# TEST REPORT

**of**

FCC Part 15 Subpart C §15.249

FCC ID : A3LAARR1D9TG

| | | |
|---|---|---|
| Equipment Under Test | : | Wireless Dongle |
| Model Name | : | AA-RR1D9TG |
| Applicant | : | Samsung Electronics Co., Ltd. |
| Manufacturer | : | Samsung Electronics Co., Ltd. |
| Date of Receipt | : | 2016.10.28 |
| Date of Test(s) | : | 2016.11.01 ~ 2016.11.24 |
| Date of Issue | : | 2016.11.24 |

In the configuration tested, the EUT complied with the standards specified above.

| | | | |
|---|---|---|---|
| **Tested By:** | **Elsie Shin** | **Date:** | **2016.11.24** |
| **Technical Manager:** | **Hyunchae You** | **Date:** | **2016.11.24** |

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# 1. General information

## 1.1 Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

Telephone : +82 31 688 0901
FAX : +82 31 688 0921

## 1.2 Details of applicant

Applicant : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea
Contact Person : Park, Eun-Bum
Phone No. : +82 31 277 5707

## 1.3. Description of EUT

| | |
|---|---|
| **Kind of Product** | Wireless Dongle |
| **Model Name** | AA-RR1D9TG |
| **Power Supply** | DC 5.0 V |
| **Frequency Range** | 2 403 ㎒ ~ 2 475 ㎒ |
| **Modulation Technique** | GFSK |
| **Number of Channels** | 73 Channels |
| **Operation Temperature** | -10 ℃ ~ 50 ℃ |
| **Antenna Type** | PCB Antenna |
| **Antenna Gain** | -5.69 ㏈i |
| **H/W Version** | 02 |
| **S/W Version** | 0102 |

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## 1.4. Test equipment list

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Interval | Cal. Due |
|---|---|---|---|---|---|---|
| Signal Generator | R&S | SMBV100A | 259067 | Jun. 20, 2016 | Annual | Jun. 20, 2017 |
| Signal Generator | Agilent | E8257D | MY51501169 | Jul. 07, 2016 | Annual | Jul. 07, 2017 |
| Spectrum Analyzer | Agilent | N9020A | MY53421758 | Sep. 24, 2016 | Annual | Sep. 23, 2017 |
| Spectrum Analyzer | R&S | FSV30 | 100768 | Mar. 30, 2016 | Annual | Mar. 30, 2017 |
| High Pass Filter | Wainwright Instrument GmbH | WHK3.0/18G-6SS | 4 | Jun. 18, 2016 | Annual | Jun. 18, 2017 |
| High Pass Filter | Wainwright Instrument GmbH | WHNX7.5/26.5G-6SS | 15 | Jun. 18, 2016 | Annual | Jun. 18, 2017 |
| Low Pass Filter | Mini-Circuits | NLP-1200+ | V8979400903-2 | Feb. 29, 2016 | Annual | Feb. 29, 2017 |
| Attenuator | Mini-Circuits | FAS-12-10 | 1 | Jun. 11, 2016 | Annual | Jun. 11, 2017 |
| DC Power Supply | R&S | HMP2020 | 020089489 | May 31, 2016 | Annual | May 31, 2017 |
| Preamplifier | H.P. | 8447F | 2944A03909 | Aug. 11, 2016 | Annual | Aug. 11, 2017 |
| Preamplifier | R&S | SCU-18 | 10117 | Apr. 07, 2016 | Annual | Apr. 07, 2017 |
| Preamplifier | MITEQ Inc. | JS44-18004000-35-8P | 1546891 | May 12, 2016 | Annual | May 12, 2017 |
| Loop Antenna | Schwarzbeck Mess-Elektronik | FMZB 1519 | 1519-039 | Aug. 19, 2015 | Biennial | Aug. 19, 2017 |
| Bilog Antenna | Schwarzbeck Mess-Elektronik | VULB 9163 | 396 | Jun. 18, 2015 | Biennial | Jun. 18, 2017 |
| Horn Antenna | R&S | HF906 | 100326 | Feb. 01, 2016 | Biennial | Feb. 01, 2018 |
| Horn Antenna | Schwarzbeck Mess-Elektronik | BBHA 9170 | 9170-540 | Sep. 01, 2015 | Biennial | Sep. 04, 2017 |
| Turn Table | INN-CO systems | CONTROLLER CO3000 | N/A | N. C. R | N/A | N. C. R |
| Antenna Master | INN-CO systems | MA4640-XP-ET | N/A | N. C. R | N/A | N. C. R |
| Test Receiver | R&S | ESU26 | 100109 | Mar. 07, 2016 | Annual | Mar. 07, 2017 |
| Anechoic Chamber | SY Corporation | L × W × H (9.6 m × 6.4 m × 6.6 m) | N/A | N.C.R. | N/A | N.C.R. |

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## 1.5. Summary of test results

The EUT has been tested according to the following specifications:

| Applied Standard : FCC Part15, Subpart C | | |
|---|---|---|
| **Standard Section** | **Test Item** | **Result** |
| 15.205<br>15.209(a)<br>15.249(a)<br>15.249(c)<br>15.249(d) | Fundamental and Radiated Spurious emission | Complied |
| 15.215(c) | 20 ㏈ Bandwidth | Complied |

## 1.6. Test Procedure(s)

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the DUT.

## 1.7. Sample calculation

Where relevant, the following sample calculation is provided

### 1.7.1. Radiation test

Field strength level (㏈㎶/m) = Measured level (㏈㎶) + Antenna factor (㏈) + Cable loss (㏈) – Amplifier gain (㏈)

## 1.8. Test report revision

| Revision | Report number | Date of Issue | Description |
|---|---|---|---|
| 0 | F690501/RF-RTL010587 | 2016.11.24 | Initial |

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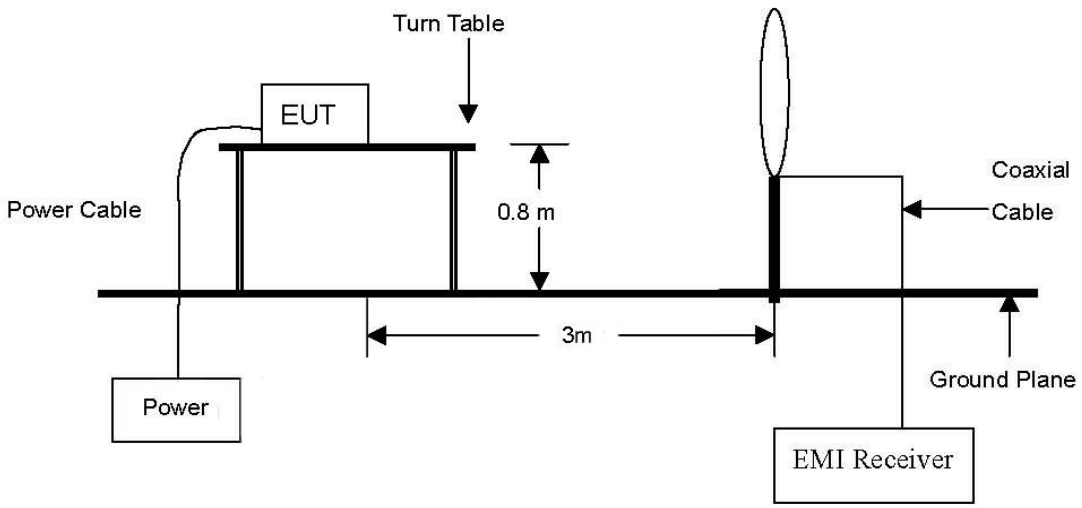
# 2. Fundamental and Radiated Spurious emission

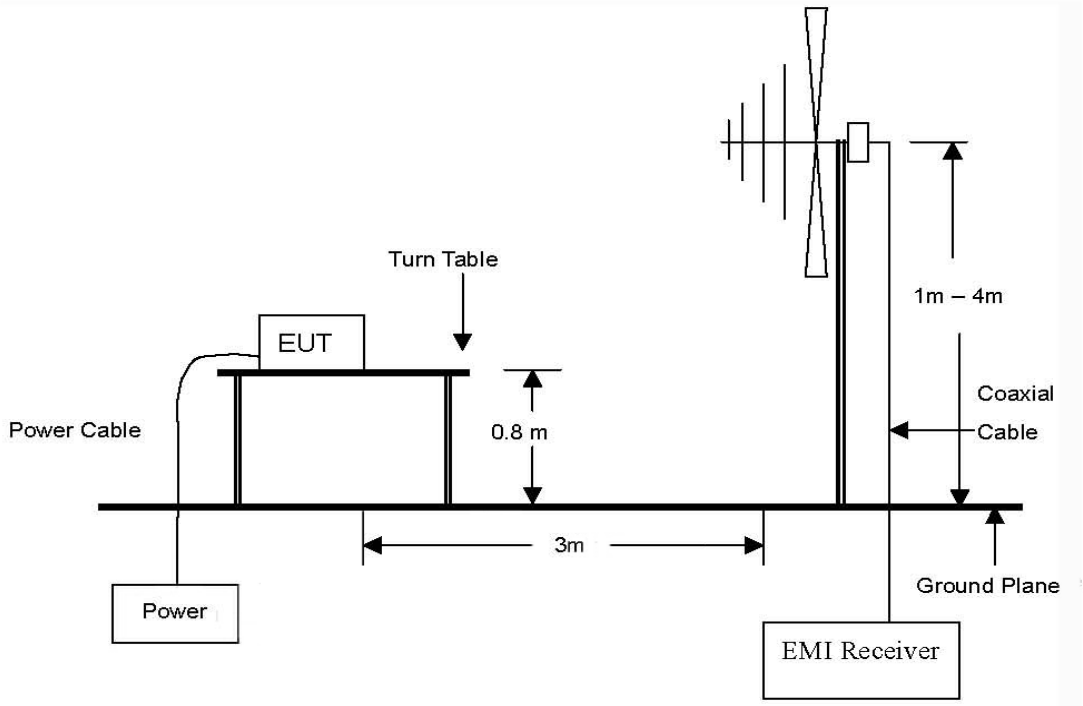
## 2.1. Test setup

### 2.1.1. Fundamental and Radiated Spurious Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions.




The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.

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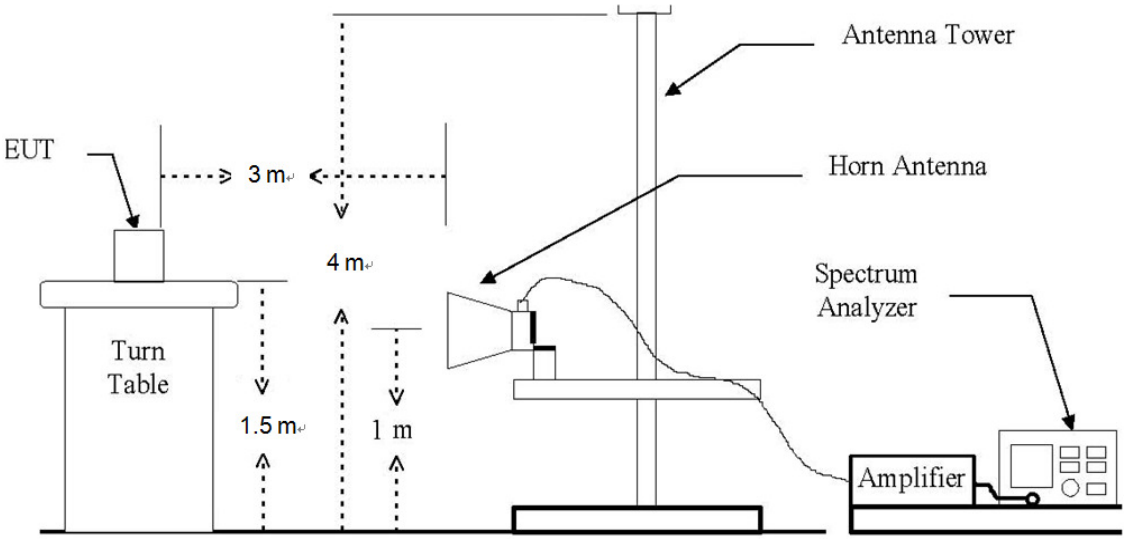
The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated form 1 ㎓ to the 10th harmonic of the highest fundamental frequency or 40 ㎓, whichever is lower.

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## 2.2. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10-2013.

### 2.2.1. Test Procedures for emission below 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

**Note;**
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 meter open field test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

### 2.2.2. Test Procedures for emission from above 30 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 ㎓ and 1.5 meters above the ground at a 3 meter anechoic chamber test site above 1 ㎓. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a trilog broadband antenna, a horn antenna and its 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.
4. 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 and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 ㏈ 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 10 ㏈ margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Note;**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 ㎑ for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 ㎓.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 ㎒ for Peak detection and frequency above 1 ㎓.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 ㎒ and the video bandwidth is 10 ㎐ for Average detection (AV) at frequency above 1 ㎓.
4. To get a maximum emission level from the EUT, the EUT is manipulated through three orthogonal planes (X, Y, Z). Worst orthogonal plan of EUT is **X – axis** during radiation test.

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## 2.3. Limit

According to §15.249(a), Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental (㎷/m) | Field strength of harmonics (㎶/m) |
|---|---|---|
| 902 – 928 ㎒ | 50 | 500 |
| 2 400 – 2 483.5 ㎒ | 50 | 500 |
| 5 725 – 5 875 ㎒ | 50 | 500 |
| 24.0 – 24.25 ㎓ | 250 | 2 500 |

According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 ㏈ below the level of the fundamental or to the general radiated emission limits in §15.209, whichever the lesser attenuation.

According to §15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (㎒) | Distance (Meters) | Field Strength (㏈㎶/m) | Field Strength (㎶/m) |
|---|---|---|---|
| 0.009 – 0.490 | 300 | 20 log (2 400/F(㎑)) | 2 400/F(㎑) |
| 0.490 – 1.705 | 30 | 20 log (24 000/F(㎑)) | 24 000/F(㎑) |
| 1.705 – 30.0 | 30 | 29.54 | 30 |
| 30 – 88 | 3 | 40.0 | 100 |
| 88 – 216 | 3 | 43.5 | 150 |
| 216 – 960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

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

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## 2.4. Test result

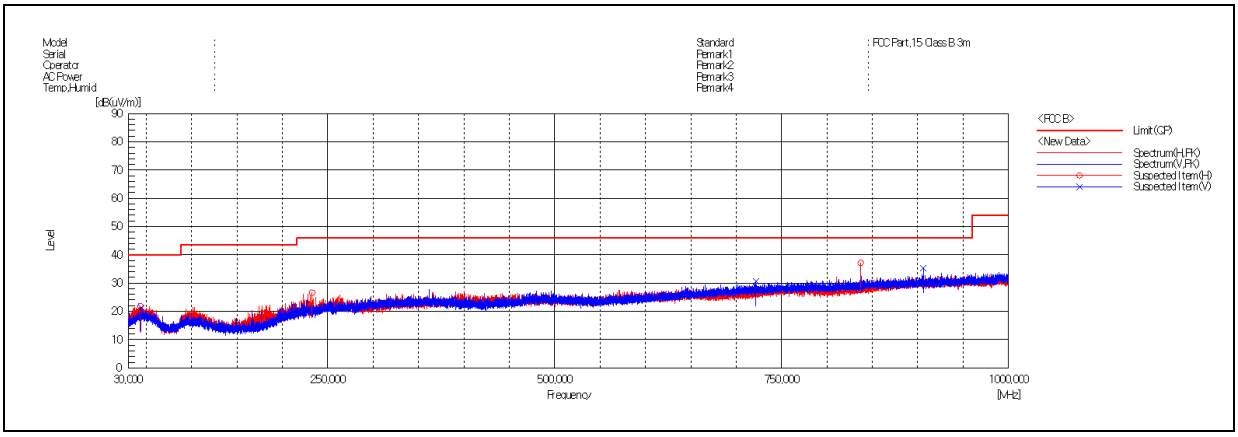
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

### 2.4.1. Radiated Spurious Emission below 1 000 ㎒

The frequency spectrum from 9 ㎑ to 1 000 ㎒ was investigated. All reading values are peak values.

| Radiated Emissions | | | Ant. | Correction Factors | | Total | FCC Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | AMP + CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 43.46 | 32.90 | Peak | H | 16.07 | -27.07 | 21.90 | 40.00 | 18.10 |
| 44.31 | 33.90 | Peak | V | 14.59 | -27.06 | 21.43 | 40.00 | 18.57 |
| 232.65 | 39.30 | Peak | H | 12.72 | -25.38 | 26.64 | 46.00 | 19.36 |
| 721.45 | 34.00 | Peak | V | 21.99 | -25.20 | 30.79 | 46.00 | 15.21 |
| 837.00 | 40.20 | Peak | H | 22.03 | -24.68 | 37.55 | 46.00 | 8.45 |
| 906.15 | 36.10 | Peak | V | 23.47 | -24.01 | 35.56 | 46.00 | 10.44 |

Remark
1. Spurious emissions for all channels were investigated and almost the same below 1 ㎓.
2. Reported spurious emissions are in **Low channel** as worst case among other channels.
3. Radiated spurious emission measurement as below.
   (Actual = Reading + AF + AMP + CL)
4. According to §15.31(o), emission levels are not report much lower than the limits by over 20 ㏈.



### 2.4.2. Radiated Spurious Emission above 1 000 ㎒

A. Low Channel (2 403 ㎒)

| Fundamental level | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 2 403.37 | 57.56 | Peak | H | 28.16 | 5.84 | 91.56 | 114.00 | 22.44 |
| 2 403.32 | 56.20 | Average | H | 28.16 | 5.84 | 90.20 | 94.00 | 3.80 |

| Radiated Emissions | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| *2 310.00 | 23.59 | Peak | H | 28.07 | 5.31 | 56.97 | 74.00 | 17.03 |
| *2 310.00 | 15.20 | Average | H | 28.07 | 5.31 | 48.58 | 54.00 | 5.42 |
| *2 389.00 | 24.94 | Peak | H | 28.15 | 5.80 | 58.89 | 74.00 | 15.11 |
| *2 389.70 | 15.40 | Average | H | 28.15 | 5.80 | 49.35 | 54.00 | 4.65 |
| *2 390.00 | 24.89 | Peak | H | 28.15 | 5.80 | 58.84 | 74.00 | 15.16 |
| *2 390.00 | 15.39 | Average | H | 28.15 | 5.80 | 49.34 | 54.00 | 4.66 |
| 2 400.00 | 24.86 | Peak | H | 28.16 | 5.87 | 58.89 | 74.00 | 15.11 |
| 2 400.00 | 15.57 | Average | H | 28.16 | 5.87 | 49.60 | 54.00 | 4.40 |

| Radiated Emissions | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| *4 806.79 | 41.72 | Peak | H | 32.66 | -30.20 | 44.18 | 74.00 | 29.82 |
| *4 806.79 | 34.97 | Average | H | 32.66 | -30.20 | 37.43 | 54.00 | 16.57 |
| Above 4 900.00 | Not detected | - | - | - | - | - | - | - |

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B. Middle Channel (2 440 ㎒)

| Fundamental level | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 2 440.33 | 59.58 | Peak | H | 28.20 | 5.62 | 93.40 | 114.00 | 20.60 |
| 2 440.23 | 58.17 | Average | H | 28.20 | 5.62 | 91.99 | 94.00 | 2.01 |

| Radiated Emissions | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| *4 880.36 | 41.24 | Peak | H | 32.86 | -29.70 | 44.40 | 74.00 | 29.60 |
| *4 880.53 | 34.31 | Average | H | 32.86 | -29.70 | 37.47 | 54.00 | 16.53 |
| Above 4 900.00 | Not detected | - | - | - | - | - | - | - |

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C. High Channel (2 475 ㎒)

| Fundamental level | | | Ant. | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 2 475.32 | 59.17 | Peak | H | 28.23 | 5.57 | 92.97 | 114.00 | 21.03 |
| 2 475.19 | 58.07 | Average | H | 28.23 | 5.57 | 91.87 | 94.00 | 2.13 |

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| *2 483.50 | 25.50 | Peak | H | 28.24 | 5.54 | 59.28 | 74.00 | 14.72 |
| *2 483.50 | 16.31 | Average | H | 28.24 | 5.54 | 50.09 | 54.00 | 3.91 |
| *2 483.97 | 28.01 | Peak | H | 28.24 | 5.54 | 61.79 | 74.00 | 12.21 |
| *2 483.70 | 16.32 | Average | H | 28.24 | 5.54 | 50.10 | 54.00 | 3.90 |
| *2 500.00 | 25.39 | Peak | H | 28.24 | 5.54 | 59.17 | 74.00 | 14.83 |
| *2 500.00 | 16.31 | Average | H | 28.26 | 5.49 | 50.06 | 54.00 | 3.94 |

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|---|---|---|---|---|---|---|---|---|
| Frequency (㎒) | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m) | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| *4 950.87 | 41.29 | Peak | H | 33.05 | -29.48 | 44.86 | 74.00 | 29.14 |
| *4 950.64 | 34.08 | Average | H | 33.05 | -29.48 | 37.65 | 54.00 | 16.35 |
| Above 5 000.00 | Not detected | - | - | - | - | - | - | - |

**Remarks;**

1. "*" means the restricted band.
2. Measuring frequencies from 1 ㎓ to the 10th harmonic of highest fundamental frequency.
3. Radiated emissions measured in frequency above 1 000 ㎒ were made with an instrument using peak/average detector mode.
4. Actual = Reading + AF + AMP + CL or Reading + AF + CL
5. According to §15.31(o), emission levels are not reported much lower than the limits by over 20 ㏈.
6. Emission was scanned up to 25 ㎓; No emissions were detected above the noise floor which was at least 20 ㏈ below the specification limit.

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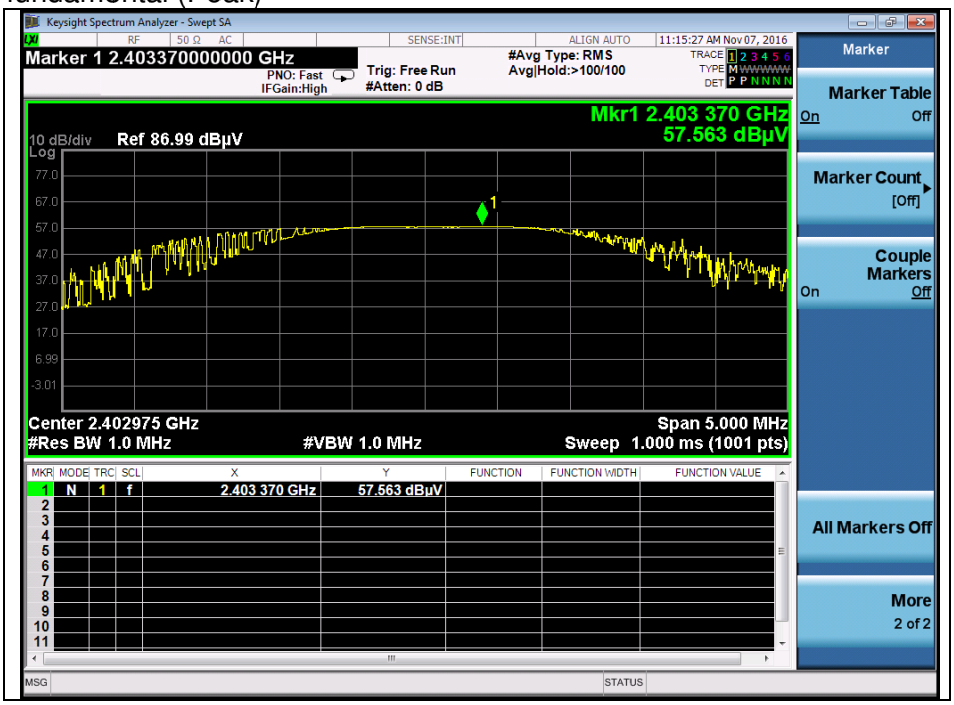
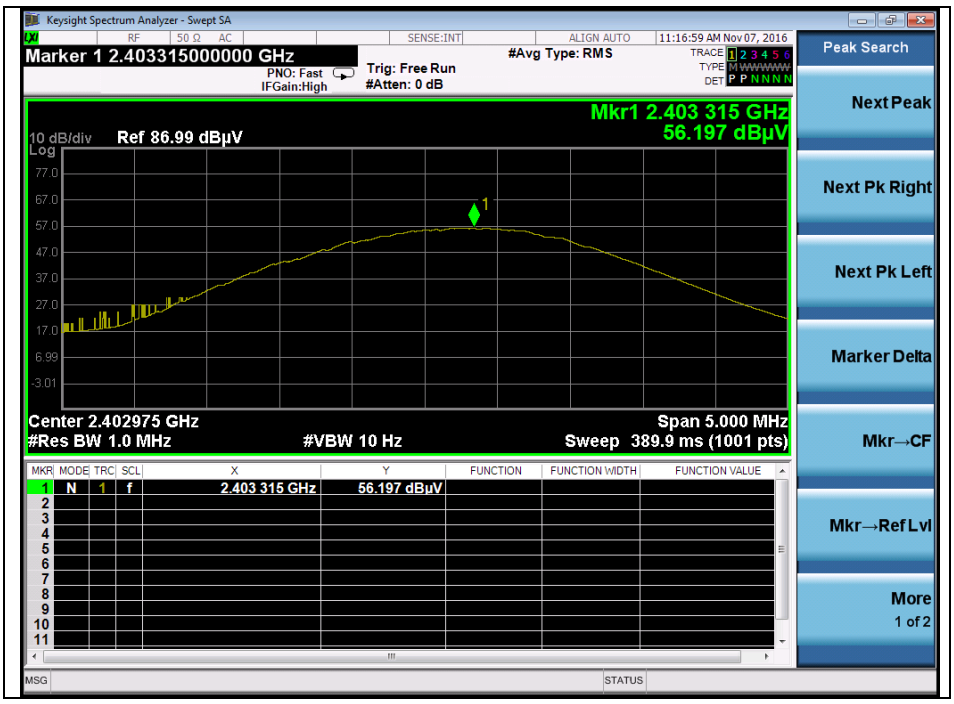
### 2.4.2. Radiated Spurious Emission above 1 000 MHz

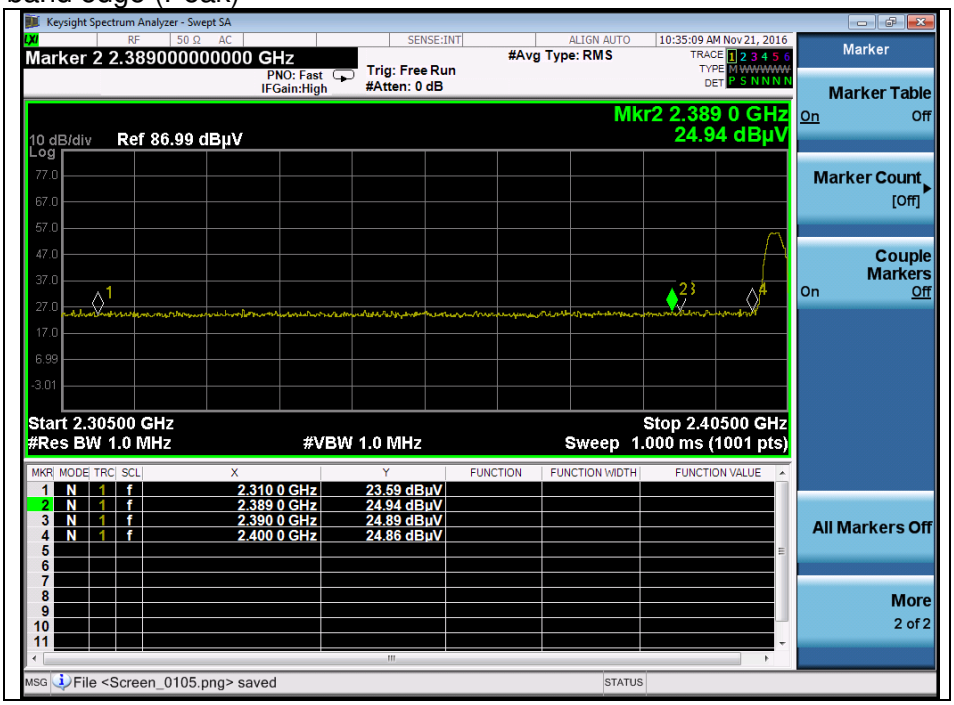
Low channel fundamental (Peak)



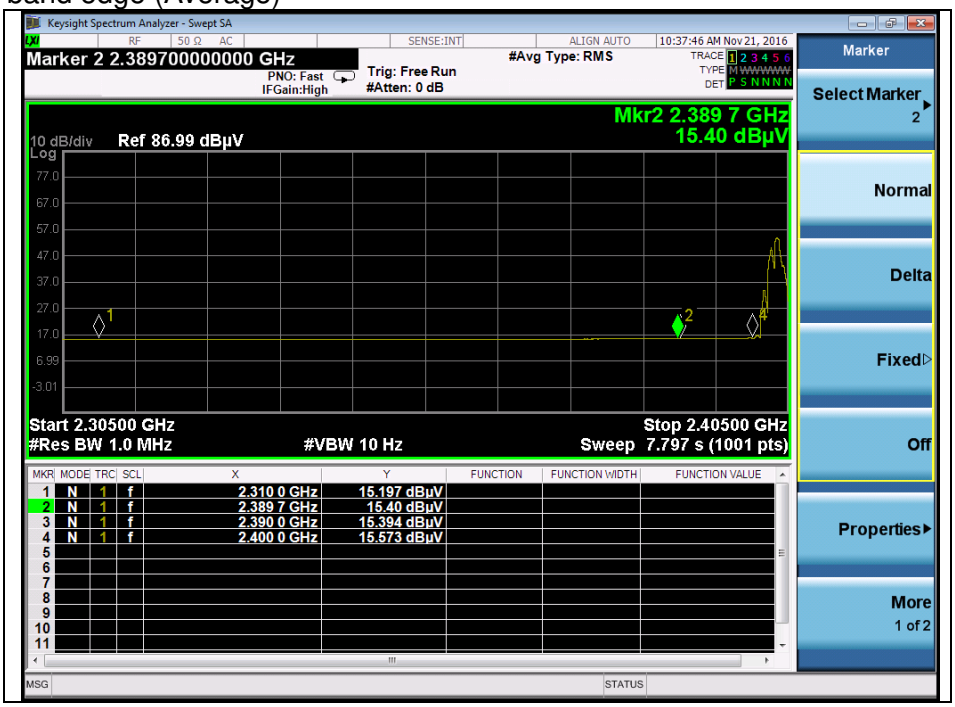

Low channel fundamental (Average)



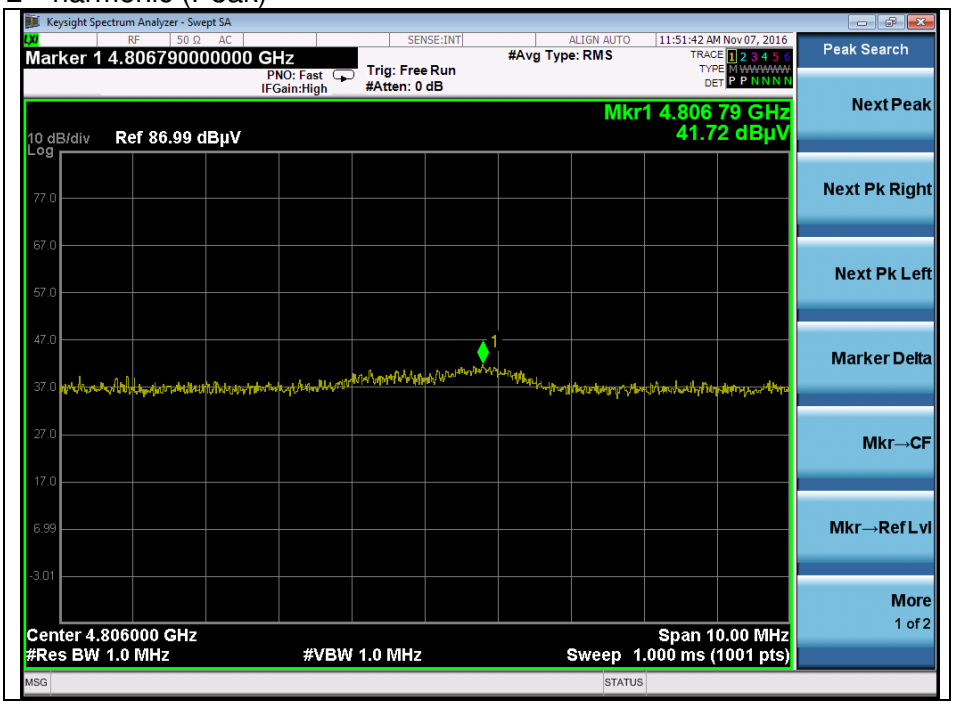
Low channel band edge (Peak)



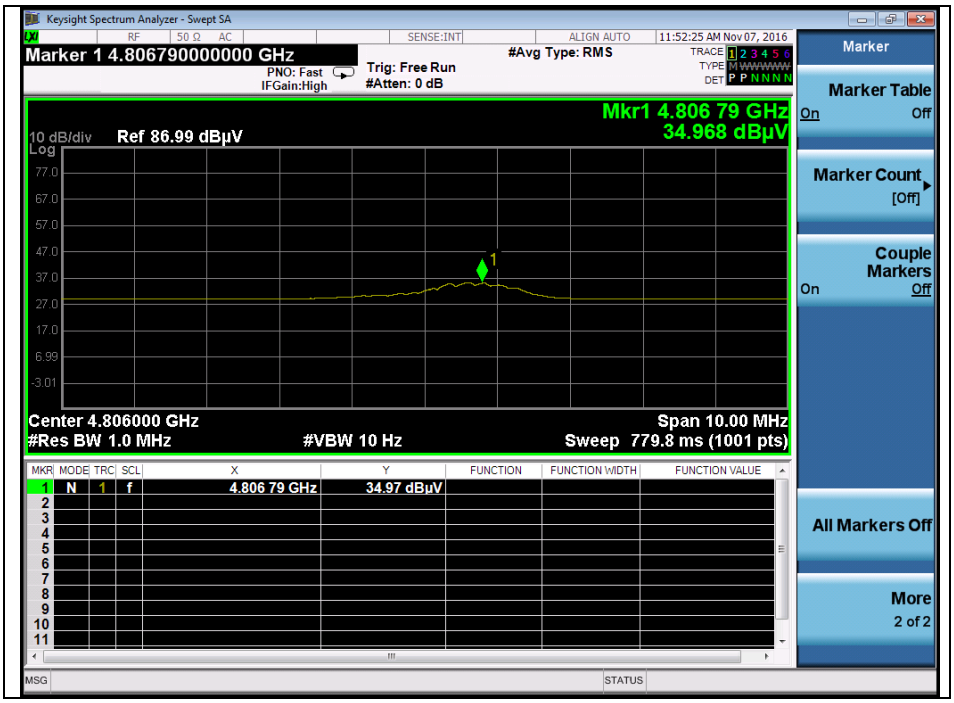

Low channel band edge (Average)



Low channel 2nd harmonic (Peak)




Low channel 2nd harmonic (Average)

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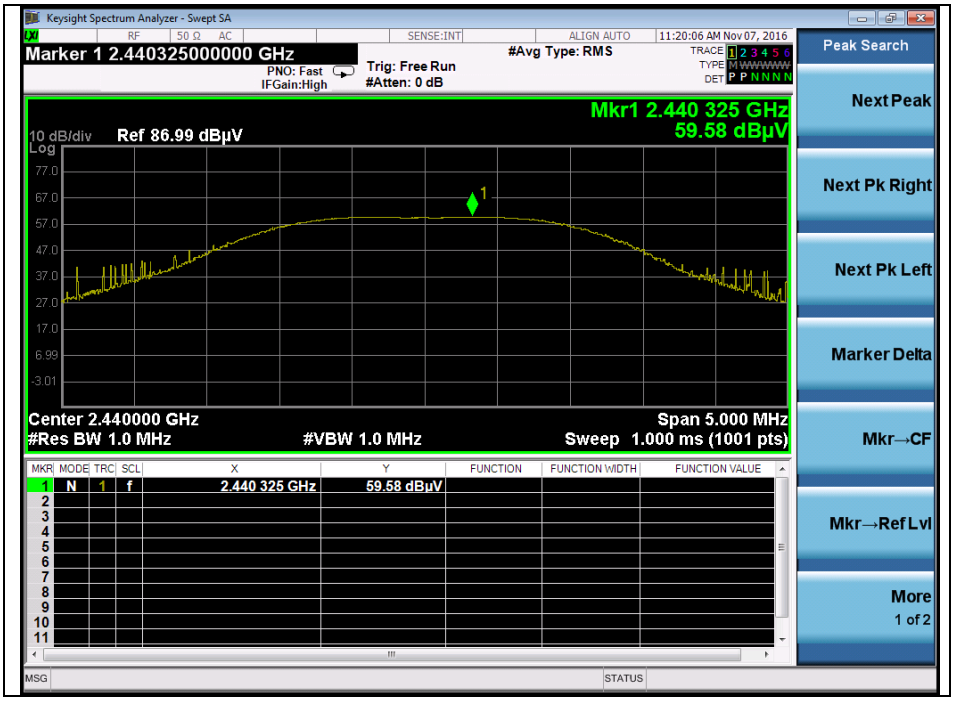
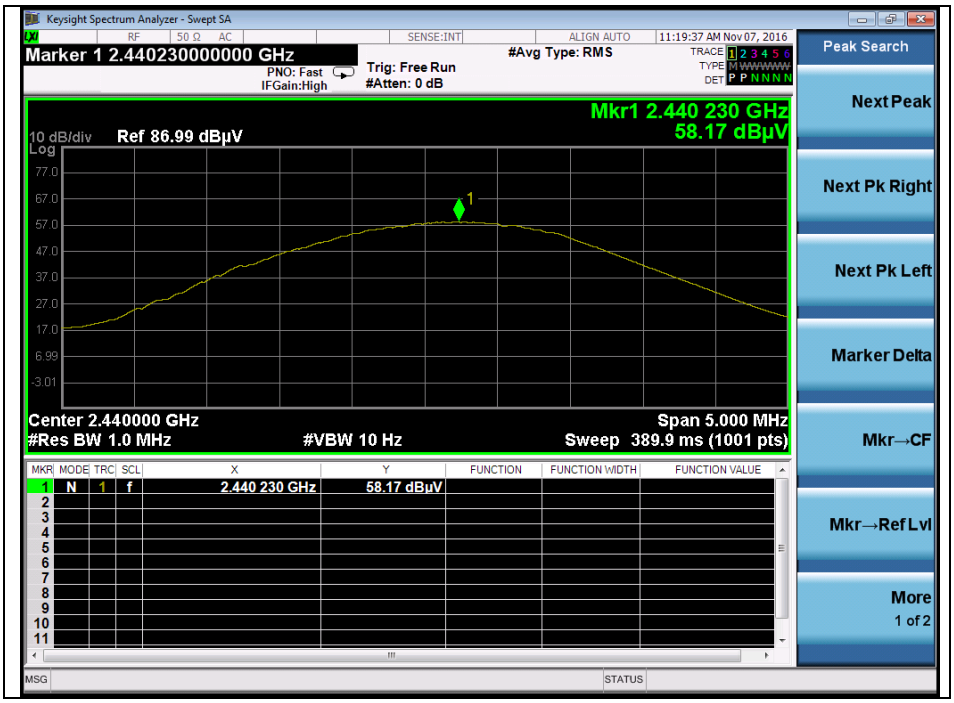
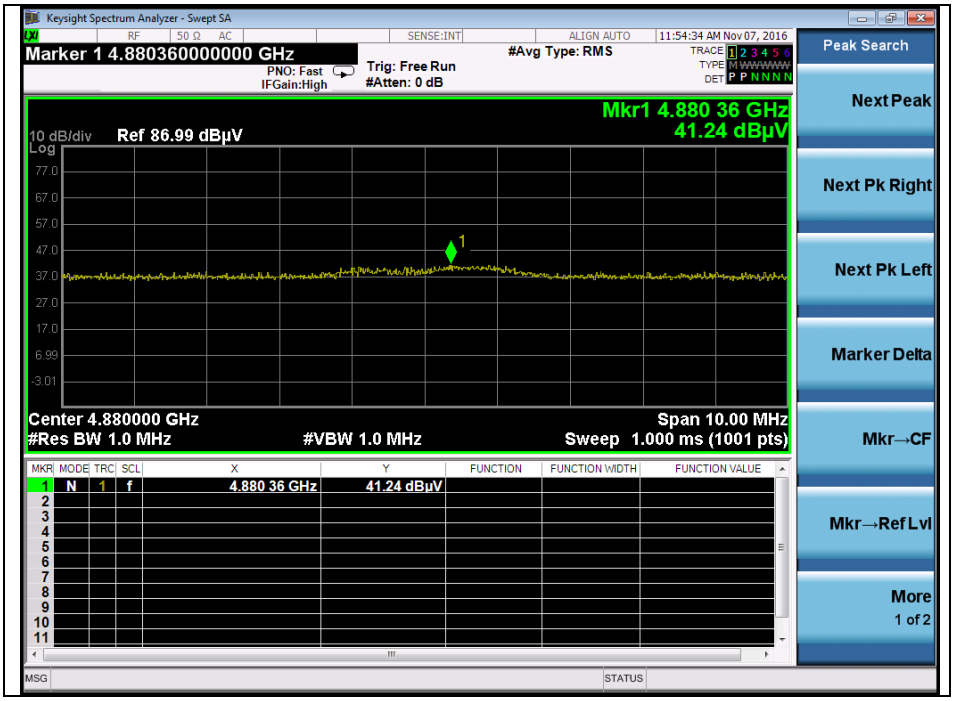
Middle channel fundamental (Peak)



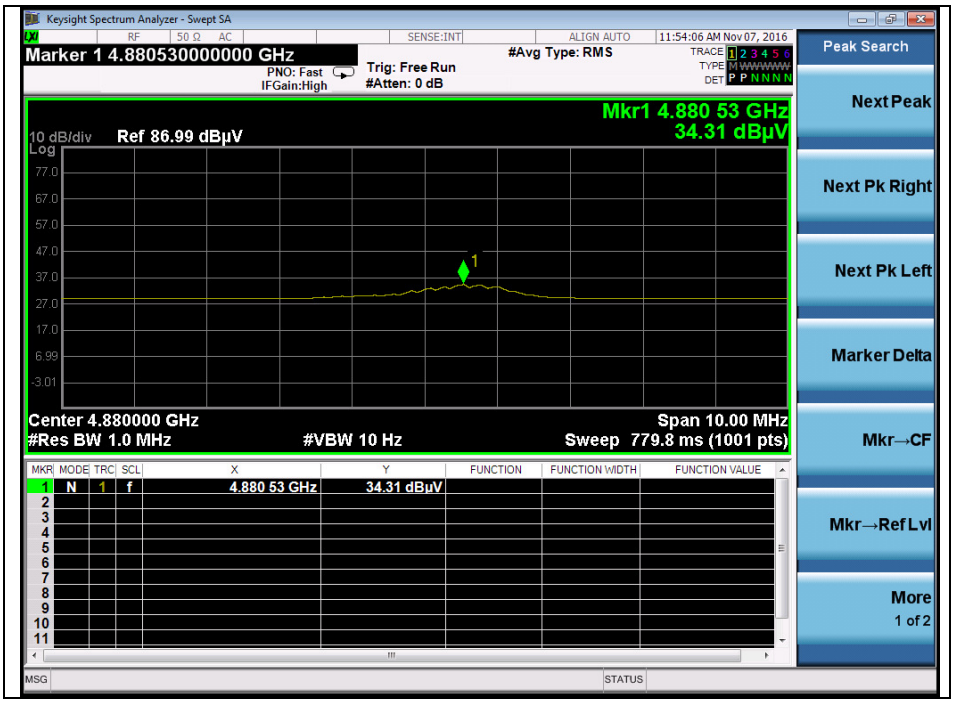

Middle channel fundamental (Average)



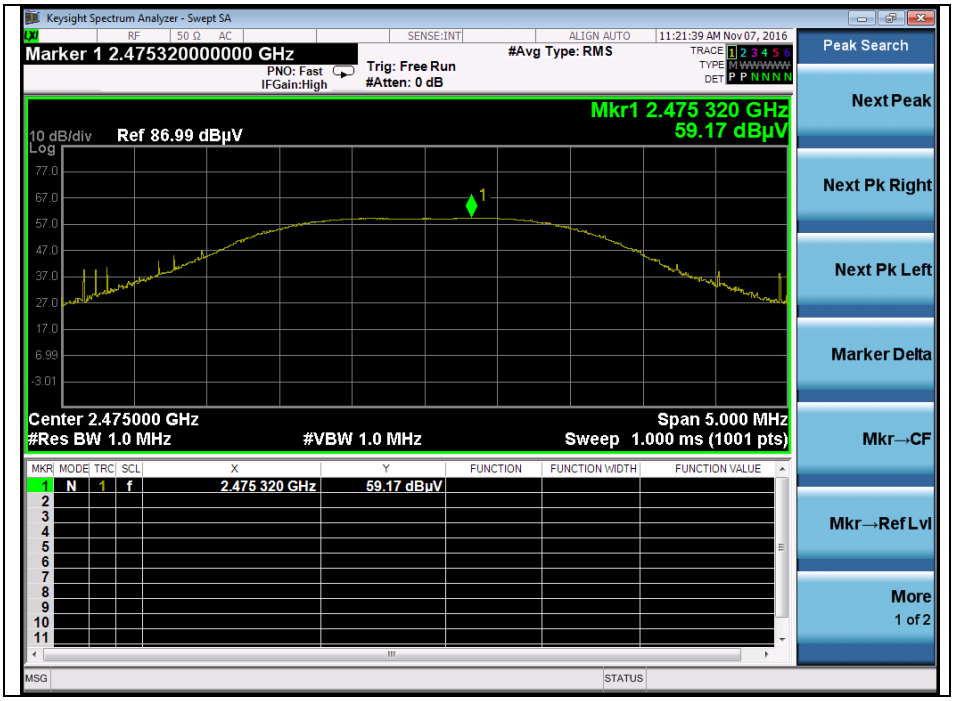
Middle channel 2nd harmonic (Peak)



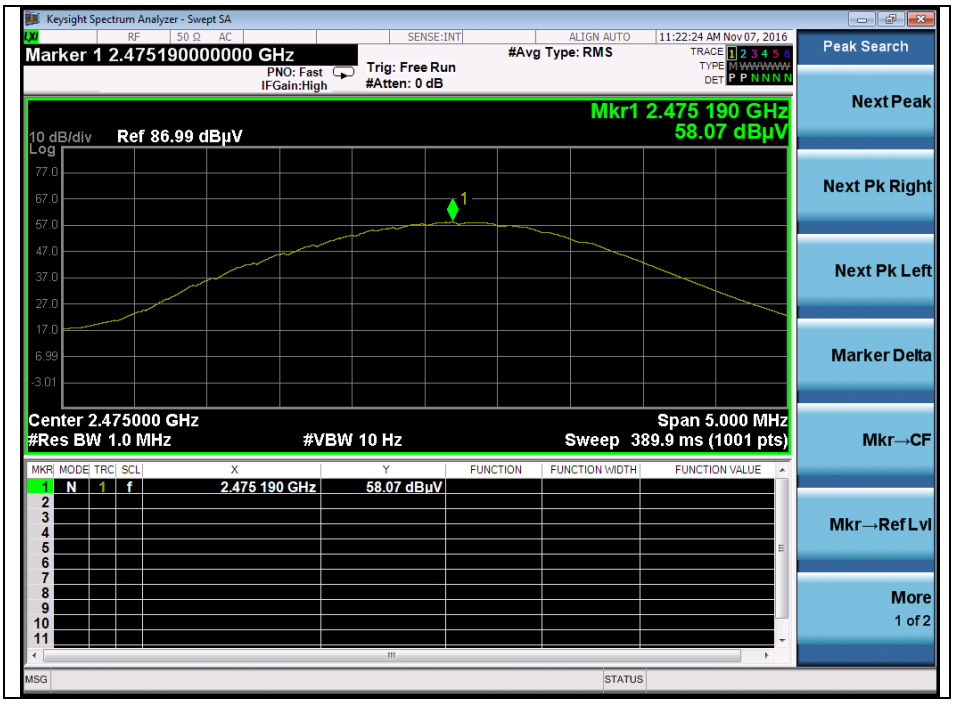

Middle channel 2nd harmonic (Average)



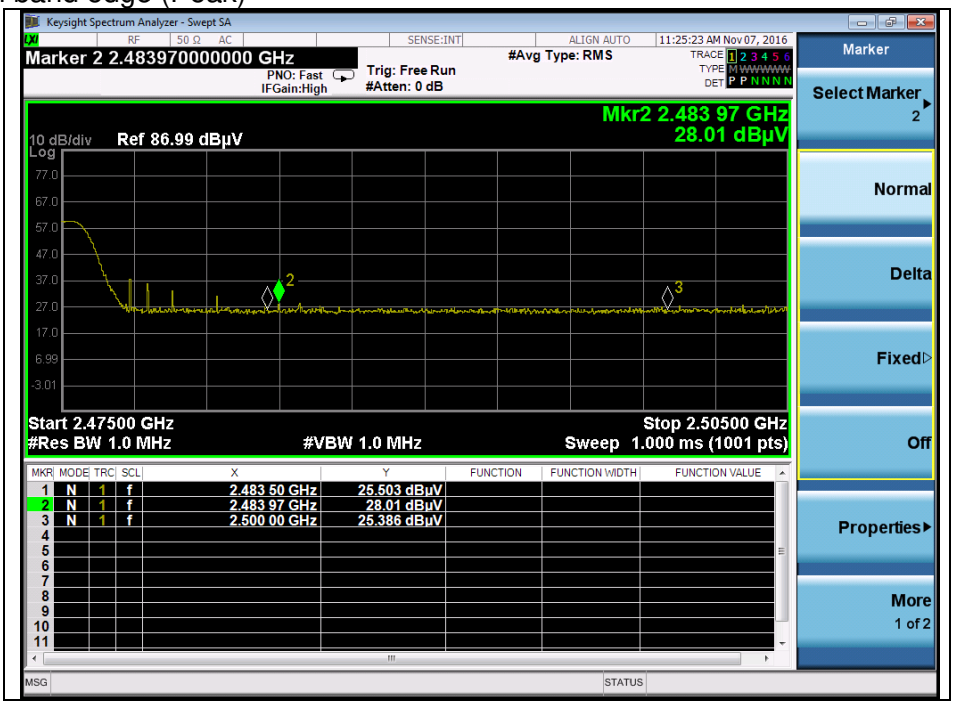
High channel fundamental (Peak)



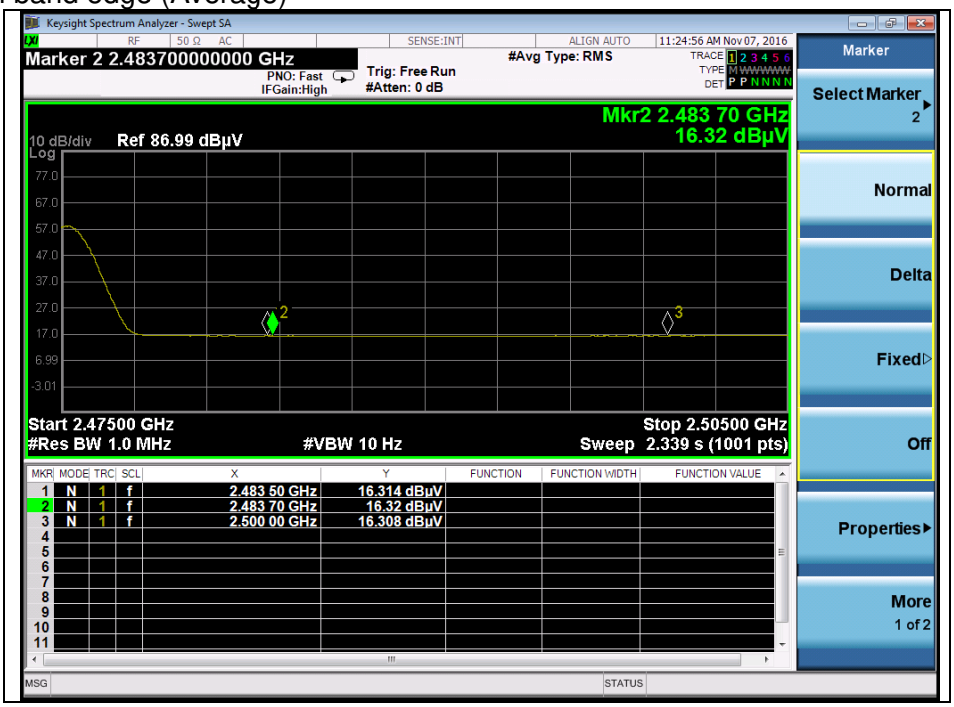

High channel fundamental (Average)



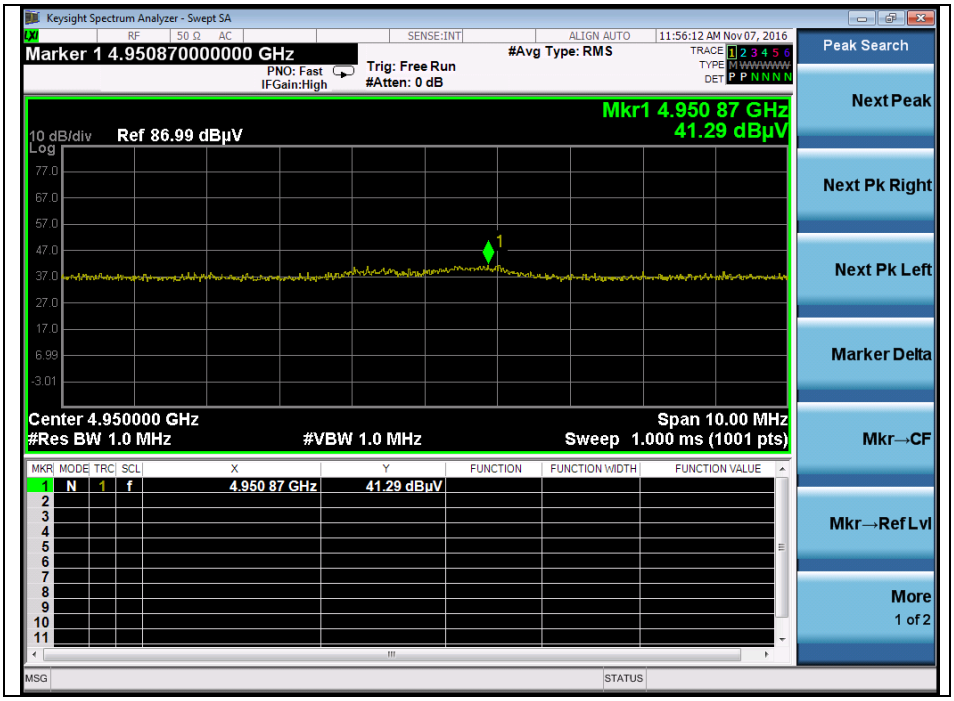
High channel band edge (Peak)



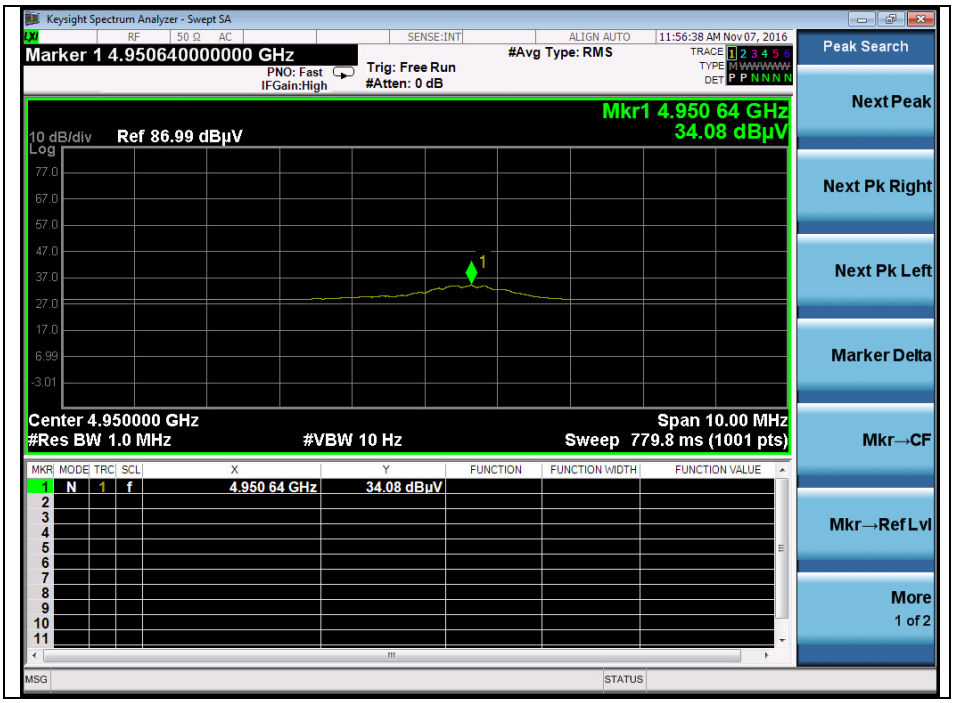

High channel band edge (Average)



High channel 2nd harmonic (Peak)



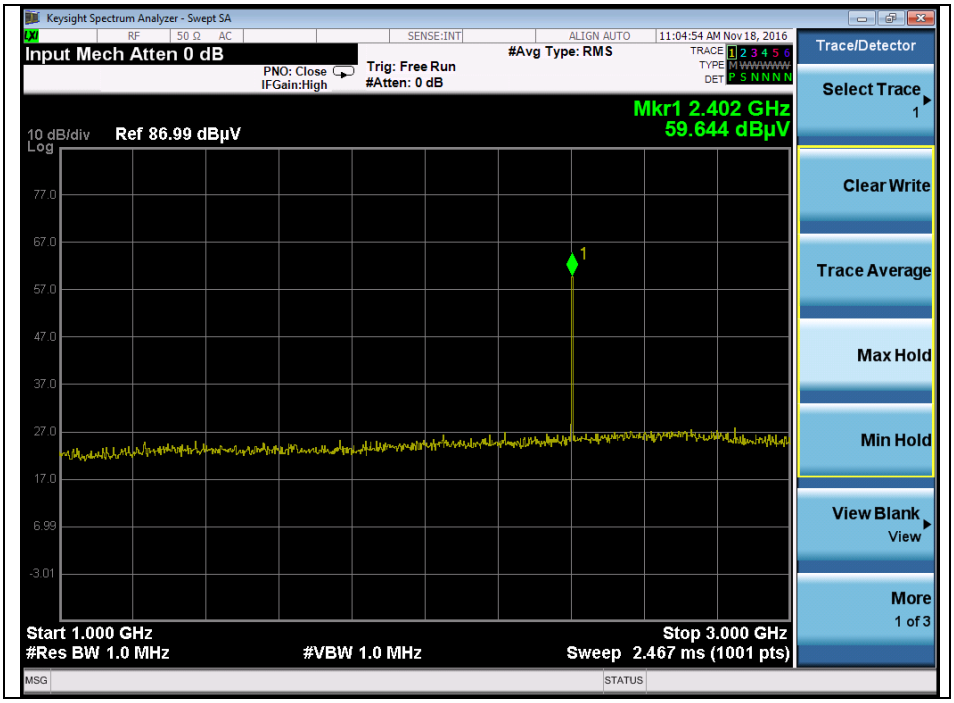

High channel 2nd harmonic (Average)



## 2.4.3. Pre-scan Test Plots

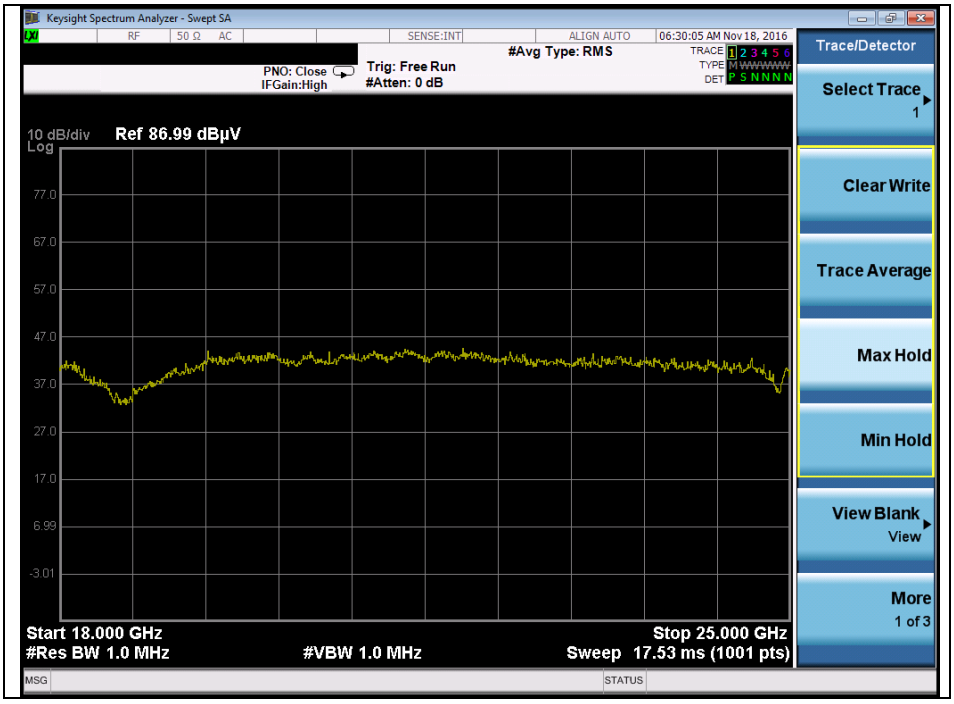
Low channel

1 ㎓ ~ 3 ㎓



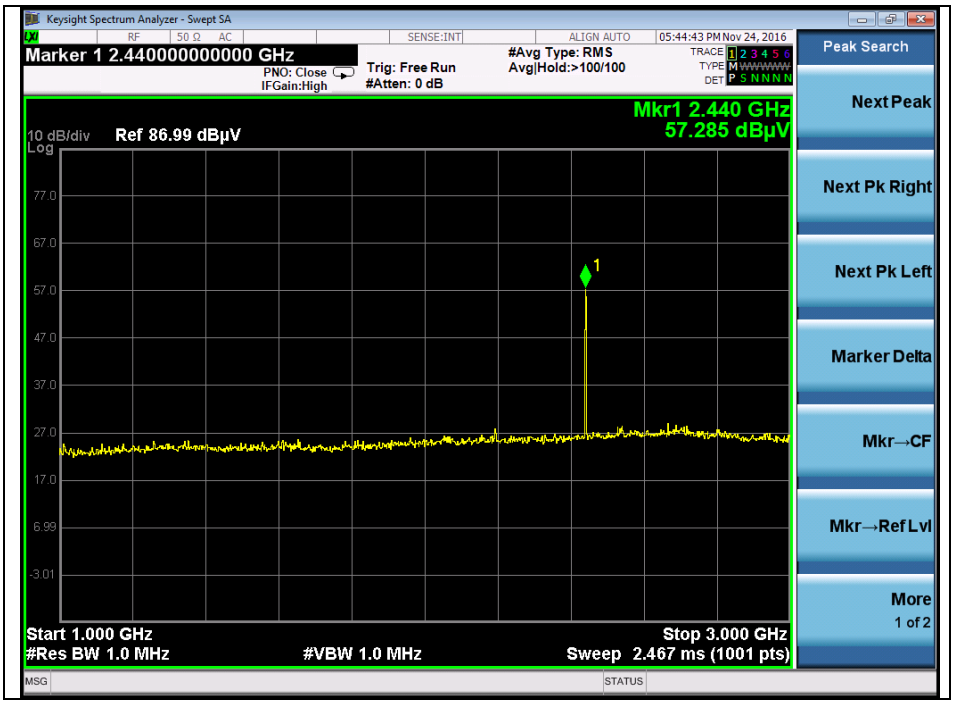

3 ㎓ ~ 18 ㎓

18 GHz ~ 25 GHz



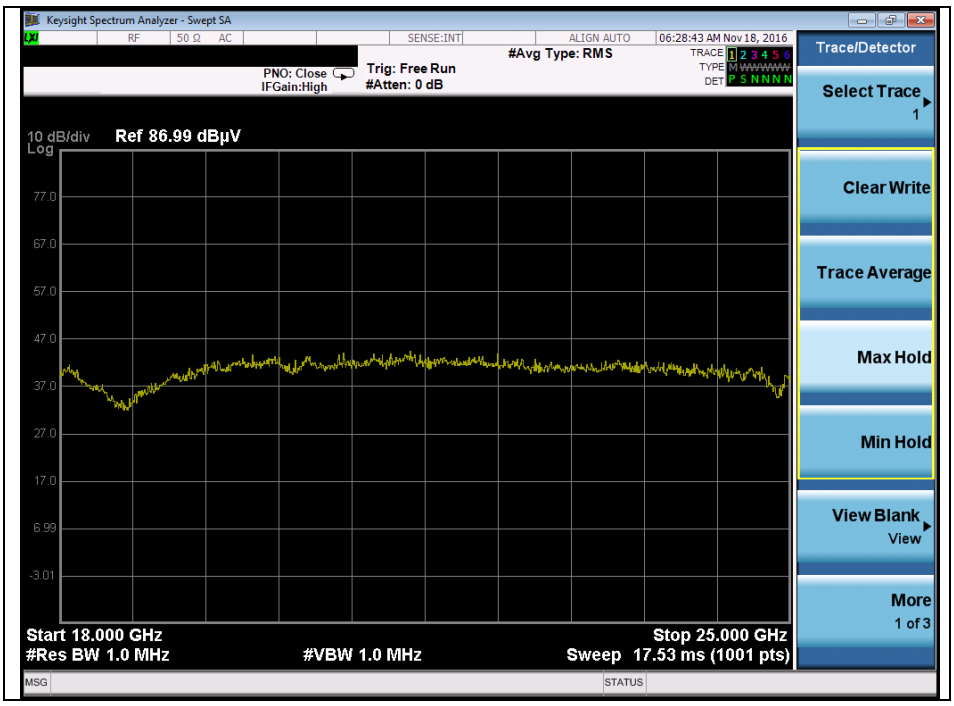

Middle channel

1 GHz ~ 3 GHz



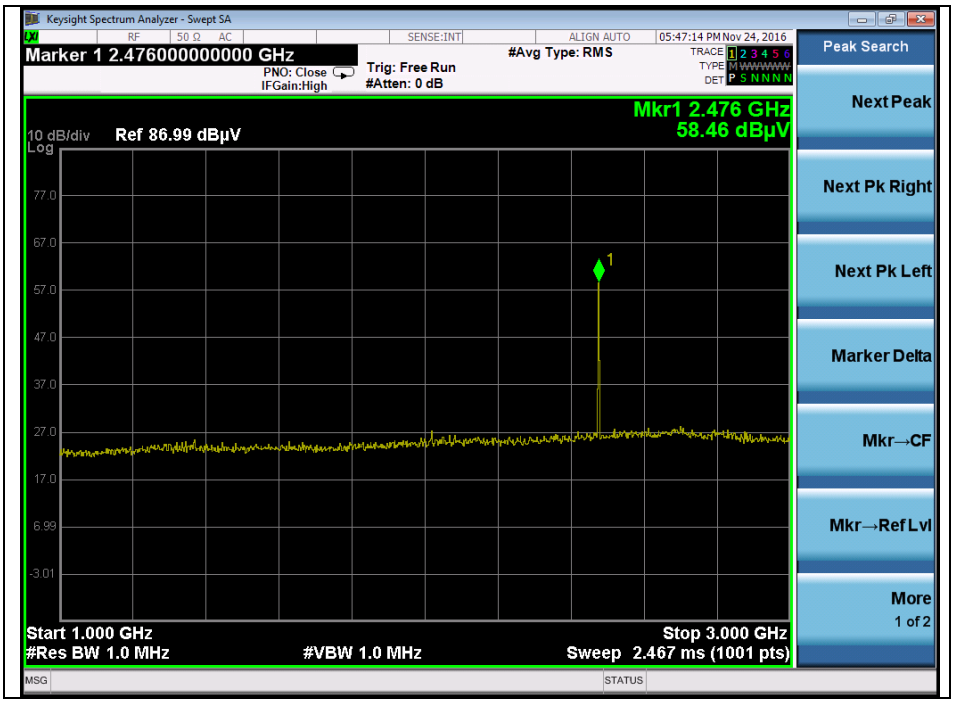
3 GHz ~ 18 GHz

18 GHz ~ 25 GHz



High channel

1 ㎓ ~ 3 ㎓




3 ㎓ ~ 18 ㎓

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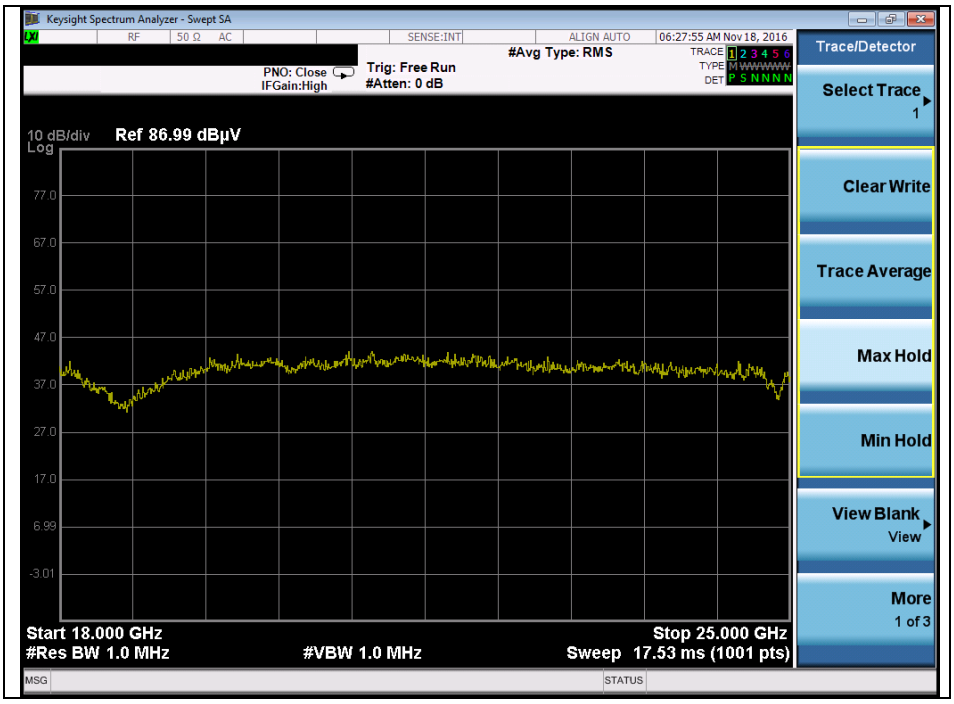
18 GHz ~ 25 GHz


Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
06:27:55 AM Nov 18, 2016
#Avg Type: RMS
TRACE 1 2 3 4 5 6
TYPE M WWWWWW
DET P S N N N N
PNO: Close
IFGain:High
Trig: Free Run
#Atten: 0 dB
10 dB/div
Log
Ref 86.99 dBµV
77.0
67.0
57.0
47.0
37.0
27.0
17.0
6.99
-3.01
Start 18.000 GHz
#Res BW 1.0 MHz
#VBW 1.0 MHz
Stop 25.000 GHz
Sweep 17.53 ms (1001 pts)
Trace/Detector
Select Trace
1
Clear Write
Trace Average
Max Hold
Min Hold
View Blank
View
More
1 of 3
MSG
STATUS

# 3. 20 ㎧ Bandwidth

## 3.1. Test Setup

## 3.2. Limit

Limit: Not Applicable

## 3.3. Test Procedure

1. The transmitter output is connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=20 ㎑, VBW=50 ㎑ and Span=3 ㎒.

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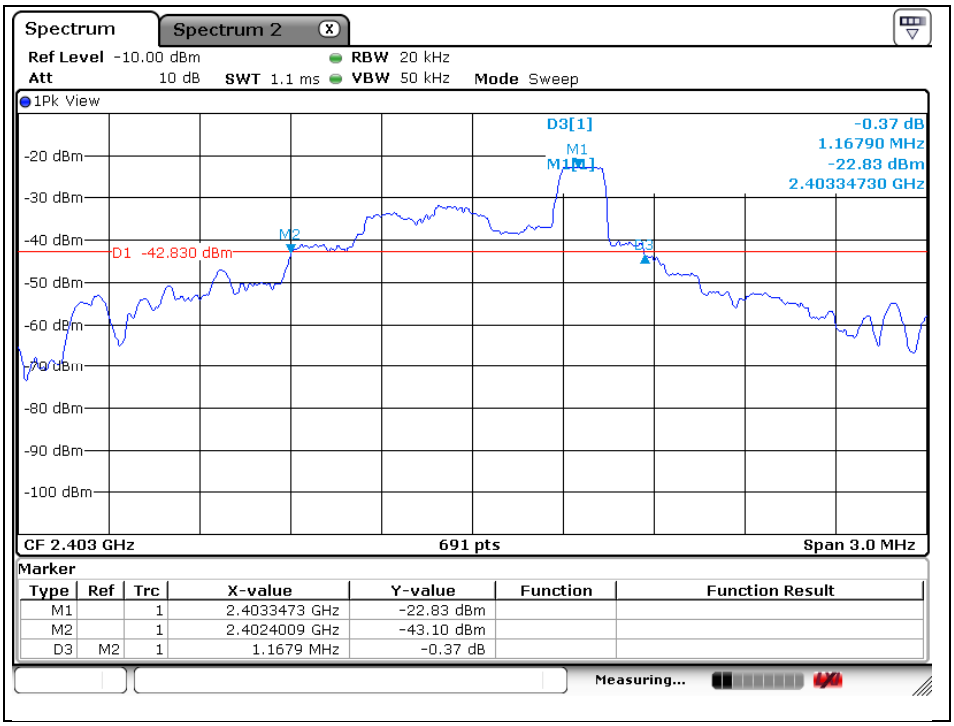
## 3.4. Test Results

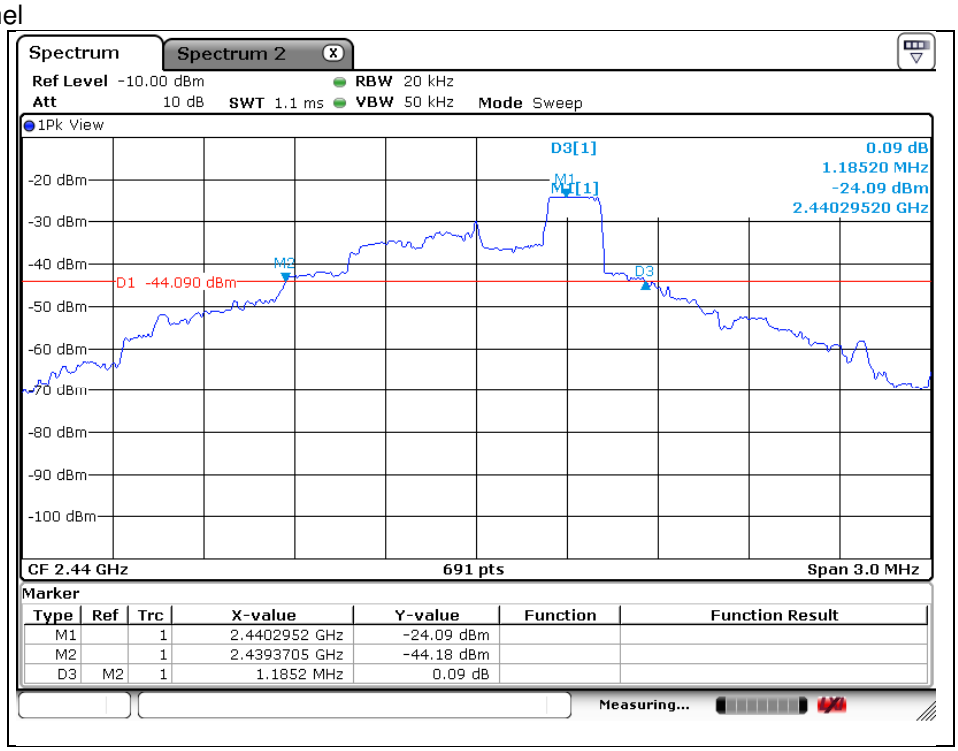
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---|---|---|
| Low | 2 403 | 1.168 |
| Middle | 2 440 | 1.185 |
| High | 2 475 | 1.111 |

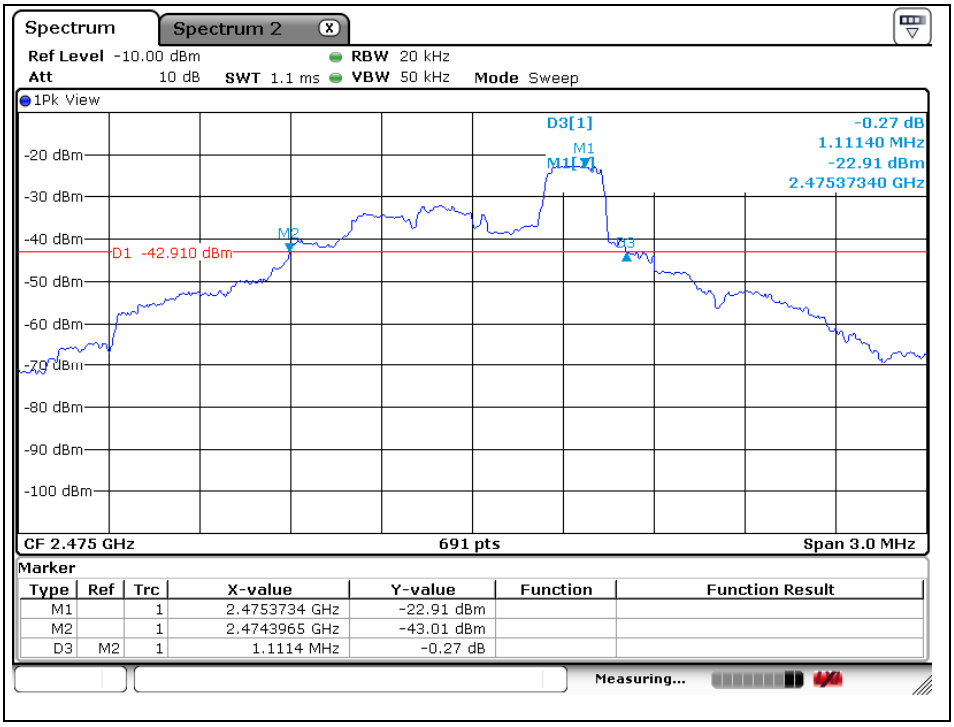
Low Channel



Middle Channel




High Channel

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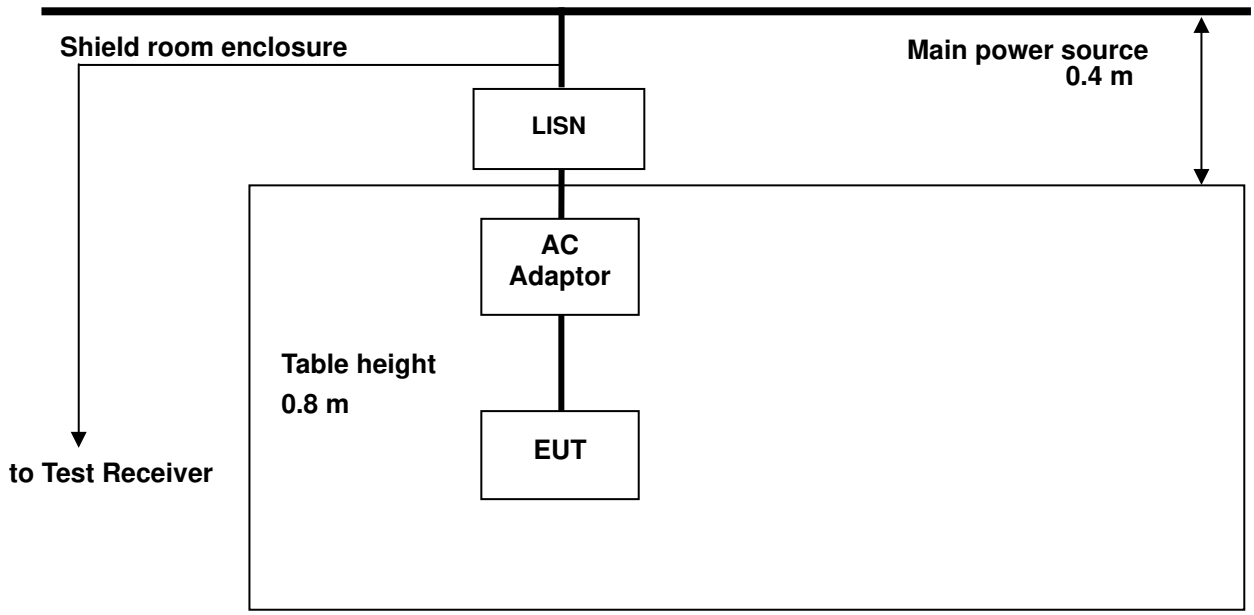
# 4. AC Power Line Conducted Emission

## 4.1. Test Setup




## 4.2. Limit

§15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 ㎕H /50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

| Frequency of Emission (㎒) | Conducted limit (㏈㎶) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 – 0.50 | 66 - 56* | 56 - 46* |
| 0.50 – 5.00 | 56 | 46 |
| 5.00 – 30.0 | 60 | 50 |

* Decreases with the logarithm of the frequency.

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## 4.3. Test Procedures

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.10-2013

1. The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.

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## 4.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Frequency range : 0.15 ㎒ – 30 ㎒
Measured Bandwidth : 9 ㎑

| FREQ. | LEVEL(dBμV) | | LINE | LIMIT(dBμV) | | MARGIN(dB) | |
|---|---|---|---|---|---|---|---|
| (㎒) | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.43 | 41.30 | 38.10 | H | 57.25 | 47.25 | 15.95 | 9.15 |
| 0.47 | 43.40 | 40.50 | H | 56.51 | 46.51 | 13.11 | 6.01 |
| 0.65 | 43.20 | 31.00 | H | 56.00 | 46.00 | 24.00 | 20.00 |
| 0.75 | 43.90 | 27.10 | H | 56.00 | 46.00 | 12.80 | 15.00 |
| 1.38 | 32.00 | 26.00 | H | 56.00 | 46.00 | 12.10 | 18.90 |
| 16.25 | 28.50 | 23.40 | H | 60.00 | 50.00 | 31.50 | 26.60 |
| 0.24 | 43.90 | 33.60 | N | 62.10 | 52.10 | 18.20 | 18.50 |
| 0.43 | 41.50 | 34.90 | N | 57.25 | 47.25 | 15.75 | 12.35 |
| 0.65 | 44.00 | 31.20 | N | 56.00 | 46.00 | 12.00 | 14.80 |
| 0.91 | 35.70 | 30.20 | N | 56.00 | 46.00 | 20.30 | 15.80 |
| 1.34 | 33.20 | 26.80 | N | 56.00 | 46.00 | 22.80 | 19.20 |
| 16.08 | 31.10 | 24.30 | N | 60.00 | 50.00 | 28.90 | 25.70 |

Remark;

1. Line ( H ): Hot, Line ( N ): Neutral.
2. All modes of operation were investigated and the worst-case emissions were reported GFSK, Low Channel.
3. Traces shown in plot mad using a peak detector and average detector.
4. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
5. Deviations to the Specifications: None.

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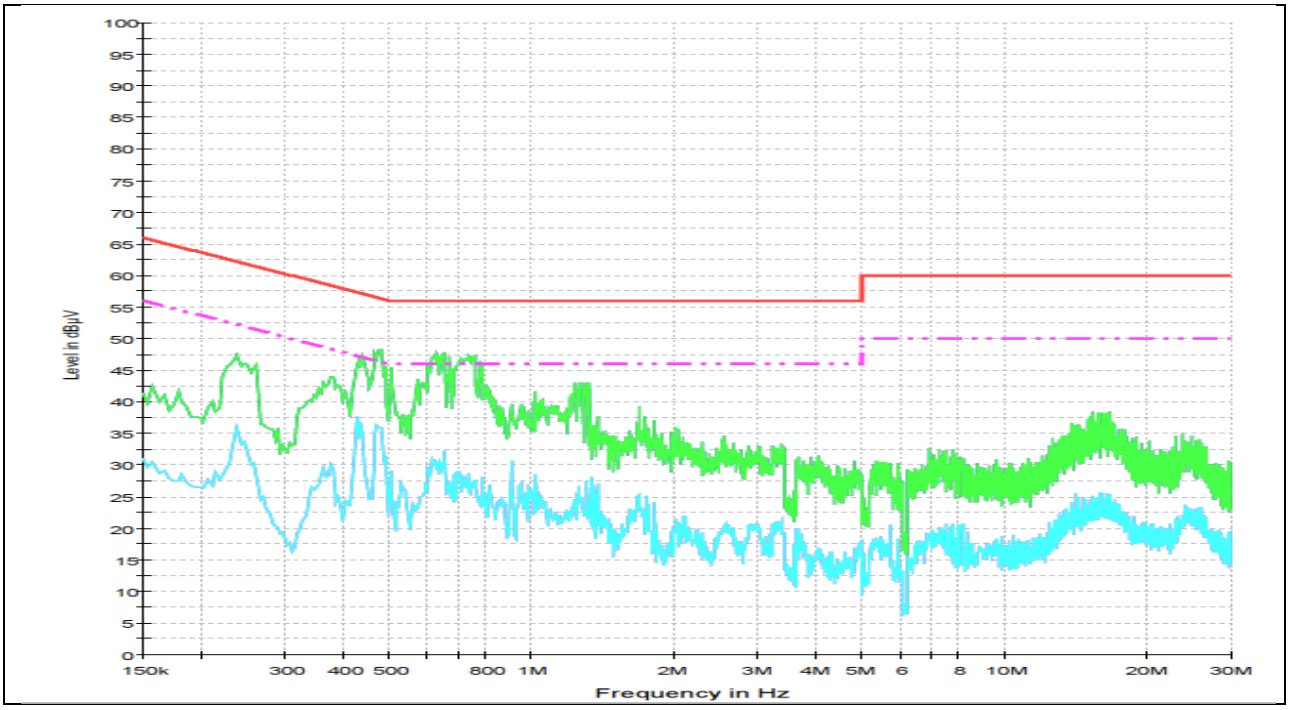
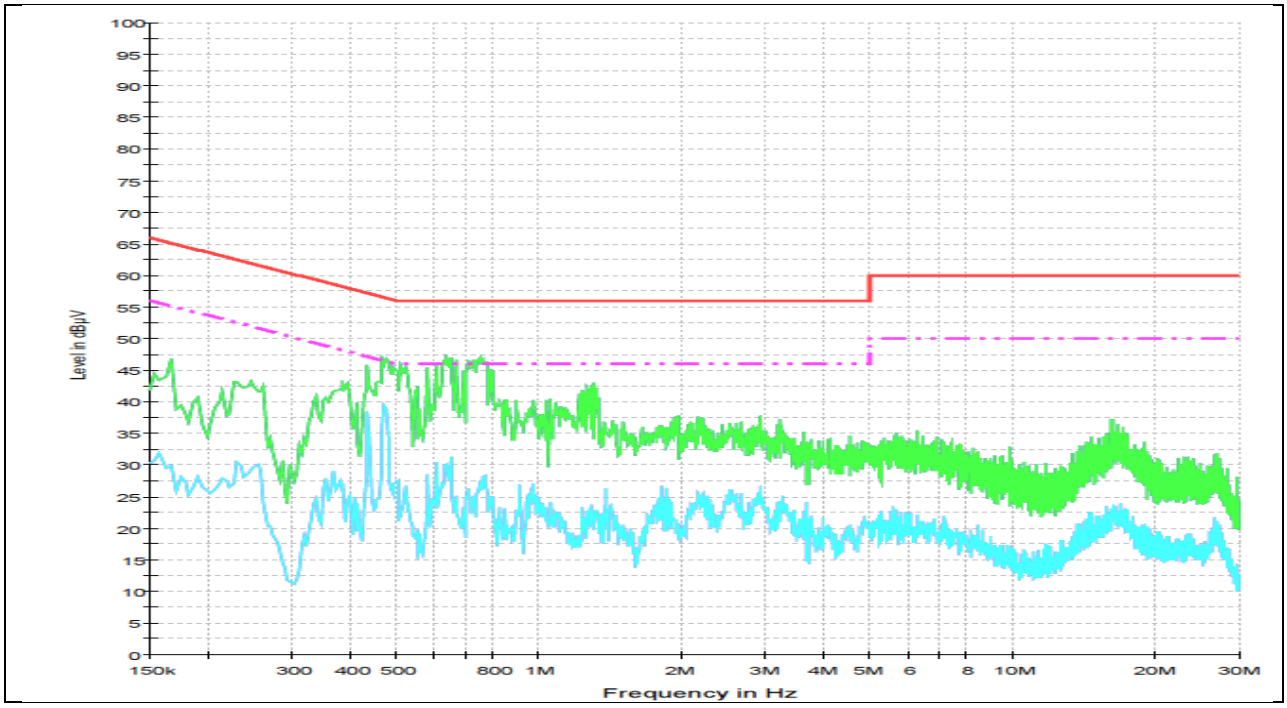
**Plots of Conducted Power line**

Test mode: (Neutral)




Test mode: (Hot)




**- End of the Test Report -**

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