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RADIO REPORT FOR CERTIFICATION

47 CFR PART 15 SUBPART C (SECTION 15.247)

Client: Minelab Electronics Pty. Ltd. **Device Under Test / PMN: Platypus Metal Detector** Model Number / HVIN: EQX 800 FCC ID: Z4C-0022

> Report Number: M170635-2R1 (This Report Supersedes M170635-2) Date of Issue: 16 November 2017

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Report Number: M170635-2R1 FCC ID: Z4C-0022



RADIO REPORT CERTIFICATE OF COMPLIANCE

Device / PMN: Model Number / HVIN: Manufacturer:	Platypus Metal Detector EQX 800 Minelab Electronics Pty. Ltd.
Tested for: Address: Phone: Contact: Email:	Minelab Electronics Pty. Ltd. 2 Second Avenue, Mawson Lakes, South Australia 5095, AUSTRALIA +61 (0)8 8238 0851 Shan Wang shan.wang@minelab.com.au
Standards:	47 CFR 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:	The EQX 800 complied with the applicable requirements of 47 CFR Part 15 Subpart C for a Digital Transmission System.
Test Dates:	10 August to 27 September, 2017
Issue Date:	16 November 2017
Issued by:	EMC TECHNOLOGIES PTY. LTD., 176 Harrick Road, Keilor Park, VIC 3042, Australia. Phone: +61 3 9365 1000, Web: www.emctech.com.au
Test Officer:	William Alam Test Engineer
Authorised Signatory:	Rob Weir Wireless Certification Manager
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.
Malalana -	Accredited for compliance with ISO/IEC 17025 - Testing.



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RADIO REPORT FOR CERTIFICATION to 47 CFR Part 15 Subpart C (section 15.247)

1.0 INTRODUCTION

Radio tests were performed on the EQX 800 Platypus Metal Detector in accordance with the applicable requirements of 47 CFR, Part 15 Subpart C – Section 15.247 for a Digital Transmission System (DTS) operating within the band: 2400 MHz to 2483.5 MHz.

1.1 Test Procedure

Radio measurements were performed in accordance with the appropriate procedures of ANSI C63.10: 2013 and KDB 558074 v03r05 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

The measurement instrumentation conformed to the requirements of ANSI C63.2: 2009.

1.2 Summary of 47 CFR Part 15 Subpart C Results

FCC	Test Performed	Results
15.203	Antenna requirement	Complied
15.205	Restricted bands of operation	Complied
15.207	Conducted limits	Complied
15.209	Radiated emissions limits; general requirements	Complied
15.247 (a)	DTS Bandwidth	Complied
15.247 (b)	Peak Output Power	Complied
15.247 (c)	Antenna Gain > 6 dBi	Not Applicable
15.247 (d)	Out of Band Emissions	Complied
15.247 (e)	Peak Power Spectral Density	Complied
15.247 (f)	Hybrid Systems	Not Applicable
15.247 (g)	FHS with continuous data streams and short bursts	Not Applicable
15.247 (h)	Adaptivity	Not Applicable
15.247 (i)	Radio Frequency Hazard	Complied
2.1049	Occupied Bandwidth	Complied



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2.0 GENERAL INFORMATION (Information supplied by the Client)

2.1 EUT (Transmitter) Details

Radio: Frequency Band: Frequency Range:

Digital Transmission System (DTS) 2400-2483.5 MHz 2406 to 2474 MHz Ch. Low: 2406 MHz Ch. Mid: 2438 MHz Ch. High: 2474 MHz FSK 4M79F1D Inverted S, PCB track with 3 dBi gain

2.2 EUT (Host) Details

Modulation:

Device under Test / PMN: Model Number / HVIN: Manufacturer: Power Supply:

Emission Designator:

Antenna type and gain:

Platypus Metal Detector EQX 800 Minelab Electronics Pty. Ltd. Internal Battery Charger tested: Redot Technology Co., Ltd. Model 4UTR2069

The EQX 800 Metal Detector was intended for operating in an open field, detecting metal targets of various sizes at different depths.

2.3 Test Configuration

Engineering software was provided to enable configuration of the radio such as selection of transmit channel.

2.4 Modifications by EMC Technologies

No modifications were performed.

2.5 Test Facility

2.5.1 General

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

Measurements in this report were performed at EMC Technologies' laboratory in Keilor Park, Victoria Australia.



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2.5.2 NATA Accreditation

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.

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to IEC/ISO17025. 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 documented test procedures, continued calibration of measurement equipment, traceable to the National Standard at the National Measurements Institute (NMI) and an internal quality system to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A²LA).

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

2.6 Test Equipment Calibration

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Agilent 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	Make/Model/Serial Number	Last Cal. dd/mm/yyyy	Due Date dd/mm/yyyy	Cal. Interval
Type Chamber	Frankonia SAC-10-2 (R-139)	22/03/2017	22/03/2018	1 Year, *1
EMI Receiver	R&S ESW26, 2 Hz – 26.5 GHz Sn: 101306 (R-143)	31/03/2017	31/03/2018	1 Year, *2
Antennas	EMCO 6502 Active Loop 9 kHz – 30 MHz Sn. 9311-2801 (A-231)	20/07/2015	20/07/2018	3 Year, *2
	SUNOL JB6 Biconilog 30 – 6000 MHz Sn. A012312 (A-363)	26/05/2016	26/05/2018	2 Year, *2
	EMCO 3115 Double Ridge Horn 1 – 18 GHz Sn: 8908-3282 (A-004)	15/07/2016	15/07/2019	3 Year, *1
	ETS-Lindgren 3160-09 Horn 18 – 26.5 GHz Sn: 66032 (A-307)	31/05/2016	31/05/2019	3 Year, *1
Cables	Room 12 inbuilt cable Panel 1 to 10 m (C-422)	31/05/2017	31/05/2018	1 Year, *1
	Room 12 inbuilt cable Panel 1 to 3 m (C-421)	31/05/2017	31/05/2018	1 Year, *1
	Room 12 Antenna cable (C-437)	31/05/2017	31/05/2018	1 Year, *1
	Sucoflex 104 Huber & Suhner 18 GHz, 5 m cable (C-337)	03/01/2017	03/01/2018	1 Year, *1
	Sucoflex 102 Huber & Suhner 40 GHz, 3 m cable (C-273)	04/01/2017	04/01/2018	1 Year, *1

Note *1. Internal NATA calibration.

Note *2. External NATA / A2LA calibration



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3.0 TEST RESULTS

3.1 §15.203 Antenna Requirement

The antenna was internal to the device ensuring that it could not be replaced.

3.2 §15.207 Conducted Limits

3.2.1 Test Procedure

The arrangement specified in ANSI C63.10: 2013 was adhered to for the conducted EMI measurements. The EUT was placed in the RF screened enclosure and a CISPR EMI Receiver as defined in ANSI C63.2: 2009 was used to perform the measurements.

The EMI Receiver was operated under program control using the Max-Hold function and automatic frequency scanning, measurement and data logging techniques. The specified 0.15 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured.

3.2.2 Peak Maximising Procedure

The various operating modes of the system were investigated. For each of the sub-ranges, the EMI receiver was set to continuous scan with the Peak detector set to Max-Hold mode. The Quasi-Peak detector and the Average detector were then invoked to measure the actual Quasi-Peak and Average level of the most significant peaks, which were detected.

3.2.3 Calculation of Voltage Levels

The voltage levels were automatically measured in software and compared to the test limit. The method of calculation was as follows:

$V_{EMI} = V_{Rx} + L$

Where:

 $V_{EM I}$ = The Measured EMI voltage in dBµV to be compared to the limit. V_{Rx} = The Voltage in dBµV read directly at the EMI receiver. L = The insertion loss in dB of the LISN, cables and transient Limiter.

3.2.4 Plotting of Conducted Emission Measurement Data

The measurement data pertaining to each frequency sub-range were concatenated to form a single graph of (peak) amplitude versus frequency. This was performed for both Active and Neutral lines and the composite graph was subsequently plotted. A list of the highest relevant peaks and the respective Quasi-Peak and Average values were also plotted on the graph.

3.2.5 Test Climatic Conditions

Shielded Room Temperature: 25°C

Relative Humidity: 46%

3.2.6 Conclusion

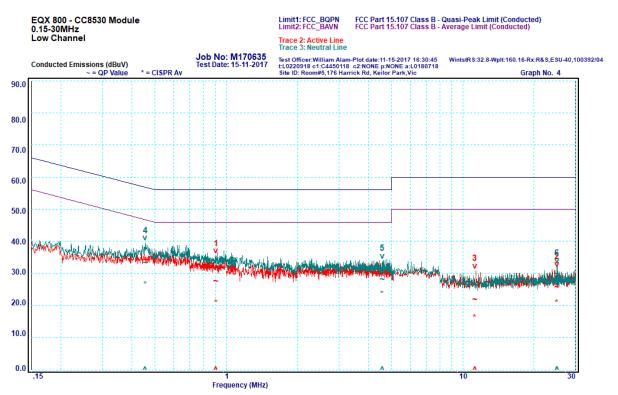
The sample complied with the applicable spurious emissions of §15.207. Refer to the following graphs for the results.



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3.2.7 Results of Conducted Emission Measurements



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Active and Neutral Line, Channel 2406MHz, 0.15-30MHz

	Frequency			Quasi-Peak		Average		
Peak	Frequency [MHz]	Line	Level [dBµV]	Limit [dBµV]	Margin [±dB]	Level [dBµV]	Limit [dBµV]	Margin [±dB]
1	0.907	Active	27.6	56	-28.4	20.8	46	-25.2
2	25.00	Active	25.6	60	-34.4	20.7	50	-29.3
3	11.23	Active	21.8	60	-38.2	16.1	50	-33.9
4	0.455	Neutral	33.3	56.8	-23.5	26.5	46.8	-20.3
5	4.568	Neutral	28.1	56	-27.9	23.5	46	-22.5
6	25.00	Neutral	29.8	60	-30.2	27.1	50	-22.9



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EQX 800 - CC8530 Module 0.15-30MHz High Channel Limit1: FCC_BQPN Limit2: FCC_BAVN FCC Part 15.107 Class B - Quasi-Peak Limit (Conducted) FCC Part 15.107 Class B - Average Limit (Conducted) Trace 2: Active Line Trace 3: Neutral Line Job No: M170635 Test Date: 15-11-2017 Test Officer:William Alam-Plot date:11-15-2017 16:34:29 ±L0220918 c1:C4450118 c2:NONE p:NONE a:L0180718 Site ID: Room#5,176 Harrick Rd, Keilor Park,Vic WintstRS:32.8-Wplt:160.16-Rx:R&S,ESU-40,100392/04 Conducted Emissions (dBuV) ~ = QP Value * = CISPR Av Graph No. 5 90.0 80.0 70.0 60.0 50.0 4 40.0 2 a half the second and the second 30.0 tadi . 20.0 10.0 0.0 10 1! Frequency (MHz)

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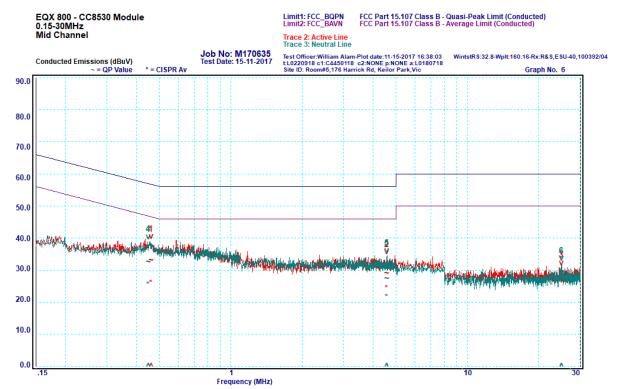
Active and Neutral Line. Channel 2474MHz. 0.	5-30MHz

	Fraguanay			Quasi-Peak		Average		
Peak	Frequency [MHz]	Line	Level [dBµV]	Limit [dBµV]	Margin [±dB]	Level [dBµV]	Limit [dBµV]	Margin [±dB]
1	0.461	Active	32.9	56.7	-23.8	26	46.7	-20.7
2	4.565	Active	29.1	56	-26.9	24.8	46	-21.2
3	25	Active	28.3	60	-31.7	25.2	50	-24.8
4	0.458	Neutral	32.8	56.7	-23.9	26.2	46.7	-20.5
5	4.568	Neutral	27.6	56	-28.4	22.1	46	-23.9
6	25	Neutral	29.6	60	-30.4	27	50	-23



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Active and Neutral Line	Channel 2438MHz, 0.15-30MHz
/ totil to and Houting Enio	

	Fraguanay			Quasi-Peak		Average		
Peak	Frequency [MHz]	Line	Level [dBµV]	Limit [dBµV]	Margin [±dB]	Level [dBµV]	Limit [dBµV]	Margin [±dB]
1	0.461	Active	33	56.7	-23.7	25.9	46.7	-20.8
2	4.566	Active	29.1	56	-26.9	24.3	46	-21.7
3	25.00	Active	29.5	60	-30.5	26.6	50	-23.4
4	0.448	Neutral	32.4	56.9	-24.5	25.3	46.9	-21.6
5	4.56	Neutral	27.4	56	-28.6	21.4	46	-24.6
6	25.00	Neutral	29.7	60	-30.3	27.0	50	-23.0



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3.3 §15.247(a2) DTS Bandwidth

In the band 2400.0 - 2483.5 MHz, the minimum 6 dB bandwidth is to be at least 500 kHz. The 6 dB bandwidth was measured while the device was transmitting with typical modulation applied. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised when measuring the bandwidth.

Results:

Centre Frequency [MHz]	Measured 6 dB Bandwidth [kHz]	Limit [kHz]	Result	
2406	2310	> 500	Complied	
2438	2288	> 500	Complied	
2474	2268	> 500	Complied	



Channel 2406 MHz



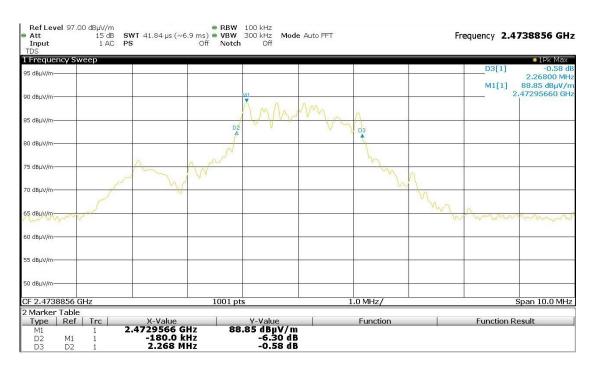
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1 Frequency Sweep				,		DS	[1]	●1Pk View -0,13 d
95 dBµV/m					1. 1.		[1]	2.28800 MH 89.25 dBµV/r
90 dBµV/m		A	M		0			2.43829200 GH
85 dBµV/m		h	www	VM.				
		D2 A		₩P3				
80 dBµV/m		1			h			
75 dBµV/m	Λ	pol			wil.			
70 dBµV/m	- Nov				- LA	M		
65 dBµV/m	nowend					N N	M	
mmmuhhh	<i>Г</i> *						m	mound
60 dBµV/m								
55 dBµV/m					<u>.</u>			
50 dBµV/m								
CF 2.438312 GHz		1001 pt	S	1	.0 MHz/			Span 10.0 MHz
2 Marker Table Type Ref Trc	X-Value	1	Y-Value	-	Function		Functio	n Result

Channel 2438 MHz



Channel 2474 MHz



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3.4 §15.247(b3) Peak Output power

Testing was performed in a semi-anechoic chamber at a distance of 3 metres. Different configurations of EUT and antenna polarization were investigated to produce highest emission EIRP and the EUT was set to transmit in continuous transmission mode.

Results:

Freq.	3 m Field	EIR	P	Limit	Ant. Gain	Conduct	ed power	Limit	Margin
(MHz)	(dBµV/m)	(dBm)	(W)	(W)	(dBi)	(dBm)	(W)	(W)	(W)
2406	96.9	1.7	0.002	4	3.0	-1.3	0.001	1	0.999
2438	97.3	2.1	0.002	4	3.0	-0.9	0.001	1	0.999
2474	96.8	1.5	0.002	4	3.0	-1.5	0.001	1	0.999

dBµV/m to dBm conversion:

$$E = 20.\log\left(\frac{\sqrt{30.P}}{d}\right) + 120$$

Where: $E = \text{electric field strength } (dB\mu V/m)$

P = EIRP in Watts

d = measurement distance in metres

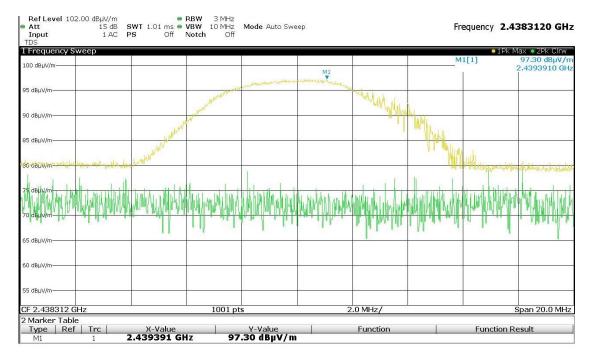


Channel 2406 MHz



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Channel 2438 MHz



Channel 2474 MHz



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3.5 §15.205 Restricted Bands of Operation

The restricted band limits were applied.

3.6 §15.209 Radiated emission limits; general requirements

The limits given in §15.247 applied, however attenuation below the general levels was not required.

3.7 §15.247(d) Out of Band Emissions

3.7.1 RADIATED SPURIOUS MEASUREMENTS

Radiated spurious emission 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 sufficient frequency resolution 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	10	0.6 metre loop antenna
0.150 to 30	9	10	0.6 metre loop antenna
30 to 1000	120	10	Biconilog hybrid
1000 to 18 000	1000	3	Standard gain or broad
18 000 to 40 000	1000	1	band horns

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. Devices design for a fixed position were tested in that position, portable devices were tested in three orthogonal orientations.

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 antenna polarisations.

Calculation of field strength

The field strength was calculated automatically by the software using the pre-stored calibration data. The method of calculation is shown below:

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

Where: E = Radiated Field Strength in dBµV/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)



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Field strength conversion over distance

To convert a limit given at a certain distance to a limit at the measurement distance or vice-versa the following equation was applied:

$$E_x = 20 \times \log\left(\frac{d_y \times 10^{E_y/20}}{d_x}\right)$$

Where: $E_x = Electric field at x metres (dB\mu V/m)$

 $E_y = Electric field at y metres (dB\mu V/m)$

 d_x = Measurement distance of x metres

dy = Measurement distance of y metres

3.7.2 Spurious Emission Limit

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.

Channel	100 kHz BW	Limit		
[MHz]	Power at 3 m [dBµV/m]	10 m [dBµV/m]	3 m [dBµV/m]	1 m [dBµV/m]
2406	91.6	61.2	71.6	81.2
2438	89.8	59.5	69.8	79.5
2474	91.5	61.1	71.5	81.1



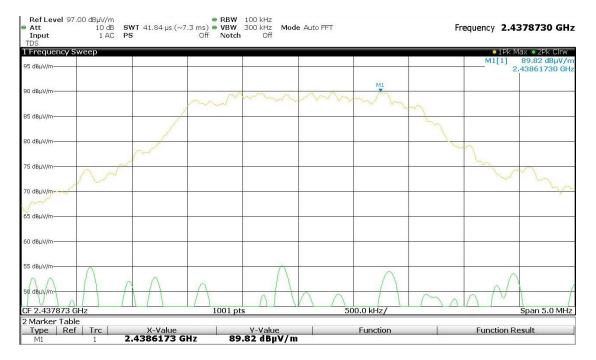
Channel 2406 MHz



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Channel 2438 MHz



Channel 2474 MHz



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3.7.3 Radiated Spurious Emission Tabulated Results

Frequency Band: 9 kHz - 30 MHz

No emissions detected above the measurement system noise floor. Limit 15.209 was applied over the full range, 9 kHz to 30 MHz.

Frequency Band: 30 - 1000 MHz

Limit 15.209 was applied over the full range, 30 MHz to 1000 MHz.

Channel	Polarity	Frequency	Quasi-Peak [dBµV/m]		Limit	Margin
[MHz]		[MHz]	10 m (Meas.)	3 m (Calc.)	[dBµV/m]	[dB]
2406	Vertical	921.51	24.1	34.6	46.0	-11.4
2400	Horizontal	590.67	17.2	27.7	46.0	-18.3
2438	Vertical	31.44	19.6	30.1	40.0	-9.9
2430	Horizontal	436.29	17.3	27.8	46.0	-18.2
		866.07	20.5	31.0	46.0	-15.0
2474	Vertical	37.35	13.9	24.4	40.0	-15.6
2474		30.00	20.3	30.8	40.0	-9.2
	Horizontal	30.12	20.2	30.7	40.0	-9.3

Frequency Band: 1 000 – 18 000 MHz

Average Detector Results:

Channel [MHz]	Polarity	Frequency [GHz]	3 m Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]
		2.397	25.6	71.6	-46.0
	Vertical 2406	4.846	33.4	54.0	-20.6
2406		17.984	46.2	54.0	-7.8
Horizontal	4.846	32.6	54.0	-21.4	
	HUHZUHIAI	10.789	33.5	54.0	-20.5
	Vertical	4.862	33.4	54.0	-20.6
2438	ventical	13.362	36.7	54.0	-17.3
2430	Horizontal	4.862	34.6	54.0	-19.4
	HUHZUHIAI	13.351	36.9	54.0	-17.1
	Vertical	4.928	34.0	54.0	-20.0
2474	Horizontal	4.937	36.2	54.0	-17.8
	nonzontai	17.922	46.2	54.0	-7.8

Peak Detector Results:

Channel [MHz]	Polarity	Frequency [GHz]	3 m Peak [dBµV/m]	Limit [dBµV/m]	Margin [dB]
		2.397	42.5	91.6	-49.1
	Vertical	4.846	48.9	74.0	-25.1
2406 Horizontal		17.984	60.6	74.0	-13.4
	Harizontal	4.846	51.0	74.0	-23.0
	Horizontai	10.789	47.2	74.0	-26.8
	Vertical	4.862	47.4	74.0	-26.6
2438	venical	13.362	51.3	74.0	-22.7
2430	Horizontal	4.862	52.6	74.0	-21.4
	HUHZUHIAI	13.351	51.2	74.0	-22.8
	Vertical	4.928	48.2	74.0	-25.8
2474	Horizontal	4.937	54.5	74.0	-19.5
	Horizontal	17.922	60.4	74.0	-13.6



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Frequency Band: 18 000 – 25 000 MHz

Average Delector Results.							
Channel	Frequency	Average [dBµV/m]		Limit	Margin		
[MHz]	[GHz]	1 m (Meas.)	3 m (Calc.)	[dBµV/m]	[dB]		
2406	22.106	51.0	41.5	63.5	-22.0		
2438	23.569	51.9	42.4	71.6	-29.2		
2474	24.853	51.7	42.2	71.6	-29.4		

Peak Detector Results:

Channel	Frequency	Peak [dBµV/m]		Limit	Margin
[MHz]	[GHz]	1 m (Meas.)	3 m (Calc.)	[dBµV/m]	[dB]
2406	22.106	65.2	55.7	83.5	-27.8
2438	23.569	65.0	55.5	91.6	-36.1
2474	24.853	65.5	56.0	91.6	-35.6

Band-edge measurement results:

Channel [MHz]	Frequency [GHz]	3 m Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2406	2.400	40.3	71.6	-31.3
2474	2.4835	40.5	54.0	-13.5

Channel [MHz]	Frequency [GHz]	3 m Peak [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2406	2.400	42.4	91.6	-49.2
2474	2.4835	41.9	74.0	-32.1



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3.7.4 Frequency Band: 9 kHz - 30 MHz

Measurements were made at a distance of 10 metres. The measurement of emissions between 9 kHz – 150 kHz were made with a resolution bandwidth (RBW) of 200 Hz and the video bandwidth (VBW) of 3 kHz, 150 kHz – 30 MHz were measured with the resolution bandwidth (RBW) of 9 kHz and the video bandwidth (VBW) of 30 kHz. Measurements were made with the loop antenna oriented perpendicular, parallel and ground-parallel with respect to the sample. Only the maximum graphs have been reported.



Channel 2406 MHz



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2 Scan				♀1Pk Max
- 10 kHz FCC209-10M				M1[1] 53.80 dBµV/m 51.550 kHz
100 dBµV/m				511000 KHZ
90 dBµV/m				
80 dBµV/m				
70 dBµV/m				
60 dBµV/m	White the warmen when when when	Aller .	M1	
50 dBµV/m		a south Marthan March	Martines	
				and a service and an and a service and a service of the service of
40 dBµV/m				
30 dBµV/m				
20 dBµV/m				
IF		Range 1	<u> </u>	
Start 9.0 kHz				Stop 150.0 kHz
2 Scan	1 MHz			● 1Pk Max ¹⁰ M ^I M1[1] 44.82 dBµV/m
				924.000 kH
70 dBµV/m				
60.dBµV/m				
- Martin Martin				
50 dBµV/m	Norman Hal		<u> </u>	
	and the second sec			
40 dBµV/m		and the start of the start and		
30 dBµV/m		and the second second second	The state of the s	
			a second second second	where the and the second and the second proper approved the second second
20 dBµV/m				
10 dBµV/m				
0 dBµV/m				
-10 dBµV/m				
	TF			
		Range 1		0 00.01***
Start 150.0 kHz				Stop 30.0 MHz

Channel 2438 MHz



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2 Scan	-					◦1Pk Max
10 kHz CC209-10M					M1	[1] 52.14 dBμV/ι 59.050 kH
100 dBµV/m						
90 dBµV/m						-
80 dBµV/m						
 70 dBµV/m						
бо dBµV/m						
	n man an a	maked when have been here	day in a	M1		
50 dBµV/m			and a standard broken	- Adamatica and a start of the	marked a design of the second	
					and the second second second	minter marked and the
40 dBµV/m						
30 dBµV/m————————————————————————————————————						
20 dBµV/m						
F						
Start 9.0 kHz		Range 1				Stop 150.0 kH
2 Scan						• 1Pk Max
CC209-10M	1 MHz				10 MFM 1	[1] 49.12 dBµV/ı 636.000 k⊦
70 dBµV/m						
					1 1	
50 dBµV/m						
	M1					
	M1	~				
50 dBµV/m	M1					
50 dBµV/m	Marken and and and and and and and and and an	made and a second a				
50 dBµV/m	Marken and and and and and and and and and an	made and a second a	And the second s			
50 dBµV/m	Marken and and and and and and and and and an	made and a second a	Andrewing		Nerrow Constraints	
50 dBµV/m	Marken and and and and and and and and and an	made and a second a	And Marketon an		Nerro and a second as	
50 dBµV/m 40 dBµV/m 30 dBµV/m	Marken and and and and and and and and and an	mit and al al and a second day of a			And the second sec	unang ng hag ng
50 dBµV/m +0 dBµV/m 30 dBµV/m 20 dBµV/m	Marken and and and and and and and and and an	mit and al al and a second day of a	A-14-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4-4			V
50 dBµV/m	Marken and and and and and and and and and an	mit and al al and a second day of a	A-14-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1			
50 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m 20 dBµV/m 10 dBµV/m 0 dBµV/m	Marken and and and and and and and and and an	mit and al al and a second day of a				un and a second
50 dBµV/m +0 dBµV/m 30 dBµV/m 20 dBµV/m 10 dBµV/m 0 dBµV/m	Marken and and and and and and and and and an	mit and al al and a second day of a				
50 dBµV/m 40 dBµV/m 30 dBµV/m 20 dBµV/m 10 dBµV/m	hand and and and and and and and and and	mit and al al and a second day of a				
50 dBµV/m 40 dBµV/m 30 dBµV/m 20 dBµV/m 10 dBµV/m 0 dBµV/m	hand and and and and and and and and and	mit and al al and a second day of a				

Channel 2474 MHz



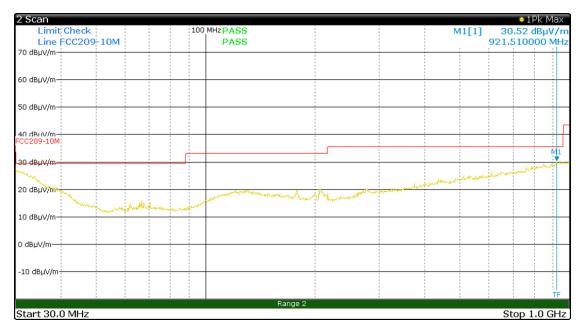
Accredited for compliance with ISO/IEC 17025 - Testing.

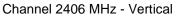
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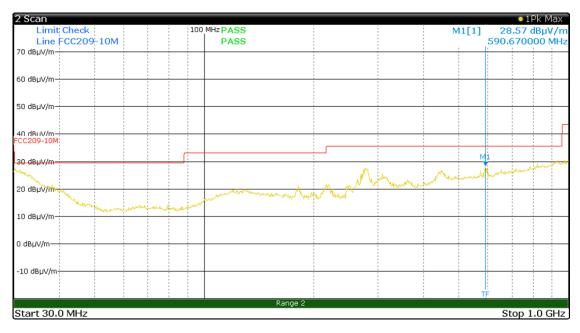


3.7.5 Frequency Band: 30 - 1000 MHz

Measurements were made at a distance of 10 metres. The measurement of emissions between 30 - 1000 MHz were made with a resolution bandwidth (RBW) of 120 kHz and the video bandwidth (VBW) of 300 kHz.







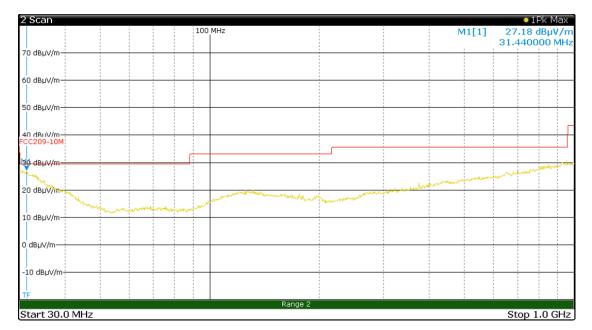
Channel 2406 MHz - Horizontal



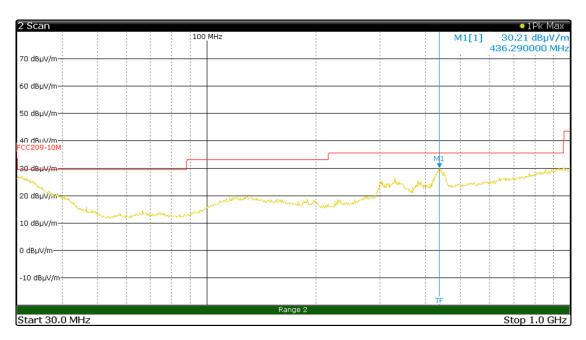
Accredited for compliance with ISO/IEC 17025 - Testing.

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Channel 2438 MHz - Vertical

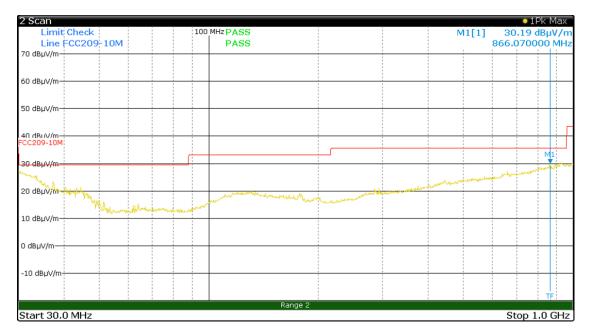


Channel 2438 MHz - Horizontal

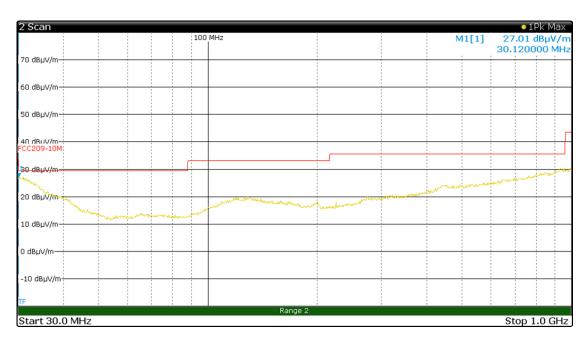


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Channel 2474 MHz - Vertical



Channel 2474 MHz - Horizontal

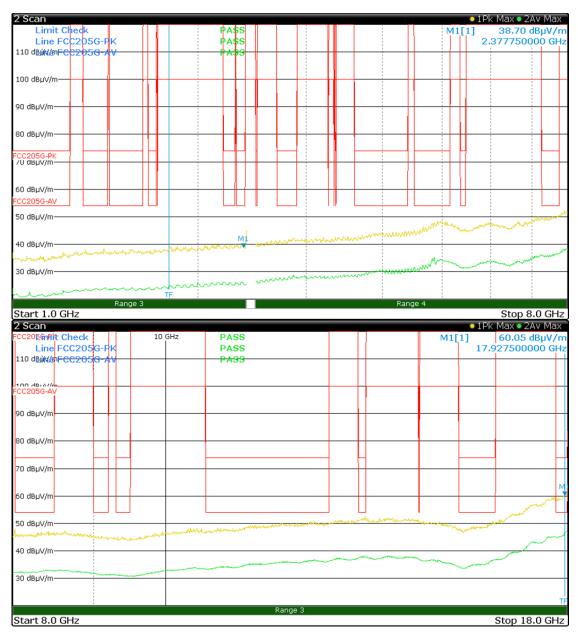


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3.7.6 Frequency Band: 1 000 – 18 000 MHz

Measurements to 18 GHz were made at a distance of 3 metres. The measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 1000 kHz.



Channel 2406 MHz - Vertical



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Limit Check				1Pk Max 2Av Max
		PA\$S	M	1[1] 51.47 dBµV/n
Line FCC205G-PK		PA\$S		4.846000000 GH
110 dBin/m - CC205G-AV		- PA\$S		
100 10 111				
100 dBµV/m				
90 dBµV/m				
50 dbpv/m				
80 dBµV/m				
-CC205G-PK /U dBµV/m				
/U dBµV/m				
60 dBµV/m				
FCC205G-AV				
50 dBµV/m				- Alexandra and
			and the second second	and an and a start and a start
10 10 11/1		and the second second	Man Marken Marken Contraction	
40 dBµV/m-	man Mennanner	CARLAND AND AND AND AND AND AND AND AND AND		
m Manuman and			Am	
30 dBµV/m			and a second sec	
		me man		
-lapon	mand		TE	
	ange 3		Range 4	
Start 1.0 GHz				Stop 8.0 GHz
2 Scan				1Pk Max 2Av Max
CC20EGARK Check	10 GHz	PASS	M1	
Line FCC205G-PK		PASS		10.789250000 GH
110 dBinter CC205G-AV		PASS		10.000200000 01
		1,400		
FCC205G-AV	_			
90 dBµV/m				
90 UBDV/III				
80 dBµV/m				<u> </u>
	- -			
70 dBµV/m				
70 dBµV/m				
70 dBµV/m 60 dBµV/m				
60 dBµV/m		M1		
60 dBµV/m		M1	ny han and the first for an and the first of the former	
60 dBµV/m				
60 dBµV/m				Manual
60 dBµV/m				
60 dBµV/m				
60 dBµV/m 50 dBµV/m 40 dBµV/m				
60 dBµV/m				
60 dBµV/m 50 dBµV/m 40 dBµV/m				All and a second s
60 dBµV/m 50 dBµV/m 40 dBµV/m				

Channel 2406 MHz - Horizontal



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2 Scan				1Pk Max • 2Av Max
Limit Check		PASS		M1[1] 47.93 dBµV/r
Line FCC2D5G-PK		PA\$S		4.861750000 GH
110 dBiiVien <mark>FCC205G-AV</mark>		- PA\$S		
100 dBµV/m				
90 dBµV/m				
80 dBµV/m				
FCC205G-PK /U dBµV/m				
/o dspv/m				
60 dBµV/m				
FCC205G-AV				
50 dBµV/m				M1
				Mr. Marine Mar
		1 - martine anna	when when the	And a second
40 dBµV/m	www.www.derahand	AND ANY		
the who who was a start of the				and the second s
30 dBµV/m		man manufun		MM0 mm
	min	men menter		
alan				TF
	nge 3		Range	
Start 1.0 GHz				Stop 8.0 GH
2 Scan				1Pk Max • 2Av Max
FCC20EGraft Check	10 GHz	PASS		M1[1] 51.46 dBµV/r
Line FCC205G-PK		PASS		13.362000000 GH
110 dBm//mFCC205G-AV		PA33		
FCC205G-AV				
90 dBµV/m				
50 dbpt/m				
80 dBµV/m				
	┛ │ ┝		Ц	
70 dBµV/m				
60 dBµV/m				
	J L		4	
50 dBµV/m		the last and and the second and and and and and and and and and a	and the second	Man and a provide a second and a
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40 dBµV/m				
το αρμν/π				
30 dBµV/m-				
30 ubpv/m				
TF				
		Range 3		Stop 18.0 GH

Channel 2438 MHz - Vertical



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Limit Check				1Pk Max • 2Av Max
	(PA	\$S	M1[
Line FCC205G-PK	PA	\$S		4.861750000 GH
110 dBinVém FCC205G-AV		\$3		
100 dBµV/m				
90 dBµV/m				
80 dBµV/m				
		╇┩╽┝╾┥┊╶╽║┝╴	I _ I	
CC205G-PK /U dBµV/m				
60 dBµV/m				
CC205G-AV			M1	
50 dBµV/m				Linger in Waldaland
			And	we have have been and the
10 dB+4//m		m wearen and	Make and Arada	
10 dBµV/m	her when the here have the			
half my how we have			Nim	and the second s
30 dBµV/m			Managagagagagagagagagagagagagagagagagaga	
		n munimum		
	min	~~ ~~		
In the second			; <u>TF</u> ;	
Ran	ige 3		Range 4	
Start 1.0 GHz				Stop 8.0 GH
2 Scan				• 1Pk Max • 2Av Max
CC20EmAlt Check	10 GHz PA	SS		
			M1[1]] 49.84 dBµV/i
Line FCC205G-PK	PA		M1[1]] 49.84 dBµV/i 12.448750000 G⊦
Line FCC205G-PK	PA	SS	M1[1]	49.84 dBµV/i 12.448750000 GH
Line FCC205G-PK		SS	M1[1	J 49.84 dBµV/ 12.448750000 GF
Line FCC205G-FK 110 dBiw/s <mark>7FCC205G-AV</mark>	PA	SS	M1[1]] 49.84 dBμV/ 12.448750000 GF
Line FCC205G-FK	PA	SS	M1[1]] 49,84 dBμV/ 12,448750000 GF
	PA	SS	M1[1]] 49,84 dBμV/ 12,448750000 GF
Line FCC205G-FK 110 dBjiv//mFCC205G-7.V	PA	SS	M1[1]] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBjiv//mFCC205G-7.V	PA	SS	M1[1]	J 49.84 dBµV/ 12.448750000 G
Line FCC205G-FK 110 dBjiv//mFCC205G-7.V	PA	SS	M1[1]] 49.84 dBµV/ 12.448750000 Gi
Line FCC205G-FK 110 dBjiv//mFCC205G-AV CC205G-AV 20 dBjiv//m	PA	SS	M1[1]] 49.84 dBµV/ 12.448750000 G
Line FCC205G-FK 110 dBjiv//mFCC205G-AV CC205G-AV 20 dBjiv//m	PA	SS] 49.84 dBµV/ 12.448750000 G
Line FCC205G-FK 110 dBjiv//mFCC205G-AV CC205G-AV 20 dBjiv//m	PA	SS] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBji//mFCC205G-AV CC205G-AV 90 dBji//m 30 dBji//m	PA	SS] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBji//mFCC205G-AV CC205G-AV 90 dBji//m 30 dBji//m	PA	SS] 49.84 dBµV/i 12.448750000 Gi
Line FCC205G-FK 110 dBji//sFCC205G-7/V CC205G-AV 90 dBji//m 30 dBji//m	PA	SS] 49.84 dBµV/i 12.448750000 Gi
Line FCC205G-FK 110 dBji//mFCC205G-AV CC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m	PA	SS] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBji//mFCC205G-AV CC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m	PA	SS] 49.84 dBµV/ 12.448750000 Gi
Line FCC205G-FK L10 dBji//mFCC205G-AV CC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m 50 dBji//m	PA	SS] 49.84 dBµV/i 12.448750000 Gi
Line FCC205G-FK L10 dBji//mFCC205G-AV CC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m 50 dBji//m	PA PA	SS 33] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBji//mFCC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m 50 dBji//m	PA PA	SS 33 		19.84 dBµV/i 12.448750000 GF 12.4487500000 GF 12.44875000000 GF 12.44875000000 GF 12.44875000000 GF 12.4487500000000000000000000000000000000000
Line FCC205G-FK 110 dBji//m FCC205G-7/V CC205G-AV 90 dBji//m 30 dBji//m 70 dBji//m 50 dBji//m 50 dBji//m	PA PA	SS 33] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK L10 dBji//m FCC205G-7/V CC205G-AV 20 dBji//m 30 dBji//m 70 dBji//m 50 dBji//m 50 dBji//m	PA PA	SS 33		149.84 dBµV/ 12.448750000 Gi
Line FCC205G-FK 110 dBiv//m CC205G-AV 90 dBµV/m 70 dBµV/m 50 dBµV/m 50 dBµV/m	PA PA	SS 33] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBjW/srFCC205G-7/V 100 dBjW/srFCC205G-7/V 90 dBjW/m 30 dBjW/m 50 dBjW/m 50 dBjW/m 40 dBjW/m	PA PA	SS 33		49.84 dBµV/I 12.448750000 GF
Line FCC205G-FK 110 dBji//m FCC205G-7/V 100 dBji//m 20 dBji//m 30 dBji//m 50 dBji//m 50 dBji//m 40 dBji//m	PA PA	SS 33] 49.84 dBµV/i 12.448750000 GF
Line FCC205G-FK 110 dBji//m FCC205G-7/V 100 dBji//m 20 dBji//m 30 dBji//m 50 dBji//m 50 dBji//m 40 dBji//m	PA PA	SS 33		49.84 dBµV/I 12.448750000 GF
Line FCC205G-FK	PA PA	SS 33 MI	M1[1]] 49.84 dBµV/ 12.448750000 GH
Line FCC205G-FK L10 dBji//m FCC205G-7/V CC205G-AV 20 dBji//m 30 dBji//m 30 dBji//m 50 dBji//m 50 dBji//m 40 dBji//m	PA PA	SS 33		Stop 18.0 GH

Channel 2438 MHz - Horizontal



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1 DL May a DAy Ma



2 Coop

Limit Check			1Pk Max 2Av Max
	PA\$S		M1[1] 48.20 dBµV/n
Line FCC205G-PK	PA\$S		4.928500000 GH
110 dBm/m FCC205G-AV			
100 dBµV/m			
90 dBµV/m			
80 dBµV/m			
CC205G-PK			
/U dBµV/m			
60 dBµV/m			
CC205G-AV			
		!" []	
50 dBµV/m			MI
			and the man which we want the second s
		mannan	New
40 dBµV/m	anter an	And the second se	
and a share the stand of the st	And Andrew and a second second		the second se
		a de un antener de la company de	MANNAN MANNAN MANNAN
30 dBµV/m		Martin and a state of the state	
	man manus man		
Anna			TP
Rang	e 3	Ran	ge 4
Start 1.0 GHz			Stop 8.0 GHz
2 Scan			1Pk Max • 2Av Max
CC2050 Plt Check	10 GHz PASS		M1[1] 60.31 dBµV/r
Line FCC205G-RK	PASS		17.920500000 GH
110 dBin//mFCC205G-AV			17.920300000 GH
TTO ODINA -CC203C-AV	PASS		
1 1 1			
100 de a // e			
100 d80 4/0 CC205G-AV			
100 de 0//2 CC205G-AV			
90 dBµV/m			
90 dBµV/m			
90 dBµV/m 30 dBµV/m			
90 dBµV/m			
100 dBµV/m 90 dBµV/m 80 dBµV/m 70 dBµV/m			
90 dBµV/m 80 dBµV/m 70 dBµV/m			
90 dBµV/m 30 dBµV/m 70 dBµV/m			
90 dBµV/m 30 dBµV/m 70 dBµV/m			
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90 dBµV/m 30 dBµV/m 70 dBµV/m 50 dBµV/m			
90 dBµV/m 30 dBµV/m 70 dBµV/m 50 dBµV/m			
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90 dBµV/m 30 dBµV/m 70 dBµV/m 50 dBµV/m 50 dBµV/m			
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20 dBµV/m 30 dBµV/m 70 dBµV/m 50 dBµV/m 50 dBµV/m 40 dBµV/m			
20 dBµV/m			
90 dBµV/m 30 dBµV/m 70 dBµV/m 50 dBµV/m 50 dBµV/m		100 S	

Channel 2474 MHz - Vertical



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Limit Check PA\$S Line FCC2D5G-FK PA\$S dBµV/m	
dBjitv/m PA89 Image: constraint of the second seco	
ldBµV/m lBµV/m	WWWWWWWWW
JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m	WWWWWWWWW
JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m JBµV/m	WWWWWWWWW
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JBµV/m IBµV/m JBµV/m IBµV/m JBµV/m IBµV/m	WWWWWWWWW
205G-PK JBµV/m	WWWWWWWWW
205G-PK JBµV/m	WWWWWWWWW
205G-PK JBµV/m	WWWWWWWWW
JBµV/m	WWWWWWWWW
JBµV/m	WWWWWWWWW
205G-AV	WWWWWWWWW
205G-AV	WWWWWWWWW
JBµV/m-	WWWWWWWWW
JBLV/m-	WWWWWWWWW
JBLV/m-	
BBUV/m-	
BBUV/m-	
BBUV/m-	
have a second and a second a second a second a	with the second s
have a second and a second a second a second a	ADD
line	
	Range 4
nrt 1.0 GHz	Stop 8.0
can	● 1Pk Max ● 2Av
2059 Fit Check 10 GHz PASS	M1[1] 48.25 dB
Line FCC205G-FK PASS	10.786750000
dBiW/shFCC205G-AV PASS	
dDubilme	
205G-AV	
dBµV/m	
JBµV/m	
dBµV/m	
	مسيري المحالي المحالي المحالي
	Make and the second water
JBµV/m	A particular of the state of th
and a straight and the for the state of the	
JBµV/m	
JBµV/m	~
	~
	~
TF Range 3	~

Channel 2474 MHz - Horizontal



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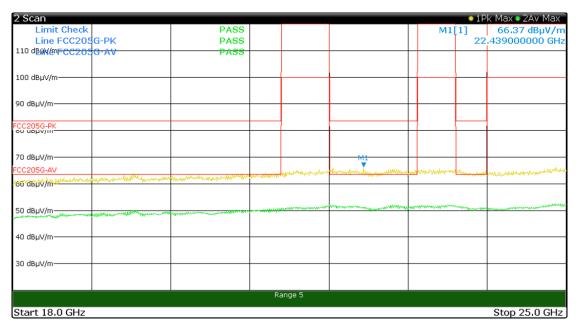


3.7.7 Frequency Band: 18 000 – 25 000 MHz

Measurements above 18 GHz were made at a distance of 1 metre. The measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 1000 kHz. Both receive antenna polarities combined.

2 Scan					Pk Max●2Av Max
Limit Check	PASS			M1[1]	61.28 dBµV/m
Line FCC205G-PK	PASS			19	720500000 GHz
110 dBiiW@FCC205G-AV	PASS				
100 dBµV/m					1
90 dBµV/m					
CC205G-PK					-
70 dBµV/m					
CC205G-AV M: 60°88/0/m////////////////////////////////	Marcolan and floridation and and an and an and and a state		Hand a mar squiper of the Whatag	and the second s	and water and the second of the second s
50 dBµV/m					
40 dBµV/m					
30 dBµV/m					
		Range 5			
Start 18.0 GHz					Stop 25.0 GHz

Channel 2406 MHz



Channel 2438 MHz



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2 Scan				•	1Pk Max 🛛 2Av Max
Limit Check	PASS			M1[1]	66.00 dBµV/m
Line FCC205G-PK	PASS				24,853250000 GHz
110 dBmV/m=cc2056-AV	PASS				
100 dBµV/m					
90 dBµV/m					
FCC205G-PK					
70 dBµV/m					
FCC205G-AV	and and a second and	and the second	entransportation the gran for the test of the test	and a start and	- total the second all the second al
50 dBµV/m				Mallalla freed all and a second and	
40 dBµV/m					
30 dBµV/m					
		Range 5			
Start 18.0 GHz					Stop 25.0 GHz

Channel 2474 MHz

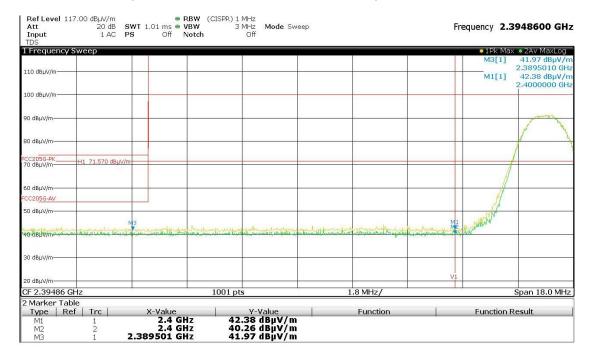


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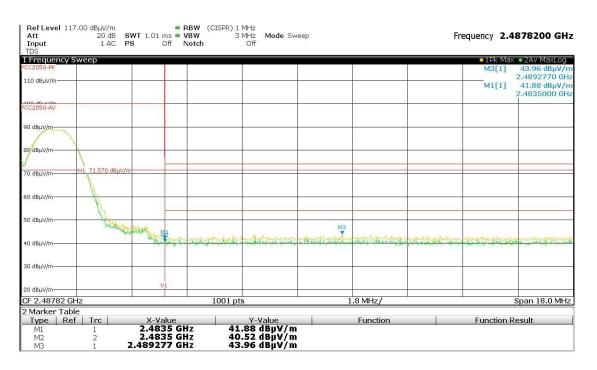


3.7.8 Band-Edge Emission Measurements

Emissions within 5 MHz of an authorised band edge were measured. The measurements were made with the sample and antenna orientated for maximum power level.



Channel 2406 MHz



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3.8 §15.247(e) Power Spectral Density

Power spectral density measurements were made at 3 metres. Different configurations of EUT and antenna polarization were investigated to produce highest emission and the EUT was set to transmit in continuous transmission mode. Power spectral density is shown below, the resolution bandwidth was 3 kHz.

Results:

Channel (MHz)	PSD at 3 m (dBµV/m)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result
2406	81.7	-15.7	8	-23.7	Complied
2438	79.3	-15.9	8	-23.9	Complied
2474	79.5	-13.6	8	-21.6	Complied

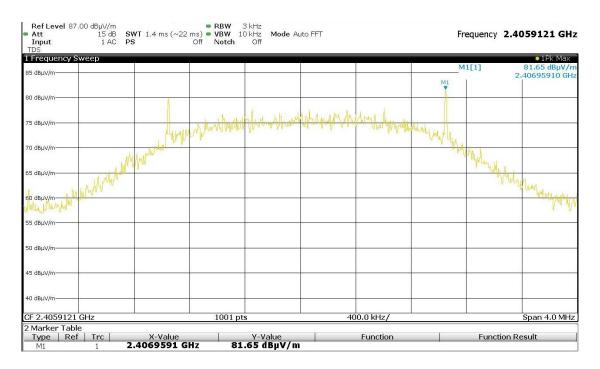
dBµV/m to dBm conversion:

$$E = 20 \log\left(\frac{\sqrt{30P}}{d}\right) + 120$$

Where: $E = \text{electric field strength in } dB\mu V/m$

P = EIRP in Watts

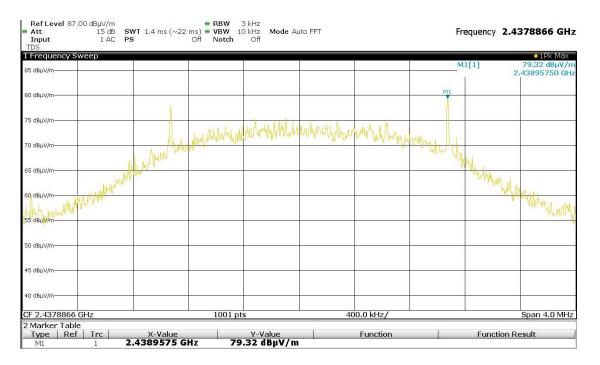
d = measurement distance in metres



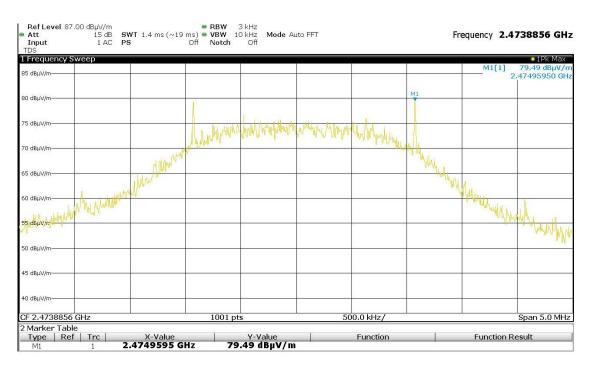
Channel 2406 MHz



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3.9 §15.247(i) Maximum Permissible Exposure

The EQX 800 was considered a portable device without containing other radios transmitting simultaneously and could be operated within 50 mm of the extremity of a user or nearby person. SAR measurement exclusion requirements of KDB 447498 D01 General RF Exposure Guidance v06 were applied. The following equation was applicable:

10-g Extremity SAR:

 $\left(\frac{max. channel power, mW}{min. separation distance, mm}\right) \times \sqrt{f(GHz)} \le 7.5$

Maximum measured power, E.I.R.P. =2 mWMinimum separation distance =5 mmHighest frequency =2.474 GHz

$$\left(\frac{2\ mW}{5\ mm}\right) \times \sqrt{2.474\ GHz} = 0.6$$

The EQX800 complied with the RF exposure requirements of FCC 1.1307.

3.10 §2.1049 Occupied bandwidth – 99% power

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

Channel [MHz]	99% Bandwidth [MHz]	Low Frequency [MHz]	High Frequency [MHz]
2406	4.654	2404	2409
2438	4.785	2436	2441
2474	4.615	2471	2476



Channel 2406 MHz



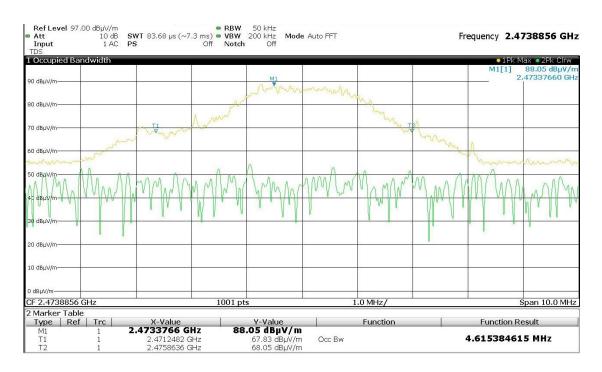
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Input 1 AC PS	● RB WT 83.68 µs (~7.3 ms) ● VB G Off Not	V 200 kHz Mode	Auto FFT		Fn	equency 2.4	378730 GHz
TDS 1 Occupied Bandwidth							1Pk Max
						M1[1]	84.85 dBµV/m
90 dBµV/m		M1				2	.43787300 GHz
		Ann hours	month	Δ			
80 dBµV/m		N	0.01	l'UL			
	a not			ne			
70 dBµV/m	A			have	A T2		
	1 and the				mana	m	
60 dBµV/m	Ana					The	
mound							roman
50 dBµV/m							
are southers							
40 dBµV/m							
30 dBµV/m				2			
20 dBµV/m							
10 dBµV/m							
0 dBµV/m							
CF 2.437873 GHz	1001	ots	1	.0 MHz/		L	Span 10.0 MHz
2 Marker Table	1001						
Type Ref Trc	X-Value	Y-Value		Function		Function R	esult
		84.85 dBµV/m					
T1 1 T2 1	2.4359249 GHz 2.4407102 GHz	70.23 dBµV/m 67.14 dBµV/m	Occ Bw		,	4.78521478	5 MHZ
12 1	2.4407102 GHZ	07.14 0BUV/III					

Channel 2438 MHz



Channel 2474 MHz



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4.0 COMPLIANCE STATEMENT

The EQX 800 Platypus Metal Detector tested on behalf of Minelab Electronics Pty. Ltd. **complied** with the requirements of 47 CFR, Part 15 Subpart C - Rules for Radio Frequency Devices (intentional radiators) for a Digital Transmission System (DTS) operating within the band: 2400 MHz to 2483.5 MHz.

5.0 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 30 MHz to 300 MHz 300 MHz to 1000 MHz 1 GHz to 18 GHz	±4.1 dB ±5.1 dB ±4.7 dB ±4.6 dB
Peak Output Power:		±1.5 dB
Peak Power Spectral Density:		±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%.



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