FCC ID: NI4B11UE

Deutscher Akkreditierungs Rat

TTI - P-G 009 / 98-00
TTI - P-G 089 / 94-50

E M I S S I O N -- T E S T R E P O R T

Testreport file no. : **T18173-1-11KG** Date of issue : March 22,2000

Model : Receiver **B11UE**

Type : TOYOTA Electronic key system **TMEL-1**

Applicant : TÜV PS Japan

Manufacturer : Toyota Motor Corporation

Licence holder : Toyota Motor Corporation

Address : 1, Toyota-cho, Toyota

Aichi, 871-8571 Japan

Test result accrdg. to the regulation(s) at page 3 : **POSITIVE**

This testreport with appendix consists of 24 pages.
The testresult only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the testlaboratory.

MIKES BABT PRODUCT SERVICE GmbH Ohmstrasse 2-4 94342 Strasskirchen Tel:+9424-9407-0 Fax:+9424-9407-60 Rev.No. 8.5

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T E S T R E G U L A T I O N S

The tests were performed according to following regulations :

o - EN 50081-1 / 2.1991
o - EN 50081-2 / 7.1993

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o - EN 55011	/ 3.1991	o - Group 1 o - class A	o - Group 2 o - class B
o - EN 55014	/ 4.1993	o - Household appliances and similar o - tools o - Semiconductor devices	
o - EN 55014	/ A2:1990		
o - EN 55104	/ 5.1995	Category:	
o - EN 55015	/ A1:1990		
o - EN 55015	/ 12.1993		
o - EN 55022	/ 5.1995	o - class A	o - class B

o - prEN 55103-1/ 3.1995
o - prEN 50121-3-2 / 3.1995
o - EN 60601-1-2 / 4.1994

o - VCCI

■ - 47 CFR Part 15 Subpart B (FCC)	0 - class A	■ - class B

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ADDRESS OF THE TEST LABORATORY

■ - **MIKES BABT PRODUCT SERVICE GmbH**
Ohmstrasse 2-4
D - 94342 Strasskirchen

o - _____
_____
_____
_____

ENVIRONMENTAL CONDITIONS

Temperature: 15-35 ° C

Humidity 45-60 %

Atmospheric pressure 860-1060 mbar

POWER SUPPLY SYSTEM UTILIZED

Power supply system : 5 V DC

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error of ±4dB. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT)

The RF-Receiver is part of a vehicle security system. The Receiver is installed inside of the vehicle.

Number of received/tested samples: 2/2

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

■ - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
o - Blank box indicates that the listed condition, standard or equipment was not applicable for this Report.

M E A S U R E M E N T P R O T O C O L F O R F C C , V C C I A N D A U S T E L

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the FCC limits or the CISPR 22 Limits.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it’s characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

General Standard Information

The test methods used comply with CISPR Publication 22 (1993), EN 55022 (1987) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

For detailed description of each measurement please refer to section testresults.

DISCOVERY OF WORST CASE MEASUREMENT CONDITION:

The Receiver B11UE is designed for the operation on the fixed receiver frequency of approx. 314.0 MHz.
To find out the worst case conditions for the complete measurement the following tests have been performed:

- Measurement of the radiated spurious emissions measured in permanent operation mode in the specified channel. This measurement have been performed in order to find out the maximum spurious emissions of the Receiver.

Based on this testresults, the measurements have been performed completely on the specified channel. This testresults are documented in the following sections of the testreport.

T E S T R E S U L T

CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz

o **- Test not applicable**

Testlocation :
o - Shielded room no. 1
■ - Shielded room no. 2
o - Shielded room no. 3
o - Shielded room no. 4
o - Shielded room no. 5
o - Shielded room no. 6
o - Shielded room no. 7
o - Anechoic chamber
o - Full compact chamber

For TEST EQUIPMENT USED please refer to ATTACHMENT D: A4

Description of Measurement

The final level, expressed in dBµV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit, which is equivalent to the Australian AS 3548 limit.

To convert between dBµV and µV, the following conversions apply:
dBµV = 20(log µV)
µV = Inverse log(dBµV/20)

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasipeak detection, and a Line Impedance Stabilization Network (LISN), with 50Ω /50 µH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasipeak and average detection and recorded on the data sheets.

Testresult

The requirements are ■ **- MET** **O - NOT MET**

Min. limit margin >20 dB at 0.15-30 MHz

Max. limit exceeding _____ dB at _____ MHz

Remarks: The limits are met.

SPURIOUS EMISSION

Spurious emissions from the EUT are measured in the frequency range of 30 to 10 times the highest used frequency using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasipeak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection, remeasurement of results which may be critical will be repeated in average mode. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

SPURIOUS EMISSION (MAGNETIC FIELD) 10 kHz - 30 MHz

■ **- Test not applicable**

o - in a shielded room
o - at a non - reflecting open-site
and
o - in a testdistance of 3 meters.
o - in a testdistance of 30 meters.

For TEST EQUIPMENT USED please refer to ATTACHMENT D: _____

Description of Measurement

The final level, expressed in dBµV/m, is arrived at by taking the reading from the EMI receiver (Level dBµV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	Limit (dBµV/m)	=	Delta (dB)
1.705	5	+	20	=	25	30	=	5

Testresult

The requirements are **O - MET** **O - NOT MET**

Min. limit margin _____ dB at _____MHz

Max. limit exceeding _____ dB at _____MHz

Remarks: Not applicable.

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

o **- Test not applicable**

■ - Open-site 1
o - Open-site 2
■ - 3 meters
o - 10 meters
o - 30 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER2

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver, where the correction factors are stored. This result then has the FCC or CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets at page 24 - 25. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	Limit (dBµV/m)	=	Delta (dB)
719	75	+	32.6	=	107.6	110	=	-2.4

Testresult in detail:

Frequency MHz	L: QPeak dBµV	L: AV dBµV	Correct.	L: QPeak dBµV/m	L: AV dBµV/m	Limit dBµV/m
303.3	22.5		+21.1	43.6		46.0

Testresult

The requirements are ■ - MET O - NOT MET

Min. limit margin 2.4 dB at 303.3 MHz

Max. limit exceeding _____ dB at _____ MHz

Remarks: The limits are met.

INTERFERENCE POWER AT THE MAINS AND INTERFACE CABLES 30 MHZ-300MHZ

■ - Test not applicable

Testlocation :
o - Anechoic chamber
o - Full compact chamber

For TEST EQUIPMENT USED please refer to ATTACHMENT D: _____

Description of Measurement

The measurement of the interference power were performed in a shielded room by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz.

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBpW)	Limit (dBpW)	=	Delta (dB)
300	40	+	-1	=	39	50	=	-11

Testresult

The requirements are **O - MET** **O - NOT MET**

Min. limit margin _____ dB at _____MHz

Max. limit exceeding _____ dB at _____MHz

Remarks: Not appplicable

SPURIOUS EMISSION 1 GHz - 18 GHz

o **- Test not applicable**

Testlocation :
o - Open-site 1
o - Open-site 2
■ - Anechoic chamber
o - Full compact chamber

o - 1 meters
■ - 3 meters
o - 10 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER3

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the Spectrumanalyzer in dBµV and adding the correction factors of the test setup incl. cables.

Example of the correction value at 1.8236 GHz

Level reading at 1.82 GHz	correction EMCO 3115	correction Amplifier AWT 8035 + cable	correction factor (summarized)	corrected level
56 dBµV	+25.7	-41.7	-16	40 dBµV

Testresult in detail:

Frequency GHz	**L: Peak dBµV**	**L: AV dBµV**	**Correct.**	**L: Peak dBµV/m**	**L: AV dBµV/m**	**Limit dBµV/m**
1.148	59.6		-16.0	43.6		54.0

The measurement was performed up to the 10th harmonic (3.14 GHz).

Testresult

The requirements are ■ **- MET** **O - NOT MET**

Min. limit margin 10.4 dB at 1.148 GHz

Max. limit exceeding _____ dB at _____ GHz

Remarks: The limits are met. The measurement has been performed in Peak-mode. For critical results, the measurement would be repeated in average mode.

EQUIPMENT UNDER TEST

Operation - mode of the EUT.:

The equipment under test was operated during the measurement under following conditions:

o - Standby

o - Testprogram (H - Pattern)

o - Testprogram (color bar)

o - Testprogram (customer specific)

■ - receive mode.

o - _____

_____

o - _____

Configuration of the equipment under test:

Following periphery devices and interface cables were connected during the measurement:

o - _____ Type : _____

o - _____ Type : _____

o - _____ Type : _____

o - _____ Type : _____

o - _____ Type : _____

o - _____ Type : _____

■ - unshielded power cable

o - unshielded cables

o - shielded cables MPS.No.:

■ - customer specific cables

o - _____

o - _____

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SUMMARY

GENERAL REMARKS:

The product receive on the following frequency:
314.0 MHz (oscillator frequency 303.3 MHz)

FINAL JUDGEMENT:

The requirements according to the technical regulations and tested operation modes are

■ - met.

o - **not** met.

The equipment under test

■ - **Fulfills** the general approval requirements cited on page 3.

o - **Does not** fulfill the general approval requirements cited on page 3.

Date of receipt of test sample : accdg. to storage record

Testing Start Date : January 13, 2000

Testing End Date : January 14, 2000

- MIKES BABT PRODUCT SERVICE GmbH -

i.V. Thomas Weise
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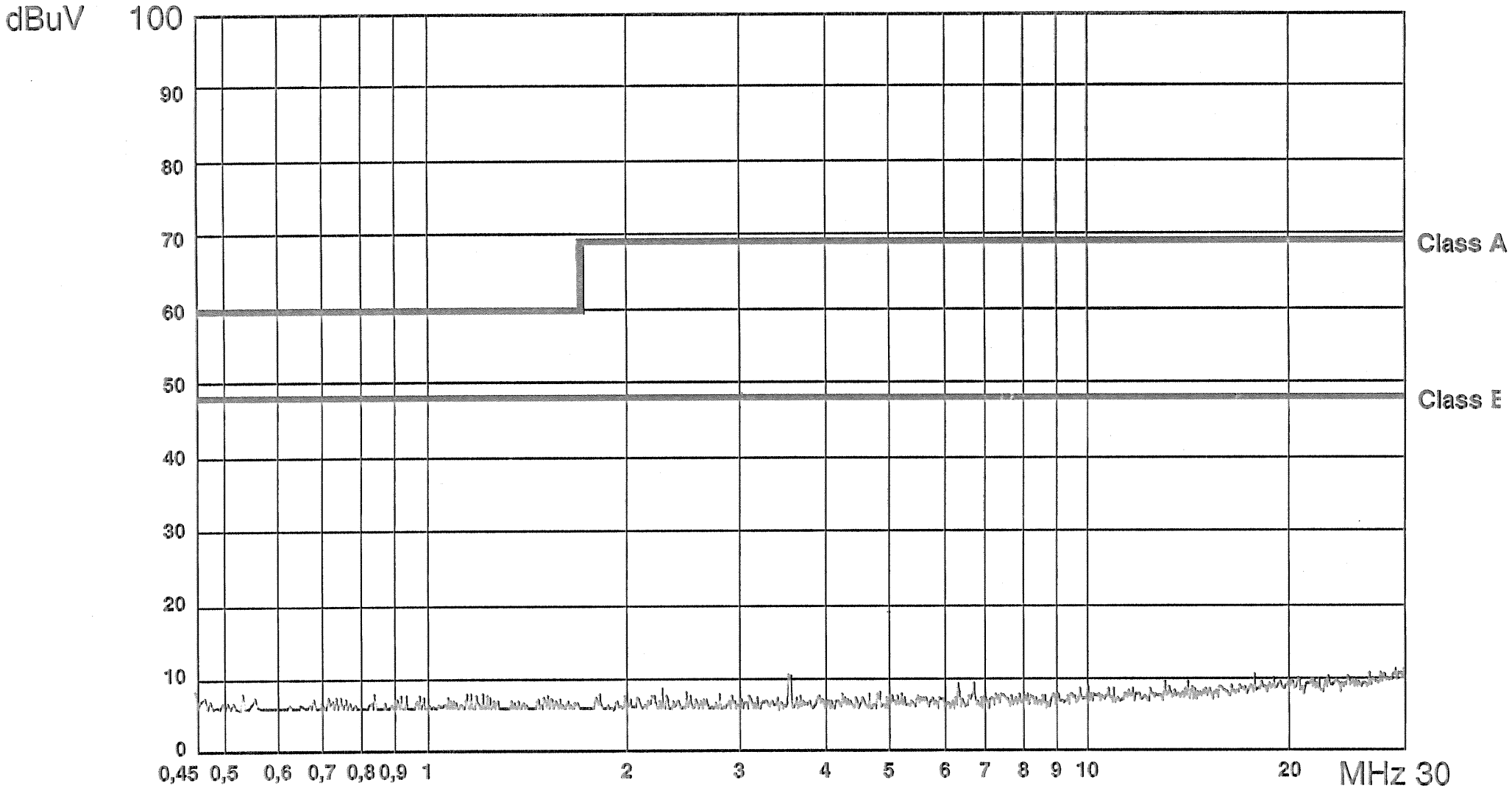
MIKES BABT PRODUCT SERVICE GmbH Ohmstrasse 2-4 94342 Strasskirchen Tel:+9424-9407-0 Fax:+9424-9407-60 Rev.No. 8.5

INTERFERENCE VOLTAGE – TEST 450 kHz – 30 MHz

FCC Part 15 Subpart B

Type/Model:	BMUE
Ser. No.:	
Client:	TOYOTA MOTOR CORP
Test mode:	Receive
Test point:	L1

mikes PRODUCT SERVICE



FCC ID: NI4B11UE

Test receiver: ☒ P ☐ QP ☐ AV

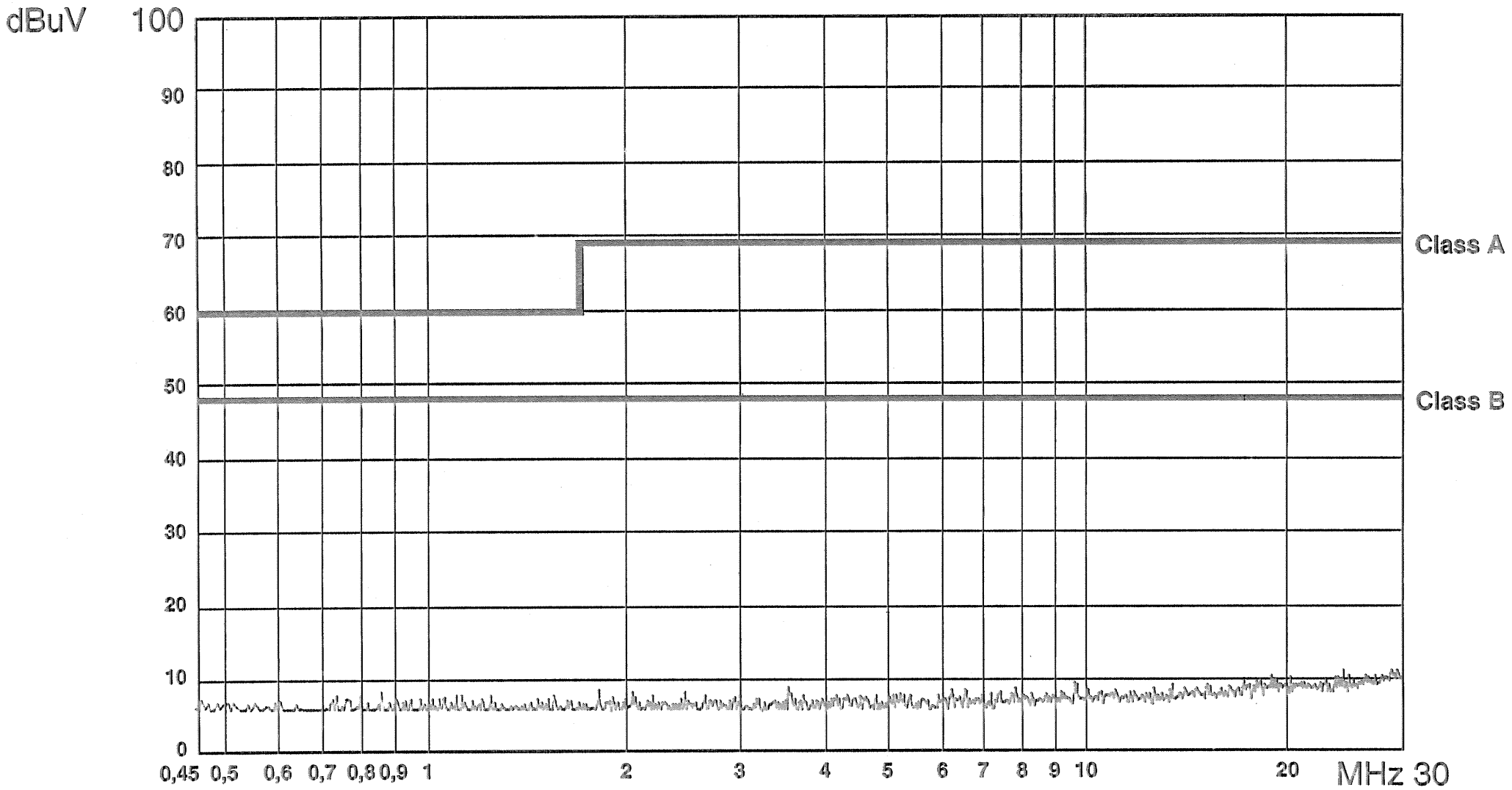
Test Result: ☒ o.k. ☐ n.o.k.

	Tag	Name	Blatt
	date	name	page
Gemessen	14.1.00		A1 of A2
tested			

INTERFERENCE VOLTAGE – TEST 450 kHz – 30 MHz

FCC Part 15 Subpart B

Type/Model: BLUE
Ser. No.:
Client: TOYOTA MOTOR CORP
Test mode: Receive
Test point: N



Test receiver: ☒ P ☐ QP ☐ AV

Test Result: ☒ o.k. ☐ n.o.k.

	Tag	Name	Blatt
	date	name	page
Gemessen	14.1.00		A2 of A2
tested			

FCC ID: NI4B11UE

Attachment : B

List of Test Equipment

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test Report No: T 18173-1-11KG
Beginning of Testing: 13-Januar-2000

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
A4	ESH 2 - Z 5	LISN	Rohde & Schwarz	04-07/60-90-033
	RG 223	RF-cable 1 m	Rosenberger HF-Technik	04-07/60-98-027
	ESH 3 - Z 2	Pulse Limiter	Rohde & Schwarz	04-07/60-99-022
	RG 223	RF-cable	Rosenberger HF-Technik	04-07/60-99-023
	HF 1/2 "	RF-cable	Rosenberger HF-Technik	04-07/60-99-024
	ESH 3	Test Receiver	Rohde & Schwarz	04-07/63-89-009
	ESH3-EZM	Spectrum Monitor	Rohde & Schwarz	04-07/74-90-017
SER2	BBA-9106	Antenna	Schwarzbeck G.	04-07/62-92-048
	UHALP-9108A	Antenna	Schwarzbeck G.	04-07/62-97-009
	ESVP	Test Receiver	Rohde & Schwarz	04-07/63-89-008
SER3	Sucoflex 104, SMA	RF-cable 2 m	Huber+Suhner	04-07/60-97-485
	Sucoflex 104, N	RF-cable 3 m	Huber+Suhner	04-07/60-97-492
	Model 3115	Hornantenna	EMCO Elektronik GmbH	04-07/62-96-458
	AWT-4534	Microwave-Amplifier	TransTech Hochfrequenztechn	04-07/66-90-217
	FSEM 30	Spectrum Analyser	Rohde & Schwarz	04-07/74-97-001