

RADIO TEST REPORT

Test Report No. 15600416H-A-R1

Customer	DENSO CORPORATION
Description of EUT	Cockpit Control Unit
Model Number of EUT	DNNS137
FCC ID	HYQDNNS137
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	January 14, 2025
Remarks	Wireless LAN (2.4 GHz band) part IEEE 802.11n SISO / MIMO 40 MHz BW only *For permissive change

Representative Test Engineer



 Takumi Nishida
 Engineer

Approved By



 Ryota Yamanaka
 Engineer


CERTIFICATE 5107.02

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There is no testing item of "Non-accreditation".

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 24.0

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REVISION HISTORY

Original Test Report No. 15600416H-A

This report is a revised version of 15600416H-A. 15600416H-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15600416H-A	December 19, 2024	-
1	15600416H-A-R1	January 14, 2025	APPENDIX 1: Test Data - Maximum Peak Output Power (Page 20) Corrected data of “Antenna 0 / 1 e.i.r.p. Result” in table for Antenna 0 + Antenna 1 of Tx 11n-40 mode. Antenna 0: 30.07 → 32.82 Antenna 1: 69.86 → 67.80 - Radiated Spurious Emission (Page 23) • Added “Floor noise” to remarks column of Horizontal 4844.0 MHz. • Corrected data of Horizontal 2387.8 MHz.

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS	PAGE
SECTION 1: Customer Information	5
SECTION 2: Equipment Under Test (EUT).....	5
SECTION 3: Test Specification, Procedures & Results	7
SECTION 4: Operation of EUT during testing	10
SECTION 5: Radiated Spurious Emission.....	15
SECTION 6: Antenna Terminal Conducted Tests	17
APPENDIX 1: Test Data.....	18
99 % Occupied Bandwidth and 6 dB Bandwidth.....	18
Maximum Peak Output Power	20
Average Output Power.....	21
Radiated Spurious Emission.....	23
Conducted Spurious Emission.....	26
Power Density.....	27
APPENDIX 2: Test Instruments	29
APPENDIX 3: Photographs of Test Setup	30
Radiated Spurious Emission.....	30
Worst Case Position	31
Antenna Terminal Conducted Tests	32

SECTION 1: Customer Information

Company Name	DENSO CORPORATION
Address	1-1, Showa-cho, Kariya-shi, Aichi-ken, 448-8661, Japan
Telephone Number	+81-566-26-5879
Contact Person	Akina Takakura

The information provided by the customer is as follows;

- Customer, Description of EUT, Model Number of EUT, FCC ID 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	Cockpit Control Unit
Model Number	DNNS137
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	December 1, 2024
Test Date	December 3 and 5, 2024

2.2 Product Description

General Specification

Rating	DC 13.2 V VDD DC 1.8 V, 3.3 V, 2.2 V
Operating temperature	5 deg. C to 35 deg. C

Radio Specification (1/2)

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked "a)" in the table below.

WLAN (IEEE802.11b/11g/11n-20/n-40)

Equipment Type	Transceiver
Frequency of Operation	20 MHz Band: 2412 MHz to 2462 MHz 40 MHz Band: 2422 MHz to 2452 MHz
Type of Modulation	DSSS (CCK, DQPSK, DBPSK) OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM)
Antenna Type	Inverted F Antenna
Antenna Gain ^{a)}	Antenna 0: 0.71 dBi (Peak) (for Right) Antenna 1: 2.19 dBi (Peak) (for Left)

Radio Specification (2/2)

Bluetooth (BR / EDR)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8 DPSK)
Antenna Type	Inverted F Antenna
Antenna Gain	0.71 dBi (Peak) (for Right)

WLAN (IEEE802.11a/11n-20/11ac-20/11n-40/11ac-40/11ac-80)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band	5180 MHz to 5240 MHz 5745 MHz to 5825 MHz
	40 MHz Band	5190 MHz to 5230 MHz 5755 MHz to 5795 MHz
	80 MHz Band	5210 MHz 5775 MHz
Type of Modulation	OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM)	
Antenna Type	Inverted F Antenna	
Antenna Gain	Antenna 0:	1.66 dBi (Peak) (for Right)
	Antenna 1:	4.04 dBi (Peak) (for Left)

GNSS

Equipment Type	Receiver
Frequency of Operation	GPS: 1575.42MHz GLONASS: 1598.0625 MHz to 1605.375 MHz
Type of Modulation	BPSK

Broadcast

Equipment Type	Receiver
Frequency of Operation	AM: 522 kHz to 1710 kHz FM: 87.75 MHz to 107.9 MHz RBDS: 87.75 MHz to 107.9 MHz XM: 2333.465 MHz to 2344.045 MHz

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	-	N/A	*1)
6dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(2) ISED: RSS-247 5.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ISED: RSS-247 5.4(d)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(e) ISED: RSS-247 5.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	6.5 dB 2390.00 MHz, AV, Horizontal	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

FCC Part 15.31 (e)

This EUT provides the stable voltage constantly to RF part regardless of input voltage.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the vehicle.

Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99% Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	-	Conducted

Other than above, 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 $k = 2$.

Radiated emission

Measurement distance	Frequency range		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	5.0
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	5.5
		Vertical	dB	5.4
	200 MHz to 1000 MHz	Horizontal	dB	5.5
		Vertical	dB	5.5
3 m	1 GHz to 6 GHz		dB	5.1
	6 GHz to 18 GHz		dB	5.4
1 m	10 GHz to 18 GHz		dB	5.4
	18 GHz to 26.5 GHz		dB	5.3
	26.5 GHz to 40 GHz		dB	4.8
0.5 m	26.5 GHz to 40 GHz		dB	5.0

Antenna Terminal Conducted

Item		Unit	Calculated Uncertainty (+/-)
Antenna terminated conducted emission / Power density / Burst power	dB	3.47	
Adjacent channel power (ACP)	dB	2.28	
Bandwidth (OBW)	%	0.96	
Time readout (time span upto 100 msec)	%	0.11	
Time readout (time span upto 1000 msec)	%	0.11	
Time readout (time span upto 60 sec)	%	0.02	
Power measurement (Power meter < 8 GHz)	dB	1.46	
Power measurement (Call box < 6 GHz)	dB	1.69	
Frequency readout (Frequency counter)	ppm	0.67	
Frequency readout (Spectrum analyzer frequency readout function)	ppm	2.13	
Temperature (constant temperature bath)	deg. C	0.69	
Humidity (constant temperature bath)	%RH	2.98	
Modulation characteristics	%	6.93	
Frequency for mobile	ppm	0.08	
Contention-based protocol	dB	2.26	

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 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

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	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	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	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	Remarks*
IEEE 802.11n SISO / MIMO 40 MHz BW (11n-40)	MCS 15 (Long GI), PN9

*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)

*Power of the EUT was set by the software as follows;

Power Setting: 11n-40 (SISO): 5 dBm
11n-40 (MIMO): 8 dBm

Software: CCU TEST Program
Soc: Version: CP25_20240517
(Date: 2024.05.17, Storage location: EUT memory)
VCPU: Version: CP25_20240517
(Date: 2024.05.17, Storage location: EUT memory)

*This setting of software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

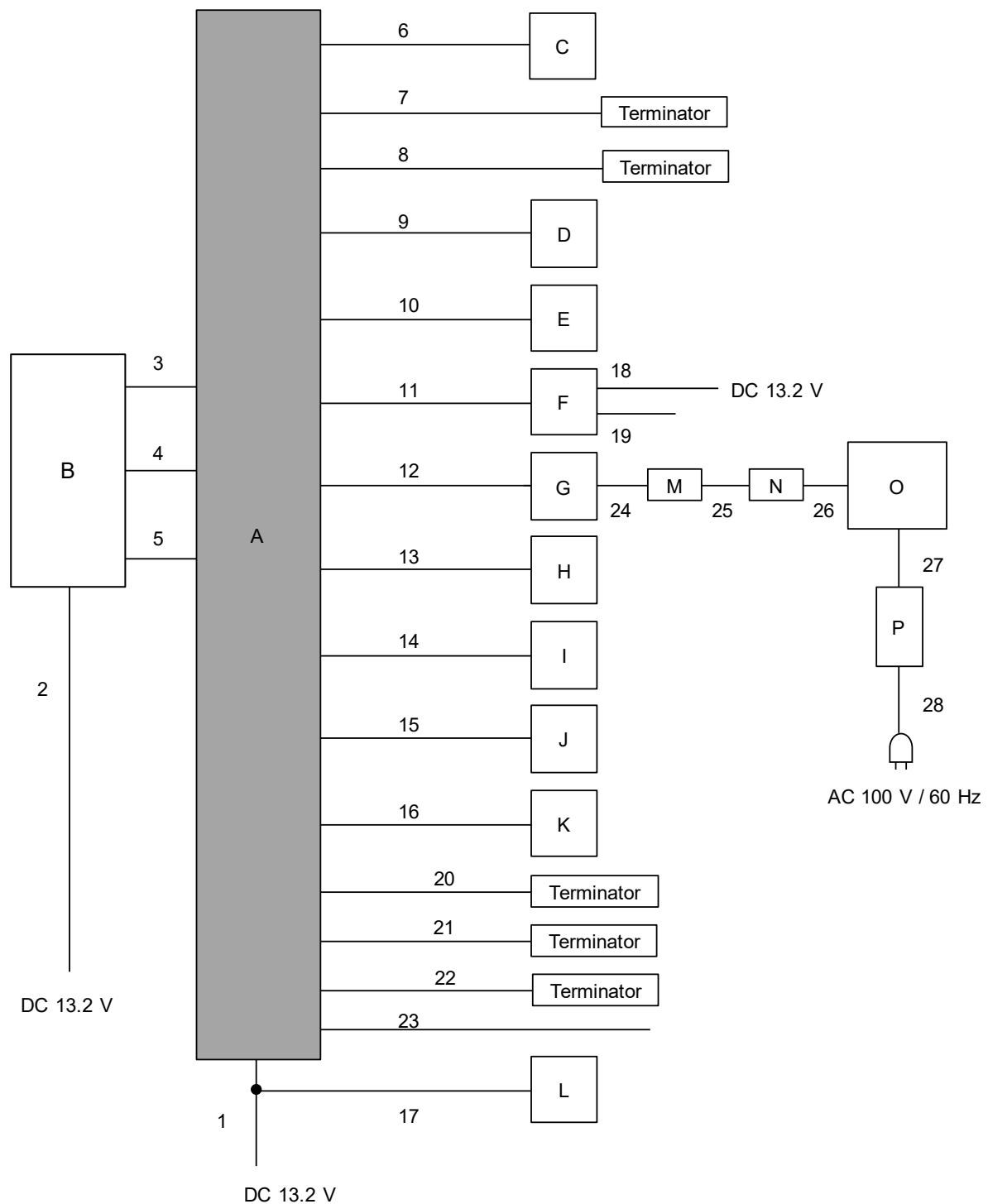
Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - " of TCB Council Workshop October 2009

*The Details of Operating Mode(s)

Test Item	Operating Mode	Tested Antenna	Tested Frequency
Radiated Spurious Emission, Conducted Spurious Emission, 6dB Bandwidth, Maximum Peak Output Power, Power Density, 99% Occupied Bandwidth	Tx 11n-40	0 to 1 (Simultaneously)	2422 MHz

4.2 Configuration and Peripherals

Antenna Terminal Conducted Tests



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

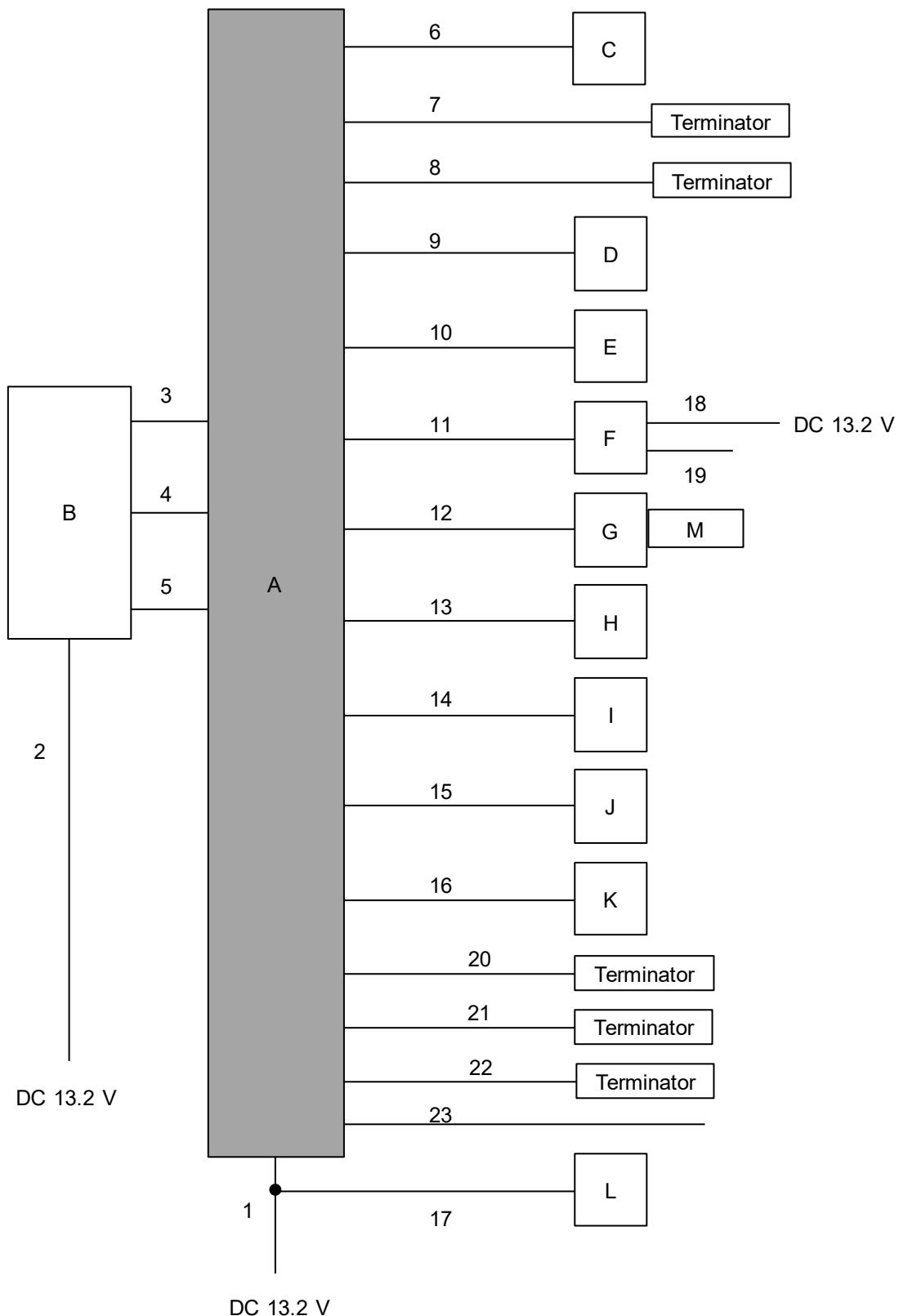
Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Cockpit Control Unit	DNNS137	46872600100000000 000002	DENSO CORPORATION	EUT
B	Display (CID)	137000-15890001	No.1	DENSO TEN CORPORATION	-
C	GPS Antenna	86277AL000	29550172	SUBARU CORPORATION	-
D	Camera Dummy	MAX96778COAXE VKIT	-	Maxim integrated	-
E	Ether Dummy	EtherBoard	-	DENSO CORPORATION	-
F	METER	5-157500-186	No.S44	DENSO CORPORATION	-
G	USB BOX	TAP8006 cable	No.12	HOSHIDEN	-
H	Speaker	AK-122	-	archill	-
I	Speaker	AK-122	-	archill	-
J	Speaker	AK-122	-	archill	-
K	Speaker	AK-122	-	archill	-
L	HEATER CONTROL Panel	137000-15990005	No.1	DENSO TEN CORPORATION	-
M	USB-LAN Adapter	LUA3-U2-ATX	26495621036190	BUFFALO INC.	-
N	USB-LAN Adapter	LUA3-U2-ATX	26495621036077	BUFFALO INC.	-
O	Laptop PC	X1 Carbon	R9-OH8OBW 15/9	LENOVO	-
P	AC Adapter	ADXL45NCC2A	11S45N0299Z1ZS944 B6KBR	LENOVO	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	4.20	Unshielded	Unshielded	-
2	DC Cable	4.30	Unshielded	Unshielded	-
3	Antenna Cable	0.57	Shielded	Shielded	-
4	Antenna Cable	0.57	Shielded	Shielded	-
5	Display Signal Cable	0.57	Shielded	Shielded	-
6	GPS Antenna Cable	1.00	Shielded	Shielded	-
7	Radio Antenna Cable(AM/FM)	2.00	Shielded	Shielded	-
8	Radio Antenna Cable(XM)	2.00	Shielded	Shielded	-
9	Camera Cable	2.00	Shielded	Shielded	-
10	Ether Cable	2.00	Shielded	Shielded	-
11	METER Signal Cable	2.00	Unshielded	Unshielded	-
12	USB BOX Cable	2.00	Shielded	Shielded	-
13	Speaker Cable	6.30	Unshielded	Unshielded	-
14	Speaker Cable	6.30	Unshielded	Unshielded	-
15	Speaker Cable	6.30	Unshielded	Unshielded	-
16	Speaker Cable	6.30	Unshielded	Unshielded	-
17	DC Cable	4.60	Unshielded	Unshielded	-
18	DC Cable	4.60	Unshielded	Unshielded	-
19	Signal Cable	2.00	Unshielded	Unshielded	-
20	Signal Cable	2.00	Unshielded	Unshielded	-
21	Signal Cable	2.00	Unshielded	Unshielded	-
22	Signal Cable	2.00	Unshielded	Unshielded	-
23	Signal Cable	2.00	Unshielded	Unshielded	-
24	USB Cable	0.18	Shielded	Shielded	-
25	LAN Cable	2.00	Shielded	Shielded	-
26	USB Cable	0.18	Shielded	Shielded	-
27	DC Cable	1.70	Unshielded	Unshielded	-
28	AC Cable	1.00	Unshielded	Unshielded	-

Radiated Spurious Emission



* 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	Cockpit Control Unit	DNNS137	4687260010000000 0000002	DENSO CORPORATION	EUT
B	Display (CID)	137000-15890001	No.1	DENSO TEN CORPORATION	-
C	GPS Antenna	86277AL000	29550172	SUBARU CORPORATION	-
D	Camera Dummy	MAX96778COAXE VKIT	-	Maxim integrated	-
E	Ether Dummy	EtherBoard	-	DENSO CORPORATION	-
F	METER	5-157500-186	No.S44	DENSO CORPORATION	-
G	USB BOX	TAP8006 cable	No.12	HOSHIDEN	-
H	Speaker	AK-122	-	archill	-
I	Speaker	AK-122	-	archill	-
J	Speaker	AK-122	-	archill	-
K	Speaker	AK-122	-	archill	-
L	HEATER CONTROL Panel	137000-15990005	No.1	DENSO TEN CORPORATION	-
M	USB Memory	RUF3-K16GB	P10416	BUFFALO INC.	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	4.20	Unshielded	Unshielded	-
2	DC Cable	4.30	Unshielded	Unshielded	-
3	Antenna Cable	0.57	Shielded	Shielded	-
4	Antenna Cable	0.57	Shielded	Shielded	-
5	Display Signal Cable	0.57	Shielded	Shielded	-
6	GPS Antenna Cable	1.00	Shielded	Shielded	-
7	Radio Antenna Cable(AM/FM)	2.00	Shielded	Shielded	-
8	Radio Antenna Cable(XM)	2.00	Shielded	Shielded	-
9	Camera Cable	2.00	Shielded	Shielded	-
10	Ether Cable	2.00	Shielded	Shielded	-
11	METER Signal Cable	2.00	Unshielded	Unshielded	-
12	USB BOX Cable	2.00	Shielded	Shielded	-
13	Speaker Cable	6.30	Unshielded	Unshielded	-
14	Speaker Cable	6.30	Unshielded	Unshielded	-
15	Speaker Cable	6.30	Unshielded	Unshielded	-
16	Speaker Cable	6.30	Unshielded	Unshielded	-
17	DC Cable	4.60	Unshielded	Unshielded	-
18	DC Cable	4.60	Unshielded	Unshielded	-
19	Signal Cable	2.00	Unshielded	Unshielded	-
20	Signal Cable	2.00	Unshielded	Unshielded	-
21	Signal Cable	2.00	Unshielded	Unshielded	-
22	Signal Cable	2.00	Unshielded	Unshielded	-
23	Signal Cable	2.00	Unshielded	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane. Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The height of the measuring antenna 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 strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below:

Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

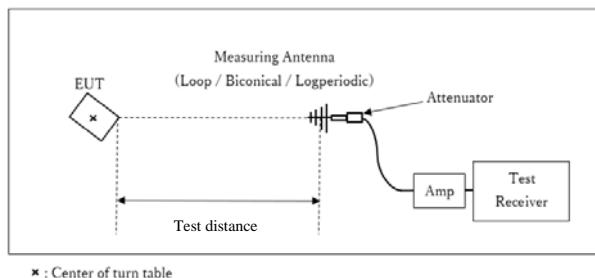
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

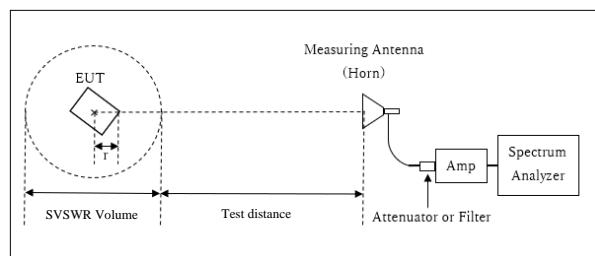
Frequency	Below 1 GHz	Above 1 GHz	20 dBc
Instrument Used	Test Receiver	Spectrum Analyzer	Spectrum Analyzer
Detector	QP	PK	AV
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces <u>11.12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces <u>11.12.2.5.2</u> The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.	PK RBW: 100 kHz VBW: 300 kHz

Figure 2: Test Setup

Below 1 GHz



1 GHz to 10 GHz



Test Distance: 3 m

[1 GHz to 6 GHz]

Distance Factor: $20 \times \log (3.55 \text{ m}^* / 3.0 \text{ m}) = 1.47 \text{ dB}$
*(Test Distance + SVSWR Volume /2) - r = 3.55 m

Test Distance: 3.00 m

SVSWR Volume: 1.5 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.2 m

[6 GHz to 10 GHz]

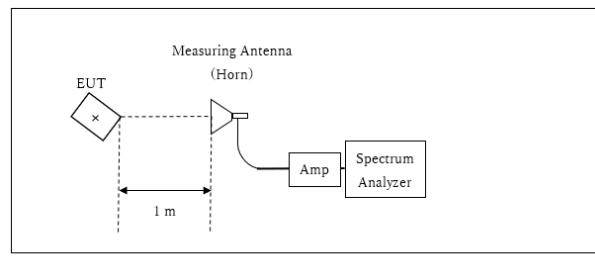
Distance Factor: $20 \times \log (3.55 \text{ m}^* / 3.0 \text{ m}) = 1.47 \text{ dB}$
*(Test Distance + SVSWR Volume /2) - r = 3.55 m

Test Distance: 3.25 m

SVSWR Volume: 1.0 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.2 m

10 GHz to 26.5 GHz



Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

*Test Distance: 1 m

The carrier level and 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 the position that has the maximum noise.

Test results are rounded off and limit are rounded down, so some differences might be observed.

Measurement Range : 30 MHz to 26.5 GHz

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	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
6dB Bandwidth	20 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)
*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohmes. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

Test results are rounded off and limit are rounded down, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test Data

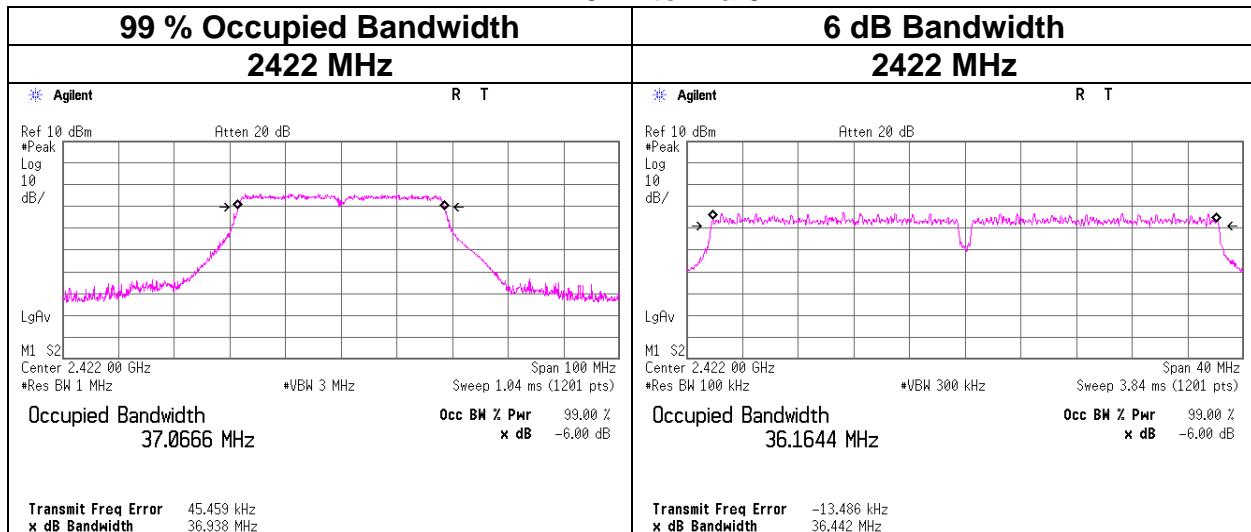
99 % Occupied Bandwidth and 6 dB Bandwidth

Test place Ise EMC Lab. No.6 Measurement Room
Date December 3, 2024
Temperature / Humidity 23 deg. C / 55 % RH
Engineer Takumi Nishida
Mode Tx

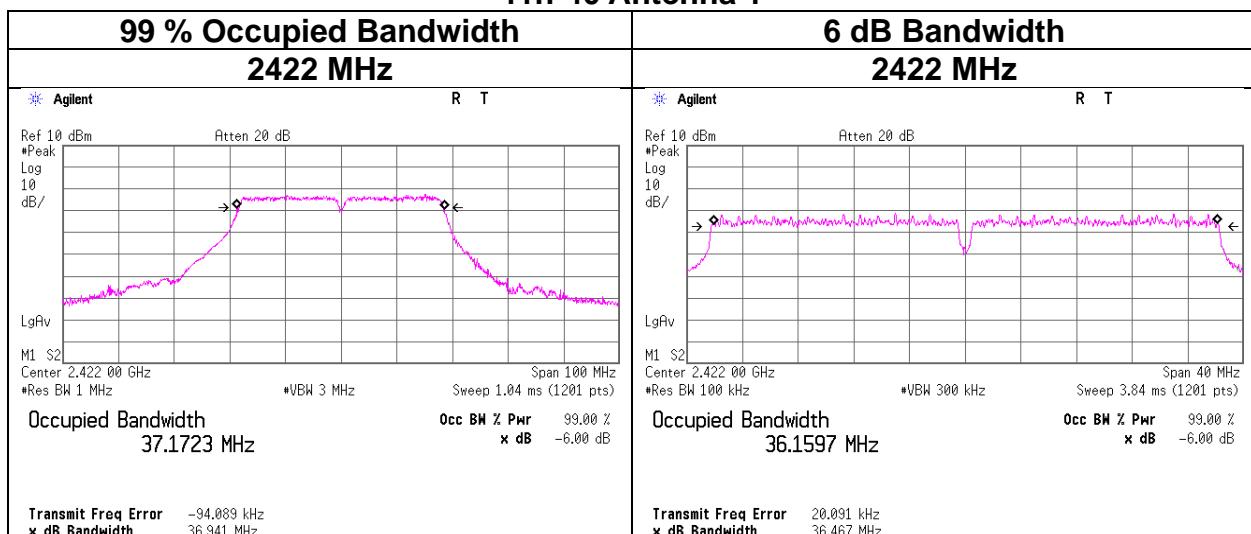
Mode	Antenna	Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
11n-40	0	2422	37066.6	36.442	> 0.5000
	1	2422	37172.3	36.467	> 0.5000

99 % Occupied Bandwidth and 6 dB Bandwidth

11n-40 Antenna 0



11n-40 Antenna 1



Maximum Peak Output Power

Test place Ise EMC Lab. No.6 Measurement Room
 Date December 3, 2024
 Temperature / Humidity 23 deg. C / 55 % RH
 Engineer Takumi Nishida
 Mode Tx 11n-40

Freq. [MHz]	Antenna 0 Conducted Power Result [mW]	Antenna 1 Conducted Power Result [mW]	Conducted Power				e.i.r.p. for RSS-247							
			Result		Limit		Margin	Antenna 0 e.i.r.p. Result [mW]	Antenna 1 e.i.r.p. Result [mW]	Result		Margin		
[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]		
2422	27.87	40.94	18.38	68.81	30.00	1000	11.62	32.82	67.80	20.03	100.61	36.02	4000.00	15.99

Sample Calculation:

Conducted Power Result = Antenna 0 Conducted Power Result + Antenna 1 Conducted Power Result

e.i.r.p. Result = Antenna 0 e.i.r.p. Result + Antenna 1 e.i.r.p. Result

Antenna 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power Result		Antenna Gain [dBj]	e.i.r.p. Result	
				[dBm]	[mW]		[dBm]	[mW]
2422	2.15	2.20	10.10	14.45	27.87	0.71	15.16	32.82

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power Result		Antenna Gain [dBj]	e.i.r.p. Result	
				[dBm]	[mW]		[dBm]	[mW]
2422	3.85	2.17	10.10	16.12	40.94	2.19	18.31	67.80

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

2422 MHz

Tx Number	MCS	Antenna 0		Antenna 1		Long GI Total Reading Power		Antenna 0		Antenna 1		Short GI Total Reading Power		Remark
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
SISO	0	-0.90	0.81	-	-	-0.90	0.81	-	-	-	-	-	-	-
	1	-0.77	0.84	-	-	-0.77	0.84	-	-	-	-	-	-	-
	2	0.39	1.09	-	-	0.39	1.09	-	-	-	-	-	-	-
	3	-0.02	1.00	-	-	-0.02	1.00	-	-	-	-	-	-	-
	4	2.71	1.87	-	-	2.71	1.87	-	-	-	-	-	-	-
	5	3.09	2.04	-	-	3.09	2.04	-	-	-	-	-	-	-
	6	2.55	1.80	-	-	2.55	1.80	-	-	-	-	-	-	-
	7	2.41	1.74	-	-	2.41	1.74	-	-	-	-	-	-	-
	0	-	-	0.96	1.25	0.96	1.25	-	-	-	-	-	-	-
	1	-	-	1.04	1.27	1.04	1.27	-	-	-	-	-	-	-
	2	-	-	2.04	1.60	2.04	1.60	-	-	-	-	-	-	-
	3	-	-	1.71	1.48	1.71	1.48	-	-	-	-	-	-	-
	4	-	-	4.41	2.76	4.41	2.76	-	-	-	-	-	-	-
	5	-	-	4.75	2.99	4.75	2.99	-	-	-	-	-	-	-
	6	-	-	4.53	2.84	4.53	2.84	-	-	-	-	-	-	-
	7	-	-	3.92	2.47	3.92	2.47	-	-	-	-	-	-	-
MIMO	0	-0.66	0.86	0.94	1.24	3.23	2.10	-	-	-	-	-	-	-
	1	-0.54	0.88	1.05	1.27	3.34	2.16	-	-	-	-	-	-	-
	2	0.41	1.10	2.03	1.60	4.31	2.70	-	-	-	-	-	-	-
	3	0.07	1.02	1.73	1.49	3.99	2.51	-	-	-	-	-	-	-
	4	3.13	2.06	4.45	2.79	6.85	4.84	-	-	-	-	-	-	-
	5	3.21	2.10	4.60	2.89	6.97	4.98	-	-	-	-	-	-	-
	6	2.86	1.93	4.42	2.77	6.72	4.70	-	-	-	-	-	-	-
	7	2.29	1.70	4.00	2.51	6.24	4.21	-	-	-	-	-	-	-
	8	-0.36	0.92	1.08	1.28	3.43	2.20	-	-	-	-	-	-	-
	9	-0.78	0.84	1.04	1.27	3.24	2.11	-	-	-	-	-	-	-
	10	0.74	1.19	2.04	1.60	4.45	2.79	-	-	-	-	-	-	-
	11	0.21	1.05	1.75	1.50	4.06	2.55	-	-	-	-	-	-	-
	12	2.87	1.94	4.60	2.89	6.83	4.82	-	-	-	-	-	-	-
	13	2.74	1.88	4.33	2.71	6.62	4.59	-	-	-	-	-	-	-
	14	2.79	1.90	4.45	2.79	6.71	4.69	-	-	-	-	-	-	-
	15	3.10	2.04	5.30	3.39	7.35	5.43	2.92	1.96	5.04	3.19	7.12	5.15	* Long GI

*Worst MCS

All comparison were carried out on same frequency and measurement factors.

Average Output Power (Reference data for RF Exposure)

Test place Ise EMC Lab. No.6 Measurement Room
Date December 3, 2024
Temperature / Humidity 23 deg. C / 55 % RH
Engineer Takumi Nishida
Mode Tx 11n-40

Antenna 0 + Antenna 1 MCS0

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2422	3.10	4.77	8.96	7.86

Antenna 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2422	-7.60	2.20	10.10	4.70	2.95	0.21	4.91	3.10

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2422	-5.70	2.17	10.10	6.57	4.54	0.21	6.78	4.77

Sample Calculation:

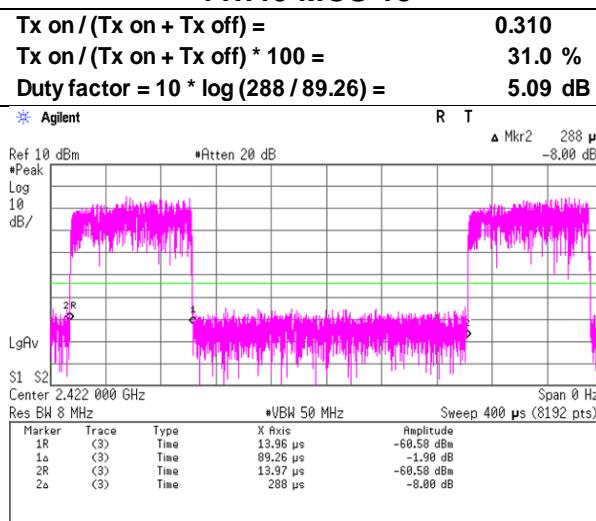
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

**The average output power was measured with the lowest order modulation and
lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.**

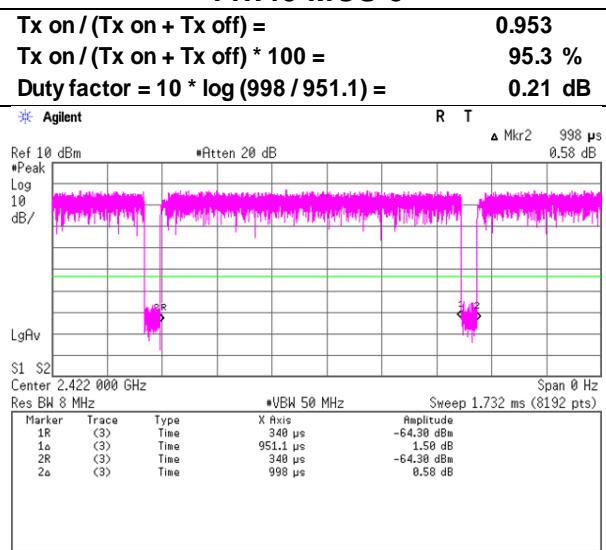
Burst rate confirmation

Test place Ise EMC Lab. No.6 Measurement Room
 Date December 3, 2024
 Temperature / Humidity 23 deg. C / 55 % RH
 Engineer Takumi Nishida
 Mode Tx

11n40 MCS 15



11n40 MCS 0



* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Radiated Spurious Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date December 5, 2024
Temperature / Humidity 21 deg. C / 42 % RH
Engineer Junki Nagatomi
Mode Tx 11n-40 2422 MHz

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	69.6	27.4	-	6.3	7.3	28.5	-	12.5	-	40.0	-	27.5	-	
Hori.	94.7	35.8	-	9.4	7.5	28.4	-	24.2	-	43.5	-	19.3	-	
Hori.	125.7	26.4	-	13.4	7.8	28.3	-	19.2	-	43.5	-	24.3	-	
Hori.	220.6	25.8	-	11.3	8.4	27.9	-	17.7	-	46.0	-	28.4	-	
Hori.	260.7	32.7	-	12.4	8.7	27.7	-	26.0	-	46.0	-	20.0	-	
Hori.	290.0	37.5	-	13.6	8.8	27.7	-	32.3	-	46.0	-	13.8	-	
Hori.	2387.8	54.7	42.6	27.5	4.5	33.2	5.1	53.5	46.5	73.9	53.9	20.5	7.4 *1)	
Hori.	2390.0	55.9	43.5	27.5	4.5	33.2	5.1	54.7	47.4	73.9	53.9	19.2	6.5 *1)	
Hori.	4108.3	45.6	37.4	30.0	6.5	32.8	5.1	49.3	46.2	73.9	53.9	24.6	7.7	
Hori.	4844.0	44.7	35.5	31.4	6.6	32.6	-	50.2	41.0	73.9	53.9	23.8	12.9	Floor noise
Hori.	7266.0	43.9	35.5	35.4	7.9	32.5	-	54.6	46.2	73.9	53.9	19.3	7.7	Floor noise
Hori.	9688.0	44.2	35.8	35.9	8.4	33.2	-	55.2	46.9	73.9	53.9	18.7	7.0	Floor noise
Vert.	44.1	26.6	-	13.5	7.0	28.5	-	18.6	-	40.0	-	21.4	-	
Vert.	54.5	28.0	-	9.5	7.1	28.5	-	16.1	-	40.0	-	23.9	-	
Vert.	69.3	29.6	-	6.3	7.3	28.5	-	14.7	-	40.0	-	25.3	-	
Vert.	96.2	32.1	-	9.6	7.5	28.4	-	20.8	-	43.5	-	22.7	-	
Vert.	127.6	25.0	-	13.6	7.8	28.3	-	18.0	-	43.5	-	25.5	-	
Vert.	290.3	34.7	-	13.6	8.8	27.7	-	29.5	-	46.0	-	16.6	-	
Vert.	2387.8	53.4	41.5	27.5	4.5	33.2	5.1	52.2	45.4	73.9	53.9	21.7	8.5 *1)	
Vert.	2390.0	50.8	40.3	27.5	4.5	33.2	5.1	49.6	44.2	73.9	53.9	24.3	9.7 *1)	
Vert.	4108.3	45.9	37.1	30.0	6.5	32.8	5.1	49.6	45.9	73.9	53.9	24.3	8.0	
Vert.	4844.0	44.2	35.5	31.4	6.6	32.6	-	49.6	41.0	73.9	53.9	24.3	12.9	Floor noise
Vert.	7266.0	44.1	35.5	35.4	7.9	32.5	-	54.8	46.2	73.9	53.9	19.1	7.7	Floor noise
Vert.	9688.0	44.2	35.8	35.9	8.4	33.2	-	55.2	46.9	73.9	53.9	18.7	7.0	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

*QP detector was used up to 1GHz.

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
[Hori/Vert]	[MHz]								
Hori.	2422.0	89.7	27.5	4.5	33.2	88.5	-	-	Carrier
Hori.	2400.0	55.4	27.5	4.5	33.2	54.2	68.5	14.3	
Vert.	2422.0	88.5	27.5	4.5	33.2	87.2	-	-	Carrier
Vert.	2400.0	52.4	27.5	4.5	33.2	51.1	67.2	16.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

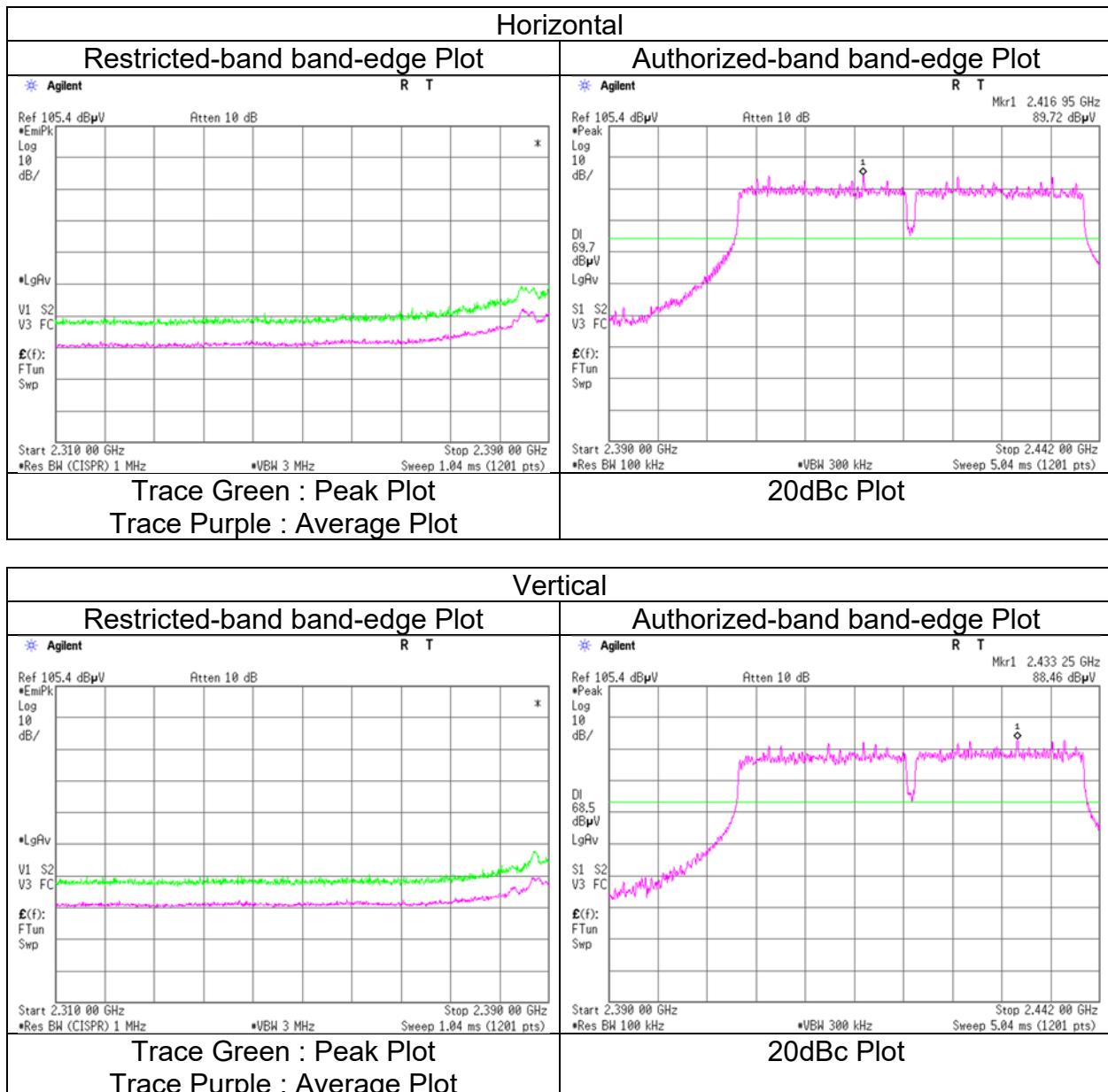
Distance factor: 1 GHz - 6 GHz $20\log(3.55 \text{ m} / 3.0 \text{ m}) = 1.47 \text{ dB}$

6 GHz - 10 GHz $20\log(3.55 \text{ m} / 3.0 \text{ m}) = 1.47 \text{ dB}$

10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

**Radiated Spurious Emission
(Reference Plot for band-edge)**

Test place Ise EMC Lab.
Semi Anechoic Chamber
Date December 5, 2024
Temperature / Humidity 21 deg. C / 42 % RH
Engineer Junki Nagatomi
Mode Tx 11n-40 2422 MHz

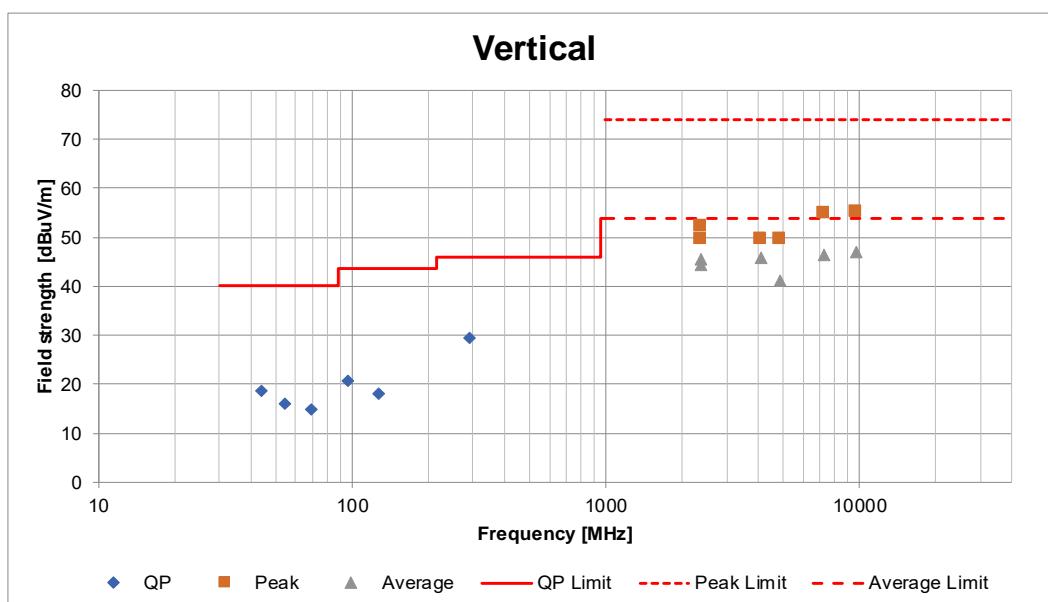
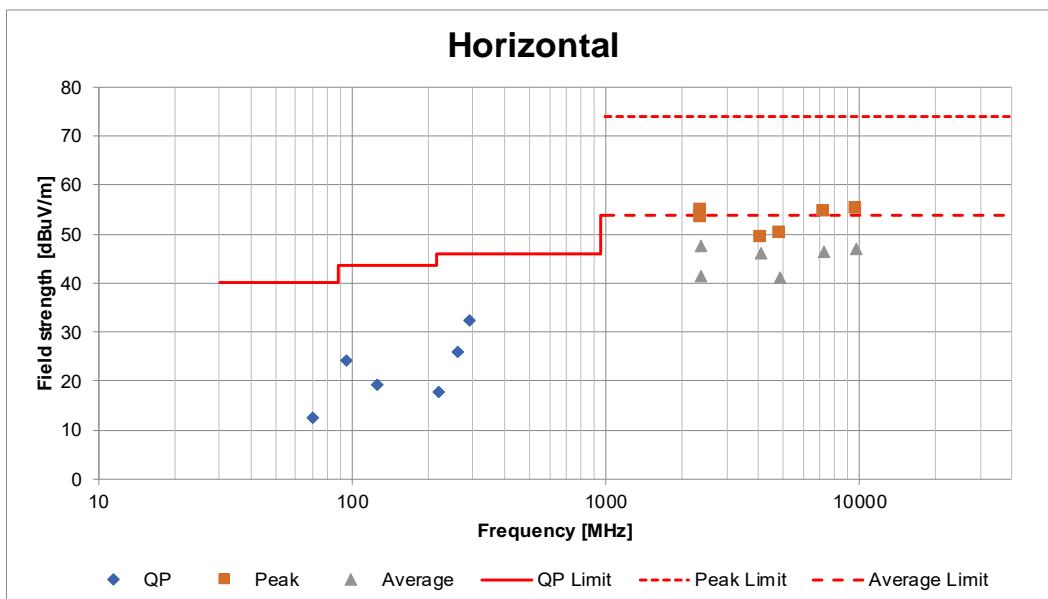


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

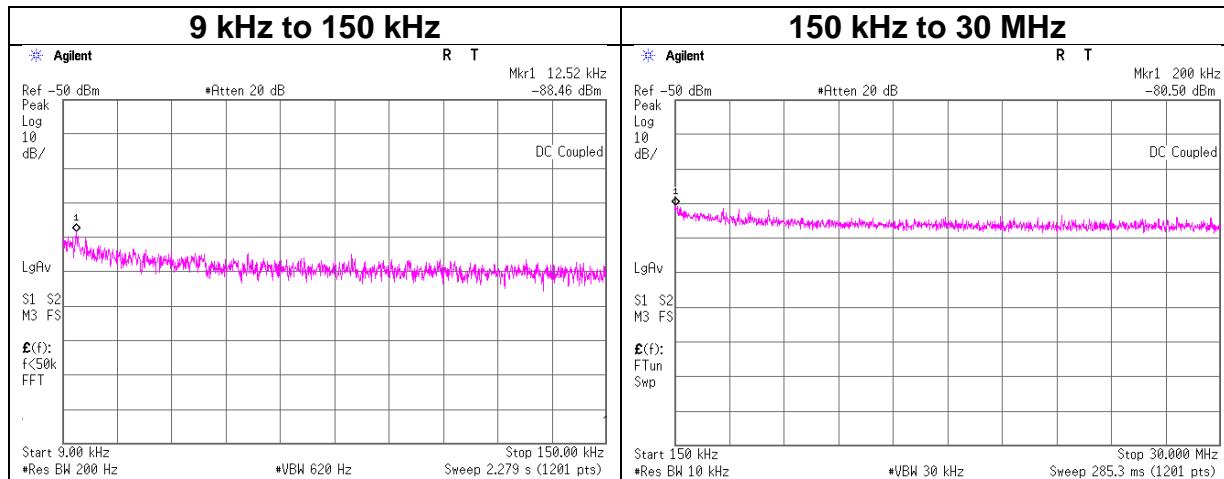
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date December 5, 2024
Temperature / Humidity 21 deg. C / 42 % RH
Engineer Junki Nagatomi
Mode Tx 11n-40 2422 MHz



*These plots data contain sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place Ise EMC Lab. No.6 Measurement Room
 Date December 3, 2024
 Temperature / Humidity 23 deg. C / 55 % RH
 Engineer Takumi Nishida
 Mode Tx 11n-40 2422 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
12.52	-88.5	0.01	9.8	2.2	2	-73.4	300	6.0	-12.2	45.6	57.8	
200.00	-80.5	0.01	9.8	2.2	2	-65.4	300	6.0	-4.2	21.5	25.7	

$E \text{ [dBuV/m]} = \text{EIRP} \text{ [dBm]} - 20 \log (\text{Distance} \text{ [m]}) + \text{Ground bounce} \text{ [dB]} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} \text{ [dBm]} = \text{Reading} \text{ [dBm]} + \text{Cable loss} \text{ [dB]} + \text{Attenuator Loss} \text{ [dB]} + \text{Antenna gain} \text{ [dBi]} + 10 * \log (N)$

N: Number of output

Power Density

Test place Ise EMC Lab. No.6 Measurement Room
Date December 3, 2024
Temperature / Humidity 23 deg. C / 55 % RH
Engineer Takumi Nishida
Mode Tx 11n-40

Antenna 0 +1

Freq. [MHz]	Antenna 1 Result [mW / 3 kHz]	Antenna 2 Result [mW / 3 kHz]	Result [dBm / 3 kHz]		Limit [dBm / 3 kHz]	Margin [dB]
2422	0.004	0.007	-19.65	0.011	8.00	27.65

Sample Calculation:

Result = Antenna 0 + 1

Antenna 0

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]		Limit [dBm / 3 kHz]	Margin [dB]
2422	-36.53	2.20	10.10	-24.23	0.004	8.00	32.23

Antenna 1

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]		Limit [dBm / 3 kHz]	Margin [dB]
2422	-33.78	2.17	10.10	-21.51	0.007	8.00	29.51

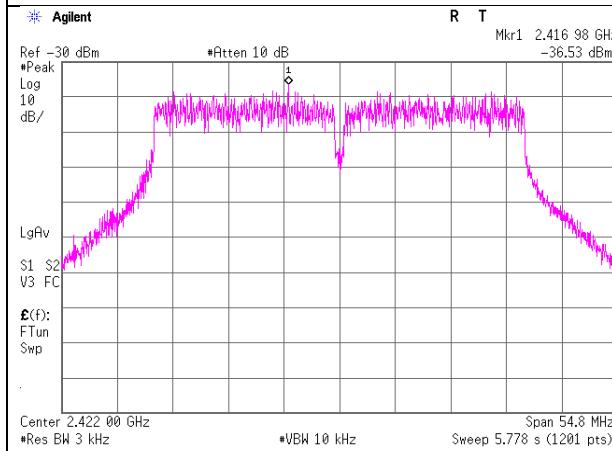
Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Power Density

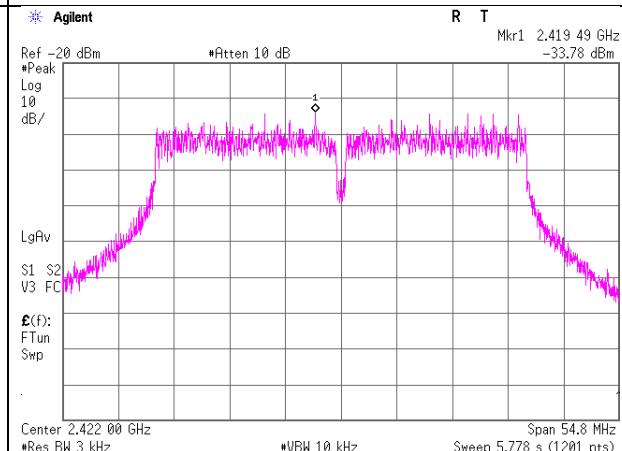
11n-40 Antenna 0

2422 MHz



11n-40 Antenna 1

2422 MHz



APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	141156	Attenuator (10dB)	Weinschel Corp	2	BL1173	11/11/2024	12
AT	141173	Attenuator (10dB) (above 1GHz)	HIROSE ELECTRIC CO., LTD.	AT-110	-	12/11/2023	12
AT	141327	Coaxial Cable	UL-ISE	-	-	02/09/2024	12
AT	141329	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	04/08/2024	12
AT	141558	Digital Tester (TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/17/2024	12
AT	141809	Power Meter	Anritsu Corporation	ML2495A	825002	05/22/2024	12
AT	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/22/2024	12
AT	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	11/13/2024	12
AT	244712	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202106	01/25/2024	12
RE	141232	High Pass Filter 3.5-18.0GHz	UL-ISE	HPF SELECTOR	001	09/13/2024	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/10/2024	12
RE	141317	Coaxial Cable	UL-ISE	-	-	09/11/2024	12
RE	141331	Attenuator(6dB)	TME	UFA-01	-	02/17/2024	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+ BBA9106	08031	07/30/2024	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	06/25/2024	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2024	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/06/2024	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/17/2024	12
RE	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	05/09/2024	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	06/05/2024	12
RE	142004	AC2_Semi Anechoic Chamber (NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
RE	142006	AC2_Semi Anechoic Chamber (SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/17/2023	24
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	238713	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	688	09/02/2024	12
RE	244707	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202102	01/25/2024	12
RE	252663	Microwave Cable	Huber+Suhner	SF126E/ 11PC35/11PC35/ 1000MM, 5000MM	616276/126E / 616275/126E	09/10/2024	12
RE	253739	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01919	10/23/2024	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:

AT: Antenna Terminal Conducted test
RE: Radiated Emission