

## TEST REPORT

**Product** : 7" Tablet PC  
**Trade mark** : KINGPAD, Dragon Touch  
**Model/Type reference** : K70, K70X, K70 PLUS, K70 PRO,  
K70X PLUS, K70X PRO  
**Serial Number** : N/A  
**Report Number** : EED32H000942-2  
**FCC ID** : S5V-D107K1  
**Date of Issue** : Aug. 24, 2015  
**Test Standards** : 47 CFR Part 15 Subpart C (2014)  
**Test result** : PASS

Prepared for:

**Proexpress Distributor LLC**

**11011 GREENWOOD AVE.N APT 5, SEATTLE, WA 98103, United States**

Prepared by:

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Check No.: 2212824360



## 2 Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | Aug. 24, 2015 | Original    |
|             |               |             |
|             |               |             |

### 3 Test Summary

| Test Item   | Test Requirement                                    | Test method      | Result |
|---|---|------------------|--------|
| Antenna Requirement   | 47 CFR Part 15, Subpart C Section 15.203/15.247 (c) | ANSI C63.10-2013 | PASS   |
| AC Power Line Conducted Emission                                  | 47 CFR Part 15, Subpart C Section 15.207            | ANSI C63.10-2013 | PASS   |
| Conducted Peak Output Power                                       | 47 CFR Part 15, Subpart C Section 15.247 (b)(3)     | ANSI C63.10-2013 | PASS   |
| 6dB Occupied Bandwidth  | 47 CFR Part 15, Subpart C Section 15.247 (a)(2)     | ANSI C63.10-2013 | PASS   |
| Power Spectral Density  | 47 CFR Part 15, Subpart C Section 15.247 (e)        | ANSI C63.10-2013 | PASS   |
| Band-edge for RF Conducted Emissions                              | 47 CFR Part 15, Subpart C Section 15.247(d)         | ANSI C63.10-2013 | PASS   |
| RF Conducted Spurious Emissions                                   | 47 CFR Part 15, Subpart C Section 15.247(d)         | ANSI C63.10-2013 | PASS   |
| Radiated Spurious Emissions                                       | 47 CFR Part 15, Subpart C Section 15.205/15.209     | ANSI C63.10-2013 | PASS   |
| Restricted bands around fundamental frequency (Radiated Emission) | 47 CFR Part 15, Subpart C Section 15.205/15.209     | ANSI C63.10-2013 | PASS   |

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

Remark:

All models are same except model name and brand name. Model K70 was selected for test.

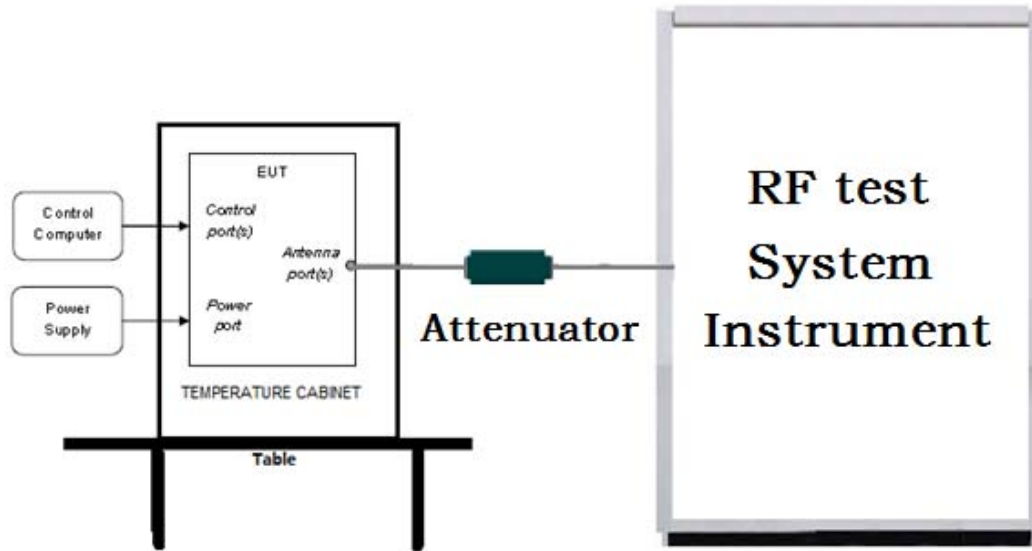
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## 5 Test Requirement

### 5.1 Test setup

#### 5.1.1 For Conducted test setup



#### 5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

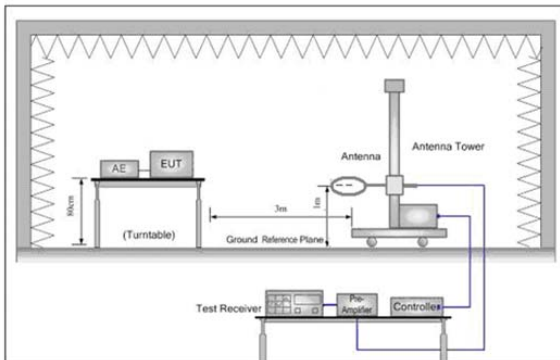


Figure 1. Below 30MHz

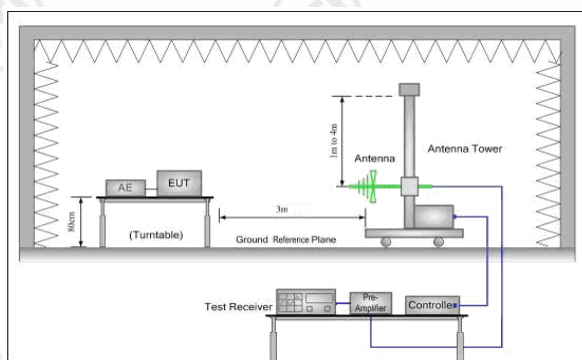


Figure 2. 30MHz to 1GHz

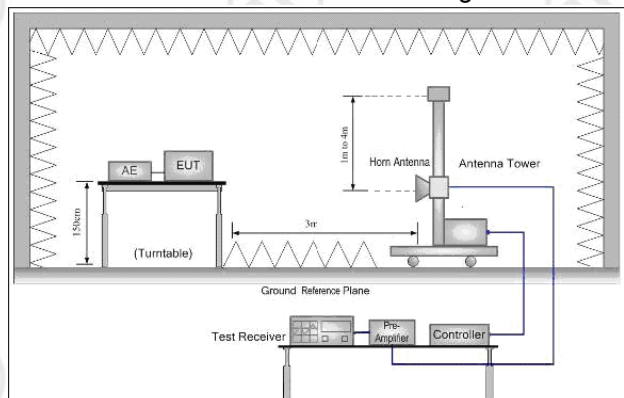
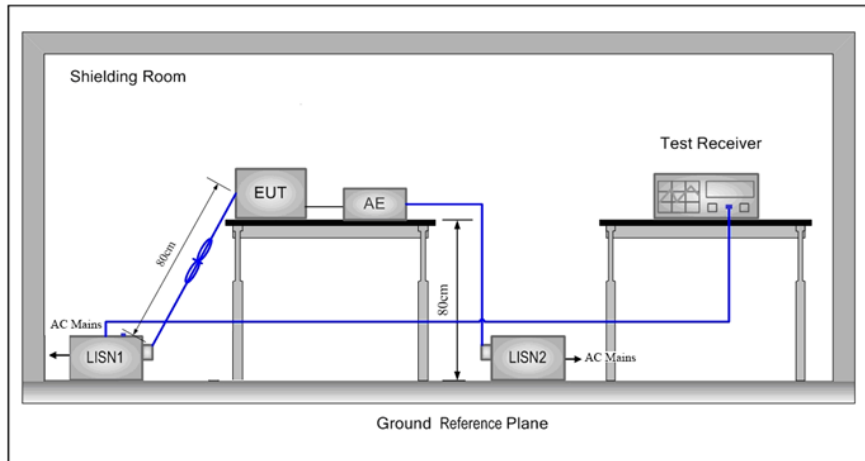


Figure 3. Above 1GHz



**5.1.3 For Conducted Emissions test setup**  
**Conducted Emissions setup**



**5.2 Test Environment**

| Operating Environment: |         |
|------------------------|---------|
| Temperature:           | 25.0 °C |
| Humidity:              | 53 % RH |
| Atmospheric Pressure:  | 995mbar |

**5.3 Test Condition**

Test channel:

| Test Mode          | Tx/Rx   | RF Channel |           |           |
|--------------------|---|------------|-----------|-----------|
|                    |   | Low(L)     | Middle(M) | High(H)   |
| 802.11b/g/n(HT20)  | 2412MHz ~2462 MHz   | Channel 1  | Channel 6 | Channel11 |
|                    |   | 2412MHz    | 2437MHz   | 2462MHz   |
| 802.11n(HT40)      | 2422MHz ~2452 MHz   | Channel 1  | Channel 4 | Channel7  |
|                    |   | 2422MHz    | 2437MHz   | 2452MHz   |
| Transmitting mode: | 1. Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.<br>2. Duty cycle > 98%. |            |           |           |

Test mode:

Pre-scan under all rate at lowest channel 1

|                  |                       |               |                 |               |               |                |                  |                |  |
|------------------|-----------------------|---------------|-----------------|---------------|---------------|----------------|------------------|----------------|--|
| <b>Mode</b>      | <b>802.11b</b>        |               |                 |               |               |                |                  |                |  |
| <b>Data Rate</b> | <b>1Mbps</b>          | <b>2Mbps</b>  | <b>5.5Mbps</b>  | <b>11Mbps</b> |               |                |                  |                |  |
| <b>EIRP(dBm)</b> | 8.12                  | 8.54          | 8.67            | 8.89          |               |                |                  |                |  |
| <b>Mode</b>      | <b>802.11g</b>        |               |                 |               |               |                |                  |                |  |
| <b>Data Rate</b> | <b>6Mbps</b>          | <b>9Mbps</b>  | <b>12Mbps</b>   | <b>18Mbps</b> | <b>24Mbps</b> | <b>36Mbps</b>  | <b>48Mbps</b>    | <b>54Mbps</b>  |  |
| <b>EIRP(dBm)</b> | 8.83                  | 7.99          | 7.87            | 7.56          | 6.88          | 6.46           | 6.23             | 5.99           |  |
| <b>Mode</b>      | <b>802.11n (HT20)</b> |               |                 |               |               |                |                  |                |  |
| <b>Data Rate</b> | <b>6.5Mbps</b>        | <b>13Mbps</b> | <b>19.5Mbps</b> | <b>26Mbps</b> | <b>39Mbps</b> | <b>52Mbps</b>  | <b>58.5Mbps</b>  | <b>65Mbps</b>  |  |
| <b>EIRP(dBm)</b> | 8.21                  | 8.11          | 8.09            | 7.87          | 6.89          | 6.48           | 6.21             | 6.16           |  |
| <b>Mode</b>      | <b>802.11n (HT40)</b> |               |                 |               |               |                |                  |                |  |
| <b>Data Rate</b> | <b>13.5Mbps</b>       | <b>27Mbps</b> | <b>40.5Mbps</b> | <b>54Mbps</b> | <b>81Mbps</b> | <b>108Mbps</b> | <b>121.5Mbps</b> | <b>135Mbps</b> |  |
| <b>EIRP(dBm)</b> | 7.67                  | 7.43          | 7.12            | 6.88          | 6.54          | 6.12           | 5.99             | 5.78           |  |


Through Pre-scan, 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n (HT20); 13.5Mbps of rate is the worst case of 802.11n (HT40).

## 6 General Information

### 6.1 Client Information

|                          |   |
|--------------------------|---|
| Applicant:               | Proexpress Distributor LLC                                    |
| Address of Applicant:    | 11011 GREENWOOD AVE.N APT 5, SEATTLE, WA 98103, United States |
| Manufacturer:            | Proexpress Distributor LLC                                    |
| Address of Manufacturer: | 11011 GREENWOOD AVE.N APT 5, SEATTLE, WA 98103, United States |

### 6.2 General Description of EUT

|                                  |   |
|----------------------------------|---|
| Product Name:                    | 7" Tablet PC  |
| Model No.(EUT):                  | K70, K70X, K70 PLUS, K70 PRO, K70X PLUS, K70X PRO   |
| Trade mark:                      | KINGPAD, Dragon Touch   |
| EUT Supports Radios application: | IEEE 802.11b/g/n  |
| Power Supply:                    | Input: 5V  2A |
| Sample Received Date:            | Jun. 29, 2015   |
| Sample tested Date:              | Jun. 29, 2015 to Aug. 24, 2015  |

### 6.3 Product Specification subjective to this standard

|                        |  |
|------------------------|--|
| Operation Frequency:   | IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz<br>IEEE 802.11n(HT40): 2422MHz to 2452MHz   |
| Channel Numbers:       | IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels<br>IEEE 802.11n HT40: 7 Channels  |
| Channel Separation:    | 5MHz   |
| Type of Modulation:    | IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK)<br>IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK)<br>IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK) |
| Sample Type:           | Portable production  |
| Antenna Type and Gain: | Type: intergral antenna<br>Gain: 0dBi  |
| Test Voltage:          | DC 3.7V  |

#### Operation Frequency each of channel(802.11b/g/n HT20)

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



| Operation Frequency each of channel(802.11n HT40) |           |         |           |         |           |
|---|-----------|---------|-----------|---------|-----------|
| Channel   | Frequency | Channel | Frequency | Channel | Frequency |
| 1   | 2422MHz   | 4       | 2437MHz   | 7       | 2452MHz   |
| 2   | 2427MHz   | 5       | 2442MHz   |         |           |
| 3   | 2432MHz   | 6       | 2447MHz   |         |           |

## 6.4 Description of Support Units

The EUT has been tested with associated equipment below:

| Device Type | Brand | Model | Data Cable | Remark |
|-------------|-------|-------|------------|--------|
| --          | --    | --    | --         | --     |
| --          | --    | --    | --         | --     |

## 6.5 Test Location

All tests were performed at:

Centre Testing International (Shenzhen) Corporation

Building C, Scientific Innovation Park, Tiegang Reservoir, Xixiang, Baoan District, Shenzhen, China

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

## 6.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### CNAS-Lab Code: L1910

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### A2LA-Lab Cert. No. 3061.01

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### FCC-Registration No.: 565659

Centre Testing International (Shenzhen) Corporation EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 565659.

**IC-Registration No.: 7408A**

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A .

**IC-Registration No.: 7408B**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

**NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

**VCCI**

The Radiation 3 &10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

**6.7 Deviation from Standards**

None.

**6.8 Abnormalities from Standard Conditions**

None.

**6.9 Other Information Requested by the Customer**

None.

**6.10 Measurement Uncertainty (95% confidence levels, k=2)**

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | $7.9 \times 10^{-8}$    |
| 2   | RF power, conducted             | 0.31dB (30MHz-1GHz)     |
|     |                                 | 0.57dB (1GHz-18GHz)     |
| 3   | Radiated Spurious emission test | 4.5dB (30MHz-1GHz)      |
|     |                                 | 4.8dB (1GHz-12.75GHz)   |
| 4   | Conduction emission             | 3.6dB (9kHz to 150kHz)  |
|     |                                 | 3.2dB (150kHz to 30MHz) |
| 5   | Temperature test                | 0.64°C                  |
| 6   | Humidity test                   | 2.8%                    |
| 7   | DC power voltages               | 0.025%                  |

## 7 Equipment List

| RF test system                   |               |                              |               |                        |                            |
|----------------------------------|---------------|------------------------------|---------------|------------------------|----------------------------|
| Equipment                        | Manufacturer  | Mode No.                     | Serial Number | Cal. Date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| Signal Generator                 | Keysight      | E8257D                       | MY53401106    | 04-14-2015             | 04-13-2016                 |
| Communication test set test set  | Agilent       | N4010A                       | MY47230124    | 04-02-2015             | 04-01-2016                 |
| Spectrum Analyzer                | Keysight      | N9010A                       | MY54510339    | 04-01-2015             | 03-31-2016                 |
| Attenuator                       | HuaXiang      | SHX370                       | 15040701      | 04-01-2015             | 03-31-2016                 |
| Signal Generator                 | Keysight      | N5182B                       | MY53051549    | 03-31-2015             | 03-30-2016                 |
| High-pass filter(3-18GHz)        | Sinoscite     | FL3CX03WG18<br>NM12-0398-002 | ---           | 01-13-2015             | 01-12-2016                 |
| High-pass filter(5-18GHz)        | MICRO-TRONICS | SPA-F-63029-4                | ---           | 01-13-2015             | 01-12-2016                 |
| band rejection filter (GSM900)   | Sinoscite     | FL5CX01CA09C<br>L12-0395-001 | ---           | 01-13-2015             | 01-12-2016                 |
| band rejection filter (GSM850)   | Sinoscite     | FL5CX01CA08C<br>L12-0393-001 | ---           | 01-13-2015             | 01-12-2016                 |
| band rejection filter (GSM1800)  | Sinoscite     | FL5CX02CA04C<br>L12-0396-002 | ---           | 01-13-2015             | 01-12-2016                 |
| band rejection filter (GSM1900)  | Sinoscite     | FL5CX02CA03C<br>L12-0394-001 | ---           | 01-13-2015             | 01-12-2016                 |
| DC Power                         | Keysight      | E3642A                       | MY54436035    | 03-31-2015             | 03-30-2016                 |
| PC-1                             | Lenovo        | R4960d                       | ---           | 04-01-2015             | 03-31-2016                 |
| BT&WI-FI Automatic control       | R&S           | OSPB157                      | 101374        | 04-01-2015             | 03-31-2016                 |
| RF control unit                  | JS Tonscend   | JS0806-2                     | 2015860006    | 04-01-2015             | 03-31-2016                 |
| BT&WI-FI Automatic test software | JS Tonscend   | JSTS1120-2                   | ---           | 04-01-2015             | 03-31-2016                 |

| Shielding Room No. 1 – Conduction Emission Test |              |          |               |                        |                            |
|---|--------------|----------|---------------|------------------------|----------------------------|
| Equipment                                       | Manufacturer | Mode No. | Serial Number | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| Receiver  | R&S          | ESCI     | 100009        | 07-09-2014             | 07-08-2015                 |
| Receiver  | R&S          | ESCI     | 100009        | 07-09-2015             | 07-08-2016                 |
| Receiver  | R&S          | ESCI     | 100009        | 07-09-2014             | 07-08-2015                 |
| Receiver  | R&S          | ESCI     | 100009        | 07-09-2015             | 07-08-2016                 |
| LISN  | R&S          | ENV216   | 100098        | 11-12-2014             | 11-13-2015                 |



| 3M Semi/full-anechoic Chamber  |              |                              |               |                        |                            |
|--------------------------------|--------------|------------------------------|---------------|------------------------|----------------------------|
| Equipment                      | Manufacturer | Mode No.                     | Serial Number | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| 3M Chamber                     | TDK          | SAC-3                        | ---           | 06-02-2015             | 06-01-2016                 |
| TRILOG Broadband Antenna       | schwarzbeck  | VULB9163                     | 9163-617      | 07-14-2014             | 07-13-2015                 |
| TRILOG Broadband Antenna       | schwarzbeck  | VULB9163                     | 9163-617      | 07-14-2015             | 07-13-2016                 |
| TRILOG Broadband Antenna       | schwarzbeck  | VULB9163                     | 9163-617      | 07-14-2014             | 07-13-2015                 |
| TRILOG Broadband Antenna       | schwarzbeck  | VULB9163                     | 9163-617      | 07-14-2015             | 07-13-2016                 |
| Microwave Preamplifier         | Agilent      | 8449B                        | 3008A02425    | 02-05-2015             | 02-04-2016                 |
| Horn Antenna                   | ETS-LINDGREN | 3117                         | 00057410      | 07-08-2014             | 07-07-2015                 |
| Horn Antenna                   | ETS-LINDGREN | 3117                         | 00057410      | 07-08-2015             | 07-07-2016                 |
| Horn Antenna                   | ETS-LINDGREN | 3117                         | 00057410      | 07-08-2014             | 07-07-2015                 |
| Horn Antenna                   | ETS-LINDGREN | 3117                         | 00057410      | 07-08-2015             | 07-07-2016                 |
| Loop Antenna                   | ETS          | 6502                         | 00071730      | 07-23-2014             | 07-22-2015                 |
| Loop Antenna                   | ETS          | 6502                         | 00071730      | 07-23-2015             | 07-22-2016                 |
| Loop Antenna                   | ETS          | 6502                         | 00071730      | 07-23-2014             | 07-22-2015                 |
| Loop Antenna                   | ETS          | 6502                         | 00071730      | 07-23-2015             | 07-22-2016                 |
| Spectrum Analyzer              | R&S          | FSP40                        | 100416        | 07-09-2014             | 07-08-2015                 |
| Spectrum Analyzer              | R&S          | FSP40                        | 100416        | 07-09-2015             | 07-08-2016                 |
| Spectrum Analyzer              | R&S          | FSP40                        | 100416        | 07-09-2014             | 07-08-2015                 |
| Spectrum Analyzer              | R&S          | FSP40                        | 100416        | 07-09-2015             | 07-08-2016                 |
| Receiver                       | R&S          | ESCI                         | 100435        | 07-09-2014             | 07-08-2015                 |
| Receiver                       | R&S          | ESCI                         | 100435        | 07-09-2015             | 07-08-2016                 |
| Receiver                       | R&S          | ESCI                         | 100435        | 07-09-2014             | 07-08-2015                 |
| Receiver                       | R&S          | ESCI                         | 100435        | 07-09-2015             | 07-08-2016                 |
| Multi device Controller        | matur        | NCD/070/10711112             | ---           | 01-13-2015             | 01-12-2016                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251547      | 07-09-2014             | 07-08-2015                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251547      | 07-09-2015             | 07-08-2016                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251547      | 07-09-2014             | 07-08-2015                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251547      | 07-09-2015             | 07-08-2016                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251546      | 07-09-2014             | 07-08-2015                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251546      | 07-09-2015             | 07-08-2016                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251546      | 07-09-2014             | 07-08-2015                 |
| LISN                           | schwarzbeck  | NNBM8125                     | 81251546      | 07-09-2015             | 07-08-2016                 |
| Signal Generator               | Agilent      | E4438C                       | MY45095744    | 04-19-2015             | 04-18-2016                 |
| Signal Generator               | Keysight     | E8257D                       | MY53401106    | 04-14-2015             | 04-13-2016                 |
| Temperature/Humidity Indicator | TAYLOR       | 1451                         | 5190          | 07-10-2014             | 07-09-2015                 |
| Temperature/Humidity Indicator | TAYLOR       | 1451                         | 5190          | 07-10-2015             | 07-09-2016                 |
| Temperature/Humidity Indicator | TAYLOR       | 1451                         | 5190          | 07-10-2014             | 07-09-2015                 |
| Temperature/Humidity Indicator | TAYLOR       | 1451                         | 5190          | 07-10-2015             | 07-09-2016                 |
| Communication test set         | Agilent      | E5515C                       | GB47050533    | 01-13-2015             | 01-12-2016                 |
| Cable line                     | Fulai(7M)    | SF106                        | 5219/6A       | 01-13-2015             | 01-12-2016                 |
| Cable line                     | Fulai(6M)    | SF106                        | 5220/6A       | 01-13-2015             | 01-12-2016                 |
| Cable line                     | Fulai(3M)    | SF106                        | 5216/6A       | 01-13-2015             | 01-12-2016                 |
| Cable line                     | Fulai(3M)    | SF106                        | 5217/6A       | 01-13-2015             | 01-12-2016                 |
| Communication test set         | R&S          | CMW500                       | 152394        | 04-19-2015             | 04-18-2016                 |
| High-pass filter(3-18GHz)      | Sinoscite    | FL3CX03WG18NM<br>12-0398-002 | ---           | 01-13-2015             | 01-12-2016                 |



|                           |               |                              |     |            |            |
|---------------------------|---------------|------------------------------|-----|------------|------------|
| High-pass filter(5-18GHz) | MICRO-TRONICS | SPA-F-63029-4                | --- | 01-13-2015 | 01-12-2016 |
| band rejection filter     | Sinoscite     | FL5CX01CA09CL1<br>2-0395-001 | --- | 01-13-2015 | 01-12-2016 |
| band rejection filter     | Sinoscite     | FL5CX01CA08CL1<br>2-0393-001 | --- | 01-13-2015 | 01-12-2016 |
| band rejection filter     | Sinoscite     | FL5CX02CA04CL1<br>2-0396-002 | --- | 01-13-2015 | 01-12-2016 |
| band rejection filter     | Sinoscite     | FL5CX02CA03CL1<br>2-0394-001 | --- | 01-13-2015 | 01-12-2016 |

## 8 Radio Technical Requirements Specification

### Reference documents for testing:

| No. | Identity           | Document Title   |
|-----|--------------------|--|
| 1   | FCC Part15C (2014) | Subpart C-Intentional Radiators                                    |
| 2   | ANSI C63.10-2013   | American National Standard for Testing Unlicensed Wireless Devices |

### Test Results List:

| Test Requirement                  | Test method | Test item   | Verdict | Note        |
|-----------------------------------|-------------|---|---------|-------------|
| Part15C Section 15.247 (b)(3)     | ANSI C63.10 | Conducted Peak Output Power                                       | PASS    | Appendix A) |
| Part15C Section 15.247 (a)(2)     | ANSI C63.10 | 6dB Occupied Bandwidth  | PASS    | Appendix B) |
| Part15C Section 15.247(d)         | ANSI C63.10 | Band-edge for RF Conducted Emissions                              | PASS    | Appendix C) |
| Part15C Section 15.247(d)         | ANSI C63.10 | RF Conducted Spurious Emissions                                   | PASS    | Appendix D) |
| Part15C Section 15.247 (e)        | ANSI C63.10 | Power Spectral Density  | PASS    | Appendix E) |
| Part15C Section 15.203/15.247 (c) | ANSI C63.10 | Antenna Requirement   | PASS    | Appendix F) |
| Part15C Section 15.207            | ANSI C63.10 | AC Power Line Conducted Emission                                  | PASS    | Appendix G) |
| Part15C Section 15.205/15.209     | ANSI C63.10 | Restricted bands around fundamental frequency (Radiated Emission) | PASS    | Appendix H) |
| Part15C Section 15.205/15.209     | ANSI C63.10 | Radiated Spurious Emissions                                       | PASS    | Appendix H) |

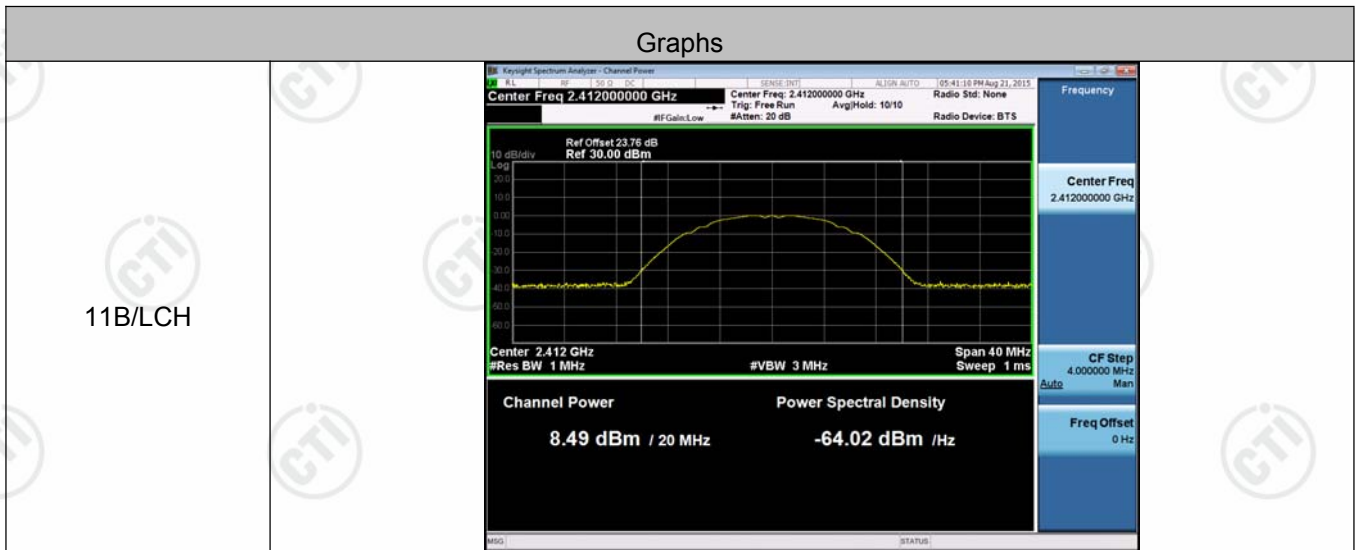
## Appendix A): Conducted Peak Output Power


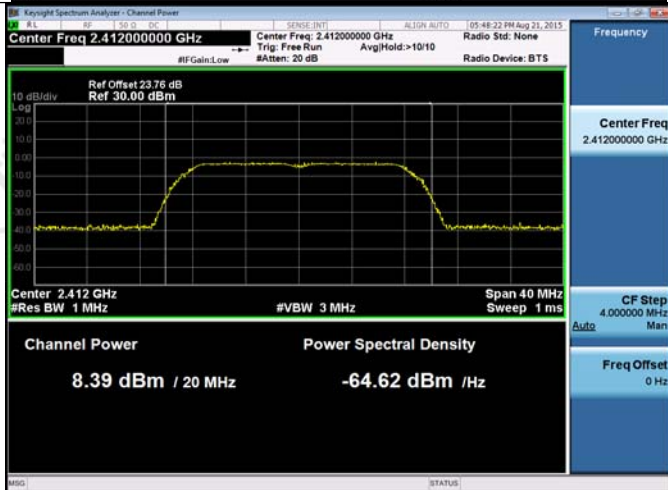
**Result Table**

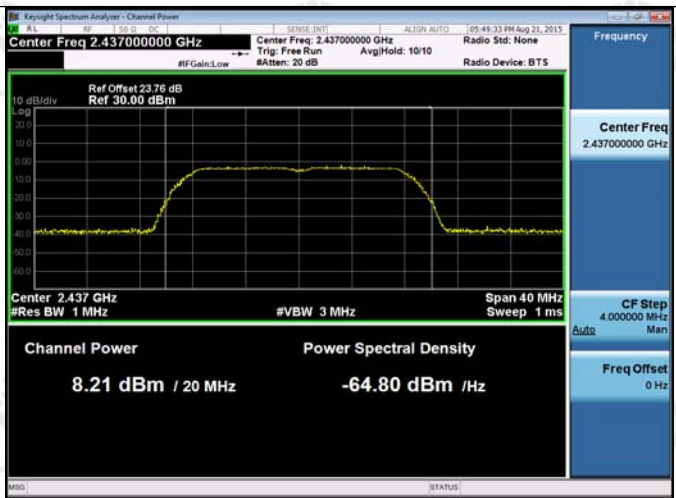
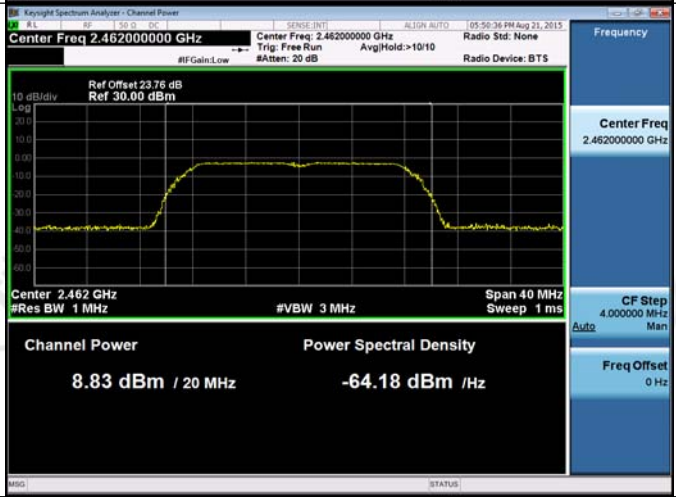
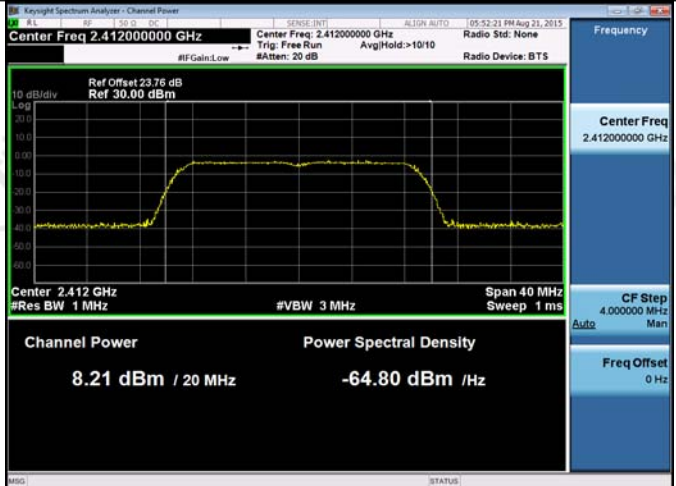
| Mode      | Channel | Conducted Peak Output Power [dBm] | Verdict |
|-----------|---------|-----------------------------------|---------|
| 11B       | LCH     | 8.49                              | PASS    |
| 11B       | MCH     | 8.77                              | PASS    |
| 11B       | HCH     | 8.89                              | PASS    |
| 11G       | LCH     | 8.39                              | PASS    |
| 11G       | MCH     | 8.21                              | PASS    |
| 11G       | HCH     | 8.83                              | PASS    |
| 11N20SISO | LCH     | 8.21                              | PASS    |
| 11N20SISO | MCH     | 8.09                              | PASS    |
| 11N20SISO | HCH     | 8.06                              | PASS    |
| 11N40SISO | LCH     | 7.21                              | PASS    |
| 11N40SISO | MCH     | 6.82                              | PASS    |
| 11N40SISO | HCH     | 7.67                              | PASS    |

Remark: peak detector is used.

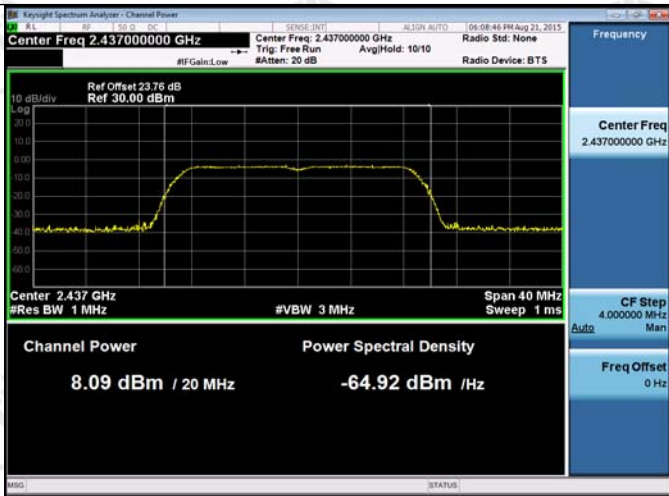
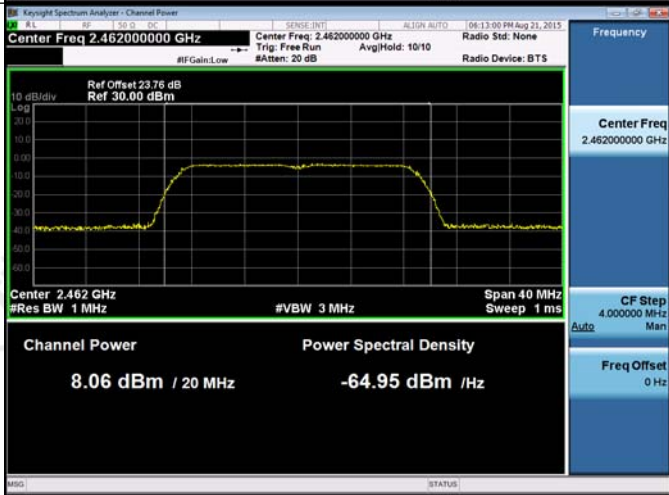
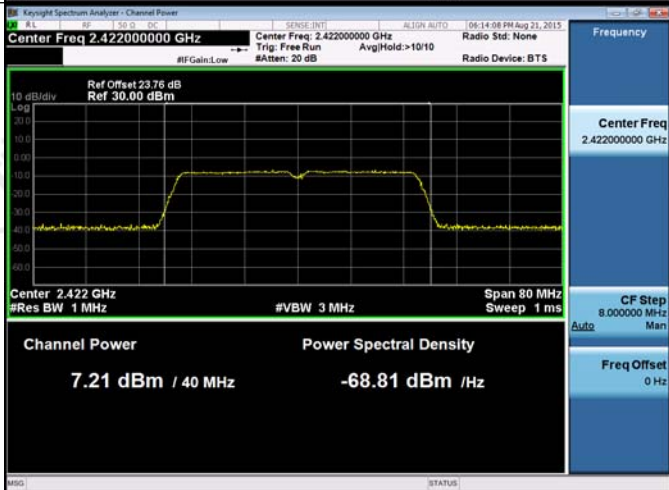
### Test Graph

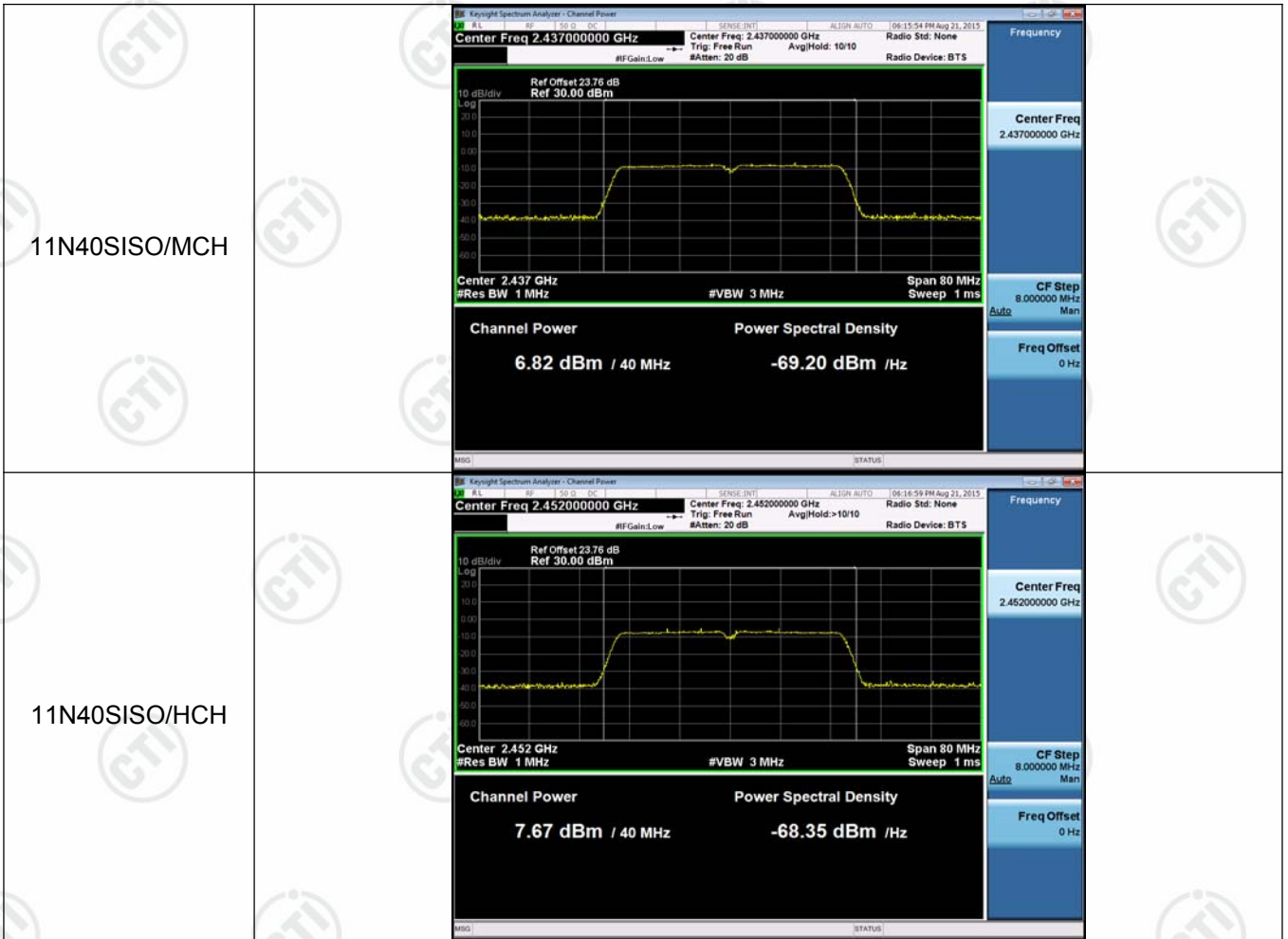


|                |   |
|----------------|---|
| <p>11B/MCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq 2.437000000 GHz</p> <p>Ref Offset 23.76 dB<br/>Ref 30.00 dBm</p> <p>Center 2.437 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power: 8.77 dBm / 20 MHz</p> <p>Power Spectral Density: -64.24 dBm / Hz</p>   |
| <p>11B/HCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq 2.462000000 GHz</p> <p>Ref Offset 23.76 dB<br/>Ref 30.00 dBm</p> <p>Center 2.462 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power: 8.89 dBm / 20 MHz</p> <p>Power Spectral Density: -63.12 dBm / Hz</p>  |
| <p>11G/LCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq 2.412000000 GHz</p> <p>Ref Offset 23.76 dB<br/>Ref 30.00 dBm</p> <p>Center 2.412 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power: 8.39 dBm / 20 MHz</p> <p>Power Spectral Density: -64.62 dBm / Hz</p> |

|                      |   |
|----------------------|---|
| <p>11G/MCH</p>       |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Channel Power: 8.21 dBm / 20 MHz</p> <p>Power Spectral Density: -64.80 dBm / Hz</p>   |
| <p>11G/HCH</p>       |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.462000000 GHz</p> <p>Channel Power: 8.33 dBm / 20 MHz</p> <p>Power Spectral Density: -64.18 dBm / Hz</p>  |
| <p>11N20SISO/LCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.412000000 GHz</p> <p>Channel Power: 8.21 dBm / 20 MHz</p> <p>Power Spectral Density: -64.80 dBm / Hz</p> |



|                      |   |
|----------------------|---|
| <p>11N20SISO/MCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.437000000 GHz</p> <p>Channel Power: 8.09 dBm / 20 MHz</p> <p>Power Spectral Density: -64.92 dBm / Hz</p>   |
| <p>11N20SISO/HCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.462000000 GHz</p> <p>Channel Power: 8.06 dBm / 20 MHz</p> <p>Power Spectral Density: -64.95 dBm / Hz</p>  |
| <p>11N40SISO/LCH</p> |  <p>Keysight Spectrum Analyzer - Channel Power</p> <p>Center Freq: 2.422000000 GHz</p> <p>Channel Power: 7.21 dBm / 40 MHz</p> <p>Power Spectral Density: -68.81 dBm / Hz</p> |



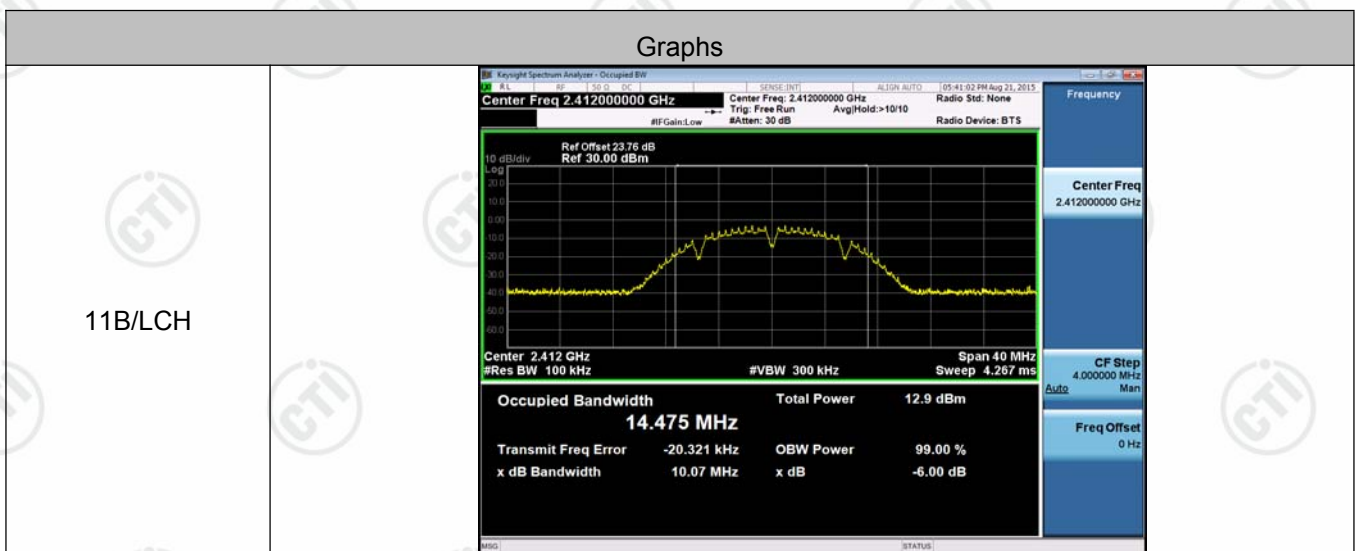
## Appendix B): 6dB Occupied Bandwidth

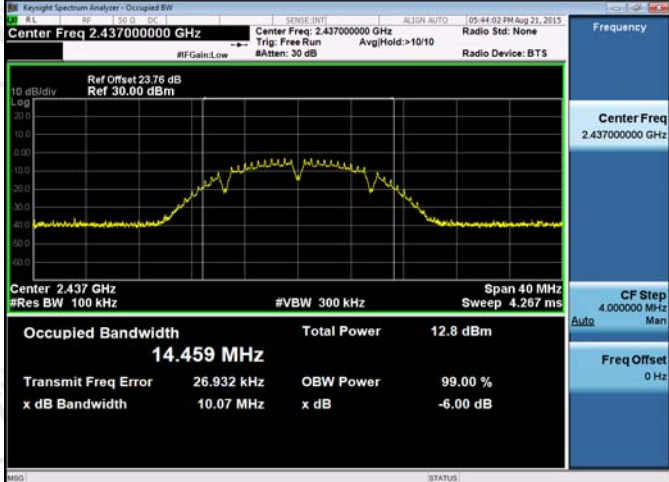
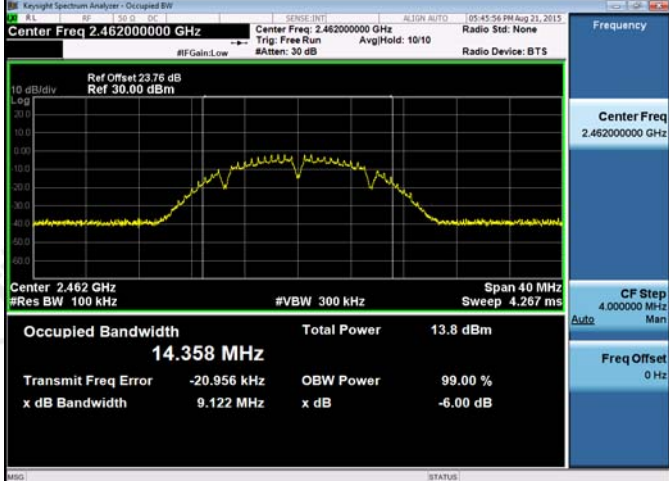
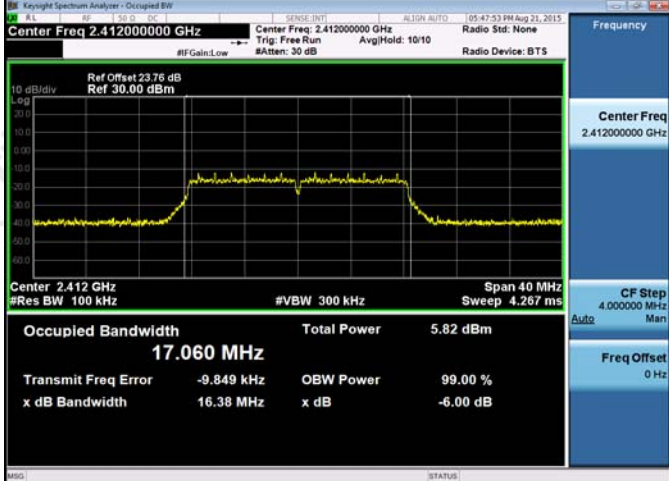
Result Table

| Mode      | Channel | 6dB Bandwidth [MHz] | 99% OBW [MHz] | Verdict |
|-----------|---------|---------------------|---------------|---------|
| 11B       | LCH     | 10.07               | 14.475        | PASS    |
| 11B       | MCH     | 10.07               | 14.459        | PASS    |
| 11B       | HCH     | 9.122               | 14.358        | PASS    |
| 11G       | LCH     | 16.38               | 17.060        | PASS    |
| 11G       | MCH     | 16.38               | 16.879        | PASS    |
| 11G       | HCH     | 16.39               | 16.811        | PASS    |
| 11N20SISO | LCH     | 17.60               | 17.892        | PASS    |
| 11N20SISO | MCH     | 17.57               | 17.819        | PASS    |
| 11N20SISO | HCH     | 17.59               | 17.792        | PASS    |
| 11N40SISO | LCH     | 36.29               | 50.730        | PASS    |
| 11N40SISO | MCH     | 35.75               | 38.687        | PASS    |
| 11N40SISO | HCH     | 36.13               | 42.281        | PASS    |

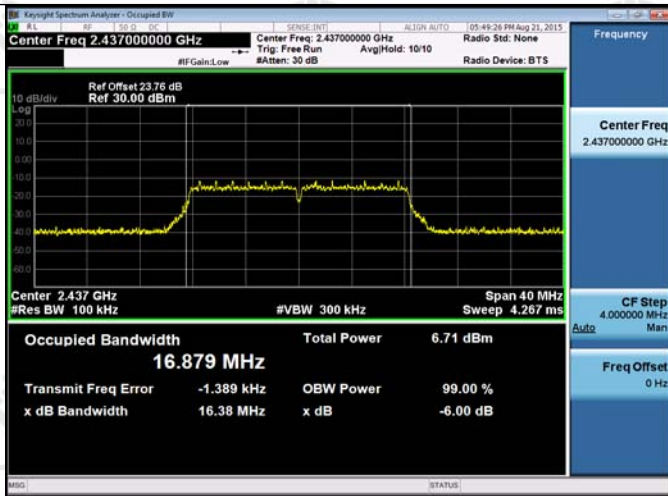
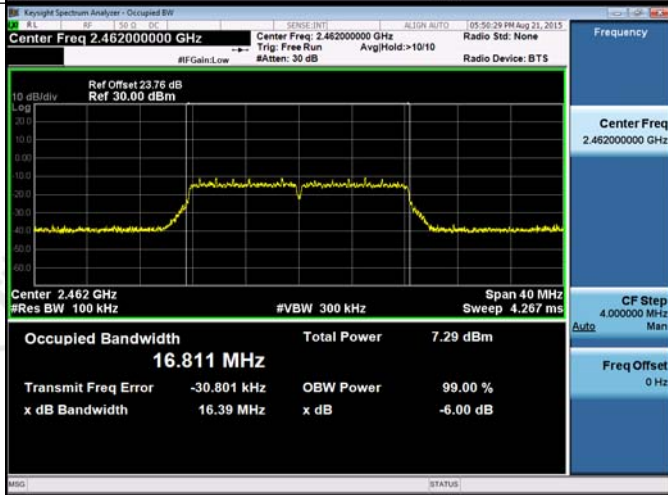
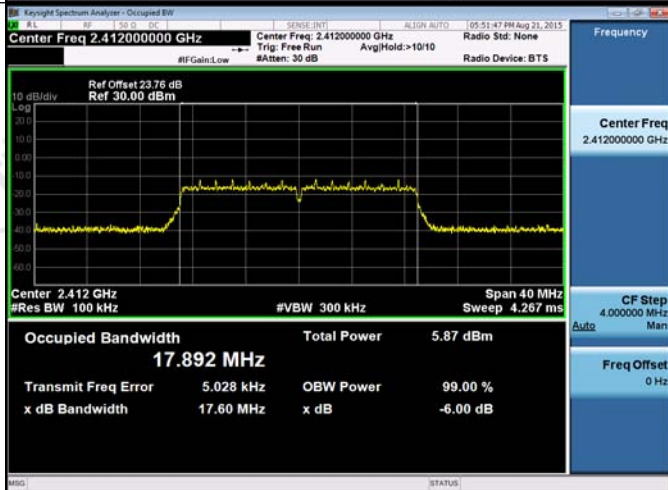
Remark: peak detector is used.

### Test Graph

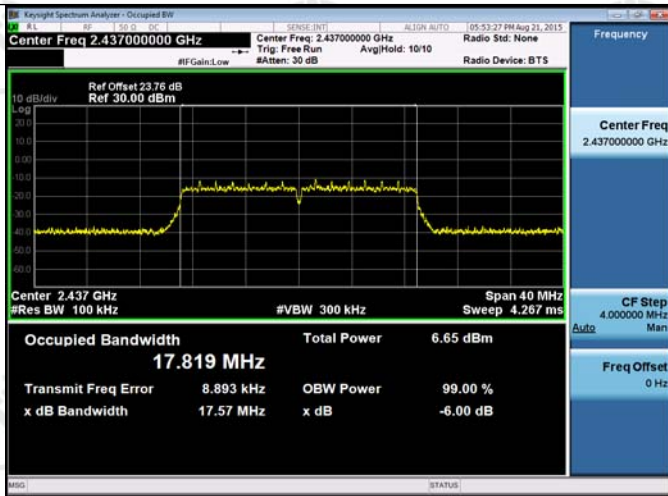
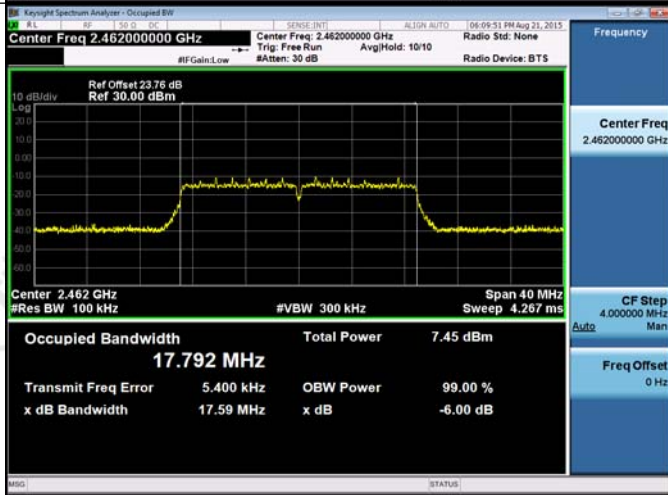
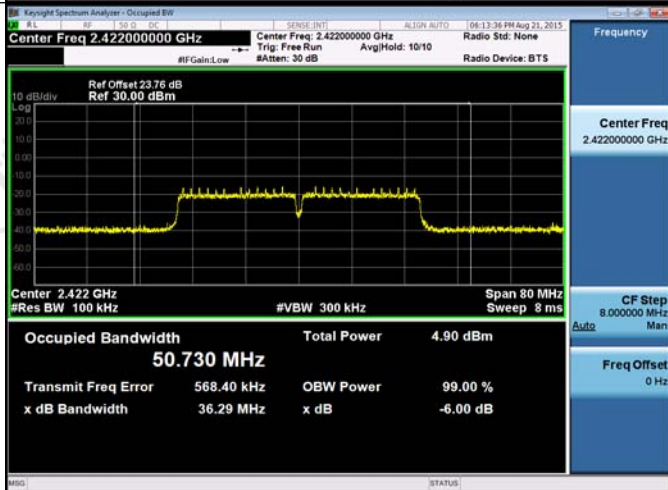


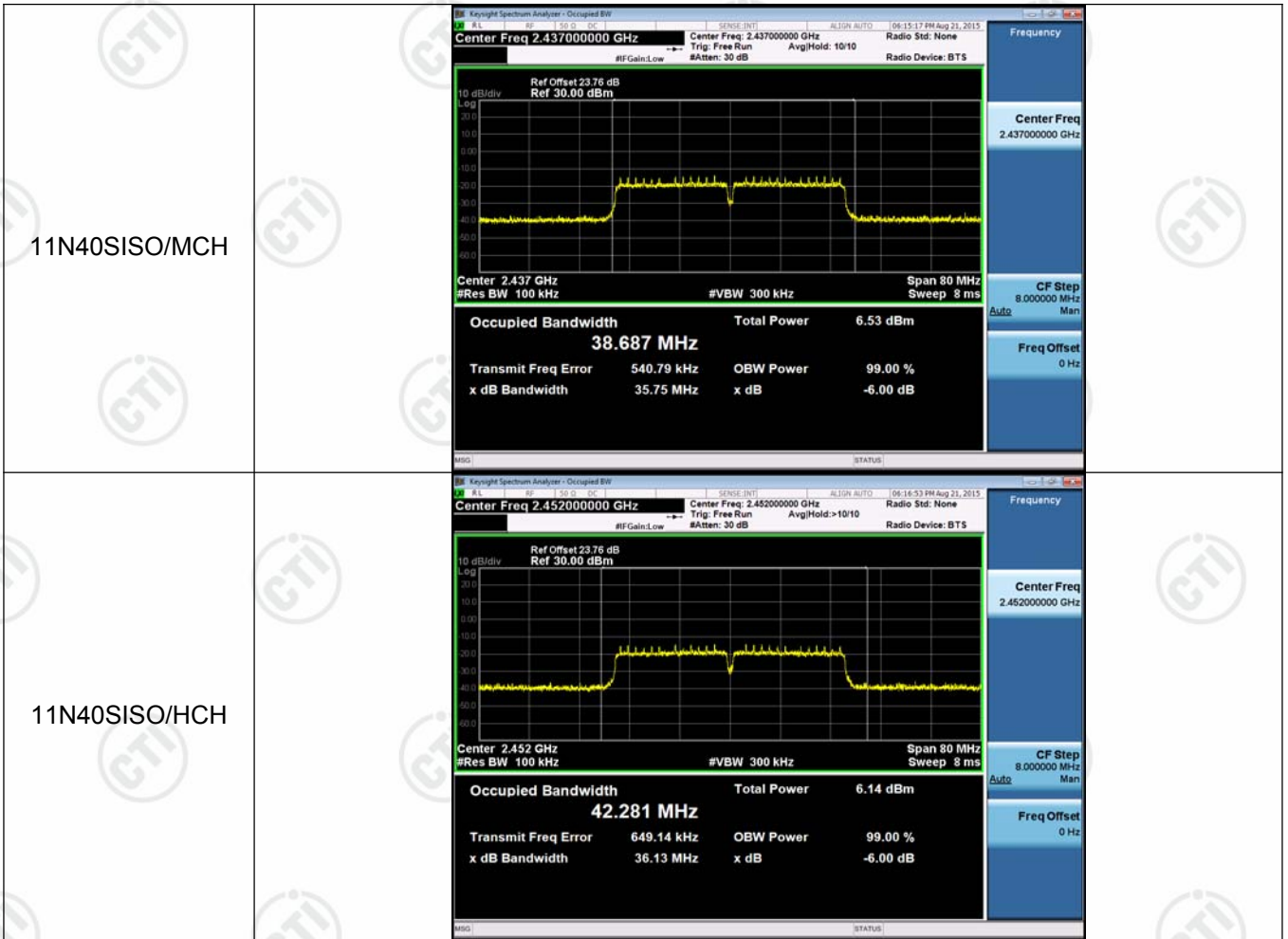
|                |  |
|----------------|--|
| <p>11B/MCH</p> |  <p>Center Freq 2.437000000 GHz</p> <p>Occupied Bandwidth: 14.459 MHz</p> <p>Total Power: 12.8 dBm</p> <p>Transmit Freq Error: 26.932 kHz</p> <p>x dB Bandwidth: 10.07 MHz</p> <p>OBW Power: 99.00 %</p> <p>x dB: -6.00 dB</p>   |
| <p>11B/HCH</p> |  <p>Center Freq 2.462000000 GHz</p> <p>Occupied Bandwidth: 14.358 MHz</p> <p>Total Power: 13.8 dBm</p> <p>Transmit Freq Error: -20.956 kHz</p> <p>x dB Bandwidth: 9.122 MHz</p> <p>OBW Power: 99.00 %</p> <p>x dB: -6.00 dB</p> |
| <p>11G/LCH</p> |  <p>Center Freq 2.412000000 GHz</p> <p>Occupied Bandwidth: 17.060 MHz</p> <p>Total Power: 5.82 dBm</p> <p>Transmit Freq Error: -9.849 kHz</p> <p>x dB Bandwidth: 16.38 MHz</p> <p>OBW Power: 99.00 %</p> <p>x dB: -6.00 dB</p> |



|                      |   |
|----------------------|---|
| <p>11G/MCH</p>       |  <p>Center Freq: 2.437000000 GHz</p> <p>Occupied Bandwidth: 16.879 MHz</p> <p>Total Power: 6.71 dBm</p> <p>Transmit Freq Error: -1.389 kHz</p> <p>x dB Bandwidth: 16.38 MHz</p>   |
| <p>11G/HCH</p>       |  <p>Center Freq: 2.462000000 GHz</p> <p>Occupied Bandwidth: 16.811 MHz</p> <p>Total Power: 7.29 dBm</p> <p>Transmit Freq Error: -30.801 kHz</p> <p>x dB Bandwidth: 16.39 MHz</p> |
| <p>11N20SISO/LCH</p> |  <p>Center Freq: 2.412000000 GHz</p> <p>Occupied Bandwidth: 17.892 MHz</p> <p>Total Power: 5.87 dBm</p> <p>Transmit Freq Error: 5.028 kHz</p> <p>x dB Bandwidth: 17.60 MHz</p>  |

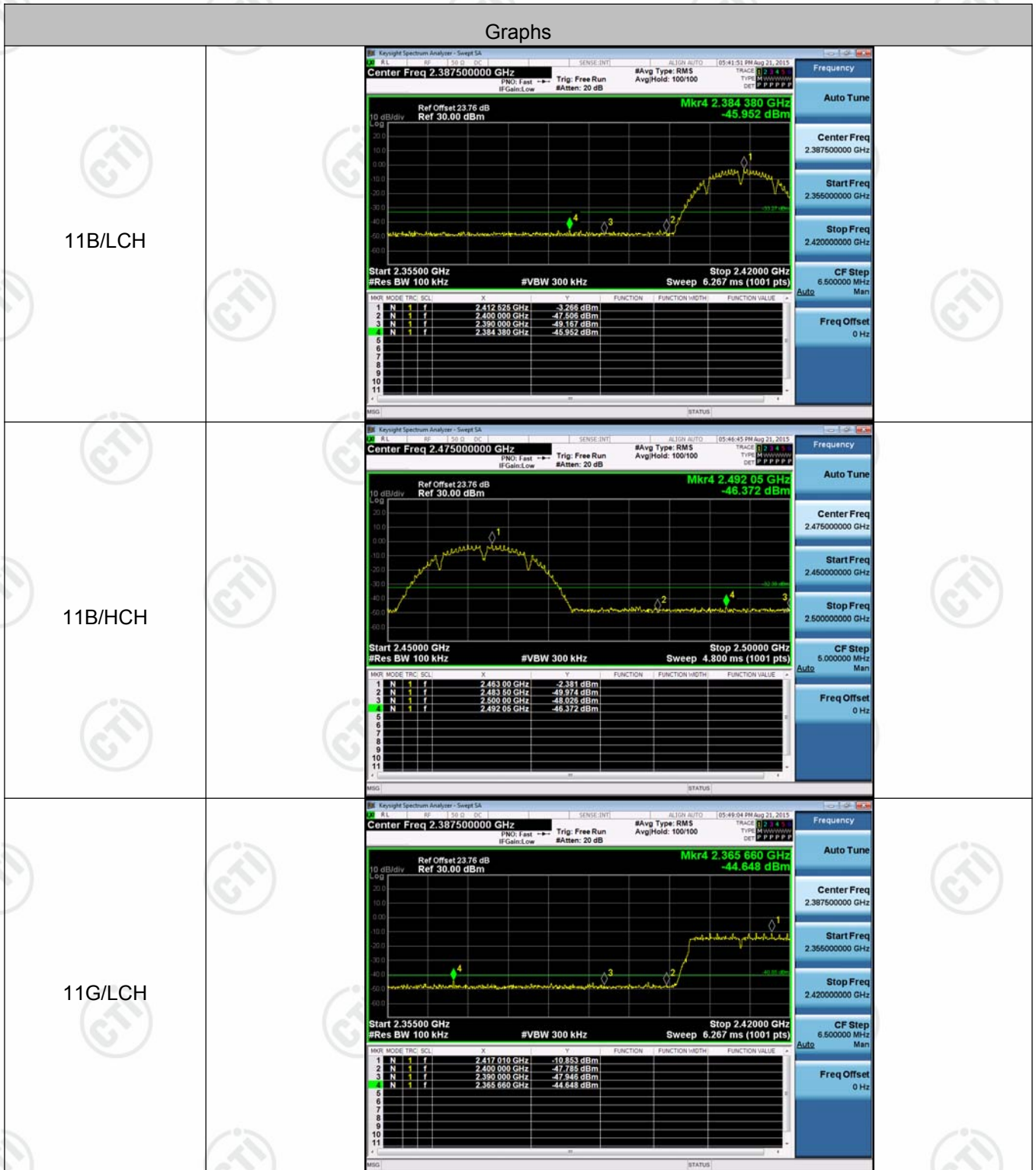


|                      |   |
|----------------------|---|
| <p>11N20SISO/MCH</p> |  <p>Center Freq: 2.437000000 GHz</p> <p>Occupied Bandwidth: 17.819 MHz</p> <p>Total Power: 6.65 dBm</p> <p>Transmit Freq Error: 8.893 kHz</p> <p>x dB Bandwidth: 17.57 MHz</p>    |
| <p>11N20SISO/HCH</p> |  <p>Center Freq: 2.462000000 GHz</p> <p>Occupied Bandwidth: 17.792 MHz</p> <p>Total Power: 7.45 dBm</p> <p>Transmit Freq Error: 5.400 kHz</p> <p>x dB Bandwidth: 17.59 MHz</p>   |
| <p>11N40SISO/LCH</p> |  <p>Center Freq: 2.422000000 GHz</p> <p>Occupied Bandwidth: 50.730 MHz</p> <p>Total Power: 4.90 dBm</p> <p>Transmit Freq Error: 568.40 kHz</p> <p>x dB Bandwidth: 36.29 MHz</p> |

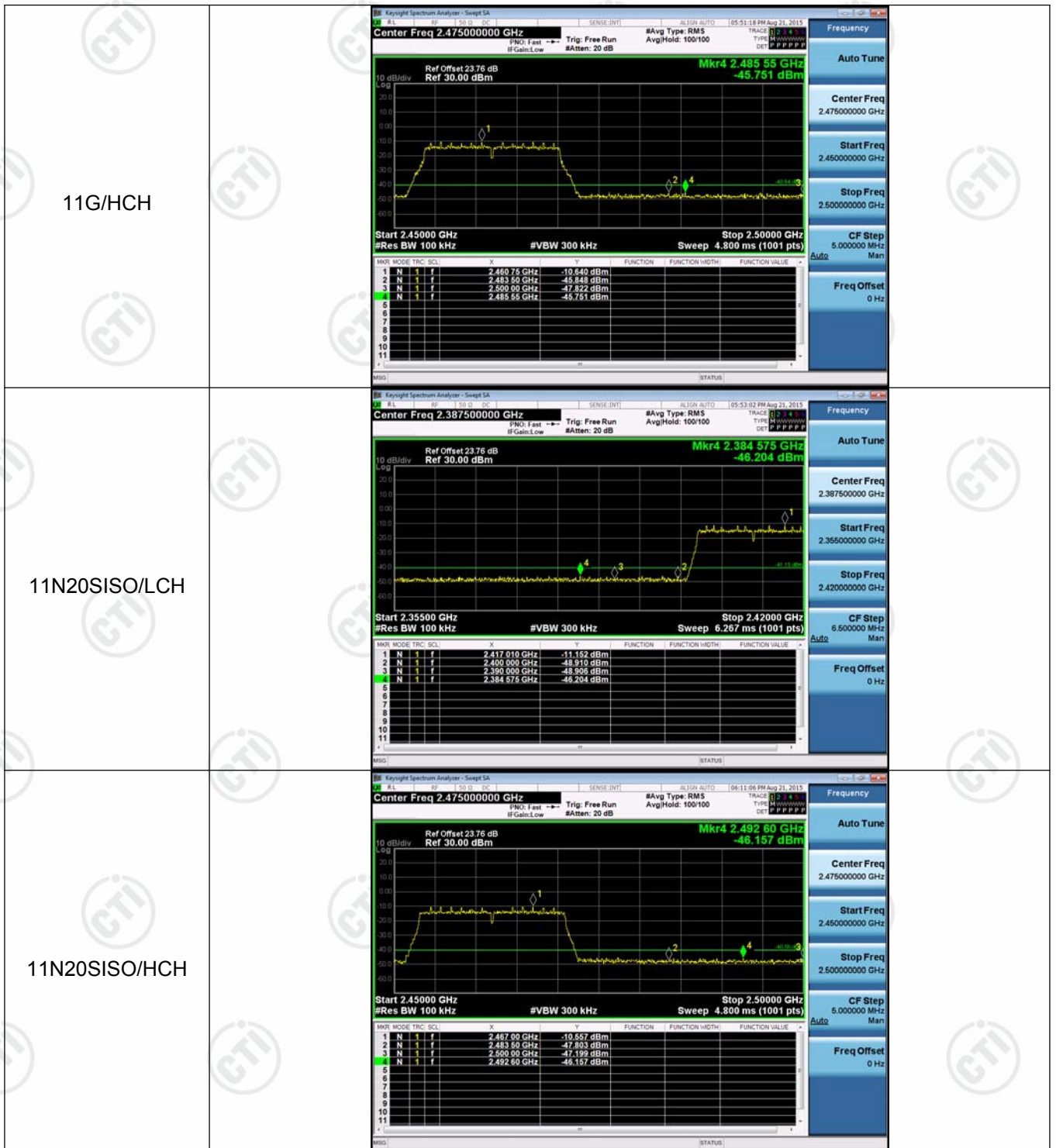


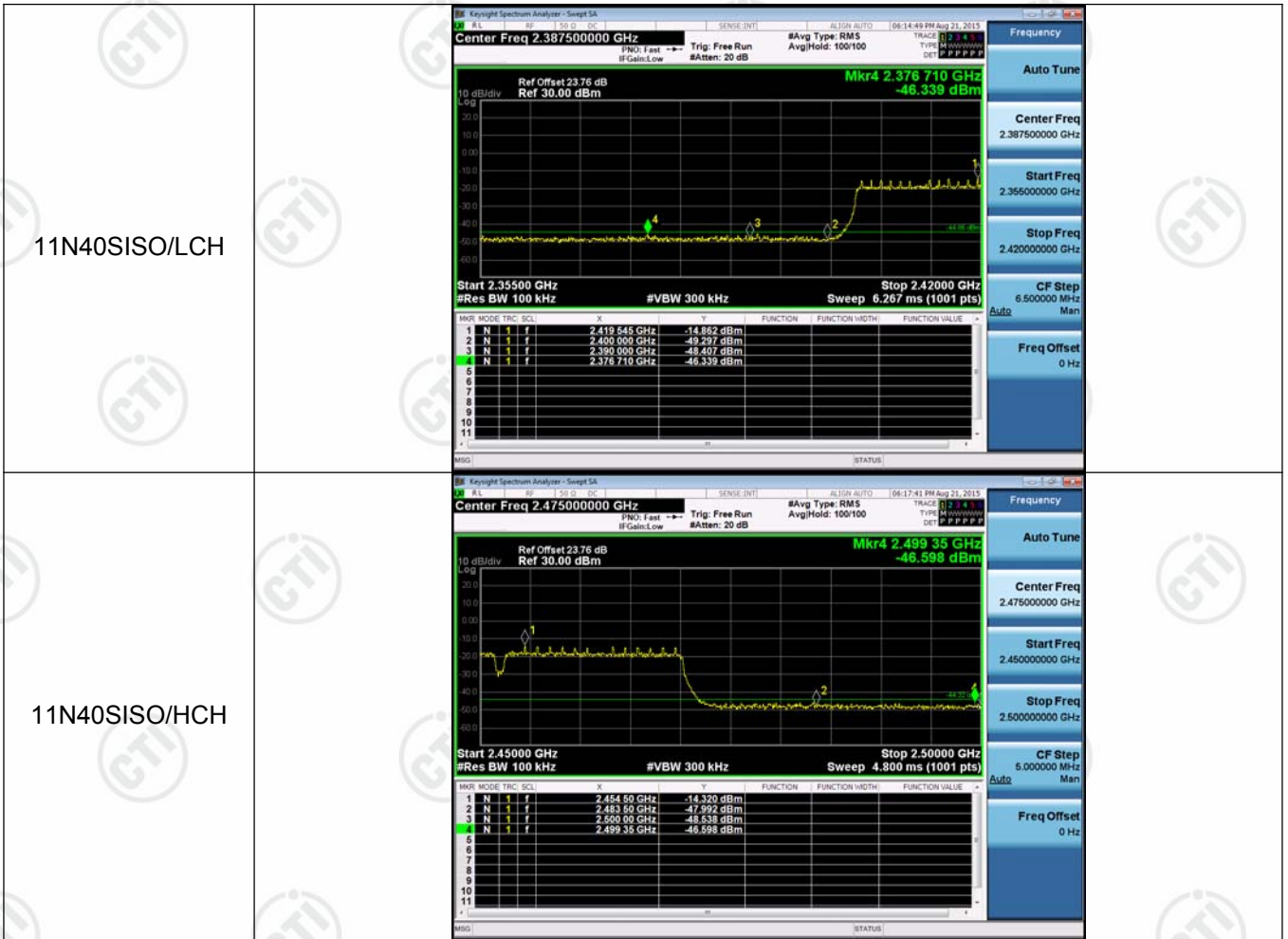
## Appendix C): Band-edge for RF Conducted Emissions

### Test Graph





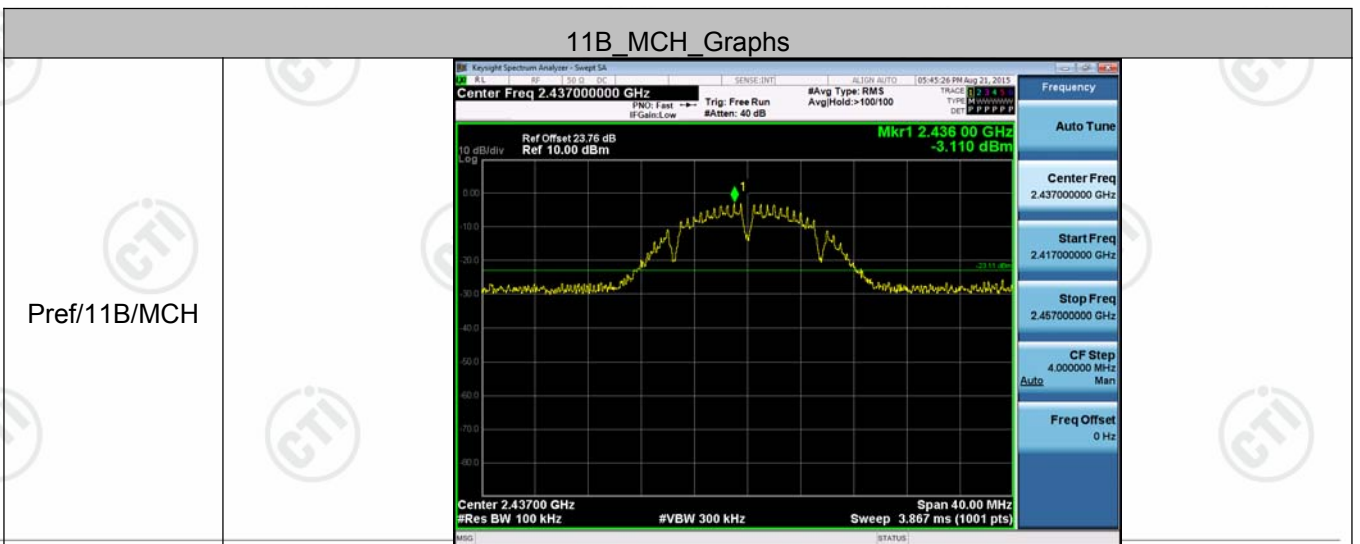
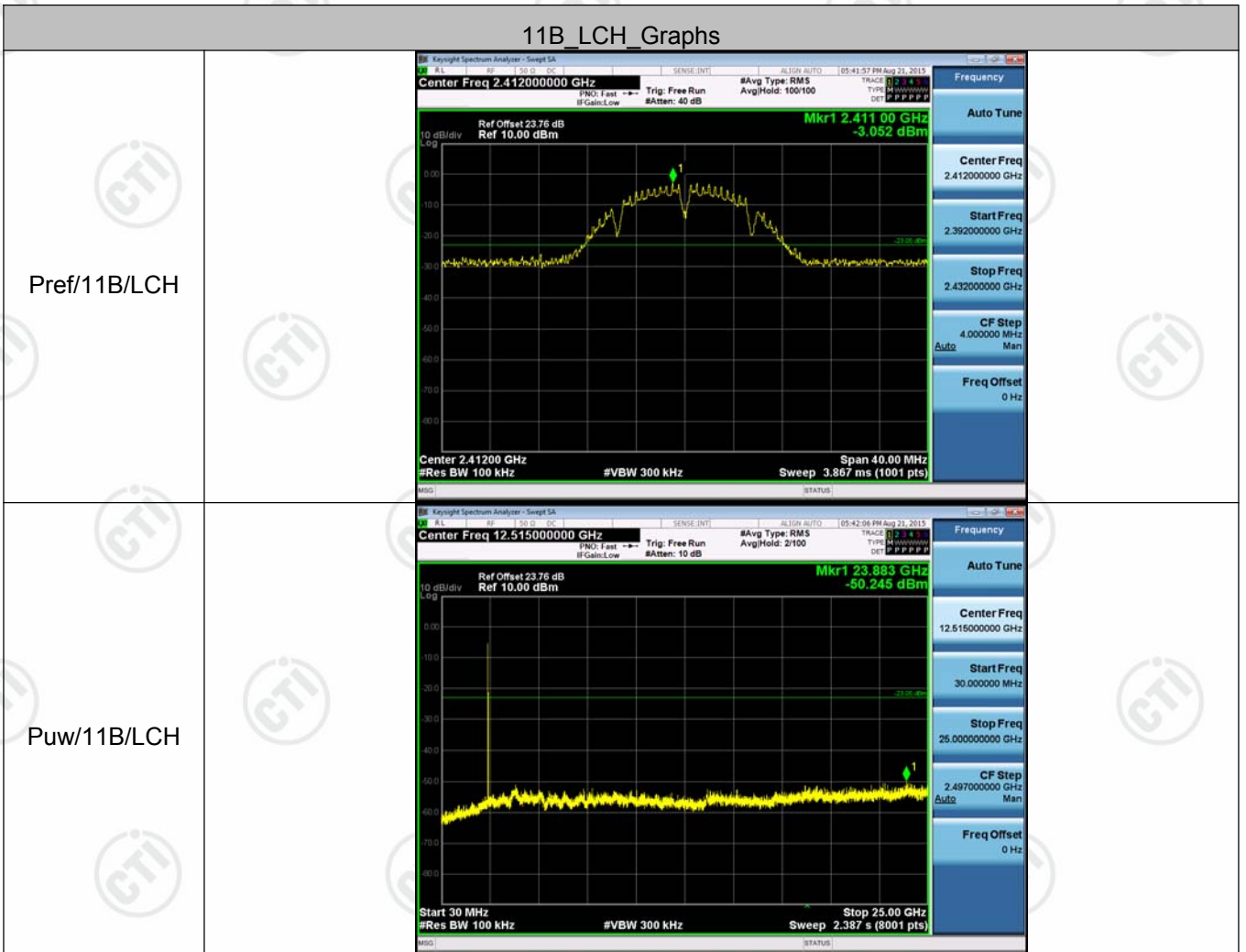


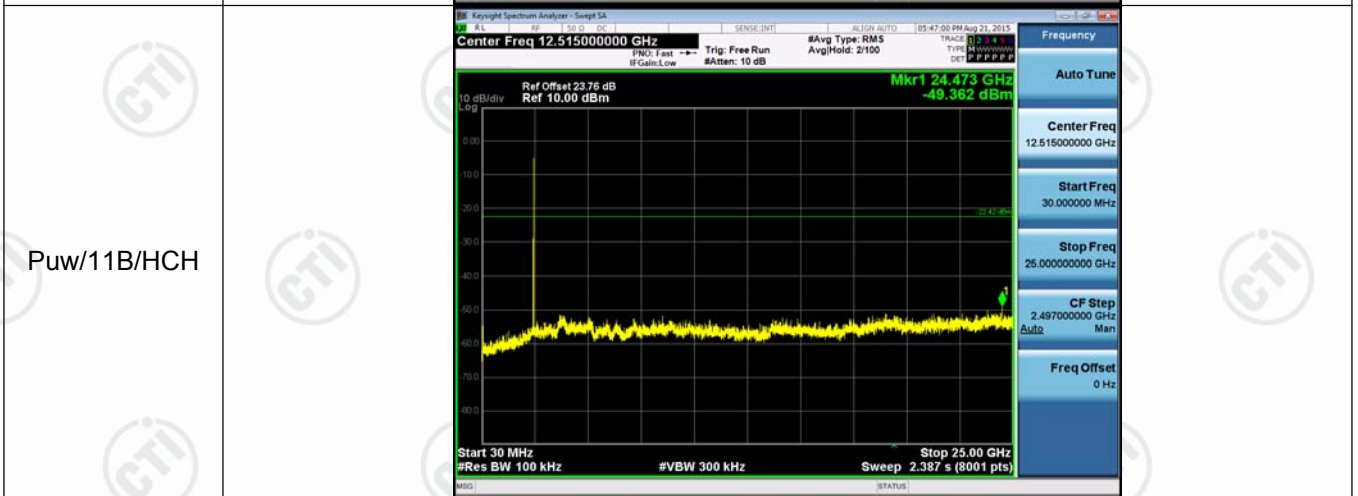
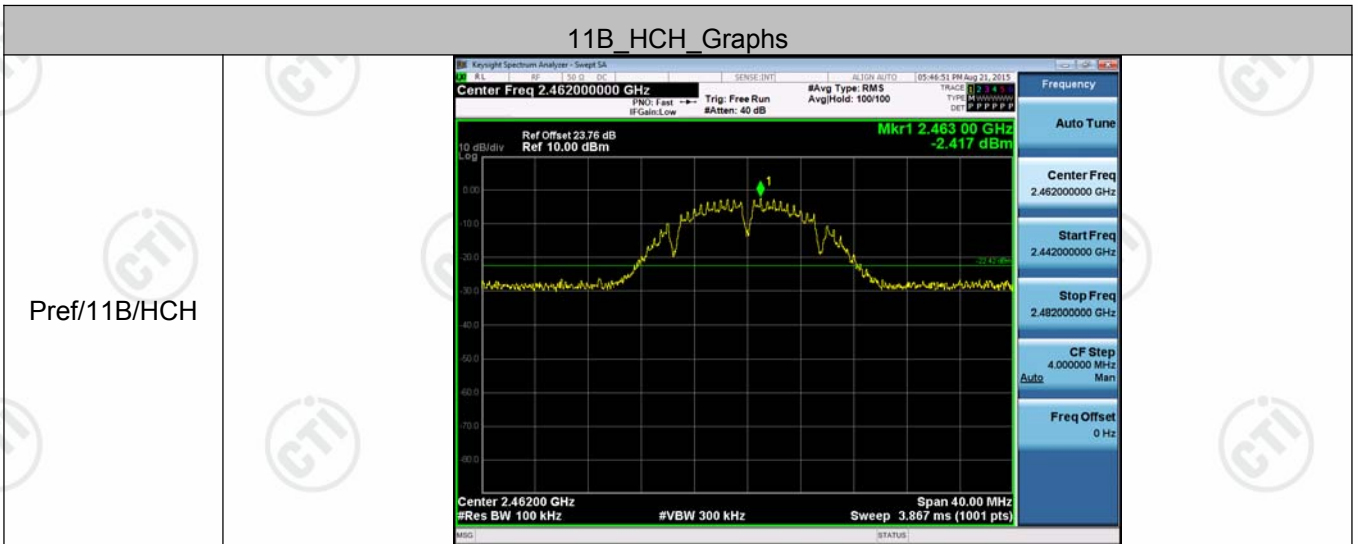
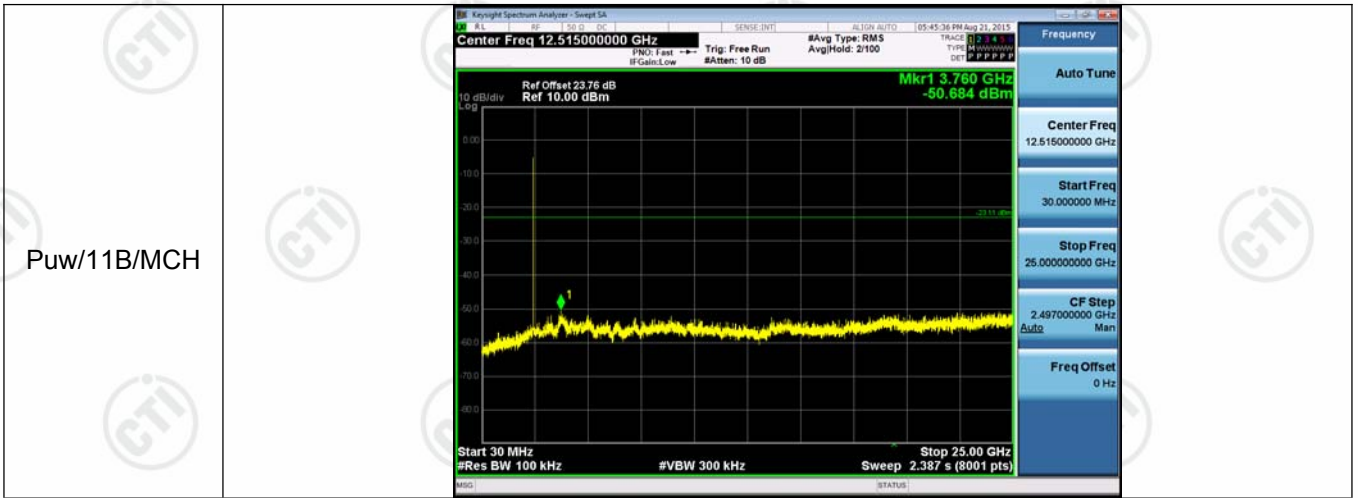


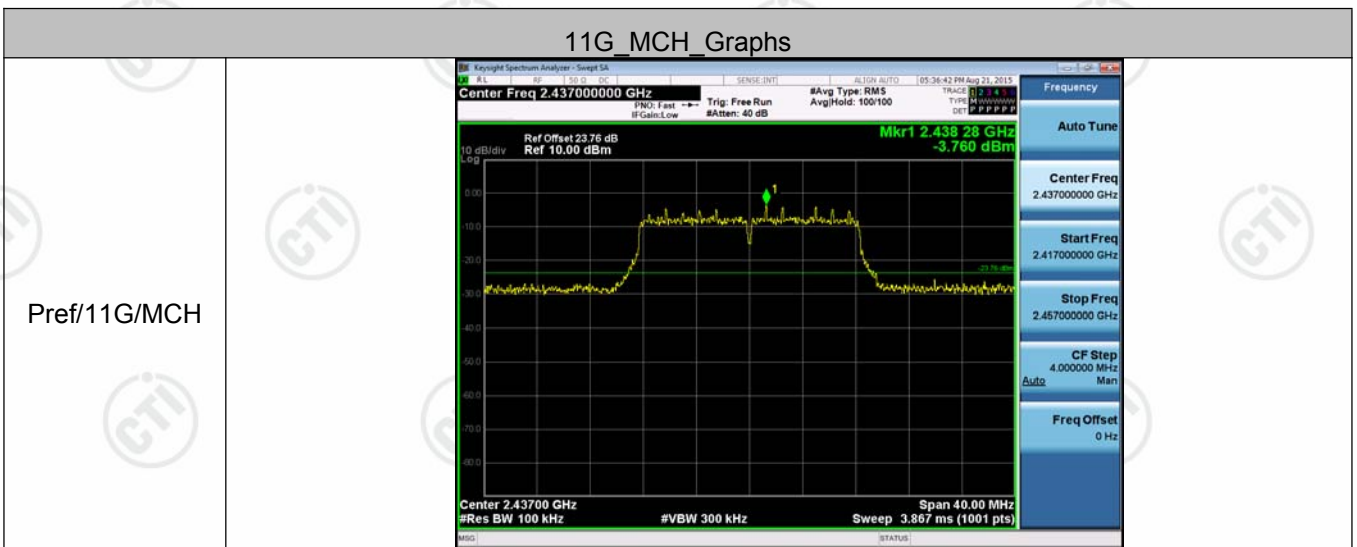
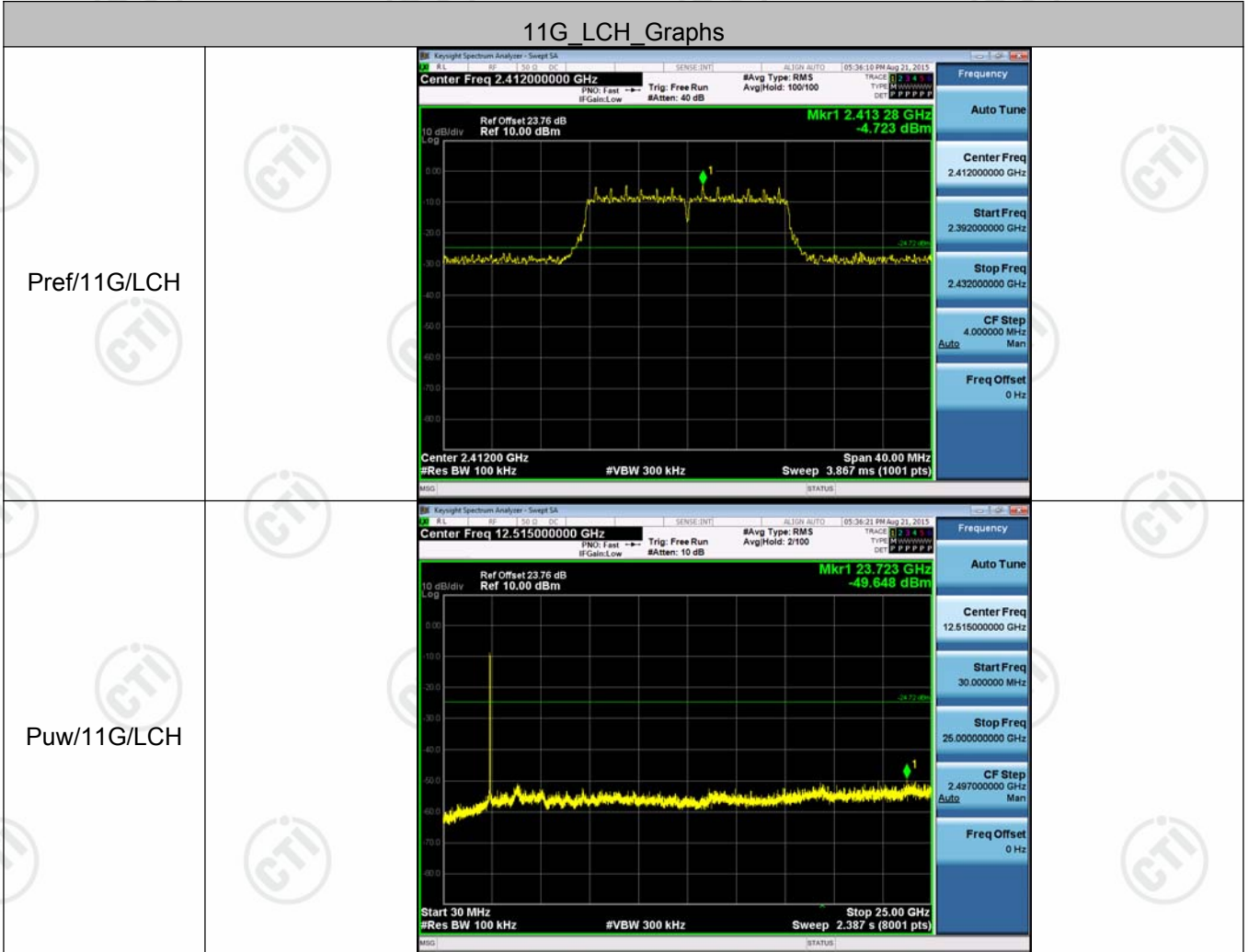


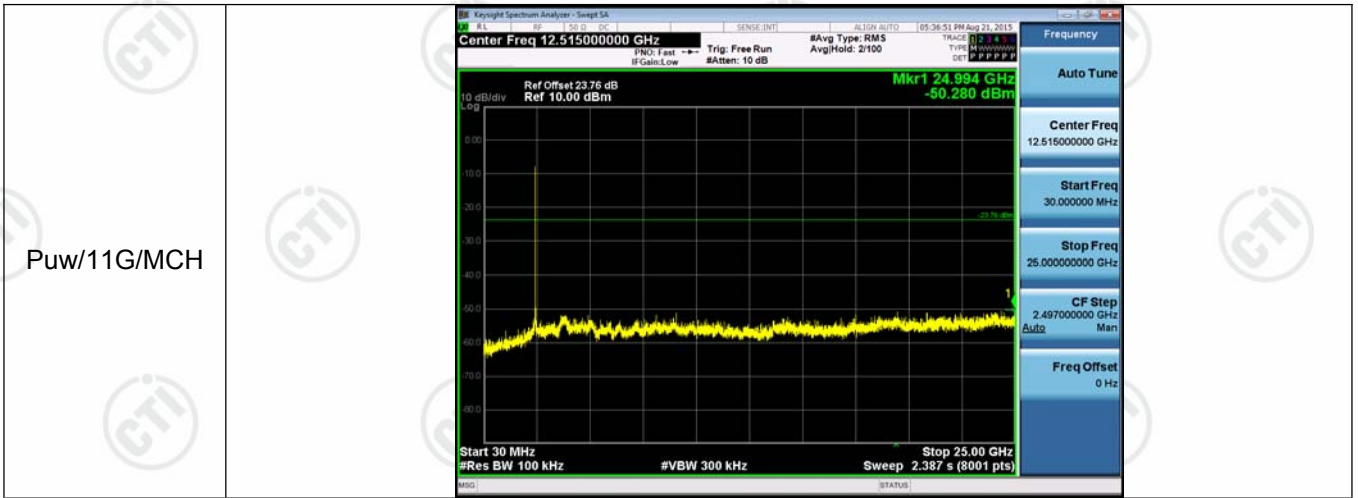
## Appendix D): RF Conducted Spurious Emissions

### Test Graph

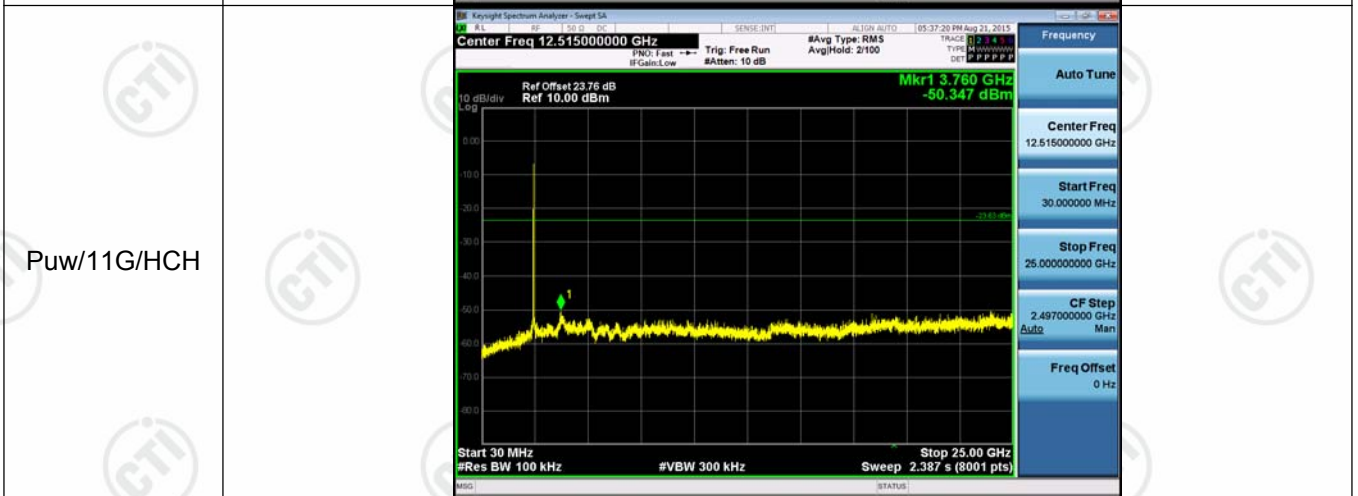
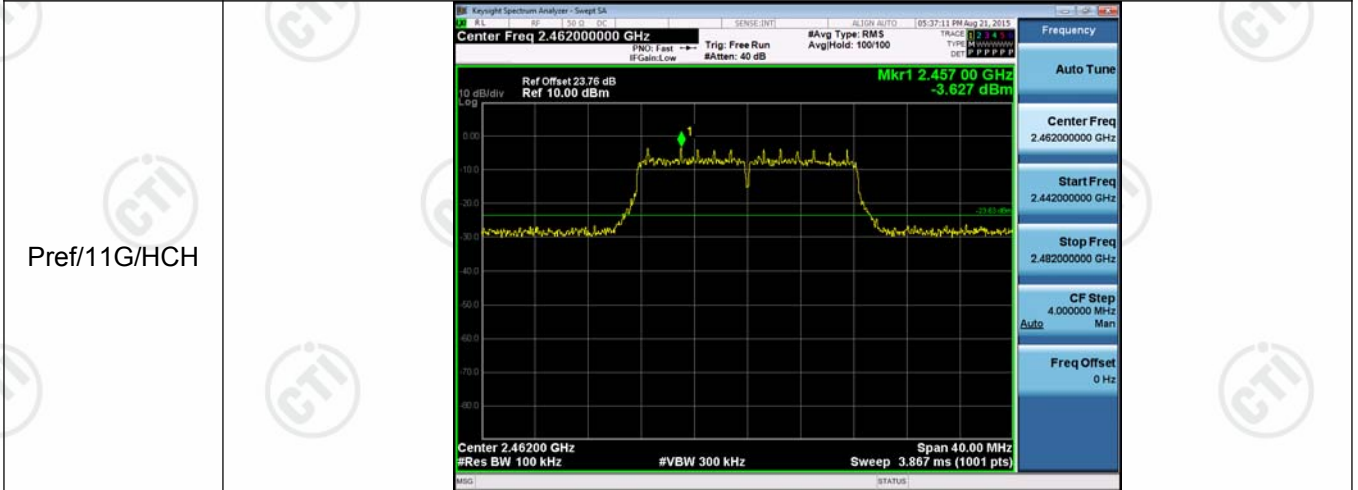




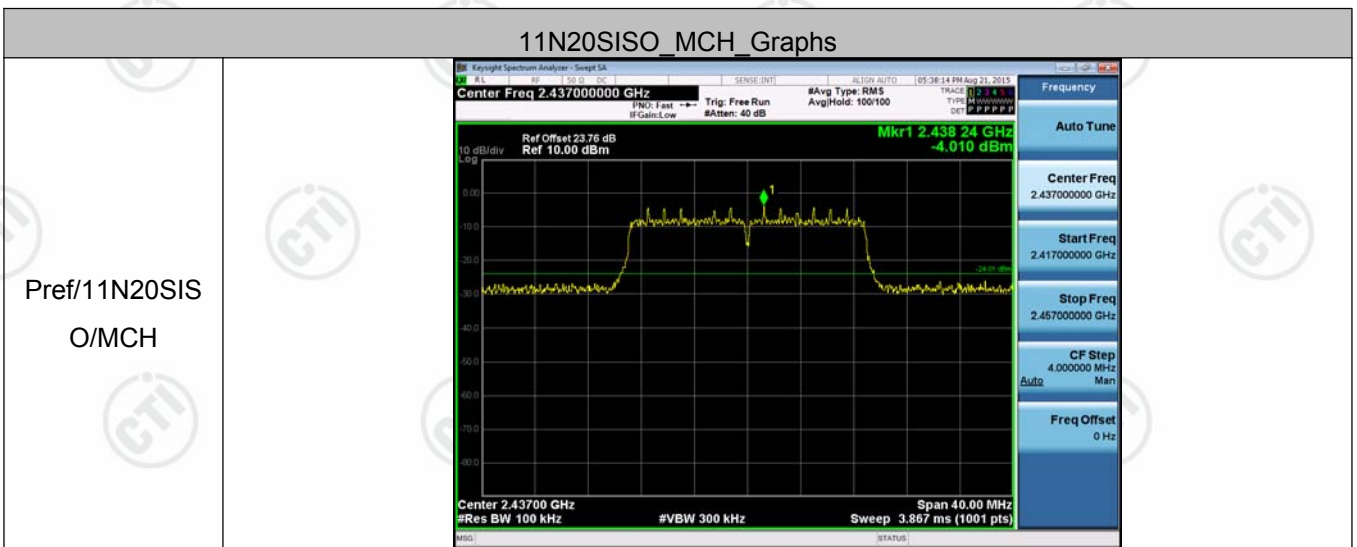
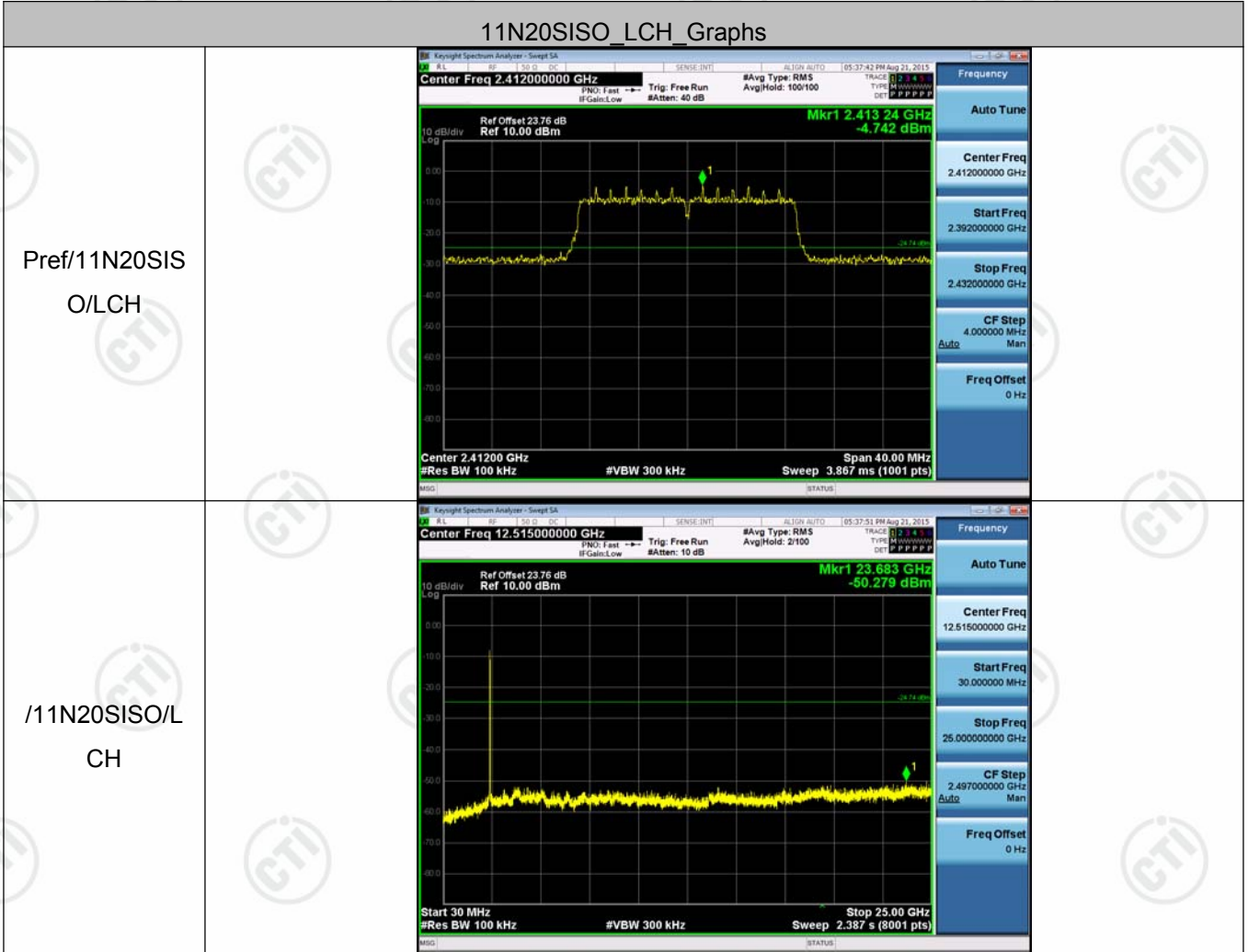




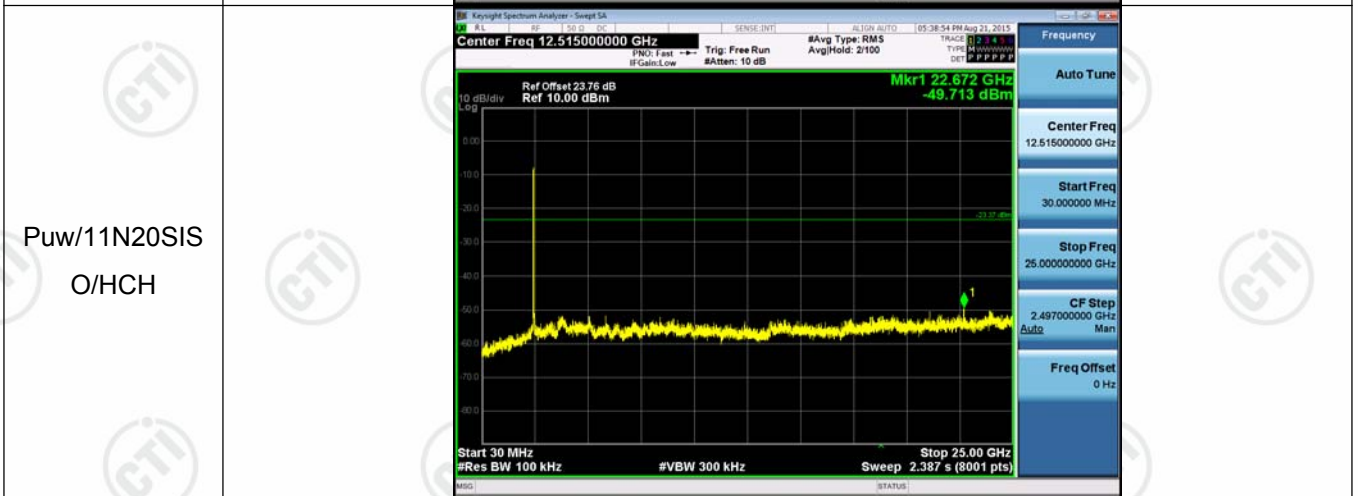
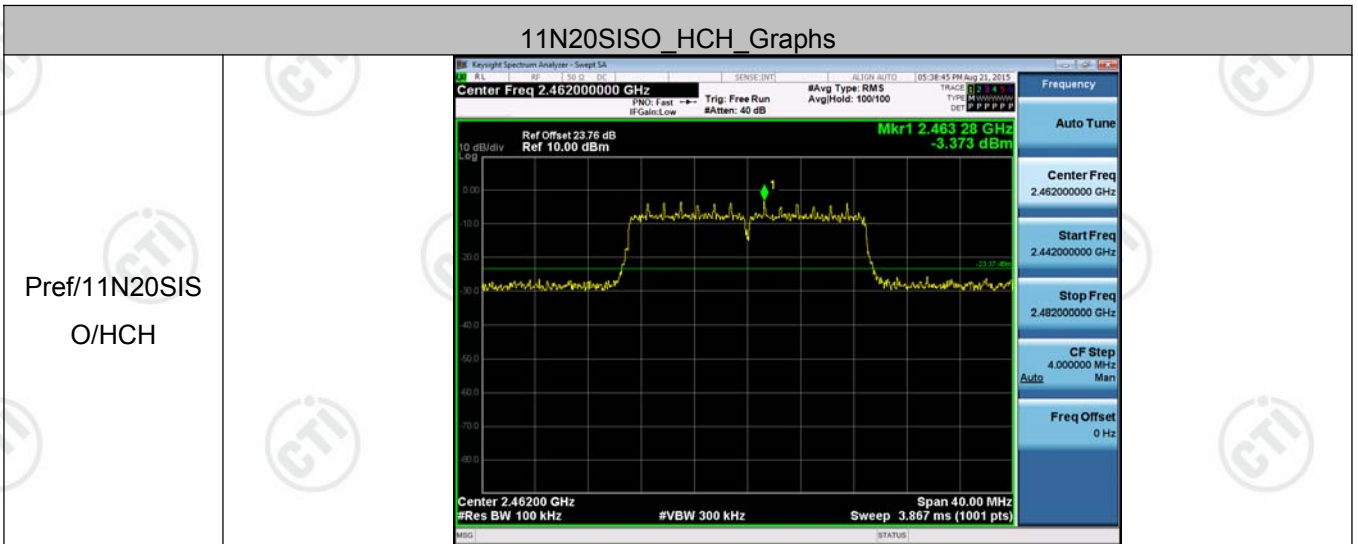
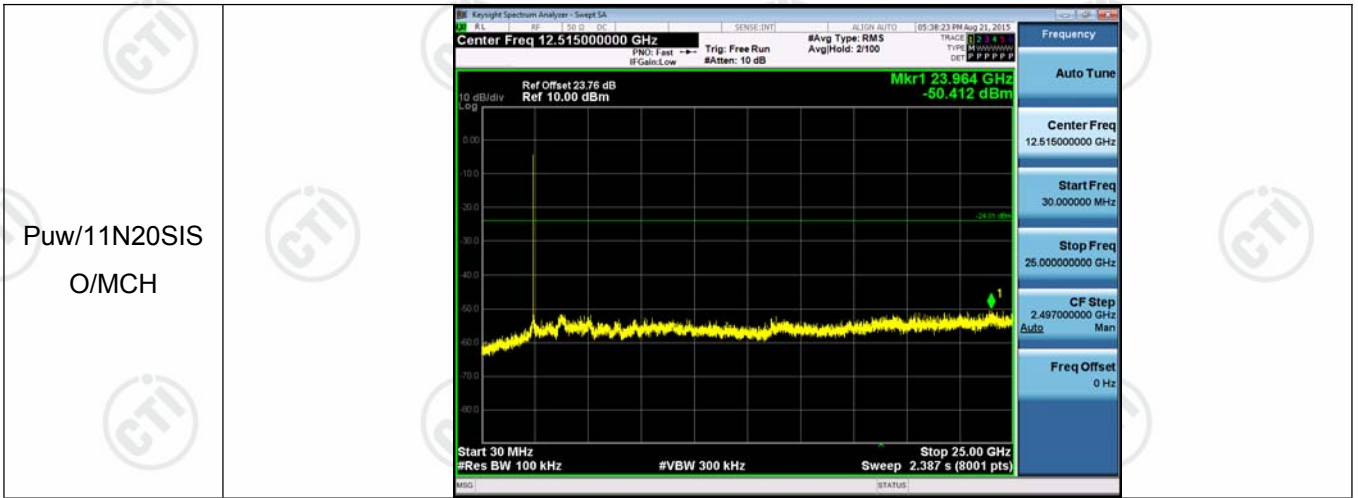
11G\_HCH\_Graphs

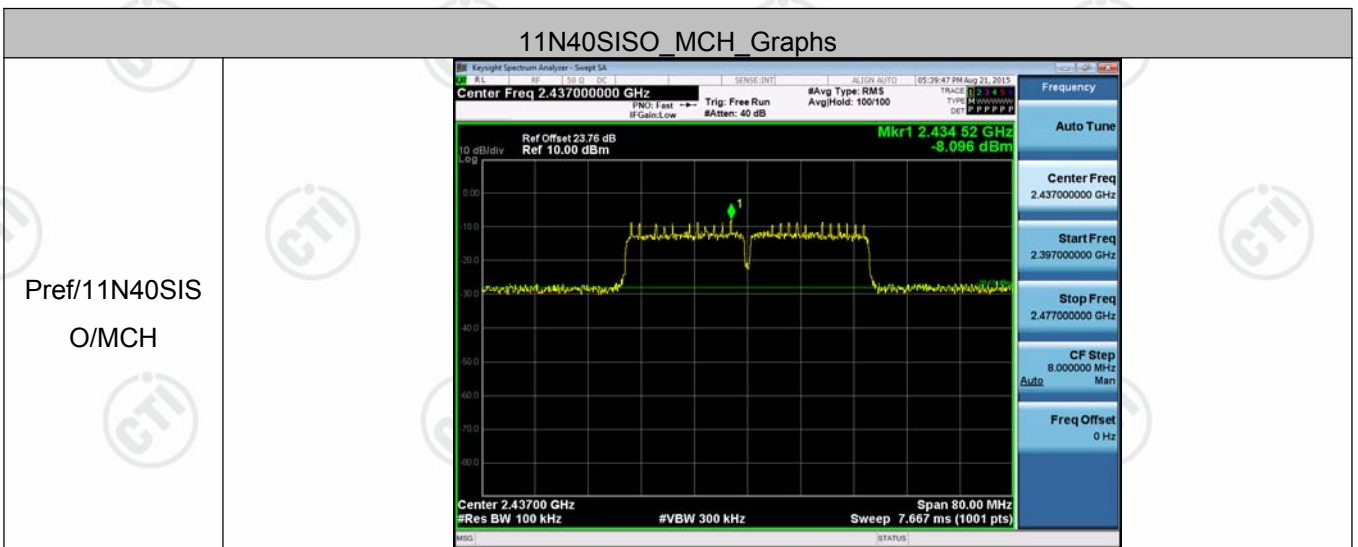
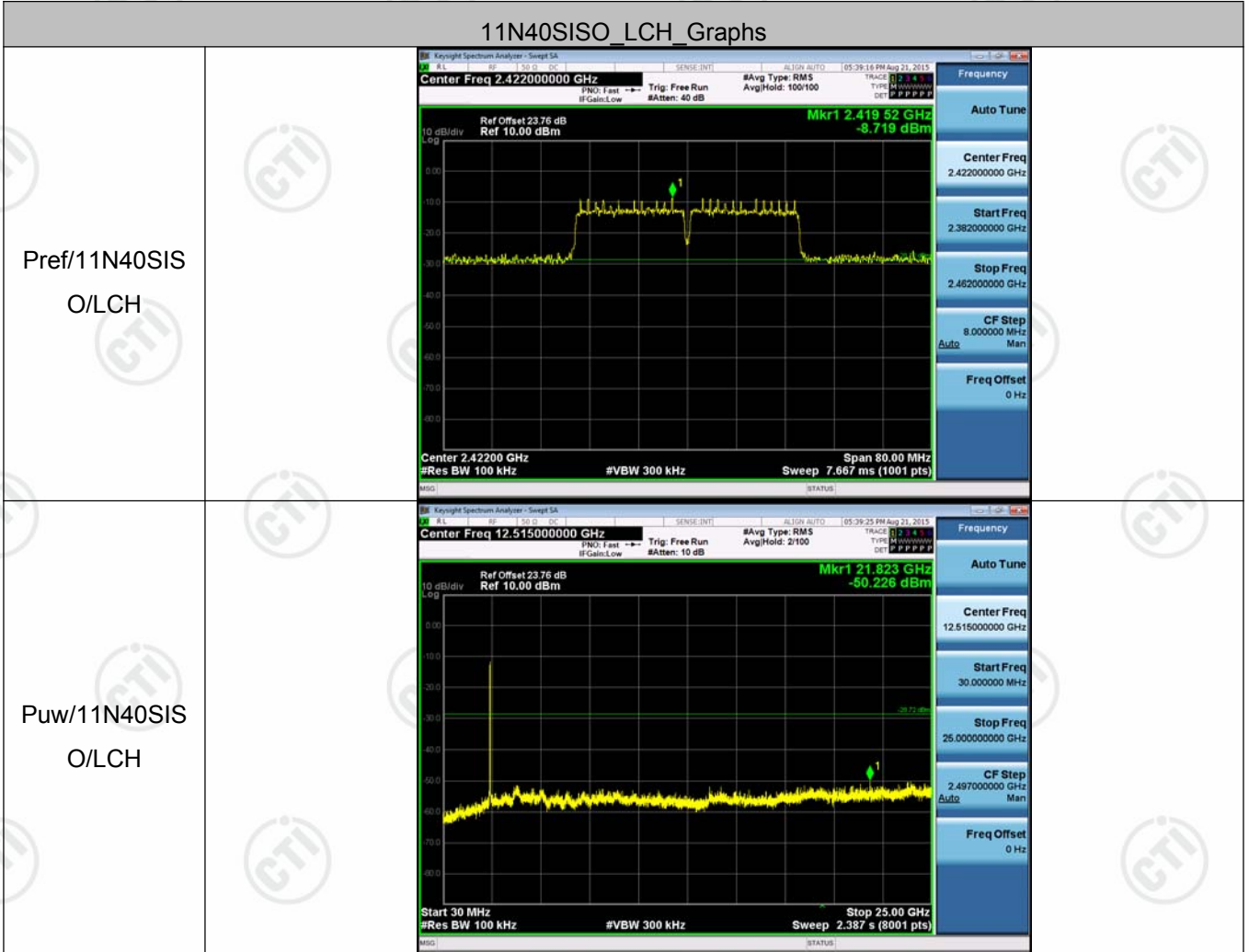


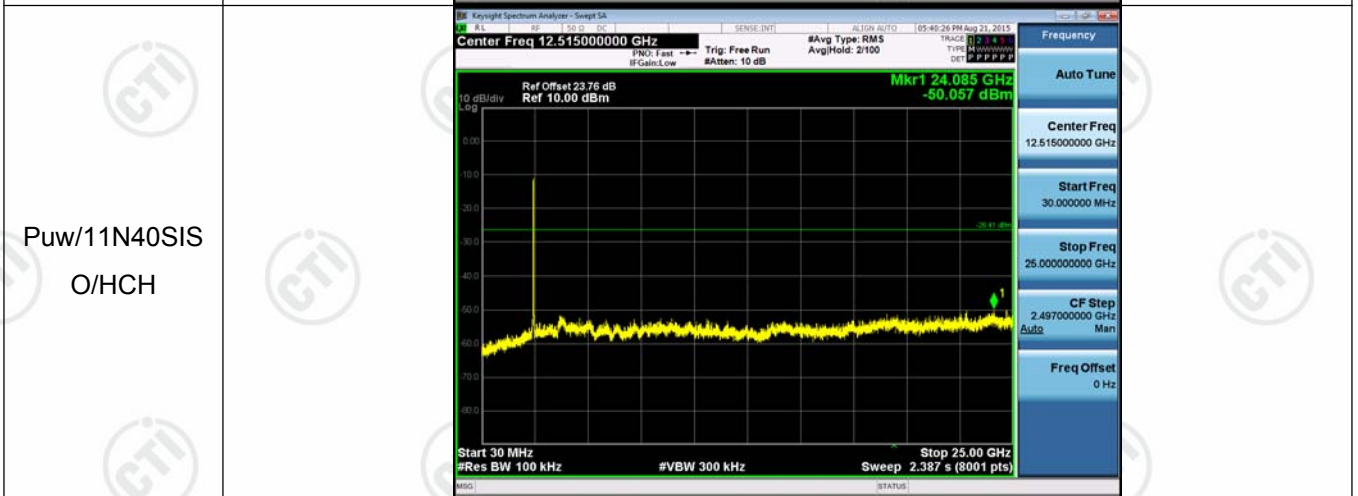
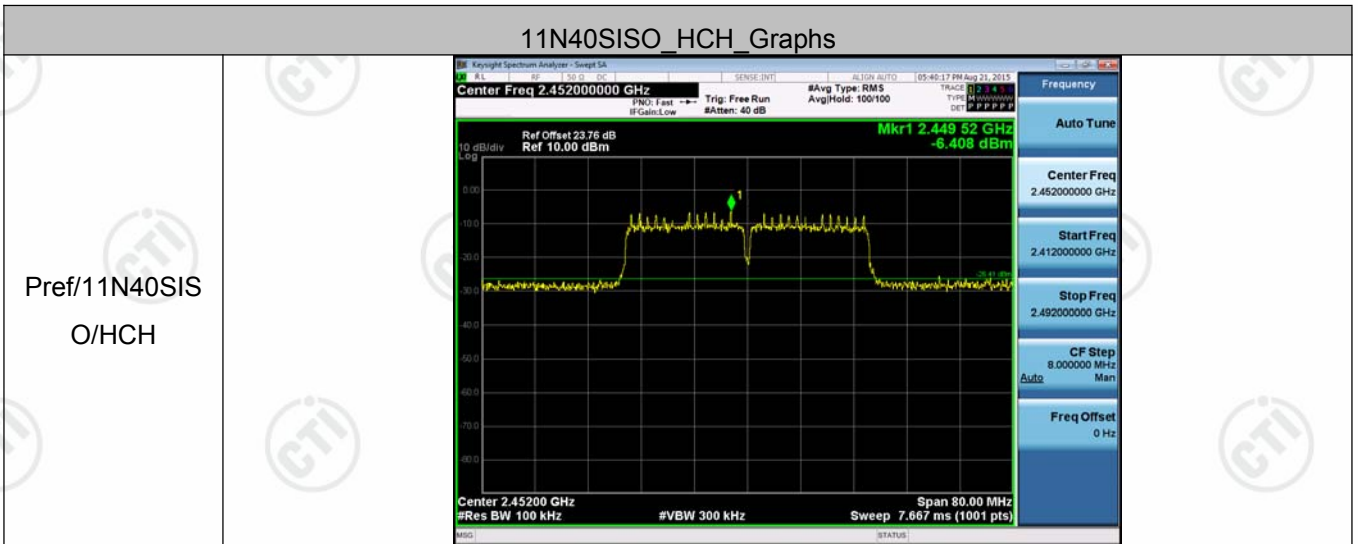
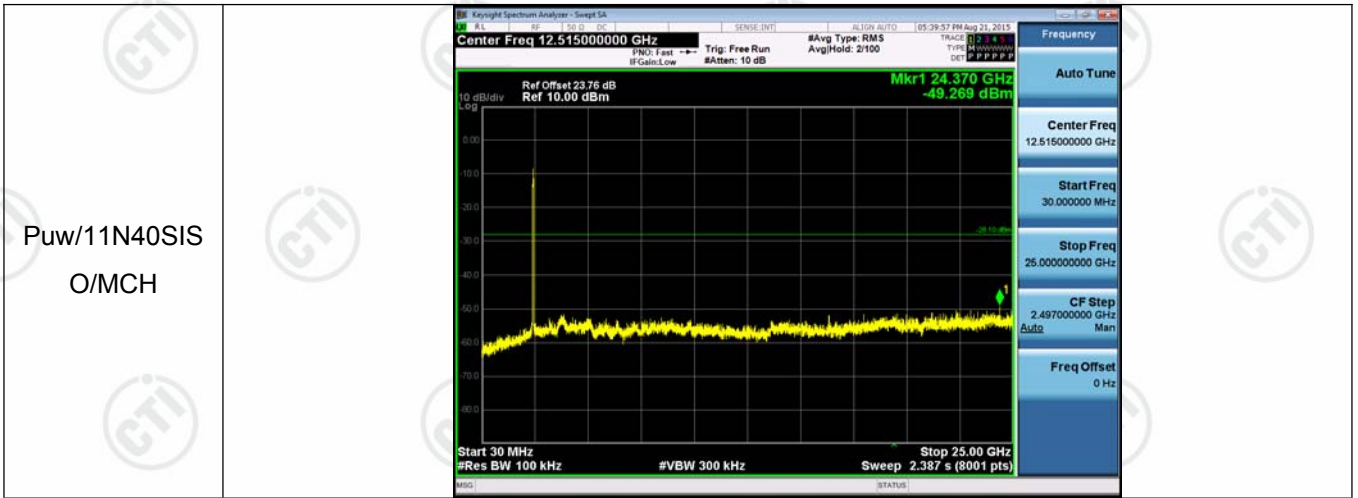










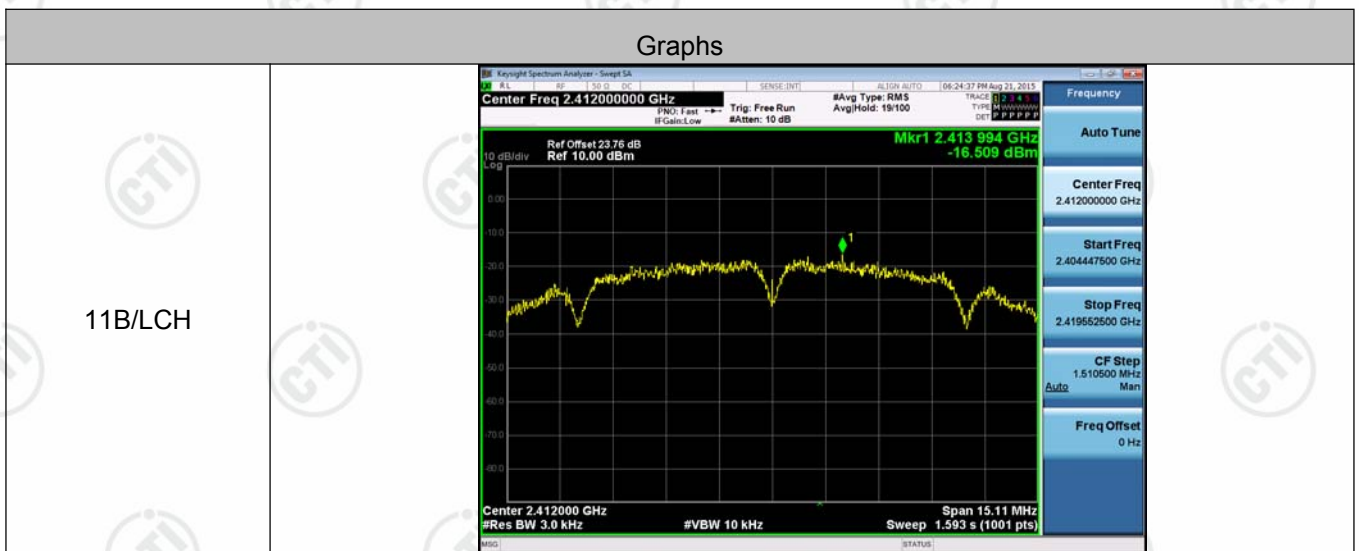


## Appendix E): Power Spectral Density




Result Table

| Mode      | Channel | Power Spectral Density [dBm] | Verdict |
|-----------|---------|------------------------------|---------|
| 11B       | LCH     | -16.509                      | PASS    |
| 11B       | MCH     | -15.811                      | PASS    |
| 11B       | HCH     | -16.383                      | PASS    |
| 11G       | LCH     | -24.890                      | PASS    |
| 11G       | MCH     | -24.236                      | PASS    |
| 11G       | HCH     | -23.870                      | PASS    |
| 11N20SISO | LCH     | -24.740                      | PASS    |
| 11N20SISO | MCH     | -25.063                      | PASS    |
| 11N20SISO | HCH     | -23.335                      | PASS    |
| 11N40SISO | LCH     | -29.545                      | PASS    |
| 11N40SISO | MCH     | -29.514                      | PASS    |
| 11N40SISO | HCH     | -28.598                      | PASS    |


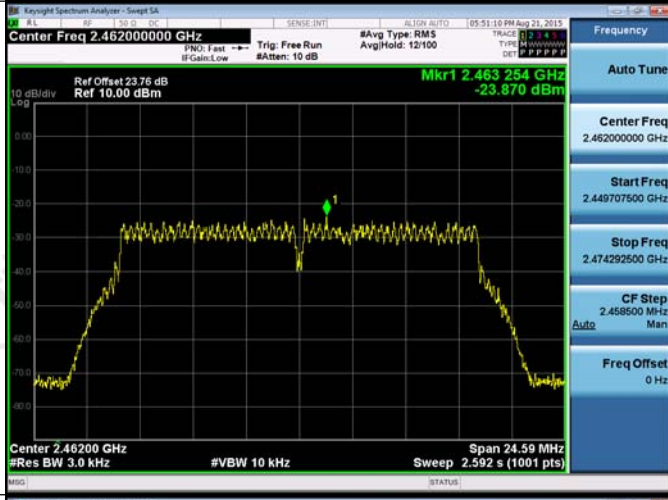
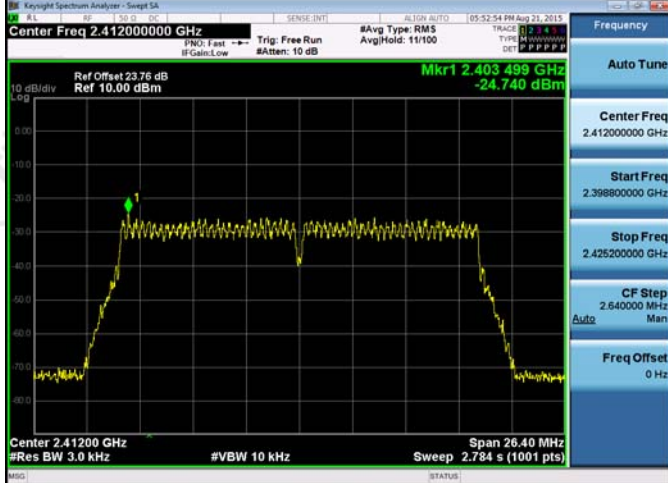
## Test Graph

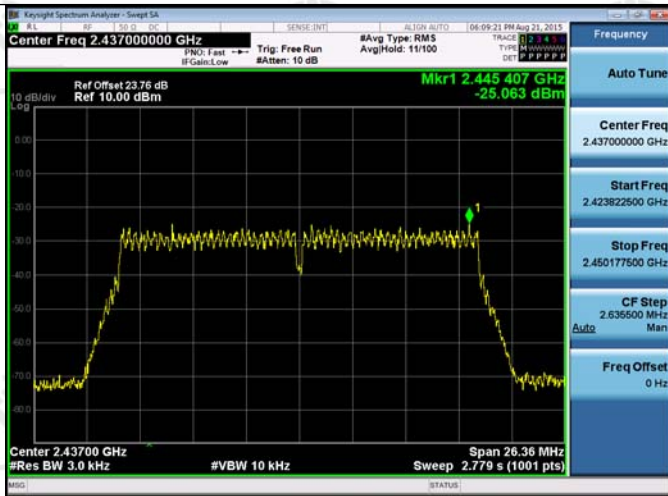
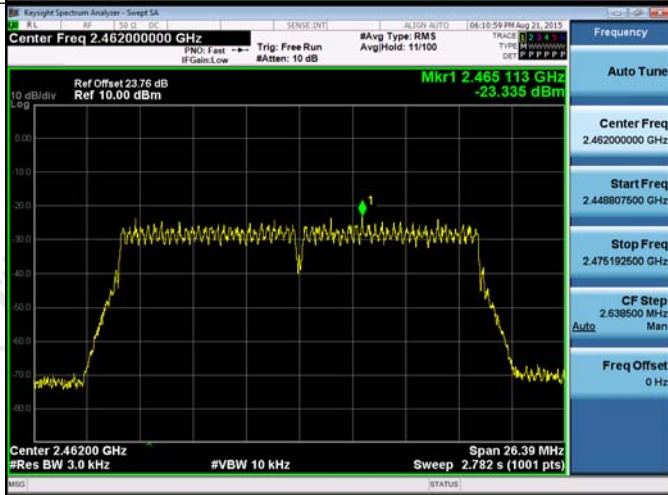


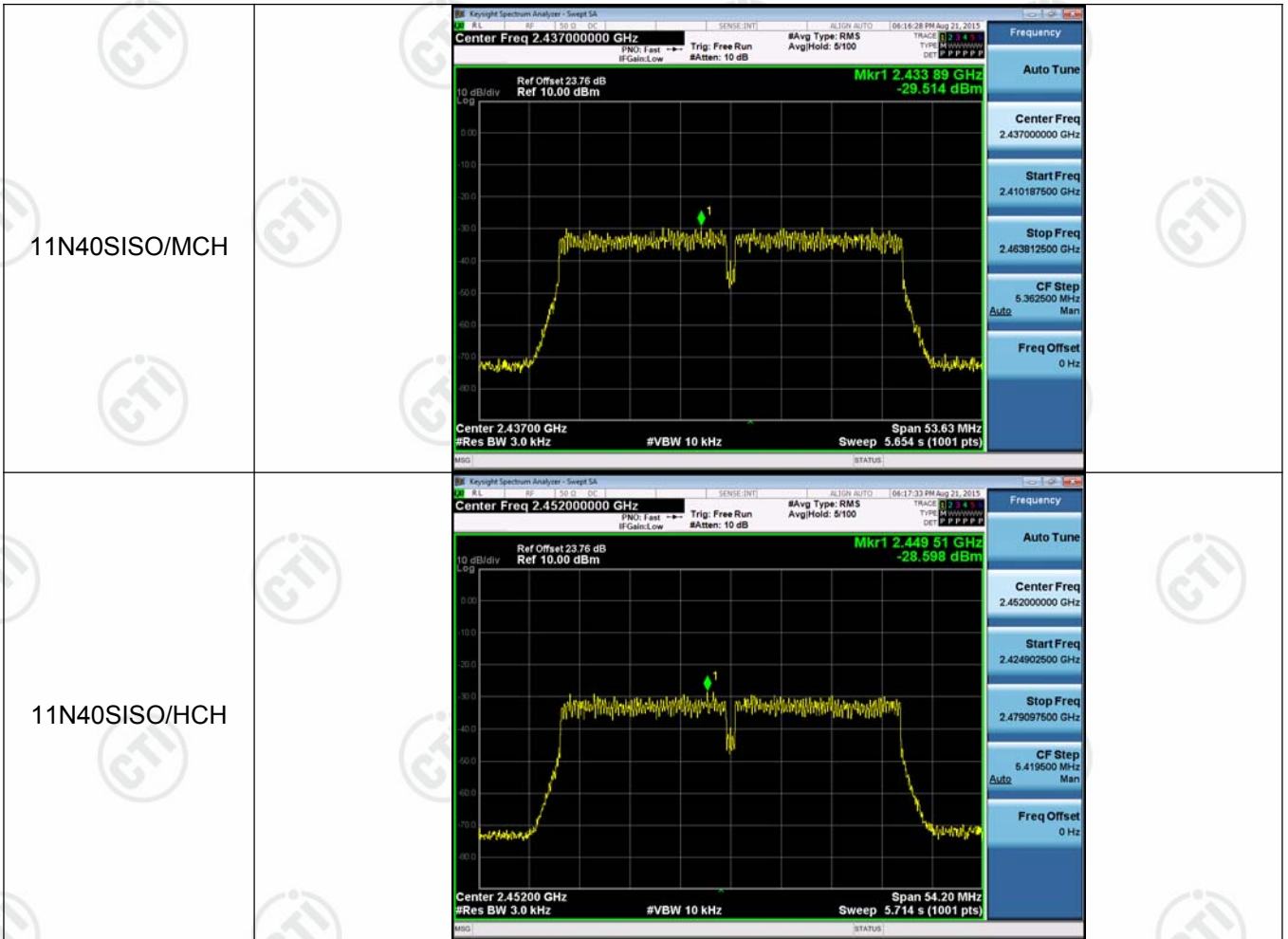


|                |  |
|----------------|--|
| <p>11B/MCH</p> |    |
| <p>11B/HCH</p> |   |
| <p>11G/LCH</p> |  |



|                      |  |
|----------------------|--|
| <p>11G/MCH</p>       |    |
| <p>11G/HCH</p>       |   |
| <p>11N20SISO/LCH</p> |  |

|                      |   |
|----------------------|---|
| <p>11N20SISO/MCH</p> |  <p>Center Freq 2.43700000 GHz</p> <p>Center Freq 2.43700 GHz</p> <p>Mkr1 2.445407 GHz<br/>-25.063 dBm</p> <p>Span 26.36 MHz</p> <p>#Res BW 3.0 kHz #VBW 10 kHz Sweep 2.779 s (1001 pts)</p>  |
| <p>11N20SISO/HCH</p> |  <p>Center Freq 2.46200000 GHz</p> <p>Center Freq 2.46200 GHz</p> <p>Mkr1 2.465113 GHz<br/>-23.335 dBm</p> <p>Span 26.39 MHz</p> <p>#Res BW 3.0 kHz #VBW 10 kHz Sweep 2.782 s (1001 pts)</p> |
| <p>11N40SISO/LCH</p> |  <p>Center Freq 2.42200000 GHz</p> <p>Center Freq 2.42200 GHz</p> <p>Mkr1 2.41922 GHz<br/>-29.545 dBm</p> <p>Span 54.44 MHz</p> <p>#Res BW 3.0 kHz #VBW 10 kHz Sweep 5.740 s (1001 pts)</p> |



## Appendix F) Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

|                     |  |
|---------------------|--|
| <b>EUT Antenna:</b> |  |
|---------------------|--|

|   |  |
|---|--|
| The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi. |  |
|---|--|



## Appendix G) AC Power Line Conducted Emission

| <p>Test Procedure:</p>   | <p>Test frequency range :150KHz-30MHz</p> <ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a <math>50\Omega/50\mu\text{H} + 5\Omega</math> linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</li> </ol> |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
|--|---|-----------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|--|--|
| <p>Limit:</p>  | <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>   | Frequency range (MHz) | Limit (dBuV) |  | Quasi-peak | Average | 0.15-0.5 | 66 to 56* | 56 to 46* | 0.5-5 | 56 | 46 | 5-30 | 60 | 50 |  |  |
| Frequency range (MHz)  | Limit (dBuV)  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
|  | Quasi-peak  | Average               |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
| 0.15-0.5   | 66 to 56*   | 56 to 46*             |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
| 0.5-5  | 56  | 46                    |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
| 5-30   | 60  | 50                    |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |
| <p>* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.</p> <p>NOTE : The lower limit is applicable at the transition frequency</p> |   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |  |  |

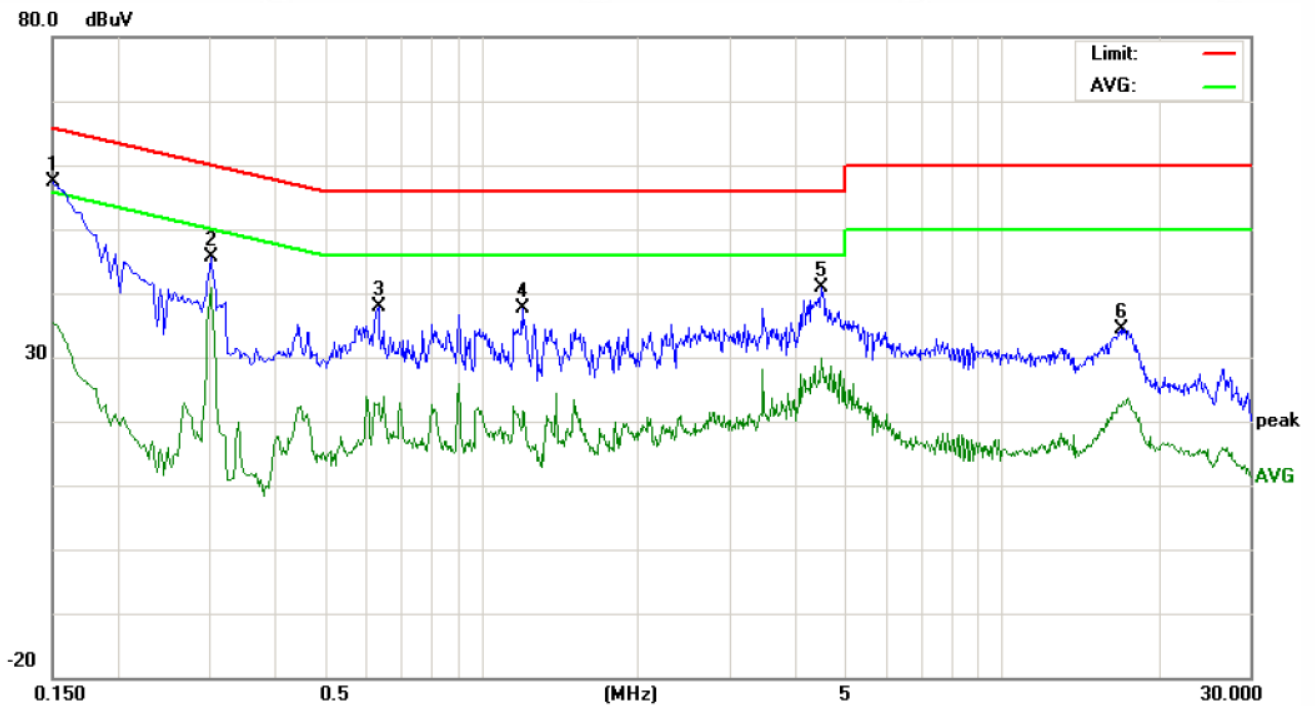


**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

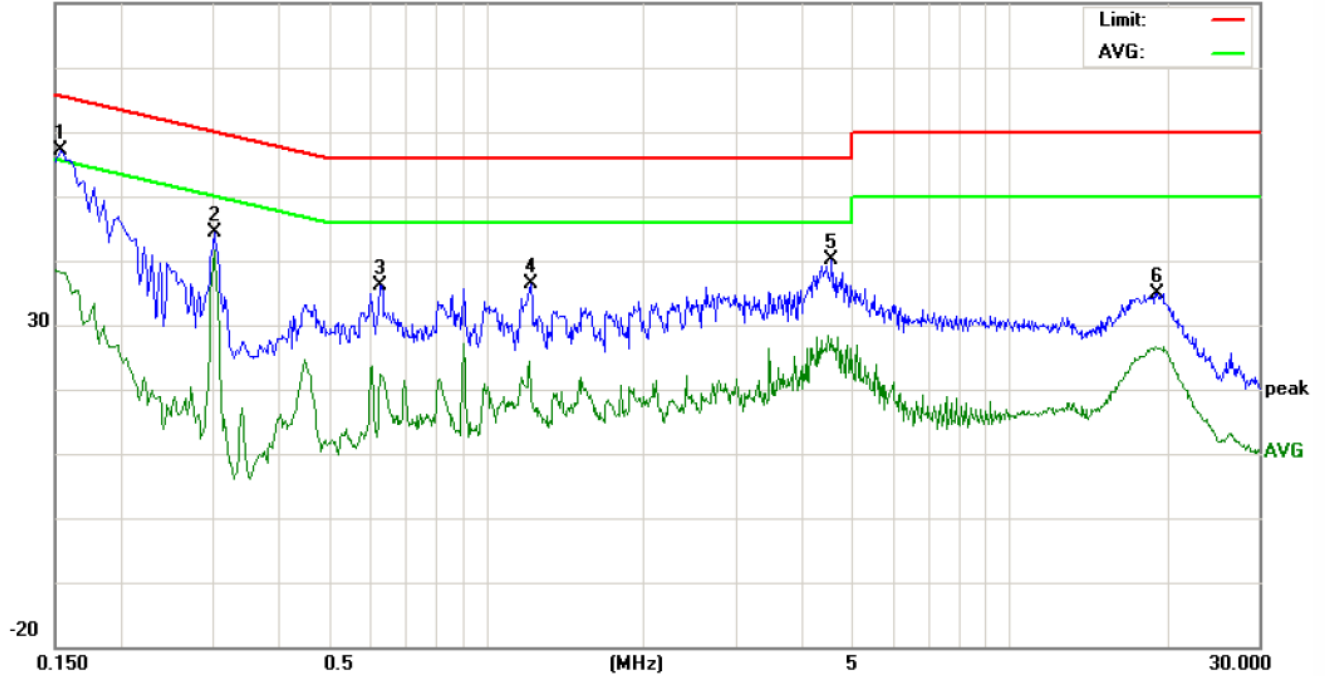
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



| No. | Freq.<br>MHz | Reading_Level<br>(dBuV) |    |       | Correct<br>Factor<br>dB | Measurement<br>(dBuV) |       |       | Limit<br>(dBuV) |        | Margin<br>(dB) |     | P/F | Comment |
|-----|--------------|-------------------------|----|-------|-------------------------|-----------------------|-------|-------|-----------------|--------|----------------|-----|-----|---------|
|     |              | Peak                    | QP | AVG   |                         | peak                  | QP    | AVG   | QP              | AVG    | QP             | AVG |     |         |
| 1   | 0.1500       | 47.36                   |    | 25.53 | 9.90                    | 57.26                 | 35.43 | 65.99 | 55.99           | -8.73  | -20.56         | P   |     |         |
| 2   | 0.3020       | 35.64                   |    | 31.00 | 9.90                    | 45.54                 | 40.90 | 60.19 | 50.19           | -14.65 | -9.29          | P   |     |         |
| 3   | 0.6340       | 27.91                   |    | 13.00 | 9.90                    | 37.81                 | 22.90 | 56.00 | 46.00           | -18.19 | -23.10         | P   |     |         |
| 4   | 1.2020       | 27.75                   |    | 9.53  | 9.90                    | 37.65                 | 19.43 | 56.00 | 46.00           | -18.35 | -26.57         | P   |     |         |
| 5   | 4.5220       | 30.92                   |    | 20.07 | 9.90                    | 40.82                 | 29.97 | 56.00 | 46.00           | -15.18 | -16.03         | P   |     |         |
| 6   | 17.0419      | 24.25                   |    | 12.38 | 10.10                   | 34.35                 | 22.48 | 60.00 | 50.00           | -25.65 | -27.52         | P   |     |         |

Neutral line:  
80.0 dBuV



| No. | Freq.<br>MHz | Reading_Level<br>(dBuV) |    |       | Correct<br>Factor<br>dB | Measurement<br>(dBuV) |       |       | Limit<br>(dBuV) |        | Margin<br>(dB) |     | P/F | Comment |
|-----|--------------|-------------------------|----|-------|-------------------------|-----------------------|-------|-------|-----------------|--------|----------------|-----|-----|---------|
|     |              | Peak                    | QP | AVG   |                         | peak                  | QP    | AVG   | QP              | AVG    | QP             | AVG |     |         |
| 1   | 0.1539       | 47.25                   |    | 28.17 | 9.90                    | 57.15                 | 38.07 | 65.78 | 55.78           | -8.63  | -17.71         | P   |     |         |
| 2   | 0.3020       | 34.60                   |    | 31.77 | 9.90                    | 44.50                 | 41.67 | 60.19 | 50.19           | -15.69 | -8.52          | P   |     |         |
| 3   | 0.6300       | 26.34                   |    | 12.35 | 9.90                    | 36.24                 | 22.25 | 56.00 | 46.00           | -19.76 | -23.75         | P   |     |         |
| 4   | 1.2180       | 26.41                   |    | 9.10  | 9.90                    | 36.31                 | 19.00 | 56.00 | 46.00           | -19.69 | -27.00         | P   |     |         |
| 5   | 4.5739       | 30.26                   |    | 17.93 | 9.90                    | 40.16                 | 27.83 | 56.00 | 46.00           | -15.84 | -18.17         | P   |     |         |
| 6   | 19.1820      | 24.64                   |    | 16.08 | 10.32                   | 34.96                 | 26.40 | 60.00 | 50.00           | -25.04 | -23.60         | P   |     |         |

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

## Appendix H) Restricted bands around fundamental frequency /Radiated Spurious Emissions

| Receiver Setup: | Frequency         | Detector   | RBW     | VBW    | Remark     |
|-----------------|-------------------|------------|---------|--------|------------|
|                 | 0.009MHz-0.090MHz | Peak       | 10kHz   | 30kHz  | Peak       |
|                 | 0.009MHz-0.090MHz | Average    | 10kHz   | 30kHz  | Average    |
|                 | 0.090MHz-0.110MHz | Quasi-peak | 10kHz   | 30kHz  | Quasi-peak |
|                 | 0.110MHz-0.490MHz | Peak       | 10kHz   | 30kHz  | Peak       |
|                 | 0.110MHz-0.490MHz | Average    | 10kHz   | 30kHz  | Average    |
|                 | 0.490MHz -30MHz   | Quasi-peak | 10kHz   | 30kHz  | Quasi-peak |
|                 | 30MHz-1GHz        | Quasi-peak | 120 kHz | 300kHz | Quasi-peak |
|                 | Above 1GHz        | Peak       | 1MHz    | 3MHz   | Peak       |
|                 |                   | Peak       | 1MHz    | 10Hz   | Average    |
| Test Procedure: |                   |            |         |        |            |

**Below 1GHz test procedure as below:**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter)..
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
- j. Repeat above procedures until all frequencies measured was complete.

| Limit: | Frequency         | Field strength (microvolt/meter) | Limit (dB $\mu$ V/m) | Remark     | Measurement distance (m) |
|--------|-------------------|----------------------------------|----------------------|------------|--------------------------|
|        | 0.009MHz-0.490MHz | 2400/F(kHz)                      | -                    | -          | 300                      |
|        | 0.490MHz-1.705MHz | 24000/F(kHz)                     | -                    | -          | 30                       |
|        | 1.705MHz-30MHz    | 30                               | -                    | -          | 30                       |
|        | 30MHz-88MHz       | 100                              | 40.0                 | Quasi-peak | 3                        |
|        | 88MHz-216MHz      | 150                              | 43.5                 | Quasi-peak | 3                        |
|        | 216MHz-960MHz     | 200                              | 46.0                 | Quasi-peak | 3                        |
|        | 960MHz-1GHz       | 500                              | 54.0                 | Quasi-peak | 3                        |
|        | Above 1GHz        | 500                              | 54.0                 | Average    | 3                        |

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.



### Radiated Spurious Emissions test Data:

All the modes of operation (X, Y, Z) were investigated and the worst-case emissions are reported.

#### A. Below 30MHz:

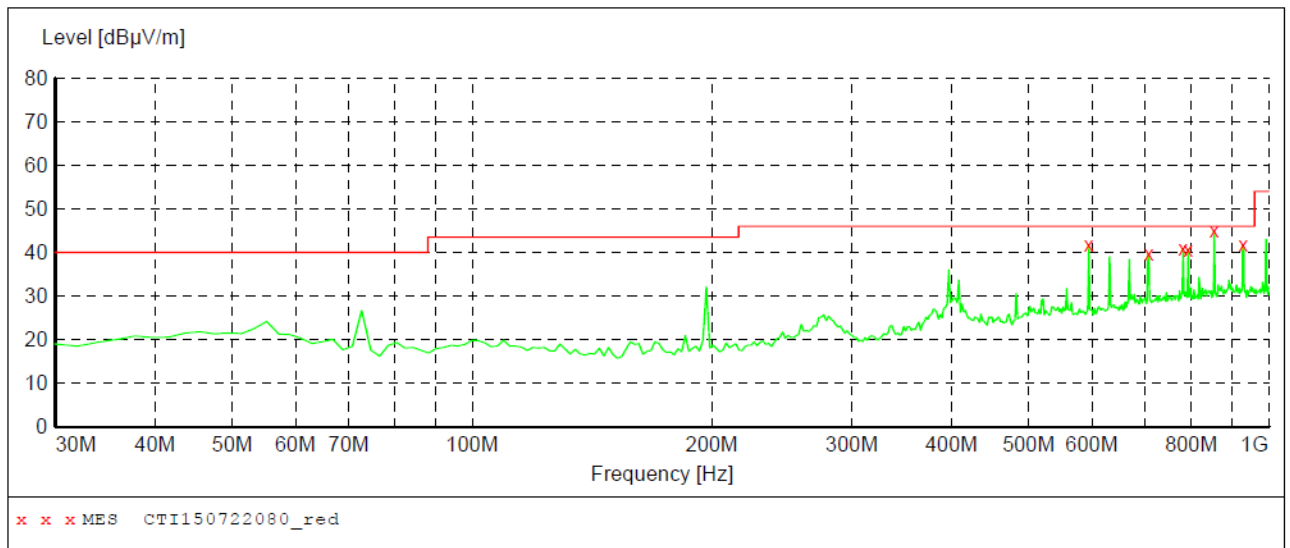
No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

#### B. 30MHz ~ 1GHz:

The test data of low channel, middle channel and high channel are almost same in frequency bands 30MHz to 1GHz, and the data of IEEE 802.11b are chosen as representative in below:

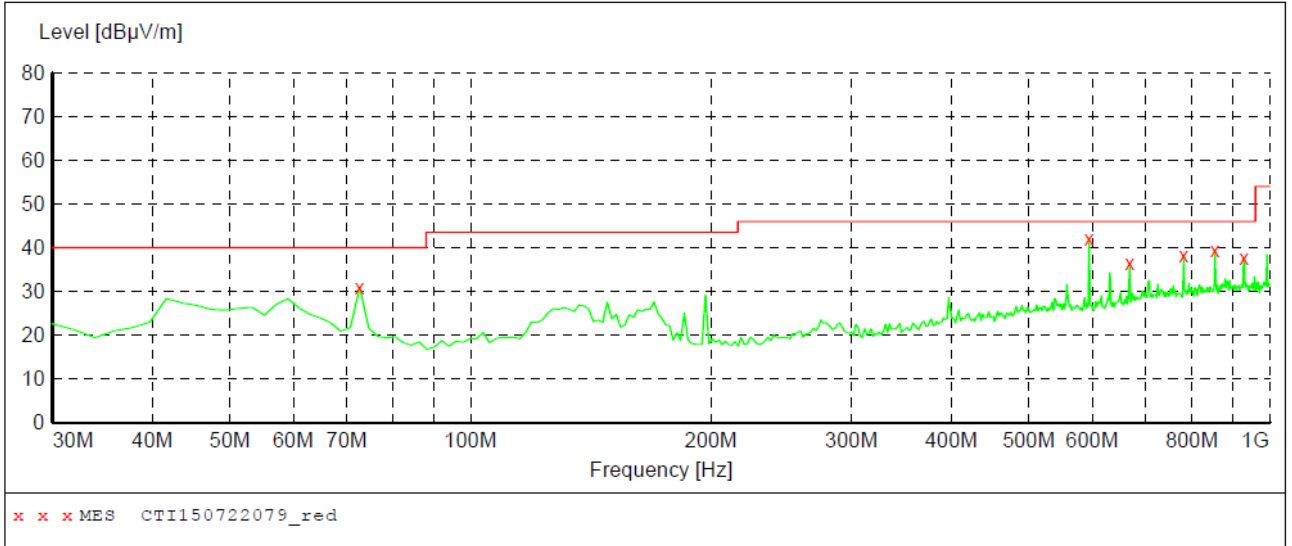
The all low channel, middle channel and high channel are tested, the worst-case IEEE 802.11b is reported.

H:



| Frequency<br>MHz | Level<br>dBµV/m | Transd<br>dB | Limit<br>dBµV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 594.540000       | 41.70           | 22.3         | 46.0            | 4.3          | ---  | 100.0        | 187.00         | HORIZONTAL   |
| 707.060000       | 39.70           | 24.7         | 46.0            | 6.3          | ---  | 100.0        | 347.00         | HORIZONTAL   |
| 780.780000       | 40.80           | 25.3         | 46.0            | 5.2          | ---  | 100.0        | 347.00         | HORIZONTAL   |
| 792.420000       | 40.70           | 25.4         | 46.0            | 5.3          | ---  | 100.0        | 18.00          | HORIZONTAL   |
| 854.500000       | 44.90           | 26.1         | 46.0            | 1.1          | ---  | 100.0        | 107.00         | HORIZONTAL   |
| 928.220000       | 41.80           | 26.7         | 46.0            | 4.2          | ---  | 100.0        | 29.00          | HORIZONTAL   |

V:



| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---------------|--------------|-----------|--------------|-----------|------|-----------|-------------|--------------|
| 72.680000     | 30.90        | 11.4      | 40.0         | 9.1       | ---  | 100.0     | 318.00      | VERTICAL     |
| 594.540000    | 42.20        | 22.3      | 46.0         | 3.8       | ---  | 100.0     | 261.00      | VERTICAL     |
| 668.260000    | 36.50        | 23.7      | 46.0         | 9.5       | ---  | 100.0     | 341.00      | VERTICAL     |
| 780.780000    | 38.10        | 25.3      | 46.0         | 7.9       | ---  | 100.0     | 208.00      | VERTICAL     |
| 854.500000    | 39.30        | 26.1      | 46.0         | 6.7       | ---  | 100.0     | 11.00       | VERTICAL     |
| 928.220000    | 37.70        | 26.7      | 46.0         | 8.3       | ---  | 100.0     | 329.00      | VERTICAL     |

**C. Above 1GHz:**

IEEE 802.11b, 11Mbps:

| Frequency (MHz)          | Measurement (dBuV/m) | Limit (dBuV/m) | Detector Type | Antenna (H/V) | Result (P/F) |
|--------------------------|----------------------|----------------|---------------|---------------|--------------|
| Low channel (2412MHz)    |                      |                |               |               |              |
| 2390.0                   | 36.13                | 74             | PK            | H             | P            |
| 2400.0                   | 50.56                | 74             | PK            | H             | P            |
| 4824.0                   | 45.25                | 74             | PK            | H             | P            |
| 2390.0                   | 36.55                | 74             | PK            | V             | P            |
| 2400.0                   | 49.94                | 74             | PK            | V             | P            |
| 4824.0                   | 46.18                | 74             | PK            | V             | P            |
| Middle channel (2437MHz) |                      |                |               |               |              |
| 4874.0                   | 45.17                | 74             | PK            | H             | P            |
| 4874.0                   | 45.78                | 74             | PK            | V             | P            |
| High channel (2462MHz)   |                      |                |               |               |              |
| 2483.5                   | 43.74                | 74             | PK            | H             | P            |
| 4924.0                   | 45.17                | 74             | PK            | H             | P            |
| 2483.5                   | 45.85                | 74             | PK            | V             | P            |
| 4924.0                   | 45.65                | 74             | PK            | V             | P            |

IEEE 802.11g, 6Mbps:

| Frequency (MHz)          | Measurement (dBuV/m) | Limit (dBuV/m) | Detector Type | Antenna (H/V) | Result (P/F) |
|--------------------------|----------------------|----------------|---------------|---------------|--------------|
| Low channel (2412MHz)    |                      |                |               |               |              |
| 2390.0                   | 36.61                | 74             | PK            | H             | P            |
| 2400.0                   | 49.63                | 74             | PK            | H             | P            |
| 4824.0                   | 44.75                | 74             | PK            | H             | P            |
| 2390.0                   | 36.48                | 74             | PK            | V             | P            |
| 2400.0                   | 50.25                | 74             | PK            | V             | P            |
| 4824.0                   | 45.72                | 74             | PK            | V             | P            |
| Middle channel (2437MHz) |                      |                |               |               |              |
| 4874.0                   | 45.75                | 74             | PK            | H             | P            |
| 4874.0                   | 44.85                | 74             | PK            | V             | P            |
| High channel (2462MHz)   |                      |                |               |               |              |
| 2483.5                   | 44.83                | 74             | PK            | H             | P            |
| 4924.0                   | 45.56                | 74             | PK            | H             | P            |
| 2483.5                   | 45.35                | 74             | PK            | V             | P            |
| 4924.0                   | 45.46                | 74             | PK            | V             | P            |

## IEEE 802.11n HT20, 6.5Mbps:

| Frequency (MHz)          | Measurement (dBuV/m) | Limit (dBuV/m) | Detector Type | Antenna (H/V) | Result (P/F) |
|--------------------------|----------------------|----------------|---------------|---------------|--------------|
| Low channel (2412MHz)    |                      |                |               |               |              |
| 2390.0                   | 36.62                | 74             | PK            | H             | P            |
| 2400.0                   | 49.68                | 74             | PK            | H             | P            |
| 4824.0                   | 44.75                | 74             | PK            | H             | P            |
| 2390.0                   | 36.55                | 74             | PK            | V             | P            |
| 2400.0                   | 49.61                | 74             | PK            | V             | P            |
| 4824.0                   | 46.85                | 74             | PK            | V             | P            |
| Middle channel (2437MHz) |                      |                |               |               |              |
| 4874.0                   | 45.71                | 74             | PK            | H             | P            |
| 4874.0                   | 45.45                | 74             | PK            | V             | P            |
| High channel (2462MHz)   |                      |                |               |               |              |
| 2483.5                   | 45.19                | 74             | PK            | H             | P            |
| 4924.0                   | 46.87                | 74             | PK            | H             | P            |
| 2483.5                   | 45.59                | 74             | PK            | V             | P            |
| 4924.0                   | 46.43                | 74             | PK            | V             | P            |

## IEEE 802.11n HT40, 13.5Mbps:

| Frequency (MHz)          | Measurement (dBuV/m) | Limit (dBuV/m) | Detector Type | Antenna (H/V) | Result (P/F) |
|--------------------------|----------------------|----------------|---------------|---------------|--------------|
| Low channel (2422MHz)    |                      |                |               |               |              |
| 2390.0                   | 36.31                | 74             | PK            | H             | P            |
| 2400.0                   | 50.54                | 74             | PK            | H             | P            |
| 4844.0                   | 46.21                | 74             | PK            | H             | P            |
| 2390.0                   | 36.44                | 74             | PK            | V             | P            |
| 2400.0                   | 50.53                | 74             | PK            | V             | P            |
| 4844.0                   | 47.85                | 74             | PK            | V             | P            |
| Middle channel (2437MHz) |                      |                |               |               |              |
| 4874.0                   | 47.75                | 74             | PK            | H             | P            |
| 4874.0                   | 46.71                | 74             | PK            | V             | P            |
| High channel (2452MHz)   |                      |                |               |               |              |
| 2483.5                   | 45.91                | 74             | PK            | H             | P            |
| 4904.0                   | 48.49                | 74             | PK            | H             | P            |
| 2483.5                   | 44.64                | 74             | PK            | V             | P            |
| 4904.0                   | 46.73                | 74             | PK            | V             | P            |



*Note:*

1) Through Pre-scan transmitting mode with all kind of modulation and data rate, find the 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40), and then Only the worst case is recorded in the report.

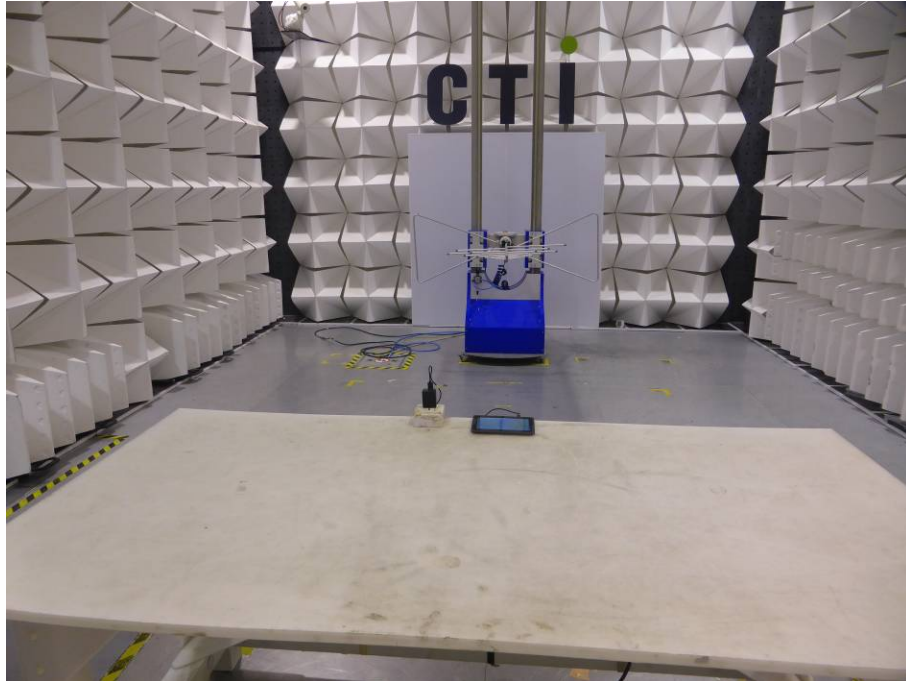
2) *The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:*

*Final Test Level = Receiver Reading - Correct Factor*

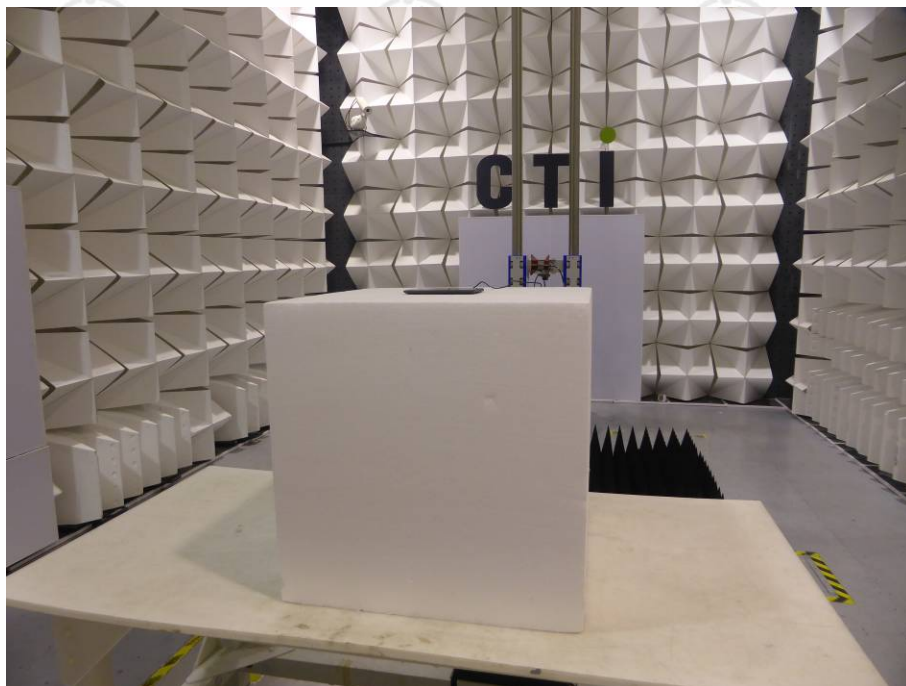
*Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor*

3) *Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.*

### PHOTOGRAPHS OF TEST SETUP



**Radiated spurious emission Test Setup-1(Below 1GHz)**



**Radiated spurious emission Test Setup-2(Above 1GHz)**



**Conducted emission Test Setup**



### PHOTOGRAPHS OF EUT Constructional Details

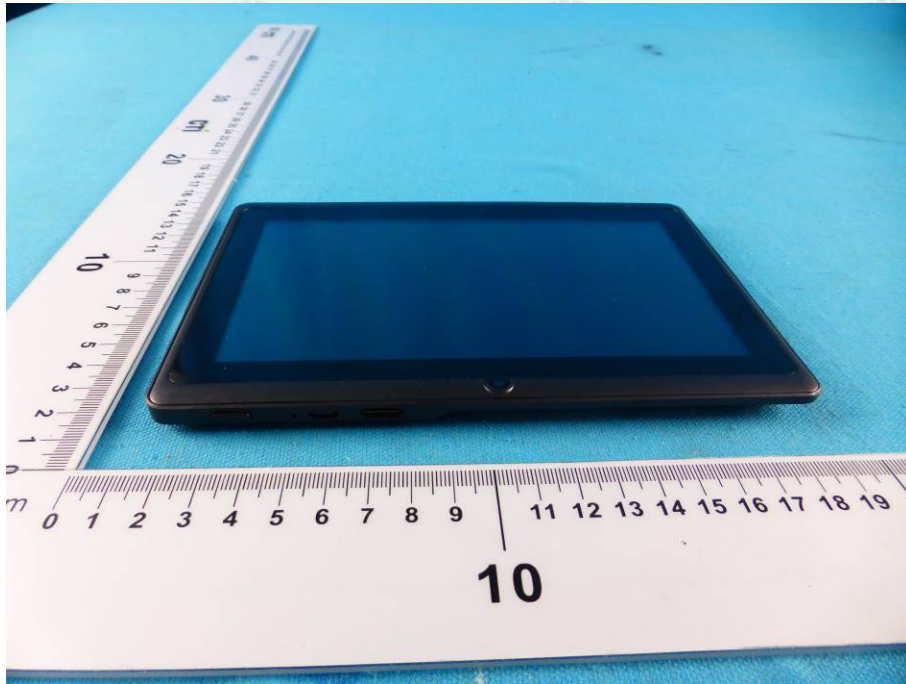


View of General Product-1

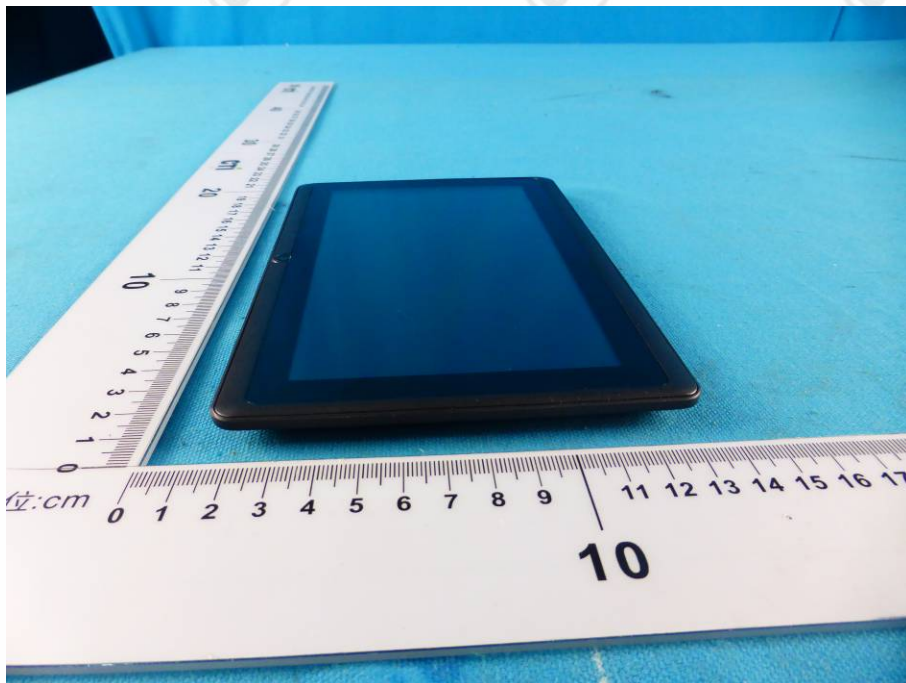


View of External Product-1

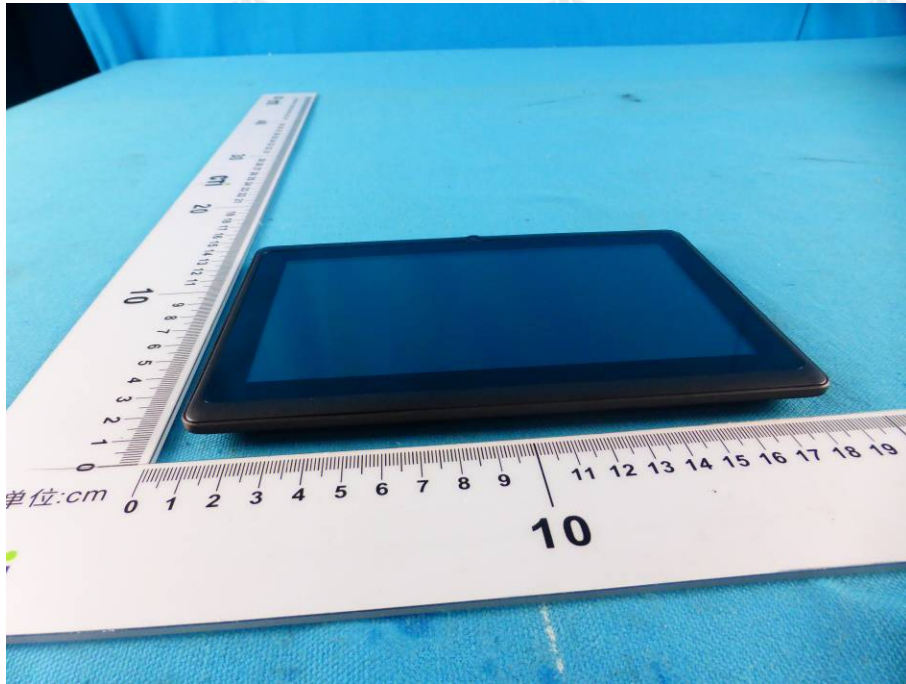




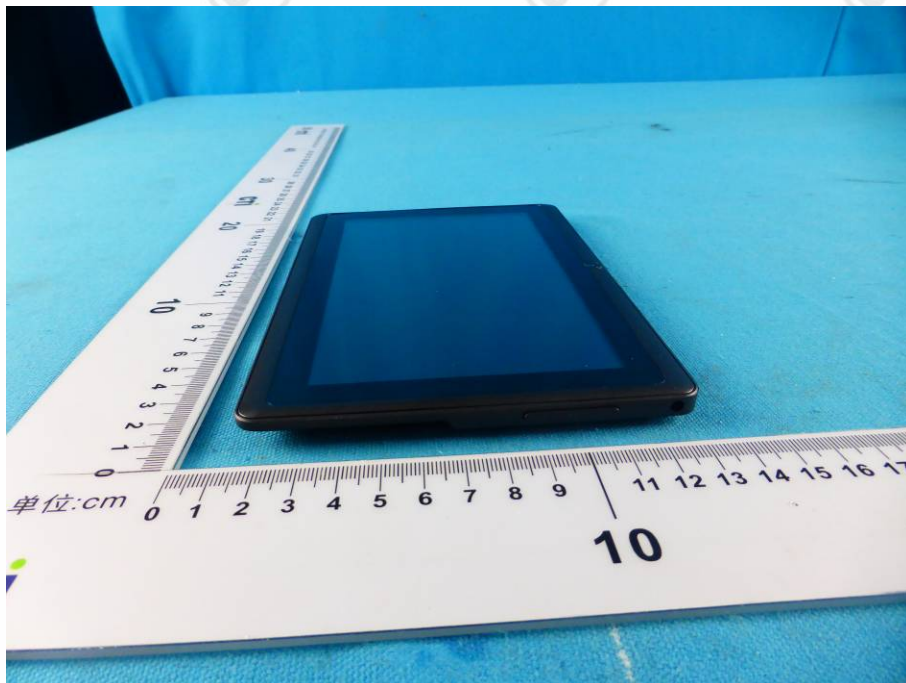
View of External Product-2



View of External Product-3

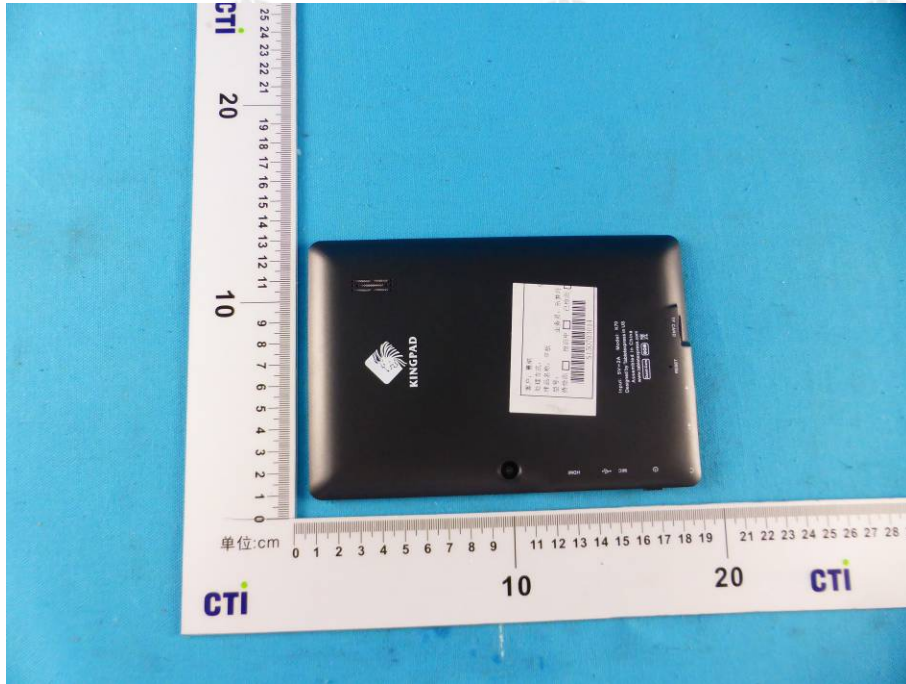


View of External Product-4

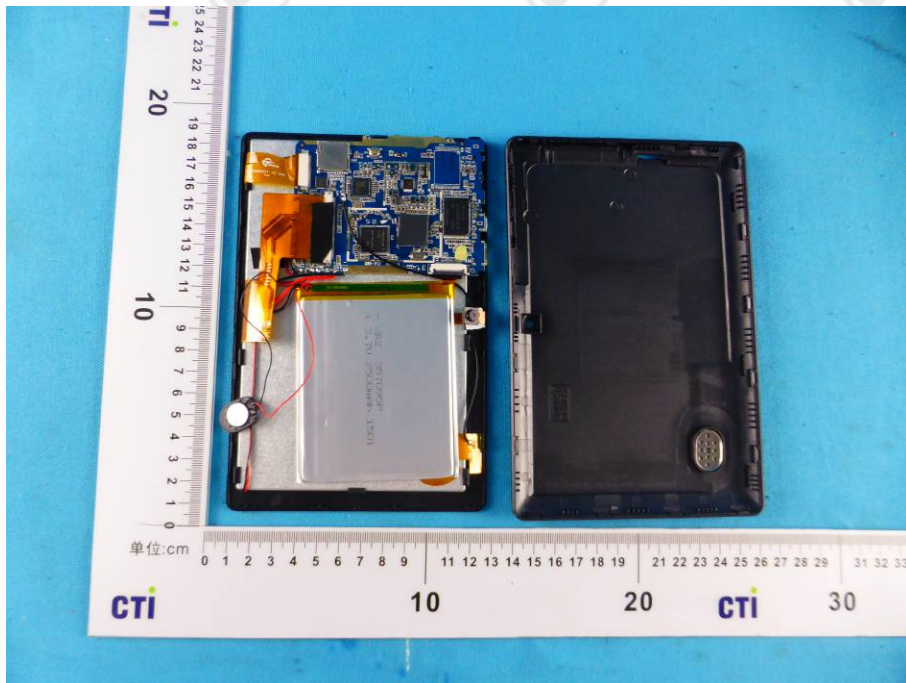


View of External Product-5

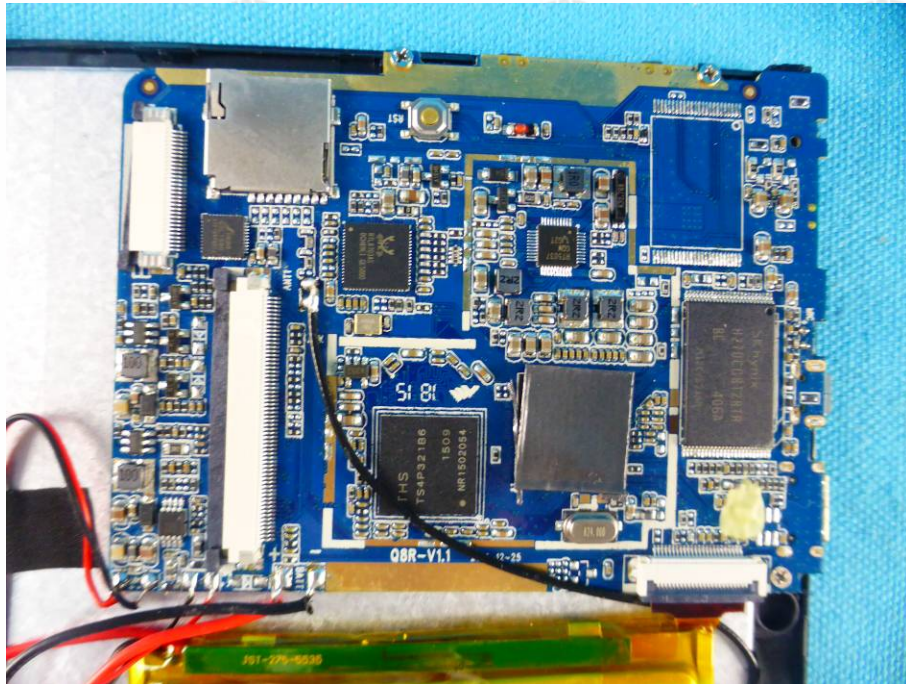




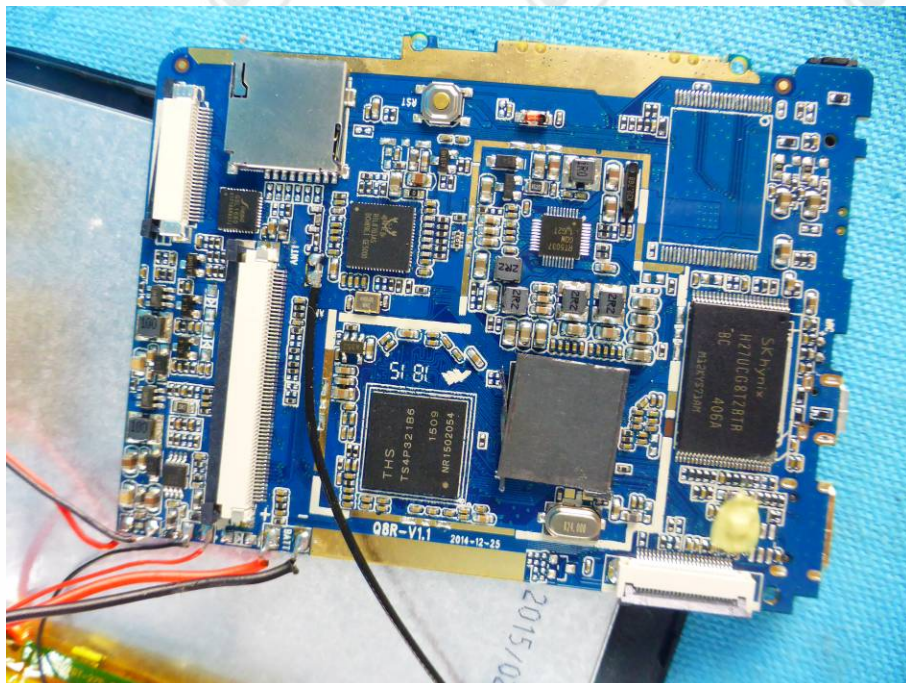
View of External Product-6



View of Internal Product-1



View of Internal Product-2



View of Internal Product-3





View of Internal Product-4



View of Internal Product-5

\*\*\* End of Report \*\*\*

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