



Canada

EMC & RF Test Report

As per

RSS-247 Issue 2:2017 & FCC Part 15 Subpart 15.247

Unlicensed Intentional Radiators

on the

rMODIT3 Module 2.4 GHz Transmitter

Issued by:

TÜV SÜD Canada Inc.
11 Gordon Collins Dr,
Gormley, ON, L0H 1G0
Canada
Ph: (905) 883-7255

Prepared by:

Min Xie,
Sr. Project Engineer

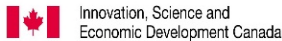
Reviewed by:

Amir Emami,
Project Engineer

Testing produced for



See Appendix A for full client & EUT details.



Registration #
6844A-3



Testing Laboratory
Certificate #2955.02



R-14023, G-20072
C-14498, T-20060



Registration #
CA6844



Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

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Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Report Scope

This report addresses the EMC verification testing and test results of the **rMODIT3 Module**. This unit is herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:


RSS-247 Issue 2:2017

FCC Part 15 Subpart C 15.247

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.


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Summary

The results contained in this report relate only to the item(s) tested.

EUT:	rMODIT Module
FCC Certification #, FCC ID:	2ADCB-RMODIT3
Industry Canada Certification #, IC:	6715C-RMODIT3
EUT passed all tests performed	Yes
Tests conducted by	Min Xie
Report reviewed by	Amir Emami


For testing dates, see "Testing Environmental Conditions and Dates".

Client	Acuity Brands Lighting, Inc	
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Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS-GEN (Table 6)	Restricted Bands for Intentional Operation	QuasiPeak Average	Pass
FCC 15.207 RSS-GEN (Table 3)	Power Line Conducted Emissions	QuasiPeak Average	N/A
FCC 15.209 RSS-GEN (Table 4)	Spurious Radiated Emissions	QuasiPeak Average	Pass
FCC 15.247(a)2 RSS-247 5.2(a)	6 dB Bandwidth	> 500 kHz	N/A
FCC 15.247(b)2 RSS-247 5.4(d)	Max Output Power	< 1 Watt	N/A
FCC 15.247(b)4 RSS-247 5.4(d)	Antenna Gain	< 6 dBi	Pass See Justifications
FCC 15.247(d) RSS-247 5.5	Antenna Conducted Spurious	< 20 dBc	N/A
FCC 15.247(e) RSS-247 5.2(b)	Spectral Density	< 8 dBm (3 kHz BW)	N/A
Overall Result			Pass

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties.

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Notes, Justifications, or Deviations

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

The report is for a Class 2 Permissive change. A new stamped metal antenna is being added to the transmitter. The following tests are not applicable:


- 6 dB Bandwidth
- Power
- Power density
- Antenna conducted emission

For the Antenna requirement specified in FCC 15.203 (RSS-247 section 5.4(d)), the Stamped Metal is with 0 dBi gain which is less than the 6 dBi limit.

For the Restricted Bands of operation, the EUT is designed to only operate between 2400 – 2483.5 MHz.

The EUT is not a hybrid system and FCC 15.247 (f) does not apply to it. However, the 15.247 (d) requirement of power density were met and are detailed later in this test report.

The EUT PCB was tested positioned in the three orthogonal axes. Worst case results are presented for each antenna, and it all occurs with the PCB positioned up. See *Appendix B* for test photos.

Client	Acuity Brands Lighting, Inc	
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Sample Calculation(s)

Radiated Emission Test

E-Field Level = Received Signal + Antenna Factor + Cable Loss – Pre-Amp Gain


E-Field Level = 50dB μ V + 10dB/m + 2dB – 20dB

E-Field Level = 42dB μ V/m

Margin = Limit – E-Field Level


Margin = 50dB μ V/m – 42dB μ V/m

Margin = 8.0 dB (pass)

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Applicable Standards, Specifications and Methods

ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard For Testing Unlicensed Wireless Devices
CFR 47 FCC 15 Subpart C	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
CISPR 32:2015 A1:2019	Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements
FCC KDB 558074: 2019	FCC KDB 558074 Digital Transmission Systems, measurements and procedures
FCC KDB 447498: 2015	RF exposure procedures and equipment authorization policies for mobile and portable devices
ICES-003 Issue 7 2020	Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
RSS-GEN Issue 5 2019	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2:2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ISO 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories

Client	Acuity Brands Lighting, Inc	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Document Revision Status

Revision	Date	Description	Initials
000	June15, 2021	Initial Release	MX
-	-	-	-

Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

DTS – Digital Transmission System
LISN – Line Impedance Stabilization Network
NCR – No Calibration Required
NSA – Normalized Site Attenuation
N/A – Not Applicable
RF – Radio Frequency

AE – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

Antenna Port – Port, other than a broadcast receiver tuner port, for connection of an antenna used for intentional transmission and/or reception of radiated RF energy.


BW – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

EMI – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

EUT – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

ITE – Information Technology Equipment. Has a primary function of entry, storage, display, retrieval, transmission, processing, switching, or control of data and/or telecommunication messages and which may be equipped with one or more ports typically for information transfer.


Client	Acuity Brands Lighting, Inc	
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Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada testing lab near Toronto, Ontario. The testing lab has calibrated 3m semi-anechoic chambers which allow measurements on a EUT that has a maximum width or length of up to 2m and a height of up to 3m. The testing lab also has a calibrated 10m Open Area Test Site (OATS). The chambers are equipped with a turntable that is capable of testing devices up to 5000lb in weight and are equipped with a mast that controls the polarization and height of the antenna. Control of the mast occurs in the control room adjoining the shielded chamber. This facility is capable of testing products that are rated for single phase or 3-phase AC input and DC capability is also available. Radiated emission measurements are performed using a BiLog antenna and a Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN and using the vertical ground plane if applicable.

Calibrations and Accreditations


The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, CA6844), Innovation, Science and Economic Development Canada (ISED, 6844A-3) and Voluntary Control Council for Interference (VCCI, R-14023, G-20072, C-14498, and T-20060). This chamber was calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at TÜV SÜD Canada. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at TÜV SÜD Canada. TÜV SÜD Canada Inc. is accredited to ISO 17025 by A2LA with Testing Certificate #2955.02. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or biennial basis as listed for each respective test.

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Testing Environmental Conditions and Dates

Following environmental conditions were recorded in the facility during time of testing

Date	Test	Initials	Temperature (°C)	Humidity (%)	Pressure (kPa)
2021 Jun 8, 10	Radiated Emissions	MX	24 – 25	37.0 – 64.2	101.3 – 101.4

Client	Acuity Brands Lighting, Inc	 TUV SUD Canada
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Detailed Test Results Section

Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Transmitter Spurious Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limits and Method

The method is as defined in FCC KDB 558074 Section 12.2 and ANSI C63.10.

The limits, as defined in 15.247(d) for unintentional radiated emissions, apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).

All unintentional emissions must also meet the ‘Spurious Conducted Emissions’ requirements of -20 dBc or greater. See also ‘Antenna Spurious Conducted Emissions (-20dBc)’ for further details.


Frequency	Field Strength Limit ($\mu\text{V/m}$)	Field Strength at 3m ($\text{dB}\mu\text{V/m}$)
0.009 MHz – 0.490 MHz	2400/F(kHz) ^a (at 300m)	128.5 to 93.8 ^a
0.490 MHz – 1.705 MHz	24000/F(kHz) ^a (at 30m)	73.8 to 63.0 ^a
1.705 MHz – 30 MHz	30 ^a (at 30m)	69.5 ^a
30 MHz – 88 MHz	100 ^a (at 3m)	40.0 ^a
88 MHz – 216 MHz	150 ^a (at 3m)	43.5 ^a
216 MHz – 960 MHz	200 ^a (at 3m)	46.0 ^a
Above 960 MHz	500 ^a (at 3m)	54.0 ^a
Above 1000 MHz	500 ^b (at 3m)	54.0 ^b
Above 1000 MHz	5 mV/m ^c (at 3m)	74.0 ^c

^aLimit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

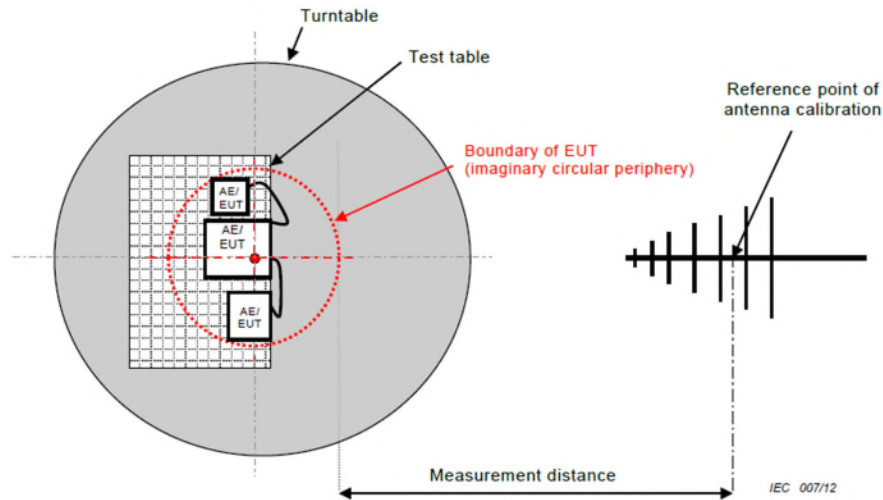
^bLimit is with 1 MHz measurement bandwidth and using an Average detector

^cLimit is with 1 MHz measurement bandwidth and using a Peak detector

Based on ANSI C63.4 Section 4.2, if the Peak detector measurements do not exceed the Quasi-Peak limits, where defined, then the EUT is deemed to have passed the requirements.

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Typical Radiated Emissions Setup



Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is $\pm 5.67\text{dB}$ for 30MHz – 1GHz and $\pm 4.58\text{dB}$ for 1GHz – 18GHz with a 'k=2' coverage factor and a 95% confidence level.


Preliminary Graphs

The graphs shown below are maximized peak measurement graphs measured with a resolution bandwidth greater than or equal to the final required detector over a full 0-360°. This peaking process is done as a worst case measurement and enables the detection of frequencies of concern for final measurement. For final measurements with the appropriate detector, where applicable, please refer to the tables under Final Measurements.

In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10th harmonic (a minimum of 24900 MHz).

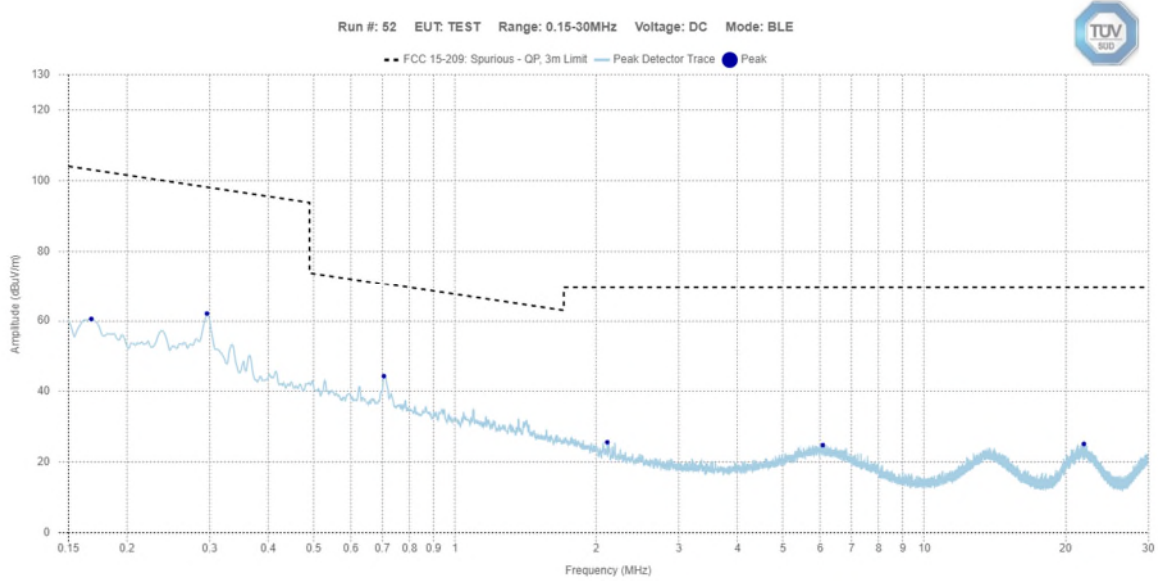
Devices scanned may be scanned at alternate test distances and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.


Peak output power for low, middle, and high channels and each of the orthogonal axes of the PCB was checked. The worst case was used for the spurious emissions for each antenna, all of which occurred on the High Channel.

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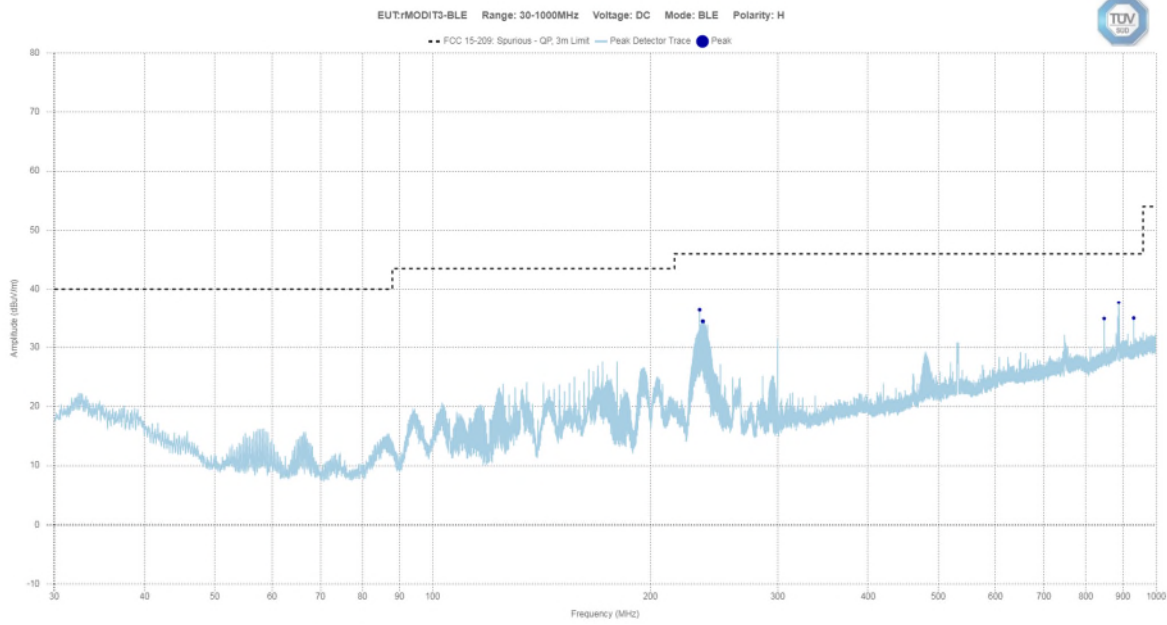
High Channel
9 kHz – 150 kHz
Peak Emission Graph

High Channel
150 kHz – 30 MHz
Peak Emission Graph

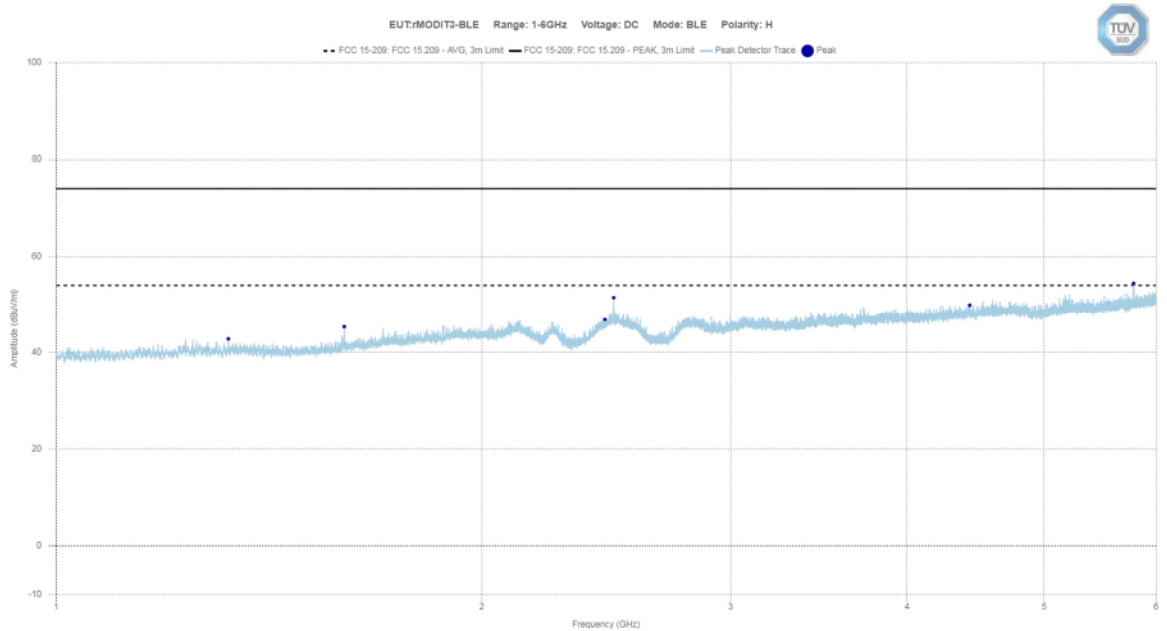



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High Channel – 30 MHz – 1 GHz Horizontal - Peak Emission Graph

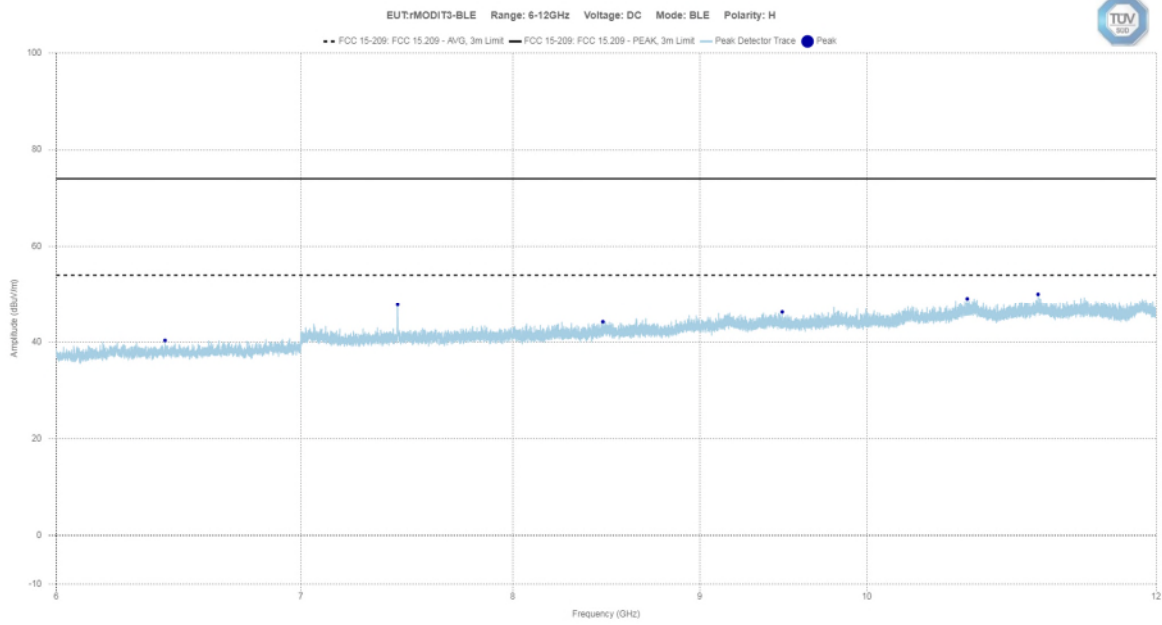


High Channel – 1 GHz – 6 GHz Horizontal - Peak Emission Graph

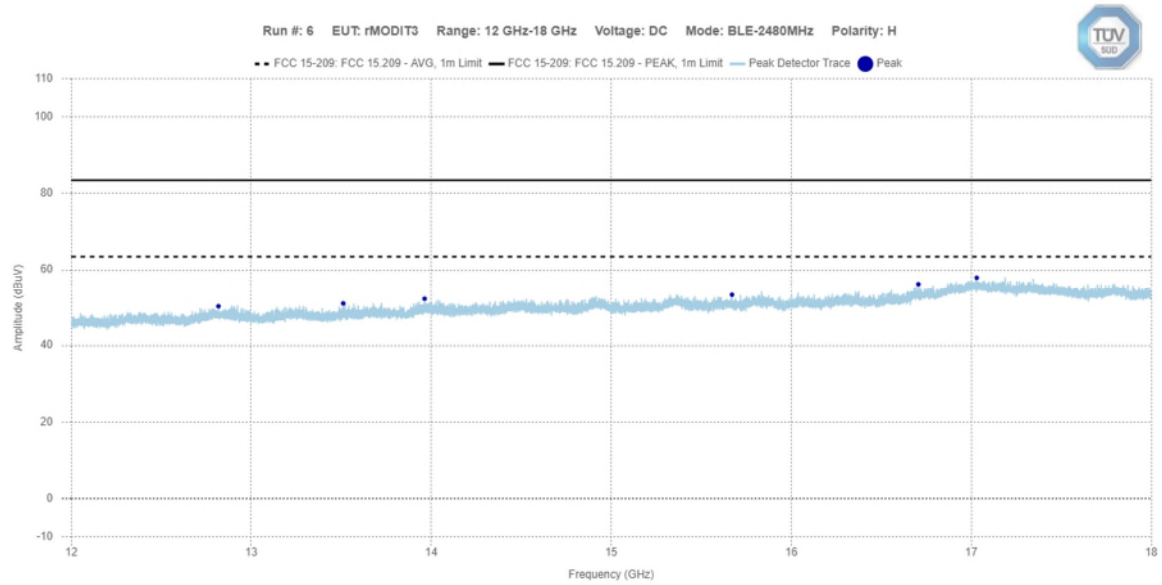



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High Channel – 6 GHz – 12 GHz Horizontal - Peak Emission Graph

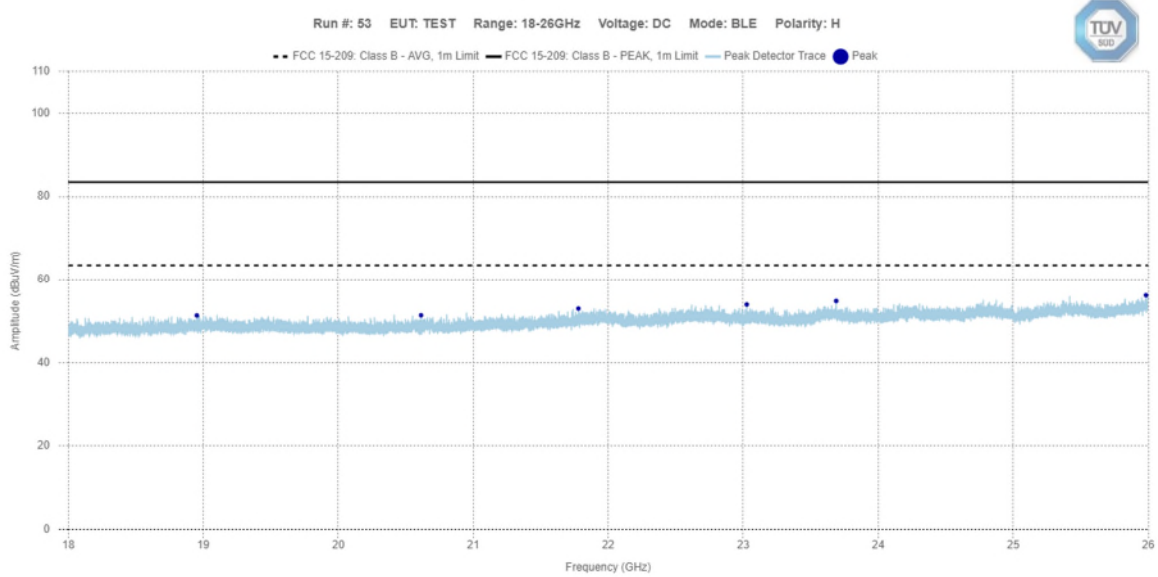


High Channel – 12 GHz – 18 GHz Horizontal - Peak Emission Graph

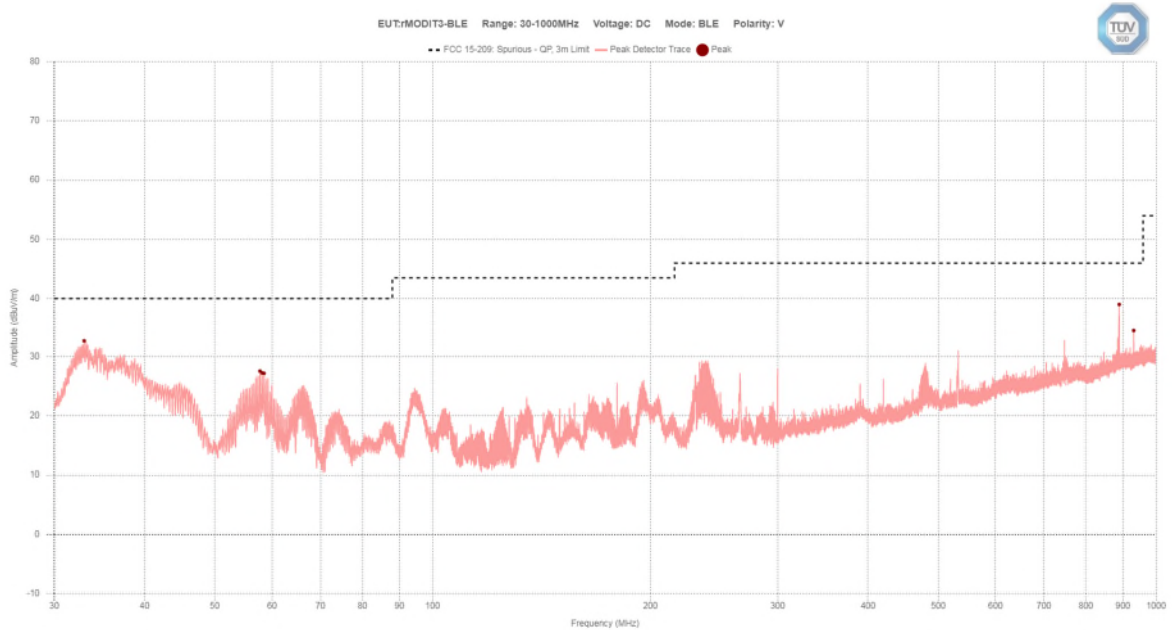



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High Channel – 18 GHz – 26 GHz Horizontal - Peak Emission Graph

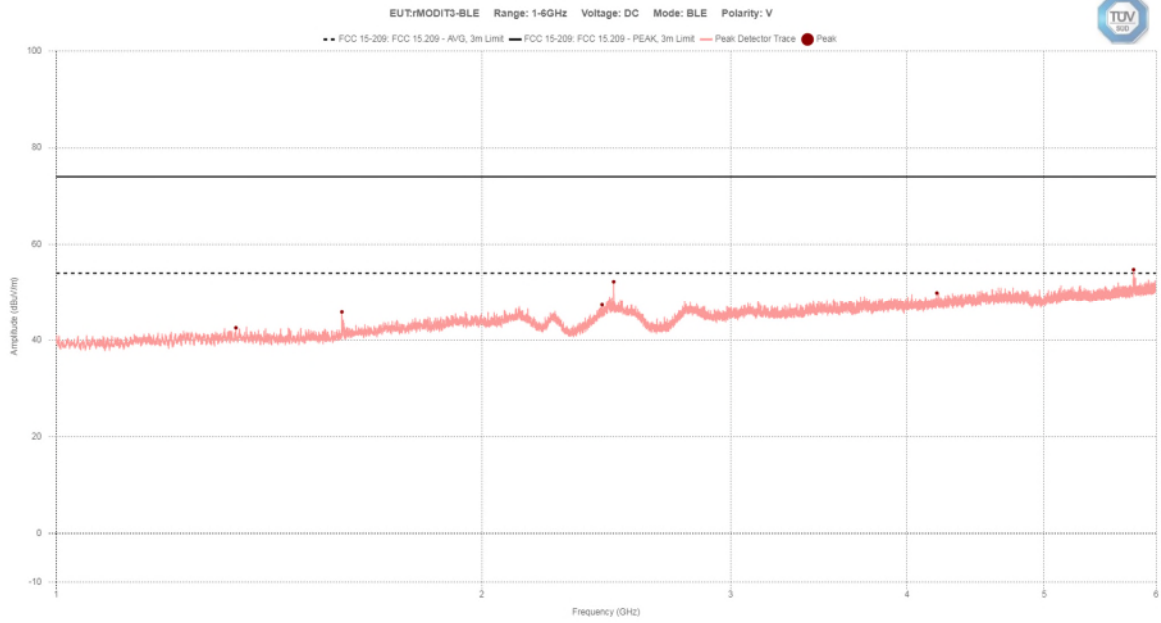


High Channel – 30 MHz – 1 GHz Vertical - Peak Emission Graph

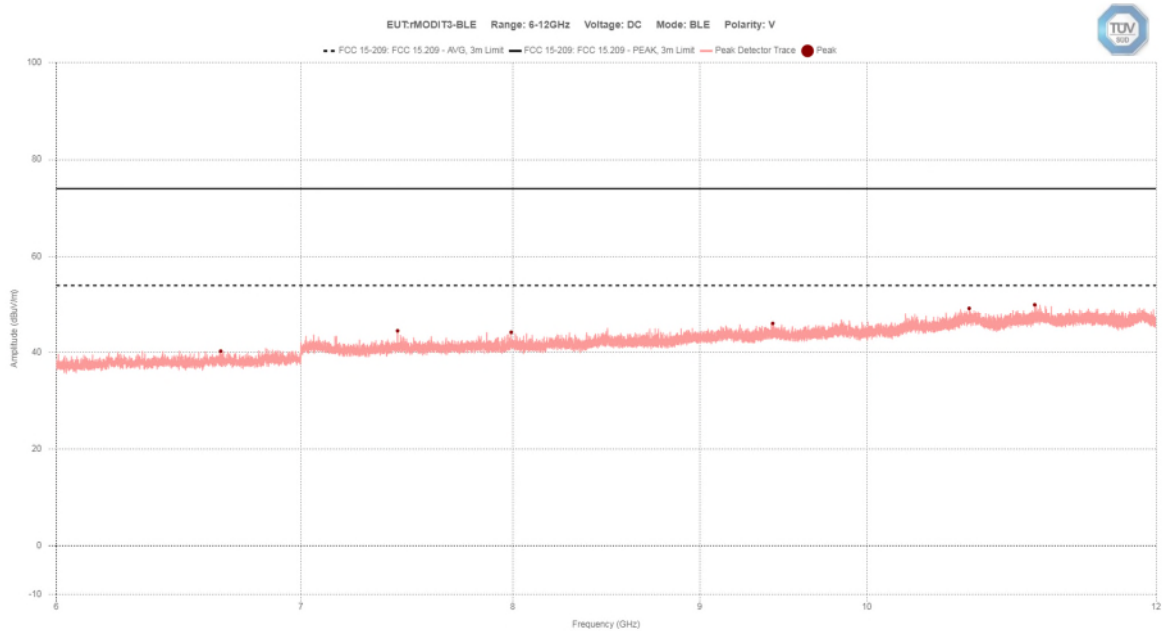



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High Channel – 1 GHz – 6 GHz Vertical - Peak Emission Graph

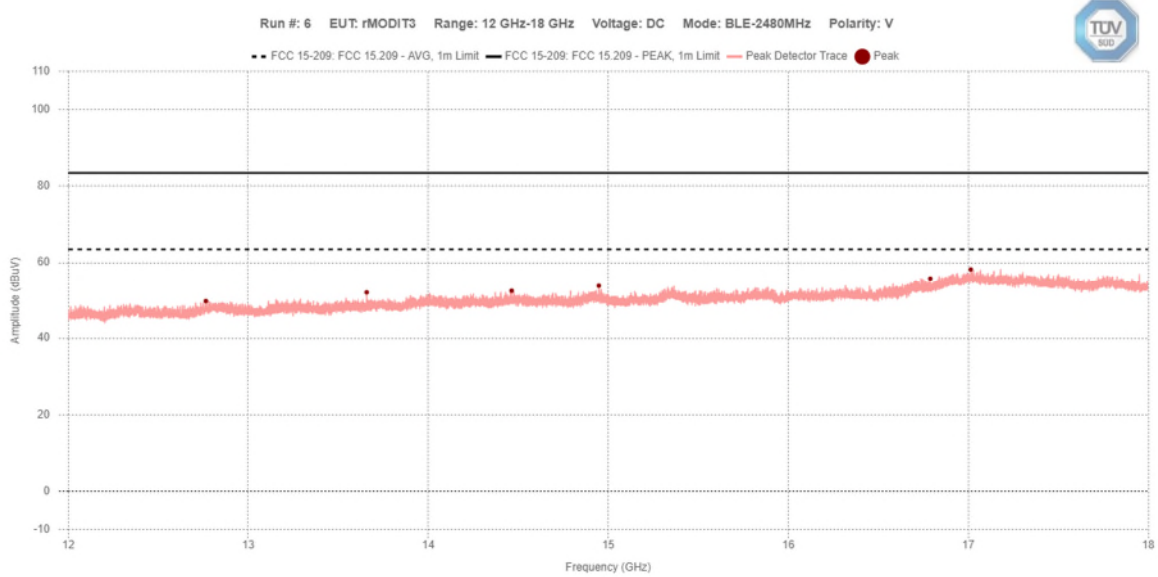


High Channel – 6 GHz – 12 GHz Vertical - Peak Emission Graph

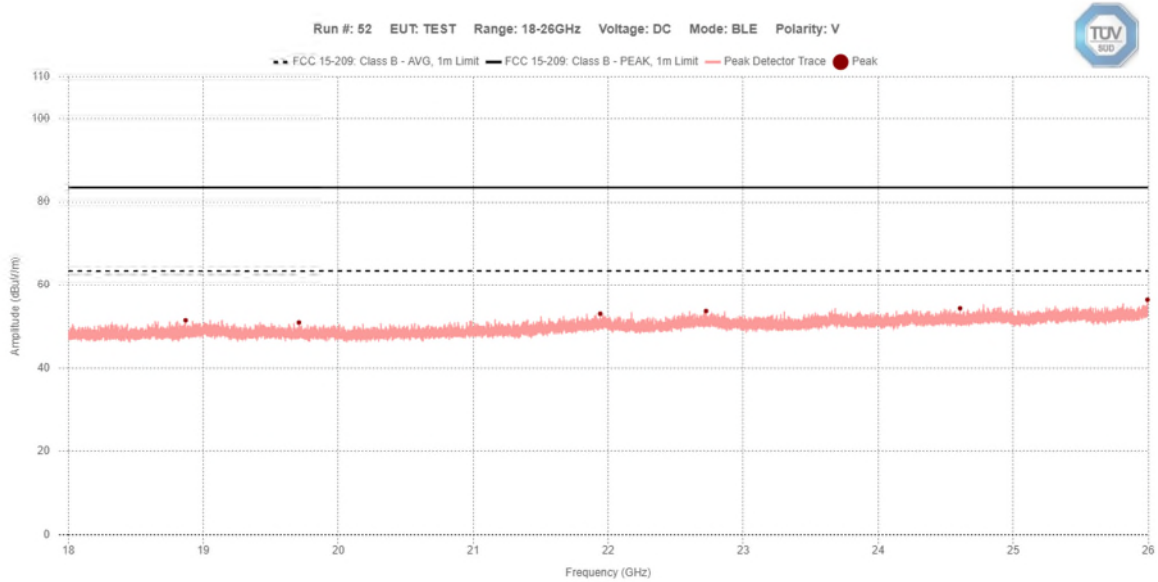



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High Channel – 12 GHz – 18 GHz Vertical - Peak Emission Graph



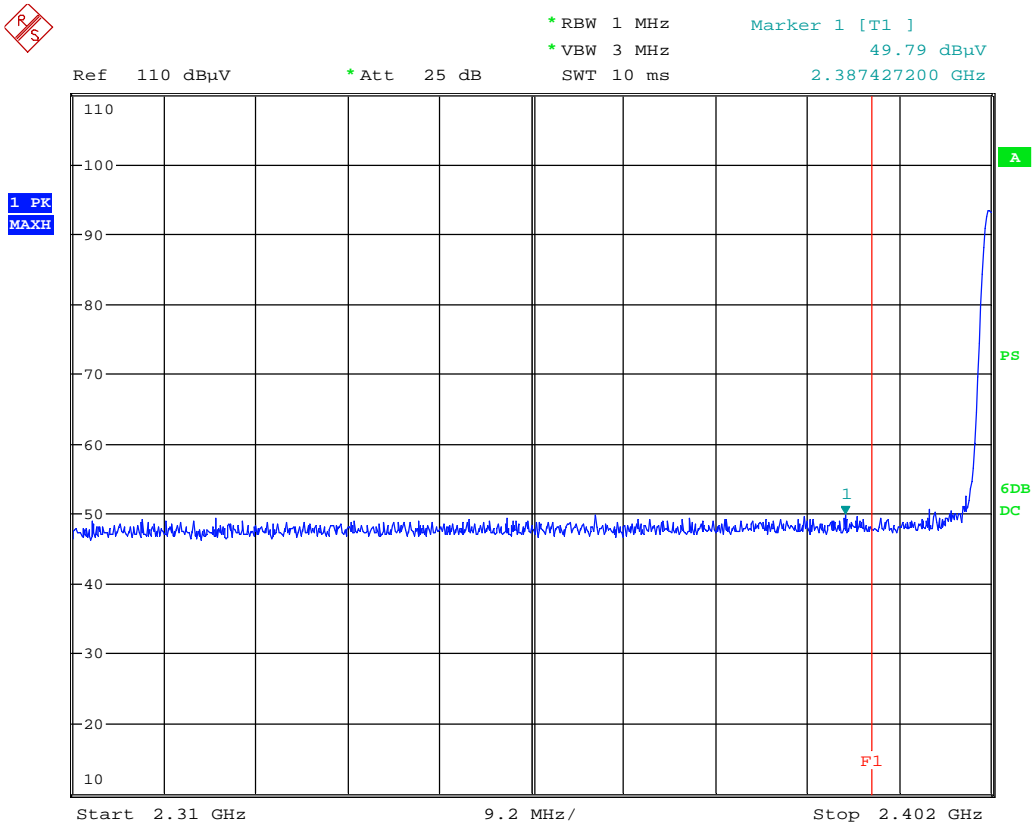
High Channel – 18 GHz – 26 GHz Vertical - Peak Emission Graph



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Band Edges

Band Edge – Low Channel Horizontal - Peak Emission

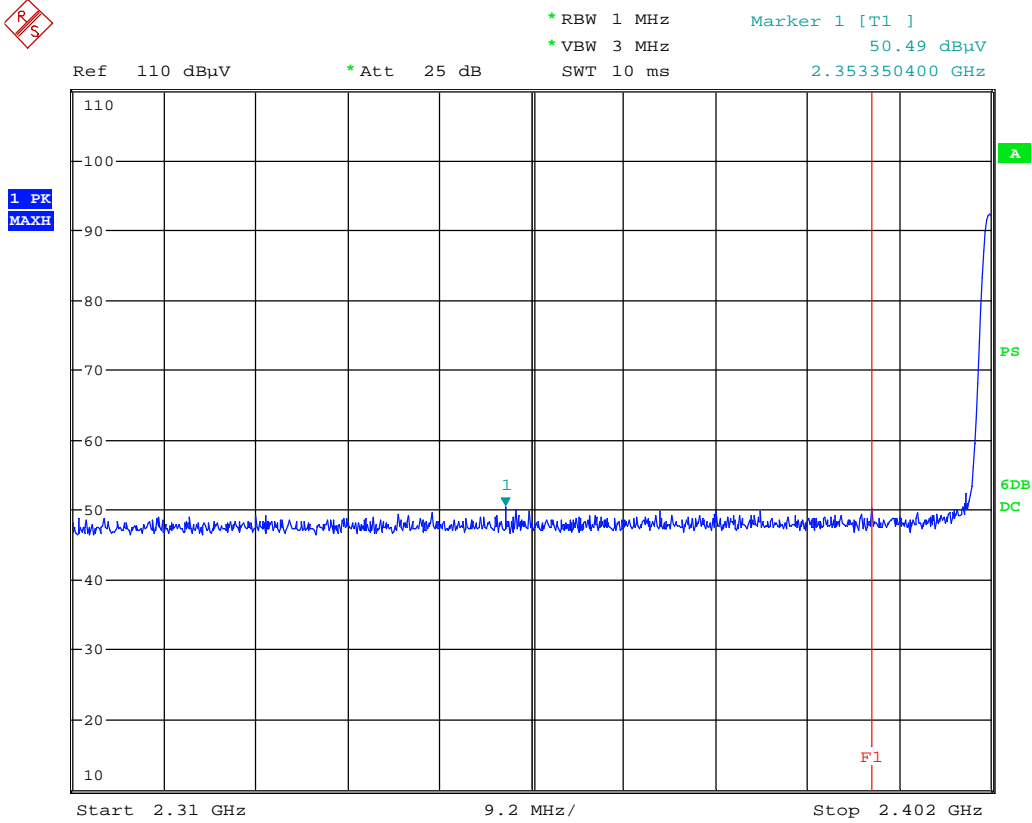


Date: 10.JUN.2021 17:12:01

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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Band Edge – Low Channel
Vertical - Peak Emission

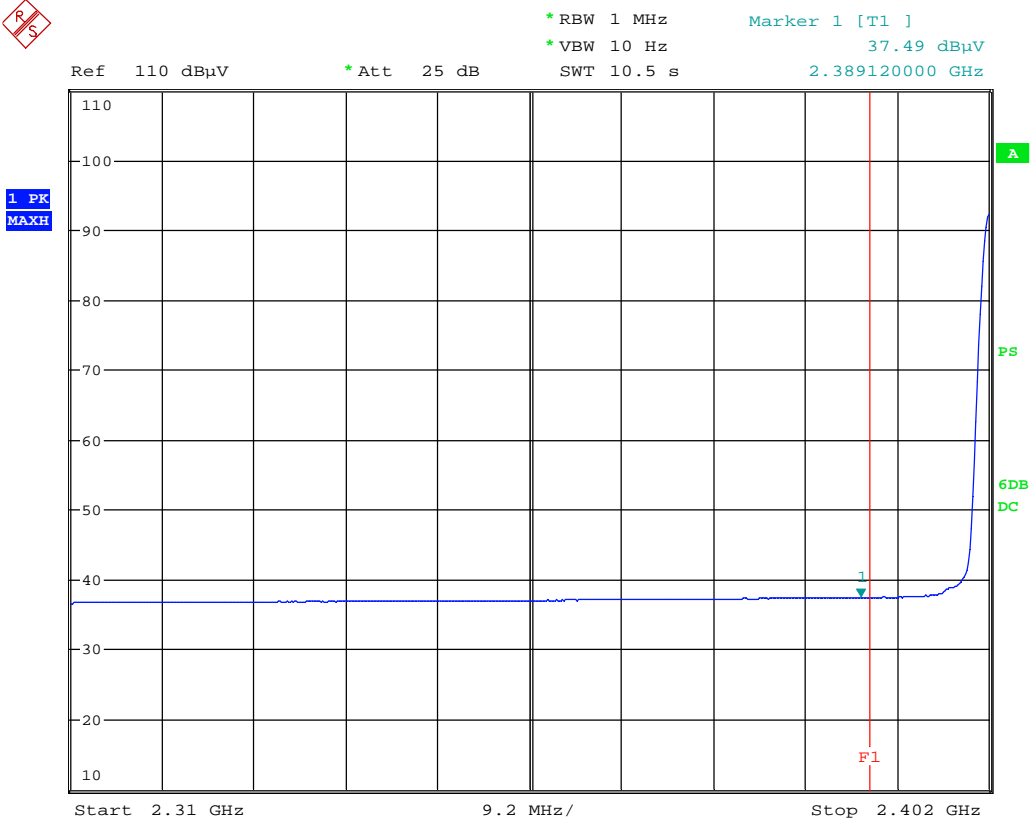


Date: 10.JUN.2021 17:17:39

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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Band Edge – Low Channel
Horizontal - Average Emission

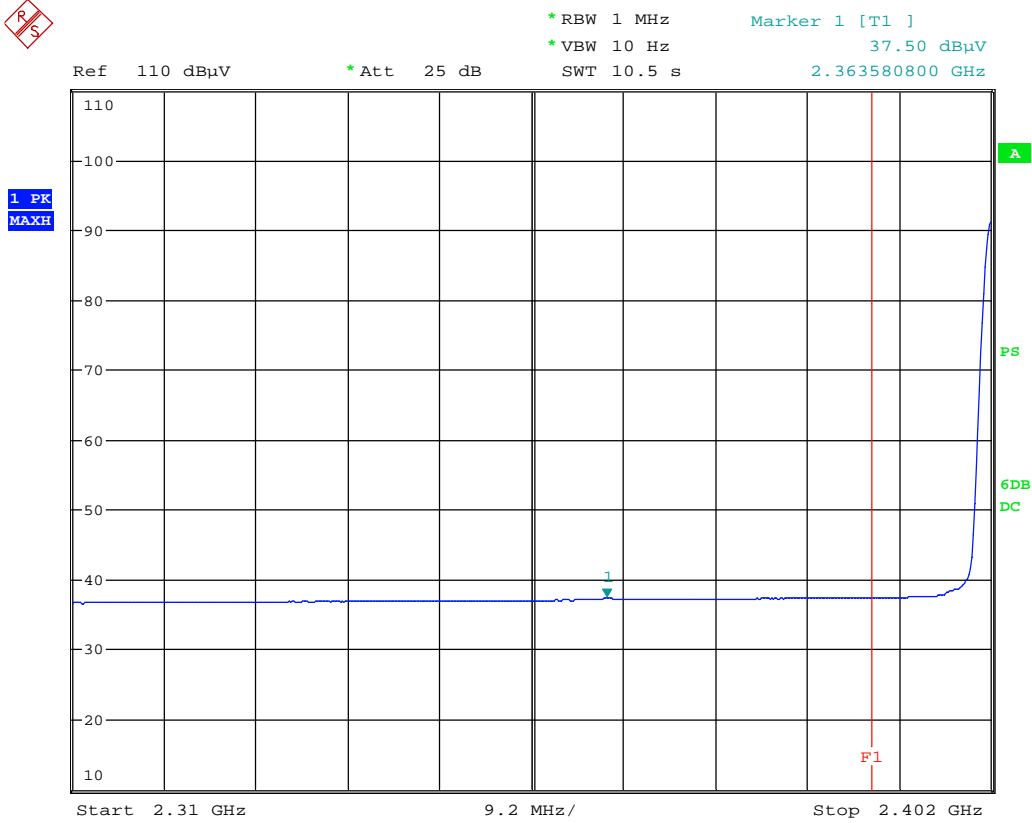


Date: 10.JUN.2021 17:12:43

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Band Edge – Low Channel
Vertical – Average Emission

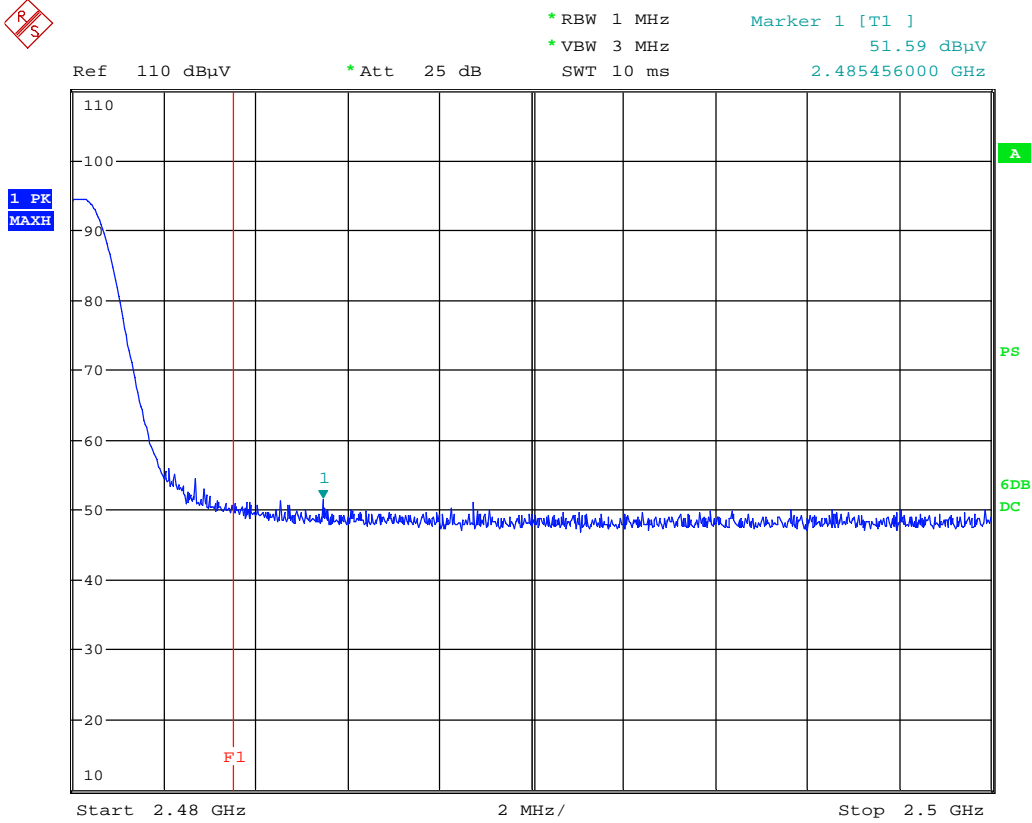


Date: 10.JUN.2021 17:18:21

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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Band Edge – High Channel
Horizontal - Peak Emission

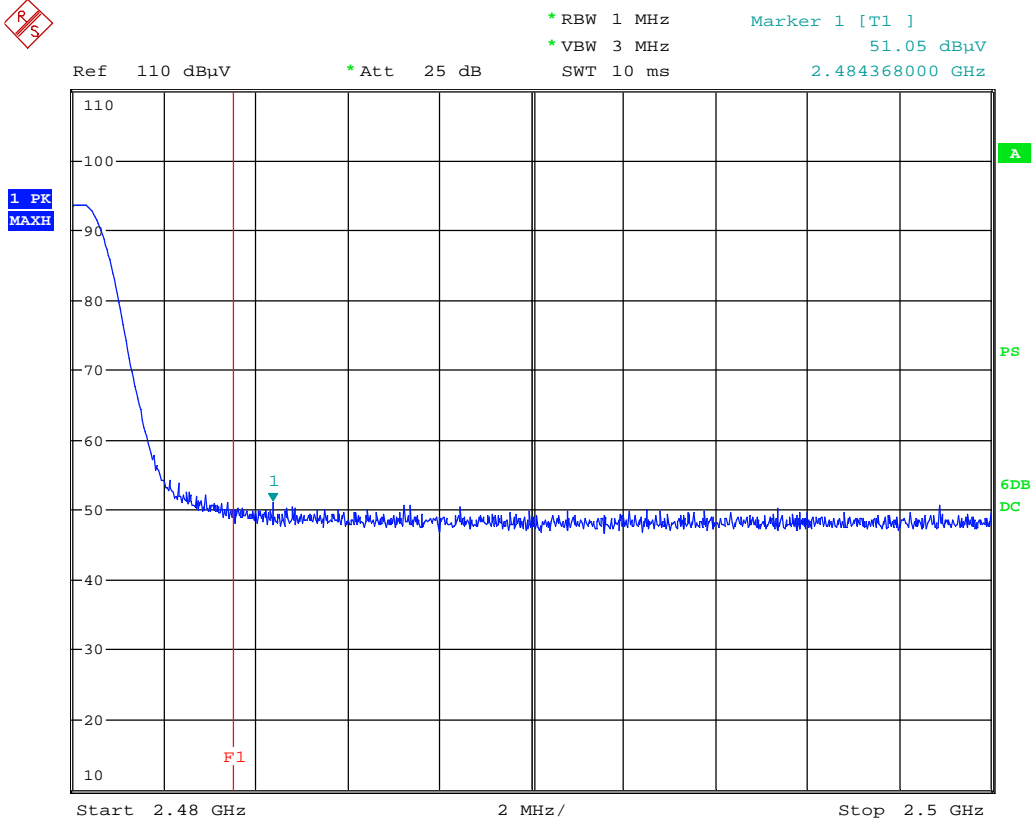


Date: 10.JUN.2021 16:01:08

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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**Band Edge – High Channel
Vertical - Peak Emission**

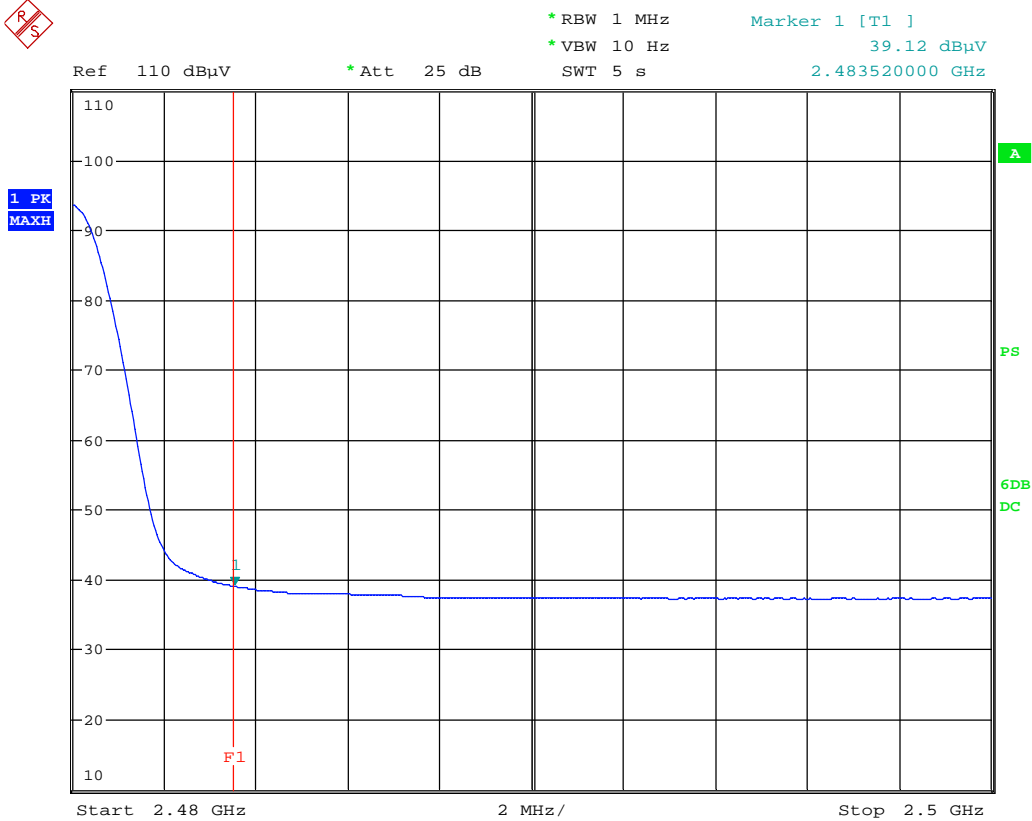


Date: 10.JUN.2021 15:55:20

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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**Band Edge – High Channel
Horizontal - Average Emission**

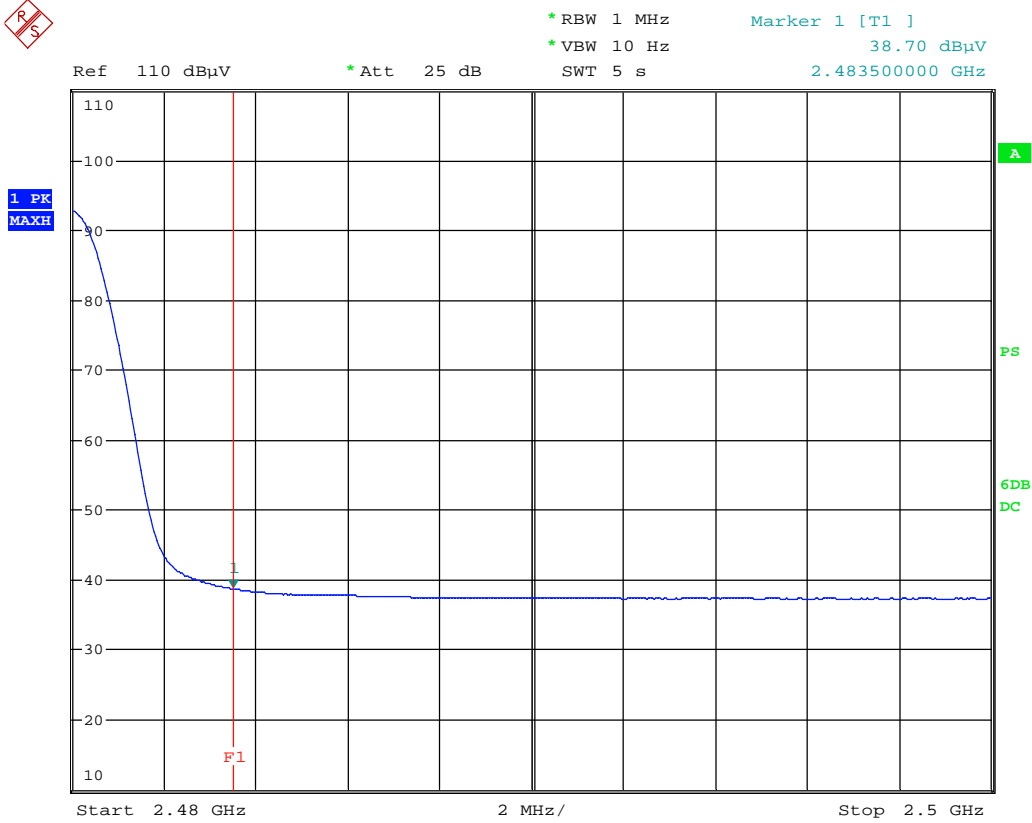


Date: 10.JUN.2021 16:01:30

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


Client	Acuity Brands Lighting, Inc	
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**Band Edge – High Channel
Vertical – Average Emission**



Date: 10.JUN.2021 15:55:42

Note: Restricted band Band Edge plot was taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for correct values.


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Final Measurements and Results


The EUT passed. In accordance with 15.247(d), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205 need to be verified with a final detector. Emissions outside the restricted bands were measured for informational purposes.

Frequency (GHz)	Detector	Correction Factor (dB)	Level (dB μ V)	3m Limit (dB μ V/m)	Margin (dB μ V/m)
Horizontal					
5.786	AVG	10.1	40.0	54.0	14.0
Vertical					
5.786	AVG	10.1	40.0	54.0	14.0


Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dB μ V)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Level (dB μ V/m)	Emission Limit (dB μ V/m)	Margin (dB)	Result
Mid Channel Z axis											
2442	Peak	Horz	93.6	32.2	4.7	10.0	-36.4	104.2			PASS
2442	Avg	Horz	92.7	32.2	4.7	10.0	-36.4	103.2			PASS
2442	Peak	Vert	86.4	32.2	4.7	10.0	-36.4	96.9			PASS
2442	Avg	Vert	85.4	32.2	4.7	10.0	-36.4	96.0			PASS
Mid Channel X axis											
2442	Peak	Horz	88.3	32.2	4.7	10.0	-36.4	98.9			PASS
2442	Avg	Horz	87.4	32.2	4.7	10.0	-36.4	97.9			PASS
2442	Peak	Vert	92.5	32.2	4.7	10.0	-36.4	103.0			PASS
2442	Avg	Vert	91.6	32.2	4.7	10.0	-36.4	102.1			PASS
Mid Channel Y axis											
2442	Peak	Horz	95.2	32.2	4.7	10.0	-36.4	105.8			PASS
2442	Avg	Horz	94.3	32.2	4.7	10.0	-36.4	104.8			PASS
2442	Peak	Vert	93.9	32.2	4.7	10.0	-36.4	104.4			PASS
2442	Avg	Vert	92.9	32.2	4.7	10.0	-36.4	103.5			PASS

Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
Low Channel Z axis											
2402	Peak	Horz	91.9	32.0	4.7	10.0	-36.4	102.2			PASS
2402	Avg	Horz	91.0	32.0	4.7	10.0	-36.4	101.3			PASS
2402	Peak	Vert	85.9	32.0	4.7	10.0	-36.4	96.1			PASS
2402	Avg	Vert	84.9	32.0	4.7	10.0	-36.4	95.1			PASS
2383.9	Peak	Horz	50.3	32.0	4.6	10.0	-36.4	60.5	74.0	13.5	PASS
2389.6	Avg	Horz	37.5	32.0	4.7	10.0	-36.4	47.7	54.0	6.3	PASS
2374.3	Peak	Vert	50.2	32.0	4.6	10.0	-36.4	60.4	74.0	13.6	PASS
2389.1	Avg	Vert	37.5	32.0	4.7	10.0	-36.4	47.7	54.0	6.3	PASS
2499.2	Peak	Horz	50.6	32.2	4.7	10.0	-36.4	61.2	74.0	12.8	PASS
2497.4	Avg	Horz	37.0	32.2	4.7	10.0	-36.4	47.5	54.0	6.5	PASS
2490.1	Peak	Vert	49.5	32.2	4.7	10.0	-36.4	60.1	74.0	13.9	PASS
2499.4	Avg	Vert	36.3	32.2	4.7	10.0	-36.4	46.9	54.0	7.1	PASS
Low Channel X axis											
2402	Peak	Horz	88.7	32.0	4.7	10.0	-36.4	98.9			PASS
2402	Avg	Horz	87.8	32.0	4.7	10.0	-36.4	98.0			PASS
2402	Peak	Vert	92.1	32.0	4.7	10.0	-36.4	102.3			PASS
2402	Avg	Vert	91.1	32.0	4.7	10.0	-36.4	101.4			PASS
2353.5	Peak	Horz	50.2	31.9	4.6	10.0	-36.4	60.4	74.0	13.6	PASS
2389.6	Avg	Horz	37.5	32.0	4.7	10.0	-36.4	47.7	54.0	6.3	PASS
2311	Peak	Vert	50.2	31.7	4.6	10.0	-36.5	60.0	74.0	14.0	PASS
2363.7	Avg	Vert	37.5	31.9	4.6	10.0	-36.4	47.7	54.0	6.3	PASS
2485.6	Peak	Horz	50.0	32.2	4.7	10.0	-36.4	60.5	74.0	13.5	PASS
2485.5	Avg	Horz	36.3	32.2	4.7	10.0	-36.4	46.9	54.0	7.1	PASS
2492.6	Peak	Vert	50.5	32.2	4.7	10.0	-36.4	61.1	74.0	12.9	PASS
2495.8	Avg	Vert	37.0	32.2	4.7	10.0	-36.4	47.5	54.0	6.5	PASS
Low Channel Y axis											
2402	Peak	Horz	93.3	32.0	4.7	10.0	-36.4	103.5			PASS
2402	Avg	Horz	92.3	32.0	4.7	10.0	-36.4	102.6			PASS
2402	Peak	Vert	92.3	32.0	4.7	10.0	-36.4	102.5			PASS
2402	Avg	Vert	91.3	32.0	4.7	10.0	-36.4	101.5			PASS
2387.4	Peak	Horz	49.8	32.0	4.7	10.0	-36.4	60.0	74.0	14.0	PASS
2389.1	Avg	Horz	37.5	32.0	4.7	10.0	-36.4	47.7	54.0	6.3	PASS
2353.4	Peak	Vert	50.5	31.9	4.6	10.0	-36.4	60.6	74.0	13.4	PASS
2363.6	Avg	Vert	37.5	31.9	4.6	10.0	-36.4	47.7	54.0	6.3	PASS
2499.2	Peak	Horz	49.5	32.2	4.7	10.0	-36.4	60.0	74.0	14.0	PASS
2496.5	Avg	Horz	36.3	32.2	4.7	10.0	-36.4	46.9	54.0	7.1	PASS
2499.8	Peak	Vert	49.4	32.2	4.7	10.0	-36.4	60.0	74.0	14.0	PASS
2495.2	Avg	Vert	36.3	32.2	4.7	10.0	-36.4	46.9	54.0	7.1	PASS


Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Test Frequency (MHz)	Detection Mode	Antenna Polarity (Horz/Vert)	Received Signal (dBµV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Level (dBµV/m)	Emission Limit (dBµV/m)	Margin (dB)	Result
High Channel Z axis											
2480	Peak	Horz	93.1	32.2	4.7	10.0	-36.4	103.7			PASS
2480	Avg	Horz	92.2	32.2	4.7	10.0	-36.4	102.8			PASS
2480	Peak	Vert	88.0	32.2	4.7	10.0	-36.4	98.6			PASS
2480	Avg	Vert	87.0	32.2	4.7	10.0	-36.4	97.6			PASS
2361.3	Peak	Horz	49.5	31.9	4.6	10.0	-36.4	59.6	74.0	14.4	PASS
2388.3	Avg	Horz	36.5	32.0	4.7	10.0	-36.4	46.7	54.0	7.3	PASS
2390	Peak	Vert	49.1	32.0	4.7	10.0	-36.4	59.3	74.0	14.7	PASS
2386.5	Avg	Vert	36.4	32.0	4.7	10.0	-36.4	46.6	54.0	7.4	PASS
2483.9	Peak	Horz	51.0	32.2	4.7	10.0	-36.4	61.6	74.0	12.4	PASS
2483.5	Avg	Horz	38.6	32.2	4.7	10.0	-36.4	49.2	54.0	4.8	PASS
2483.7	Peak	Vert	50.4	32.2	4.7	10.0	-36.4	61.0	74.0	13.0	PASS
2483.5	Avg	Vert	37.8	32.2	4.7	10.0	-36.4	48.4	54.0	5.6	PASS
High Channel X axis											
2480	Peak	Horz	91.3	32.2	4.7	10.0	-36.4	101.9			PASS
2480	Avg	Horz	90.4	32.2	4.7	10.0	-36.4	101.0			PASS
2480	Peak	Vert	94.4	32.2	4.7	10.0	-36.4	105.0			PASS
2480	Avg	Vert	93.5	32.2	4.7	10.0	-36.4	104.1			PASS
2383.7	Peak	Horz	49.3	32.0	4.6	10.0	-36.4	59.5	74.0	14.5	PASS
2389.9	Avg	Horz	36.4	32.0	4.7	10.0	-36.4	46.6	54.0	7.4	PASS
2375	Peak	Vert	49.1	32.0	4.6	10.0	-36.4	59.2	74.0	14.8	PASS
2388.6	Avg	Vert	36.4	32.0	4.7	10.0	-36.4	46.6	54.0	7.4	PASS
2483.9	Peak	Horz	50.6	32.2	4.7	10.0	-36.4	61.2	74.0	12.8	PASS
2483.5	Avg	Horz	38.3	32.2	4.7	10.0	-36.4	48.9	54.0	5.1	PASS
2484.4	Peak	Vert	51.0	32.2	4.7	10.0	-36.4	61.5	74.0	12.5	PASS
2483.5	Avg	Vert	39.1	32.2	4.7	10.0	-36.4	49.7	54.0	4.3	PASS
High Channel Y axis											
2480	Peak	Horz	94.4	32.2	4.7	10.0	-36.4	105.0			PASS
2480	Avg	Horz	93.5	32.2	4.7	10.0	-36.4	104.1			PASS
2480	Peak	Vert	93.6	32.2	4.7	10.0	-36.4	104.2			PASS
2480	Avg	Vert	92.7	32.2	4.7	10.0	-36.4	103.3			PASS
2346	Peak	Horz	49.3	31.9	4.6	10.0	-36.4	59.4	74.0	14.6	PASS
2389.4	Avg	Horz	36.4	32.0	4.7	10.0	-36.4	46.6	54.0	7.4	PASS
2362.9	Peak	Vert	49.1	31.9	4.6	10.0	-36.4	59.2	74.0	14.8	PASS
2389.1	Avg	Vert	36.5	32.0	4.7	10.0	-36.4	46.6	54.0	7.4	PASS
2485.5	Peak	Horz	51.6	32.2	4.7	10.0	-36.4	62.2	74.0	11.8	PASS
2483.5	Avg	Horz	39.1	32.2	4.7	10.0	-36.4	49.7	54.0	4.3	PASS
2484.4	Peak	Vert	51.0	32.2	4.7	10.0	-36.4	61.6	74.0	12.4	PASS
2483.5	Avg	Vert	38.7	32.2	4.7	10.0	-36.4	49.3	54.0	4.7	PASS


Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 15, 2020	Jan. 15, 2022	GEMC 233
Loop Antenna	EM 6871	Electro-Metrics	Feb 26, 2021	Feb 26, 2023	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb 26, 2021	Feb 26, 2023	GEMC 71
BiLog Antenna	3142-C	ETS-Lindgren	Nov. 25, 2020	Nov. 25, 2022	GEMC 8
Horn Antenna 1 – 6 GHz	3117	ETS-Lindgren	Feb. 17, 2020	Feb. 17, 2022	GEMC 340
Horn Antenna 6 – 18 GHz	WBH218HN	Q-par	Apr. 1, 2020	Apr. 1, 2022	GEMC 6375
Horn Antenna 18 - 26.5 GHz	SAS-572	A.H. Systems	Dec. 1, 2020	Dec. 1, 2022	GEMC 6371
Attenuator 6 dB	612-6-1	Meca Electronics, Inc	NCR	NCR	GEMC 286
Pre-Amp 9 kHz – 1 GHz	CPA9230	Chase	May 22, 2020	May 22, 2022	GEMC 301
2.4GHz-2.5GHz Notch Filter	BRM50702	Micro-Tronics	NCR	NCR	GEMC 230
RF Cable HF	HP305S	Semflex Inc.	NCR	NCR	GEMC 330
RF Cable 10m	LMR-400-10M- 50Ω-MN-MN	LexTec	NCR	NCR	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	NCR	NCR	GEMC 271
Emissions Software	V2.0.4	TUV SUD Canada, Inc.	NCR	NCR	GEMC 361

Client	Acuity Brands Lighting, Inc	 TUV SUD Canada
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Appendix A – EUT Summary


Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

For further details for filing purposes, refer to filing package.

General EUT Description

Client	
Organization / Address	Acuity Brands Lighting, Inc. 1 Acuity Way, Decatur, GA 30035 United States
Contact	Alex Bahk
Phone	770-593-5062
Email	Alex.Bahk@AcuityBrands.com
EUT Details	
EUT Name	rMODIT3
FCC ID	2ADCB-RMODIT3
IC ID	6715C-RMODIT3
Equipment Category	Integrated Wireless Sensor
Basic EUT Functionality	915 MHz wireless module with BLE
Connectors available on EUT	Pogo pin connector
Peripherals Required for Test	Laptop and debug board to configure the test firmware on the EUT via UART
Intentional Radiator Frequency	902 to 928MHz (Proprietary) 2402 to 2480 MHz (BLE)


Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT and Test Setup Photos’.

Client	Acuity Brands Lighting, Inc	
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

EUT Configuration

Please see Appendix B for a picture of the unit running in normal conditions.

- Wireless configured to transmit continuously at 100% duty cycle with modulation
- Low Channel: Ch 0 = 2402MHz
- Middle Channel: Ch 20 = 2442 MHz
- High Channel: Ch 39 = 2480 MHz
- Power Level Register Setting: 37
- For the Spurious Radiated Emissions, the transmitter was set to Ch 20 which was the worst case.

Client	Acuity Brands Lighting, Inc	 TUV SUD Canada
Product	rMODIT3 Module	
Standard(s)	RSS 247 Issue 2:2017 FCC Part 15 Subpart 15.247	

Appendix B – EUT and Test Setup Photos

Refer to the files separate from this test report