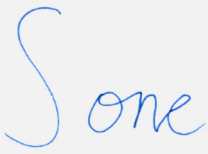
RADIO TEST REPORT

Test Report No. 16202807H-D

Customer	**NIDEC MOBILITY CORPORATION**
Description of EUT	**Body Control Module for Keyless Start System**
Model Number of EUT	**K59S0**
Test standard	**ETSI EN 300 220-2 V3.3.1**
Test Result	**Complied**
Issue Date	**July 28, 2026**
Remarks	**-**

Representative Test Engineer	Approved By
	
Tomoya Sone Engineer	Akihiko Maeda Leader

CERTIFICATE 5107.02

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REVISION HISTORY

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	16202807H-D	July 28, 2026	-

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	ICES	Interference-Causing Equipment Standard
AC	Alternating Current	IEC	International Electrotechnical Commission
AFH	Adaptive Frequency Hopping	IEEE	Institute of Electrical and Electronics Engineers
AM	Amplitude Modulation	IF	Intermediate Frequency
Amp, AMP	Amplifier	ILAC	International Laboratory Accreditation Conference
ANSI	American National Standards Institute	ISED	Innovation, Science and Economic Development Canada
Ant, ANT	Antenna	ISO	International Organization for Standardization
AP	Access Point	JAB	Japan Accreditation Board
ASK	Amplitude Shift Keying	LAN	Local Area Network
Atten., ATT	Attenuator	LIMS	Laboratory Information Management System
AV	Average	MCS	Modulation and Coding Scheme
BPSK	Binary Phase-Shift Keying	MRA	Mutual Recognition Arrangement
BR	Bluetooth Basic Rate	N/A	Not Applicable
BT	Bluetooth	NIST	National Institute of Standards and Technology
BT LE	Bluetooth Low Energy	NS	No signal detect.
BW	BandWidth	NSA	Normalized Site Attenuation
Cal Int	Calibration Interval	NVLAP	National Voluntary Laboratory Accreditation Program
CCK	Complementary Code Keying	OBW	Occupied Band Width
Ch., CH	Channel	OFDM	Orthogonal Frequency Division Multiplexing
CISPR	Comite International Special des Perturbations Radioelectriques	P/M	Power meter
CW	Continuous Wave	PCB	Printed Circuit Board
DBPSK	Differential BPSK	PER	Packet Error Rate
DC	Direct Current	PHY	Physical Layer
D-factor	Distance factor	PK	Peak
DFS	Dynamic Frequency Selection	PN	Pseudo random Noise
DQPSK	Differential QPSK	PRBS	Pseudo-Random Bit Sequence
DSSS	Direct Sequence Spread Spectrum	PSD	Power Spectral Density
EDR	Enhanced Data Rate	QAM	Quadrature Amplitude Modulation
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	QP	Quasi-Peak
EMC	ElectroMagnetic Compatibility	QPSK	Quadri-Phase Shift Keying
EMI	ElectroMagnetic Interference	RBW	Resolution Band Width
EN	European Norm	RDS	Radio Data System
ERP, e.r.p.	Effective Radiated Power	RE	Radio Equipment
EU	European Union	RF	Radio Frequency
EUT	Equipment Under Test	RMS	Root Mean Square
Fac.	Factor	RSS	Radio Standards Specifications
FCC	Federal Communications Commission	Rx	Receiving
FHSS	Frequency Hopping Spread Spectrum	SA, S/A	Spectrum Analyzer
FM	Frequency Modulation	SG	Signal Generator
Freq.	Frequency	SVSWR	Site-Voltage Standing Wave Ratio
FSK	Frequency Shift Keying	TR	Test Receiver
GFSK	Gaussian Frequency-Shift Keying	Tx	Transmitting
GNSS	Global Navigation Satellite System	VBW	Video BandWidth
GPS	Global Positioning System	Vert.	Vertical
Hori.	Horizontal	WLAN	Wireless LAN

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SECTION 1: Customer Information

Company Name	NIDEC MOBILITY CORPORATION
Address	6368, Nenjozaka, Okusa, Komaki, Aichi, 485-0802, Japan
Telephone Number	+81-568-78-6159
Contact Person	Takashi Betsui

The Information provided by the customer is as follows;
- Customer, Description of EUT, Model Number of EUT on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	Body Control Module for Keyless Start System
Model Number	K59S0
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	February 2, 2026
Test Date	February 3 to 10, 2026

2.2 Product Description

General Specification

Rating	DC 12.0 V (typ.), DC 8.0 V to 16 V
Operating temperature	Except Antennas: -40 deg. C to 85 deg. C Antennas: -40 deg. C to 90 deg. C

Radio Specification

[Transmitter]

Radio Type	Transmitter
Frequency of Operation	125 kHz
Modulation	ASK

[Receiver]

Radio Type	Receiver
Frequency of Operation	433.92 MHz (Band I)
Local oscillator frequency (f_{LO})	24.305 MHz
Intermediate frequency (f_{IF})	251 kHz
Operating Channel Width (OCW)	110 kHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Radio	ETSI EN 300 220-2 V3.3.1
Title	Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz with power levels ranging up to 500 mW e.r.p.; Part 2: Harmonised Standard for access to radio spectrum for non specific radio equipment

3.2 Procedures and results

[Transmitter]
For Test Procedure and Limit, refer to the following clauses of ETSI EN 300 220-2 V3.3.1.

Item	Test Procedure	Limit	Test Method	Results	Remarks
Unwanted emissions in the spurious domain (radiated measurement)	Clause 5.3.1.3	Clause 4.3.1.2.1 Clause 4.3.1.3	Radiated	N/A	*1)
Unwanted emissions in the spurious domain (conducted measurement)	Clause 5.3.1.3	Clause 4.3.1.2.1 Clause 4.3.1.3	Conducted	N/A	*1)
Effective Radiated Power (radiated measurement)	Clause 5.4.1.1.3	Clause 4.4.1.3	Radiated	N/A	*1)
Effective Radiated Power (conducted measurement)	Clause 5.4.1.2.3	Clause 4.4.1.3	Conducted	N/A	*1)
Maximum e.r.p. power spectral density	Clause 5.4.2.4	Clause 4.4.2.3	Conducted	N/A	*1)
Duty Cycle	Clause 5.4.3.4	Clause 4.4.3.3	Conducted	N/A	*1)
Maximum occupied bandwidth	Clause 5.4.4.4	Clause 4.4.4.3	Conducted	N/A	*1)
Transmitter frequency stability	Clause 5.4.5.5	Clause 4.4.5.3	Conducted	N/A	*1)
Transmitter out of band emissions	Clause 5.4.6.4	Clause 4.4.6.3	Conducted	N/A	*1)
Adjacent channel power	Clause 5.4.7.4	Clause 4.4.7.3	Conducted	N/A	*1)
Transmitter spectrum mask at permitted frequency band edges	Clause 5.4.8.4	Clause 4.4.8.3	Conducted	N/A	*1)
Transient power	Clause 5.4.9.4	Clause 4.4.9.3	Conducted	N/A	*1)
Transmitter behaviour under low voltage conditions	Clause 5.4.10.4	Clause 4.4.10.3	Conducted	N/A	*1)
FHSS equipment	Clause 5.4.11.4	Clause 4.4.11.3	Conducted	N/A	*1)
Short term behaviour	Clause 5.4.12.4	Clause 4.4.12.3	Conducted	N/A	*1)

* Note: UL Japan, Inc.'s EMI Work Procedure: Work Instructions-ULID-003591.
*1) This test is not applicable since the EUT does not operate at the transmitting frequency specified by the requirements.

[Receiver]
For Test Procedure and Limit, refer to the following clauses of ETSI EN 300 220-2 V3.3.1.

Item	Test Procedure	Limit	Test Method	Results	Remarks
Unwanted emissions in the spurious domain	Clause 5.3.1.3	Clause 4.3.1.2.1 Clause 4.3.1.3	Radiated	Complied	-
Receiver sensitivity	Clause 5.5.1.2	Clause 4.5.1.3 Clause 4.5.1.4	Radiated	Complied	-
Receiver dynamic range	Clause 5.5.2.4	Clause 4.5.2.3	Conducted	Complied	-
Adjacent channel selectivity	Clause 5.5.3.4	Clause 4.5.3.3	Conducted	N/A	*1)
Blocking	Clause 5.5.4.4	Clause 4.5.4.3	Conducted	Complied	-
Receiver spurious response rejection	Clause 5.5.5.4	Clause 4.5.5.3	Conducted	Complied	-
Receiver intermodulation rejection	Clause 5.5.6.4	Clause 4.5.6.3	Conducted	N/A	*1)

*Note: UL Japan, Inc.'s EMI Work Procedure: Work Instructions-ULID-003591.
*1) This test is not applicable since there are no channel spacing restrictions in the band used by the EUT.

[Polite spectrum access]
For Test Procedure and Limit, refer to the following clauses of ETSI EN 300 220-2 V3.3.1.

Item	Test Procedure	Limit	Test Method	Results	Remarks
Clear Channel Assessment threshold	Clause 5.6.1.4	Clause 4.6.2.3	Conducted	N/A	*1)
Polite spectrum access timing parameters	Clause 5.6.2.4	Clause 4.6.3.2	Conducted	N/A	*1)

*Note: UL Japan, Inc.'s EMI Work Procedure: Work Instructions-ULID-003591.
*1) This test is not applicable since the EUT operates in Band I.

3.3 Additions or deviations to standards

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

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

Item	Unit	Required Uncertainty (+/-)	Calculated Uncertainty (+/-)
Radio frequency (using frequency counter)	ppm	0.5	0.08
Radio frequency derived from OBW measurement (0.5 ppm + 2 % of OBW)	%	2.0	0.96
RF power, conducted *)	dB	1.5	1.43
Conducted spurious emission of transmitter, valid up to 6 GHz	dB	3	2.72
Conducted emission of receivers	dB	3	2.72
Radiated emission of transmitter, valid up to 6 GHz	dB	6	5.89
Radiated emission of receiver, valid up to 6 GHz	dB	6	5.89
RF level uncertainty for a given BER (Conducted)	dB	1.5	1.35
Sensitivity below 3 GHz *1)	dB	Not Defined	1.35
Temperature	deg C	1	0.69
Humidity	%	10	2.98
Time using SA	%	5	0.11
Time using oscilloscope	%	5	0.37

* Adjacent channel selectivity, Receiver intermodulation rejection is not calculated.
*1) including Receiver dynamic range

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan
Telephone: +81-596-24-8999
A2LA Certificate Number: 5107.02

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber (SAC1)	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber (SAC2)	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber (SAC3)	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room (PR3)	3 m
No.3 shielded room (SR3)	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber (SAC4)	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room (PR4)	3 m
No.4 shielded room (SR4)	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber (SAC5)	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room (MR5)	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room (SR6)	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room (MR6)	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room (SR7)	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room (MR8)	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room (MR9)	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room (SR10)	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room (MR11)	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room (MR12)	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

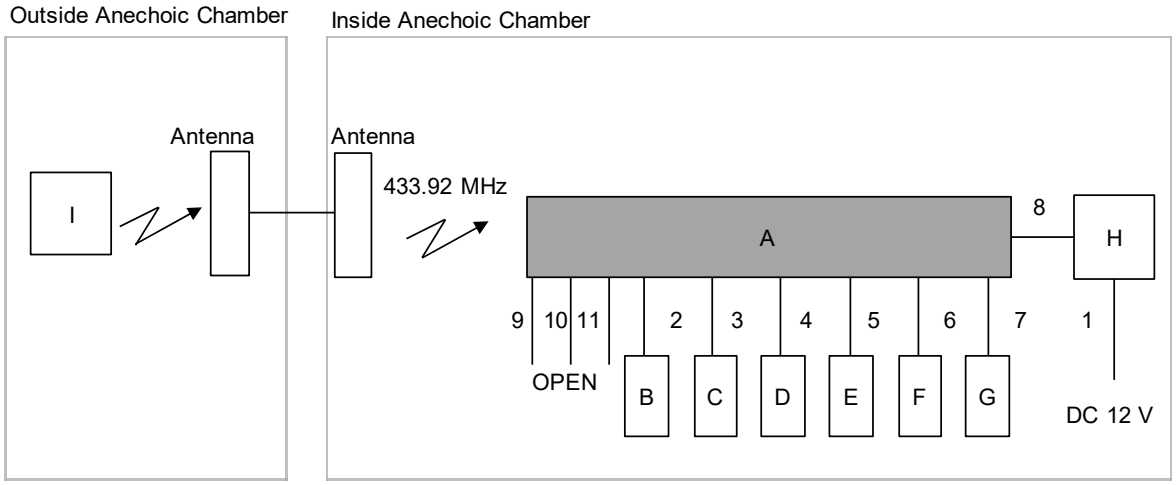
SECTION 4: Operation of EUT during testing

4.1 Operating mode(s)

Mode	Test Item
1) Keyless Entry Communication (Rx 433.92 MHz)	- Unwanted emissions in the spurious domain - Receiver sensitivity - Receiver dynamic range - Blocking - Receiver spurious response rejection
* EUT has the operating by the software follows; Software: Version: 0x5101002F-02	
*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting.	
Justification: The system was configured in a typical fashion (as a user would normally use it) for testing.	

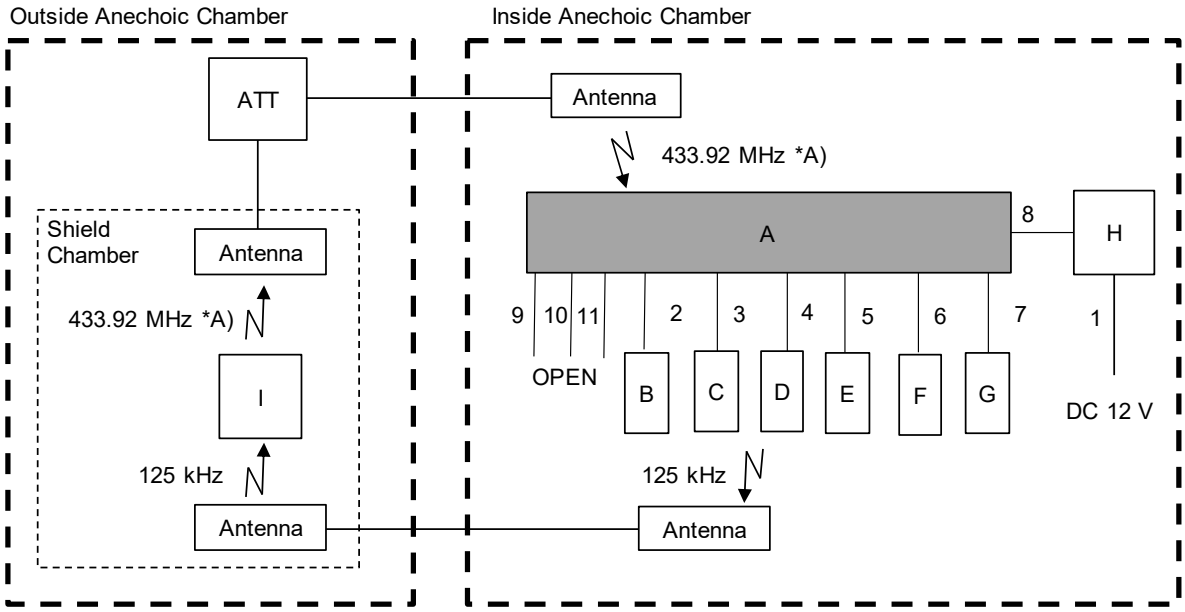
4.2 Configuration and peripherals

[Unwanted emissions in the spurious domain and Receiver sensitivity test]



*Item No. A includes Receiver Antenna.

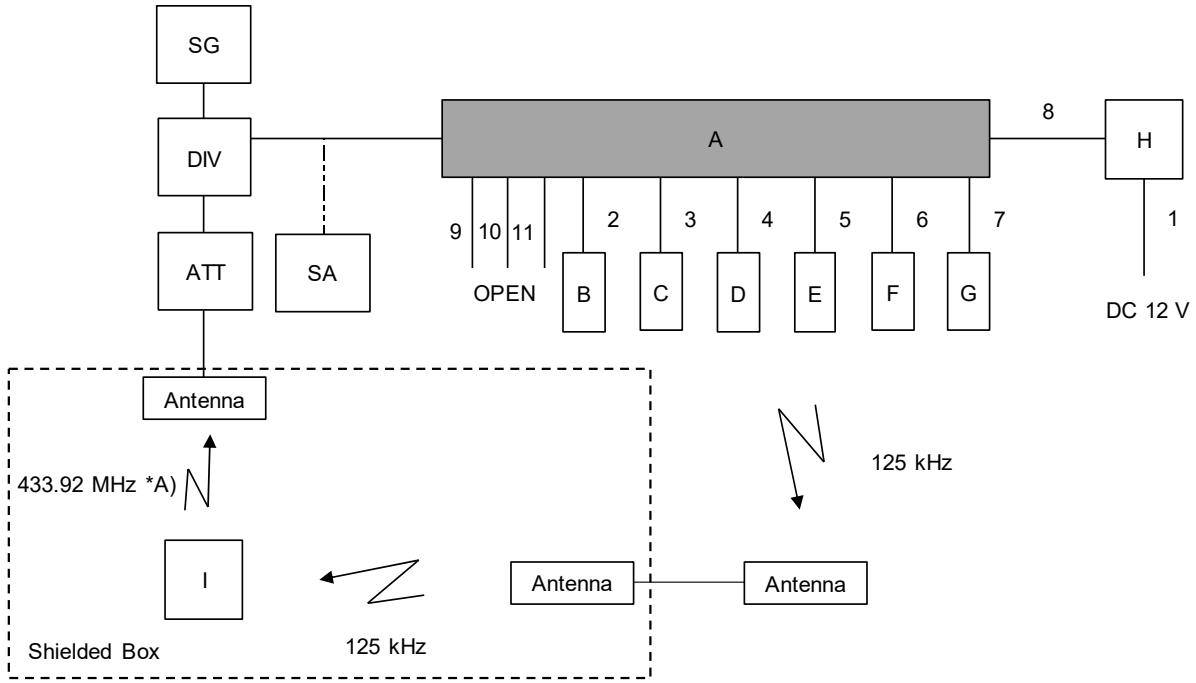
[Receiver sensitivity test]



ATT: Variable Attenuator

*A) Each message is sent in 32 bits.

[Antenna Terminal Conducted tests]



DIV: Power Divider
ATT: Variable Attenuator
SA: Spectrum Analyzer
SG: Signal Generator

*SA was connected when checking the SG output level.
*A) Each message is sent in 32 bits.

*Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	BCM	K59S0	No.101 *1) No.102 *2)	NIDEC MOBILITY CORPORATION	EUT
B	LF Antenna (ANA)	CGF-S003-D32 (Type Y2-3)	2023/12 No.3	NIDEC MOBILITY CORPORATION	-
C	LF Antenna (ANB)	CGF-S002-J2E (Type E-2)	Type E-2 No.02	NIDEC MOBILITY CORPORATION	-
D	LF Antenna (AND)	CGF-S002-J0B (Type B)	Type B No.02	NIDEC MOBILITY CORPORATION	-
E	LF Antenna (ANL)	CGF-S003-D03 (Type Y3)	2023/12 No.2	NIDEC MOBILITY CORPORATION	-
F	LF Antenna (ANI)	CGF-S002-D03 (Type 3)	Type 3 No.02	NIDEC MOBILITY CORPORATION	-
G	PUSH START SWITCH	P55R0	5th PSW No.06	NIDEC MOBILITY CORPORATION	-
H	Jig Borad	-	SIM No.02	NIDEC MOBILITY CORPORATION	-
I	REMOCON	R55R3	5th REM No.11	NIDEC MOBILITY CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0 *1) 1.0 *2)	Unshielded	Unshielded	-
2	Antenna Cable	3.0	Unshielded	Unshielded	ANA Port
3	Antenna Cable	3.0	Unshielded	Unshielded	ANB Port
4	Antenna Cable	3.0	Unshielded	Unshielded	AND Port
5	Antenna Cable	3.0	Unshielded	Unshielded	ANL Port
6	Antenna Cable	3.0	Unshielded	Unshielded	ANI Port
7	Antenna Cable	3.0	Unshielded	Unshielded	-
8	Signal Cable	3.0	Unshielded	Unshielded	-
9	Signal Cable	1.3	Unshielded	Unshielded	-
10	Signal Cable	1.3	Unshielded	Unshielded	-
11	Signal Cable	1.3	Unshielded	Unshielded	-

*1) Used for Unwanted emissions in the spurious domain and Receiver sensitivity test
*2) Used for Antenna Terminal Conducted Tests

SECTION 5: Unwanted emissions in the spurious domain

Test Procedure

Ambient temperature : See data.
Relative humidity : See data.

1) EUT was placed on the platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The Radiated Electric Field Strength has been measured in semi anechoic chamber at a distance of 3 m.
The measuring antenna height was varied between 1 m to 4 m and the turn table was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization.

2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1.5 m as the EUT. The frequency below 1 GHz of the Substitution Antenna was used the Half wave dipole Antenna, which was tuned the measured frequency in 1).
The frequency above 1 GHz of the Substitution Antenna was used Horn Antenna.
The Substitution Antenna was connected to the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1).
Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field strength is equal to the measured value in 1) by means of varying the measuring antenna height between 1 m to 4 m to obtain maximum receiving level.
Its Output power of Signal Generator was recorded.

3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna except for the Half wave dipole Antenna for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.

Pre-check scan setting

Frequency	25 MHz to 30 MHz	30 MHz to 1 GHz	1 GHz to 6 GHz
Instrument Used	Spectrum Analyzer		
IF Bandwidth	Peak RBW: 10 kHz VBW: 30 kHz	Peak RBW: 100 kHz VBW: 300 kHz	Peak RBW: 1 MHz VBW: 3 MHz
Trace Mode	Max hold		

Measured setting

Frequency	25 MHz to 30 MHz	30 MHz to 1 GHz	1 GHz to 6 GHz
Instrument Used	Spectrum Analyzer		
IF Bandwidth	RMS RBW: 10 kHz VBW: 30 kHz	RMS RBW: 100 kHz VBW: 300 kHz	RMS RBW: 1 MHz VBW: 3 MHz
Span / Sweep time	Zero / Suitable to capture one transmission burst		
Trace Mode	Clear Write (band power)		

The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at representative X-axis since no difference was found among each position.

Test data : APPENDIX
Test result : Pass

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Instrument Used	Remarks
Receiver dynamic range	Spectrum Analyzer	Normal condition
Blocking	Spectrum Analyzer Signal Generator	Normal condition
Receiver spurious response rejection	Spectrum Analyzer Signal Generator	Normal condition

The test results are rounded off to one or two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0.0 dB of the data sheets.

Test Data : APPENDIX
Test Result : Pass

SECTION 7: Receiver sensitivity

Test Procedure

Ambient temperature : See data.
Relative humidity : See data.

1) The reference input power to the transmitting antenna was measured using the communication counterpart with the variable attenuator set to 0 dB. The measured power was recorded as P. The radiated signal strength was measured in a semi-anechoic chamber at a measurement distance of 3 m. Measurements were performed with both horizontal and vertical antenna polarizations. A half-wave dipole antenna was used as the receiving antenna.
2) The EUT was placed on a non-conductive support measuring 0.5 m × 0.5 m and positioned 1.5 m above the conductive ground plane.
The radiated signal strength was measured in a semi-anechoic chamber at a measurement distance of 3 m.
Measurements were performed with both horizontal and vertical transmitting antenna polarizations. The EUT was evaluated in the X-, Y-, and Z-axis orientations. The maximum receiver sensitivity condition was determined by rotating the turntable and increasing the attenuation of the variable attenuator by X dB until the receiver performance criterion specified in Clause 4.2.1 was reached.
3) The difference between the transmitting antenna input power measured with the variable attenuator set to 0 dB and the transmitting antenna input power under the maximum receiver sensitivity condition was defined as X_{ATT}.

   Sensitivity Level = $P - X_{ATT}$

   where:
   P = Reference transmitting antenna input power with the variable attenuator set to 0 dB (dBm)
   X_{ATT} = Increase in attenuation required to reach the receiver sensitivity threshold (dB)

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Unwanted emissions in the spurious domain

Mode	Mode 1

Date	Test site	Temperature	Humidity	Engineer
February 3, 2026	SAC2	22 deg. C	46 % RH	Shousei Hamaguchi

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
52.000	NS	44.3	-	-35.5	1.4	-29.0	-	-68.0	-57.0	-	11.0	-	-	100	0	
371.967	41.0	42.6	-50.7	-47.8	3.9	-7.8	-64.6	-61.7	-57.0	7.6	***4.7***	138	25	132	0	
403.965	37.5	35.2	-54.2	-54.0	4.1	-7.6	-68.1	-67.9	-57.0	11.1	10.9	384	0	128	0	
433.669	NS	NS	-	-	-	-	-	-	-57.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15
Rx-ANTENNA : Biconical Antenna(25 MHz-300 MHz), Logperiodic Antenna(300 MHz-1000 MHz), Horn Antenna(1 GHz-6 GHz)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(25 MHz-120 MHz), Dipole Antenna(120 MHz-1000MHz), Horn Antenna(1 GHz-6 GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : Spectrum Analyzer RMS Average
25 to 30 MHz(RBW: 10 kHz / VBW: 30 kHz), 30 to 1000 MHz(RBW: 100 kHz / VBW: 300 kHz), 1 to 6 GHz(RBW: 1 MHz / VBW: 3 MHz)

Receiver sensitivity, Receiver dynamic range, Blocking and Receiver spurious response rejection

Mode	Mode 1

Date	Test site	Temperature	Humidity	Engineer
February 9, 2026	SAC2	23 deg. C	36 % RH	Tomoya Sone
February 10, 2026	MR6	22 deg. C	38 % RH	Tomoya Sone

[Receiver sensitivity]

Message success ratio	0.98
BER	0.000631
Minimum receiving level [dBm]	-102.1
Receiver Sensitivity limit [dBm]	-60.0
Margin [dB]	42.1

BER = 1 - (Message success ratio) ^ (1 / Number of Bits)
Number of Bits = 32 Bits
* Message success ratio was confirmed by the LED illumination.

[Receiver dynamic range]

Maxmum receiving level *1) [dBm]	-29.1
Receiver dynamic range limit [dB]	≧ 60.0
Receiver dynamic range [dB]	73.0
Margin [dB]	13.0

*1) The raise of output level was stopped at this level, because it was found that there was enough margin.
* Receiver dynamic range = Maxmum receiving level - Minimum receiving level

[Blocking]
Receiving frequency 433.92 MHz

Frequency Offset		Output level of Transmitter	Output level of SG	Limit	Margin	Remark
[MHz]	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	
+5%	455.62	-93.6	0.4	-44.0	44.4	
+10	443.98		0.4	-44.0	44.4	
+2	435.98		-3.4	-69.0	65.6	
-2	431.87		-3.4	-69.0	65.6	
-10	423.87		-0.1	-44.0	43.9	
-5%	412.22		-1.8	-44.0	42.2	

*The limit is rounded down to one decimal place.
*The test result is rounded off to one or two decimal places, so some differences might be observed.
*The output level of the transmitter is the minimum receiving level or 10 × log OCW-117dBm, whichever is higher, +3dB.

[Receiver spurious response rejection]
Receiving frequency 433.92 MHz

Frequency Offset		Output level of Transmitter	Output level of SG	Limit	Margin	Remark
[Range]	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	
Range 1	431.77	-93.6	-3.7	-54.0	50.3	
Range 2	433.42		-21.9	-79.0	57.1	*2)
Range 2	433.79		-69.9	-79.0	9.1	*3)
Range 3	434.05		-74.3	-79.0	4.7	*4)
Range 4	436.65		-6.1	-54.0	47.9	

*The limit is rounded down to one decimal place.
*The test result is rounded off to one or two decimal places, so some differences might be observed.
*For Range 1 and Range 4, the SG applied frequency was swept and the test was performed at the frequency that produced the worst results.
*The output level of the transmitter is the minimum receiving level or 10logOCW-117dBm, whichever is higher, +3dB.
*2) f_{LO}-f_{IF}
*3) f_{nom}-f_{IF}/2
*4) f_{nom}+f_{IF}/2
Range 1: -2 MHz from OC edge FOClow (418.920 MHz to 431.865 MHz)
Range 2: -2 MHz from OC edges FOClow (431.865 MHz to 433.865 MHz)
Range 3: +2 MHz from OC edges FOChigh (433.975 MHz to 435.975 MHz)
Range 4: > 2 MHz from OC edge FOChigh (435.975 MHz to 448.920 MHz)

*Calculation of the frequency range for Operating Channel

f_{nom} [MHz]	OCW [kHz]	FOC_{low} [MHz]	FOC_{high} [MHz]	f_{LO} [MHz]	f_{IF} [MHz]
433.92	110.0	433.865	433.975	433.669	0.251

APPENDIX 2: Test instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141219	Coaxial Cable	UL-ISE	-	-	07/04/2025	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/22/2025	12
RE	141277	Signal Generator	Rohde & Schwarz	SMIQ03B	839657/039	08/27/2025	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+ BBA9106	08031	07/22/2025	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/20/2025	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2025	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/09/2026	12
RE	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	11/14/2025	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	07/08/2025	24
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	143211	Dipole Antenna	Schwarzbeck Mess-Elektronik OHG	VHAP	1137	09/18/2025	12
RE	147006	Dipole Antenna	Schwarzbeck Mess-Elektronik OHG	UHAP	601	06/25/2025	12
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	244707	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202102	01/13/2026	12
RE	252663	Microwave Cable	Huber+Suhner	SF126E/11PC35/ 11PC35/ 1000MM,5000MM	616276/126E / 616275/126E	09/03/2025	12
RE	253739	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01919	10/17/2025	12
RE	266727	Attenuator	Huber+Suhner	6806_N-50-1	40701613	07/09/2025	12
RE	142541	Shield Chamber	Roude&Schwarz	CMU-Z11	1150.1008.02	-	-
RE	194879	Attenuator	Keysight Technologies Inc	8495A / 8495B	MY42150956 / MY42147424	-	-
RB	141558	Digital Tester(TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/13/2025	12
RB	141821	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G	0326	09/04/2025	12
RB	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	02/04/2025	12
RB	142370	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S308	-	-
RB	142371	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S309	-	-
RB	142376	Microwave Cable	Junkosha	MWX-221-02000DMSDMS	1507S108	-	-
RB	142379	Microwave Cable	Junkosha	MWX-221-02000DMSDMS	1507S111	-	-
RB	142541	Shield Chamber	Roude&Schwarz	CMU-Z11	1150.1008.02	-	-
RB	158264	Signal Generator	Keysight Technologies Inc	N5182A	MY50142539	09/02/2025	12
RB	194879	Attenuator	Keysight Technologies Inc	8495A / 8495B	MY42150956 / MY42147424	-	-
RB	202511	Loop Antenna	UL-ISE	-	-	-	-
RB	242375	Low Pass Filer	CRYSTEK	CLPFL-0050	-	-	-
RB	244712	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202106	01/13/2026	12

***Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

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: Unwanted emissions in the spurious domain (Radiated) and Receiver sensitivity
RB: Receiver dynamic range, Blocking and Receiver spurious response rejection

APPENDIX 3: Photographs of test setup

Radiated emission

Photo 1

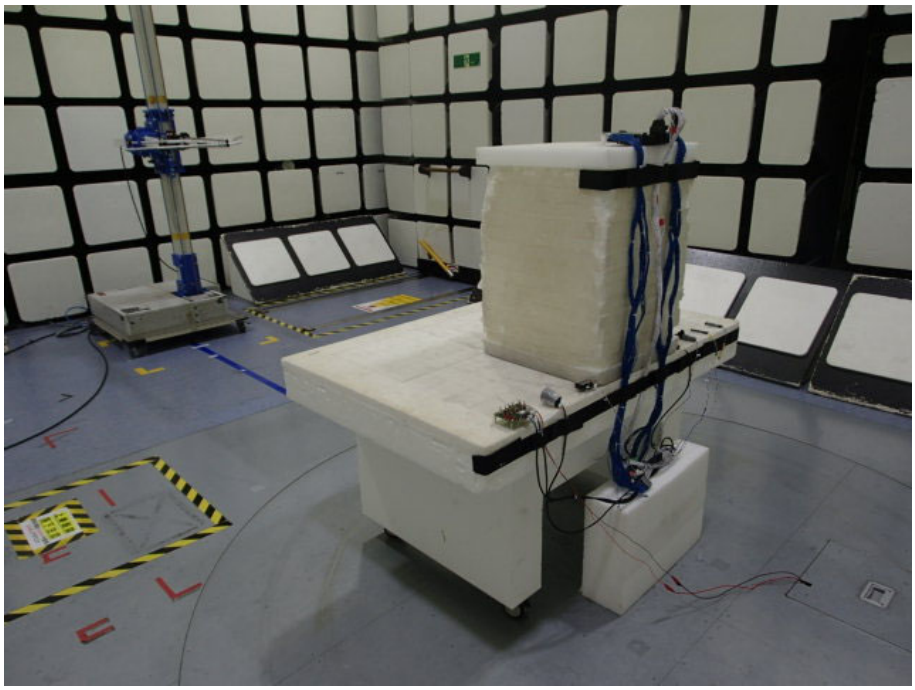
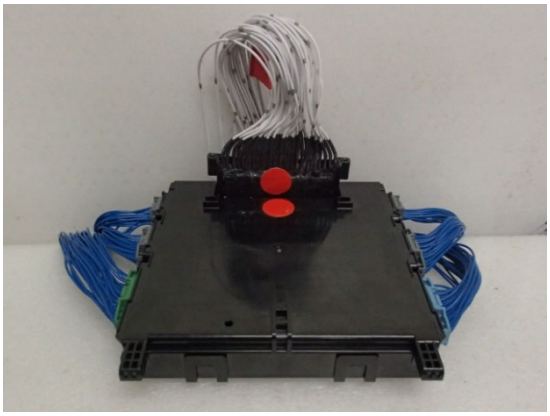


Photo 2

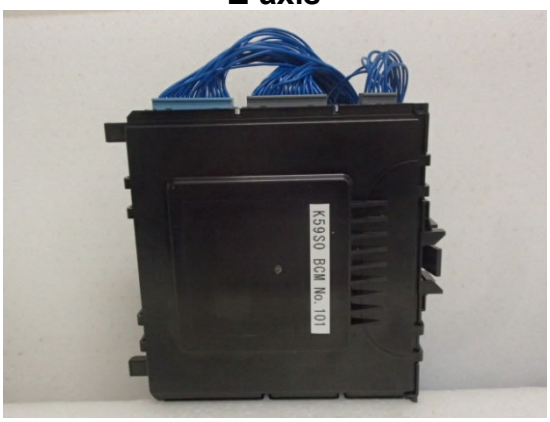
Worst Case Position
(Horizontal: X-axis / Vertical: X-axis)

X-axis



Y-axis

Z-axis



Receiver sensitivity

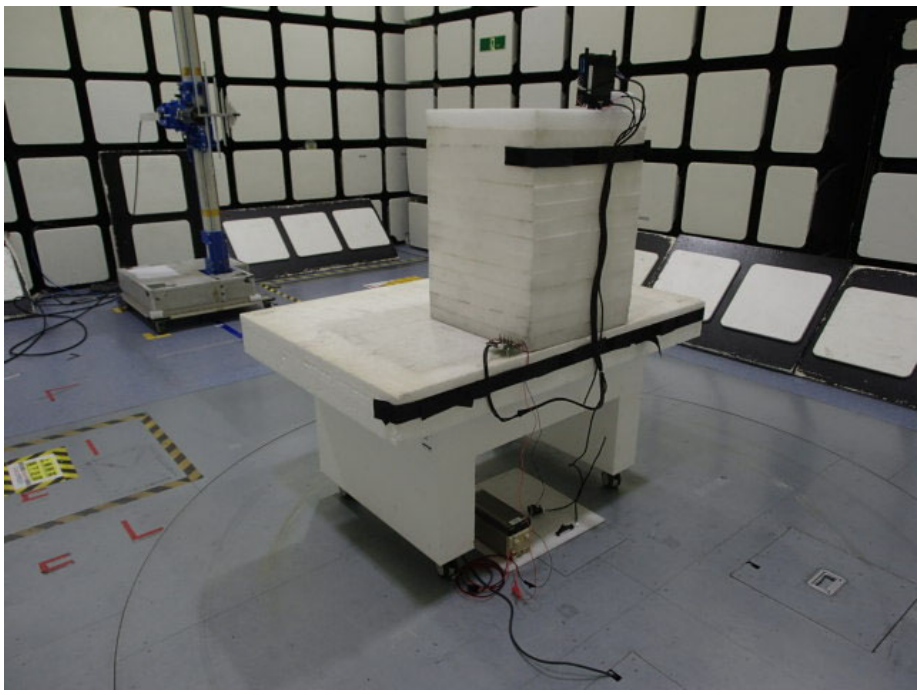


Photo 1

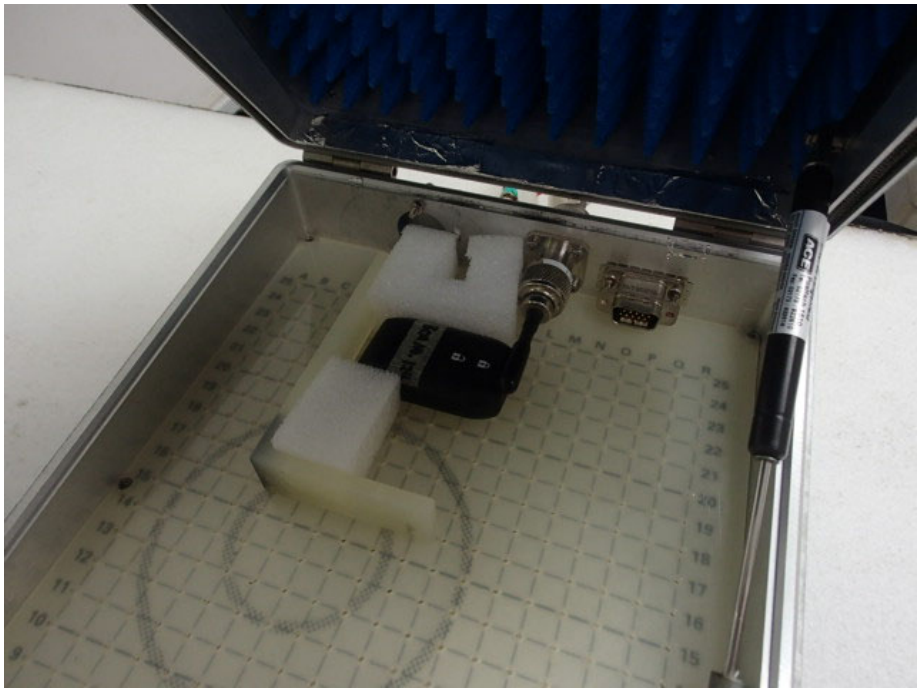


Photo 2

Receiver dynamic range, Blocking and Receiver spurious response rejection

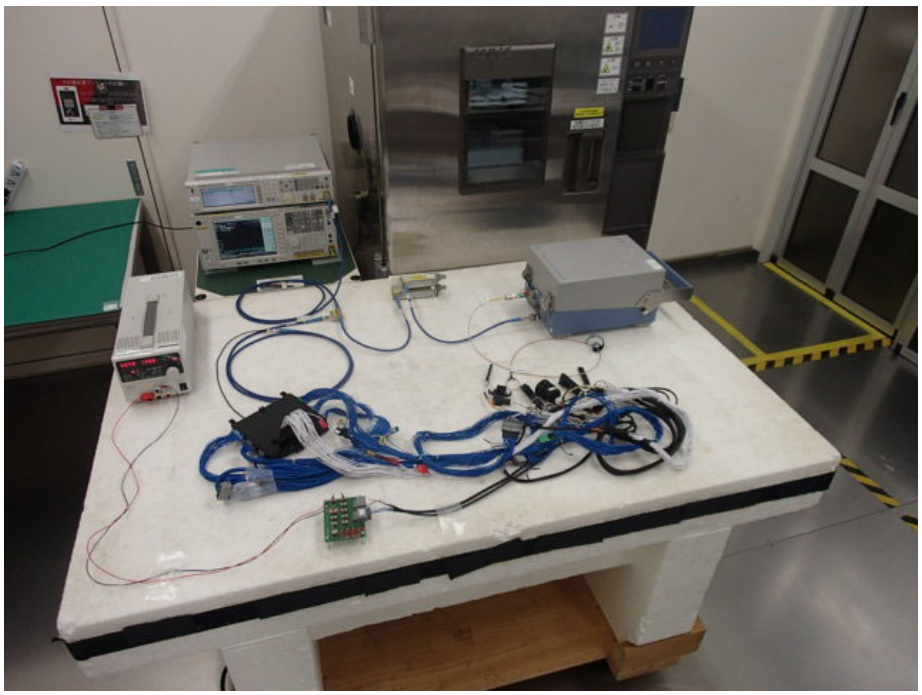


Photo 1

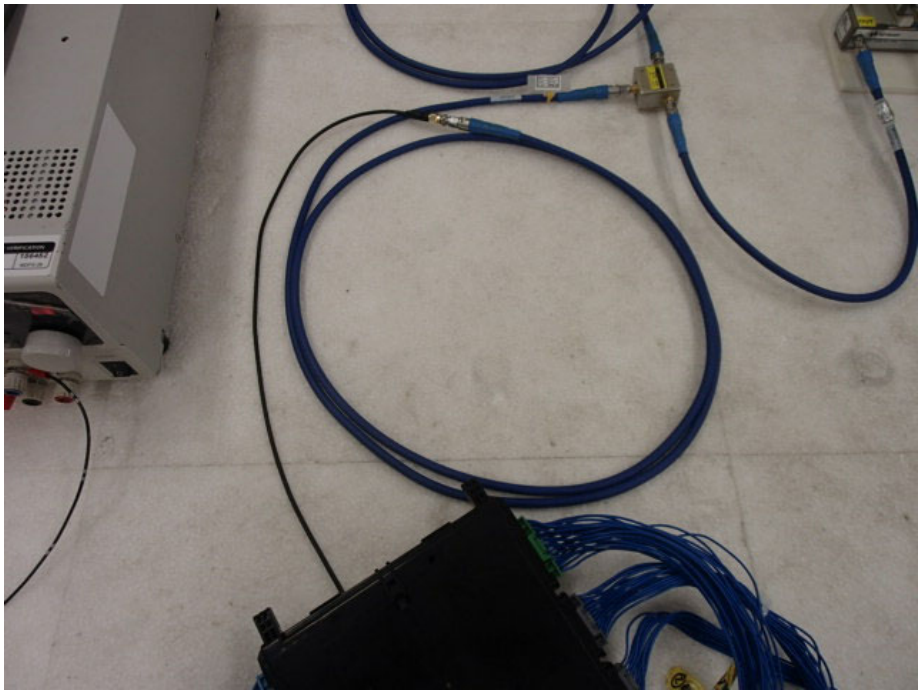


Photo 2

Receiver dynamic range, Blocking and Receiver spurious response rejection

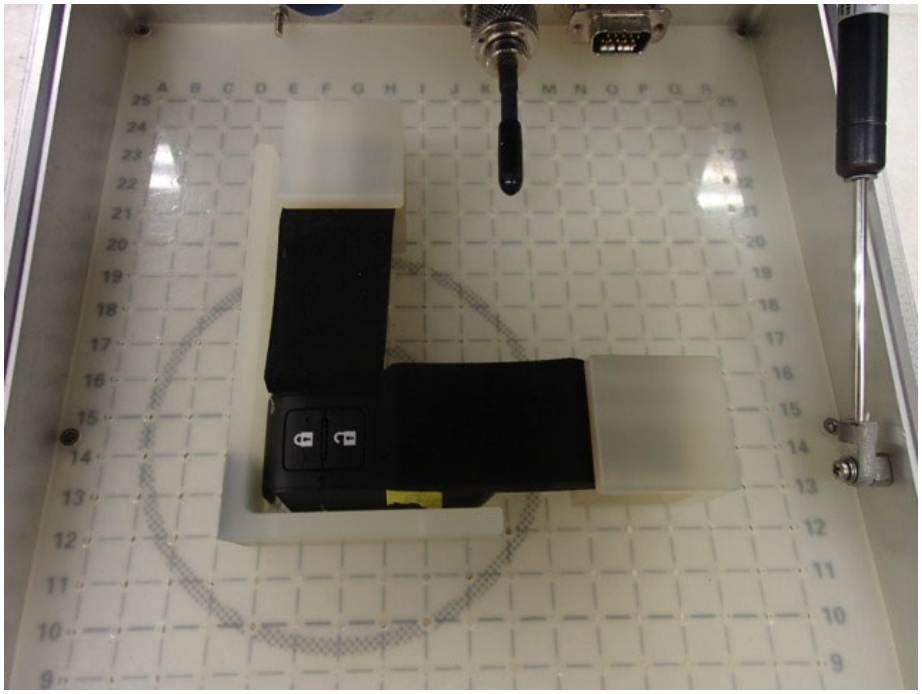


Photo 3

End of Report