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# RADIO REPORT FOR CERTIFICATION

## REPORT NUMBER: M181127-1R1

## TEST STANDARD: FCC PART 15 SUBPART C SECTION 15.247

## CLIENT: ROBERT BOSCH (AUSTRALIA) PTY LTD

## DEVICE: MCSS RF MODULE

## MODEL: 6LP GW / 6LP SN

## FCC ID: LXP-6LPRF

## DATE OF ISSUE: 5 FEBRUARY 2019



**Equipment Under Test: MCSS RF module**

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# RADIO REPORT FOR CERTIFICATION TO FCC PART 15 SUBPART C SECTION 15.247

## CERTIFICATE OF COMPLIANCE

| | |
|---|---|
| Device: | MCSS RF module |
| Model Number: | 6LP GW / 6LP SN |
| Serial Number: | 00-12-4B-00-18-6E-7B-1B / 00-12-4B-00-18-6E-7B-6E |
| Manufacturer: | ROBERT BOSCH (AUSTRALIA) PTY LTD |
| FCC ID: | FCC ID: LXP-6LPRF |
| Tested for: | ROBERT BOSCH (AUSTRALIA) PTY LTD |
| Address: | 1555 CENTRE ROAD, CLAYTON VIC 3168 |
| Phone Number: | +61 3 9541 5213 |
| Contact: | Brendan Westhorpe |
| Email: | Brendan.Westhorpe@au.bosch.com |
| Standard: | FCC Part 15 – Radio Frequency Devices<br>Subpart C – Intentional Radiators<br>Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz |
| Result: | |
| Test Date(s): | 11,12 & 13 December, 2018, 10 & 11 January, 2019 |
| Issue Date: | 5 February 2019 |
| Test Engineer(s): | Wison Xaio |
| Attestation: | *I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing.* |
| Authorised Signatory: | Chris Zombolas<br>Technical Director<br>EMC Technologies Pty Ltd |

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# RADIO REPORT FOR CERTIFICATION TO FCC PART 15 SUBPART C SECTION 15.247

## 1 TEST SUMMARY

| Section | Clause | Sample | Result(s) |
|---|---|---|---|
| 6.1 | §15.203 Antenna Requirement | N/A | Complied |
| 6.2 | §15.205 Restricted Bands of Operation | 6LP GW | Complied |
| 6.3 | §15.207 Conducted Limits | N/A | Not Applicable |
| 6.4 | §15.209 Radiated emission limits; general requirements | 6LP GW | Complied |
| 6.5 | §15.247(a)(1) Channel Separation | 6LP GW & 6LP SN | Complied |
| 6.6 | §15.247(a)(1)(i) Number of channels and time of occupancy | 6LP GW & 6LP SN | Complied |
| 6.7 | §15.247(b)(2) Peak Output Power | 6LP GW | Complied |
| 6.8 | §15.247(d) Out-of-Band/Spurious Emissions | 6LP GW | Complied |
| 6.9 | §15.247(d) Band-Edge Emission Measurements | 6LP GW & 6LP SN | |
| 6.10 | §15.247(i) Maximum Permissible Exposure | N/A | Complied |
| 6.11 | §15.215 Occupied Bandwidth – 99% power | 6LP GW | Complied |

## 2 TEST FACILITY

### 2.1 General

EMC Technologies Pty Ltd is listed by the FCC as a test laboratory able to perform compliance testing for the public. EMC Technologies is listed as an FCC part 47 CFR 2.948 test lab and may perform the testing required under Parts 15 and 18 – **FCC Registration Number 90560**.

EMC Technologies Pty Ltd has also been accredited as a Conformity Assessment Body (CAB) by Australian Communications and Media Authority (ACMA) under the APECTEL MRA and is designated to perform compliance testing on equipment subject to Declaration of Conformity (DoC) and Certification under Parts 15 and 18 of the FCC Commission's rules – **Registration Number 494713 & Designation number AU0001**.

EMC Technologies indoor open are test site (iOATS) have been accepted by Industry Canada for the performance of radiated measurements in accordance with RSS-Gen, Issue 8 - **Industry Canada iOATS number - IC 3569B**.

### 2.2 NATA Accreditation

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO17025 requirements. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires fully documented test procedures, continued calibration of all equipment to the National Standard at the National Measurements Institute (NMI) and an internal quality system similar to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation ($A^2LA$).

EMC Technologies is accredited in Australia by the National Association of Testing Authorities (NATA). All testing in this report has been conducted in accordance with EMC Technologies'

scope of NATA accreditation to ISO 17025 for both testing and calibration and ISO 17020 for Inspection – **Accreditation Number 5292**.

The current full scope of accreditation can be found on the NATA website: www.nata.com.au

## 3 TEST EQUIPMENT CALIBRATION

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA accredited laboratory such as Keysight Technologies (Australia) Pty Ltd or the National Measurement Institute (NMI) or in-house. All equipment calibration is traceable to Australian national standards at the National Measurements Institute.

| Equipment Type | Make/Model/Serial Number | Last Cal. dd/mm/yyyy | Due Date dd/mm/yyyy | Cal. Interval |
|---|---|---|---|---|
| **Chamber** | Frankonia SAC-3-2<br>(R-144) | 17/07/2017 | 17/07/2020 | 3 Year*1 |
| | | | | |
| **EMI Receiver** | R&S ESW26<br>Sn: 101306 (R-143) | 14/05/2018 | 14/05/2019 | 1 Year*2 |
| | | | | |
| **Antennas** | EMCO 6502 Active Loop<br>9 kHz – 30 MHz<br>Sn. 9311-2801 (A-231) | 15/08/2018 | 15/08/2021 | 3 Year*2 |
| | SUNOL JB1<br>Sn. A061917 (A-425) | 21/07/2017 | 21/07/2019 | 2 Year*2 |
| | EMCO 3115 Double Ridge Horn<br>Sn: 8908-3282 (A-004) | 15/07/2016 | 15/07/2019 | 3 Year*1 |
| | | | | |
| **Cables*4** | Huber & Suhner Sucoflex 104A<br>Sn: 503055 (C-457) | 02/01/2018 | 02/01/2019 | 1 Year*1 |
| | Huber & Suhner Sucoflex 104A<br>Sn: 507099 (C-479) | 10/01/2018 | 10/01/2019 | 1 Year*1 |
| | Huber & Suhner Sucoflex 104A<br>Sn: 503061 (C-463) | 03/01/2018 | 03/01/2019 | 1 Year*1 |

Note *1. Internal NATA calibration.
Note *2. External NATA / A2LA calibration.
Note *3. Calibration date was valid during the time of testing.
Note *4. Cables are verified before measurements are taken.

## 4 MEASUREMENT UNCERTAINTY

EMC Technologies has evaluated the equipment and the methods used to perform the emissions testing. The estimated measurement uncertainties for emissions tests shown within this report are as follows:

| | | |
|---|---|---|
| **Conducted Emissions:** | 9 kHz to 30 MHz | ±3.2 dB |
| **Radiated Emissions:** | 9 kHz to 30 MHz | ±4.1 dB |
| | 30 MHz to 300 MHz | ±5.1 dB |
| | 300 MHz to 1000 MHz | ±4.7 dB |
| | 1 GHz to 18 GHz | ±4.6 dB |
| **Peak Output Power:** | | ±1.5 dB |

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

# 5 DEVICE DETAILS

(Information supplied by the Client)

Radio frequency module encompassing two variants. This module operates as a frequency hopping system in the 915MHz band. The variants have identical RF sections and only differ in parts loading with connectors and a USB to UART section.

## 5.1 EUT (Transmitter) Details

| | |
|---|---|
| **Radio:** | MCSS RF module transmitter |
| **Operating Frequency Range:** | 917.0 – 927.6 MHz |
| **Modulation:** | FHSS |
| **Number of Channels:** | 50 |
| **Microprocessor:** | TI CC1310 |
| **Antenna:** | Pulse W5012 half-wave dipole antenna |
| **Antenna gain:** | 2.0 dBi |
| **Highest frequency related to the transmitter circuit** | 927.6 MHz |

## 5.2 EUT (Host) Details

| | |
|---|---|
| **Test Sample:** | MCSS RF module |
| **Model Number:** | 6LP GW / 6LP SN |
| **Serial Number:** | 00-12-4B-00-18-6E-7B-1B / 00-12-4B-00-18-6E-7B-6E |
| **Manufacturer:** | ROBERT BOSCH (AUSTRALIA) PTY LTD |
| **Supply Rating:** | 2.5-5.5V DC |

## 5.3 Test Configuration

Testing was performed with the EUT set to transmit continuously (with modulation applied).

Frequency hopping system attributes were tested with model 6LP SN and 6LP GW. Single channel transmissions were tested with Model 6LP GW.

## 5.4 Modifications

No modification was required to achieve compliance.

# 6 RESULTS

## 6.1 §15.203 Antenna Requirement

The MCSS RF module has an U.FL antenna port and incorporates the following external antenna only:

**Antenna Type:** Pulse W5012 half-wave dipole antenna
**Antenna gain:** 2.0 dBi
**Connector:** RP-SMA
**Antenna port to antenna connection:** 200 mm Amphenol U.FL to RP-SMA cable

The above installation will prevent any unauthorised switching of antennas.

## 6.2 §15.205 Restricted Bands of Operation

The provisions of the §15.205 restricted bands of operation and §15.209 radiated emissions limits have been met, refer to section 6.8

## 6.3 §15.207 Conducted Limits

The device is DC powered and does not connect directly or indirectly to the AC mains network. Test was not applicable.

## 6.4 §15.209 Radiated emission limits; general requirements

The provisions of the §15.205 restricted bands of operation and §15.209 radiated emissions limits have been met, refer to section 6.8

## 6.5 §15.247(a)(1) Channel Separation

### 6.5.1 Test Procedure

The channel separation was measured while the device was transmitting with typical hopping function enable. The 20dB bandwidth was measured to determine the limits.

### 6.5.2 Limits

In the band 902 – 928 MHz, the channel separation must be more than 25 kHz or the 20dB bandwidth, whichever is greater.

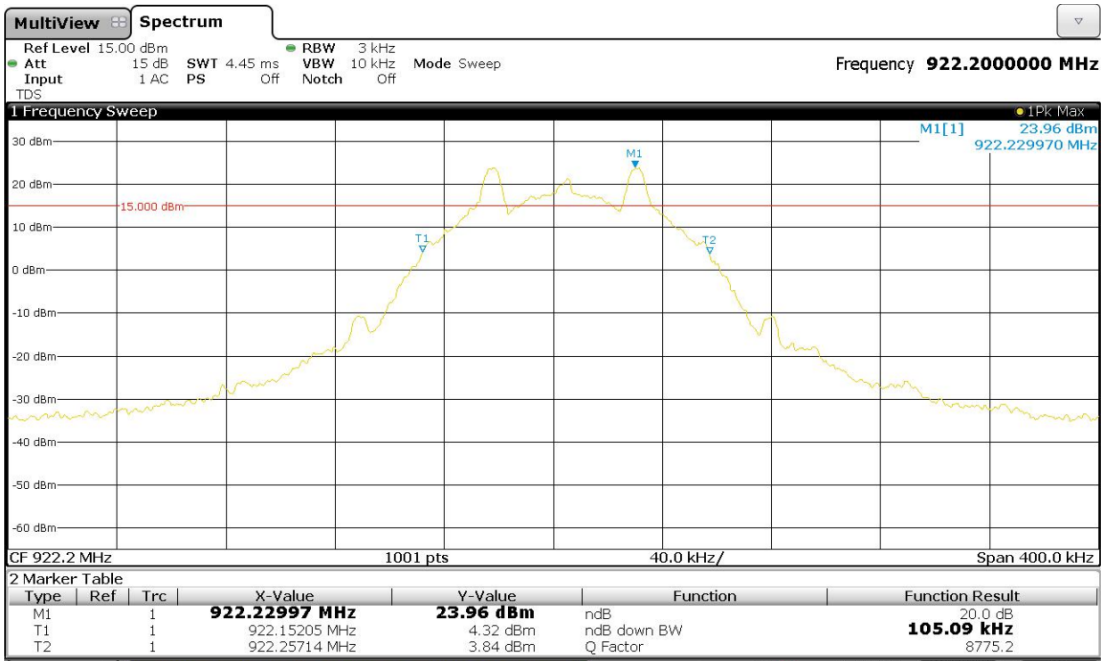
### 6.5.3 Results

**20dB bandwidth**

*Table 6-1: 20dB Bandwidth*

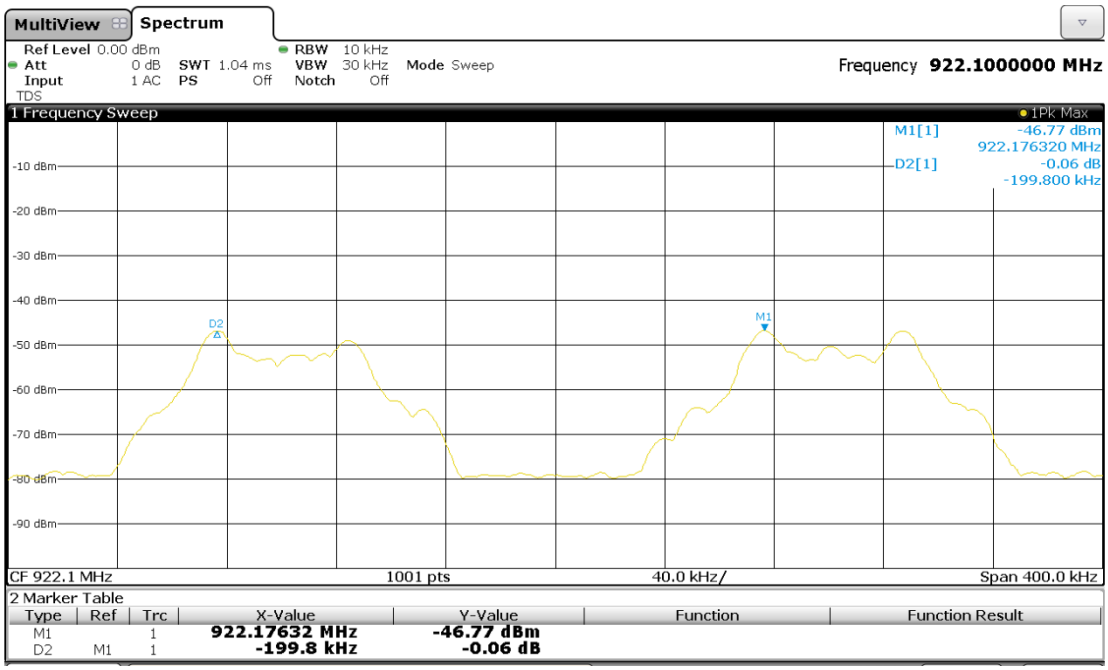
| Channel | Centre Frequency [MHz] | 20 dB Bandwidth [kHz] |
|---|---|---|
| Low | 917.0 | 103.10 |
| Middle | 922.2 | **105.09** |
| High | 927.6 | 104.30 |

The largest 20 dB bandwidth was measured on the Middle channel:




*Graph 6-1: 20-dB bandwidth – Middle channel 922.2 MHz*

## Channel Separation




*Graph 6-2: Channel Separation*

*Table 6-2: Channel Separation*

| Channel Separation [kHz] | Limit [kHz] | Result |
|---|---|---|
| 199.8 | >=105.09 | Complied |

## 6.6 §15.247(a)(1)(i) Number of channels and time of occupancy

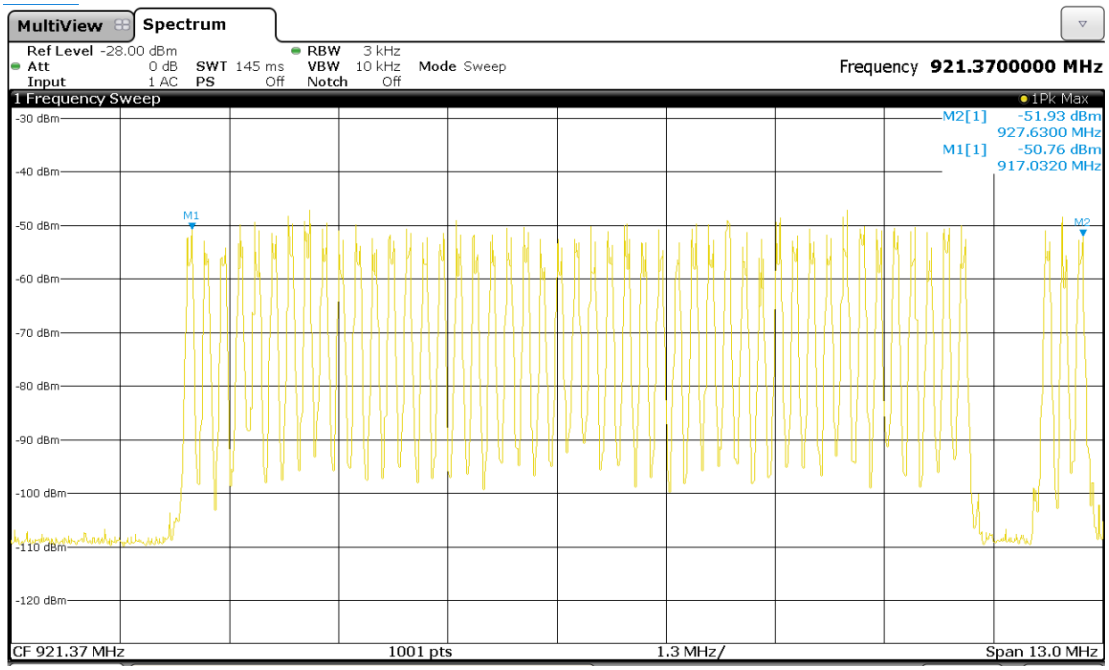
### 6.6.1 Test Procedure

The tests were performed in accordance with ANSI C63.10: 2013 Clause 7.8.3 for Number of hopping frequencies and Clause 7.8.4 for Time of occupancy.

### 6.6.2 Limits

In the band 902-928 MHz, frequency hopping systems operation bands shall use at least 50 hopping frequencies. The average time of occupancy on any channels shall not be greater than 0.4 seconds within a 20 seconds period.

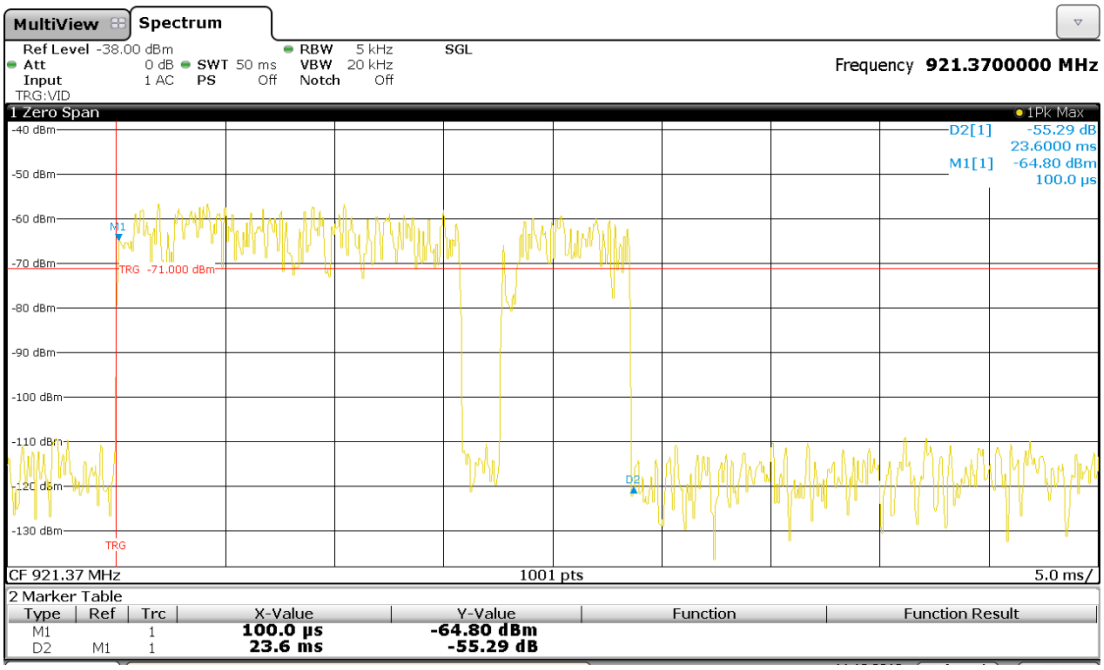
### 6.6.3 Results



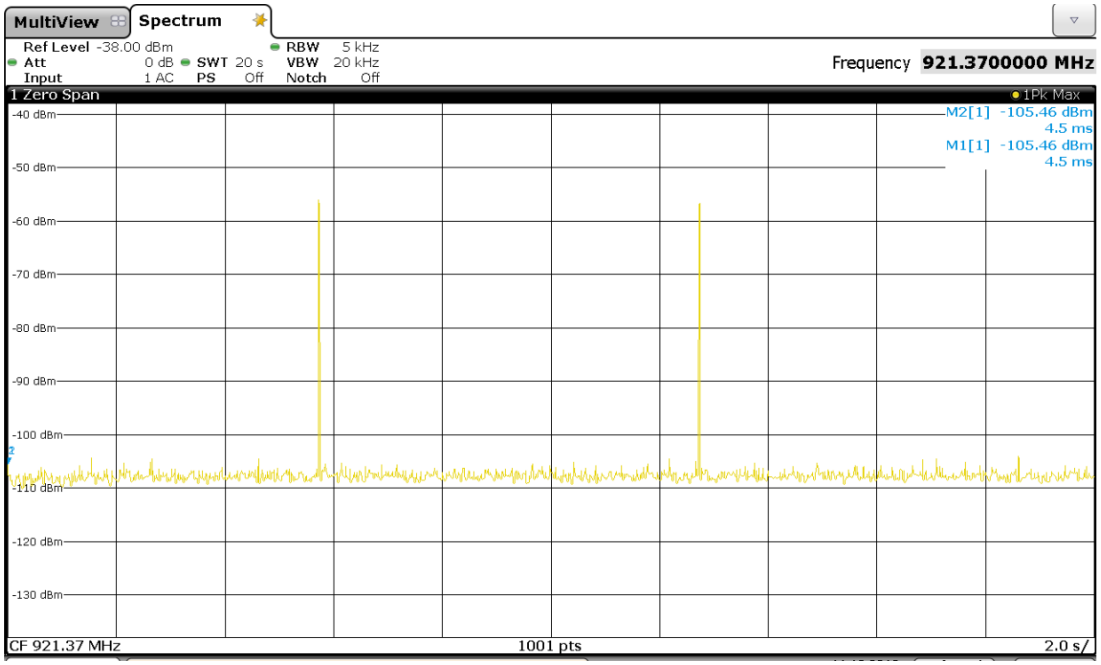

*Graph 6-3: Number of Channels*

*Table 6-3: Number of Channels*

| Number of Channels | Limit [kHz] | Result |
|---|---|---|
| 50 | >=50 | Complied |




*Graph 6-4: Single hop time of occupancy*




*Graph 6-5: Number of hops over 20 s*

*Table 6-4: Time of occupancy*

| Single hop time of occupancy [ms] | Number of hops over 20 s | Total time of occupancy over 20 s [ms] | Limit [ms] | Result |
|---|---|---|---|---|
| 23.6 | 2 | 47.2 | <=400 | Complied |

## 6.7 §15.247(b)(2) Peak Output Power

### 6.7.1 Test procedure

The peak output power was measured using the conducted methods according the procedure from ANSI C63.10 clause 7.8.5.

### 6.7.2 Limits

From §15.247(b)(2), the peak output power limit at frequencies 902-928 MHz for frequency hopping systems employing 50 hopping channels is 1 W.

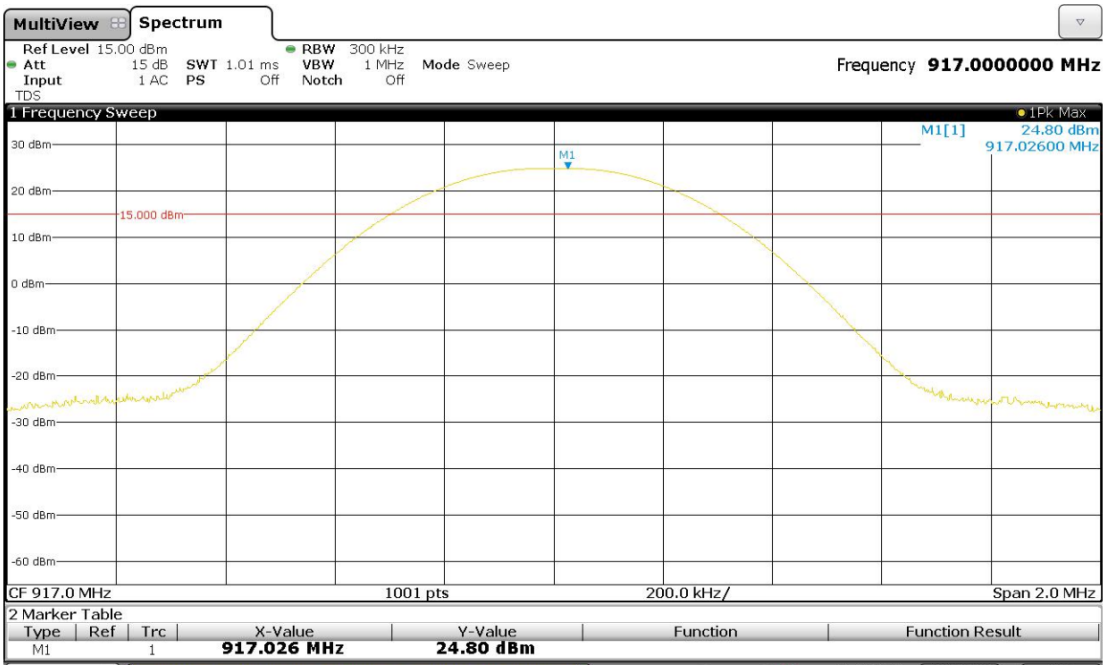
### 6.7.3 Results

Conducted Peak Output Power

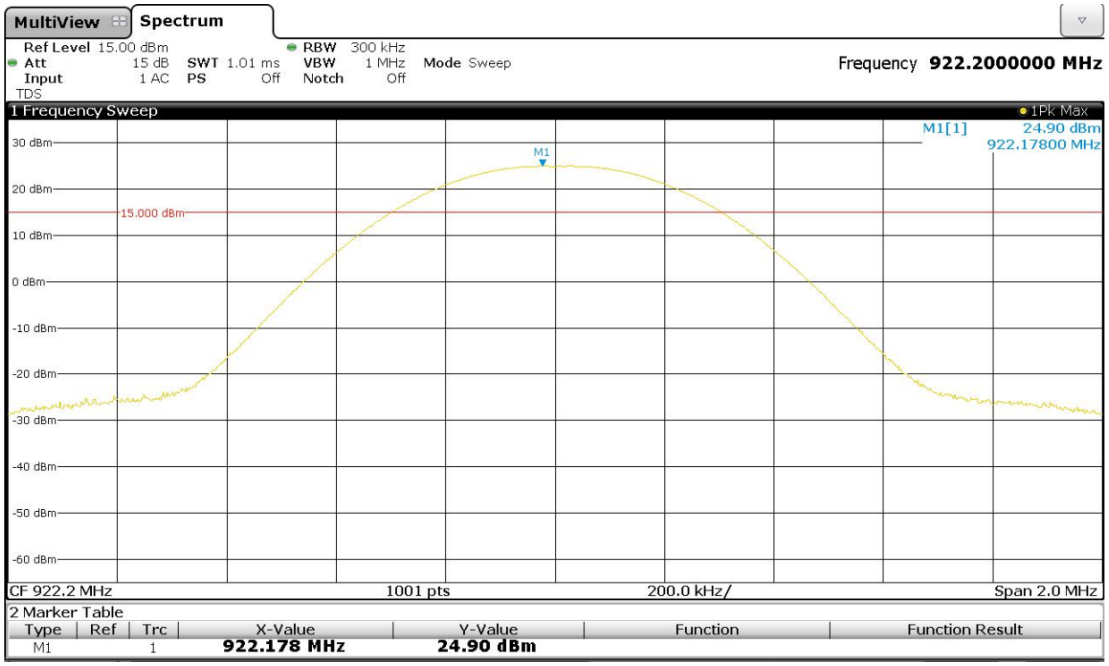
*Table 6-5: Conducted Peak Output Power*

| Channel | Freq. MHz | Conducted Power | | Limit | Δ Limit* | Result |
|---|---|---|---|---|---|---|
| | | dBm | W | W | W | |
| Low | 917.0 | 24.80 | 0.301 | 1 | -0.699 | Complied |
| Middle | 922.2 | 24.90 | 0.309 | 1 | -0.681 | Complied |
| High | 927.6 | 24.33 | 0.271 | 1 | -0.729 | Complied |

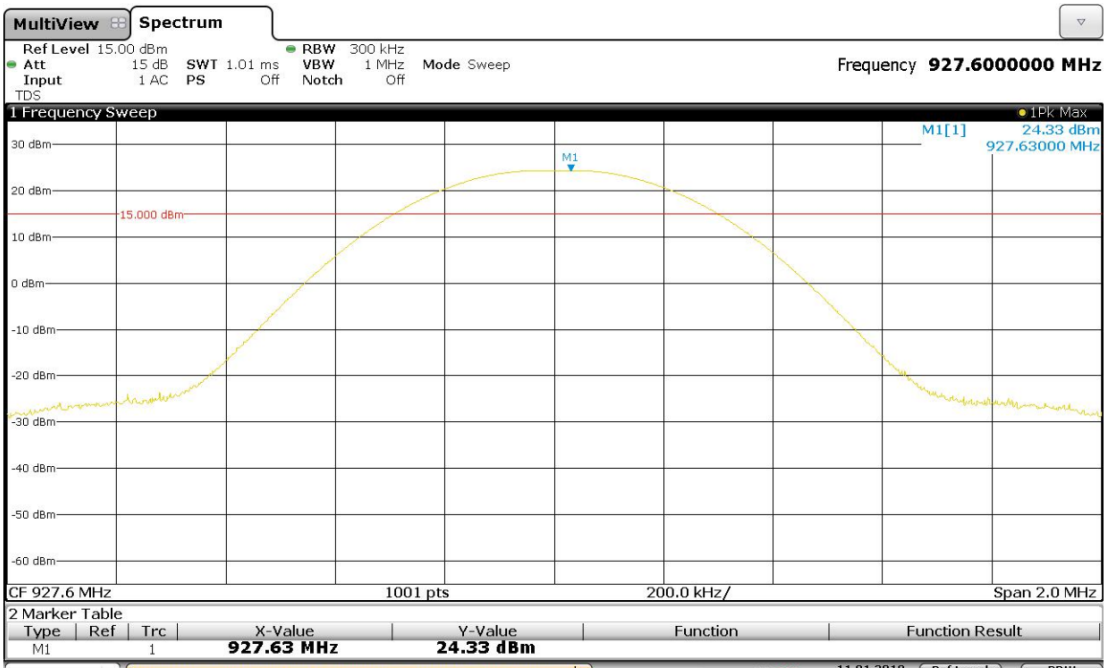
*A negative Δ is below the limit




*Graph 6-6: Conducted Peak Power – 917MHz (Low channel)*




*Graph 6-7: Conducted Peak Power – 922.2MHz (Middle channel)*




*Graph 6-8: Conducted Peak Power – 927.6MHz (High channel)*

## 6.8 §15.247(d) Out-of-Band/Spurious Emissions

### 6.8.1 Test procedure

Radiated out-of-band/spurious emissions measurements were performed in a semi-anechoic chamber compliant with ANSI C63.4: 2014.

The test frequency range was sub-divided into smaller bands with the defined resolution bandwidths to permit reliable display and identification of emissions.

| Frequency range [MHz] | Measurement Bandwidth [kHz] | Measurement Distance [m] | Antenna |
|---|---|---|---|
| 0.009 to 0.150 | 0.2 | 3 | 0.6 metre loop antenna |
| 0.150 to 30 | 9 | 3 | |
| 30 to 1000 | 120 | 3 | Biconilog hybrid |
| 1000 to 18 000 | 1000 | 3 | Standard gain or broadband horn |
| 18 000 to 40 000 | 1000 | 1 | |

EUT was set at a height of 0.8 m for measurements below 1000 MHz and set at a height of 1.5 m for measurements above 1000 MHz.

The sample was slowly rotated with the spectrum analyser set to Max-Hold. This was performed for at least two antenna heights. When an emission was located, it was positively identified and its maximum level found by rotating the automated turntable and by varying the antenna height. For below 1000 MHz the emissions were measured with a Quasi-Peak detector, and for above 1000 MHz the emissions were measured with Peak and Average detectors.

EUT was investigated on all three axes (x, y, and z) with the loop antenna. Measurements on the worst axis are presented below.

The measurement data for each frequency range was corrected for cable losses, antenna factors and preamplifier gain. This process was performed for both horizontal and vertical polarisations of the measurement antenna.

### 6.8.2 Evaluation of field strength

Field strengths were calculated automatically by the software using pre-stored calibration data. The method of calculation is shown below:

$$\boldsymbol{E = V + AF - G + L}$$

Where: *E* = Radiated Field Strength in dBµV/m.
*V* = EMI Receiver Voltage in dBµV/m.
*AF* = Antenna Factor in dB (stored as a data array).
*G* = Preamplifier Gain in dB (stored as a data array).
*L* = Cable loss in dB (stored as a data array of Insertion Loss versus frequency).

### 6.8.3 Limits

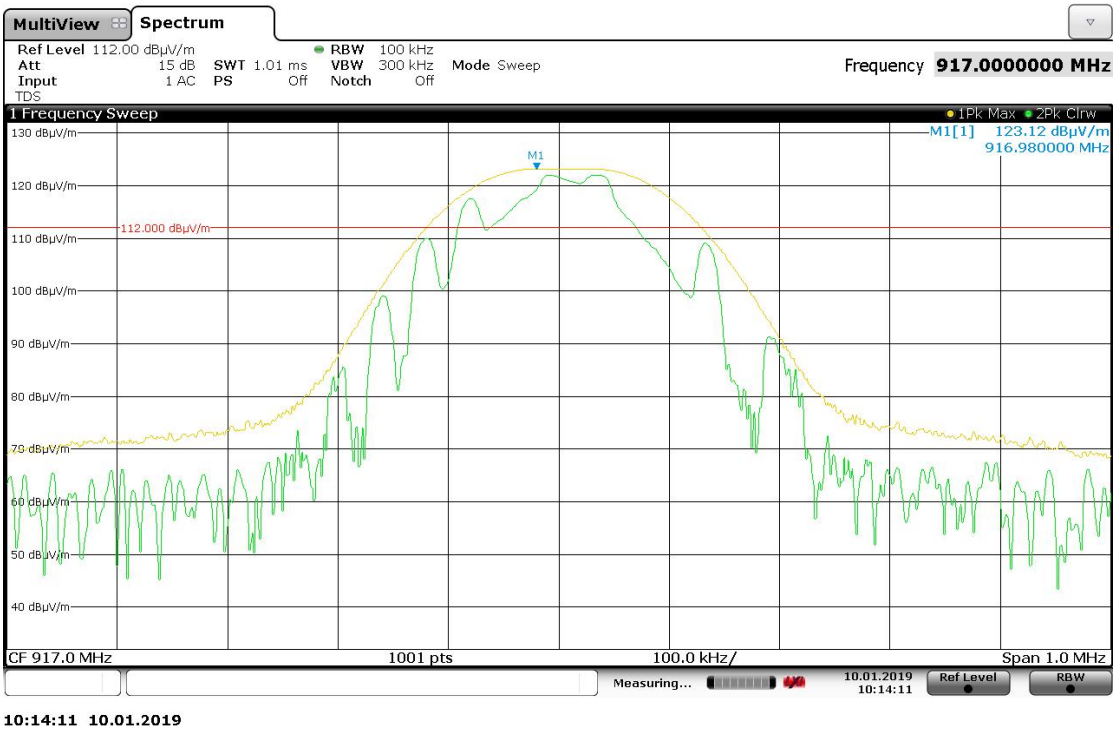
The limit applied is in accordance with the out-of-band/spurious emissions limit defined in §15.247(d).

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The in-band peak PSD in 100 kHz bandwidth were measured on all three channels. The maximum PSD level was used to establish the limit. However, the general limits of §15.209 apply for the restricted bands of operation defined in §15.205.

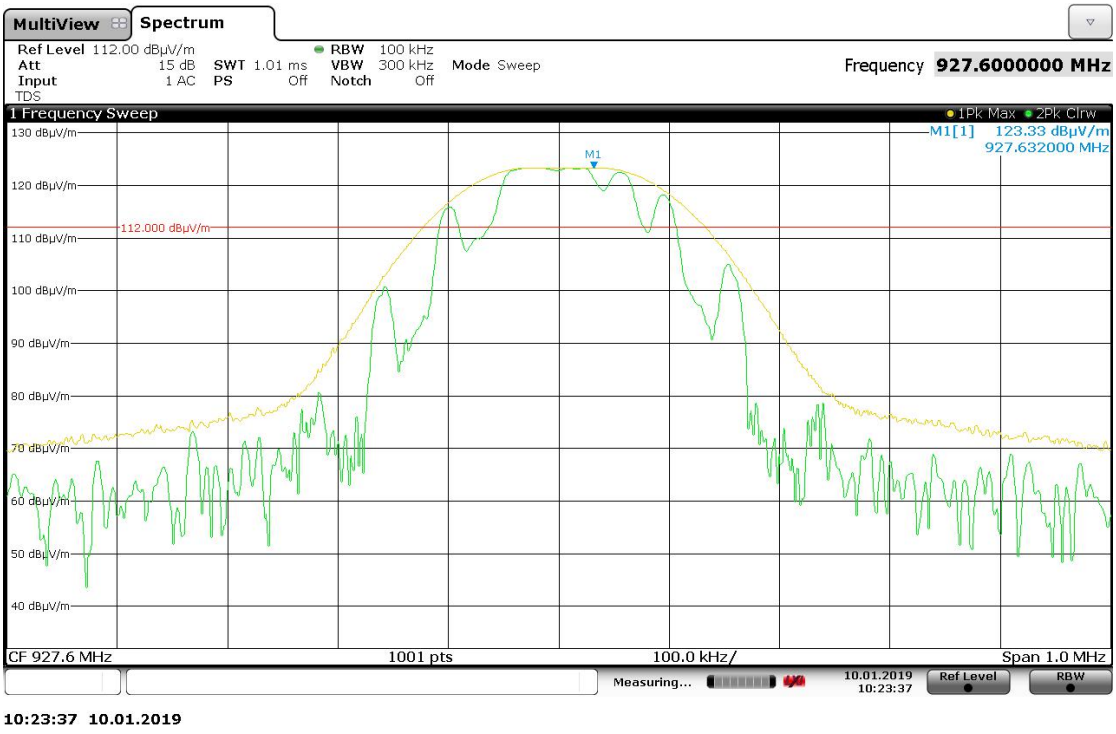
*Table 6-6: 100 kHz reference level measurement*

| Channel | Peak at 3 m (dBµV/m) | Limit at 3m (dBµV/m) |
|---|---|---|
| Middle | 123.41 | 103.41 |




*Graph 6-9: 100 kHz bandwidth. Peak measurement, EUT x-axis, Measurement antenna – Vertical polarisation, Low channel – 917 MHz*

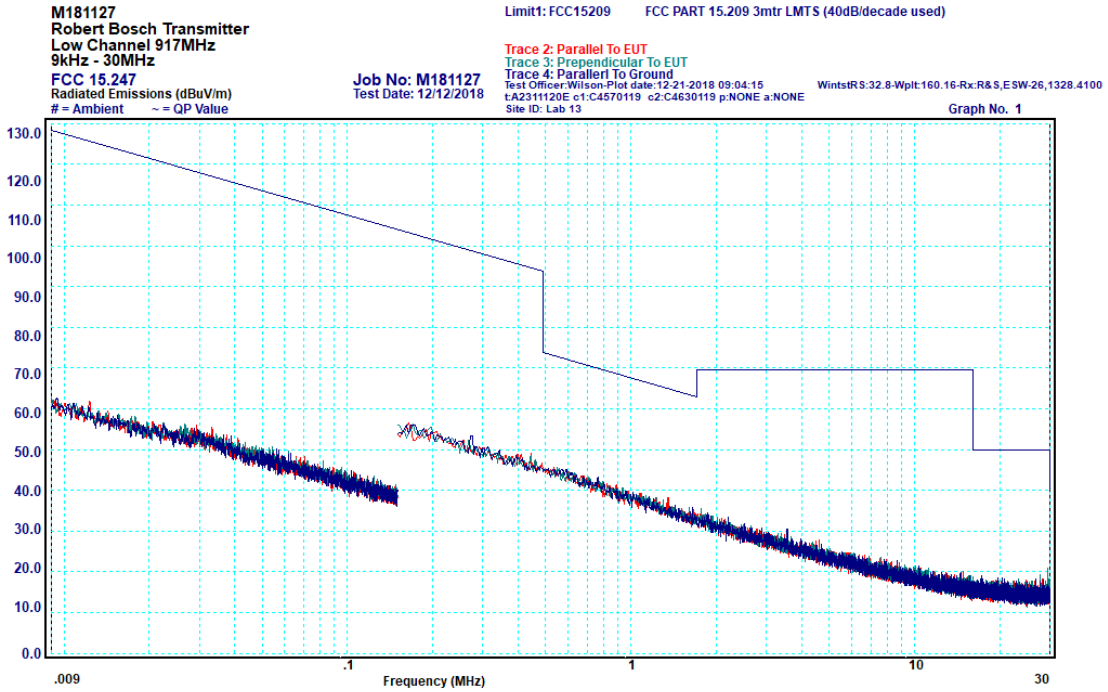

*Graph 6-10: 100 kHz bandwidth. Peak measurement, EUT x-axis, Measurement antenna – Vertical polarisation, Middle channel – 922.2 MHz*



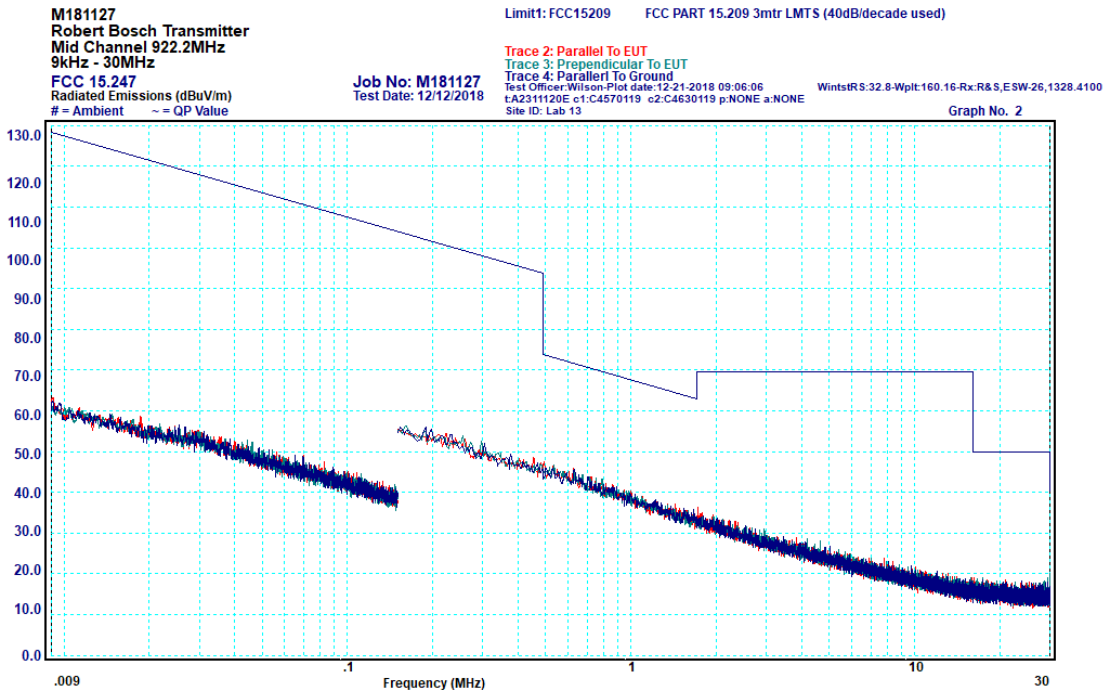

*Graph 6-11: 100 kHz bandwidth. Peak measurement, EUT x-axis, Measurement antenna – Vertical polarisation, High channel – 927.6 MHz*

### 6.8.4 Results: Frequency Band: 9 kHz - 30 MHz

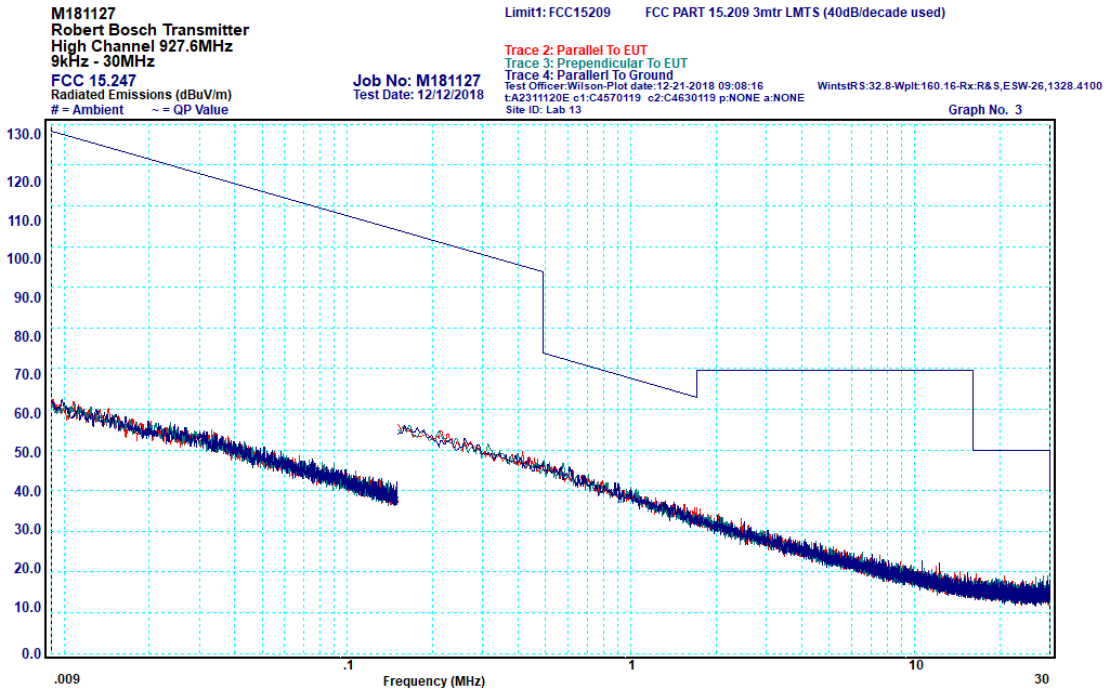
All emissions measured in the frequency band 9 kHz to 30 MHz complied with the requirements of §15.247(d). The emissions were 10 dB or more below the limit.




*Graph 6-12: Radiated spurious emissions 9 kHz – 30 MHz, Low channel – 917 MHz*



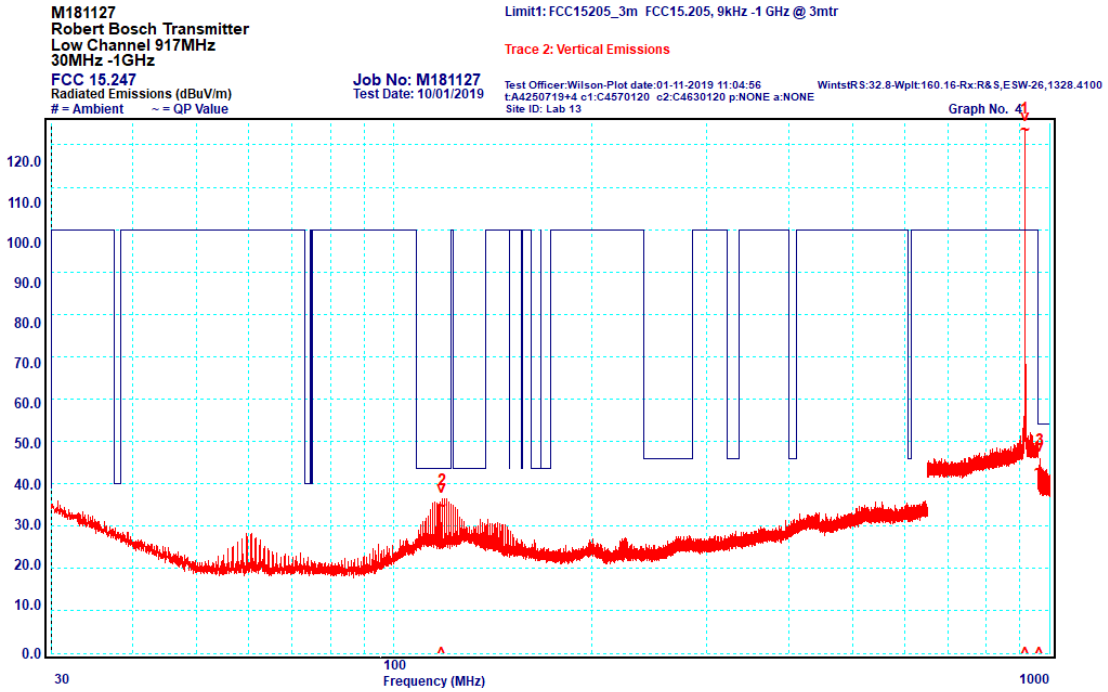

*Graph 6-13: Radiated spurious emissions 9 kHz – 30 MHz, Middle Channel – 922.2 MHz*




*Graph 6-14: Radiated spurious emissions 9 kHz – 30 MHz, High Channel – 927.6 MHz*

### 6.8.5 Results: Frequency Band: 30 - 1000 MHz

All spurious emissions measured in the frequency band 30 MHz to 1000 MHz complied with the requirements of §15.247(d).

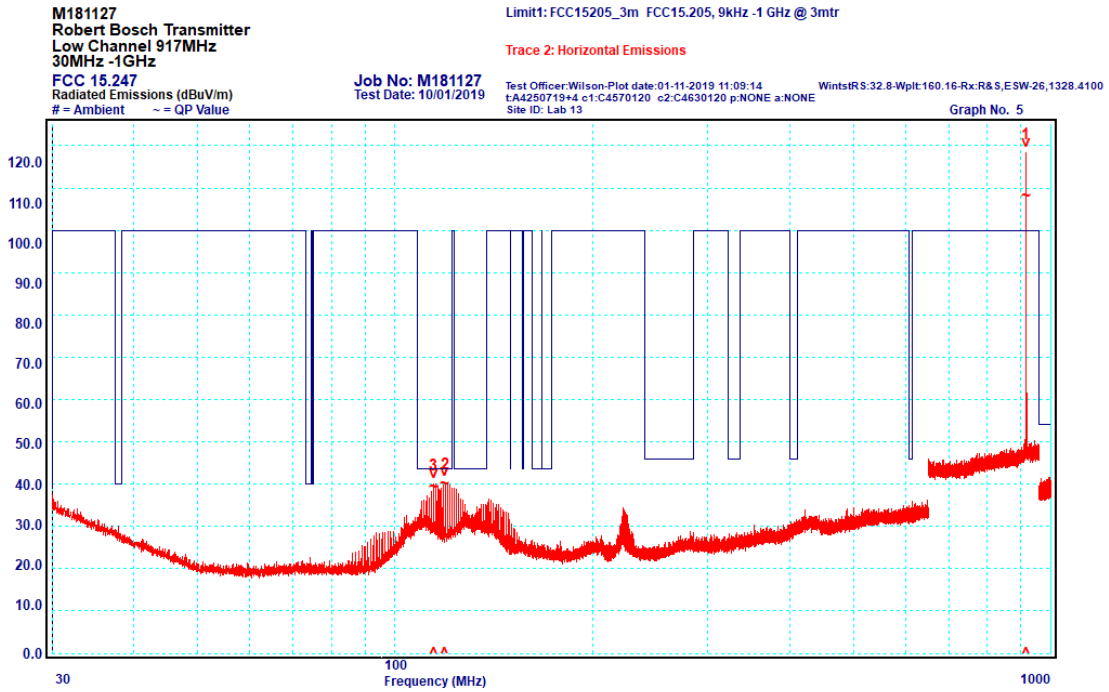



*Graph 6-15: Spurious Emissions, 30 – 1000 MHz, Vertical, Low channel 917 MHz*

*Table 6-7: Spurious Emissions, 30 - 1000 MHz, Vertical, Low channel 917 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Vertical | 917.00 | 123.4 | N/A | N/A |
| 2 | Vertical | 118.40 | 34.6 | 43.5 | -8.9 |
| 3 | Vertical | 965.05 | 43.1 | 54.0 | -10.9 |

*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

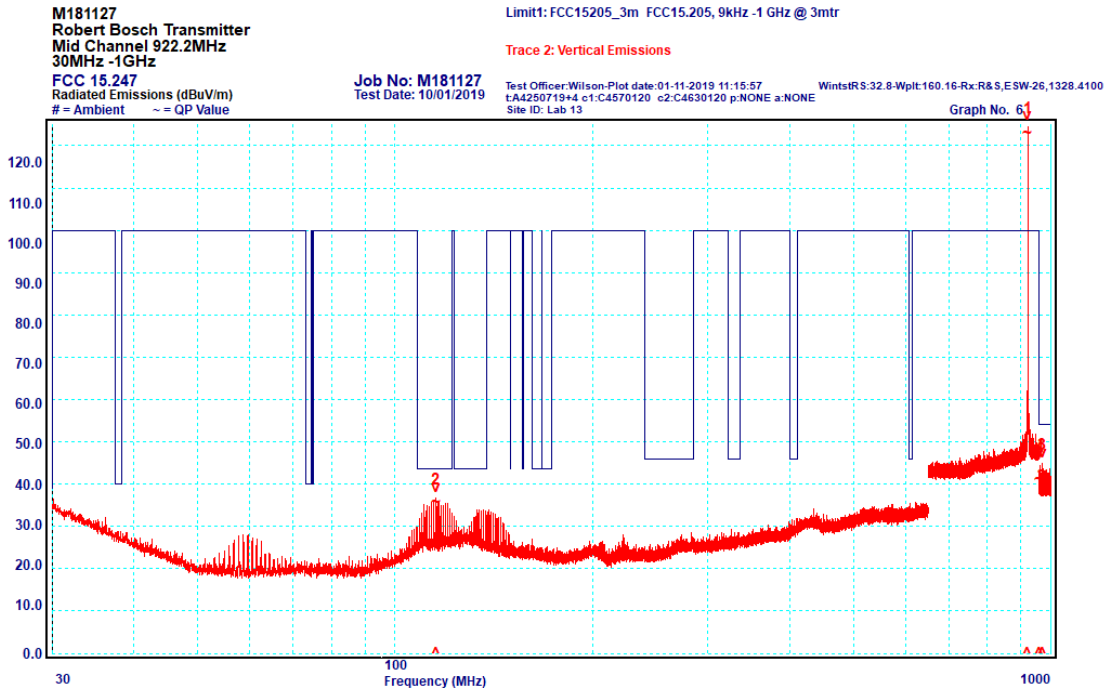



*Graph 6-16: Spurious Emissions, 30 – 1000 MHz, Horizontal, Low channel 917 MHz*

*Table 6-8: Spurious Emissions, 30 - 1000 MHz, Horizontal, Low channel 917 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Horizontal | 917.00 | 108.2 | N/A | N/A |
| 2 | Horizontal | 119.32 | 40.0 | 43.5 | -3.5 |
| 3 | Horizontal | 114.58 | 39.4 | 43.5 | -4.1 |

*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

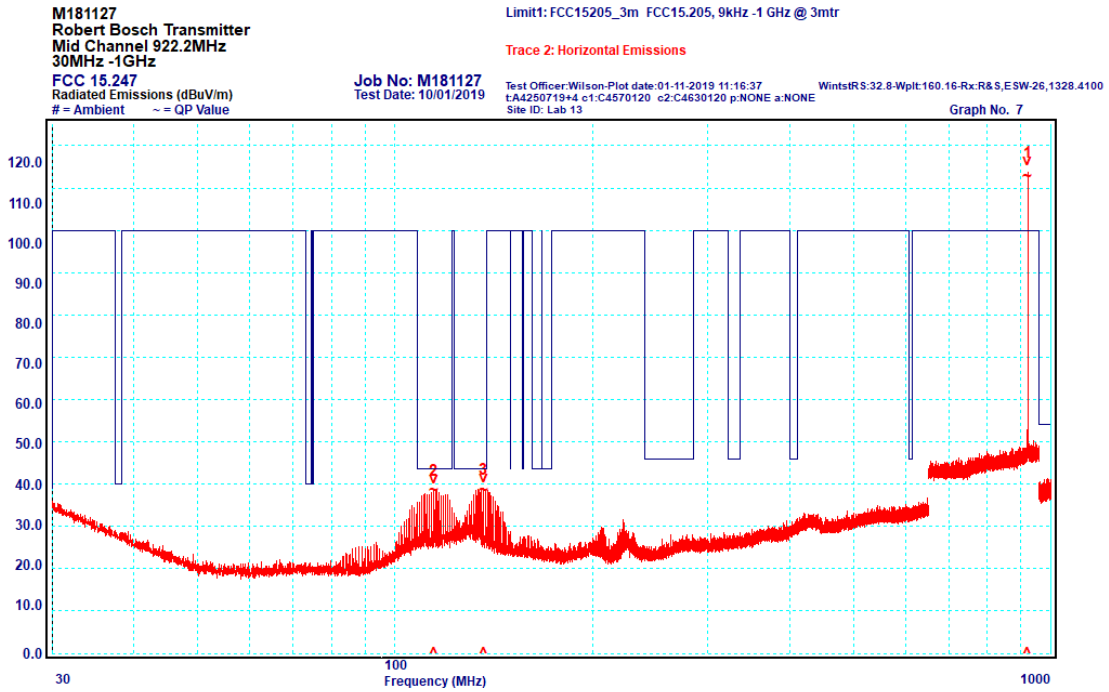



*Graph 6-17: Spurious Emissions, 30 – 1000 MHz, Vertical, Middle channel 922.2 MHz*

*Table 6-9: Spurious Emissions, 30 - 1000 MHz, Vertical, Middle channel 922.2 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Vertical | 922.21 | 123 | N/A | N/A |
| 2 | Vertical | 115.55 | 35.7 | 43.5 | -7.8 |
| 3 | Vertical | 970.16 | 42.8 | 54 | -11.2 |
| 4 | Vertical | 962.18 | 41 | 54 | -13 |

*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

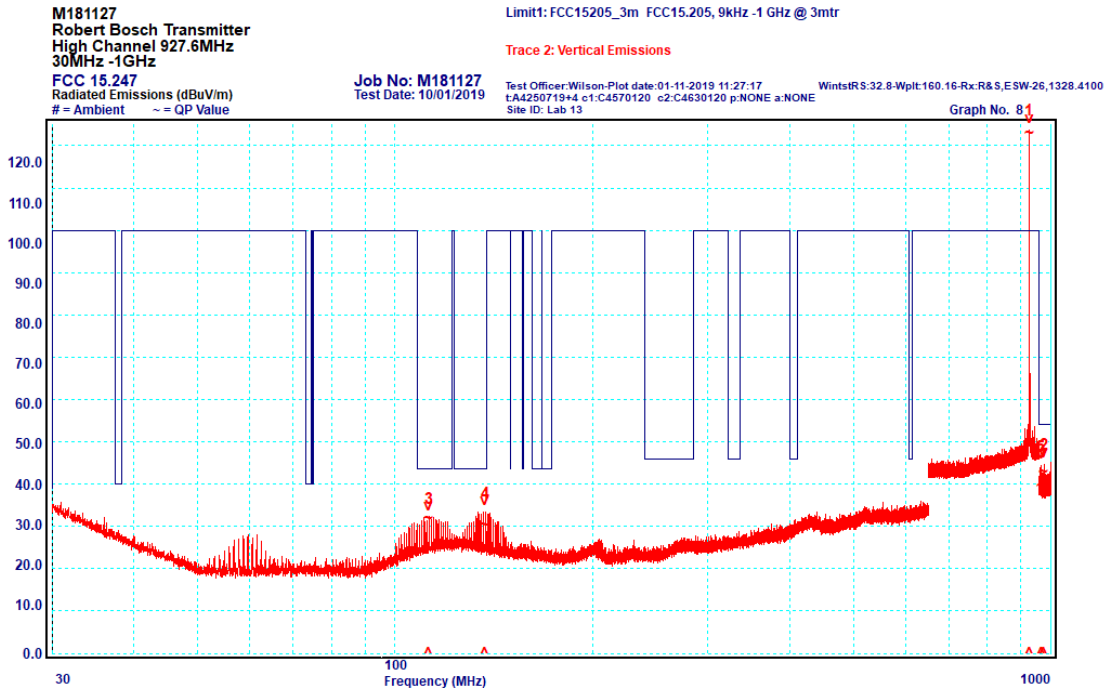



*Graph 6-18: Spurious Emissions, 30 – 1000 MHz, Horizontal, Middle channel 922.2 MHz*

*Table 6-10: Spurious Emissions, 30 - 1000 MHz, Horizontal, Middle channel 922.2 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Horizontal | 922.2 | 112.8 | N/A | N/A |
| 2 | Horizontal | 114.64 | 38.6 | 43.5 | -4.9 |
| 3 | Horizontal | 136.45 | 38.4 | 43.5 | -5.1 |

*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

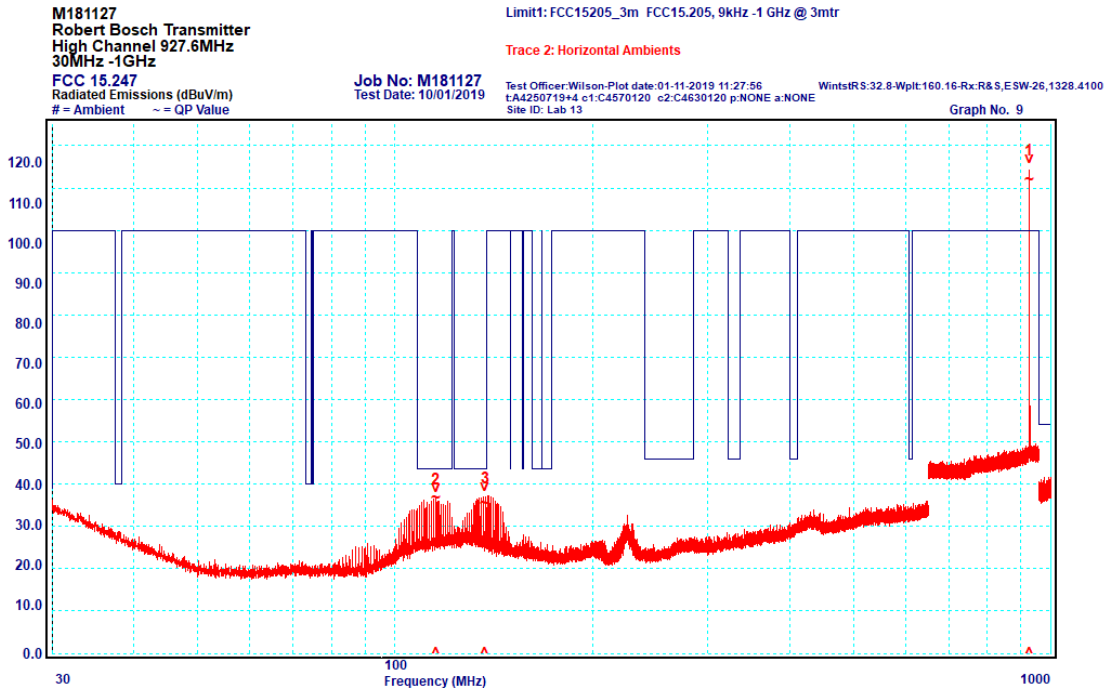



*Graph 6-19: Spurious Emissions, 30 – 1000 MHz, Vertical, High channel 927.6 MHz*

*Table 6-11: Spurious Emissions, 30 - 1000 MHz, High channel 927.6 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Vertical | 927.6 | 122.9 | N/A | N/A |
| 2 | Vertical | 975.61 | 42.8 | 54 | -11.2 |
| 3 | Vertical | 112.74 | 31.9 | 43.5 | -11.6 |
| 4 | Vertical | 137.34 | 30.3 | 43.5 | -13.2 |
| 5 | Vertical | 967.52 | 39.5 | 54 | -14.5 |

*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard




*Graph 6-20: Spurious Emissions, 30 – 1000 MHz, Horizontal, High channel 927.6 MHz*

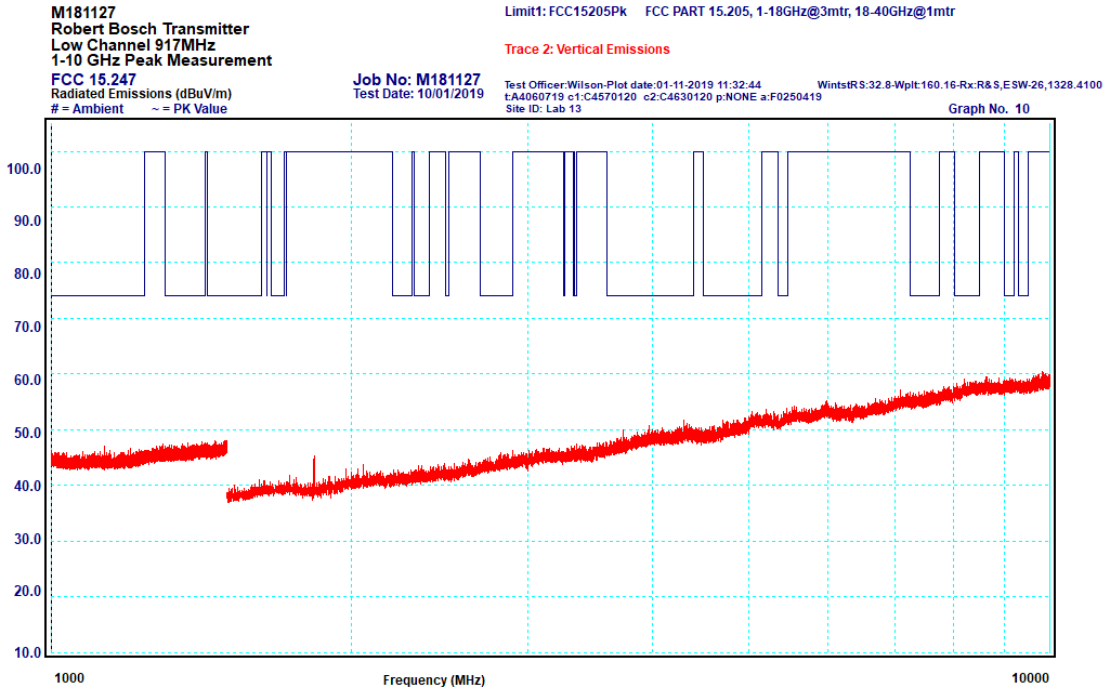
*Table 6-12: Spurious Emissions, 30 - 1000 MHz, High channel 927.6 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1* | Horizontal | 927.61 | 111.9 | N/A | N/A |
| 2 | Horizontal | 115.56 | 36.6 | 43.5 | -6.9 |
| 3 | Horizontal | 137.35 | 35.4 | 43.5 | -8.1 |

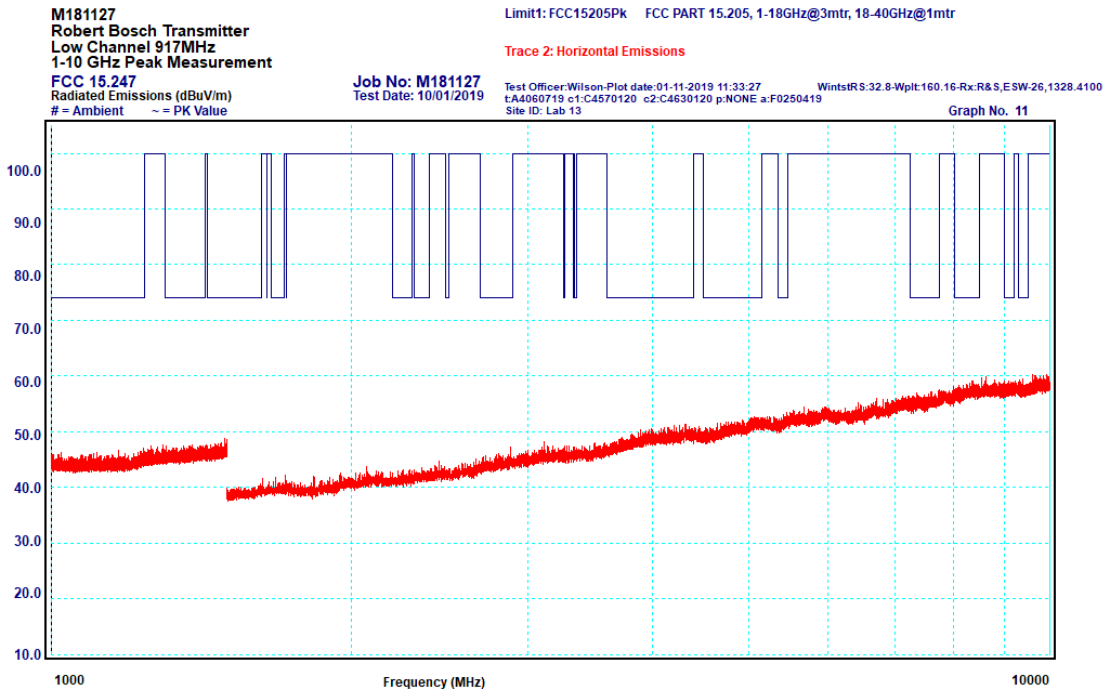
*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

### 6.8.6 Results: Frequency Band: 1000 – 10000 MHz

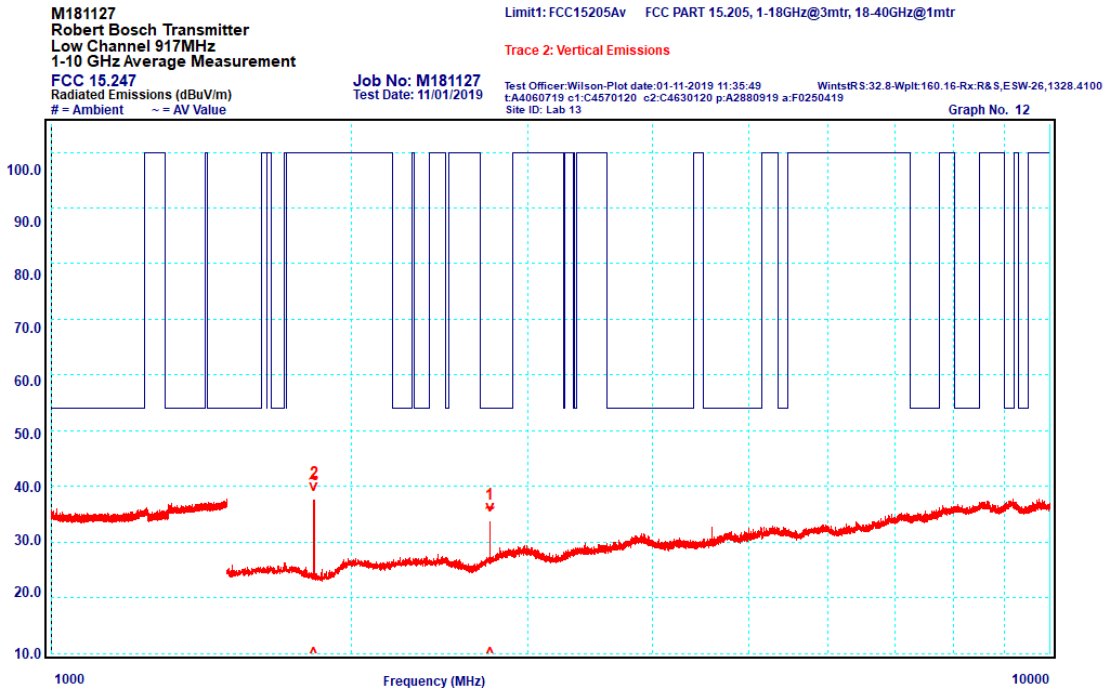
All spurious emissions measured in the frequency band 1000 MHz to 10000 MHz complied with the requirements of §15.247(d). The emissions were more than 10 dB below the limit.




*Graph 6-21: Spurious Emissions, 1000 - 10000 MHz, Vertical, Peak, Low channel 917 MHz*



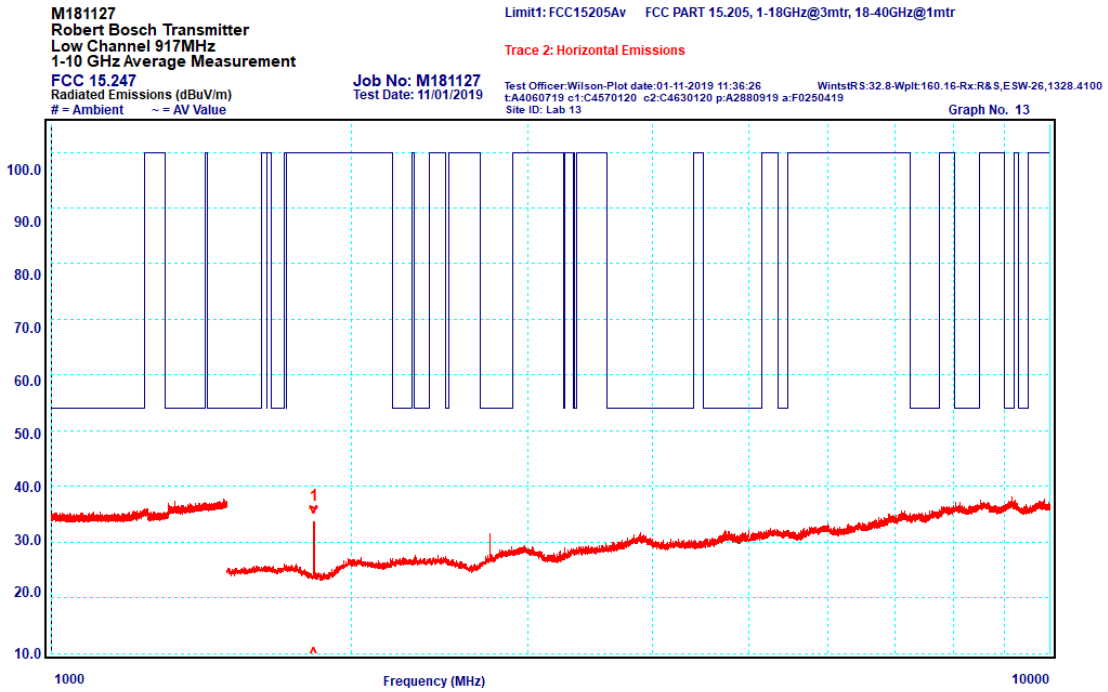

*Graph 6-22: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Peak, Low channel 917 MHz*




*Graph 6-23: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, Low channel 917 MHz*

*Table 6-13: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, Low channel 917 MHz*

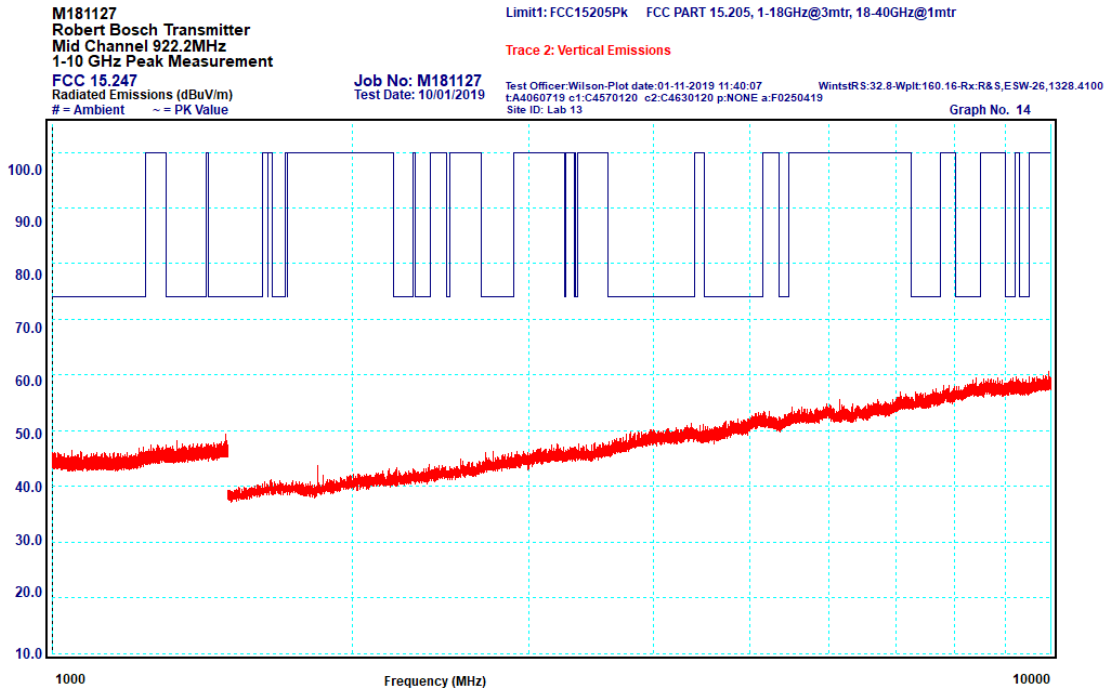
| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Vertical | 2751.03 | 36 | 54 | -18 |
| 2 | Vertical | 1834 | 41.2 | 103.41 | -62.21 |



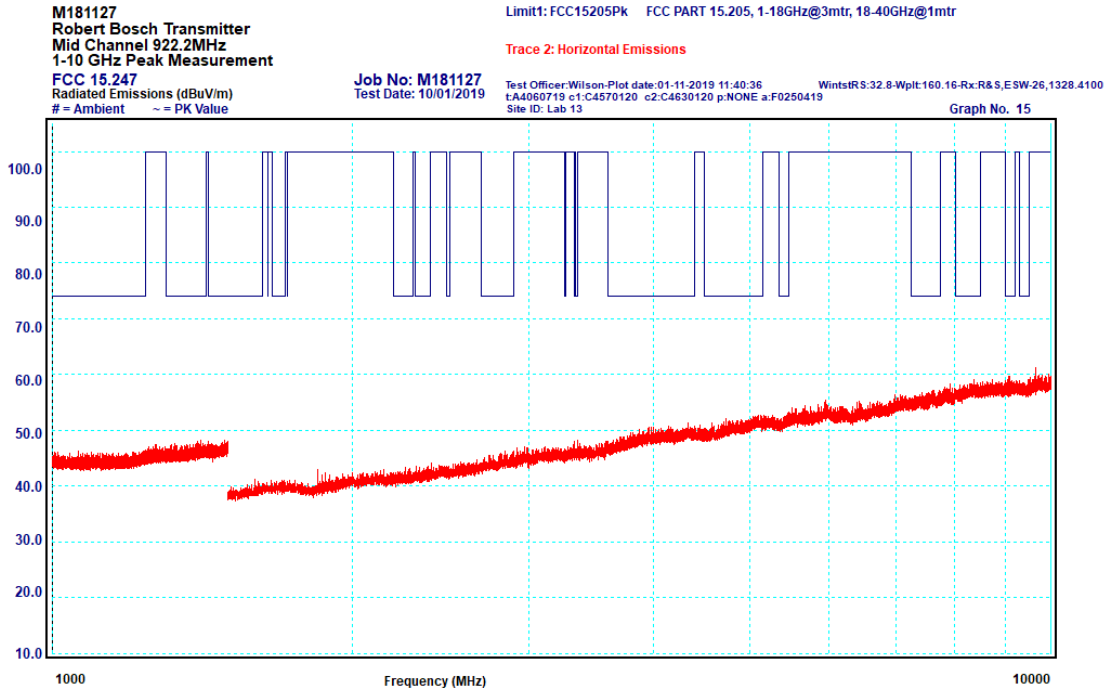

*Graph 6-24: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Average, Low channel 917 MHz*

*Table 6-14: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Average, Low channel 917 MHz*

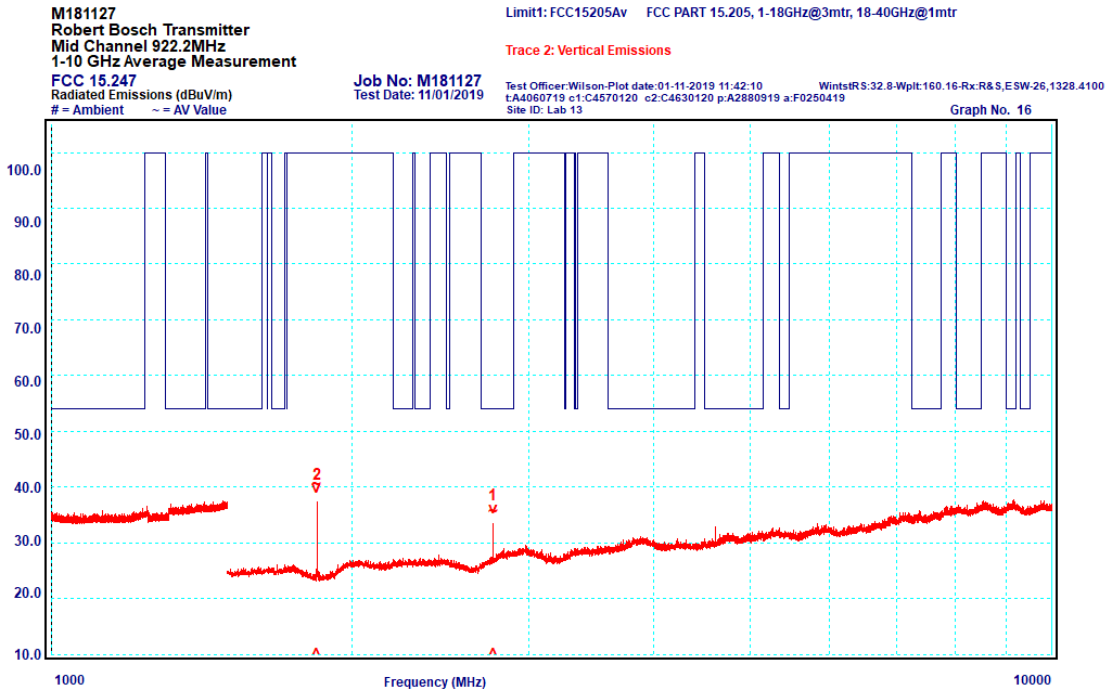
| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Horizontal | 1834.02 | 36.0 | 103.41 | -67.41 |




*Graph 6-25: Spurious Emissions, 1000 - 10000 MHz, Vertical, Peak, Middle channel 922.2 MHz*



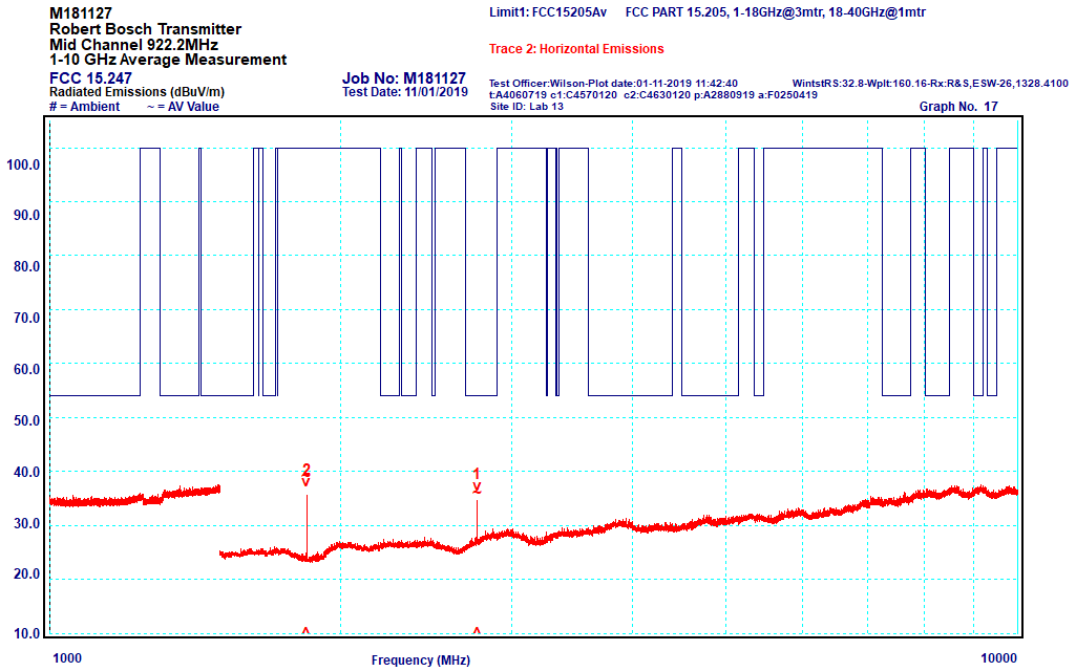

*Graph 6-26: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Peak, Middle channel 922.2 MHz*




*Graph 6-27: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, Middle channel 922.2 MHz*

*Table 6-15: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, Middle channel 922.2 MHz*

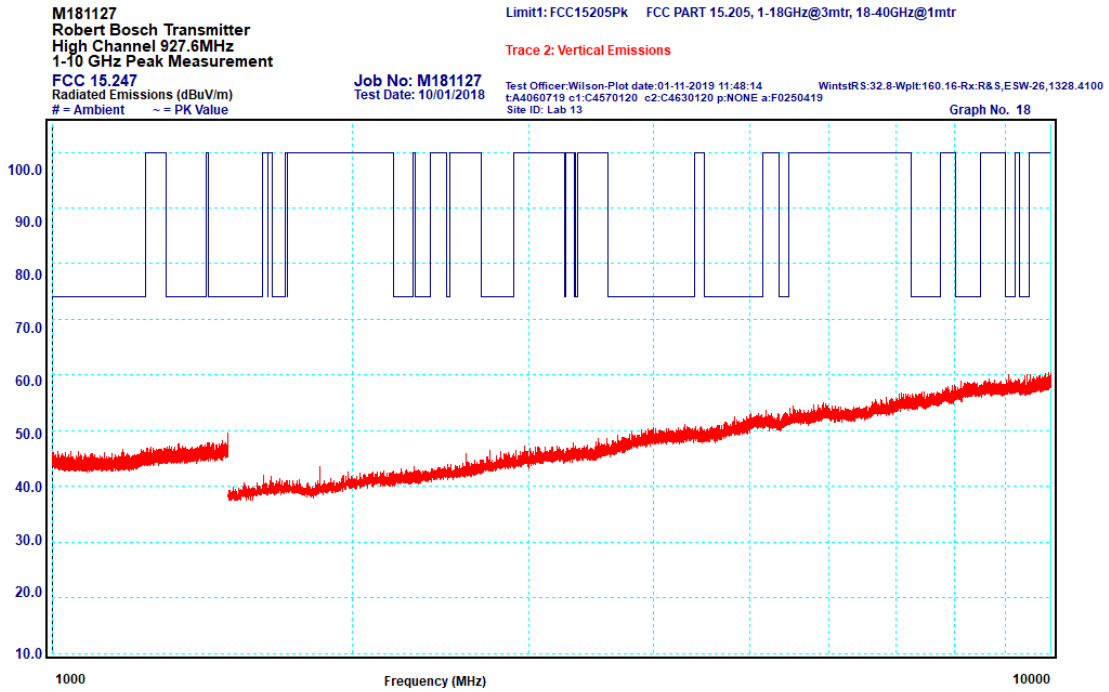
| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Vertical | 2766.65 | 35.5 | 54 | -18.5 |
| 2 | Vertical | 1844.43 | 40.4 | 103.41 | -63.01 |



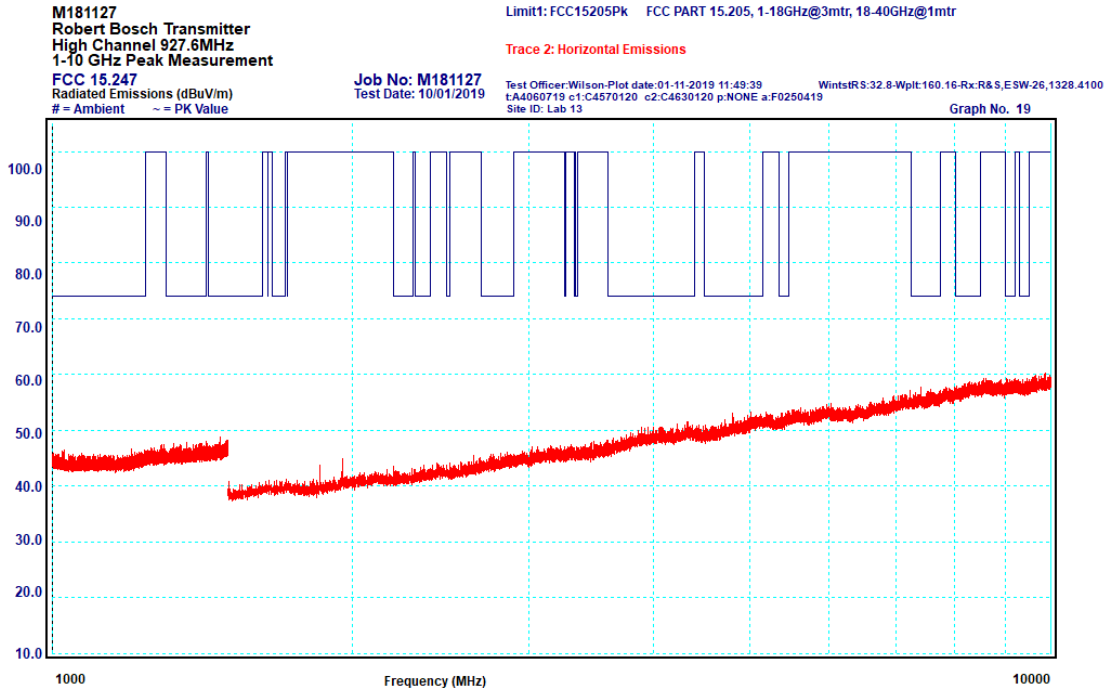

*Graph 6-28: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Average, Middle channel 922.2 MHz*

*Table 6-16: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Average, Middle channel 922.2 MHz*

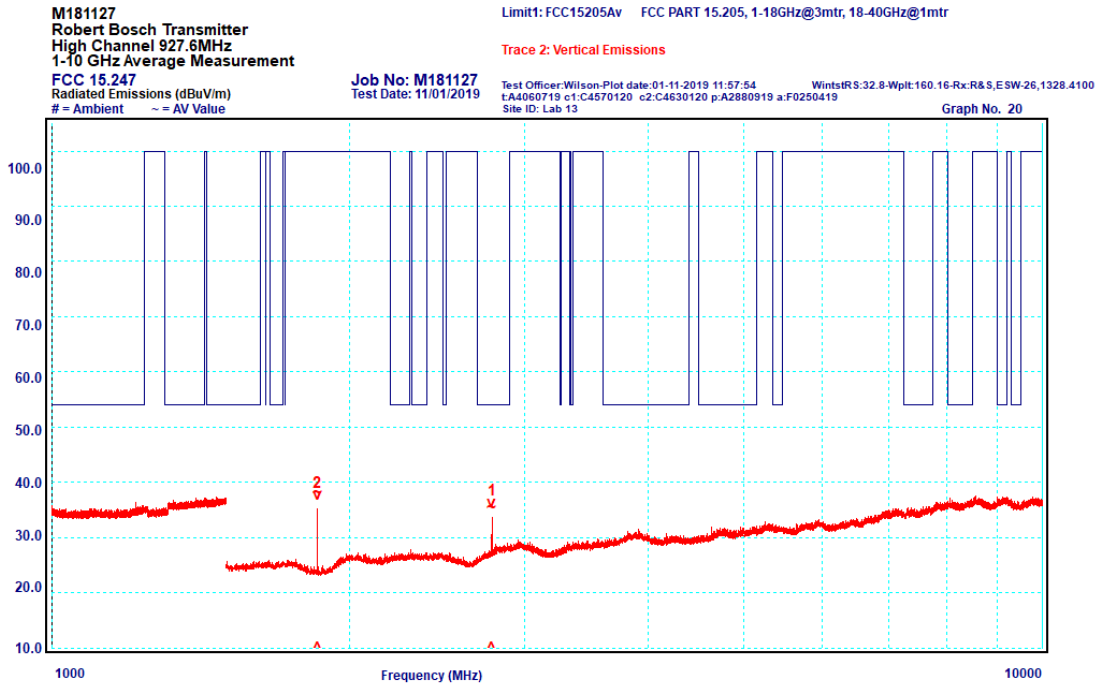
| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Horizontal | 2766.62 | 35.9 | 54 | -18.1 |
| 2 | Horizontal | 1844.4 | 39 | 103.41 | -64.41 |




*Graph 6-29: Spurious Emissions, 1000 - 10000 MHz, Vertical, Peak, High channel 927.6 MHz*



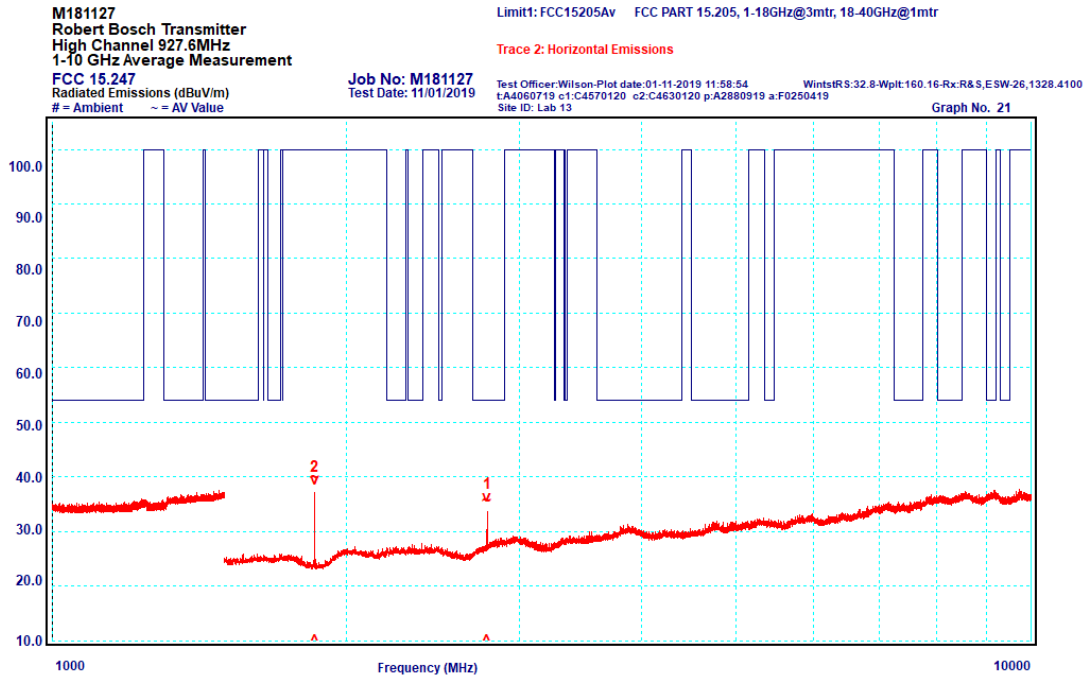

*Graph 6-30: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Peak, High channel 927.6 MHz*




*Graph 6-31: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, High channel 927.6 MHz*

*Table 6-17: Spurious Emissions, 1000 - 10000 MHz, Vertical, Average, High channel 927.6 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Vertical | 2782.85 | 35.4 | 54 | -18.6 |
| 2 | Vertical | 1855.21 | 38 | 103.41 | -65.41 |




*Graph 6-32: Spurious Emissions, 1000 - 10000 MHz, Horizontal, Average, High channel 927.6 MHz*

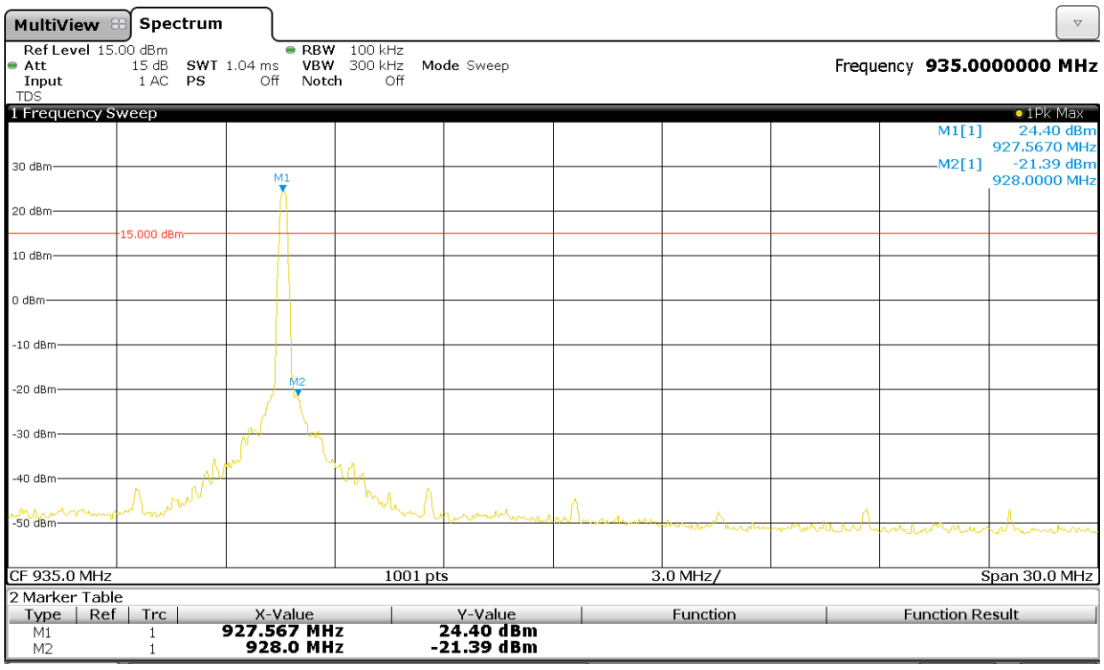
*Table 6-18: Spurious Emissions, 1000 - 10000 MHz, Average, High channel 927.6 MHz*

| Peak | Polarisation | Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Delta Limit (dB) |
|---|---|---|---|---|---|
| 1 | Horizontal | 2782.81 | 35.6 | 54 | -18.4 |
| 2 | Horizontal | 1855.2 | 39.8 | 103.41 | -63.61 |

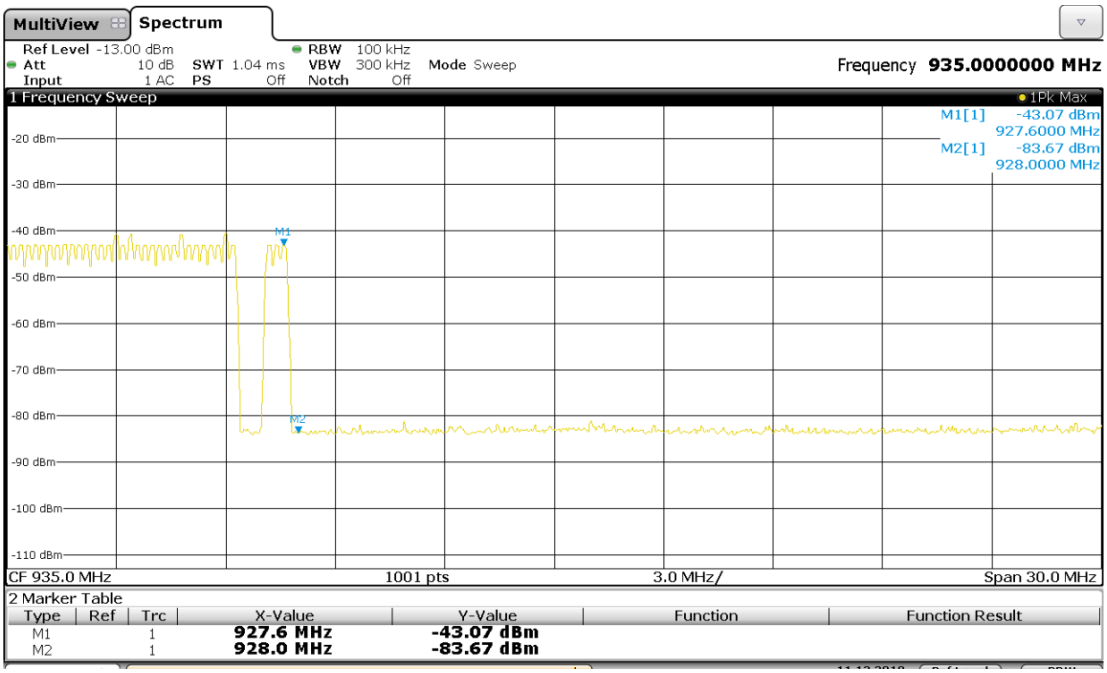
## 6.9 §15.247(d) Band Edge Emission Measurements

Band-edge measurements were done using conducted methods in accordance to ANSI C63.10 clause 6.10.

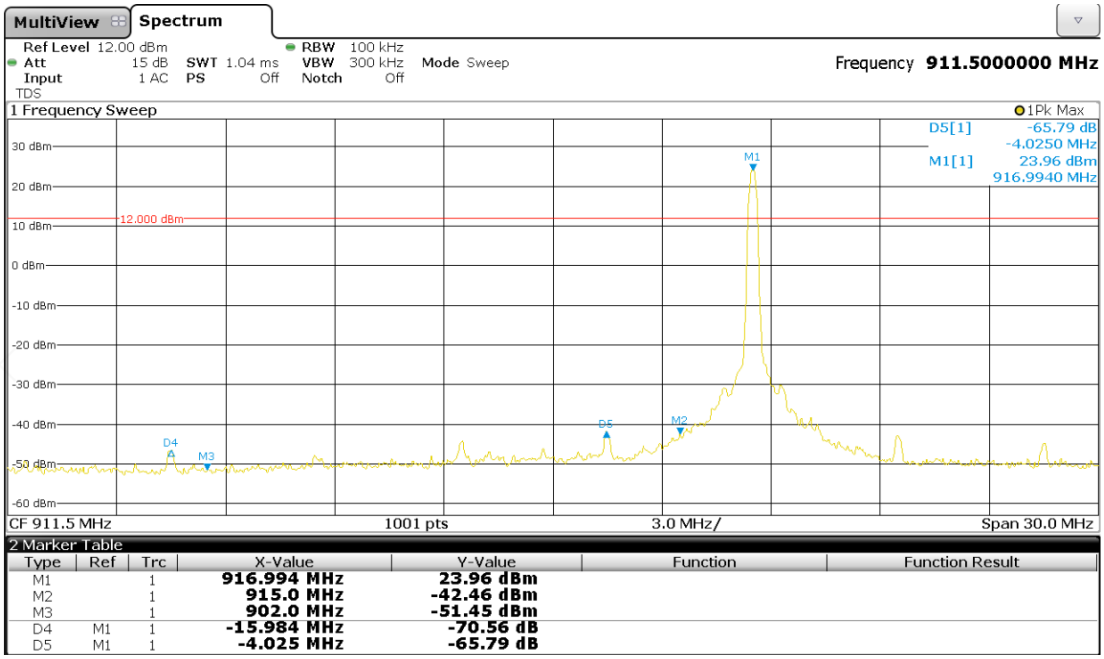
All emissions measured near the lower and higher band edge complied with the requirements of §15.247(d).



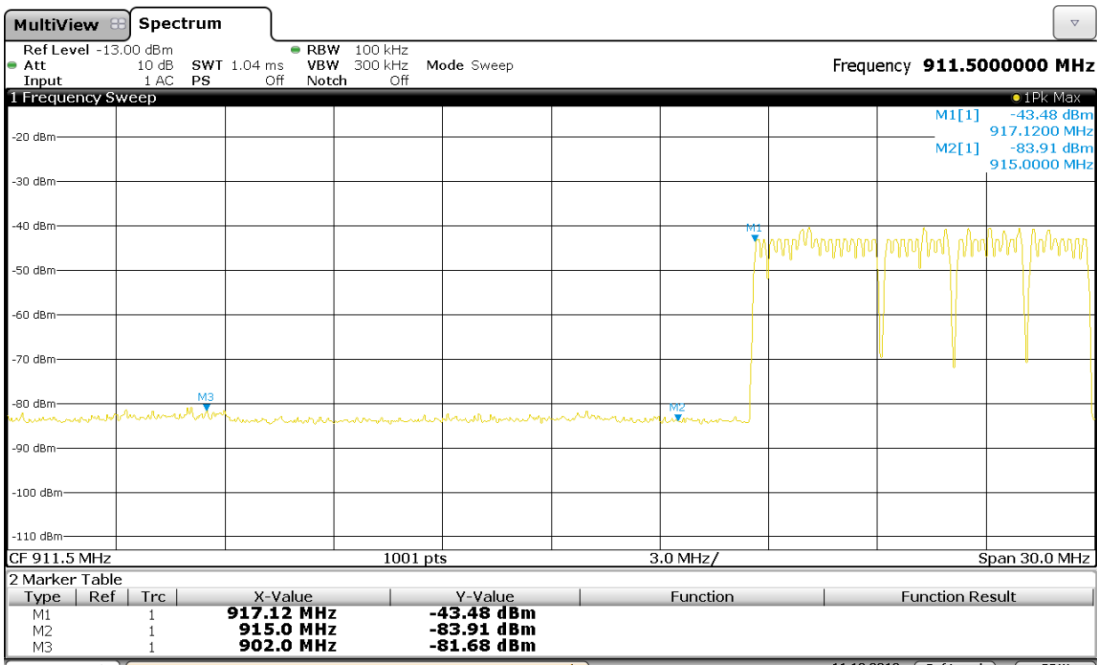

*Graph 6-33: Higher band edge 928 MHz, High channel 927.6 MHz, Hopping off*




*Graph 6-34: Higher band edge 928 MHz, High channel 927.6 MHz, Hopping on*




*Graph 6-35: Lower band edge 902 MHz, Low channel 917 MHz, Hopping off*




*Graph 6-36: Lower band edge 902 MHz, Low channel 917 MHz, Hopping on*

## 6.10 §15.247(i) Maximum Permissible Exposure

The EUT complied with the applicable maximum permissible exposure levels. Refer to EMC Technologies report M181127-2.

## 6.11 §15.215 Occupied Bandwidth – 99% power

### 6.11.1 Test procedure

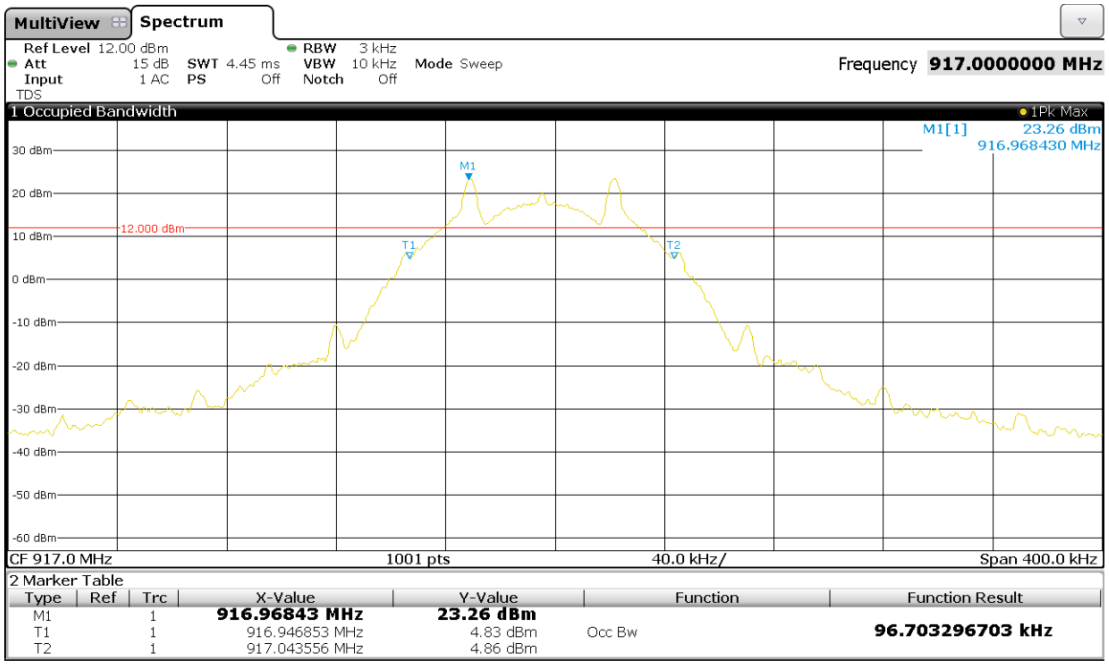
The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

### 6.11.2 Limits

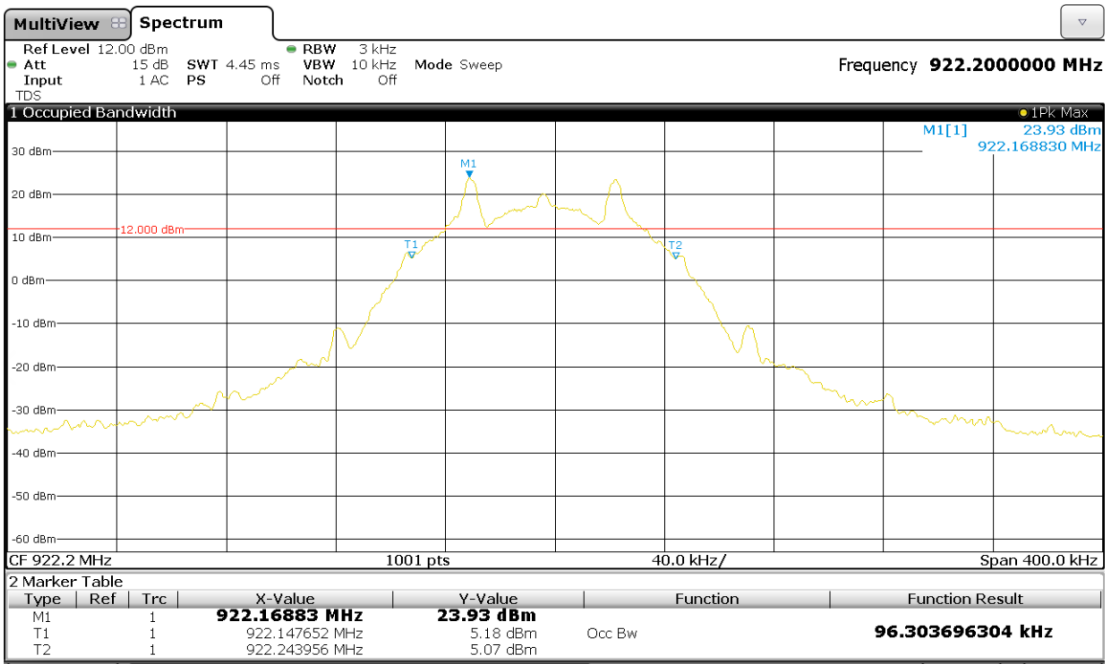
The 99% power should be contained within the frequency band 902 – 928 MHz.

### 6.11.3 Results

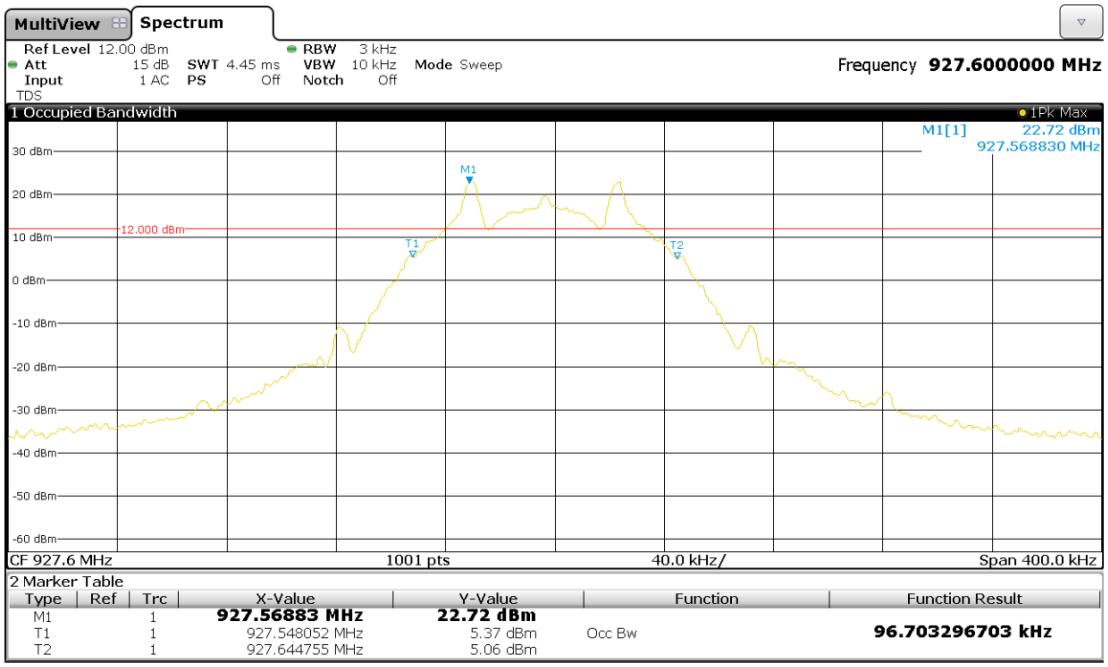
| Channel | 99% Bandwidth [MHz] | Low Frequency [MHz] | High Frequency [MHz] | Result |
|---|---|---|---|---|
| Low | 0.0967 | 916.94 | 917.04 | Complied |
| Middle | 0.0963 | 922.14 | 922.24 | Complied |
| High | 0.0967 | 927.54 | 927.64 | Complied |




*Graph 6-37: Occupied bandwidth – Low channel 917 MHz*




*Graph 6-38: Occupied bandwidth – Middle channel 922.2 MHz*




*Graph 6-39: Occupied bandwidth – High channel 927.6 MHz*