

FCC TEST REPORT

Applicant Name : ONESOFTDIGM. Co., Ltd.
Brand Name : ONESOFTDIGM. Co., Ltd.
Applicant Address : CHANGEUP GROUND #401, #402, 87 Cheongam-ro,
Nam-gu, Pohang-si, Gyeongbuk 37673, Republic of Korea
FCC ID : 2BEDQ-FR-B30
Products Name : Fitrus+
Model No. : FR-B30
Variant Model No. : Fitrus_plus
Products Manufacturer : EST
Test Standard : FCC CFR 47 Part 15 Subpart C
Test Method : KDB 558074 v05r02 and ANSI C63.10:2013
Test Result : PASS
Dates of Test : December 19, 2023 to December 21, 2023
Date of Issue : December 22, 2023
Test Laboratory : Korea Standard Testlab
FCC Registration No. : 0028220721

Tested by

Approved by



Chi Yeon Lee
Test Engineer



Kidong Kim
Technical Manager

TABLE OF CONTENTS

| | |
|--|----|
| 1. General Information | 4 |
| 1.1. Client Information | 4 |
| 1.2. General Description of E.U.T. | 4 |
| 1.3. Details of E.U.T. | 4 |
| 1.4. Test Facility | 5 |
| 2. Test Equipment and Ancillaries used for Tests | 6 |
| 3. Summary of Test Results | 7 |
| 4. Test Results | 8 |
| 4.1. E.U.T. test conditions | 8 |
| 4.1.1. EUT channels and frequencies list | 9 |
| 4.1.2. Test Mode | 9 |
| 4.2. Antenna | 10 |
| 4.2.1. Requirement | 10 |
| 4.2.2. Test Result | 10 |
| 4.3. Duty Cycle | 11 |
| 4.3.1. Requirement | 11 |
| 4.3.2. Test method | 11 |
| 4.3.3. Test Configuration | 11 |
| 4.3.4. Test Procedure | 11 |
| 4.3.5. Test result | 12 |
| 4.4. 6dB Bandwidth | 14 |
| 4.4.1. Requirement | 14 |
| 4.4.2. Test method | 14 |
| 4.4.3. Test Configuration | 14 |
| 4.4.4. Test Procedure | 14 |
| 4.4.5. Test result | 15 |
| 4.5. Conducted Maximum Output Power | 17 |
| 4.5.1. Requirement | 17 |
| 4.5.2. Test Method | 17 |
| 4.5.3. Test Configuration | 17 |
| 4.5.4. Test Procedure | 17 |
| 4.5.5. Test result | 18 |
| 4.6. Power Spectral Density | 20 |
| 4.6.1. Requirement | 20 |
| 4.6.2. Test Method | 20 |
| 4.6.3. Test Configuration | 20 |
| 4.6.4. Test Procedure | 20 |

| | |
|--|----|
| 4.6.5. Test result | 21 |
| 4.7. Conducted Spurious Emission | 23 |
| 4.7.1. Requirement | 23 |
| 4.7.2. Test Method | 23 |
| 4.7.3. Test Configuration | 23 |
| 4.7.4. Test Procedure | 23 |
| 4.7.5. Test result | 24 |
| 4.8. Conducted Band Edges(Out of Band Emissions) | 30 |
| 4.8.1. Requirement | 30 |
| 4.8.2. Test Method | 30 |
| 4.8.3. Test Configuration | 30 |
| 4.8.4. Test Procedure | 30 |
| 4.8.5. Test result | 31 |
| 4.9. Radiated Spurious Emission | 33 |
| 4.9.1. Requirement | 33 |
| 4.9.2. Test Method | 33 |
| 4.9.3. Test Configuration | 34 |
| 4.9.4. Test Procedure | 35 |
| 4.9.5. Test result | 36 |
| 4.10. Radiated Restricted Band Edge | 48 |
| 4.10.1. Requirement | 48 |
| 4.10.2. Test Method | 48 |
| 4.10.3. Test Configuration | 48 |
| 4.10.4. Test Procedure | 48 |
| 4.10.5. Test result | 48 |

1. General Information

1.1. Client Information

Applicant : ONESOFTDIGM. Co., Ltd.
Address of Applicant : CHANGeUP GROUND #401, #402, 87 Cheongam-ro, Nam-gu,
Pohang-si, Gyeongbuk 37673, Republic of Korea

1.2. General Description of E.U.T.

Product Name : Fitrus+
Model No. : FR-B30

1.3. Details of E.U.T.

Operating Frequency : 2402 MHz to 2480 MHz
Type of Modulation : GFSK
Number of Channels : 40 Channels
Channel Separation : 2 MHz
Duty Cycle : Continuous operation possible for testing purposes
Antenna Type : Chip Antenna
Antenna gain : 0.0 dBi
Speciality : Bluetooth specification version (BLE)
Power Supply : Working voltage
Normal Test Voltage : DC 3.7 V

1.4. Test Facility

The test site and measurement facilities used to collect the radiated and conducted data are located at #107-25, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea.

-. Address

Korea Standard Testlab
#107-25, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea
Tel : +82-31-356-7333
FAX : +82-31-356-7303

-. Laboratory Accreditations and Listings

KC Designation No. : KR0155
FCC Registration No. : 0028220721

2. Test Equipment and Ancillaries used for Tests

| No. | Test Equipment | Manufacturer | Model No. | Serial No. | Next Cal. Data | Used equipment |
|-----|------------------------------|--------------------|-------------|--------------|----------------|----------------|
| 1 | Spectrum Analyzer | Agilent | E4440A | MY45304715 | 24.10.05 | ■ |
| 2 | Signal and Spectrum Analyzer | ROHDE & SCHWARZ | FSV40 | 101267 | 24.12.08 | ■ |
| 3 | DC Power Supply | KEYSIGHT | U8002A | MY5813082 | 24.02.27 | ■ |
| 4 | Signal Generator | Leader Electronics | 3220 | 137231 | 24.05.18 | ■ |
| 5 | Synthesized CW Generator | HP | 83711B | US34490158 | 24.05.18 | ■ |
| 6 | Low Noise Amplifier | Testek | TK-PA06S | 190018-L | 24.05.18 | □ |
| 7 | Pre Amplifier | HP | 8449B | 3008A00224 | 24.05.18 | ■ |
| 8 | Attenuator | TAE SUNG | SMA-2 | N/A | 24.05.18 | ■ |
| 9 | Loop ANT. | Com-Power | AL-130 | 121010 | 24.05.26 | □ |
| 10 | Bi-log Antenna | SCHWARZBECK | VULB9160 | 3311 | 24.03.03 | ■ |
| 11 | Horn ANT. | SCHWARZBECK | BBHA 9120 D | 9120D-1281 | 24.02.27 | ■ |
| 12 | Test Receiver | ROHDE&SCHWARZ | ESR7 | 102112 | 24.02.27 | ■ |
| 13 | RMS Multimeter | CHEKMAN | TK-201 | KT2018600226 | 24.02.24 | ■ |

3. Summary of Test Results

| No | Test | Standard Sub-Class | Result |
|----|---|------------------------------|-----------|
| 0 | Antenna Requirement | §15.203 | Compliant |
| 1 | 6dB Bandwidth | §15.247(a) | Compliant |
| 2 | Conducted Maximum Output Power | §15.247(b) | Compliant |
| 3 | Power Spectral Density | §15.247(e) | Compliant |
| 4 | Conducted Spurious Emission | §15.247(d) | Compliant |
| 5 | Conducted Band Edges(Out of Band Emissions) | §15.247(d) | Compliant |
| 6 | Radiated Spurious Emission | §15.247(d), §15.205, §15.209 | Compliant |
| 7 | Radiated Restricted Band Edge | §15.247(d), §15.205, §15.209 | Compliant |

4. Test Results

4.1. E.U.T. test conditions

| | |
|--|---|
| Test Voltage: | DC 3.7 V |
| Temperature: | 25 °C |
| Humidity: | 50 % RH |
| Atmospheric Pressure: | 1 006 mbar |
| Test frequencies and frequency range: | Test frequencies are 2 402 MHz to 2 480 MHz. Low channel is 2 402 MHz, Middle channel is 2 440 MHz, High channel is 2 480 MHz, BLE Mode, Total channel is 40. |

4.1.1. EUT channels and frequencies list

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0 | 2 402 | 20 | 2 442 |
| 1 | 2 404 | 21 | 2 444 |
| 2 | 2 406 | 22 | 2 446 |
| 3 | 2 408 | 23 | 2 448 |
| 4 | 2 410 | 24 | 2 450 |
| 5 | 2 412 | 25 | 2 452 |
| 6 | 2 414 | 26 | 2 454 |
| 7 | 2 416 | 27 | 2 456 |
| 8 | 2 418 | 28 | 2 458 |
| 9 | 2 420 | 29 | 2 460 |
| 10 | 2 422 | 30 | 2 462 |
| 11 | 2 424 | 31 | 2 464 |
| 12 | 2 426 | 32 | 2 466 |
| 13 | 2 428 | 33 | 2 468 |
| 14 | 2 430 | 34 | 2 470 |
| 15 | 2 432 | 35 | 2 472 |
| 16 | 2 434 | 36 | 2 474 |
| 17 | 2 436 | 37 | 2 476 |
| 18 | 2 438 | 38 | 2 478 |
| 19 | 2 440 | 39 | 2 480 |

4.1.2. Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test mode | Low channel | Middle channel | High channel |
|--------------|-------------|----------------|--------------|
| Transmitting | 2 402 MHz | 2 440 MHz | 2 480 MHz |

4.2. Antenna

4.2.1. Requirement

According to §15.203, 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.

And according to §15.247(b)(4), 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.

4.2.2. Test Result

The transmitter has an integral Chip antenna. The directional gain of the antenna is 0.0 dBi

Test result : Pass

4.3. Duty Cycle

4.3.1. Requirement

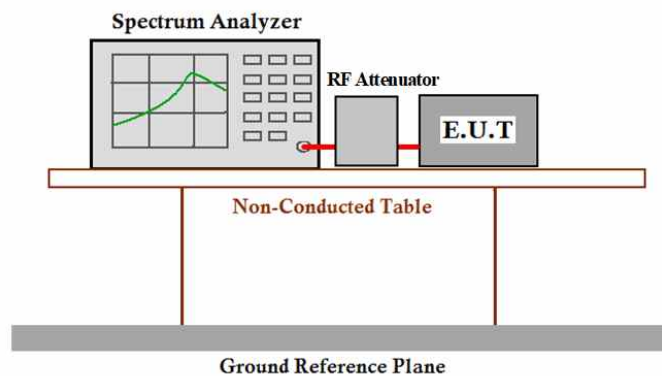
The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method, 6.0)b) in KDB 558074 v05r02.

4.3.2. Test method

KDB 558074 v05r02

4.3.3. Test Configuration



4.3.4. Test Procedure

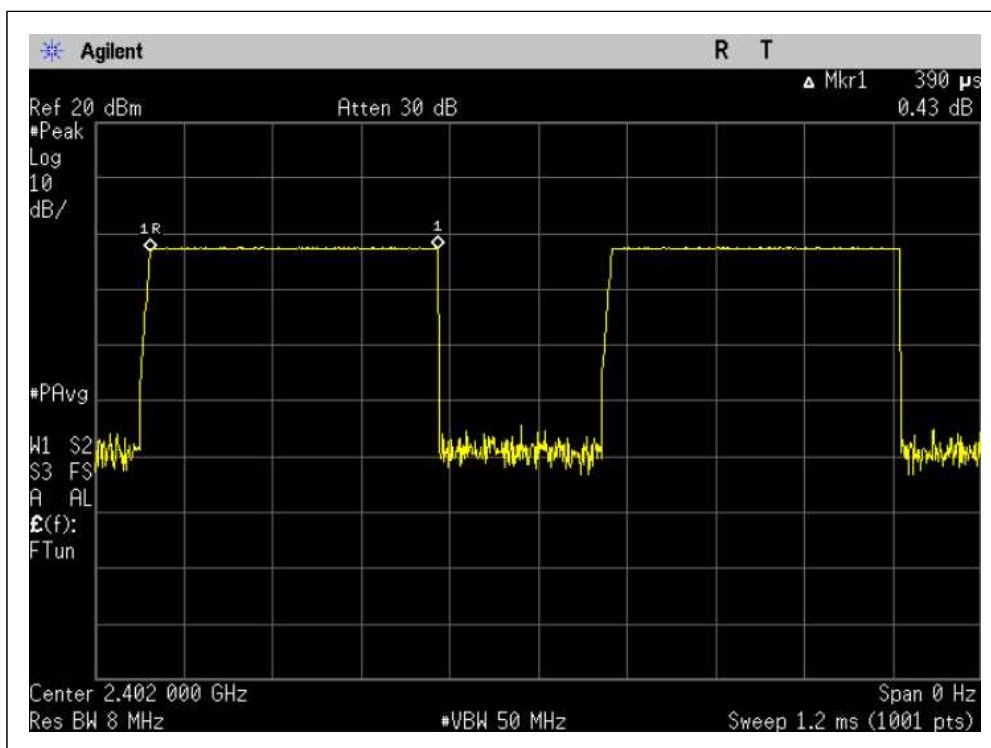
- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer :
 - a) Set RBW = 10MHz(the largest available value)
 - b) Set the video bandwidth (VBW) =10 MHz(\geq RBW)
 - c) Detector = Peak.
 - d) Trace mode = Clear write.
 - e) SPAN = 0 Hz
 - f) Measure T_{total} and T_{on}
- g) Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

4.3.5. Test result

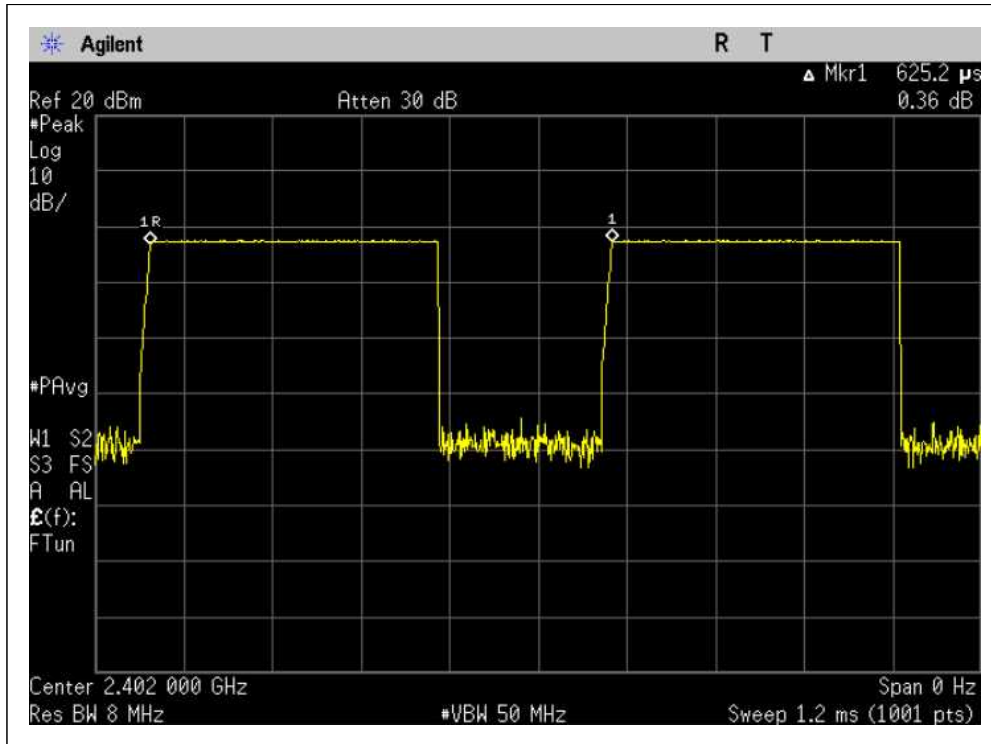
| Data rate (Bit/s) | Packet length (Byte) | T _{on} (ms) | T _{total} (ms) | Duty Cycle | Duty Cycle Factor (dB) |
|----------------------|-------------------------|-------------------------|----------------------------|------------|---------------------------|
| 1M | 10 | 0.390 | 0.625 | 0.624 | 2.04 |

1M Bit/s Test Plots :

Duty Cycle(Low-CH 0) T_{on}



Duty Cycle(Low-CH 0) T_{total}



4.4. 6 dB Bandwidth

4.4.1. Requirement

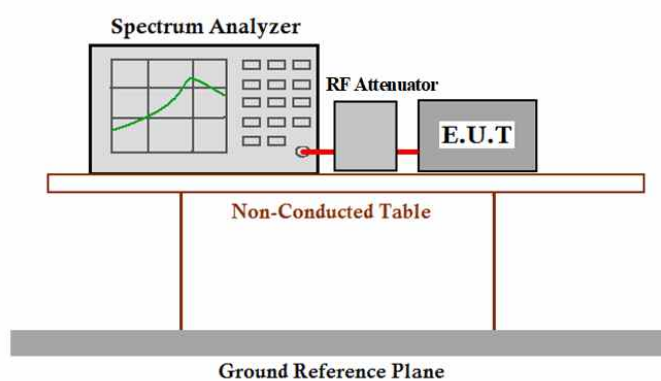
FCC Part 15 C section 15.247

(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.4.2. Test method

KDB 558074 v05r02 and ANSI C63.10:2013

4.4.3. Test Configuration



4.4.4. Test Procedure

- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer :
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

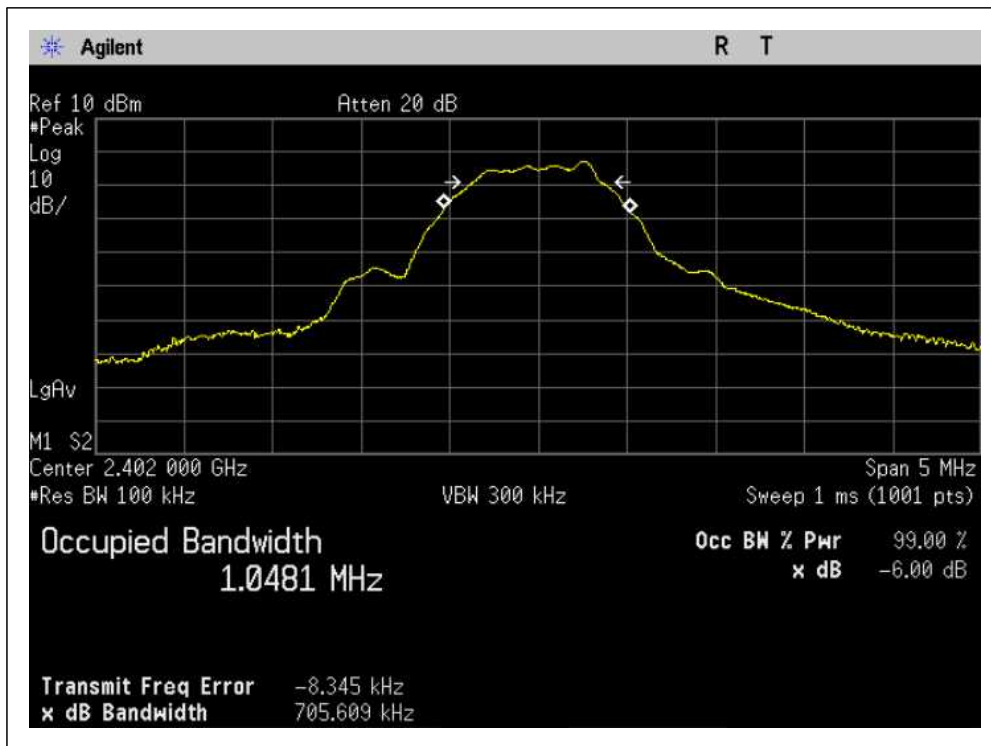
4.4.5. Test result

| Mode (Bit/s) | Channel | 6dB Bandwidth (kHz) | Limit (kHz) |
|--------------|---------|---------------------|-------------|
| 1M | 0 | 705.609 | >500 |
| | 19 | 706.471 | |
| | 39 | 701.733 | |

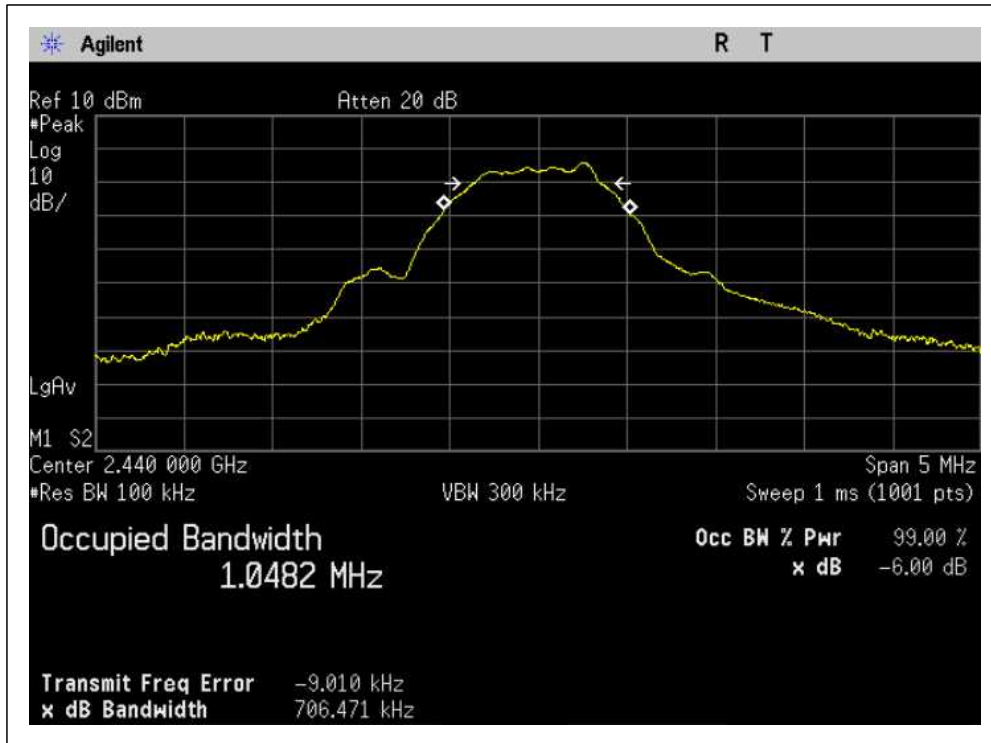
Test result : The unit does meet the FCC requirements.

Please refer to the following test plots:

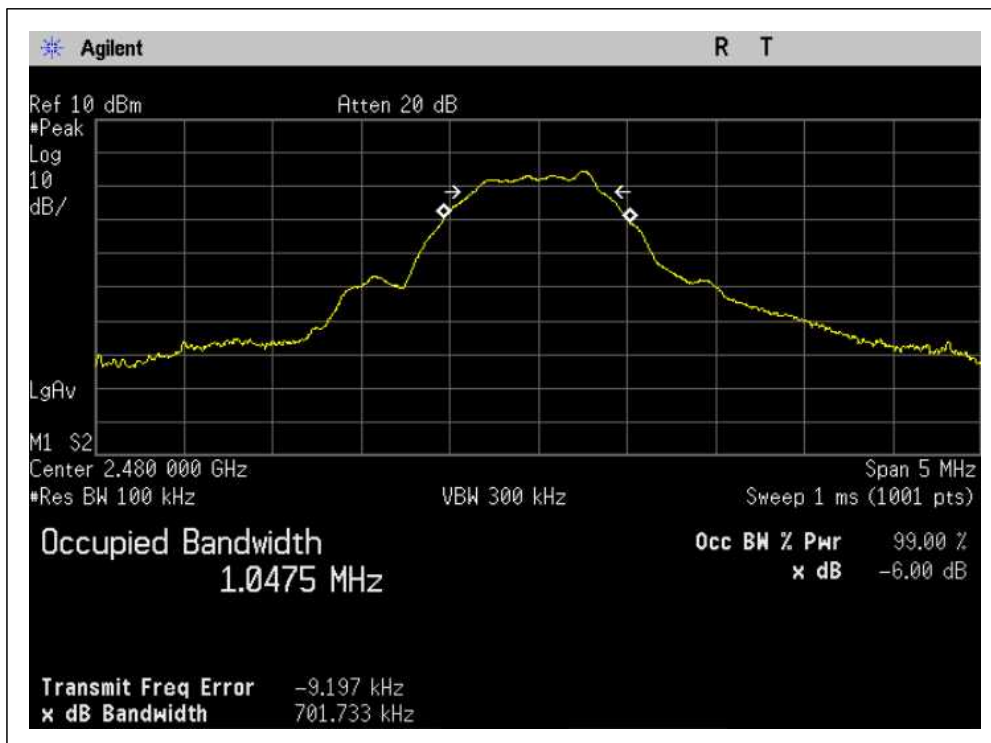
1M (Low-CH 0)



1M (Mid-CH 19)



1M (High-CH 39)



4.5. Conducted Maximum Output Power

4.5.1. Requirement

FCC Part 15 C section 15.247

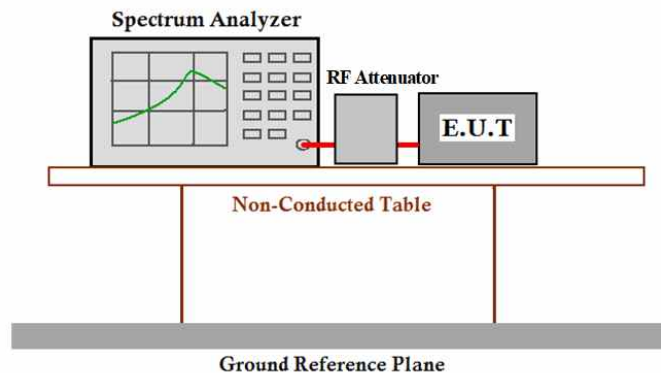
(b)(3) For systems using digital modulation in the 902 ~ 928 MHz, 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 850 MHz bands: 1 Watt.

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 paragraph (b) (1), (b) (2), and (b) (3) of section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.5.2. Test Method

KDB 558074 v05r02 and ANSI C63.10:2013

4.5.3. Test Configuration



4.5.4. Test Procedure

- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer:
 - a) Set $RBW \geq DTS$ bandwidth
 - b) Set the video bandwidth (VBW) $\geq 3 \times RBW$.
 - c) Set span $\geq 3 \times RBW$.
 - d) Sweep time = auto couple.
 - e) Detector = Peak.
 - f) Trace mode = max hold.
 - g) Allow the trace to stabilize.
 - h) Use peak marker function to determine the peak amplitude level.

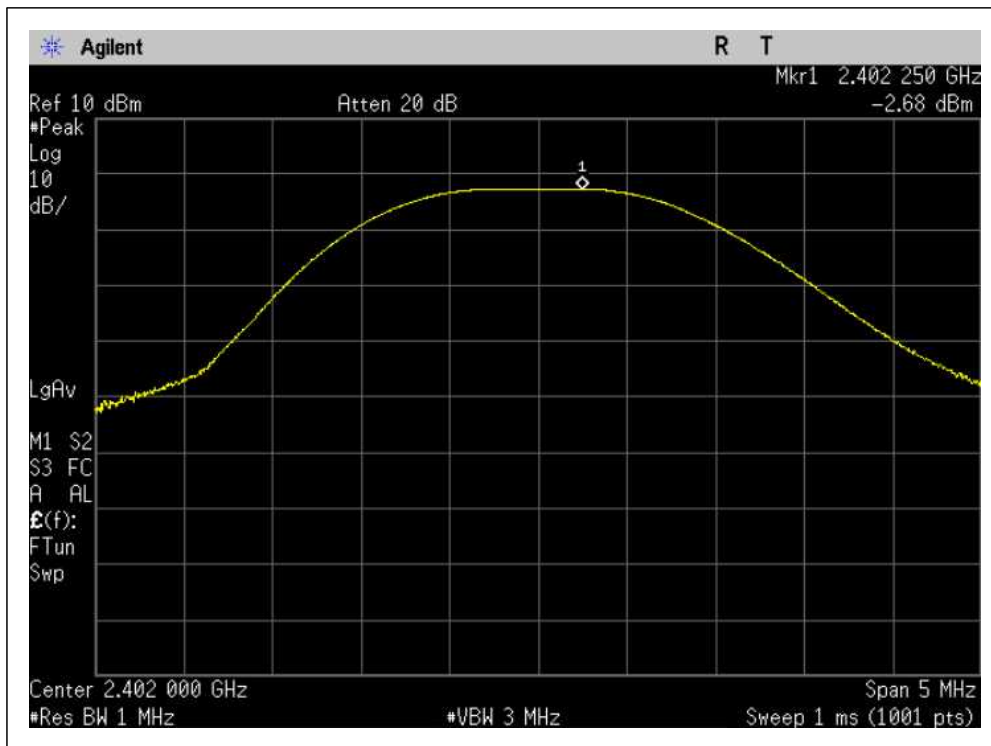
4.5.5. Test result

| Mode (Bit/s) | Channel | Highest signal level (dBm) | Limit (dBm) |
|--------------|---------|----------------------------|-------------|
| 1M | 0 | -2.68 | 30 (1 Watt) |
| | 19 | -4.06 | |
| | 39 | -5.34 | |

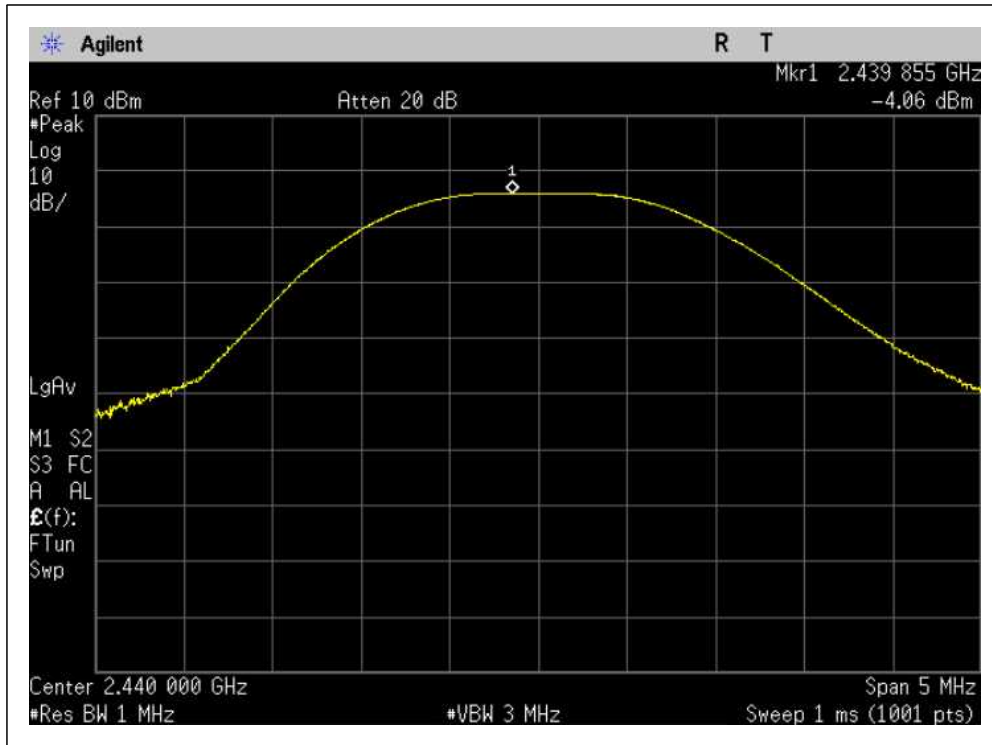
Test result : The unit does meet the FCC requirements.

Please refer to the following test plots:

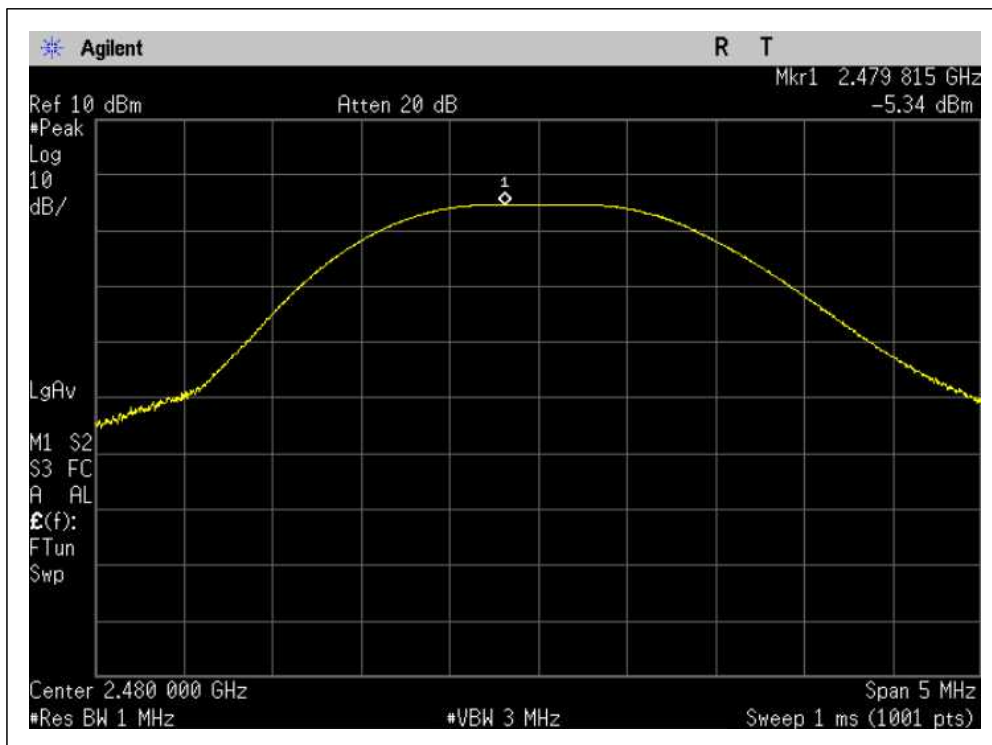
1M (Low-CH 0)



1M (Mid-CH 19)



1M (High-CH 39)



4.6. Power Spectral Density

4.6.1. Requirement

FCC Part 15 C section 15.247

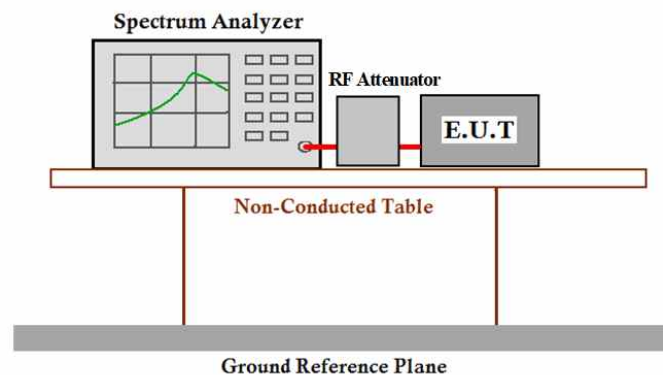
(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

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.

4.6.2. Test Method

KDB 558074 v05r02 and ANSI C63.10:2013

4.6.3. Test Configuration



4.6.4. Test Procedure

- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer:
 - a) Set analyzer center frequency to DTS channel center frequency.
 - b) Set the span to 1.5 times the DTS bandwidth.
 - c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - d) Set the VBW $\geq 3 \times \text{RBW}$.
 - e) Detector = peak.
 - f) Sweep time = auto couple.
 - g) Trace mode = max hold.
 - h) Allow trace to fully stabilize.
 - i) Use the peak marker function to determine the maximum amplitude level within the RBW.
 - j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.6.5. Test result

| Frequency (MHz) | Channel No. | Mode | Test Result | | | |
|-----------------|-------------|------|---------------------|-----------------------|---|-------------|
| | | | Measured Power(dBm) | Duty Cycle Factor(dB) | Measured Power(dBm) + Duty Cycle Factor(dB) | Limit (dBm) |
| 2402 | 0 | 1M | -2.85 | 2.04 | -0.81 | 8 |
| 2440 | 19 | | -4.22 | 2.04 | -2.18 | |
| 2480 | 39 | | -5.47 | 2.04 | -3.43 | |

Note:

1. Spectrum reading values are not plot data.

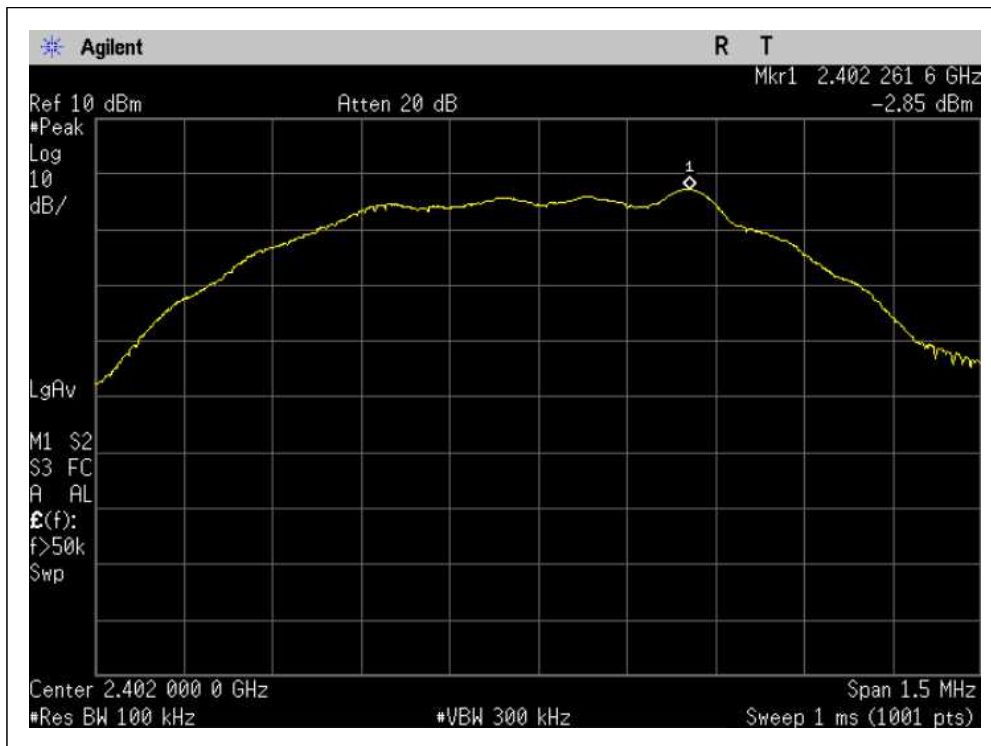
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset = Attenuator loss + Cable loss

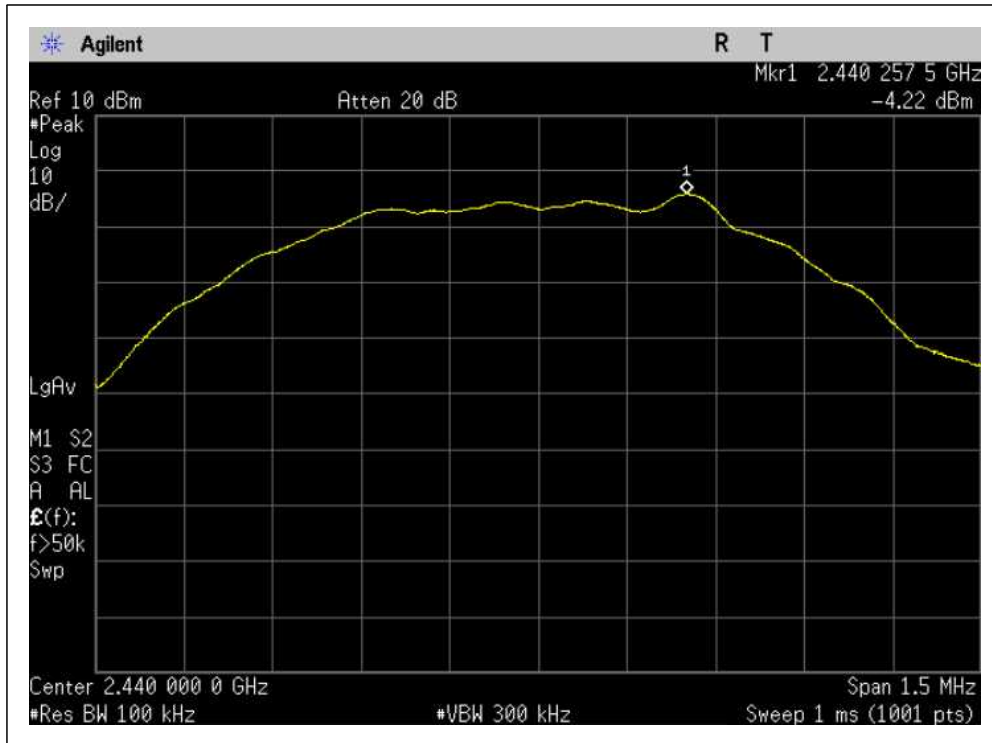
3. This unit does meet the FCC requirements.

Please refer to the following test plots:

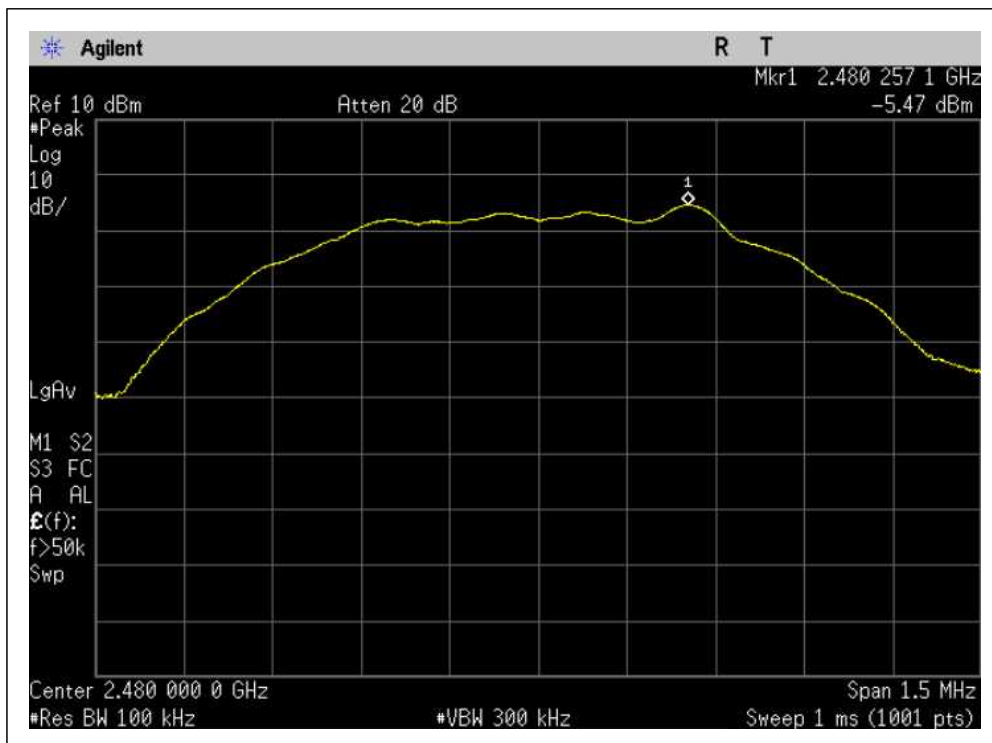
1M (Low-CH 0)



1M (Mid-CH 19)



1M (High-CH 39)



4.7. Conducted Spurious Emission

4.7.1. Requirement

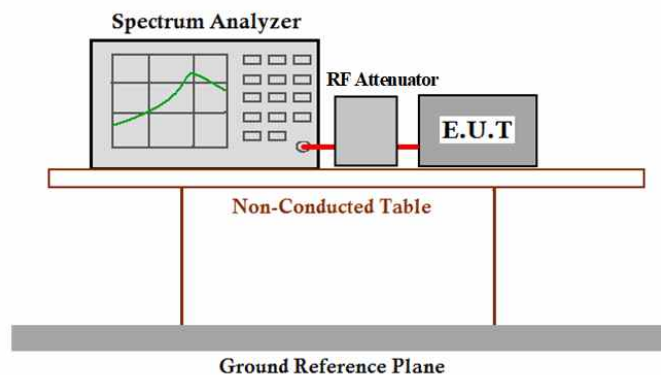
FCC Part15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Based on either an RF conducted or a radiated measurement. Provided the transmitter demonstrates compliance with the peak conducted power limits.

4.7.2. Test Method

KDB 558074 v05r02 and ANSI C63.10:2013

4.7.3. Test Configuration

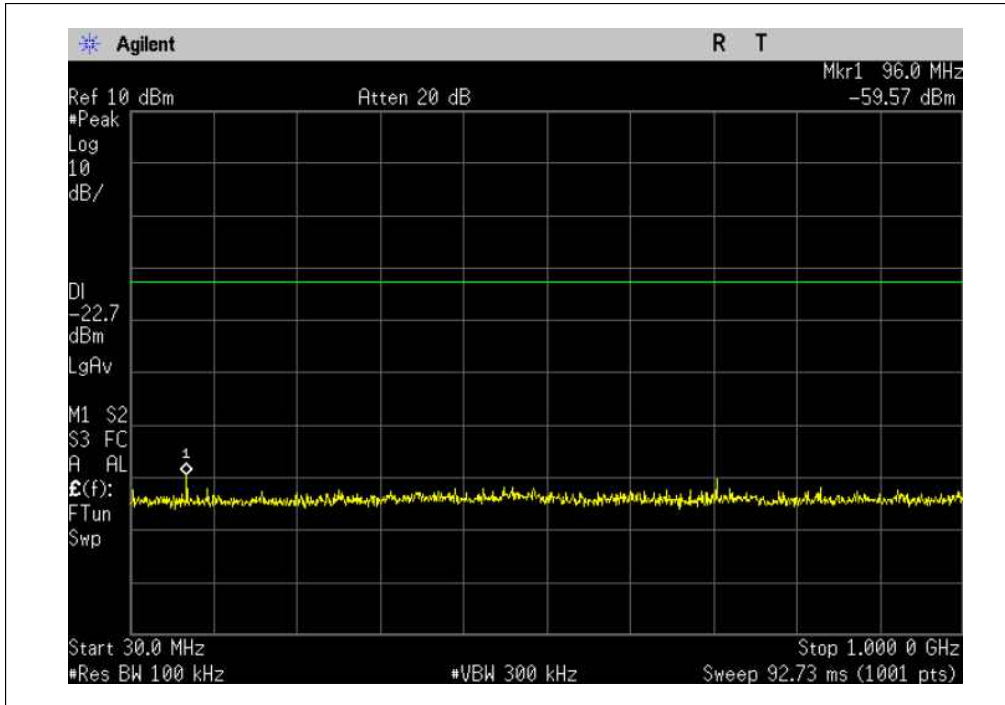


4.7.4. Test Procedure

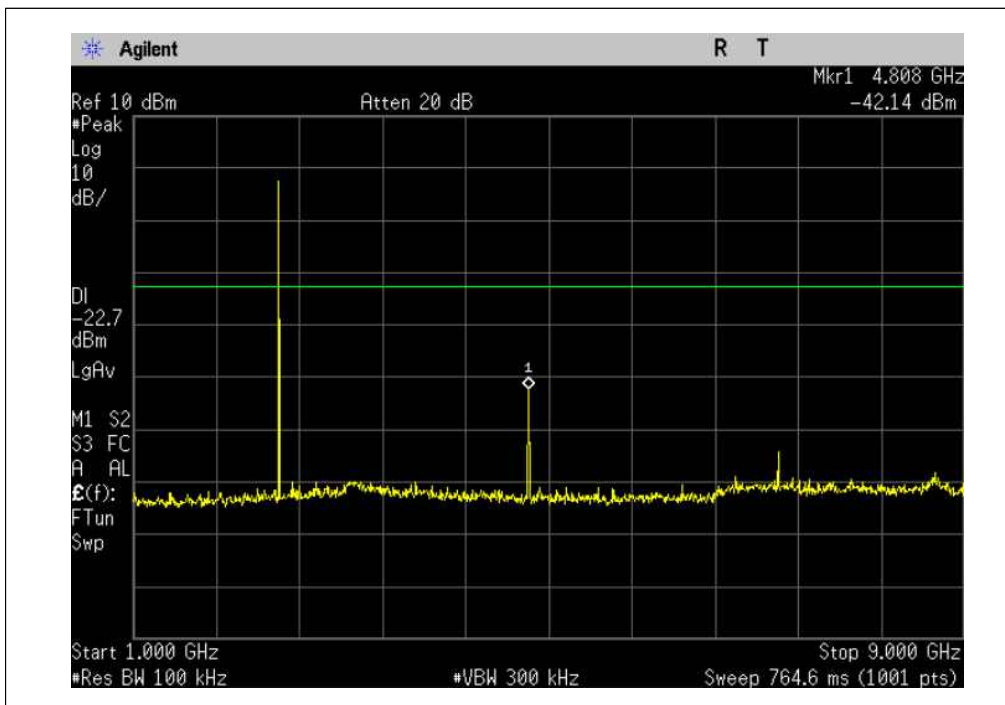
- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer:
 - a) Set the RBW = 100 kHz
 - b) Set the VBW = 300 kHz
 - c) Detector = peak.
 - d) Sweep time = auto couple.
 - e) Trace mode = max hold.
 - f) Scan up through 10th harmonic.

4.7.5. Test result

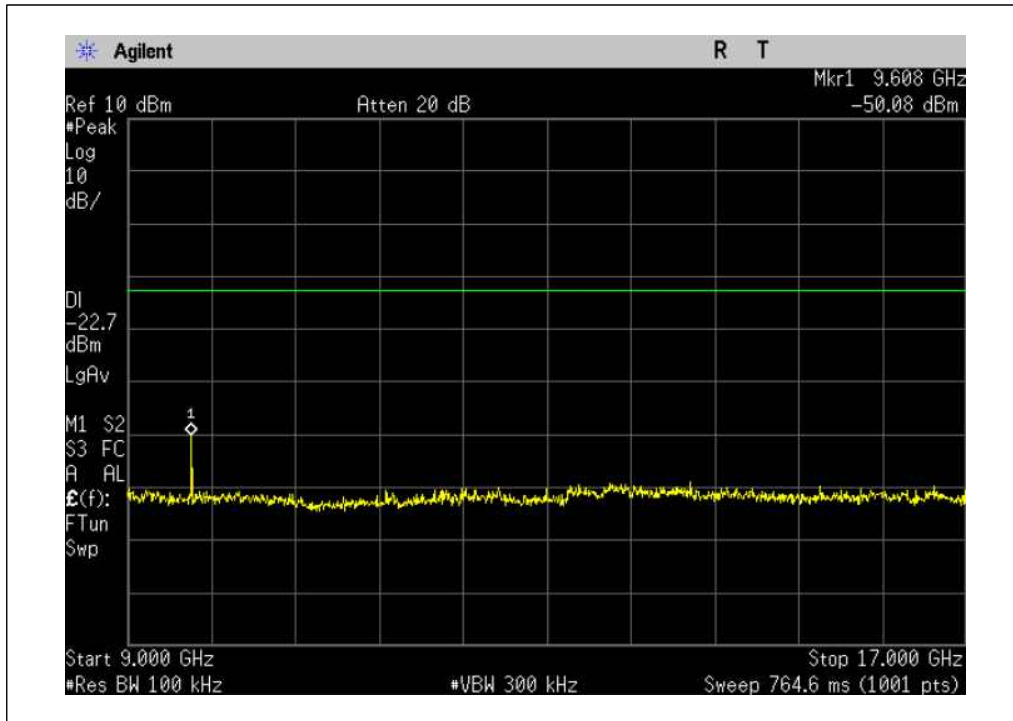
1M (Low-CH 0)_30 MHz to 1 GHz



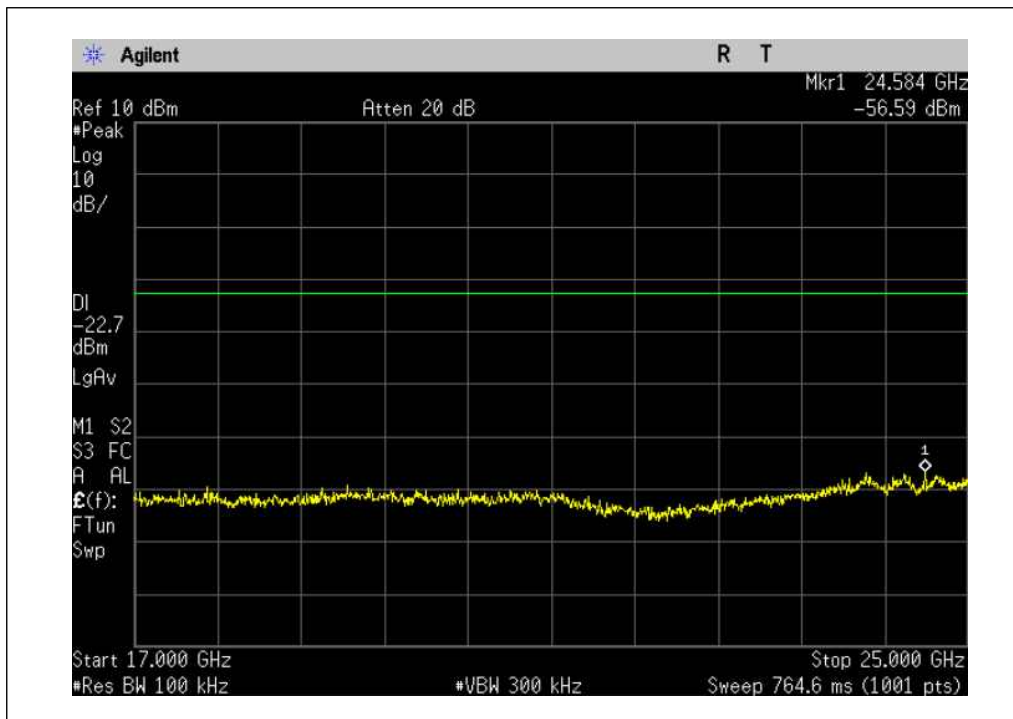
1M (Low-CH 0)_1 GHz to 9 GHz



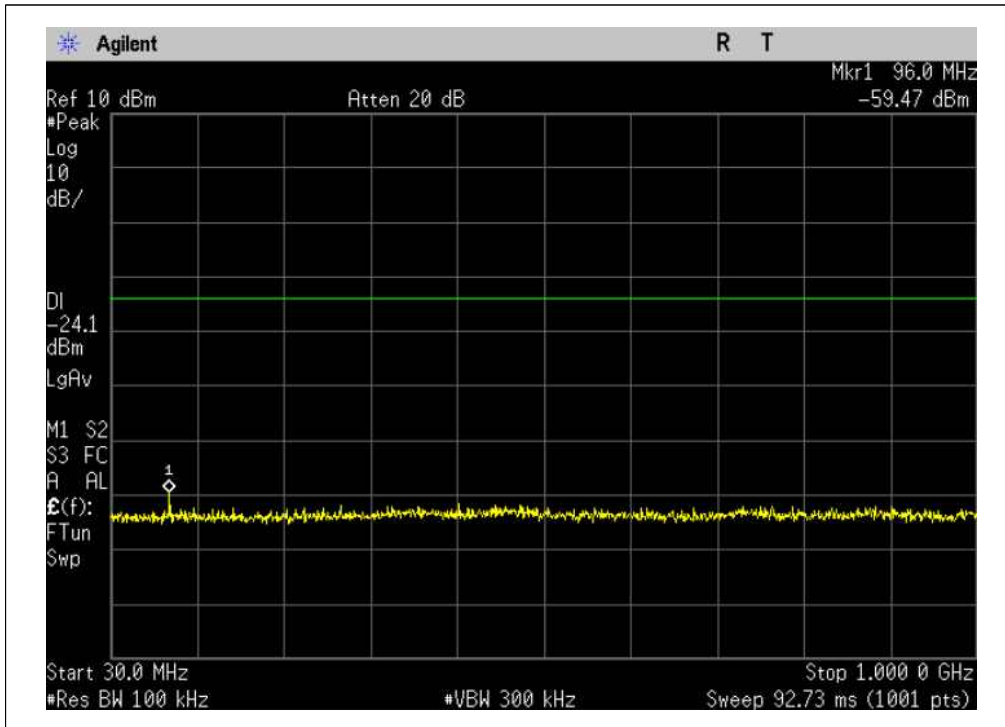
1M (Low-CH 0)_9 GHz to 17 GHz



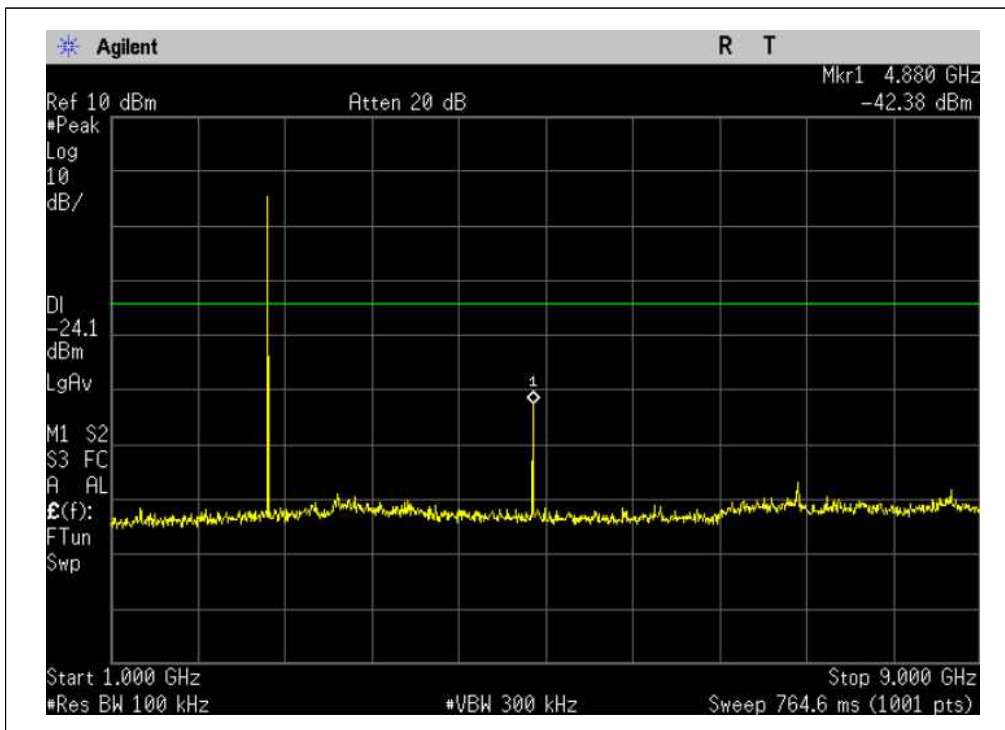
1M (Low-CH 0)_17 GHz to 25 GHz



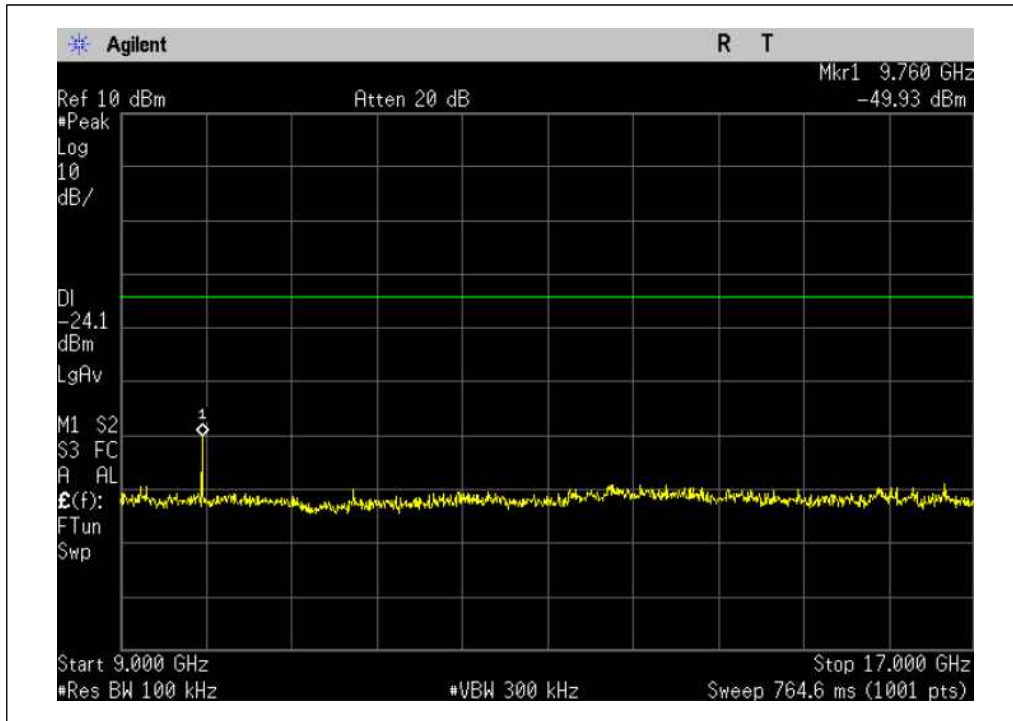
1M (Mid-CH 19)_30 MHz to 1 GHz



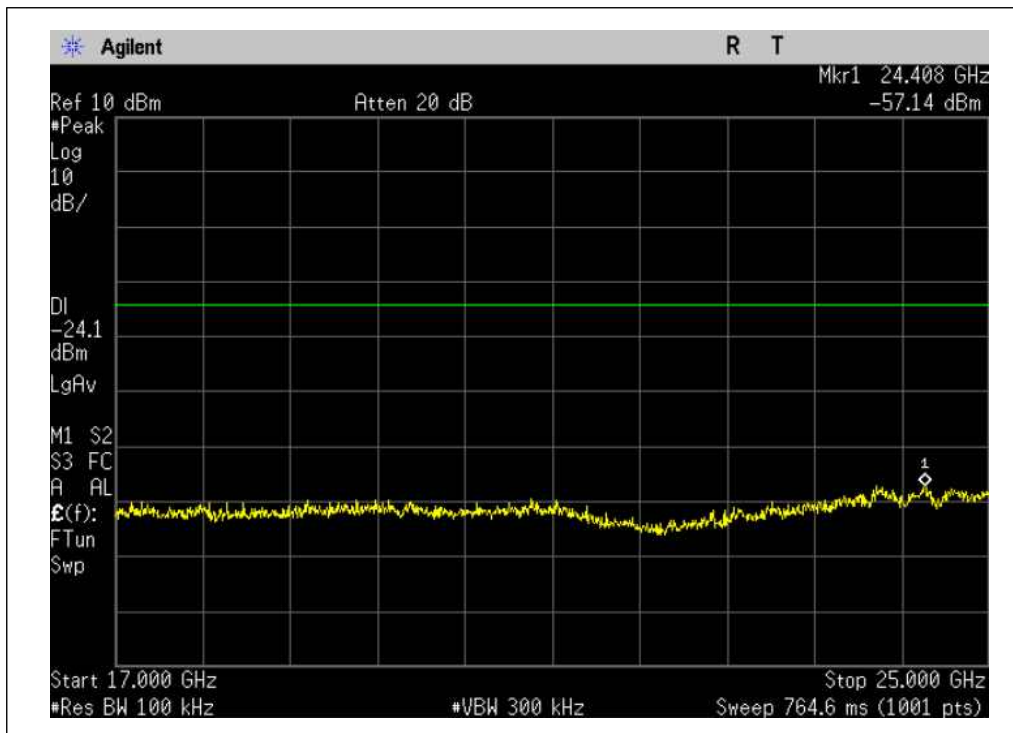
1M (Mid-CH 19)_1 GHz to 9 GHz



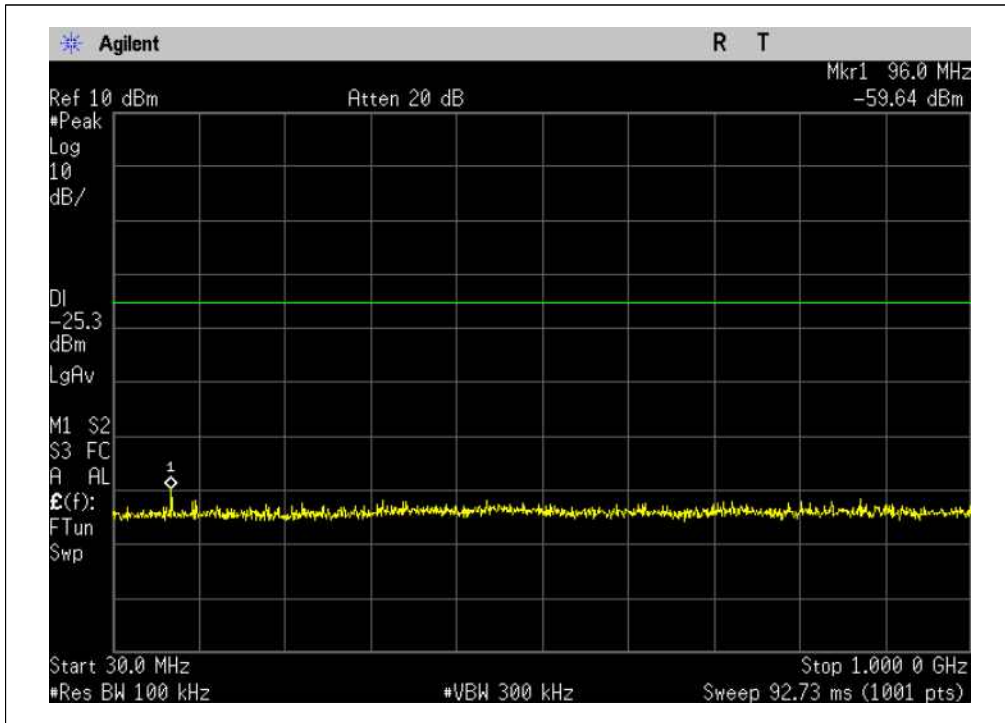
1M (Mid-CH 19)_9 GHz to 17 GHz



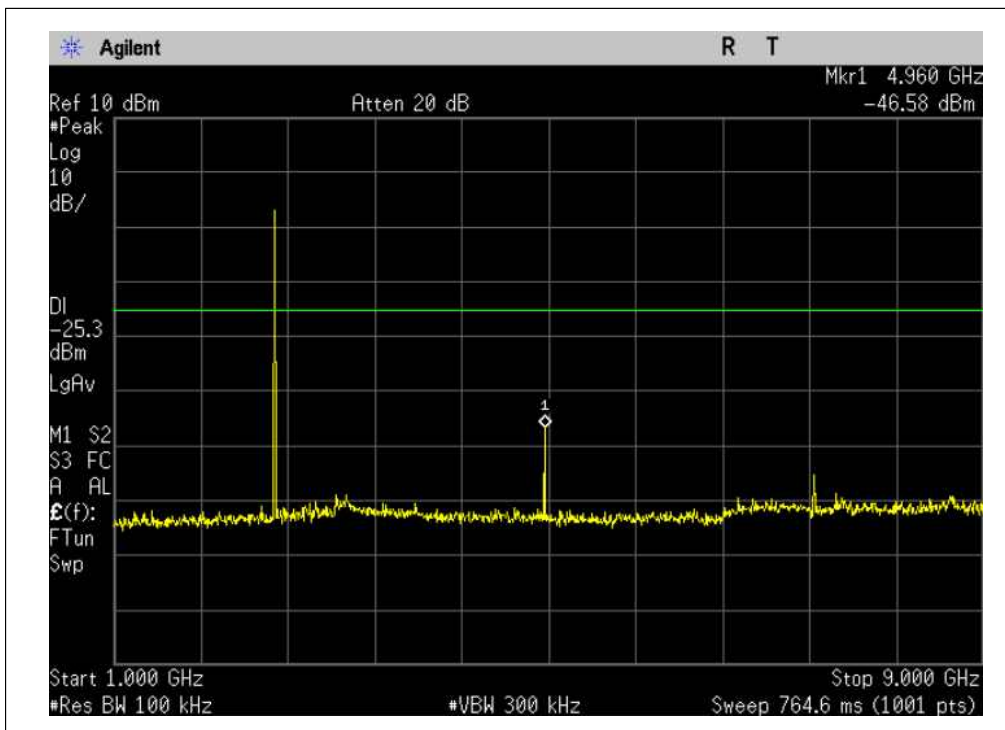
1M (Mid-CH 19)_17 GHz to 25 GHz



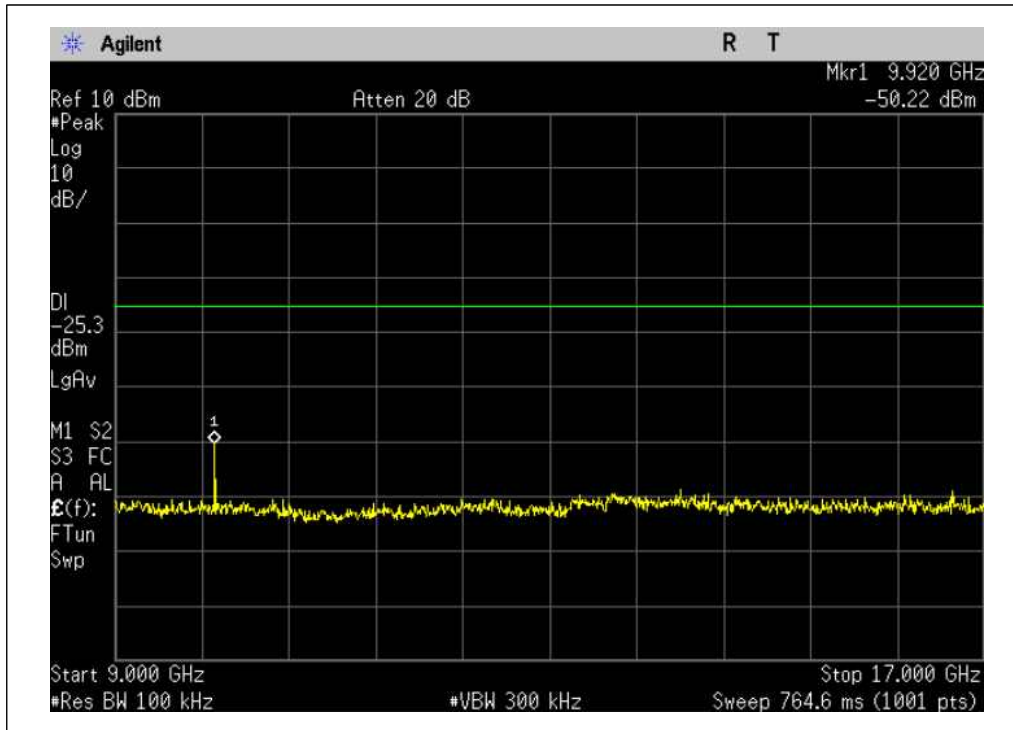
1M (High-CH 39)_30 MHz to 1 GHz



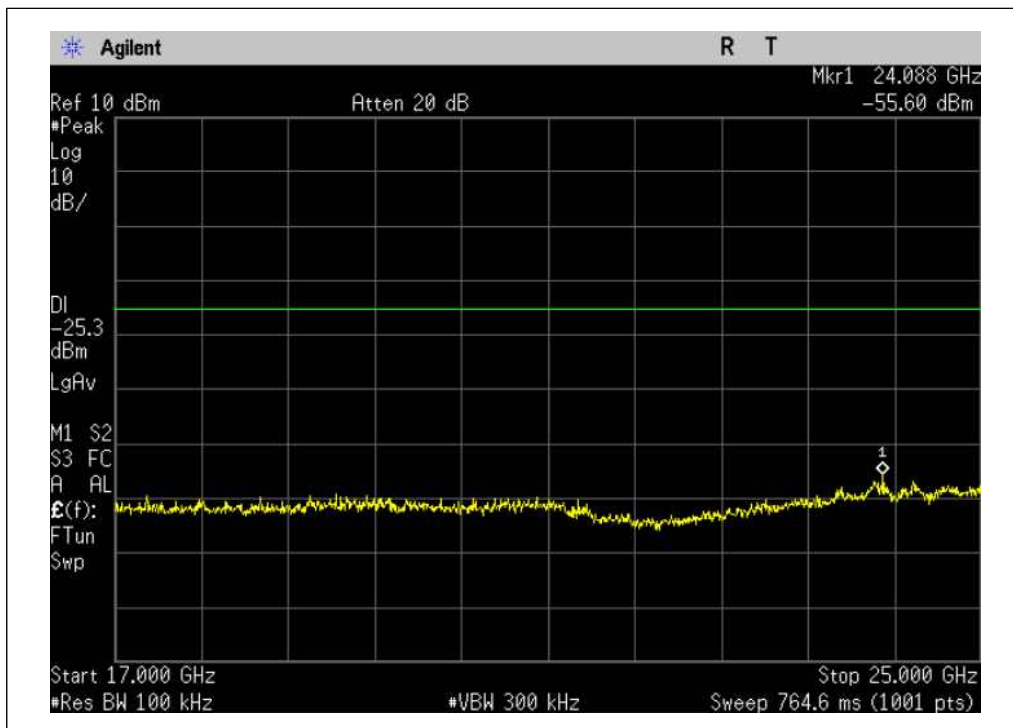
1M (High-CH 39)_1 GHz to 9 GHz



1M (High-CH 39)_9 GHz to 17 GHz



1M (High-CH 39)_17 GHz to 25 GHz



4.8. Conducted Band Edges(Out of Band Emissions)

4.8.1. Requirement

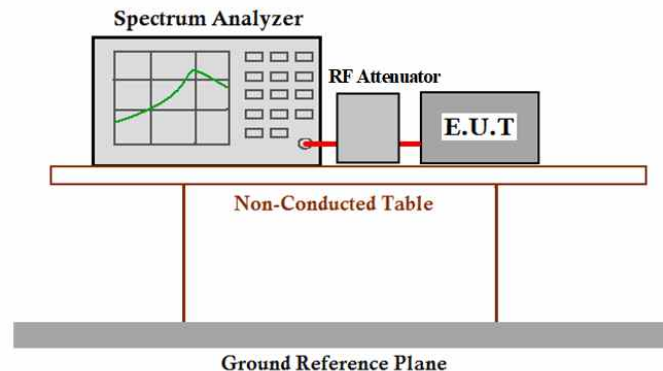
FCC Part15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.8.2. Test Method

KDB 558074 v05r02 and ANSI C63.10:2013

4.8.3. Test Configuration



4.8.4. Test Procedure

- 1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.

2) Set the spectrum analyzer:

- a) Set start frequency to DTS channel edge frequency.
- b) Set stop frequency so as to encompass the spectrum to be examined.
- c) Set RBW = 100 kHz.
- d) Set VBW $\geq 3 \times$ RBW
- e) Detector = peak.
- f) Trace Mode = max hold.
- g) Sweep = auto couple.
- h) Ensure that the number of measurement points $\geq 2 \times$ Span/VBW
- i) Allow trace to fully stabilize.

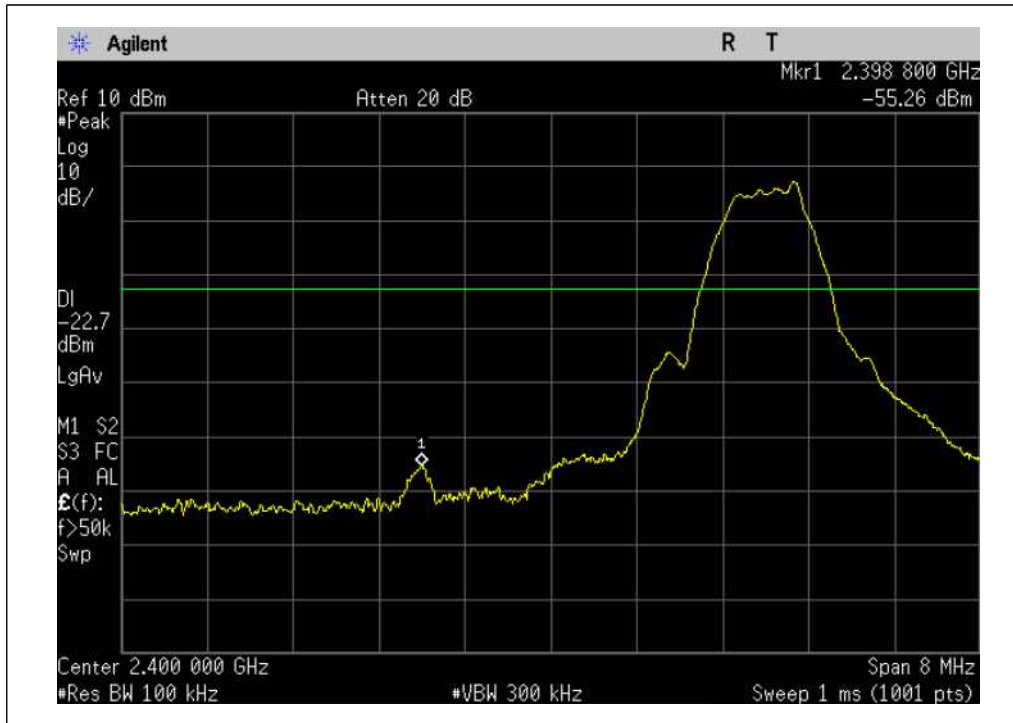
4.8.5. Test result

Compare with the output power of the lowest frequency, the Lower Edges attenuated more than 20 dB.

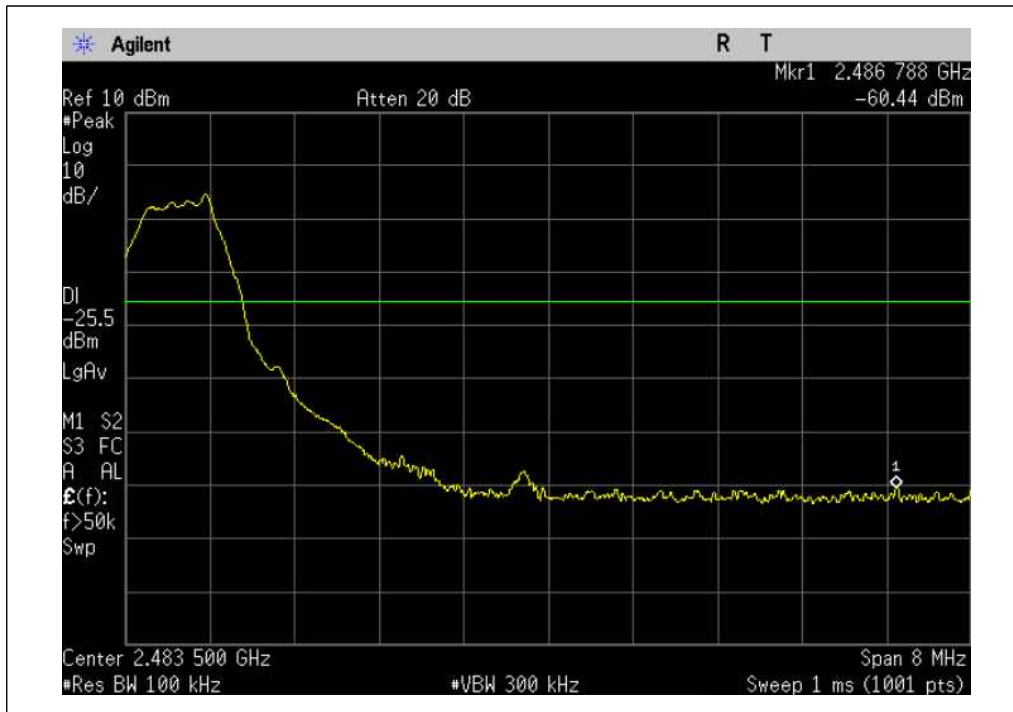
Compare with the output power of the highest frequency, the Upper Edges attenuated more than 20 dB.

Result plot as follows:

1M (Low-CH 0)



1M (High-CH 39)



4.9. Radiated Spurious Emission

4.9.1. Requirement

FCC Part15 C section 15.247

(d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limited specified in Section 15.209(a) (see Section 15.205(c)).

4.9.2. Test Method

ANSI C63.10:2013

1) Test site

Measurement Distance : 3 m (Semi-Anechoic Chamber)

2) Receiver setup

| Frequency | Detector | RBW | VBW | Remark |
|--------------|------------|---------|---------|------------------|
| 30 MHz~1 GHz | Quasi-peak | 120 KHz | 300 KHz | Quasi-peak Value |
| Above 1 GHz | Peak | 1 MHz | 3 MHz | Peak Value |
| | RMS | 1 MHz | 3 MHz | Average Vaile |

3) Limit

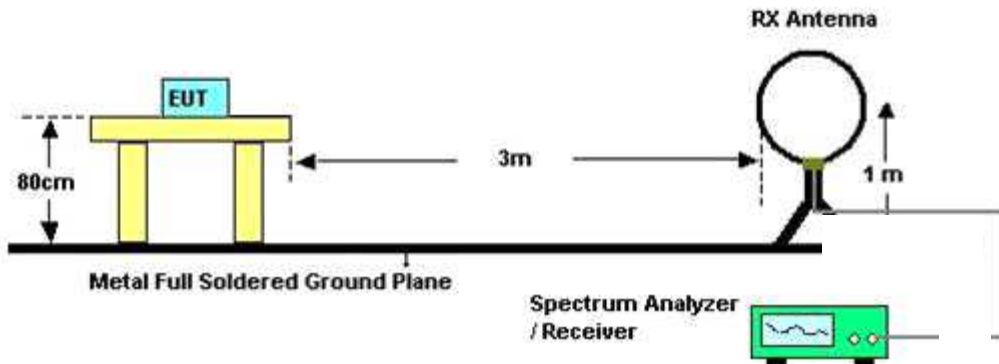
| Frequency | Limit(dB μ V/m @ 3m) | Remark |
|-------------------|--------------------------|------------------|
| 30 MHz ~ 88 MHz | 40.0 | Quasi-peak Vaule |
| 88 MHz ~ 216 MHz | 43.5 | Quasi-peak Vaule |
| 216 MHz ~ 960 MHz | 46.0 | Quasi-peak Vaule |
| 960 MHz ~ 1 GHz | 54.0 | Quasi-peak Vaule |
| Above 1 GHz | 54.0 | Average Value |
| | 74.0 | Peak Value |

4) Test Frequency Range

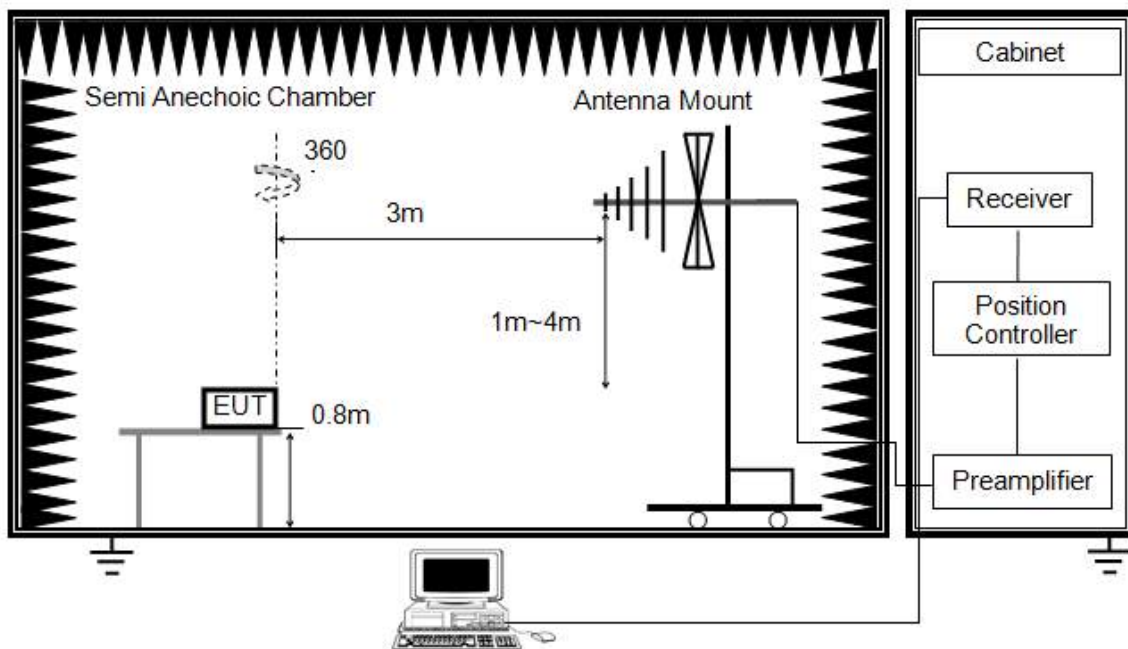
30 MHz ~ 26.5 GHz

4.9.3. Test Configuration

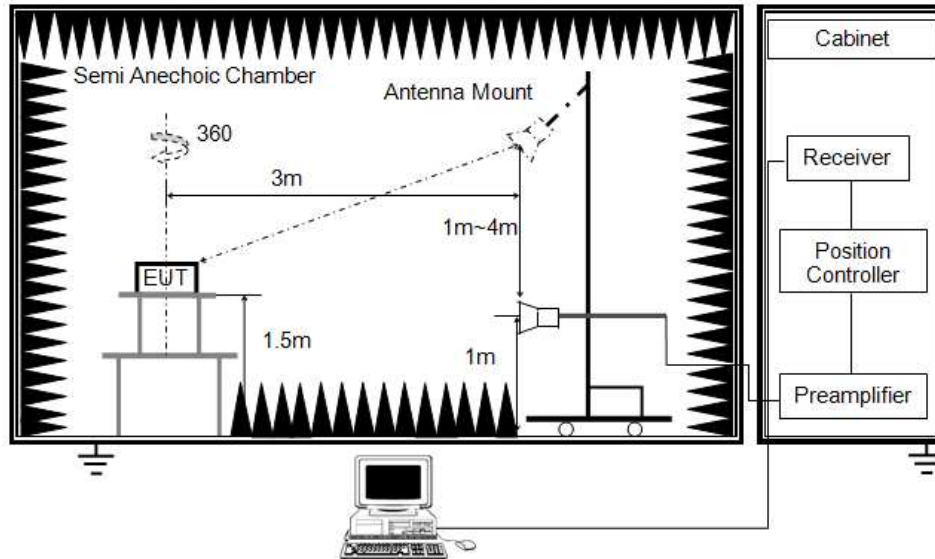
1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 26.5 GHz emissions:



4.9.4. Test Procedure

- 1) The EUT is placed on a turntable. For below 1 GHz, the EUT is 0.8 m above ground plane; For above 1 GHz, the EUT is 1.5m above ground plane.
- 2) The turn turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3 m away from the receiving antenna, which is move from 1m to 4 m to find out the maximum emissions. The spectrum was investigated from the lowest radio highest fundamental frequency or to 40 GHz, whichever is lower.
- 4) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6) Repeat above procedures until the measurements for all frequencies are complete.
- 7) Below 1 GHz:
Total(Measurement Type : Quasi-Peak)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
- 8) Above 1 GHz:
Total (Measurement Type : Peak)
= Peak Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)
Total (Measurement Type : Average)
= Average Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

4.9.5. Test result

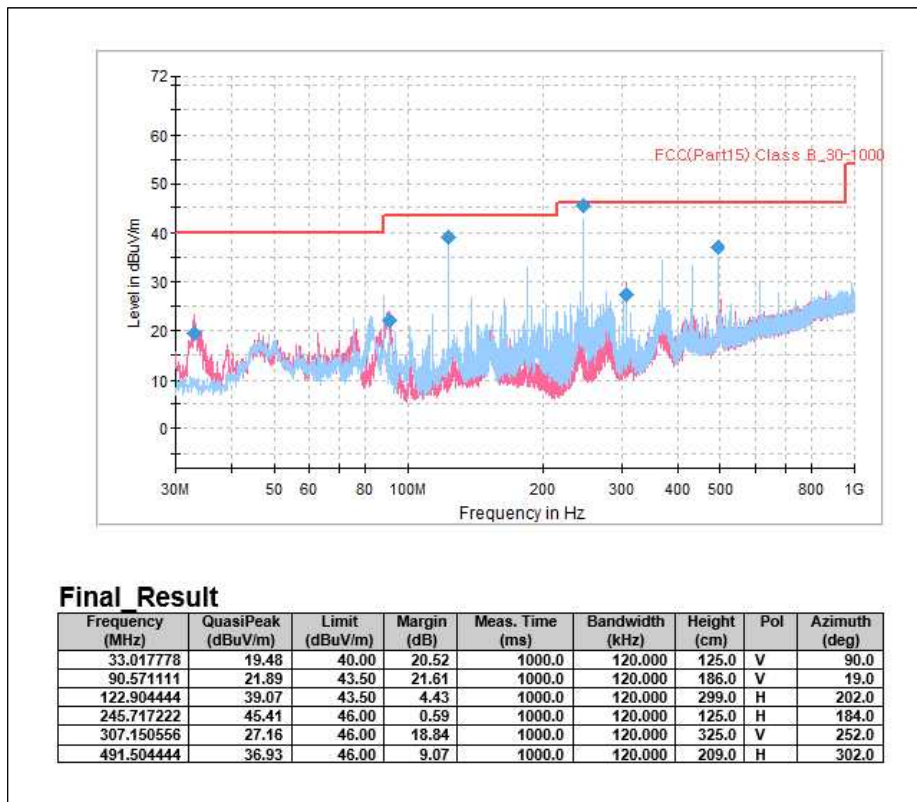
1) Test at low Channel (2 402 MHz) in transmitting status

a) 9 kHz ~ 30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20 dB below the limit, so the test data were not recorded in the test report.

b) Below 1GHz

Horizontal and Vertical:

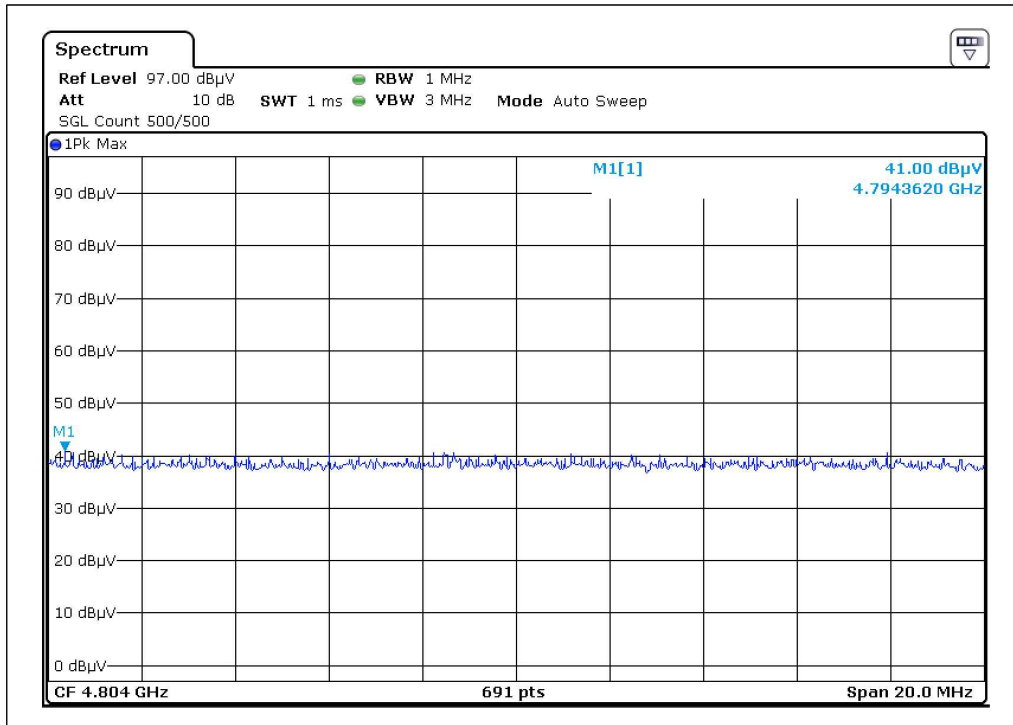


c) Above 1GHz

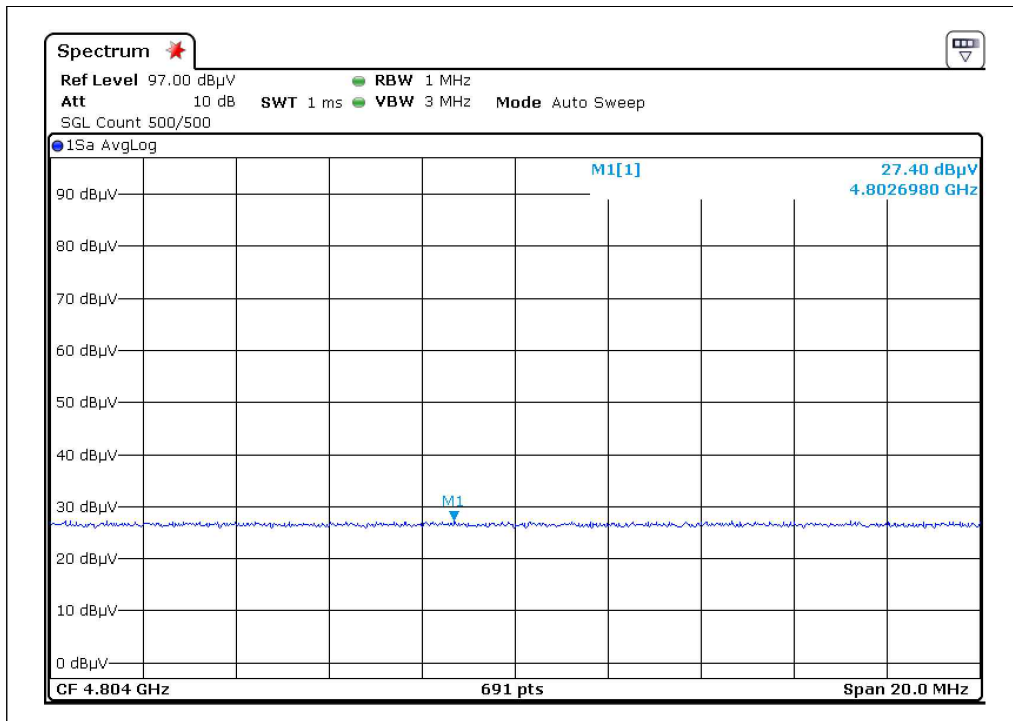
Mode: 1M

| Frequency [MHz] | Reading [dBuV] | Duty Cycle Correction [dB] | A.F + C.L - A.G + D.F [dB] | Pol. [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|----------------------------|----------------------------|------------|----------------|----------------|-------------|------------------|
| 4 804 | 41.00 | 0.00 | -6.51 | H | 34.49 | 74.00 | 39.51 | PK |
| 4 804 | 27.40 | 2.04 | -6.51 | H | 22.93 | 54.00 | 31.07 | AV |
| 7 206 | 40.04 | 0.00 | -4.81 | H | 35.23 | 74.00 | 38.77 | PK |
| 7 206 | 26.74 | 2.04 | -4.81 | H | 23.97 | 54.00 | 30.03 | AV |
| 9 608 | 40.21 | 0.00 | -4.01 | V | 36.20 | 74.00 | 37.80 | PK |
| 9 608 | 26.68 | 2.04 | -4.01 | V | 24.71 | 54.00 | 29.29 | AV |

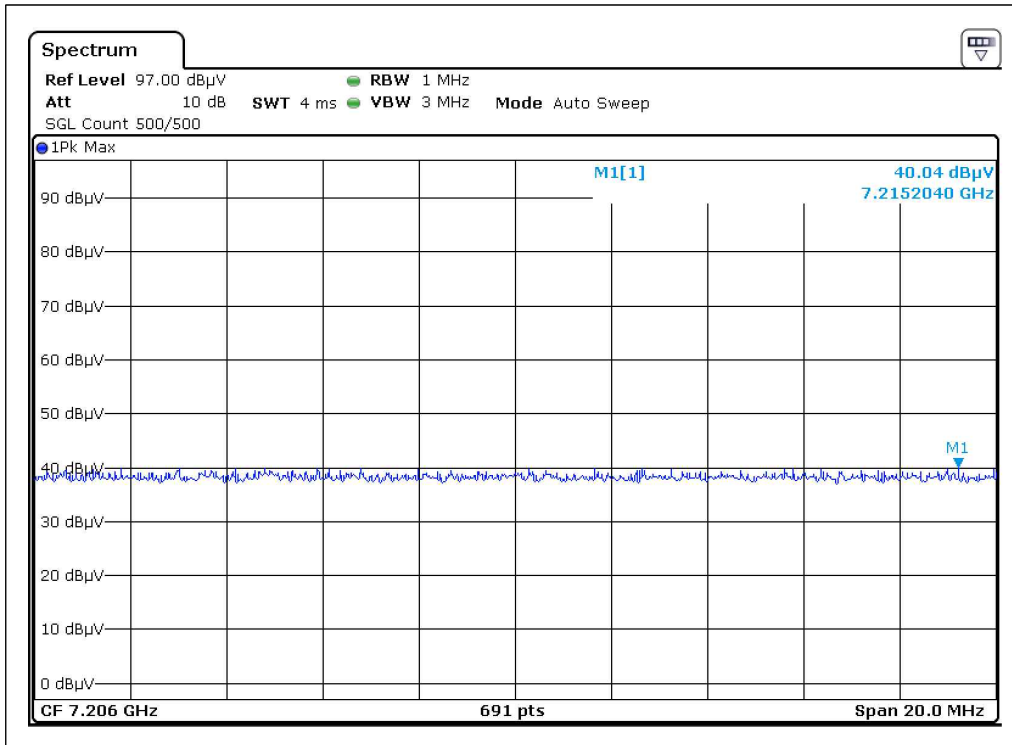
1M_Worst case: X-H_Peak Reading (Ch.0 2rd Harmonic)



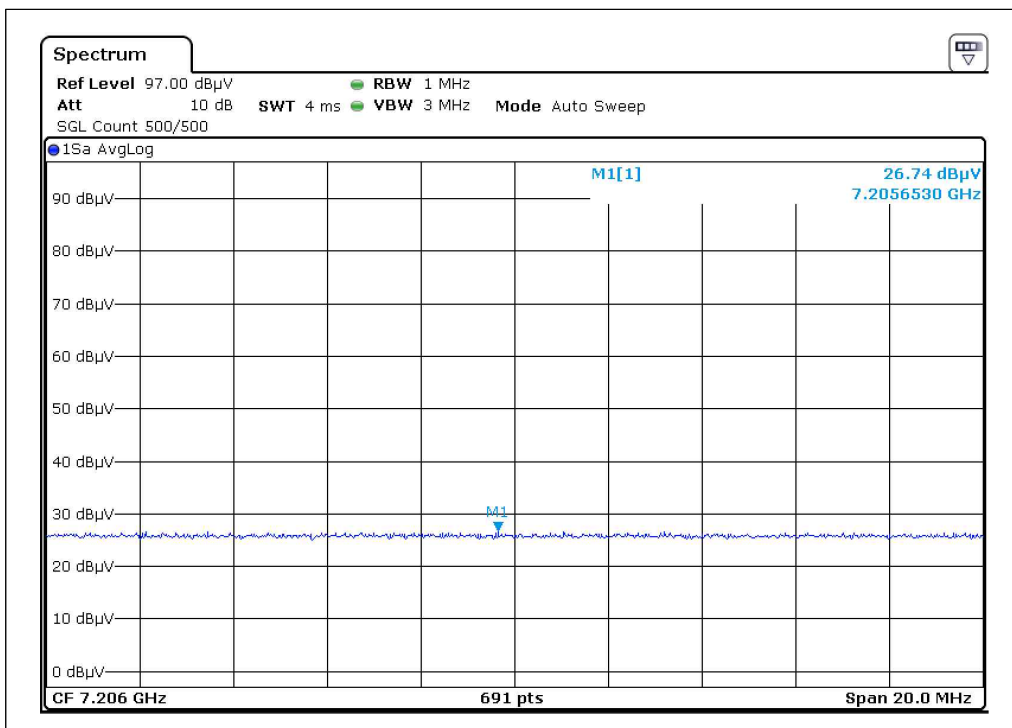
1M_Worst case: X-H_Average Reading (Ch.0 2rd Harmonic)



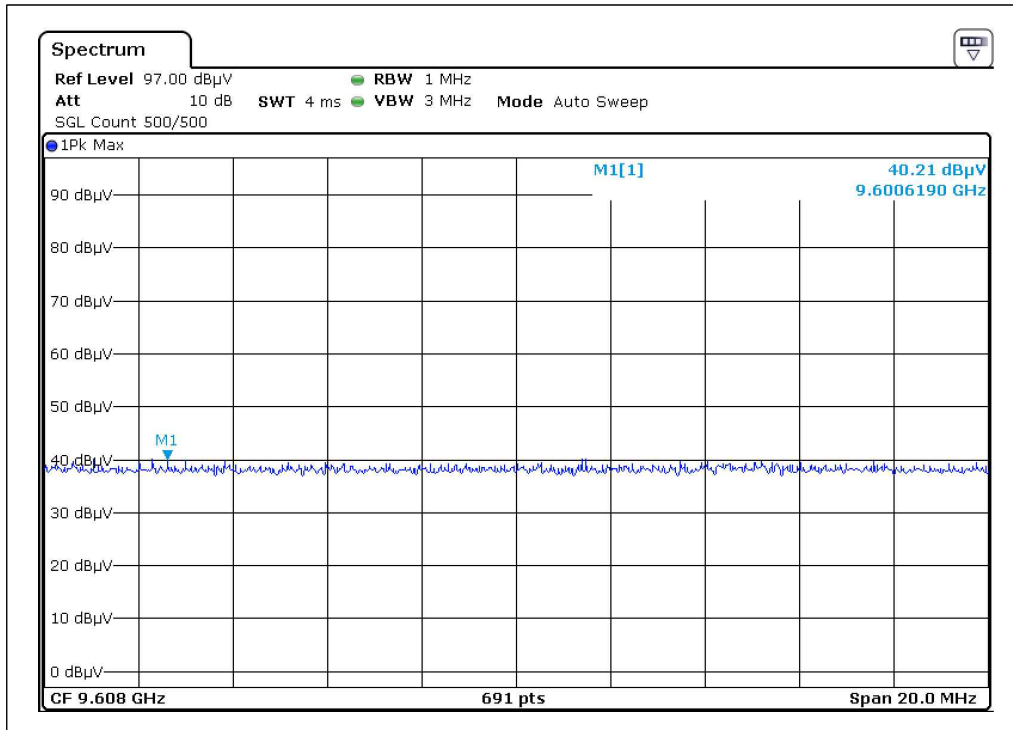
1M_Worst case: X-H_Peak Reading (Ch.0 3rd Harmonic)



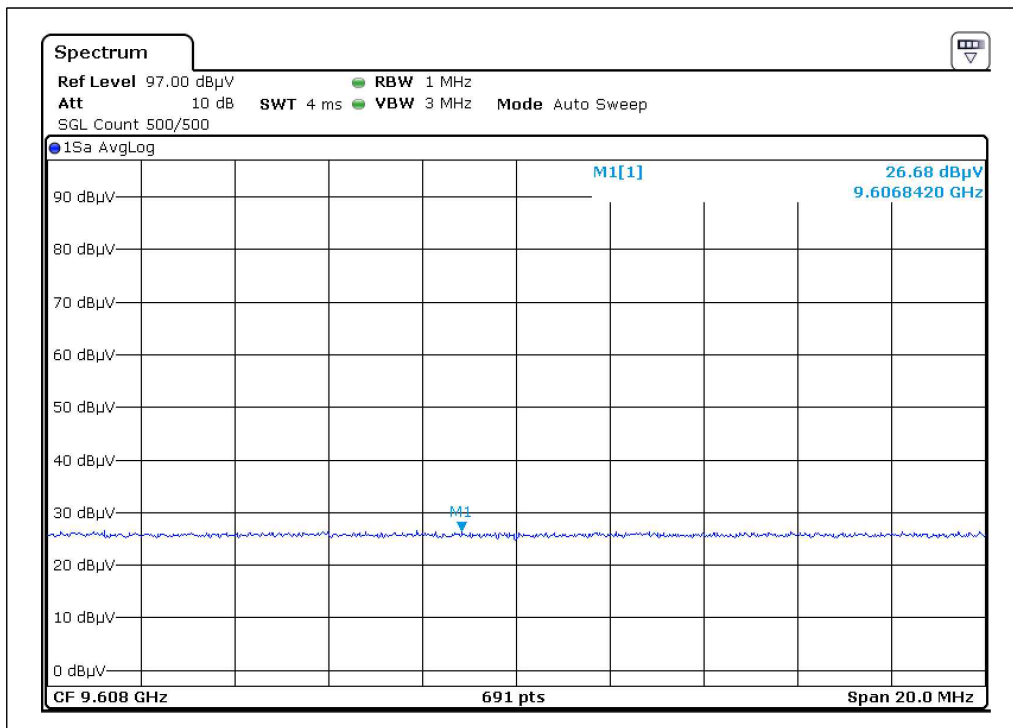
1M_Worst case: X-H_Average Reading (Ch.0 3rd Harmonic)



1M_Worst case: X-H_Peak Reading (Ch.0 4rd Harmonic)



1M_Worst case: X-H_Average Reading (Ch.0 4rd Harmonic)



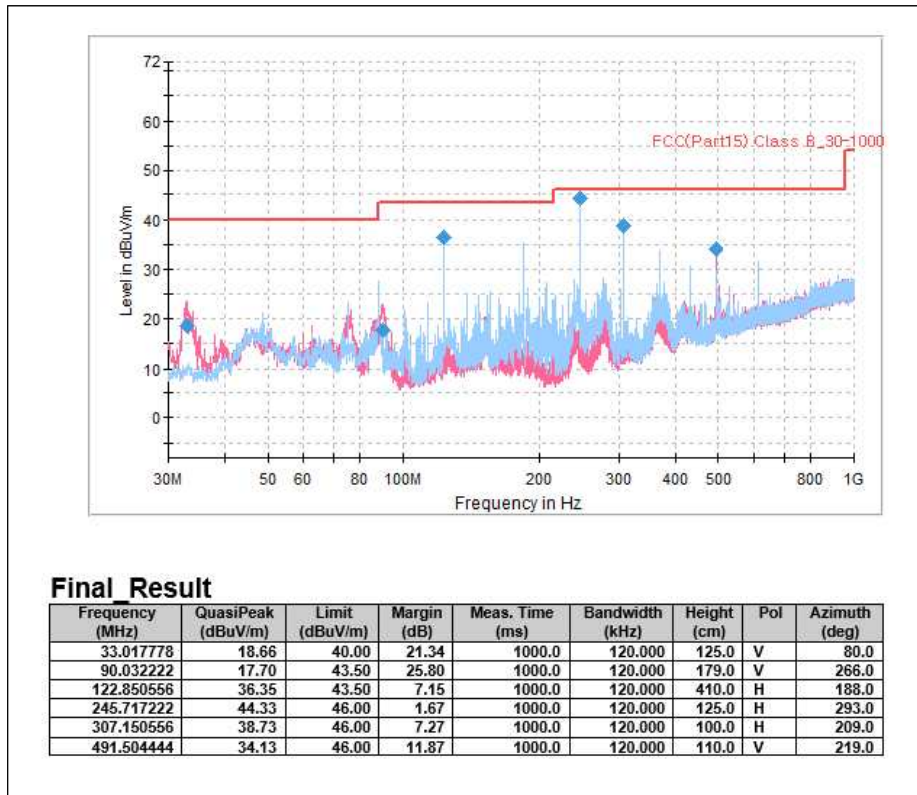
2) Test at middle Channel (2 440 MHz)in transmitting status

a) 9 kHz ~ 30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20 dB below the limit, so the test data were not recorded in the test report.

b) Below 1GHz

Horizontal and Vertical:

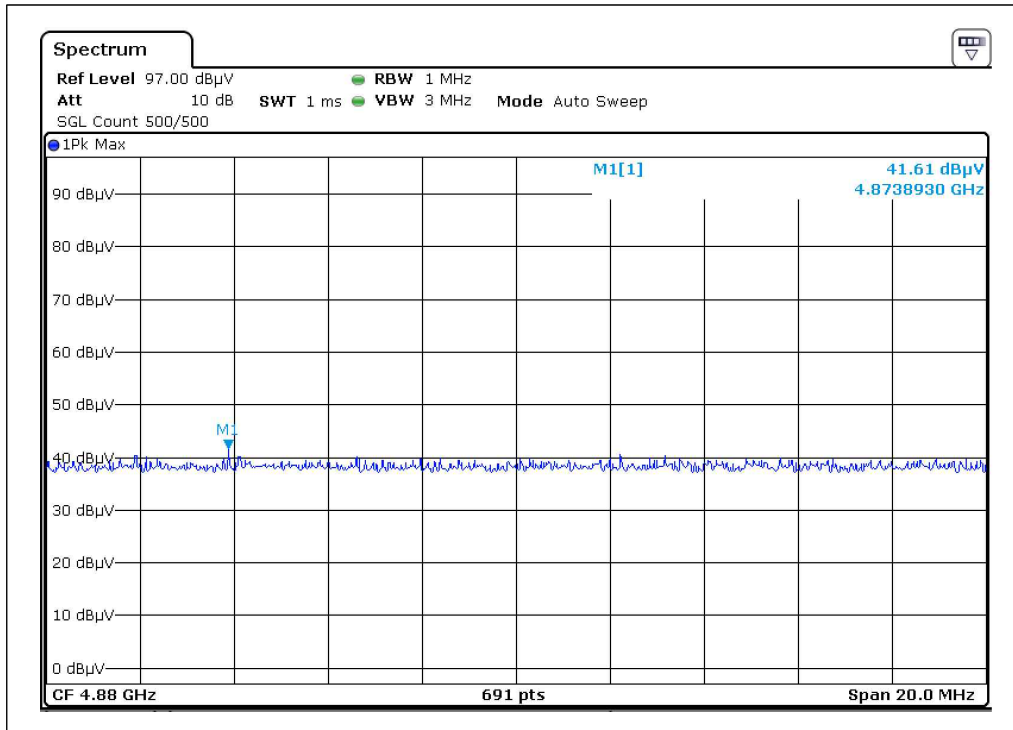


c) Above 1GHz

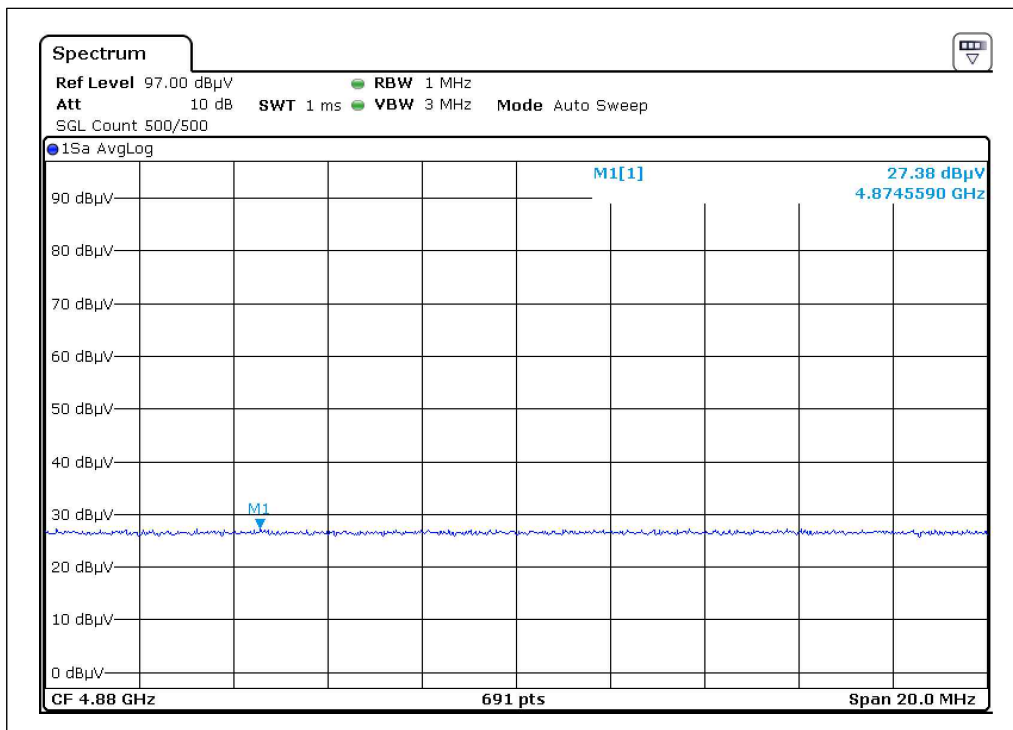
Mode: 1M

| Frequency [MHz] | Reading [dBuV] | Duty Cycle Correction [dB] | A.F + C.L - A.G + D.F [dB] | Pol. [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|----------------------------|----------------------------|------------|----------------|----------------|-------------|------------------|
| 4 880 | 41.61 | 0.00 | -6.51 | H | 35.10 | 74.00 | 38.90 | PK |
| 4 880 | 27.38 | 2.04 | -6.51 | H | 22.91 | 54.00 | 31.09 | AV |
| 7 320 | 40.79 | 0.00 | -4.81 | H | 35.98 | 74.00 | 38.02 | PK |
| 7 320 | 26.62 | 2.04 | -4.81 | H | 23.85 | 54.00 | 30.15 | AV |
| 9 760 | 40.55 | 0.00 | -4.01 | V | 36.54 | 74.00 | 37.46 | PK |
| 9 760 | 26.21 | 2.04 | -4.01 | V | 24.24 | 54.00 | 29.76 | AV |

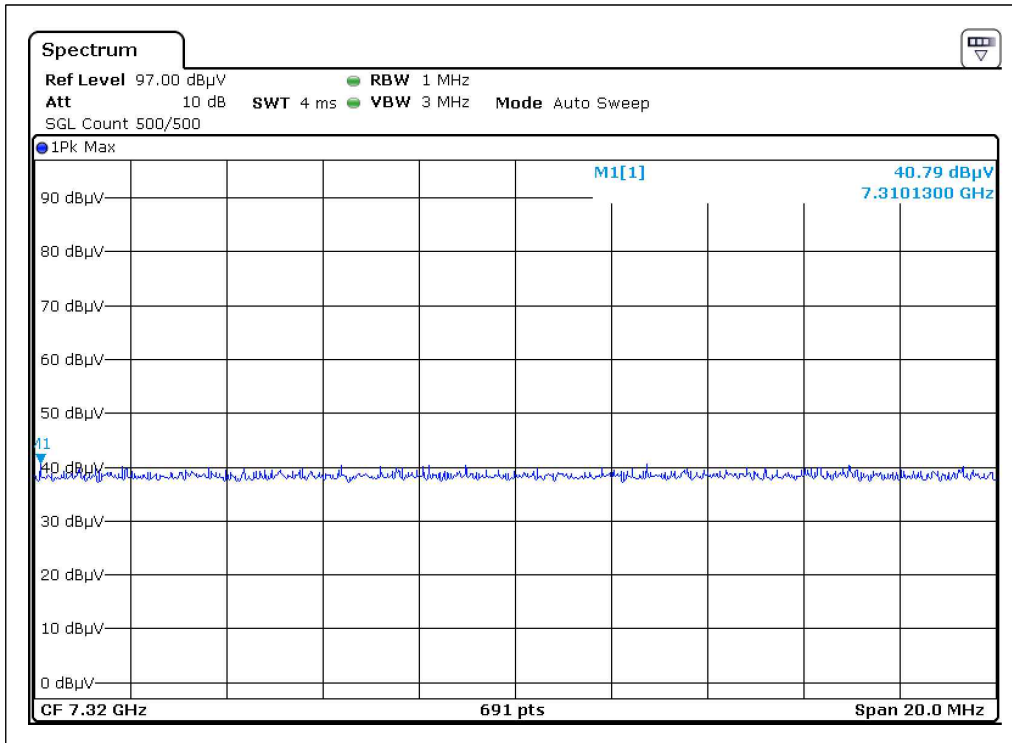
1M_Worst case: X-H_Peak Reading (Ch.19 2rd Harmonic)



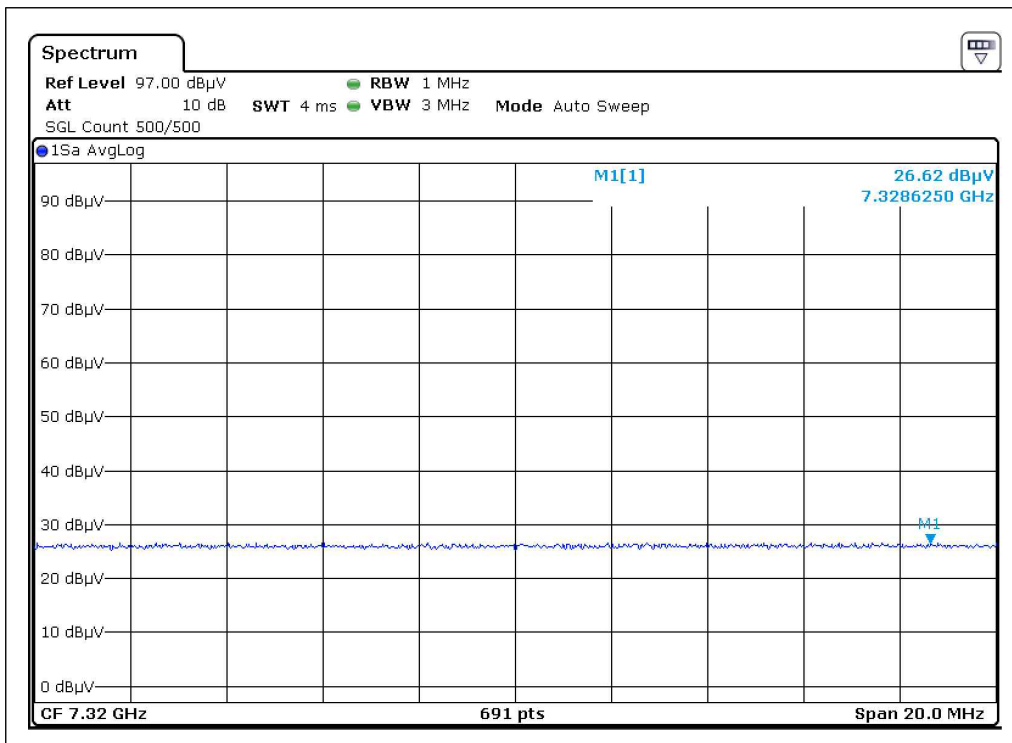
1M_Worst case: X-H_Average Reading (Ch.19 2rd Harmonic)



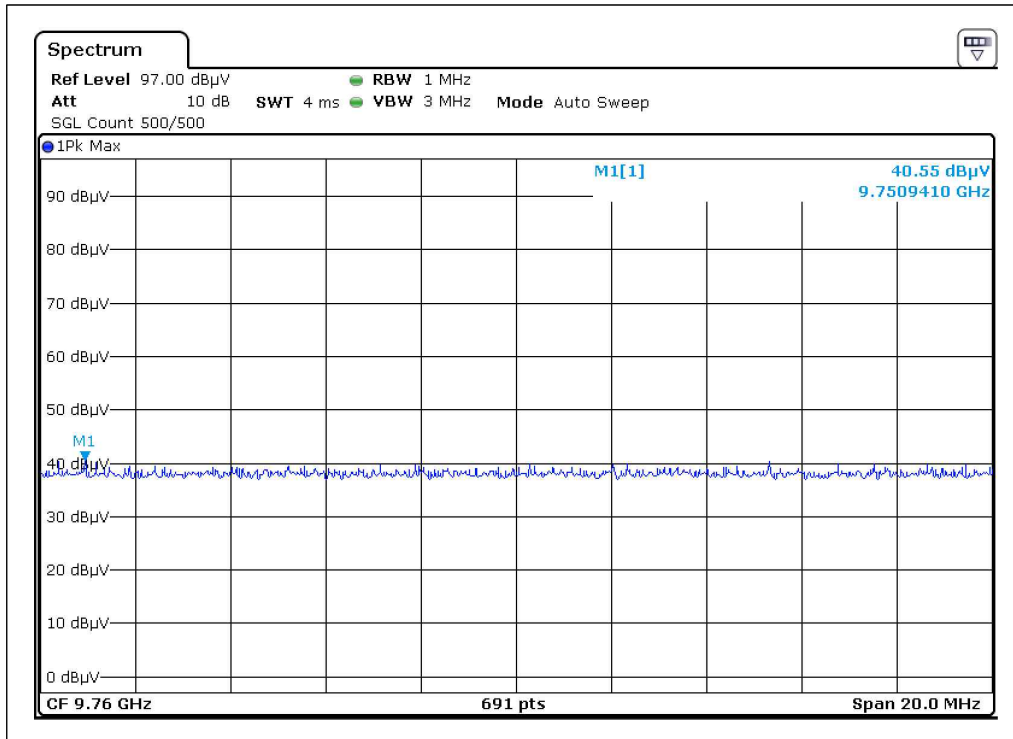
1M_Worst case: X-H_Peak Reading (Ch.19 3rd Harmonic)



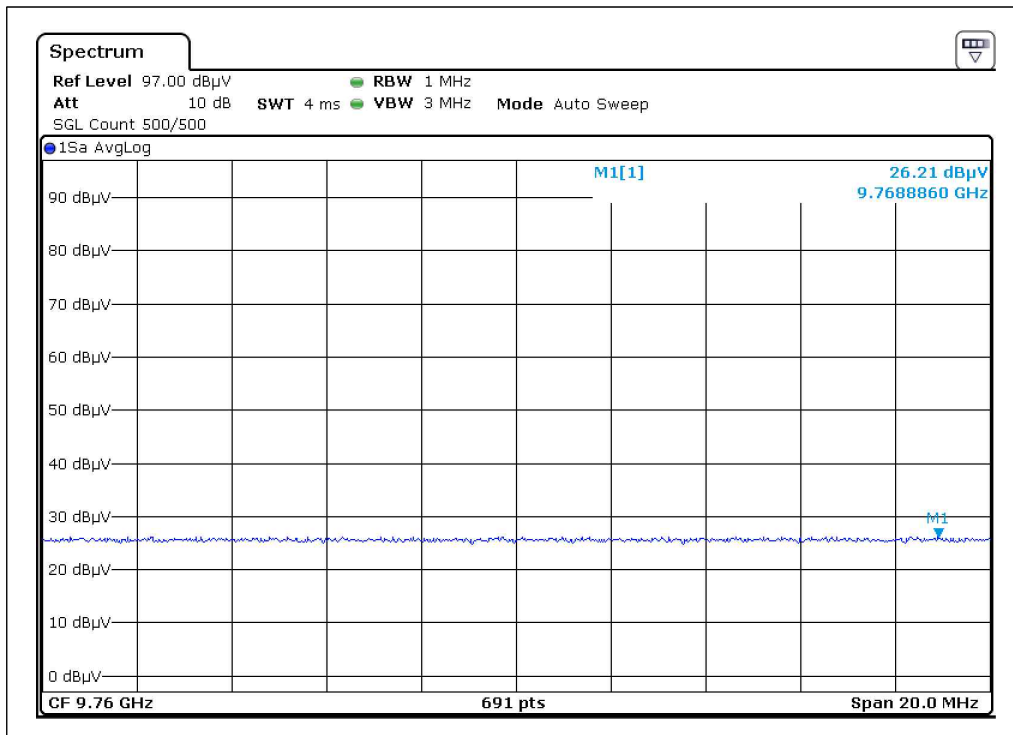
1M_Worst case: X-H_Average Reading (Ch.19 3rd Harmonic)



1M_Worst case: X-H_Peak Reading (Ch.19 4rd Harmonic)



1M_Worst case: X-H_Average Reading (Ch.19 4rd Harmonic)



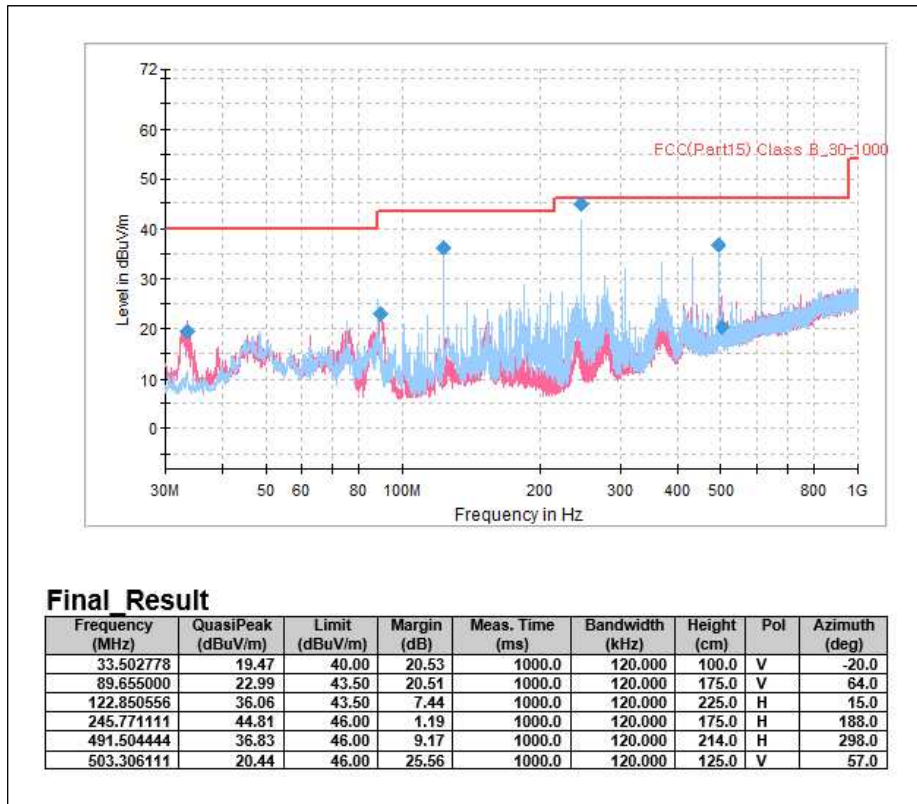
3) Test at high Channel (2 480 MHz) in transmitting status

a) 9 kHz ~ 30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20 dB below the limit, so the test data were not recorded in the test report.

b) Below 1GHz

Horizontal and Vertical:

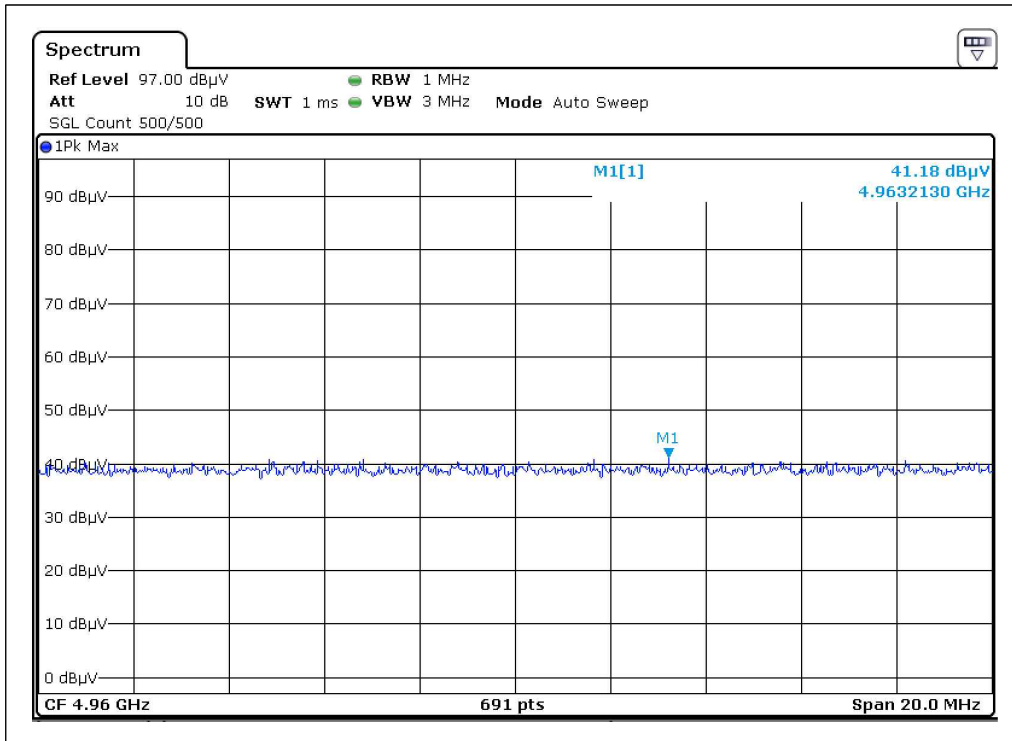


c) Above 1GHz

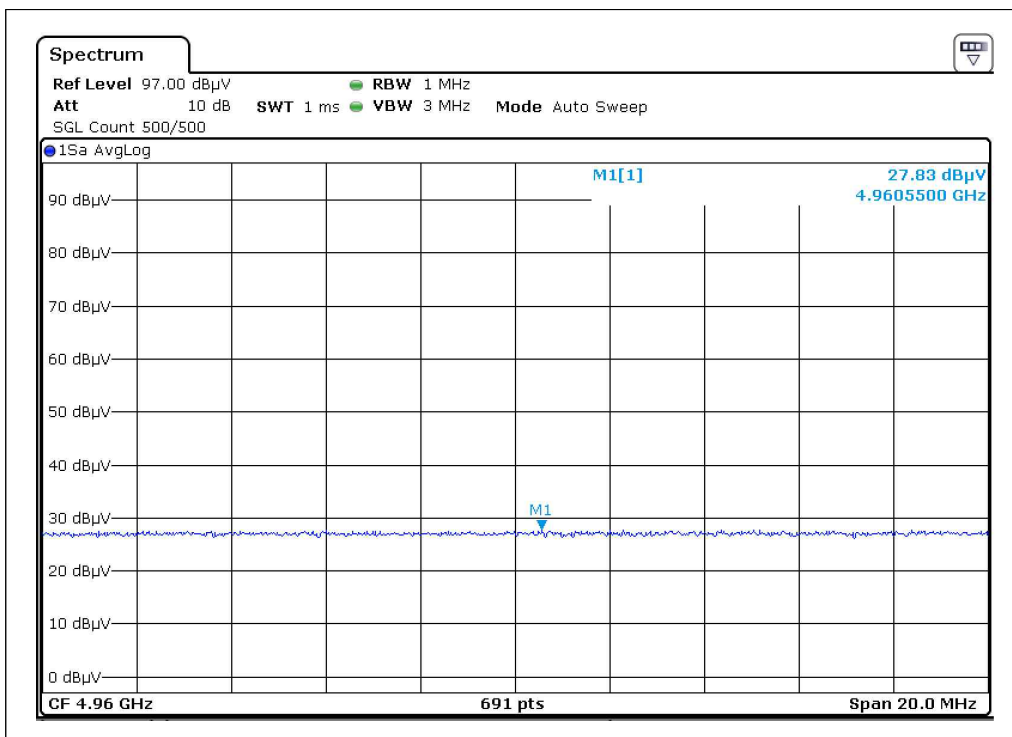
Mode: 1M

| Frequency [MHz] | Reading [dBuV] | Duty Cycle Correction [dB] | A.F + C.L - A.G + D.F [dB] | Pol. [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|----------------------------|----------------------------|------------|----------------|----------------|-------------|------------------|
| 4 960 | 41.18 | 0.00 | -6.51 | H | 34.67 | 74.00 | 39.33 | PK |
| 4 960 | 27.83 | 2.04 | -6.51 | H | 23.36 | 54.00 | 30.64 | AV |
| 7 440 | 41.73 | 0.00 | -4.81 | H | 36.92 | 74.00 | 37.08 | PK |
| 7 440 | 27.10 | 2.04 | -4.81 | H | 24.33 | 54.00 | 29.67 | AV |
| 9 920 | 40.68 | 0.00 | -4.01 | V | 36.67 | 74.00 | 37.33 | PK |
| 9 920 | 26.88 | 2.04 | -4.01 | V | 24.91 | 54.00 | 29.09 | AV |

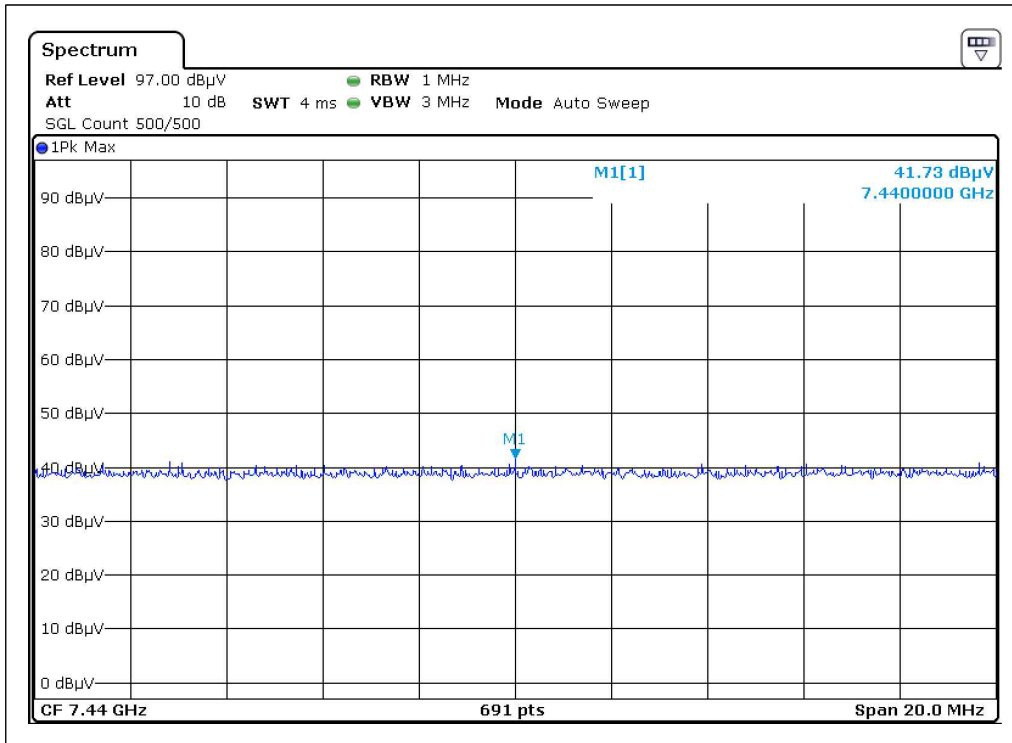
1M_Worst case: X-H_Peak Reading (Ch.39 2rd Harmonic)



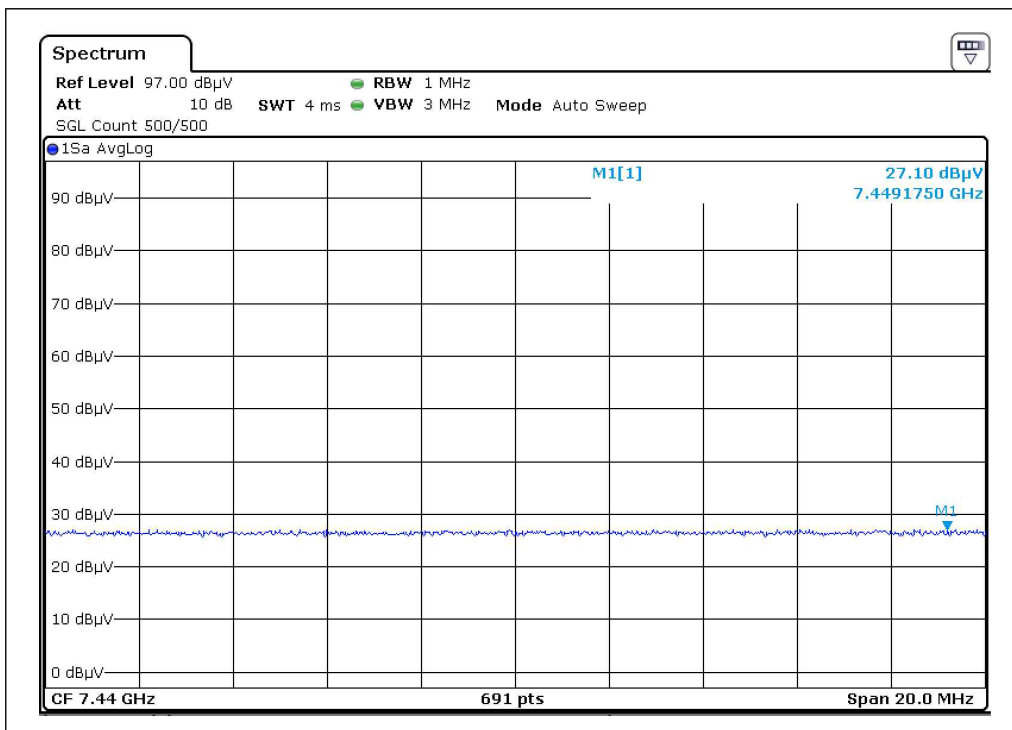
1M_Worst case: X-H_Average Reading (Ch.39 2rd Harmonic)



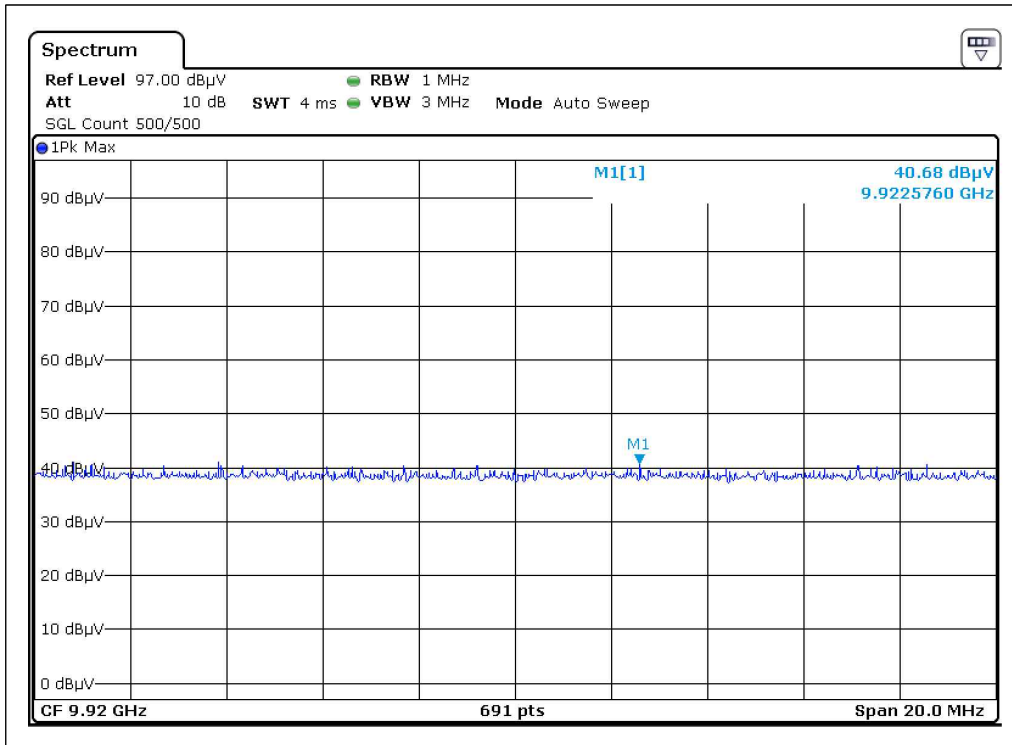
1M_Worst case: X-H_Peak Reading (Ch.39 3rd Harmonic)



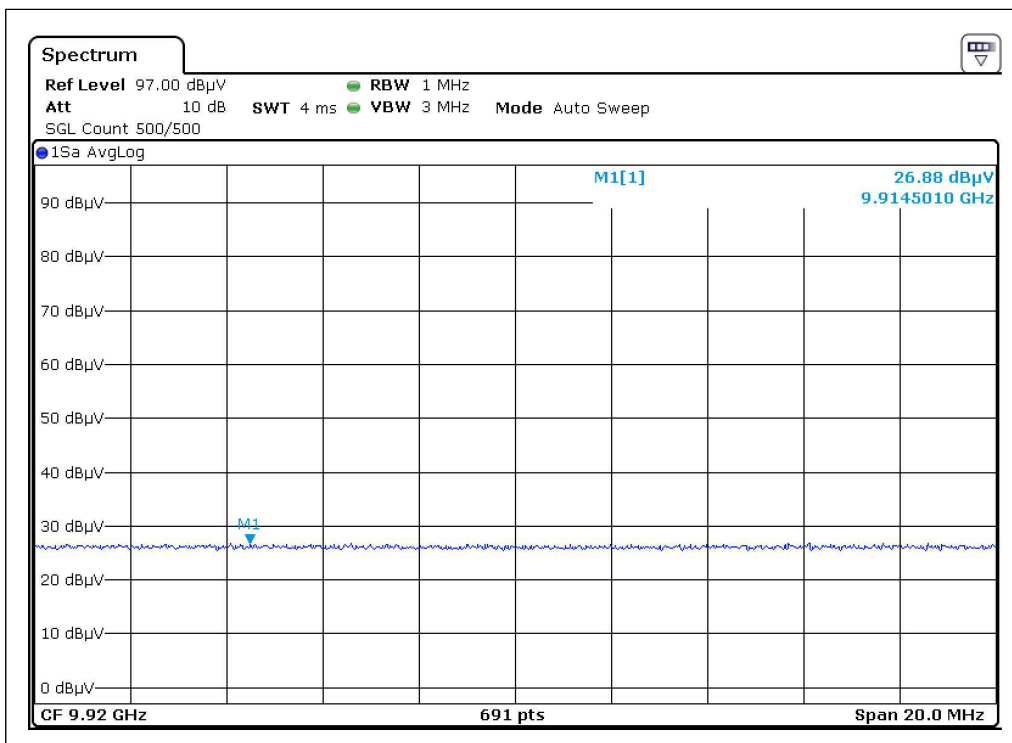
1M_Worst case: X-H_Average Reading (Ch.39 3rd Harmonic)



1M_Worst case: X-H_Peak Reading (Ch.39 4rd Harmonic)



1M_Worst case: X-H_Average Reading (Ch.39 4rd Harmonic)



4.10. Radiated Restricted Band Edge

4.10.1. Requirement

FCC Part15 C section 15.247

(d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limited specified in Section 15.209(a) (see Section 15.205(c)).

4.10.2. Test Method

ANSI C63.10

1) Test site

Measurement Distance : 3 m (Semi-Anechoic Chamber)

2) Receiver setup

| Frequency | Detector | RBW | VBW | Remark |
|--------------|------------|---------|---------|------------------|
| 30 MHz~1 GHz | Quasi-peak | 120 KHz | 300 KHz | Quasi-peak Value |
| Above 1 GHz | Peak | 1 MHz | 3 MHz | Peak Value |
| | RMS | 1 MHz | 3 MHz | Average Vaile |

3) Limit

| Frequency | Limit(dB μ V/m @ 3m) | Remark |
|-------------------|--------------------------|------------------|
| 30 MHz ~ 88 MHz | 40.0 | Quasi-peak Vaule |
| 88 MHz ~ 216 MHz | 43.5 | Quasi-peak Vaule |
| 216 MHz ~ 960 MHz | 46.0 | Quasi-peak Vaule |
| 960 MHz ~ 1 GHz | 54.0 | Quasi-peak Vaule |
| Above 1 GHz | 54.0 | Average Value |
| | 74.0 | Peak Value |

4.10.3. Test Configuration

Same as Radiated Spurious Emission.

4.10.4. Test Procedure

Same as Radiated Spurious Emission.

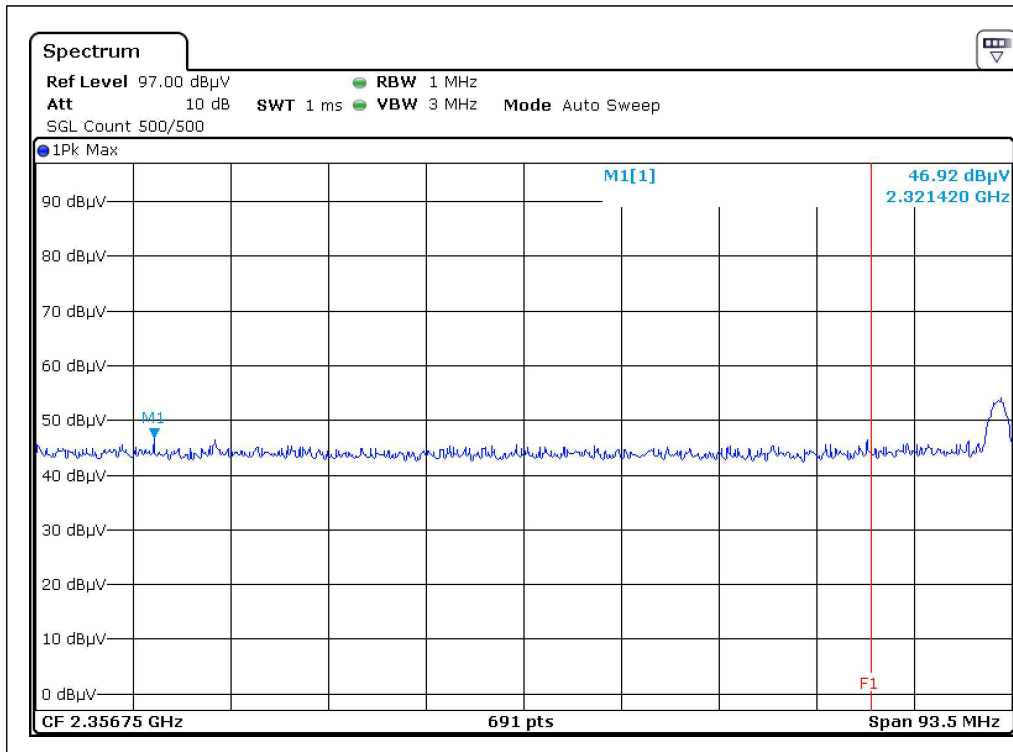
4.10.5. Test result

Mode: 1M

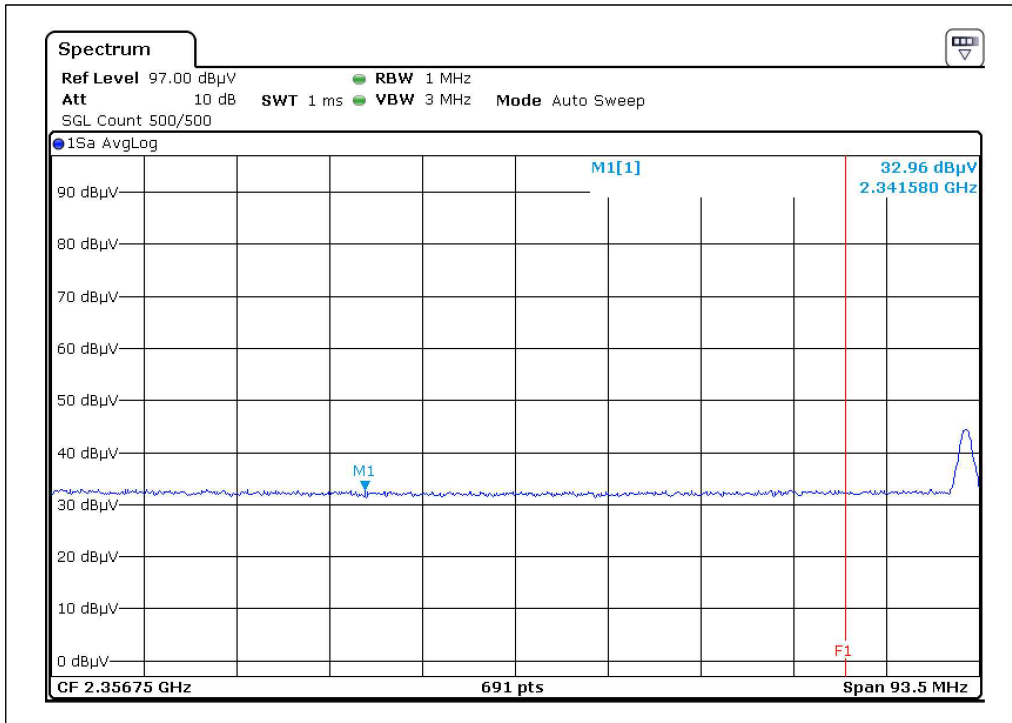
| Frequency [MHz] | Reading [dBuV] | Duty Cycle Correction [dB] | A.F + C.L - A.G + D.F [dB] | Pol. [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Measurement Type |
|-----------------|----------------|----------------------------|----------------------------|------------|----------------|----------------|-------------|------------------|
| 2 390.0 | 46.92 | 0.00 | -9.61 | H | 37.31 | 74.00 | 36.67 | PK |
| 2 390.0 | 32.96 | 2.04 | -9.61 | H | 25.39 | 54.00 | 28.59 | AV |
| 2 390.0 | 46.01 | 0.00 | -9.61 | V | 36.40 | 74.00 | 37.58 | PK |
| 2 390.0 | 32.82 | 2.04 | -9.61 | V | 25.25 | 54.00 | 28.73 | AV |
| 2 483.5 | 46.82 | 0.00 | -9.61 | H | 37.21 | 74.00 | 36.77 | PK |
| 2 483.5 | 32.91 | 2.04 | -9.61 | H | 25.34 | 54.00 | 28.64 | AV |
| 2 483.5 | 46.56 | 0.00 | -9.61 | V | 36.95 | 74.00 | 37.03 | PK |
| 2 483.5 | 32.81 | 2.04 | -9.61 | V | 25.24 | 54.00 | 28.74 | AV |

Please refer to the following test plots:

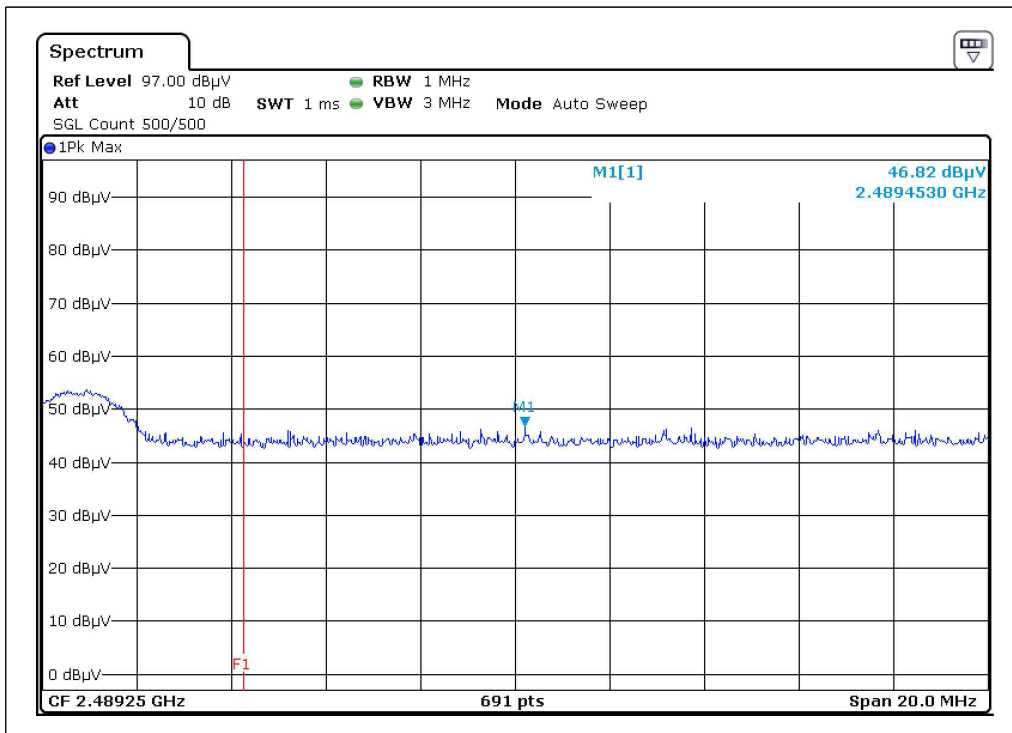
1M_Worst case: X-H_Peak Reading (Ch.0)



1M_Worst case: X-H_Average Reading (Ch.0)



1M_Worst case: Z-H_Peak Reading (Ch.39)



1M_Worst case: Z-H_Average Reading (Ch.39)

