

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                            |                                                                             |                                                                     |                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                                           | 50350222 001                                                                               | <b>Auftrags-Nr.:</b><br>Order no.:                                          | 238112392                                                           | Seite 1 von 37<br>Page 1 of 37                                                        |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                                  | N/A                                                                                        | <b>Auftragsdatum:</b><br>Order date:                                        | 6-Feb-2020                                                          |                                                                                       |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                                       | 香港商意法半導體股份有限公司台灣分公司<br>臺北市內湖區瑞湖街 58 號 9、10、11 樓                                            |                                                                             |                                                                     |                                                                                       |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                                  | STM32WB5MMG                                                                                |                                                                             |                                                                     |                                                                                       |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                                           | 32WB5M                                                                                     |                                                                             |                                                                     |                                                                                       |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                                             | NCC LP0002 Test report                                                                     |                                                                             |                                                                     |                                                                                       |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                                          | NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018)<br>Section 3.10.1 |                                                                             |                                                                     |                                                                                       |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                                                 | 19-Feb-2020                                                                                |                                                                             |                                                                     |                                                                                       |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                                            | A001065433-010,<br>A001065433-024                                                          |                                                                             |                                                                     |                                                                                       |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                                               | 21-Feb-2020 - 24-Mar-2020                                                                  |                                                                             |                                                                     |                                                                                       |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                                          | EMC/RF Laboratory Taipei                                                                   |                                                                             |                                                                     |                                                                                       |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                                       | Taipei Testing laboratories                                                                |                                                                             |                                                                     |                                                                                       |
| <b>Prüfresultat:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                                                 | Pass                                                                                       |                                                                             |                                                                     |                                                                                       |
| <b>überprüft von:</b><br>reviewed by:                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                                                                             | <b>genehmigt von:</b><br>authorized by:                             |  |
| <b>Datum:</b> 20-Jun-2020<br>Date: (Report Date)                                                                                                                                                                                                                                                                                                                                                                                                                      | Mars Y.J. Lin                                                                              | <b>Datum:</b> 20-Jun-2020<br>Date:                                          | Brenda S.H. Chen                                                    |                                                                                       |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           | Project Engineer                                                                           | <b>Stellung / Position:</b>                                                 | Project Manager                                                     |                                                                                       |
| <b>Sonstiges / Other:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                            |                                                                             |                                                                     |                                                                                       |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                                       |                                                                                            | Prüfmuster vollständig und unbeschädigt<br>Test item complete and undamaged |                                                                     |                                                                                       |
| * Legende:                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 = sehr gut<br>P(ass) = entspricht o.g. Prüfgrundlage(n)                                  | 2 = gut<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)                  | 3 = befriedigend<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 4 = ausreichend<br>N/A = nicht anwendbar                                              |
| * Legend:                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 = very good<br>P(ass) = passed a.m. test specification(s)                                | 2 = good<br>F(ail) = failed a.m. test specification(s)                      | 3 = satisfactory<br>F(ail) = failed a.m. test specification(s)      | 4 = sufficient<br>N/A = not applicable                                                |
| 5 = mangelhaft<br>N/T = nicht getestet<br>5 = poor<br>N/T = not tested                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |                                                                             |                                                                     |                                                                                       |
| <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></p> <p><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 6dB BANDWIDTH**

RESULT: Passed

### **5.1.4 POWER DENSITY**

RESULT: Passed

### **5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100kHz BANDWIDTH**

RESULT: Passed

### **5.1.6 SPURIOUS EMISSION**

RESULT: Passed

### **5.2.1 MAINS CONDUCTED EMISSIONS**

RESULT: Passed

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## 1. General Remarks

### 1.1 Complementary Materials

The following attachments are integral parts of this test report:

**Appendix P: Photo Documentation internal view**  
(File Name: 50350222 001, 50350224 001 Appendix P)

**Appendix D: Test Result of Radiated Emissions**  
(File Name: 50350222 001 Appendix D)

#### Test Specifications

The following standards were applied.

**Table 1: Applied Standard and Test Levels**

| Radio                                                                                                          |
|----------------------------------------------------------------------------------------------------------------|
| NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018)(107 年 1 月 10 日)<br>ANSI C63.10 (2018) |

### 1.2 Decision Rule of conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard

## 2. Test Sites

### 2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.  
Taipei City 105  
Taiwan (R.O.C.)

### 2.2 Test Facility

AC Mains Conduction:  
11F. No.758, Sec. 4, Bade Rd., Songshan Dist.  
Taipei City 105  
Taiwan (R.O.C.)  
FCC Registration No.: 180491  
IC Canada Registration No.: 9465A

Conducted Test / Radiated Test:  
No. 458-18, Sec 2, Fenliao., Linkou Dist.  
New Taipei City 244  
Taiwan (R.O.C.)  
FCC Registration No.: 226631  
IC Canada Registration No.: 25563

TAF Accredited NCC Test Lab. No.:3567  
TAF ISO17025 Certification effective period: 6<sup>th</sup>-May-2019 to 05<sup>th</sup>-May-2022



Testing Laboratory  
**3567**

## 2.3 List of Test and Measurement Instruments

**Table 2: List of Test and Measurement Equipment**

| <b>Equipment</b>                   | <b>Manufacturer</b>              | <b>Model No.</b>         | <b>Serial No.</b>          | <b>Cal. Date</b> | <b>Cal. Due Date</b> |
|------------------------------------|----------------------------------|--------------------------|----------------------------|------------------|----------------------|
| EMI Test Receiver                  | R&S                              | ESR7                     | 102108                     | 2019/4/17        | 2020/4/16            |
| Spectrum Analyzer                  | R&S                              | FSV40                    | 101508                     | 2019/10/15       | 2020/10/15           |
| Pre-Amplifier                      | Agilent                          | 8447D                    | 2944A10772                 | 2020/2/14        | 2021/2/13            |
| Pre-Amplifier                      | EMCI                             | EMC051845SE              | 980633                     | 2020/2/07        | 2021/2/06            |
| Pre-Amplifier                      | EMCI                             | EMC184045SE              | 980657                     | 2020/2/07        | 2021/2/06            |
| Bilog Antenna                      | SCHWARZBECK                      | VULB-9168                | 00951                      | 2020/1/14        | 2021/1/13            |
| Horn Antenna                       | ETS-Lindgren                     | 3117                     | 00218930                   | 2020/12/27       | 2021/12/26           |
| Horn Antenna                       | SCHWARZBECK                      | BBHA 9170                | 00887                      | 2019/4/12        | 2020/4/11            |
| Loop Antenna                       | EMCI                             | LPA600                   | 287                        | 2019/12/20       | 2020/12/19           |
| Test Software                      | Audix                            | e3                       | Ver. 9                     | N/A              | N/A                  |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>104EA_9k~18G | 800056/4EA                 | 2019/4/18        | 2020/4/17            |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>104_9k~18G   | 804680/4                   | 2019/4/18        | 2020/4/17            |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>104_9k~18G   | MY37202/4                  | 2019/4/18        | 2020/4/17            |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>102EA_1G~40G | 800898/2EA                 | 2019/4/18        | 2020/4/17            |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>102EA_1G~40G | 800901/2EA                 | 2019/4/18        | 2020/4/17            |
| Test Cable                         | HUBER+SUHNER                     | SUCOFLEX<br>102EA_1G~40G | 801027/2EA                 | 2019/4/18        | 2020/4/17            |
| Power Meter                        | Anritsu                          | ML2495A                  | 1901008                    | 2019/4/29        | 2020/4/28            |
| Power Sensor                       | Anritsu                          | MA2411B                  | 1725269                    | 2019/4/29        | 2020/4/28            |
| EMI Test Receiver                  | Rohde & Schwarz                  | ESR 7                    | 101062                     | 2019/10/15       | 2020/10/15           |
| Two-Line V-Network<br>(for EUT)    | Rohde & Schwarz                  | ENV216                   | 101243                     | 2019/06/23       | 2020/06/23           |
| Two-Line V-Network                 | Rohde & Schwarz                  | ENV216                   | 101262                     | 2019/07/16       | 2020/07/16           |
| Telecom ISN 4 Line                 | Fischer Custom<br>Communications | FFCC-TLISN-<br>T4-02-09  | 101168                     | 2020/02/03       | 2021/02/03           |
| Impedance<br>Stabilization Network | TESEQ                            | ISN T800                 | 51949                      | 2020/02/25       | 2021/02/25           |
| Pulse Limiter                      | Rohde & Schwarz                  | ESH3-Z2                  | 0357.8810.54-<br>102102-HN | 2019/07/25       | 2020/07/25           |
| Test Software                      | Audix                            | e3                       | Ver. 9                     | N/A              | N/A                  |

## 2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

## 2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

## 2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements .

**Table 3: Emission Measurement Uncertainty**

| Parameter                            | Uncertainty |
|--------------------------------------|-------------|
| Radio Frequency                      | ± 0.1 ppm   |
| RF power/RF Exposure(MPE), conducted | ± 1.5 dB    |
| RF power density, conducted          | ± 3 dB      |
| spurious emissions, conducted        | ± 3 dB      |
| all emissions, radiated              | ± 6 dB      |
| Temperature                          | ± 1 °C      |
| Humidity                             | ± 5 %       |
| DC and low frequency voltages        | ±3 %        |

## 3. General Product Information

### 3.1 Product Function and Intended Use

The EUT is a STM32WB5MMG. It contains a Bluetooth compatible chip enabling the user to communicate data through a Wireless interface.  
For details refer to the User Guide, Data Sheet and Circuit Diagram.

### 3.2 System Details and Ratings

**Table 4: Basic Information of EUT**

| Item                        | EUT information        |
|-----------------------------|------------------------|
| Kind of Equipment/Test Item | STM32WB5MMG            |
| Type Identification         | 32WB5M                 |
| Brand Name                  | STMicroelectronics SAS |

**Table 5: Technical Specification of EUT**

| Technical Specification | Value          |
|-------------------------|----------------|
| Operating Frequencies   | 2402- 2480 MHz |
| Channel Spacing         | 2 MHz          |
| Channel number          | 40             |
| Operation Voltage       | 3.3Vdc         |
| Modulation              | GFSK           |
| Antenna gain            | 2.0dBi         |

### **3.3 Independent Operation Modes**

Basic operation modes are:

- A. Transmitting
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- B. Receiving
- C. Standby
- D. Off

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

Refer to the Circuit Diagram.

### **3.5 Submitted Documents**

- Circuit Diagram
- Instruction Manual
- 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.

**Table 6: Table for Parameters of Test Software Setting**

| Mode   | Channel Frequency |          |          |
|--------|-------------------|----------|----------|
|        | 2402 MHz          | 2440 MHz | 2480 MHz |
| BLE 1M | 6                 | 6        | 6        |
| BLE 2M | 6                 | 6        | 6        |

### 4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:

Conducted: A001065433-010

Radiated: A001065433-024

Full test was applied on all test modes, but only worst case was shown

|               |                              |
|---------------|------------------------------|
| Test Software | setupSTM32CubeMonitor-RF.exe |
|---------------|------------------------------|

### 4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

#### Support Unit

| Item No. | Equipments | Manufacturer | Model No. | Serial No. | Spec.        |
|----------|------------|--------------|-----------|------------|--------------|
| 1        | Notebook   | HP           | RTL8821CE | CND9111MY2 | N/A          |
| 2        | Adapter    | HP           | TP-LA16   | N/A        | N/A          |
| A        | USB Cable  | N/A          | N/A       | N/A        | Length: 150m |
| B        | USB Cable  | N/A          | N/A       | N/A        | Length: 200m |

### 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

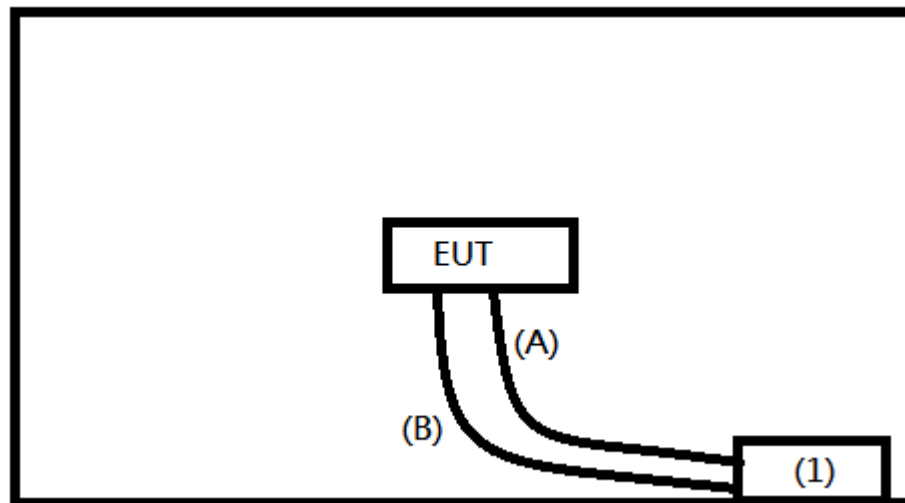


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

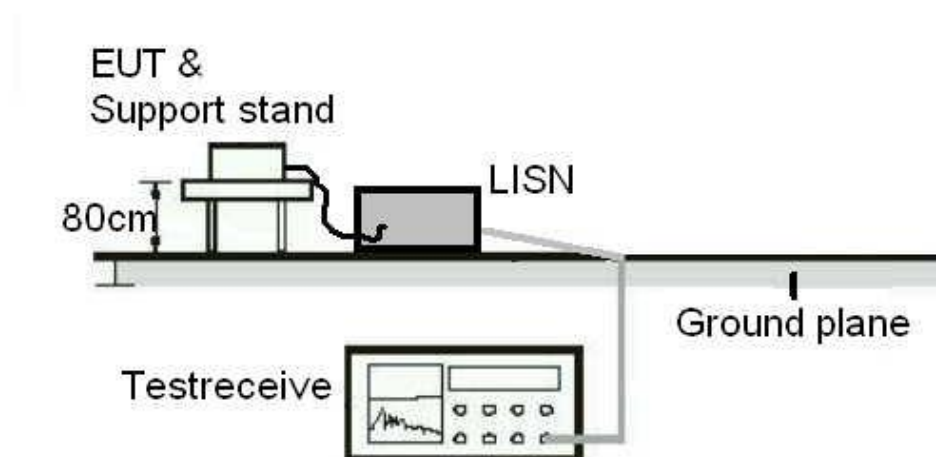
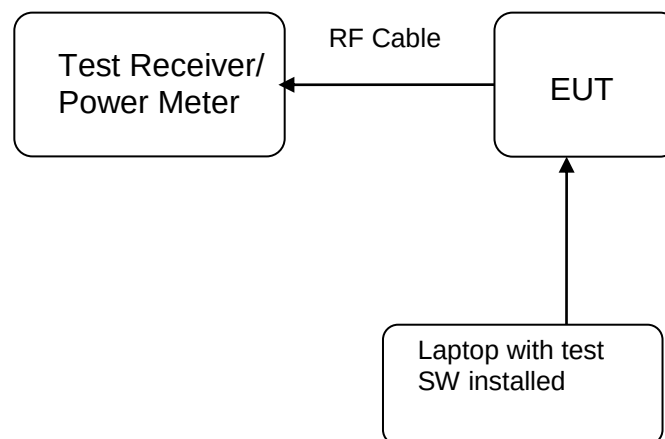


**Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement**

## 5. Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**RESULT:****Passed**

Test standard : LP0002(2018): 2.2, 3.10.1.3

Requirement : use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 2.0dBi. The antenna is a chip antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

## 5.1.2 Peak Output Power

### RESULT:

**Passed**

Test standard : LP0002(2018): 3.10.1.2 (1)(C)  
 Basic standard : LP0002(2018)  
 Limit : 1 Watt  
 Kind of test site : Shielded room

### Test setup

Test Channel : Low/ Middle/ High  
 Operation Mode : A  
  
 Ambient temperature : 20-24 °C  
 Relative humidity : 50-65 %  
 Atmospheric pressure : 100-103 kPa

**Table 7: Test result of Peak Output Power, BLE 1M**

| Channel        | Channel Frequency (MHz) | Output Power |         | Average Output Power | Limit |
|----------------|-------------------------|--------------|---------|----------------------|-------|
|                |                         | (dBm)        | (W)     | (W)                  | (W)   |
| Low Channel    | 2402                    | 3.90         | 0.00245 | 0.00244              | 1     |
| Middle Channel | 2440                    | 3.83         | 0.00242 | 0.00239              | 1     |
| High Channel   | 2480                    | 3.72         | 0.00236 | 0.00234              | 1     |

Pmax: 2.4547 mW

**Table 8: Test result of Peak Output Power, BLE 2M**

| Channel        | Channel Frequency (MHz) | Output Power |         | Average Output Power | Limit |
|----------------|-------------------------|--------------|---------|----------------------|-------|
|                |                         | (dBm)        | (W)     | (W)                  | (W)   |
| Low Channel    | 2402                    | 3.89         | 0.00245 | 0.00243              | 1     |
| Middle Channel | 2440                    | 3.82         | 0.00241 | 0.00238              | 1     |
| High Channel   | 2480                    | 3.70         | 0.00234 | 0.00232              | 1     |

Pmax: 2.4491 mW

### 5.1.3 6dB Bandwidth

**RESULT:**
**Passed**

Test standard : LP0002(2018): 3.10.1.6 (2)(A)  
 Basic standard : LP0002(2018)  
 Kind of test site : Shielded room

**Test setup**

Test Channel : Low/ Middle/ High  
 Operation Mode : A

Ambient temperature : 20-24°C  
 Relative humidity : 50-65%  
 Atmospheric pressure : 100-103 kPa

**Table 9: Test result of 6dB Bandwidth, BLE 1M**

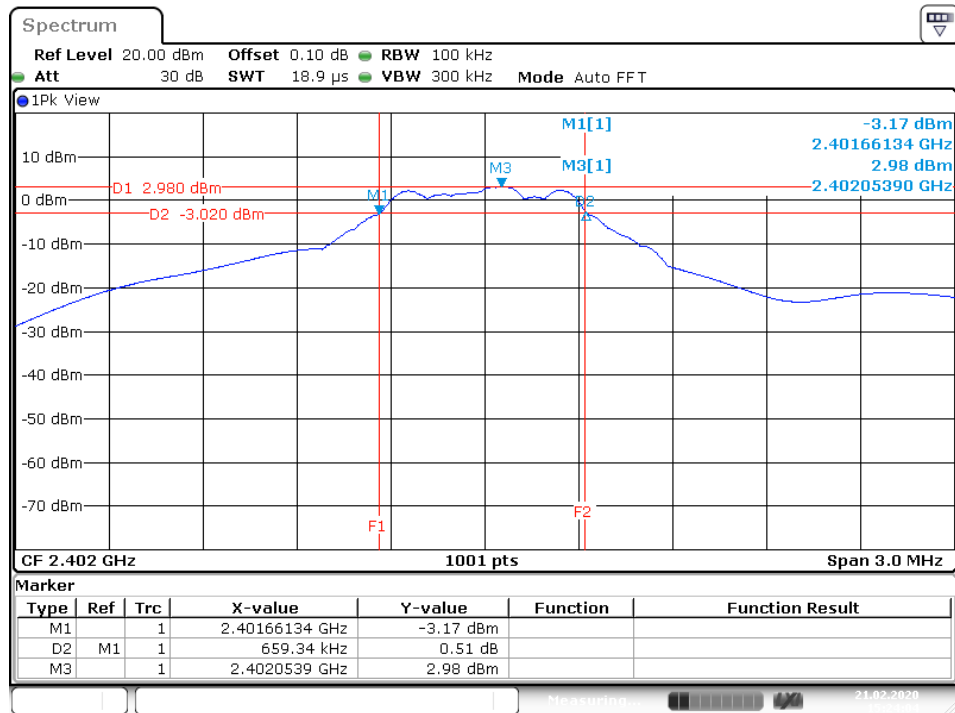
| Channel      | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | Limit (kHz) | Result |
|--------------|-------------------------|---------------------|-------------|--------|
| Low Channel  | 2402                    | 659.34              | >500        | Pass   |
| Mid Channel  | 2440                    | 659.34              | >500        | Pass   |
| High Channel | 2480                    | 662.34              | >500        | Pass   |

**Table 10: Test result of 6dB Bandwidth, BLE 2M**

| Channel      | Channel Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (kHz) | Result |
|--------------|-------------------------|---------------------|-------------|--------|
| Low Channel  | 2402                    | 1.118               | >500        | Pass   |
| Mid Channel  | 2440                    | 1.108               | >500        | Pass   |
| High Channel | 2480                    | 1.118               | >500        | Pass   |

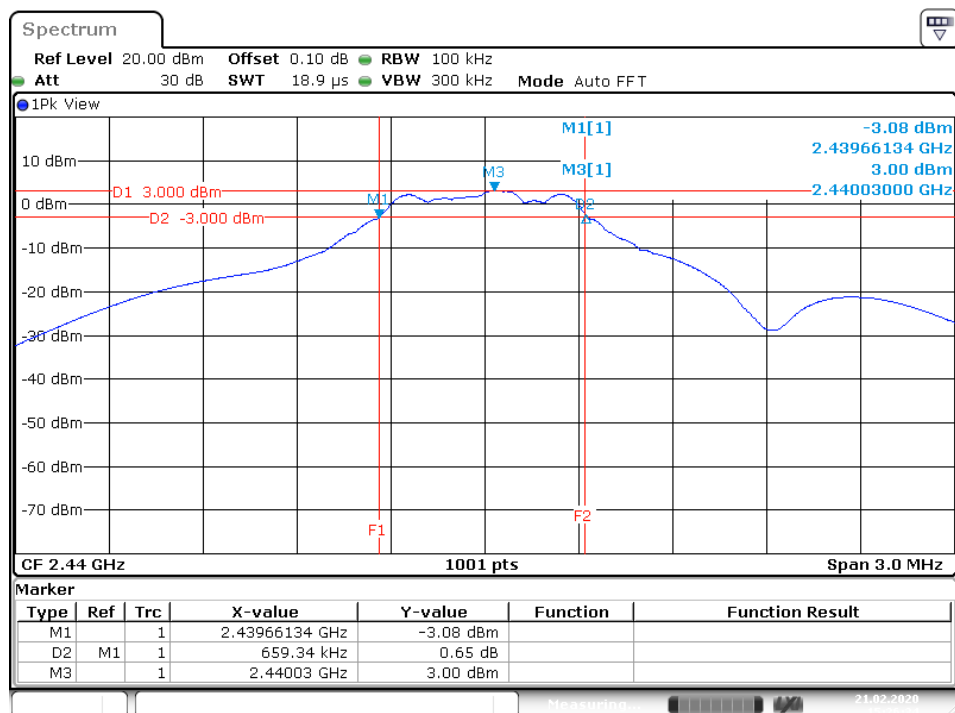
## Test Plot of 6dB Bandwidth, BLE 1M

### Low Channel



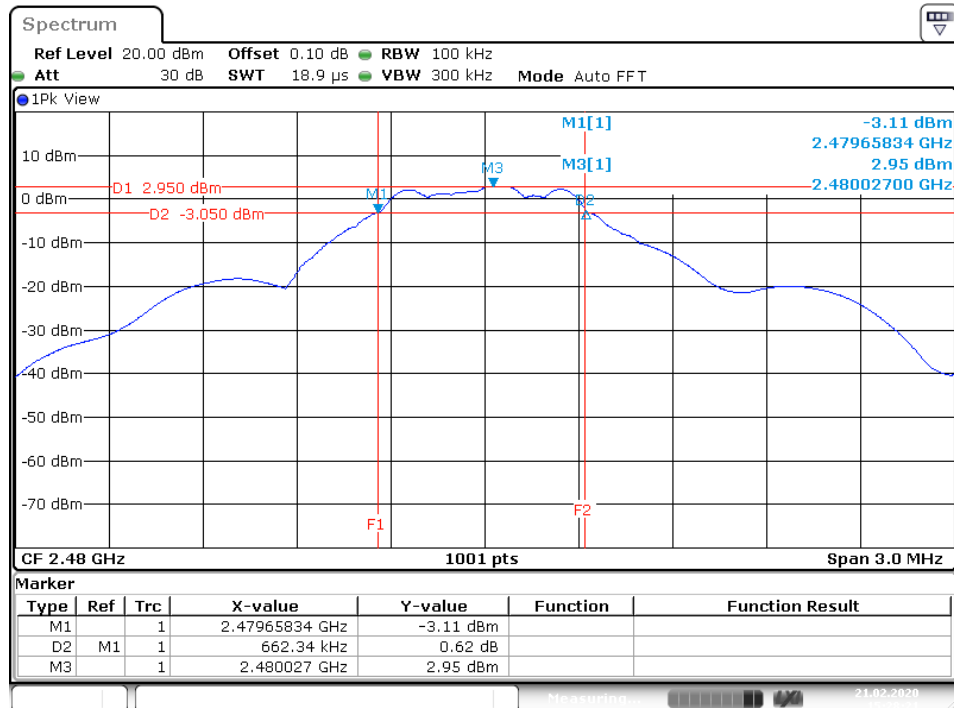
Date: 21.FEB.2020 15:24:04

### Middle Channel



Date: 21.FEB.2020 15:26:34

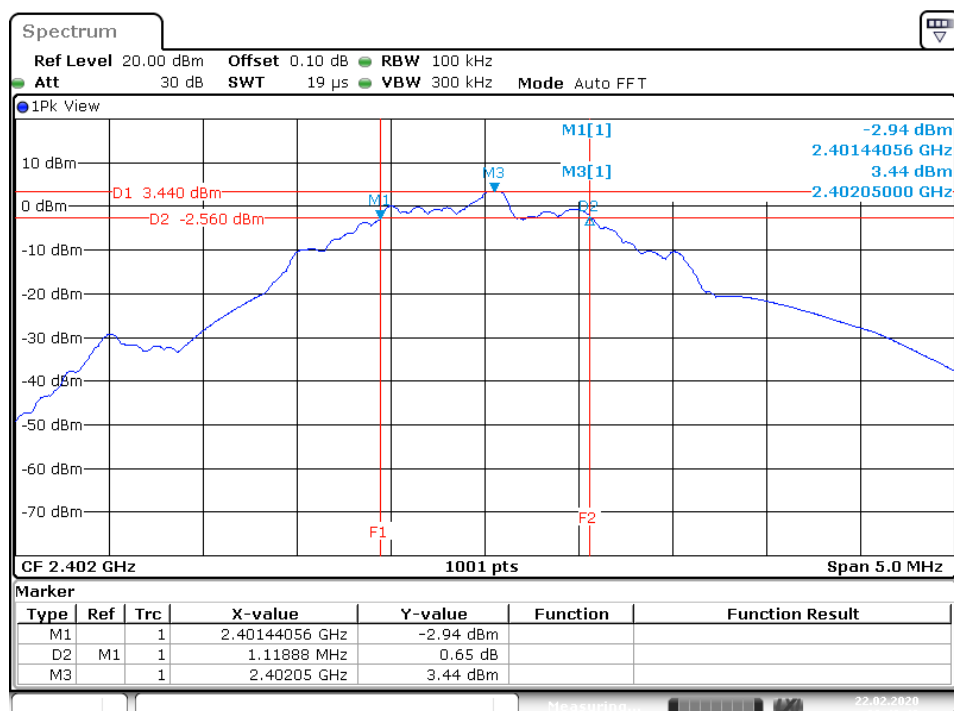
## High Channel



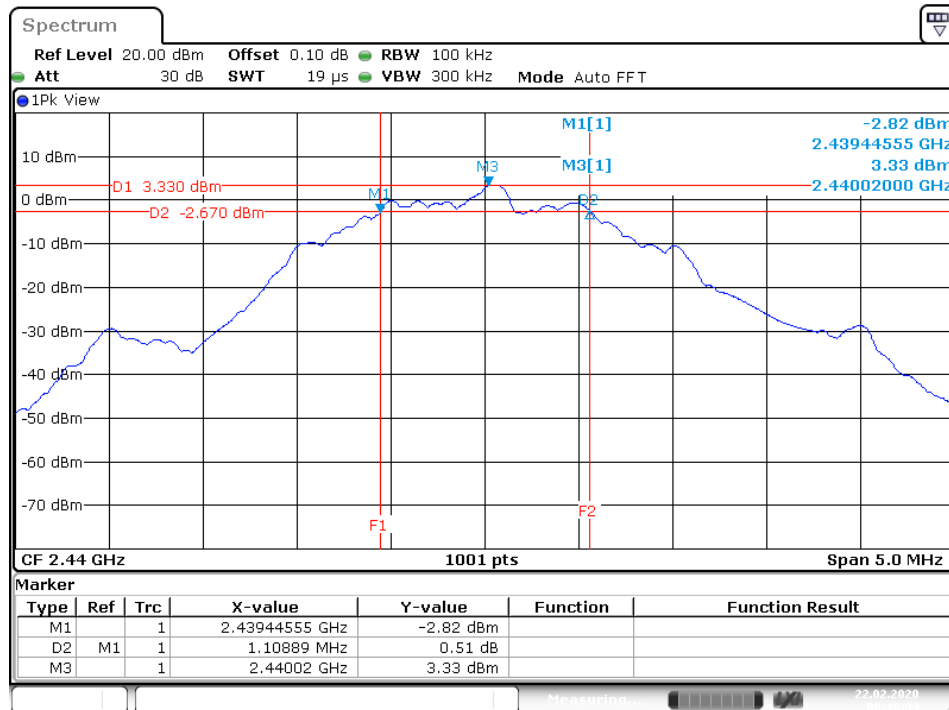
Date: 21.FEB.2020 15:28:21

## Test Plot of 6dB Bandwidth, BLE 2M

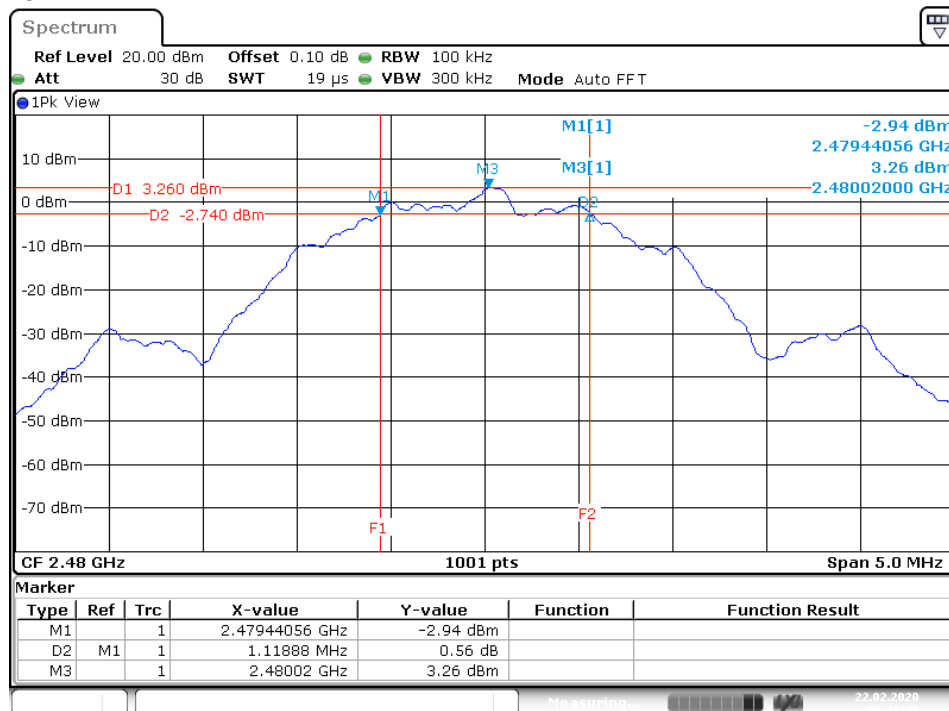
### Low Channel



Date: 22.FEB.2020 08:42:49

**Middle Channel**


Date: 22.FEB.2020 08:46:35

**High Channel**


Date: 22.FEB.2020 08:48:46

## 5.1.4 Power Density

### RESULT:

**Passed**

Test standard : LP0002(2018): 3.10.1.6 (2)(B)  
 Basic standard : LP0002(2018)  
 Kind of test site : Shielded room

### Test setup

Test Channel : Low/ Middle/ High  
 Operation Mode : A  
 Ambient temperature : 20-24°C  
 Relative humidity : 50-65%  
 Atmospheric pressure : 100-103 kPa

**Table 11: Test result of Power Density, BLE 1M**

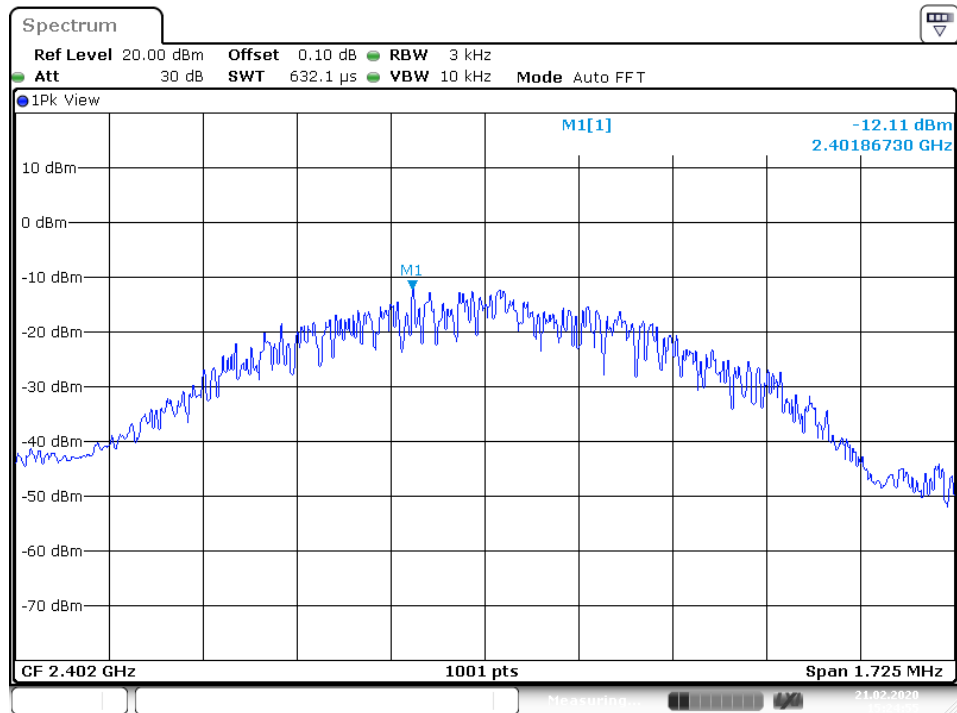
| Channel        | Channel Frequency (MHz) | Power Density | Limit |
|----------------|-------------------------|---------------|-------|
|                |                         | (dBm)         | (dBm) |
| Low Channel    | 2402                    | -12.11        | 8     |
| Middle Channel | 2440                    | -12.16        | 8     |
| High Channel   | 2480                    | -12.19        | 8     |

**Table 12: Test result of Power Density, BLE 2M**

| Channel        | Channel Frequency (MHz) | Power Density | Limit |
|----------------|-------------------------|---------------|-------|
|                |                         | (dBm)         | (dBm) |
| Low Channel    | 2402                    | -11.84        | 8     |
| Middle Channel | 2440                    | -11.86        | 8     |
| High Channel   | 2480                    | -11.95        | 8     |

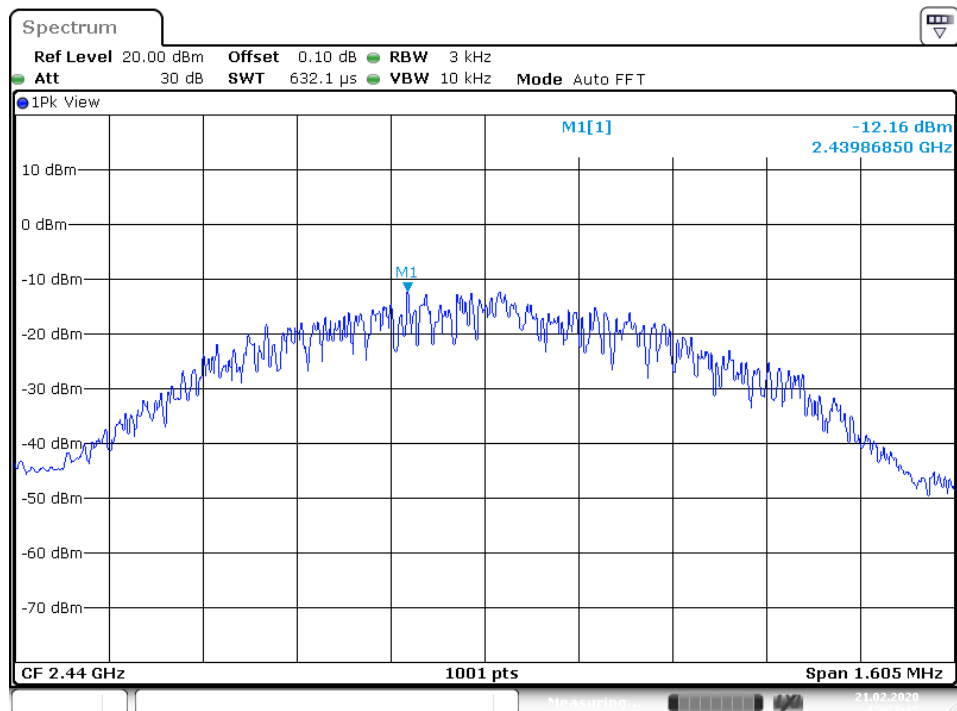
## Test Plot of Power Density, BLE 1M

### Low Channel



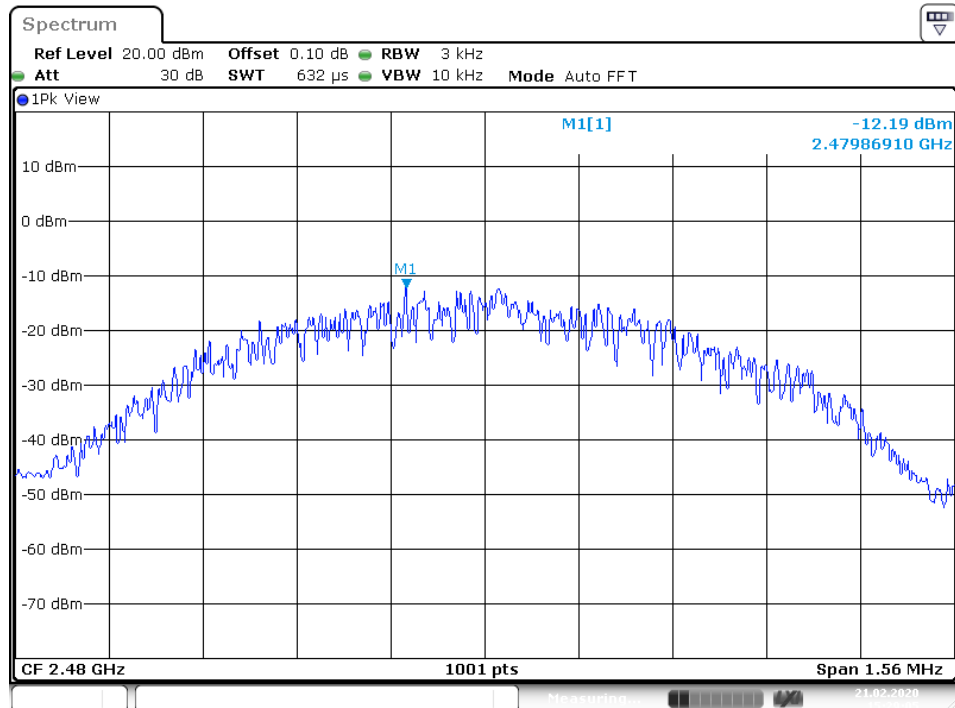
Date: 21.FEB.2020 15:24:55

### Middle Channel



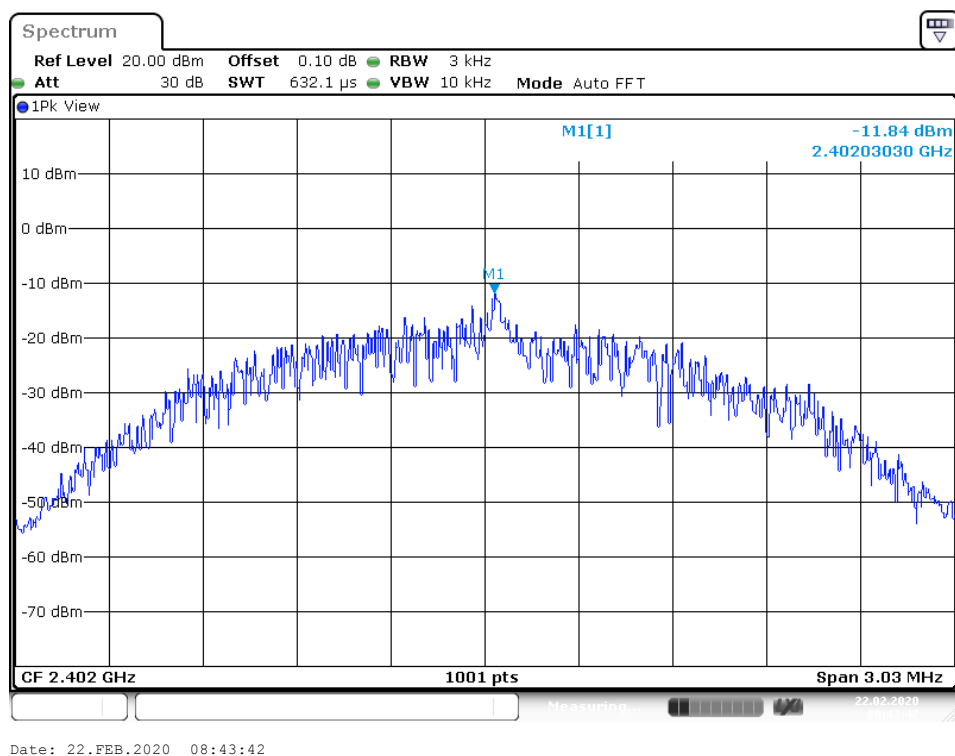
Date: 21.FEB.2020 15:27:15

### High Channel

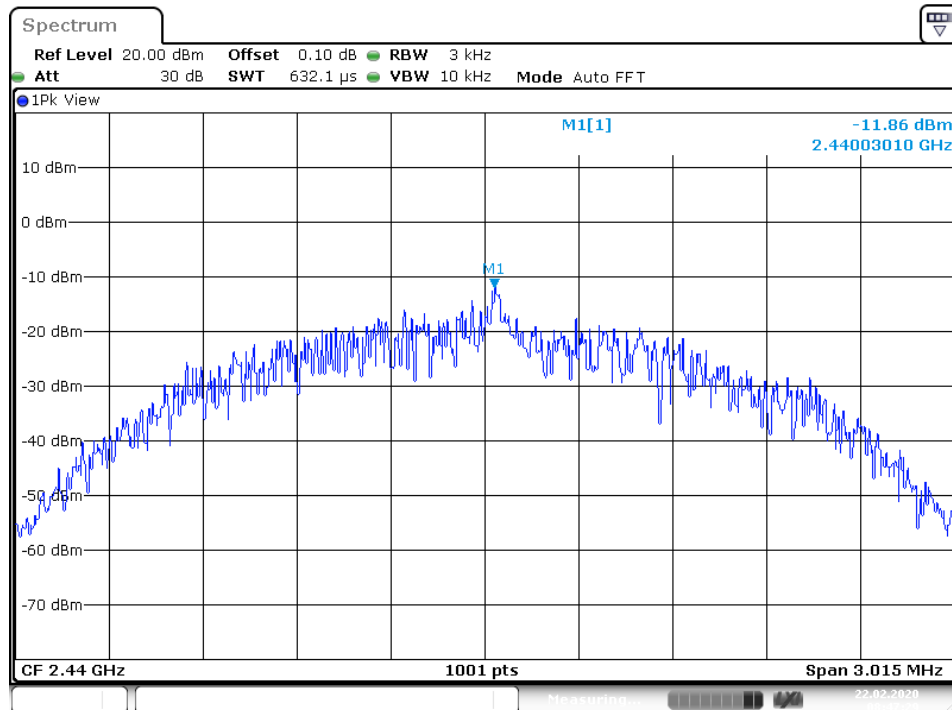


### Test Plot of Power Density, BLE 2M

#### Low Channel

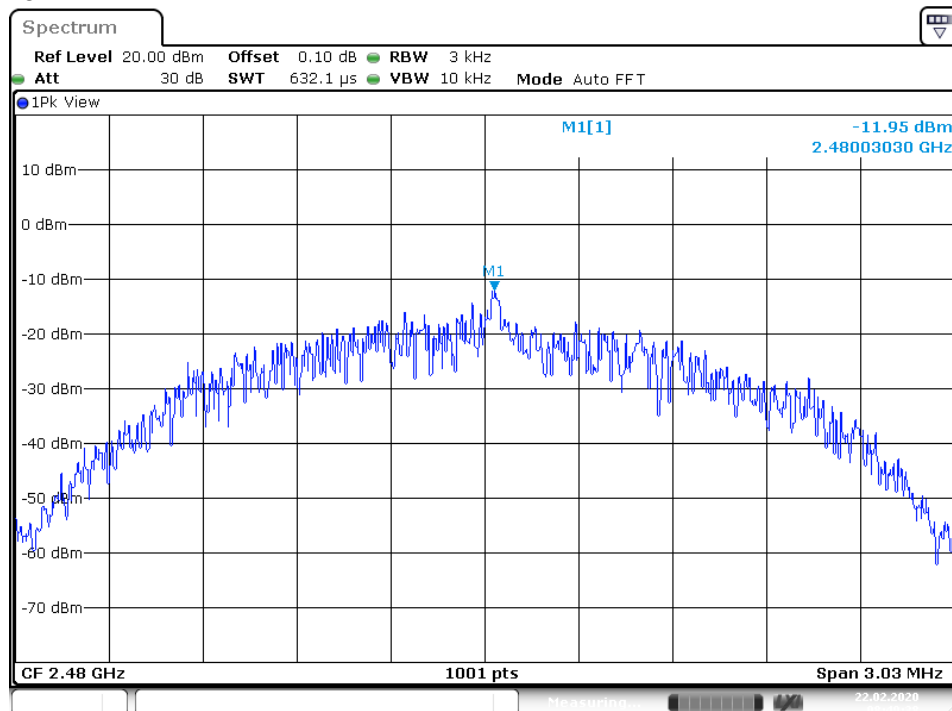


### Middle Channel



Date: 22.FEB.2020 08:47:30

### High Channel



Date: 22.FEB.2020 08:49:38

### 5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

**RESULT:****Passed**

|                   |   |                                                                                                                |
|-------------------|---|----------------------------------------------------------------------------------------------------------------|
| Test standard     | : | LP0002(2018): 3.10.1.5                                                                                         |
| Basic standard    | : | LP0002(2018)                                                                                                   |
| Limit             | : | 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power) |
| Kind of test site | : | Shielded room                                                                                                  |

**Test setup**

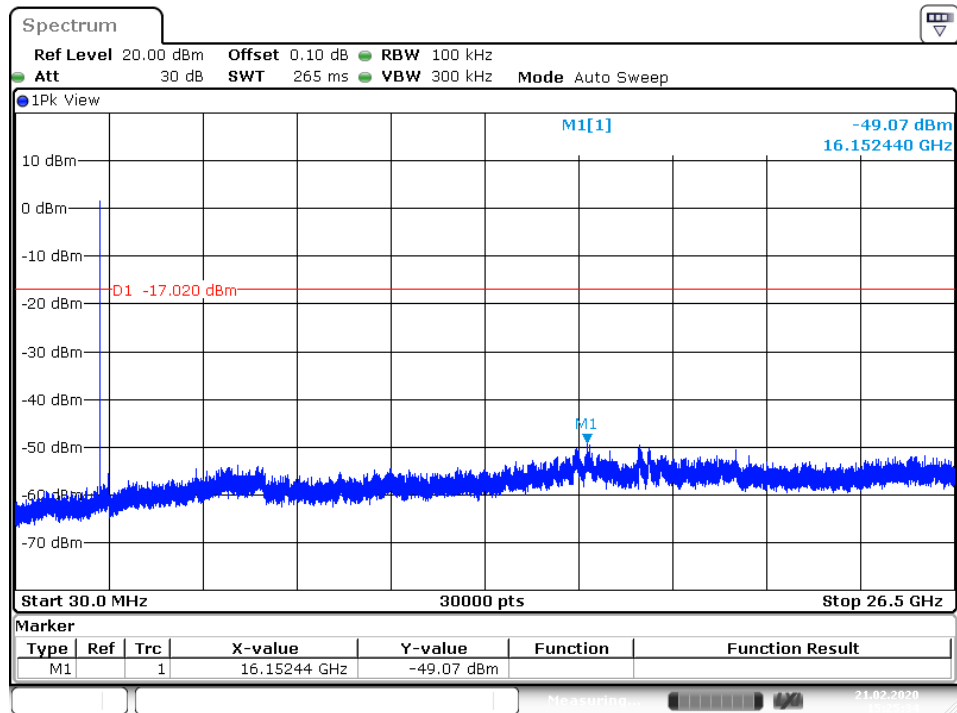
|                      |   |                                                                                         |
|----------------------|---|-----------------------------------------------------------------------------------------|
| Test Channel         | : | Low/ Middle/ High for Conducted Spurious Emissions<br>Low/ High for Frequency Band Edge |
| Operation Mode       | : | A                                                                                       |
| Ambient temperature  | : | 20-24°C                                                                                 |
| Relative humidity    | : | 50-65%                                                                                  |
| Atmospheric pressure | : | 100-103 kPa                                                                             |

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

Due to the small size of the RF circuit and that there are no inductive components of significant size connected to the antenna port, 9kHz to 30MHz frequency range is not tested based on technical judgment.

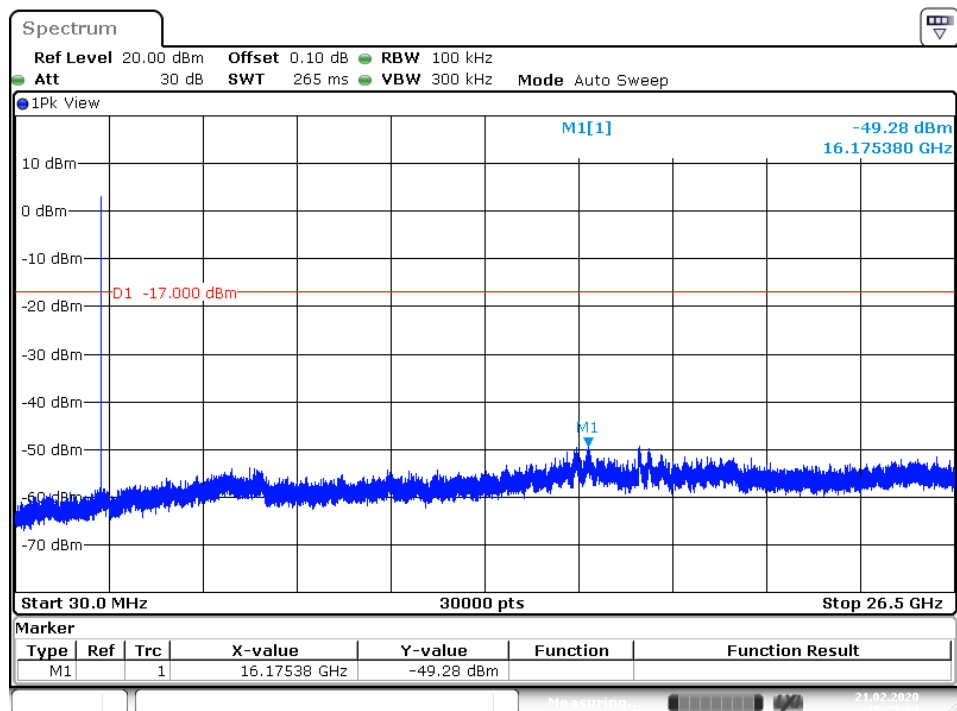
## Test Plot 100kHz Conducted Emissions, BLE 1M

### Low Channel

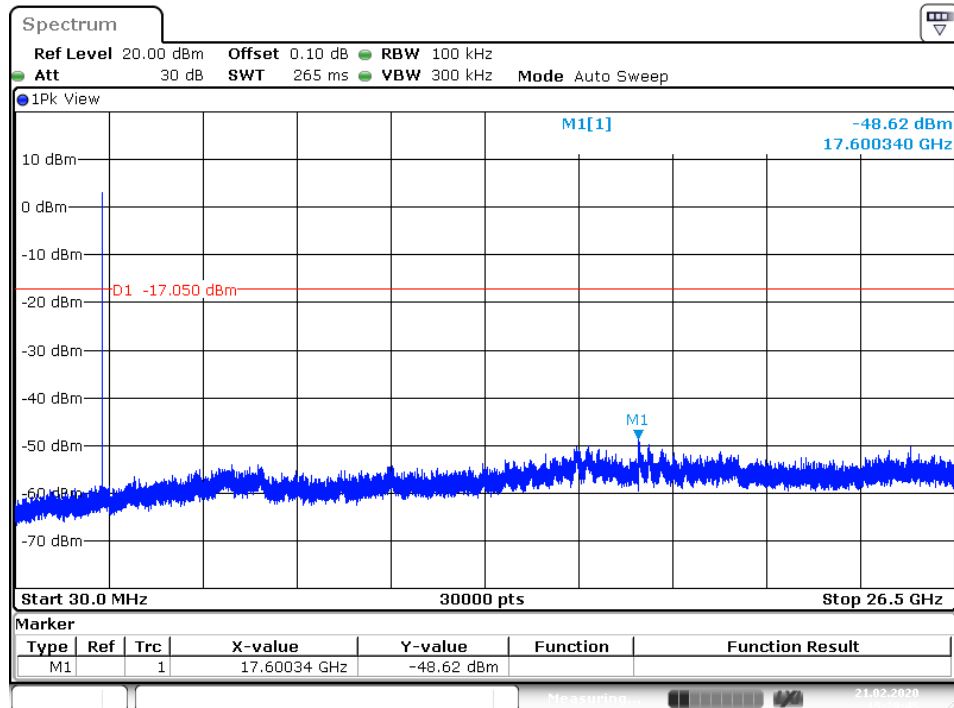


Date: 21.FEB.2020 15:25:34

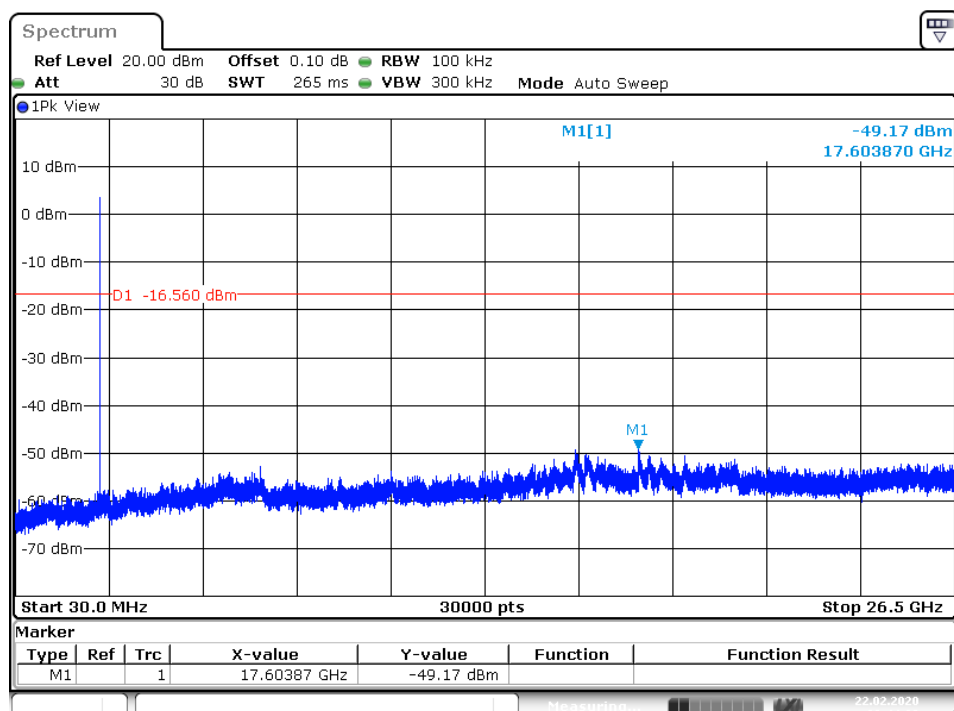
### Middle Channel



Date: 21.FEB.2020 15:27:34

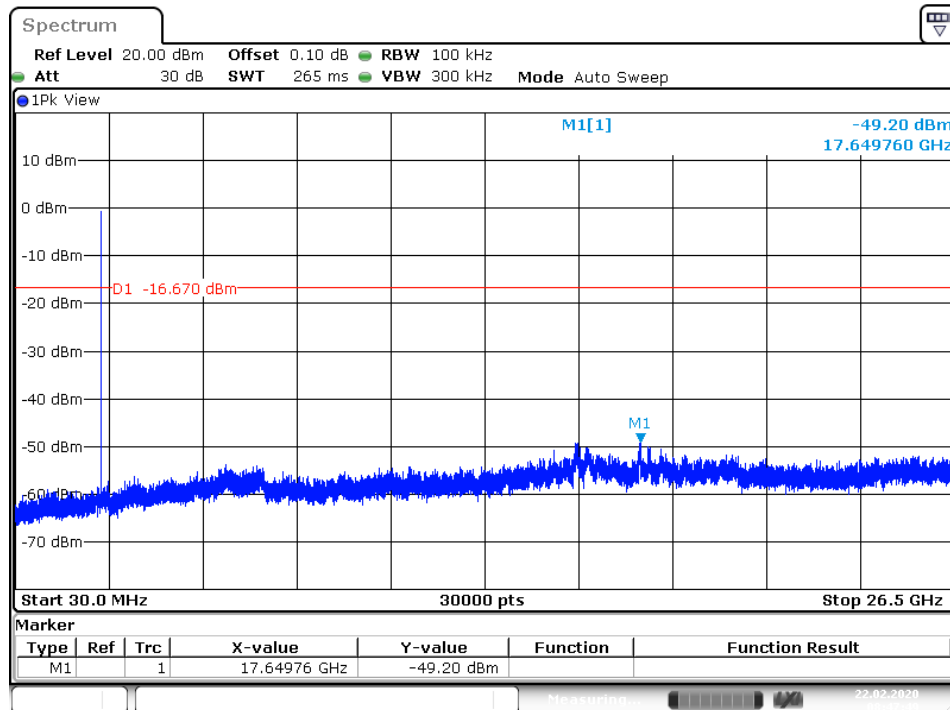
**High Channel**


Date: 21.FEB.2020 15:29:45

**Test Plot 100kHz Conducted Emissions, BLE 2M**
**Low Channel**


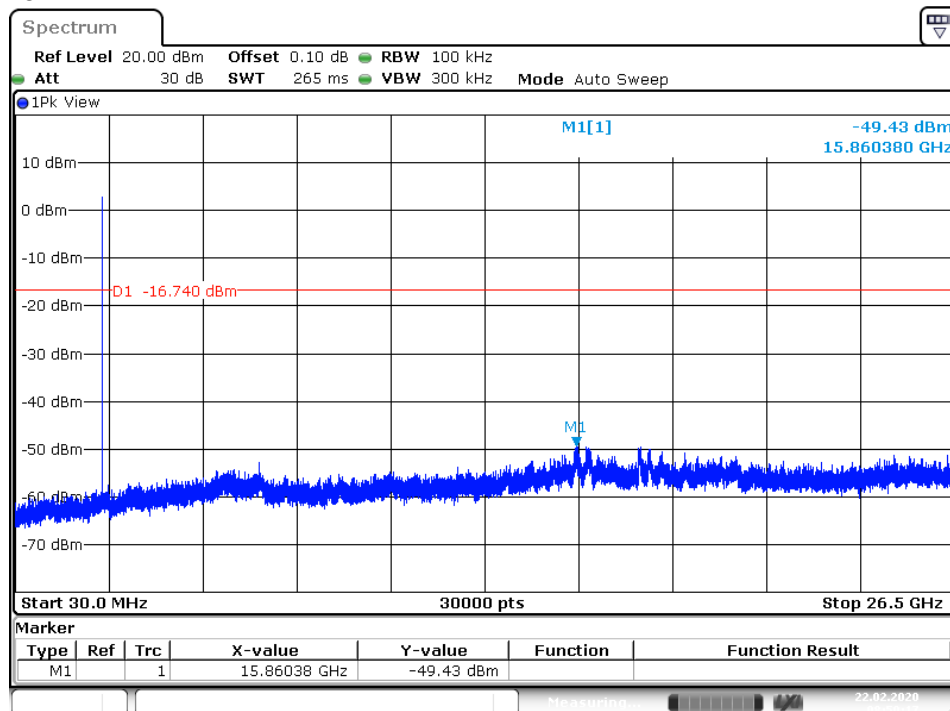
Date: 22.FEB.2020 08:44:29

### Middle Channel



Date: 22.FEB.2020 08:47:49

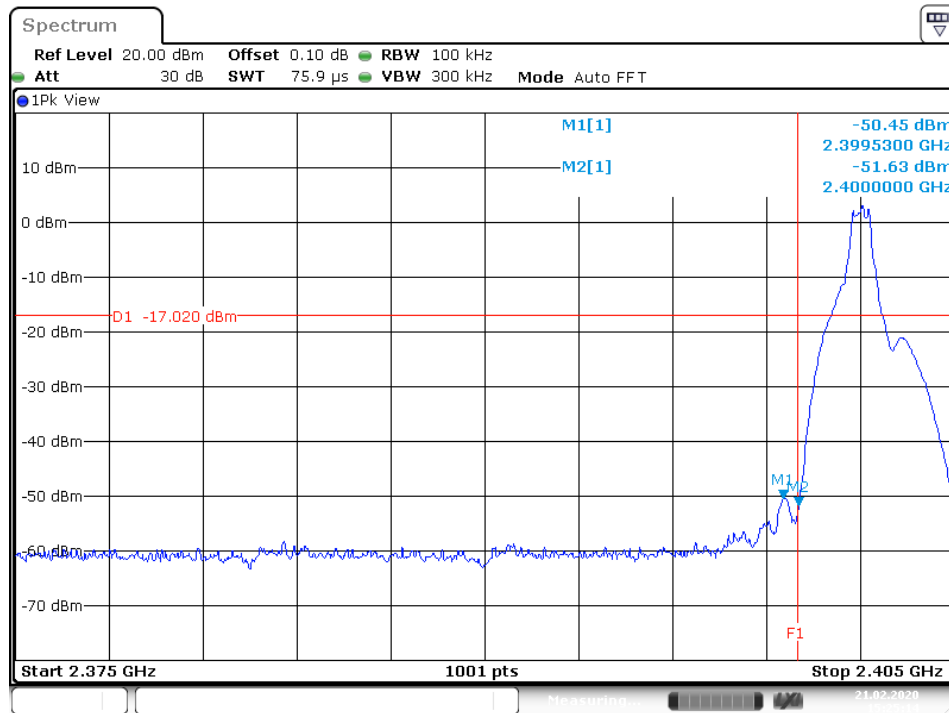
### High Channel



Date: 22.FEB.2020 08:50:17

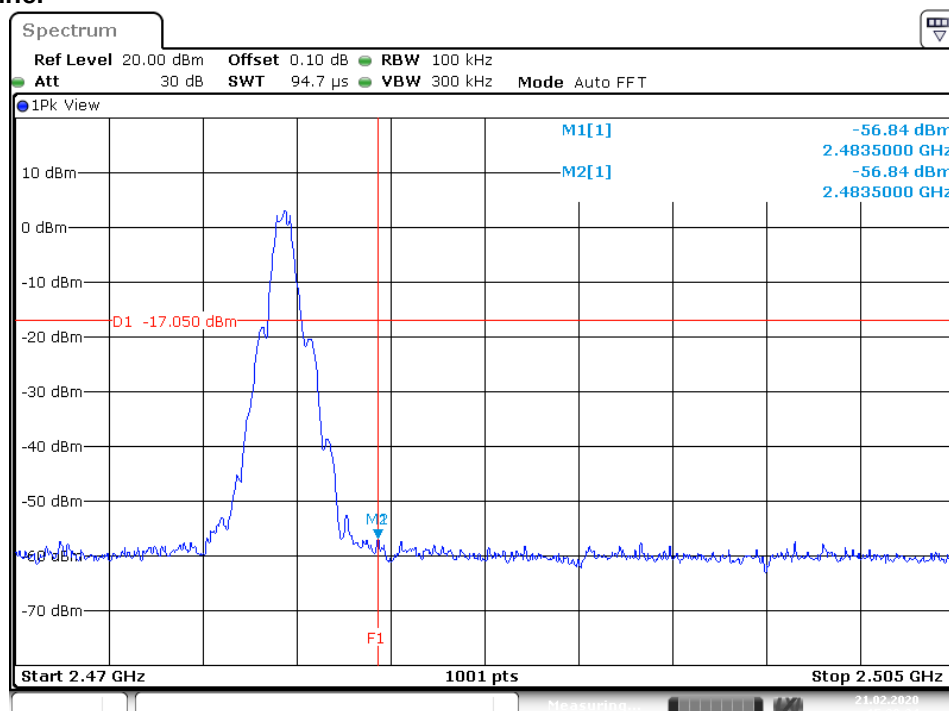
## Test Plot 100kHz RBW of Band Edge, BLE 1M

### Low Channel



Date: 21.FEB.2020 15:25:14

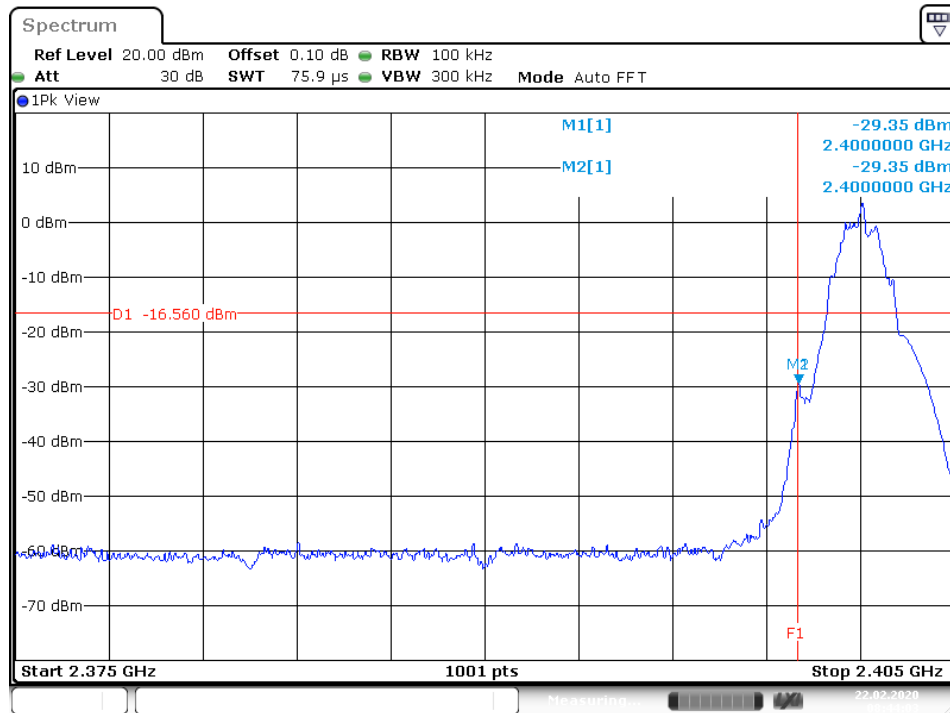
### High Channel



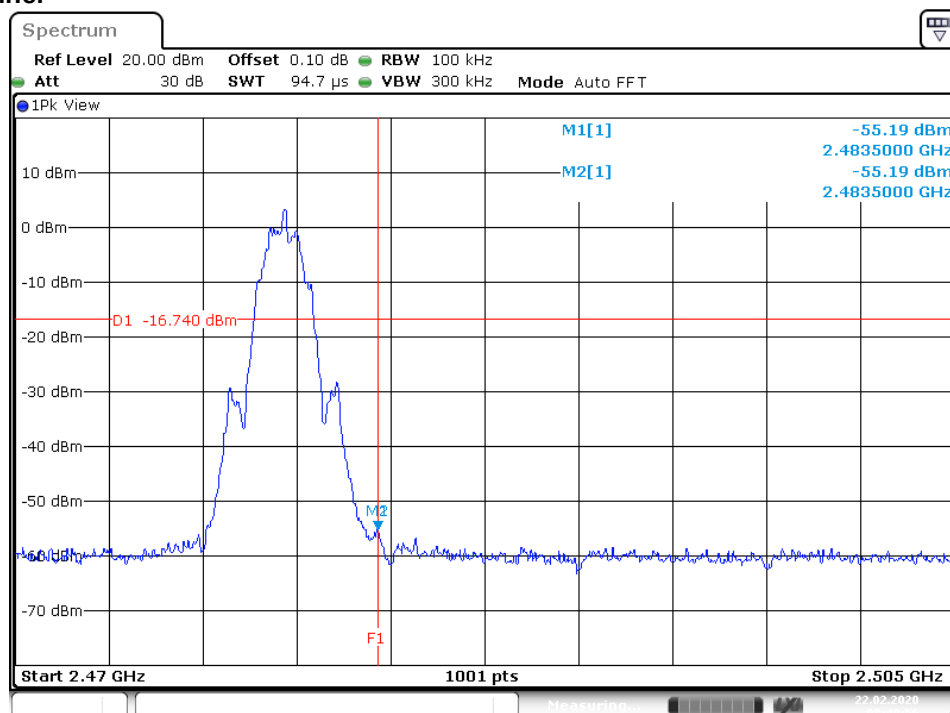
Date: 21.FEB.2020 15:29:24

## Test Plot 100kHz RBW of Band Edge, BLE 2M

### Low Channel



### High Channel



### 5.1.6 Spurious Emission

**RESULT:****Passed**

Test standard : LP0002(2018): 3.10.1.5 (2)  
Basic standard : ANSI C63.10 (2013)  
Limits : Radiated emissions which fall in the restricted bands, as defined in LP0002(2018): 2.7 , must comply with the radiated emission limits specified in LP0002(2018): 2.8

Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in LP0002(2018): 2.8

Kind of test site : 3m Semi-Anechoic Chamber

**Test setup**

Test Channel : Low/ Middle/ High  
Operation mode : A, B

Ambient temperature : 20-24 °C  
Relative humidity : 50-65 %  
Atmospheric pressure : 100-103 kPa

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

For details refer to Appendix D.

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

## 5.2 Mains Emissions

### 5.2.1 Mains Conducted Emissions

**RESULT:****Passed**

|                   |   |                                                                                                                                   |
|-------------------|---|-----------------------------------------------------------------------------------------------------------------------------------|
| Test standard     | : | LP0002(2018):2.3                                                                                                                  |
| Limits            | : | Mains Conducted emissions as defined in<br>above test standards must comply with the<br>mains conducted emission limits specified |
| Kind of test site | : | Shielded Room                                                                                                                     |

**Test setup**

|                      |   |             |
|----------------------|---|-------------|
| Test Channel         | : | 2402MHz     |
| Operation mode       | : | A           |
| Ambient temperature  | : | 20-24 °C    |
| Relative humidity    | : | 50-65 %     |
| Atmospheric pressure | : | 100-103 kPa |

Remark: For details refer to Appendix D.

## 6. Photographs of the Test Set-Up

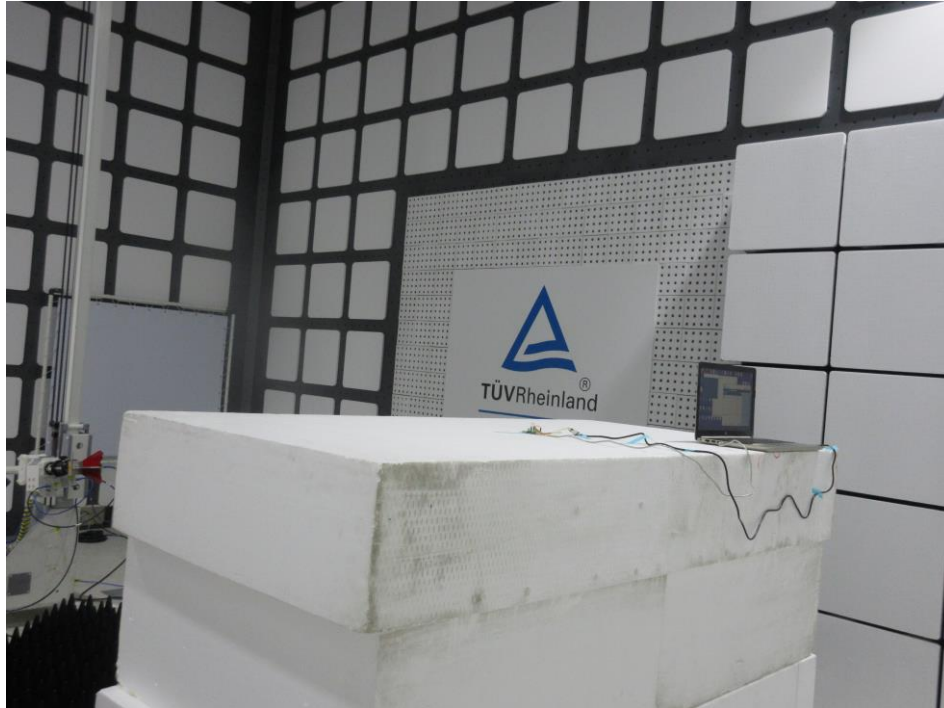
**Photograph 1: Set-up for Spurious Emissions (Front View 1)**



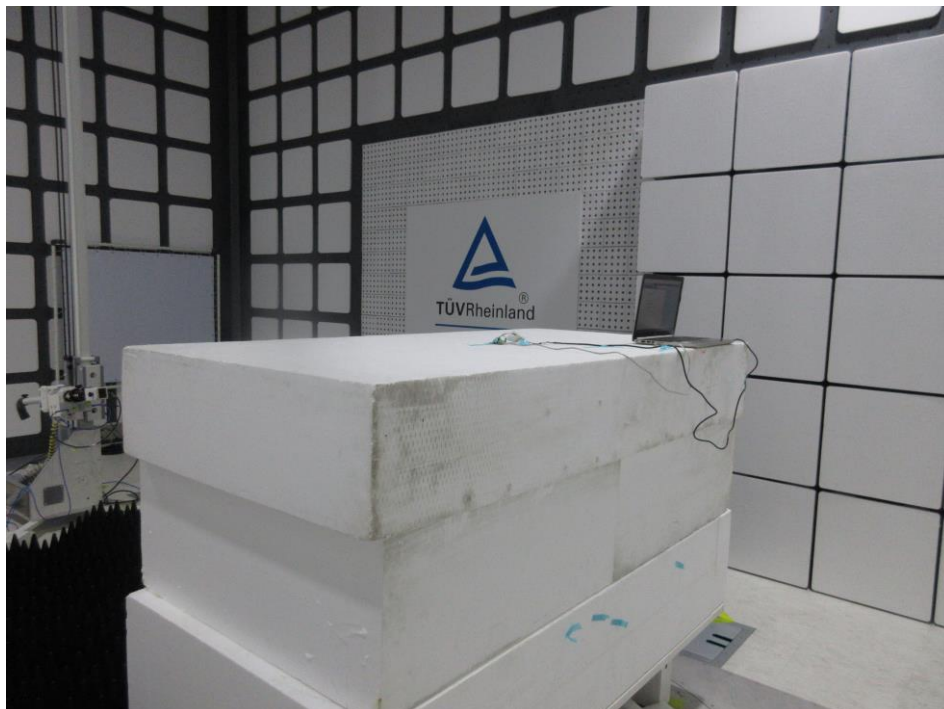
**Photograph 2: Set-up for Spurious Emissions (Front View 2)**



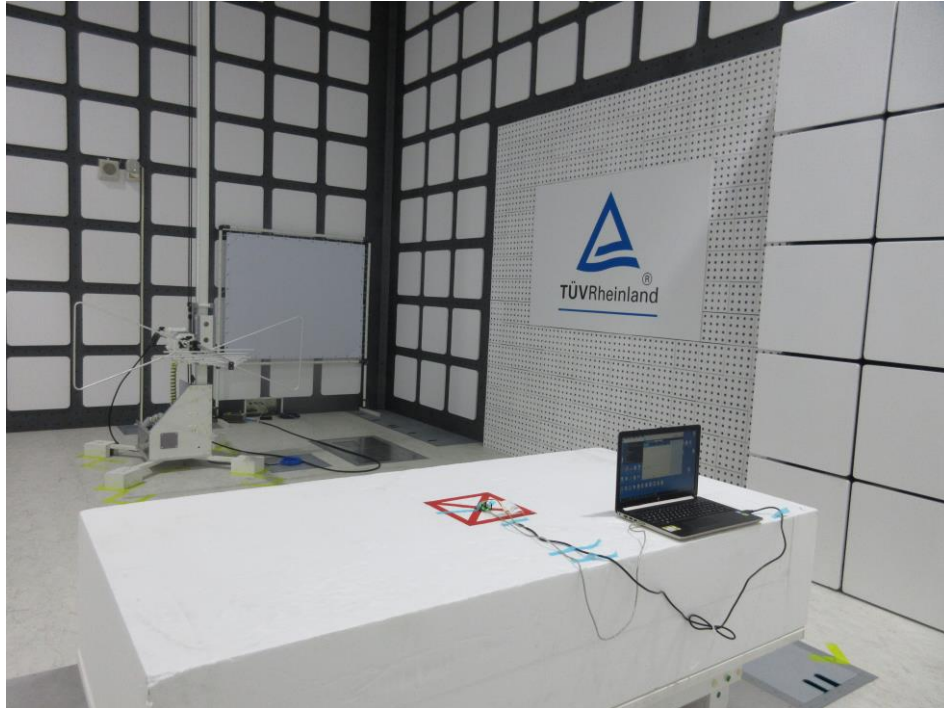
**Photograph 3: Set-up for Spurious Emissions (Back View 1)**



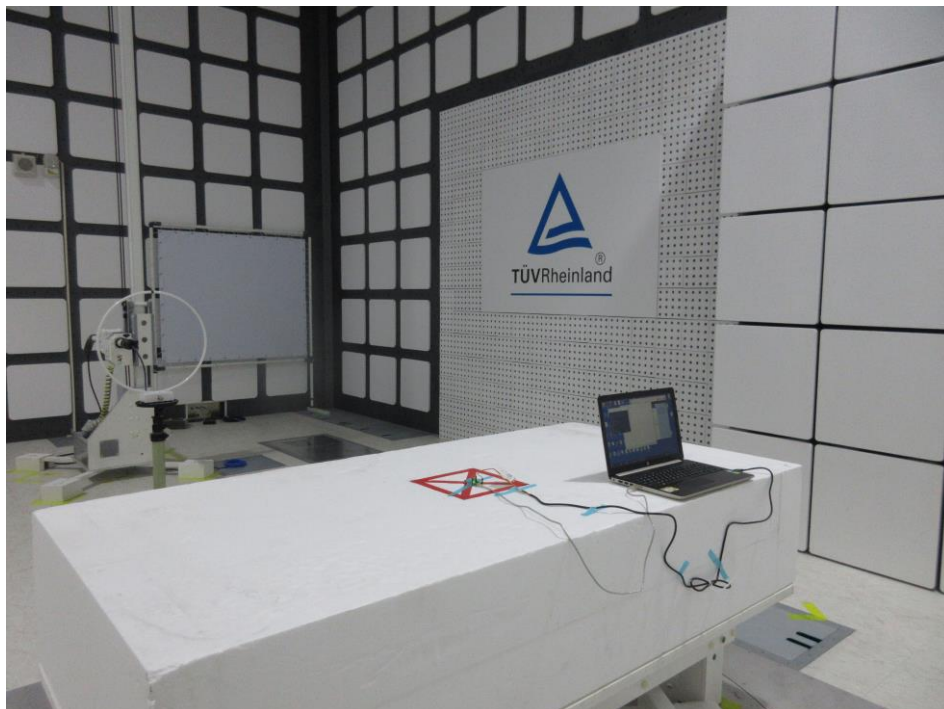
**Photograph 4: Set-up for Spurious Emissions (Back View 2)**



**Photograph 5: Set-up for Spurious Emissions (Back View 3)**



**Photograph 6: Set-up for Spurious Emissions (Back View 4)**



**Photograph 7: Set-up for AC Mains Conducted testing (Front View)**



**Photograph 8: Set-up for AC Mains Conducted testing (Back View)**



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