



FCC LISTED, REGISTRATION  
 NUMBER: 720267

Informe de ensayo nº:  
 Test report No:

ISED LISTED REGISTRATION  
 NUMBER 4621A-2

**NIE: 56316RRF.001A3**

Test report (Modification 3)  
 USA FCC Part 15.247, 15.209 , 15.207  
 CANADA RSS-247, RSS-Gen,  
 Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.  
 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area  
 Network (LE-LAN) Devices.  
 General Requirements and Information for the Certification of Radio Apparatus.

|   |   |
|---|---|
| <b>Identificación del objeto ensayado..... :</b><br>Identification of item tested | GPS Tracking Device   |
| <b>Marca .....</b><br>Trademark   | Ping  |
| <b>Modelo y/o referencia tipo .....</b><br>Model and /or type reference           | P0100D1   |
| <b>Other identification of the product ... :</b>                                  | FCC ID: 2AOL3-P0100DX<br>IC: 23634-P0100DX  |
| <b>Final HW version .....</b>   | R1.8  |
| <b>Final SW version .....</b>   | ---   |
| <b>Características.....</b><br>Features   | ---   |
| <b>Solicitante.....</b><br>Applicant  | PING GPS<br>19825 North Cove Rd, Ste 173 Cornelius, NC 28031 USA  |
| <b>Método de ensayo solicitado, norma.. :</b><br>Test method requested, standard  | USA FCC Part 15.247 10-1-17 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.<br>USA FCC Part 15.209 10-1-17 Edition: Radiated emission limits; general requirements.<br>USA FCC Part 15.207 10-1-17 Edition: Conducted emission limits; general requirements.<br>CANADA RSS-247 Issue 2 (February 2017).<br>CANADA RSS-Gen Issue 4 (November 2014).<br>Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v04 dated 04/05/2017.<br>ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. |
| <b>Resultado .....</b><br>Summary   | IN COMPLIANCE   |

|  |                              |
|--|------------------------------|
| <b>Aprobado por (nombre / cargo y firma) .....</b> : | A. Llamas<br>RF Lab. Manager |
| Approved by (name / position & signature)            |                              |
| <b>Fecha de realización .....</b> :                  | 2018-04-18                   |
| Date of issue  |                              |
| <b>Formato de informe No. ....</b> :                 | FDT11_20                     |
| Report template No                                   |                              |

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## Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

DEKRA Testing and Certification is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: ISED 4621A-2.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification..
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

## Uncertainty

Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Testing and Certification internal document PODT000.

## Usage of samples

Samples undergoing test have been selected by: **the client**

Sample S/01 is composed of the following elements:

| Control N° | Description         | Model   | Serial N° | Date of reception |
|------------|---------------------|---------|-----------|-------------------|
| 56316C/004 | GPS Tracking Device | P0100D1 | ---       | 2018-01-30        |
| 56316C/003 | USB charger cable   | ---     | ---       | 2018-01-30        |

1. Sample S/01 has undergone following test(s).

All radiated tests indicated in appendix A.

Sample S/02 is composed of the following elements:

| Control N° | Description  | Model   | Serial N° | Date of reception |
|------------|--|---------|-----------|-------------------|
| 56316C/005 | GPS Tracking Device with temporary antenna connector | P0100D1 | ---       | 2018-01-30        |

1. Sample S/02 has undergone following test(s).

All conducted tests indicated in appendix A.

Sample S/03 is composed of the following elements:

| Control N° | Description         | Model   | Serial N° | Date of reception |
|------------|---------------------|---------|-----------|-------------------|
| 56316C/004 | GPS Tracking Device | P0100D1 | ---       | 2018-01-30        |
| 56316C/003 | USB charger cable   | ---     | ---       | 2018-01-30        |

Auxiliary element used with sample S/03:

| Control N° | Description   | Model | Serial N° | Date of reception |
|------------|---------------|-------|-----------|-------------------|
| 56316C/002 | AC/DC Adapter | --    | ---       | 2018-01-30        |

1. Sample S/03 has undergone following test(s).

All electromagnetic conducted tests indicated in appendix B.

## Test sample description

Using a combination of GPS, GSM and Bluetooth Low Energy hardware, in conjunction with a smartphone app, the Ping device provides the end user with the capability to track the location of people and valuables around the world.

The PING device can be commercialized under different models: P0100D0, P0100D1, P0100D2, P0100D3, P0100D4, P0100D5, P0100D6, P0100D7, P0100D8 and P0100D9. All models are electrically and mechanically identical. The only difference between model is the color of the housing (see applicant's declaration letter in point "Remarks and Comments").

## Identification of the client

PING GPS

19825 North Cove Rd, Ste 173

Cornelius, NC 28031 USA

## Testing period

The performed test started on 2018-02-01 and finished on 2018-02-08.

The tests have been performed at DEKRA Testing and Certification S.A.U.

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

|                                      |                              |
|--------------------------------------|------------------------------|
| <b>Temperature</b>                   | Min. = 15 °C<br>Max. = 35 °C |
| <b>Relative humidity</b>             | Min. = 20 %<br>Max. = 75 %   |
| <b>Shielding effectiveness</b>       | > 100 dB                     |
| <b>Electric insulation</b>           | > 10 k $\Omega$              |
| <b>Reference resistance to earth</b> | < 1 $\Omega$                 |

In the semianechoic chamber, the following limits were not exceeded during the test.

|                                      |  |
|--------------------------------------|--|
| <b>Temperature</b>                   | Min. = 15 °C<br>Max. = 35 °C   |
| <b>Relative humidity</b>             | Min. = 20 %<br>Max. = 75 %   |
| <b>Air pressure</b>                  | Min. = 860 mbar<br>Max. = 1060 mbar  |
| <b>Shielding effectiveness</b>       | > 100 dB   |
| <b>Electric insulation</b>           | > 10 k $\Omega$  |
| <b>Reference resistance to earth</b> | < 1 $\Omega$   |
| <b>Normal site attenuation (NSA)</b> | < $\pm$ 4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz) |
| <b>Field homogeneity</b>             | More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).                 |

In the chamber for conducted measurements, the following limits were not exceeded during the test:

|                                      |                                     |
|--------------------------------------|-------------------------------------|
| <b>Temperature</b>                   | Min. = 15 °C<br>Max. = 35 °C        |
| <b>Relative humidity</b>             | Min. = 20 %<br>Max. = 75 %          |
| <b>Air pressure</b>                  | Min. = 860 mbar<br>Max. = 1060 mbar |
| <b>Shielding effectiveness</b>       | > 100 dB                            |
| <b>Electric insulation</b>           | > 10 kΩ                             |
| <b>Reference resistance to earth</b> | < 1 Ω                               |

### Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 56316RRF.001A2 related with the same samples, in the next clauses and sub-clauses:

| Clauses / Sub-clauses                         | Modification   | Justification |
|---|--|---------------|
| Cover sheet / Title                           | The reference FCC15.207 is included to the title   | TCB request   |
| Cover sheet / Test method requested, standard | The reference FCC15.207 is included to the sub-clause  | TCB request   |
| Test verdicts / Table BTLE                    | The reference FCC15.207 / RSS Gen is included to the table   | TCB request   |
| Remarks and comments / Used instrumentation   | The reference of instrumentation for electromagnetic conducted emissions and RF cables is included on the equipment list | TCB request   |
| Appendixes                                    | Appendix B for electromagnetic continuous conducted emissions is added   | TCB request   |
| Remarks and comments/Used Instrumentation     | It was changed the Manufacturer/Model of LISN used   | Typo          |

This modification test report cancels and replaces the test report 56316RRF.001A2.

### Remarks and comments

1; The tests have been performed by the technical personnel: Carolina Postigo, David Rubio and Alberto Parada.

2: Used instrumentation:

#### Conducted Measurements

|    |  | Last Cal. date | Cal. due date |
|----|--|----------------|---------------|
| 1. | Spectrum analyser Agilent PSA E4440A         | 2017/10        | 2019/10       |
| 2. | Digital Multimeter Fluke 179                 | 2017/05        | 2018/05       |
| 3. | DC power supply Keysight Technologies U8002A | ---            | ---           |
| 4. | EMI TEST Receiver R&S ESU40                  | 2016/03        | 2018/03       |
| 5. | Transient Limiter SCHWARZBECK VTSD 9561-F    | 2017/03        | 2019/03       |
| 6. | LISN NARDA PMM L3-32                         | 2017/09        | 2018/09       |

Radiated Measurements

|   | Last Cal. date | Cal. due date |
|---|----------------|---------------|
| 1. Semianechoic Absorber Lined Chamber ETS FACT3 200STP             | N.A.           | N.A.          |
| 2. BiconicalLog antenna ETS LINDGREN 3142E                          | 2017/07        | 2020/04       |
| 3. Multi Device Controller EMCO 2090                                | N.A.           | N.A.          |
| 4. Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D | 2016/11        | 2019/11       |
| 5. Broadband Horn antenna 18-40 GHz SCHWARZBECK BBHA 9170           | 2017/03        | 2020/03       |
| 6. EMI Test Receiver R&S ESU 40                                     | 2016/03        | 2018/03       |
| 7. Signal and spectrum analyzer R&S FSV40                           | 2017/07        | 2019/07       |
| 8. RF pre-amplifier 30 MHz-6 GHz Bonn Elektronik BLNA 0360-01N      | 2017/07        | 2018/09       |
| 9. RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-1M           | 2016/02        | 2018/02       |
| 10. RF pre-amplifier 18-40 GHz NARDA JS44-18004000-33-8P            | 2018/02        | 2019/02       |
| 11. RF cable Sucoflex 1 meter                                       | 2017/04        | 2018/04       |
| 12. RF cable Sucoflex 2 meter                                       | 2017/04        | 2018/04       |
| 13. RF cable Sucoflex 10 meter                                      | 2016/07        | 2018/07       |

3: Applicant's declaration letter (see next page).



ping

Ping GPS  
19825 North Cove Rd, Ste 173  
Cornelius, NC 28031

## Declaration of Similarity

To whom it may concern:

We, **Ping GPS**, located in **19825 North Cove Rd, Ste 173, Cornelius, NC, USA** declare under our sole responsibility that the products listed below are electrically and mechanically identical, and the only difference is the color of the housing:

Type of equipment: **GPS Tracking Device**

Trade name: **Ping GPS**

Models name: **P0100D0, P0100D1, P0100D2, P0100D3, P0100D4, P0100D5, P0100D6, P0100D7, P0100D8, P0100D9**

Because of this, test results from **P0100D1** remains applicable, valid and representative for the models **P0100D0, P0100D2, P0100D3, P0100D4, P0100D5, P0100D6, P0100D7, P0100D8, P0100D9**.

And as evidence thereof, I hereby issue this letter in Cornelius, NC on February 22, 2018.

Authorized Signature by:



Name: **Joshua Lippiner**

Title: **President**

## Testing verdicts

|                             |     |
|-----------------------------|-----|
| <b>Not applicable</b> ..... | N/A |
| <b>Pass</b> .....           | P   |
| <b>Fail</b> .....           | F   |
| <b>Not measured</b> .....   | N/M |

### 1. BTLE

| FCC PART 15 PARAGRAPH / RSS-247 / RSS-Gen           |  | VERDICT |   |   |    |
|---|--|---------|---|---|----|
|   |  | NA      | P | F | NM |
| Section 15.247 Subclause (a) (2) / RSS-247 5.2. (a) | 6 dB Bandwidth                               |         | P |   |    |
| Section 15.247 Subclause (b) / RSS-247 5.4. (d)     | Maximum output power and antenna gain        |         | P |   |    |
| Section 15.247 Subclause (d) / RSS-247 5.5. ..      | Emission limitations conducted (Transmitter) |         | P |   |    |
| Section 15.247 Subclause (d) / RSS-247 5.5. ..      | Band-edge emissions compliance (Transmitter) |         | P |   |    |
| Section 15.247 Subclause (e) / RSS-247 5.2. (b)     | Power spectral density                       |         | P |   |    |
| Section 15.247 Subclause (d) / RSS-247 5.5. ...     | Emission limitations radiated (Transmitter)  |         | P |   |    |
| Section 15.207 Subclause (c) / RSS Gen 8.8          | AC Power Line Conducted Emissions Limits     |         | P |   |    |

## Appendix A – Test result (Bluetooth Low Energy)

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## TEST CONDITIONS

Power supply (V):

$$V_{\text{nominal}} = 4 \text{ Vdc}$$

Type of power supply = DC voltage from internal battery.

Type of antenna = Internal antenna.

Declared Gain for antenna (maximum) = 2 dBi.

### TEST FREQUENCIES:

Lowest channel: 2402 MHz

Middle channel: 2440 MHz

Highest channel: 2480 MHz

The test set-up was made in accordance to the general provisions of FCC DTS Measurement 558074 D01 DTS Meas Guidance v04 dated 04/05/2017.

The sample was used to configure the EUT to continuously transmit at a specified output power in all channels.

### CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyzer.



### RADIATED MEASUREMENTS

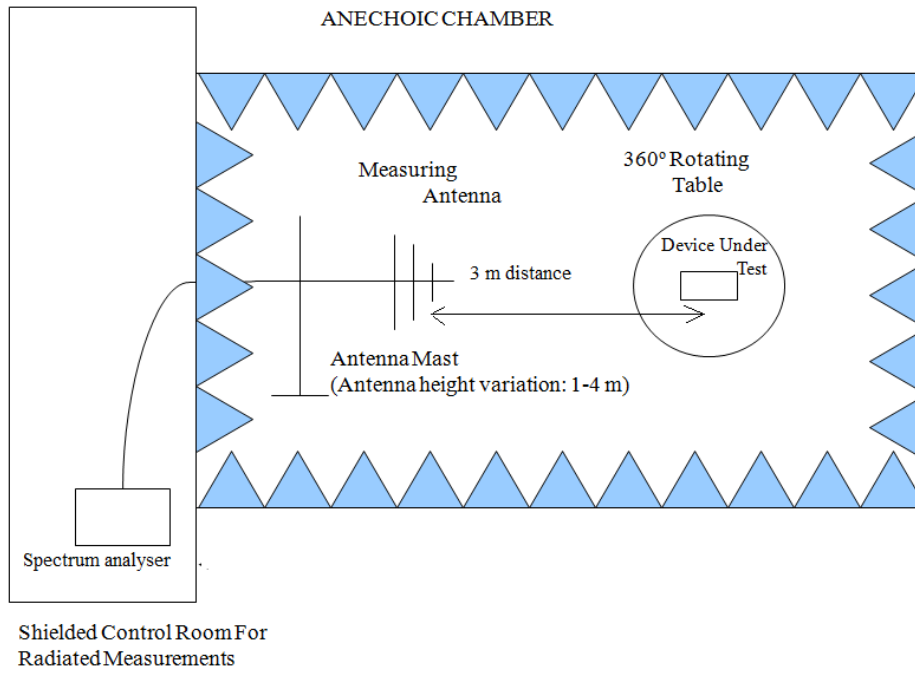
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

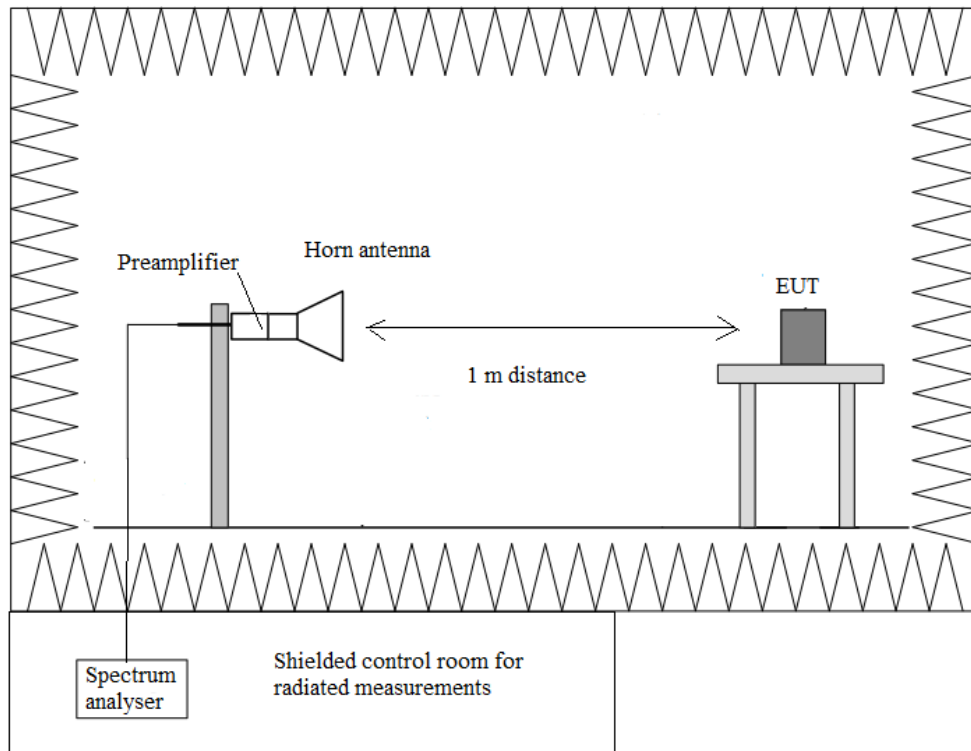
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

### Radiated measurements setup $f < 1$ GHz



### Radiated measurements setup $f > 1$ GHz



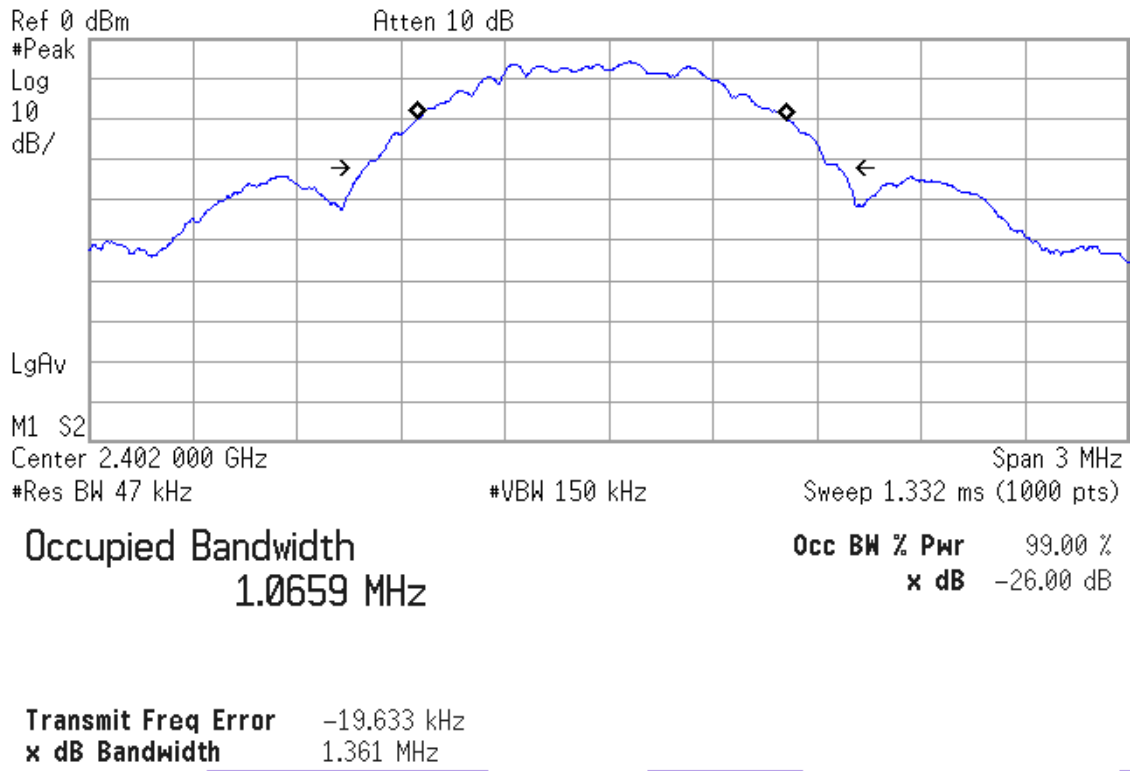
## Occupied Bandwidth

### RESULTS

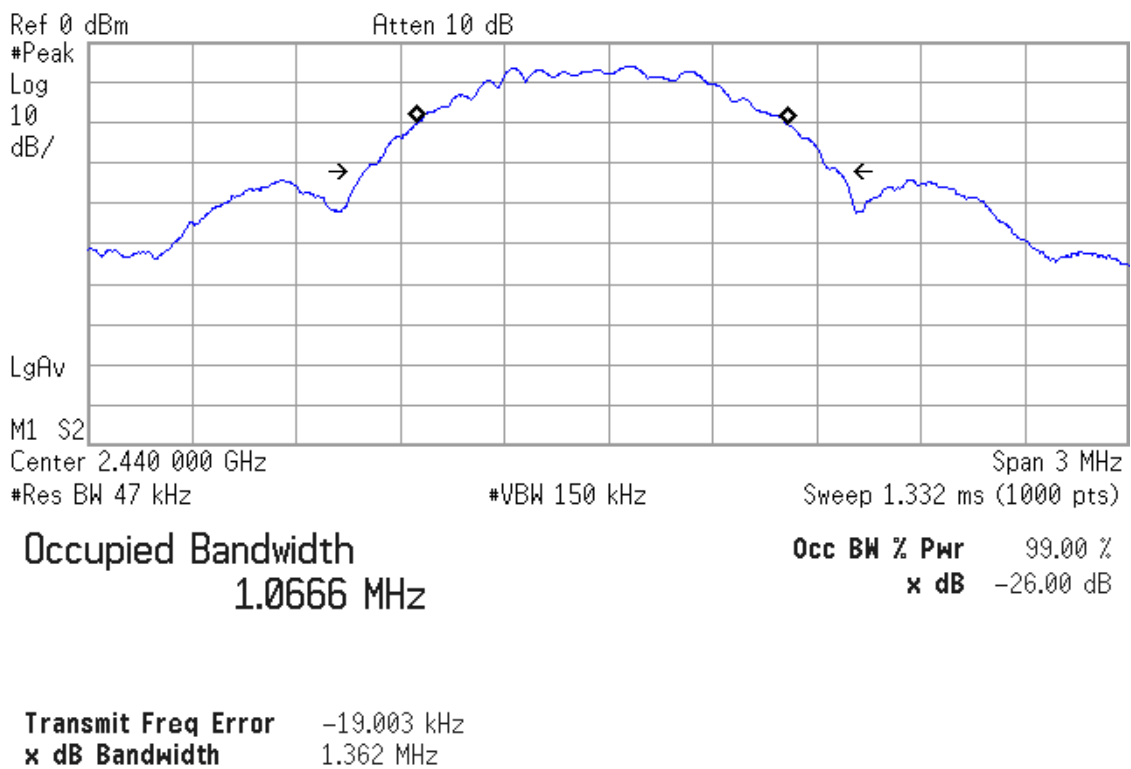
(see next plots).

|                               | Lowest frequency<br>2402 MHz | Middle frequency<br>2440 MHz | Highest frequency<br>2480 MHz |
|-------------------------------|------------------------------|------------------------------|-------------------------------|
| 99% bandwidth (MHz)           | 1.0659                       | 1.0666                       | 1.0598                        |
| -26 dBc bandwidth (MHz)       | 1.361                        | 1.362                        | 1.358                         |
| Measurement uncertainty (kHz) | <± 5                         |                              |                               |

Lowest Channel

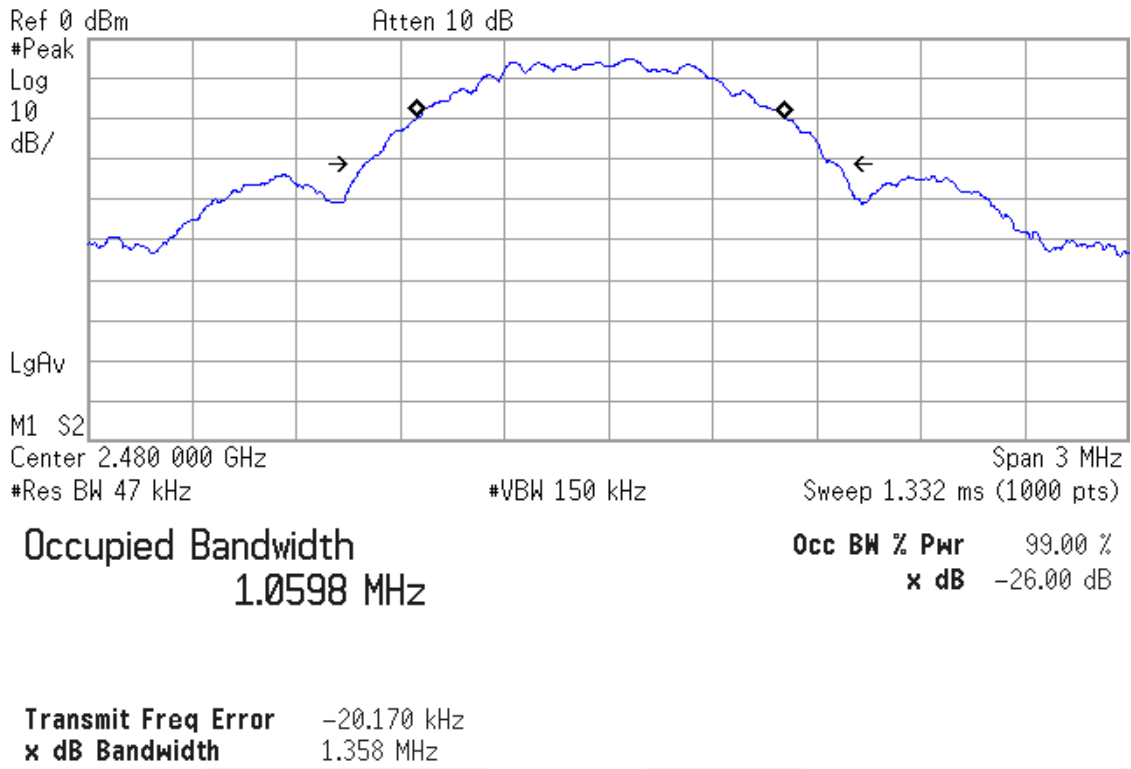


Middle Channel





Highest channel



**Section 15.247 Subclause (a) (2) / RSS-247 5.2. (a). 6 dB Bandwidth**

SPECIFICATION

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

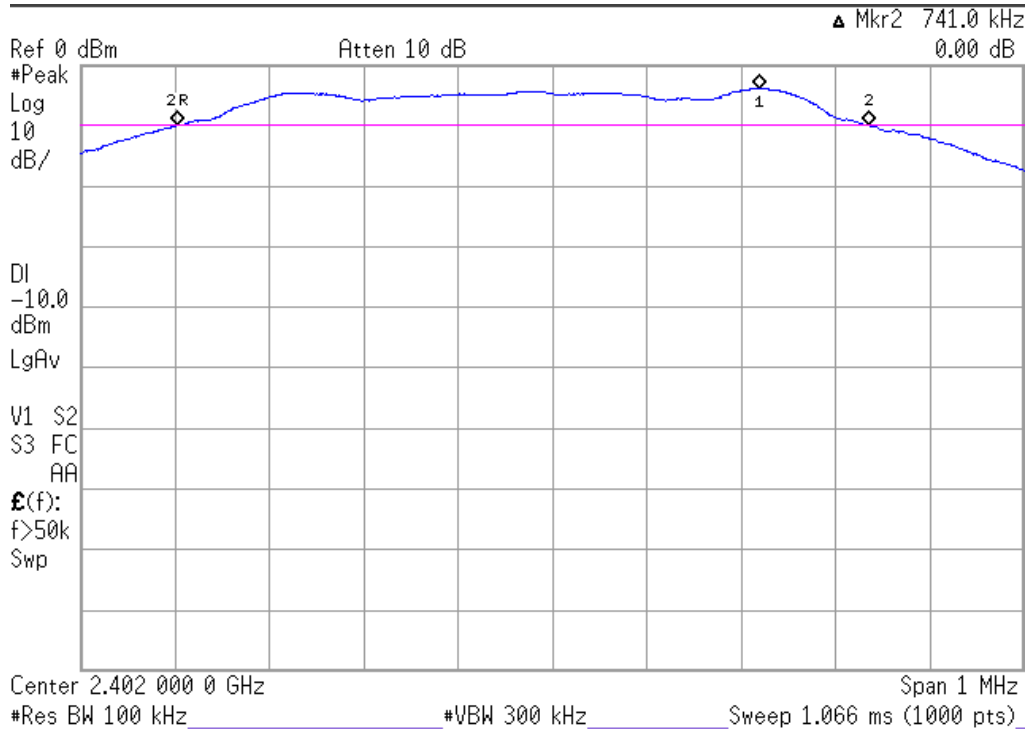
6 dB Bandwidth (see next plots).

|                               | Lowest frequency<br>2402 MHz | Middle frequency<br>2440 MHz | Highest frequency<br>2480 MHz |
|-------------------------------|------------------------------|------------------------------|-------------------------------|
| 6 dB Spectrum bandwidth (kHz) | 741.0                        | 734.5                        | 740.0                         |
| Measurement uncertainty (kHz) | <±8                          |                              |                               |

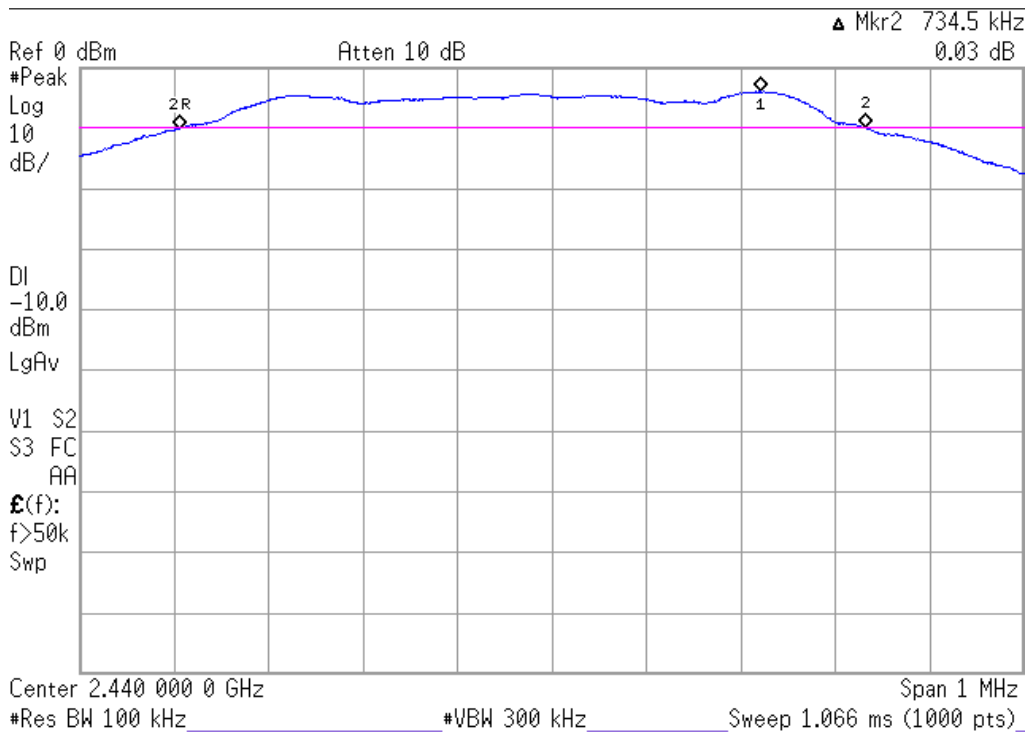
Verdict: PASS

6 dB BANDWIDTH.

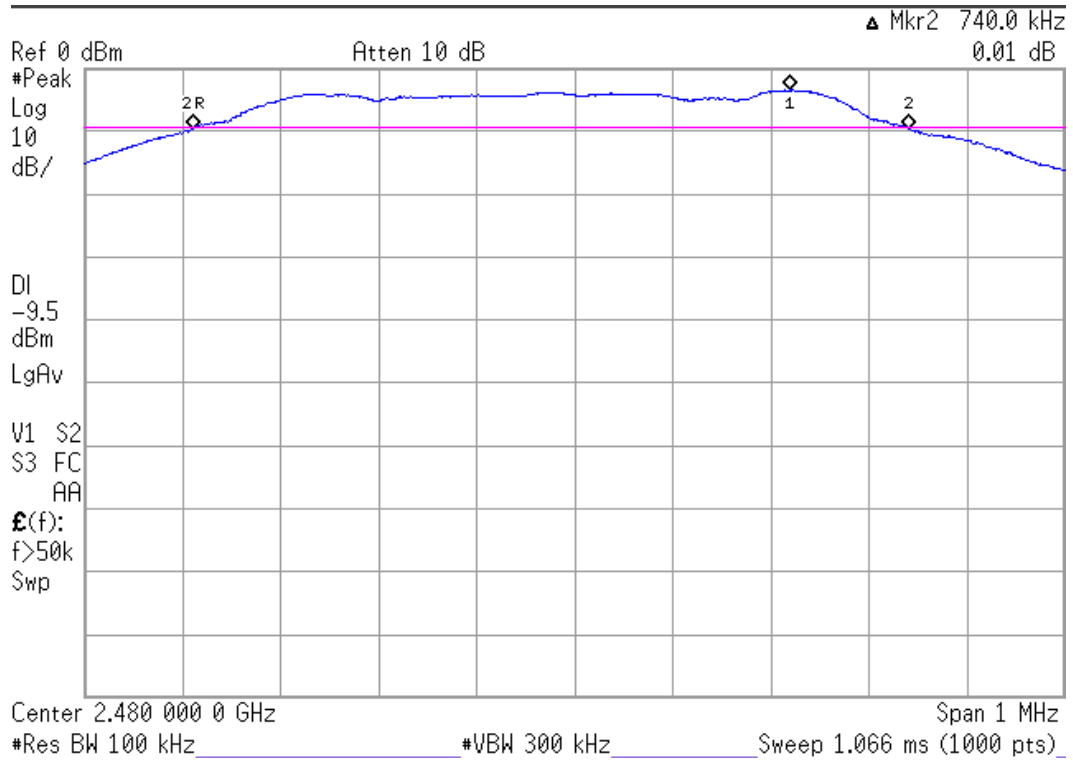
Lowest Channel



Middle Channel



### Highest Channel



**Section 15.247 Subclause (b) / RSS-247 5.4. (d). Maximum output power and antenna gain**

**SPECIFICATION**

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).  
The e.i.r.p. shall not exceed 4 W (36 dBm) (Canada).

**RESULTS**

The maximum peak conducted output power was measured using the method according to point 9.1.1. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v04 dated 04/05/2017.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

MAXIMUM OUTPUT POWER. See next plots.

Maximum declared antenna gain: +2 dBi.

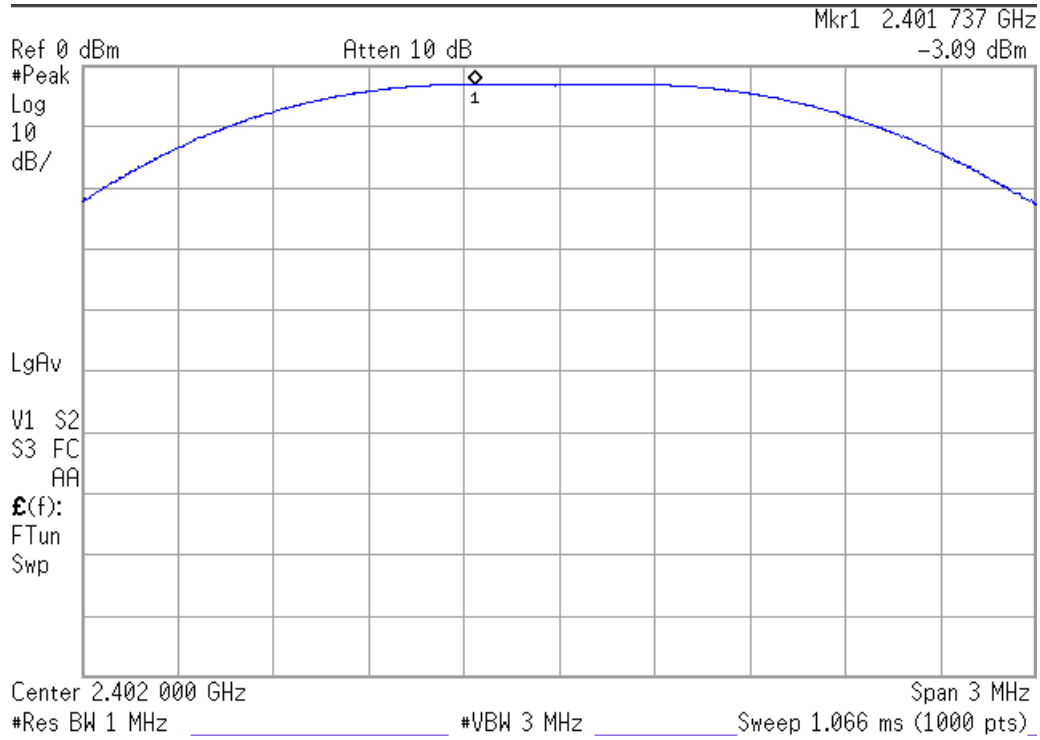
|                               | Lowest frequency<br>2402 MHz | Middle frequency<br>2440 MHz | Highest frequency<br>2480 MHz |
|-------------------------------|------------------------------|------------------------------|-------------------------------|
| Maximum conducted power (dBm) | -3.09                        | -3.18                        | -2.61                         |
| Maximum EIRP power (dBm)      | -1.09                        | -1.18                        | -0.61                         |
| Measurement uncertainty (dB)  | <±0.78                       |                              |                               |

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

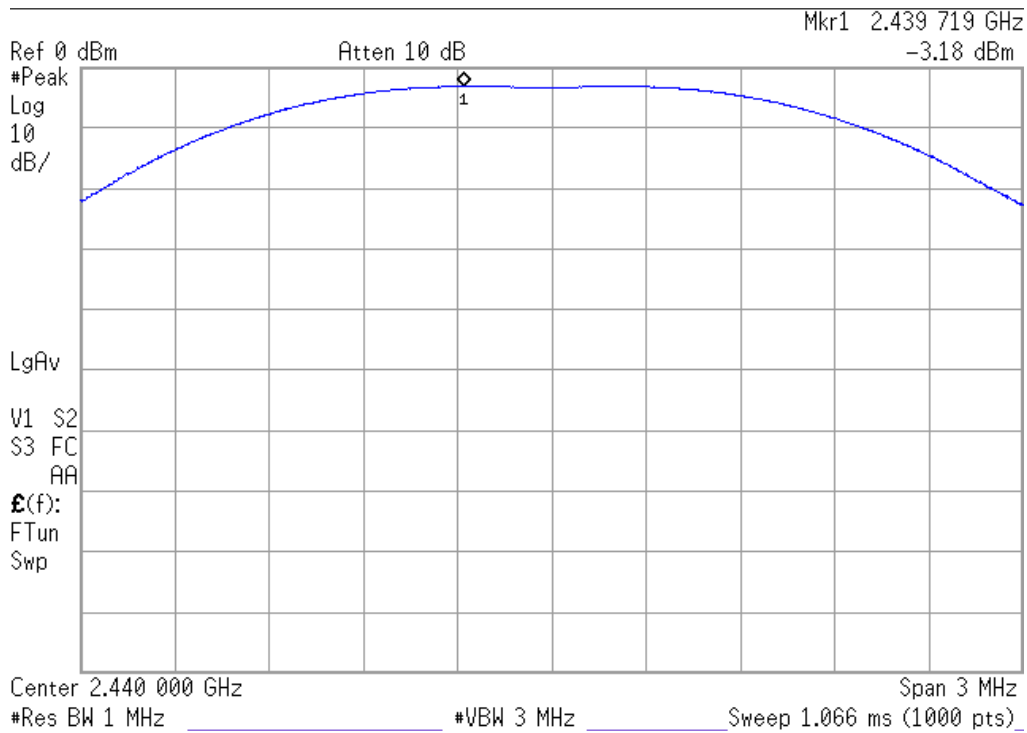
Verdict: PASS

### CONDUCTED PEAK POWER.

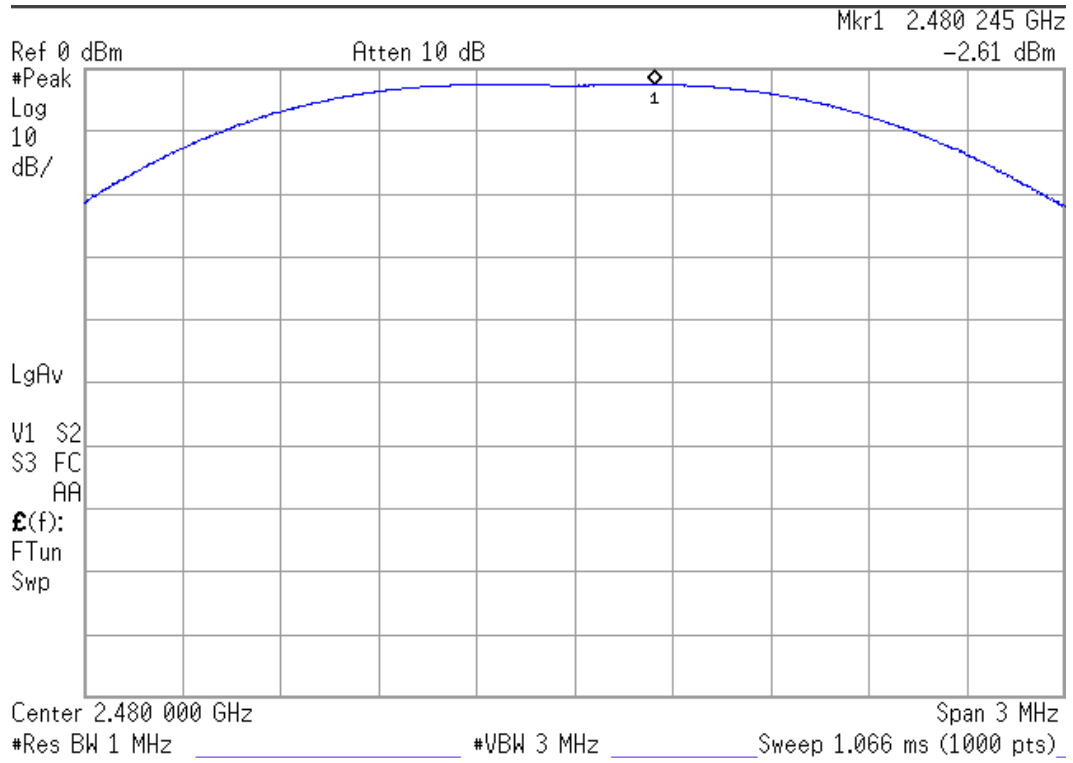
Lowest frequency



Middle frequency



### Highest frequency



**Section 15.247 Subclause (d) / RSS-247 5.5. Emission limitations conducted (Transmitter)**

**SPECIFICATION**

In any 100 kHz bandwidth outside the frequency band in which the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

**RESULTS:**

Reference Level Measurement

|                                   | Lowest frequency<br>2402 MHz | Middle frequency<br>2440 MHz | Highest frequency<br>2480 MHz |
|-----------------------------------|------------------------------|------------------------------|-------------------------------|
| Reference Level Measurement (dBm) | -3.06                        | -3.90                        | -3.41                         |
| Measurement uncertainty (dB)      | <±0.78                       |                              |                               |

Lowest frequency 2402 MHz:

| Spurious frequency (MHz)     | Emission Level (dBm) | Limit (dBm) |
|------------------------------|----------------------|-------------|
| 30.01                        | -39.85               | -23.06      |
| Measurement uncertainty (dB) | <±0.78               |             |

Middle frequency 2440 MHz:

| Spurious frequency (MHz)     | Emission Level (dBm) | Limit (dBm) |
|------------------------------|----------------------|-------------|
| 30.01                        | -39.71               | -23.90      |
| Measurement uncertainty (dB) | <±0.78               |             |



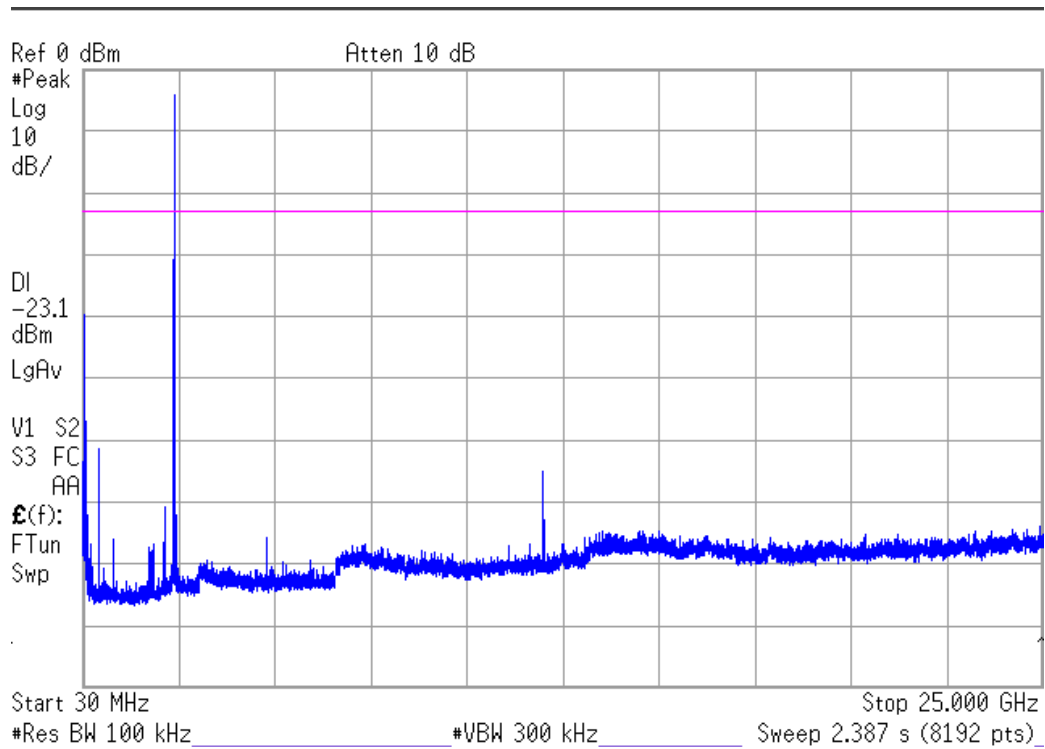
Highest frequency 2480 MHz:

| Spurious frequency (MHz)     | Emission Level (dBm) | Limit (dBm) |
|------------------------------|----------------------|-------------|
| 30.01                        | -39.82               | -23.41      |
| Measurement uncertainty (dB) | <±0.78               |             |

Measurement uncertainty (dB): < 0.78

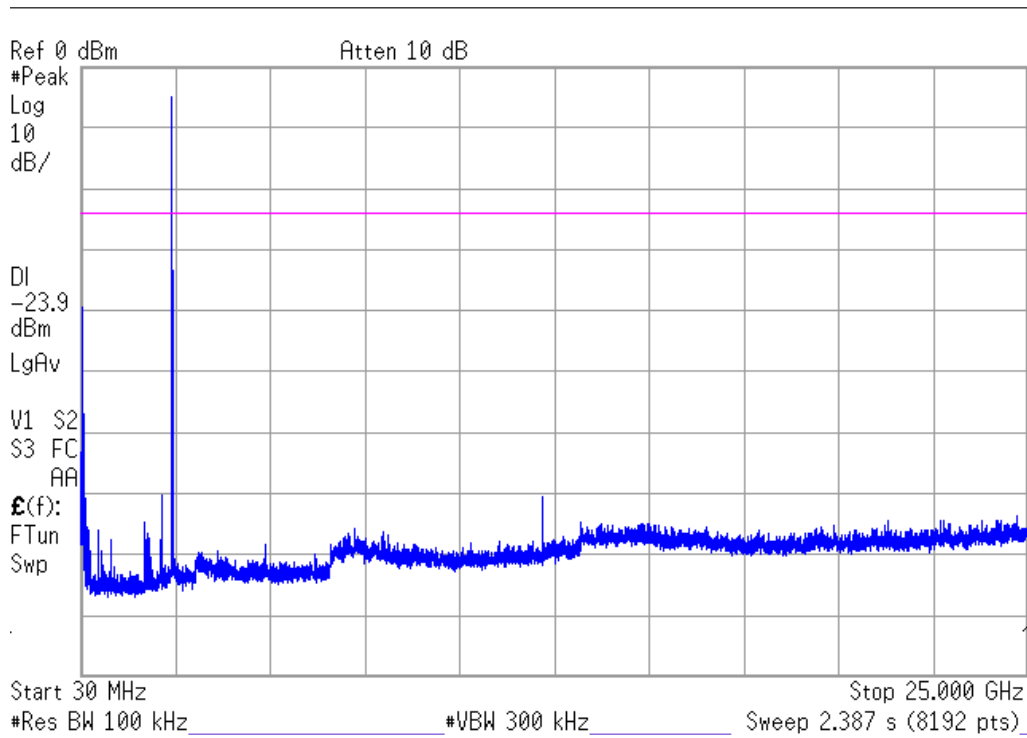
Verdict: PASS

Lowest frequency



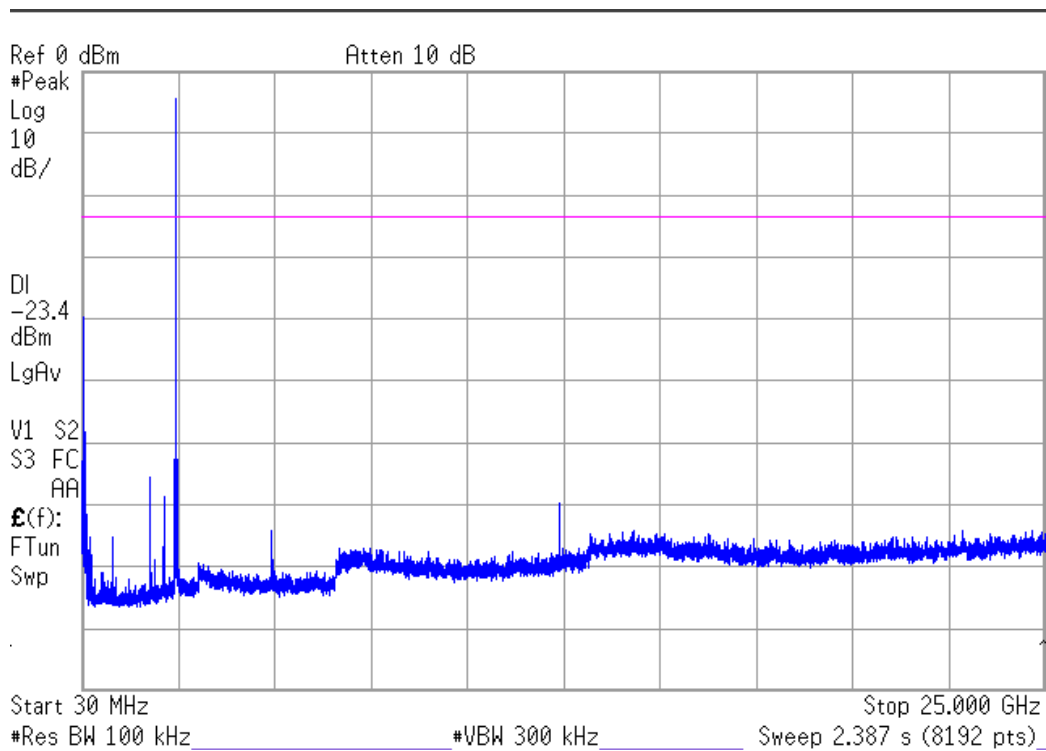
Note: The peak shown in the plot above the limit is the carrier frequency.

### Middle frequency



Note: The peak shown in the plot above the limit is the carrier frequency.

### Highest frequency



Note: The peak shown in the plot above the limit is the carrier frequency.

### Section 15.247 Subclause (d) / RSS-247 5.5. Band-edge emissions compliance (Transmitter)

#### SPECIFICATION

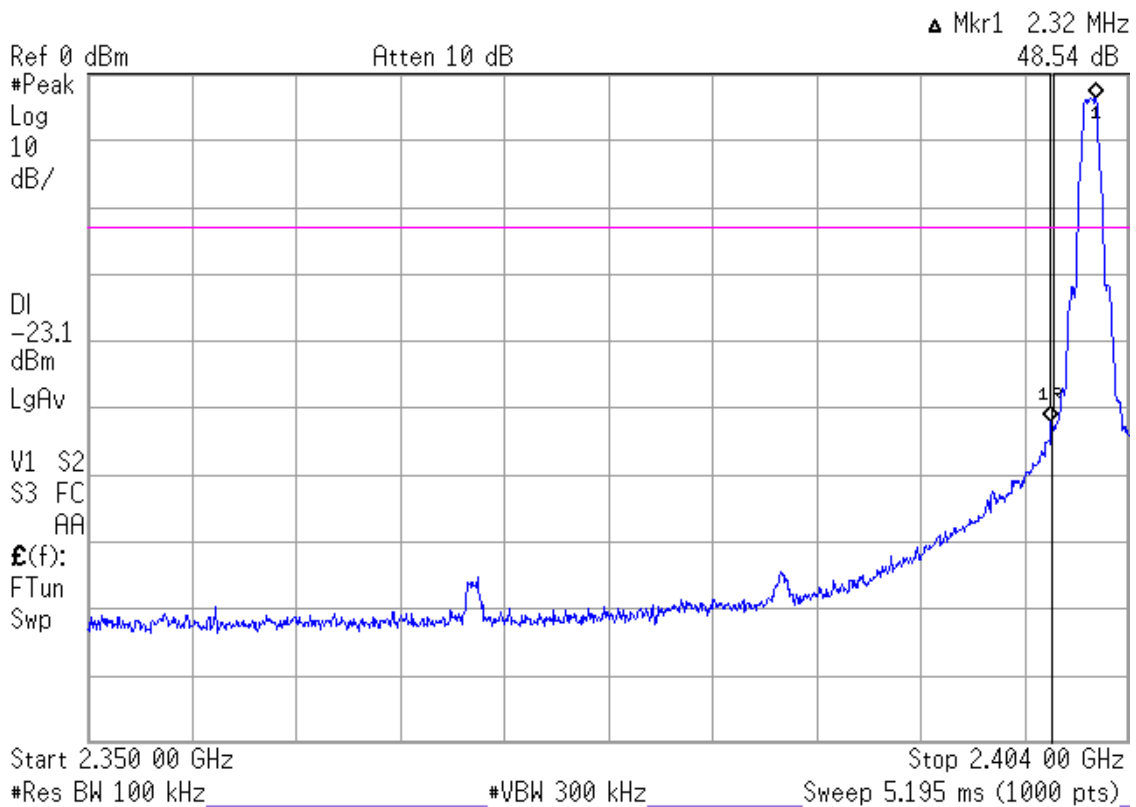
In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

#### RESULTS:

Note: Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

##### 1. LOW FREQUENCY SECTION. CONDUCTED.

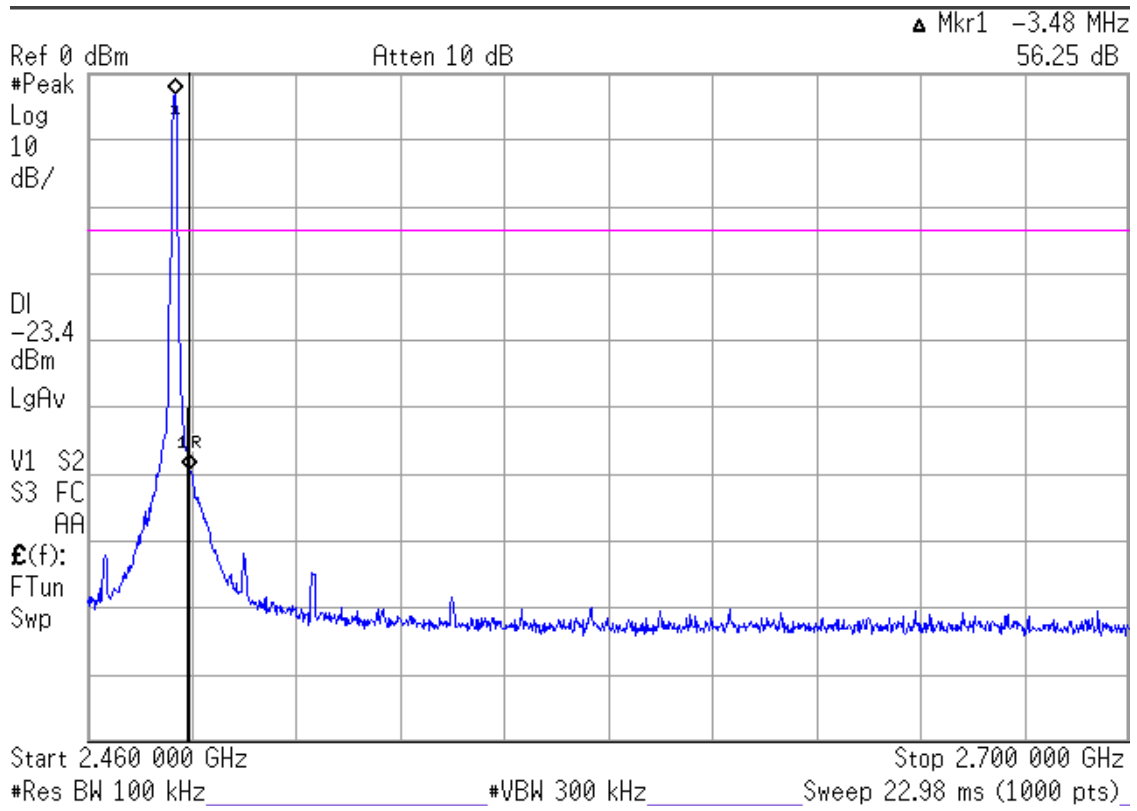
See next plot.



Verdict: PASS

2. HIGH FREQUENCY SECTION. CONDUCTED.

See next plot.



|                              |         |
|------------------------------|---------|
| Measurement uncertainty (dB) | < ±0.78 |
|------------------------------|---------|

Verdict: PASS

### Section 15.247 Subclause (e) / RSS-247 5.2. (b) Power spectral density

#### SPECIFICATION

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.

#### RESULTS

The maximum power spectral density level in the fundamental emission was measured using the method PKPSD (Peak PSD) according to point 10.2. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v04 dated 05/04/2017.

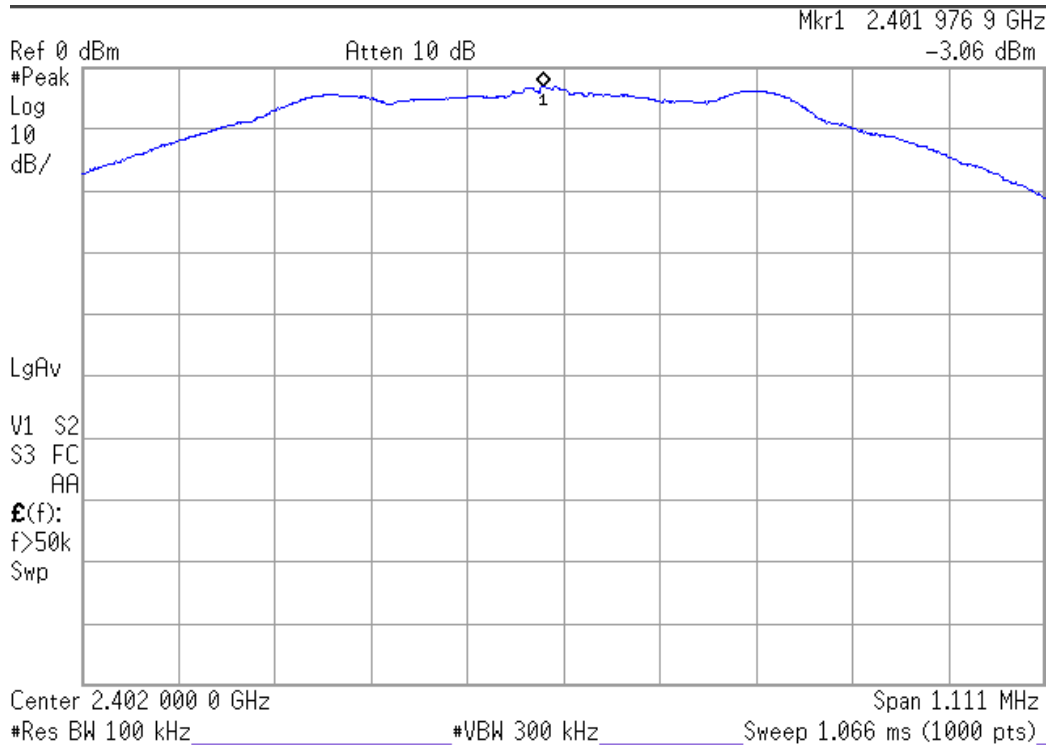
Power spectral density (see next plots).

|                              | Lowest frequency<br>2402 MHz | Middle frequency<br>2440 MHz | Highest frequency<br>2480 MHz |
|------------------------------|------------------------------|------------------------------|-------------------------------|
| Power spectral density (dBm) | -3.06                        | -3.90                        | -3.41                         |
| Measurement uncertainty (dB) | <±1.20                       |                              |                               |

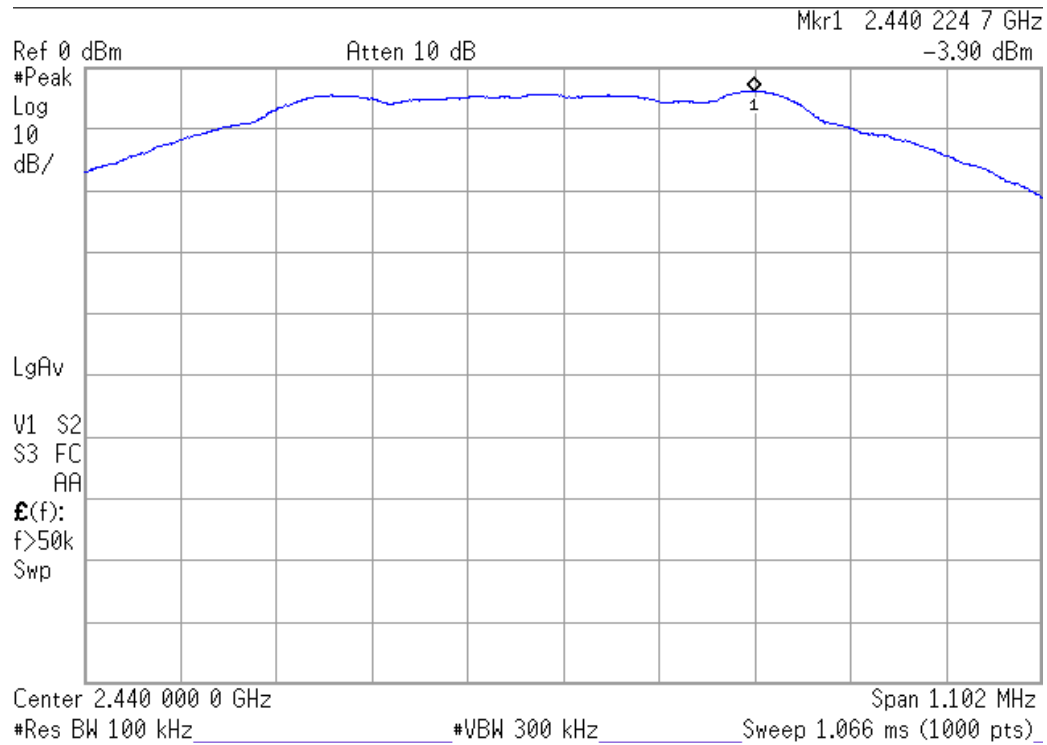
Verdict: PASS

## POWER SPECTRAL DENSITY

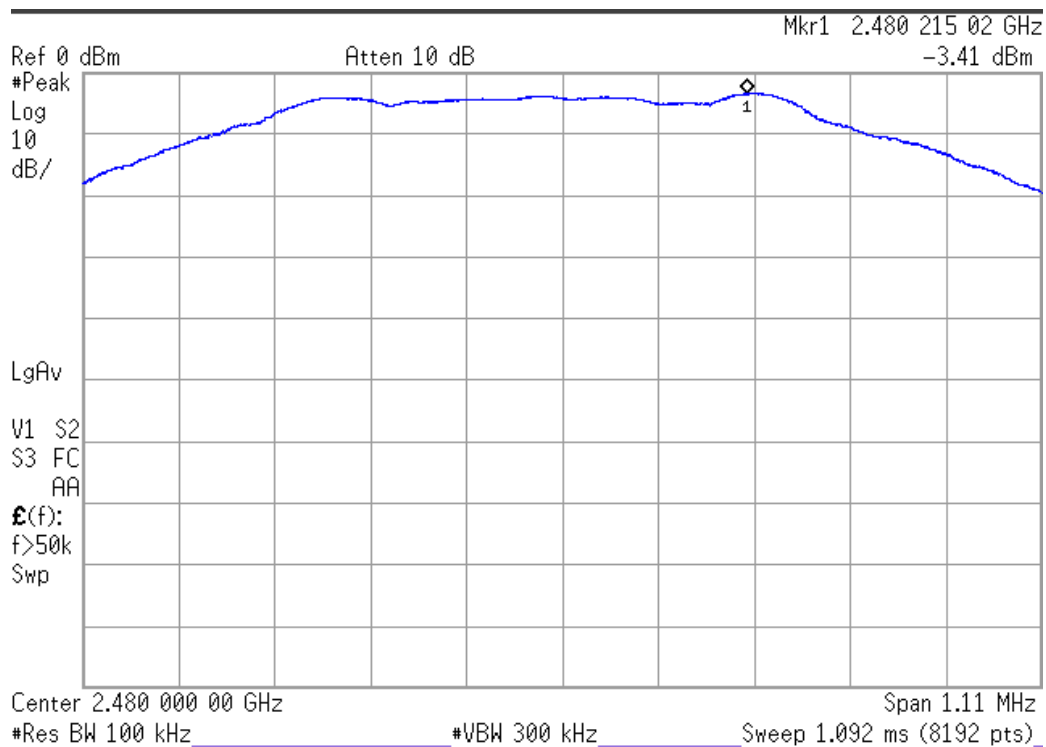
### Lowest Channel



### Middle Channel



### Highest Channel



## Section 15.247 Subclause (d) / RSS-247 5.5. Emission limitations radiated (Transmitter)

### SPECIFICATION

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

| Frequency Range (MHz) | Field strength ( $\mu\text{V}/\text{m}$ ) | Field strength ( $\text{dB}\mu\text{V}/\text{m}$ ) | Measurement distance (m) |
|-----------------------|---|--|--------------------------|
| 0.009-0.490           | 2400/F(kHz)                               | -  | 300                      |
| 0.490-1.705           | 24000/F(kHz)                              | -  | 30                       |
| 1.705 - 30.0          | 30  | -  | 30                       |
| 30 - 88               | 100                                       | 40   | 3                        |
| 88 - 216              | 150                                       | 43.5   | 3                        |
| 216 - 960             | 200                                       | 46   | 3                        |
| 960 - 25000           | 500                                       | 54   | 3                        |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.



### Frequency range 30 MHz-1000 MHz.

The spurious signals detected do not depend on the operating channel.

| Spurious frequency (MHz) | Polarization | Detector   | Emission Level (dB $\mu$ V/m) | Measurement Uncertainty (dB) |
|--------------------------|--------------|------------|-------------------------------|------------------------------|
| 124.672                  | V            | Quasi-peak | 25.1                          | $\pm 3.88$                   |

### Frequency range 1 GHz-25 GHz

The results in the next tables show the maximum measured levels in the 1-25 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

Spurious signals with peak levels above the average limit (54 dB $\mu$ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

#### Lowest Channel

| Spurious frequency (GHz) | Polarization | Detector | Emission Level (dB $\mu$ V/m) | Measurement Uncertainty (dB) |
|--------------------------|--------------|----------|-------------------------------|------------------------------|
| 4.80425                  | H            | Peak     | 40.32                         | $\pm 4.87$                   |

#### Middle Channel

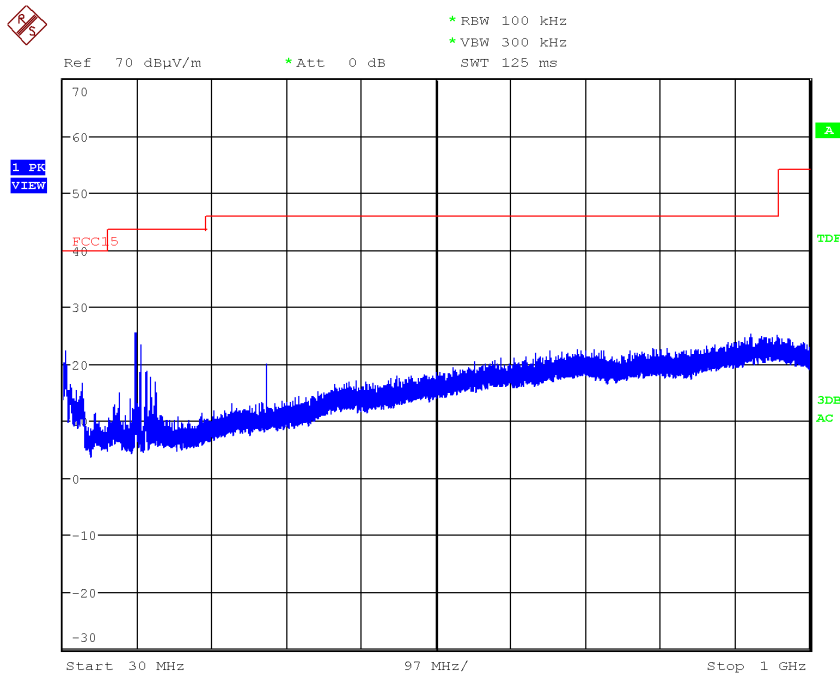
| Spurious frequency (GHz) | Polarization | Detector | Emission Level (dB $\mu$ V/m) | Measurement Uncertainty (dB) |
|--------------------------|--------------|----------|-------------------------------|------------------------------|
| 4.88075                  | H            | Peak     | 40.89                         | $\pm 4.87$                   |

#### Highest Channel

No spurious signal were found at less than 20 dB respect to the limit

Verdict: PASS

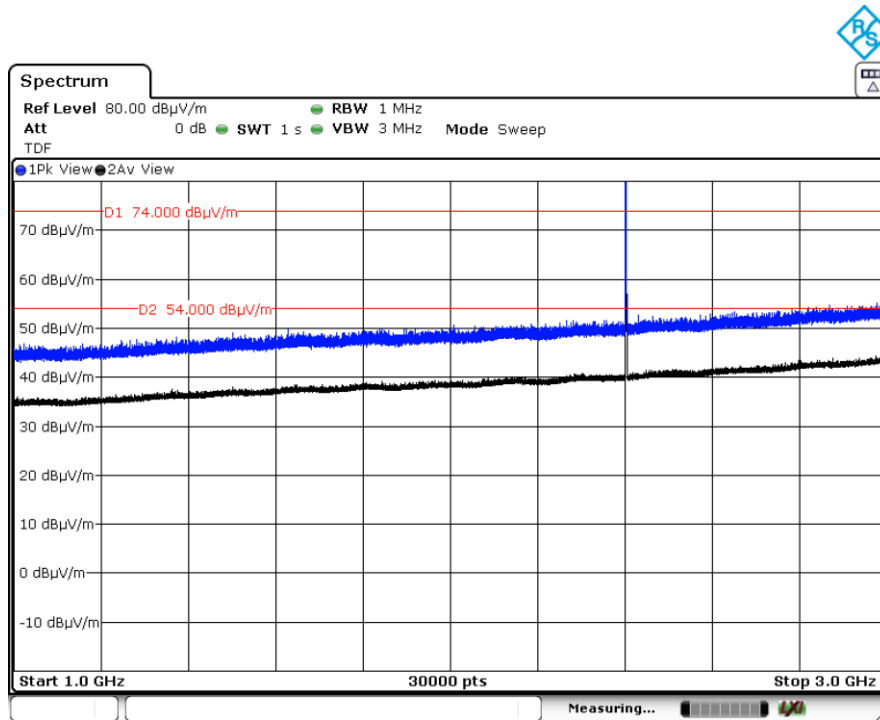
FREQUENCY RANGE 30 MHz-1000 MHz.



(This plot is valid for all three channels).

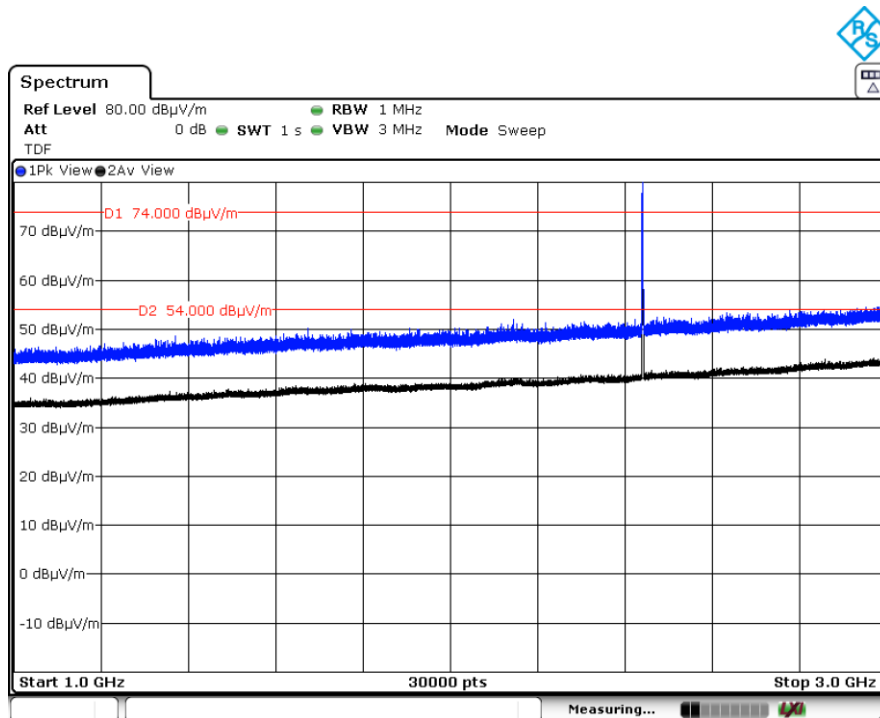
FREQUENCY RANGE 1 GHz to 3 GHz.

CHANNEL: Lowest (2402 MHz).



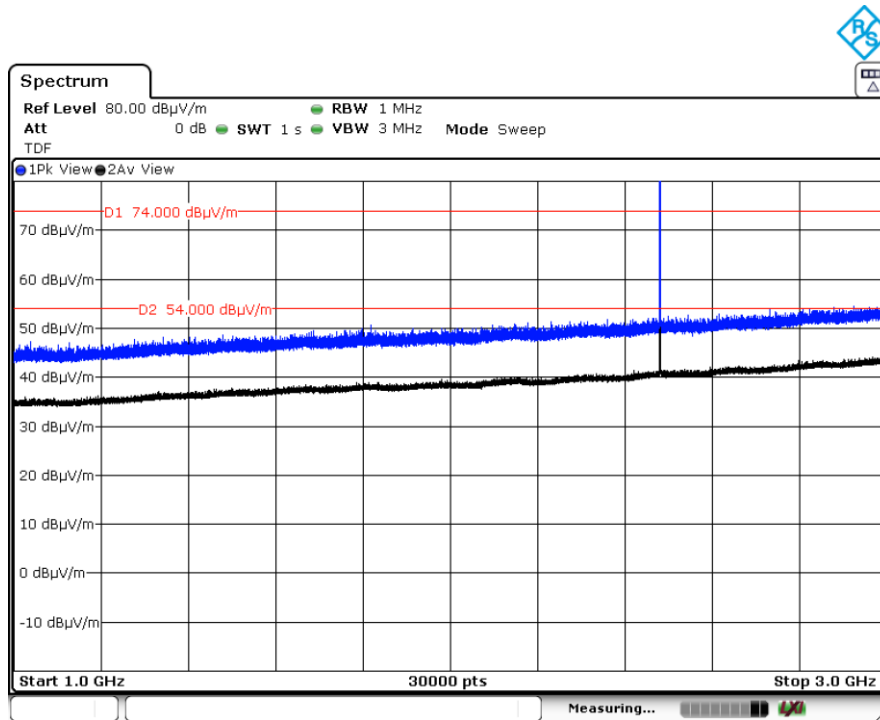
Note: The peak shown in the plot above the limit is the carrier frequency.

CHANNEL: Middle (2440 MHz).



Note: The peak shown in the plot above the limit is the carrier frequency.

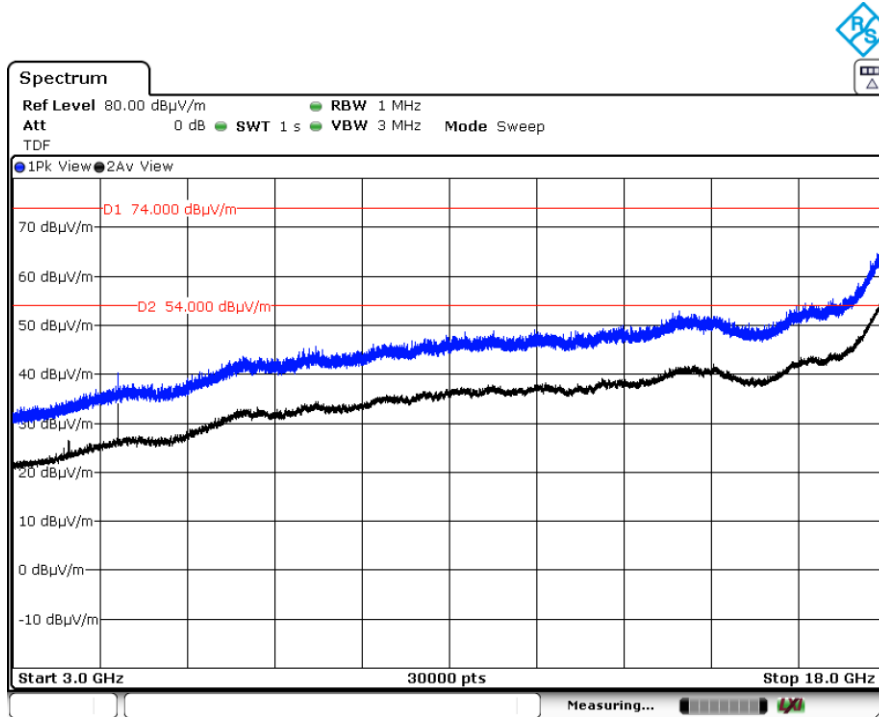
**CHANNEL: Highest (2480 MHz).**



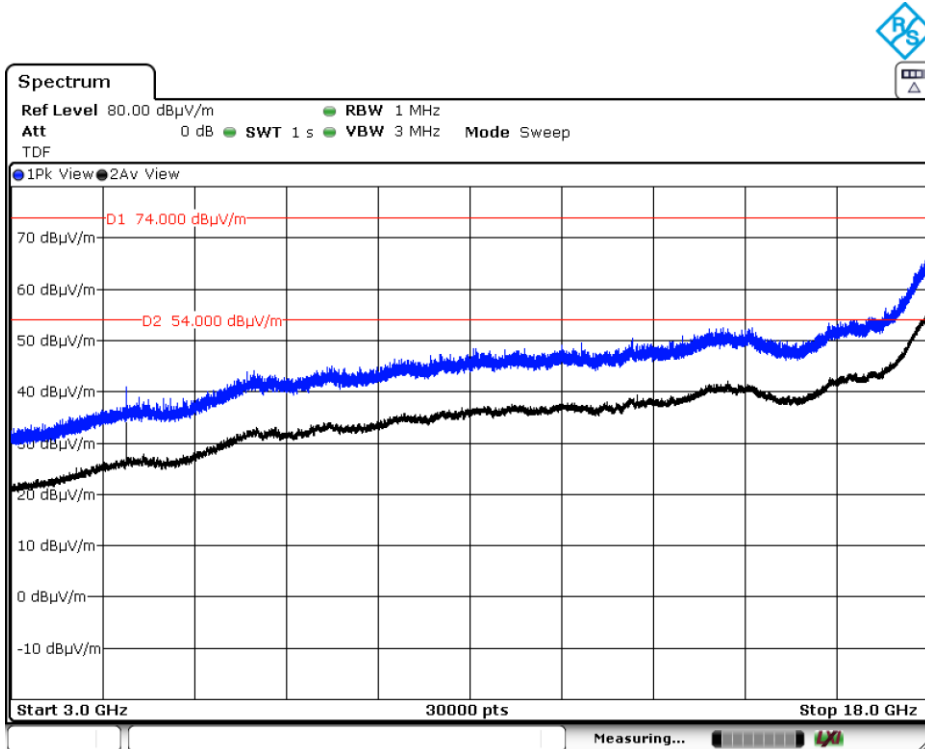
Note: The peak shown in the plot above the limit is the carrier frequency.

FREQUENCY RANGE 3 GHz to 18 GHz.

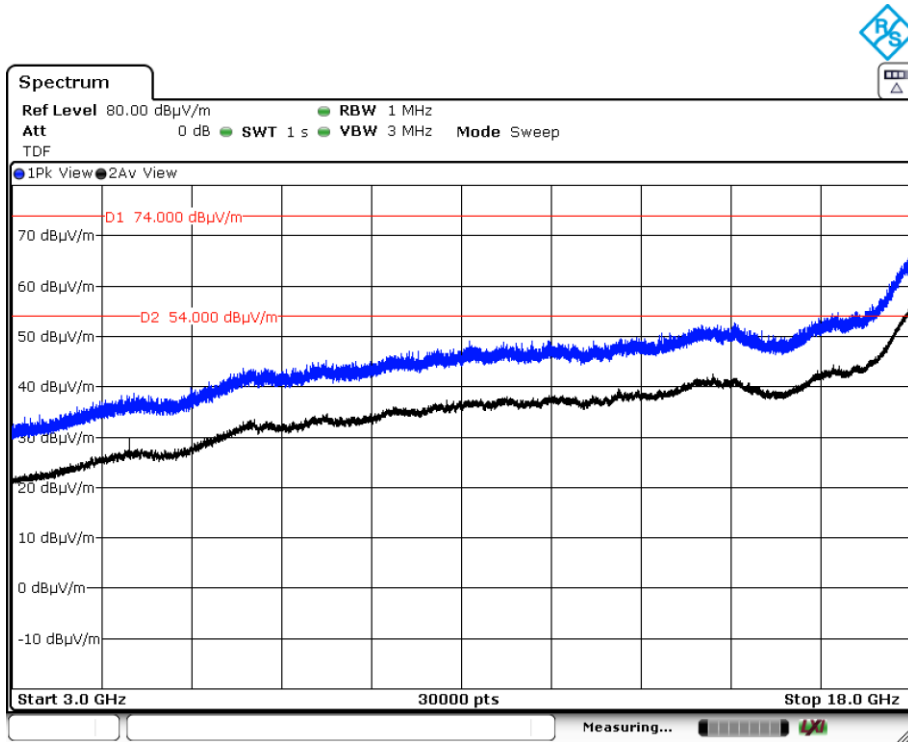
CHANNEL: Lowest (2402 MHz).



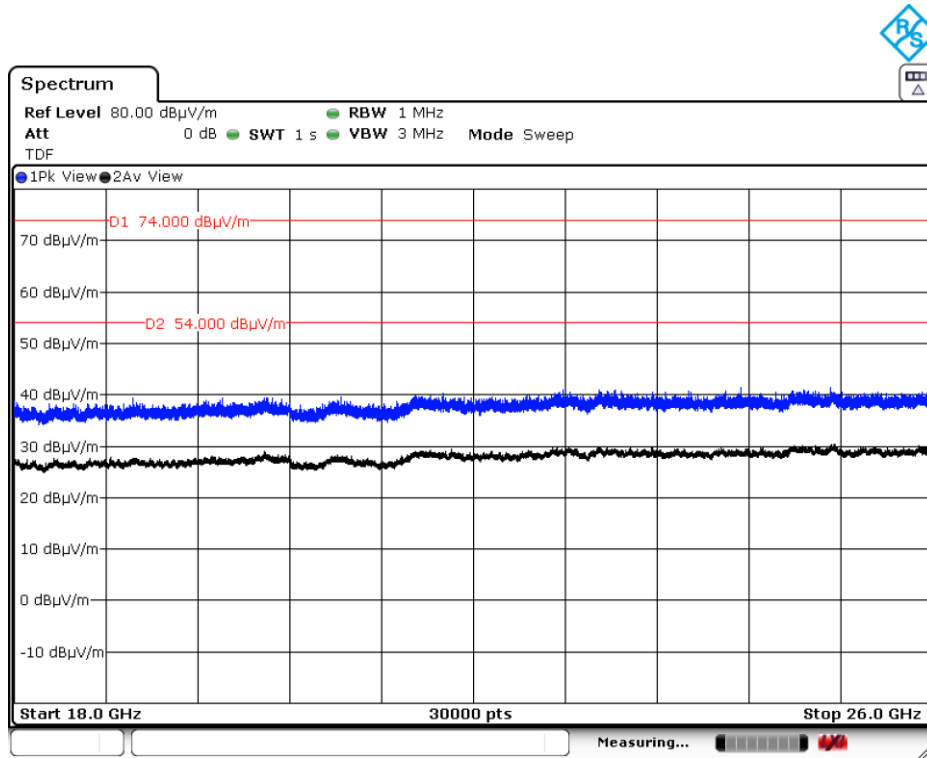
CHANNEL: Middle (2440 MHz).



**CHANNEL: Highest (2480 MHz).**



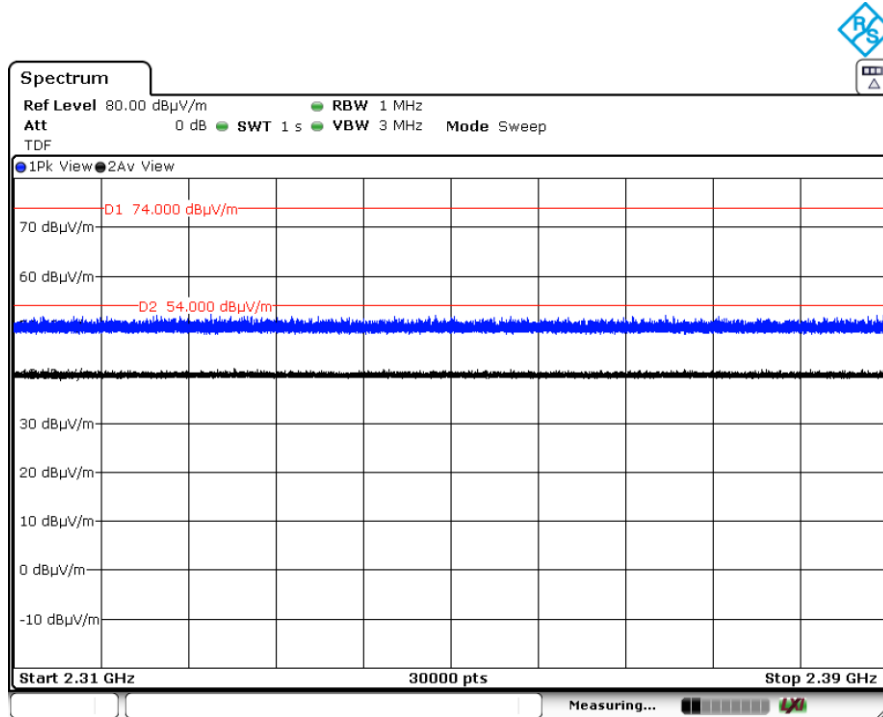
**FREQUENCY RANGE 18 GHz to 26 GHz.**



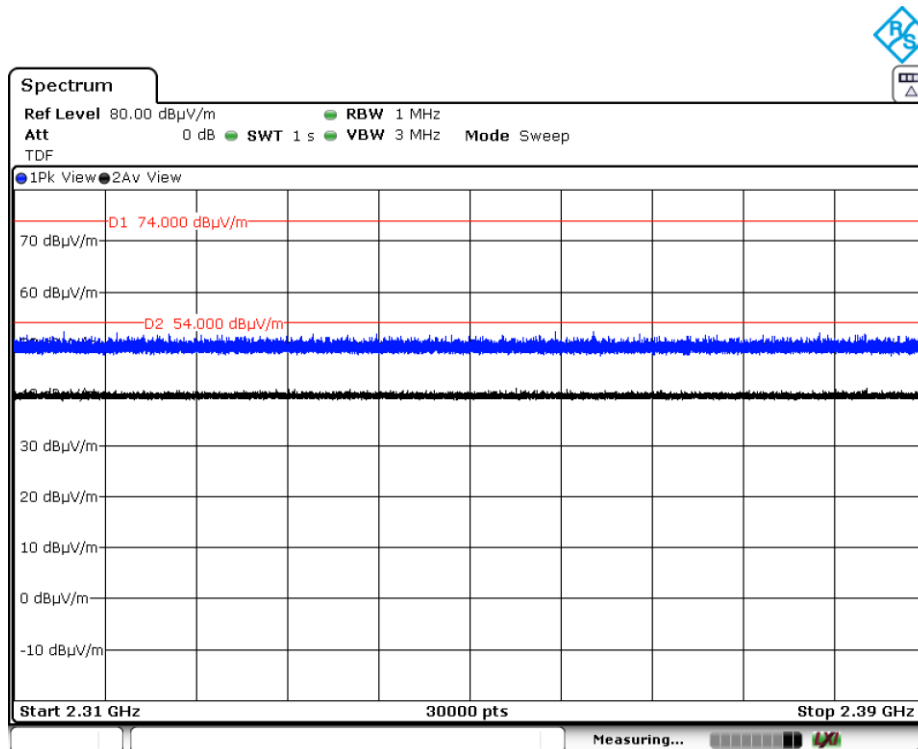
(This plot is valid for all three channels).

FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

CHANNEL: Lowest (2402 MHz).

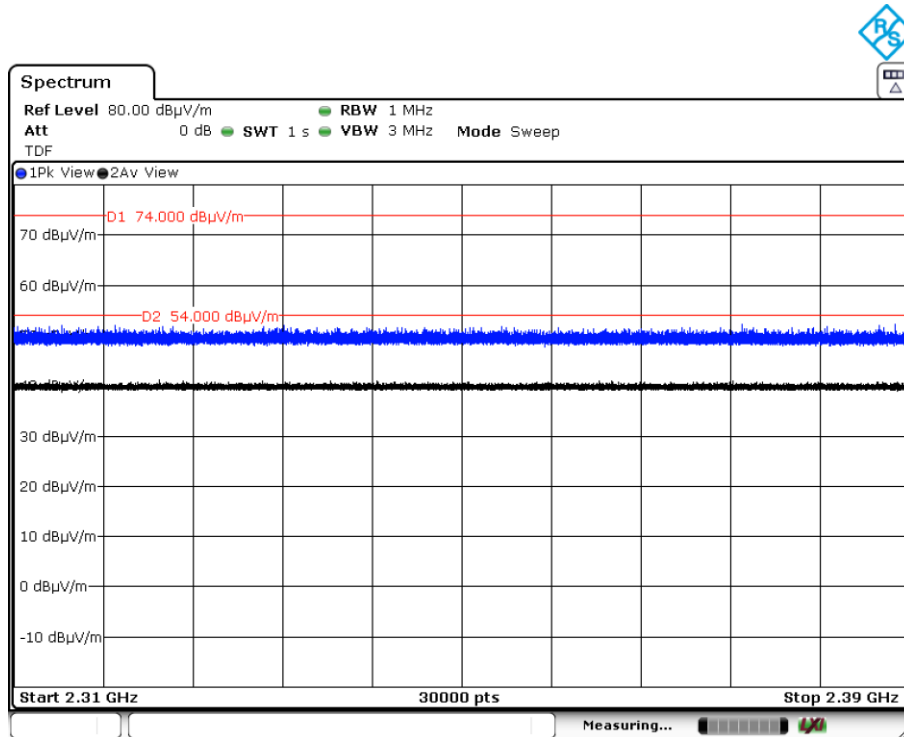


CHANNEL: Middle (2440 MHz).



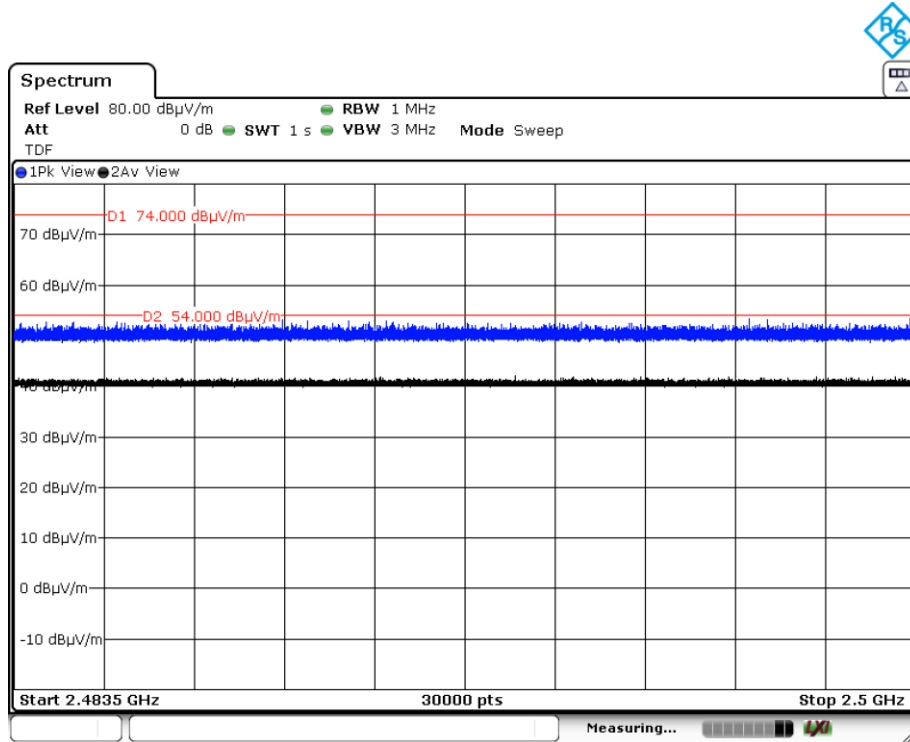


**CHANNEL: Highest (2480 MHz).**

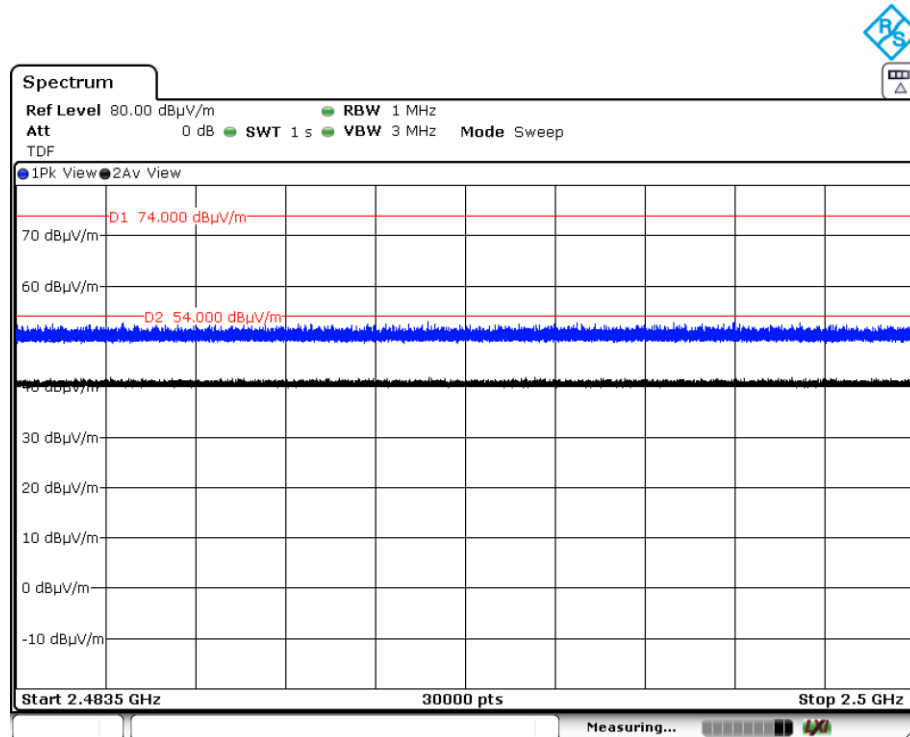


FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND).

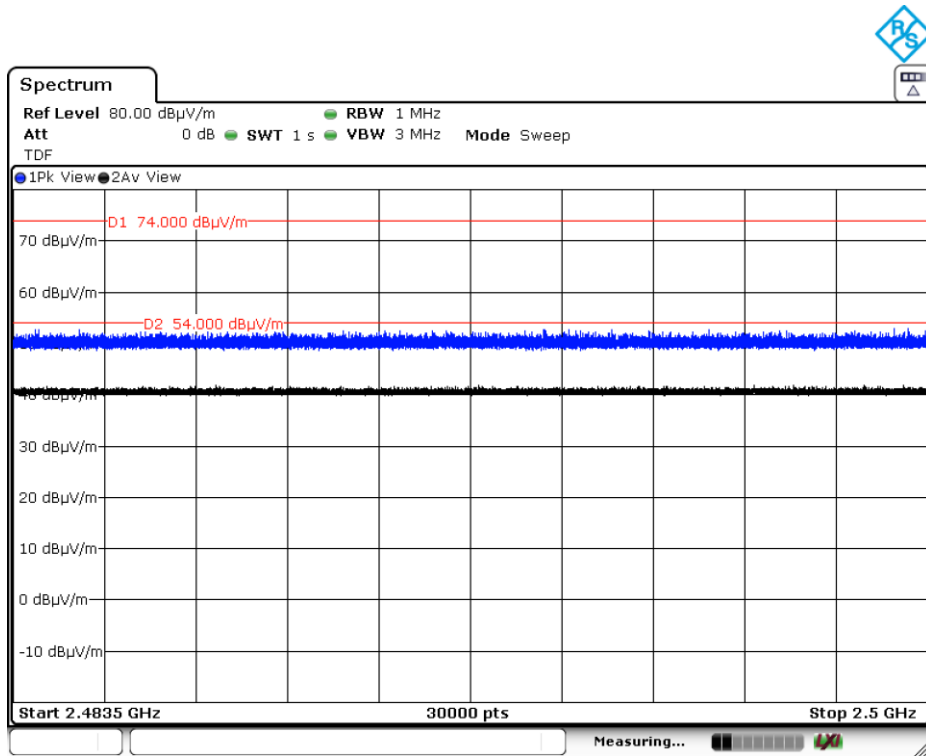
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2440 MHz).



CHANNEL: Highest (2480 MHz).



## Appendix B – Continuous Conducted Emissions

## APPENDIX B CONTENT

|  |    |
|--|----|
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| CONTINUOUS CONDUCTED EMISSION .....      | 47 |

## DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers, are shown in the following table:

| OPERATION MODE | DESCRIPTION   |
|----------------|---|
| OM#01          | EUT ON. UMTS FDD Band II TCH. GPS Receiving valid positioning signal. BT LE in communication. Power Supply: 5 Vdc |

**CONTINUOUS CONDUCTED EMISSION**

|                |                    |  |
|----------------|--------------------|--|
| <b>LIMITS:</b> | Product standard : | FCC CFR 47, Part 15, Subpart C (10-1-17 Edition), Secs. 15.207 & RSS-Gen (Issue 4) |
|                | Test standard :    | FCC CFR 47, Part 15, Subpart C (10-1-17 Edition), Secs. 15.207 & RSS-Gen (Issue 4) |

**CLASS B**

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart C (10-01-2017) Secs 15.207 & RSS-Gen (Issue 4), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

| Frequency range<br>(MHz) | Limit (dBµV) |         |
|--------------------------|--------------|---------|
|                          | Quasi-peak   | Average |
| 0,15 to 0,5              | 66-56        | 56-46   |
| 0,5 to 5                 | 56           | 46      |
| 5 to 30                  | 60           | 50      |

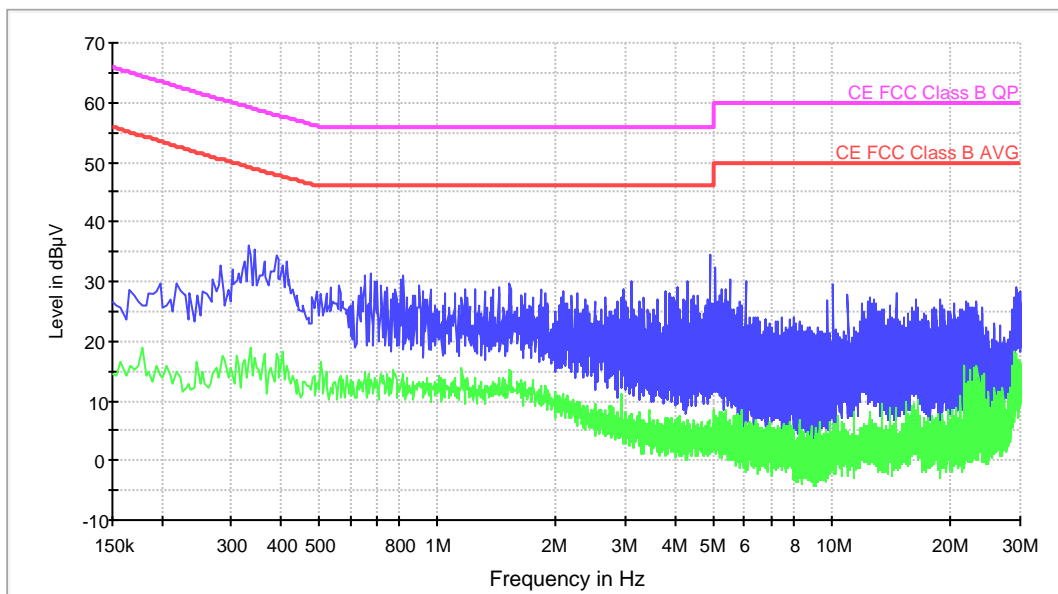
|                                |  |
|--------------------------------|--|
| <b>TESTED SAMPLES:</b>         | S/03   |
| <b>TESTED OPERATION MODES:</b> | OM#01  |
| <b>TEST RESULTS:</b>           | CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire |

| CCmmnnhh | DESCRIPTION                                | RESULT |
|----------|--|--------|
| CC03010N | Range: 150kHz – 30MHz. Neutral wire noise. | P      |
| CC0301L1 | Range: 150kHz – 30MHz. Phase wire noise.   | P      |

## Conducted Emission. CC03010N

Project: 56316rem.001  
 Company: Dekra USA  
 Sample: S/03  
 Operation mode: OM#01  
 Description: EUT ON. UMTS FDD Band II TCH. GPS Receiving valid positioning signal. BT LE in communication. Power Supply: 5 Vdc. Neutral wire noise

### EC FCC Class B



— Peak Scan    — Average Scan    — CE FCC Class B AVG    — CE FCC Class B QP

### Subrange Maxima

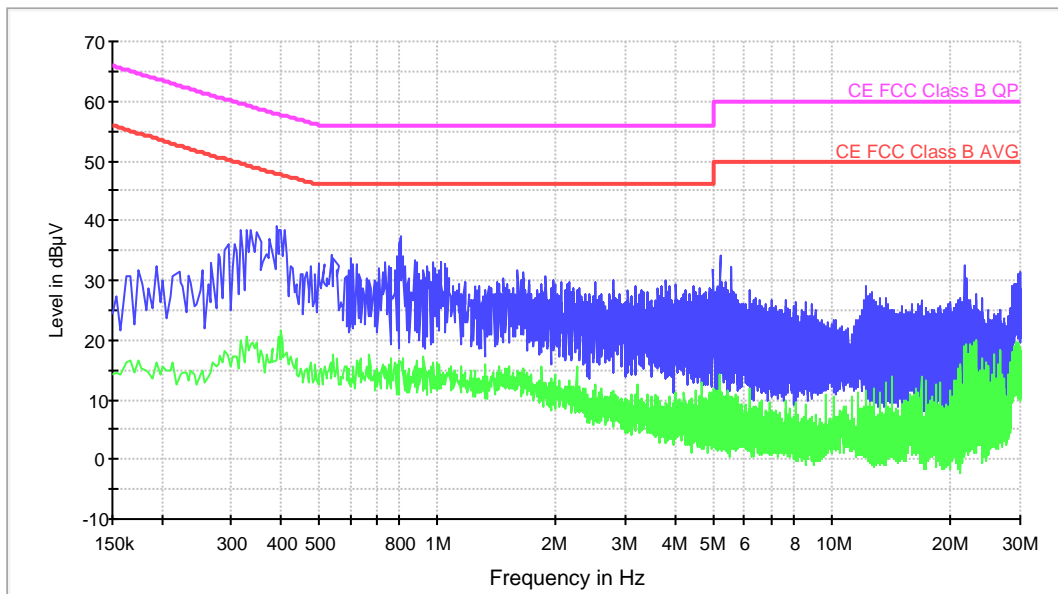
| Frequency (MHz) | MaxPeak-ClearWrite (dBµV) | Average-ClearWrite (dBµV) |
|-----------------|---------------------------|---------------------------|
| 0.246000        | 31.1                      | 17.6                      |
| 0.402000        | 35.3                      | 20.5                      |
| 0.586000        | 35.7                      | 15.1                      |
| 0.754000        | 34.2                      | 13.9                      |
| 1.350000        | 31.5                      | 12.5                      |
| 3.094000        | 29.6                      | 8.3                       |
| 4.318000        | 30.8                      | 7.3                       |
| 7.450000        | 25.1                      | 4.0                       |
| 12.414000       | 27.4                      | 7.9                       |
| 29.358000       | 29.3                      | 15.6                      |



## Conducted Emission. CC0301L1

Project: 56316rem.001  
 Company: Dekra USA  
 Sample: S/03  
 Operation mode: OM#01  
 Description: EUT ON. UMTS FDD Band II TCH. GPS Receiving valid positioning signal. BT LE in communication. Power Supply: 5 Vdc. Phase wire noise

### EC FCC Class B



— Peak Scan    — Average Scan    — CE FCC Class B AVG    — CE FCC Class B QP

### Subrange Maxima

| Frequency (MHz) | MaxPeak-ClearWrite (dBµV) | Average-ClearWrite (dBµV) |
|-----------------|---------------------------|---------------------------|
| 0.194000        | 32.0                      | 15.3                      |
| 0.390000        | 38.5                      | 21.9                      |
| 0.606000        | 34.6                      | 13.5                      |
| 0.806000        | 37.5                      | 24.0                      |
| 1.602000        | 31.4                      | 14.7                      |
| 2.798000        | 31.5                      | 11.0                      |
| 5.182000        | 30.7                      | 13.9                      |
| 6.158000        | 29.6                      | 12.6                      |
| 12.202000       | 29.2                      | 17.6                      |
| 29.854000       | 31.0                      | 18.0                      |