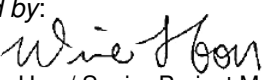


|                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 |                                                                                           |                                                  |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|
| <b>Prüfbericht-Nr.:</b><br><i>Test Report No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>50052507 001</b>                                                                                                                                                                                                                                                                                                                                                  | <b>Auftrags-Nr.:</b><br><i>Order No.:</i>                                                                                       | <b>164069415</b>                                                                          | Seite 1 von 28<br><i>Page 1 of 28</i>            |                                         |
| <b>Kunden-Referenz-Nr.:</b><br><i>Client Reference No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>60008704</b>                                                                                                                                                                                                                                                                                                                                                      | <b>Auftragsdatum:</b><br><i>Order date:</i>                                                                                     | <b>19.07.2016</b>                                                                         |                                                  |                                         |
| <b>Auftraggeber:</b><br><i>Client:</i>                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>SHENZHEN DEHUIDA TECHNOLOGY CO.,LTD.</b><br>Dehuida Industrial Park, No. 237, Xikeng Road, Guanlan Street, Baoan                                                                                                                                                                                                                                                  |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Prüfgegenstand:</b><br><i>Test item:</i>                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>HP Bluetooth Speaker 400</b>                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Bezeichnung / Typ-Nr.:</b><br><i>Identification / Type No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                  | <b>BM2128</b><br>(HP)                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Auftrags-Inhalt:</b><br><i>Order content:</i>                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>FCC Certification and Verification</b>                                                                                                                                                                                                                                                                                                                            |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Prüfgrundlage:</b><br><i>Test specification:</i>                                                                                                                                                                                                                                                                                                                                                                                                                 | CFR47 FCC Part 15: Subpart C Section 15.247<br>CFR47 FCC Part 15: Subpart C Section 15.207<br>CFR47 FCC Part 15: Subpart C Section 15.209<br>FCC KDB Publication 447498 v06<br>CFR47 FCC Part 15: Subpart B Section 15.107<br>CFR47 FCC Part 15: Subpart B Section 15.109<br>RSS-247 Issue 1 May 2015<br>RSS-102 Issue 5 March 2015<br>RSS-Gen Issue 4 November 2014 |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Wareneingangsdatum:</b><br><i>Date of receipt:</i>                                                                                                                                                                                                                                                                                                                                                                                                               | <b>19.07.2016</b>                                                                                                                                                                                                                                                                                                                                                    |                                              |                                                                                           |                                                  |                                         |
| <b>Prüfmuster-Nr.:</b><br><i>Test sample No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>N/A</b>                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Prüfzeitraum:</b><br><i>Testing period:</i>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>27.07.2016 - 30.07.2016</b>                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Ort der Prüfung:</b><br><i>Place of testing:</i>                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>refer to clause 2.1</b>                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Prüflaboratorium:</b><br><i>Testing laboratory:</i>                                                                                                                                                                                                                                                                                                                                                                                                              | <b>TÜV Rheinland (Shenzhen) Co., Ltd.</b>                                                                                                                                                                                                                                                                                                                            |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Prüfergebnis*:</b><br><i>Test result*:</i>                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Pass</b>                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>geprüft von / tested by:</b><br>                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                      | <b>kontrolliert von / reviewed by:</b><br> |                                                                                           |                                                  |                                         |
| <b>Datum</b><br><i>Date</i>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Name / Stellung</b><br><i>Name / Position</i>                                                                                                                                                                                                                                                                                                                     | <b>Unterschrift</b><br><i>Signature</i>                                                                                         | <b>Datum</b><br><i>Date</i>                                                               | <b>Name / Stellung</b><br><i>Name / Position</i> | <b>Unterschrift</b><br><i>Signature</i> |
| 21.08.2016                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Winnie Hou / Senior Project Manager                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                 | 01.09.2016                                                                                | Owen Tian / Technical Certifier                  |                                         |
| <b>Sonstiges / Other:</b> FCC ID: RWY-DHDBM2128, IC: 10425A-DHDBM2128                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br><i>Condition of the test item at delivery:</i>                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 | <b>Prüfmuster vollständig und unbeschädigt</b><br><i>Test item complete and undamaged</i> |                                                  |                                         |
| <p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft<br/> P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor<br/> P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>                    |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 |                                                                                           |                                                  |                                         |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p> |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                 |                                                                                           |                                                  |                                         |

## TEST SUMMARY

**5.1.1 ANTENNA REQUIREMENT**

RESULT: *Passed*

**5.1.2 PEAK OUTPUT POWER**

RESULT: *Passed*

**5.1.3 99% BANDWIDTH**

RESULT: *Passed*

**5.1.4 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100KHZ BANDWIDTH**

RESULT: *Passed*

**5.1.5 SPURIOUS EMISSION**

RESULT: *Passed*

**5.1.6 20dB BANDWIDTH**

RESULT: *Passed*

**5.1.7 FREQUENCY SEPARATION**

RESULT: *Passed*

**5.1.8 NUMBER OF HOPPING FREQUENCY**

RESULT: *Passed*

**5.1.9 TIME OF OCCUPANCY**

RESULT: *Passed*

**5.1.10 CONDUCTED EMISSIONS**

RESULT: *Passed*

**5.1.11 RADIATED EMISSION**

RESULT: *Passed*

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## **1. General Remarks**

### **1.1 Complementary Materials**

All attachments are integral parts of this test report. This applies especially to the following appendix:  
Appendix 1: Test Result

## **2. Test Sites**

### **2.1 Test Facilities**

Shenzhen Academy of Metrology and Quality Inspection .  
NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China

FCC Registration No.: 446246,806614, 994606

Test site Industry Canada No.: 11177A-1, 11177A-2

The tests at the test site have been conducted under the supervision of a TÜV engineer.

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

| Kind of Equipment                              | Manufacturer    | Type     | S/N    | Calibrated until |
|------------------------------------------------|-----------------|----------|--------|------------------|
| <b>Spurious emission and Radiated emission</b> |                 |          |        |                  |
| Spectrum Analyzer                              | Rohde&Schwarz   | ESU40    | 100263 | 2017-03-22       |
| Test Receiver                                  | Rohde&Schwarz   | ESI26    | 100307 | 2016-12-10       |
| Bilog Antenna                                  | Schwarzbeck     | VULB9163 | 172    | 2017-01-06       |
| Loop Antenna                                   | Schwarzbeck     | FMZB1516 | 113    | 2018-01-06       |
| Horn Antenna                                   | Schwarzbeck     | HF907    | 100309 | 2017-3-20        |
| Horn Antenna                                   | Schwarzbeck     | 3160-10  | 10025  | 2017-03-27       |
| Pre-Amplifier                                  | Rohde&Schwarz   | SCU-26   | 10020  | 2017-3-20        |
| Pre-Amplifier                                  | Rohde&Schwarz   | SCU-18   | 10118  | 2017-3-20        |
| <b>Radio Spectrum Test</b>                     |                 |          |        |                  |
| Spectrum Analyzer                              | Rohde & Schwarz | FSQ40    | 200112 | 2017-04-24       |
| <b>Conducted Emission</b>                      |                 |          |        |                  |
| Test Receiver                                  | Rohde & Schwarz | ESCS30   | 100003 | 2016-12-10       |
| L.I.S.N.                                       | Schwarzbeck     | ENV216   | 100042 | 2016-09-24       |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are  $\pm 3\text{dB}$ .

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

## 2.7 Status of Facility Used for Testing

Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center) located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is HP Bluetooth Mini Speaker 400 with Bluetooth function.  
For details refer to the User Manual, Technical Description and Circuit Diagram.

#### 3.2 Ratings and System Details

Table 2: Rating of EUT

|                    |                          |
|--------------------|--------------------------|
| Kind of Equipment: | HP Bluetooth Speaker 400 |
| Type Designation:  | BM2128                   |
| FCC ID             | RWY-DHDBM2128            |
| IC                 | 10425A-DHDBM2128         |

Table 3: Technical Specification of Bluetooth (BDR & EDR)

| Technical Specification   | Value                                                                        |
|---------------------------|------------------------------------------------------------------------------|
| Operating Frequency band  | 2402 – 2480 MHz                                                              |
| Bluetooth Core Version    | 3.0                                                                          |
| Channel Number            | 79 channels                                                                  |
| Channel separation        | 1MHz                                                                         |
| Extreme Temperature Range | 0°C to +60°C                                                                 |
| Operation Voltage         | DC 3.7V via lithium Battery (ETL064041)<br>DC 5.0V via USB port for charging |
| Modulation                | GFSK, 8DPSK, $\pi$ /4DQPSK                                                   |
| Antenna Type              | Integral antenna                                                             |
| Antenna Gain              | 0 dBi                                                                        |
| RF Output Power           | 0.00147W (1.66dBm)                                                           |

**Table 4: RF channel and frequency of Bluetooth (BDR & EDR mode)**

| RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 0          | 2402.00         | 20         | 2422.00         | 40         | 2442.00         | 60         | 2462.00         |
| 1          | 2403.00         | 21         | 2423.00         | 41         | 2443.00         | 61         | 2463.00         |
| 2          | 2404.00         | 22         | 2424.00         | 42         | 2444.00         | 62         | 2464.00         |
| 3          | 2405.00         | 23         | 2425.00         | 43         | 2445.00         | 63         | 2465.00         |
| 4          | 2406.00         | 24         | 2426.00         | 44         | 2446.00         | 64         | 2466.00         |
| 5          | 2407.00         | 25         | 2427.00         | 45         | 2447.00         | 65         | 2467.00         |
| 6          | 2408.00         | 26         | 2428.00         | 46         | 2448.00         | 66         | 2468.00         |
| 7          | 2409.00         | 27         | 2429.00         | 47         | 2449.00         | 67         | 2469.00         |
| 8          | 2410.00         | 28         | 2430.00         | 48         | 2450.00         | 68         | 2470.00         |
| 9          | 2411.00         | 29         | 2431.00         | 49         | 2451.00         | 69         | 2471.00         |
| 10         | 2412.00         | 30         | 2432.00         | 50         | 2452.00         | 70         | 2472.00         |
| 11         | 2413.00         | 31         | 2433.00         | 51         | 2453.00         | 71         | 2473.00         |
| 12         | 2414.00         | 32         | 2434.00         | 52         | 2454.00         | 72         | 2474.00         |
| 13         | 2415.00         | 33         | 2435.00         | 53         | 2455.00         | 73         | 2475.00         |
| 14         | 2416.00         | 34         | 2436.00         | 54         | 2456.00         | 74         | 2476.00         |
| 15         | 2417.00         | 35         | 2437.00         | 55         | 2457.00         | 75         | 2477.00         |
| 16         | 2418.00         | 36         | 2438.00         | 56         | 2458.00         | 76         | 2478.00         |
| 17         | 2419.00         | 37         | 2439.00         | 57         | 2459.00         | 77         | 2479.00         |
| 18         | 2420.00         | 38         | 2440.00         | 58         | 2460.00         | 78         | 2480.00         |
| 19         | 2421.00         | 39         | 2441.00         | 59         | 2461.00         |            |                 |

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth mode (BDR & EDR)
  - 1. Transmitting on low channel
  - 2. Transmitting on middle channel
  - 3. Transmitting on high channel
- B. On, Bluetooth hopping mode
- C. Play with audio in
- D. Charging
- E. Off

### **3.4 Noise Generating and Noise Suppressing Parts**

Refer to the Circuit Diagram.

### **3.5 Submitted Documents**

- |                         |                      |
|-------------------------|----------------------|
| - Bill of Material      | - Circuit Diagram    |
| - PCB Layout            | - Instruction Manual |
| - Photo Document        | - Rating Label       |
| - Technical Description |                      |

## 4. Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.4: 2014 and ANSI C63.10: 2013.

### 4.3 Special Accessories and Auxiliary Equipment

The EUT was tested with following accessories:

| Description | Manufacturer | Type           | S/N          |
|-------------|--------------|----------------|--------------|
| iPhone6S    | Apple        | MKQL2ZP/A      | DNPQGYT9GRY7 |
| Adaptor     | BYD          | TUAU050200-L00 | 60213200045B |

### 4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

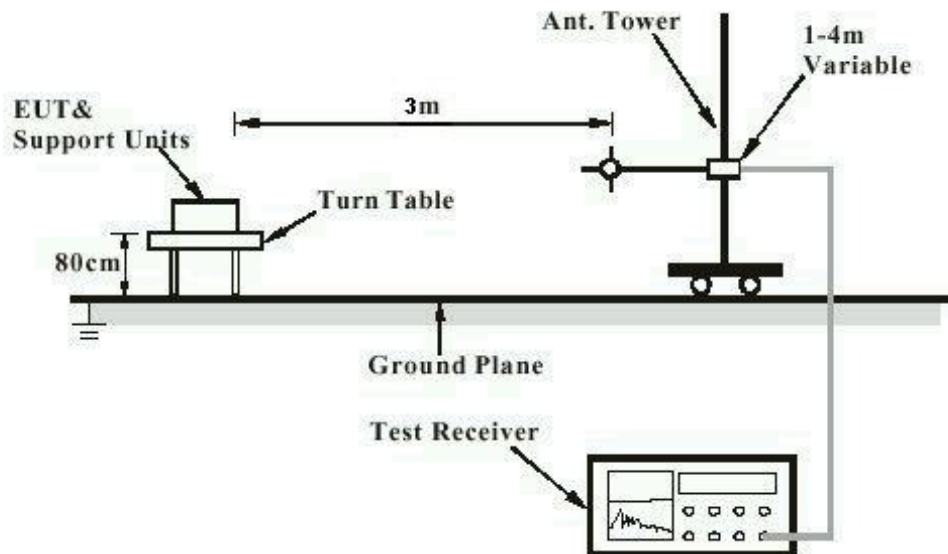
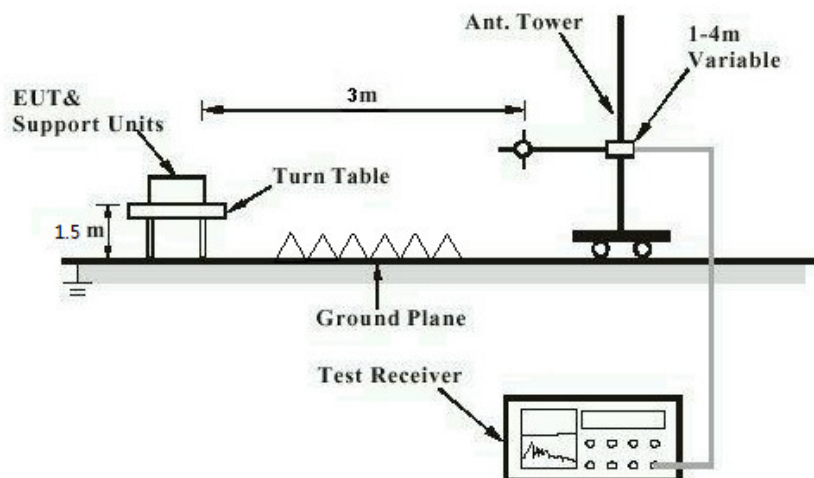
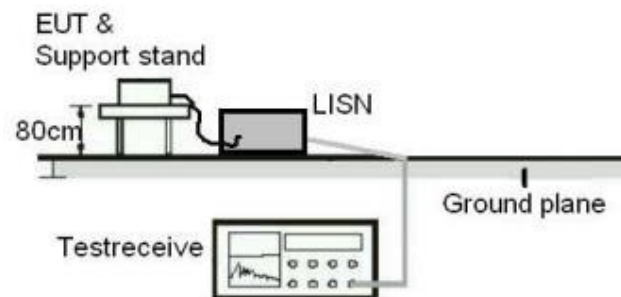


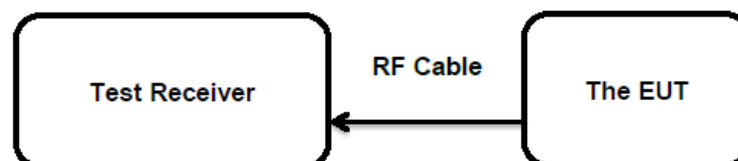
Diagram of Measurement Configuration for Radiation Test (Above 1GHz)



### Diagram of Measurement Equipment Configuration for Mains Conduction Measurement



### Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



## 5. Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**RESULT:****Passed**

|               |   |                                                                        |
|---------------|---|------------------------------------------------------------------------|
| Test standard | : | FCC Part 15.247(b)(4) and Part 15.203<br>RSS-Gen 6.7                   |
| Limit         | : | the use of antennas with directional gains that do<br>not exceed 6 dBi |

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT photo for details.

Note: The cable loss is taken into account in results.

### 5.1.3 99% Bandwidth

**RESULT:****Passed**

Date of testing : 2016-07-30  
Test standard : RSS-Gen clause 6.6  
Basic standard : ANSI C63.10: 2013  
Kind of test site : Shielded room

**Test setup**

Test Channel : Low/ Middle/ High  
Operation Mode : A  
Ambient temperature : 25°C  
Relative humidity : 55%  
Atmospheric pressure : 101 kPa

**Table 6: Test result of 99% Bandwidth**

| Test Mode | Channel Frequency (MHz) | 99% Bandwidth (kHz) | Limit (kHz) |
|-----------|-------------------------|---------------------|-------------|
| BDR       | 2402                    | 1006.25             | /           |
|           | 2441                    | 990.625             |             |
|           | 2480                    | 990.625             |             |
| EDR       | 2402                    | 1350.000            | /           |
|           | 2441                    | 1325.000            |             |
|           | 2480                    | 1321.875            |             |

Note: The cable loss is taken into account in results.

**5.1.4 Conducted spurious emissions measured in 100kHz  
Bandwidth****RESULT:****Passed**

|                   |   |                                                                                                                                                                                                                                                                              |
|-------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of testing   | : | 2016-07-30                                                                                                                                                                                                                                                                   |
| Test standard     | : | FCC part 15.247(d)<br>RSS-247 Clause 5.5                                                                                                                                                                                                                                     |
| Basic standard    | : | ANSI C63.10: 2013                                                                                                                                                                                                                                                            |
| Limit             | : | 20dB (below that in the 100kHz bandwidth within<br>the band that contains the highest level of the<br>desired power);<br>In addition, radiated emissions which fall in the<br>restricted bands, must also comply with the radiated<br>emission limits specified in 15.209(a) |
| Kind of test site | : | Shield room                                                                                                                                                                                                                                                                  |

**Test setup**

|                      |   |           |
|----------------------|---|-----------|
| Test Channel         | : | Low/ High |
| Operation mode       | : | A         |
| Ambient temperature  | : | 25°C      |
| Relative humidity    | : | 55%       |
| Atmospheric pressure | : | 101 kPa   |

All emissions are more than 20dB below fundamental, details refer to Appendix 1, and compliance is achieved as well.

### 5.1.5 Spurious Emission

**RESULT:****Passed**

|                   |   |                                                                       |
|-------------------|---|-----------------------------------------------------------------------|
| Date of testing   | : | 2016-07-27                                                            |
| Test standard     | : | FCC part 15.247(d)<br>FCC Part 15.205<br>RSS-247 Clause 3.3           |
| Basic standard    | : | ANSI C63.10: 2013                                                     |
| Limits            | : | Refer to 15.209(a) of FCC part 15.247(d)<br>RSS-Gen Table 4 & Table 5 |
| Kind of test site | : | 3m Semi-Anechoic Chamber                                              |

**Test setup**

|                      |   |                   |
|----------------------|---|-------------------|
| Test Channel         | : | Low/ Middle/ High |
| Operation mode       | : | A                 |
| Ambient temperature  | : | 25°C              |
| Relative humidity    | : | 55%               |
| Atmospheric pressure | : | 101 kPa           |

**Remark:**

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test setup photos.

Testing was carried out within frequency range 9kHz to the tenth harmonics.

For details refer to Appendix 1.

| Test Mode | Channel Frequency (MHz) | 20dB Bandwidth (kHz) | 2/3 of 20dB Bandwidth (kHz) | Limit (MHz) |
|-----------|-------------------------|----------------------|-----------------------------|-------------|
| BDR       | 2402                    | 1097.8               | 731.867                     | /           |
|           | 2441                    | 1100.8               | 733.867                     |             |
|           | 2480                    | 1097.8               | 731.867                     |             |
| EDR       | 2402                    | 1371.2               | 914.133                     | /           |
|           | 2441                    | 1350.6               | 900.400                     |             |
|           | 2480                    | 1366.2               | 910.800                     |             |

| Channel           | Channel Frequency (MHz) | Measured Channel Separation (MHz) | Limit (kHz)                      | Result |
|-------------------|-------------------------|-----------------------------------|----------------------------------|--------|
| Low Channel       | 2402                    | 1.003                             | ≥ 25kHz or 2/3 of 20dB bandwidth | Pass   |
| Adjacency Channel | 2403                    |                                   |                                  |        |
| Mid Channel       | 2441                    | 1.003                             | ≥ 25kHz or 2/3 of 20dB bandwidth | Pass   |
| Adjacency Channel | 2442                    |                                   |                                  |        |
| High Channel      | 2480                    | 1.003                             | ≥ 25kHz or 2/3 of 20dB bandwidth | Pass   |
| Adjacency Channel | 2479                    |                                   |                                  |        |

**5.1.8 Number of hopping frequency****RESULT:****Passed**

Date of testing : 2016-07-30  
Test standard : FCC part 15.247(a)(1)(iii)  
RSS-247 Clause 5.1(4)  
Basic standard : ANSI C63.10: 2013  
Limits :  $\geq 15$  non-overlapping channels  
Kind of test site : Shield room

**Test setup**

Test Channel : Low/ Middle/ High  
Operation Mode : B  
Ambient temperature : 25°C  
Relative humidity : 55%  
Atmospheric pressure : 101 kPa

**Table 9: Test result of Number of hopping frequency**

| Frequency Range                  | Measured Quantity of Hopping Channel | Limit     | Result |
|----------------------------------|--------------------------------------|-----------|--------|
| <u>2400</u> to <u>2483.5</u> MHz | 79                                   | $\geq 15$ | Pass   |

$$\text{Period} = 0.4 \text{ (seconds/ channel)} \times 79 \text{ (channel)} = 31.6 \text{ seconds}$$

### 5.1.10 Conducted emissions

**RESULT:****Passed**

|                   |   |                                                               |
|-------------------|---|---------------------------------------------------------------|
| Date of testing   | : | 2016-07-27                                                    |
| Test standard     | : | FCC Part 15.107(a) & FCC Part 15.207(a)<br>RSS-Gen Clause 8.8 |
| Basic standard    | : | ANSI C63.10: 2013 & ANSI C63.4: 2014                          |
| Frequency range   | : | 0.15 – 30MHz                                                  |
| Limits            | : | FCC Part 15.207(a) & FCC Part 15.207(a)<br>RSS-Gen Table 3    |
| Kind of test site | : | Shield room                                                   |

**Test setup**

|                      |   |                         |
|----------------------|---|-------------------------|
| Input Voltage        | : | DC 5V via AC/DC Adapter |
| Operation Mode       | : | B+D, C+D                |
| Earthing             | : | Not connected           |
| Ambient temperature  | : | 25°C                    |
| Relative humidity    | : | 55%                     |
| Atmospheric pressure | : | 101 kPa                 |

For details refer to Appendix 1.

### 5.1.11 Radiated Emission

**RESULT:****Passed**

|                   |   |                                                            |
|-------------------|---|------------------------------------------------------------|
| Date of testing   | : | 2016-07-28                                                 |
| Test standard     | : | FCC Part 15.109(a) & FCC Part 15.209(a)<br>RSS-Gen 8.9     |
| Basic standard    | : | ANSI C63.4: 2014                                           |
| Frequency range   | : | 30 - 6000MHz                                               |
| Classification    | : | Class B                                                    |
| Limit             | : | FCC Part 15.109(a) & FCC Part 15.209(a)<br>RSS-Gen Table 4 |
| Kind of test site | : | 3m Semi-Anechoic Chamber                                   |

**Test setup**

|                      |   |                         |
|----------------------|---|-------------------------|
| Input Voltage        | : | DC 5V via AC/DC Adapter |
| Operation mode       | : | D                       |
| Earthing             | : | Not connected           |
| Ambient temperature  | : | Refer to Appendix 1     |
| Relative humidity    | : | Refer to Appendix 1     |
| Atmospheric pressure | : | Refer to Appendix 1     |

Test data refer to Appendix 1.

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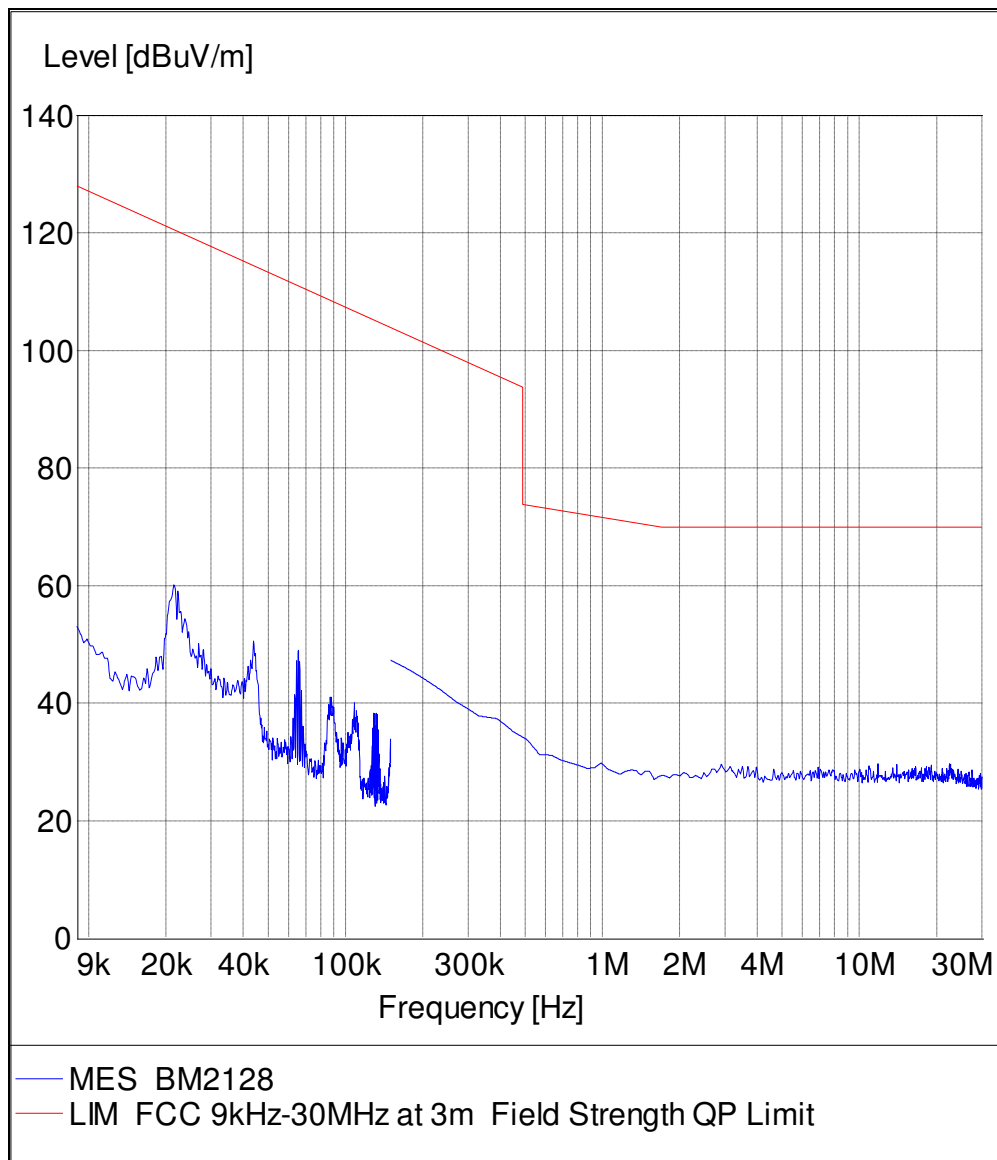
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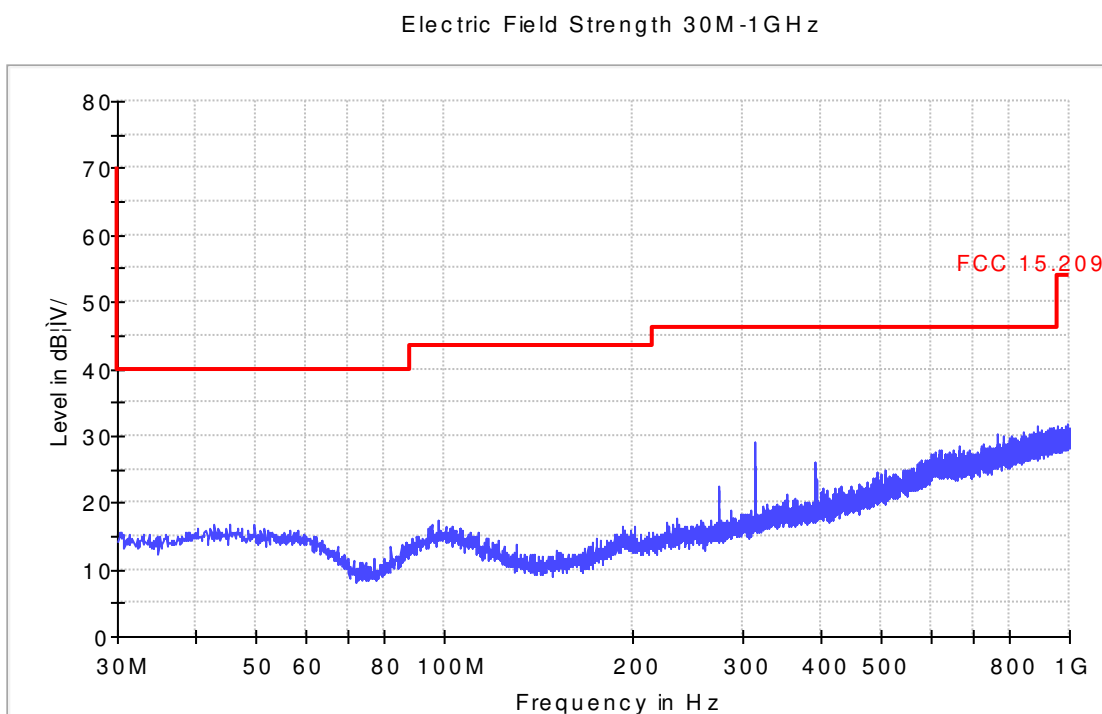
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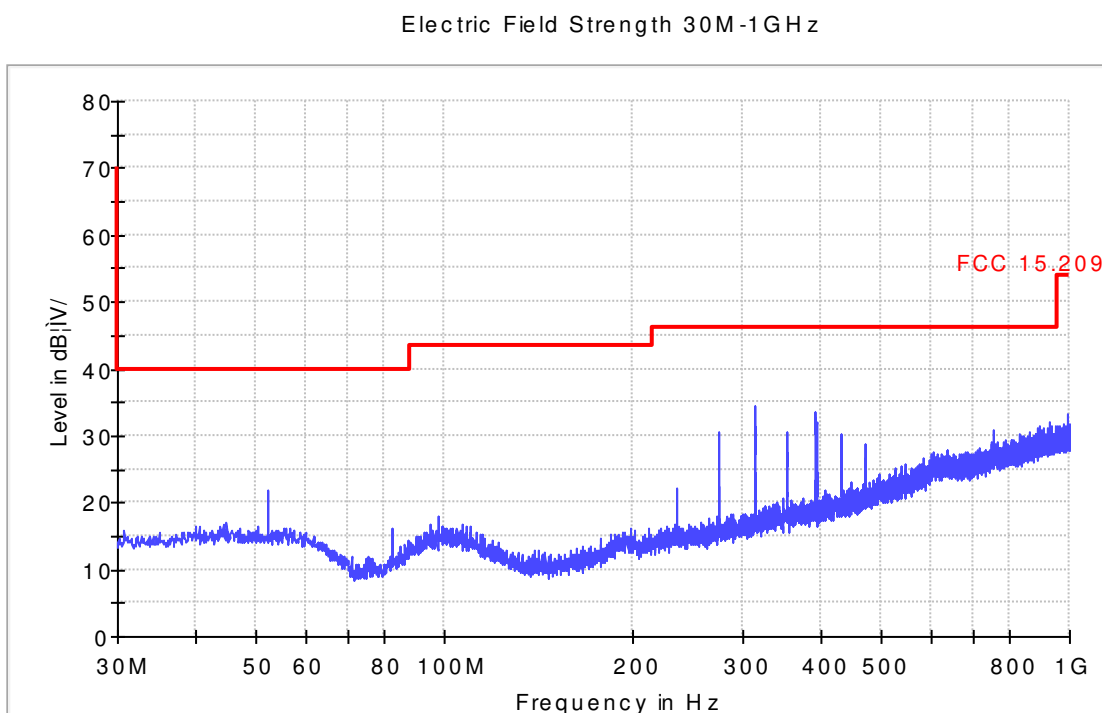
**Figure 1: Test figure of spurious emissions, mode A.1, X plane (9kHz – 30MHz)**



**Figure 2: Test figure of spurious emissions, mode A.1, Horizontal polarity (30MHz – 1GHz)**

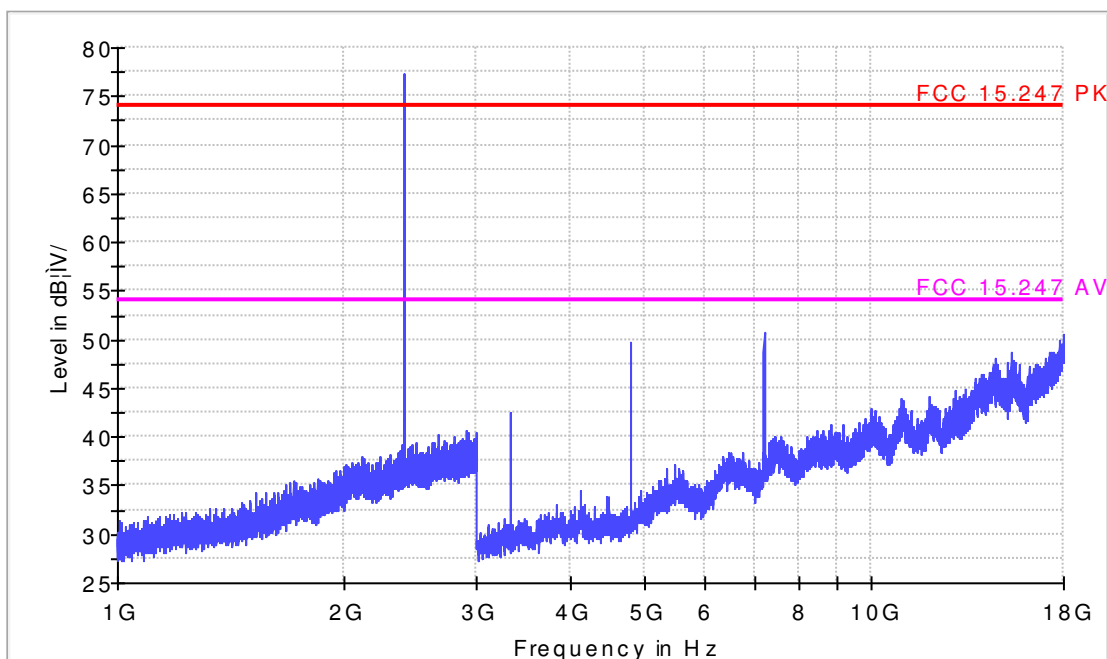


**Figure 3: Test figure of spurious emissions, mode A.1, Vertical polarity (30MHz – 1GHz)**



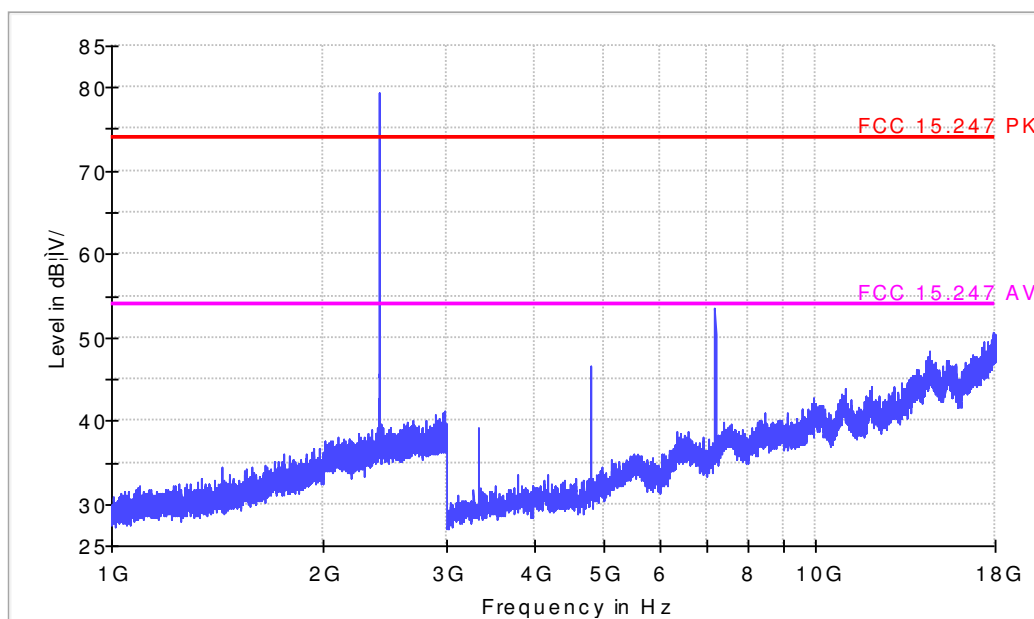
**Figure 4: Test figure of spurious emissions, mode A.1, Horizontal polarity (1GHz –18GHz)**

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

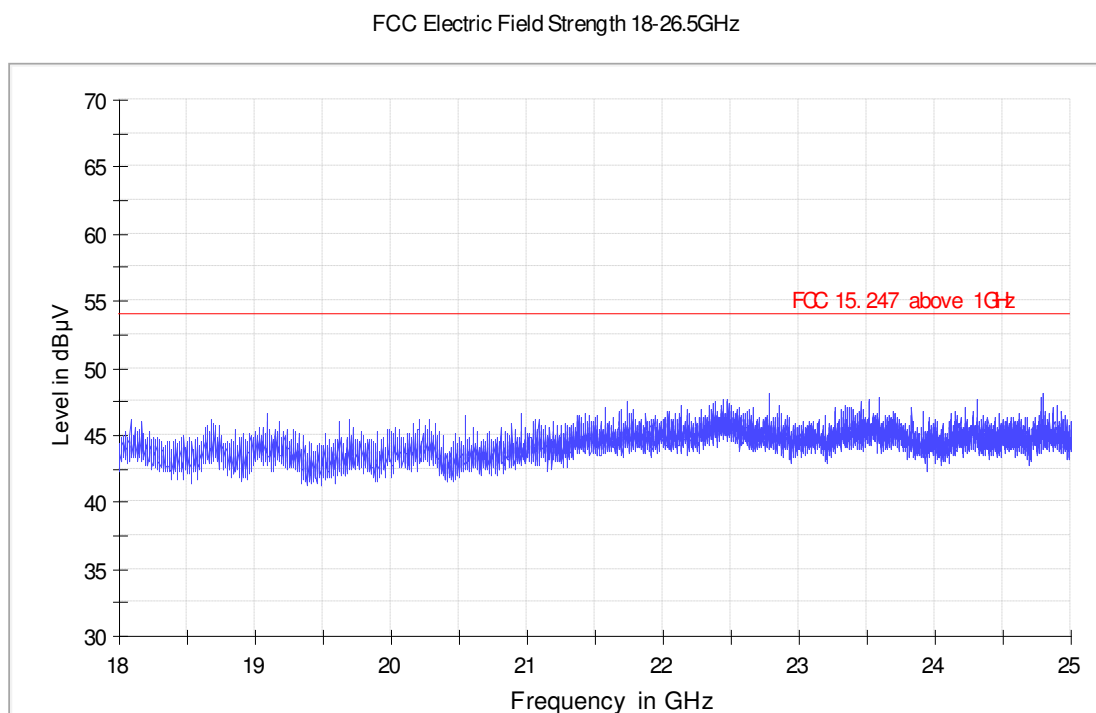


**Figure 5: Test figure of spurious emissions, mode A.1, Vertical polarity (1GHz –18GHz)**

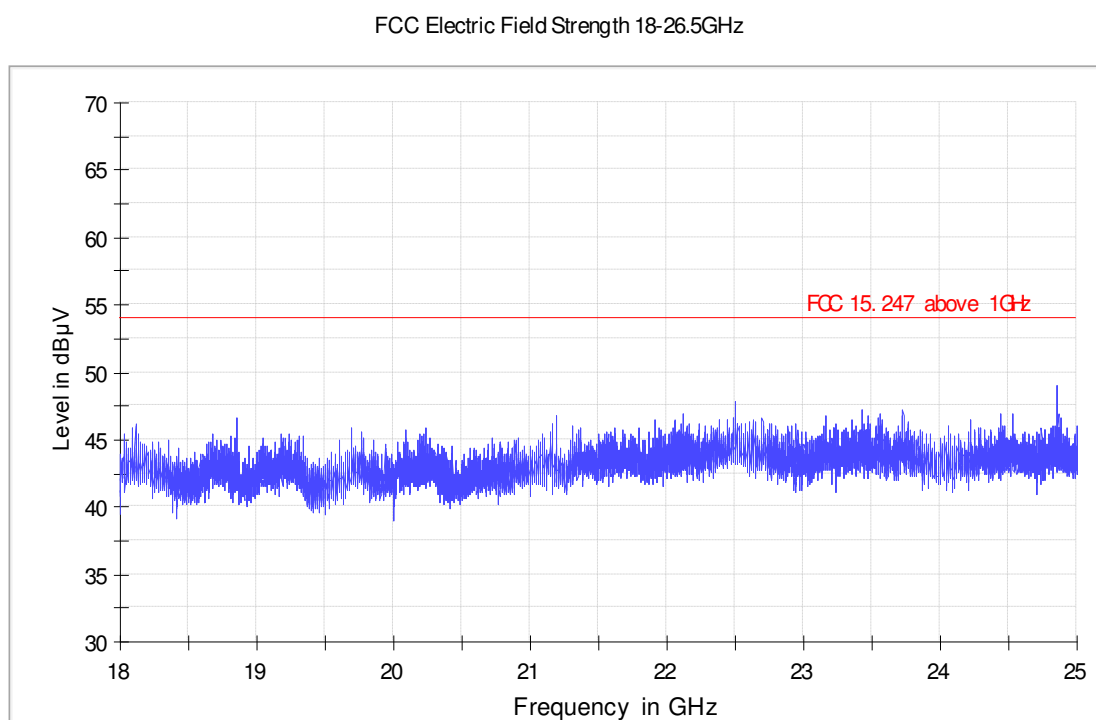
FCC Electric Field Strength 1-18GHz operate on 2.4GHz



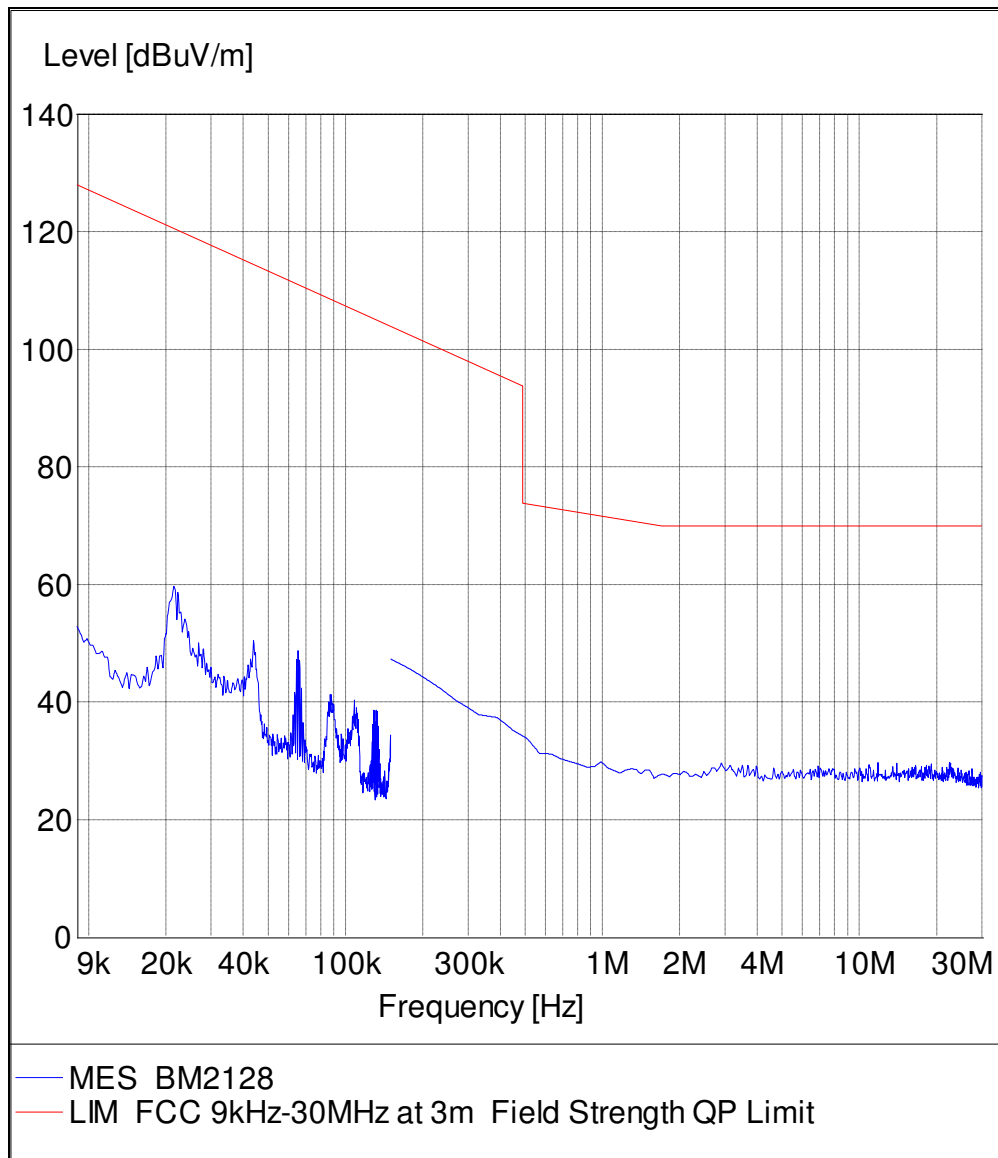
**Figure 6: Test figure of spurious emissions, mode A.1, Horizontal polarity (18GHz –25GHz)**



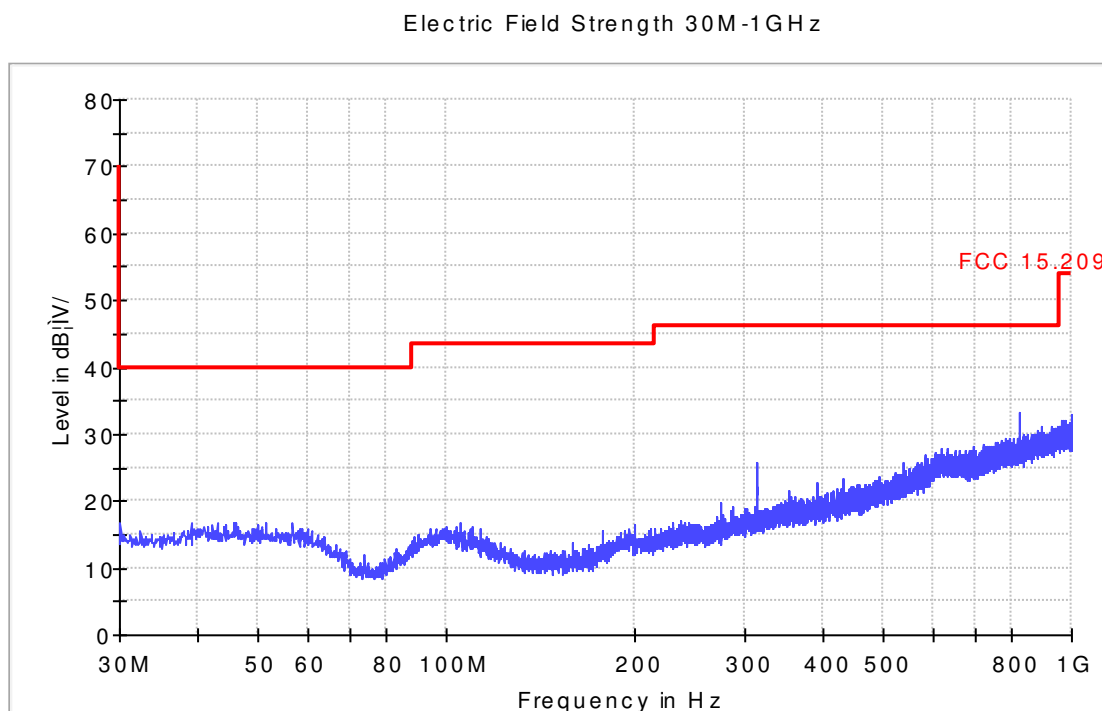
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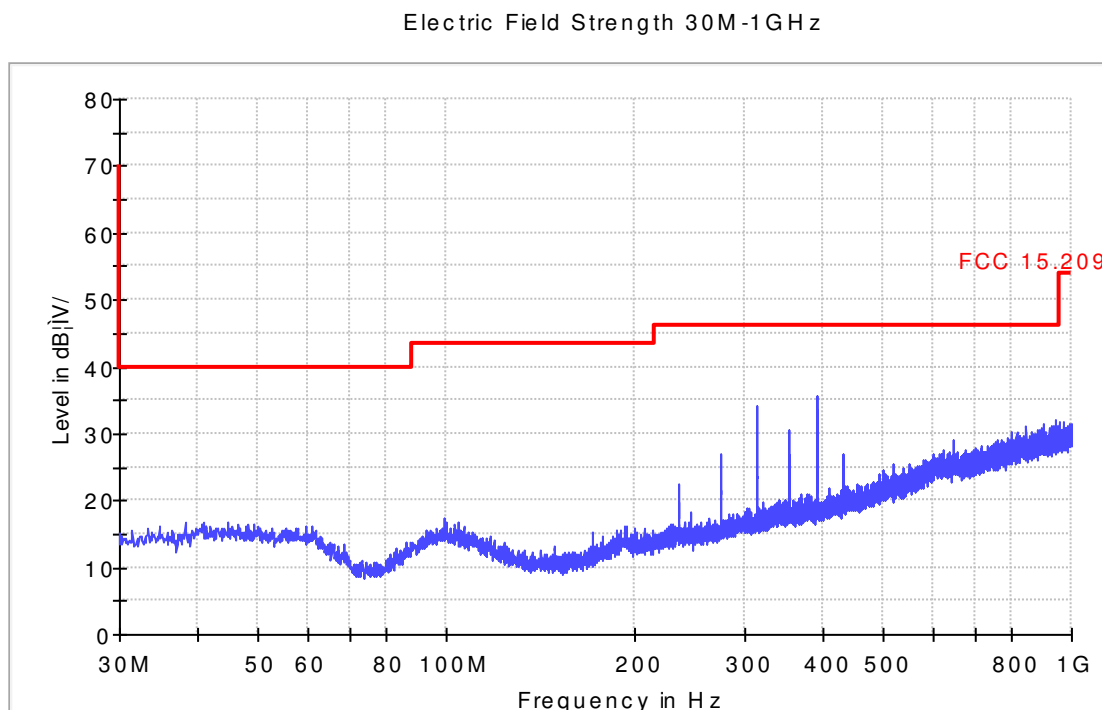
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**Figure 9: Test figure of spurious emissions, mode A.2, Horizontal polarity (30MHz – 1GHz)**

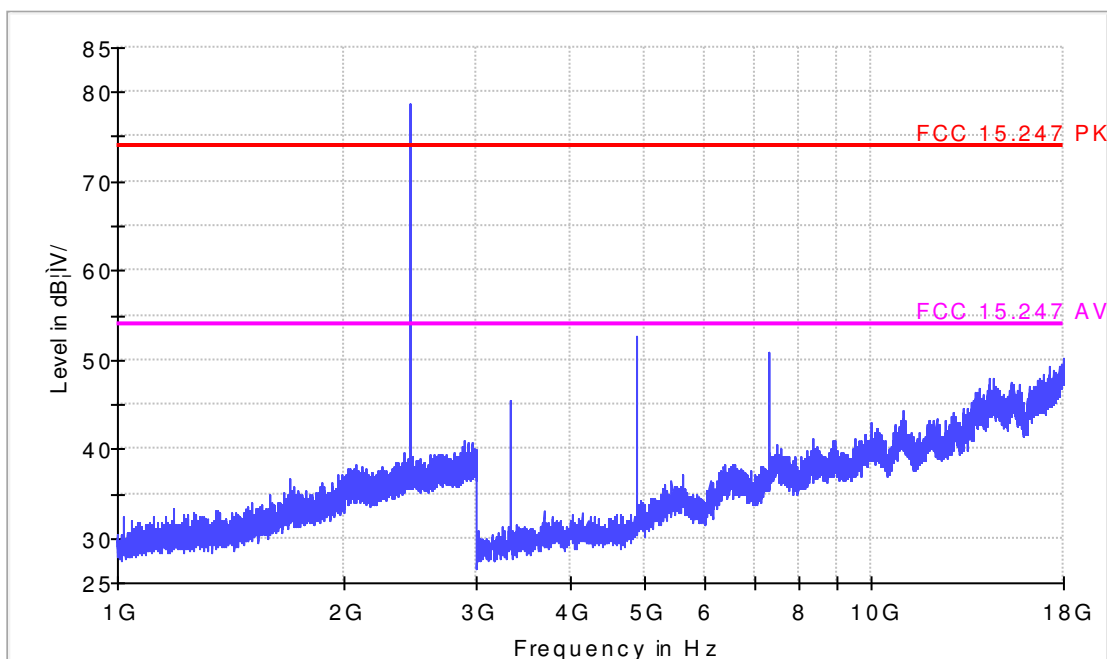


**Figure 10: Test figure of spurious emissions, mode A.2, Vertical polarity (30MHz – 1GHz)**



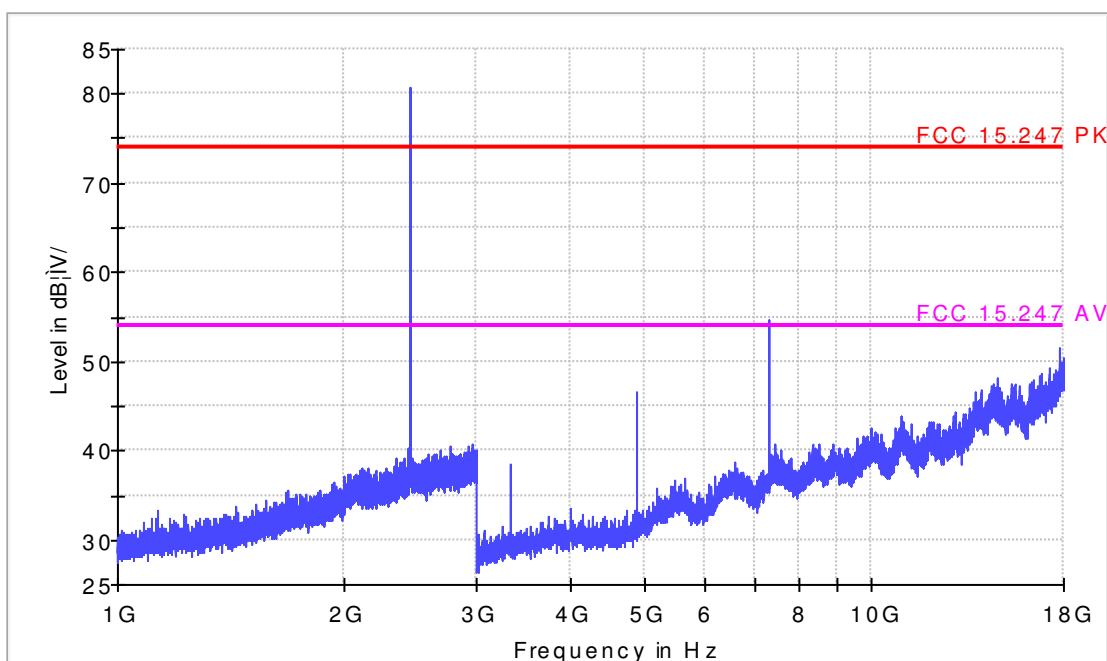
**Figure 11: Test figure of spurious emissions, mode A.2, Horizontal polarity (1GHz – 18GHz)**

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

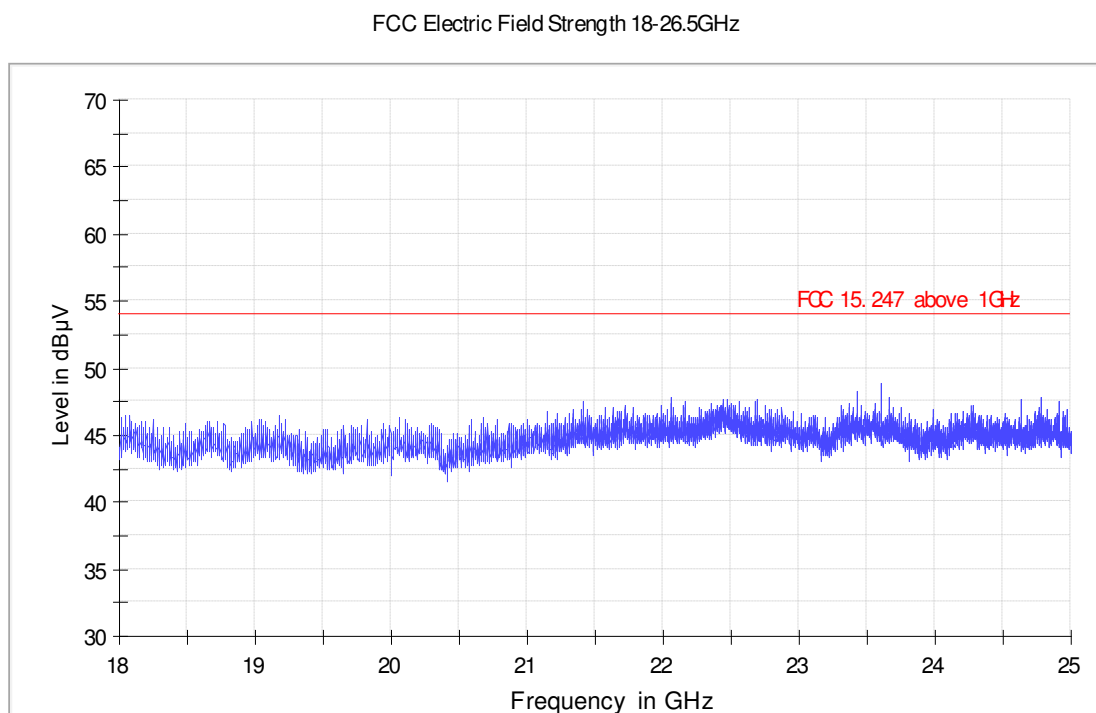


**Figure 12: Test figure of spurious emissions, mode A.2, Vertical polarity (1GHz – 18GHz)**

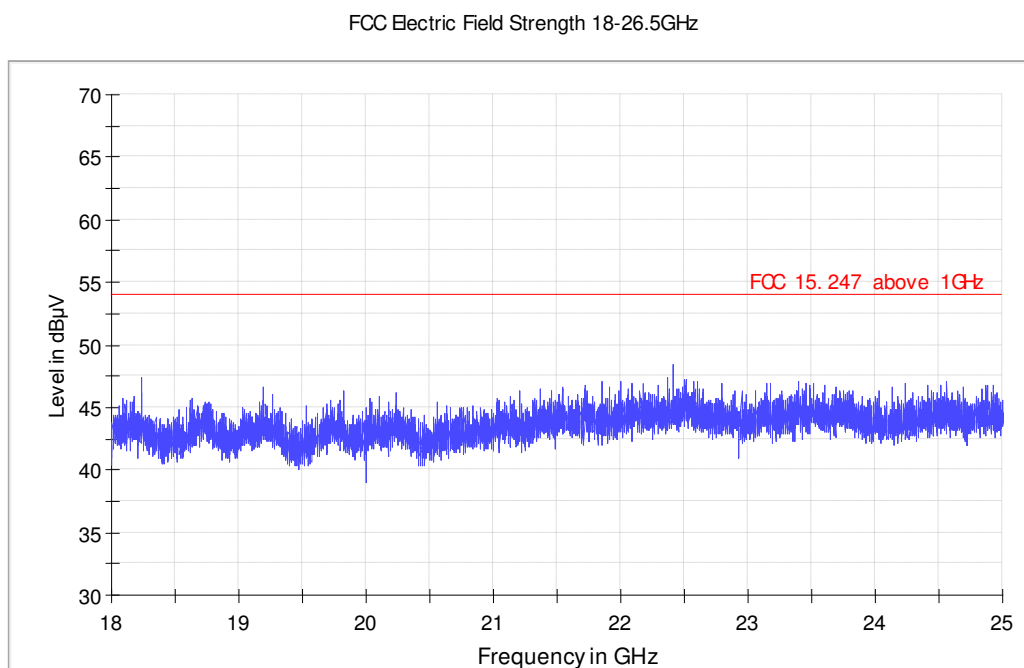
FCC Electric Field Strength 1-18GHz operate on 2.4GHz



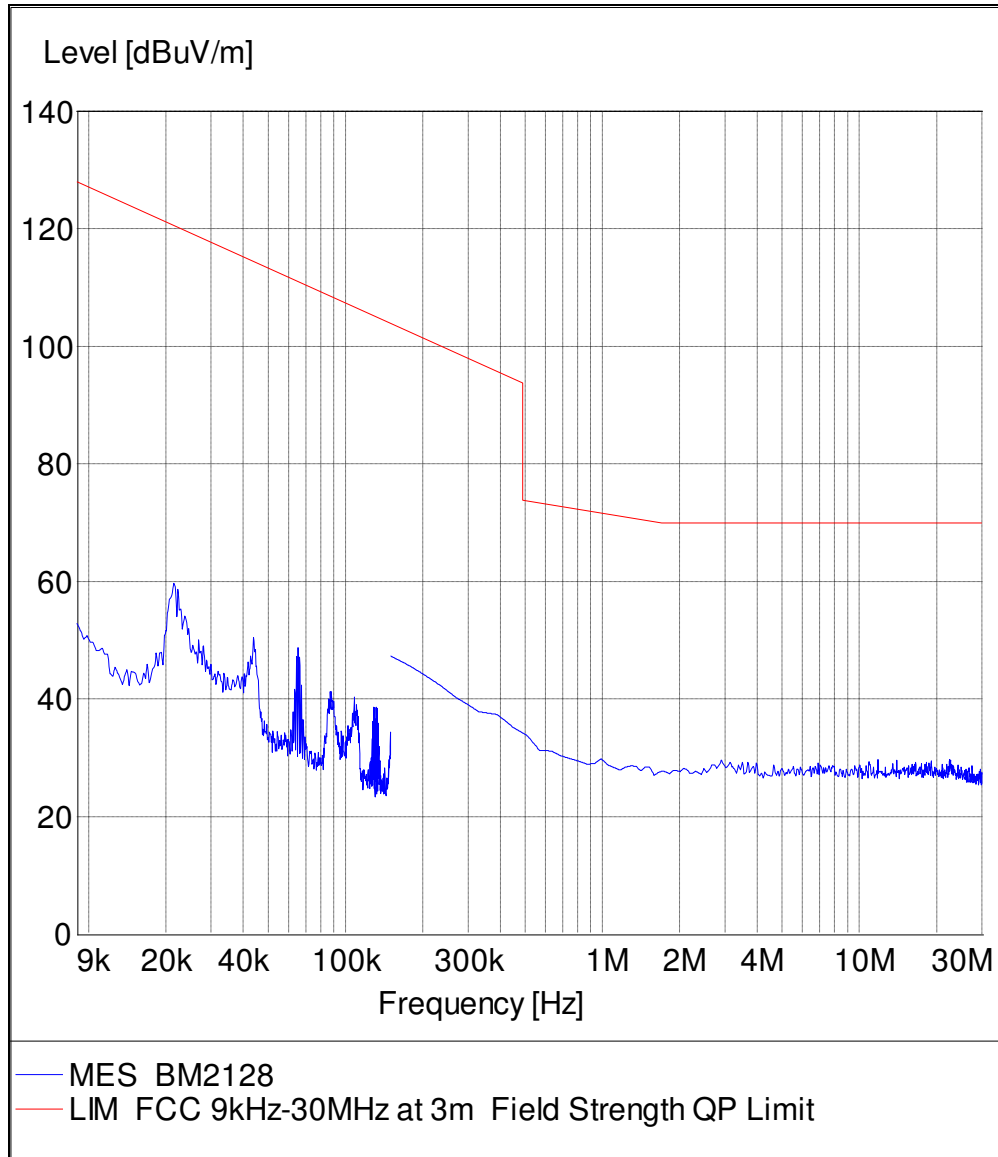
**Figure 13: Test figure of spurious emissions, mode A.2, Horizontal polarity (18GHz – 25GHz)**



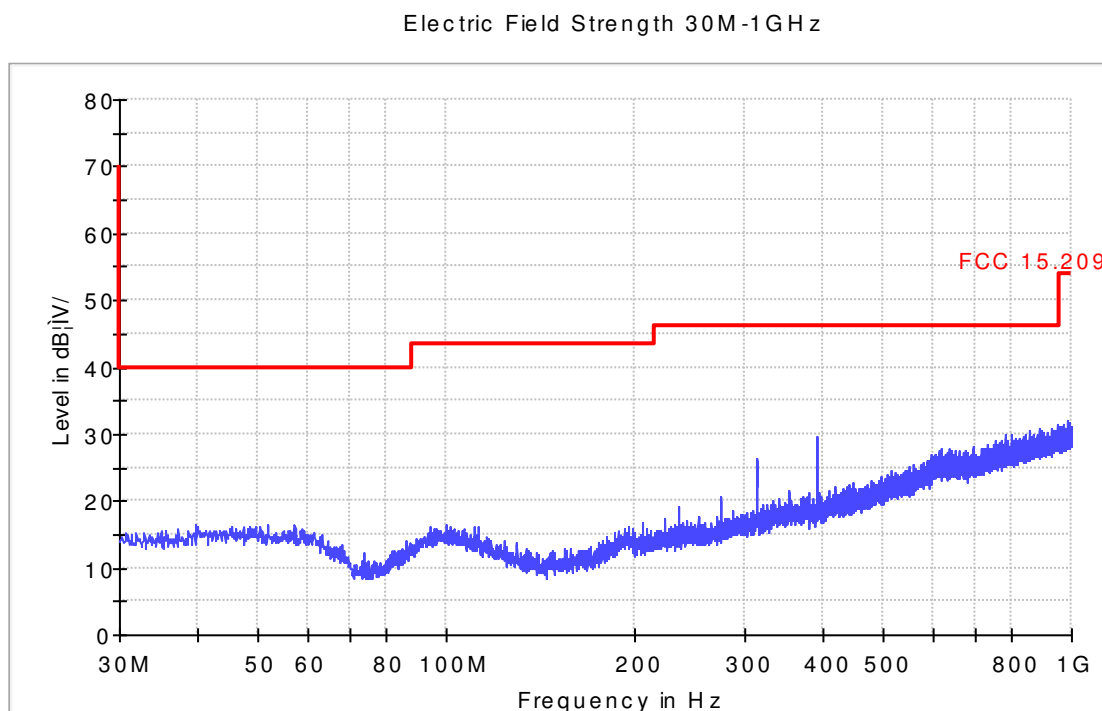
**Figure 14: Test figure of spurious emissions, mode A.2, Vertical polarity (18GHz – 25GHz)**



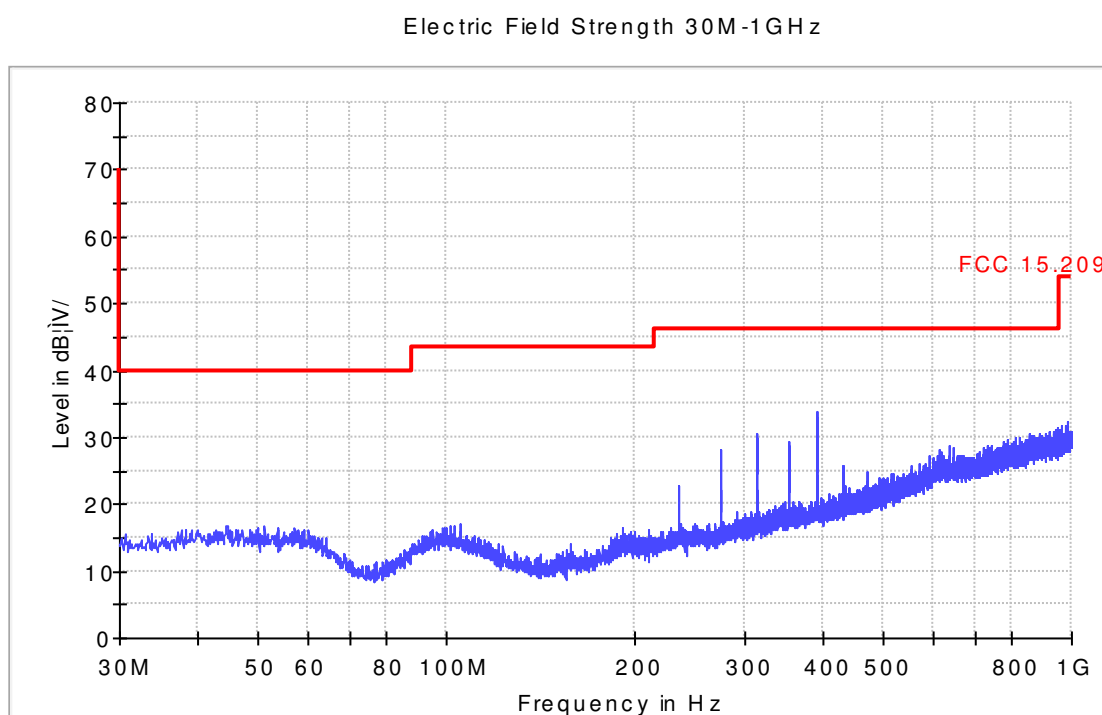
**Figure 15: Test figure of spurious emissions, mode A.3, X plane (9kHz – 30MHz)**



**Figure 16: Test figure of spurious emissions, mode A.3, Horizontal polarity (30MHz – 1GHz)**

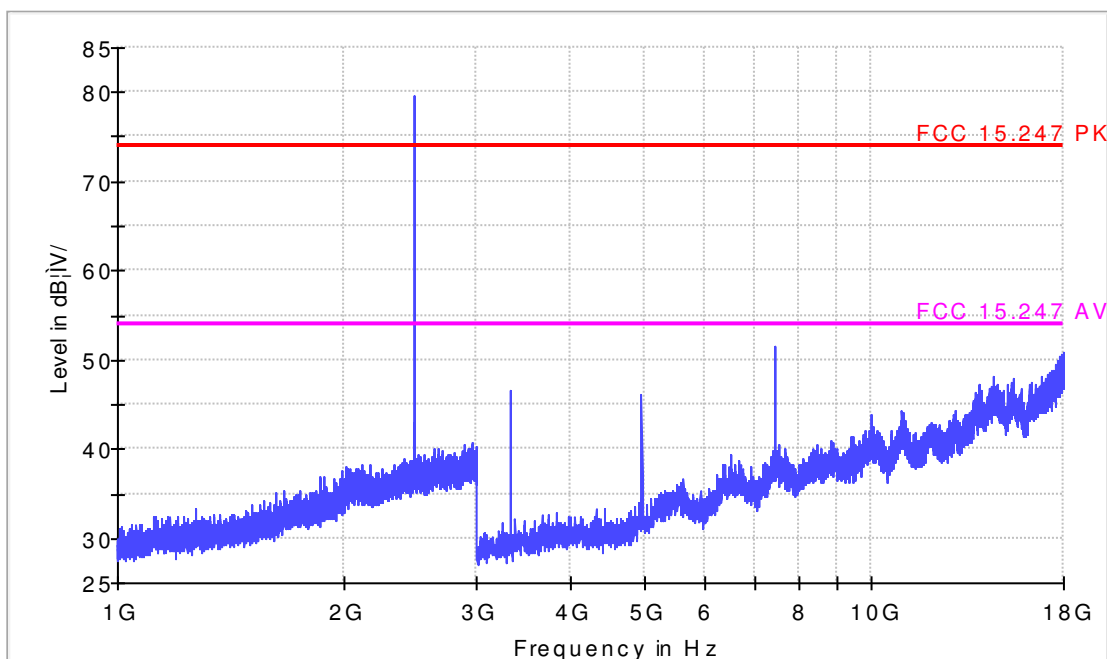


**Figure 17: Test figure of spurious emissions, mode A.3, Vertical polarity (30MHz – 1GHz)**



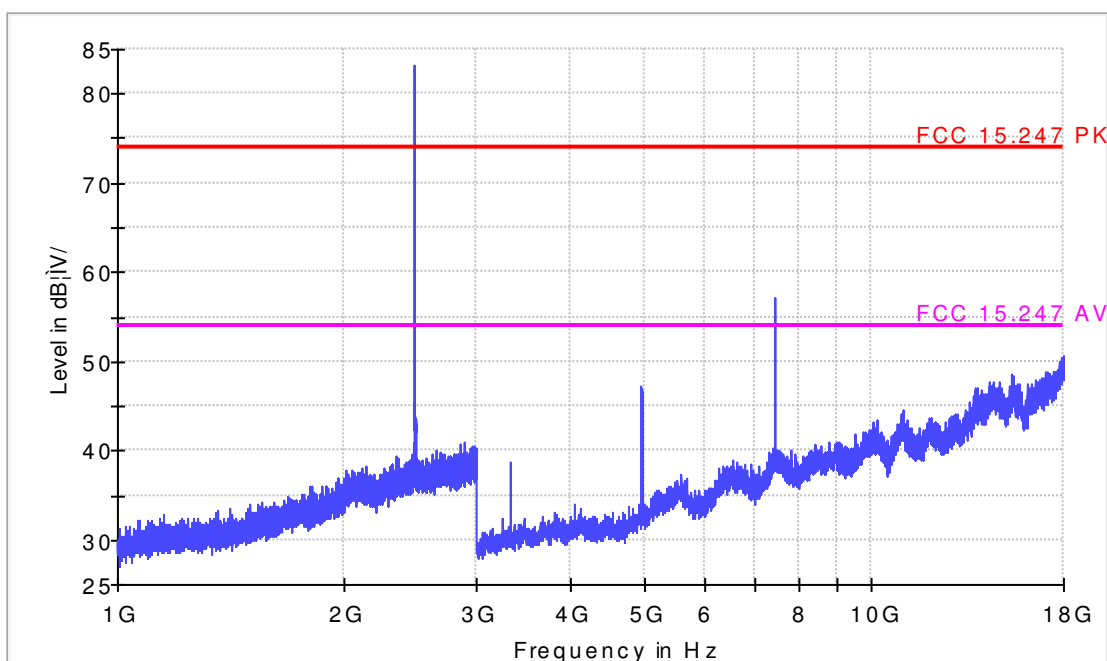
**Figure 18: Test figure of spurious emissions, mode A.3, Horizontal polarity (1GHz –18GHz)**

FCC Electric Field Strength 1-18GHz operate on 2.4GHz



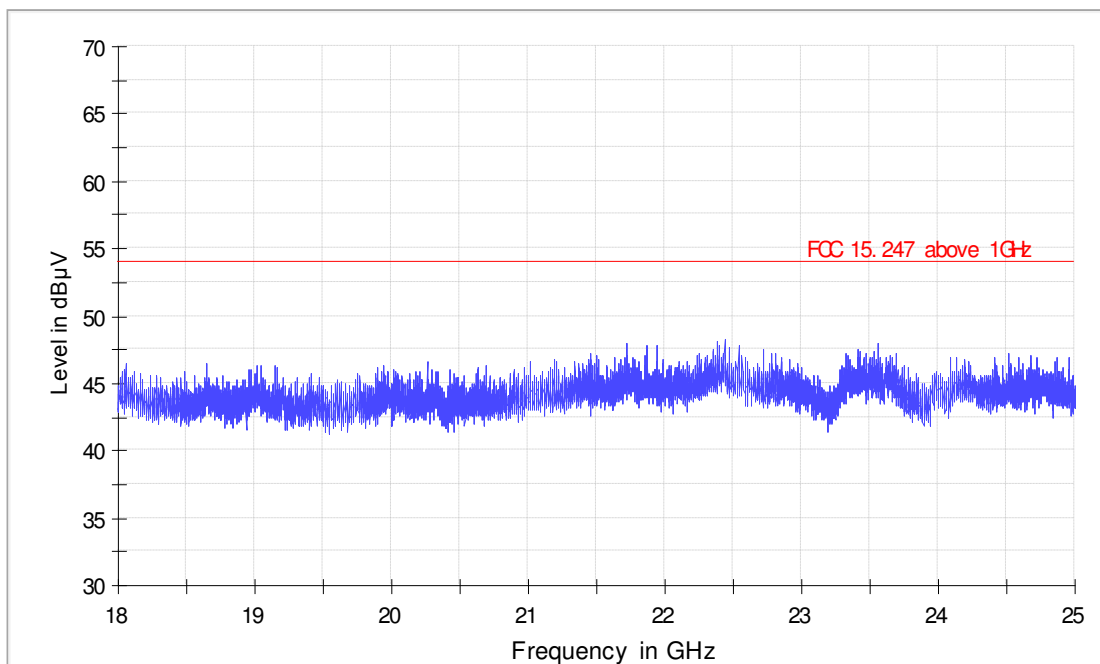
**Figure 19: Test figure of spurious emissions, mode A.3, Vertical polarity (1GHz – 18GHz)**

FCC Electric Field Strength 1-18GHz operate on 2.4GHz



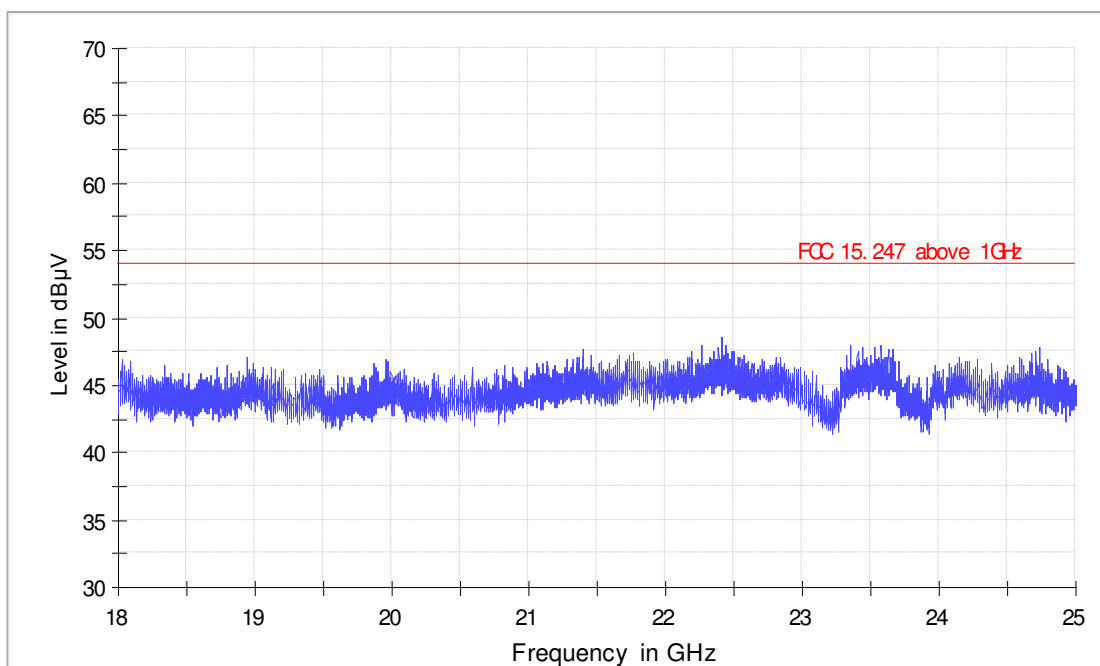
**Figure 20: Test figure of spurious emissions, mode A.3, Horizontal polarity (18GHz –25GHz)**

FCC Electric Field Strength 18-26.5GHz



**Figure 21: Test figure of spurious emissions, mode A.3, Vertical polarity (18GHz – 25GHz)**

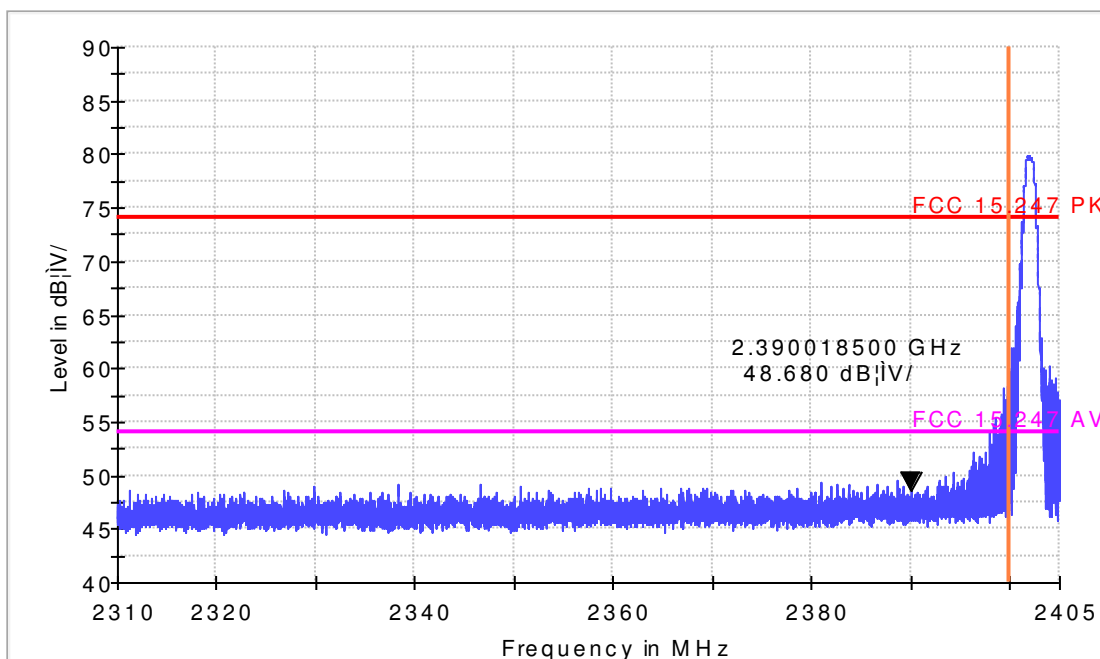
FCC Electric Field Strength 18-26.5GHz



**Figure 22: Test figure of Radiated emissions in restricted bands, Mode A.1, Horizontal**

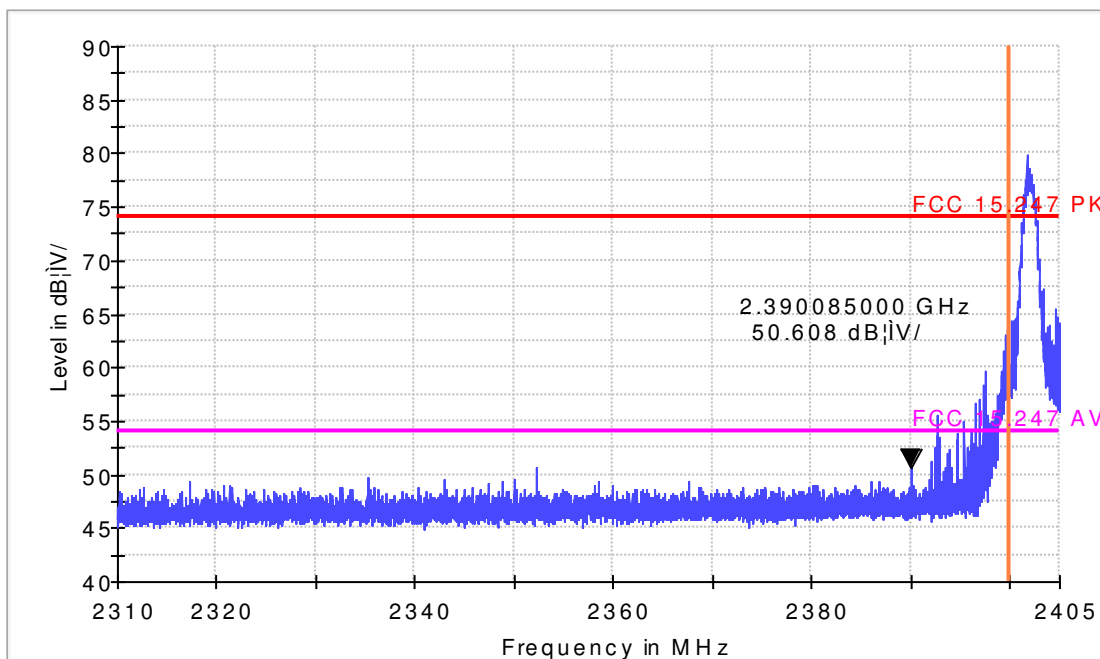
BDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



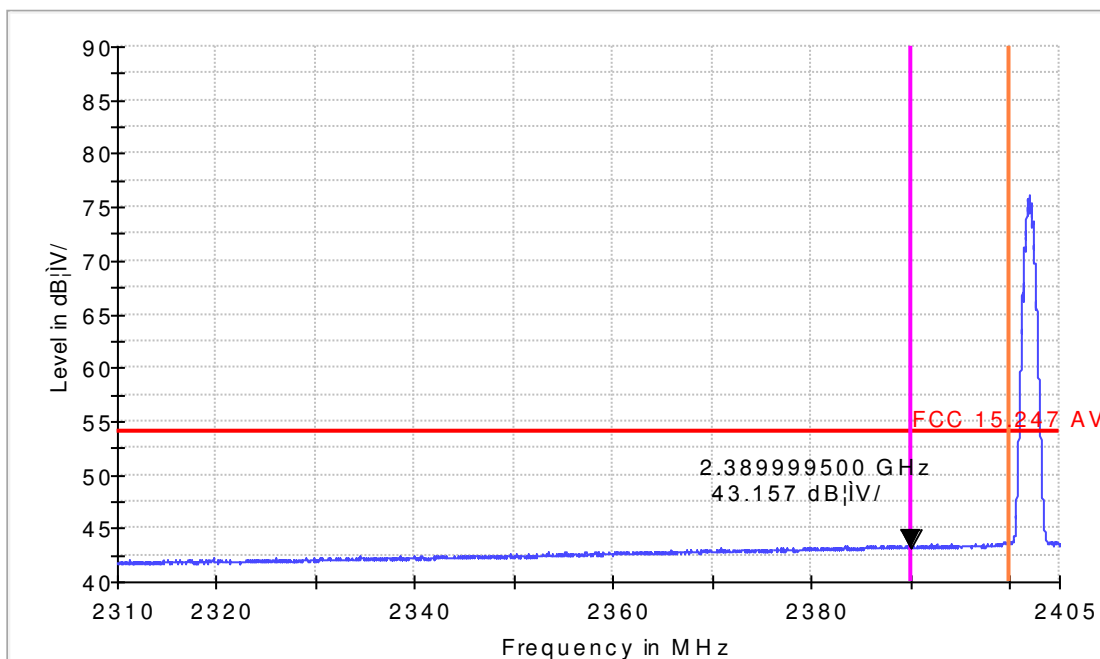
EDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



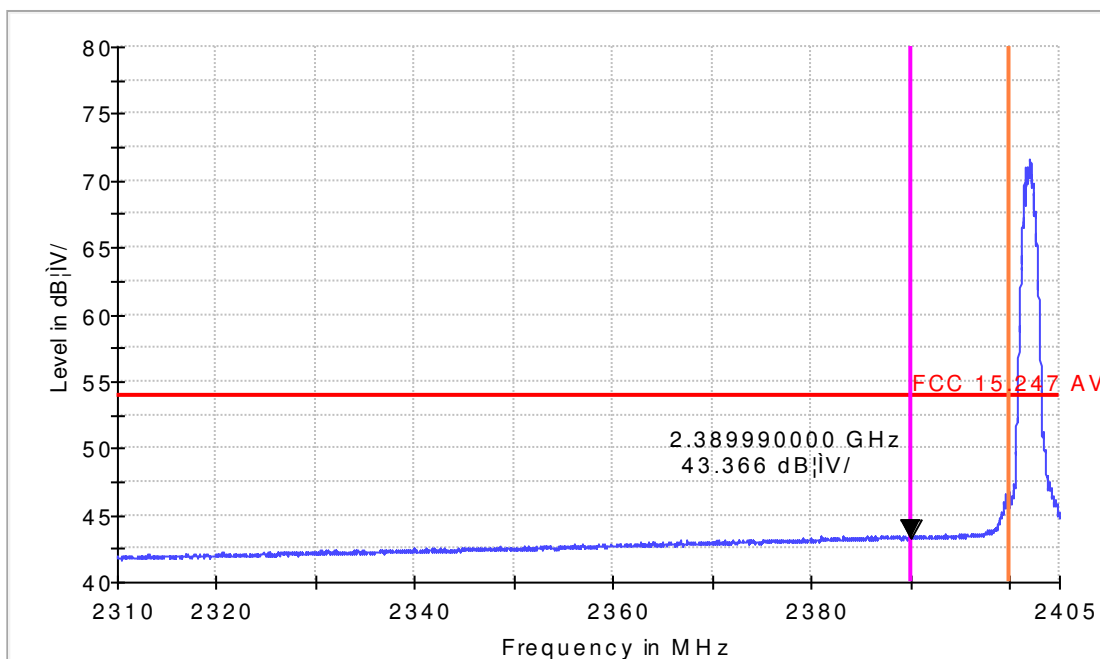
BDR

FCC Electric Field Strength 2.4GHz Bandedge-AV



EDR

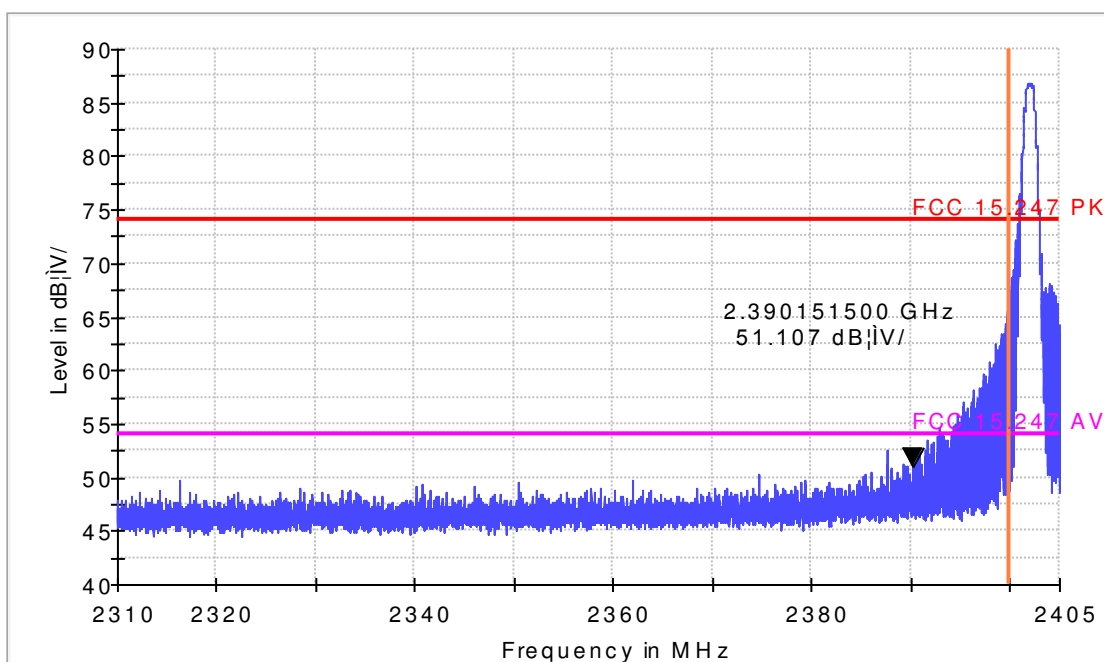
FCC Electric Field Strength 2.4GHz Bandedge-AV



**Figure 23: Test figure of Radiated emissions in restricted bands, Mode A.1, Vertical**

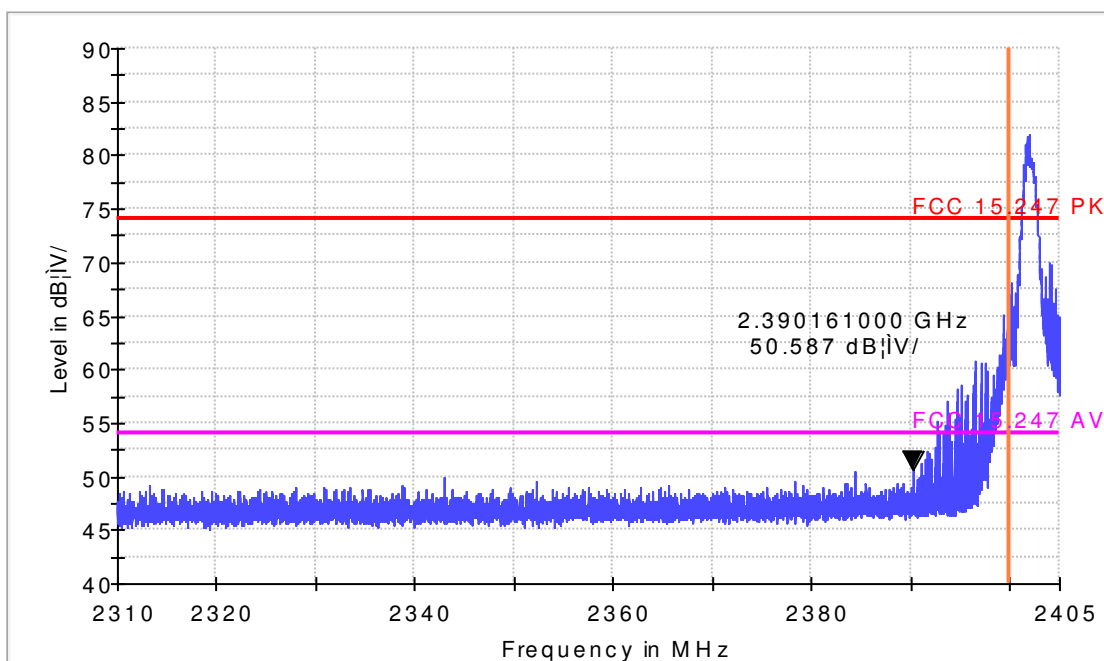
BDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



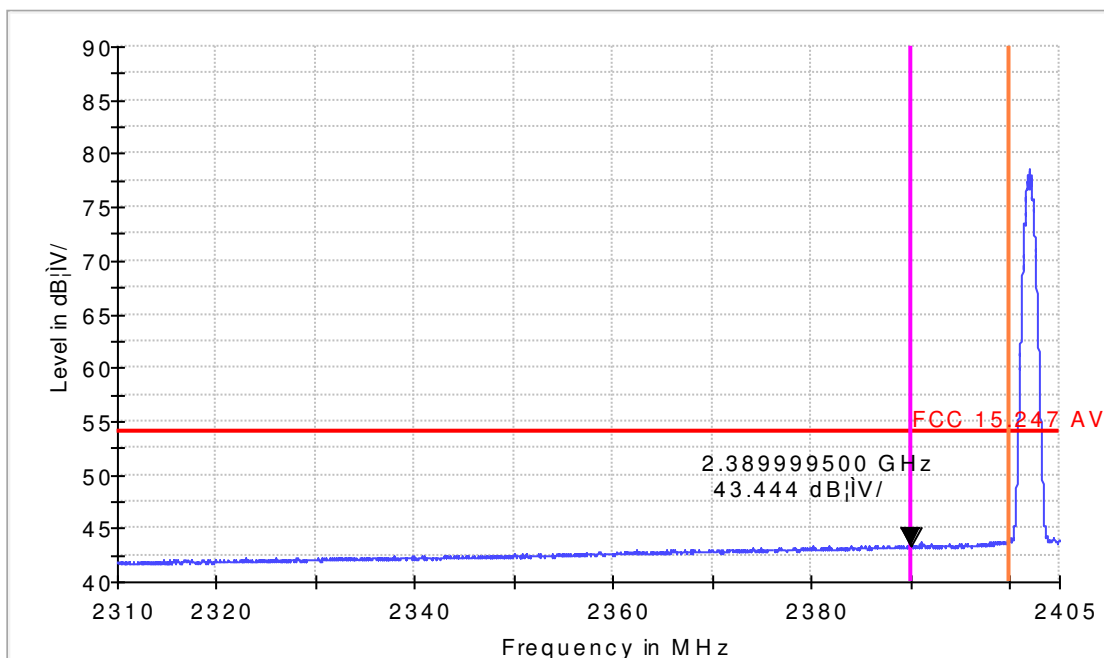
EDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



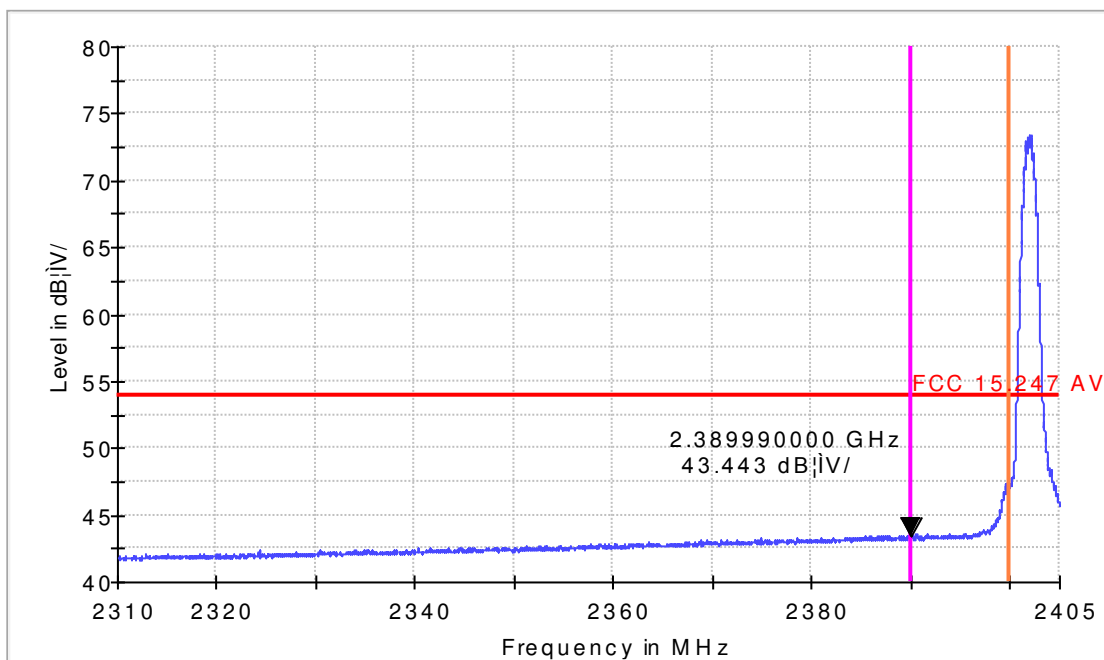
BDR

FCC Electric Field Strength 2.4GHz Bandedge-AV



EDR

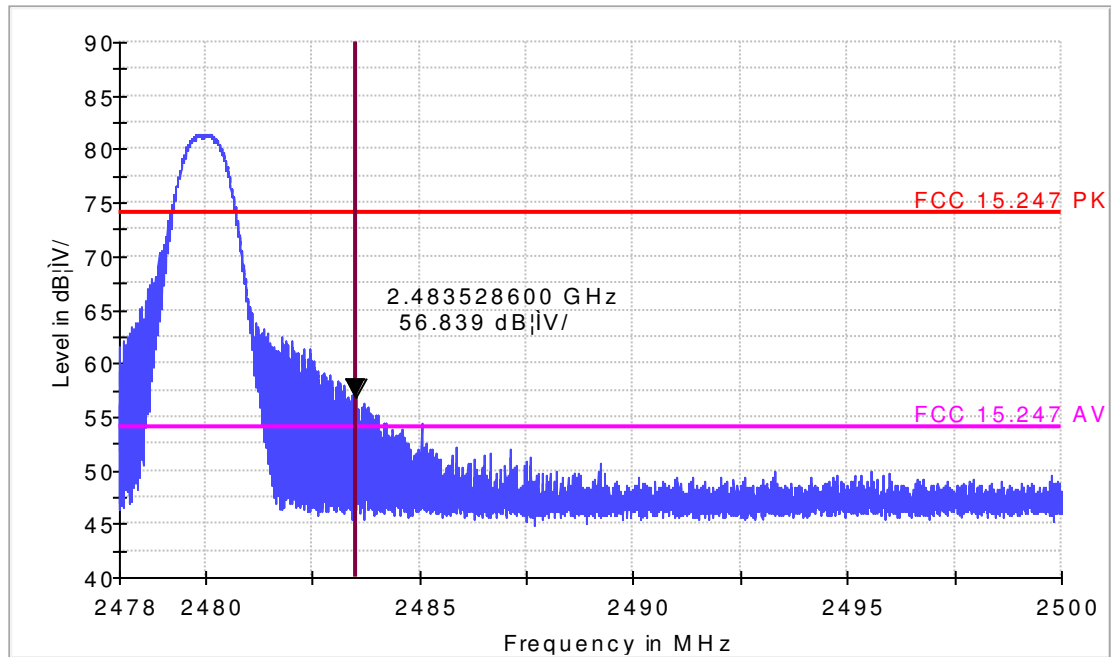
FCC Electric Field Strength 2.4GHz Bandedge-AV



**Figure 24: Test figure of Radiated emissions in restricted bands, Mode A.3, Horizontal**

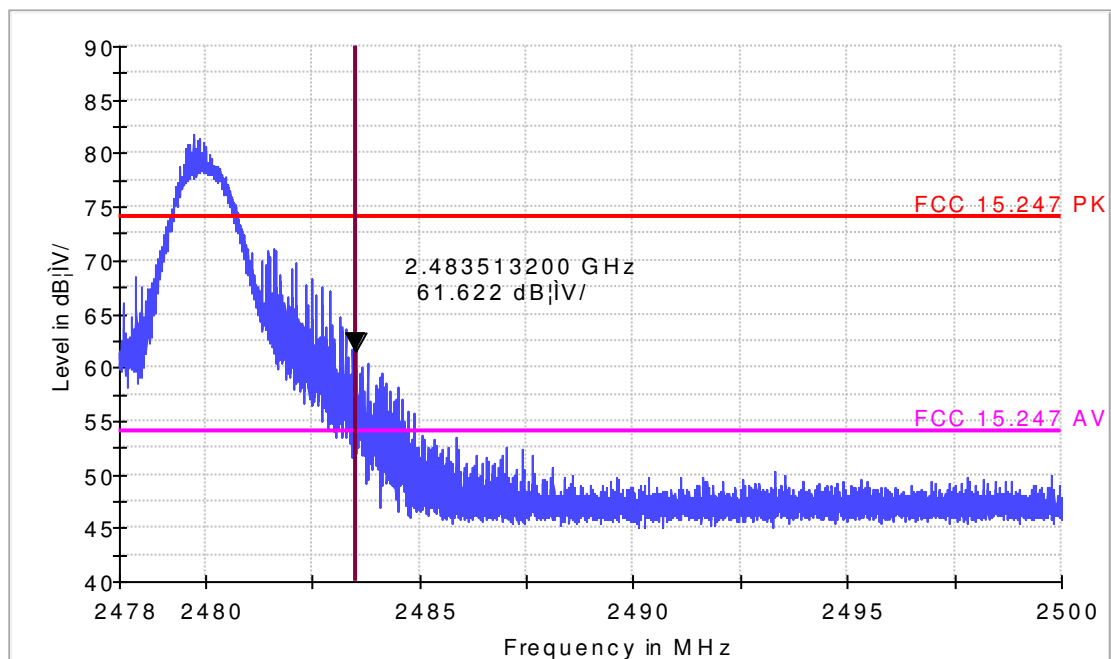
BDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



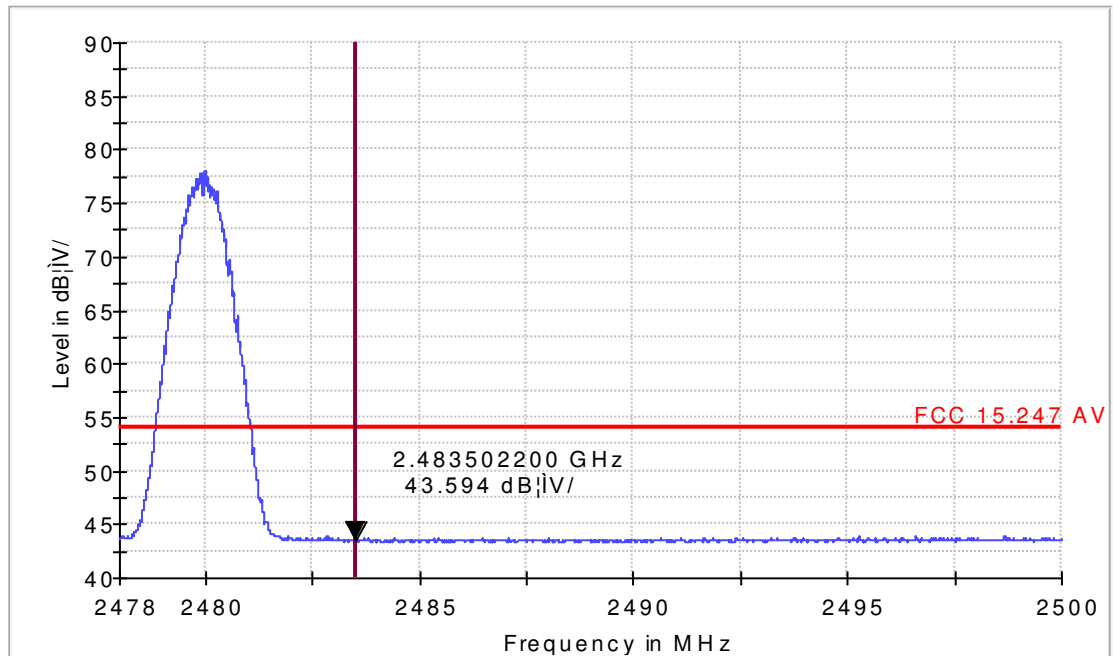
EDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



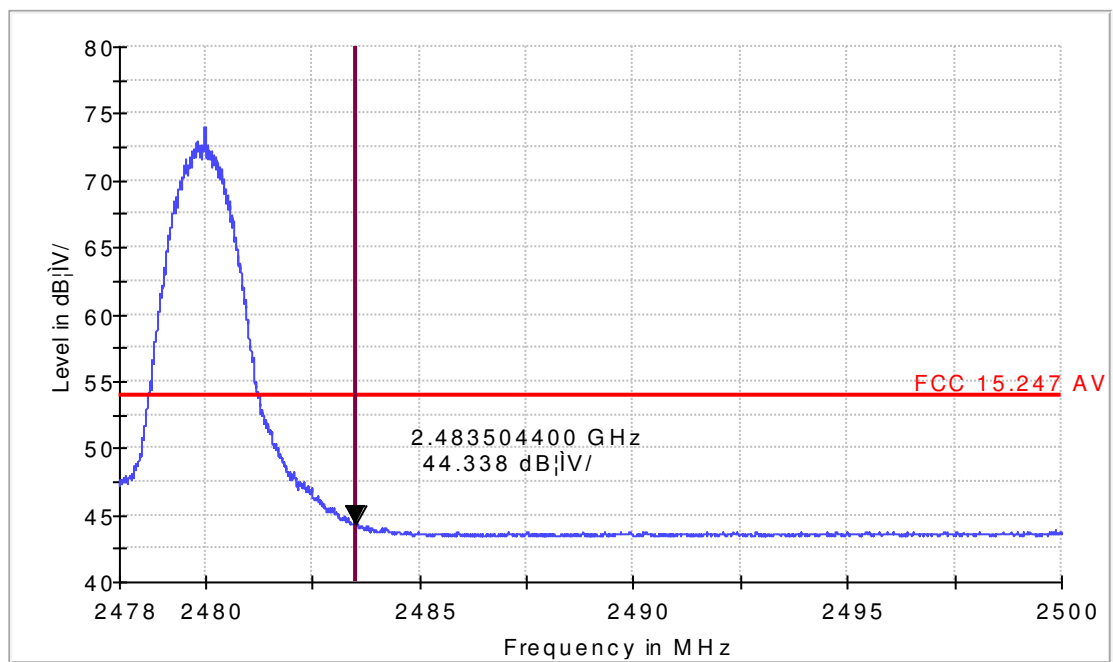
BDR

FCC Electric Field Strength 2.4GHz Bandedge-AV



EDR

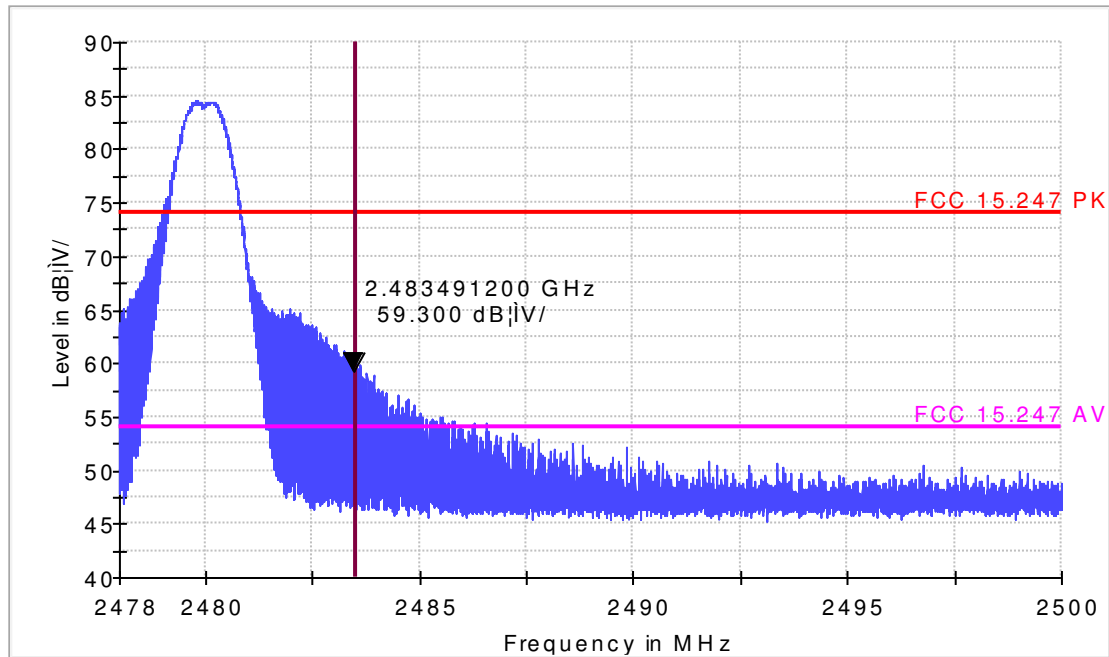
FCC Electric Field Strength 2.4GHz Bandedge-AV



**Figure 25: Test figure of Radiated emissions in restricted bands, Mode A.3, Vertical**

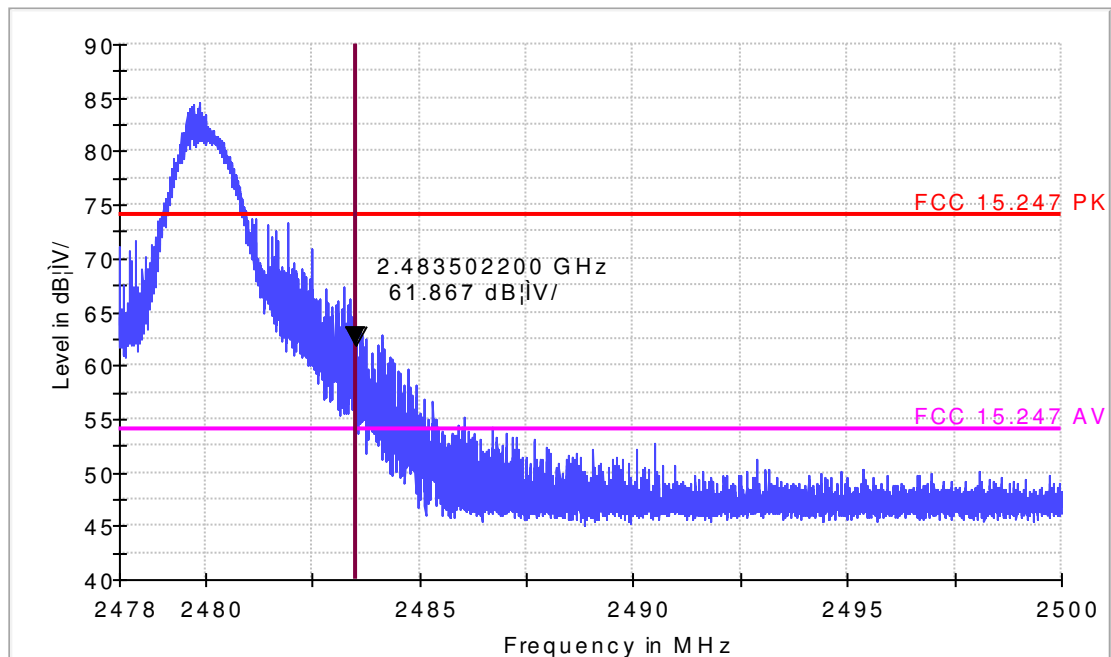
BDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



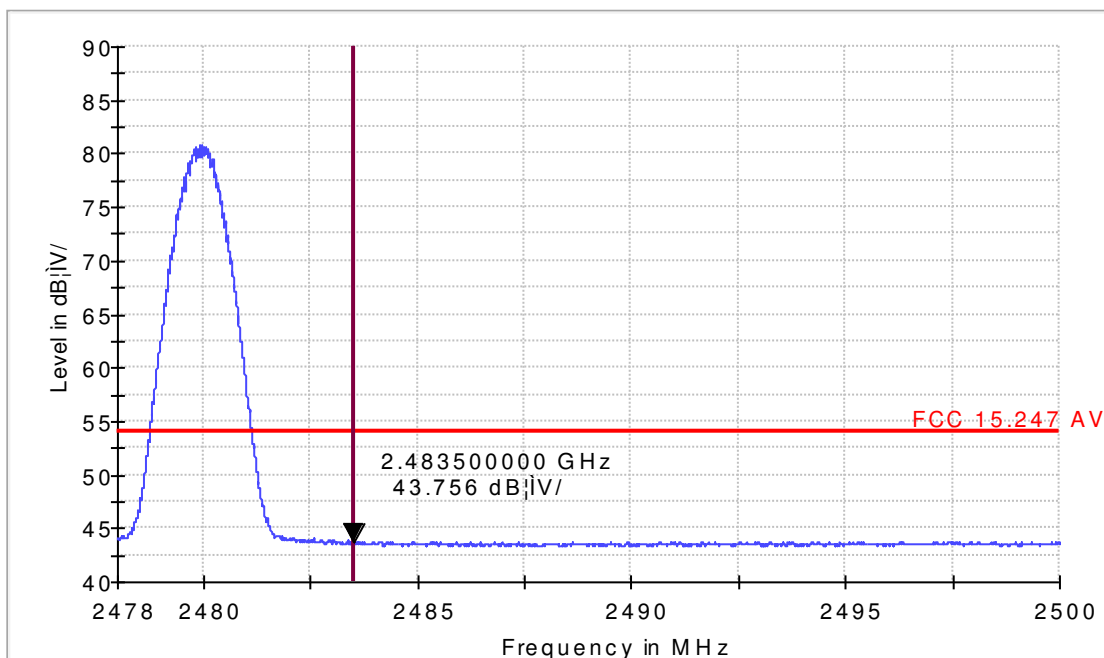
EDR

FCC Electric Field Strength 2.4GHz Bandedge-PK



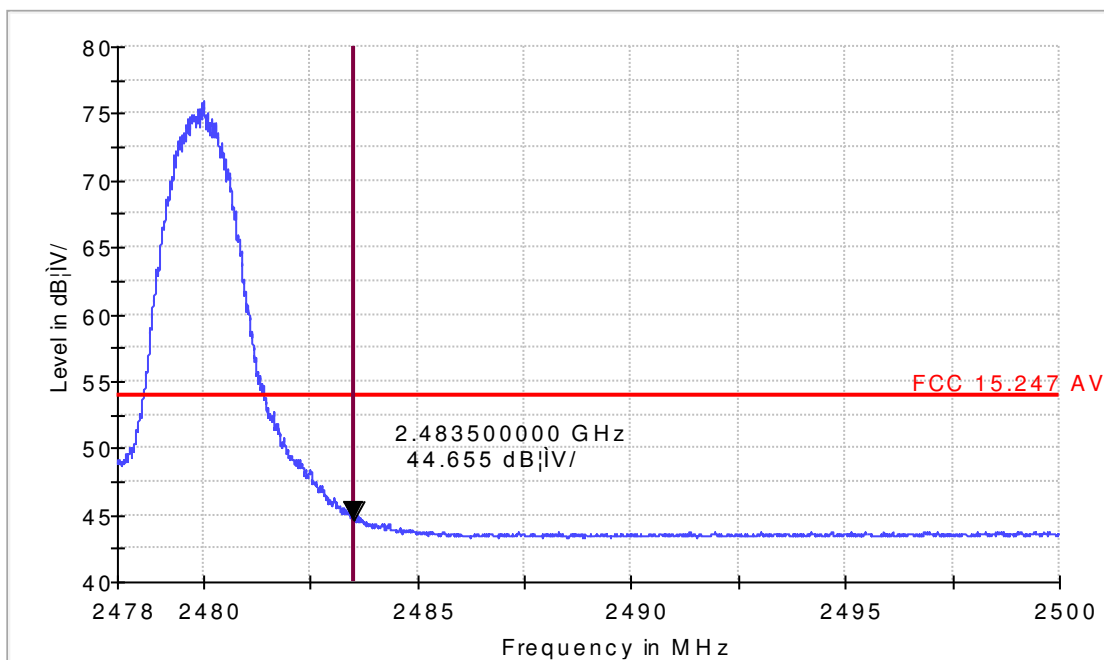
BDR

FCC Electric Field Strength 2.4GHz Bandedge-AV



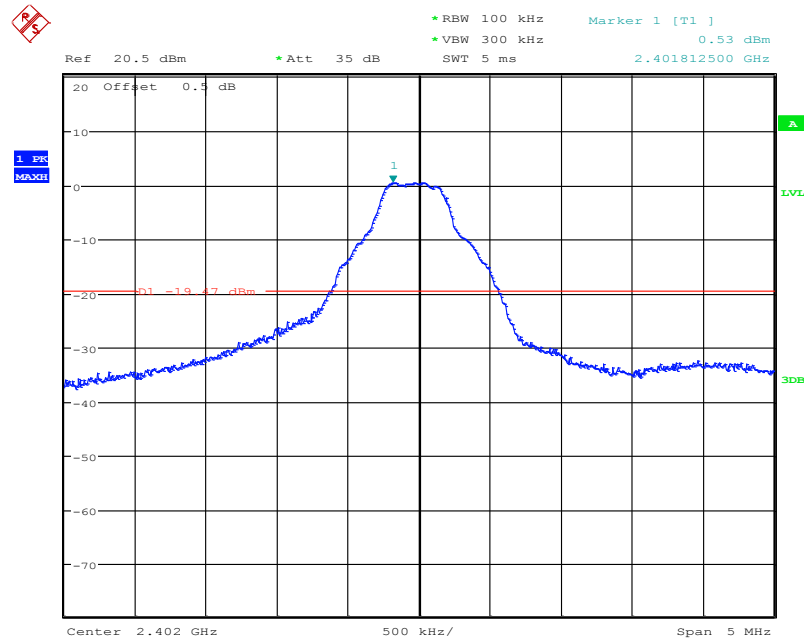
EDR

FCC Electric Field Strength 2.4GHz Bandedge-AV

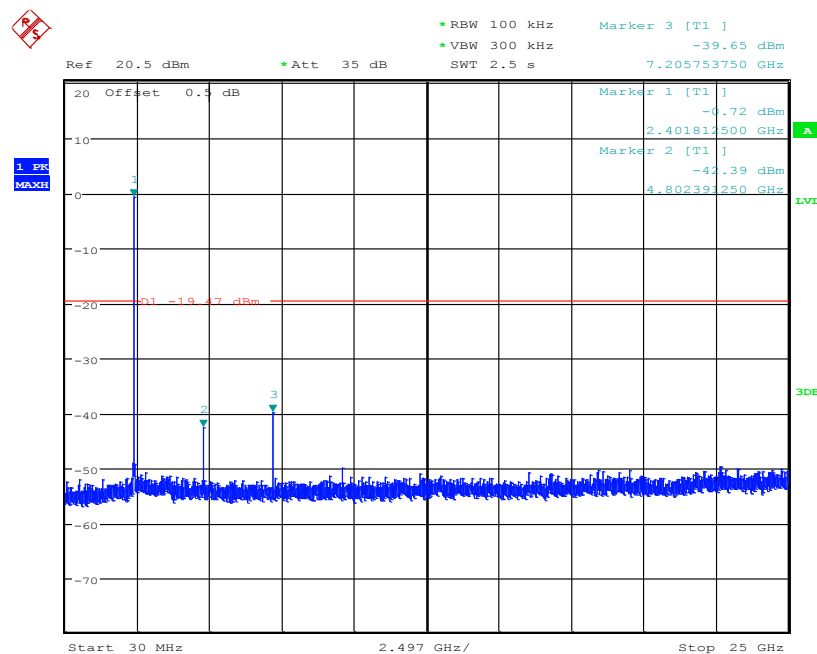


**Figure 26: Test figure of conducted emissions in 100kHz Bandwidth, Mode A.1**

BDR

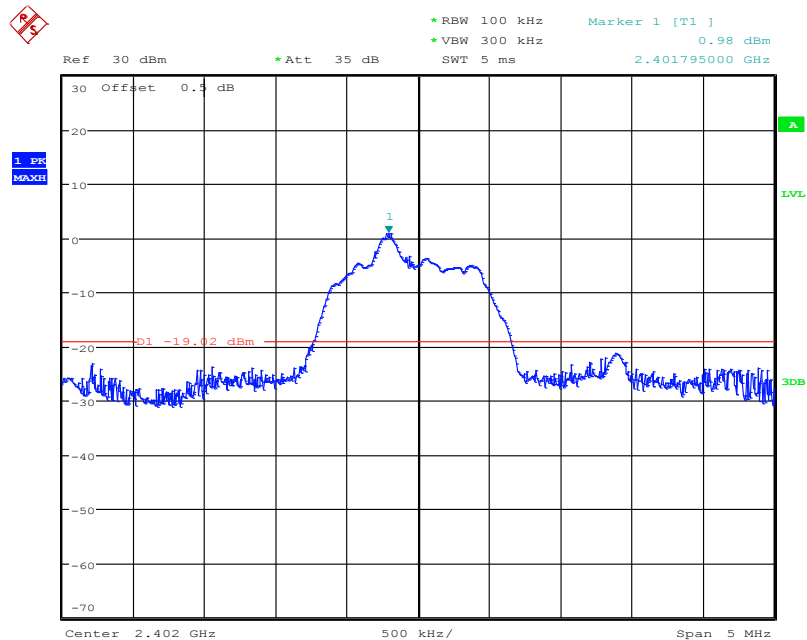


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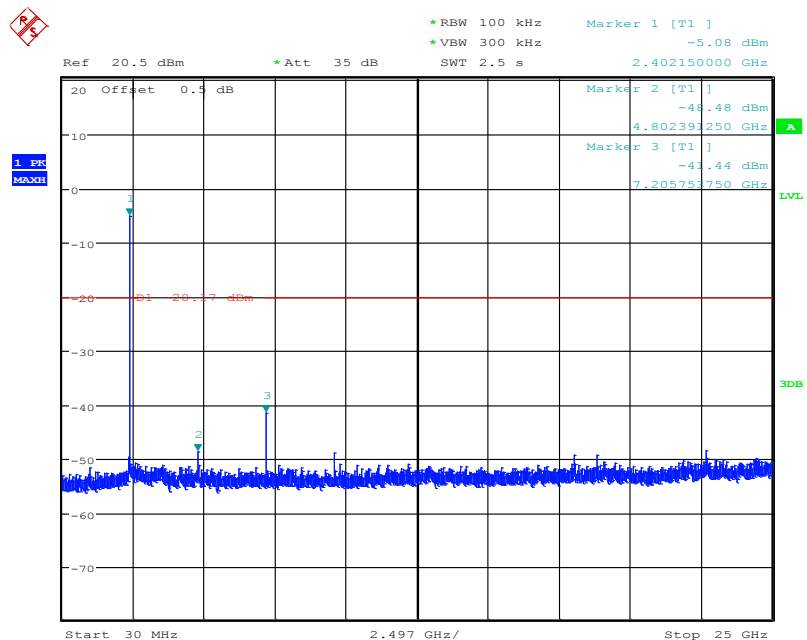


Date: 30.JUL.2016 15:01:28

## EDR



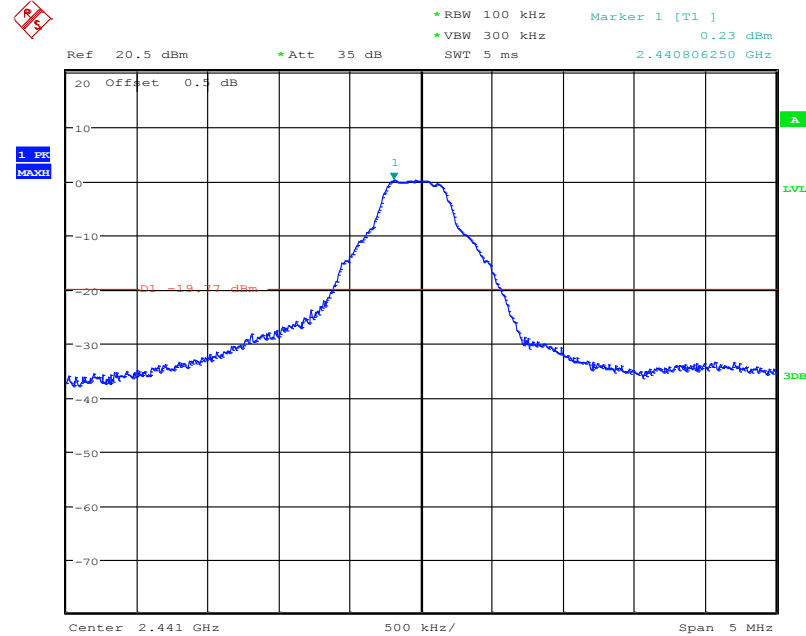
Date: 30.JUL.2016 12:42:51



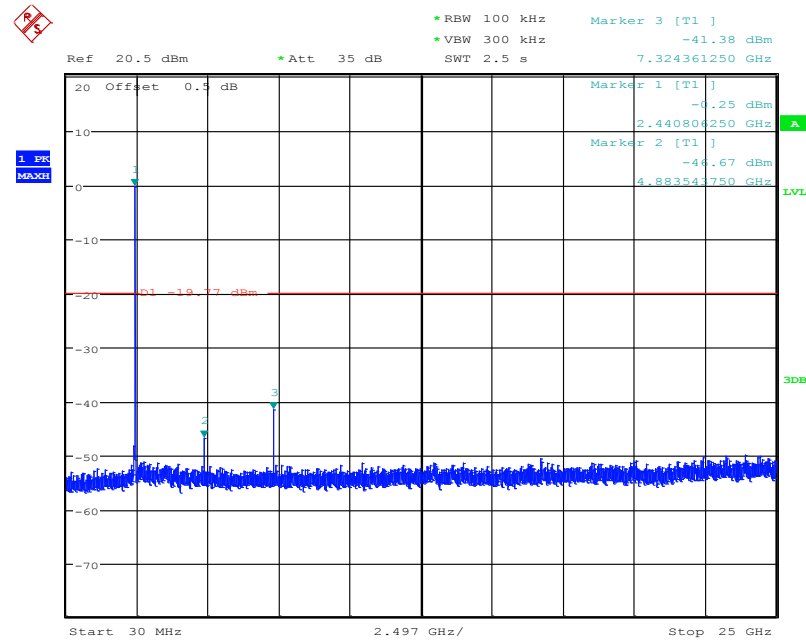
Date: 30.JUL.2016 15:15:55

**Figure 27: Test figure of conducted emissions in 100kHz Bandwidth, Mode A.2**

BDR

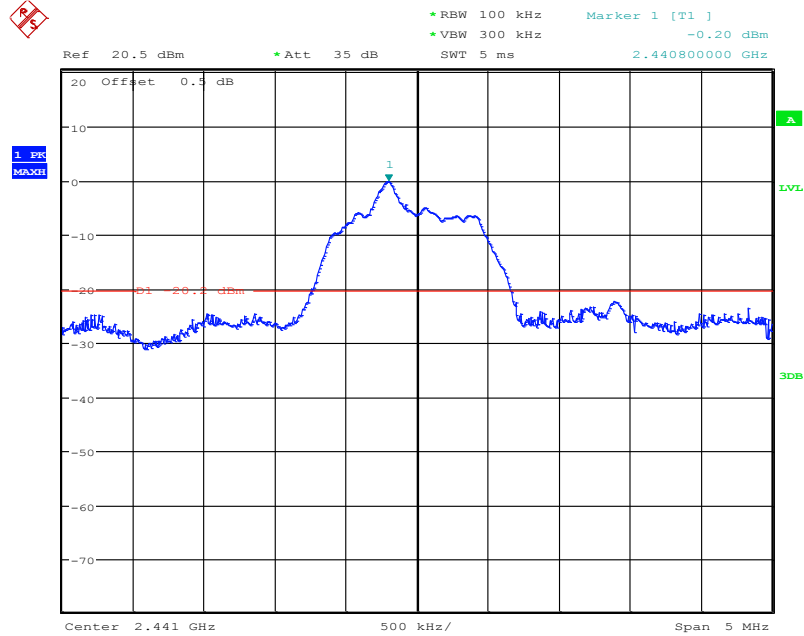


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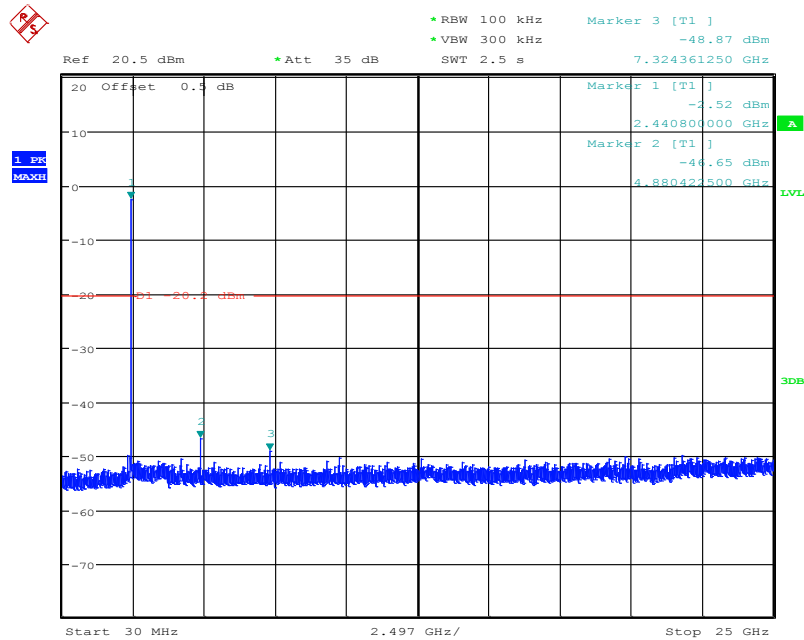


Date: 30.JUL.2016 15:03:20

EDR



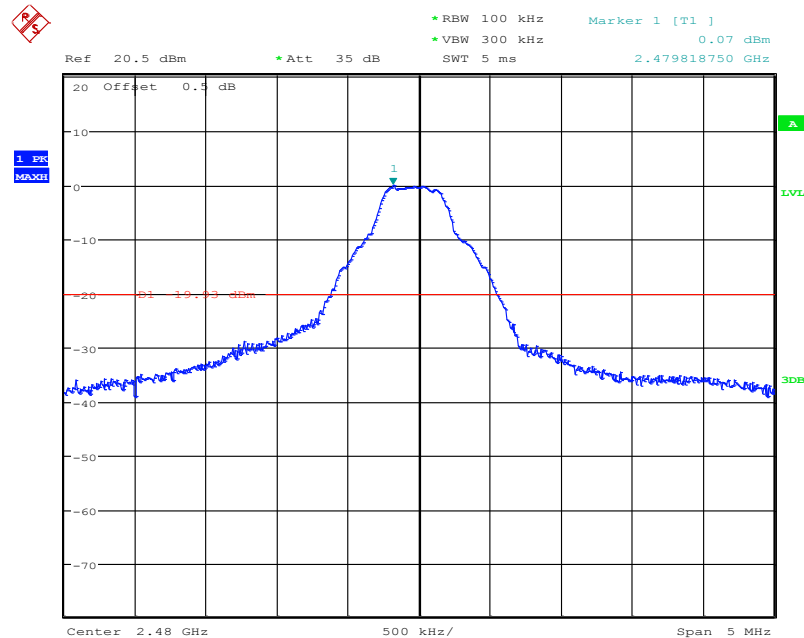
Date: 30.JUL.2016 15:20:16



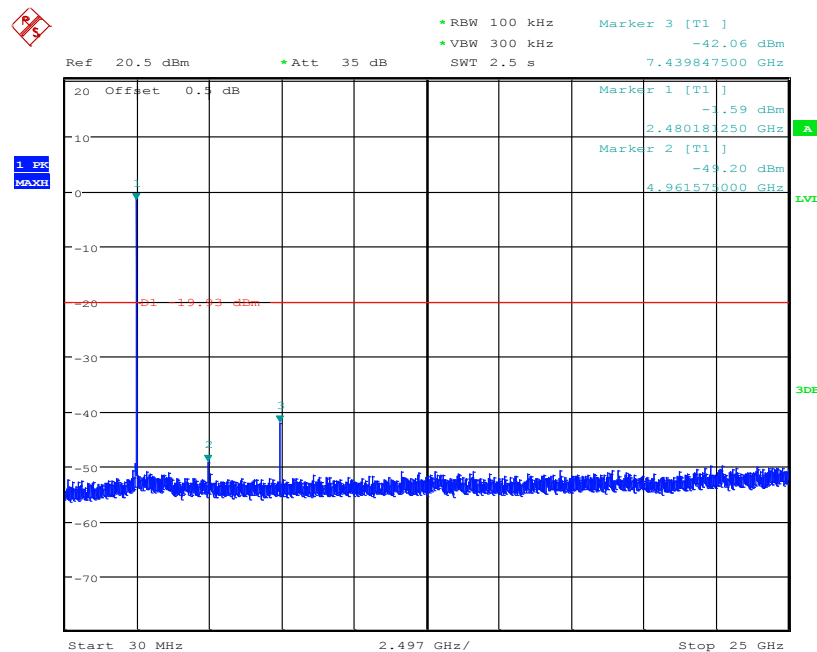
Date: 30.JUL.2016 15:21:39

**Figure 28: Test figure of conducted emissions in 100kHz Bandwidth, Mode A.3**

BDR

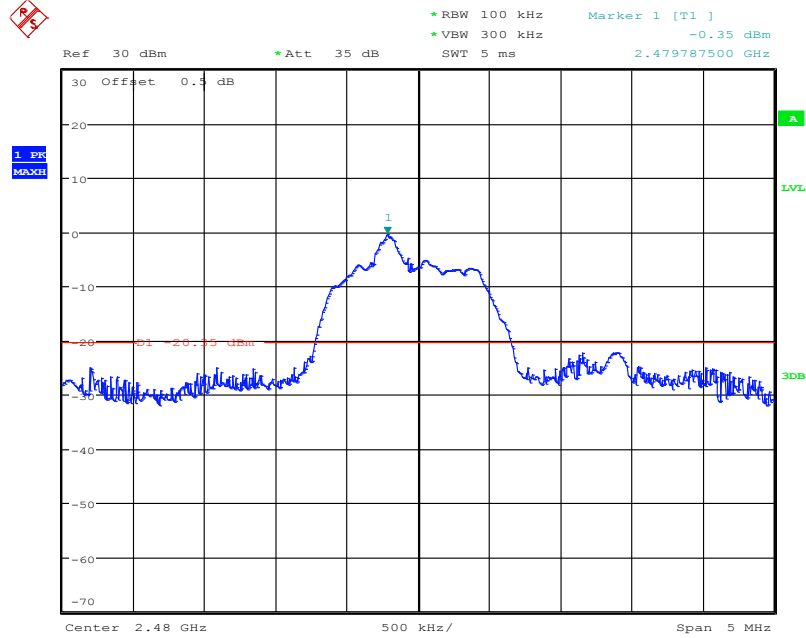


Date: 30.JUL.2016 15:04:28

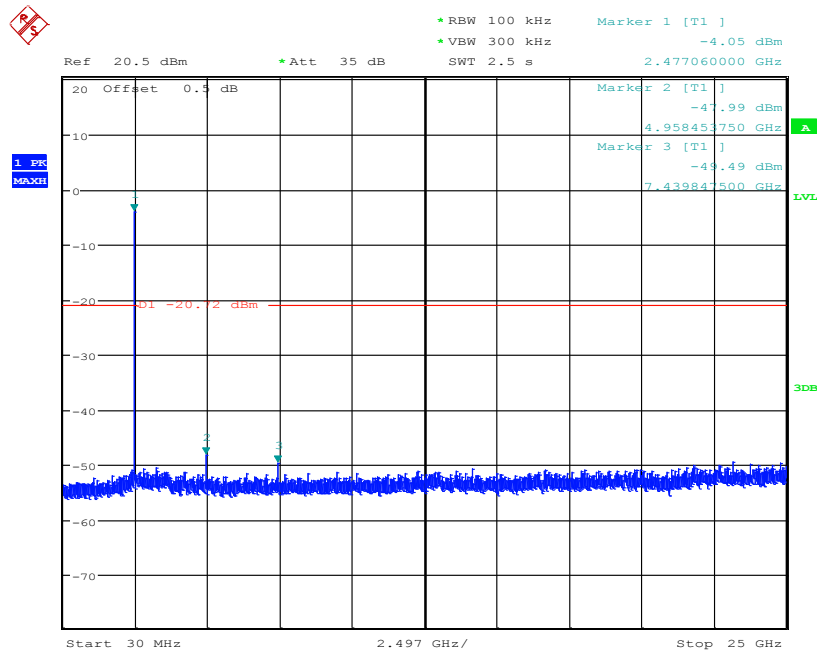


Date: 30.JUL.2016 15:05:47

EDR



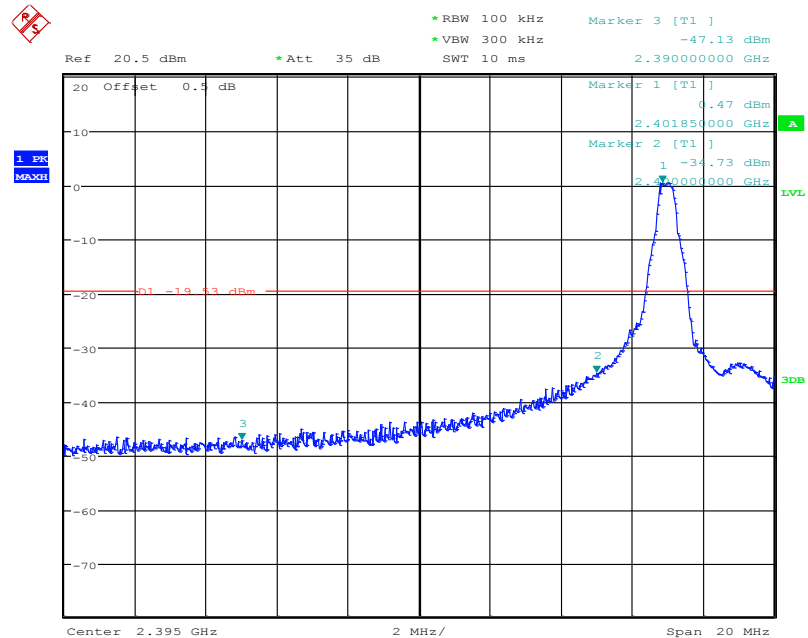
Date: 30.JUL.2016 12:48:36



Date: 30.JUL.2016 15:25:35

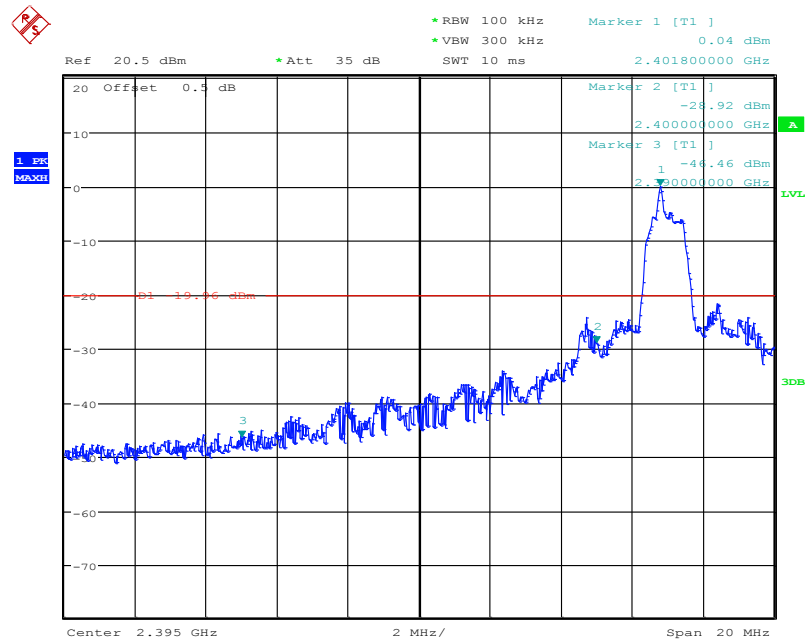
**Figure 29: Test figure of Frequency Band Edge in 100kHz Bandwidth, Mode A.1**

BDR



Date: 30.JUL.2016 15:07:17

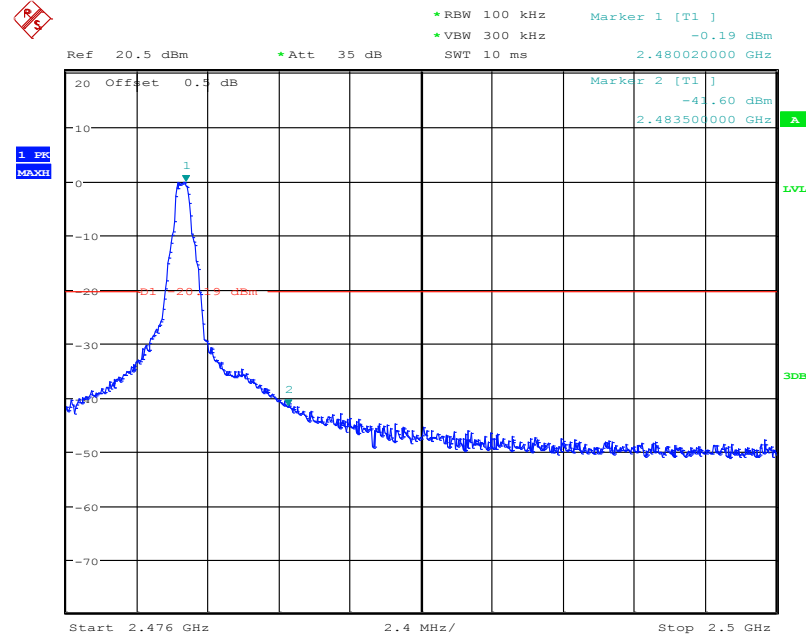
EDR



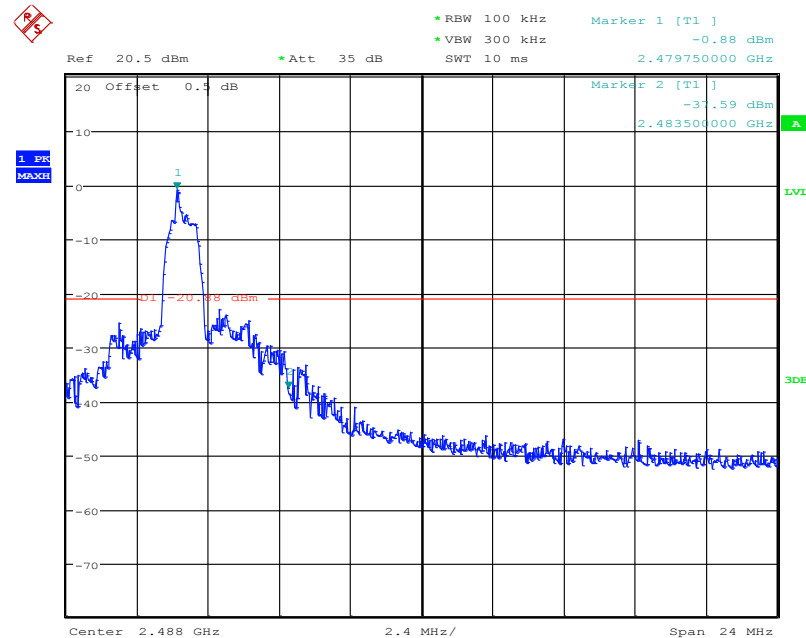
Date: 30.JUL.2016 15:27:54

**Figure 30: Test figure of Frequency Band Edge in 100kHz Bandwidth, Mode A.3**

BDR

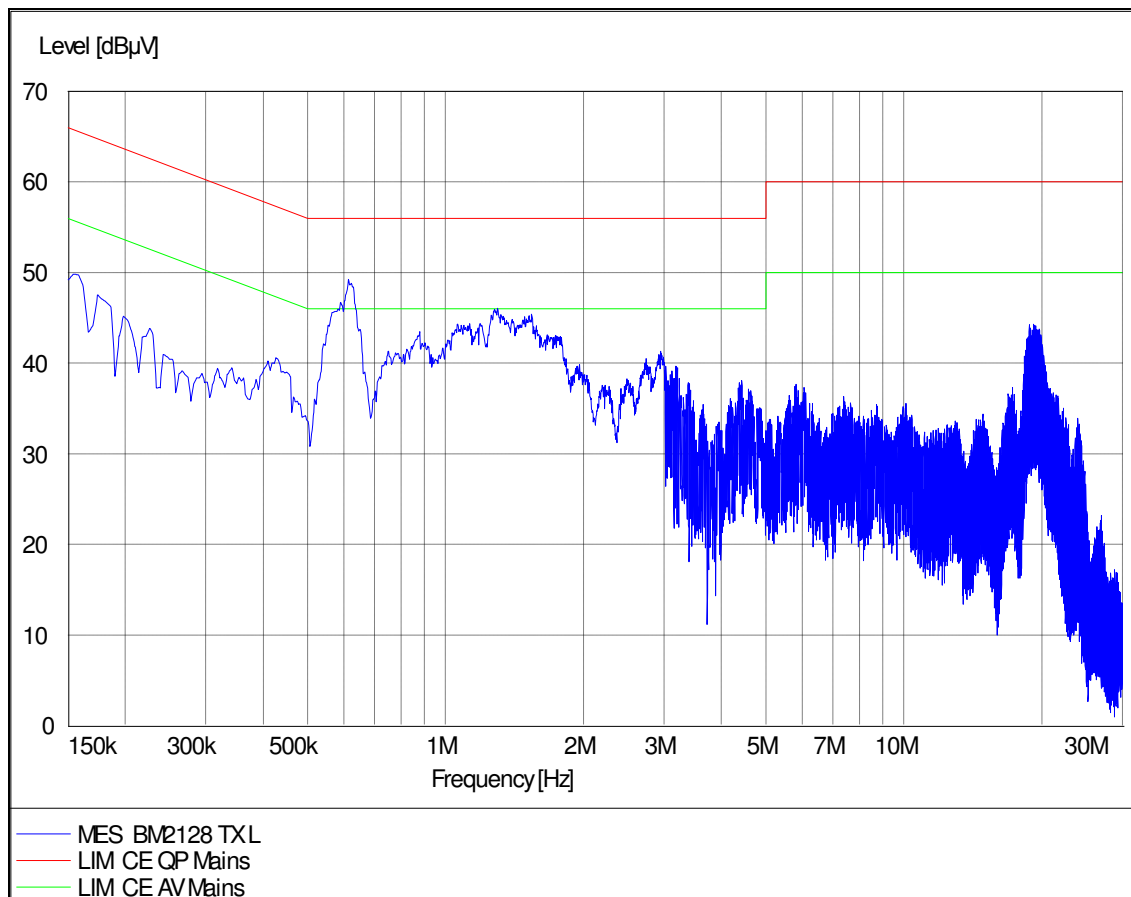


Date: 30.JUL.2016 15:13:11



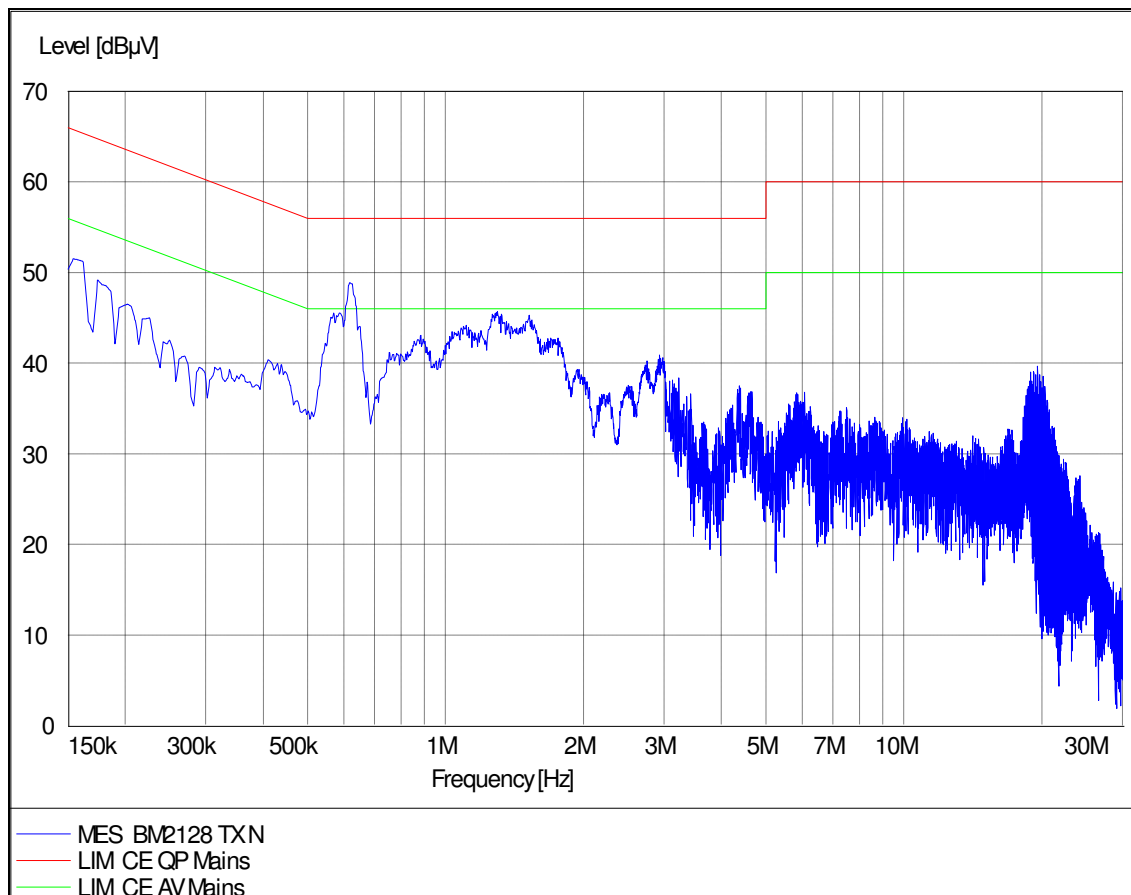
Date: 30.JUL.2016 15:38:50

**Figure 31: Test figure of Conducted emissions, Mode B+D, line live**



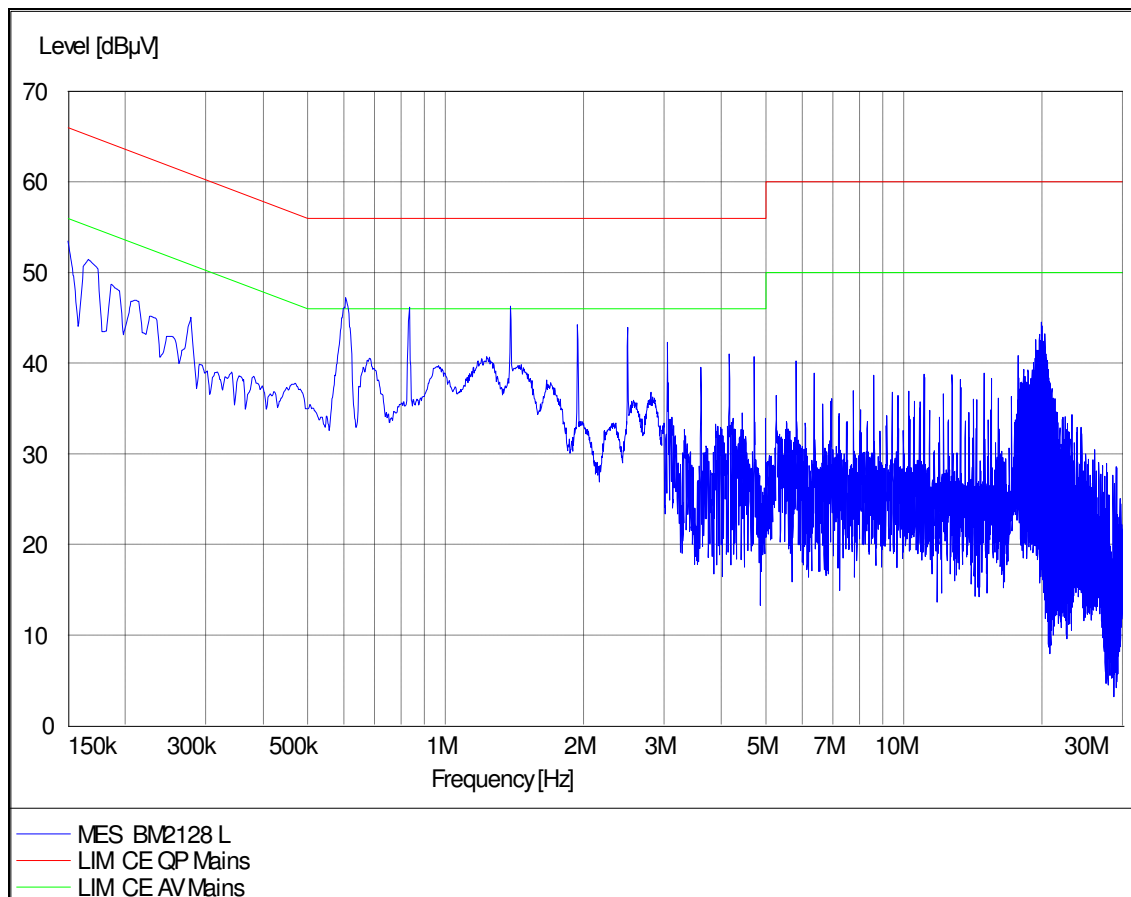
| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Quasi-Peak        |                             |                  | Average           |                             |                  |
|--------------------|------------------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|
|                    |                              | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) |
| 0.618              | 9.8                          | 36.1              | 45.9                        | 56               | 29.2              | 39                          | 46               |
| 0.878              | 9.8                          | 29.4              | 39.2                        | 56               | 22.3              | 32.1                        | 46               |
| 1.074              | 9.8                          | 30.0              | 39.8                        | 56               | 23.7              | 33.5                        | 46               |
| 1.282              | 9.8                          | 30.5              | 40.3                        | 56               | 24.9              | 34.7                        | 46               |
| 1.522              | 9.8                          | 31.4              | 41.2                        | 56               | 25.3              | 35.1                        | 46               |
| 1.742              | 9.8                          | 30.5              | 40.3                        | 56               | 24.4              | 34.2                        | 46               |

**Figure 32: Test figure of Conducted emissions, Mode B+D, line neutral**



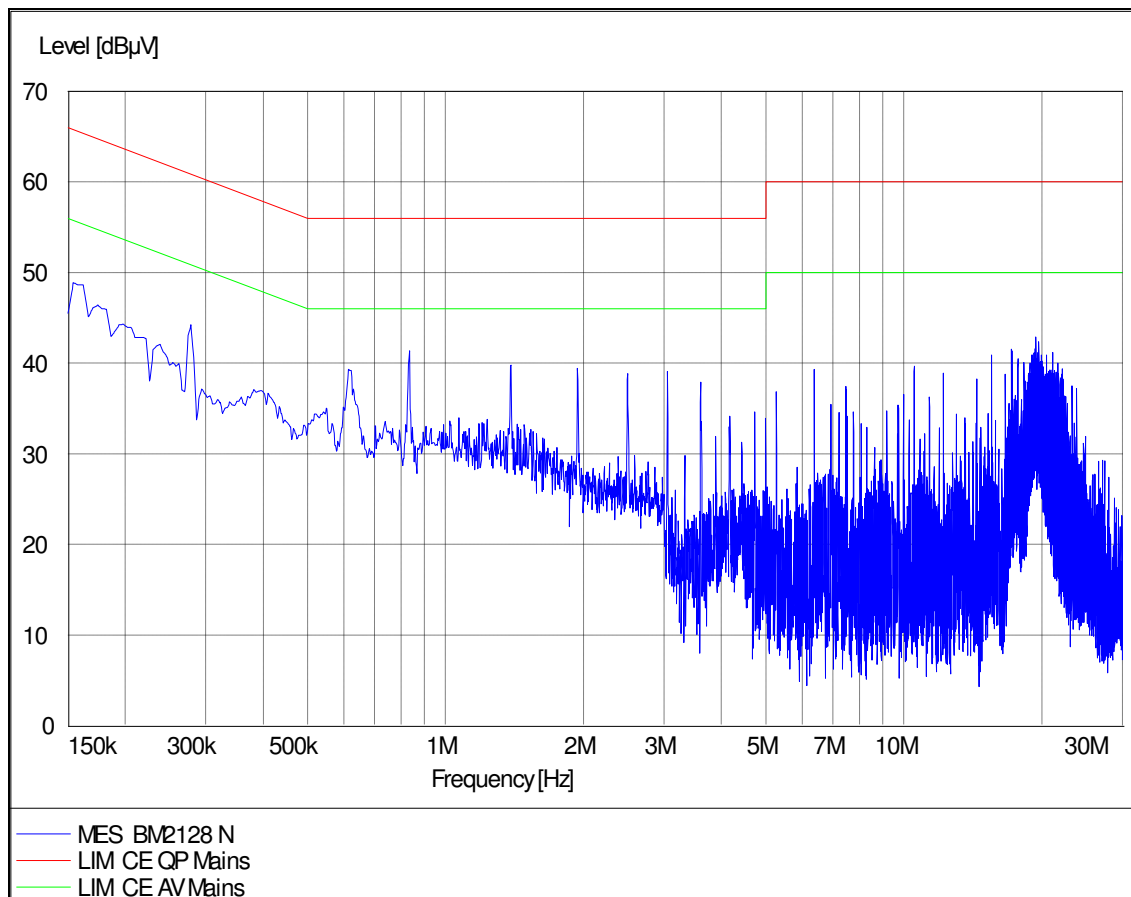
| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Quasi-Peak        |                             |                  | Average           |                             |                  |
|--------------------|------------------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|
|                    |                              | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) |
| 0.574              | 9.8                          | 31.5              | 41.3                        | 56               | 24.8              | 34.6                        | 50.9             |
| 0.622              | 9.8                          | 35.6              | 45.4                        | 56               | 28.6              | 38.4                        | 46               |
| 0.874              | 9.8                          | 29.2              | 39                          | 56               | 22.8              | 32.6                        | 46               |
| 1.098              | 9.8                          | 30.0              | 39.8                        | 56               | 23.6              | 33.4                        | 46               |
| 1.29               | 9.8                          | 31.8              | 41.6                        | 56               | 24.8              | 34.6                        | 46               |
| 1.522              | 9.8                          | 31.2              | 41                          | 56               | 24.2              | 34                          | 46               |

**Figure 33: Test figure of Conducted emissions, Mode C+D, line live**



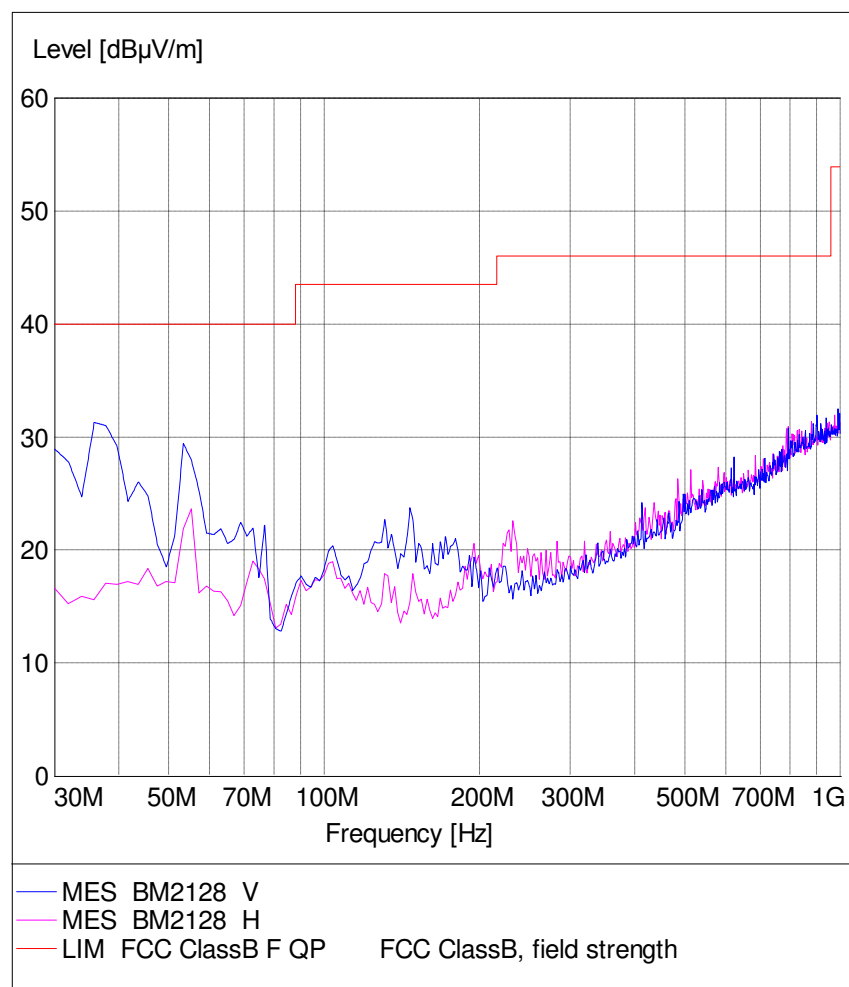
| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Quasi-Peak        |                             |                  | Average           |                             |                  |
|--------------------|------------------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|
|                    |                              | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) |
| 0.606              | 9.8                          | 34.6              | 44.4                        | 56               | 28.2              | 38                          | 46               |
| 0.834              | 9.8                          | 33.5              | 43.3                        | 56               | 26.9              | 36.7                        | 46               |
| 1.386              | 9.8                          | 32.4              | 42.2                        | 56               | 26.9              | 36.7                        | 46               |
| 1.942              | 9.8                          | 31.5              | 41.3                        | 56               | 25.7              | 35.5                        | 46               |
| 2.498              | 9.9                          | 31.1              | 41                          | 56               | 25.7              | 35.6                        | 46               |
| 3.052              | 9.9                          | 30.5              | 40.4                        | 56               | 25.7              | 35.6                        | 46               |

**Figure 34: Test figure of Conducted emissions, Mode C+D, line neutral**



| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Quasi-Peak        |                             |                  | Average           |                             |                  |
|--------------------|------------------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|
|                    |                              | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) | Reading<br>(dBμV) | Emission<br>Level<br>(dBμV) | Limits<br>(dBμV) |
| 0.278              | 9.7                          | 30.4              | 40.1                        | 60.9             | 21.5              | 31.2                        | 50.9             |
| 0.618              | 9.8                          | 22.9              | 32.7                        | 56               | 18.1              | 27.9                        | 46               |
| 0.834              | 9.8                          | 30.4              | 40.2                        | 56               | 21.9              | 31.7                        | 46               |
| 1.386              | 9.8                          | 29.5              | 39.3                        | 56               | 22.3              | 32.1                        | 46               |
| 1.942              | 9.8                          | 28.7              | 38.5                        | 56               | 21.8              | 31.6                        | 46               |
| 2.498              | 9.9                          | 28.8              | 38.7                        | 56               | 21.6              | 31.5                        | 46               |

**Figure 35: Test figure of Radiated emissions, Mode D, below 1GHz, Horizontal & Vertical**



| Frequency (MHz) | Cable Loss +preamp(dB) | Antenna Factor (dB) | Readings (dBμV/m) | Level (dBμV/m) | Polarity (H/V) | Turntable Angle(deg) | Antenna Height(m) | Limits (dBμV/m) | Margin (dB) |
|-----------------|------------------------|---------------------|-------------------|----------------|----------------|----------------------|-------------------|-----------------|-------------|
| 31.728          | 0.6                    | 12.3                | 5.4               | 18.3           | V              | 30                   | 1.0               | 40.0            | 21.7        |
| 37.179          | 0.6                    | 12.3                | 11.9              | 24.8           | V              | 50                   | 1.0               | 40.0            | 15.2        |
| 44.508          | 0.7                    | 13.6                | 5.0               | 19.3           | V              | 350                  | 1.0               | 40.0            | 20.7        |
| 54.347          | 0.8                    | 13.3                | 9.3               | 23.4           | V              | 10                   | 1.0               | 40.0            | 16.6        |
| 70.189          | 0.9                    | 8.7                 | 6.9               | 16.5           | V              | 90                   | 1.0               | 40.0            | 23.5        |
| 147.137         | 1.4                    | 8.2                 | 5.3               | 14.9           | V              | 0                    | 1.0               | 43.5            | 28.6        |
| 44.654          | 0.7                    | 13.6                | 0.8               | 15.1           | H              | 10                   | 2.0               | 40              | 24.9        |
| 55.524          | 0.9                    | 13.0                | 4.5               | 18.4           | H              | 30                   | 2.0               | 40              | 21.6        |
| 73.231          | 1.0                    | 8.7                 | 5.0               | 14.7           | H              | 350                  | 2.0               | 40              | 25.3        |
| 102.724         | 1.1                    | 13.2                | -0.9              | 13.4           | H              | 330                  | 2.0               | 43.5            | 30.1        |
| 194.504         | 1.6                    | 10.6                | 1.9               | 14.1           | H              | 10                   | 2.0               | 43.5            | 29.4        |
| 223.548         | 1.8                    | 11.2                | 2.6               | 15.6           | H              | 290                  | 2.0               | 46              | 30.4        |

**Figure 36: Test figure of Radiated emissions, Mode D, above 1GHz, Horizontal & Vertical**

