



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|------------------------|------------------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 | Power Spectral Density | 8 dBm (in any 3KHz) | 2400-2483.5 | PASS |

4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times DTS bandwidth.
3. Set the RBW ≥ 3 kHz.
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 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



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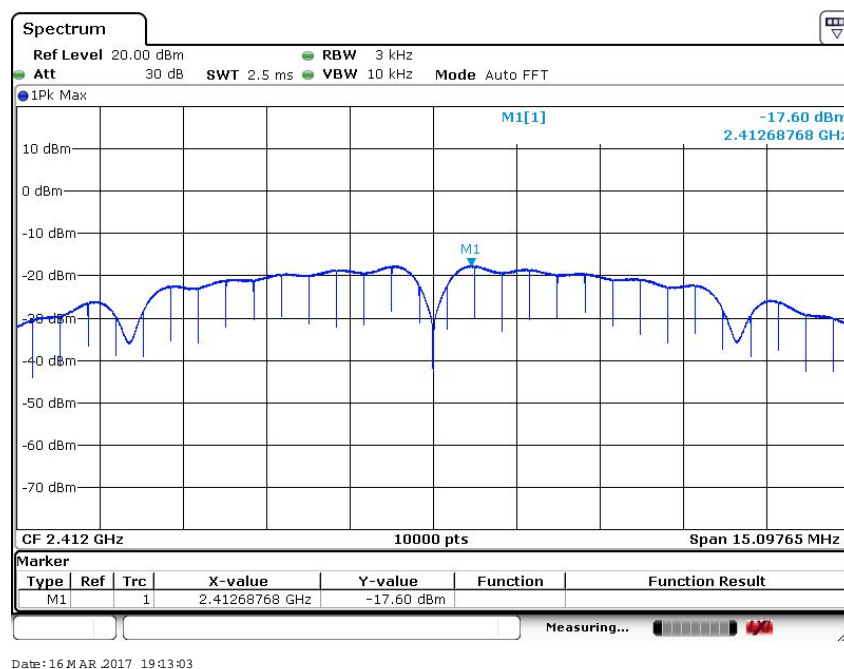
4.1.5 TEST RESULTS

| | | | |
|---------------|-----------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 56% |
| Pressure : | 1015 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX b Mode /CH01, CH06, CH11 | | |

Note: The relevant measured result has the offset with cable loss already.

| Frequency | Power Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|--------------------------|------------------|--------|
| 2412 MHz | -17.60 | 8 | PASS |
| 2437 MHz | -17.01 | 8 | PASS |
| 2462 MHz | -16.63 | 8 | PASS |

TX CH01



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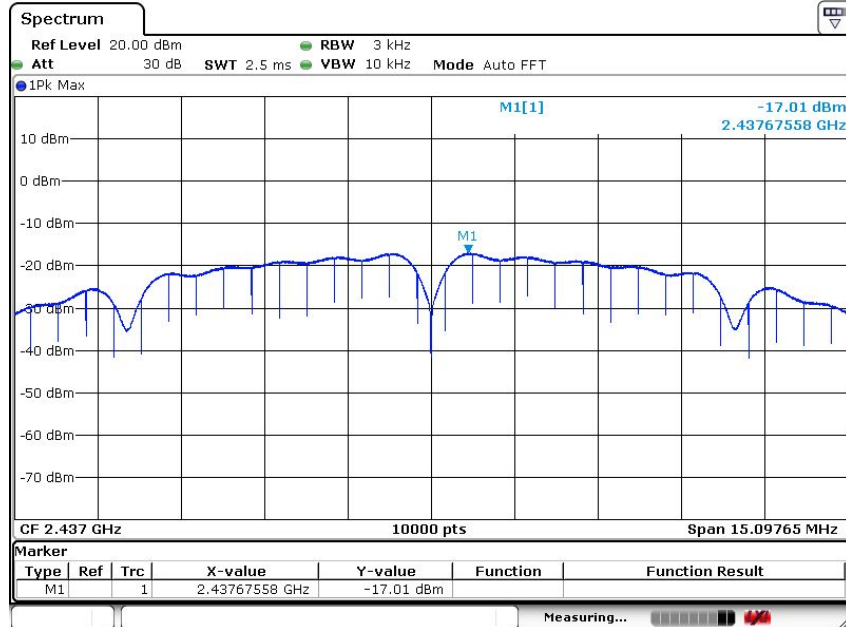


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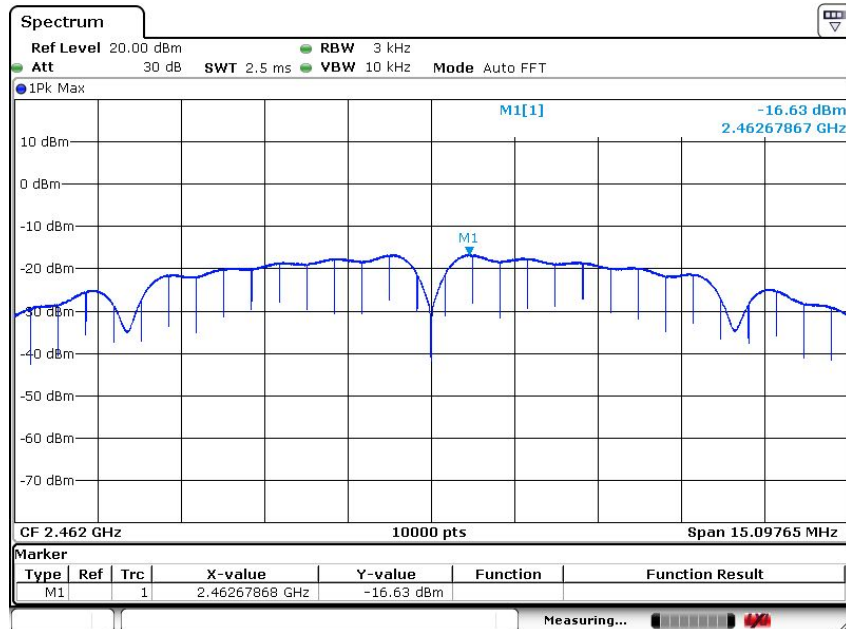
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TX CH06



Date: 16 MAR 2017 19:13:19

TX CH11



Date: 16 MAR 2017 19:13:44

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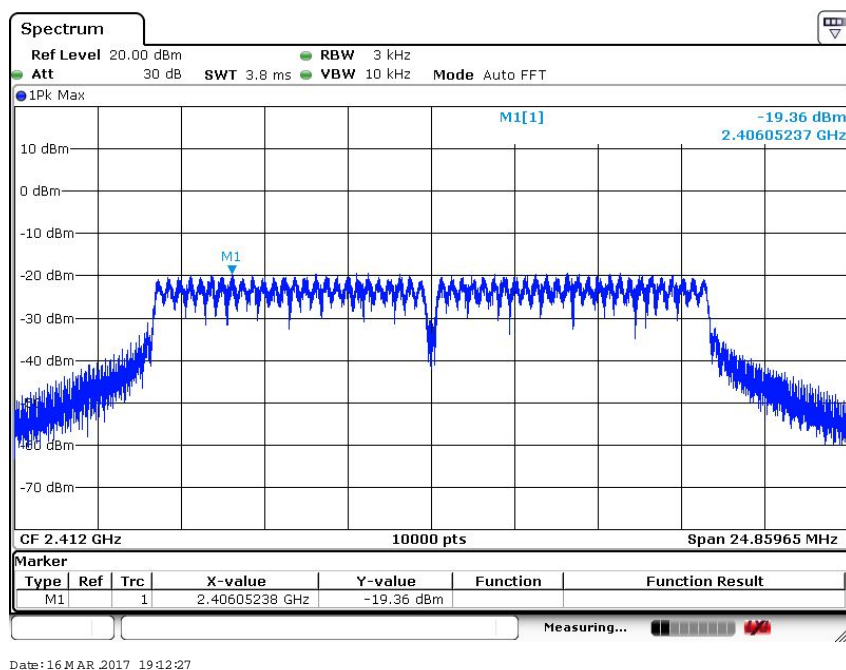
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| | | | |
|---------------|-----------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 56% |
| Pressure : | 1015 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX g Mode /CH01, CH06, CH11 | | |

Note: The relevant measured result has the offset with cable loss already.

| Frequency | Power Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|--------------------------|------------------|--------|
| 2412 MHz | -19.36 | 8 | PASS |
| 2437 MHz | -18.89 | 8 | PASS |
| 2462 MHz | -18.77 | 8 | PASS |

TX CH01



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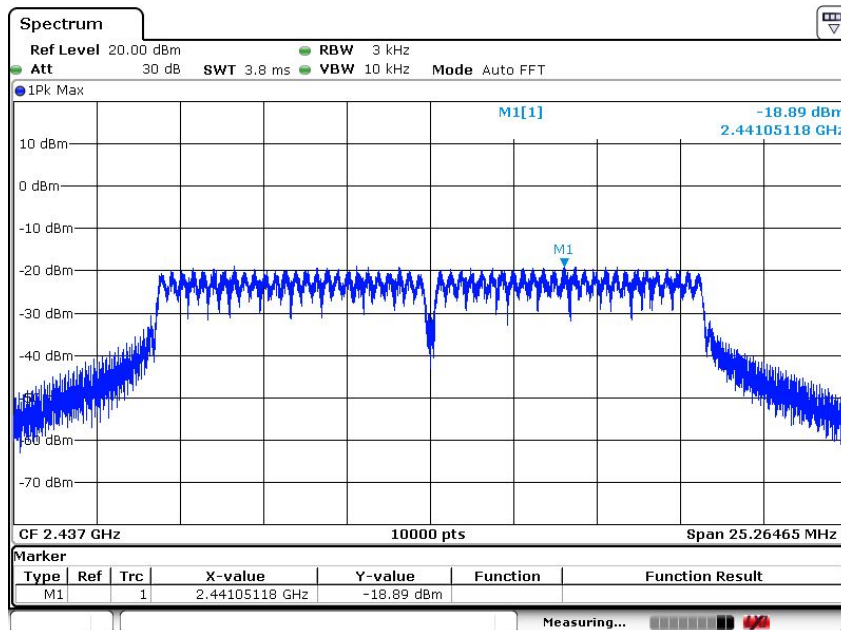


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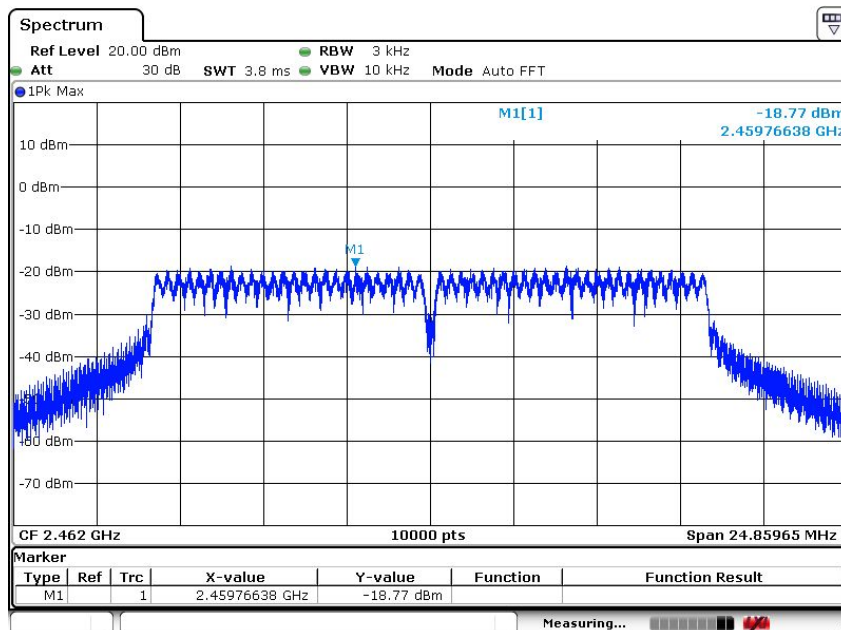
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TX CH06



Date: 16 MAR 2017 19:12:04

TX CH11



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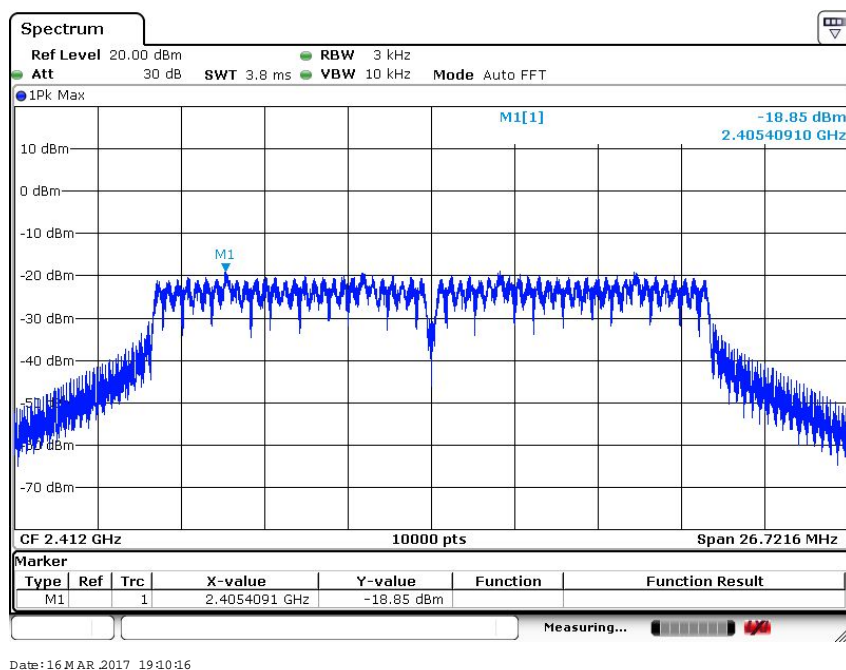
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| | | | |
|---------------|-----------------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 56% |
| Pressure : | 1015 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX n(HT20) Mode /CH01, CH06, CH11 | | |

Note: The relevant measured result has the offset with cable loss already.

| Frequency | Power Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|--------------------------|------------------|--------|
| 2412 MHz | -18.85 | 8 | PASS |
| 2437 MHz | -18.16 | 8 | PASS |
| 2462 MHz | -17.88 | 8 | PASS |

TX CH01



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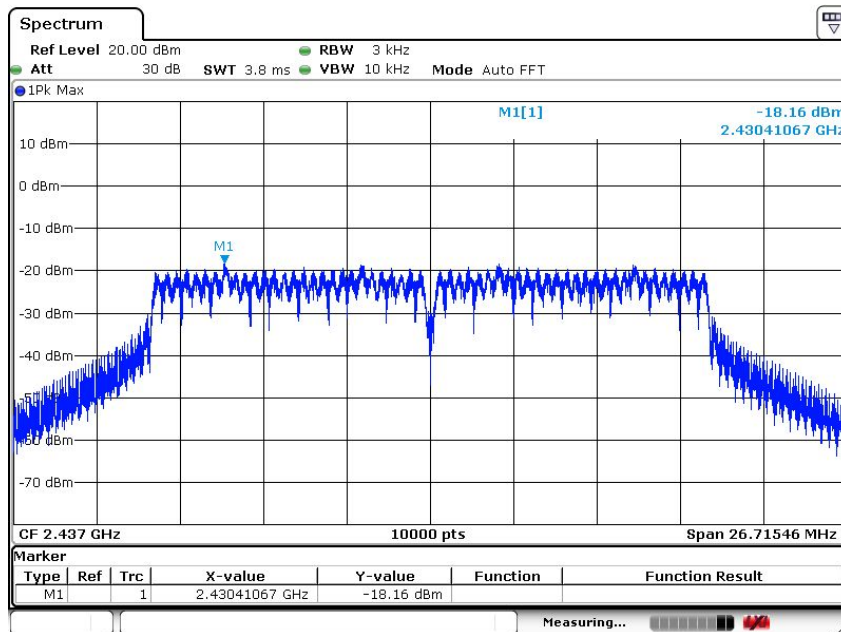


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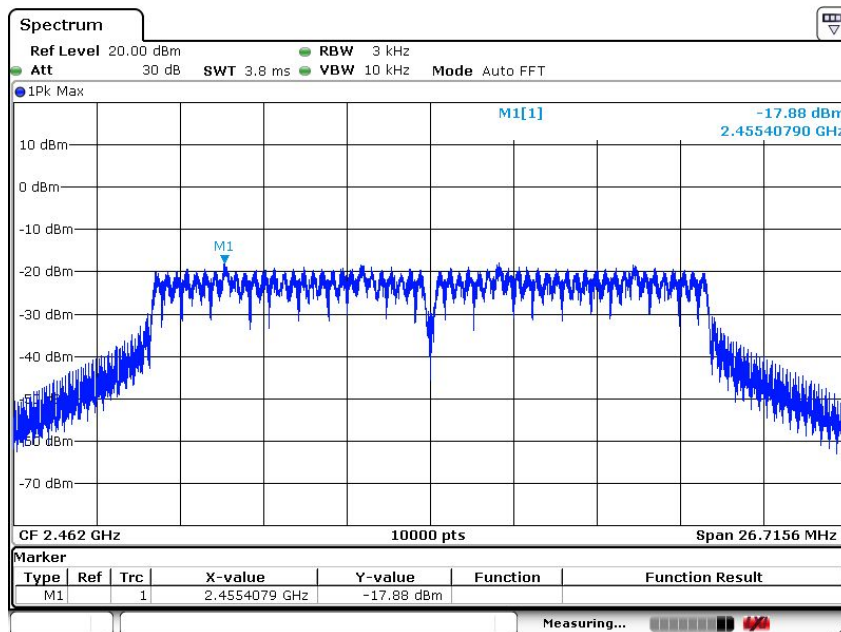
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TX CH06



Date: 16 MAR 2017 19:10:44

TX CH11



Date: 16 MAR 2017 19:11:07

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5. BANDWIDTH TEST

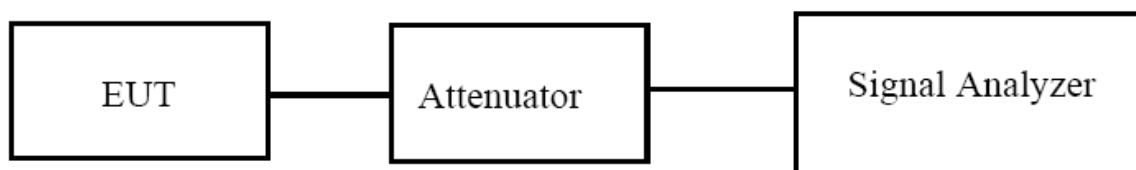
5.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-----------|---|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(a)(2) | Bandwidth | $\geq 500\text{KHz}$ (6dB bandwidth) | 2400-2483.5 | PASS |

5.1.1 TEST PROCEDURE

According to KDB 558074 D01 DTS Meas Guidance v03r03

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



5.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



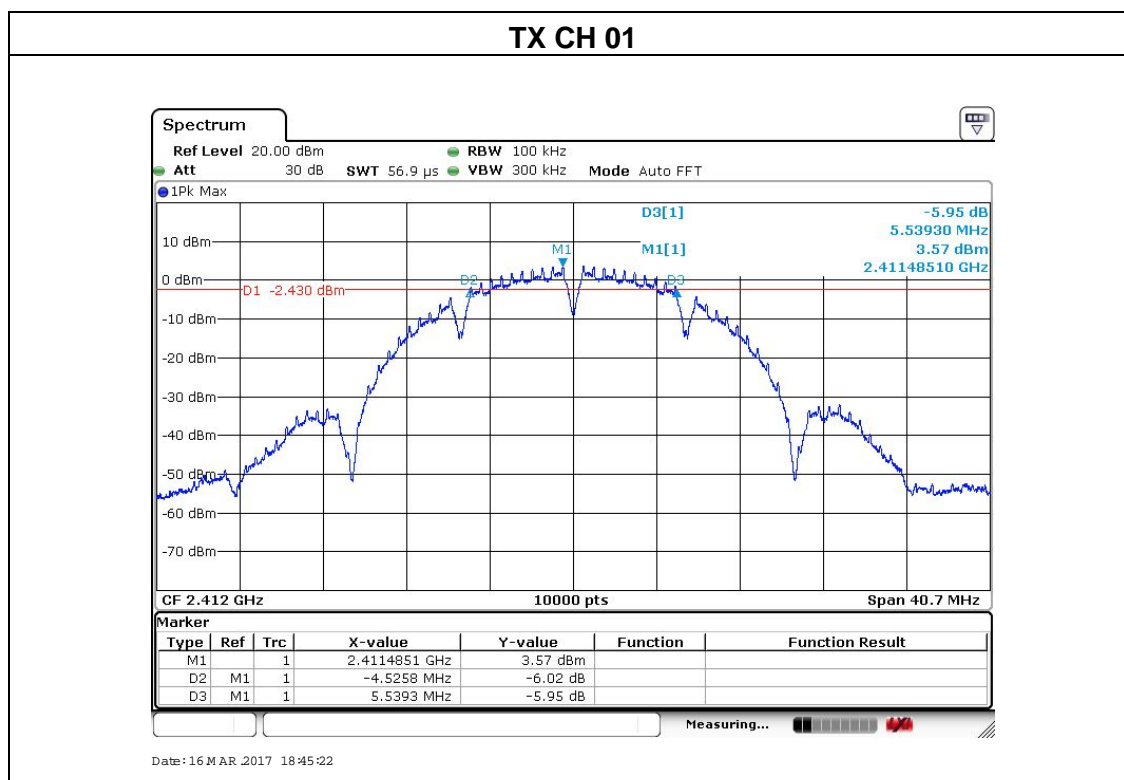
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5.1.3 TEST RESULTS

| | | | |
|---------------|-----------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 56% |
| Pressure : | 1012 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX b Mode /CH01, CH06, CH11 | | |

| Channel | Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|---------------------|-------------|--------|
| Low | 2412 | 10.065 | 500 | Pass |
| Middle | 2437 | 10.065 | 500 | Pass |
| High | 2462 | 10.065 | 500 | Pass |

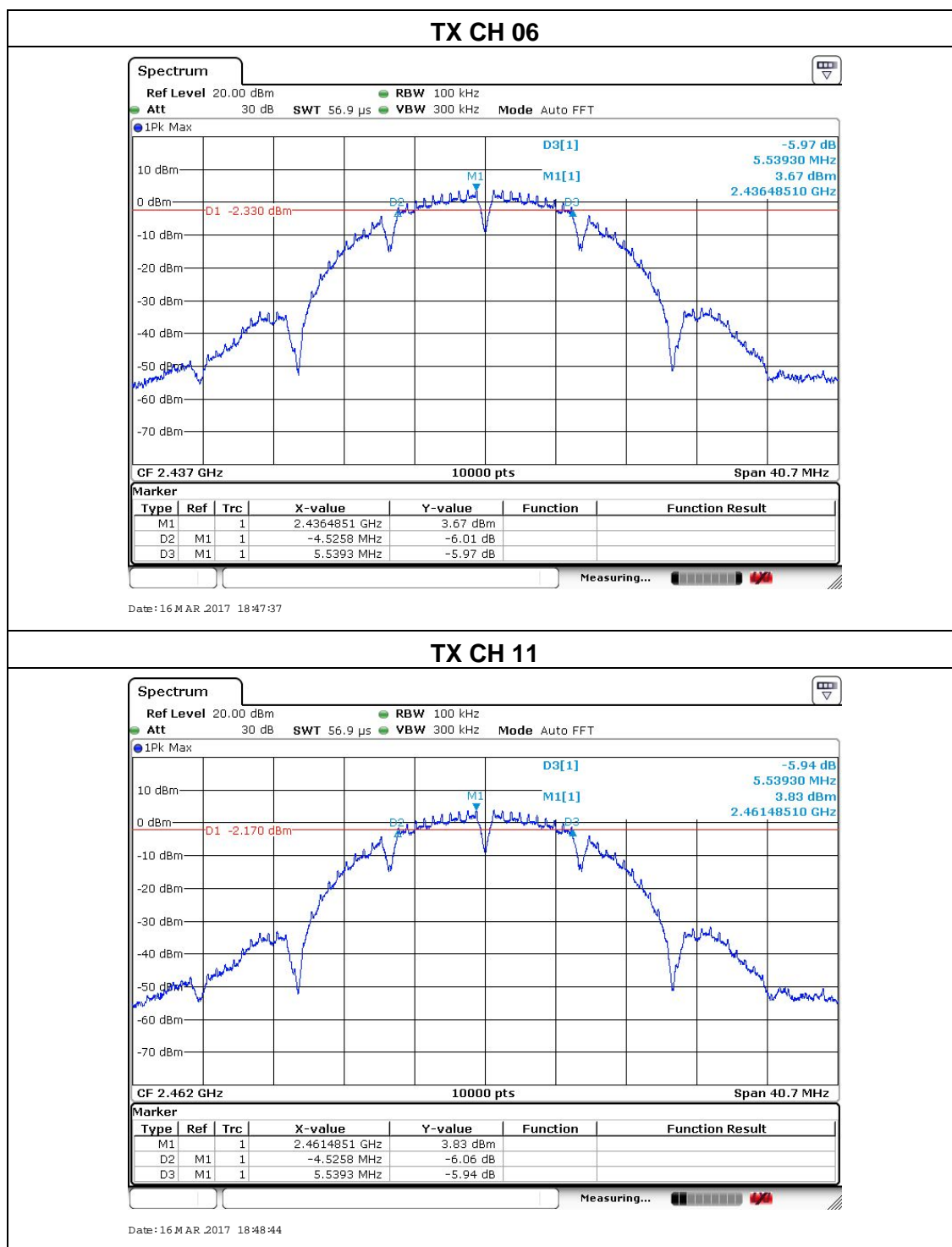


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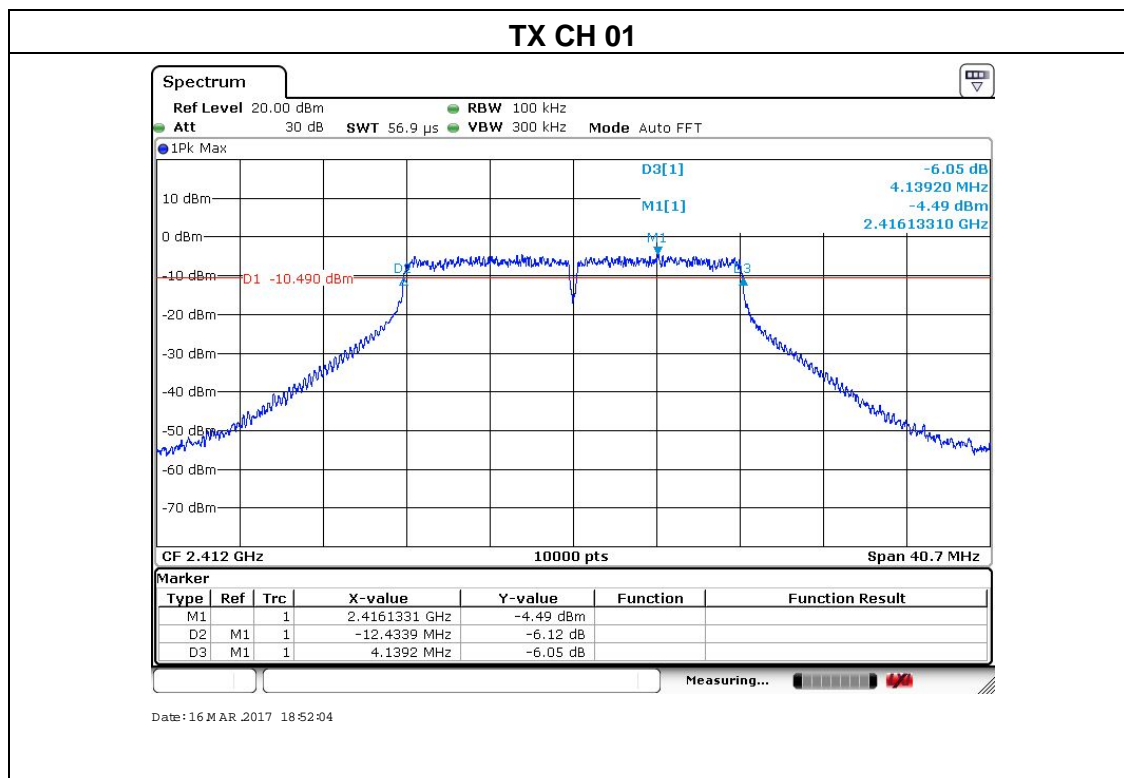


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| | | | |
|---------------|-----------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX g Mode /CH01, CH06, CH11 | | |

| Channel | Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|---------------------|-------------|--------|
| Low | 2412 | 16.573 | 500 | Pass |
| Middle | 2437 | 16.573 | 500 | Pass |
| High | 2462 | 16.573 | 500 | Pass |

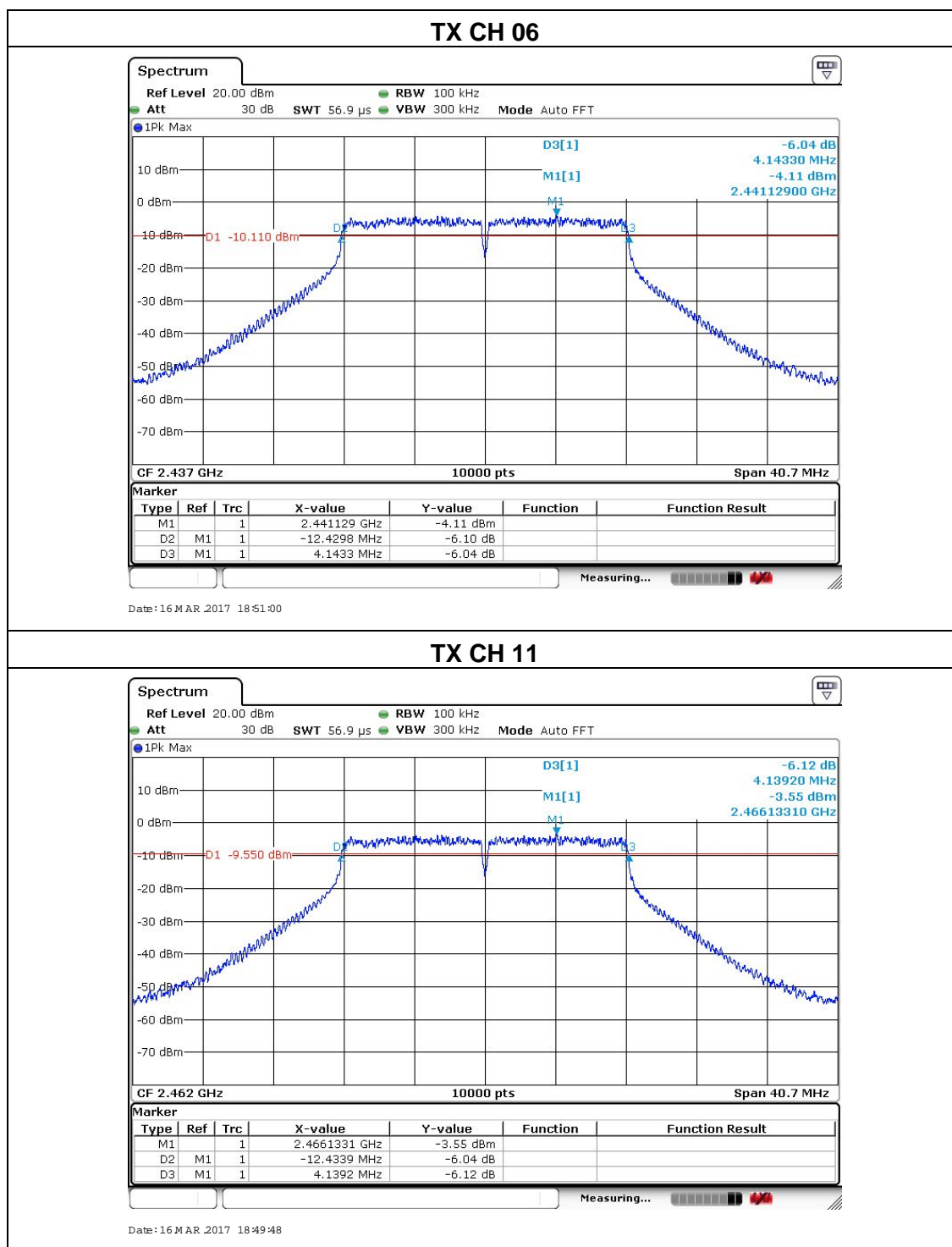


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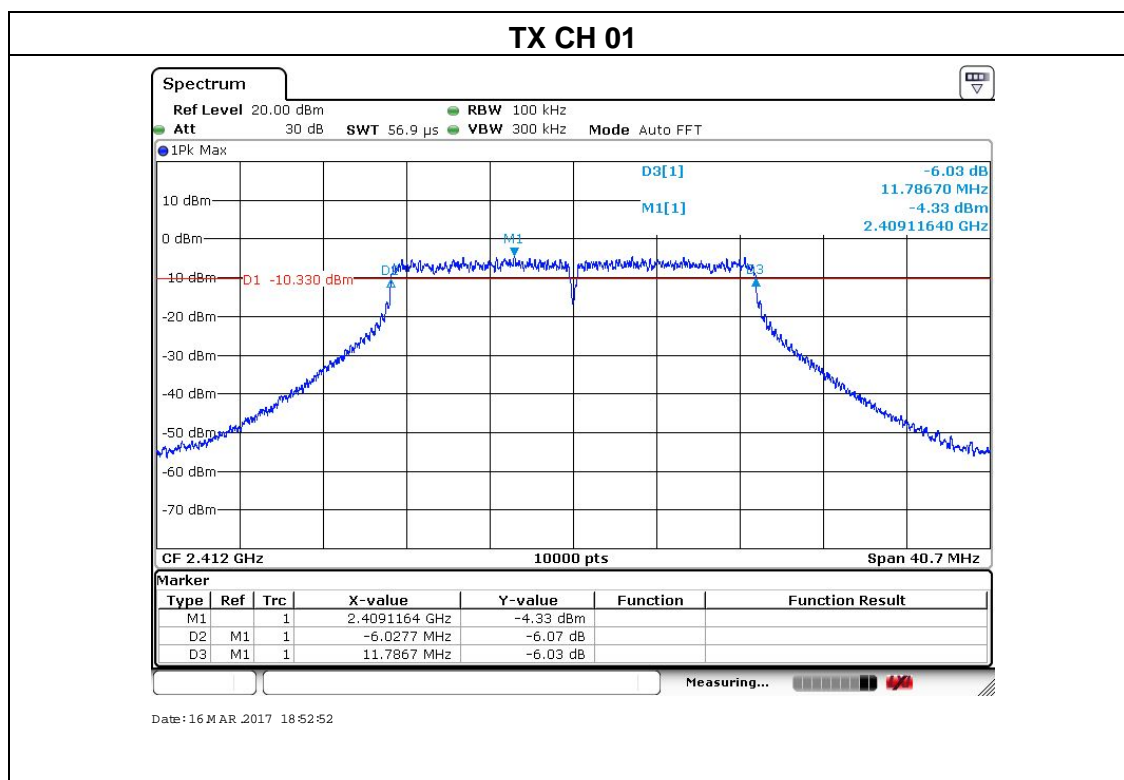


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| | | | |
|---------------|-----------------------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX n(HT20) Mode /CH01, CH06, CH11 | | |

| Channel | Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|---------------------|-------------|--------|
| Low | 2412 | 17.814 | 500 | Pass |
| Middle | 2437 | 17.810 | 500 | Pass |
| High | 2462 | 17.810 | 500 | Pass |



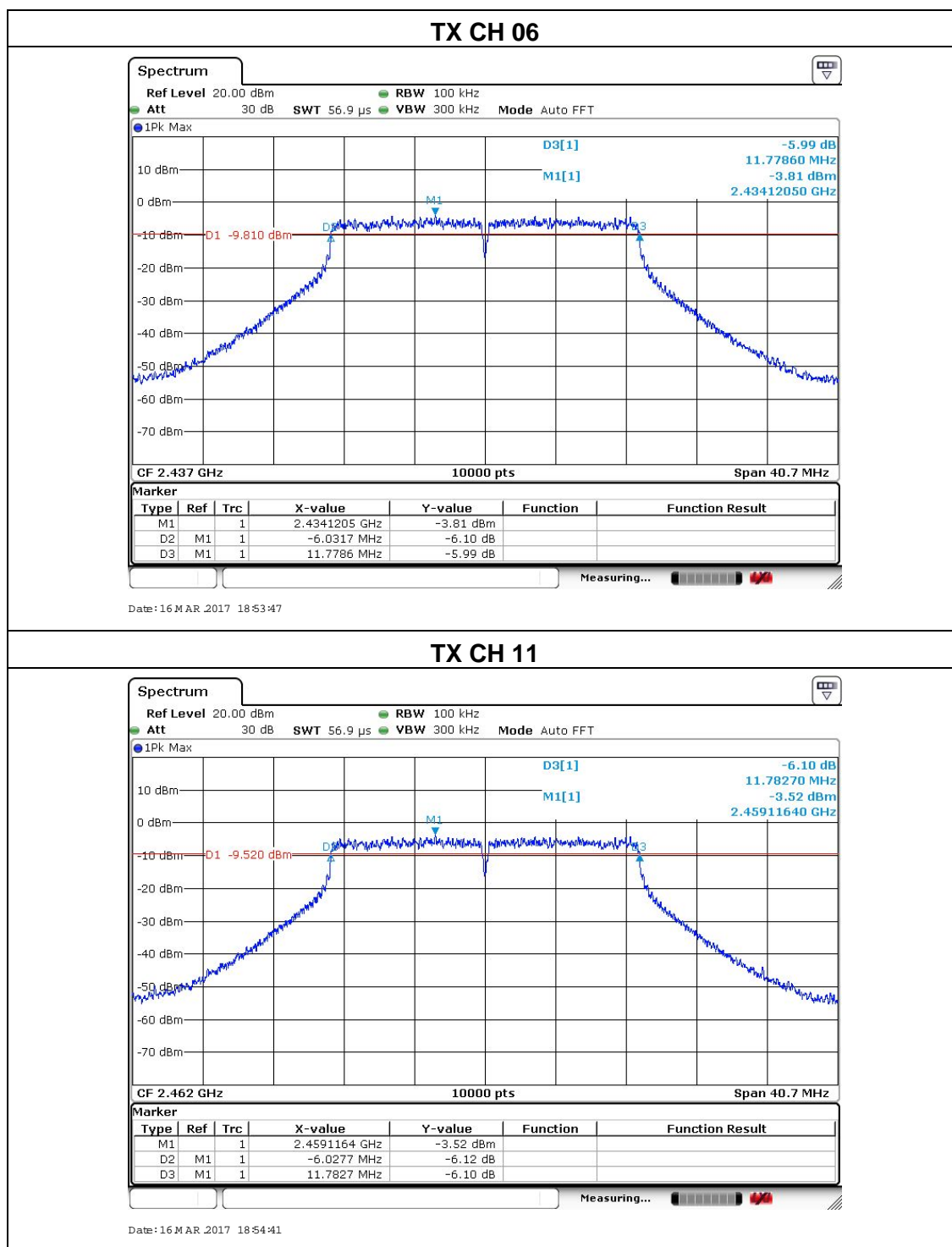
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6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-------------------|-----------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(b)(3) | Peak Output Power | 1 watt or 30dBm | 2400-2483.5 | PASS |

6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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6.1.5 TEST RESULTS

| | | | |
|---------------|--------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX b/g/n Mode | | |

| Test Channel | Frequency | Maximum Conducted Output Power(PK) | Max. Tune up Power | LIMIT |
|---------------|-----------|------------------------------------|--------------------|-------|
| | (MHz) | (dBm) | (dBm) | (dBm) |
| 802.11b | | | | |
| CH01 | 2412 | 16.75 | 17.00 | 30 |
| CH06 | 2437 | 16.58 | 17.00 | 30 |
| CH11 | 2462 | 16.49 | 17.00 | 30 |
| 802.11g | | | | |
| CH01 | 2412 | 16.37 | 17.00 | 30 |
| CH06 | 2437 | 16.65 | 17.00 | 30 |
| CH11 | 2462 | 16.72 | 17.00 | 30 |
| 802.11n(HT20) | | | | |
| CH01 | 2412 | 14.37 | 15.00 | 30 |
| CH06 | 2437 | 14.72 | 15.00 | 30 |
| CH11 | 2462 | 14.68 | 15.00 | 30 |

Note: the highest powers for:

802.11b: 1Mbps

802.11g: 6Mbps

802.11n(HT20):11Mbps



7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

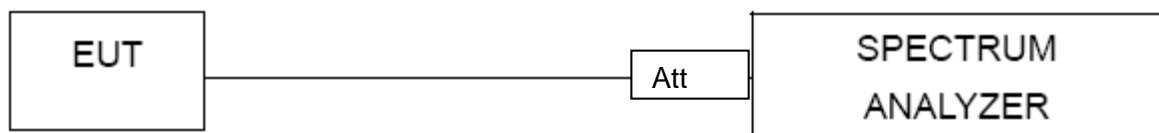
TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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7.4 TEST RESULTS

| | | | |
|---------------|--------------------|---------------------|--------------|
| EUT : | Wi-Fi Smart Socket | Model Name : | WK40 |
| Temperature : | 25 °C | Relative Humidity : | 56% |
| Pressure : | 1012 hPa | Test Voltage : | AC 120V/60Hz |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type | Comment |
|---------------|---------------|--------|----------------|----------|--------|---------------|----------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | |
| 802.11b | | | | | | | |
| 2390 | 41.12 | 9.86 | 50.98 | 74 | -23.02 | Pk | Vertical |
| 2390 | 29.88 | 9.86 | 39.74 | 54 | -14.26 | Av | Vertical |
| 2483.5 | 42.36 | 10.14 | 52.5 | 74 | -21.5 | Pk | Vertical |
| 2483.5 | 30.87 | 10.14 | 41.01 | 54 | -12.99 | Av | Vertical |
| 802.11g | | | | | | | |
| 2390 | 44.68 | 9.86 | 54.54 | 74 | -19.46 | Pk | Vertical |
| 2390 | 32.21 | 9.86 | 42.07 | 54 | -11.93 | Av | Vertical |
| 2483.5 | 40.59 | 10.14 | 50.73 | 74 | -23.27 | Pk | Vertical |
| 2483.5 | 29.87 | 10.14 | 40.01 | 54 | -13.99 | Av | Vertical |
| 802.11n(HT20) | | | | | | | |
| 2390 | 42.18 | 9.86 | 52.04 | 74 | -21.96 | Pk | Vertical |
| 2390 | 31.11 | 9.86 | 40.97 | 54 | -13.03 | Av | Vertical |
| 2483.5 | 43.16 | 10.14 | 53.3 | 74 | -20.7 | Pk | Vertical |
| 2483.5 | 32.49 | 10.14 | 42.63 | 54 | -11.37 | Av | Vertical |

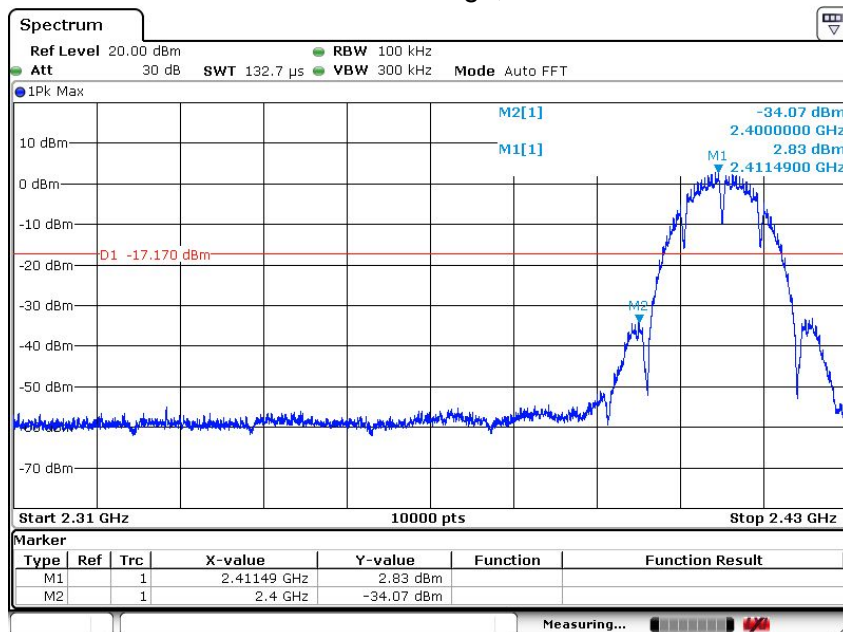
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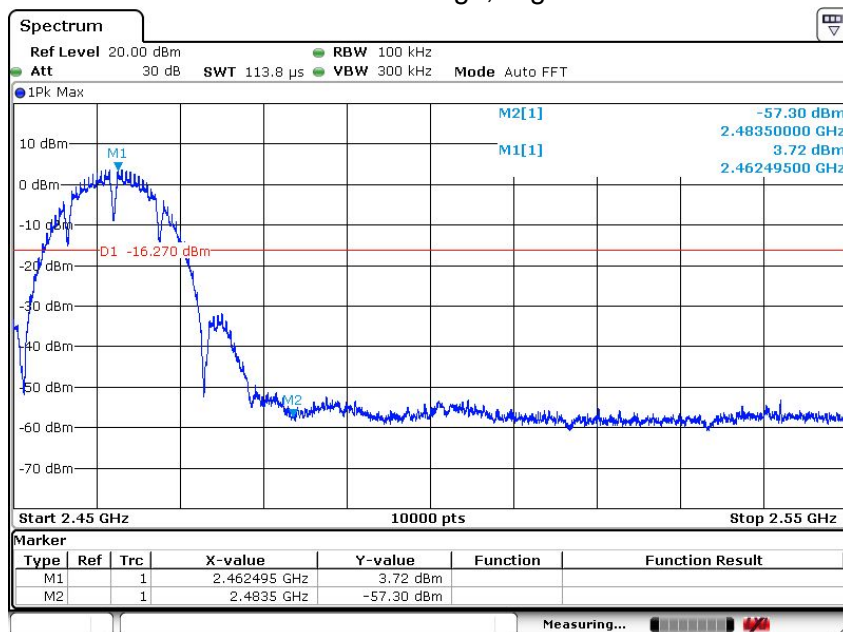
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802.11b: Band Edge, Left Side



Date: 16 MAR. 2017 19:14:51

802.11b: Band Edge, Right Side



Date: 16 MAR. 2017 19:15:37

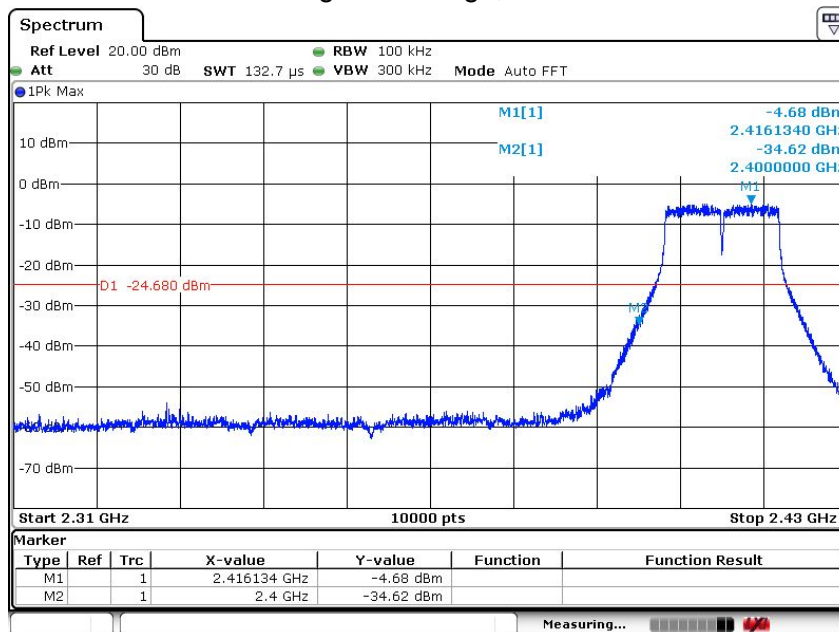
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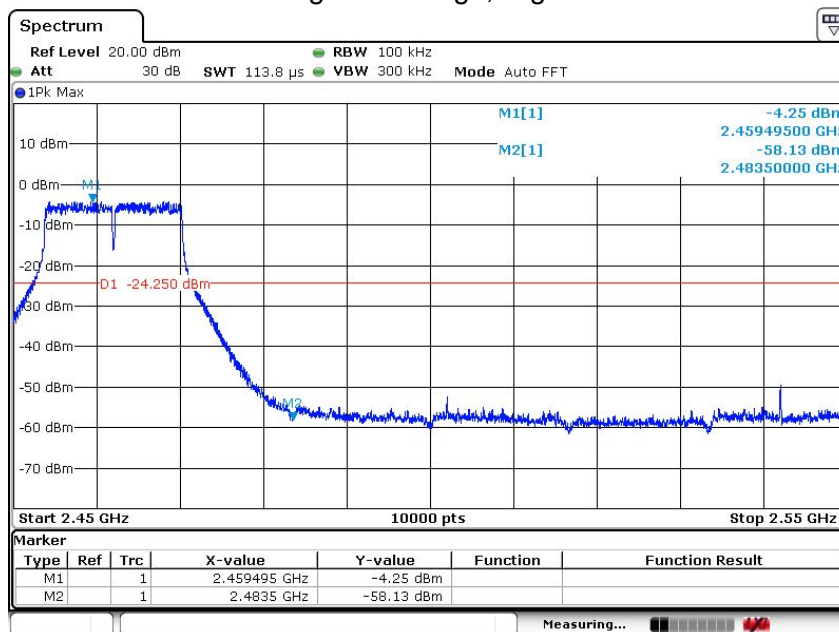
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802.11g: Band Edge, Left Side



Date: 16 MAR. 2017 19:17:01

802.11g: Band Edge, Right Side



Date: 16 MAR. 2017 19:16:26

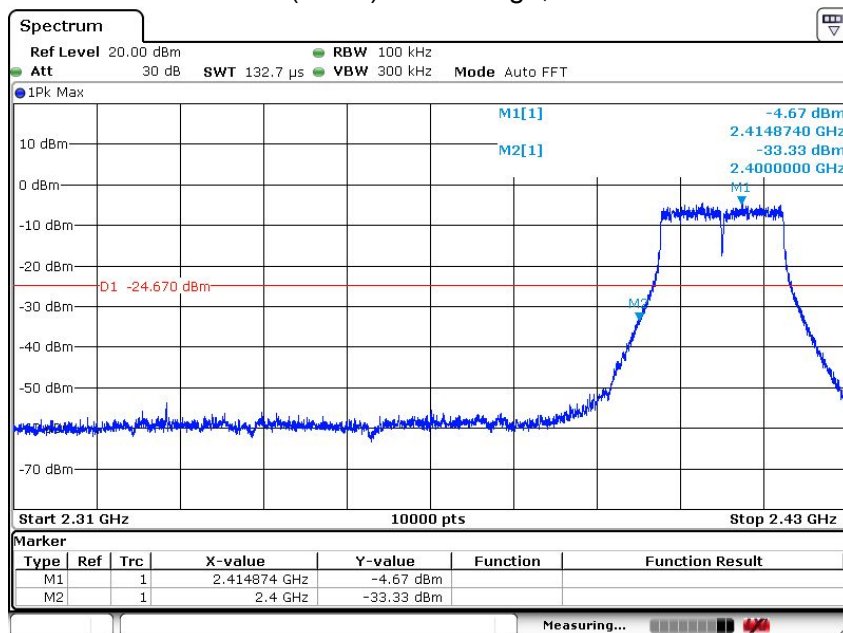
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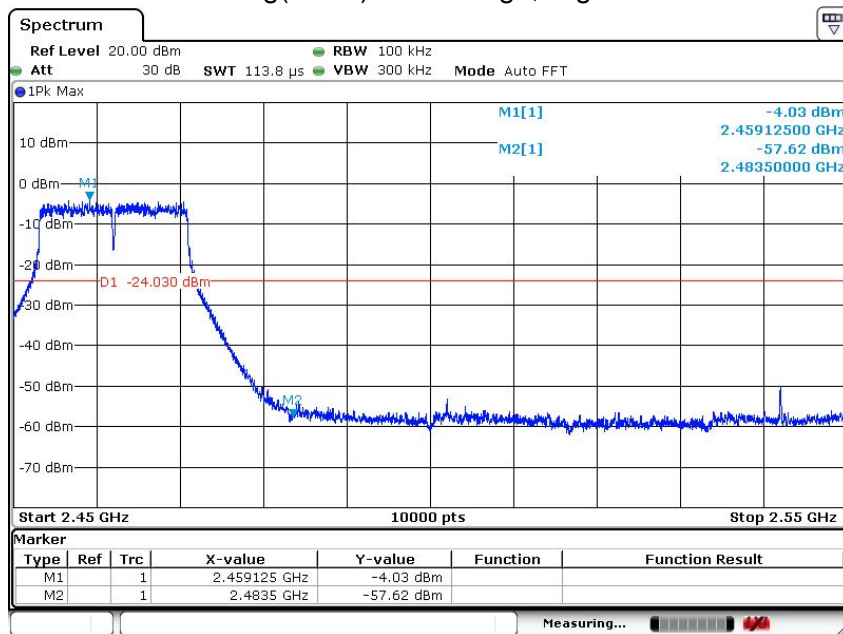
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802.11n(HT20): Band Edge, Left Side



Date: 16 MAR. 2017 19:17:24

802.11g(HT20): Band Edge, Right Side



Date: 16 MAR. 2017 19:18:00

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8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

8.2 EUT ANTENNA

The EUT antenna is PCB antenna with 0dBi gain. It comply with the standard requirement.