

FCC TEST REPORT

for

SHENZHEN HAINATIANYUAN ECOMMERCE CO.,LTD

10.1 inch Tablet PC

Model Number: M10

Serial Number:X10

FCC ID: 2AH96-M10

Prepared for : SHENZHEN HAINATIANYUAN ECOMMERCE CO.,LTD

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Report No. : 16KWE053742F

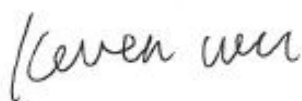
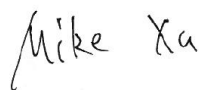

Date of Test : Apr. 27~May.08, 2016

Date of Report : May. 09, 2016

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Keyway Testing Technology Co., Ltd.

| | | | |
|--|--|--|----------------------|
| Applicant: Address: | SHENZHEN HAINATIANYUAN ECOMMERCE CO.,LTD 308, Jinyuanjia Industrial Park, Xialilang Ind Area, Nanwan St., Longgang, Shenzhen, Guangdong, China | | |
| Manufacturer: Address: | SHENZHEN HAINATIANYUAN ECOMMERCE CO.,LTD 308, Jinyuanjia Industrial Park, Xialilang Ind Area, Nanwan St., Longgang, Shenzhen, Guangdong, China | | |
| E.U.T: | 10.1 inch Tablet PC | | |
| Model Number: | M10 | | |
| Serial Model: | X10 | | |
| Trade Name: | HAEHNE | Serial No.: | ----- |
| Date of Receipt: | Apr. 26, 2016 | Date of Test: | Apr. 27~May.08, 2016 |
| Test Specification: | FCC Part 15, Subpart 15.247: Oct. 1, 2015 ANSI C63.10:2013 KDB558074 D01 DTS Meas Guidance v03r05 | | |
| Test Result: | The equipment under test was found to be compliance with the requirements of the standards applied. | | |
| Issue Date: May. 09, 2016 | | | |
| Tested by: | Reviewed by: | Approved by: | |
|  <hr/> Keven Wu / Engineer |  <hr/> Mike Xu / Supervisor |  <hr/> Andy Gao / Supervisor | |
| Other Aspects: | None. | | |
| Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested | | | |
| This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd. | | | |

1.TEST SUMMARY

| Test Items | Test Requirement | Result |
|----------------------------|----------------------------|--------|
| Conducted Emissions | 15.207 | PASS |
| Radiated Emissions | 15.205(a)/15.209/15.247(d) | PASS |
| 6dB&99% Bandwidth | 15.247(a)(2) | PASS |
| Power density | 15.247(e) | PASS |
| Maximum Peak Output Power | 15.247(b) | PASS |
| Emissions from out of band | 15.247(d) | PASS |
| Antenna Requirement | 15.203 | PASS |

2.GENERAL PRODUCT INFORMATION

2.1. Product Function

Refer to Technical Construction Form and User Manual.

2.2. Description of Device (EUT)

| | |
|----------------------------|--|
| Product Name: | 10.1 inch Tablet PC |
| Model: | M10 |
| Serial Model: | X10 |
| Model Difference | All the models are the same circuit and RF module, except the model names and colour. |
| Operation Frequency: | 2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40)) |
| Channel numbers: | 11 for 802.11b/802.11g/802.11n(H20) ,7 for 802.11n(H40) |
| Modulation technology: | Direct Sequence Spread Spectrum (DSSS) for (IEEE 802.11b) Orthogonal Frequency Division Multiplexing(OFDM) for (IEEE 802.11g/802.11n) |
| Data speed (IEEE 802.11b): | 1Mbps, 2Mbps, 5.5Mbps, 11Mbps |
| Data speed (IEEE 802.11g): | 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps |
| Data speed (IEEE 802.11n): | Up to 150Mbps |
| Antenna Type: | FPCB |
| Antenna gain: | 1.0dBi |
| Power supply: | DC 3.7V or DC 5V from adapter |
| Adapter: | Model:JHD-AP010U-050180BA INPUT:100-240V~50/60Hz 0.3A OUTPUT:5V,1800mA |

2.3. Independent Operation Modes

The basic operation modes are:

2.3.1. EUT work WFI TX mode, and frequency as below:

| | | |
|--------|----------------|-----------|
| Mode 1 | 802.11b | Frequency |
| | | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 2 | 802.11g | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 3 | 802.11n(HT20) | 2412MHz |
| | | 2437MHz |
| | | 2462MHz |
| Mode 4 | 802.11 n(HT40) | 2422MHz |
| | | 2437MHz |
| | | 2452MHz |
| Mode 5 | LINK Mode | |

Remark: According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup”
802.11b mode:1Mbps ,802.11g mode:6Mbps , 802.11n HT20 mode:MCS0, 802.11n HT20 mode:MCS0.

2.4. Test Supporting System

None.

2.5. TEST SITES

2.5.1. Test Facilities

Lab Qualifications : Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

Certificated by FCC, USA
Registration No.: 370994
Date of registration: February 21, 2012

Certificated by CNAS China
Registration No.: CNAS L5783
Date of registration: August 8, 2012

2.6. List of Test and Measurement Instruments

2.6.1. For conducted emission at the mains terminals test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|--------------------------|---------------|-----------|------------|------------|------------|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101156 | Apr. 09,16 | Apr. 09,17 |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 101315 | Apr. 09,16 | Apr. 09,17 |
| RF Cable | FUJIKURA | 3D-2W | 944 Cable | Apr. 09,16 | Apr. 09,17 |

2.6.2. For radiated emission test

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---------------------------------------|---------------|---------------|--------------|------------|------------|
| EMI Test Receiver | Rohde&Schwarz | ESCI | 101156 | Apr. 09,16 | Apr. 09,17 |
| Bilog Antenna | ETS-LINDGREEN | 3142D | 135452 | Apr. 09,16 | Apr. 09,17 |
| Spectrum Analyzer | Agilent | E4411B | MY4511304 | Apr. 09,16 | Apr. 09,17 |
| 3m Semi-anechoic Chamber | ETS-LINDGREEN | 966 | KW01 | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier | SONOMA | 310 | 187016 | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier | Agilent | 8449B | 3008A00251 | Apr. 09,16 | Apr. 09,17 |
| RF Cable | IMRO | IMRO-400 | 966 Cable 1# | N/A | N/A |
| MULTI-DEVICE Controller | ETS-LINDGREEN | 2090 | 126913 | N/A | N/A |
| Horn Antenna | SCHWARZBECK | BBHA9170 | 9170-068 | Apr. 09,16 | Apr. 09,17 |
| Spectrum Analyzer | Agilent | E4408B | MY44211125 | Apr. 09,16 | Apr. 09,17 |
| High Pass filter | Micro | HPM50111 | 324216 | Apr. 09,16 | Apr. 09,17 |
| Constant temperature and humidity box | GF | GTH-800-40-1P | MAA9906-005 | Apr. 09,16 | Apr. 09,17 |
| Attenuation | MCE | 24-10-34 | BN9258 | Apr. 02,16 | Apr. 02,17 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | Apr. 02,16 | Apr. 02,17 |
| Power Meter | R&S | NRVS | 100696 | Apr. 24,16 | Apr. 24,17 |
| Power Sensor | R&S | URV5-Z4 | 395.1619.05 | Apr. 24,16 | Apr. 24,17 |

3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: 10.1 inch Tablet PC)

3.3. Test Operation Mode and Test Software

None.

3.4. Special Accessories and Auxiliary Equipment

| | |
|----------|--|
| Adapter: | Model:JHD-AP010U-050180BA INPUT:100-240V~50/60Hz 0.3A OUTPUT:5V,1800mA |
|----------|--|

3.5. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Conducted Emission at the Mains Terminals Test

4.1.1. Limit 15.209 limits

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB μ V) | |
|-----------------------------|------------------------------|----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 | 56 to 46 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

4.1.2. Test Setup

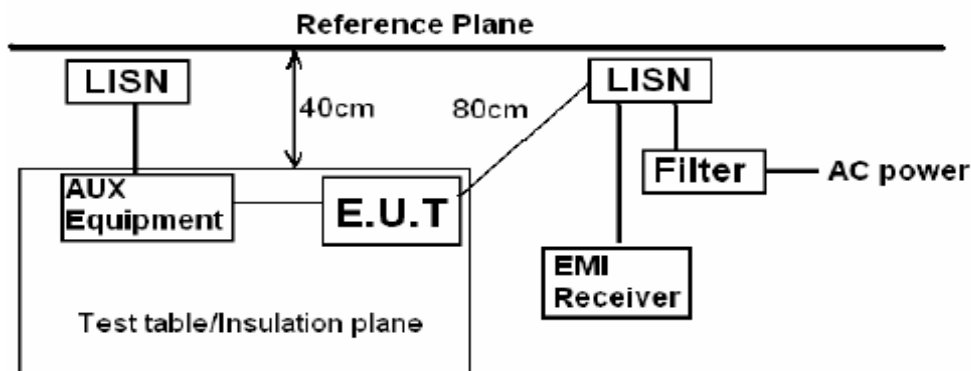
The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

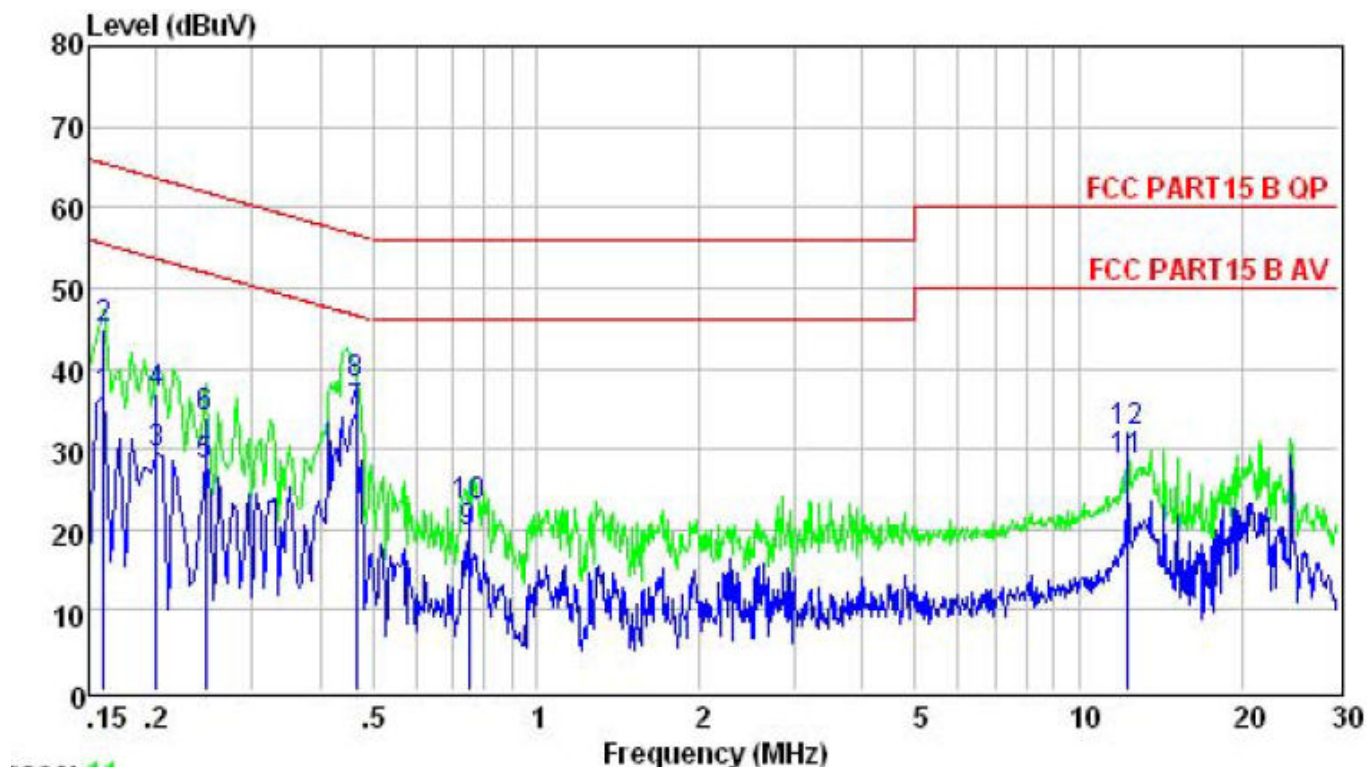
The bandwidth of the test receiver was set at 9 kHz.

Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.



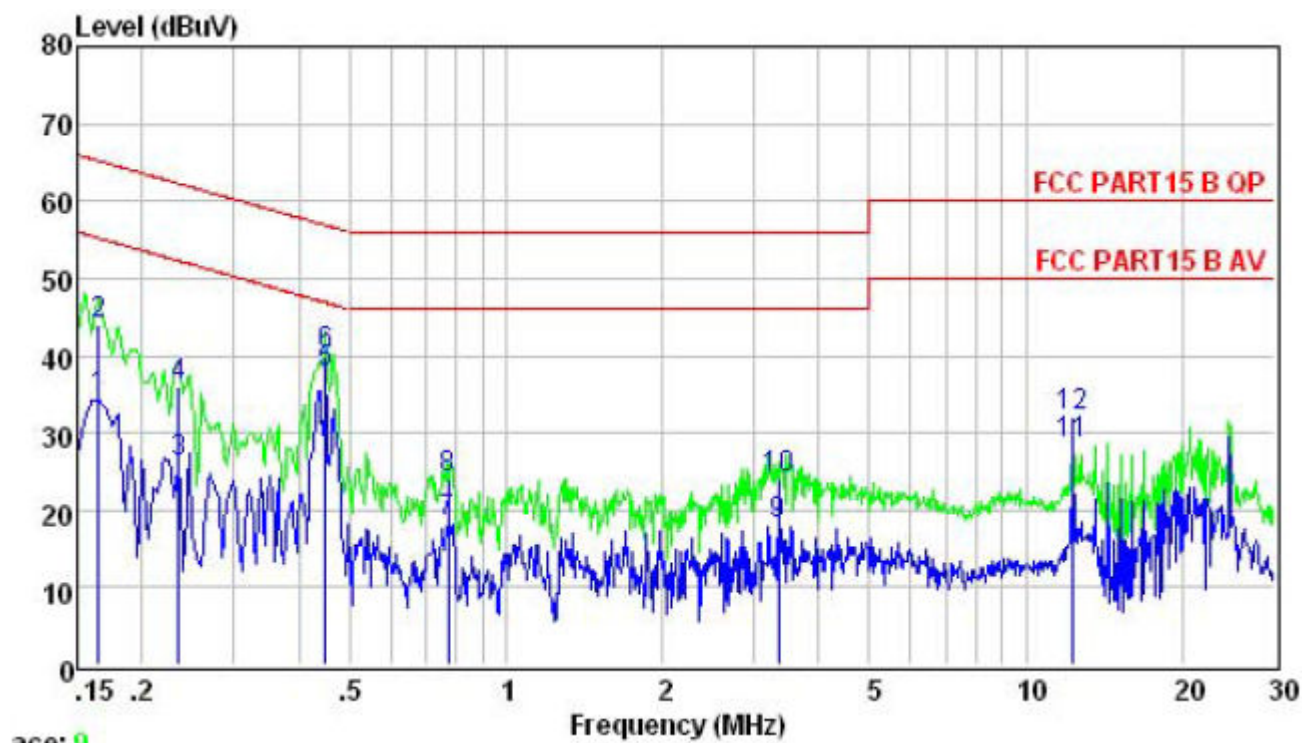
Remark:
 E.U.T: Equipment Under Test
 LISN: Line Impedance Stabilization Network
 Test table height=0.8m

| | | | |
|----------------|--------------------------------------|---------------------|--------|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | L |
| Test Voltage : | DC 5.0V form Adapter AC 120V/60Hz | Test Mode : | Mode 5 |



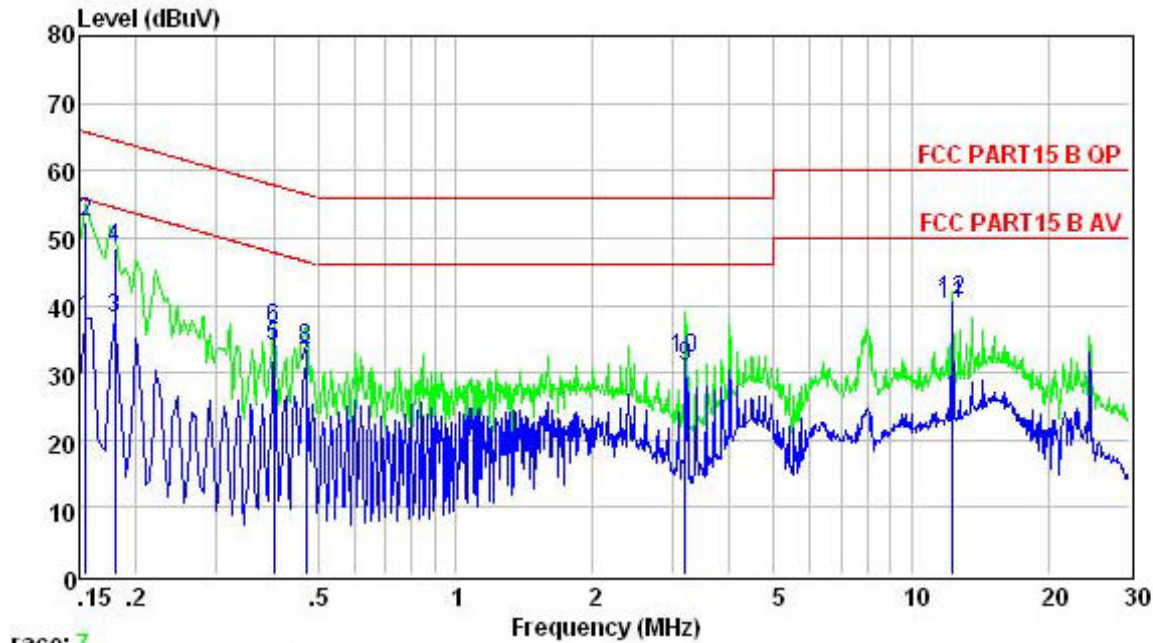
| | Freq | Level | Limit | Over | Remark |
|----|--------|-------|-------|--------|---------|
| | MHz | dBuV | Line | Limit | |
| | | | dBuV | dB | |
| 1 | 0.160 | 36.53 | 55.47 | -18.94 | Average |
| 2 | 0.160 | 45.00 | 65.47 | -20.47 | QP |
| 3 | 0.200 | 29.51 | 53.62 | -24.11 | Average |
| 4 | 0.200 | 37.00 | 63.62 | -26.62 | QP |
| 5 | 0.246 | 27.88 | 51.91 | -24.03 | Average |
| 6 | 0.246 | 34.00 | 61.91 | -27.91 | QP |
| 7 | 0.466 | 34.39 | 46.58 | -12.19 | Average |
| 8 | 0.466 | 38.00 | 56.58 | -18.58 | QP |
| 9 | 0.751 | 19.49 | 46.00 | -26.51 | Average |
| 10 | 0.751 | 23.00 | 56.00 | -33.00 | QP |
| 11 | 12.318 | 28.49 | 50.00 | -21.51 | Average |
| 12 | 12.318 | 32.00 | 60.00 | -28.00 | QP |

| | | | |
|----------------|--------------------------------------|---------------------|--------|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | N |
| Test Voltage : | DC 5.0V form Adapter AC 120V/60Hz | Test Mode : | Mode 5 |



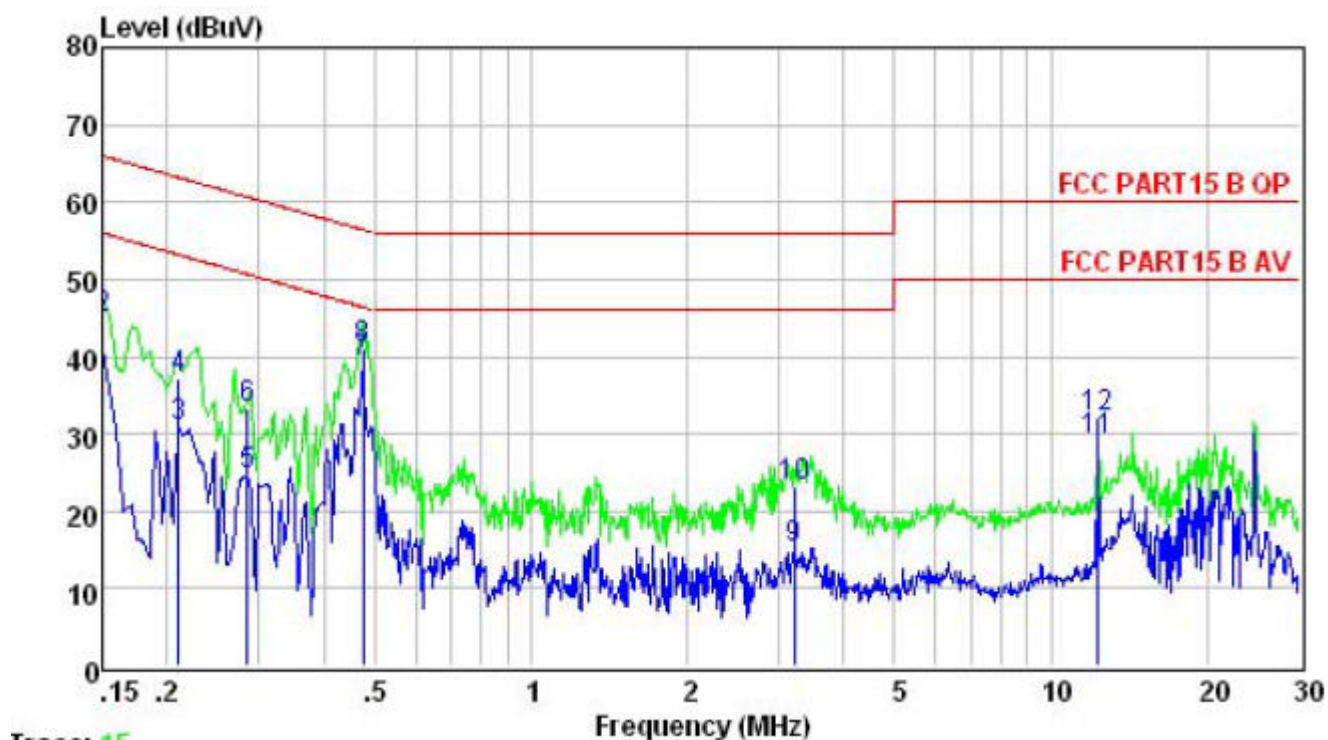
| | Freq | Level | Limit | Over | Remark |
|----|--------|-------|-------|--------|---------|
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.165 | 34.38 | 55.21 | -20.83 | Average |
| 2 | 0.165 | 44.00 | 65.21 | -21.21 | QP |
| 3 | 0.235 | 26.16 | 52.26 | -26.10 | Average |
| 4 | 0.235 | 36.00 | 62.26 | -26.26 | QP |
| 5 | 0.449 | 37.78 | 46.89 | -9.11 | Average |
| 6 | 0.449 | 40.00 | 56.89 | -16.89 | QP |
| 7 | 0.775 | 18.34 | 46.00 | -27.66 | Average |
| 8 | 0.775 | 24.00 | 56.00 | -32.00 | QP |
| 9 | 3.346 | 18.26 | 46.00 | -27.74 | Average |
| 10 | 3.346 | 24.00 | 56.00 | -32.00 | QP |
| 11 | 12.318 | 28.68 | 50.00 | -21.32 | Average |
| 12 | 12.318 | 32.20 | 60.00 | -27.80 | QP |

| | | | |
|----------------|--------------------------------------|---------------------|--------|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | L |
| Test Voltage : | DC 5.0V form Adapter AC 240V/60Hz | Test Mode : | Mode 5 |



| | Freq | Level | Limit | Over | Remark |
|----|--------|-------|-------|--------|---------|
| | MHz | dBuV | Line | Limit | dB |
| 1 | 0.155 | 38.00 | 55.74 | -17.74 | Average |
| 2 | 0.155 | 52.36 | 65.74 | -13.38 | QP |
| 3 | 0.180 | 37.97 | 54.50 | -16.53 | Average |
| 4 | 0.180 | 48.56 | 64.50 | -15.94 | QP |
| 5 | 0.400 | 33.80 | 47.86 | -14.06 | Average |
| 6 | 0.400 | 36.60 | 57.86 | -21.26 | QP |
| 7 | 0.471 | 30.84 | 46.49 | -15.65 | Average |
| 8 | 0.471 | 33.56 | 56.49 | -22.93 | QP |
| 9 | 3.190 | 30.78 | 46.00 | -15.22 | Average |
| 10 | 3.190 | 32.15 | 56.00 | -23.85 | QP |
| 11 | 12.318 | 40.10 | 50.00 | -9.90 | Average |
| 12 | 12.318 | 40.89 | 60.00 | -19.11 | QP |

| | | | |
|----------------|--------------------------------------|---------------------|--------|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | N |
| Test Voltage : | DC 5.0V form Adapter AC 240V/60Hz | Test Mode : | Mode 5 |



| | Freq | Level | Limit | Over | |
|----|--------|-------|-------|--------|---------|
| | MHz | dBuV | Line | Limit | Remark |
| | MHz | dBuV | dBuV | dB | |
| 1 | 0.150 | 40.62 | 56.00 | -15.38 | Average |
| 2 | 0.150 | 45.00 | 66.00 | -21.00 | QP |
| 3 | 0.211 | 31.07 | 53.18 | -22.11 | Average |
| 4 | 0.211 | 37.30 | 63.18 | -25.88 | QP |
| 5 | 0.285 | 24.66 | 50.68 | -26.02 | Average |
| 6 | 0.285 | 33.30 | 60.68 | -27.38 | QP |
| 7 | 0.476 | 39.24 | 46.41 | -7.17 | Average |
| 8 | 0.476 | 41.00 | 56.41 | -15.41 | QP |
| 9 | 3.207 | 15.14 | 46.00 | -30.86 | Average |
| 10 | 3.207 | 23.30 | 56.00 | -32.70 | QP |
| 11 | 12.318 | 29.20 | 50.00 | -20.80 | Average |
| 12 | 12.318 | 32.20 | 60.00 | -27.80 | QP |

4.2. Radiated Emission Test

4.2.1. Limit 15.209 limits

| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|------------------|--------------------|---|-----------------------------------|
| | | $\mu\text{V}/\text{m}$ | $\text{dB}(\mu\text{V})/\text{m}$ |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) | |

4.2.2. Restricted bands of operation

| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (²) |

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m (above 1GHz, the high was 1.5m) above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz, Both PK and AV measure, PK detector is used.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

2. Measurement Uncertainty: ± 3.2 dB at a level of confidence of 95%.

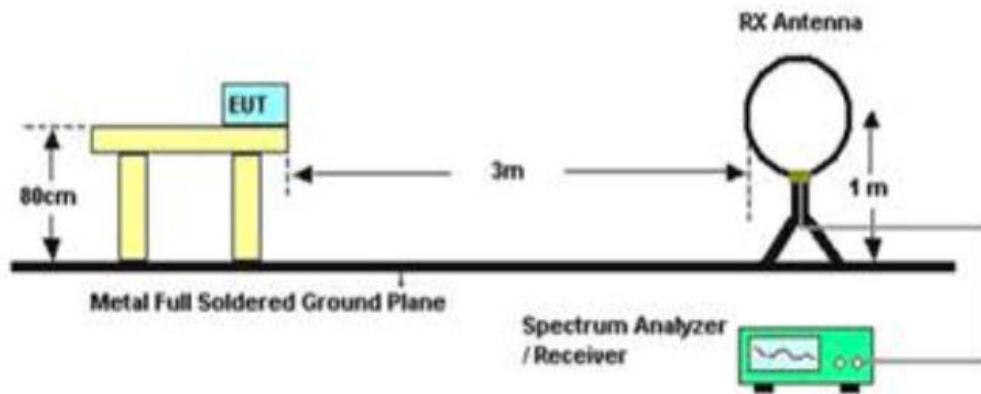
3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

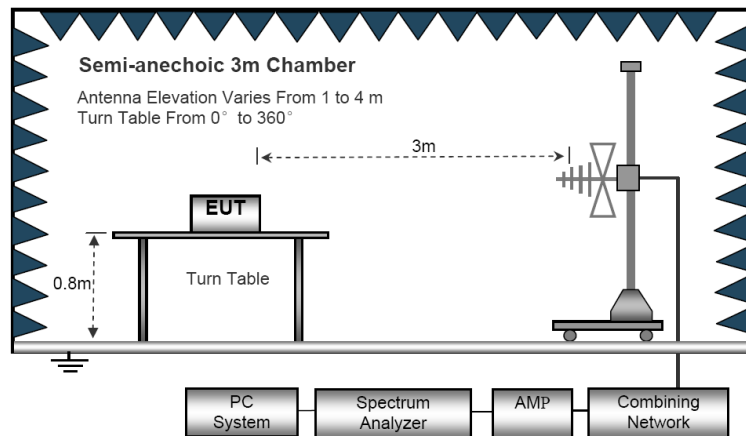
5. For Both PK and AV value above 1GHz, PK detector is used.

6. EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report (Z orientation).

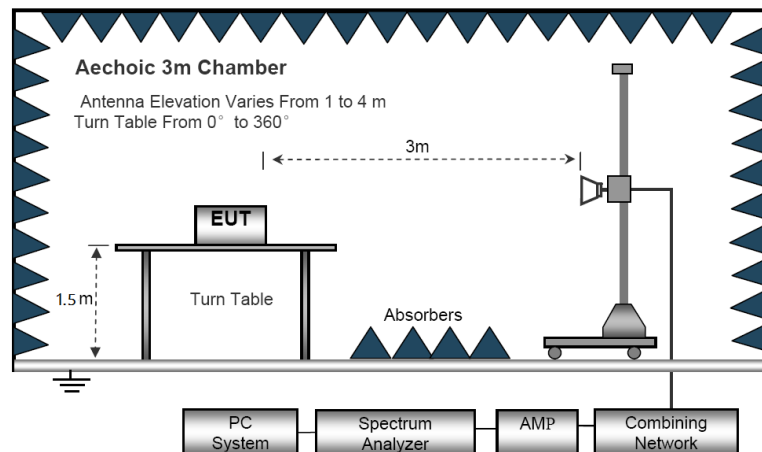
Radiated Emission Test-Up Frequency Below 30MHz



Below 1GHz



Above 1GHz



| | | | |
|----------------|---------------------|---------------------|-----|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Test Mode : | TX |
| Test Voltage : | DC 3.7V | | |

Below 30MHz

| Freq. | Reading | Limit | Margin | State |
|-------|----------|----------|--------|-------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | P |
| -- | -- | -- | -- | P |

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

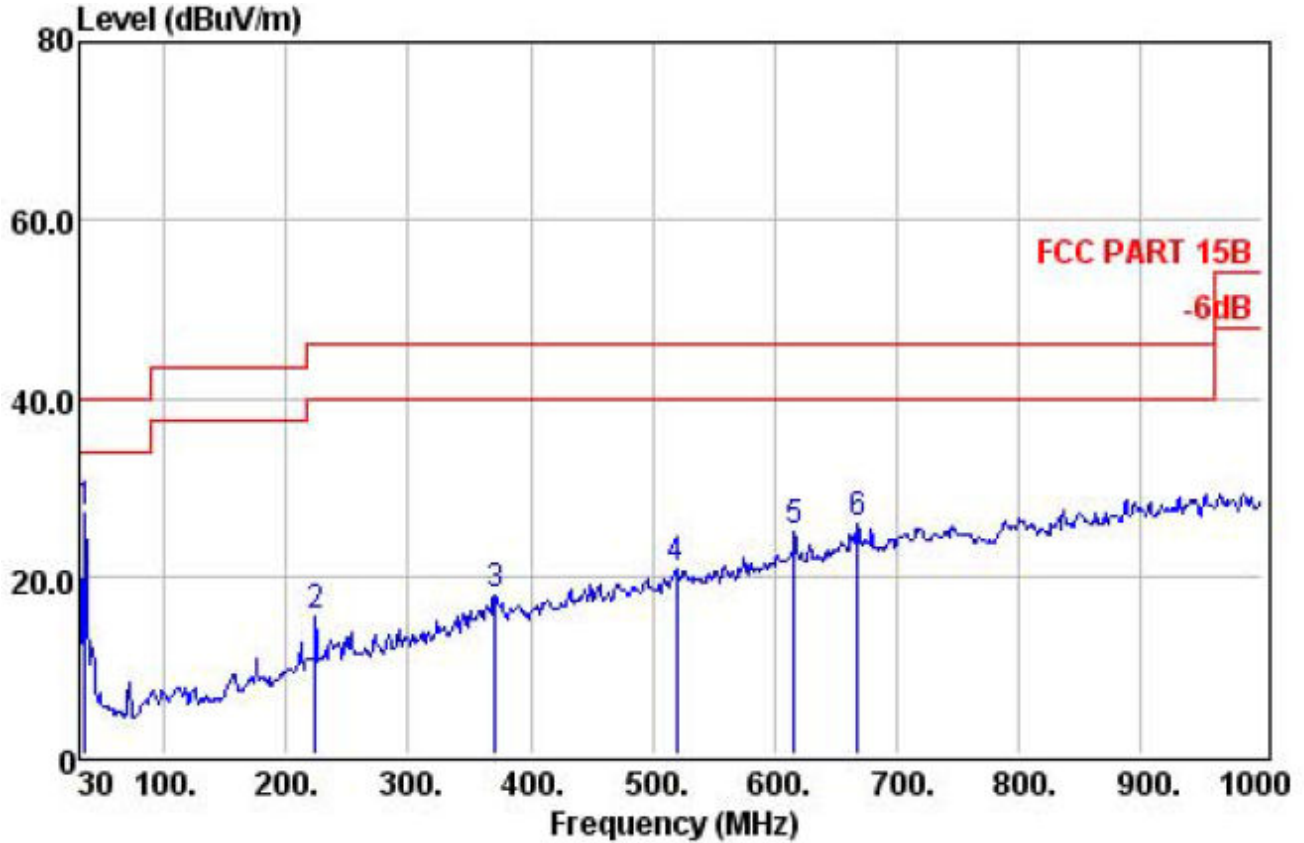
Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Below 1GHz

| | | | |
|----------------|---------------------|---------------------|-----|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Test Mode : | TX |
| Test Voltage : | DC 3.7V | | |

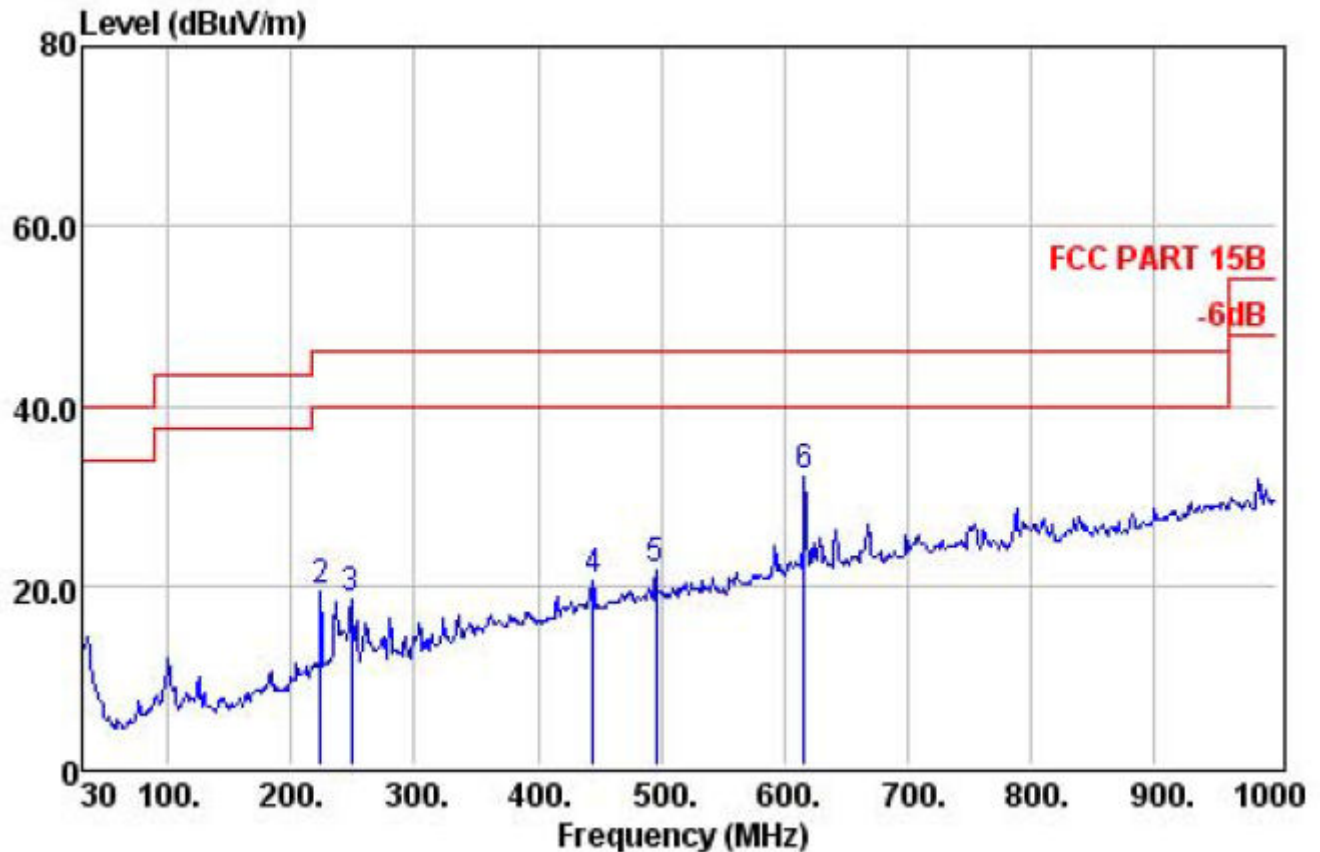
Vertical



| | Freq | Preamp Factor | Read Level | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|--------|------------------|---------------|---------------|--------|---------------|---------------|--------|
| | MHz | dB | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 34.85 | 31.38 | 41.80 | 0.56 | 26.92 | 40.00 | -13.08 | QP |
| 2 | 224.00 | 30.95 | 32.85 | 1.53 | 15.58 | 46.00 | -30.42 | QP |
| 3 | 371.44 | 30.62 | 30.02 | 2.27 | 17.84 | 46.00 | -28.16 | QP |
| 4 | 519.85 | 30.67 | 29.45 | 2.94 | 20.82 | 46.00 | -25.18 | QP |
| 5 | 616.85 | 30.64 | 31.11 | 3.38 | 24.92 | 46.00 | -21.08 | QP |
| 6 | 668.26 | 30.79 | 31.13 | 3.69 | 25.87 | 46.00 | -20.13 | QP |

| | | | |
|----------------|---------------------|---------------------|-----|
| EUT : | 10.1 inch Tablet PC | Model Name : | M10 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Test Mode : | TX |
| Test Voltage : | DC 3.7V | | |

Horizontal



| | Preamp | Read | Cable | | Limit | Over | |
|---|--------|--------|-------|------|--------|--------|-----------|
| | Freq | Factor | Level | Loss | Level | Line | Limit |
| | MHz | dB | dBuV | dB | dBuV/m | dBuV/m | dB |
| 1 | 30.00 | 31.41 | 27.18 | 0.56 | 15.13 | 40.00 | -24.87 QP |
| 2 | 224.00 | 30.95 | 36.50 | 1.53 | 19.23 | 46.00 | -26.77 QP |
| 3 | 248.25 | 30.96 | 34.94 | 1.70 | 18.53 | 46.00 | -27.47 QP |
| 4 | 445.16 | 30.61 | 31.01 | 2.62 | 20.52 | 46.00 | -25.48 QP |
| 5 | 495.60 | 30.59 | 30.81 | 2.77 | 21.62 | 46.00 | -24.38 QP |
| 6 | 616.85 | 30.64 | 38.37 | 3.38 | 32.18 | 46.00 | -13.82 QP |

NOTE:

Absolute Level= ReadingLevel+antenna Factor+cable loss-preamp factor,

Over Limit= Absolute Level – Limit

Above 1GHz

| Polar (H/V) | Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------------------------------|-----------|------------------|--------|-------------------|----------|--------|------------------|
| | (MHz) | (dBuV) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | |
| Low Channel (2412 MHz)-Above 1G | | | | | | | |
| 4824.000 | 46.23 | 10.12 | 56.35 | 74 | -17.65 | Pk | Vertical |
| 4824.000 | 33.11 | 10.12 | 43.23 | 54 | -10.77 | AV | Vertical |
| 7236.000 | 41.09 | 12.05 | 53.14 | 74 | -20.86 | pk | Vertical |
| 4824.000 | 47.22 | 10.12 | 57.34 | 74 | -16.66 | pk | Horizontal |
| 4824.000 | 35.25 | 10.12 | 45.37 | 54 | -8.63 | AV | Horizontal |
| 7236.000 | 40.04 | 12.05 | 52.09 | 74 | -21.91 | pk | Horizontal |
| Mid Channel (2437 MHz)-Above 1G | | | | | | | |
| 4874.000 | 51.15 | 10.42 | 61.57 | 74 | -12.43 | pk | Vertical |
| 4874.000 | 35.37 | 10.42 | 45.79 | 54 | -8.21 | AV | Vertical |
| 7311.000 | 40.68 | 12.81 | 53.49 | 74 | -20.51 | Pk | Vertical |
| 4874.000 | 53.77 | 10.42 | 64.19 | 74 | -9.81 | Pk | Horizontal |
| 4874.000 | 35.62 | 10.42 | 46.04 | 54 | -7.96 | AV | Horizontal |
| 7311.000 | 36.23 | 12.81 | 49.04 | 74 | -24.96 | Pk | Horizontal |
| High Channel (2462 MHz)- Above 1G | | | | | | | |
| 4924.000 | 47.73 | 10.48 | 58.21 | 74 | -15.79 | pk | Vertical |
| 4924.000 | 36.43 | 10.48 | 46.91 | 54 | -7.09 | AV | Vertical |
| 7386.000 | 36.52 | 12.87 | 49.39 | 74 | -24.61 | pk | Vertical |
| 4924.000 | 48.23 | 10.48 | 58.71 | 74 | -15.29 | pk | Horizontal |
| 4924.000 | 36.98 | 10.48 | 47.46 | 54 | -6.54 | AV | Horizontal |
| 7386.000 | 35.13 | 12.87 | 48 | 74 | -26.00 | pk | Horizontal |

Note: "802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average didn't record. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported

Spurious Emission in Band Edge:

| | Frequency (MHz) | Antenna polarization (H/V) | Emission (dBuV/m) | Band edge Limit (dBuV/m) | | Result |
|---------------|--------------------|----------------------------------|----------------------|-----------------------------|-------|--------|
| | | | PK | PK | AV | |
| 802.11b | 2390 | H | 48.24 | 74.00 | 54.00 | Pass |
| | 2390 | V | 49.11 | 74.00 | 54.00 | Pass |
| | 2483.5 | H | 47.24 | 74.00 | 54.00 | Pass |
| | 2483.5 | V | 46.56 | 74.00 | 54.00 | Pass |
| 802.11g | 2390 | H | 52.23 | 74.00 | 54.00 | Pass |
| | 2390 | V | 42.27 | 74.00 | 54.00 | Pass |
| | 2483.5 | H | 51.31 | 74.00 | 54.00 | Pass |
| | 2483.5 | V | 49.54 | 74.00 | 54.00 | Pass |
| 802.11n(HT20) | 2390 | H | 51.22 | 74.00 | 54.00 | Pass |
| | 2390 | V | 48.72 | 74.00 | 54.00 | Pass |
| | 2483.5 | H | 52.44 | 74.00 | 54.00 | Pass |
| | 2483.5 | V | 43.12 | 74.00 | 54.00 | Pass |
| 802.11n(HT40) | 2390 | H | 50.21 | 74.00 | 54.00 | Pass |
| | 2390 | V | 51.23 | 74.00 | 54.00 | Pass |
| | 2483.5 | H | 52.12 | 74.00 | 54.00 | Pass |
| | 2483.5 | V | 50.33 | 74.00 | 54.00 | Pass |

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

Spurious Emission in Restricted Band:

All the modulation modes have been tested and all other emissions more than 20dB below the limit, the worst result was report as below:

| Polar (H/V) | Frequency | Factor | Meter Reading | Emission Level | Limits | Margin | Detector Type |
|----------------|-----------|--------|---------------|-------------------|----------|--------|------------------|
| | (MHz) | (dB) | (dBuV) | (dBuV/m) | (dBuV/m) | (dB) | |
| 802.11b | | | | | | | |
| Vertical | 2842.000 | 37.87 | 6.74 | 44.61 | 74 | -29.39 | Pk |
| Horizontal | 2842.000 | 36.55 | 6.74 | 43.29 | 74 | -30.71 | PK |
| Vertical | 3265.000 | 37.65 | 7.33 | 44.98 | 74 | -29.02 | Pk |
| Horizontal | 3265.000 | 37.25 | 7.33 | 44.58 | 74 | -29.42 | PK |
| 802.11g | | | | | | | |
| Vertical | 2842.000 | 37.23 | 6.74 | 43.97 | 74 | -30.03 | Pk |
| Horizontal | 2842.000 | 36.43 | 6.74 | 43.17 | 74 | -30.83 | PK |
| Vertical | 3265.000 | 37.22 | 7.33 | 44.55 | 74 | -29.45 | Pk |
| Horizontal | 3265.000 | 37.37 | 7.33 | 44.7 | 74 | -29.3 | PK |
| 802.11n(HT20) | | | | | | | |
| Vertical | 2842.000 | 37.65 | 6.74 | 44.39 | 74 | -29.61 | Pk |
| Horizontal | 2842.000 | 36.44 | 6.74 | 43.18 | 74 | -30.82 | PK |
| Vertical | 3265.000 | 37.62 | 7.33 | 44.95 | 74 | -29.05 | Pk |
| Horizontal | 3265.000 | 37.45 | 7.33 | 44.78 | 74 | -29.22 | PK |
| 802.11n(HT40) | | | | | | | |
| Vertical | 2842.000 | 36.12 | 6.74 | 42.86 | 74 | -31.14 | Pk |
| Horizontal | 2842.000 | 35.74 | 6.74 | 42.48 | 74 | -31.52 | PK |
| Vertical | 3265.000 | 36.94 | 7.33 | 44.27 | 74 | -29.73 | Pk |
| Horizontal | 3265.000 | 38.43 | 7.33 | 45.76 | 74 | -28.24 | PK |

5. BAND EDGE COMPLIANCE TEST

5.1. Limits

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

5.2. Test setup

The EUT was placed on a turn table which was 1.5 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure.

For conduct test, VBW is set at 300kHz and RBW is set at 100kHz for measurement.

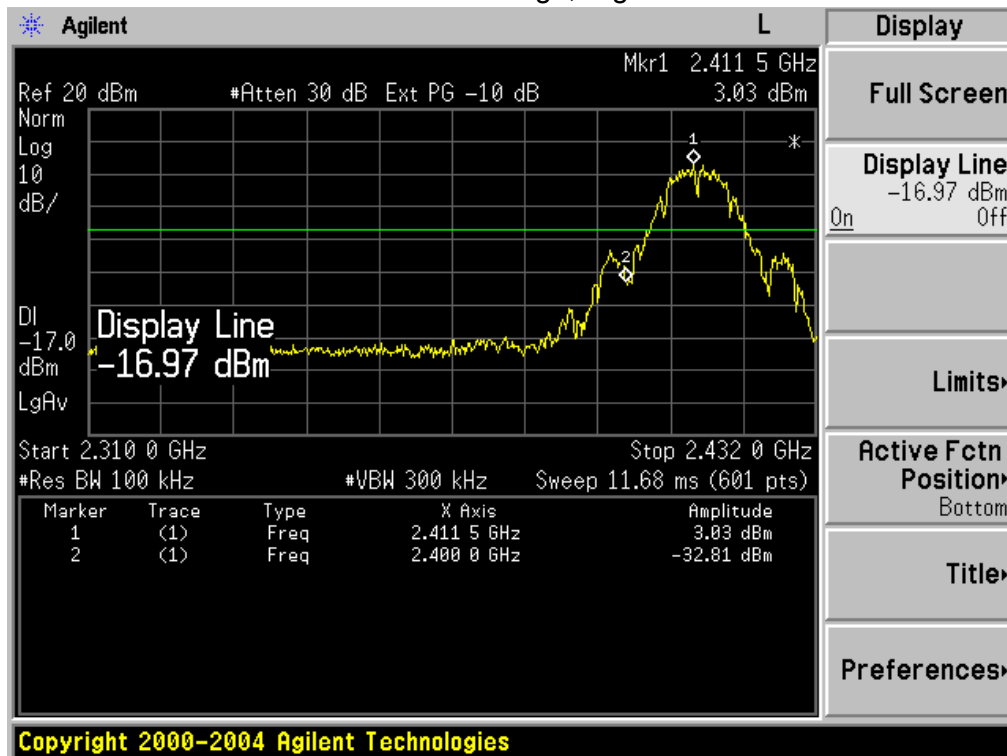
Note: 1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

2. For Both PK and AV value above 1GHz, PK detector is used.

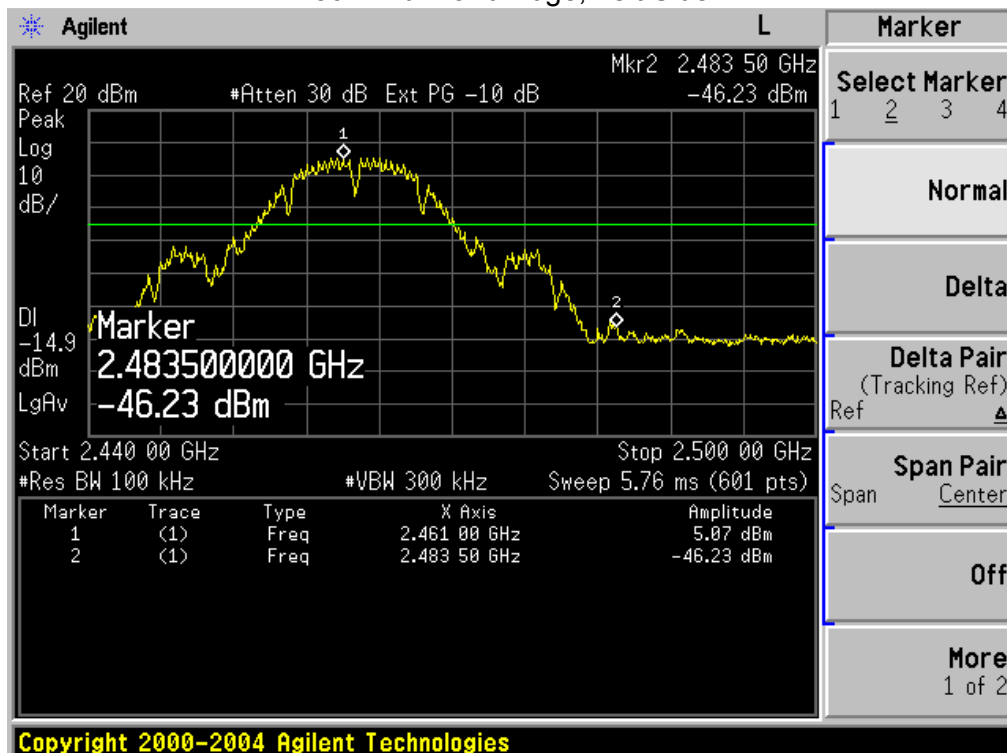
Remark : All emission out of band are more than 30dB lower than fundamental.

| Frequency Band MHz | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
|-----------------------|--------------------------------------|------------------|--------|
| 802.11b mode | | | |
| 2400 | 35.84 | 20 | Pass |
| 2483.5 | 51.3 | 20 | Pass |
| 802.11g mode | | | |
| 2400 | 25.58 | 20 | Pass |
| 2483.5 | 39.35 | 20 | Pass |
| 802.11n-HT20 mode | | | |
| 2400 | 25 | 20 | Pass |
| 2483.5 | 40.31 | 20 | Pass |
| 802.11n-HT40 mode | | | |
| 2400 | 24.55 | 20 | Pass |
| 2483.5 | 31.45 | 20 | Pass |

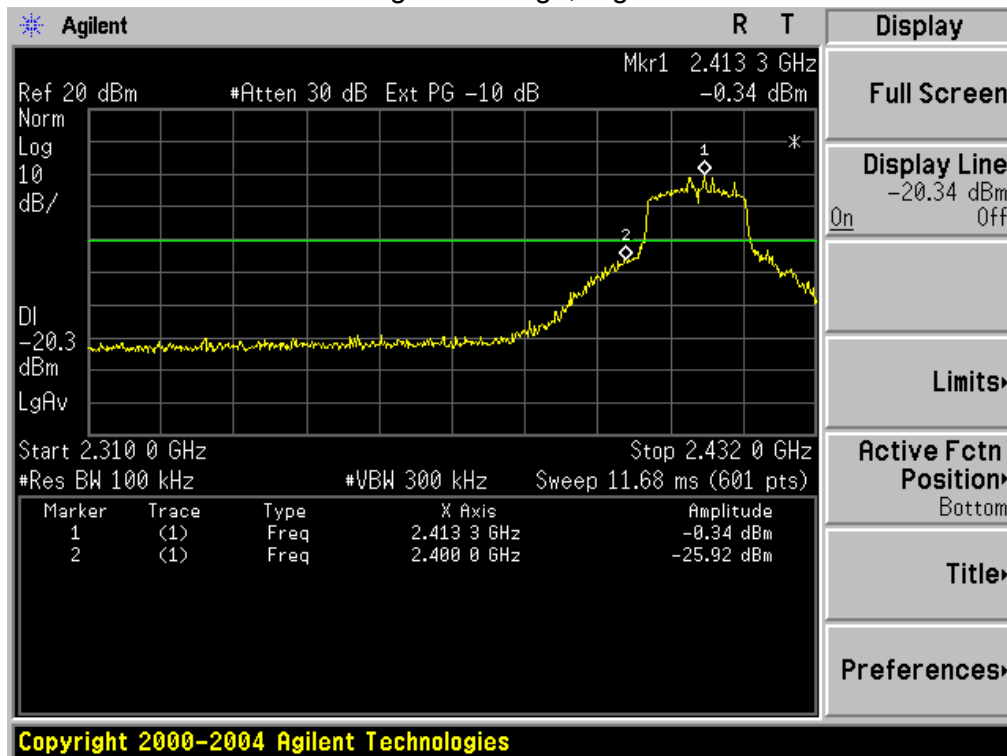
802.11b: Band Edge, Right Side



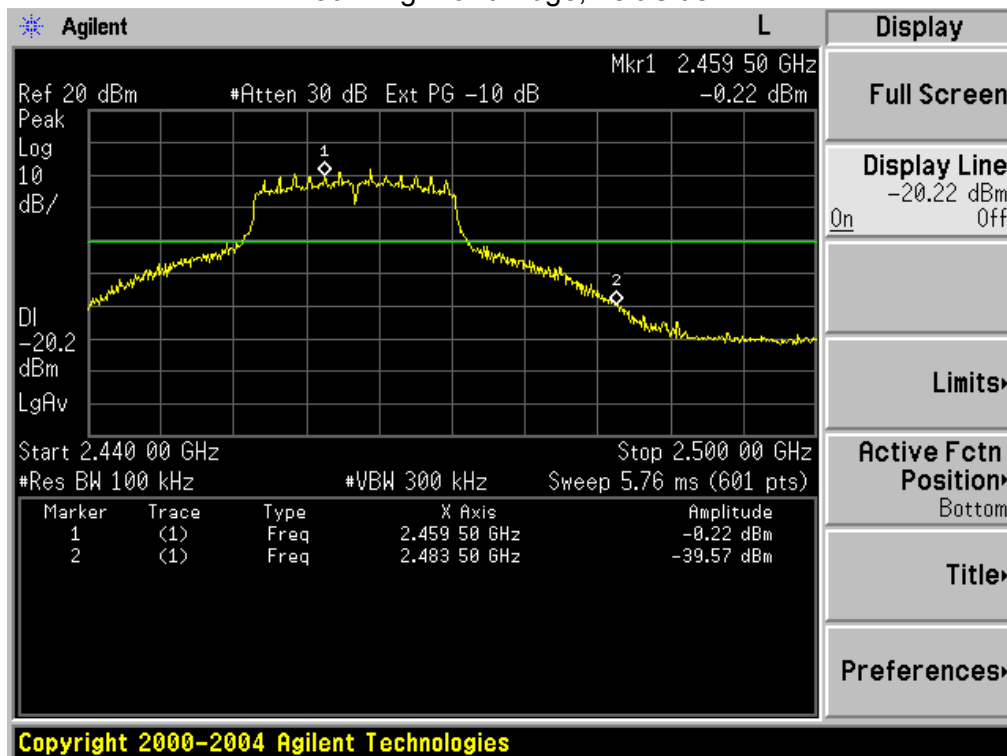
802.11b: Band Edge, Left Side



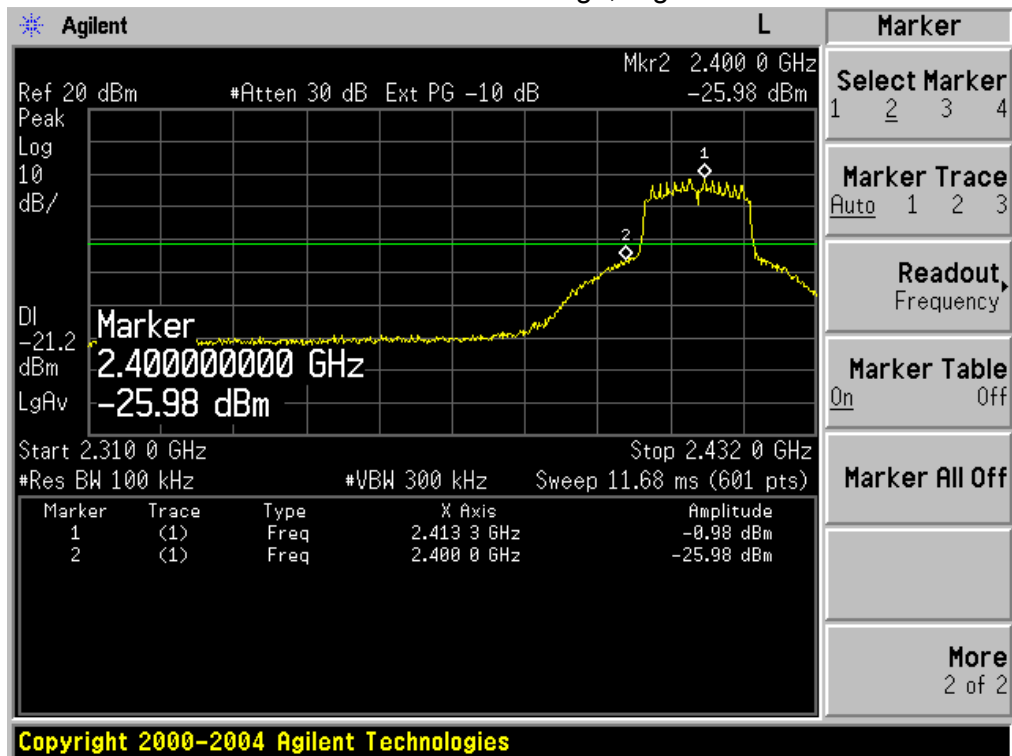
802.11g: Band Edge, Right Side



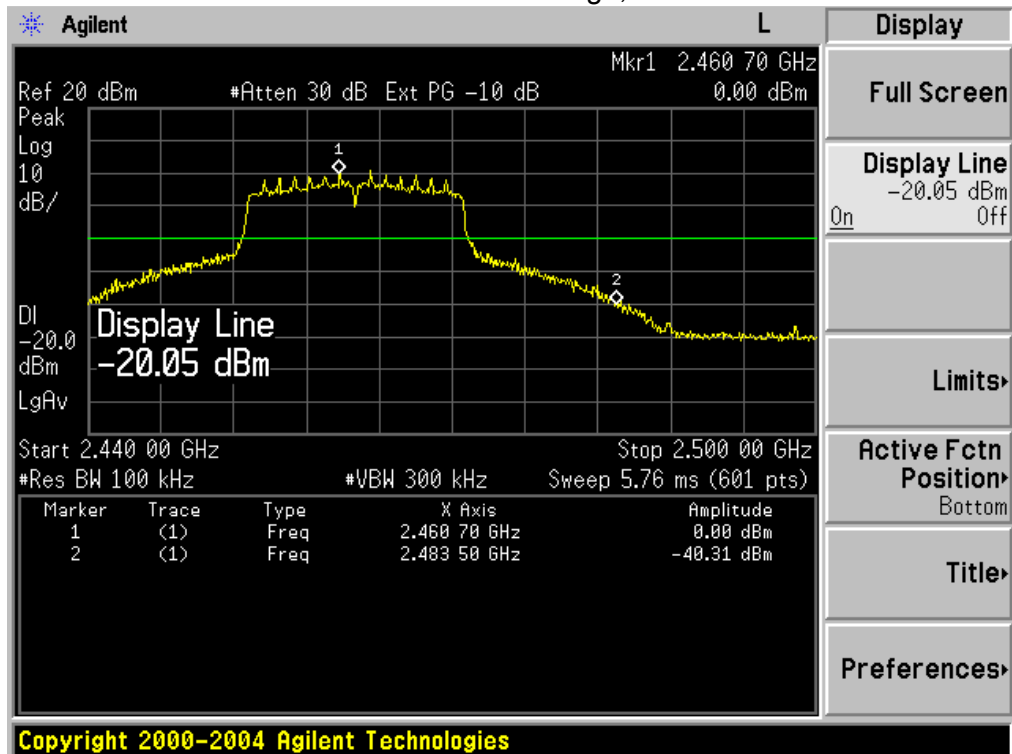
802.11g: Band Edge, Left Side



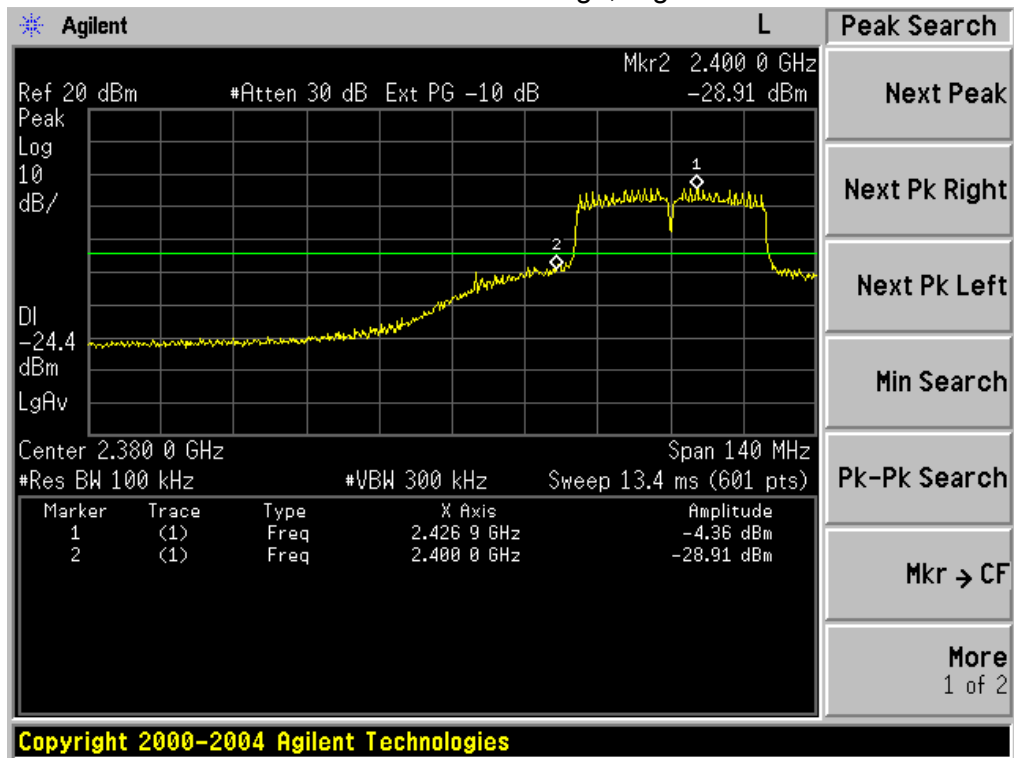
802.11n-HT20: Band Edge, Right Side



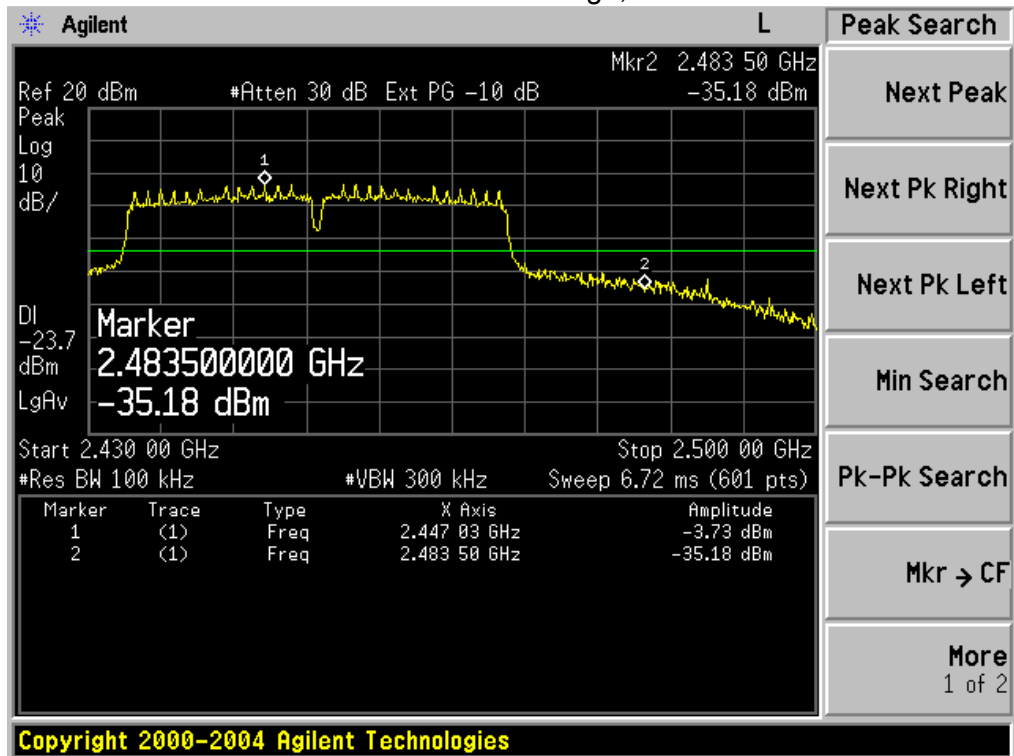
802.11n-HT20: Band Edge, Left Side



802.11n-HT40: Band Edge, Right Side



802.11n-HT40: Band Edge, Left Side



6. BANDWIDTH TEST

6.1. Limits

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

6.2. TEST PROCEDURE

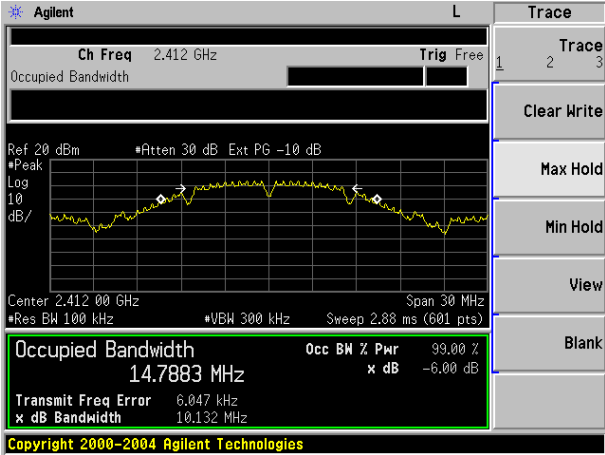
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test data:

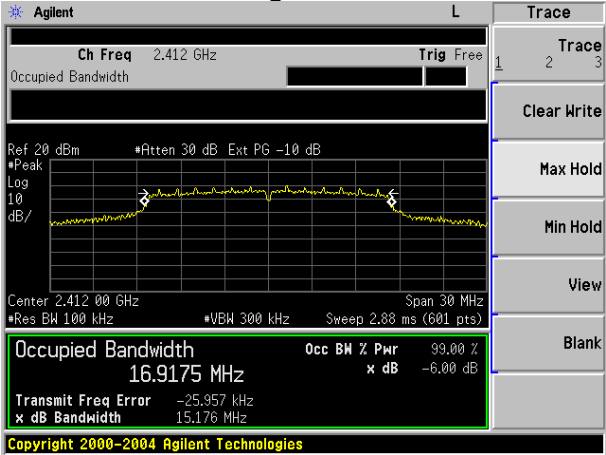
| | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Result |
|-------------------|--------------------|---------------------------|----------------|--------|
| 802.11b | 2412 | 10.132 | >0.5 | Pass |
| | 2437 | 10.243 | >0.5 | Pass |
| | 2462 | 10.237 | >0.5 | Pass |
| 802.11g | 2412 | 15.176 | >0.5 | Pass |
| | 2437 | 16.268 | >0.5 | Pass |
| | 2462 | 16.171 | >0.5 | Pass |
| 802.11n (HT20) | 2412 | 15.503 | >0.5 | Pass |
| | 2437 | 17.484 | >0.5 | Pass |
| | 2462 | 17.473 | >0.5 | Pass |
| 802.11n (HT40) | 2422 | 35.996 | >0.5 | Pass |
| | 2437 | 36.068 | >0.5 | Pass |
| | 2452 | 36.183 | >0.5 | Pass |

Test plot as follows:
6dB bandwidth

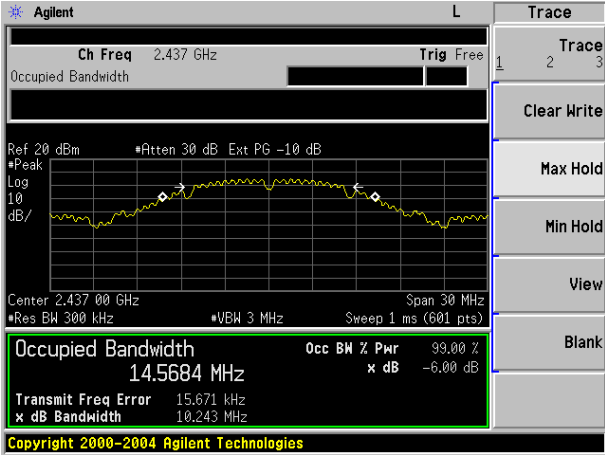
802.11b 2412MHz



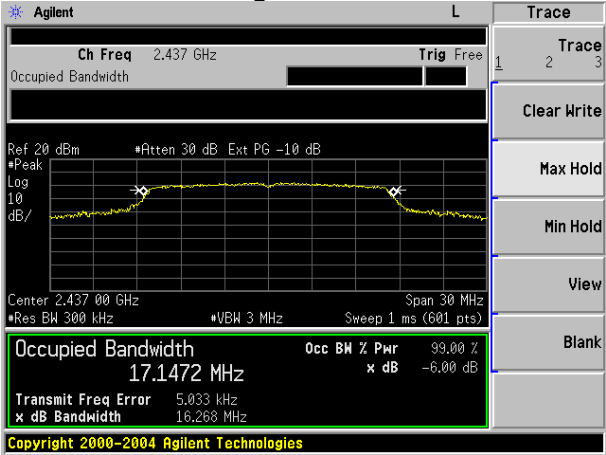
802.11g 2412MHz



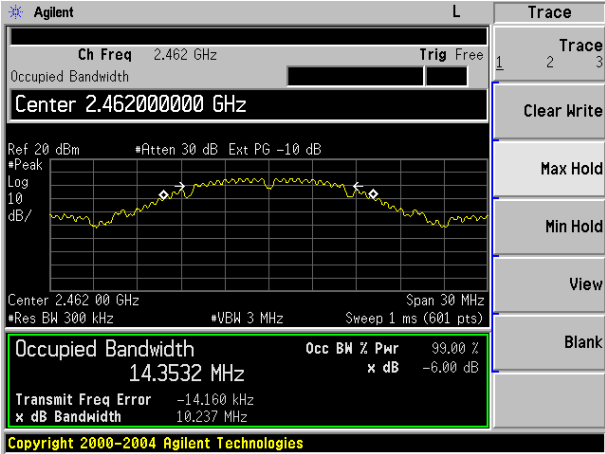
802.11b 2437MHz



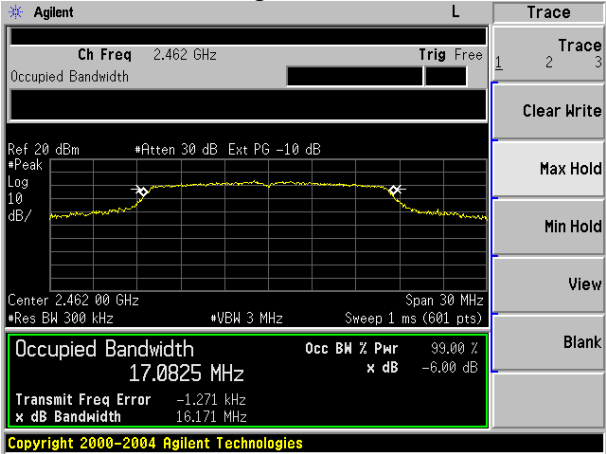
802.11g 2437MHz



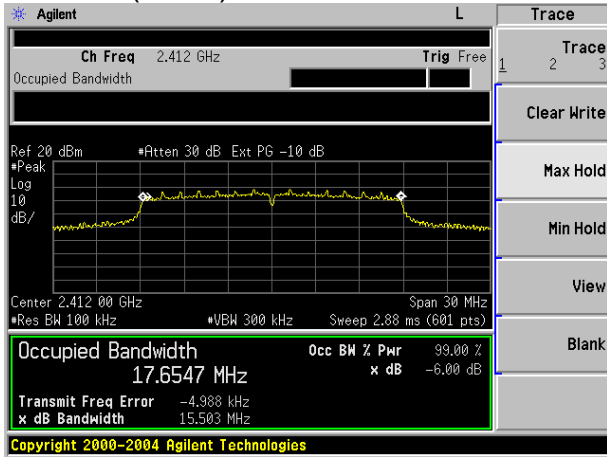
802.11b 2462MHz



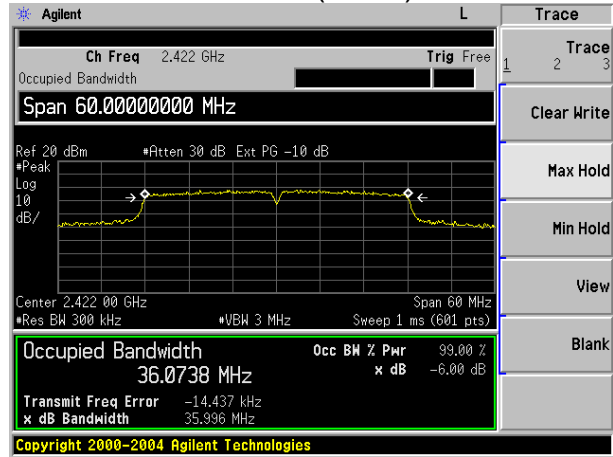
802.11g 2462MHz



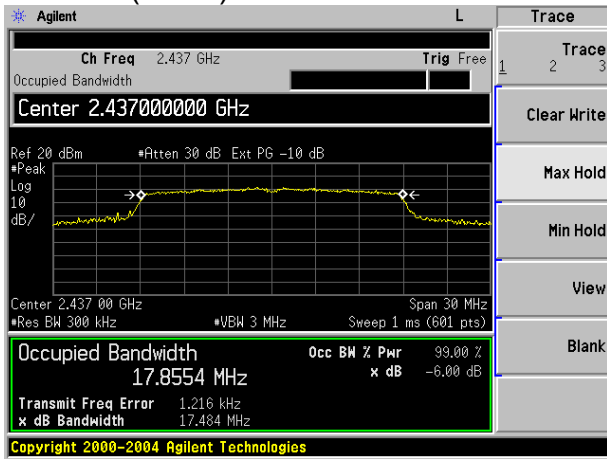
802.11n (HT20) 2412MHz



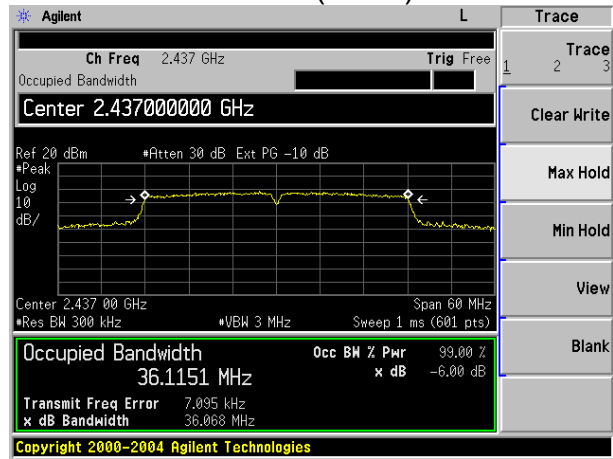
802.11n (HT40) 2422MHz



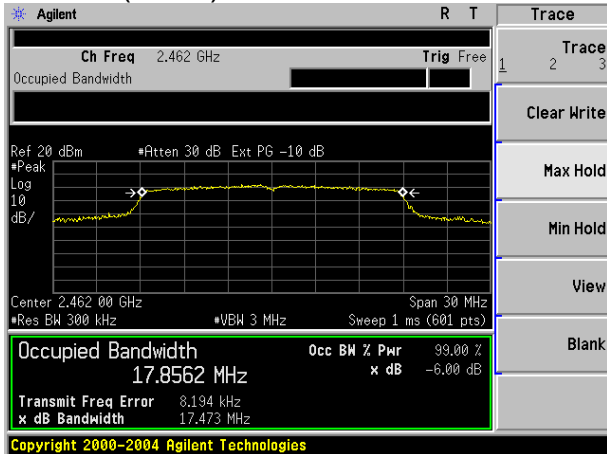
802.11n (HT20) 2437MHz



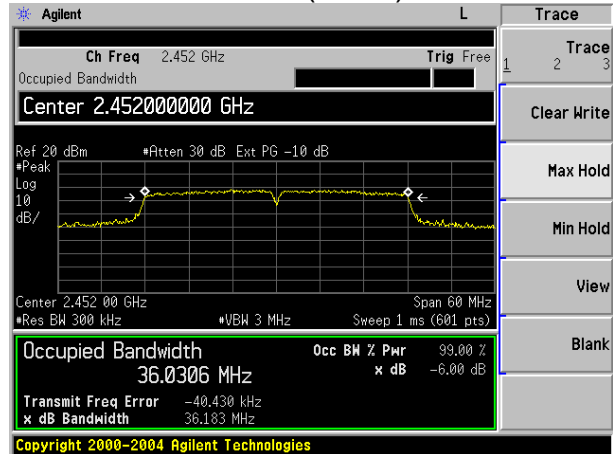
802.11n (HT40) 2437MHz



802.11n(HT20) 2462MHz



802.11n (HT40)2452MHz



7. OUTPUT POWER TEST

7.1. Limits

For systems using digital modulation in the 2400~2483.5MHz, The out put Power shall not exceed 1W (30dBm)

7.2. Test setup

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

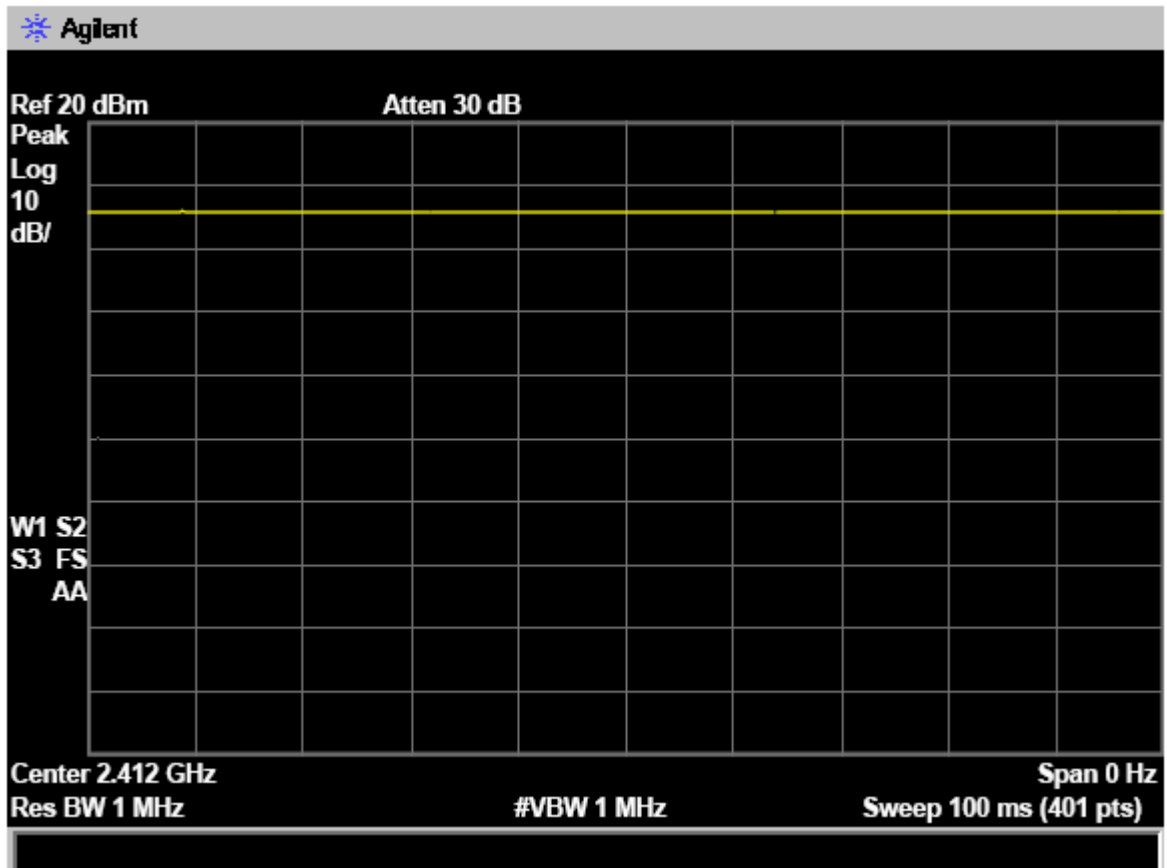


7.3. Test result

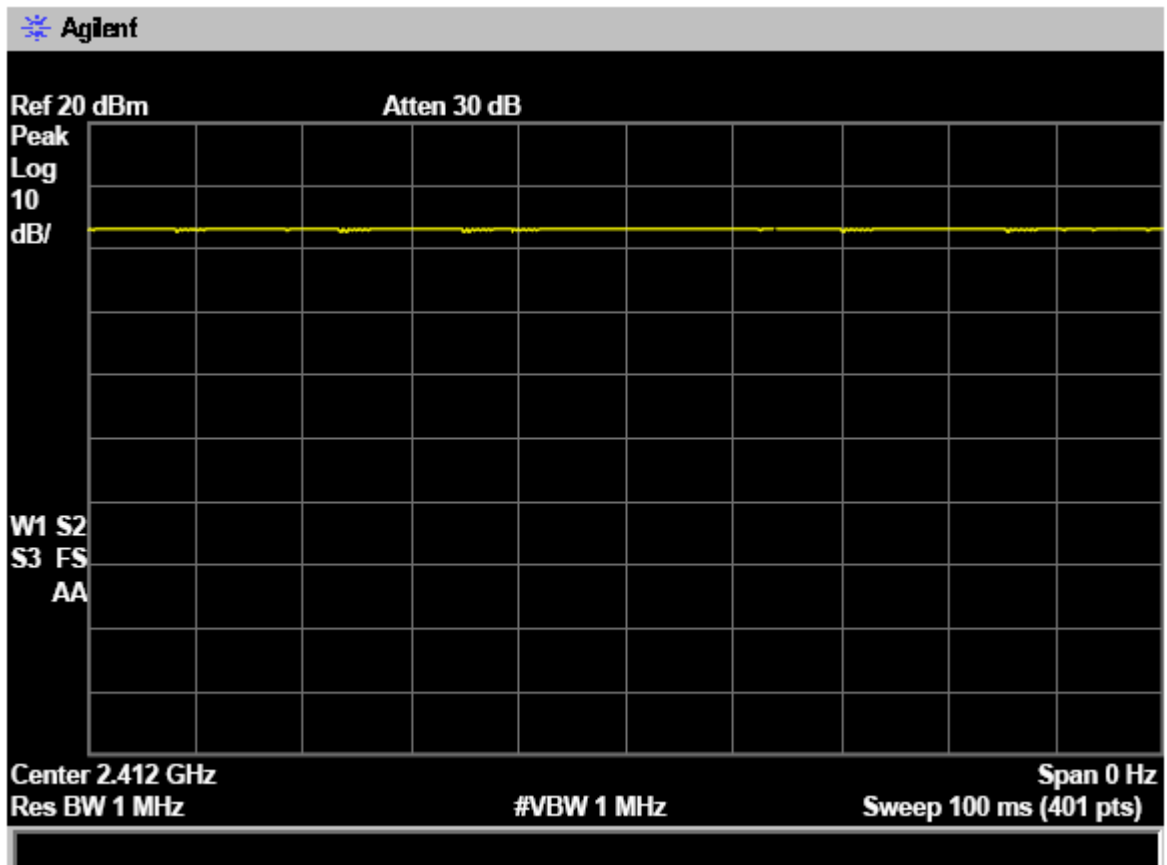
| Test Channe | Frequency | Maximum Peak Conducted Output Power (PK) | Maximum Peak Conducted Output Power (AV) | LIMIT |
|----------------------------|-----------|--|--|-------|
| | (MHz) | (dBm) | (dBm) | dBm |
| TX 802.11b Mode | | | | |
| CH01 | 2412 | 12.43 | 9.21 | 30 |
| CH06 | 2437 | 12.32 | 9.15 | 30 |
| CH11 | 2462 | 12.31 | 9.26 | 30 |
| TX 802.11g Mode | | | | |
| CH01 | 2412 | 11.16 | 8.14 | 30 |
| CH06 | 2437 | 11.31 | 8.53 | 30 |
| CH11 | 2462 | 11.24 | 8.31 | 30 |
| TX 802.11n(20) Mode | | | | |
| CH01 | 2412 | 10.54 | 7.85 | 30 |
| CH06 | 2437 | 10.73 | 7.54 | 30 |
| CH11 | 2462 | 10.72 | 7.73 | 30 |
| TX 802.11n(40) Mode | | | | |
| CH03 | 2422 | 10.24 | 7.33 | 30 |
| CH06 | 2437 | 10.48 | 7.36 | 30 |
| CH09 | 2452 | 10.28 | 7.43 | 30 |

Note: For power test the duty cycle is 100% in continous transmitting mode.

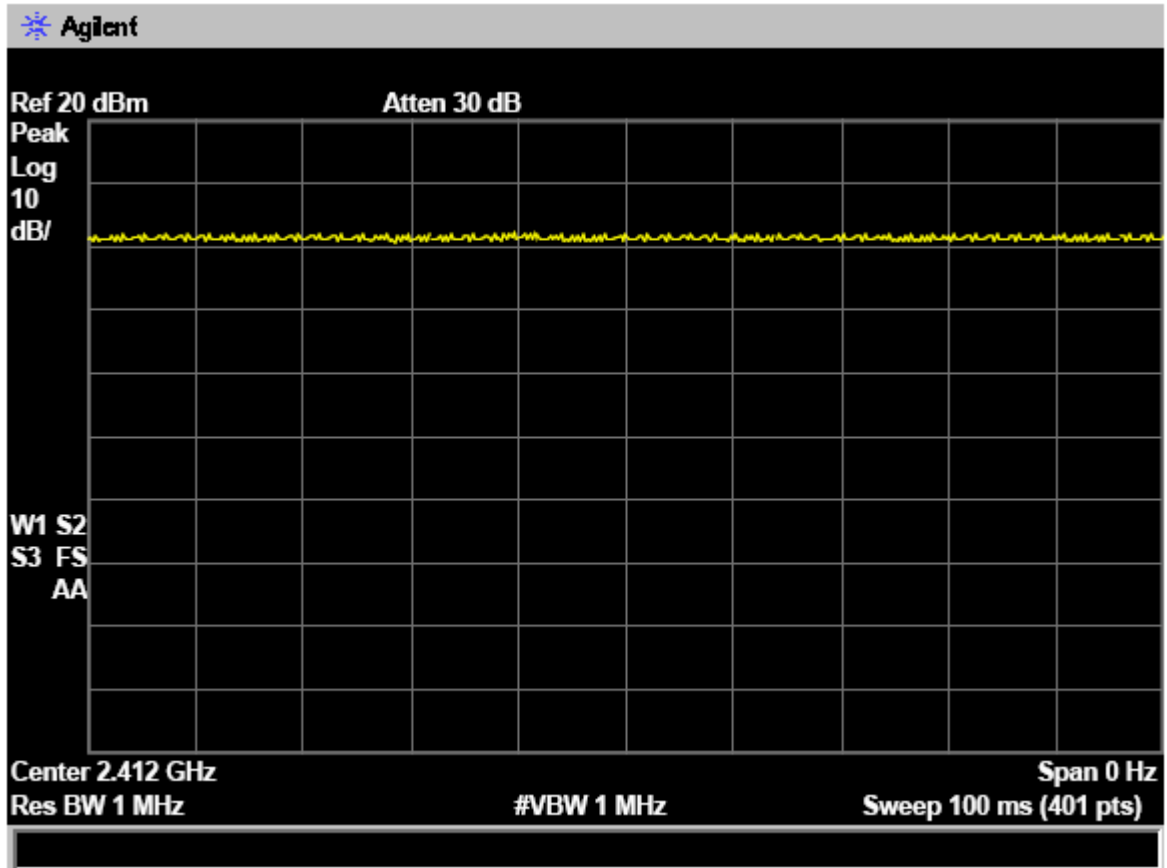
Test plot of Duty Cycle for 802.11b



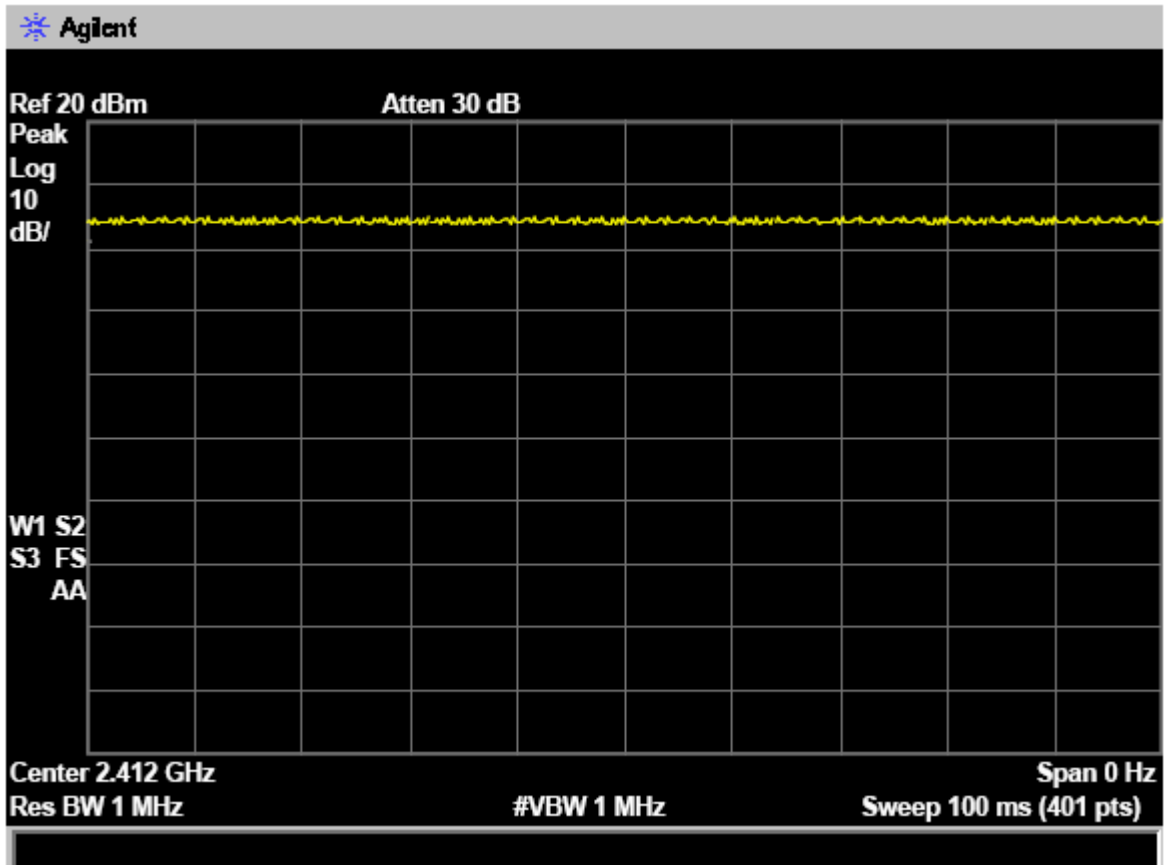
Test plot of Duty Cycle for 802.11g



Test plot of Duty Cycle for 802.11n -HT20



Test plot of Duty Cycle for 802.11n -HT40



8. POWER SPECTRAL DENSITY TEST

8.1. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

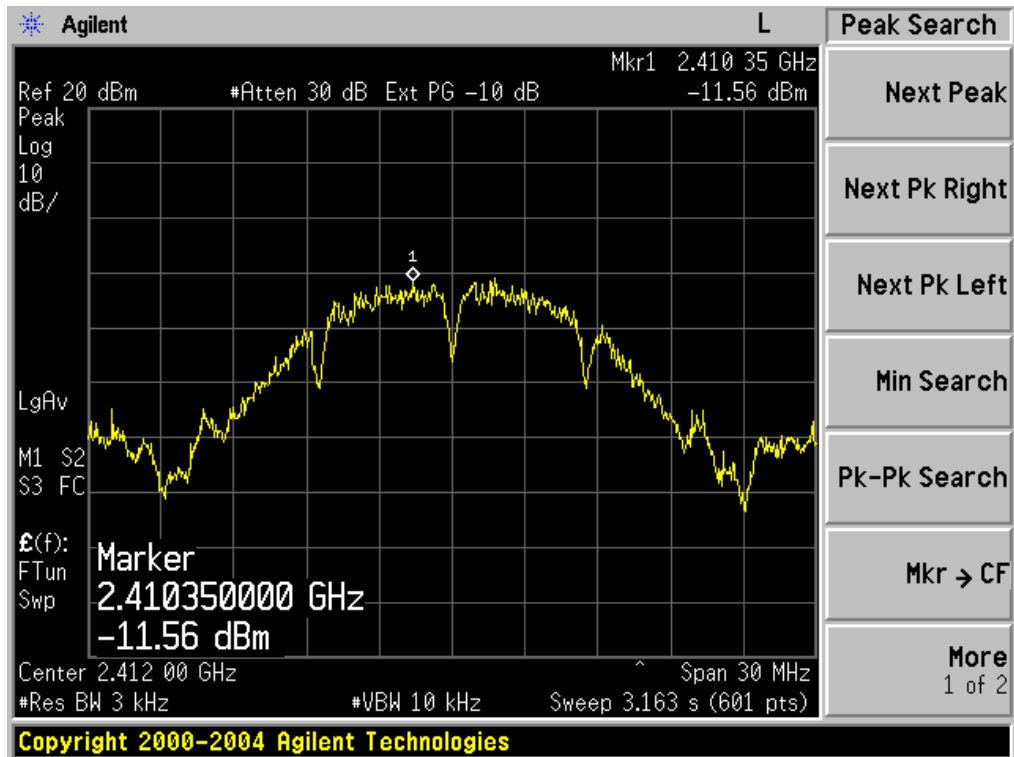
8.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \text{ RBW}$.
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 within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

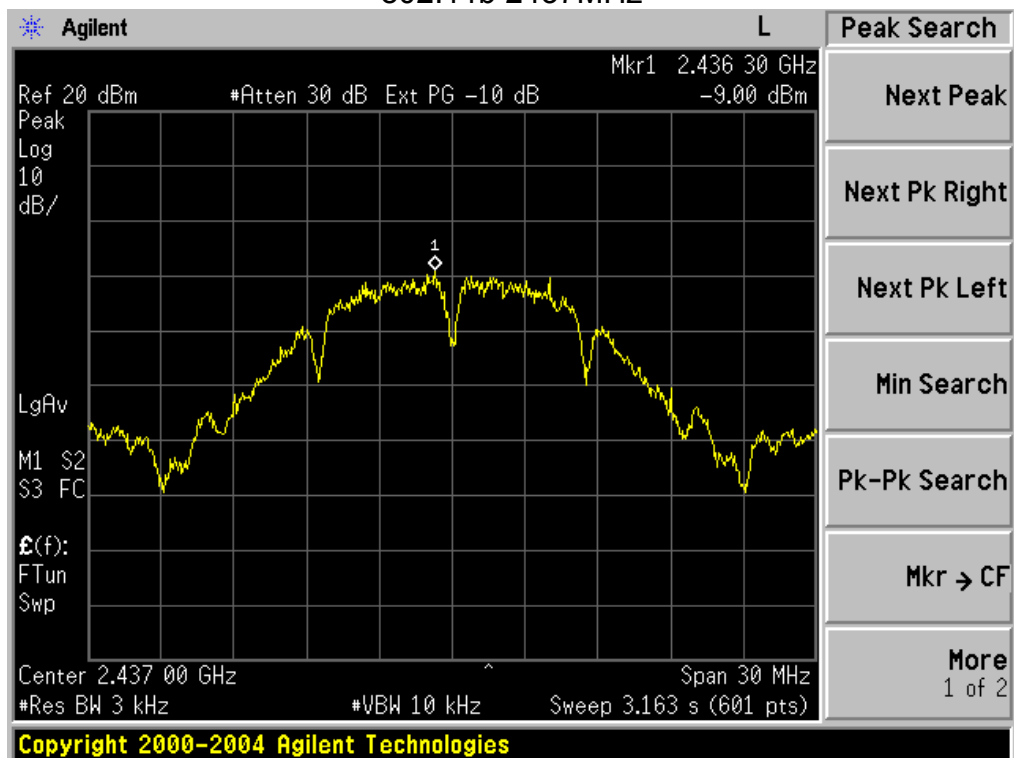
8.3. Test result

| | Channel Frequency (MHz) | Power density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|----------------|-------------------------|--------------------------|------------------|--------|
| 802.11b | 2412 | -11.56 | 8 | Pass |
| | 2437 | -9.00 | 8 | Pass |
| | 2462 | -6.96 | 8 | Pass |
| 802.11g | 2412 | -15.05 | 8 | Pass |
| | 2437 | -12.86 | 8 | Pass |
| | 2462 | -13.29 | 8 | Pass |
| 802.11n (HT20) | 2412 | -17.06 | 8 | Pass |
| | 2437 | -15.51 | 8 | Pass |
| | 2462 | -13.69 | 8 | Pass |
| 802.11n (HT40) | 2422 | -18.70 | 8 | Pass |
| | 2437 | -18.73 | 8 | Pass |
| | 2452 | -18.84 | 8 | Pass |

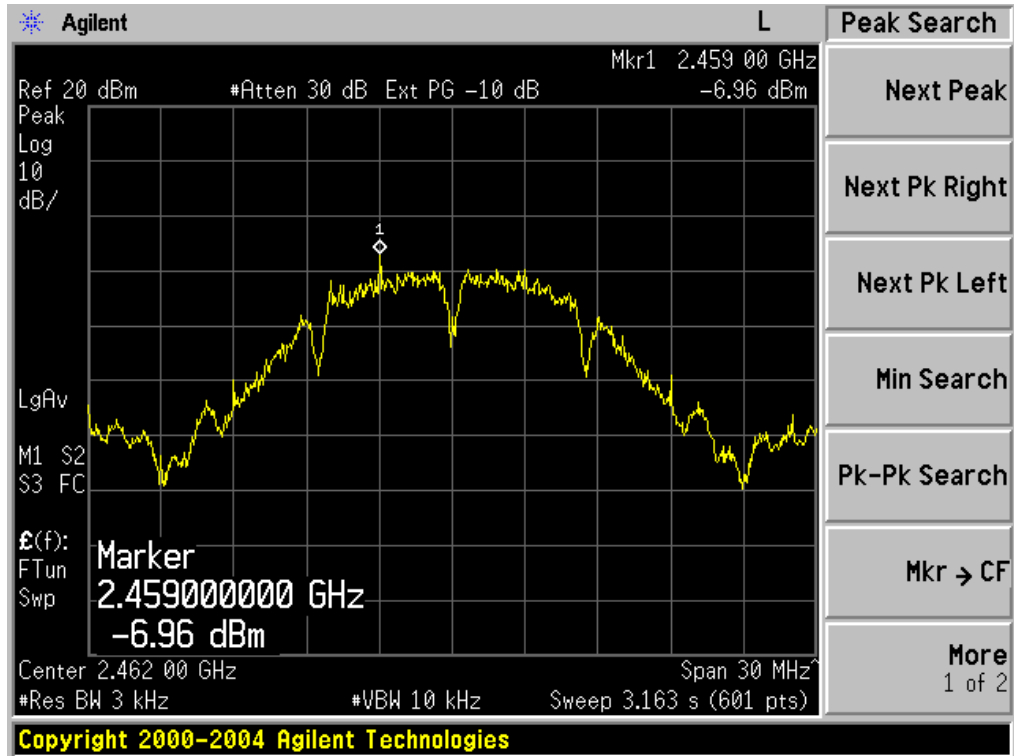
802.11b 2412MHz



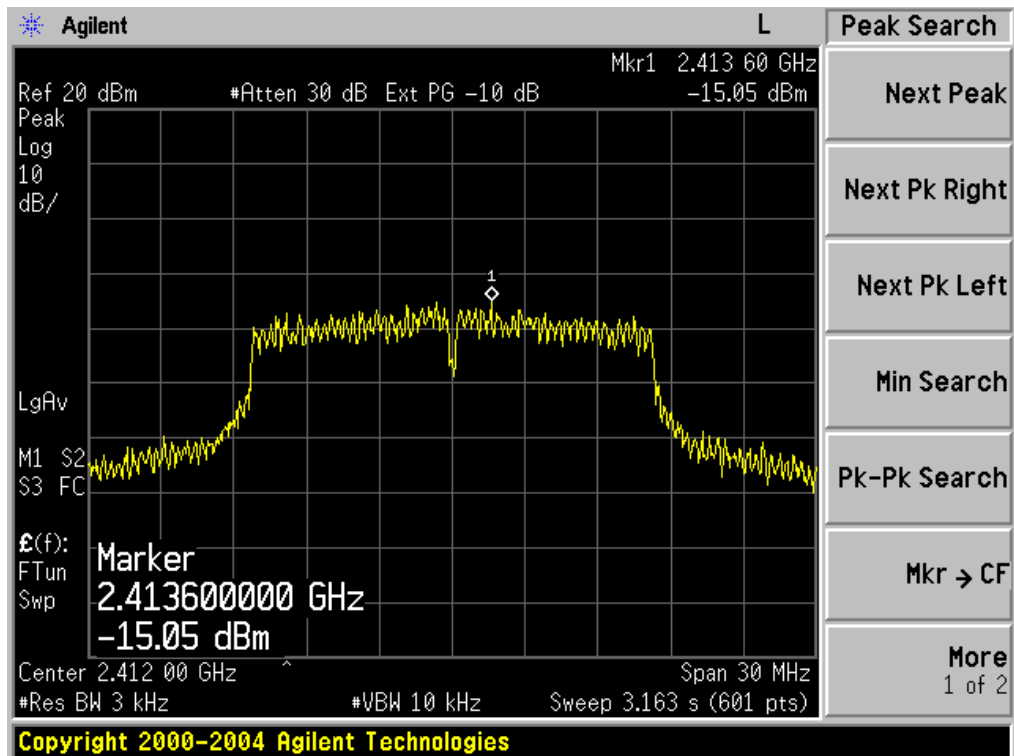
802.11b 2437MHz



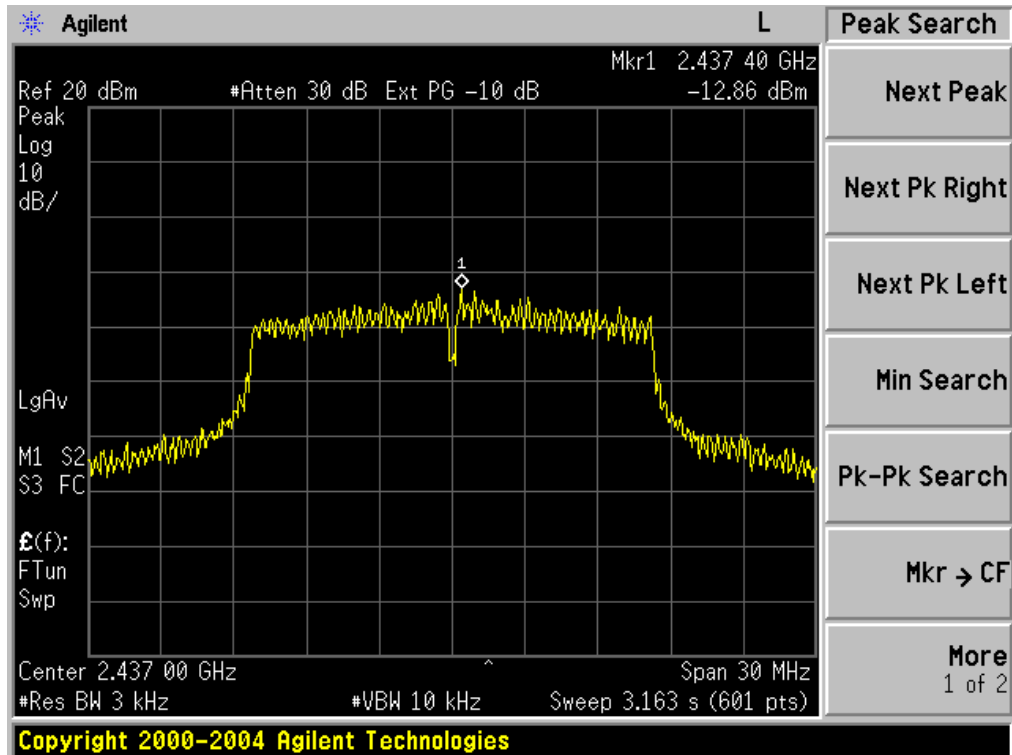
802.11b 2462MHz



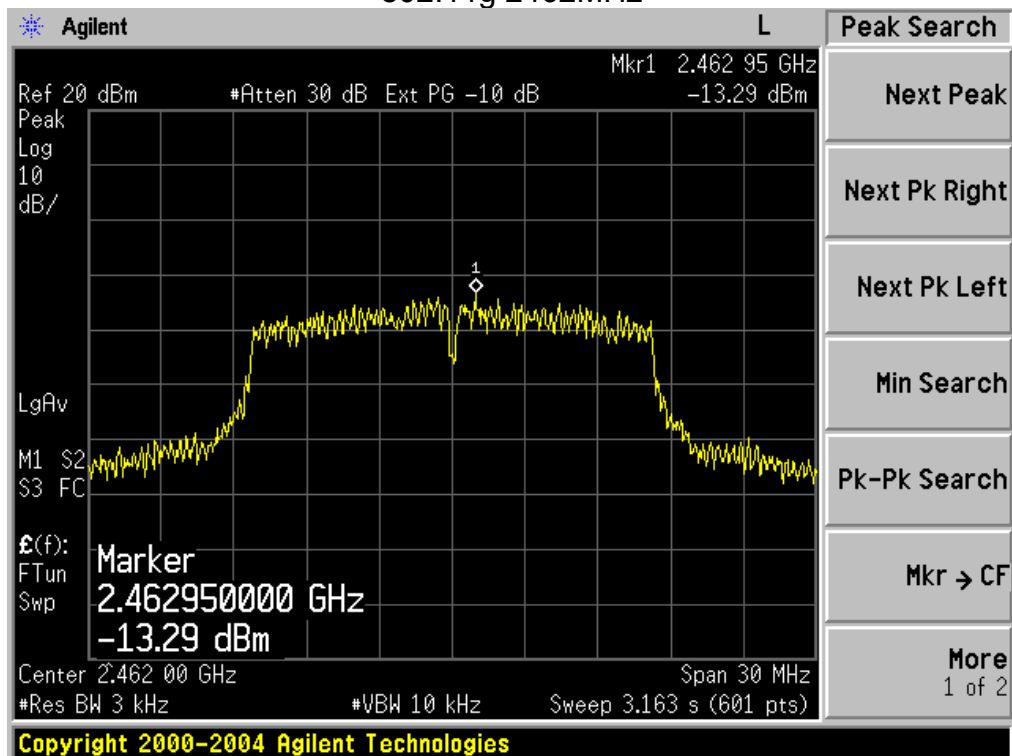
802.11g 2412MHz



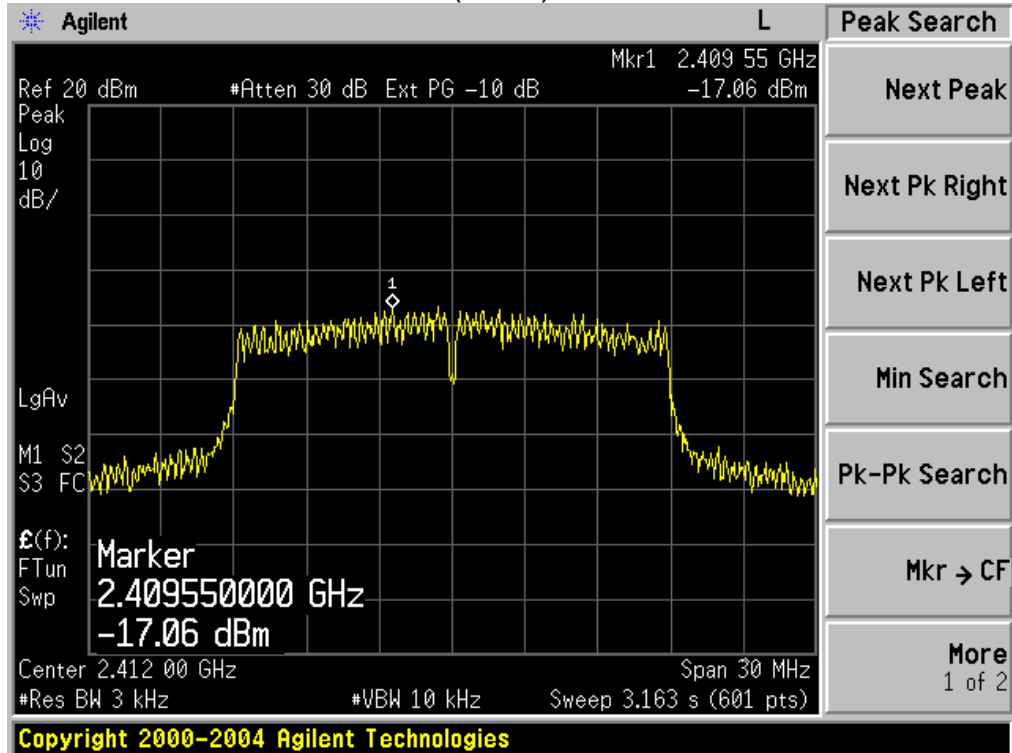
802.11g 2437MHz



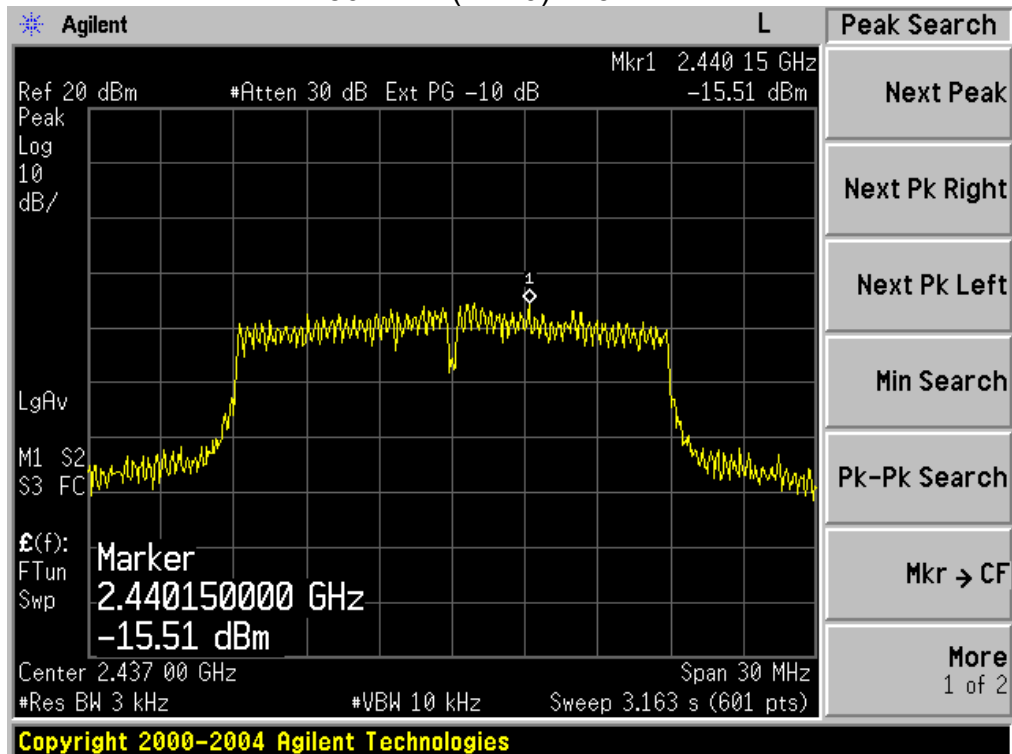
802.11g 2462MHz



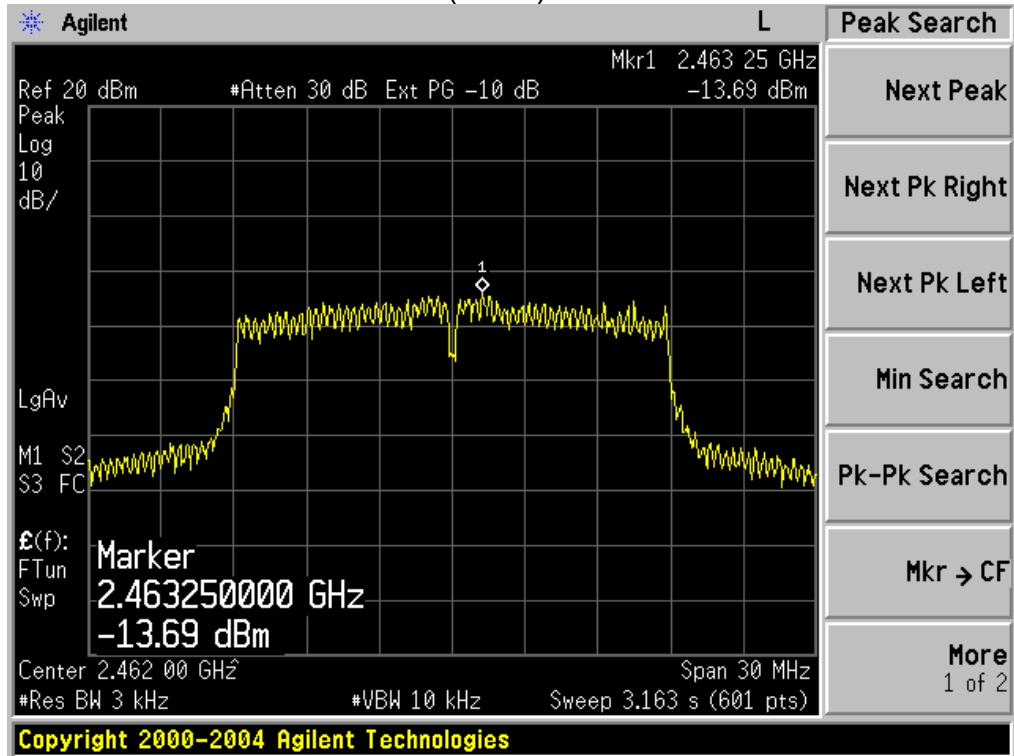
802.11n (HT20) 2412MHz



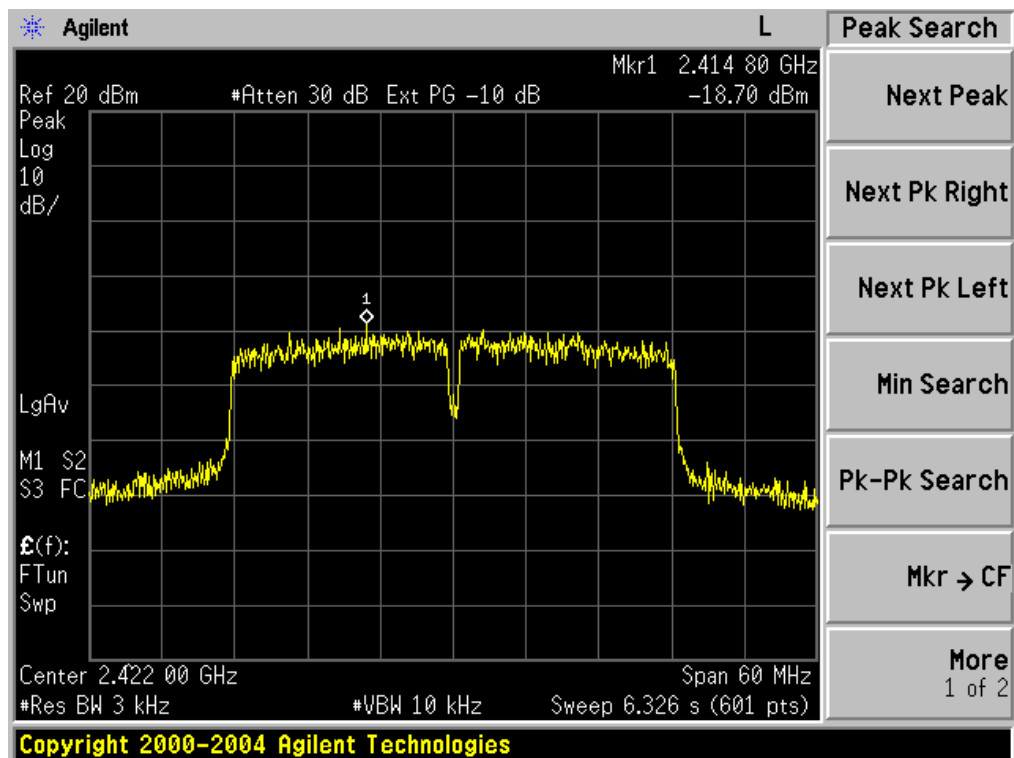
802.11n (HT20) 2437MHz



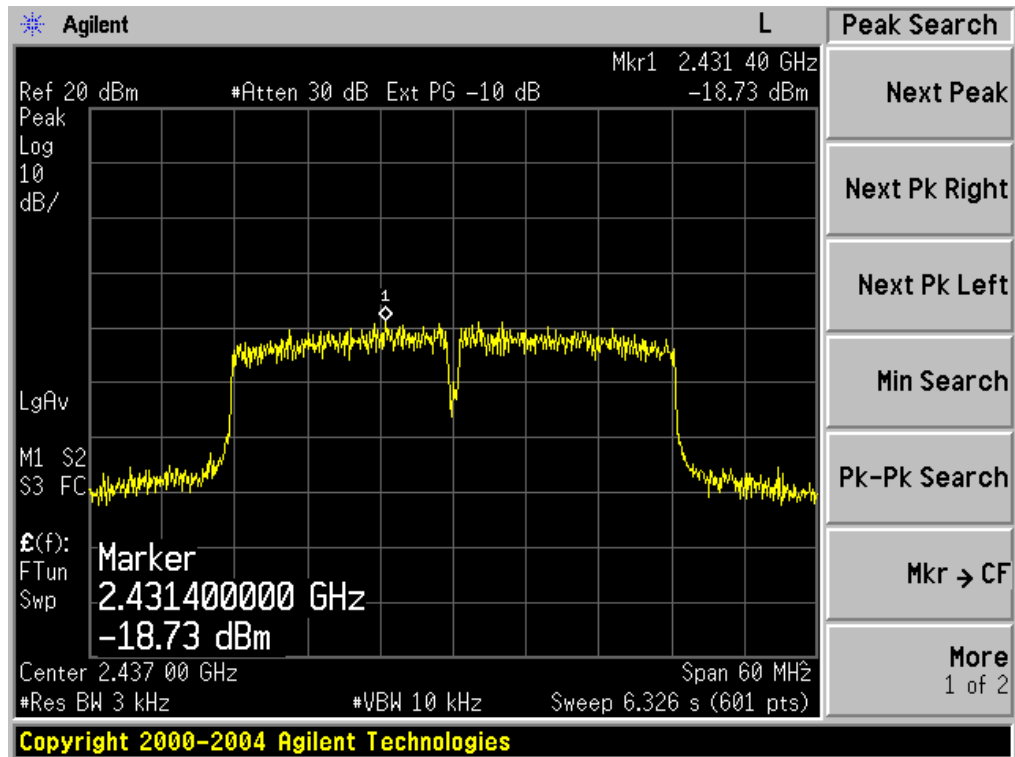
802.11n(HT20) 2462MHz



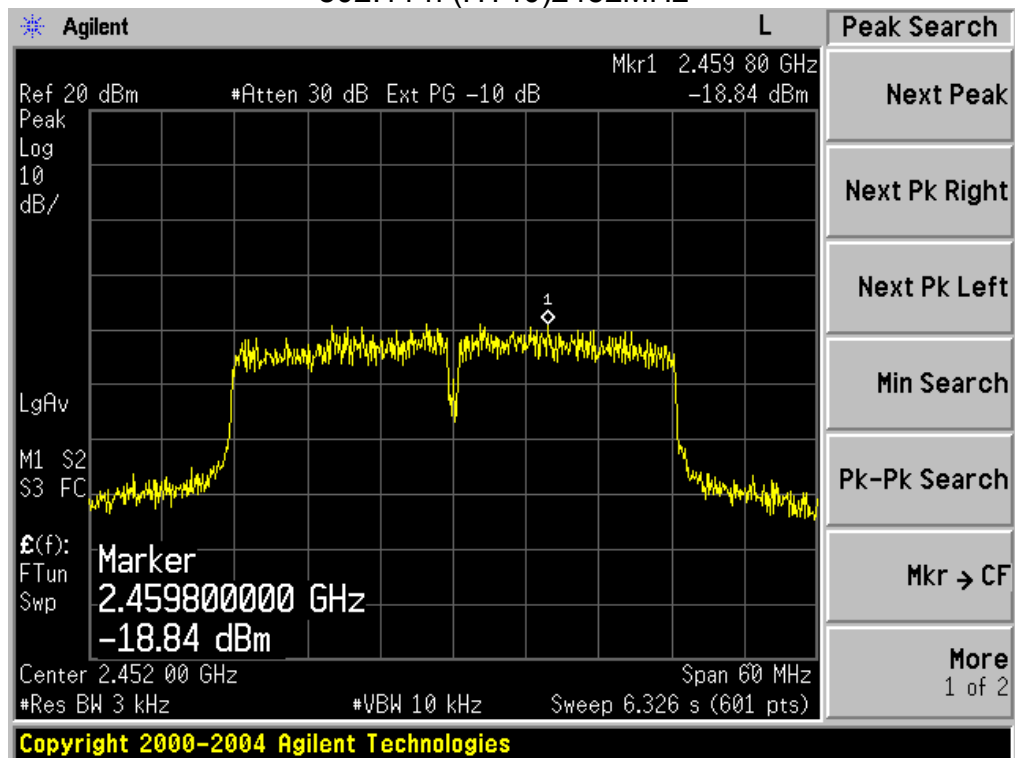
802.11 n (HT40) 2422MHz



802.11 n (HT40) 2437MHz



802.11 n (HT40)2452MHz



9. ANTENNA REQUIREMENTS

9.1. Limits

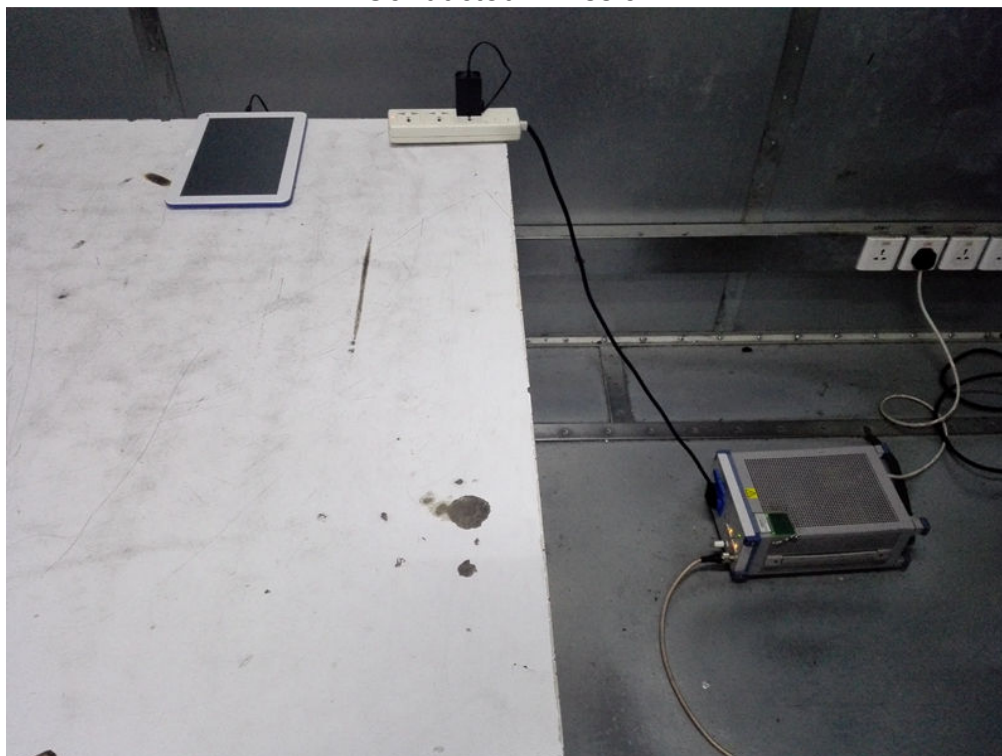
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2. Result

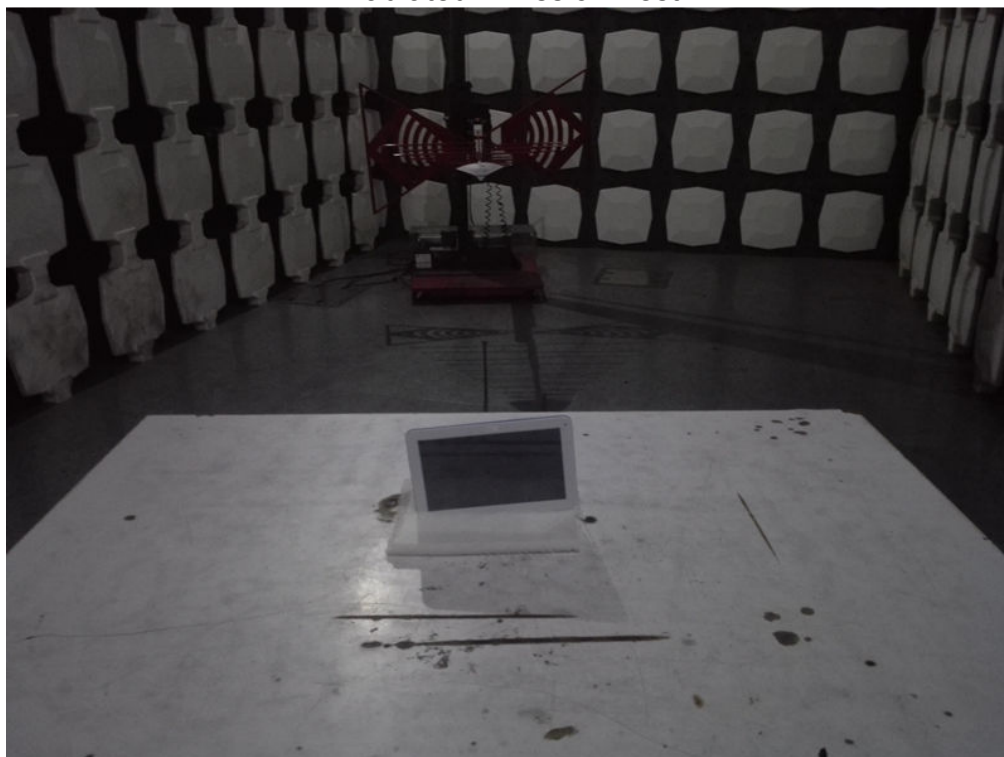
The antennas used for this product is Permanently fixed antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0dBi.

10. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission



Radiated Emission Test



11. PHOTOGRAPHS OF THE EUT

Reference to the test report No.16KWE053741F.

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