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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**

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Accreditation No.5292

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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

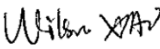
Tested for: ROBERT BOSCH (AUSTRALIA) PTY LTD  
Address: 1555 CENTRE ROAD, CLAYTON VIC 3168  
Phone Number: +61 3 9541 5213  
Contact: Brendan Westhorpe  
Email: Brendan.Westhorpe@au.bosch.com

Standard: FCC Part 15 – Radio Frequency Devices  
Subpart C – Intentional Radiators  
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

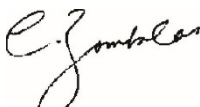
Result:

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  
Technical Director  
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<sup>2</sup>LA).

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’

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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](http://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 (R-144)	17/07/2017	17/07/2020	3 Year* <sup>1</sup>
EMI Receiver	R&S ESW26 Sn: 101306 (R-143)	14/05/2018	14/05/2019	1 Year* <sup>2</sup>
Antennas	EMCO 6502 Active Loop 9 kHz – 30 MHz Sn: 9311-2801 (A-231)	15/08/2018	15/08/2021	3 Year* <sup>2</sup>
	SUNOL JB1 Sn: A061917 (A-425)	21/07/2017	21/07/2019	2 Year* <sup>2</sup>
	EMCO 3115 Double Ridge Horn Sn: 8908-3282 (A-004)	15/07/2016	15/07/2019	3 Year* <sup>1</sup>
Cables* <sup>4</sup>	Huber & Suhner Sucoflex 104A Sn: 503055 (C-457)	02/01/2018	02/01/2019	1 Year* <sup>1</sup>
	Huber & Suhner Sucoflex 104A Sn: 507099 (C-479)	10/01/2018	10/01/2019	1 Year* <sup>1</sup>
	Huber & Suhner Sucoflex 104A Sn: 503061 (C-463)	03/01/2018	03/01/2019	1 Year* <sup>1</sup>

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:

<b>Conducted Emissions:</b>	9 kHz to 30 MHz	±3.2 dB
<b>Radiated Emissions:</b>	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
<b>Peak Output Power:</b>		±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

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

### 5.2 EUT (Host) Details

<b>Test Sample:</b>	MCSS RF module
<b>Model Number:</b>	6LP GW / 6LP SN
<b>Serial Number:</b>	00-12-4B-00-18-6E-7B-1B / 00-12-4B-00-18-6E-7B-6E
<b>Manufacturer:</b>	ROBERT BOSCH (AUSTRALIA) PTY LTD
<b>Supply Rating:</b>	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.

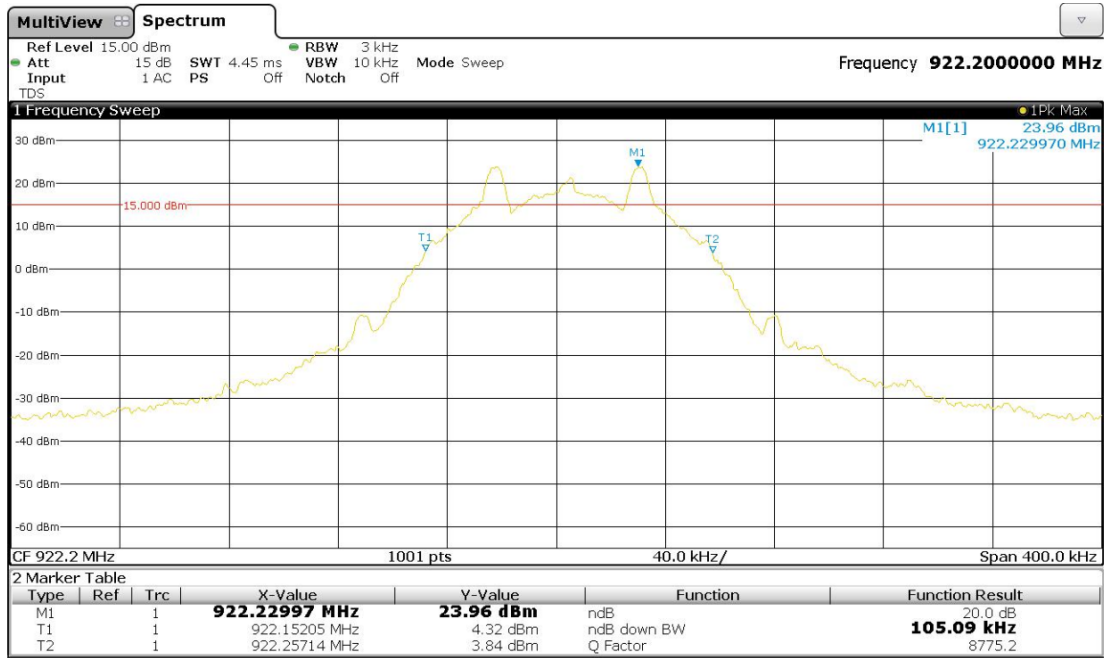
#### 6.5.3 Results

##### 20dB bandwidth

Table 6-1: 20dB Bandwidth

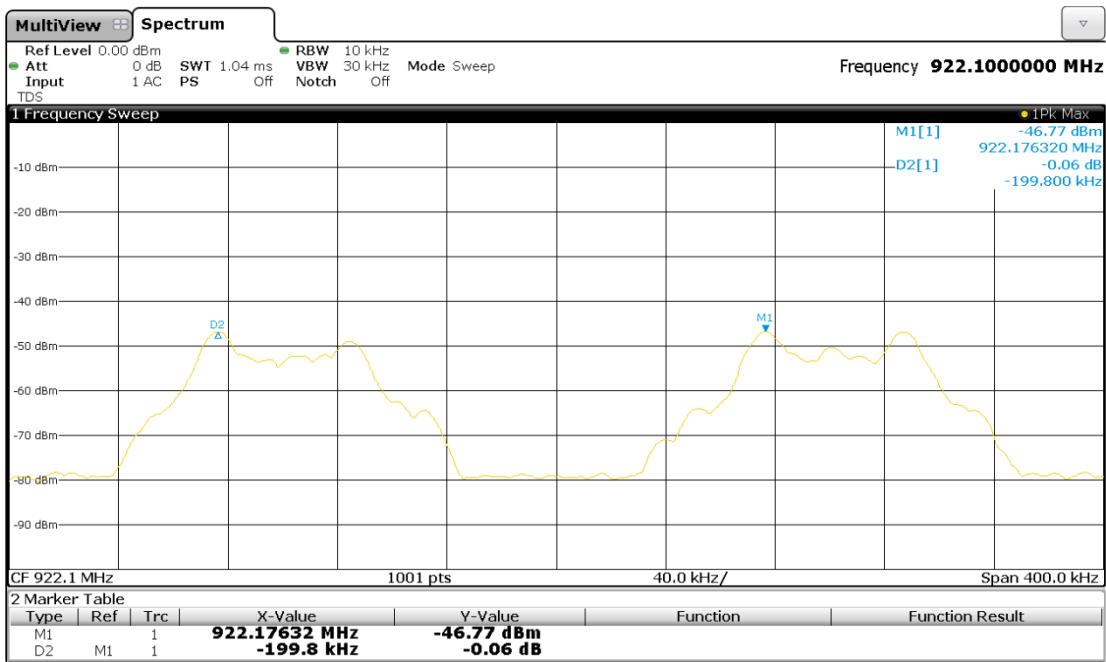
Channel	Centre Frequency [MHz]	20 dB Bandwidth [kHz]
Low	917.0	103.10
Middle	922.2	<b>105.09</b>
High	927.6	104.30

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

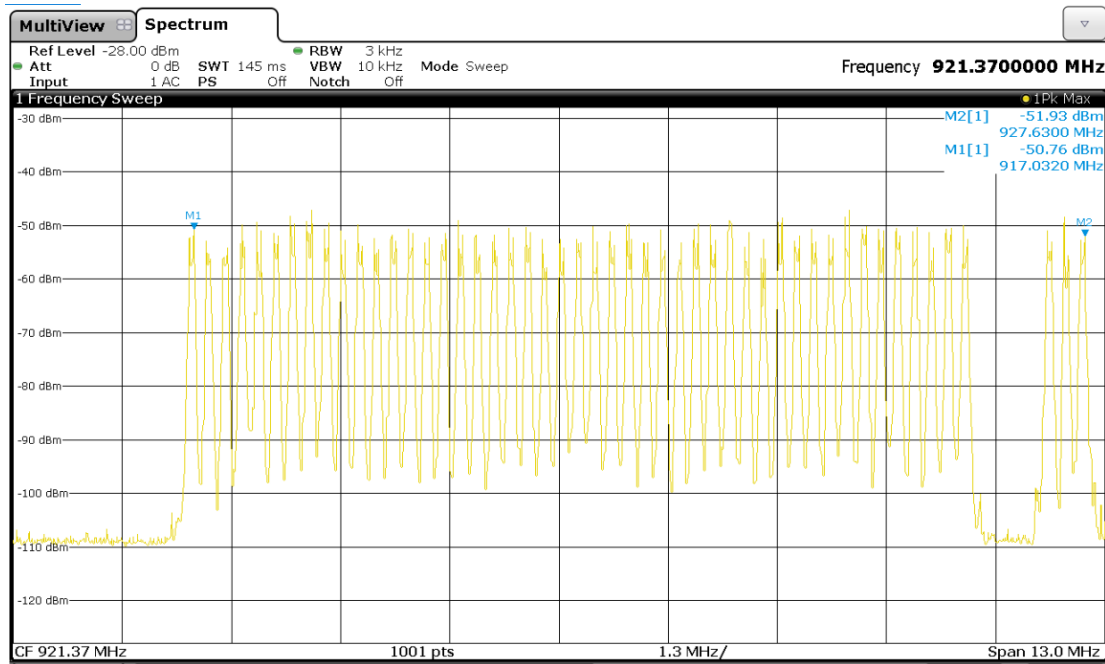
### 6.6.1 Test Procedure

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.

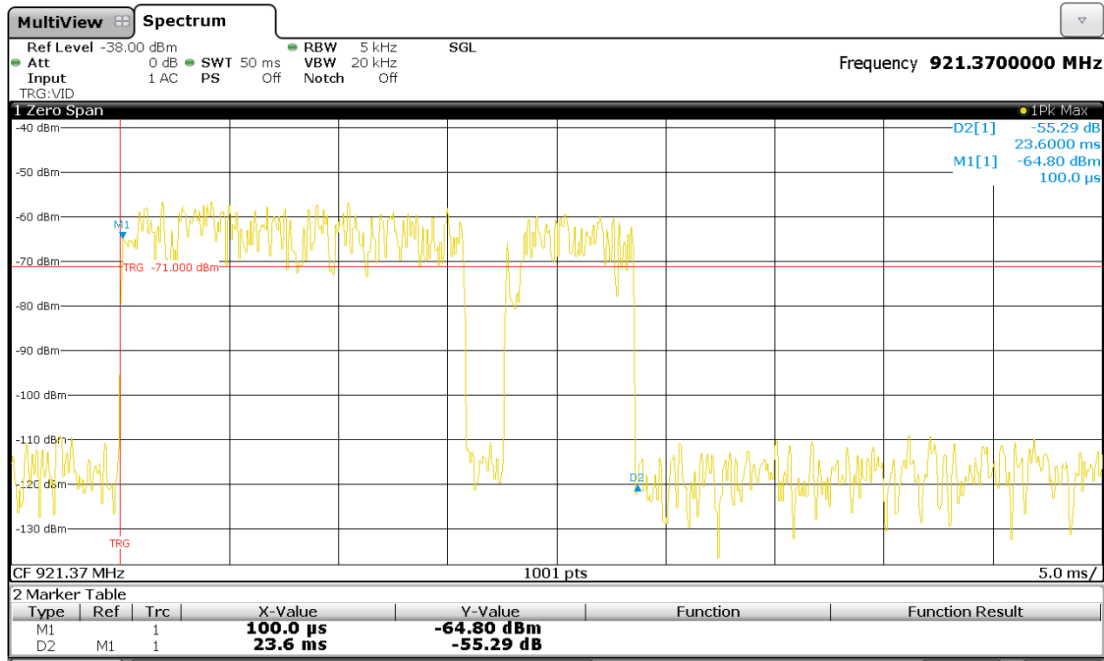
### 6.6.3 Results



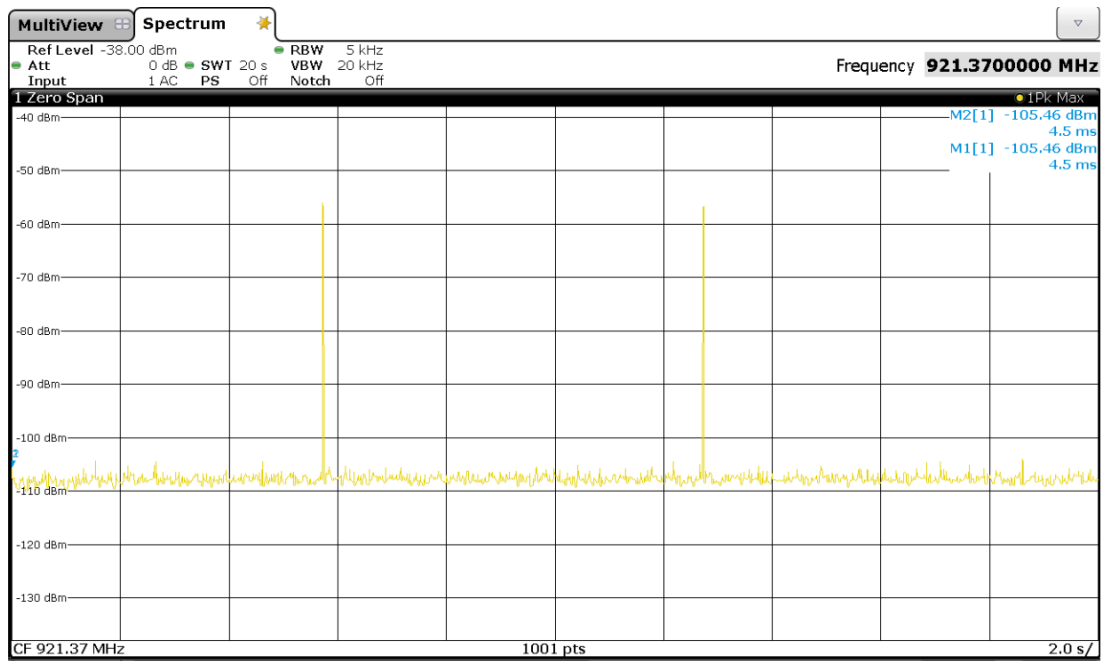
Graph 6-3: Number of Channels

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.

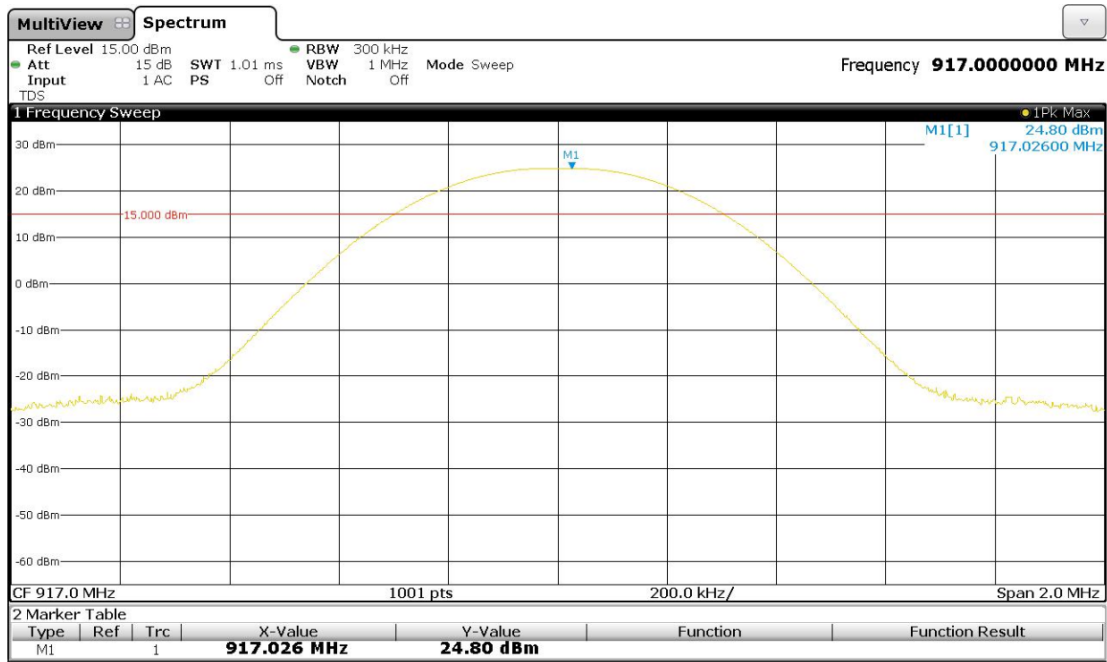
### 6.7.3 Results

Conducted Peak Output Power

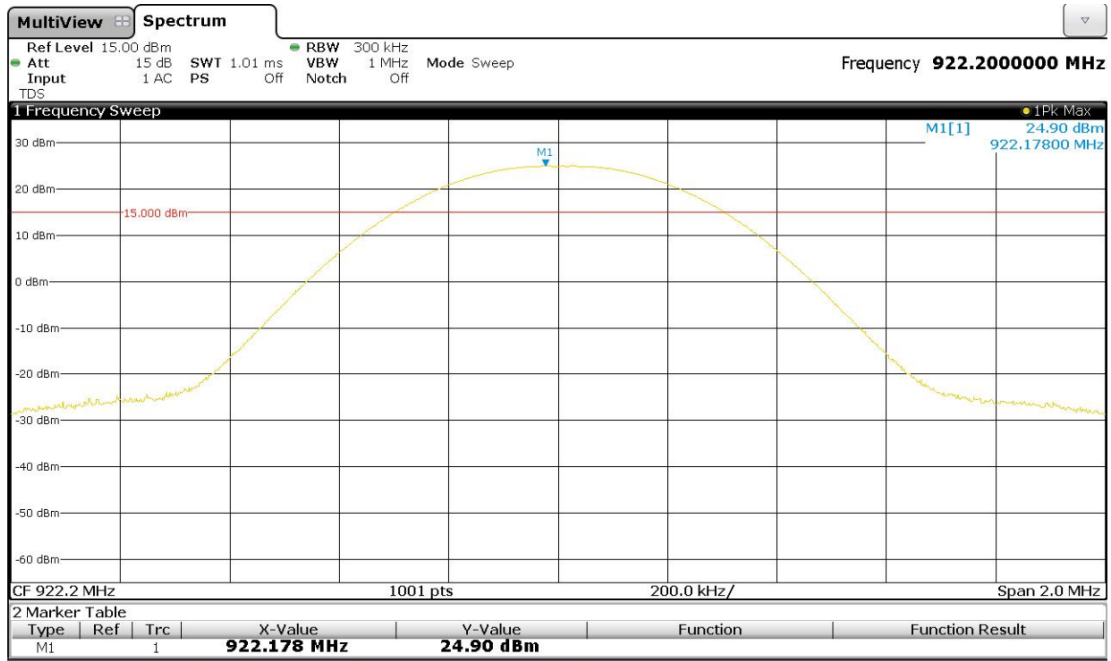
Table 6-5: Conducted Peak Output Power

Channel	Freq. MHz	Conducted Power		Limit	$\Delta$ 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

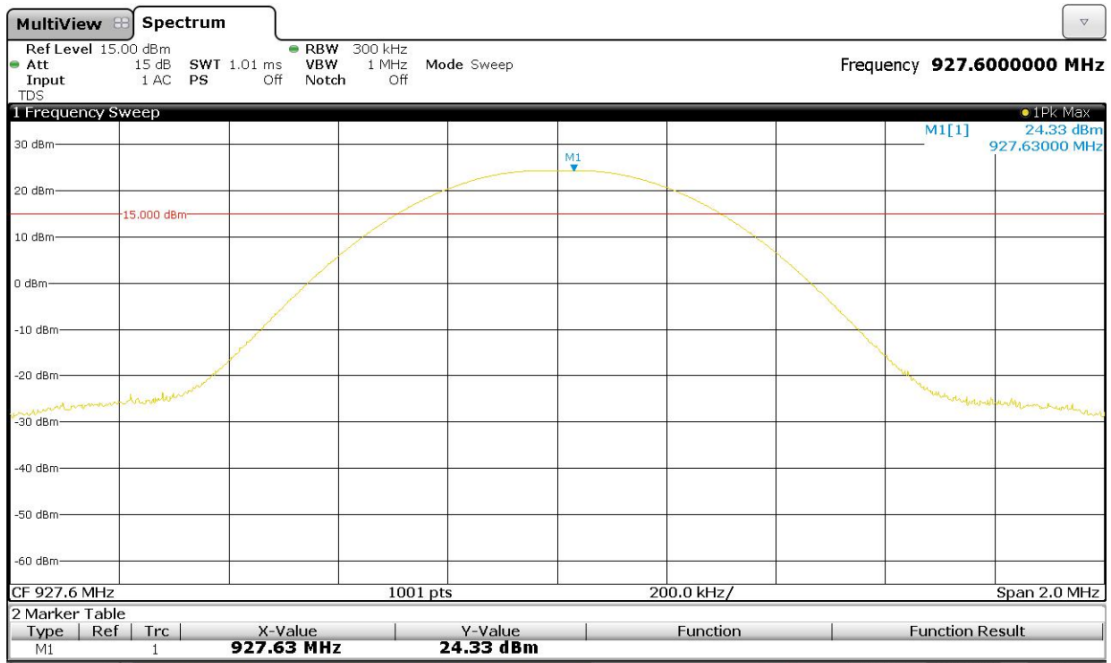
\*A negative  $\Delta$  is below the limit



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:

$$E = V + AF - G + L$$

Where:  $E$  = Radiated Field Strength in dB $\mu$ V/m.

$V$  = EMI Receiver Voltage in dB $\mu$ V/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).

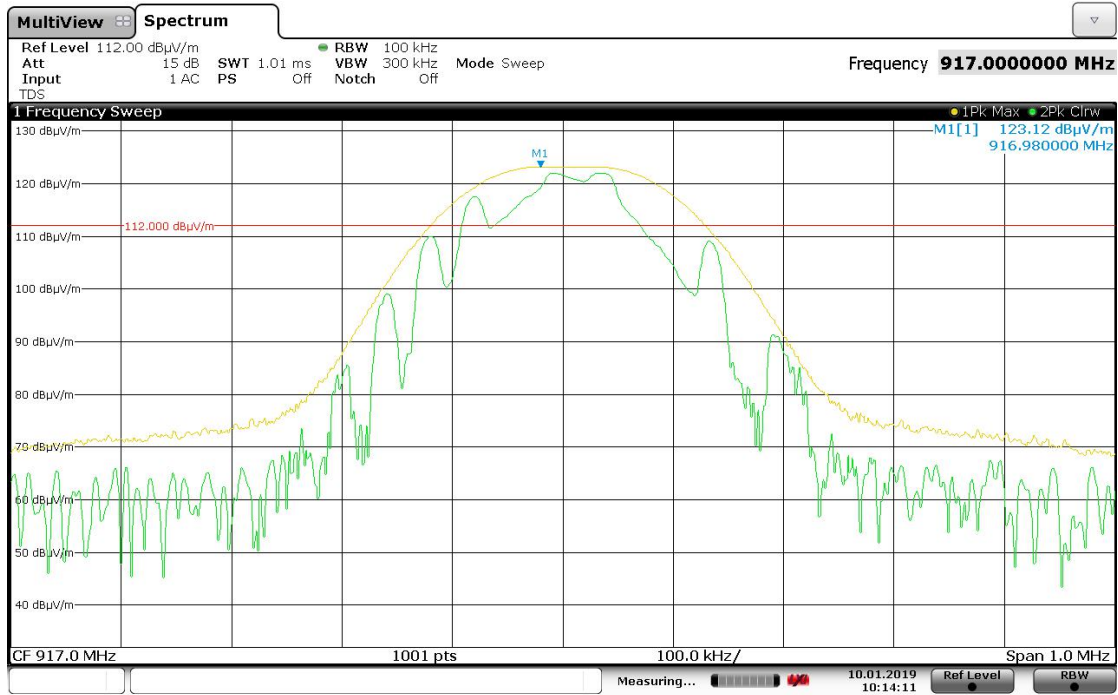
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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



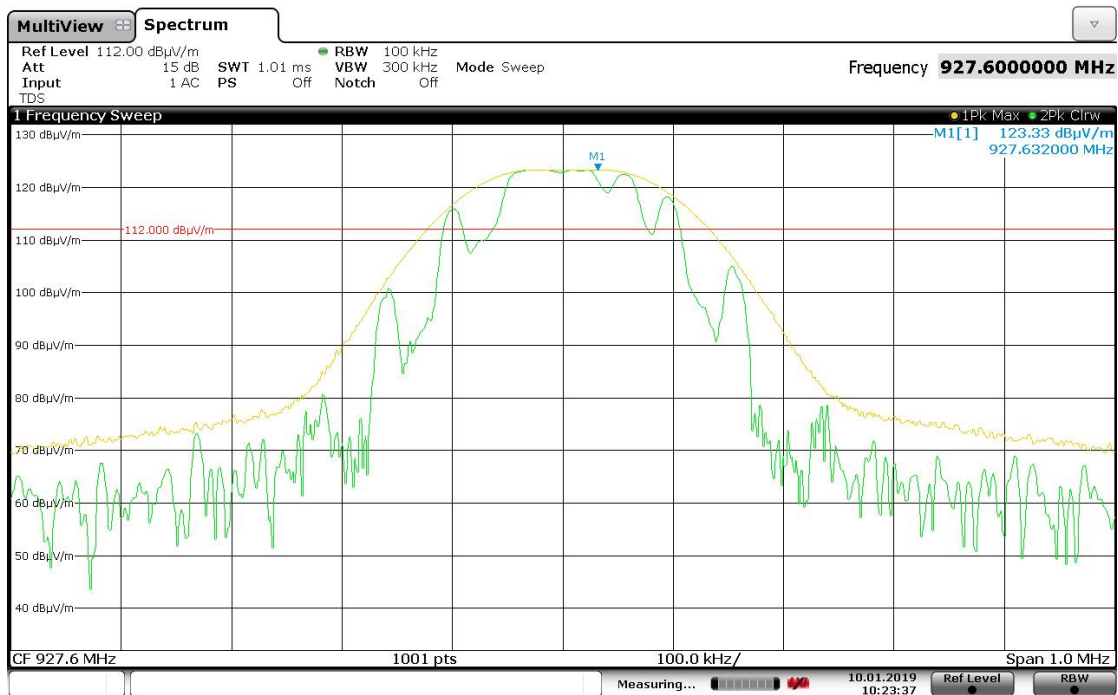
10:14:11 10.01.2019

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



10:19:27 10.01.2019

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

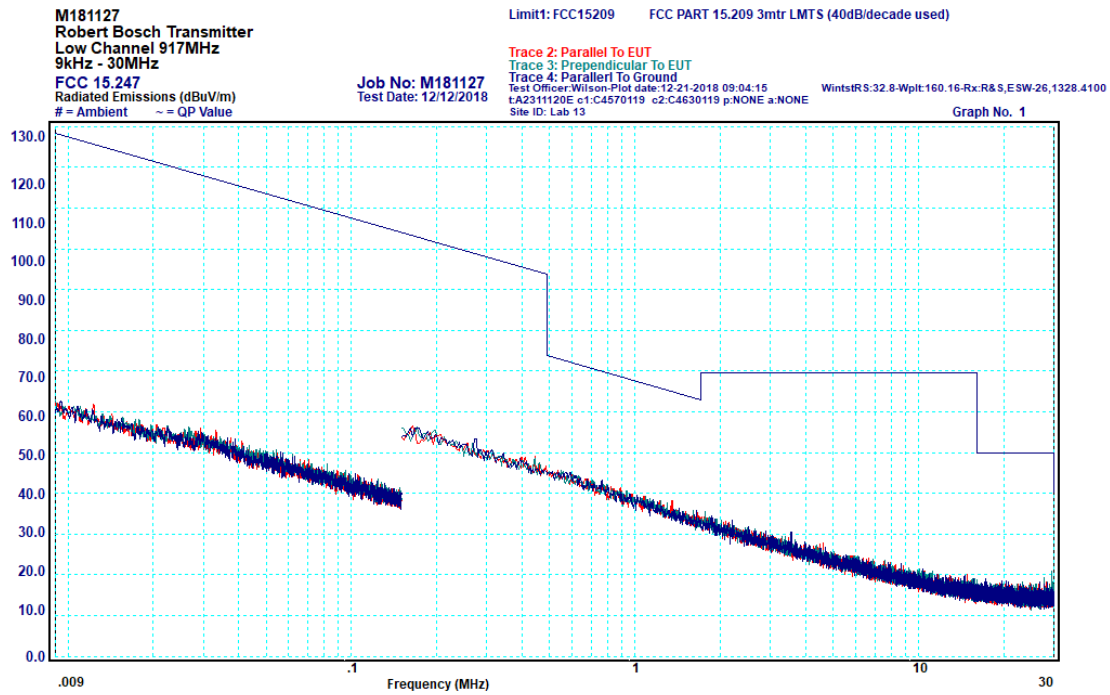


10:23:37 10.01.2019

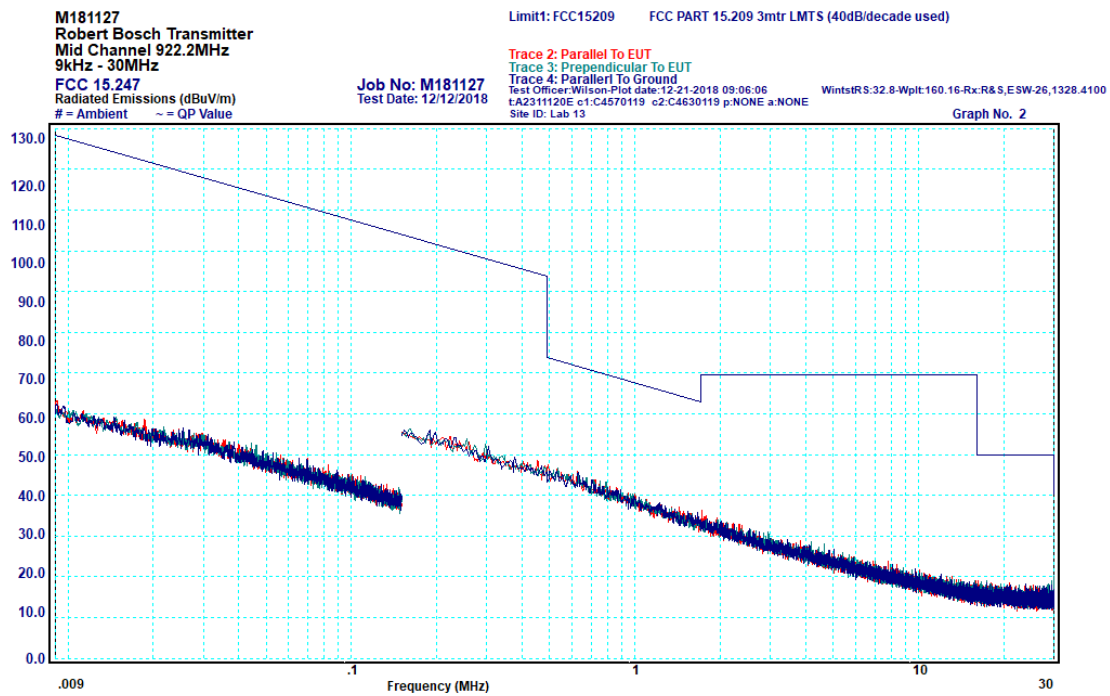
Graph 6-11: 100 kHz bandwidth. Peak measurement, EUT x-axis, Measurement antenna – Vertical polarisation, High channel – 927.6 MHz

### 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

M181127  
Robert Bosch Transmitter  
High Channel 927.6MHz  
9kHz - 30MHz  
FCC 15.247  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

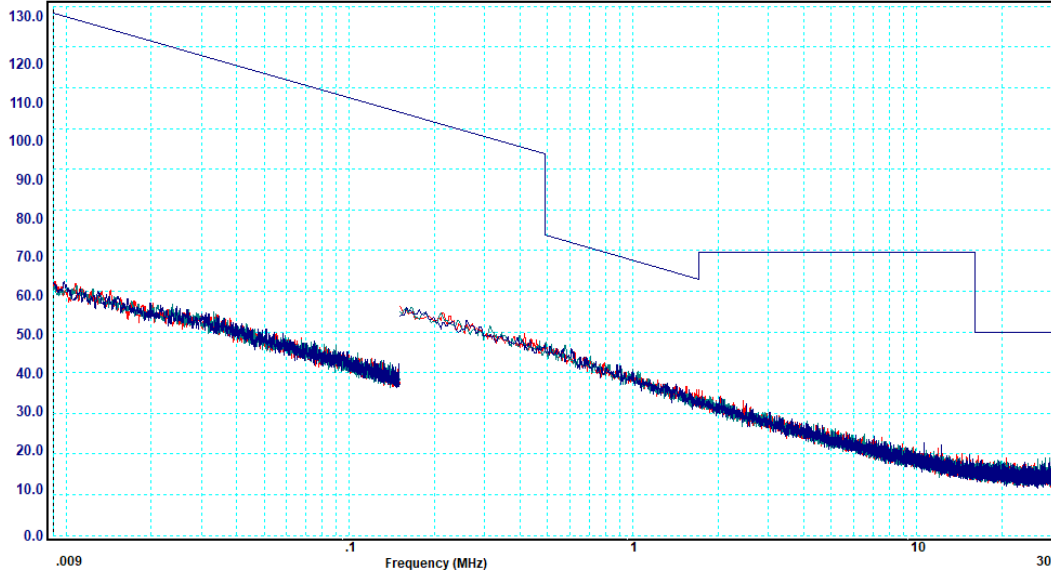
Limit1: FCC15209 FCC PART 15.209 3mtr LMTS (40dB/decade used)

Job No: M181127  
Test Date: 12/12/2018

Trace 2: Parallel To EUT  
Trace 3: Perpendicular To EUT  
Trace 4: Parallel To Ground  
Test Officer: Wilson-Plot date: 12-21-2018 09:08:16  
tA231120E c1:C4570119 c2:C4630119 p:NONE a:NONE  
Site ID: Lab 13

WintsRS:32.0-Wpit:160.16-Rx:R&S,ESW-26,1328.4100

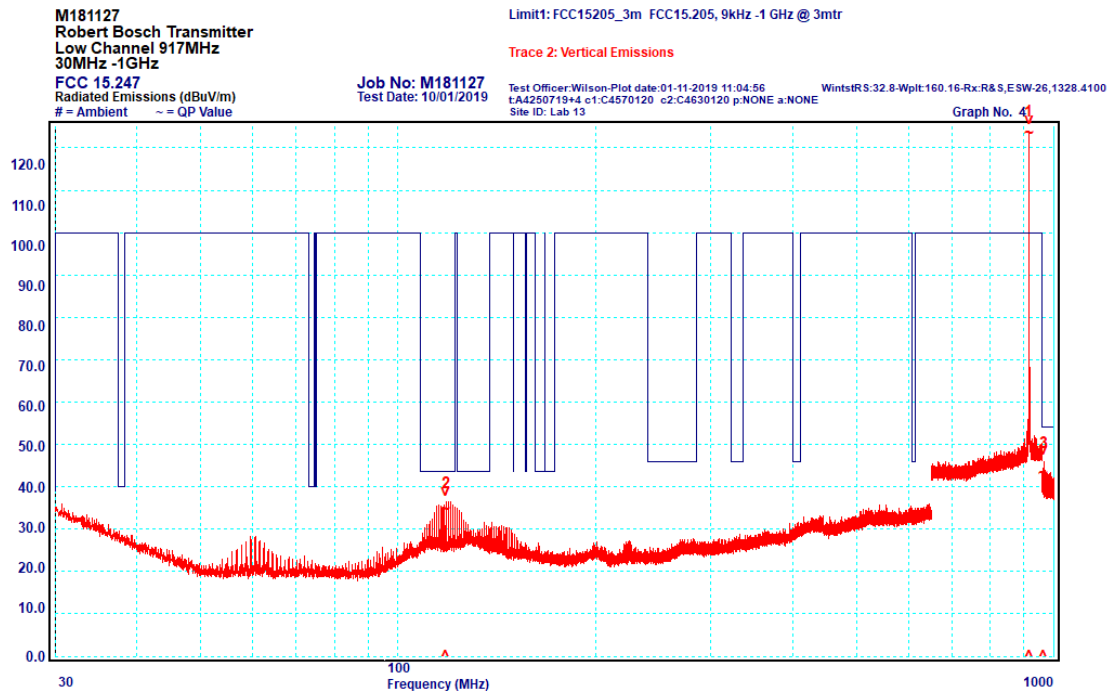
Graph No. 3



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

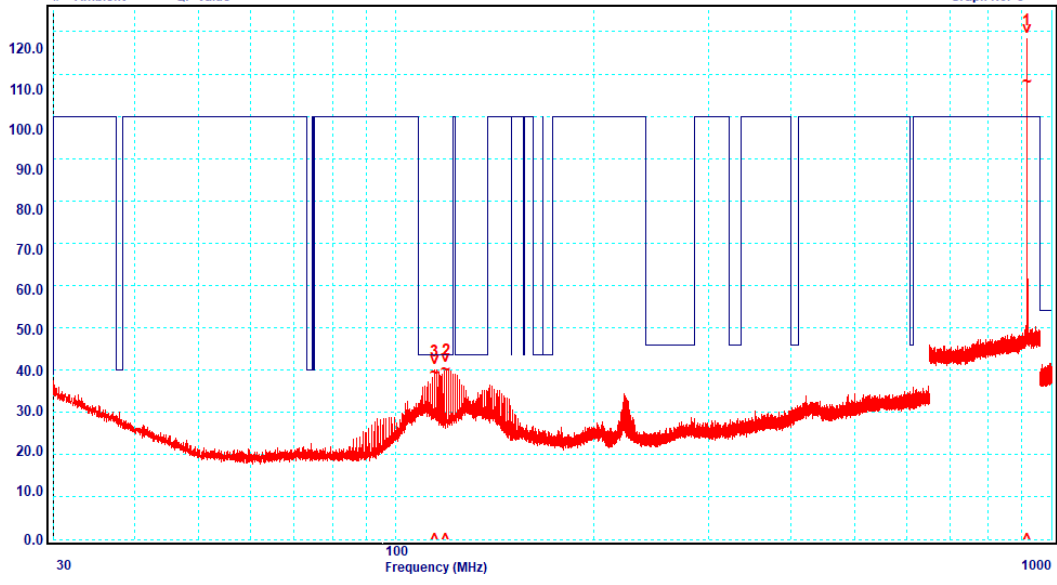
M181127  
 Robert Bosch Transmitter  
 Low Channel 917MHz  
 30MHz -1GHz  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = QP Value

Limit1: FCC15205\_3m FCC15.205, 9kHz -1 GHz @ 3mtr  
 Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:09:14  
 t:A4250719+4 c1:C4570120 c2:C4630120 p:NONE a:NONE  
 WinstRS:32.8-Wpit160.16-Rx:R&S,ESW-26,1328.4100  
 Site ID: Lab 13

Graph No. 5



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

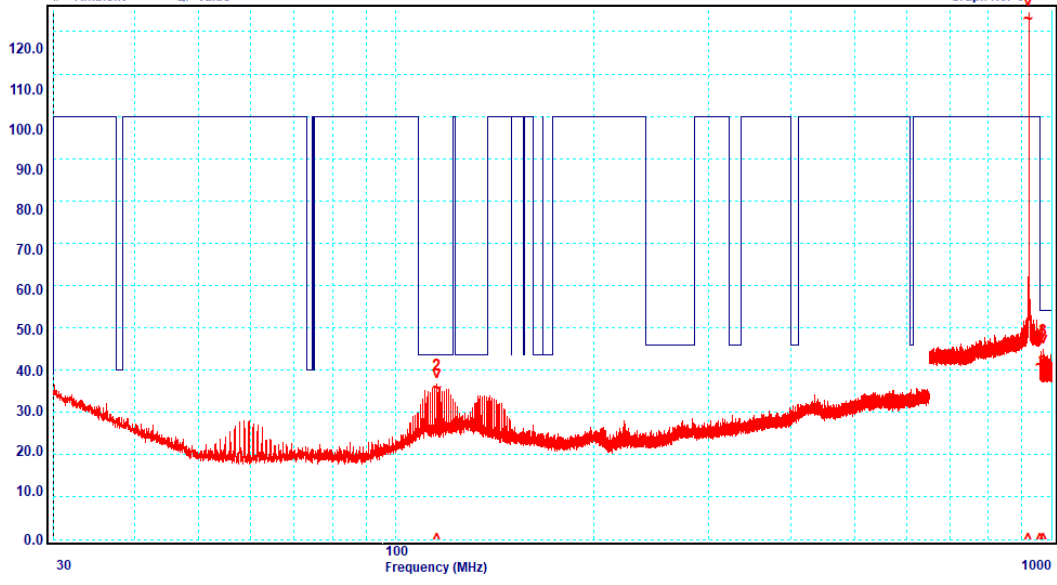
M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 30MHz -1GHz  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = QP Value

Limit1: FCC15205\_3m FCC15.205, 9kHz -1 GHz @ 3mtr  
 Trace 2: Vertical Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:15:57  
 t:A4250719+4 c1:C4570120 c2:C4630120 p:NONE a:NONE  
 WintsRS:32.8-Wpit160.16-Rx:R&S,ESW-26,1328.4100  
 Site ID: Lab 13

Graph No. 61



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

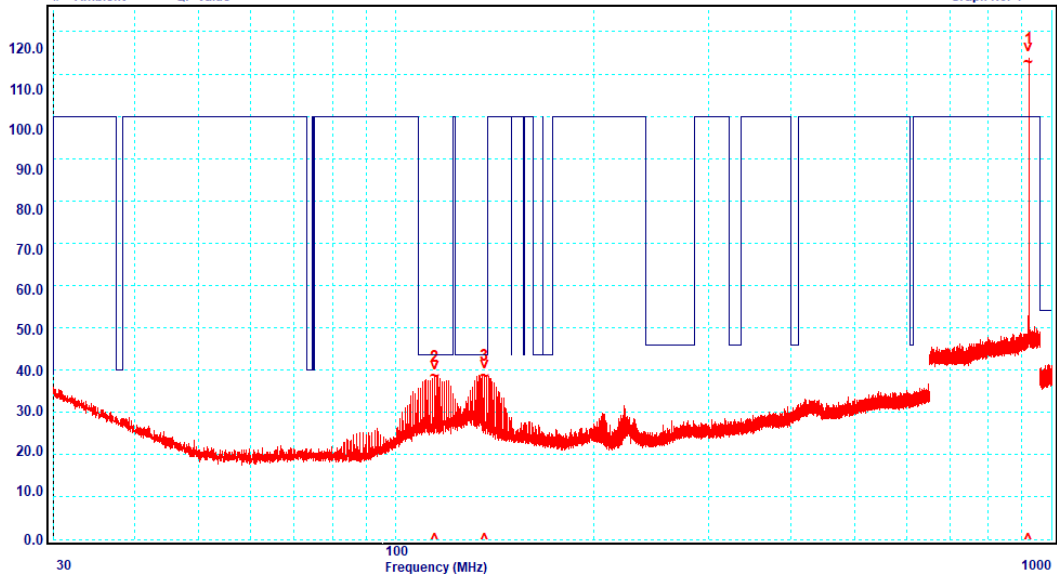
M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 30MHz -1GHz  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = QP Value

Limit1: FCC15205\_3m FCC15.205, 9kHz -1 GHz @ 3mtr  
 Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:16:37  
 t:A4250719+4 c1:C4570120 c2:C4630120 p:NONE a:NONE  
 WintsRS:32.8-Wpit:160.16-Rx:R&S,ESW-26,1328.4100  
 Site ID: Lab 13

Graph No. 7



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 (dBuV/m)	Limit (dBuV/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



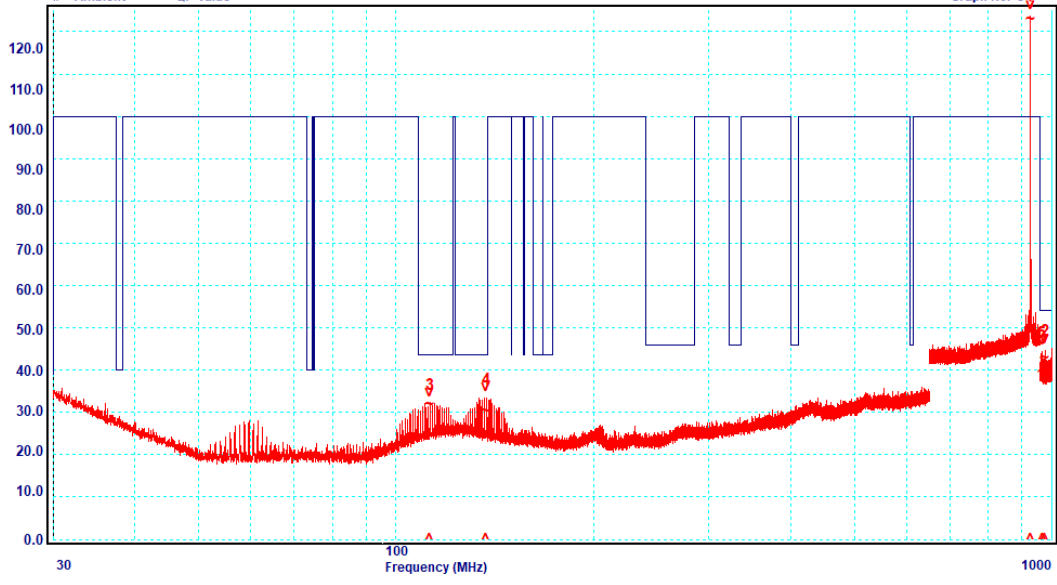
M181127  
 Robert Bosch Transmitter  
 High Channel 927.6MHz  
 30MHz -1GHz  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = QP Value

Limit1: FCC15205\_3m FCC15.205, 9kHz -1 GHz @ 3mtr  
 Trace 2: Vertical Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:27:17  
 t:A4250719+4 c1:C4570120 c2:C4630120 p:NONE a:NONE  
 WintsRS:32.8-Wpit160.16-Rx:R&S,ESW-26,1328.4100  
 Site ID: Lab 13

Graph No. 81



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

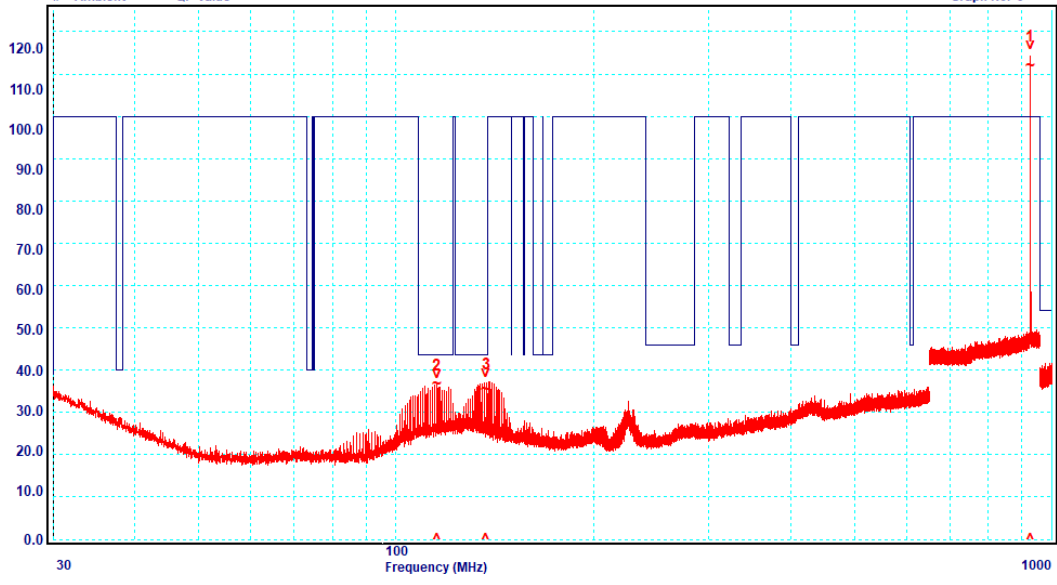
M181127  
 Robert Bosch Transmitter  
 High Channel 927.6MHz  
 30MHz -1GHz  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = QP Value

Limit1: FCC15205\_3m FCC15.205, 9kHz -1 GHz @ 3mtr  
 Trace 2: Horizontal Ambients

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:27:56  
 t:A4250719+4 c1:C4570120 c2:C4630120 p:NONE a:NONE  
 WintsRS:32.8-Wpit160.16-Rx:R&S,ESW-26,1328.4100  
 Site ID: Lab 13

Graph No. 9



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

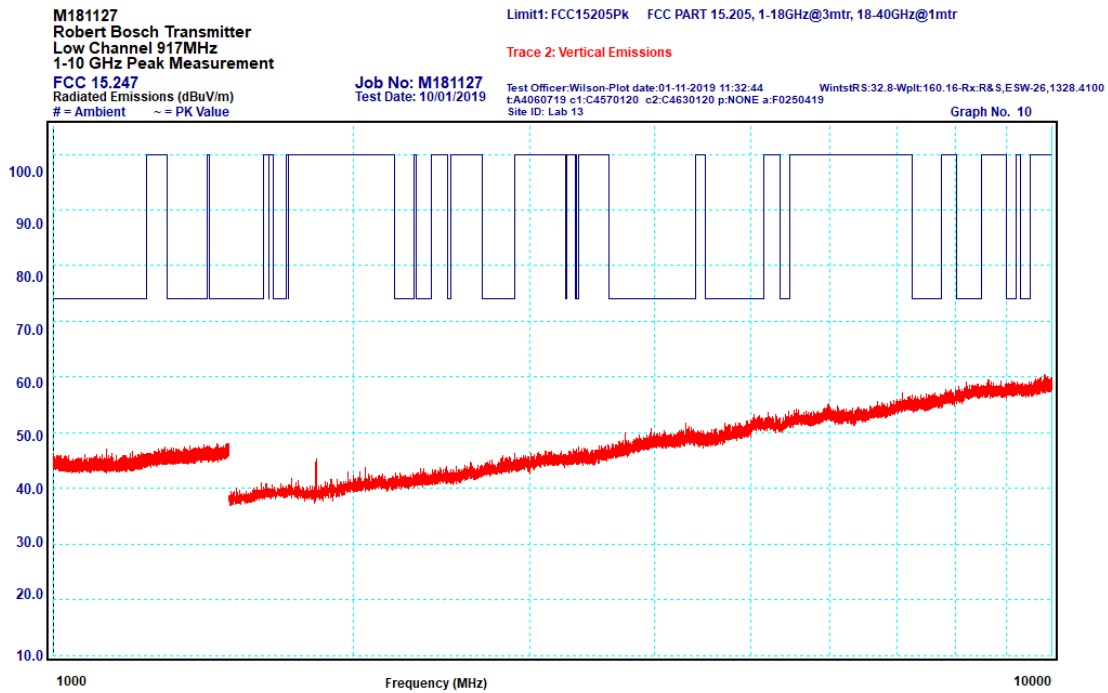
Table 6-12: Spurious Emissions, 30 - 1000 MHz, High channel 927.6 MHz

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

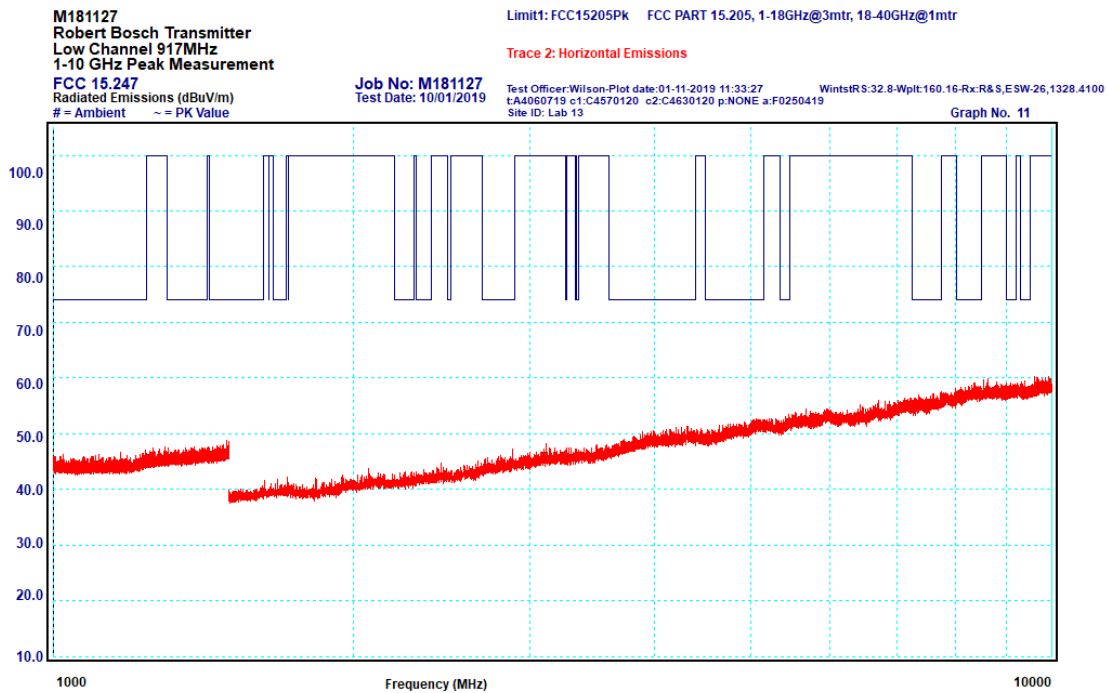
\*Peak 1 is the fundamental transmission and is not subject to the spurious limits of the standard

### 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

M181127  
 Robert Bosch Transmitter  
 Low Channel 917MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

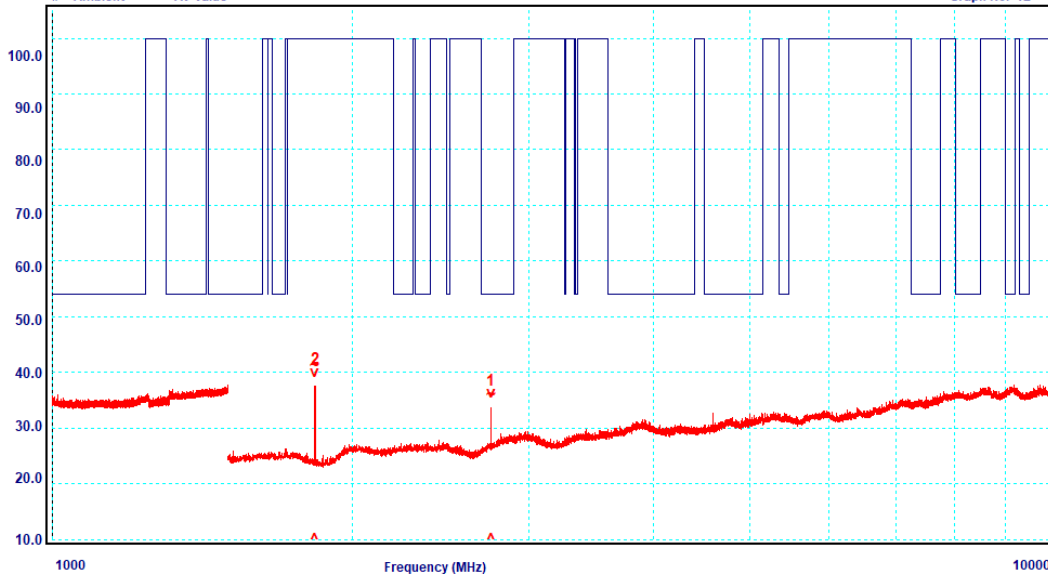
Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Vertical Emissions

Job No: M181127  
 Test Date: 11/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:35:49 WinstkRS:32.8-Wplt:160.16-Rx:R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:A2880919 a:F0250419  
 Site ID: Lab 13

Graph No. 12



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

M181127  
 Robert Bosch Transmitter  
 Low Channel 917MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

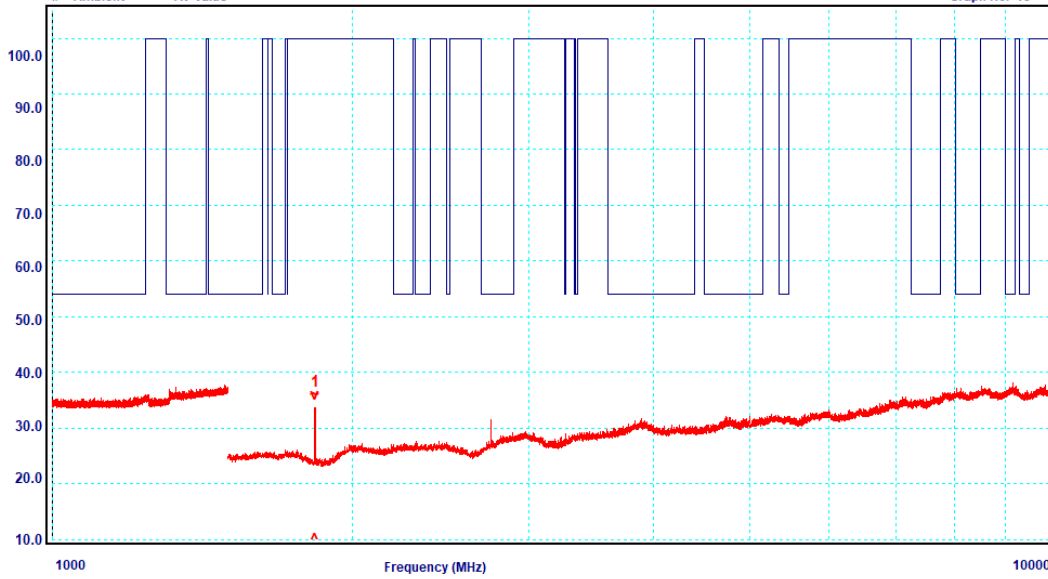
Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 11/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:36:26 WinstRS:32.8-Wplt:160.16-Rx:R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:A2880919 a:F0250419  
 Site ID: Lab 13

Graph No. 13



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

M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 1-10 GHz Peak Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = PK Value

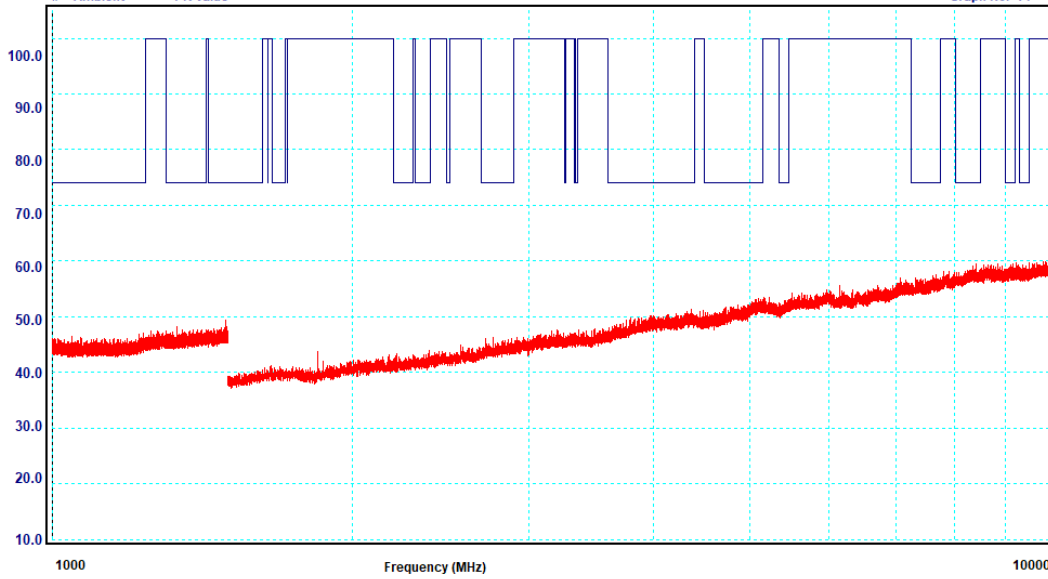
Limit1: FCC15205Pk FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Vertical Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:40:07 WinstRS: 32.8-Wpltr: 160.16-Rx: R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:NONE a:F0250419  
 Site ID: Lab 13

Graph No. 14



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

M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 1-10 GHz Peak Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = PK Value

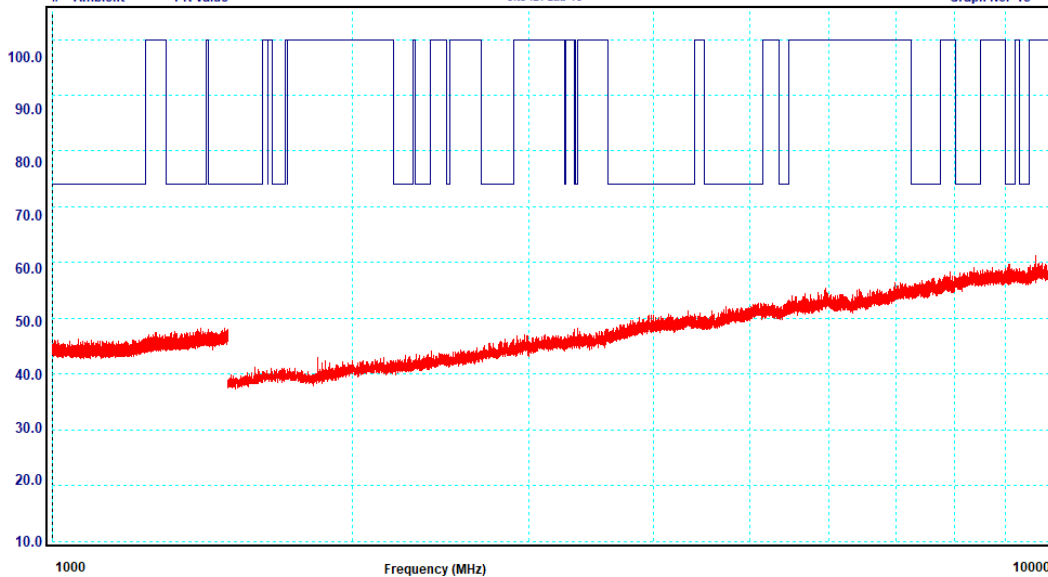
Limit1: FCC15205Pk FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:40:36 WinstRS: 32.8-Wpltr: 160.16-Rx: R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:NONE a:F0250419  
 Site ID: Lab 13

Graph No. 15



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



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M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

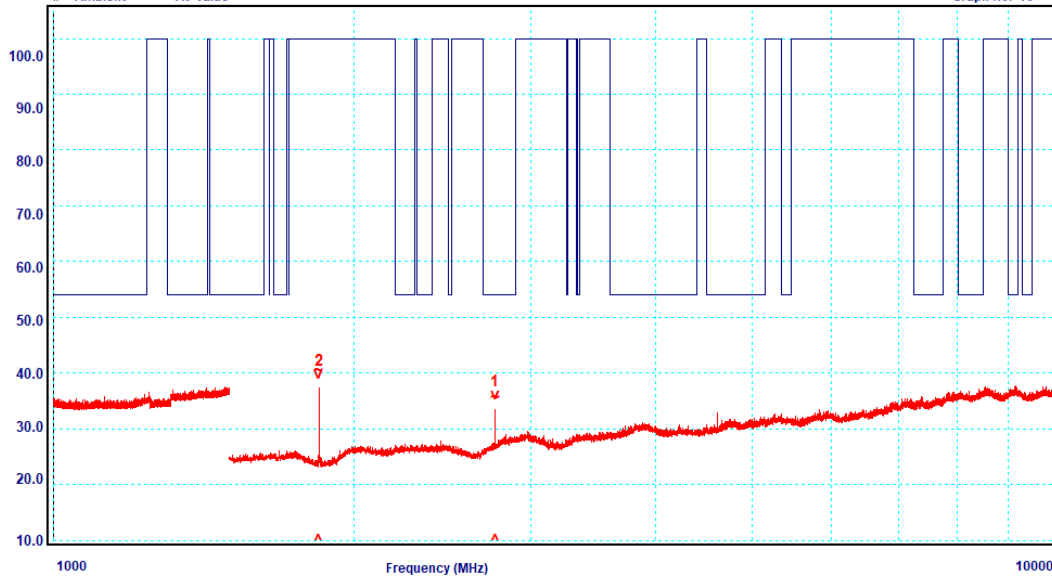
Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Vertical Emissions

Job No: M181127  
 Test Date: 11/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:42:10 WinstorS: 32.8-Wpit: 160.16-Rx: R&S, ESW-26, 1328.4100  
 t: A4060719 c: C4570120 c2: C4630120 p: A2680919 a: F0260419  
 Site ID: Lab 13

Graph No. 16



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 (dBuV/m)	Limit (dBuV/m)	Delta Limit (dB)
1	Vertical	2766.65	35.5	54	-18.5
2	Vertical	1844.43	40.4	103.41	-63.01

M181127  
 Robert Bosch Transmitter  
 Mid Channel 922.2MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

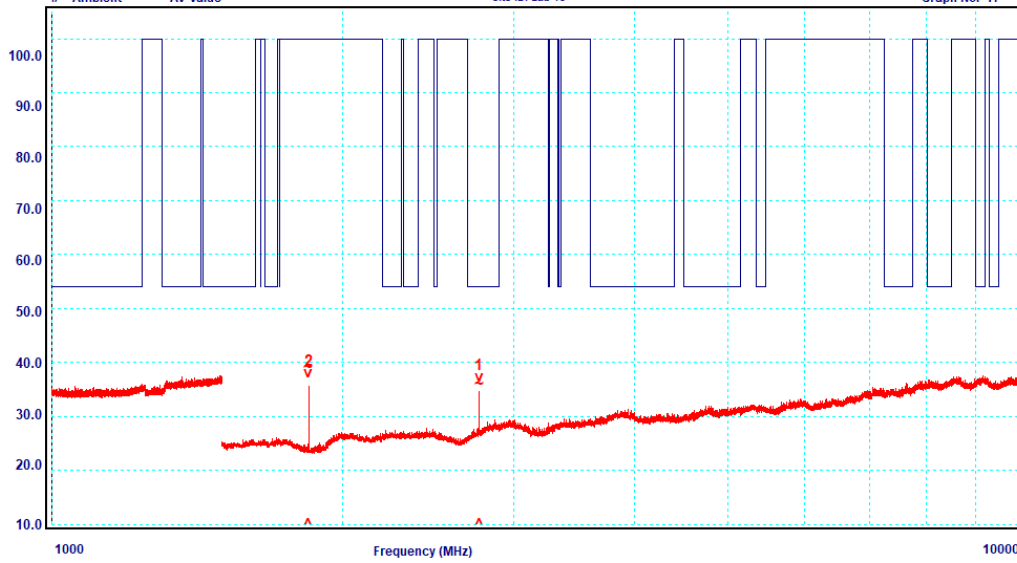
Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 11/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:42:40 WintRS: 32.8-Wpl: 160.16-Rx: R&S, ESW-26, 1328.4100  
 tA4060719 c1: C4570120 c2: C4630120 p: A2880919 a: F0250419  
 Site ID: Lab 13

Graph No. 17



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



**M181127**  
**Robert Bosch Transmitter**  
**High Channel 927.6MHz**  
**1-10 GHz Peak Measurement**  
**FCC 15.247**  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = PK Value

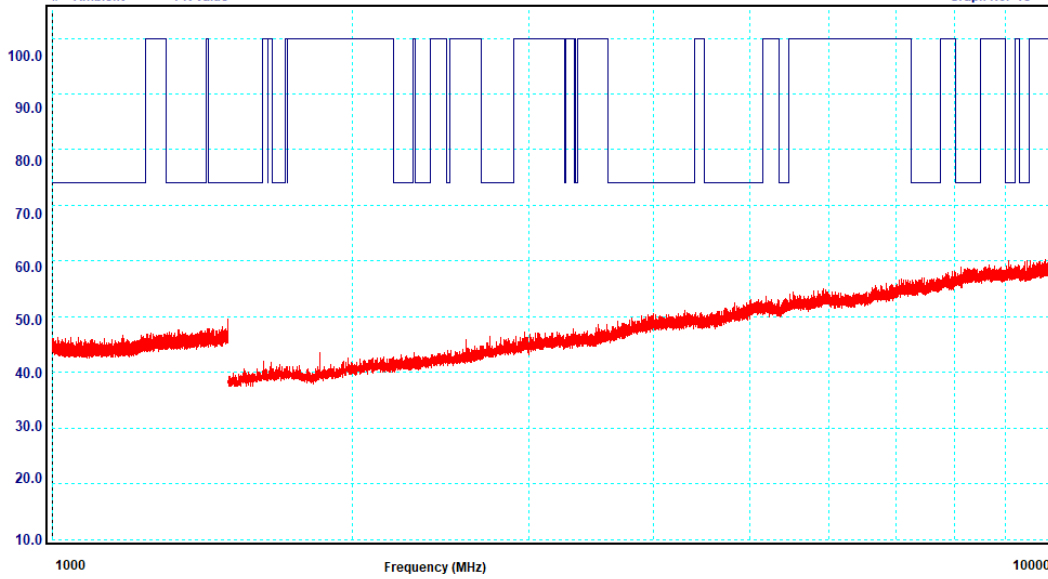
Limit1: FCC15205Pk FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Vertical Emissions

**Job No: M181127**  
 Test Date: 10/01/2018

Test Officer: Wilson-Plot date: 01-11-2019 11:48:14 WinstRS: 32.8-Wpltr: 160.16-Rx: R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:NONE a:F0250419  
 Site ID: Lab 13

Graph No. 18



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

**M181127**  
**Robert Bosch Transmitter**  
**High Channel 927.6MHz**  
**1-10 GHz Peak Measurement**  
**FCC 15.247**  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = PK Value

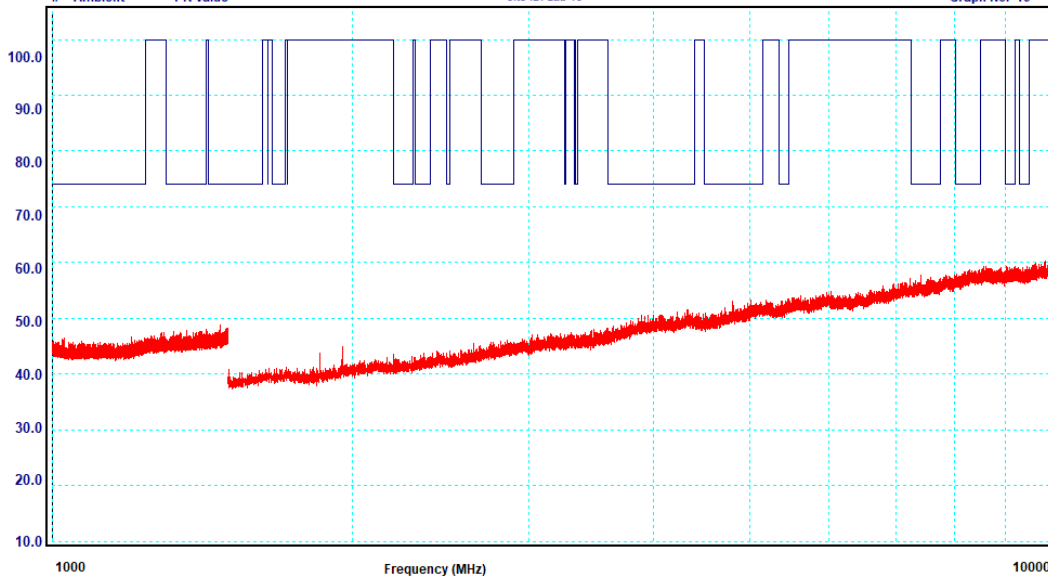
Limit1: FCC15205Pk FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Horizontal Emissions

**Job No: M181127**  
 Test Date: 10/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:49:39 WinstRS: 32.8-Wpltr: 160.16-Rx: R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:NONE a:F0250419  
 Site ID: Lab 13

Graph No. 19



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



This document shall not be reproduced except in full.

M181127  
 Robert Bosch Transmitter  
 High Channel 927.6MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

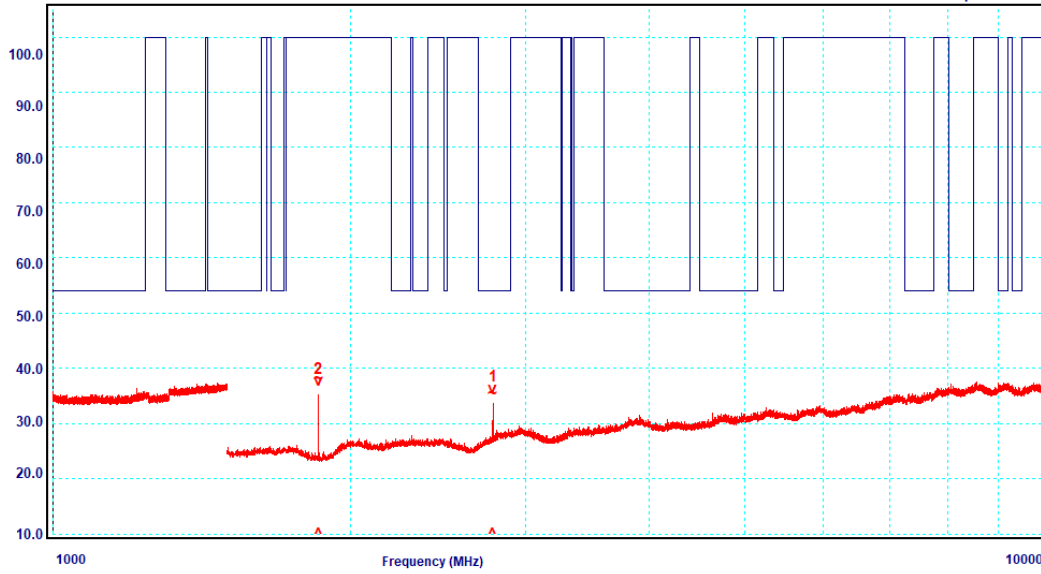
Job No: M181127  
 Test Date: 11/01/2019

Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Vertical Emissions

Test Officer: Wilson-Plot date: 01-11-2019 11:57:54 WinstRS: 32.8-Wplt: 160.16-Rx: R&S,ESW-26,1328.4100  
 t:A4060719 c1:C4570120 c2:C4630120 p:A2880919 a:F0250419  
 Site ID: Lab 13

Graph No. 20



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 (dBuV/m)	Limit (dBuV/m)	Delta Limit (dB)
1	Vertical	2782.85	35.4	54	-18.6
2	Vertical	1855.21	38	103.41	-65.41



This document shall not be reproduced except in full.

M181127  
 Robert Bosch Transmitter  
 High Channel 927.6MHz  
 1-10 GHz Average Measurement  
 FCC 15.247  
 Radiated Emissions (dBuV/m)  
 # = Ambient ~ = AV Value

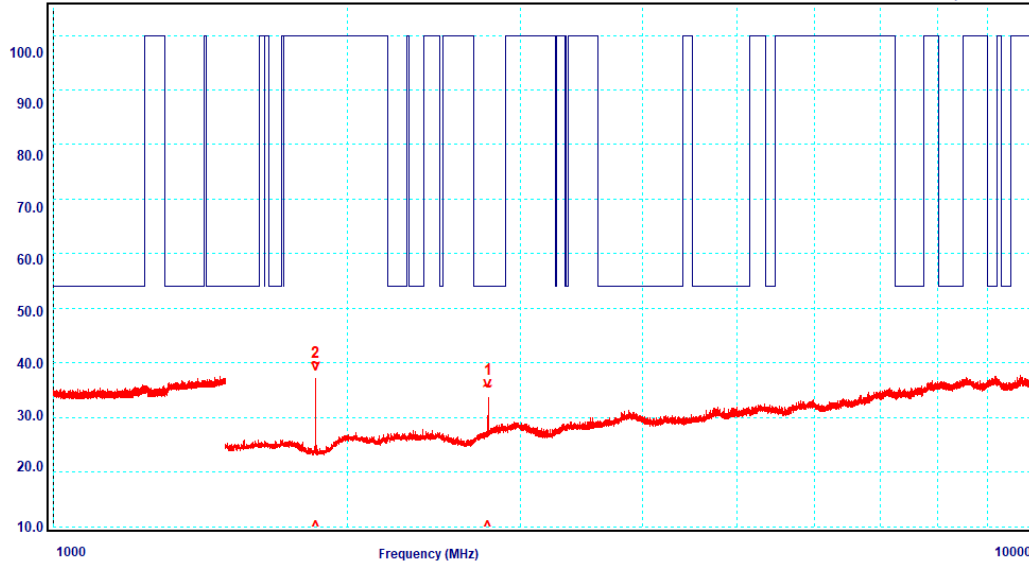
Limit1: FCC15205Av FCC PART 15.205, 1-18GHz@3mtr, 18-40GHz@1mtr

Trace 2: Horizontal Emissions

Job No: M181127  
 Test Date: 11/01/2019

Test Officer: Wilson-Plot date: 01-11-2019 11:58:54 WintIR S: 32.8 Wpl: 160.16-Rx: R&S, ESW-26, 1328.4100  
 t: A4060719 c1: C4570120 c2: C4630120 p: A2880919 a: F0250419  
 Site ID: Lab 13

Graph No. 21



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

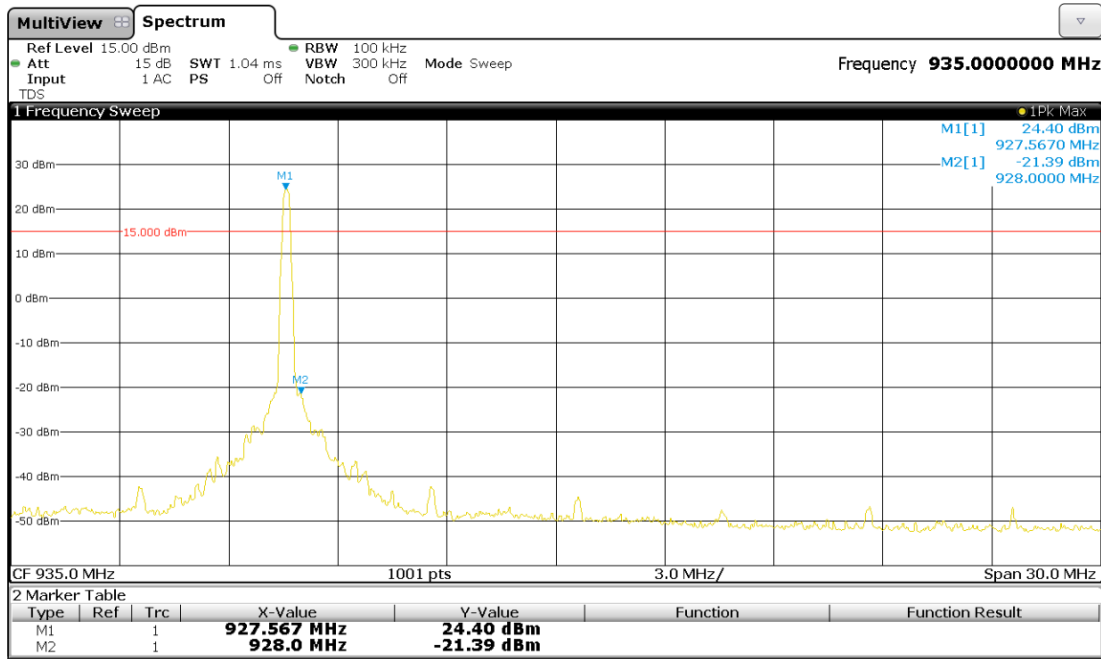
Table 6-18: Spurious Emissions, 1000 - 10000 MHz, Average, High channel 927.6 MHz

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

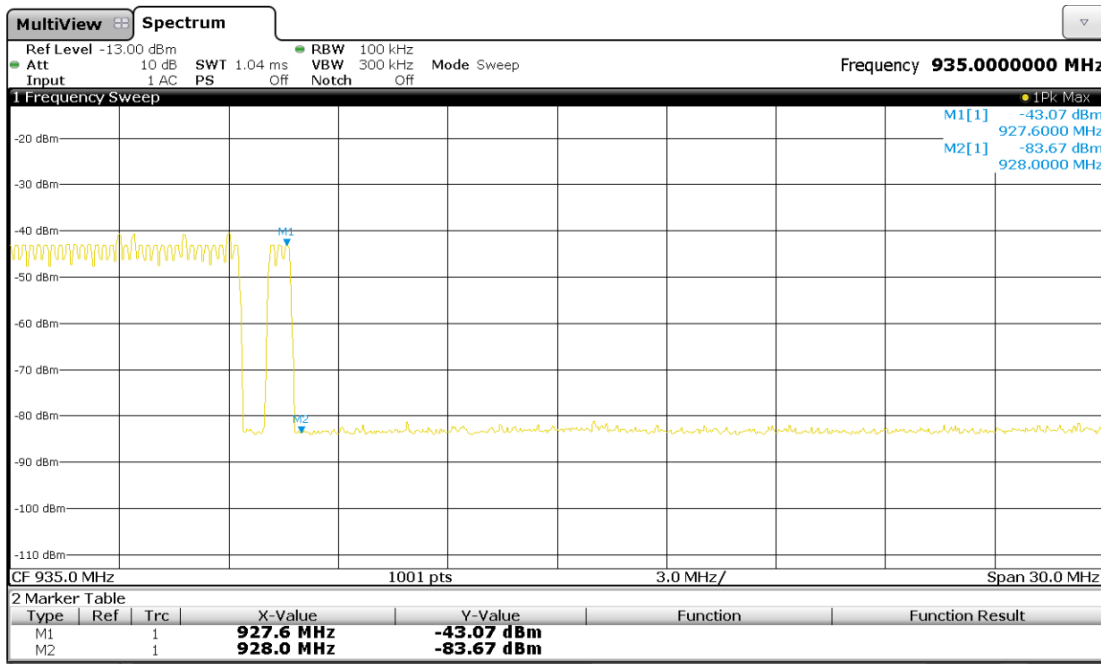
### 6.9 §15.247(d) Band Edge Emission Measurements

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

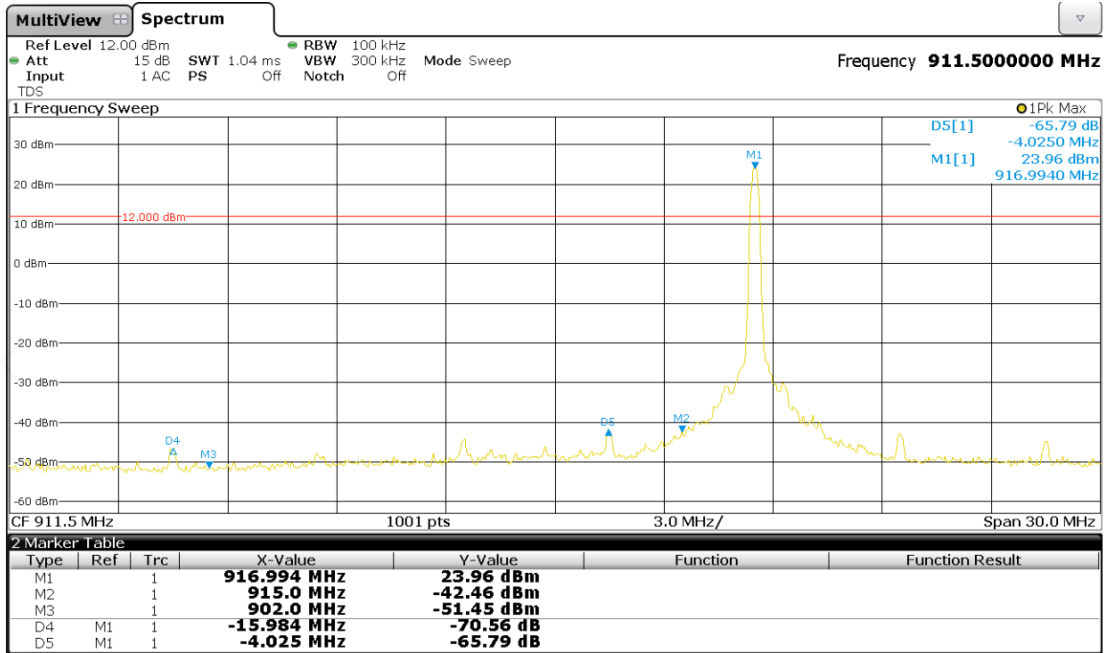
All emissions measured near the lower and higher band edge complied with the requirements of §15.247(d).



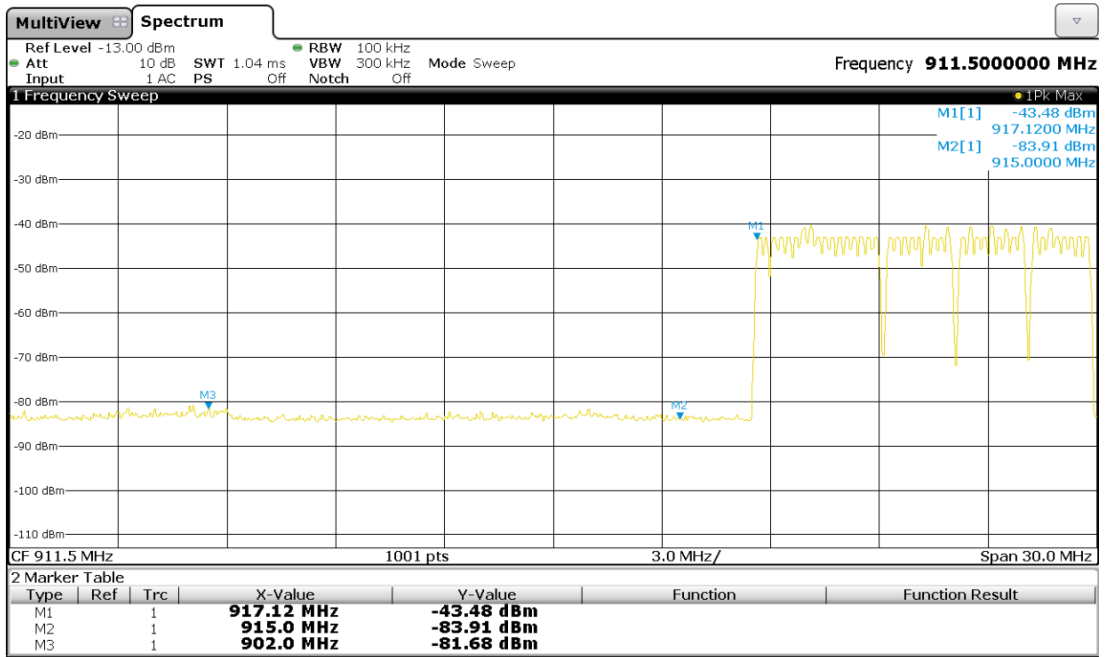
Graph 6-33: Higher band edge 928 MHz, High channel 927.6 MHz, Hopping off



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

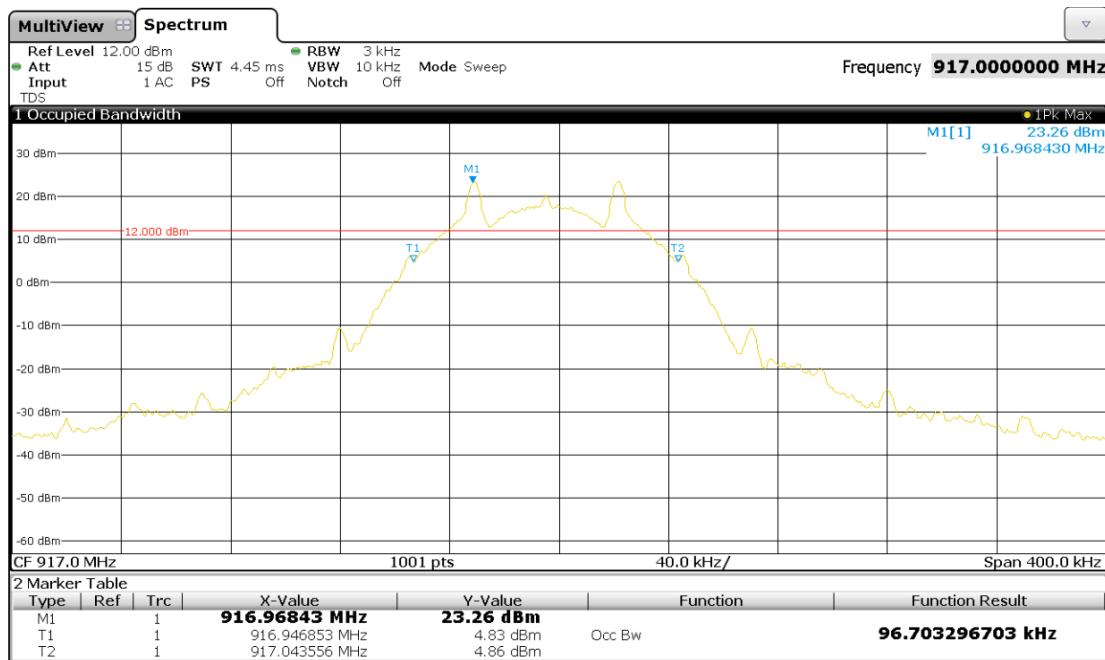
The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

#### 6.11.2 Limits

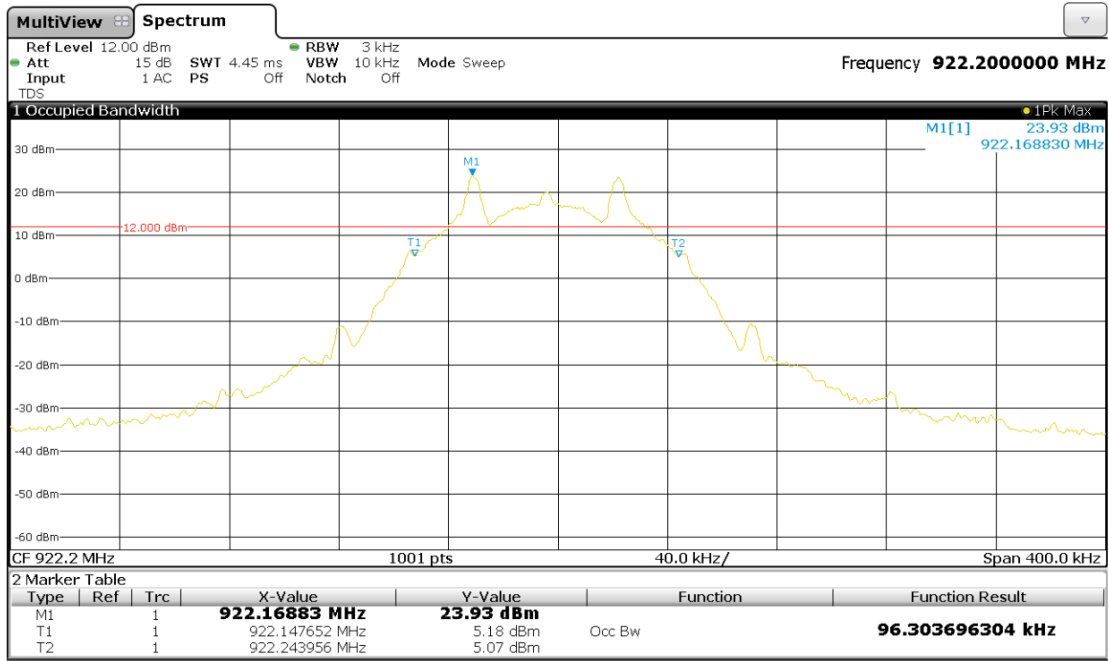
The 99% power should be contained within the frequency band 902 – 928 MHz.

#### 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