# Test Report

**Date : 2019-06-11** 
**No. : HM19030026**

**Applicant:** K-MARK INDUSTRIAL LIMITED
FLAT A, 7/F., MAI ON IND. BLDG. 17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG

**Supplier / Manufacturer:** K-MARK INDUSTRIAL LIMITED
FLAT A, 7/F., MAI ON IND. BLDG. 17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG

**Description of Sample(s):** Submitted sample(s) said to be

| | |
|---|---|
| Product: | Hunting camera with 2.4GHz Wi-Fi and BT 4.0 module |
| Brand Name: | GSM, LLC |
| Model No.: | FLX Camera |
| FCC ID: | VEP-FLXCAM |

**Date Samples Received:** 2019-03-28

**Date Tested:** 2019-05-10 to 2019-05-16

**Investigation Requested:** Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2018 and ANSI C63.10:2013 for FCC Certification.

**Conclusions:** The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

**Remarks:** IEEE 802.11b/g/n (HT20 and HT40)


CHEUNG Chi, Kenneth
Authorized Signatory

# Test Report



**CONTENT:**

## 1.0 General Details

### 1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
Head Office: 10 Dai Wang Street, Taipo Industrial Estate, Tai Po, N.T., Hong Kong
Telephone: 852 2666 1888
Fax: 852 2664 4353

### 1.2 Equipment Under Test [EUT]

**Description of Sample(s)**

| | |
|---|---|
| Product: | Hunting camera with 2.4GHz Wi-Fi and BT 4.0 module |
| Manufacturer: | K-mark industrial limited<br>Flat a, 7/f., mai on ind. Bldg. 17-21 kung yip street, kwai chung, hong kong |
| Brand Name: | GSM, LLC |
| Model Number: | FLX Camera |
| Rating: | "AA" x8 = 12Vd.c / 12Vd.c from Lead-acid battery through DC jack |

### 1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Hunting camera with wireless function. The tests were conducted under RF Test mode to maintain continuous transmission (>98% duty cycle) during test. The transmission signal is digital modulated with channel frequency range 2412-2472MHz. The R.F. signal was modulated by IC; the type of modulation used was DSSS and OFDM. The EUT does not supported Ad-Hoc function.

### 1.3 Date of Order

2019-03-28

### 1.4 Submitted Sample(s):

1 Sample

### 1.5 Test Duration

2019-05-10 to 2019-05-16

### 1.6 Country of Origin

China

### 1.7 RF Module Details

802.11b/g/n

| | |
|---|---|
| Module Model Number: | RTL8189ES |
| Module FCC ID: | N/A |
| Module Transmission Type: | 802.11 b/g/n |
| Modulation: | DSSS, OFDM |
| Data Rates: | 300Mbps (Max) |
| Frequency Range: | 2400-2483.5MHz |
| Carrier Frequencies: | 2412MHz – 2472MHz |

Bluetooth (BLE)

| | |
|---|---|
| Module Model Number: | RYB070I |
| Module FCC ID: | QLY-RYB070I |
| Module Transmission Type: | BLE |
| Modulation: | GFSK |
| Data Rates: | 1Mbps (Max) |
| Frequency Range: | 2400-2483.5MHz |
| Carrier Frequencies: | 2402MHz – 2480MHz |

Module Specification (specification provided by manufacturer)

### 1.8 Channel List

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 1 | 2412 | 8 | 2447 |
| 2 | 2417 | 9 | 2452 |
| 3 | 2422 | 10 | 2457 |
| 4 | 2427 | 11 | 2462 |
| 5 | 2432 | 12 | 2467 |
| 6 | 2437 | 13 | 2472 |
| 7 | 2442 | -- | -- |

## 2.0 Technical Details

### 2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2017 Regulations and ANSI C63.10:2013 for FCC Certification.
According FCC KDB 558074 DTS Measurement Guidance, Duty cycle ≧98%.
The device was realized by test software.

### 2.2 Test Standards and Results Summary Tables

| EMISSION<br>Results Summary | | | | | | |
|---|---|---|---|---|---|---|
| Test Condition | Test Requirement | Test Method | Class / Severity | Test Result | | |
| | | | | Pass | Failed | N/A |
| Maximum Peak Output Power | FCC 47CFR 15.247(b)(3) | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| Radiated Spurious Emissions | FCC 47CFR 15.209 | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| AC Mains Conducted Emissions | FCC 47CFR 15.207 | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| Power Spectral Density | FCC 47CFR 15.247(e) | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| 6dB Bandwidth | FCC 47CFR 15.247(a)(2) | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| Band Edge Emissions (Radiated) | FCC 47CFR 15.247(d) | ANSI C63.10: 2013 | N/A | ☒ | ☐ | ☐ |
| Antenna requirement | FCC 47CFR 15.203 | N/A | N/A | ☒ | ☐ | ☐ |
| RF Exposure | FCC 47CFR 15.247(i) | N/A | N/A | ☒ | ☐ | ☐ |

Note: N/A - Not Applicable

## 3.0 Test Results

### 3.1 Emission

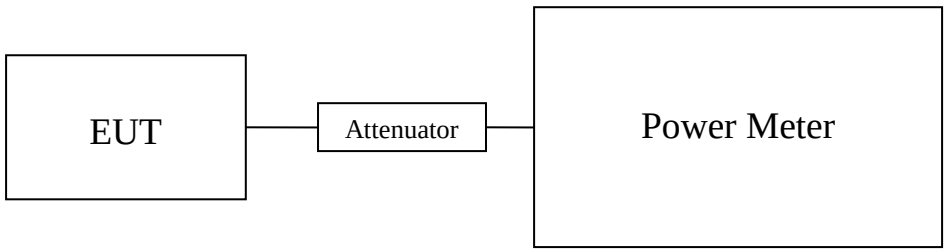
#### 3.1.1 Maximum Peak Output Power

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(b)(3) |
| Test Method: | ANSI C63.10: 2013 |
| Test Date: | 2019-05-10 |
| Mode of Operation: | Tx mode (802.11b/g/n) |

**Test Method:**

The RF output of the EUT was connected to the Power Meter. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in Watt.

**Test Setup:**



**Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:**

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

**Results of Tx Mode: Pass (TX Unit) (802.11b)**
**Maximum conducted output power**

| Channel | Frequency(MHz) | Output Power(Watt) |
|---|---|---|
| 1 | 2412 | 0.0041 |
| 7 | 2442 | 0.0044 |
| 13 | 2472 | 0.0066 |

**Results of Tx Mode: Pass (TX Unit) (802.11g)**
**Maximum conducted output power**

| Channel | Frequency(MHz) | Output Power(Watt) |
|---|---|---|
| 1 | 2412 | 0.0035 |
| 7 | 2442 | 0.0042 |
| 13 | 2472 | 0.0054 |

**Results of Tx Mode: Pass (TX Unit) (802.11n(HT20))**
**Maximum conducted output power**

| Channel | Frequency(MHz) | Output Power(Watt) |
|---|---|---|
| 1 | 2412 | 0.0033 |
| 7 | 2442 | 0.0043 |
| 13 | 2472 | 0.0051 |

**Results of Tx Mode: Pass (TX Unit) (802.11(HT40))**
**Maximum conducted output power**

| Channel | Frequency(MHz) | Output Power(Watt) |
|---|---|---|
| 3 | 2422 | 0.0033 |
| 7 | 2442 | 0.0036 |
| 11 | 2462 | 0.0043 |

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 26GHz 1.7dB

### 3.1.2 Radiated Emissions

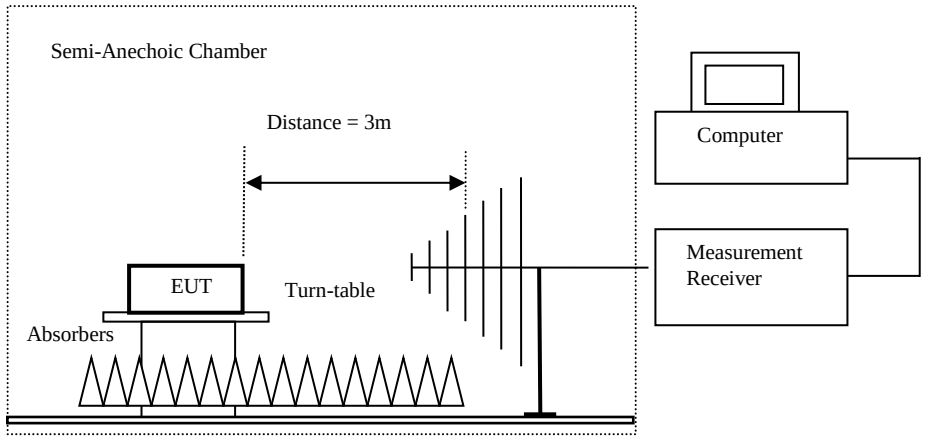
| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.209 |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2019-05-13 |
| Mode of Operation: | Tx mode (802.11 b/g/n) |

**Test Method:**

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The measured field strength would be calculated as EIRP.

Semi-anechoic chamber located at STC filed with Industry Canada File Number: 4789A

**Test Setup:**



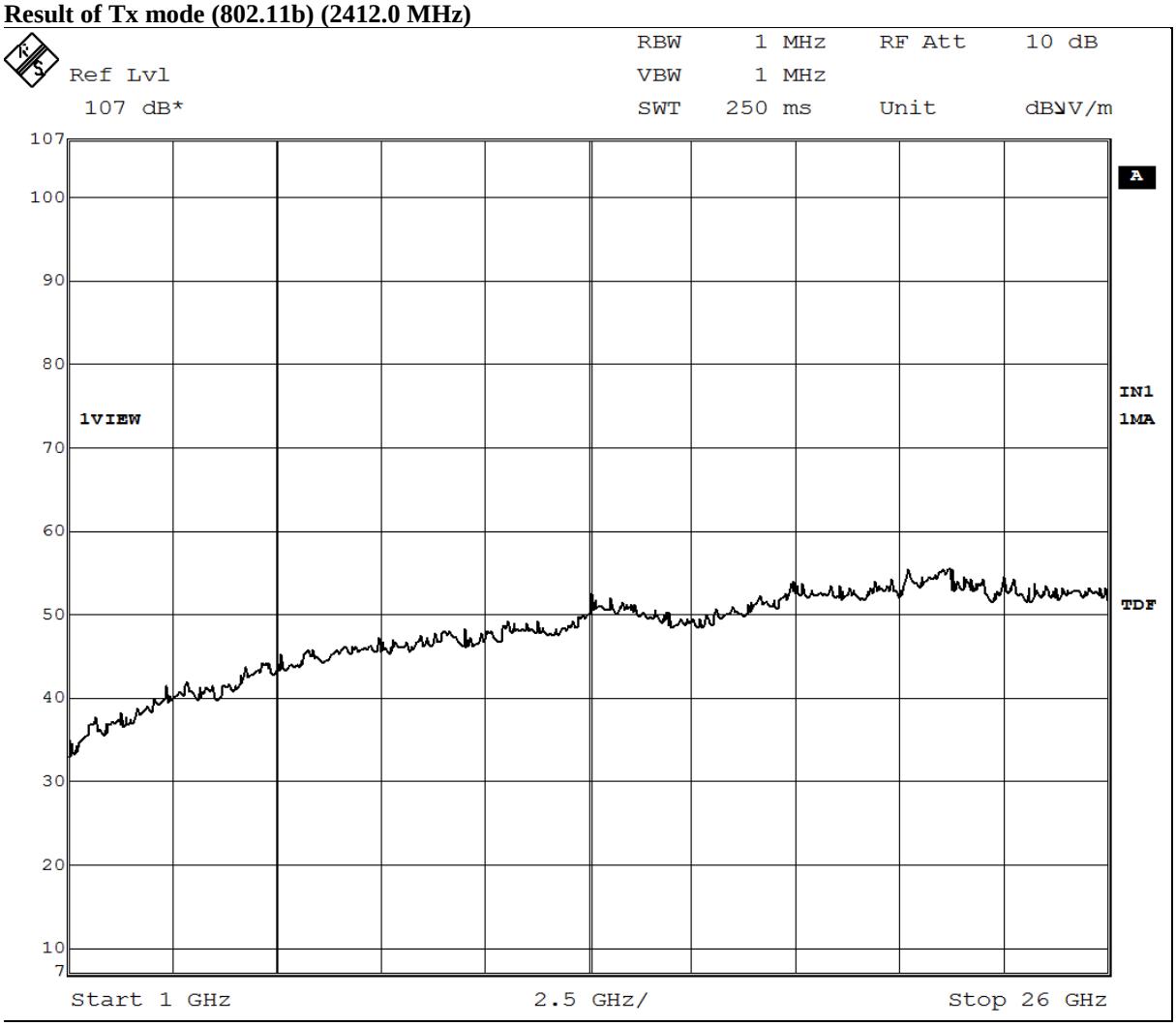

- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.
-For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

Limits for Radiated Emissions FCC 47 CFR 15.247 Class B]:

| Frequency Range | Quasi-Peak Limits |
|---|---|
| [MHz] | [μV/m] |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

**Result of Tx mode (802.11b) (2412.0 MHz)**



**Result of Tx mode (802.11b) (2412.0 MHz) (9kHz – 30MHz): Pass**

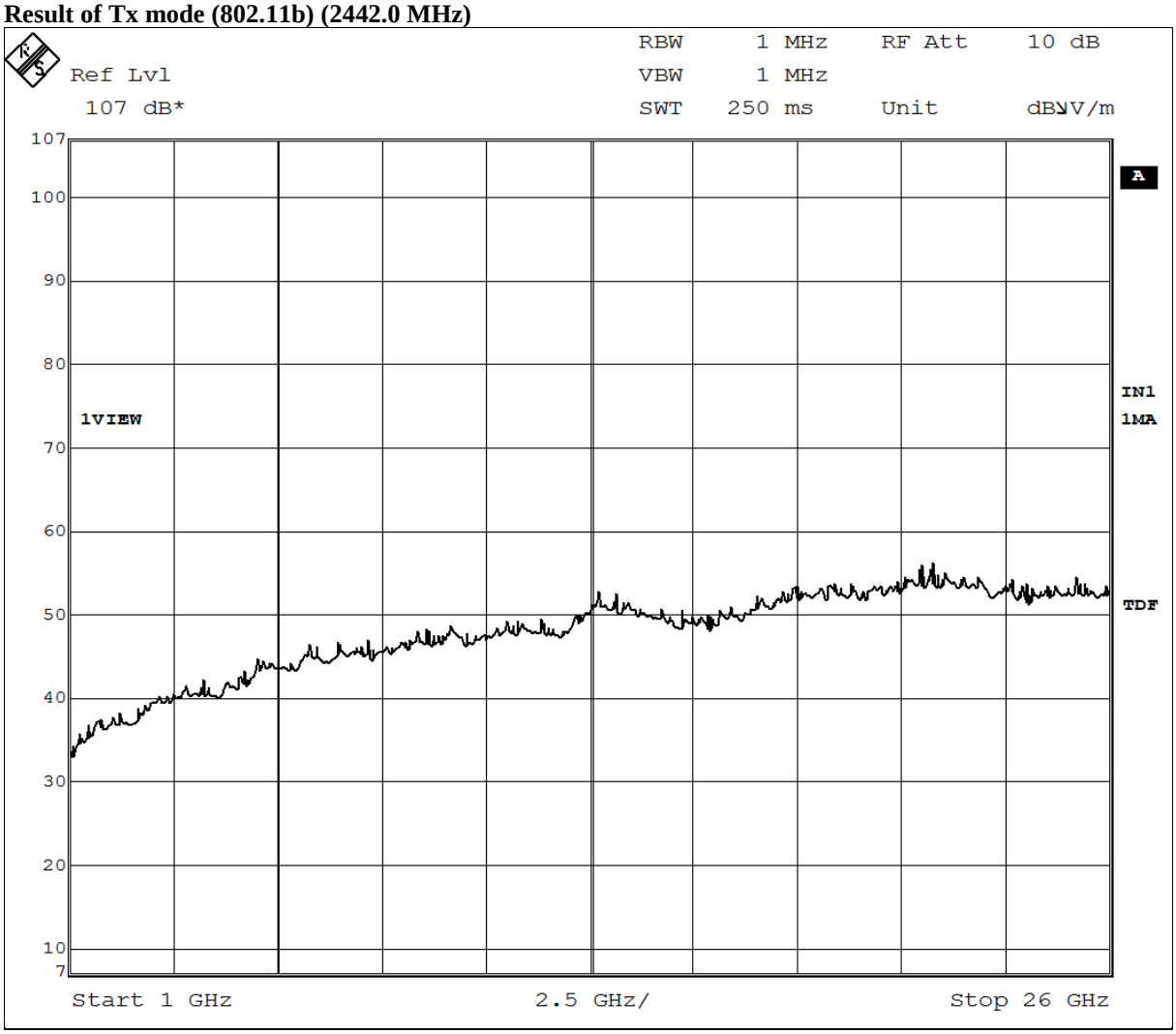
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11b) (2412.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 72.3 | 27.9 | 100.2 | N/A | N/A | Vertical |
| 4824.0 | 9.4 | 32.1 | 41.5 | 74.0 | 32.5 | Vertical |
| 7236.0 | 2.1 | 38.6 | 40.7 | 74.0 | 33.3 | Vertical |
| 9648.0 | -1.3 | 41.3 | 40.0 | 74.0 | 34.0 | Vertical |
| 12060.0 | -1.8 | 43.5 | 41.7 | 74.0 | 32.3 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 64.8 | 27.9 | 92.7 | N/A | N/A | Vertical |
| 4824.0 | 0.3 | 32.1 | 32.4 | 54.0 | 21.6 | Vertical |
| 7236.0 | -2.1 | 38.6 | 36.5 | 54.0 | 17.5 | Vertical |
| 9648.0 | -8.7 | 41.3 | 32.6 | 54.0 | 21.4 | Vertical |
| 12060.0 | -9.1 | 43.5 | 34.4 | 54.0 | 19.6 | Vertical |

**Result of Tx mode (802.11b) (2442.0 MHz)**



**Result of Tx mode (802.11b) (2442.0 MHz) (9kHz – 30MHz): Pass**

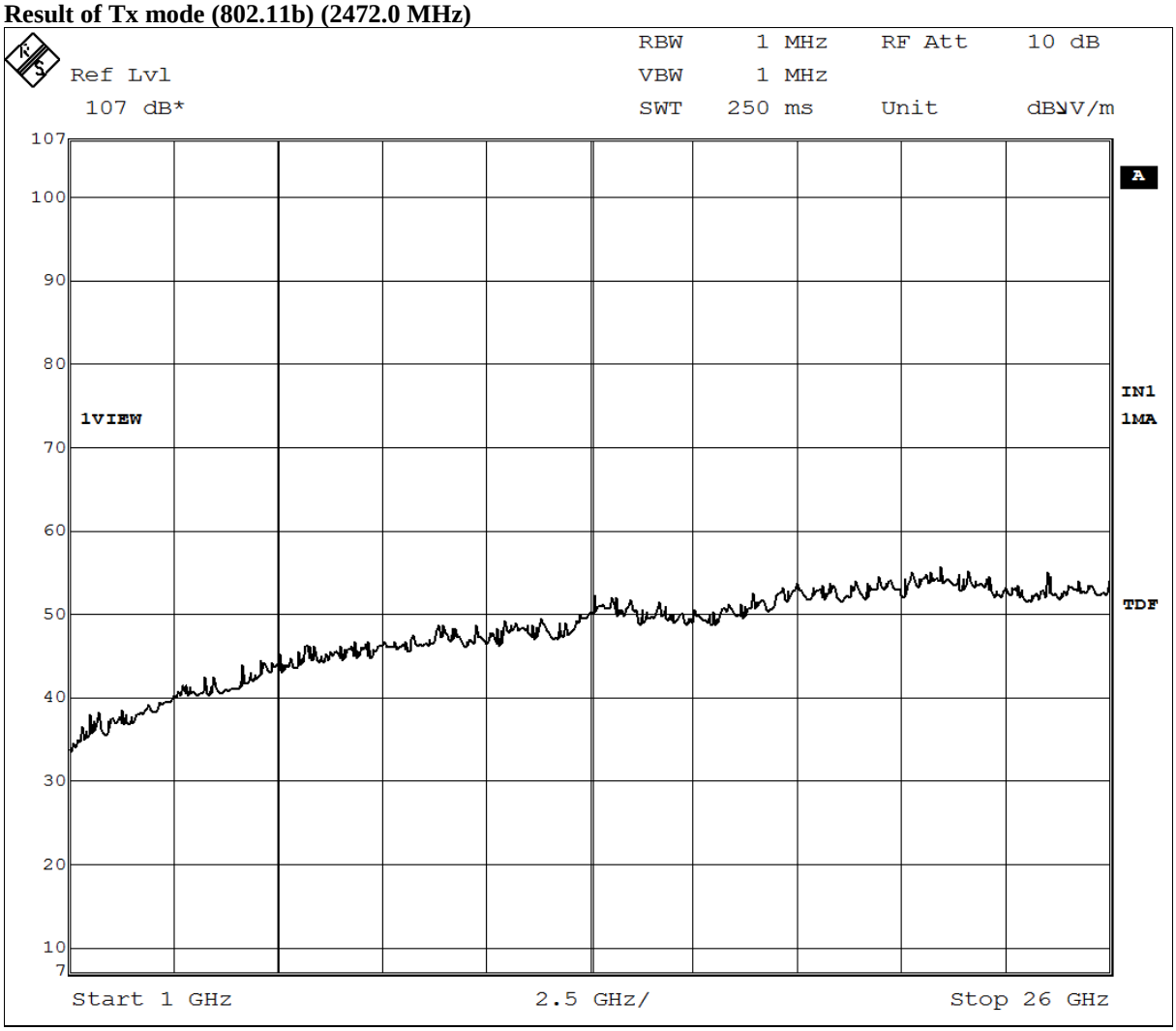
| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Field Strength<br>uV/m | Limit<br>uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11b) (2442.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2442.0 | 71.1 | 27.9 | 99.0 | N/A | N/A | Vertical |
| 4884.0 | 9.4 | 32.1 | 41.5 | 74.0 | 32.5 | Vertical |
| 7326.0 | 1.9 | 38.6 | 40.5 | 74.0 | 33.5 | Vertical |
| 9768.0 | -1.5 | 41.3 | 39.8 | 74.0 | 34.2 | Vertical |
| 12210.0 | -2.1 | 43.5 | 41.4 | 74.0 | 32.6 | Vertical |

| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2442.0 | 63.5 | 27.9 | 91.4 | N/A | N/A | Vertical |
| 4884.0 | -0.8 | 32.1 | 31.3 | 54.0 | 22.7 | Vertical |
| 7326.0 | -1.5 | 38.6 | 37.1 | 54.0 | 16.9 | Vertical |
| 9768.0 | -8.4 | 41.3 | 32.9 | 54.0 | 21.1 | Vertical |
| 12210.0 | -8.5 | 43.5 | 35.0 | 54.0 | 19.0 | Vertical |

**Result of Tx mode (802.11b) (2472.0 MHz)**



**Result of Tx mode (802.11b) (2472.0 MHz) (9kHz – 30MHz): Pass**

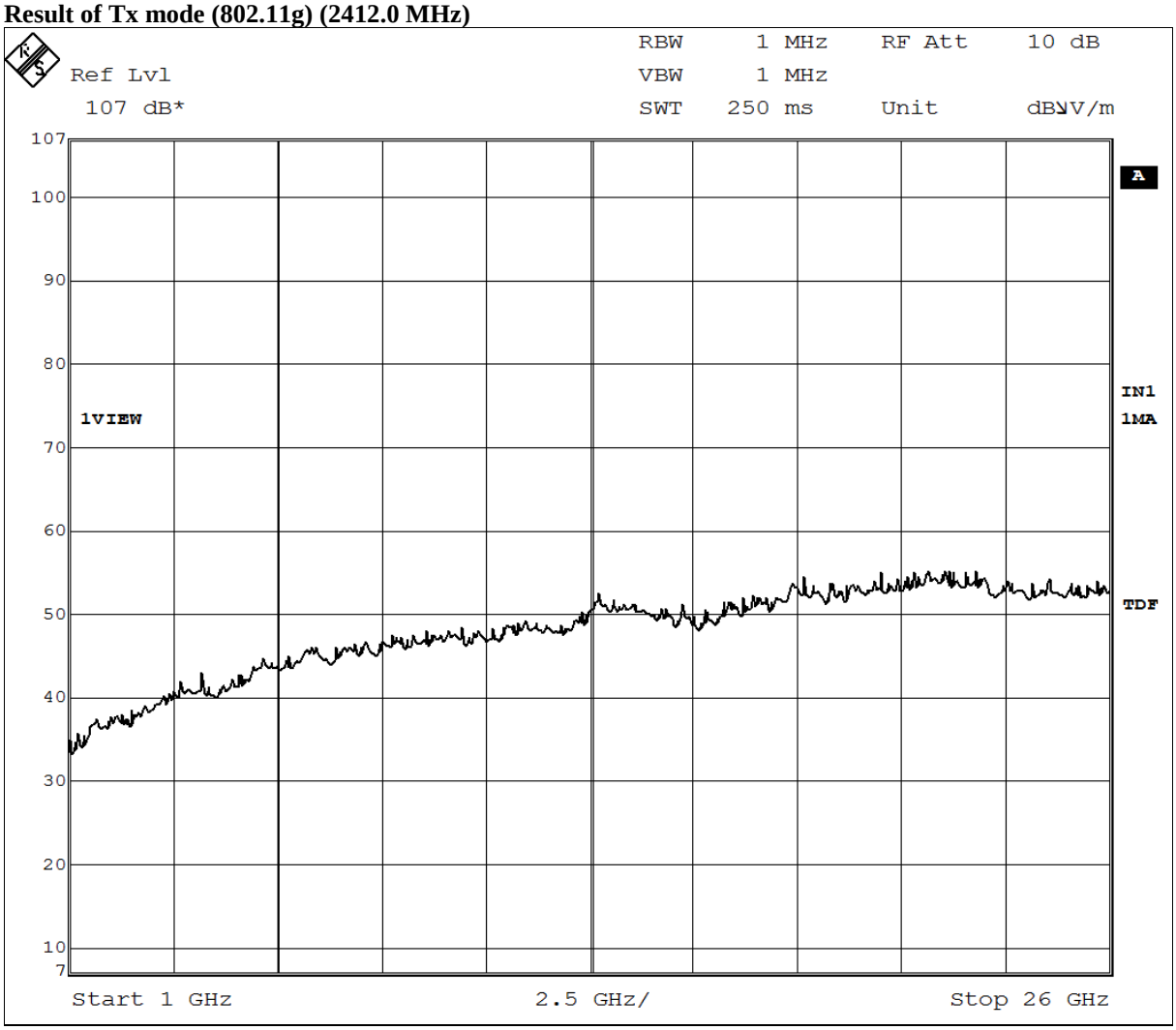
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11b) (2472.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 76.5 | 27.9 | 104.4 | N/A | N/A | Vertical |
| 4944.0 | 10.5 | 32.2 | 42.7 | 74.0 | 31.3 | Vertical |
| 7416.0 | 3.1 | 38.6 | 41.7 | 74.0 | 32.3 | Vertical |
| 9888.0 | -0.9 | 42.1 | 41.2 | 74.0 | 32.8 | Vertical |
| 12360.0 | -2.7 | 44.1 | 41.4 | 74.0 | 32.6 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 67.4 | 27.9 | 95.3 | N/A | N/A | Vertical |
| 4944.0 | -2.1 | 32.2 | 30.1 | 54.0 | 23.9 | Vertical |
| 7416.0 | -3.1 | 38.6 | 35.5 | 54.0 | 18.5 | Vertical |
| 9888.0 | -8.9 | 42.1 | 33.2 | 54.0 | 20.8 | Vertical |
| 12360.0 | -8.6 | 44.1 | 35.5 | 54.0 | 18.5 | Vertical |

**Result of Tx mode (802.11g) (2412.0 MHz)**



**Result of Tx mode (802.11g) (2412.0 MHz) (9kHz – 30MHz): Pass**

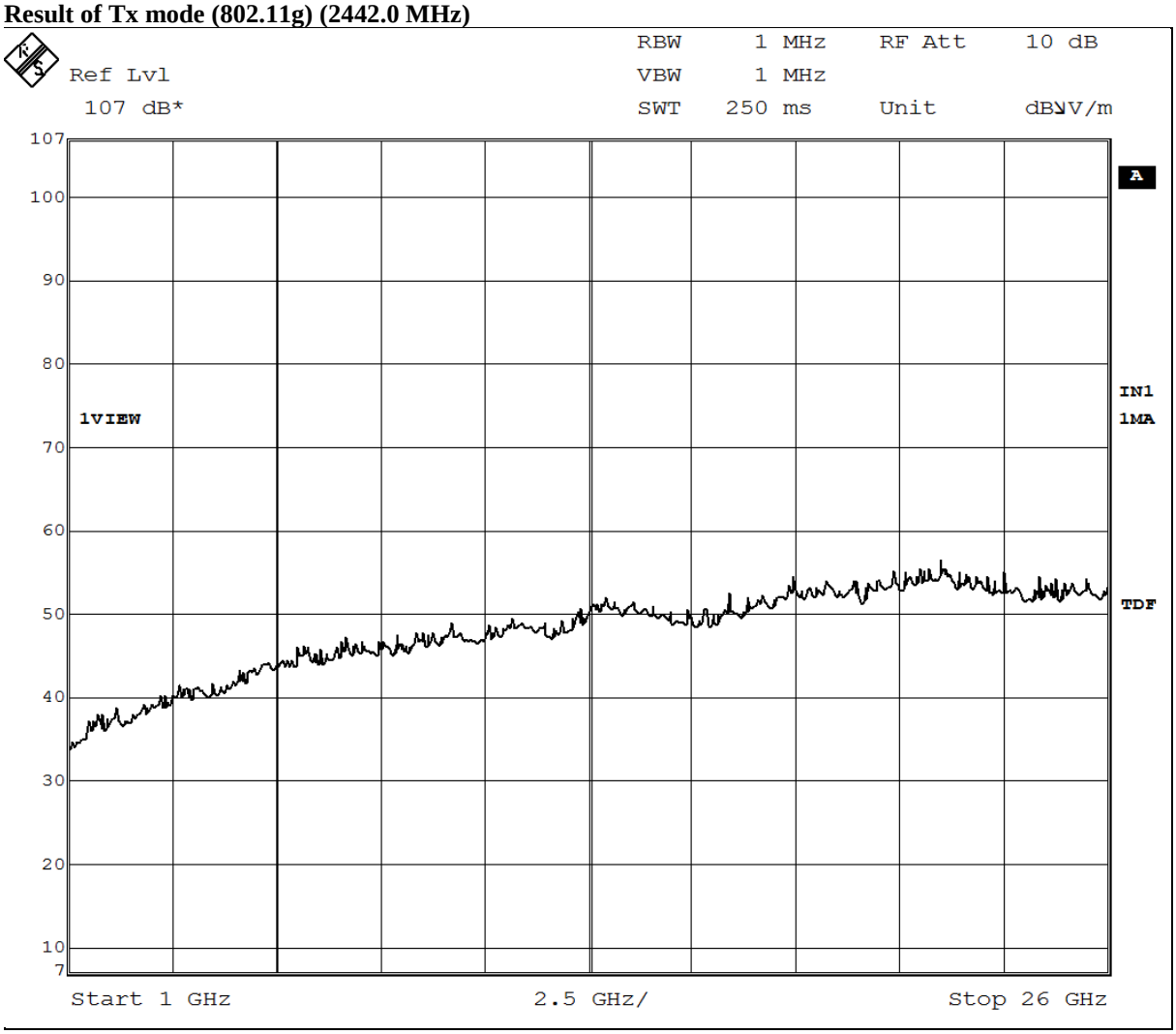
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11g) (2412.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 63.2 | 27.9 | 91.1 | N/A | N/A | Vertical |
| 4824.0 | 7.9 | 32.1 | 40.0 | 74.0 | 34.0 | Vertical |
| 7236.0 | 2.1 | 38.6 | 40.7 | 74.0 | 33.3 | Vertical |
| 9648.0 | -2.1 | 41.3 | 39.2 | 74.0 | 34.8 | Vertical |
| 12060.0 | -2.5 | 43.5 | 41.0 | 74.0 | 33.0 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 51.4 | 27.9 | 79.3 | N/A | N/A | Vertical |
| 4824.0 | -2.1 | 32.1 | 30.0 | 54.0 | 24.0 | Vertical |
| 7236.0 | -2.3 | 38.6 | 36.3 | 54.0 | 17.7 | Vertical |
| 9648.0 | -8.9 | 41.3 | 32.4 | 54.0 | 21.6 | Vertical |
| 12060.0 | -9.2 | 43.5 | 34.3 | 54.0 | 19.7 | Vertical |

**Result of Tx mode (802.11g) (2442.0 MHz)**



**Result of Tx mode (802.11g) (2442.0 MHz) (9kHz – 30MHz): Pass**

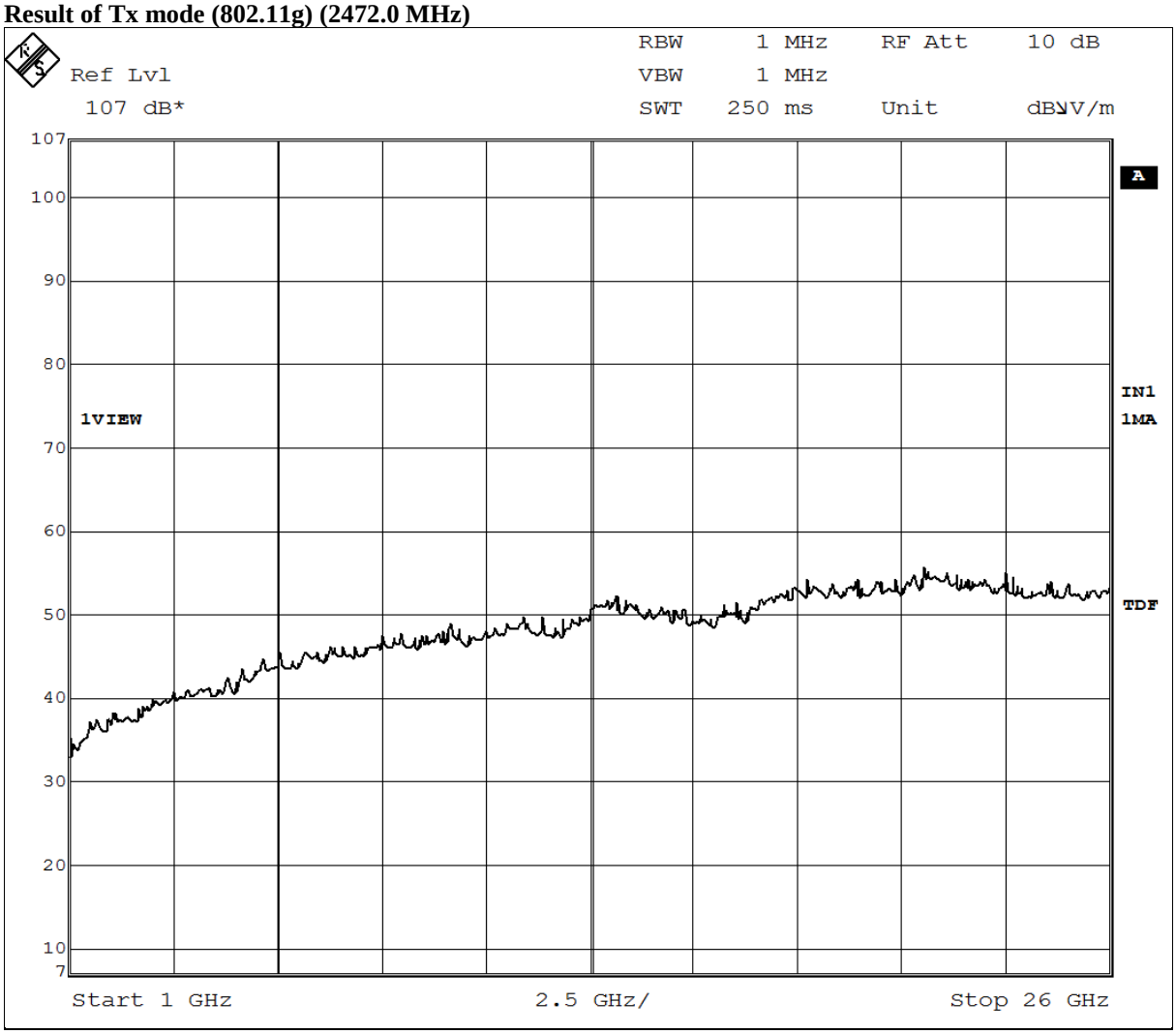
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11g) (2442.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2442.0 | 61.3 | 27.9 | 89.2 | N/A | N/A | Vertical |
| 4884.0 | 7.2 | 32.1 | 39.3 | 74.0 | 34.7 | Vertical |
| 7326.0 | 1.1 | 38.6 | 39.7 | 74.0 | 34.3 | Vertical |
| 9768.0 | -2.3 | 41.3 | 39.0 | 74.0 | 35.0 | Vertical |
| 12210.0 | -3.1 | 43.5 | 40.4 | 74.0 | 33.6 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2442.0 | 49.7 | 27.9 | 77.6 | N/A | N/A | Vertical |
| 4884.0 | -2.1 | 32.1 | 30.0 | 54.0 | 24.0 | Vertical |
| 7326.0 | -3.1 | 38.6 | 35.5 | 54.0 | 18.5 | Vertical |
| 9768.0 | -7.8 | 41.3 | 33.5 | 54.0 | 20.5 | Vertical |
| 12210.0 | -8.1 | 43.5 | 35.4 | 54.0 | 18.6 | Vertical |

**Result of Tx mode (802.11g) (2472.0 MHz)**



**Result of Tx mode (802.11g) (9kHz – 30MHz): Pass**

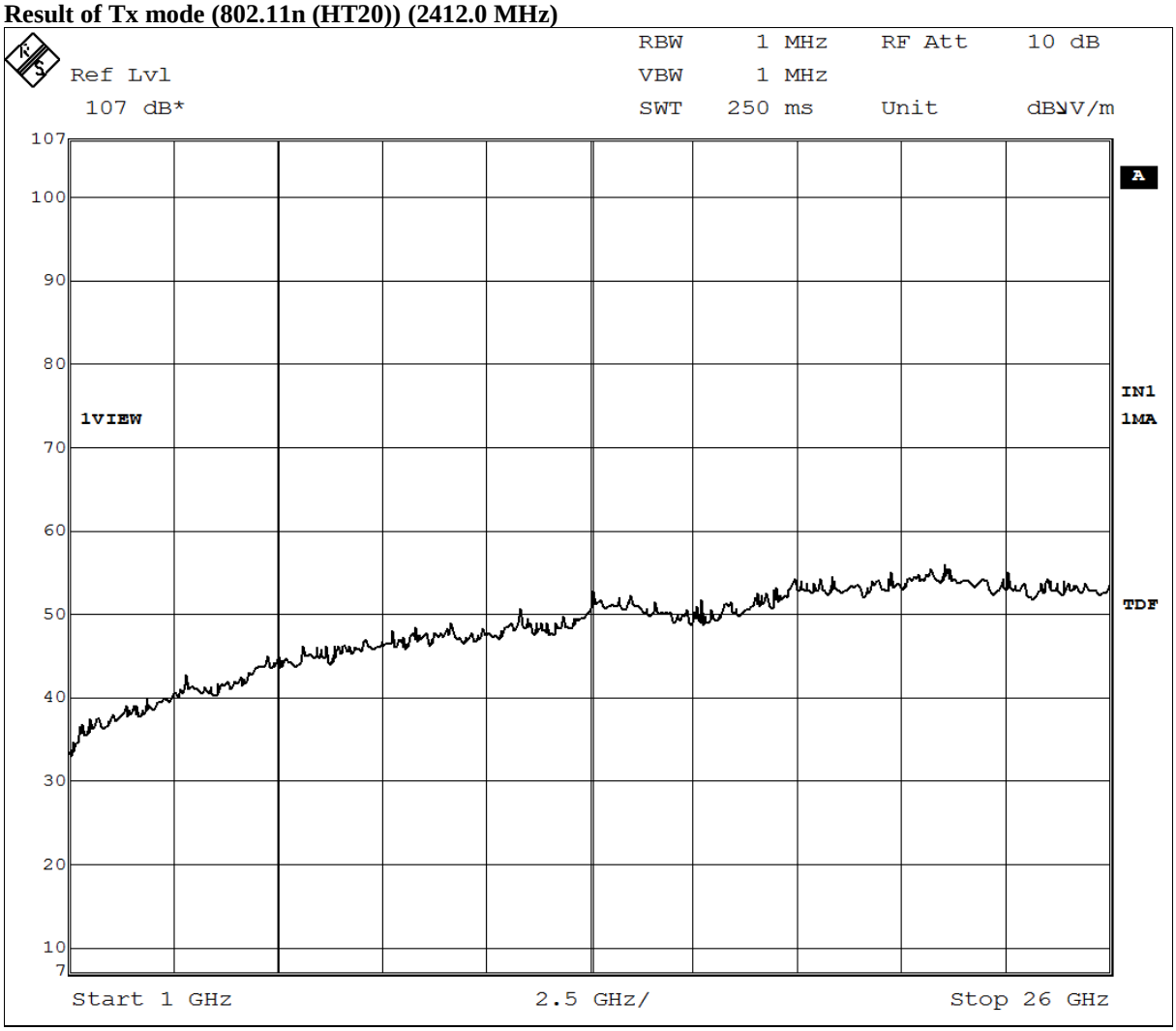
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11g) (2472.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 65.2 | 27.9 | 93.1 | N/A | N/A | Vertical |
| 4944.0 | 7.9 | 32.2 | 40.1 | 74.0 | 33.9 | Vertical |
| 7416.0 | -1.5 | 38.6 | 37.1 | 74.0 | 36.9 | Vertical |
| 9888.0 | -2.7 | 42.1 | 39.4 | 74.0 | 34.6 | Vertical |
| 12360.0 | -3.4 | 44.1 | 40.7 | 74.0 | 33.3 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 52.4 | 27.9 | 80.3 | N/A | N/A | Vertical |
| 4944.0 | -1.7 | 32.2 | 30.5 | 54.0 | 23.5 | Vertical |
| 7416.0 | -2.1 | 38.6 | 36.5 | 54.0 | 17.5 | Vertical |
| 9888.0 | -8.7 | 42.1 | 33.4 | 54.0 | 20.6 | Vertical |
| 12360.0 | -9.1 | 44.1 | 35.0 | 54.0 | 19.0 | Vertical |

**Result of Tx mode (802.11n (HT20)) (2412.0 MHz)**



**Result of Tx mode (802.11n (HT20)) (2412.0 MHz) (9kHz – 30MHz): Pass**

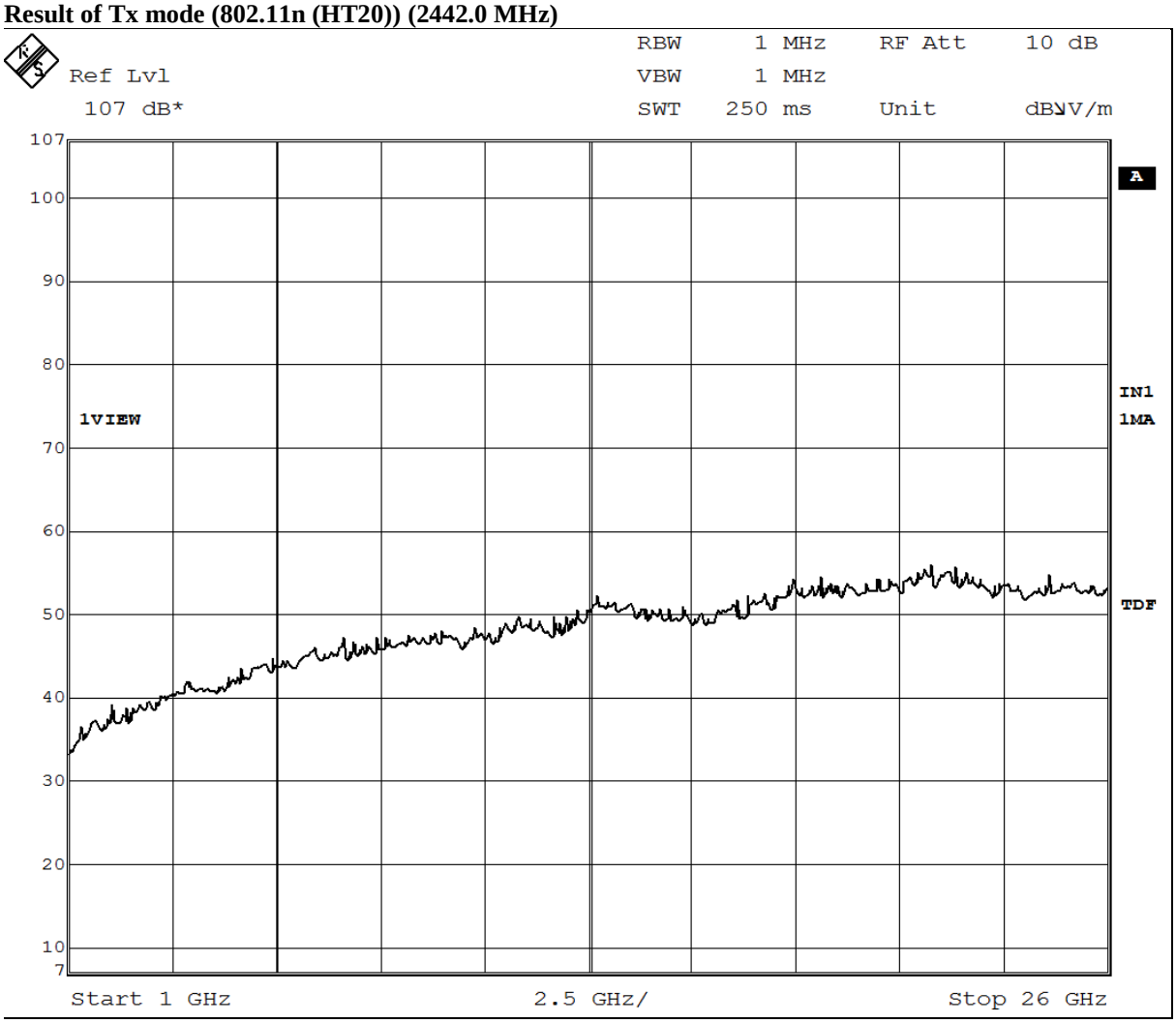
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT20)) (2412.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 64.1 | 27.9 | 92.0 | N/A | N/A | Vertical |
| 4824.0 | 6.8 | 32.1 | 38.9 | 74.0 | 35.1 | Vertical |
| 7236.0 | 1.6 | 38.6 | 40.2 | 74.0 | 33.8 | Vertical |
| 9648.0 | -2.3 | 41.3 | 39.0 | 74.0 | 35.0 | Vertical |
| 12060.0 | -2.5 | 43.5 | 41.0 | 74.0 | 33.0 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2412.0 | 48.4 | 27.9 | 76.3 | N/A | N/A | Vertical |
| 4824.0 | -1.4 | 32.1 | 30.7 | 54.0 | 23.3 | Vertical |
| 7236.0 | -2.1 | 38.6 | 36.5 | 54.0 | 17.5 | Vertical |
| 9648.0 | -8.4 | 41.3 | 32.9 | 54.0 | 21.1 | Vertical |
| 12060.0 | -9.1 | 43.5 | 34.4 | 54.0 | 19.6 | Vertical |

**Result of Tx mode (802.11n (HT20)) (2442.0 MHz)**



**Result of Tx mode (802.11n (HT20)) (2442.0 MHz) (9kHz – 30MHz): Pass**

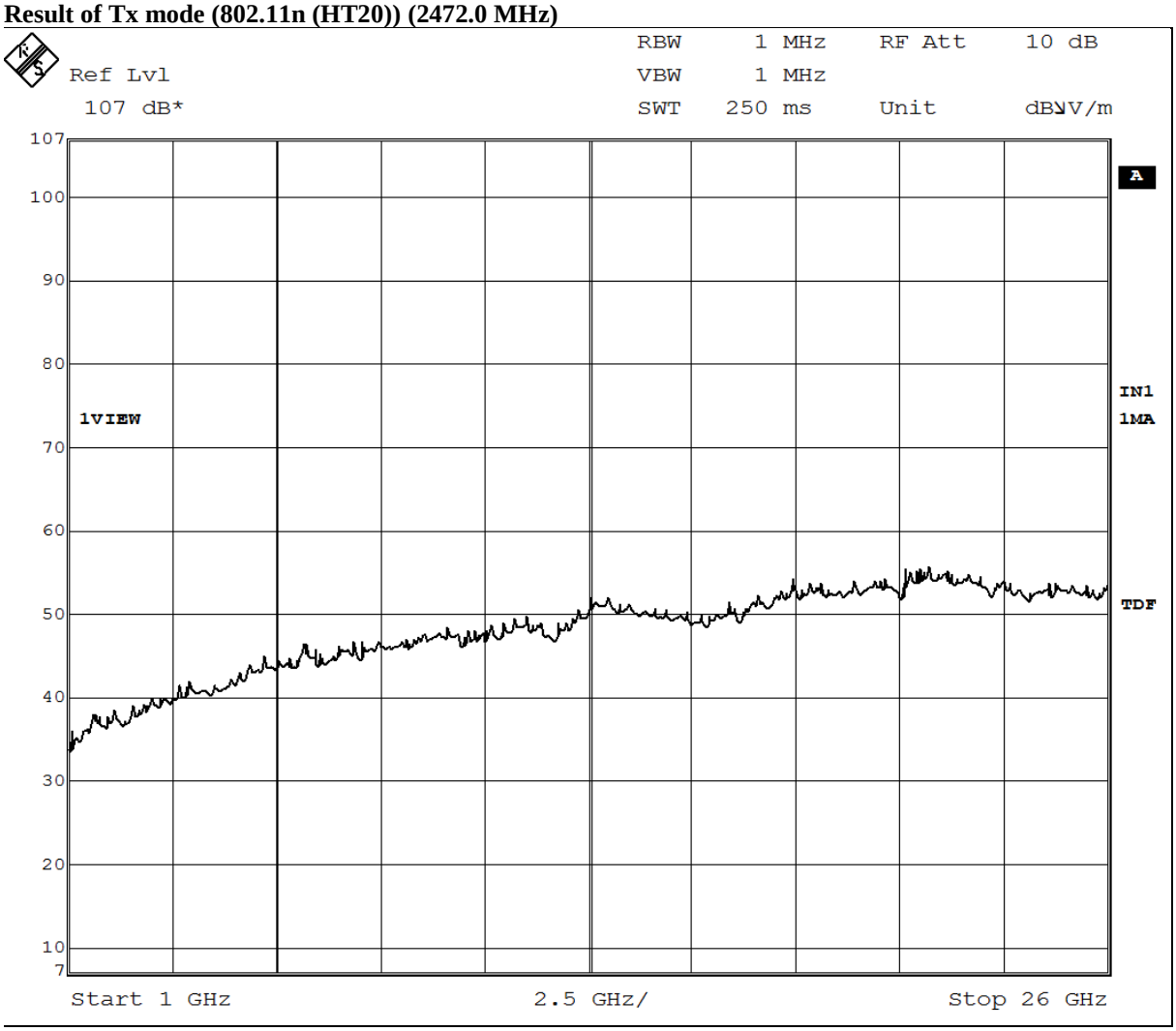
| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Field Strength<br>uV/m | Limit<br>uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT20)) (2442.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2442.0 | 63.4 | 27.9 | 91.3 | N/A | N/A | Vertical |
| 4884.0 | 5.9 | 32.1 | 38.0 | 74.0 | 36.0 | Vertical |
| 7326.0 | 1.2 | 38.6 | 39.8 | 74.0 | 34.2 | Vertical |
| 9768.0 | -1.8 | 41.3 | 39.5 | 74.0 | 34.5 | Vertical |
| 12210.0 | -2.7 | 43.5 | 40.8 | 74.0 | 33.2 | Vertical |

| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2442.0 | 46.3 | 27.9 | 74.2 | N/A | N/A | Vertical |
| 4884.0 | 1.4 | 32.1 | 33.5 | 54.0 | 20.5 | Vertical |
| 7326.0 | -2.6 | 38.6 | 36.0 | 54.0 | 18.0 | Vertical |
| 9768.0 | -9.3 | 41.3 | 32.0 | 54.0 | 22.0 | Vertical |
| 12210.0 | -8.4 | 43.5 | 35.1 | 54.0 | 18.9 | Vertical |

**Result of Tx mode (802.11n (HT20)) (2472.0 MHz)**



**Result of Tx mode (802.11n (HT20)) (2472.0 MHz) (9kHz – 30MHz): Pass**

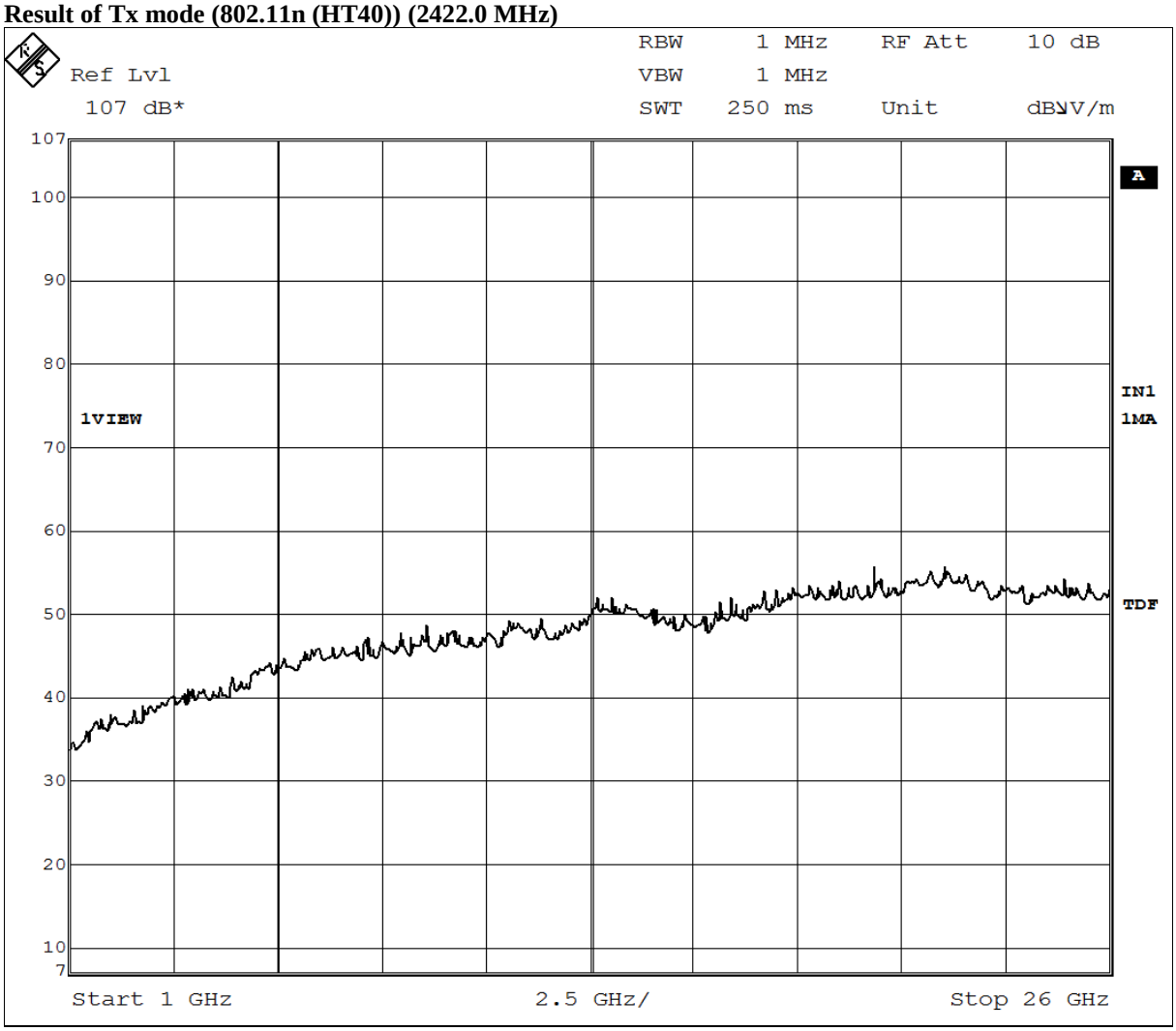
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT20)) (2472.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 67.4 | 27.9 | 95.3 | N/A | N/A | Vertical |
| 4944.0 | 5.8 | 32.2 | 38.0 | 74.0 | 36.0 | Vertical |
| 7416.0 | 0.9 | 38.6 | 39.5 | 74.0 | 34.5 | Vertical |
| 9888.0 | -2.4 | 42.1 | 39.7 | 74.0 | 34.3 | Vertical |
| 12360.0 | -2.9 | 44.1 | 41.2 | 74.0 | 32.8 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2472.0 | 50.9 | 27.9 | 78.8 | N/A | N/A | Vertical |
| 4944.0 | -1.8 | 32.2 | 30.4 | 54.0 | 23.6 | Vertical |
| 7416.0 | -3.4 | 38.6 | 35.2 | 54.0 | 18.8 | Vertical |
| 9888.0 | -7.8 | 42.1 | 34.3 | 54.0 | 19.7 | Vertical |
| 12360.0 | -8.5 | 44.1 | 35.6 | 54.0 | 18.4 | Vertical |

**Result of Tx mode (802.11n (HT40)) (2422.0 MHz)**



**Result of Tx mode (802.11n (HT40)) (2422.0 MHz) (9kHz – 30MHz): Pass**

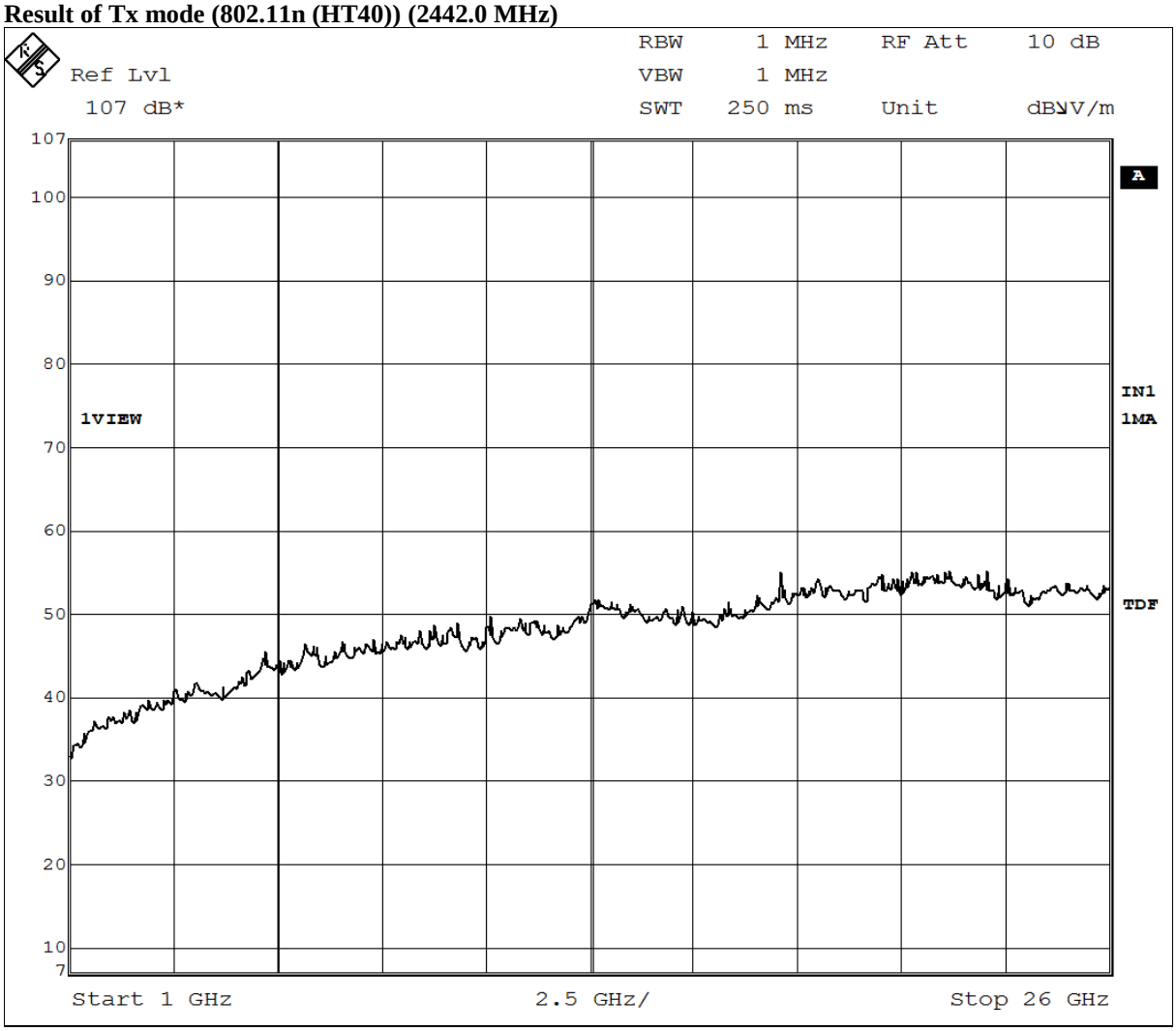
| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Field Strength<br>uV/m | Limit<br>uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT40)) (2422.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2422.0 | 61.8 | 27.9 | 89.7 | N/A | N/A | Vertical |
| 4844.0 | 5.8 | 32.1 | 37.9 | 74.0 | 36.1 | Vertical |
| 7266.0 | -1.8 | 38.6 | 36.8 | 74.0 | 37.2 | Vertical |
| 9688.0 | -2.5 | 41.3 | 38.8 | 74.0 | 35.2 | Vertical |
| 12110.0 | -2.7 | 43.5 | 40.8 | 74.0 | 33.2 | Vertical |

| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBuV | Correction Factor<br>dB/m | Field Strength<br>dBuV/m | Limit @3m<br>dBuV/m | Margin<br>dBuV/m | E-Field Polarity |
| 2422.0 | 46.2 | 27.9 | 74.1 | N/A | N/A | Vertical |
| 4844.0 | -1.8 | 32.1 | 30.3 | 54.0 | 23.7 | Vertical |
| 7266.0 | -4.7 | 38.6 | 33.9 | 54.0 | 20.1 | Vertical |
| 9688.0 | -8.9 | 41.3 | 32.4 | 54.0 | 21.6 | Vertical |
| 12110.0 | -9.3 | 43.5 | 34.2 | 54.0 | 19.8 | Vertical |

**Result of Tx mode (802.11n (HT40)) (2442.0 MHz)**



**Result of Tx mode (802.11n (HT40)) (2442.0 MHz) (9kHz – 30MHz): Pass**

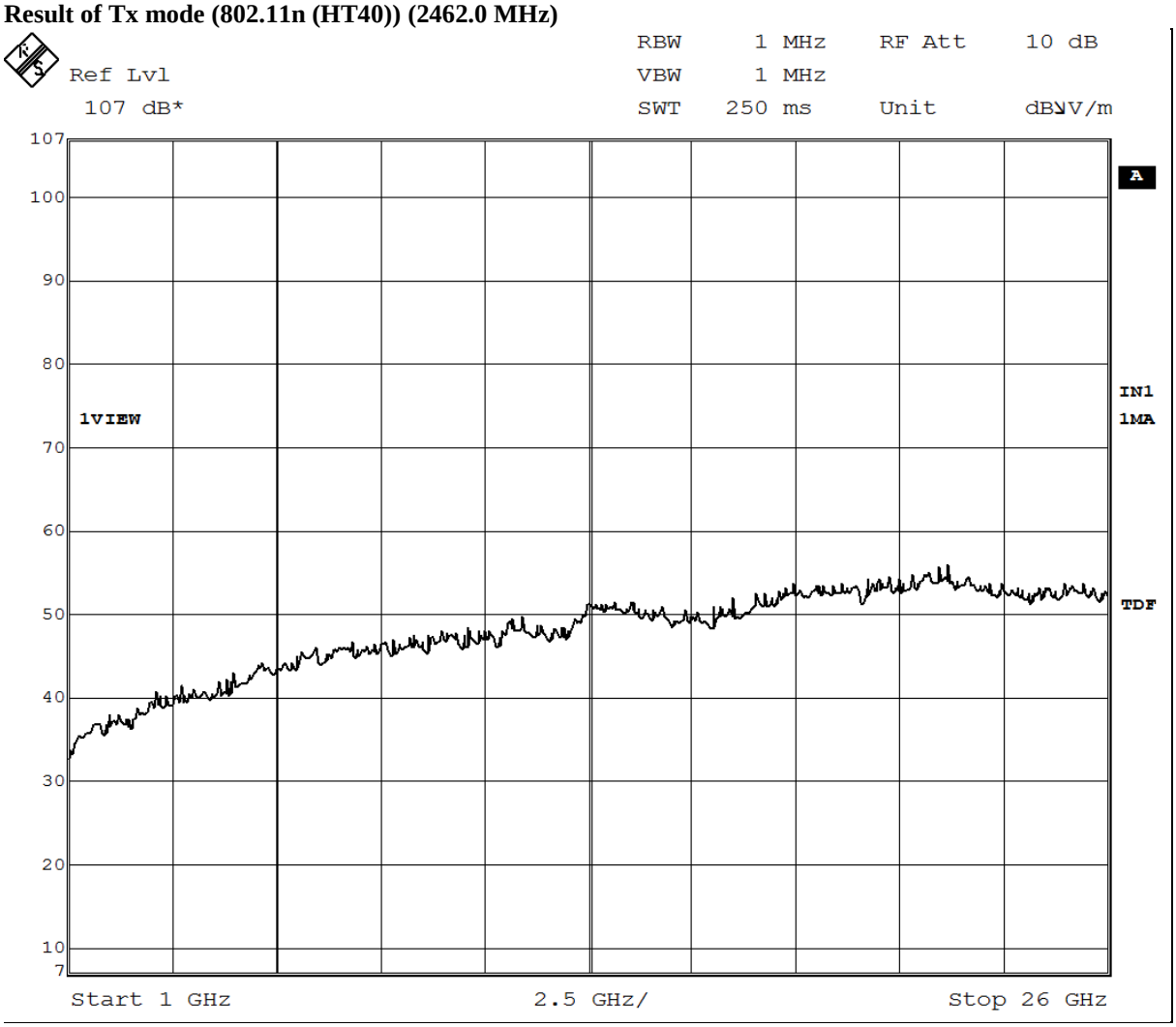
| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT40)) (2442.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2442.0 | 60.7 | 27.9 | 88.6 | N/A | N/A | Vertical |
| 4884.0 | 5.3 | 32.1 | 37.4 | 74.0 | 36.6 | Vertical |
| 7326.0 | -2.2 | 38.6 | 36.4 | 74.0 | 37.6 | Vertical |
| 9768.0 | -2.8 | 41.3 | 38.5 | 74.0 | 35.5 | Vertical |
| 12210.0 | -3.3 | 43.5 | 40.2 | 74.0 | 33.8 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2442.0 | 43.1 | 27.9 | 71.0 | N/A | N/A | Vertical |
| 4884.0 | -1.9 | 32.1 | 30.2 | 54.0 | 23.8 | Vertical |
| 7326.0 | -2.7 | 38.6 | 35.9 | 54.0 | 18.1 | Vertical |
| 9768.0 | -7.5 | 41.3 | 33.8 | 54.0 | 20.2 | Vertical |
| 12210.0 | -9.6 | 43.5 | 33.9 | 54.0 | 20.1 | Vertical |

**Result of Tx mode (802.11n (HT40)) (2462.0 MHz)**



**Result of Tx mode (802.11n (HT40)) (2462.0 MHz) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBuV | Correction Factor dB/m | Field Strength dBuV/m | Field Strength uV/m | Limit uV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the Limits** | | | | | | |

**Result of Tx mode (802.11n (HT40)) (2462.0 MHz) (Above 1GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2462.0 | 62.4 | 27.9 | 90.3 | N/A | N/A | Vertical |
| 4924.0 | 5.9 | 32.2 | 38.1 | 74.0 | 35.9 | Vertical |
| 7386.0 | 0.3 | 38.6 | 38.9 | 74.0 | 35.1 | Vertical |
| 9848.0 | -2.4 | 42.1 | 39.7 | 74.0 | 34.3 | Vertical |
| 12310.0 | -3.3 | 44.1 | 40.8 | 74.0 | 33.2 | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2462.0 | 44.7 | 27.9 | 72.6 | N/A | N/A | Vertical |
| 4924.0 | -2.8 | 32.2 | 29.4 | 54.0 | 24.6 | Vertical |
| 7386.0 | -3.3 | 38.6 | 35.3 | 54.0 | 18.7 | Vertical |
| 9848.0 | -7.6 | 42.1 | 34.5 | 54.0 | 19.5 | Vertical |
| 12310.0 | -8.9 | 44.1 | 35.2 | 54.0 | 18.8 | Vertical |

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 9kHz-30MHz 3.3dB
30MHz -1GHz 4.6dB
1GHz -26GHz 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

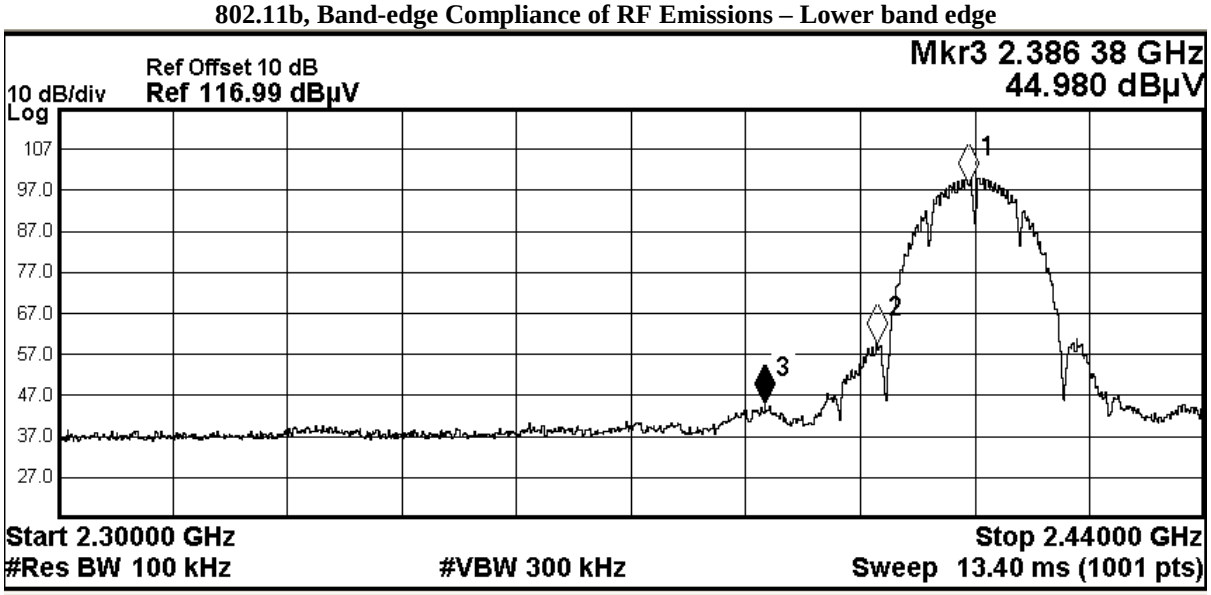
**Band Edge Measurement:**

**Limit：**

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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2400 – Lowest Fundamental (2412) | 38.9 |

**802.11b, Band-edge Compliance of RF Emissions – Lower band edge**

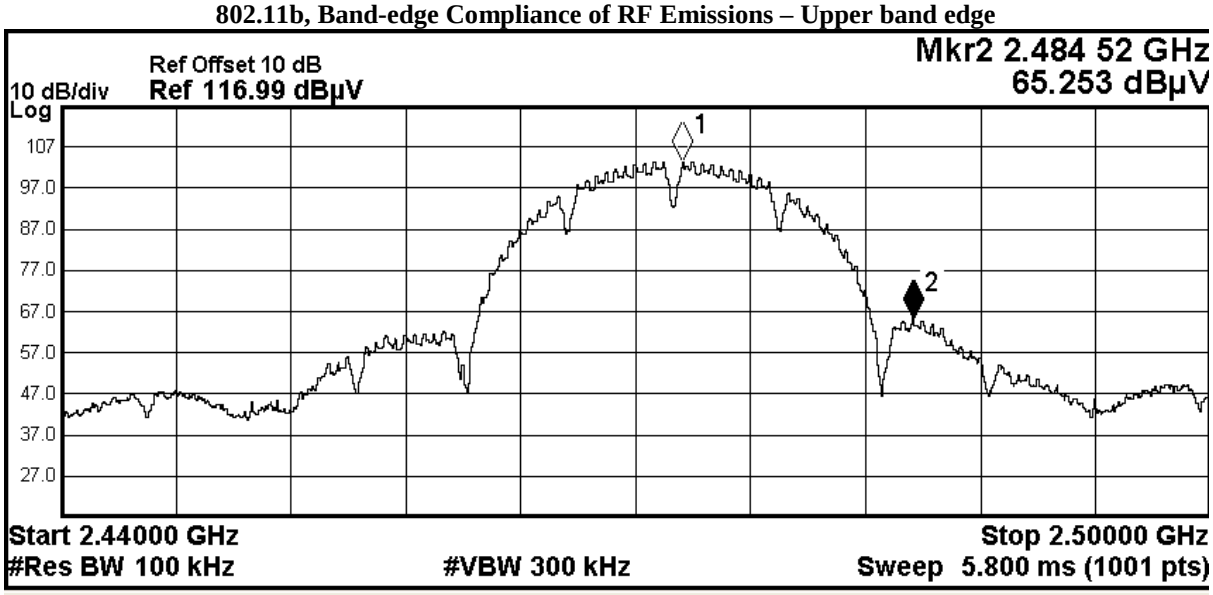



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.411 16 GHz | 98.577 dBµV | | | |
| 2 | N | 1 | f | 2.400 00 GHz | 59.642 dBµV | | | |
| 3 | N | 1 | f | 2.386 38 GHz | 44.980 dBµV | | | |
| 4 | | | | | | | | |

**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2483.5 - Highest Fundamental (2472) | 38.1 |

**802.11b, Band-edge Compliance of RF Emissions – Upper band edge**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.472 46 GHz | 103.394 dBµV | | | |
| 2 | N | 1 | f | 2.484 52 GHz | 65.253 dBµV | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |

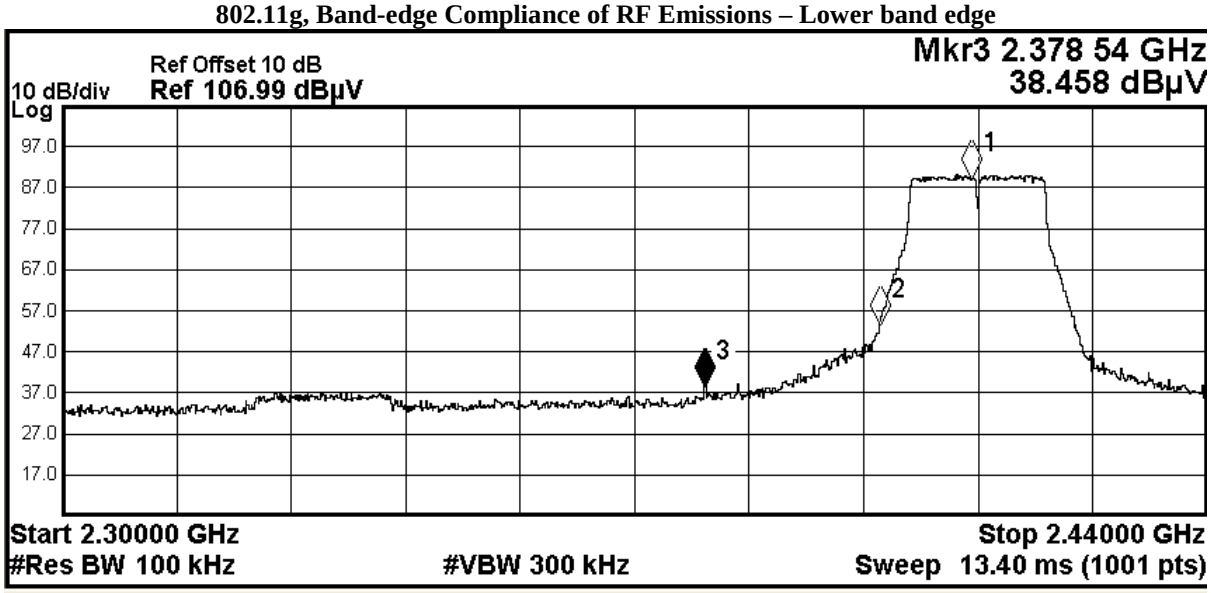
**802.11b, Radiated Emissions Band-edge and Restricted Band Result:**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2386.4 | 17.1 | 27.9 | 45.0 | 74.0 | 29.0 | Vertical |
| 2484.5 | 37.4 | 27.9 | 65.3 | 74.0 | 8.7 | Vertical |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2386.4 | 4.5 | 27.9 | 32.4 | 54.0 | 21.6 | Vertical |
| 2484.5 | 24.9 | 27.9 | 52.8 | 54.0 | 1.2 | Vertical |

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2400 – Lowest Fundamental (2412) | 35.4 |

**802.11g, Band-edge Compliance of RF Emissions – Lower band edge**

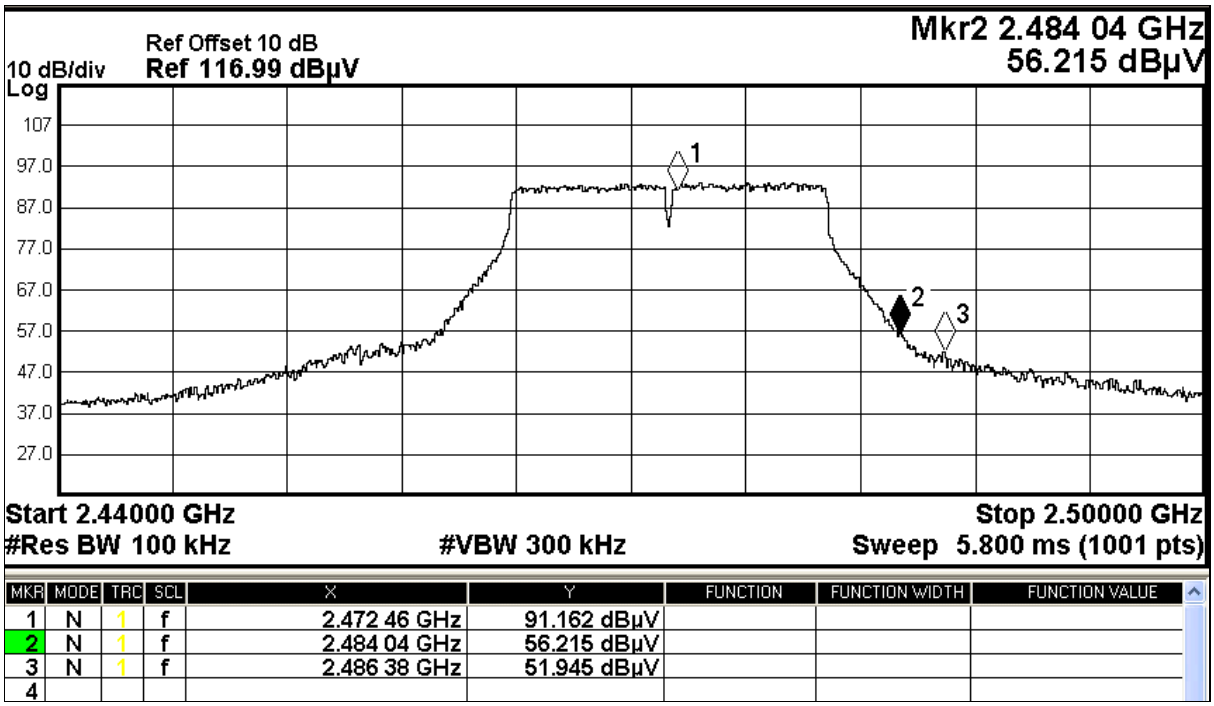



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.411 16 GHz | 88.839 dBµV | | | |
| 2 | N | 1 | f | 2.400 00 GHz | 53.419 dBµV | | | |
| 3 | N | 1 | f | 2.378 54 GHz | 38.458 dBµV | | | |
| 4 | | | | | | | | |

**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2483.5 - Highest Fundamental (2472) | 34.9 |

**802.11g, Band-edge Compliance of RF Emissions – Upper band edge**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.472 46 GHz | 91.162 dBµV | | | |
| 2 | N | 1 | f | 2.484 04 GHz | 56.215 dBµV | | | |
| 3 | N | 1 | f | 2.486 38 GHz | 51.945 dBµV | | | |
| 4 | | | | | | | | |

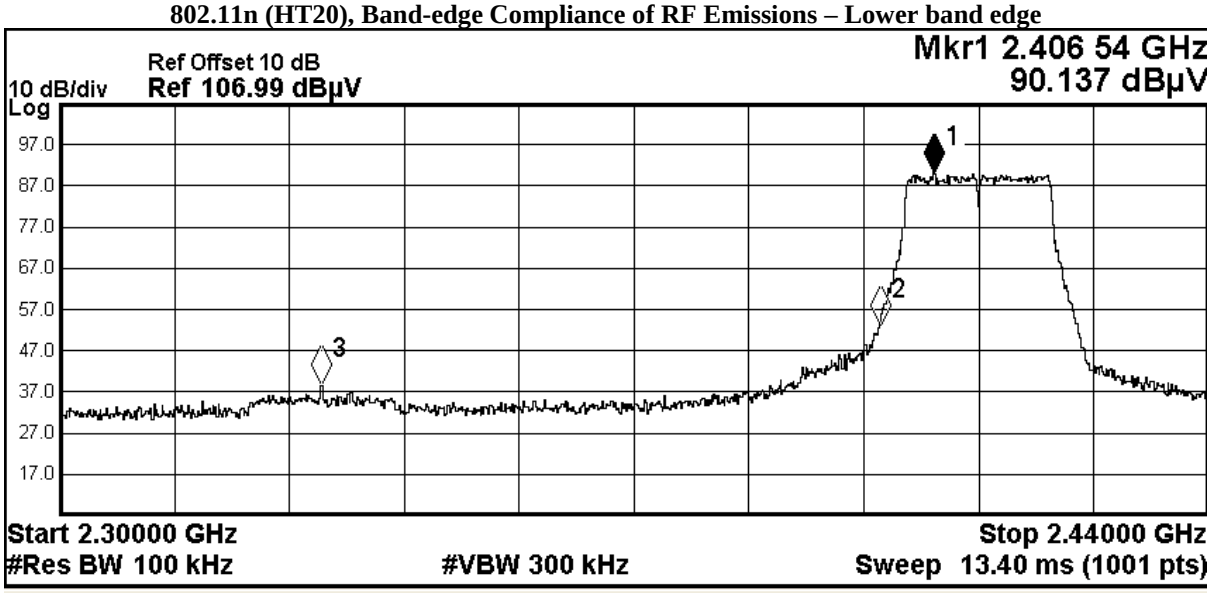
**802.11g, Radiated Emissions Band-edge and Restricted Band Result:**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2378.0 | 11.1 | 27.9 | 39.0 | 74.0 | 35.0 | Vertical |
| 2484.0 | 28.3 | 27.9 | 56.2 | 74.0 | 17.8 | Vertical |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2378.0 | 1.8 | 27.9 | 29.7 | 54.0 | 24.3 | Vertical |
| 2484.0 | 13.7 | 27.9 | 41.6 | 54.0 | 12.4 | Vertical |

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2400 – Lowest Fundamental (2412) | 37.0 |

**802.11n (HT20), Band-edge Compliance of RF Emissions – Lower band edge**

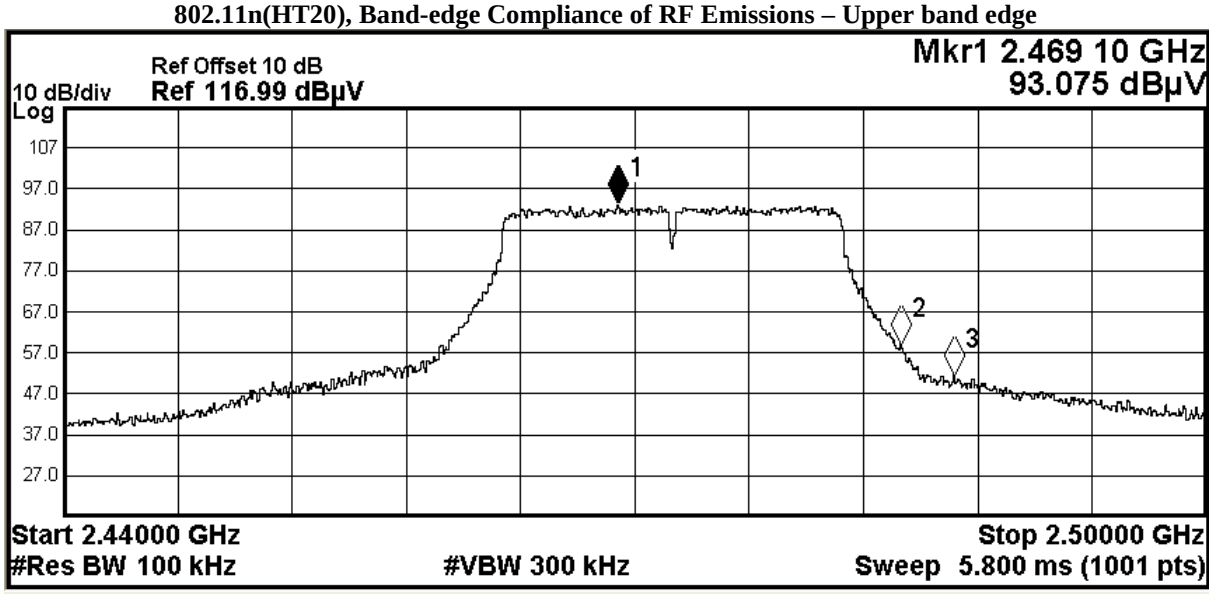



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.406 54 GHz | 90.137 dBµV | | | |
| 2 | N | 1 | f | 2.400 00 GHz | 53.091 dBµV | | | |
| 3 | N | 1 | f | 2.331 92 GHz | 38.592 dBµV | | | |
| 4 | | | | | | | | |

**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2483.5 - Highest Fundamental (2472) | 34.1 |

**802.11n(HT20), Band-edge Compliance of RF Emissions – Upper band edge**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.469 10 GHz | 93.075 dBµV | | | |
| 2 | N | 1 | f | 2.483 98 GHz | 58.943 dBµV | | | |
| 3 | N | 1 | f | 2.486 74 GHz | 51.476 dBµV | | | |
| 4 | | | | | | | | |

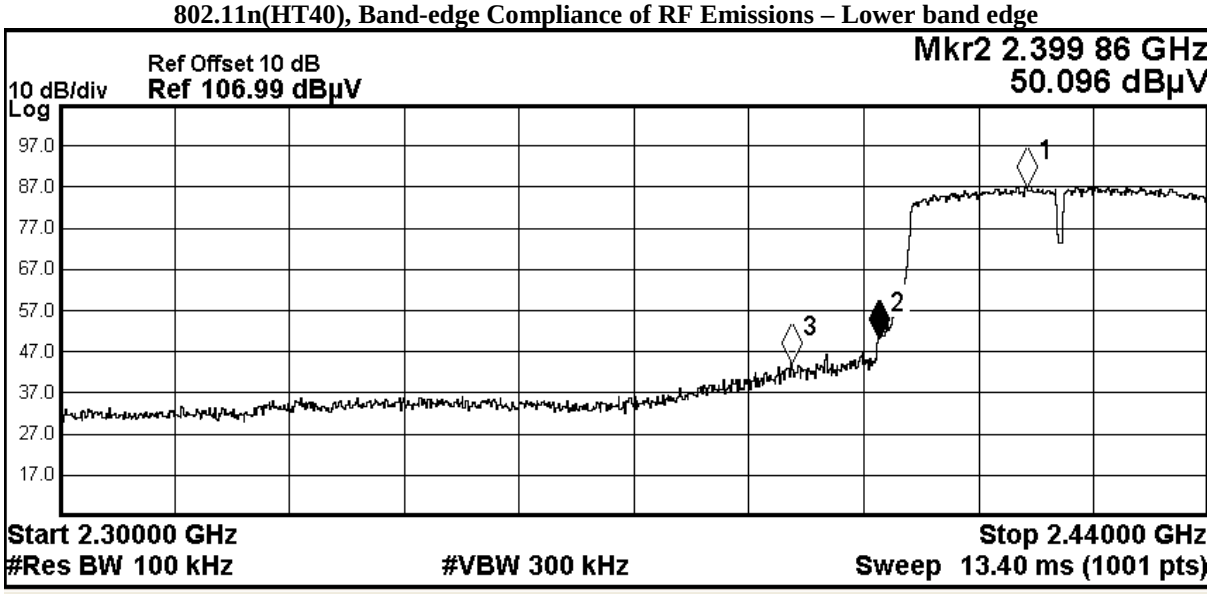
**802.11n(HT20), Radiated Emissions Band-edge and Restricted Band Result：**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2331.9 | 10.7 | 27.9 | 38.6 | 74.0 | 35.4 | Vertical |
| 2486.7 | 23.6 | 27.9 | 51.5 | 74.0 | 22.5 | Vertical |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2331.9 | 1.3 | 27.9 | 29.2 | 54.0 | 24.8 | Vertical |
| 2486.7 | 7.5 | 27.9 | 35.4 | 54.0 | 18.6 | Vertical |

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2400 – Lowest Fundamental (2412) | 36.9 |

**802.11n(HT40), Band-edge Compliance of RF Emissions – Lower band edge**

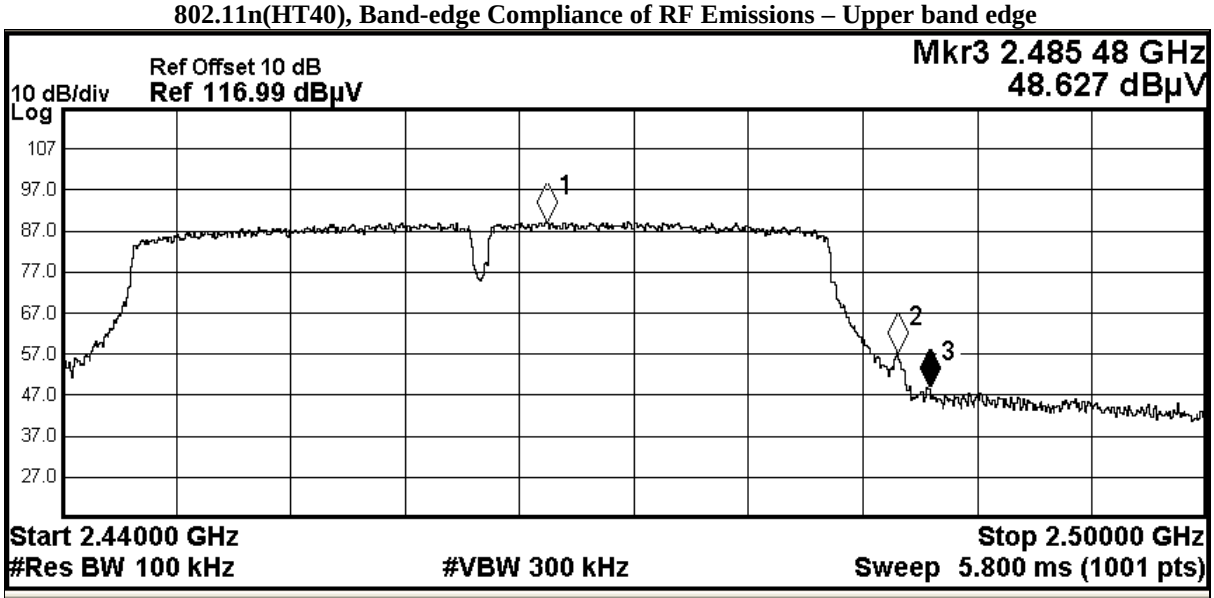



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.417 88 GHz | 87.037 dBµV | | | |
| 2 | N | 1 | f | 2.399 86 GHz | 50.096 dBµV | | | |
| 3 | N | 1 | f | 2.389 18 GHz | 44.156 dBµV | | | |
| 4 | | | | | | | | |

**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range [MHz] | Conducted Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2483.5 - Highest Fundamental (2472) | 40.6 |

**802.11n(HT40), Band-edge Compliance of RF Emissions – Upper band edge**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.465 44 GHz | 89.233 dBµV | | | |
| 2 | N | 1 | f | 2.483 80 GHz | 57.353 dBµV | | | |
| 3 | N | 1 | f | 2.485 48 GHz | 48.627 dBµV | | | |
| 4 | | | | | | | | |

**802.11n (HT40), Radiated Emissions Band-edge and Restricted Band Result:**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2389.2 | 16.2 | 27.9 | 44.1 | 74.0 | 29.9 | Vertical |
| 2485.4 | 20.7 | 27.9 | 48.6 | 74.0 | 25.4 | Vertical |

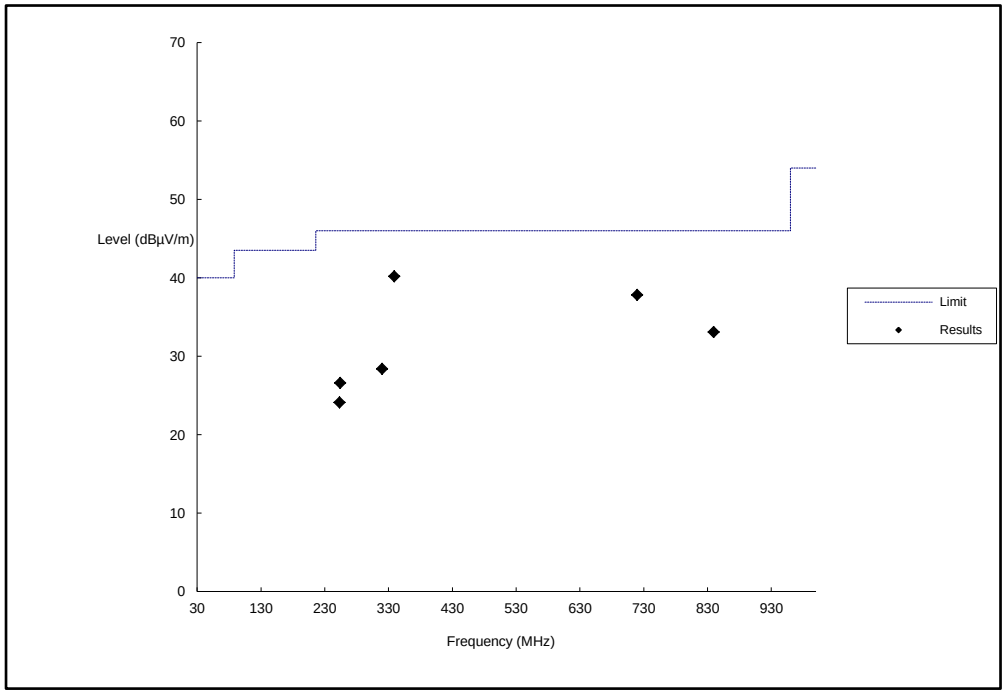
| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2389.2 | 1.3 | 27.9 | 29.2 | 54.0 | 24.8 | Vertical |
| 2485.4 | 10.8 | 27.9 | 38.7 | 54.0 | 15.3 | Vertical |

Limits for Radiated Emissions FCC 47 CFR 15.247 Class B]:

| Frequency Range | Quasi-Peak Limits |
|---|---|
| [MHz] | [μV/m] |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

**Results of Tx mode (802.11b, 2402MHz) (30MHz – 1GHz): Pass**
Please refer to the following table for result details(The data is the worst cases)



| Radiated Emissions Quasi-Peak | | | | | |
|---|---|---|---|---|---|
| Emission Frequency MHz | E-Field Polarity | Level @3m dBµV/m | Limit @3m dBµV/m | Level @3m µV/m | Limit @3m µV/m |
| 254.4 | Horizontal | 26.6 | 46.0 | 21.4 | 200 |
| 339.3 | Horizontal | 40.2 | 46.0 | 102.3 | 200 |
| 720.0 | Horizontal | 37.8 | 46.0 | 77.6 | 200 |
| 253.1 | Vertical | 24.1 | 46.0 | 16.0 | 200 |
| 320.1 | Vertical | 28.4 | 46.0 | 26.3 | 200 |
| 840.0 | Vertical | 33.1 | 46.0 | 45.2 | 200 |

Remarks:
Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB
Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

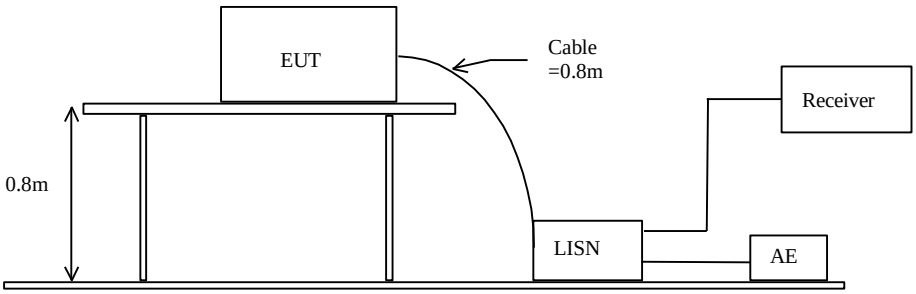
### 3.1.3 Conducted Emissions (0.15MHz to 30MHz)

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.207 Class B |
| Test Method: | ANSI C63.10: 2013 |
| Test Date: | 2019-05-16 |
| Mode of Operation: | Charge mode |

**Test Method:**

The test was performed in accordance with ANSI C63.10: 2013, with the following: initial measurements were performed in peak and average detection modes on the live line, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

**Test Setup:**



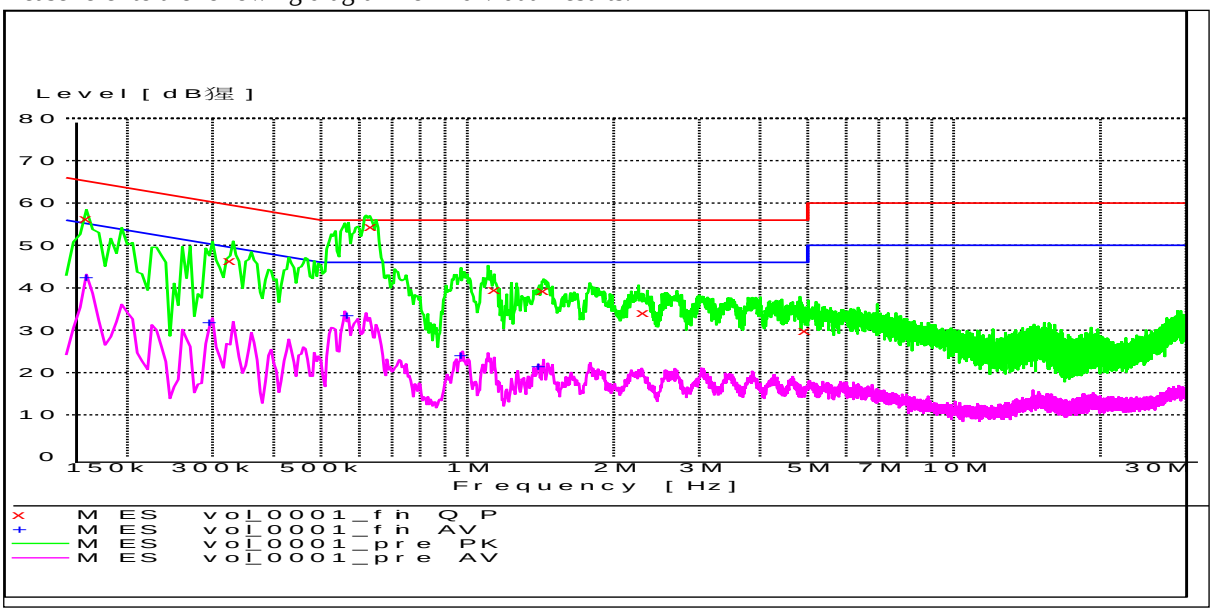
**Limits for Conducted Emissions (FCC 47 CFR 15.207):**

| Frequency Range [MHz] | Quasi-Peak Limits [dBμV] | Average [dBμV] |
|---|---|---|
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

**Results of Tx mode (Live and Neutral): PASS**
Please refer to the following diagram for individual results.



**Results of Tx mode: PASS**

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.165000 | 56.30 | 9.9 | 65 | 8.9 | N | GND |
| 0.325000 | 46.40 | 10.0 | 60 | 13.1 | N | GND |
| 0.635000 | 54.50 | 10.0 | 56 | 1.5 | N | GND |
| 1.140000 | 39.50 | 10.0 | 56 | 16.5 | N | GND |
| 1.435000 | 39.20 | 10.0 | 56 | 16.8 | N | GND |
| 2.305000 | 34.20 | 10.1 | 56 | 21.8 | N | GND |
| 4.945000 | 29.80 | 10.3 | 56 | 26.2 | N | GND |

***MEASUREMENT RESULT: "vol_0001_fin AV"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.165000 | 42.40 | 9.9 | 55 | 12.8 | N | GND |
| 0.295000 | 31.80 | 9.9 | 50 | 18.6 | N | GND |
| 0.565000 | 33.40 | 10.0 | 46 | 12.6 | N | GND |
| 0.970000 | 23.90 | 10.0 | 46 | 22.1 | N | GND |
| 1.400000 | 21.40 | 10.0 | 46 | 24.6 | N | GND |

### 3.1.4 Power Spectral Density

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(e) |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2019-05-10 |
| Mode of Operation: | Tx mode (802.11 b/g/n) |

**Test Method:**

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz , VBW= 10kHz , Set the span to 1.5 times the DTS channel bandwidth. Detector = peak, Sweep time = auto couple , Trace mode = max hold.

**Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

**Test Limit:**
The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

**Remarks:**
The RBW used for PSD measurement was 100 kHz, therefore correction factor applied to calculate final results. The correction factor = 10log(3kHz/100kHz) = -15.2dB.

**Results of Tx Mode (802.11b) : Pass**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| **2412.0** | -22.0 | **8dBm** |
| **2442.0** | -21.1 | **8dBm** |
| **2472.0** | -27.1 | **8dBm** |

**Results of Tx Mode (802.11g) : Pass**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| **2412.0** | -32.1 | **8dBm** |
| **2442.0** | -31.2 | **8dBm** |
| **2472.0** | -30.0 | **8dBm** |

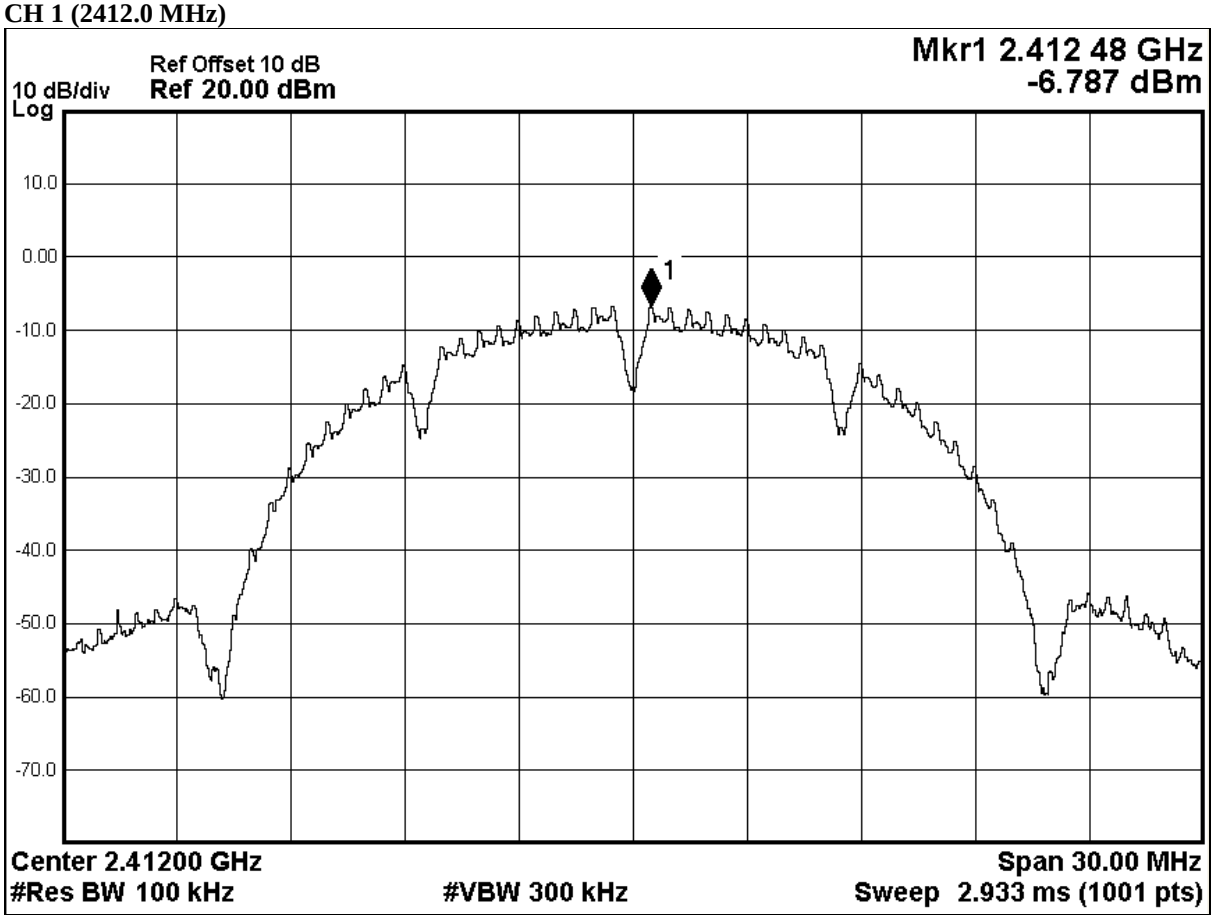
**Results of Tx Mode (802.11n(HT20)) : Pass**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| **2412.0** | -31.8 | **8dBm** |
| **2442.0** | -31.4 | **8dBm** |
| **2472.0** | -30.0 | **8dBm** |

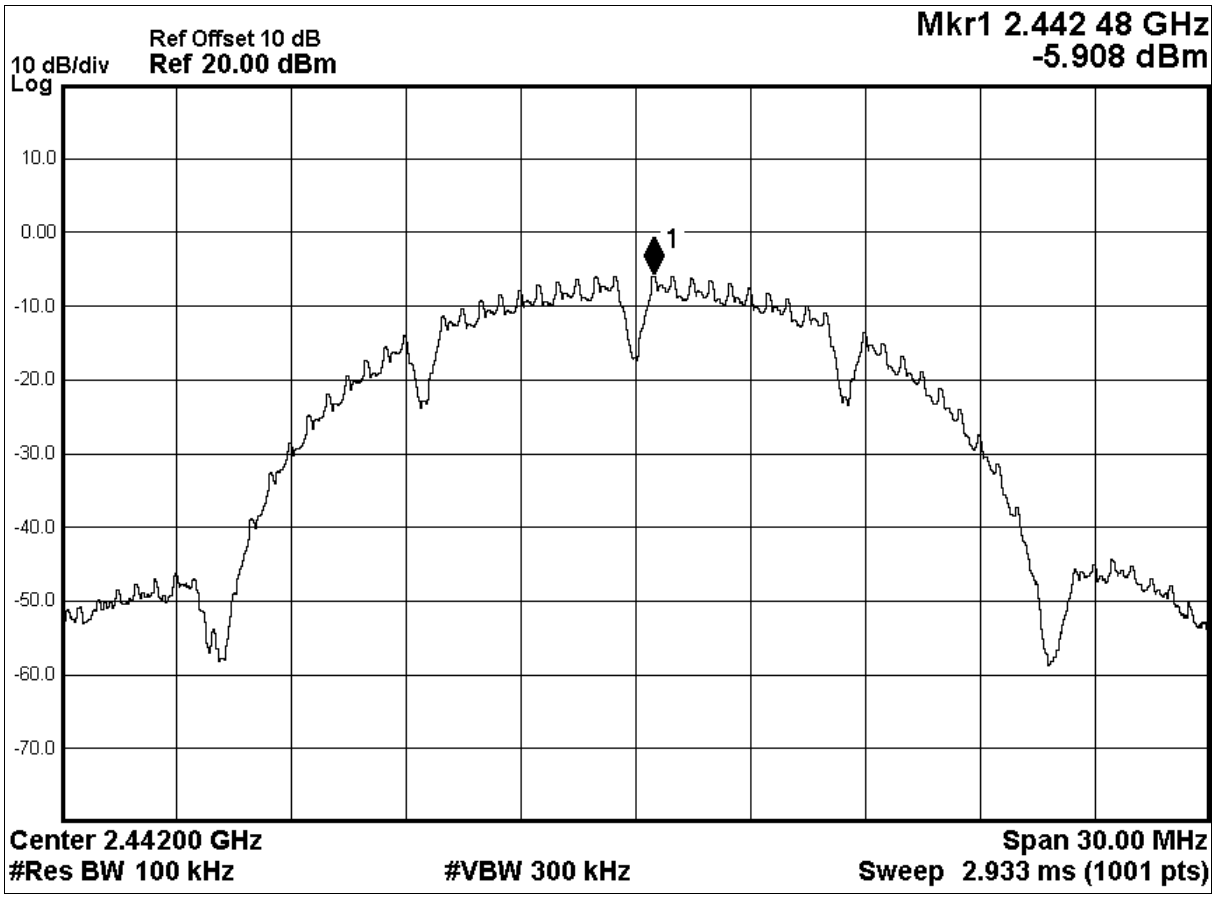
**Results of Tx Mode (802.11n(HT40)) : Pass**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| **2422.0** | -34.9 | **8dBm** |
| **2442.0** | -34.4 | **8dBm** |
| **2462.0** | -33.5 | **8dBm** |

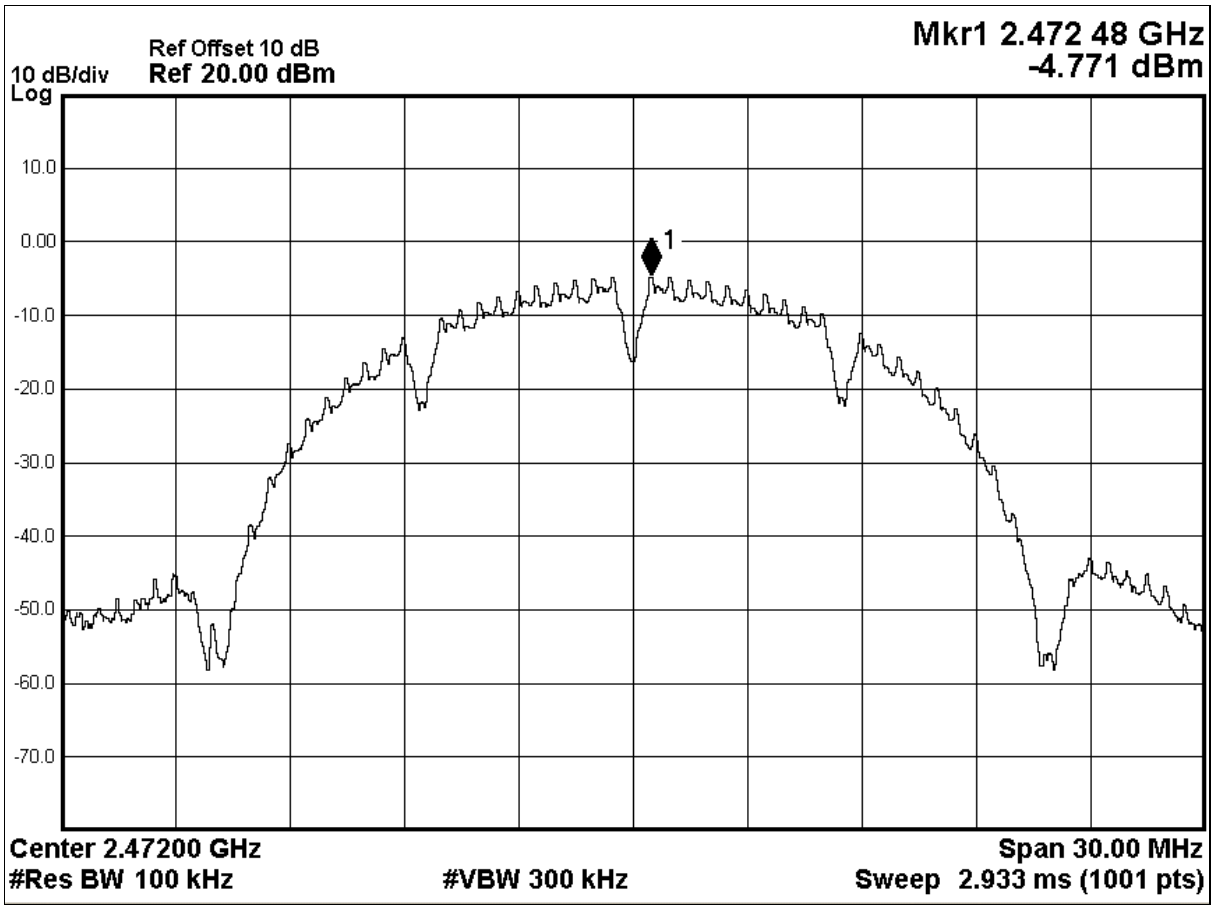
**Tx mode (802.11b)**
**CH 1 (2412.0 MHz)**



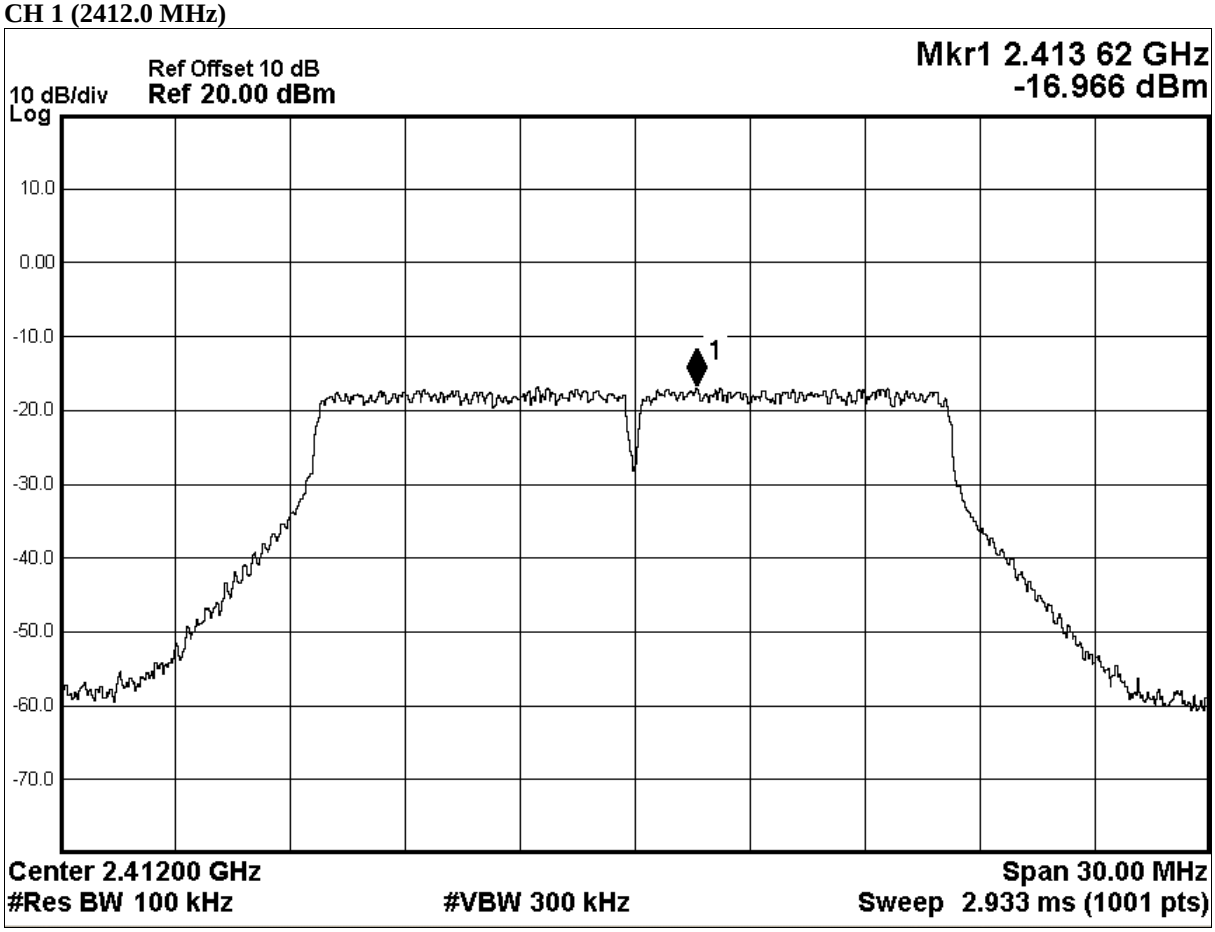
**Tx mode (802.11b)**
**CH 7 (2442.0 MHz)**



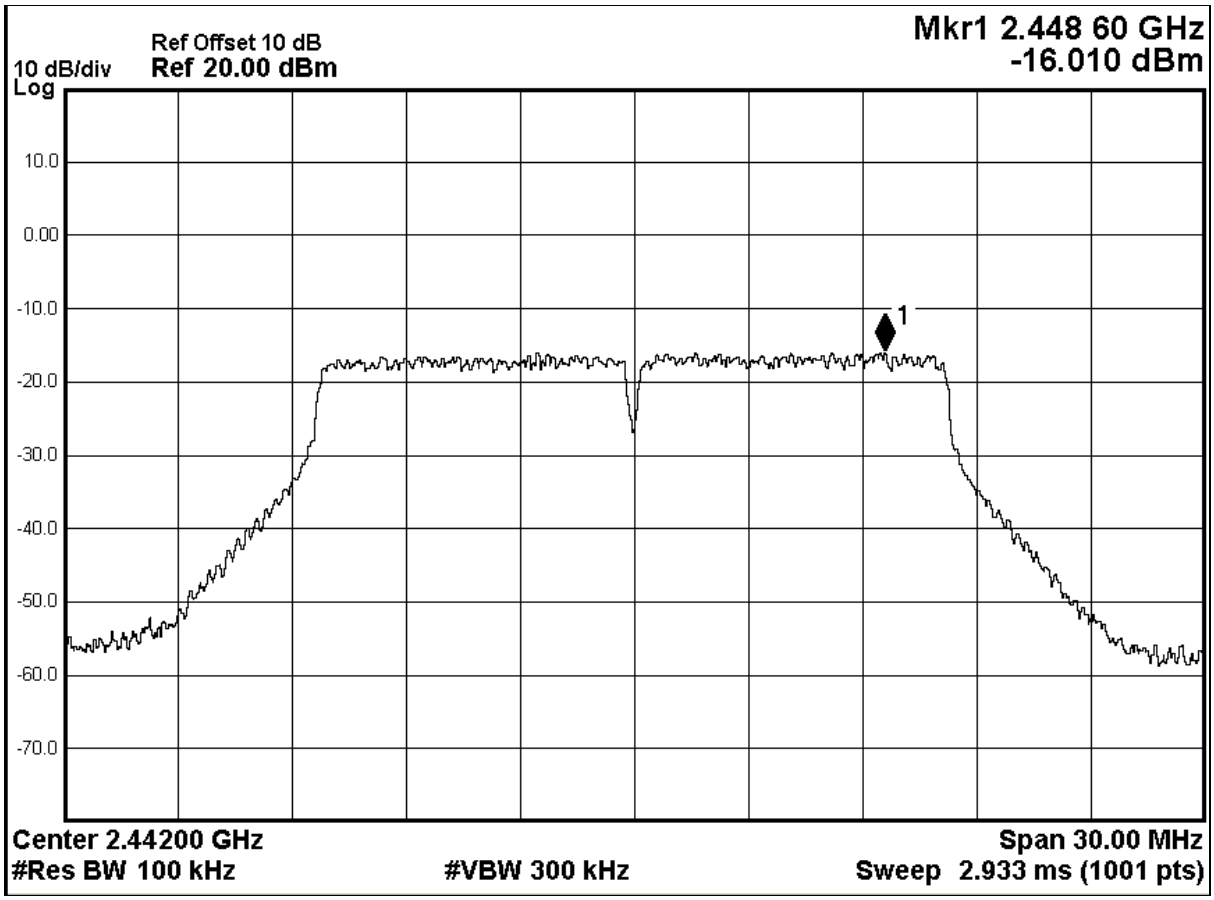
**Tx mode (802.11b)**
**CH 13 (2472.0 MHz)**



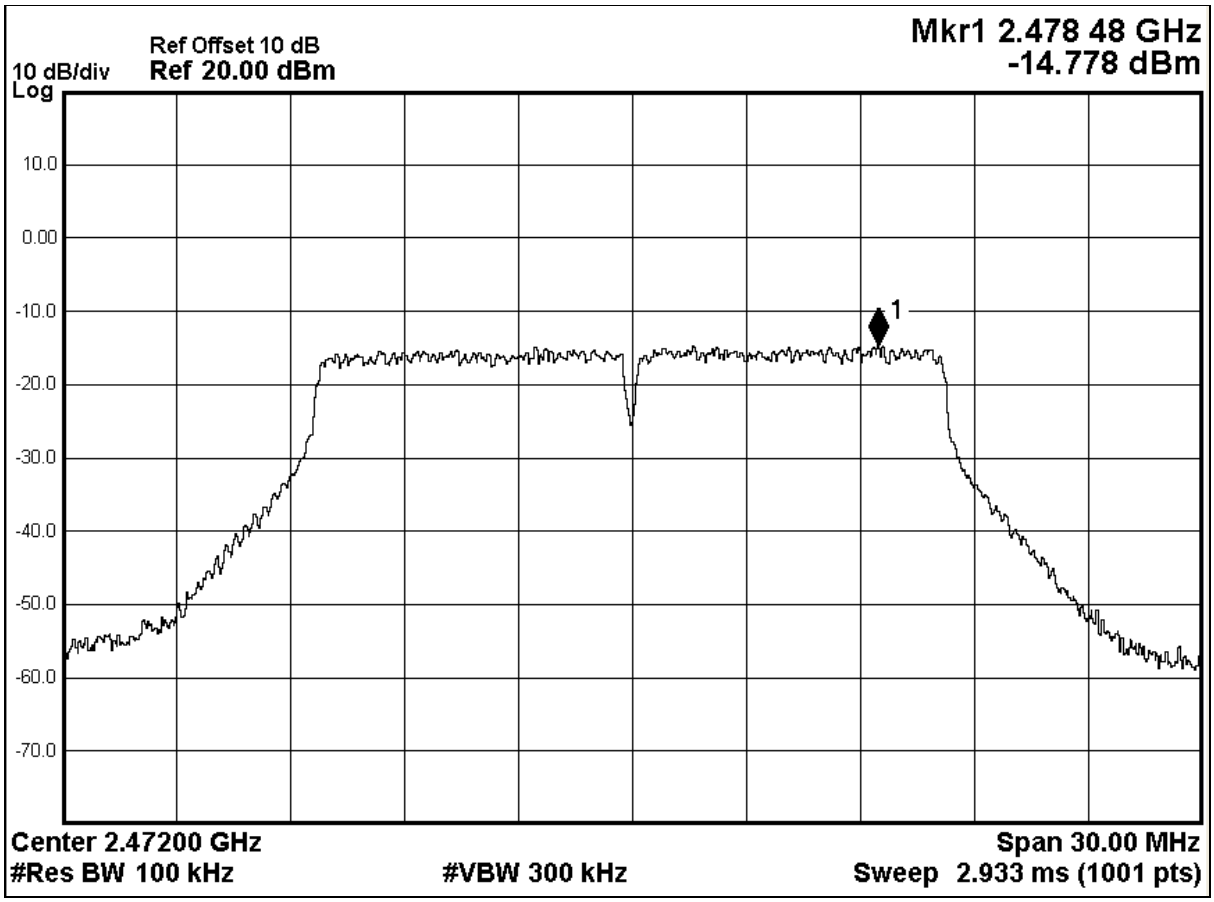
**Tx mode (802.11g)**
**CH 1 (2412.0 MHz)**



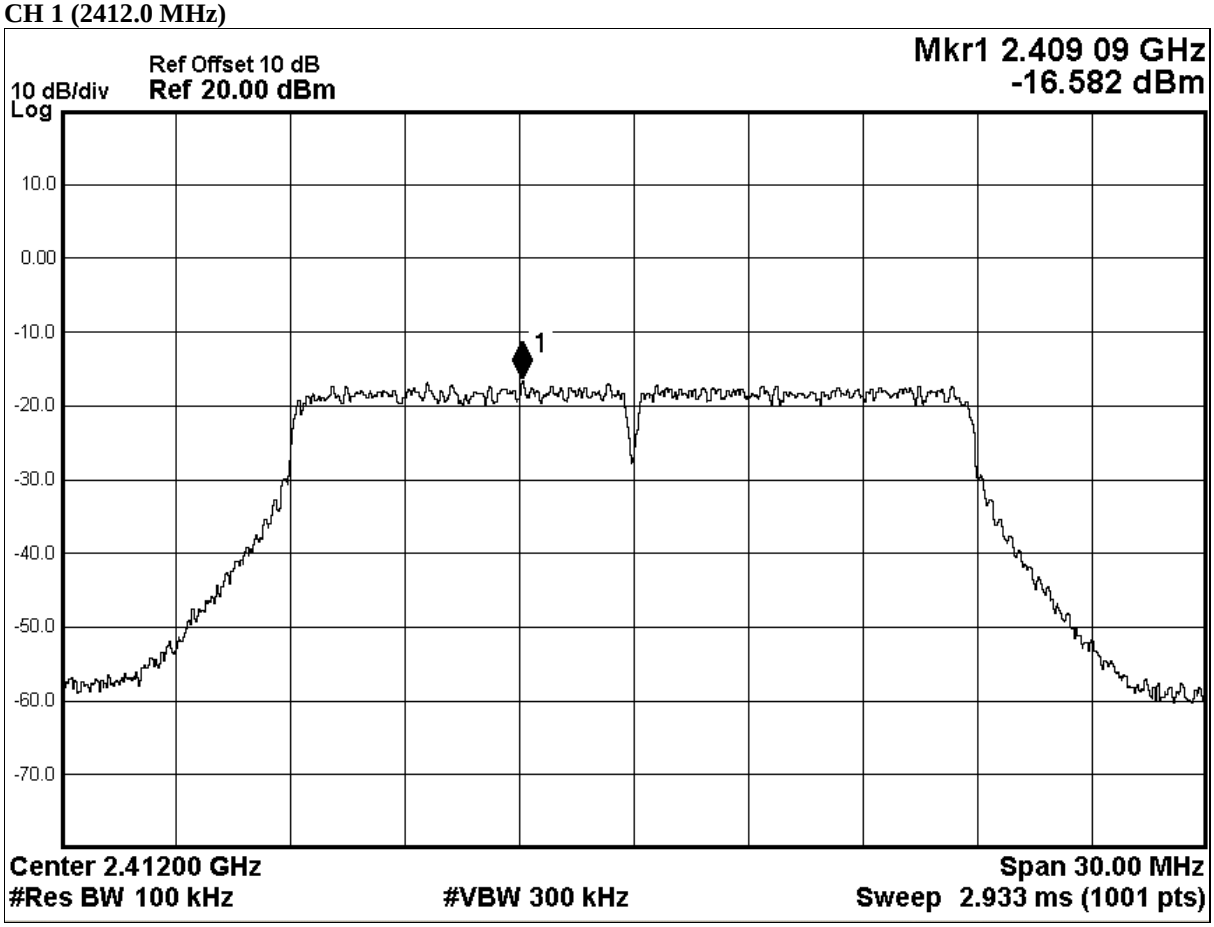
**Tx mode (802.11g)**
**CH 7 (2442.0 MHz)**



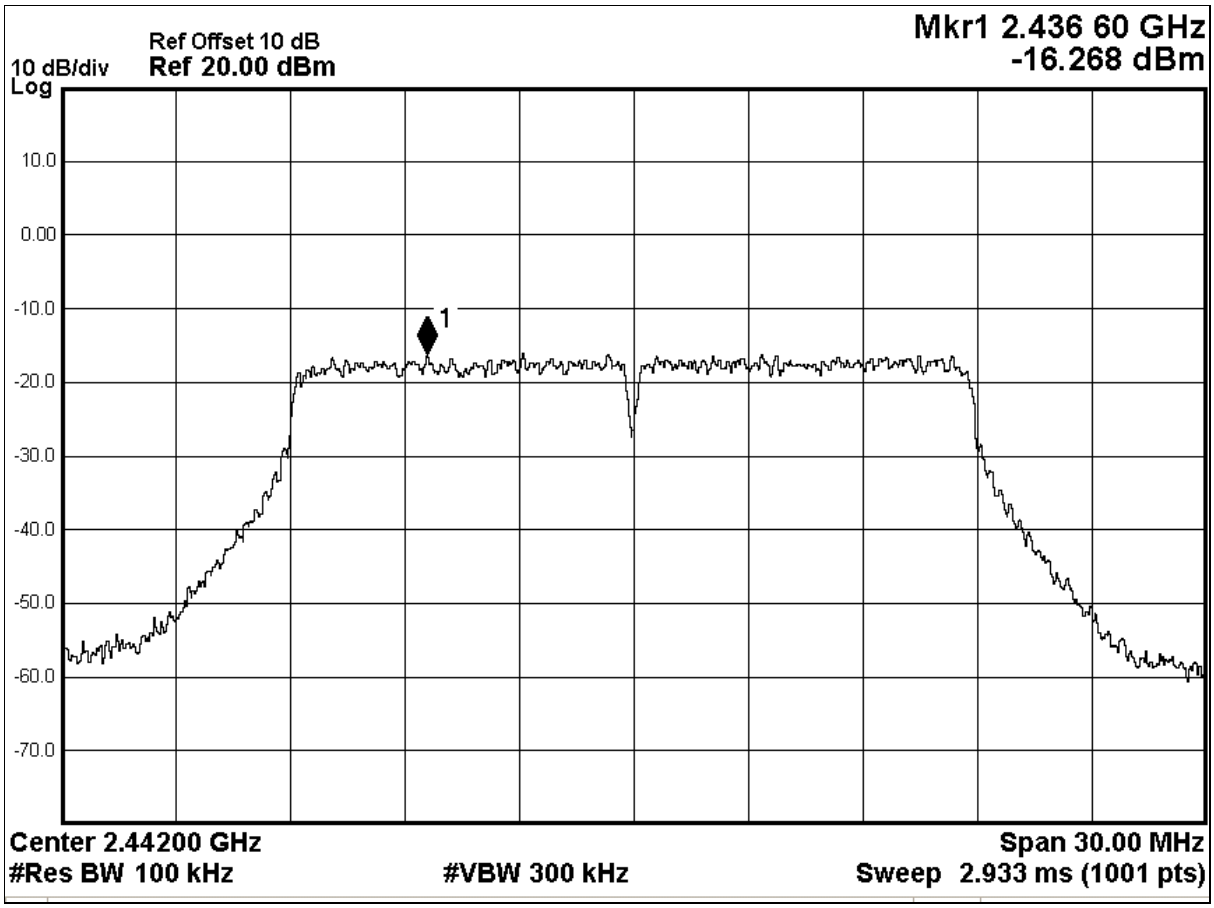
**Tx mode (802.11g)**
**CH 13 (2472.0 MHz)**



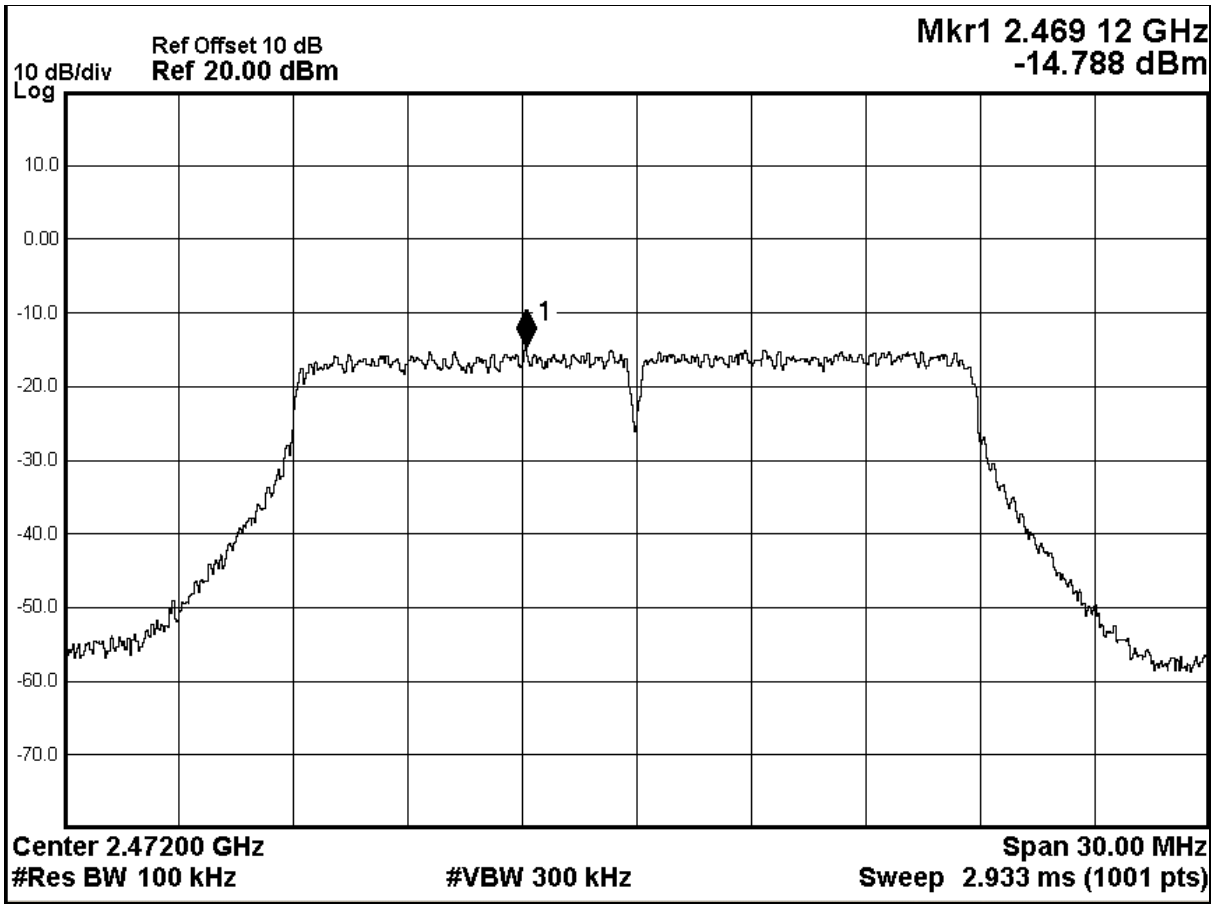
**Tx mode (802.11n(HT20))**
**CH 1 (2412.0 MHz)**



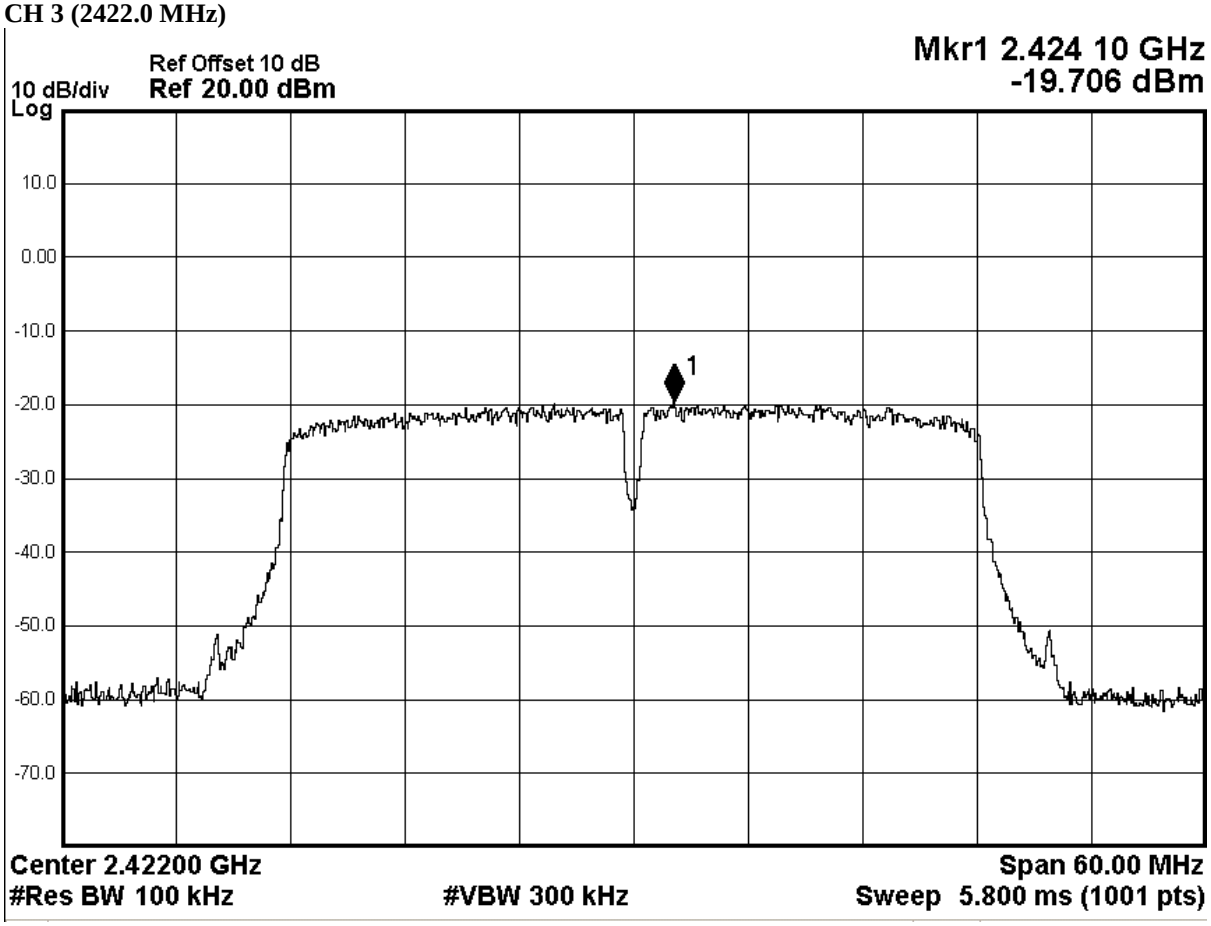
**Tx mode (802.11n(HT20))**
**CH 7 (2442.0 MHz)**



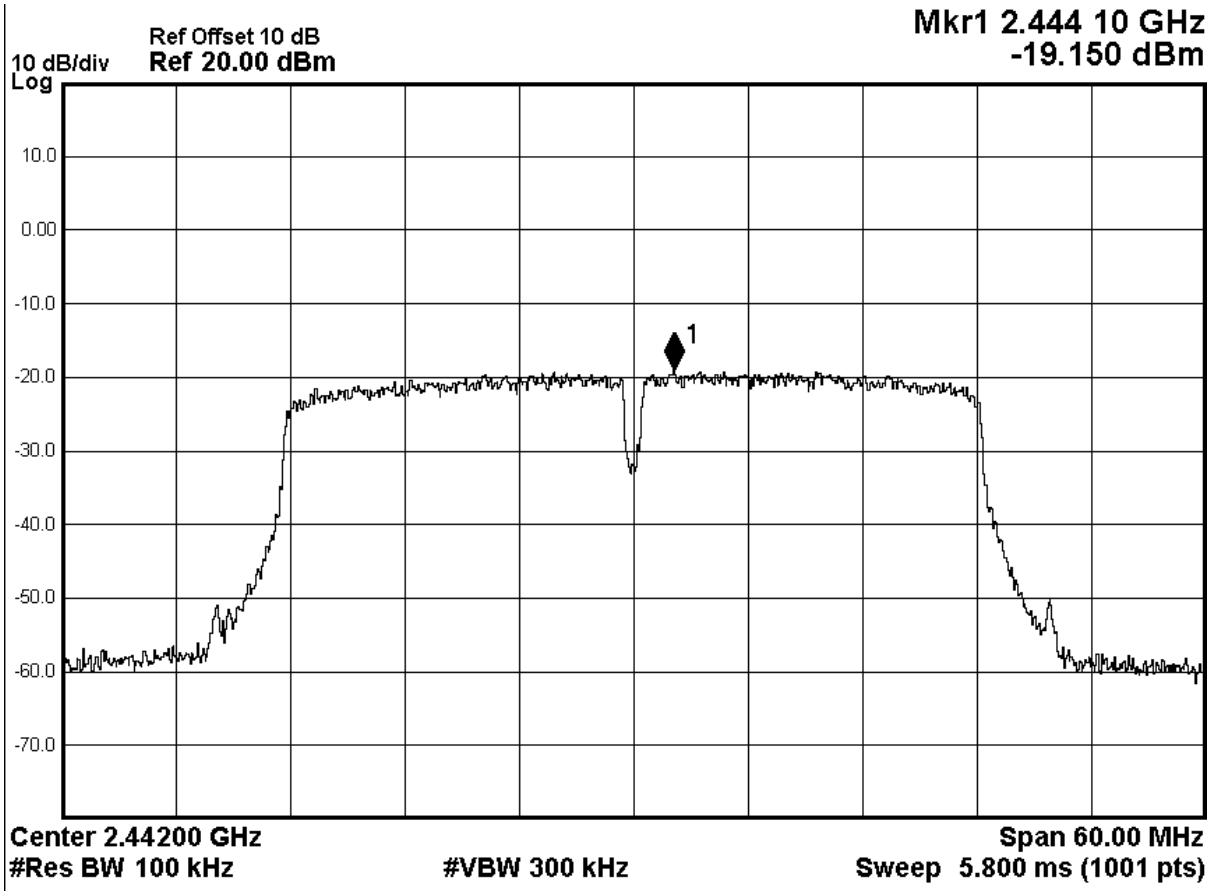
**Tx mode (802.11n(HT20))**
**CH 13 (2472.0 MHz)**



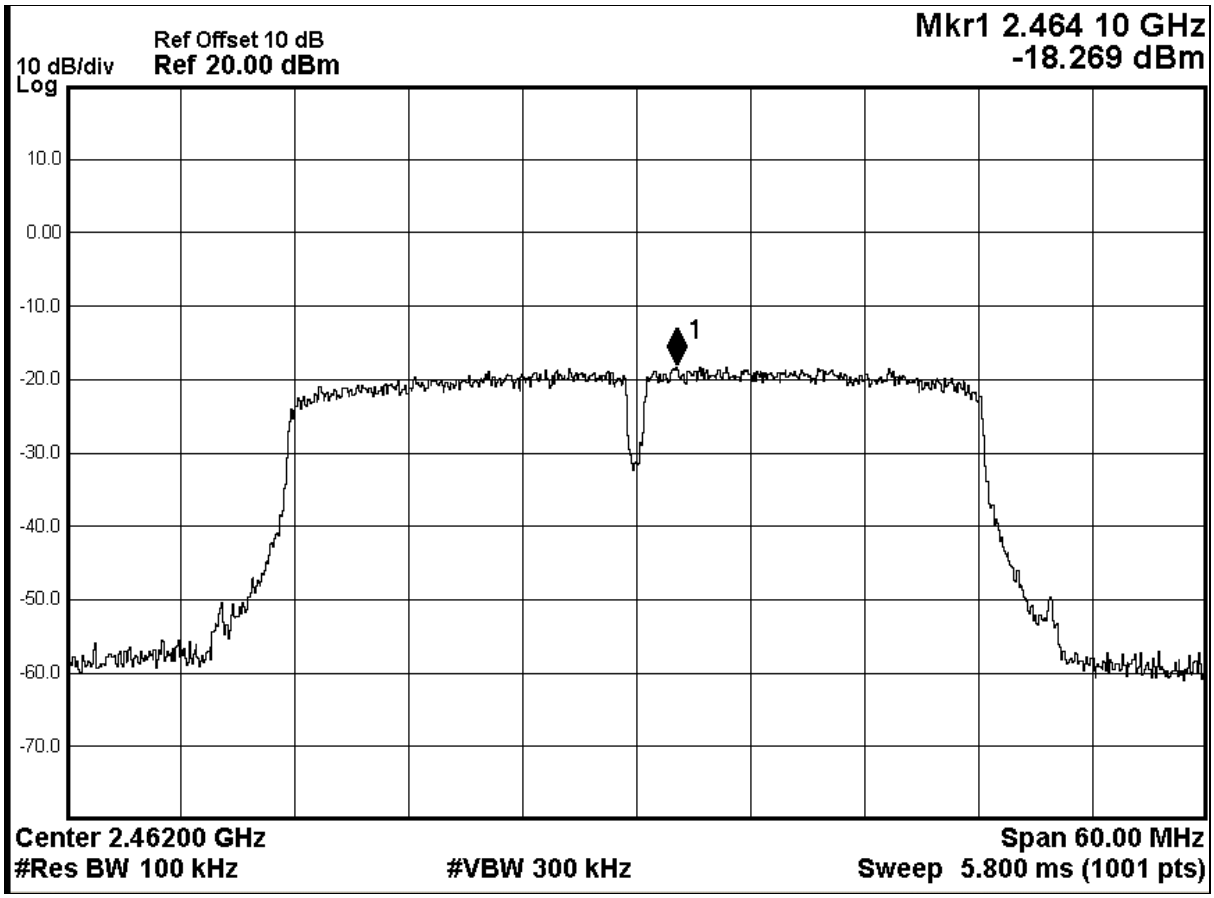
**Tx mode (802.11n(HT40))**
**CH 3 (2422.0 MHz)**



**Tx mode (802.11n(HT40))**
**CH 7 (2442.0 MHz)**



**Tx mode (802.11n(HT40))**
**CH 11 (2462.0 MHz)**



### 3.1.5 6dB Spectrum Bandwidth Measurement

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(a)(2) |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2019-05-14 |
| Mode of Operation: | Tx mode (802.11 b/g/n) |

**Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

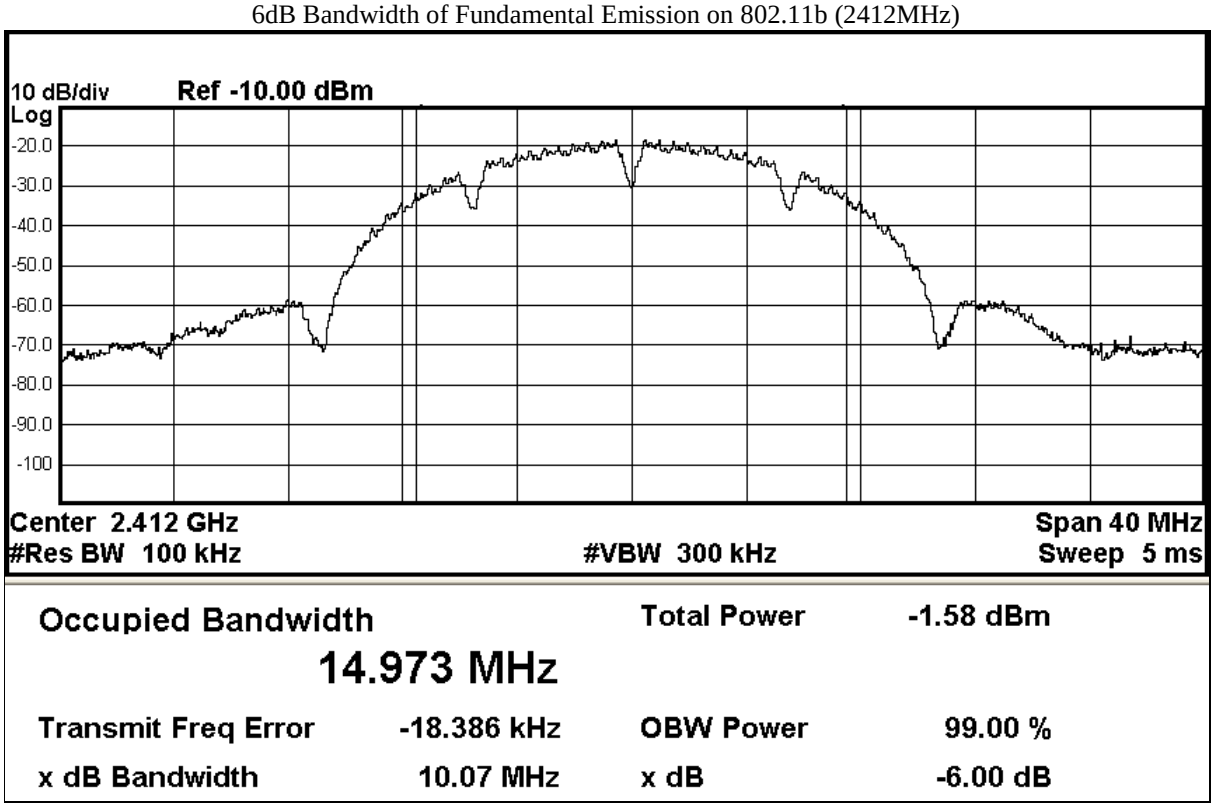
**Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 10.07 | > 500 |

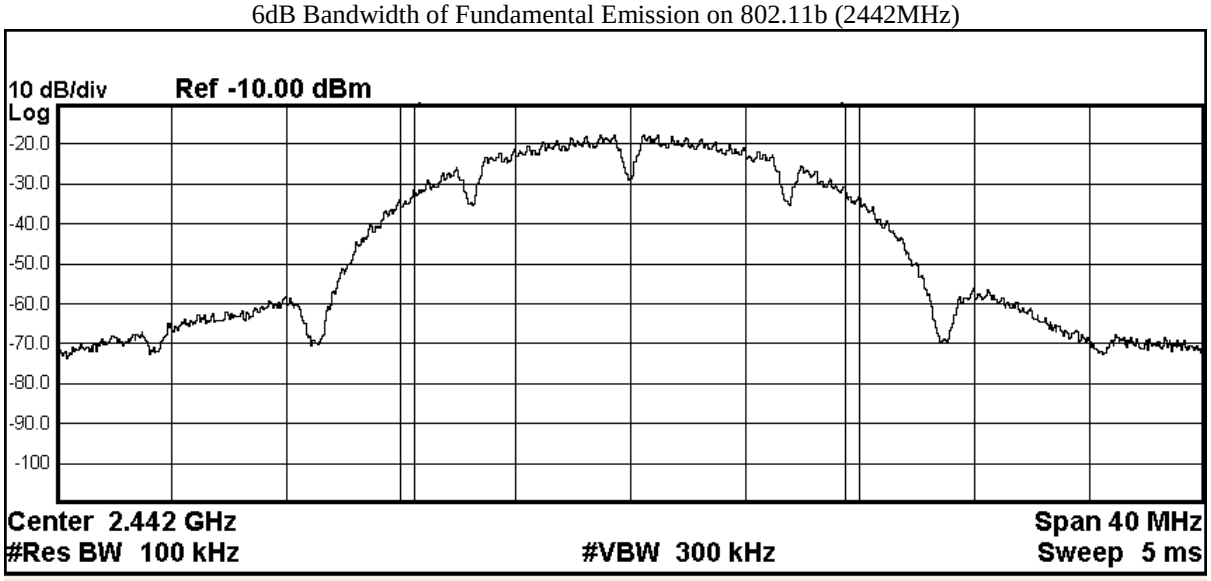
6dB Bandwidth of Fundamental Emission on 802.11b (2412MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2442.0 | 10.06 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11b (2442MHz)

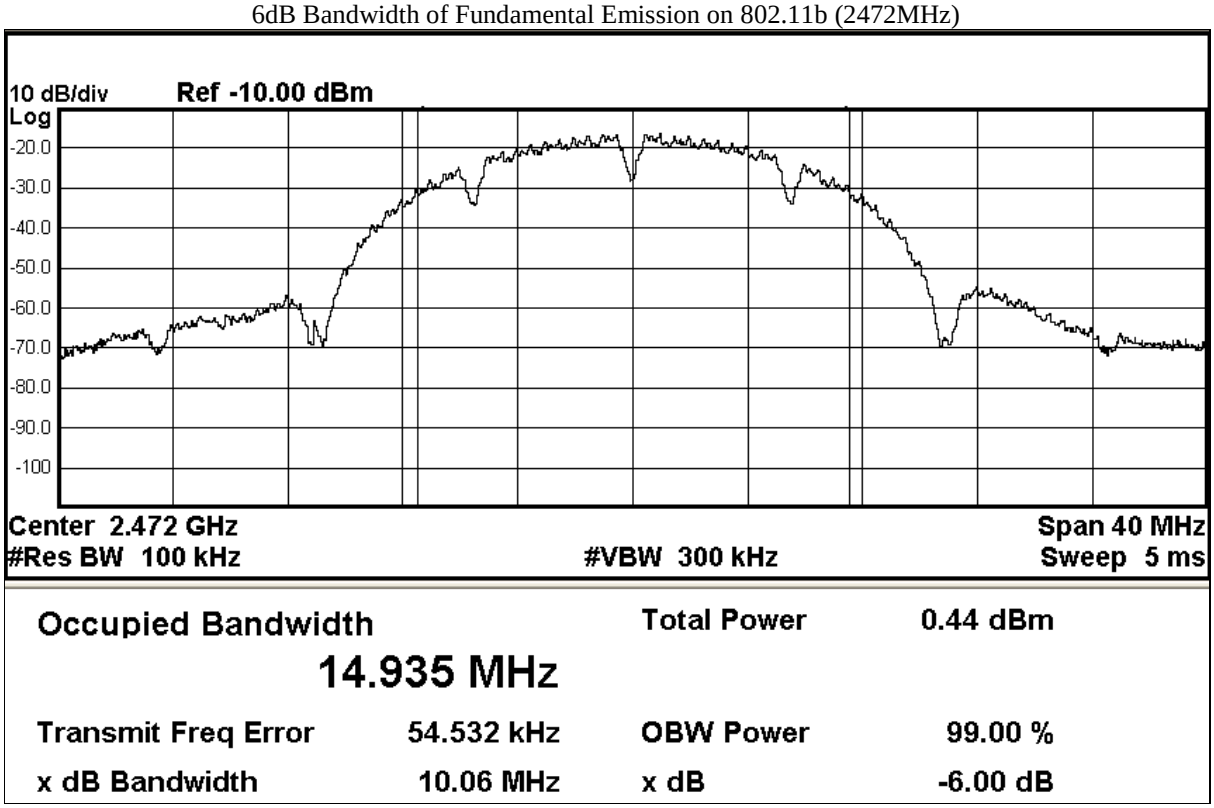



| | | | |
|---|---|---|---|
| Occupied Bandwidth | | Total Power | -0.78 dBm |
| 14.945 MHz | | | |
| Transmit Freq Error | 23.015 kHz | OBW Power | 99.00 % |
| x dB Bandwidth | 10.06 MHz | x dB | -6.00 dB |

**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2472.0 | 10.06 | > 500 |

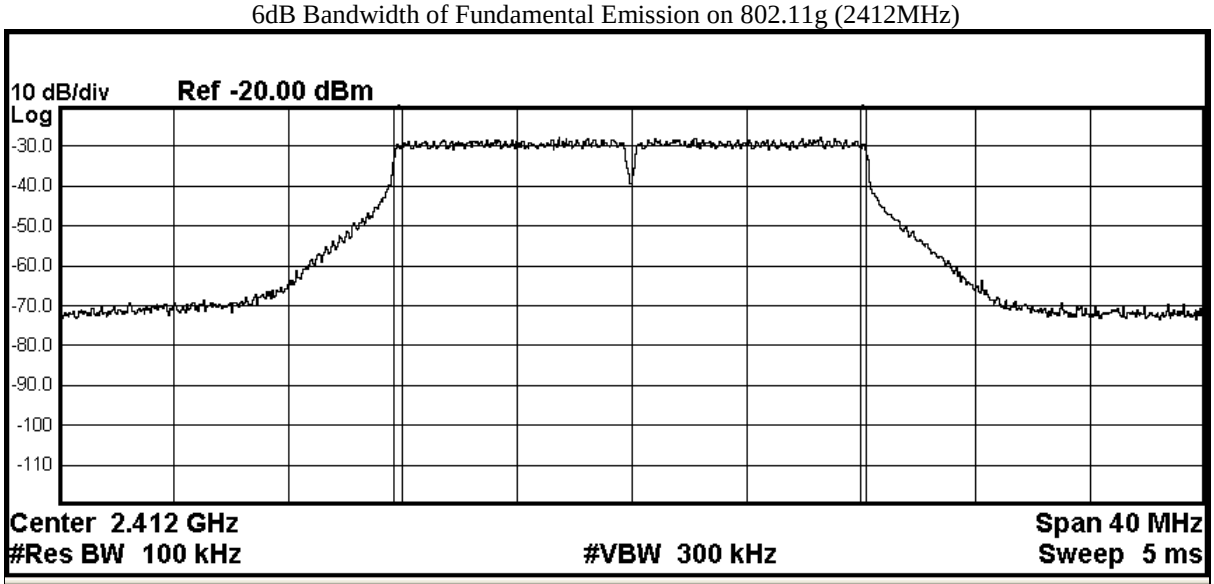
6dB Bandwidth of Fundamental Emission on 802.11b (2472MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 16.56 | > 500 |

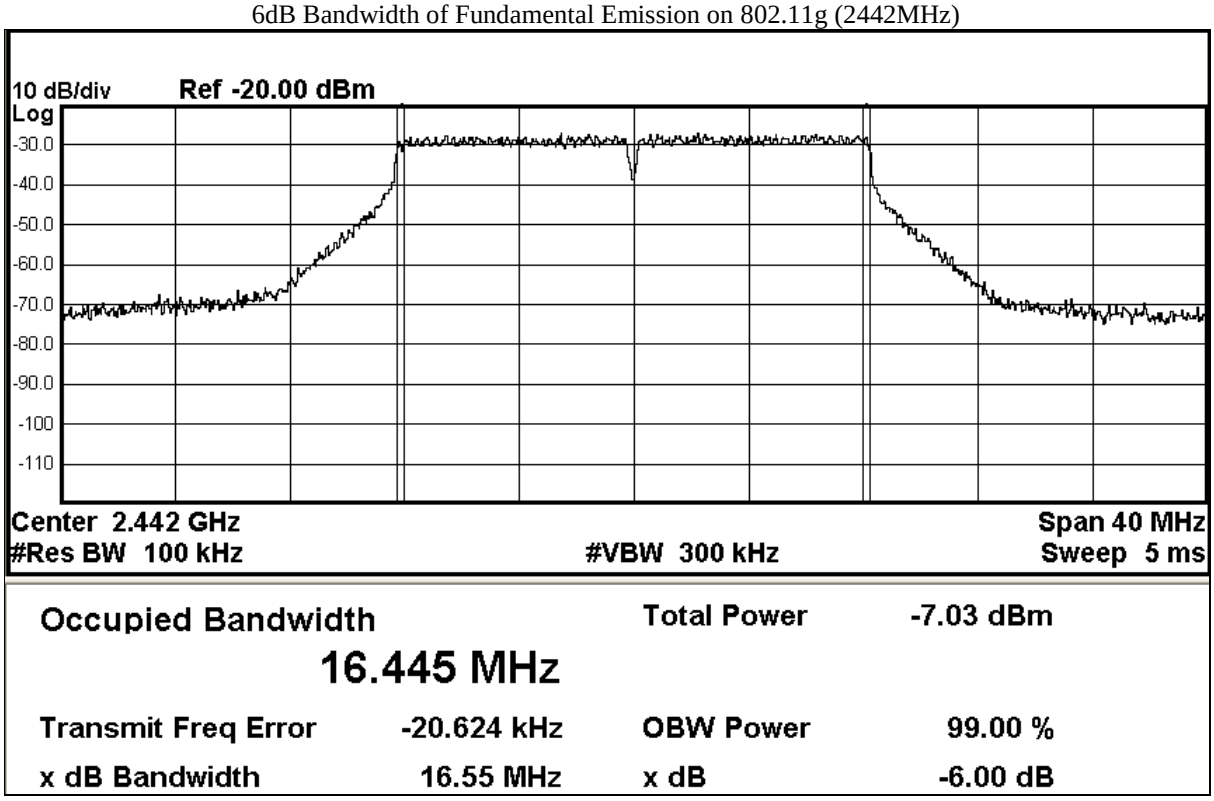
6dB Bandwidth of Fundamental Emission on 802.11g (2412MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2442.0 | 16.55 | > 500 |

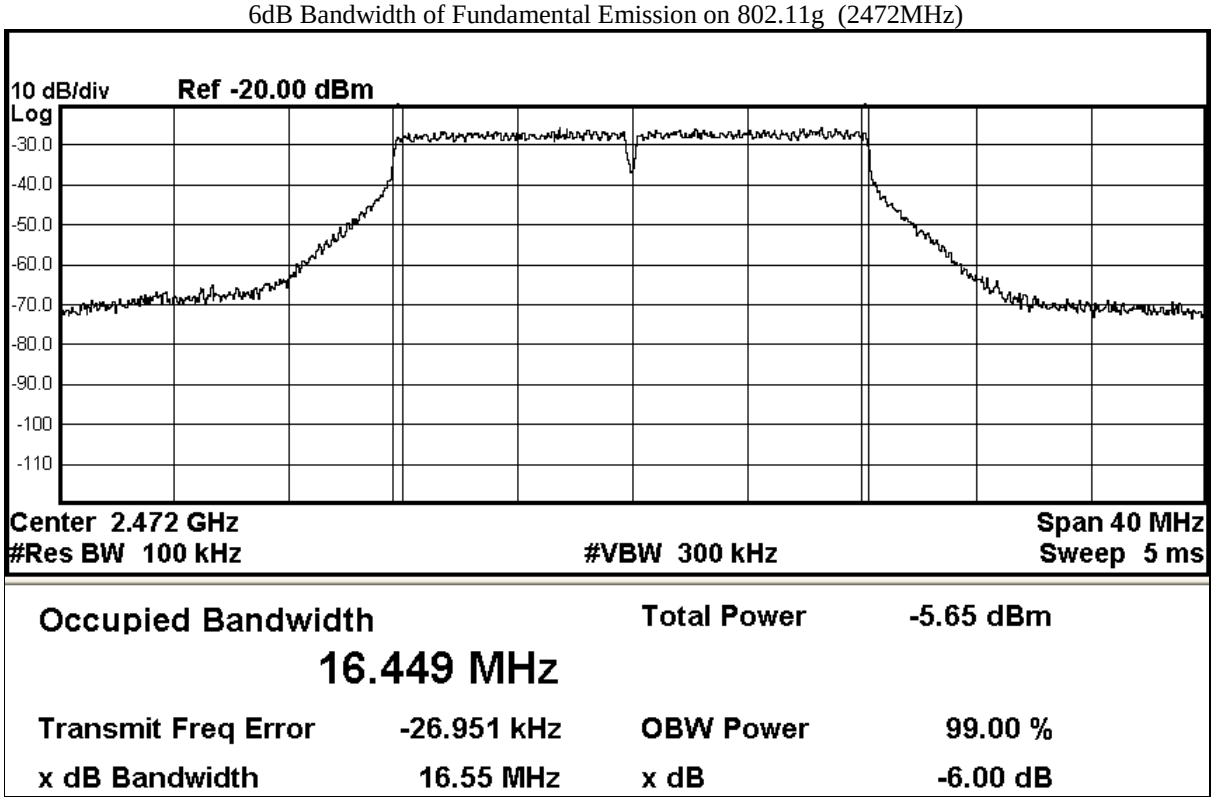
6dB Bandwidth of Fundamental Emission on 802.11g (2442MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2472.0 | 16.55 | > 500 |

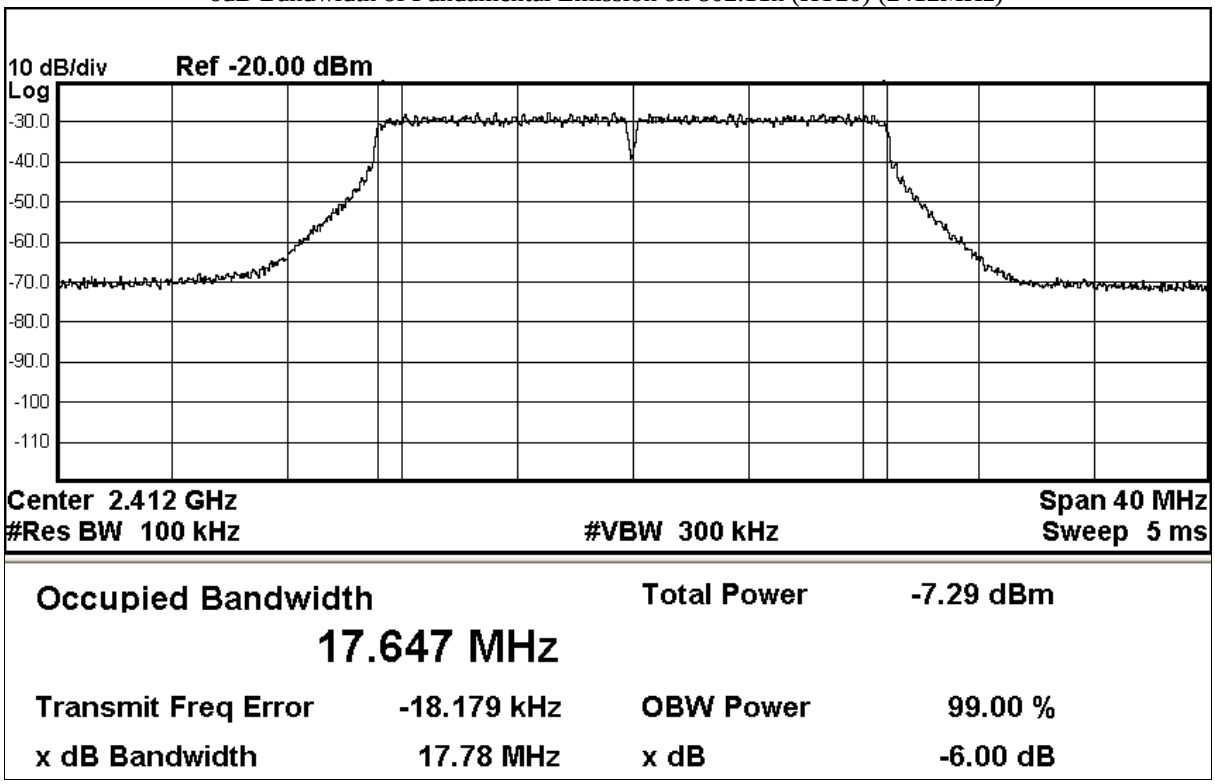
6dB Bandwidth of Fundamental Emission on 802.11g (2472MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 17.78 | > 500 |

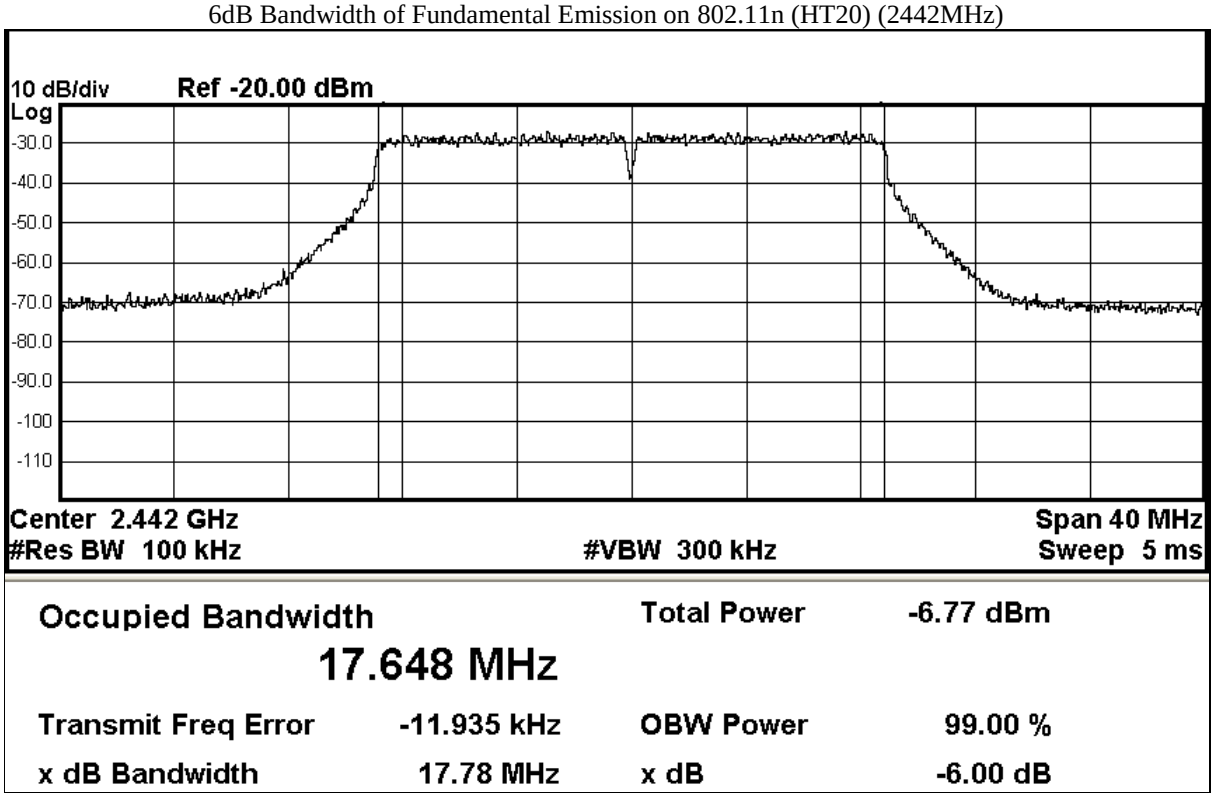
6dB Bandwidth of Fundamental Emission on 802.11n (HT20) (2412MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2442.0 | 17.78 | > 500 |

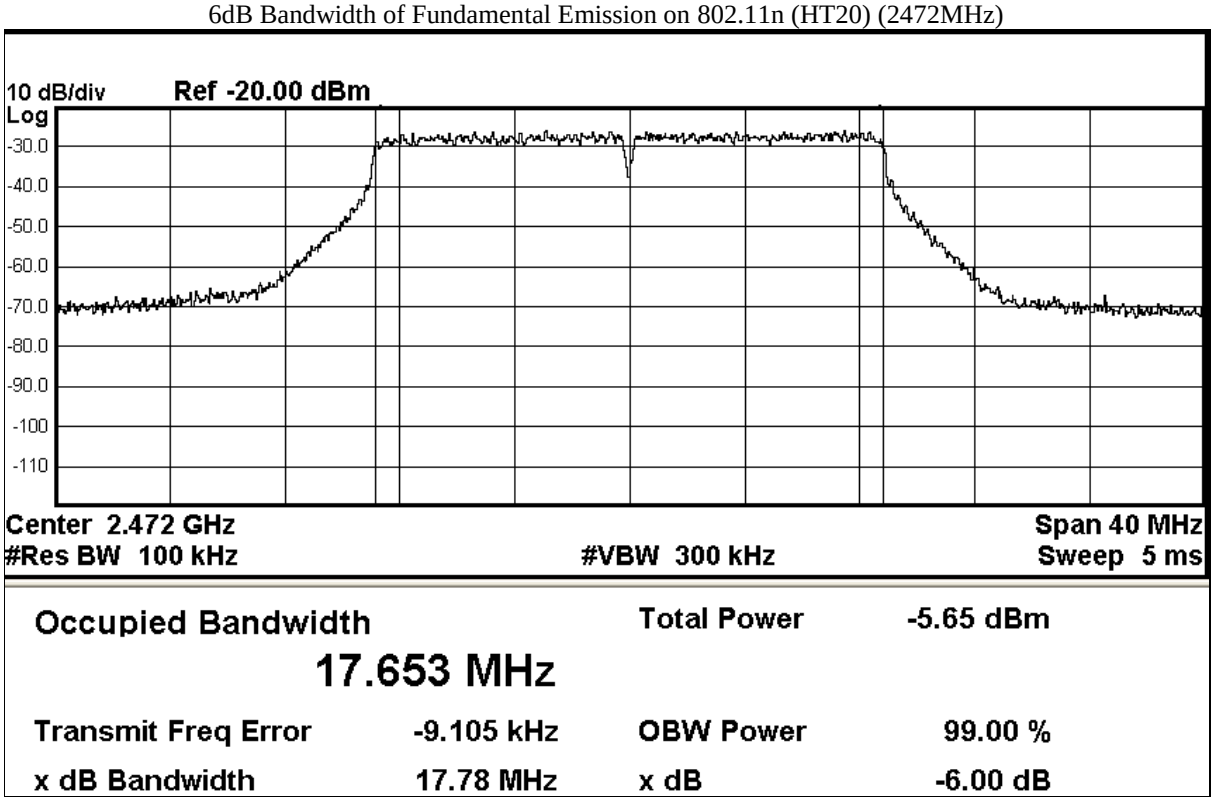
6dB Bandwidth of Fundamental Emission on 802.11n (HT20) (2442MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2472.0 | 17.78 | > 500 |

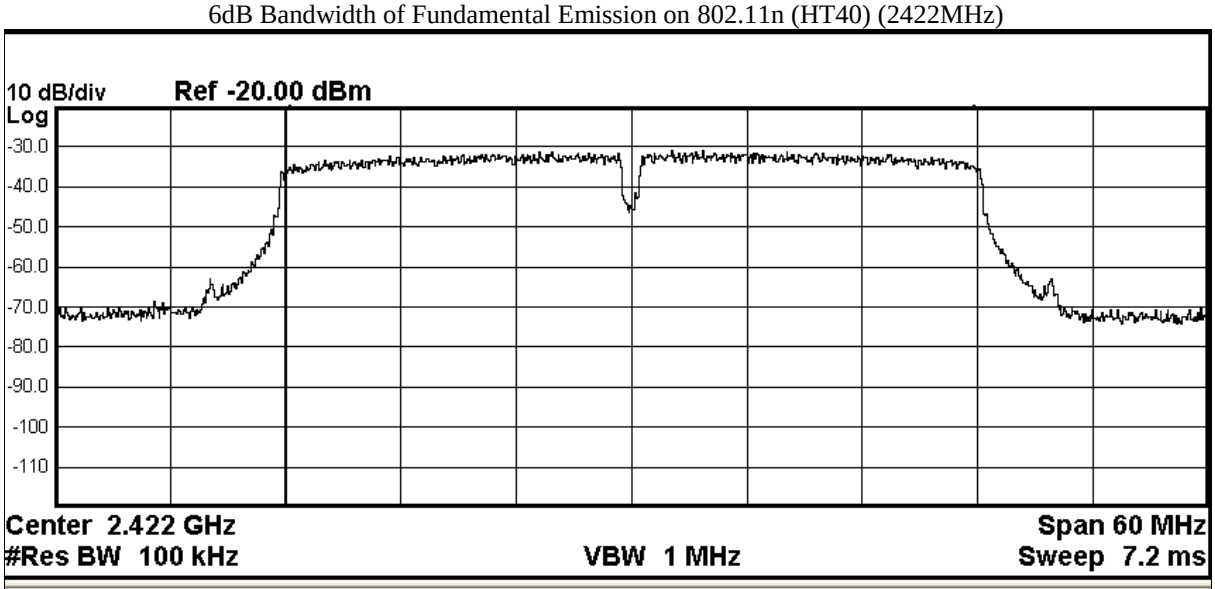
6dB Bandwidth of Fundamental Emission on 802.11n (HT20) (2472MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2422.0 | 36.36 | > 500 |

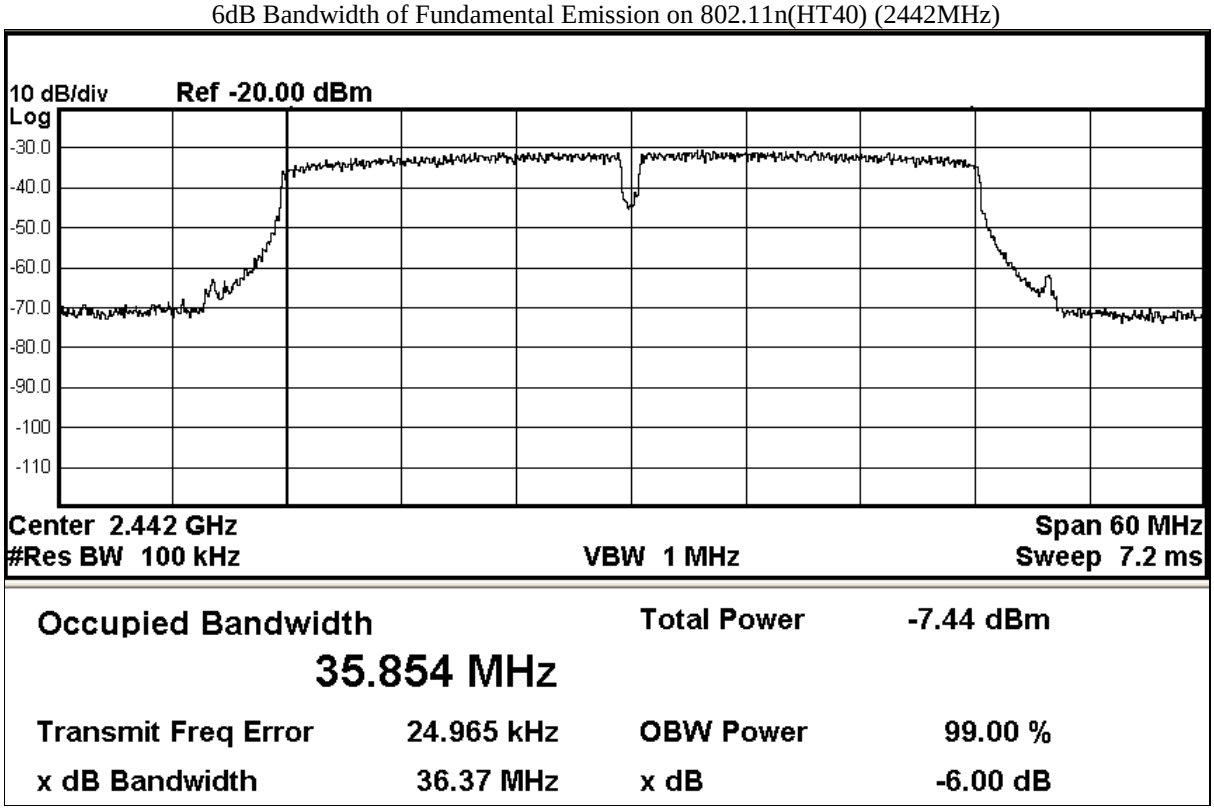
6dB Bandwidth of Fundamental Emission on 802.11n (HT40) (2422MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2442.0 | 36.37 | > 500 |

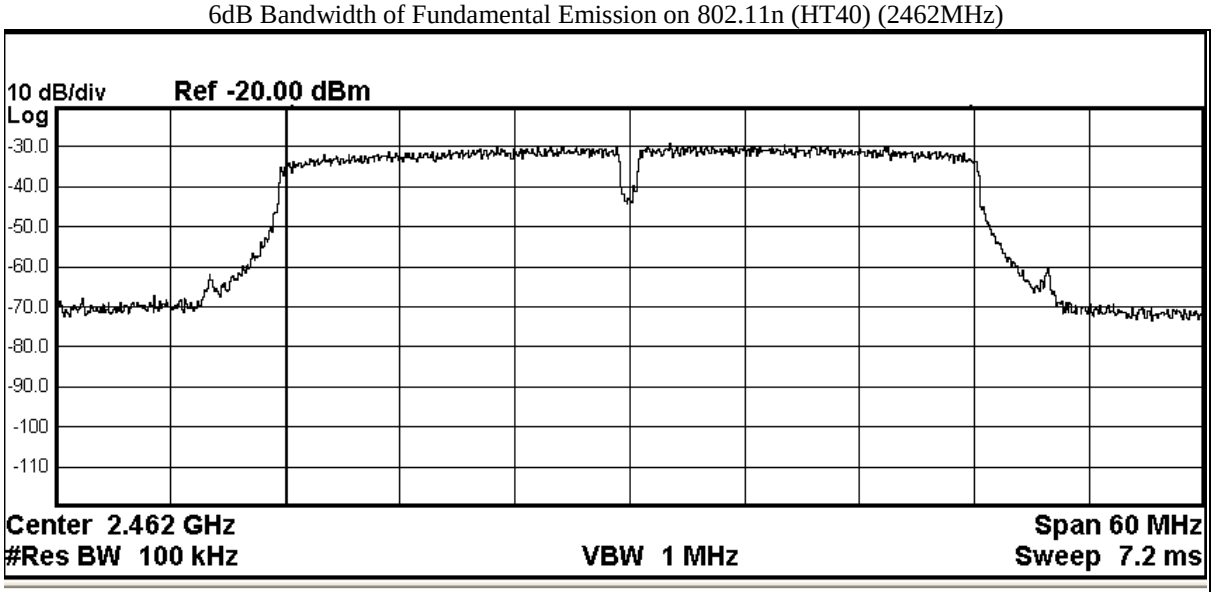
6dB Bandwidth of Fundamental Emission on 802.11n(HT40) (2442MHz)



**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2462.0 | 36.34 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11n (HT40) (2462MHz)




| | | | |
|---|---|---|---|
| Occupied Bandwidth | | Total Power | -6.50 dBm |
| 35.842 MHz | | | |
| Transmit Freq Error | 41.703 kHz | OBW Power | 99.00 % |
| x dB Bandwidth | 36.34 MHz | x dB | -6.00 dB |

### 3.1.6 RF Exposure

**RF Exposure**

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(i) |
| Test Date: | 2019-05-16 |
| Mode of Operation: | Tx mode |

**Requirements:**

In 15.247(i), an equipment shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the limits in §§ 1.1310 and 2.1093 of this chapter.
Applications to the Commission for construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities must contain a statement confirming compliance with the limits unless the facility, operation, or transmitter is categorically excluded, as discussed below. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to KDB447498 D01 General RF Exposure Guidance v06, unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition.

**Test Results:**

**RF Exposure Evaluation**

For 802.11b/g/n

The Maximum tune-up power = 9.89dBm (9.76mW)

SAR Test Exclusion Thresholds= 38mW

The test separation distances is ≤20 mm
The power tune up tolerance is 8.19±1.70dBm
Max. duty factor is 100%

**RF Exposure Evaluation**

Bluetooth (BLE)

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2402.0 | 51.3 | 27.9 | 79.2 | N/A | N/A | Vertical |
| 2440.0 | 50.2 | 27.9 | 78.1 | N/A | N/A | Vertical |
| 2442.0 | 50.7 | 27.9 | 78.6 | N/A | N/A | Vertical |

| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dBuV/m | E-Field Polarity |
| 2402.0 | 40.3 | 27.9 | 68.2 | N/A | N/A | Vertical |
| 2440.0 | 39.8 | 27.9 | 67.7 | N/A | N/A | Vertical |
| 2442.0 | 41.1 | 27.9 | 69.0 | N/A | N/A | Vertical |

The Maximum EIRP = -16.1dBm (0.025mW)

SAR Test Exclusion Thresholds= 38mW

The test separation distances is ≤20 mm
The power tune up tolerance is 8.19±1.70dBm
Max. duty factor is 100%

## Appendix A

### List of Measurement Equipment

**Radiated Emission**

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---|---|---|---|---|---|---|
| EM215 | MULTIDEVICE CONTROLLER | EMCO | 2090 | 00024676 | N/A | N/A |
| EM217 | ELECTRIC POWERED TURNTABLE | EMCO | 2088 | 00029144 | N/A | N/A |
| EM218 | ANECHOIC CHAMBER | ETS-LINDGREN | FACT-3 | -- | 2019/01/24 | 2020/01/24 |
| EM356 | ANTENNA POSITIONING TOWER | ETS-LINDGREN | 2171B | 00150346 | N/A | N/A |
| EM354 | BICONILOG ANTENNA | ETS-LINDGREN | 3143B | 00142073 | 2018/03/29 | 2020/03/29 |
| EM229 | EMI TEST RECEIVER | R&S | ESIB40 | 100248 | 2018/06/12 | 2019/06/12 |
| EM276 | BROADBAND HORN ANTENNA | A-INFOMW | JXTXLB-10180-SF | J203109090300 7 | 2018/04/27 | 2020/04/27 |
| EM318 | USB WIDEBAND POWER SENSOR | AGILENT | U2022XA | MY53470001 | 2019/03/23 | 2021/03/23 |
| EM353 | LOOP ANTENNA | ETS_LINDGREN | 6502 | 00206533 | 2018/04/16 | 2020/04/16 |

**Line Conducted**

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---|---|---|---|---|---|---|
| EM119 | LISN | R & S | ESH3-Z5 | 0831.5518.52 | 2018/11/13 | 2019/11/13 |
| EM181 | EMI TEST RECEIVER | ROHDE & SCHWARZ | ESIB7 | 100072 | 2018/06/12 | 2019/06/12 |
| EM179 | IMPULSE LIMITER | ROHDE & SCHWARZ | ESH3-Z2 | 357-8810.52/54 | 2019/01/24 | 2020/01/24 |
| EM154 | SHIELDING ROOM | SIEMENS MATSUSHITA COMPONENTS | N/A | 803-740-057-99A | 2017/02/06 | 2022/02/06 |
| N/A | MEASUREMENT AND EVALUATION SOFTWARE | ROHDE & SCHWARZ | ESIB-K1 | V1.20 | N/A | N/A |

Remarks:-

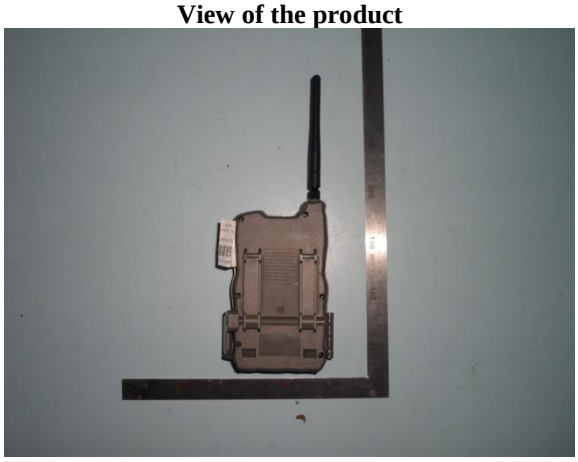
CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

**Appendix B**

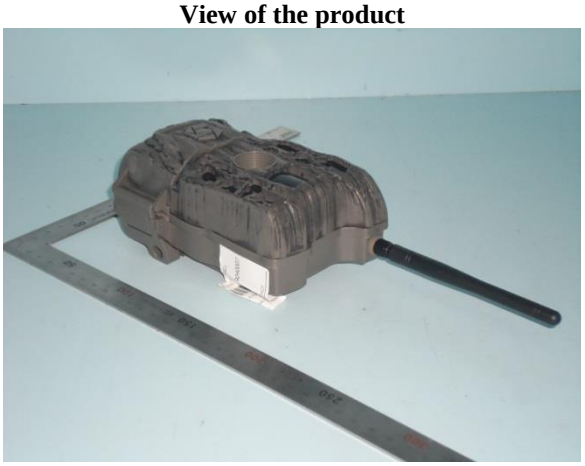
**Photographs of EUT**

**View of the product**

**View of the product**

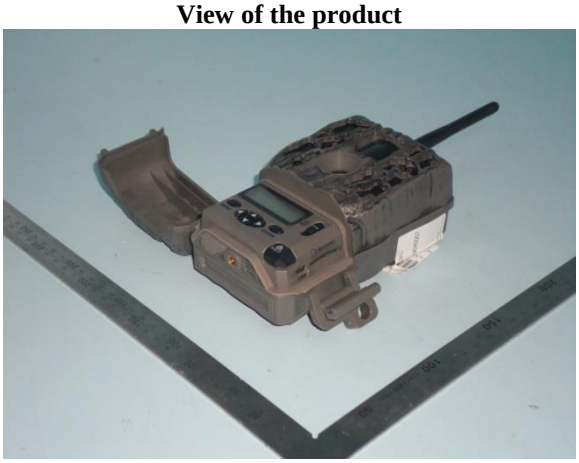


**View of the product**

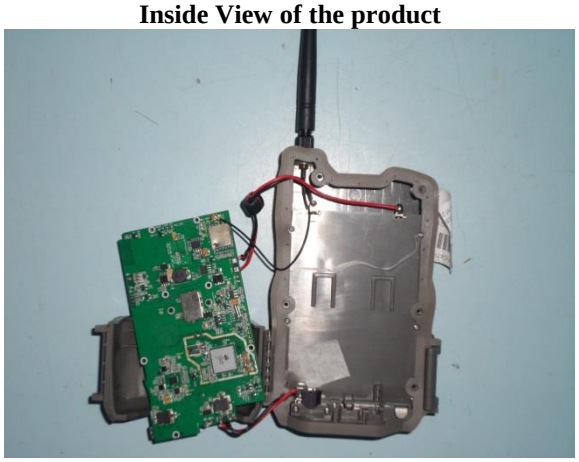


**View of the product**

**View of the product**

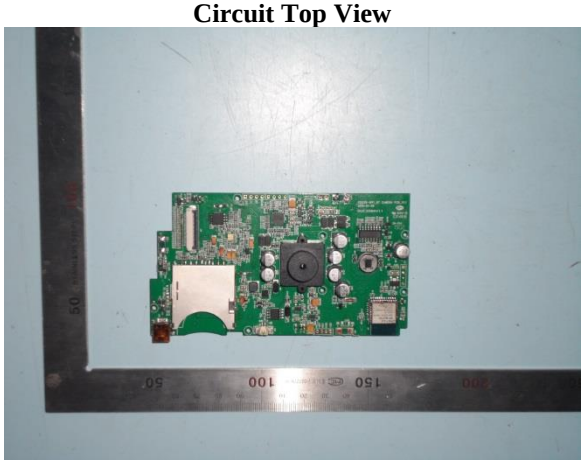


**Inside View of the product**



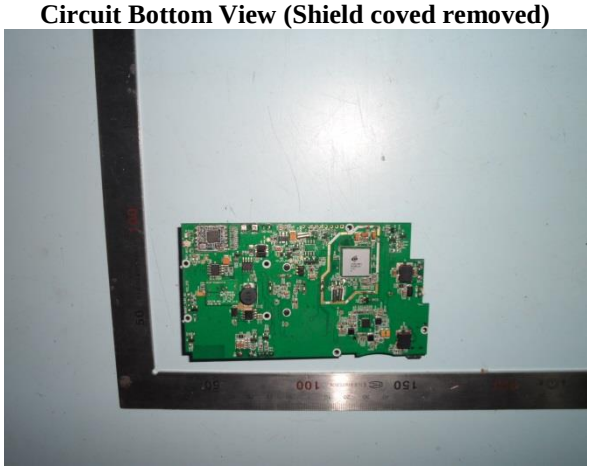
**Photographs of EUT**

**Circuit Top View**

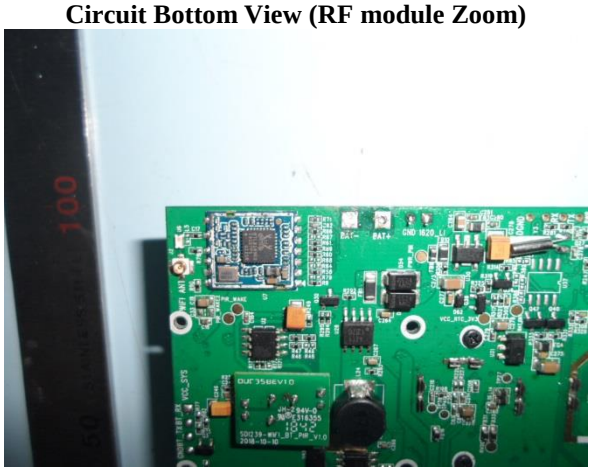


**Circuit Bottom View**

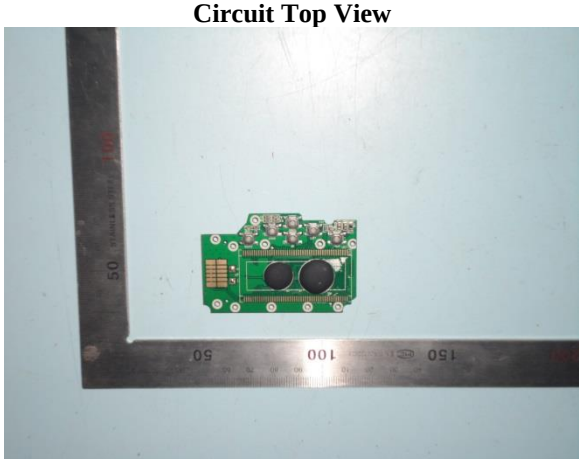
**Circuit Bottom View (Shield coved removed)**



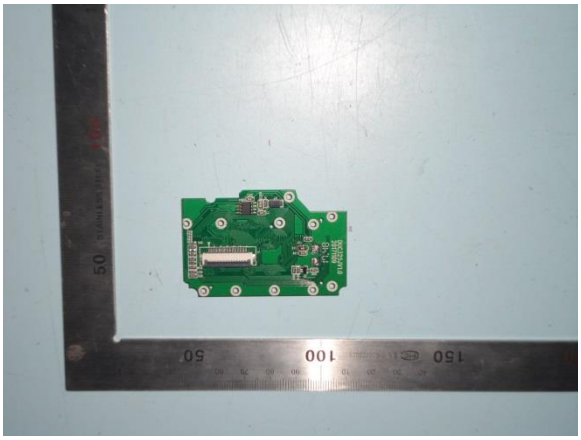
**Circuit Bottom View (RF module Zoom)**



**Circuit Top View**

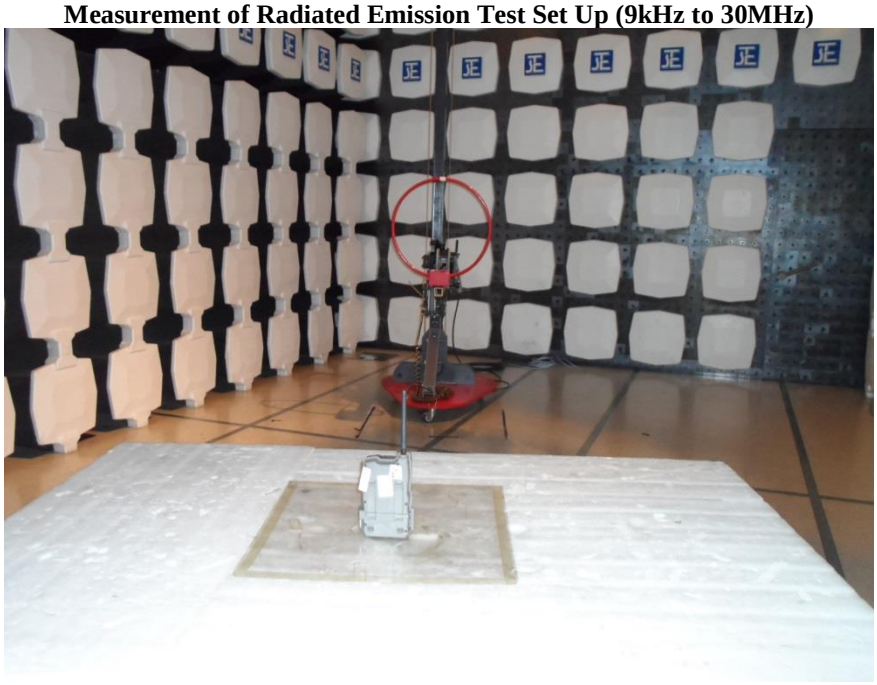


**Circuit Bottom View**

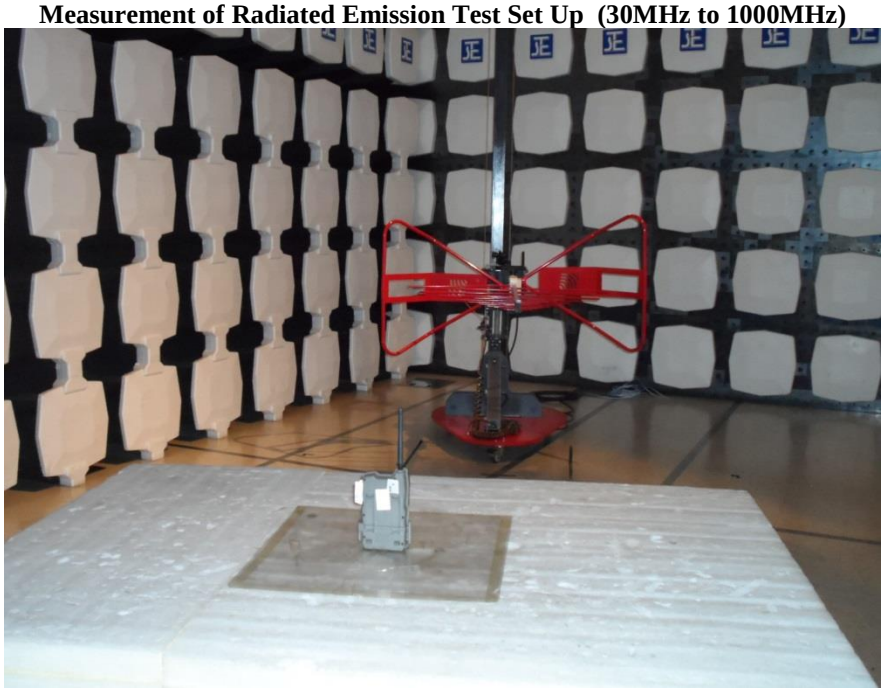


**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)**

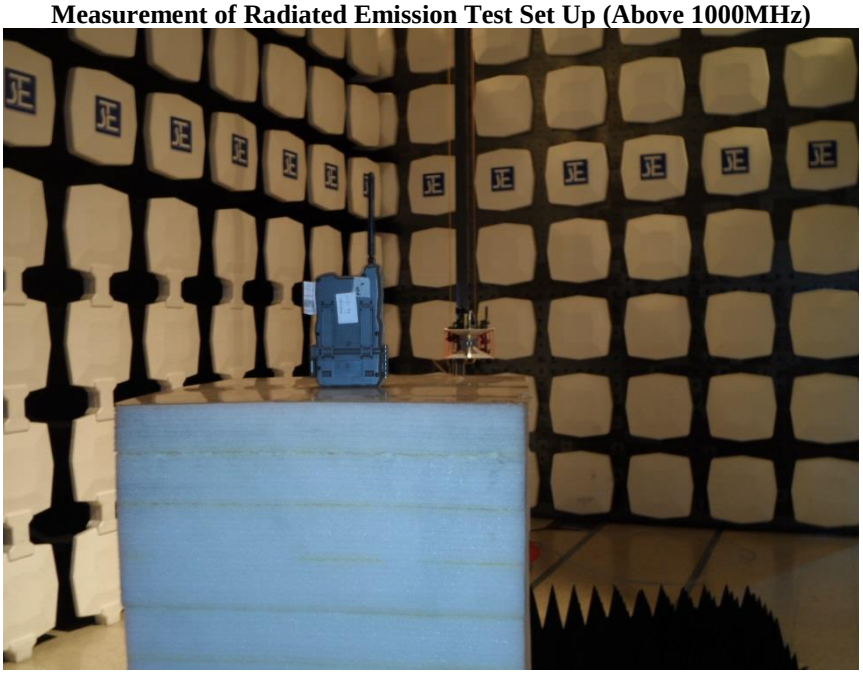


**Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)**

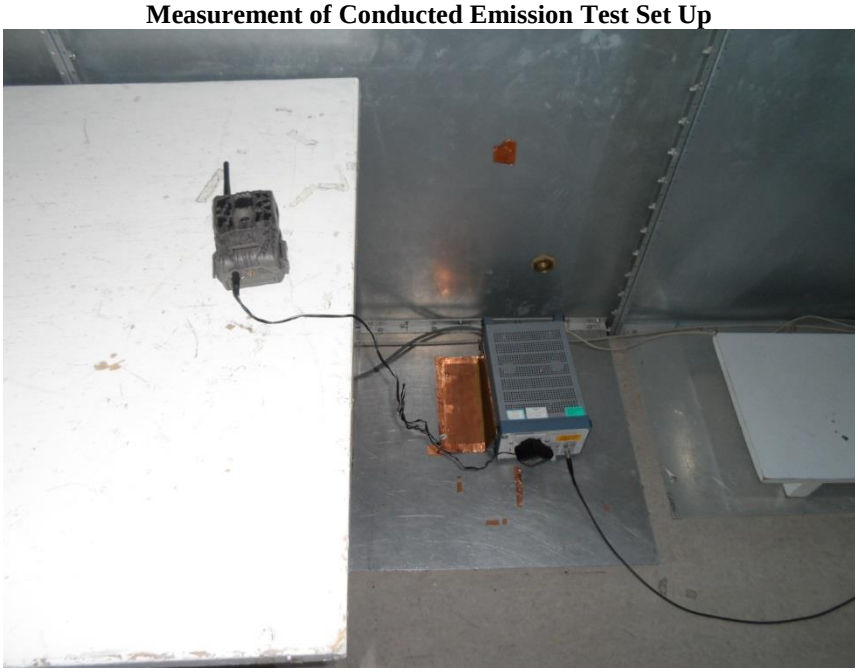


**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (Above 1000MHz)**



**Measurement of Conducted Emission Test Set Up**



******* End of Test Report *******

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1. All samples and goods are accepted by The Hong Kong Standards & Testing Centre Limited (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The Company provides its services on the basis that such terms and conditions constitute express agreement between the Company and any person, firm or company requesting its services (the "Clients").

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3. The Company shall be at liberty to disclose the testing-related documents and/or files anytime to any third-party accreditation and/or recognition bodies for audit or other related purposes. No liabilities whatsoever shall attach to the Company's act of disclosure.

4. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

5. The results in Report apply only to the sample as received and do not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

6. When a statement of conformity to a specification or standard is provided, the ILAC-G8 Guidance document (and/or IEC Guide 115 in the electrotechnical sector) will be adopted as a decision rule for the determination of conformity unless it is inherent in the requested specification or standard, or otherwise specified in the Report.

7. In the event of the improper use the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

8. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

9. The Company will not be liable for or accept responsibility for any loss or damage howsoever arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

10. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

11. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

12. Issuance records of the Report are available on the internet at www.stc.group. Further enquiry of validity or verification of the Reports should be addressed to the Company.