Test report issued under the responsibility of:
EMITECH MONTPELLIER laboratory
MRA US-EU Designation Number: FR0006
Canadian CAB Identifier: FR0003

RADIO TEST REPORT

FCC 47 CFR part 15.247
RSS-247, issue 2, February 2017

Company ..... :	**UPONOR Inc.**
Address..... :	5925 148th Street West APPLE VALLEY 55124 MINNESOTA - USA
Test item description. ..... :	**Wireless actuators for temperature control in home application for heating/cooling system**
Trade Mark. ..... :	UPONOR
Manufacturer..... :	WATTS ELECTRONICS FRANCE
Model/Type reference..... :	P08208 / A3801208 (R-208 NA)
FCC ID..... :	V9MSM4NA1
IC. ..... :	7664A-SM4NA1
Ratings..... :	120Vac/60Hz
Testing Laboratory ..... :	**EMITECH MONTPELLIER laboratory**
Address..... :	145 rue de Massacan 34740 VENDARGUES FRANCE
Report Reference No..... :	**RR-EVE-21D571-6A**
Test procedure. ..... :	FCC IC Certification
Diffusion..... :	Mr DORE
Applicant's name. ..... :	WATTS ELECTRONICS FRANCE
Date of issue..... :	April 7, 2022
Total number of pages..... :	110
Revision..... :	0
Modified page(s)..... :	Creation
Compiled by..... :	Alexis TOUZET
Approved by (+ signature)..... :	Olivier HEYER (Laboratory Manager)

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REVISION HISTORY:

Revision	Date	Modified pages	Modifications
0	April 7, 2022	/	Creation

1. GENERAL INFORMATIONS

This document submits the results of Radio tests performed on the equipment **Wireless actuators for temperature control in domestic applications for heating / cooling system A3801208 – P08208 / R-208 NA** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed in §2 of this test report.

TESTING PROCEDURE AND TESTING LOCATION:

Testing Location ..... :	EMITECH MONTPELLIER laboratory
Address. ..... :	145 rue de Massacan 34740 VENDARGUES FRANCE
Test procedure. ..... :	FCC IC Certification
Tested by ..... :	Alexis TOUZET & Morgan PATEY
Test supervisor ..... :	None
Date of receipt of test item ..... :	N/A
Date (s) of performance of tests ..... :	From July 05th to August 04th of 2021

APPLICANT'S GENERAL INFORMATIONS:

Company name ..... :	WATTS ELECTRONICS FRANCE for UPONOR Inc.
Company address. ..... :	5925 148th Street West APPLE VALLEY 55124 MINNESOTA - USA
Person(s) present during the tests. ..... :	Mr DESGRANGES
Responsible. ..... :	Mr DORE

GENERAL REMARKS:

The information in italics is declared by the manufacturer and is under his responsibility
The test results presented in this report relate only to the object tested.
The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report the decimal separator is point.

POSSIBLE TEST CASE VERDICTS:

Test case does not apply to the test object.:	N/A
Test case not performed..... :	N/P
Test object does meet the requirement..... :	P (Pass)
Test object does not meet the requirement. ..... :	F (Fail)

DEFINITIONS AND ABBREVIATIONS:

E.U.T.	Equipement under test	AE	Ancillary equipment	Pk	Peak detector
RBW	Resolution bandwidth	VBW	Video bandwidth	QP	Quasi-peak detector
OATS	Open area test site	FAR	Full anechoic room	Av	Average detector
VP	Vertical Polarization	HP	Horizontal Polarization	RMS	Root Mean Square
RF	Radio frequency	NTR	Nothing to report	N/C	Not communicated

2. REFERENCE DOCUMENT(S)

NORMATIVE REFERENCES:
The following referenced documents are necessary for the application of the present test report. **FCC 47 CRF part 15: April, 2020** Code of federal regulations. Title 47- Telecommunication Chapter 1- Federal Communication Commission. Part 15- Radio frequency devices Subpart B- Unintentional Radiators. Limits and methods of measurement of radio disturbance. Characteristic of information technology equipment. **FCC 47 CRF part 15.247** Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850MHz. (frequency hopping and digitally modulated) **RSS-247, issue 2, February 2017** Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence Exempt Local Area Network (LE-LAN) Devices **RSS/CNR-Gen, Issue 5, March 2019** Exigences générales et information relatives à la certification du matériel de radiocommunication **ANSI C 63.10:2013** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices **ANSI C 63.4:2014** American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz Although the product standard uses obsolete technical standards, the latest versions of standards achievable by the laboratory will be used for testing.
INFORMATIVE REFERENCES:
The following referenced documents are not necessary for the application of the present test report but they assist the user with regard to a particular subject area.

3. EQUIPMENT TECHNICAL DESCRIPTION

3.1. Test Conditions

Test item description. ..... :	Wireless actuators for temperature control in domestic applications for heating / cooling system
Model/Type reference..... :	P08208 / A3801208 (R-208 NA)
FCC ID..... :	V9MSM4NA1
IC. ..... :	7664A-SM4NA1
Trade Mark. ..... :	UPONOR
Serial number (S/N)..... :	Not communicated
Part number (P/N). ..... :	Not communicated
Software version..... :	*414*
Firmware version. ..... :	Not communicated
Type of sample..... :	Pre-serial
Function(s)..... :	R-208 NA is the antenna part of the BASE part (X-265 – A380265A – P08205) which drives actuators for temperature control in domestic applications for heating / cooling system
Manufacturer name. ..... :	WATTS ELECTRONICS FRANCE
Address. ..... :	ZA des Tourettes BP 10 43800 ROSIERES FRANCE

General product information:

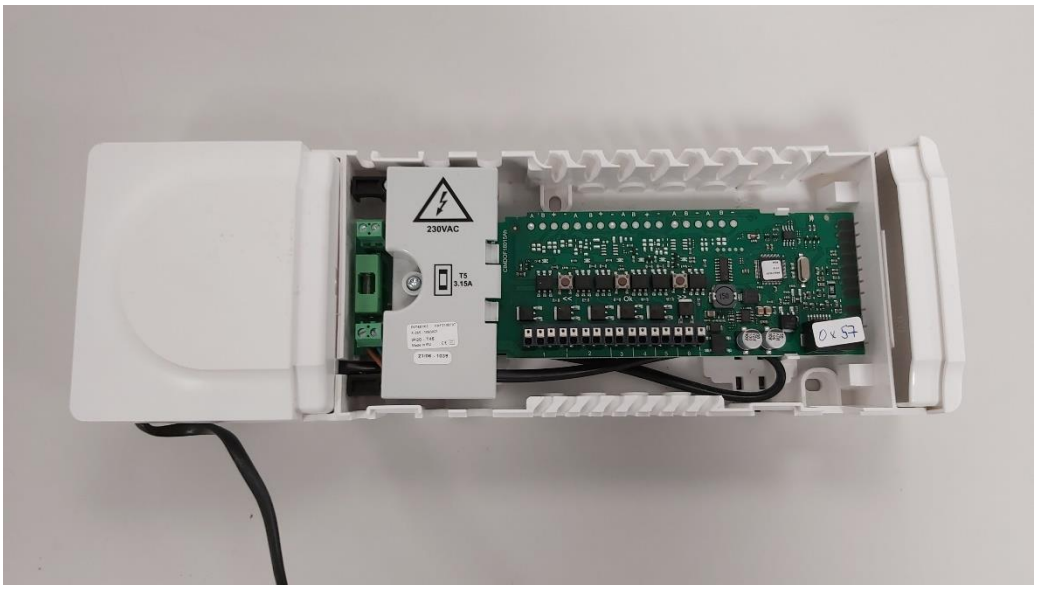
N/A

3.2. EUT Marking plate

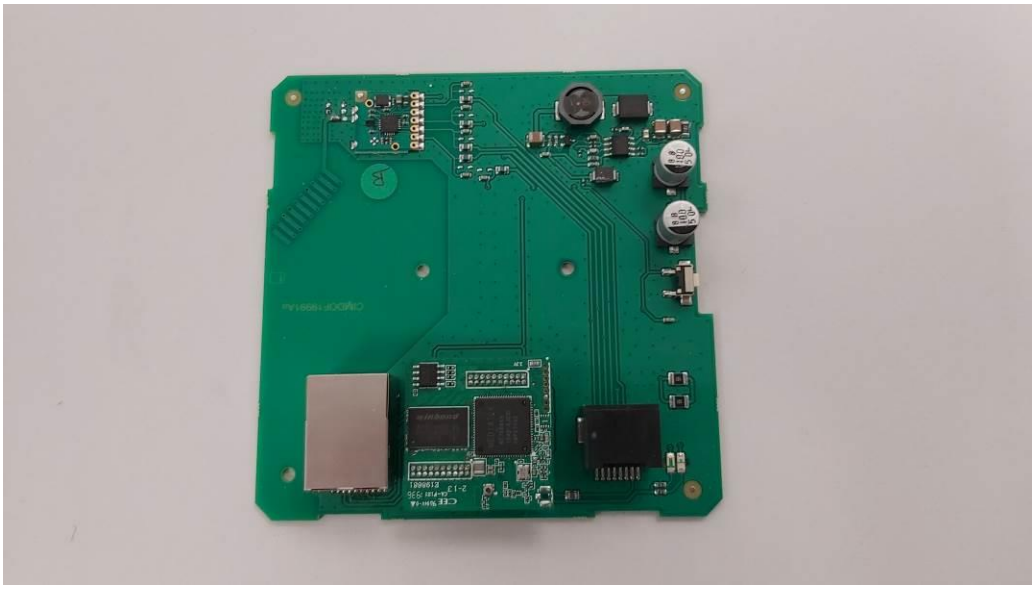
During tests, the EUT did not have its marking plate.

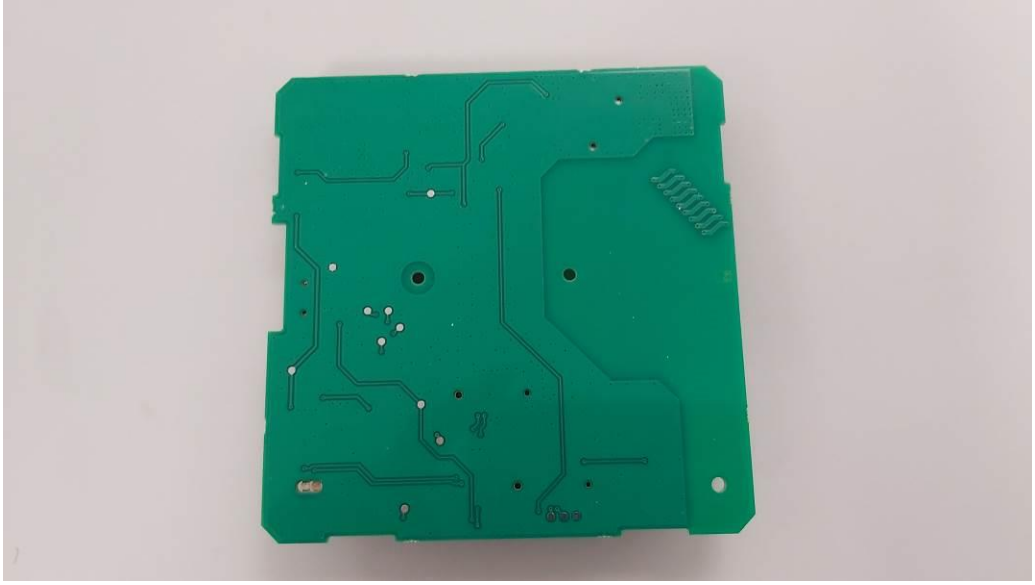
3.3. EUT General view

3.4. EUT Internal view (X-265 – A380265A – P08205)



3.5. EUT Internal view (R-208 NA)





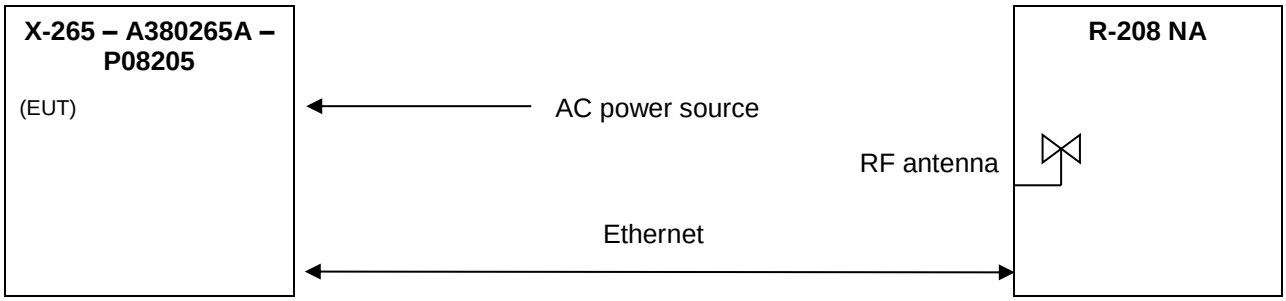
3.6. EUT Mechanical and Electrical Design

Power supply. ..... :	*120Vac/60Hz*
Power supply range..... :	*Not communicated*
Power type..... :	*Single phase without earth*
Power (W)..... :	*60*
Nominal current (A). ..... :	*0.5*
Dimensions (L x W x H) (m). ..... :	*X-265 – A380265A – P08205: 0.11x0.055x0.34* *R-208 NA : 0.11x0.11x0.021*
Weight (kg). ..... :	*2*
Temperature range (°C). ..... :	*0° to +45°C*
Ground bounding strap..... :	*No*

Comments:

N/A

3.7. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	Plastic	N/A
1	AC power source	AC/DC	<3m	2P	120Vac/60Hz
2	RF antenna	RF	N/A	N/A	2400MHz
4	Ethernet	DC & I/O	<3m	RJ45	Power Over Ethernet

AC/DC :	AC/DC Converter port	AC ..... :	Alternative current port	DC ..... :	Discontinuous current port
I/O .....:	Input or Output port	TP ..... :	Telecommunication port	RF ..... :	Radio frequency port
N/E .....:	Non Electrical port				

3.8. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type..... :	*Transceiver*
Technology..... :	*SRD and WiFi*
Environmental profile..... :	*Data transmissions*
Temperature range..... :	*0°C to +45°C*
Antenna type ..... :	*Internal*
Antenna Gain..... :	*Not communicated*
Comments:	
N/A	
b) TRANSMITTER PARAMETERS (TX)	
Frequency bands..... :	*Wi-Fi : 2400 MHz to 2483.5 MHz*
RF Power..... :	*Not communicated*
Number of channels / Separation..... :	*11*
Modulation type ..... :	*802.11b and 802.11g*
Duty cycle ..... :	*Not communicated*
Tested frequency..... :	*2412 MHz (Low channel (Ch #1))* *2437 MHz (Mid channel (Ch #6))* *2462 MHz (High channel (Ch #11))* *2467 MHz (Canada High channel (Ch #12)) exclusively used for Canada*
c) RECEIVER PARAMETERS (RX)	
Frequency bands..... :	*Wi-Fi : 2400 MHz to 2483.5 MHz*
Bandwidth..... :	*20 MHz*

4. OPINION(S) AND INTERPRETATION(S)

TEST(S) PERFORMED	DEVIATION(S) TO TEST METHOD(S)
FCC part 15.247 subclause d) and RSS-247	N/A
FCC part 15.247 and RSS-247	N/A
FCC part 15.109, 15.209, 15.205, 15.215, CNR-Gen	N/A
FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen	N/A
FCC part 15 Radio part 15.215 and RSS Gen	N/A
ANSI C63.4: 2014	N/A
ANSI C63.10: 2013	N/A

Comments: N/A

5. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
SUBPART A - GENERAL			
Labeling requirements		N/P	15.19 / See certification documents
Information to user		N/P	15.21 / See certification documents
Home-built devices		N/A	15.23
Kits		N/A	15.25
Special Accessories		N/A	15.27
Inspection by the Commission		N/A	15.29
Measurement standards		PASS	15.31
Test procedure for CPU boards and computer power supplies		N/A	15.32
Frequency range of radiated measurements		PASS	15.33
Measurement detector functions and bandwidths		PASS	15.35
Transition provisions for compliance with the rules		N/P	15.37 / See certification documents
SUBPART B – UNINTENTIONAL RADIATORS			
Equipment authorization			15.101
- Verification		N/P	
- Declaration of Conformity		N/P	
CPU boards and power supplies used in personal computers		N/A	15.102
Exempted device		N/A	15.103
Information to the user		N/P	15.105 / See certification documents
Conducted limits	Class B	N/A	15.107 /
Radiated emission limits	Class B	PASS	15.109
Antenna power conduction limits for receivers		N/A	15.111
Power line carrier systems		N/A	15.113
TV interface devices, including cable system terminal devices		N/A	15.115
TV broadcast receivers		N/A	15.117
Cable ready consumer electronics equipment		N/A	15.118
Program blocking technology requirements for TV receivers		N/A	15.120
Scanning receivers and frequency converters used with scanning receivers		N/A	15.121

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
Labeling of digital cable ready products		**N/A**	**15.123**
SUBPART C –INTENTIONAL RADIATORS			
Equipment authorization requirement		**PASS**	**15.201 / Transmitter part is subject to Certification procedure**
Certified operating frequency range		**N/A**	**15.202**
Antenna requirement		**PASS**	**15.203 / Antenna gain limitation to 6dBi**
External radio frequency power amplifiers and antenna modifications		**N/A**	**15.204**
Restricted bands of operation		**PASS**	**15.204**
Conducted limits	**Class B**	**PASS**	**15.207**
Radiated emission limits; general requirements	**Class B**	**PASS**	**15.209**
Tunnel radio systems		**N/A**	**15.211**
Modular transmitters		**N/A**	**15.212**
Cable locating equipment		**N/A**	**15.213**
Cordless telephones		**N/A**	**15.214**
Additional provisions to the general radiated emission limits		**PASS**	**15.215**
Operation within the band 902-928MHz, 2400-2483.5MHz and 5725-5850MHz			**15.247**
- **Frequency hopping and digitally modulated**		**-**	**a)**
- Frequency hopping system		N/A	a) (1)
- Digital modulation system		PASS	a) (2)
- **Maximum peak conducted output power**		**-**	**b)**
- For hopping system in the 2400-2483.5 MHz and 5725-5850 MHz bands		N/A	b) (1)
- For hopping system in the 902-928MHz band		N/A	b) (2)
- For system using digital modulation in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands		PASS	b) (3)
- **Operation with directional antenna gains > 6 dBi**		**N/A**	**c)**
- **Out-of-band emissions**		**PASS**	**d)**
- **Power spectral density conducted**		**PASS**	**e)**
- **Hybrid system**		**N/A**	**f)**
- **Frequency hopping additional requirements**		**N/A**	**g)**
- **Frequency hopping intelligence**		**N/A**	**h)**
- **RF exposure compliance**		**PASS**	**i)**

Sample subject to the test complies for tests done with the requirements of the reference document(s) listed in §2 of this test report and, where applicable, with deviation(s) specified in this document.

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the results with the exception of emission tests based on CISPR standards.

TEST(S) PERFORMED	MODIFICATION(S)
FCC part 15.247 subclause d) and RSS-247	N/A
FCC part 15.247 and RSS-247	N/A
FCC part 15.109, 15.209, 15.205, 15.215, CNR-Gen	N/A
FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen	N/A
FCC part 15 Radio part 15.215 and RSS Gen	N/A
ANSI C63.4: 2014	N/A
ANSI C63.10: 2013	N/A

6. MEASUREMENT UNCERTAINTY

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Radio frequency	± 1 x 10^{-7}	±1 x 10^{-7}
RF power, conducted		
RF power	± 0.8dB	± 1 dB
Power spectral density	± 2.3dB	± 3 dB
Occuped bandwidth		
RF power	± 3.8 %	± 5 %
Conducted emission (spurious)		
f ≤ 1 GHz	± 0.8 dB	± 3 dB
1 GHz - 12.75 GHz	± 1.6 dB	
Radiated emission (ERP / EIRP)		
f ≤ 62.5 MHz	± 5.1 dB	± 6 dB
62.5 MHz - 1 GHz	± 5.1 dB	± 6 dB
1 GHz - 18 GHz	± 5.2 dB	± 6 dB
18 GHz – 26 GHz	± 5.1 dB	± 6 dB
26 GHz – 40 GHz	± 5.4 dB	± 6 dB
EIRP and power spectral density with diode	± 5.2 dB	± 6 dB
Radiated emission (magnetic field)		
9kHz – 30MHz	± 3 dB	± 6 dB
Supply voltages	± 3 %	± 3 %
Temperature	± 1 °C	± 1°C
Humidity	± 5 %	± 5 %
Time / Duty cycle	± 4.4 %	± 5 %
Radiated emission (electric field for FCC standard)		
9kHz – 30MHz	± 2.7 dB	/
30MHz – 1GHz	± 5.0 dB	/
1GHz – 18GHz	± 5.6 dB	/
18GHz – 26GHz	± 5.7 dB	/
26GHz – 40GHz	± 5.7 dB	/

For the calculation of expanded uncertainty, the confidence interval is 95 % (k=2).

7. RF EXPOSURE

Maximum EIRP = 23dBm (199.52 mW) at 2467MHz

In accordance with KDB 447498 D01 General RF Exposure Guidance v06:
PSD= EIRP/(4*π*R2)=199.52/(4*π*(20 cm)²)= 0.039694 mW/cm²
Limit= 1 mW/cm²

8. TEST CONDITIONS AND RESULTS

8.1. Conducted limits

Reference standard:	FCC part 15.107, 15.207 RSS-Gen
Test method:	ANSI C63.4: 2014
General test setup: EUT is set on an insulating support at 40cm from the ground reference plane. All power was connected to the system through Artificial Mains Network (AMN). The AMN is placed at 80cm from the boundary of the EUT and bonded to a ground reference plane.	

TESTED CABLE	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
120Vac/60Hz power supply / All channels	150kHz-30MHz	15.207	EMI5059	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	30 to 60 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: N/A		

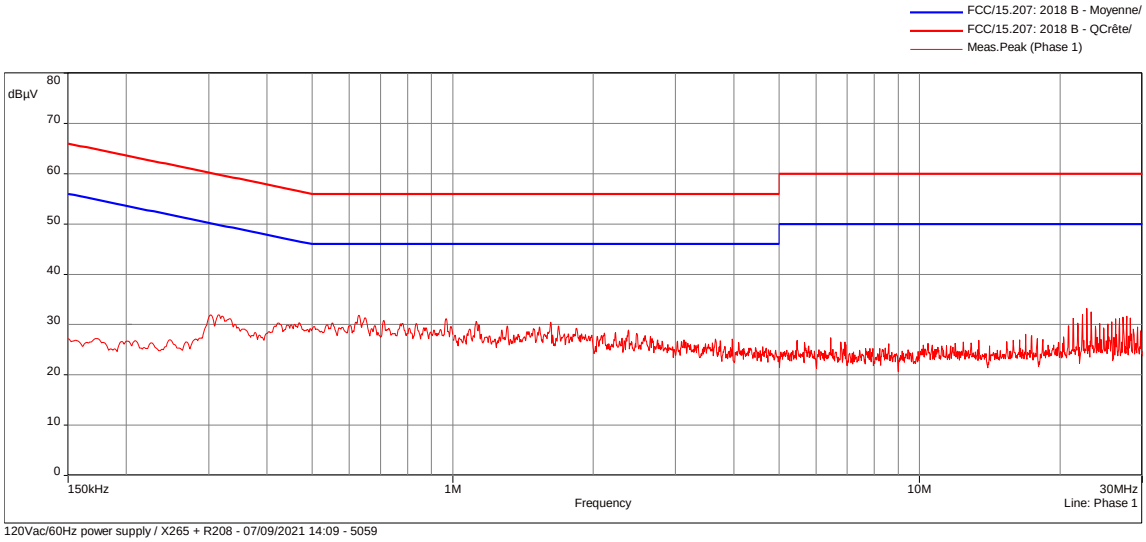
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322		
Cable	EMITECH	Current absorber sheath	9491	23/06/2020	23/08/2022
Cable	C&C	N-3m	14333	18/03/2021	18/05/2023
LISN	PMM	L2-16	1209	08/06/2020	08/08/2022
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FPL1003	16027	14/08/2020	14/10/2021
Software	Nexio	BAT EMC	0000		
Surges Suppressor	Hewlett Packard	11947A	0238	20/12/2019	20/02/2023
Thermohygrometer	Testo	608-H2	12268	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

BAT-EMC software version: V3.18.0.26 Blank cells = Permanent validity

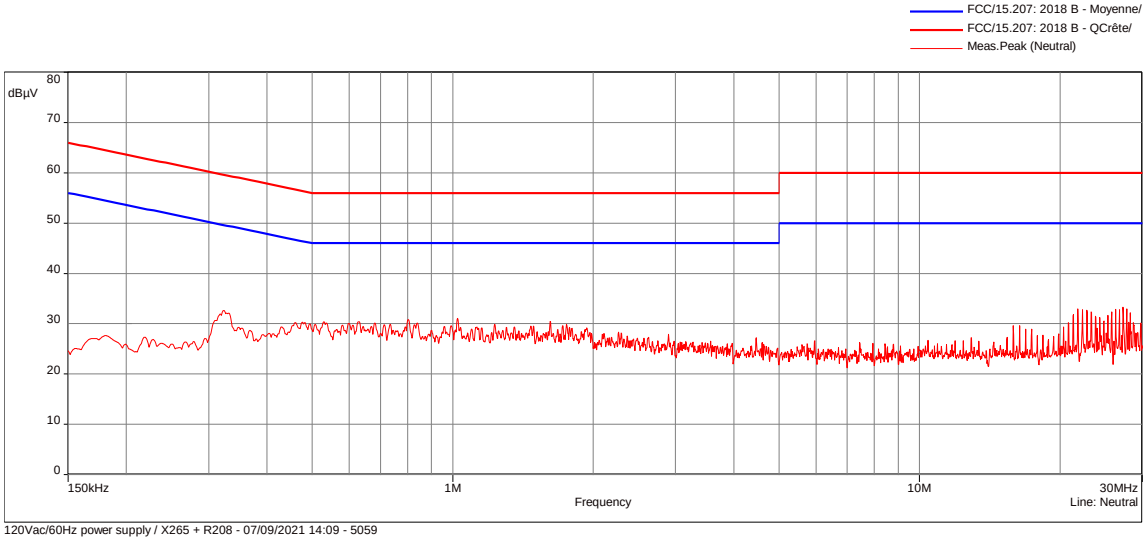
CONDUCTED EMISSION (MEASUREMENT) - TABULATED RESULTS							
120VAC/60HZ POWER SUPPLY / ALL CHANNELS						EMI5059	
Terminal	Test Frequency (MHz)	Meter Reading dB (µV)	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level dB (µV)	Limit dB (µV)	Margin (dB)
/	/	/	/	/	/	/	/
Supplementary information: No spurious emissions were detected.							

TEST SETUP PHOTO(S)

CONDUCTED EMISSION (MEASUREMENT) - GRAPH			
120VAC/60HZ POWER SUPPLY / ALL CHANNELS		EMI5059	
EUT mode:	Tx & Rx mode	**T (°C):**	26.6
Test Date:	09/07/2021	**H (%):**	36.6
Test Operator:	ATO	**P (hPa):**	1013



120Vac/60Hz power supply / X265 + R208 - 07/09/2021 14:09 - 5059



120Vac/60Hz power supply / X265 + R208 - 07/09/2021 14:09 - 5059

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Neutral	150kHz-1MHz	10kHz	30kHz	Peak
Neutral	1MHz-10MHz	10kHz	30kHz	Peak
Neutral	10MHz-30MHz	10kHz	30kHz	Peak
Phase 1	150kHz-1MHz	10kHz	30kHz	Peak
Phase 1	1MHz-10MHz	10kHz	30kHz	Peak
Phase 1	10MHz-30MHz	10kHz	30kHz	Peak
Measure with:	A.M.N.			
Comments:	N/A			
EUT modification(s): N/A				

No spurious emissions were detected.

8.2. 6dB bandwidth

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	ANSI C63.10 : 2013

Test description:

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

EUT is connected to the measuring receiver via 50Ω attenuator(s). Tests are done in max-hold mode in order to capture all channels.

TEST CASE AND CONDITIONS	SEVERITY	RESULT TAB.	VERDICT
Low channel (Ch #1) / 802.11b	>500kHz	EMI8049	**PASS**
Mid channel (Ch #6) / 802.11b	>500kHz	EMI8050	**PASS**
High channel (Ch #11) / 802.11b	>500kHz	EMI8051	**PASS**
Canada High channel (Ch #12) / 802.11b	>500kHz	EMI8052	**PASS**
Low channel (Ch #1) / 802.11g	>500kHz	EMI8053	**PASS**
Mid channel (Ch #6) / 802.11g	>500kHz	EMI8054	**PASS**
High channel (Ch #11) / 802.11g	>500kHz	EMI8055	**PASS**
Canada High channel (Ch #12) / 802.11g	>500kHz	EMI8056	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	22.6 °C
Relative Humidity	20 to 75 %	58.3 %
Atmospheric pressure	N/A	1004 hPa
Test method deviation: N/A		
Supplementary information:		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322		
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023

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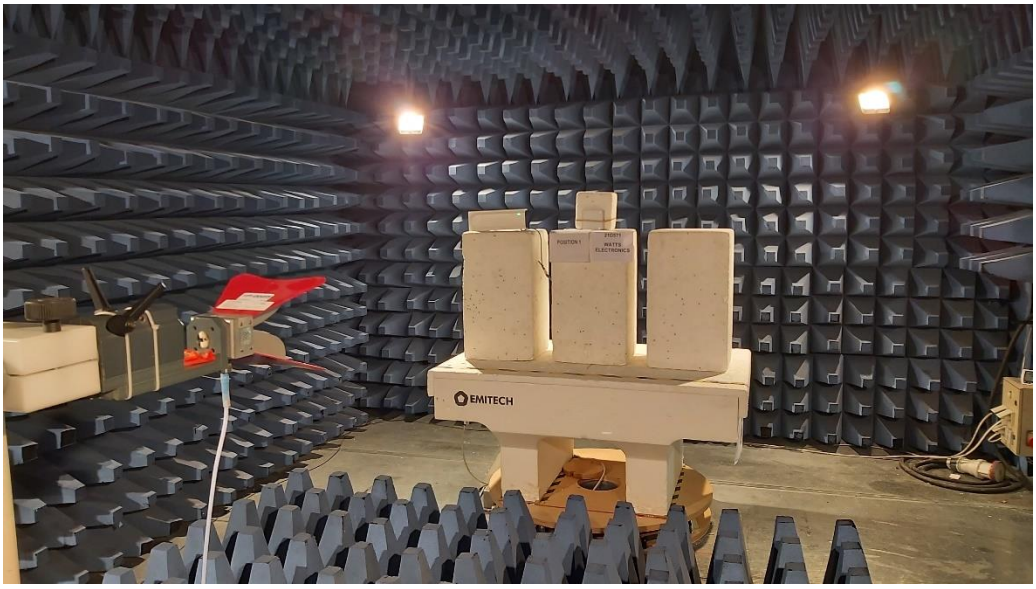
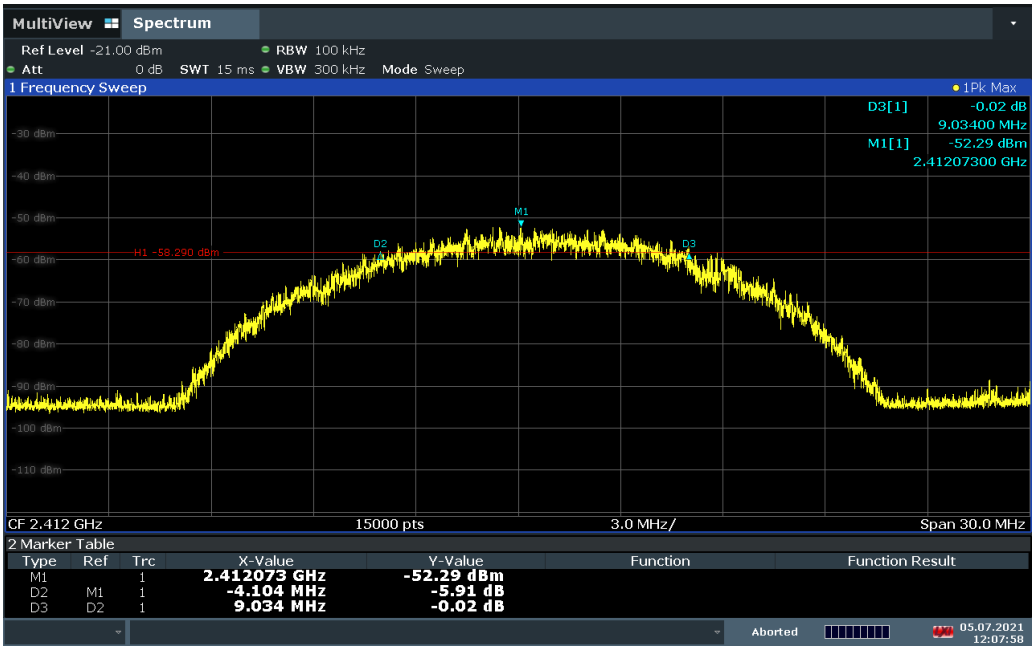
TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)


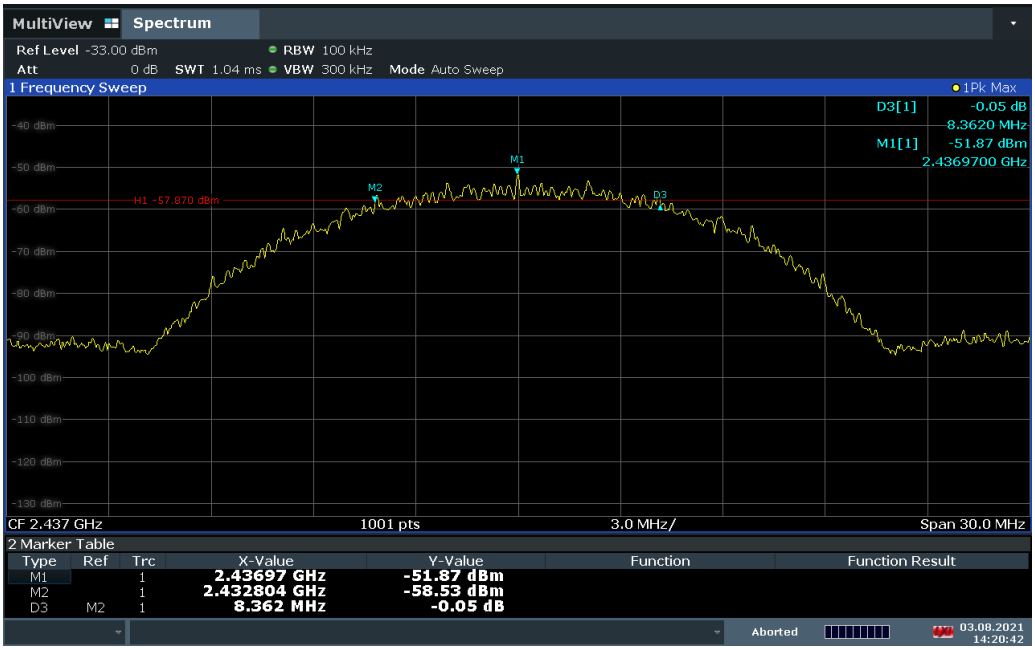
6dB Bandwidth - Graph	
Low channel (Ch #1) / 802.11b	EMI8049
EUT mode:	Tx mode
Test Date:	05/07/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Low channel (Ch #1) / 802.11b			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2412 MHz	100kHz	9.034 MHz	>500kHz

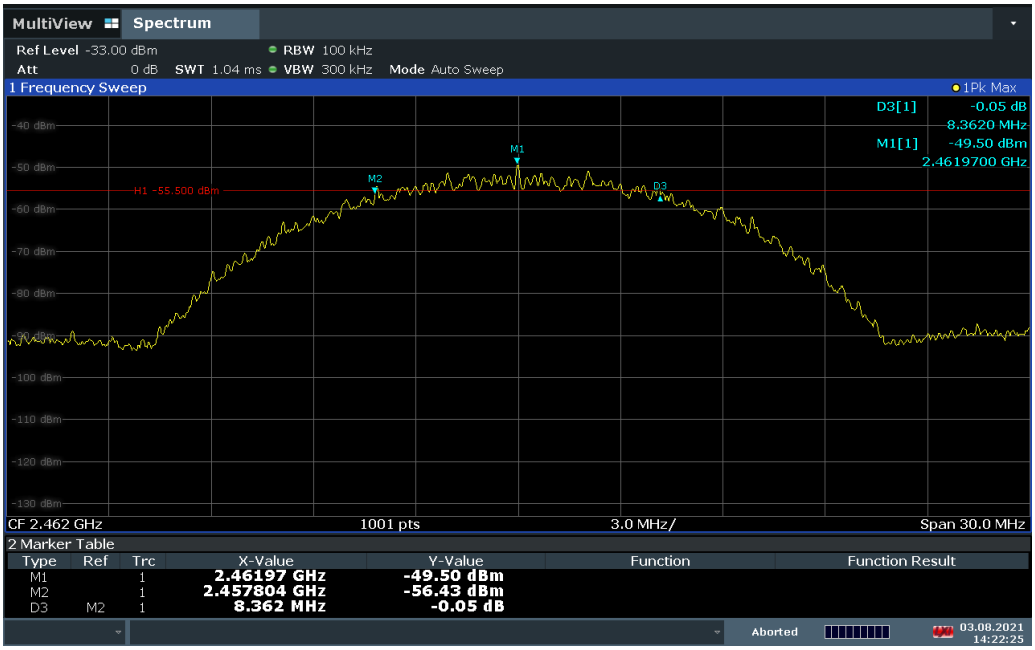
6dB Bandwidth - Graph	
Mid channel (Ch #6) / 802.11b	EMI8050
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Mid channel (Ch #6) / 802.11b			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2437 MHz	100kHz	8.362 MHz	>500kHz

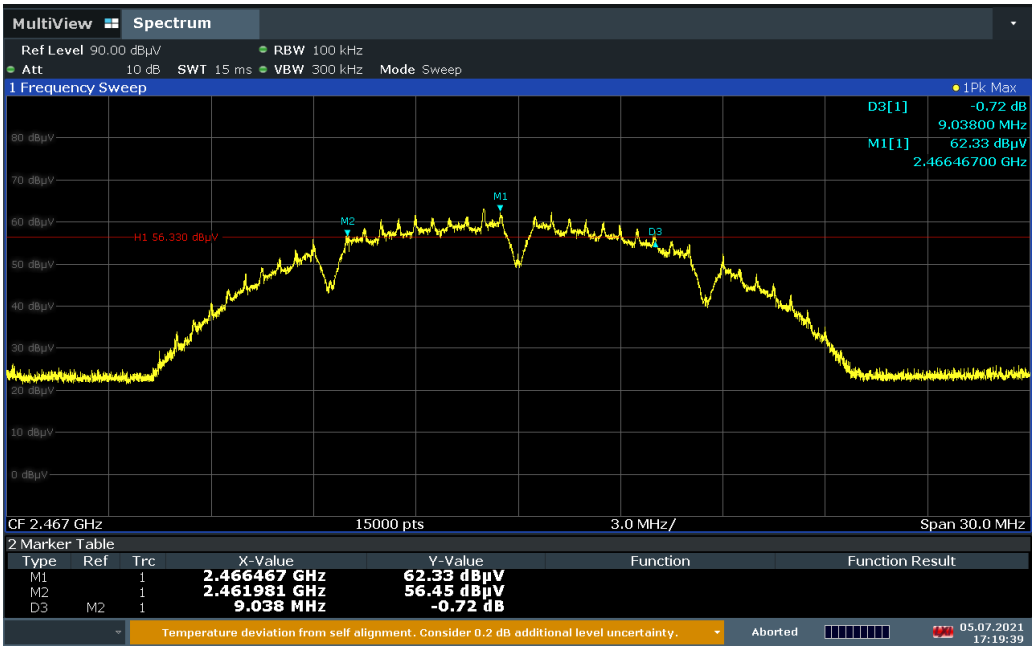
6dB Bandwidth - Graph	
High channel (Ch #11) / 802.11b	EMI8051
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
High channel (Ch #11) / 802.11b			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2462 MHz	100kHz	8.362 MHz	>500kHz

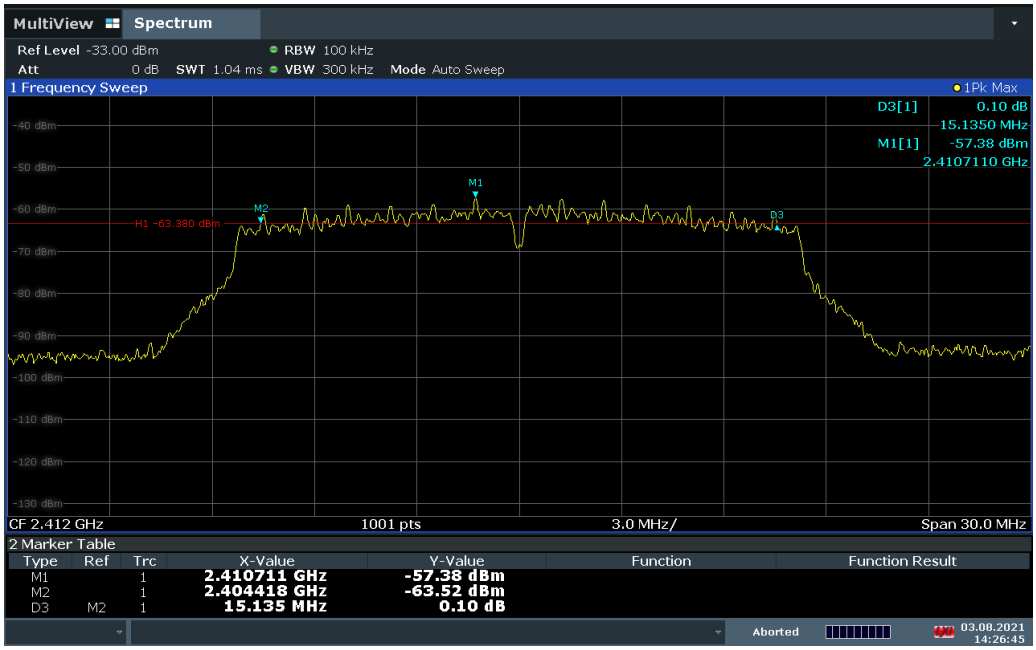
6dB Bandwidth - Graph	
Canada High channel (Ch #12) / 802.11b	EMI8052
EUT mode:	Tx mode
Test Date:	05/07/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Canada High channel (Ch #12) / 802.11b			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2467 MHz	100kHz	9.038 MHz	>500kHz

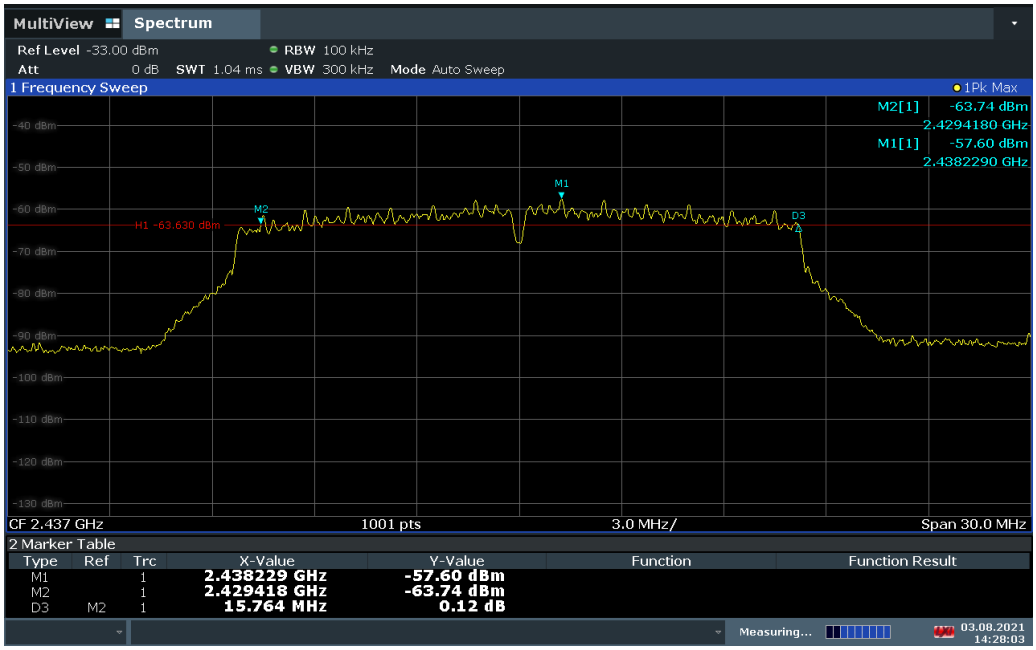
6dB Bandwidth - Graph	
Low channel (Ch #1) / 802.11g	EMI8053
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Low channel (Ch #1) / 802.11g			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2412 MHz	100kHz	15.135 MHz	>500kHz

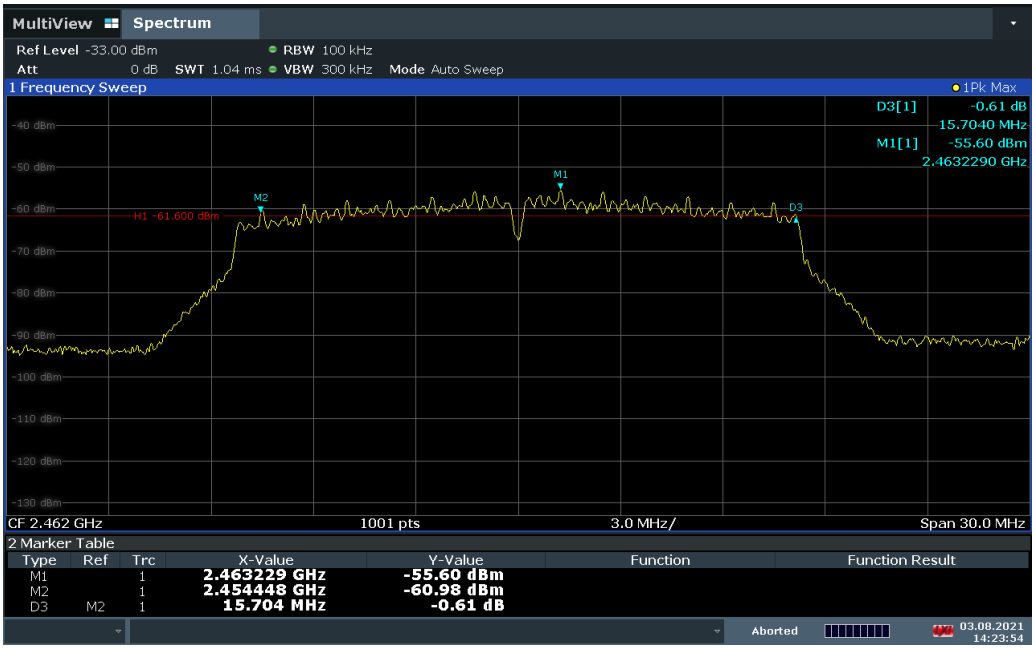
6dB Bandwidth - Graph	
Mid channel (Ch #6) / 802.11g	EMI8054
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Mid channel (Ch #6) / 802.11g			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2437 MHz	100kHz	15.764 MHz	>500kHz

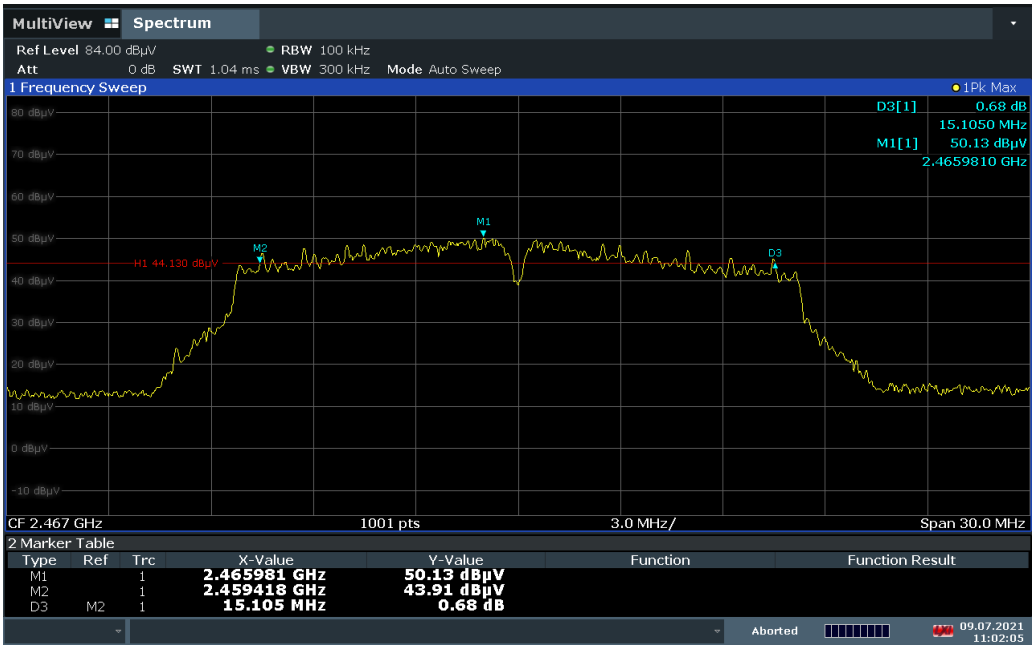
6dB Bandwidth - Graph	
High channel (Ch #11) / 802.11g	EMI8055
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
High channel (Ch #11) / 802.11g			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2462 MHz	100kHz	15.704 MHz	>500kHz

6dB Bandwidth - Graph	
Canada High channel (Ch #12) / 802.11g	EMI8056
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

6dB Bandwith - Tabulated Results			
Canada High channel (Ch #12) / 802.11g			
Frequency	**RBW**	**6 dB Bandwith**	**Limit**
2467 MHz	100kHz	15.105 MHz	>500kHz

8.3. 99% Occupied bandwidth

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	ANSI C63.10 : 2013
Test description: The occupied bandwidth (OBW) is the Frequency Range in which 99 % of the total mean power of a given emission falls. The residual part of the total power being denoted as β, which, in cases of symmetrical spectra, splits up into β/2 on each side of the spectrum. Unless otherwise specified, β/2 is taken as 0,5 %. The maximum occupied bandwidth includes all associated side bands above the appropriate emissions level and the frequency error or drift under extreme test conditions.	

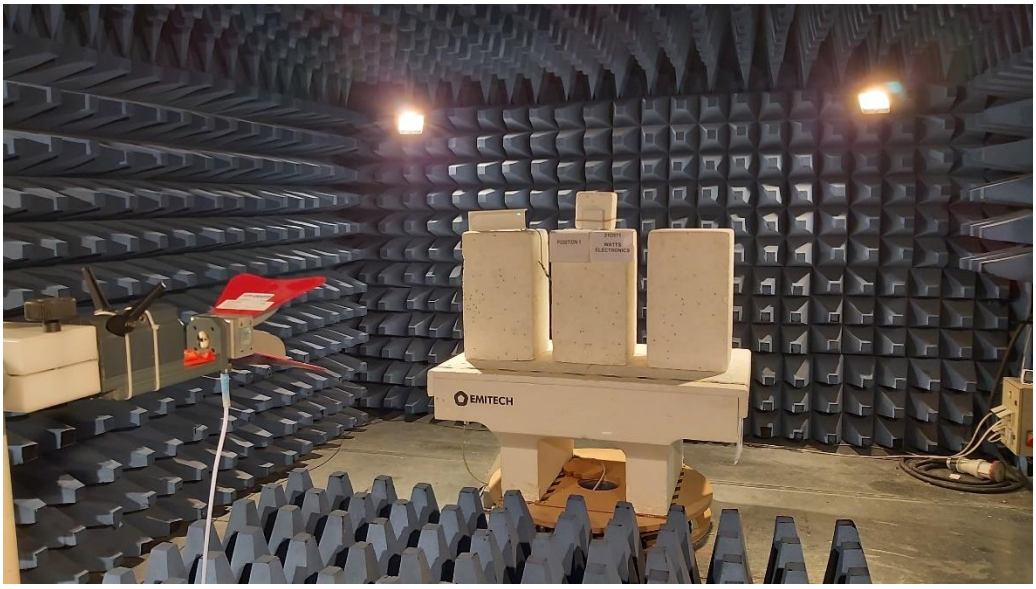
TEST CASE AND CONDITIONS	SEVERITY	RESULT TAB.	VERDICT
Low channel (Ch #1) / 802.11b	Within 2400MHz to 2483.5MHz	EMI8057	**PASS**
Mid channel (Ch #6) / 802.11b	Within 2400MHz to 2483.5MHz	EMI8058	**PASS**
High channel (Ch #11) / 802.11b	Within 2400MHz to 2483.5MHz	EMI8059	**PASS**
Canada High channel (Ch #12) / 802.11b	Within 2400MHz to 2483.5MHz	EMI8060	**PASS**
Low channel (Ch #1) / 802.11g	Within 2400MHz to 2483.5MHz	EMI8061	**PASS**
Mid channel (Ch #6) / 802.11g	Within 2400MHz to 2483.5MHz	EMI8062	**PASS**
High channel (Ch #11) / 802.11g	Within 2400MHz to 2483.5MHz	EMI8063	**PASS**
Canada High channel (Ch #12) / 802.11g	Within 2400MHz to 2483.5MHz	EMI8064	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	22.6 °C
Relative Humidity	20 to 75 %	58.3 %
Atmospheric pressure	N/A	1004 hPa
Test method deviation: N/A		
Supplementary information:		

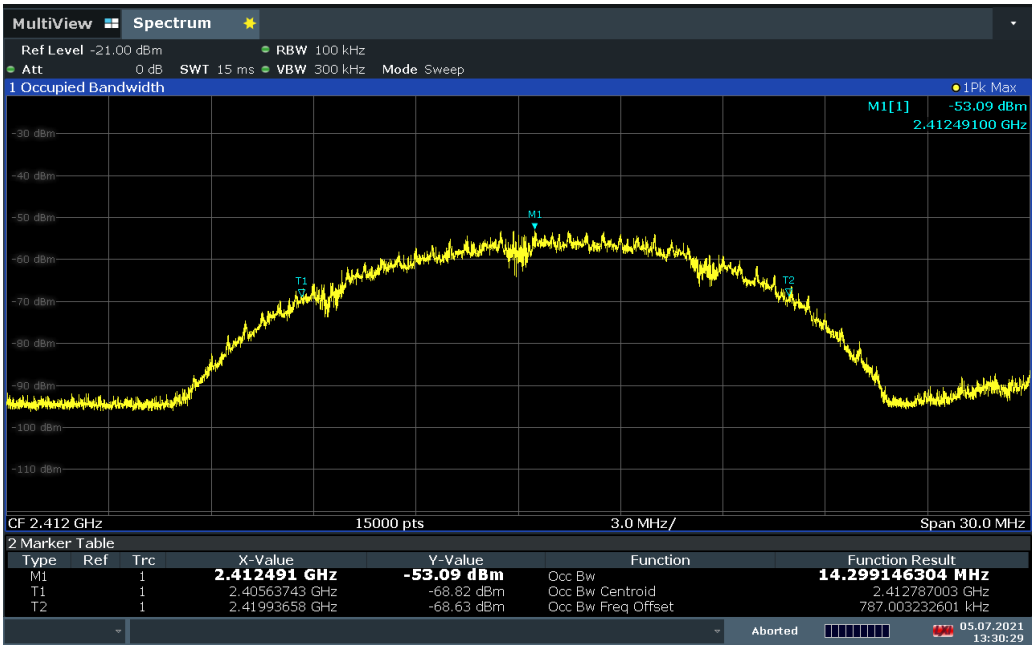
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322		
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023

Blank cells = Permanent validity

TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)


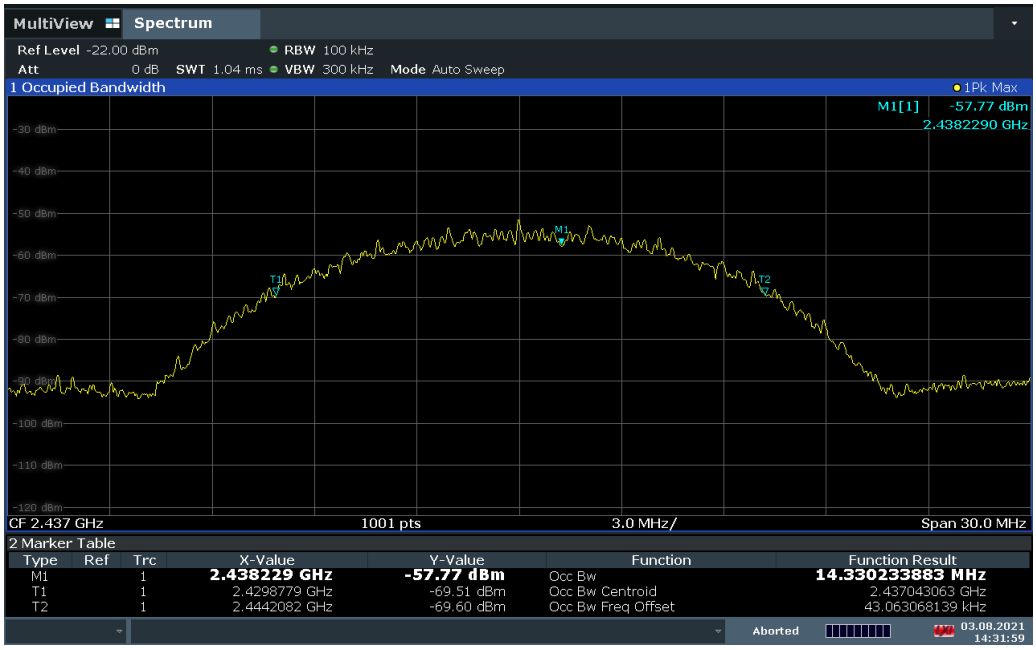
OCCUPIED BANDWIDTH - GRAPH	
LOW CHANNEL (CH #1) / 802.11B	EMI8057
EUT mode:	Tx mode
Test Date:	05/07/2021
Test Operator:	ATO



EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
LOW CHANNEL (CH #1) / 802.11B			
f_{Low}	f_{High}	OBW 99%	Limit
2405.637 MHz	2419.936 MHz	14.299 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

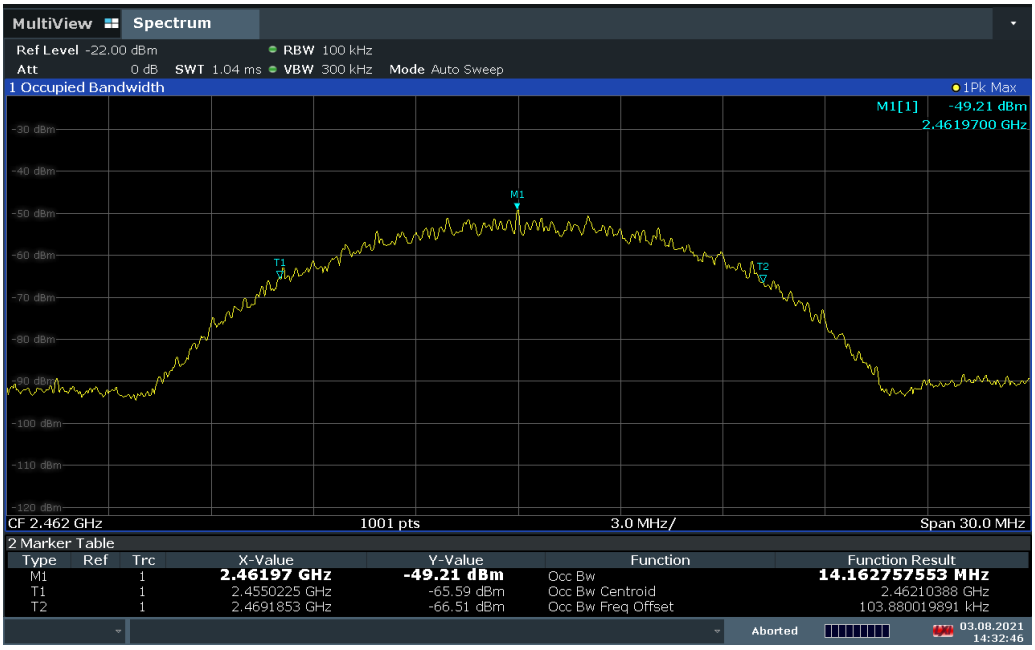
OCCUPIED BANDWIDTH - GRAPH	
MID CHANNEL (CH #6) / 802.11B	EMI8058
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
MID CHANNEL (CH #6) / 802.11B			
f_{Low}	f_{High}	OBW 99%	Limit
2429.877 MHz	2444.208 MHz	14.330 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

OCCUPIED BANDWIDTH - GRAPH	
HIGH CHANNEL (CH #11) / 802.11B	EMI8059
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

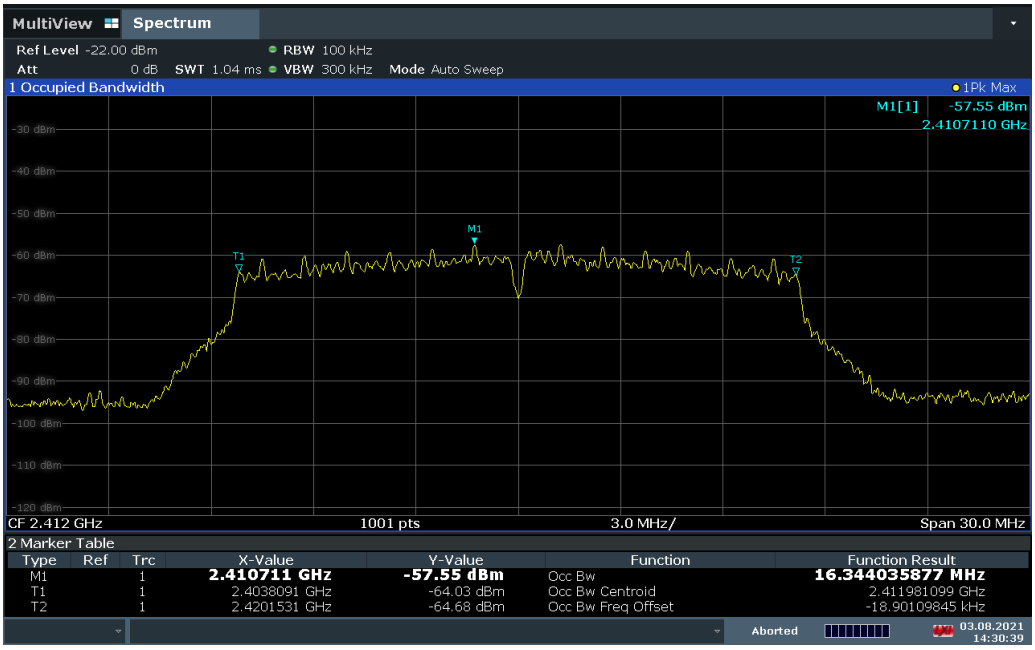
OCCUPIED BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL (CH #11) / 802.11B			
f_{Low}	f_{High}	OBW 99%	Limit
2455.022 MHz	2469.185 MHz	14.162 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

OCCUPIED BANDWIDTH - GRAPH	
CANADA HIGH CHANNEL (CH #12) / 802.11B	EMI8060
EUT mode:	Tx mode
Test Date:	05/07/2021
Test Operator:	ATO

EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
CANADA HIGH CHANNEL (CH #12) / 802.11B			
f_{Low}	f_{High}	OBW 99%	Limit
2459.451 MHz	2473.739 MHz	14.288 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

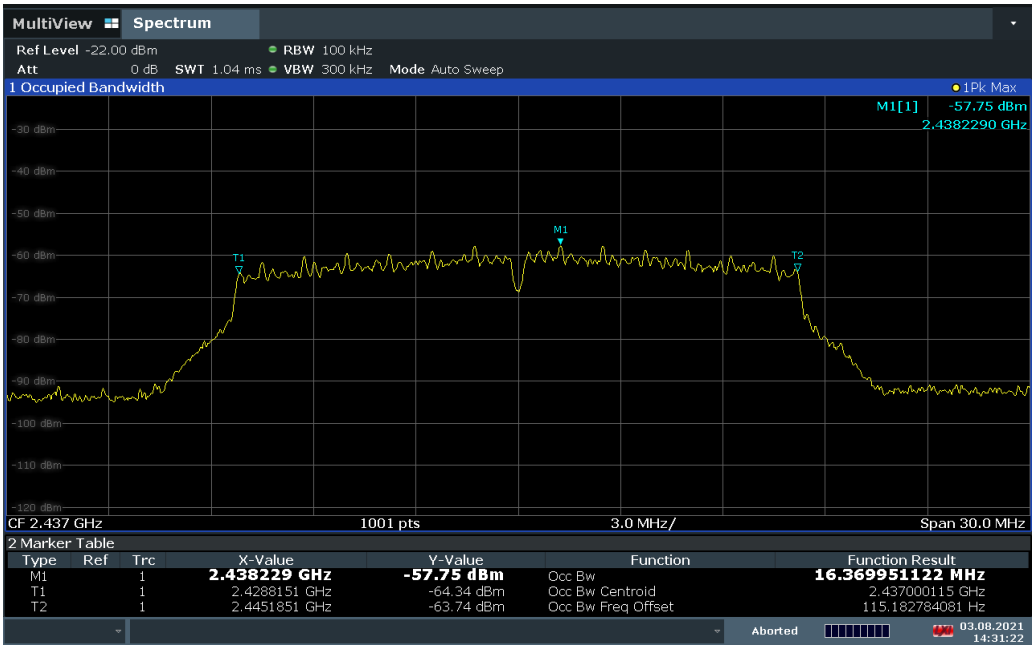
OCCUPIED BANDWIDTH - GRAPH	
LOW CHANNEL (CH #1) / 802.11G	EMI8061
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
LOW CHANNEL (CH #1) / 802.11G			
f_{Low}	f_{High}	OBW 99%	Limit
2403.809 MHz	2420.153 MHz	16.354 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

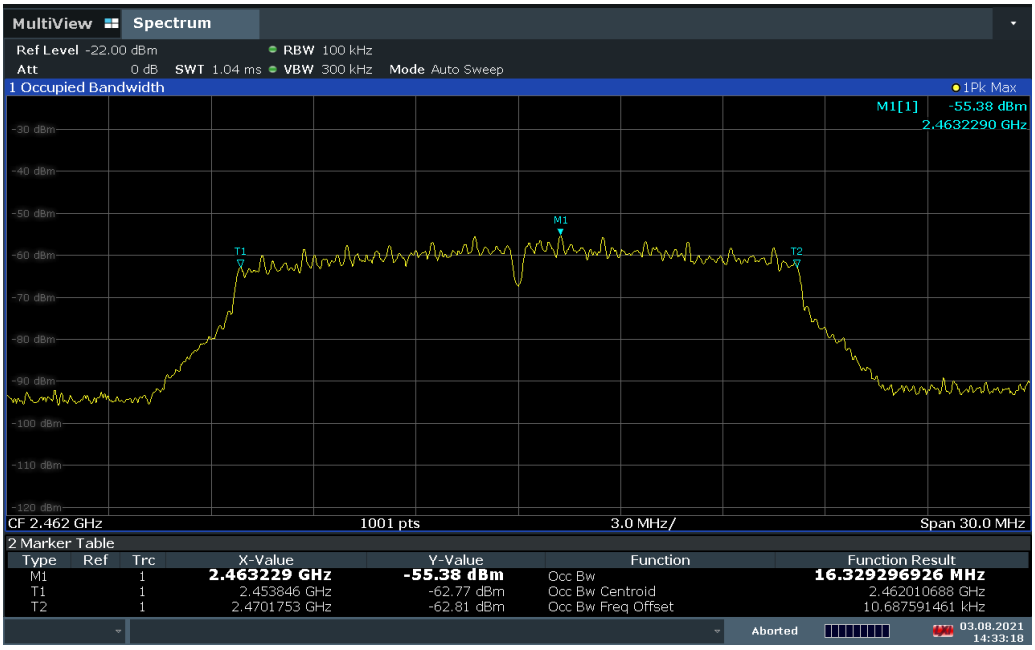
OCCUPIED BANDWIDTH - GRAPH	
MID CHANNEL (CH #6) / 802.11G	EMI8062
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
MID CHANNEL (CH #6) / 802.11G			
f_{Low}	f_{High}	OBW 99%	Limit
2428.815 MHz	2445.185 MHz	16.369 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

OCCUPIED BANDWIDTH - GRAPH	
HIGH CHANNEL (CH #11) / 802.11G	EMI8063
EUT mode:	Tx mode
Test Date:	03/08/2021
Test Operator:	ATO



EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL (CH #11) / 802.11G			
f_{Low}	f_{High}	OBW 99%	Limit
2453.846 MHz	2470.175 MHz	16.329 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

OCCUPIED BANDWIDTH - GRAPH	
CANADA HIGH CHANNEL (CH #12) / 802.11G	EMI8064
EUT mode:	Tx mode
Test Date:	09/07/2021
Test Operator:	ATO

EUT modification(s): N/A

OCCUPIED BANDWIDTH - TABULATED RESULTS			
CANADA HIGH CHANNEL (CH #12) / 802.11G			
f_{Low}	f_{High}	OBW 99%	Limit
2458.821 MHz	2475.059 MHz	16.238 MHz	Flow > 2400MHz Fhigh < 2483.5 MHz

8.4. Maximum effective isotropic radiated power

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247

Test description: EUT is set on an insulating support at 150cm above the ground reference plane.

Measurement are done on a normalized test site by the substitution method.

The test antenna is oriented in the two polarizations (vertical and horizontal), and the product is rotated at 360° in the horizontal plane (See photo(s) for initial position of the EUT(0°)). If applicable the test antenna was raised and lowered through the specified range of height until a maximum signal level is detected.

For portable equipements a research of maximum level is done on the 3 axes. Only the highest levels are recorded.

Then EUT is set inside the climatic enclosure. Measurements are repeated in extreme test conditions with the carrier level correlated with the maximum carrier level measured in normal conditions. EUT is powered by a stabilized power supply.

Tested Configuration	Parameter	Severity	Result Tab.	Verdict
RF Output Power / Low channel (Ch #1) / 802.11b	2.362GHz-2.462GHz	1W (30dBm)	EMI4523	**PASS**
RF Output Power / Mid channel (Ch #6) / 802.11b	2.387GHz-2.487GHz	1W (30dBm)	EMI5042	**PASS**
RF Output Power / High channel (Ch #11) / 802.11b	2.412GHz-2.512GHz	1W (30dBm)	EMI5043	**PASS**
RF Output Power / Canada High channel (Ch #12) / 802.11b	2.417GHz-2.517GHz	1W (30dBm)	EMI4549	**PASS**
RF Output Power / Low channel (Ch #1) / 802.11g	2.362GHz-2.462GHz	1W (30dBm)	EMI5044	**PASS**
RF Output Power / Mid channel (Ch #6) / 802.11g	2.387GHz-2.487GHz	1W (30dBm)	EMI5092	**PASS**
RF Output Power / High channel (Ch #11) / 802.11g	2.412GHz-2.512GHz	1W (30dBm)	EMI5093	**PASS**
RF Output Power / Canada High channel (Ch #12) / 802.11g	2.417GHz-2.517GHz	1W (30dBm)	EMI5045	**PASS**

Laboratory parameters:	Required prior to the test	During the test
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: N/A		

Test equipment used					
Category	**Brand**	**Type**	**Identifier**	**Cal. Date**	**Cal. Due**
AC power source	KIKUSUI	PCR 4000L	15322		
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Attenuator	EMITECH	SUB.V2-H	14495	13/01/2021	13/03/2022
Attenuator	EMITECH	SUB.V2-V	14496	13/01/2021	13/03/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023

Blank cells = Permanent validity

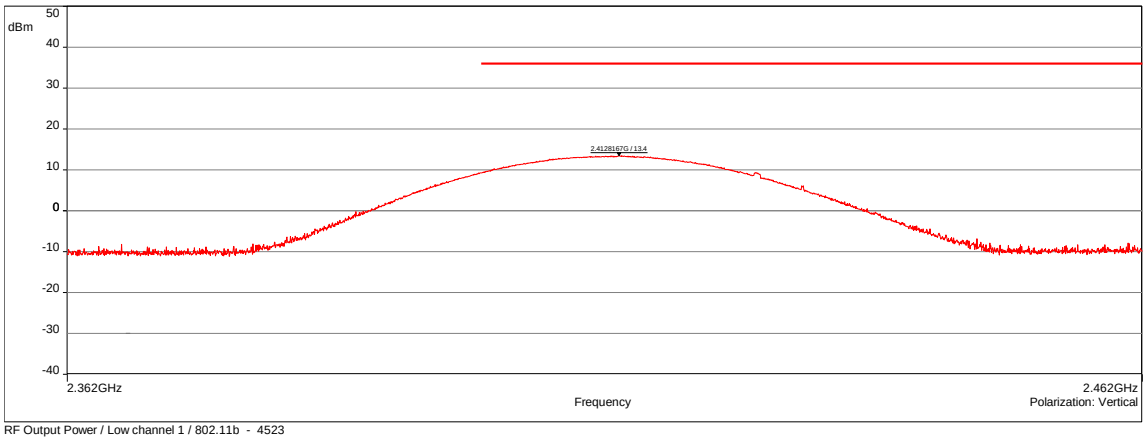
TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / LOW CHANNEL (CH #1) / 802.11B		EMI4523	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	05/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

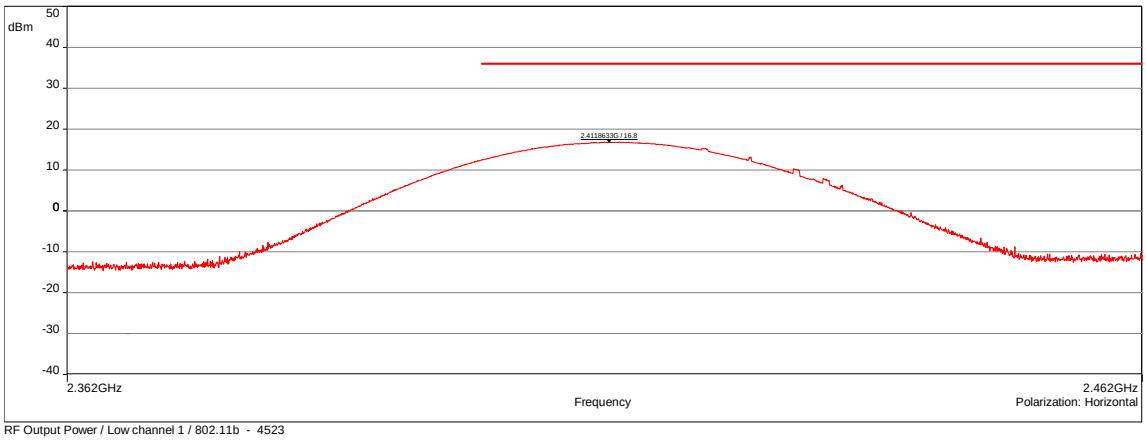
Sub-range 1
Frequencies: 2.362 GHz - 2.462 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / Low channel 1 / 802.11b - 4523

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.362 GHz - 2.462 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m



RF Output Power / Low channel 1 / 802.11b - 4523

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.362GHz-2.462GHz	20MHz	60MHz	Peak
Horizontal	2.362GHz-2.462GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

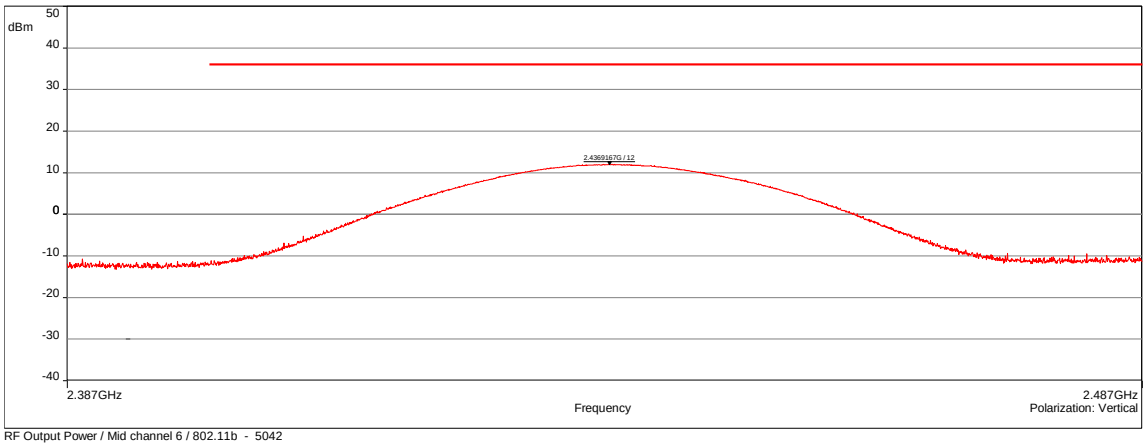
EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / LOW CHANNEL (CH #1) / 802.11B			EMI4523
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2412.81	Vertical	13.4	36
2411.86	Horizontal	16.8	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / MID CHANNEL (CH #6) / 802.11B		EMI5042	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	08/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

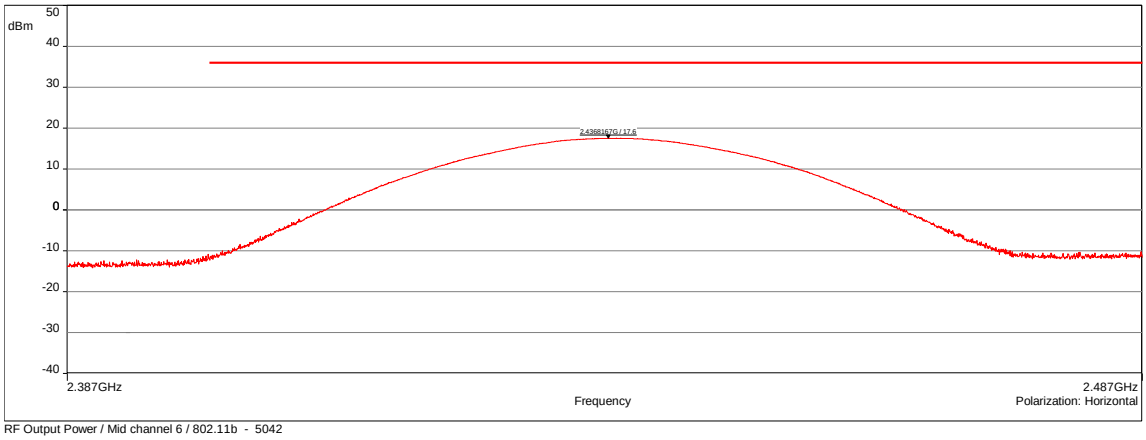
Sub-range 1
Frequencies: 2.387 GHz - 2.487 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / Mid channel 6 / 802.11b - 5042

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.387 GHz - 2.487 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m

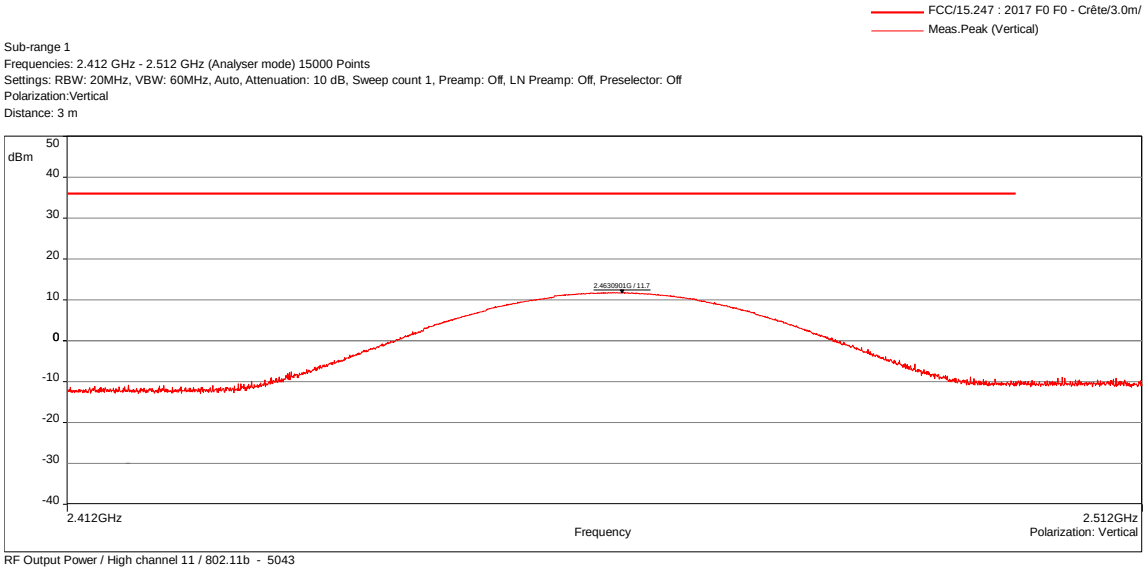


RF Output Power / Mid channel 6 / 802.11b - 5042

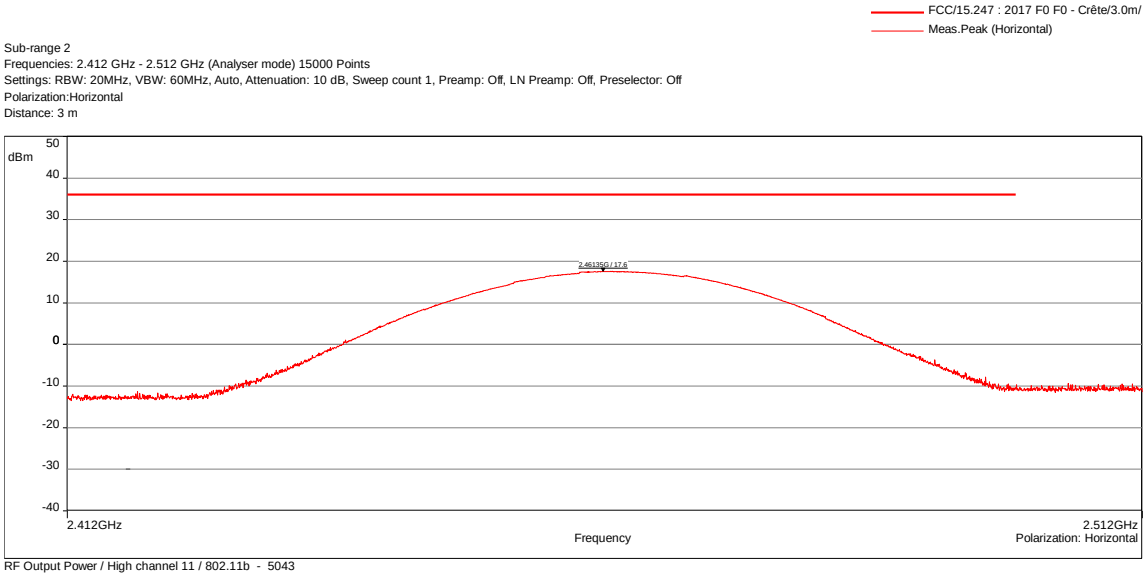
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.387GHz-2.487GHz	20MHz	60MHz	Peak
Horizontal	2.387GHz-2.487GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / MID CHANNEL (CH #6) / 802.11B			EMI5042
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2436.91	Vertical	12.0	36
2436.81	Horizontal	17.6	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / HIGH CHANNEL (CH #11) / 802.11B		EMI5043	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	08/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006



RF Output Power / High channel 11 / 802.11b - 5043



RF Output Power / High channel 11 / 802.11b - 5043

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.412GHz-2.512GHz	20MHz	60MHz	Peak
Horizontal	2.412GHz-2.512GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

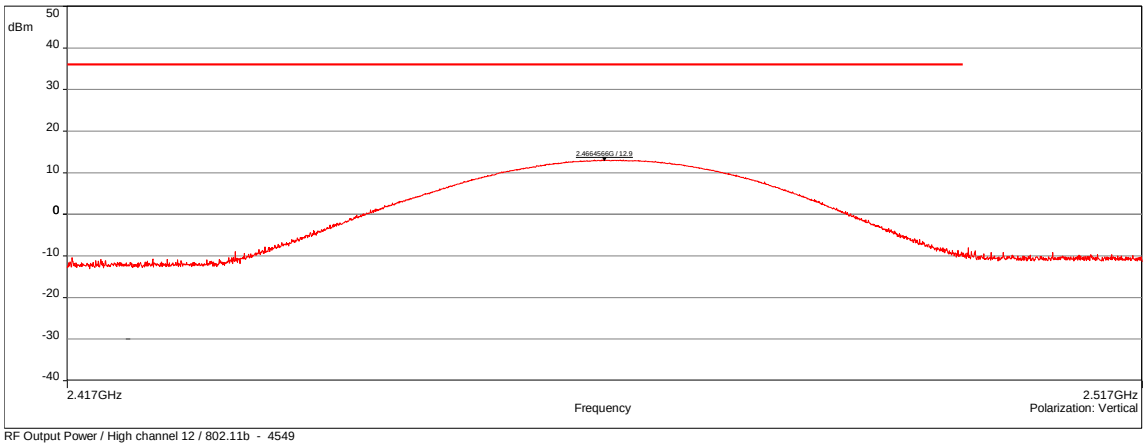
EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / HIGH CHANNEL (CH #11) / 802.11B			EMI5043
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2463.09	Vertical	11.7	36
2461.35	Horizontal	17.6	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / CANADA HIGH CHANNEL (CH #12) / 802.11B		EMI4549	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	05/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

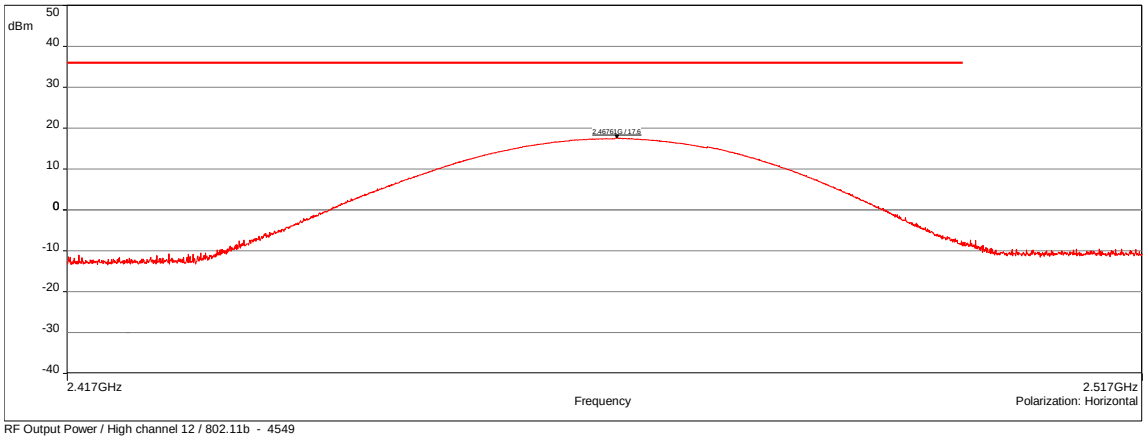
Sub-range 1
Frequencies: 2.417 GHz - 2.517 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / High channel 12 / 802.11b - 4549

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.417 GHz - 2.517 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m



RF Output Power / High channel 12 / 802.11b - 4549

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.417GHz-2.517GHz	20MHz	60MHz	Peak
Horizontal	2.417GHz-2.517GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

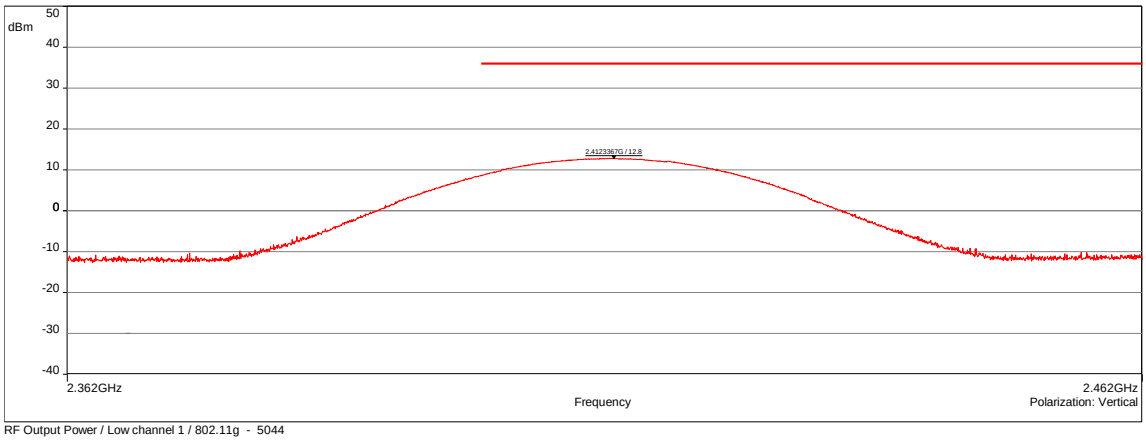
EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / CANADA HIGH CHANNEL (CH #12) / 802.11B			EMI4549
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2466.45	Vertical	12.9	36
2467.61	Horizontal	17.6	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / LOW CHANNEL (CH #1) / 802.11G		EMI5044	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	03/08/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

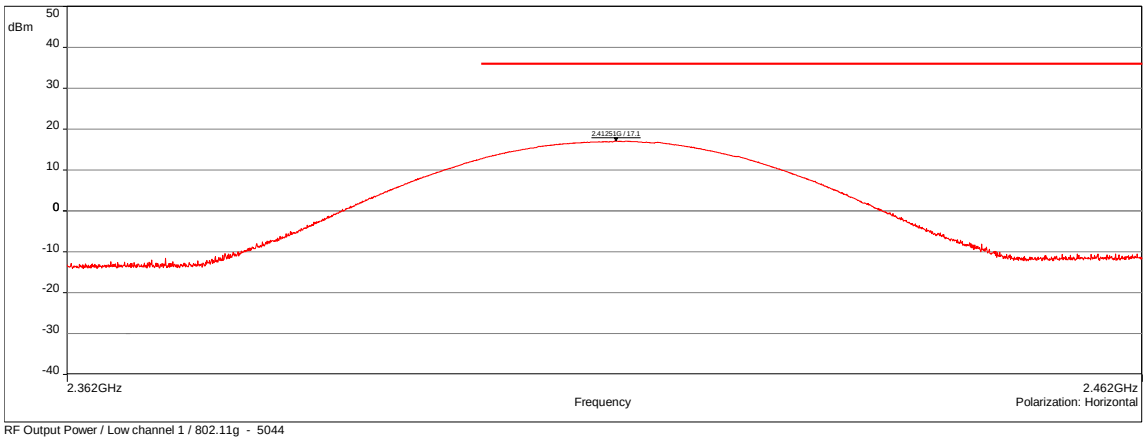
Sub-range 1
Frequencies: 2.362 GHz - 2.462 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / Low channel 1 / 802.11g - 5044

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.362 GHz - 2.462 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m



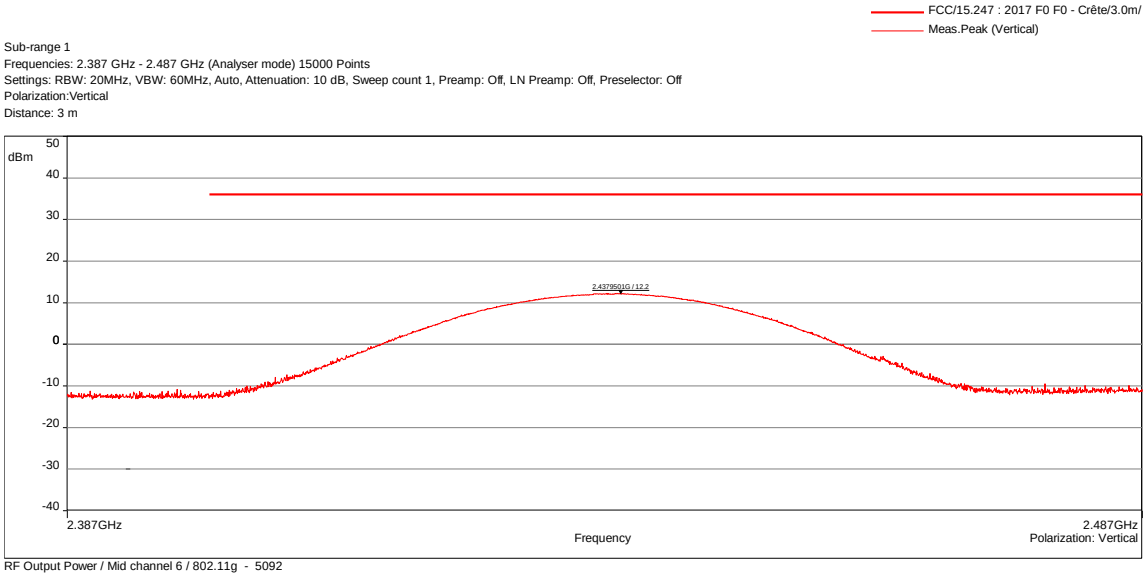
RF Output Power / Low channel 1 / 802.11g - 5044

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.362GHz-2.462GHz	20MHz	60MHz	Peak
Horizontal	2.362GHz-2.462GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

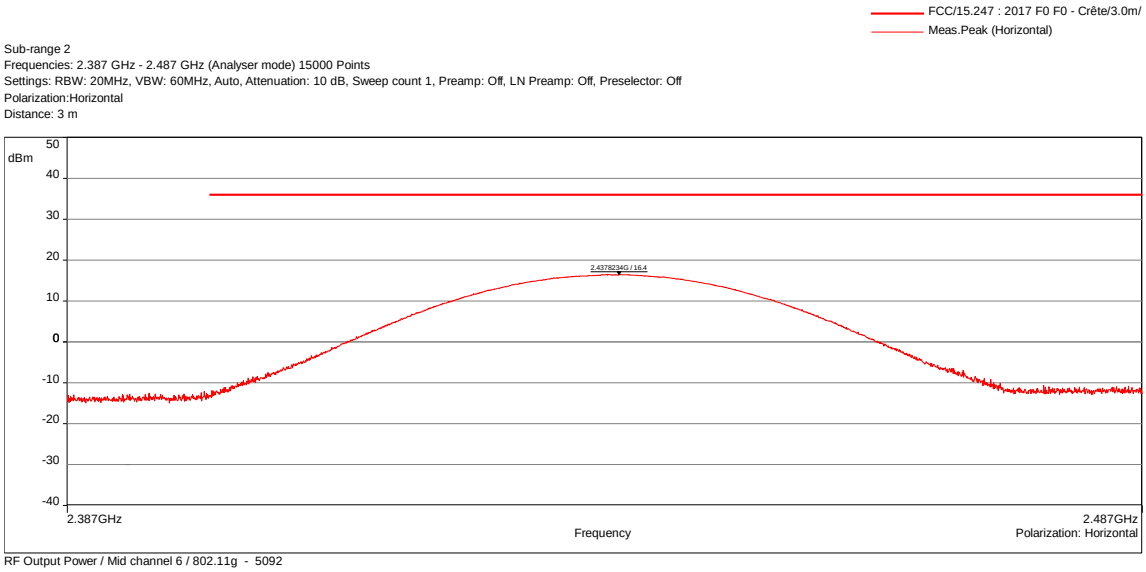
EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / LOW CHANNEL (CH #1) / 802.11G			EMI5044
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2412.33	Vertical	12.8	36
2412.51	Horizontal	17.1	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / MID CHANNEL (CH #6) / 802.11G		EMI5092	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	03/08/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006



RF Output Power / Mid channel 6 / 802.11g - 5092



RF Output Power / Mid channel 6 / 802.11g - 5092

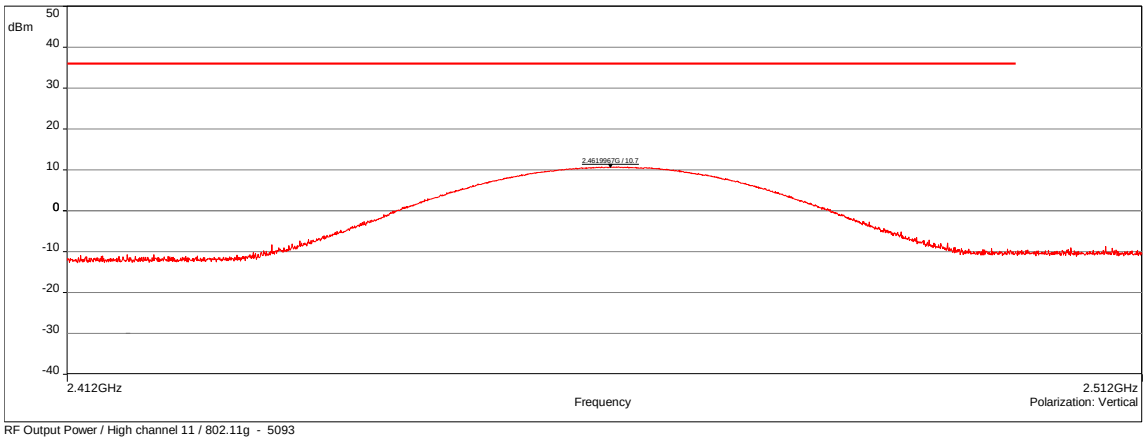
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.387GHz-2.487GHz	20MHz	60MHz	Peak
Horizontal	2.387GHz-2.487GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / MID CHANNEL (CH #6) / 802.11G			EMI5092
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2437.95	Vertical	12.2	36
2437.82	Horizontal	16.4	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / HIGH CHANNEL (CH #11) / 802.11G		EMI5093	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	03/08/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

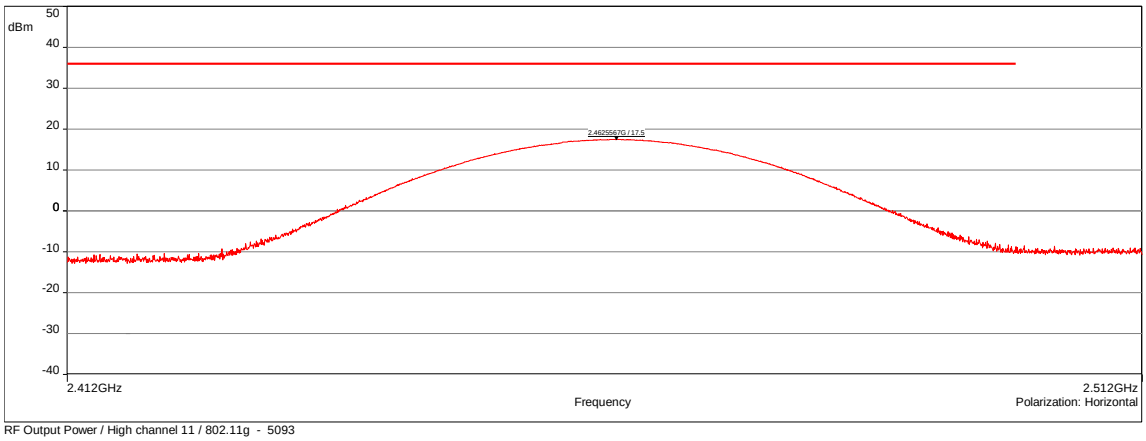
Sub-range 1
Frequencies: 2.412 GHz - 2.512 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / High channel 11 / 802.11g - 5093

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.412 GHz - 2.512 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m



RF Output Power / High channel 11 / 802.11g - 5093

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.412GHz-2.512GHz	20MHz	60MHz	Peak
Horizontal	2.412GHz-2.512GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

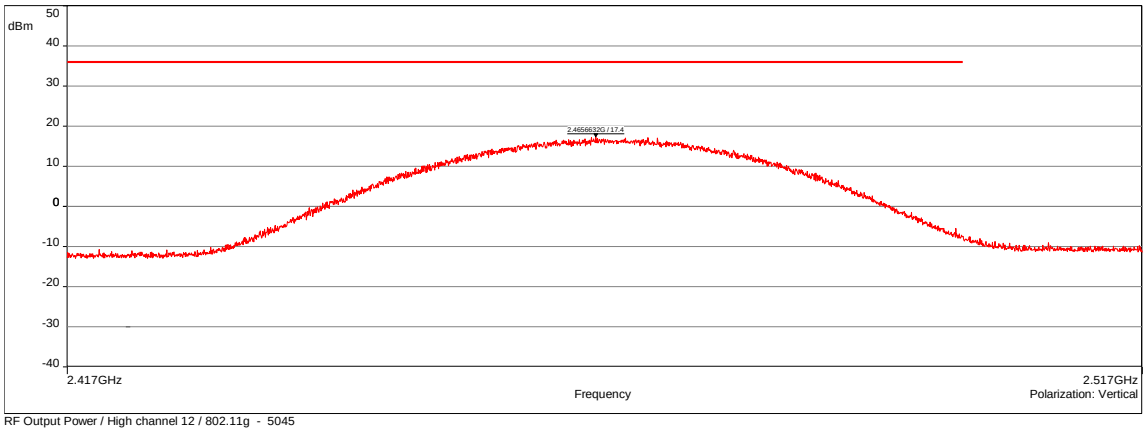
EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / HIGH CHANNEL (CH #11) / 802.11G			EMI5093
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2461.99	Vertical	10.7	36
2462.55	Horizontal	17.5	36

EFFECTIVE ISOTROPIC RADIATED POWER - GRAPH			
RF OUTPUT POWER / CANADA HIGH CHANNEL (CH #12) / 802.11G		EMI5045	
EUT mode:	Unmodulated Tx	**T (°C):**	24.3
Test Date:	08/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1006

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Vertical)

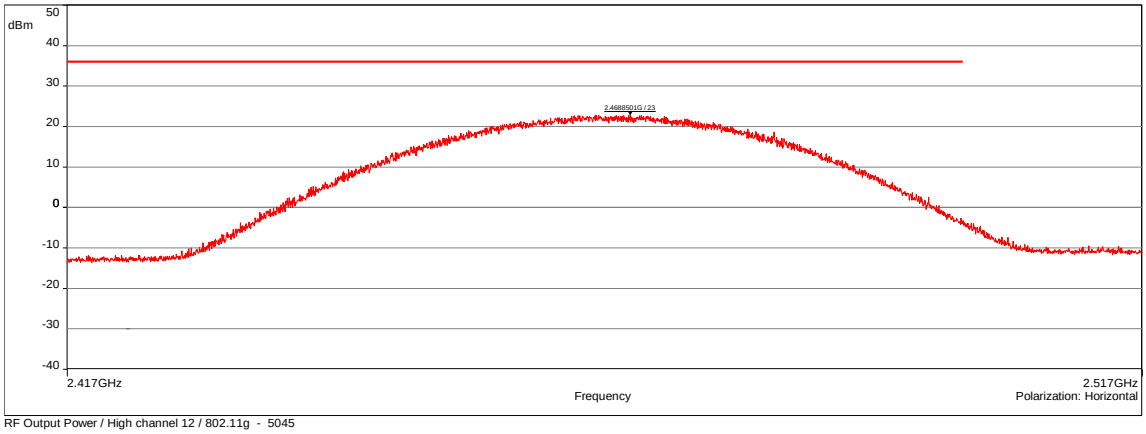
Sub-range 1
Frequencies: 2.417 GHz - 2.517 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Vertical
Distance: 3 m



RF Output Power / High channel 12 / 802.11g - 5045

FCC/15.247 : 2017 F0 F0 - Crête/3.0m/
Meas.Peak (Horizontal)

Sub-range 2
Frequencies: 2.417 GHz - 2.517 GHz (Analyser mode) 15000 Points
Settings: RBW: 20MHz, VBW: 60MHz, Auto, Attenuation: 10 dB, Sweep count 1, Preamp: Off, LN Preamp: Off, Preselector: Off
Polarization:Horizontal
Distance: 3 m



RF Output Power / High channel 12 / 802.11g - 5045

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.417GHz-2.517GHz	20MHz	60MHz	Peak
Horizontal	2.417GHz-2.517GHz	20MHz	60MHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS			
RF OUTPUT POWER / CANADA HIGH CHANNEL (CH #12) / 802.11G			EMI5045
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2465.66	Vertical	17.4	36
2468.85	Horizontal	23.0	36

8.5. Band-edge compliance

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 subclause d) and RSS-247

Test description: d)

In any 100 kHz bandwidth outside the frequency band in which the 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

EUT is connected to the measuring receiver via 50Ω attenuator(s).Only the highest levels are recorded.

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Radiated measurement / Band Edge / Low channel / 802.11b	2.38GHz-2.5GHz	>20dBc	EMI4526	**PASS**
Radiated measurement / Band Edge / Low channel / 802.11g	2.38GHz-2.5GHz	>20dBc	EMI5099	**PASS**
Radiated measurement / Band Edge / Mid channel (Ch #6) / 802.11b	2.38GHz-2.5GHz	>20dBc	EMI5103	**PASS**
Radiated measurement / Band Edge / Mid channel (Ch #6) / 802.11g	2.38GHz-2.5GHz	>20dBc	EMI5101	**PASS**
Radiated measurement / Band Edge / High channel (Ch #11) / 802.11b	2.38GHz-2.5GHz	>20dBc	EMI5105	**PASS**
Radiated measurement / Band Edge / High channel (Ch #11) / 802.11g	2.38GHz-2.5GHz	>20dBc	EMI5107	**PASS**
Radiated measurement / Band Edge / Canada High channel (Ch #12) / 802.11b	2.38GHz-2.5GHz	>20dBc	EMI4553	**PASS**
Radiated measurement / Band Edge / Canada High channel (Ch #12) / 802.11g	2.38GHz-2.5GHz	>20dBc	EMI5047	**PASS**

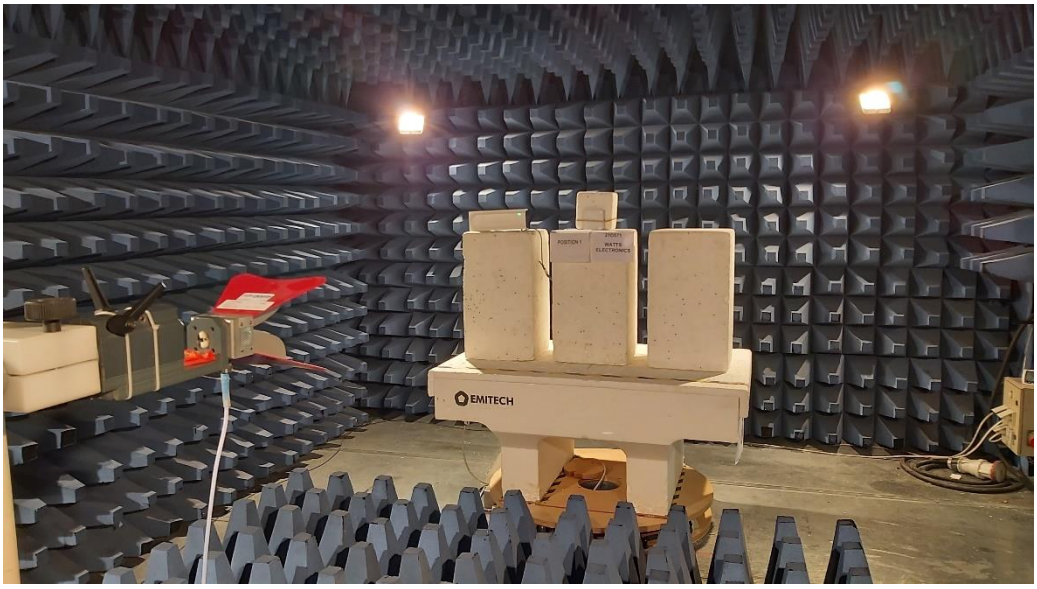
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322		
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022

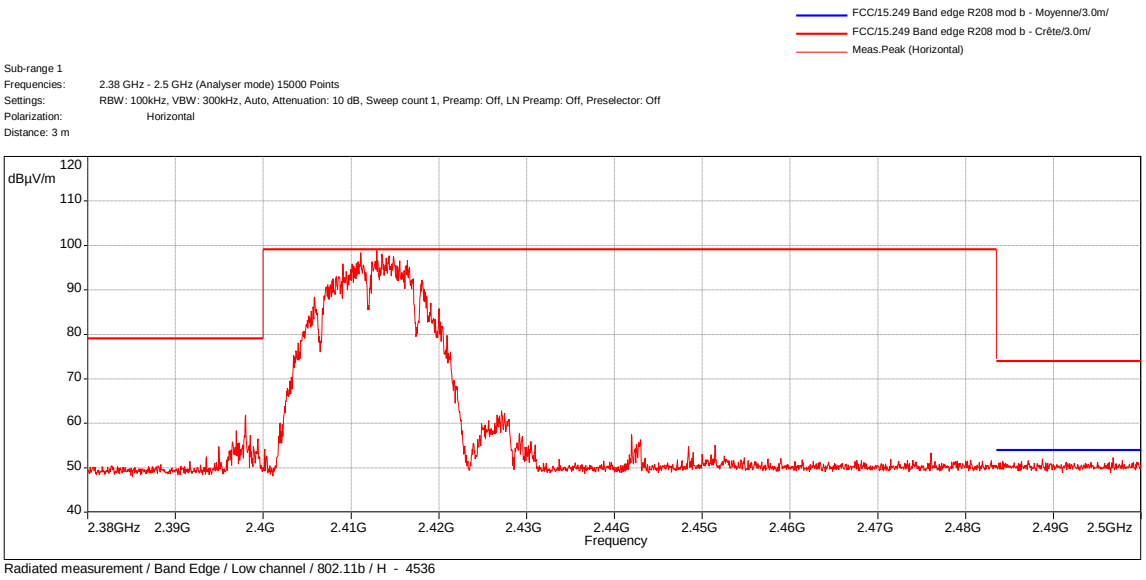
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

BAT-EMC software version: V3.18.0.26 Blank cells = Permanent validity

TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)


BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / LOW CHANNEL (CH #1) / 802.11B		EMI4526	
EUT mode:	Tx mode	**T (°C):**	25.6
Test Date:	05/07/2021	**H (%):**	43.8
Test Operator:	ATO	**P (hPa):**	1010

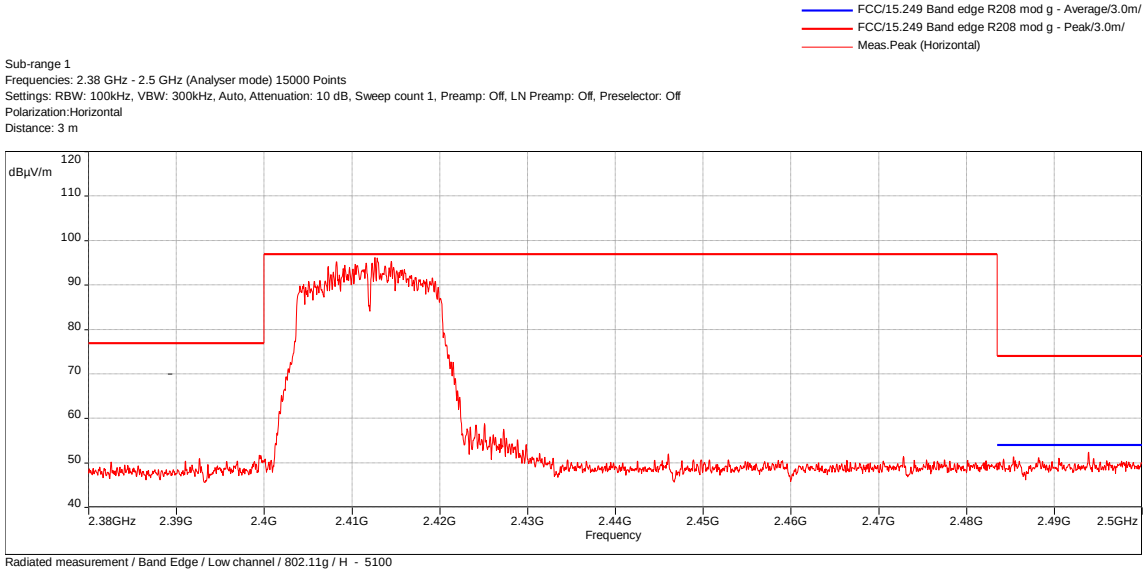


Radiated measurement / Band Edge / Low channel / 802.11b / H - 4536

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE /LOW CHANNEL (CH #1) / 802.11G		EMI5099	
EUT mode:	Tx mode	**T (°C):**	23.6
Test Date:	03/08/2021	**H (%):**	44.8
Test Operator:	ATO	**P (hPa):**	1007

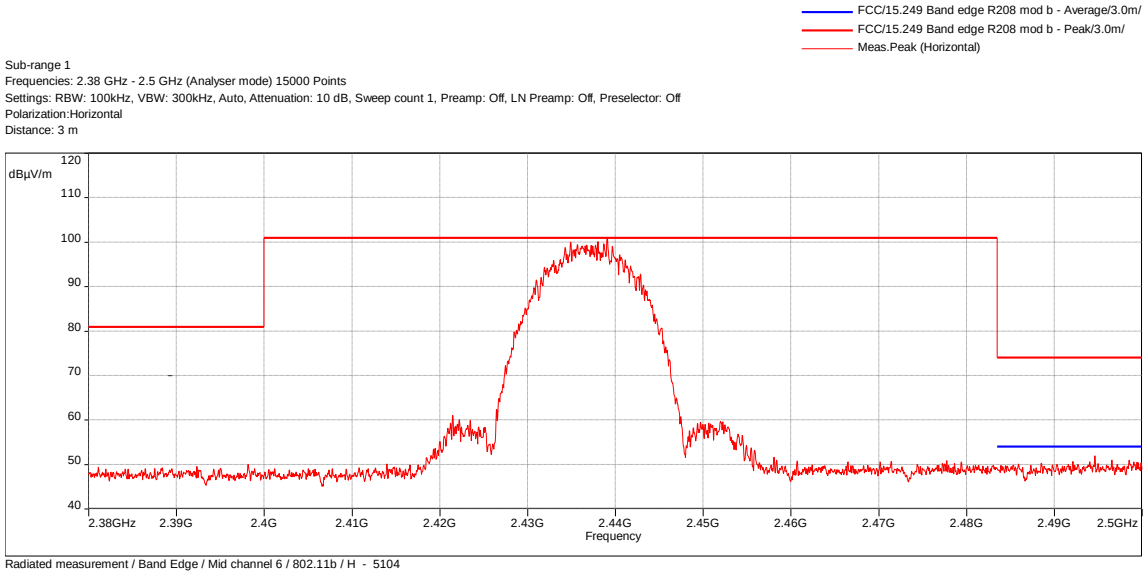


Radiated measurement / Band Edge / Low channel / 802.11g / H - 5100

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

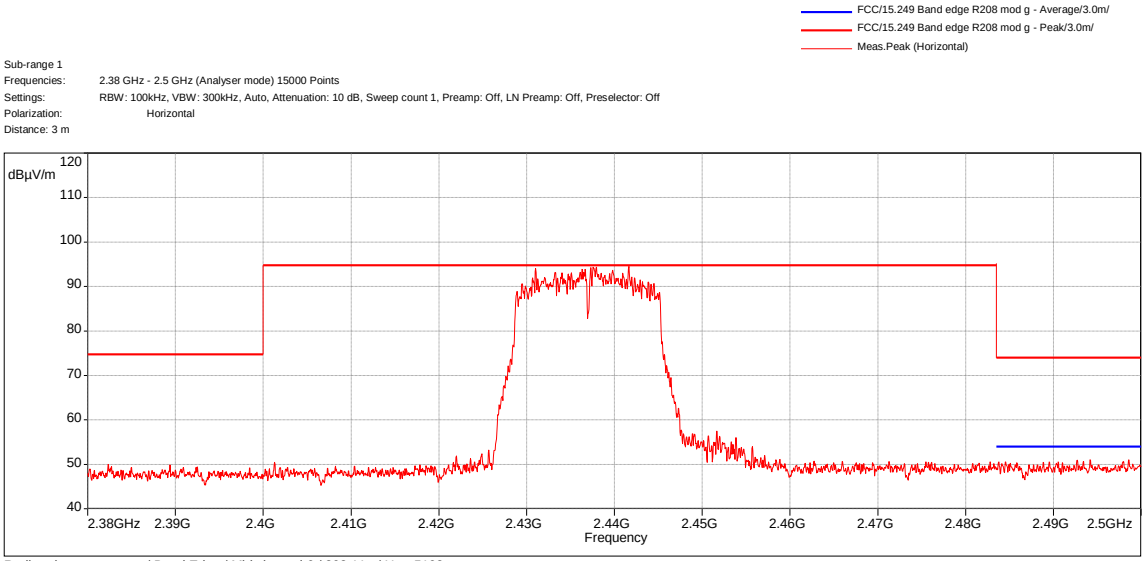
BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / MID CHANNEL (CH #6) / 802.11B		EMI5103	
EUT mode:	Tx mode	**T (°C):**	23.6
Test Date:	03/08/2021	**H (%):**	44.8
Test Operator:	ATO	**P (hPa):**	1007



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / MID CHANNEL (CH #6) / 802.11G		EMI5101	
EUT mode:	Tx mode	**T (°C):**	23.6
Test Date:	03/08/2021	**H (%):**	44.8
Test Operator:	ATO	**P (hPa):**	1007

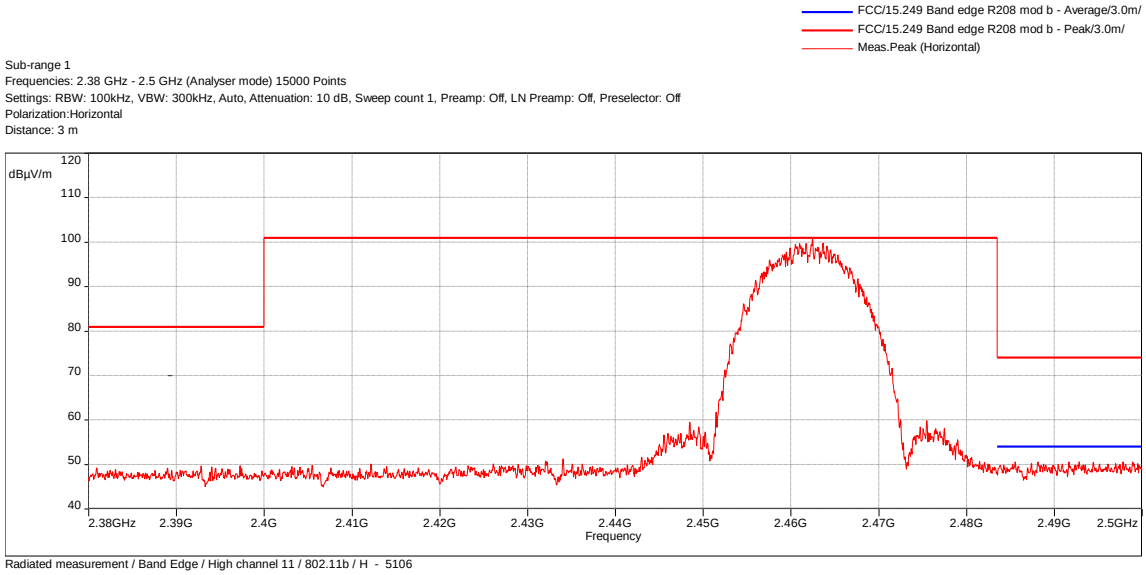


Radiated measurement / Band Edge / Mid channel 6 / 802.11g / H - 5102

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

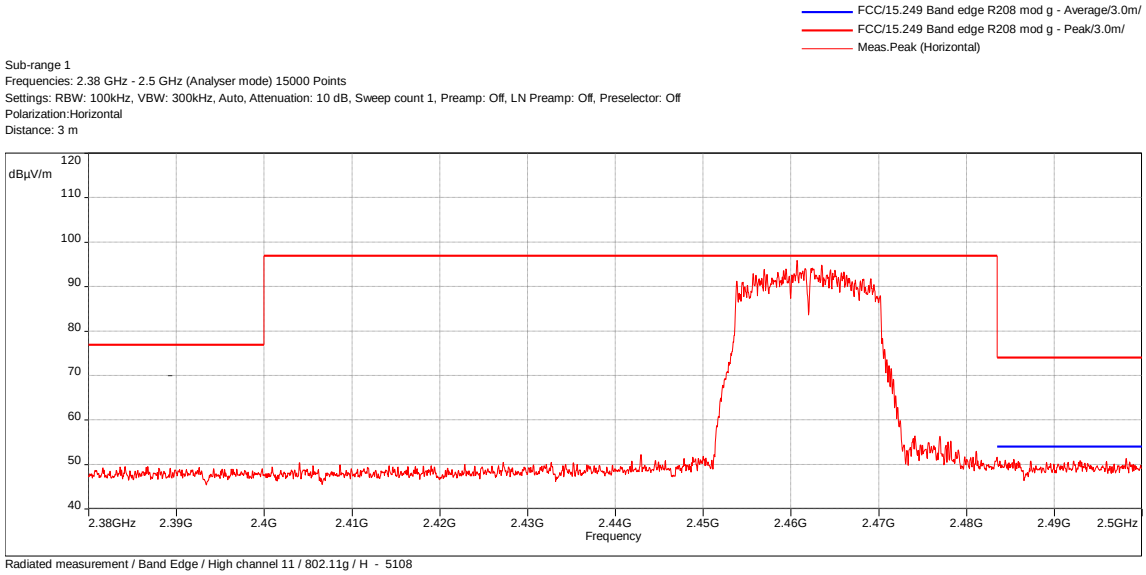
BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / HIGH CHANNEL (CH #11) / 802.11B		EMI5105	
EUT mode:	Tx mode	**T (°C):**	23.6
Test Date:	03/08/2021	**H (%):**	44.8
Test Operator:	ATO	**P (hPa):**	1007



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

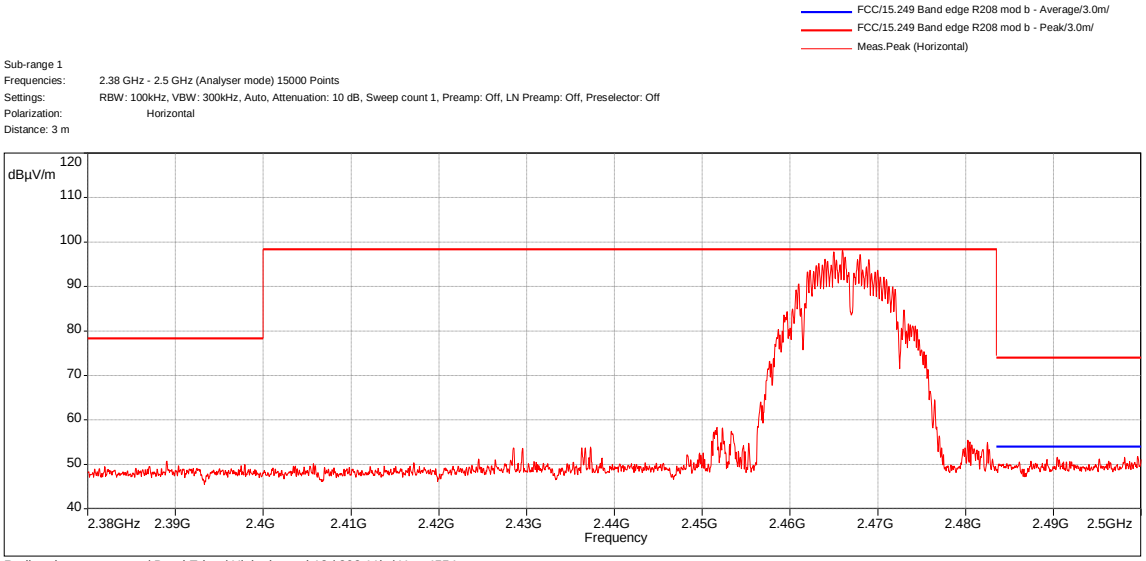
BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / HIGH CHANNEL (CH #11) / 802.11G		EMI5107	
EUT mode:	Tx mode	**T (°C):**	23.6
Test Date:	03/08/2021	**H (%):**	44.8
Test Operator:	ATO	**P (hPa):**	1007



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / CANADA HIGH CHANNEL (CH #12) / 802.11B		EMI4553	
EUT mode:	Tx mode	**T (°C):**	29.0
Test Date:	05/07/2021	**H (%):**	49.8
Test Operator:	ATO	**P (hPa):**	1006

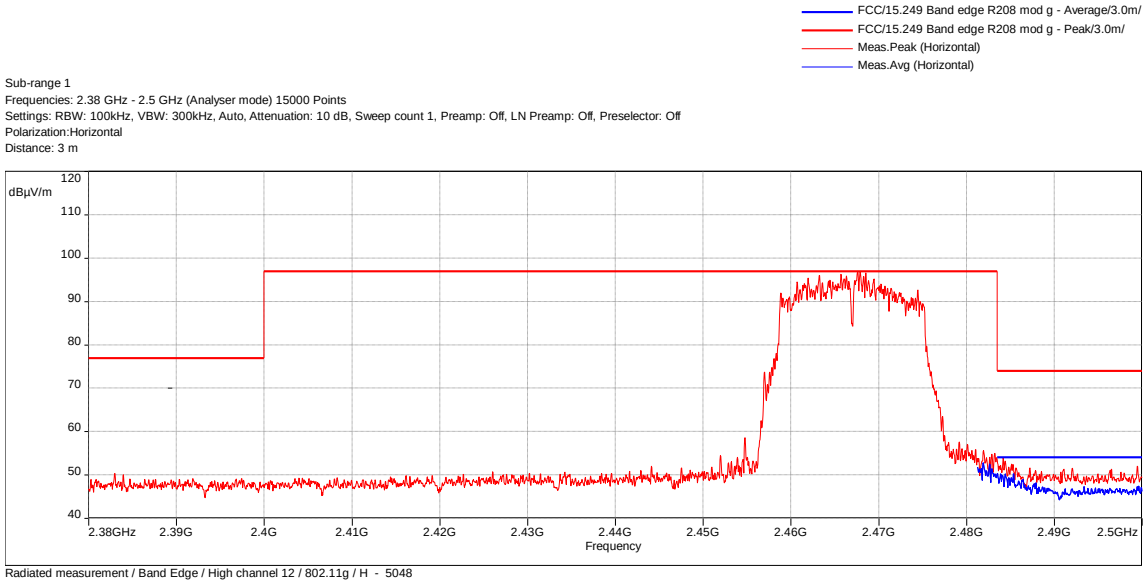


Radiated measurement / Band Edge / High channel 12 / 802.11b / H - 4554

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

BAND EDGE - GRAPH			
RADIATED MEASUREMENT / BAND EDGE / CANADA HIGH CHANNEL (CH #12) / 802.11G		EMI5047	
EUT mode:	Tx mode	**T (°C):**	28.8
Test Date:	08/07/2021	**H (%):**	47.5
Test Operator:	ATO	**P (hPa):**	1010



Radiated measurement / Band Edge / High channel 12 / 802.11g / H - 5048

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Horizontal	2.38GHz-2.5GHz	100kHz	300kHz	Peak
Horizontal	2.48GHz-2.5GHz	100kHz	3MHz	AVG
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

8.6. Power spectral density

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247

Test description: e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

EUT is connected to the measuring receiver via 50Ω attenuator(s).Only the highest levels are recorded.

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
PSD / Low channel (Ch #1) / 802.11b	2.402GHz-2.422GHz	8dBm/3kHz	EMI4535	**PASS**
PSD / Low channel (Ch #1) / 802.11g	2.402GHz-2.422GHz	8dBm/3kHz	EMI5094	**PASS**
PSD / Mid channel (Ch #6) / 802.11b	2.427GHz-2.447GHz	8dBm/3kHz	EMI5096	**PASS**
PSD / Mid channel (Ch #6) / 802.11g	2.427GHz-2.447GHz	8dBm/3kHz	EMI5095	**PASS**
PSD / High channel (Ch #11) / 802.11b	2.452GHz-2.472GHz	8dBm/3kHz	EMI5097	**PASS**
PSD / High channel (Ch #11) / 802.11g	2.452GHz-2.472GHz	8dBm/3kHz	EMI5098	**PASS**
PSD / Canada High channel (Ch #12) / 802.11b	2.457GHz-2.477GHz	8dBm/3kHz	EMI4552	**PASS**
PSD / Canada High channel (Ch #12) / 802.11g	2.457GHz-2.477GHz	8dBm/3kHz	EMI5046	**PASS**

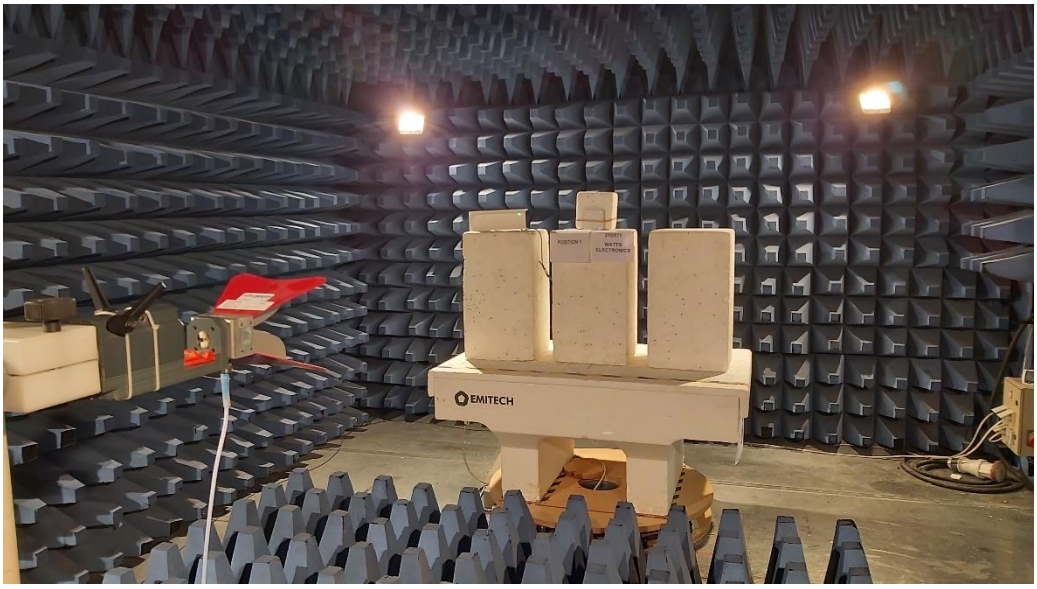
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(s)*
Relative Humidity	20 to 75 %	*See Graph(s)*
Atmospheric pressure	N/A	*See Graph(s)*
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	15322		
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Attenuator	EMITECH	SUB.V2-H	14495	13/01/2021	13/03/2022
Attenuator	EMITECH	SUB.V2-V	14496	13/01/2021	13/03/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023

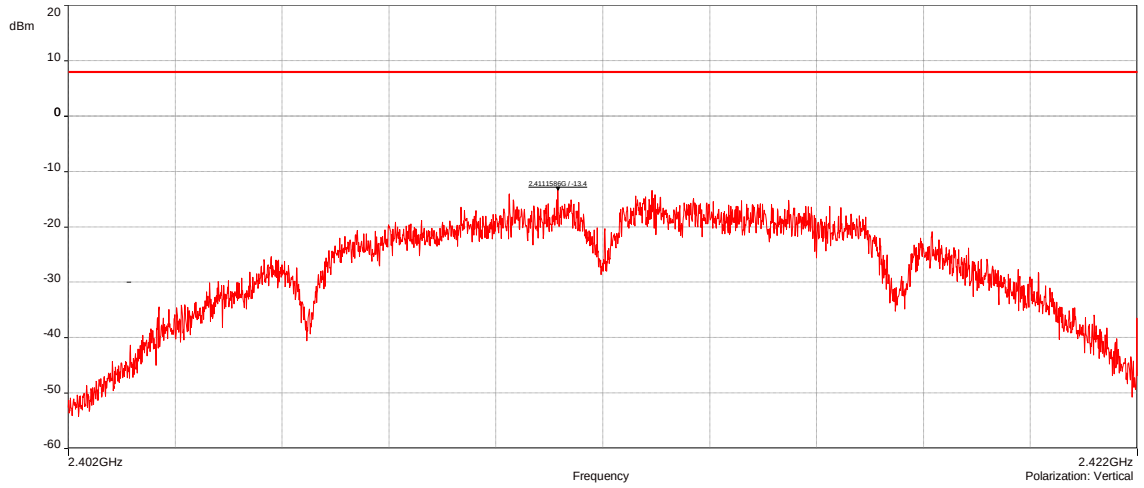
BAT-EMC software version: V3.18.0.26

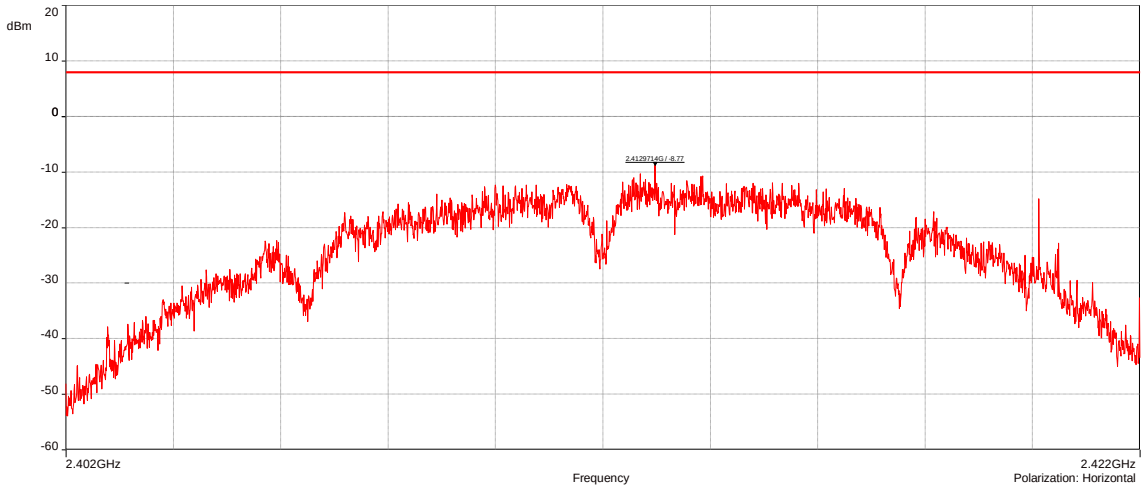
Blank cells = Permanent validity

TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)


POWER SPECTRAL DENSITY - GRAPH			
PSD / LOW CHANNEL (CH #1) / 802.11B		EMI4535	
EUT mode:	Tx mode	**T (°C):**	24.3
Test Date:	05/07/2021	**H (%):**	49.3
Test Operator:	ATO & OAT	**P (hPa):**	1010

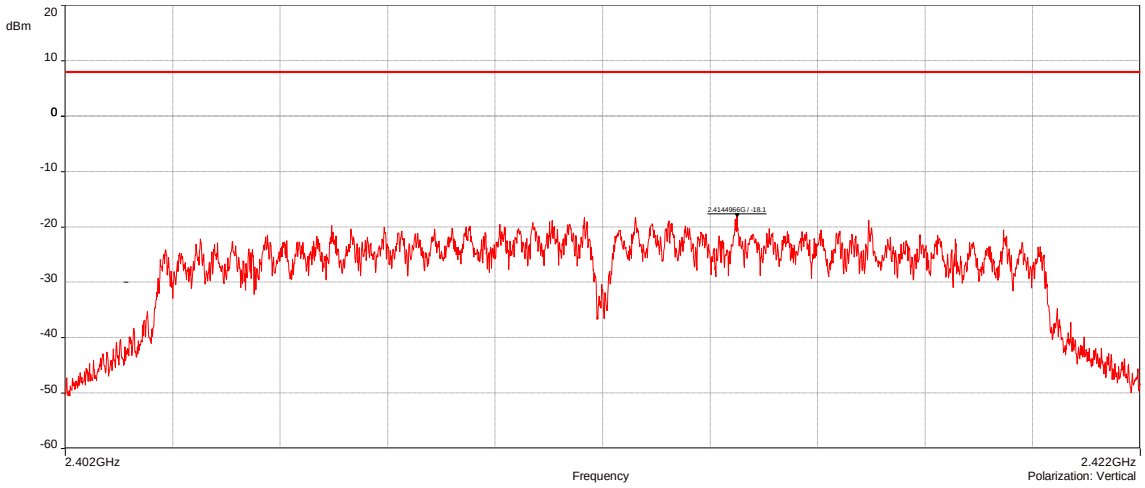


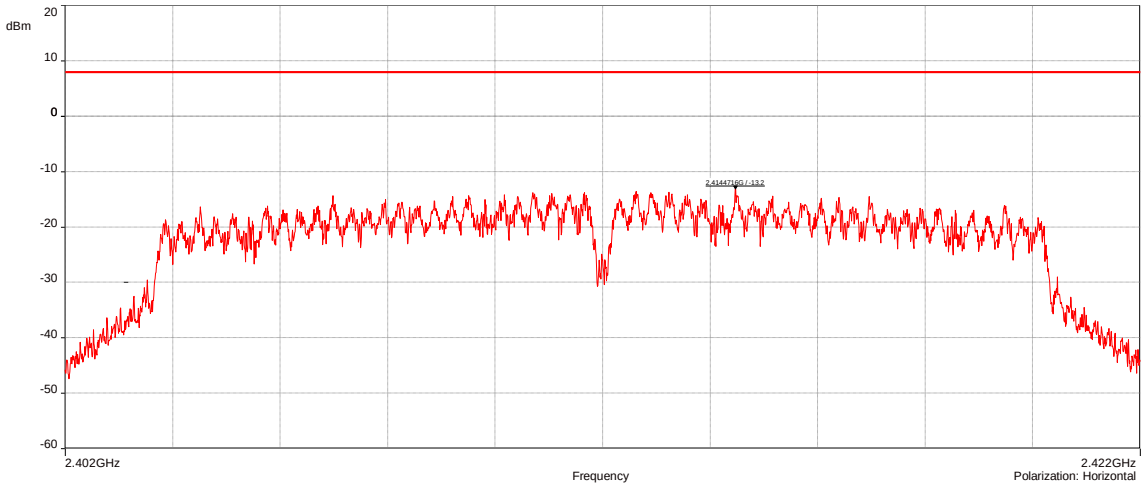


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.402GHz-2.422GHz	3kHz	9kHz	Peak
Horizontal	2.402GHz-2.422GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / LOW CHANNEL (CH #1) / 802.11B			EMI4535
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2411.15	Vertical	-13.4	8
2412.97	Horizontal	-8.77	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / LOW CHANNEL (CH #1) / 802.11G		EMI5094	
EUT mode:	Tx mode	**T (°C):**	23.8
Test Date:	03/08/2021	**H (%):**	44.7
Test Operator:	ATO	**P (hPa):**	1007



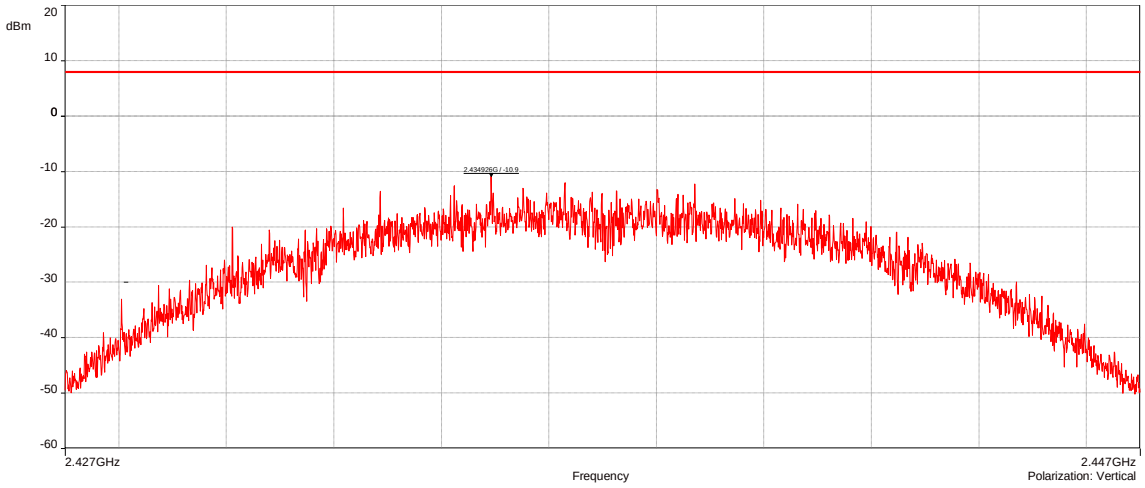


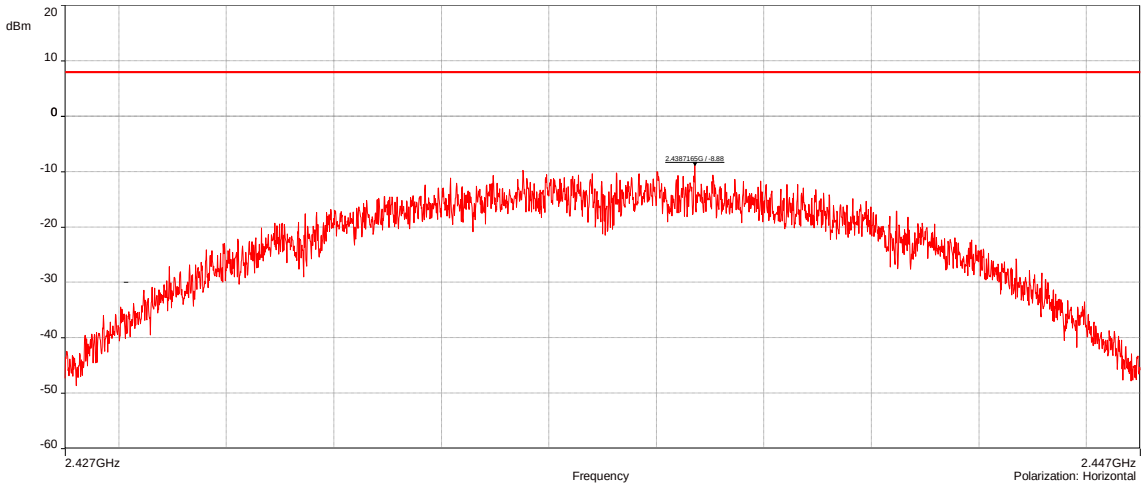
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.402GHz-2.422GHz	3kHz	9kHz	Peak
Horizontal	2.402GHz-2.422GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / LOW CHANNEL (CH #1) / 802.11G			EMI5094
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2414.49	Vertical	-18.1	8
2414.47	Horizontal	-13.2	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / MID CHANNEL (CH #6) / 802.11B		EMI5096	
EUT mode:	Tx mode	**T (°C):**	23.8
Test Date:	03/08/2021	**H (%):**	44.7
Test Operator:	ATO	**P (hPa):**	1007

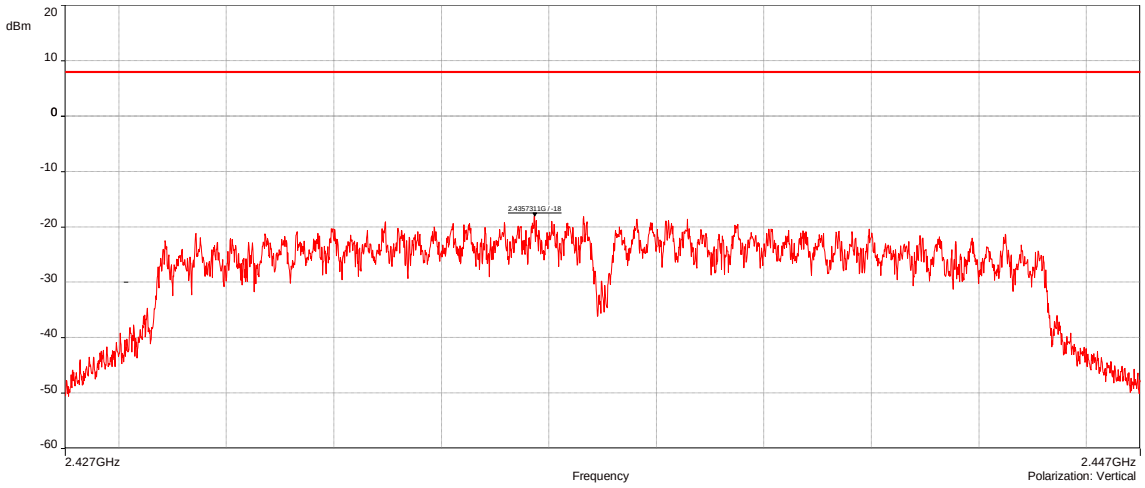


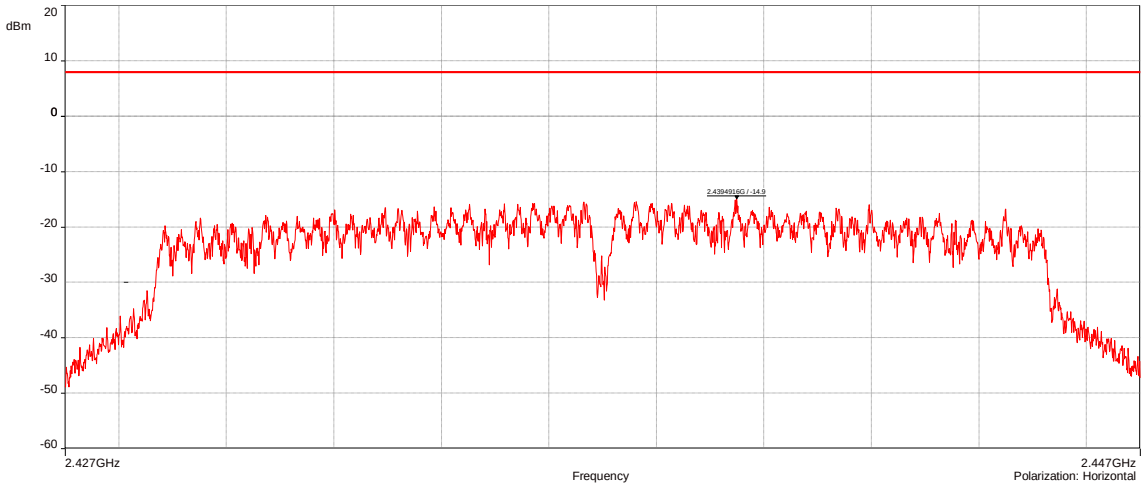


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.427GHz-2.447GHz	3kHz	9kHz	Peak
Horizontal	2.427GHz-2.447GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / MID CHANNEL (CH #6) / 802.11B			EMI5096
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2434.92	Vertical	-10.9	8
2438.71	Horizontal	-8.88	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / MID CHANNEL (CH #6) / 802.11G		EMI5095	
EUT mode:	Tx mode	**T (°C):**	23.8
Test Date:	03/08/2021	**H (%):**	44.7
Test Operator:	ATO	**P (hPa):**	1007

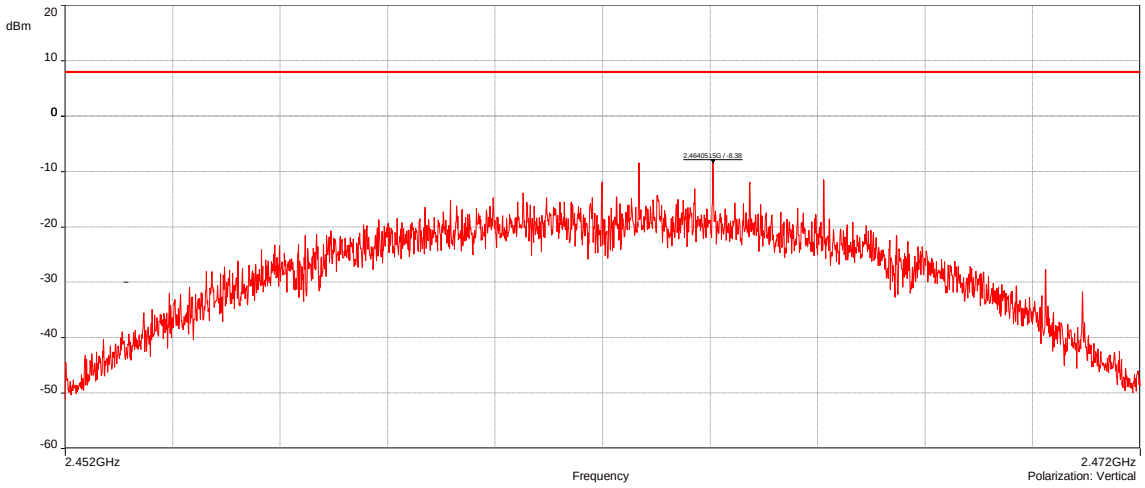


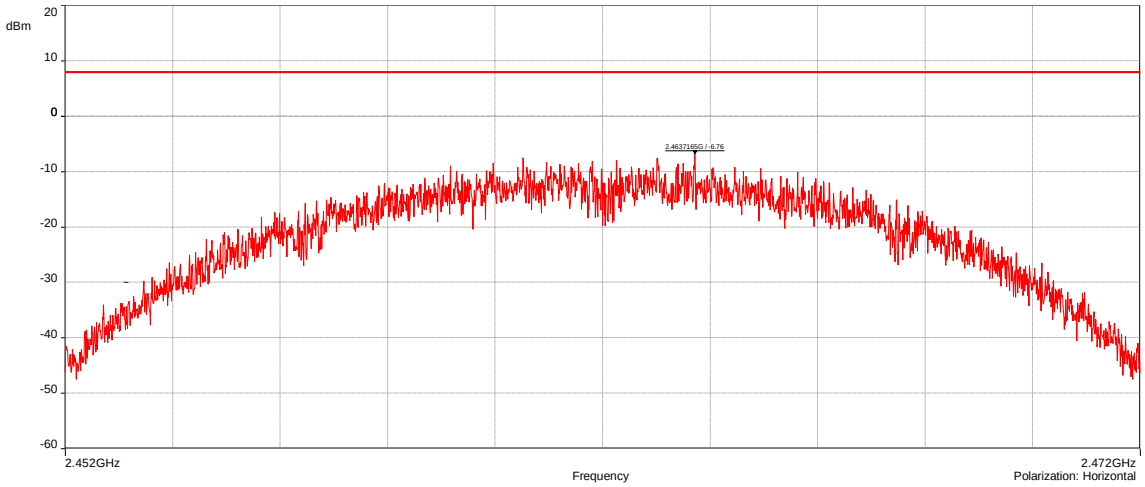


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.427GHz-2.447GHz	3kHz	9kHz	Peak
Horizontal	2.427GHz-2.447GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / MID CHANNEL (CH #6) / 802.11G			EMI5095
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2435.73	Vertical	-18.0	8
2439.49	Horizontal	-14.9	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / HIGH CHANNEL (CH #11) / 802.11B		EMI5097	
EUT mode:	Tx mode	**T (°C):**	23.8
Test Date:	03/08/2021	**H (%):**	44.7
Test Operator:	ATO	**P (hPa):**	1007

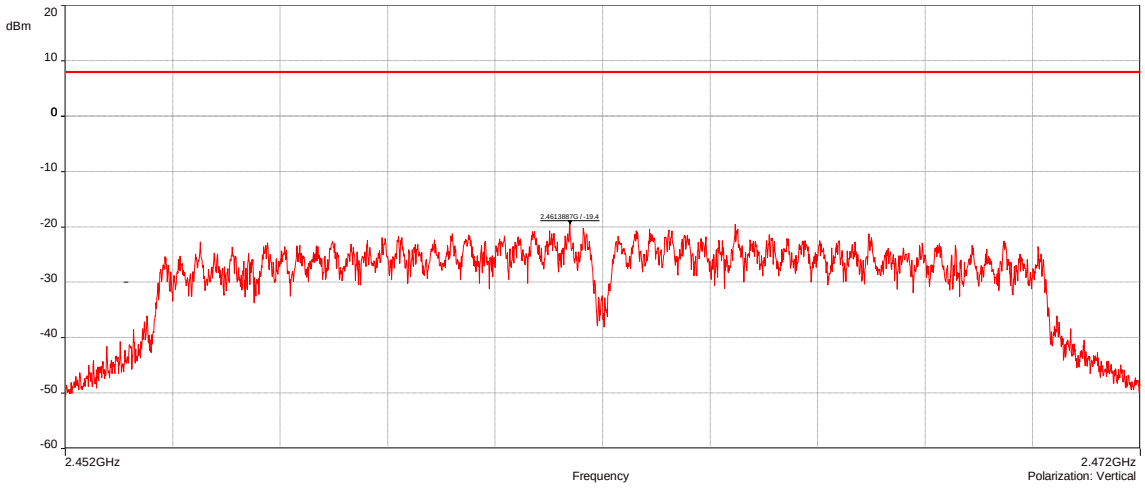


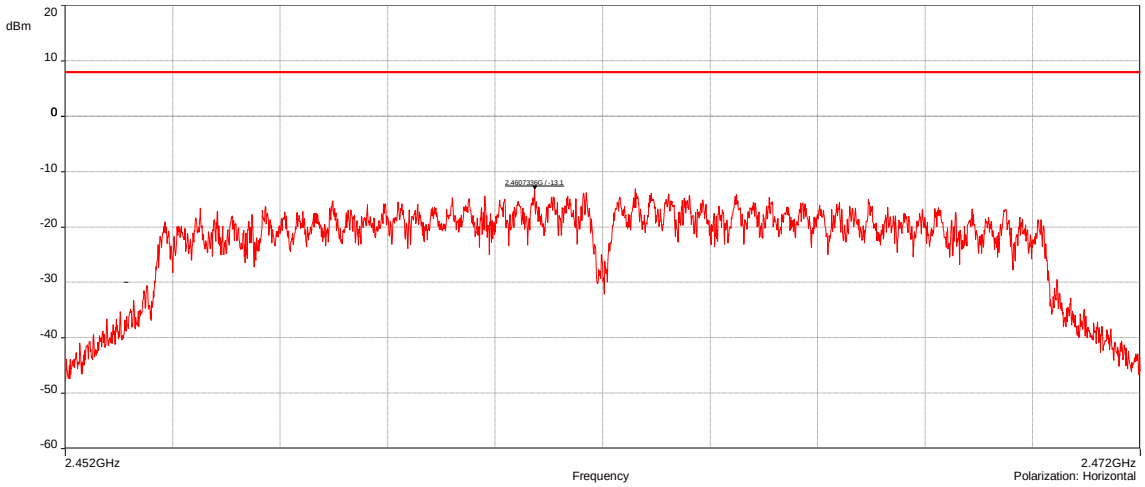


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.452GHz-2.472GHz	3kHz	9kHz	Peak
Horizontal	2.452GHz-2.472GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / HIGH CHANNEL (CH #11) / 802.11B			EMI5097
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2464.05	Vertical	-8.38	8
2463.71	Horizontal	-6.76	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / HIGH CHANNEL (CH #11) / 802.11G		EMI5098	
EUT mode:	Tx mode	**T (°C):**	23.8
Test Date:	03/08/2021	**H (%):**	44.7
Test Operator:	ATO	**P (hPa):**	1007

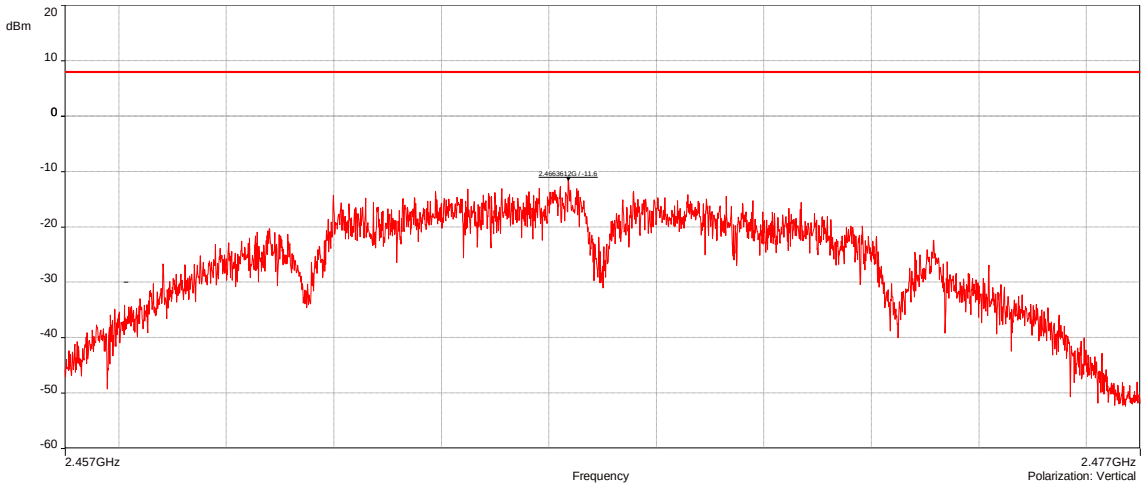


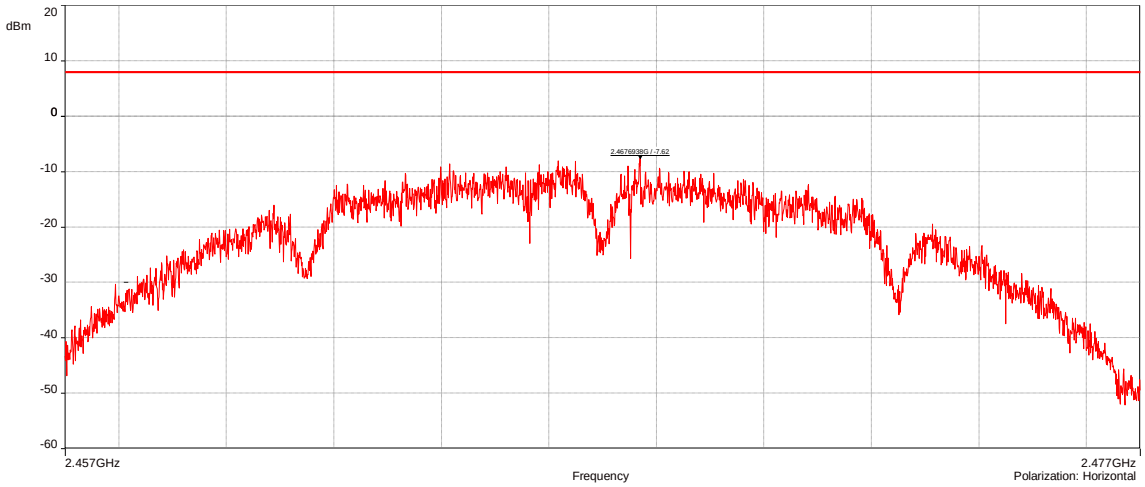


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.452GHz-2.472GHz	3kHz	9kHz	Peak
Horizontal	2.452GHz-2.472GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / HIGH CHANNEL (CH #11) / 802.11G			EMI5098
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2461.38	Vertical	-19.4	8
2460.73	Horizontal	-13.1	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / CANADA HIGH CHANNEL (CH #12) / 802.11B		EMI4552	
EUT mode:	Tx mode	**T (°C):**	29.0
Test Date:	05/07/2021	**H (%):**	49.3
Test Operator:	ATO	**P (hPa):**	1010

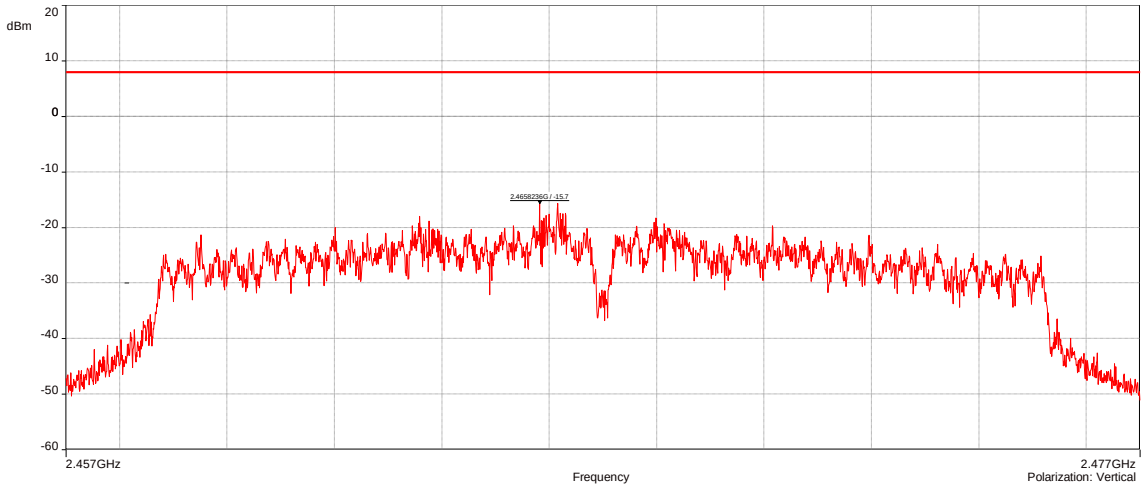


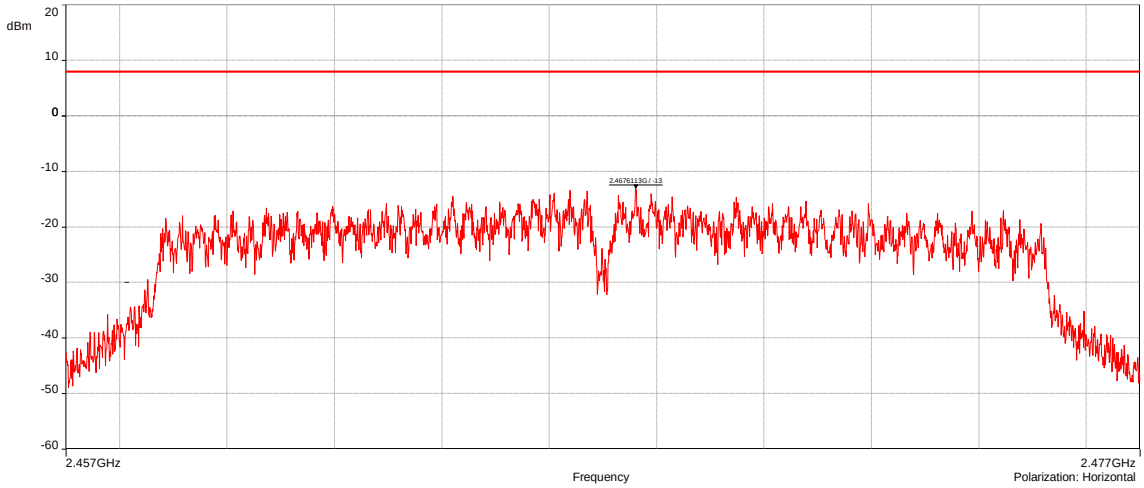


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.457GHz-2.477GHz	3kHz	9kHz	Peak
Horizontal	2.457GHz-2.477GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / CANADA HIGH CHANNEL (CH #12) / 802.11B			EMI4552
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2466.36	Vertical	-11.6	8
2467.69	Horizontal	-7.62	8

POWER SPECTRAL DENSITY - GRAPH			
PSD / CANADA HIGH CHANNEL (CH #12) / 802.11G		EMI5046	
EUT mode:	Tx mode	**T (°C):**	28.2
Test Date:	08/07/2021	**H (%):**	47.8
Test Operator:	ATO	**P (hPa):**	1010





POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	2.457GHz-2.477GHz	3kHz	9kHz	Peak
Horizontal	2.457GHz-2.477GHz	3kHz	9kHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD / CANADA HIGH CHANNEL (CH #12) / 802.11G			EMI5046
Frequency (MHz)	**Polarization**	**Level (dBm)**	**Limit (dBm)**
2465.82	Vertical	-15.7	8
2467.61	Horizontal	-13.0	8

8.7. Transmitter radiated spurious emissions at frequencies <30MHz

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen

General test setup: Spurious domain emission limits are limits on emissions at frequencies other than those of the carrier and sidebands associated with normal test modulation**.**

EUT is set on an insulating support at 80cm above the ground reference plane.

Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter in a anechoic chamber. The EUT was rotated 360°in order to maximize radiated levels. Test antenna was oriented in 3 axes (0°, 45° and 90°).

Final measurements (quasi-peak) were then performed in a 10-meter Open Area Test Site that complies to CISPR 16 in the same measurement conditions.

All frequencies were investigated, where applicable.

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Radiated measurement / 0° / 802.11b / All channels	9kHz-30MHz	15.209	EMI5027	**PASS**
Radiated measurement / 45° / 802.11b / All channels	9kHz-30MHz	15.209	EMI5028	**PASS**
Radiated measurement / 90° / 802.11b / All channels	9kHz-30MHz	15.209	EMI5029	**PASS**
Radiated measurement / 0° / 802.11g / All channels	9kHz-30MHz	15.209	EMI5030	**PASS**
Radiated measurement / 45° / 802.11g / All channels	9kHz-30MHz	15.209	EMI5031	**PASS**
Radiated measurement / 90° / 802.11g / All channels	9kHz-30MHz	15.209	EMI5032	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*

Test method deviation: N/A

Supplementary information: Limit indicated on measurement curves is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR4000L	3074	25/07/2019	25/09/2021
Antenna	Rohde & Schwarz	HFH2-Z2	5825	24/04/2020	24/06/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023

BAT-EMC software version: V3.18.0.26 Blank cells = Permanent validity

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 0° / 802.11B / ALL CHANNELS				EMI5027	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
4.416	Peak	-32.58	-1.72	18.04	-19.76
4.622	Peak	-32.59	0.01	18.04	-18.03
Supplementary information: N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 45° / 802.11B / ALL CHANNELS				EMI5028	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
0.514	Peak	-32.45	0.17	21.89	-21.73
1.537	Peak	-32.41	-10.44	12.37	-22.81
4.417	Peak	-32.58	-0.67	18.04	-18.71
4.622	Peak	-32.59	1.97	18.04	-16.07
Supplementary information: N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 90° / 802.11B / ALL CHANNELS				EMI5029	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
0.514	Peak	-32.45	2.68	21.88	-19.20
1.128	Peak	-32.42	-8.05	15.06	-23.11
1.539	Peak	-32.41	-10.65	12.36	-23.01
4.622	Peak	-32.59	-4.04	18.04	-22.08
Supplementary information: N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 0° / 802.11G / ALL CHANNELS				EMI5030	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
4.419	Peak	-32.58	-2.12	18.04	-20.16
4.625	Peak	-32.59	0.03	18.04	-18.01
Supplementary information: N/A					

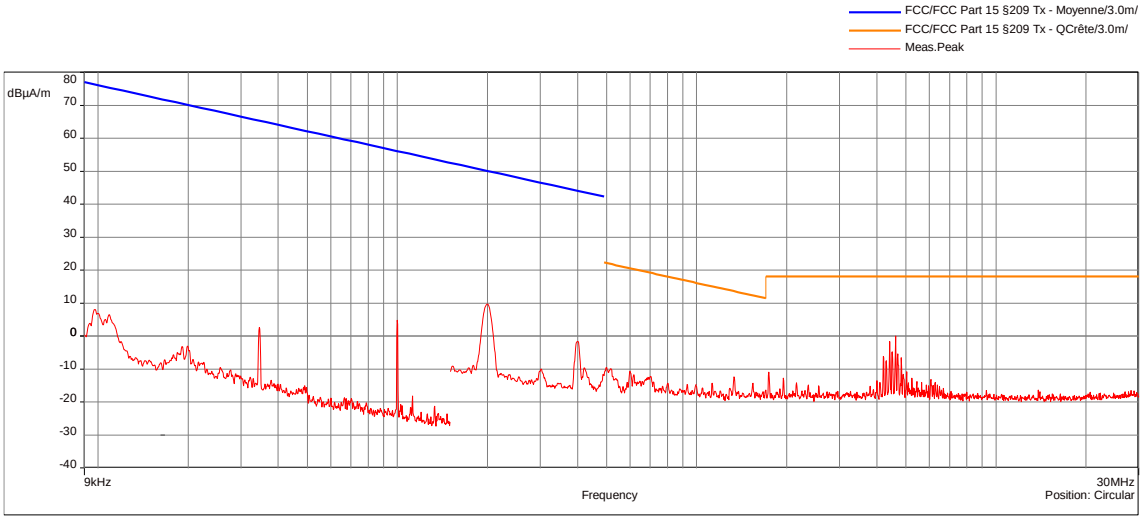
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 45° / 802.11G / ALL CHANNELS				EMI5031	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
0.514	Peak	-32.45	0.30	21.89	-21.59
1.539	Peak	-32.41	-9.90	12.36	-22.25
4.419	Peak	-32.58	-0.99	18.04	-19.03
4.622	Peak	-32.59	1.74	18.04	-16.30
Supplementary information: N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES < 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT / 90° / 802.11G / ALL CHANNELS				EMI5032	
Frequency MHz	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)
0.513	Peak	-32.45	2.32	21.89	-19.58
0.719	Peak	-32.44	-3.66	18.97	-22.63
1.539	Peak	-32.41	-10.69	12.36	-23.05
4.625	Peak	-32.59	-3.72	18.04	-21.76
Supplementary information: N/A					

TEST SETUP PHOTO(S)

TEST SETUP PHOTO(S)

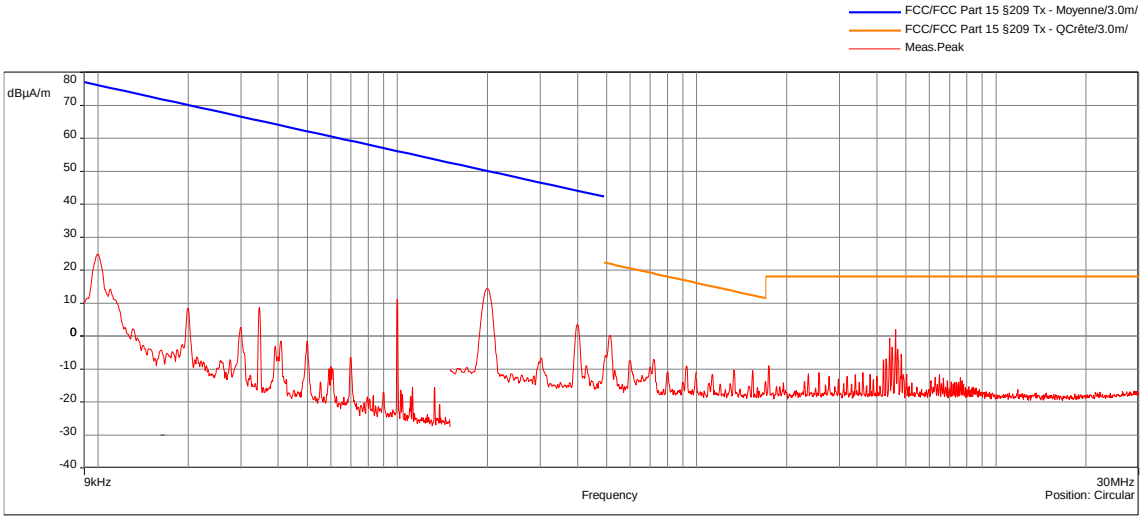
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 0° / 802.11B / ALL CHANNELS		EMI5027	
EUT mode:	Tx mode	**T (°C):**	25.6
Test Date:	08/07/2021	**H (%):**	46.0
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

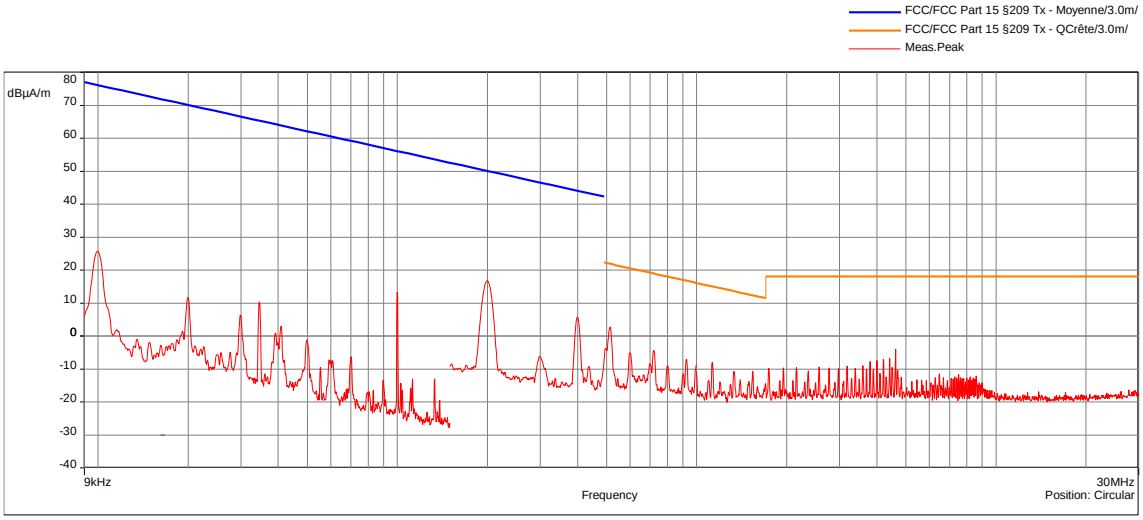
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 45° / 802.11B / ALL CHANNELS		EMI5028	
EUT mode:	Tx mode	**T (°C):**	25.6
Test Date:	08/07/2021	**H (%):**	46.0
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

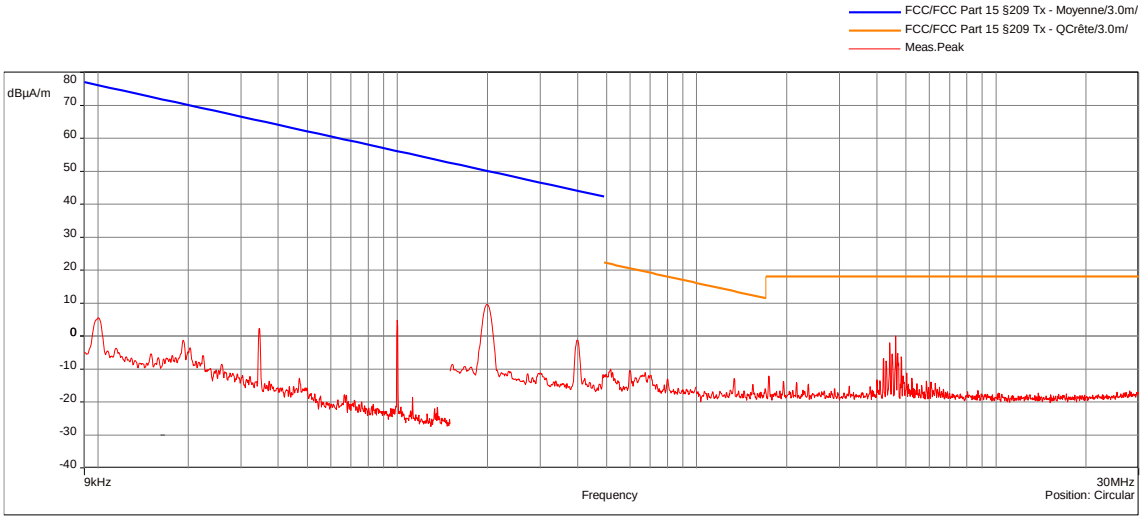
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 90° / 802.11B / ALL CHANNELS		EMI5029	
EUT mode:	Tx mode	**T (°C):**	25.6
Test Date:	08/07/2021	**H (%):**	46.0
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

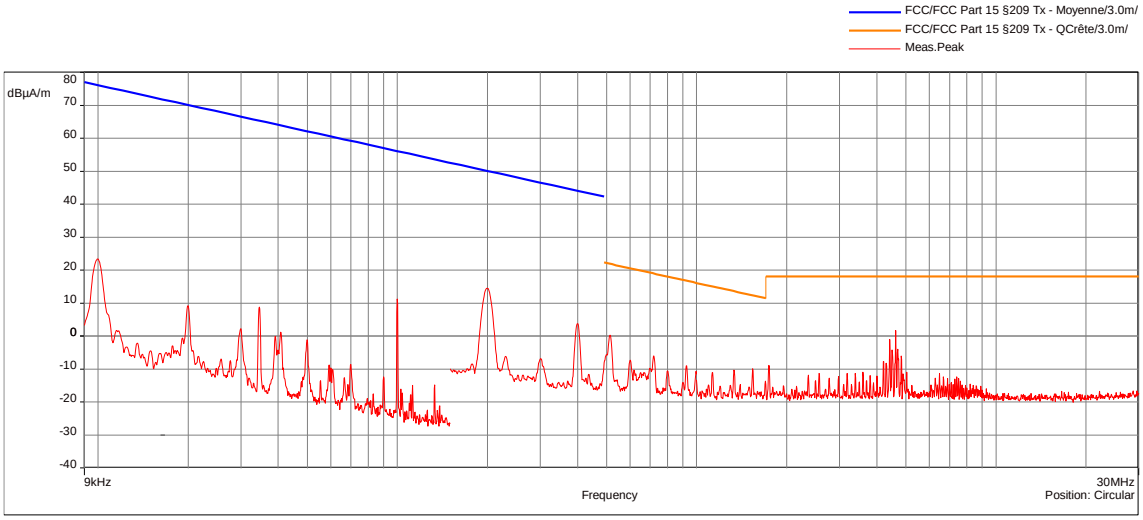
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 0° / 802.11G / ALL CHANNELS		EMI5030	
EUT mode:	Tx mode	**T (°C):**	27.3
Test Date:	08/07/2021	**H (%):**	41.1
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

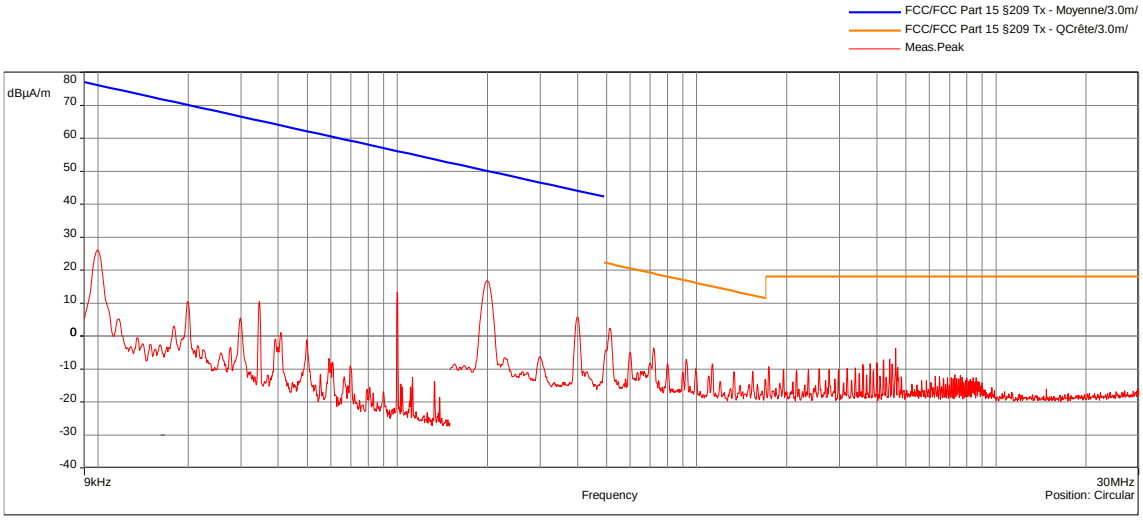
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 45° / 802.11G / ALL CHANNELS		EMI5031	
EUT mode:	Tx mode	**T (°C):**	27.3
Test Date:	08/07/2021	**H (%):**	41.1
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH			
RADIATED MEASUREMENT / 90° / 802.11G / ALL CHANNELS		EMI5032	
EUT mode:	Tx mode	**T (°C):**	27.3
Test Date:	08/07/2021	**H (%):**	41.1
Test Operator:	ATO	**P (hPa):**	1010



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor			

EUT modification(s): N/A

8.8. Transmitter radiated spurious emissions at frequencies >30MHz

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen

Test description: EUT is set on an insulating support at 80(f<1GHz), 150cm(f>1GHz)cm above the ground reference plane.

Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities.

Final measurements (quasi-peak or average) were then performed in a semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. The EUT was rotated 360° about its azimuth and adjusting the receive antenna height from 1 to 4 m.

All frequencies were investigated, where applicable.

For portable equipements a research of maximum level is done on the 3 axes. Only the highest levels are recorded.

Radiated measurement / All channels / 802.11b	30MHz-1GHz	15.209	EMI5068	**PASS**
Radiated measurement / All channels / 802.11g	30MHz-1GHz	15.209	EMI5069	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11b / Low channel (Ch #1)	1GHz-18GHz	15.209	EMI4525	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11g / Low channel (Ch #1)	1GHz-18GHz	15.209	EMI5109	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11b / Mid channel (Ch #6)	1GHz-18GHz	15.209	EMI5111	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11g / Mid channel (Ch #6)	1GHz-18GHz	15.209	EMI5110	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11b / High channel (Ch #11)	1GHz-18GHz	15.209	EMI5112	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11g / High channel (Ch #11)	1GHz-18GHz	15.209	EMI5113	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11b / Canada High channel (Ch #12)	1GHz-18GHz	15.209	EMI4541	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11g / Canada High channel (Ch #12)	1GHz-18GHz	15.209	EMI5050	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11b / Low channel (Ch #1)	18GHz-26.5GHz	15.209	EMI5123	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11g / Low channel (Ch #1)	18GHz-26.5GHz	15.209	EMI5127	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11b / Mid channel (Ch #6)	18GHz-26.5GHz	15.209	EMI5124	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11g / Mid channel (Ch #6)	18GHz-26.5GHz	15.209	EMI5128	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11b / High channel (Ch #11)	18GHz-26.5GHz	15.209	EMI5125	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11g / High channel (Ch #11)	18GHz-26.5GHz	15.209	EMI5129	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11b / Canada High channel (Ch #12)	18GHz-26.5GHz	15.209	EMI5126	**PASS**
Radiated measurement 18GHz to 26.5GHz / 802.11g / Canada High channel (Ch #12)	18GHz-26.5GHz	15.209	EMI5130	**PASS**

Radiated measurement / Rx mode / All channels / 802.11b	30MHz-1GHz	15.109 Class B	EMI5132	**PASS**
Radiated measurement / Rx mode / All channels / 802.11g	30MHz-1GHz	15.109 Class B	EMI5133	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11b / All channels / Rx mode	1GHz-18GHz	15.109 Class B	EMI5121	**PASS**
Radiated measurement 1GHz to 18GHz / 802.11g / All channels / Rx mode	1GHz-18GHz	15.109 Class B	EMI5051	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	GW Instek	APS-1102	17754	02/03/2021	02/05/2022
AC power source	KIKUSUI	PCR4000L	3074	25/07/2019	25/09/2021
Antenna	Rohde & Schwarz	HFH2-Z2	5825	24/04/2020	24/06/2022
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Antenna	Electro Metrics	BIA-30HF	1107	13/06/2018	13/08/2021
Antenna	Rohde & Schwarz	HL223	1137	13/06/2018	13/08/2021
Antenna	Rohde & Schwarz	HL223	3126	13/06/2018	13/08/2021
Cable	MegaPhase	F135N1N28	16666	25/10/2019	25/12/2021
Cable	MegaPhase	F135N1N28	16667	25/10/2019	25/12/2021
Cable	MegaPhase	F135N1N28	16668	25/10/2019	25/12/2021
Cable	/	N-1m	3625	27/01/2021	27/03/2023
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-3m	14379	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-6,5m	14380	25/07/2019	25/09/2021
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Cable	MegaPhase	TM18-N1N1-118	12841	14/08/2020	14/10/2022
Filter	Micro-Tronics	HPM18865	12843	09/06/2018	09/08/2021
Filter	Wainwright Instruments	WTRCTV5-700-1000-20-60	12838	27/06/2018	27/08/2021
Preamplifier	IMPULSE	CA118-546ACN	9169	13/01/2021	13/03/2022
Receiver	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7562	09/06/2021	09/08/2023
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

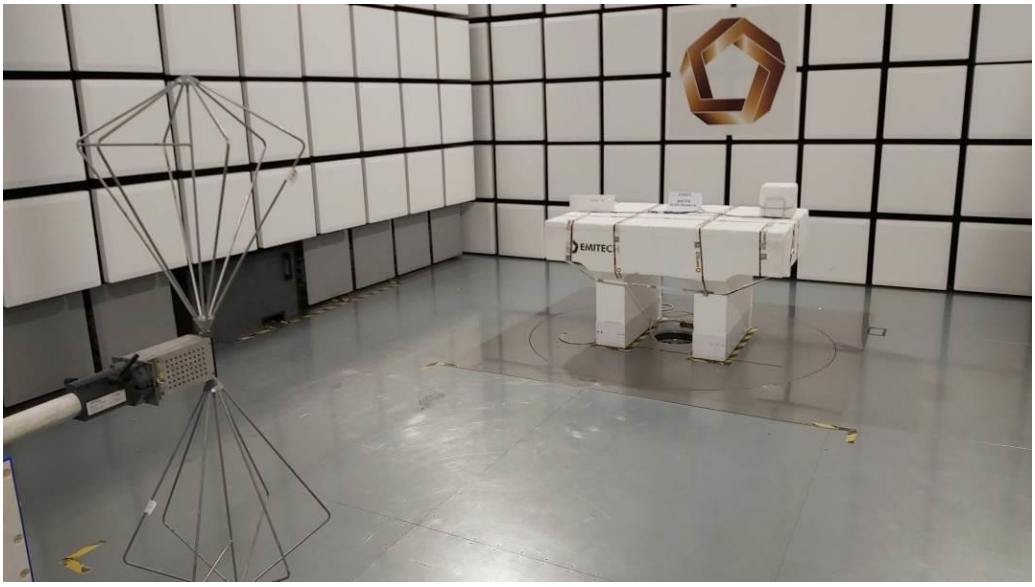
BAT-EMC software version: V3.18.0.26 Blank cells = Permanent validity

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES > 30MHZ - TABULATED RESULTS					
Frequency MHz	**Detector (Pk/QP/Av)**	**Antenna polarization**	**Level (dBµV/m)**	**Limit Avg (dBµV/m)**	**Margin (dB)**
N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information: except following tabulated results, No spurious emissions were detected.					

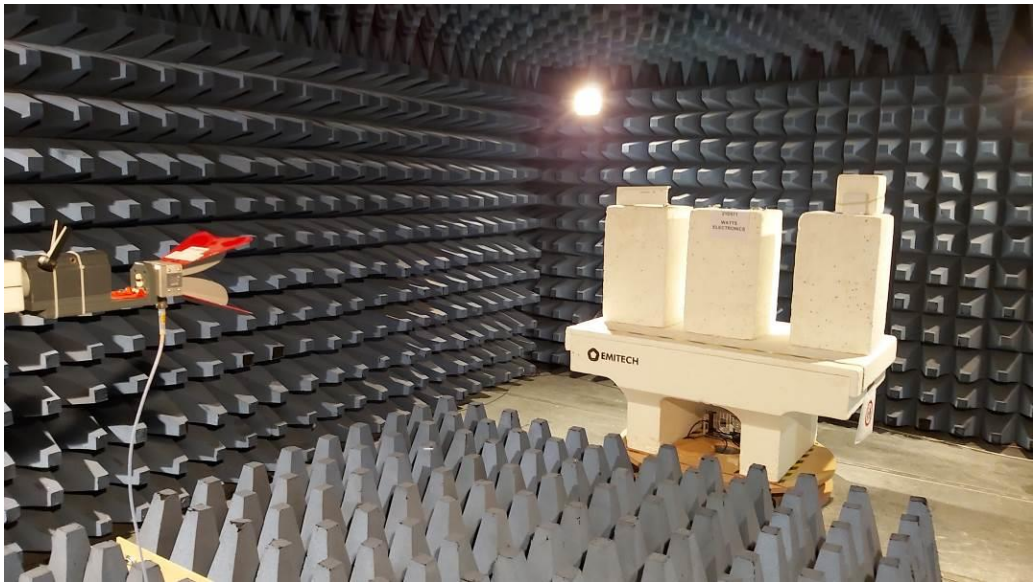
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES > 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT 1GHZ TO 18GHZ / 802.11B / MID CHANNEL (CH #6)				EMI5111	
Frequency MHz	**Detector (Pk/QP/Av)**	**Antenna polarization**	**Level (dBµV/m)**	**Limit Avg (dBµV/m)**	**Margin (dB)**
4873.124	Peak	Vertical	48.90	54	-5.10
7309.287	Peak	Vertical	49.32	54	-4.68
4873.124	Peak	Horizontal	50.79	54	-3.21
Supplementary information: N/A					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES > 30MHZ - TABULATED RESULTS					
RADIATED MEASUREMENT 1GHZ TO 18GHZ / 802.11B / HIGH CHANNEL (CH #11)				EMI5112	
Frequency MHz	**Detector (Pk/QP/Av)**	**Antenna polarization**	**Level (dBµV/m)**	**Limit Avg (dBµV/m)**	**Margin (dB)**
4923.128	Peak	Vertical	49.81	54	-4.19
4923.128	Peak	Horizontal	49.11	54	-4.89
Supplementary information: N/A					

TEST SETUP PHOTO(S) - RADIATED MEASUREMENT

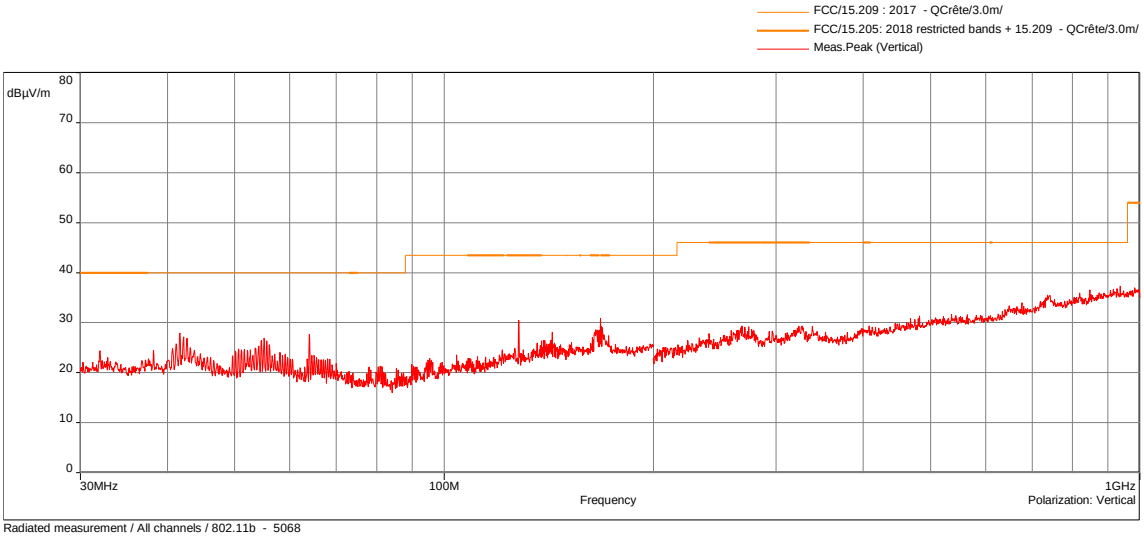
TEST SETUP PHOTO(S) - RADIATED MEASUREMENT / 30MHZ TO 200MHZ


TEST SETUP PHOTO(S) - RADIATED MEASUREMENT / 200MHZ TO 1GHZ

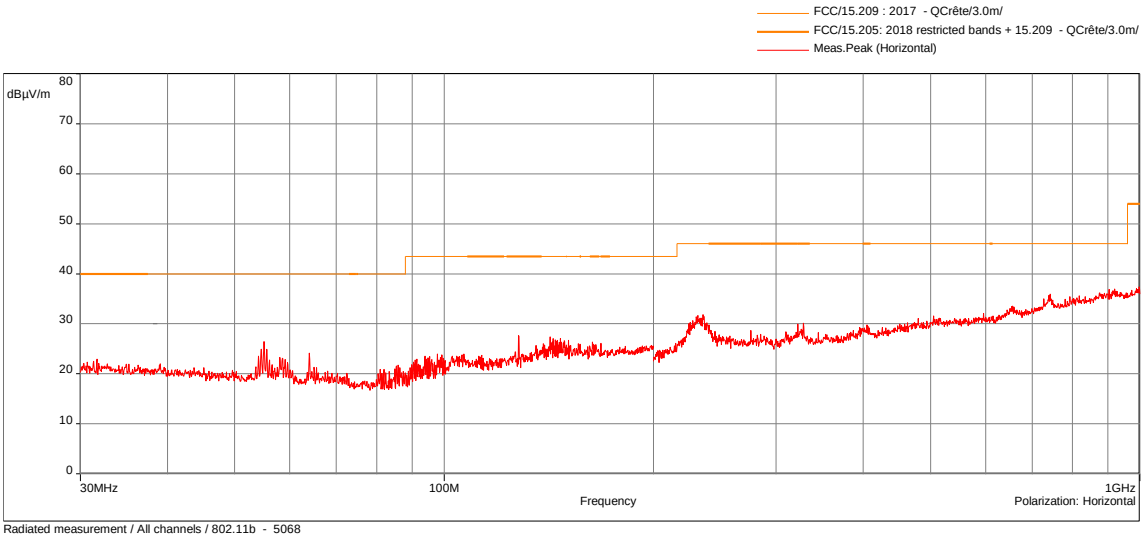
TEST SETUP PHOTO(S) - RADIATED MEASUREMENT / 1GHZ TO 18GHZ


TEST SETUP PHOTO(S) - RADIATED MEASUREMENT / 18GHZ TO 26.5GHZ

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / ALL CHANNELS / 802.11B		EMI5068	
EUT mode:	Tx mode	**T (°C):**	20.2
Test Date:	02/08/2021	**H (%):**	41.0
Test Operator:	ATO	**P (hPa):**	1004



Radiated measurement / All channels / 802.11b - 5068

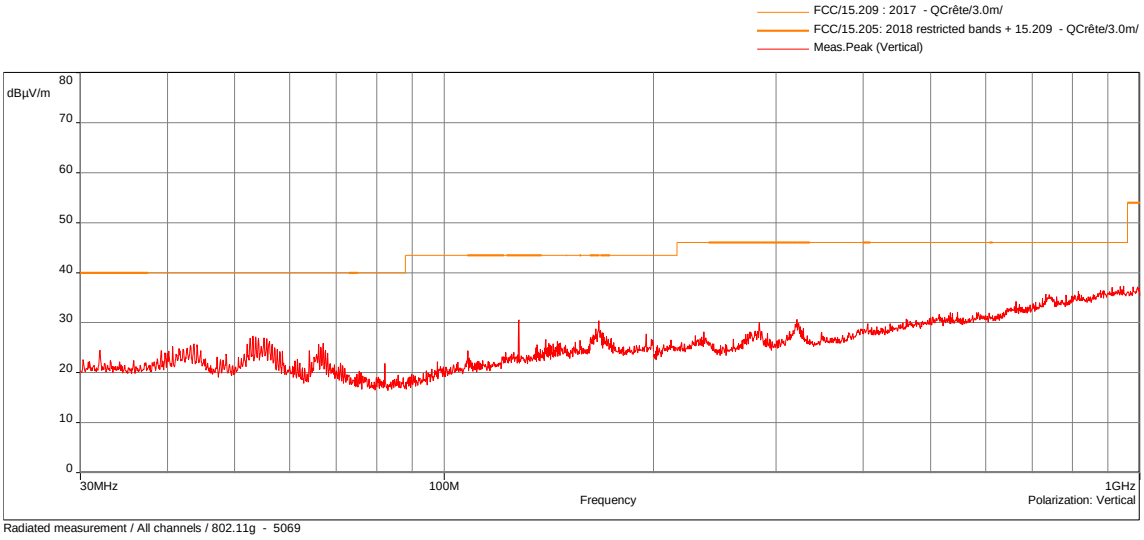


Radiated measurement / All channels / 802.11b - 5068

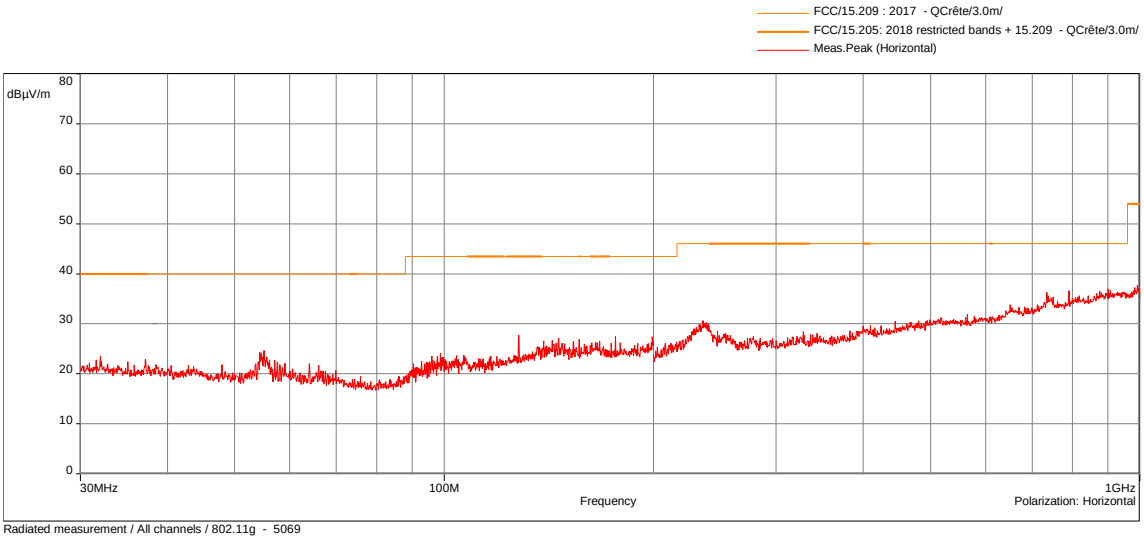
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / ALL CHANNELS / 802.11G		EMI5069	
EUT mode:	Tx mode	**T (°C):**	20.2
Test Date:	02/08/2021	**H (%):**	41.0
Test Operator:	ATO	**P (hPa):**	1004



Radiated measurement / All channels / 802.11g - 5069

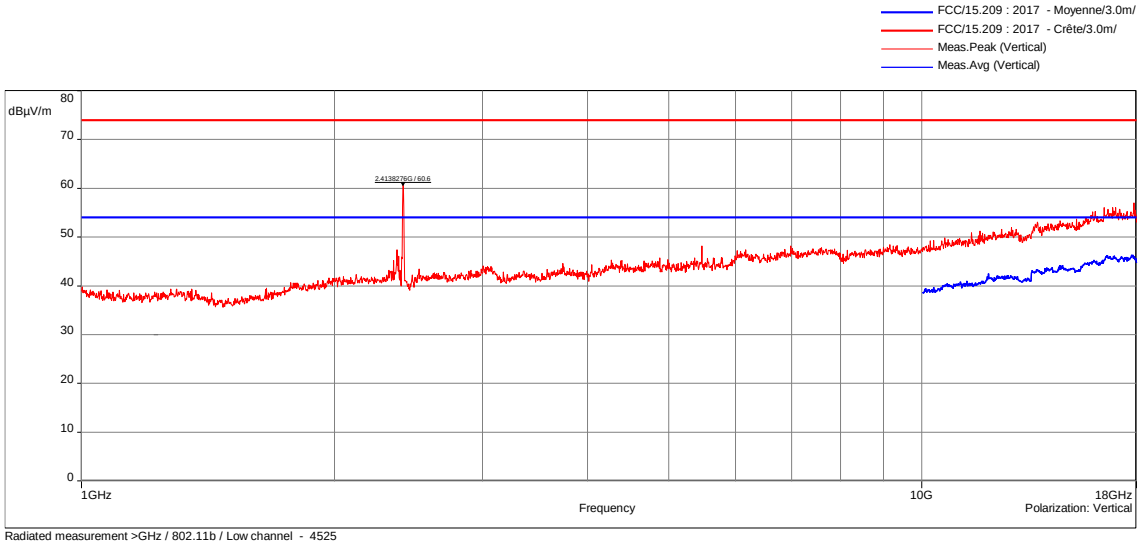


Radiated measurement / All channels / 802.11g - 5069

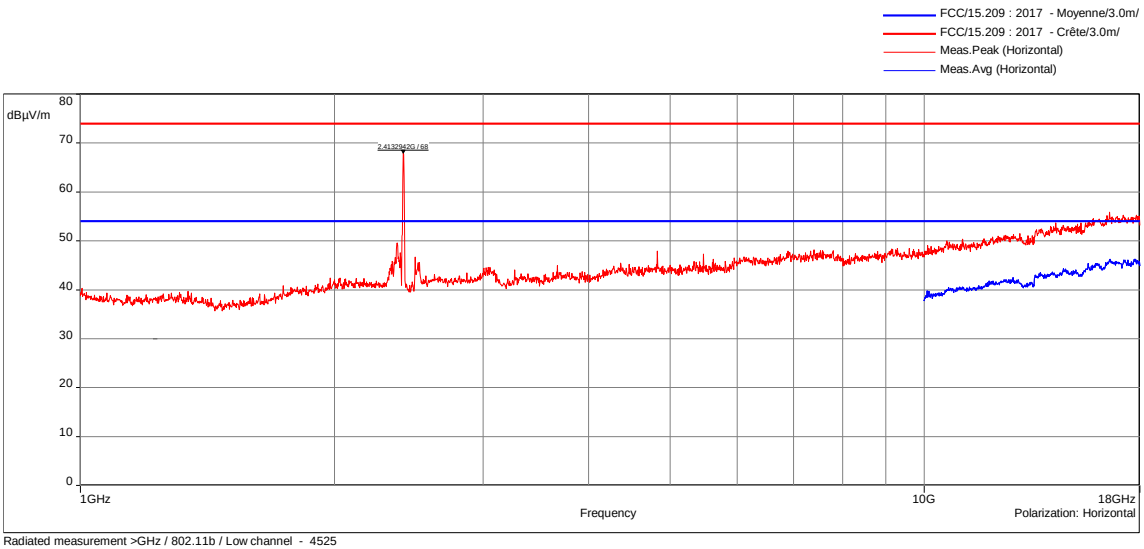
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11B / LOW CHANNEL (CH #1)		EMI4525	
EUT mode:	Tx mode	**T (°C):**	25.8
Test Date:	10/09/2021	**H (%):**	43.2
Test Operator:	ATO	**P (hPa):**	1006



Radiated measurement >GHz / 802.11b / Low channel - 4525

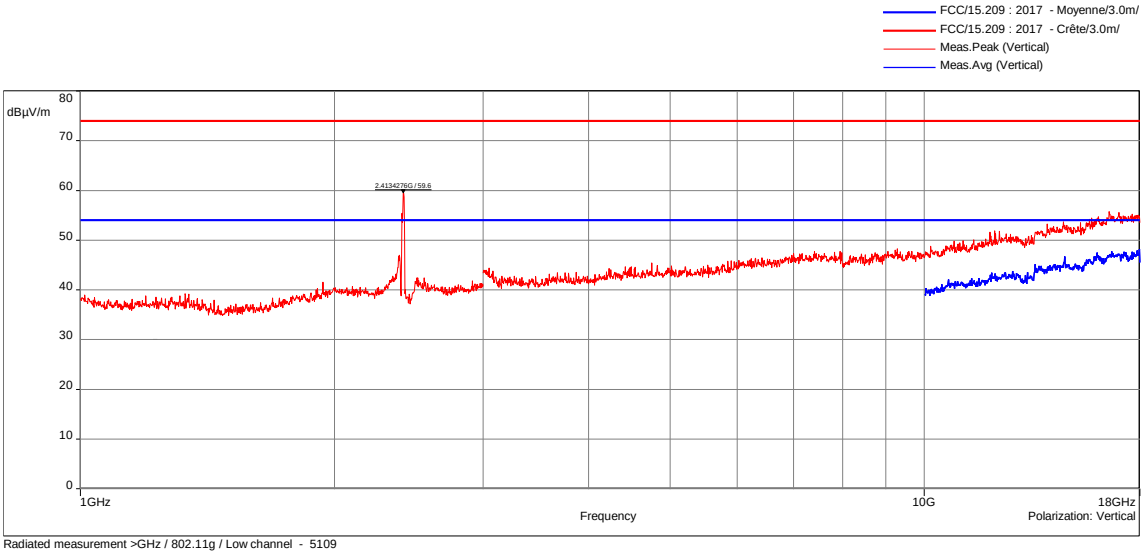


Radiated measurement >GHz / 802.11b / Low channel - 4525

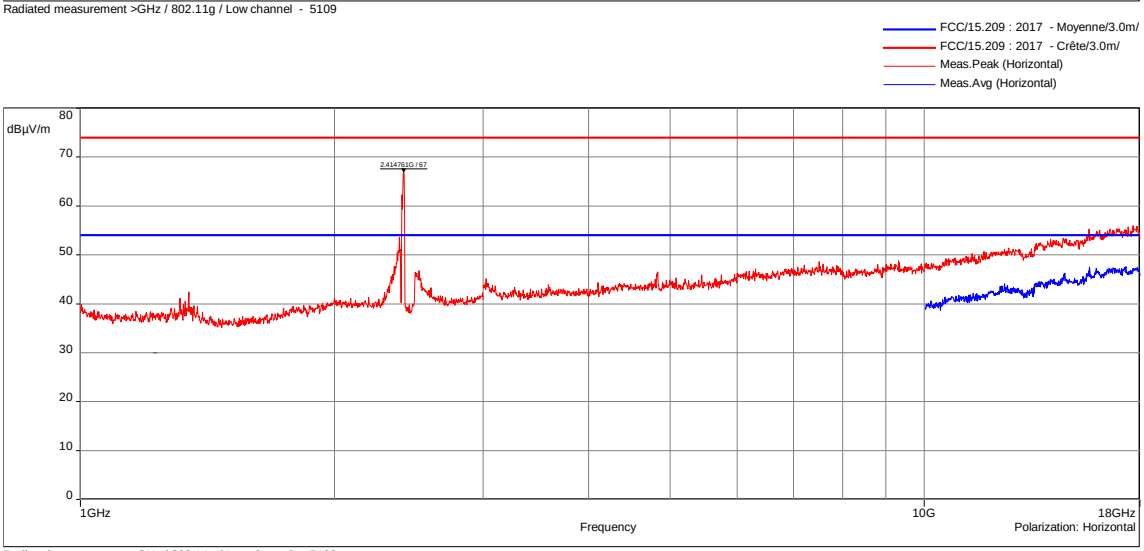
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11G / LOW CHANNEL (CH #1)		EMI5109	
EUT mode:	Tx mode	**T (°C):**	24.8
Test Date:	03/08/2021	**H (%):**	43.6
Test Operator:	ATO	**P (hPa):**	1007



Radiated measurement >GHz / 802.11g / Low channel - 5109

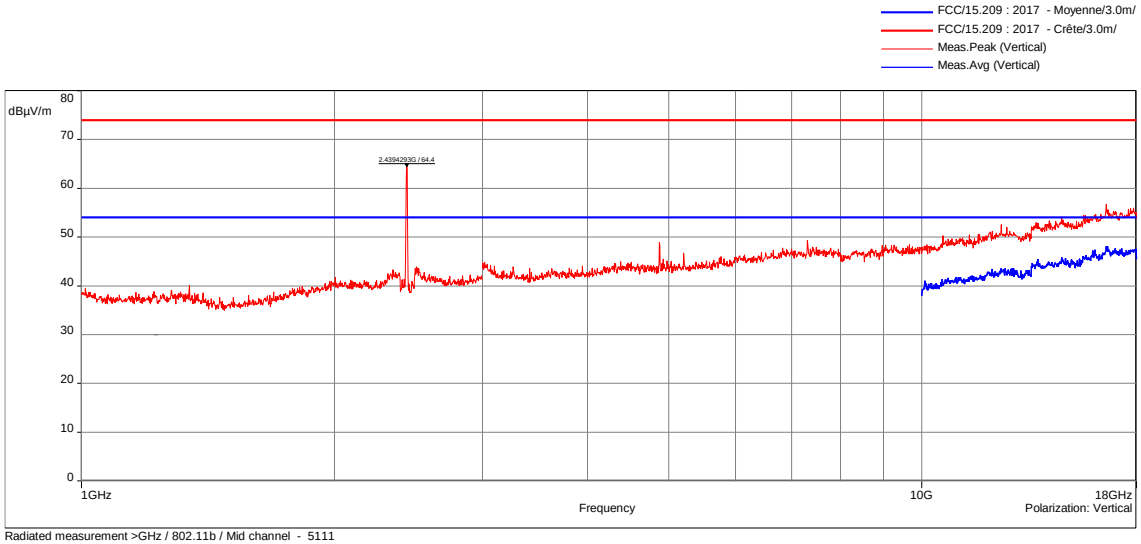


Radiated measurement >GHz / 802.11g / Low channel - 5109

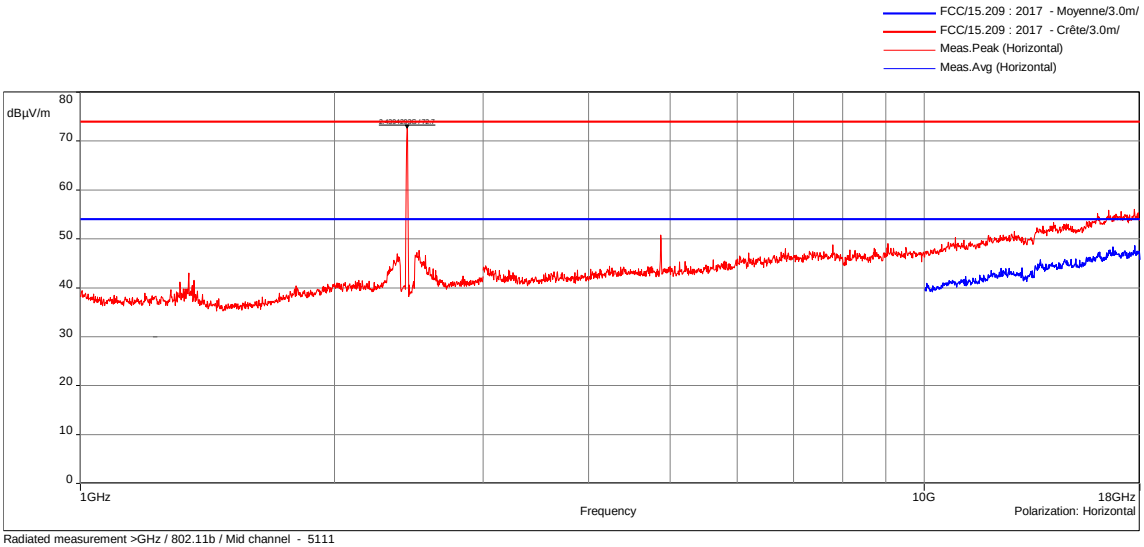
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11B / MID CHANNEL (CH #6)		EMI5111	
EUT mode:	Tx mode	**T (°C):**	24.8
Test Date:	03/08/2021	**H (%):**	43.6
Test Operator:	ATO	**P (hPa):**	1007



Radiated measurement >GHz / 802.11b / Mid channel - 5111

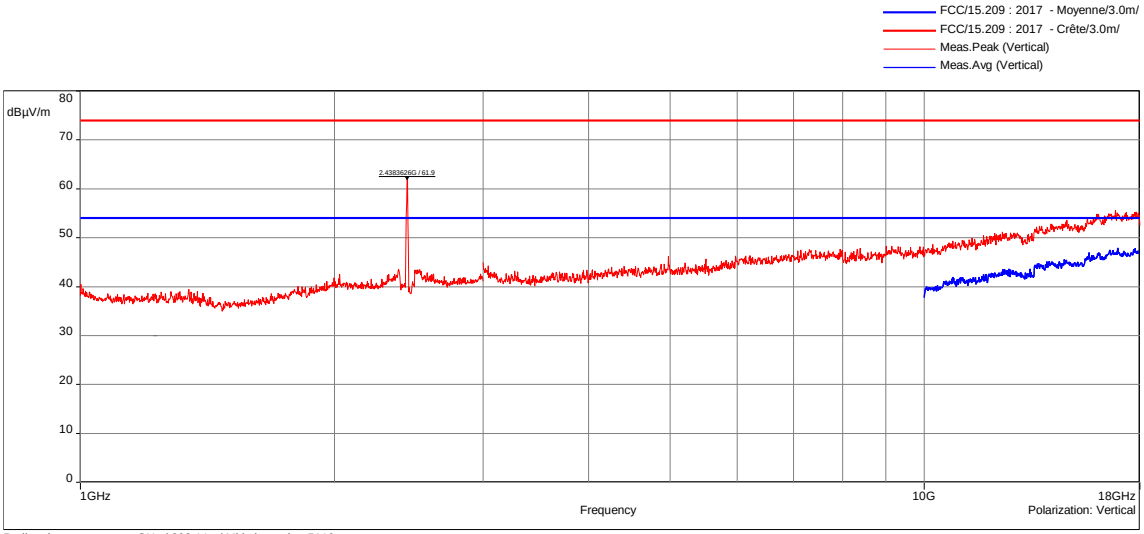


Radiated measurement >GHz / 802.11b / Mid channel - 5111

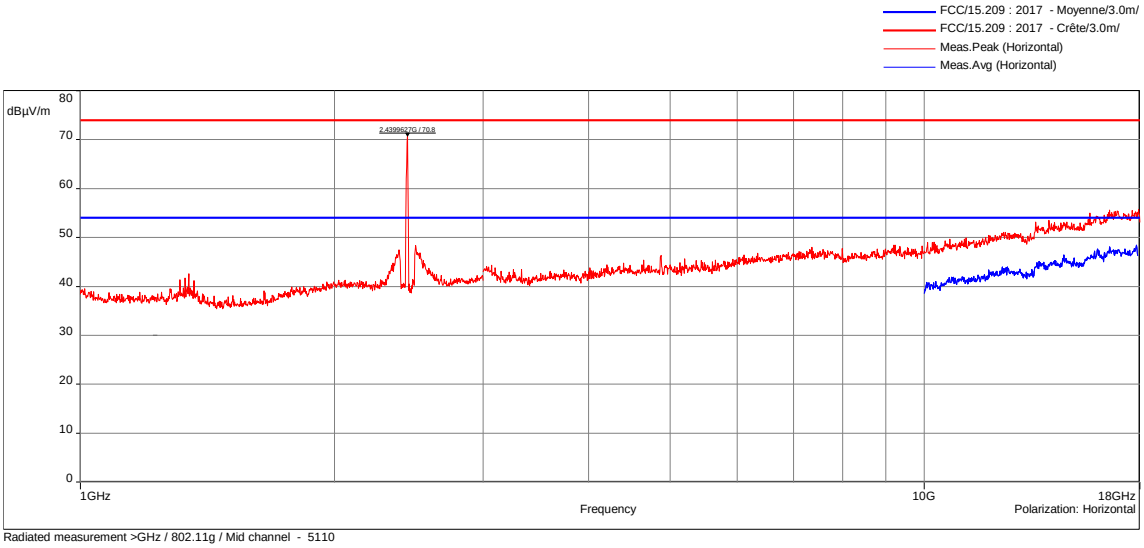
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11G / MID CHANNEL (CH #6)		EMI5110	
EUT mode:	Tx mode	**T (°C):**	24.8
Test Date:	03/08/2021	**H (%):**	43.6
Test Operator:	ATO	**P (hPa):**	1007



Radiated measurement >GHz / 802.11g / Mid channel - 5110

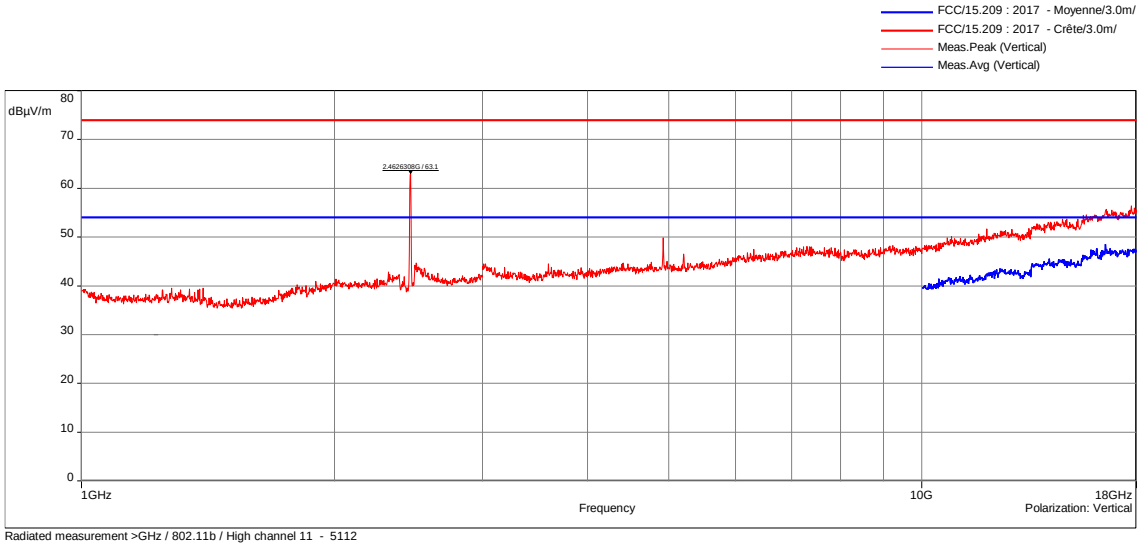


Radiated measurement >GHz / 802.11g / Mid channel - 5110

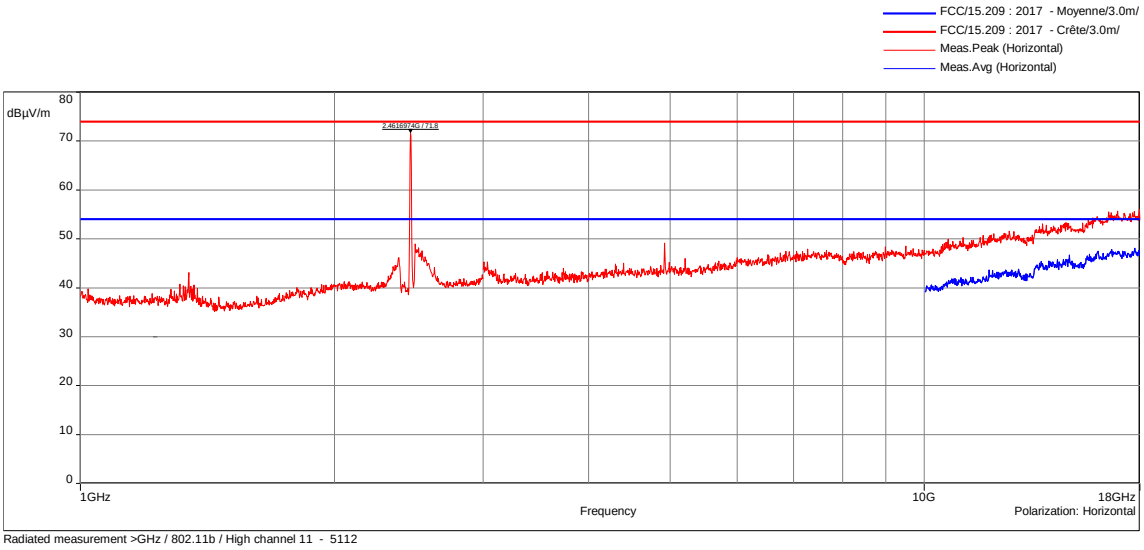
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11B / HIGH CHANNEL (CH #11)		EMI5112	
EUT mode:	Tx mode	**T (°C):**	24.8
Test Date:	03/08/2021	**H (%):**	43.6
Test Operator:	ATO	**P (hPa):**	1007



Radiated measurement >GHz / 802.11b / High channel 11 - 5112

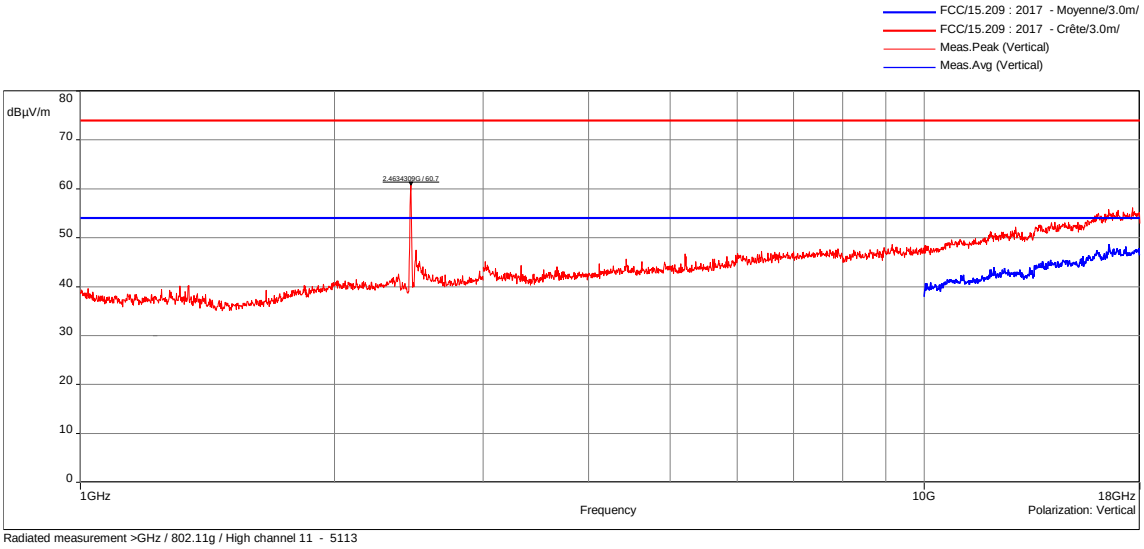


Radiated measurement >GHz / 802.11b / High channel 11 - 5112

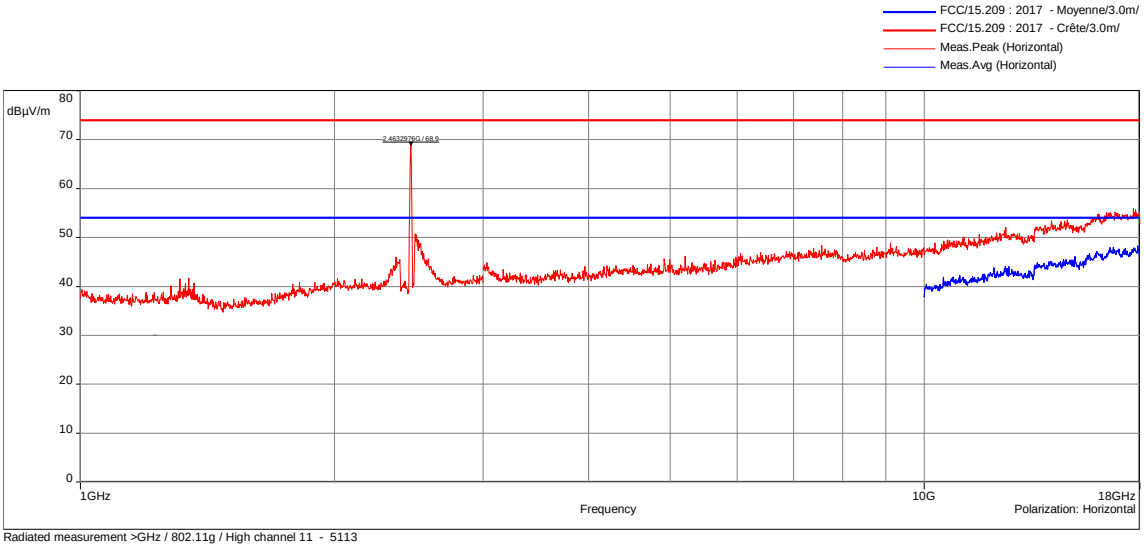
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is due to operating frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11G / HIGH CHANNEL (CH #11)		EMI5113	
EUT mode:	Tx mode	**T (°C):**	24.8
Test Date:	03/08/2021	**H (%):**	43.6
Test Operator:	ATO	**P (hPa):**	1007



Radiated measurement >GHz / 802.11g / High channel 11 - 5113

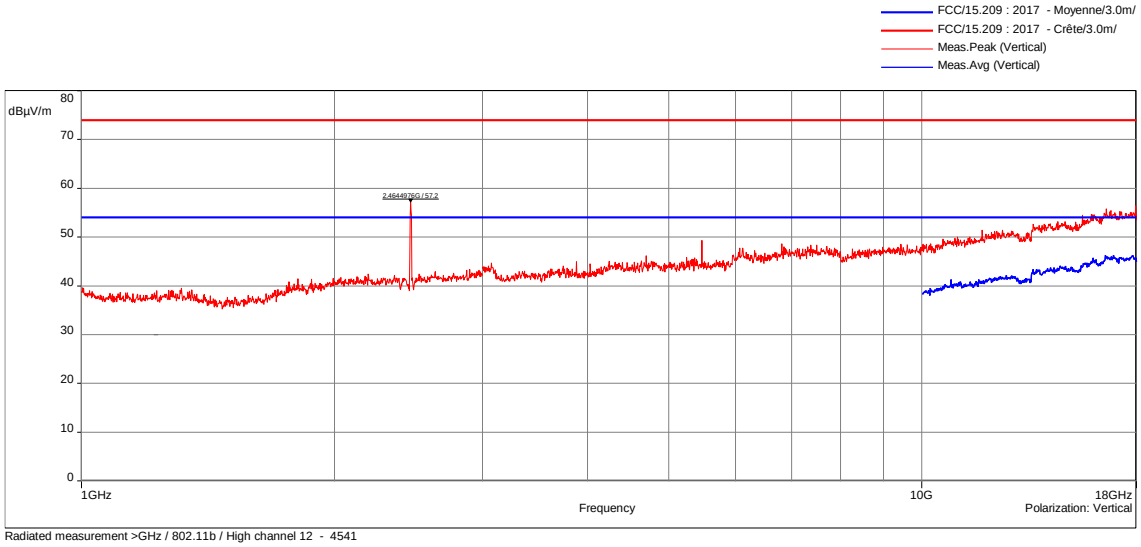


Radiated measurement >GHz / 802.11g / High channel 11 - 5113

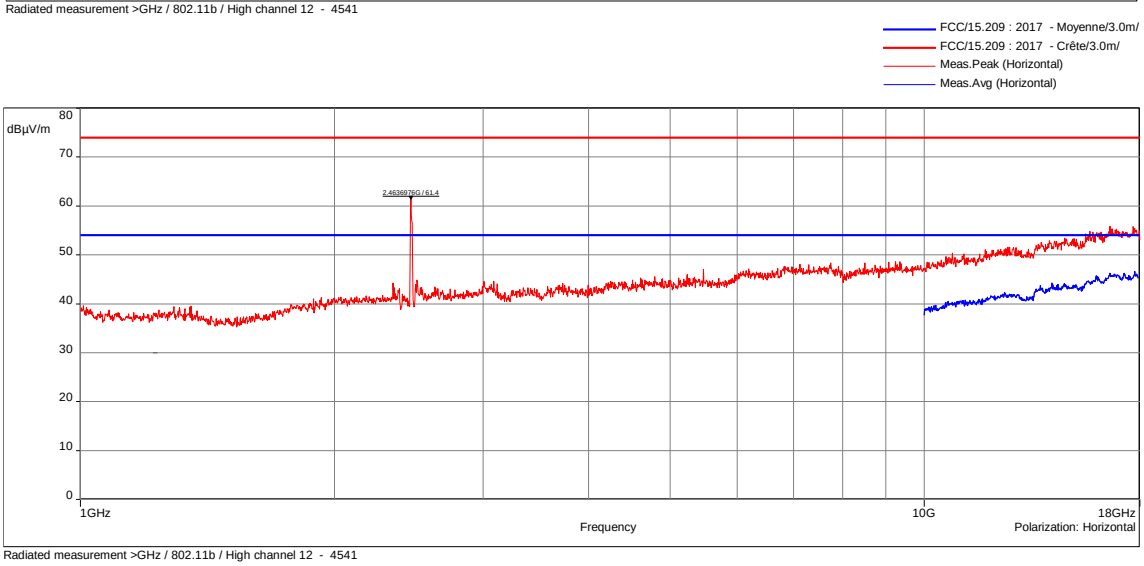
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11B / CANADA HIGH CHANNEL (CH #12)		EMI4541	
EUT mode:	Tx mode	**T (°C):**	28.8
Test Date:	05/07/2021	**H (%):**	46.4
Test Operator:	ATO	**P (hPa):**	1006



Radiated measurement >GHz / 802.11b / High channel 12 - 4541

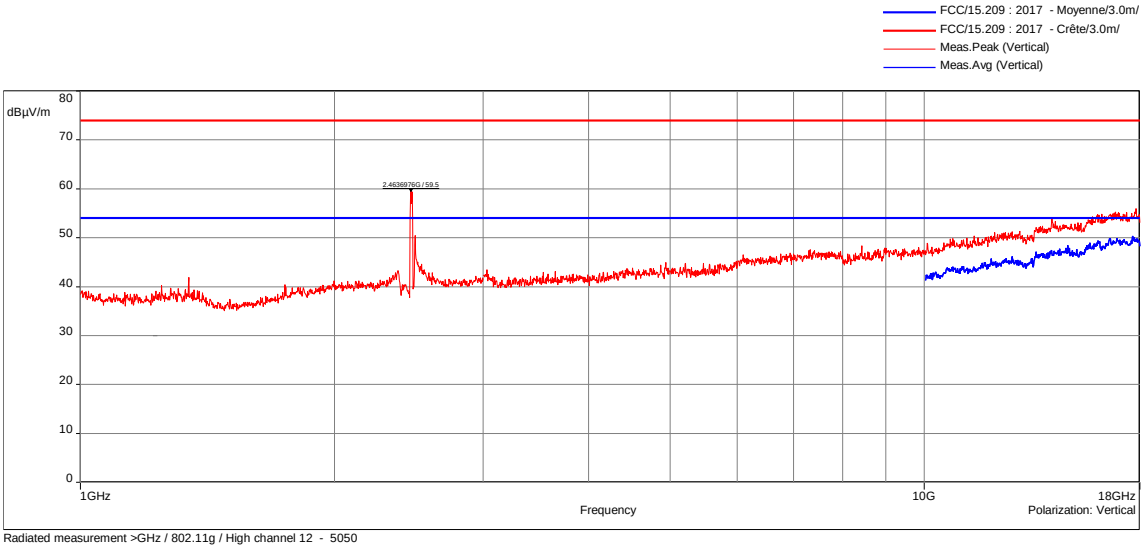


Radiated measurement >GHz / 802.11b / High channel 12 - 4541

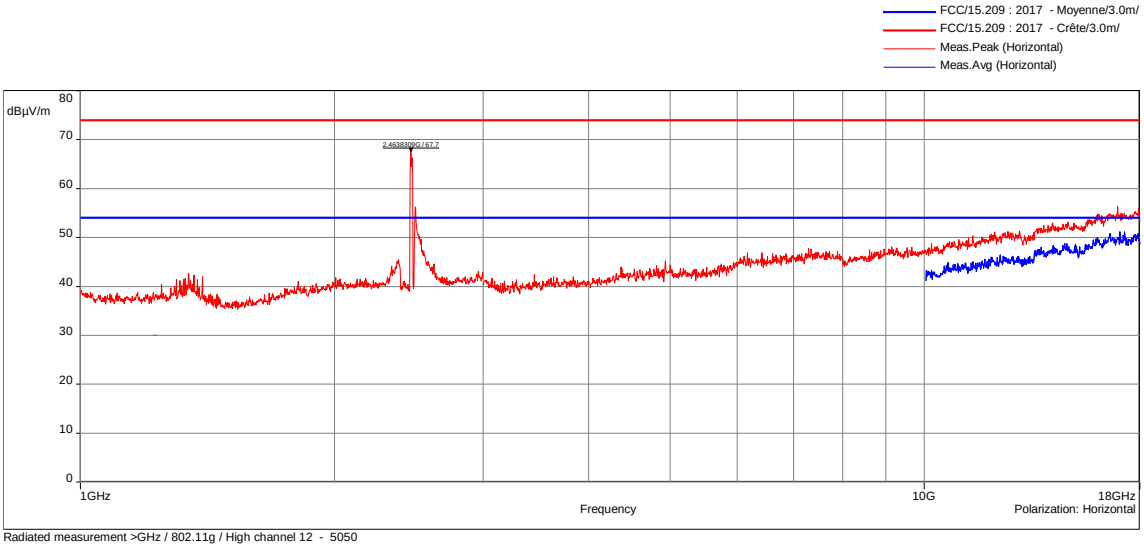
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / 1GHZ TO 18GHZ / 802.11G / CANADA HIGH CHANNEL (CH #12)		EMI5050	
EUT mode:	Tx mode	**T (°C):**	28.8
Test Date:	09/07/2021	**H (%):**	46.4
Test Operator:	ATO	**P (hPa):**	1006



Radiated measurement >GHz / 802.11g / High channel 12 - 5050

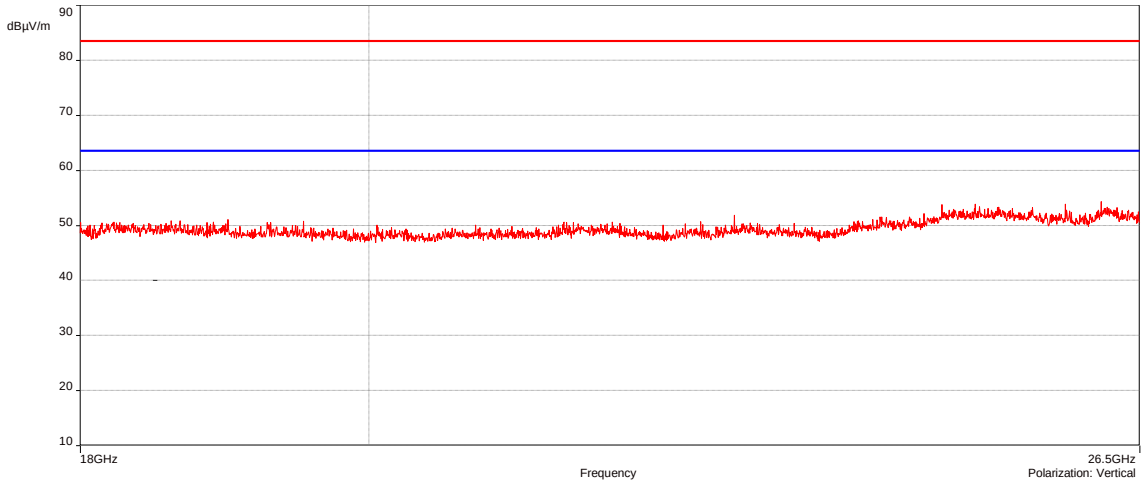


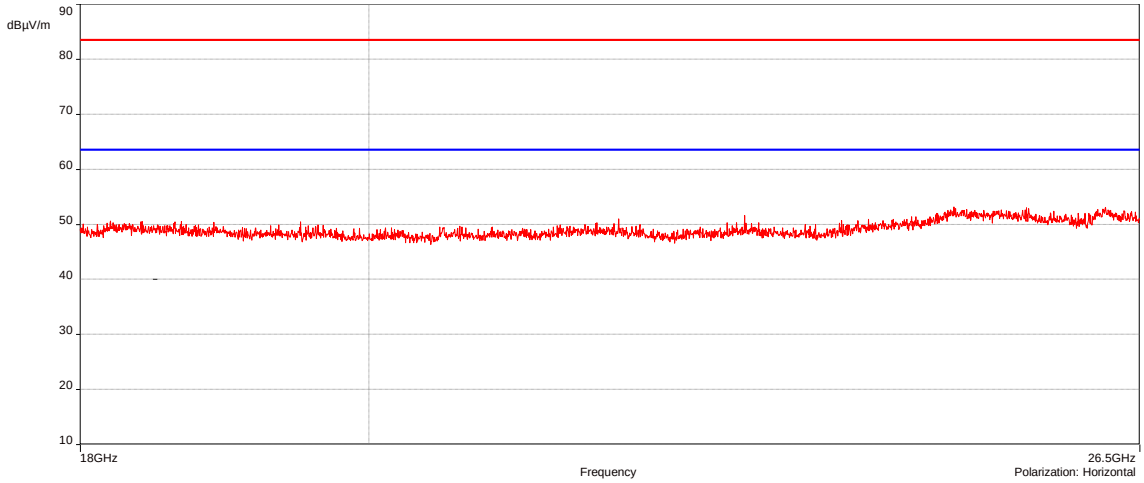
Radiated measurement >GHz / 802.11g / High channel 12 - 5050

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	2.4GHz is the main carrier signal frequency.			

EUT modification(s): N/A

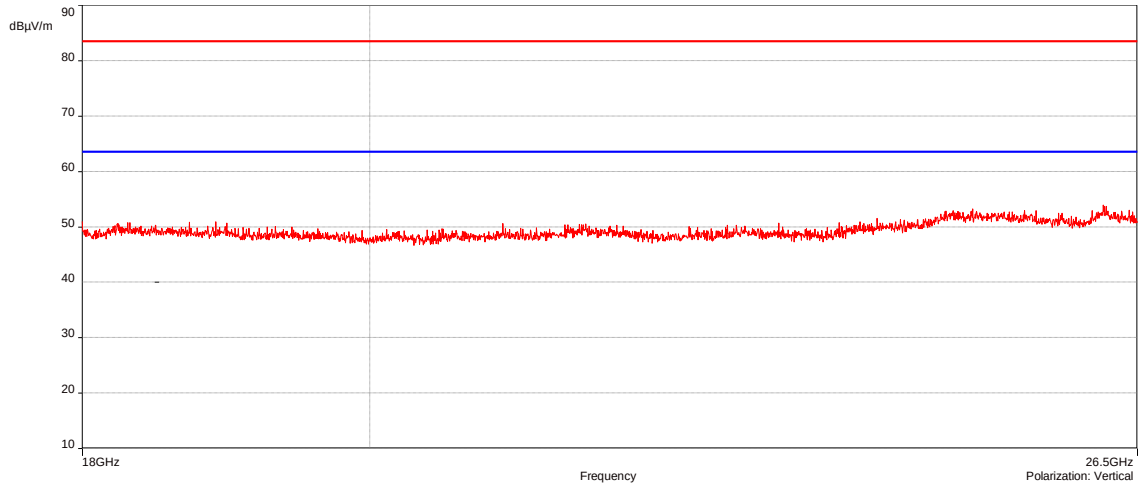
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11B / LOW CHANNEL		EMI5123	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

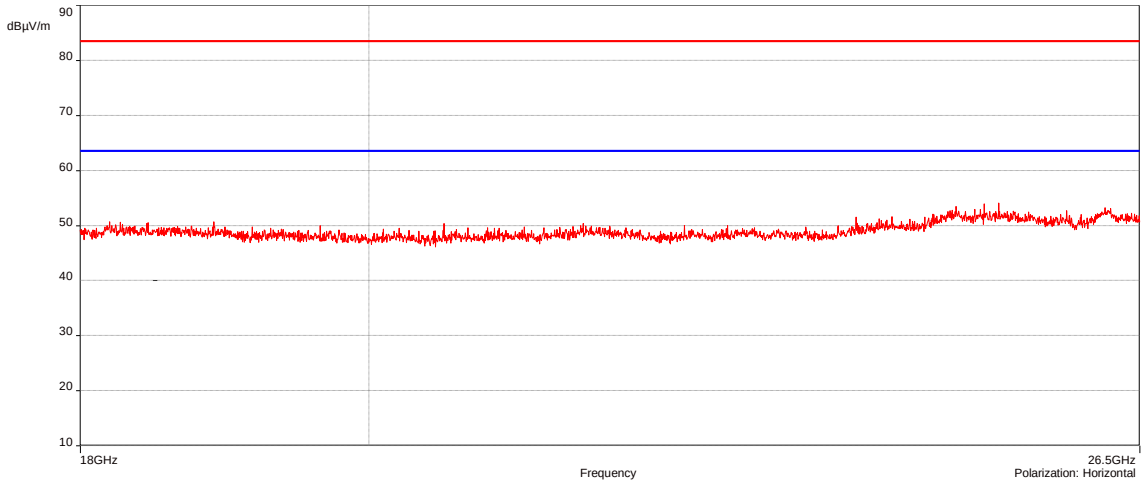




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

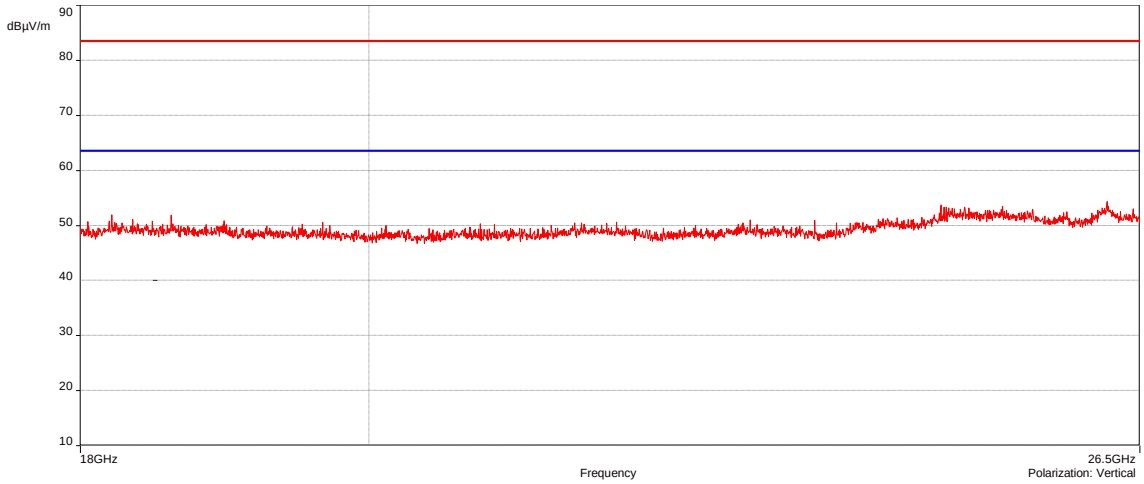
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11G / LOW CHANNEL		EMI5127	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

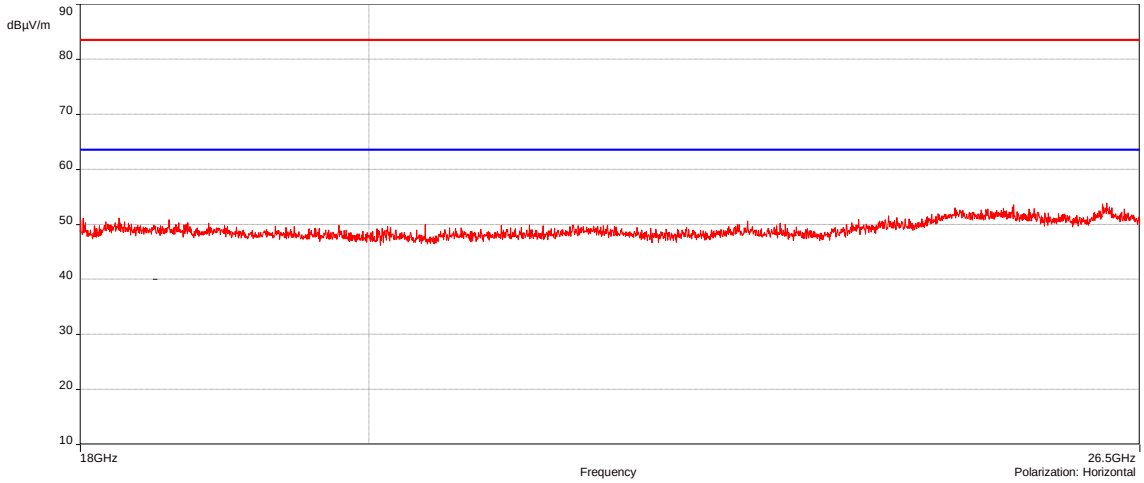




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

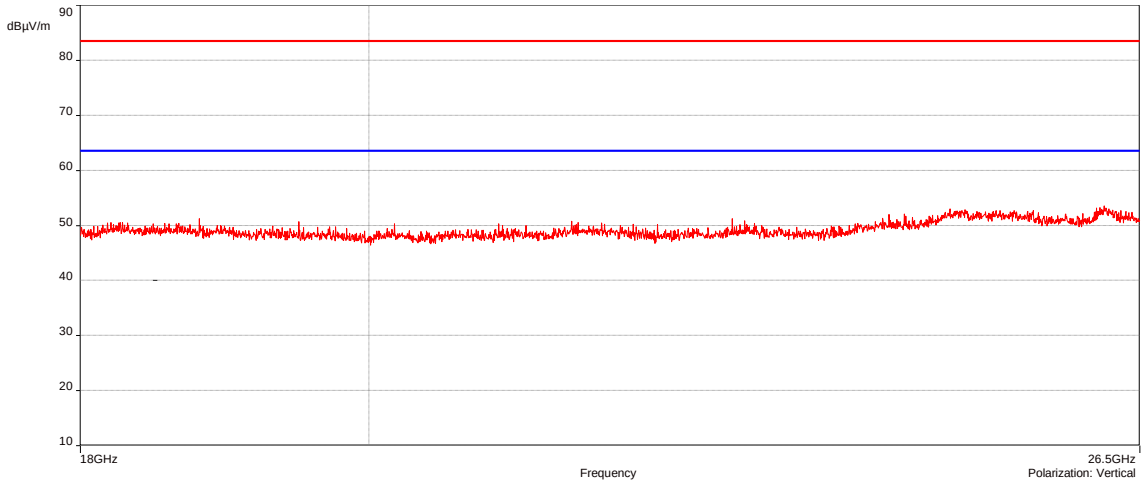
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11B / MID CHANNEL		EMI5124	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

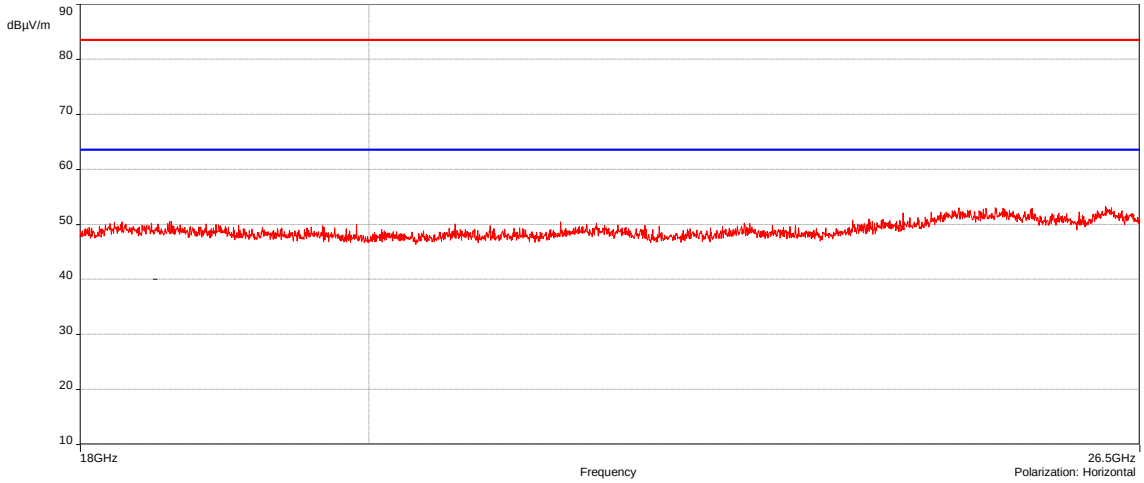




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

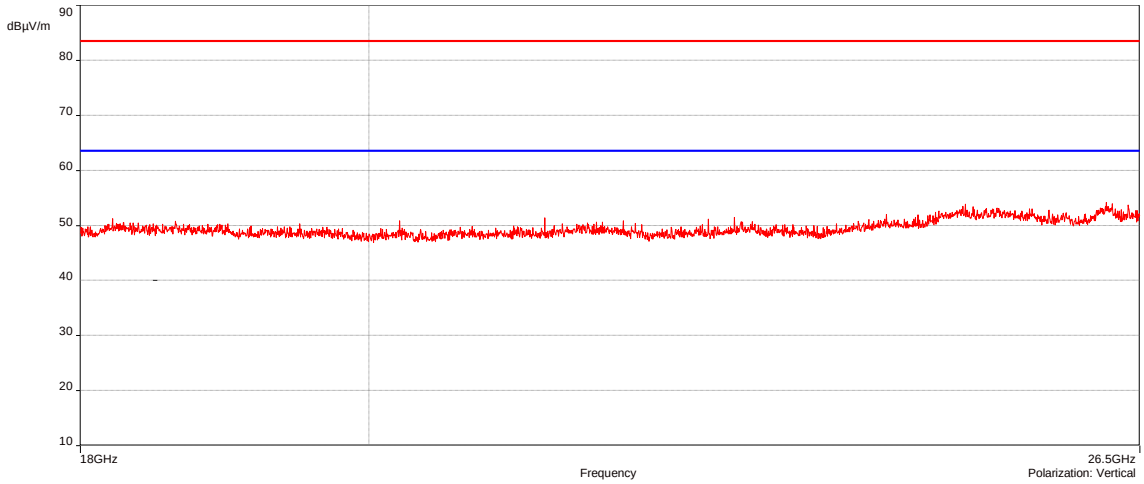
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11G / MID CHANNEL		EMI5128	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

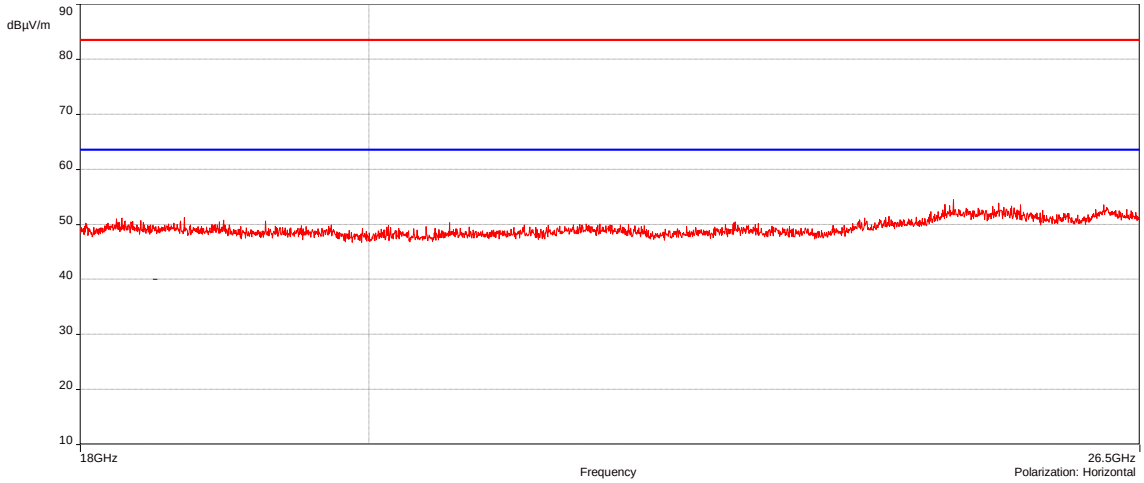




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

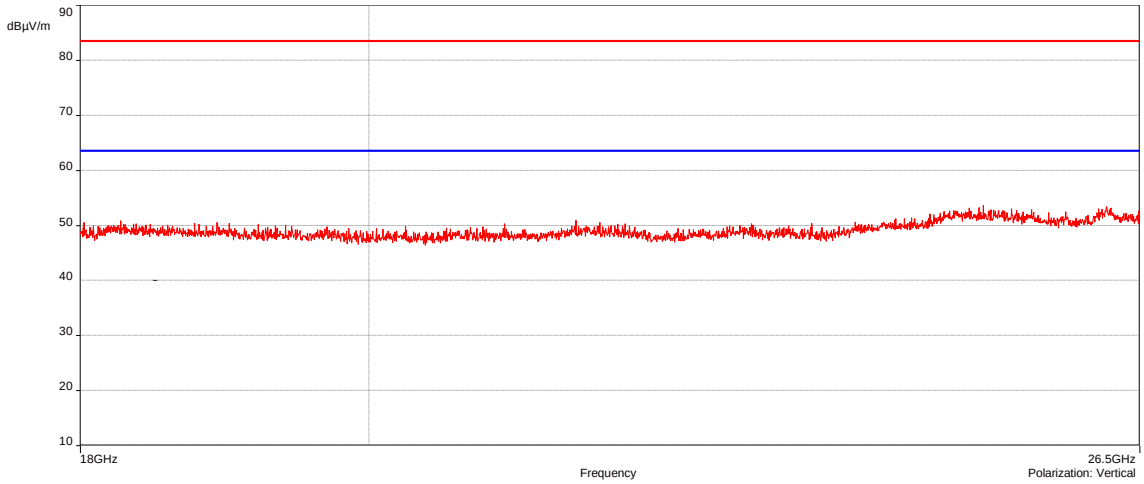
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11B / HIGH CHANNEL (CH #11)		EMI5125	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

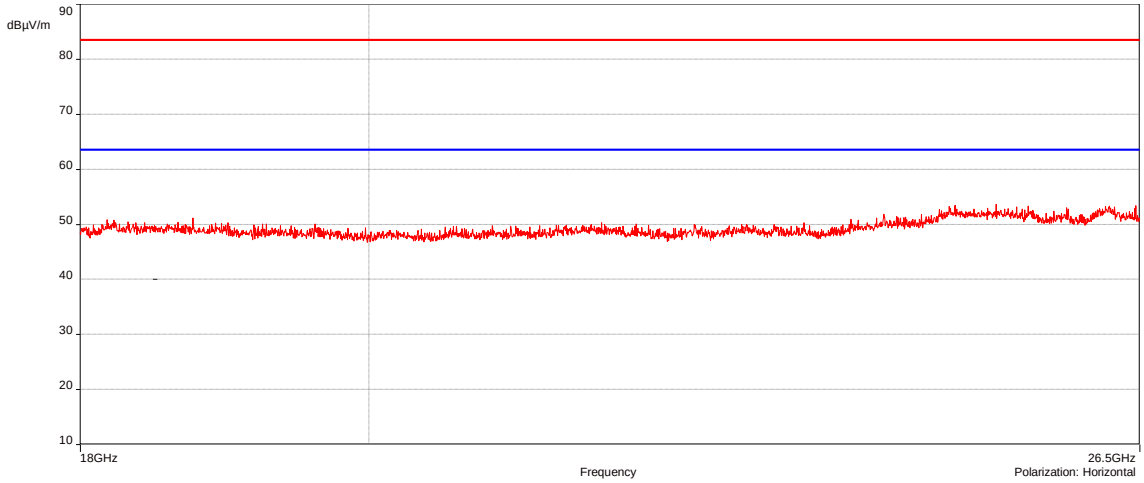




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

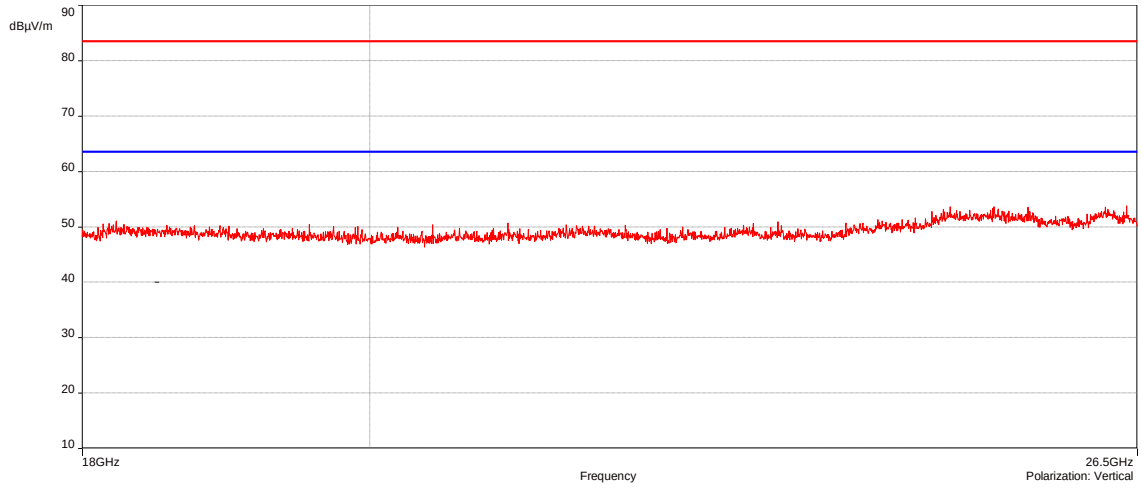
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11G / HIGH CHANNEL (CH #11)		EMI5129	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

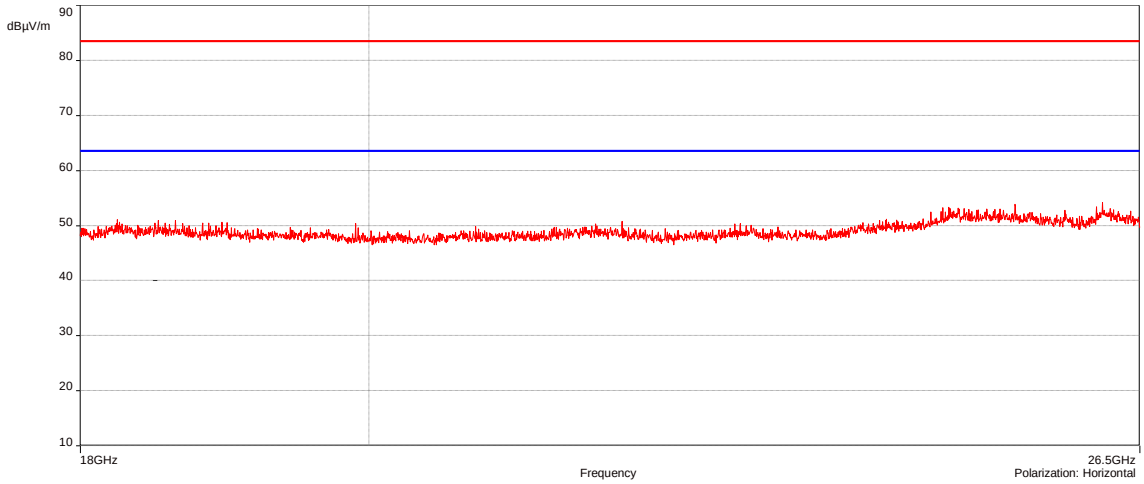




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11B / CANADA HIGH CHANNEL (CH #12)		EMI5126	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004

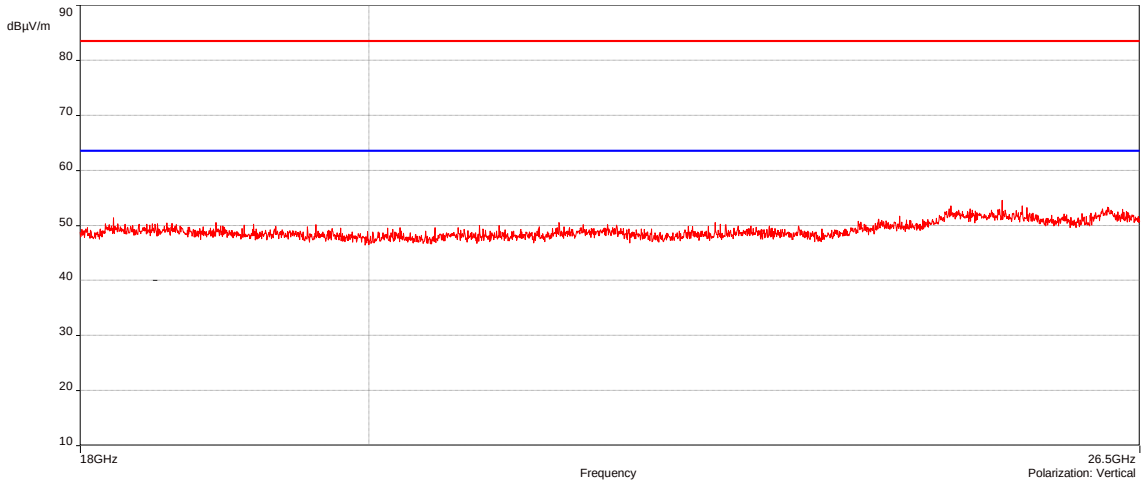


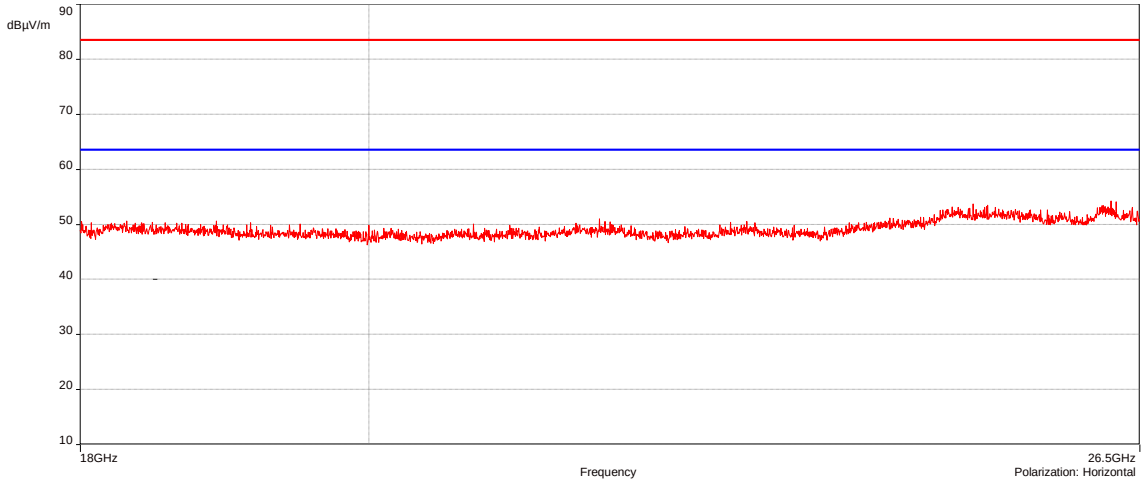


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

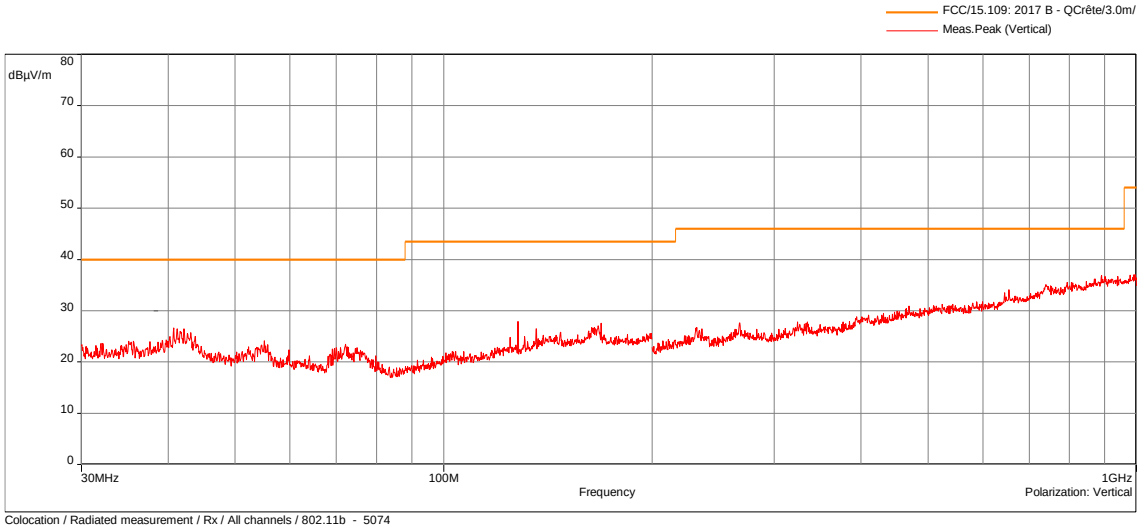
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 18GHZ TO 26.5GHZ / 802.11G / CANADA HIGH CHANNEL (CH #12)		EMI5130	
EUT mode:	Tx mode	**T (°C):**	23.9
Test Date:	04/08/2021	**H (%):**	46.8
Test Operator:	MPA	**P (hPa):**	1004



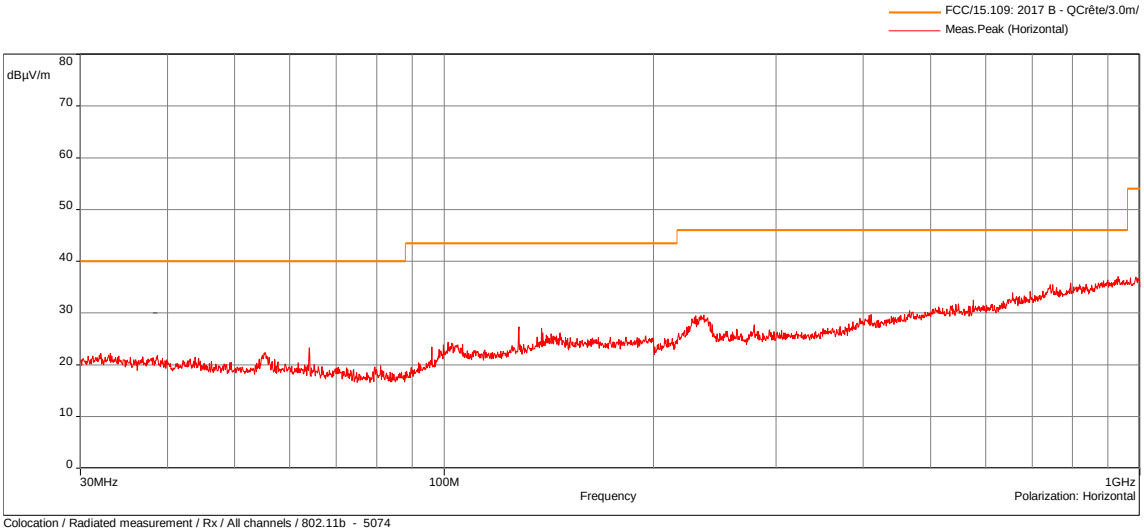


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	18GHz-26.5GHz	1MHz	3MHz	Peak
Horizontal	18GHz-26.5GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / RX MODE / ALL CHANNELS / 802.11B		EMI5132	
EUT mode:	Rx mode	**T (°C):**	20.2
Test Date:	02/08/2021	**H (%):**	41.0
Test Operator:	ATO	**P (hPa):**	1004



Colocation / Radiated measurement / Rx / All channels / 802.11b - 5074

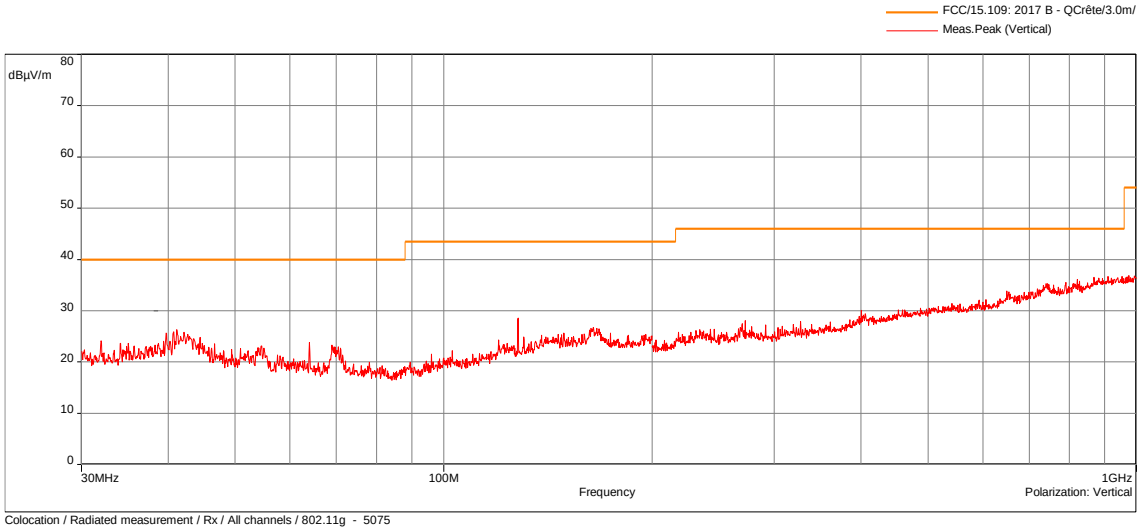


Colocation / Radiated measurement / Rx / All channels / 802.11b - 5074

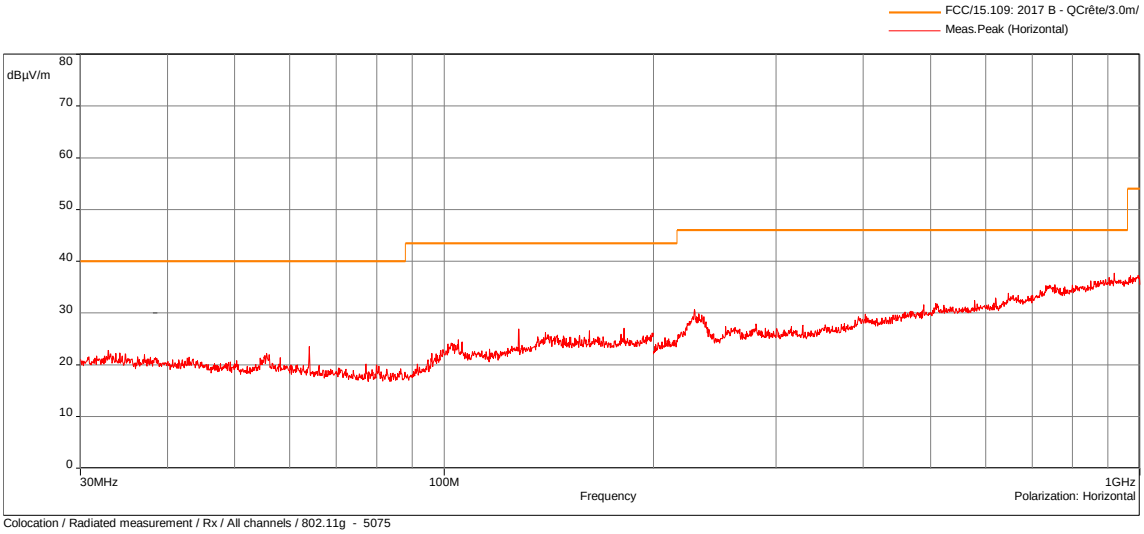
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT / RX MODE / ALL CHANNELS / 802.11G		EMI5133	
EUT mode:	Rx mode	**T (°C):**	20.2
Test Date:	02/08/2021	**H (%):**	41.0
Test Operator:	ATO	**P (hPa):**	1004



Colocation / Radiated measurement / Rx / All channels / 802.11g - 5075

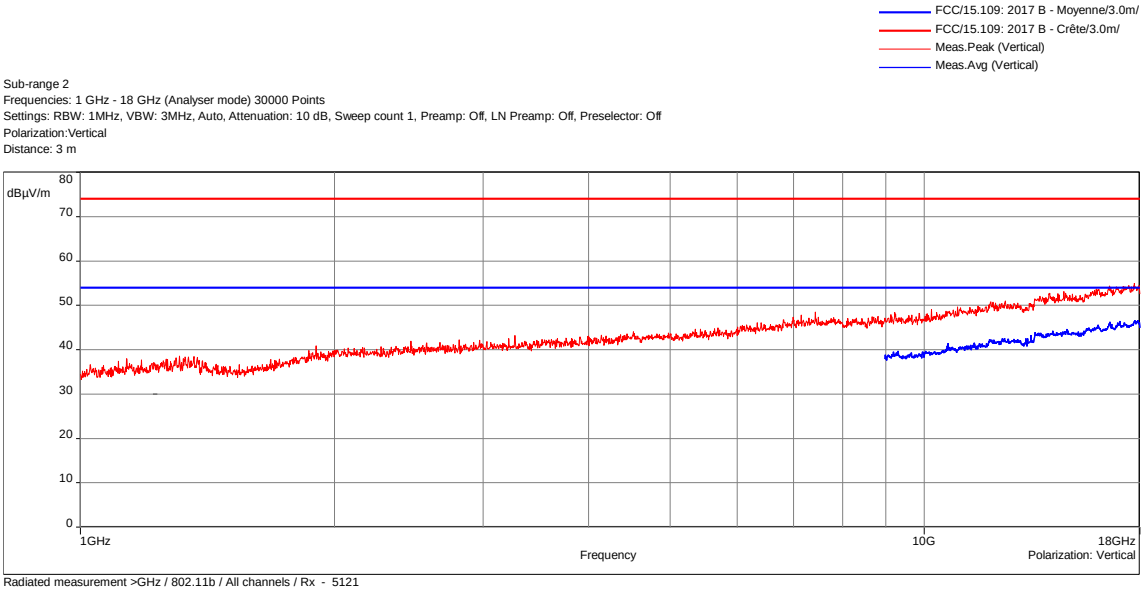


Colocation / Radiated measurement / Rx / All channels / 802.11g - 5075

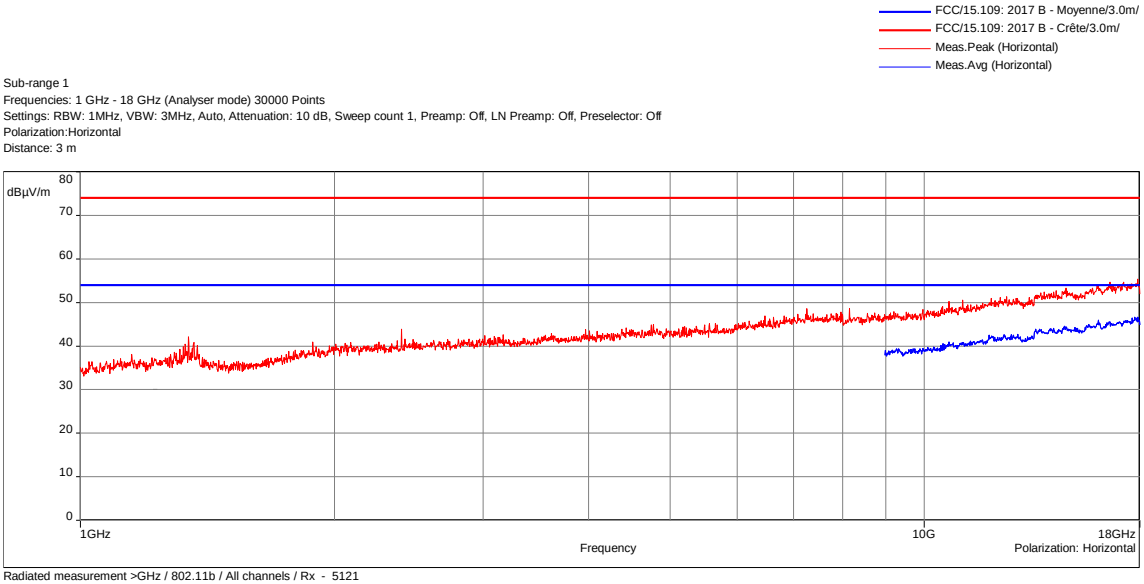
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 1GHZ TO 18GHZ / 802.11B / ALL CHANNELS / RX MODE		EMI5121	
EUT mode:	Rx mode	**T (°C):**	22.8
Test Date:	04/08/2021	**H (%):**	42.3
Test Operator:	ATO	**P (hPa):**	1004



Radiated measurement >GHz / 802.11b / All channels / Rx - 5121

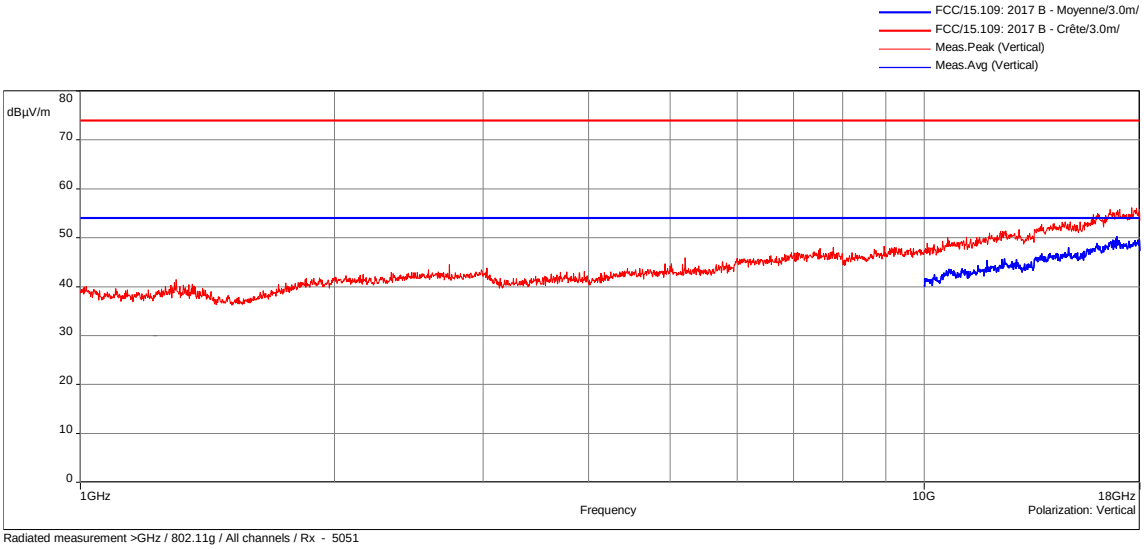


Radiated measurement >GHz / 802.11b / All channels / Rx - 5121

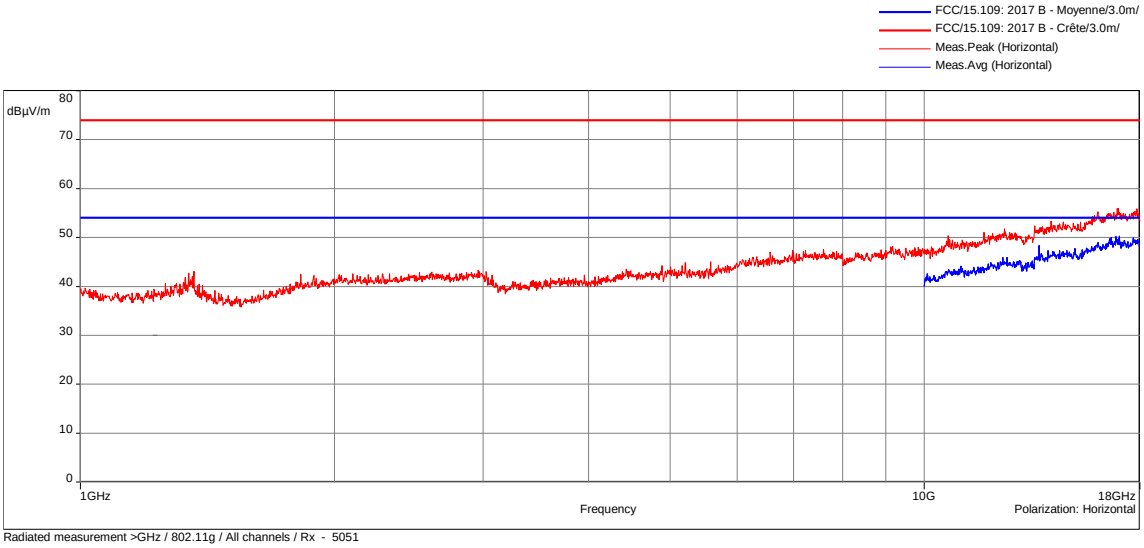
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHZ - GRAPH			
RADIATED MEASUREMENT 1GHZ TO 18GHZ / 802.11G / ALL CHANNELS / RX MODE		EMI5051	
EUT mode:	Rx mode	**T (°C):**	22.8
Test Date:	09/07/2021	**H (%):**	42.3
Test Operator:	ATO & MPA	**P (hPa):**	1004



Radiated measurement >GHz / 802.11g / All channels / Rx - 5051



Radiated measurement >GHz / 802.11g / All channels / Rx - 5051

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-3GHz	1MHz	3MHz	Peak
Horizontal	1GHz-3GHz	1MHz	3MHz	Peak
Vertical	3GHz-18GHz	1MHz	3MHz	Peak
Horizontal	3GHz-18GHz	1MHz	3MHz	Peak
Vertical	10GHz-18GHz	1MHz	3MHz	AVG
Horizontal	10GHz-18GHz	1MHz	3MHz	AVG
Configuration:	N/A			
Comments:	N/A			

EUT modification(s): N/A

8.9. Frequency error

Reference standard:	FCC part 15 Radio part 15.215 and RSS Gen
Test method:	FCC part 15 Radio part 15.215 and RSS Gen
Test description: Frequency error is the difference between the measured unmodulated carrier frequency under extreme conditions and the nominal Centre Frequency as stated by the manufacturer. This measurement procedure only applies if the EUT can generate an unmodulated carrier. EUT is set inside the climatic enclosure. It is connected to the measuring receiver via 50Ω attenuator(s). RBW=200Hz	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Low channel (Ch #1) / 802.11b	Tx mode	Within 2408.35MHz To 2475.15MHz	EMI6786	**PASS**
Mid channel (Ch #6) / 802.11b	Tx mode		EMI6787	**PASS**
High channel (Ch #11) / 802.11b	Tx mode		EMI6788	**PASS**
Canada High channel (Ch #12) / 802.11b	Tx mode		EMI6789	**PASS**
Low channel (Ch #1) / 802.11g	Tx mode		EMI6790	**PASS**
Mid channel (Ch #6) / 802.11g	Tx mode		EMI6791	**PASS**
High channel (Ch #11) / 802.11g	Tx mode		EMI6792	**PASS**
Canada High channel (Ch #12) / 802.11g	Tx mode		EMI6793	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	21.7
Relative Humidity	20 to 75 %	66.4
Atmospheric pressure	N/A	1004
Test method deviation: N/A		
Supplementary information: EUT power supply is replaced by a stabilized power supply. Limit indicated is 80% of the permitted band.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	GW Instek	APS-1102	17754	02/03/2021	02/05/2022
Antenna	EMITECH	3.5 cm	4653		
Cable	C&C	N-3m	14331	18/03/2021	18/05/2023
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Cable	Radiall	SMA-1m	16564	29/07/2019	29/09/2021
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	07/04/2021	07/06/2022
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermohygrometer	Testo	608-H2	7611	09/06/2021	09/08/2023
Thermometer contactless	GHM Greisinger	GMH 3710	12968	06/10/2020	06/12/2021

Blank cells = Permanent validity

TEST SETUP PHOTO(S)

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
LOW CHANNEL (CH #1) / 802.11B			EMI6786	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2412.00116	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2412.00567	
Extremes Temperature conditions	45	120Vac/60Hz	2412.02274	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2412.00761	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2412.00886	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
MID CHANNEL (CH #6) / 802.11B			EMI6787	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2437.00166	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2437.00575	
Extremes Temperature conditions	45	120Vac/60Hz	2437.02291	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2437.00721	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2437.00788	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
HIGH CHANNEL (CH #11) / 802.11B			EMI6788	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2462.00212	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2462.00588	
Extremes Temperature conditions	45	120Vac/60Hz	2462.02008	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2462.00714	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2462.00757	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
CANADA HIGH CHANNEL (CH #12) / 802.11B			EMI6789	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2467.00240	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2467.00612	
Extremes Temperature conditions	45	120Vac/60Hz	2467.01890	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2467.00755	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2467.00712	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
LOW CHANNEL (CH #1) / 802.11G			EMI6790	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2411.99805	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2412.00170	
Extremes Temperature conditions	45	120Vac/60Hz	2411.99940	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2411.99169	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2411.99180	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
MID CHANNEL (CH #6) / 802.11G			EMI6791	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2436.99310	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2437.00100	
Extremes Temperature conditions	45	120Vac/60Hz	2436.99890	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2436.99195	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2436.99190	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
HIGH CHANNEL (CH #11) / 802.11G			EMI6792	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2461.99280	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2462.00000	
Extremes Temperature conditions	45	120Vac/60Hz	2461.99880	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2461.99247	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2466.99430	

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
CANADA HIGH CHANNEL (CH #12) / 802.11G			EMI6793	
Test Case	**Temperature (°C)**	**Power supply**	**Frequency (MHz)**	**Limit**
Normal conditions	25	120Vac/60Hz	2466.99280	Within 2408.35MHz To 2475.15MHz
Extremes Temperature conditions	0	120Vac/60Hz	2466.99840	
Extremes Temperature conditions	45	120Vac/60Hz	2466.99810	
Extremes Power supply conditions -15%	25	102Vac/60Hz	2466.99327	
Extremes Power supply conditions +15%	25	138Vac/60Hz	2466.9943	

End of test report