



# **CERTIFICATION TEST REPORT**

**Report Number. :** 4789354138-E4V2

**Applicant :** SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 16677, KOREA

**Model :** SM-G770U1

**FCC ID :** A3LSMG770U

**EUT Description :** GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac,  
ANT+ and NFC

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**  
March 09, 2020

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ACCREDITED

Testing Laboratory

TL-637

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## REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions                         | Revised By  |
|------|------------|-----------------------------------|-------------|
| V1   | 03/03/20   | Initial issue                     | Hyunsik Yun |
| V2   | 03/09/20   | Updated to address TCB's question | Hyunsik Yun |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC

**MODEL:** SM-G770U1

**SERIAL NUMBER:** R37MC0CE6KN (CONDUCTED)  
R38MC0CE28A (RADIATED);

**DATE TESTED:** JAN 17, 2020 – FEB 05, 2020;

| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart C | Complies     |

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL Korea, Ltd. By:



Junwhan Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Hyunsik Yun  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. SUMMARY TABLE

| FCC Part Section   | Test Description                        | Test Limit | Test Condition       | Test Result |
|--------------------|---|------------|----------------------|-------------|
| 15.247 (a)(2)      | Occupied Band width (6dB)               | > 500kHz   | Conducted            | Pass        |
| 2.1051, 15.247 (d) | Band Edge / Conducted Spurious Emission | -30dBc     |                      | Pass        |
| 15.247 (b)(3)      | TX conducted output power               | < 30dBm    |                      | Pass        |
| 15.247 (e)         | PSD                                     | < 8dBm     |                      | Pass        |
| 15.207 (a)         | AC Power Line conducted emissions       | Section 10 | Power Line conducted | Pass        |
| 15.205, 15.209     | Radiated Spurious Emission              | < 54dBuV/m | Radiated             | Pass        |

## 3. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 DTS Meas Guidance v05r02.
4. ANSI C63.10-2013.

## 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 218 Maeyeong-ro                     |           |
|-------------------------------------|-----------|
| <input checked="" type="checkbox"/> | Chamber 1 |
| <input checked="" type="checkbox"/> | Chamber 2 |
| <input type="checkbox"/>            | Chamber 3 |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/wp-content/uploads/2017/05/TL-637.pdf>.

## 5. CALIBRATION AND UNCERTAINTY

### 5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 5.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 28.9 \text{ dBuV/m} &= 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} \end{aligned}$$

### 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                              | UNCERTAINTY |
|--|-------------|
| Conducted Disturbance, 0.15 to 30 MHz  | 2.35 dB     |
| Radiated Disturbance, 30 MHz to 1 GHz  | 3.49 dB     |
| Radiated Disturbance, 1 GHz to 18 GHz  | 5.82 dB     |
| Radiated Disturbance, 18 GHz to 40 GHz | 5.49 dB     |

Uncertainty figures are valid to a confidence level of 95%.

### 5.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is a GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC. This test report addresses the DTS (WLAN) operational mode.

#### WiFi operating mode

| Frequency rage                  | Mode               | ANT 1 | ANT 2 |
|---------------------------------|--------------------|-------|-------|
| 2.4GHz<br>(2412 MHz ~ 2472 MHz) | 802.11b SISO       | TX/RX | TX/RX |
|                                 | 802.11g SISO       | TX/RX | TX/RX |
|                                 | 802.11g MIMO       | TX/RX | TX/RX |
|                                 | 802.11n(HT20) SISO | TX/RX | TX/RX |
|                                 | 802.11n(HT20) MIMO | TX/RX | TX/RX |

### 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

| Frequency Range [MHz] | Mode               | Output Power [dBm] |       | Output Power [mW] |        |
|-----------------------|--------------------|--------------------|-------|-------------------|--------|
|                       |                    | ANT1               | ANT2  | ANT1              | ANT2   |
| 2412 - 2472           | 802.11b SISO       | 20.46              | 20.08 | 111.17            | 101.86 |
|                       | 802.11g SISO       | 18.57              | 18.39 | 71.94             | 69.02  |
|                       | 802.11g MIMO       | 21.46              |       | 139.96            |        |
|                       | 802.11n(HT20) SISO | 18.43              | 18.24 | 69.66             | 66.68  |
|                       | 802.11n(HT20) MIMO | 21.36              |       | 136.77            |        |



### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.  
 Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antennas, with Antenna 1's maximum gain of -3.57 dBi and Antenna 2's maximum gain of -6.42 dBi

"WIFI1" and "WIFI2" as indicated in antenna specification are written as Antenna 1 and Antenna 2 in this report.

### 6.4. TESTED CHANNELS LIST

| 802.11b Mode     | Channel | Frequency (MHz) |
|------------------|---------|-----------------|
| Low              | 1       | 2412            |
| Mid              | 6       | 2437            |
| High             | 11      | 2462            |
| Reduction High 1 | 12      | 2467            |
| Reduction High 2 | 13      | 2472            |

| 802.11g Mode     | Channel | Frequency (MHz) |
|------------------|---------|-----------------|
| Low              | 1       | 2412            |
| Mid              | 6       | 2437            |
| High             | 11      | 2462            |
| Reduction High 1 | 12      | 2467            |
| Reduction High 2 | 13      | 2472            |

| 802.11n HT20 Mode | Channel | Frequency (MHz) |
|-------------------|---------|-----------------|
| Low               | 1       | 2412            |
| Mid               | 6       | 2437            |
| High              | 11      | 2462            |
| Reduction High 1  | 12      | 2467            |
| Reduction High 2  | 13      | 2472            |

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## 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/High Channels.

For SISO (Antenna 1), the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

For SISO (Antenna 2), the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

For MIMO, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps 2TX

802.11n HT20 mode: MCS0 2TX

Depending on spot-check results for 802.11g / n HT20, MIMO mode is worst case than SISO (Antenna 1) and SISO (Antenna 2). So radiation test for 802.11g / n HT20 were evaluated at MIMO mode.

Note : All radiated and power line conducted tests were performed attached with travel adapter for the worst case condition mode.

## 6.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |             |                |        |
|------------------------|--------------|-------------|----------------|--------|
| Description            | Manufacturer | Model       | Serial Number  | FCC ID |
| Charger                | SAMSUNG      | EP-TA800    | R37MAYF19B7DK3 | N/A    |
| Data Cable             | SAMSUNG      | EP-DA705BBE | N/A            | N/A    |

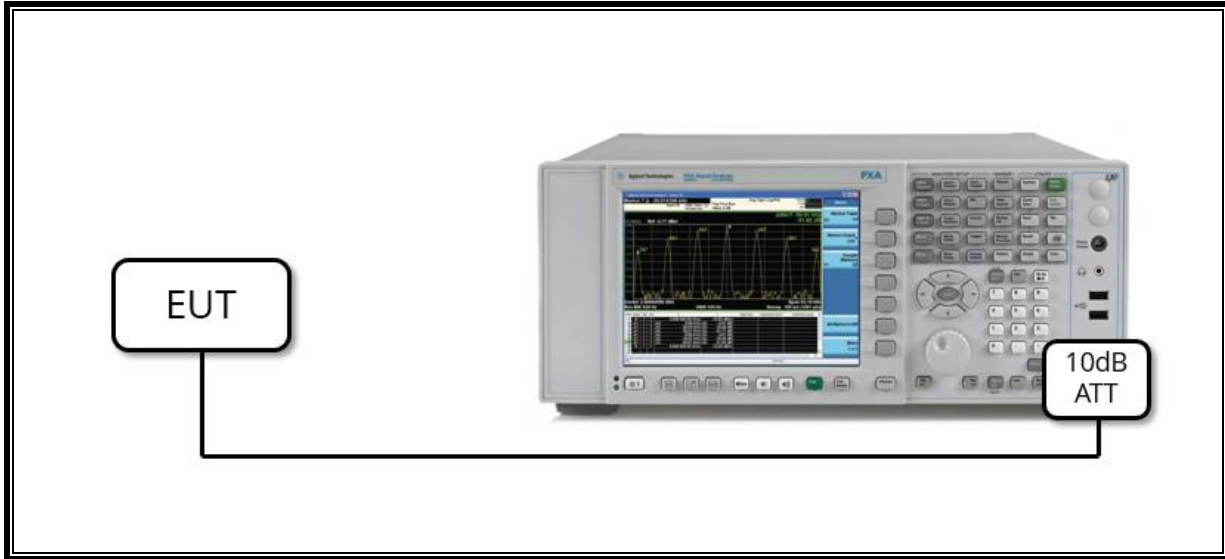
### I/O CABLE

| I/O Cable List |          |                      |                |            |                  |         |
|----------------|----------|----------------------|----------------|------------|------------------|---------|
| Cable No       | Port     | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1              | DC Power | 1                    | C Type         | Shielded   | 1.0m             | N/A     |

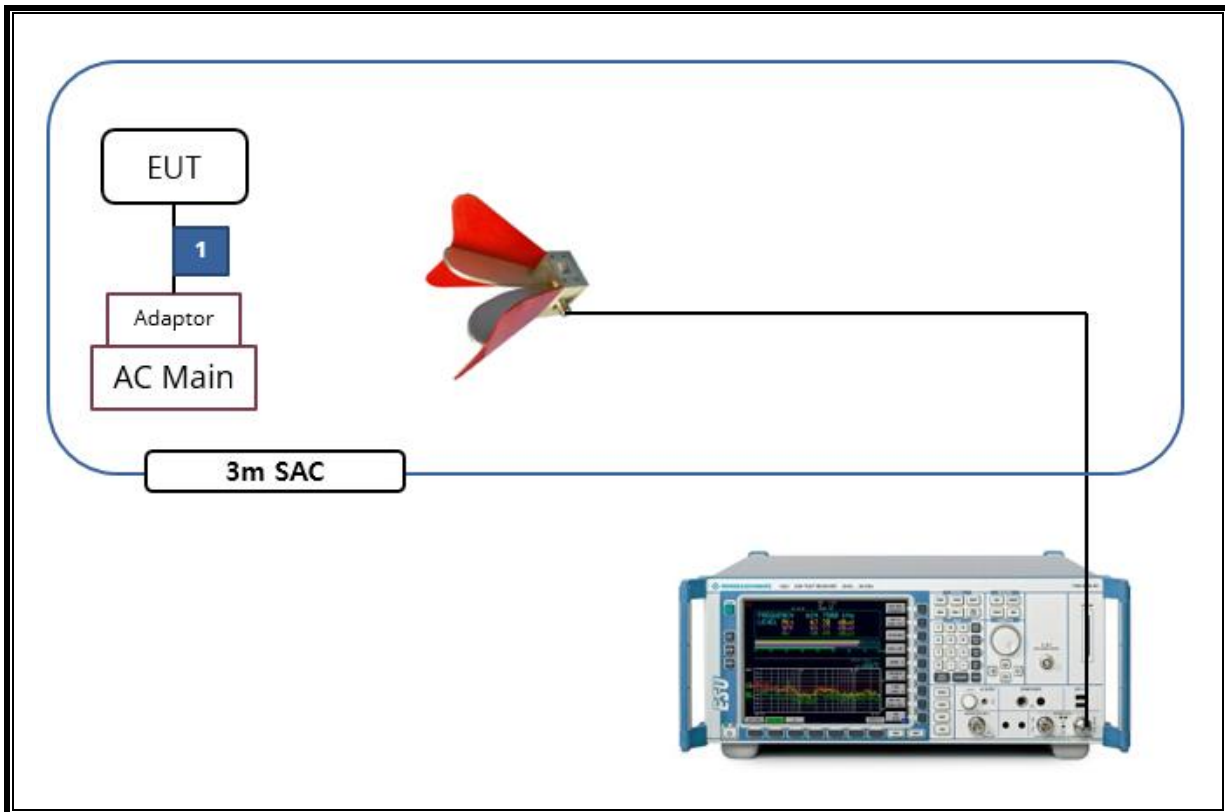
### TEST SETUP

The EUT is a stand-alone unit during the tests.  
Test software in hidden menu exercised the EUT to enable DTS mode.

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



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## 7. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.2.3.

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band EMISSIONS (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN RESTRICTED BANDS KDB 558074 D01 v05r02, Section 8.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

## 8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Test Equipment List         |               |                        |            |             |
|-----------------------------|---------------|------------------------|------------|-------------|
| Description                 | Manufacturer  | Model                  | S/N        | New Cal Due |
| Antenna, Bilog, 30MHz-1GHz  | SCHWARZBECK   | VULB9163               | 750        | 08-04-20    |
| Antenna, Bilog, 30MHz-1GHz  | SCHWARZBECK   | VULB9163               | 749        | 08-04-20    |
| Antenna, Bilog, 30MHz-1GHz  | SCHWARZBECK   | VULB9163               | 845        | 08-04-20    |
| Antenna, Horn, 18 GHz       | ETS           | 3115                   | 00167211   | 08-04-20    |
| Antenna, Horn, 18 GHz       | ETS           | 3115                   | 00161451   | 08-04-20    |
| Antenna, Horn, 18 GHz       | ETS           | 3117                   | 00168724   | 08-04-20    |
| Antenna, Horn, 18 GHz       | ETS           | 3117                   | 00168717   | 08-04-20    |
| Antenna, Horn, 18 GHz       | ETS           | 3117                   | 00205959   | 08-04-20    |
| Antenna, Horn, 40 GHz       | ETS           | 3116C                  | 00166155   | 08-14-20    |
| Antenna, Horn, 40 GHz       | ETS           | 3116C                  | 00168645   | 10-02-21    |
| Preamplifier                | ETS           | 3116C-PA               | 00168841   | 08-08-20    |
| Preamplifier, 1000 MHz      | Sonoma        | 310N                   | 341282     | 08-05-20    |
| Preamplifier, 1000 MHz      | Sonoma        | 310N                   | 351741     | 08-05-20    |
| Preamplifier, 1000 MHz      | Sonoma        | 310N                   | 370599     | 08-05-20    |
| Preamplifier, 18 GHz        | Miteq         | AFS42-00101800-25-S-42 | 1876511    | 08-06-20    |
| Preamplifier, 18 GHz        | Miteq         | AFS42-00101800-25-S-42 | 1896138    | 08-06-20    |
| Preamplifier, 18 GHz        | Miteq         | AFS42-00101800-25-S-42 | 2029169    | 08-06-20    |
| Spectrum Analyzer, 44 GHz   | Agilent / HP  | N9030A                 | MY54170614 | 08-06-20    |
| Spectrum Analyzer, 44 GHz   | Agilent / HP  | N9030A                 | MY54490312 | 08-06-20    |
| Spectrum Analyzer, 43.5 GHz | R&S           | FSW43                  | 104089     | 08-06-20    |
| Average Power Sensor        | Agilent / HP  | U2000                  | MY54270007 | 08-09-20    |
| Attenuator                  | PASTERNAK     | PE7087-10              | A001       | 08-08-20    |
| Attenuator                  | PASTERNAK     | PE7087-10              | A008       | 08-08-20    |
| Attenuator                  | PASTERNAK     | PE7004-10              | 2          | 08-06-20    |
| Attenuator                  | PASTERNAK     | PE7087-10              | A009       | 08-08-20    |
| EMI Test Receive, 40 GHz    | R&S           | ESU40                  | 100439     | 08-06-20    |
| EMI Test Receive, 40 GHz    | R&S           | ESU40                  | 100457     | 08-06-20    |
| EMI Test Receive, 44 GHz    | R&S           | ESW44                  | 101590     | 08-05-20    |
| EMI Test Receive, 3 GHz     | R&S           | ESR3                   | 101832     | 08-05-20    |
| Low Pass Filter 5GHz        | Micro-Tronics | LPS17541               | 009        | 08-06-20    |
| Low Pass Filter 5GHz        | Micro-Tronics | LPS17541               | 015        | 08-06-20    |
| Low Pass Filter 5GHz        | Micro-Tronics | LPS17541               | 020        | 08-06-20    |
| High Pass Filter 3GHz       | Micro-Tronics | HPM17543               | 010        | 08-06-20    |
| High Pass Filter 3GHz       | Micro-Tronics | HPM17543               | 015        | 08-06-20    |
| High Pass Filter 3GHz       | Micro-Tronics | HPM17543               | 020        | 08-06-20    |
| High Pass Filter 6GHz       | Micro-Tronics | HPS17542               | 009        | 08-06-20    |
| High Pass Filter 6GHz       | Micro-Tronics | HPS17542               | 016        | 08-06-20    |
| High Pass Filter 6GHz       | Micro-Tronics | HPS17542               | 021        | 08-06-20    |
| LISN                        | R&S           | ENV-216                | 101837     | 08-09-20    |
| Antenna, Loop, 9kHz-30MHz   | R&S           | HFH2-Z2                | 100418     | 10-02-21    |
| Antenna, Loop, 9kHz-30MHz   |               |                        |            |             |
| Description                 | Manufacturer  | Model                  | Version    |             |
| Radiated software           | UL            | UL EMC                 | Ver 9.5    |             |
| AC Line Conducted software  | UL            | UL EMC                 | Ver 9.5    |             |

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

| Band    | Mode          | On Time [ms] | Period [ms] | Duty Cycle X [Linear] | Duty Cycle X [%] | Duty Cycle Correction Factor [dB] | 1/T Minimum VBW [kHz] |
|---------|---------------|--------------|-------------|-----------------------|------------------|-----------------------------------|-----------------------|
| 2.4 GHz | 802.11b       | 15.12        | 15.29       | 0.99                  | 98.89            | 0.00                              | 0.066                 |
|         | 802.11g       | 2.796        | 2.834       | 0.99                  | 98.66            | 0.00                              | 0.358                 |
|         | 802.11n(HT20) | 2.599        | 2.637       | 0.99                  | 98.56            | 0.00                              | 0.385                 |



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## 9.2. 6 dB BANDWIDTH

### LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST PROCEDURE

Reference to KDB 558074 D01 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

### RESULTS

- Please refer to the next page

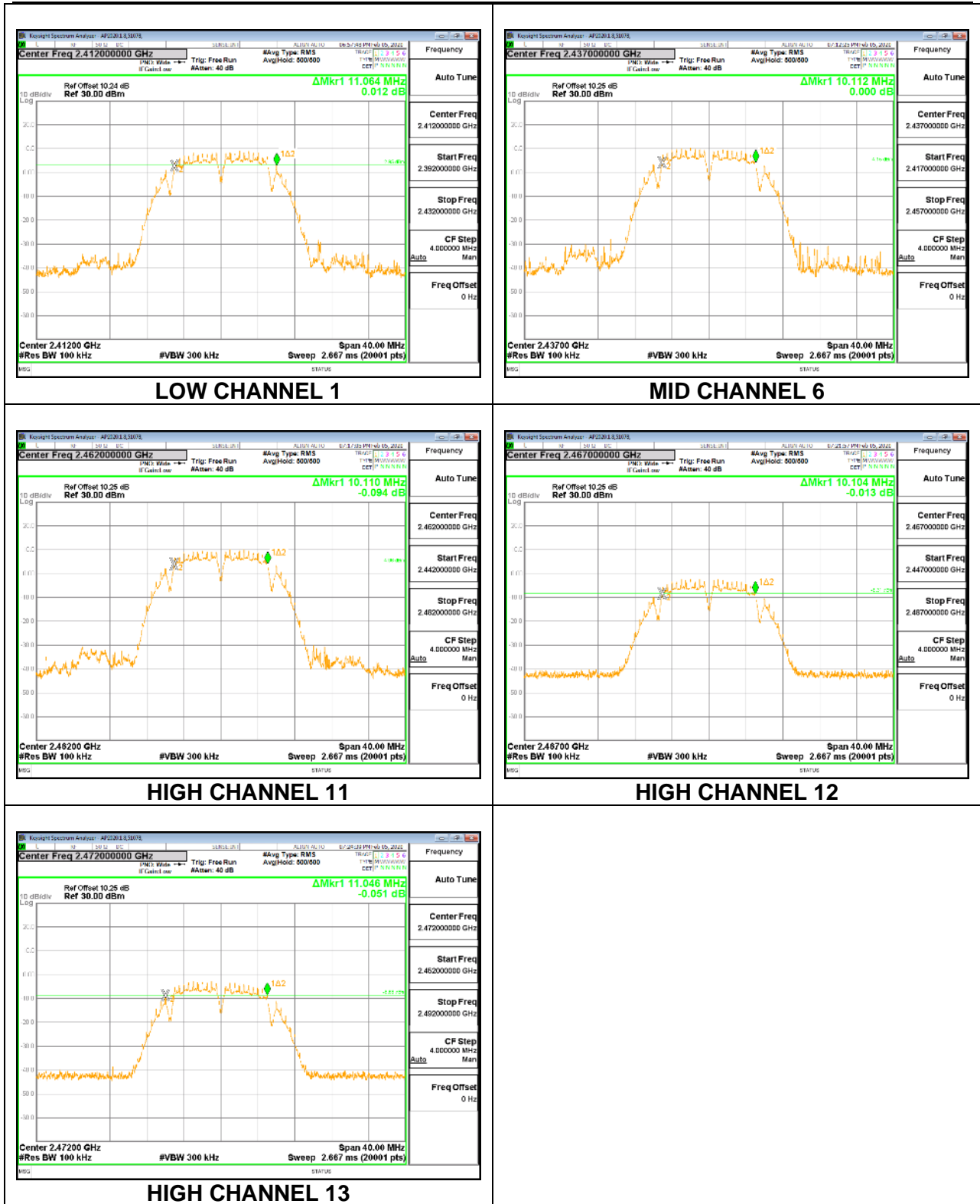


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**9.2.1. 802.11b MODE**

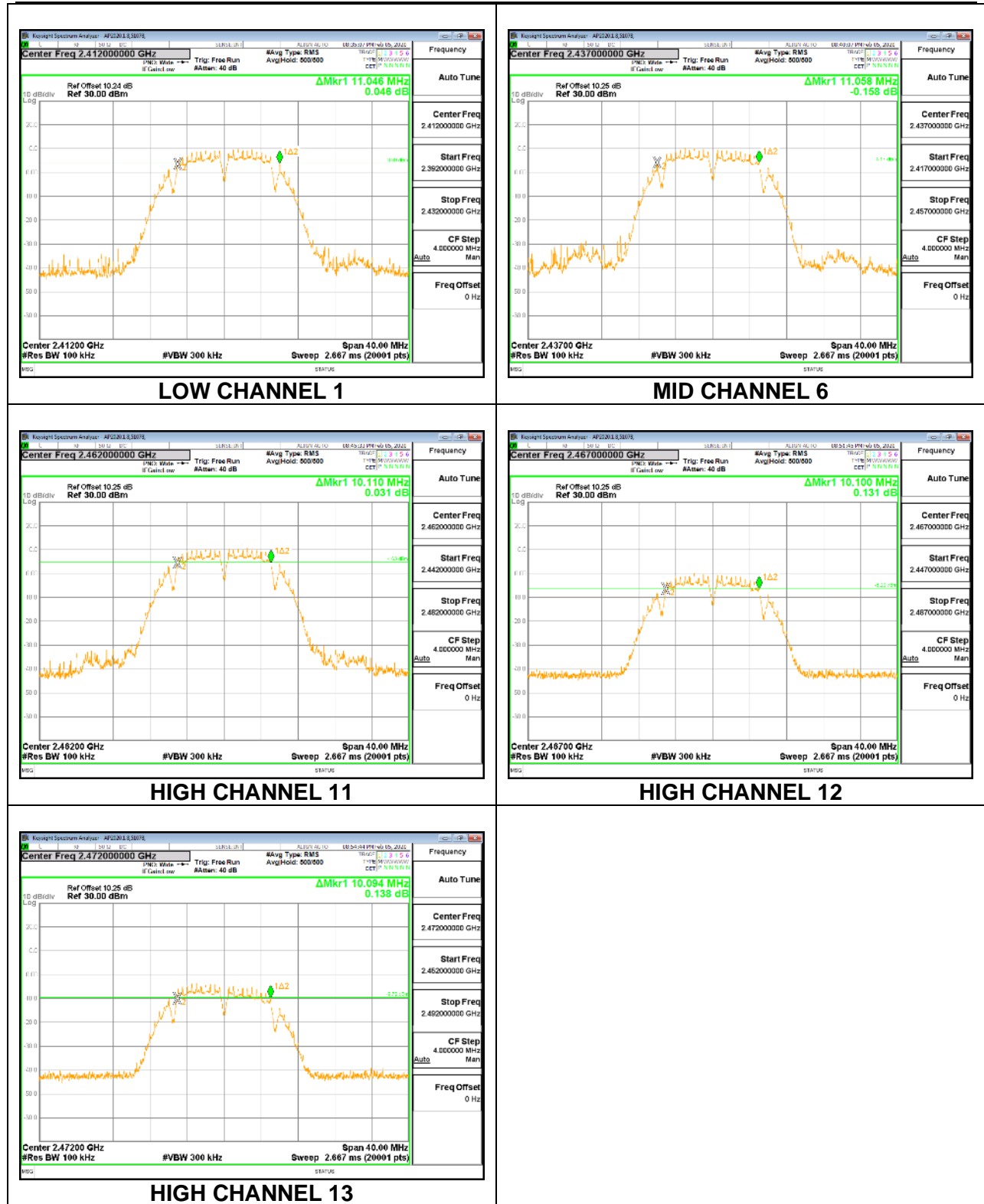
**1TX Antenna 1 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 11.0640                 | 0.5                    |
| Mid 6   | 2437               | 10.1120                 | 0.5                    |
| High 11 | 2462               | 10.1100                 | 0.5                    |
| High 12 | 2467               | 10.1040                 | 0.5                    |
| High 13 | 2472               | 11.0460                 | 0.5                    |



**1TX Antenna 2 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 11.0460                 | 0.5                    |
| Mid 6   | 2437               | 11.0580                 | 0.5                    |
| High 11 | 2462               | 10.1100                 | 0.5                    |
| High 12 | 2467               | 10.1000                 | 0.5                    |
| High 13 | 2472               | 10.0940                 | 0.5                    |

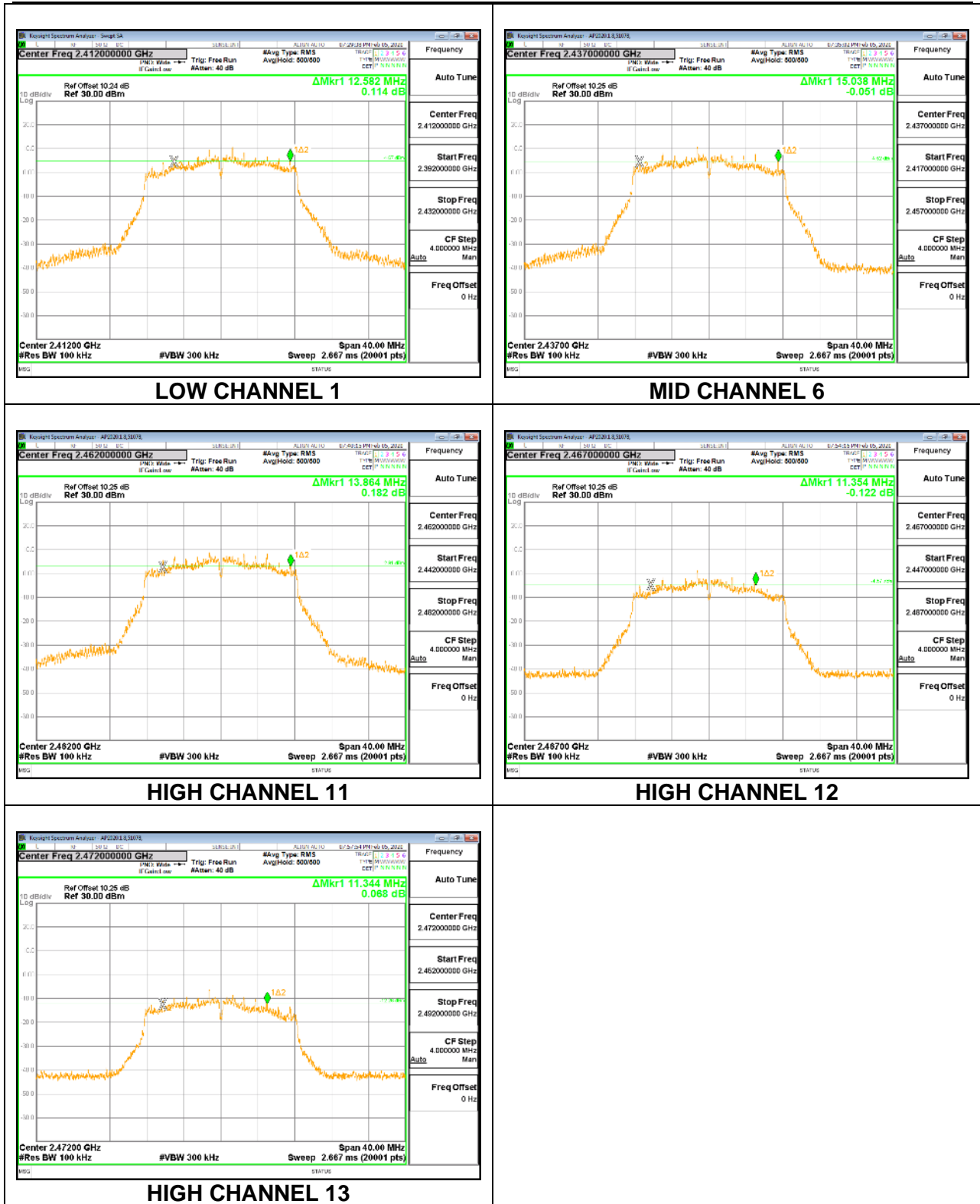


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**9.2.2. 802.11g MODE**

**1TX Antenna 1 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 12.5820                 | 0.5                    |
| Mid 6   | 2437               | 15.0380                 | 0.5                    |
| High 11 | 2462               | 13.8640                 | 0.5                    |
| High 12 | 2467               | 11.3540                 | 0.5                    |
| High 13 | 2472               | 11.3440                 | 0.5                    |



**1TX Antenna 2 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 15.0400                 | 0.5                    |
| Mid 6   | 2437               | 12.6000                 | 0.5                    |
| High 11 | 2462               | 13.8300                 | 0.5                    |
| High 12 | 2467               | 11.3480                 | 0.5                    |
| High 13 | 2472               | 12.5640                 | 0.5                    |



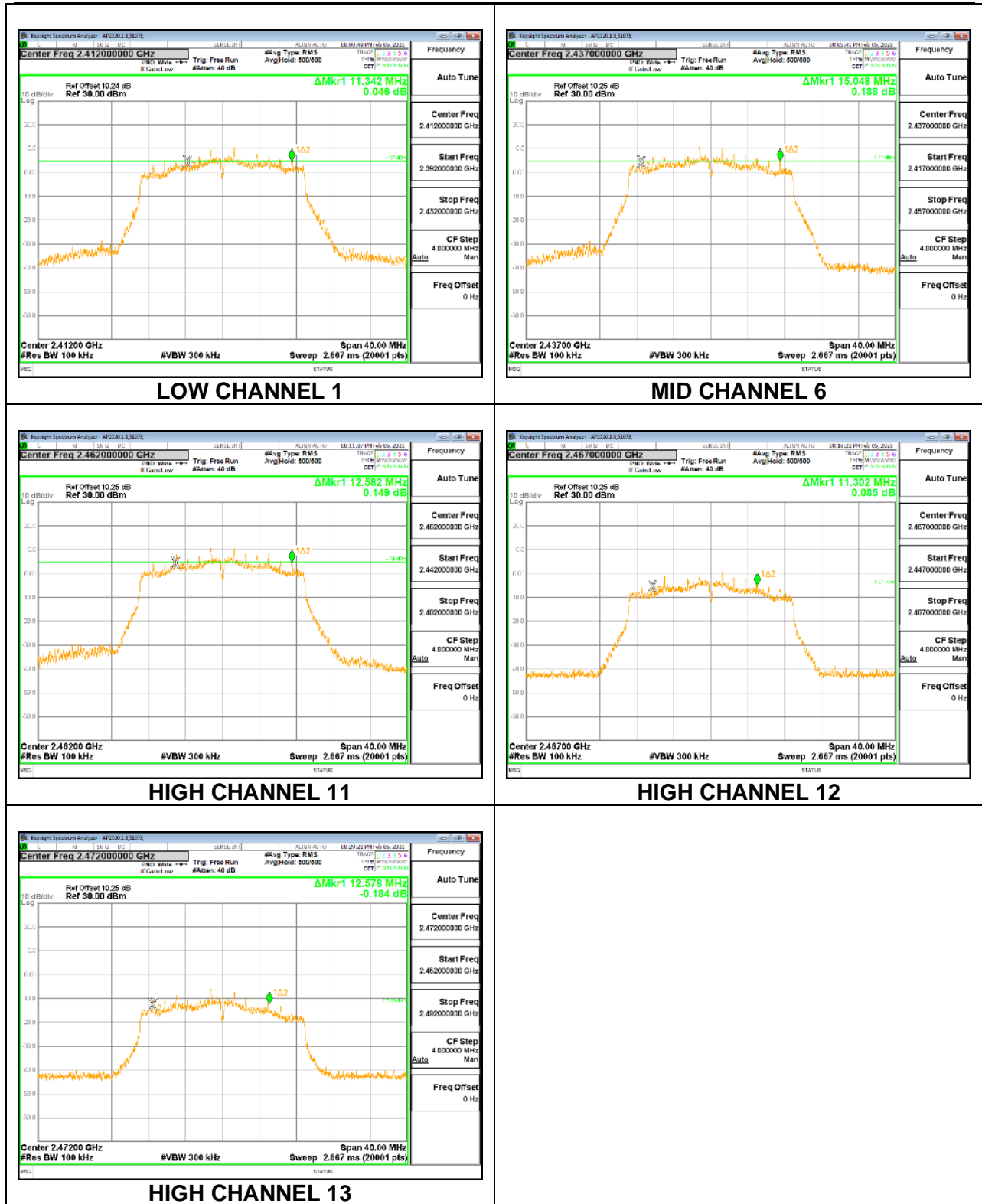


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**9.2.3. 802.11n HT20 MODE**

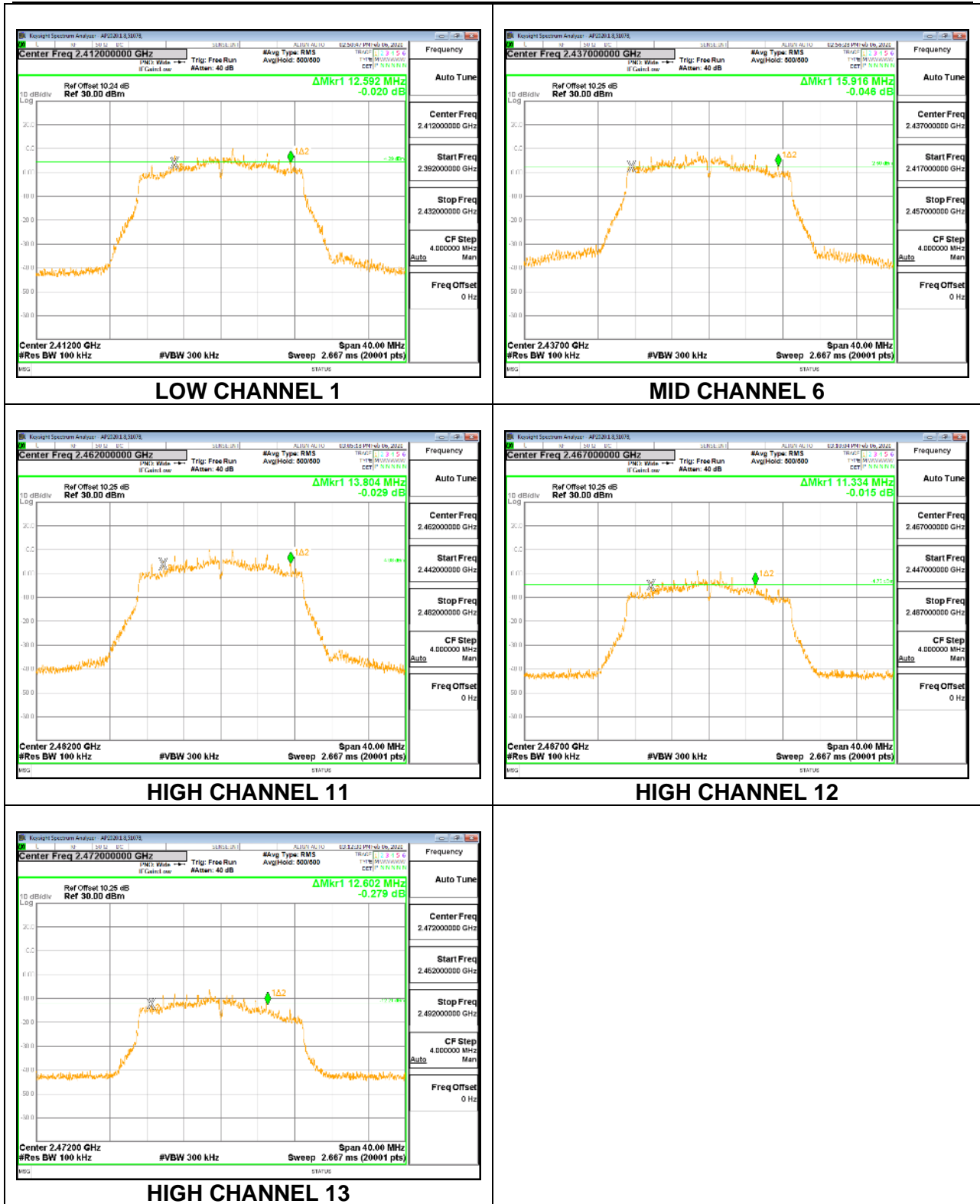
**1TX Antenna 1 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 11.3420                 | 0.5                    |
| Mid 6   | 2437               | 15.0480                 | 0.5                    |
| High 11 | 2462               | 12.5820                 | 0.5                    |
| High 12 | 2467               | 11.3020                 | 0.5                    |
| High 13 | 2472               | 12.5780                 | 0.5                    |



**1TX Antenna 2 MODE**

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low 1   | 2412               | 12.5920                 | 0.5                    |
| Mid 6   | 2437               | 15.9160                 | 0.5                    |
| High 11 | 2462               | 13.8040                 | 0.5                    |
| High 12 | 2467               | 11.3340                 | 0.5                    |
| High 13 | 2472               | 12.6020                 | 0.5                    |



### 9.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power.

Output power measurement was performed utilizing the 8.3.2.3 under KDB558074 D01 15.247 Meas Guidance.

Duty cycle correction factor is not added to the average output power results for duty cycle factor > 98%.

#### DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains.  
The directional gain is:

| Bands [MHz] | ANT 1 [dBi] | ANT 2 [dBi] | Correlated Directional Gain [dBi] |
|-------------|-------------|-------------|-----------------------------------|
| 2 412- 2472 | -3.57       | -6.42       | -1.87                             |

- IEEE 802.11b Mode is not supported MIMO operation. So can't transmit on two antennas as the same time.

**RESULTS**

**9.3.1. 1TX\_TEST RESULTS**

| Frequency Range [MHz]                           | ANT Gain     |       | FCC Power Limit [dBm] | Max Power [dBm] |
|---|--------------|-------|-----------------------|-----------------|
|   | ANT1         | ANT2  |                       |                 |
| 2 412 – 2 472                                   | -3.57        | -6.42 | 30.00                 | 30.00           |
| <b>Included in Calculations of Corr'd Power</b> |              |       |                       |                 |
| Duty Cycle CF                                   | 802.11b      |       | 0.00                  | dB              |
|   | 802.11g      |       | 0.00                  | dB              |
|   | 802.11n HT20 |       | 0.00                  | dB              |

Calculation of Output Power result  
 → Corr'd Power = Meas Power + Duty Cycle CF

| Mode              | Channel | Frequency [MHz] | Meas Power [dBm] |              | Corr'd Power [dBm] |              | Power Limit [dBm] |
|-------------------|---------|-----------------|------------------|--------------|--------------------|--------------|-------------------|
|                   |         |                 | ANT1             | ANT2         | ANT1               | ANT2         |                   |
| 802.11b           | 1       | 2412            | 20.15            | 19.78        | 20.15              | 19.78        | 30.00             |
|                   | 6       | 2437            | 20.43            | 19.79        | 20.43              | 19.79        |                   |
|                   | 11      | 2462            | <b>20.46</b>     | <b>20.08</b> | <b>20.46</b>       | <b>20.08</b> |                   |
|                   | 12      | 2467            | 8.56             | 8.58         | 8.56               | 8.58         |                   |
|                   | 13      | 2472            | 2.48             | 2.89         | 2.48               | 2.89         |                   |
| <b>Worst Case</b> |         |                 |                  |              | <b>20.46</b>       | <b>20.08</b> |                   |
| 802.11g           | 1       | 2412            | 18.51            | 18.15        | 18.51              | 18.15        | 30.00             |
|                   | 6       | 2437            | <b>18.57</b>     | <b>18.39</b> | <b>18.57</b>       | <b>18.39</b> |                   |
|                   | 11      | 2462            | 18.54            | 18.14        | 18.54              | 18.14        |                   |
|                   | 12      | 2467            | 8.75             | 8.73         | 8.75               | 8.73         |                   |
|                   | 13      | 2472            | 2.37             | 2.04         | 2.37               | 2.04         |                   |
| <b>Worst Case</b> |         |                 |                  |              | <b>18.57</b>       | <b>18.39</b> |                   |
| 802.11n HT20      | 1       | 2412            | 18.37            | 18.00        | 18.37              | 18.00        | 30.00             |
|                   | 6       | 2437            | <b>18.43</b>     | <b>18.24</b> | <b>18.43</b>       | <b>18.24</b> |                   |
|                   | 11      | 2462            | 18.37            | 18.00        | 18.37              | 18.00        |                   |
|                   | 12      | 2467            | 8.60             | 8.57         | 8.60               | 8.57         |                   |
|                   | 13      | 2472            | 2.24             | 2.32         | 2.24               | 2.32         |                   |
| <b>Worst Case</b> |         |                 |                  |              | <b>18.43</b>       | <b>18.24</b> |                   |

**9.3.2. 2TX\_TEST RESULTS**

| Frequency Range [MHz]                           | ANT Gain                                | FCC Power Limit [dBm] | Max Power [dBm] |
|---|---|-----------------------|-----------------|
|   | Correlated Chain Directional Gain [dBi] |                       |                 |
| 2 412 – 2 472                                   | -1.87                                   | 30.00                 | 30.00           |
| <b>Included in Calculations of Corr'd Power</b> |   |                       |                 |
| Duty Cycle CF                                   | 802.11g                                 |                       | 0.00 dB         |
|   | 802.11n HT20                            |                       | 0.00 dB         |

**Calculation of Output Power result**

→ Total Corr'd Power = ANT1 Power + ANT2 Power + Duty Cycle CF

| Mode              | Channel | Frequency [MHz] | Meas Power [dBm] |              | Total Corr'd Power [dBm] | Power Limit [dBm] |
|-------------------|---------|-----------------|------------------|--------------|--------------------------|-------------------|
|                   |         |                 | ANT1             | ANT2         |                          |                   |
| 802.11g           | 1       | 2412            | 18.51            | 18.18        | 21.36                    | 30.00             |
|                   | 6       | 2437            | <b>18.57</b>     | <b>18.33</b> | <b>21.46</b>             |                   |
|                   | 11      | 2462            | 18.54            | 18.18        | 21.37                    |                   |
|                   | 12      | 2467            | 8.74             | 7.88         | 11.34                    |                   |
|                   | 13      | 2472            | 2.26             | 1.88         | 5.08                     |                   |
| <b>Worst Case</b> |         |                 |                  |              | <b>21.46</b>             |                   |
| 802.11n HT20      | 1       | 2412            | 18.38            | 18.00        | 21.20                    | 30.00             |
|                   | 6       | 2437            | <b>18.46</b>     | <b>18.24</b> | <b>21.36</b>             |                   |
|                   | 11      | 2462            | 18.37            | 18.00        | 21.20                    |                   |
|                   | 12      | 2467            | 8.58             | 7.74         | 11.19                    |                   |
|                   | 13      | 2472            | 2.83             | 2.13         | 5.50                     |                   |
| <b>Worst Case</b> |         |                 |                  |              | <b>21.36</b>             |                   |

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## 9.4. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST PROCEDURE

Power Spectral Density was performed utilizing the section 8.4 under KDB558074 D01 15.247 Meas Guidance.



**RESULTS**

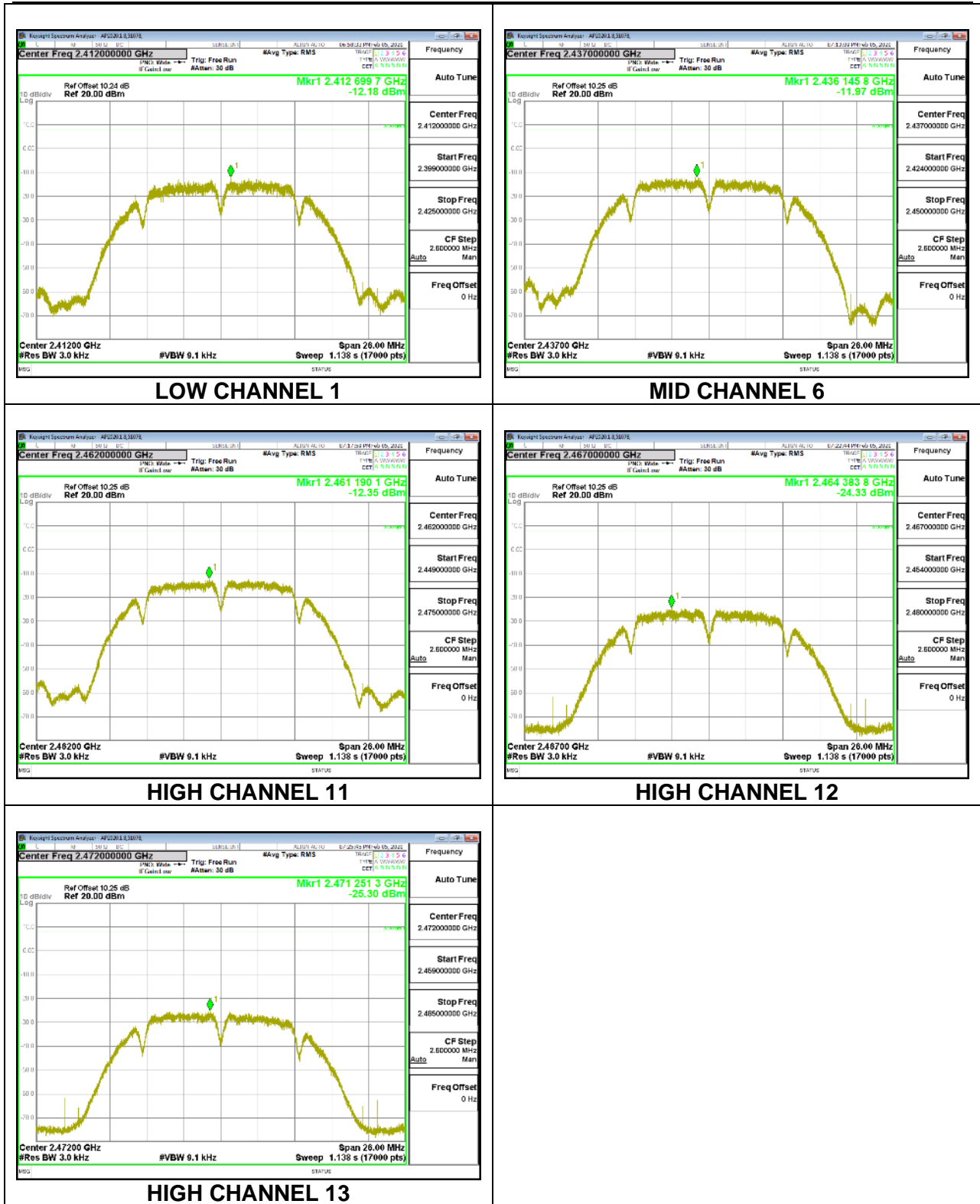
**9.4.1. 802.11b MODE**

**1TX Antenna 1 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.18                                  | -12.18  | 8.0                              | -20.2                  |
| Mid 6          | 2437                       | -11.97                                  | -11.97  | 8.0                              | -20.0                  |
| High 11        | 2462                       | -12.35                                  | -12.35  | 8.0                              | -20.3                  |
| High 12        | 2467                       | -24.33                                  | -24.33  | 8.0                              | -32.3                  |
| High 13        | 2472                       | -25.30                                  | -25.30  | 8.0                              | -33.3                  |

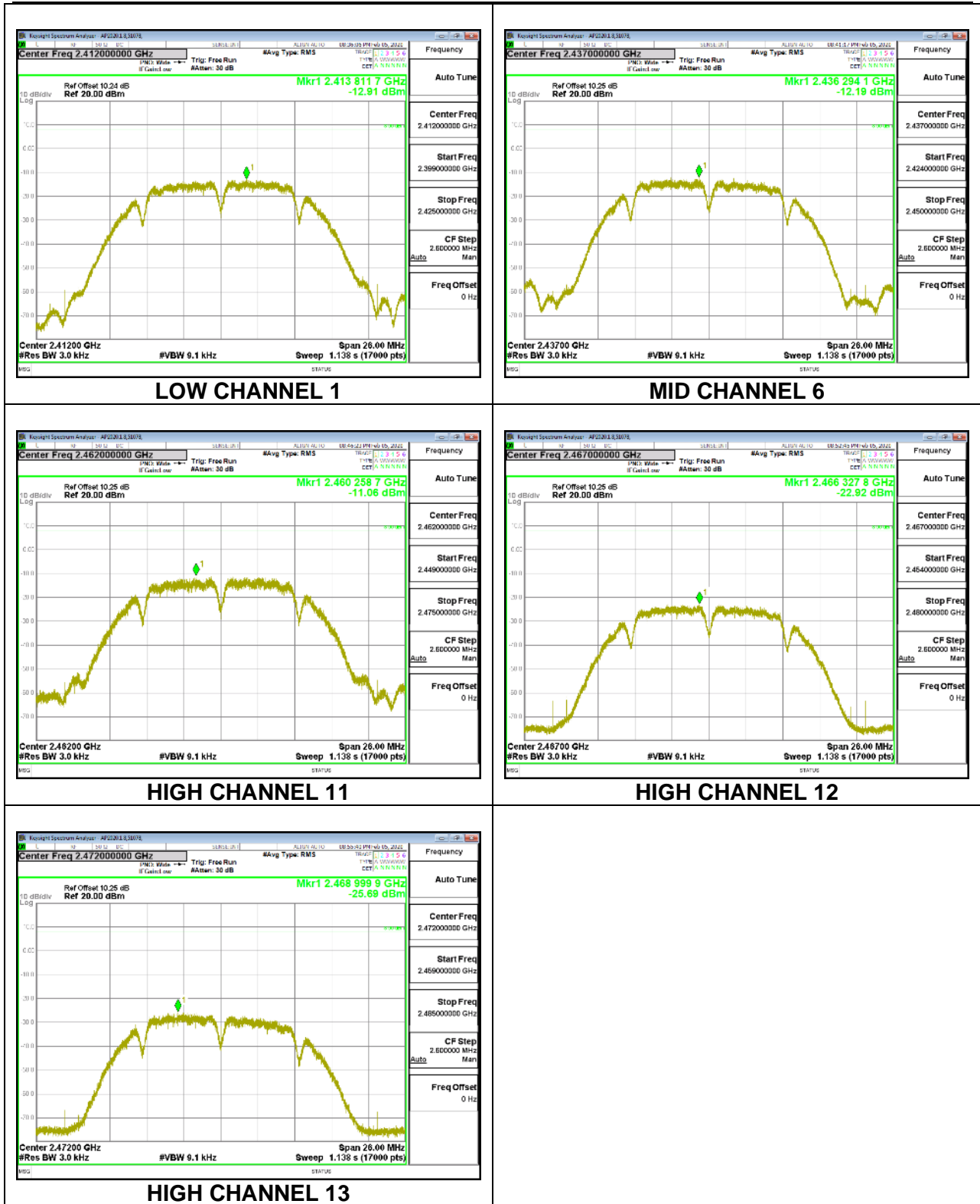


**1TX Antenna 2 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.91                                  | -12.91  | 8.0                              | -20.9                  |
| Mid 6          | 2437                       | -12.19                                  | -12.19  | 8.0                              | -20.2                  |
| High 11        | 2462                       | -11.06                                  | -11.06  | 8.0                              | -19.1                  |
| High 12        | 2467                       | -22.92                                  | -22.92  | 8.0                              | -30.9                  |
| High 13        | 2472                       | -25.69                                  | -25.69  | 8.0                              | -33.7                  |



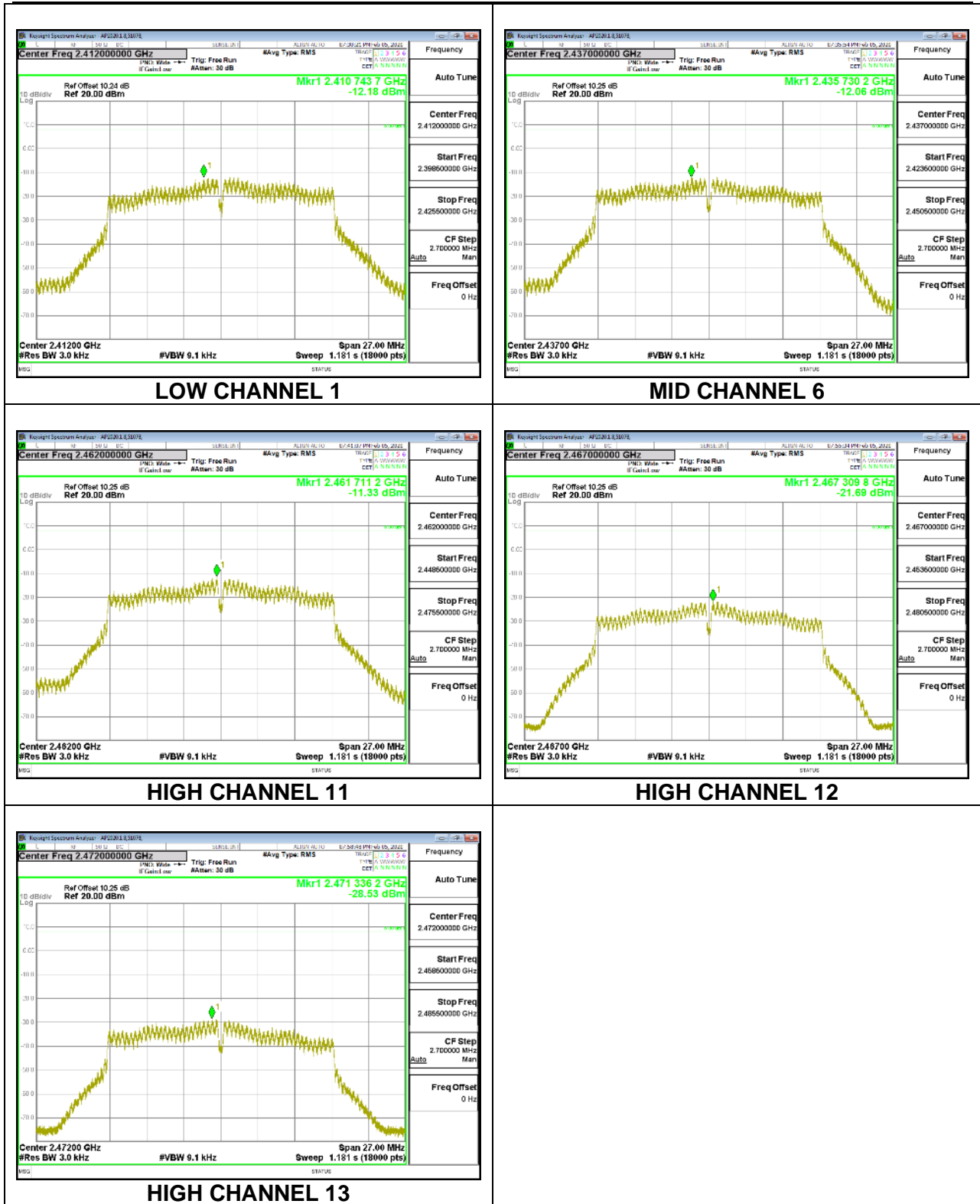
**9.4.2. 802.11g MODE**

**1TX Antenna 1 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.18                                  | -12.18  | 8.0                              | -20.2                  |
| Mid 6          | 2437                       | -12.06                                  | -12.06  | 8.0                              | -20.1                  |
| High 11        | 2462                       | -11.33                                  | -11.33  | 8.0                              | -19.3                  |
| High 12        | 2467                       | -21.69                                  | -21.69  | 8.0                              | -29.7                  |
| High 13        | 2472                       | -28.53                                  | -28.53  | 8.0                              | -36.5                  |

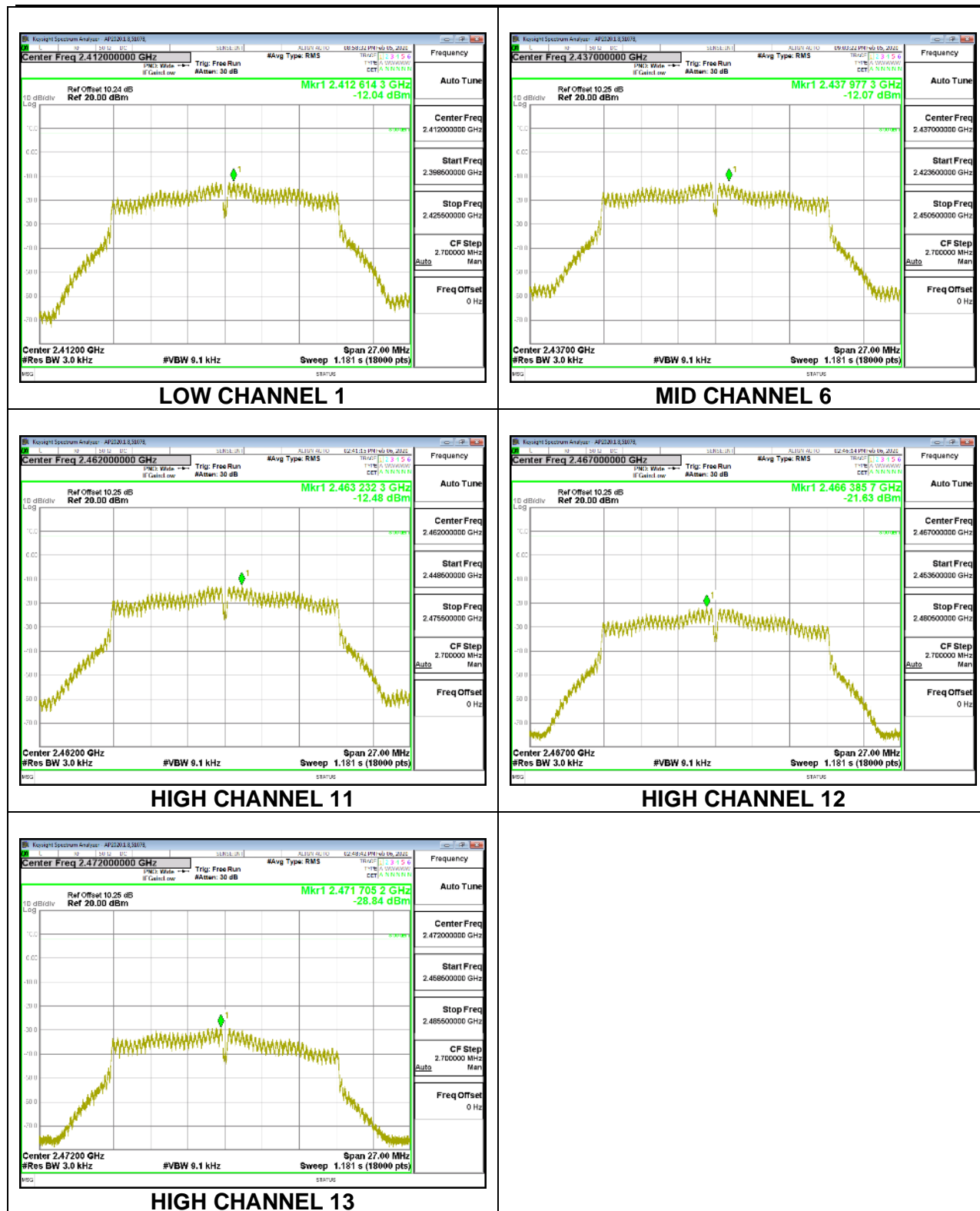


**1TX Antenna 2 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.04                                  | -12.04  | 8.0                              | -20.0                  |
| Mid 6          | 2437                       | -12.07                                  | -12.07  | 8.0                              | -20.1                  |
| High 11        | 2462                       | -12.48                                  | -12.48  | 8.0                              | -20.5                  |
| High 12        | 2467                       | -21.63                                  | -21.63  | 8.0                              | -29.6                  |
| High 13        | 2472                       | -28.84                                  | -28.84  | 8.0                              | -36.8                  |





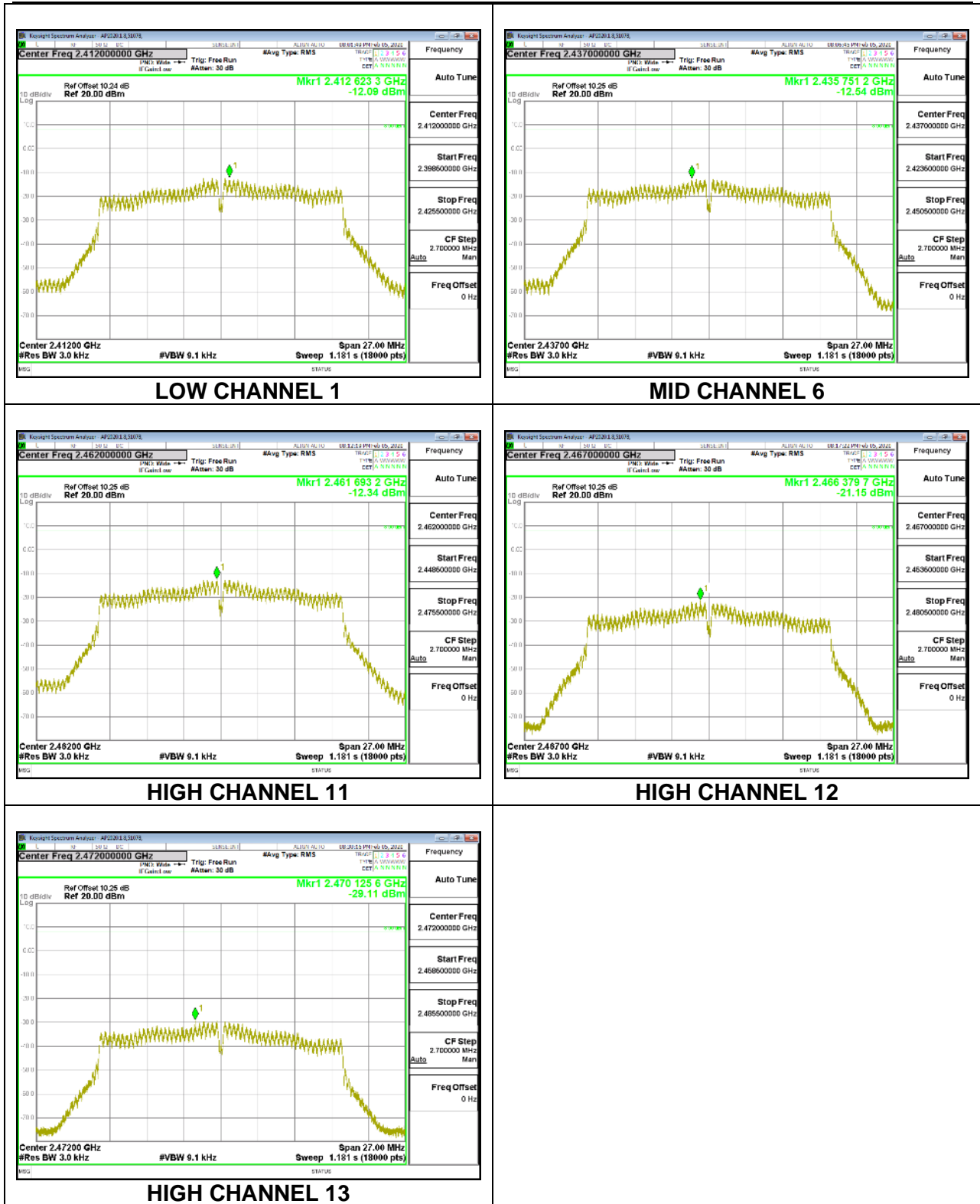
**9.4.3. 802.11n HT20 MODE**

**1TX Antenna 1 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.09                                  | -12.09  | 8.0                              | -20.1                  |
| Mid 6          | 2437                       | -12.54                                  | -12.54  | 8.0                              | -20.5                  |
| High 11        | 2462                       | -12.34                                  | -12.34  | 8.0                              | -20.3                  |
| High 12        | 2467                       | -21.15                                  | -21.15  | 8.0                              | -29.2                  |
| High 13        | 2472                       | -29.11                                  | -29.11  | 8.0                              | -37.1                  |

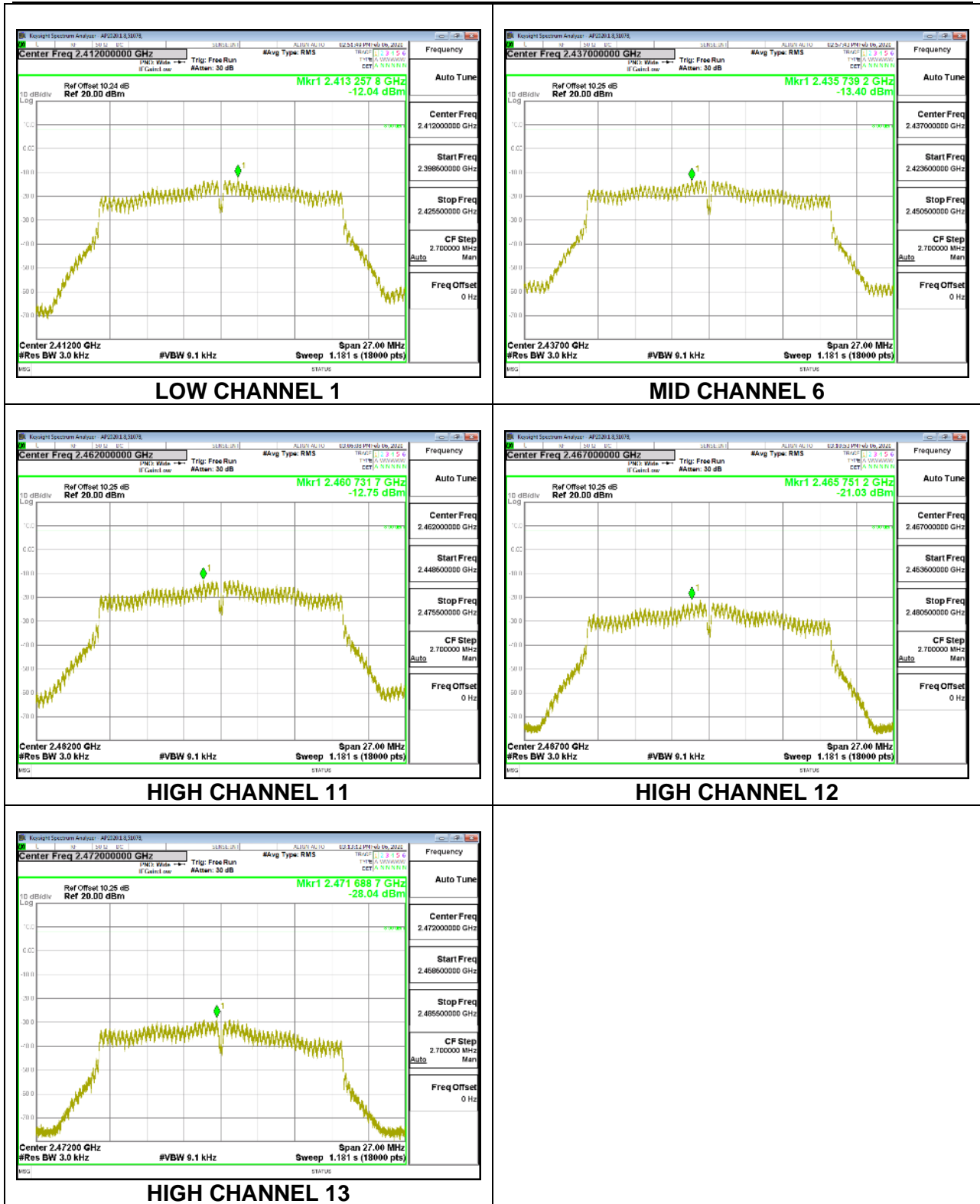


**1TX Antenna 2 MODE**

|                           |      |   |
|---------------------------|------|---|
| <b>Duty Cycle CF (dB)</b> | 0.00 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|---|

**PSD Results**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 0<br/>Meas<br/>(dBm/ 3kHz)</b> | <b>Total<br/>Corr'd<br/>PSD<br/>(dBm/<br/>3kHz)</b> | <b>Limit<br/>(dBm/<br/>3kHz)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|---|---|----------------------------------|------------------------|
| Low 1          | 2412                       | -12.04                                  | -12.04  | 8.0                              | -20.0                  |
| Mid 6          | 2437                       | -13.40                                  | -13.40  | 8.0                              | -21.4                  |
| High 11        | 2462                       | -12.75                                  | -12.75  | 8.0                              | -20.7                  |
| High 12        | 2467                       | -21.03                                  | -21.03  | 8.0                              | -29.0                  |
| High 13        | 2472                       | -28.04                                  | -28.04  | 8.0                              | -36.0                  |



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## 9.5. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d)

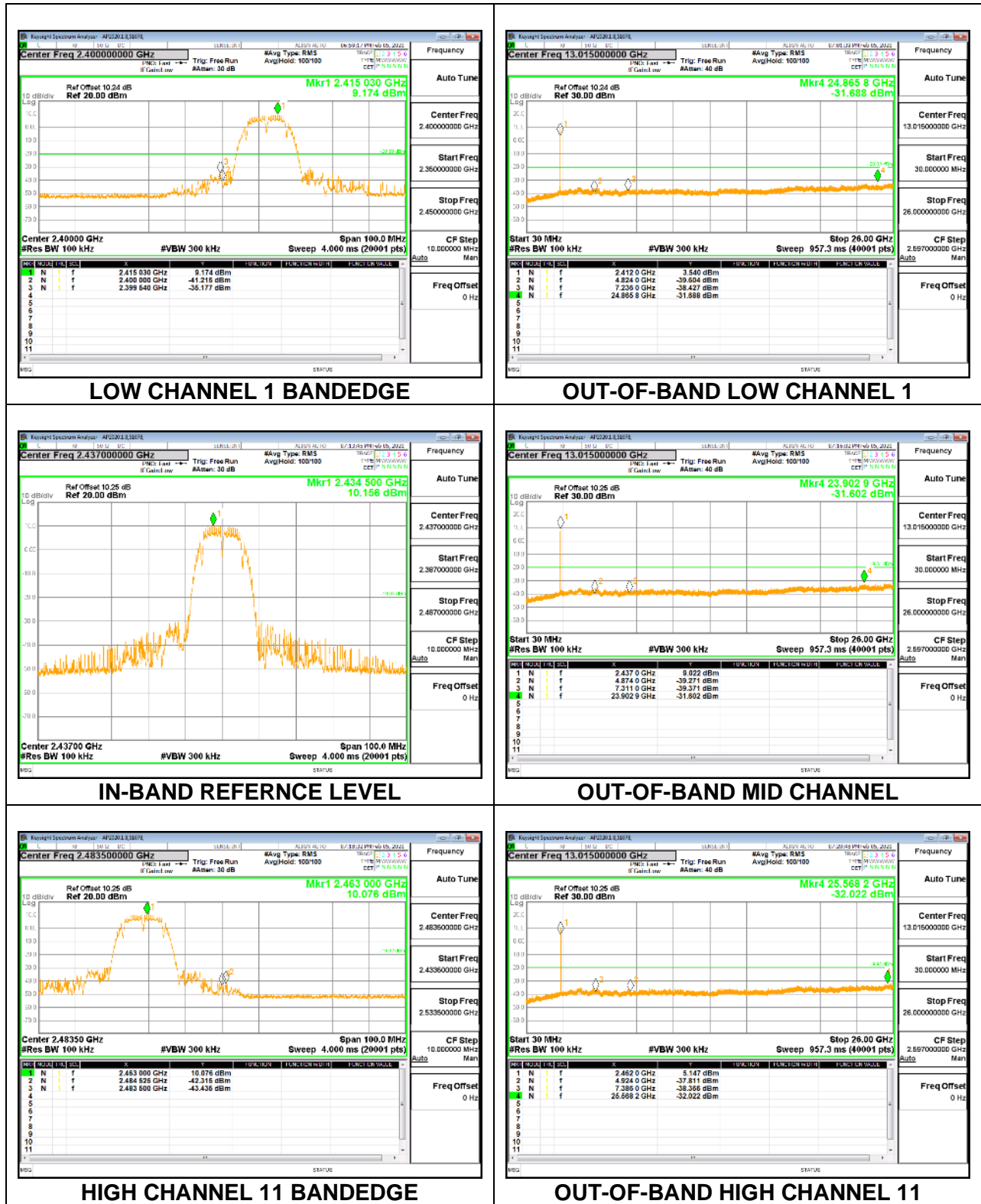
RSS-247 5.5

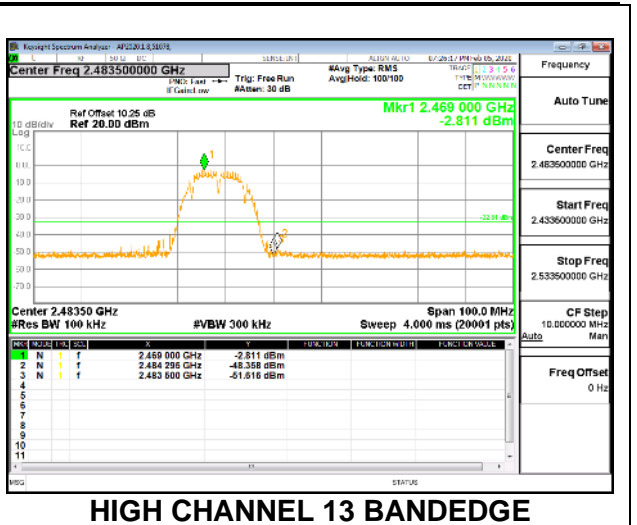
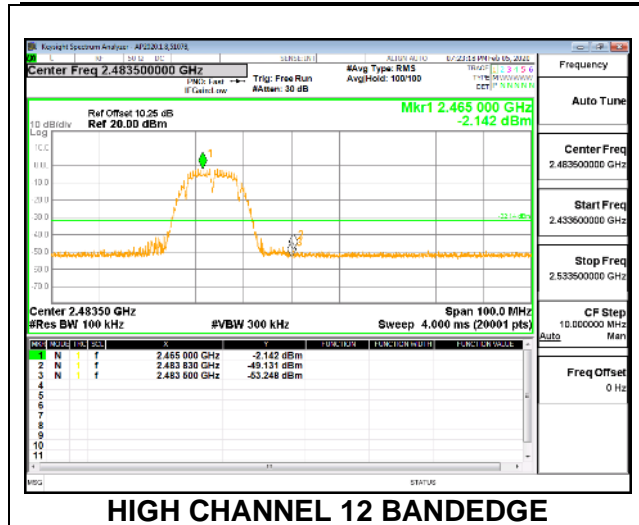
Output power was measured based on the use of average measurement, therefore the required attenuation is 30 dB.

### RESULTS

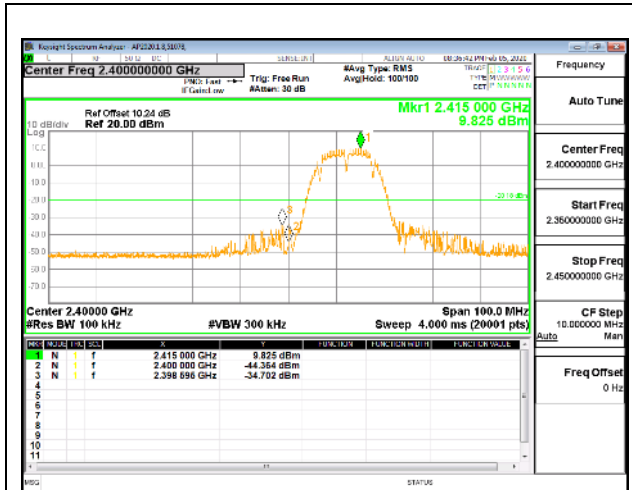
### 9.5.1. 802.11b MODE

#### 1TX Antenna 1 MODE

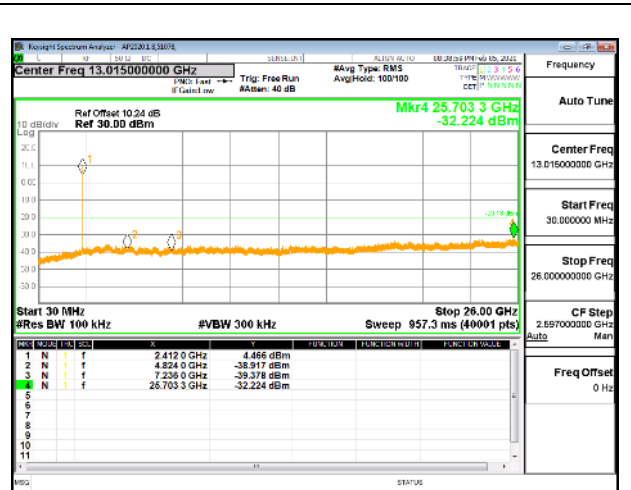




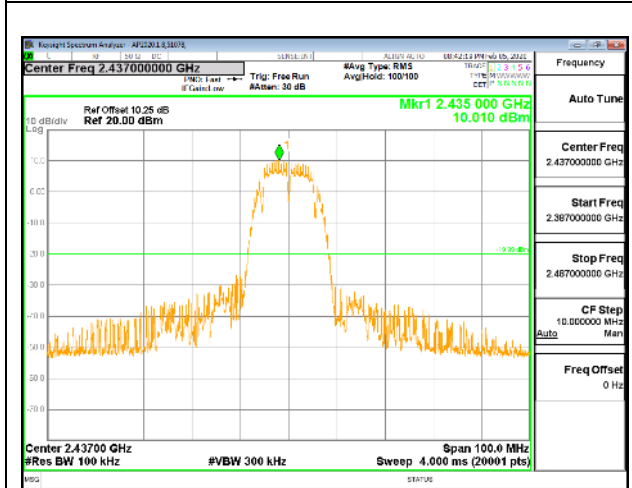
**1TX Antenna 2 MODE**



**LOW CHANNEL 1 BANDEDGE**



**OUT-OF-BAND LOW CHANNEL 1**



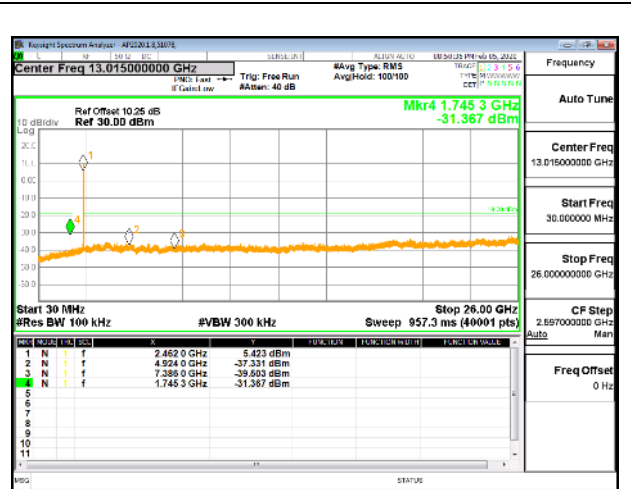
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**

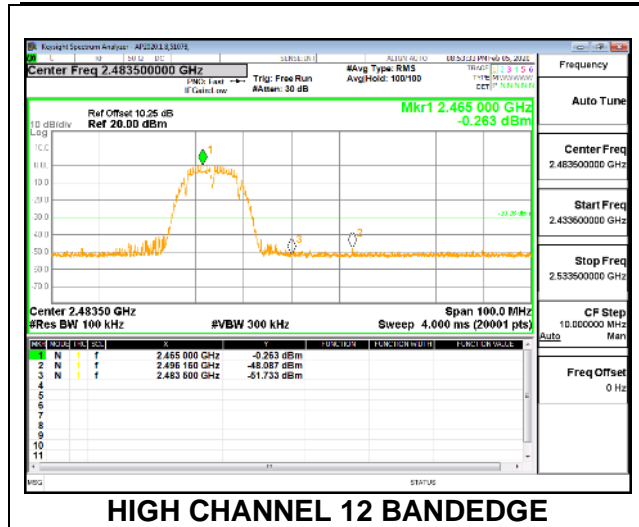


**HIGH CHANNEL 11 BANDEDGE**

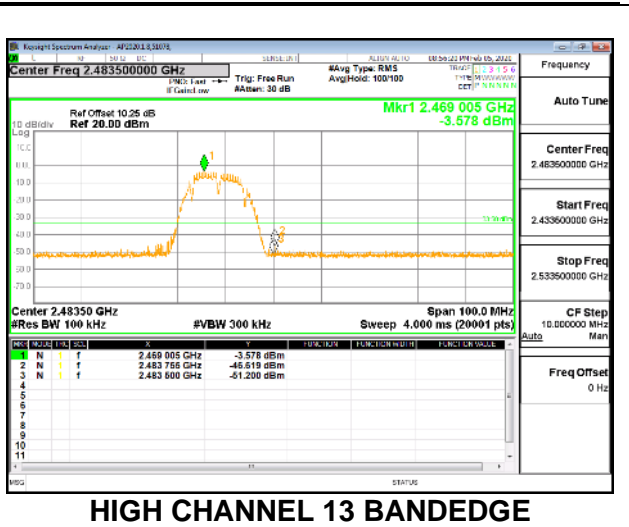


**OUT-OF-BAND HIGH CHANNEL 11**





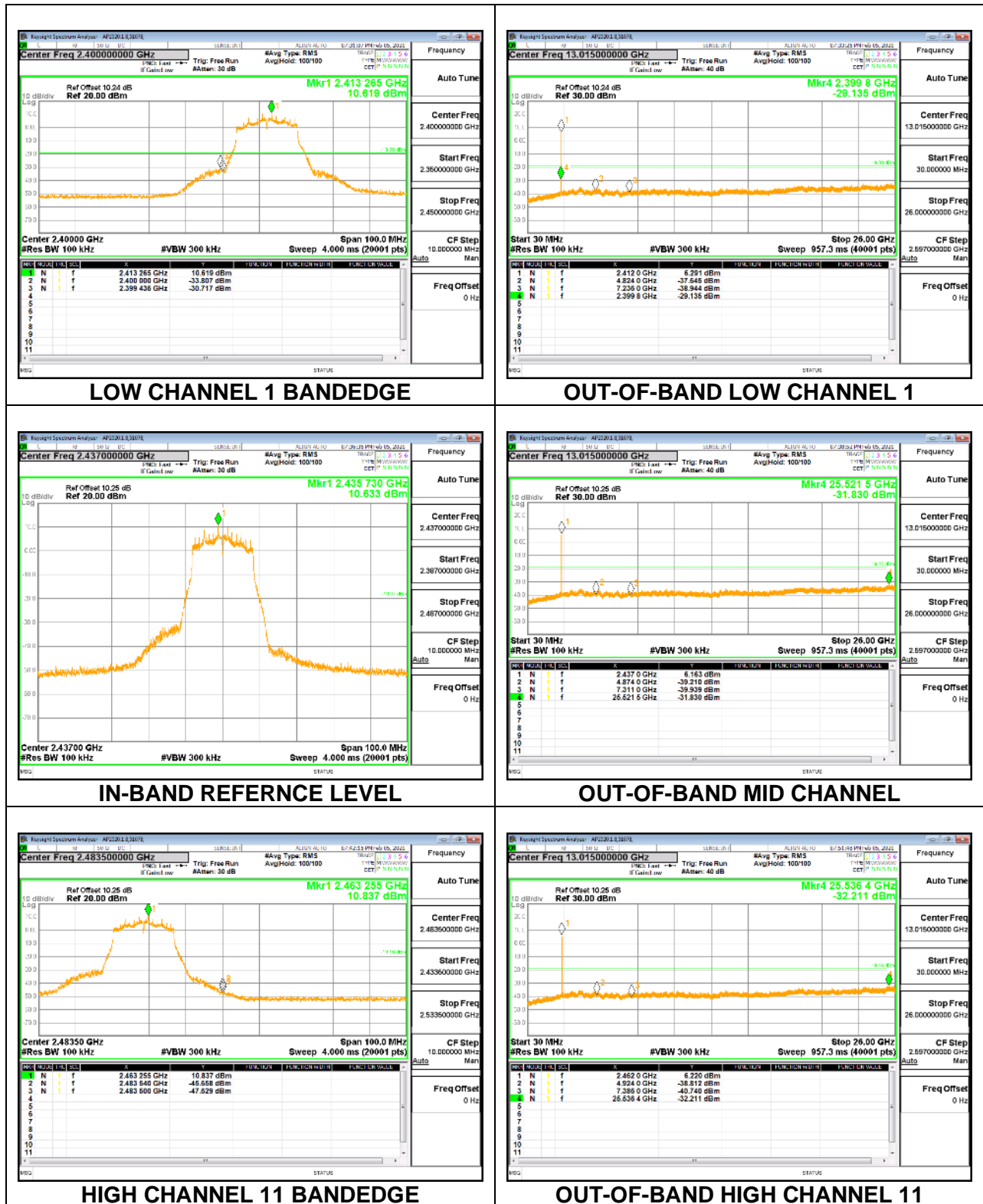
**HIGH CHANNEL 12 BANDEDGE**

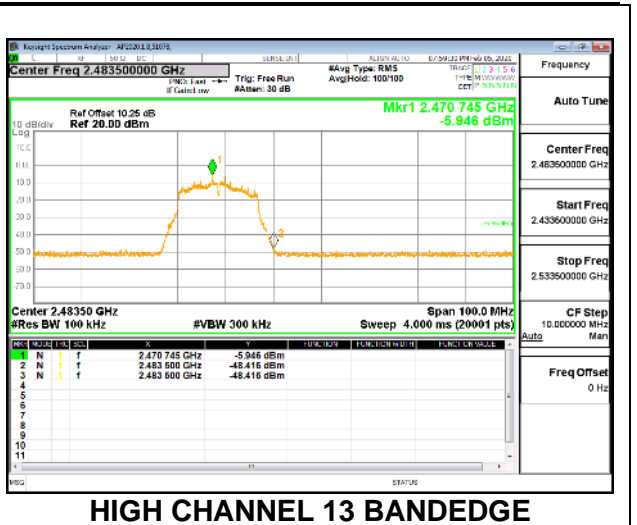
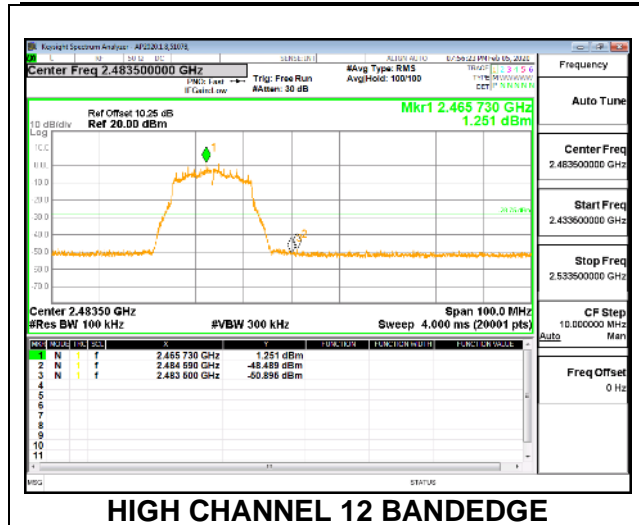


**HIGH CHANNEL 13 BANDEDGE**

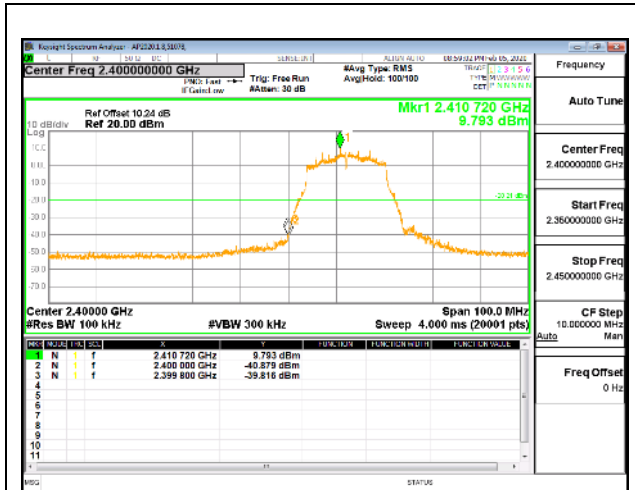
9.5.2. 802.11g MODE

1TX Antenna 1 MODE

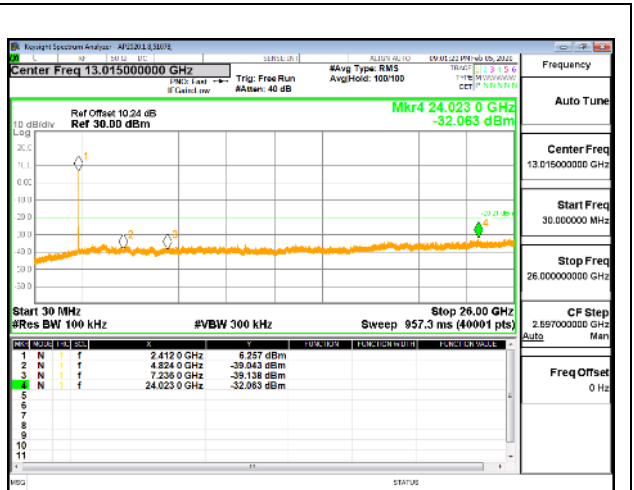




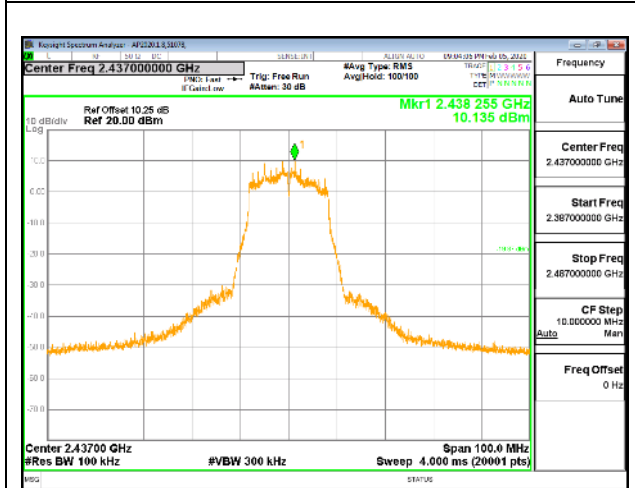
**1TX Antenna 2 MODE**



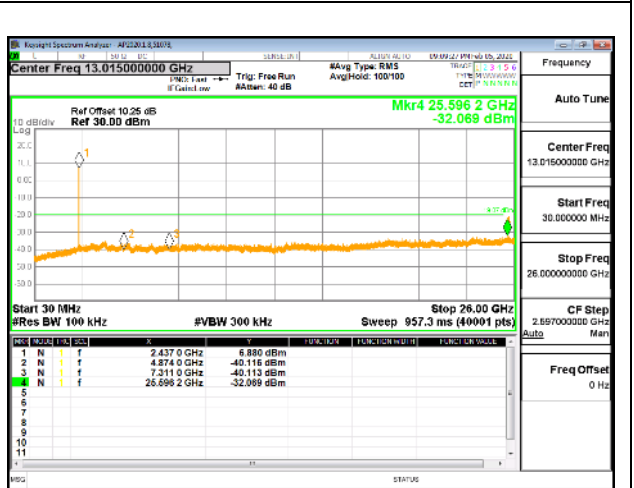
**LOW CHANNEL 1 BANDEDGE**



**OUT-OF-BAND LOW CHANNEL 1**



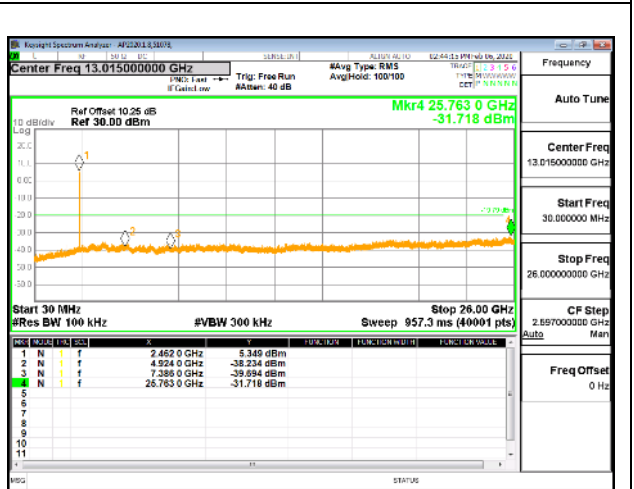
**IN-BAND REFERENCE LEVEL**



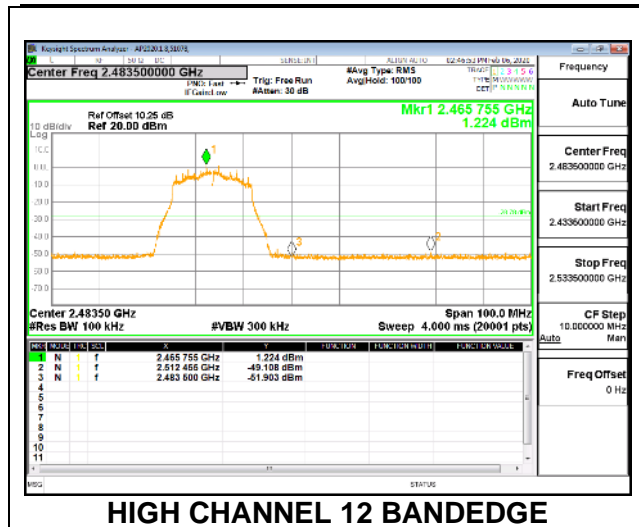
**OUT-OF-BAND MID CHANNEL**



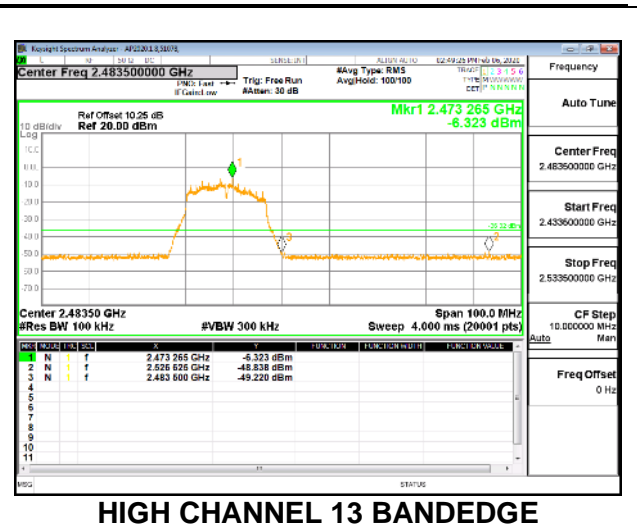
**HIGH CHANNEL 11 BANDEDGE**



**OUT-OF-BAND HIGH CHANNEL 11**



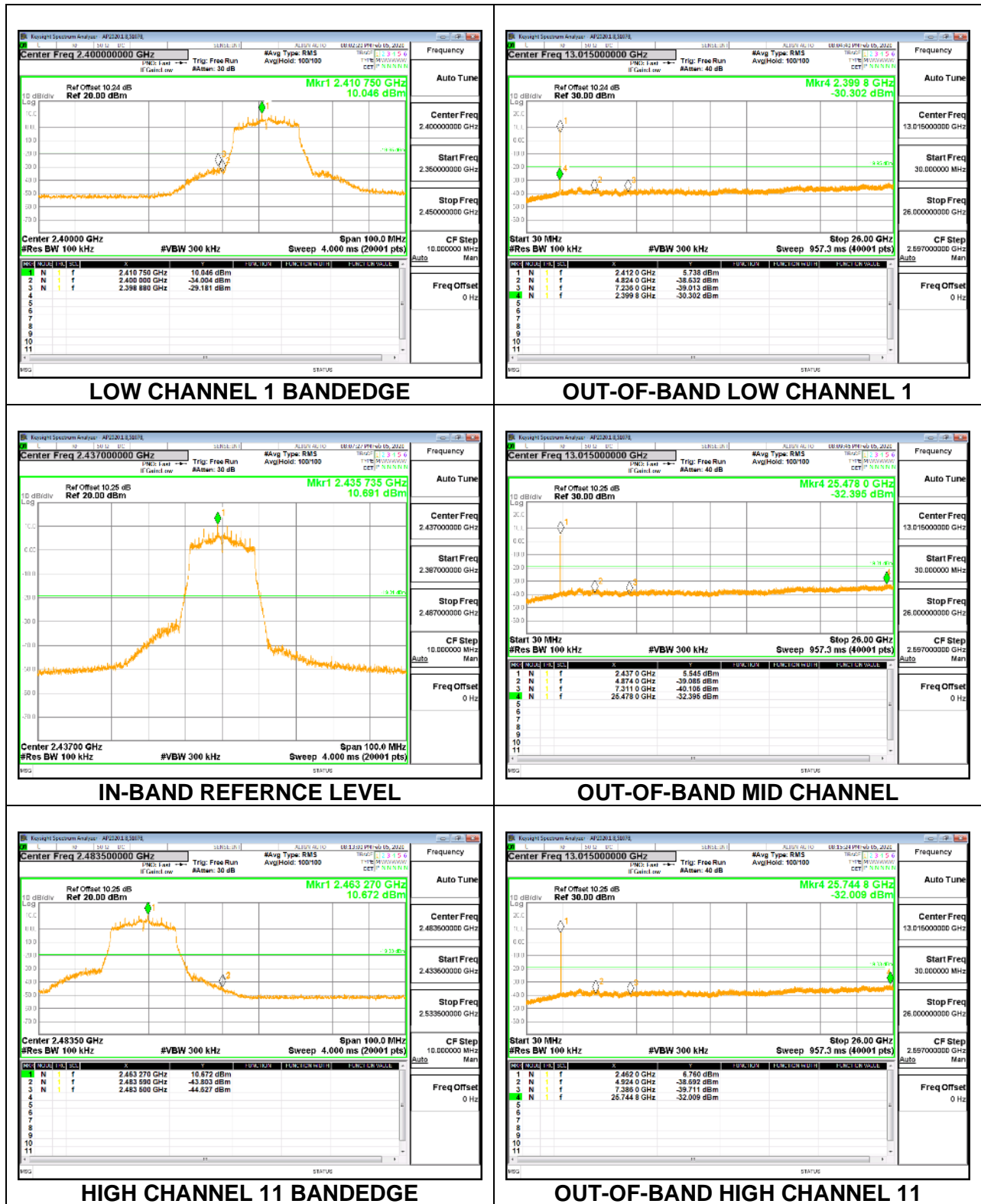
**HIGH CHANNEL 12 BANDEDGE**

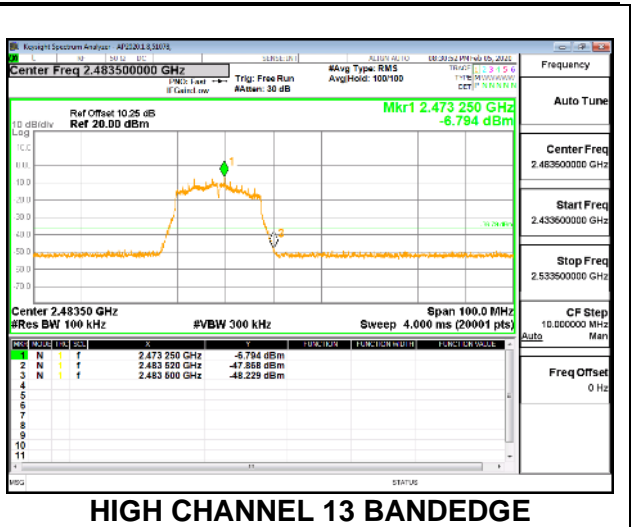
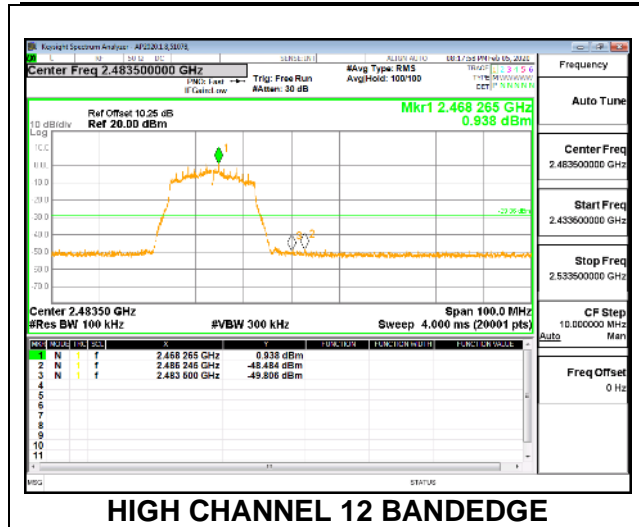


**HIGH CHANNEL 13 BANDEDGE**

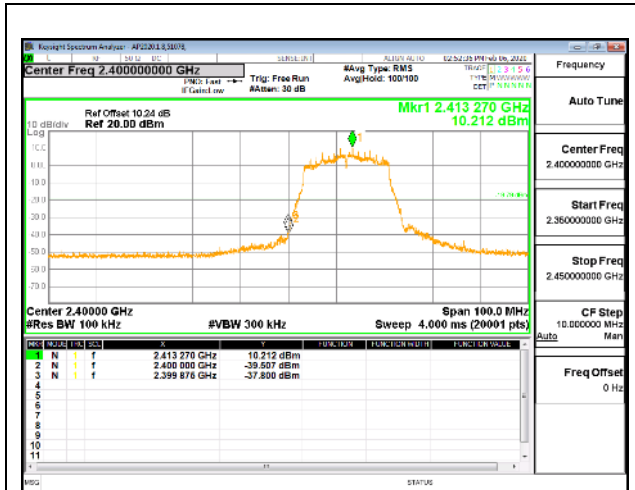
9.5.3. 802.11n HT20 MODE

1TX Antenna 1 MODE

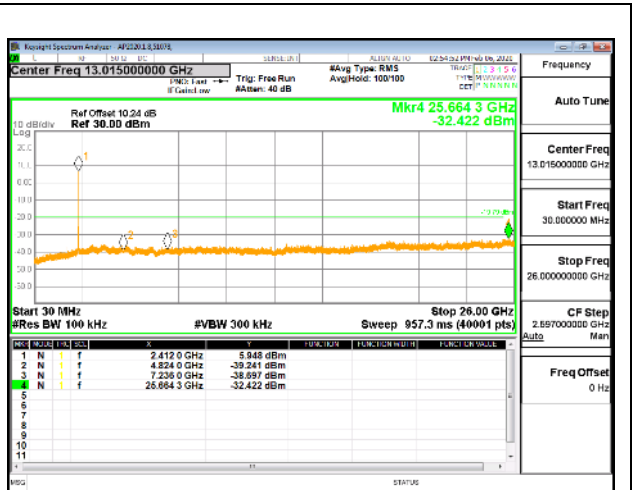




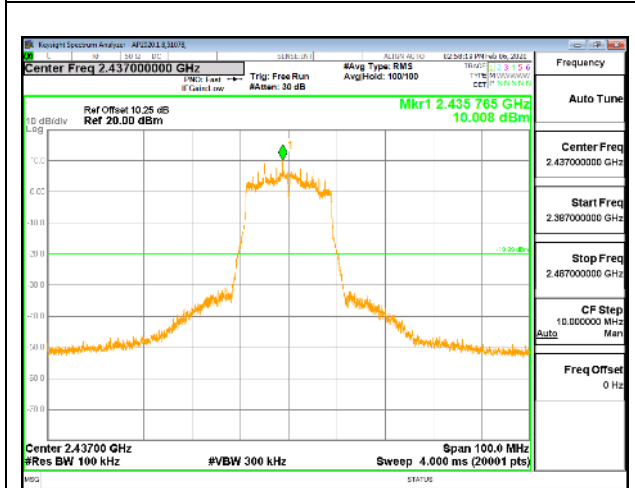
**1TX Antenna 2 MODE**



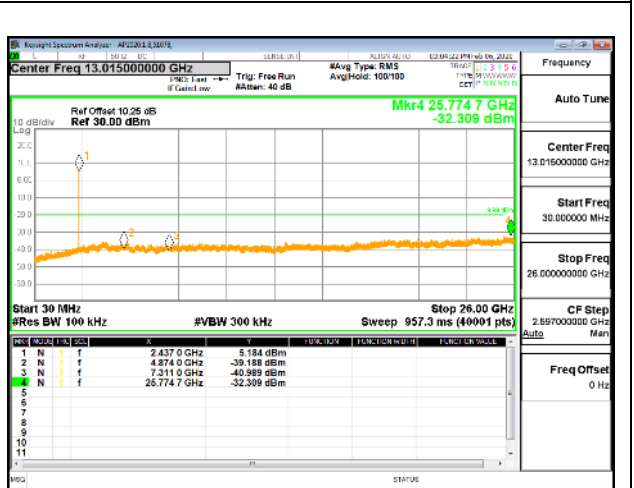
**LOW CHANNEL 1 BANDEDGE**



**OUT-OF-BAND LOW CHANNEL 1**



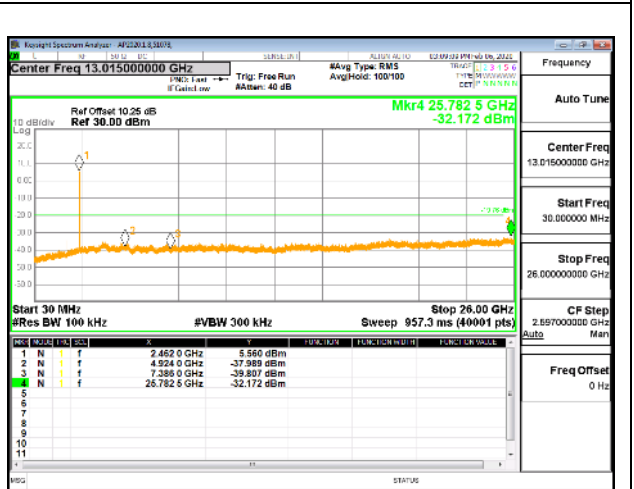
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**

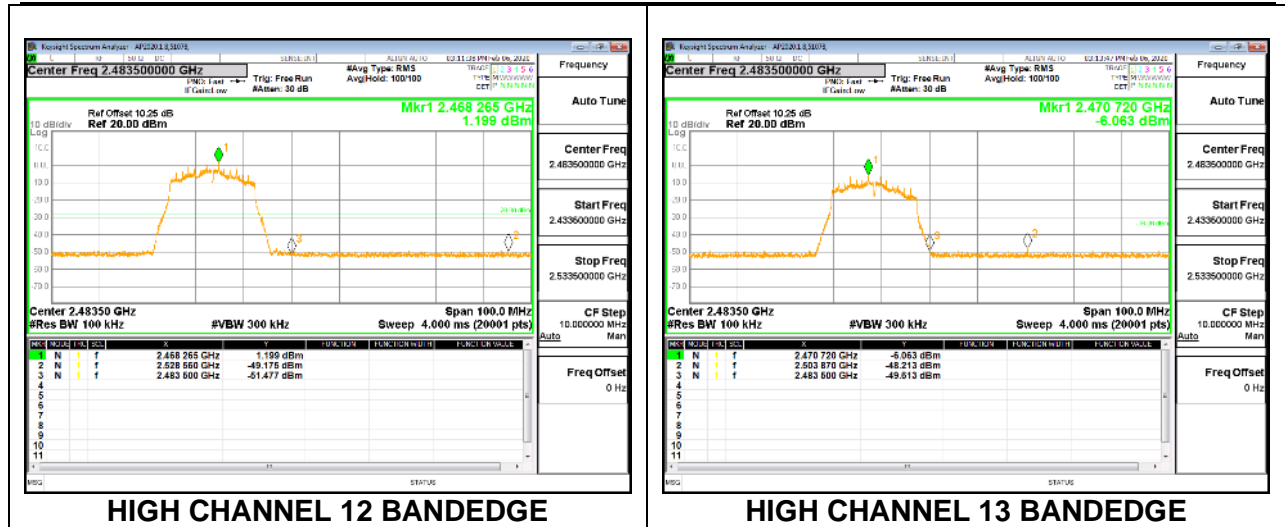


**HIGH CHANNEL 11 BANDEDGE**



**OUT-OF-BAND HIGH CHANNEL 11**





## 10. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209

| Limits for radiated disturbance of an intentional radiator |                 |                          |
|--|-----------------|--------------------------|
| Frequency range (MHz)                                      | Limits (µV/m)   | Measurement Distance (m) |
| 0.009 – 0.490  | 2400 / F (kHz)  | 300                      |
| 0.490 – 1.705  | 24000 / F (kHz) | 30                       |
| 1.705 – 30.0   | 30              | 30                       |
| 30 – 88  | 100**           | 3                        |
| 88 - 216   | 150**           | 3                        |
| 216 – 960  | 200**           | 3                        |
| Above 960  | 500             | 3                        |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

| MHz               | MHz                 | MHz            | MHz             | GHz          | GHz           |
|-------------------|---------------------|----------------|-----------------|--------------|---------------|
| 0.009 ~ 0.110     | 8.41425 ~ 8.41475   | 108 ~ 121.94   | 1300 ~ 1427     | 4.5 ~ 5.15   | 14.47 ~ 14.5  |
| 0.495 ~ 0.505     | 12.29 ~ 12.293      | 123 ~ 138      | 1435 ~ 1626.5   | 5.35 ~ 5.46  | 15.35 ~ 16.2  |
| 2.1735 ~ 2.1905   | 12.51975 ~ 12.52025 | 149.9 ~ 150.05 | 1645.5 ~ 1646.5 | 7.25 ~ 7.75  | 17.7 ~ 21.4   |
| 4.125 ~ 4.128     | 12.57675 ~ 12.57725 | 156.52475 ~    | 1660 ~ 1710     | 8.025 ~ 8.5  | 22.01 ~ 23.12 |
| 4.17725 ~ 4.17775 | 13.36 ~ 13.41       | 156.52525      | 1718.8 ~ 1722.2 | 9.0 ~ 9.2    | 23.6 ~ 24.0   |
| 4.20725 ~ 4.20775 | 16.42 ~ 16.423      | 156.7 ~ 156.9  | 2200 ~ 2300     | 9.3 ~ 9.5    | 31.2 ~ 31.8   |
| 6.215 ~ 6.218     | 16.69475 ~ 16.69525 | 162.0125 ~     | 2310 ~ 2390     | 10.6 ~ 12.7  | 36.43 ~ 36.5  |
| 6.26775 ~ 6.26825 | 16.80425 ~ 16.80475 | 167.17         | 2483.5 ~ 2500   | 13.25 ~ 13.4 | Above 38.6    |
| 6.31175 ~ 6.31225 | 25.5 ~ 25.67        | 167.72 ~ 173.2 | 2655 ~ 2900     |              |               |
| 8.291 ~ 8.294     | 37.5 ~ 38.25        | 240 ~ 285      | 3260 ~ 3267     |              |               |
| 8.362 ~ 8.366     | 73 ~ 74.6           | 322 ~ 335.4    | 3332 ~ 3339     |              |               |
| 8.37625 ~ 8.38675 | 74.8 ~ 75.2         | 399.90 ~ 410   | 3345.8 ~ 3358   |              |               |
|                   |                     | 608 ~ 614      | 3600 ~ 4400     |              |               |
|                   |                     | 960 ~ 1240     |                 |              |               |

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1 GHz and 150 cm for above 1 GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted bandedge, Final detection of spurious harmonic emissions)  
Duty cycle factor=  $10\log(1/x)$  For this sample B mode = 0dB (duty cycle >98%); G mode = 0dB (duty cycle >98%); N mode = 0dB (duty cycle >98%).

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.  
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9 kHz to 30 MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).  
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

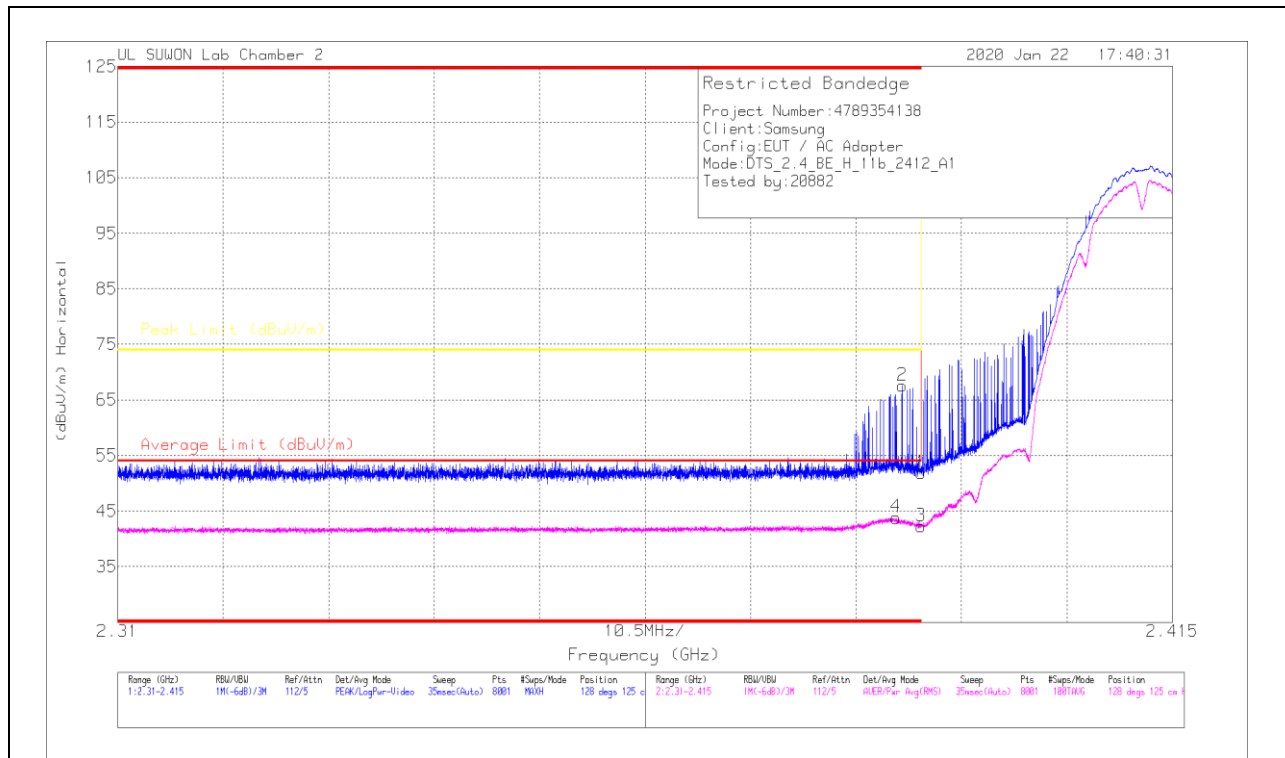
## 10.1. TRANSMITTER ABOVE 1 GHz

### 10.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

#### 1TX Antenna 1 MODE

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



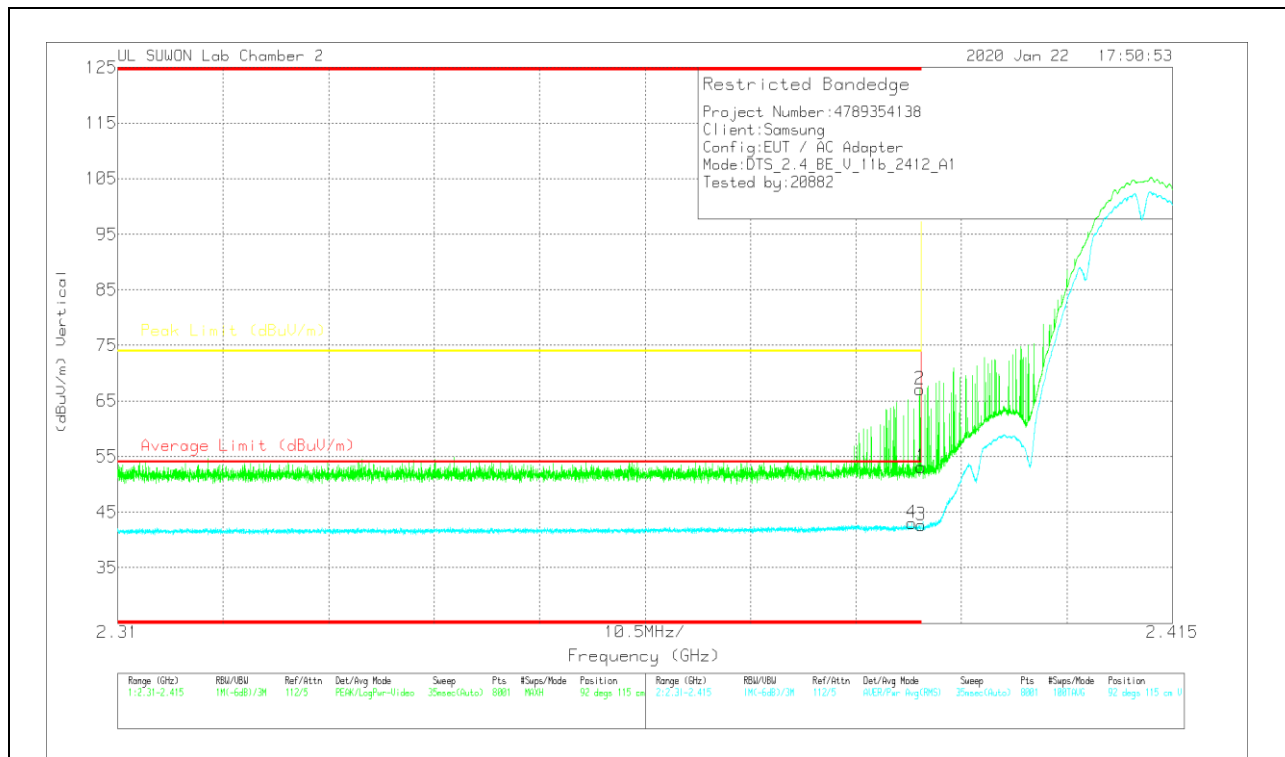
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 40.88                | Pk  | 31.6          | -20.6        | 0            | 51.88                      | -                      | -           | 74                  | -22.12         | 128            | 125         | H        |
| 2      | * 2.38908       | 56.54                | Pk  | 31.6          | -20.6        | 0            | 67.54                      | -                      | -           | 74                  | -6.46          | 128            | 125         | H        |
| 3      | * 2.39          | 31.29                | RMS | 31.6          | -20.6        | 0            | 42.29                      | 54                     | -11.71      | -                   | -              | 128            | 125         | H        |
| 4      | * 2.3975        | 32.84                | RMS | 31.6          | -20.6        | 0            | 43.84                      | 54                     | -10.16      | -                   | -              | 128            | 125         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

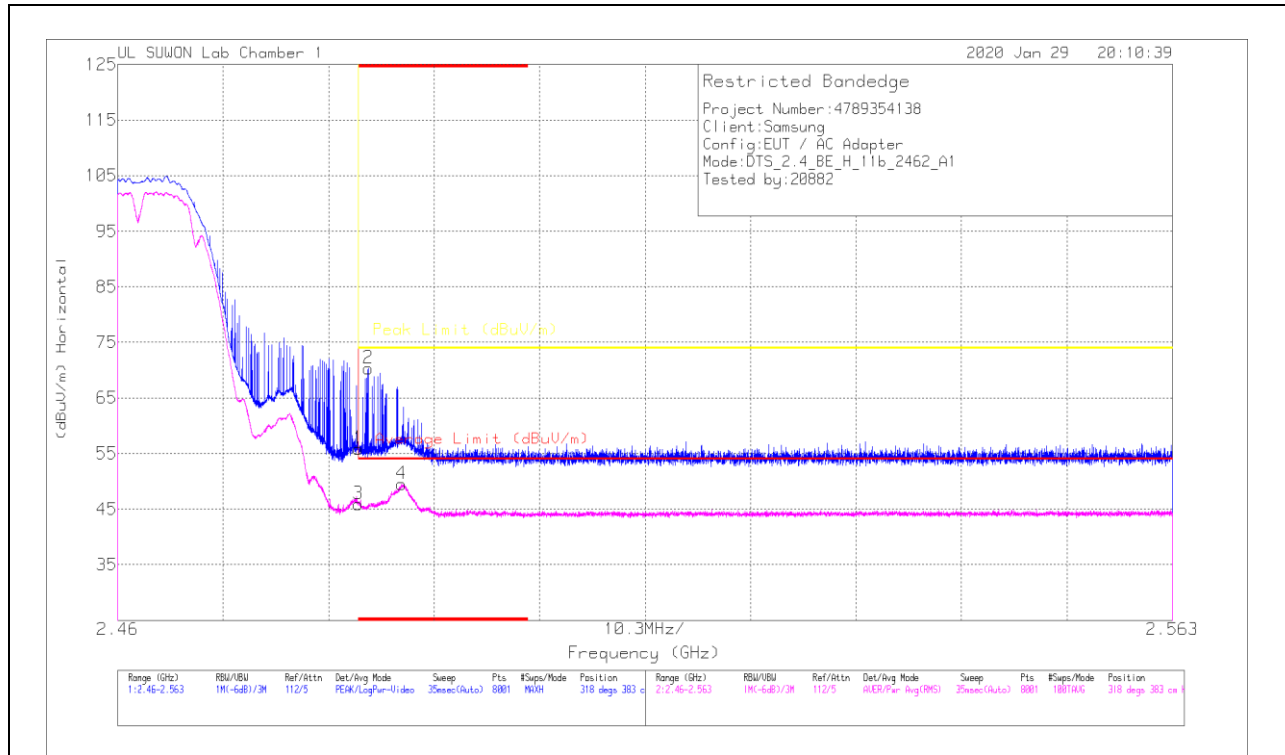


| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 42.07                | Pk  | 31.6          | -20.6        | 0            | 53.07                      | -                      | -           | 74                  | -20.93         | 92             | 115         | V        |
| 2      | * 2.38383       | 56.12                | Pk  | 31.6          | -20.6        | 0            | 67.12                      | -                      | -           | 74                  | -6.88          | 92             | 115         | V        |
| 3      | * 2.39          | 31.63                | RMS | 31.6          | -20.6        | 0            | 42.63                      | 54                     | -11.37      | -                   | -              | 92             | 115         | V        |
| 4      | * 2.38904       | 32.05                | RMS | 31.6          | -20.6        | 0            | 43.05                      | 54                     | -10.95      | -                   | -              | 92             | 115         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**BANDEDGE (HIGH CHANNEL, CH 11)**

**HORIZONTAL RESULT**



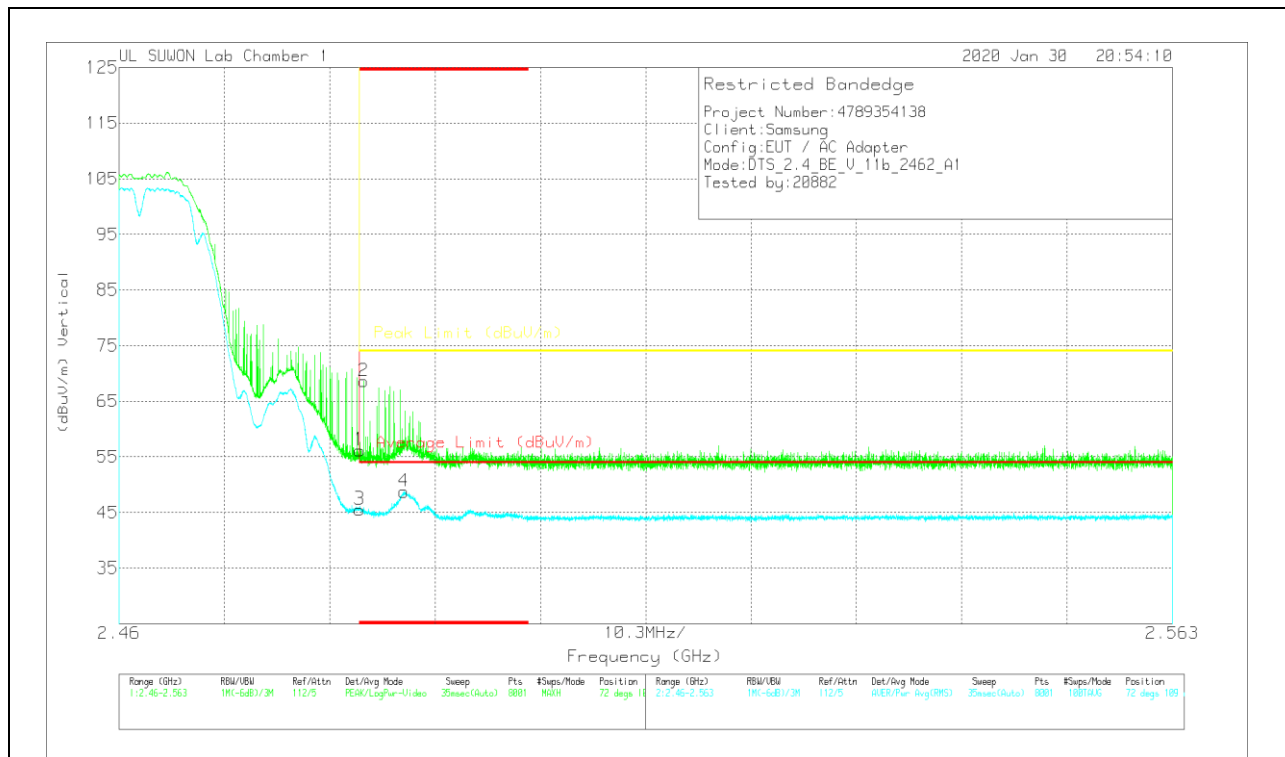
| Marker | Frequency (GHz) | Meas Reading (dBuV) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|---------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 44.32               | Pk  | 31.9          | -20.4        | 0            | 55.82                      | -                      | -           | 74                  | -18.18         | 318            | 383         | H        |
| 2      | * 2.48445       | 58.83               | Pk  | 31.9          | -20.4        | 0            | 70.33                      | -                      | -           | 74                  | -3.67          | 318            | 383         | H        |
| 3      | * 2.48351       | 34.4                | RMS | 31.9          | -20.4        | 0            | 45.9                       | 54                     | -8.1        | -                   | -              | 318            | 383         | H        |
| 4      | * 2.48775       | 38.11               | RMS | 31.9          | -20.5        | 0            | 49.51                      | 54                     | -4.49       | -                   | -              | 318            | 383         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV/m) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|------------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 44.68                  | Pk  | 31.9          | -20.4        | 0            | 56.19                      | -                      | -           | 74                  | -17.82         | 72             | 109         | V        |
| 2      | * 2.48392       | 57.12                  | Pk  | 31.9          | -20.4        | 0            | 68.62                      | -                      | -           | 74                  | -5.38          | 72             | 109         | V        |
| 3      | * 2.48351       | 34.03                  | RMS | 31.9          | -20.4        | 0            | 45.53                      | 54                     | -8.47       | -                   | -              | 72             | 109         | V        |
| 4      | * 2.48785       | 37.37                  | RMS | 31.9          | -20.5        | 0            | 48.77                      | 54                     | -5.23       | -                   | -              | 72             | 109         | V        |

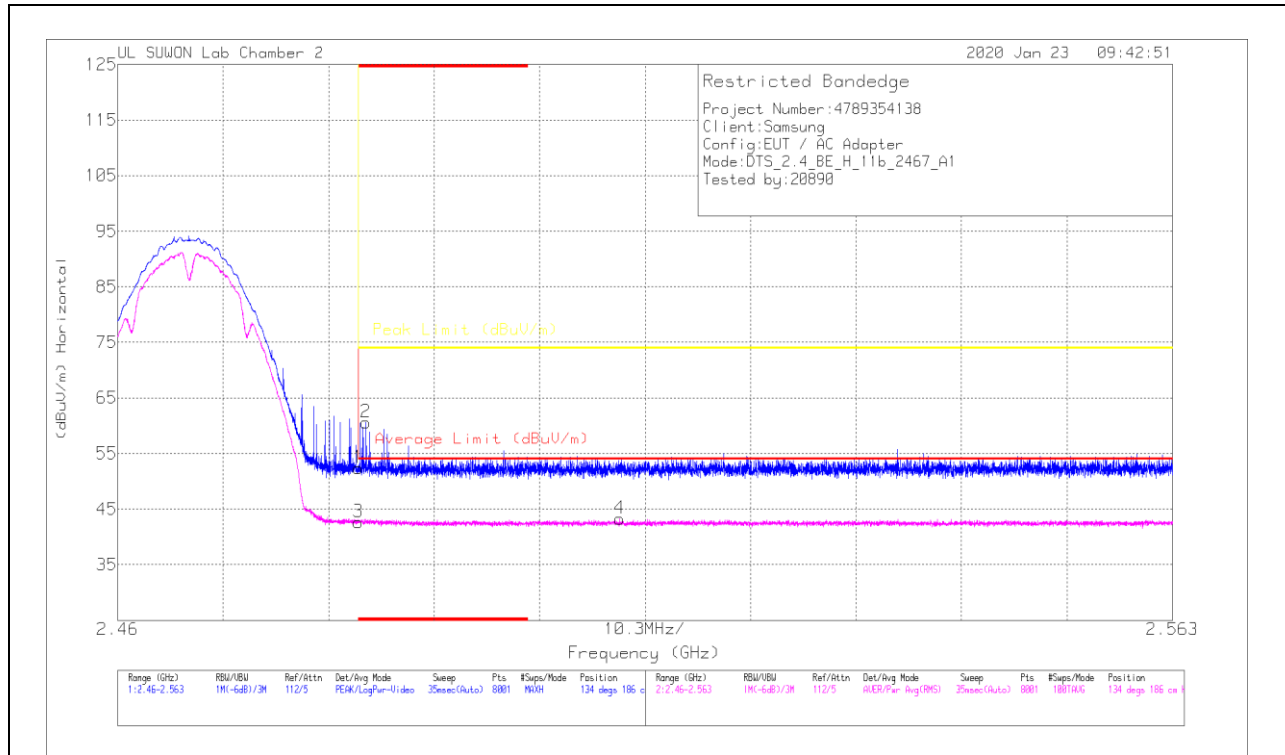
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

**BANDEDGE (HIGH CHANNEL, CH 12)**

**HORIZONTAL RESULT**

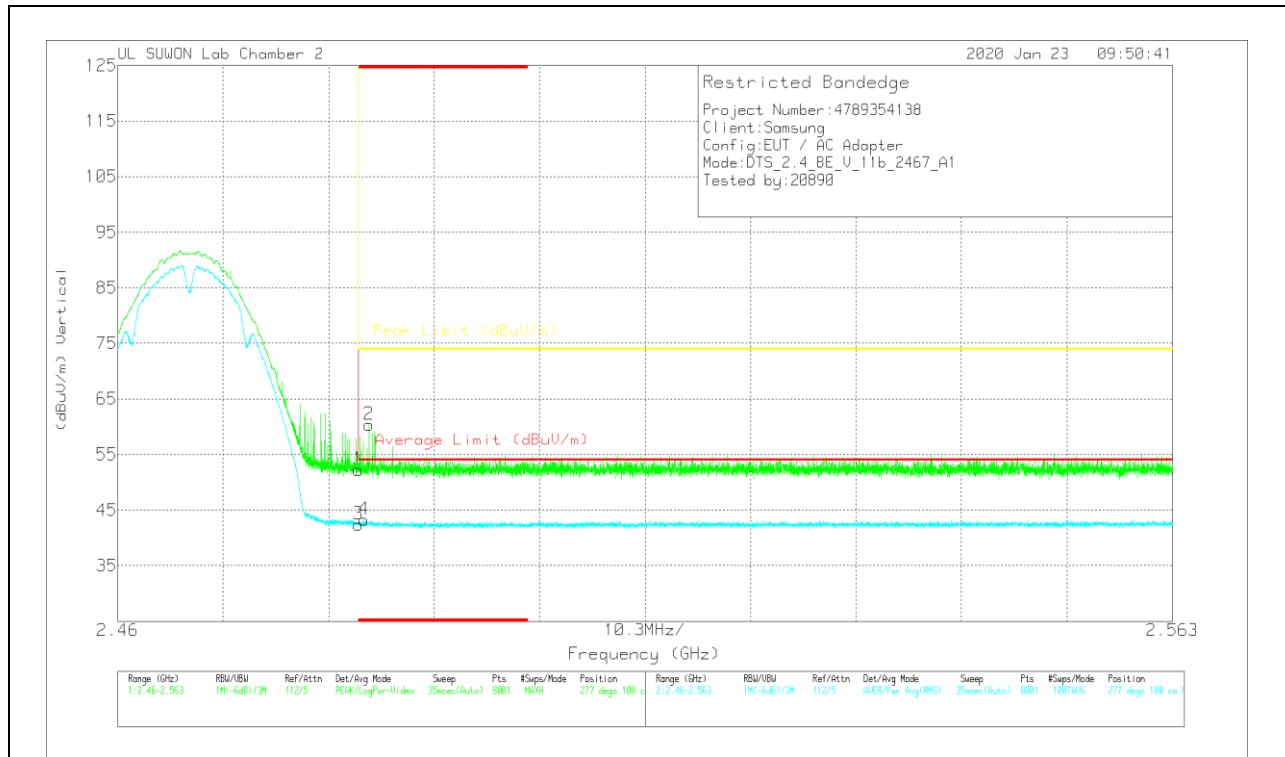


| Marker | Frequency (GHz) | Meas Reading (dBuV) | Det | 3117.00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|---------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *2.48351        | 40.93               | Pk  | -31.9         | -20.4        | 0            | 52.43                      | -                      | -           | 74                  | -21.57         | 134            | 186         | H        |
| 2      | *2.48426        | 48.15               | Pk  | -31.9         | -20.4        | 0            | 60.65                      | -                      | -           | 74                  | -13.35         | 134            | 186         | H        |
| 3      | *2.48351        | 31.15               | RMS | -31.9         | -20.4        | 0            | 42.65                      | 54                     | -11.35      | -                   | -              | 134            | 186         | H        |
| 4      | 2.509           | 31.87               | RMS | -31.9         | -20.5        | 0            | 43.27                      | 54                     | -10.73      | -                   | -              | 134            | 186         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection



### VERTICAL RESULT

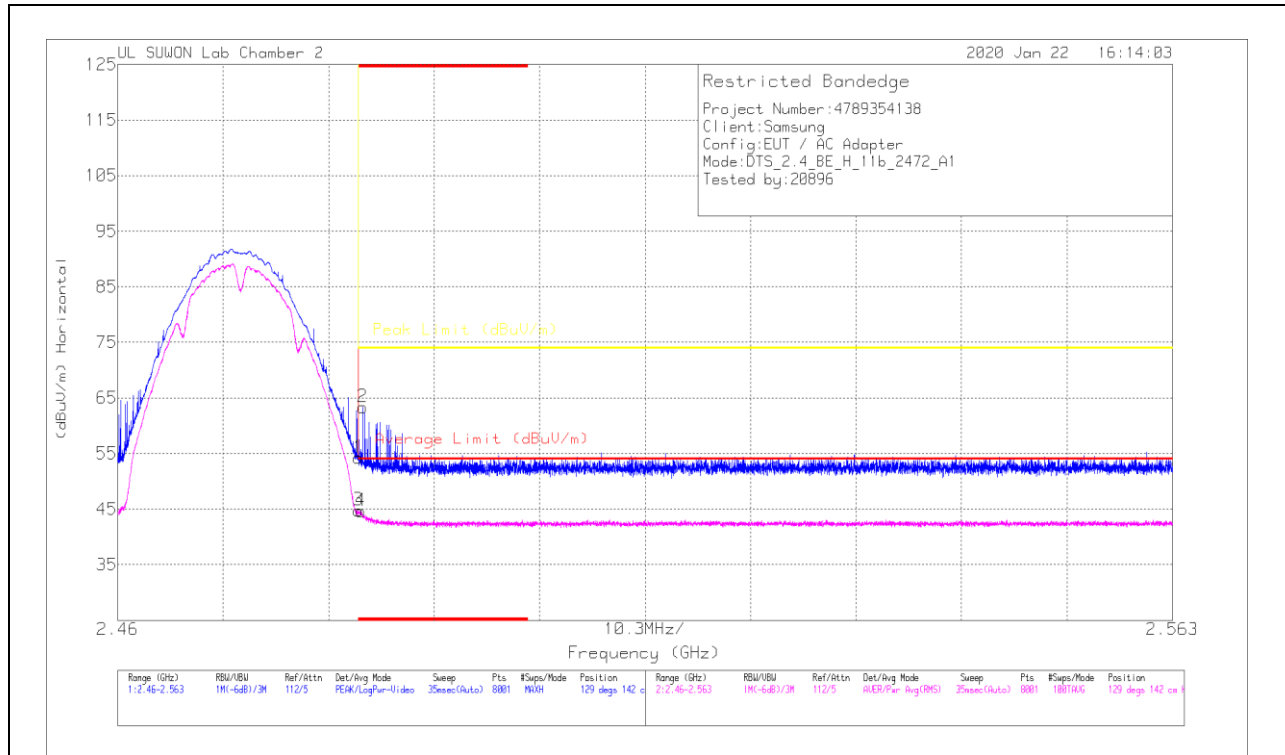


| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 40.8                 | Pk  | 31.9          | -20.4        | 0            | 52.3                       | -                      | -           | 74                  | -21.7          | 277            | 100         | V        |
| 2      | * 2.48455       | 48.87                | Pk  | 31.9          | -20.4        | 0            | 60.37                      | -                      | -           | 74                  | -13.63         | 277            | 100         | V        |
| 3      | * 2.48351       | 30.96                | RMS | 31.9          | -20.4        | 0            | 42.46                      | 54                     | -11.54      | -                   | -              | 277            | 100         | V        |
| 4      | * 2.48402       | 31.77                | RMS | 31.9          | -20.4        | 0            | 43.27                      | 54                     | -10.73      | -                   | -              | 277            | 100         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**BANDEDGE (HIGH CHANNEL, CH 13)**

**HORIZONTAL RESULT**



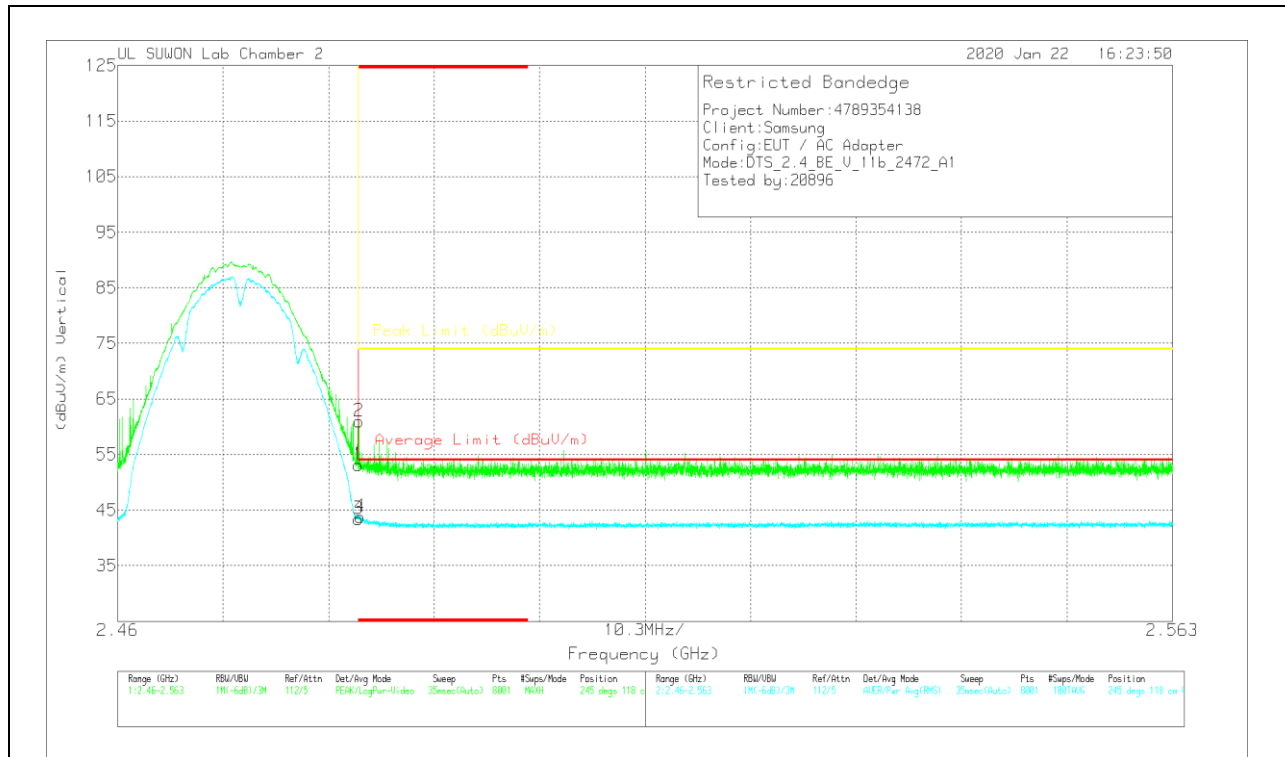
| Marker | Frequency (GHz) | Meas Reading (dBuV) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|---------------------|-----|---------------|--------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 42.73               | Pk  | -31.9         | -20.4        | 0            | 54.23                      | -                      | -           | 74                  | -19.77         | 129            | 142         | H        |
| 2      | * 2.48392       | 51.86               | Pk  | -31.9         | -20.4        | 0            | 63.36                      | -                      | -           | 74                  | -10.64         | 129            | 142         | H        |
| 3      | * 2.48351       | 33.31               | RMS | -31.9         | -20.4        | 0            | 44.81                      | 54                     | -9.19       | -                   | -              | 129            | 142         | H        |
| 4      | * 2.48375       | 33.11               | RMS | -31.9         | -20.4        | 0            | 44.81                      | 54                     | -9.39       | -                   | -              | 129            | 142         | H        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

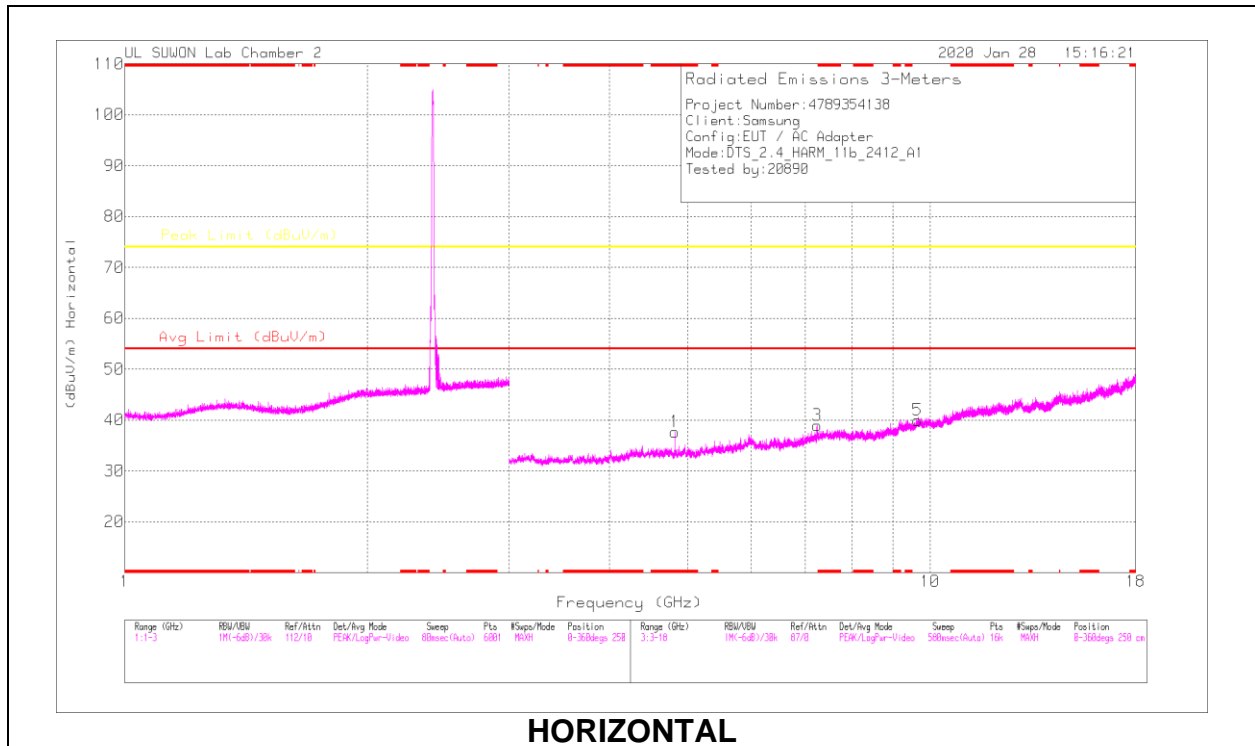


| Marker | Frequency (GHz) | Meter Reading (dBu/m) | Det | 3117_00168724 | 10dB_ATT[dB] | DC Corr (dB) | Corrected Reading (dBu/m) | Average Limit (dBu/m) | Margin (dB) | Peak Limit (dBu/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|-----------------------|-----|---------------|--------------|--------------|---------------------------|-----------------------|-------------|--------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 41.59                 | Pk  | 31.9          | -20.4        | 0            | 63.09                     | -                     | -           | 74                 | -20.91         | 245            | 118         | V        |
| 2      | * 2.48354       | 49.43                 | Pk  | 31.9          | -20.4        | 0            | 69.93                     | -                     | -           | 74                 | -13.07         | 245            | 118         | V        |
| 3      | * 2.48351       | 31.94                 | RMS | 31.9          | -20.4        | 0            | 43.44                     | 54                    | -10.56      | -                  | -              | 245            | 118         | V        |
| 4      | * 2.48366       | 32.28                 | RMS | 31.9          | -20.4        | 0            | 43.78                     | 54                    | -10.22      | -                  | -              | 245            | 118         | V        |

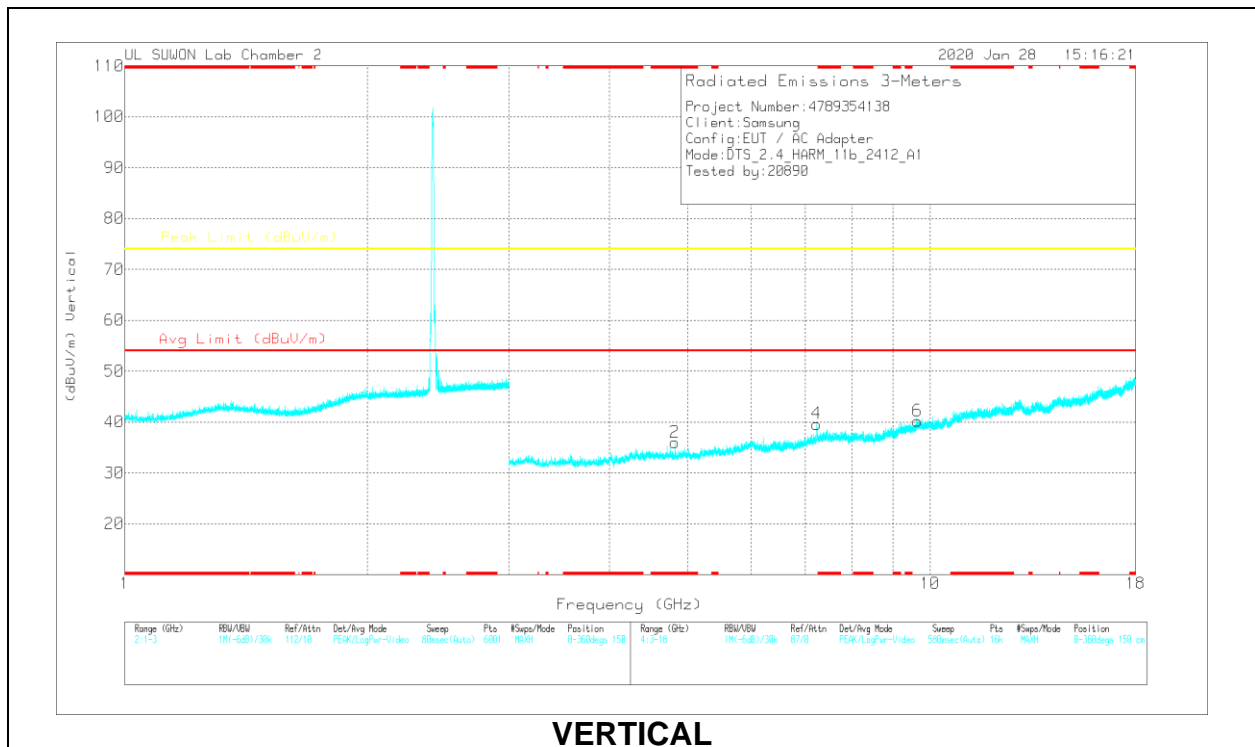
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL, CH 1 RESULTS**



**HORIZONTAL**



**VERTICAL**

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.