# TEST REPORT

**KCTL Inc.**
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http://www.kctl.co.kr

**1. Applicant**

Name: HYUNDAE PHOTONICS Co., LTD.

Address: 15, Jungang-daero 123-gil, Buk-gu, Daegu, Korea

**2. Sample Description:**

FCC ID: 2AHSHS-III

Type of equipment: Digital Radio Slave

Basic Model: S-III

**3. Date of Test:** April 20 ~ April 21, 2016

**4. Test standard used:** FCC Part 15 Subpart C 15.247

**5. Test Results**

Test Item: Refer to page 7

Result: Refer to page 8 ~ page 32

Measurement Uncertainty: Refer to page 7

This result shown in this report refer only to the sample(s) tested unless otherwise stated.

| | | |
|---|---|---|
| Affirmation | Tested by<br>Name: EUI JUNG, KIM | Technical Manager<br>Name: CHANG MIN, KIM |

2016. 04. 25

**KCTL Inc.** Testing Laboratory

# [ Contents ]

# 1. Client information

| | |
|---|---|
| **Applicant:** | HYUNDAE PHOTONICS Co., LTD. |
| **Address:** | 15, Jungang-daero 123-gil, Buk-gu, Daegu, Korea |
| **Telephone number:** | +82-53-943-1333 |
| **Facsimile number:** | +82-53-359-0333 |
| **Contact person:** | Jung Su, Kim / a-garden@nate.com |

| | |
|---|---|
| **Manufacturer:** | HYUNDAE PHOTONICS Co., LTD. |
| **Address:** | 15, Jungang-daero 123-gil, Buk-gu, Daegu, Korea |

# 2. Laboratory information

## Address

**KCTL Inc.**
65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Telephone Number: 82-70-5008-1016  Facsimile Number: 82-505-299-8311

## Certificate

KOLAS No.: KT231
FCC Site Designation No.: KR0040
FCC Site Registration No.: 687132
VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849
IC Site Registration No.:8035A-2

## SITE MAP

# 3. Description of E.U.T.

## 3.1 Basic description

| | |
|---|---|
| Applicant: | HYUNDAE PHOTONICS Co., LTD. |
| Address of Applicant | 15, Jungang-daero 123-gil, Buk-gu, Daegu, Korea |
| Manufacturer | HYUNDAE PHOTONICS Co., LTD. |
| Address of Manufacturer | 15, Jungang-daero 123-gil, Buk-gu, Daegu, Korea |
| Type of equipment | Digital Radio Slave |
| Basic Model | S-III |
| Serial number | N/A |

## 3.2 General description

| | |
|---|---|
| Frequency Range | 2 427 ㎒ ~ 2 457 ㎒ |
| Type of Modulation | GFSK |
| Number of Channels | 16 ch |
| Type of Antenna | PCB Antenna |
| Antenna Gain | 0 dBi |
| Transmit Power | -0.56 dBm |
| Power supply | DC 1.5 V |
| Product SW/HW version | version 1.0 / version 1.0 |
| Radio SW/HW version | version 1.0 / version 1.0 |
| Test SW Version | N/A |
| RF power setting in TEST SW | Referred the measuring instrument from manufacturer |

Note : The above EUT information was declared by the manufacturer.

## 3.3 Test frequency

| | Frequency |
|---|---|
| Lowest frequency | 2 427 ㎒ |
| Middle frequency | 2 441 ㎒ |
| Highest frequency | 2 457 ㎒ |

## 3.4 Test Voltage

| Mode | Voltage |
|---|---|
| Nominal voltage | DC 1.5 Ⅴ |

# 4. Summary of test results

## 4.1 Standards & results

| FCC Rule Reference | IC Rule Reference | Parameter | Report Section | Test Result |
|---|---|---|---|---|
| 15.203, 15.247(b)(4) | - | Antenna Requirement | 5.1 | C |
| 15.247(b)(3) | RSS-247 5.4(4) | Maximum Peak Output Power | 5.2 | C |
| 15.247(e) | RSS-247 5.2(2) | Peak Power Spectral Density | 5.3 | C |
| 15.247(a)(2) | RSS-247 5.2(1) | 6 dB Channel Bandwidth | 5.4 | C |
| - | RSS-247 5.2(1) | Occupied Bandwidth | 5.4 | C |
| 15.247(d), 15.205(a), 15.209(a) | RSS-247 5.5 | Spurious Emission, Band Edge, and Restricted bands | 5.5 | C |
| 15.207(a) | RSS-247 5.5 RSS-GEN 8.9 | Conducted Emissions | - | NA1) |

Note: C = complies, NC = Not complies, NT = Not tested, NA = Not Applicable
N/A1) : This test is not applicable because the EUT uses battery and it's not to be connected to the public utility(AC) power line.

* The general test methods used to test this device is ANSI C63.10-2013

## 4.2 Uncertainty

| Measurement Item | Expanded Uncertainty U = *k*Uc (*k* = 2) | |
|---|---|---|
| Conducted RF power | 1.44 dB | |
| Conducted Spurious Emissions | 1.52 dB | |
| Radiated Spurious Emissions | 30 ㎒ ~ 300 ㎒: | + 4.94 dB, - 5.06 dB |
| | | + 4.93 dB, - 5.05 dB |
| | 300 ㎒ ~ 1 000 ㎒: | + 4.97 dB, - 5.08 dB |
| | | + 4.84 dB, - 4.96 dB |
| | 1 ㎓ ~ 25 ㎓: | + 6.03 dB, - 6.05 dB |

# 5. Test results

## 5.1 Antenna Requirement

### 5.1.1 Regulation

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.

### 5.1.2 Result

## - Complied

The transmitter has a PCB Antenna. The transmitter has a Internal Antenna which is attached on PCB board permanently.

## 5.2 Maximum Peak Output Power

### 5.2.1 Regulation

According to §15.247(b)(3), For systems using digital modulation in the 902-928 ㎒, 2 400-2 483.5 ㎒, and 5 725-5 850 ㎒ bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

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 ㏈i. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 ㏈i 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 ㏈ that the directional gain of the antenna exceeds 6 ㏈i.

### 5.2.2 Measurement Procedure

These test measurement settings are specified in section 9.0 of 558074 D01 DTS Meas Guidance.

#### 5.2.2.1 PKPM1 Peak power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

## 5.2.3 Test Result

## - Complied

| Channel | Frequency (㎒) | Result (㏈m) | Limit (㏈m) | Margin (㏈) | Average Power (㏈m) |
|---|---|---|---|---|---|
| Lowest | 2 427 | -0.56 | 30.00 | 30.56 | -0.91 |
| Middle | 2 441 | -0.86 | 30.00 | 30.86 | -1.18 |
| Highest | 2 457 | -0.96 | 30.00 | 30.96 | -1.30 |

- NOTE:
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.
2. It was measured by power sensor.
3. Average power result = measured power + D.C.C.F
   (D.C.C.F = Duty cycle correction factor)

## 5.3 Peak Power Spectral Density

### 5.3.1 Regulation

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 ㎑ 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.

### 5.3.2 Measurement Procedure

These test measurement settings are specified in section 10.0 of 558074 D01 DTS Meas Guidance.

#### 5.3.2.1 Method PKPSD (peak PSD)

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

1) Set analyzer center frequency to DTS channel center frequency.

2) Set the span to 1.5 times the DTS bandwidth.

3) Set the RBW to: 3 ㎑ ≤ RBW ≤ 100 ㎑.

4) Set the VBW ≥ 3 x RBW.

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 amplitude level within the RBW.

10) If measured value exceeds limit, reduce RBW (no less than 3 ㎑) and repeat.

## 5.3.3 Test Result

## - Complied

| Channel | Frequency (㎒) | Result [dBm/3 ㎑] | Limit [dBm/3 ㎑] | Margin [dB] |
|---|---|---|---|---|
| Lowest | 2 427 | -12.88 | 8.00 | 20.88 |
| Middle | 2 441 | -13.18 | 8.00 | 21.18 |
| Highest | 2 457 | -13.94 | 8.00 | 21.94 |

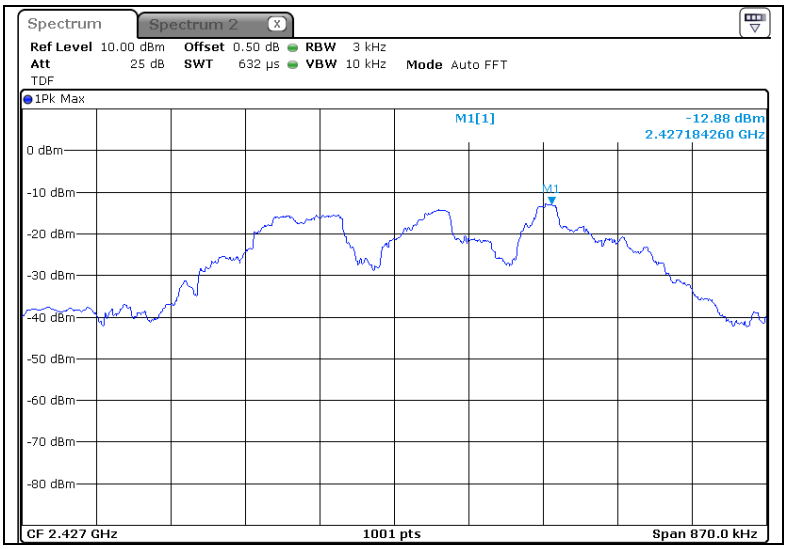
-NOTE:

1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

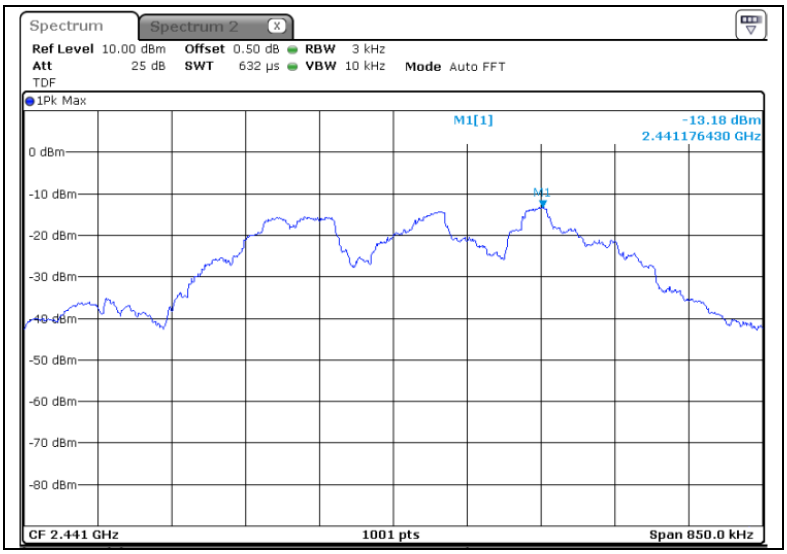
## 5.3.4 Test Plot

Figure 1. Plot of the Power Density

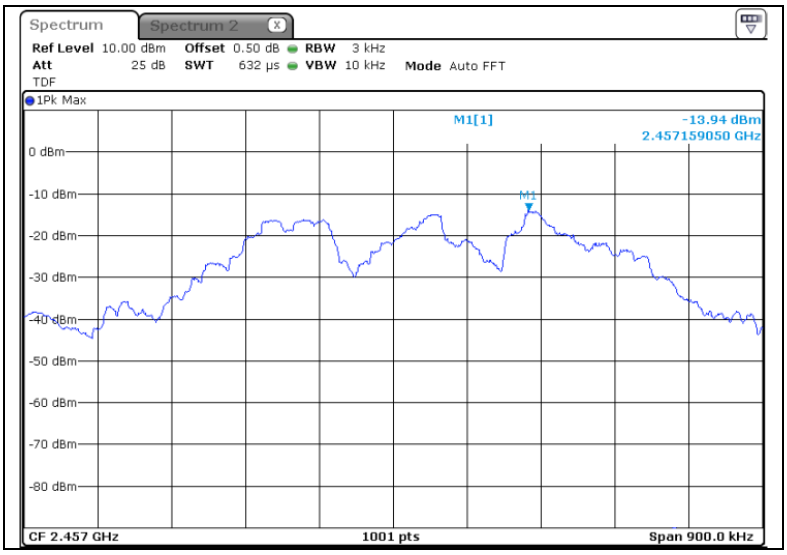
Lowest Channel (2 427 ㎒)




Middle Channel (2 441 ㎒)



Highest Channel (2 457 ㎒)



## 5.4 6 dB Bandwidth(DTS Channel Bandwidth)

### 5.4.1 Regulation

According to §15.247(a)(2) Systems using digital modulation techniques may operate in the 902–928 ㎒, 2 400–2 483.5 ㎒, and 5 725–5 850 ㎒ bands. The minimum 6 ㏈ bandwidth shall be at least 500 ㎑.

### 5.4.2 Measurement Procedure

These test measurement settings are specified in section 8.0 of 558074 D01 DTS Meas Guidance.

#### 5.4.2.1 DTS Channel Bandwidth-Option 1

1) Set RBW = 100 ㎑.
2) Set the video bandwidth (VBW) ≥ 3 x RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Sweep = auto couple.
6) Allow the trace to stabilize.
7) 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 ㏈ relative to the maximum level measured in the fundamental emission.

#### 5.4.2.2 DTS Channel Bandwidth Measurement Procedure-Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X ㏈ bandwidth mode with X set to 6 ㏈, if the functionality described above (i.e., RBW = 100 ㎑, VBW ≥ 3 x RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 ㏈.

## 5.4.3 Test Result

## - Complied

| Channel | Frequency [㎒] | 6 ㏈ Bandwidth [㎒] | Min. Limit [㎒] | Occupied Bandwidth (99 % BW) [㎒] |
|---|---|---|---|---|
| Lowest | 2 427 | 0.58 | 0.50 | 1.52 |
| Middle | 2 441 | 0.57 | 0.50 | 1.73 |
| Highest | 2 457 | 0.60 | 0.50 | 1.55 |

-NOTE:

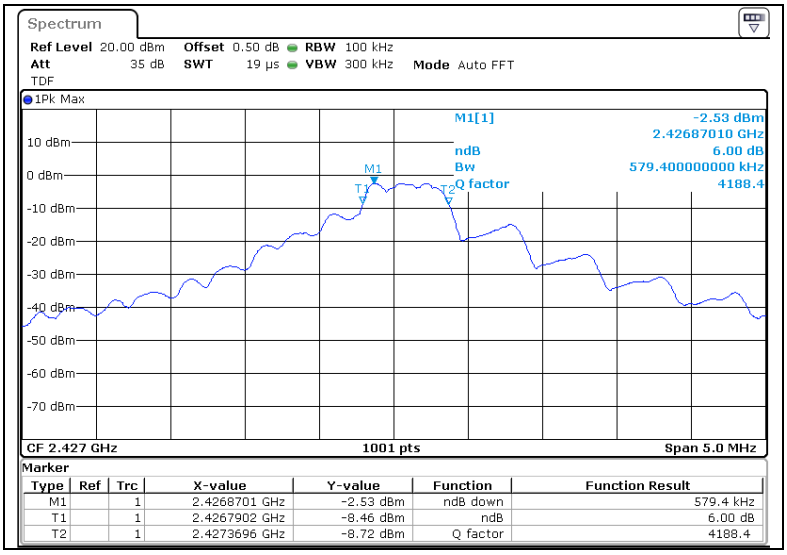
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

## 5.4.4 Test Plot

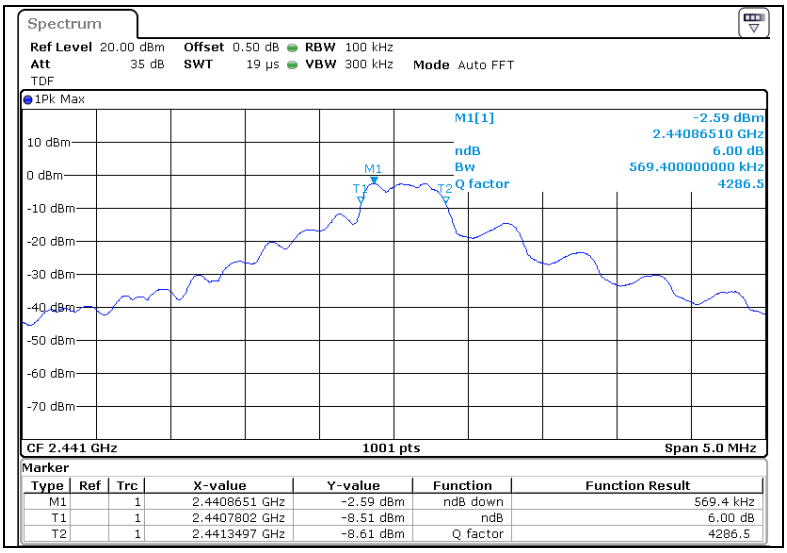
Figure 2. Plot of the 6 dB Bandwidth & Occupied Bandwidth

*** 6 dB Bandwidth**

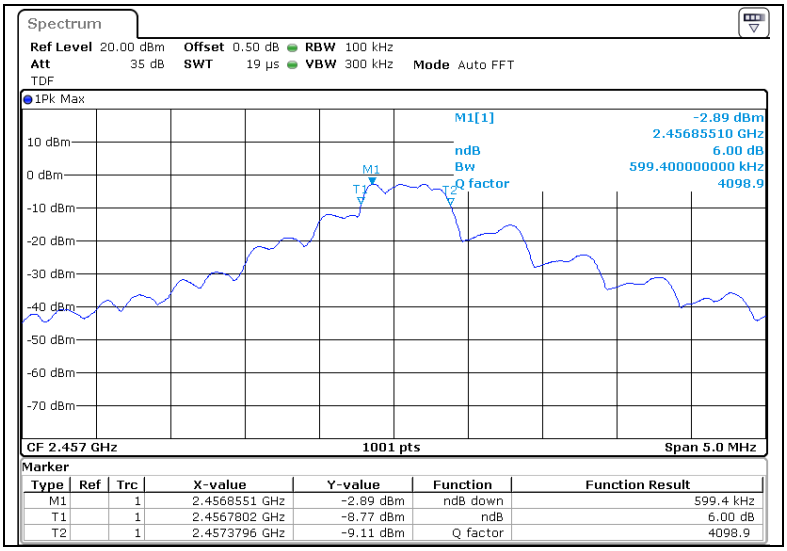
Lowest Channel (2 427 ㎒)




Middle Channel (2 441 ㎒)

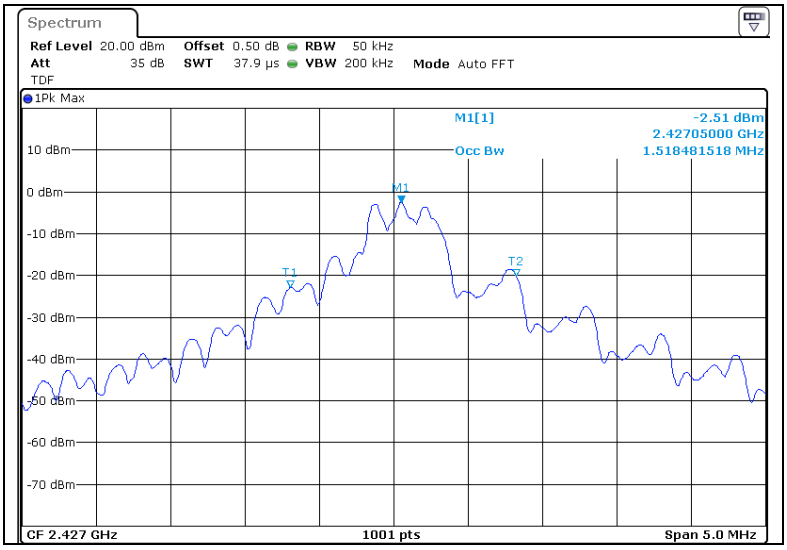


Highest Channel (2 457 ㎒)

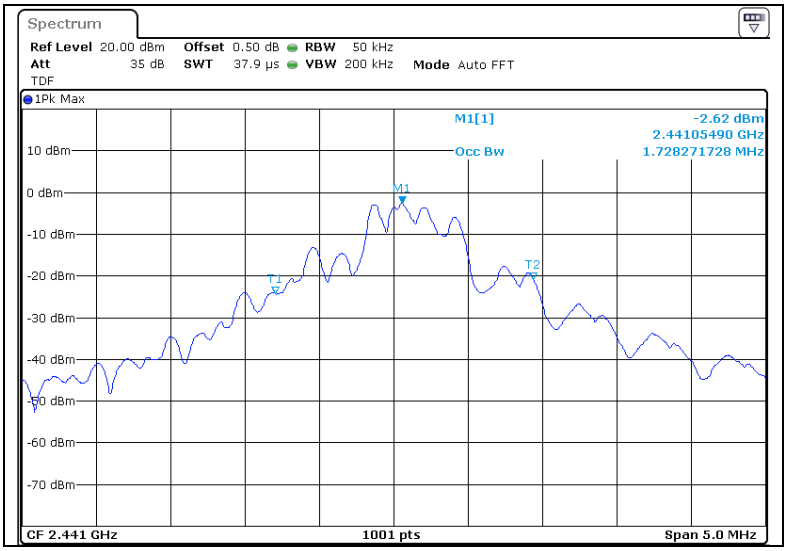



***OBW**

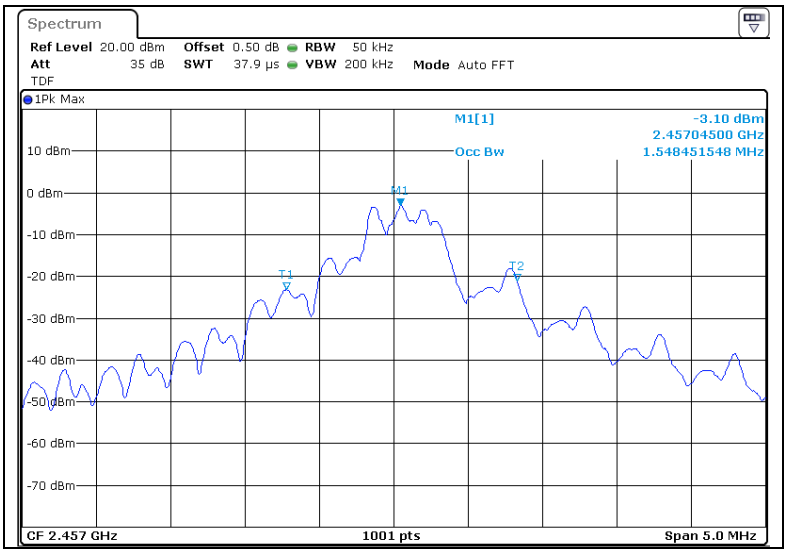
Lowest Channel (2 427 ㎒)



Middle Channel (2 441 ㎒)




Highest Channel (2 457 ㎒)



## 5.5 Spurious Emission, Band Edge, and Restricted bands

### 5.5.1 Regulation

According to §15.247(d), in any 100 ㎑ 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 ㏈ below that in the 100 ㎑ 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 ㏈ instead of 20 ㏈. 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)).

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed the field strength levels specified in the following table:

| Frequency (㎒) | Field strength (㎶/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2 400/F(㎑) | 300 |
| 0.490 - 1.705 | 24 000/F(㎑) | 30 |
| 1.705 - 30 | 30 | 30 |
| 30 - 88 | 100** | 3 |
| 88 - 216 | 150** | 3 |
| 216 - 960 | 200** | 3 |
| Above 960 | 500 | 3 |

**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., §§15.231 and 15.241.

According to § 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.009 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| 0.495 - 0.505 | 16.694 75 - 16.695 25 | 608 - 614 | 5.35 - 5.46 |
| 2.173 5 - 2.190 5 | 16.804 25 - 16.804 75 | 960 – 1 240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1 300 – 1 427 | 8.025 - 8.5 |
| 4.177 25 - 4.177 75 | 37.5 - 38.25 | 1 435 – 1 626.5 | 9.0 - 9.2 |
| 4.207 25 - 4.207 75 | 73 - 74.6 | 1 645.5 – 1 646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1 660 – 1 710 | 10.6 - 12.7 |
| 6.267 75 - 6.268 25 | 108 - 121.94 | 1 718.8 – 1 722.2 | 13.25 - 13.4 |
| 6.311 75 - 6.312 25 | 123 - 138 | 2 200 – 2 300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2 310 – 2 390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.524 75 - 156.525 25 | 2 483.5 – 2 500 | 17.7 - 21.4 |
| 8.376 25 - 8.386 75 | 156.7 - 156.9 | 2 690 – 2 900 | 22.01 - 23.12 |
| 8.414 25 - 8.414 75 | 162.012 5 - 167.17 | 3 260 – 3 267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3 332 – 3 339 | 31.2 - 31.8 |
| 12.519 75 - 12.520 25 | 240 - 285 | 3 345.8 – 3 358 | 36.43 - 36.5 |
| 12.576 75 - 12.577 25 | 322 - 335.4 | 3 600 – 4 400 | Above 38.6 |
| 13.36 - 13.41 | | | |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

## 5.5.2Measurement Procedure

### 5.5.2.1 Band-edge Compliance of RF Conducted Emissions

#### 5.5.2.1.1 Reference Level Measurement

Establish a reference level by using the following procedure:

1) Set instrument center frequency to DTS channel center frequency.
2) Set the span to ≥ 1.5 times the DTS bandwidth.
3) Set the RBW = 100 ㎑.
4) Set the VBW ≥ 3 x RBW.
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 PSD level.

#### 5.5.2.1.2 Emissions Level Measurement

1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 ㎑.
3) Set the VBW ≥ 3 x RBW.
4) Detector = peak.
5) Ensure that the number of measurement points ≥ span/RBW
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 amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

### 5.5.2.2 Conducted Spurious Emissions

Set the spectrum analyzer as follows:

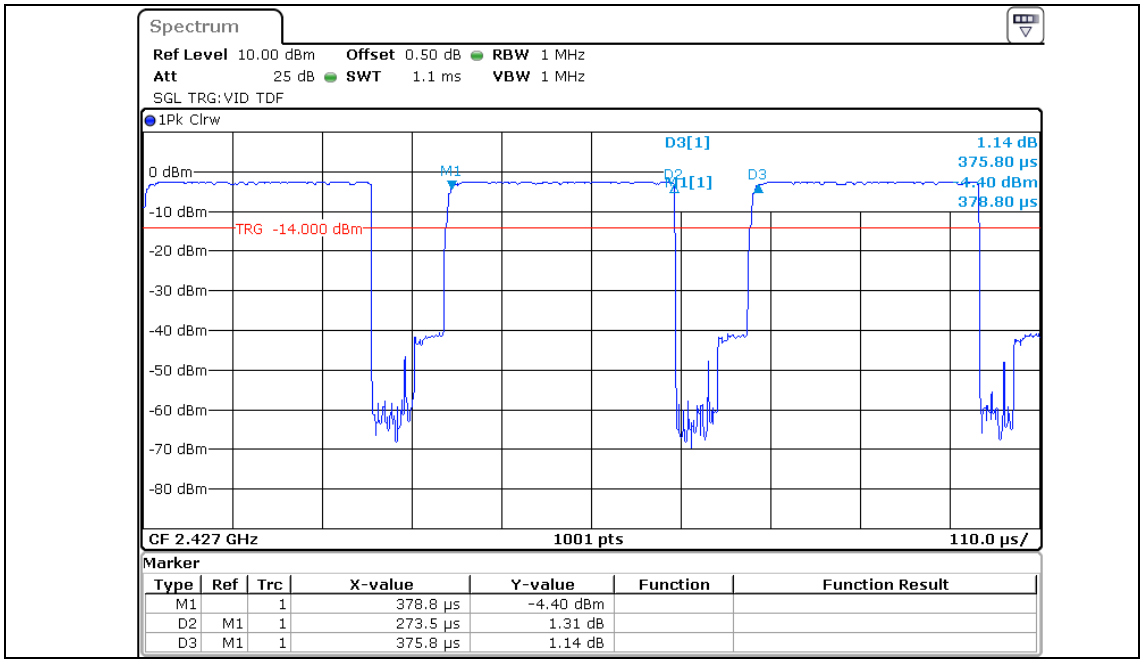
1) Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
2) RBW = 100 ㎑
3) VBW ≥ RBW
4) Sweep = auto
5) Detector function = peak
6) Trace = max hold
7) Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
8) Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

## 5.5.2.3 Radiated Spurious Emissions

1) The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m semi-anechoic chamber. The EUT was tested at a distance 3 meters.
2) The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3) The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 ㎑ to 30 ㎒ using the loop antenna, and from 30 to 1 000 ㎒ using the Bi-Log antenna, and from 1 000 ㎒ to 26 500 ㎒ using the horn antenna.
4) Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
5) The 0.8m height is for below 1 G testing, and 1.5m is for above 1G testing.

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 3 ㎒ for Average detection (AV) at frequency above 1 ㎓. (Detector = RMS, Averaging type = power)
   A duty cycle correction factor has to be added to the measurement result.
   (DCCF = 10 log(1/x) = 10 log (0.376/0.274)) = 1.38)




*Note: period : 375.8 us, On time : 273.5 us

## 5.5.3 Test Result

## - Complied

1. Conducted Spurious Emissions was shown in figure 3.
   Note: We took the insertion loss of the cable into consideration within the measuring instrument.
2. Measured value of the Field strength of spurious Emissions (Radiated)
3. It tested x,y and z – 3 axis each, mentioned only worst case data at this report.

*** Below 1 ㎓ data (worst-case)**

**Lowest Channel (2 427 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| **Quasi-Peak DATA. Emissions below 30 ㎒** | | | | | | | |
| Below 30.00 | **Not Detected** | - | - | - | - | - | - |
| **Quasi-Peak DATA. Emissions below 1 ㎓** | | | | | | | |
| 90.38 | 120 | V | 38.70 | -17.50 | 21.20 | 43.50 | 22.30 |
| 839.59 | 120 | V | 18.90 | -1.40 | 17.50 | 46.00 | 28.50 |
| 890.51 | 120 | V | 19.40 | -0.20 | 19.20 | 46.00 | 26.80 |
| Below 1 000.00 | **Not Detected** | - | - | - | - | - | - |

*** 1 ㎓ ~ 26.5 ㎓ data**

**Lowest Channel (2 427 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | |
| *2 356.75 | 1 000 | V | 40.70 | 3.20 | 43.90 | 74.00 | 30.10 |
| 4 854.38 | 1 000 | H | 47.90 | 8.90 | 56.80 | 74.00 | 17.20 |
| 7 280.63 | 1 000 | H | 36.00 | 14.50 | 50.50 | 74.00 | 23.50 |
| 10 816.87 | 1 000 | H | 30.50 | 19.20 | 49.70 | 74.00 | 24.30 |
| 14 962.50 | 1 000 | H | 33.80 | 24.30 | 58.10 | 74.00 | 15.90 |
| Above 15 000.00 | Not Detected | - | - | - | - | - | - |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | |
| *2 356.75 | 1 000 | V | 28.50 | 3.20 | 33.08 | 54.00 | 20.92 |
| 4 854.38 | 1 000 | H | 37.20 | 8.90 | 47.48 | 54.00 | 6.52 |
| 7 280.63 | 1 000 | H | 21.90 | 14.50 | 37.78 | 54.00 | 16.22 |
| 10 816.87 | 1 000 | H | 24.20 | 19.20 | 44.78 | 54.00 | 9.22 |
| 14 962.50 | 1 000 | H | 22.00 | 24.30 | 47.68 | 54.00 | 6.32 |
| Above 15 000.00 | Not Detected | - | - | - | - | - | - |

* This Asterisk means restricted band.

NOTE1. Factor = Cable loss – Amp gain + Antenna factor
Reading value at average data was corrected with DCCF
DCCF = Duty Cycle Correction Factor

**Middle Channel (2 441 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | |
| 4 880.63 | 1 000 | H | 40.50 | 8.80 | 49.30 | 74.00 | 24.70 |
| 7 323.75 | 1 000 | H | 36.50 | 14.50 | 51.00 | 74.00 | 23.00 |
| 10 946.25 | 1 000 | H | 30.60 | 19.40 | 50.00 | 74.00 | 24.00 |
| 13 747.50 | 1 000 | H | 33.10 | 23.70 | 56.80 | 74.00 | 17.20 |
| 15 686.25 | 1 000 | H | 34.90 | 26.80 | 61.70 | 74.00 | 12.30 |
| Above 16 000.00 | Not Detected | - | - | - | - | - | - |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | |
| 4 880.63 | 1 000 | H | 32.40 | 8.80 | 42.58 | 54.00 | 11.42 |
| 7 323.75 | 1 000 | H | 18.60 | 14.50 | 34.48 | 54.00 | 19.52 |
| 10 946.25 | 1 000 | H | 25.50 | 19.40 | 46.28 | 54.00 | 7.72 |
| 13 747.50 | 1 000 | H | 22.30 | 23.50 | 47.18 | 54.00 | 6.82 |
| 15 686.25 | 1 000 | H | 19.40 | 26.80 | 47.58 | 54.00 | 6.42 |
| Above 16 000.00 | Not Detected | - | - | - | - | - | - |

* This Asterisk means restricted band.

NOTE1. Factor = Cable loss – Amp gain + Antenna factor
Reading value at average data was corrected with DCCF
DCCF = Duty Cycle Correction Factor

**Highest Channel (2 457 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | |
| *2 494.25 | 1 000 | H | 49.90 | 3.30 | 53.20 | 74.00 | 20.80 |
| 2 564.75 | 1 000 | H | 49.00 | 3.40 | 52.40 | 74.00 | 21.60 |
| 4 912.50 | 1 000 | V | 39.40 | 8.80 | 48.20 | 74.00 | 25.80 |
| 7 370.63 | 1 000 | H | 36.30 | 14.60 | 50.90 | 74.00 | 23.10 |
| 12 238.12 | 1 000 | H | 30.20 | 21.50 | 51.70 | 74.00 | 22.30 |
| 16 501.87 | 1 000 | H | 34.40 | 28.80 | 63.20 | 74.00 | 10.80 |
| Above 17 000.00 | Not Detected | - | - | - | - | - | - |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | |
| *2 494.25 | 1 000 | H | 27.40 | 3.30 | 32.08 | 54.00 | 21.92 |
| 2 564.75 | 1 000 | H | 28.60 | 3.40 | 33.38 | 54.00 | 20.62 |
| 4 912.50 | 1 000 | V | 24.00 | 8.80 | 34.18 | 54.00 | 19.82 |
| 7 370.63 | 1 000 | H | 29.40 | 14.60 | 45.38 | 54.00 | 8.62 |
| 12 238.12 | 1 000 | H | 23.60 | 21.50 | 46.48 | 54.00 | 7.52 |
| 16 501.87 | 1 000 | H | 17.80 | 28.80 | 47.98 | 54.00 | 6.02 |
| Above 17 000.00 | Not Detected | - | - | - | - | - | - |

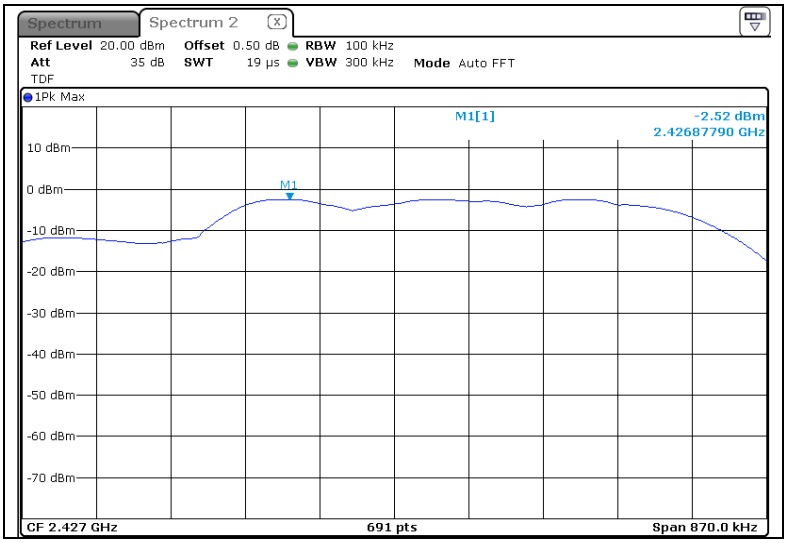
* This Asterisk means restricted band.

NOTE1. Factor = Cable loss – Amp gain + Antenna factor
Reading value at average data was corrected with DCCF
DCCF = Duty Cycle Correction Factor

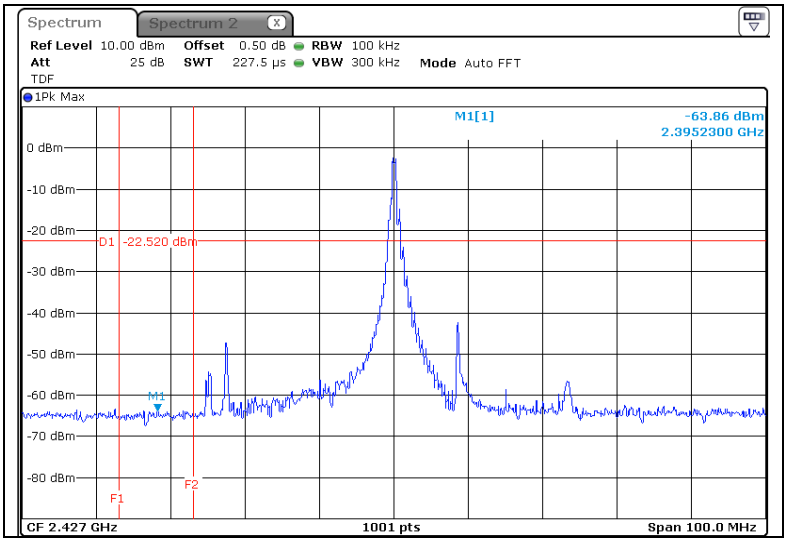
Figure 3. Plot of the Band-edge & Conducted Spurious Emissions

Lowest Channel (2 427 ㎒)

**Reference**

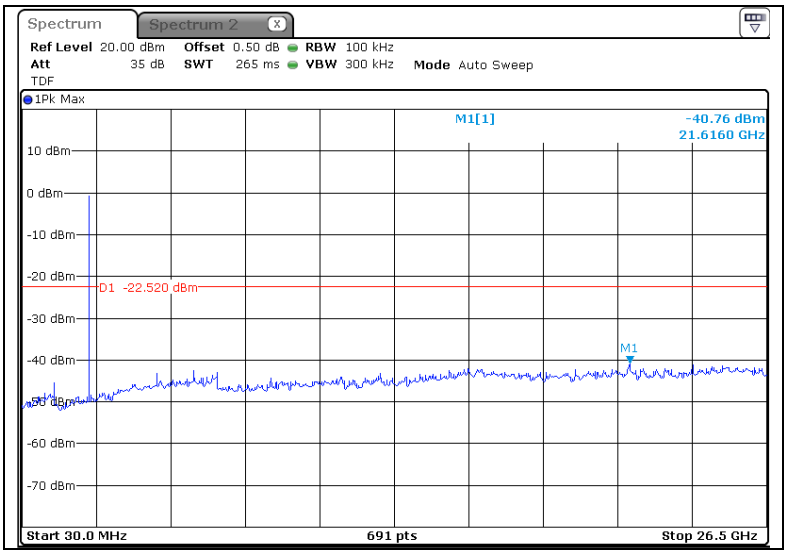



**Band-edge**



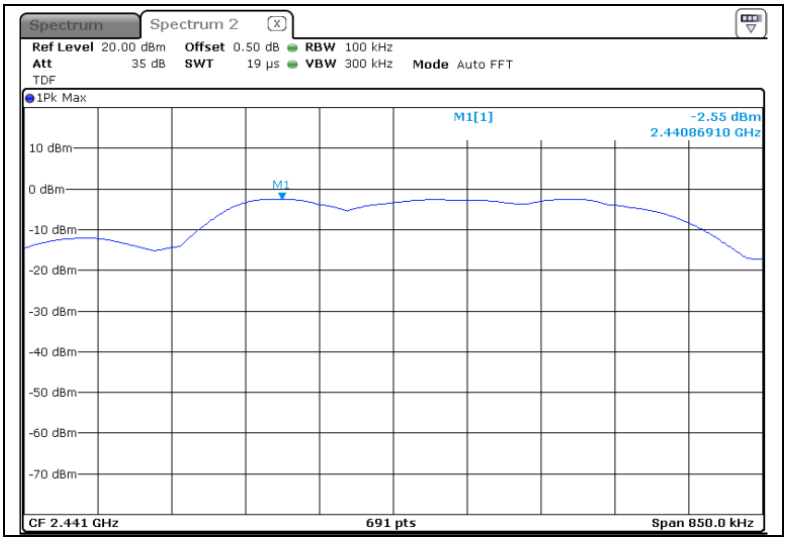

* Result of 2 400 ㎒(F1: 2 390 ㎒, F2: 2 400 ㎒)

## Conducted Spurious Emissions

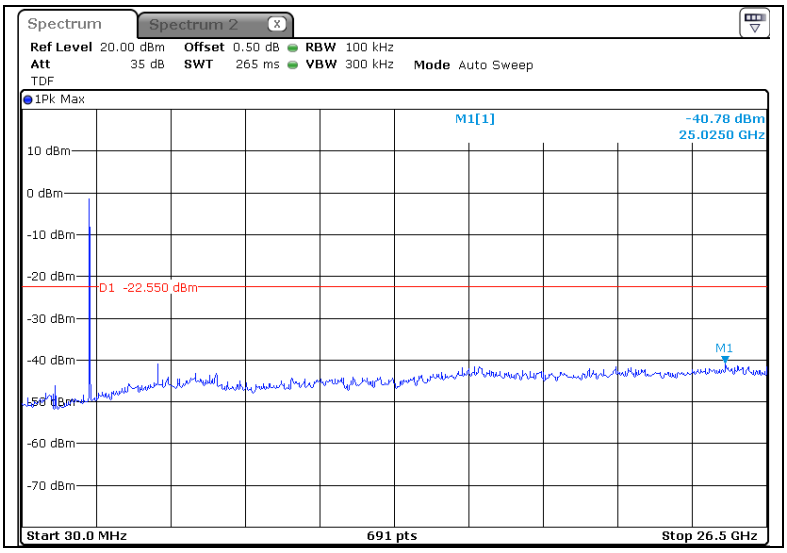



Middle Channel (2 441 ㎒)

## Reference

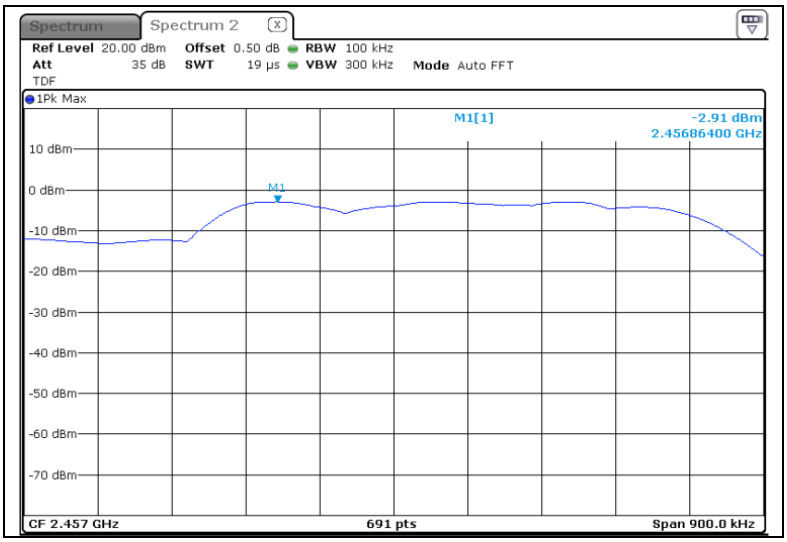


## Conducted Spurious Emissions

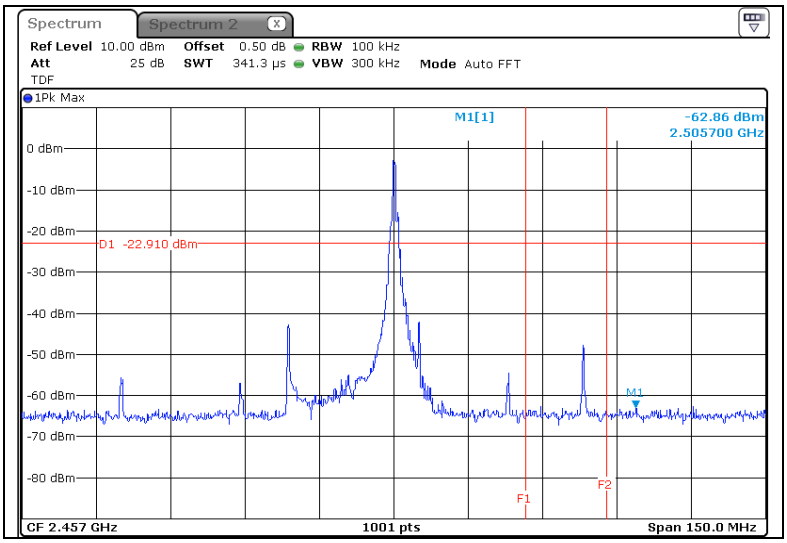



Highest Channel (2 457 ㎒)

## Reference

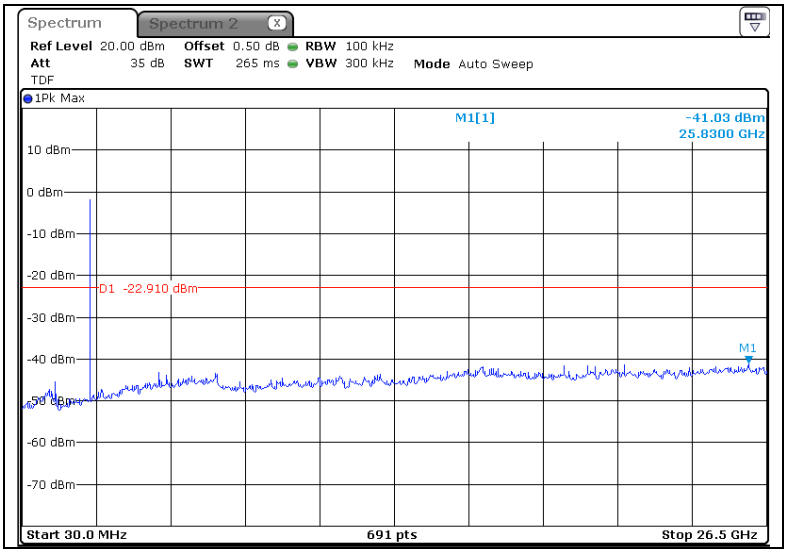


## Band-edge




* Result of 2 483.5 ㎒(F1: 2 483.5 ㎒, F2: 2 500 ㎒)

## Conducted Spurious Emissions



# 6. Test equipment used for test

| | Equipment Name | Manufacturer | Model No. | Serial No. | Next Cal. Date |
|---|---|---|---|---|---|
| ■ | Spectrum Analyzer | R & S | FSV40 | 100989 | 17.01.07 |
| ■ | DC Power Supply | Agilent | E3632A | MY40017108 | 16.07.15 |
| ■ | Signal Generator | R & S | SMR40 | 100007 | 16.06.15 |
| ■ | Wideband Power Sensor | R & S | NRP-Z81 | 100677 | 17.01.08 |
| ■ | Test Receiver | ESR | ESR | 101078 | 16.09.02 |
| ■ | Bi-Log Antenna | SCHWARZBECK | VULB 9163 | 552 | 16.07.10 |
| ■ | Amplifier | SONOMA INSTRUMENT | 310N | 344922 | 16.09.02 |
| ■ | Attenuator | SCHWARZBECK | DGA9552N | BU2404 | 17.04.08 |
| ■ | Horn antenna | ETS.lindgren | 3117 | 155787 | 16.11.25 |
| ■ | Broadband Preamplifier | SCHWARZBECK | BBV9718 | 9718-233 | 17.01.09 |
| ■ | LOOP Antenna | R & S | HFH2-Z2 | 100355 | 18.03.03 |
| ■ | Antenna Mast | MATURO | AM4.0 | 079/3440509 | - |
| ■ | Turn Table | MATURO | CO2000-SOFT | - | - |
| ■ | Highpass Filter | Wainwright InstrumentsGmbH | WHKX3.0/18G-12SS | 44 | 17.02.01 |
| ■ | Vector Signal Generator | R & S | SMBV100A | 257566 | 17.01.07 |