RADIO TEST REPORT

Test Report No. 14781152S-F-R3

Customer	**Canon Inc.**
Description of EUT	**Wireless Module**
Model Number of EUT	**ES205**
FCC ID	**AZD248**
Test Regulation	**FCC Part 15 Subpart E**
Test Result	**Complied**
Issue Date	**July 9, 2024**
Remarks	**WLAN (6 GHz band) part** **CBP test only**

Representative Test Engineer	Approved By
K. Adachi	T. Imamura
Kenichi Adachi Engineer	Toyokazu Imamura Engineer

CERTIFICATE 1266.03

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.

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

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- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14781152S-F

This report is a revised version of 14781152S-F-R2. 14781152S-F-R2 is replaced with this report.

Revision	Test Report No.	Date	Revised Contents
- (Original)	14781152S-F	June 7, 2024	-
1	14781152S-F-R1	June 13, 2024	Section 2 Added rating: DC 1.8 V
2	14781152S-F-R2	June 27, 2024	Cover page Corrected FCC ID: AZD 248 to AZD248
			Section 2.2 Addition of the value of the Directional Gain.
			Section 3 Modification of FCC Part 15.31 (e) From: The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement. To: The module is constantly provided the stable voltage (DC 3.3 V / 1.8 V) from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.
			P19 and.20 Additional comment. " * customer's cable loss is a loss of antenna cable for measurement attached to the sample provided by the customer. * Incumbent power is level at the point of connector of customer's measurement cable connected the antenna port of EUT. * Adjusted incumbent power is level at antenna port of EUT."
			P.6, P19 and.20 Correction antenna gain. (additional minimum (min) antenna gain)
			P.21 Correction of the transcription of tested frequencies.
3	14781152S-F-R3	July 9, 2024	P.6 Additional specification of "6 GHz Contention Based Protocol Incumbent avoidance".
			P.19 Correction antenna gain (U-NII-5 & 6 change from -1.55 to -2.03 dBi.)
			P.21 Correction frequency. (from 6175 to 6195)

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS PAGE

SECTION 1: Customer Information

Company Name	Canon Inc.
Address	30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501 Japan
Telephone Number	+81-3-5482-4941
Contact Person	Yasuhito Yukita

The information provided from 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	Wireless Module
Model Number	ES205
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	May 8, 2023
Test Date	May 21 to May 22, 2024

2.2 Product Description

General Specification

Rating	DC 3.3 V / DC 1.8 V
Operating temperature	-40 deg. C to +85 deg. C

Radio Specification

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.

Bluetooth (BR/EDR/BTLE)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS, GFSK / π/4-DQPSK, 8DPSK / GFSK
Antenna Type	Monopole Antenna
Antenna Gain a)	2.67 dBi

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

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
	OFDMA: (20 MHz band): 26/52/106/242-tone RU	
Antenna Type	Monopole Antenna	
Antenna Gain a)	Antenna Gain	Directinal Gain *1)
	2.67 dBi	5.69 dBi

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

Equipment Type	Transceiver		
Frequency of Operation	20 MHz Band:	5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5700 MHz 5745 MHz to 5825 MHz 5955 MHz to 6415 MHz 6435 MHz to 6515 MHz 6535 MHz to 6875 MHz (*6875 MHz:straddle ch) 6895 MHz to 7095 MHz	
	40 MHz Band	5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5670 MHz 5755 MHz to 5795 MHz 5965 MHz to 6405 MHz 6445 MHz to 6525 MHz (*6525 MHz:straddle ch) 6565 MHz to 6885 MHz (*6885 MHz:straddle ch) 6925 MHz to 7085 MHz	
	80 MHz band	5210 MHz 5290 MHz 5530 MHz to 5610 MHz 5775 MHz 5985 MHz to 6385 MHz 6465 MHz to 6545 MHz (*6545 MHz:straddle ch) 6625 MHz to 6865 MHz (*6865 MHz:straddle ch) 6945 MHz to 7025 MHz	
Type of Modulation	OFDM		
	OFDMA (IEEE802.11ax only)	(20 MHz band): 26/52/106/242-tone RU	
		(40 MHz band): 26/52/106/242/484-tone RU	
		(80 MHz band): 26/52/106/242/484/996-tone RU	
Antenna Type	Monopole Antenna		
Antenna Gain a)	Antenna Gain	Directinal Gain *1)	Band
	5.14 dBi (max), 2.53 dBi (min)	8.16 dBi (max)	(WLAN UNII-1 and UNII-2A band)
	3.53 dBi (max), 1.95 dBi (min)	6.55 dBi (max)	(WLAN UNII-2C band)
	3.05 dBi (max), 0.91 dBi (min)	6.07 dBi (max)	(WLAN UNII-3 band)
	1.61 dBi (max), -1.55 dBi (min)	4.63 dBi (max)	(WLAN UNII-5 and UNII-6 band)
	0.60 dBi (max), -2.03 dBi (min)	3.62 dBi (max)	(WLAN UNII-7 and UNII-8 band)
6 GHz Contention Based Protocol Incumbent avoidance	Channel puncturing: Not supported		
	Bandwidth reduction: Not supported		

*1) Directional Gain = Antenna Gain + Arry Gain
Arry Gain = 10 * log (Number of transmit Antennas / Number of spatial streams)
Number of transmit Antennas = 2, Number of spatial streams = 1

SECTION 3: Test specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart E The latest version on the first day of the testing period
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices Section 15.407 General technical requirements

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Contention Based Protocol	**FCC:** KDB Publication Number 987594	**FCC:** 15.407 (d) (6)	N/A	Complied	Conducted
	ISED: -	**ISED:** RSS-248 4.7			
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.					

FCC Part 15.31 (e)
The module is constantly provided the stable voltage (DC 3.3 V / 1.8 V) from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The EUT has a unique coupling/antenna connector (MHF-4L (IPEX)). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to Standard
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.

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector) SPM-06	1.1 dB
Power Measurement above 1 GHz (Peak Detector) SPM-06	1.8 dB
Power Measurement above 1 GHz (Average Detector) SPM-07	1.0 dB
Power Measurement above 1 GHz (Peak Detector) SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector) SPM-13	0.81 dB
Power Measurement above 1 GHz (Peak Detector) SPM-13	1.1 dB
Spurious Emission (Conducted) below 1 GHz	0.91 dB
Conducted Emissions Power Density Measurement 1 GHz to 3 GHz	1.3 dB
Conducted Emissions Power Density Measurement 3 GHz to 18 GHz	2.5 dB
Spurious Emission (Conducted) 18 GHz to 26.5 GHz	2.8 dB
Spurious Emission (Conducted) 26.5 GHz to 40 GHz	2.6 dB
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.96 deg.C.
Humidity_SCH-01	4.0 %
Temperature_SCH-02	2.2 deg.C.
Voltage	0.74 %

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
A2LA Certificate Number: 1266.03
(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test room	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber (SAC1)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber (SAC2)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber (SAC3)	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber (SAC4)	8.1 x 5.1 x 3.55	8.1 x 5.1	-
Wireless anechoic chamber 1 (WAC1)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
Wireless anechoic chamber 2 (WAC2)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
No.1 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	2.55 x 4.1 x 2.5	-	-
No.2 Measurement room	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2	3.0 x 4.5 x 2.7	3.0 x 4.5	-

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 802.11ax MIMO 20 MHz BW (11ax-20)	MCS 0 (1SS), PN9
IEEE 802.11ax MIMO 80 MHz BW (11ax-80)	MCS 0 (1SS), PN9
The worst condition was determined based on the test result of Maximum Peak Output Power. (SS: Spatial Stream)	
*Power of the EUT was set by the software as follows; Power Setting: Power Setting: Fixed Software: 18.53 (For WLAN) (Date: 2023.05 25, Storage location: Driven by connected PC) *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 and also was judged the necessity of 802.11ac/ax mode by the pre-test.	

Power Setting for OFDMA (U-NII 5 & 6)

	20 MHz BW	80 MHz BW
26-tone RU	-7 dBm (2SS) -10 dBm (1SS)	-10 dBm (2SS) -12 dBm (1SS)
52-tone RU	-4 dBm (2SS) -7 dBm (1SS)	-7 dBm (2SS) -10 dBm (1SS)
106-tone RU	-1 dBm (2SS) -4 dBm (1SS)	-4 dBm (2SS) -7 dBm (1SS)
242-tone RU	3 dBm (2SS) -1 dBm (1SS)	-1 dBm (2SS) -4 dBm (1SS)
484-tone RU	-	1 dBm (2SS) -2 dBm (1SS)
996-tone RU	-	4 dBm (2SS) 1 dBm (1SS)

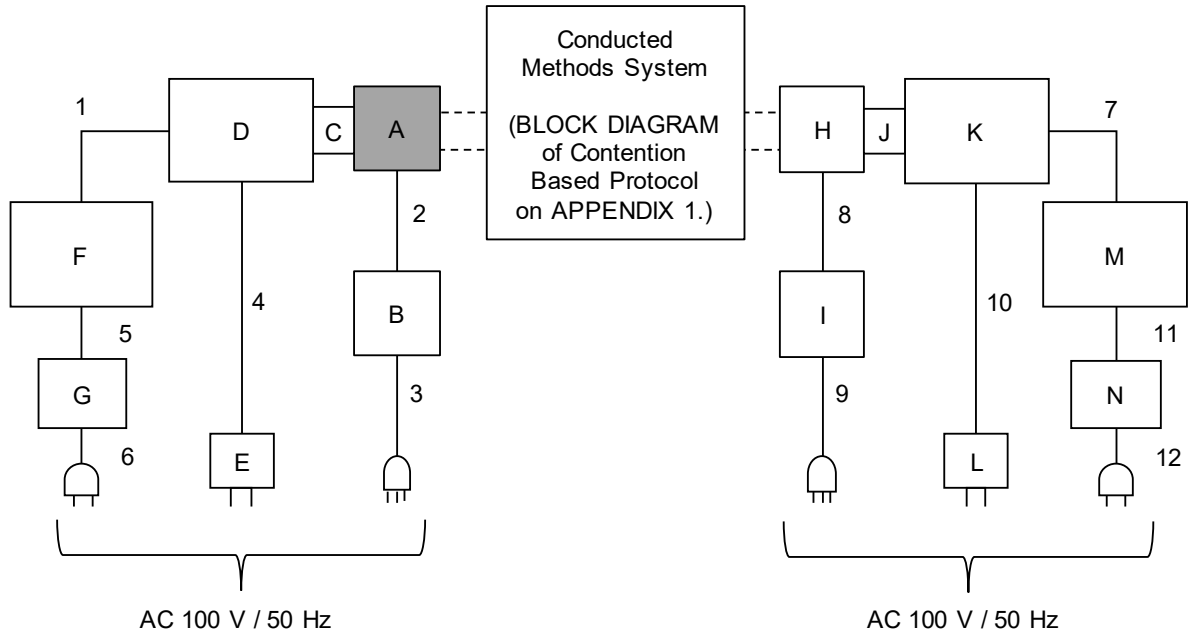
Power Setting for OFDMA (U-NII 7 & 8)

	20 MHz BW	80 MHz BW
26-tone RU	-6 dBm (2SS) -9 dBm (1SS)	-9 dBm (2SS) -12 dBm (1SS)
52-tone RU	-3 dBm (2SS) -6 dBm (1SS)	-6 dBm (2SS) -9 dBm (1SS)
106-tone RU	0 dBm (2SS) -3 dBm (1SS)	-3 dBm (2SS) -6 dBm (1SS)
242-tone RU	4 dBm (2SS) 0 dBm (1SS)	0 dBm (2SS) -3 dBm (1SS)
484-tone RU	-	2 dBm (2SS) -1 dBm (1SS)
996-tone RU	-	5 dBm (2SS) 2 dBm (1SS)

*The Details of Operation Mode(s)

Test Item	**Operating Mode *1)**	**Tested Antenna**	**Tested Frequency**			
			U-NII-5	**U-NII-6**	**U-NII-7**	**U-NII-8**
Contention Based Protocol	Communication 11ax-20	ANT 0 + ANT 1	6195 MHz	6475 MHz	6695 MHz	6995 MHz
	Communication 11ax-80		6225 MHz	6465 MHz	6625 MHz	6945 MHz

4.2 Configuration and Peripherals



Description of EUT and Support Equipment

No.	Item	Model Number	Serial Number	Manufacturer	Remarks
A	Wireless module	ES205	B1	Canon Inc.	EUT *1)
B	Power Supply (DC)	RPE-4323	150D015G2	RS PRO	-
C	Interface board	WJIG2021_2	A17	Canon Inc.	-
D	Raspberry Pi board	600-90768-01 REV2.0	2-4	Infineon Technologies AG	-
E	AC Adapter	QFWB-30-12-US01	16	Qualtek	-
F	Laptop PC	HP 250 G9/CT	JPH318LWC6	HP	-
G	AC Adapter	TPN-LA15	-	Lite-On Technorogy Corp.	-
H	Wireless module	ES205	B5	Canon Inc.	-
I	Power Sup ply (DC)	PAN35-10A	ML002085	Kikusui Electronics Corp.	-
J	Interface board	WJIG2021_2	A14	Canon Inc.	-
K	Raspberry Pi board	600-90768-01 REV2.0	2-1	Infineon Technologies AG	-
L	AC Adapter	QFWB-30-12-US01	01	Qualtek	-
M	Laptop PC	HP 250 G9/CT	JPH318LWSV	HP	-

*1) With Jig board

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	LAN	2.0	Unshielded	Unshielded	-
2	DC	0.9	Unshielded	Unshielded	-
3	AC	2.0	Unshielded	Unshielded	-
4	DC	1.5	Unshielded	Unshielded	-
5	DC	1.7	Unshielded	Unshielded	-
6	AC	0.9	Unshielded	Unshielded	-
7	LAN	3.0	Unshielded	Unshielded	-
8	DC	0.9	Unshielded	Unshielded	-
9	AC	2.0	Unshielded	Unshielded	-
10	DC	1.5	Unshielded	Unshielded	-
11	DC	1.7	Unshielded	Unshielded	-
12	AC	0.9	Unshielded	Unshielded	-

SECTION 5: 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 and Test method
Contention based protocol	2 to 5 times span of EBW (check only) / Zero span	1 MHz	3 MHz	Auto / 100 s	Peak	-	Spectrum Analyzer

The test results and limit are rounded off to two decimals place, 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

Contention Based Protocol

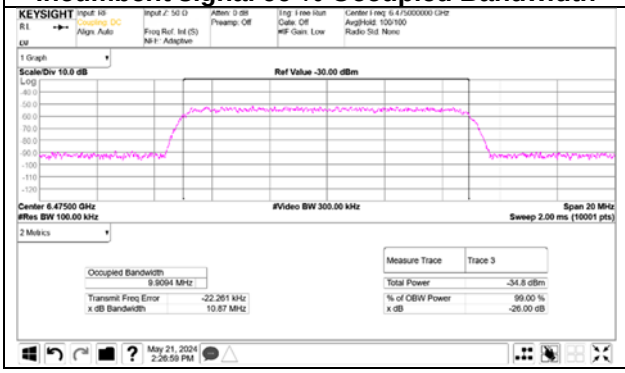
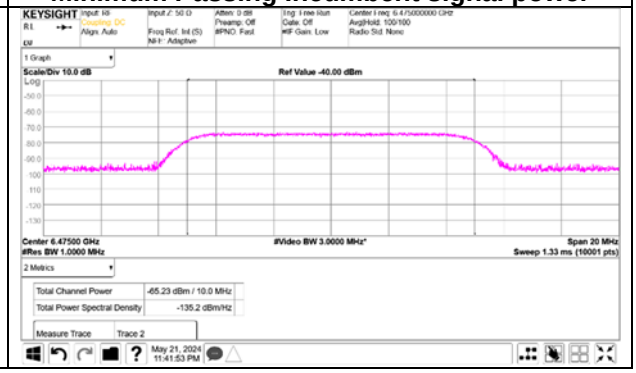
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	May 21, 2024	May 22, 2024
Temperature / Humidity	25 deg. C / 43 % RH	26 deg. C / 41 % RH
Engineer	Shiro Kobayashi	Kenichi Adachi
Mode	Communication 11ax-20 / Communication 11ax-80	

Incumbent signal plots

[20 MHz BW mode]
All tests were conducted with the Incumbent Signal frequency set to the middle of EUT channel and a nominal 99 % occupied power bandwidth of 10 MHz.

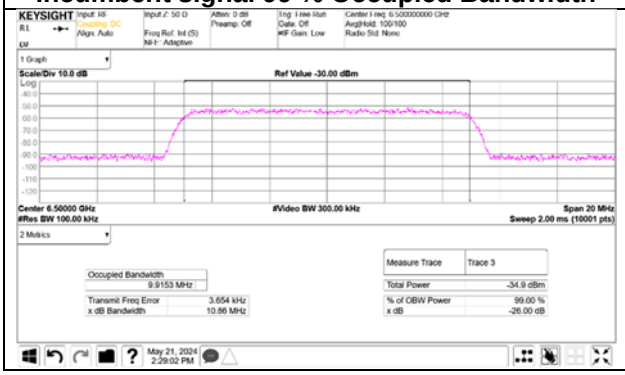
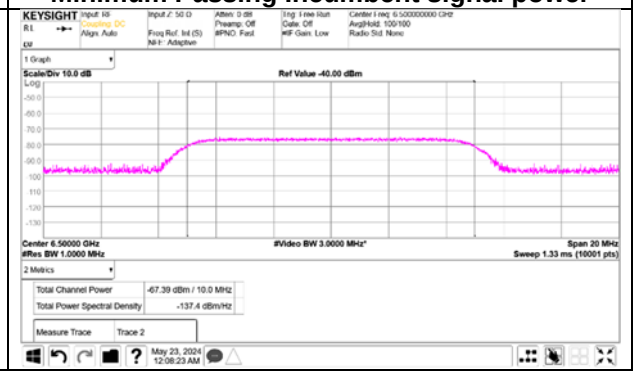
[80 MHz BW mode]
All tests were conducted with the Incumbent Signal frequency set to as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel and a 99 % occupied bandwidth of 10 MHz.

Reference plot
U-NII-5

Incumbent signal 99 % Occupied Bandwidth	Minimum Passing Incumbent signal power
	

Incumbent signal power takes into account customer supplied cable losses.

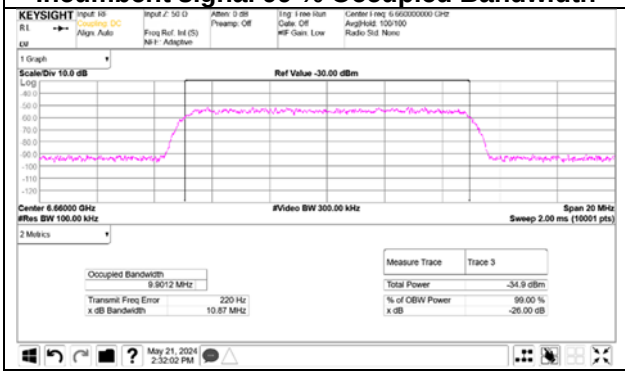
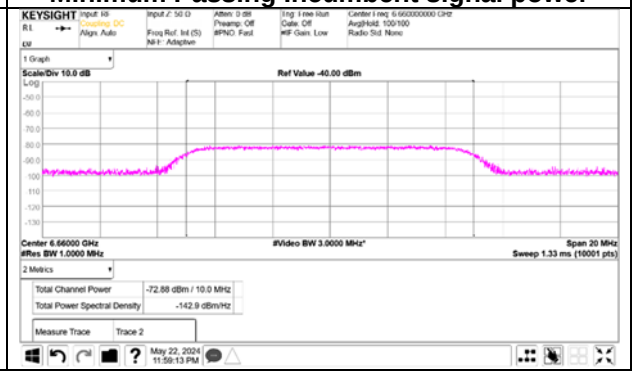
Reference plot
U-NII-6

Incumbent signal 99 % Occupied Bandwidth	Minimum Passing Incumbent signal power
	

Incumbent signal power takes into account customer supplied cable losses.

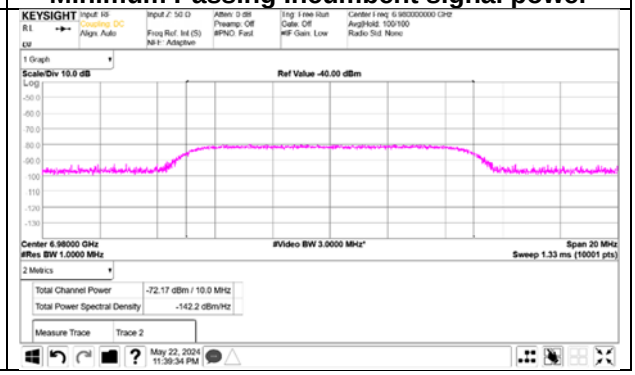
Contention Based Protocol

Reference plot
U-NII-7

Incumbent signal 99 % Occupied Bandwidth	Minimum Passing Incumbent signal power
	

Incumbent signal power takes into account customer supplied cable losses.

Reference plot
U-NII-8

Incumbent signal 99 % Occupied Bandwidth	Minimum Passing Incumbent signal power
	

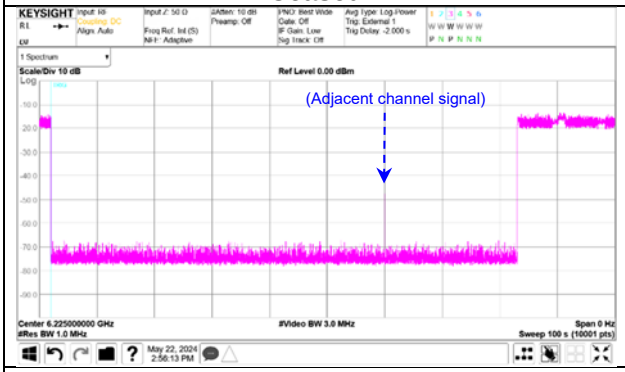
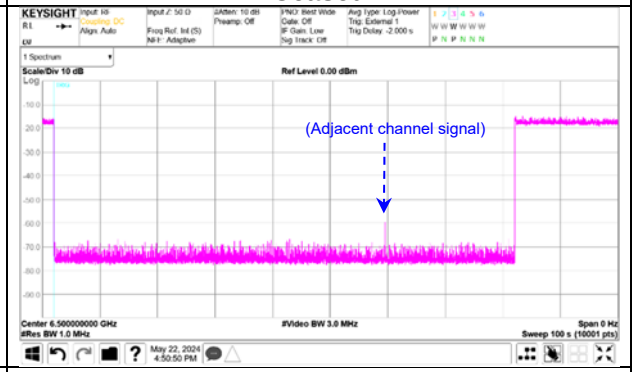
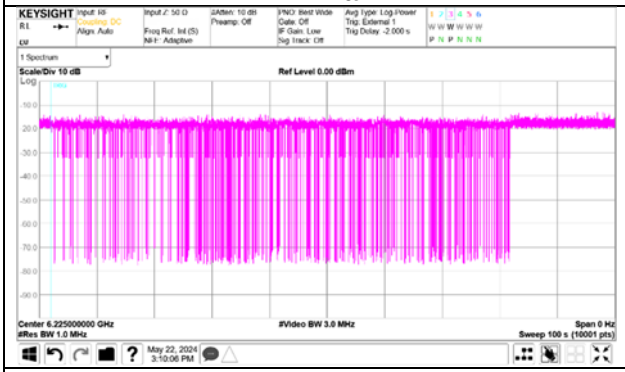
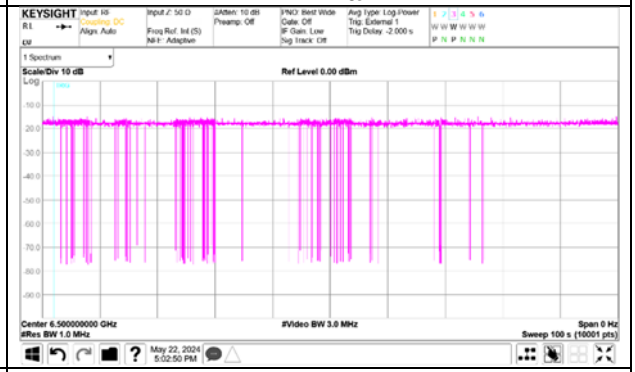
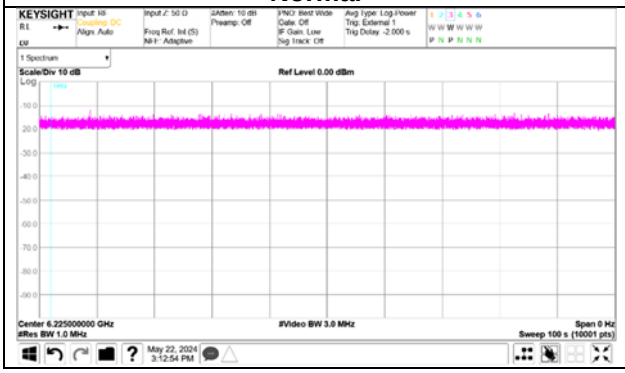
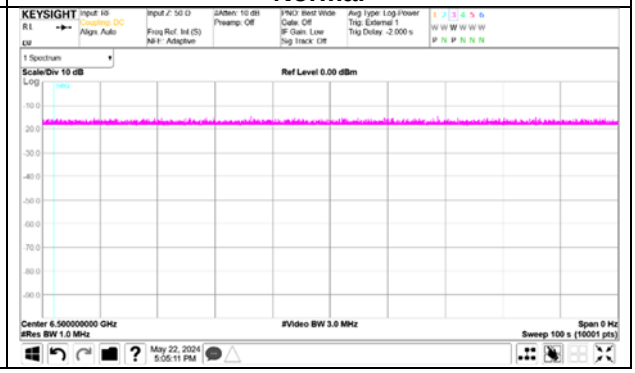
Incumbent signal power takes into account customer supplied cable losses.

Contention Based Protocol

EUT response to the applied incumbent signal

A link between the EUT and the Companion Device was established on the test channel.
Traffic flowing from the EUT to Companion Device was then initiated.
A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period.
Transmissions cease while the incumbent AWGN Signal is present and resume after it is removed.
Span was set to zero to ensure detection of transmissions from EUT.

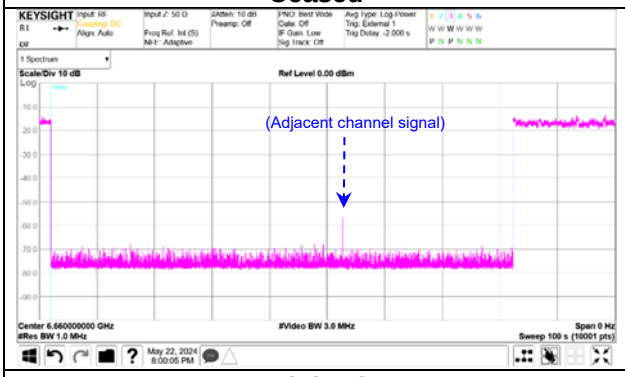
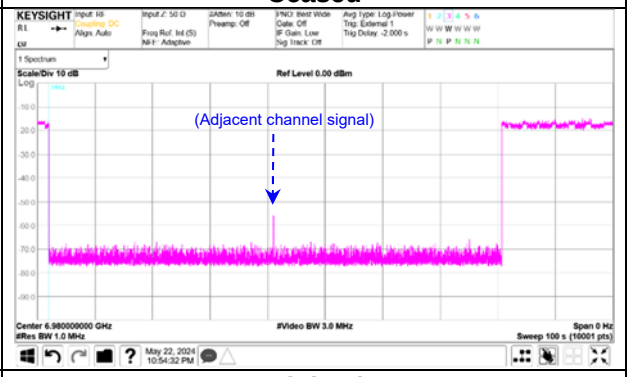
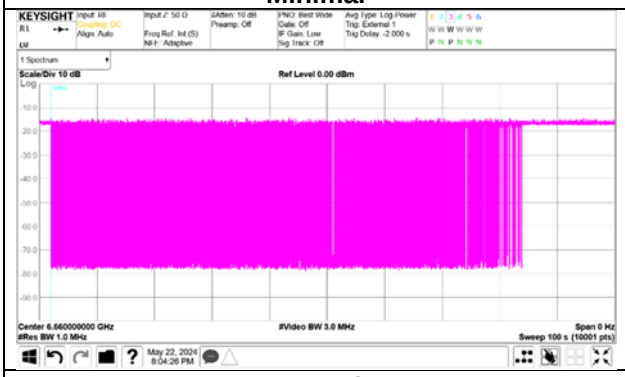
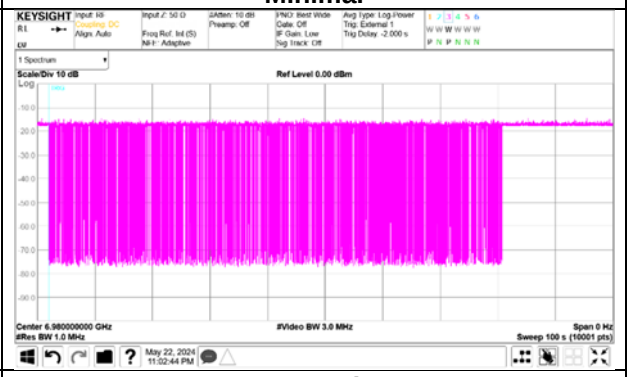
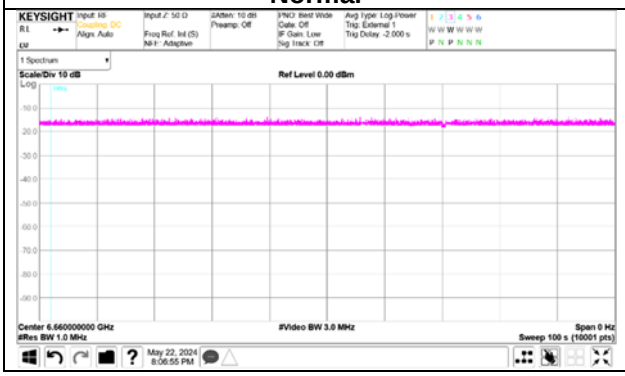
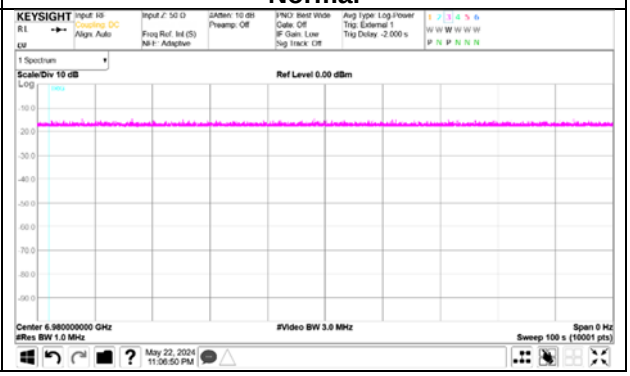
Reference plot

U-NII-5	U-NII-6
Ceased	Ceased
	
Minimal	Minimal
	
Normal	Normal
	

Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.
Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.
Normal: The level at which there no apparent detection and the operation of the EUT is still considered optimal.

Contention Based Protocol

Reference plot

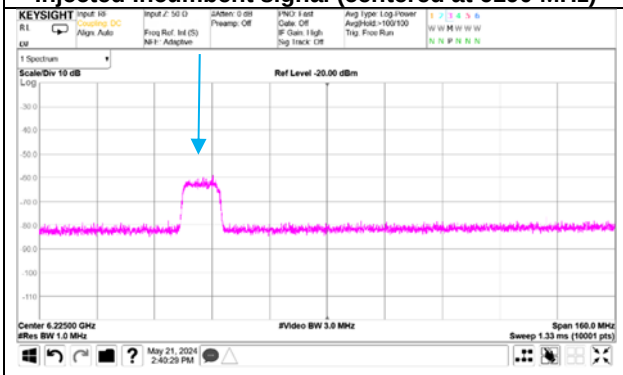
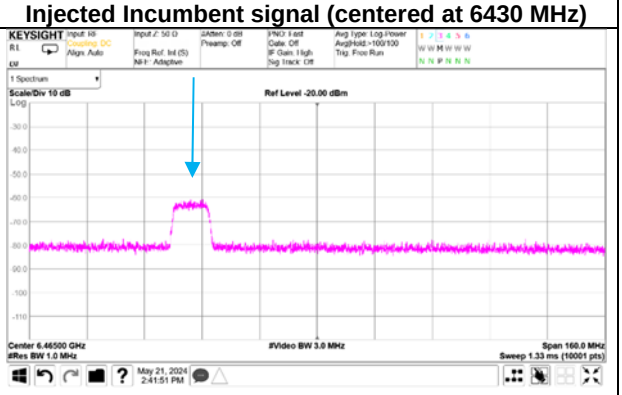
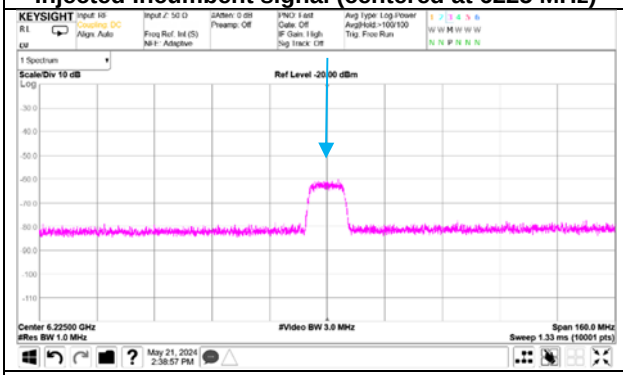
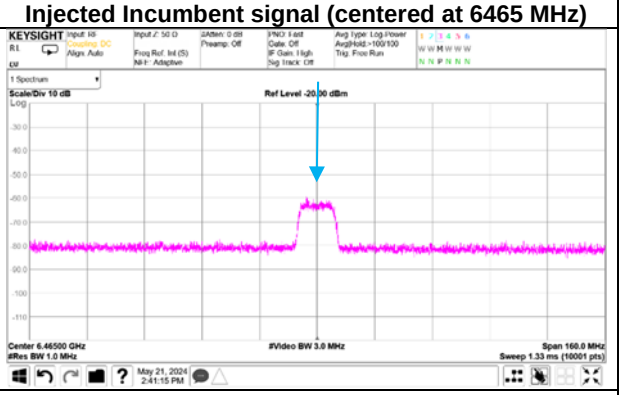
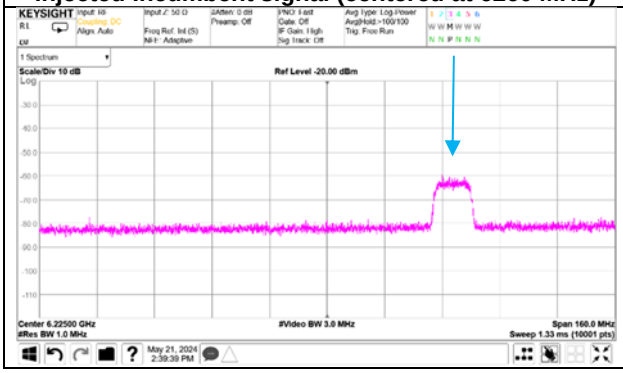
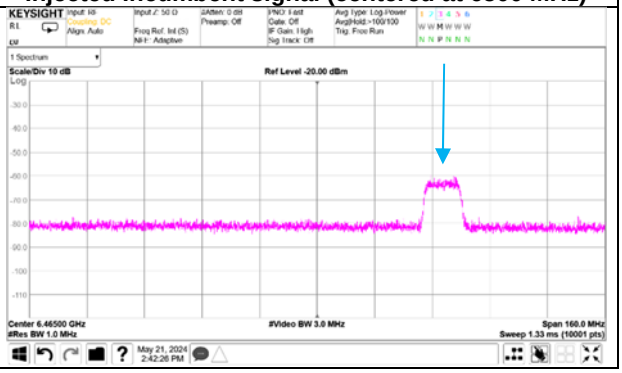
U-NII-7	U-NII-8
Ceased	Ceased
	
Minimal	Minimal
	
Normal	Normal
	

Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.
Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.
Normal: The level at which there no apparent detection and the operation of the EUT is still considered optimal.

Contention Based Protocol

CBP Bandwidth Reduction Description

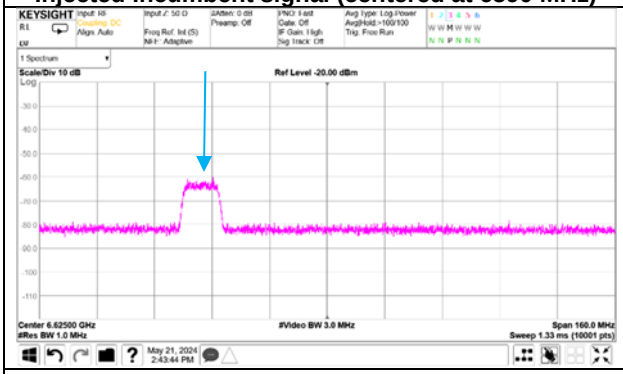
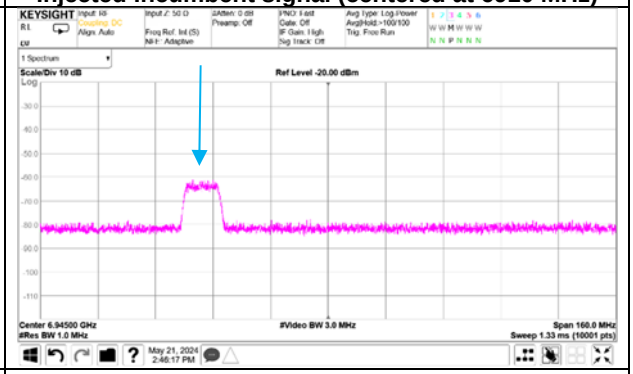
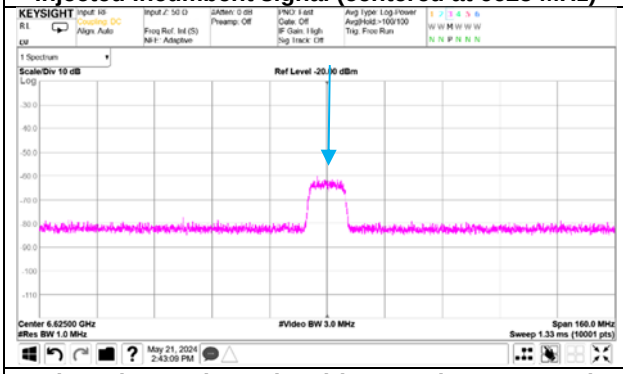
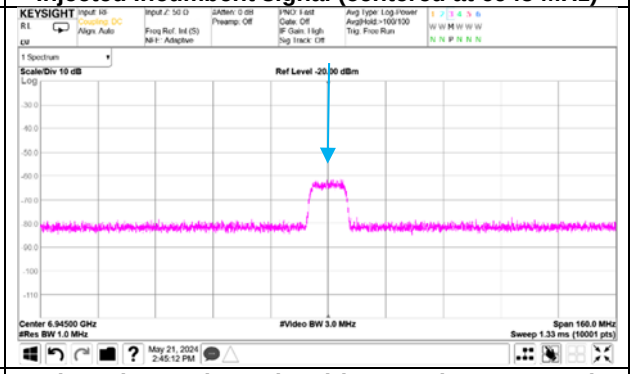
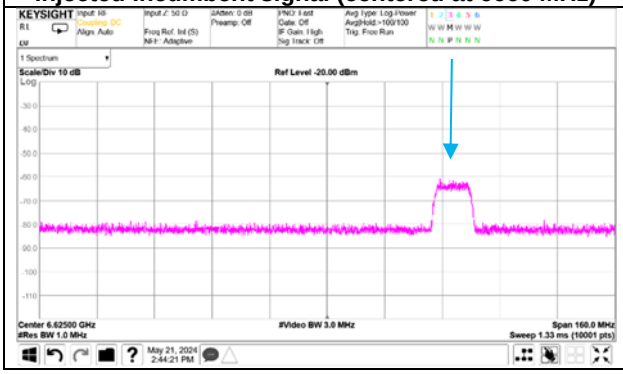
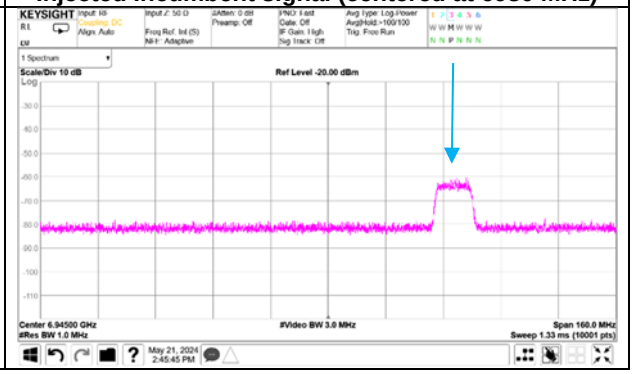
It was confirmed how the channel is reduced when AWGN is injected at the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel.

U-NII-5	U-NII-6
Injected Incumbent signal (centered at 6190 MHz)	Injected Incumbent signal (centered at 6430 MHz)
	
Injected Incumbent signal (centered at 6225 MHz)	Injected Incumbent signal (centered at 6465 MHz)
	
Injected Incumbent signal (centered at 6260 MHz)	Injected Incumbent signal (centered at 6500 MHz)
	

* No EUT transmission was confirmed after the incumbent signal was injected.

→ : Incumbent signal

Contention Based Protocol

U-NII-7	U-NII-8
Injected Incumbent signal (centered at 6590 MHz)	Injected Incumbent signal (centered at 6910 MHz)
	
Injected Incumbent signal (centered at 6625 MHz)	Injected Incumbent signal (centered at 6945 MHz)
	
Injected Incumbent signal (centered at 6660 MHz)	Injected Incumbent signal (centered at 6980 MHz)
	

* No EUT transmission was confirmed after the incumbent signal was injected.

→ : Incumbent signal

Contention Based Protocol

Incumbent signal detection results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent Frequency [MHz]	Incumbent Power [dBm]	customer's cable Loss [dB]	Antenna gain * [dBi]	Adjusted Incumbent Power [dBm]	Detection Limit [dBm]	EUT Tx Status
5	6195	20	6195	-66.06	0.32	-2.03	-64.35	-62.00	Ceased
				-72.96	0.32	-2.03	-71.25	-62.00	Minimal
				-73.26	0.32	-2.03	-71.55	-62.00	Normal
	6225	80	6190	-69.09	0.32	-2.03	-67.38	-62.00	Ceased
				-73.09	0.32	-2.03	-71.38	-62.00	Minimal
				-73.29	0.32	-2.03	-71.58	-62.00	Normal
			6225	-71.27	0.32	-2.03	-69.56	-62.00	Ceased
				-72.27	0.32	-2.03	-70.56	-62.00	Minimal
				-72.47	0.32	-2.03	-70.76	-62.00	Normal
			6260	-71.87	0.32	-2.03	-70.16	-62.00	Ceased
				-73.07	0.32	-2.03	-71.36	-62.00	Minimal
				-73.27	0.32	-2.03	-71.56	-62.00	Normal
6	6475	20	6475	-66.15	0.32	-2.03	-64.44	-62.00	Ceased
				-73.75	0.32	-2.03	-72.04	-62.00	Minimal
				-74.05	0.32	-2.03	-72.34	-62.00	Normal
	6465	80	6430	-70.48	0.32	-2.03	-68.77	-62.00	Ceased
				-71.88	0.32	-2.03	-70.17	-62.00	Minimal
				-72.08	0.32	-2.03	-70.37	-62.00	Normal
			6465	-69.62	0.32	-2.03	-67.91	-62.00	Ceased
				-72.02	0.32	-2.03	-70.31	-62.00	Minimal
				-72.22	0.32	-2.03	-70.51	-62.00	Normal
			6500	-68.31	0.32	-2.03	-66.60	-62.00	Ceased
				-69.71	0.32	-2.03	-68.00	-62.00	Minimal
				-69.91	0.32	-2.03	-68.20	-62.00	Normal

Adjusted Incumbent Power = Incumbent Power - customer's cable Loss - Antenna gain.
* The antenna gain value was applied as conservative condition (minimum antenna gain).

* customer's cable loss is a loss of antenna cable for measurement attached to the sample provided by the customer.
* Incumbent power is level at the point of connector of customer's measurement cable connected the antenna port of EUT.
* Adjusted incumbent power is level at antenna port of EUT.

The testing was performed with the AWGN signal set to Normal level (more than 20 dB below the -62 dBm threshold) and increased until the EUT detected and stopped transmitting (Ceased level).

EUT Tx Status means below
Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.
Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.
Normal: The level at which there no apparent detection and the operation of the EUT is still considered optimal.

Contention Based Protocol

Incumbent signal detection results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent Frequency [MHz]	Incumbent Power [dBm]	customer's cable Loss [dB]	Antenna gain * [dBi]	Adjusted Incumbent Power [dBm]	Detection Limit [dBm]	EUT Tx Status
7	6695	20	6695	-65.61	0.32	-2.03	-63.90	-62.00	Ceased
				-76.11	0.32	-2.03	-74.40	-62.00	Minimal
				-76.41	0.32	-2.03	-74.70	-62.00	Normal
	6625	80	6590	-74.51	0.32	-2.03	-72.80	-62.00	Ceased
				-76.11	0.32	-2.03	-74.40	-62.00	Minimal
				-76.31	0.32	-2.03	-74.60	-62.00	Normal
			6625	-75.23	0.32	-2.03	-73.52	-62.00	Ceased
				-76.43	0.32	-2.03	-74.72	-62.00	Minimal
				-76.63	0.32	-2.03	-74.92	-62.00	Normal
			6660	-73.80	0.32	-2.03	-72.09	-62.00	Ceased
				-75.00	0.32	-2.03	-73.29	-62.00	Minimal
				-75.20	0.32	-2.03	-73.49	-62.00	Normal
8	6995	20	6995	-65.57	0.32	-2.03	-63.86	-62.00	Ceased
				-76.07	0.32	-2.03	-74.36	-62.00	Minimal
				-76.37	0.32	-2.03	-74.66	-62.00	Normal
	6945	80	6910	-74.62	0.32	-2.03	-72.91	-62.00	Ceased
				-76.02	0.32	-2.03	-74.31	-62.00	Minimal
				-76.22	0.32	-2.03	-74.51	-62.00	Normal
			6945	-73.82	0.32	-2.03	-72.11	-62.00	Ceased
				-76.02	0.32	-2.03	-74.31	-62.00	Minimal
				-76.22	0.32	-2.03	-74.51	-62.00	Normal
			6980	-73.09	0.32	-2.03	-71.38	-62.00	Ceased
				-74.69	0.32	-2.03	-72.98	-62.00	Minimal
				-74.89	0.32	-2.03	-73.18	-62.00	Normal

Adjusted Incumbent Power = Incumbent Power - customer's cable Loss - Antenna gain.
* The antenna gain value was applied as conservative condition (minimum antenna gain).

* customer’s cable loss is a loss of antenna cable for measurement attached to the sample provided by the customer.
* Incumbent power is level at the point of connector of customer's measurement cable connected the antenna port of EUT.
* Adjusted incumbent power is level at antenna port of EUT.

The testing was performed with the AWGN signal set to Normal level (more than 20 dB below the -62 dBm threshold) and increased until the EUT detected and stopped transmitting (Ceased level).

EUT Tx Status means below
Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.
Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.
Normal: The level at which there no apparent detection and the operation of the EUT is still considered optimal.

Contention Based Protocol

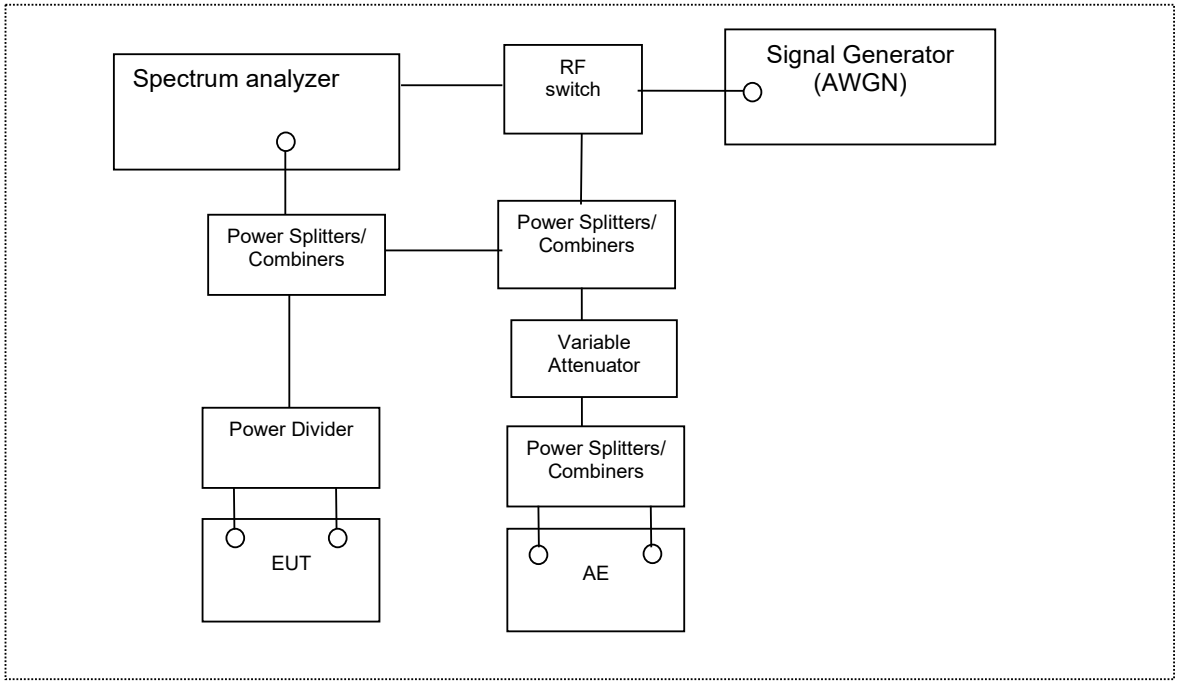
Incumbent signal detection certainty results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent * Frequency [MHz]	Trial No. 1	2	3	4	5	6	7	8	9	10	Detection Rate [%]	Detection Rate Limit [%]
5	6195	20	6195	○	○	○	○	○	○	○	○	○	○	100.0	90.0
	6225	80	6190	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6225	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6260	○	○	○	○	○	○	○	○	○	○	100.0	90.0
6	6475	20	6475	○	○	○	○	○	○	○	○	○	○	100.0	90.0
	6465	80	6430	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6465	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6500	○	○	○	○	○	○	○	○	○	○	100.0	90.0
7	6695	20	6695	○	○	○	○	○	○	○	○	○	○	100.0	90.0
	6625	80	6590	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6625	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6660	○	○	○	○	○	○	○	○	○	○	100.0	90.0
8	6995	20	6995	○	○	○	○	○	○	○	○	○	○	100.0	90.0
	6945	80	6910	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6945	○	○	○	○	○	○	○	○	○	○	100.0	90.0
			6980	○	○	○	○	○	○	○	○	○	○	100.0	90.0

"○" means EUT ceased.
Blank means EUT did not ceased.
* Test was performed at the level which the EUT Tx status was ceased.

Contention Based Protocol

Conducted Methods System Block Diagram of Contention Based Protocol



***Signal Generator and Spectrum Analyzer were started at the same time by Switcher.**

APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CBP	146212	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997828	2023/09/25	12
CBP	191845	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/07	12
CBP	145174	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	2024/03/07	12
CBP	145175	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	2023/12/08	12
CBP	146020	RF switch circuit	UL Japan	-	1	-	-
CBP	146252	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	2023/11/22	12
CBP	146253	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	2023/11/22	12
CBP	146261	Power Divider	Keysight Technologies Inc	11636B	56998	2024/04/04	12
CBP	146276	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	2023/11/22	12
CBP	167151	Step Attenuator	Keysight Technologies Inc	8494B	MY42157639	2024/02/14	12
CBP	167152	Step Attenuator	Keysight Technologies Inc	8496B	MY42151198	2024/02/14	12
CBP	196949	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803480/2	2024/03/07	12
CBP	199606	Microwave cable	RS Pro	R-132G7210 100CO	-	-	-
CBP	202920	Microwave cable	RS Pro	R-132G7210 100CO	-	-	-
CBP	226868	Signal Generator	Rohde & Schwarz	SMW200A	108835	2024/04/09	12
CBP	235697	Coaxial Cable	Hayashi-Repic co., Ltd.	KMS020B-GL140sE-KMS020B-2.0m	47456-01-01	2024/04/09	12
CBP	236410	Spectrum Analyzer	Keysight Technologies Inc	N9030B	MY63050151	2024/04/26	12
CBP	246245	Coaxial Cable	Hayashi-Repic co., Ltd.	SMS13-13A26-SMS13-1.0m	49883-01-02	2024/03/15	12
CBP	246246	Coaxial Cable	Hayashi-Repic co., Ltd.	SMS13-13A26-SMS13-1.0m	49883-01-03	2024/03/15	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:

CBP: Contention Based Protocol