RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-210

License exempt radio equipment

Report Reference No	G0M-2306-2102-TFC209LP-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 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Bridgestone Mobility Solutions B.V.
Address	Beethovenstraat 503 1083 HK Amsterdam Netherlands
Test Specification	47 CFR Part 15C RSS-210, Issue 10, 2020-04 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Telematic Accessory with Display + RFID + Bluetooth
Model(s)	PROI
Additional Model(s)	None
Brand Name(s)	webfleet PRO i
Hardware Version(s)	46/2022
Software Version(s)	0.0.25
FCC ID	2AGPAPROI
IC	20911-PROI
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	2023-11-09	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	W. Treffke .....
Approved by (+ signature) (Test Lab Engineer)	Radwan Jaafar	....
Date of Issue	2023-11-09	
Total number of pages	29	
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:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-11-09	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

REPORT INDEX

1 Equipment (Test Item) Under Test 6
1.1 Photos – Equipment External 7
1.2 Photos – Equipment Internal 9
1.3 Photos – Test Setup 11
1.4 Support Equipment 13
1.5 Test mode duty cycle 14
1.6 Test Modes 16
1.7 Test Frequencies 17
1.8 Sample emission level calculation 18
2 Result Summary 19
3 Test Conditions and Results 20
3.1 Test Conditions and Results - Occupied bandwidth 20
3.2 Test Conditions and Results - Radiated spurious emissions 23

ANNEX A Radiated spurious emissions - FCC15.209 26
ANNEX B Radiated spurious emissions – RSS - Gen 28

1 Equipment (Test Item) Under Test

Description	Telematic Accessory with Display + RFID + Bluetooth	
Model	PROI	
Additional Model(s)	None	
Brand Name(s)	webfleet PRO i	
Serial Number(s)	SN: 00213E8059F6	
Test Sample Id(s)	44644	
Hardware Version(s)	46/2022	
Software Version(s)	0.0.25	
PMN	webfleet PRO i	
HVIN	PROI	
FVIN	0.0.25	
HMN	n/a	
FCC ID	2AGPAPROI	
IC	20911-PROI	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency	125 kHz	
Radio technology	RFID	
Modulation	ASK	
Number of antenna ports	1	
Antenna 1 (13.56 MHz)	Type	Integrated
	Model	PCB trace loop antenna
	Manufacturer	Webfleet Solution
	Gain	unspecified
Antenna 2 (125 KHz)	Type	Integrated
	Model	PCB trace loop antenna
	Manufacturer	Webfleet Solution
	Gain	unspecified
Supply Voltage	V_{NOM}	12 VDC (24 VDC)
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
Manufacturer	Bridgestone Mobility Solutions B.V. Beethovenstraat 503 1083 HK Amsterdam Netherlands	

1.1 Photos – Equipment External

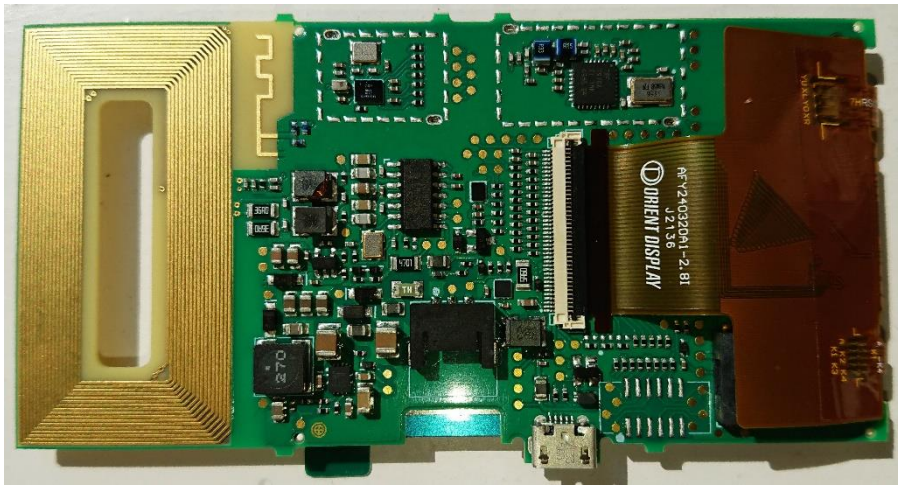
EUT Overview

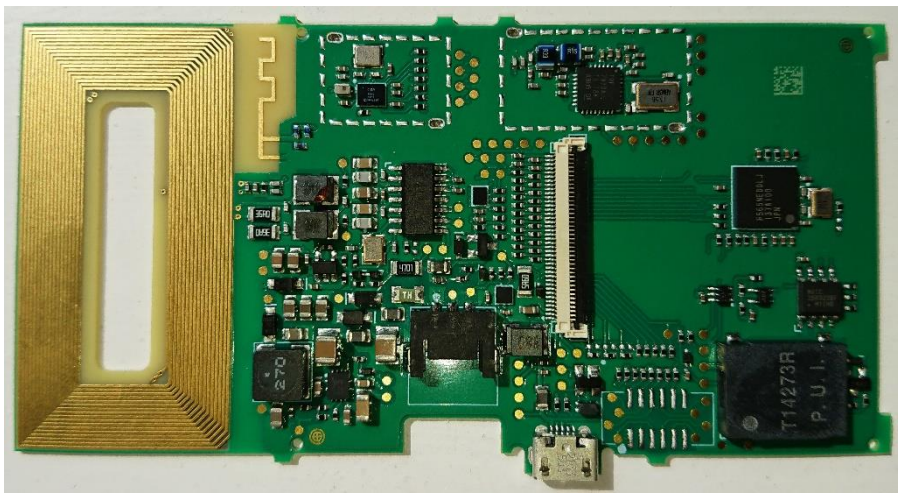
EUT Top View

EUT Bottom View

1.2 Photos – Equipment Internal

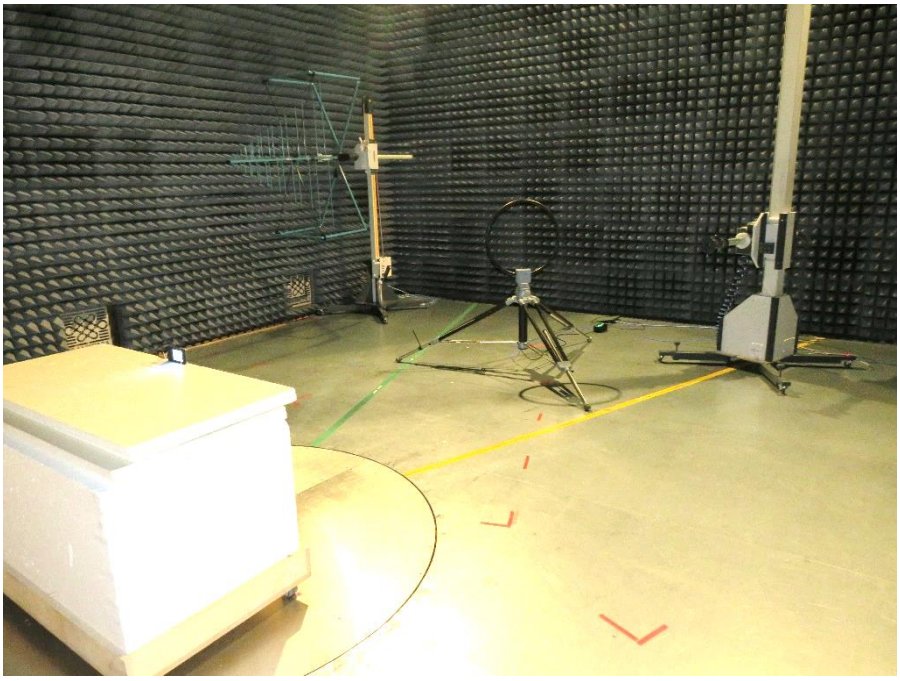
PROI PCBA Front with Display (RFID Antenna 13.56MHz)

PROI PCBA Back with Display (RFID Antenna 125 kHz)


PROI PCBA Back without Display (RFID Antenna 125kHz)


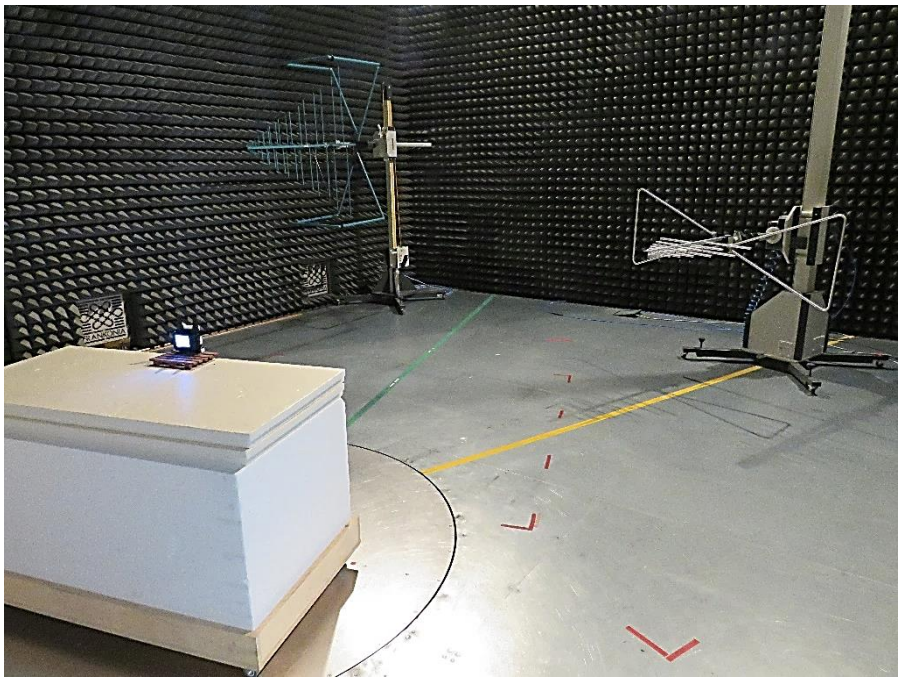
1.3 Photos – Test Setup

Test setup below 30 MHz - view 1

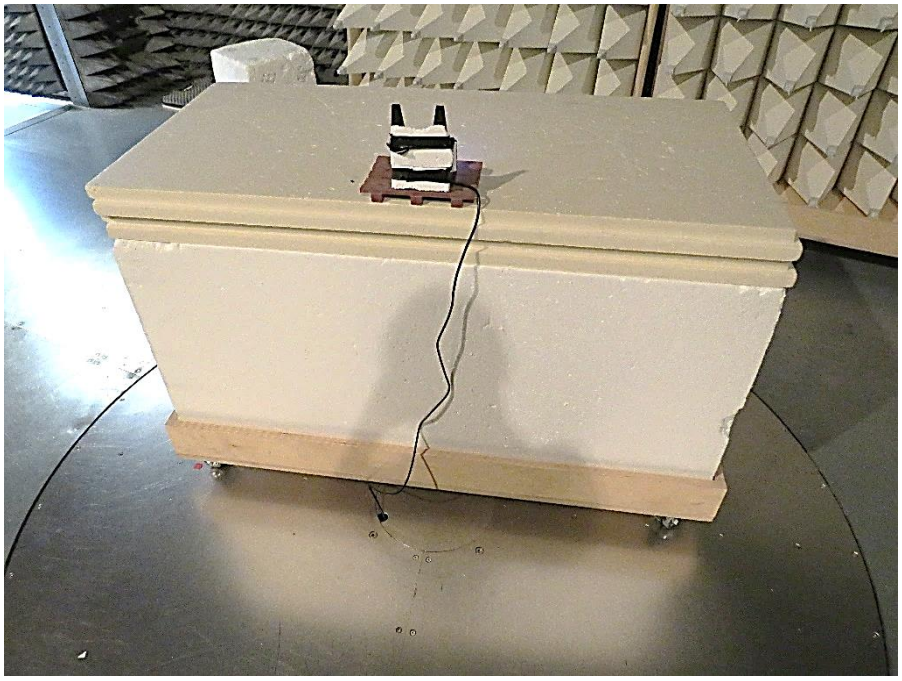


Test setup below 30 MHz - view 2

Test setup above 30 MHz - view 1



Test setup above 30 MHz - view 2



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
None				
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode duty cycle

1.5.1 Information

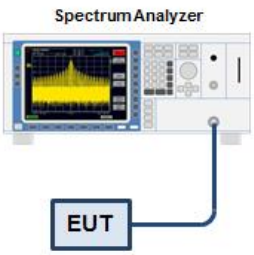
Test Information	
Measurement Method	ANSI C63.10 11.6

1.5.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required (10 x Log_{10}(1/DC)

1.5.3 Setup

Test Setup



1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2023-08	2024-08
Cable	Gigalane	SMS111B CAABB	EF00779	2023-03	2024-03

1.5.5 Procedure

Test Procedure

1. EUT set to test mode
2. Span is set to zero span
3. Detector set to peak
4. Sweep time is set long enough to capture at least 5 bursts
5. Envelope peak value of emission spectrum is selected
6. The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst
7. The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period
8. The duty cycle is calculated by DC = T_{ON} / (T_{ON} + T_{OFF})
9. The duty cycle correction is calculated by DC = 10 x Log_{10}(T_{ON} / (T_{ON} + T_{OFF}))

1.5.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
Transmit	100%	0

1.6 Test Modes

Mode	Description
Transmit	Mode = Transmit Modulation =ASK Duty cycle = 100 %
Comment: The receiver is permanent co-located with transmitter	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [kHz]
F1	Tx / Rx	0	125

1.8 Sample emission level calculation

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

Reading:

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

A.F.:

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

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-210				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
ISED RSS-Gen 6.7 Issue 5 A2	Occupied Bandwidth	ANSI C63.10-2013	N/R	Information only
FCC 15.35(c) ISED RSS-Gen 6.10 Issue 5 A2	Duty Cycle	ANSI C63.10-2013	N/R	Information only
FCC 15.209 ISED RSS-210 7 Issue 10 ISED RSS-Gen 6.13 Issue 5 A2	Radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-210 5 Issue 10 ISED RSS-Gen 7.1 Issue 5 A2	Receiver radiated spurious emissions	ANSI C63.10-2013	N/R	permanently co-located transmitter.
47 CFR 15.207 ISED RSS-210 5 RSS-Gen 7.2	AC power line conducted emissions	ANSI C63.10-2013	N/R	Vehicular use
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

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

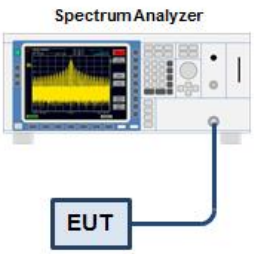
Test Information	
Reference	ISED RSS-Gen 6.7
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	± 1.26 %
Operator	Wilfried Treffke
Date	2023-08-30

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup

Test Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2023-08	2024-08
Cable	Gigalane	SMS111B CAABB	EF00779	2023-03	2024-03

3.1.5 Procedure

Test Procedure

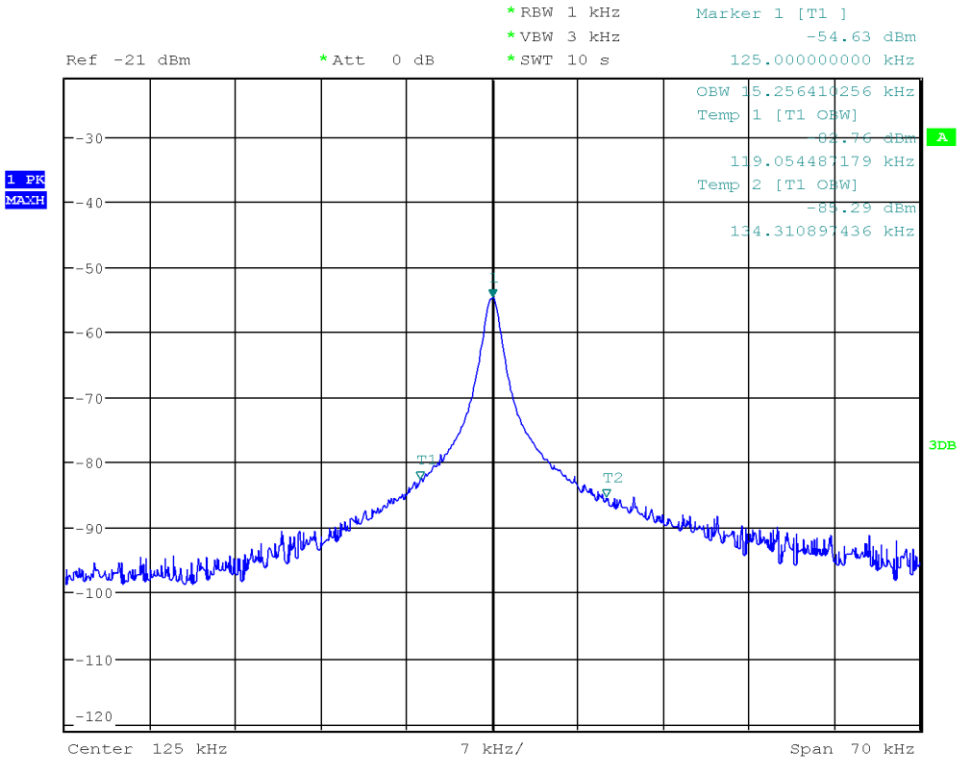
1. EUT transmitter is activated in test mode under normal conditions
2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum
3. Resolution bandwidth set to 1% to 5% of Ocupied Bandwidth
4. The occupied bandwidth (99%) is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Channel [kHz]	Bandwidth [kHz]
Transmit	125	15.25

Occupied Bandwidth

Project Number:	G0M-2306-2102
Applicant:	Bridgestone Mobility Solutions B.V.
Model Description:	Telematic Accessory with Display + RFID + Bluetooth
Model:	PROI
Test Sample ID:	44971
Reference Standards:	FCC 15.225, RSS-210
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	ASK, Channel: 0.125 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-08-30
Occupied Bandwidth [MHz]:	0.015



Date: 30.AUG.2023 14:41:57

3.2 Test Conditions and Results - Radiated spurious emissions

3.2.1 Information

Test Information	
Reference	FCC 15.209 / ISED RSS-210 7
Measurement Method	ANSI C63.10
Measurement Uncertainty	± 5.95 dB
Operator	Florian Voigt
Date	2023-07-15

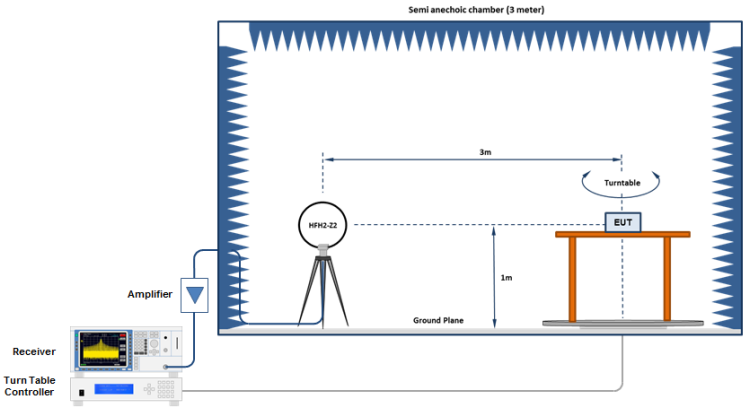
3.2.2 Limits

Limits according to 47 CFR Part 15.209				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
0.009 - 0.090	Average	2400/F	48.5 - 28.5	300
0.090 - 0.110	Quasi-Peak	2400/F	28.5 - 26.8	300
0.110 - 0.490	Average	2400/F	26.8 - 13.8	300
0.490 - 1.705	Quasi-Peak	24000/F	33.8 - 23.0	30
1.705 - 30	Quasi-Peak	30	29.5	30
Note: F [kHz]				

Limits blow 30 MHz according to RSS-Gen				
Frequency range [MHz]	Detector	Limit [µA/m]	Limit [dBµA/m]	Limit Distance [m]
0.009 - 0.090	Average	6.37/F[kHz]	-3.0 to -23.0	300
0.090 - 0.110	Quasi-Peak	6.37/F[kHz]	-23.0 to -24.7	300
0.110 - 0.490	Average	6.37/F[kHz]	-24.7 to -37.7	300
0.490 - 1.705	Quasi-Peak	63.7/F[kHz]	-17.7 to -28.6	30
1.705 - 30	Quasi-Peak	0.08	-21.9	30

Limits above 30 MHz				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 - 88	Quasi-Peak	100	40	3
88 - 216	Quasi-Peak	150	43.5	3

3.2.3 Setup

Test Setup < 30 MHz


3.2.4 Equipment

Test Equipment >30 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2022-11	2025-11
Measurement Receiver	R&S	ESU 26	EF00887	2023-08	2024-08
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2023-02	2024-02
Loop Antenna	R&S	HFH2-Z2	EF00184	2021-01	2024-01

3.2.5 Procedure

Test Procedure
1. EUT set to test mode 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to maximum emission levels

3.2.6 Results

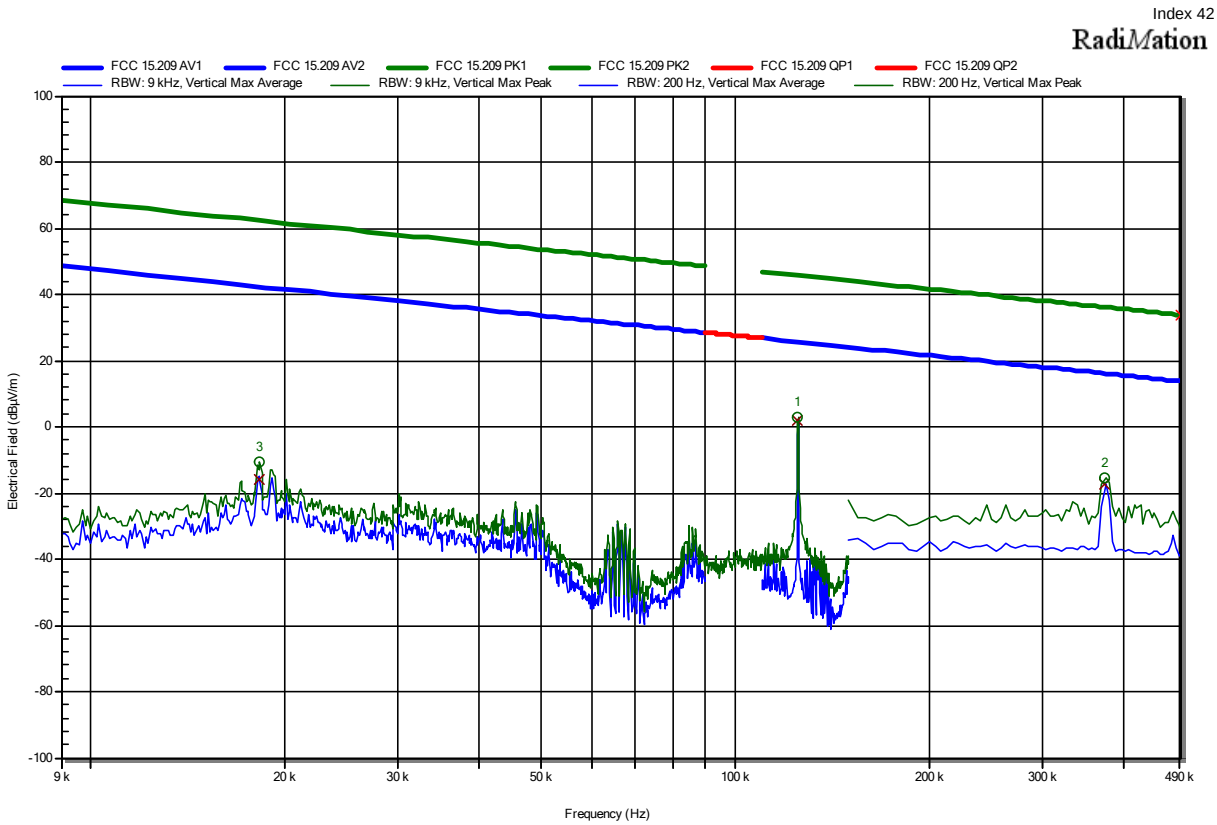
Test Results - 47 CFR Part 15.209						
Channel [kHz]	Emission [kHz]	Level [dBµV/m]	Detector	Polarization	Limit [dBµV/m]	Margin [dB]
125	0.0183	-10.80	pk	ver	62.30	-73.18
125	0.0183	-15.70	avg	ver	42.30	-58.03
125	0.125	02.90	pk	ver	45.70	-42.74
125	0.125	01.70	avg	ver	25.70	-23.97
125	0.375	-15.30	pk	ver	36.10	-51.42
125	0.375	-17.50	avg	ver	16.10	-33.63
125	0.624546	06.90	qpk	ver	31.70	-24.83
125	0.874737	01.00	qpk	ver	28.80	-27.83
125	1.126	-03.00	qpk	ver	26.60	-29.62
125	1.375	-05.00	qpk	ver	24.90	-29.85

Test Results - RSS-210							
Channel [kHz]	Emission [kHz]	Level [dBµA/m]	Detector	Pol.	Limit [dBµA/m]	Limit distance [m]	Margin [dB]
125	125	-49.6	pk	ver	-5.9	300	-43.72
125	125	-50	avg	ver	-25.9	300	-24.17
125	379.5	-76.1	pk	ver	-15.5	300	-60.55
125	379.5	-82.6	avg	ver	-35.5	300	-47.10
125	624.546	-45.9	qpk	ver	-19.8	30	-26.11
125	874.737	-51.6	qpk	ver	-22.8	30	-28.83
125	1125	-55.8	qpk	ver	-24.9	30	-30.87

ANNEX A Radiated spurious emissions - FCC15.209

Radiated Spurious Emissions according to 47 CFR § 15.209

Project Number:	G0M-2306-2102
Applicant:	Bridgestone Mobility Solutions B.V.
Model Description:	Telematic Accessory with Display + RFID + Bluetooth
Model:	PROI
Test Sample ID:	44644 (SN: 00213E8059F6)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12 V DC (24 V DC)
Antenna:	Rohde & Schwarz HFH 2-Z2, Vertical
Measurement distance:	3 m
Mode:	Tx; RFID 125 kHz, ASK
Test Date:	2023-07-15

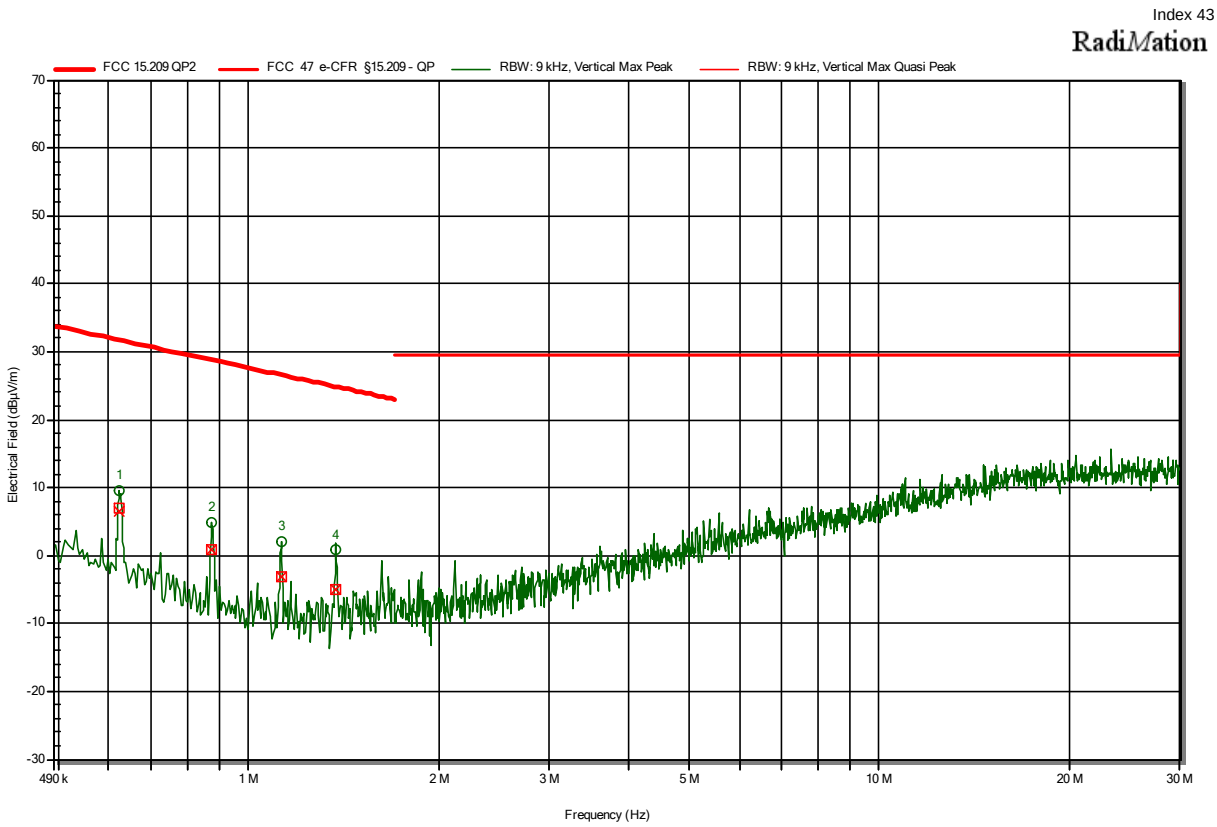


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
18.3 kHz	-10.8 dBµV/m	62.3 dBµV/m	-73.18 dB	Pass
125 kHz	2.9 dBµV/m	45.7 dBµV/m	-42.74 dB	Pass
375 kHz	-15.3 dBµV/m	36.1 dBµV/m	-51.42 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
18.3 kHz	-15.7 dBµV/m	42.3 dBµV/m	-58.03 dB	Pass
125 kHz	1.7 dBµV/m	25.7 dBµV/m	-23.97 dB	Pass
375 kHz	-17.5 dBµV/m	16.1 dBµV/m	-33.63 dB	Pass

Radiated Spurious Emissions according to 47 CFR § 15.209

Project Number:	G0M-2306-2102
Applicant:	Bridgestone Mobility Solutions B.V.
Model Description:	Telematic Accessory with Display + RFID + Bluetooth
Model:	PROI
Test Sample ID:	44644 (SN: 00213E8059F6)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12 V DC (24 V DC)
Antenna:	Rohde & Schwarz HFH 2-Z2, Vertical
Measurement distance:	3 m
Mode:	Tx; RFID 125 kHz, ASK
Test Date:	2023-07-15
Note:	

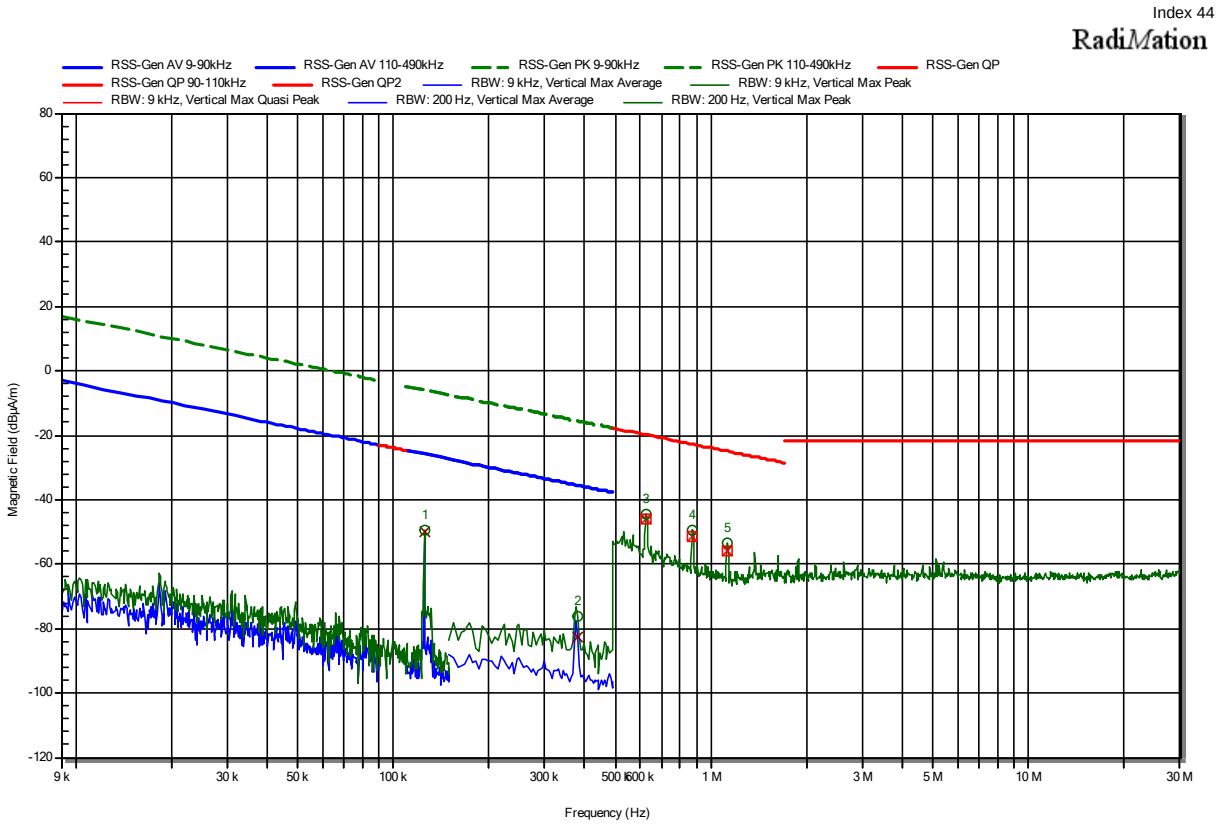


Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
624.546 kHz	6.9 dBµV/m	31.7 dBµV/m	-24.83 dB	Pass
874.737 kHz	1 dBµV/m	28.8 dBµV/m	-27.83 dB	Pass
1.126 MHz	-3 dBµV/m	26.6 dBµV/m	-29.62 dB	Pass
1.375 MHz	-5 dBµV/m	24.9 dBµV/m	-29.85 dB	Pass

ANNEX B Radiated spurious emissions – RSS - Gen

Radiated Spurious Emissions according to RSS-Gen Issue 5

Project Number:	G0M-2306-2102
Applicant:	Bridgestone Mobility Solutions B.V.
Model Description:	Telematic Accessory with Display + RFID + Bluetooth
Model:	PROI
Test Sample ID:	44644 (SN: 00213E8059F6)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12 V DC (24 V DC)
Antenna:	Rohde & Schwarz HFH 2-Z2, Vertical
Measurement distance:	3 m
Mode:	Tx; RFID 125 kHz, ASK
Test Date:	2023-07-15



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
125 kHz	-49.6 dBµA/m	-5.9 dBµA/m	-43.72 dB	Pass
379.5 kHz	-76.1 dBµA/m	-15.5 dBµA/m	-60.55 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
125 kHz	-50 dBµA/m	-25.9 dBµA/m	-24.17 dB	Pass
379.5 kHz	-82.6 dBµA/m	-35.5 dBµA/m	-47.1 dB	Pass

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
624.546 kHz	-45.9 dBµA/m	-19.8 dBµA/m	-26.11 dB	Pass
874.737 kHz	-51.6 dBµA/m	-22.8 dBµA/m	-28.83 dB	Pass
1.125 MHz	-55.8 dBµA/m	-24.9 dBµA/m	-30.87 dB	Pass

= = = END OF TEST REPORT = = =