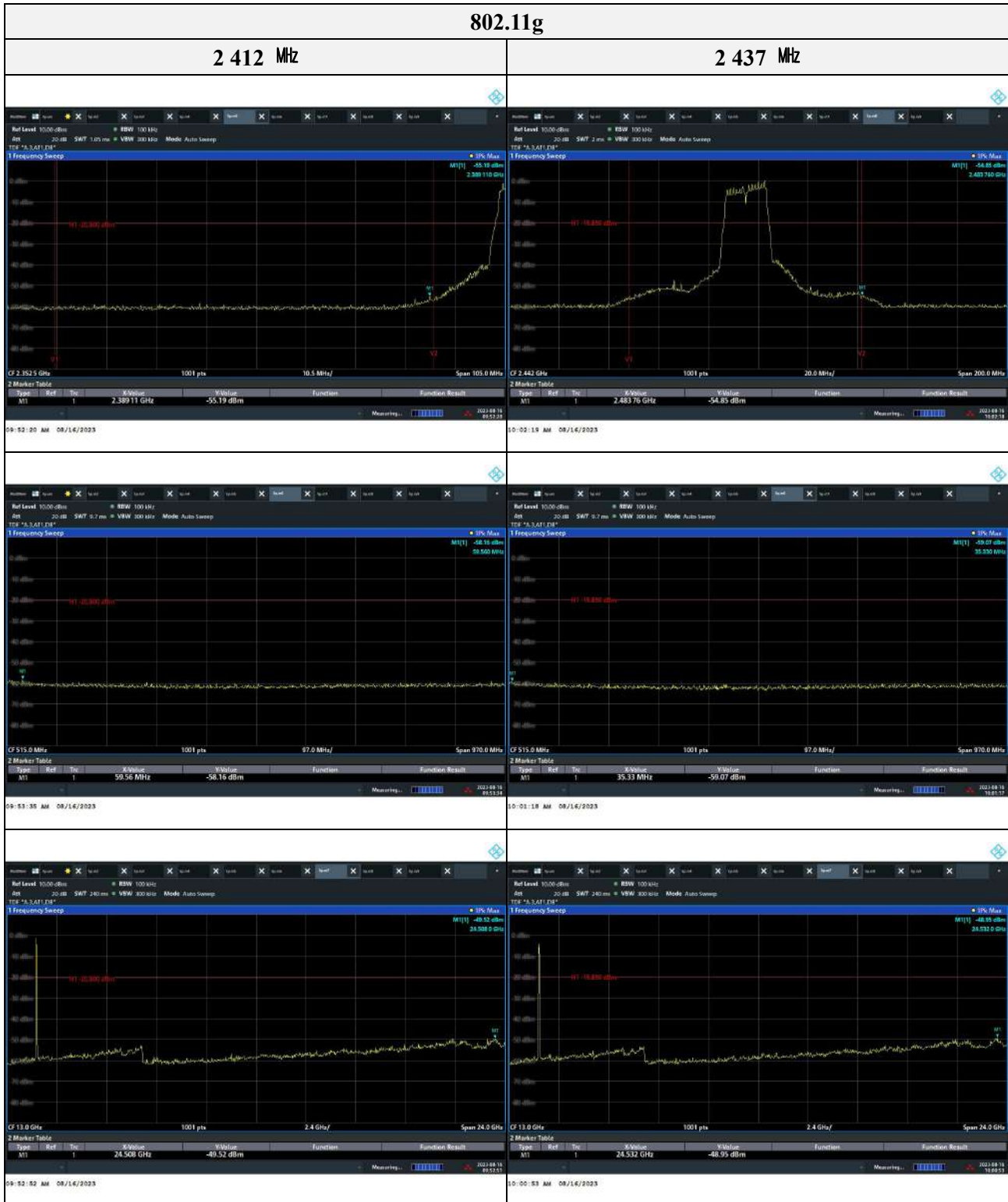
KES Co., Ltd.

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

Report No.:

KES-RF-23T0111

Page (64) of (75)



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 kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (65) of (75)

802.11g	
2 462 MHz	-
	N/A
	N/A
	N/A

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (66) of (75)



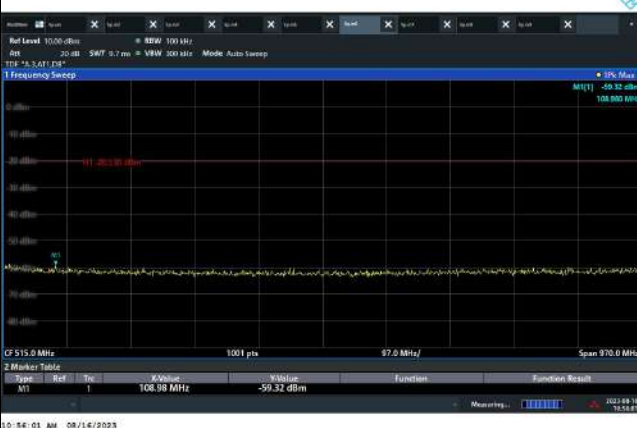
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (67) of (75)

802.11n_HT20	
2 462 MHz	-
	N/A
	N/A
	N/A

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 kes@kes.co.kr



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

Report No.:

KES-RF-23T0111

Page (68) of (75)



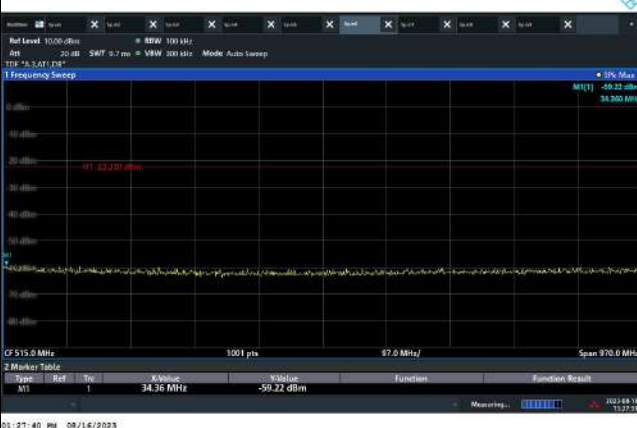
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



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

Report No.:
KES-RF-23T0111
Page (69) of (75)

802.11n_HT40	
2 452 MHz	-
	N/A
	N/A
	N/A

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 kes@kes.co.kr

3.6. AC conducted emissions

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 be 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



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

Report No.:

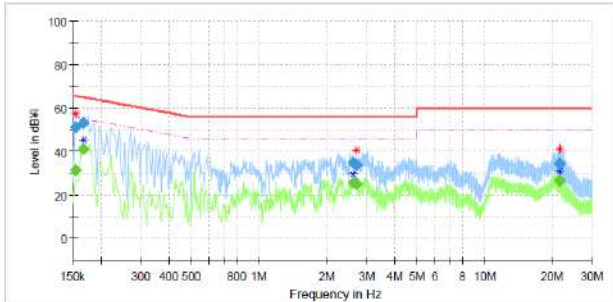
KES-RF-23T0111

Page (71) of (75)

Test results

Mode: LE 1Mbps
Channel: 00 (Worst case)

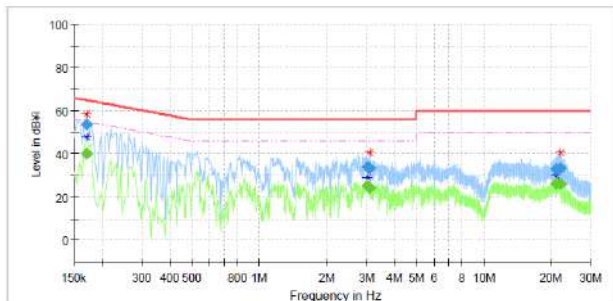
Hot Line



Final Result

Frequency (MHz)	QuasiPeak (dBm V)	CAverage (dBm V)	Limit (dBm V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154000	---	31.58	55.78	24.20	1000.0	9.000	L1	19.4
0.154000	51.26	---	55.78	14.52	1000.0	9.000	L1	19.4
0.166000	---	41.22	55.16	13.94	1000.0	9.000	L1	19.4
0.166000	53.18	---	55.16	11.98	1000.0	9.000	L1	19.4
2.618000	---	25.52	46.00	20.48	1000.0	9.000	L1	19.6
2.618000	34.71	---	56.00	21.29	1000.0	9.000	L1	19.6
2.718000	---	25.03	46.00	20.97	1000.0	9.000	L1	19.6
2.718000	33.97	---	56.00	22.03	1000.0	9.000	L1	19.6
21.578000	---	26.90	50.00	23.10	1000.0	9.000	L1	20.2
21.578000	34.40	---	60.00	25.60	1000.0	9.000	L1	20.2
21.626000	---	26.84	50.00	23.16	1000.0	9.000	L1	20.2
21.626000	34.42	---	60.00	25.58	1000.0	9.000	L1	20.2

Neutral Line



Final Result

Frequency (MHz)	QuasiPeak (dBm V)	CAverage (dBm V)	Limit (dBm V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	40.27	54.96	14.69	1000.0	9.000	N	19.4
0.170000	53.88	---	54.96	11.08	1000.0	9.000	N	19.4
3.022000	---	25.36	46.00	20.64	1000.0	9.000	N	19.6
3.022000	34.04	---	56.00	21.96	1000.0	9.000	N	19.6
3.114000	---	24.38	46.00	21.62	1000.0	9.000	N	19.6
3.114000	33.23	---	56.00	22.77	1000.0	9.000	N	19.6
21.154000	---	26.01	50.00	23.99	1000.0	9.000	N	20.2
21.154000	32.80	---	60.00	27.20	1000.0	9.000	N	20.2
21.946000	---	26.29	50.00	23.71	1000.0	9.000	N	20.2
21.946000	33.61	---	60.00	26.39	1000.0	9.000	N	20.2

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 kes@kes.co.kr



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

Report No.:

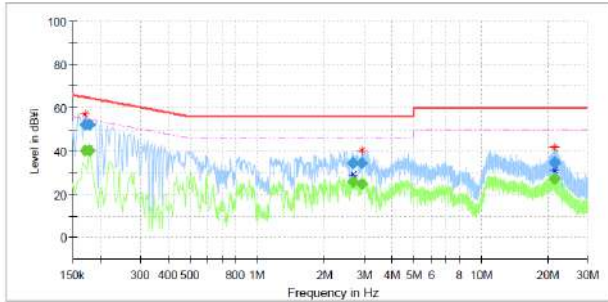
KES-RF-23T0111

Page (72) of (75)

Test results

Mode: 802.11g
Channel: 6 (Worst case)

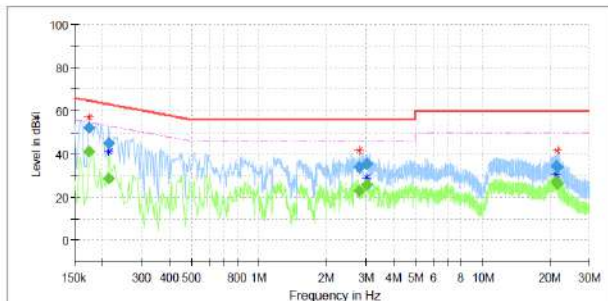
Hot Line



Final Result

Frequency (MHz)	QuasiPeak (dBm V)	CAverage (dBm V)	Limit (dBm V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	40.38	54.96	14.58	1000.0	9.000	L1	19.4
0.170000	62.30	---	64.96	12.66	1000.0	9.000	L1	19.4
0.178000	---	40.40	54.58	14.18	1000.0	9.000	L1	19.4
0.178000	62.33	---	64.58	12.25	1000.0	9.000	L1	19.4
2.666000	---	25.66	46.00	20.34	1000.0	9.000	L1	19.6
2.666000	34.43	---	56.00	21.57	1000.0	9.000	L1	19.6
2.946000	---	24.70	46.00	21.30	1000.0	9.000	L1	19.6
2.946000	34.29	---	56.00	21.71	1000.0	9.000	L1	19.6
21.310000	---	27.16	60.00	22.84	1000.0	9.000	L1	20.2
21.310000	34.47	---	60.00	25.53	1000.0	9.000	L1	20.2
21.394000	---	27.16	60.00	22.84	1000.0	9.000	L1	20.2
21.394000	34.70	---	60.00	25.30	1000.0	9.000	L1	20.2

Neutral Line



Final Result

Frequency (MHz)	QuasiPeak (dBm V)	CAverage (dBm V)	Limit (dBm V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.174000	---	41.14	54.77	13.63	1000.0	9.000	N	19.4
0.174000	62.16	---	64.77	12.61	1000.0	9.000	N	19.4
0.214000	---	28.69	53.06	24.46	1000.0	9.000	N	19.4
0.214000	44.84	---	63.06	18.21	1000.0	9.000	N	19.4
2.810000	---	22.79	46.00	23.21	1000.0	9.000	N	19.6
2.810000	33.67	---	56.00	22.33	1000.0	9.000	N	19.6
3.022000	---	25.70	46.00	20.30	1000.0	9.000	N	19.6
3.022000	35.12	---	56.00	20.88	1000.0	9.000	N	19.6
21.202000	---	27.25	60.00	22.75	1000.0	9.000	N	20.2
21.202000	34.25	---	60.00	25.75	1000.0	9.000	N	20.2
21.610000	---	26.26	60.00	23.74	1000.0	9.000	N	20.2
21.610000	34.01	---	60.00	25.99	1000.0	9.000	N	20.2

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 kes@kes.co.kr

3.7. Antenna Requirement

According to 15.207(a), An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Note.

1. The EUT has an internal chip antenna and meets the requirements of this section.

**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

Report No.:

KES-RF-23T0111

Page (74) of (75)

Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
EMI Test Receiver	R&S	ESU26	100552	1 year	2024.03.21
Spectrum Analyzer	R&S	FSV3030	101800	1 year	2024.02.02
Spectrum analyzer	R&S	FSV40-N	102194	1 year	2024.08.08
ATTENUATOR	Mini-Circuits	BW-S10-2W263+	1	1 year	2024.01.13
Power Meter	Anritsu	ML2495A	1438001	1 year	2024.01.13
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2024.01.13
SIGNAL GENERATOR	KEYSIGHT	N5182B	MY59100115	1 year	2024.05.26
SIGNAL GENERATOR	Anritsu	68369B	002118	1 year	2024.05.12
Attenuator	HUBER+SHHNER	6806.17.A	NONE	1 year	2024.03.21
Loop Antenna	Schwarzbeck	FMZB1513	1513-257	2 years	2025.03.22
Horn Antenna	A.H	SAS-571	414	1 year	2024.01.16
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA 9170550	1 year	2024.01.16
TRILOG- BROADBAND ANTENNA	VULB9163	Schwarzbeck	714	2 years	2024.04.19
Amplifier	SONOMA INSTRUMENT	310N	186549	1 year	2024.03.21
PREAMPLIFIER	HP	8449B	3008A00538	1 year	2024.05.31
BROADBAND AMPLIFIER	SCHWARZBECK	BBV9721	PS9721-003	1 year	2024.01.16
EMI TEST RECEIVER	R & S	ESR3	101783	1 year	2023.11.11
LISN	R & S	ENV216	101787	1 year	2023.11.10
PULSE LIMITER	R & S	ESH3-Z2	101915	1 year	2023.11.10

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook computer	LG Electronics Inc.,	LG15N53	311QCFT567147

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 kes@kes.co.kr

Appendix B. Test setup photos

Radiated test	Conducted test
	
	
	N/A

The end of test report.

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 kes@kes.co.kr