EMC Bayswater Pty Ltd
18/88 Merrindale Drive Croydon South, Victoria, 3136, Australia
Telephone: +61 3 9761 5888
Facsimile: +61 3 8761 6547
Email: sales@emcbayswater.com.au
ABN: 49 112 221 333

RADIO COMPLIANCE REPORT
For Class II permissive change testing
In accordance with:
CFR47 FCC Part 15, Subpart C, 15.247

Setec BMPRO Pty Ltd

SONIC

Bluetooth Module

FCC ID: 2ASJH-SONIC

REPORT: E2406-1648-6
DATE: July, 2024

Accreditation Number: 18553
Accredited for compliance with ISO/IEC 17025 - Testing

Certificate of Compliance
Class II Permissive Change Compliance Report
EMC Bayswater Test Report: E2406-1648-6
Issue Date: July, 2024

Test Sample(s):	Bluetooth Module
Model No:	SONIC
Serial No:	Engineering sample
FCC ID:	2ASJH-SONIC

Customer Details:

Mr. Cecilio Dimasacat
Setec BMPRO Pty Ltd
19 Henderson Road,
Knoxfield, VIC 3180
Australia

Phone No: +61 3 9763 0962 Fax No: +61 3 9763 8789
e-mail: cecilio.dimasacat@setec.com.au

Test Specification: CFR47 FCC Part 15, Subpart C, 15.247

Results Summary:

15.203 - Antenna requirement	***Complied***
15.247 (a) (2) - 6dB Bandwidth	***Not Tested****
15.247 (b)(3) – Maximum Output Power	***Complied***
15.247 (d) - Out-of-Band Emissions - – 100kHz, -20dBc	***Not Tested****
15.247 (d) - Emissions on the Band edge	***Complied***
15.247 (d), 15.209 – Radiated emissions in Restricted bands	***Complied***
15.247 (e) - Power Spectral Density	***Not Tested****
15.247 (i) - Radio frequency hazard	***Complied***

**Customer requested partial testing for Class II permissive change.*

Test Date(s): 13th to 17th of June, 2024

Test House (Issued By):

EMC Bayswater Pty Ltd
18/88 Merrindale Drive
Croydon South
Victoria 3136
Australia

FCC Accredited Test Firm Registration number: 527798
FCC Accredited Test Firm Designation number: AU0004

Phone No: +61 3 9761 5888 e-mail: sales@emcbayswater.com.au
Fax No: +61 3 8761 6547 Web: www.emcbayswater.com.au/

This is to certify that the necessary measurements were made by EMC Bayswater Pty Ltd, and that the modified Setec BMPRO Pty Ltd, SONIC, Bluetooth Module, has been tested in accordance with requirements contained in the appropriate commission regulations for Class II permissive change.

Tested and prepared by:	Approved by:	
		04/07/2024 11:11
Adnan Zaman (EMC Test Engineer)	Neville Liyanapatabendige (Manager)	Date

Class II Permissive Change Compliance Report
for
Setec BMPRO Pty Ltd

Contents

1. Introduction

Electromagnetic Compatibility (EMC) tests were performed on a Setec BMPRO Pty Ltd, SONIC, Bluetooth Module in accordance with the requirements of Title 47 of the standard CFR47 FCC Part 15, Subpart C, 15.247.

Class II permissive change testing has been carried out to ensure that this previously certified device remains compliant.

2. Test Report Revision History

None

3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantee the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full (with the exception of the certificate on page 2) without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will nullify the document.

4. Summary of Results

The EUT complied with applicable requirements of CFR47 FCC Part 15, Subpart C, 15.247. Worst-case results are tabled as follows:

FCC Part 15C sections	Test	Result
15.203	Antenna Requirement	Complied[#1]
15.247 (b)(3)	Maximum Peak Output Power	Complied by 29.3dB
15.247 (d)	Emissions on the Band edge	Complied by 10.8dB
15.247 (d), 15.209	Radiated emissions in Restricted bands	Complied by 1.3dB[+]

[+]Refer to relevant section for statement of measurement uncertainty.

[#1]The Antenna is attached to a dedicated connector, external to the device

Table 1: Summary of test results

5. Product Sample Details

5.1. EUT Description

The EUT (Equipment Under Test), as supplied by the client, is described as follows:

Product:	Bluetooth Module	
Model No:	SONIC	
Serial No:	Engineering sample	
Firmware:	Not supplied	
Software:	N/A	
Power Specifications:	1.7 - 3.3 Vdc, 15mA max.	
Dimensions:	20mm x 23mm x 3.8mm (Length x Width x Height)	
Weight:	< 1gram	
EUT Type:	Tested as table-top	
Transmitter details:	Description:	System-on-chip
	Type:	nRF52840
	Modulation:	GFSK
	Channels:	2.402 + k GHz, k= 0… 78
	Max power:	+4dBm
	Data Rates:	1Mbps and 2Mbps
	Antenna:	External 2.4 GHz FlexPIFA Antenna (Laird 001-0022)
	Antenna Gain:	+2dBi

(Customer supplied product information)

(Refer to photographs in Annex A & C for views of the EUT)

5.2. Product description

The EUT (Equipment Under Test) has been described by the customer as follows:

"SONIC is a single mode Bluetooth Low Energy (BLE) v.5.3 module that is designed for integration in Setec BMPRO's power conversion, and RV features control and monitoring products. It requires power and software to implement BLE functionality. This module enables the products to connect to a wide range of external devices/sensors via configurable GPIO interfaces and preconfigured NFC, QSPI, I2C, and UART interfaces."

(Customer supplied product description information)

The highest frequency generated or used in the device or on which the device operates or tunes as specified by the customer is 2480MHz (BLE).

5.3. Support Equipment

Support Equipment 1:	Description:	Carrier Board
	Manufacturer:	Setec BMPRO
	Model No:	Not stated
	Serial No:	Not stated

5.4. Product operating modes

"Transmit mode
Receive mode"

(Customer supplied product operating mode information)

5.5. Product operating mode for testing

"Transmit mode"

(Customer supplied product operating mode for testing information)

5.6. Configuration

The EUT was either configured by the customer or configured using the customer's instructions.

The module is mounted on a carrier board containing a 12V-3.3V DC/DC power converter. The Carrier Board was connected to an external DC Power source. For transmitter testing, the module is configured to transmit maximum power of +4dBm with data rate of 2Mbps. The EUT transmitted at maximum TX power at the lowest, middle and highest TX frequencies.

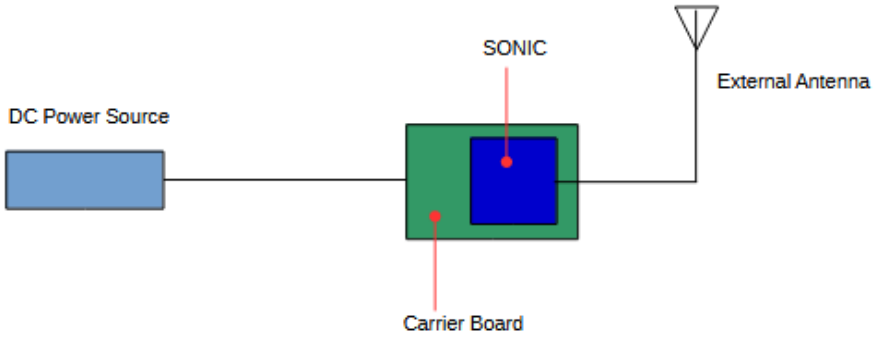


Figure 1: Block diagram of EUT test configuration – Radiated Method

5.7. Modifications

The Setec BMPRO Pty Ltd requested to reduce the power level configured at the module +8dBm to +4dBm to comply with the Radiated emissions in Restricted bands testing. All the testing was performed with a +4dBm power level configured at the module.

EMC Bayswater Pty Ltd did not modify the EUT.

6. Test Facility & Equipment

6.1. Test Facility

Tests were performed at the indoor Open Area Test Site (iOATS) at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

EMC Bayswater Pty Ltd FCC Test Firm registration number is 527798.

EMC Bayswater Pty Ltd FCC Test Firm Designation number is AU0004.

6.2. Test Equipment

Refer to Appendix A for the measurement instrument list.

7. Referenced Standards

CFR47 FCC Part 15, Subpart C, 15.247

CFR47 FCC Part 15, Subpart B

ANSI C63.10 - 2013
American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

ANSI C63.4 - 2014
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

FCC KDB - 558074 D01 15.247 Meas Guidance v05r02

8. Referenced Documents

Test Plan
Not supplied

9. Antenna Requirement – FCC Part 15.203

9.1. Requirements

As per section 15.203 of CFR47 FCC Part 15, Subpart C, 15.247:

- An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

9.2. Result

The EUT uses external antenna with dedicated connector. Therefore, the EUT complied with the antenna requirements of CFR47 FCC Part 15, Subpart C, Section 15.203.

10. Duty Cycle correction factor

Value	Declared by the manufacturer
Duty Cycle	Maximum 17%

Table 2: Duty Cycle

Duty Cycle = (17/100) = 0.17
Duty Cycle Correction Factor = 20*Log(0.17) = -15.4dB

The customer supplied sample for testing was configured to transmit at 100% duty cycle.

The measurement uncertainty was calculated as follows:

Measurement Parameter	Calculated measurement uncertainty
Time	±0.2%

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Notes: The customer declared maximum duty cycle is 17%.

The duty cycle correction factor for 17% duty cycle is -15.4dB.

Assessment: All Peak measurements of the transmission fundamental and associated harmonics can be reduced by 15.4dB.

11. Maximum Peak Output Power – FCC 15.247 (b)(3)

11.1. Test Procedure

The Maximum Peak Output Power measurements were performed in accordance with ANSI C63.10 - 2013.

Radiated Emissions were measured 3 metres away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is an ANSI C63.4 compliant semi-anechoic chamber with ground plane. The EUT was placed on a non-conductive support at a height of 1.5m above the ground plane.

A Horn antenna was used and an area of 3m x 3m was covered between the antenna and the EUT using RF absorbing material with a rated attenuation more than 20dB over the frequency range.

For both horizontal and vertical antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned with 1MHz RBW and 3MHz VBW. The antenna height was varied from 1 to 4 metres using the antenna bore-sighting technique and the turntable slowly rotated. The EUT was orientated in each of the X, Y and Z-axis, in-turn, to find the worst case emissions. The maximum emissions were recorded.

Plots of the accumulated measurement data for both horizontal and vertical antenna polarizations, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report)

The EUT was tested on the top, middle and bottom channels.

(Refer to photographs in Annex B for views of the test configuration)

11.2. Limits

For systems using digital modulation techniques:

Transmit operating frequency (MHz)	Peak Power (W)	Peak Power (dBm)	e.i.r.p (W)	e.i.r.p (dBm)
2400 – 2483.5	1	30	4	36

Table 3: Limits – Transmitter maximum peak output power

11.3.Test Results

The worst-case maximum output power measurements are tabulated below:

(Refer to graphs in Appendix C.1)

Channel	Frequency (MHz)	Measured E-Field Peak (dBμV/m)	e.i.r.p (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	2402	99.899	+4.7	36.0	-31.3	Complied
Middle	2440	101.883	+6.7	36.0	**-29.3***	Complied
Top	2480	100.836	+5.6	36.0	-30.4	Complied

**Worst-case emissions*

Table 4: Results for Maximum Peak Output Power – 2 Mbps

The measurement uncertainty was calculated at ±4.83dB. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of approximately *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	15.1°C
Humidity:	54%
Atmospheric pressure:	1021.9hPa

Table 5: Climatic Conditions

Notes: The transmitter maximum output power was below the specified limit for the specified operating frequency.

The transmitter was continuously transmitting in modulated transmit mode.

Duty cycle correction factor was not applied to the measurements.

Assessment: The EUT complied with the Transmitter Maximum Peak output power requirements of CFR47 FCC Part 15, Subpart C, 15.247 (b)(3).

12. Radiated emissions in Restricted bands – 15.247 (d), 15.209

12.1. Requirements

As per section 15.247(d) of 47 CFR Part 15 Subpart C:

- Radiated emissions which fall in the restricted bands, as defined in section 15.205(a) of 47 CFR Part 15 Subpart C, must also comply with the radiated emission limits specified in section15.209(a) of 47 CFR Part 15 Subpart C (see §15.205(c) of 47 CFR Part 15 Subpart C).

As per section 47 CFR Part 15 Subpart C section 15.209 (Radiated emissions, general requirements) the EUT is required to meet the limits that permit the highest field strength of the following table for the radiated emissions which fall in the restricted bands, as defined in section 15.205(a) of 47 CFR Part 15 Subpart C:

Frequency Range (MHz)	Limits at 3m (dBμV/m)
0.009 to 0.490	128.5 to 93.8
0.490 to 1.705	73.8 to 62.9
1.705 to 30.0	69.5
30.0 to 88	40.0
88.0 to 216.0	43.5
216.0 to 960.0	46.0
Above 960	54.0
NOTE: The lower limit shall apply at the transition frequency.	

Note 1: as per CFR FCC Part 15 section15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

Note 2: as per CFR FCC Part 15.35 (b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519 of this part, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

Table 6: Limits for Radiated Spurious Emissions at distance of 3m – Restricted Bands

12.2.Test Procedure

The Radiated Emissions were performed in accordance with the section 11.12 of ANSI C63.10 - 2013.

Radiated Emissions were measured 3 metres (from 9kHz to 25GHz) away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is an ANSI C63.4 compliant semi-anechoic chamber with ground plane. The EUT was placed on a non-conductive support at a height of 0.8m (9kHz to 1GHz) and 1.5m (1GHz to 25GHz) above the ground plane.

In the frequency range of 9kHz to 30MHz, an Active loop antenna was used. For X (Parallel), Y (Perpendicular) and Z (Ground-Parallel) antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 1m fixed height, and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 200Hz (9kHz to 150kHz), 9kHz (150kHz to 30MHz) and a video bandwidth of 30kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emission was then accurately determined. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees to find the worst-case emission arrangement. Quasi peak measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 200Hz (9kHz to 150kHz) and 9kHz (150kHz to 30MHz).

In the frequency range of 30MHz to 1GHz, a Biconilog antenna was used. For both horizontal and vertical antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 4 different fixed height positions and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 120kHz and a video bandwidth of 300kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emission was then accurately determined. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees and varying the height of the antenna between 1 and 4 metres to find the worst-case emission arrangement. Quasi peak measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 120kHz.

In the frequency range 1.0GHz to 25GHz a Horn antenna was used and an area of 3m x 3m was covered between the antenna and the EUT using RF absorbing material with a rated attenuation more than 20dB over the frequency range. The height of the horn antenna was varied using the antenna bore-sighting technique and the turntable slowly rotated to maximise the emissions. For both horizontal and vertical antenna polarizations, the Peak and Average preview measurements were performed with a resolution bandwidth of 1 MHz and a video bandwidth of 3MHz. Peak and average emissions that exceeded the applicable limit or were close to the applicable limit were investigated further. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees and the antenna height varied (if applicable, using the antenna bore-sighting technique) to find the worst-case emission arrangement. Peak and CISPR Average measurements were then performed using a

measuring time of no less than 15 seconds, the maximum emission level in the observed duration was recorded as the final result. The final peak and CISPR Average measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 1 MHz. Peak and Average measurements were performed at spot frequencies where the peak or average emission was close to, or exceeded the applicable limit line with the EUT rotation and antenna height varied (if applicable, using the antenna bore-sighting technique) to produce the highest emission.

Plots of the accumulated measurement data for both horizontal and vertical antenna polarizations, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photographs in Annex B for views of the test configuration)

12.3.Test Results

Transmitter Spurious Emissions measurements are detailed as follows:

(Refer to graphs in Appendix C.3)

Operating Channel: Bottom, Middle and Top				
Measurement Antenna Polarisation	**Frequency (MHz)**	**Result peak (dBµV/m)**	**Limit Quasi-peak/ Average (dBµV/m)**	**Delta limit (dB)**
X	Peak preview emissions >20dB below limit or no significant emissions above the noise floor observed			
Y	Peak preview emissions >20dB below limit or no significant emissions above the noise floor observed			
Z	Peak preview emissions >20dB below limit or no significant emissions above the noise floor observed			

Table 7: Transmitter Spurious Emissions – 9kHz to 30MHz – 2Mbps

Operating Channel: Bottom				
Measurement Antenna Polarisation	**Frequency (MHz)**	**Result Quasi-peak (dBµV/m)**	**Limit Quasi-peak (dBµV/m)**	**Delta limit (dB)**
Horizontal	38.051	19.9	40.0	-20.1
	130.444	18.6	43.5	-24.9
	609.042	28.4	46.0	**-17.6***
Vertical	37.566	20.1	40.0	-19.9
	113.372	17.5	43.5	-26.0
	610.836	28.3	46.0	-17.7

**Worst-case emissions*

Table 8: Transmitter Spurious Emissions – 30MHz to 1GHz – 2Mbps

Operating Channel: Bottom, (2402MHz)								
Measurement Antenna Polarisation	**Frequency (MHz)**	**Peak Result (dBµV/m)**	**Duty Cycle Factor (dB)**	**Average Result (dBµV/m)**	**Peak Limit (dBµV/m)**	**Average Limit (dBµV/m)**	**Peak Delta Limit (dB)**	**Average Delta Limit (dB)**
Horizontal	4803.120	61.0	-15.4	45.6	74.0	54.0	-13.0	-8.4
	4804.800	61.1	-15.4	45.7	74.0	54.0	-12.9	-8.3
	12007.600	52.2	-15.4	36.8	74.0	54.0	-21.8	-17.2
	12012.880	51.5	-15.4	36.1	74.0	54.0	-22.5	-17.9
Vertical	4802.880	64.4	-15.4	49.0	74.0	54.0	**-9.6***	**-5.0***
	4804.800	64.3	-15.4	48.9	74.0	54.0	-9.7	-5.1
	12007.840	51.6	-15.4	36.2	74.0	54.0	-22.4	-17.8
	12012.400	51.7	-15.4	36.3	74.0	54.0	-22.3	-17.7

**Worst-case emissions*

Table 9: Transmitter Spurious Emissions – 1GHz to 25GHz – 2Mbps

Operating Channel: Middle, (2440MHz)								
Measurement Antenna Polarisation	**Frequency (MHz)**	**Peak Result (dBµV/m)**	**Duty Cycle Factor (dB)**	**Average Result (dBµV/m)**	**Peak Limit (dBµV/m)**	**Average Limit (dBµV/m)**	**Peak Delta Limit (dB)**	**Average Delta Limit (dB)**
Horizontal	4879.200	65.0	-15.4	49.6	74.0	54.0	-9.0	-4.4+
	4881.120	65.5	-15.4	50.1	74.0	54.0	-8.5	-3.9+
	7318.240	51.3	-15.4	35.9	74.0	54.0	-22.7	-18.1
	7321.600	51.6	-15.4	36.2	74.0	54.0	-22.4	-17.8
	12202.240	51.2	-15.4	35.8	74.0	54.0	-22.8	-18.2
Vertical	4880.880	64.8	-15.4	49.4	74.0	54.0	-9.2	-4.6+
	4878.960	68.1	-15.4	52.7	74.0	54.0	**-5.9***	**-1.3*+**
	7318.480	50.1	-15.4	34.7	74.0	54.0	-23.9	-19.3
	7321.600	49.6	-15.4	34.2	74.0	54.0	-24.4	-19.8
	12202.480	51.7	-15.4	36.3	74.0	54.0	-22.3	-17.7

**Worst-case emissions, +Refer to measurement uncertainty statement*

Table 10: Transmitter Spurious Emissions – 1GHz to 25GHz – 2Mbps

Operating Channel: Top, (2480MHz)								
Measurement Antenna Polarisation	**Frequency (MHz)**	**Peak Result (dBµV/m)**	**Duty Cycle Factor (dB)**	**Average Result (dBµV/m)**	**Peak Limit (dBµV/m)**	**Average Limit (dBµV/m)**	**Peak Delta Limit (dB)**	**Average Delta Limit (dB)**
Horizontal	2487.460	57.2	-15.4	41.8	74.0	54.0	-16.8	-12.2
	2488.500	57.2	-15.4	41.8	74.0	54.0	-16.8	-12.2
	4959.120	65.1	-15.4	49.7	74.0	54.0	-8.9	-4.3+
	4961.040	65.9	-15.4	50.5	74.0	54.0	-8.1	-3.5+
	7438.720	50.7	-15.4	35.3	74.0	54.0	-23.3	-18.7
	7441.360	50.7	-15.4	35.3	74.0	54.0	-23.3	-18.7
	12400.000	49.3	-15.4	33.9	74.0	54.0	-24.7	-20.1
Vertical	2488.500	56.4	-15.4	41.0	74.0	54.0	-17.6	-13.0
	4958.880	67.5	-15.4	52.1	74.0	54.0	**-6.5***	**-1.9*+**
	4960.800	67.3	-15.4	51.9	74.0	54.0	-6.7	-2.1+
	7438.720	49.2	-15.4	33.8	74.0	54.0	-24.8	-20.2
	7441.600	50.1	-15.4	34.7	74.0	54.0	-23.9	-19.3
	12400.000	49.2	-15.4	33.8	74.0	54.0	-24.8	-20.2

**Worst-case emissions, +Refer to measurement uncertainty statement*

Table 11: Transmitter Spurious Emissions – 1GHz to 25GHz – 2Mbps

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
30MHz to 1GHz	±4.65dB
1GHz to 6GHz	±4.83dB
6GHz to 18GHz	±4.49dB
18GHz to 26.5GHz	±4.46dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	14.4 to 15.1°C
Humidity:	54 to 56%
Atmospheric pressure:	1018.8 to 1021.9hPa

Table 12: Climatic conditions

Calculation: The above results are based upon the following calculation:

$$E = V_{QP/PK/AV} + AF - G_{Amp} + L_C$$

Where:

E = E-field in dBµV/m

$V_{QP/PK/AV}$ = Measured Voltage (Quasi Peak, Peak or Average) in dBµV

AF = Antenna Factor in dB(/m)

L_C = Cable and attenuator Loss in dB
G_{Amp} = Pre Amplifier Voltage Gain in dB

Example calculation:

$E = V_{PK} + AF - G_{Amp} + L_C$
$E = 30dB\mu V + 12dB/m - 0dB + 2.3dB$
$E = 44.3\ dB\mu V/m$

Notes: All Transmitter Radiated spurious emissions in restricted bands measurements were below the specified limits.

Radiated Emissions measurements were made up to the 10th harmonic.

The transmitter was continuously transmitting in modulated transmit mode.

The average measurements were determined from the Peak detector measurements by applying the duty cycle correction factor.

Assessment: The EUT complied with the Radiated emissions in Restricted bands requirements of CFR47 FCC Part 15, Subpart C, 15.247 (d).

13. Emissions on the Band edge – FCC 15.247 (d)

13.1. Test Procedure

The Band edge Measurement (100kHz, -20dB from fc & Restricted bands) was performed in accordance with the section 11.11, 11.12 and 11.13 of ANSI C63.10 – 2013.

Radiated measurements were performed within 2 MHz of the authorised lower band-edge.

At the lowest channel, 99% Occupied Band Width of the fundamental channel emission was within 2 MHz of the authorised Lower band edge therefore Marker-delta method was used. Unwanted emission at the lower band-edge were performed as per section 6.10.4 of ANSI C63.10 - 2013. At authorised-band band edge where the requiring band-edge emission attenuation is -20dB in a 100kHz bandwidth relative to the highest fundamental channel PSD in 100kHz. Radiated peak measurements were performed as per as section 6.10.4 of ANSI C63.10 - 2013.

The higher end of the band-edge was in restricted-band therefore measurements were performed as per section 6.10.5 of ANSI C63.10 - 2013. The FCC 15.209 limits are applicable to emission in restricted-band band-edge.

(Refer to photographs in Annex B for views of the test configuration)

13.2. Limits

Band edge in Non-restricted Bands

As per CFR47 FCC Part 15, Subpart C, 15.247 (d) the EUT shall meet the requirements that in any given 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 measured highest fundamental channel PSD in 100kHz was +4.8dBm

Band edge Frequencies	Limits (dBm)
Lower Edge (2402MHz)	-15.2

Table 13: Limits for Band edge - -20dBc (Non-restricted bands)

Band edge in Restricted Bands

As per CFR47 FCC Part 15, Subpart C, 15.247 (d) and 15.209 (Transmitter emission limits) the EUT is required to meet the limits that permit the highest field strength of the following table for the radiated emissions which fall in the restricted bands, as defined in section 15.205(a) of 47 CFR Part 15 Subpart C :

Band edge Frequencies	Limits at 3m (dBμV/m)
2483.5MHz to 2485.5	54.0

Note 1: as per CFR FCC Part 15.35 (b), The emission limits shown in the above table are based on measurements employing an average detector.

Table 14: Limits for Radiated Spurious Emissions at distance of 3m – Restricted Bands.

13.3.Test Results

Band edge measurements are detailed as follows:

(Refer to graphs in Appendix C.2)

Operating Channel: Bottom (2402MHz)				
Measurement Antenna Polarisation	**Frequency (MHz)**	**Result Radiated Peak Power Spectral Density (dBm/100kHz)**	**Limit Radiated Peak Power Spectral Density (dBm/100kHz)**	**Delta limit (dB)**
Horizontal	2399.962	-26.9	-15.2	-11.7
	2399.973	-26.0	-15.2	**-10.8***
Vertical	2399.976	-27.4	-15.2	-12.2
	2399.987	-26.7	-15.2	-11.5

**Worst-case emissions*

Table 15: Transmitter Emissions on the Band edge - Low end – 2 Mbps

Operating Channel: Top (2480MHz)								
Measurement Antenna Polarisation	**Peak Measurements**				**Average Measurements**			
	Frequency (MHz)	**Result (dBμV/m)**	**Limit (dBμV/m)**	**Delta Limit (dB)**	**Frequency (MHz)**	**Result (dBμV/m)**	**Limit (dBμV/m)**	**Delta Limit (dB)**
Horizontal	2483.560	56.0	74.0	**-18.0***	2483.560	38.6	54.0	**-15.4***
	2485.120	52.8	74.0	-21.2	2484.080	38.0	54.0	-16.0
Vertical	2483.560	55.2	74.0	-18.8	2483.560	38.3	54.0	-15.7
	2483.820	54.0	74.0	-20.0	2484.080	37.2	54.0	-16.8

**Worst-case emissions*

Table 16: Transmitter Emissions on the Band edge - High end – 2 Mbps

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
Radiated (1GHz to 6GHz)	±4.83dB
Conducted (1GHz to 6GHz)	±1.4dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	15.1°C
Humidity:	54%
Atmospheric pressure:	1021.9hPa

Table 17: Climatic conditions

Calculation: The above results are based upon the following calculation:

$$E = V_{QP/PK/AV} + AF - G_{Amp} + L_C$$

Where:

E = E-field in dBμV/m
$V_{QP/PK/AV}$ = Measured Voltage (Quasi Peak, Peak or Average) in dBμV
AF = Antenna Factor in dB(/m)
L_C = Cable and attenuator Loss in dB
G_{Amp} = Pre Amplifier Voltage Gain in dB

Example calculation:

$E = V_{PK} + AF - G_{Amp} + L_C$
$E = 30dB\mu V + 12dB/m - 0dB + 2.3dB$
$E = 44.3\ dB\mu V/m$

Notes: All Band edge measurements were below the specified limits.

The transmitter was continuously transmitting in modulated transmit mode.

Duty cycle correction factor was not applied to the measurements.

Assessment: The EUT complied with the Transmitter Emissions on the Band edge requirements of CFR47 FCC Part 15, Subpart C, 15.247 (d).

14. Conclusion

The modified Setec BMPRO Pty Ltd, SONIC, Bluetooth Module complied with the applicable tested requirements of CFR47 FCC Part 15, Subpart C, 15.247 for Class II permissive change.

Appendix A – Test Equipment

Inv.	Equipment	Make	Model No.	Serial No.	Calibration		
					Interval	Due	Type
Transmitter Maximum EIRP, Band-edge and Radiated Emissions							
1217	ANALYSER, EMI Receiver	Rohde & Schwarz	ESU40	100182	1 year	Jun-24*	E
0935	ANTENNA, Biconilog	Sunol Sciences	JB5	A071106	2 years	May-25	E
0718	ATTENUATOR, 6dB	JFW	50FPE-006	-	1 year	Jan-25	I
0633	ANTENNA, Double Ridge Horn	EMCO	3115	9712-5369	3 years	Aug-24	I
0559	PRE-AMP, Microwave, 18GHz	Miteq	AFS8	605305	1 year	May-25	I
1009	CABLE, Coax, Sucoflex 104B	Huber+Suhner	00065/4B	C405	2 years	Aug-24	V
1010	CABLE, Coax, Sucoflex 104B	Huber+Suhner	00078/4B	C406	2 years	Aug-24	V
1064	PRE-AMP, Microwave, 26GHz	Miteq	AFS33	1696371	1 year	May-25	I
1193	Standard Gain Horn Antenna - 5.85GHz to 8.2GHz	A.H. Systems, inc	SAS-584	186	1 year	May-25	E
1194	Standard Gain Horn Antenna - 8.2GHz to 12.4GHz	A.H. Systems, inc	SAS-585	224	1 year	May-25	E
1195	Standard Gain Horn Antenna - 12.4GHz to 18.0GHz	A.H. Systems, inc	SAS-586	195	1 year	May-25	E
1196	Standard Gain Horn Antenna - 18.0GHz to 26.5GHz	A.H. Systems, inc	SAS-587	181	1 year	May-25	E
0024	ANTENNA, Active Loop	EMCO	6502	2620	2 years	Feb-26	I
0932	CONTROLLER, Position	Sunol Sciences	SC104V-3	081006-1	N/A	N/A	V
0933	TURNTABLE	Sunol Sciences	SM46C	081006-2	N/A	N/A	V
0934	MAST, Antenna	Sunol Sciences	TLT2	081006-5	N/A	N/A	V
1145	CABLE, Coax, Sucoflex 104PA	Huber + Suhner	84279564	SN MY056/4PA	1 year	Jan-25	I
0989	CABLE, Coax, Sucoflex 104A	Huber+Suhner	44454/4A	C357	1 year	Jan-25	I
1238	CABLE, Coax, Sucoflex 126 E	Huber + Suhner	10422876	SN 8000495/126E	1 year	Jan-25	I
1155	Hygrometer, Temp, Humidity	DigiTech	QM7312	-	2 years	Jul-25	I
0710	ATTENUATOR, 10dB	JFW	50HF-010N		3 years	Dec-24	I
1123	Band-stop filter- 2.4GHz to 2.5GHz	Micro-Tronics	BRM50702	127	2 years	Jul-25	I
1259	High Pass filter	Micro-Tronics	HPM50111	G237	1 year	Mar-25	I
0666	Enclosure, Semi-Anechoic, No 1	RFI Industries	S800 iOATS	1229	3 years	Aug-25	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A	N/A

V: Verification of operation against an internal reference
I: Internal calibration against a traceable standard
E: External calibration by a NATA endorsed facility
N/A: Not Applicable
**Calibration valid at the time of testing*

Appendix B – Photographs

Annex	Number	Photograph Description
A	1	EUT on Carrier Board – External Views
A	2	
A	3	
A	4	
A	5	
A	6	
A	7	
A	8	Antenna
A	9	
A	10	
A	11	
A	12	
B	1	Radiated measurements – EUT Antenna X Orientation
B	2	Radiated measurements – EUT Antenna Y Orientation
B	3	Radiated measurements – EUT Antenna Z Orientation
B	4	Radiated measurements – 9kHz to 30MHz – X Antenna orientation
B	5	Radiated measurements – 9kHz to 30MHz – Y Antenna orientation
B	6	Radiated measurements – 9kHz to 30MHz – Z Antenna orientation
B	7	Radiated measurements – below 1GHz
B	8	Radiated measurements – above 1GHz
C	1	EUT on Carrier Board – Internal Views
C	2	
C	3	
C	4	
C	5	
C	6	

EUT External Photographs	EMC Bayswater Test Report E2406-1648-6 Annex A
EUT Orientations & Test Configurations Photographs	EMC Bayswater Test Report E2406-1648-6 Annex B
EUT Internal Photographs	EMC Bayswater Test Report E2406-1648-6 Annex C

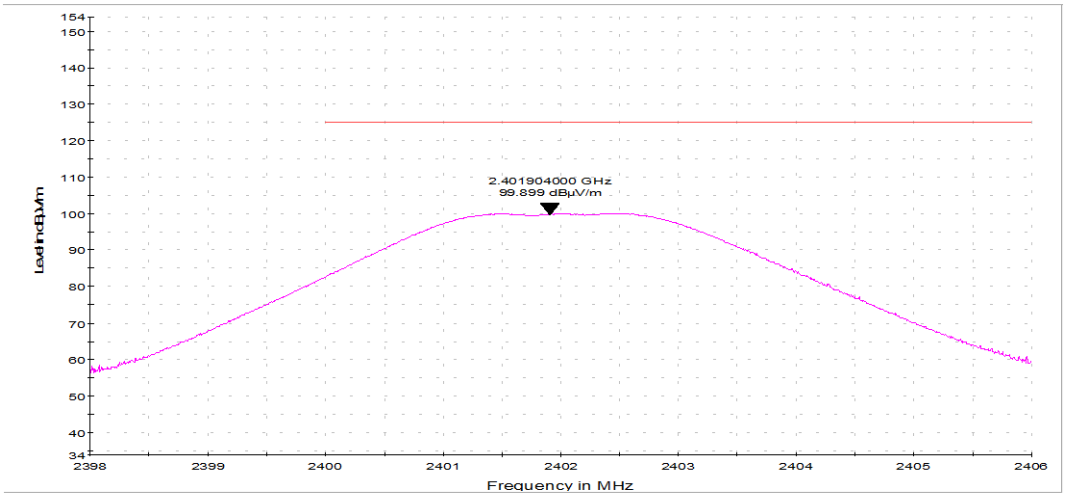
Appendix C.1 – Measurement Graphs – Maximum Peak Output Power - 15.247 (b)(3)

No.	Test	Graph Description
1	Maximum Peak Output Power – 2 Mbps	2402MHz Channel
2		2440MHz Channel
3		2480MHz Channel

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Maximum Peak Output Power
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 2 Mbps

Job Number: E2406-1648-6
Test Engineer: AZ

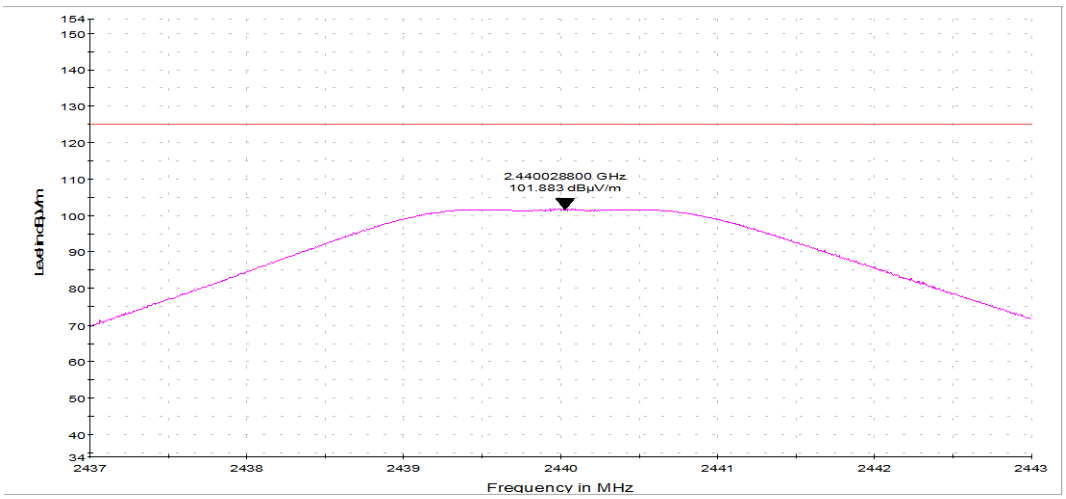


Graph 1

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Maximum Peak Output Power
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 2 Mbps

Job Number: E2406-1648-6
Test Engineer: AZ



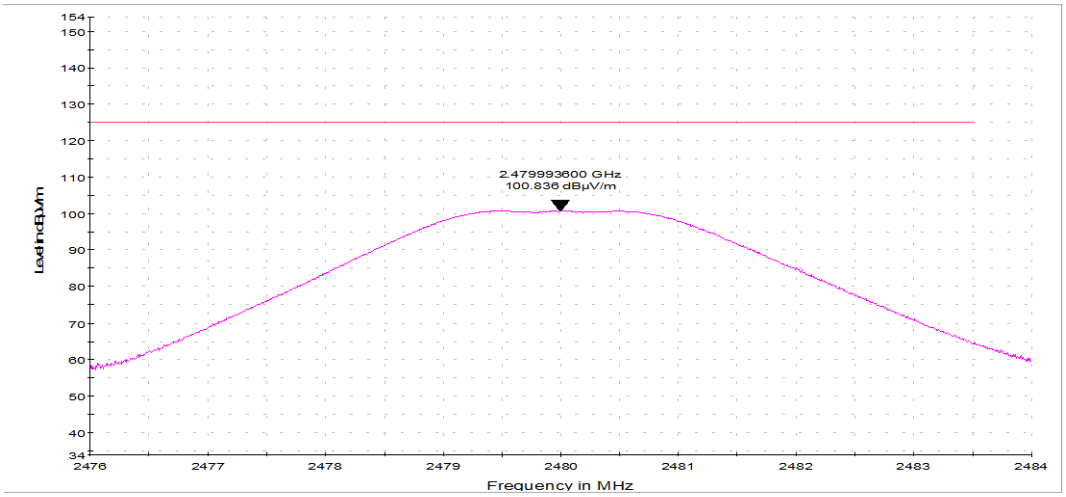
Graph 2

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Maximum Peak Output Power
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 2 Mbps

Job Number: E2406-1648-6

Test Engineer: AZ



Graph 3

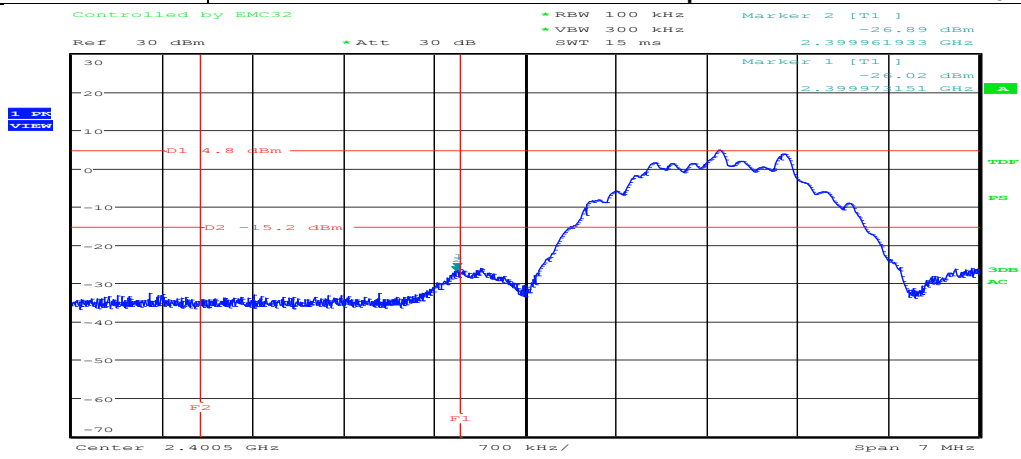
Appendix C.2 – Measurement Graphs – Band Edge - 15.247 (d)

No.	Test	Graph Description
4	Band edge Measurement – 2 Mbps	2402MHz Channel (Non-restricted Band – Bandedge) – Horizontal measurement Antenna
5		2402MHz Channel (Non-restricted Band – Bandedge) – Vertical measurement Antenna
6	Band edge Measurement – 2 Mbps	2480MHz Channel (Restricted Bands) – Horizontal measurement Antenna
7		2480MHz Channel (Restricted Bands) – Vertical measurement Antenna

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Band edge Measurement (100kHz, -20dB from fc)
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel (Non-restricted Band – Bandedge) – Horizontal measurement Antenna – 2 Mbps

Job Number: E2406-1648-6
Test Engineer: AZ

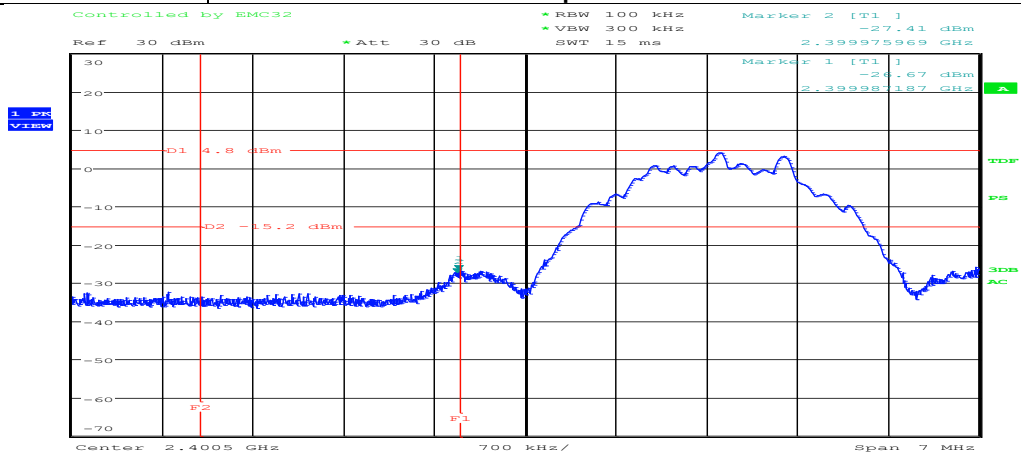


Graph 4

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Band edge Measurement (100kHz, -20dB from fc)
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel (Non-restricted Band – Bandedge) – Vertical measurement Antenna – 2 Mbps

Job Number: E2406-1648-6
Test Engineer: AZ



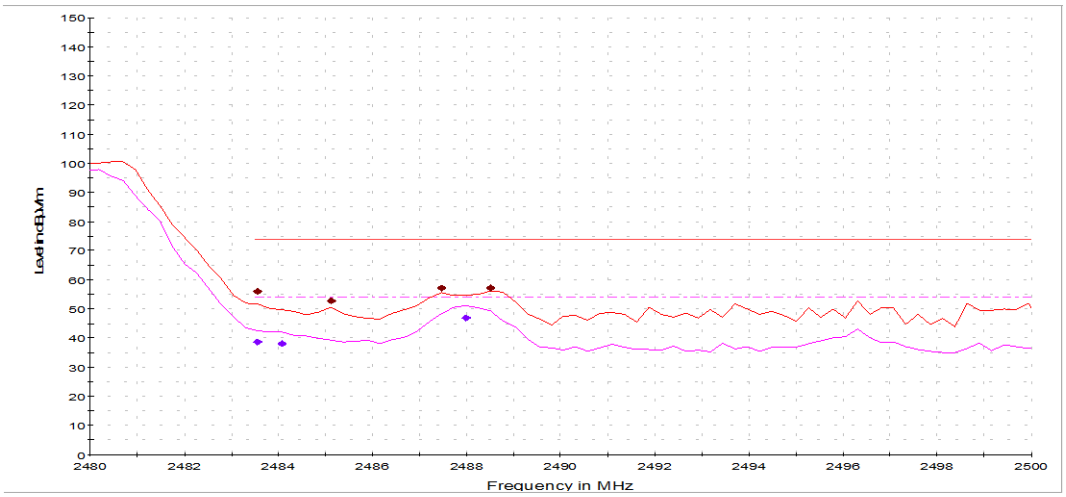
Graph 5

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Band edge Measurement
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel (Restricted Bands) – Horizontal measurement Antenna – 2 Mbps

Job Number: E2406-1648-6

Test Engineer: AZ



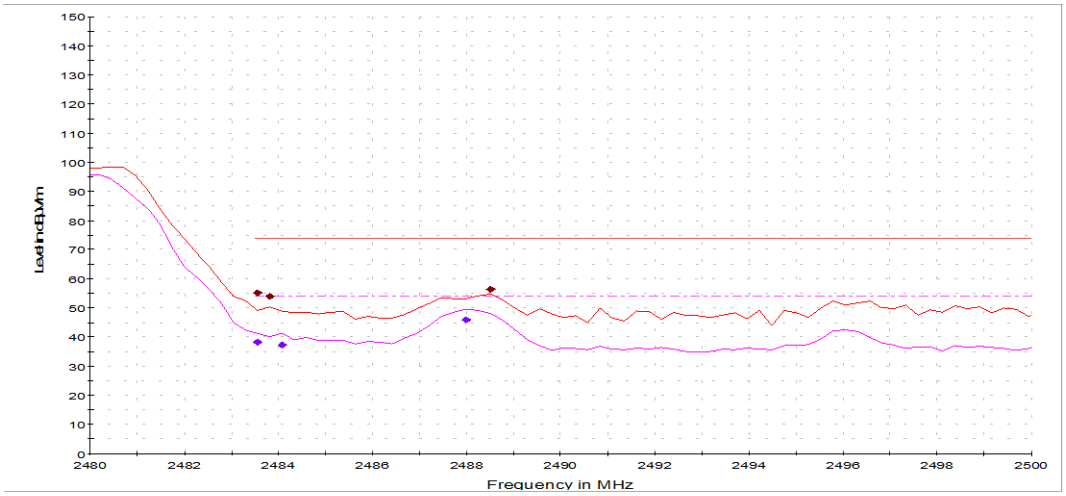
Graph 6

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Band edge Measurement
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel (Restricted Bands) – Vertical measurement Antenna – 2 Mbps

Job Number: E2406-1648-6

Test Engineer: AZ



Graph 7

Appendix C.3 – Measurement Graphs – Transmitter Spurious – FCC 15.247 (d), 15.209 – Restricted Bands

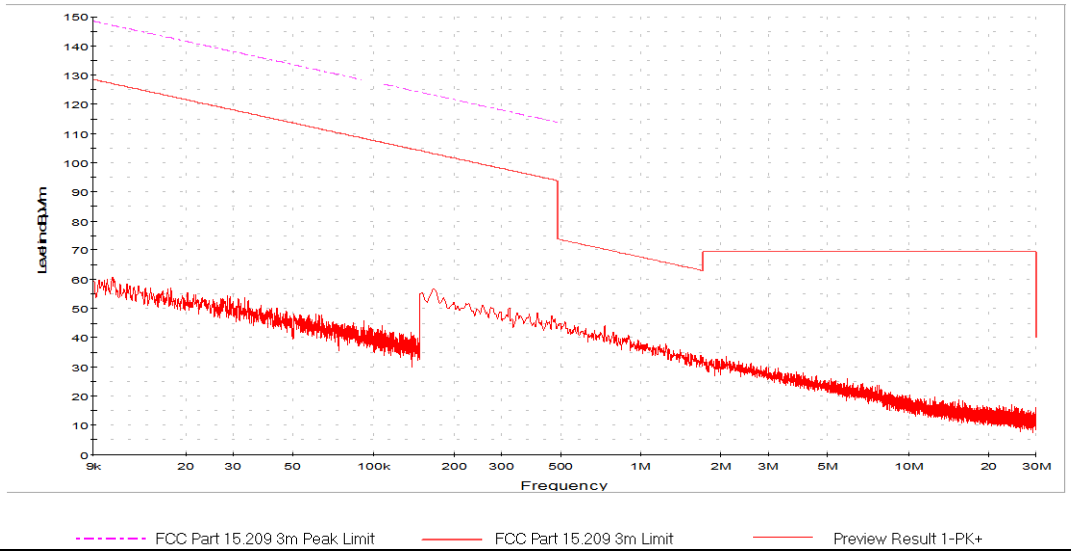
No.	Test	Graph Description
8	9kHz to 30MHz	2402MHz Channel, Antenna X
9		2402MHz Channel, Antenna Y
10		2402MHz Channel, Antenna Z
11		2440MHz Channel, Antenna X
12		2440MHz Channel, Antenna Y
13		2440MHz Channel, Antenna Z
14		2480MHz Channel, Antenna X
15		2480MHz Channel, Antenna Y
16		2480MHz Channel, Antenna Z
17	30MHz to 1GHz	2402MHz Channel, Antenna Horizontal
18		2402MHz Channel, Antenna Vertical
19		2440MHz Channel, Antenna Horizontal
20		2440MHz Channel, Antenna Vertical
21		2480MHz Channel, Antenna Horizontal
22		2480MHz Channel, Antenna Vertical
23	1GHz to 3.6GHz	2402MHz Channel, Antenna Horizontal
24		2402MHz Channel, Antenna Vertical
25		2440MHz Channel, Antenna Horizontal
26		2440MHz Channel, Antenna Vertical
27		2480MHz Channel, Antenna Horizontal
28		2480MHz Channel, Antenna Vertical
29	3.6GHz to 6GHz	2402MHz Channel, Antenna Horizontal
30		2402MHz Channel, Antenna Vertical
31		2440MHz Channel, Antenna Horizontal
32		2440MHz Channel, Antenna Vertical
33		2480MHz Channel, Antenna Horizontal
34		2480MHz Channel, Antenna Vertical
35	5.8GHz to 8.2GHz	2402MHz Channel, Antenna Horizontal
36		2402MHz Channel, Antenna Vertical
37		2440MHz Channel, Antenna Horizontal
38		2440MHz Channel, Antenna Vertical
39		2480MHz Channel, Antenna Horizontal
40		2480MHz Channel, Antenna Vertical
41	8.2GHz to 12.4GHz	2402MHz Channel, Antenna Horizontal
42		2402MHz Channel, Antenna Vertical
43		2440MHz Channel, Antenna Horizontal
44		2440MHz Channel, Antenna Vertical
45		2480MHz Channel, Antenna Horizontal
46		2480MHz Channel, Antenna Vertical
47	12.4GHz to 18GHz	2402MHz Channel, Antenna Horizontal
48		2402MHz Channel, Antenna Vertical
49		2440MHz Channel, Antenna Horizontal
50		2440MHz Channel, Antenna Vertical
51		2480MHz Channel, Antenna Horizontal
52		2480MHz Channel, Antenna Vertical

No.	Test	Graph Description
53	18GHz to 25GHz	2402MHz Channel, Antenna Horizontal
54		2402MHz Channel, Antenna Vertical
55		2440MHz Channel, Antenna Horizontal
56		2440MHz Channel, Antenna Vertical
57		2480MHz Channel, Antenna Horizontal
58		2480MHz Channel, Antenna Vertical

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel - 9KHz to 30MHz
X Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

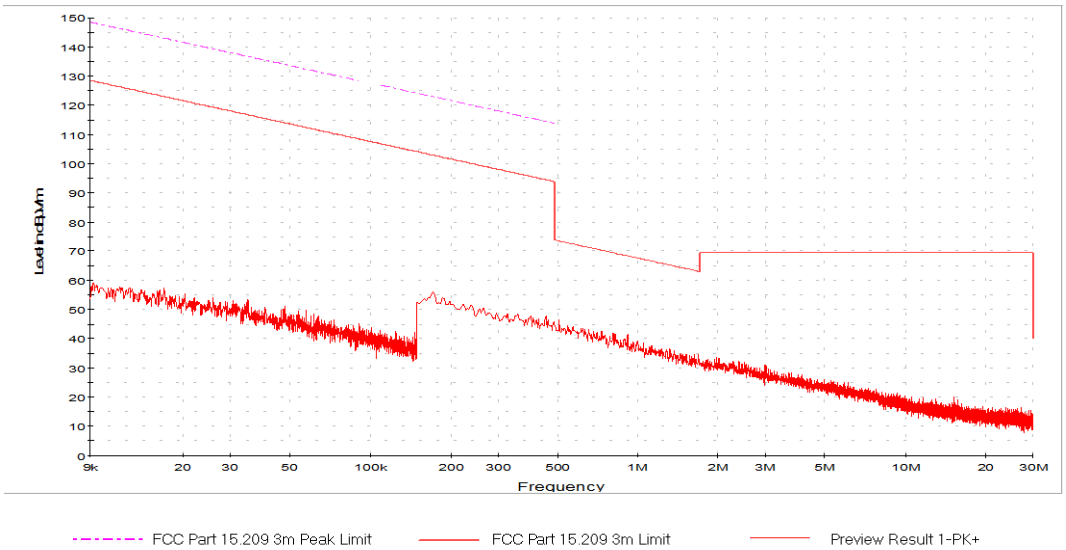


Graph 8

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel - 9KHz to 30MHz
Y Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

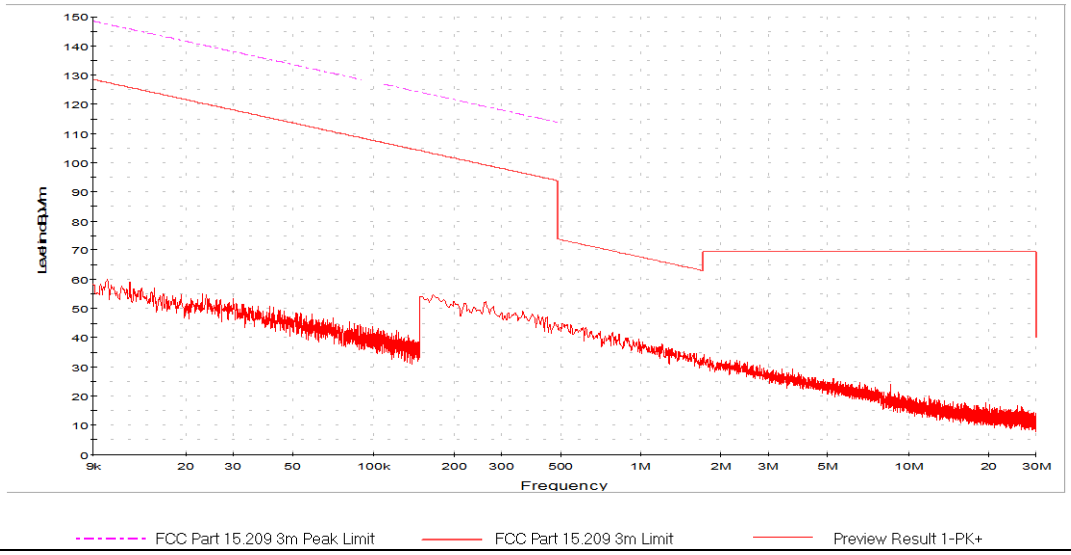


Graph 9

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel - 9KHz to 30MHz
Z Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

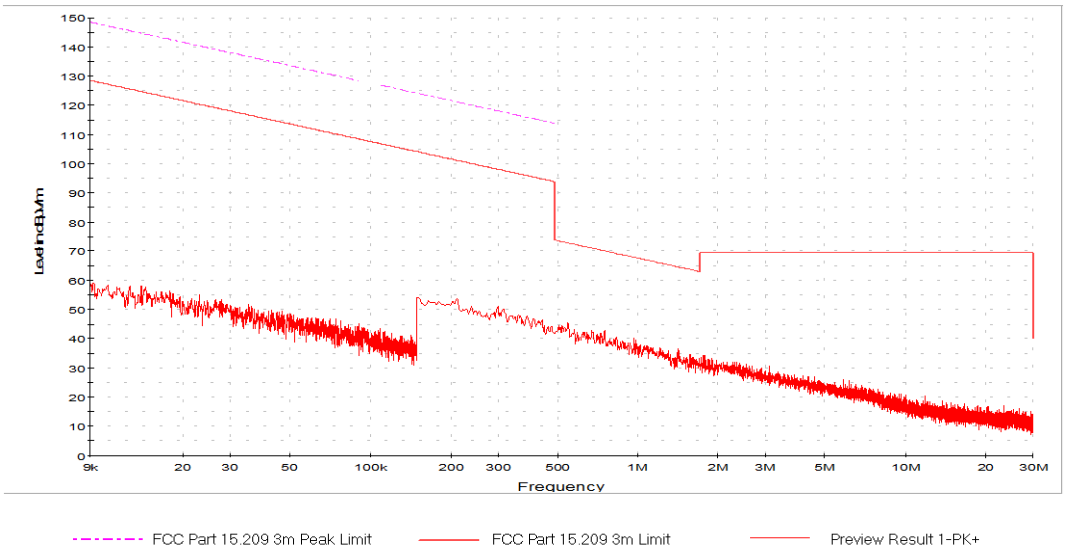


Graph 10

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel - 9KHz to 30MHz
X Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

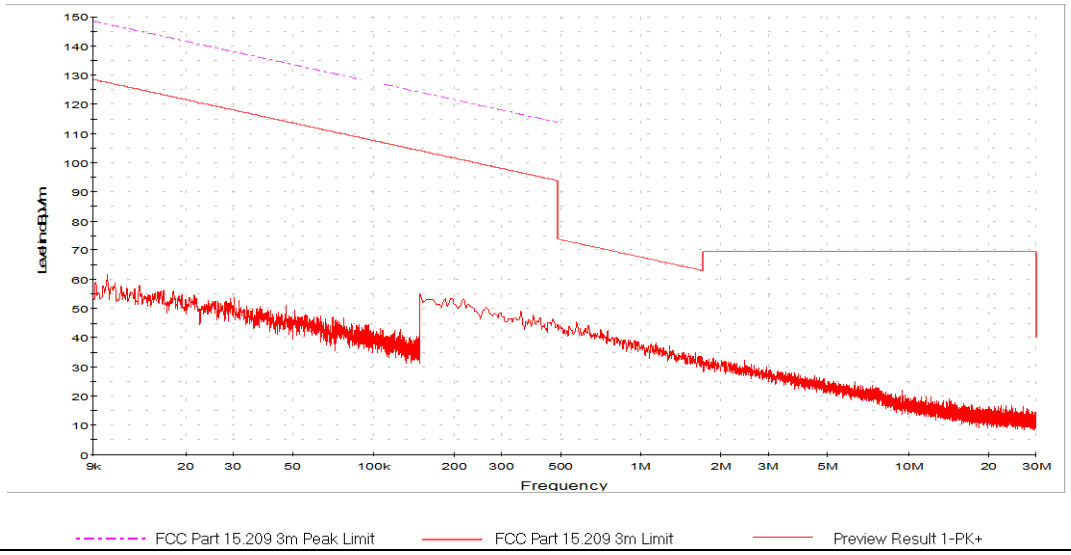


Graph 11

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel - 9KHz to 30MHz
Y Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

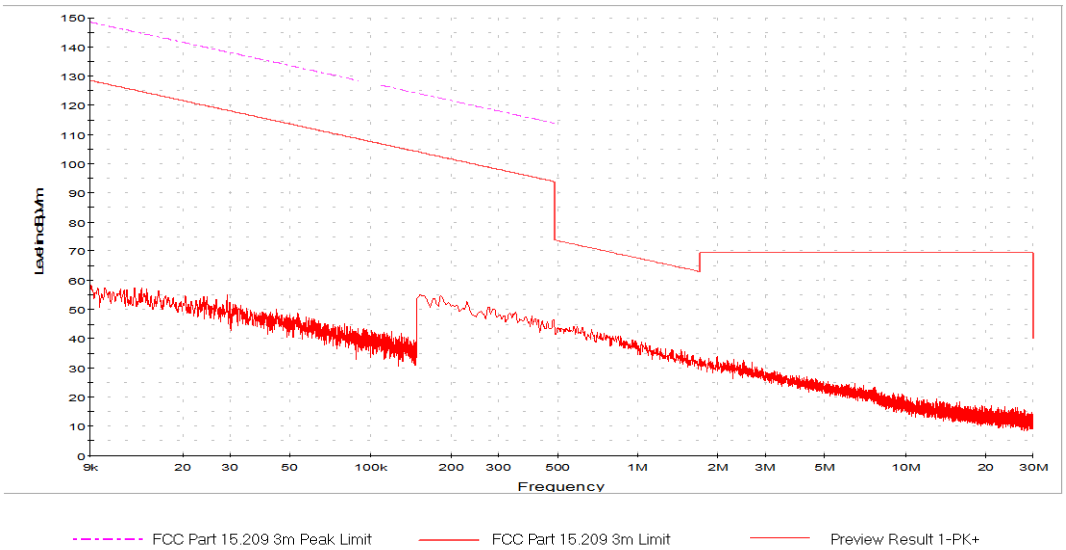


Graph 12

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel - 9KHz to 30MHz
Z Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

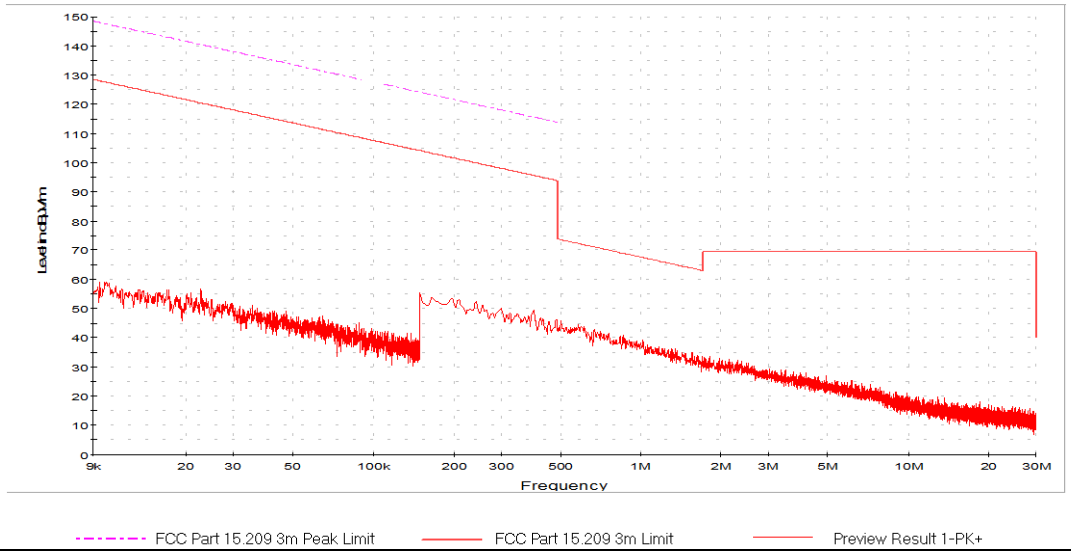


Graph 13

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel - 9KHz to 30MHz
X Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

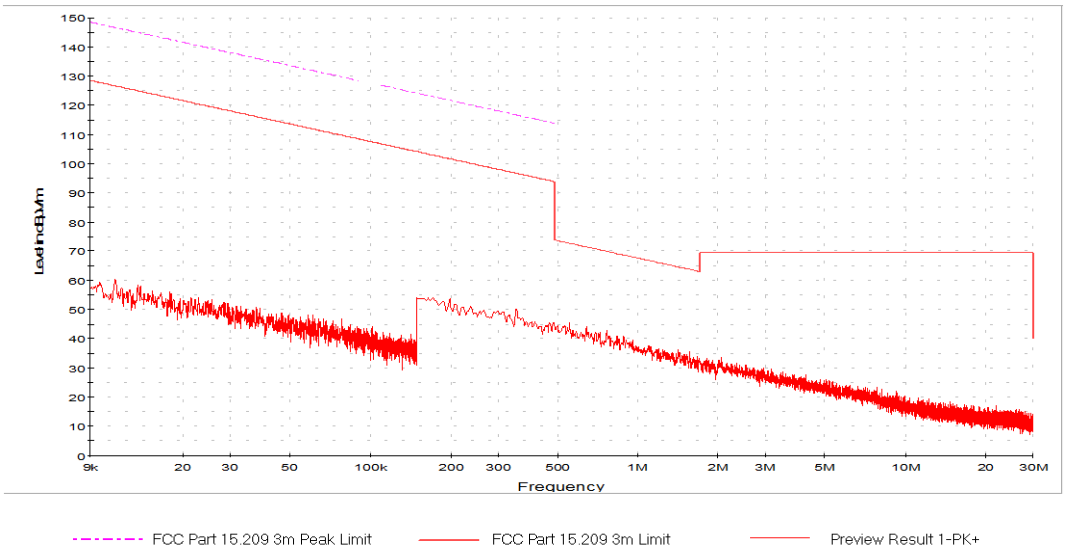


Graph 14

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel - 9KHz to 30MHz
Y Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

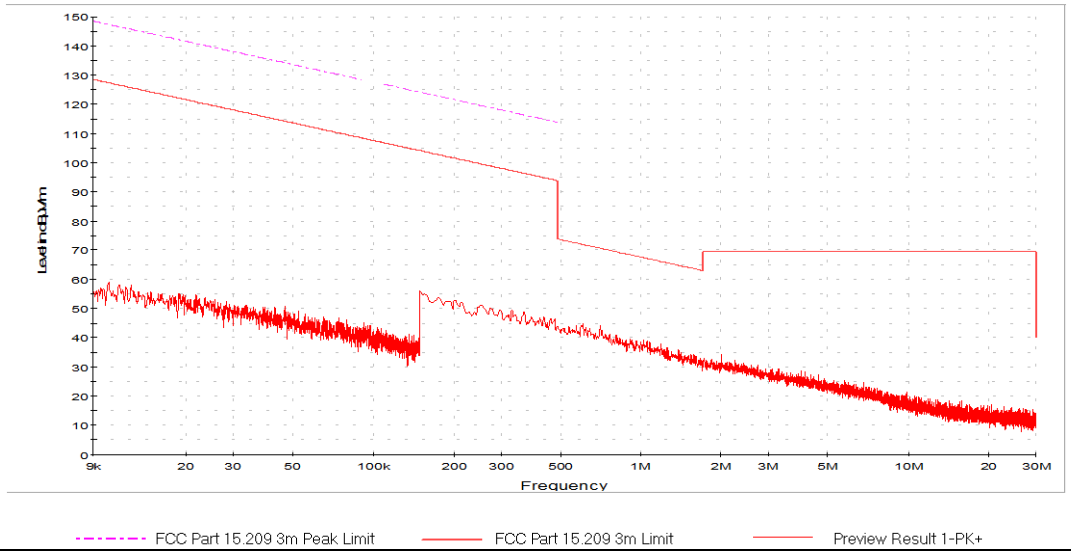


Graph 15

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel - 9KHz to 30MHz
Z Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

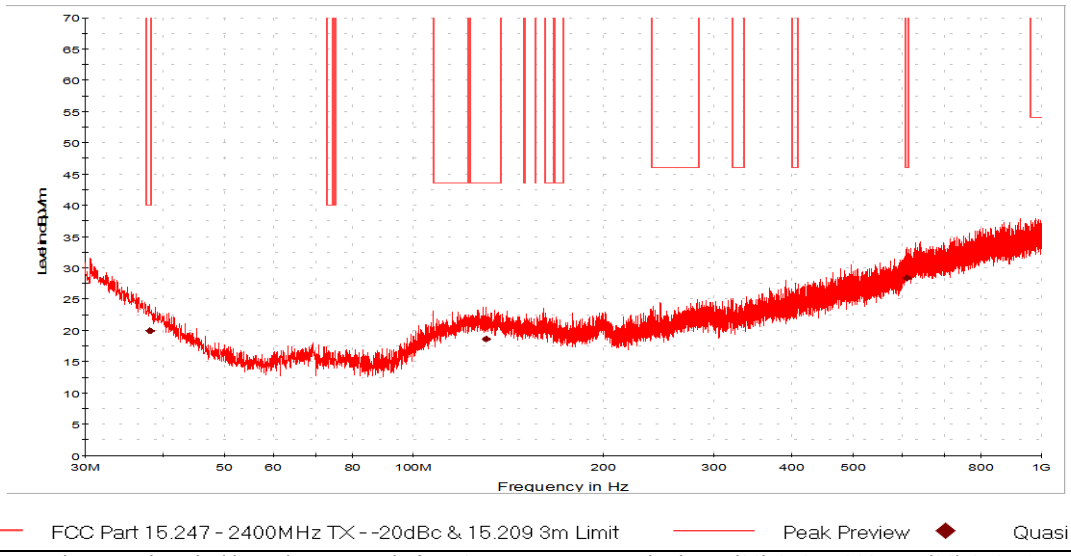


Graph 16

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 30MHz to 1GHz
Horizontal Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

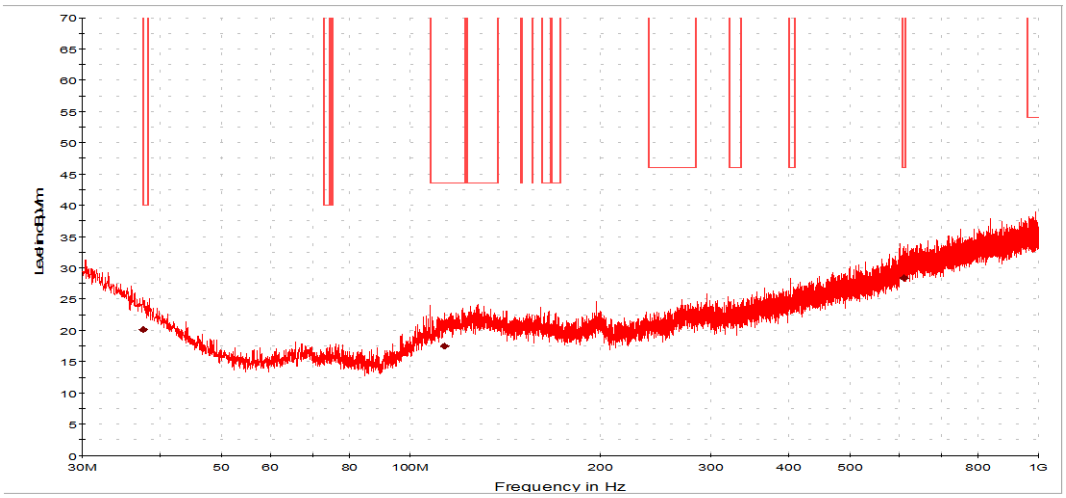


Graph 17

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 30MHz to 1GHz
Vertical Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL



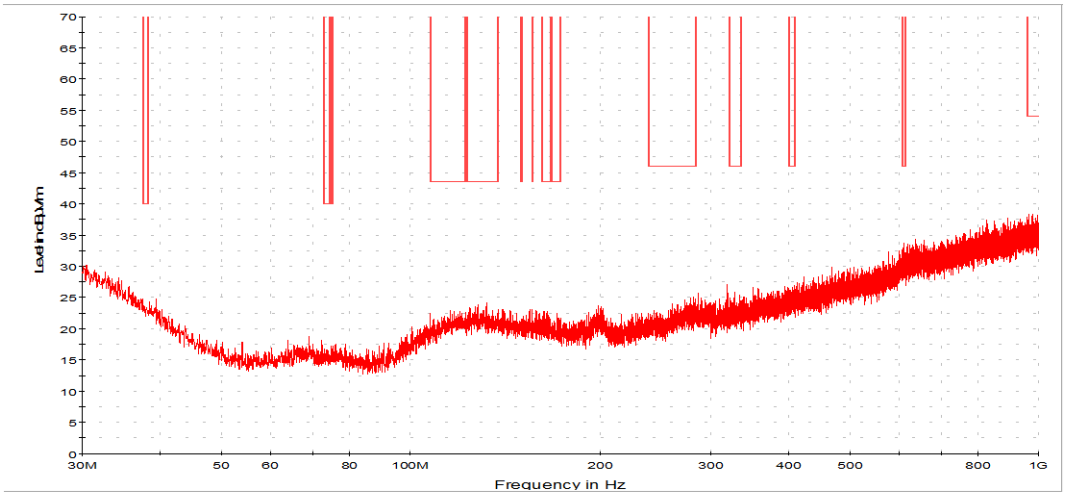
FCC Part 15.247 - 2400MHz TX - -20dBc & 15.209 3m Limit — Peak Preview ◆ Quasi Peak

Graph 18

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 30MHz to 1GHz
Horizontal Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL



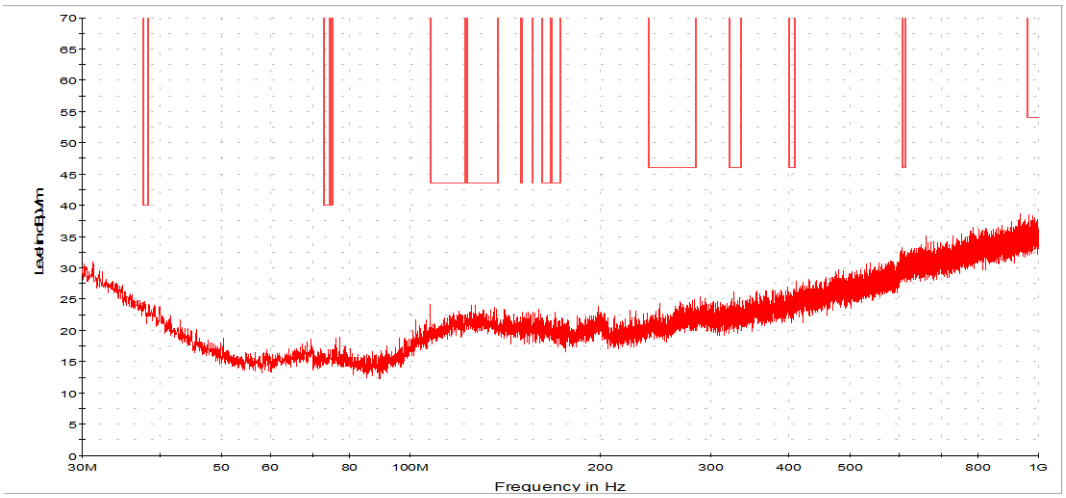
FCC Part 15.247 - 2400MHz TX - -20dBc & 15.209 3m Limit — Peak Preview ◆ Quasi Peak

Graph 19

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 30MHz to 1GHz
Vertical Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

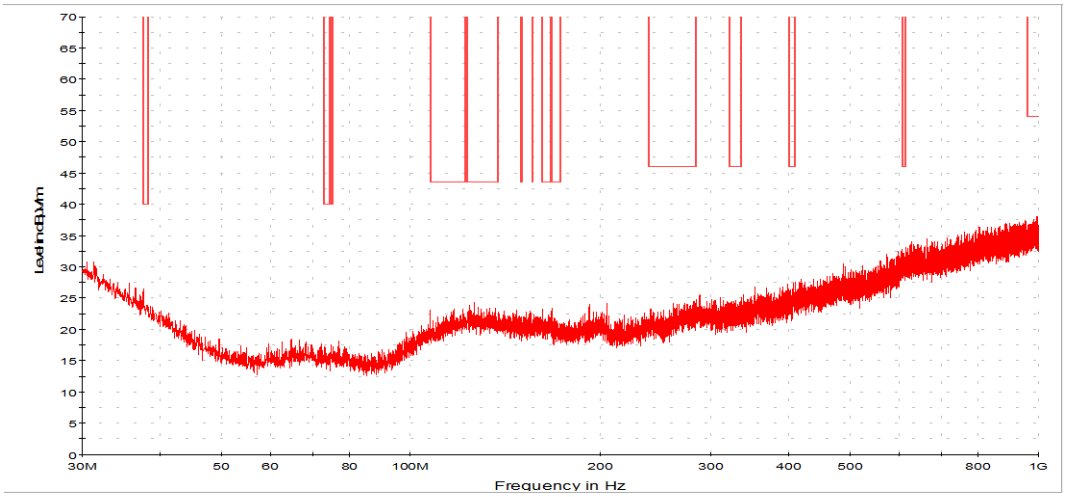


Graph 20

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 30MHz to 1GHz
Horizontal Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

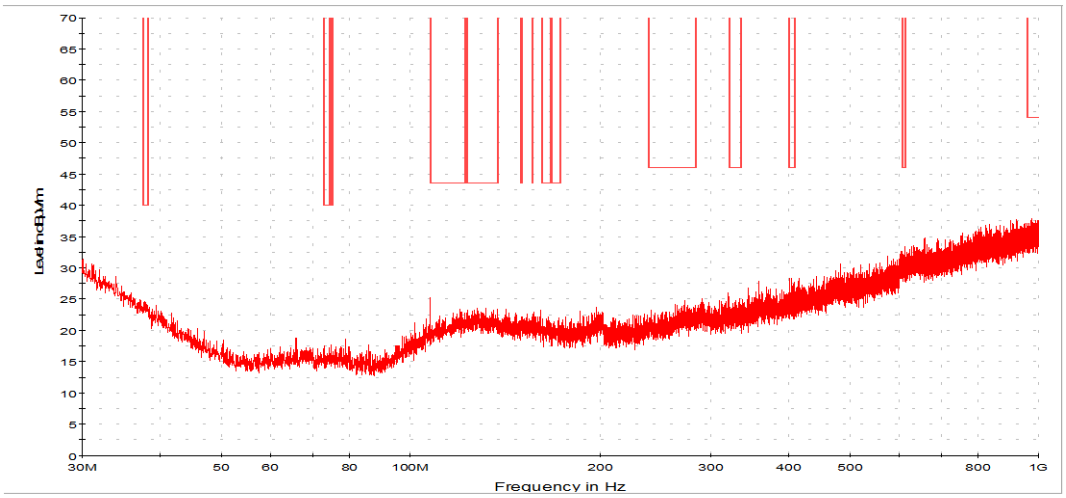


Graph 21

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 30MHz to 1GHz
Vertical Antenna Orientation

Job Number: E2406-1648-6
Test Engineer: NL

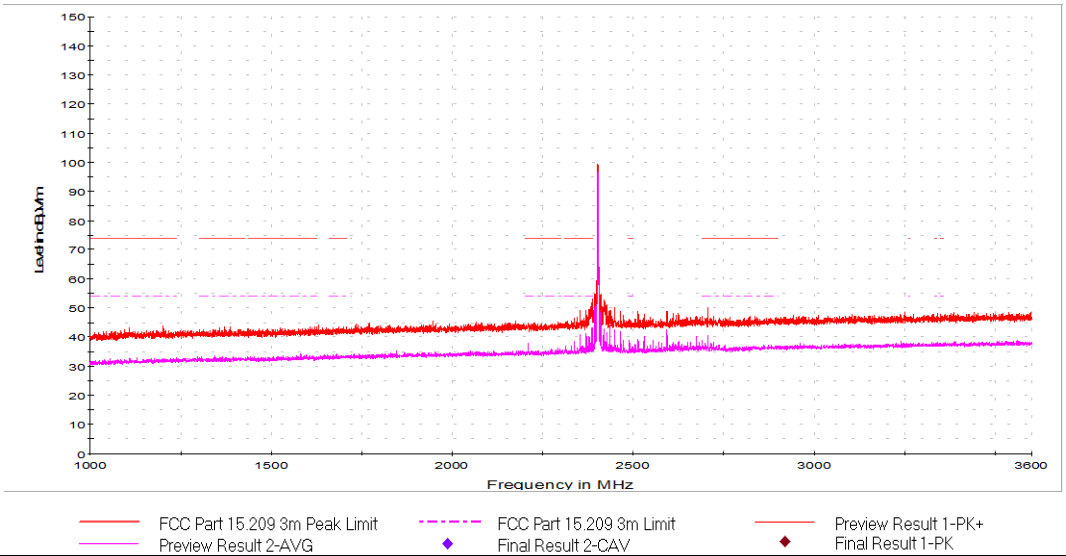


Graph 22

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 1GHz to 3.6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

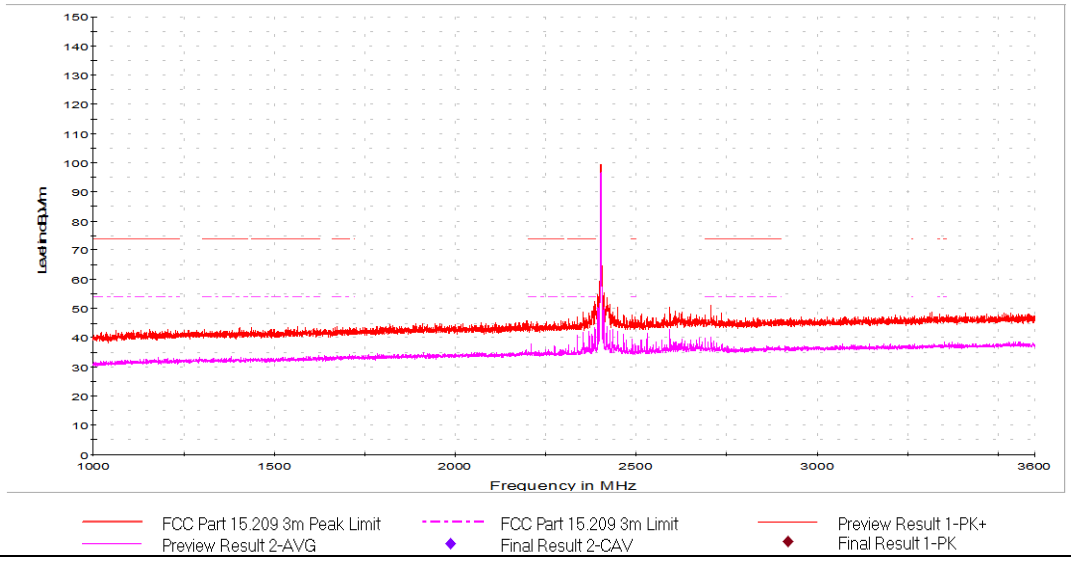


Graph 23

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 1GHz to 3.6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

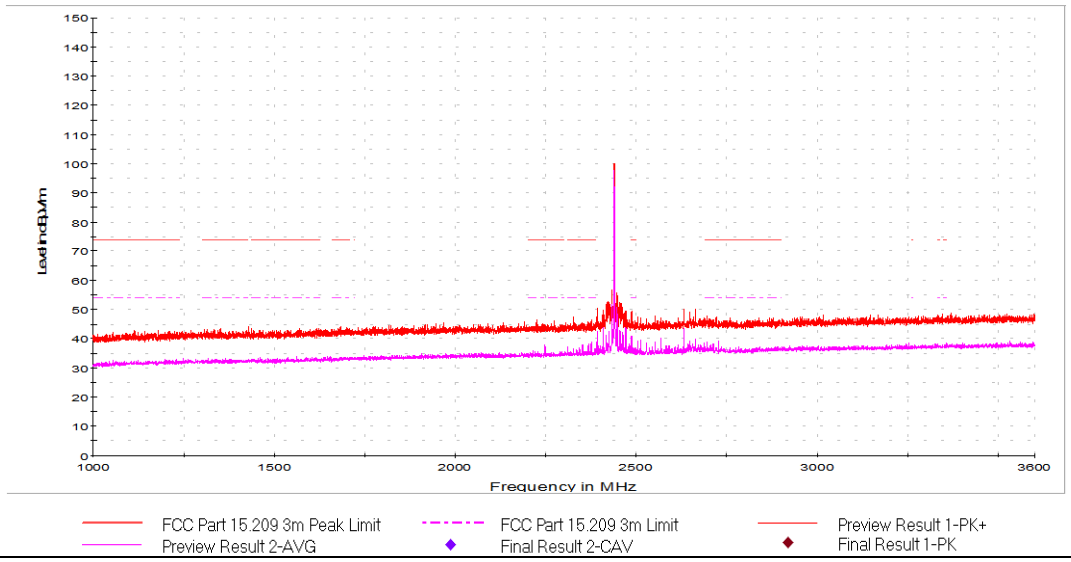


Graph 24

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 1GHz to 3.6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

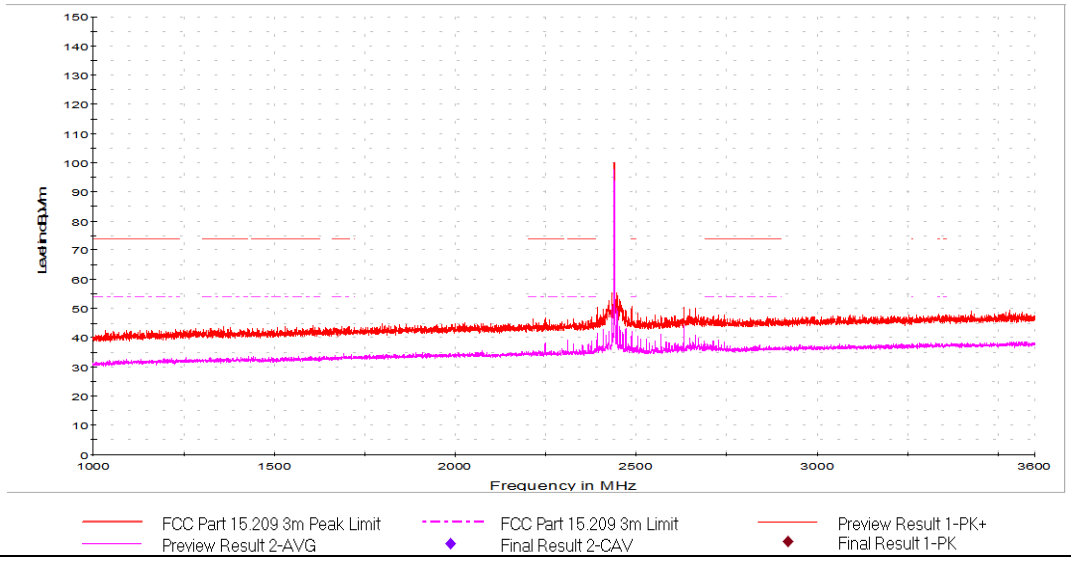


Graph 25

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 1GHz to 3.6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

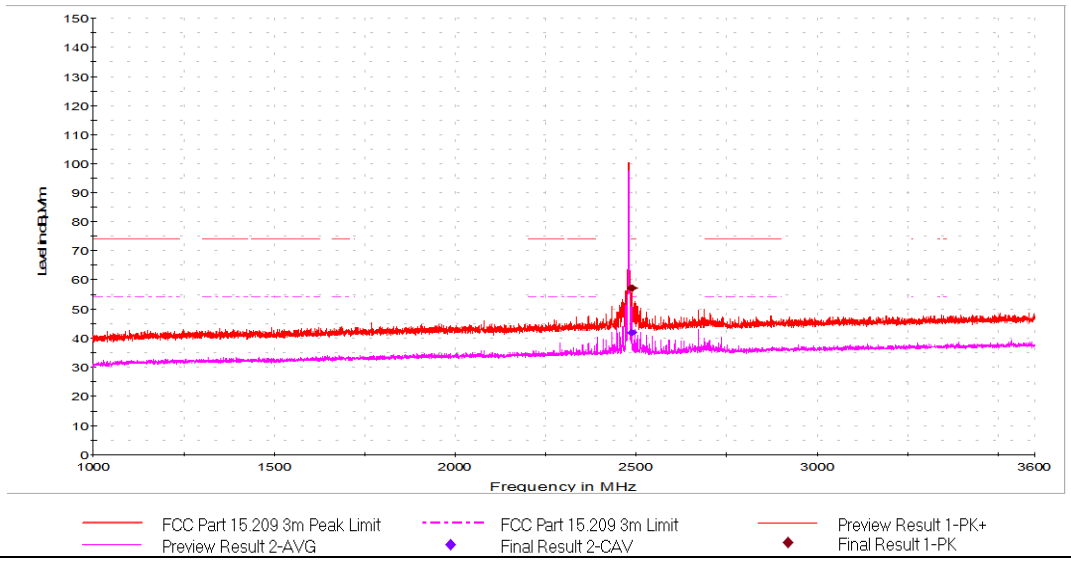


Graph 26

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 1GHz to 3.6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

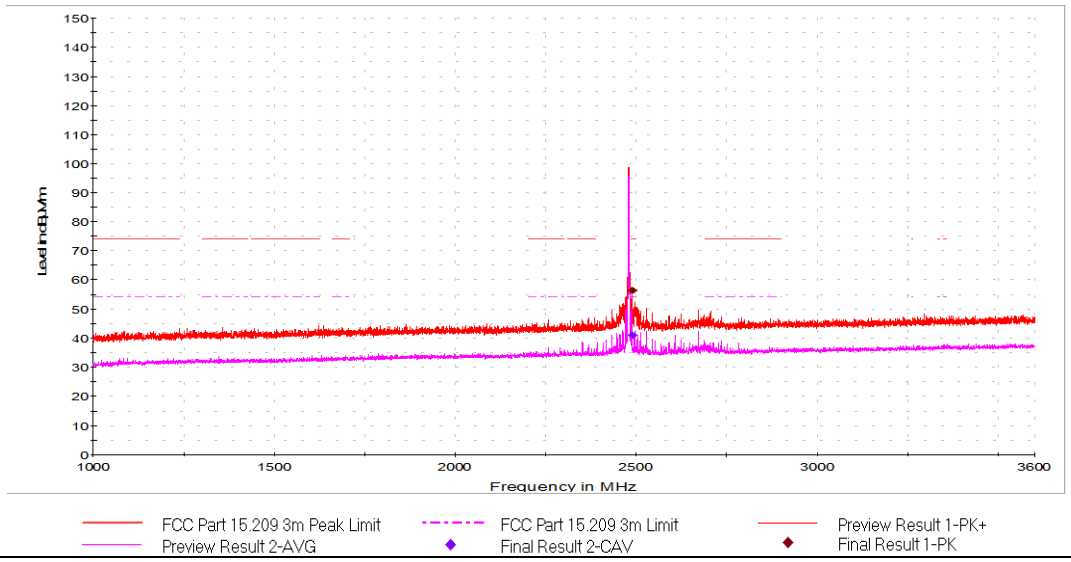


Graph 27

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 1GHz to 3.6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

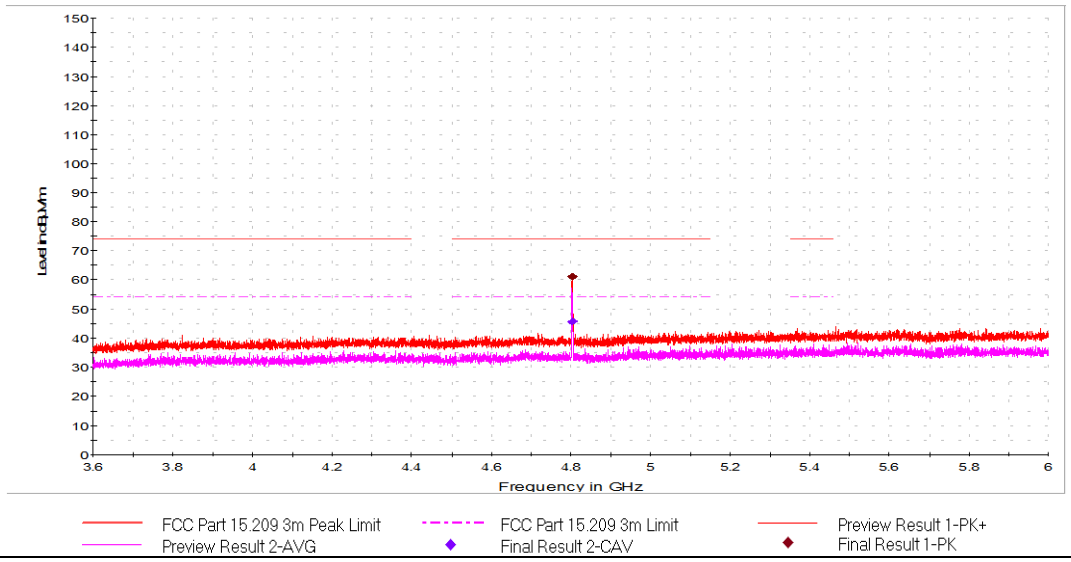


Graph 28

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 3.6GHz to 6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

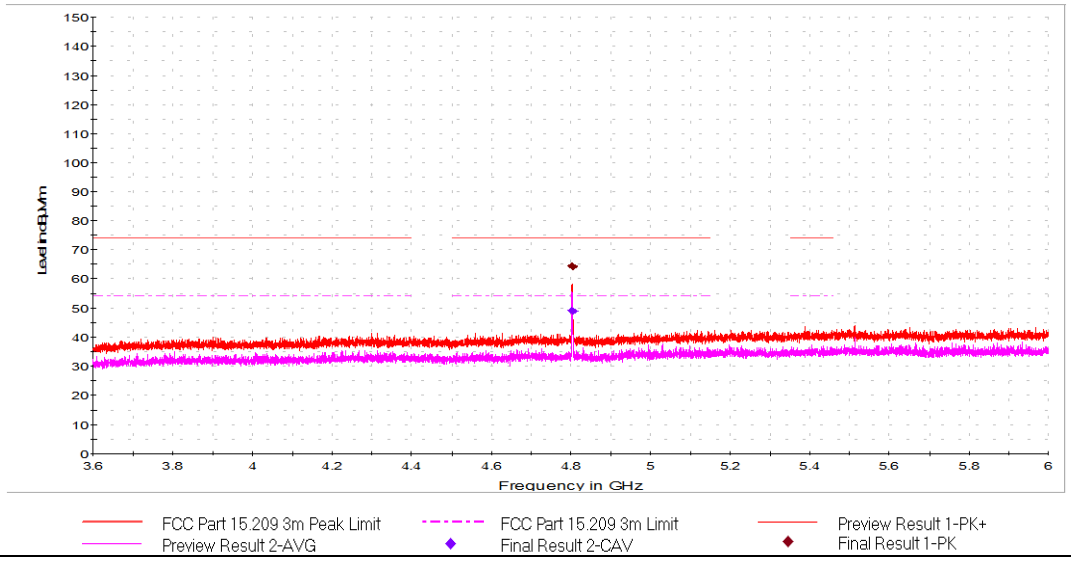


Graph 29

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 3.6GHz to 6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

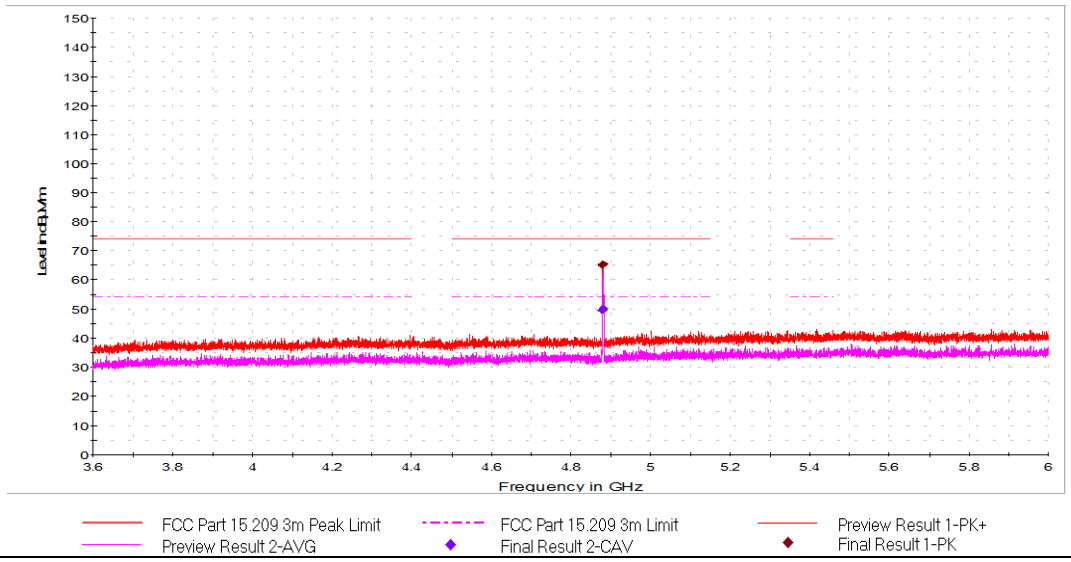


Graph 30

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 3.6GHz to 6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

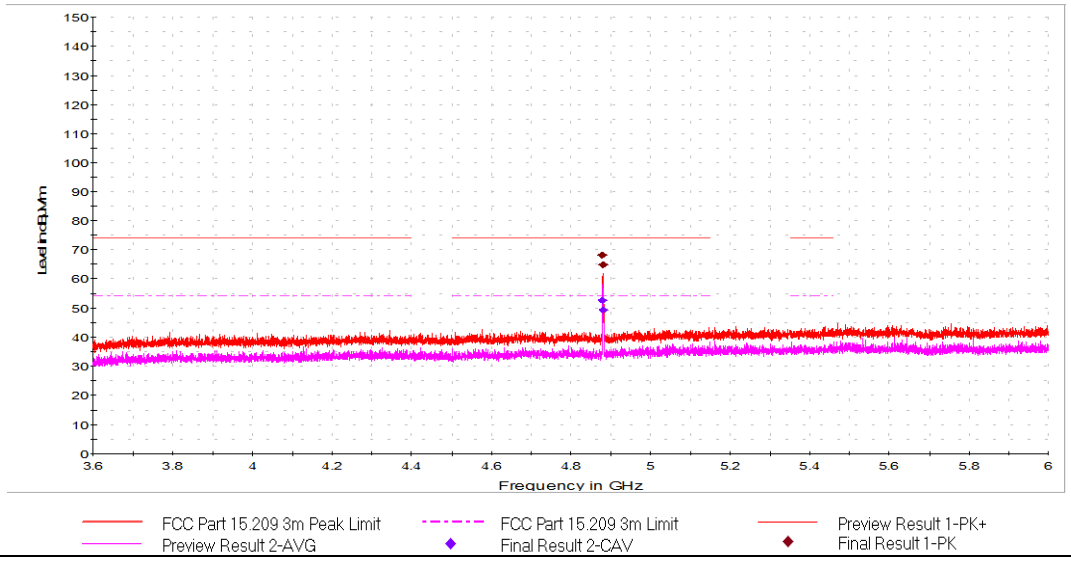


Graph 31

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 3.6GHz to 6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

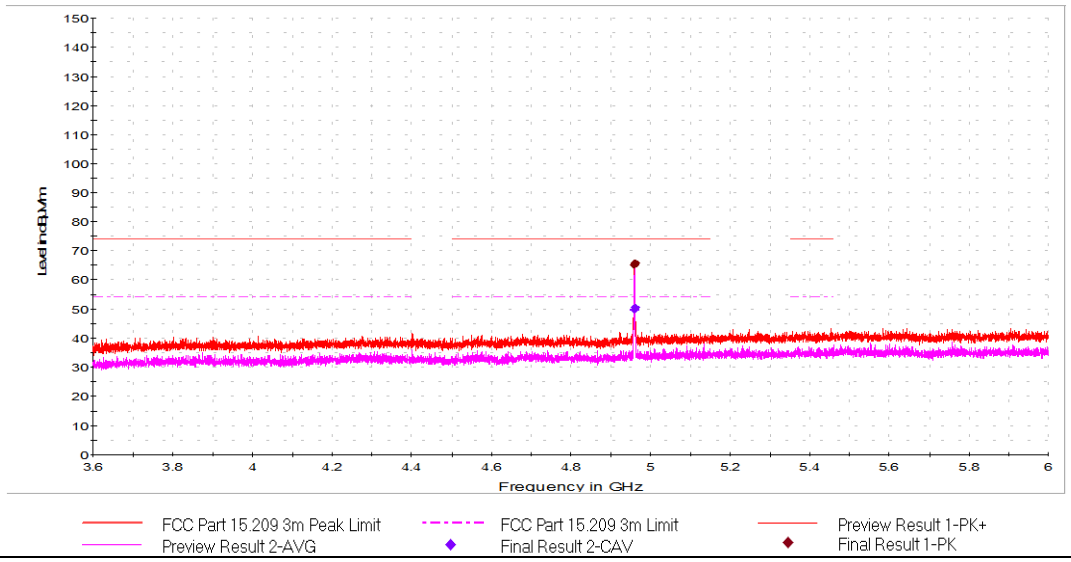


Graph 32

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 3.6GHz to 6GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

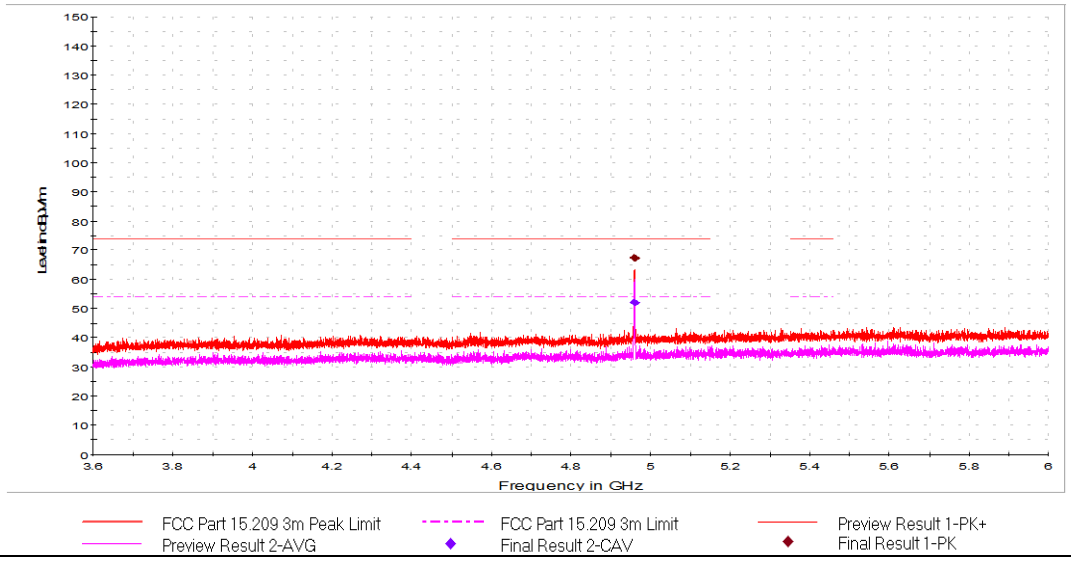


Graph 33

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 3.6GHz to 6GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

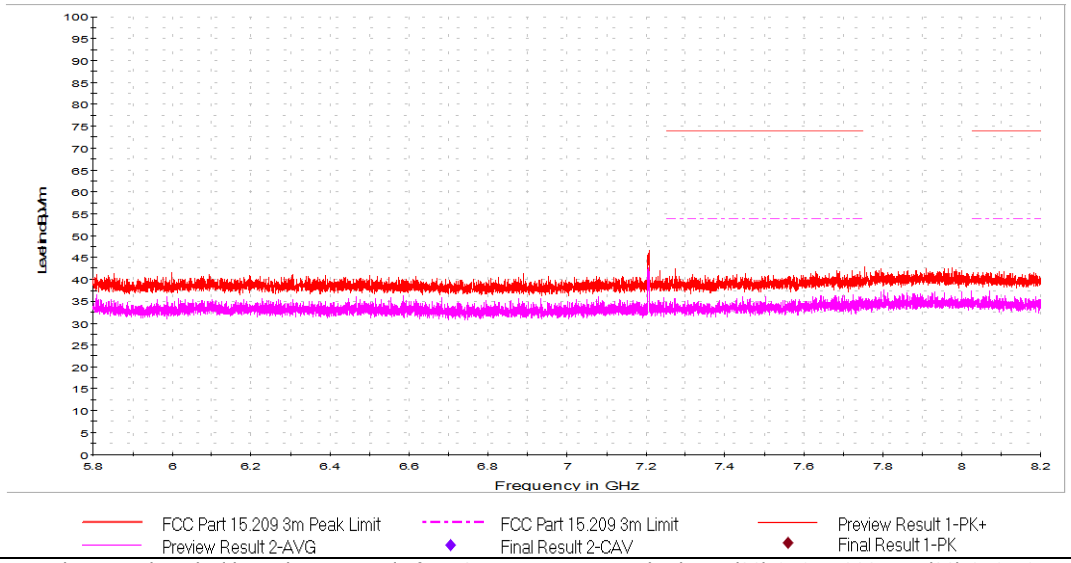


Graph 34

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 5.8GHz to 8.2GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

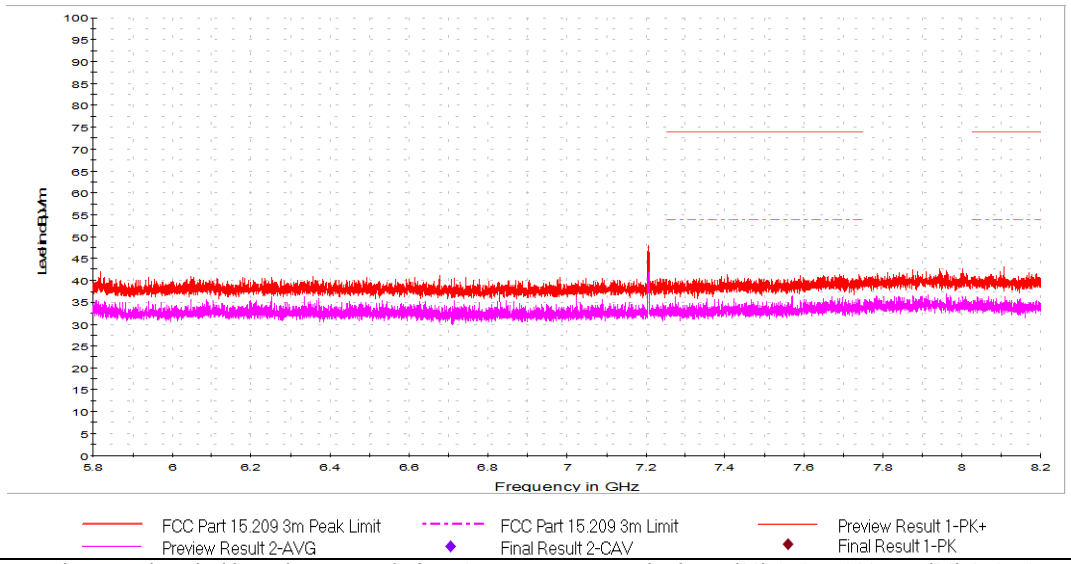


Graph 35

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 5.8GHz to 8.2GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

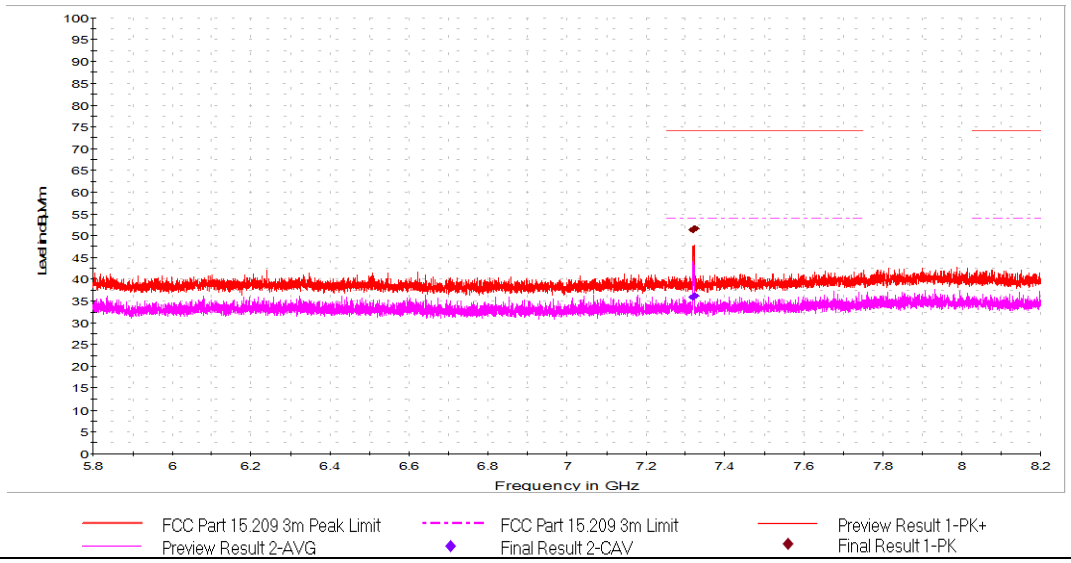


Graph 36

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 5.8GHz to 8.2GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

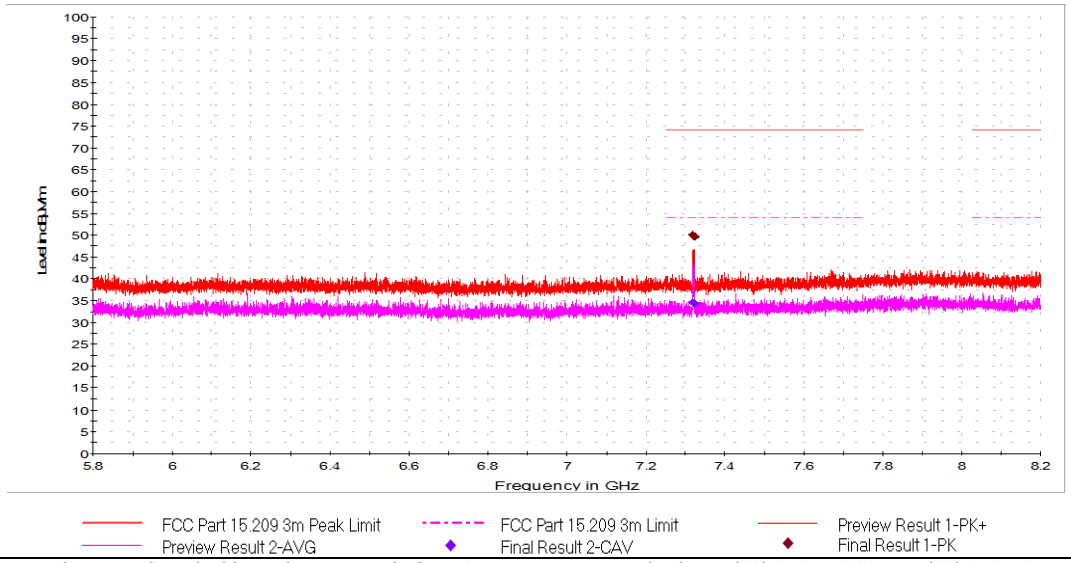


Graph 37

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 5.8GHz to 8.2GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

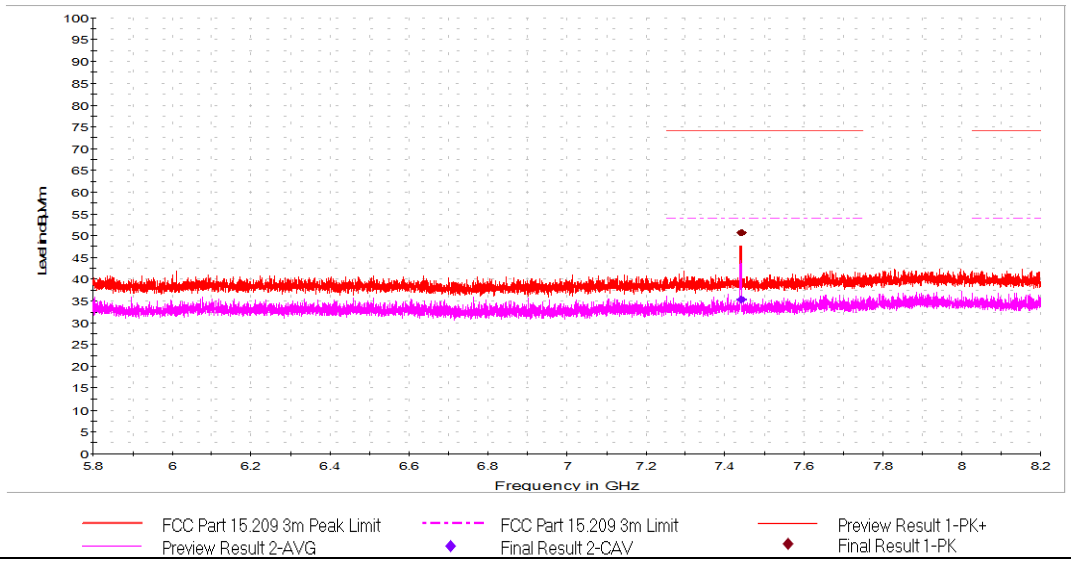


Graph 38

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 5.8GHz to 8.2GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

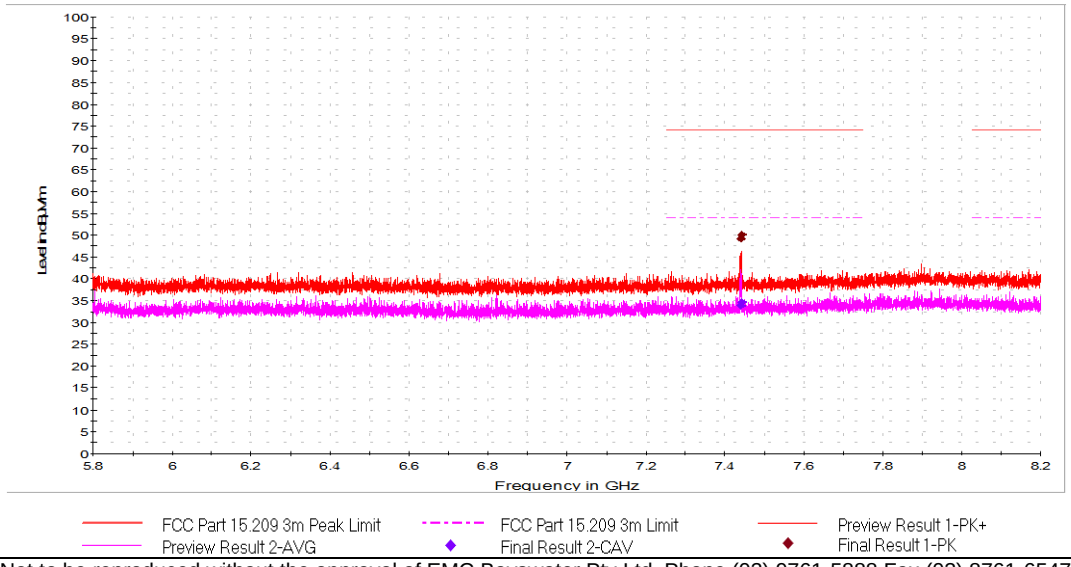


Graph 39

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 5.8GHz to 8.2GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

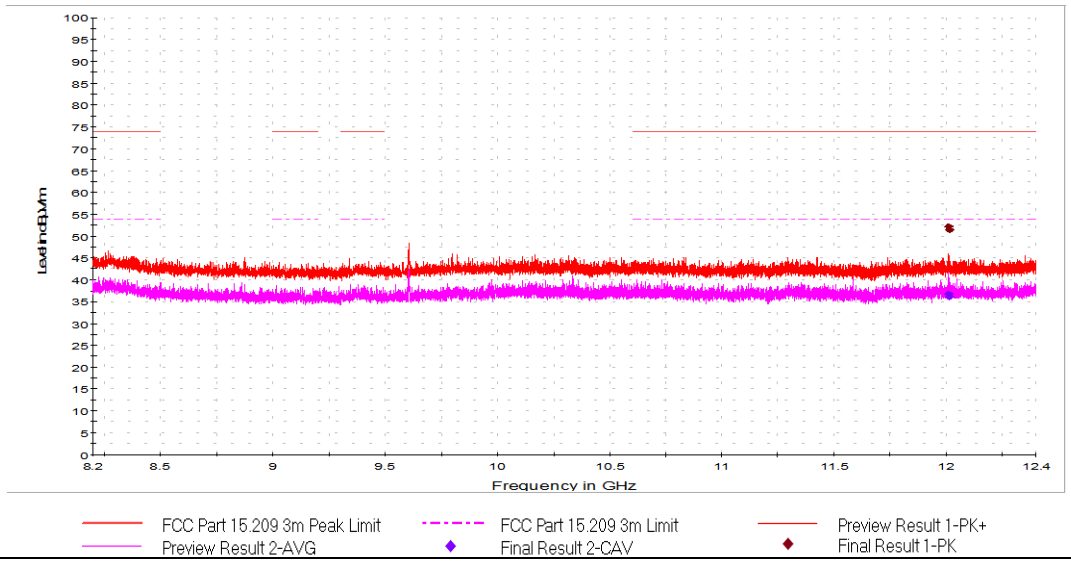


Graph 40

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 8.2GHz to 12.4GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

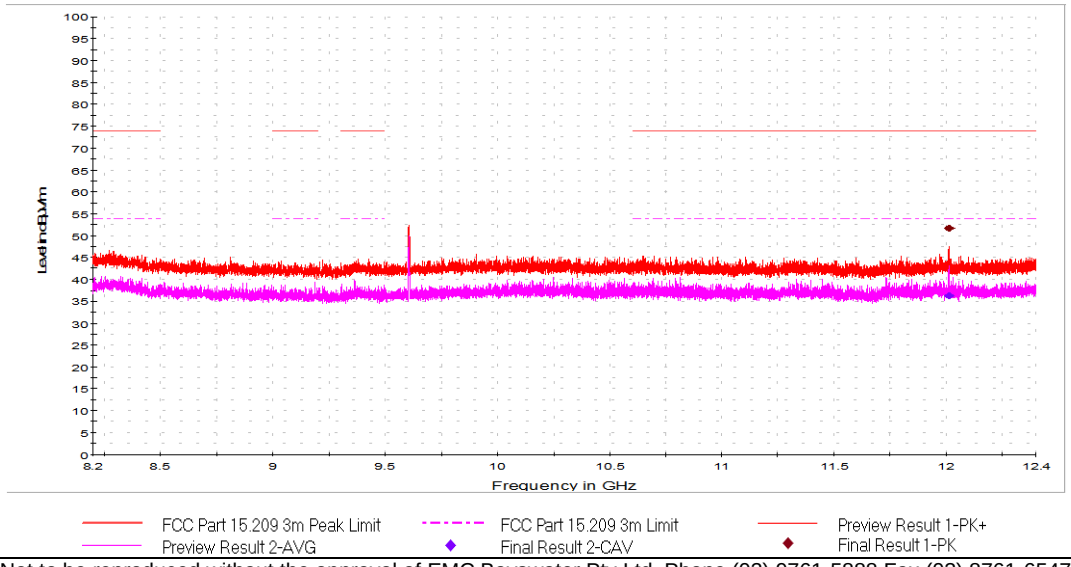


Graph 41

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 8.2GHz to 12.4GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

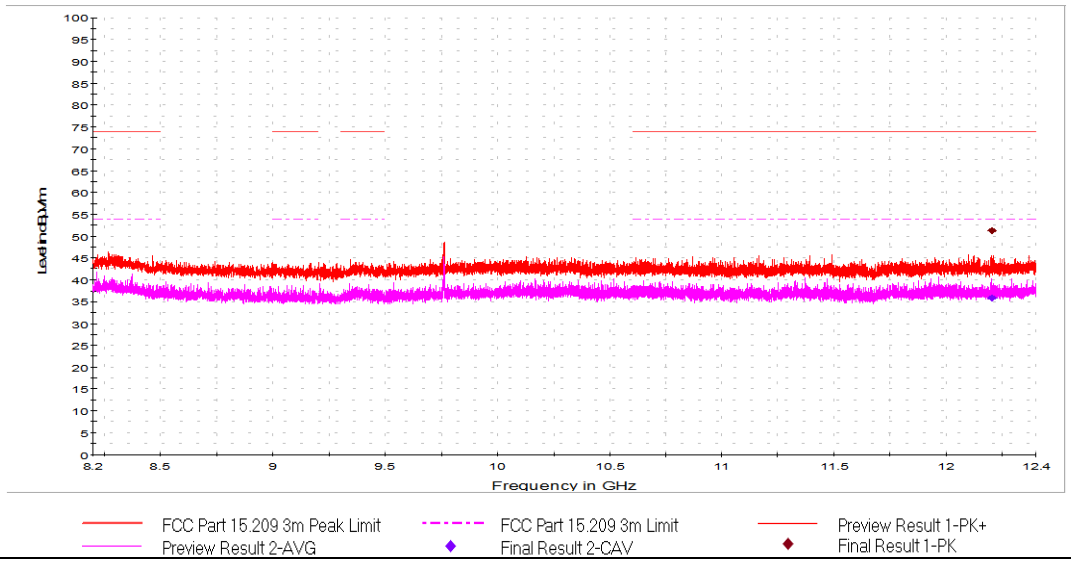


Graph 42

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 8.2GHz to 12.4GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

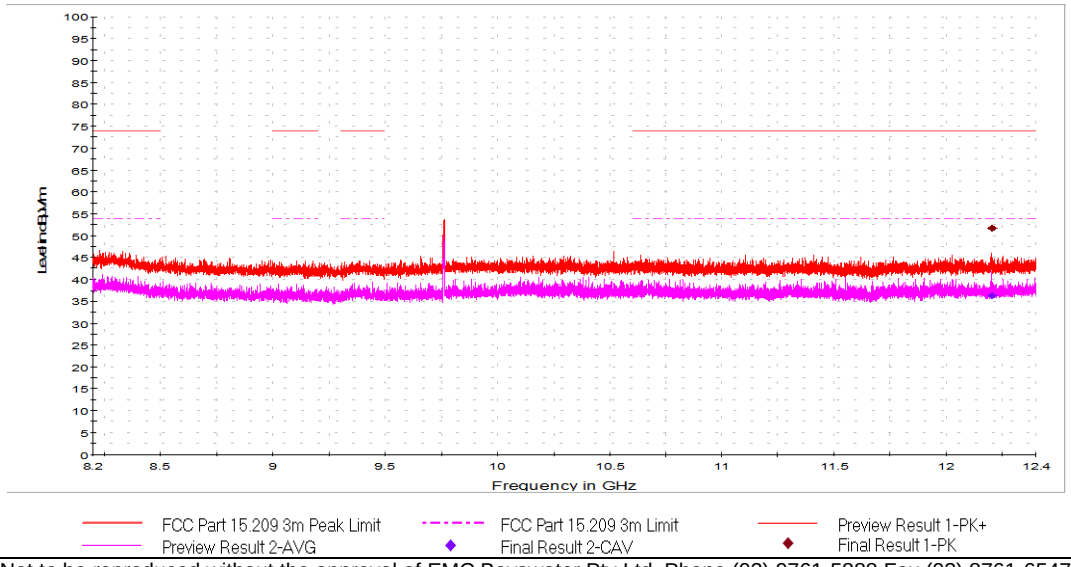


Graph 43

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 8.2GHz to 12.4GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

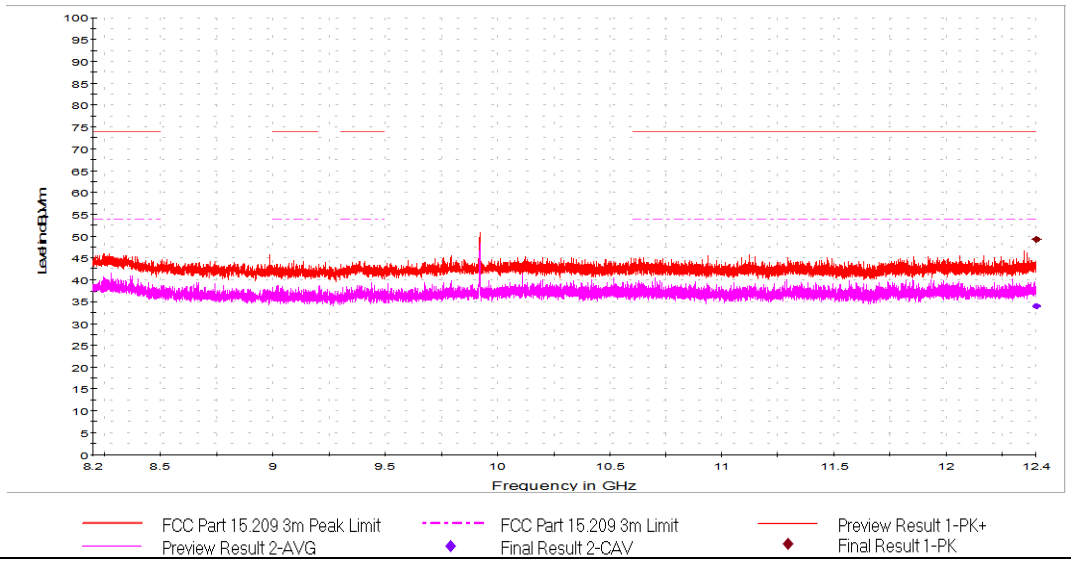


Graph 44

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 8.2GHz to 12.4GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

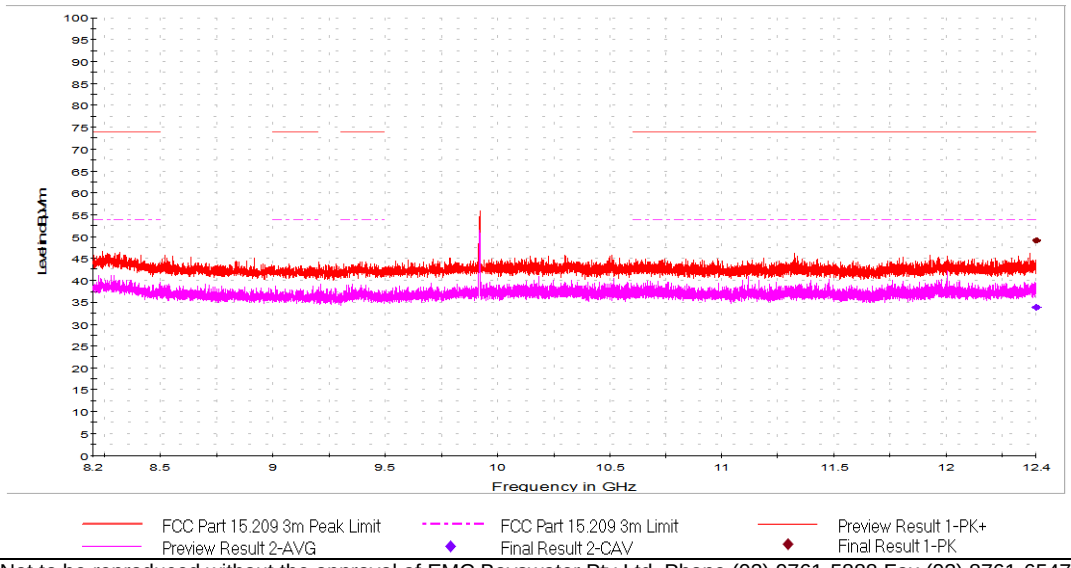


Graph 45

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 8.2GHz to 12.4GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

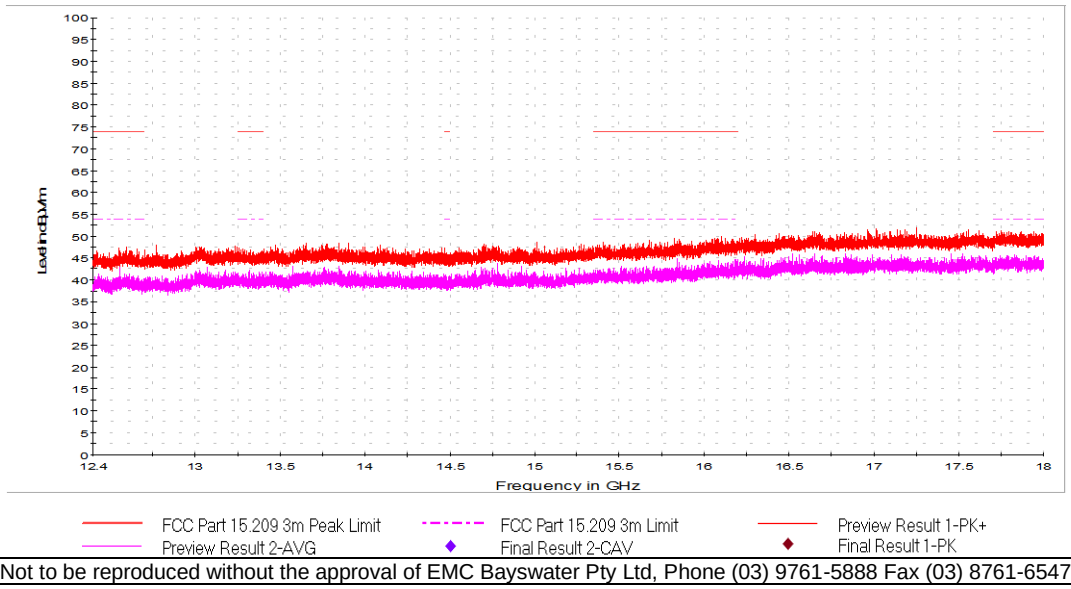


Graph 46

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 12.4GHz to 18GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

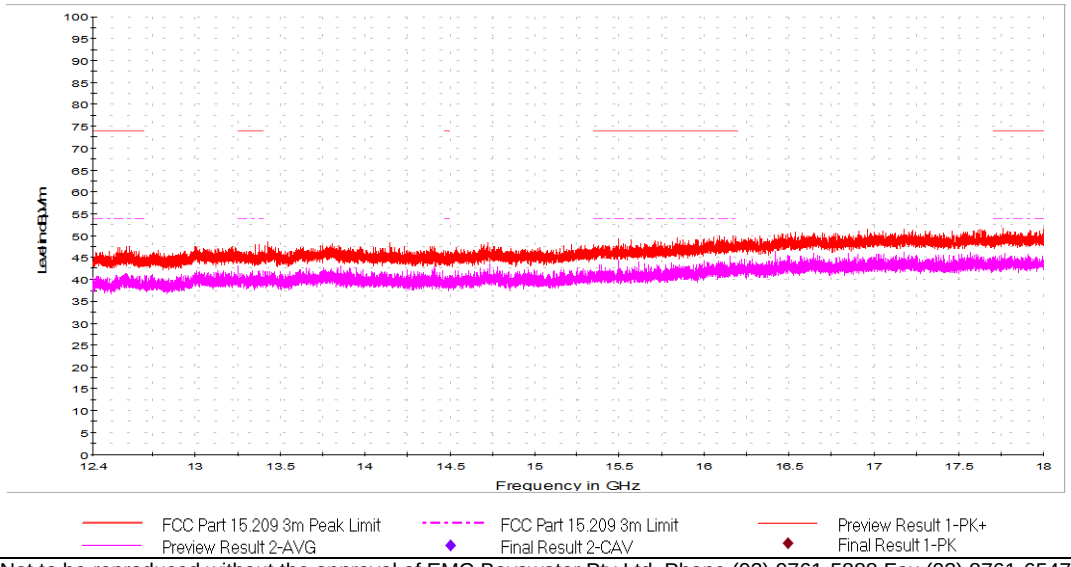


Graph 47

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 12.4GHz to 18GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

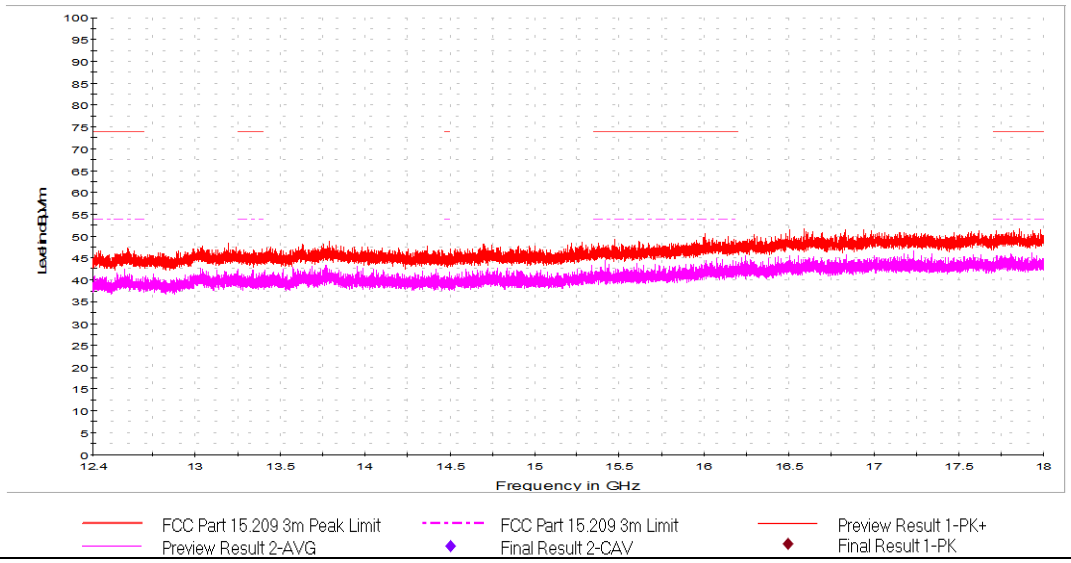


Graph 48

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 12.4GHz to 18GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

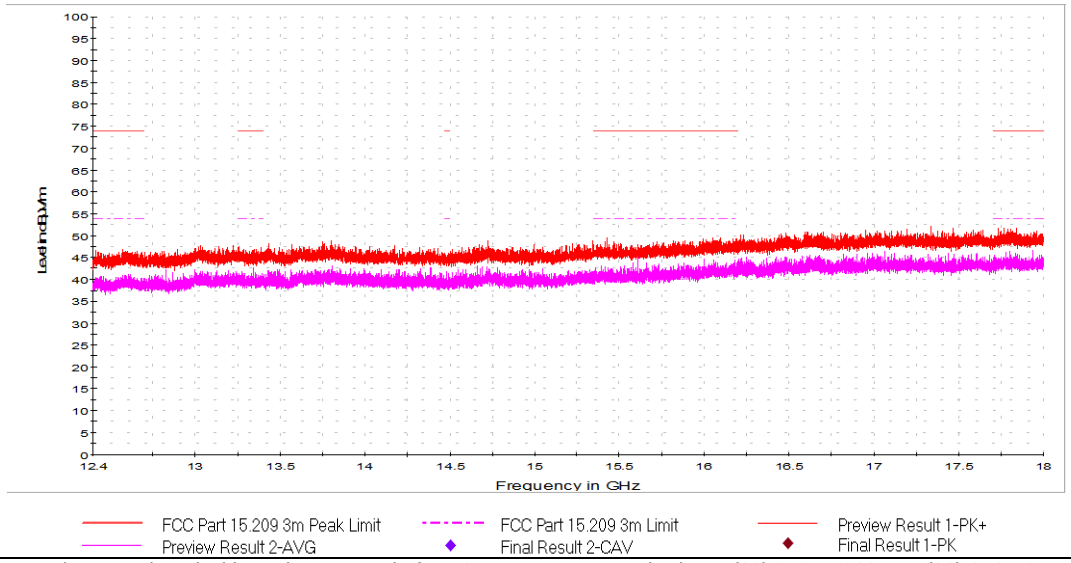


Graph 49

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 12.4GHz to 18GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

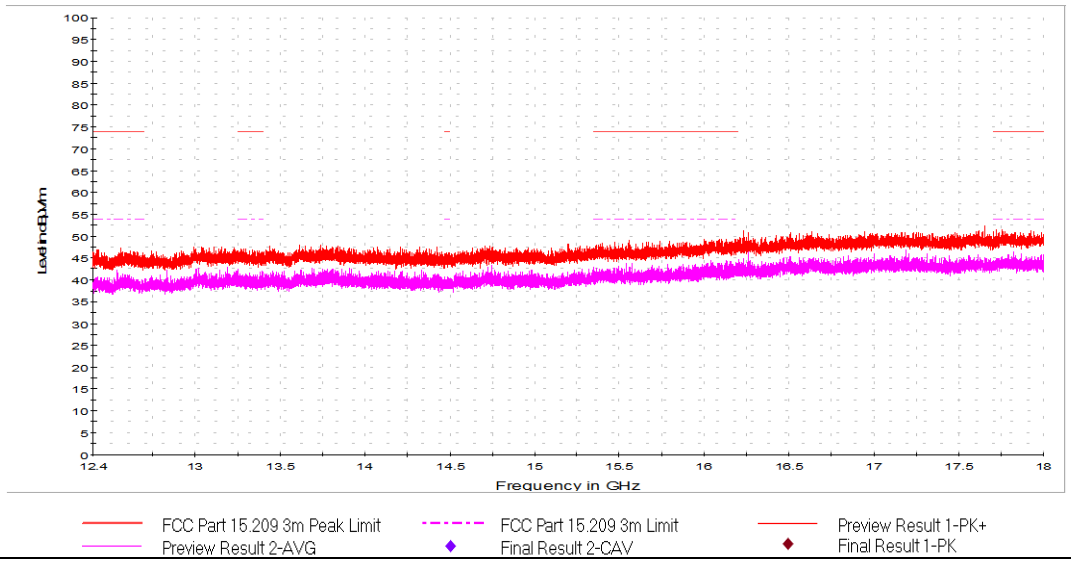


Graph 50

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 12.4GHz to 18GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

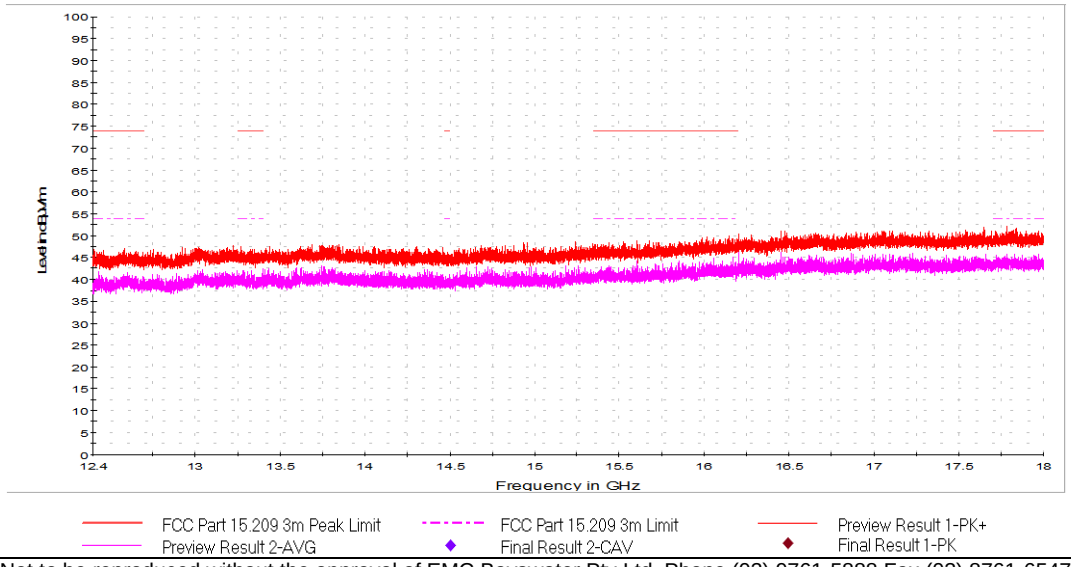


Graph 51

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 12.4GHz to 18GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: AZ

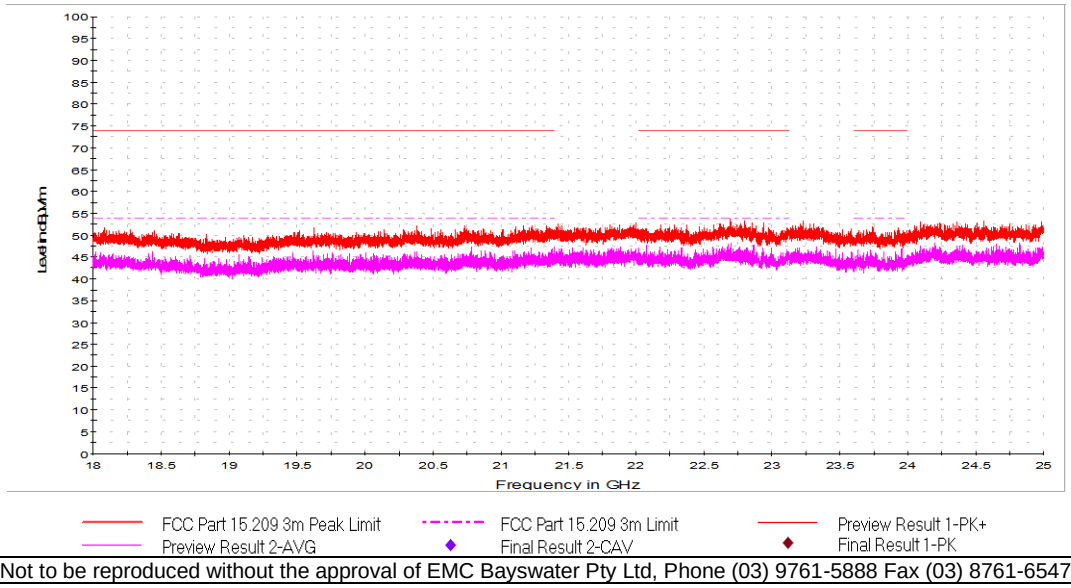


Graph 52

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 18GHz to 25GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: NL

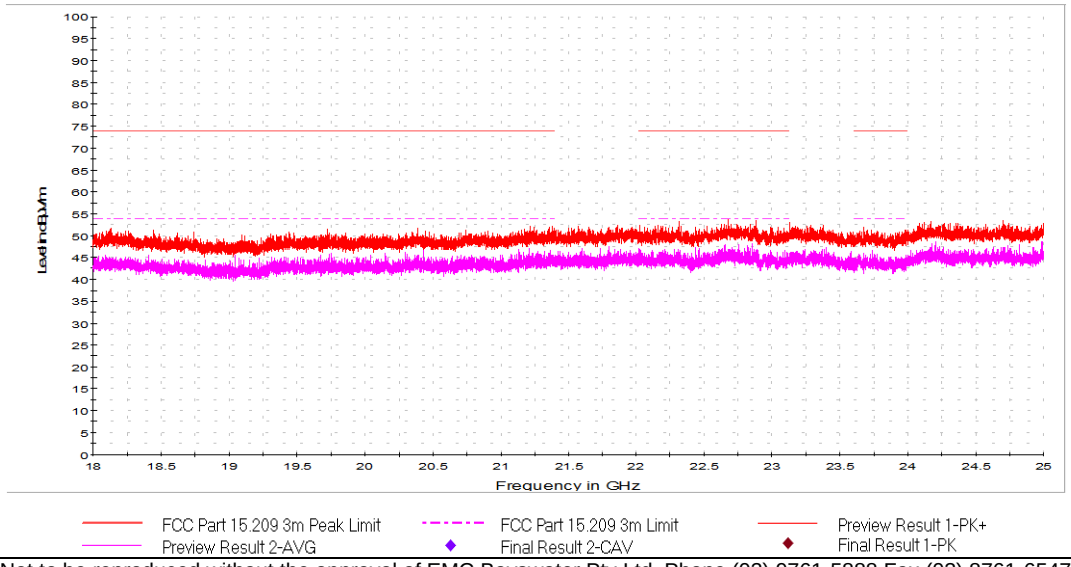


Graph 53

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2402MHz Channel – 18GHz to 25GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: NL

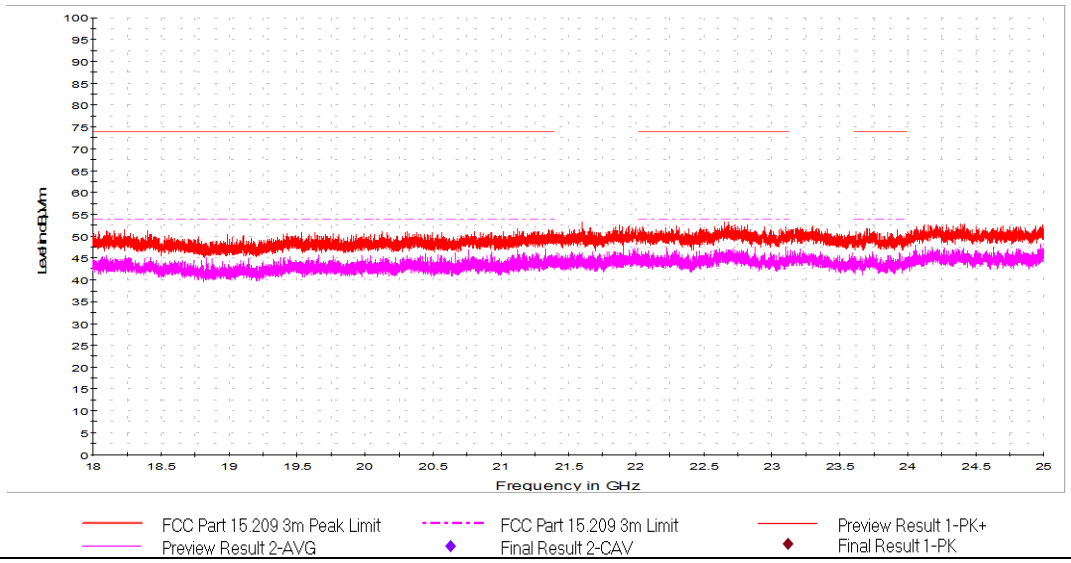


Graph 54

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 18GHz to 25GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: NL

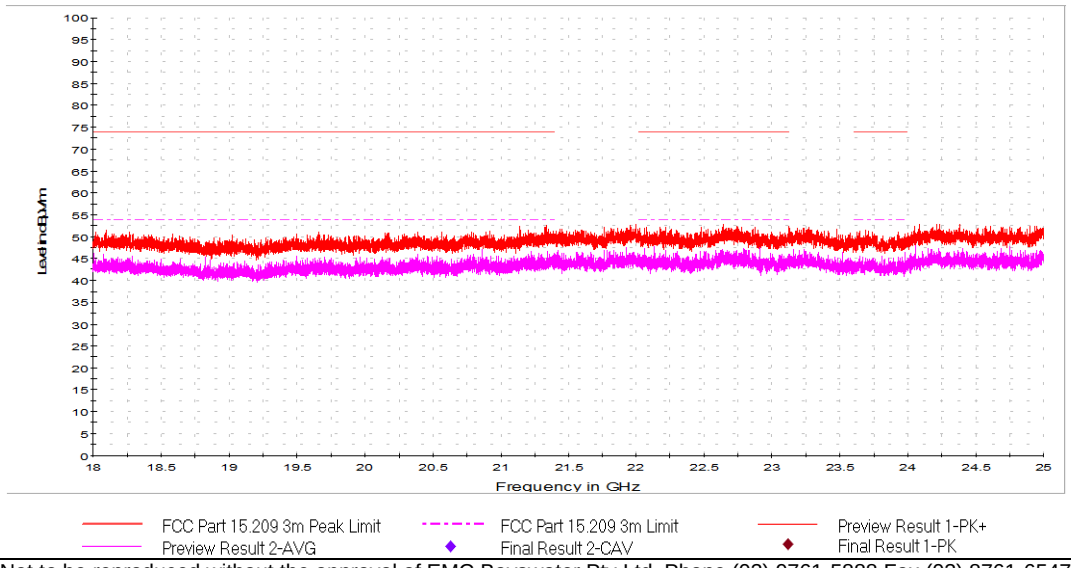


Graph 55

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2440MHz Channel – 18GHz to 25GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: NL

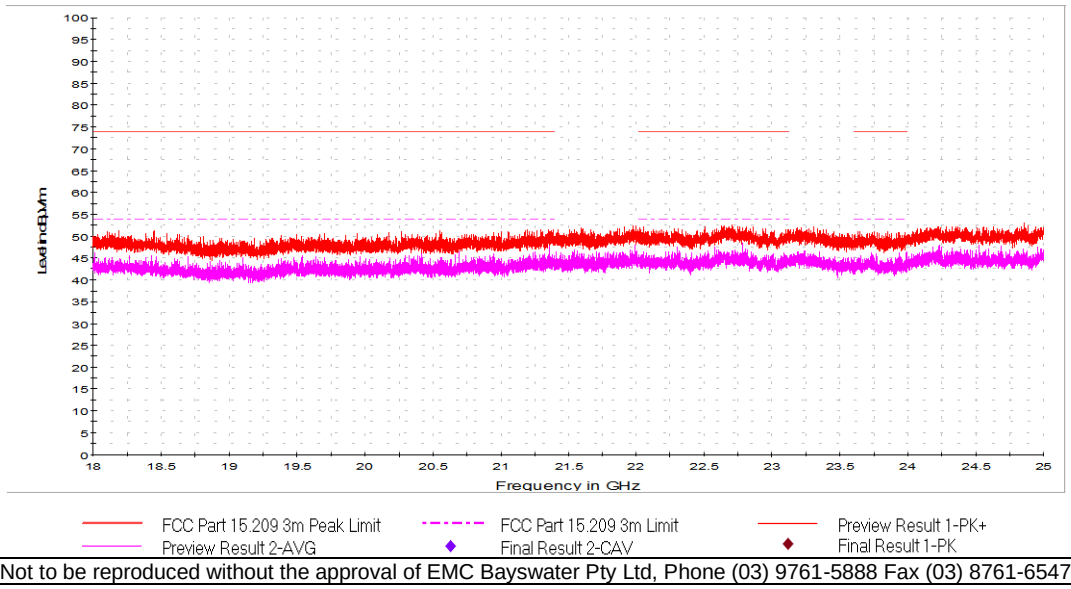


Graph 56

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 18GHz to 25GHz
Horizontal Antenna Polarisation

Job Number: E2406-1648-6
Test Engineer: NL



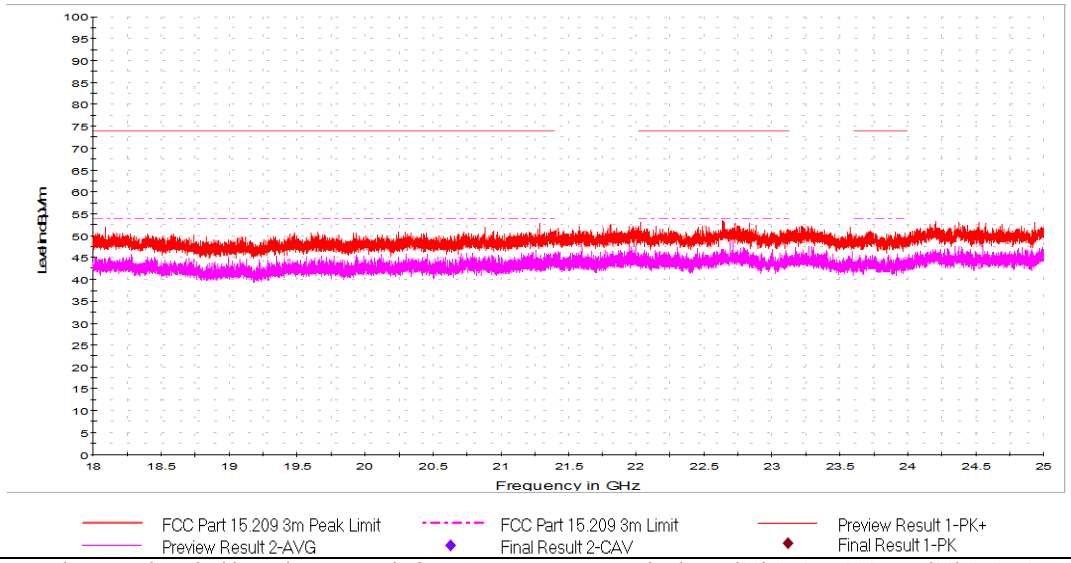
Graph 57

EMC Bayswater Pty. Ltd.

CFR47 FCC Part 15, Subpart C, 15.247 - Radiated emissions in Restricted bands
Setec BMPRO Pty Ltd - SONIC - Bluetooth Module
2480MHz Channel – 18GHz to 25GHz
Vertical Antenna Polarisation

Job Number: E2406-1648-6

Test Engineer: NL



Graph 58