

Test Report

Test Report Number	EOTEL003
Applied Standard(s)	FCC Part15 Subpart C / ANSI C63.4-2003
Date of Issue	26th November, 2013
Testing Laboratory Address	Astronaut Noborito Laboratory 294 Noborito, Tama-ku Kawasaki-shi, Kanagawa, 214-0014 Japan
Test Date(s)	25th October, 2013
Product Name	Tire molding pressure transmitter
Model Number	11S-US
Serial Number	-
Applicant (Client) Address	Bridgestone Corporation 3-1-1, Ogawahigashi-Cho, Kodaira-Shi, Tokyo, 187-8531 Japan
Manufacturer Address	Denshitsu Shin Co., Ltd SIC3-3305, Kamimizo, Chuou-ku, Sagami-hara-shi, Kanagawa-ken 252-0243 Japan

Test Result

The test result for the electromagnetic compatibility tests as described in the section 1 to 2 and in this page was:

Pass

Tested by: Katsutoshi Hatanaka
Katsutoshi Hatanaka
Test Engineer

Approved by: Koji Imai
Koji Imai
Testing Group Leader

Checked box (☒) indicates that the listed condition, standard or equipment is applicable for this Report.
Blank box (☐) indicates that the listed condition, standard or equipment is not applicable for this Report.
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Test results of this report refer only to the EUT tested here.

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1. Summary

1.1 Terms and definitions

AV
Average

DoC
Declaration of Conformity

EUT
Equipment Under Test

QP
Quasi-peak

1.2 Standard(s) and Result

Applied Standard(s)	Normative Reference(s)	Test Limit	FCC Part and RSS Section(s)	Result	Reference Clause No.
FCC Part15 Subpart C IC	20dB Bandwidth	FCC 15.231 (c)Limits	15.231(c)	Pass	3.2
	Conditions for intentional radiators to comply with periodic operation	FCC 15.231 (e)Limits	15.231(e)	Pass	3.3
	Field Strength	FCC 15.209 limits FCC 15.231 limits	15.231 (b)(e)	Pass	3.4

Table 1 Standard and result

1.3 Deviations from Standard(s)

There was no deviation from the standard.

1.4 Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

The antennas of the Bridgestone Corporation are permanently attached.
There are no provisions for connection to an external antenna

Conclusion:

The Bridgestone Corporation. FCC ID: SBD11S-US equipment complies with the requirement of §15.203.

2. Equipment Under Test (EUT)

2.1 General Descriptions

It is the molding pressure information transmitter of the tire to use in a factory.

2.2 Detailed Descriptions

Product Name	Tire molding pressure transmitter
Model Number	11S-US
Serial Number	—
Power Supply	DC 3.0V (Battery×2)
Dimension	66mm(W) ×90mm(H) × 28mm(D)
Operating Frequency	426.0625MHz
Equipment Category	Security / Remote Control Transmitter
Normal Placement	Industrial test equipment (in door)
Condition of the EUT	Product
FCC ID	SBD11S-US

Table 2 Detailed Description

2.3 Labeling Requirements

§15.19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2). Please see attachment for FCC ID label and label location.

Conclusion:

The Bridgestone Corporation. FCC ID: SBD11S-US equipment complies with the requirement of §15.19.

2.4 Measurement Condition

2.4.1 EUT Operation

The EUT was measured by transmitter mode continuously.

2.4.2 Configuration and Peripherals

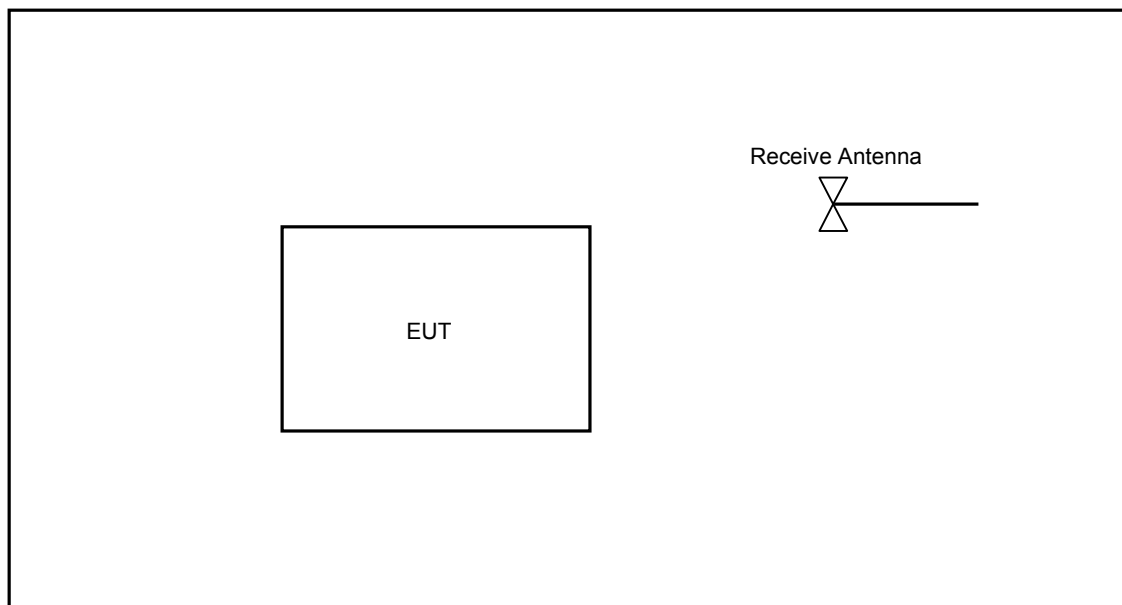


Figure 1 configuration and Peripherals

2.4.3 EUT

Mark	Description	Model number	Serial Number	FCC ID Code or DoC status	Manufacturer
1	Tire molding pressure transmitter	11S-US	-	SBD11S-US	Denshitsuushin.co.,Ltd

Table 3 EUT

3. Test Data

3.1 Test specification

Standard	FCC Part15 Subpart C
Tested Frequency	426.0625MHz
Test Date	25 th October 2013
Test Location	Astronaut Noborito Laboratory Thermostatic chamber
Test Engineer	Katsutoshi Hatanaka
Temperature	23.3 °C
Humidity	43.8% RH
Power Supply	DC 3.0V (Battery×2)

Table 4 Test specification

3.2 15.231(d) 20dB Bandwidth

3.2.1 Test Result

Pass

3.2.2 Test Detail

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices Operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission Shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB Down from the modulated carrier.

3.2.3 Test data

Measurement frequency (MHz)	Result(kHz)	Limits(kHz) Limits= frequency×0.25%
426.0625	6.00	1065.156

Table 5 20dB Bandwidth

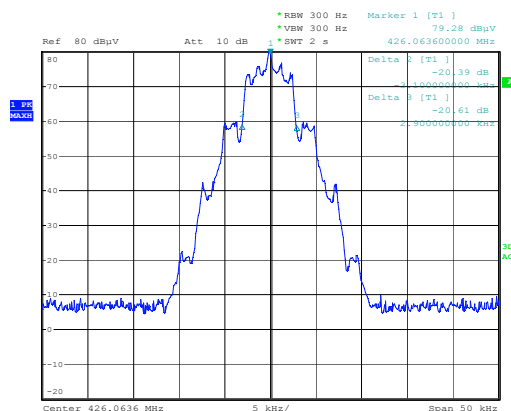


Figure 2 20dB Bandwidth

3.3 15.231(e) Conditions for intentional radiators to comply with periodic operation

3.3.1 Test Result

Pass

3.3.2 Test Detail

(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following.

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

3.3.3 Test Data

Result			
Duration of transmission		Duration of each Transmission	
1 st	2 nd	1 st	2 nd
43.20ms	5.70ms	10.16s	10.24s

Table 6 Duration of transmission/Duration of each Transmission

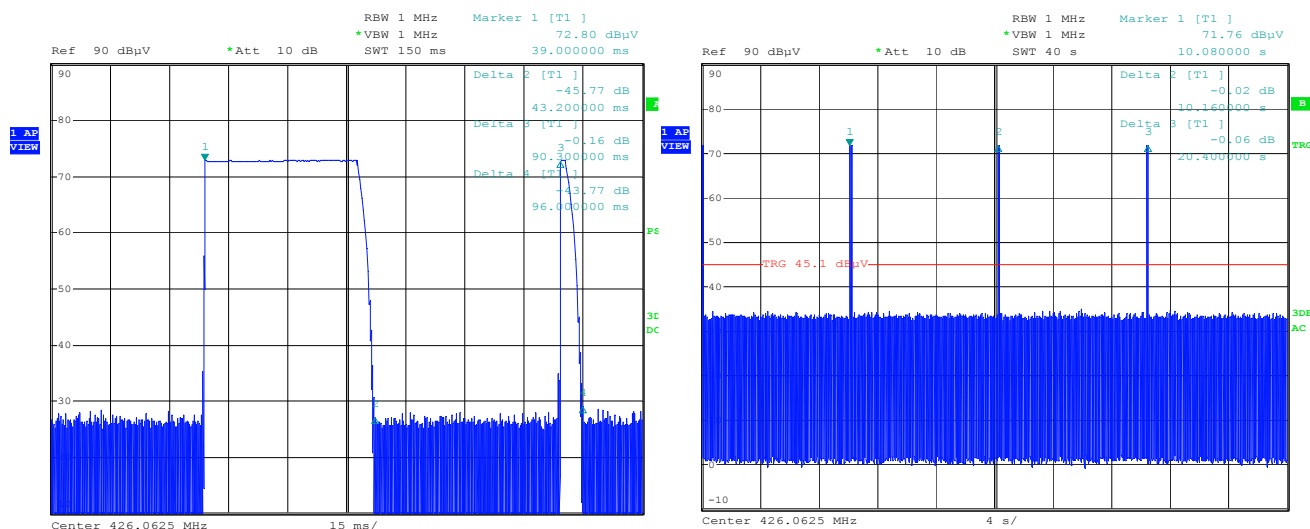


Figure 3 Duration of transmission/Duration of each Transmission

3.4 15.231(e) Field strength of emissions

3.4.1 Test Result

Pass

3.4.2 Test Detail

Fundamental frequency (MHz)	Field Strength of the Fundamental		Field Strength of Unwanted emissions	
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
40.66-40.70	1,000	60	100	40
70-130	500	53.9	50	33.9
130-174	500 to 1,500*	53.9-63.5*	50 to 150*	33.9 to 43.5*
174-260	1,500	63.5	150	43.5
260-470	1,500 to 5,000*	63.5 to 73.9*	150 to 500*	43.5 to 53.9*
Above 470	5,000	73.9	500	53.9

* Linear interpolations

Table 7 Field strength of emissions limits

Notes:

- (1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
- (2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission applies, further, compliance with the provisions of 15.205 shall be demonstrated using the measurement instrumentation specified in that section.
- (3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 15.209, whichever limit permits a higher field strength.

3.4.3 Test data

Emission Frequency (MHz)	Level (dB μV)	Factor (dB)	Antenna Position (m)	Turntable Angle (°)	EUT Pol. (H/V)	3m Field Strength (dB $\mu\text{V/m}$)		Limit (dB $\mu\text{V/m}$)		Margin (dB)	
						Average	Peak	Average	Average +20dB	Average	Peak
426.0625	80.9	-11.1	1.01	281	V	69.8	76.1	72.6	92.6	2.8	16.5
426.0625	76.3	-11.1	1.01	24	H	65.2	71.5	72.6	92.6	7.4	21.1

Table 8 Field strength of the fundamental results

Emission Frequency (MHz)	Level (dBμV)	Factor (dB)	Antenna Position (m)	Turntable Angle (°)	EUT Pol. (H/V)	3m Field Strength (dBμV/m)		Limit(dBμV/m)		Margin(dB)	
						Average	Peak	Average	Average +20dB	Average	Peak
85.080	35.7	-22.7	1.01	182	V	13.0	19.3	33.9	53.9	20.9	40.0
340.600	47.4	-13.4	1.01	24	H	34.0	40.3	49.0	69.0	15.0	28.7
511.400	34.9	-9.6	1.01	48	V	25.3	31.6	53.9	73.9	28.6	42.3
596.800	35.3	-8.0	1.01	48	V	27.3	33.5	53.9	73.9	26.6	40.3
1705.411	53.0	-14.7	1.11	285	V	38.3	44.6	53.9	73.9	15.6	29.3
1785.571	55.8	-13.6	1.11	285	V	42.2	48.4	53.9	73.9	11.7	25.5
2026.052	59.1	-11.5	2.67	6	H	47.6	53.8	53.9	73.9	6.3	20.0
4951.904	47.9	-5.3	3.40	41	H	42.6	48.8	53.9	73.9	11.3	25.0

Table 9 Field Strength of Unwanted emissions results

Note :

- (1) Measuring distance : 3m
- (2) Antenna height variation : 1 - 4m
- (3) Turn table position : 0 - 360°
- (4) All measurements were performed using a Logperidodec Antenna. The antenna was positioned in three orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.
The EUT was positioned in three orthogonal planes to determine the orientation resulting in the worst case emissions.
- (5) Analyzer setting for measurements :
 - 30 to 1000MHz : peak detector
 - Above 1GHz : peak detector
- (6) Field Strength Level $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dB\mu V]} + \text{Factor }_{[dB/m]}$
 $\text{Factor }_{[dB]} = \text{Antenna Factor }_{[dB]} + \text{Cable Loss }_{[dB]} + \text{Amp Factor }_{[dB]} + \text{Duty Cycle Average Factor }_{[dB]}$
 $\text{Duty Cycle Average Factor }_{[dB]} = 20\log_{10} (43.2\text{ms} + 5.7\text{ms}) + 100\text{ms}$
- (7) Margin $_{[dB]} = \text{Limit }_{[dB\mu V/m]} - \text{Field Strength Level }_{[dB\mu V/m]}$

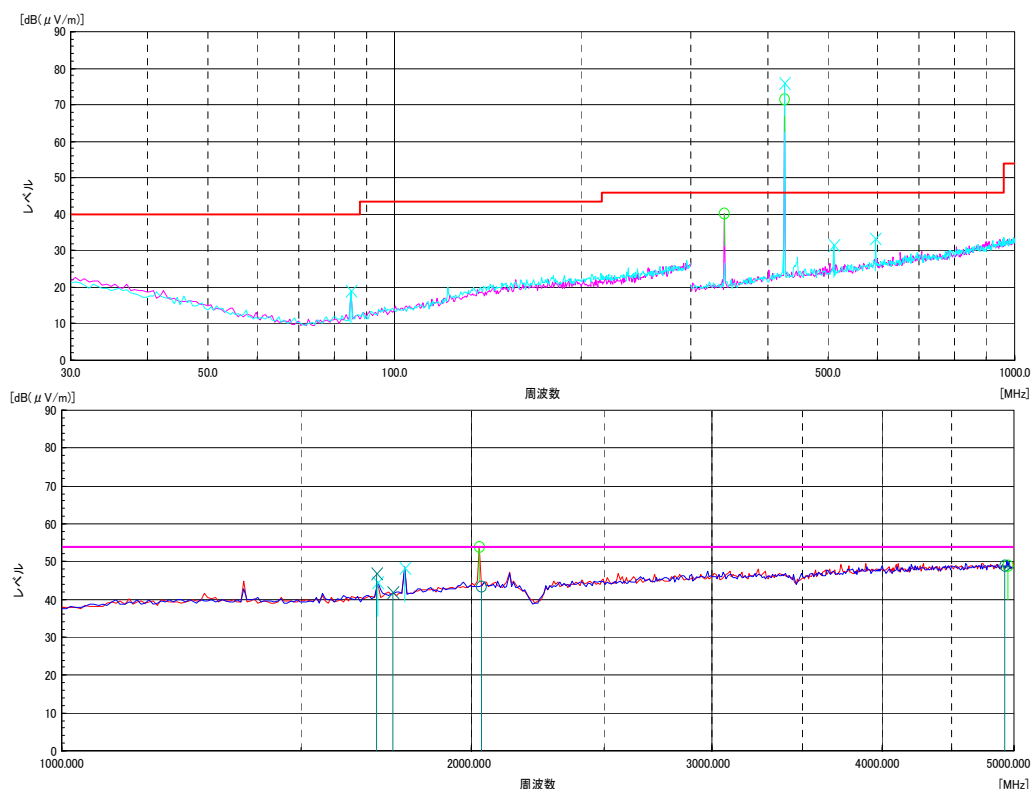
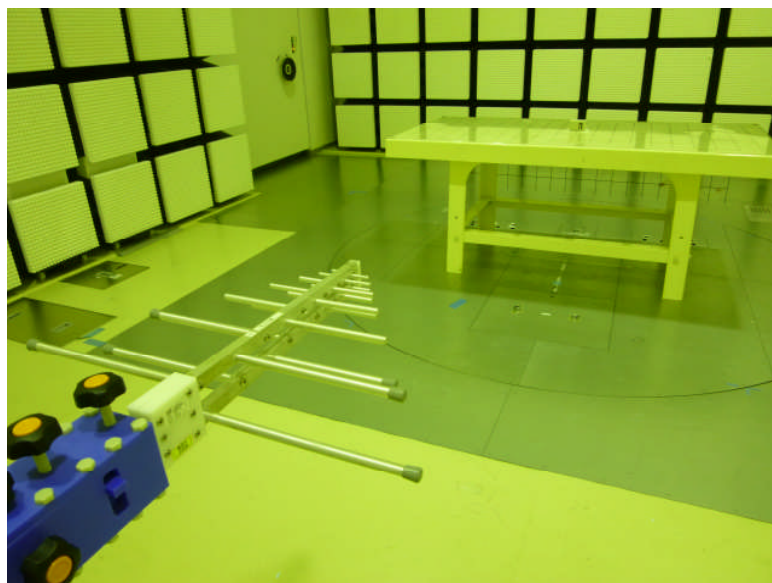
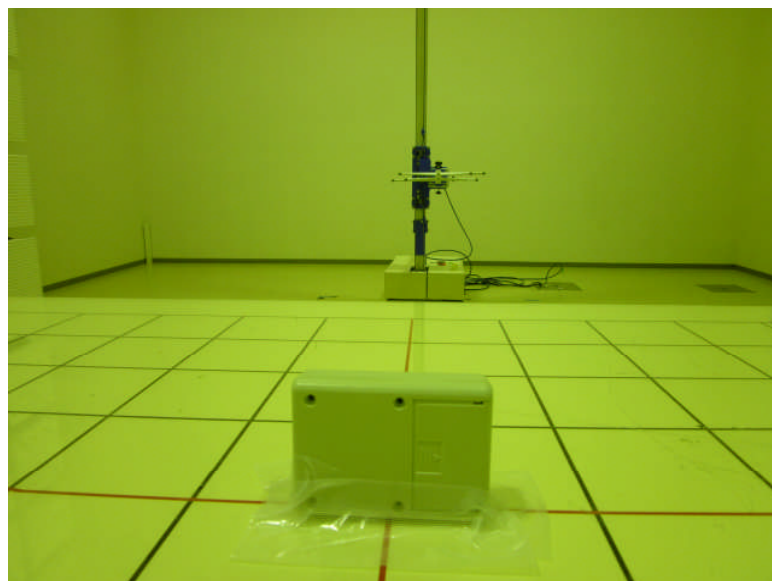


Figure 4 Field strength of emissions Plot

4. Photographs of Test Setup



**Photo1 Test Setup for Field Strength of emissions
(Antenna Side)**



**Photo2 Test Setup for Field Strength of emissions
(EUT Side)**

5. Test Instruments

5.1 Test Instruments

Product Name	Manufacturer	Model Number	Serial Number	Calibration Date	Due Date
Spectrum analyzer Receiver	Rohde&Schwarz	ESIB40	100263	2013/6/26	2014/6/30
Pre-Amplifier	SONOMA	310N	270610	2013/7/11	2014/7/31
Pre-Amplifier	Toyo	TPA0108-40	632	2013/7/11	2014/7/31
Biconical Antenna	Schwarzbeck	VHAP9103	91032542	2013/6/10	2014/6/30
Logperidodec Antenna	Schwarzbeck	UHALP9108A	0779	2013/6/10	2014/6/30
Horn Antenna	ETS-LINDGREN	3117	00146463	2013/5/01	2014/5/31

Table 10 Field strength emissions & Bandwidth

5.2 Interconnecting Cables

Mark	Description	Length (m)	Shielded		Tested Port(s) (Note:1)	
			Cable	Connector	Applicable	Interface
1	Antenna cable	12.0	Shielded	Shielded	No	RF Signal

Note1: Tested port(s) required for applicable standard(s).

Remarks: The length described here is the length of the cable typically used in the tests, but different length of the cable may be used in some tests to satisfy the requirements for the test.

Table 11 Interconnecting Cables