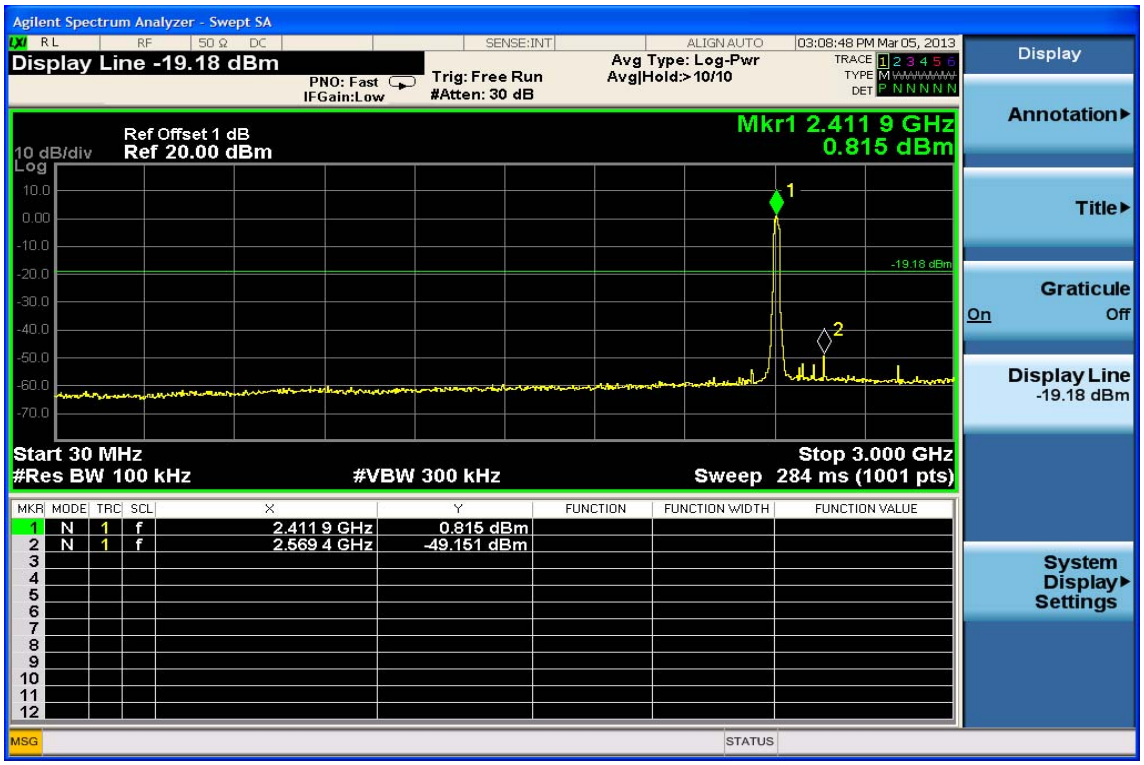
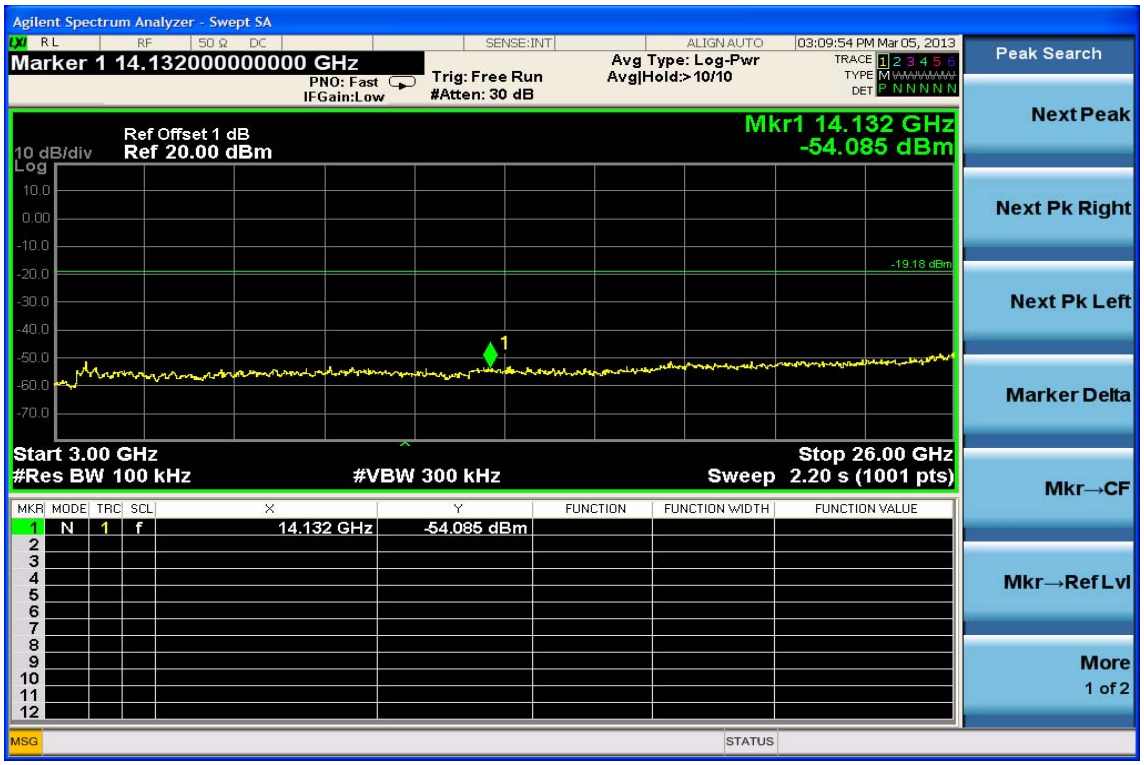
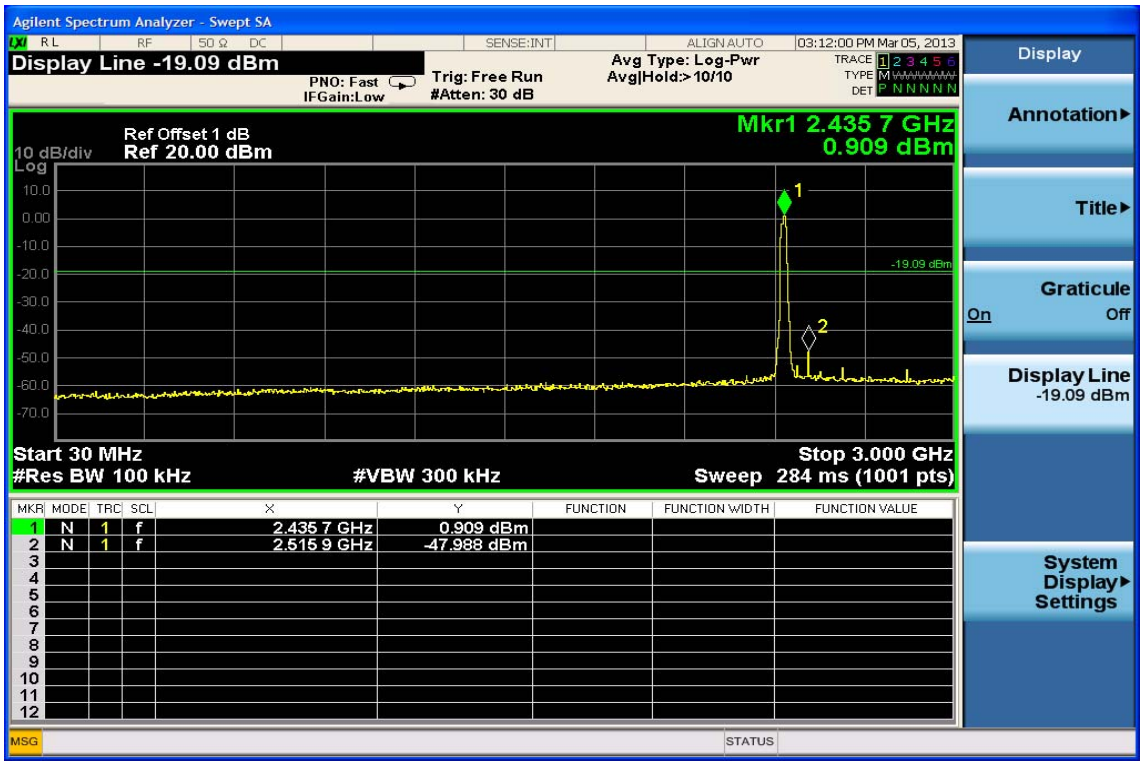
## Conducted Spurious Emission Measurement Result
## 802.11n_20M for 2.4GHz
## Ch Low 30MHz – 3GHz



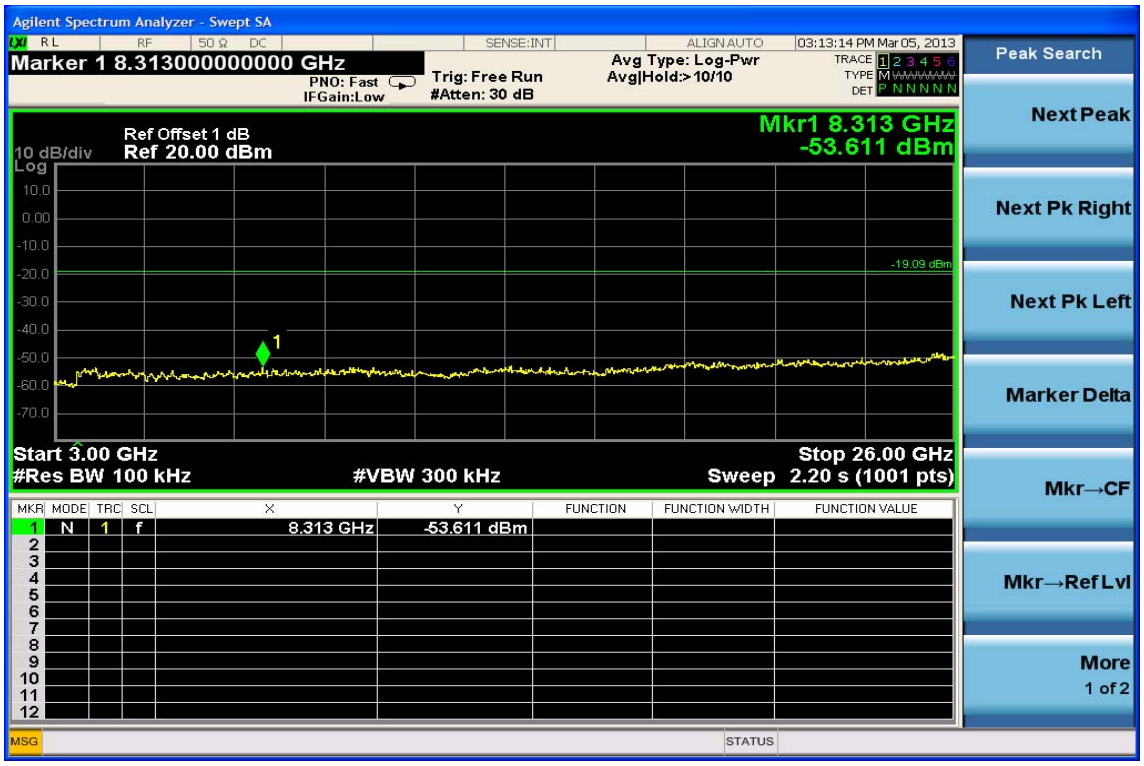

## Ch Low 3GHz – 26.5GHz



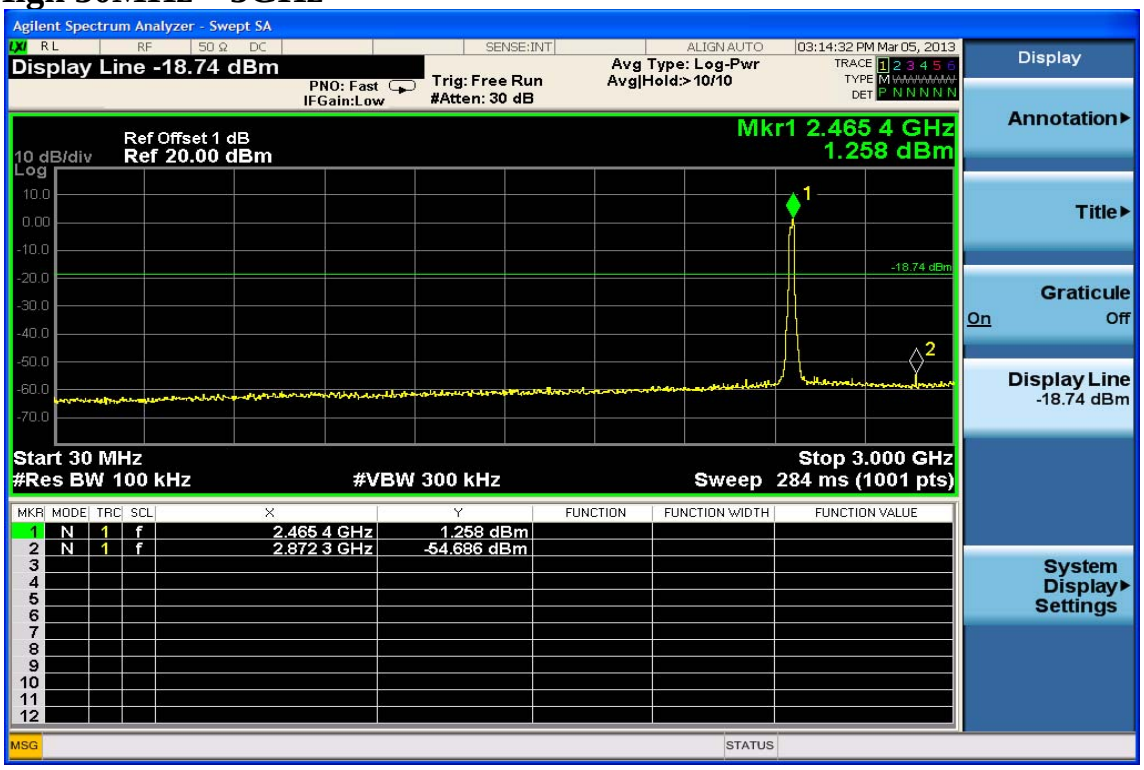
## Ch Mid 30MHz – 3GHz



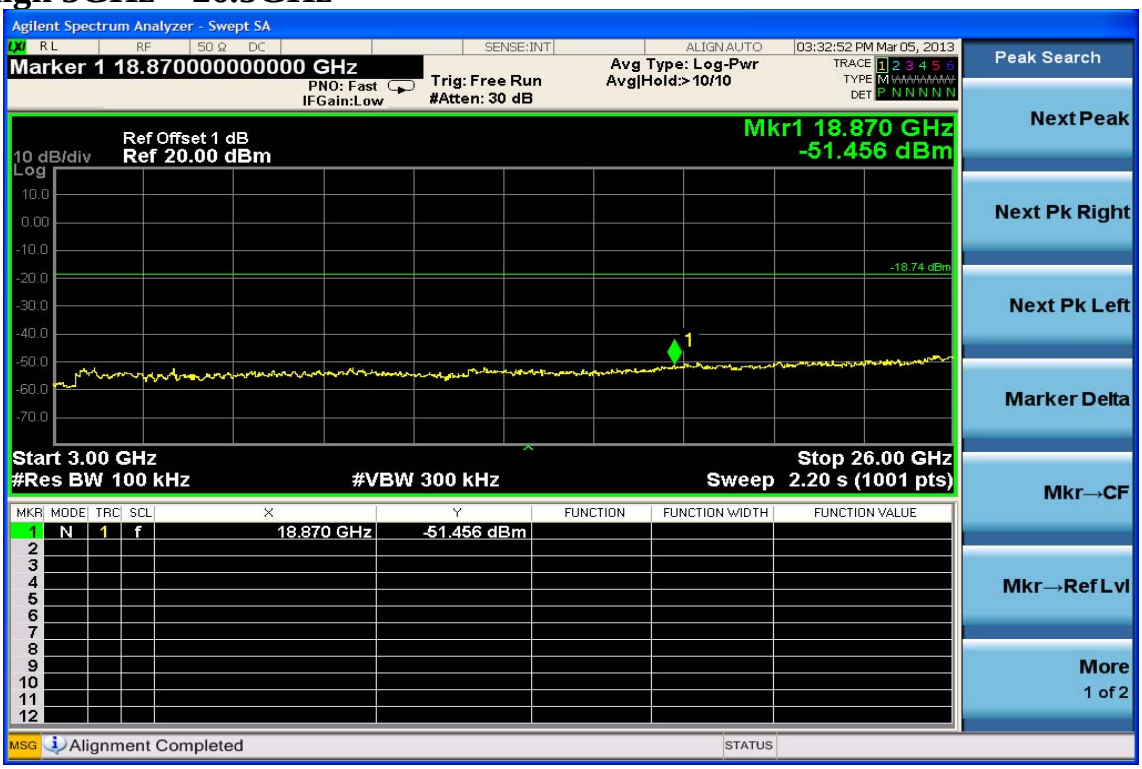

## Ch Mid 3GHz – 26.5GHz



## Ch High 30MHz – 3GHz



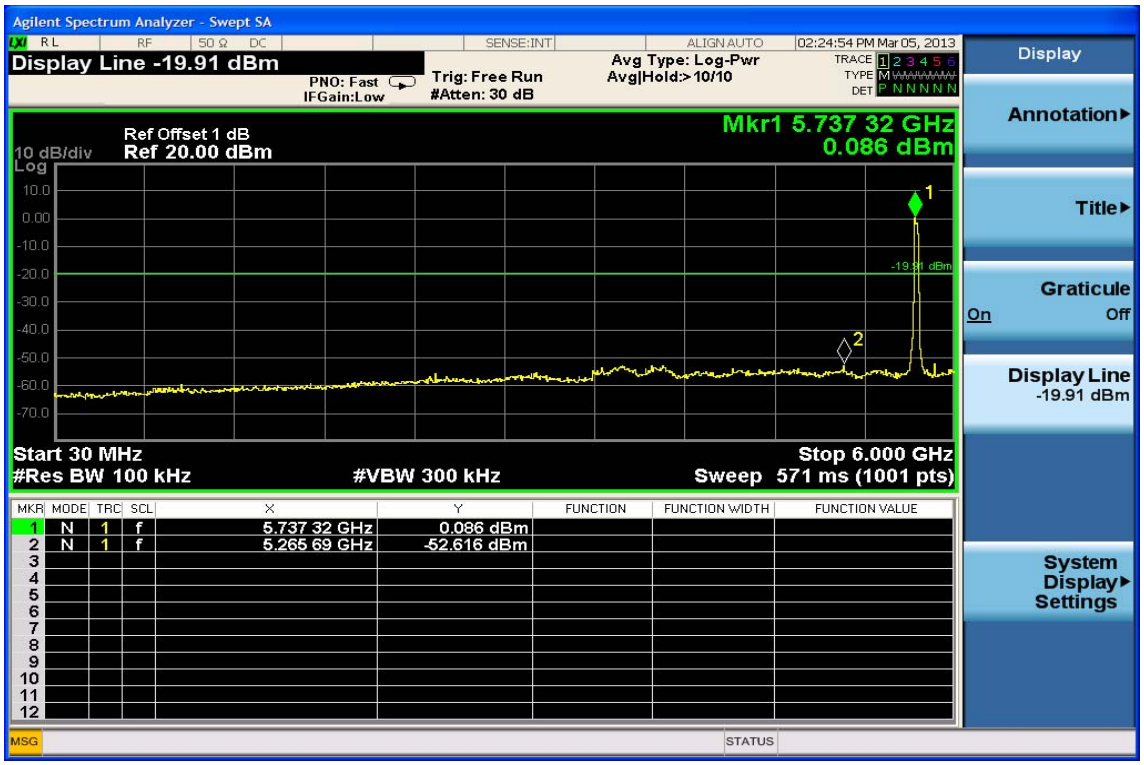

## Ch High 3GHz – 26.5GHz



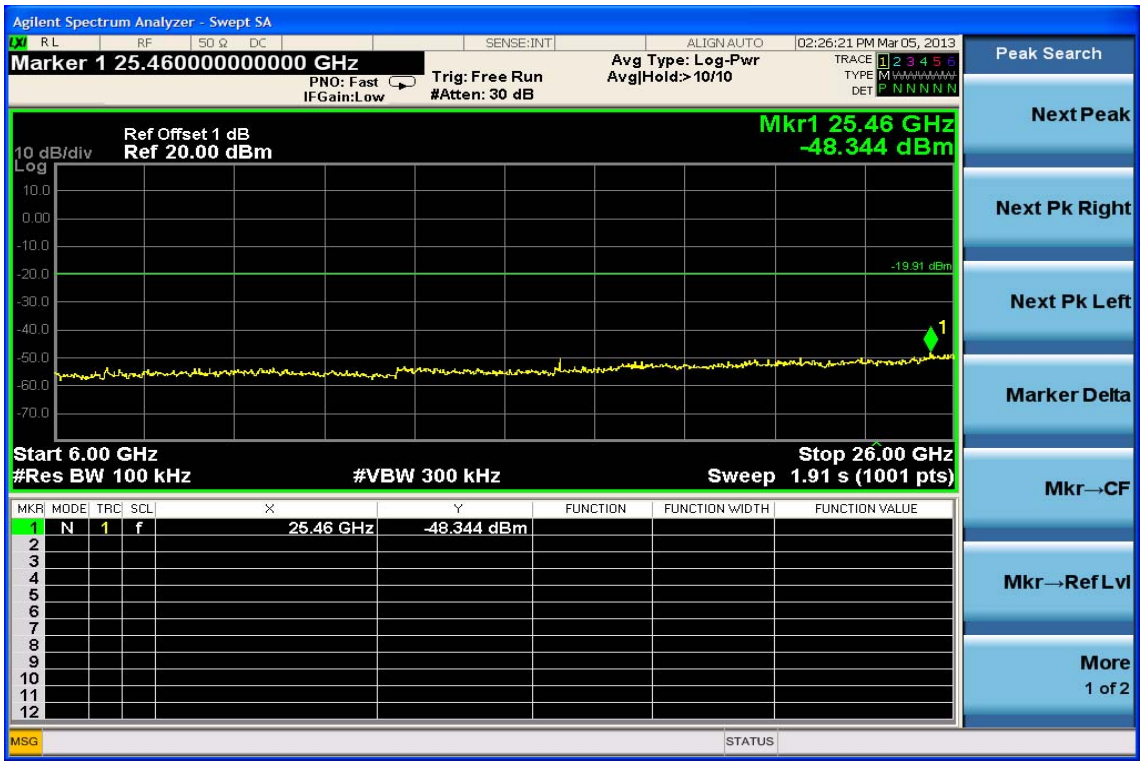
## Conducted Spurious Emission Measurement Result

## 802.11a

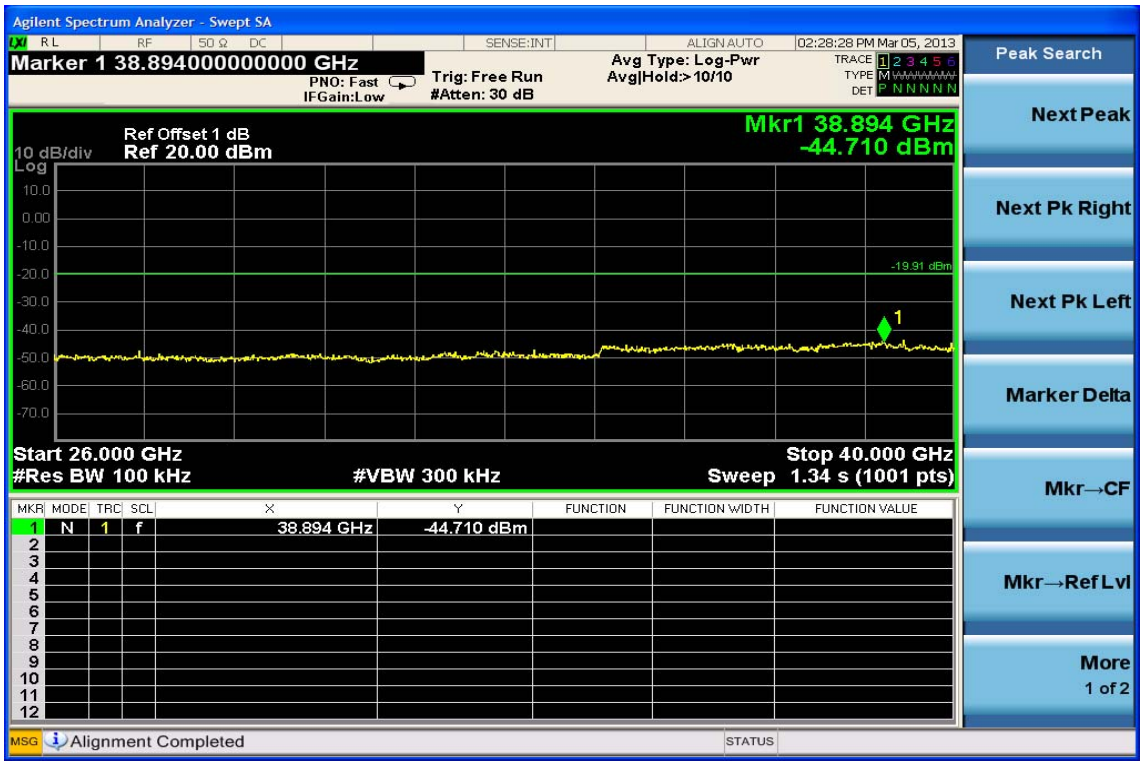
## Ch Low 30MHz – 3GHz



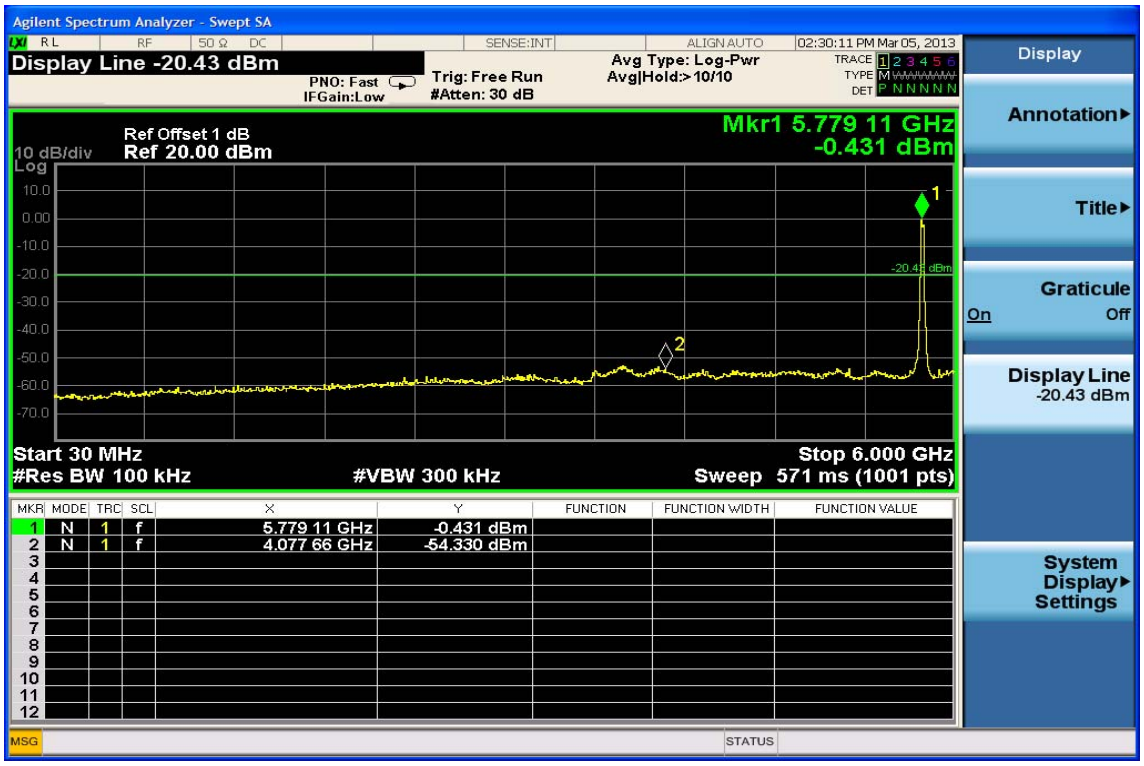

## Ch Low 3GHz – 26GHz



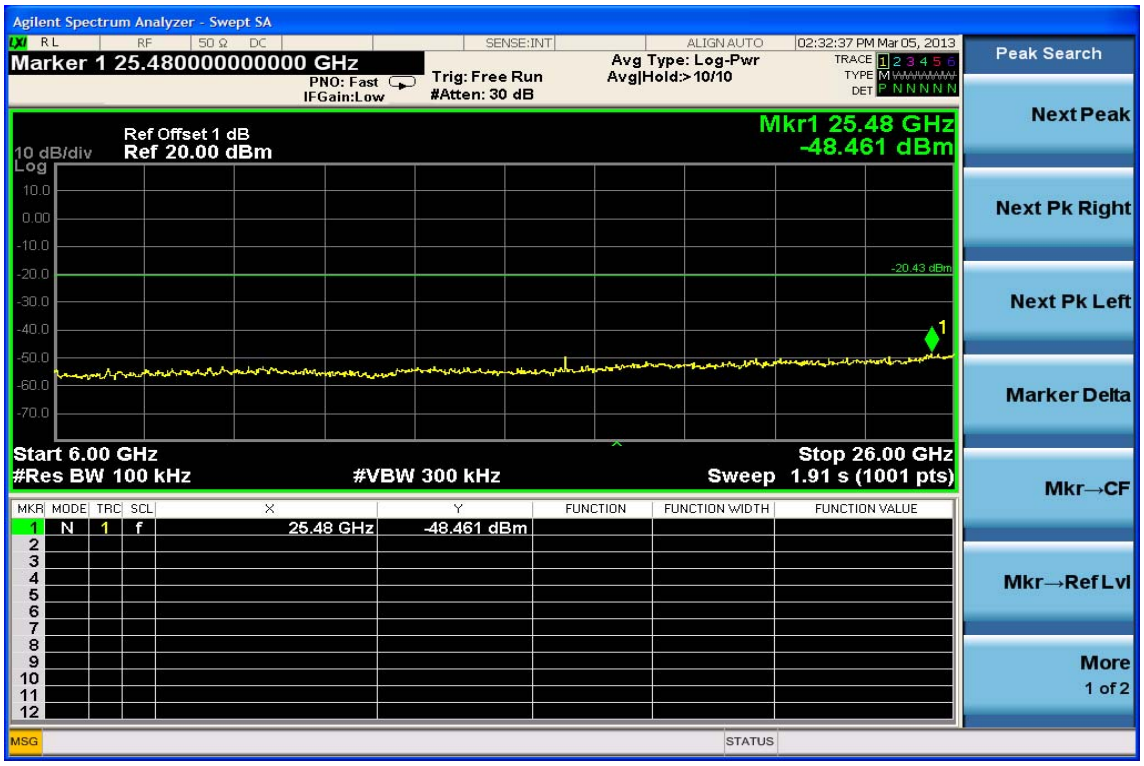
## Ch Low 26GHz – 40GHz



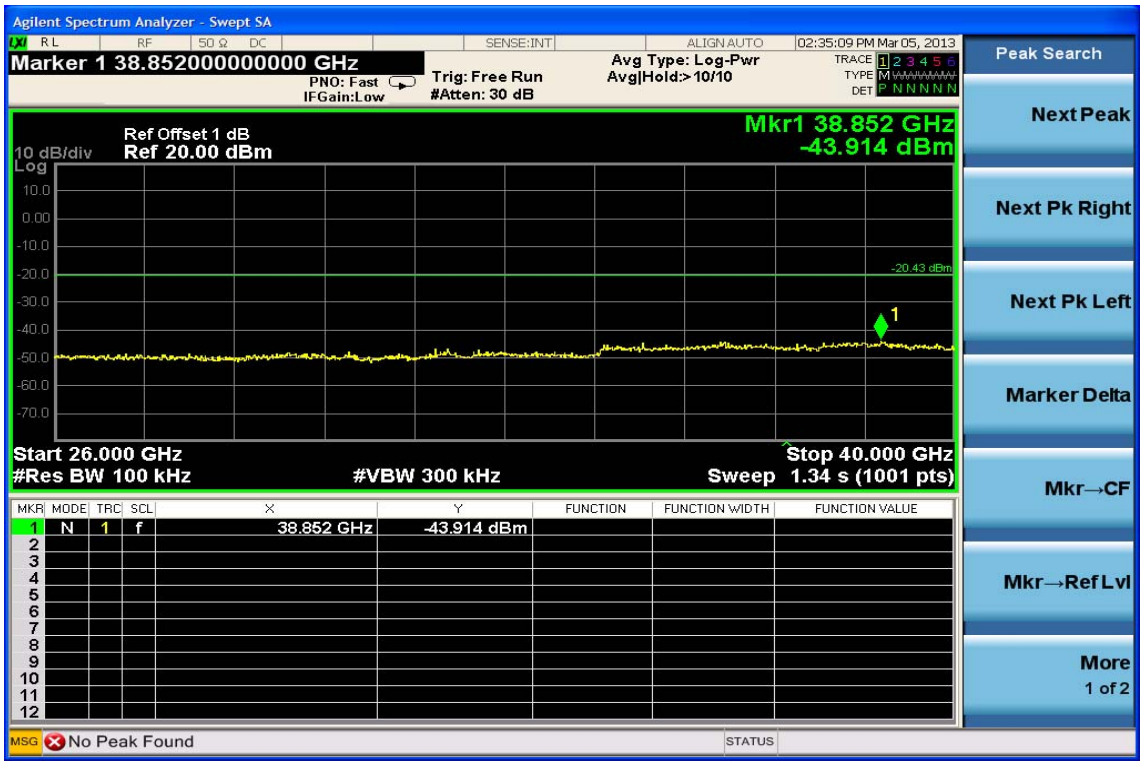
## Ch Mid 30MHz – 3GHz



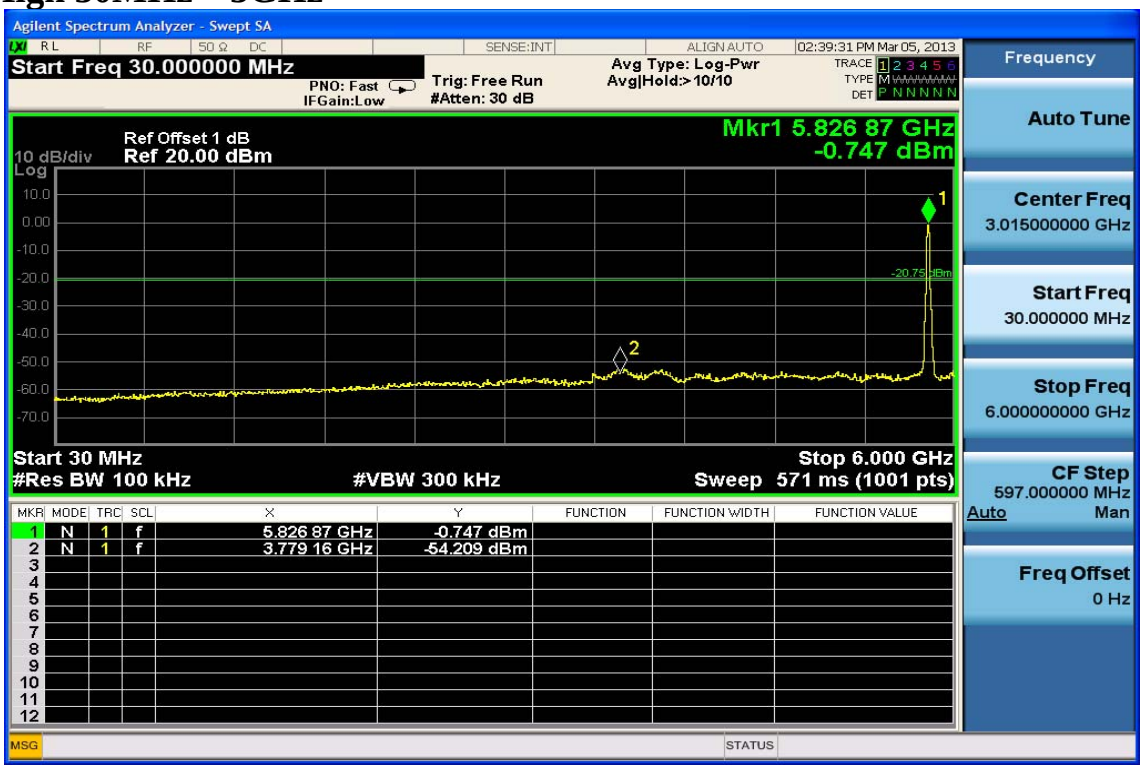

## Ch Mid 3GHz – 26GHz



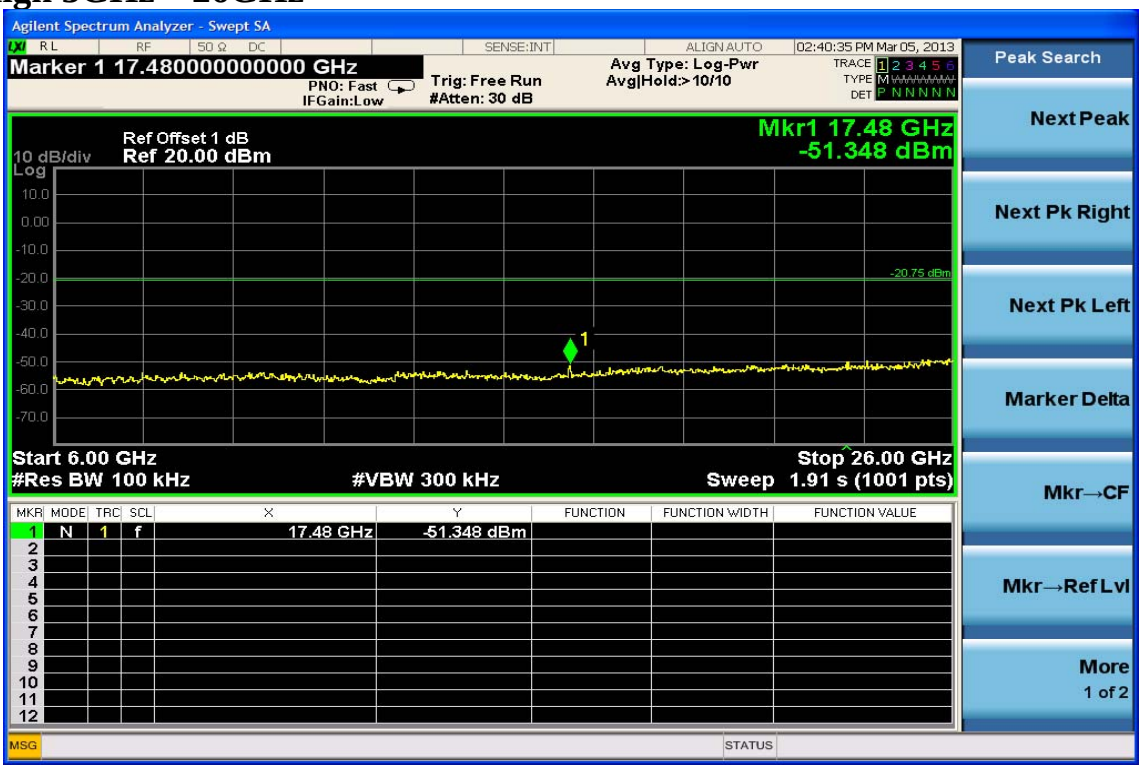
## Ch Mid 26GHz – 40GHz



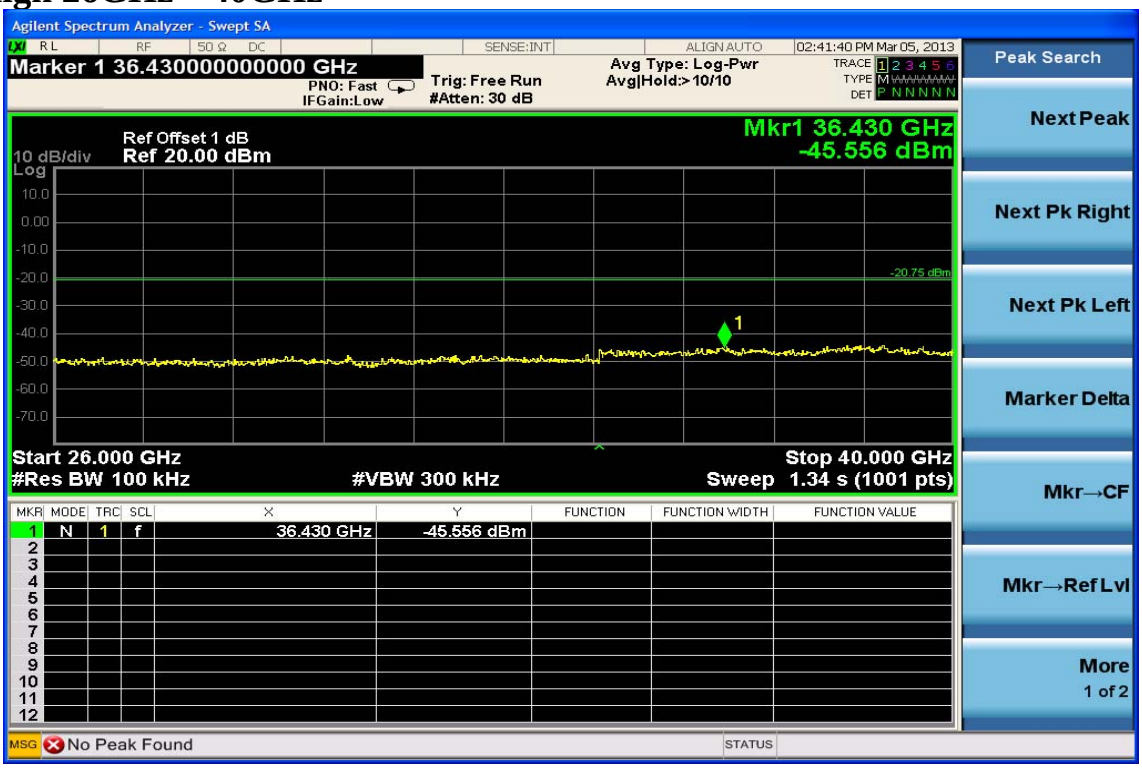
## Ch High 30MHz – 3GHz



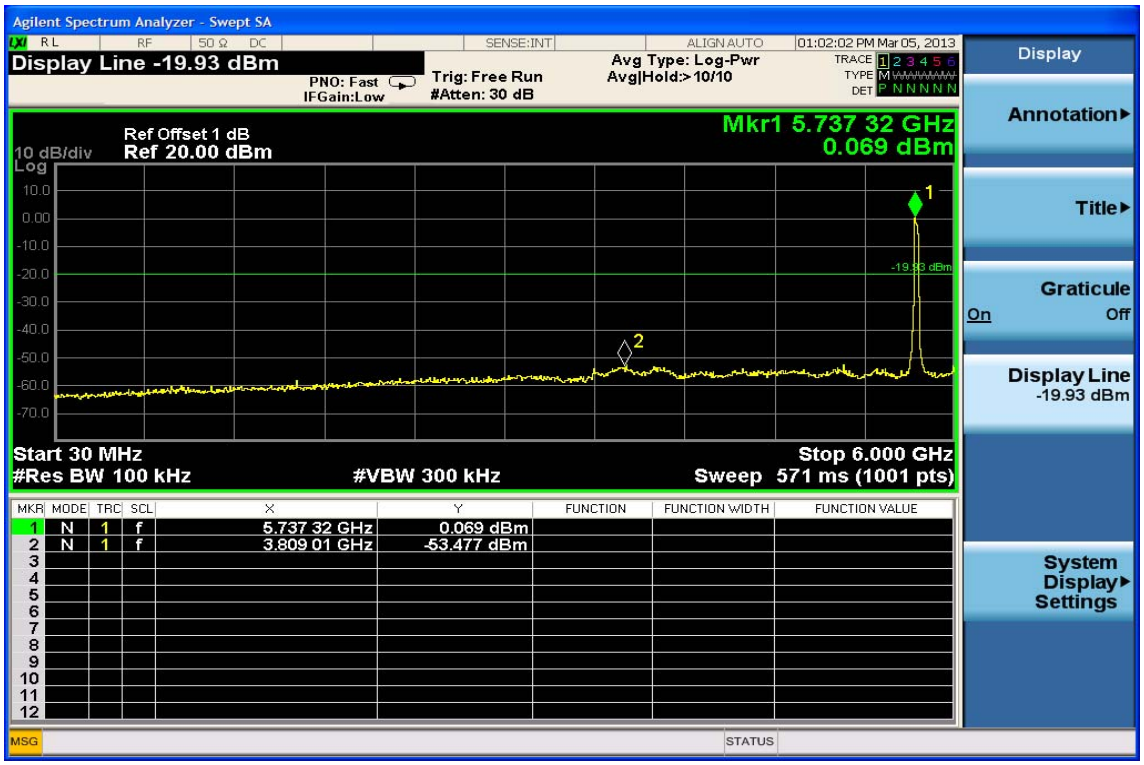

## Ch High 3GHz – 26GHz



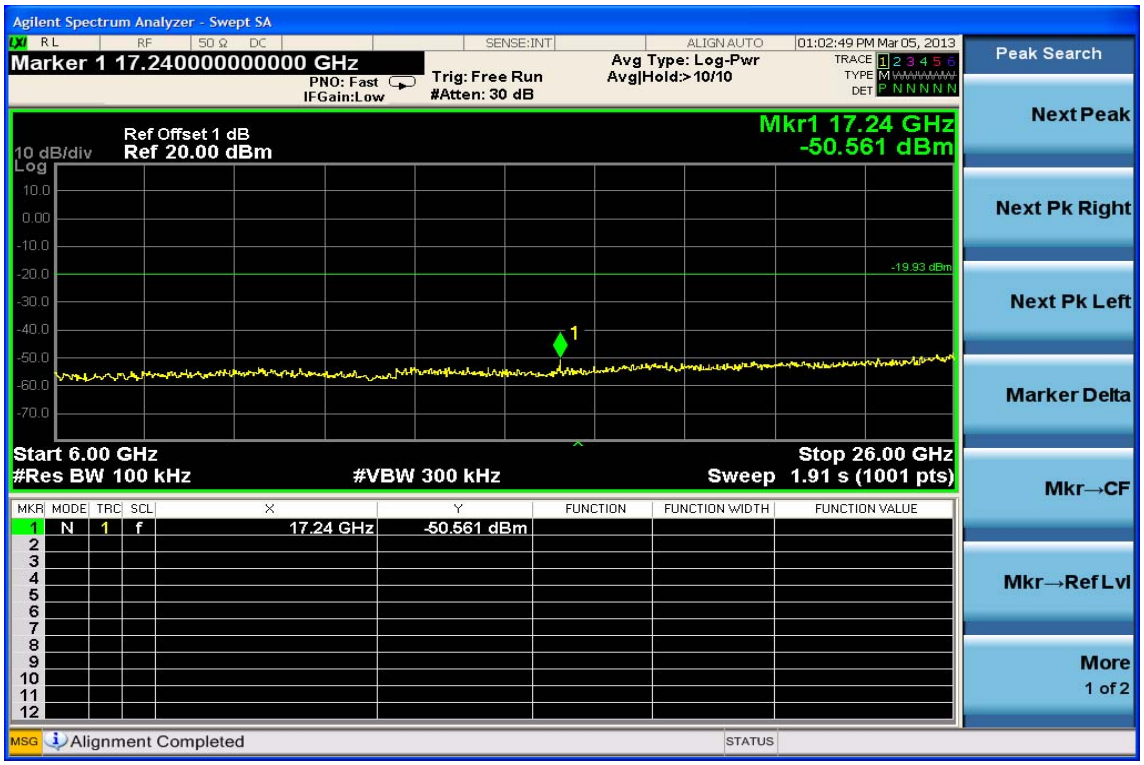
## Ch High 26GHz – 40GHz



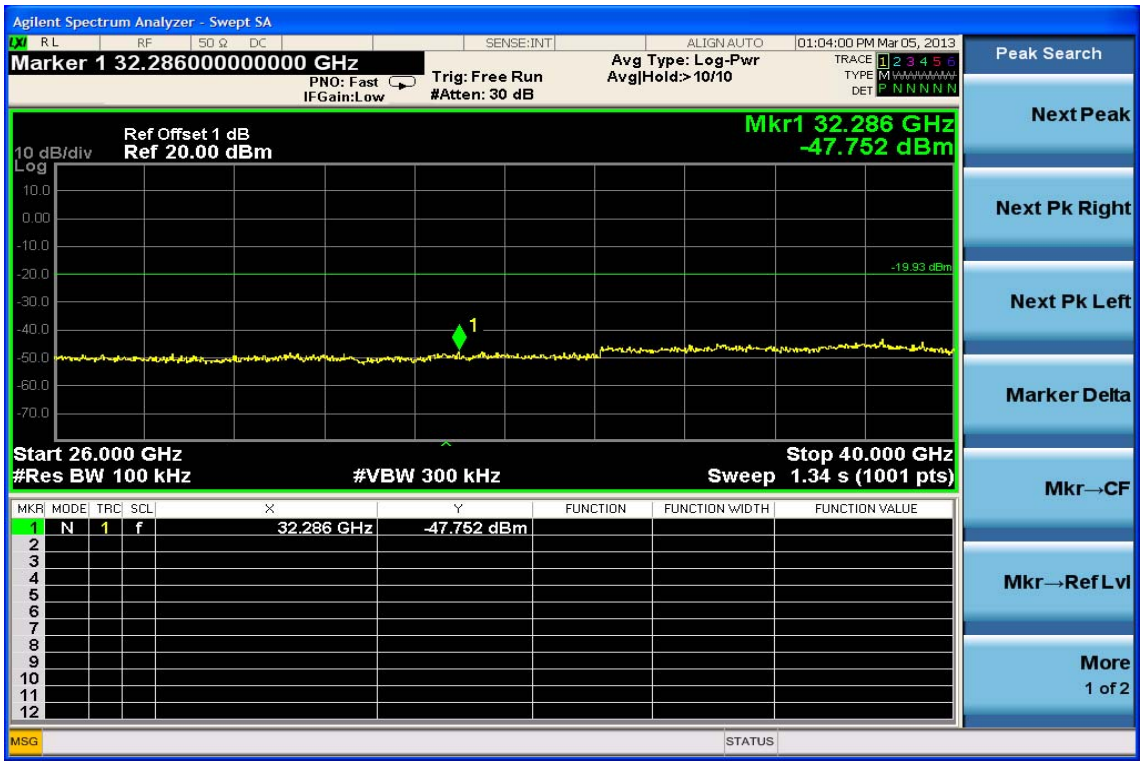
## Conducted Spurious Emission Measurement Result
## 802.11n_20M for 5GHz
## Ch Low 30MHz – 3GHz



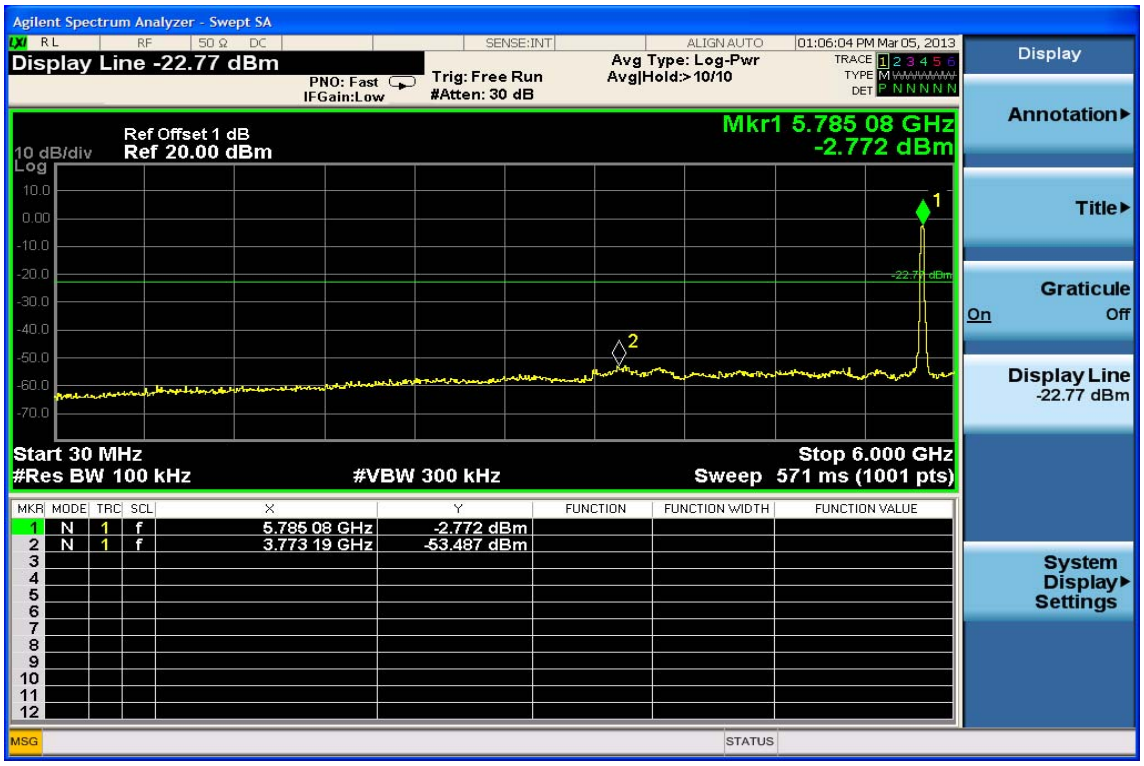

## Ch Low 3GHz – 26GHz



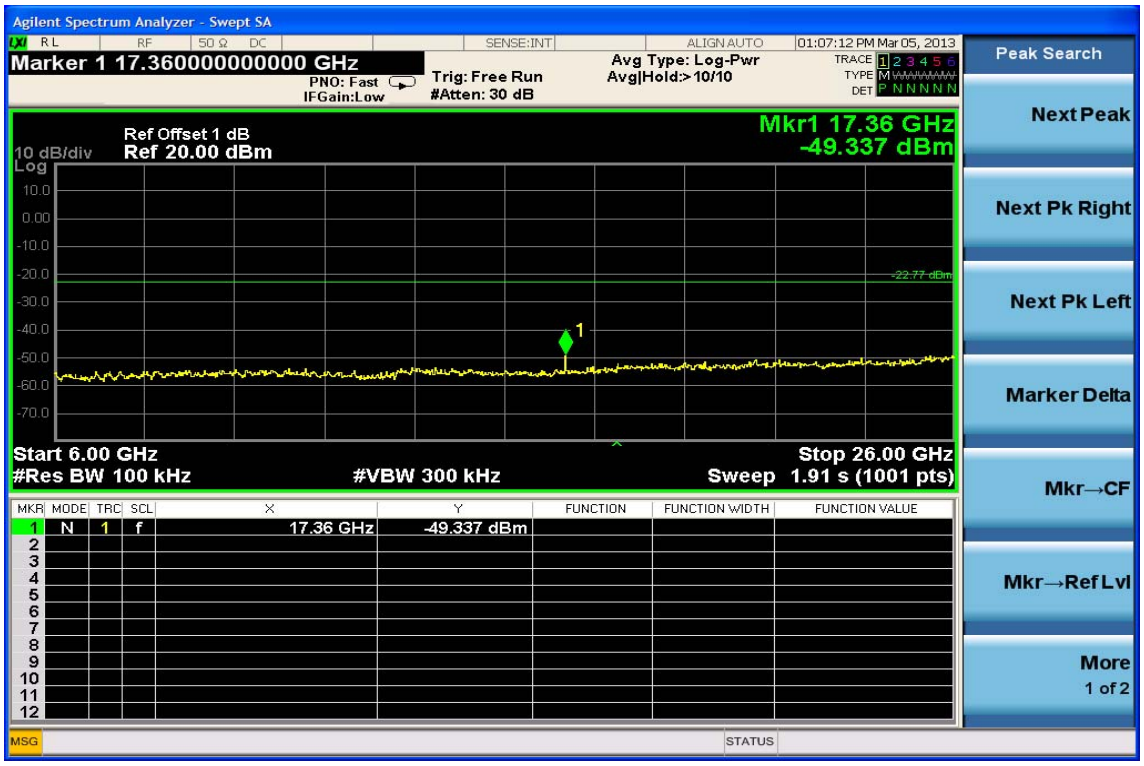
## Ch Low 26GHz – 40GHz



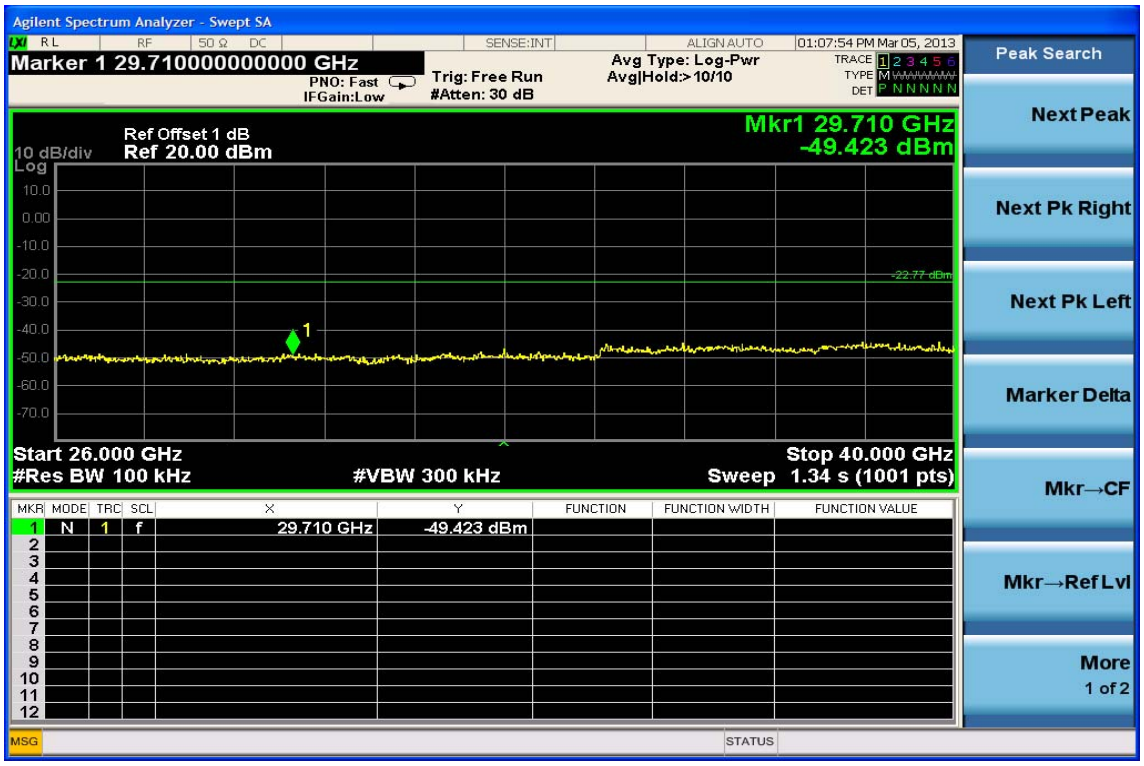
## Ch Mid 30MHz – 3GHz



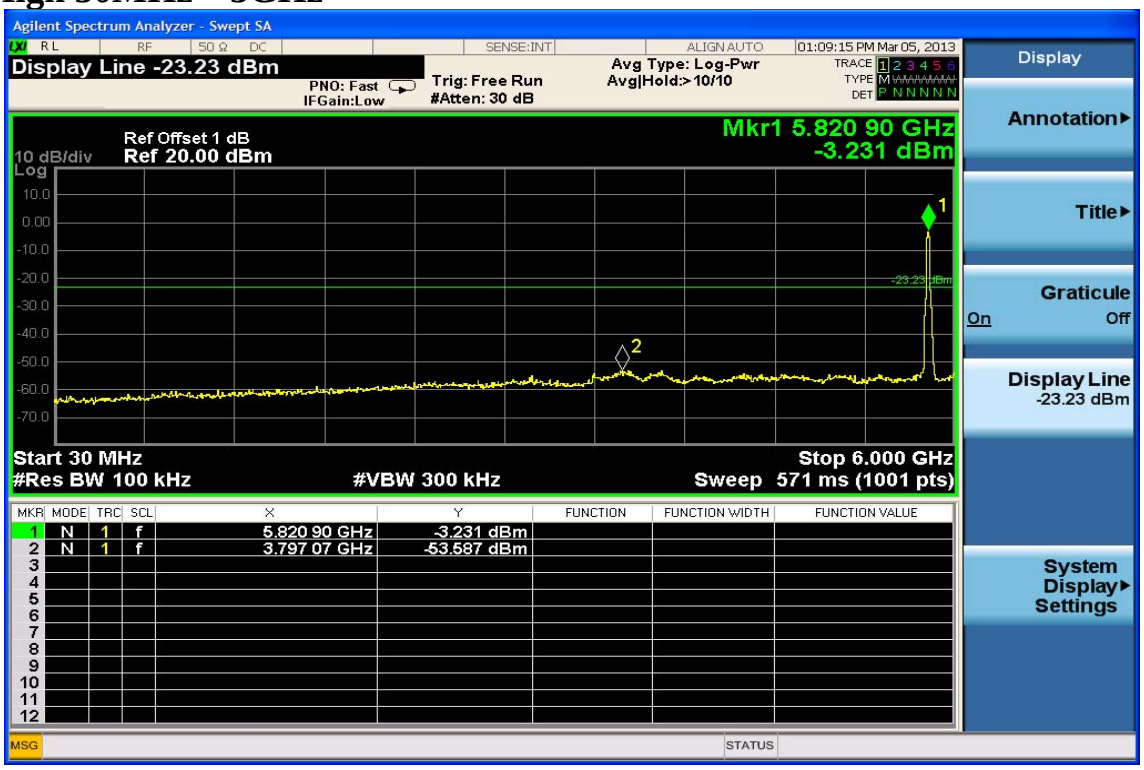

## Ch Mid 3GHz – 26GHz



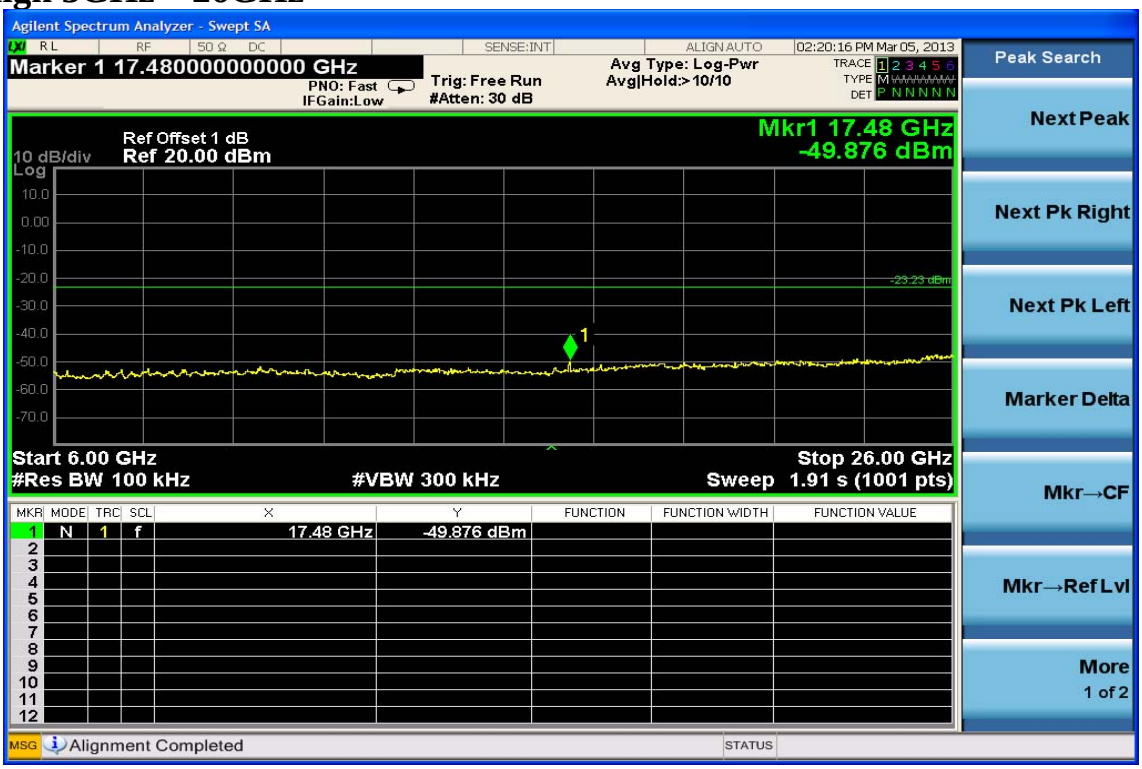
## Ch Mid 26GHz – 40GHz



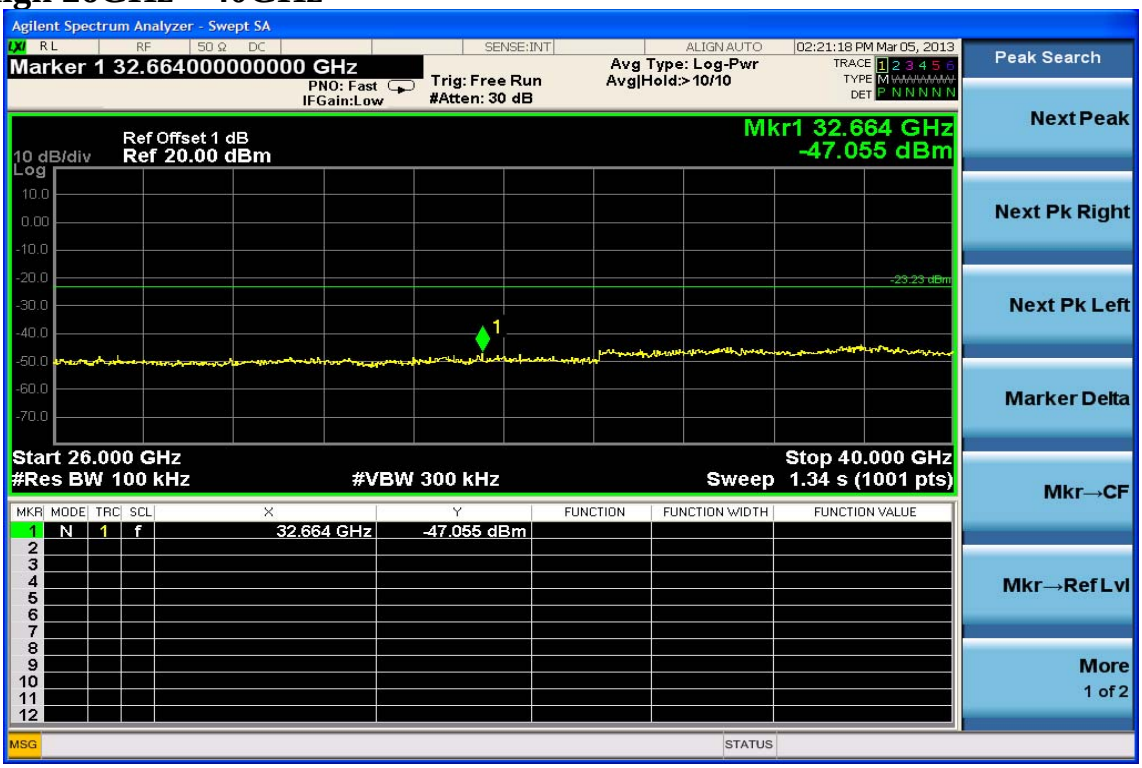
## Ch High 30MHz – 3GHz




## Ch High 3GHz – 26GHz



## Ch High 26GHz – 40GHz



**Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 802.11 g TX CH Low | Test Date | 2013/03/11 |
| Fundamental Frequency | 2412MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 55.22 | 44.47 | -14.36 | 30.11 | 40.00 | -9.89 | Peak | VERTICAL |
| 2 | 78.50 | 49.21 | -18.14 | 31.07 | 40.00 | -8.93 | Peak | VERTICAL |
| 3 | 163.86 | 42.24 | -13.70 | 28.54 | 43.50 | -14.96 | Peak | VERTICAL |
| 4 | 337.49 | 38.09 | -11.71 | 26.38 | 46.00 | -19.62 | Peak | VERTICAL |
| 5 | 600.36 | 39.02 | -6.74 | 32.28 | 46.00 | -13.72 | Peak | VERTICAL |
| 6 | 940.83 | 33.26 | -1.38 | 31.88 | 46.00 | -14.12 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 78.50 | 52.84 | -18.14 | 34.70 | 40.00 | -5.30 | Peak | HORIZONTAL |
| 2 | 165.80 | 41.88 | -13.86 | 28.02 | 43.50 | -15.48 | Peak | HORIZONTAL |
| 3 | 233.70 | 47.67 | -14.77 | 32.90 | 46.00 | -13.10 | Peak | HORIZONTAL |
| 4 | 314.21 | 38.86 | -12.14 | 26.72 | 46.00 | -19.28 | Peak | HORIZONTAL |
| 5 | 418.00 | 34.47 | -10.16 | 24.31 | 46.00 | -21.69 | Peak | HORIZONTAL |
| 6 | 655.65 | 39.37 | -5.90 | 33.47 | 46.00 | -12.53 | Peak | HORIZONTAL |

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

**Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 802.11g TX CH Mid | Test Date | 2013/03/11 |
| Fundamental Frequency | 2437MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 55.22 | 43.52 | -14.36 | 29.16 | 40.00 | -10.84 | Peak | VERTICAL |
| 2 | 78.50 | 49.76 | -18.14 | 31.62 | 40.00 | -8.38 | Peak | VERTICAL |
| 3 | 165.80 | 41.22 | -13.86 | 27.36 | 43.50 | -16.14 | Peak | VERTICAL |
| 4 | 338.46 | 37.65 | -11.69 | 25.96 | 46.00 | -20.04 | Peak | VERTICAL |
| 5 | 600.36 | 39.34 | -6.74 | 32.60 | 46.00 | -13.40 | Peak | VERTICAL |
| 6 | 940.83 | 32.29 | -1.38 | 30.91 | 46.00 | -15.09 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 78.50 | 51.26 | -18.14 | 33.12 | 40.00 | -6.88 | Peak | HORIZONTAL |
| 2 | 166.77 | 41.53 | -13.94 | 27.59 | 43.50 | -15.91 | Peak | HORIZONTAL |
| 3 | 208.48 | 42.75 | -16.15 | 26.60 | 43.50 | -16.90 | Peak | HORIZONTAL |
| 4 | 313.24 | 39.31 | -12.16 | 27.15 | 46.00 | -18.85 | Peak | HORIZONTAL |
| 5 | 418.00 | 35.55 | -10.16 | 25.39 | 46.00 | -20.61 | Peak | HORIZONTAL |
| 6 | 641.10 | 40.23 | -6.11 | 34.12 | 46.00 | -11.88 | Peak | HORIZONTAL |

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
2 Measuring frequencies from the lowest internal frequency to the 1GHz.
3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

**Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 802.11g TX CH High | Test Date | 2013/03/11 |
| Fundamental Frequency | 2462MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 55.22 | 44.35 | -14.36 | 29.99 | 40.00 | -10.01 | Peak | VERTICAL |
| 2 | 78.50 | 53.04 | -18.14 | 34.90 | 40.00 | -5.10 | Peak | VERTICAL |
| 3 | 163.86 | 42.60 | -13.70 | 28.90 | 43.50 | -14.60 | Peak | VERTICAL |
| 4 | 335.55 | 37.22 | -11.73 | 25.49 | 46.00 | -20.51 | Peak | VERTICAL |
| 5 | 600.36 | 37.13 | -6.74 | 30.39 | 46.00 | -15.61 | Peak | VERTICAL |
| 6 | 940.83 | 32.17 | -1.38 | 30.79 | 46.00 | -15.21 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 77.53 | 51.65 | -17.89 | 33.76 | 40.00 | -6.24 | Peak | HORIZONTAL |
| 2 | 161.92 | 41.78 | -13.53 | 28.25 | 43.50 | -15.25 | Peak | HORIZONTAL |
| 3 | 310.33 | 39.96 | -12.23 | 27.73 | 46.00 | -18.27 | Peak | HORIZONTAL |
| 4 | 418.00 | 34.65 | -10.16 | 24.49 | 46.00 | -21.51 | Peak | HORIZONTAL |
| 5 | 641.10 | 37.87 | -6.11 | 31.76 | 46.00 | -14.24 | Peak | HORIZONTAL |
| 6 | 940.83 | 29.44 | -1.38 | 28.06 | 46.00 | -17.94 | Peak | HORIZONTAL |

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

**Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 8802.11g TX CH Low | Test Date | 2013/03/11 |
| Fundamental Frequency | 2412MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 1728.00 | 53.02 | -14.02 | 39.00 | 74.00 | -35.00 | Peak | VERTICAL |
| 2 | 4824.00 | 45.68 | -2.26 | 43.42 | 74.00 | -30.58 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 4824.00 | 44.94 | -2.26 | 42.68 | 74.00 | -31.32 | Peak | HORIZONTAL |
| 2 | 4920.00 | 50.92 | -1.94 | 48.98 | 74.00 | -25.02 | Peak | HORIZONTAL |

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 802.11g TX CH Mid | Test Date | 2013/03/11 |
| Fundamental Frequency | 2437MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 4766.00 | 47.72 | -2.45 | 45.27 | 74.00 | -28.73 | Peak | VERTICAL |
| 2 | 4874.00 | 45.15 | -2.09 | 43.06 | 74.00 | -30.94 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 1735.00 | 53.05 | -13.96 | 39.09 | 74.00 | -34.91 | Peak | HORIZONTAL |
| 2 | 4874.00 | 43.90 | -2.09 | 41.81 | 74.00 | -32.19 | Peak | HORIZONTAL |

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)**

| | | | |
|---|---|---|---|
| Operation Mode | 802.11g TX CH High | Test Date | 2013/03/11 |
| Fundamental Frequency | 2462MHz | Test By | Dino |
| Temperature | 25 ℃ | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|---|---|---|---|---|---|---|---|---|
| 1 | 2204.00 | 50.97 | -11.73 | 39.24 | 74.00 | -34.76 | Peak | VERTICAL |
| 2 | 4924.00 | 44.89 | -1.92 | 42.97 | 74.00 | -31.03 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 1735.00 | 54.69 | -13.96 | 40.73 | 74.00 | -33.27 | Peak | HORIZONTAL |
| 2 | 4924.00 | 44.71 | -1.92 | 42.79 | 74.00 | -31.21 | Peak | HORIZONTAL |

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

# 10 Peak Power Spectral Density

## 10.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 8, §A8.2(b) and §A8.3(2), The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0 second duration.

## 10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

## 10.3 Test Set-up:

Refer to section 6.3 for details.

## 10.4 Measurement Procedure:

**Refer to section 9 Measurement Procedure PKPSD:of KDB Document: 558074 D01 DTS Meas Guidance v02**

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (3 kHz/100 kHz = -15.2 dB).
11. The resulting peak PSD level must be ≤ 8 dBm.

## 10.5 Measurement Result:

**802.11b Mode**

| Frequency MHz | Power Density Reading (dBm)/100KHz | BWCF (dB) | Power Density Level (dBm)/3KHz | Maximum Limit (dBm) |
|---|---|---|---|---|
| 2412 | 8.347 | -15.2 | -6.853 | 8 |
| 2437 | 8.225 | -15.2 | -6.975 | 8 |
| 2462 | 8.312 | -15.2 | -6.888 | 8 |

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz)
kHz = -15.2 dB)

**802.11g Mode**

| Frequency MHz | Power Density Reading (dBm)/100KHz | BWCF (dB) | Power Density Level (dBm)/3KHz | Maximum Limit (dBm) |
|---|---|---|---|---|
| 2412 | 2.592 | -15.2 | -12.608 | 8 |
| 2437 | 2.31 | -15.2 | -12.89 | 8 |
| 2462 | 2.288 | -15.2 | -12.912 | 8 |

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz)
kHz = -15.2 dB)

**802.11n HT20 Mode**

| Frequency MHz | Power Density Reading (dBm)/100KHz | BWCF (dB) | Power Density Level (dBm)/3KHz | Maximum Limit (dBm) |
|---|---|---|---|---|
| 2412 | 1.067 | -15.2 | -14.133 | 8 |
| 2437 | 1.465 | -15.2 | -13.735 | 8 |
| 2462 | 1.903 | -15.2 | -13.297 | 8 |

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz)
kHz = -15.2 dB)

**802.11a HT20 Mode**

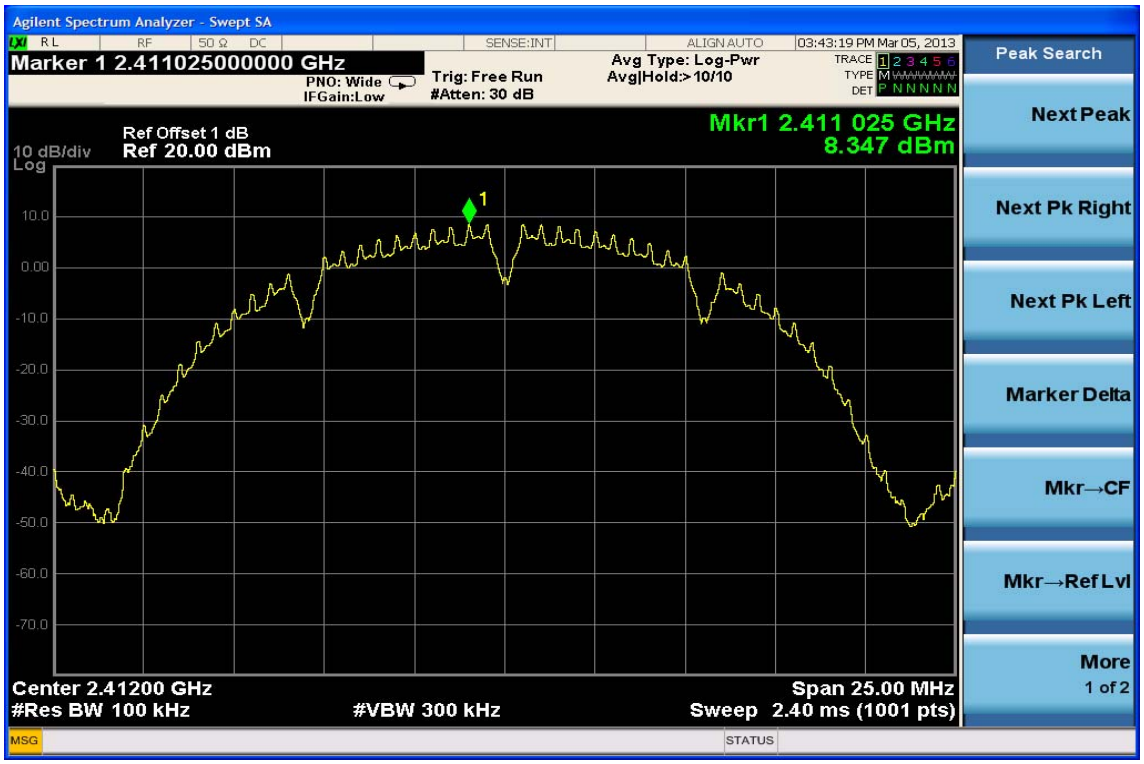
| Frequency MHz | Power Density Reading (dBm)/100KHz | BWCF (dB) | Power Density Level (dBm)/3KHz | Maximum Limit (dBm) |
|---|---|---|---|---|
| 5745 | -0.561 | -15.2 | -15.761 | 8 |
| 5785 | -0.906 | -15.2 | -16.106 | 8 |
| 5825 | -2.872 | -15.2 | -18.072 | 8 |

**802.11a HT20 Mode**

| Frequency MHz | Power Density Reading (dBm)/100KHz | BWCF (dB) | Power Density Level (dBm)/3KHz | Maximum Limit (dBm) |
|---|---|---|---|---|
| 5745 | -2.5 | -15.2 | -17.7 | 8 |
| 5785 | -1.075 | -15.2 | -16.275 | 8 |
| 5825 | -0.301 | -15.2 | -15.501 | 8 |

## 802.11b

## Power Spectral Density Test Plot (CH-Low)




## Power Spectral Density Test Plot (CH-Mid)

## Power Spectral Density Test Plot (CH-High)

## 802.11g

## Power Spectral Density Test Plot (CH-Low)


## Power Spectral Density Test Plot (CH-Mid)

## Power Spectral Density Test Plot (CH-High)

## 802.11n_20M for 2.4GHz
## Power Spectral Density Test Plot (CH-Low)


## Power Spectral Density Test Plot (CH-Mid)

## Power Spectral Density Test Plot (CH-High)

## 802.11a

## Power Spectral Density Test Plot (CH-Low)


## Power Spectral Density Test Plot (CH-Mid)

## Power Spectral Density Test Plot (CH-High)

## 802.11n_20M for 5GHz
## Power Spectral Density Test Plot (CH-Low)


## Power Spectral Density Test Plot (CH-Mid)

## Power Spectral Density Test Plot (CH-High)

# 11 ANTENNA REQUIREMENT

## 11.1 Standard Applicable:

According to §15.203, Antenna 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 shall be considered sufficient to comply with the provisions of this Section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.
When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be ad
ded to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

## 11.2 Antenna Connected Construction:

The directional gins of antenna used for transmitting is -2.07dBi for 2.4G / 0.7dBi for 5G, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

# 12 Maximum Permissible Exposure (MPE)

## 12.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density ($mW/cm^2$) | Averaging Time (minute) |
|---|---|---|---|---|
| Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *($180/f^2$) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | F/1500 | 30 |
| 1500-15000 | / | / | 1.0 | 30 |

F = frequency in MHz

* = Plane-wave equipment power density

## 12.2 Maximum Permissible Exposure (MPE) Evaluation

The worst case of Average power: refer to section 6.5 for detail measurement date.

802.11b

| Cable loss = 0 | | Output Power | | Limit (dBm) |
|---|---|---|---|---|
| CH | Frequency (MHz) | Detector | | |
| | | PK (dBm) | AV (dBm) | |
| 1 | 2412 | 20.05 | 17.84 | 30 |
| 6 | 2437 | 20.25 | 18.09 | |
| 11 | 2462 | 20.40 | 18.16 | |

**MPE Prediction (802.11b)**

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

| | | |
|---|---|---|
| Maximum average output power at antenna input | 18.16 | (dBm) |
| Maximum Average output power at antenna input | 65.46361741 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 65.46361741 | (mW) |
| Antenna gain (typical): | -2.07 | (dBi) |
| Maximum antenna gain: | 0.620869034 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2462 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.0080900 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.008 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$ at 2462MHz.

The worst case of Average power: refer to section 6.5 for detail measurement date.

802.11n 20MHz(5G)

| Cable loss = 0 | | Output Power | | Limit (dBm) |
|---|---|---|---|---|
| CH | Frequency (MHz) | Detector | | |
| | | PK (dBm) | AV (dBm) | |
| 149 | 5745 | 17.53 | 11.76 | 30 |
| 157 | 5785 | 16.88 | 11.52 | |
| 165 | 5825 | 17.11 | 11.84 | |

**MPE Prediction (802.11n 20MHz)**

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

| | | |
|---|---|---|
| Maximum average output power at antenna input | 11.84 | (dBm) |
| Maximum Average output power at antenna input | 15.27566058 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 15.27566058 | (mW) |
| Antenna gain (typical): | 0.7 | (dBi) |
| Maximum antenna gain: | 1.174897555 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5825 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.0035723 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.0036 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$ at 5825MHz.