

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2012-9529-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Renesas Electronics Germany GmbH
Address	Grenzstraße 28 01109 Dresden GERMANY
Test Specification	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Customer programmable Bluetooth LE module with integrated antenna
Model(s) A	RYZ012A100FZ00#HD0
Additional Model(s) B	Customer programmable Bluetooth LE module with external antenna RYZ012B100FZ00#HD0
Brand Name(s)	None
Hardware Version(s)	1
Software Version(s)	1
FCC ID	COR-RYZ012X1
IC	24477-RYZ012X1
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2020-01-19	
Report:		
Compiled by	Charline Graf	
Tested by (+ signature)	Charline Graf	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2021-04-13	
Total number of pages	174	
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:		
There are two Models: Model A: RYZ012A100FZ00#HD0 with integrated antenna (full test) Model B: RYZ012B100FZ00#HD0 with dedicated external antenna (Class 2 Permissive Change)		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2021-04-13	Initial Release	

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

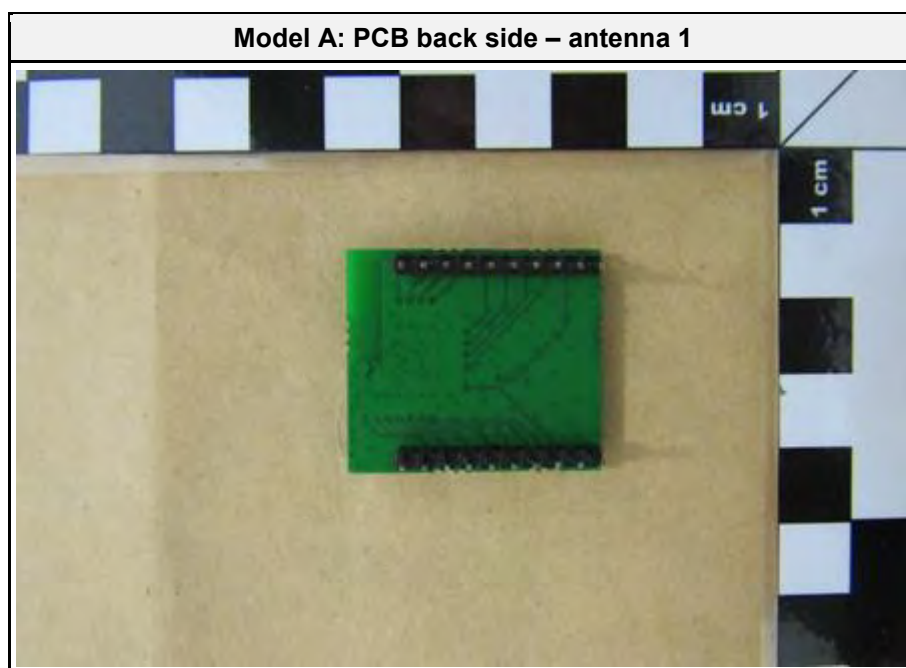
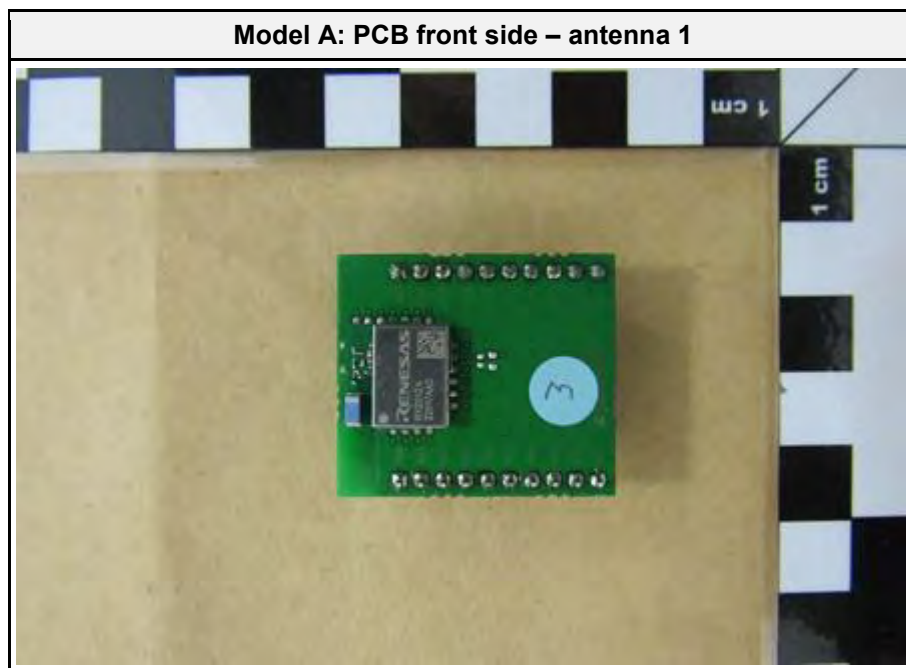
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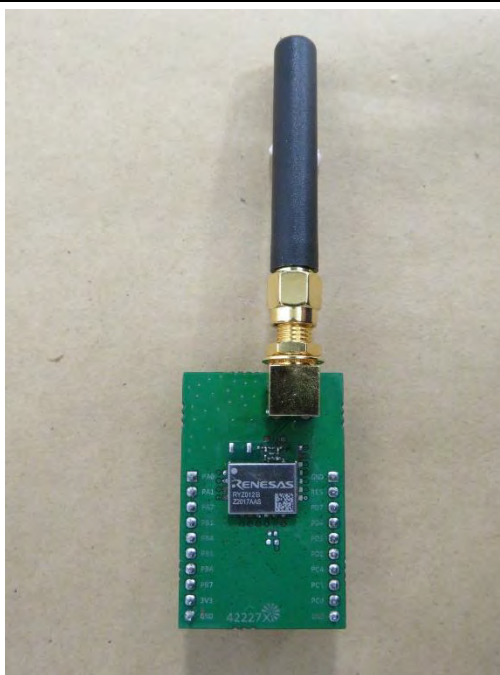
1 Equipment (Test Item) Under Test

Description	Customer programmable Bluetooth LE module with integrated antenna	
Model A	RYZ012A100FZ00#HD0	
Additional Model(s) B	Customer programmable Bluetooth LE module with external antenna RYZ012B100FZ00#HD0	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	1	
Software Version(s)	1	
PMN	A: RYZ012A1 B: RYZ012B1	
HVIN	A: RYZ012A1 B: RYZ012B1	
FVIN	A: N/A B: N/A	
HMN	A: N/A B: N/A	
FCC ID	COR-RYZ012X1	
IC	24477-RYZ012X1	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth LE 5.0	
Bluetooth Specification	LE 1M PHY	Yes
	LE 2M PHY	Yes
	LE Coded PHY S=8 (125 kbit)	Yes
	LE Coded PHY S=2 (500 kbit)	Yes
	Stable Modulation Index - Transmitter	No
	Stable Modulation Index - Receiver	No
Modulation	GFSK	
Number of antenna ports	2	
Antenna 1	Type	Integrated
	Model	RFANT3216120A5T
	Manufacturer	Walsin Technology
	Gain	2.0 dBi
Antenna 2	Type	External
	Model	W1095K
	Manufacturer	PulseLarsen Antennas
	Gain	1.0 dBi
Supply Voltage	V _{NOM}	3.3 VDC
Operating Temperature	T _{NOM}	25 °C
Manufacturer	Renesas Electronics America, Inc. 6024 Silver Creek Valley Road CA 95138 San Jose USA	

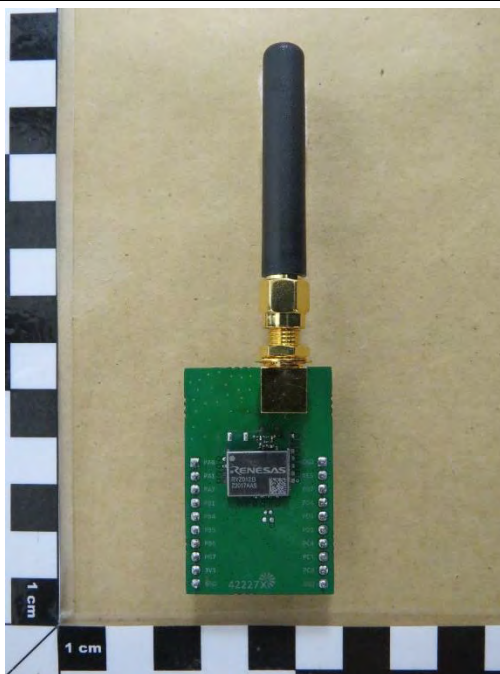
1.1 Photos – Equipment

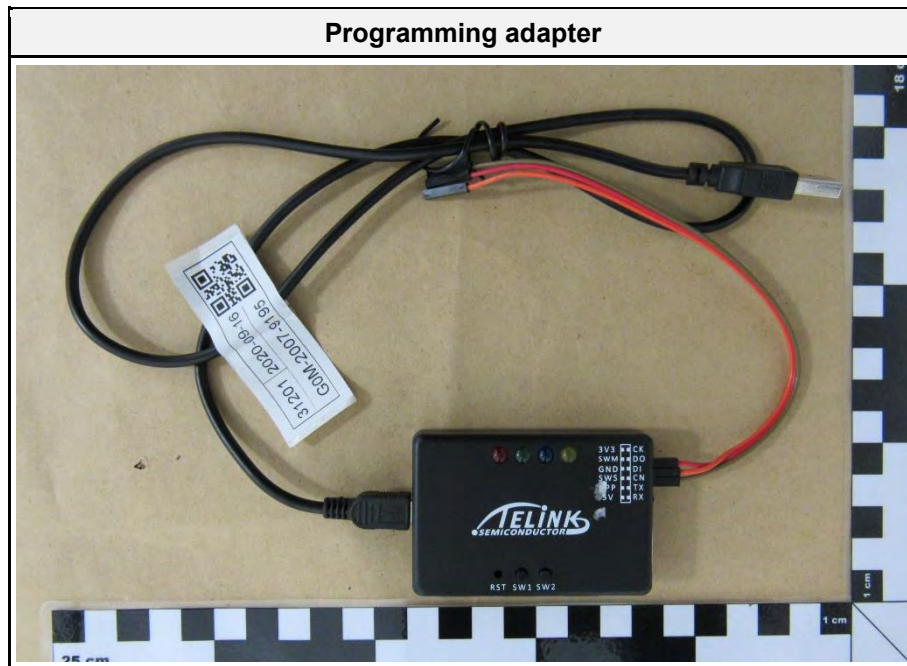


Model B: PCB front side – antenna 2

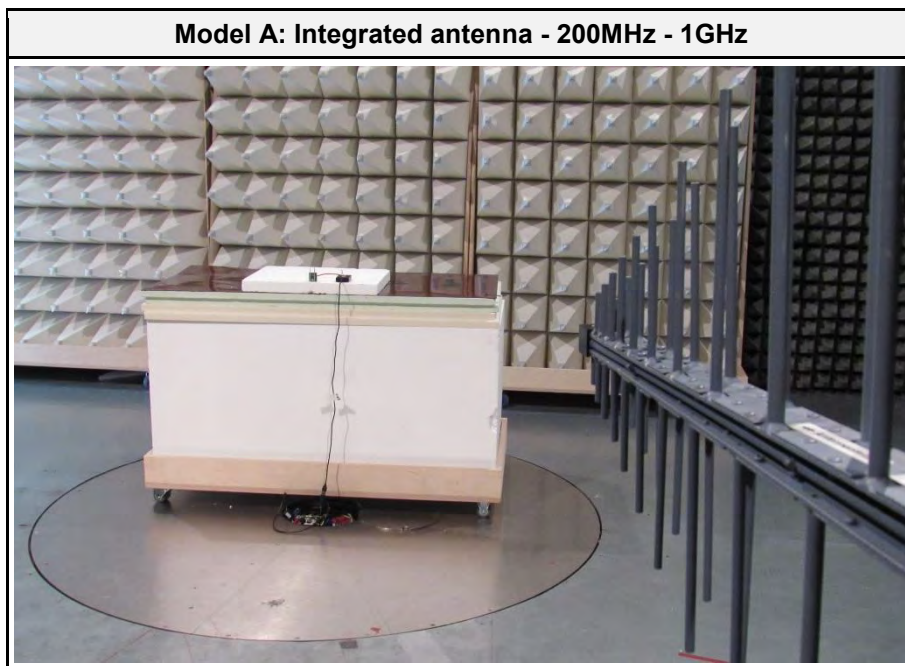
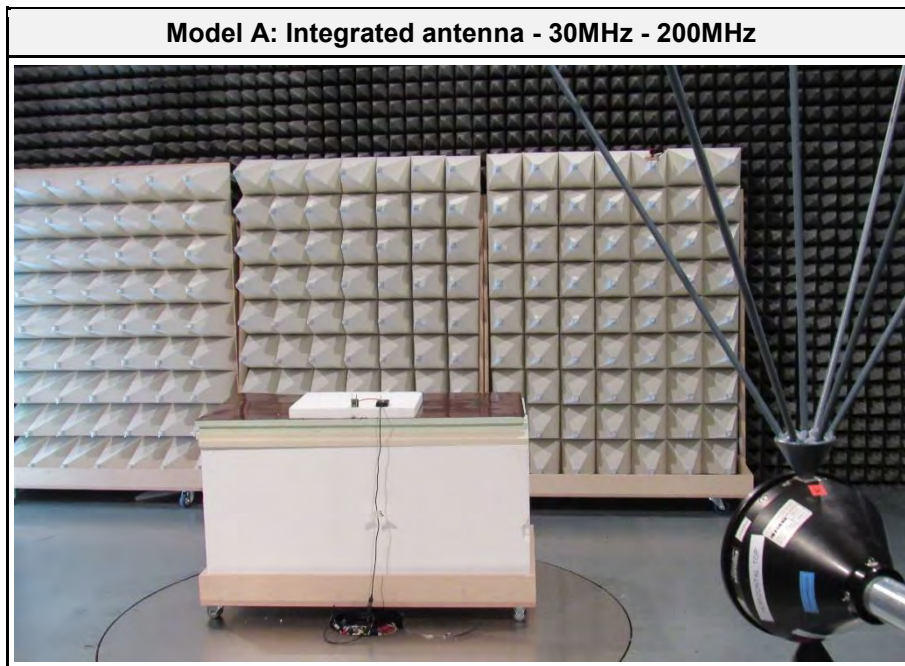


Model B: PCB back side – antenna 2

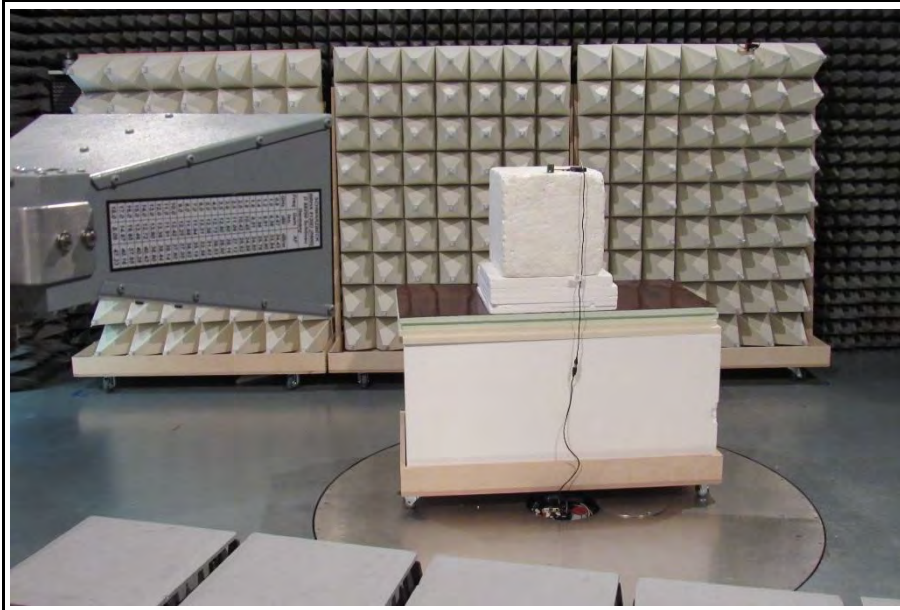




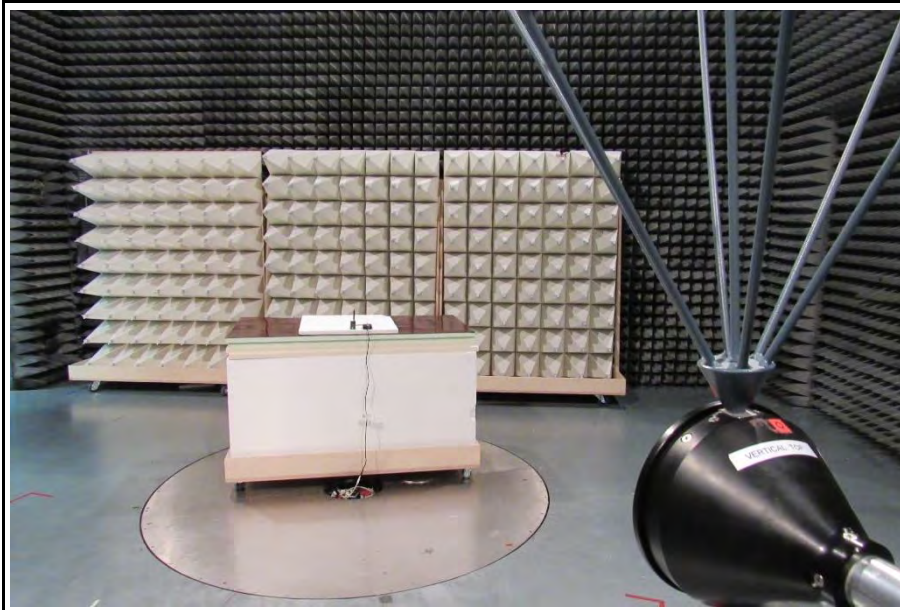
1.2 Photos – Test Setup



Model A: Integrated antenna above 1 GHz



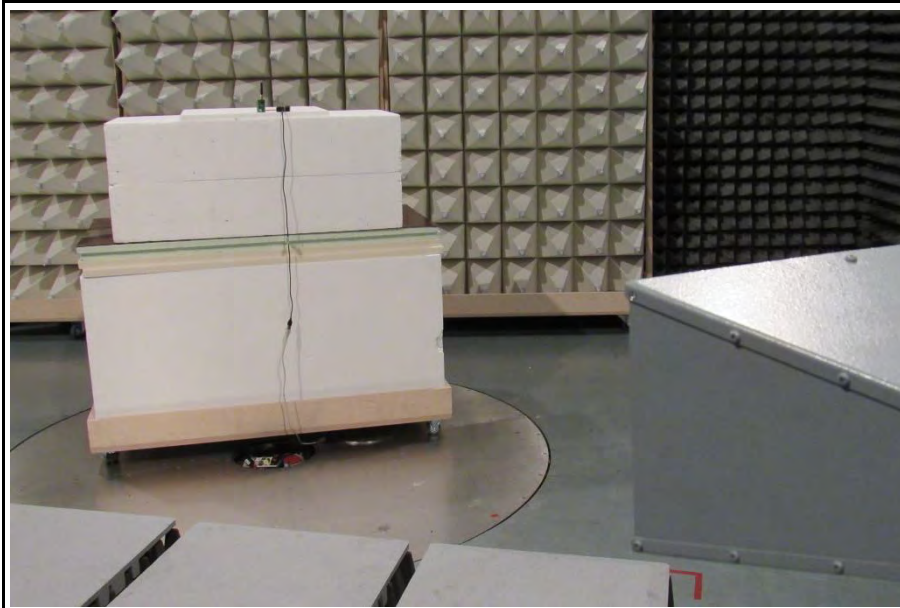
Model B: External antenna - 30MHz - 200MHz



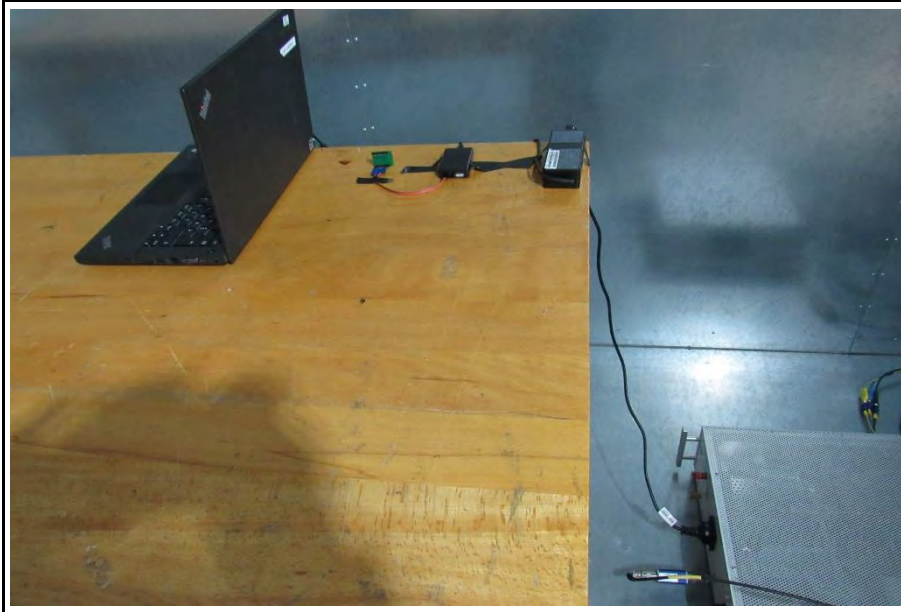
Model B: External antenna - 200MHz - 1GHz



Model B: External antenna - above 1 GHz



AC-power line



1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Programming adapter	Telink	EVK TLSR8266BR56	-
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
1 Mbps	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 64%
2 Mbps	Mode = Transmit Modulation = GFSK Spreading = None Duty cycle = 33%
Receive	Mode = Receive
Comment: Test mode selection was based on pre-compliance measurement of all operational modes. The operational modes 1 Mbps and 2 Mbps were selected for compliance tests.	

1.5 Test Frequencies

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

1.6 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 dB μ V. 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:

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/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 dB μ V + 26 dB/m	= 47.5 dB μ V/m	:	47.5 dB μ V/m - 57.0 dB μ V/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment:				

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 - Occupied bandwidth

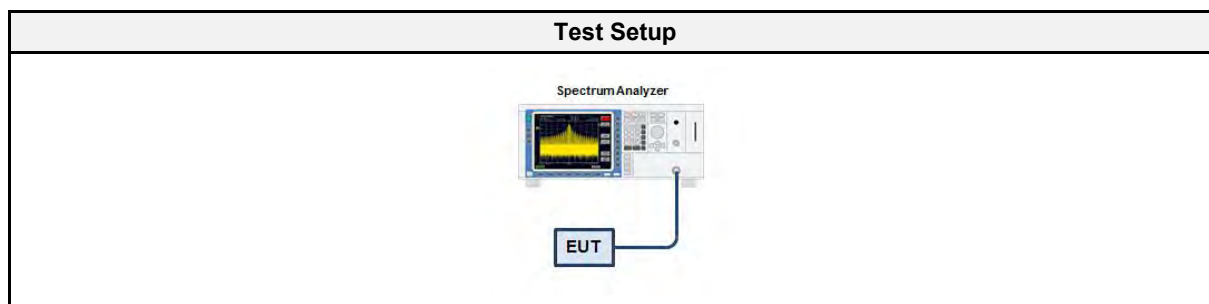
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Test Sample ID	32802
Operator	Charline Graf
Date	2021-01-26

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.1.5 Procedure

Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
1 Mbps	2402	1.030
1 Mbps	2440	1.030
1 Mbps	2480	1.030

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
2 Mbps	2402	2.055
2 Mbps	2440	2.050
2 Mbps	2480	2.055

Occupied Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.030



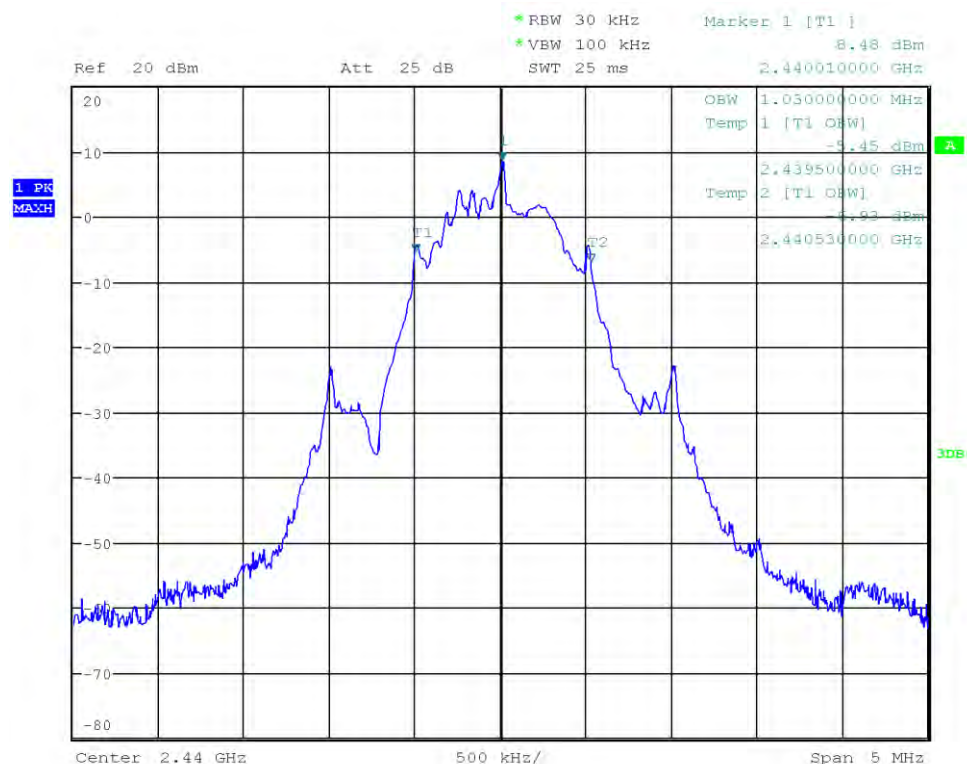
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Test Report No.: G0M-2012-9529-TFC247BL-V01

Eurofins Product Service GmbH
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Occupied Bandwidth

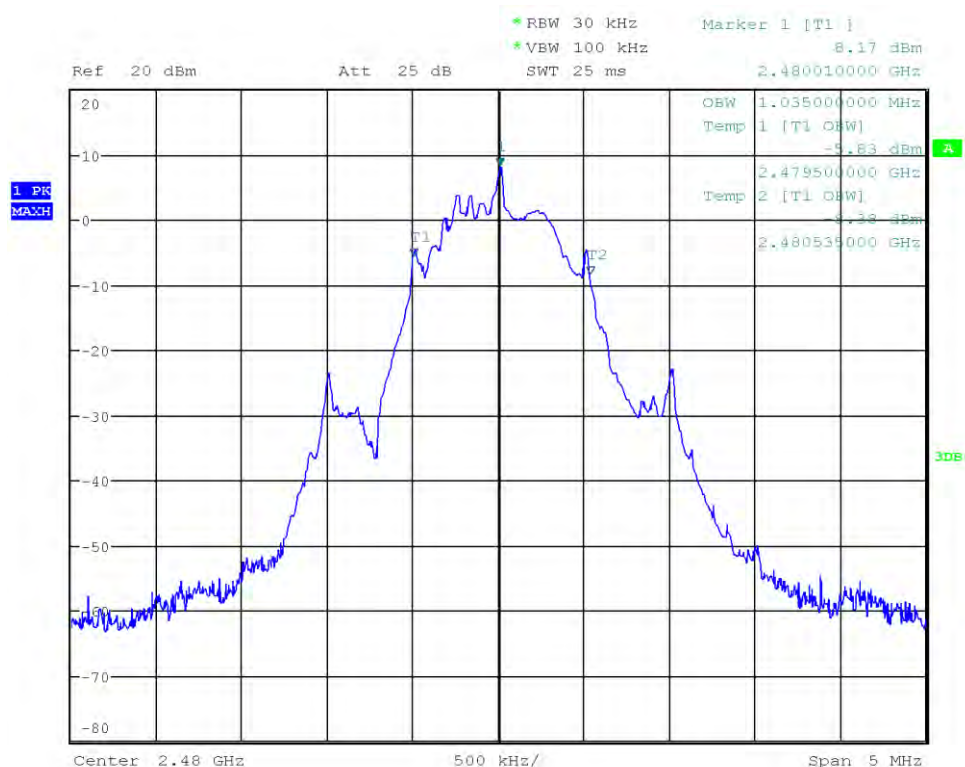
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.030



Date: 19.MAR.2003 17:21:21

Occupied Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Occupied Bandwidth [MHz]: 1.030



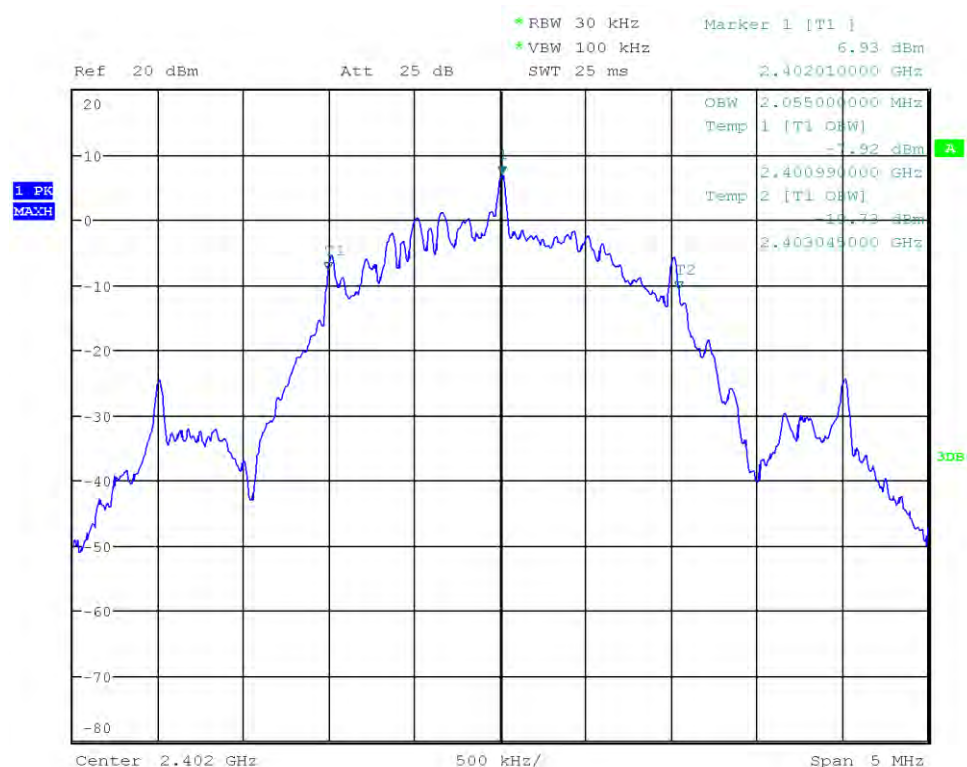
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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Occupied Bandwidth

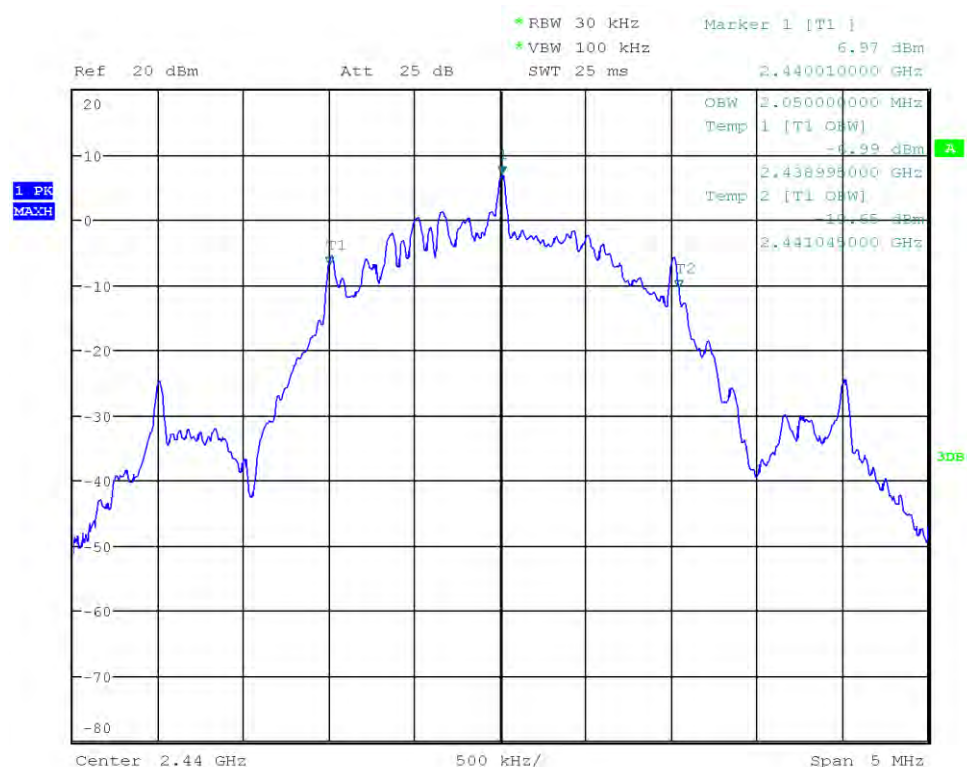
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Occupied Bandwidth [MHz]: 2.055



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Occupied Bandwidth

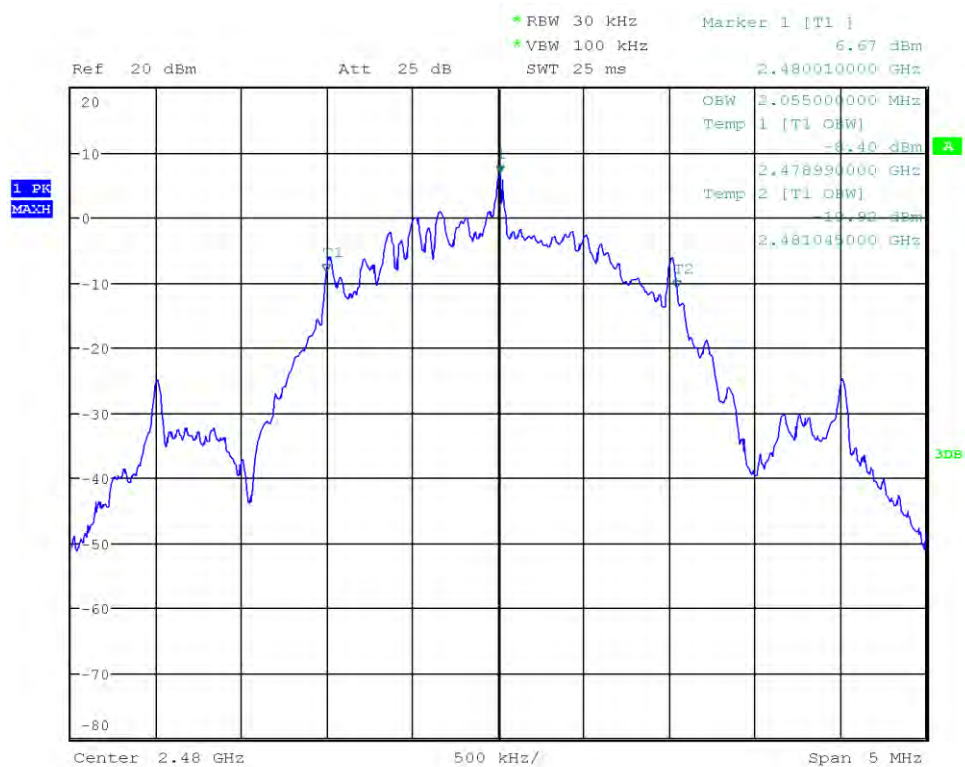
Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Model:	RYZ012A000FZ00#HD0
Test Sample ID:	32802
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Charline Graf
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-01-26
Note:	2 Mbps
Occupied Bandwidth [MHz]:	2.050



Date: 19.MAR.2003 17:25:02

Occupied Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Occupied Bandwidth [MHz]: 2.055



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3.2 Test Conditions and Results - 6 dB bandwidth

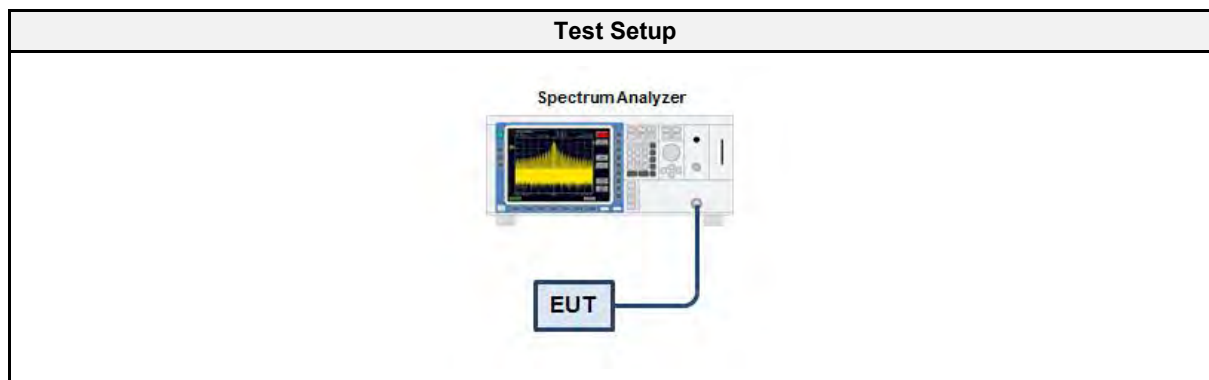
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	$\pm 1.26 \%$
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.2.2 Limits

Limits
$\geq 500\text{kHz}$

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	— (diverse)	— (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.2.5 Procedure

Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation

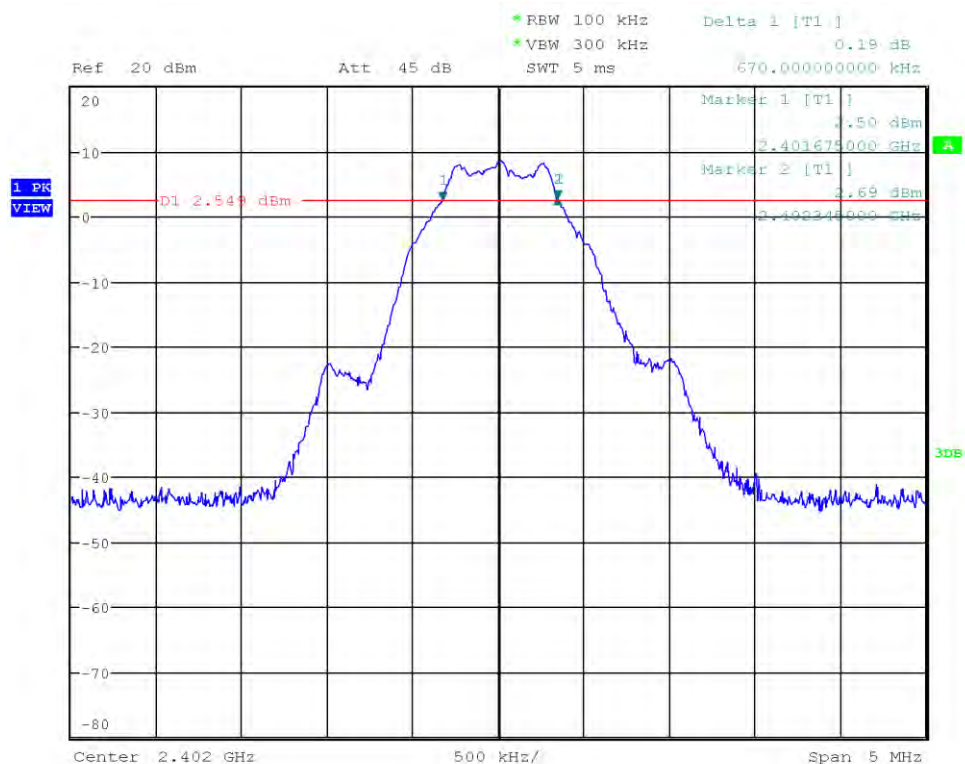
3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
1 Mbps	2402	670	500	PASS
1 Mbps	2440	675	500	PASS
1 Mbps	2480	670	500	PASS

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
2 Mbps	2402	1125	500	PASS
2 Mbps	2440	1135	500	PASS
2 Mbps	2480	1130	500	PASS

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Lower Frequency [MHz]: 2401.675
 Upper Frequency [MHz]: 2402.345
 6 dB Bandwidth [kHz]: 670



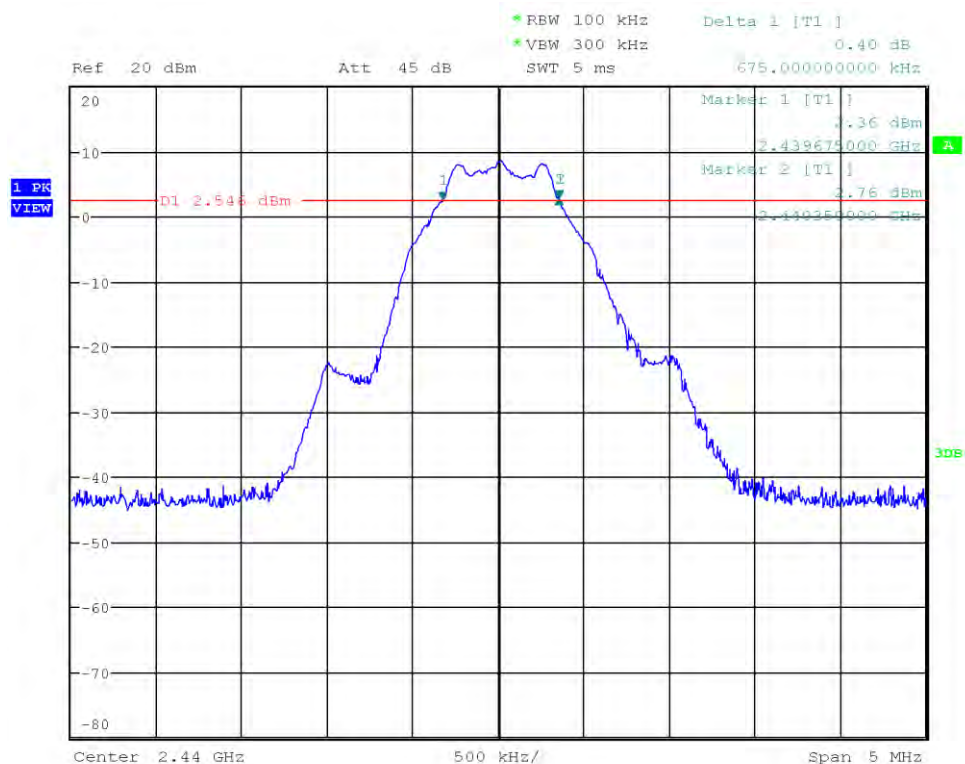
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Lower Frequency [MHz]: 2439.675
 Upper Frequency [MHz]: 2440.350
 6 dB Bandwidth [kHz]: 675



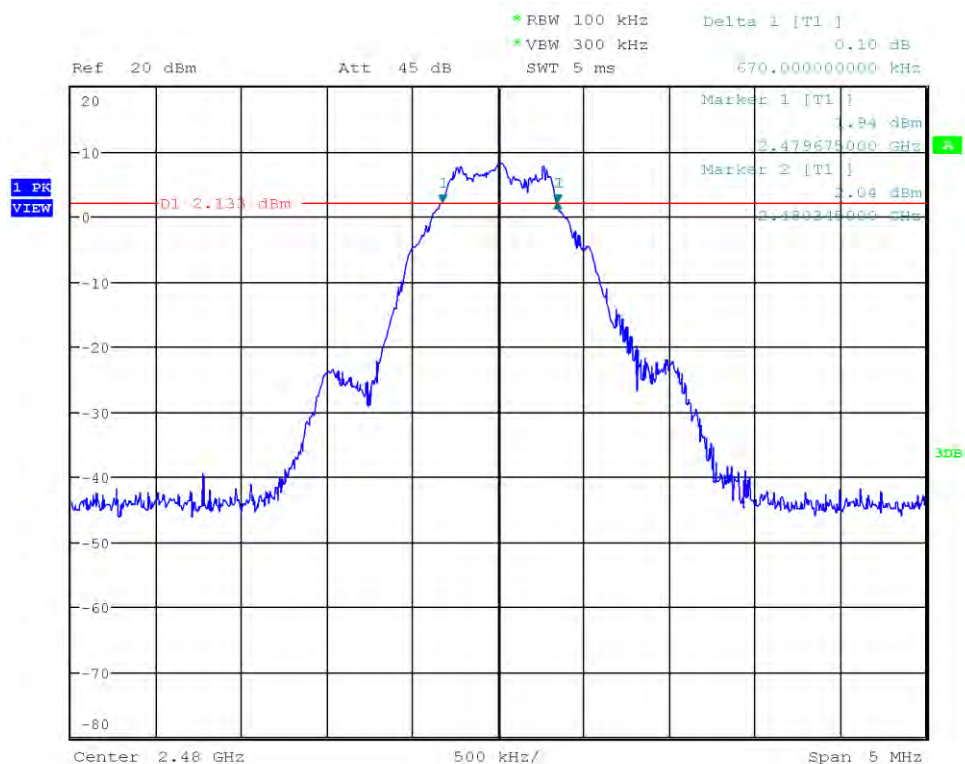
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Lower Frequency [MHz]: 2479.675
 Upper Frequency [MHz]: 2480.345
 6 dB Bandwidth [kHz]: 670



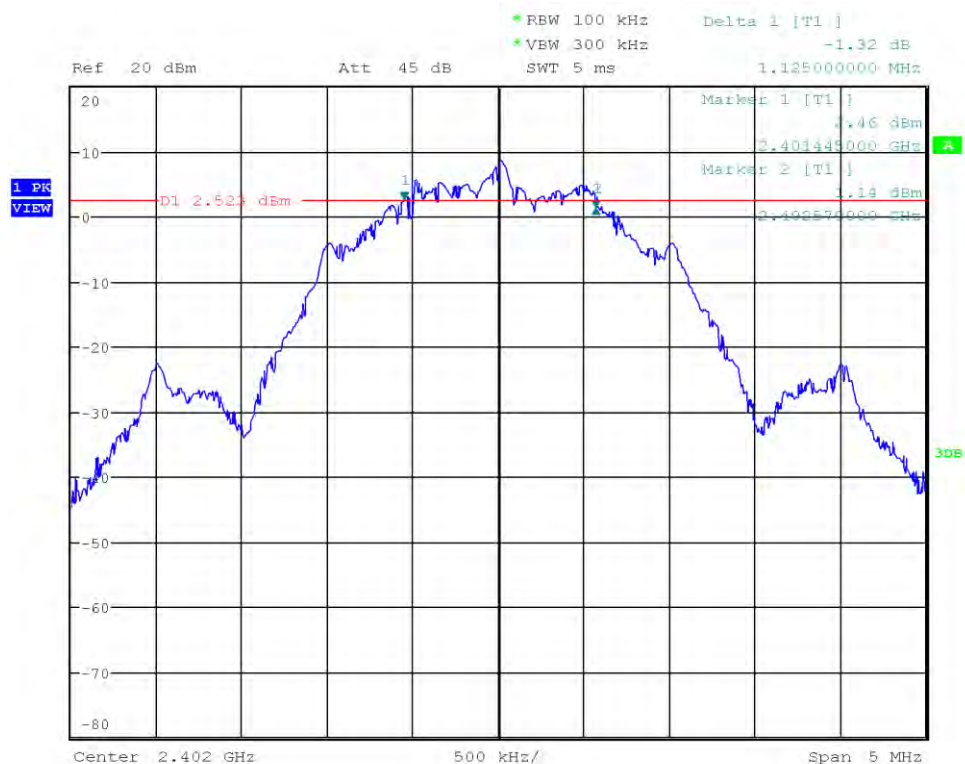
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Lower Frequency [MHz]: 2401.445
 Upper Frequency [MHz]: 2402.570
 6 dB Bandwidth [kHz]: 1125



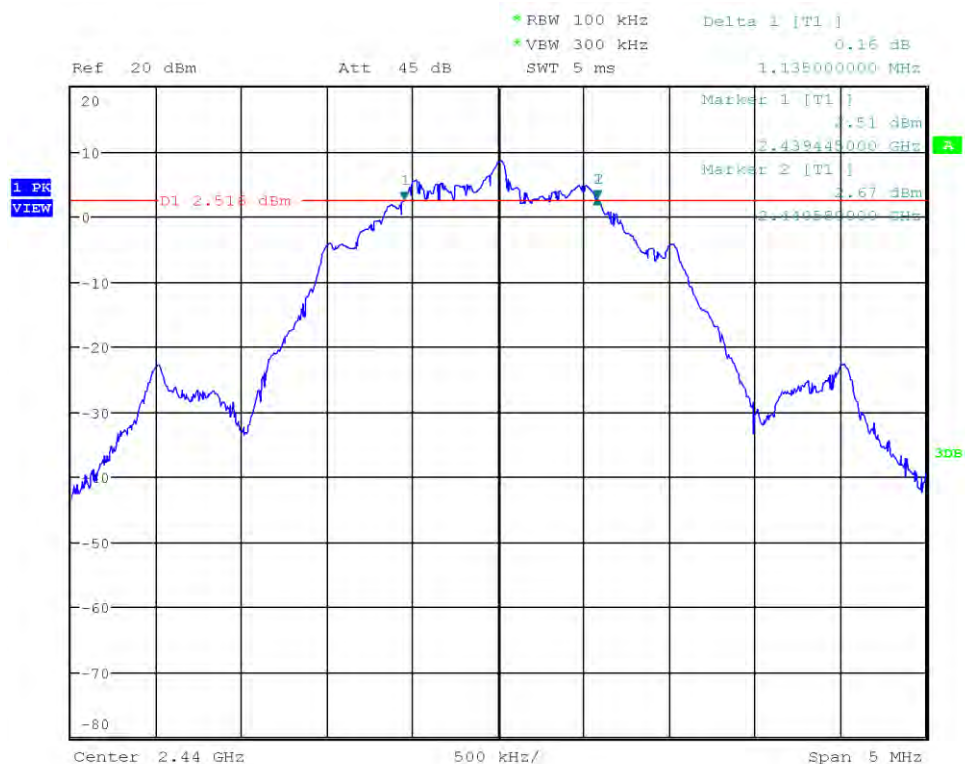
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Lower Frequency [MHz]: 2439.445
 Upper Frequency [MHz]: 2440.580
 6 dB Bandwidth [kHz]: 1135



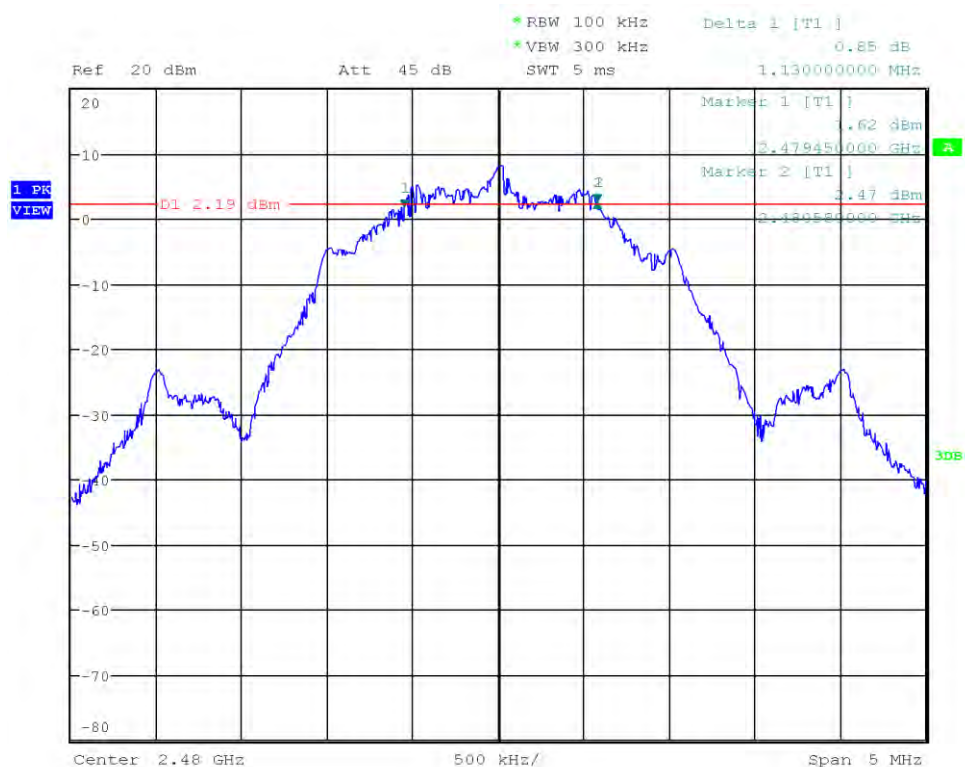
Date: 19.MAR.2003 17:34:16

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

DTS (6 dB) Bandwidth

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Lower Frequency [MHz]: 2479.450
 Upper Frequency [MHz]: 2480.580
 6 dB Bandwidth [kHz]: 1130



Date: 19.MAR.2003 17:35:04

3.3 Test Conditions and Results - Maximum peak conducted output power

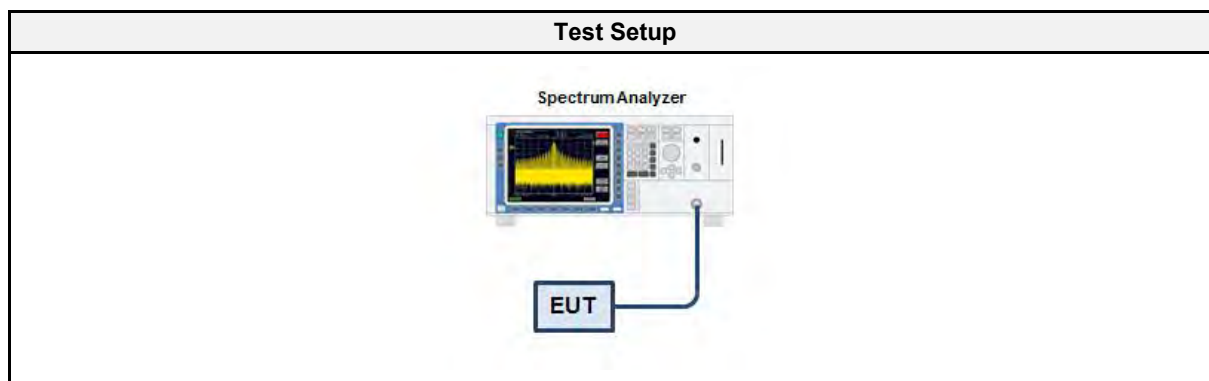
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.3.2 Limits

Limits
1 W (30 dBm)
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set ≥ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

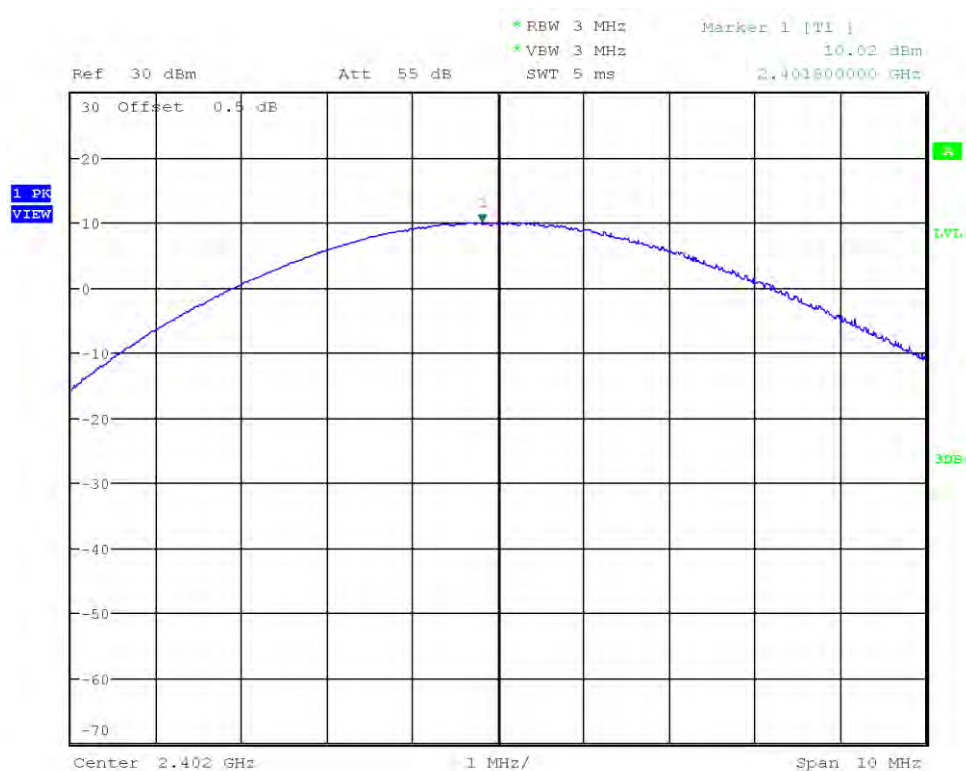
3.3.6 Results

Test Results – 1 Mbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	10.021	0.0100	1.0	PASS
2440	10.043	0.0101	1.0	PASS
2480	9.669	0.0093	1.0	PASS

Test Results – 2 Mbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	10.061	0.0101	1.0	PASS
2440	10.065	0.0102	1.0	PASS
2480	9.760	0.0095	1.0	PASS

Peak Conducted Output Power

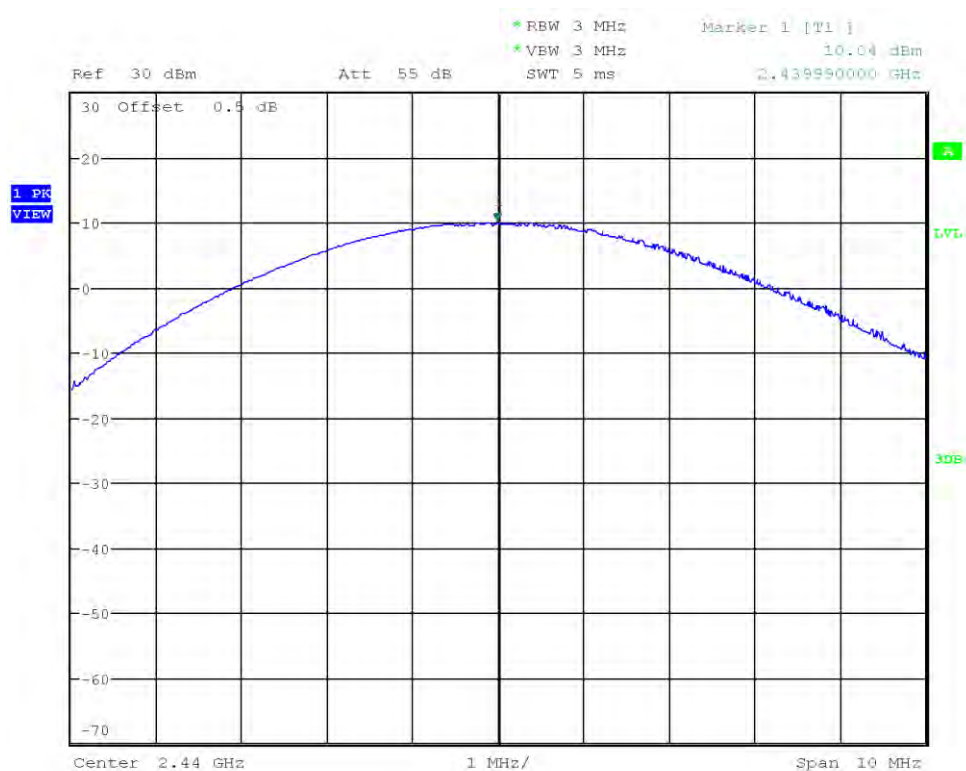
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Power [dBm]: 10.021
 Peak Power [W]: 0.0100



Date: 19.MAR.2003 17:50:07

Peak Conducted Output Power

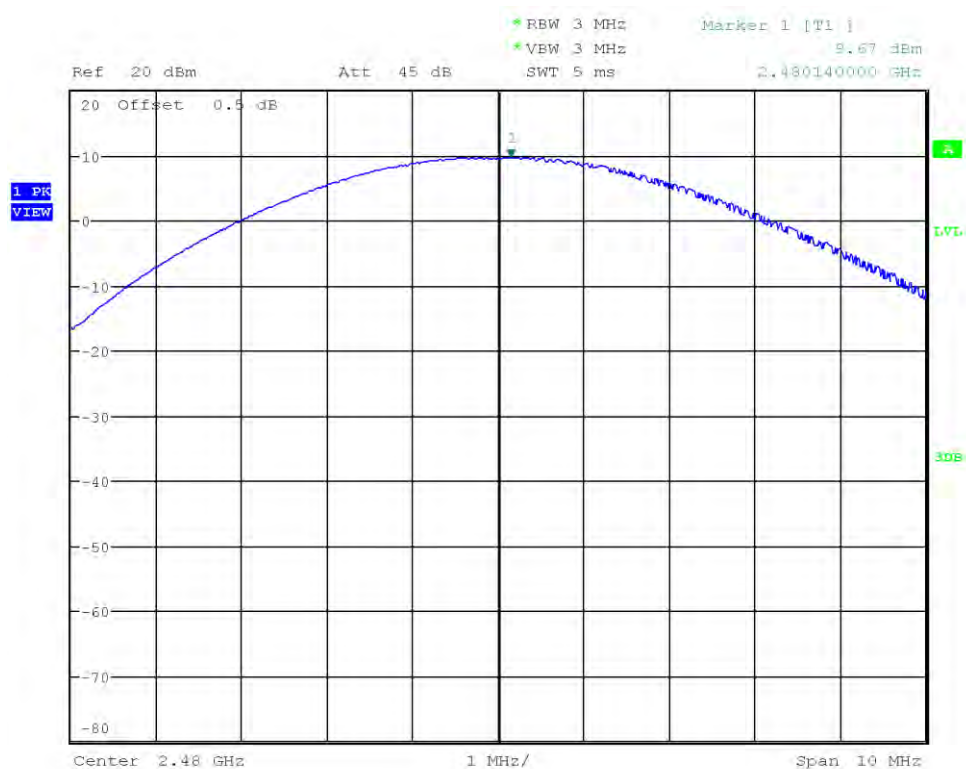
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Power [dBm]: 10.043
 Peak Power [W]: 0.0101



Date: 19.MAR.2003 17:50:58

Peak Conducted Output Power

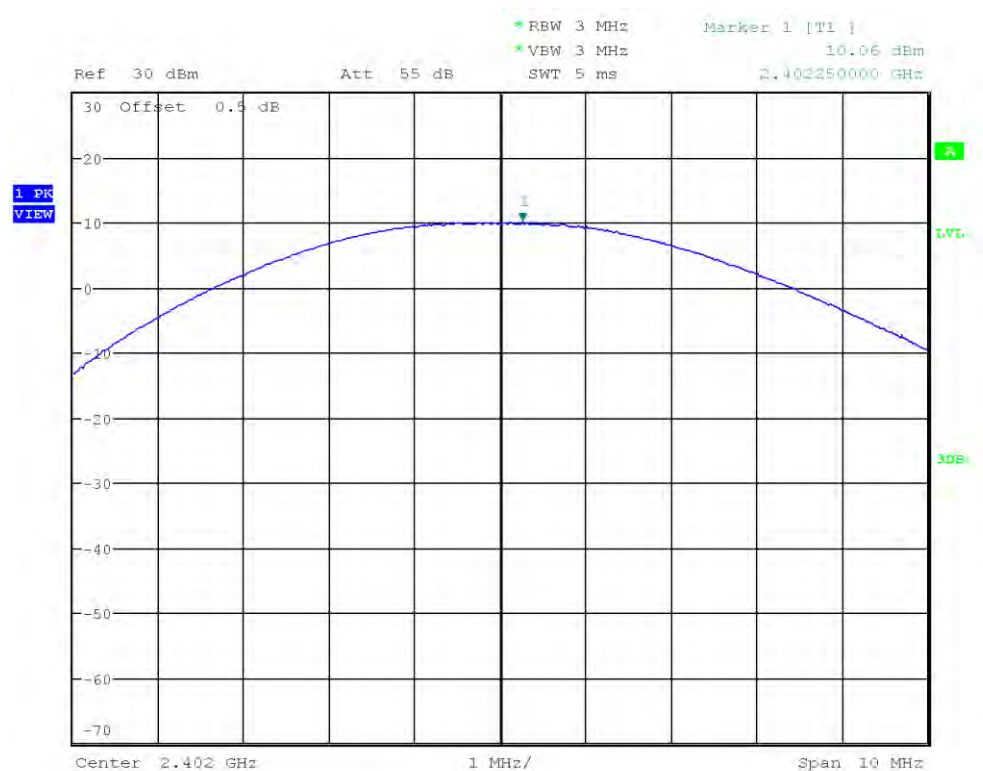
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Power [dBm]: 9.669
 Peak Power [W]: 0.0093



Date: 19.MAR.2003 17:51:48

Peak Conducted Output Powe

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Power [dBm]: 10.061
 Peak Power [W]: 0.0101



Date: 19.MAR.2003 17:52:48

Peak Conducted Output Power

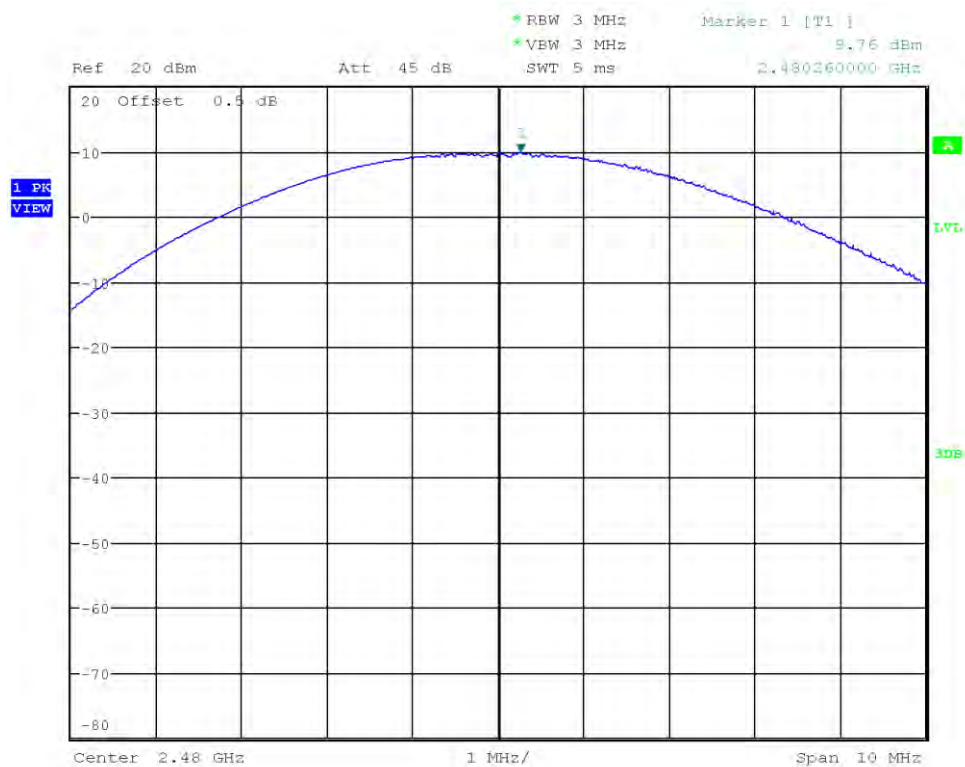
Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Power [dBm]: 10.065
 Peak Power [W]: 0.0102



Date: 19.MAR.2003 17:53:56

Peak Conducted Output Power

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Power [dBm]: 9.760
 Peak Power [W]: 0.0095



Date: 19.MAR.2003 17:54:36

3.4 Test Conditions and Results - Power spectral density

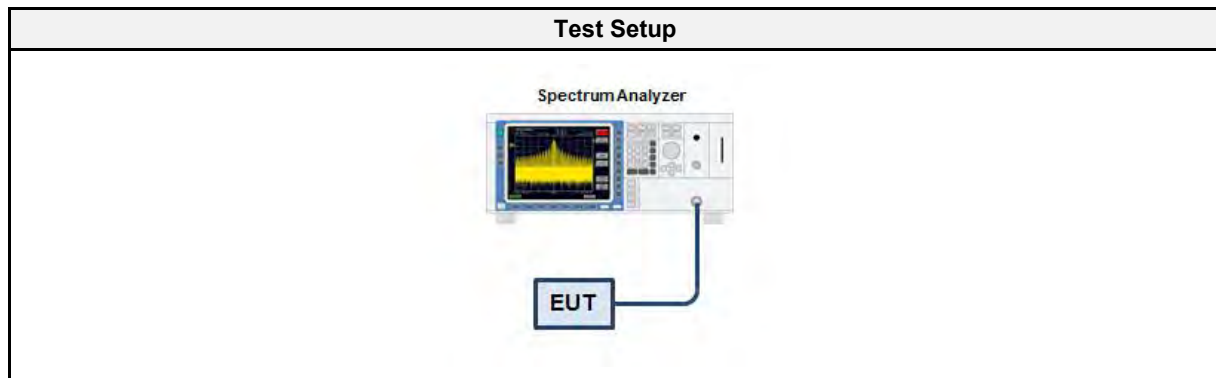
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.4.5 Procedure

Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW $\geq$ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum 5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated 6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results – 1Mbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2402	5.217	8.0	PASS
2440	5.196	8.0	PASS
2480	4.857	8.0	PASS
RBW = 10 kHz			

Test Results – 2 Mbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2402	7.361	8.0	PASS
2440	7.395	8.0	PASS
2480	7.080	8.0	PASS
RBW = 30 kHz			

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Frequency [MHz]: 2402.009
 Spectral Density [dBm/RBW]: 5.217
 Resolution Bandwidth [kHz]: 10 kHz



Date: 19.MAR.2003 17:58:59

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Frequency [MHz]: 2440.009
 Spectral Density [dBm/RBW]: 5.196
 Resolution Bandwidth [kHz]: 10 kHz



Date: 19.MAR.2003 18:04:46

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Peak Frequency [MHz]: 2480.009
 Spectral Density [dBm/RBW]: 4.857
 Resolution Bandwidth [kHz]: 10 kHz



Date: 19.MAR.2003 18:07:43

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Frequency [MHz]: 2402.005
 Spectral Density [dBm/RBW]: 7.361
 Resolution Bandwidth [kHz]: 30 kHz



Date: 19.MAR.2003 18:18:09

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Frequency [MHz]: 2440.010
 Spectral Density [dBm/RBW]: 7.395
 Resolution Bandwidth [kHz]: 30 kHz



Date: 19.MAR.2003 18:19:41

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Peak Power Spectral Density

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Peak Frequency [MHz]: 2480.010
 Spectral Density [dBm/RBW]: 7.080
 Resolution Bandwidth [kHz]: 30 kHz



Date: 19.MAR.2003 18:21:40

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

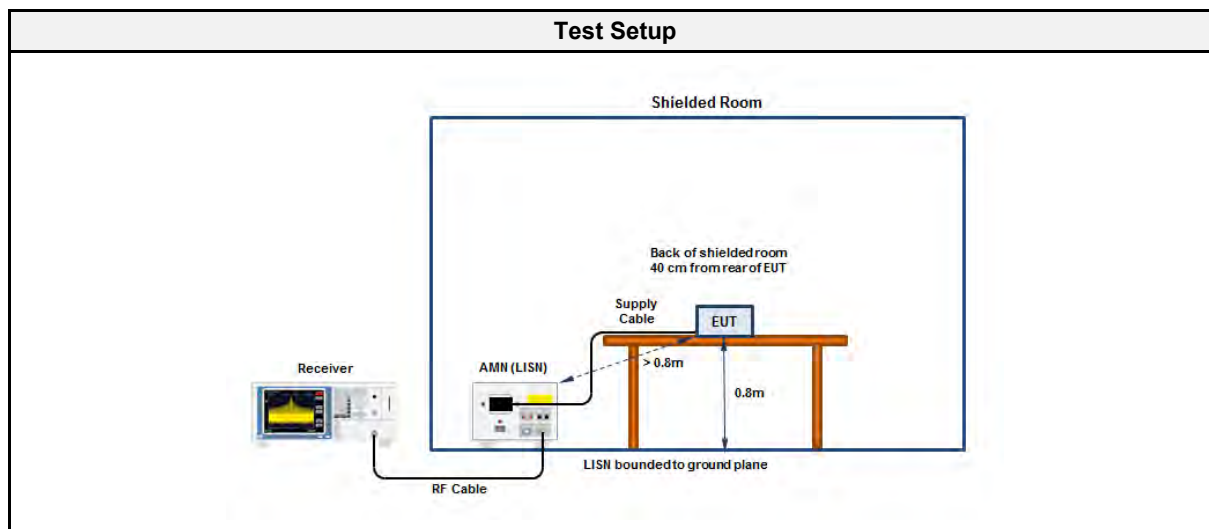
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.5.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBµV]	Average [dBµV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Limit decreases linearly with the logarithm of the frequency

3.5.3 Setup



3.5.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

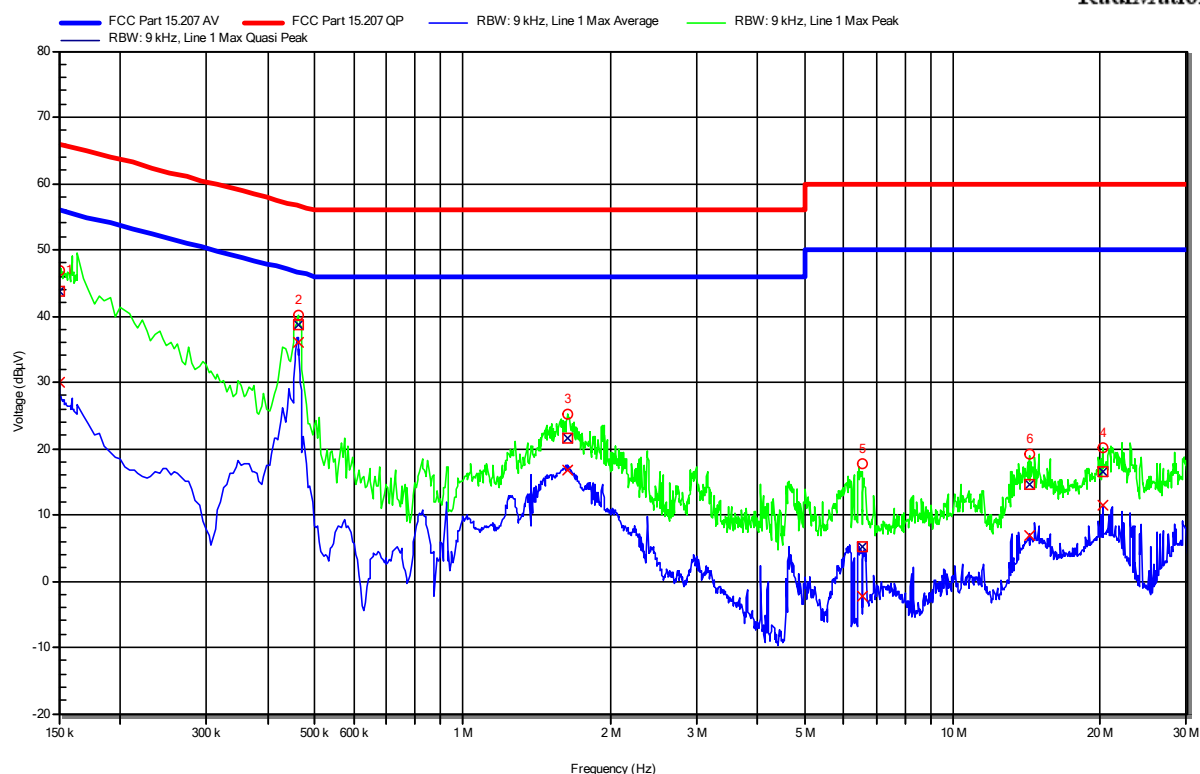
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2020-07	2021-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2020-07	2021-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2020-07	2021-07

**Conducted emissions at the mains power port
according to FCC 47 CFR 15.247**

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Ms. Graf
 Test Date: 2021-01-26
 Operating Conditions: ambient temperature: 25 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC L
 Operational Mode & EUT Configuration: BTLE, 2440 MHz
 Applied to Port: Mains
 Note 1: 1 Mbps mode declared as worst case

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Radiation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	43.83 dBµV	66 dBµV	-22.17 dB	Pass	Line 1
2	461.4 kHz	38.71 dBµV	56.67 dBµV	-17.96 dB	Pass	Line 1
3	1.644 MHz	21.55 dBµV	56 dBµV	-34.45 dB	Pass	Line 1
4	20.184 MHz	16.52 dBµV	60 dBµV	-43.48 dB	Pass	Line 1
5	6.536 MHz	5.07 dBµV	60 dBµV	-54.93 dB	Pass	Line 1
6	14.366 MHz	14.63 dBµV	60 dBµV	-45.37 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	30.08 dBμV	56 dBμV	-25.92 dB	Pass	Line 1
2	461.4 kHz	36.11 dBμV	46.67 dBμV	-10.56 dB	Pass	Line 1
3	1.644 MHz	16.86 dBμV	46 dBμV	-29.14 dB	Pass	Line 1
4	20.184 MHz	11.38 dBμV	50 dBμV	-38.62 dB	Pass	Line 1
5	6.536 MHz	-2.2 dBμV	50 dBμV	-52.2 dB	Pass	Line 1
6	14.366 MHz	6.75 dBμV	50 dBμV	-43.25 dB	Pass	Line 1

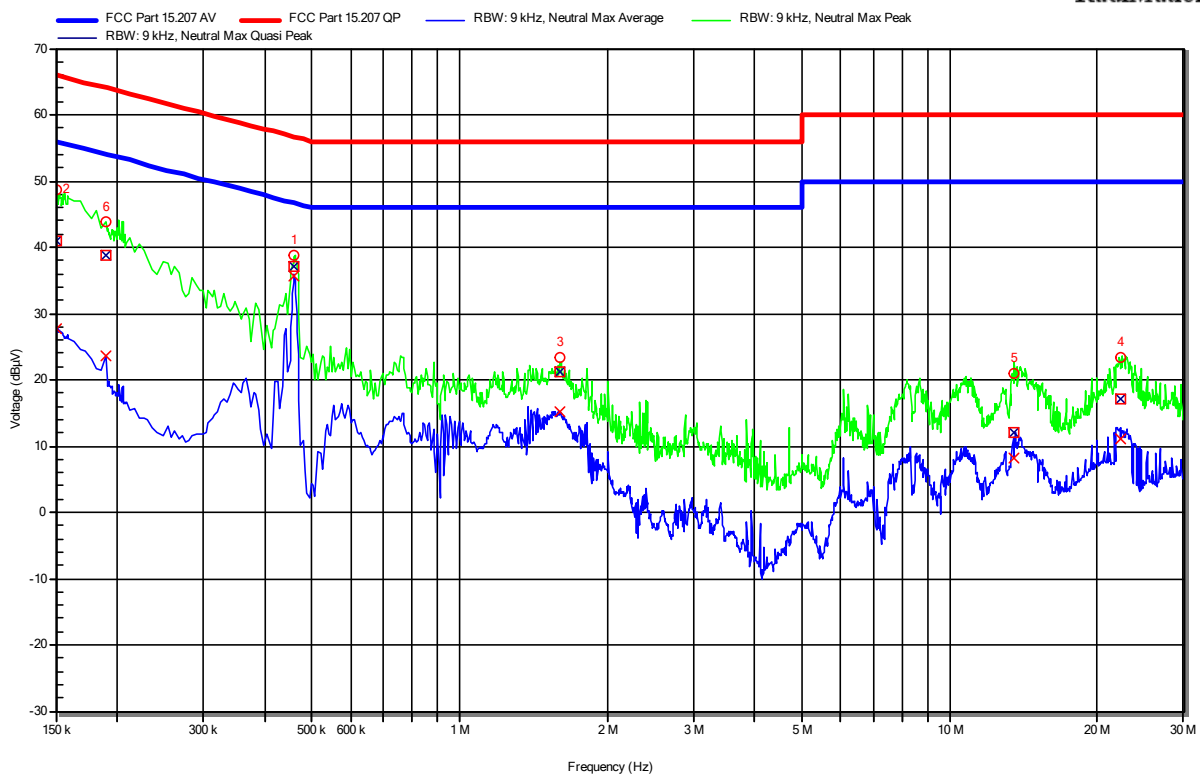
Conducted emissions at the mains power port

according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Ms. Graf
 Test Date: 2021-01-26
 Operating Conditions: ambient temperature: 25 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC N
 Operational Mode & EUT Configuration: BTLE, 2440 MHz
 Applied to Port: Mains
 Note 1: 1 Mbps mode declared as worst case

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	460.5 kHz	37.06 dBµV	56.68 dBµV	-19.62 dB	Pass	Neutral
2	150 kHz	41.05 dBµV	66 dBµV	-24.95 dB	Pass	Neutral
3	1.608 MHz	21.22 dBµV	56 dBµV	-34.78 dB	Pass	Neutral
4	22.398 MHz	17.06 dBµV	60 dBµV	-42.94 dB	Pass	Neutral
5	13.495 MHz	12.1 dBµV	60 dBµV	-47.9 dB	Pass	Neutral
6	190.5 kHz	38.84 dBµV	64.01 dBµV	-25.17 dB	Pass	Neutral

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	460.5 kHz	35.63 dB μ V	46.68 dB μ V	-11.06 dB	Pass	Neutral
2	150 kHz	27.79 dB μ V	56 dB μ V	-28.21 dB	Pass	Neutral
3	1.608 MHz	15.26 dB μ V	46 dB μ V	-30.74 dB	Pass	Neutral
4	22.398 MHz	11.14 dB μ V	50 dB μ V	-38.86 dB	Pass	Neutral
5	13.495 MHz	8.24 dB μ V	50 dB μ V	-41.76 dB	Pass	Neutral
6	190.5 kHz	23.68 dB μ V	54.01 dB μ V	-30.34 dB	Pass	Neutral

3.6 Test Conditions and Results - Band-edge compliance

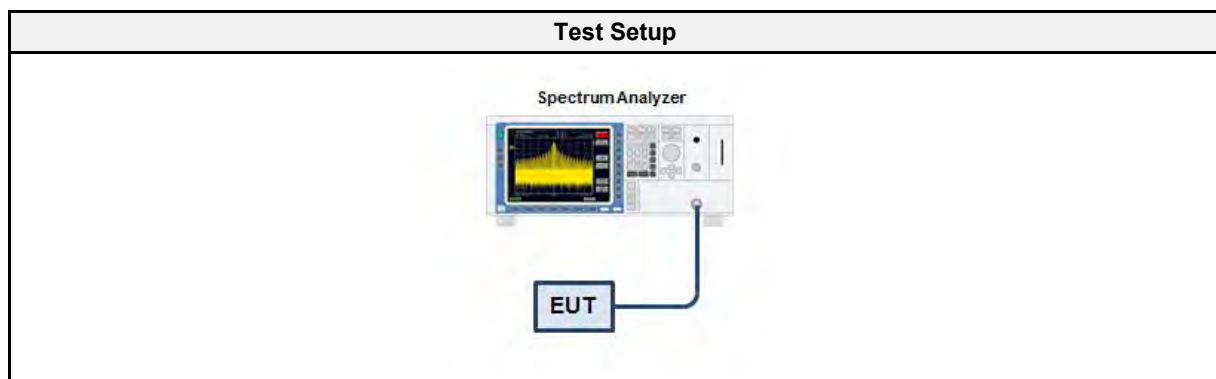
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.6.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

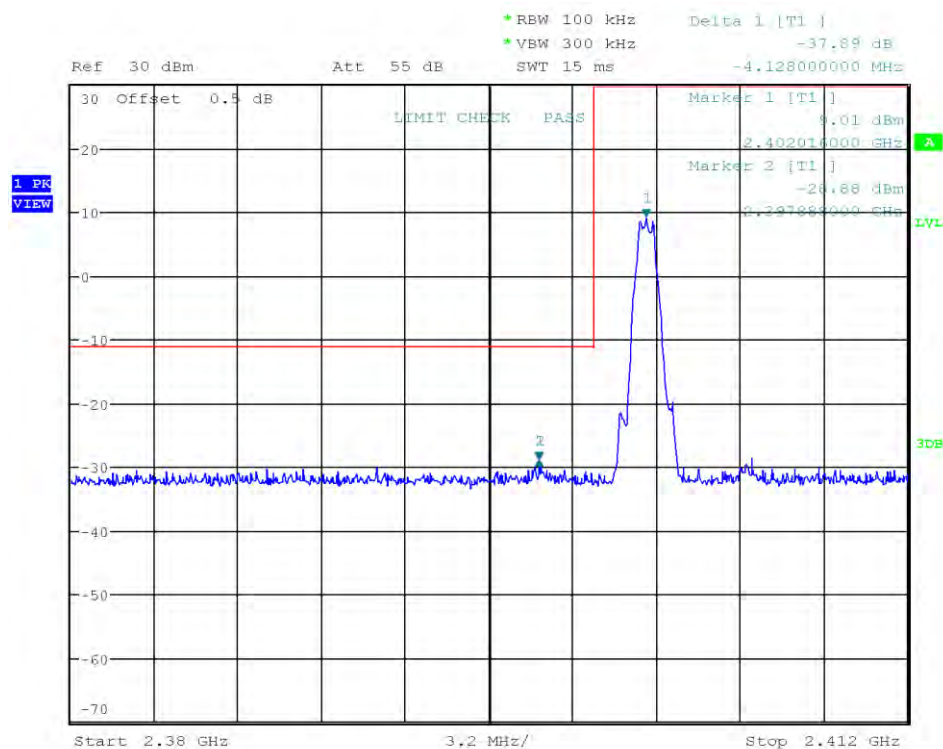
3.6.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
1 Mbps	2402	-37.89	-20	PASS
1 Mbps	2480	-41.57	-20	PASS

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
2 Mbps	2402	-31.65	-20	PASS
2 Mbps	2480	-42.99	-20	PASS

Emissions in non-restricted frequency bands at the Band-edge

Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Model:	RYZ012A000FZ00#HD0
Test Sample ID:	32802
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Charline Graf
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-01-26
Note:	1 Mbps
Band-edge	Lower
In-band Frequency [MHz]:	2402.016
Max. in-band Level [dBm/100 kHz]:	9.005
Out-of-band Frequency [MHz]:	2397.888
Max. out-of-band Level [dBm/100 kHz]:	-28.882
Attenuation [dB]:	-37.89



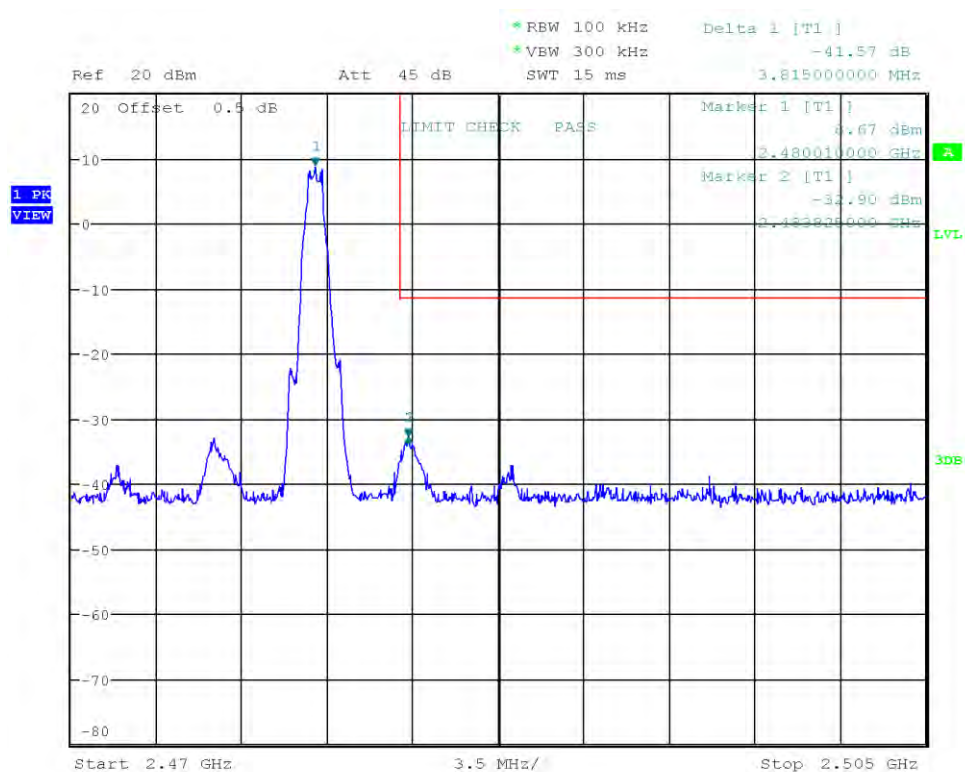
Date: 19.MAR.2003 18:39:30

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Emissions in non-restricted frequency bands at the Band-edge

Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Model:	RYZ012A000FZ00#HD0
Test Sample ID:	32802
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Charline Graf
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-01-26
Note:	1 Mbps
Band-edge	Upper
In-band Frequency [MHz]:	2480.01
Max. in-band Level [dBm/100 kHz]:	8.674
Out-of-band Frequency [MHz]:	2483.825
Max. out-of-band Level [dBm/100 kHz]:	-32.896
Attenuation [dB]:	-41.57



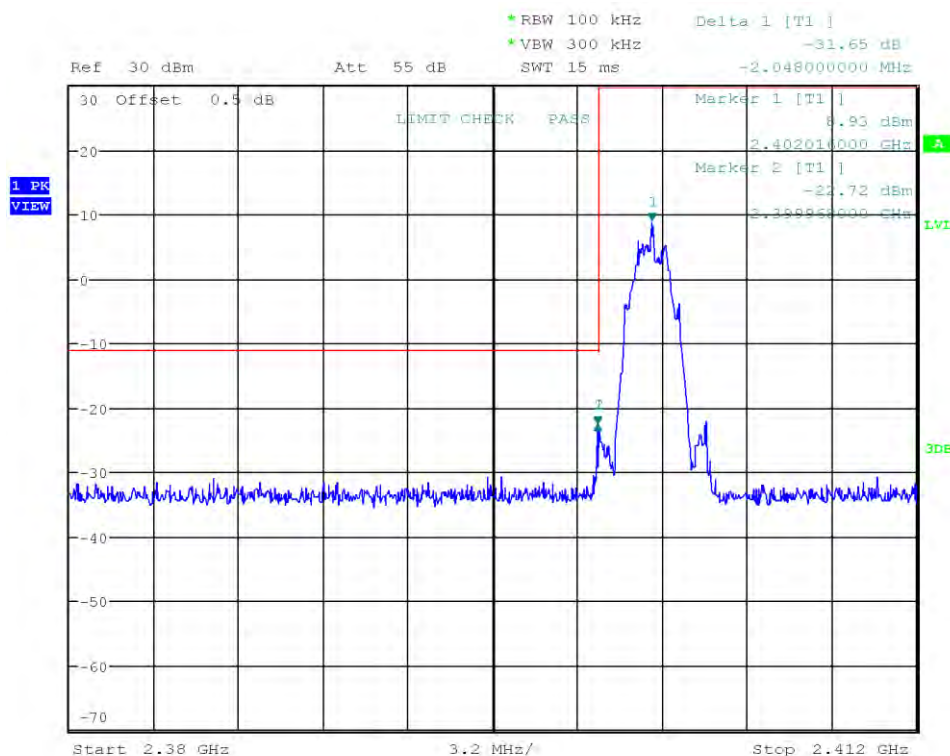
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Emissions in non-restricted frequency bands at the Band-edge

Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Model:	RYZ012A000FZ00#HD0
Test Sample ID:	32802
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Charline Graf
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-01-26
Note:	2 Mbps
Band-edge	Lower
In-band Frequency [MHz]:	2402.016
Max. in-band Level [dBm/100 kHz]:	8.931
Out-of-band Frequency [MHz]:	2399.968
Max. out-of-band Level [dBm/100 kHz]:	-22.716
Attenuation [dB]:	-31.65



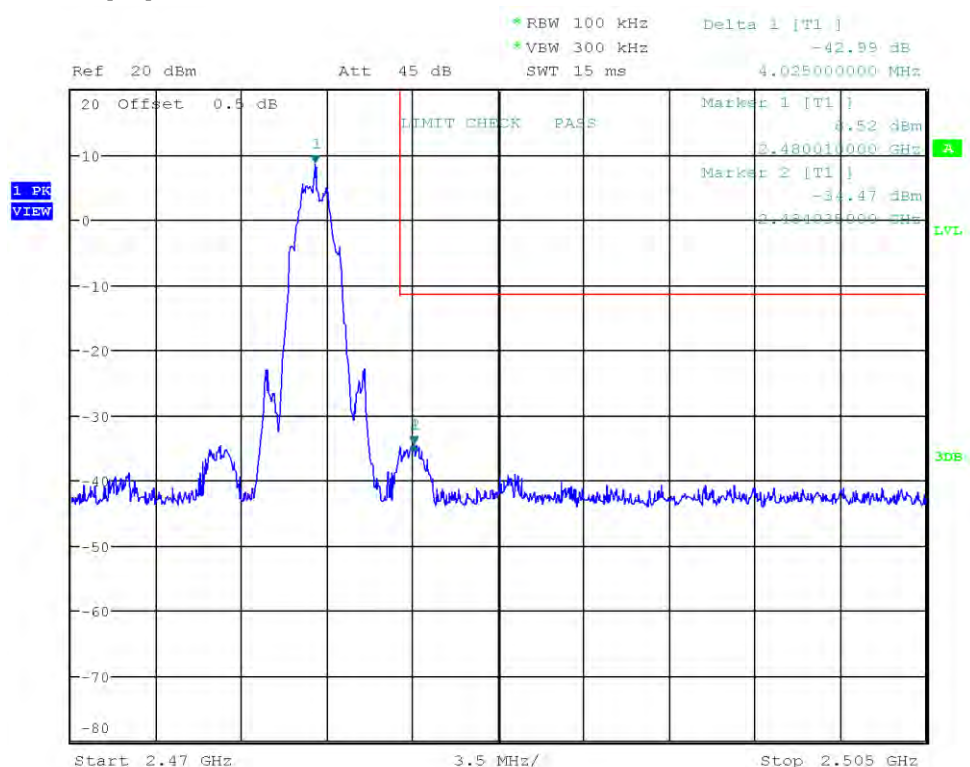
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Emissions in non-restricted frequency bands at the Band-edge

Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Model:	RYZ012A000FZ00#HD0
Test Sample ID:	32802
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operating Conditions:	Tnom/Vnom
Operator:	Charline Graf
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-01-26
Note:	2 Mbps
Band-edge	Upper
In-band Frequency [MHz]:	2480.01
Max. in-band Level [dBm/100 kHz]:	8.516
Out-of-band Frequency [MHz]:	2484.035
Max. out-of-band Level [dBm/100 kHz]:	-34.473
Attenuation [dB]:	-42.99



Date: 19.MAR.2003 18:47:31

3.7 Test Conditions and Results - Conducted spurious emissions

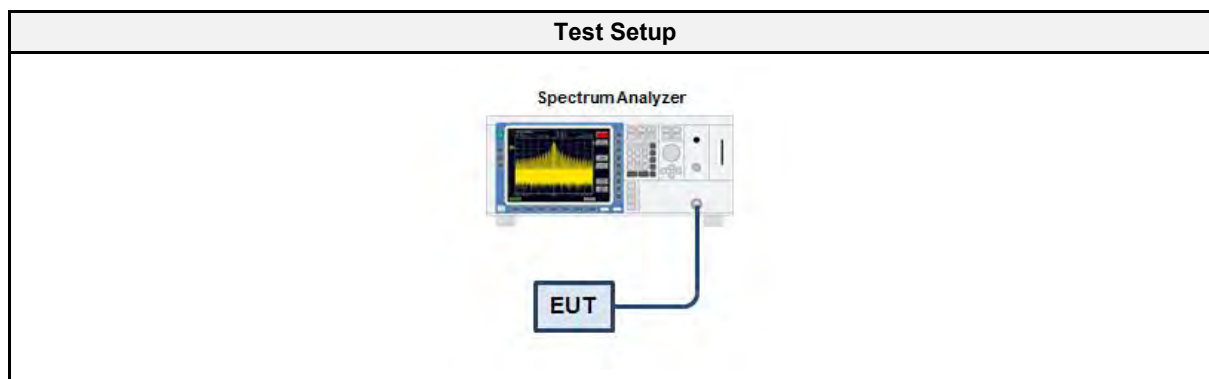
3.7.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-26

3.7.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.7.3 Setup



3.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Spectrum Analyser	R&S	FSU 43	EF01631	2020-07	2021-07

3.7.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band

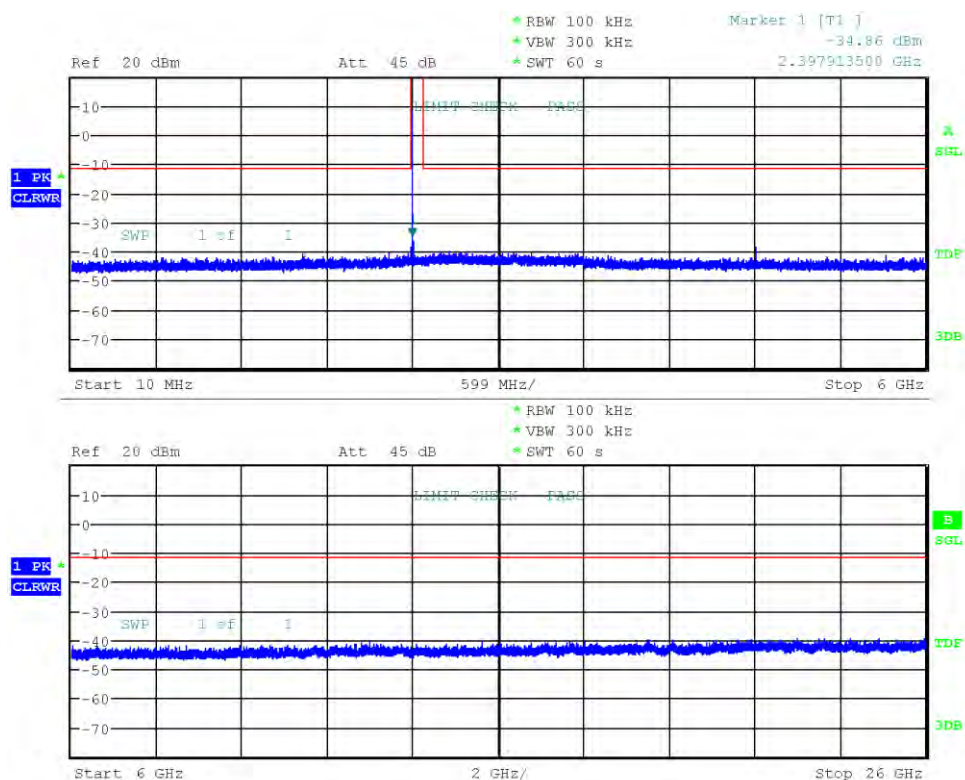
3.7.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
1 Mbps	2402	PASS
1 Mbps	2440	PASS
1 Mbps	2480	PASS

Test Results		
Mode	Channel [MHz]	Verdict
2 Mbps	2402	PASS
2 Mbps	2440	PASS
2 Mbps	2480	PASS

Conducted Spurious Emissions

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 8.9
 Out-of-band Limit [dBm/100 kHz]: -11.1



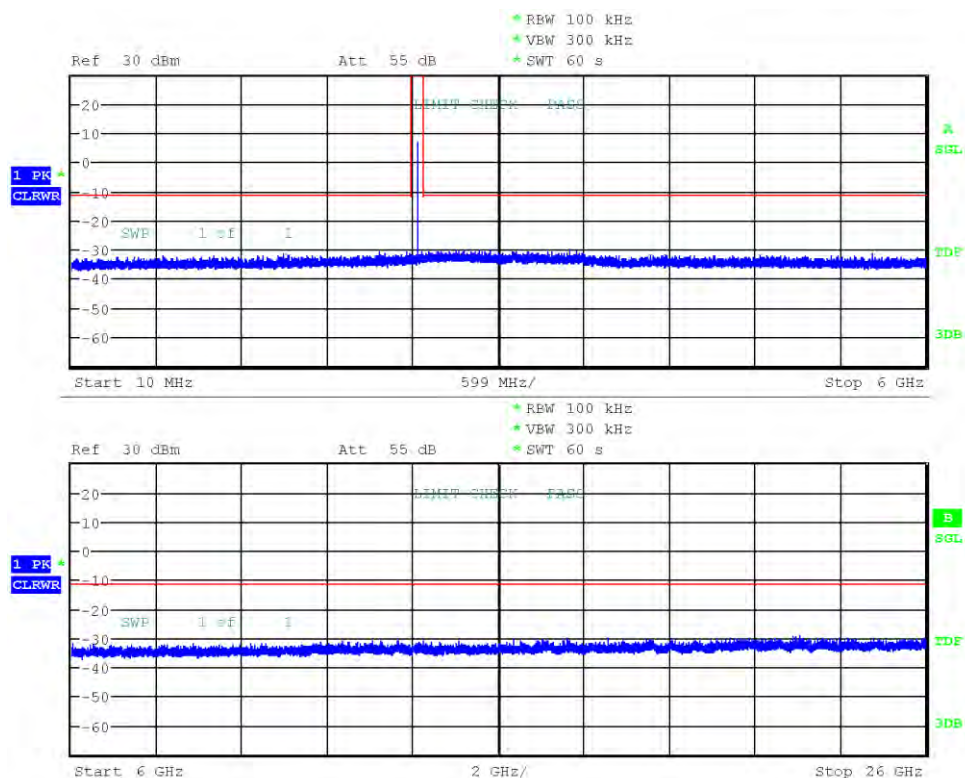
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 8.9
 Out-of-band Limit [dBm/100 kHz]: -11.1



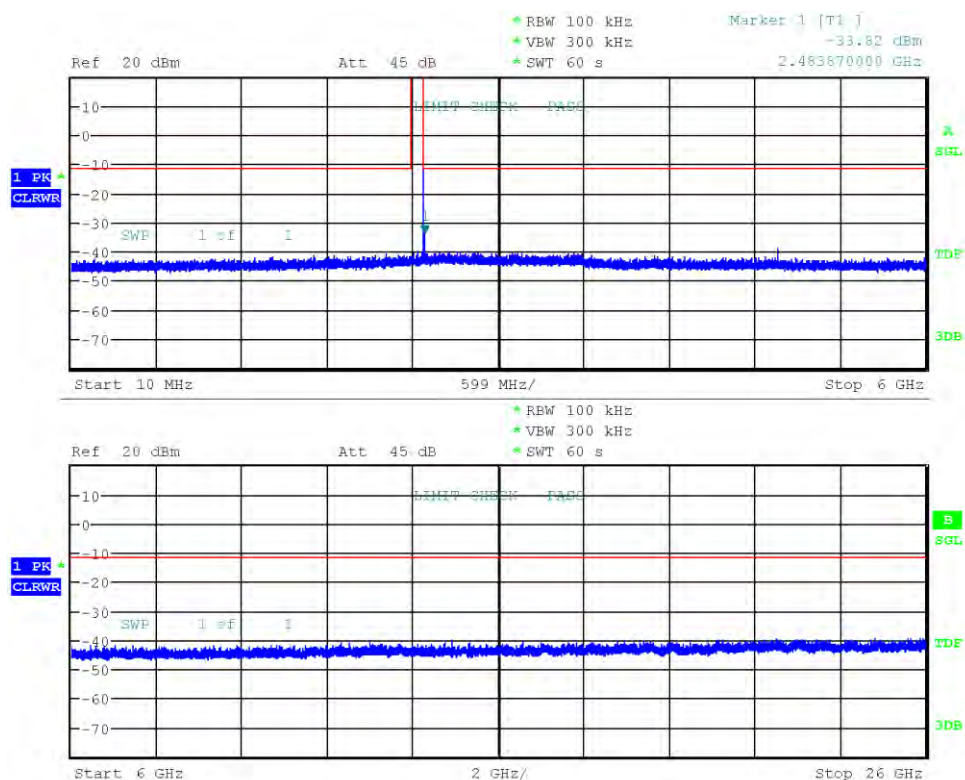
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 1 Mbps
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 8.6
 Out-of-band Limit [dBm/100 kHz]: -11.4



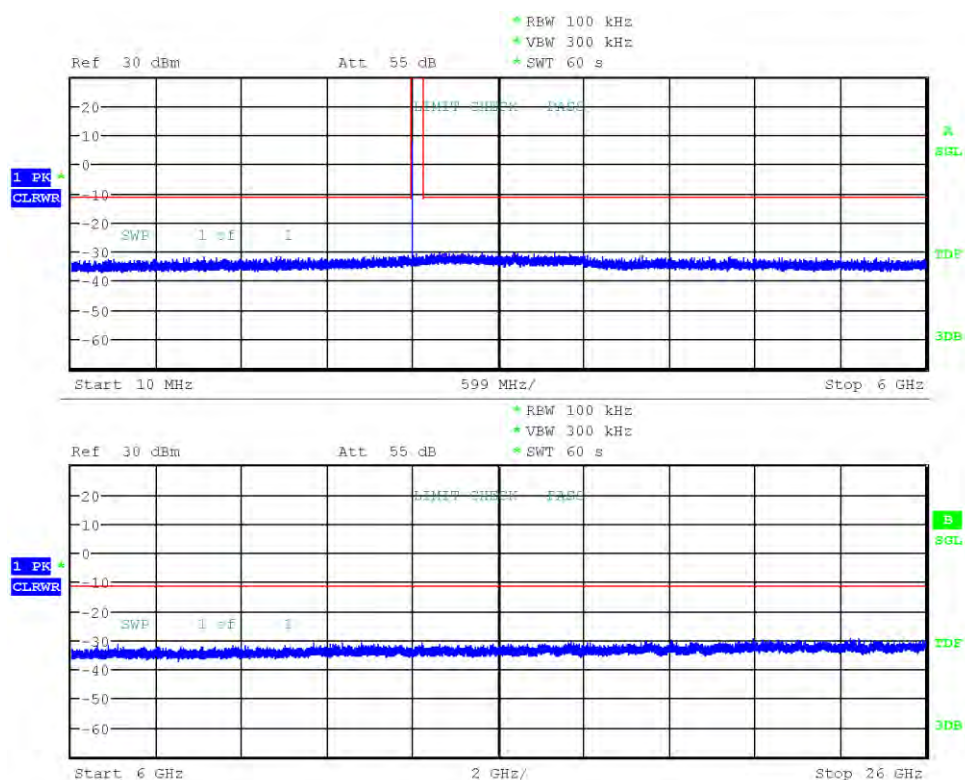
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Conducted Spurious Emissions

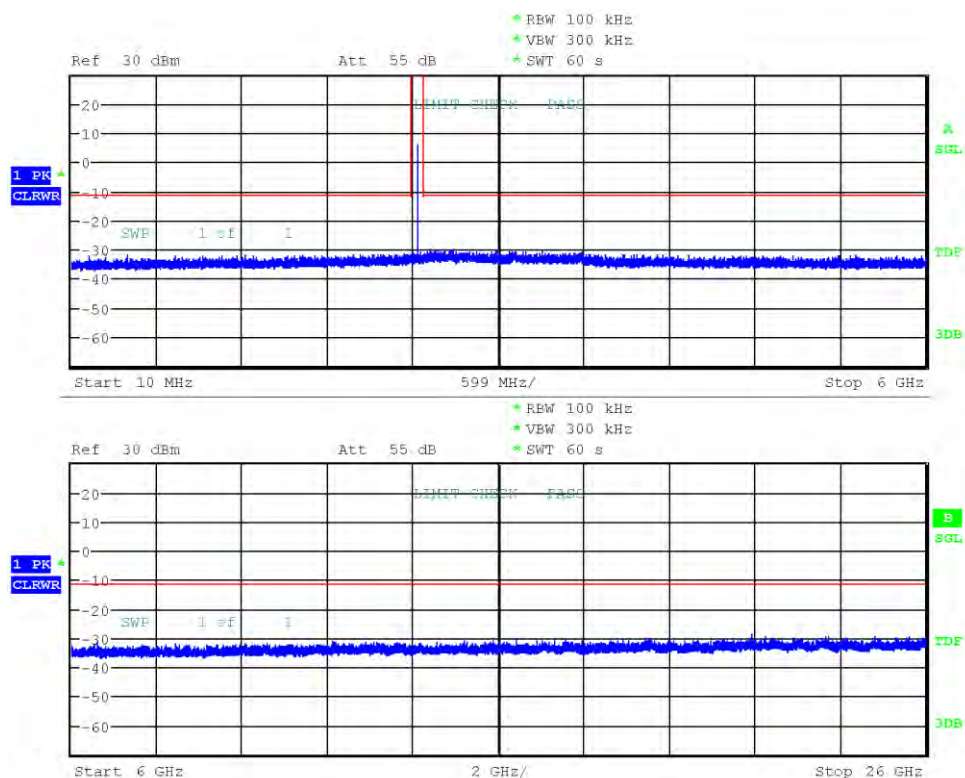
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 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2402.0
 Max. in-band Level [dBm/100 kHz]: 9.0
 Out-of-band Limit [dBm/100 kHz]: -11.0



Date: 19.MAR.2003 19:24:15

Conducted Spurious Emissions

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 9.0
 Out-of-band Limit [dBm/100 kHz]: -11.0



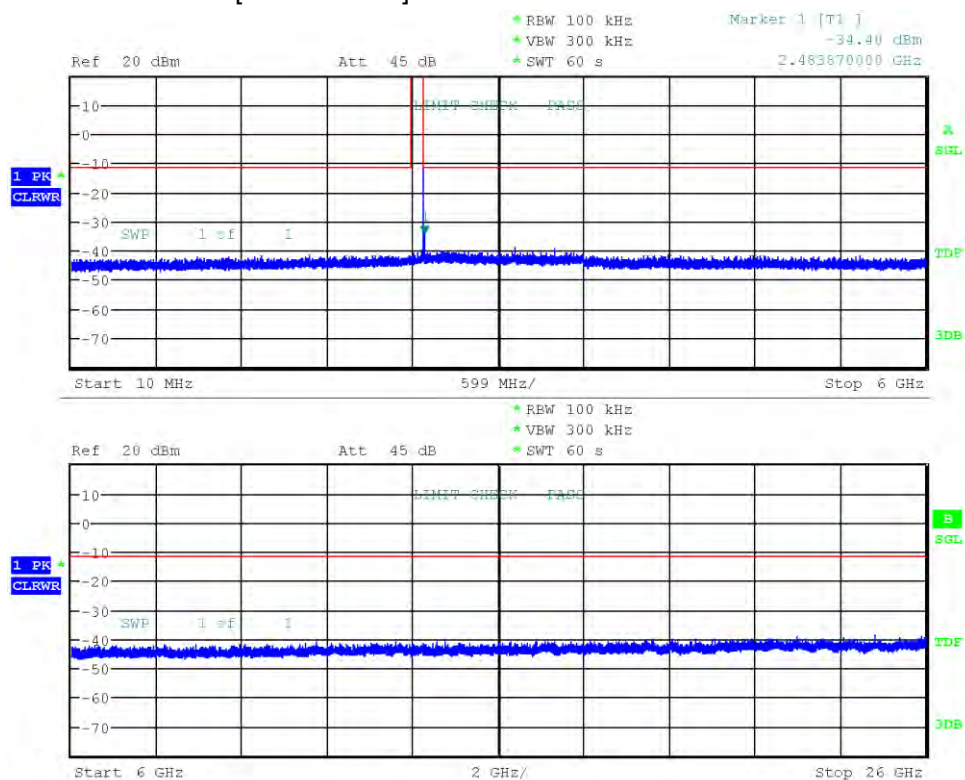
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Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Conducted Spurious Emissions

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module with integrated antenna
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32802
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Charline Graf
 Test Site: Eurofins Product Service GmbH
 Test Date: 2021-01-26
 Note: 2 Mbps
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: 8.7
 Out-of-band Limit [dBm/100 kHz]: -11.3



Date: 19.MAR.2003 19:30:41

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

3.8 Test Conditions and Results - Transmitter radiated emissions

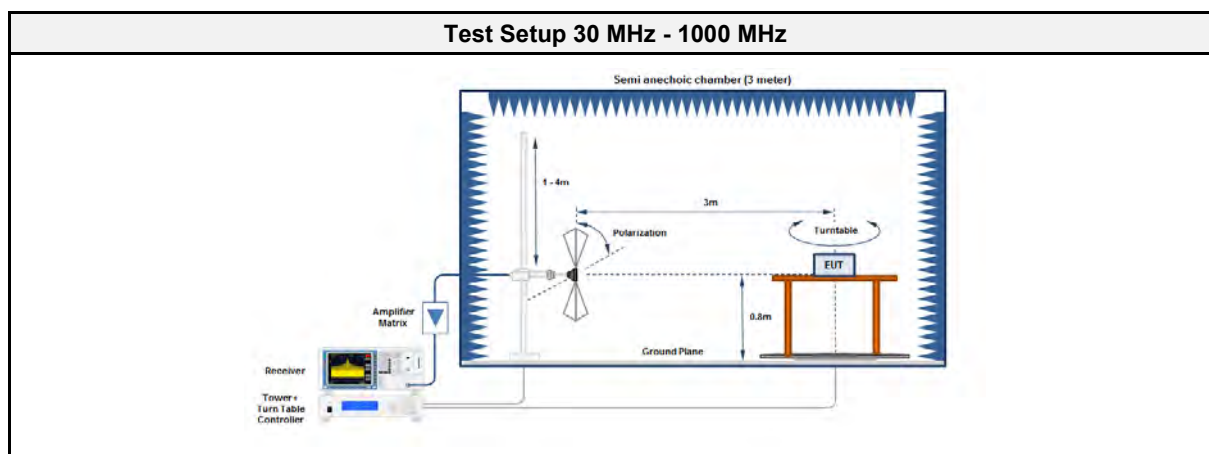
3.8.1 Information

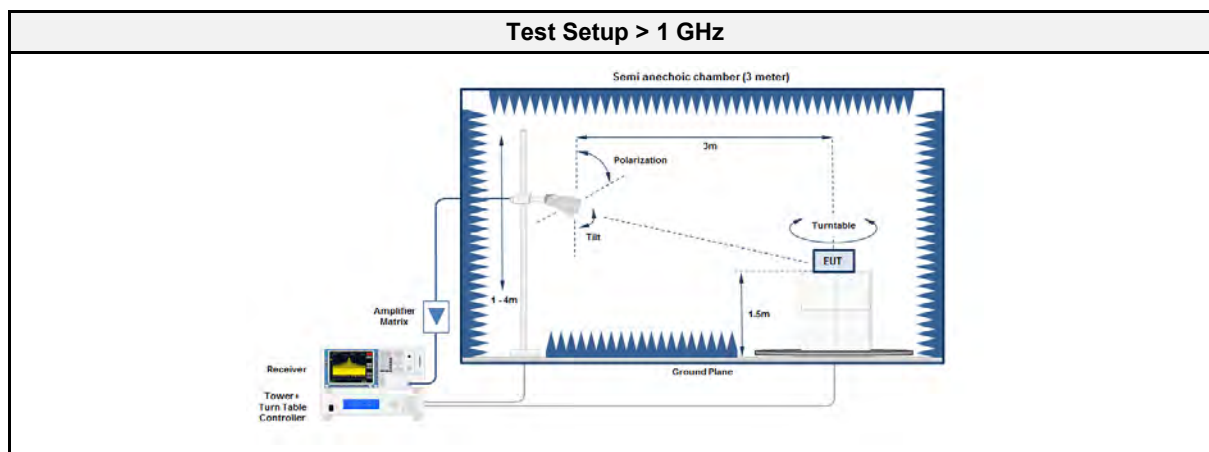
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Charline Graf
Date	2021-01-20

3.8.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [µV/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

3.8.3 Setup





3.8.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	— (diverse)	— (diverse)	EF00779	2020-12	2021-12
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	R&S	VULB 9162	EF00978	2019-10	2022-10
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	— (diverse)	— (diverse)	EF00779	2020-12	2021-12
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2020-11	2021-11
Antenna	Amplifier Research	AT4560	EF01152	2020-11	2022-11

3.8.5 Procedure

Test Procedure 30 MHz - 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

3.8.6 Results

Test Results – Integrated antenna						
Channel	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
Channel 0	2400	43.37	pk	hor	74.00	-30.63
Channel 0	4801	48.33	pk	hor	74.00	-25.67
Channel 0	4801	43.42	pk	hor	74.00	-30.58
Channel 0	4801	50.16	pk	ver	74.00	-23.84
Channel 0	4801	48.50	pk	ver	74.00	-25.50
Channel 0	7205	56.02	pk	hor	74.00	-17.98
Channel 0	7205	52.90	avg	hor	54.00	-1.1
Channel 0	7205	47.70	pk	hor	74.00	-26.30
Channel 0	7212	54.33	pk	ver	74.00	-19.67
Channel 0	7212	50.50	avg	ver	54.00	-3.5
Channel 0	7212	56.73	pk	ver	74.00	-17.27
Channel 0	7212	52.80	avg	ver	54.00	-1.2
Channel 19	4878	45.50	pk	hor	74.00	-28.50
Channel 19	4878	44.37	pk	hor	74.00	-29.63
Channel 19	4878	46.28	pk	ver	74.00	-27.72
Channel 19	4878	46.27	pk	ver	74.00	-27.73
Channel 19	7321	47.57	pk	hor	74.00	-26.43
Channel 19	7321	48.74	pk	hor	74.00	-25.26
Channel 19	7321	52.85	pk	ver	74.00	-21.15
Channel 19	7321	49.70	avg	ver	54.00	-4.3
Channel 19	7321	50.84	pk	ver	74.00	-23.16
Channel 39	4962	42.90	pk	hor	74.00	-31.10
Channel 39	4962	42.15	pk	hor	74.00	-31.85
Channel 39	4962	41.65	pk	ver	74.00	-32.35
Channel 39	4962	40.66	pk	ver	74.00	-33.34
Channel 39	7442	47.90	pk	hor	74.00	-26.10
Channel 39	7442	46.60	pk	hor	74.00	-27.40
Channel 39	7442	47.41	pk	ver	74.00	-26.59
Channel 39	7442	47.13	pk	ver	74.00	-26.87
Comment: 1Mbps mode is declared as worst case						

Test Results – External antenna						
Channel	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
Channel 0	2300	50.82	pk	ver	74.00	-23.18
Channel 0	2398	64.79	pk	hor	74.00	-09.21
Channel 0	2398	46.34	avg	hor	54.00	-7.66
Channel 0	2500	47.72	pk	ver	74.00	-26.28
Channel 0	4801	57.07	pk	hor	74.00	-16.93
Channel 0	4801	51.99	avg	hor	54.00	-2.01
Channel 0	4801	45.11	pk	ver	74.00	-28.89
Channel 0	7212	50.59	pk	ver	74.00	-23.41
Channel 0	8109	52.10	pk	ver	74.00	-21.90
Channel 19	239.744	29.93	pk	ver	95.00	-65.07
Channel 19	960.256	39.03	pk	ver	54.00	-14.97
Channel 19	2300	49.37	pk	ver	74.00	-24.63
Channel 19	2514	49.49	pk	ver	74.00	-24.51
Channel 19	7321	53.04	pk	hor	74.00	-20.96
Channel 19	7321	48.76	avg	hor	54.00	-5.24
Channel 19	7321	45.20	pk	ver	74.00	-28.80
Channel 39	960.256	38.44	pk	hor	54.00	-15.56
Channel 39	960.256	38.63	pk	ver	54.00	-15.37
Channel 39	2500	51.44	pk	hor	74.00	-22.56
Channel 39	2500	58.01	pk	ver	74.00	-15.99
Channel 39	2500	20.59	avg	ver	54.00	-33.41
Channel 39	7442	51.32	pk	hor	74.00	-22.68
Channel 39	7442	48.85	pk	ver	74.00	-25.15
Comment: 1Mbps mode is declared as worst case						

3.9 Test Conditions and Results - Receiver radiated emissions

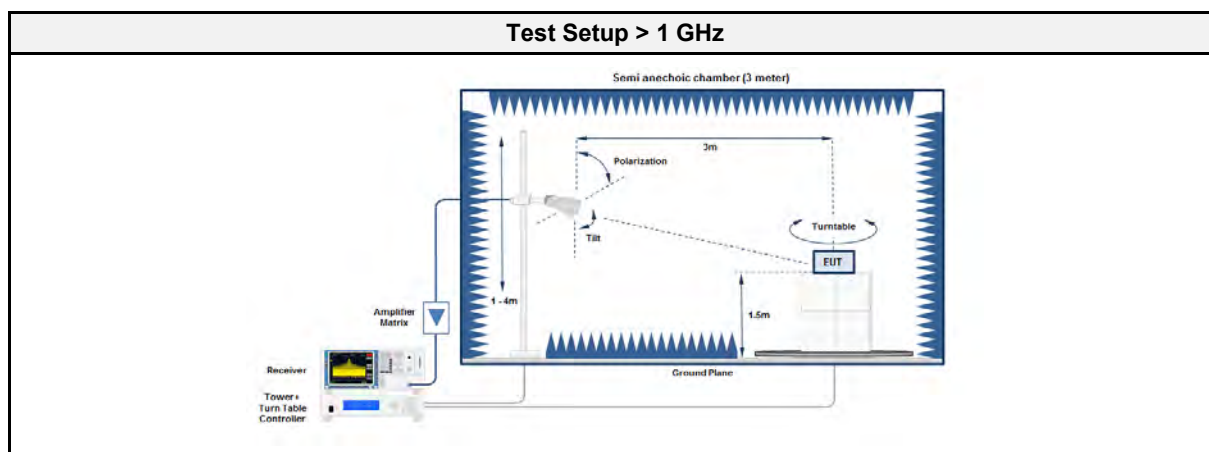
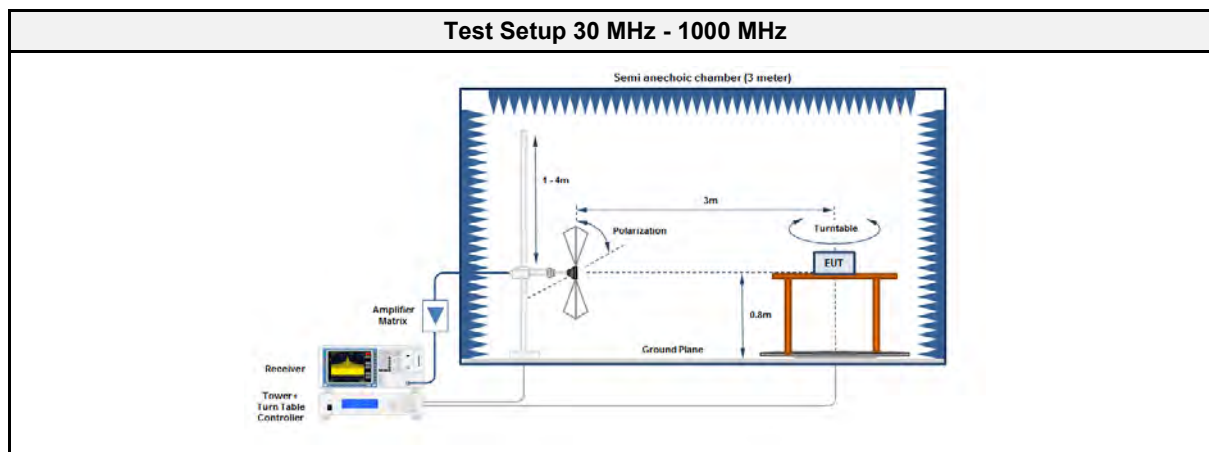
3.9.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Model Description:	Customer programmable Bluetooth LE module with integrated antenna
Operator	Charline Graf
Date	2021-01-20

3.9.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
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

3.9.3 Setup



3.9.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	R&S	VULB 9162	EF00978	2019-10	2022-10
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Cable (diverse)	– (diverse)	– (diverse)	EF00779	2020-12	2021-12
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2020-11	2021-11
Antenna	Amplifier Research	AT4560	EF01152	2020-11	2022-11

3.9.5 Procedure

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

3.9.6 Results

Test Results – Integrated antenna						
Channel	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
0-39	4955	43.46	pk	hor	53.98	-10.52
0-39	4955	45.37	pk	ver	53.98	-08.61
Comment: 1Mbps mode is declared as worst case						

Test Results – External antenna						
Channel	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
0-39	31.09	39.13	pk	ver	40.00	-00.87
0-39	31.362	38.25	pk	hor	40.00	-01.75
0-39	59.968	38.28	pk	ver	40.00	-01.72
0-39	83.942	35.61	pk	ver	40.00	-04.39
0-39	239.744	34.03	pk	hor	46.00	-11.97
0-39	239.744	29.70	pk	ver	46.00	-16.30
0-39	960.256	38.62	pk	hor	53.90	-15.28
0-39	960.256	34.59	pk	ver	53.90	-19.31
0-39	1438	33.33	pk	ver	53.98	-20.65
0-39	4955	38.36	pk	hor	53.98	-15.62
0-39	4955	40.04	pk	ver	53.98	-13.94
Comment: 1Mbps mode is declared as worst case						

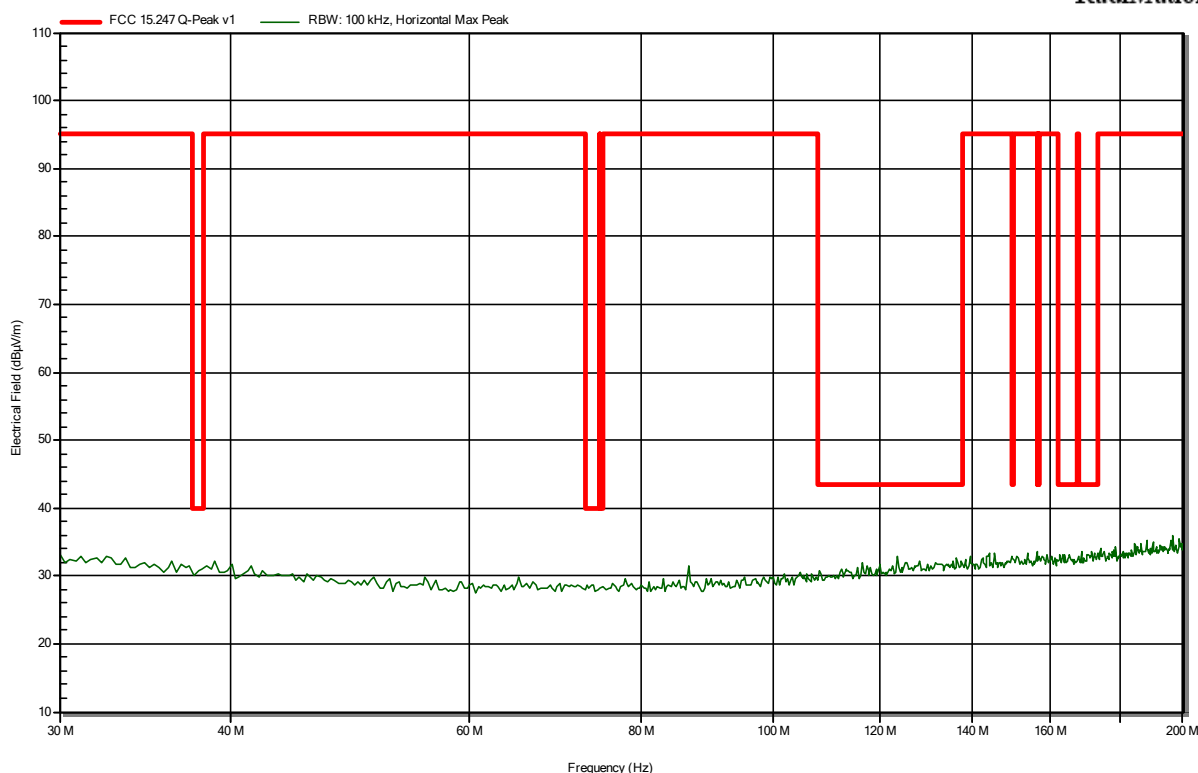
ANNEX A Transmitter spurious emissions with integrated antenna

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

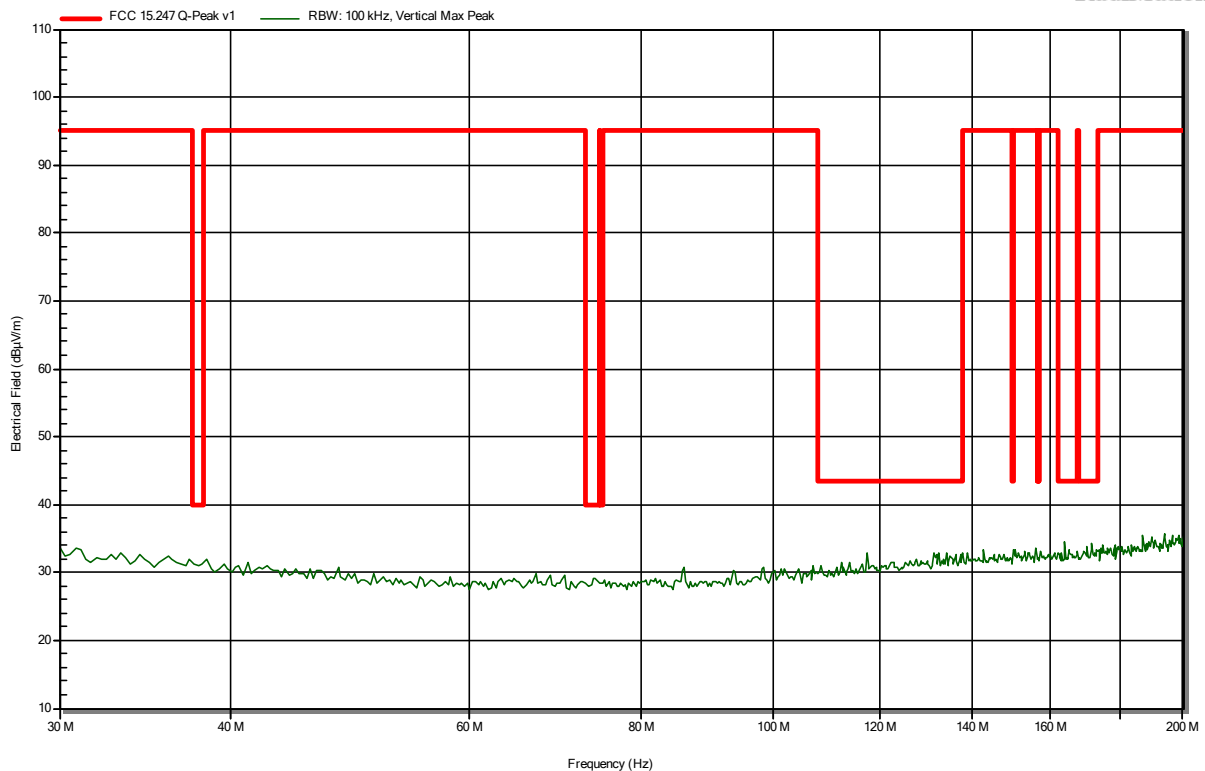


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

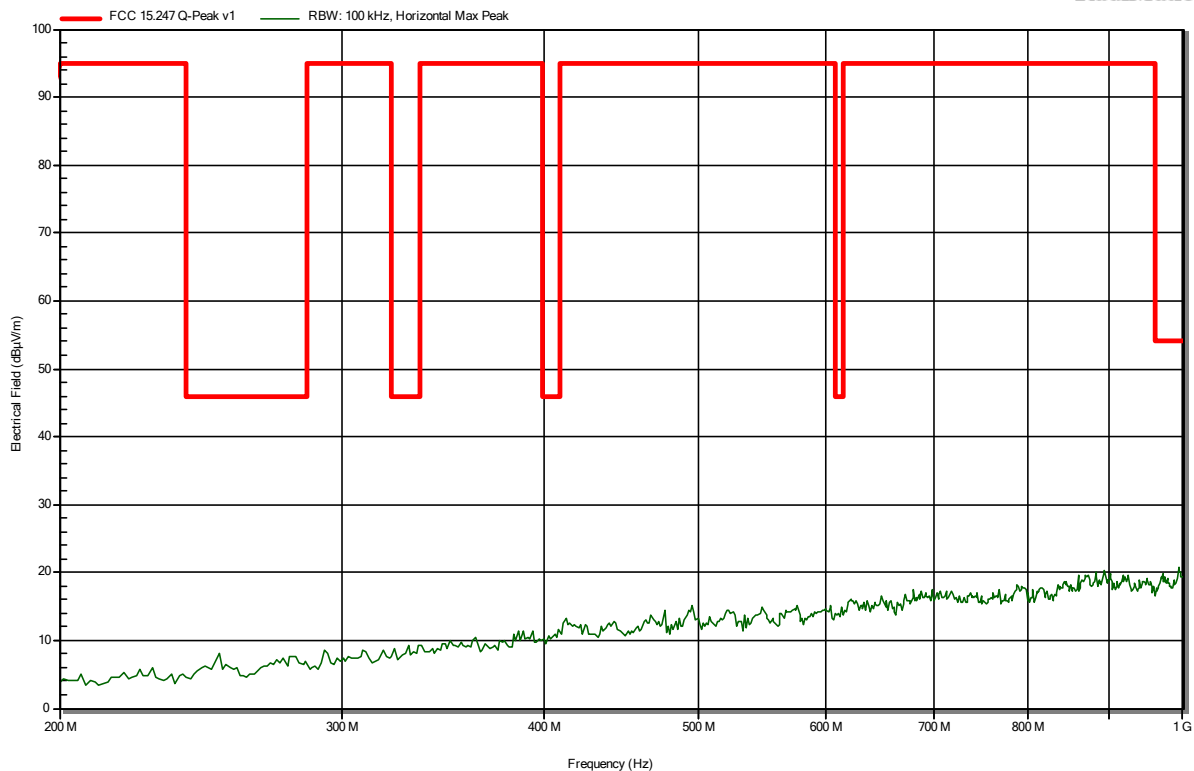


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

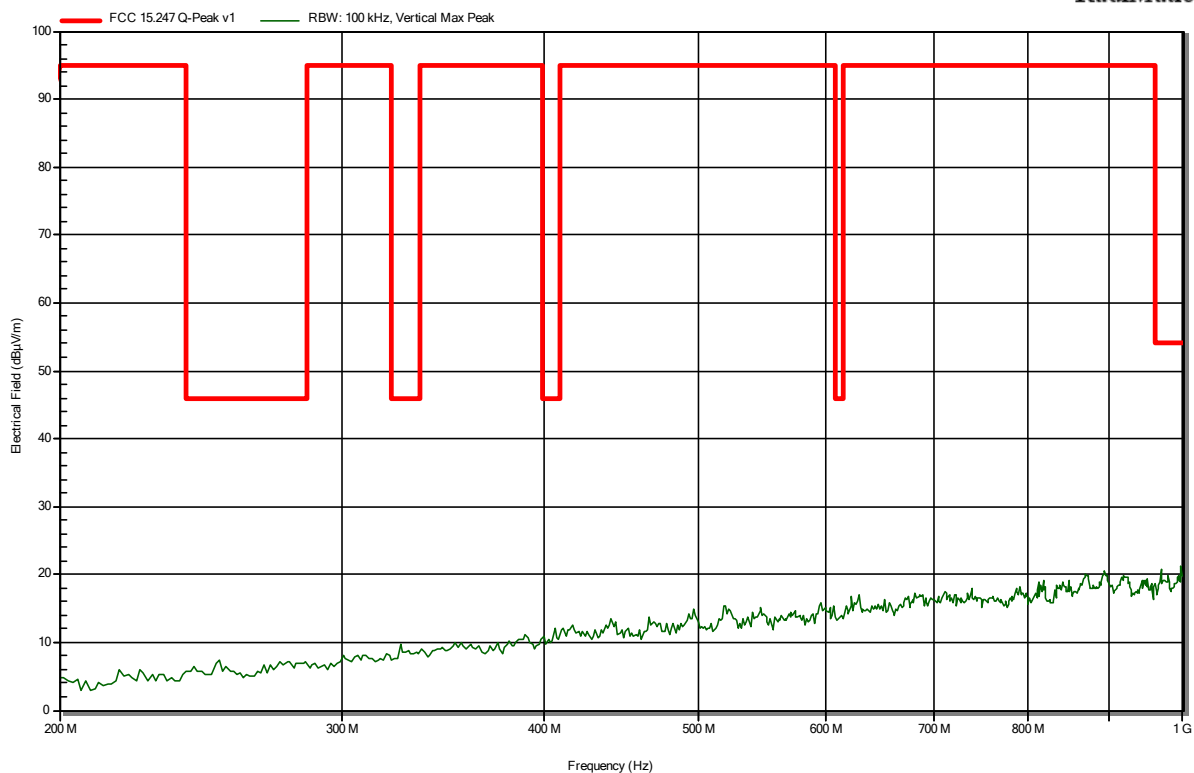


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

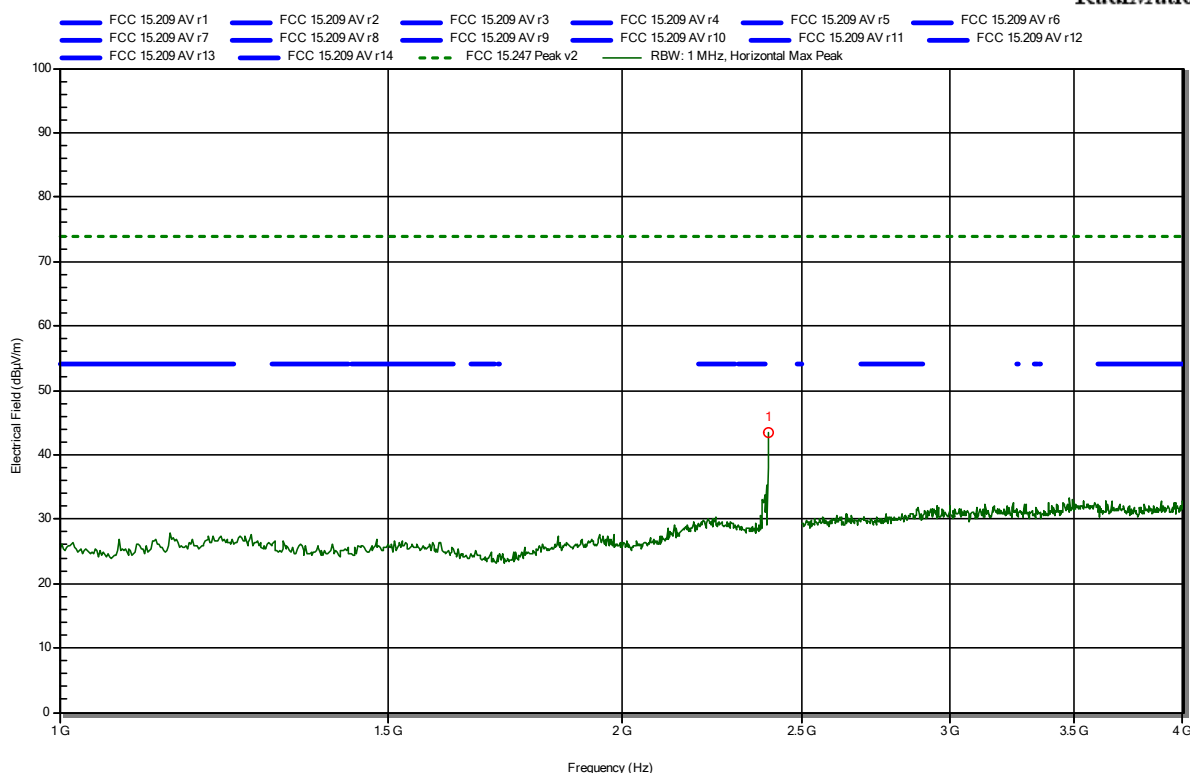


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4 GHz	43.37 dBµV/m	74 dBµV/m	-30.63 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

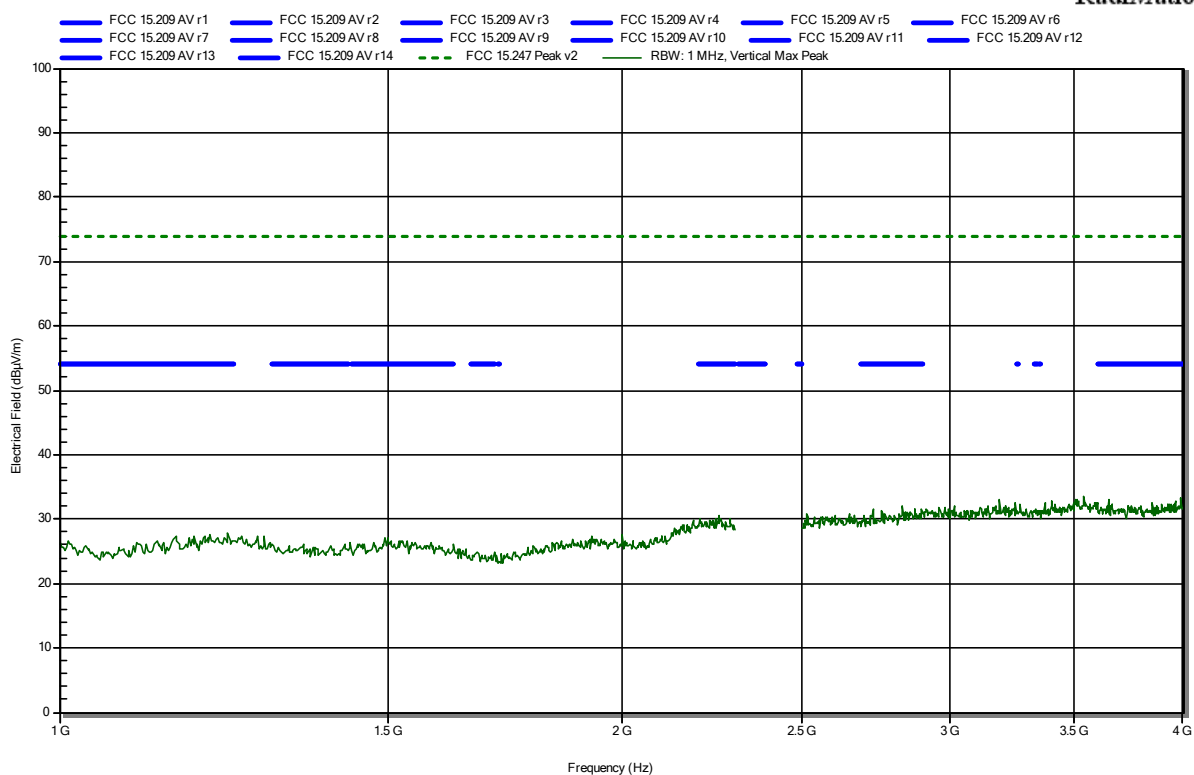
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

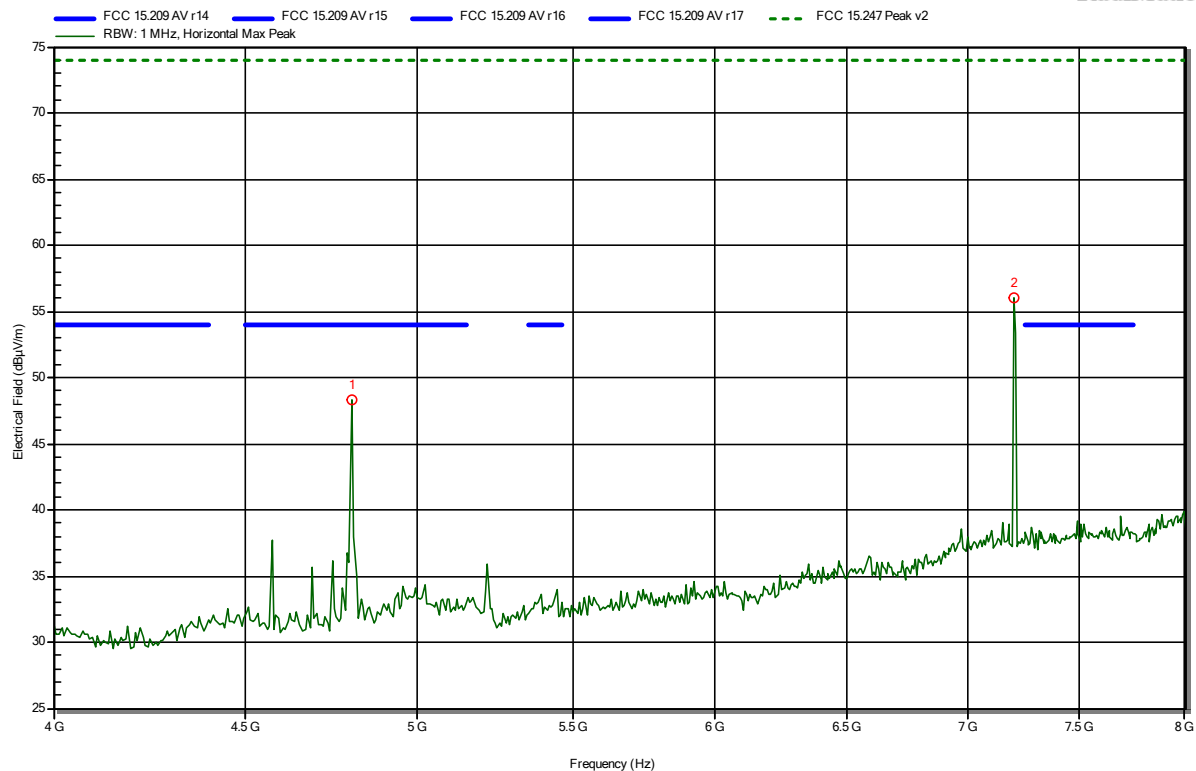


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	48.33 dBμV/m	74 dBμV/m	-25.67 dB	Pass
7.205 GHz	56.02 dBμV/m	74 dBμV/m	-17.98 dB	Pass

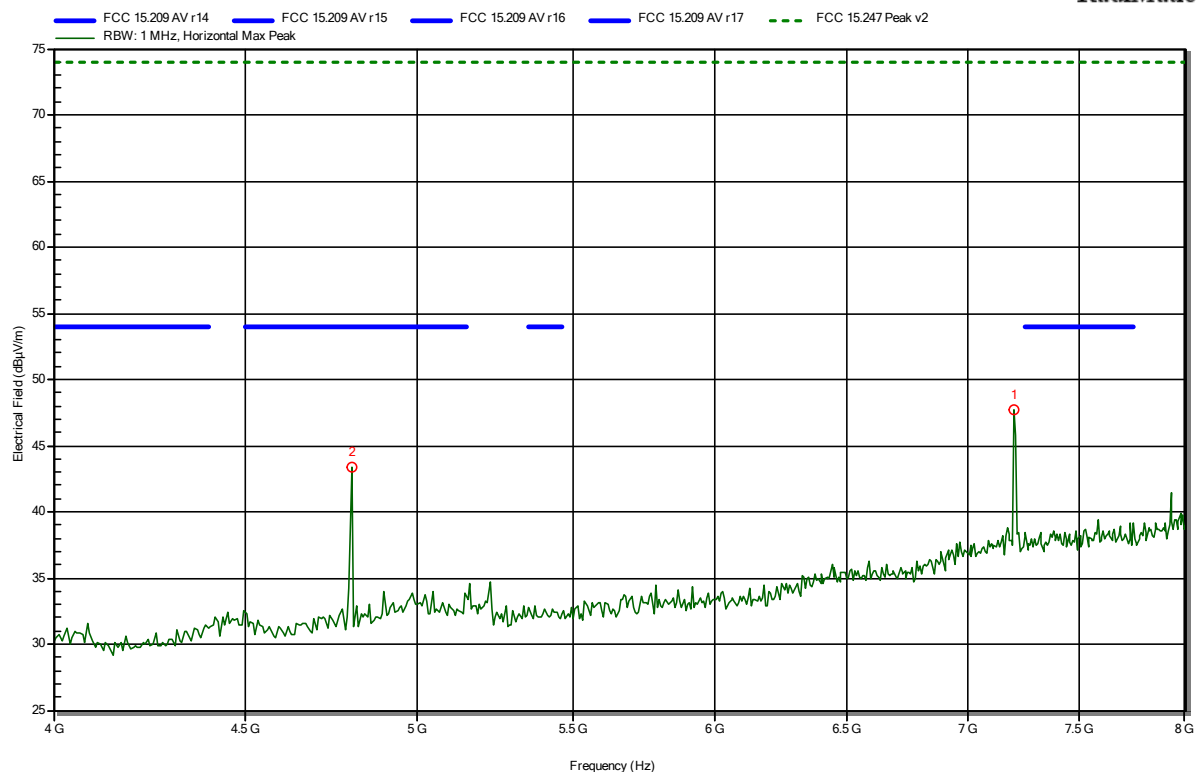
Frequency	Average	Average Limit	Average Difference	Average Status
7.205 GHz	52.9 dBμV/m	54 dBμV/m	-1.1	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal

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RadiMation



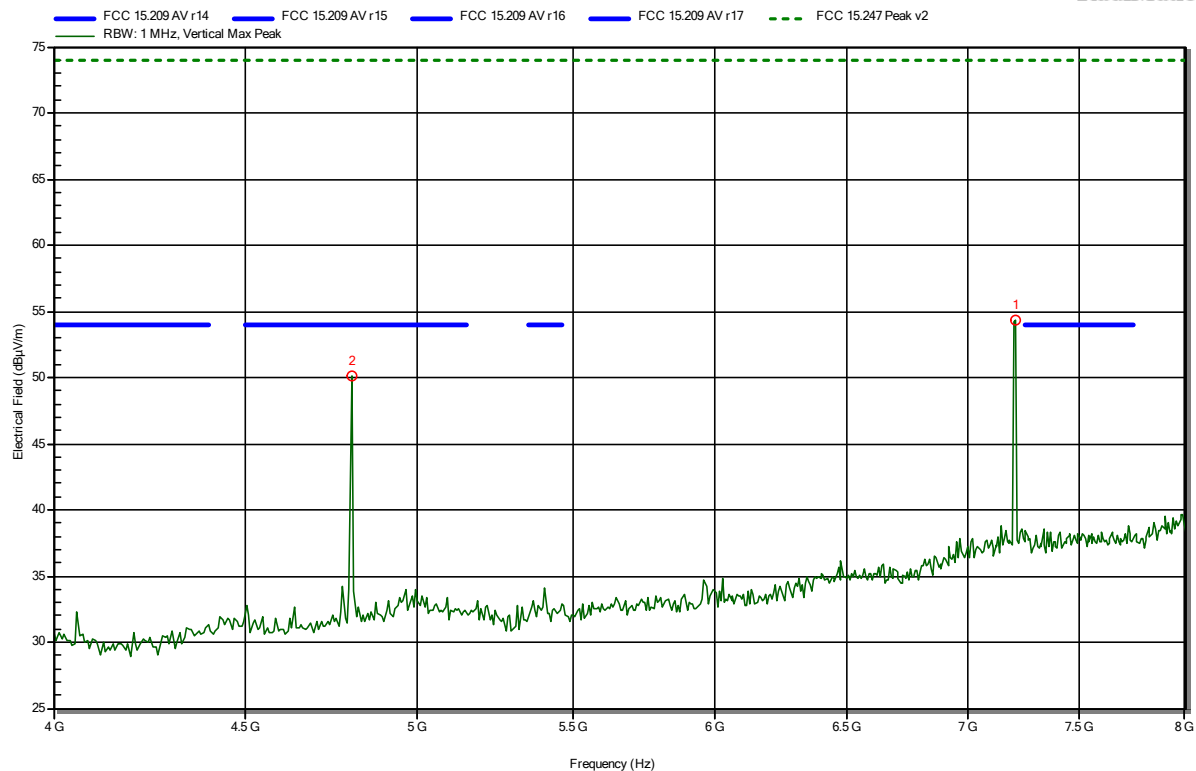
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	43.42 dBµV/m	74 dBµV/m	-30.58 dB	Pass
7.205 GHz	47.7 dBµV/m	74 dBµV/m	-26.3 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	50.16 dBμV/m	74 dBμV/m	-23.84 dB	Pass
7.212 GHz	54.33 dBμV/m	74 dBμV/m	-19.67 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
7.212 GHz	50.5 dBμV/m	54 dBμV/m	-3.5	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

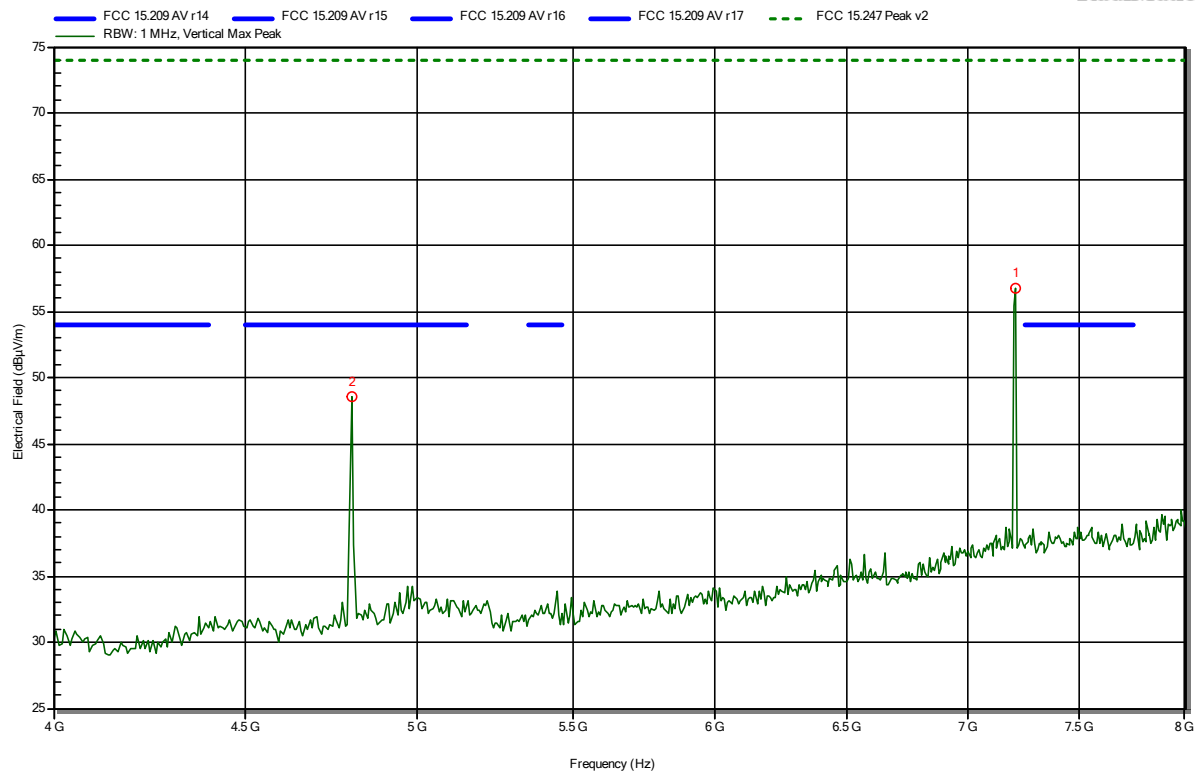
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	48.5 dBμV/m	74 dBμV/m	-25.5 dB	Pass
7.212 GHz	56.73 dBμV/m	74 dBμV/m	-17.27 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
7.212 GHz	52.8 dBμV/m	54 dBμV/m	-1.2	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

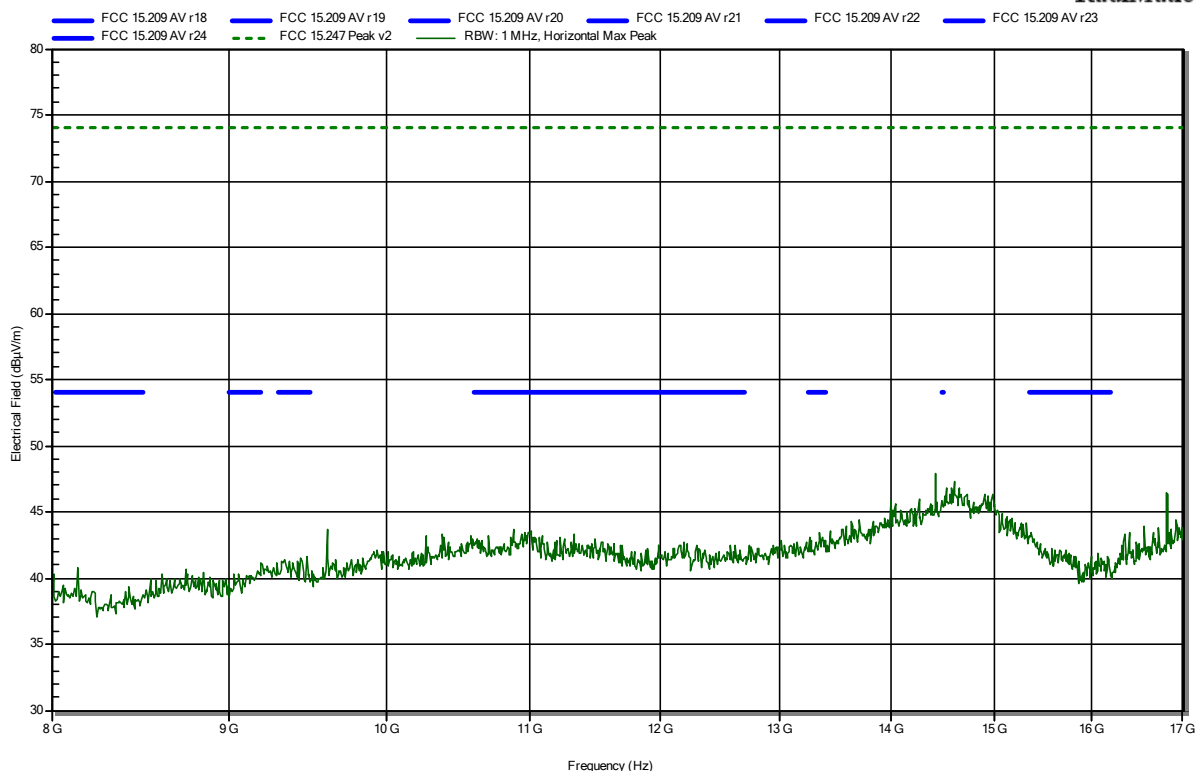
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

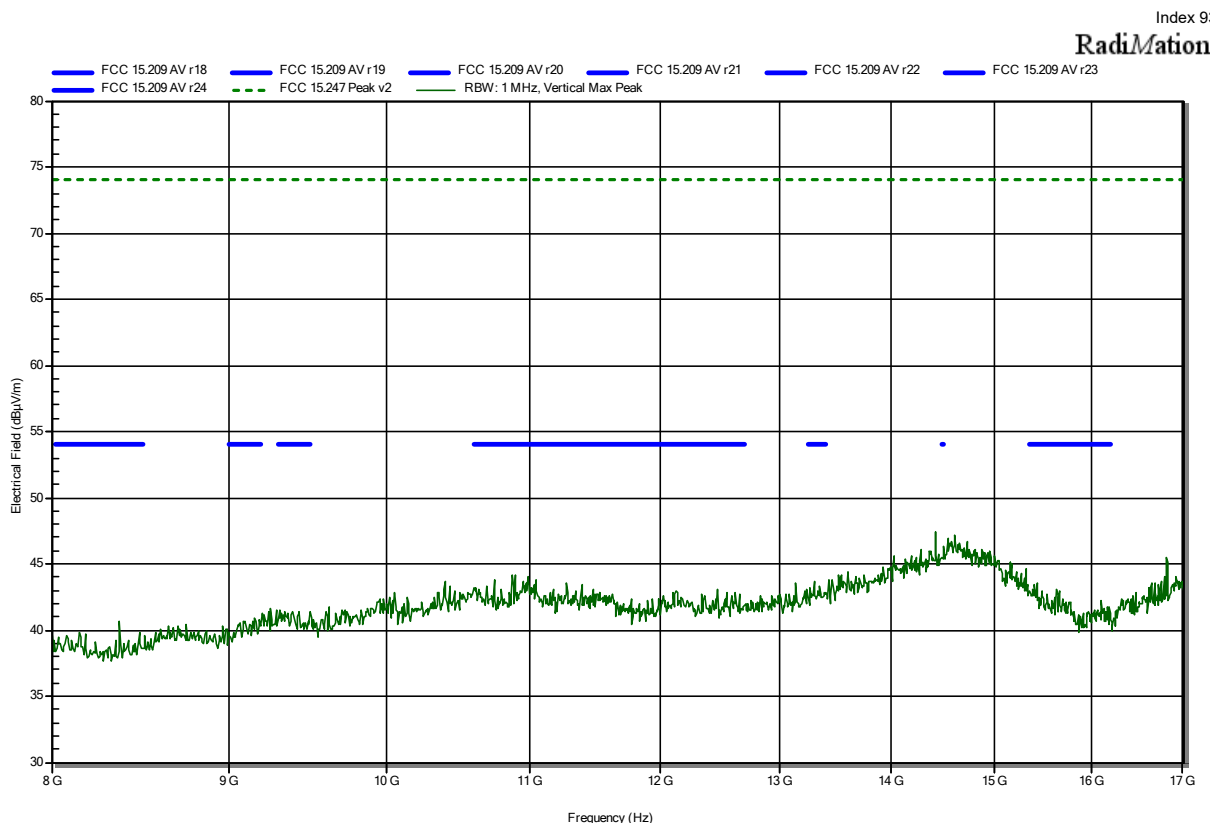
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Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

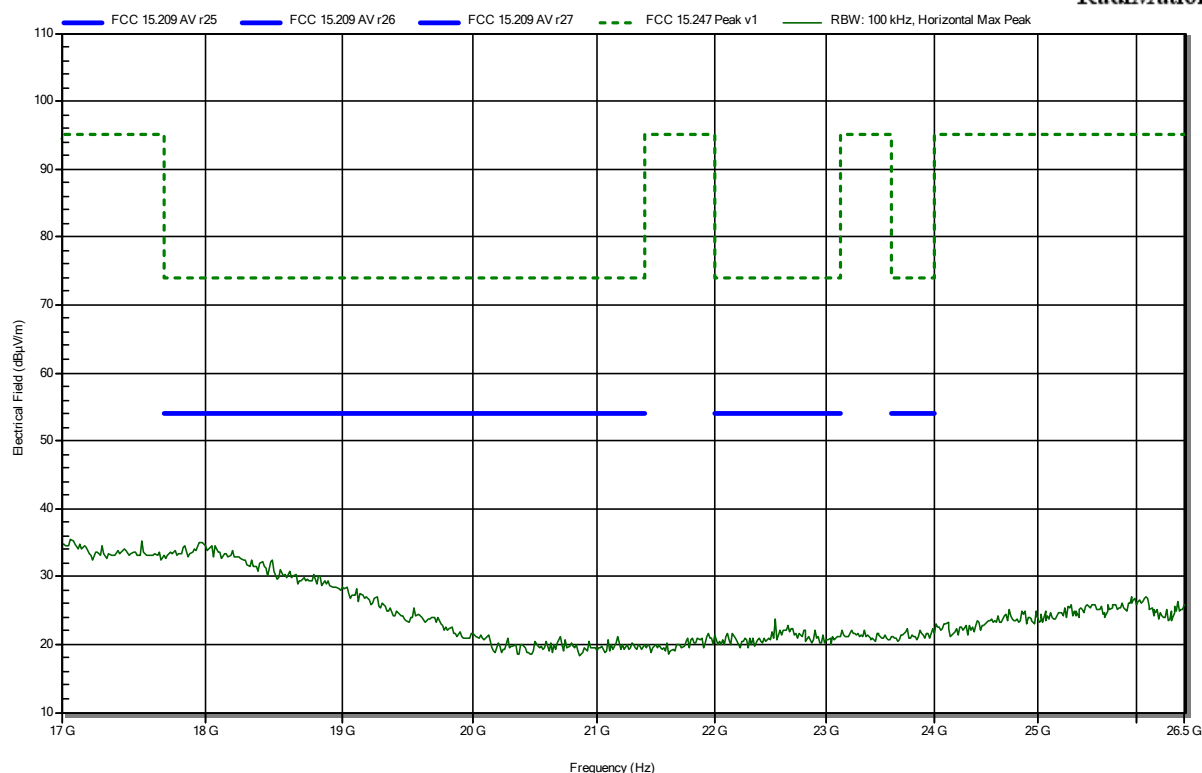


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

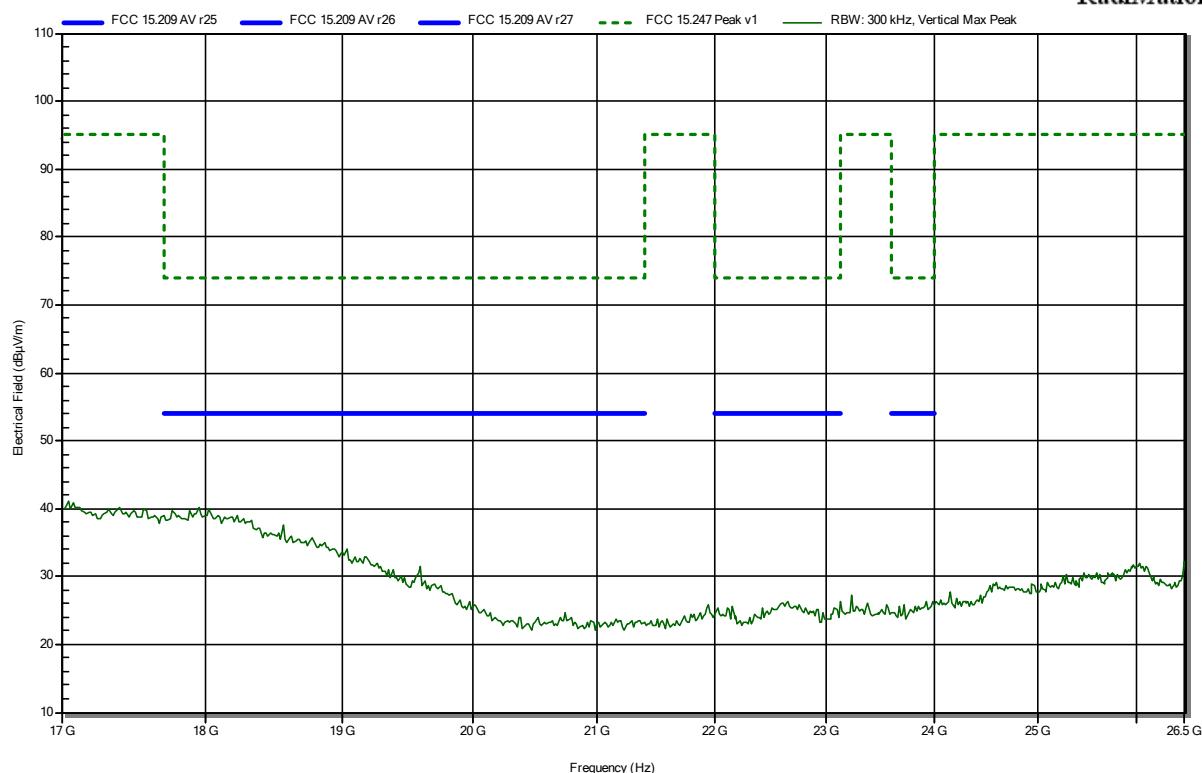


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

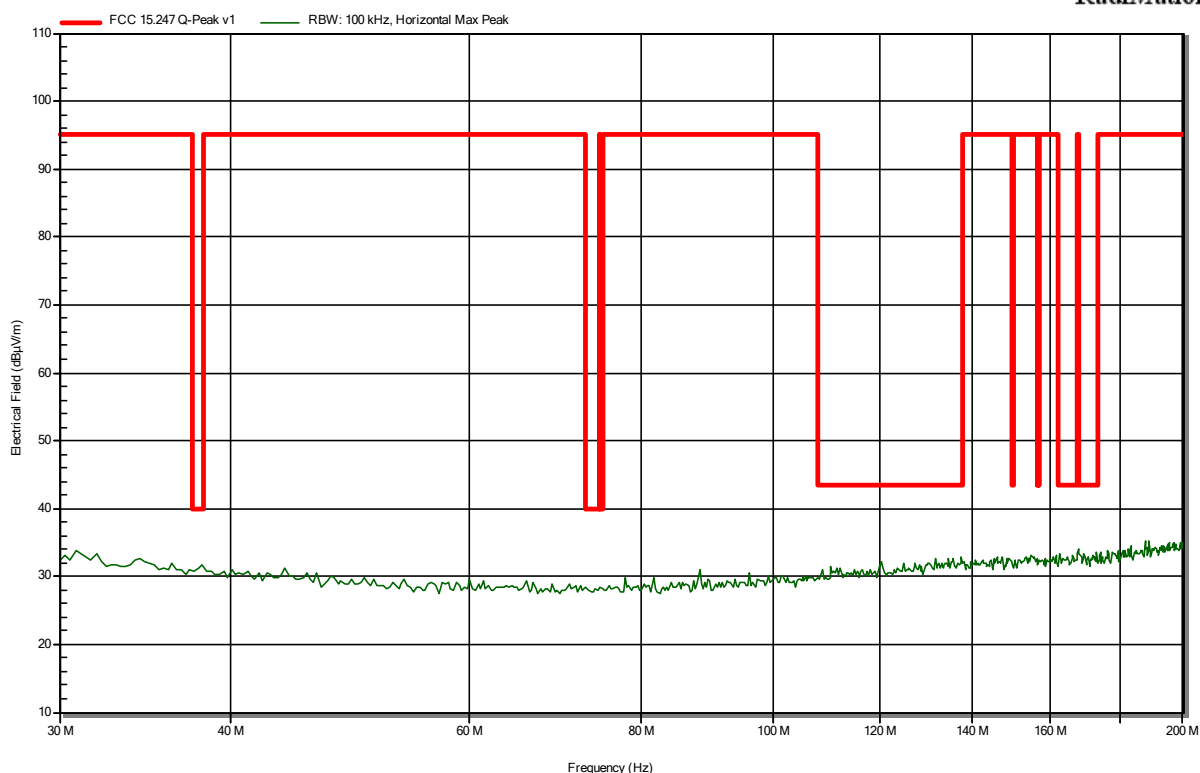


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

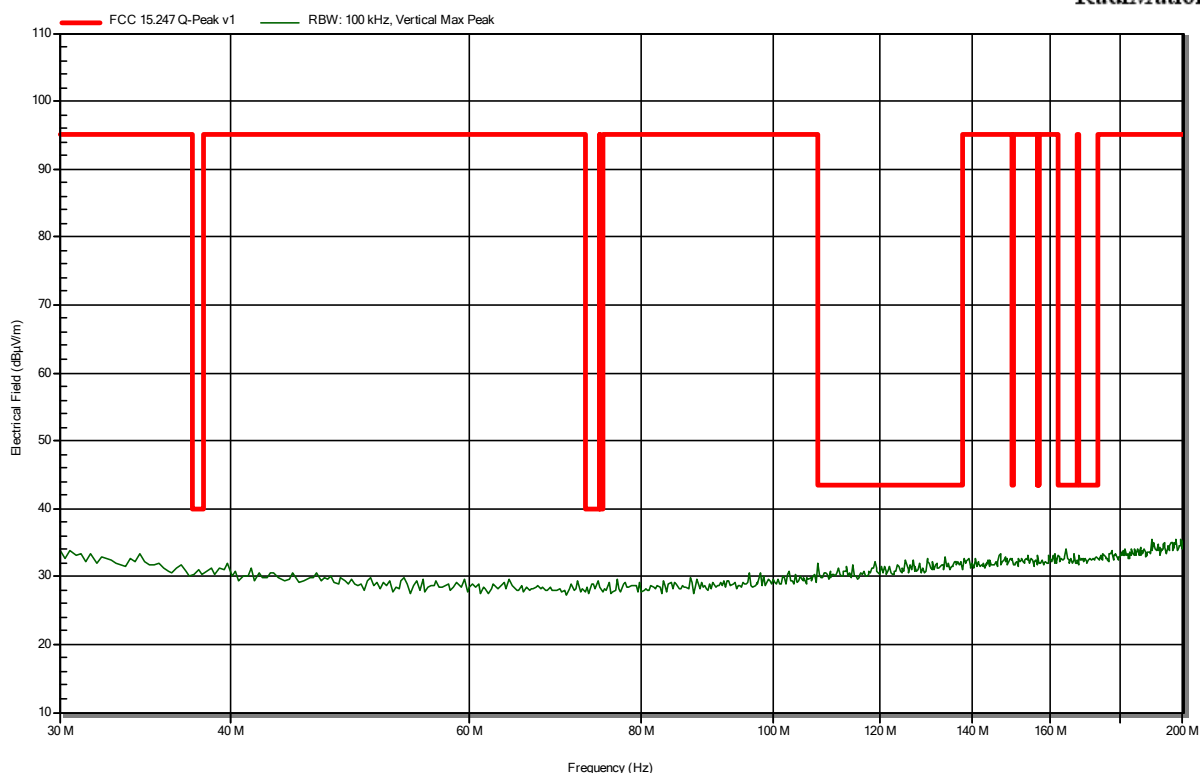


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

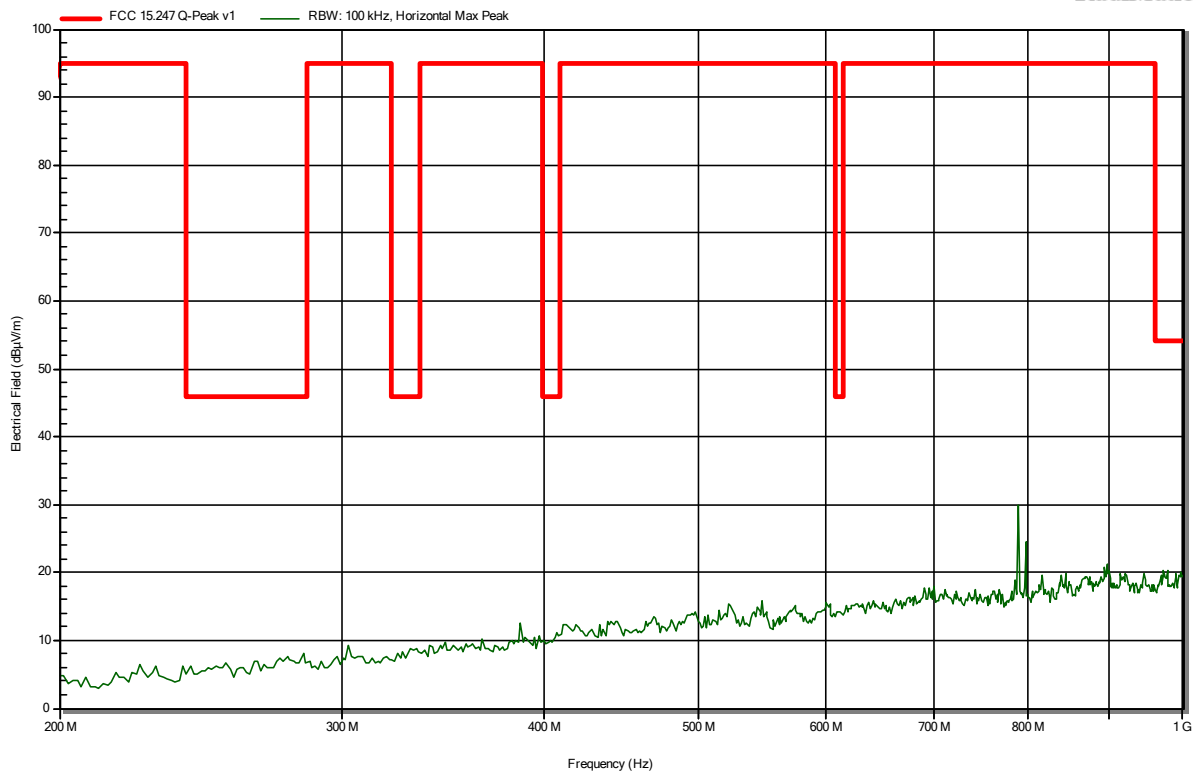


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

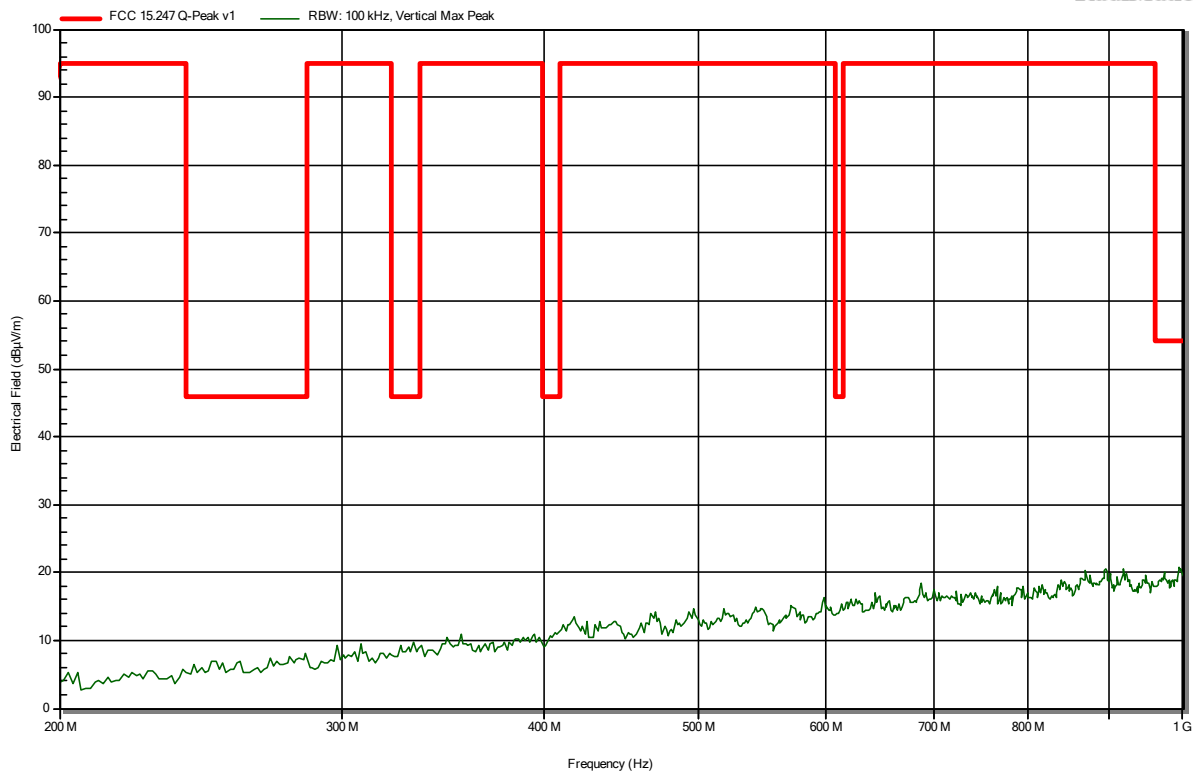


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

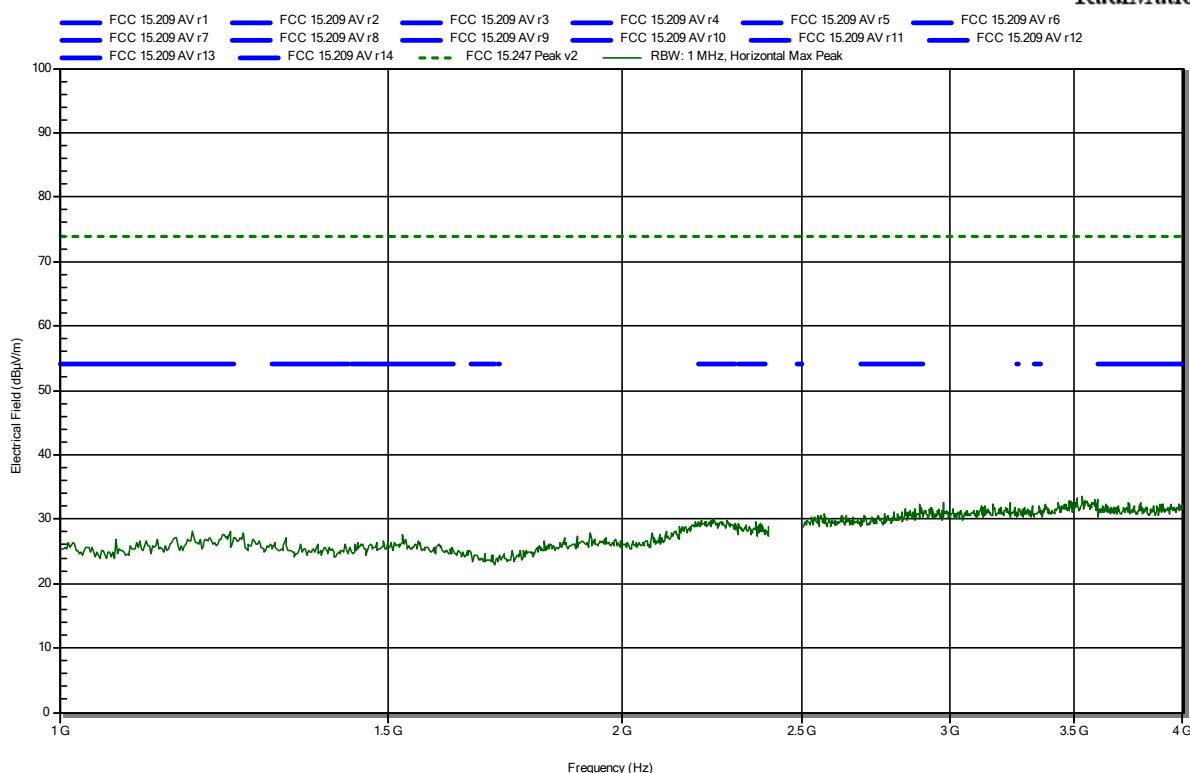


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

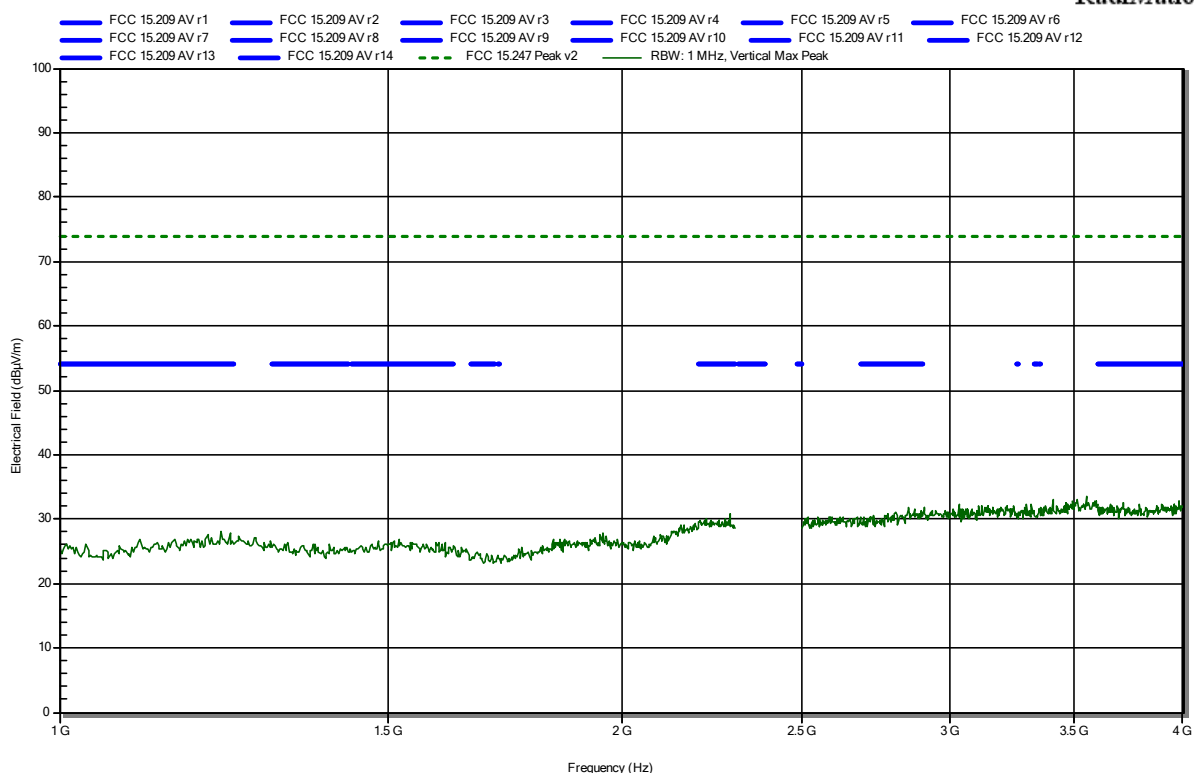


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

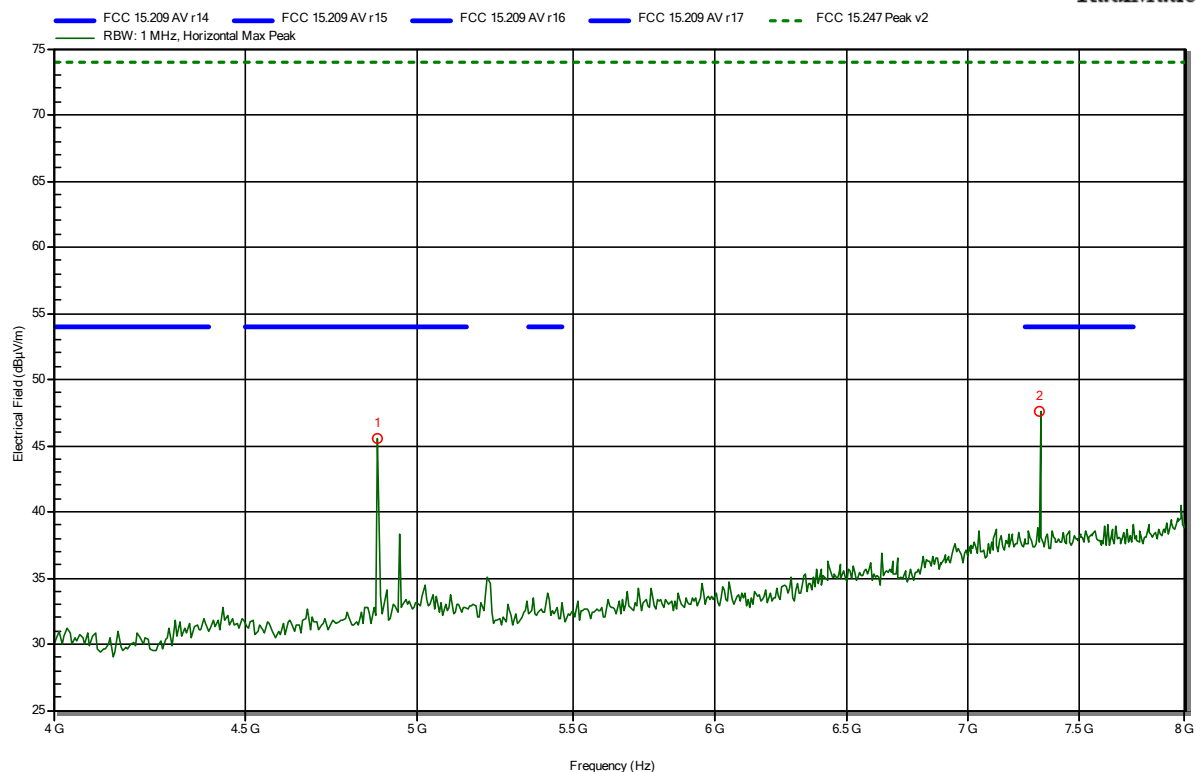


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal

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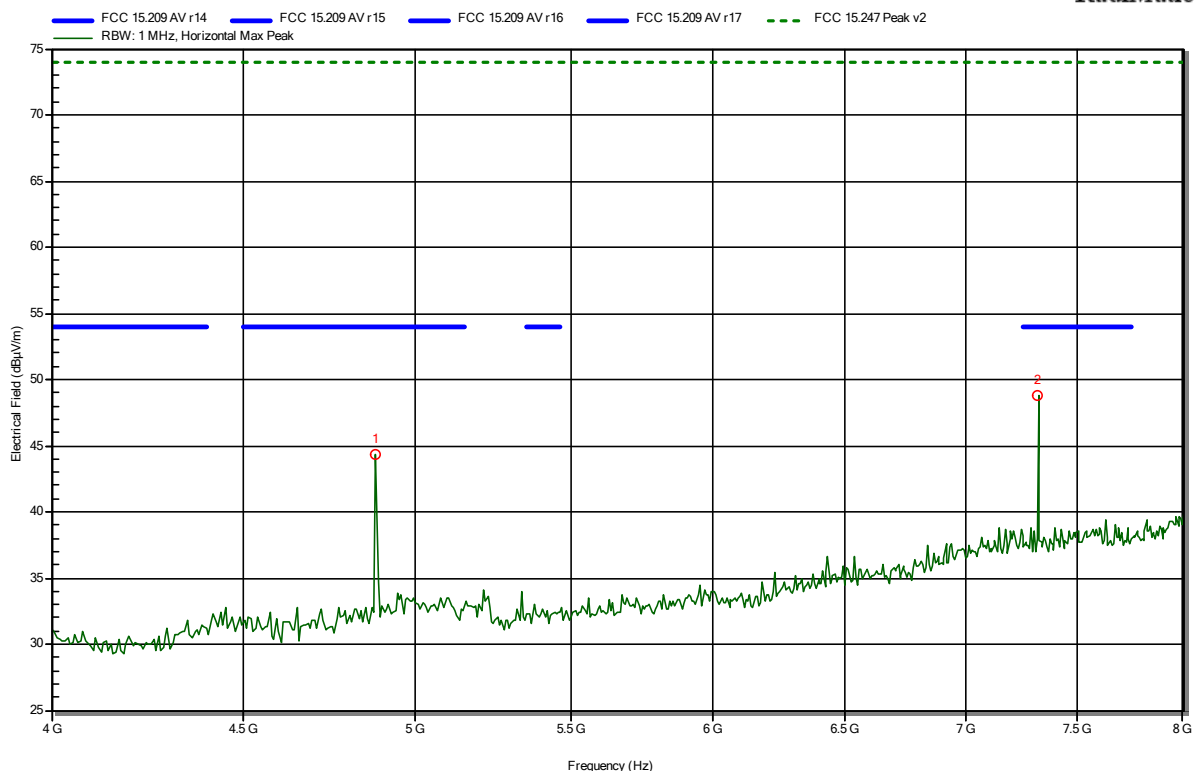
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.878 GHz	45.5 dBµV/m	74 dBµV/m	-28.5 dB	Pass
7.321 GHz	47.57 dBµV/m	74 dBµV/m	-26.43 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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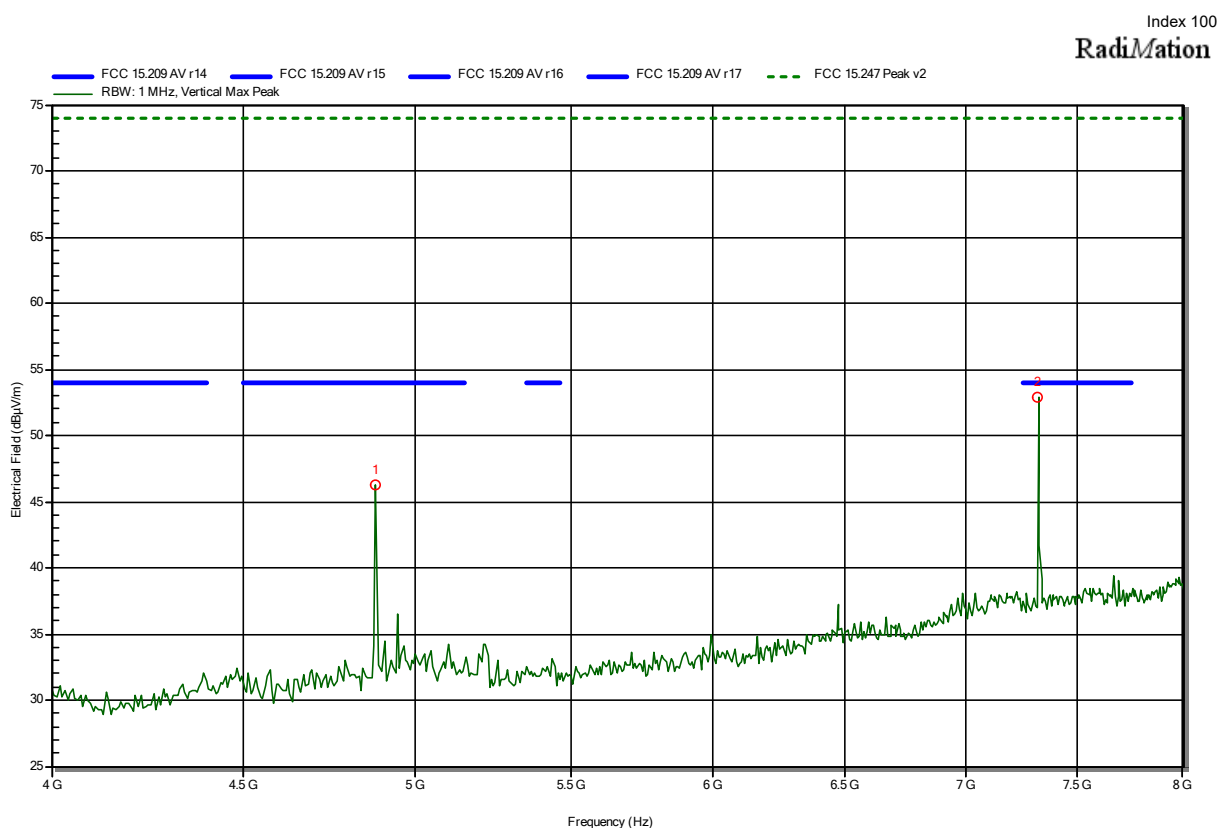
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.878 GHz	44.37 dBµV/m	74 dBµV/m	-29.63 dB	Pass
7.321 GHz	48.74 dBµV/m	74 dBµV/m	-25.26 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal



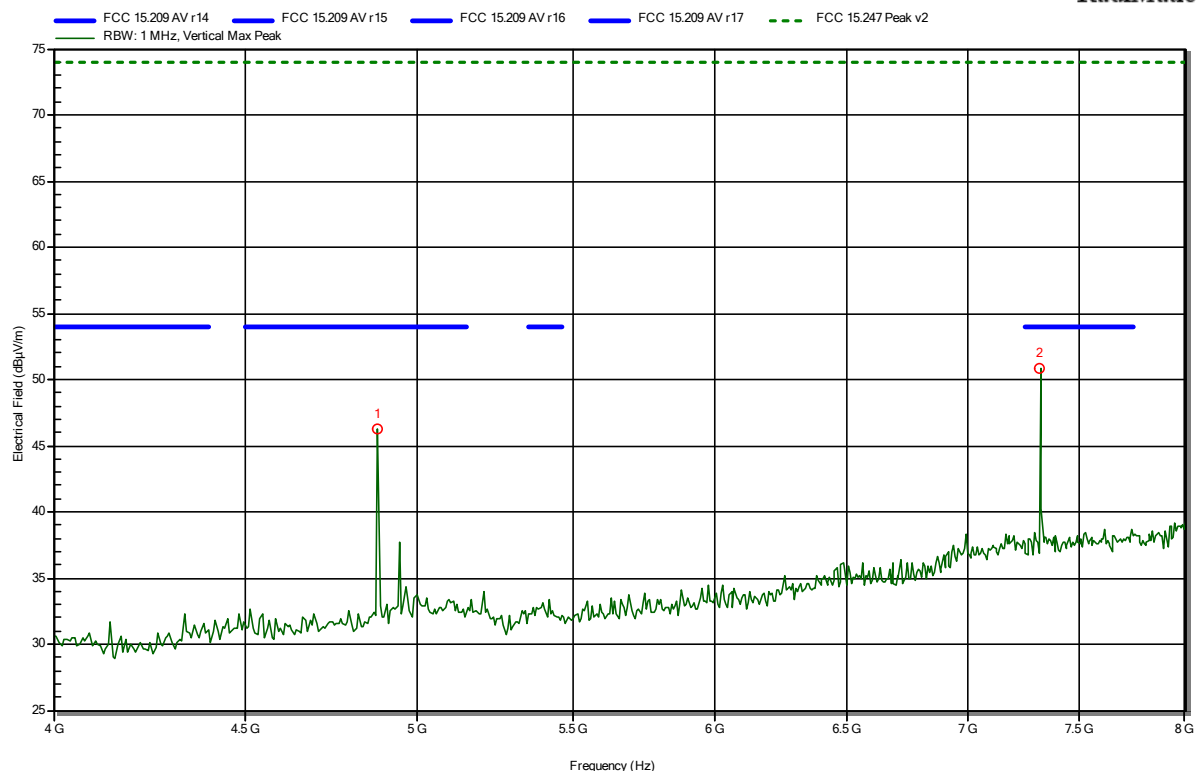
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.878 GHz	46.28 dBµV/m	74 dBµV/m	-27.72 dB	Pass
7.321 GHz	52.85 dBµV/m	74 dBµV/m	-21.15 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
7.321 GHz	49.7 dBµV/m	54 dBµV/m	-4.3	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



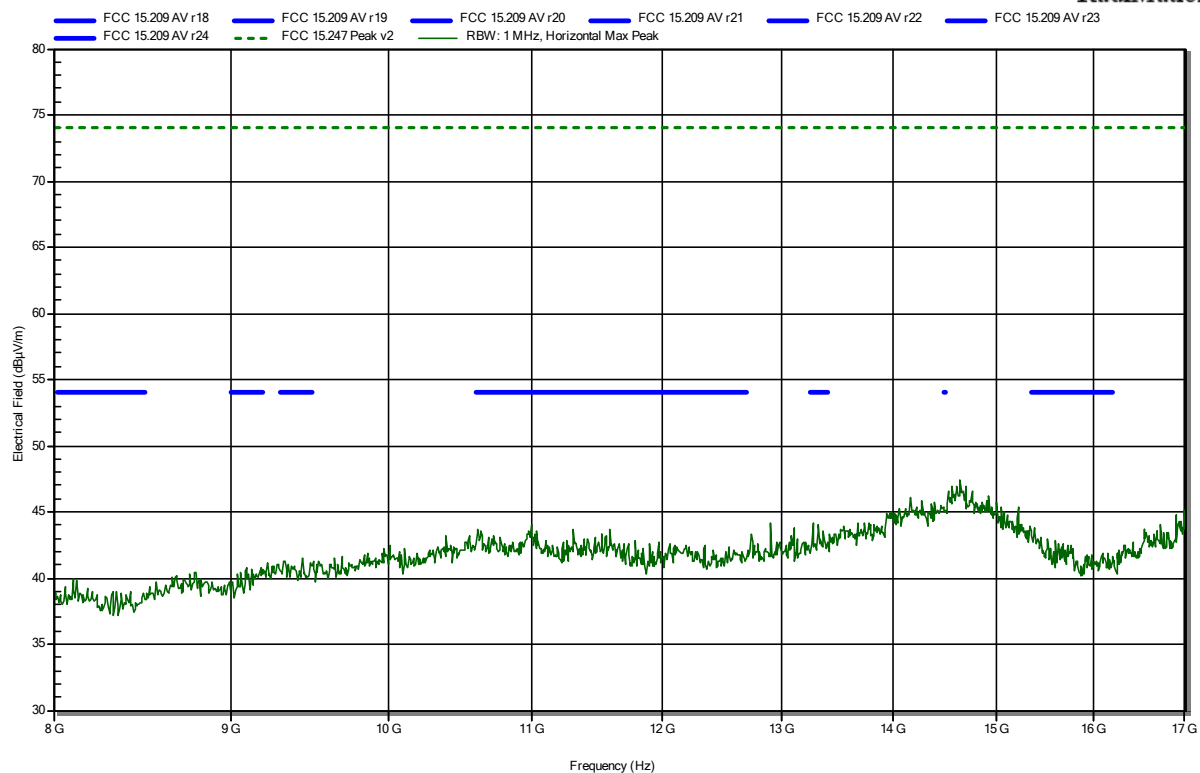
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.878 GHz	46.27 dBμV/m	74 dBμV/m	-27.73 dB	Pass
7.321 GHz	50.84 dBμV/m	74 dBμV/m	-23.16 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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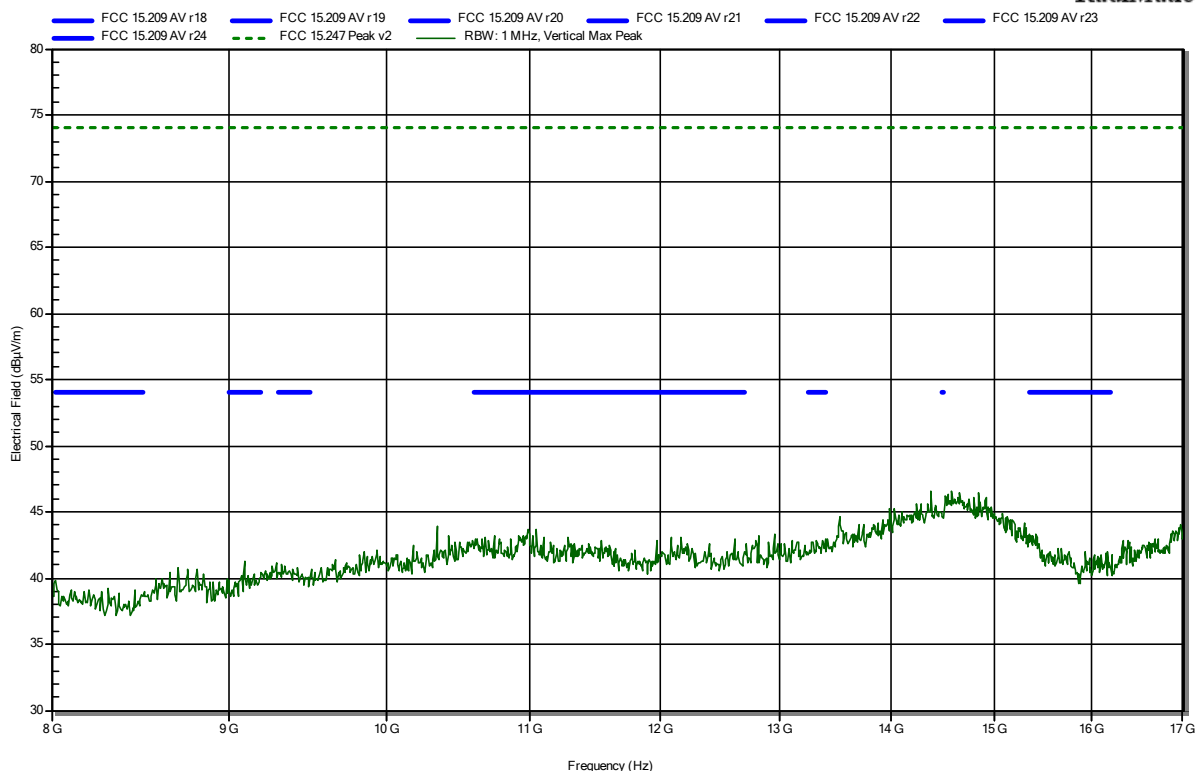


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

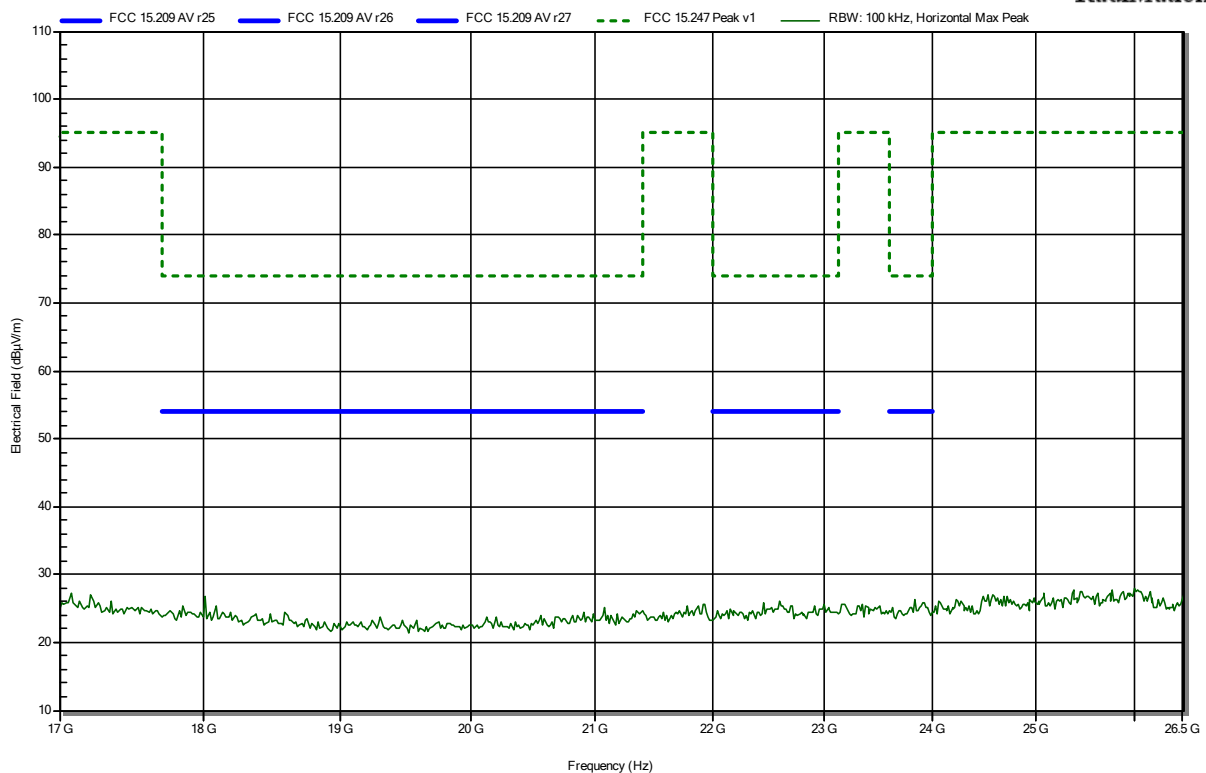


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

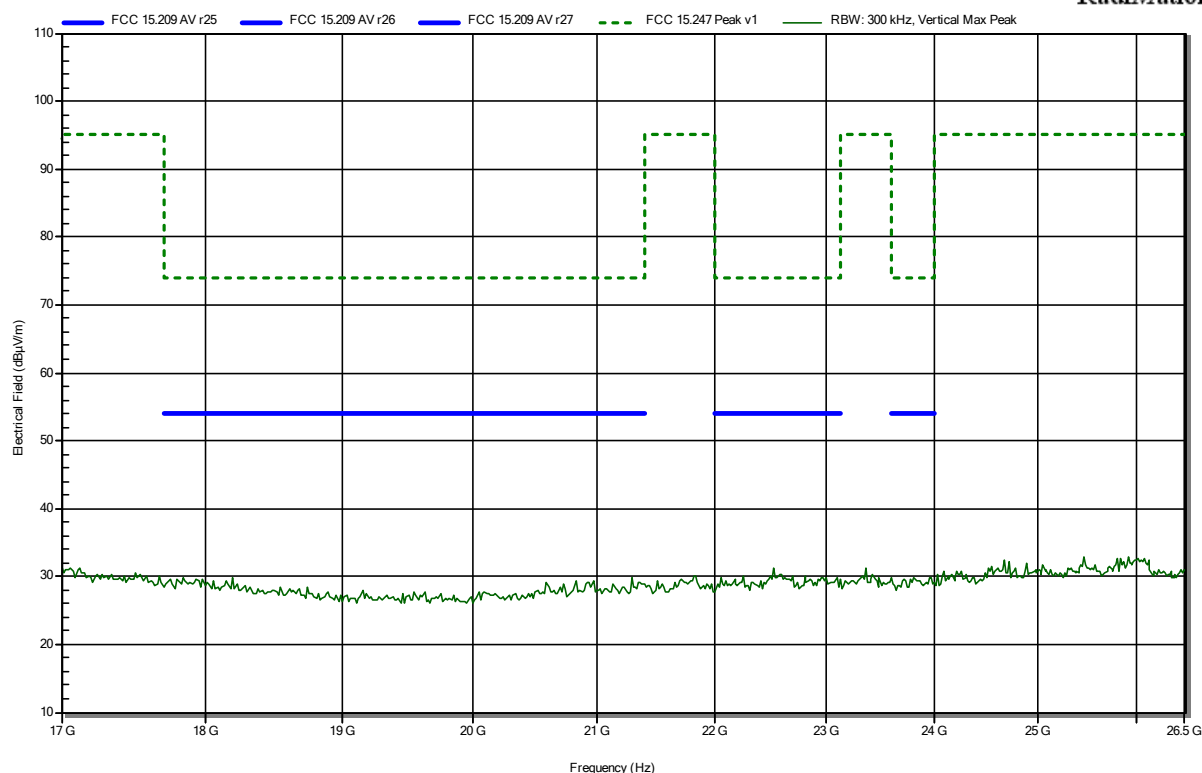


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

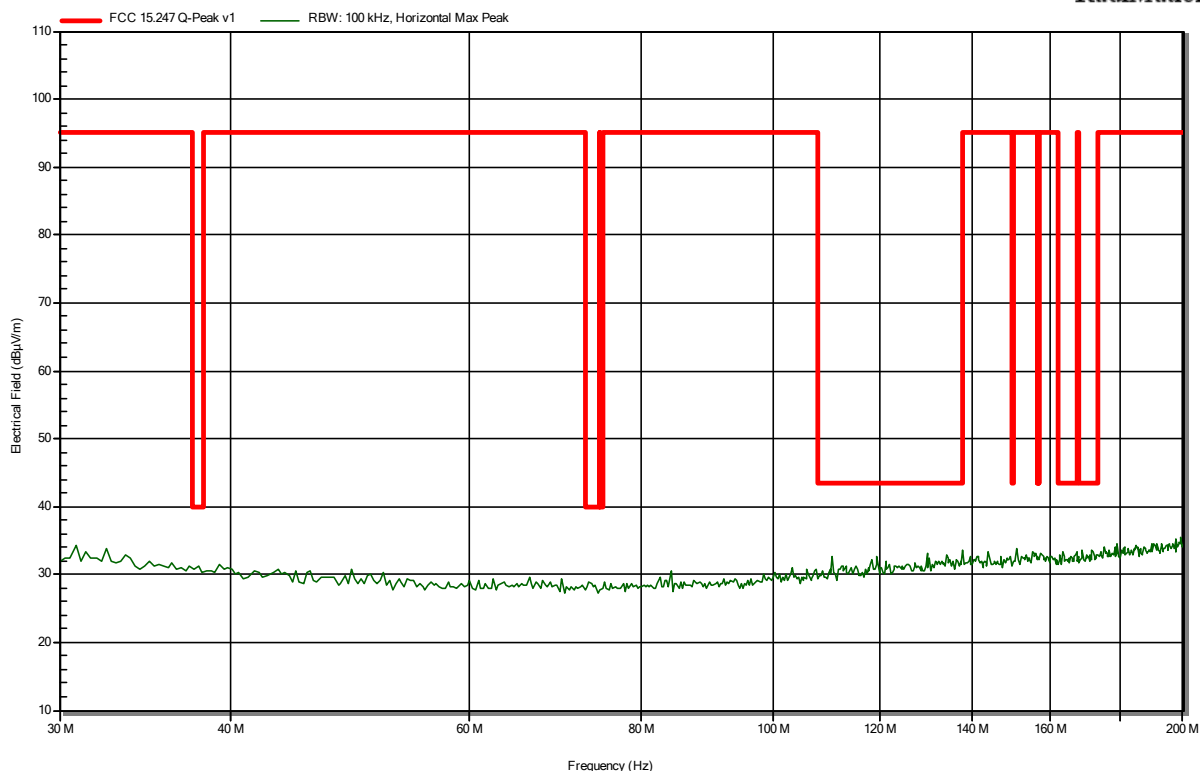


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

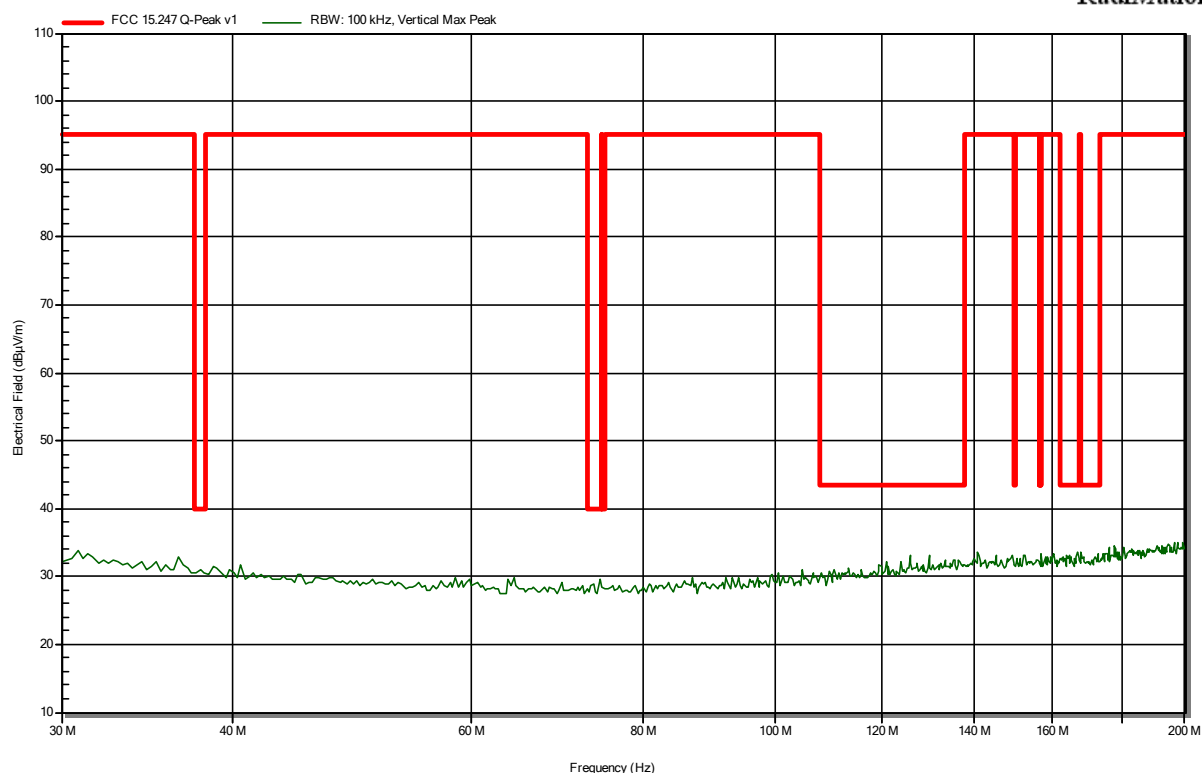


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

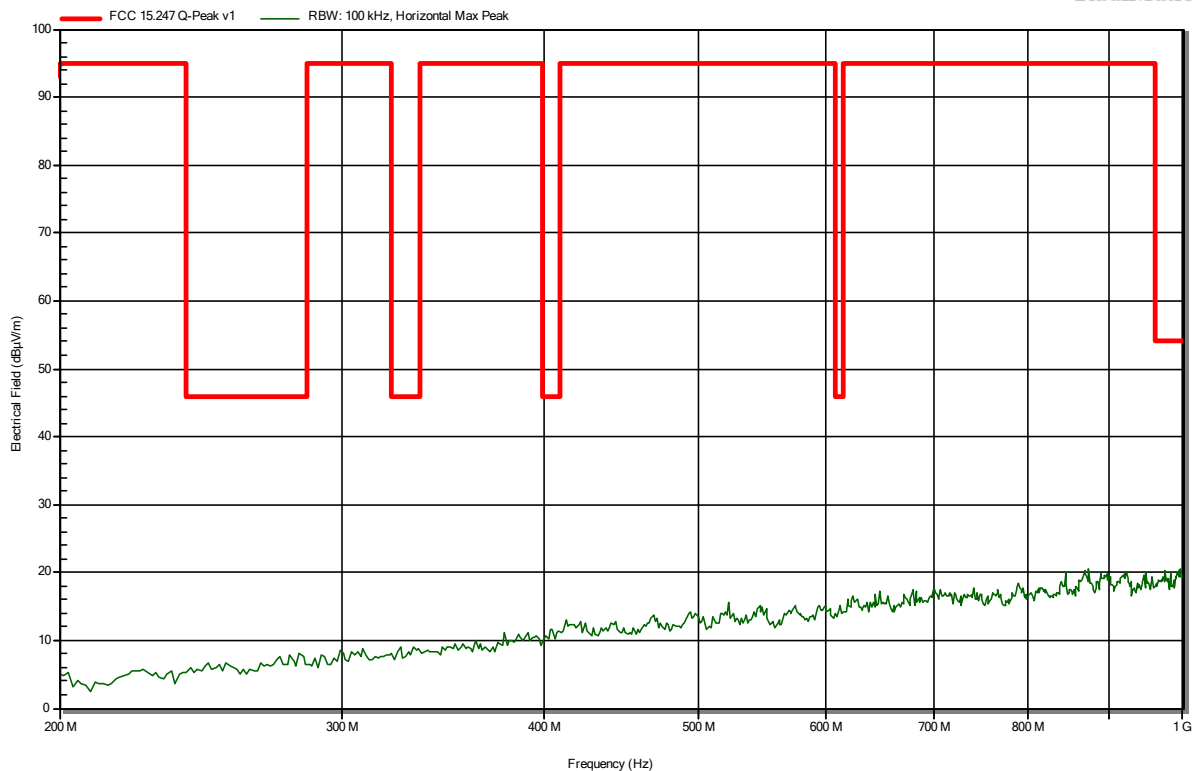


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

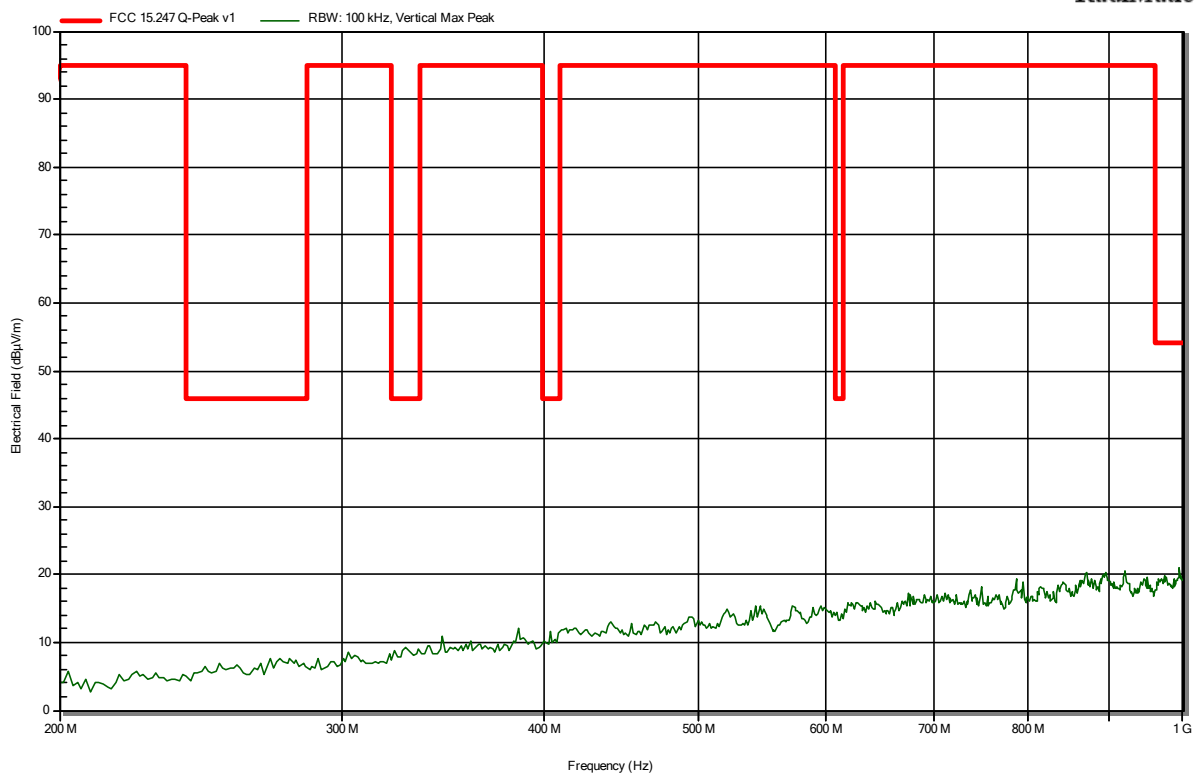


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

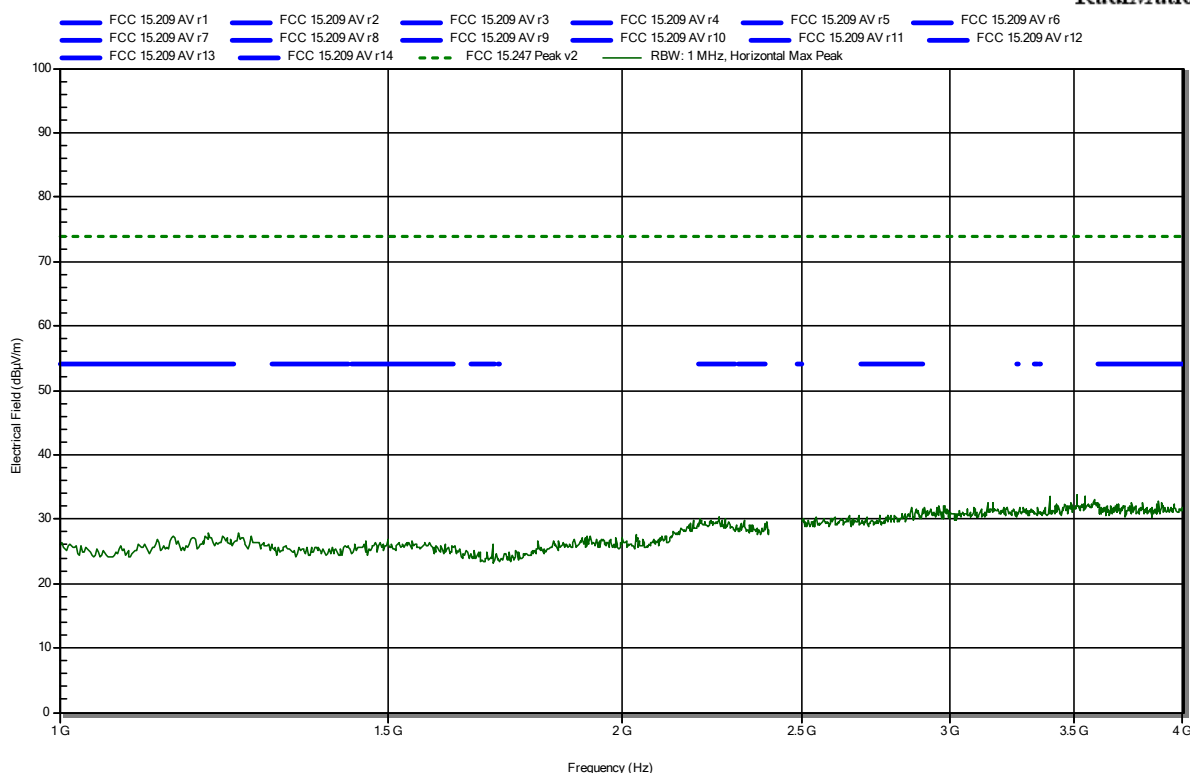


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



Test Report No.: G0M-2012-9529-TFC247BL-V01

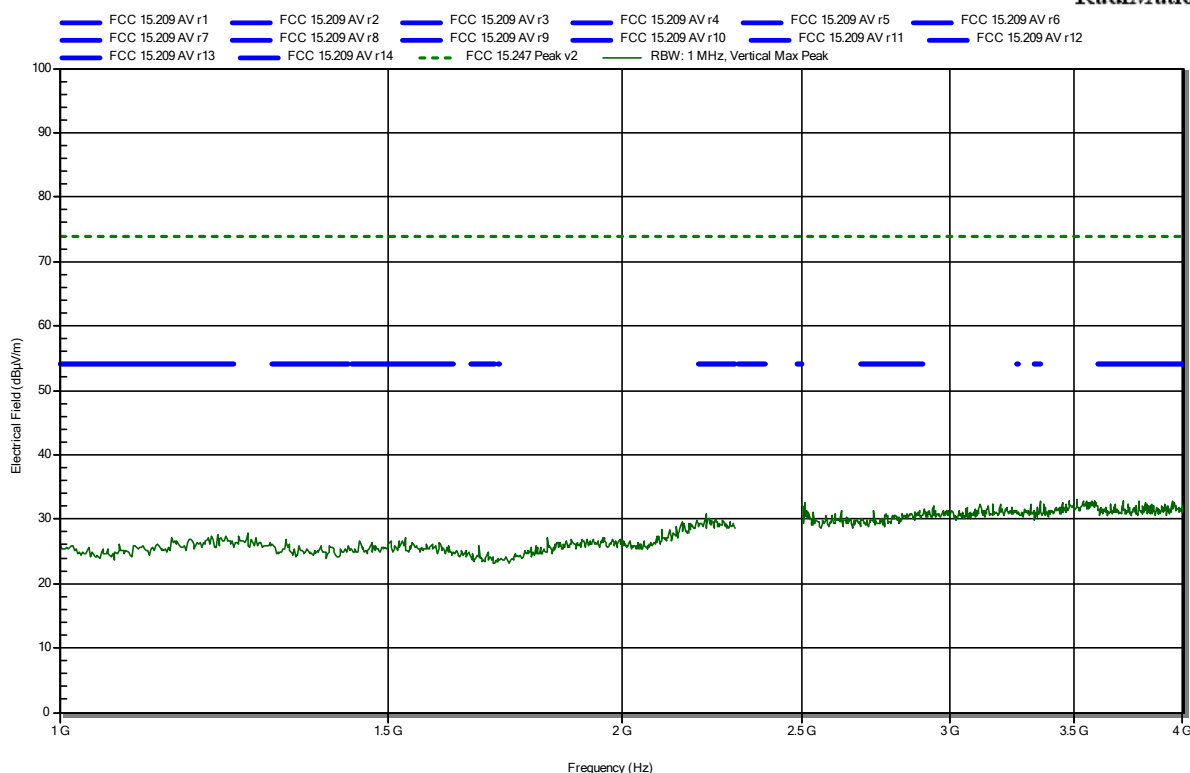
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



Test Report No.: G0M-2012-9529-TFC247BL-V01

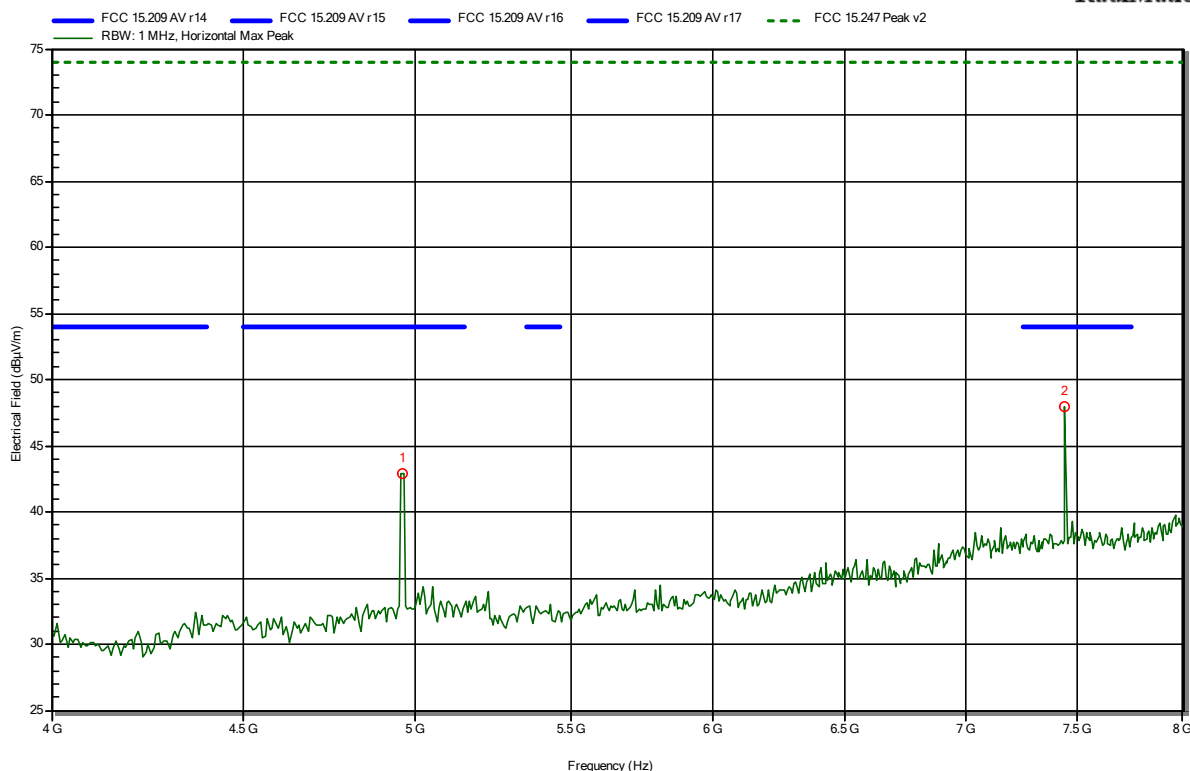
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



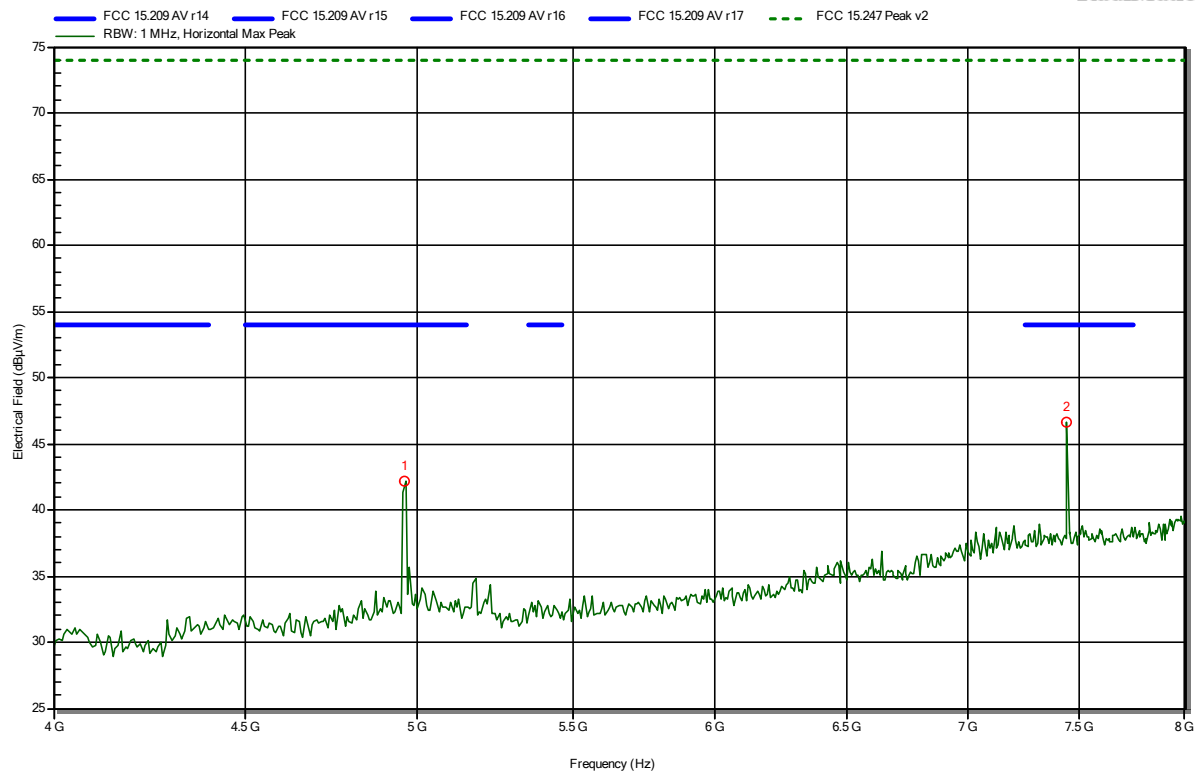
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	42.9 dBμV/m	74 dBμV/m	-31.1 dB	Pass
7.442 GHz	47.9 dBμV/m	74 dBμV/m	-26.1 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal

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RadiMation



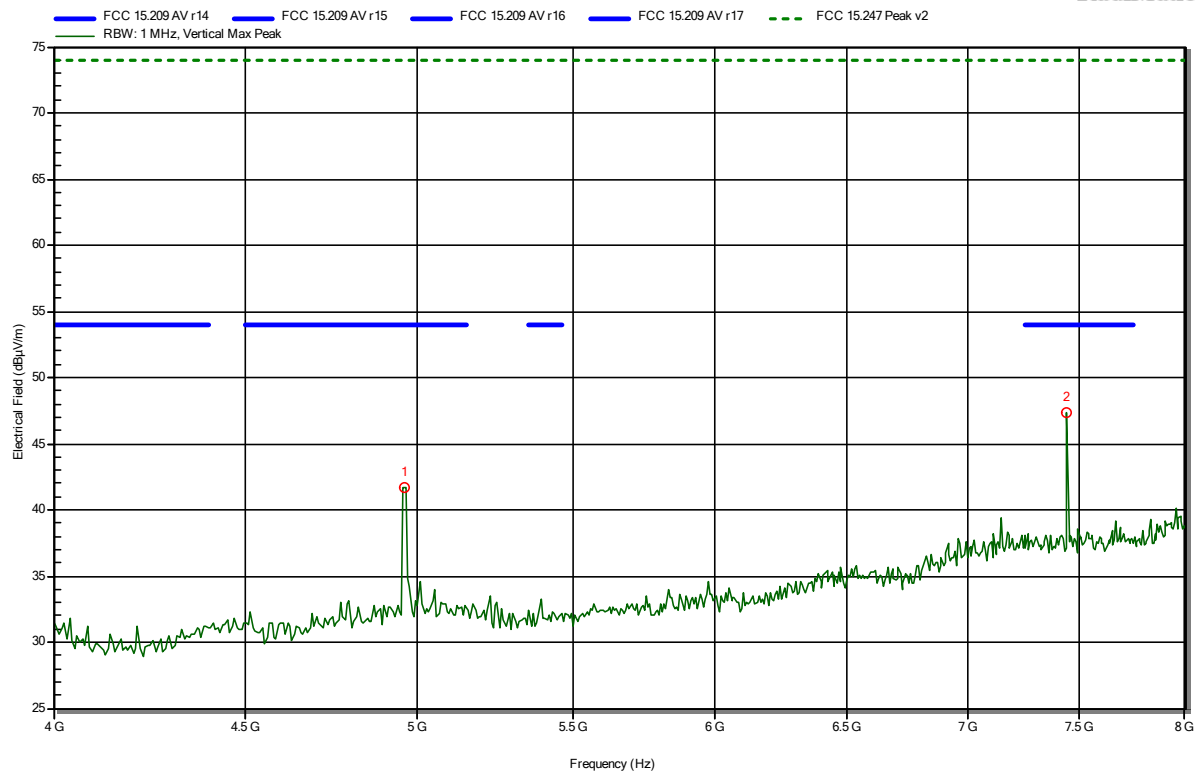
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	42.15 dBμV/m	74 dBμV/m	-31.85 dB	Pass
7.442 GHz	46.6 dBμV/m	74 dBμV/m	-27.4 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation



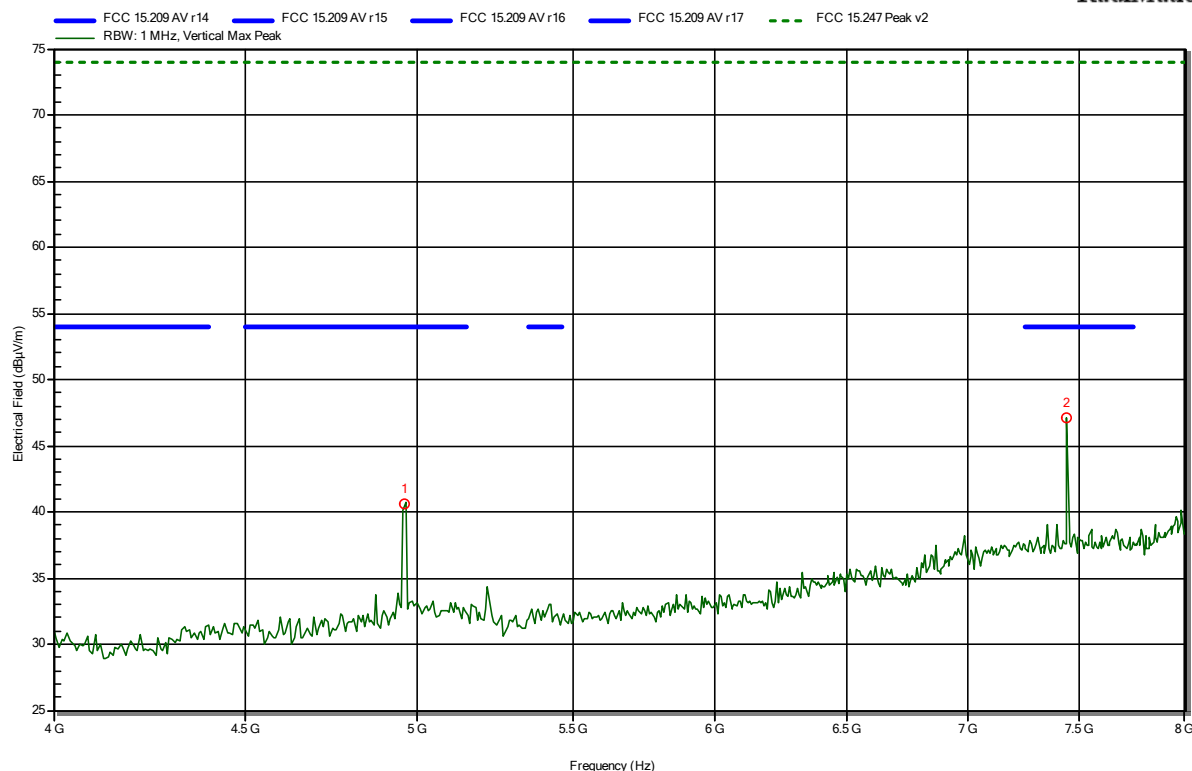
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	41.65 dBµV/m	74 dBµV/m	-32.35 dB	Pass
7.442 GHz	47.41 dBµV/m	74 dBµV/m	-26.59 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT horizontal

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RadiMation



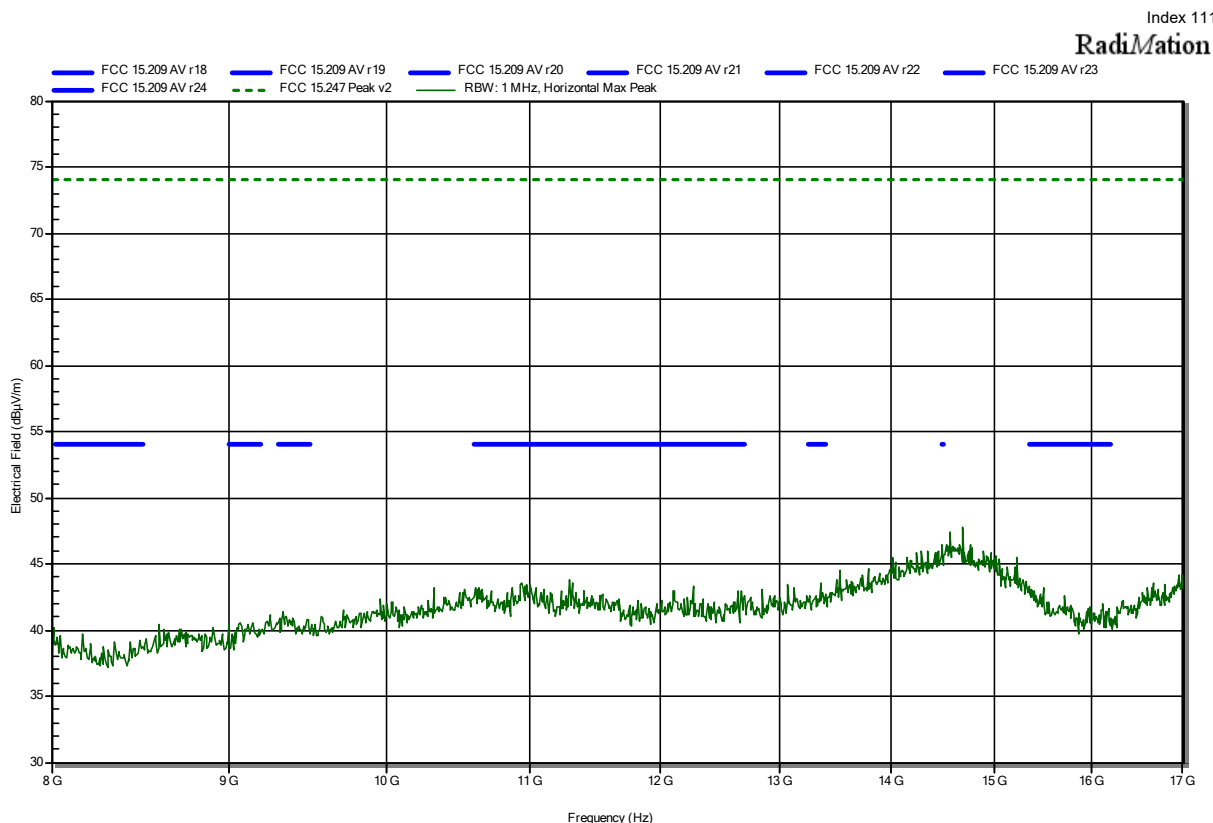
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	40.66 dBμV/m	74 dBμV/m	-33.34 dB	Pass
7.442 GHz	47.13 dBμV/m	74 dBμV/m	-26.87 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

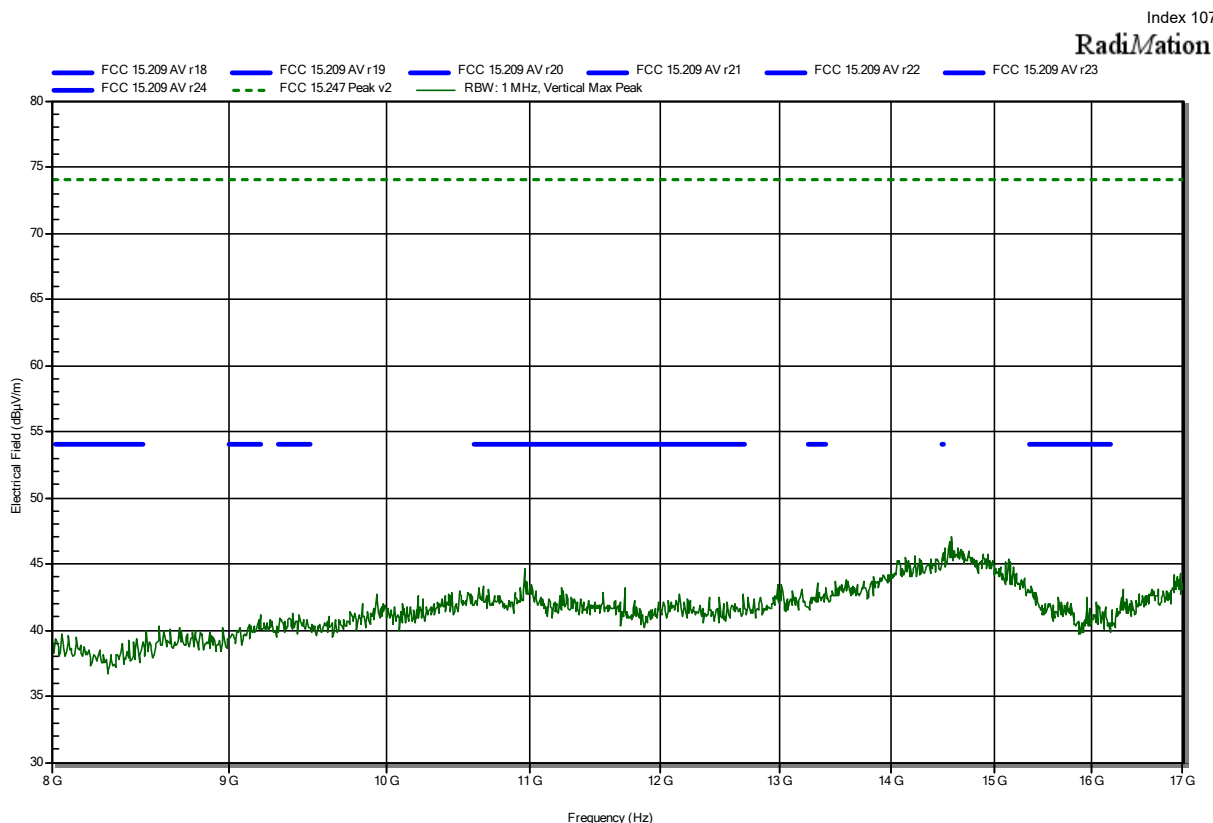
Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

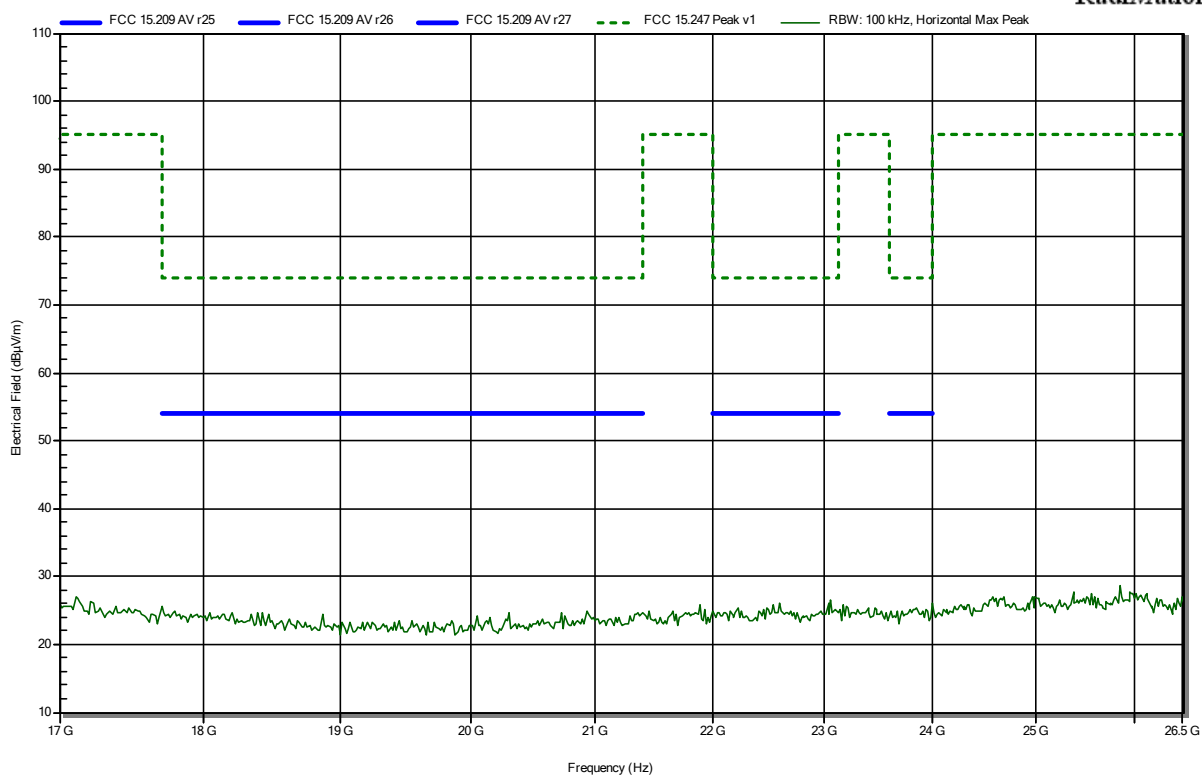


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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RadiMation

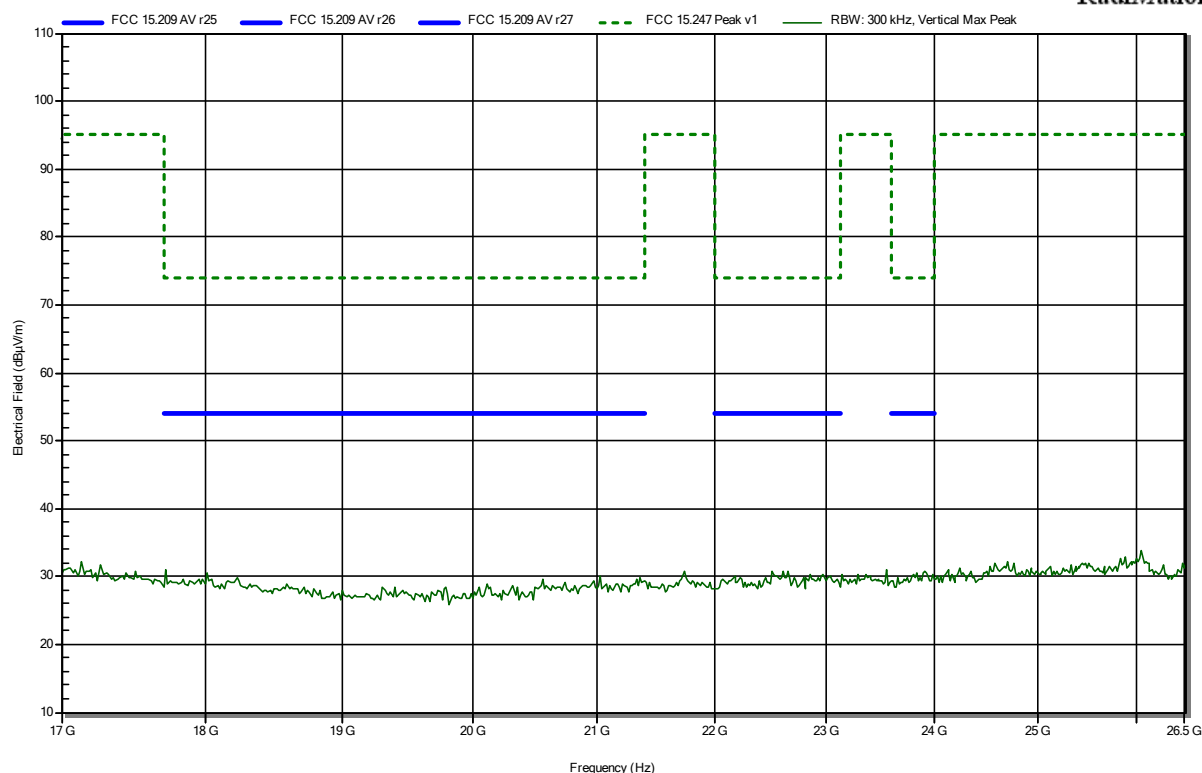


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-20
 Note: EUT vertical

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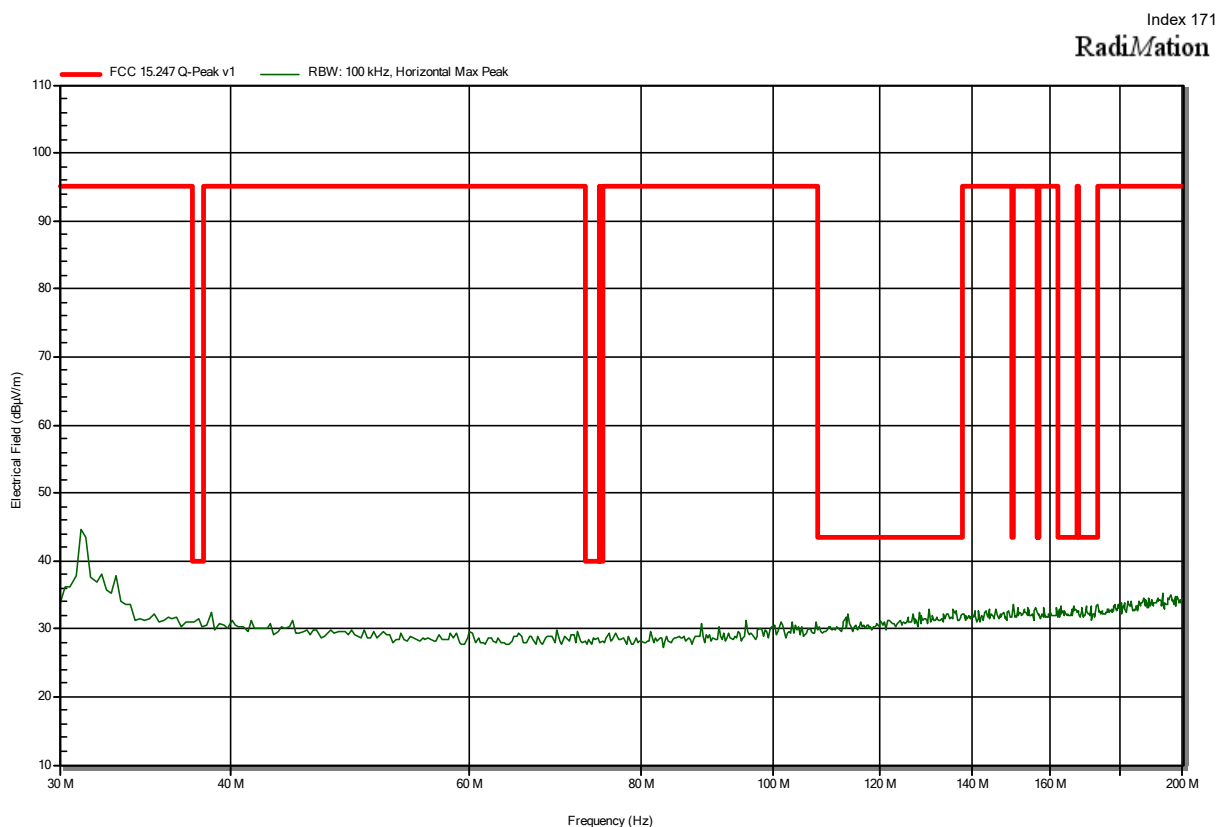
RadiMation



ANNEX B Transmitter spurious emissions with external antenna

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

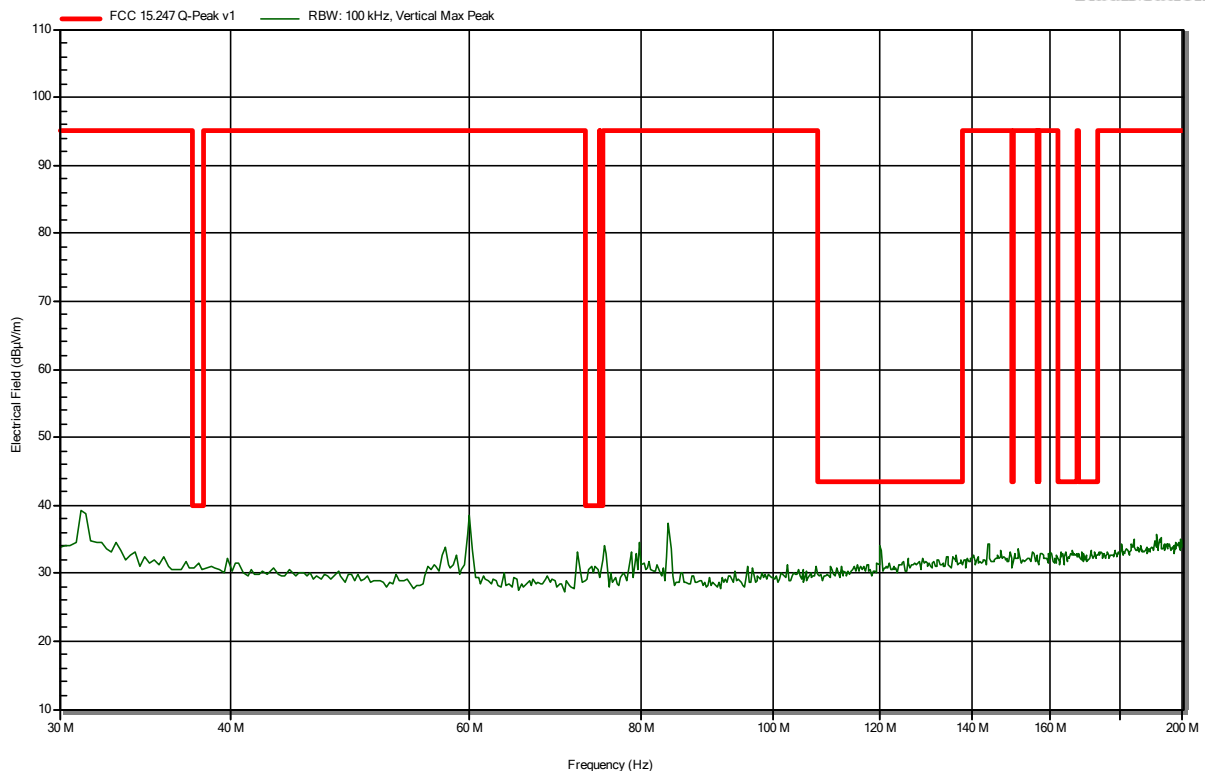


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

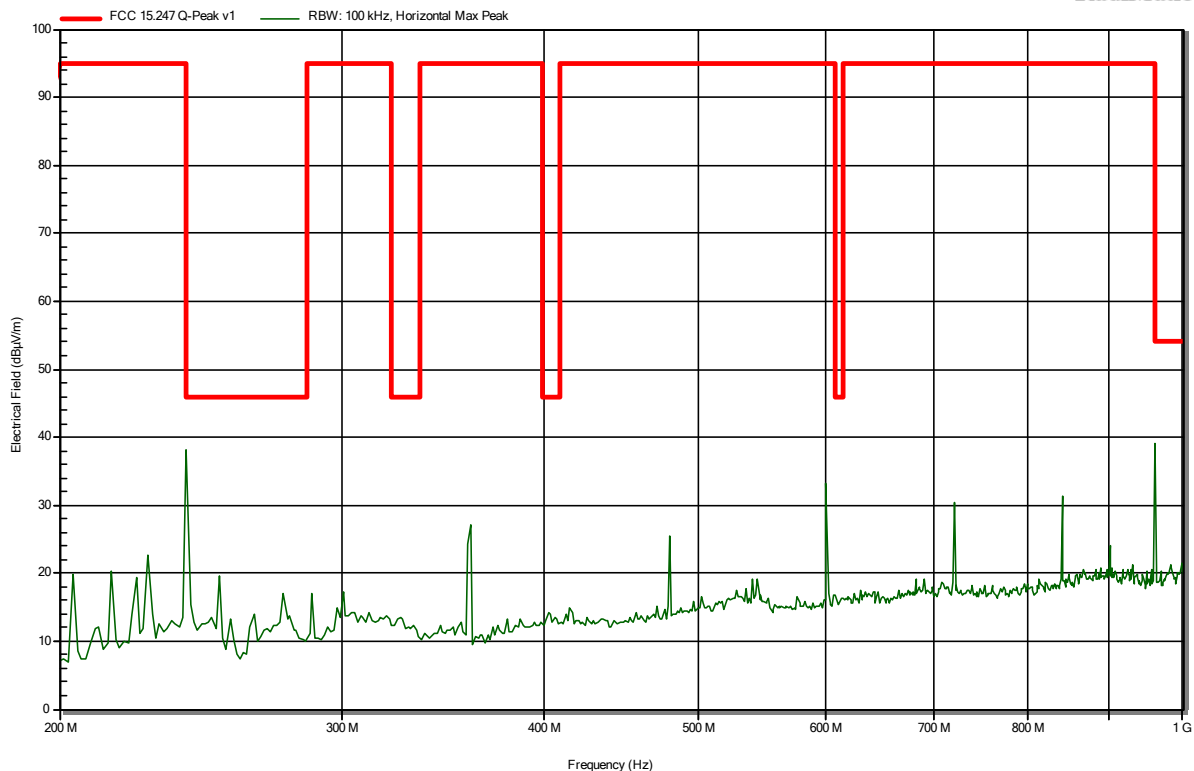


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

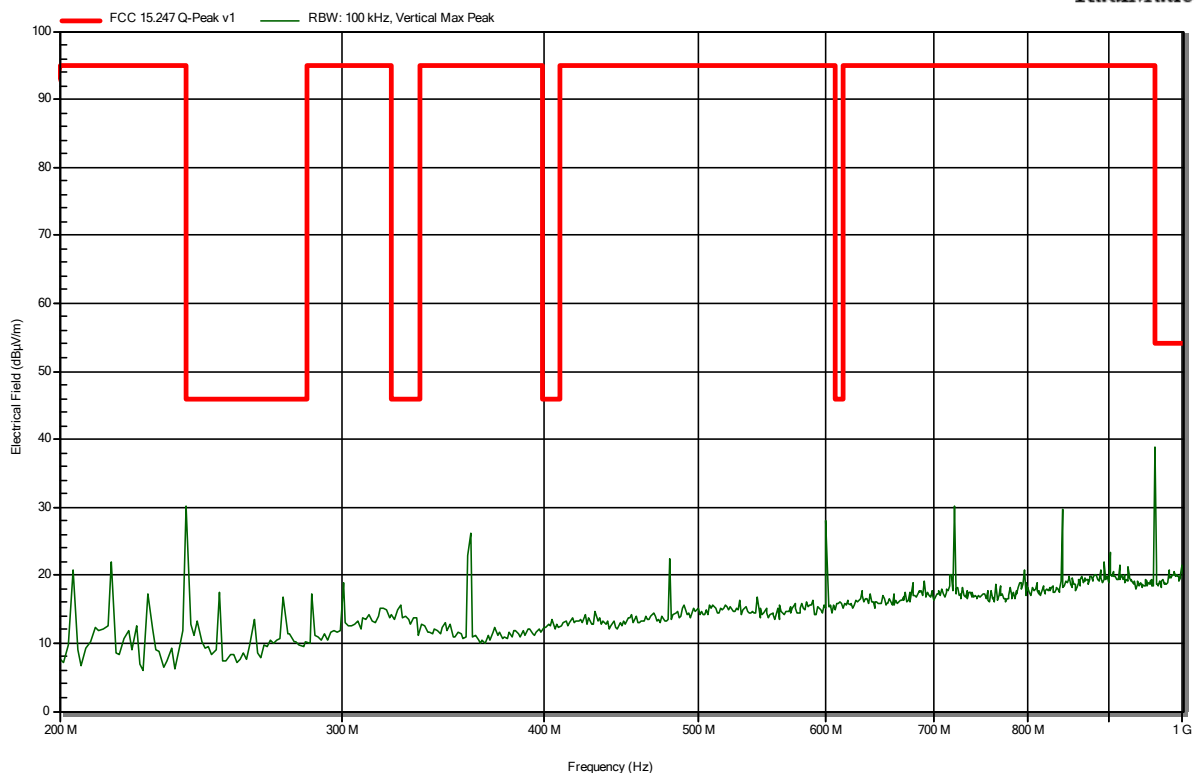


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

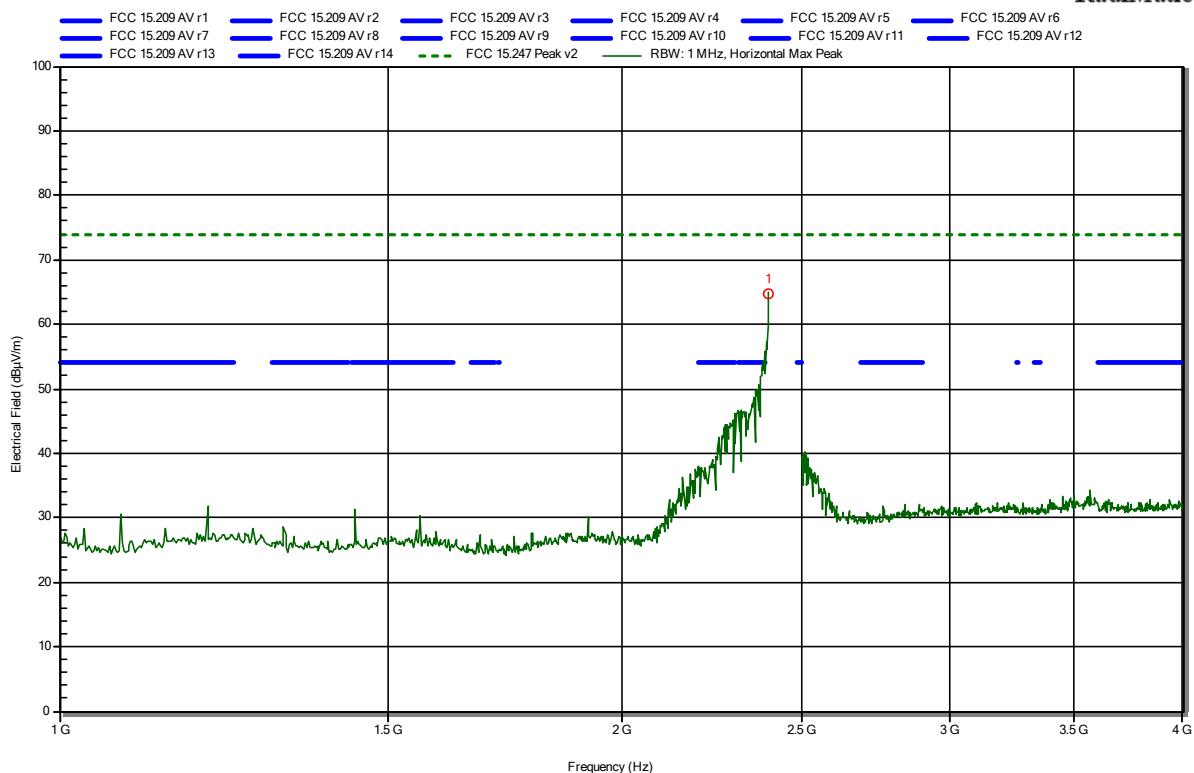


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



Frequency 2.398 GHz	Peak 64.79 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -9.21 dB	Peak Status Pass
Frequency 2.398 GHz	Average 46.34 dBµV/m	Average Limit 54 dBµV/m	Peak Difference -7.66 dB	Peak Status Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

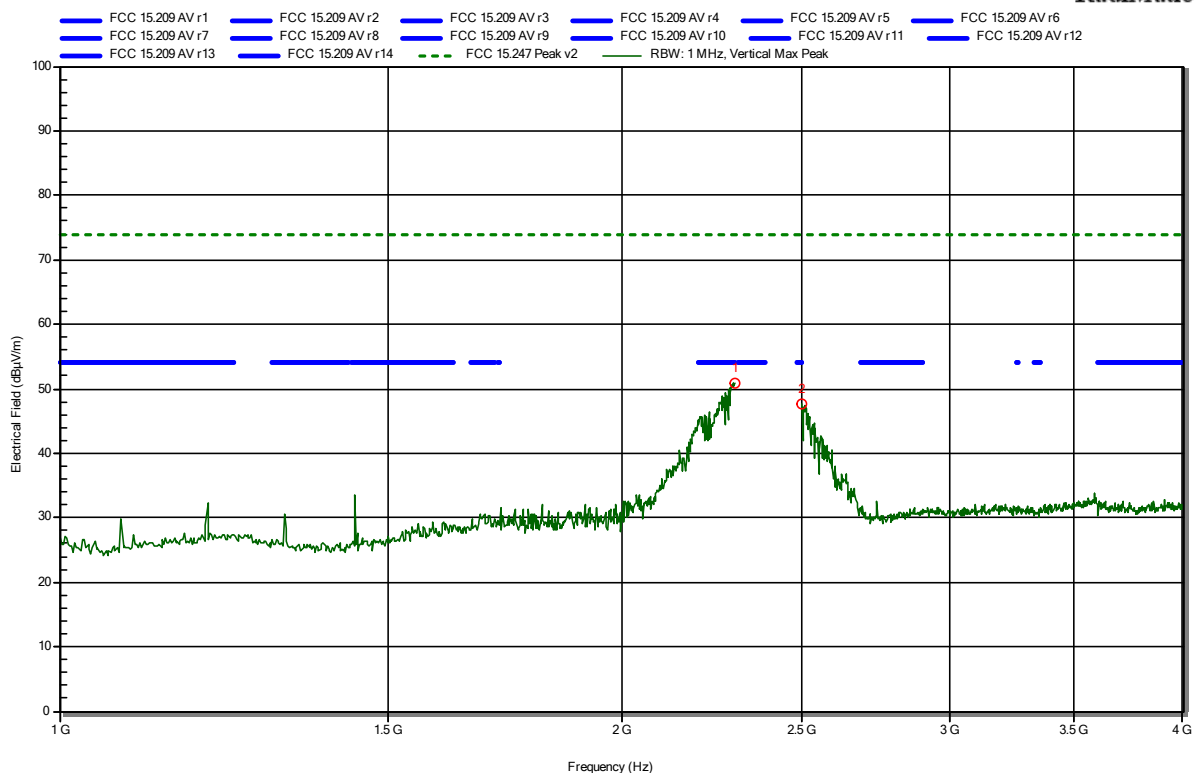
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



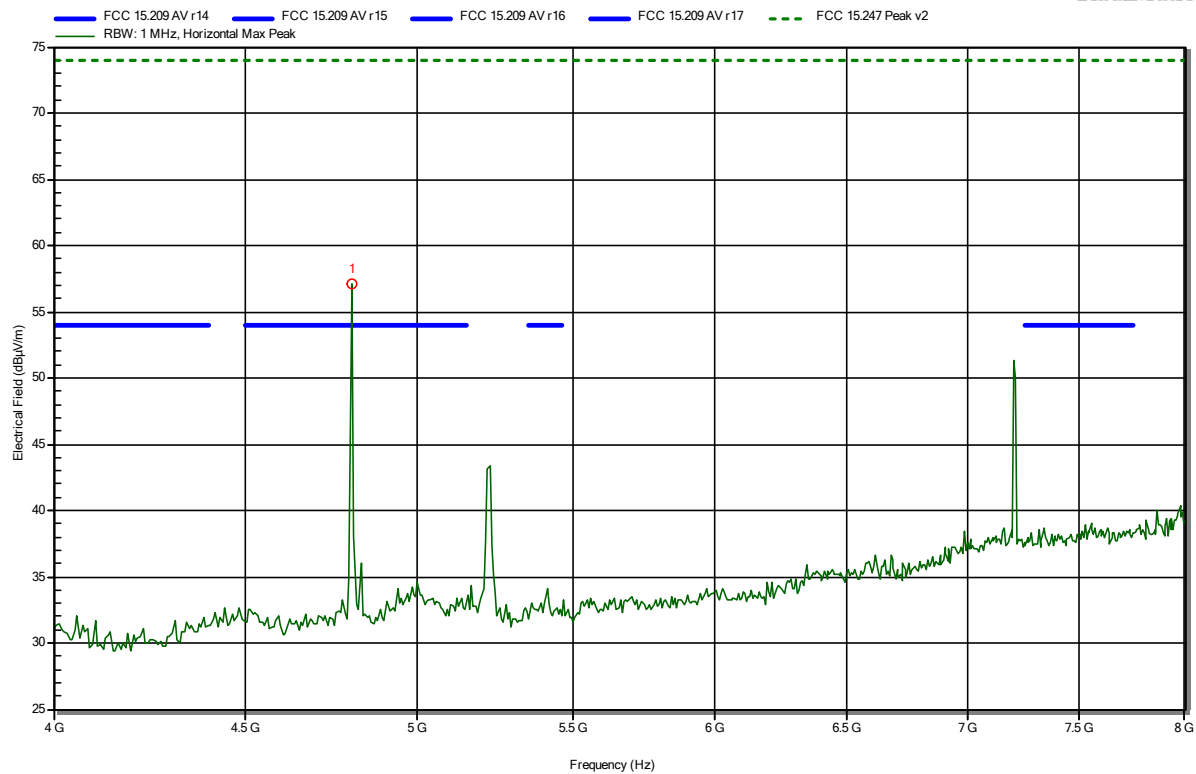
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3 GHz	50.82 dBµV/m	74 dBµV/m	-23.18 dB	Pass
2.5 GHz	47.72 dBµV/m	74 dBµV/m	-26.28 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



Frequency 4.801 GHz	Peak 57.07 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -16.93 dB	Peak Status Pass
Frequency 4.801 GHz	Average 51.99 dBμV/m	Average Limit 54 dBμV/m	Peak Difference -2.01dB	Peak Status Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

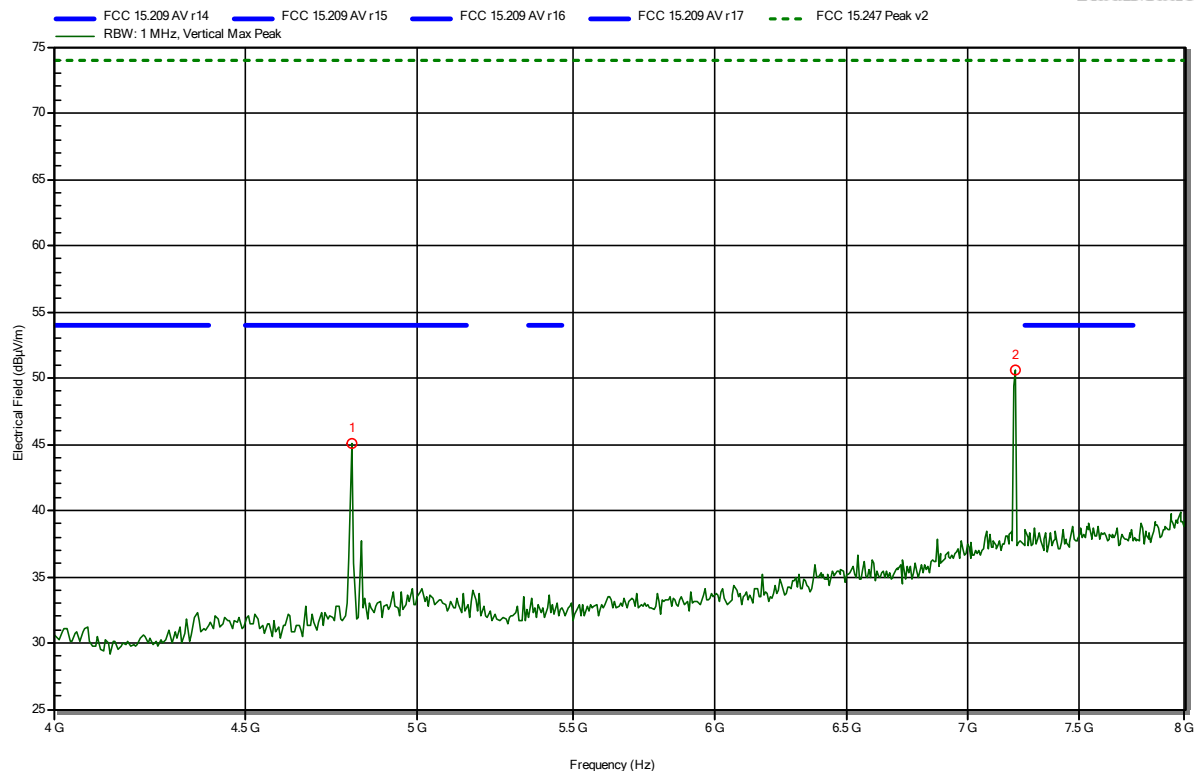
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



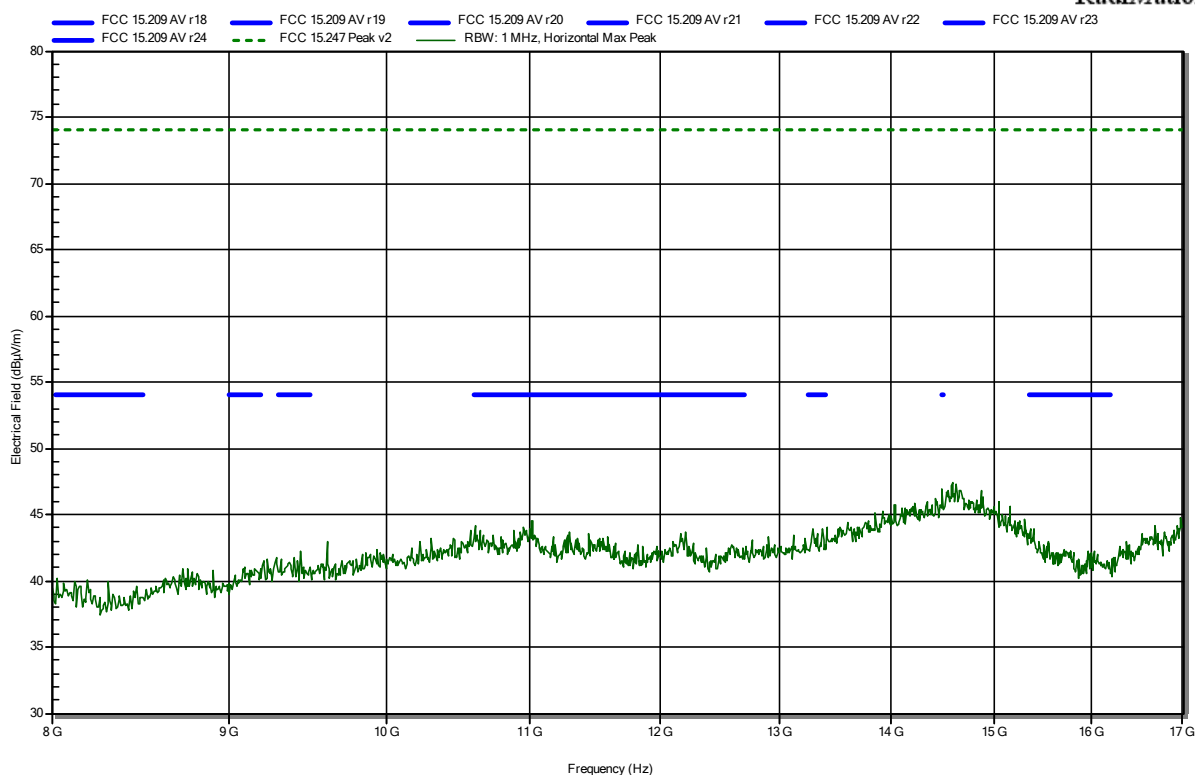
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	45.11 dBμV/m	74 dBμV/m	-28.89 dB	Pass
7.212 GHz	50.59 dBμV/m	74 dBμV/m	-23.41 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

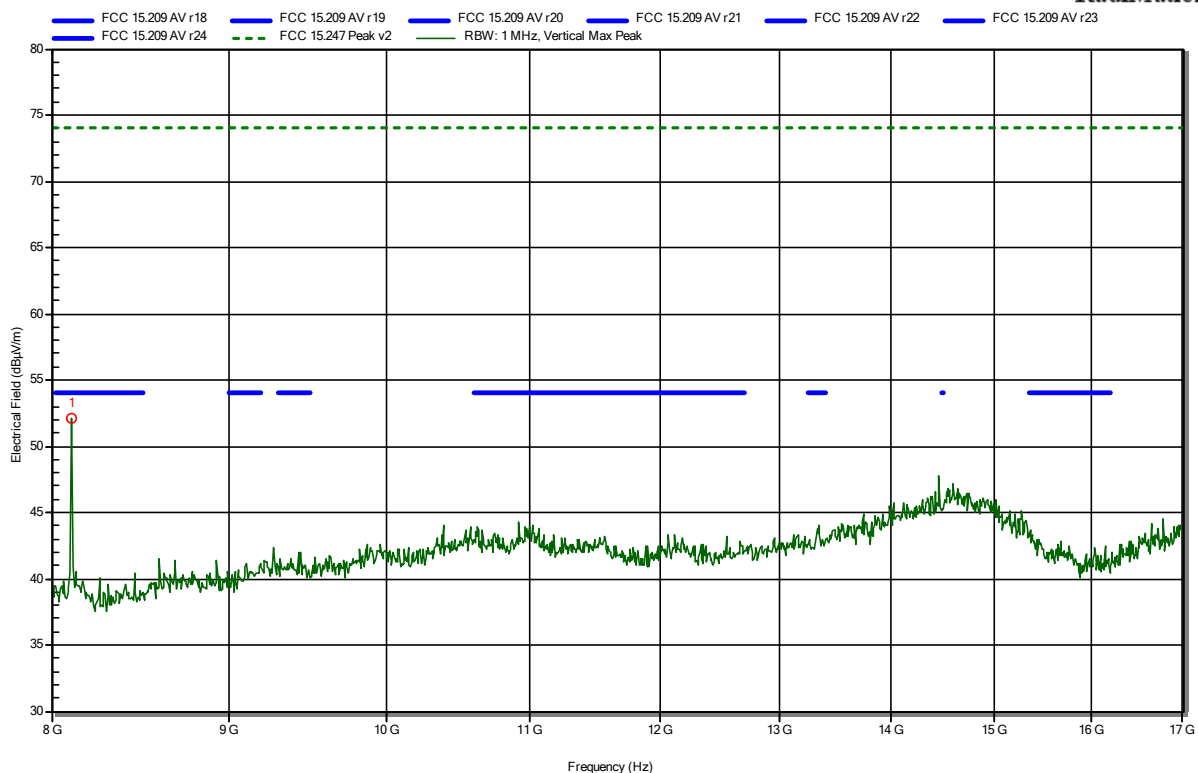


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



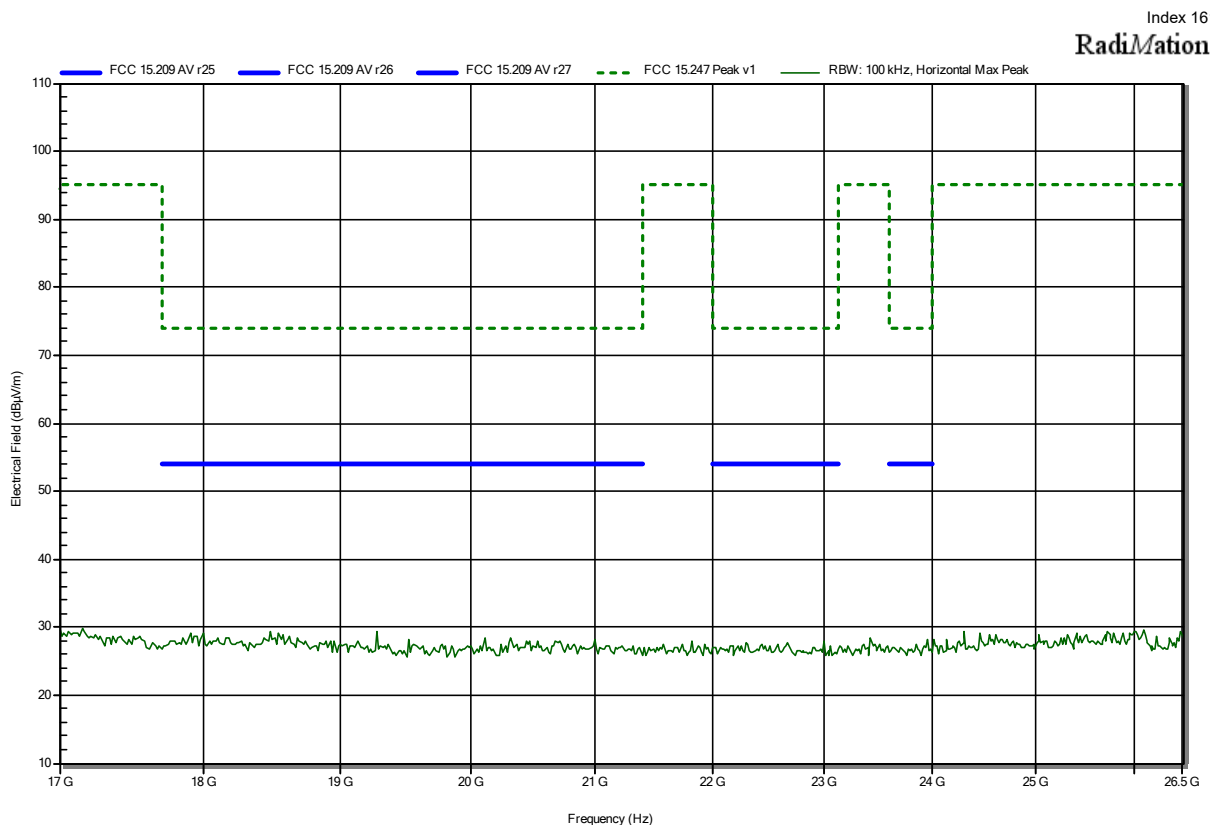
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
8.109 GHz	52.1 dBμV/m	74 dBμV/m	-21.9 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

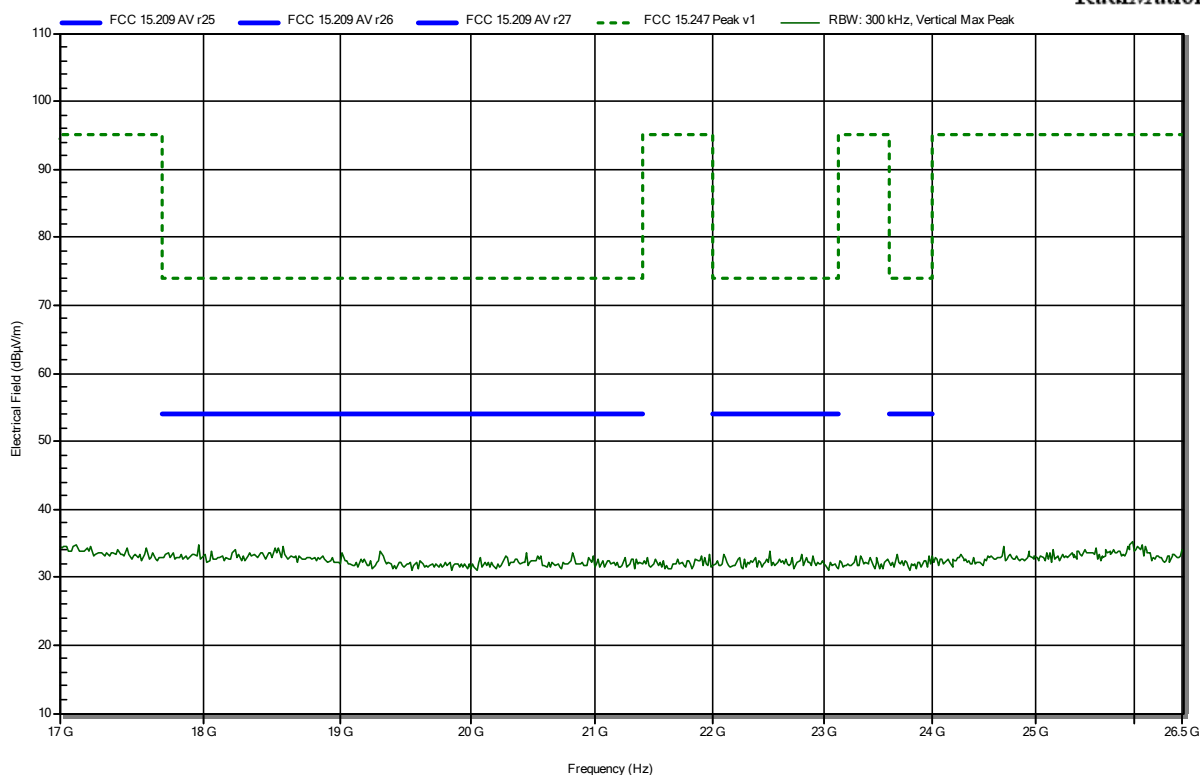


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 0, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

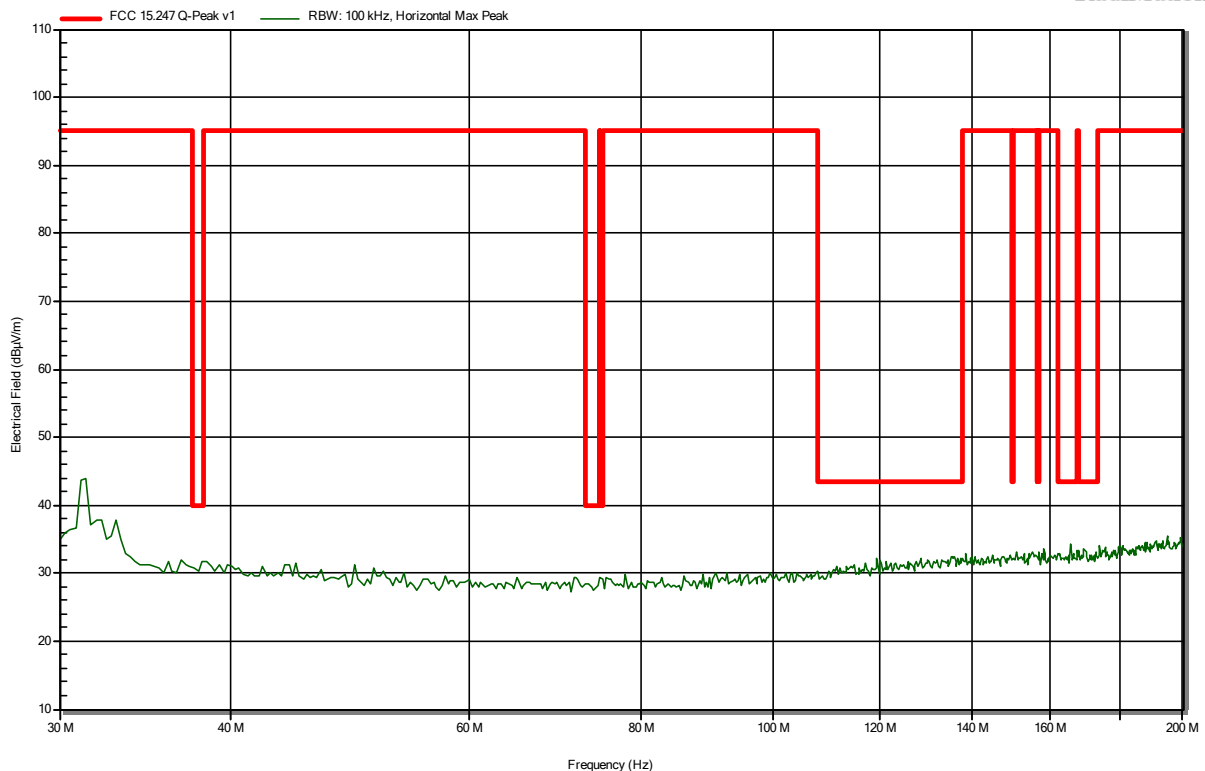


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

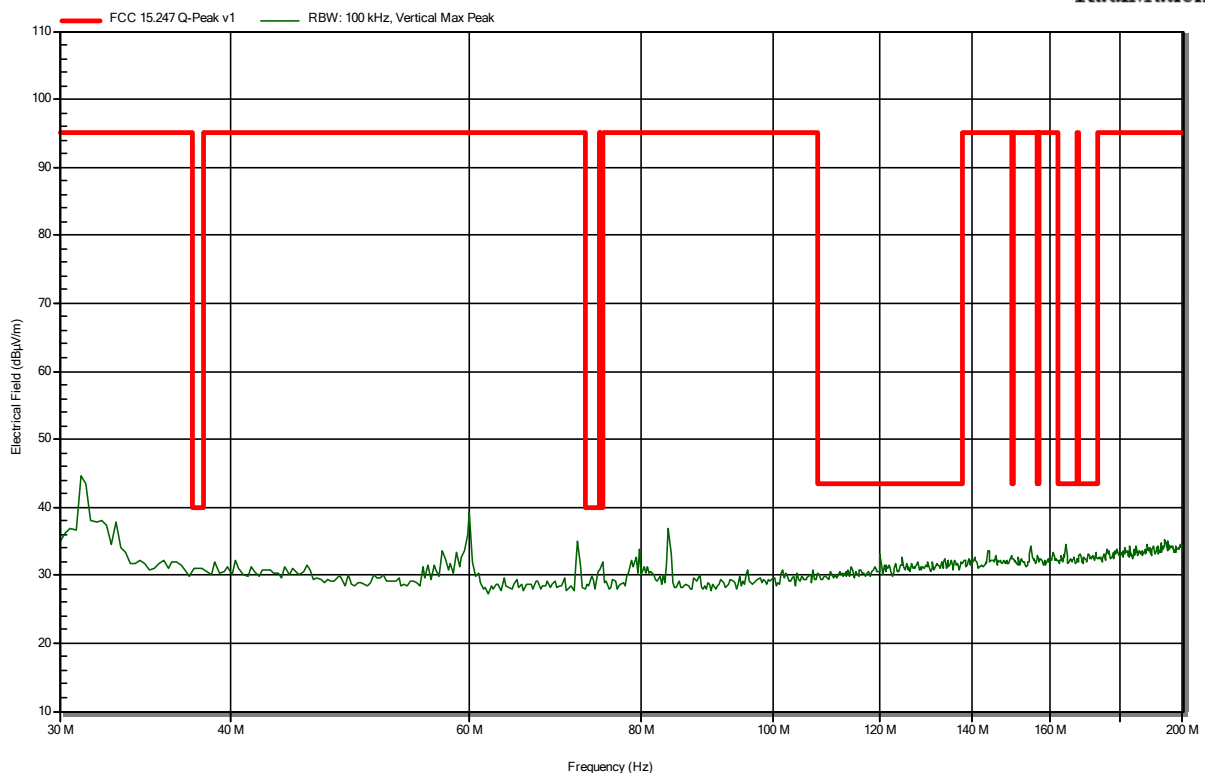


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

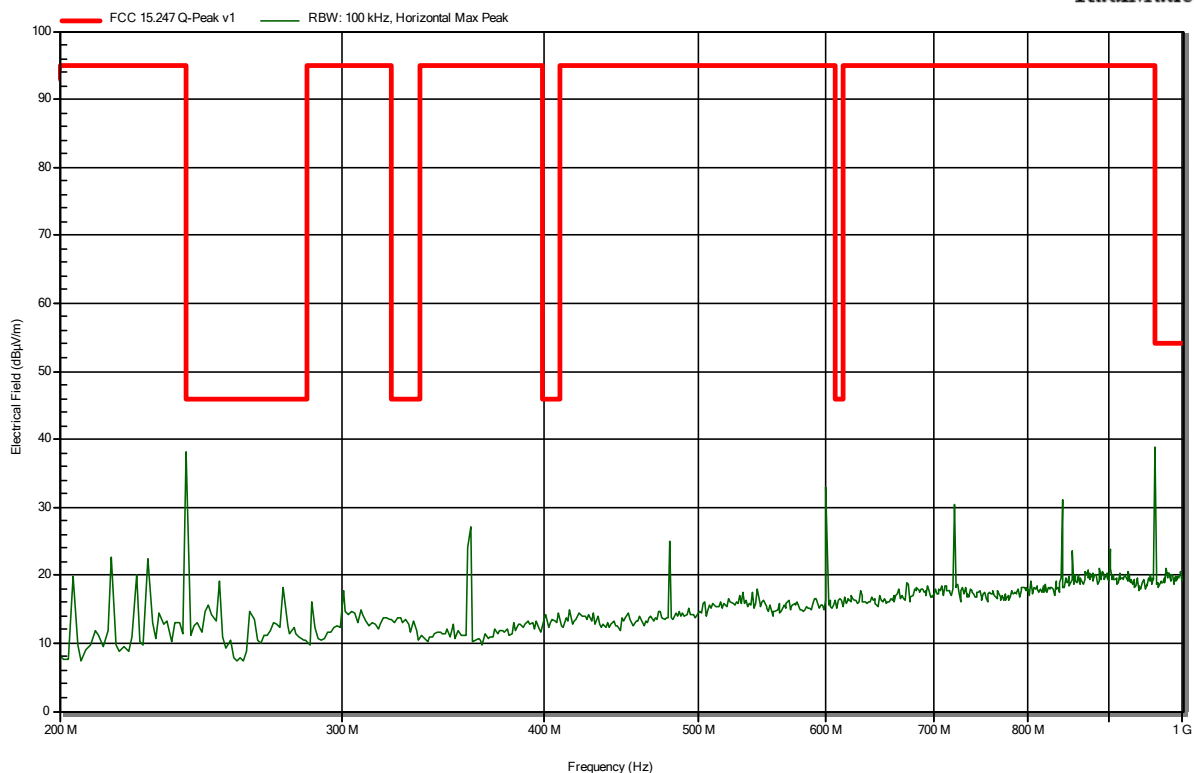


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

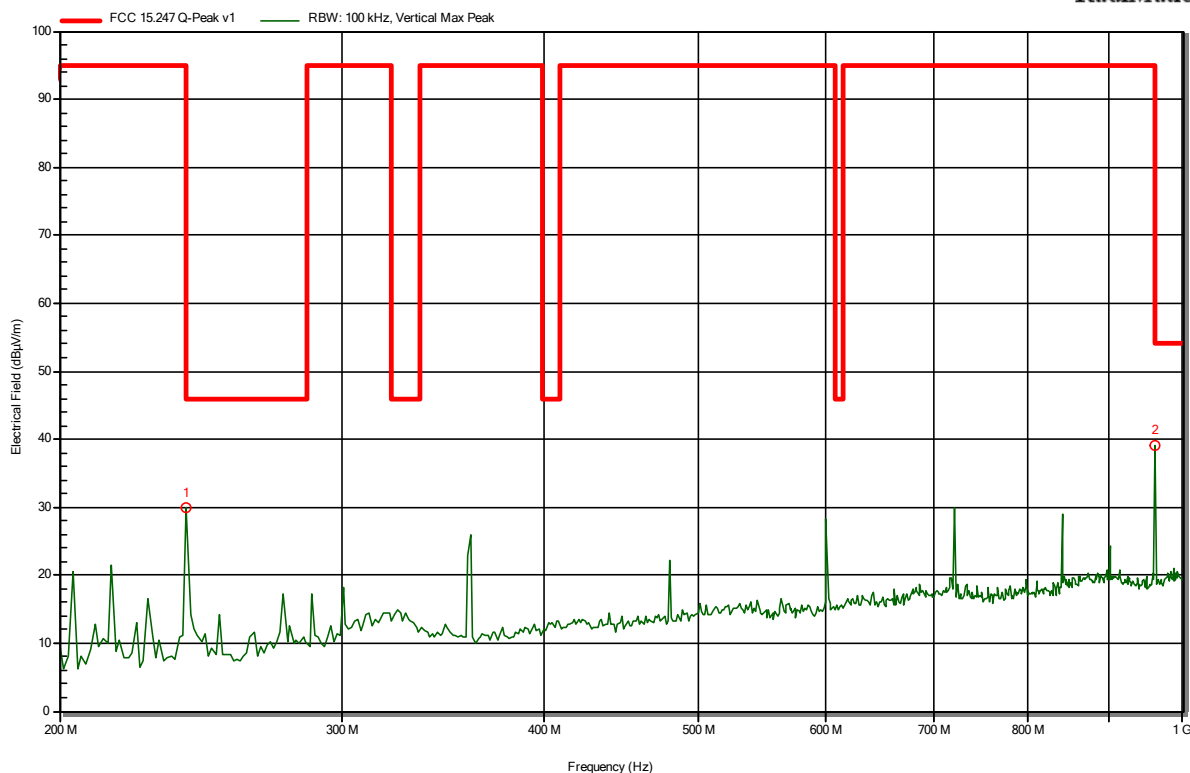


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation



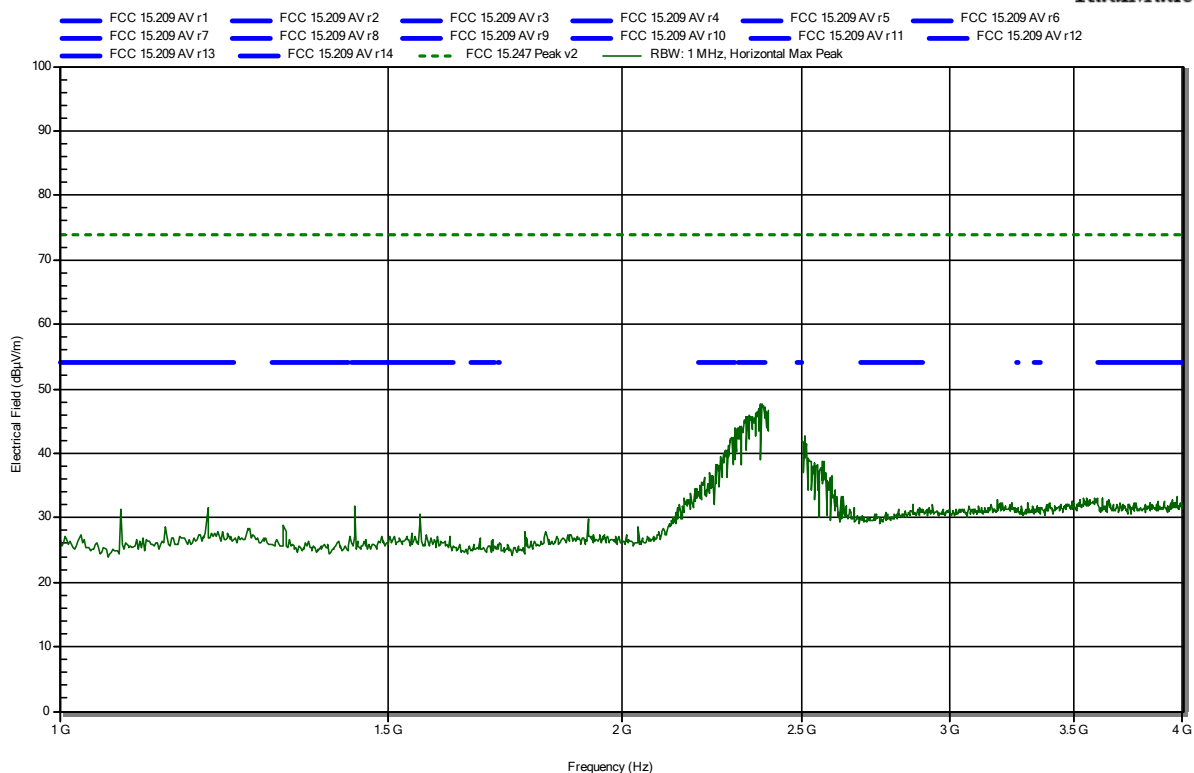
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
239.744 MHz	29.93 dBμV/m	95 dBμV/m	-65.07 dB	Pass
960.256 MHz	39.03 dBμV/m	54 dBμV/m	-14.97 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

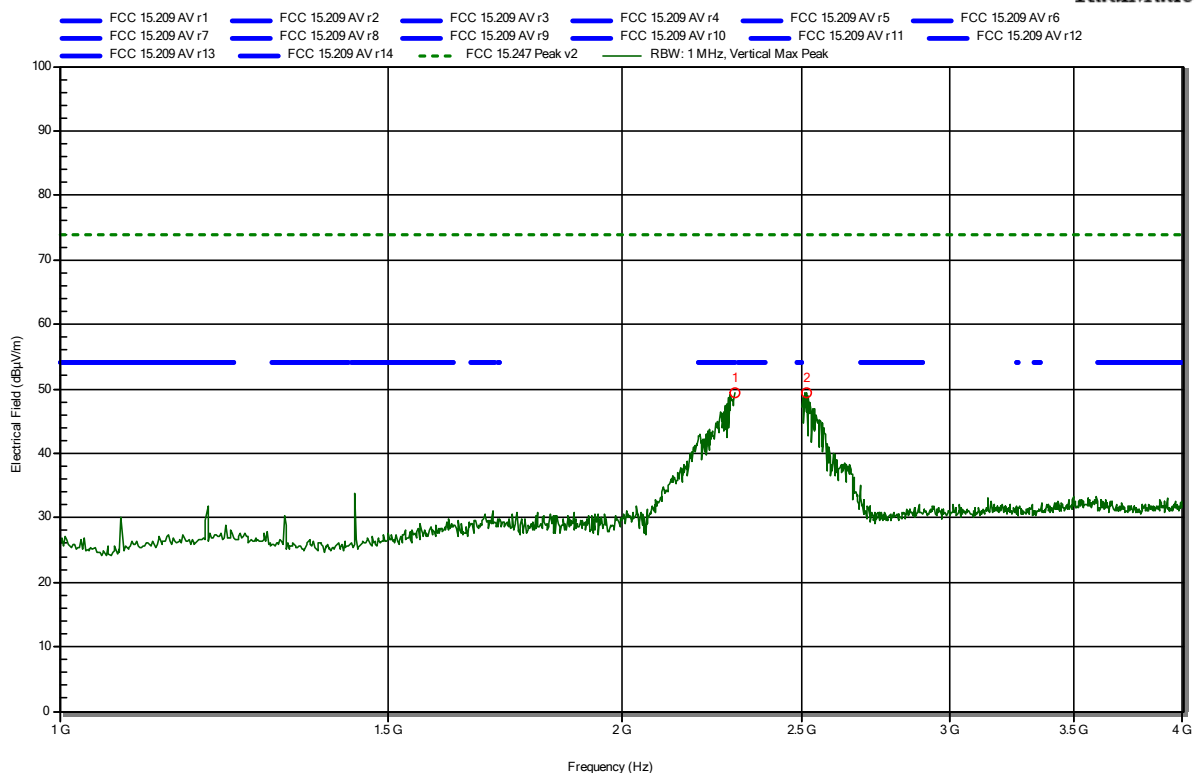


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



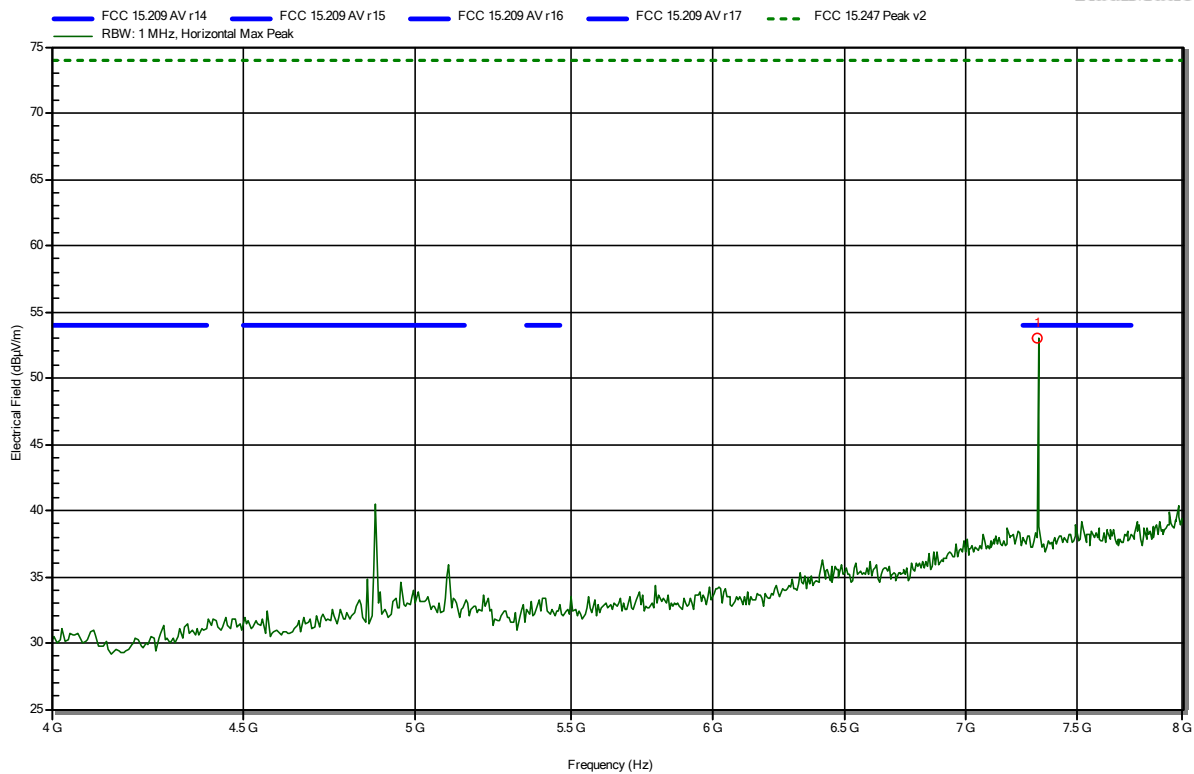
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3 GHz	49.37 dBμV/m	74 dBμV/m	-24.63 dB	Pass
2.514 GHz	49.49 dBμV/m	74 dBμV/m	-24.51 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



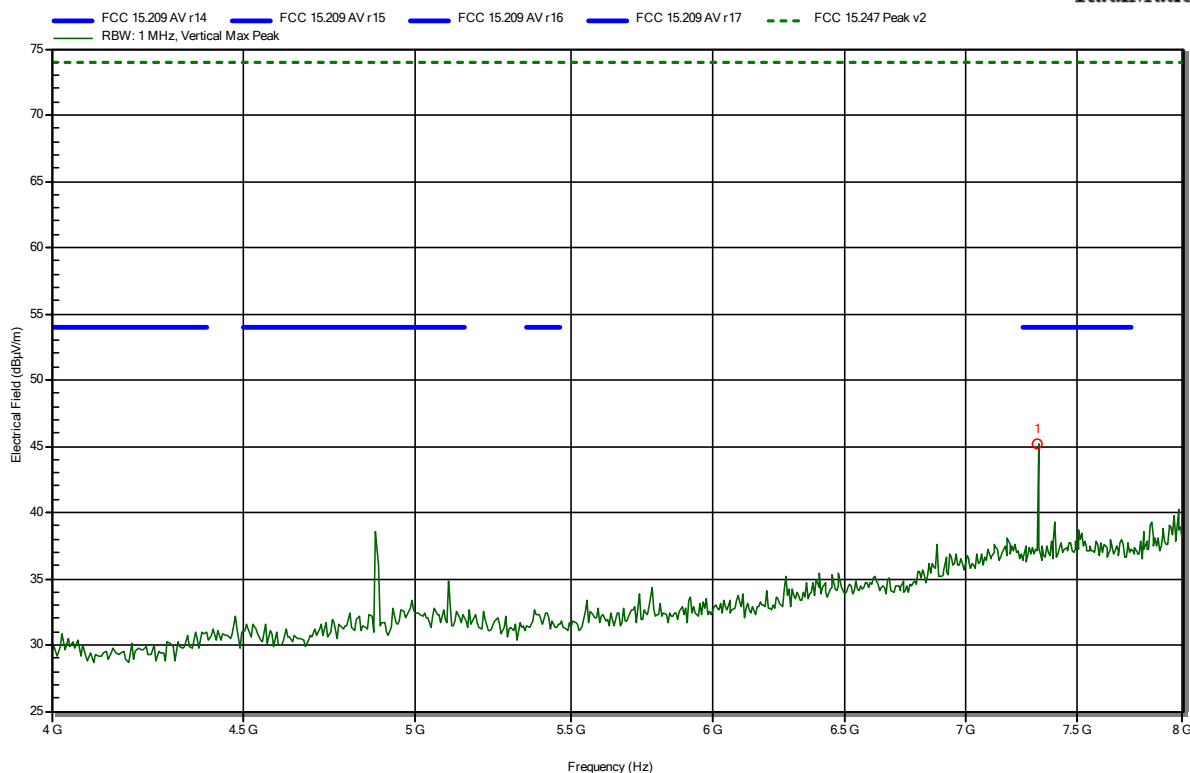
Frequency 7.321 GHz	Peak 53.04 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -20.96 dB	Peak Status Pass
Frequency 7.321 GHz	Average 48.76 dBμV/m	Average Limit 54 dBμV/m	Peak Difference -5.24 dB	Peak Status Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



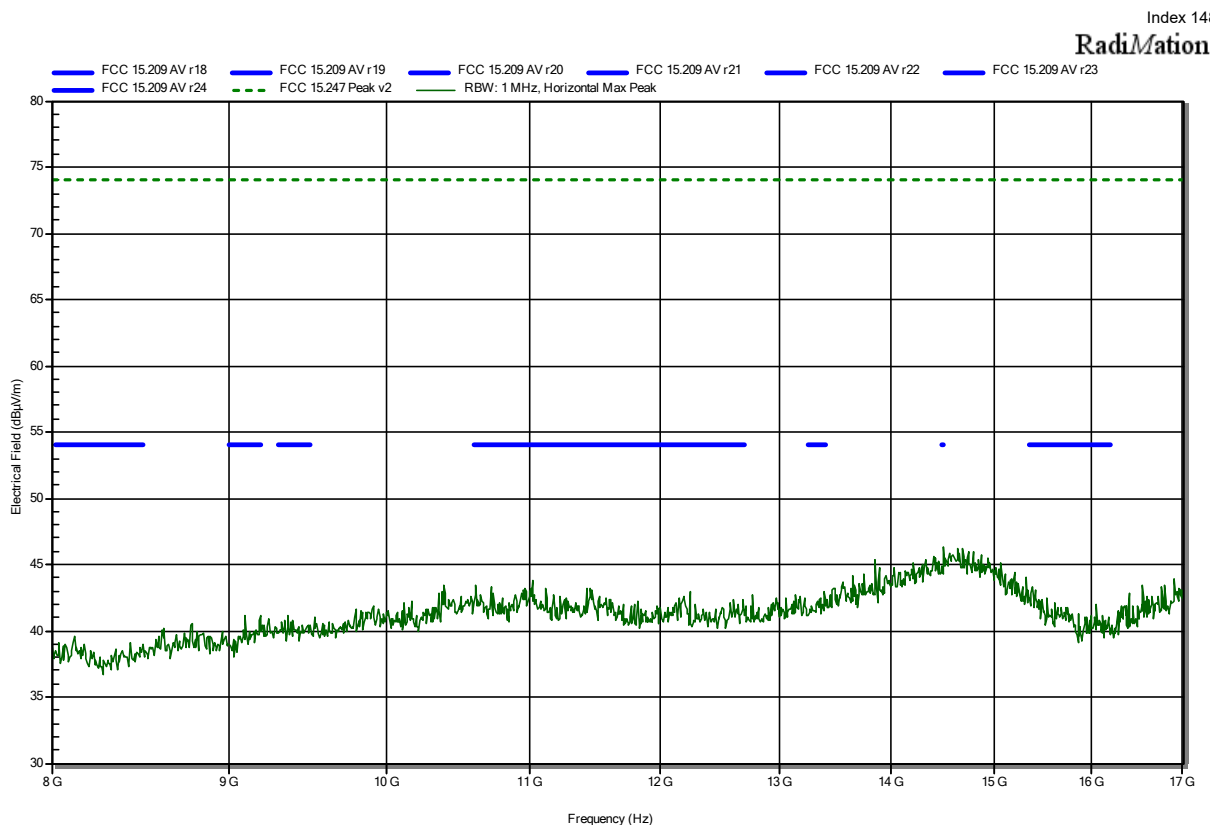
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.321 GHz	45.2 dBμV/m	74 dBμV/m	-28.8 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

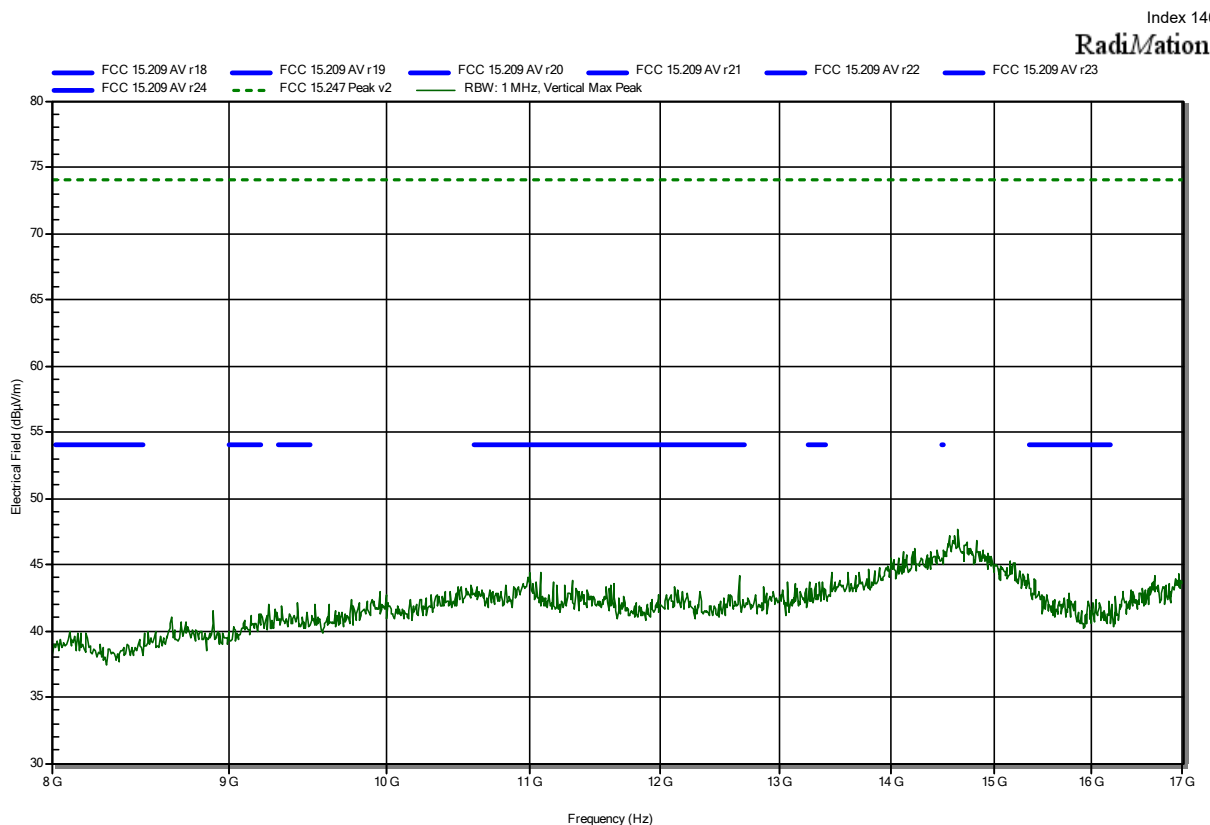
Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

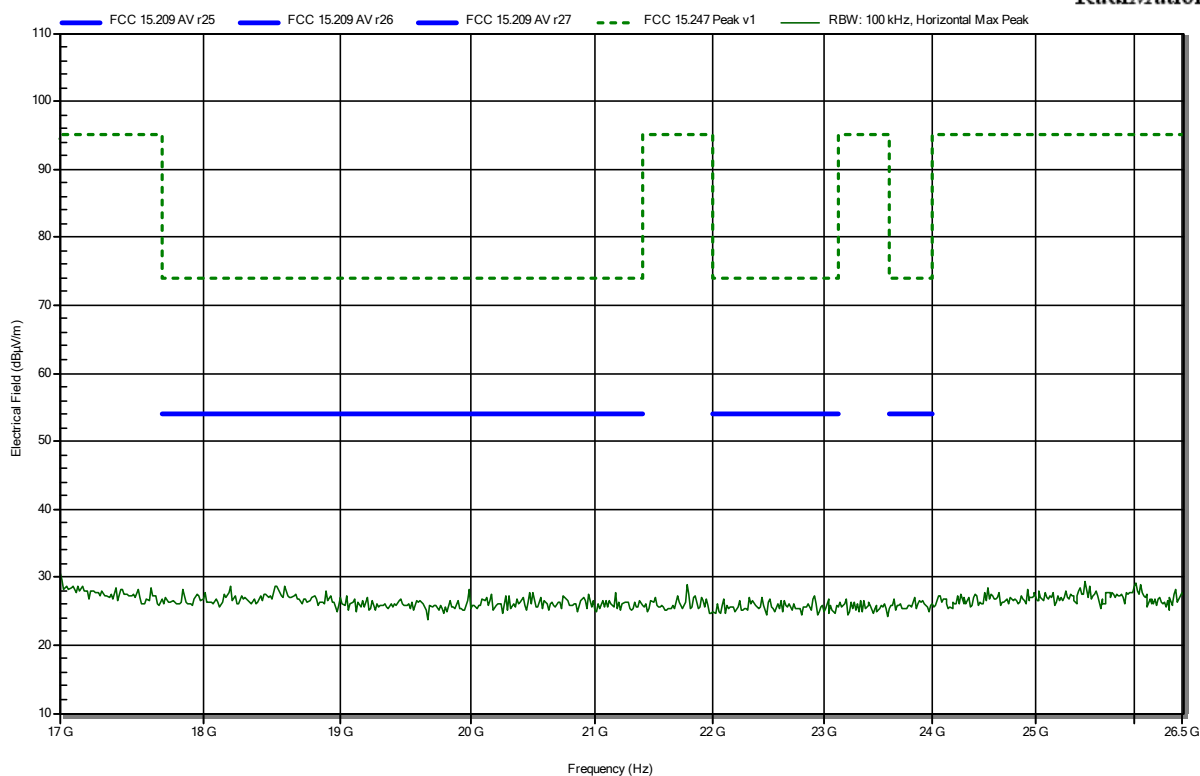


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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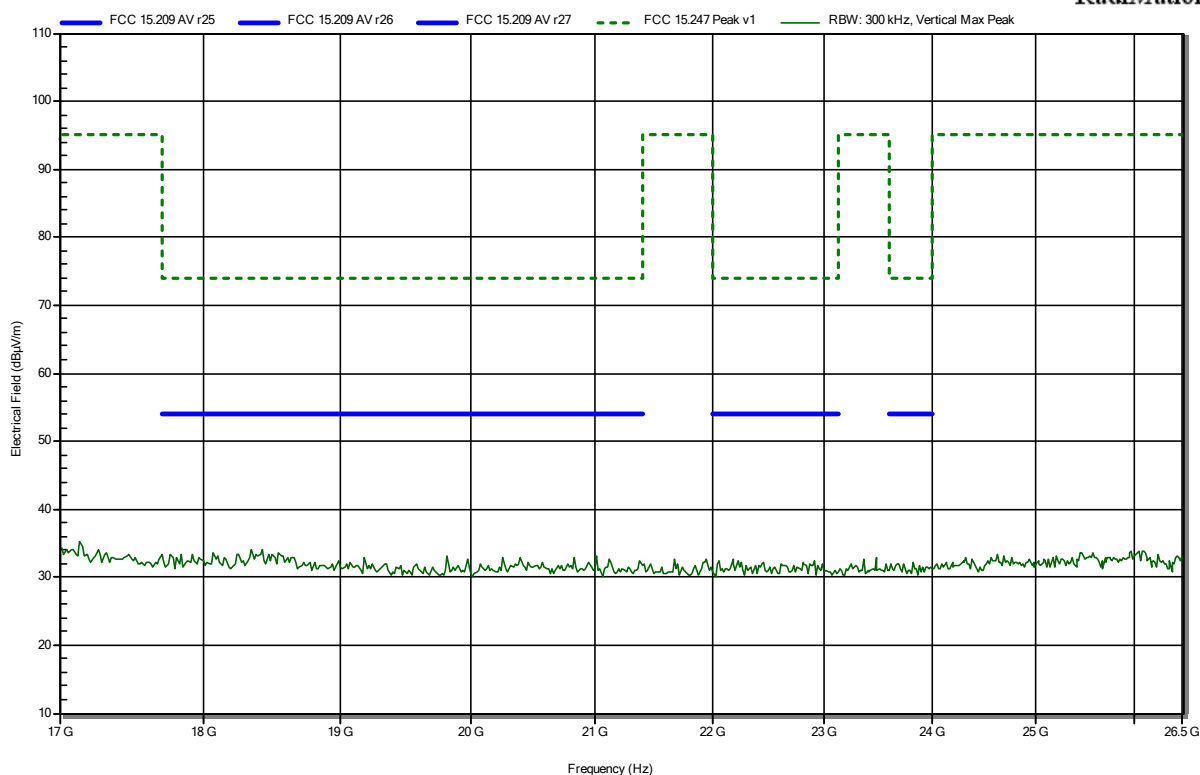


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 19, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

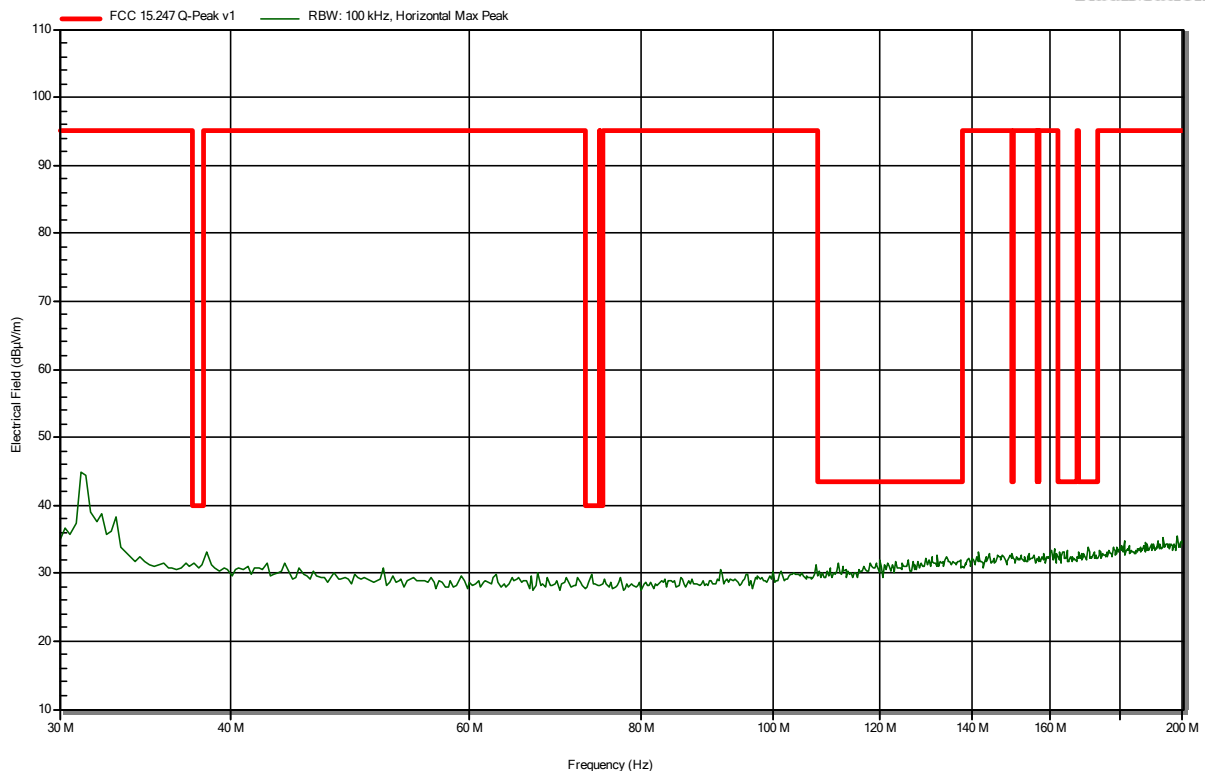


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

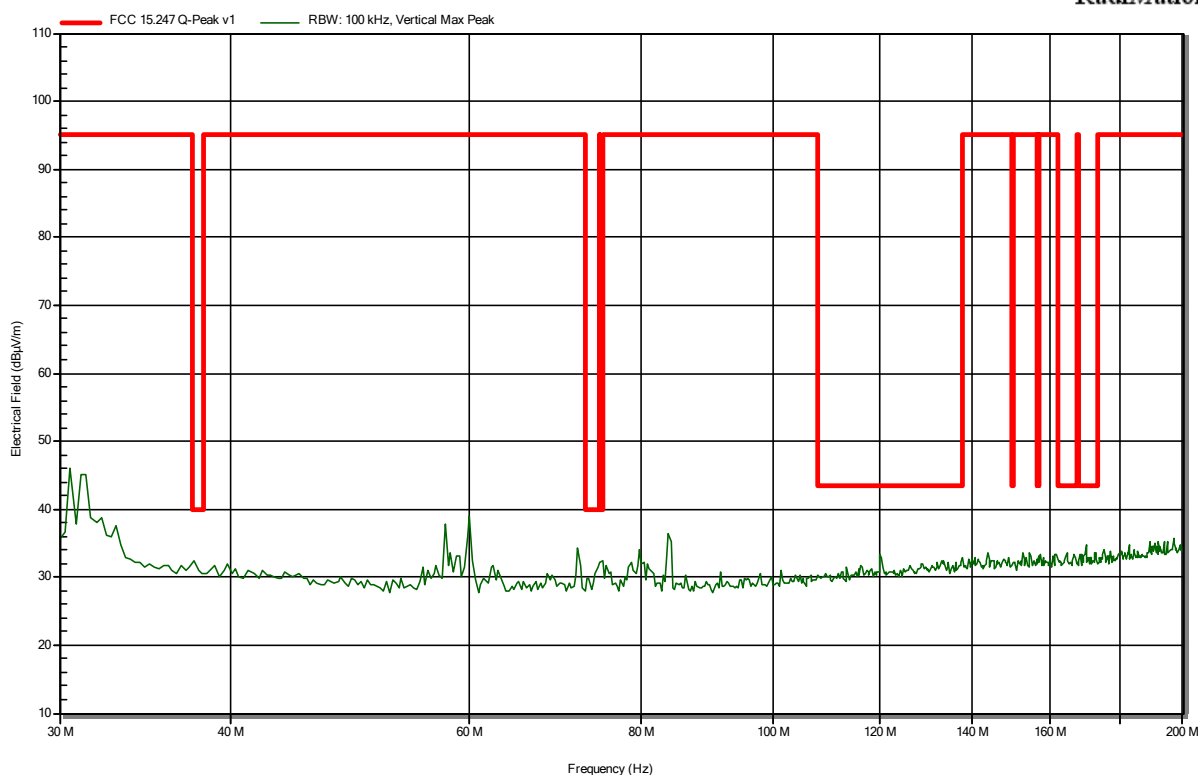


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation

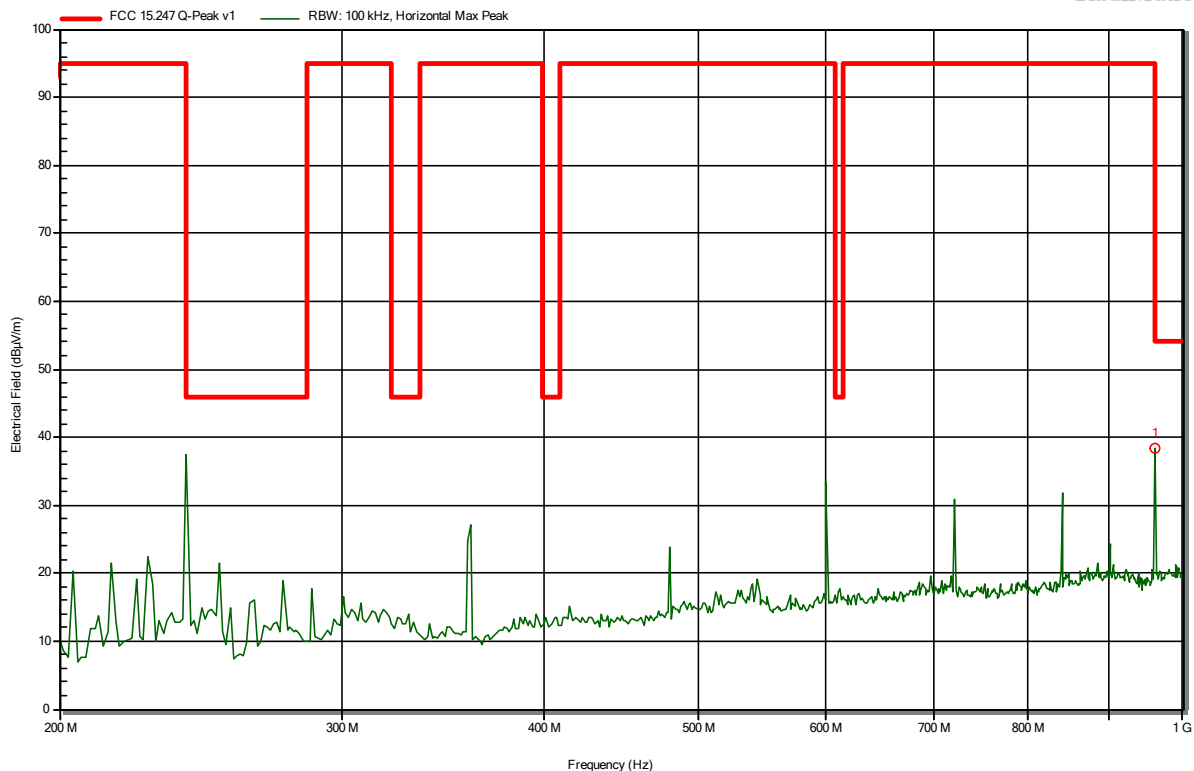


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-29
 Note: EUT vertical

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RadiMation



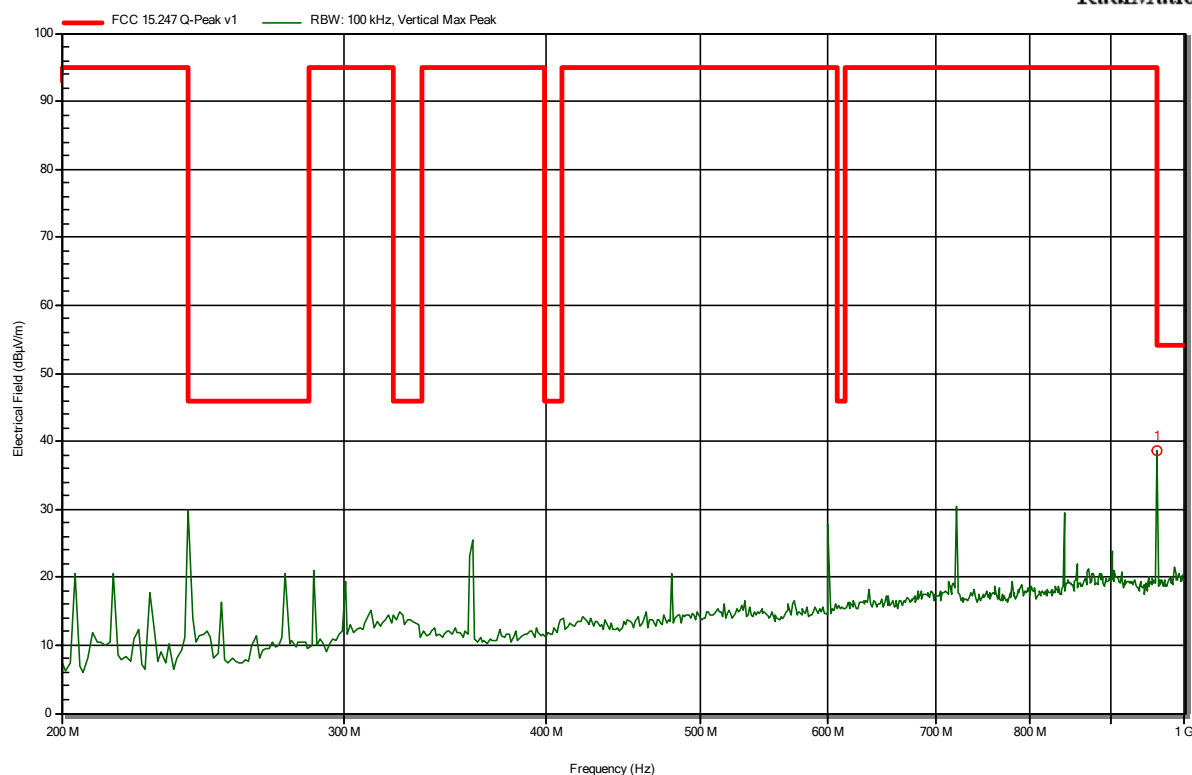
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
960.256 MHz	38.44 dBμV/m	54 dBμV/m	-15.56 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2012-9529
Applicant:	Renesas Electronics Germany GmbH
Model Description:	Customer programmable Bluetooth LE module
Model:	RYZ012B000FZ00#HD0
Test Sample ID:	32801
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
Test Date:	2021-01-29
Note:	EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
960.256 MHz	38.63 dBuV/m	54 dBuV/m	-15.37 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

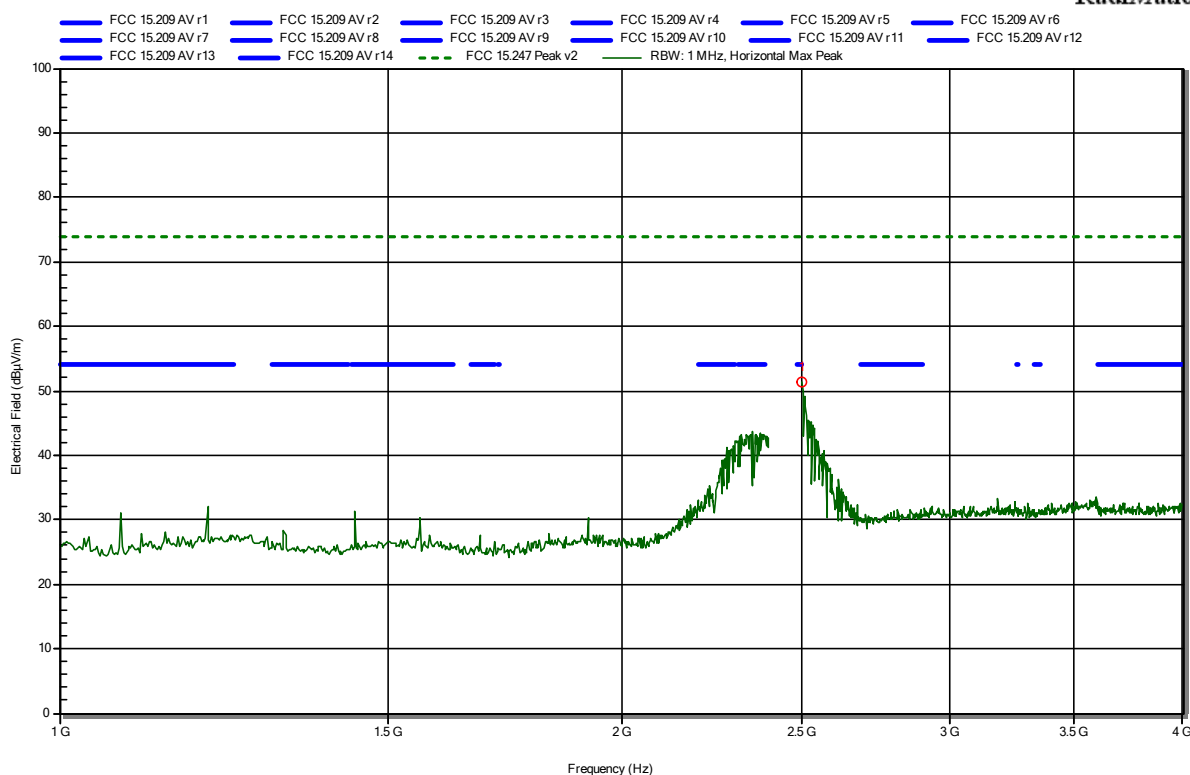
Eurolins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.5 GHz	51.44 dBµV/m	74 dBµV/m	-22.56 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

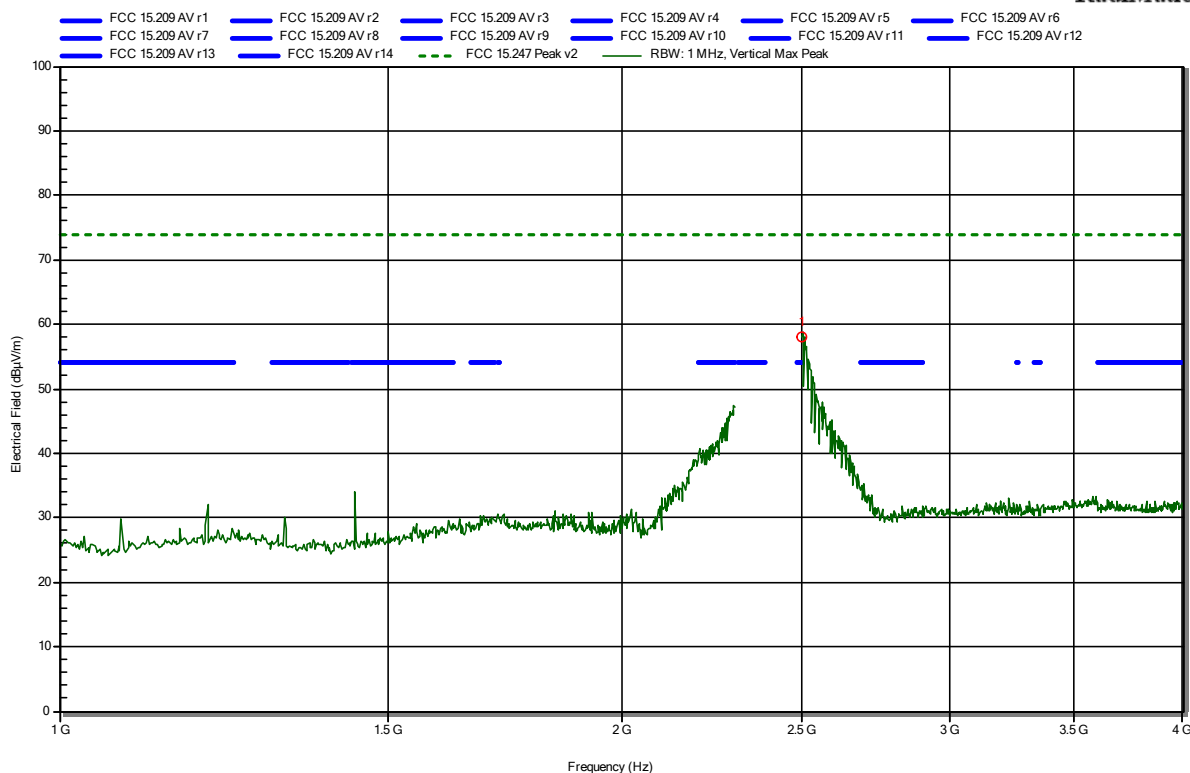
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



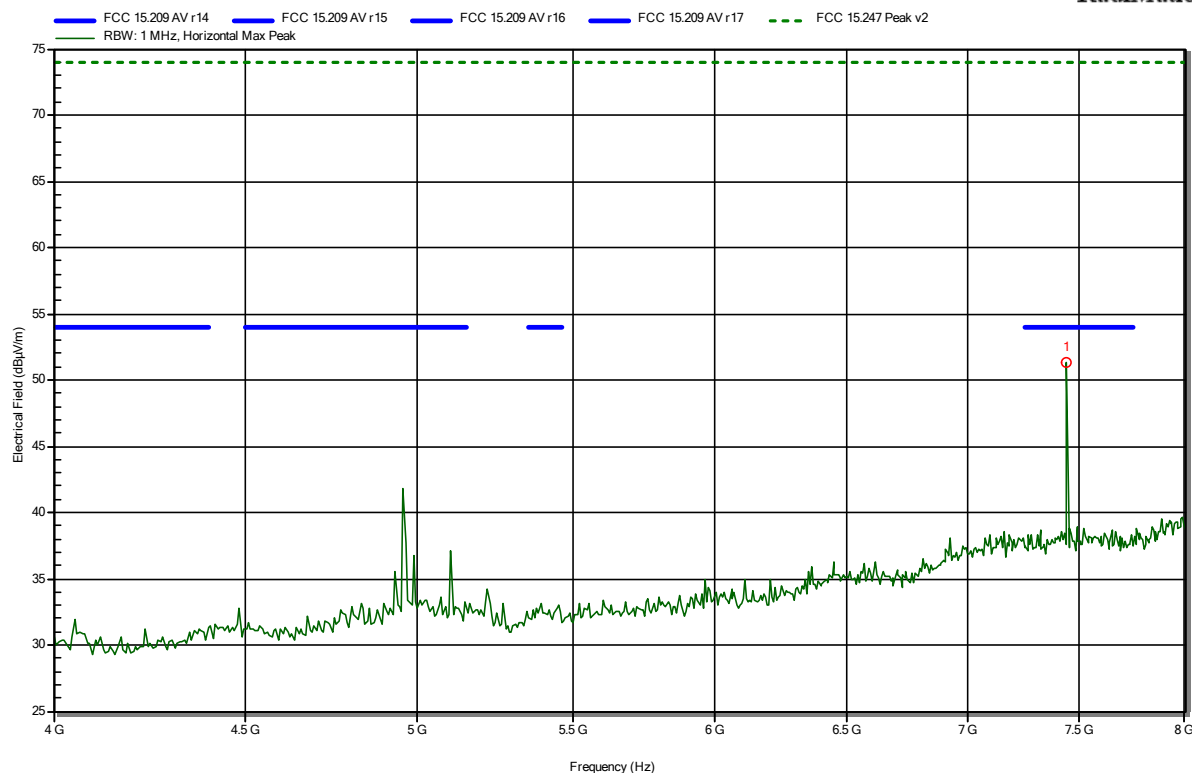
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.5 GHz	58.01 dBµV/m	74 dBµV/m	-15.99 dB	Pass
Frequency	Average	Average Limit	Peak Difference	Peak Status
2.5 GHz	20.59 dBµV/m	54 dBµV/m	-33.41 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.442 GHz	51.32 dBμV/m	74 dBμV/m	-22.68 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

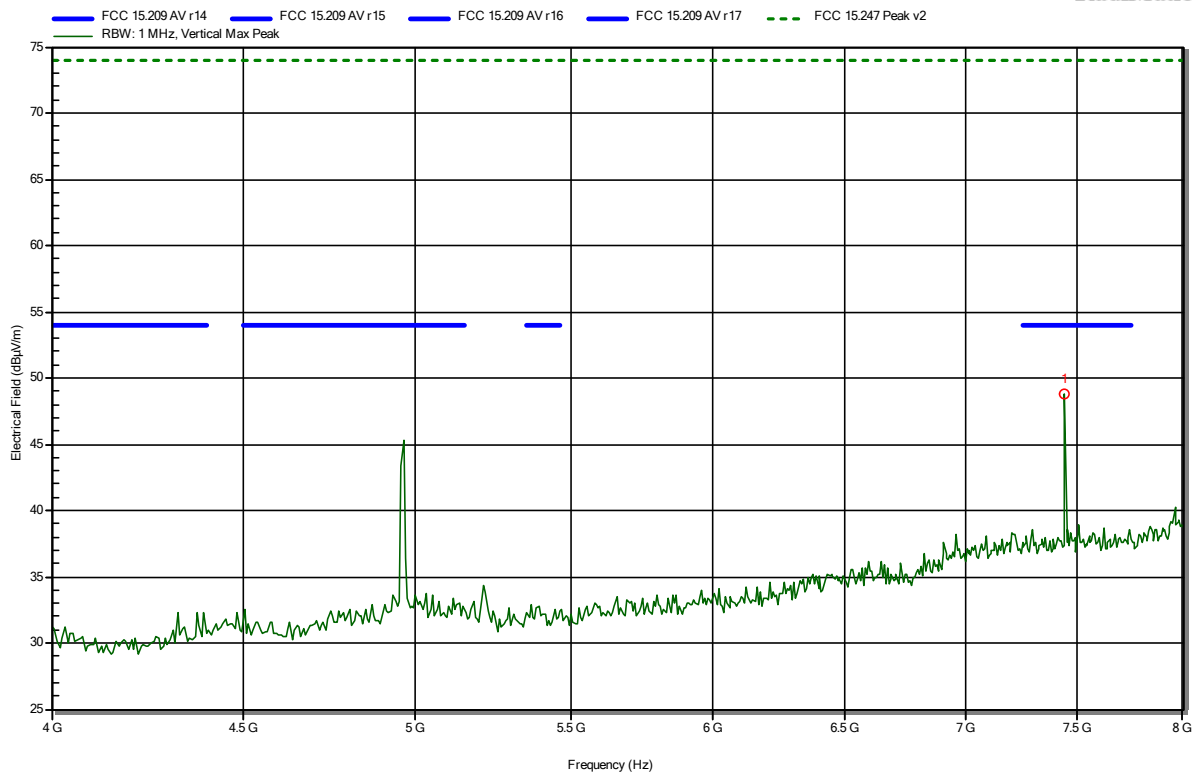
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



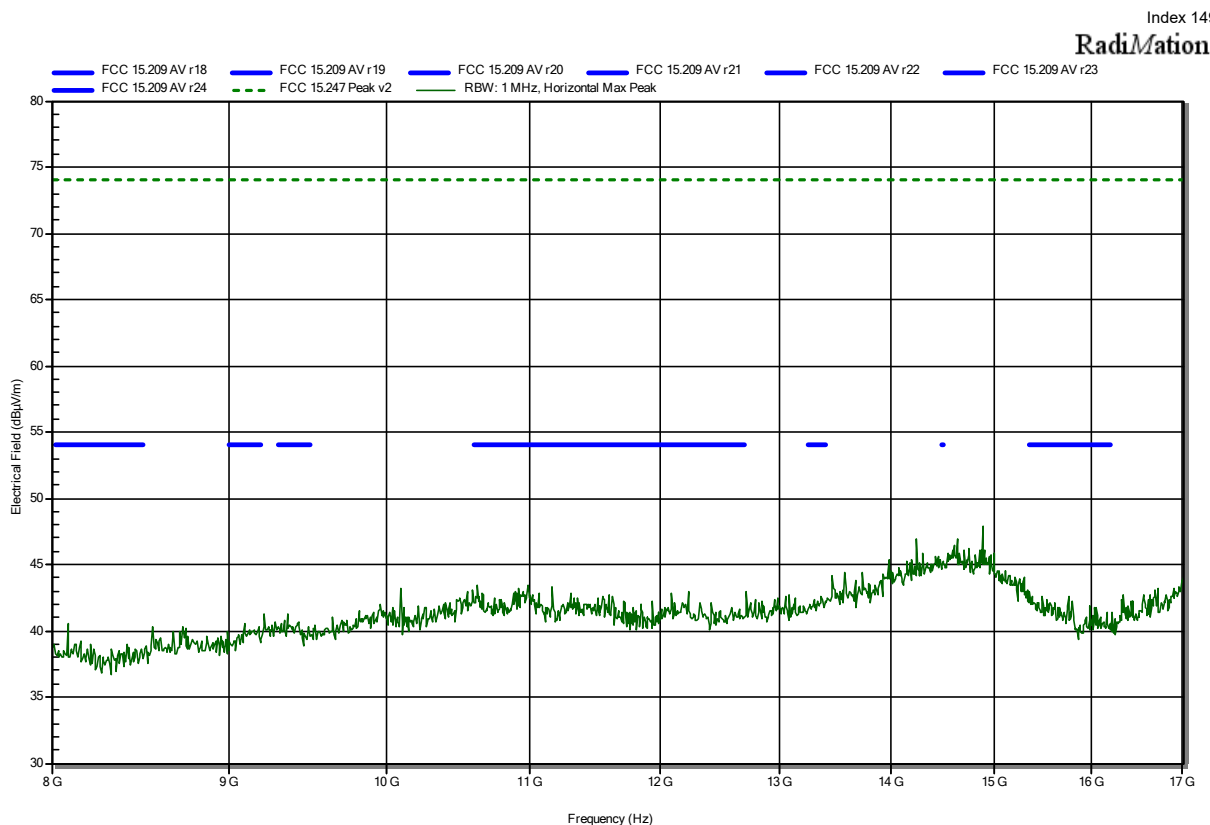
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.442 GHz	48.85 dBμV/m	74 dBμV/m	-25.15 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

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

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

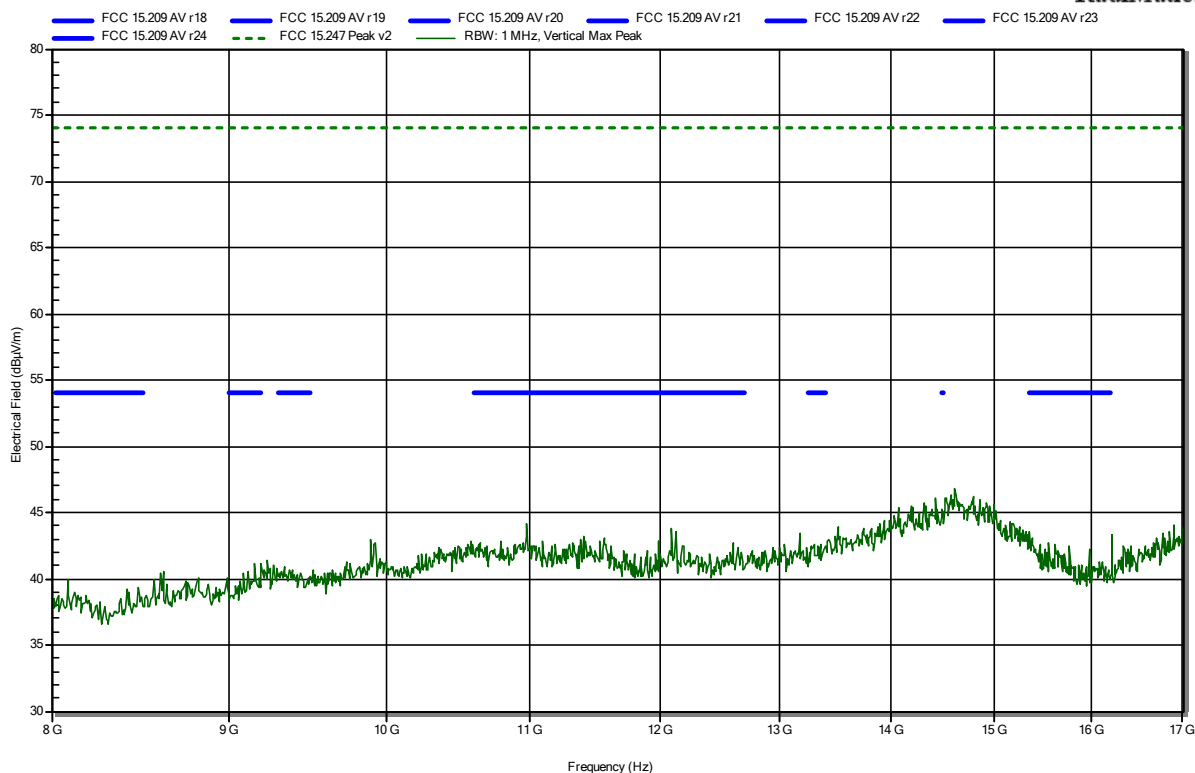


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

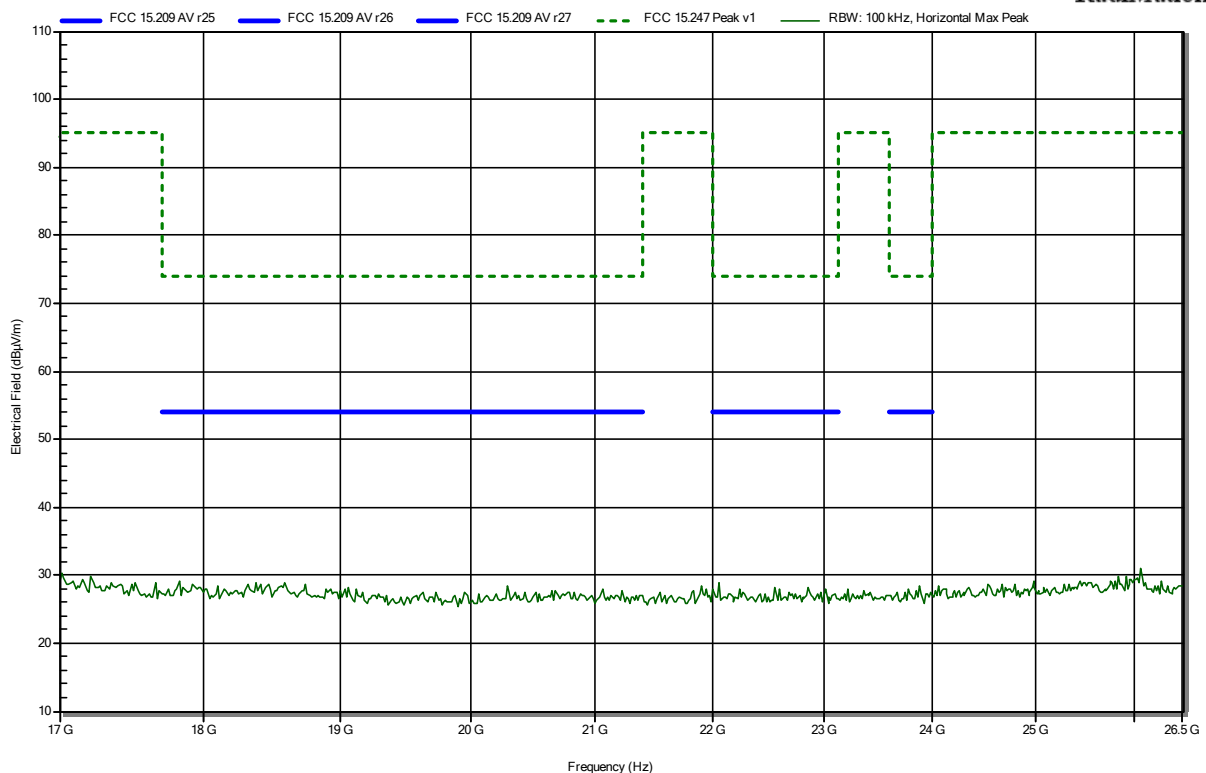


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Horizontal
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation

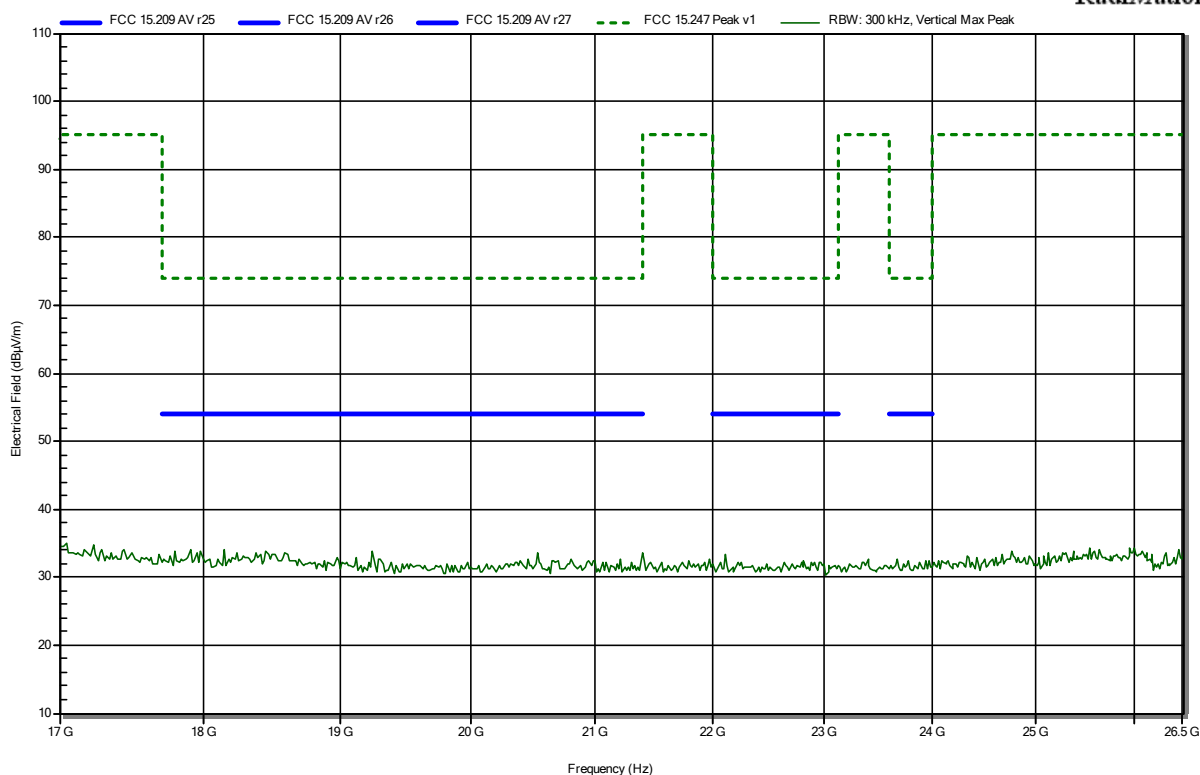


Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560, Vertical
 Measurement distance: 1 m
 Mode: Tx; BLE, Channel 39, 37 Byte data length, PRBS9, 10 dBm
 Test Date: 2021-01-28
 Note: EUT vertical

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RadiMation



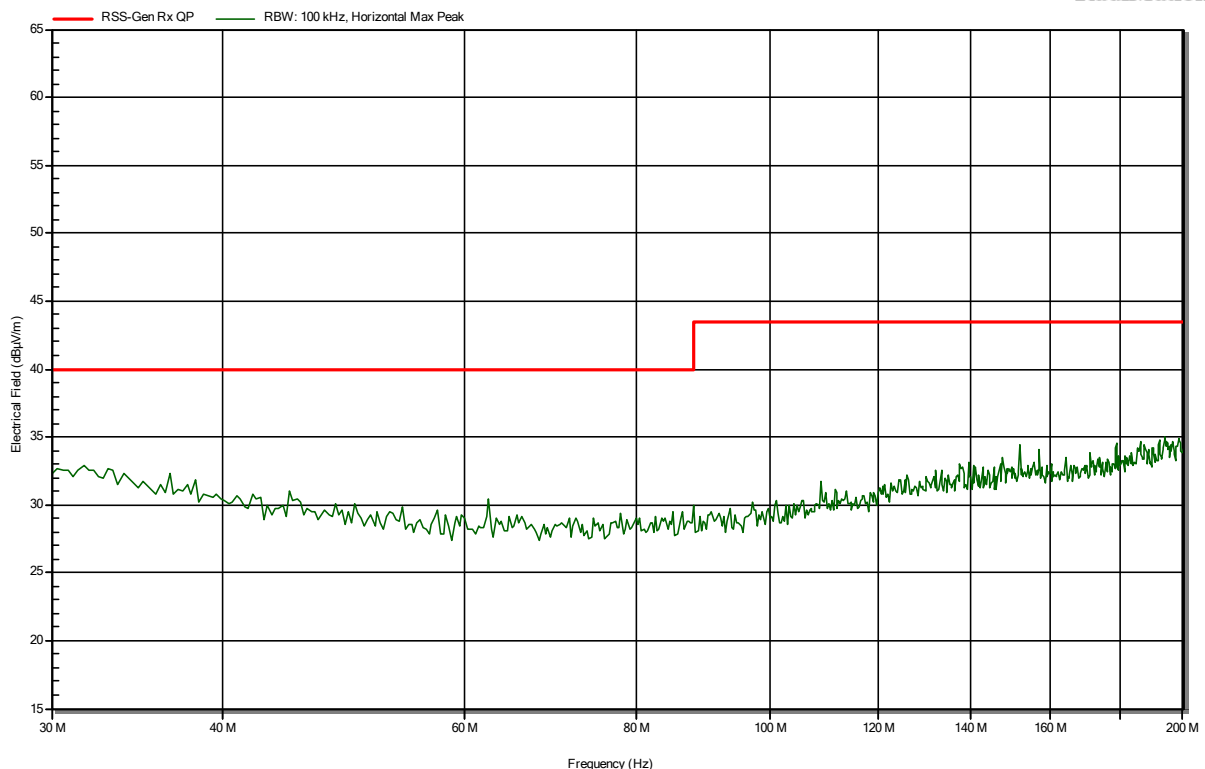
ANNEX C Receiver spurious emissions with integrated antenna

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

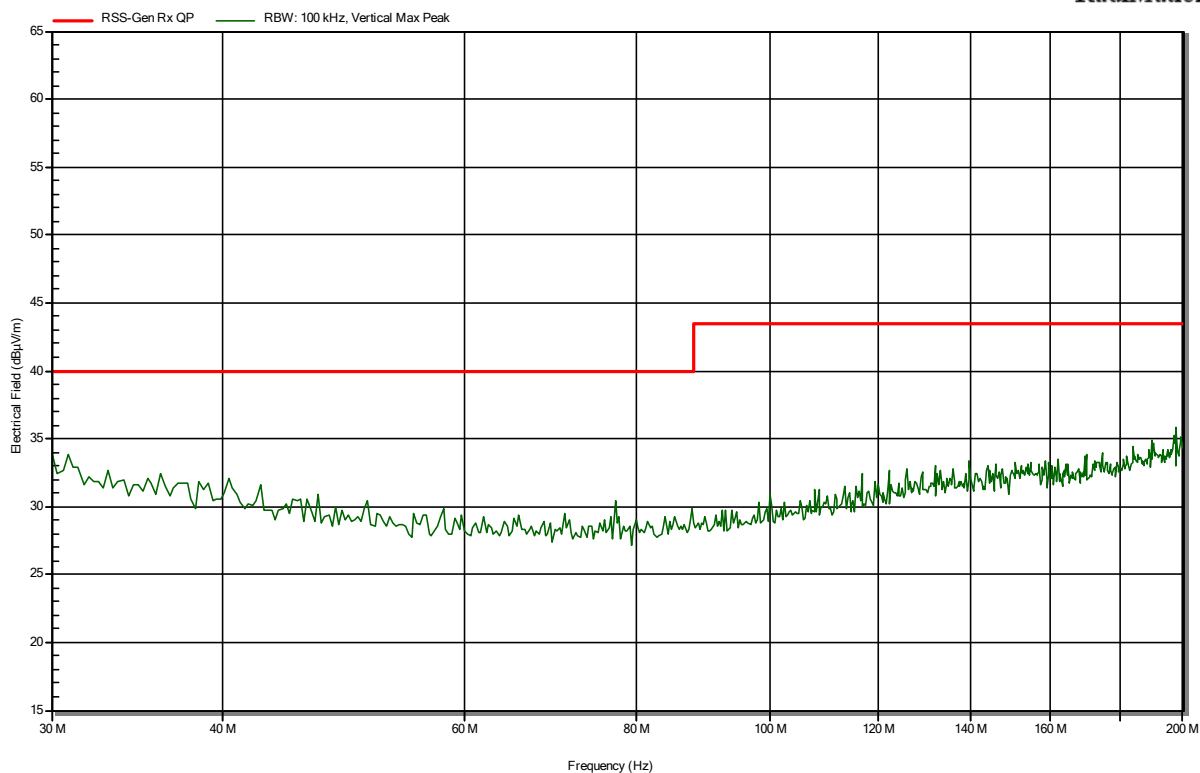


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

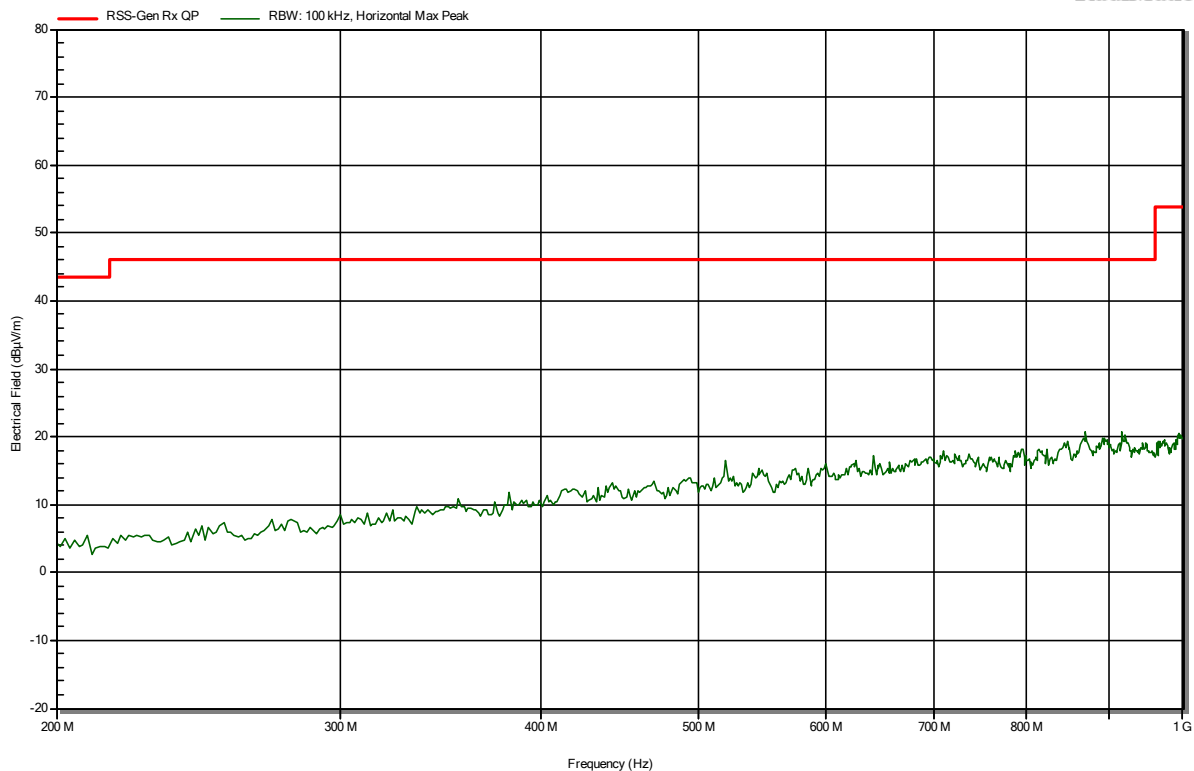


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

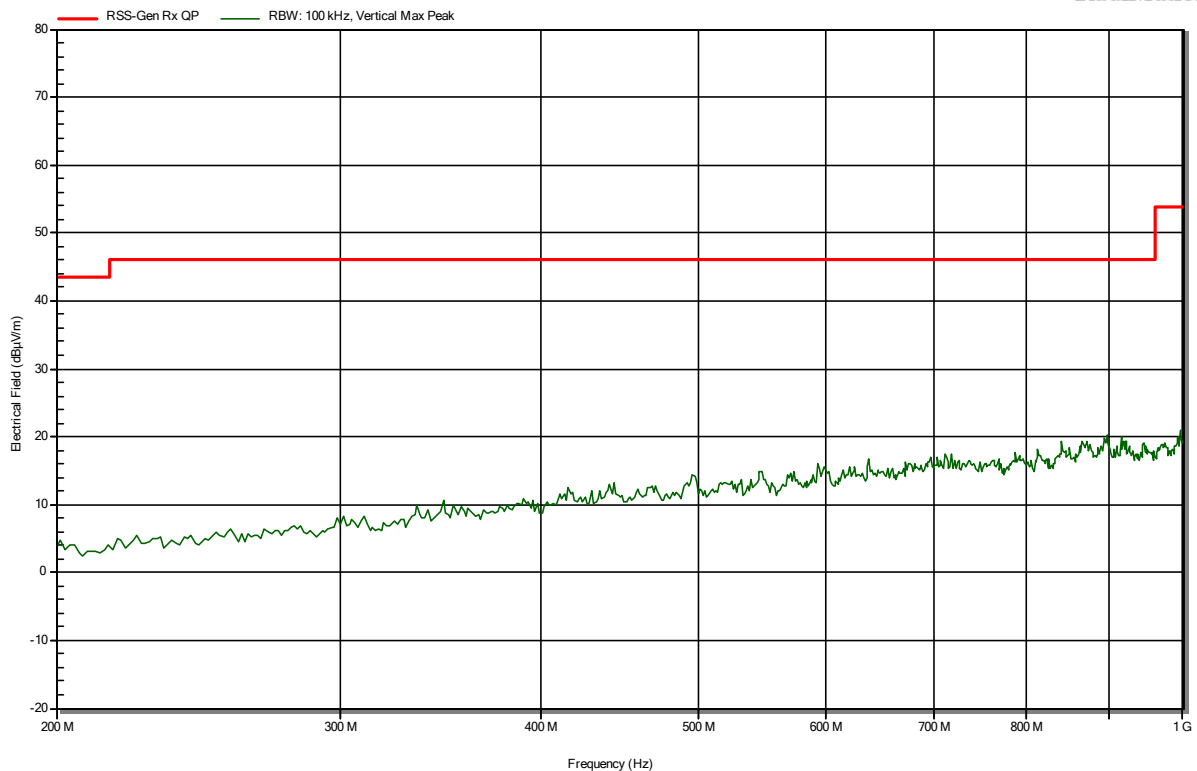


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

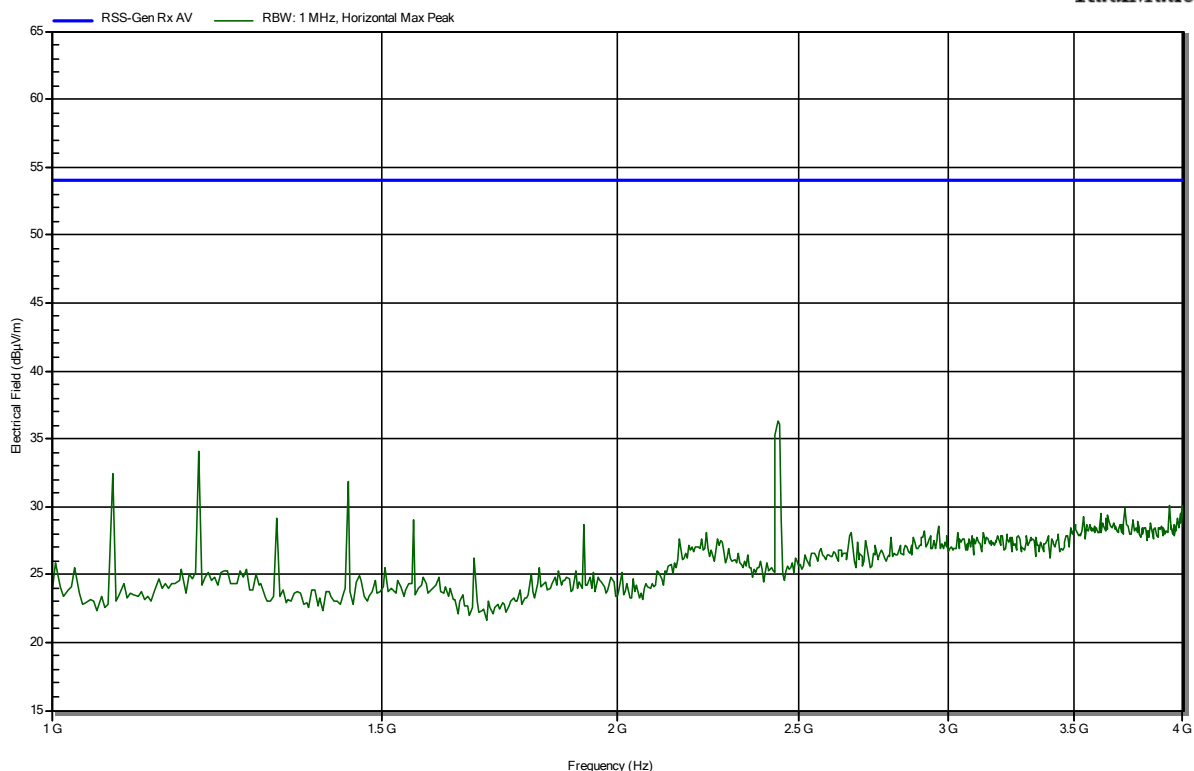


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

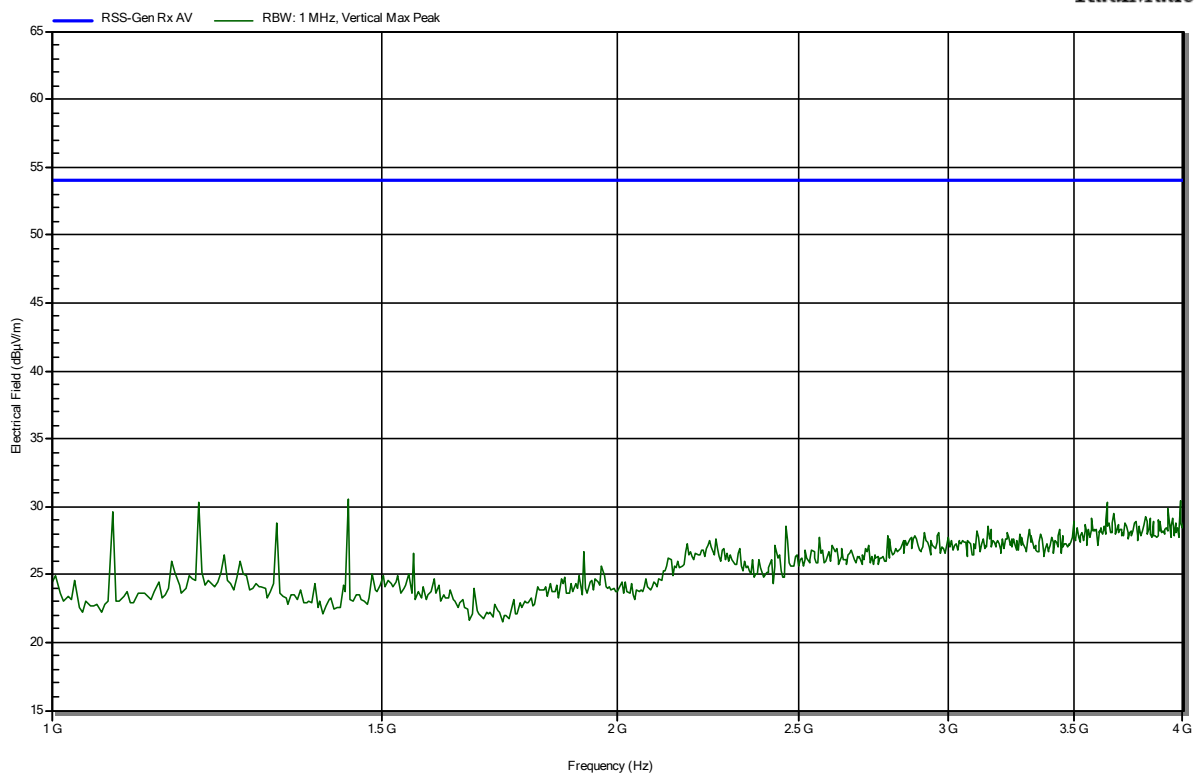


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation

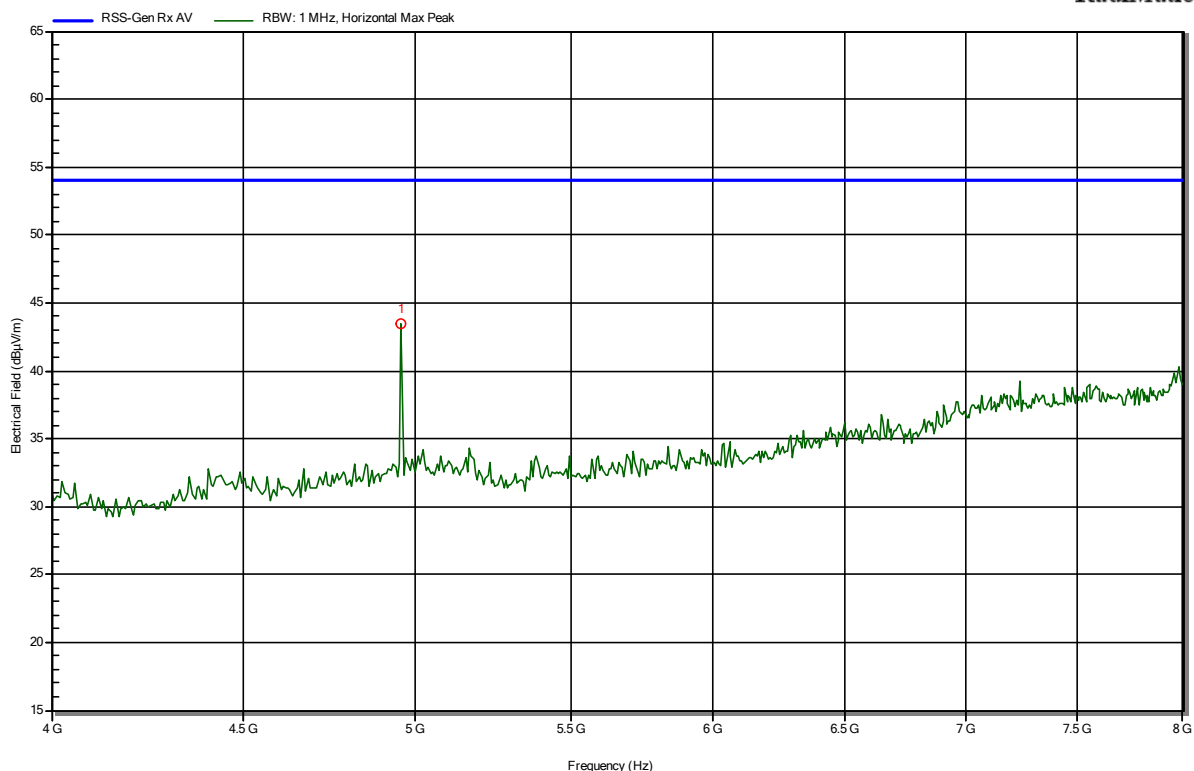


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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RadiMation



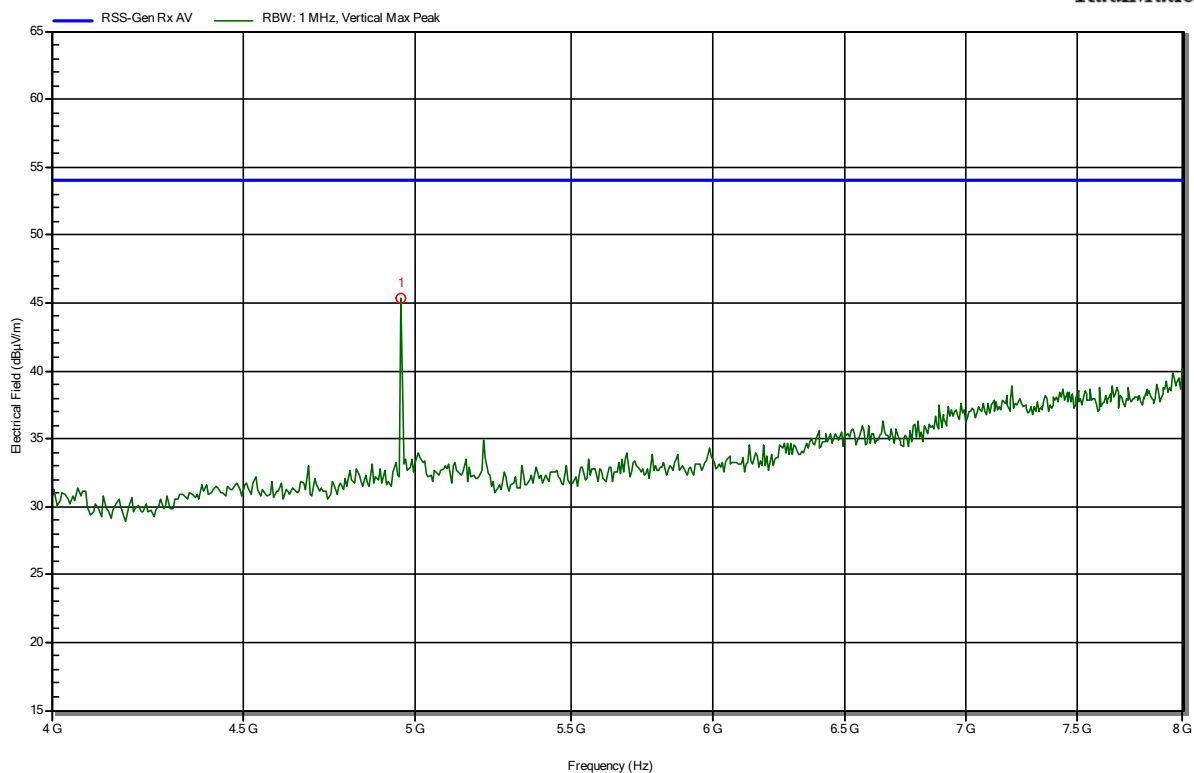
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.955 GHz	43.46 dBµV/m	53.98 dBµV/m	-10.52 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:

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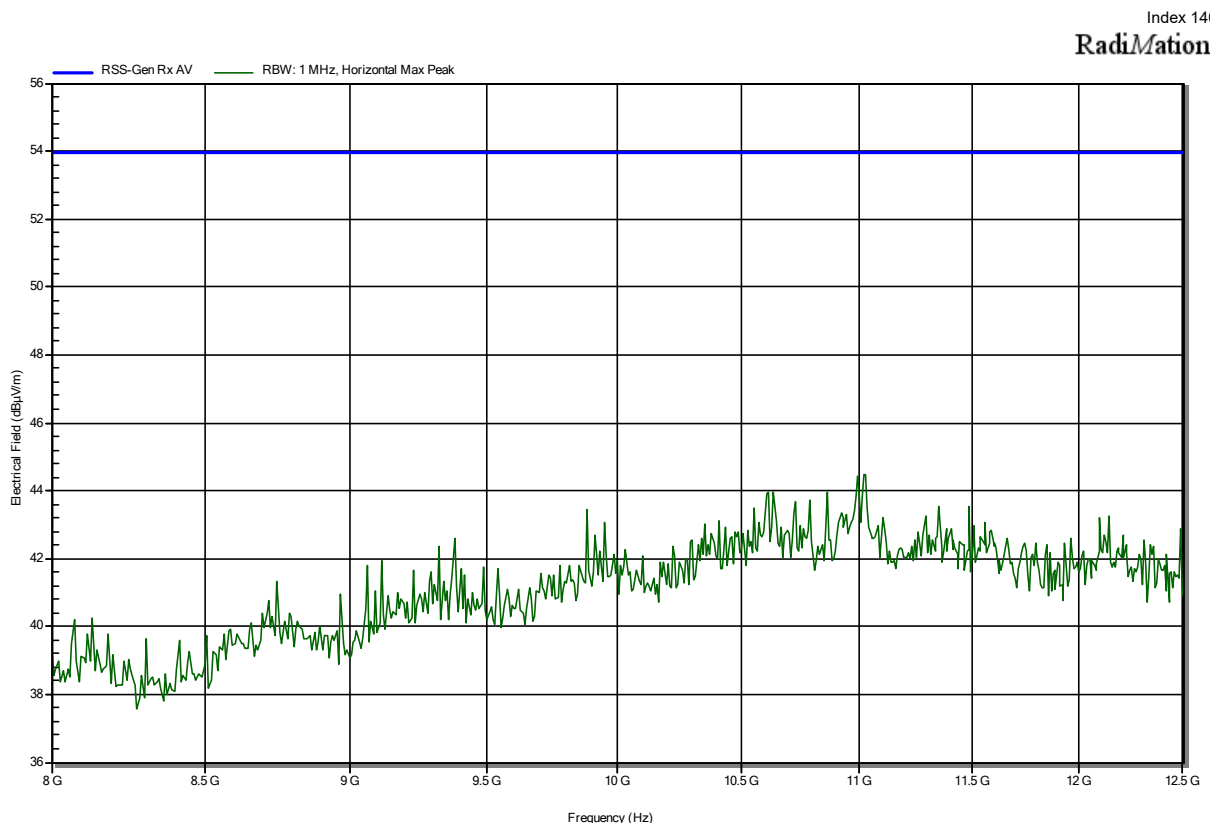
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.955 GHz	45.37 dBµV/m	53.98 dBµV/m	-8.61 dB	Pass

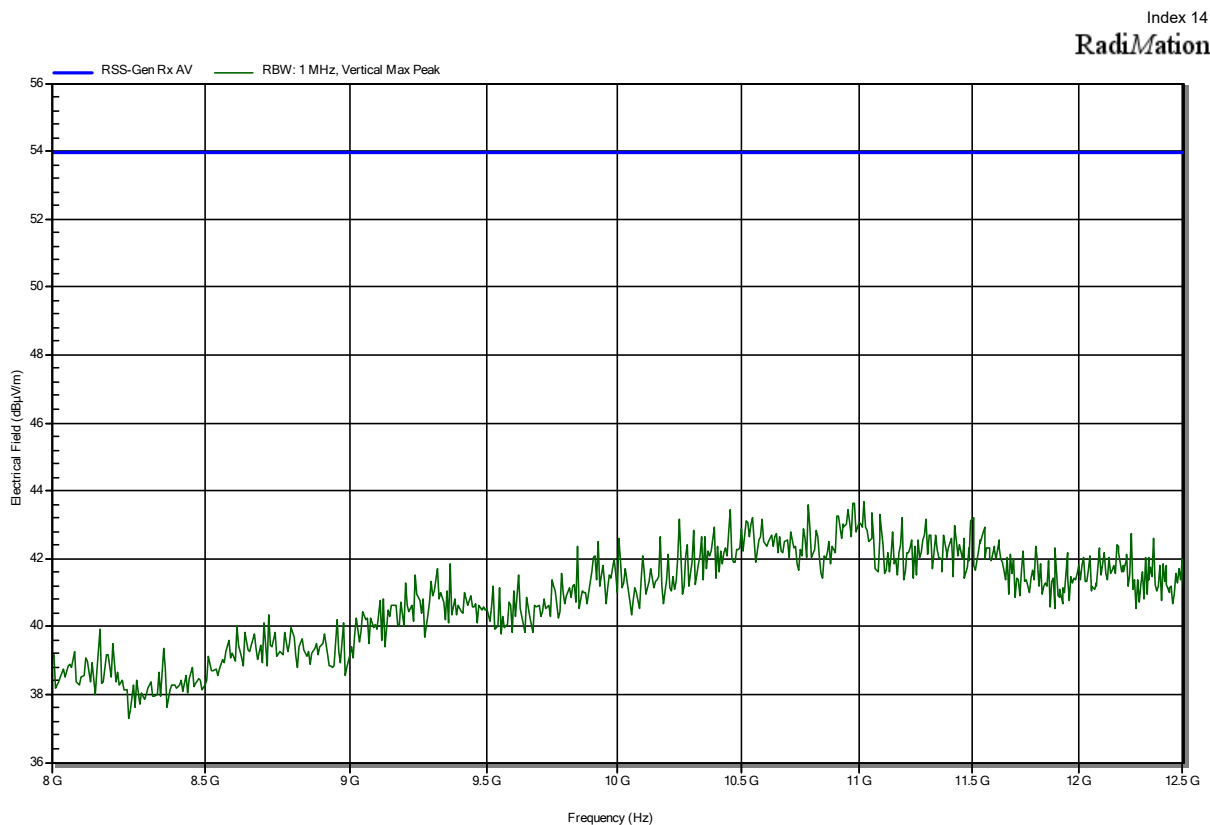
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:



Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012A000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-20
 Note:



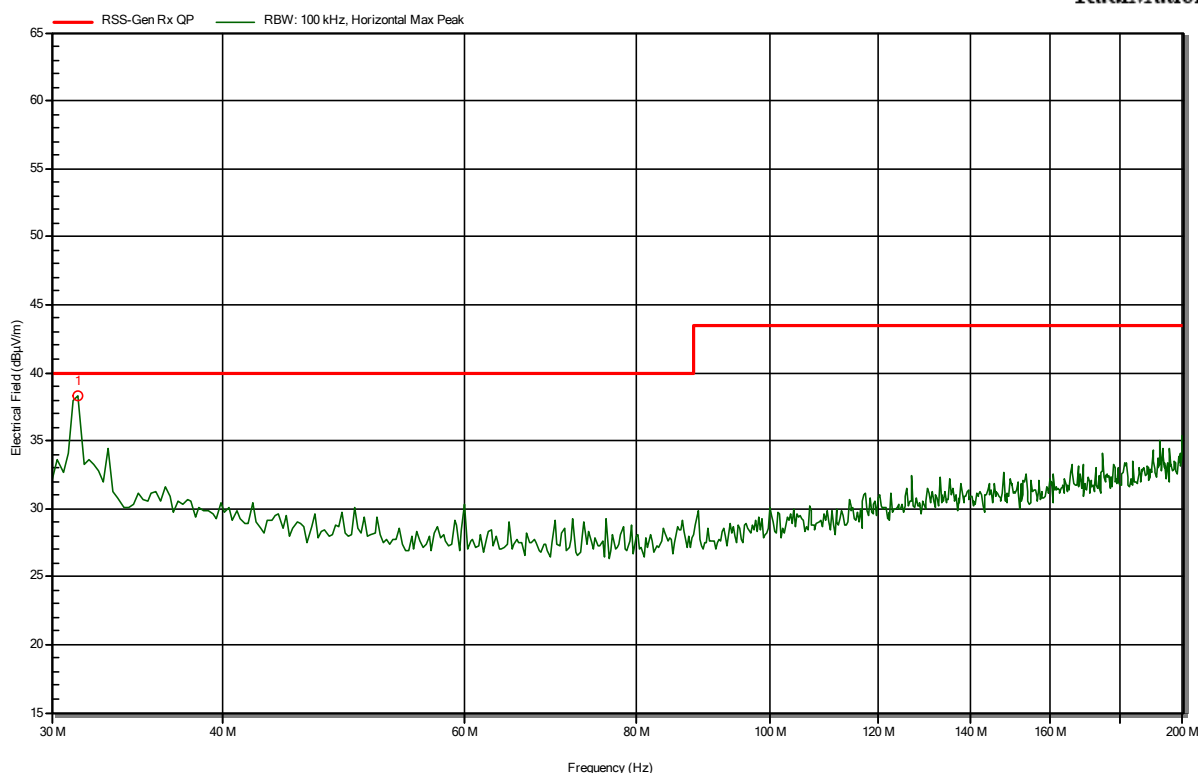
ANNEX D Receiver spurious emissions with external antenna

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
31.362 MHz	38.25 dBµV/m	40 dBµV/m	-1.75 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

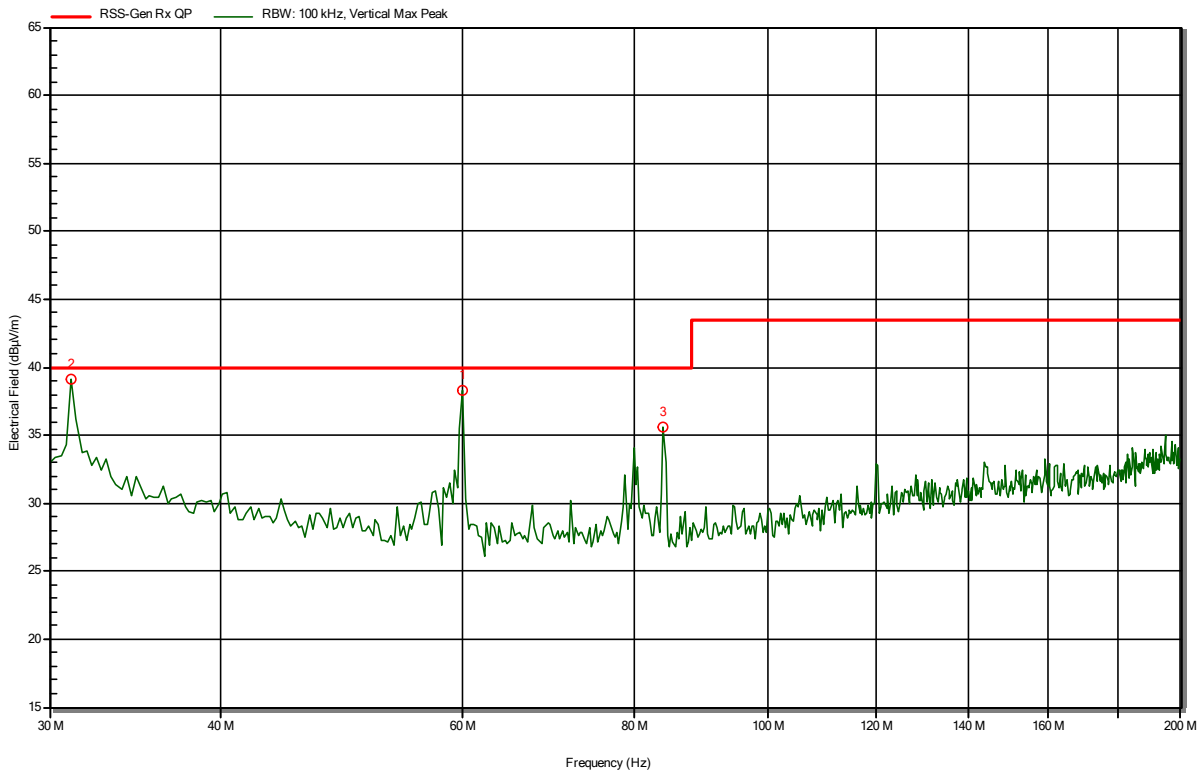
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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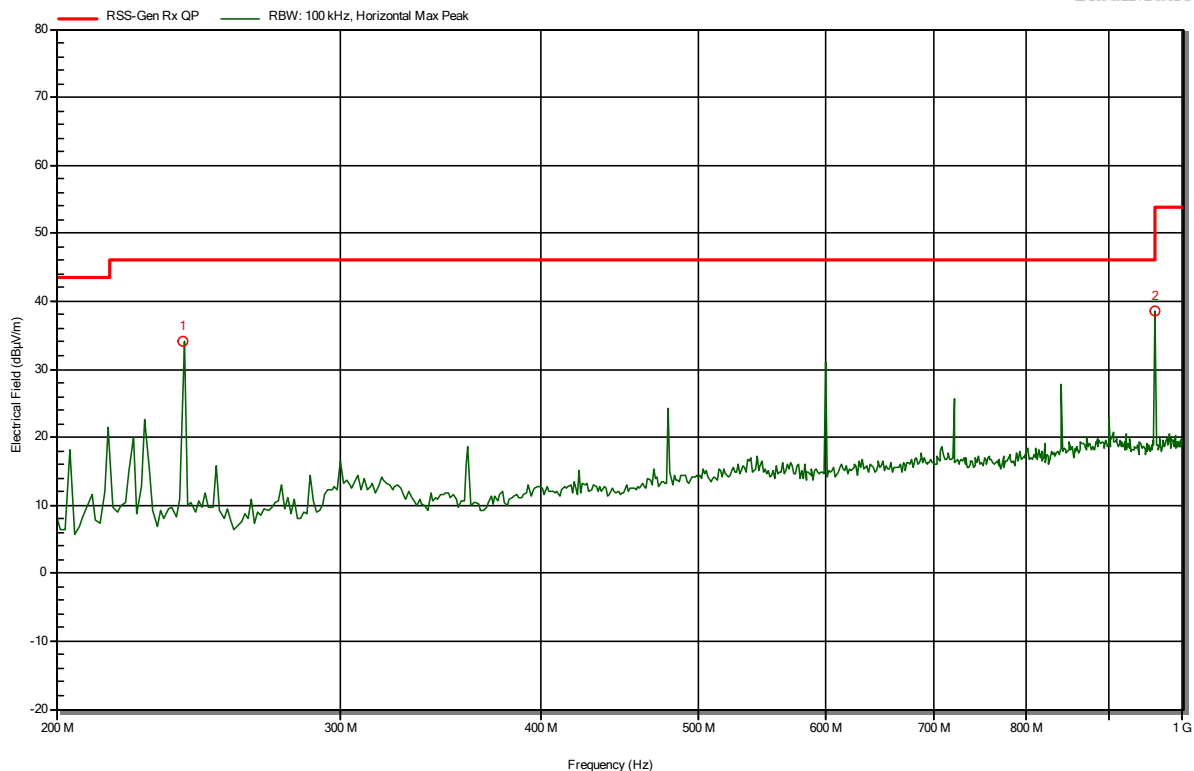
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
31.09 MHz	39.13 dBμV/m	40 dBμV/m	-0.87 dB	Pass
59.968 MHz	38.28 dBμV/m	40 dBμV/m	-1.72 dB	Pass
83.942 MHz	35.61 dBμV/m	40 dBμV/m	-4.39 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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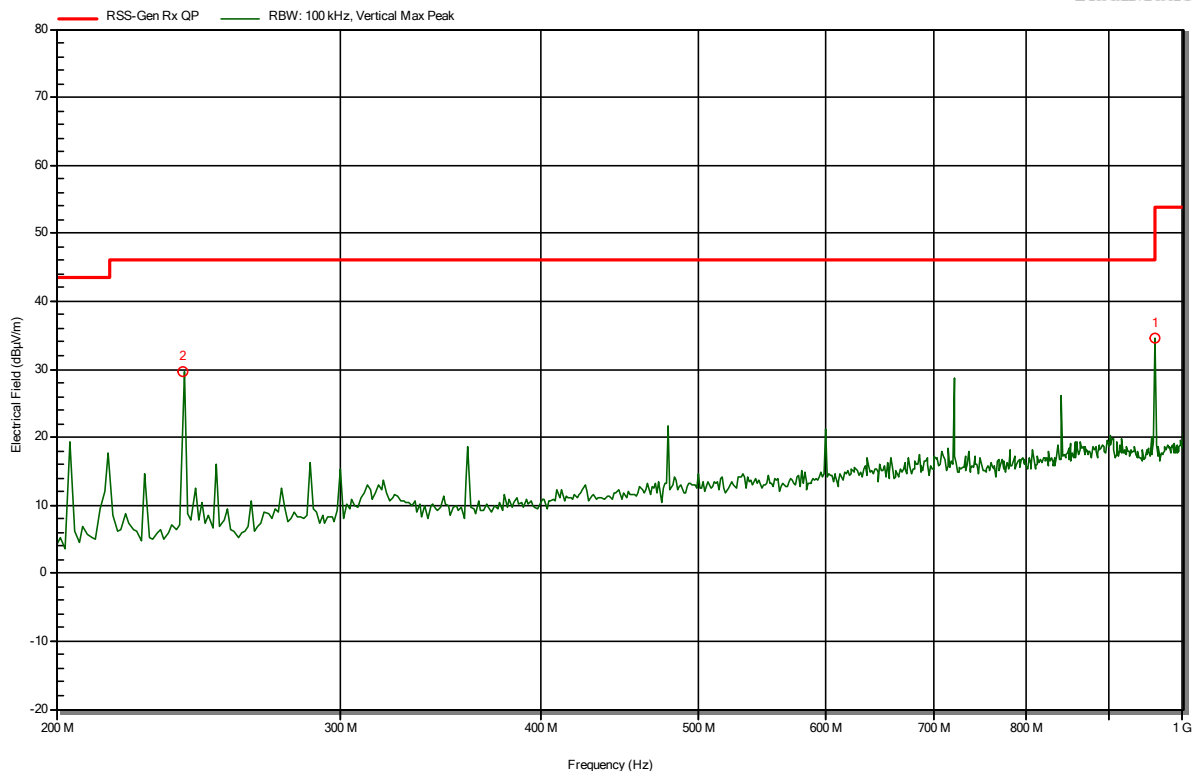
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
239.744 MHz	34.03 dBµV/m	46 dBµV/m	-11.97 dB	Pass
960.256 MHz	38.62 dBµV/m	53.9 dBµV/m	-15.28 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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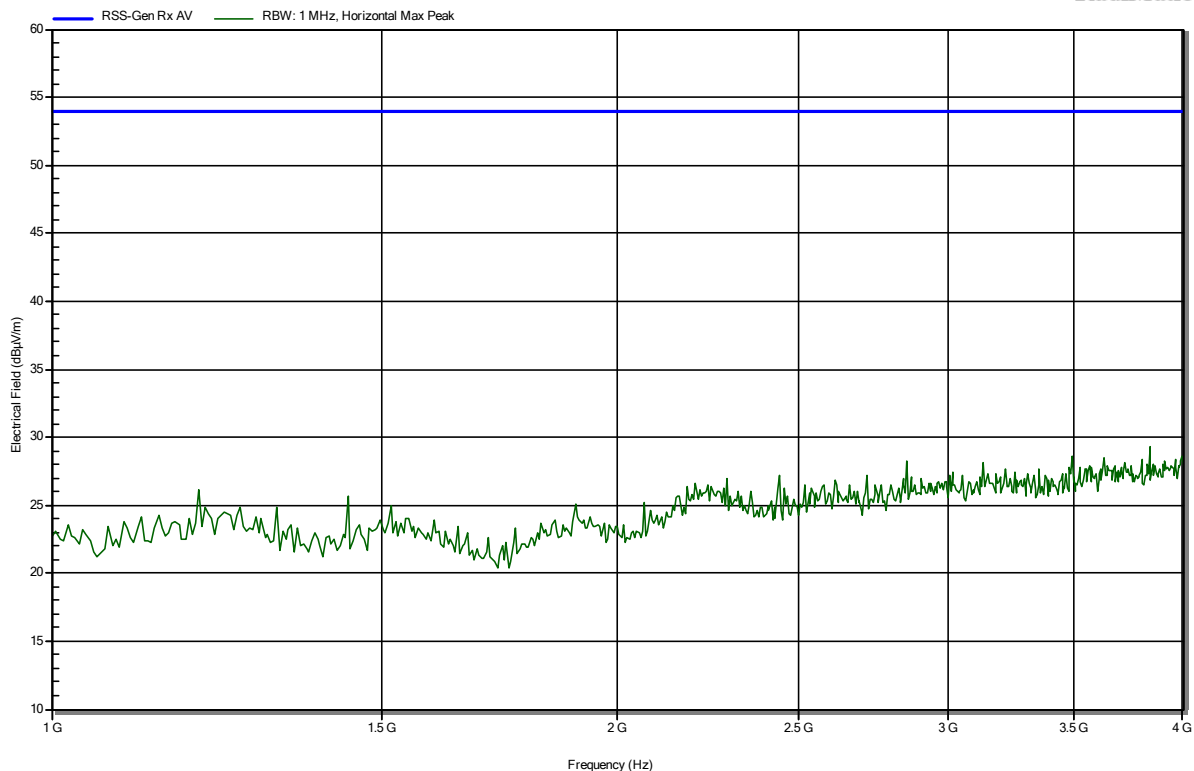
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
239.744 MHz	29.7 dBμV/m	46 dBμV/m	-16.3 dB	Pass
960.256 MHz	34.59 dBμV/m	53.9 dBμV/m	-19.31 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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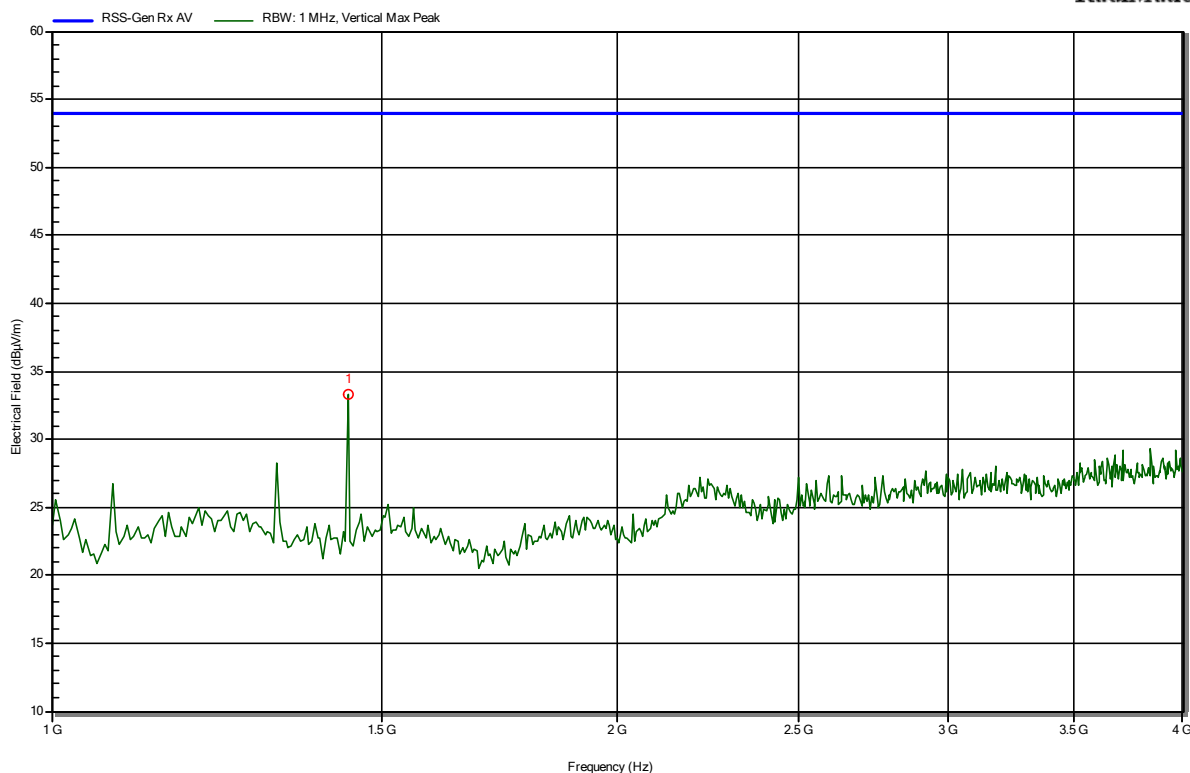


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.438 GHz	33.33 dBμV/m	53.98 dBμV/m	-20.65 dB	Pass

Test Report No.: G0M-2012-9529-TFC247BL-V01

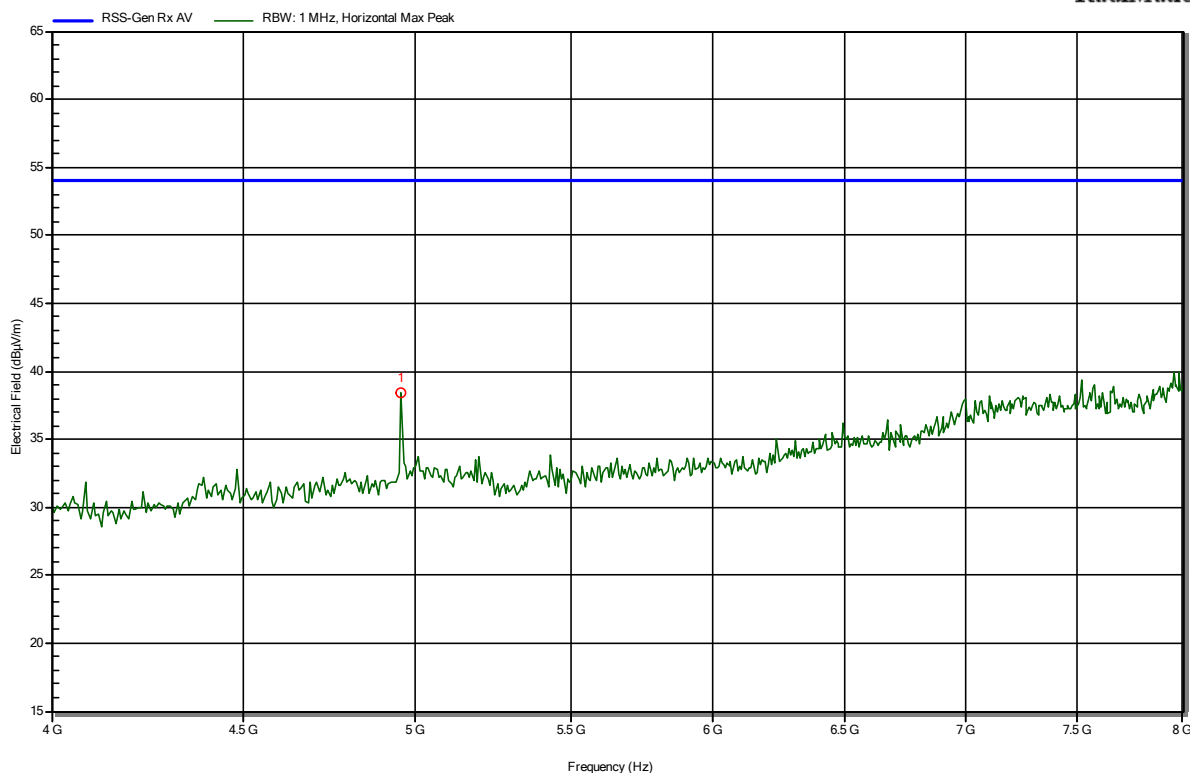
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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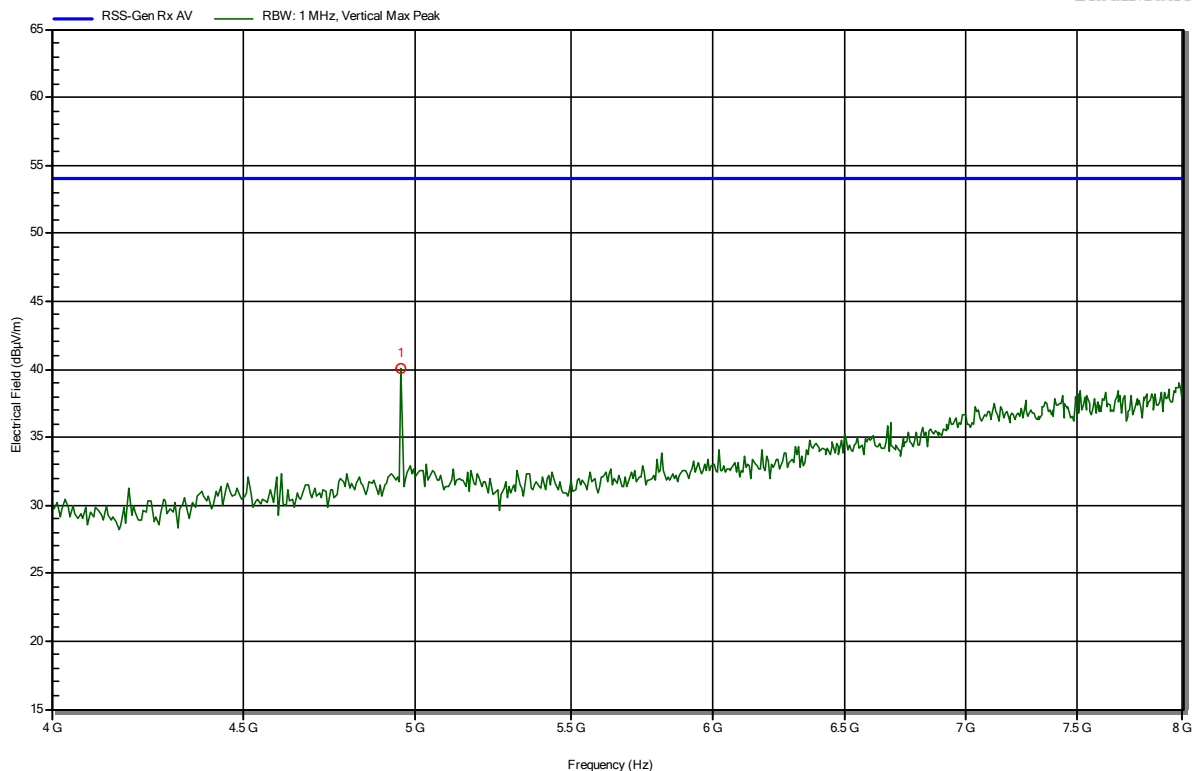
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.955 GHz	38.36 dBµV/m	53.98 dBµV/m	-15.62 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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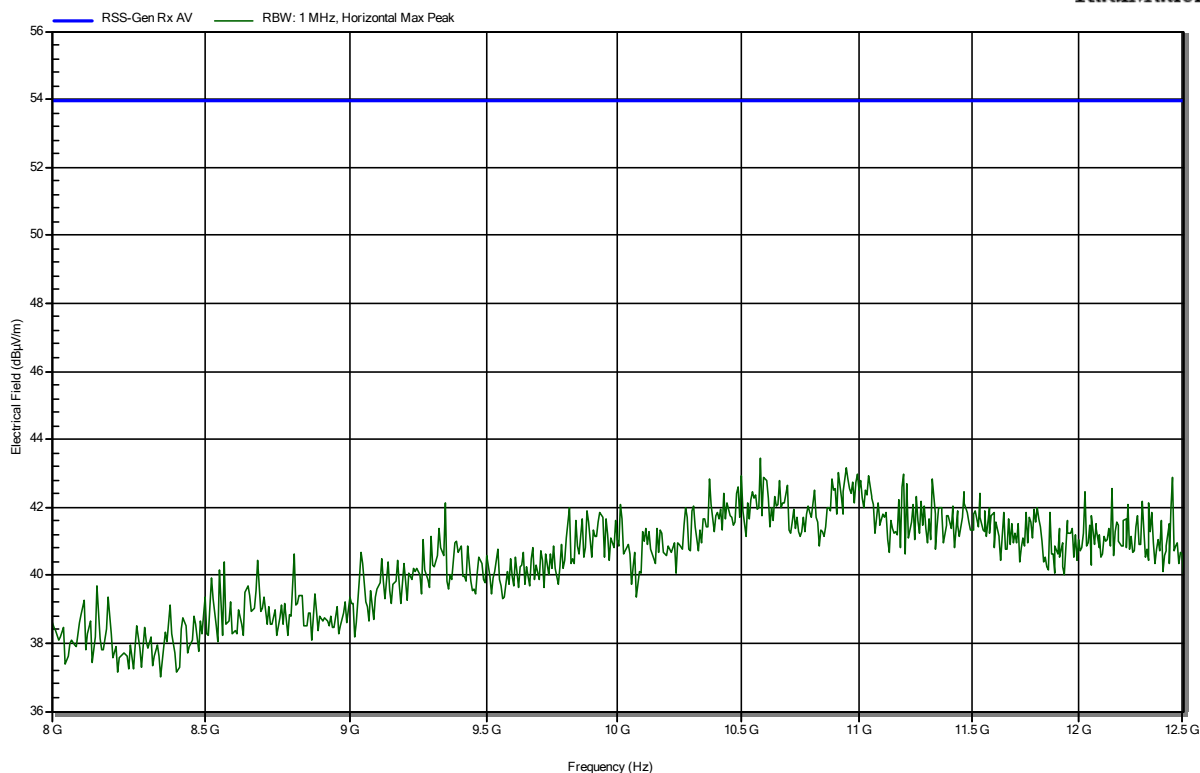
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.955 GHz	40.04 dBμV/m	53.98 dBμV/m	-13.94 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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RadiMation

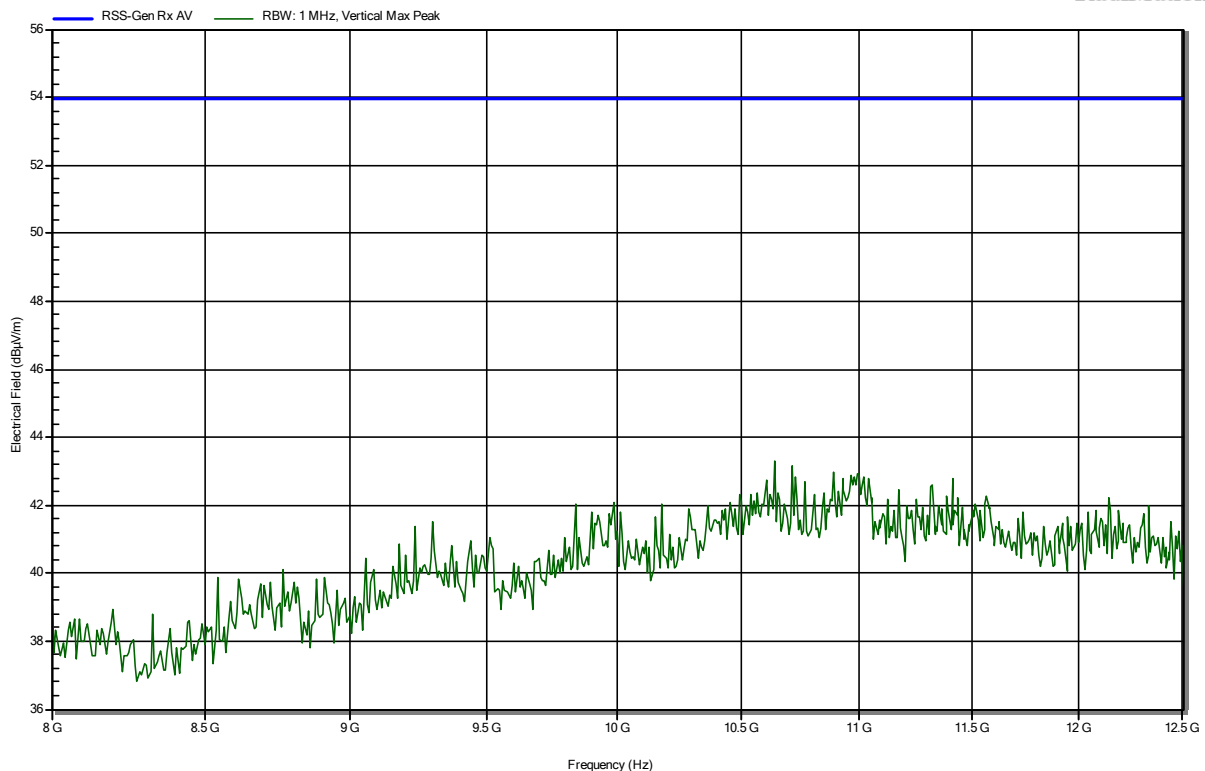


Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

Project Number: G0M-2012-9529
 Applicant: Renesas Electronics Germany GmbH
 Model Description: Customer programmable Bluetooth LE module
 Model: RYZ012B000FZ00#HD0
 Test Sample ID: 32801
 Test Site: Eurofins Product Service GmbH
 Operator: Charline Graf
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 24 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m, converted to 3 m
 Mode: Rx; BLE, Channel 0-39
 Test Date: 2021-01-29
 Note: EUT vertical, external antenna

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=== END OF TEST REPORT ===

Test Report No.: G0M-2012-9529-TFC247BL-V01

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