RADIO TEST REPORT

Test Report No. : 13273483S-B

Applicant	:	**Panasonic Corporation**
Type of EUT	:	**Seat Back ECU**
Model Number of EUT	:	**AT2002**
Test standard	:	**EN 300 328 V2.1.1**
Test Result	:	**Complied (Refer to SECTION 3.2)**

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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 standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
7. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
8. The information provided from the customer for this report is identified in SECTION 1.

Date of test: March 13 to 30, 2020

Representative test engineer:

Toshinori Yamada
Engineer
Consumer Technology Division

Approved by :

Shinichi Takano
Engineer
Consumer Technology Division

RTL02610

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

REVISION HISTORY

Original Test Report No.: 13273483S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13273483S-B	April 21, 2020	-	-

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Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	4261, Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa-ken, 224-8520, Japan
Telephone Number	:	+81-50-3380-5341
Facsimile Number	:	+81-45-931-0806
Contact Person	:	Yuki Tojo

The information provided from the customer is as follows;
- Applicant, Type 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)
- SECTION 4: Operation of EUT during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type of Equipment	:	Seat Back ECU
Model No.	:	AT2002
Serial No.	:	Refer to SECTION 4.2
Rating	:	DC 13.2 V
Receipt Date of Sample (Information from test lab.)	:	March 13, 2020
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: AT2002 (referred to as the EUT in this report) is a Seat Back ECU.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2472 MHz
Modulation	:	DSSS, OFDM
Antenna type	:	Dipole
Antenna Gain	:	0.85 dBi
Clock frequency (Maximum)	:	48 MHz
Operating Temperature	:	-30 deg. C to +65 deg. C

List of Model No.

Model: AT2002 includes the following models:
CR-ET3BX0AJ (Tested model), CR-ET3BX1AJ, CR-ET3BX0BJ, CR-ET3BX1BJ
Difference of these models: Vehicle type, Destination

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Radio	:	EN 300 328 V2.1.1
Title	:	Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
Purpose of test	:	Compliance with the harmonized RE directive 2014/53/EU.

3.2 Procedures and results

Item	Test Procedure	Limit	Test method	Worst margin	Results	Remarks
RF output power	Clause 5.4.2	Clause 4.3.2.2	Conducted	-	Complied a)	-
Power Spectral Density	Clause 5.4.3	Clause 4.3.2.3	Conducted	-	Complied b)	-
Duty cycle, Tx-sequence, Tx-gap	Clause 5.4.2	Clause 4.3.2.4	Conducted	-	N/A	*1)
Medium Utilisation (MU) factor	Clause 5.4.2	Clause 4.3.2.5	Conducted	-	N/A	*1)
Adaptivity (adaptive equipment using modulations other than FHSS)	Clause 5.4.6	Clause 4.3.2.6	Conducted	-	Complied c)	-
Occupied Channel Bandwidth	Clause 5.4.7	Clause 4.3.2.7	Conducted	-	Complied d)	-
Transmitter unwanted emissions in the out-of-band domain	Clause 5.4.8	Clause 4.3.2.8	Conducted	-	Complied e)	-
Transmitter unwanted emissions in the spurious domain	Clause 5.4.9	Clause 4.3.2.9	Radiated	17.4 dB 491.531 MHz, Vertical Tx 11g 2472 MHz ---------- 491.540 MHz, Vertical Tx 11n-20 2472 MHz	Complied f)	-
Receiver Spurious emissions	Clause 5.4.10	Clause 4.3.2.10	Radiated	8.9 dB 1998.032 MHz, Vertical Rx 2472 MHz	Complied g)	-
Transmitter unwanted emissions in the spurious domain	Clause 5.4.9	Clause 4.3.2.9	Conducted	-	N/A	*2)
Receiver Spurious emissions	Clause 5.4.10	Clause 4.3.2.10	Conducted	-	N/A	*2)
Receiver Blocking	Clause 5.4.11	Clause 4.3.2.11	Conducted	-	Complied h)	-
Geo-location capability	-	Clause 4.3.2.12	-	-	N/A	*3)

Note: UL Japan, Inc.'s EMI Work Procedure 13-EM-W0420.
*1) The test is not applicable since the EUT is an adaptive equipment and does not operate in a non-adaptive mode.
*2) The EUT does not have antenna connector.
*3) The EUT does not have Geo-location capability.

a) Refer to APPENDIX 1 (data of RF Output Power)
b) Refer to APPENDIX 1 (data of Power Spectral Density)
c) Refer to APPENDIX 1 (data of Adaptivity and Unwanted Signal tests)
d) Refer to APPENDIX 1 (data of Occupied Channel Bandwidth)
e) Refer to APPENDIX 1 (data of Transmitter unwanted emissions in the out-of-band domain)
f) Refer to APPENDIX 1 (data of Transmitter unwanted emissions in the spurious domain (Radiated))
g) Refer to APPENDIX 1 (data of Receiver spurious emissions (Radiated))
h) Refer to APPENDIX 1 (data of Receiver Blocking)

Symbols:

Complied	The data of this test item has enough margin, more than the measurement uncertainty.
Complied#	The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

3.3 Additions or deviations to standards

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

3.4 Uncertainty

Although this standard determines only the limit value of uncertainty, there is no applicable rule of uncertainty in this. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

Shonan EMC Lab.

Substitution measurement (EUT height: 1.5 m, Distance: 3 m)	
Frequency range	Uncertainty (+/-)
30 MHz - 200 MHz	4.8 dB
200 MHz - 1000 MHz	3.5 dB
1 GHz - 12.75 GHz	4.3 dB

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.98 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Average Detector)_SPM-08, 09, 10, 11	1.30 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	1.06 dB
Conducted emissions Measurement (below 1 GHz)	0.9 dB
Conducted emissions Power Density Measurement (1 GHz-3 GHz)	0.9 dB
Conducted emissions Measurement (3 GHz-18 GHz)	2.9 dB
Conducted emissions Measurement (18 GHz-26.5 GHz)	2.6 dB
Frequency Measurement (Spectrum Analyzer)	2.1 x 10^-7
Bandwidth Measurement	0.07 %
Duty cycle and Time Measurement	0.262 %
Temperature	0.95 deg.C.
Voltage	0.83 %
Humidity	4.2 %
Receiver Blocking (Wanted RF Level)_SWT-02	2.73 dB
Receiver Blocking (Blocking Signal Level)_SWT-02	1.95 dB
Receiver Blocking (Wanted RF Level)_SSG-12	2.58 dB
Receiver Blocking (Blocking Signal Level)_SSG-12	1.96 dB
Receiver Blocking (Wanted RF Level)_SBT-01	2.71 dB
Receiver Blocking (Blocking Signal Level)_SBT-01	1.88 dB
Receiver Blocking (Blocking Signal Level)_without tester	1.19 dB

3.5 Test Location

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

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	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	-

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)

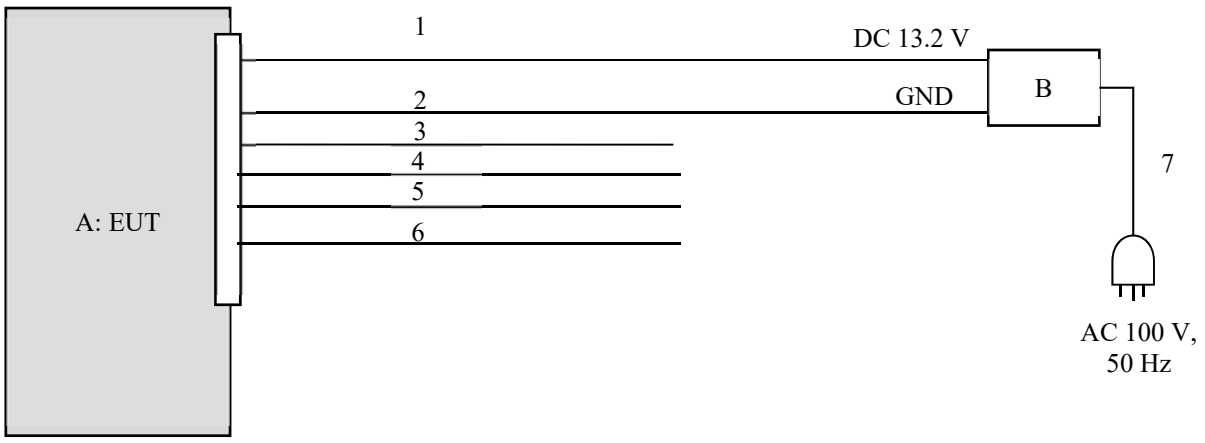
Mode	Remarks*
IEEE 802.11b (11b)	2 Mbps, PN9
IEEE 802.11g (11g)	36 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 3, PN9
*The worst condition was determined based on the test result of RF Output power. *EUT has the power settings by the software as follows; - Power Setting: 10 dBm - Software: WIFI Diag ver.9.94 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.	

Details of Operating Mode(s)

Test item	Operating mode	Tested frequency
RF output power, Power Spectral Density	Transmitting IEEE 802.11b/g/n-20	2412 MHz 2442 MHz 2472 MHz
Adaptivity	Communication IEEE 802.11b/g/n-20	2412 MHz 2472 MHz
Occupied channel bandwidth	Transmitting IEEE 802.11b/g/n-20	2412 MHz 2472 MHz
Transmitter unwanted emissions in the out-of-band domain	Transmitting IEEE 802.11b/g/n-20	2412 MHz 2472 MHz
Transmitter unwanted emissions in the spurious domain (Radiated)	Transmitting IEEE 802.11b/g/n-20	2412 MHz 2472 MHz
Receiver spurious emissions (Radiated)	Receiving IEEE 802.11b/g/n-20	2412 MHz 2472 MHz
Receiver blocking	Communication IEEE 802.11b/g *1)	2412 MHz 2472 MHz
*1) Since 11g and 11n-20 have the same nominal channel bandwidth and no differences in transmitting specification, test was performed on the 11g mode that had the lowest data rate.		

Extreme test condition	
Temperature	-30 deg. C to +65 deg. C
Voltage	Vnom: DC 13.2 V

4.2 Configuration and peripherals



* Cabling and setup 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	Seat Back ECU	AT2002	ECU2_064 *1) ECU2_065 *2) ECU2_060 *3) ECU2_058 *4)	Panasonic	EUT
B	Power Supply (DC)	PAN35-10A	NA000955	KIKUSUI	-

*1) Used for Antenna Terminal conducted test other than Adaptivity and Receiver Blocking
*2) Used for Radiated Emission test below 1 GHz
*3) Used for Radiated Emission test above 1 GHz
*4) Used for Adaptivity and Receiver Blocking

List of cables used

No.	Name	Length (m)	Shield	Remarks
1	DC+	3.9	Unshielded	-
2	GND	3.9	Unshielded	-
3	Signal	2.5	Unshielded	-
4	Earphone	2.5	Shielded	-
5	Earphone	2.5	Shielded	-
6	Signal	2.5	Unshielded	-
7	AC	2.0	Unshielded	-

SECTION 5: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Instrument used	Remark
RF Output Power	Power Meter	Normal and Extreme conditions
Power Spectral Density	Spectrum Analyzer	Option 1 Normal condition
Adaptivity	Spectrum Analyzer	Normal condition
Occupied Channel Bandwidth	Spectrum Analyzer	Normal condition
Transmitter unwanted emissions in the out-of band domain	Spectrum Analyzer	Normal conditions - Detector mode: RMS - Trace: Max Hold - Band power was used on behalf of the time domain power function. - Filter mode: Gaussian Filter Since the data in this test report has enough margin
Receiver Blocking	Wireless Test Set	Normal condition

The test results are rounded off to 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 6: Transmitter unwanted emissions in the spurious domain and Receiver spurious emissions (Radiated)

Test Procedure

1) 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 intensity 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) Below 1 GHz:
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.
Above 1 GHz:
Equivalent isotropic 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 (horn antenna) for the substitution antenna, the equivalent isotropic radiated power was calculated by compensating the finite substitution antenna.

Pre-check scan setting (PK)

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	Peak, RBW: 100 kHz / VBW: 300 kHz	Peak, RBW: 1 MHz / VBW: 3 MHz
Trace mode	Max hold	Max hold

Measured setting (RMS)

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	RMS, RBW: 100 kHz / VBW: 300 kHz	RMS, RBW: 1 MHz / VBW: 3 MHz
Span	Zero	
Sweep mode	Single Sweep	
Sweep time	Tx: more than 120 % of the duration of the longest burst detected during the measurement of the RF Output Power Rx: 30 ms	
Sweep points	Tx: Sweep time [μs] / (1 μs) with a maximum of 30000 Rx: equal or more than 30000	

The test was made on EUT at the normal use position.
The test results are rounded off to one decimal place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

RF Output Power

Report No.	13273483S-B	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	March 13, 2020	March 16, 2020
Temperature / Humidity	26 deg. C / 49 % RH	21 deg. C / 36 % RH
Engineer	Shiro Kobayashi	Toshinori Yamada
Mode	Tx	

11b Receiver Category : 1

Test Condition Temp.	Test Condition Volt.	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
nom	nom	2412.0	-2.07	2.30	10.18	0.85	11.26	20.00	8.74
		2442.0	-2.02	2.31	10.18	0.85	11.32	20.00	8.68
		2472.0	-2.14	2.32	10.18	0.85	11.21	20.00	8.79
min	nom	2412.0	-1.93	2.30	10.18	0.85	11.40	20.00	8.60
		2442.0	-1.80	2.31	10.18	0.85	11.54	20.00	8.46
		2472.0	-2.06	2.32	10.18	0.85	11.29	20.00	8.71
max	nom	2412.0	-2.23	2.30	10.18	0.85	11.10	20.00	8.90
		2442.0	-2.12	2.31	10.18	0.85	11.22	20.00	8.78
		2472.0	-2.28	2.32	10.18	0.85	11.07	20.00	8.93

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

11g Receiver Category : 1

Test Condition Temp.	Test Condition Volt.	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
nom	nom	2412.0	-2.21	2.30	10.18	0.85	11.12	20.00	8.88
		2442.0	-2.12	2.31	10.18	0.85	11.22	20.00	8.78
		2472.0	-2.26	2.32	10.18	0.85	11.09	20.00	8.91
min	nom	2412.0	-2.02	2.30	10.18	0.85	11.31	20.00	8.69
		2442.0	-1.97	2.31	10.18	0.85	11.37	20.00	8.63
		2472.0	-2.19	2.32	10.18	0.85	11.16	20.00	8.84
max	nom	2412.0	-2.36	2.30	10.18	0.85	10.97	20.00	9.03
		2442.0	-2.26	2.31	10.18	0.85	11.08	20.00	8.92
		2472.0	-2.41	2.32	10.18	0.85	10.94	20.00	9.06

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

11n-20 Receiver Category : 1

Test Condition Temp.	Test Condition Volt.	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
nom	nom	2412.0	-2.22	2.30	10.18	0.85	11.11	20.00	8.89
		2442.0	-2.18	2.31	10.18	0.85	11.16	20.00	8.84
		2472.0	-2.33	2.32	10.18	0.85	11.02	20.00	8.98
min	nom	2412.0	-2.22	2.30	10.18	0.85	11.11	20.00	8.89
		2442.0	-2.18	2.31	10.18	0.85	11.16	20.00	8.84
		2472.0	-2.33	2.32	10.18	0.85	11.02	20.00	8.98
max	nom	2412.0	-2.39	2.30	10.18	0.85	10.94	20.00	9.06
		2442.0	-2.32	2.31	10.18	0.85	11.02	20.00	8.98
		2472.0	-2.42	2.32	10.18	0.85	10.93	20.00	9.07

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

RF Output Power
(Worst Rate Check)

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 13, 2020
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Shiro Kobayashi
Mode	Tx

11b 2442 MHz

Rate [Mbps]	Reading [dBm]	Remark
1	-2.30	-
2	-2.02	*
5.5	-2.06	-
11	-2.05	-

*: Worst Rate

11g 2442 MHz

Rate [Mbps]	Reading [dBm]	Remark
6	-2.62	-
9	-2.67	-
12	-2.58	-
18	-2.66	-
24	-2.27	-
36	-2.12	*
48	-2.16	-
54	-2.14	-

*: Worst Rate

11n-20 2442 MHz

MCS	Reading [dBm]	Remark
0	-2.77	-
1	-2.78	-
2	-2.75	-
3	-2.18	*
4	-2.21	-
5	-2.19	-
6	-2.19	-
7	-2.20	-

*: Worst Rate

Sample Calculation:
All comparisons were carried out on same frequency and measurement factors.

Power Spectral Density

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 13, 2020
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Shiro Kobayashi
Mode	Tx

11b

Test Condition		Ch	S/A	S/A	RF Output	Result	Limit	Margin
Temp.	Volt.	Freq.	Maximum Reading	Total Power Reading	Power			
		[MHz]	[dBm/MHz]	[dBm]	[dBm]	[dBm/MHz]	[dBm/MHz]	[dB]
nom	nom	2412.00	-8.72	-1.16	11.26	3.70	10.00	6.30
		2442.00	-9.14	-1.29	11.32	3.46	10.00	6.54
		2472.00	-9.27	-1.41	11.21	3.35	10.00	6.65

Result [dBm/MHz] = S/A Maximum Reading [dBm/MHz] - S/A Total Power Reading [dBm] (*1) + RF Output Power [dBm] (*2)
(*1) Integrated value of 2400 MHz to 2483.5 MHz
(*2) Refer to RF Output Power

11g

Test Condition		Ch	S/A	S/A	RF Output	Result	Limit	Margin
Temp.	Volt.	Freq.	Maximum Reading	Total Power Reading	Power			
		[MHz]	[dBm/MHz]	[dBm]	[dBm]	[dBm/MHz]	[dBm/MHz]	[dB]
nom	nom	2412.00	-13.25	-1.66	11.12	-0.46	10.00	10.46
		2442.00	-13.02	-1.51	11.22	-0.29	10.00	10.29
		2472.00	-13.36	-1.69	11.09	-0.58	10.00	10.58

Result [dBm/MHz] = S/A Maximum Reading [dBm/MHz] - S/A Total Power Reading [dBm] (*1) + RF Output Power [dBm] (*2)
(*1) Integrated value of 2400 MHz to 2483.5 MHz
(*2) Refer to RF Output Power

11n-20

Test Condition		Ch	S/A	S/A	RF Output	Result	Limit	Margin
Temp.	Volt.	Freq.	Maximum Reading	Total Power Reading	Power			
		[MHz]	[dBm/MHz]	[dBm]	[dBm]	[dBm/MHz]	[dBm/MHz]	[dB]
nom	nom	2412.00	-13.52	-1.57	11.11	-0.83	10.00	10.83
		2442.00	-13.31	-1.48	11.16	-0.67	10.00	10.67
		2472.00	-13.59	-1.65	11.02	-0.92	10.00	10.92

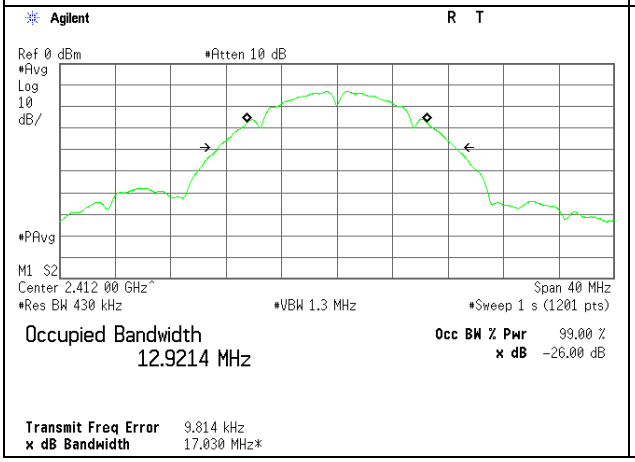
Result [dBm/MHz] = S/A Maximum Reading [dBm/MHz] - S/A Total Power Reading [dBm] (*1) + RF Output Power [dBm] (*2)
(*1) Integrated value of 2400 MHz to 2483.5 MHz
(*2) Refer to RF Output Power

Occupied Channel Bandwidth

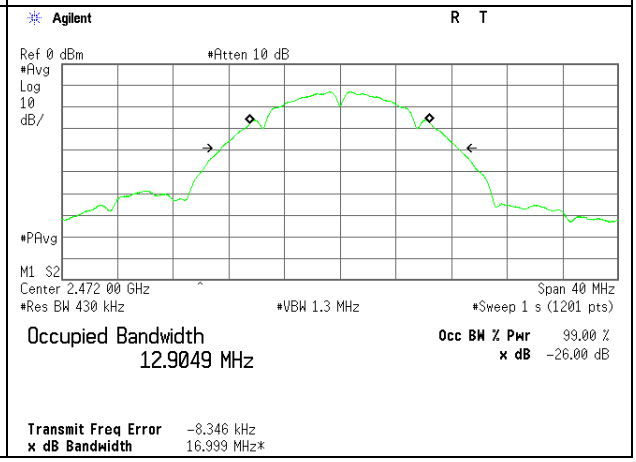
Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 13, 2020
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11b

Frequency [MHz]	Bandwidth [MHz]	Result [MHz]	Limit [MHz]
2412	12.9214	2405.5393	> 2400
2472	12.9049	2478.4525	< 2483.5

Tx 2412 MHz



Tx 2472 MHz

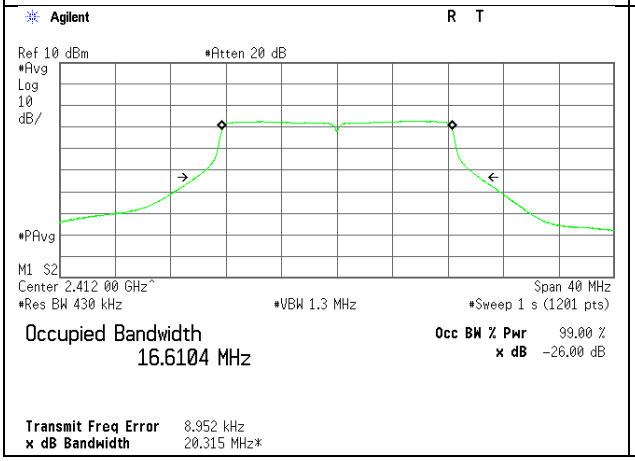


Occupied Channel Bandwidth

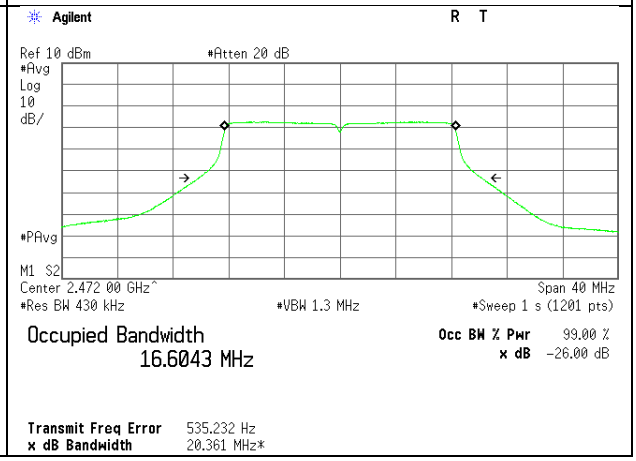
Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 13, 2020
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11g

Frequency [MHz]	Bandwidth [MHz]	Result [MHz]	Limit [MHz]
2412	16.6104	2403.6948	> 2400
2472	16.6043	2480.3022	< 2483.5

Tx 2412 MHz



Tx 2472 MHz

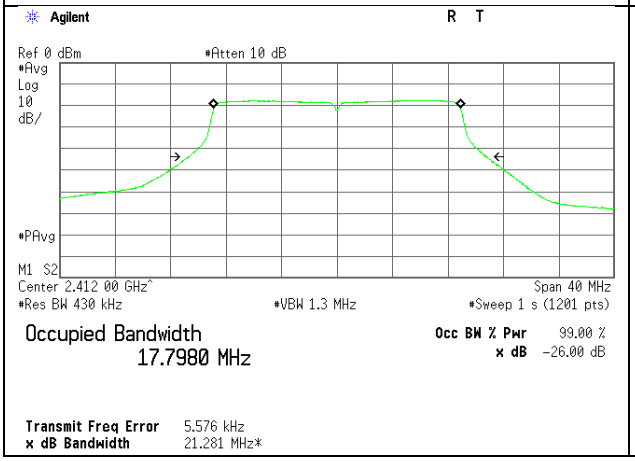


Occupied Channel Bandwidth

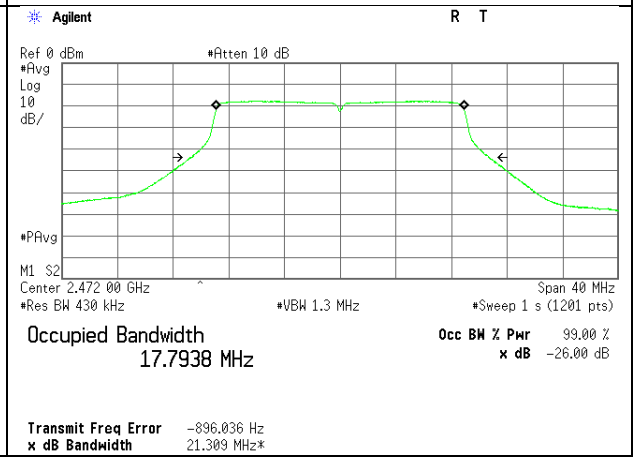
Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 13, 2020
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11n-20

Frequency [MHz]	Bandwidth [MHz]	Result [MHz]	Limit [MHz]
2412	17.7980	2403.1010	> 2400
2472	17.7938	2480.8969	< 2483.5

Tx 2412 MHz



Tx 2472 MHz



Transmitter unwanted emissions in the out-of-band domain

Report No.	13273483S-B	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	March 17, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 45 % RH	21 deg. C / 41 % RH
Engineer	Toshinori Yamada	Toshinori Yamada
Mode	Tx	

11b

Frequency [MHz]	S/A (AV) Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]	Remarks
2382.6	-64.28	2.30	10.18	0.85	-50.95	-20.00	30.95	Lowest ch 2400 MHz - 2 BW
2398.5	-53.16	2.30	10.18	0.85	-39.83	-10.00	29.83	Lowest ch 2400 MHz - BW
2484.0	-58.59	2.32	10.18	0.85	-45.24	-10.00	35.24	Highest ch 2483.5 MHz + BW
2498.9	-62.98	2.32	10.18	0.85	-49.63	-20.00	29.63	Highest ch 2483.5 MHz + 2 BW

11g

Frequency [MHz]	S/A (AV) Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]	Remarks
2382.9	-57.83	2.30	10.18	0.85	-44.50	-20.00	24.50	Lowest ch 2400 MHz - 2 BW
2399.5	-34.33	2.30	10.18	0.85	-21.00	-10.00	11.00	Lowest ch 2400 MHz - BW
2484.0	-32.50	2.32	10.18	0.85	-19.15	-10.00	9.15	Highest ch 2483.5 MHz + BW
2500.6	-57.30	2.32	10.18	0.85	-43.95	-20.00	23.95	Highest ch 2483.5 MHz + 2 BW

11n-20

Frequency [MHz]	S/A (AV) Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]	Remarks
2381.7	-59.29	2.30	10.18	0.85	-45.96	-20.00	25.96	Lowest ch 2400 MHz - 2 BW
2399.5	-33.44	2.30	10.18	0.85	-20.11	-10.00	10.11	Lowest ch 2400 MHz - BW
2484.0	-30.80	2.32	10.18	0.85	-17.45	-10.00	7.45	Highest ch 2483.5 MHz + BW
2501.8	-58.56	2.32	10.18	0.85	-45.21	-20.00	25.21	Highest ch 2483.5 MHz + 2 BW

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

*Above test result was maximum value on each 1 BW.

Adaptivity and Unwanted Signal tests

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 25, 2020
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Takahiro Kawakami
Mode	Communication mode 11b

Maximum Channel Occupancy Time [ms]	Measured Channel Occupancy Time [ms]
13	12.44

CCA Time	Extended CCA Time [us]	Measured idle period [us]
	Min	
18 us - 160 us	18	402.17

Interference Detection Threshold

Freq. [MHz]	RF output power (e.i.r.p.) [dBm]	Antenna Gain [dBi]	Cable loss [dB]	CCA threshold level [dBm/MHz]
2412.0	11.26	0.85	0.92	-59.49
2472.0	11.21	0.85	0.92	-59.44

CCA threshold level = -70 [dBm/MHz] + (20 [dBm] - RF output Power(e.i.r.p.) [dBm] + EUT Antenna Gain [dBi] + Cable loss [dB])

Interference

Freq. [MHz]	Measured Stop time [ms]	Limit [ms]	Results
2412.0	10.29	12.44	Pass
2472.0	11.64	12.44	Pass

Stop time = (End of Transmission) - (Start of Interference signal)

Interference with unwanted signal

Freq. [MHz]	Results
2412.0	Pass
2472.0	Pass

*No transmission signal was detected except short control signal after interference signal was added.
After the application of unwanted signal, transmission signal was continuously stopped.

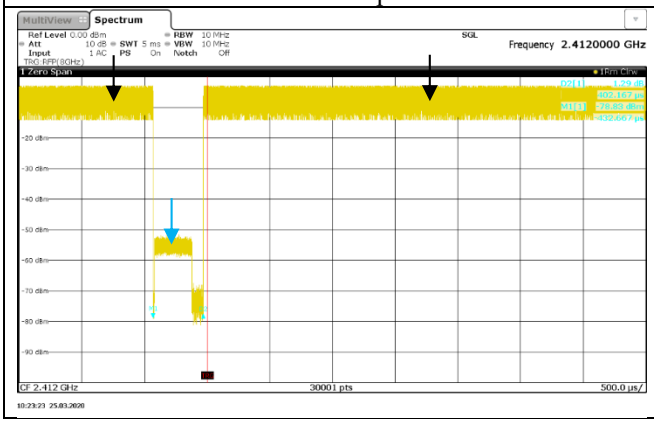
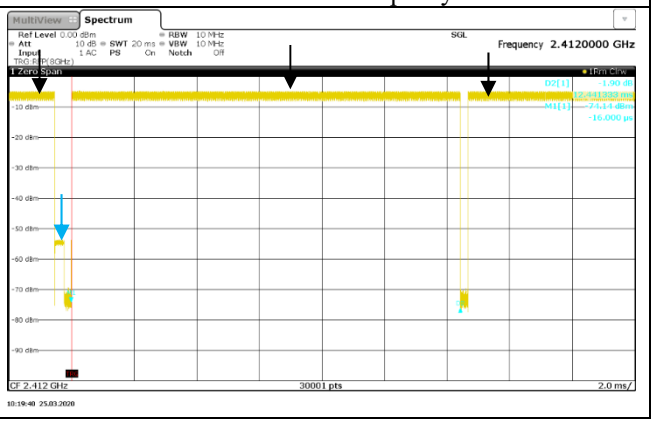
Short Control Signalling Transmissions

Freq. [MHz]	Measured ON time *1) [ms]	Duty cycle *2) [%]	Limit [%]	Results
2412.0	1.78	3.56	10	Pass
2472.0	1.54	3.08	10	Pass

*1) Measured ON Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
*2) Duty cycle = (Measured ON time / 50msec) * 100
The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 30001 bins on the horizontal axis.
A time-domain resolution of 0.01 msec/bin is achievable with a 300 millisecond sweep time.
Measured ON time is calculated by multiplying the number of bins during an observation period by the dwell time per bin,
with the analyzer set to peak detection.

Adaptivity and Unwanted Signal tests

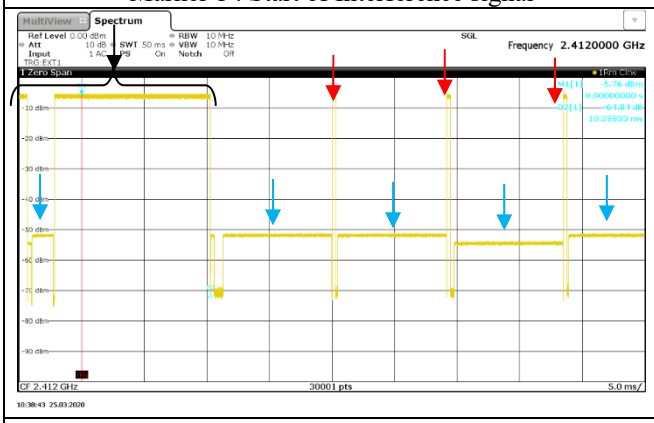
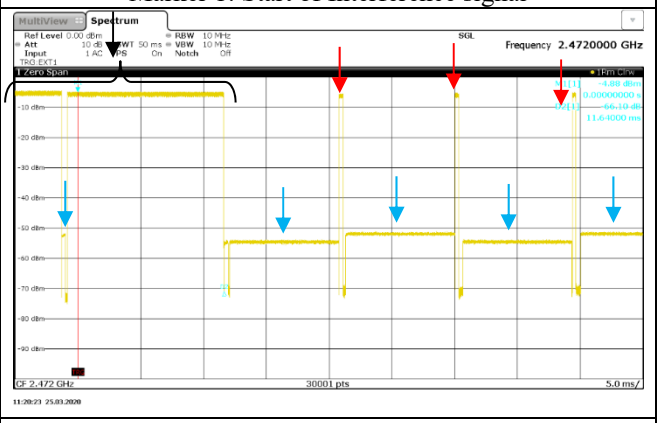
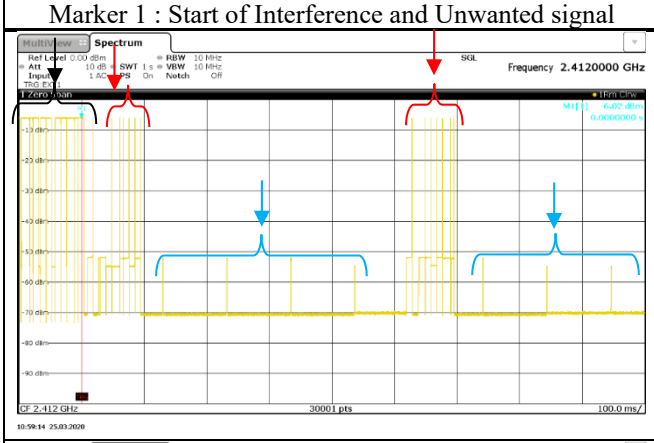
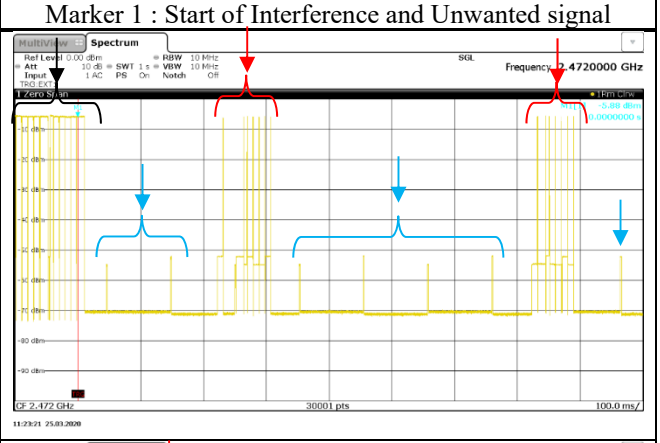
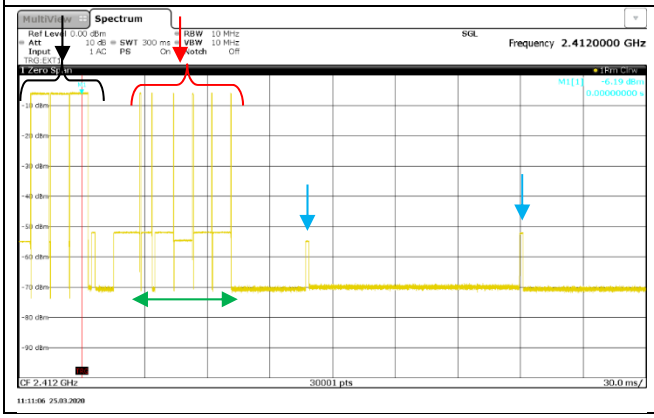
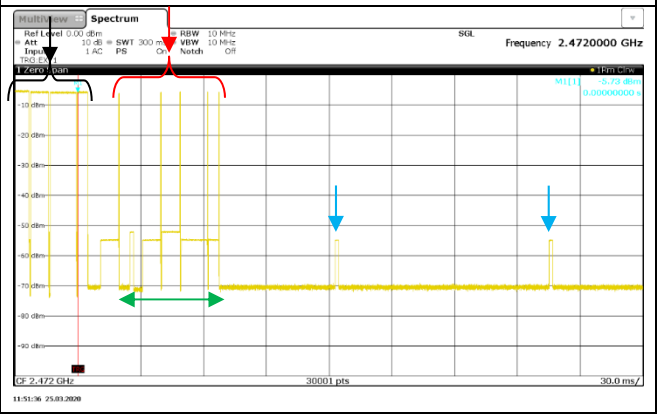
11b Traffic plot

Measured idle period	Measured Channel Occupancy Time
	

→ : Traffic from EUT
→ : Traffic from Companion device

Adaptivity and Unwanted Signal tests

11b Plot of Detection

2412 MHz	2472 MHz
Adding the Interference signal Marker 1 : Start of Interference signal	Adding the Interference signal Marker 1: Start of Interference signal
	
Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal	Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal
	
	

: Transmission signal
: Short Control Signalling Transmission (if signal is indicated)
: 50ms
: Traffic from Companion device

Adaptivity and Unwanted Signal tests

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 25, 2020
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Takahiro Kawakami
Mode	Communication mode 11g

Maximum Channel Occupancy Time [ms]	Measured Channel Occupancy Time [ms]
13	2.05

CCA Time	Extended CCA Time [us]	Measured idle period [us]
	Min	
18 us - 160 us	18	151.07

Interference Detection Threshold

Freq. [MHz]	RF output power (e.i.r.p.) [dBm]	Antenna Gain [dBi]	Cable loss [dB]	CCA threshold level [dBm/MHz]
2412.0	11.12	0.85	0.92	-59.35
2472.0	11.09	0.85	0.92	-59.32

CCA threshold level = -70 [dBm/MHz] + (20 [dBm] - RF output Power(e.i.r.p.) [dBm] + EUT Antenna Gain [dBi] + Cable loss [dB])

Interference

Freq. [MHz]	Measured Stop time [ms]	Limit [ms]	Results
2412.0	0.84	2.05	Pass
2472.0	0.93	2.05	Pass

Stop time = (End of Transmission) - (Start of Interference signal)

Interference with unwanted signal

Freq. [MHz]	Results
2412.0	Pass
2472.0	Pass

*No transmission signal was detected except short control signal after interference signal was added.
After the application of unwanted signal, transmission signal was continuously stopped.

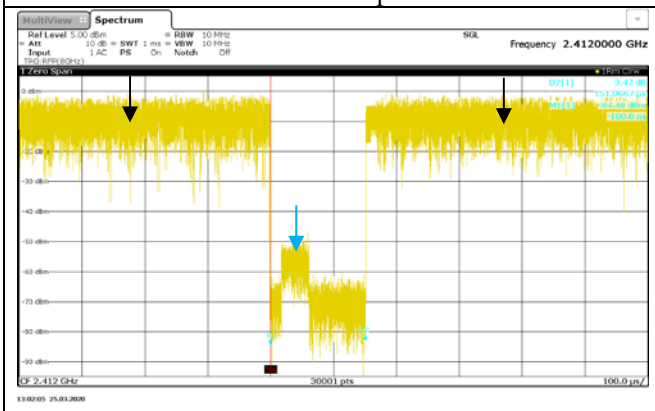
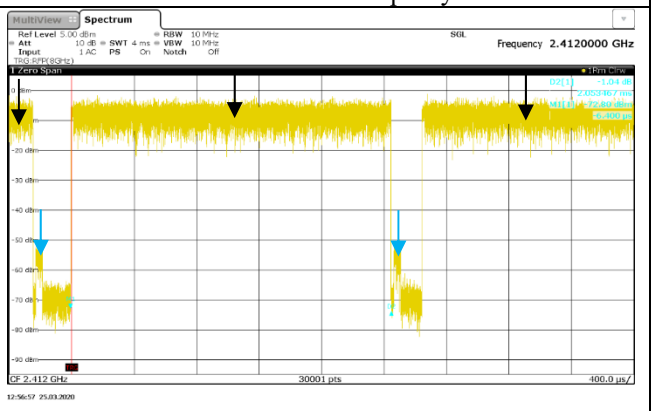
Short Control Signalling Transmissions

Freq. [MHz]	Measured ON time *1) [ms]	Duty cycle *2) [%]	Limit [%]	Results
2412.0	0.30	0.60	10	Pass
2472.0	0.22	0.44	10	Pass

*1) Measured ON Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
*2) Duty cycle = (Measured ON time / 50msec) * 100
The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 30001 bins on the horizontal axis.
A time-domain resolution of 0.0033 msec/bin is achievable with a 100 millisecond sweep time.
Measured ON time is calculated by multiplying the number of bins during an observation period by the dwell time per bin,
with the analyzer set to peak detection.

Adaptivity and Unwanted Signal tests

11g Traffic plot

Measured idle period	Measured Channel Occupancy Time
	

→ : Traffic from EUT

→ : Traffic from Companion device

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Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
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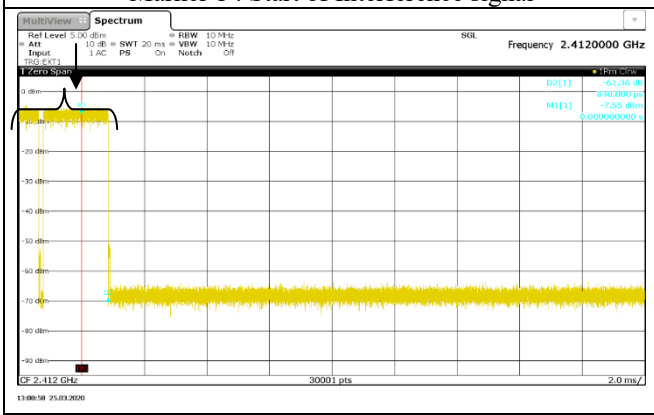
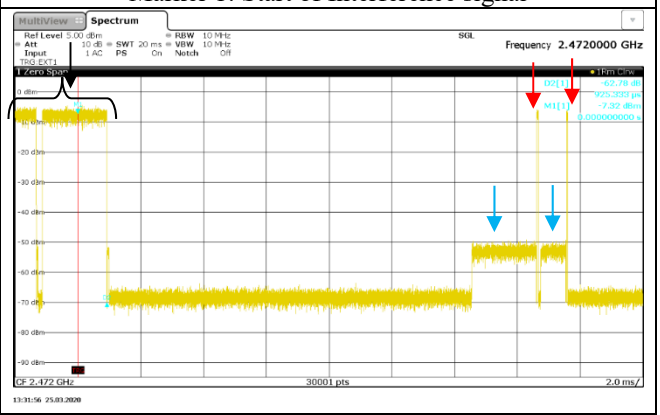
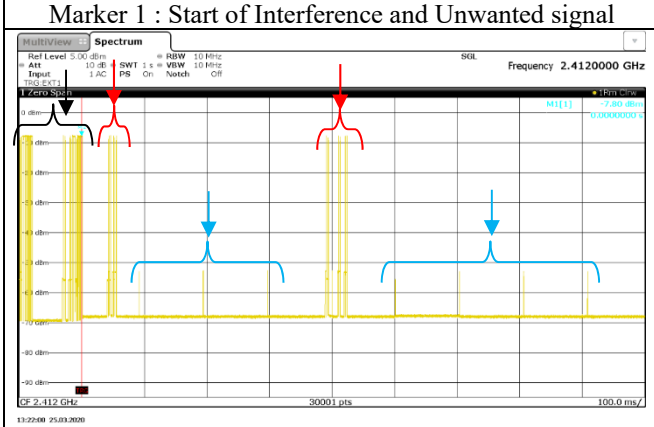
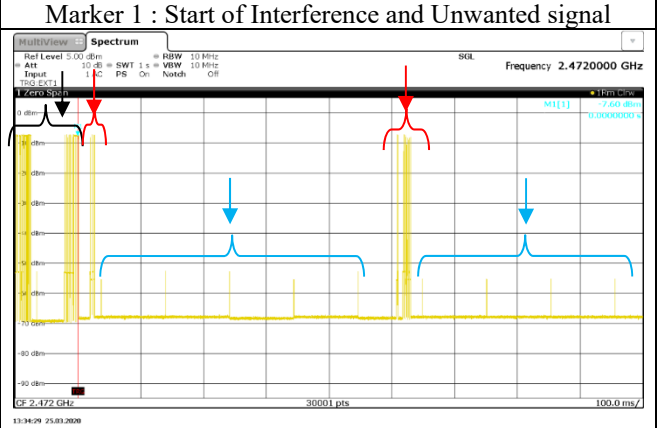
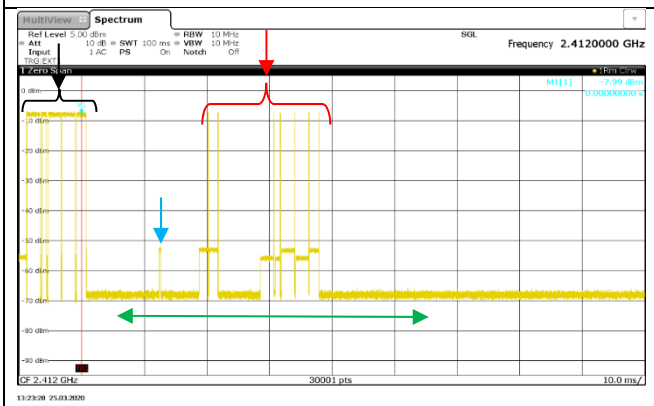
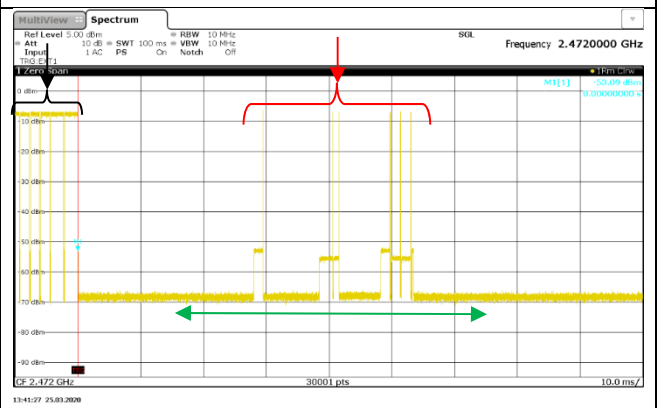
Adaptivity and Unwanted Signal tests

11g Plot of Detection

2412 MHz	2472 MHz
Adding the Interference signal Marker 1 : Start of Interference signal	Adding the Interference signal Marker 1: Start of Interference signal
	
Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal	Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal
	
	

: Transmission signal
: Short Control Signalling Transmission (if signal is indicated)
: 50ms
: Traffic from Companion device

Adaptivity and Unwanted Signal tests

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 25, 2020
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Takahiro Kawakami
Mode	Communication mode 11n-20

Maximum Channel Occupancy Time [ms]	Measured Channel Occupancy Time [ms]
13	0.23

CCA Time	Extended CCA Time [us]	Measured idle period [us]
	Min	
18 us - 160 us	18	154.73

Interference Detection Threshold

Freq. [MHz]	RF output power (e.i.r.p.) [dBm]	Antenna Gain [dBi]	Cable loss [dB]	CCA threshold level [dBm/MHz]
2412.0	11.11	0.85	0.92	-59.34
2472.0	11.02	0.85	0.92	-59.25

CCA threshold level = -70 [dBm/MHz] + (20 [dBm] - RF output Power(e.i.r.p.) [dBm] + EUT Antenna Gain [dBi] + Cable loss [dB])

Interference

Freq. [MHz]	Measured Stop time [ms]	Limit [ms]	Results
2412.0	0.06	0.23	Pass
2472.0	0.14	0.23	Pass

Stop time = (End of Transmission) - (Start of Interference signal)

Interference with unwanted signal

Freq. [MHz]	Results
2412.0	Pass
2472.0	Pass

*No transmission signal was detected except short control signal after interference signal was added.
After the application of unwanted signal, transmission signal was continuously stopped.

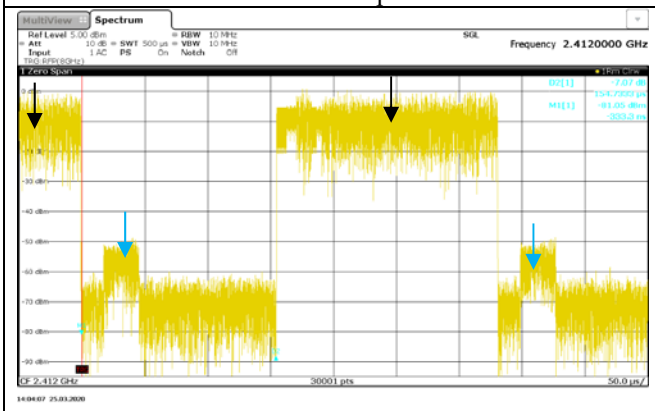
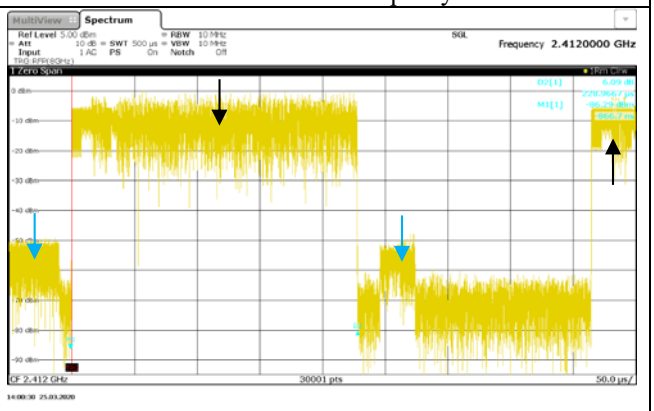
Short Control Signalling Transmissions

Freq. [MHz]	Measured ON time *1) [ms]	Duty cycle *2) [%]	Limit [%]	Results
2412.0	0.65	1.30	10	Pass
2472.0	0.65	1.30	10	Pass

*1) Measured ON Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
*2) Duty cycle = (Measured ON time / 50msec) * 100
The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 30001 bins on the horizontal axis.
A time-domain resolution of 0.0033 msec/bin is achievable with a 100 millisecond sweep time.
Measured ON time is calculated by multiplying the number of bins during an observation period by the dwell time per bin,
with the analyzer set to peak detection.

Adaptivity and Unwanted Signal tests

11n-20 Traffic plot

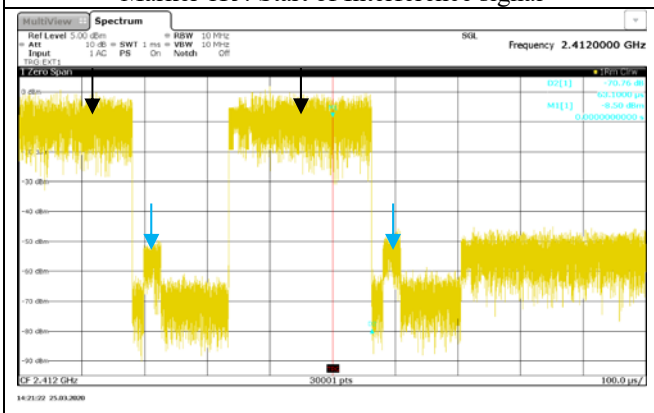
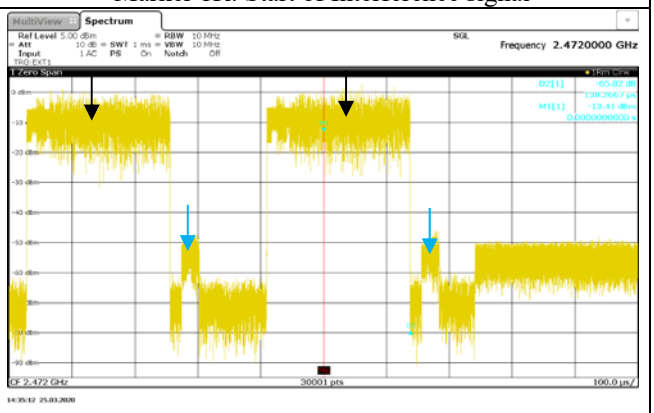
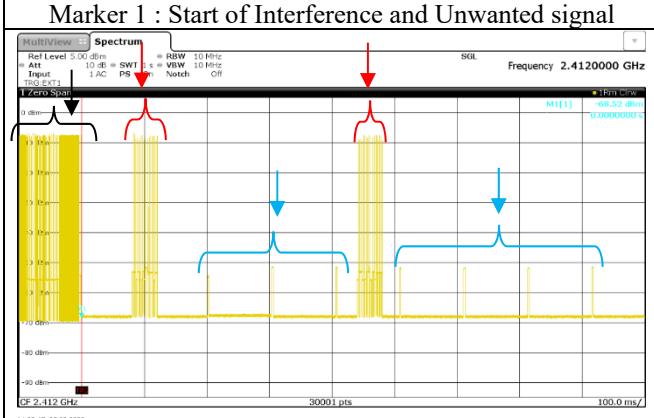
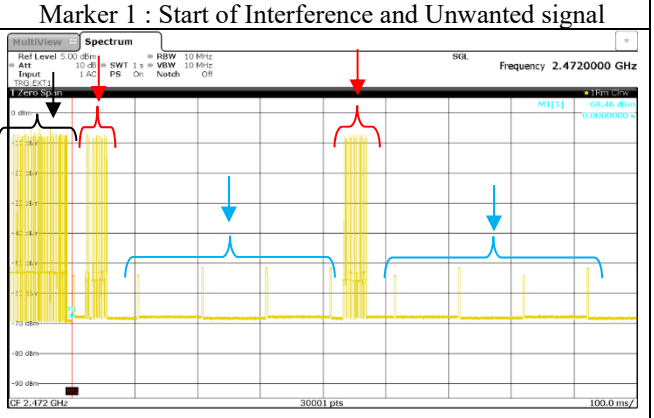
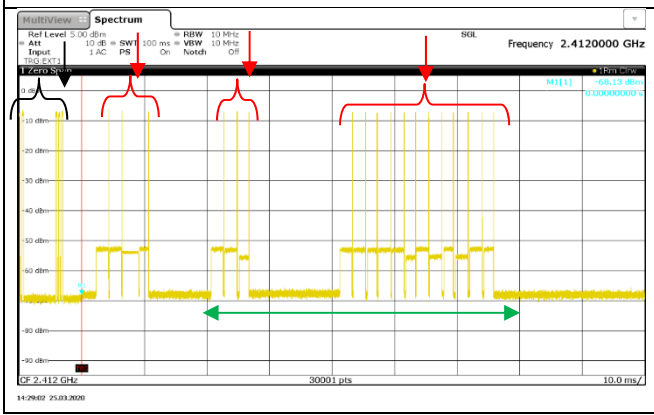
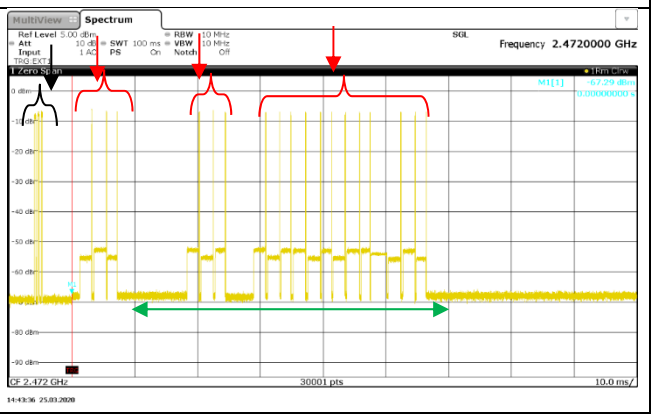
Measured idle period	Measured Channel Occupancy Time
	

→ : Traffic from EUT

→ : Traffic from Companion device

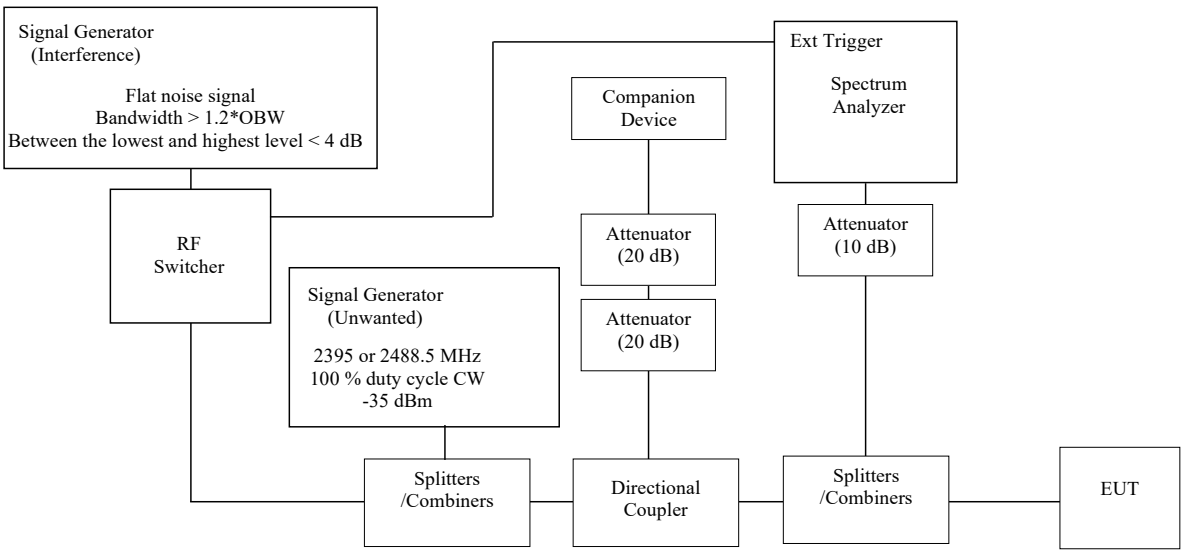
Adaptivity and Unwanted Signal tests

11n-20 Plot of Detection

2412 MHz	2472 MHz
Adding the Interference signal Marker 1R : Start of Interference signal	Adding the Interference signal Marker 1R: Start of Interference signal
	
Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal	Adding the Interference signal and Unwanted signal Marker 1 : Start of Interference and Unwanted signal
	
	

: Transmission signal
: Short Control Signalling Transmission (if signal is indicated)
: 50ms
: Traffic from Companion device

CONDUCTED METHODS SYSTEM BLOCK DIAGRAM of Adaptivity and Unwanted Signal



***Signal Generator and Spectrum Analyzer were started at the same time by Function Generator.**
Interference signal and Unwanted signal are added to EUT simultaneously as it does not change the test result phenomenologically.

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11b 2412 MHz	

(Below 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.533	30.13	-60.31	2.15	14.38	-74.69	-54.00	20.6	Hori.	166	40	Dipol	RMS
2	491.536	32.51	-57.44	2.15	14.38	-71.82	-54.00	17.8	Vert.	125	191	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.078	51.28	-56.15	12.06	8.34	-52.43	-30.00	22.4	Hori.	144	88	Horn	Peak
2	4824.000	50.23	-58.02	11.97	8.49	-54.54	-30.00	24.5	Hori.	146	103	Horn	Peak
3	4662.078	51.16	-57.30	12.06	8.34	-53.58	-30.00	23.5	Vert.	176	94	Horn	Peak
4	4824.000	49.26	-60.98	11.97	8.49	-57.50	-30.00	27.5	Vert.	192	125	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11b 2472 MHz	

(Below 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.521	30.48	-59.96	2.15	14.38	-74.34	-54.00	20.3	Hori.	150	228	Dipol	RMS
2	491.531	32.67	-57.28	2.15	14.38	-71.66	-54.00	17.6	Vert.	159	2	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.056	51.16	-56.27	12.06	8.34	-52.55	-30.00	22.5	Hori.	118	85	Horn	Peak
2	4944.000	51.99	-54.53	12.02	8.61	-51.12	-30.00	21.1	Hori.	183	34	Horn	Peak
3	4662.056	51.24	-57.22	12.06	8.34	-53.50	-30.00	23.5	Vert.	175	94	Horn	Peak
4	4944.000	49.31	-60.64	12.02	8.61	-57.23	-30.00	27.2	Vert.	150	177	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11g 2412 MHz	

(Below 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.540	30.29	-60.15	2.15	14.38	-74.53	-54.00	20.5	Hori.	156	49	Dipol	RMS
2	491.533	32.62	-57.33	2.15	14.38	-71.71	-54.00	17.7	Vert.	134	190	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		(PK)				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.064	51.67	-55.76	12.06	8.34	-52.04	-30.00	22.0	Hori.	143	85	Horn	Peak
2	4824.000	47.92	-60.33	11.97	8.49	-56.85	-30.00	26.8	Hori.	191	37	Horn	Peak
3	4662.064	51.69	-56.77	12.06	8.34	-53.05	-30.00	23.0	Vert.	175	95	Horn	Peak
4	4824.000	47.34	-62.90	11.97	8.49	-59.42	-30.00	29.4	Vert.	172	173	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11g 2472 MHz	

(Below 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.558	30.36	-60.08	2.15	14.38	-74.46	-54.00	20.4	Hori.	150	36	Dipol	RMS
2	491.531	32.87	-57.08	2.15	14.38	-71.46	-54.00	17.4	Vert.	153	2	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.071	51.27	-56.15	12.06	8.34	-52.43	-30.00	22.4	Hori.	143	85	Horn	Peak
2	4944.000	47.38	-59.14	12.02	8.61	-55.73	-30.00	25.7	Hori.	157	33	Horn	Peak
3	4662.071	51.83	-56.63	12.06	8.34	-52.91	-30.00	22.9	Vert.	174	93	Horn	Peak
4	4944.000	47.49	-62.46	12.02	8.61	-59.05	-30.00	29.0	Vert.	169	176	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11n-20 2412 MHz	

(Below 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.540	30.51	-59.93	2.15	14.38	-74.31	-54.00	20.3	Hori.	172	30	Dipol	RMS
2	491.539	32.63	-57.32	2.15	14.38	-71.70	-54.00	17.7	Vert.	141	260	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	EIRP Result	EIRP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.069	51.86	-55.57	12.06	8.34	-51.85	-30.00	21.8	Hori.	144	85	Horn	Peak
2	4824.000	47.73	-60.52	11.97	8.49	-57.04	-30.00	27.0	Hori.	165	37	Horn	Peak
3	4662.069	51.20	-57.26	12.06	8.34	-53.54	-30.00	23.5	Vert.	156	97	Horn	Peak
4	4824.000	48.52	-61.72	11.97	8.49	-58.24	-30.00	28.2	Vert.	163	171	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 11n-20 2472 MHz	

(Below 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		<PK>				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	491.541	30.90	-59.54	2.15	14.38	-73.92	-54.00	19.9	Hori.	147	185	Dipol	RMS
2	491.540	32.88	-57.07	2.15	14.38	-71.45	-54.00	17.4	Vert.	132	191	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading	SG Level	TX Ant.Gain	TX Loss	ERP		Margin	Pola.	Height	Angle	TX Ant.Type	Comment
		<PK>				Result	Limit						
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	4662.070	51.38	-56.04	12.06	8.34	-52.32	-30.00	22.3	Hori.	118	84	Horn	Peak
2	4944.000	47.93	-58.59	12.02	8.61	-55.18	-30.00	25.1	Hori.	143	32	Horn	Peak
3	4662.070	51.82	-56.64	12.06	8.34	-52.92	-30.00	22.9	Vert.	175	95	Horn	Peak
4	4944.000	48.10	-61.85	12.02	8.61	-58.44	-30.00	28.4	Vert.	175	181	Horn	Peak

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Receiver spurious emissions (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Rx 2412 MHz	

(Below 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	88.195	20.25	-84.13	-16.05	1.54	-103.87	-57.00	46.8	Hori.	228	268	Dipol	RMS
2	491.538	30.20	-60.24	2.15	14.38	-74.62	-57.00	17.6	Hori.	165	143	Dipol	RMS
3	889.002	29.07	-53.65	2.15	15.99	-69.64	-57.00	12.6	Hori.	111	209	Dipol	RMS
4	88.275	20.41	-83.61	-16.02	1.55	-103.33	-57.00	46.3	Vert.	160	183	Dipol	RMS
5	491.541	33.57	-56.38	2.15	14.38	-70.76	-57.00	13.7	Vert.	136	176	Dipol	RMS
6	889.103	28.76	-52.99	2.15	15.99	-68.98	-57.00	11.9	Vert.	138	221	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	1110.961	47.35	-65.16	5.83	3.99	-63.32	-47.00	16.3	Hori.	144	6	Horn	RMS
2	1998.034	48.80	-62.53	9.35	5.39	-58.57	-47.00	11.5	Hori.	161	51	Horn	RMS
3	1110.961	52.68	-61.23	5.83	3.99	-59.39	-47.00	12.3	Vert.	159	249	Horn	RMS
4	1998.034	50.05	-61.63	9.35	5.39	-57.67	-47.00	10.6	Vert.	184	248	Horn	RMS
5	3333.264	44.19	-64.13	12.06	7.00	-59.07	-47.00	12.0	Vert.	152	64	Horn	RMS
6	5333.225	39.58	-67.01	12.70	8.95	-63.26	-47.00	16.2	Vert.	165	77	Horn	RMS
7	5999.871	39.50	-64.14	12.73	9.53	-60.94	-47.00	13.9	Vert.	147	1	Horn	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Receiver spurious emissions (Radiated)

Report No.	13273483S-B	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Date	March 21, 2020	March 30, 2020
Temperature / Humidity	26 deg. C / 43% RH	25 deg. C / 33% RH
Engineer	Horomasa Sato	Makoto Hosaka
	(Below 1 GHz)	(Above 1 GHz)
Mode	Rx 2472 MHz	

(Below 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	88.226	20.19	-84.19	-16.04	1.55	-103.93	-57.00	46.9	Hori.	214	244	Dipol	RMS
2	491.538	32.18	-58.26	2.15	14.38	-72.64	-57.00	15.6	Hori.	149	179	Dipol	RMS
3	888.754	28.53	-54.17	2.15	15.99	-70.16	-57.00	13.1	Hori.	100	303	Dipol	RMS
4	88.436	20.31	-83.71	-15.97	1.55	-103.38	-57.00	46.3	Vert.	100	4	Dipol	RMS
5	491.534	32.63	-57.32	2.15	14.38	-71.70	-57.00	14.7	Vert.	125	192	Dipol	RMS
6	888.978	26.56	-55.19	2.15	15.99	-71.18	-57.00	14.1	Vert.	100	161	Dipol	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable + ATT) [dB] - 2.15 [dB]
Tx Ant: 120MHz turned Dipole(30 MHz-120 MHz), Dipole(120 MHz-1 GHz) / Rx-Ant: Biconical(25 MHz-200 MHz), Logperiodic(200 MHz-1 GHz)

(Above 1 GHz)

No.	Freq.	Reading (PK)	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	1110.974	47.14	-65.37	5.83	3.99	-63.53	-47.00	16.5	Hori.	111	202	Horn	RMS
2	1998.032	49.89	-61.44	9.35	5.39	-57.48	-47.00	10.4	Hori.	162	49	Horn	RMS
3	4662.074	39.78	-64.41	12.06	8.34	-60.69	-47.00	13.6	Hori.	142	86	Horn	RMS
4	1110.974	52.84	-61.07	5.83	3.99	-59.23	-47.00	12.2	Vert.	160	244	Horn	RMS
5	1998.032	51.78	-59.90	9.35	5.39	-55.94	-47.00	8.9	Vert.	184	246	Horn	RMS
6	3333.256	44.45	-63.87	12.06	7.00	-58.81	-47.00	11.8	Vert.	152	64	Horn	RMS
7	4662.074	39.99	-64.48	12.06	8.34	-60.76	-47.00	13.7	Vert.	185	94	Horn	RMS
8	5999.856	39.15	-64.49	12.73	9.53	-61.29	-47.00	14.2	Vert.	146	357	Horn	RMS

Calculation:Result [dBm] = SG level [dBm] + Tx Ant Gain [dBi] - Tx Loss (Cable)[dB]
Tx Antenna: Horn(1 GHz-40 GHz) / Rx-Antenna: Horn(1 GHz-40 GHz)

Receiver Blocking

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 24, 2020
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Takahiro Kawakami
Mode	Communication 11b

Wanted signal mean power from companion device (dBm)	Measured Receiver Sensitivity (corrected by the actual antenna assembly gain) (dBm)	
	Lowest Channel	Highest Channel
Pmin	-96.78	-97.58
Pmin + 6 dB	-90.78	-91.58

Receiver Category 1 equipment

Operating Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Blocking signal power (corrected by the actual antenna assembly gain) (dBm) *1)	Result PER (%)	Limit PER (%)
Lowest Channel	P_{min} + 6 dB	2380	-53	-52.2	0.14	≦10
		2503.5			0.04	
	P_{min} + 6 dB	2300	-47	-46.2	0.02	
		2330			0.08	
		2360			0.06	
	P_{min} + 6 dB	2523.5	-47	-46.2	0.06	
		2553.5			0.08	
		2583.5			0.04	
		2613.5			0.06	
		2643.5			0.06	
		2673.5			0.02	
Highest Channel	P_{min} + 6 dB	2380	-53	-52.2	0.44	≦10
		2503.5			0.46	
	P_{min} + 6 dB	2300	-47	-46.2	0.4	
		2330			0.62	
		2360			0.5	
	P_{min} + 6 dB	2523.5	-47	-46.2	0.52	
		2553.5			0.36	
		2583.5			0.62	
		2613.5			0.58	
		2643.5			0.4	
		2673.5			0.32	

*Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criterion a PER less than or equal to 10 % in the absence of any blocking signal.

*1) Blocking signal power was adjusted by product antenna gain 0.85 dBi.

Receiver Blocking

Report No.	13273483S-B
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 24, 2020
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Takahiro Kawakami
Mode	Communication 11g

Wanted signal mean power from companion device (dBm)	Measured Receiver Sensitivity (corrected by the actual antenna assembly gain) (dBm)	
	Lowest Channel	Highest Channel
Pmin	-91.48	-91.98
Pmin + 6 dB	-85.48	-85.98

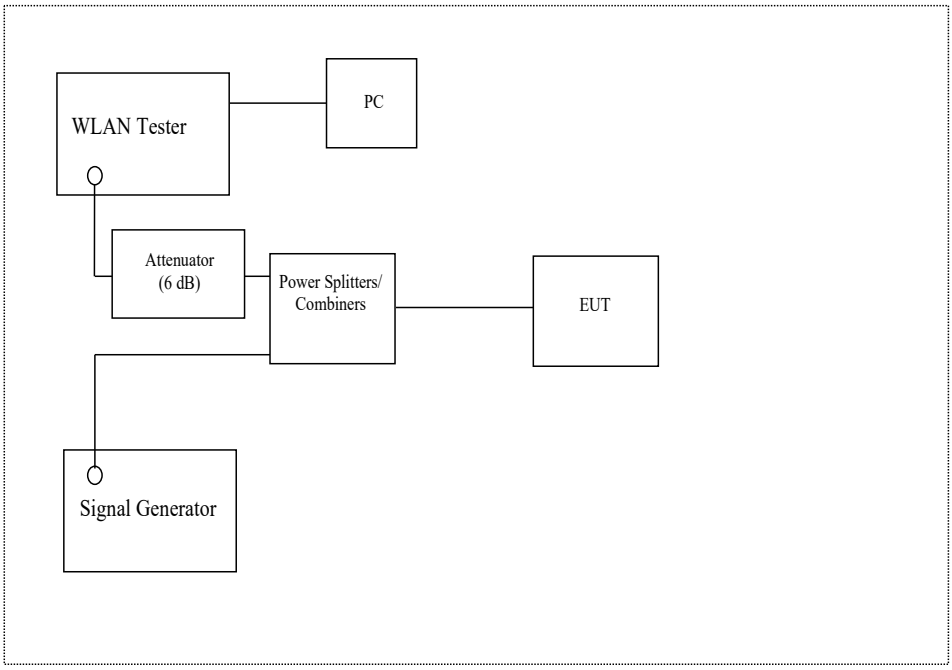
Receiver Category 1 equipment

Operating Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Blocking signal power (corrected by the actual antenna assembly gain) (dBm) *1)	Result PER (%)	Limit PER (%)
Lowest Channel	P_{min} + 6 dB	2380	-53	-52.2	0.12	≦10
		2503.5			0.08	
	P_{min} + 6 dB	2300	-47	-46.2	0.08	
		2330			0.1	
		2360			0.1	
	P_{min} + 6 dB	2523.5	-47	-46.2	0.04	
		2553.5			0.06	
		2583.5			0.12	
		2613.5			0.08	
		2643.5			0.12	
		2673.5			0.1	
Highest Channel	P_{min} + 6 dB	2380	-53	-52.2	0.5	≦10
		2503.5			0.62	
	P_{min} + 6 dB	2300	-47	-46.2	0.48	
		2330			0.6	
		2360			0.48	
	P_{min} + 6 dB	2523.5	-47	-46.2	0.62	
		2553.5			0.76	
		2583.5			0.76	
		2613.5			0.68	
		2643.5			0.7	
		2673.5			0.72	

*Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criterion a PER less than or equal to 10 % in the absence of any blocking signal.

*1) Blocking signal power was adjusted by product antenna gain 0.85 dBi.

CONDUCTED METHODS SYSTEM BLOCK DIAGRAM of Receiver Blocking



APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
Ad	CSG-12	143677	Signal Generator	Keysight Technologies Inc	N5182B	MY53050599	2019/05/22	12
Ad	SAT10-09	145132	Attenuator	Weinschel Corp.	54A-10	W5692	2019/11/05	12
Ad	SAT20-06	145146	Attenuator	Weinschel Corp.	54A-20	31506	2019/04/16	12
Ad	SAT20-07	145155	Attenuator	Weinschel Corp.	54A-20	31484	2019/04/16	12
Ad	SCC-G11	145174	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	2020/03/02	12
Ad	SCC-G63	196946	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	803411/2	2020/03/10	12
Ad	SCC-G64	196945	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	803414/2	2020/03/10	12
Ad	SCC-G65	196942	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	803416/2	2020/03/10	12
Ad	SDCPL-11	145439	Directional Coupler	Mini-Circuits	ZGDC35-93HP+	210	2019/07/04	12
Ad	SPSC-03	146253	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	2019/11/18	12
Ad	SSG-11	146256	Signal Generator	Keysight Technologies Inc	E8257D-550	MY53400714	2019/05/23	12
Ad,AT, RB	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2019/10/01	12
Ad,AT ,RB	SOS-19	175823	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/19	12
Ad,AT, RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2019/11/22	12
Ad,RB	SPSC-02	146252	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	2019/11/18	12
AT	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2019/12/12	12
AT	SCC-G14	145175	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	2019/12/12	12
AT	SCH-01	145200	Temperature and Humidity Chamber	ESPEC	PL-1KT	14020837	2019/04/16	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2020/01/28	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2020/01/28	12
AT	SRENT-15	160899	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185516	2020/01/15	12
AT	SSA-03	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2019/08/08	12
RB	SAT6-10	145152	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	2019/04/19	12
RB	SCC-G37	151614	Coaxial Cable	Junkosha	MWX241-01000KMSKMS/B	1612Q035	2019/12/12	12
RB	SCC-G38	151615	Coaxial Cable	Junkosha	MWX241-01000KMSKMS/B	1612Q036	2019/12/12	12
RB	SCC-G39	151616	Coaxial Cable	Junkosha	MWX241-01000KMSKMS/B	1612Q037	2019/12/12	12
RB	SSG-13	158037	Signal Generator	Rohde & Schwarz	SMBV100A	262877	2019/08/20	12
RB	SWT-02	160830	WLAN Test Set	Anritsu	MT8862A	6261711746	2019/04/18	12

Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-SEMI-5	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	KDA-05	146355	Dipole Antenna	Schwarzbeck Mess - Elektronik	VHAP	1065	2020/02/01	12
RE	KDA-06	146348	Dipole Antenna	Schwarzbeck Mess - Elektronik	UHAP	1049	2020/02/01	12
RE	KHA-08	144943	DRG Horn Antenna	A.H.Systems	SAS-200/571	224	2019/05/09	12
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
RE	SAEC-02(NSA)	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2020/03/20	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2019/04/08	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2020/02/19	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2019/07/12	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2019/11/06	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2020/02/21	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck Mess - Elektronik	BBA9106	91032666	2019/05/07	12
RE	SCC-04	145032	Coaxial Cable	Fujikura,HP,Mini-Circits,Fujikura	5D2W	-	2019/09/26	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2019/04/19	12
RE	SCC-G42	151618	Coaxial Cable	Junkosha	J12J103275-00	FEB-28-17-017	2020/03/04	12
RE	SCC-G50	178573	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	MY13407/4E	2020/03/09	12
RE	SCC-G51	178572	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800288 /4A	2020/03/09	12
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2019/04/16	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120D	9120D-726	2019/06/26	12
RE	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck Mess - Elektronik	VUSLP9111B	196	2019/05/07	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	SSG-02	146226	Signal Generator	Keysight Technologies Inc	E8257D-540	MY48051404	2020/01/29	12
RE	STR-07	146209	Test Receiver	Rohde & Schwarz	ESU26	100484	2019/09/13	12
RE	STS-02	145793	Digital Hitester	Hioki	3805-50	80997819	2019/04/02	12
RE	STS-03	146210	Digital Hitester	Hioki	3805-50	80997823	2019/10/01	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:

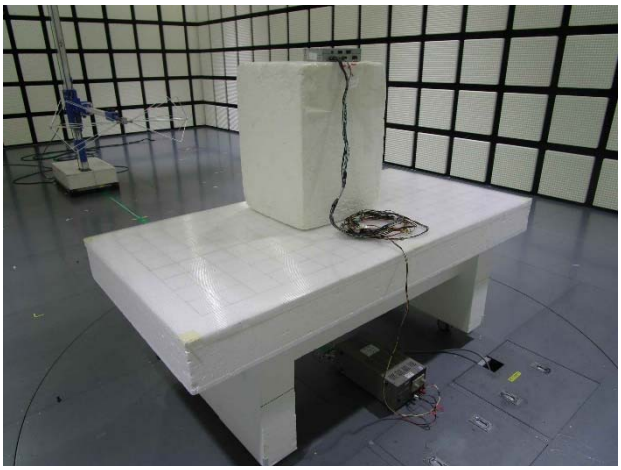
AT: Antenna Terminal Conducted test
RE: Radiated emission test
RB: Receiver Blocking test
Ad: Adaptivity and Unwanted Signal test

APPENDIX 3: Photographs of test setup

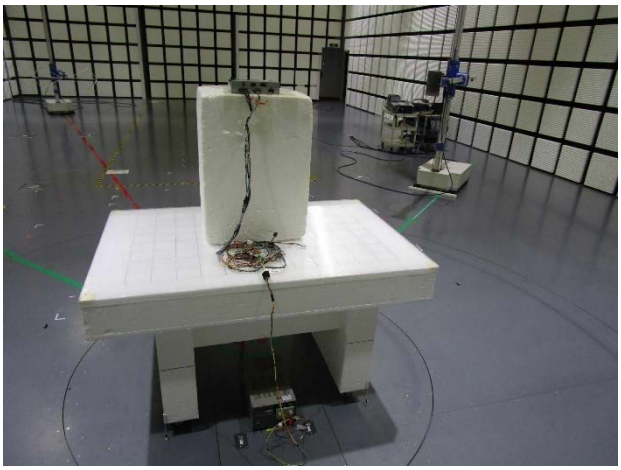
Radiated emission

Front

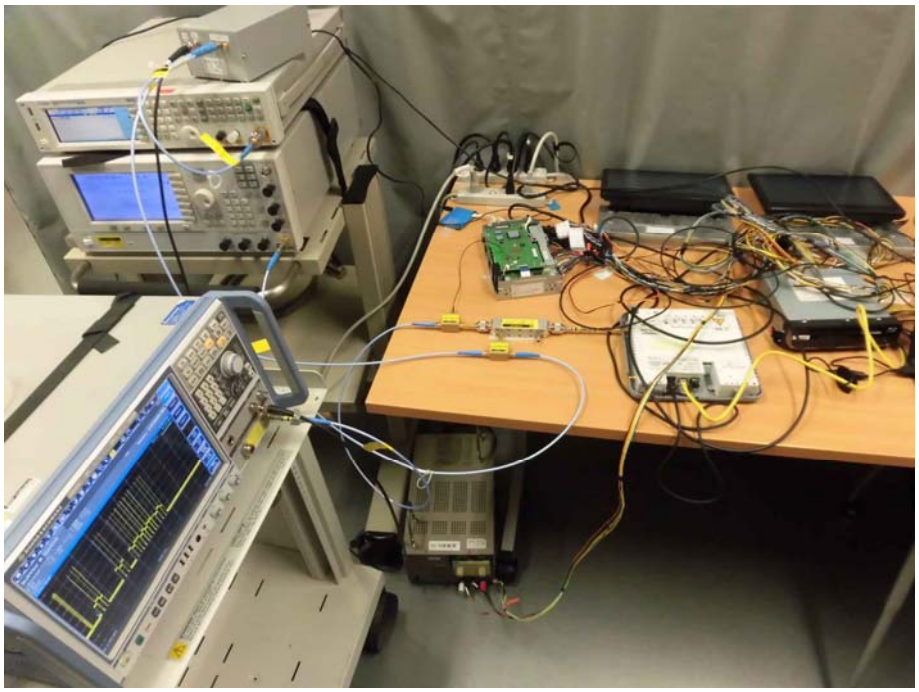
Below 1 GHz

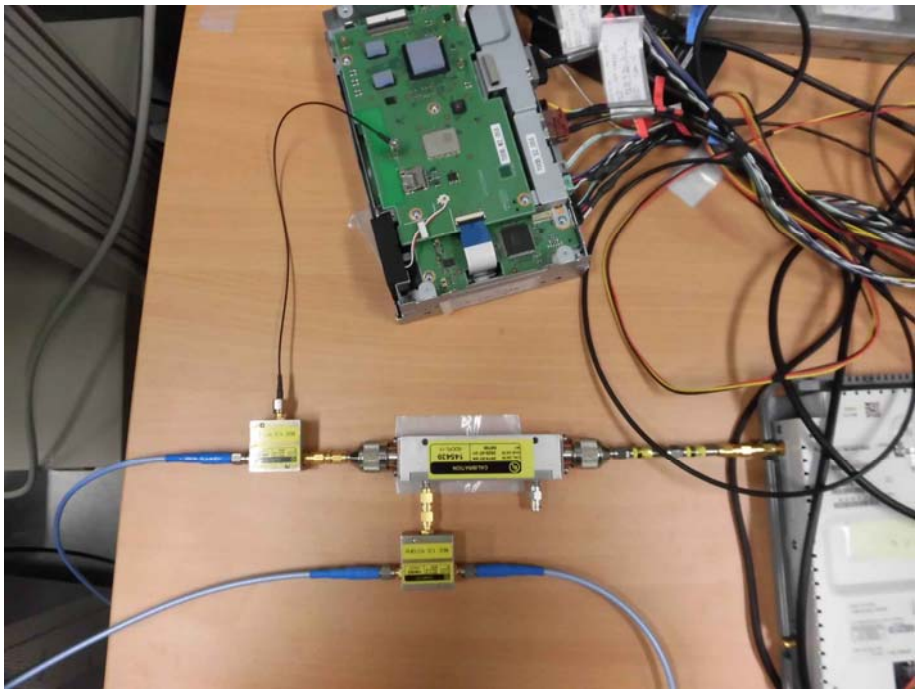


Above 1 GHz

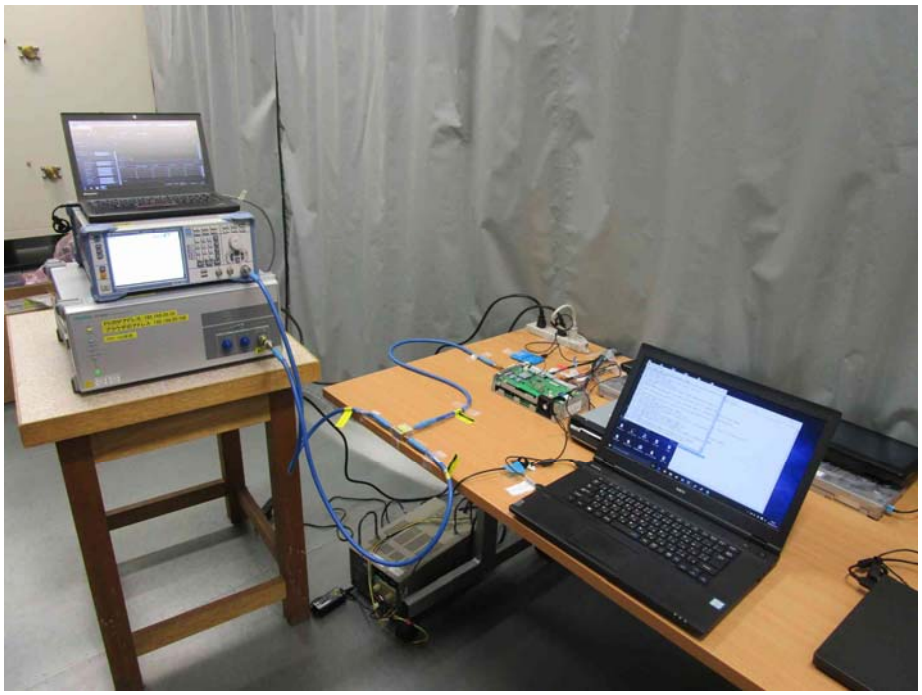


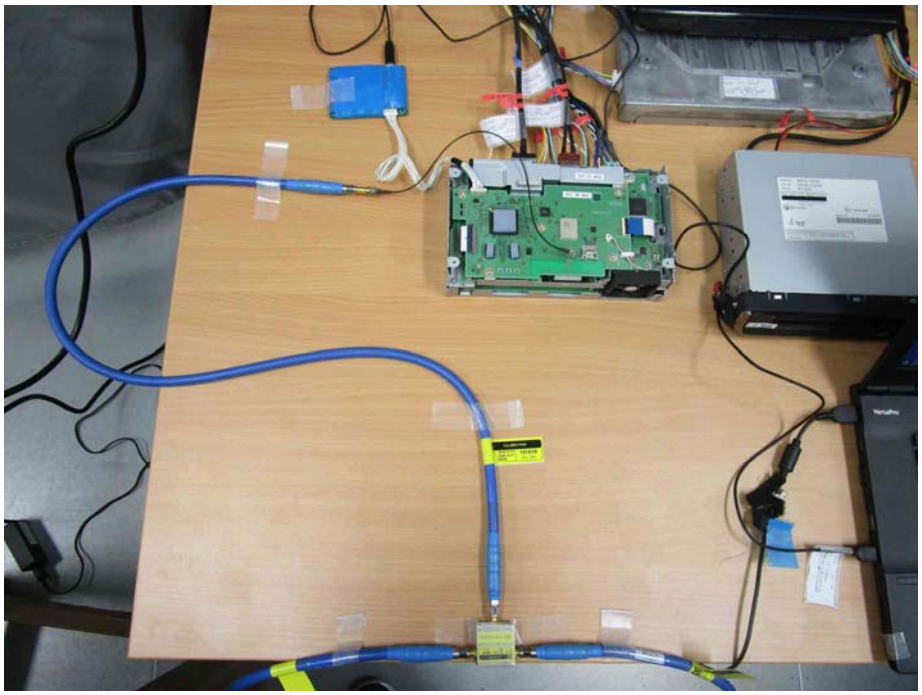
Adaptivity and Unwanted Signal tests





Receiver Blocking





End of Report

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