RADIO TEST REPORT

Test Report No.: 11632280S-A-R1

Applicant	:	**Bridgestone Corporation**
Type of Equipment	:	**NEXT B-TAG July 2017 Ver Reader/Writer Outer case**
Model No.	:	**K812**
FCC ID	:	**SBDK812**
Test regulation	:	**FCC Part15 Subpart C: 2017**
Test result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This report is a revised version of 11632280S-A.

Date of test: March 28 to 30, 2017

Tested by:

Makoto Hosaka
Engineer
Consumer Technology Division

Approved by :

Akio Hayashi
Leader
Consumer Technology Division

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

RTL02610

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REVISION HISTORY

Original Test Report No.: 11632280S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11632280S-A	July 31, 2017	-	-
1	11632280S-A-R1	August 24, 2017	4	Correction of Antenna type

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SECTION 1: Customer information

Company Name	:	Bridgestone Corporation
Brand name	:	BRIDGESTONE
Address	:	1-1, Kyobashi 3-chome, Chuo-ku, Tokyo 104-8340, Japan
Telephone Number	:	+81-3-6836-3368
Facsimile Number	:	+81-3-6836-3364
Contact Person	:	Shinichiro Terada

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	NEXT B-TAG July 2017 Ver Reader/Writer Outer case
Model Number	:	K812
Serial Number	:	Refer to Section 4.2
Rating	:	DC 5 V
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Receipt Date of Sample	:	March 27, 2017
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: K812 (referred to as the EUT in this report) is NEXT B-TAG July 2017 Ver Reader/Writer Outer case.

Feature of EUT:
It is used as an attachment of mobile device.
The wireless function is used to;
- prompt the TPMS sensor to switch ON/OFF
- transmit signal of 125 kHz to register the information
- receive the information of tire pressure and temperature (433.92 MHz)

Clock frequencies: 125 kHz, 8 MHz, 10.7 MHz (IF), 13.225625 MHz, 433.92 MHz

<Radio part>

Radio type	:	Transmitter
Frequency of operation	:	125 kHz
Modulation	:	ASK
Antenna type	:	Coil
Antenna gain	:	2.5 dBi
ITU code	:	A1D

Radio type	:	Receiver
Receiver type	:	Super-heterodyne
Frequency of operation	:	433.92 MHz
Antenna type	:	1/4λ

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements

* The revision on June 14, 2017, does not affect the test specification applied to the EUT.

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2013	FCC 15.207	-	N/A *1)	-	N/A
Electric field strength of Fundamental emission	ANSI C63.10:2013	FCC 15.209	Radiated	N/A	10.3 dB Polarization: 0 deg. Detection: Average	Complied
Electric field strength of Spurious emission	ANSI C63.10:2013	FCC 15.209	Radiated	N/A	7.1 dB Freq.: 255.998 MHz Polarization: Vertical	Complied
-26 dB bandwidth	ANSI C63.10:2013	-	Radiated	N/A	-	-
*1) The test is not applicable since the EUT has no AC mains. Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						

FCC 15.31 (e)
This EUT provides stable voltage (DC 5 V) constantly to RF transmitter regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203
The equipment and its antenna comply with this requirement since the EUT has a unique coupling/antenna connector.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99 %)	RSS-Gen 6.6	-	Radiated	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

* Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k*=2.

Item	Frequency range	No.1 SAC*1 /SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

The data listed in this test report has enough margin, more than site margin.

Other tests
Bandwidth Measurement uncertainty for this test was: (±) 1.01 %

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

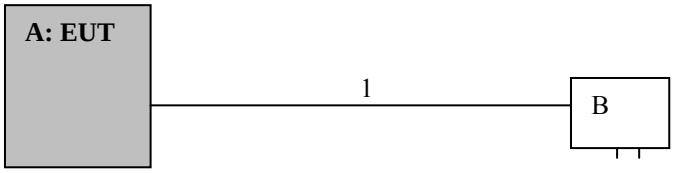
Test item	Operating mode	Tested frequency
All items	Transmitting (Duty Cycle: 100 percent *1)	125 kHz

*1) The test was performed under the condition of Continuous wave in consideration of the worst case.

Software for testing: 96W2152F010001
Power setting: Fixed

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	NEXT B-TAG July 2017 Ver Reader/Writer Outer case	K812	11	YOKOWO CO., LTD.	EUT
B	AC Adaptor	IU08-2050120-WP	-	MOTOROLA	-

List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	3.0	Shielded	Shielded	*2)

*2) The cable is normally connected to a mobile device and transmission from the EUT is controlled by the mobile device. However, the test sample which can conduct continuous transmission when supplied with power via USB was used. In order to take the data of carrier and spurious emission in the worse-case, the mobile device was not installed in the EUT.

SECTION 5: Radiated emission (Fundamental and Spurious emission)

5.1 Operating environment

The test was carried out in a semi-anechoic chamber.

Temperature : Refer to APPENDIX 1.
Humidity : Refer to APPENDIX 1.

5.2 Test configuration

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 9 kHz - 1 GHz
Test distance : 3 m
EUT position : Table top

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane at a distance of 3 m.
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788. These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane. However test results were confirmed to pass against standard limit.

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3 m
Frequency: From 9 kHz to 30 MHz at distance 3 m
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical polarization (antenna angle: 0 deg.to 360 deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

Frequency: From 30 MHz to 1 GHz at distance 3m (Refer to Figure 2).
The measuring antenna height was varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

	9 kHz to 90 kHz & 110 kHz to 150 kHz	90 kHz to 110 kHz	150 kHz to 490 kHz	490 kHz to 30 MHz	30 MHz to 1 GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Measuring antenna	Loop antenna				Biconical (30 MHz -199.99 MHz) Logperiodic (200 MHz-1 GHz)

* FCC 15.31 (f)(2) (9 kHz-30 MHz)
9 kHz – 490 kHz [Limit at 3 m]= [Limit at 300 m]-40log (3[m]/300[m])
490 kHz – 30 MHz [Limit at 3 m]= [Limit at 30 m]-40log (3[m]/30[m])

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT, and the test was made with the condition that has the maximum noise. Worst axis: Refer to the data.

5.5 Results

Summary of the test results : Pass

Refer to APPENDIX 1.

Figure 1. Direction of the Loop Antenna

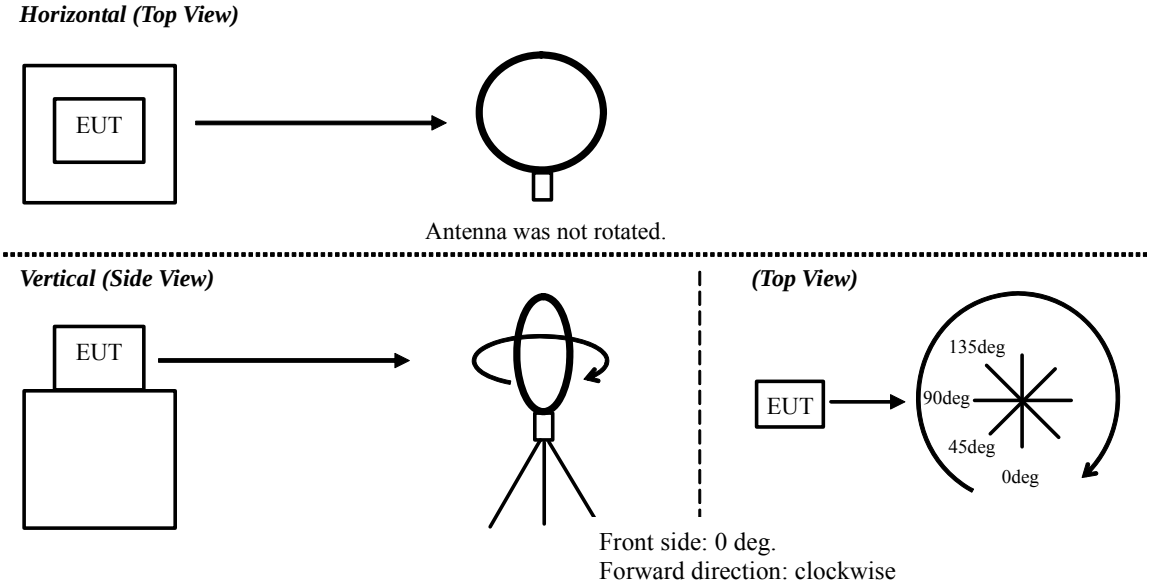
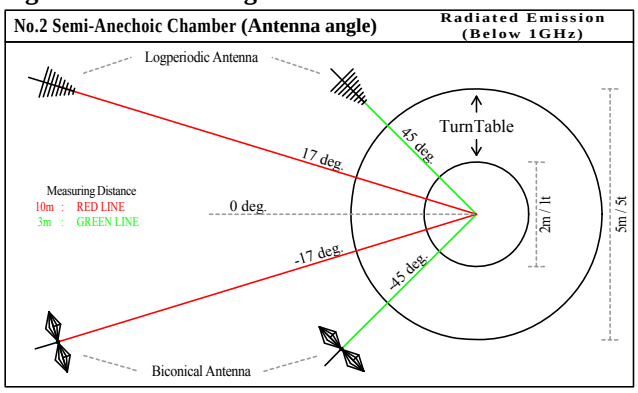


Figure 2. Antenna angle



SECTION 6: -26 dB bandwidth & Occupied bandwidth (99 %)

Test procedure

The test was measured with a spectrum analyzer using a test fixture.

Results

Summary of the test results: Pass
Refer to APPENDIX 1.

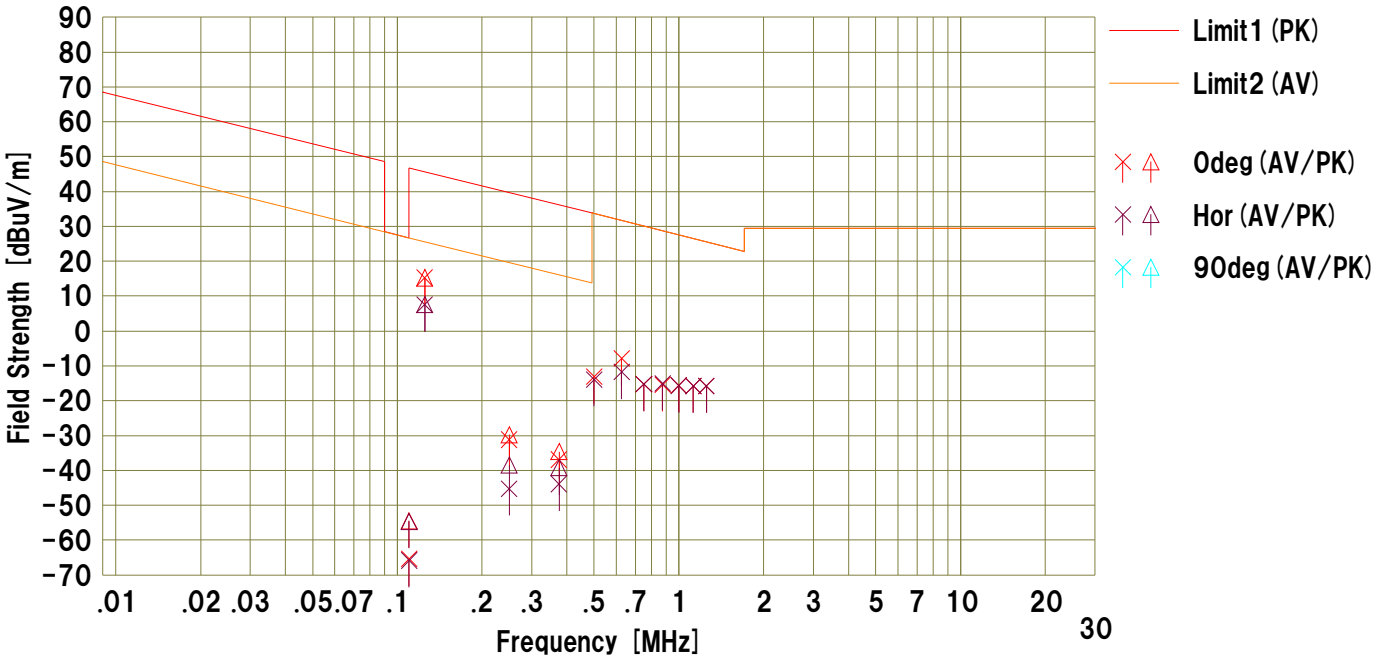
DATA OF RADIATED EMISSION (below 30MHz) TEST

UL Japan,Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2017/03/28

Company : Bridgestone Corporation
Kind of EUT : Outer case K812
Model No. : K812
Serial No. : 11
Remarks : EUT Axis: Hor:Z , Ver:X

Mode : Transmitting125kHz
Order No. : 11632280S
Power : DC 5 V
Temp./Humi. : 18 deg.C / 35 %RH

Limit1 : FCC15.209 (a) , 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15.209 (a) , 9-90kHz:AV, 110-490kHz:AV, other:QP Engineer : Makoto Hosaka



No.	Freq.	Reading <AV>	Reading <PK>	Ant.Fac	Loss	Gain	S.Fac	Result <AV>	Result <PK>	Limit <PK>	Limit <AV>	Margin <PK>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	0.11001	20.30	31.30	19.67	6.06	31.44	-80.00	-65.41	-54.41	46.70	26.70	101.1	92.1	0deg	43	
2	0.12500	101.20	101.20	19.65	6.06	31.63	-80.00	15.28	15.28	45.60	25.60	30.3	10.3	0deg	43	
3	0.25000	55.10	56.50	19.60	6.08	31.95	-80.00	-31.17	-29.77	39.61	19.61	69.3	50.7	0deg	231	
4	0.37500	49.40	51.70	19.56	6.09	31.95	-80.00	-36.90	-34.60	36.11	16.11	70.7	53.0	0deg	46	
5	0.50000	33.20	---	19.54	6.11	31.95	-40.00	-13.10	---	33.62	33.62	---	46.7	0deg	225	QP
6	0.62500	38.40	---	19.52	6.12	31.94	-40.00	-7.90	---	31.67	31.67	---	39.5	0deg	37	QP
7	0.75000	31.10	---	19.52	6.13	31.94	-40.00	-15.19	---	30.08	30.08	---	45.2	0deg	0	QP
8	0.87500	30.90	---	19.48	6.15	31.94	-40.00	-15.41	---	28.73	28.73	---	44.1	0deg	0	QP
9	1.00000	30.70	---	19.49	6.16	31.94	-40.00	-15.59	---	27.56	27.56	---	43.1	0deg	0	QP
10	1.12500	30.50	---	19.49	6.17	31.94	-40.00	-15.78	---	26.53	26.53	---	42.3	0deg	0	QP
11	1.25000	30.50	---	19.49	6.17	31.94	-40.00	-15.78	---	25.61	25.61	---	41.3	0deg	0	QP
12	0.11001	19.90	31.10	19.67	6.06	31.44	-80.00	-65.81	-54.61	46.70	26.70	101.3	92.5	Hor	126	
13	0.12500	93.50	93.50	19.65	6.06	31.63	-80.00	7.58	7.58	45.60	25.60	38.0	18.0	Hor	161	
14	0.25000	41.00	47.80	19.60	6.08	31.95	-80.00	-45.27	-38.47	39.61	19.61	78.0	64.8	Hor	183	
15	0.37500	42.40	47.10	19.56	6.09	31.95	-80.00	-43.90	-39.20	36.11	16.11	75.3	60.0	Hor	110	
16	0.50000	32.40	---	19.54	6.11	31.95	-40.00	-13.90	---	33.62	33.62	---	47.5	Hor	142	QP
17	0.62500	34.50	---	19.52	6.12	31.94	-40.00	-11.80	---	31.67	31.67	---	43.4	Hor	1	QP
18	0.75000	31.00	---	19.52	6.13	31.94	-40.00	-15.29	---	30.08	30.08	---	45.3	Hor	0	QP
19	0.87500	31.30	---	19.48	6.15	31.94	-40.00	-15.01	---	28.73	28.73	---	43.7	Hor	0	QP
20	1.00000	30.60	---	19.49	6.16	31.94	-40.00	-15.69	---	27.56	27.56	---	43.2	Hor	0	QP
21	1.12500	30.50	---	19.49	6.17	31.94	-40.00	-15.78	---	26.53	26.53	---	42.3	Hor	0	QP

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

DATA OF RADIATED EMISSION TEST

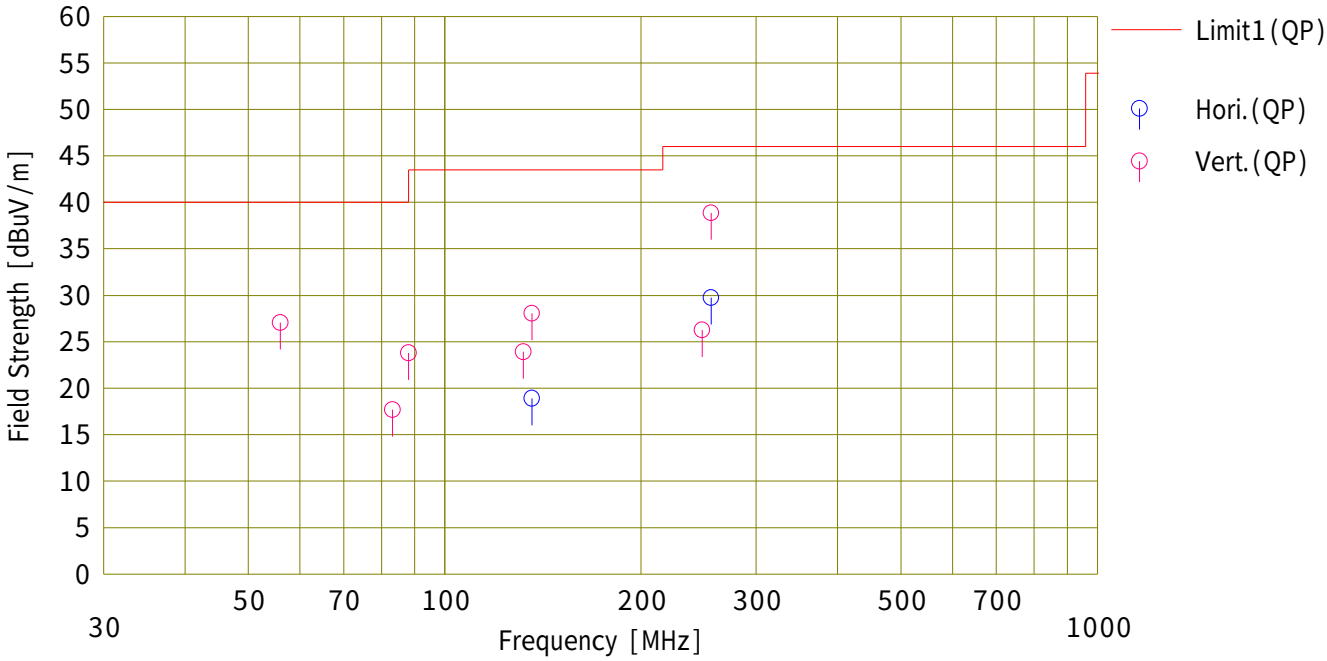
UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2017/03/29

Company : **Bridgestone Corporation**
Kind of EUT : Outer case K812
Model No. : K812
Serial No. : 11
Remarks : EUT Axis: Z

Mode : Transmitting125kHz
Order No. : 11632280S
Power : DC 5 V
Temp./Humi. : 16 deg.C / 36 %RH

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:AV

Engineer : Hikaru Shirasawa



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	136.005	28.36	14.09	8.27	31.81	18.91	43.50	24.5	Hori.	228	131	BC	
2	255.997	43.27	11.93	6.24	31.69	29.75	46.00	16.2	Hori.	303	248	LP	
3	56.001	42.82	8.98	7.16	31.89	27.07	40.00	12.9	Vert.	100	214	BC	
4	83.196	34.55	6.87	8.14	31.86	17.70	40.00	22.3	Vert.	100	186	BC	
5	88.002	39.73	7.80	8.14	31.86	23.81	43.50	19.6	Vert.	100	359	BC	
6	131.941	33.78	13.80	8.16	31.82	23.92	43.50	19.5	Vert.	100	42	BC	
7	136.001	37.50	14.09	8.27	31.81	28.05	43.50	15.4	Vert.	100	258	BC	
8	247.999	40.08	11.72	6.17	31.70	26.27	46.00	19.7	Vert.	100	328	LP	
9	255.998	52.40	11.93	6.24	31.69	38.88	46.00	7.1	Vert.	382	237	LP	

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT+ΔAF)[dB]-Gain(AMP)[dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

-26dB Bandwidth (FCC) / 99% Occupied Bandwidth

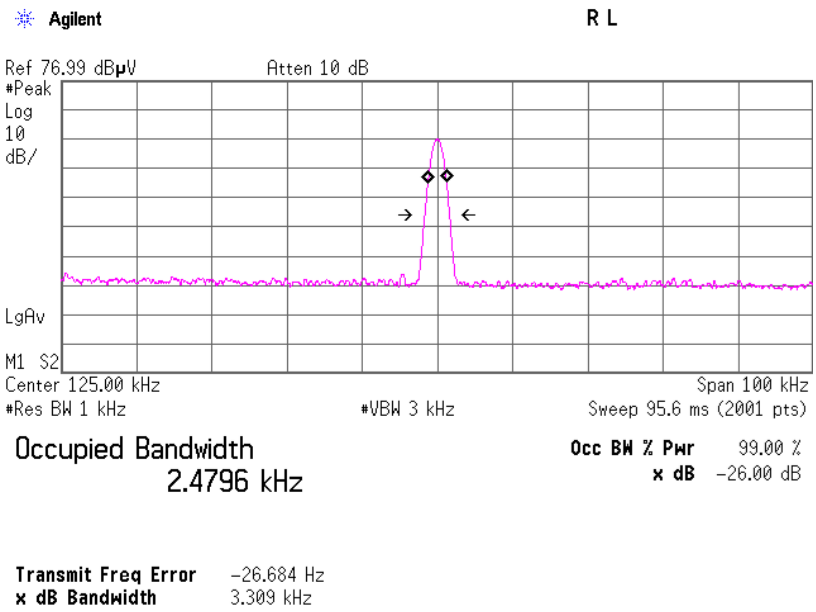
UL Japan, Inc. Shonan EMC No.5 Shielded room
DATE : March 30, 2017

COMPANY : Bridgestone Corporation
EQUIPMENT : **Outer case K812**
MODEL NUMBER : K812
SERIAL NUMBER : 11

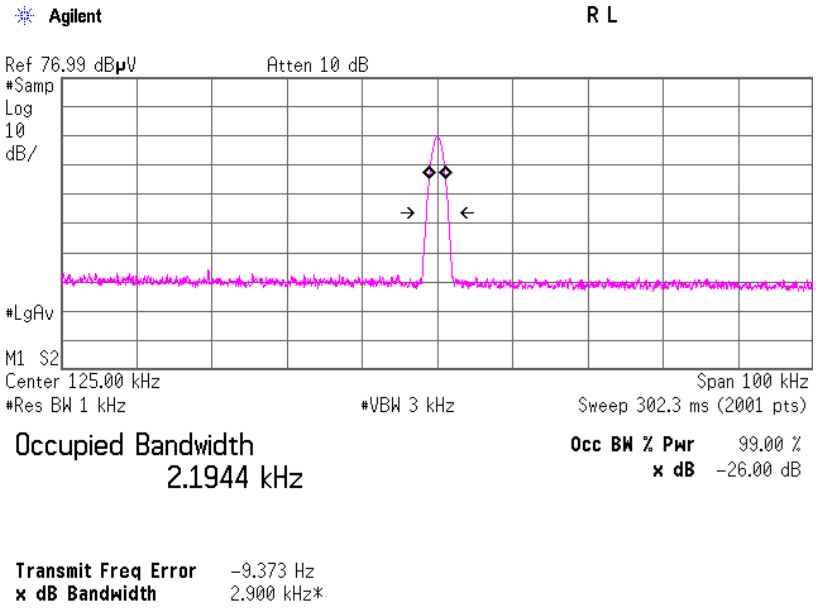
MODE : **Transmitting 125 kHz**
Order NO : **11632280S**
POWER : **DC 5 V**
TEMP./HUMI. : **22 deg.C / 30 %RH**

ENGINEER : **Hikaru Shirasawa**

-26dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
3.309	2.1944



(-26dB Bandwidth)



(99% Occupied Bandwidth)

APPENDIX
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAT6-12	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2016/10/28 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2016/09/15 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2017/02/09 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2017/02/09 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2016/11/23 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SLA-06	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	195	RE	2017/01/05 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2016/07/13 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2017/03/08 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	BW	2016/09/26 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	BW	Pre Check
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	BW	2016/12/13 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards.
Test Item :
RE: Radiated emission,
BW: Bandwidth