



Global Product Certification
EMC-EMF Safety Approvals

Melbourne

176 Harrick Road
Keilor Park, Vic 3042
Tel: +61 3 9365 1000

Sydney

Unit 3/87 Station Road
Seven Hills, NSW 2147
Tel: +61 2 9624 2777

Email: emc-general@emctech.com.au
Web: www.emctech.com.au

RADIO TEST REPORT

REPORT NUMBER: M2010040-4

TEST STANDARD: SPOT CHECK EVALUATION TO
FCC PART 15 SUBPART C
SECTION 15.247 AND
ISED RSS-247 SECTION 5.0

**CLIENT: AUTOMATIC TECHNOLOGY
AUSTRALIA PTY LTD**

**DEVICE: OVERHEAD GARAGE DOOR
OPENER**

MODEL: ATS-3AM

FCC ID: X4K-WSS33-1

IC ID: 8880A-WSS33

DATE OF ISSUE: 24 MAY 2021

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Accreditation No.5292

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Equipment Under Test (EUT): Overhead Garage Door Opener

REVISION TABLE

Version	Sec/Para Changed	Change Made	Date
1		Initial issue of document	24/05/2021

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RADIO TEST REPORT

CERTIFICATE OF COMPLIANCE

Device: Overhead Garage Door Opener
Model: ATS-3AM
Manufacturer: Automatic Technology Australia Pty Ltd

Radio Module: Hub Board PCBA
FCC ID: X4K-WSS33-1
IC ID: 8880A-WSS33

Tested for: Automatic Technology Australia Pty Ltd
Address: 6-8 Fiveways Boulevard, Keysborough, VIC 3173, Australia
Phone Number: 03 9791 0275
Contact: Nikolai Klepikov
Email: nikolai.klepikov@ata-aust.com.au

Standard: Spot Check Evaluation to following standards:

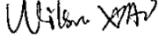
FCC Part 15, Subpart C, Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ISED RSS-247, Issue 2, Section 5 Standard specifications for frequency hopping systems and digital transmission systems operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

Result: The Overhead Garage Door Opener complied with the applicable requirements above standards. Refer to Report M2010040-4 for full details.

Test Date(s): 27 -29 January 2021

Issue Date: 24 May 2021


Test Engineer(s): Wilson Xiao

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: Shabbir Ahmed
Lead Engineer – Radio

Issued by: EMC Technologies Pty. Ltd.,
176 Harrick Road, Keilor Park, VIC, 3042, Australia.
Phone: +61 3 9365 1000
E-mail: emc-general@emctech.com.au **Web:** www.emctech.com.au

RADIO REPORT

1 TEST SUMMARY

Section	Description	FCC	ISED	Test Mode	Result(s)
6.1	Peak Output Power	§15.247(b)(3)	§RSS-247 5.4(d)	802.11b/g/n Channel 6 (2437 MHz)	Complied
6.2	Spurious Emissions	§15.247(d)	§RSS-247 5.5	9kHz – 26 GHz: 802.11b Channel 1 (2412 MHz)	Complied
6.3	Band Edge Emissions	§15.247(d)	§RSS-247 5.5	802.11n Channel 1 & 11 (2412 & 2462 MHz)	Complied

2 TEST FACILITY

2.1 General

EMC Technologies Pty Ltd is accredited by the FCC as a test laboratory able to perform compliance testing for the public. EMC Technologies Pty Ltd has also been designated 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 Pty Ltd is also an ISED Canada recognized testing laboratory – **ISED company number: 3569B** and **CAB identifier number: AU0001**.

2.2 Test Laboratory/Accreditations

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 (A²LA).

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 registered 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)	10/08/2020	10/08/2023	3 Year ^{*1}
EMI Receiver	R&S ESW26 Sn: 101306 (R-143)	05/06/2020	05/06/2021	1 Year ^{*2}
Antennas	EMCO 6502 Active Loop Antenna Sn: 100019-243 (A-310)	31/08/2020	31/08/2022	2 Year ^{*2}
	SUNOL JB1 Sn: A061917 (A-425)	04/09/2019	04/09/2021	2 Year ^{*2}
	EMCO 3115 Horn Antenna Sn: 8908-3282 (A-004)	16/01/2019	16/01/2022	3 Year ^{*1}
	ETS-Lindgren Horn Antenna Sn: 66032 (A-307)	12/06/2018	12/06/2021	3 Year ^{*2}
Cables ^{*3}	Huber & Suhner Sucoflex 104A Sn: 503055 (C-457)	05/01/2021	05/01/2022	1 Year ^{*1}
	Huber & Suhner Sucoflex 104A Sn: 800448 (C-520)	05/01/2021	05/01/2022	1 Year ^{*1}
	Huber & Suhner Sucoflex 102DC Sn: 27319/2 (C-273)	06/01/2021	06/01/2022	1 Year ^{*1}

Note *1. Internal NATA calibration.

Note *2. External NATA / A2LA calibration.

Note *3. 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:

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
	18 GHz to 40 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%.

Application of measurement uncertainty for this report:

The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement instrumentation uncertainty. However, the measurement uncertainty shall appear in the test report.



Accreditation No.5292

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5 Device Details

(Information supplied by the Client)

The ATS-3 is an electro-mechanical device for opening and closing Overhead Garage Doors automatically. They can be controlled from inside the garage by a wall mounted wireless transmitter WTX-7V1AM or from a remote location using a wireless handheld transmitter PTX-6V1AM or TB-6V1AM or smart phone via a network.

5.1 EUT (Transmitter) Details

Radio Module:	Hub Board PCBA
Manufacture:	ACEMAX INDUSTRIAL CO., LTD
Number of Channels:	11
Frequency Band:	2400 MHz – 2483.5 MHz
	2412 MHz – 2462 MHz
Operating Frequency:	Low Channel: 2412 MHz Mid Channel: 2437 MHz High Channel: 2462 MHz
	802.11b CCK
Modulation:	802.11g/n(HT20) OFDM
Antenna:	FPCB Antenna
Antenna Peak Gain:	1 dBi

5.2 EUT (Host) Details

Test Sample:	Overhead Garage Door Opener
Model:	ATS-3AM
Supply Rating:	110 - 120 V AC, 0.8 A, 50/60 Hz
Manufacturer:	Countermast Technology (Dalian) Company Limited

5.3 Test Configuration

Testing was performed with the transceiver set to transmit continuously.

5.4 Modifications

No modifications were required to achieve compliance.

5.5 Deviations from the Standard

Note any deviations to the standard

6 RESULTS

6.1 §15.247(b)(3) / §RSS-247 5.4(d) Peak Output Power

6.1.1 Test Procedure

The field strength of the fundamental transmitted frequency was measured inside a semi-anechoic chamber compliant with ANSI C63.4: 2014 in accordance to ANSI C63.10: 2013 clause 11.9.2.2.

The EUT was positioned on a test turn-table and rotated through 360° to determine the highest emissions. The measurement antenna was also varied between 1 and 4 metres height. Different orientations of the EUT (x, y and z-axis) and measurement antenna polarisations (vertical and horizontal) were investigated to produce the highest emission EIRP.

All measurements were made at a distance of 3 metres. Measurements on the worst orientation presented below.

6.1.2 Limits

The maximum conducted output power at 2400 – 2483.5 MHz is 1 Watts or 30 dBm.

6.1.3 Results

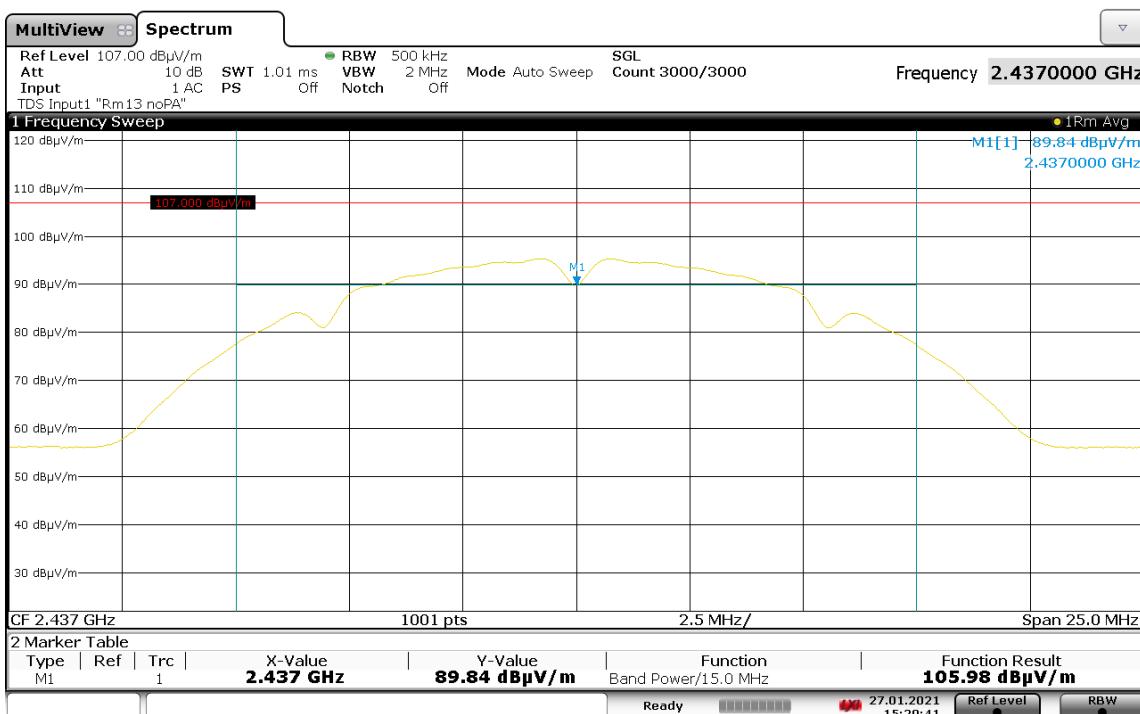
Table 6-1: Maximum EIRP

Test Mode	Freq. [MHz]	E-Field@ 3 m dBuV/m	EIRP (dBm)	Antenna Gain (dBi)	Equivalent Conducted Output Power (dBm)	Limit (dBm)	Results
802.11b	2437	105.98	10.75	1	9.75	30	Complied
802.11g	2437	105.66	10.43	1	9.43	30	Complied
802.11n	2437	105.51	10.28	1	9.28	30	Complied

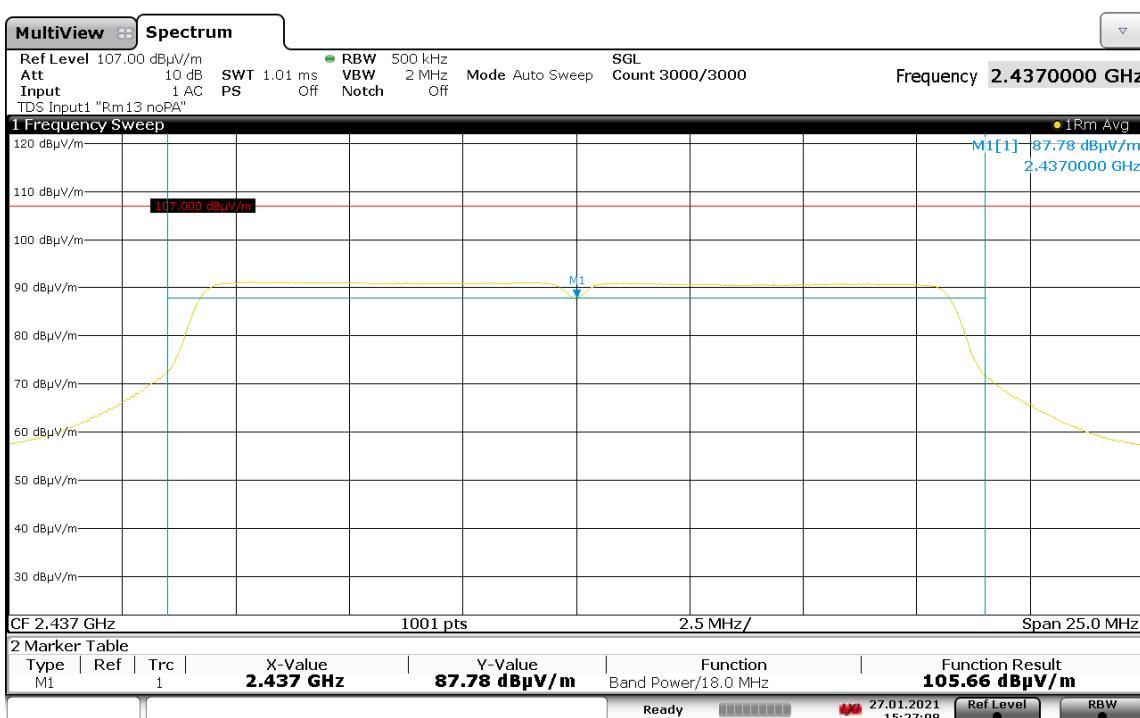
The measured radiated field strength is converted to equivalent conducted output power for checking compliance (KDB 558074 D01 Section 3).



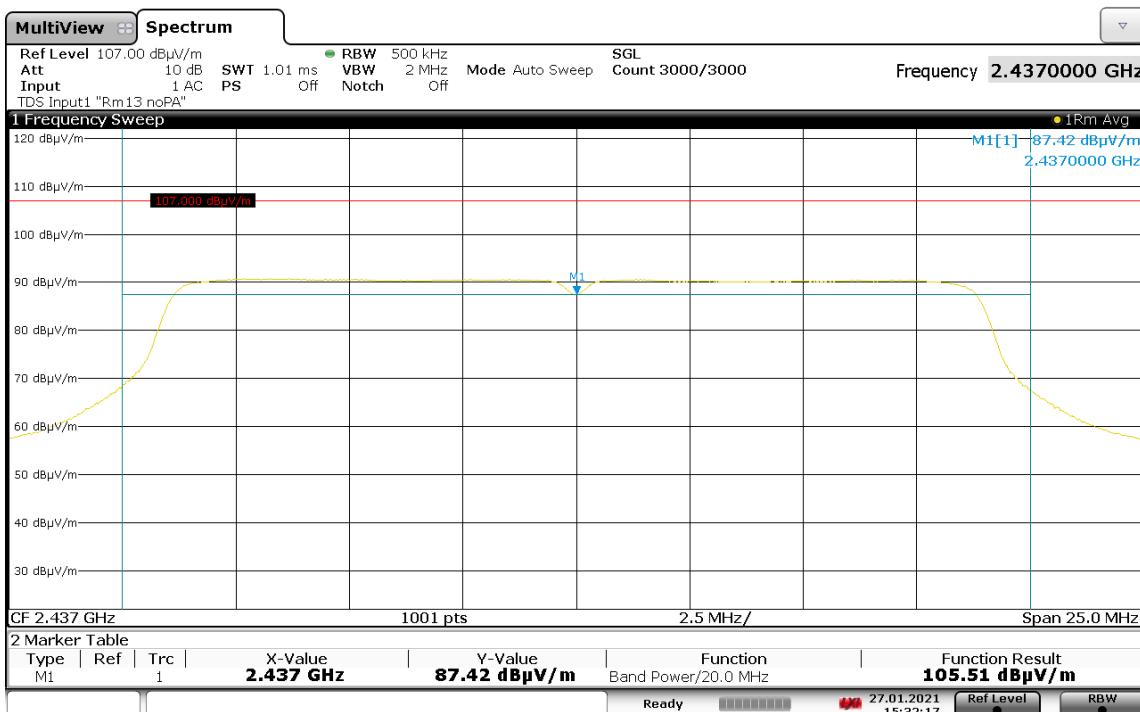
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Graph 6-1: Max EIRP, 2437 MHz, 802.11b



Graph 6-2: Max EIRP, 2437 MHz, 802.11g



15:32:17 27.01.2021

Graph 6-3: Max EIRP, 2437 MHz, 802.11n(HT20)

6.2 §15.247(d) / §RSS-247 5.5 Spurious Emissions

6.2.1 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	
1000 to 18 000	1000	3	
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.

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.

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

6.2.2 Limits

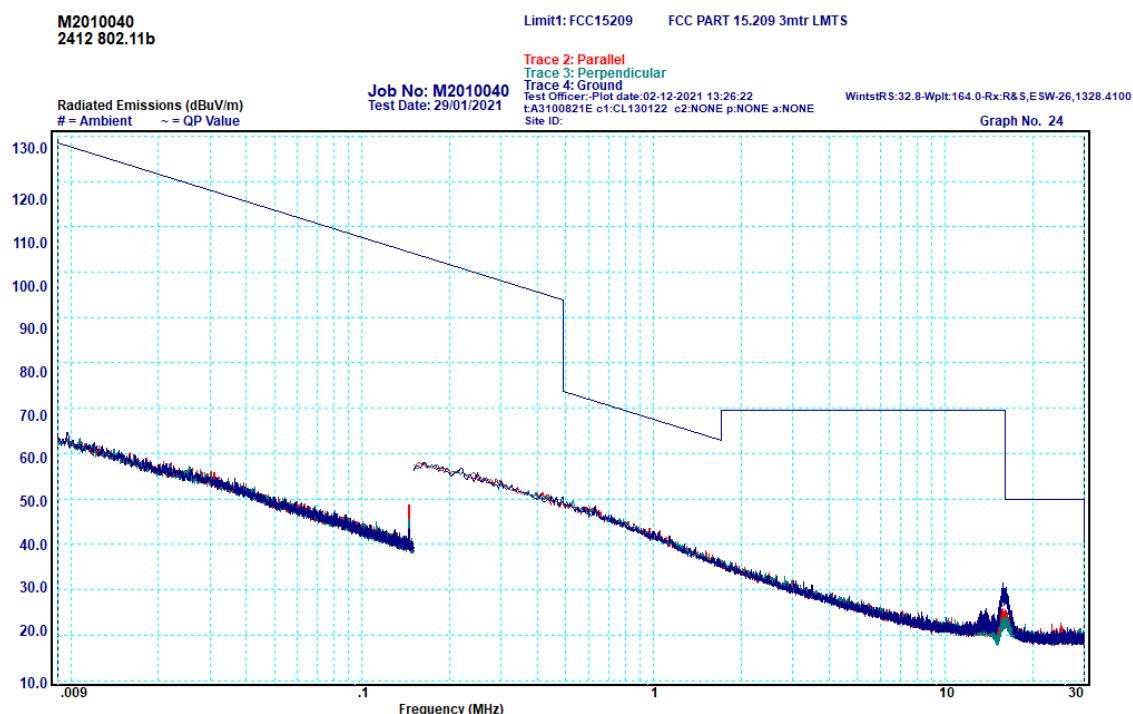
The limit applied is in accordance with the out-of-band/spurious emissions limit defined in §15.247(d).

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 channels according to ANSI C63.10-2013 clause 11.11.2. The maximum PSD level was used to establish the limit for nonrestricted frequency bands. However, the general limits of §15.209 apply for the restricted bands of operation defined in §15.205.

6.2.3 Transmitter Spurious Emissions: 9 kHz to 30 MHz

All emissions measured in the frequency band 9kHz - 30MHz complied with the requirements of the standard.

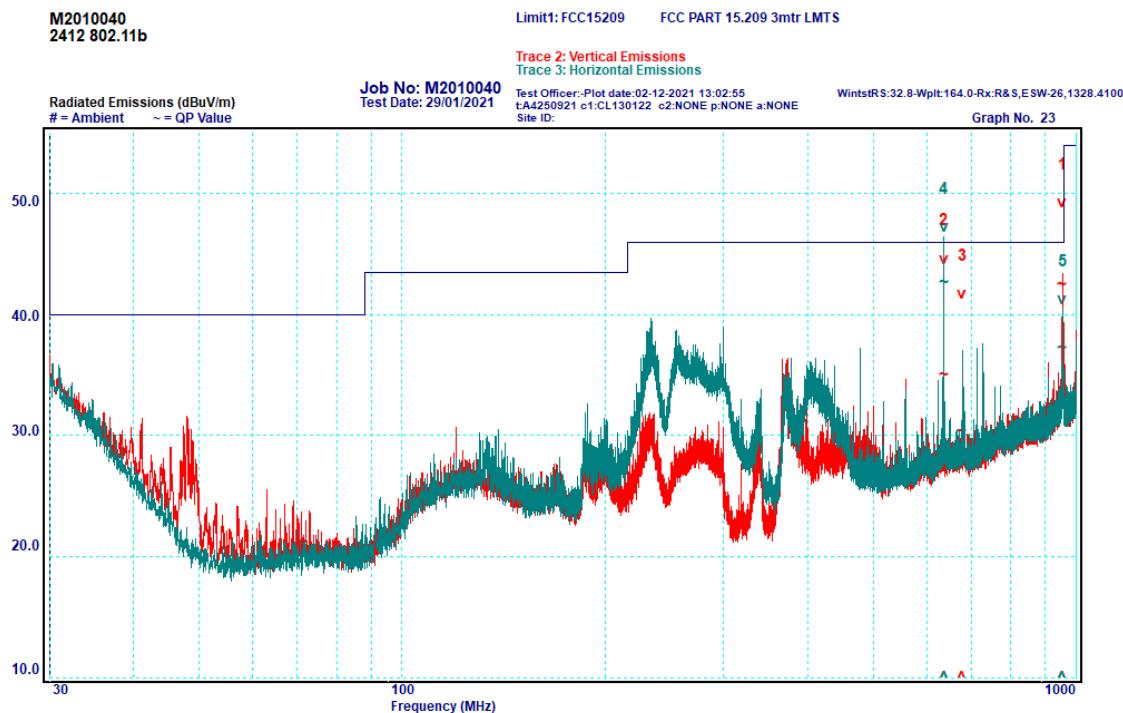


Graph 6-4: Transmitter Spurious Emissions, 9kHz – 30 MHz, 2437 MHz, 802.11b, 2412 MHz

No peaks were measured within 10 dB of the limit.

6.2.4 Transmitter Spurious Emissions: 30 - 1000 MHz

All emissions measured in the frequency band 30 – 1000 MHz complied with the requirements of the standard.



Graph 6-5: Transmitter Spurious Emissions, 30 – 1000 MHz, 2412 MHz, 802.11b

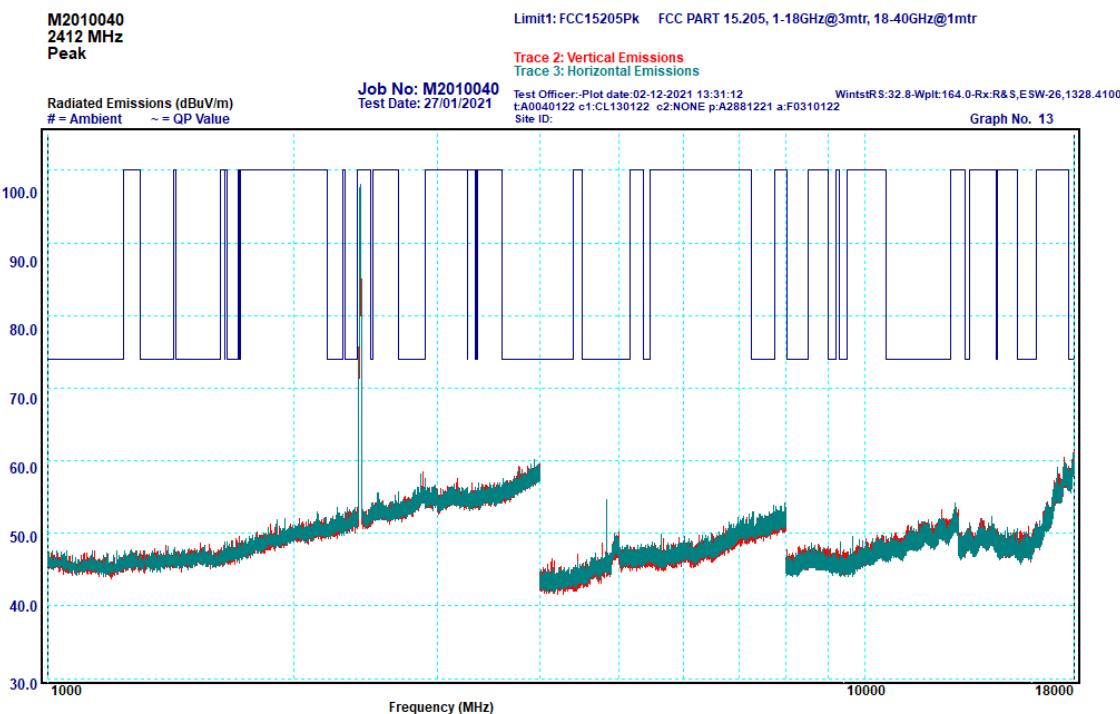
Table 6-2: Transmitter Spurious Emissions, 30 – 1000 MHz, 2412 MHz, 802.11b

Peak	Frequency [MHz]	Polarisation	Quasi Peak		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1	953.98	Vertical	42.5	46	-3.5
2	636	Vertical	35	46	-11
3	677.34	Vertical	30.3	46	-15.7
4	635.97	Horizontal	42.7	46	-3.3
5	953.99	Horizontal	37.3	46	-8.7

6.2.5 Transmitter Spurious Emissions: 1 - 18 GHz

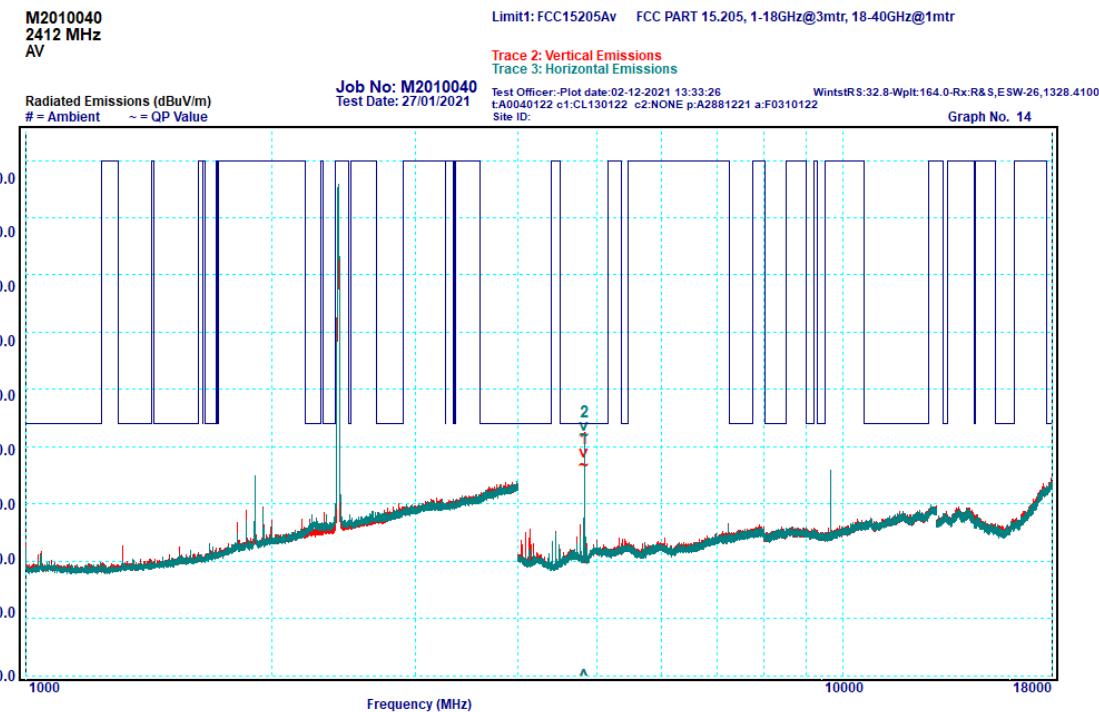
All emissions measured in the frequency band 1 – 18 GHz complied with the requirements of the standard.

Peak Measurements:



Graph 6-6: Transmitter Spurious Emissions, 1 – 18 GHz, 2412 MHz, 802.11b, Peak

Average Measurements:



Graph 6-7: Transmitter Spurious Emissions, 1 – 18 GHz, 2412 MHz, 802.11b, Average

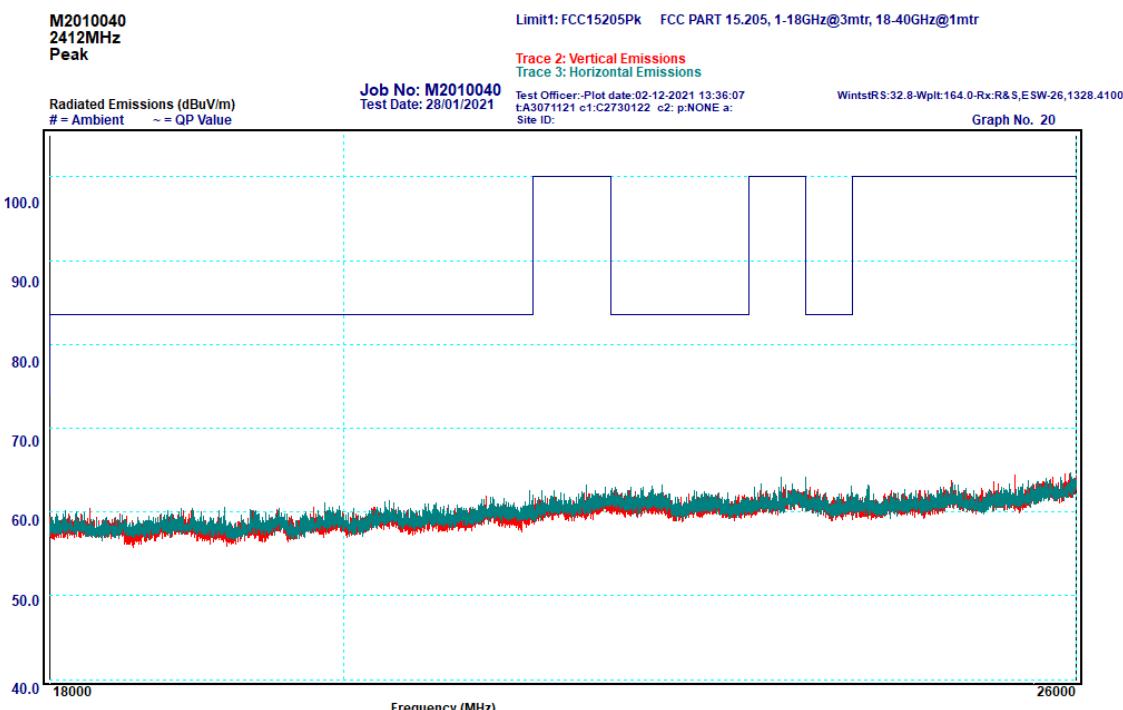
Table 6-3: Transmitter Spurious Emissions, 1 – 18 GHz, 2412 MHz, 802.11b, Average

Peak	Frequency [MHz]	Polarisation	Avg		
			Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
1	4823.98	Vertical	46.7	54	-7.3
2	4823.98	Horizontal	52	54	-2

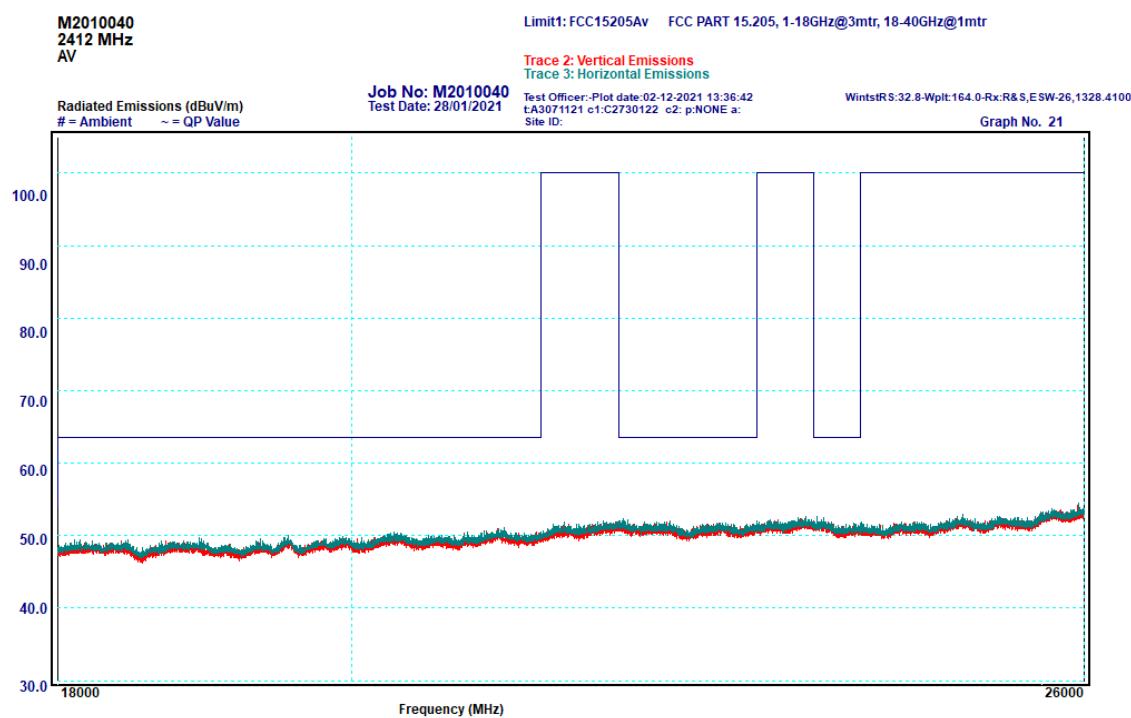
6.2.6 Transmitter Spurious Emissions: 18 - 26 GHz

All emissions measured in the frequency band 18 – 26 GHz complied with the requirements of the standard.

Peak Measurements:



Graph 6-8: Transmitter Spurious Emissions, 18 – 26 GHz, 2412 MHz, 802.11b, Peak
No peaks were measured within 10 dB of the limit.

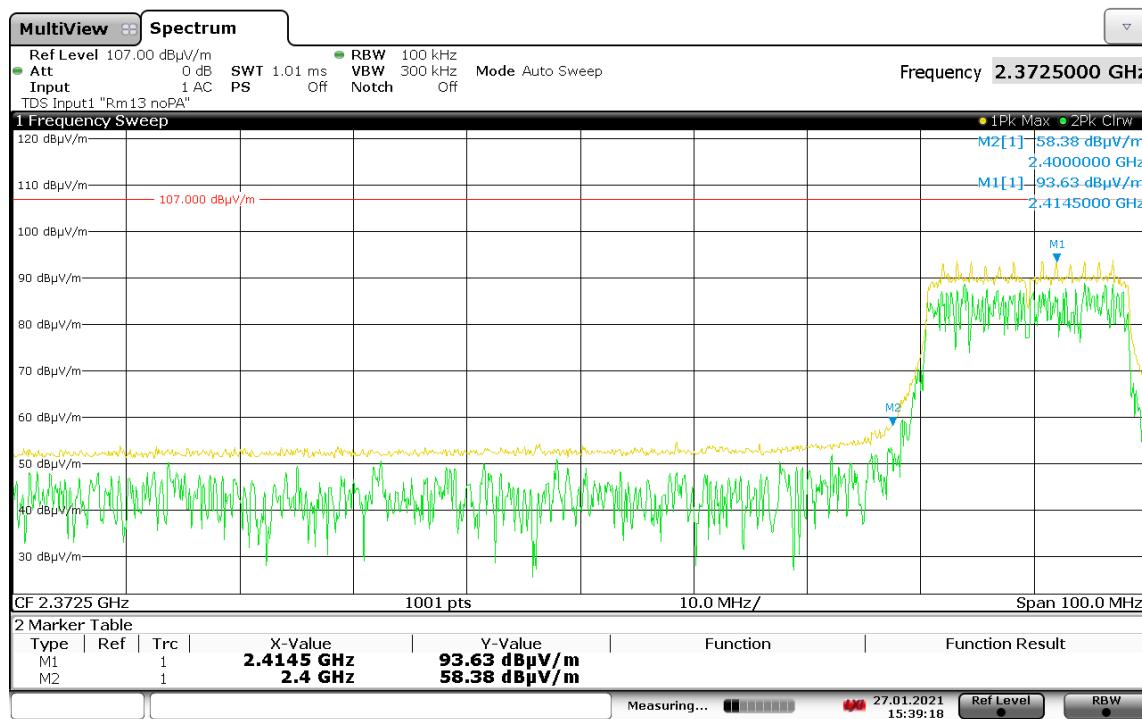
Average Measurements:

Graph 6-9: Transmitter Spurious Emissions, 18 – 26 GHz, 2412 MHz, 802.11b, Average

No peaks were measured within 10 dB of the limit.

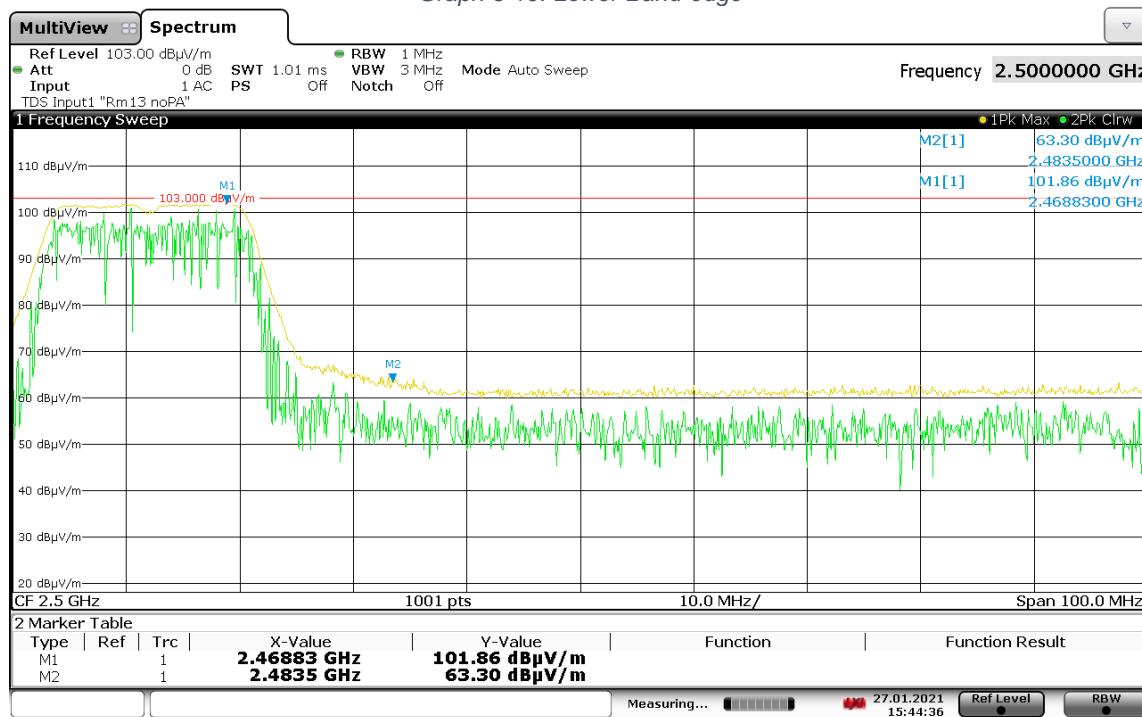
6.3 §15.247(d) / §RSS 5.5 Band Edge Emission Measurements

Band-edge measurements were done using radiated in accordance to ANSI C63.10 clause 6.10. All emissions measured near the lower and upper band edge complied with the requirements of §15.247 / §RSS 5.5. Authorised-band band-edges were measured in the lower end and Restricted-band band-edges were measured in the upper end.



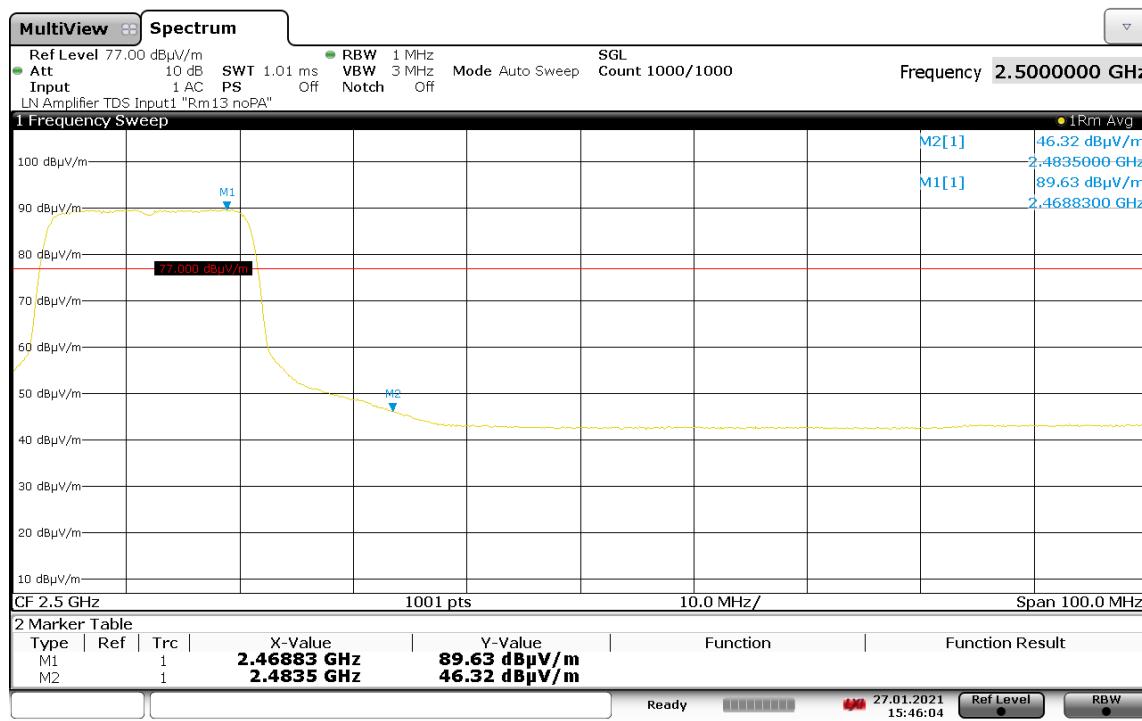
15:39:19 27.01.2021

Graph 6-10: Lower Band-edge



15:44:37 27.01.2021

Graph 6-11: Upper Band-edge, Peak



Graph 6-12: Upper Band-edge, Average

END OF REPORT