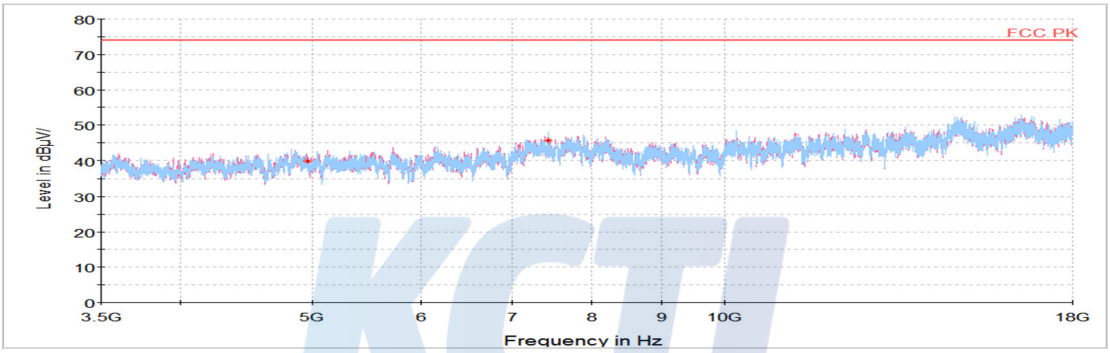
## BLE 2 MBit/s(255 Bytes) / Harmonic

### 39 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 7 439.92[1)] | H | 61.07 | 35.40 | -50.87 | - | 45.60 | 74.00 | 28.40 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

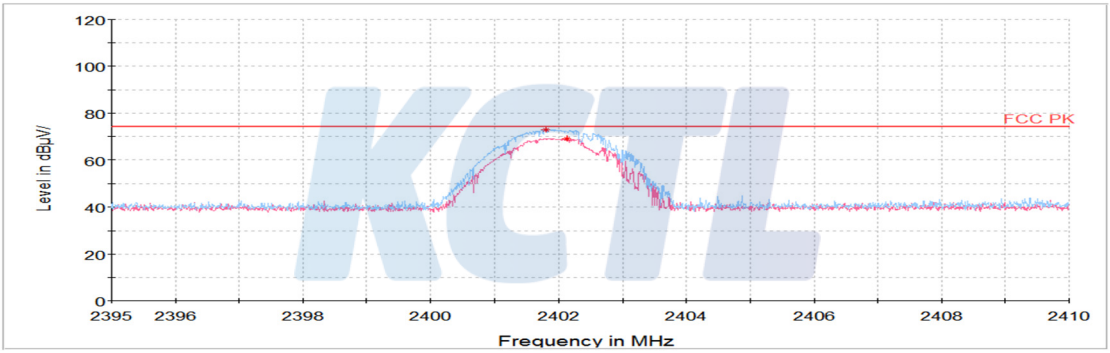


## Test results (ANT+)
## ANT+ / Fundamental

### 0 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 2 401.82[1)] | H | 69.90 | 31.90 | -28.99 | - | 72.81 | 113.98 | 41.17 |
| 2 402.12[1)] | V | 66.14 | 31.90 | -28.99 | - | 69.05 | 113.98 | 44.93 |
| **Average Data** | | | | | | | | |
| 2 401.82[1)] | H | 69.90 | 31.90 | -28.99 | -33.17 | 39.65 | 93.98 | 54.33 |
| 2 402.12[1)] | V | 66.14 | 31.90 | -28.99 | -33.17 | 35.88 | 93.98 | 58.10 |

**Horizontal/Vertical for 2 402 MHz**



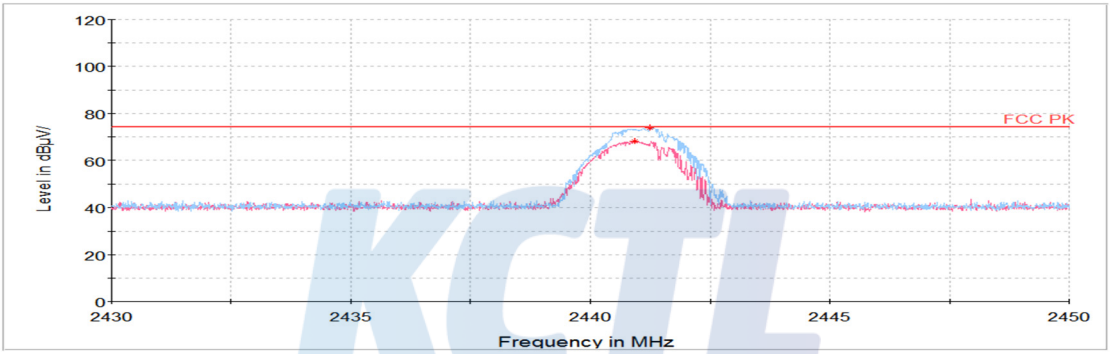

**Notes:**

DCCF = 20log10 (number of pulses in 100 ms x (on time / 100 ms))
= 20log10 (13 x (0.168 96 ms/100 ms)) = -33.17 dB

## 39 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 2 441.24[1)] | H | 70.84 | 31.98 | -29.10 | - | 73.72 | 113.98 | 40.26 |
| 2 440.91[1)] | V | 65.10 | 31.98 | -29.10 | - | 67.98 | 113.98 | 46.00 |
| **Average Data** | | | | | | | | |
| 2 441.24[1)] | H | 70.84 | 31.98 | -29.10 | -33.17 | 40.56 | 93.98 | 53.42 |
| 2 440.91[1)] | V | 65.10 | 31.98 | -29.10 | -33.17 | 34.81 | 93.98 | 59.17 |

**Horizontal/Vertical for 2 441 ㎒**



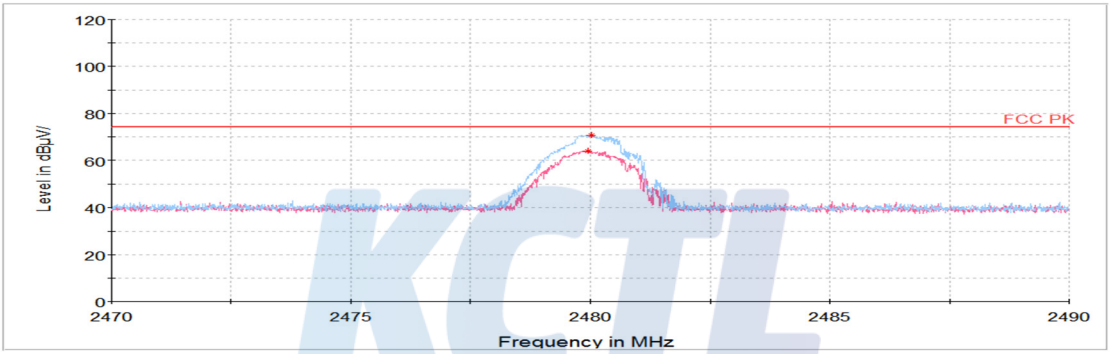

**Notes:**

DCCF = 20log10 (number of pulses in 100 ㎳ x (on time / 100 ㎳))
= 20log10 (13 x (0.168 96 ㎳/100 ㎳)) = -33.17 ㏈

### 78 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 2 480.00[1)] | H | 67.66 | 32.06 | -29.20 | - | 70.52 | 113.98 | 43.46 |
| 2 479.93[1)] | V | 60.92 | 32.06 | -29.20 | - | 63.78 | 113.98 | 50.20 |
| **Average Data** | | | | | | | | |
| 2 480.00[1)] | H | 67.66 | 32.06 | -29.20 | -33.17 | 37.36 | 93.98 | 56.62 |
| 2 479.93[1)] | V | 60.92 | 32.06 | -29.20 | -33.17 | 30.61 | 93.98 | 63.37 |

**Horizontal/Vertical for 2 480 ㎒**




**Notes:**

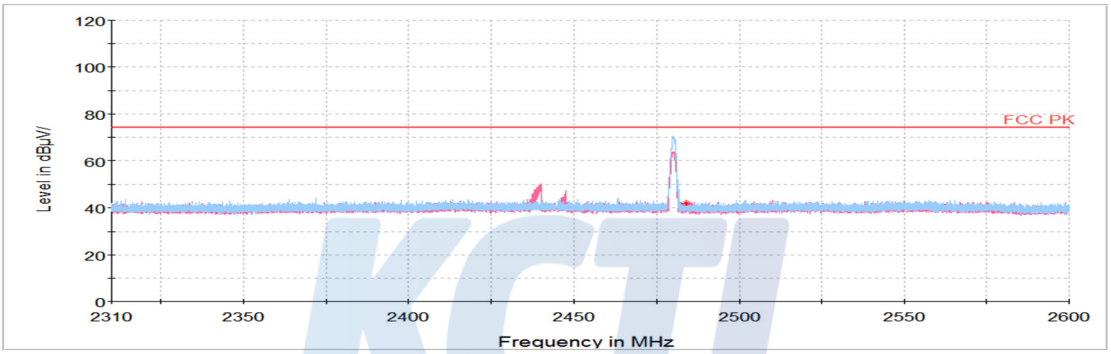
DCCF = 20log10 (number of pulses in 100 ㎳ x (on time / 100 ㎳))
= 20log10 (13 x (0.168 96 ㎳/100 ㎳)) = -33.17 ㏈

## ANT+ / Band-edge

### 39 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 2 483.86[1)] | H | 39.31 | 32.07 | -29.21 | - | 42.17 | 74.00 | 31.83 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for Band-edge**

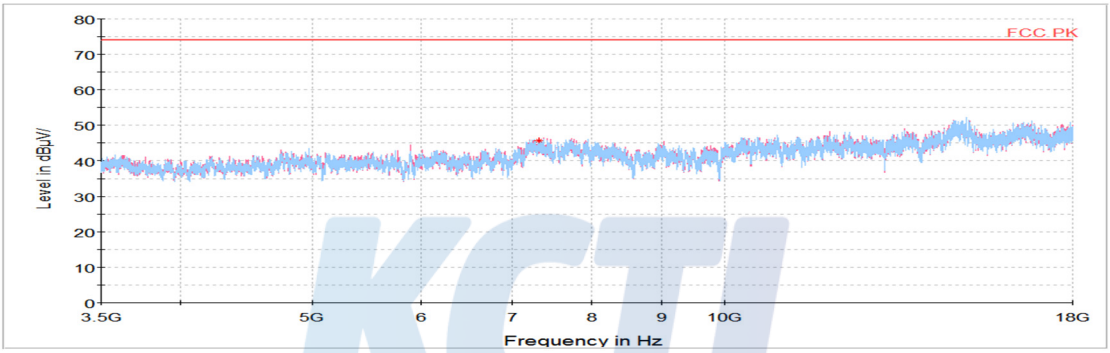


## ANT+ / Harmonic

### 39 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 7 323.47[1)] | H | 61.55 | 35.40 | -51.44 | - | 45.51 | 74.00 | 28.49 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

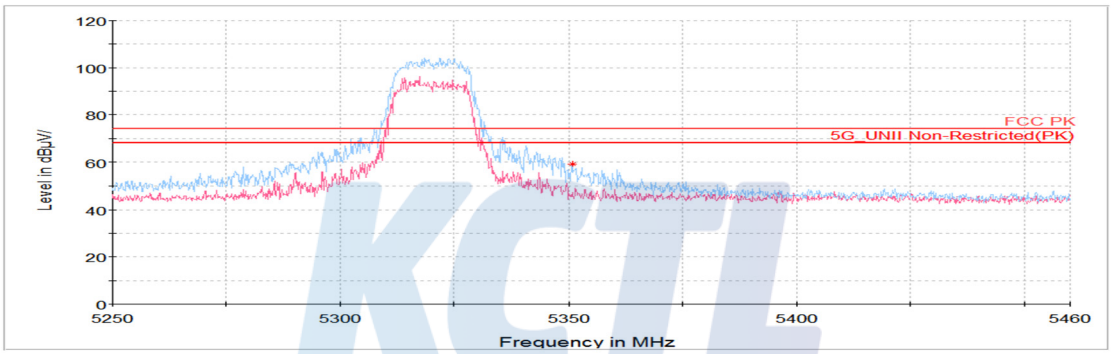


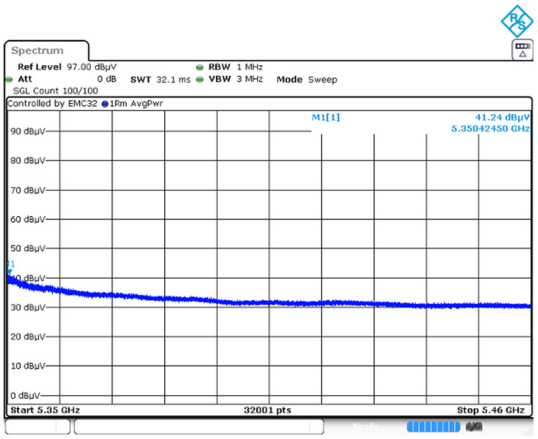
## Test results (5G WIFI)
## 802.11a / Band-edge

### 64 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 350.42[1)] | H | 51.37 | 34.56 | -26.84 | - | 59.09 | 74.00 | 14.91 |
| **Average Data** | | | | | | | | |
| 5 350.42[1)] | H | 41.24 | 34.56 | -26.84 | 0.30 | 49.26 | 54.00 | 4.74 |

**Horizontal/Vertical for Band-edge**



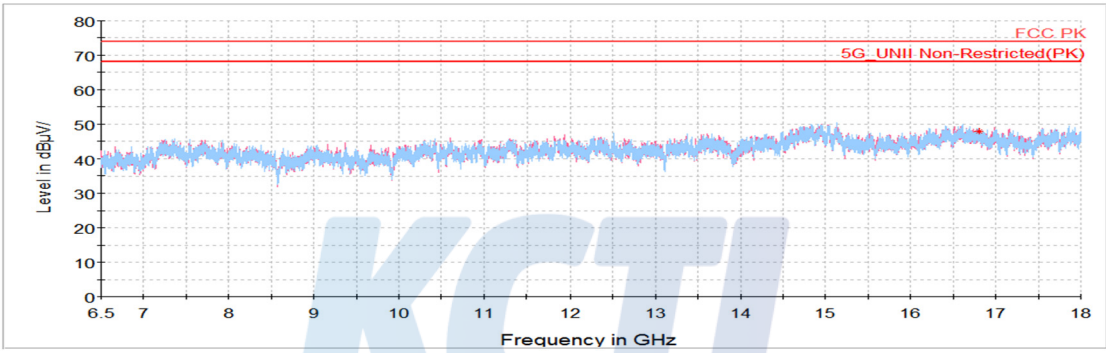

| Average data | |
|---|---|
|  | Blank |

## 802.11a / Harmonic

### 120 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 16 800.77[1)] | V | 52.81 | 41.80 | -46.85 | - | 47.76 | 74.00 | 26.24 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

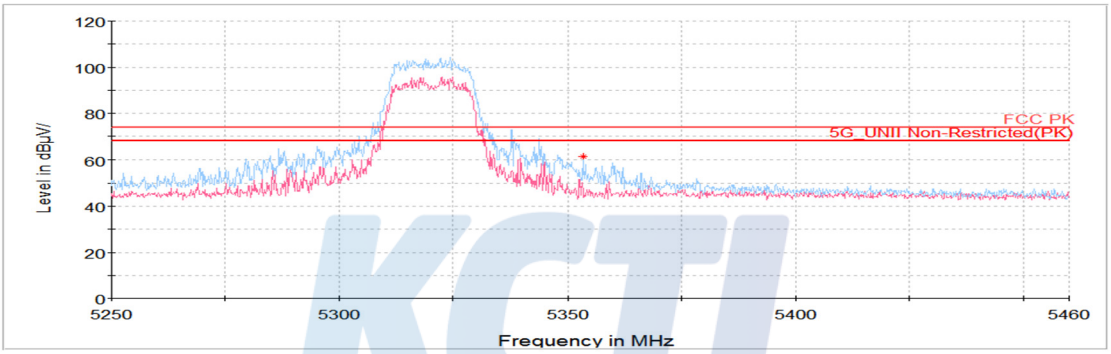


## 802.11n HT20 / Band-edge

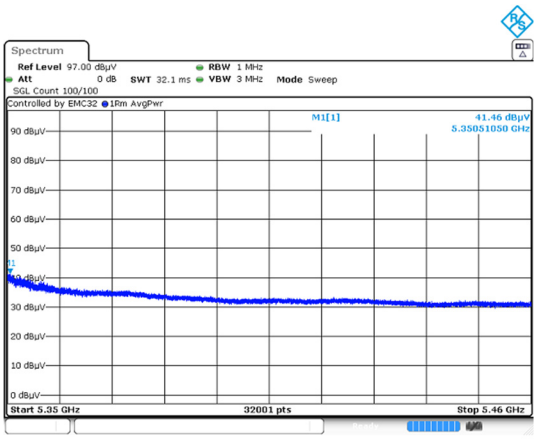
### 64 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 350.51[1)] | H | 53.49 | 34.56 | -26.84 | - | 61.21 | 74.00 | 12.79 |
| **Average Data** | | | | | | | | |
| 5 350.51[1)] | H | 41.46 | 34.56 | -26.84 | 0.35 | 49.53 | 54.00 | 4.47 |

**Horizontal/Vertical for Band-edge**




**Average data**

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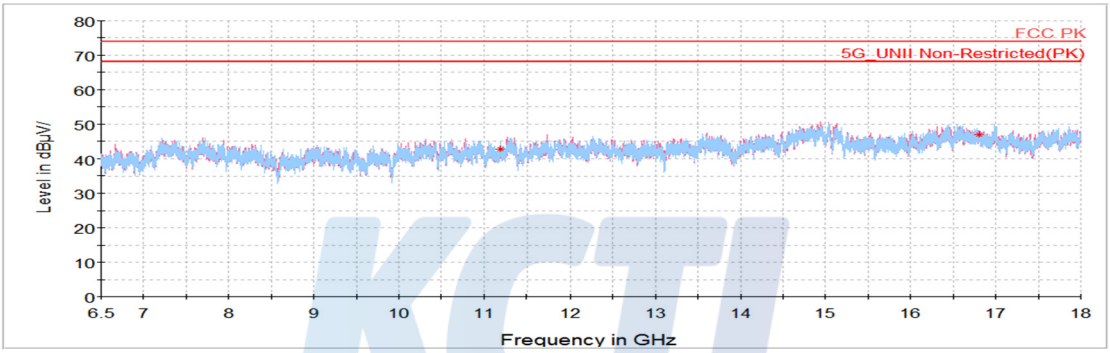
## 802.11n HT20 / Harmonic

### 120 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 16 800.41[1)] | H | 51.94 | 41.80 | -46.85 | - | 46.89 | 74.00 | 27.11 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

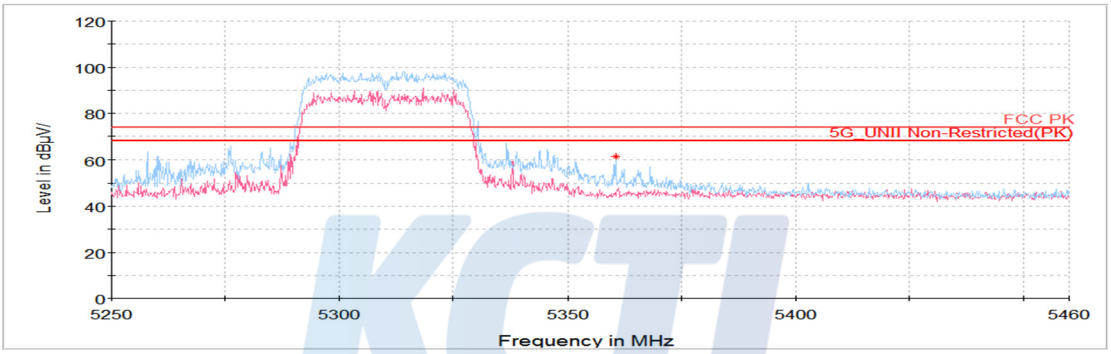


## 802.11n HT40 / Band-edge

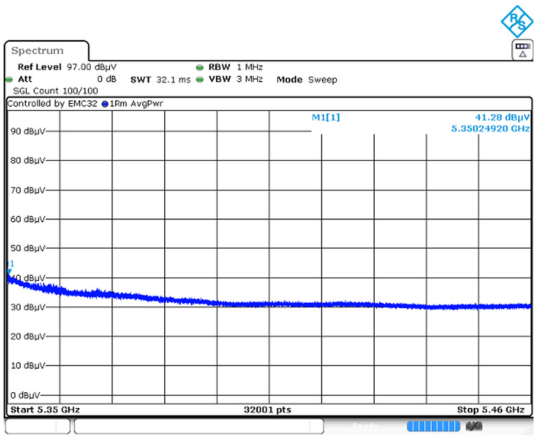
### 62 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 350.25[1)] | H | 53.41 | 34.56 | -26.84 | - | 61.13 | 74.00 | 12.87 |
| **Average Data** | | | | | | | | |
| 5 350.25[1)] | H | 41.28 | 34.56 | -26.84 | 0.66 | 49.66 | 54.00 | 4.34 |

**Horizontal/Vertical for Band-edge**




**Average data**

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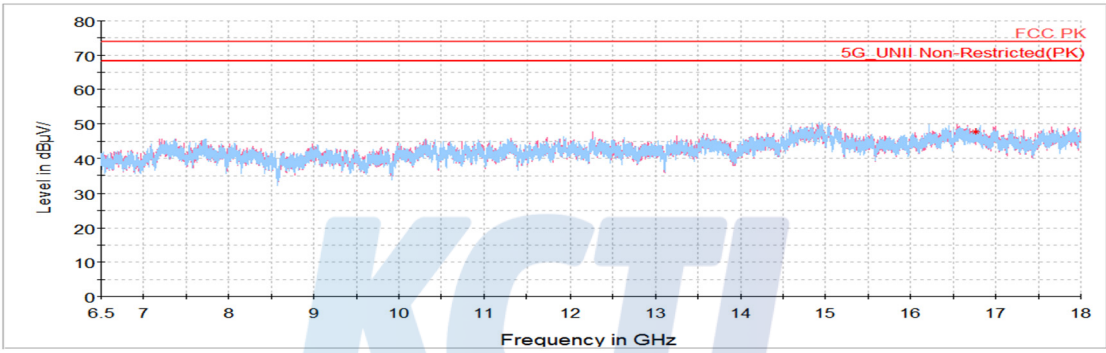
## 802.11n HT40 / Harmonic

### 118 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 16 769.86[1)] | H | 52.86 | 41.77 | -46.84 | - | 47.79 | 74.00 | 26.21 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

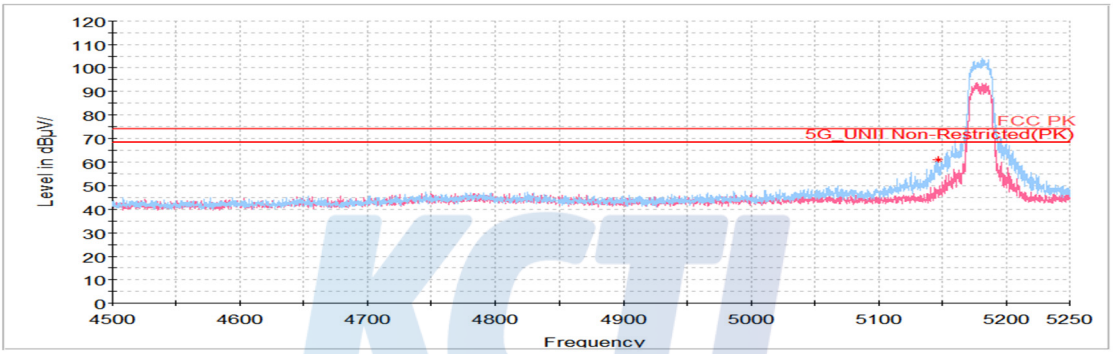


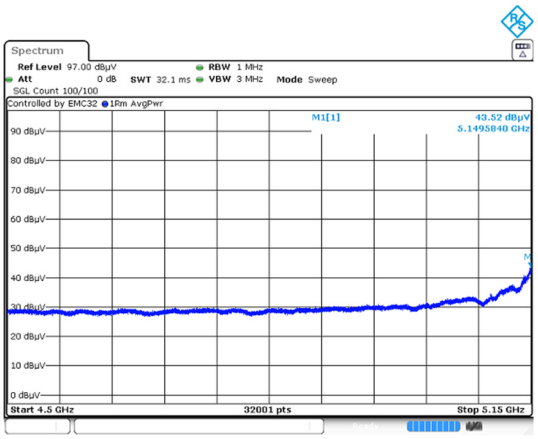
## 802.11ac VHT20 / Band-edge

### 36 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 149.58[1)] | H | 53.80 | 34.24 | -27.12 | - | 60.92 | 74.00 | 13.08 |
| **Average Data** | | | | | | | | |
| 5 149.58[1)] | H | 43.52 | 34.24 | -27.12 | 0.31 | 50.95 | 54.00 | 3.05 |

**Horizontal/Vertical for Band-edge**



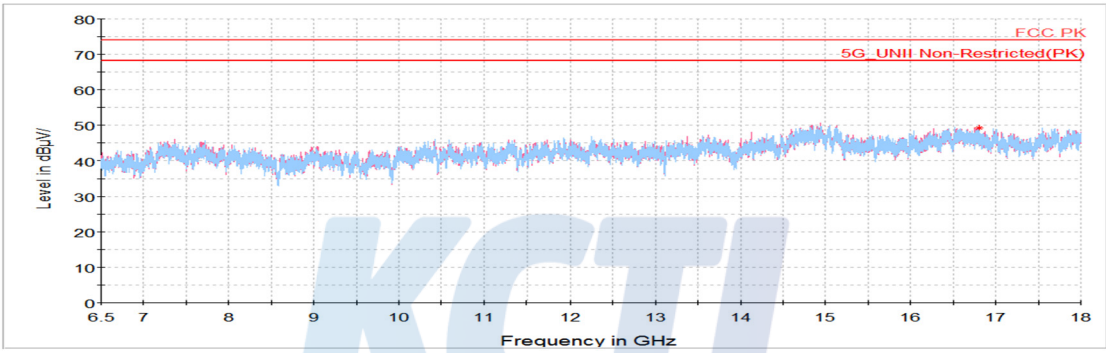

| Average data | |
|---|---|
|  | Blank |

## 802.11ac VHT20 / Harmonic

### 120 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 16 801.48[1)] | H | 54.19 | 41.80 | -46.85 | - | 49.14 | 74.00 | 24.86 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**

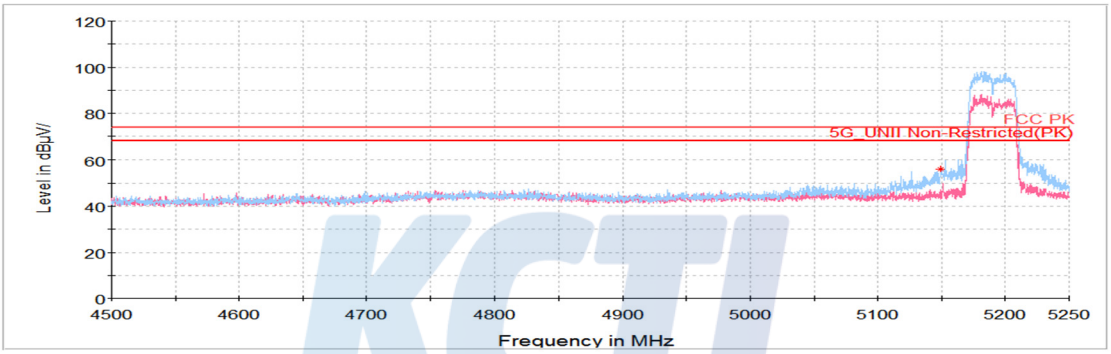


## 802.11ac VHT40 / Band-edge

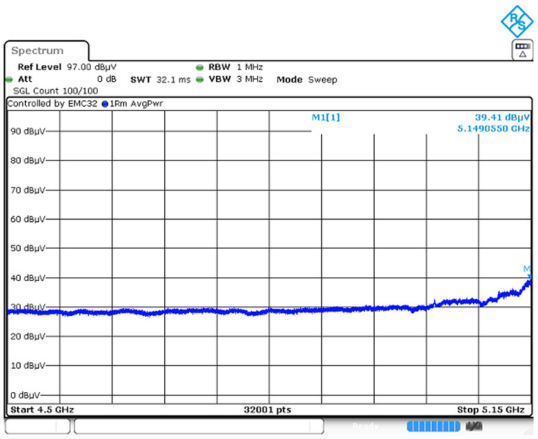
### 38 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 149.06[1)] | H | 48.65 | 34.24 | -27.11 | - | 55.78 | 74.00 | 18.22 |
| **Average Data** | | | | | | | | |
| 5 149.06[1)] | H | 39.41 | 34.24 | -27.11 | 0.61 | 47.15 | 54.00 | 6.85 |

**Horizontal/Vertical for Band-edge**




**Average data**

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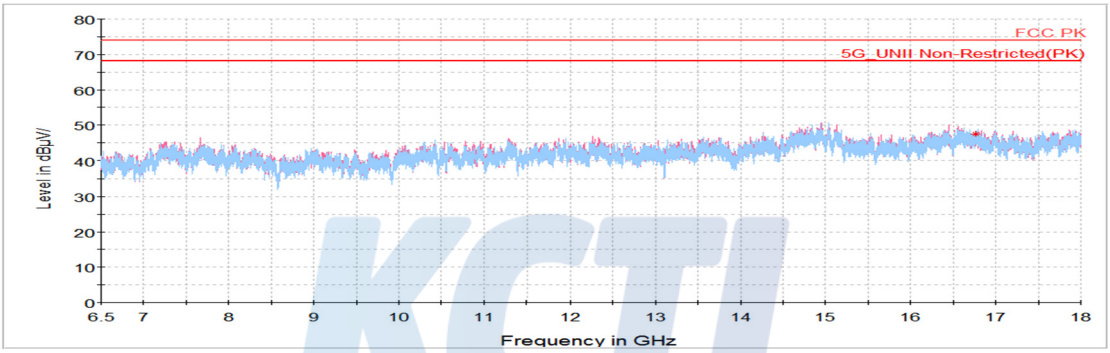
## 802.11ac VHT40 / Harmonic

### 118 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 16 771.30[1)] | V | 52.44 | 41.77 | -46.84 | - | 47.37 | 74.00 | 26.63 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 dB of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

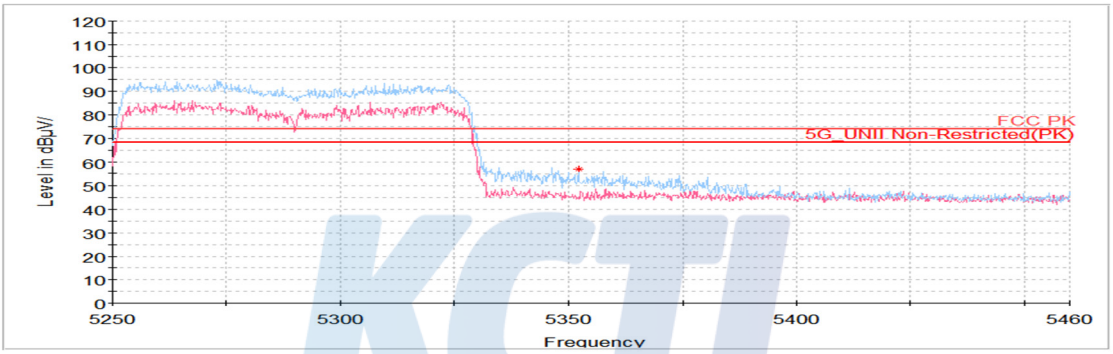


## 802.11ac VHT80 / Band-edge

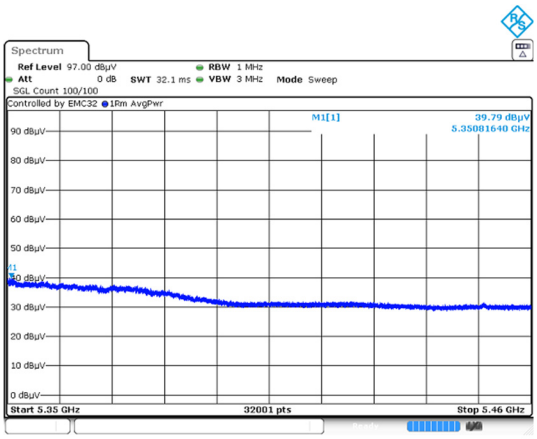
### 58 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (V/H) | (dB(μV)) | (dB) | (dB) | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 5 350.82[1)] | H | 49.09 | 34.56 | -26.84 | - | 56.81 | 74.00 | 17.19 |
| **Average Data** | | | | | | | | |
| 5 350.82[1)] | H | 39.79 | 34.56 | -26.84 | 1.25 | 48.76 | 54.00 | 5.24 |

**Horizontal/Vertical for Band-edge**




**Average data**

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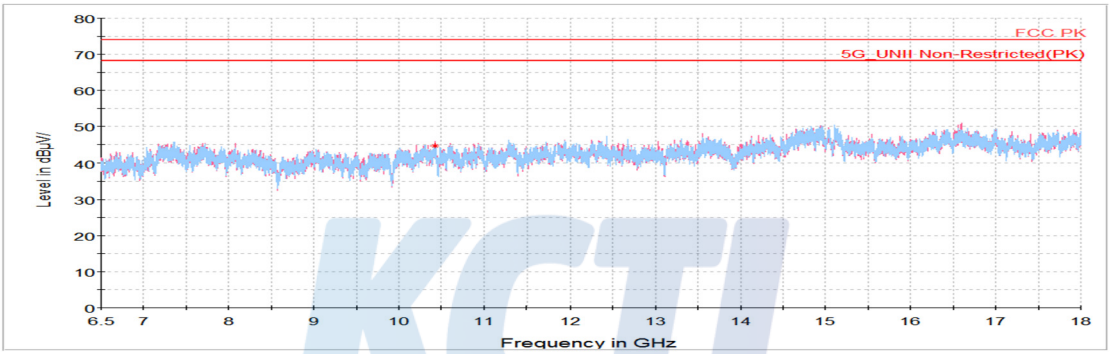
## 802.11ac VHT80 / Harmonic

### 42 Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
|---|---|---|---|---|---|---|---|---|
| (㎒) | (V/H) | (dB(㎶)) | (dB) | (dB) | (dB) | (dB(㎶/m)) | (dB(㎶/m)) | (dB) |
| **Peak data** | | | | | | | | |
| 10 420.06[1)] | H | 57.24 | 37.32 | -50.01 | - | 44.55 | 74.00 | 29.45 |
| **Average Data** | | | | | | | | |
| No spurious emissions were detected within 20 ㏈ of the limit. | | | | | | | | |

**Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓**



# 4. Measurement equipment

| Equipment Name | Manufacturer | Model No. | Serial No. | Next Cal. Date |
|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV40 | 100988 | 20.01.04 |
| Bluetooth Tester | TESCOM | TC-3000B | 3000B640056 | 20.01.25 |
| COAXIAL FIXED ATTENUATOR | Agilent | 8491B-003 | 2708A18758 | 20.05.04 |
| Horn antenna | ETS.lindgren | 3117 | 155787 | 20.10.24 |
| Broadband PreAmplifier | SCHWARZBECK | BBV9718 | 216 | 20.07.30 |
| AMPLIFIER | L-3 Narda-MITEQ | AMF-7D-01001800 -22-10P | 2031196 | 20.02.21 |
| LOOP Antenna | R&S | HFH2-Z2 | 100355 | 20.08.24 |
| Antenna Mast | Innco Systems | MA4640-XP-ET | - | - |
| Turn Table | Innco Systems | DT2000 | 79 | - |
| Highpass Filter | WT | WT-A1698-HS | WT160411001 | 20.05.14 |
| Highpass Filter | WT | WT-A1699-HS | WT160411002 | 20.05.14 |
| Vector Signal Generator | R&S | SMBV100A | 257566 | 20.01.04 |
| Signal Generator | R&S | SMR40 | 100007 | 20.05.13 |
| Cable Assembly | RadiAll | 2301761768000PJ | 1724.659 | - |
| Cable Assembly | gigalane | RG-400 | - | - |
| Cable Assembly | HUER+SUHNER | SUCOFLEX 104 | MY4342/4 | - |
| Biconical VHF-UHF Broadband Antenna | SCHWARZBECK | VUBA9117 | 275 | 20.04.13 |
| Bilog Antenna | Teseq GmbH | CBL 6143A | 35039 | 21.05.21 |
| Horn Antenna | ETS.lindgren | 3117 | 00161083 | 20.09.18 |
| Horn Antenna | ETS.lindgren | 3117 | 161225 | 20.05.22 |
| Horn Antenna | ETS.lindgren | 3116 | 00086632 | 20.02.15 |
| Horn Antenna | ETS.lindgren | 3116 | 00086635 | 20.05.09 |
| High pass Filter | Wainwright Instruments GmbH | WHKX3.0/18G-12SS | 44 | 20.01.25 |
| High pass Filter | Wainwright Instruments GmbH | WHKX1.0/1.5S-10SS | 14 | 20.01.25 |
| Attenuator | Weinschel ENGINEERING | 10 | AJ1239 | 20.05.14 |
| Attenuator | API Inmet | 40AH2W-10 | 12 | 20.05.15 |
| Amplifier | SONOMA INSTRUMENT | 310N | 186402 | 20.01.04 |
| Amplifier | L-3 Narda-MITEQ | AMF-7D-01001800-22-10P | 2031196 | 20.02.21 |
| Amplifier | L-3 Narda-MITEQ | JS44-18004000-33-8P | 2000997 | 20.08.01 |
| Spectrum Analyzer | AGILENT | N9040B | MY57010132 | 20.07.31 |
| Signal Generator | R&S | SMB100A | 176206 | 20.01.25 |
| Widebnad Radio Communication Tester | R & S | CMW500 | 141780 | 20.04.18 |

| | | | | |
|---|---|---|---|---|
| Antenna Mast | MATURO | EAS 1.5 | 042/8941211 | N/A |
| Antenna Mast | MATURO | EAS 1.5 | 043/8941211 | N/A |
| Turn Table | MATURO | TT 0.8 PF | 041/8941211 | N/A |
| Cable Assembly | Radiall | R286303620 | 1649.241 | - |
| Cable Assembly | Radiall | TESTPRO 3 | - | - |

**End of test report**

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