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# TEST REPORT
# Part 15 Subpart C 15.247

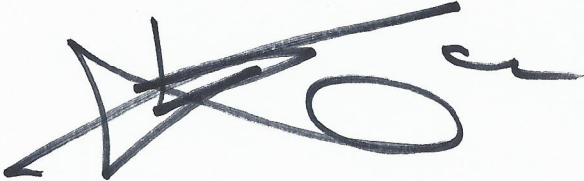| | |
|---|---|
| **Equipment under test** | BABY CAMERA |
| **Model name** | SEP-5001RDN |
| **Derivative model** | SEP-5002RDN |
| **FCC ID** | NLMSEP5001RDN |
| **Applicant** | Hanwha Techwin Co., Ltd. |
| **Manufacturer** | RDI Technology (Shenzhen) Co.,Ltd. |
| **Date of test(s)** | 2017.01.02 ~ 2017.01.09 |
| **Date of issue** | 2017.01.09 |

**Issued to**
**Hanwha Techwin Co., Ltd.**
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| Test and report completed by : | Report approval by : |
|---|---|
| | |
| Kwang-yeol Choo<br>Test engineer | Jeff Do<br>Technical manager |

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## Revision history

| Revision | Date of issue | Test report No. | Description |
|----------|---------------|-----------------|-------------|
| - | 2017.01.09 | KES-RF-17T0004 | Initial |

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# 1. General information

Applicant: Hanwha Techwin Co., Ltd.

Applicant address: 1204, Changwon-daero, Seongsan-gu, Changwon-si
Gyeongsangnam-do, South Korea

Test site: KES Co., Ltd.

Test site address: C-3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Korea
473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea

FCC rule part(s): 15.247

FCC ID: NLMSEP5001RDN

Test device serial No.: ☒ Production          ☐ Pre-production          ☐ Engineering

## 1.1. EUT description

| | |
|---|---|
| Equipment under test | BABY CAMERA |
| Frequency range | FHSS : 2 408 ㎒ ~ 2 468 ㎒ |
| | WIFI : 2 412 ㎒ ~ 2 462 ㎒ (11b/g/n_HT20) |
| | 2 422 ㎒ ~ 2 452 ㎒(11n_HT40) |
| Modulation technique | FHSS, GFSK |
| | WIFI : DSSS, OFDM |
| Number of channels | FHSS : 16 |
| | WIFI : 11(802.11b/g/n_HT20), 7(802.11n_HT40) |
| Antenna specification | Antenna type: Dipole, Peak gain: 2 ㏈i |
| Power source | AC 120 V (Adapter) |

## 1.2. Test configuration

The **Hanwha Techwin Co., Ltd. BABY CAMERA FCC ID: NLMSEP5001RDN** was tested per the guidance of KDB 558074 D01 v03r05. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

## 1.3. Accessory information

| Applicant | Equipment | Manufacturer | Model | Power source |
|---|---|---|---|---|
| Hanwha Techwin Co., Ltd. | Environment Sensor | RDI Technology (Shenzhen) Co., Ltd. | SEA-SE10 | DC 5V(Mini USB) |

## 1.4. Device modifications

N/A

## 1.5. Derivation model information

The circuit diagram and software of the basic model(SEP-5001RDN) and derivative(SEP-5002RDN) are fundamentally the same. But the derivative is being blocked sensor port.

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## 1.6. Frequency/channel operations

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

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

## 1.7. Worst case data rate

1. Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
2. Worst-case data rates were:
   802.11b: **1 Mbps**
   802.11g: **6 Mbps**
   802.11n_HT20: **MCS0**
   802.11n_HT40: **MCS0**

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## 2.    Summary  of  tests

| Reference | Parameter | Test results |
|---|---|---|
| 15.247(a)(2) | 6 ㏈ bandwidth | Pass |
| 15.247(b)(3) | Peak 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 |

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## 3. Test results
## 3.1. 6 dB bandwidth

**Test procedure**
KDB 558074 D01 v03r05 – Section 8.1 or 8.2
Used test method is section 8.1.

**Section 8.1**
1. RBW = 100 kHz.
2. VBW ≥ 3 × RBW.
3. Detector = peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

**Section 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 kHz, VBW ≥ 3 × 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 ≥ 6 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.
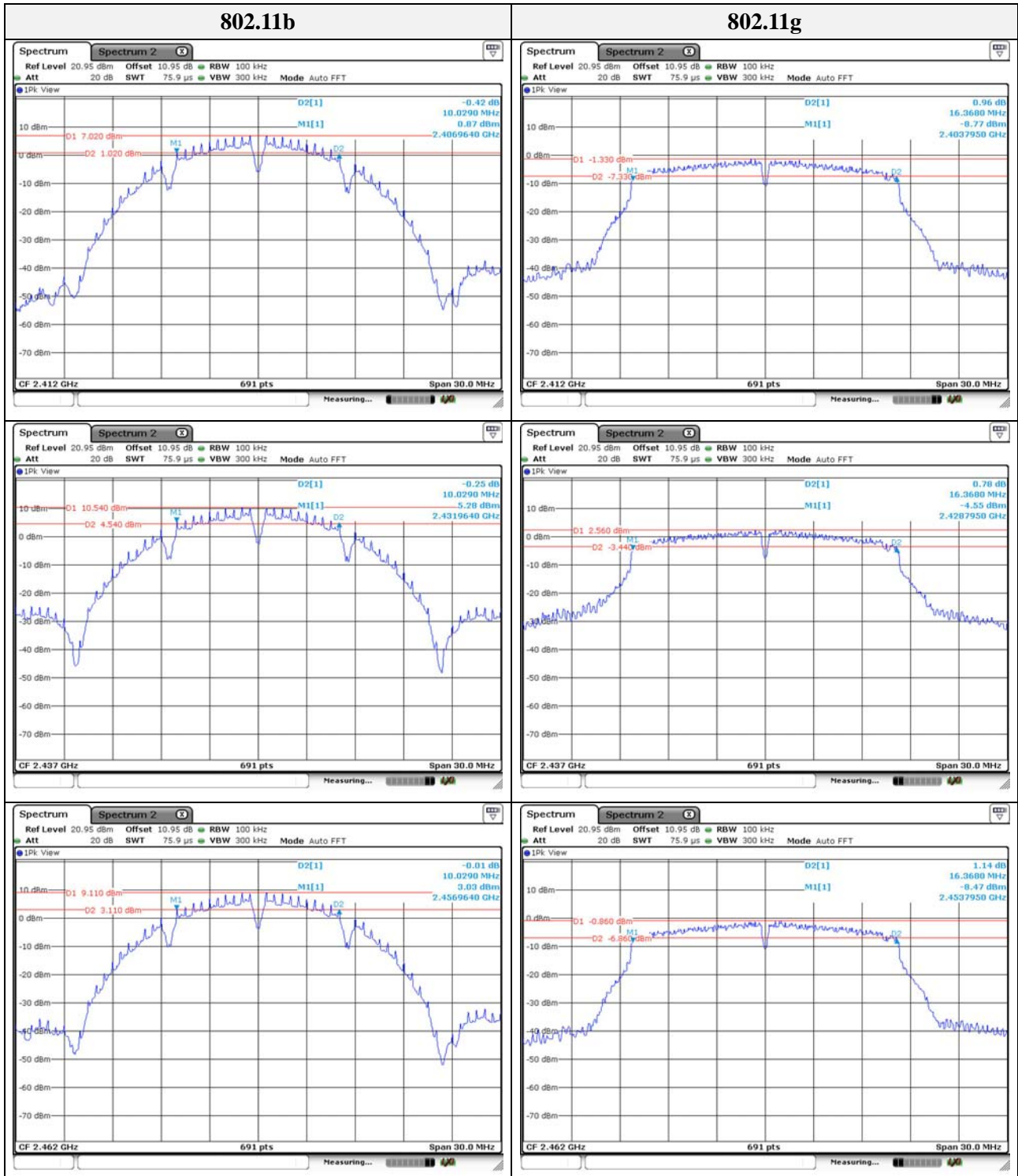
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## Test results

| 6 ㏈ bandwidth of 20 ㎒ bandwidth | | | | |
|---|---|---|---|---|
| Measured 6 ㏈ bandwidth(㎒) | | | | Limit(㎒) |
| Frequency(㎒) | 802.11b | 802.11g | 802.11n | |
| 2 412 | 10.029 | 16.368 | 17.583 | |
| 2 437 | 10.029 | 16.368 | 17.583 | 0.5 |
| 2 462 | 10.029 | 16.368 | 17.583 | |

| 6 ㏈ bandwidth of 40 ㎒ bandwidth | | |
|---|---|---|
| Measured 6 ㏈ bandwidth(㎒) | | |
| Frequency(㎒) | 802.11n | Limit(㎒) |
| 2 422 | 36.120 | |
| 2 437 | 36.120 | 0.5 |
| 2 452 | 36.120 | |

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| 802.11b | 802.11g |
|---|---|
|  |  |
|  |  |
|  |  |

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| 802.11n(HT20) | 802.11n(HT40) |
|---|---|
|  |  |
|  |  |
|  |  |

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## 3.2.      Output power

**Test procedure**

KDB 558074 D01 v03r05 – section 9.1.1 or 9.1.2
Used test method is section 9.1.2.

**Section 9.1.1**

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

1.  Set the RBW $\geq$ DTS bandwidth.
2.  Set VBW $\geq$ 3 $\times$ RBW.
3.  Set span $\geq$ 3 $\times$ RBW
4.  Sweep time = auto couple
5.  Detector = peak
6.  Trace mode = max hold
7.  Allow trace to fully stabilize
8.  Use peak marker function to determine the peak amplitude level

**Section 9.1.2**

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 utilize a fast-responding diode detector.

**Limit**

According to §15.247(b)(3), For systems using digital modulation in the 902~928 ㎒, 2 400~2 483.5 ㎒, and 5 725~5 850 ㎒ 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.

According to §15.247(b)(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 ㏈i. Except as shown in paragraph (c) of this section, if transmit-ting antennas of directional gain greater than 6 ㏈i are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 ㏈i.

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**Test results**

| Measured output power (dBm) | | | | | |
|---|---|---|---|---|---|
| **Mode** | **2412 ㎒** | | **2437 ㎒** | | **2467 ㎒** | |
| | **Peak** | **Average** | **Peak** | **Average** | **Peak** | **Average** |
| 11b | 18.26 | 16.31 | 19.40 | 17.50 | 20.03 | 18.16 |
| 11g | 21.85 | 12.75 | 23.37 | 15.68 | 21.14 | 11.09 |
| 11n | 22.66 | 12.55 | 23.74 | 15.53 | 22.13 | 10.95 |
| **Mode** | **2422 ㎒** | | **2437 ㎒** | | **2452 ㎒** | |
| | **Peak** | **Average** | **Peak** | **Average** | **Peak** | **Average** |
| 11n | 21.82 | 11.31 | 23.54 | 15.38 | 21.70 | 10.61 |

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## 3.3. Power spectral density

**Test procedure**

KDB 558074 D01 v03r05– section 10.2

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW : 3 ㎑ $\leq$ RBW $\leq$ 100 ㎑
4. Set the VBW $\geq$ 3 $\times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW(no less than 3 ㎑) 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 ㏈m in any 3 ㎑ 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.

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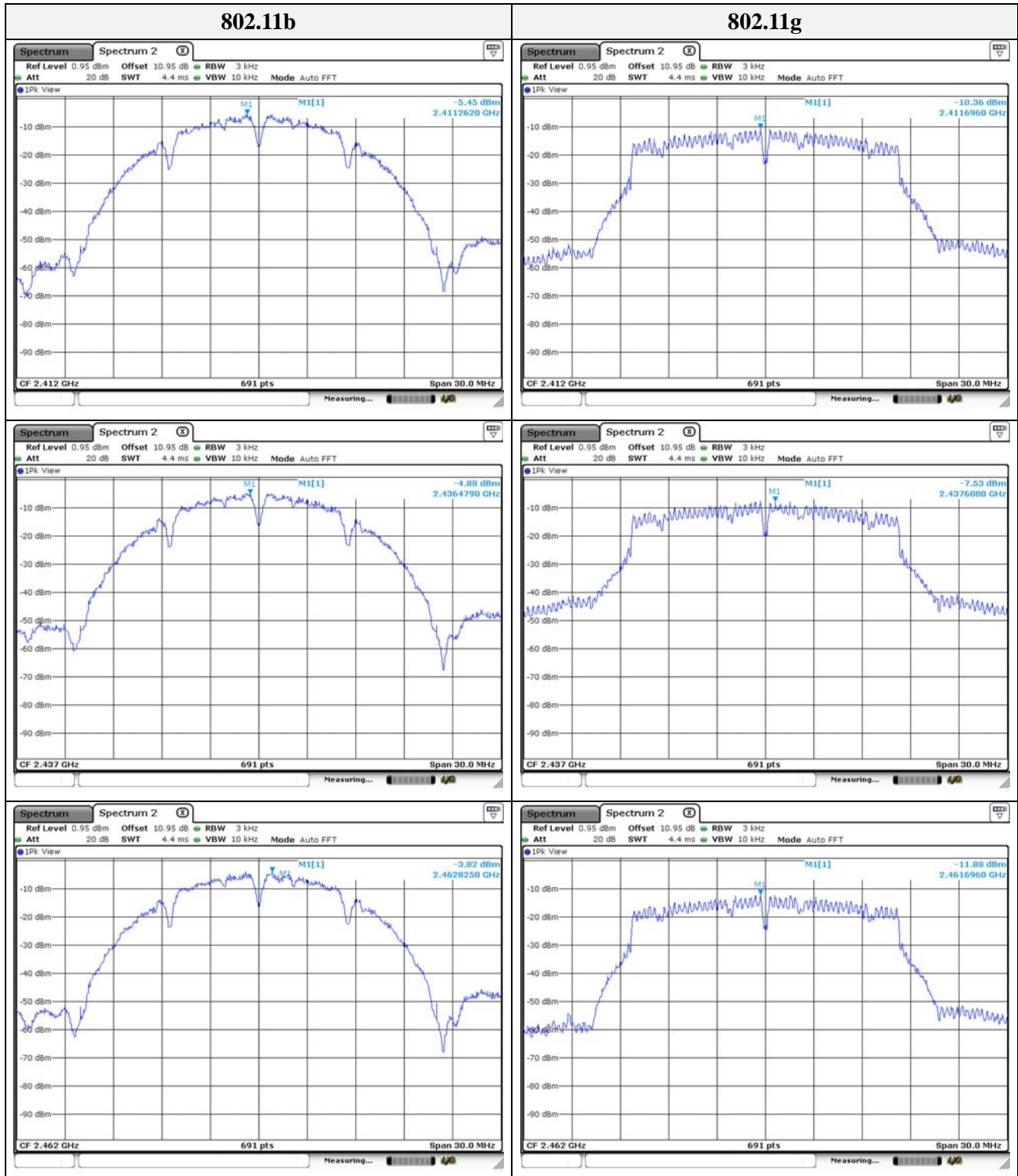www.kes.co.kr

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**Test results**

| PSD of 20 ㎒ bandwidth | | | | |
|---|---|---|---|---|
| Measured PDS(dBm) | | | | Limit(dBm) |
| Frequency(㎒) | 802.11b | 802.11g | 802.11n | |
| 2412 | -5.45 | -10.36 | -11.22 | |
| 2437 | -4.88 | -7.53 | -7.94 | 8 |
| 2462 | -3.82 | -11.88 | -12.29 | |

| PSD of 40 ㎒ bandwidth | | |
|---|---|---|
| Measured PDS(dBm) | | |
| Frequency(㎒) | 802.11n | Limit(dBm) |
| 2422 | -14.68 | |
| 2437 | -10.28 | 8 |
| 2452 | -15.72 | |

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## SISO

| 802.11b | 802.11g |
|---------|---------|

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| 802.11n(HT20) | 802.11n(HT40) |
|---|---|
|  |  |
|  |  |
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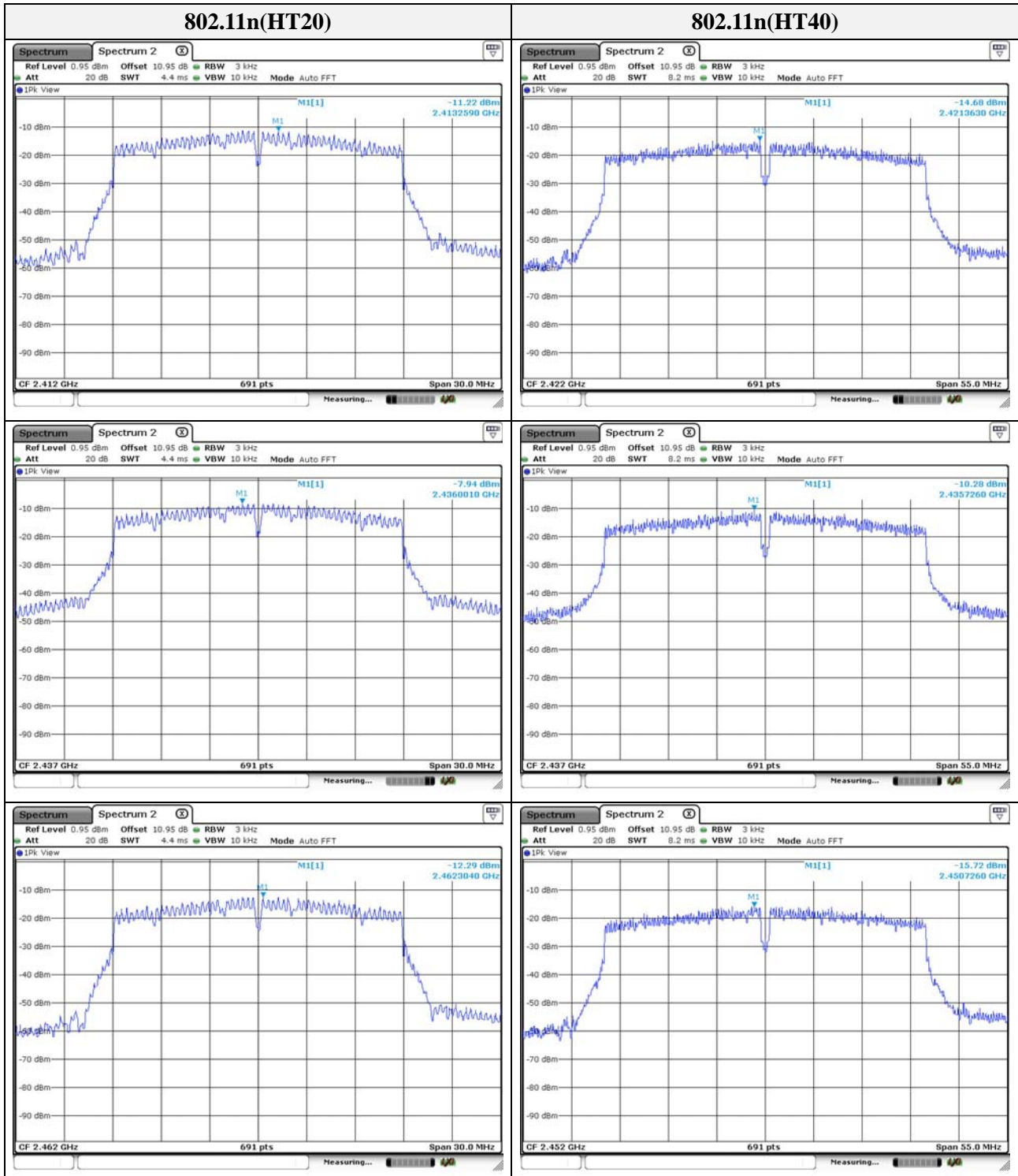
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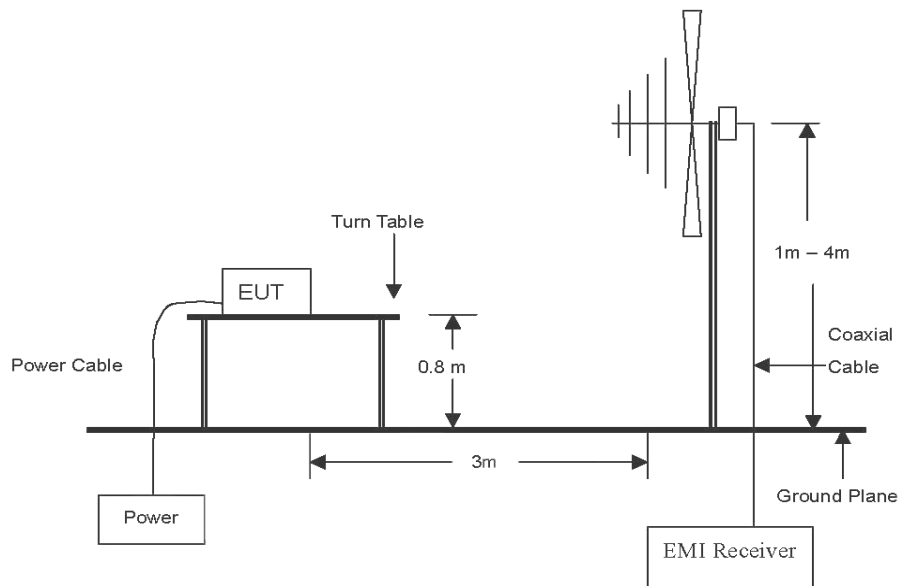
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## 3.4.　　Radiated restricted band and emissions
**Test setup**

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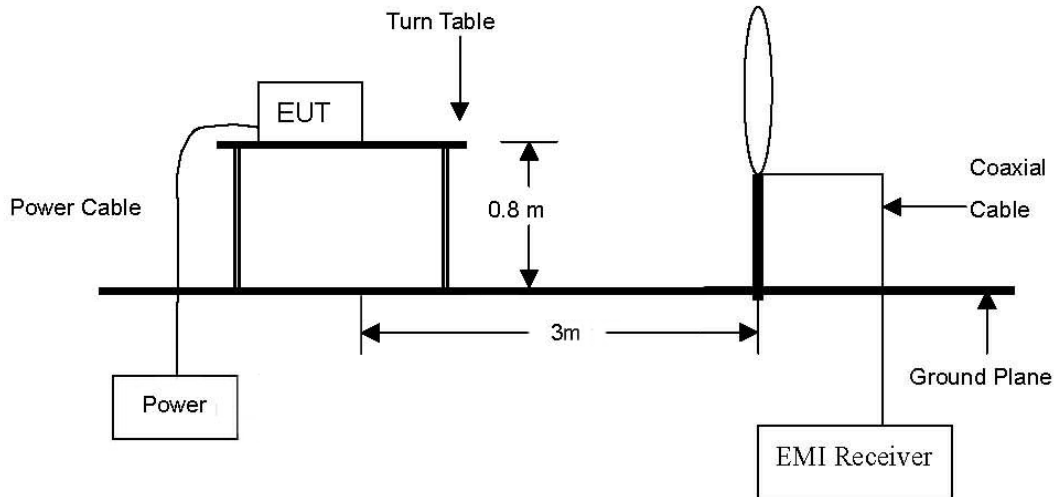


The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.

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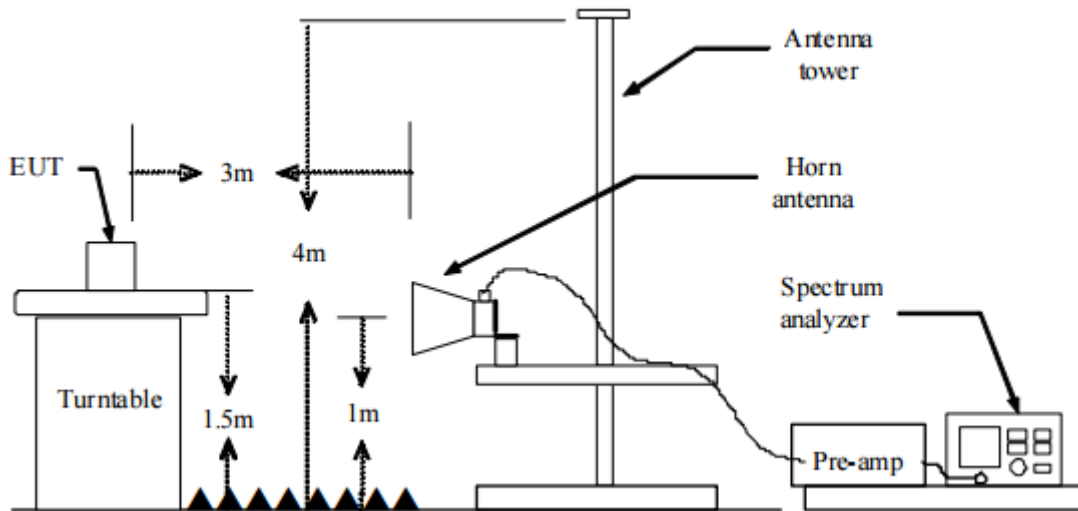


**Test procedure below 30 ㎒**

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. 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 ㎒**

1. Spectrum analyzer settings for $f < 1$ ㎓:
   ① Span = wide enough to fully capture the emission being measured
   ② RBW = 100 ㎑
   ③ VBW ≥ RBW
   ④ Detector = quasi peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
2. Spectrum analyzer settings for $f \geq 1$ ㎓: Peak
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   ③ VBW ≥ 3 ㎒
   ④ Detector = peak
   ⑤ Sweep time = auto
   ⑥ Trace = max hold
   ⑦ Trace was allowed to stabilize

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3. Spectrum analyzer settings for $f \geq 1$ ㎓: Average
   ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
   ② RBW = 1 ㎒
   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 ㏈ 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 ($\geq$ 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. $f <30$ ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/D_s)$
   $f \geq 30$ ㎒, extrapolation factor of 20 ㏈/decade of distance. $F_d = 20\log(D_m/D_s)$
   Where:
   $F_d$ = Distance factor in ㏈
   $D_m$ = Measurement distance in meters
   $D_s$ = Specification distance in meters
3. CF(Correction factors(㏈)) = Antenna factor(㏈/m) + Cable loss(㏈) + or Amp. gain(㏈) + or $F_d$(㏈)
4. Field strength(㏈㎌/m) = Level(㏈㎌) + CF (㏈) + or DCF(㏈)
5. Margin(㏈) = Limit(㏈㎌/m) - Field strength(㏈㎌/m)
6. Emissions below 18 ㎓ were measured at a 3 meter test distance while emissions above 18 ㎓ 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 ㏈ of respective limits were not reported.

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**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 (㎒) | Distance (Meters) | Radiated (㎶/m) |
|---|---|---|
| 0.009 ~ 0.490 | 300 | 2400/F(㎑) |
| 0.490 ~ 1.705 | 30 | 24000/F(㎑) |
| 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 ㎒, 76 ~ 88 ㎒, 174 ~ 216 ㎒ or 470 ~ 806 ㎒. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

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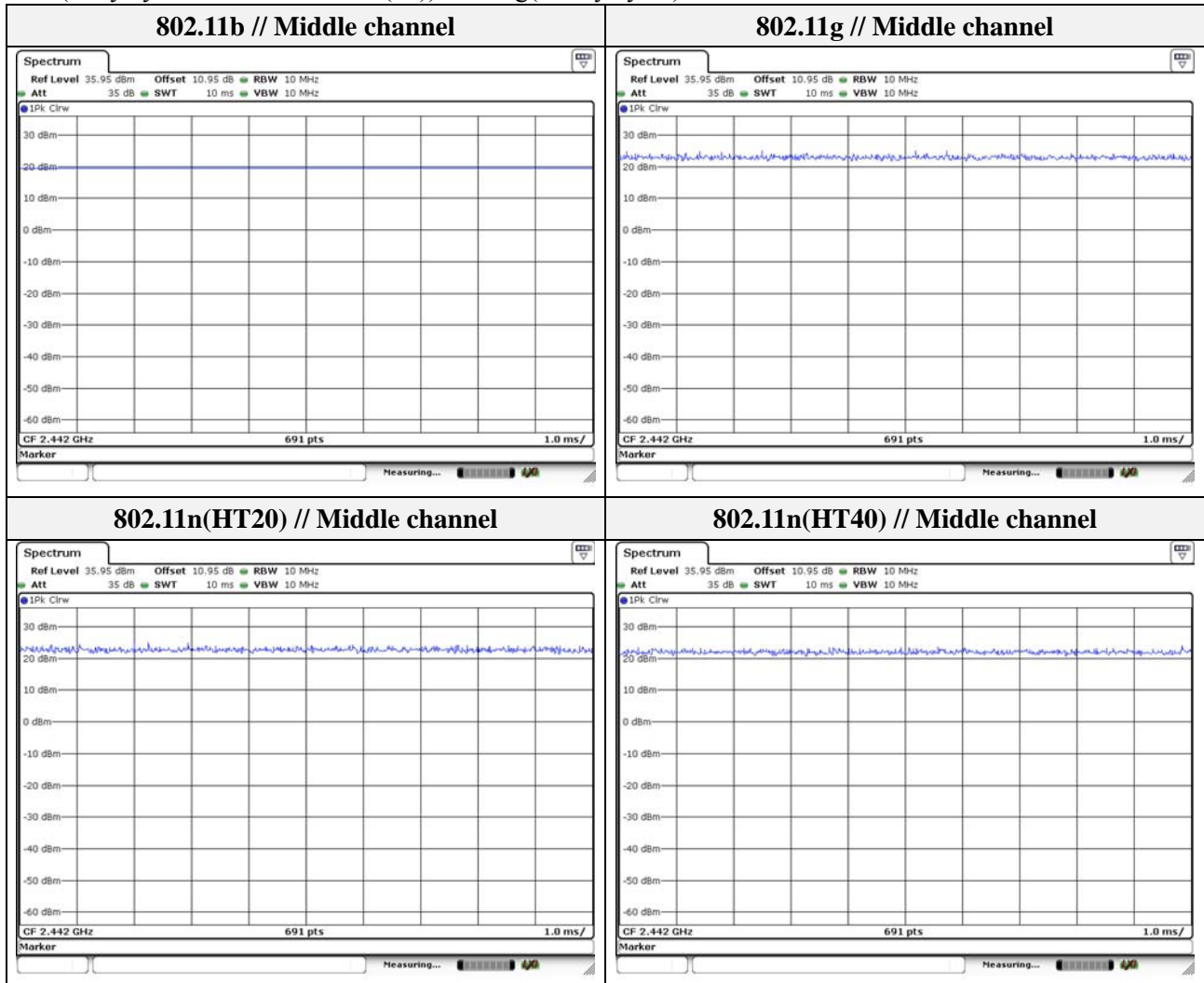Test report No.:
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## Duty cycle

Regarding to KDB 558074 D01_v03r05, 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 | 10.00 | 10.00 | 1 | 100 | 0 |
| 802.11g | 10.00 | 10.00 | 1 | 100 | 0 |
| 802.11n(HT20) | 10.00 | 10.00 | 1 | 100 | 0 |
| 802.11n(HT40) | 10.00 | 10.00 | 1 | 100 | 0 |

`.

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

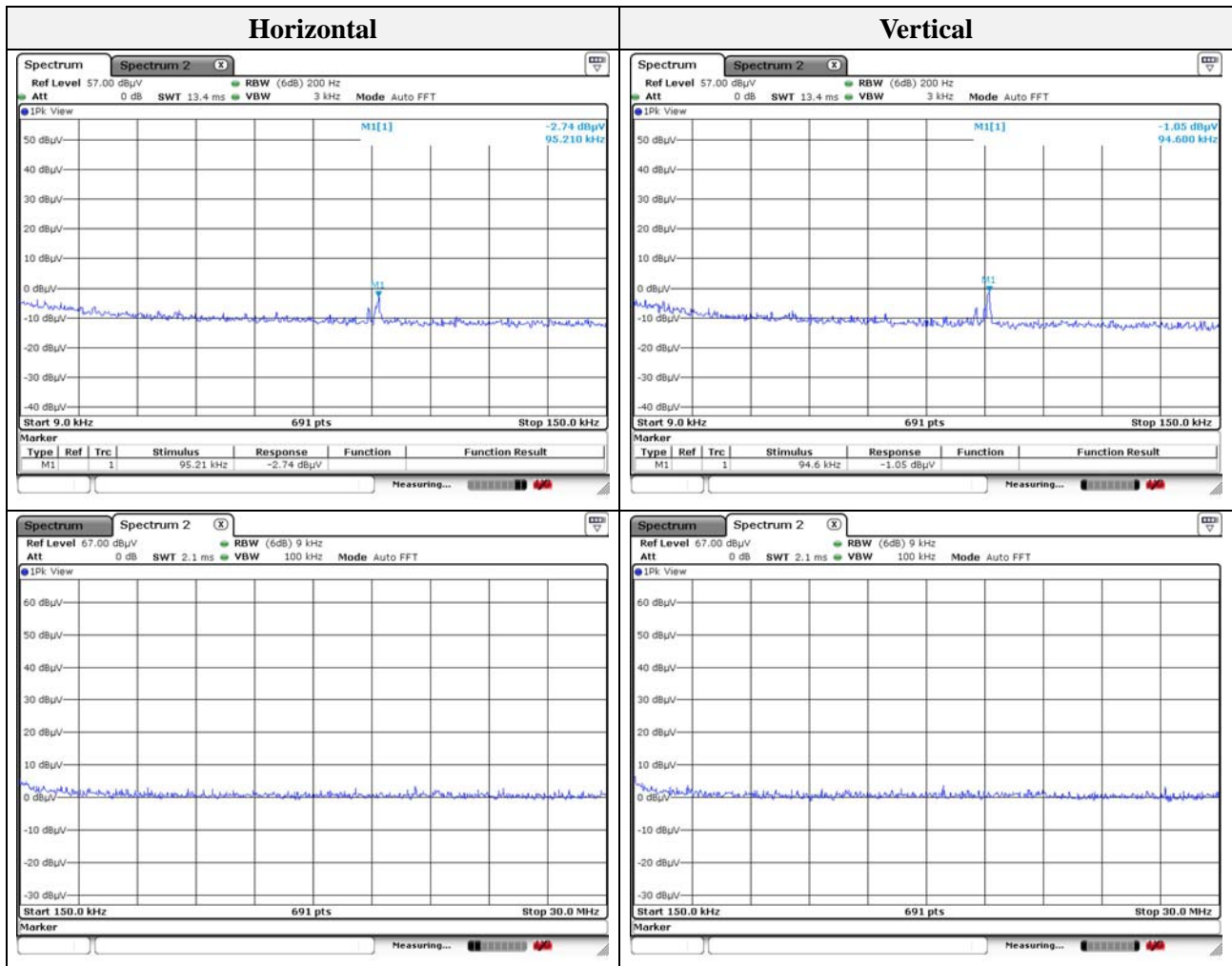DCF(Duty cycle correction factor (dB)) = 10log(1/duty cycle)

| 802.11b // Middle channel | 802.11g // Middle channel |
|---|---|
|  |  |

| 802.11n(HT20) // Middle channel | 802.11n(HT40) // Middle channel |
|---|---|
|  |  |

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## Test results (Below 30 ㎒)

Mode: 802.11n(HT20)

Distance of measurement: 3 meter

Channel: 06(Worst case)

| Frequency (㎒) | Level (dBµV) | Ant. Pol. (H/V) | CF (dB) | $F_d$ (dB) | Field strength (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| No spurious emissions were detected within 20 ㏈ of the limit | | | | | | | |

| Horizontal | Vertical |
|---|---|

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## Test results (Below 1 000 ㎒) – Worst case

| | |
|---|---|
| Mode: | 802.11n(HT20) |
| Distance of measurement: | 3 meter |
| Channel: | 06(Worst case) |



| | Horizontal | Vertical |
|---|---|---|

Horizontal

| | Freq | Level | Read Level | Ant Factor | Cable Loss | Preamp Factor | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV | dB/m | dB | dB | dBuV/m | dB | | |
| 1 | 177.44 | 32.56 | 21.90 | 9.30 | 1.36 | 0.00 | 43.50 | -10.94 | | horizontal |
| 2 | 199.75 | 34.09 | 21.46 | 11.28 | 1.35 | 0.00 | 43.50 | -9.41 | | horizontal |
| 3 | 216.24 | 35.52 | 22.45 | 11.64 | 1.43 | 0.00 | 46.00 | -10.48 | | horizontal |
| 4 pp | 270.56 | 41.27 | 26.80 | 12.77 | 1.70 | 0.00 | 46.00 | -4.73 | | horizontal |
| 5 | 284.14 | 37.98 | 23.16 | 13.05 | 1.77 | 0.00 | 46.00 | -8.02 | | horizontal |
| 6 | 324.88 | 40.10 | 24.25 | 13.96 | 1.89 | 0.00 | 46.00 | -5.90 | | horizontal |
| 7 | 338.46 | 37.57 | 21.40 | 14.27 | 1.90 | 0.00 | 46.00 | -8.43 | | horizontal |
| 8 | 540.22 | 41.17 | 20.66 | 17.98 | 2.53 | 0.00 | 46.00 | -4.83 | | horizontal |
| 9 | 575.14 | 40.57 | 19.26 | 18.75 | 2.56 | 0.00 | 46.00 | -5.43 | | horizontal |

Vertical

| | Freq | Level | Read Level | Ant Factor | Cable Loss | Preamp Factor | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV | dB/m | dB | dB | dBuV/m | dB | | |
| 1 | 132.82 | 30.36 | 20.60 | 8.60 | 1.16 | 0.00 | 43.50 | -13.14 | | vertical |
| 2 | 177.44 | 30.95 | 20.29 | 9.30 | 1.36 | 0.00 | 43.50 | -12.55 | | vertical |
| 3 | 270.56 | 37.06 | 22.59 | 12.77 | 1.70 | 0.00 | 46.00 | -8.94 | | vertical |
| 4 | 284.14 | 34.80 | 19.98 | 13.05 | 1.77 | 0.00 | 46.00 | -11.20 | | vertical |
| 5 | 324.88 | 34.46 | 18.61 | 13.96 | 1.89 | 0.00 | 46.00 | -11.54 | | vertical |
| 6 | 337.49 | 35.08 | 18.93 | 14.25 | 1.90 | 0.00 | 46.00 | -10.92 | | vertical |
| 7 | 540.22 | 40.79 | 20.28 | 17.98 | 2.53 | 0.00 | 46.00 | -5.21 | | vertical |
| 8 | 575.14 | 40.04 | 18.73 | 18.75 | 2.56 | 0.00 | 46.00 | -5.96 | | vertical |
| 9 pp | 648.86 | 41.21 | 19.00 | 19.50 | 2.71 | 0.00 | 46.00 | -4.79 | | vertical |

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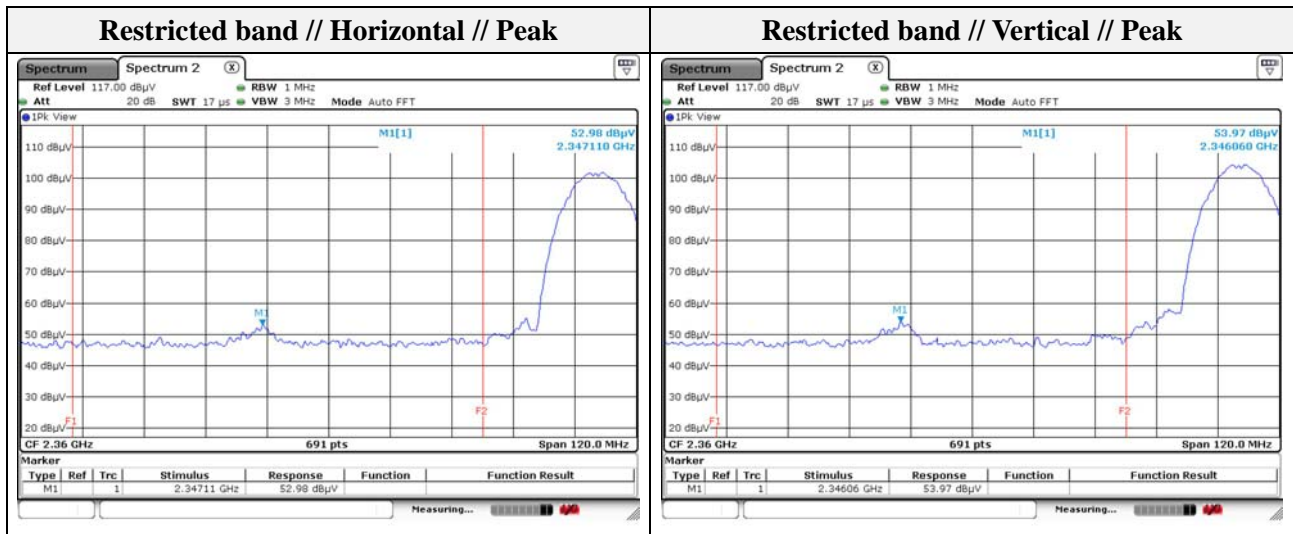
## Test results (Above 1 000 ㎒)
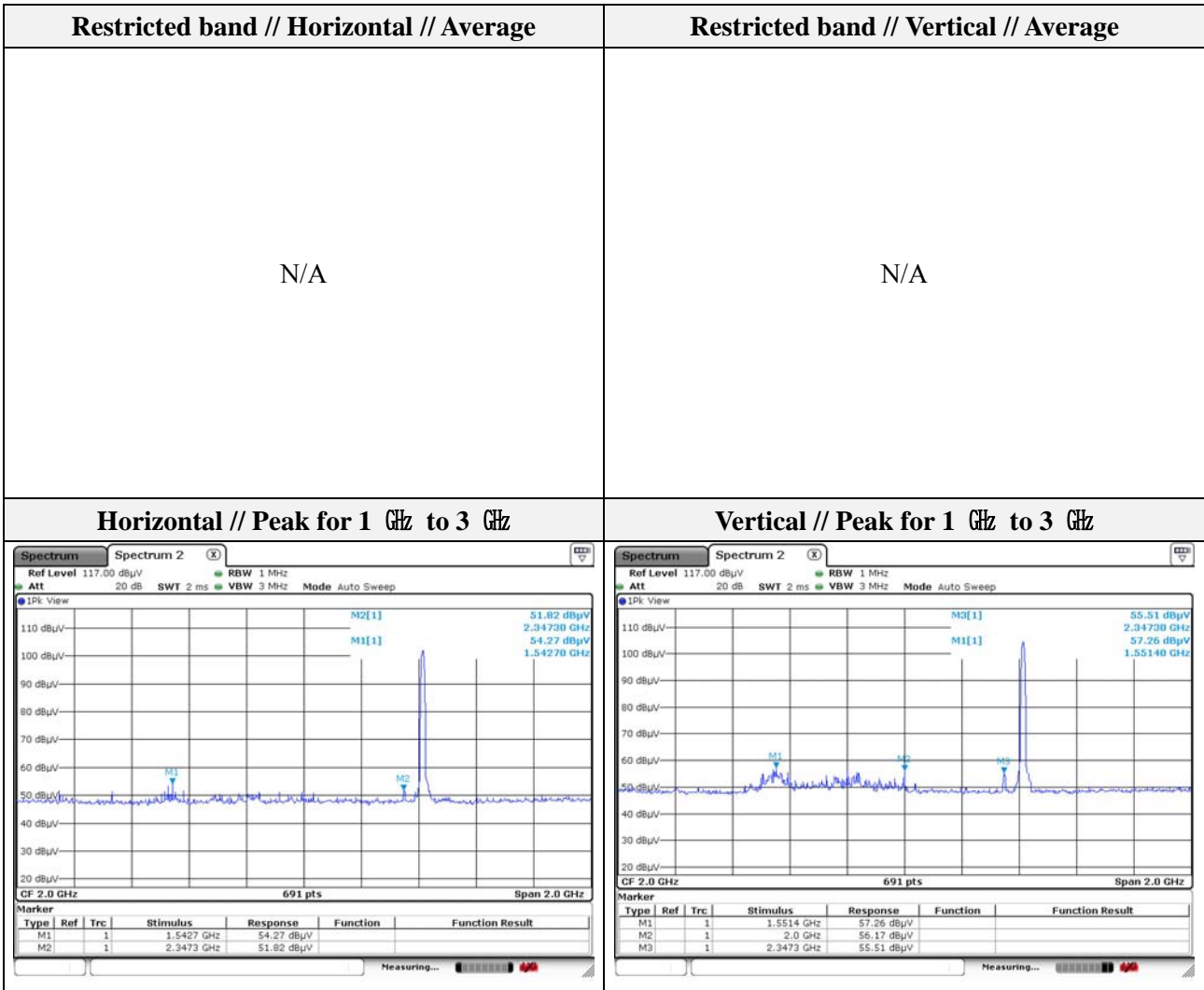
Mode:                       802.11b

Distance of measurement:    3 meter

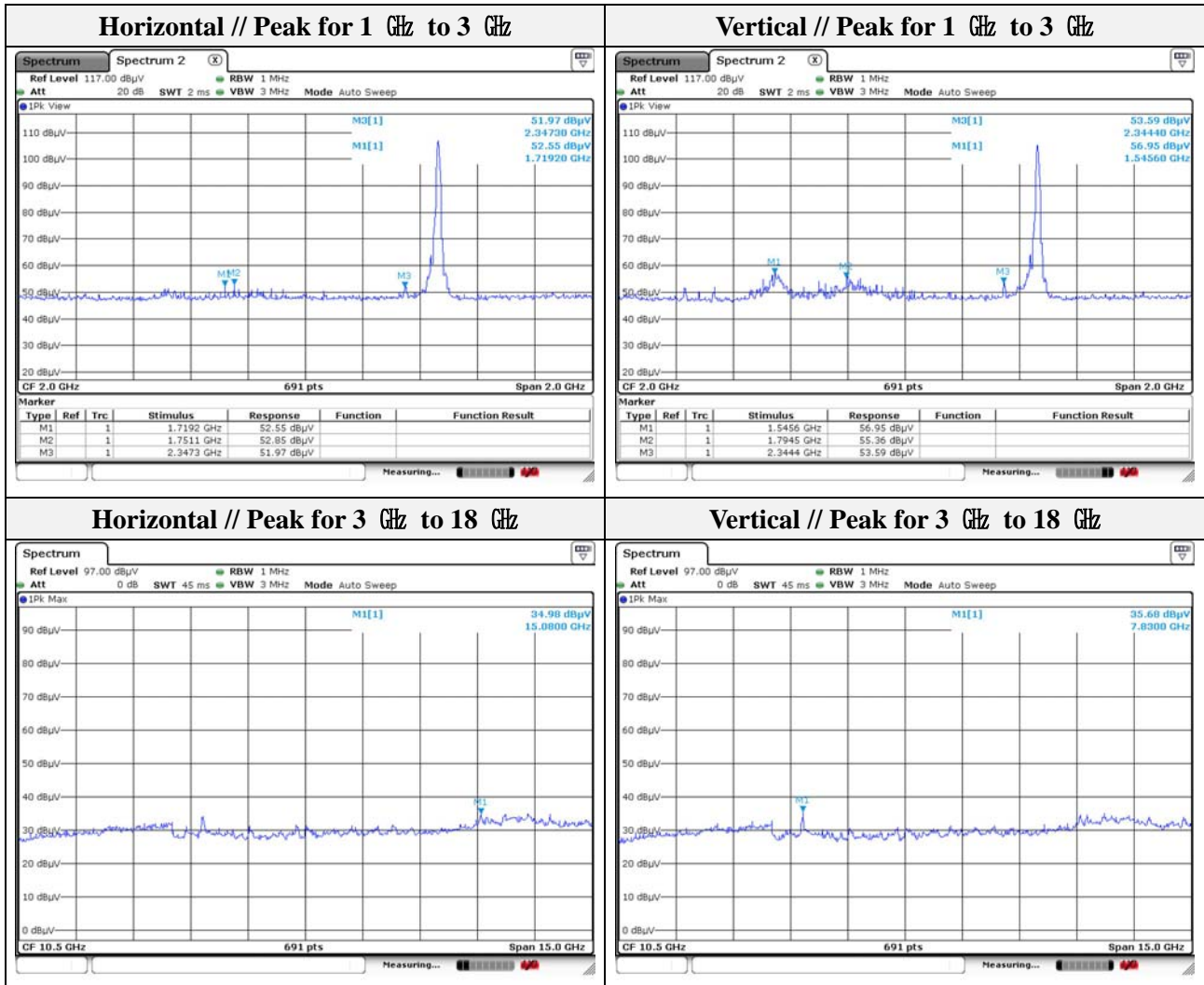Channel:                   01

| Frequency (㎒) | Level (dB$\mu$V) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dB$\mu$V/m) | Limit (dB$\mu$V/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1542.70 | 54.27 | Peak | H | -7.05 | - | 47.22 | 74.00 | 26.78 |
| 1551.40 | 57.26 | Peak | V | -6.97 | - | 50.29 | 74.00 | 23.71 |
| 2000.00 | 56.17 | Peak | V | -2.91 | - | 53.26 | 74.00 | 20.74 |
| 2346.06 | 53.97 | Peak | V | -1.95 | - | 52.02 | 74.00 | 21.98 |
| 2347.11 | 52.98 | Peak | H | -1.95 | - | 51.03 | 74.00 | 22.97 |
| 2347.30 | 51.82 | Peak | H | -1.95 | - | 49.87 | 74.00 | 24.13 |
| 2347.30 | 55.51 | Peak | V | -1.95 | - | 53.56 | 74.00 | 20.44 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |

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| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |
| **Horizontal // Peak for 1 ㎓ to 3 ㎓** | **Vertical // Peak for 1 ㎓ to 3 ㎓** |

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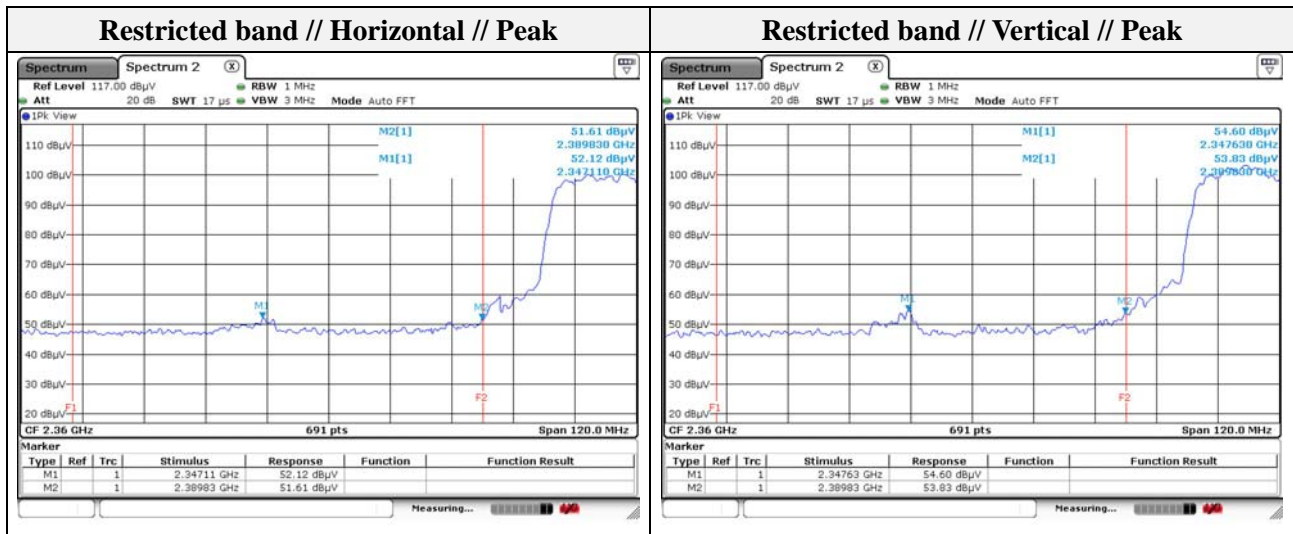| **Horizontal // Peak for 3 ㎓ to 18 ㎓** | **Vertical // Peak for 3 ㎓ to 18 ㎓** |
|---|---|
|  |  |
| **Horizontal // Average for 3 ㎓ to 18 ㎓** | **Vertical // Average for 3 ㎓ to 18 ㎓** |
| N/A | N/A |
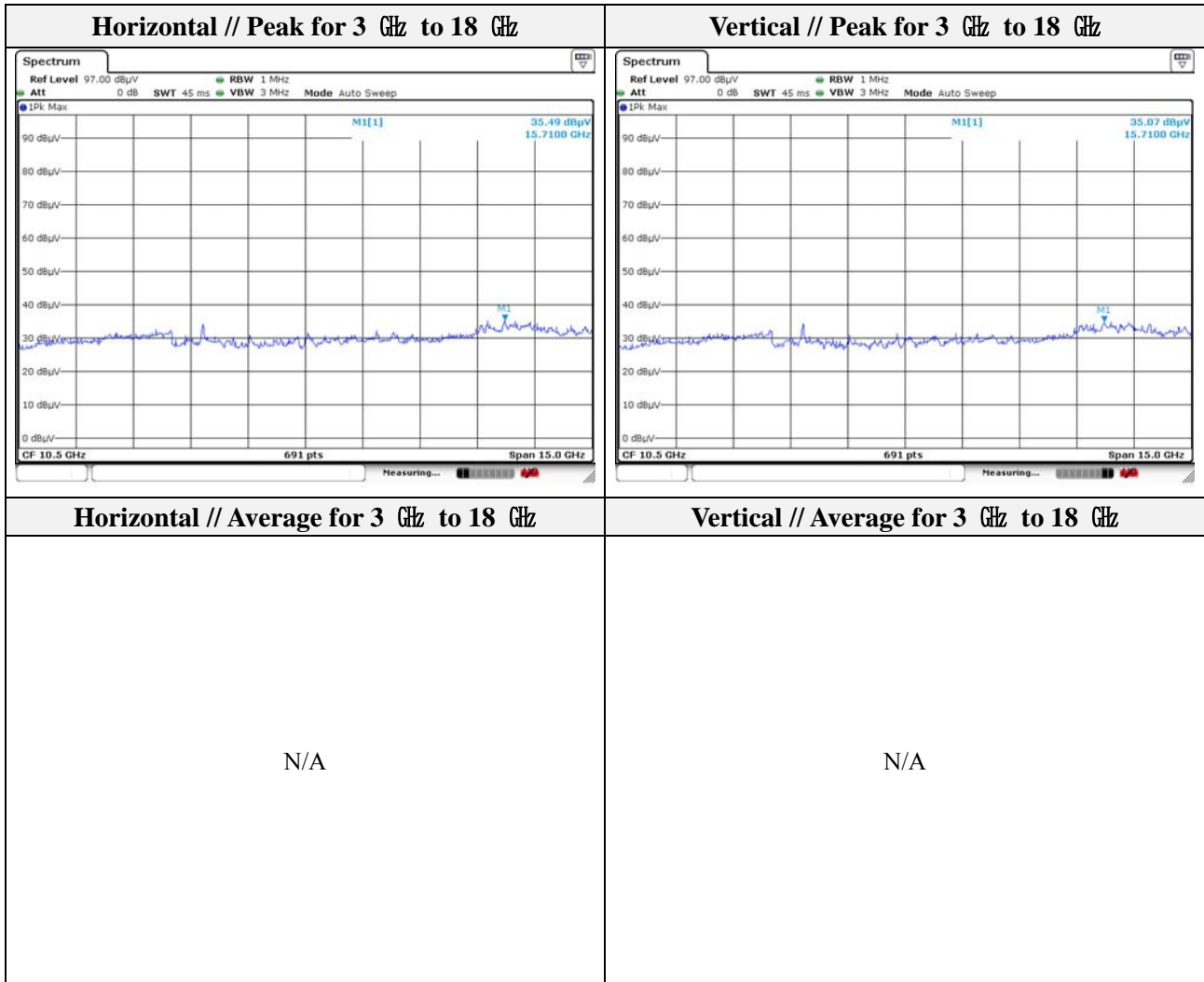
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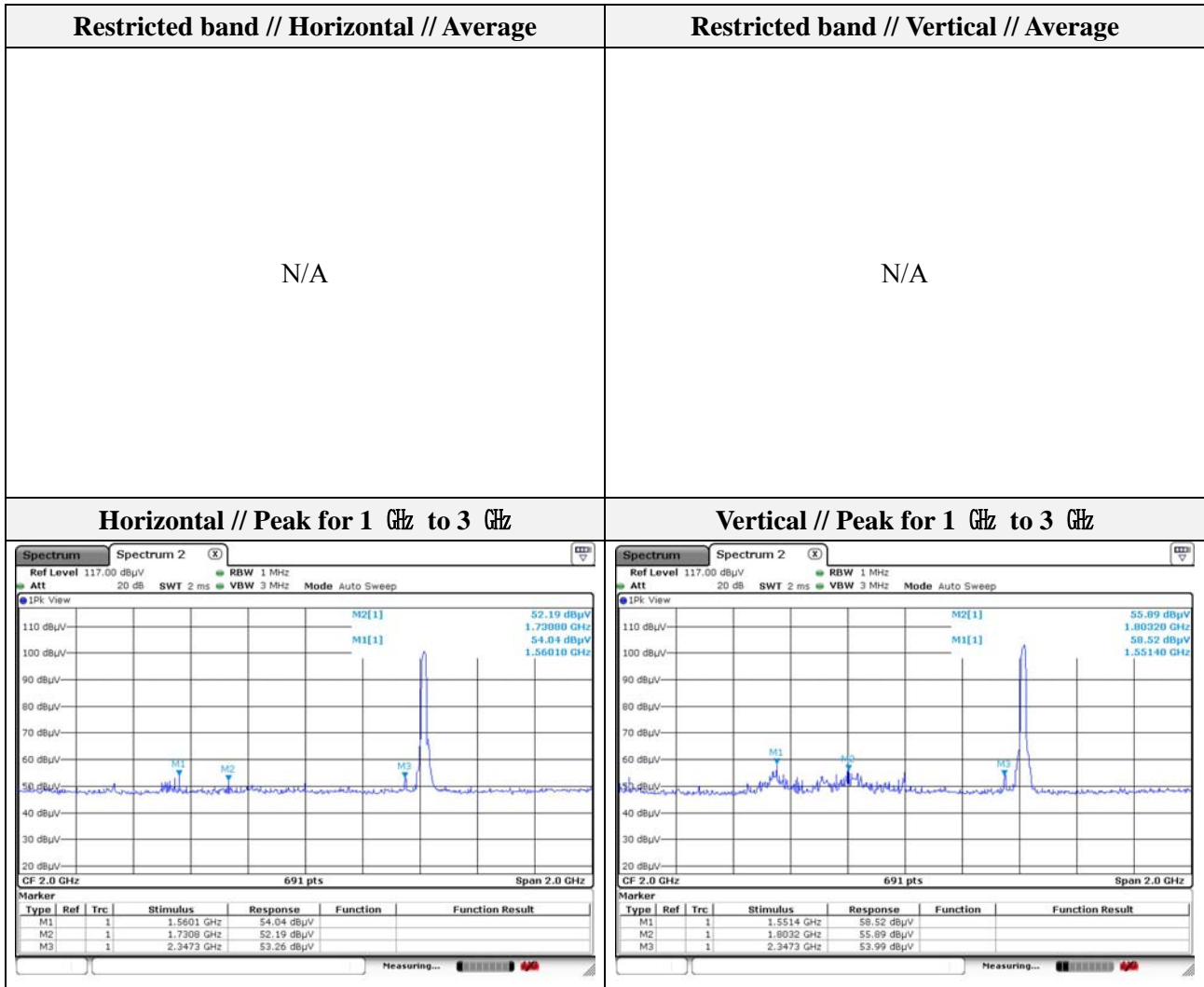Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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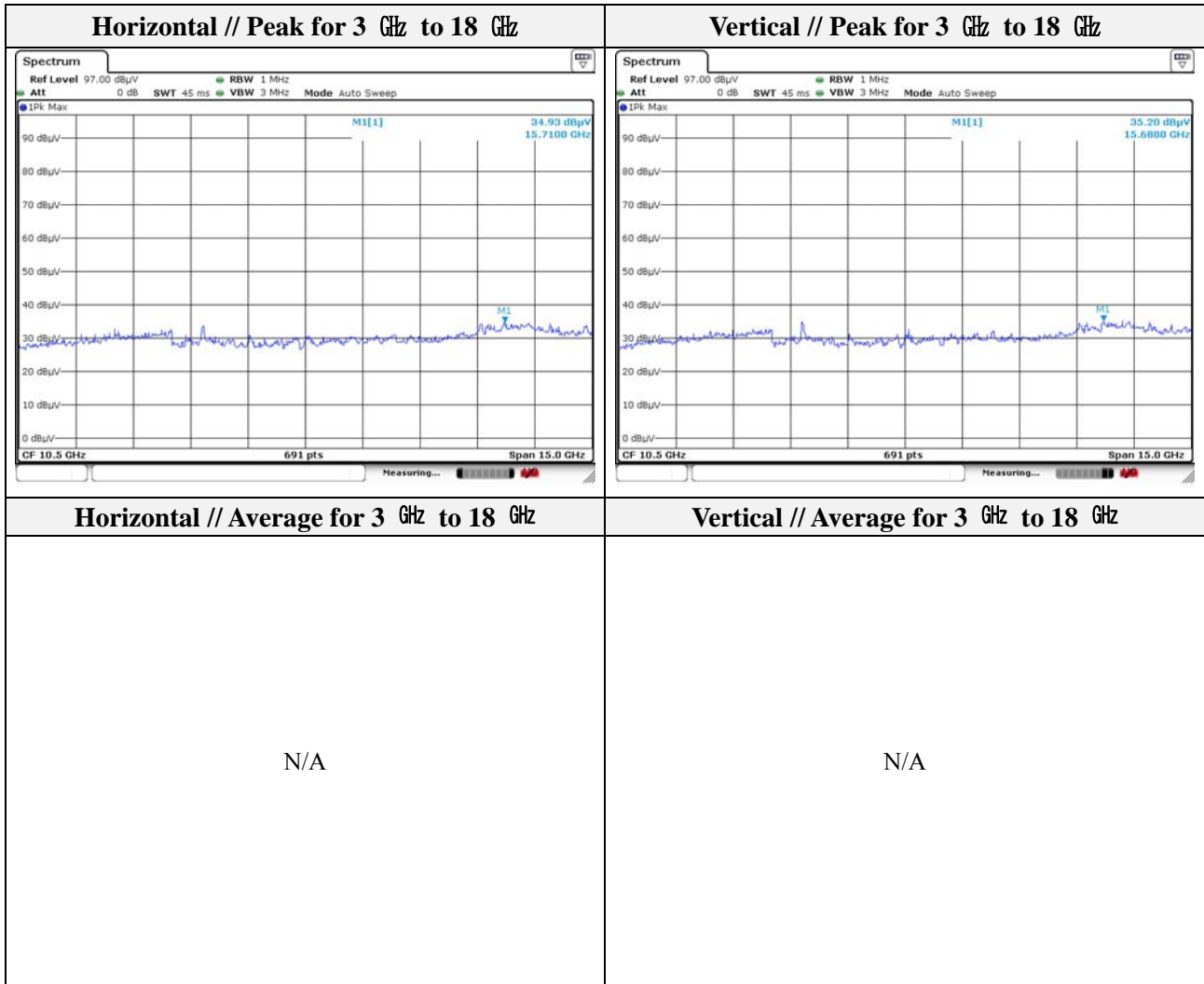| Mode: | 802.11b |
| Distance of measurement: | 3 meter |
| Channel: | 06 |

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1551.40 | 57.20 | Peak | V | -6.97 | - | 50.23 | 74.00 | 23.77 |
| 1577.40 | 53.75 | Peak | H | -6.74 | - | 47.01 | 74.00 | 26.99 |
| 1748.20 | 54.07 | Peak | H | -5.07 | - | 49.00 | 74.00 | 25.00 |
| 1814.80 | 58.22 | Peak | V | -4.44 | - | 53.78 | 74.00 | 20.22 |
| 2347.30 | 53.83 | Peak | H | -1.95 | - | 51.88 | 74.00 | 22.12 |
| 2347.30 | 55.84 | Peak | V | -1.95 | - | 53.89 | 74.00 | 20.11 |

| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
|---|---|
| | |

| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|---|---|
| | |

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Mode: 802.11b

Distance of measurement: 3 meter

Channel: 11

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1545.60 | 56.95 | Peak | V | -7.02 | - | 49.93 | 74.00 | 24.07 |
| 1719.20 | 52.55 | Peak | H | -5.36 | - | 47.19 | 74.00 | 26.81 |
| 1751.10 | 52.85 | Peak | H | -5.04 | - | 47.81 | 74.00 | 26.19 |
| 1794.50 | 55.36 | Peak | V | -4.61 | - | 50.75 | 74.00 | 23.25 |
| 2344.40 | 53.59 | Peak | V | -1.95 | - | 51.64 | 74.00 | 22.36 |
| 2347.30 | 51.97 | Peak | H | -1.95 | - | 50.02 | 74.00 | 23.98 |
| 2488.06 | 54.49 | Peak | V | -1.58 | - | 52.91 | 74.00 | 21.09 |
| 2488.42 | 55.12 | Peak | H | -1.58 | - | 53.54 | 74.00 | 20.46 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |

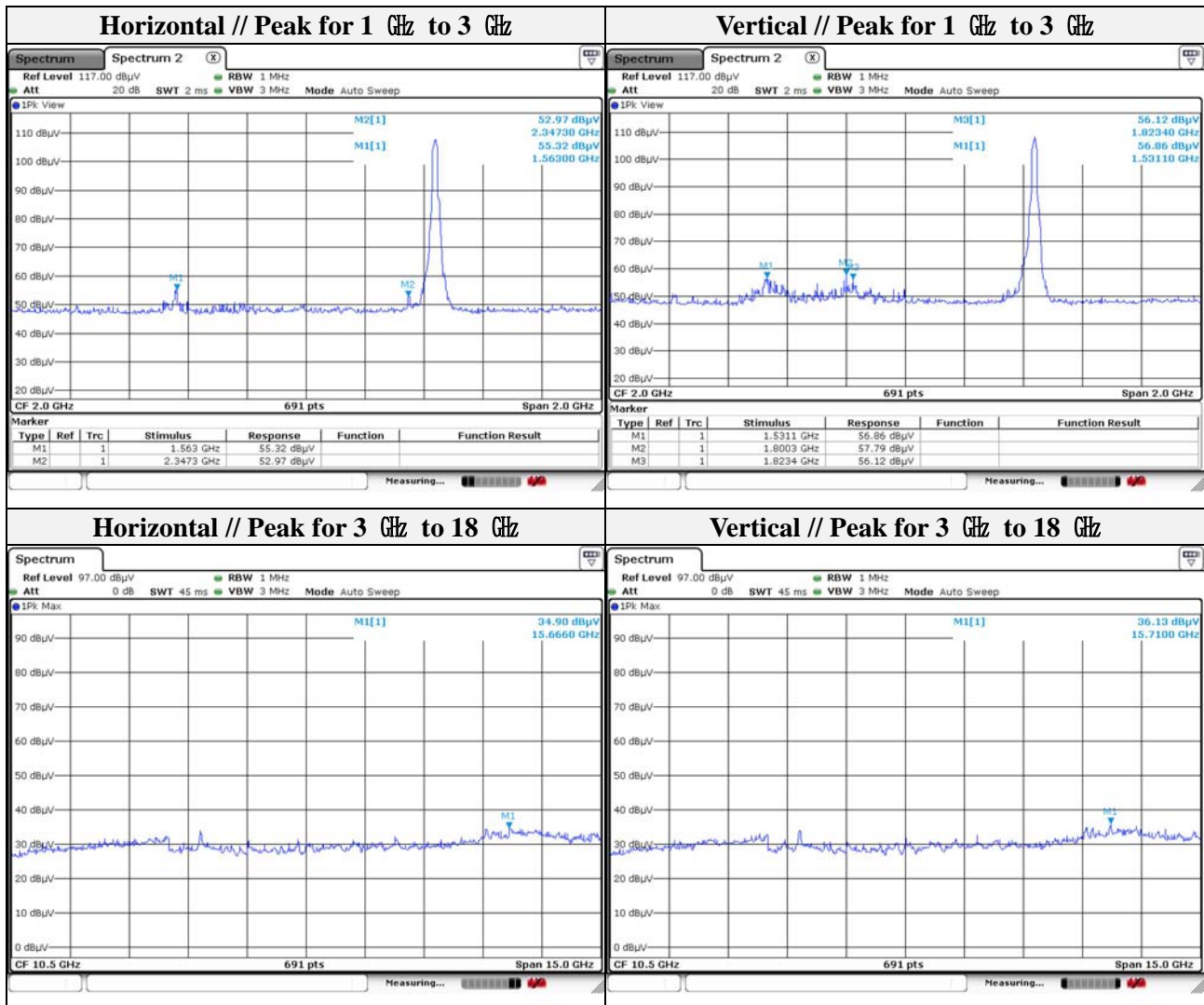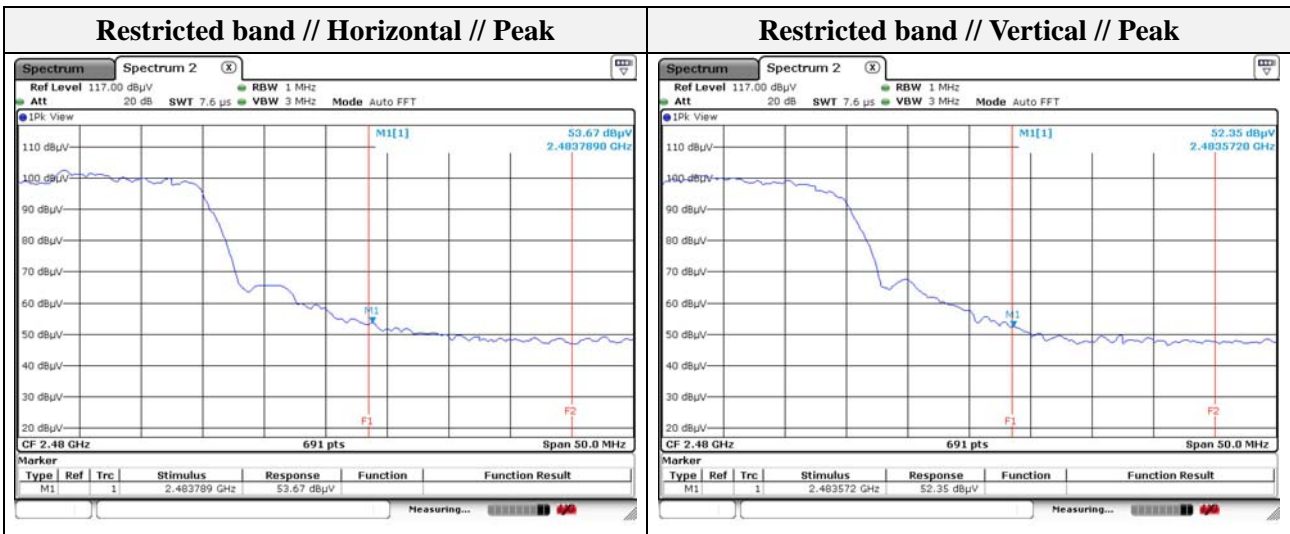| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |
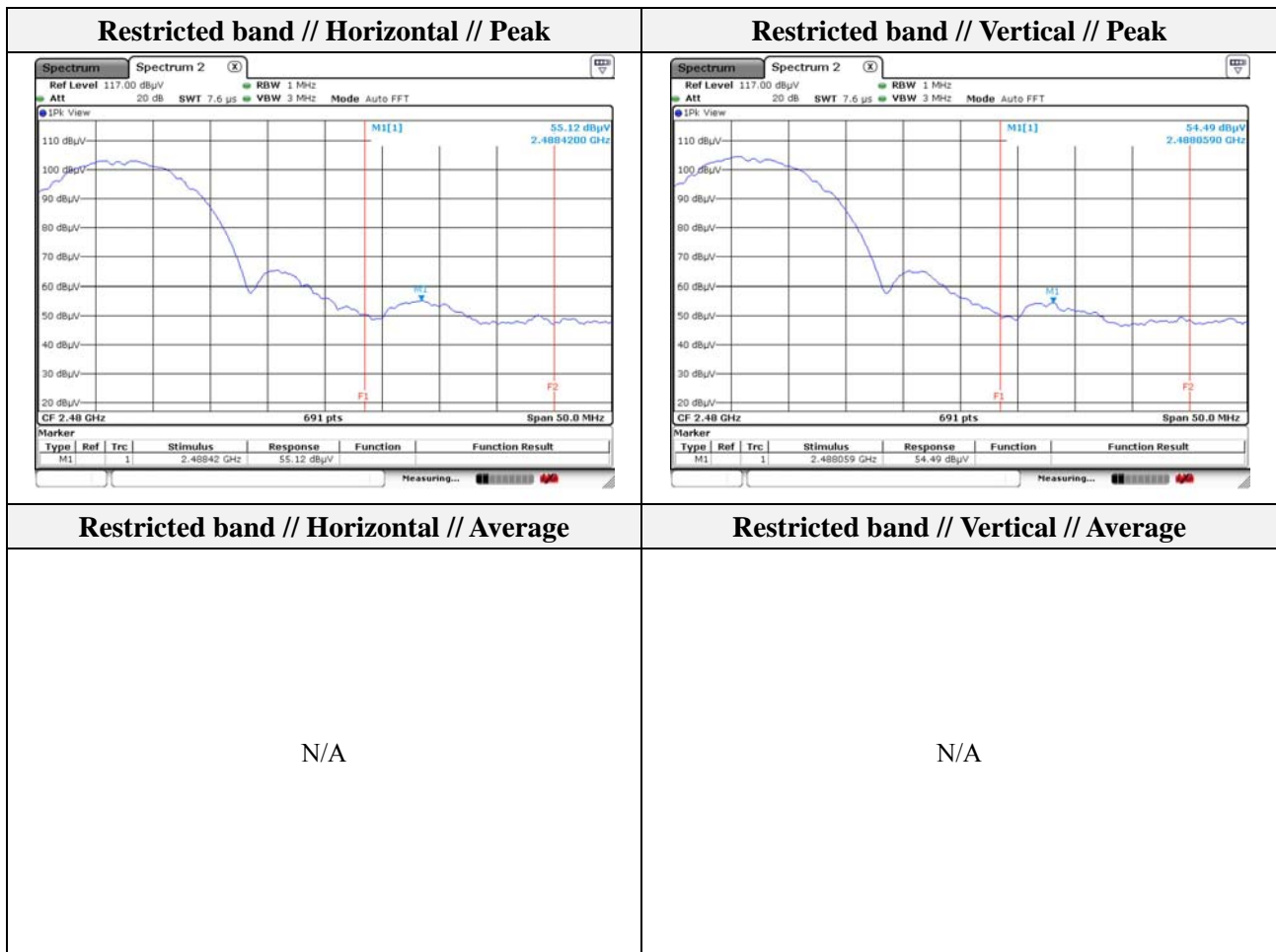
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| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
|---|---|
|  |  |
| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|  |  |

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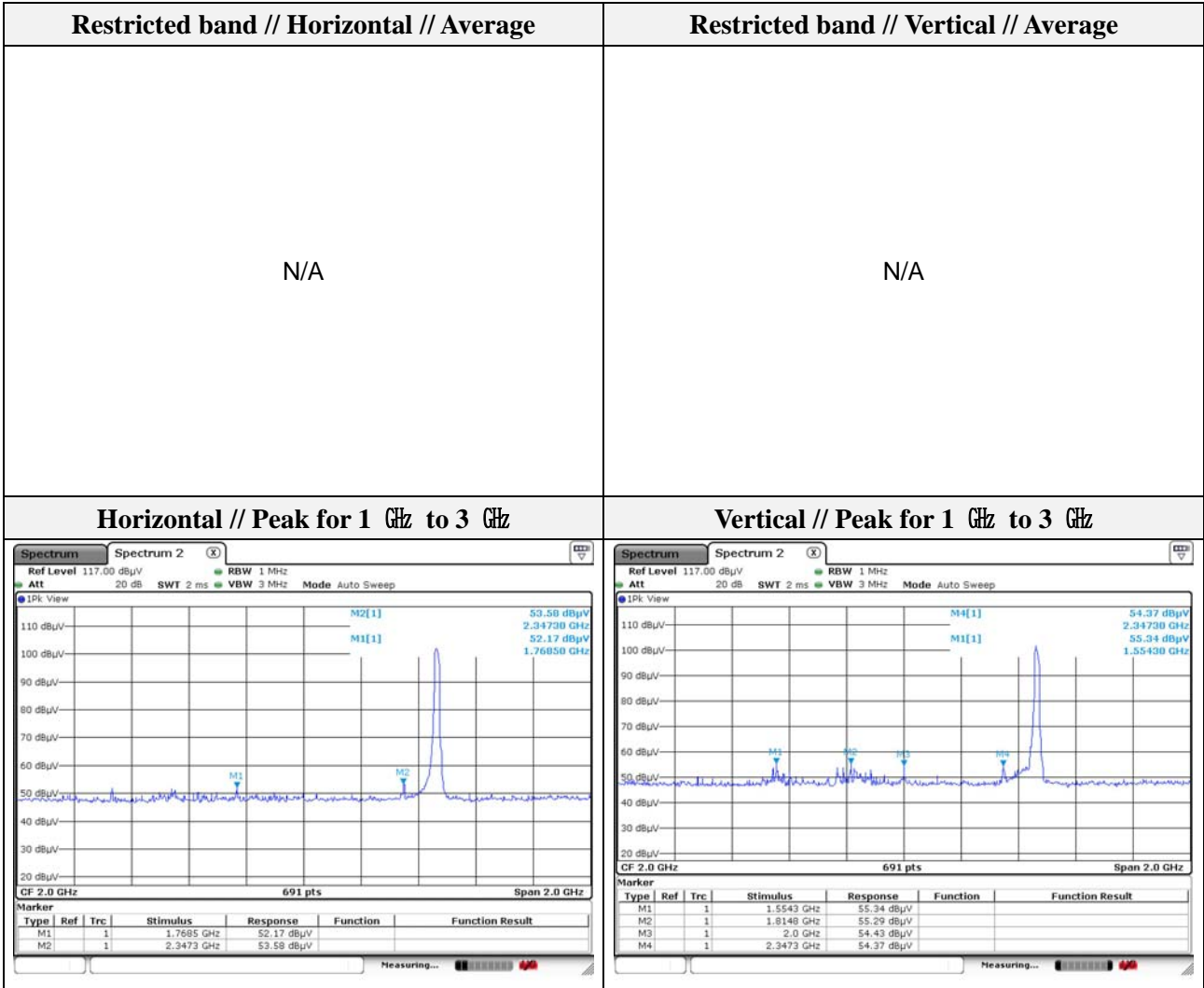Mode:                                    802.11g

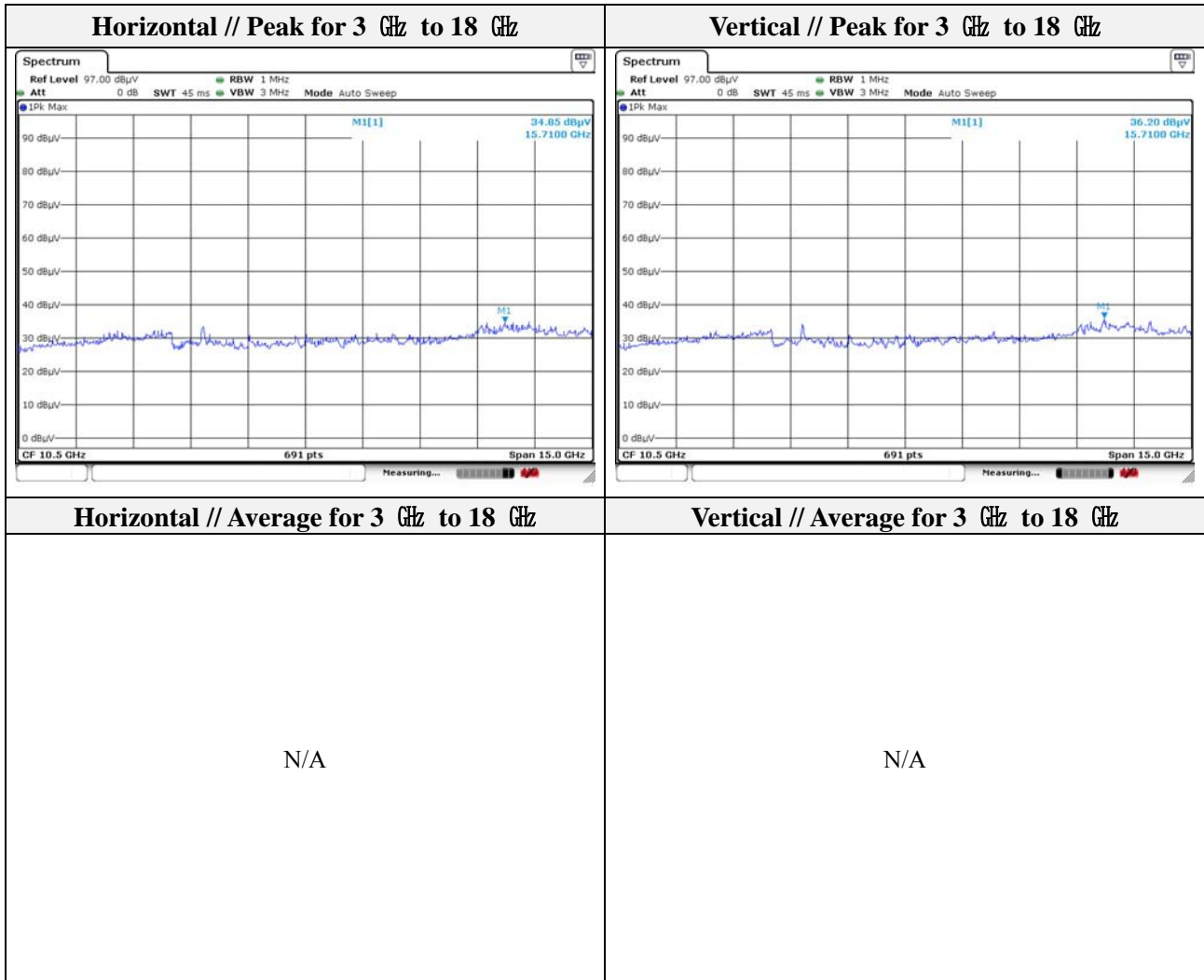Distance of measurement:    3 meter

Channel:                             01

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1551.40 | 58.52 | Peak | V | -6.97 | - | 51.55 | 74.00 | 22.45 |
| 1560.10 | 54.04 | Peak | H | -6.90 | - | 47.14 | 74.00 | 26.86 |
| 1730.80 | 52.19 | Peak | H | -5.25 | - | 46.94 | 74.00 | 27.06 |
| 1803.20 | 55.89 | Peak | V | -4.53 | - | 51.36 | 74.00 | 22.64 |
| 2347.11 | 52.12 | Peak | H | -1.95 | - | 50.17 | 74.00 | 23.83 |
| 2347.30 | 53.26 | Peak | H | -1.95 | - | 51.31 | 74.00 | 22.69 |
| 2347.30 | 53.99 | Peak | V | -1.95 | - | 52.04 | 74.00 | 21.96 |
| 2347.63 | 54.60 | Peak | V | -1.95 | - | 52.65 | 74.00 | 21.35 |
| 2389.83 | 51.61 | Peak | H | -1.86 | - | 49.75 | 74.00 | 24.25 |
| 2389.83 | 53.83 | Peak | V | -1.86 | - | 51.97 | 74.00 | 22.03 |

| **Restricted band // Horizontal // Peak** | **Restricted band // Vertical // Peak** |
|---|---|

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| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |

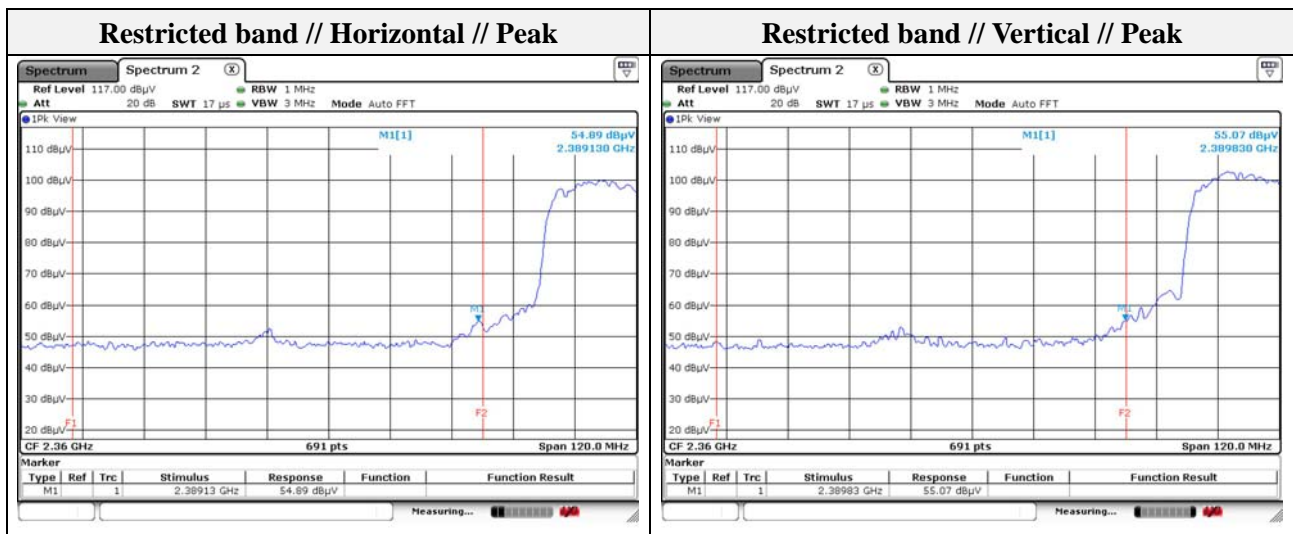| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
|---|---|
|  |  |

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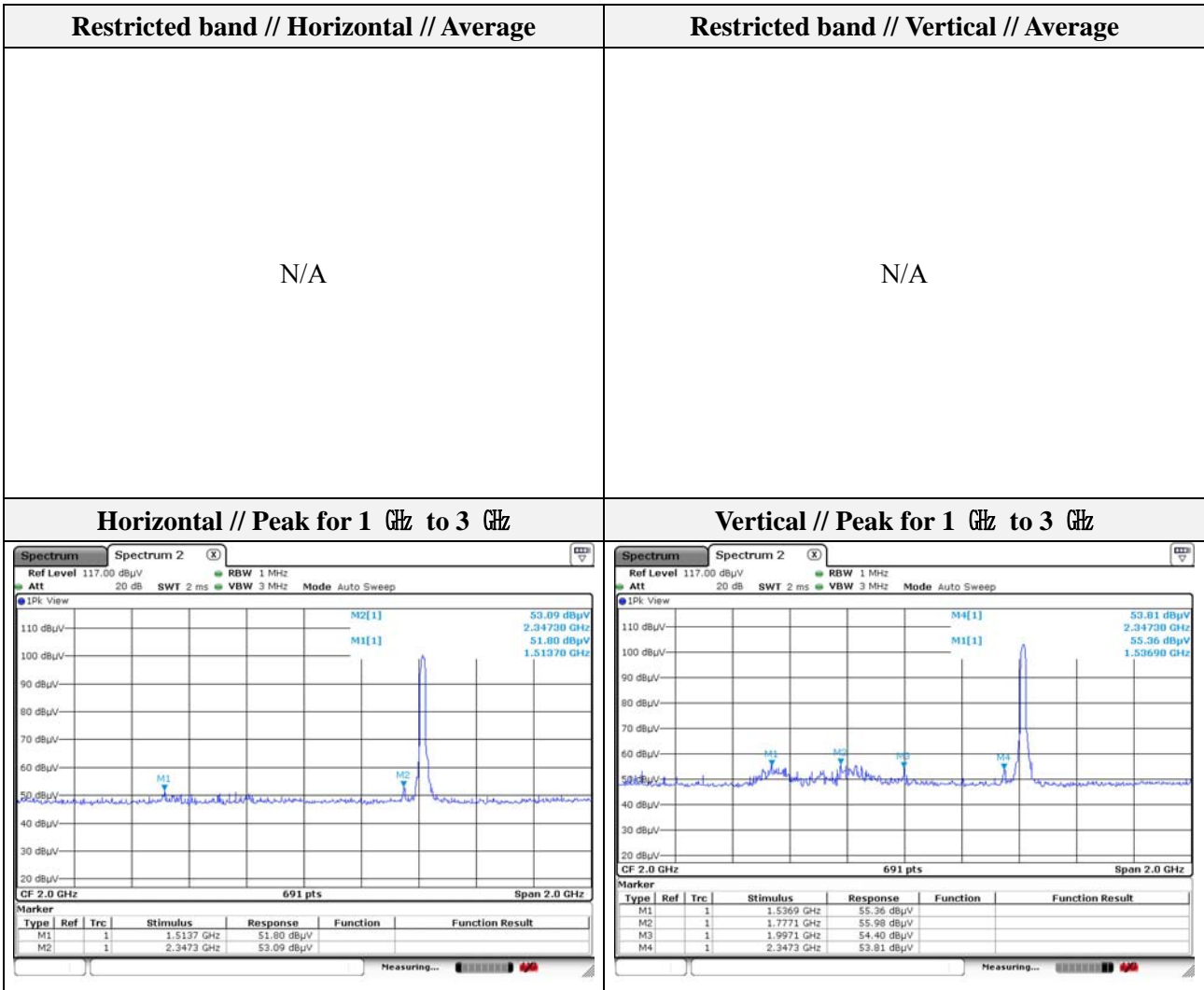The test results in the report only apply to the tested sample.

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| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|---|---|
|  |  |

| Horizontal // Average for 3 ㎓ to 18 ㎓ | Vertical // Average for 3 ㎓ to 18 ㎓ |
|---|---|
| N/A | N/A |

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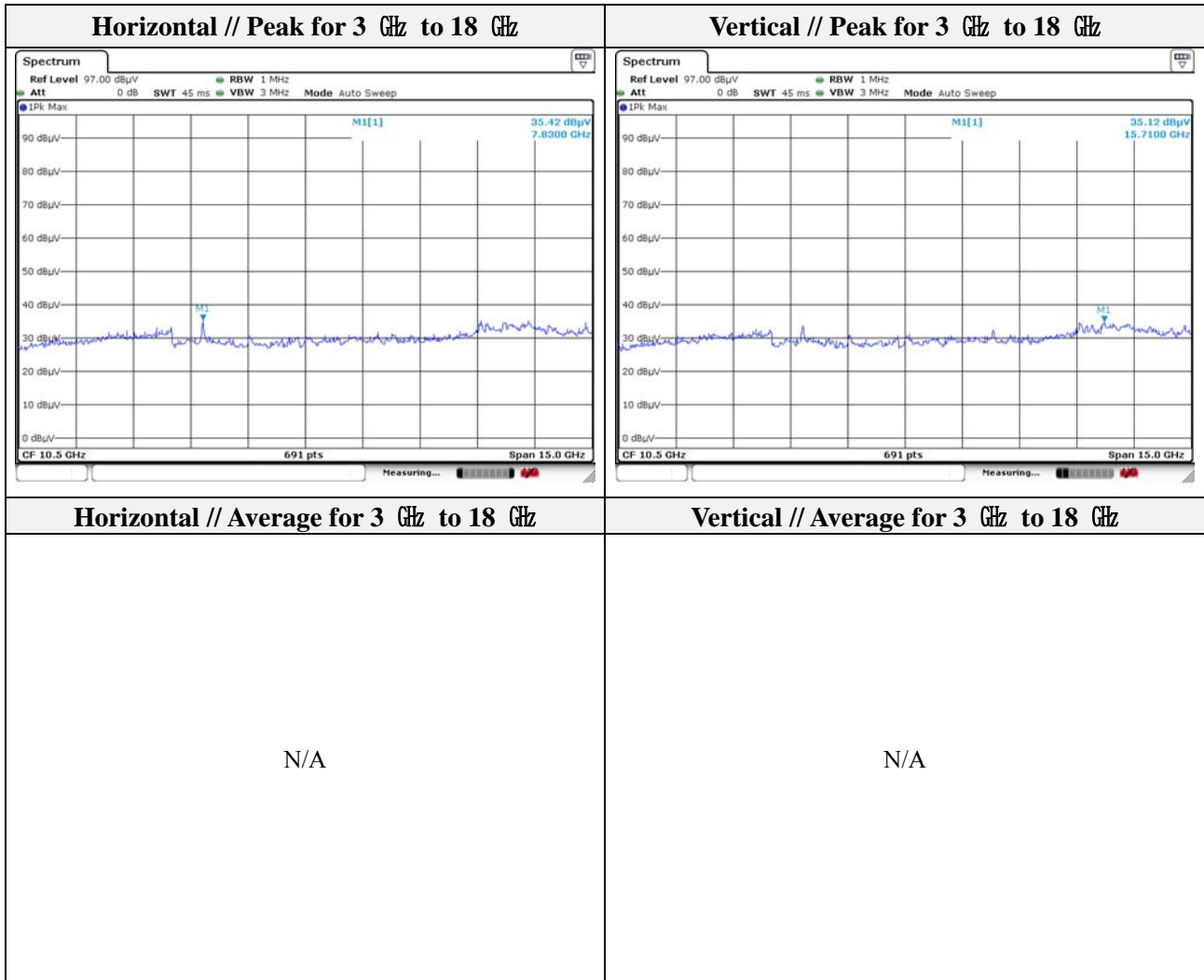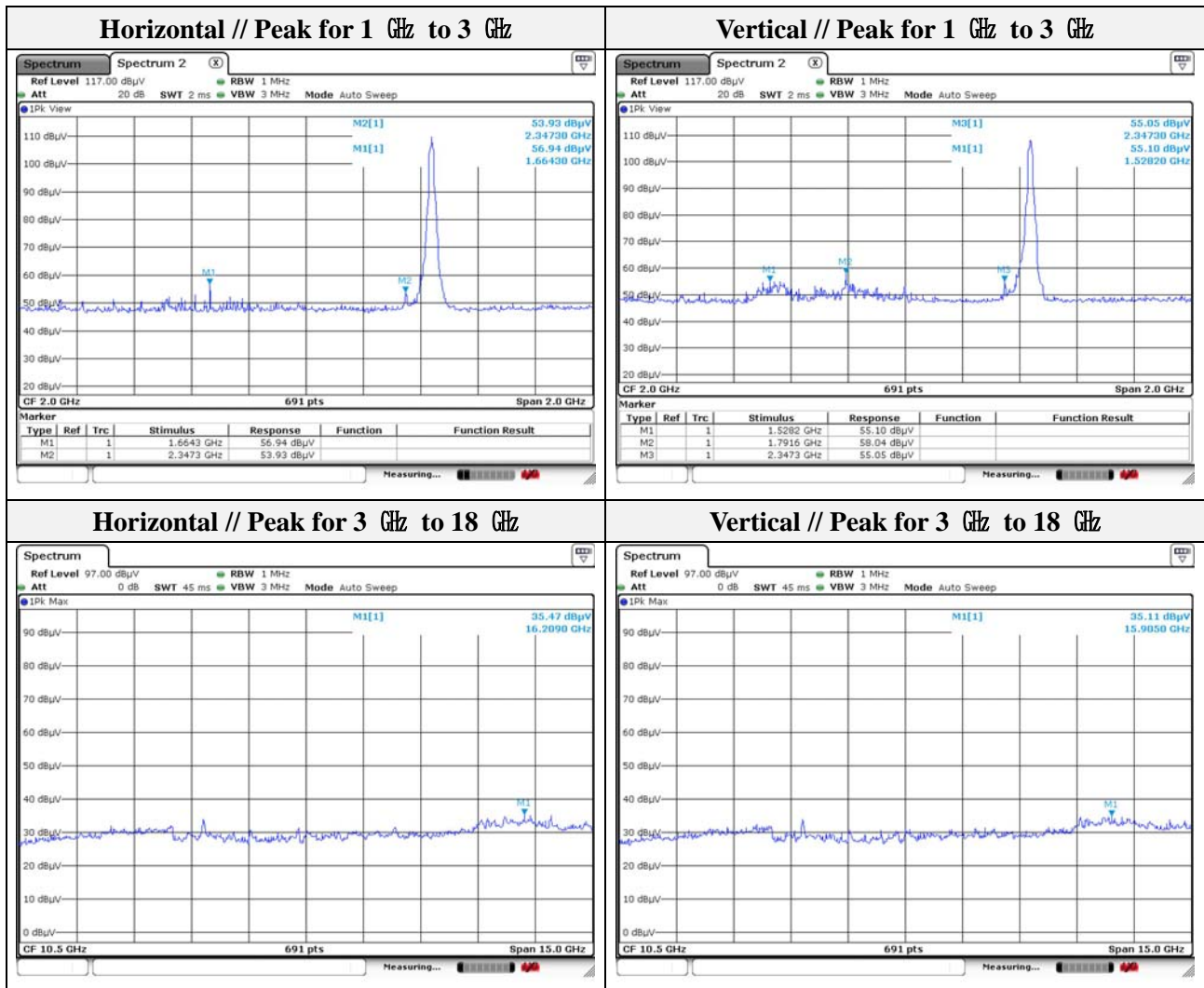Mode: 802.11g

Distance of measurement: 3 meter

Channel: 06

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1531.10 | 56.86 | Peak | V | -7.15 | - | 49.71 | 74.00 | 24.29 |
| 1563.00 | 55.32 | Peak | H | -6.87 | - | 48.45 | 74.00 | 25.55 |
| 1800.30 | 57.79 | Peak | V | -4.56 | - | 53.23 | 74.00 | 20.77 |
| 1823.40 | 56.12 | Peak | V | -4.37 | - | 51.75 | 74.00 | 22.25 |
| 2347.30 | 52.97 | Peak | H | -1.95 | - | 51.02 | 74.00 | 22.98 |

### Horizontal // Peak for 1 ㎓ to 3 ㎓



### Vertical // Peak for 1 ㎓ to 3 ㎓



### Horizontal // Peak for 3 ㎓ to 18 ㎓



### Vertical // Peak for 3 ㎓ to 18 ㎓

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Mode:                              802.11g

Distance of measurement:   3 meter

Channel:                          11

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1554.30 | 55.34 | Peak | V | -6.95 | - | 48.39 | 74.00 | 25.61 |
| 1768.50 | 52.17 | Peak | H | -4.87 | - | 47.30 | 74.00 | 26.70 |
| 1814.80 | 55.29 | Peak | V | -4.44 | - | 50.85 | 74.00 | 23.15 |
| 2000.00 | 54.43 | Peak | V | -2.91 | - | 51.52 | 74.00 | 22.48 |
| 2347.30 | 53.58 | Peak | H | -1.95 | - | 51.63 | 74.00 | 22.37 |
| 2347.30 | 54.37 | Peak | V | -1.95 | - | 52.42 | 74.00 | 21.58 |
| 2483.57 | 52.35 | Peak | V | -1.60 | - | 50.75 | 74.00 | 23.25 |
| 2483.79 | 53.67 | Peak | H | -1.60 | - | 52.07 | 74.00 | 21.93 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |

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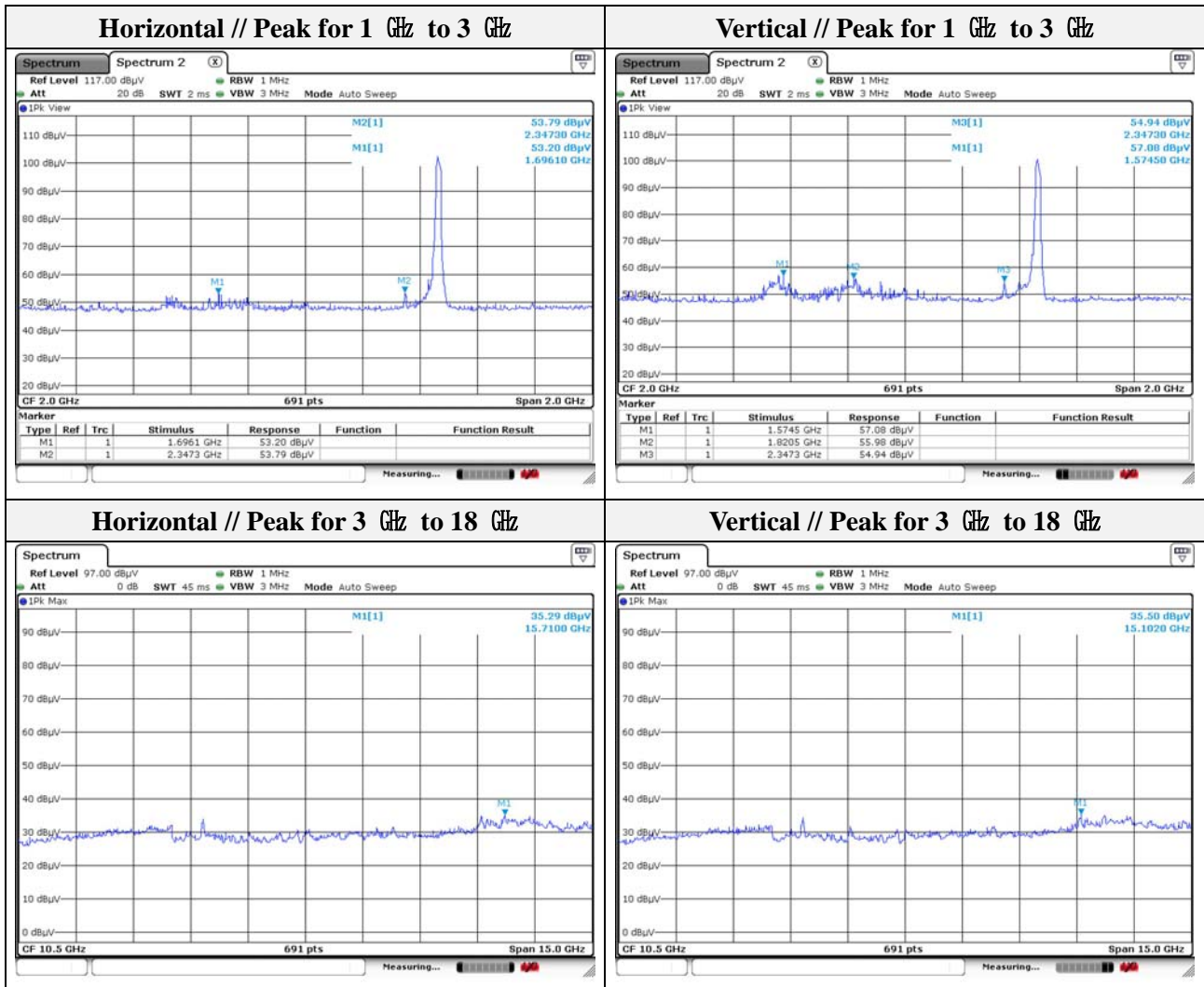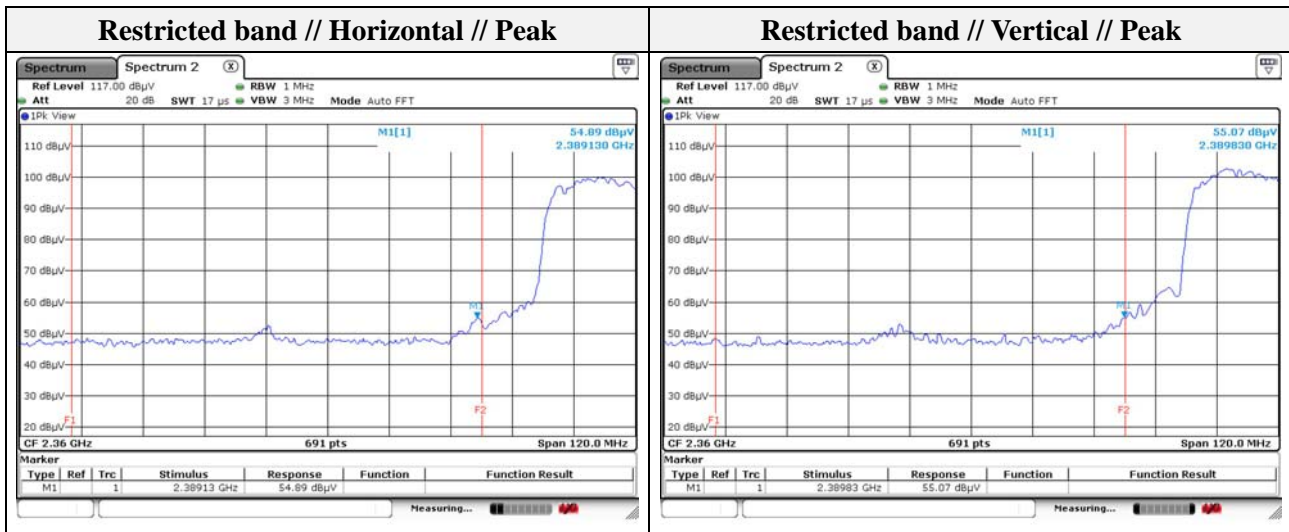| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |
| **Horizontal // Peak for 1 ㎓ to 3 ㎓** | **Vertical // Peak for 1 ㎓ to 3 ㎓** |

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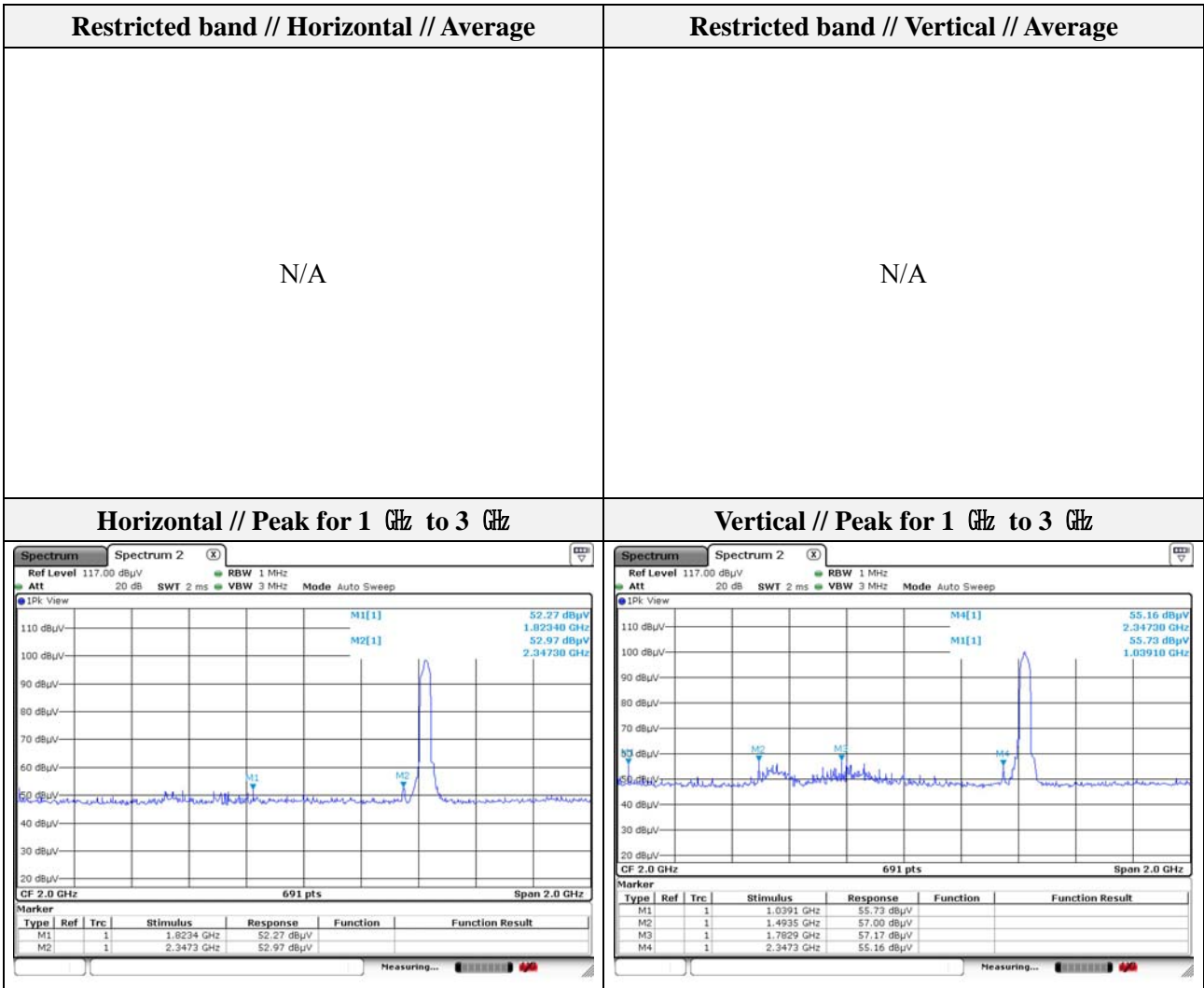
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| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|---|---|
|  |  |
| **Horizontal // Average for 3 ㎓ to 18 ㎓** | **Vertical // Average for 3 ㎓ to 18 ㎓** |
| N/A | N/A |

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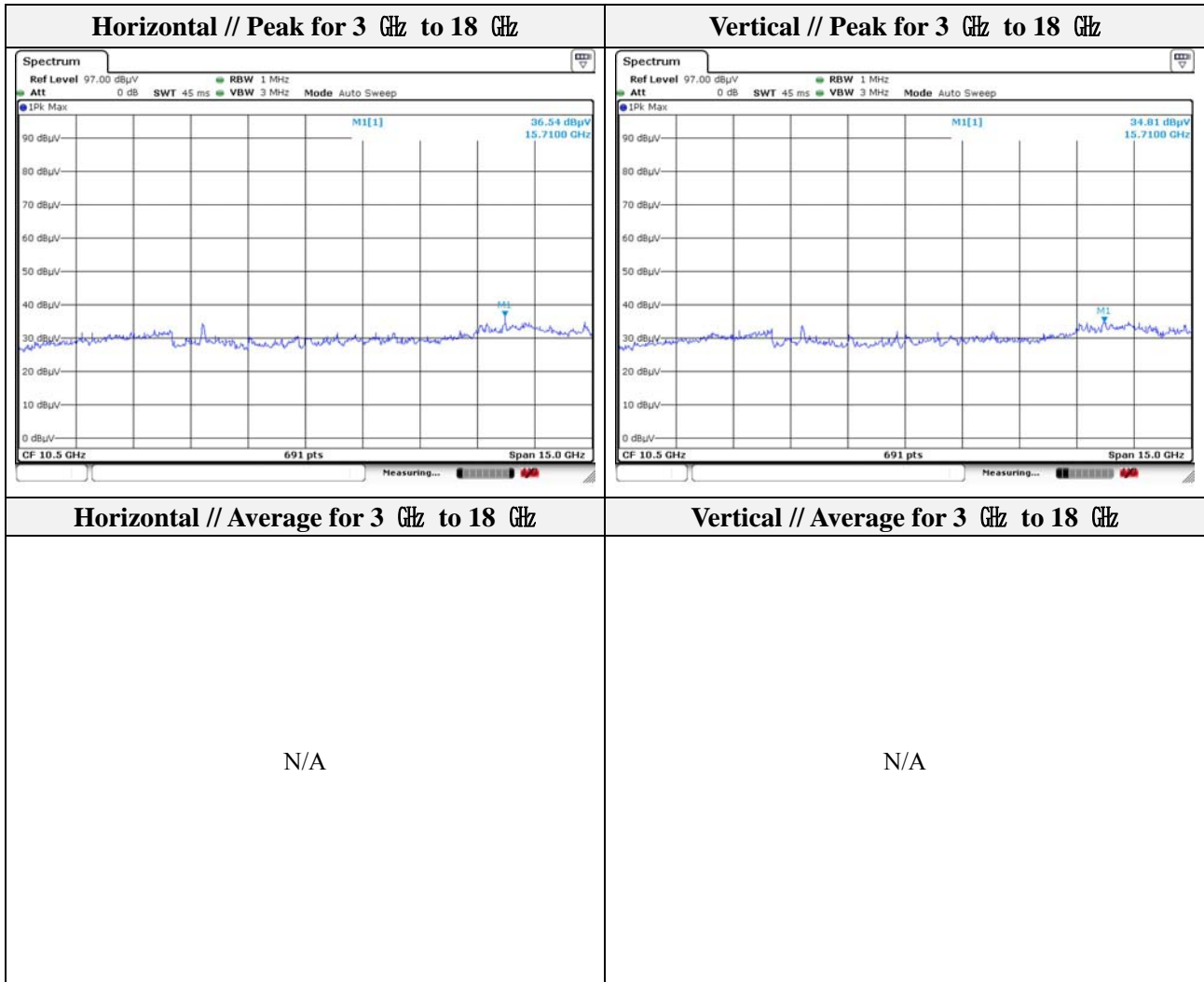
Distance of measurement:    3 meter

Channel:      01

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1513.70 | 51.80 | Peak | H | -7.30 | - | 44.50 | 74.00 | 29.50 |
| 1536.90 | 55.36 | Peak | V | -7.10 | - | 48.26 | 74.00 | 25.74 |
| 1777.10 | 55.98 | Peak | V | -4.79 | - | 51.19 | 74.00 | 22.81 |
| 1997.10 | 54.40 | Peak | V | -2.93 | - | 51.47 | 74.00 | 22.53 |
| 2347.30 | 53.09 | Peak | H | -1.95 | - | 51.14 | 74.00 | 22.86 |
| 2347.30 | 53.81 | Peak | V | -1.95 | - | 51.86 | 74.00 | 22.14 |
| 2389.13 | 54.89 | Peak | H | -1.86 | - | 53.03 | 74.00 | 20.97 |
| 2389.83 | 55.07 | Peak | V | -1.86 | - | 53.21 | 74.00 | 20.79 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |

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| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |

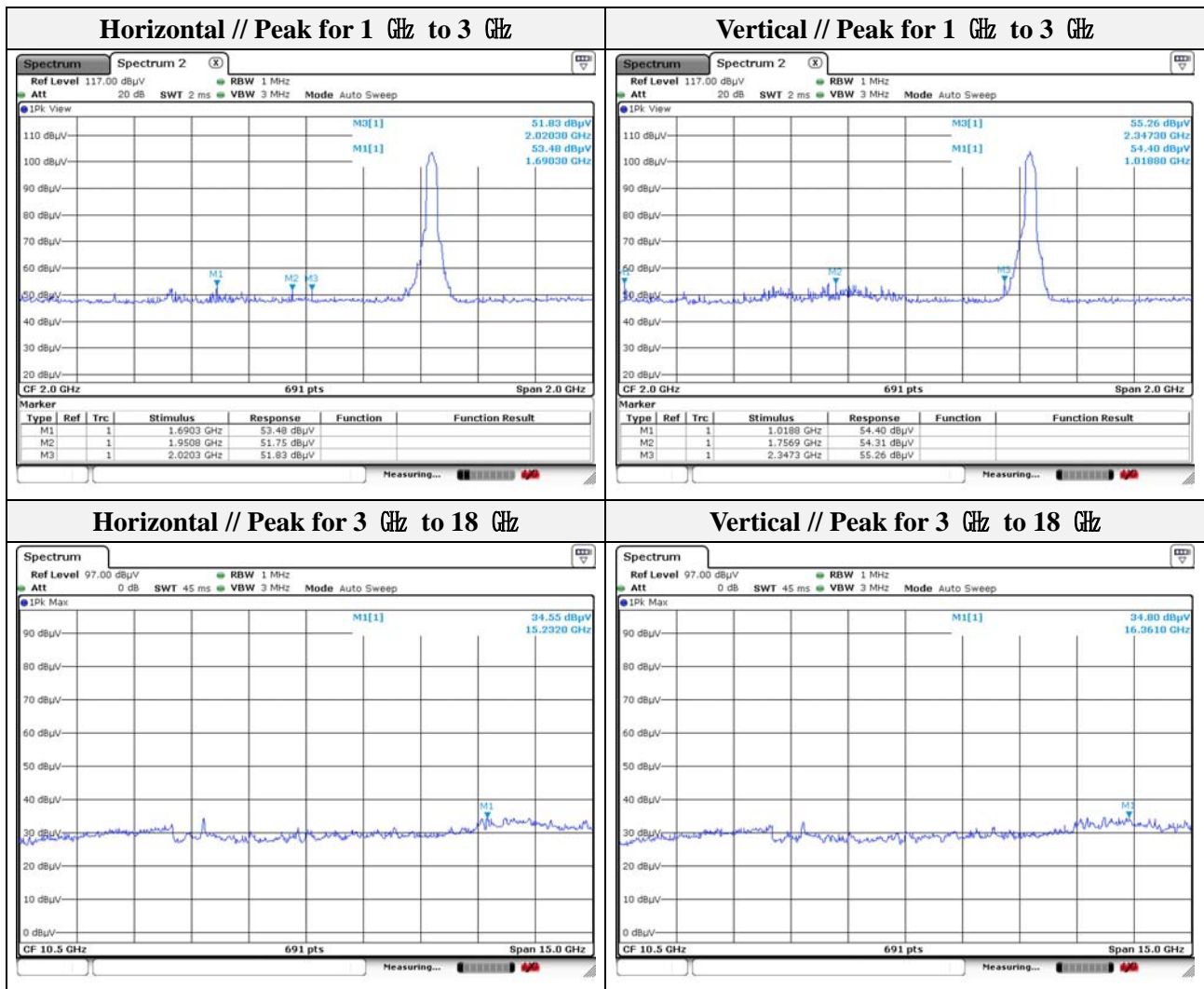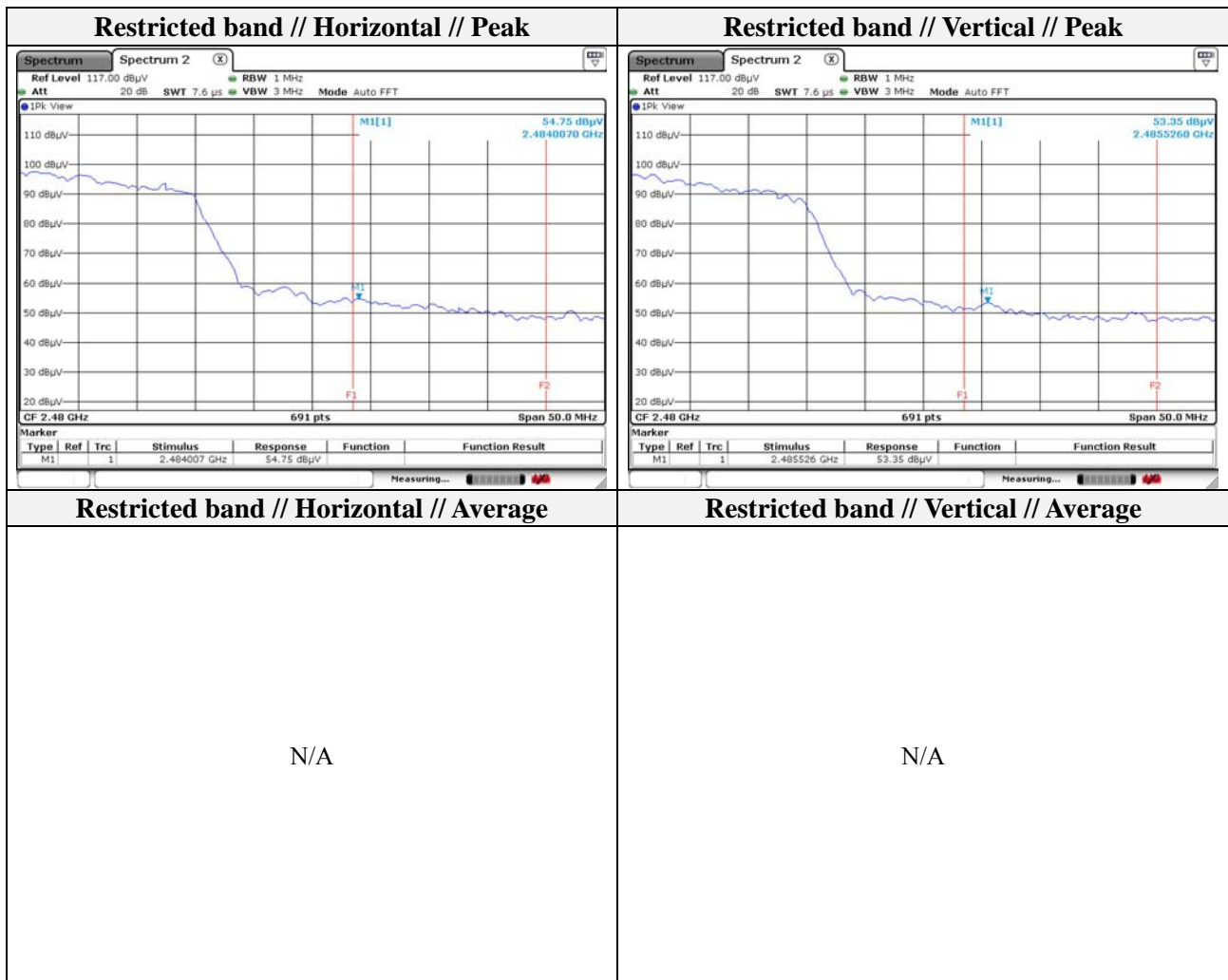| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
|---|---|
|  |  |

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| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|---|---|
|  |  |

| Horizontal // Average for 3 ㎓ to 18 ㎓ | Vertical // Average for 3 ㎓ to 18 ㎓ |
|---|---|
| N/A | N/A |

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

| Frequency (㎒) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1528.20 | 55.10 | Peak | V | -7.18 | - | 47.92 | 74.00 | 26.08 |
| 1664.30 | 56.94 | Peak | H | -5.91 | - | 51.03 | 74.00 | 22.97 |
| 1791.60 | 58.04 | Peak | V | -4.64 | - | 53.40 | 74.00 | 20.60 |
| 2347.30 | 53.93 | Peak | H | -1.95 | - | 51.98 | 74.00 | 22.02 |
| 2347.30 | 55.05 | Peak | V | -1.95 | - | 53.10 | 74.00 | 20.90 |

| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
| --- | --- |
| | |

| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
| --- | --- |
| | |

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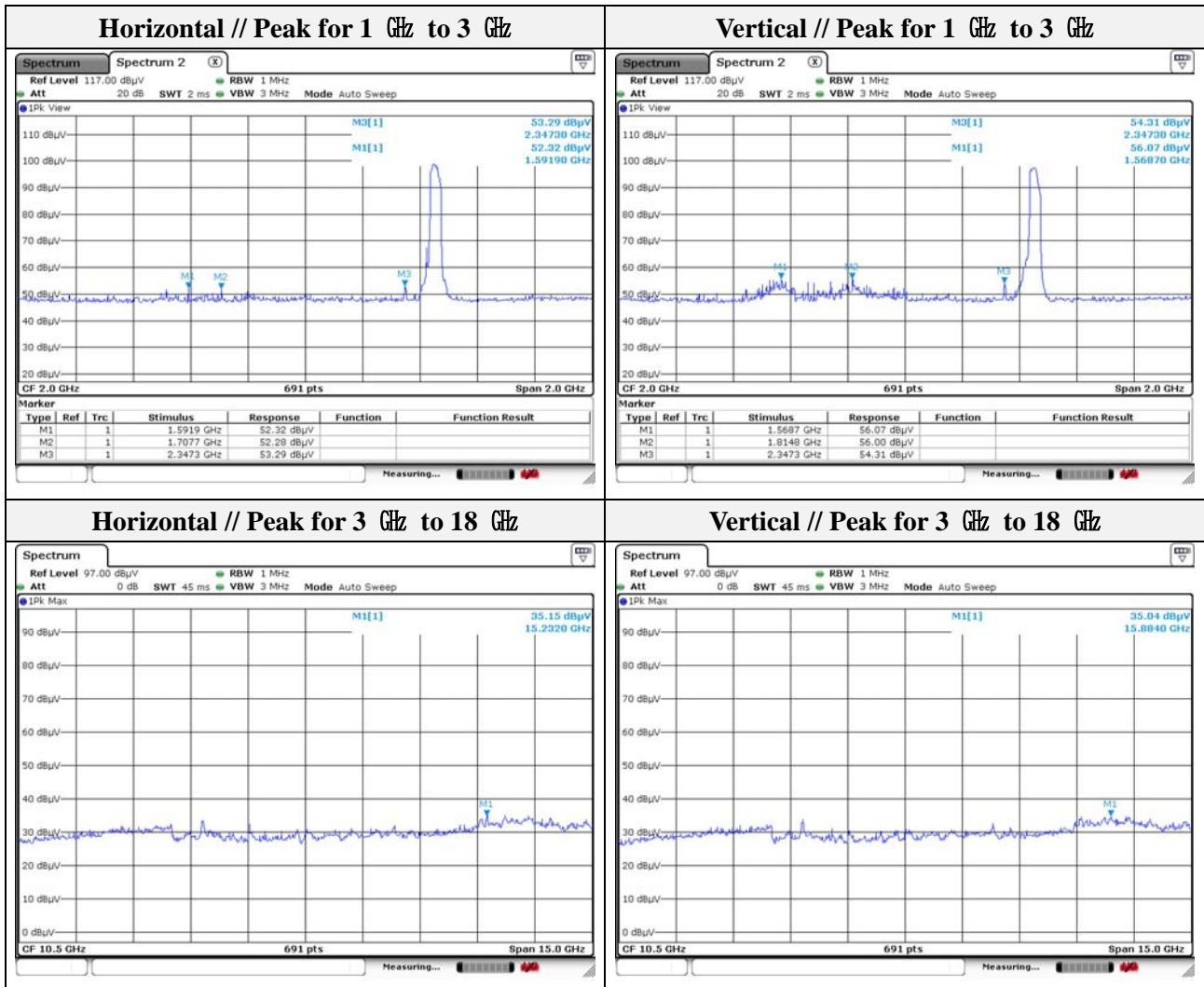www.kes.co.kr

Mode:     802.11n(HT20)

Distance of measurement:    3 meter

Channel:    11

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1574.50 | 57.08 | Peak | V | -6.77 | - | 50.31 | 74.00 | 23.69 |
| 1696.10 | 53.20 | Peak | H | -5.59 | - | 47.61 | 74.00 | 26.39 |
| 1820.50 | 55.98 | Peak | V | -4.39 | - | 51.59 | 74.00 | 22.41 |
| 2347.30 | 53.79 | Peak | H | -1.95 | - | 51.84 | 74.00 | 22.16 |
| 2347.30 | 54.94 | Peak | V | -1.95 | - | 52.99 | 74.00 | 21.01 |
| 2483.57 | 52.75 | Peak | V | -1.60 | - | 51.15 | 74.00 | 22.85 |
| 2486.25 | 51.79 | Peak | H | -1.59 | - | 50.20 | 74.00 | 23.80 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |

| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |
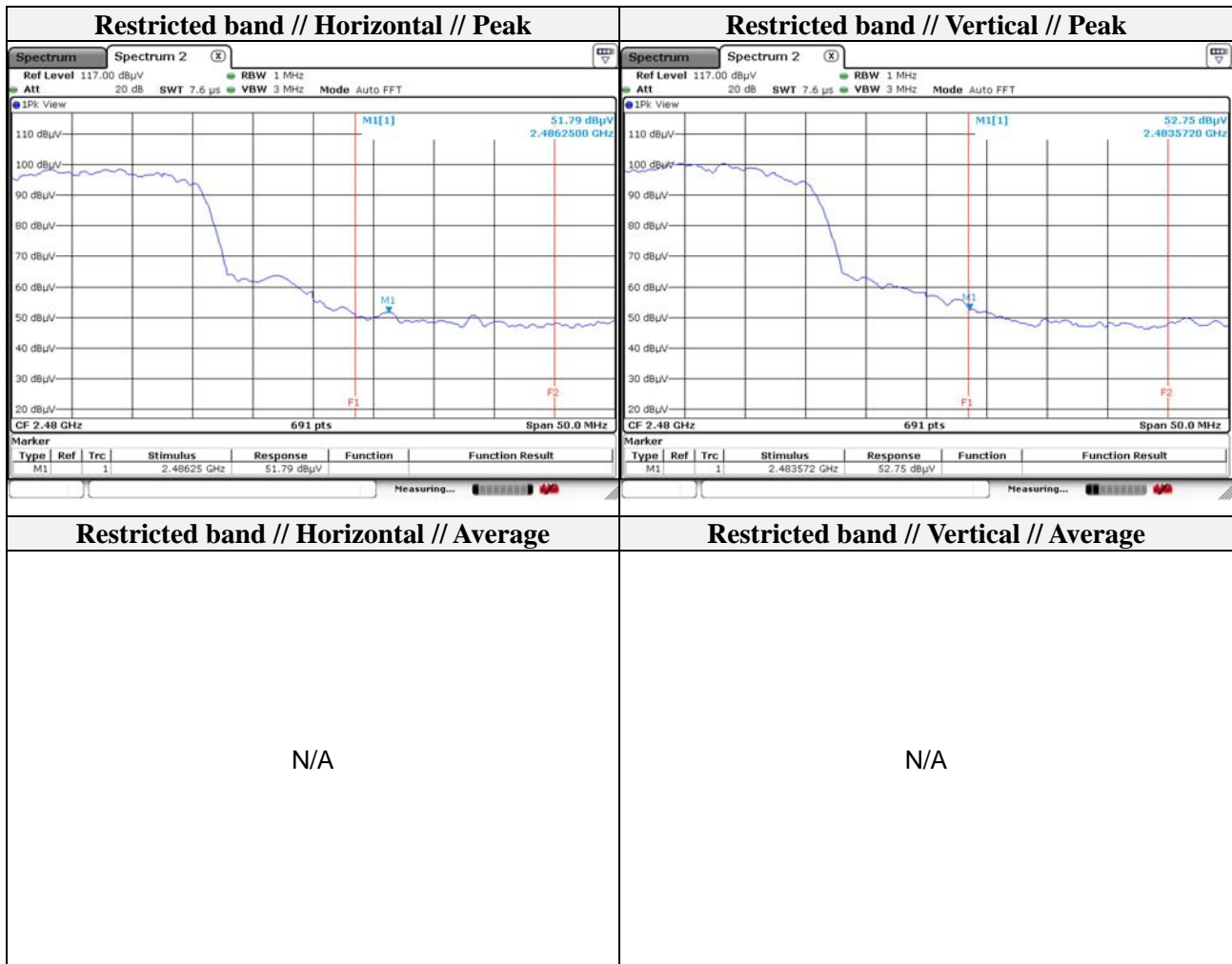
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## Horizontal // Peak for 1 ㎓ to 3 ㎓



## Vertical // Peak for 1 ㎓ to 3 ㎓



## Horizontal // Peak for 3 ㎓ to 18 ㎓



## Vertical // Peak for 3 ㎓ to 18 ㎓

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Mode:      802.11n(HT40)

Distance of measurement:      3 meter

Channel:      03

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1039.10 | 55.73 | Peak | V | -9.93 | - | 45.80 | 74.00 | 28.20 |
| 1493.50 | 57.00 | Peak | V | -7.46 | - | 49.54 | 74.00 | 24.46 |
| 1782.90 | 57.17 | Peak | V | -4.73 | - | 52.44 | 74.00 | 21.56 |
| 1823.40 | 52.27 | Peak | H | -4.37 | - | 47.90 | 74.00 | 26.10 |
| 2346.24 | 53.88 | Peak | V | -1.95 | - | 51.93 | 74.00 | 22.07 |
| 2347.30 | 52.97 | Peak | H | -1.95 | - | 51.02 | 74.00 | 22.98 |
| 2347.30 | 55.16 | Peak | V | -1.95 | - | 53.21 | 74.00 | 20.79 |
| 2388.96 | 51.79 | Peak | H | -1.86 | - | 49.93 | 74.00 | 24.07 |
| 2389.93 | 55.41 | Peak | V | -1.86 | - | 53.55 | 74.00 | 20.45 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|

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| Restricted band // Horizontal // Average | Restricted band // Vertical // Average |
|---|---|
| N/A | N/A |
| **Horizontal // Peak for 1 ㎓ to 3 ㎓** | **Vertical // Peak for 1 ㎓ to 3 ㎓** |



Horizontal // Peak for 1 ㎓ to 3 ㎓

| Marker Type | Ref | Trc | Stimulus | Response | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.8234 GHz | 52.27 dBμV | | |
| M2 | | 1 | 2.3473 GHz | 52.97 dBμV | | |



Vertical // Peak for 1 ㎓ to 3 ㎓

| Marker Type | Ref | Trc | Stimulus | Response | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 1.0391 GHz | 55.73 dBμV | | |
| M2 | | 1 | 1.4935 GHz | 57.00 dBμV | | |
| M3 | | 1 | 1.7829 GHz | 57.17 dBμV | | |
| M4 | | 1 | 2.3473 GHz | 55.16 dBμV | | |

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| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|---|---|
|  |  |
| **Horizontal // Average for 3 ㎓ to 18 ㎓** | **Vertical // Average for 3 ㎓ to 18 ㎓** |
| N/A | N/A |

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Mode: 802.11n(HT40)

Distance of measurement: 3 meter

Channel: 06

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1018.80 | 54.40 | Peak | V | -10.05 | - | 44.35 | 74.00 | 29.65 |
| 1690.30 | 53.48 | Peak | H | -5.65 | - | 47.83 | 74.00 | 26.17 |
| 1756.90 | 54.31 | Peak | V | -4.99 | - | 49.32 | 74.00 | 24.68 |
| 1950.80 | 51.75 | Peak | H | -3.32 | - | 48.43 | 74.00 | 25.57 |
| 2020.30 | 51.83 | Peak | H | -2.84 | - | 48.99 | 74.00 | 25.01 |
| 2347.30 | 55.26 | Peak | V | -1.95 | - | 53.31 | 74.00 | 20.69 |

| Horizontal // Peak for 1 GHz to 3 GHz | Vertical // Peak for 1 GHz to 3 GHz |
|---|---|
|  |  |

| Horizontal // Peak for 3 GHz to 18 GHz | Vertical // Peak for 3 GHz to 18 GHz |
|---|---|
|  |  |

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Mode:      802.11n(HT40)

Distance of measurement:    3 meter

Channel:      09

| Frequency (MHz) | Level (dBμV) | Detect mode | Ant. Pol. (H/V) | CF (dB) | DCF (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 1568.70 | 56.07 | Peak | V | -6.82 | - | 49.25 | 74.00 | 24.75 |
| 1591.90 | 52.32 | Peak | H | -6.62 | - | 45.70 | 74.00 | 28.30 |
| 1707.70 | 52.28 | Peak | H | -5.48 | - | 46.80 | 74.00 | 27.20 |
| 1814.80 | 56.00 | Peak | V | -4.44 | - | 51.56 | 74.00 | 22.44 |
| 2347.30 | 53.29 | Peak | H | -1.95 | - | 51.34 | 74.00 | 22.66 |
| 2347.30 | 54.31 | Peak | V | -1.95 | - | 52.36 | 74.00 | 21.64 |
| 2484.00 | 54.75 | Peak | H | -1.60 | - | 53.15 | 74.00 | 20.85 |
| 2485.52 | 53.35 | Peak | V | -1.59 | - | 51.76 | 74.00 | 22.24 |

| Restricted band // Horizontal // Peak | Restricted band // Vertical // Peak |
|---|---|
|  |  |
| **Restricted band // Horizontal // Average** | **Restricted band // Vertical // Average** |
| N/A | N/A |

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| Horizontal // Peak for 1 ㎓ to 3 ㎓ | Vertical // Peak for 1 ㎓ to 3 ㎓ |
|---|---|
|  |  |
| Horizontal // Peak for 3 ㎓ to 18 ㎓ | Vertical // Peak for 3 ㎓ to 18 ㎓ |
|  |  |

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### Test results (18 ㎓ to 30 ㎓)

Mode: 802.11n(HT20)

Distance of measurement: 3 meter

Channel: 06(Worst case)

| Frequency (㎒) | Level (dBμV) | Ant. Pol. (H/V) | CF (dB) | F$_d$ (dB) | Field strength (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| No spurious emissions were detected within 20㏈ of the limit ||||||||

| Horizontal | Vertical |
|---|---|
|  |  |

**Note.**

1. Average test would be performed if the peak result were greater than the average limit.
2. Actual = Reading + AFCL(Ant. factor – Amp. gain + Cable loss) + DCF(Duty cycle correction factor)
3. Duty cycle correction factor = 20log(dwell time/100 ㎳)

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### 3.5 Conducted spurious emissions & band edge

**Test procedure**

**Band edge**

KDB 558074 D01 v03r05 – Section 11.3

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. RBW = 100 ㎑
4. VBW = 300 ㎑
5. Detector = Peak
6. Number of sweep points $\geq$ 2 × Span/RBW
7. Trace mode = max hold
8. Sweep time = auto
9. The trace was allowed to stabilize

**Out of band emissions**

KDB 558074 D01 v03r05 – Section 11.3

1. Start frequency was set to 30 ㎒ and stop frequency was set to 25 ㎓ for 2.4 ㎓ frequencies and 40 ㎓ for 5 ㎓ frequencies (separated into two plots per channel)
2. RBW = 100 ㎑
3. VBW = 300 ㎑
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

**Limit**

According to 15.247(d), in any 100 ㎑ 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 ㏈ below that in the 100 ㎑ 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 ㏈ instead of 20 ㏈. 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

| 802.11b |
|---|



N/A

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**802.11g**



N/A

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| 802.11n(HT20) |
|---|



N/A

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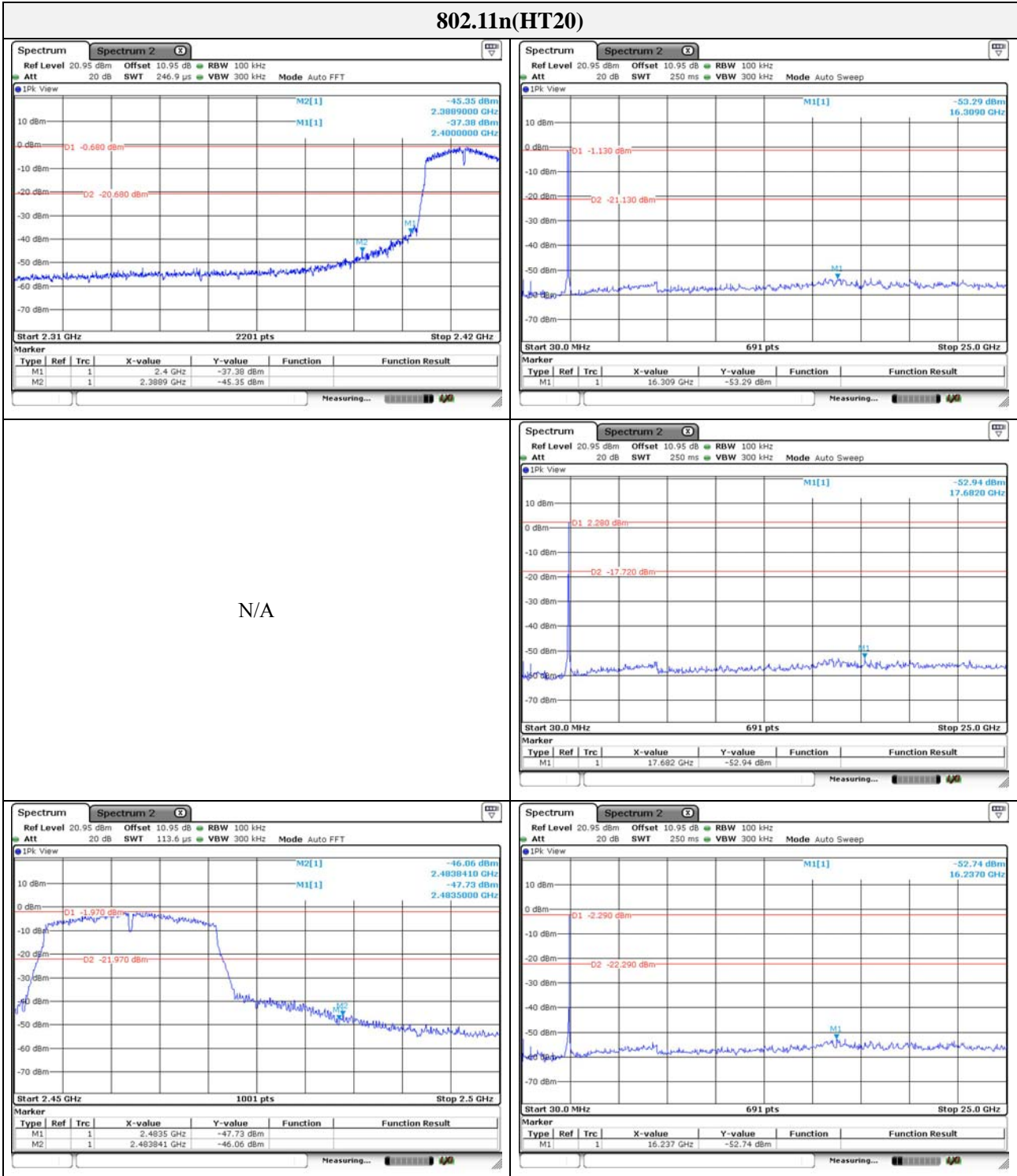
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| 802.11n(HT40) |
|---|

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## 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 ㎑ to 30 ㎒, 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.
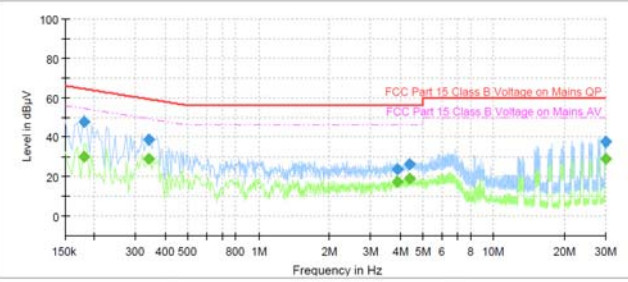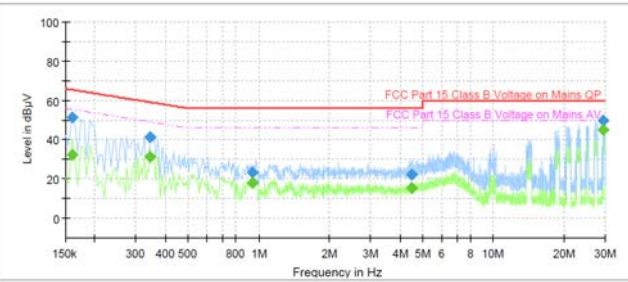
| Frequency of Emission (㎒) | Conducted limit (dB$\mu$V/m) | |
|:---:|:---:|:---:|
| | **Quasi-peak** | **Average** |
| 0.15 – 0.50 | 66 - 56* | 56 - 46* |
| 0.50 – 5.00 | 56 | 46 |
| 5.00 – 30.0 | 60 | 50 |

**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.
3. Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).

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## Test results

| Hot Line | | | | | | | | |
|---|---|---|---|---|---|---|---|---|



**Final_Result**

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.180000 | --- | 29.95 | 54.49 | 24.54 | 1000.0 | 9.000 | L1 | 21.0 |
| 0.180000 | 47.43 | --- | 64.49 | 17.06 | 1000.0 | 9.000 | L1 | 21.0 |
| 0.340000 | --- | 29.18 | 49.20 | 20.02 | 1000.0 | 9.000 | L1 | 20.8 |
| 0.340000 | 38.75 | --- | 59.20 | 20.45 | 1000.0 | 9.000 | L1 | 20.8 |
| 3.905000 | --- | 17.24 | 46.00 | 28.76 | 1000.0 | 9.000 | L1 | 19.8 |
| 3.905000 | 24.09 | --- | 56.00 | 31.91 | 1000.0 | 9.000 | L1 | 19.8 |
| 4.395000 | --- | 18.87 | 46.00 | 27.13 | 1000.0 | 9.000 | L1 | 19.8 |
| 4.395000 | 26.57 | --- | 56.00 | 29.43 | 1000.0 | 9.000 | L1 | 19.8 |
| 29.890000 | --- | 28.94 | 50.00 | 21.06 | 1000.0 | 9.000 | L1 | 20.4 |
| 29.890000 | 37.49 | --- | 60.00 | 22.51 | 1000.0 | 9.000 | L1 | 20.4 |

| Neutral Line | | | | | | | | |
|---|---|---|---|---|---|---|---|---|



**Final_Result**

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.160000 | --- | 32.33 | 55.46 | 23.13 | 1000.0 | 9.000 | N | 21.1 |
| 0.160000 | 51.16 | --- | 65.46 | 14.30 | 1000.0 | 9.000 | N | 21.1 |
| 0.345000 | --- | 31.40 | 49.08 | 17.68 | 1000.0 | 9.000 | N | 20.7 |
| 0.345000 | 41.12 | --- | 59.08 | 17.96 | 1000.0 | 9.000 | N | 20.7 |
| 0.935000 | --- | 18.15 | 46.00 | 27.85 | 1000.0 | 9.000 | N | 20.2 |
| 0.935000 | 23.58 | --- | 56.00 | 32.42 | 1000.0 | 9.000 | N | 20.2 |
| 4.475000 | --- | 15.46 | 46.00 | 30.54 | 1000.0 | 9.000 | N | 19.8 |
| 4.475000 | 22.35 | --- | 56.00 | 33.65 | 1000.0 | 9.000 | N | 19.8 |
| 29.465000 | --- | 44.91 | 50.00 | 5.09 | 1000.0 | 9.000 | N | 20.5 |
| 29.465000 | 49.86 | --- | 60.00 | 10.14 | 1000.0 | 9.000 | N | 20.5 |

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## Appendix A.   Measurement equipment

| Equipment | Manufacturer | Model | Serial No. | Calibration interval | Calibration due. |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV30 | 100736 | 1 year | 2017.07.06 |
| Spectrum Analyzer | R&S | FSV40 | 101002 | 1 year | 2017.07.06 |
| 8360B Series Swept Signal Generator | HP | 83630B | 3844A00786 | 1 year | 2017.01.25 |
| PSG Analog Signal Generator | Agilent | E8257C | US42340237 | 1 year | 2017.07.05 |
| Attenuator | Keysight | 8493C | 82509 | 1 year | 2017.01.25 |
| Attenuator | HP | 8493C | 08961 | 1 year | 2017.07.05 |
| Loop Antenna | R&S | HFH2-Z2.335.4711.52 | 826532 | 2 years | 2017.03.03 |
| Trilog-broadband antenna | SCHWARZBECK | VULB 9163 | 9168-713 | 2 years | 2017.05.15 |
| Horn Antenna | A.H. | SAS-571 | 781 | 2 years | 2017.05.07 |
| Horn Antenna | SCHWARZBECK | BBHA9170 | BBHA9170550 | 2 years | 2017.04.30 |
| High Pass Filter | WAINWRIGHT INSTRUMENT | WHJS3000-10TT | 1 | 1 year | 2017.07.04 |
| Low Pass Filter | WEINSCHEL | WLK1.0/18G-10TT | 1 | 1 year | 2017.07.04 |
| Preamplifier | HP | 8449B | 3008A00538 | 1 year | 2017.07.05 |
| Broadband Amplifier | SCHWARZBECK | BBV-9721 | PS9721-003 | 1 year | 2017.01.25 |
| EMI Test Receiver | R&S | ESR3 | 101781 | 1 year | 2017.05.03 |
| EMI Test Receiver | R&S | ESU26 | 100552 | 1 year | 2017.04.24 |
| EMI Test Receiver | R&S | ESR3 | 101783 | 1 year | 2017.05.03 |
| LISN | R&S | ENV216 | 101137 | 1 year | 2017.02.04 |

### Peripheral devices

| Device | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| Notebook Computer | Samsung Electronics Co., Ltd. | NP-QX411L | HJV993BB905283V |