

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400 – 2483.5 MHz band	
Report Reference No	G0M-1705-6546-TFC247BL-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 IC Testing Laboratory site: 3470A-2
Applicant	Kubo Robotics ApS
Address	Niels Bohrs Allé 185 5220 Odense SØ Denmark
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02
Non-Standard Test Method	None
Test Scope	Partial compliance test
Equipment under Test (EUT):	
Product Description	Educational robot
Model(s)	Kubo
Additional Model(s)	None
Brand Name(s)	Kubo
Hardware Version(s)	P1
Software Version(s)	P1
FCC-ID	2AOWV-KUBO-10
IC	N/A
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2017-08-25	
Report:		
Compiled by	Abdullah Al Jamal	
Tested by (+ signature) (Responsible for Test)	Abdullah Al Jamal / W. Treffke	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2018-03-08	
Total number of pages	67	
General Remarks:		
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. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2017-10-26	Initial Release	
02	2018-03-08	Replaced document: G0M-1705-6546-TFC247BL-V01 Replaced by: G0M-1705-6546-TFC247BL-V02 Changes: Product description, Applicant and FCC ID corrected.	Abdullah Al Jamal

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

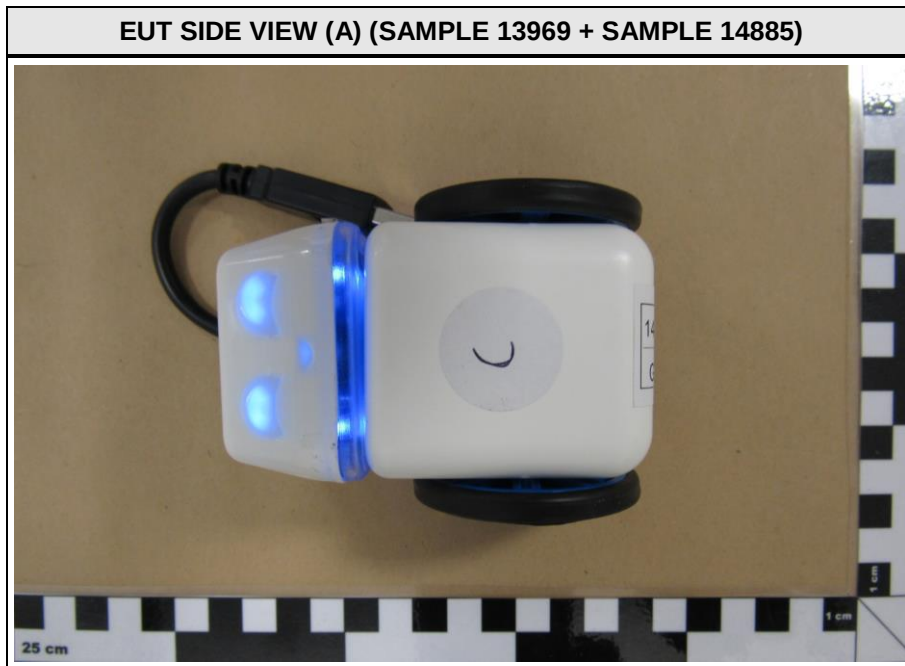
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1 Equipment (Test Item) Under Test

Description	Educational robot	
Model	Kubo	
Additional Model(s)	None	
Brand Name(s)	Kubo	
Serial Number(s)	Not specified	
Hardware Version(s)	P1	
Software Version(s)	P1	
PMN	None	
HVIN	None	
FVIN	None	
HMN	None	
FCC-ID	2AOWV-KUBO-10	
IC	None	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400 - 2483.5 MHz	
Radio technology	Bluetooth LE	
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	Integrated antenna
	Model	RN4871
	Manufacturer	Microchip
	Gain	0.9 dBi
Supply Voltage	V_{NOM}	5.0 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	Kubo Robotics ApS Niels Bohrs Allé 185 5220 Odense SØ Denmark	

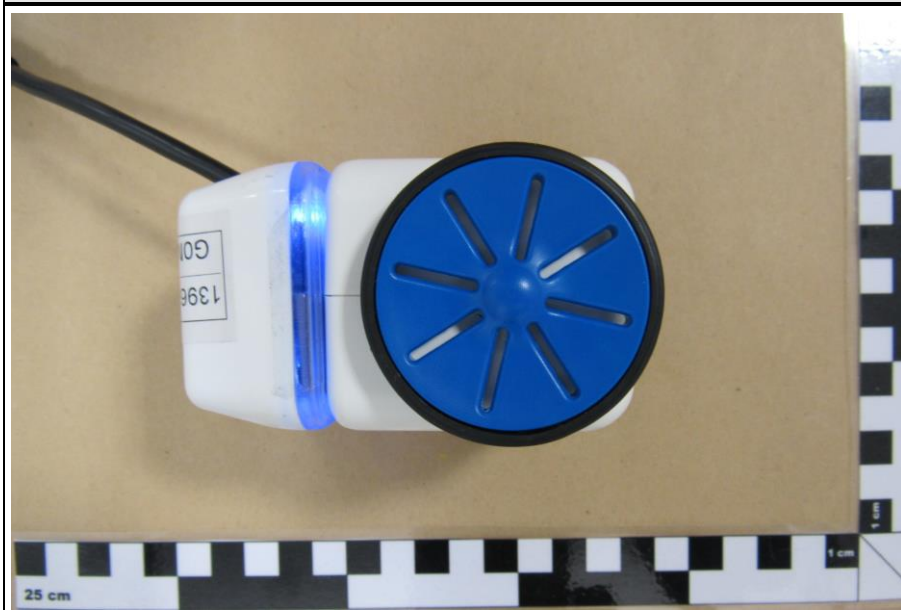
1.1 Photos – Equipment External



EUT SIDE VIEW (C) (SAMPLE 13969 + SAMPLE 14885)



EUT SIDE VIEW (D) (SAMPLE 13969 + SAMPLE 14885)



EUT BOTTOM VIEW (SAMPLE 13969 + SAMPLE 14885)



EUT TOP VIEW (SAMPLE 13969 + SAMPLE 14885)



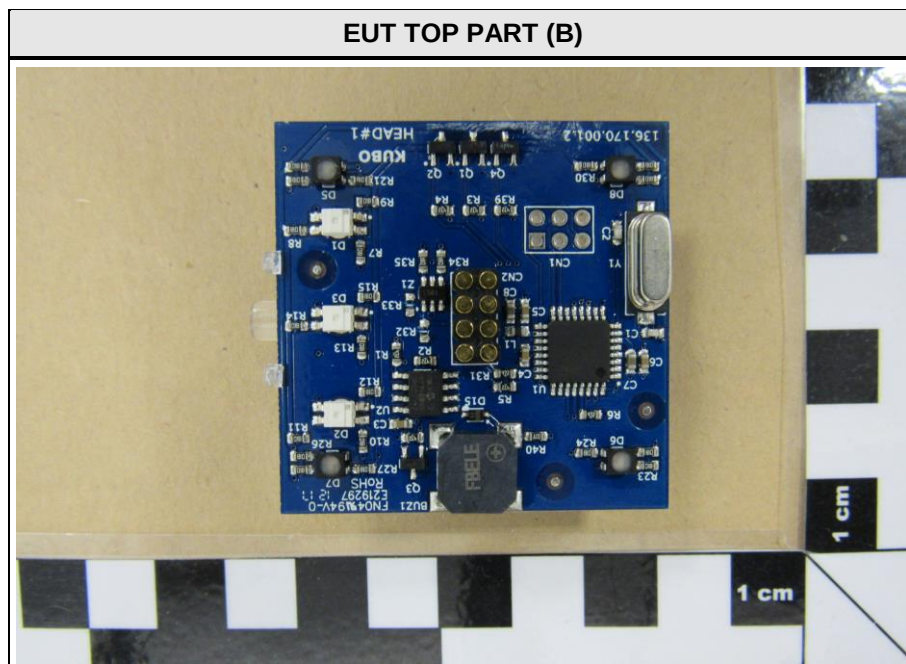
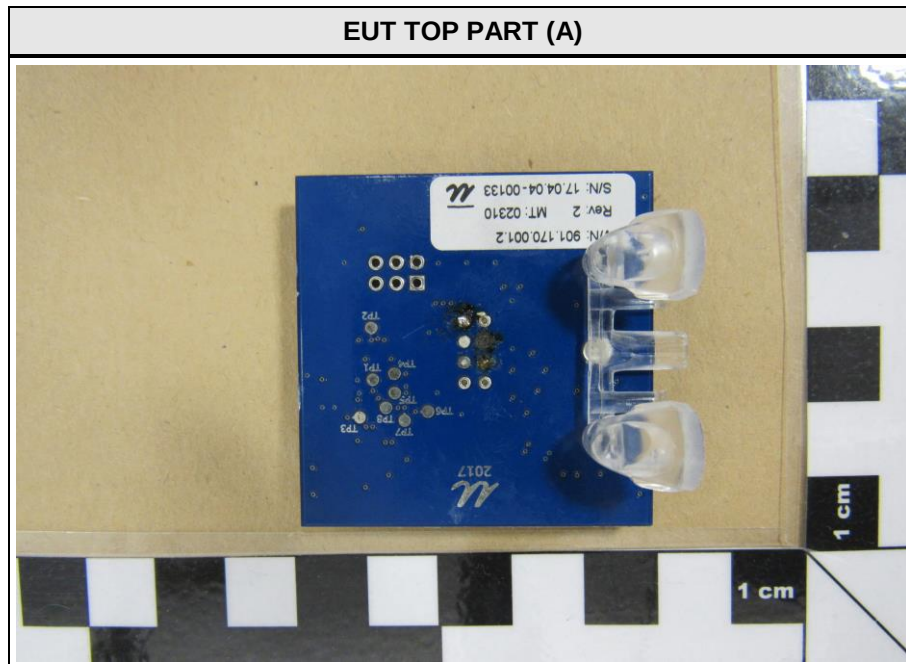
EUT SEPERATED (A) (SAMPLE 13969 + SAMPLE 14885)



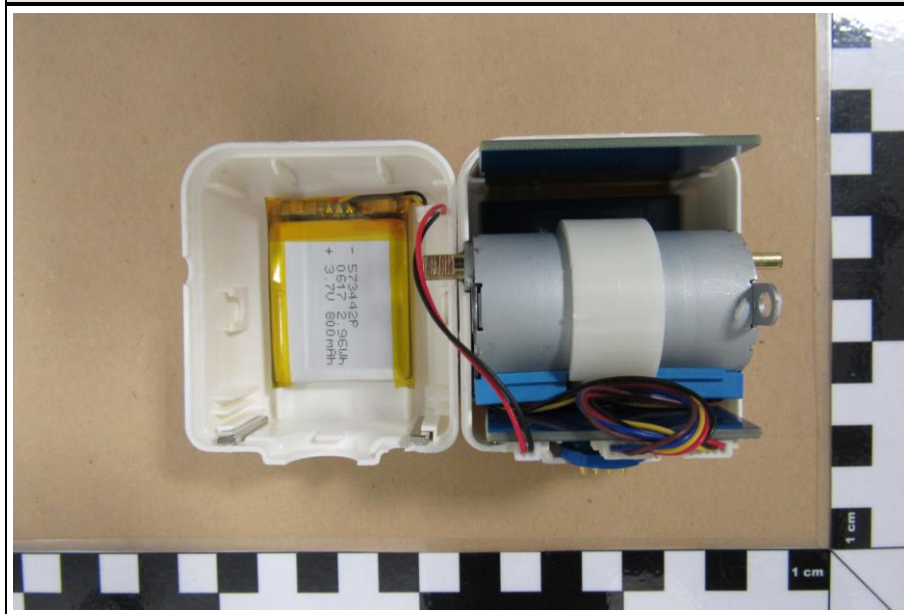
EUT SEPERATED (B) (SAMPLE 13969 + SAMPLE 14885)



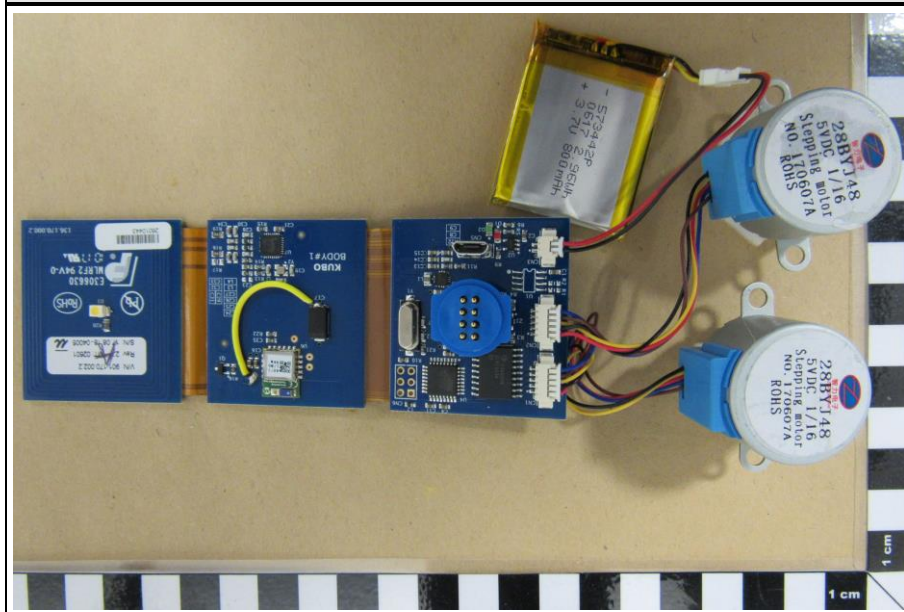
1.2 Photos – Equipment Internal



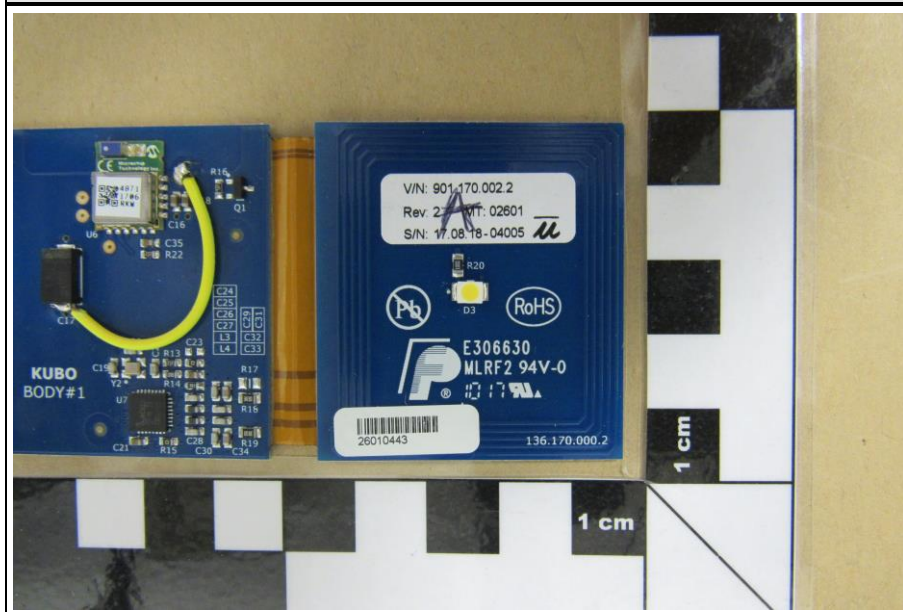
EUT BOTTOM PART (A) OVERVIEW (A)



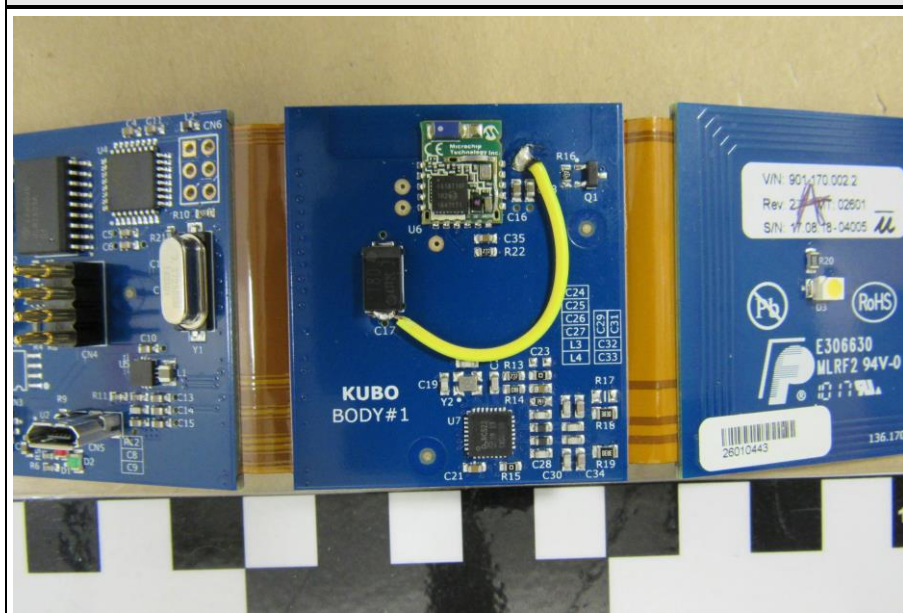
EUT BOTTOM PART (B) OVERVIEW (B)



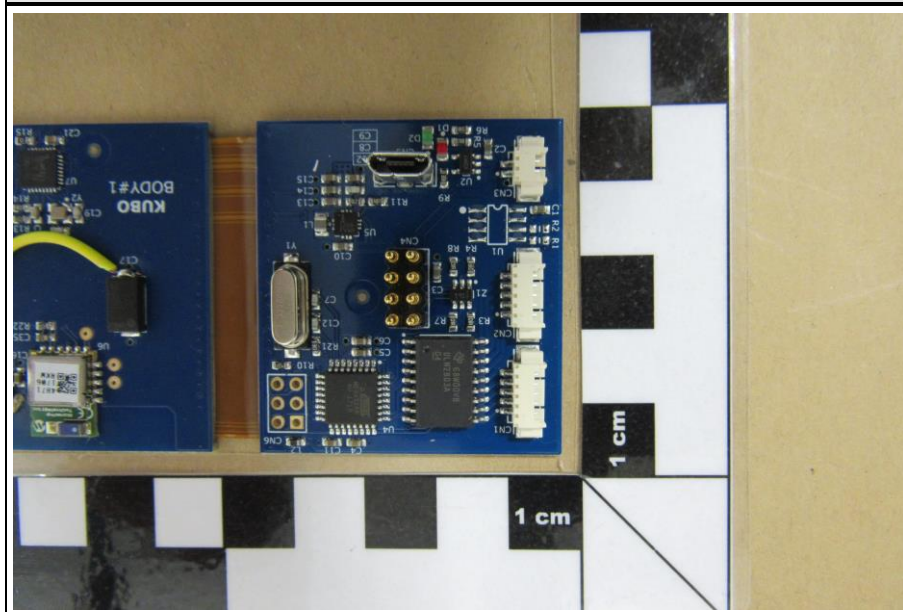
EUT BOTTOM PART (C) DETAILS (A)



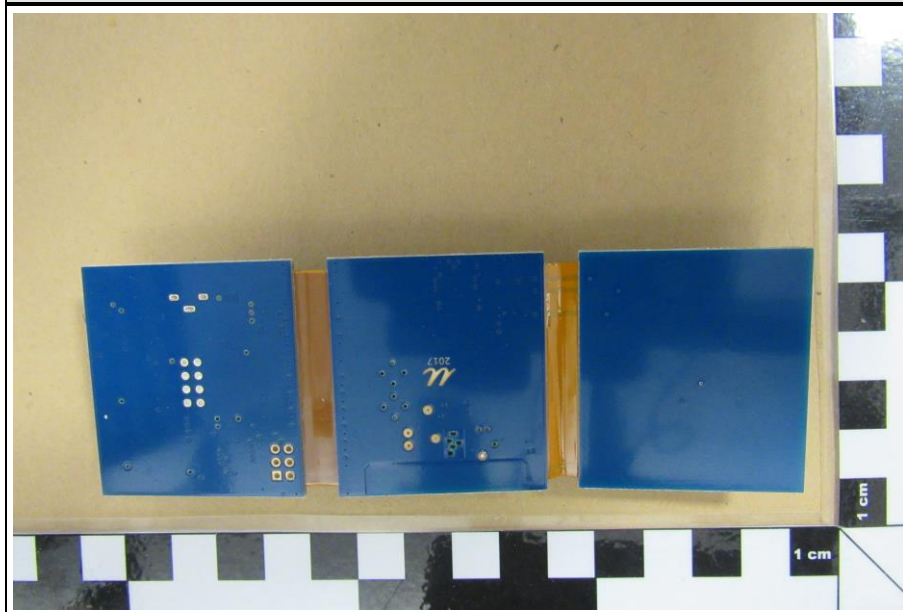
EUT BOTTOM PART (D) DETAILS (B)



EUT BOTTOM PART (E) DETAILS (C)



EUT BOTTOM PART (F) OVERVIEW (C)



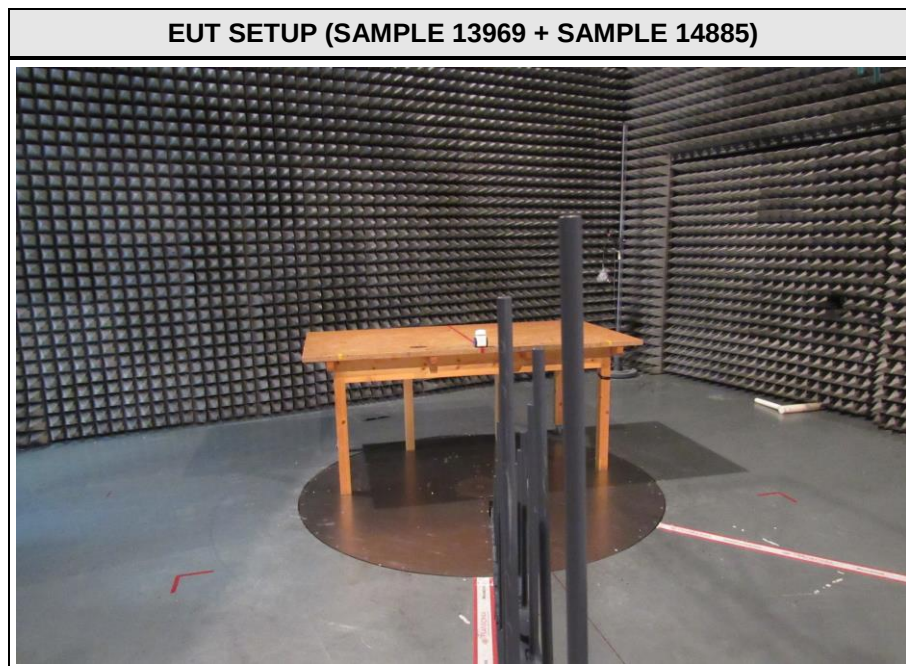
EUT BOTTOM PART (G) BATTERY



EUT BOTTOM PART (H) MOTOR



1.3 Photos – Test Setup



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE1	Laptop	Dell	Latitude E6430	S/N 4MX5TY1
AE2	Power Supply	Dell	LA65NS2-01	S/N 6TM1C
Description:				
AE1; AE2	Auxillary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 Test Modes

Mode	Description
GFSK	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 50%
Comment:	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx / Rx	19	2440
F3	Tx / Rx	39	2480

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBμV/m). The FCC limits are given in units of μV/m. The following formula is used to convert the units of μV/m to dBμV/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading	- FCC limit	= Margin
+21.5 dBμV	+ 26 dB = 47.5 dBμV/m	:	47.5 dBμV/m	- 57.0 dBμV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
RSS-Gen 6.6	Occupied Bandwidth	ANSI C63.10	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247 § 5.2	6 dB Bandwidth	ANSI C63.10	N/T	
FCC § 15.247(b)(3) ISED RSS-247 § 5.4	Maximum peak conducted power	ANSI C63.10	N/T	
FCC § 15.247(e) ISED RSS-247 § 5.2	Power spectral density	ANSI C63.10	N/T	
FCC § 15.207 ISED RSS-247 § 3.1	AC power line conducted emissions	ANSI C63.10	N/T	No transitions during charging
FCC § 15.247(d) ISED RSS-247 § 5.5	Band edge compliance	ANSI C63.10	N/T	
FCC § 15.247(d) ISED RSS-247 § 5.5	Conducted spurious emissions	ANSI C63.10	N/T	
FCC § 15.247(d) FCC § 15.209 ISED RSS-GEN § 8.9	Transmitter radiated spurious emissions	ANSI C63.10	PASS	
ISED RSS-247 § 3.1	Receiver radiated spurious emissions	ANSI C63.10	N/T	
Comment: Reference to FCC ID A8TBM78ABCDEF GH.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Transmitter radiated emissions

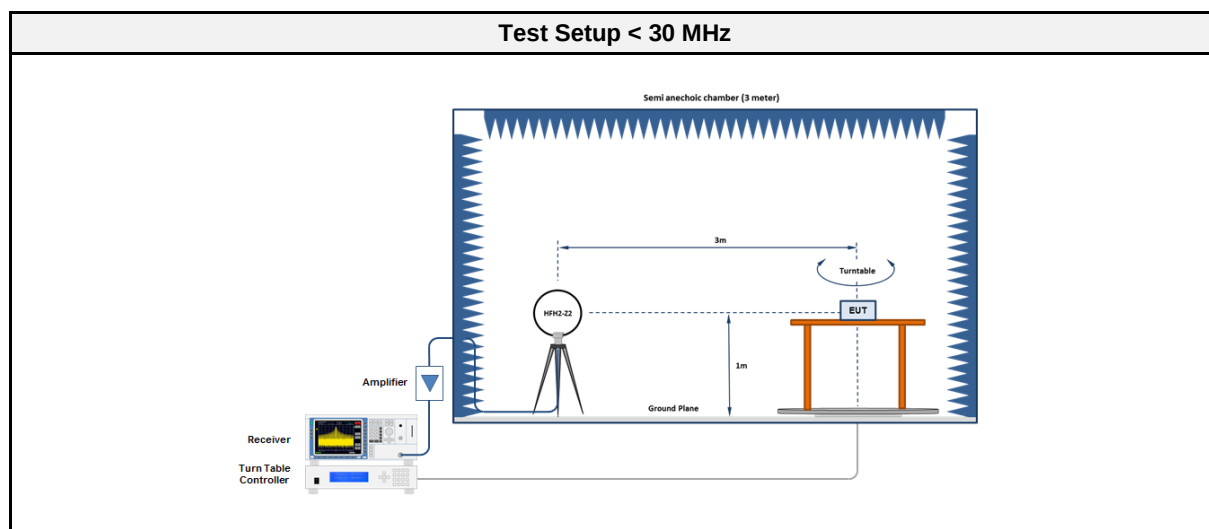
3.1.1 Information

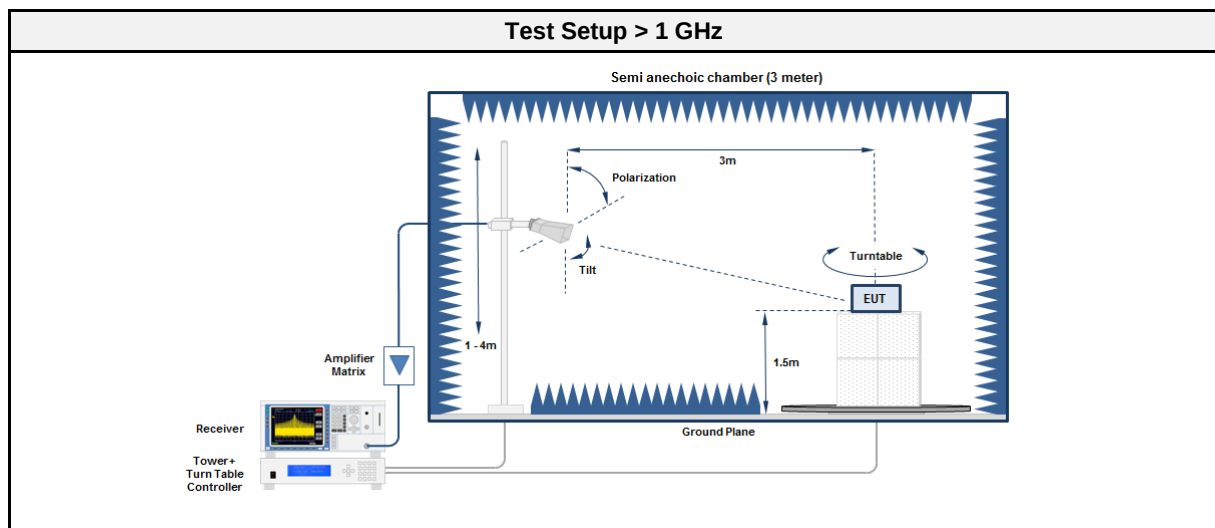
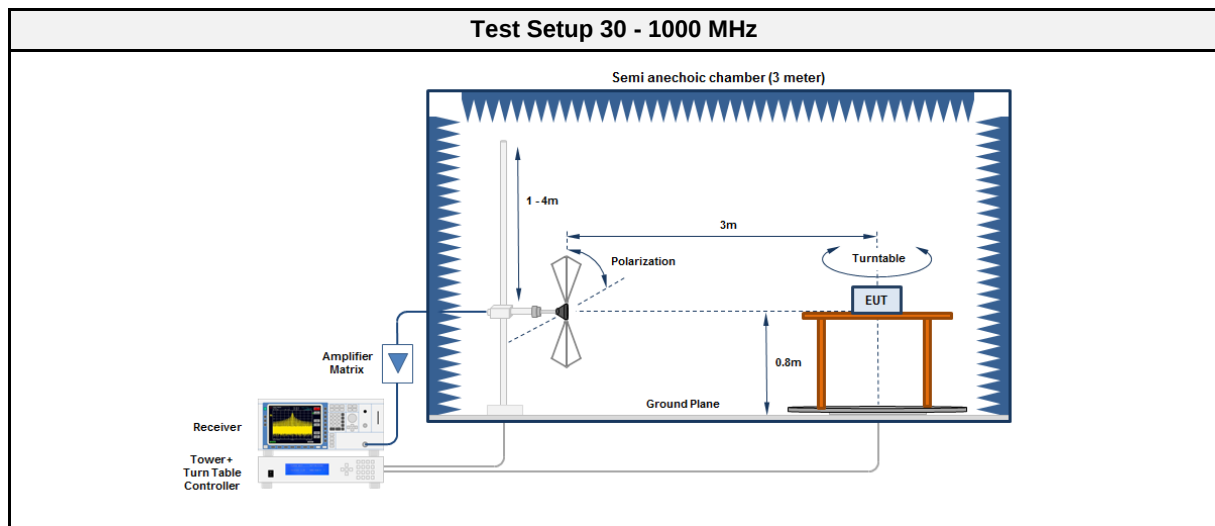
Test Information	
Reference	FCC 15.247(d) / ISSED RSS-GEN 8.9
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Abdullah Al Jamal
Date	2017-09-28

3.1.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [dB μ V/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.1.3 Setup





3.1.4 Equipment

Test Equipment < 30 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Loop Antenna	R&S	HFH2-Z2	EF00184	2016-12	2018-12
Spectrum Analyzer	R&S	FSU 26	EF01003	2017-07	2018-07

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Antenna	R&S	VULB 9162	EF00978	2016-11	2017-11
Antenna	R&S	HK 116	EF00012	2016-05	2019-05
Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Antenna	R&S	BBHA 9120D	EF00018	2016-09	2019-09
Antenna	Amplifier Research	AT4560	EF00302	2017-03	2018-03

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Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.1.5 Procedure

Test Procedure < 30 MHz	
1.	EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground
2.	EUT set to test mode
3.	The EUT is rotated through 360°
4.	The emissions are measured with peak detector and max hold
5.	All significant emissions are measured again using the corresponding final detector

Test Procedure 30 - 1000 MHz	
1.	EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground
2.	EUT set to test mode
3.	The receiver is set to peak detection with max hold
4.	The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5.	All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz	
1.	EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground
2.	EUT set to test mode
3.	The receiver is set to peak detection with max hold
4.	The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5.	All significant emissions are measured again using the corresponding final detector

3.1.6 Results

Test Results < 30 MHz						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
13.56	0.035218	-31.60	avg	ver	36.60	-68.28

Test Results > 30 MHz						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2402	243.2	26.79	pk	hor	46.00	-19.21
2402	243.2	25.83	pk	ver	46.00	-20.17
2402	4800	39.71	pk	hor	74.00	-34.29
2402	4800	38.04	pk	ver	74.00	-35.96
2402	22092	40.72	pk	hor	74.00	-33.28
2402	23004	40.62	pk	ver	74.00	-33.38
2440	121.12	31.90	pk	hor	43.52	-11.62
2440	243.2	28.17	pk	ver	46.00	-17.83
2440	270.4	22.71	pk	hor	46.00	-23.29
2440	4880	39.57	pk	hor	74.00	-34.43
2440	4880	38.76	pk	ver	74.00	-35.24
2440	9480	44.12	pk	hor	74.00	-29.88
2440	19660	36.93	pk	hor	74.00	-37.07
2440	22510	39.58	pk	ver	74.00	-34.42
2480	132	32.27	pk	hor	43.52	-11.25
2480	243.2	26.38	pk	hor	46.00	-19.62
2480	243.2	28.84	pk	ver	46.00	-17.16
2480	1356	29.03	pk	ver	74.00	-44.97

Test Report No.: G0M-1705-6546-TFC247BL-V02

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

2480	4960	38.87	pk	hor	74.00	-35.13
2480	4960	36.79	pk	ver	74.00	-37.21
2480	21237	37.98	pk	hor	74.00	-36.02
2480	23080	40.87	pk	ver	74.00	-33.13

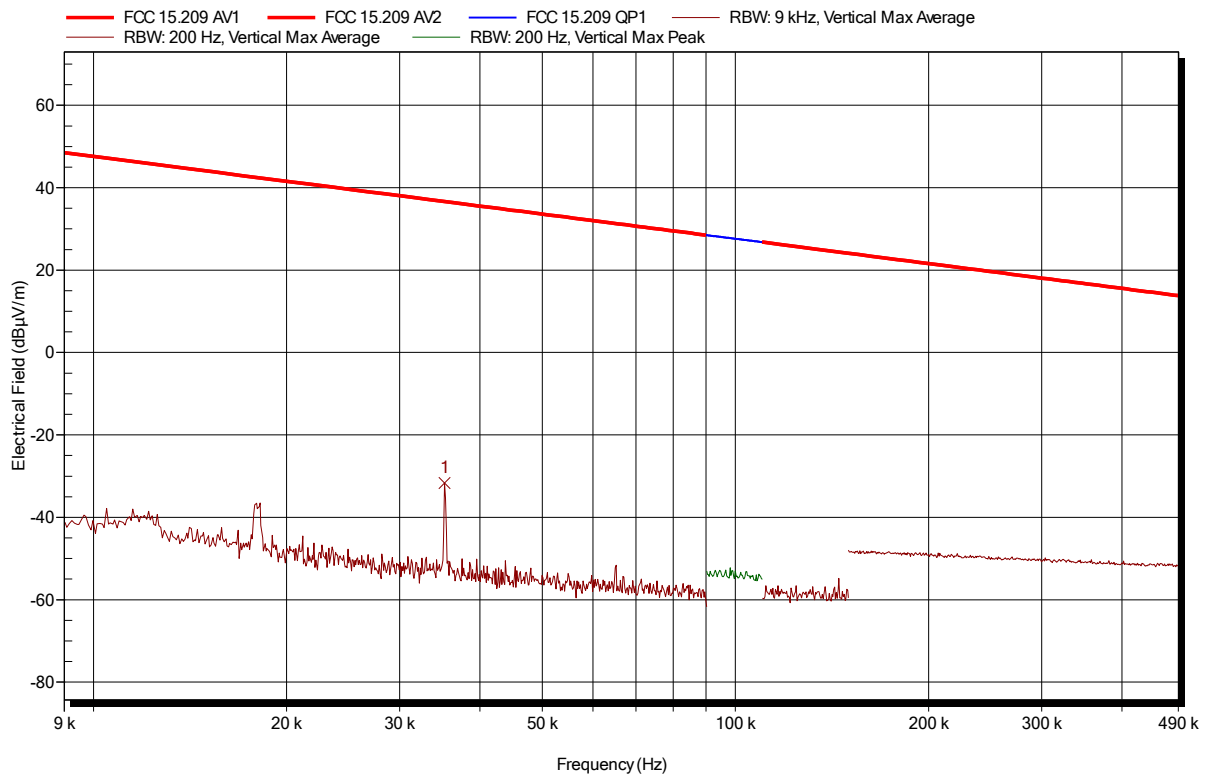
ANNEX A Transmitter spurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Kubo Robot
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0 VDC (lithium battery)
Antenna: Rohde & Schwarz HFH 2-Z2
Measurement distance: 3 m converted to 300 m
Mode: TX; RFID; 13.56 MHz
Test Date: 2017-06-27
Note: co-located, 2480 MHz

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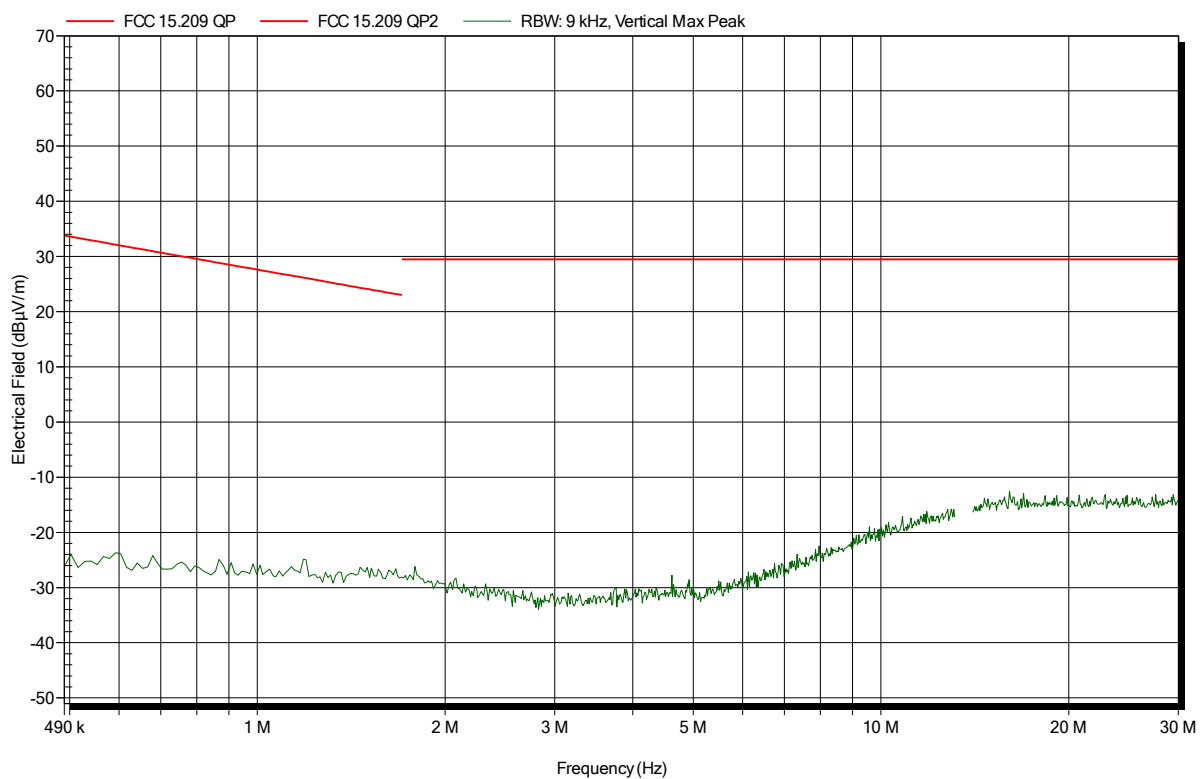
Frequency	Average	Average Limit	Average Difference	Average Status
35,218 kHz	-31,6 dBµV/m	36,6 dBµV/m	-68,28 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Kubo Robot
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 25°C, Vnom: 5.0 VDC (lithium battery)
 Antenna: Rohde & Schwarz HFH 2-Z2
 Measurement distance: 3 m converted to 30 m
 Mode: TX; RFID; 13.56 MHz
 Test Date: 2017-06-27
 Note: co-located, 2480 MHz

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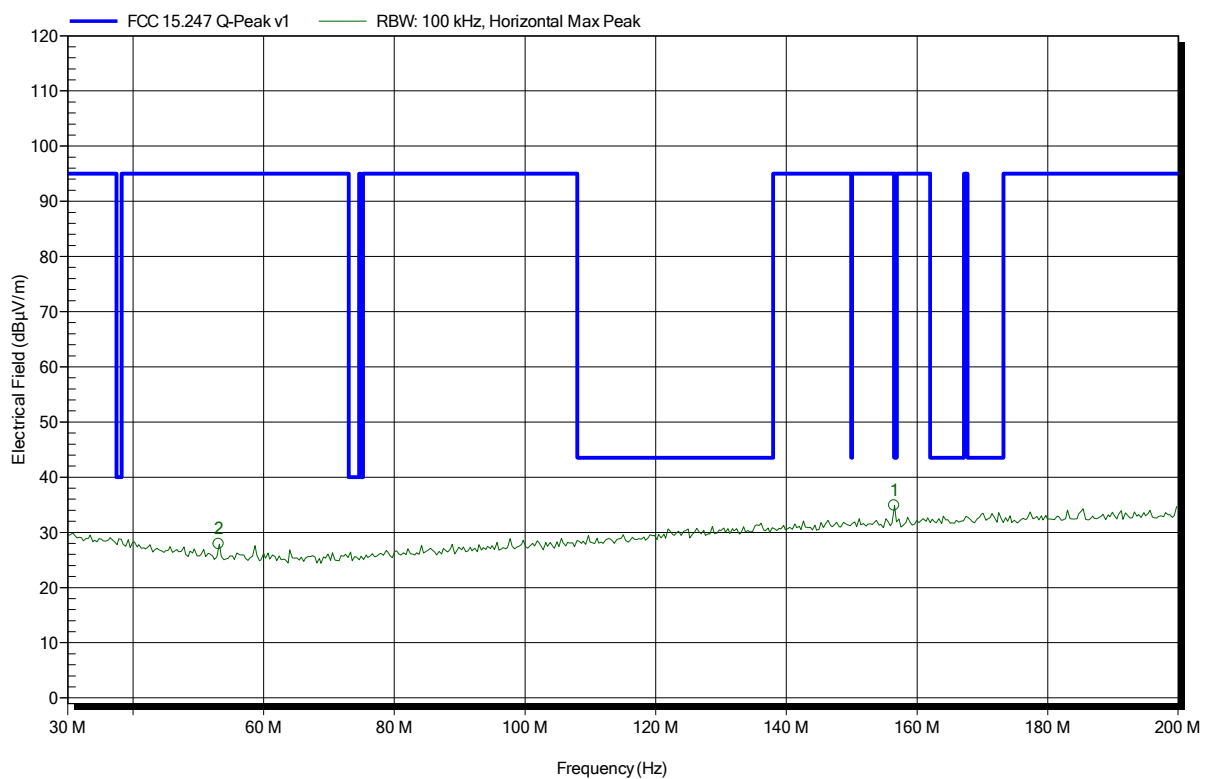


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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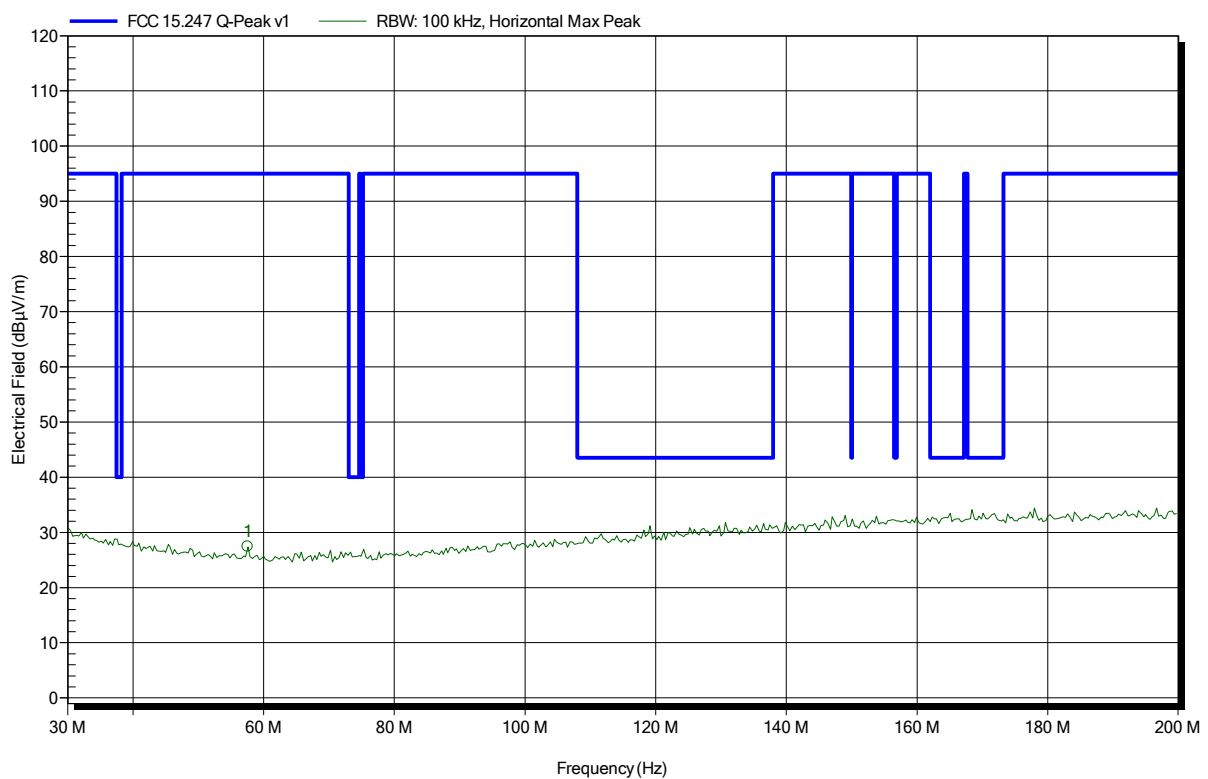


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
156.48 MHz	34.85 dBµV/m	95 dBµV/m	-60.15 dB	Pass
53.12 MHz	27.89 dBµV/m	95 dBµV/m	-67.11 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546
 Applicant: Bolis ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; BLE/RFID co-location; 2402 MHz
 Test Date: 2017-09-28
 Note:

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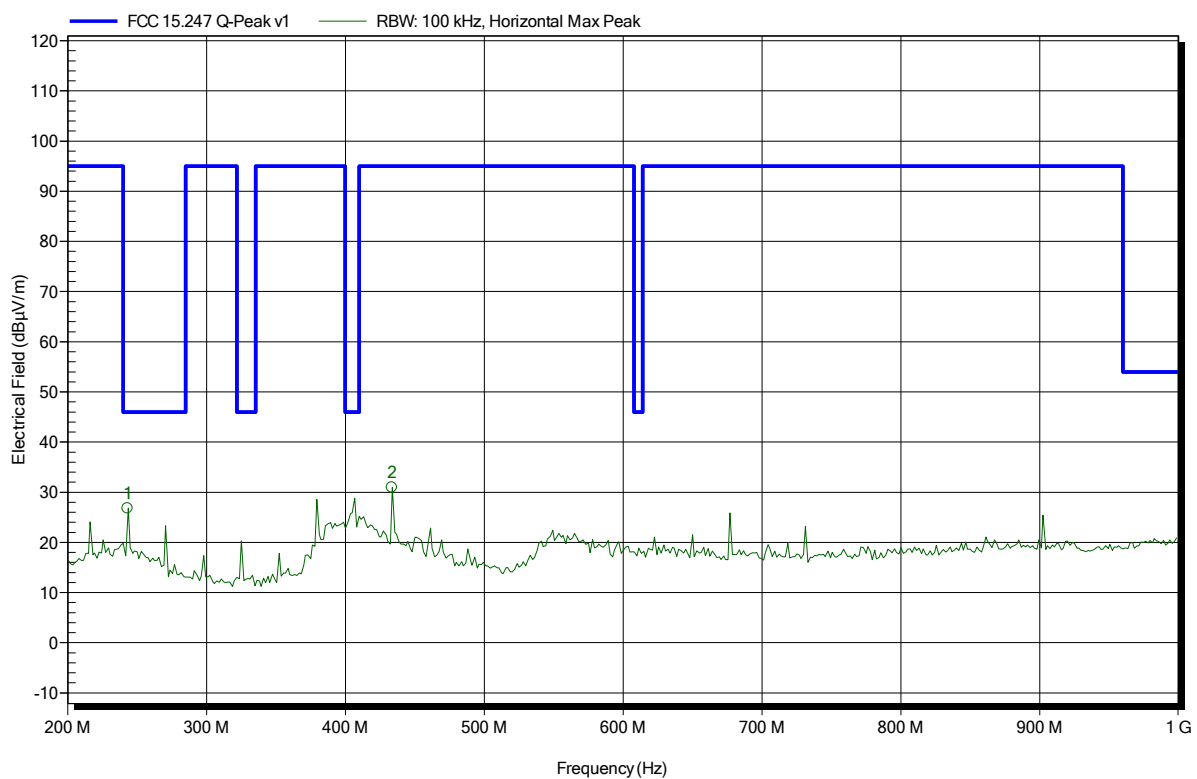
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
57.54 MHz	27.39 dBµV/m	95 dBµV/m	-67.61 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; BLE/RFID co-location; 2402 MHz
 Test Date: 2017-09-28
 Note:

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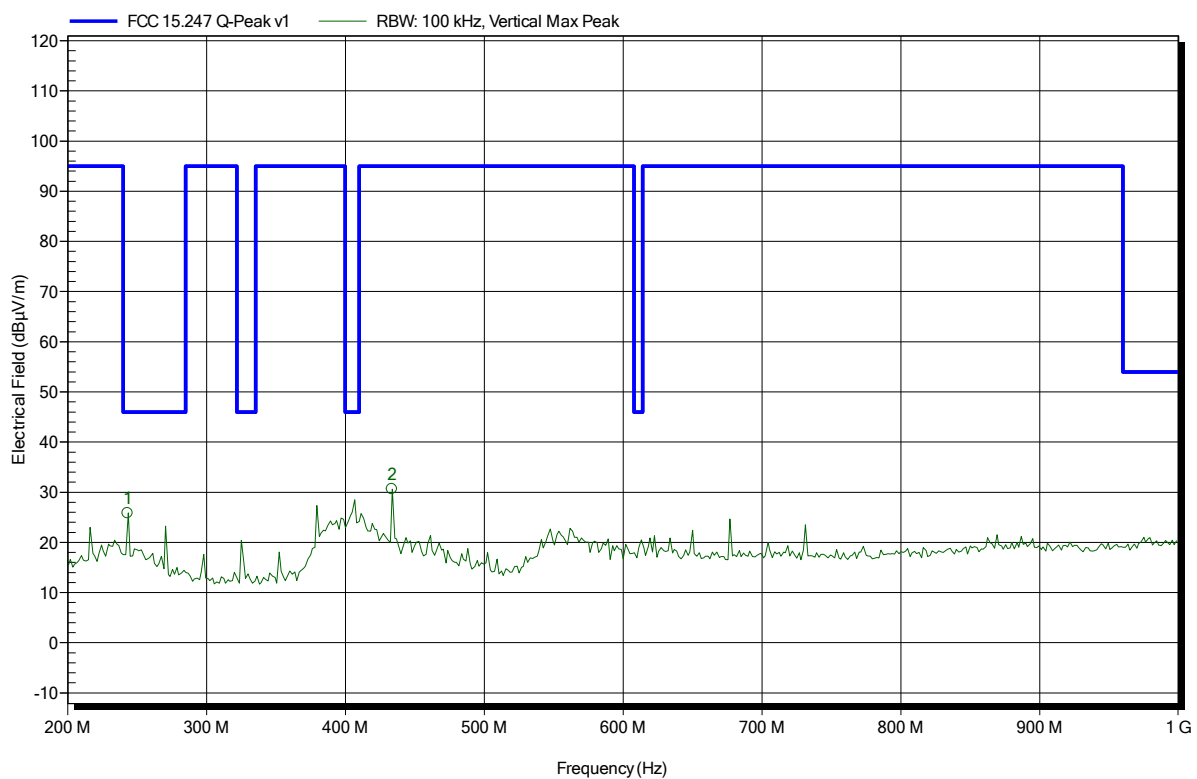
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
243.2 MHz	26.79 dBµV/m	46 dBµV/m	-19.21 dB	Pass
433.6 MHz	30.94 dBµV/m	95 dBµV/m	-64.06 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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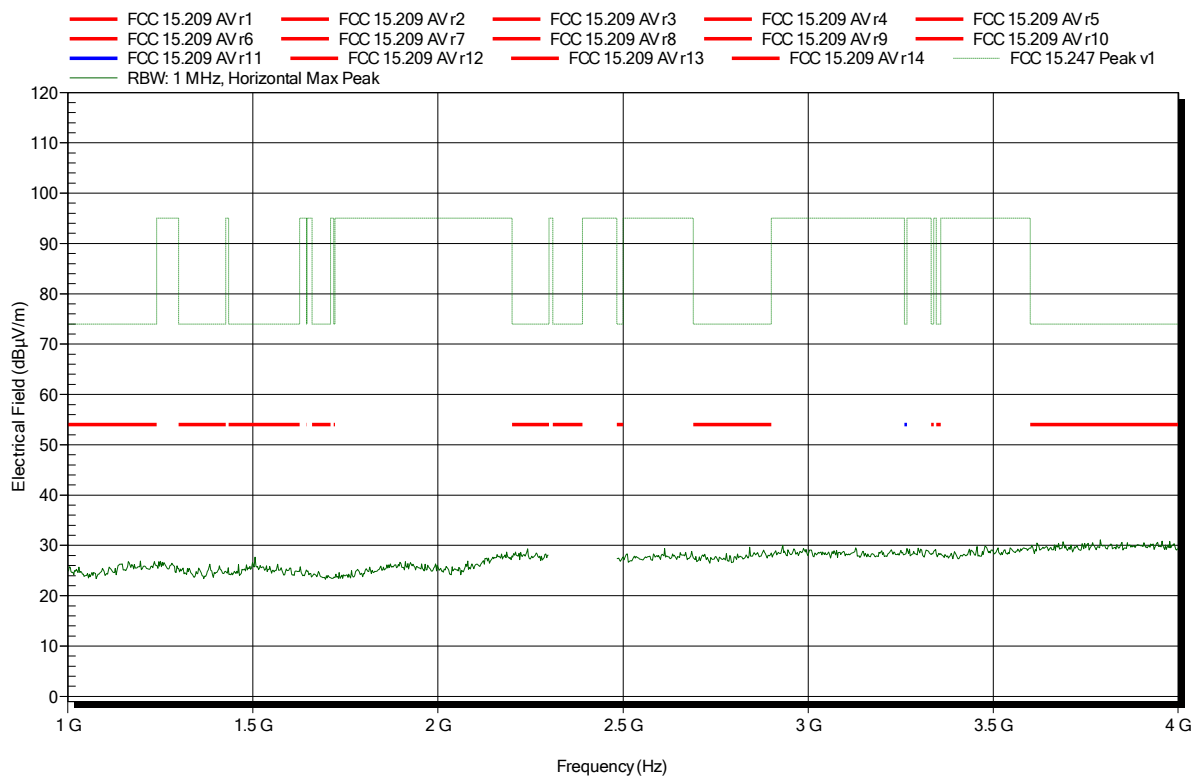
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
243.2 MHz	25.83 dBµV/m	46 dBµV/m	-20.17 dB	Pass
433.6 MHz	30.6 dBµV/m	95 dBµV/m	-64.4 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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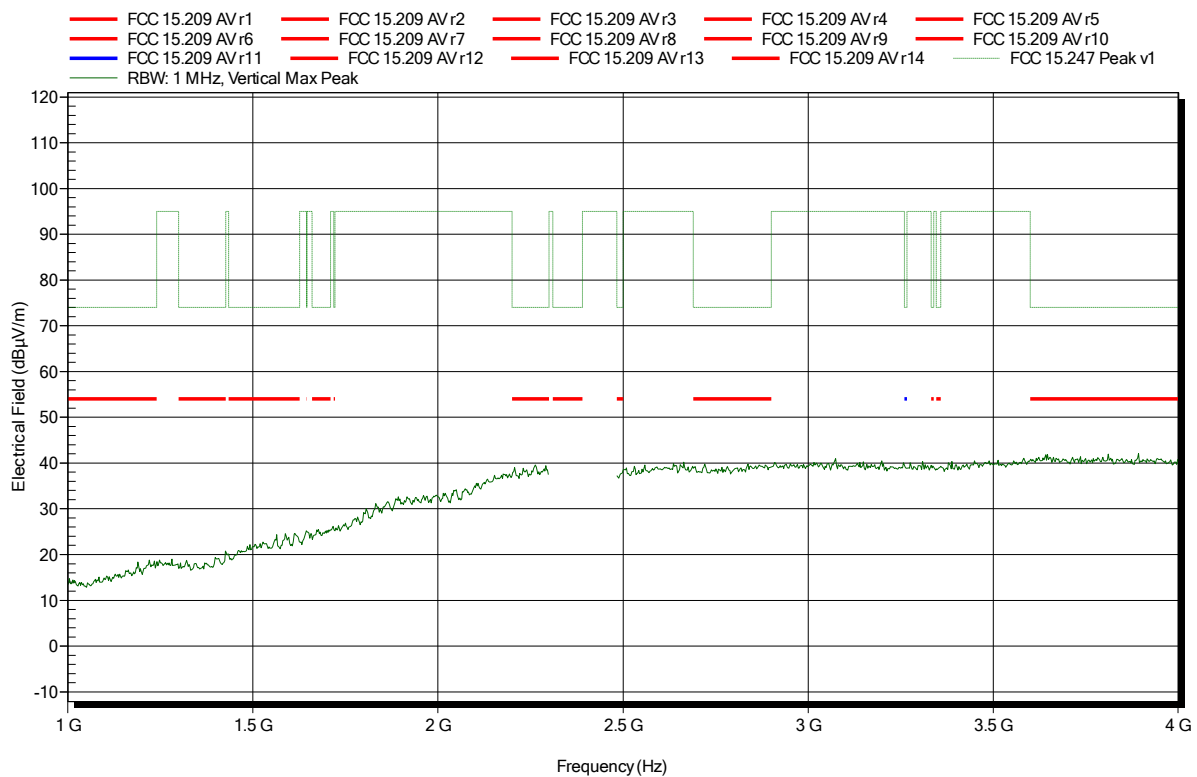


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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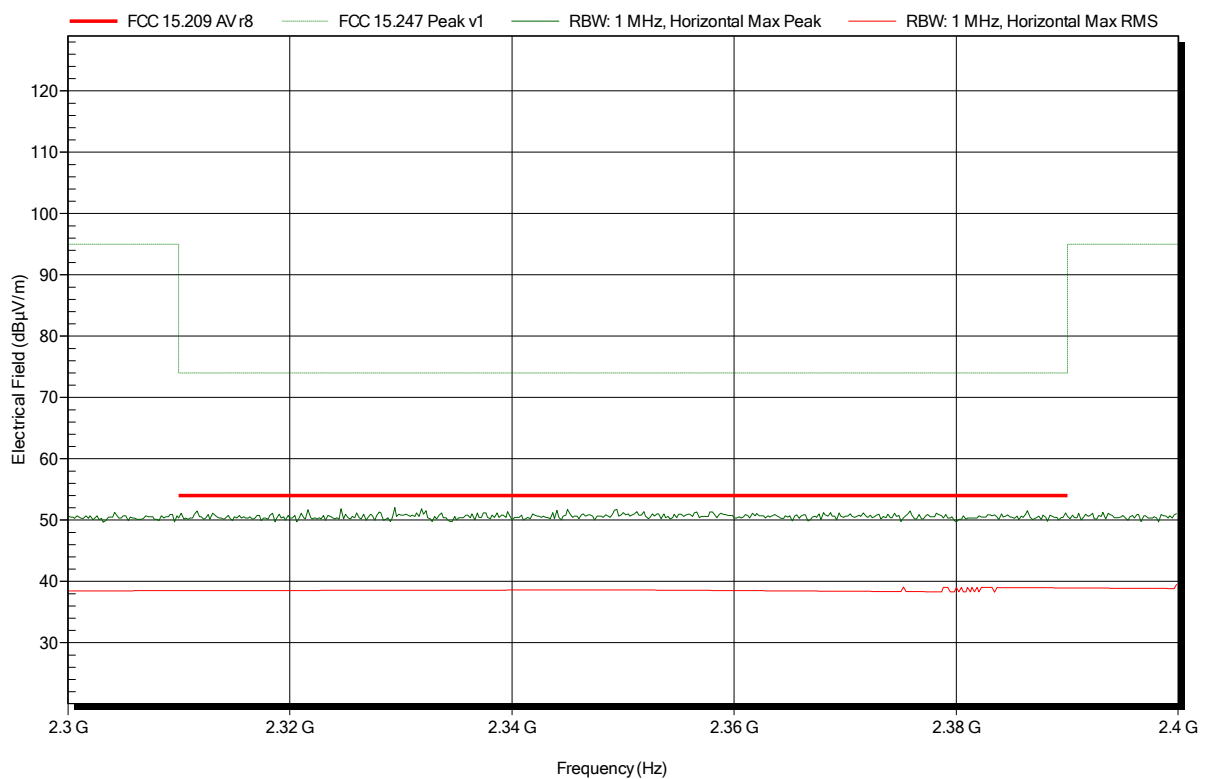


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note: lower bandedge

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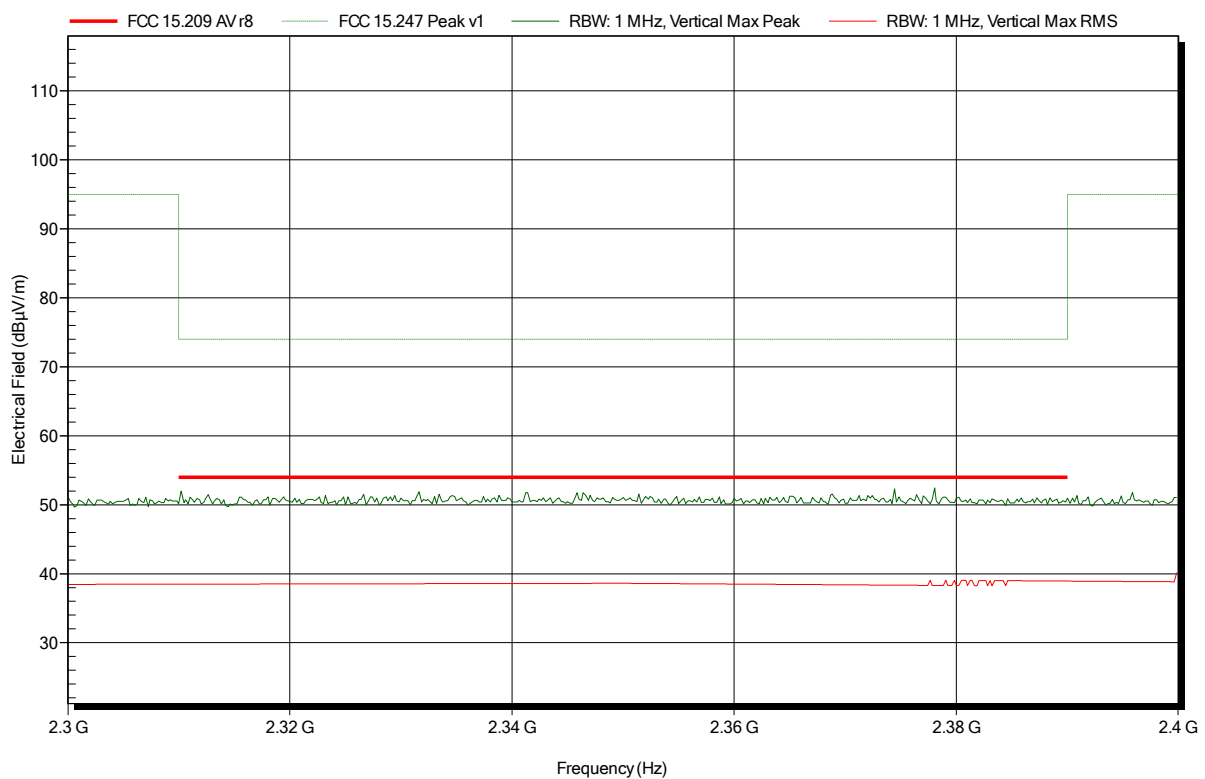


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note: lower bandedge

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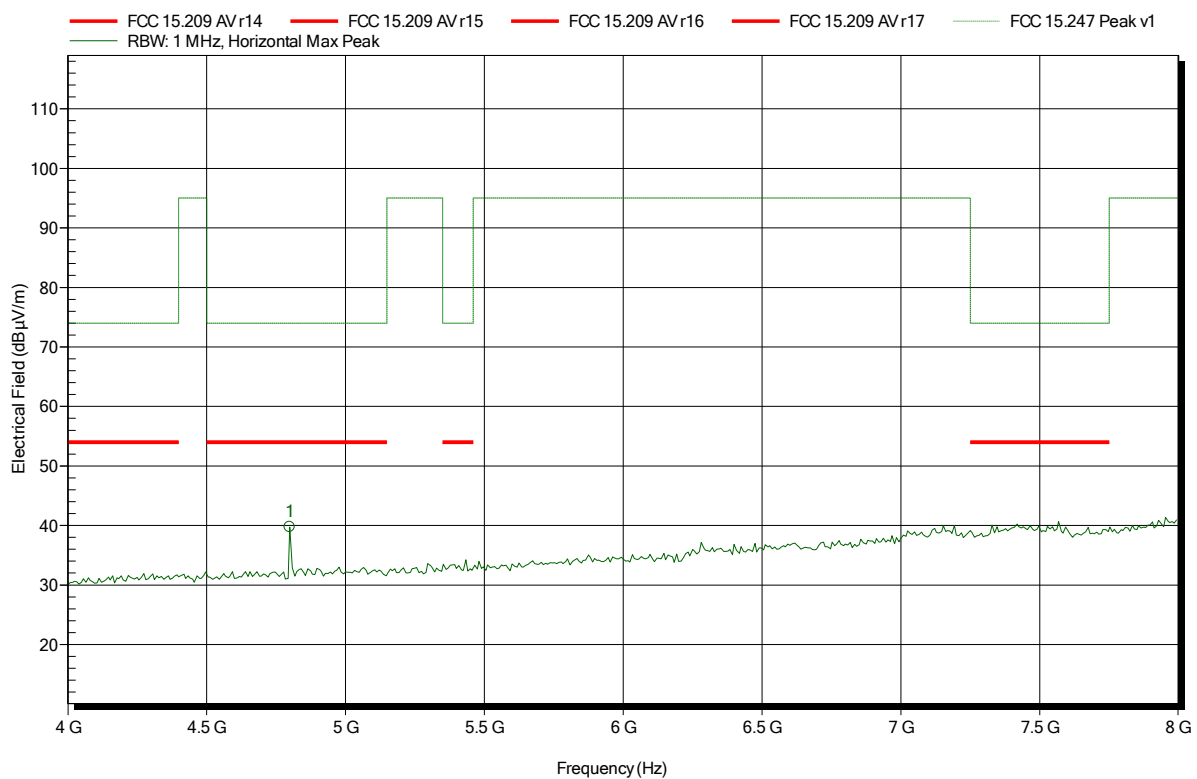


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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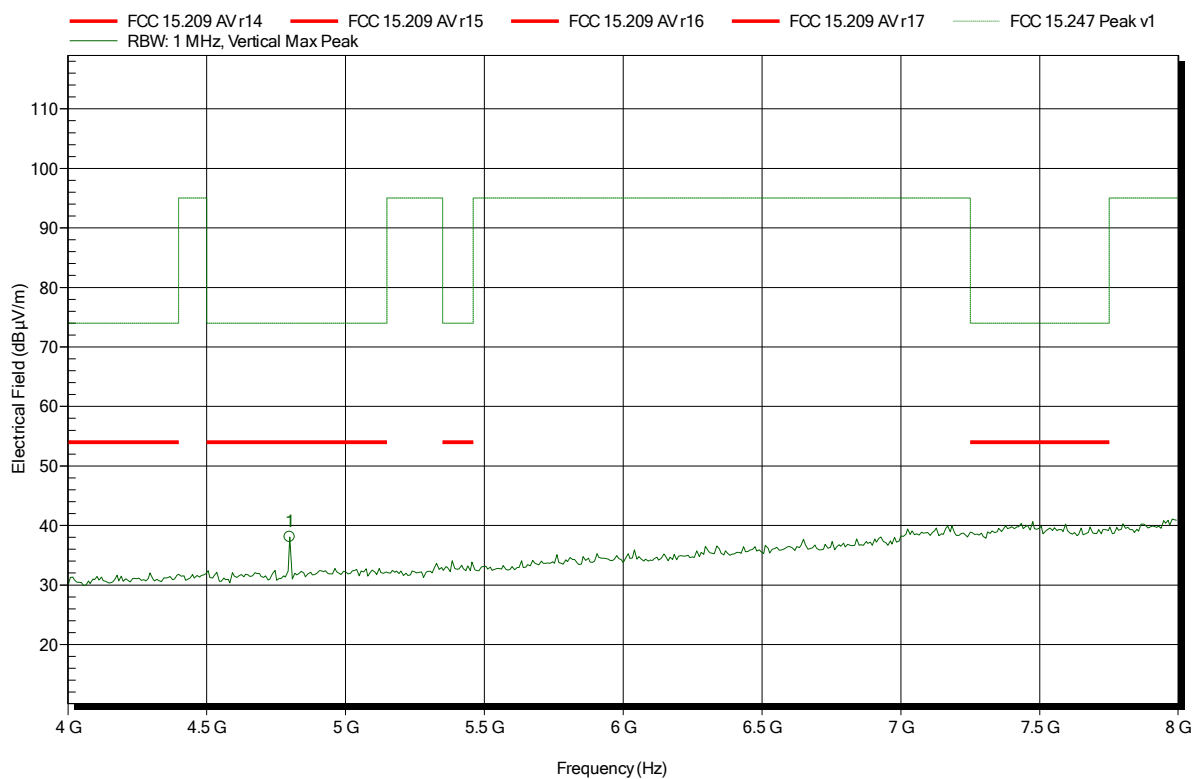
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.8 GHz	39.71 dBµV/m	74 dBµV/m	-34.29 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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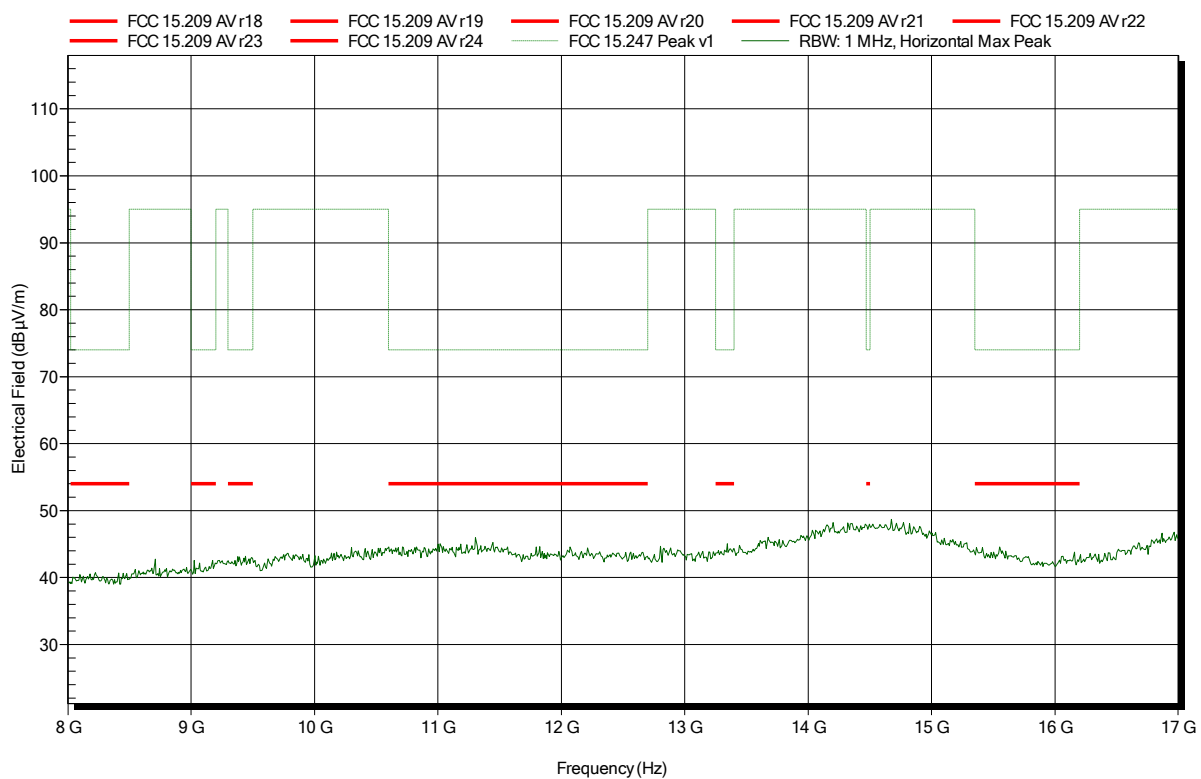
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.8 GHz	38.04 dBµV/m	74 dBµV/m	-35.96 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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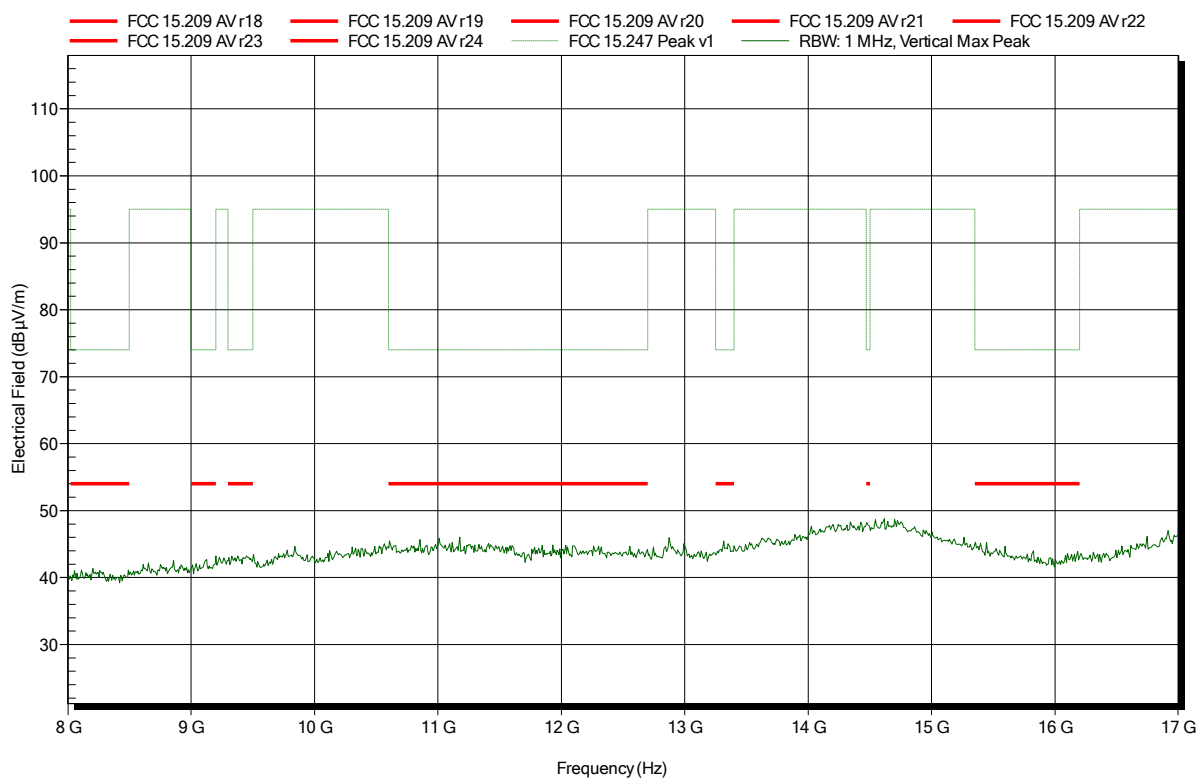


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2402 MHz
Test Date: 2017-09-28
Note:

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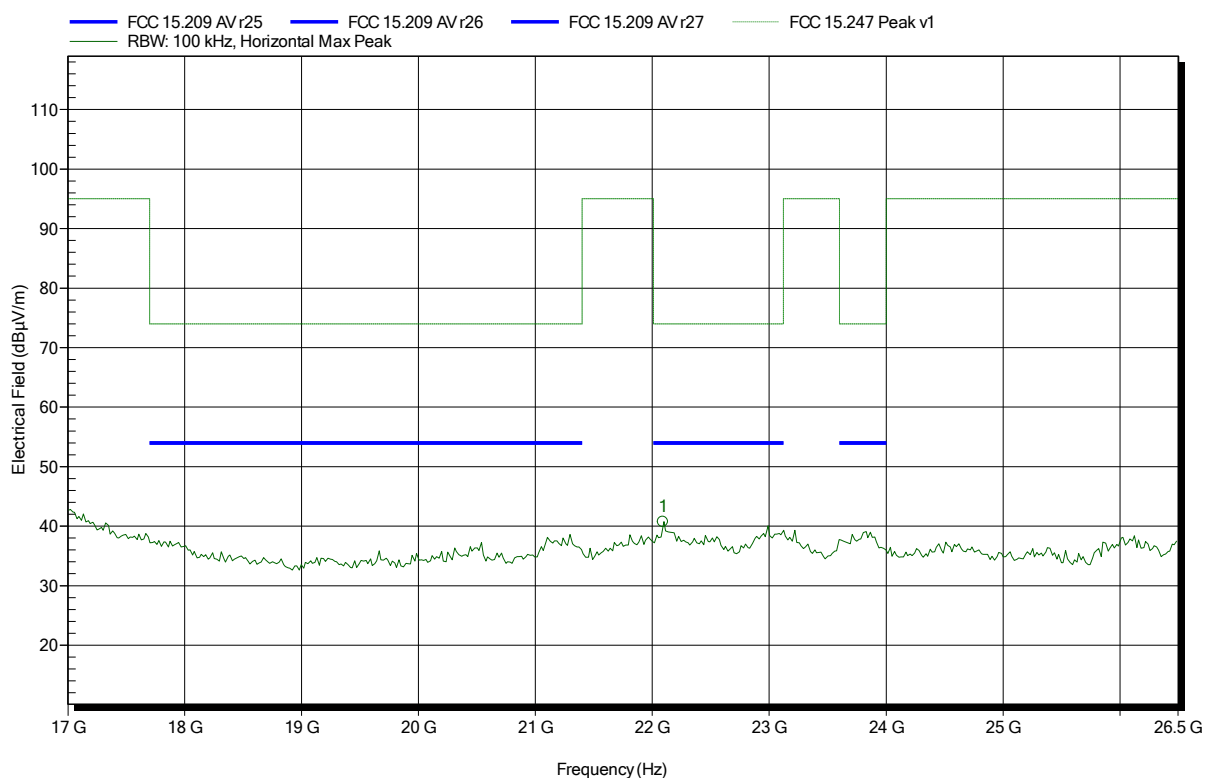


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BLE/RFID co-location; 2402 MHz
 Test Date: 2017-09-28
 Note:

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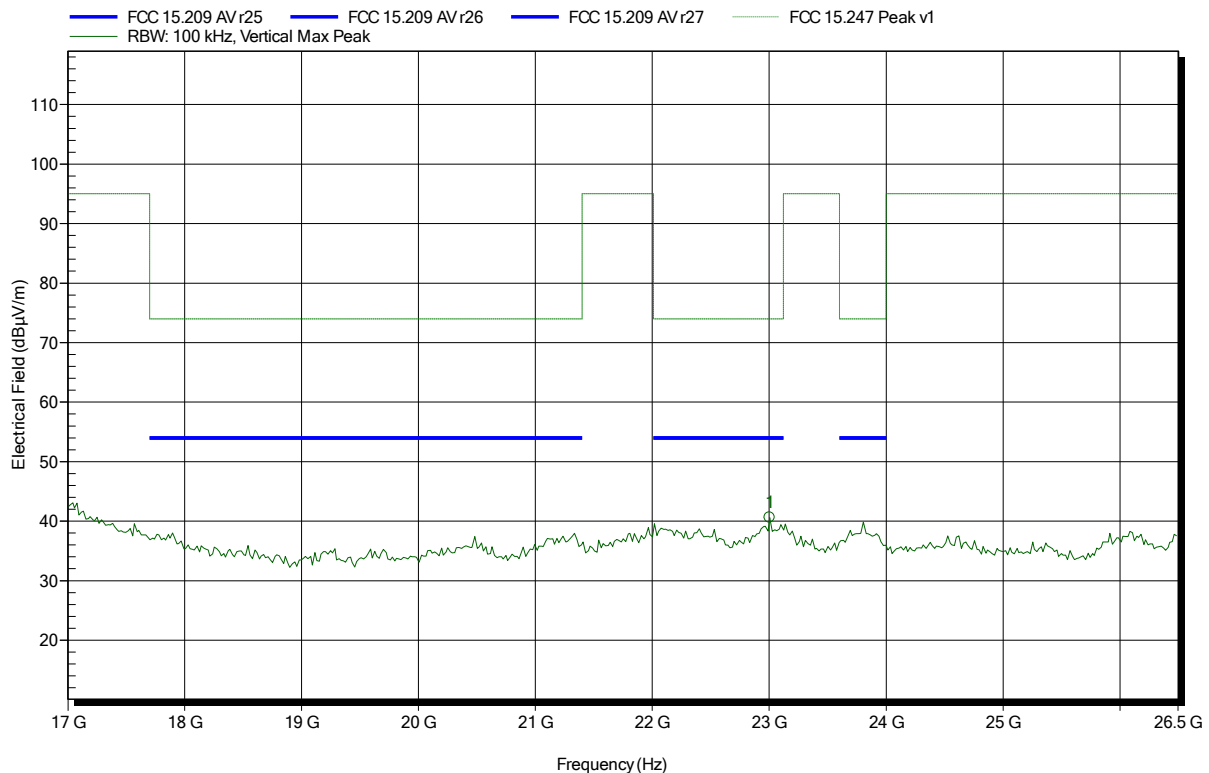
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
22.092 GHz	40.72 dBµV/m	74 dBµV/m	-33.28 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BLE/RFID co-location; 2402 MHz
 Test Date: 2017-09-28
 Note:

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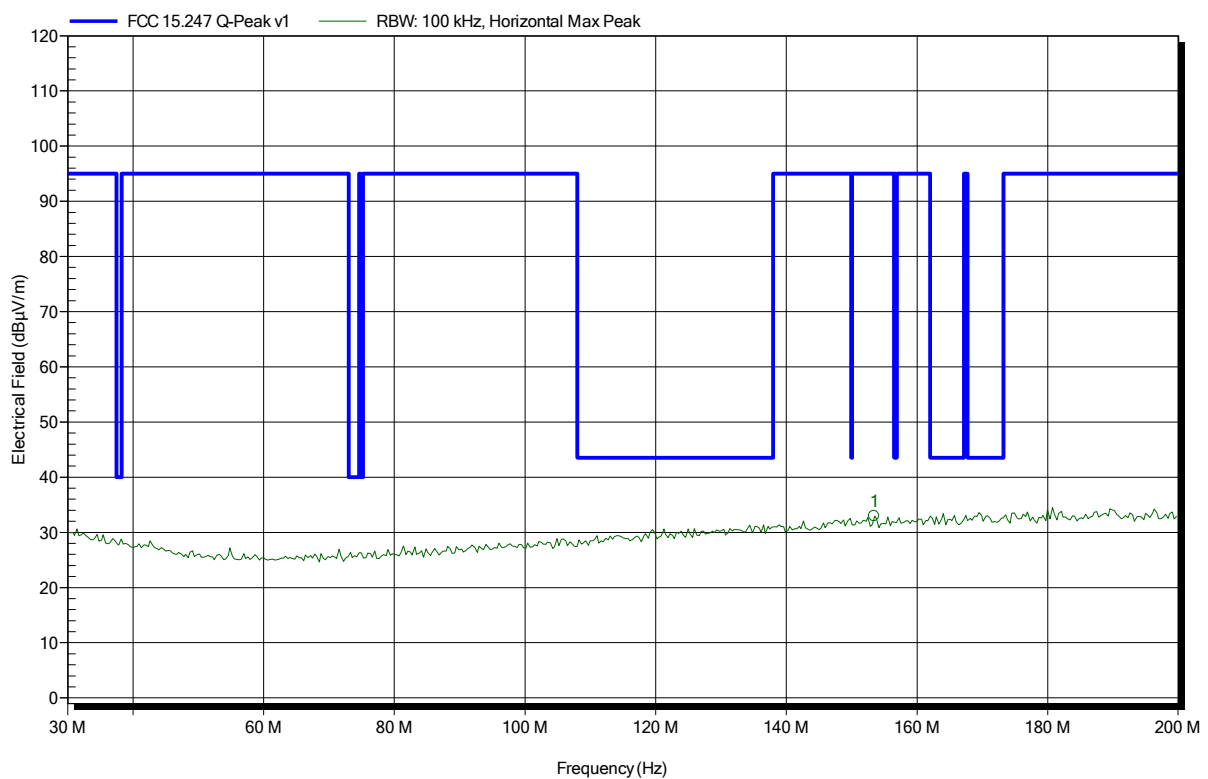


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
23.004 GHz	40.62 dBµV/m	74 dBµV/m	-33.38 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546
 Applicant: Bolis ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; BLE/RFID co-location; 2440 MHz
 Test Date: 2017-09-28
 Note:

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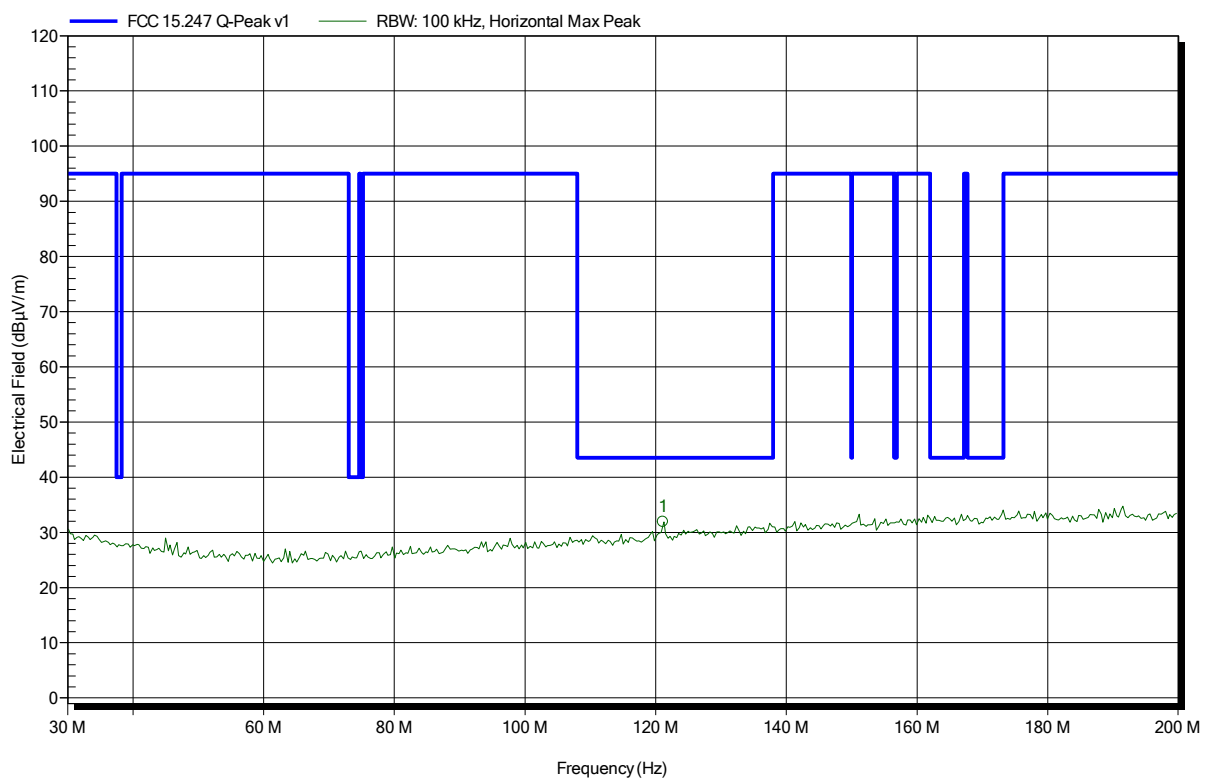
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
153.42 MHz	32.93 dBµV/m	95 dBµV/m	-62.07 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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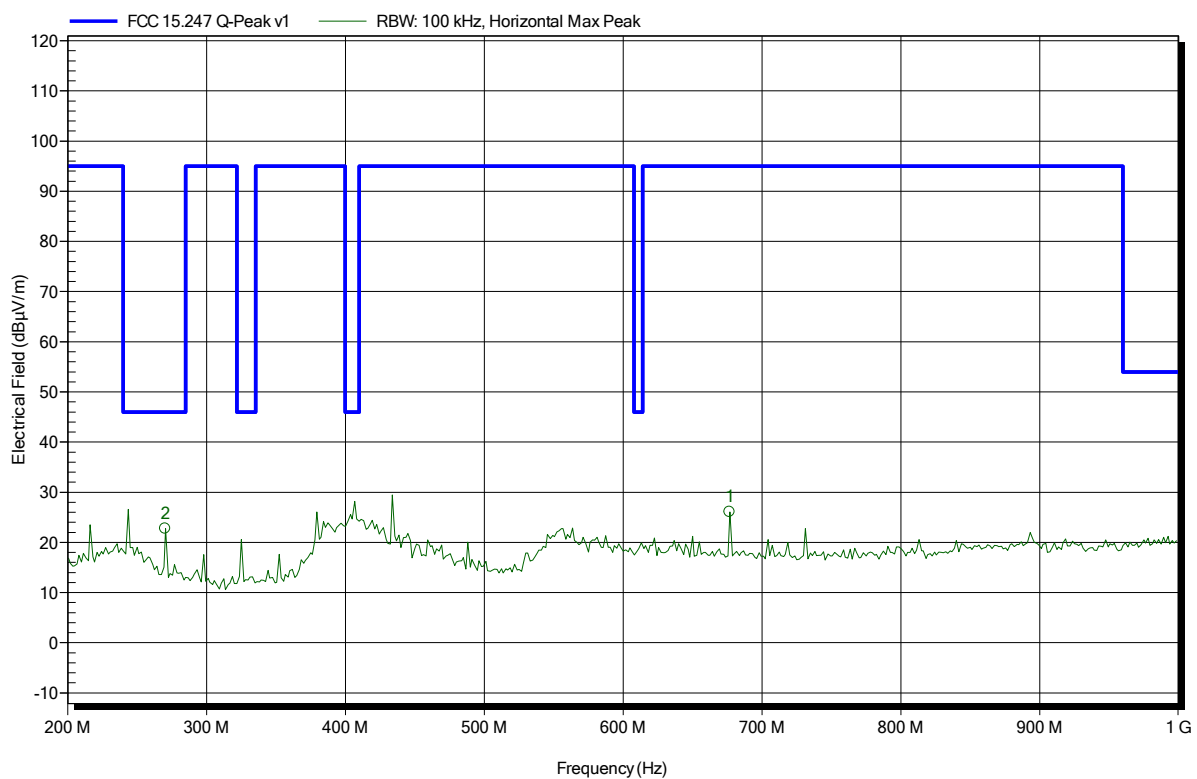
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
121.12 MHz	31.9 dBµV/m	43.52 dBµV/m	-11.62 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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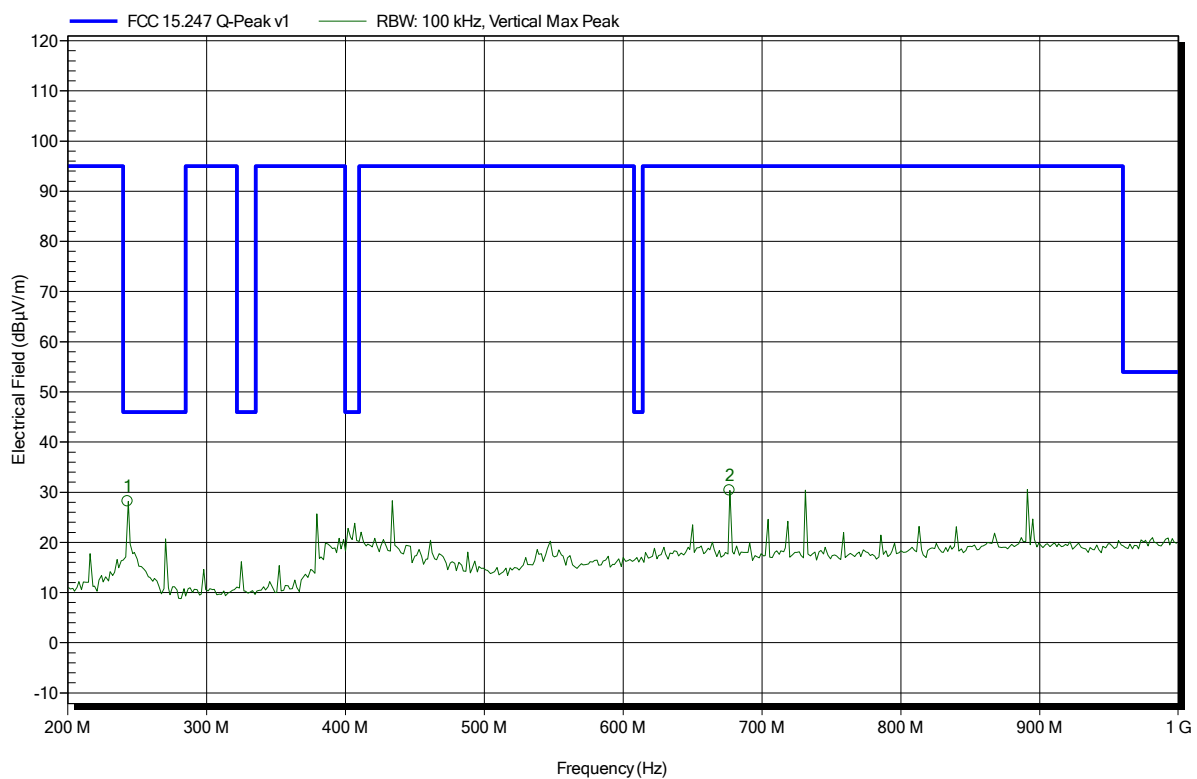
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
270.4 MHz	22.71 dBµV/m	46 dBµV/m	-23.29 dB	Pass
676.8 MHz	26.05 dBµV/m	95 dBµV/m	-68.95 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.4°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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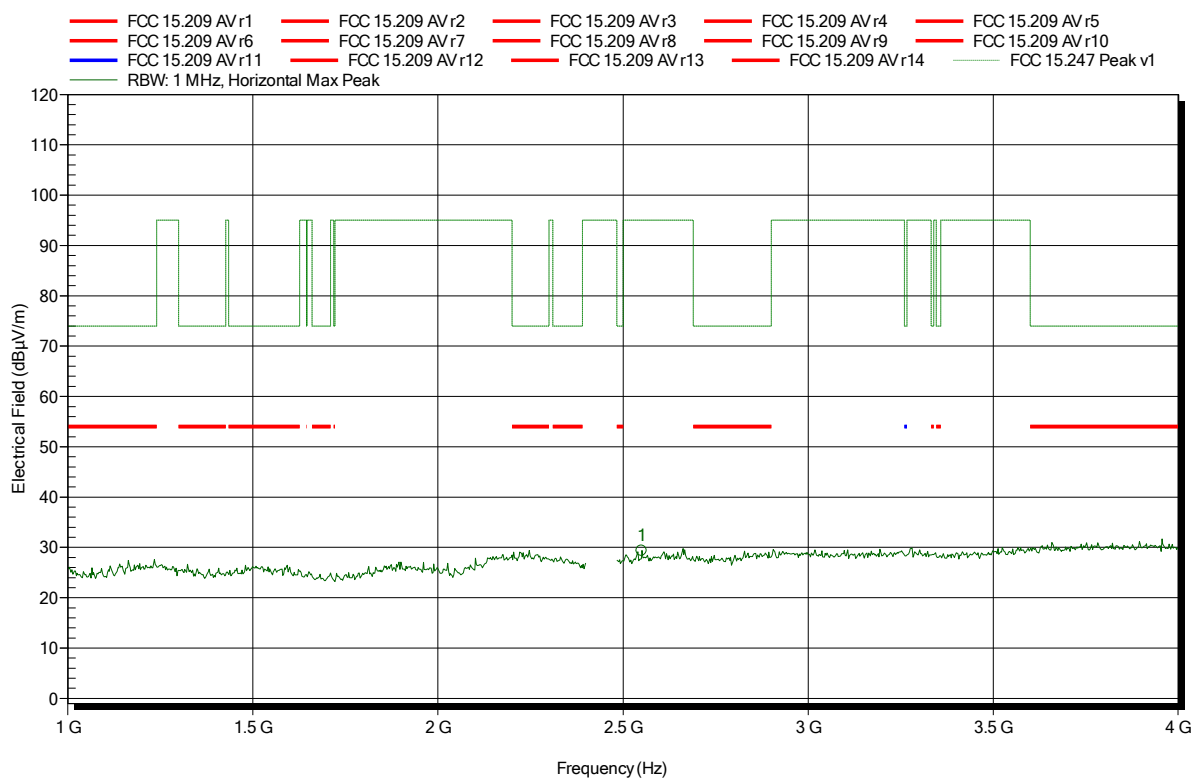
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
243.2 MHz	28.17 dBμV/m	46 dBμV/m	-17.83 dB	Pass
676.8 MHz	30.33 dBμV/m	95 dBμV/m	-64.67 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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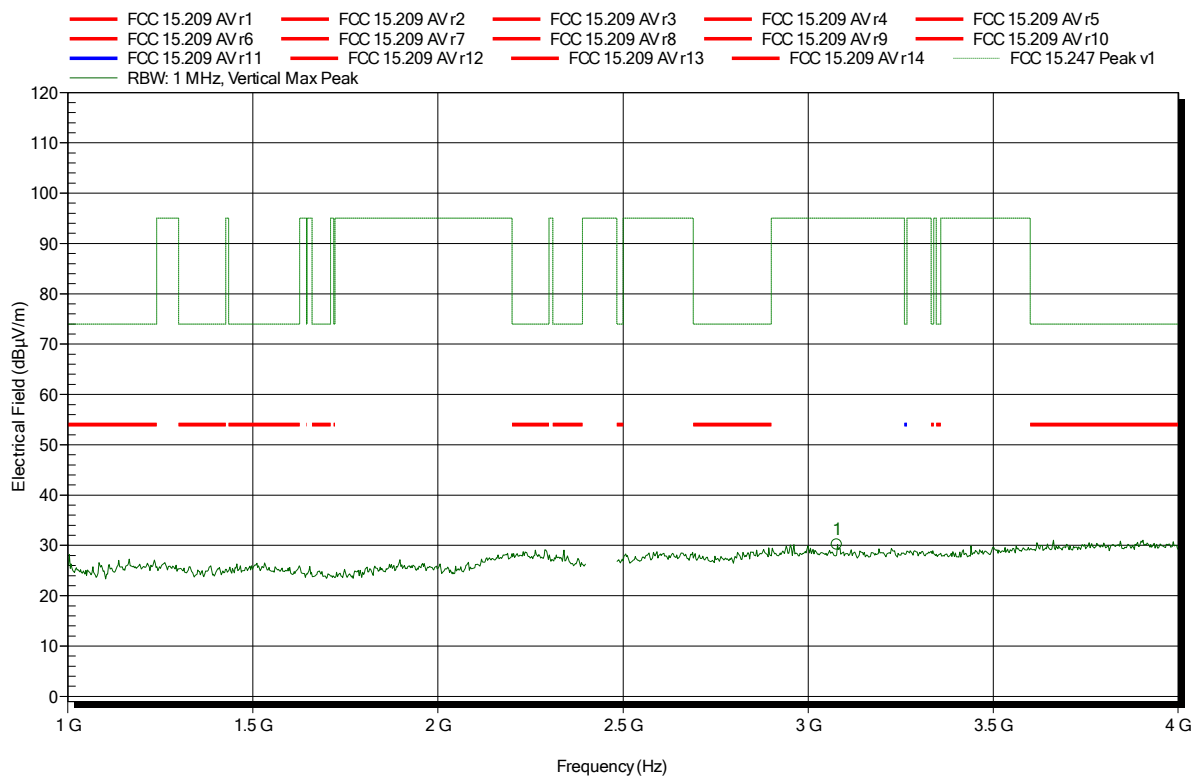
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.5502 GHz	29.36 dBµV/m	95 dBµV/m	-65.64 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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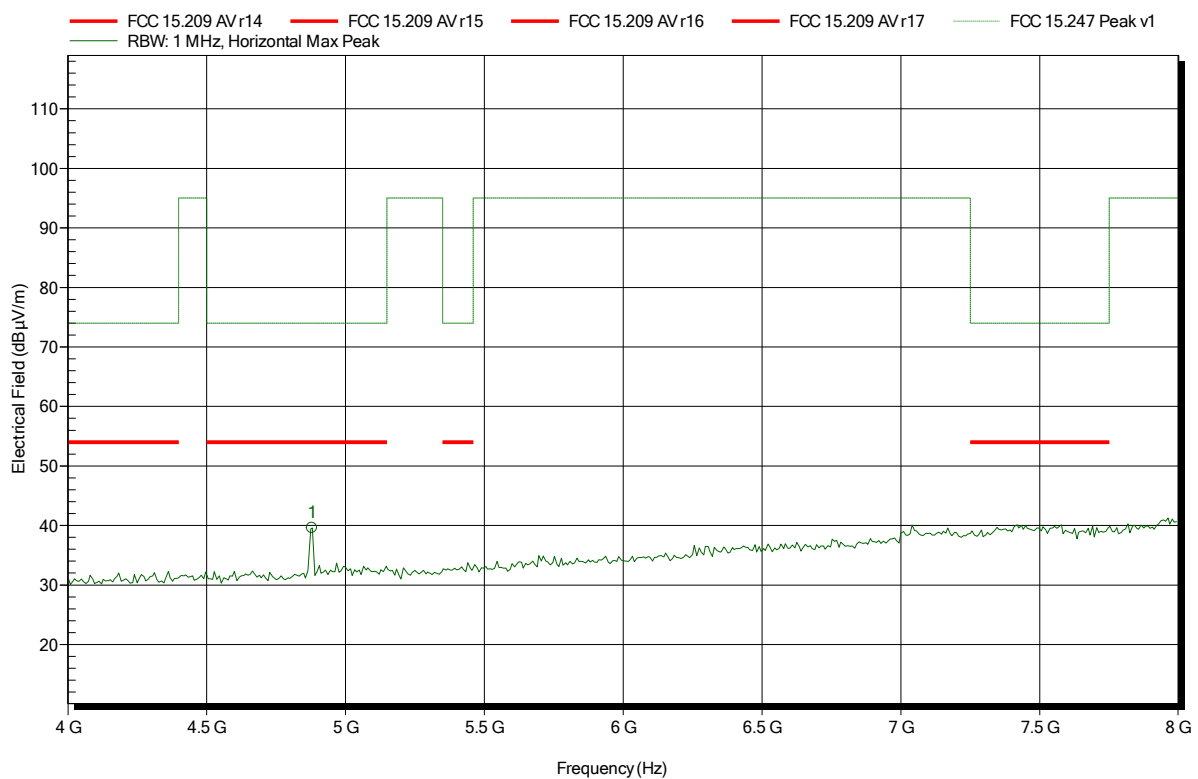
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.078 GHz	30.13 dBµV/m	95 dBµV/m	-64.87 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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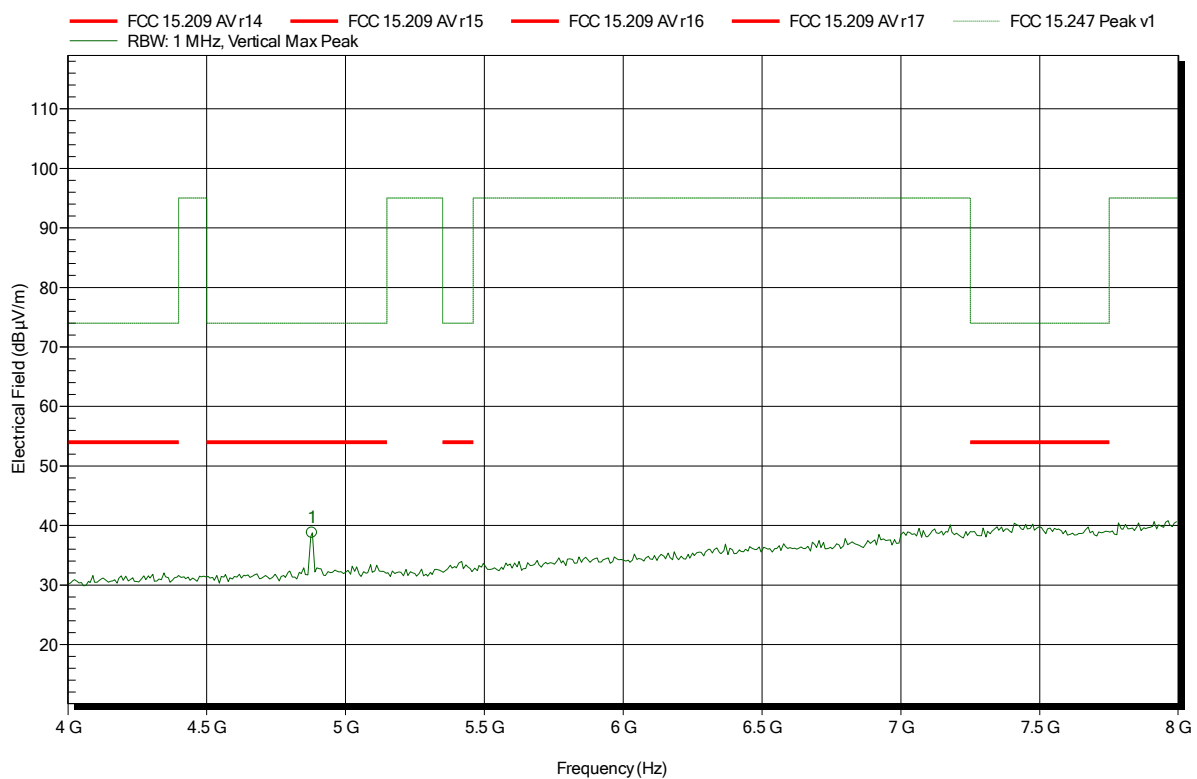
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.88 GHz	39.57 dBµV/m	74 dBµV/m	-34.43 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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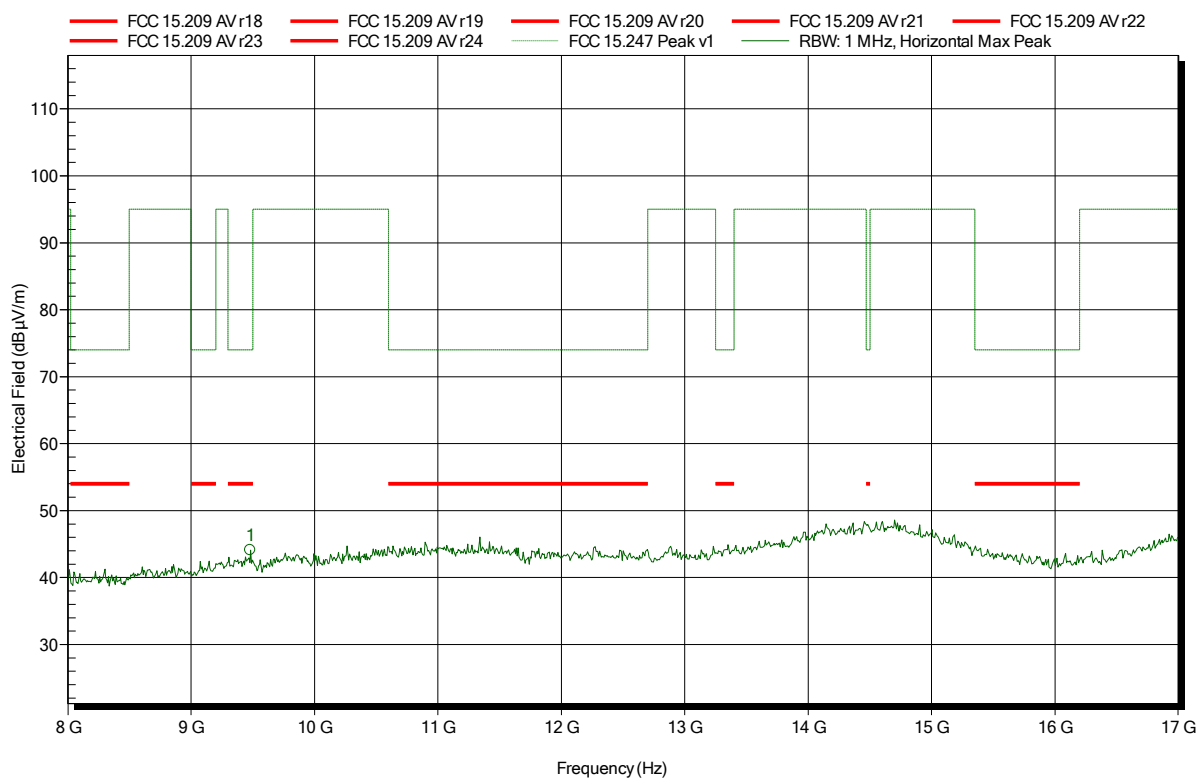
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.88 GHz	38.76 dBµV/m	74 dBµV/m	-35.24 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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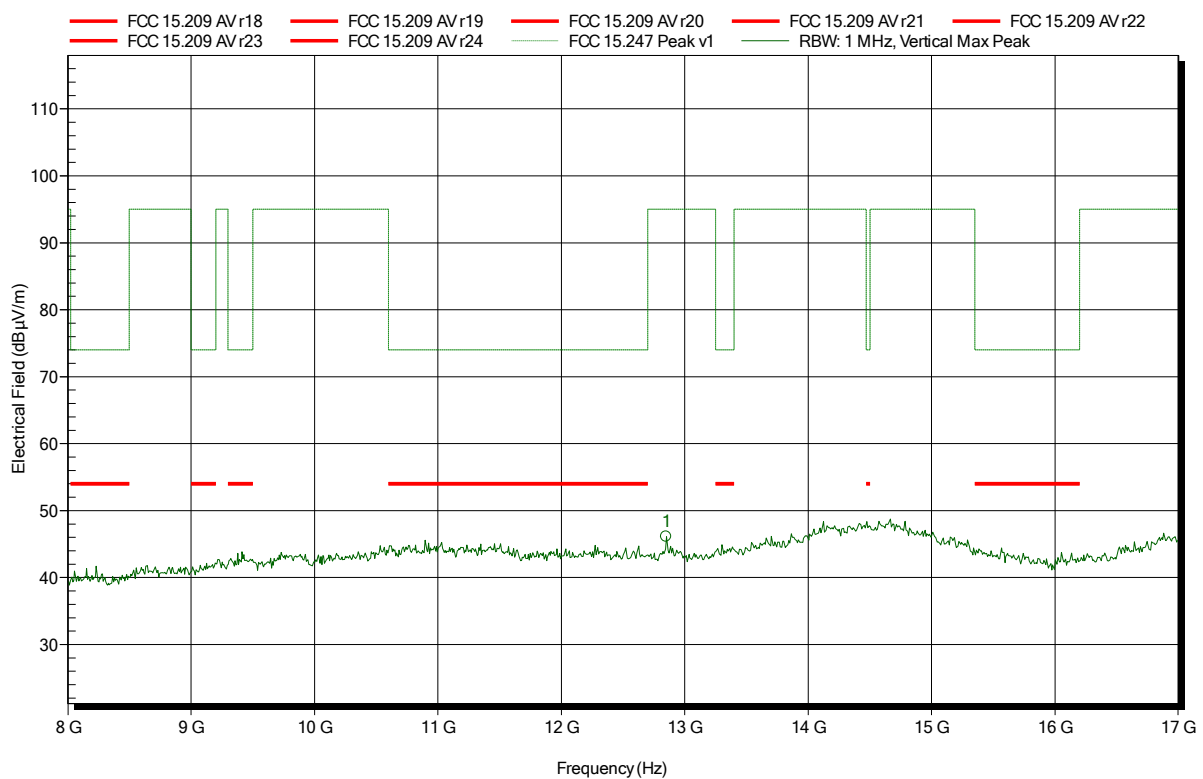
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
9.48 GHz	44.12 dBµV/m	74 dBµV/m	-29.88 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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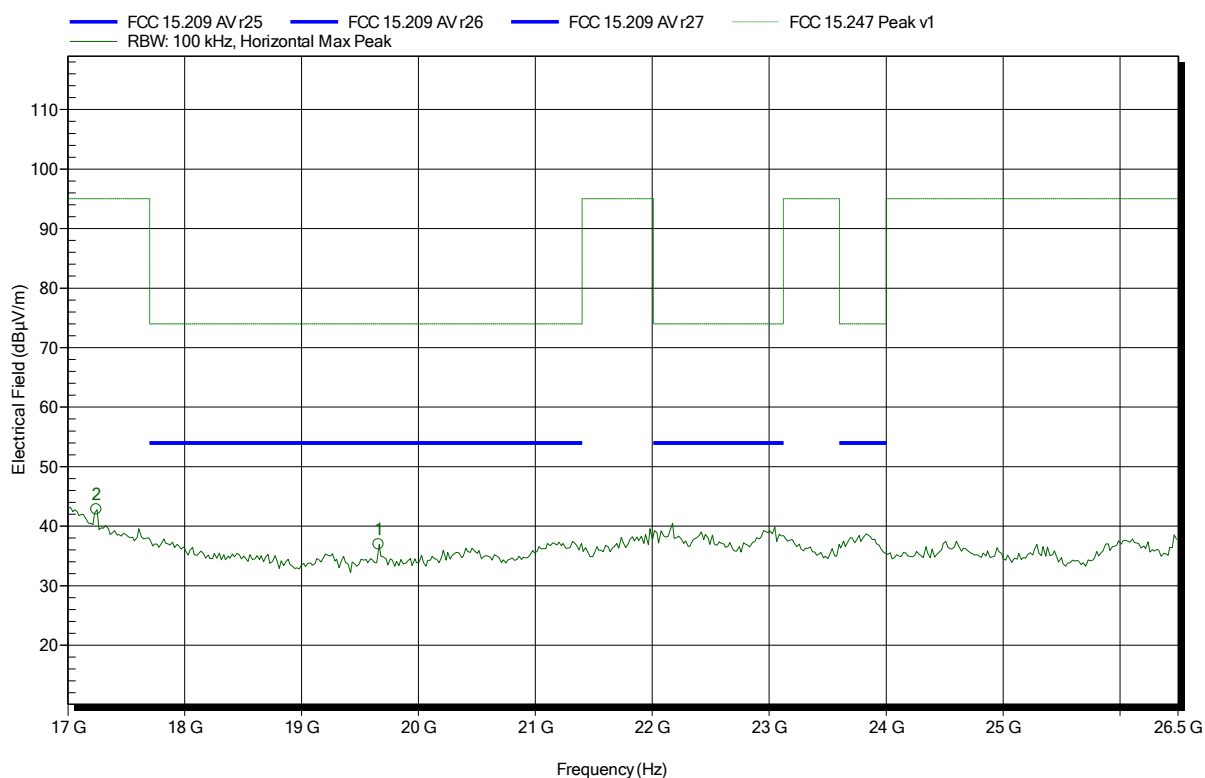
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.85 GHz	46.1 dBµV/m	95 dBµV/m	-48.9 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2440 MHz
Test Date: 2017-09-28
Note:

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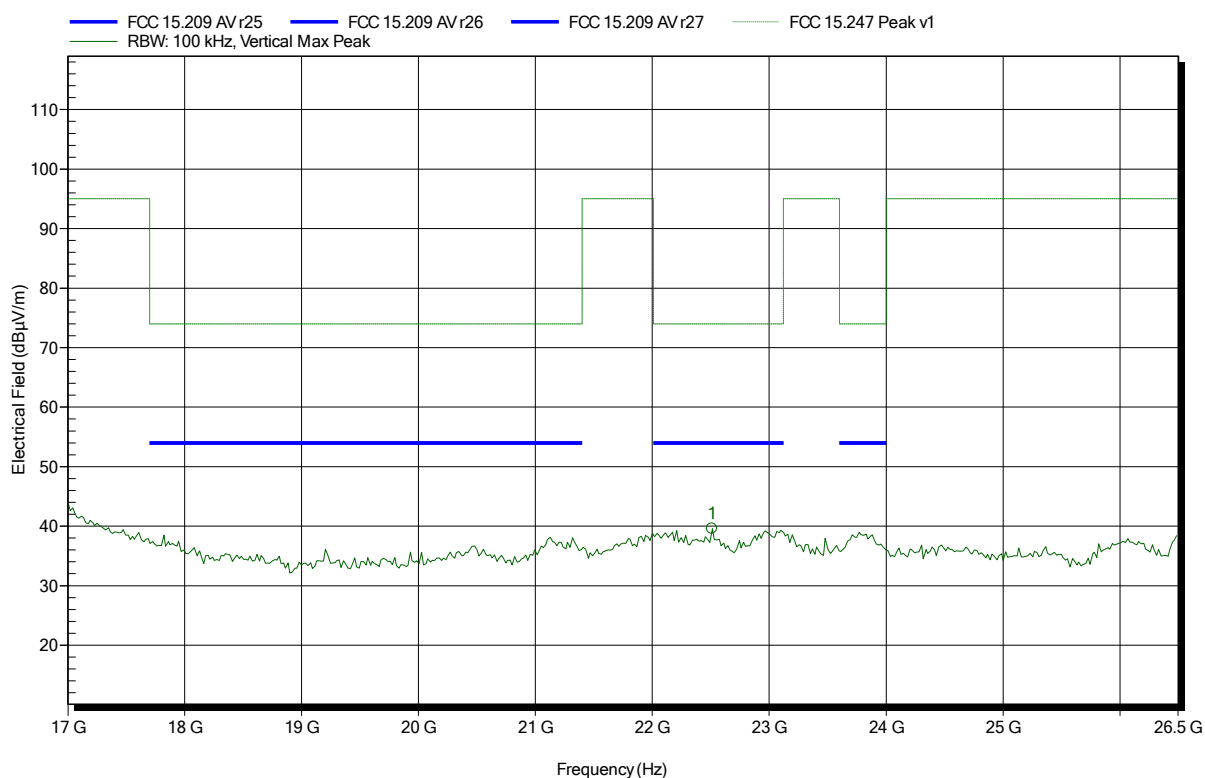
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
17.247 GHz	42.81 dBµV/m	95 dBµV/m	-52.19 dB	Pass
19.66 GHz	36.93 dBµV/m	74 dBµV/m	-37.07 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BLE/RFID co-location; 2440 MHz
 Test Date: 2017-09-28
 Note:

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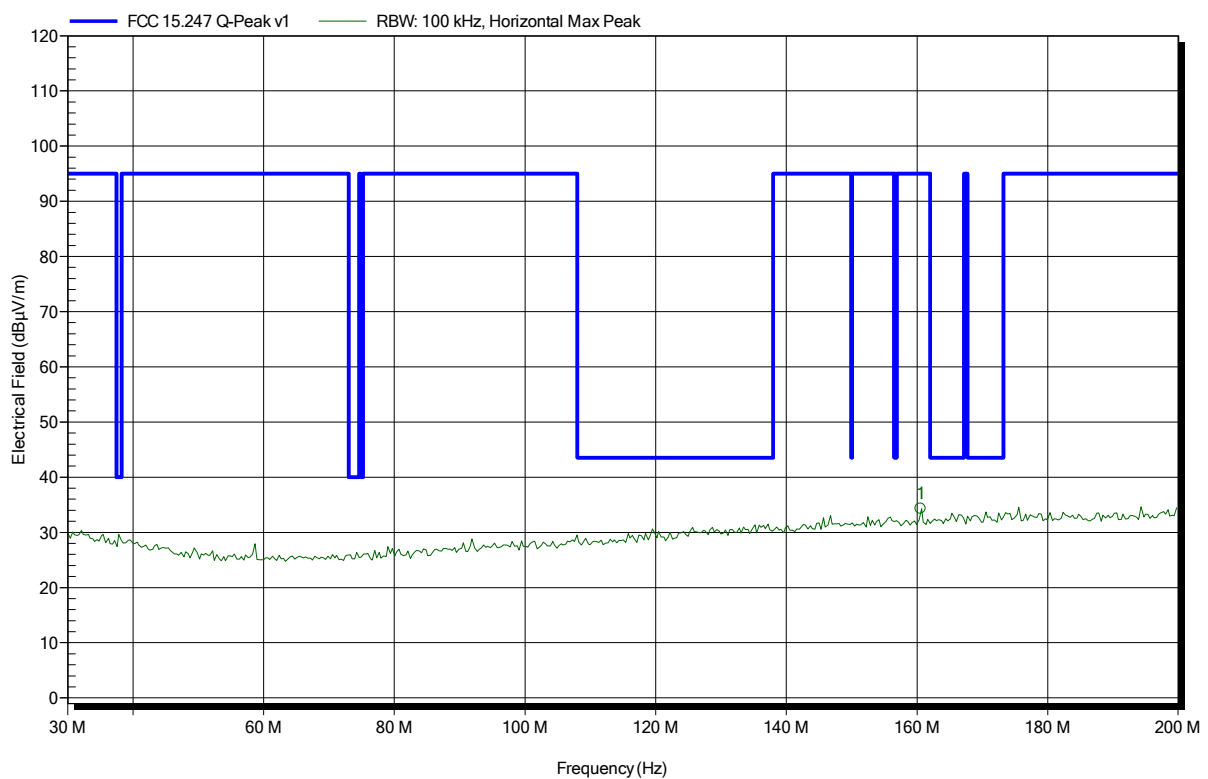


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
22.51 GHz	39.58 dBµV/m	74 dBµV/m	-34.42 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546
 Applicant: Bolis ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; BLE/RFID co-location; 2480 MHz
 Test Date: 2017-09-28
 Note:

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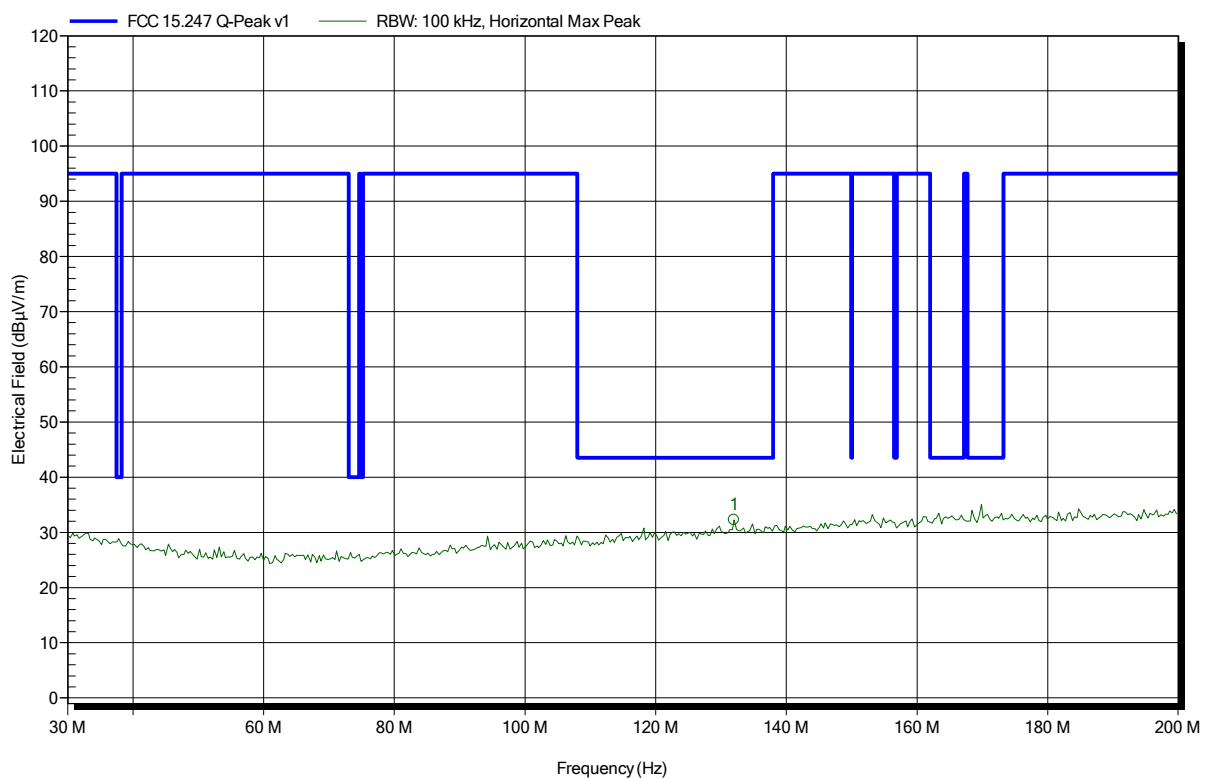


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
160.56 MHz	34.3 dBμV/m	95 dBμV/m	-60.7 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546
 Applicant: Bolis ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 24.9°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; BLE/RFID co-location; 2480 MHz
 Test Date: 2017-09-28
 Note:

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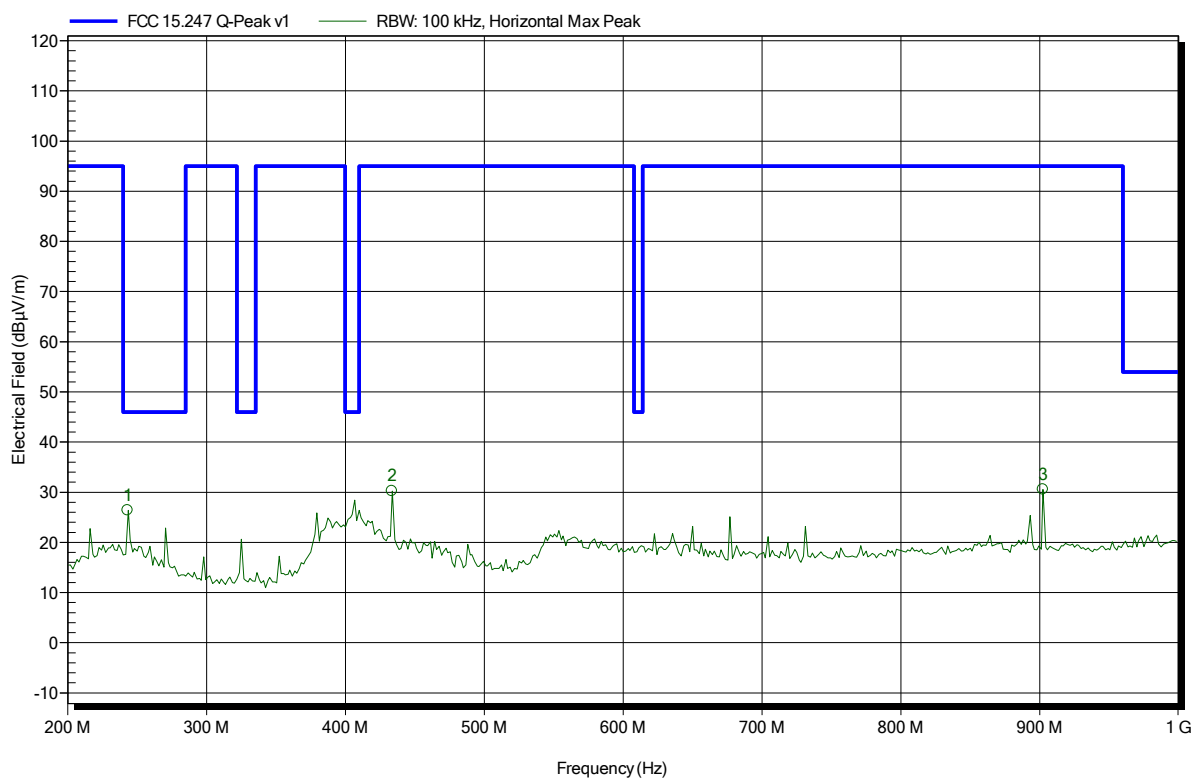
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
132 MHz	32.27 dBµV/m	43.52 dBµV/m	-11.25 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 23.9°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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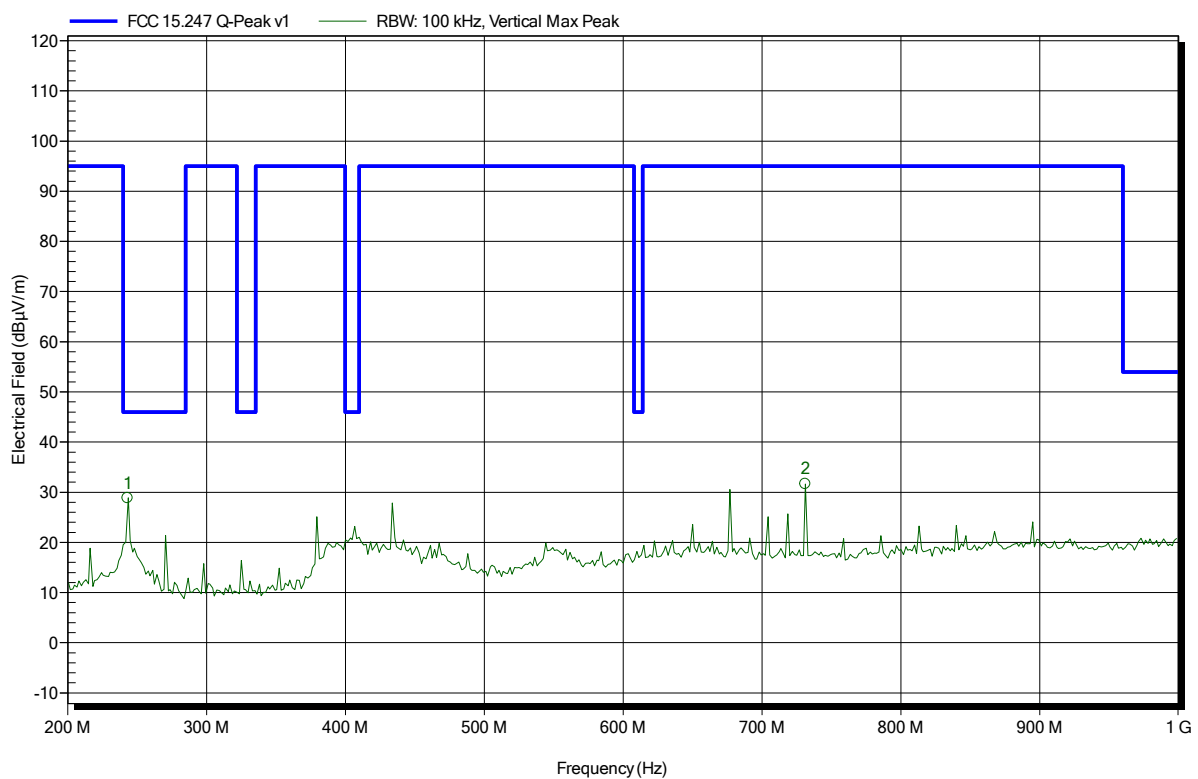
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
243.2 MHz	26.38 dBµV/m	46 dBµV/m	-19.62 dB	Pass
433.6 MHz	30.26 dBµV/m	95 dBµV/m	-64.74 dB	Pass
902.4 MHz	30.54 dBµV/m	95 dBµV/m	-64.46 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolis ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 23.9°C, Vnom: 5.0VDC (lithium battery)
Antenna: Rohde & Schwarz HL 223, Vertical
Measurement distance: 3 m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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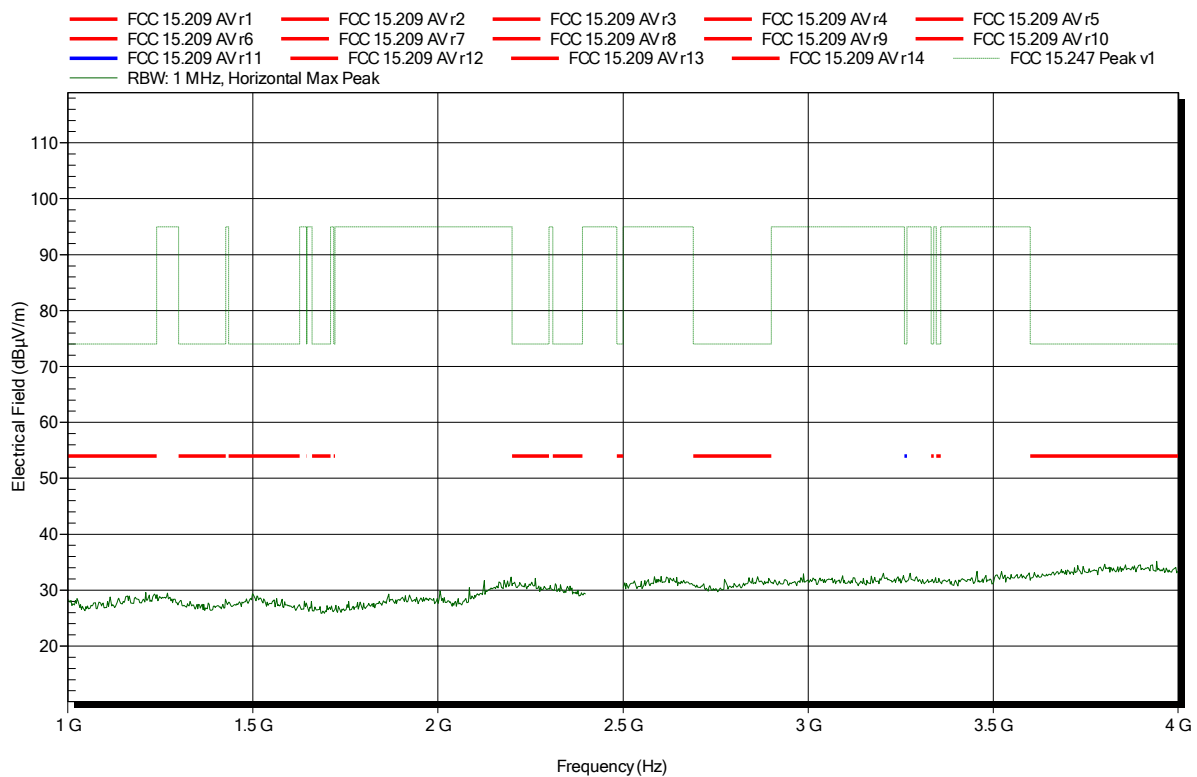
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
243.2 MHz	28.84 dBµV/m	46 dBµV/m	-17.16 dB	Pass
731.2 MHz	31.64 dBµV/m	95 dBµV/m	-63.36 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.8°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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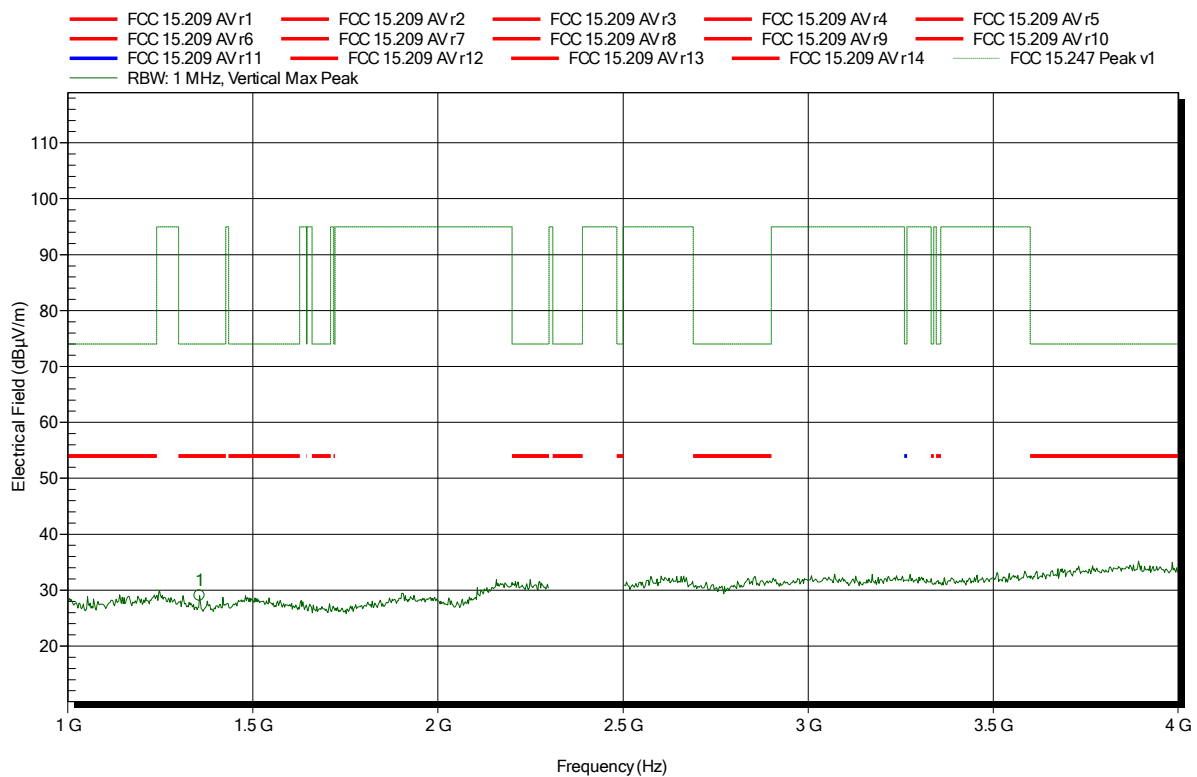


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
 EUT Name: 13.56 MHz RFID
 Model: Kubo
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Al Jamal
 Test Conditions: Tnom: 25.1°C, Vnom: 5.0VDC (lithium battery)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BLE/RFID co-location; 2480 MHz
 Test Date: 2017-09-28
 Note:

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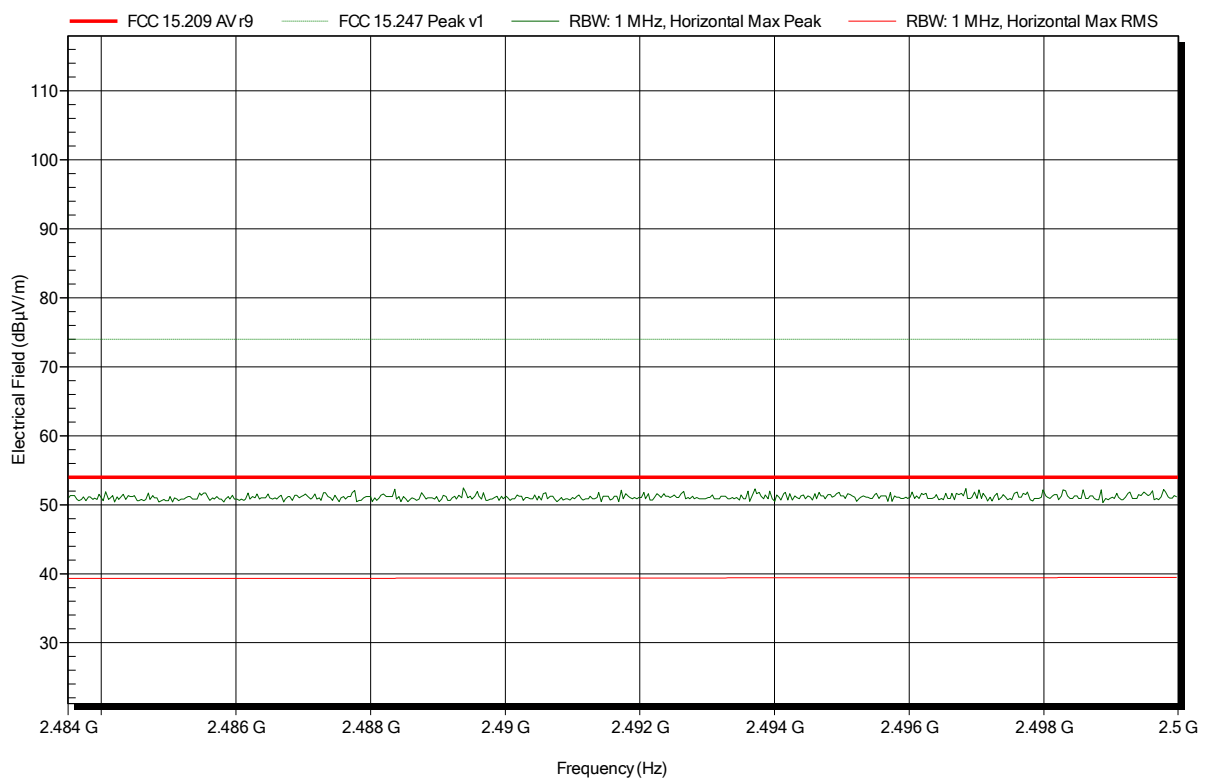
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.356 GHz	29.03 dBµV/m	74 dBµV/m	-44.97 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.8°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note: upper bandedge

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Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25.1°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note: upper bandedge

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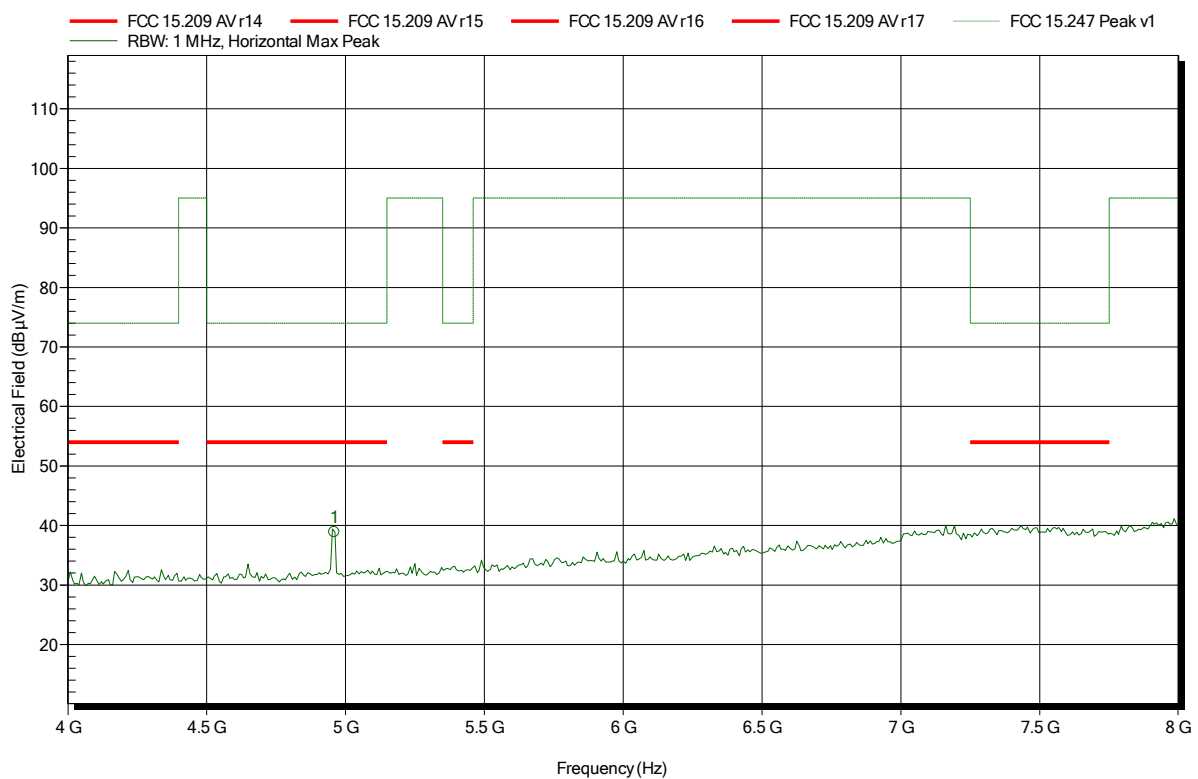


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 24.8°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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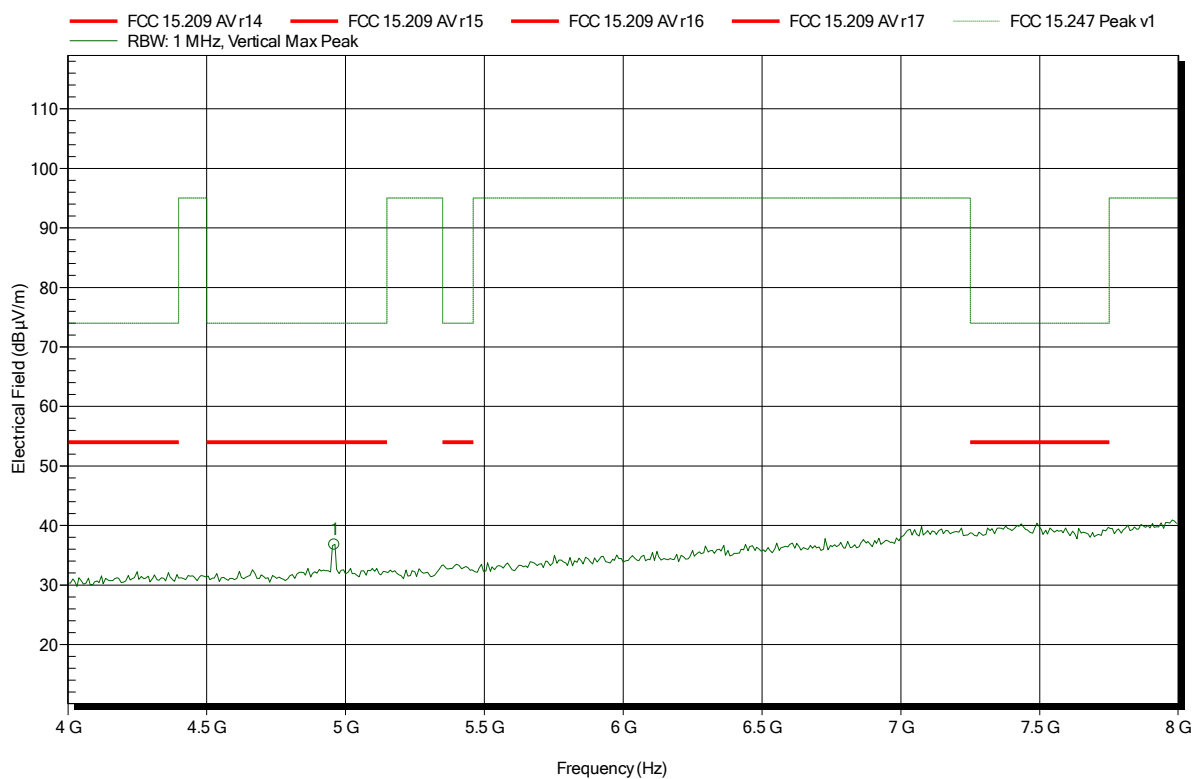
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.96 GHz	38.87 dBµV/m	74 dBµV/m	-35.13 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25.1°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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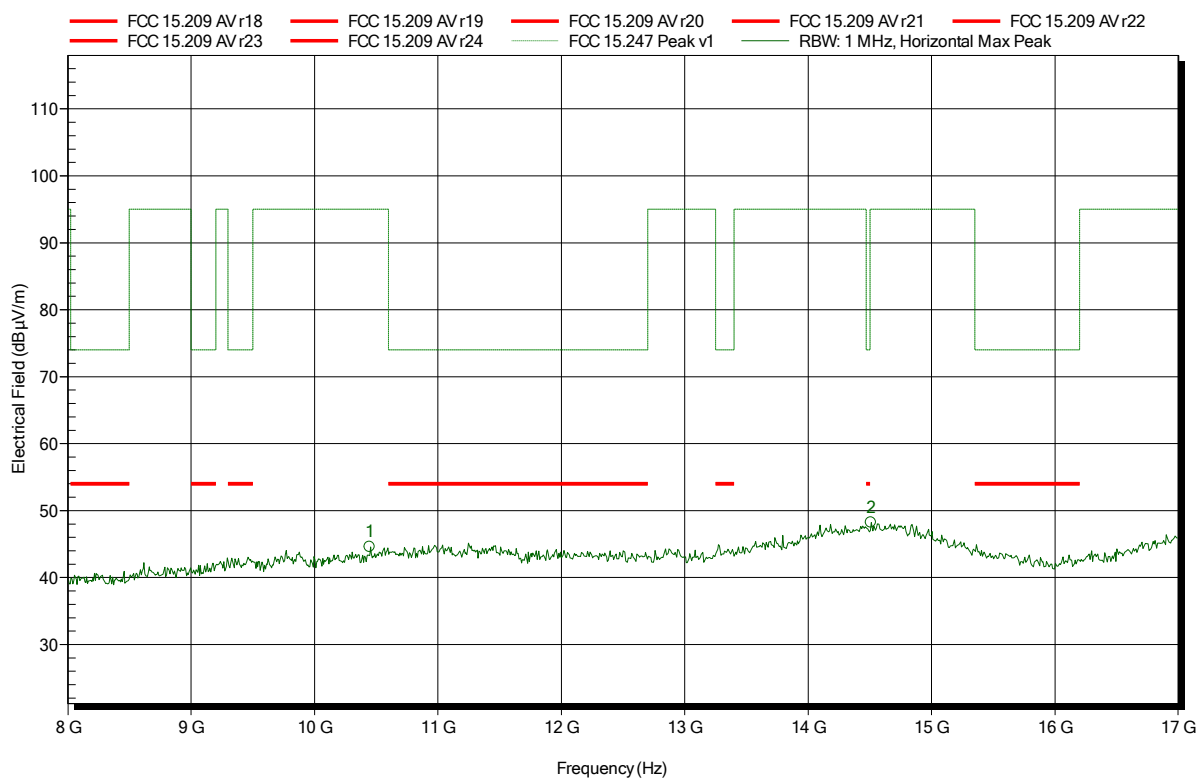
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.96 GHz	36.79 dBµV/m	74 dBµV/m	-37.21 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25.1°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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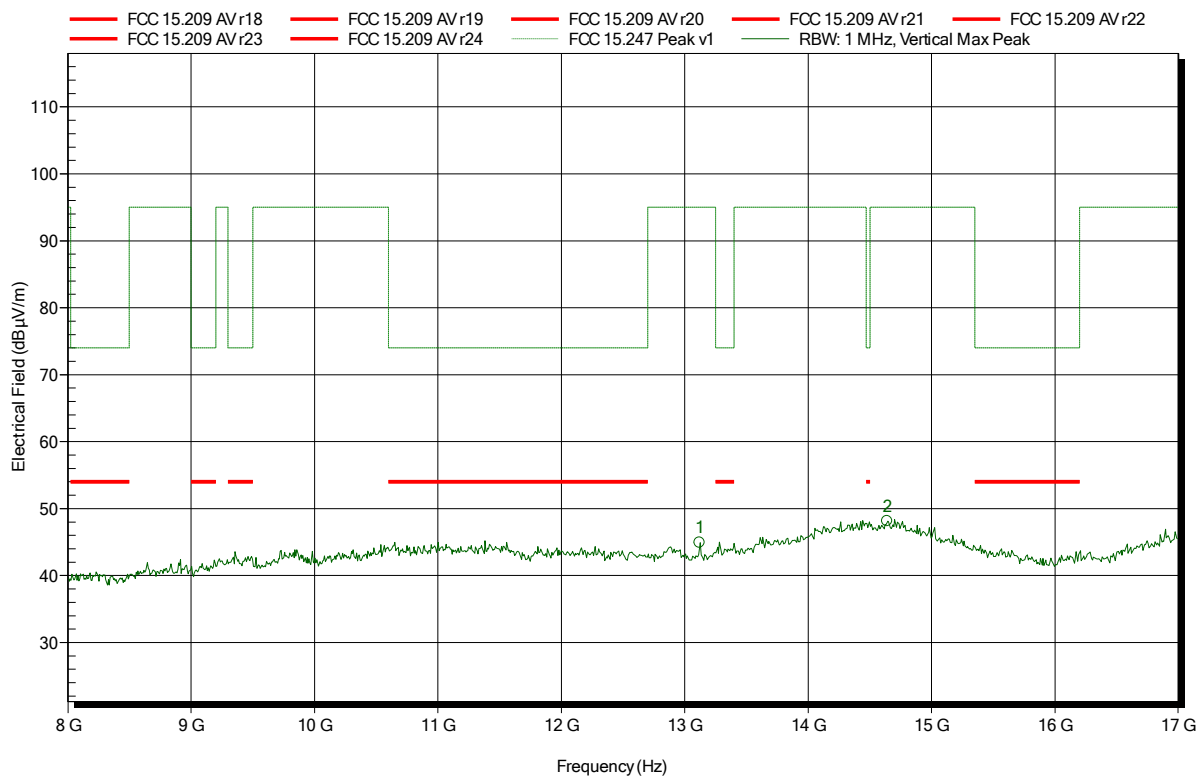
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
10.448 GHz	44.56 dBµV/m	95 dBµV/m	-50.44 dB	Pass
14.51 GHz	48.23 dBµV/m	95 dBµV/m	-46.77 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25.1°C, Vnom: 5.0VDC (lithium battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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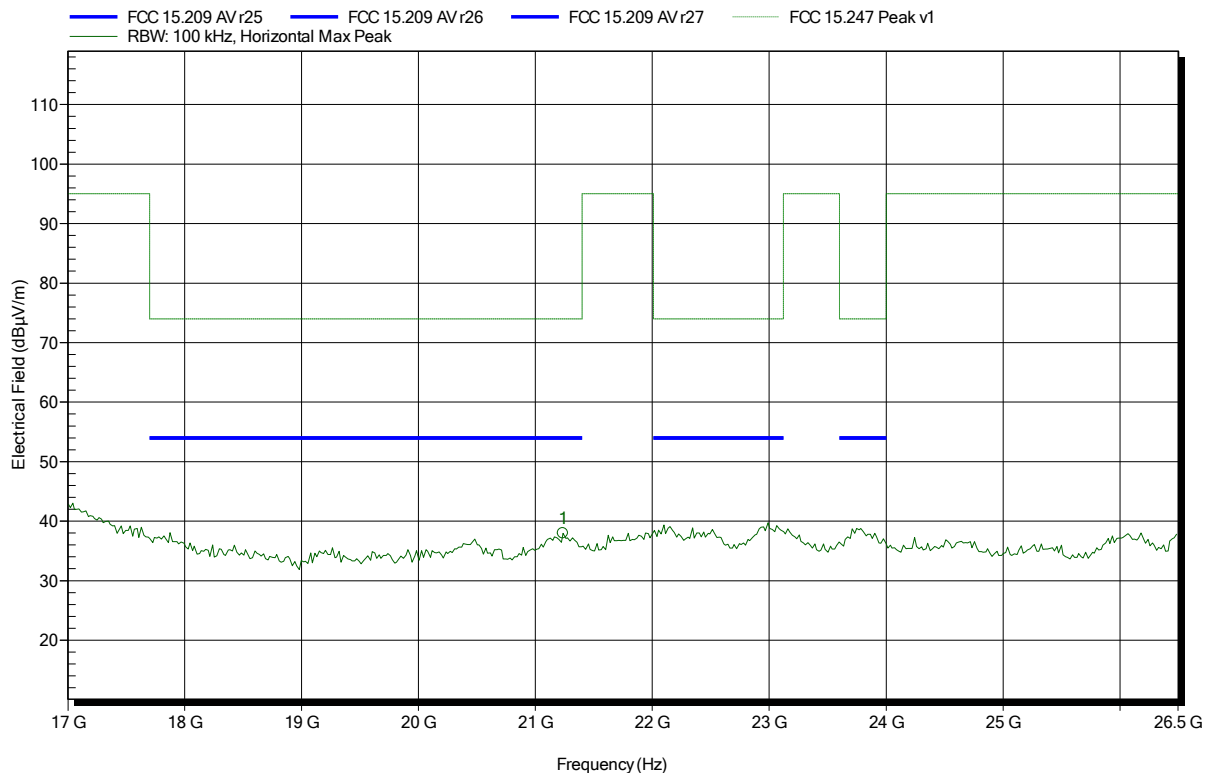
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
13.12 GHz	44.91 dBµV/m	95 dBµV/m	-50.09 dB	Pass
14.64 GHz	48.13 dBµV/m	95 dBµV/m	-46.87 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
Horizontal
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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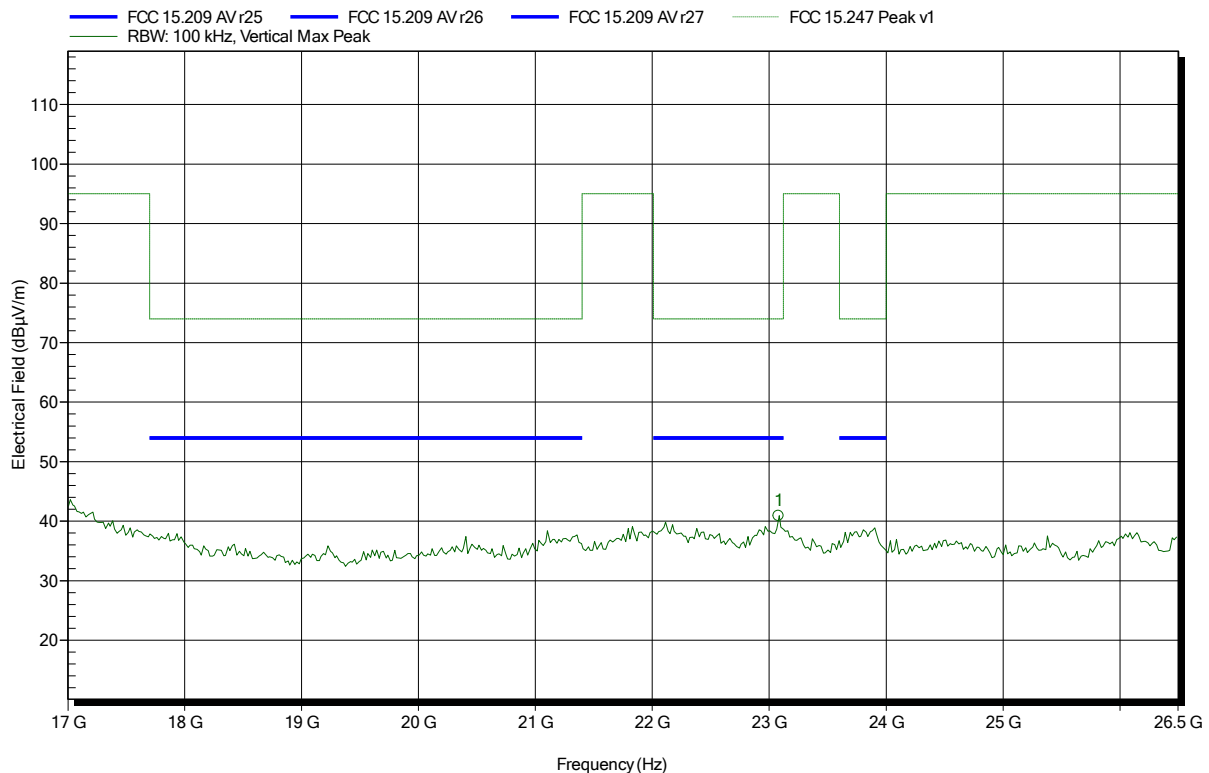
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
21.237 GHz	37.98 dBµV/m	74 dBµV/m	-36.02 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6546

Applicant: Bolls ApS
EUT Name: 13.56 MHz RFID
Model: Kubo
Test Site: Eurofins Product Service GmbH
Operator: Mr. Al Jamal
Test Conditions: Tnom: 25°C, Vnom: 5.0VDC (lithium battery)
Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
Vertical
Measurement distance: 1 m converted to 3m
Mode: TX; BLE/RFID co-location; 2480 MHz
Test Date: 2017-09-28
Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
23.08 GHz	40.87 dBµV/m	74 dBµV/m	-33.13 dB	Pass