



RADIO TEST REPORT

Test Report No. 14173126H-A

Customer	Sony Interactive Entertainment Inc.
Description of EUT	Wireless communication module
Model Number of EUT	J20H104
FCC ID	AK8M21DFD1
Test Regulation	FCC Part 15 Subpart C: 2021
Test Result	Complied (Refer to SECTION 3)
Issue Date	March 11, 2022
Remarks	WLAN (2.4 GHz band) and Bluetooth Low Energy parts

Representative Test Engineer

Ken Fujita

Ken Fujita
Engineer

Approved By

Takayuki S.

Takayuki Shimada
Leader



CERTIFICATE 5107.02

- ☐ 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".

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 20.0

ANNOUNCEMENT

- This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- The results in this report apply only to the sample tested.
- This sample tested is in compliance with the limits of the above regulation.
- The test results in this test report are traceable to the national or international standards.
- This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
- This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
- The all test items in this test report are conducted by UL Japan, Inc Ise EMC Lab.
- The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. has been accredited.
- The information provided from the applicant for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14173126H-A

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14173126H-A	March 11, 2022	-

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	5
SECTION 2: Equipment Under Test (EUT).....	5
SECTION 3: Test Specification, Procedures & Results.....	8
SECTION 4: Operation of EUT during testing.....	11
SECTION 5: Conducted Emission.....	14
SECTION 6: Radiated Spurious Emission	15
SECTION 7: Antenna Terminal Conducted Tests.....	17
APPENDIX 1: Test Data.....	18
Conducted Emission	18
6 dB Bandwidth and 99 % Occupied Bandwidth.....	21
Maximum Peak Output Power.....	44
Average Output Power.....	53
Burst rate confirmation	59
Radiated Spurious Emission	65
Conducted Spurious Emission	115
Power Density	128
APPENDIX 2: Test Instruments	153
APPENDIX 3: Photographs of Test Setup	155
Conducted Emission	155
Radiated Spurious Emission	156
Worst Case Position	159
Antenna Terminal Conducted Tests.....	162
Test Configuration and peripherals.....	163

SECTION 1: Customer Information

Company Name	Sony Interactive Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-50-3807-5639
Contact Person	Miho Nakamura

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

* 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

Description	Wireless communication module
Model Number	J20H104
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	January 17, 2022
Test Date	January 18 to February 15, 2022

2.2 Product Description

General Specification

Rating	DC 3.3 V
--------	----------

Radio Specification

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 (IEEE802.11ax only)	20 MHz: 26/52/106/242-tone RU
Bandwidth & Channel spacing	Less than 20 MHz & 5 MHz	
Method of frequency generation	Synthesizer	
Antenna Type	PIFA	
Antenna Gain: G_{ANT}	Antenna 1: 5.0 dBi Antenna 2: 5.0 dBi	
Directional Gain *1)	8.01 dBi	
Maximum clock frequency	640 MHz	

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 M Band: 5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz	
	40 M Band: 5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz	
	80 M Band: 5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz	
Type of Modulation	OFDM	
	OFDMA (IEEE802.11ax only)	20 MHz: 26/52/106/242-tone RU
		40 MHz: 26/52/106/242/484-tone RU 80 MHz: 26/52/106/242/484/996-tone RU
Bandwidth & Channel spacing	Less than 20 MHz / 40 MHz / 80 MHz & 20 MHz / 40 MHz / 80 MHz	
Method of frequency generation	Synthesizer	
Antenna Type	PIFA	
Antenna Gain: G_{ANT}	Antenna 1: 6.4 dBi Antenna 3: 5.0 dBi	
Directional Gain *1)	8.74 dBi	
Maximum clock frequency	640 MHz	

BT1: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz
Method of frequency generation	Synthesizer
Antenna Type	PIFA
Antenna Gain	Antenna 3: 5.8 dBi
Maximum clock frequency	640 MHz

BT2: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz
Method of frequency generation	Synthesizer
Antenna Type	PIFA
Antenna Gain	Antenna 4: 5.8 dBi
Maximum clock frequency	640 MHz

*1) Directional antenna gain = $10 \log \left(\frac{G_{ANT1}}{(10^{20} + 10^{20})^2 / 2} \right)$

*This test report applies to WLAN (2.4 GHz band) and Bluetooth (Low Energy) parts.

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	28.91 dB 0.60506 MHz, AV, N	Complied a)	-
6dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(2) ISED: RSS-247 5.2(a)	See data.	Complied b)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ISED: RSS-247 5.4(d)		Complied c)	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(e) ISED: RSS-247 5.2(b)		Complied d)	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	7.0 dB 2390.0 MHz Horizontal, AV	Complied e), f)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593. * In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred. *1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6. a) Refer to APPENDIX 1 (data of Conducted Emission) b) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth) c) Refer to APPENDIX 1 (data of Maximum Peak Output Power) d) Refer to APPENDIX 1 (data of Power Density) e) Refer to APPENDIX 1 (data of Conducted Spurious Emission) f) Refer to APPENDIX 1 (data of Radiated Spurious Emission) 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					

FCC Part 15.31 (e)

The stable voltage will be supplied by the end product, which will be required to have a power supply regulator. Therefore, the EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector (U.FL). Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99% Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)					

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. 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 $k=2$.

Conducted emission

Using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.7 dB
	0.15 MHz to 30 MHz	3.3 dB

Radiated emission

Measurement distance	Frequency range		Uncertainty (+/-)
3 m	9 kHz to 30 MHz		3.2 dB
10 m			3.0 dB
3 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	5.0 dB
	200 MHz to 1000 MHz	Horizontal	5.1 dB
		Vertical	6.2 dB
10 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	4.8 dB
	200 MHz to 1000 MHz	Horizontal	5.0 dB
		Vertical	5.0 dB
3 m	1 GHz to 6 GHz		4.9 dB
	6 GHz to 18 GHz		5.2 dB
1 m	10 GHz to 26.5 GHz		5.4 dB
	26.5 GHz to 40 GHz		5.4 dB
10 m	1 GHz to 18 GHz		5.4 dB

Antenna Terminal test

Test Item	Uncertainty (+/-)
20 dB Bandwidth / 99 % Occupied Bandwidth	0.96 %
Maximum Peak Output Power / Average Output Power	1.5 dB
Carrier Frequency Separation	0.42 %
Dwell time / Burst rate	0.10 %
Conducted Spurious Emission	2.7 dB

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

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

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

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

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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)

[WLAN]

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.

Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	6 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 11, PN9
IEEE 802.11ax MIMO 20 MHz BW (11ax-20)	MCS 3 (1TX), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power Setting: Other than OFDMA: 8.0 dBm OFDMA: -0.5 dBm (26-tone RU), 2.5 dBm (52-tone RU), 5.0 dBm (106-tone RU), 8.0 dBm (242-tone RU) Software: autotest_for-ULJ.sh (Date: January 19, 2022, 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.	

*The Details of Operating Mode(s)

Test Item	Operating Mode	Tested Antenna	Tested Frequency
Conducted Emission, Radiated Spurious Emission (Below 1 GHz), Conducted Spurious Emission	Tx 11ax-20 OFDM *1)	Antenna 1 + 2	2412 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx 11b Tx 11ax-20 OFDM *2) Tx 11ax-20 OFDMA *3)	Antenna 1 + 2	2412 MHz 2437 MHz 2462 MHz
Maximum Peak Output Power, Power Density	Tx 11b Tx 11g Tx 11n-20 Tx 11ax-20 OFDM Tx 11ax-20 OFDMA	Antenna 1 Antenna 2 Antenna 1 + 2	2412 MHz 2437 MHz 2462 MHz
6dB Bandwidth, 99% Occupied Bandwidth	Tx 11b Tx 11g Tx 11n-20 Tx 11ax-20 OFDM Tx 11ax-20 OFDMA	Antenna 2 *4)	2412 MHz 2437 MHz 2462 MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test. *2) Since 11g and 11n-20, 11ax-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest output power. *3) OFDMA configuration tests were conducted only at the band edge since preliminary testing indicated that the other spurious emission was lower than OFDM. *4) The test was conducted with the antenna that had the highest power as a representative.			

[BT LE]

Mode	Remarks*
Bluetooth Low Energy (BT LE) 1M-PHY Uncoded PHY (1M-PHY)	Maximum Packet Size, PRBS9
Bluetooth Low Energy (BT LE) 2M-PHY Uncoded PHY (2M-PHY)	Maximum Packet Size, PRBS9
*Power of the EUT was set by the software as follows; Power Setting: 2.0 dBm Software: MT_TEST_Tool_Ver6.5 (Date: January 14, 2022, 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.	

*The Details of Operating Mode(s)

Test Item	Operating Mode	Tested Antenna	Tested frequency
Conducted Emission, Radiated Spurious Emission (Below 1 GHz)	Tx BT LE, 2M-PHY *1)	Antenna 3 (BT1)	2440 MHz
	Tx BT LE, 1M-PHY *1)	Antenna 4 (BT2)	
Radiated Spurious Emission (Above 1 GHz), Maximum Peak Output Power, Power Density, 6dB Bandwidth, 99% Occupied Bandwidth, Conducted Spurious Emission	Tx BT LE, 1M-PHY	Antenna 3 (BT1)	2402 MHz
	Tx BT LE, 2M-PHY	Antenna 4 (BT2)	2440 MHz
			2480 MHz
*1) Conducted emissions and Spurious emissions for frequencies below 1 GHz were limited to the channel that had the highest power during the antenna terminal test, as preliminary testing indicated that changing the operating frequency had no significant impact on the emissions in those frequency bands.			

Simultaneous transmission (Only Antenna 3 simultaneously transmits BT1 and WLAN 5 GHz band on a single antenna.)

Test Item	Mode *1)	Tested Antenna
Radiated Spurious Emission	Tx BT LE 2M-PHY 2402 MHz + Tx 11ax-20 (OFDM) 5500 MHz	Antenna 3 (BT1)
*1) The test was conducted on representative mode, the worst mode at Spurious emission test for BT and the mode had the highest power at Antenna terminal conducted test for WLAN 5 GHz band.		

4.2 Configuration and Peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Conducted Emission

Test Procedure and Conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

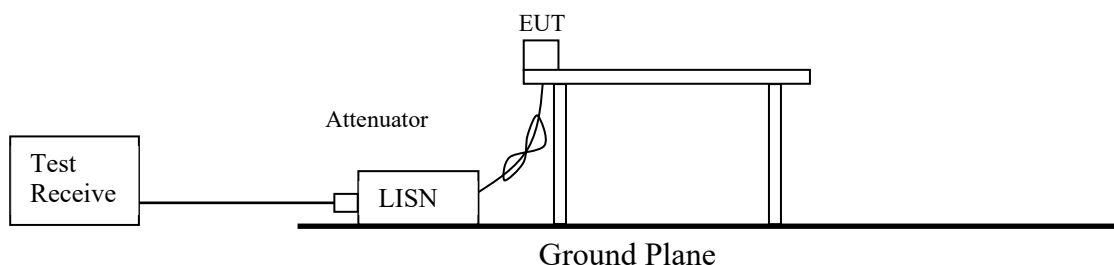
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	: QP and CISPR AV
Measurement Range	: 0.15 MHz to 30 MHz
Test Data	: APPENDIX
Test Result	: Pass

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

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

[For below 1 GHz]

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

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

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

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

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

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

Test Antennas are used as below;

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

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

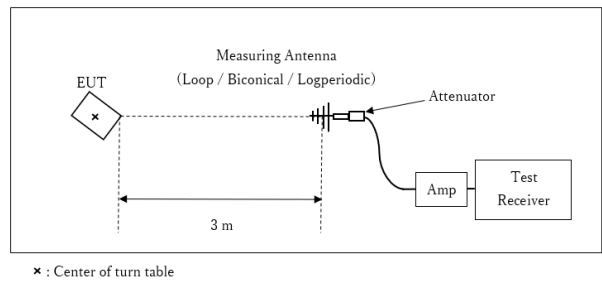
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

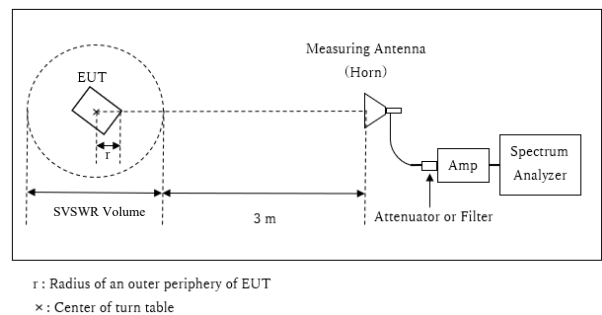
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz to 10 GHz

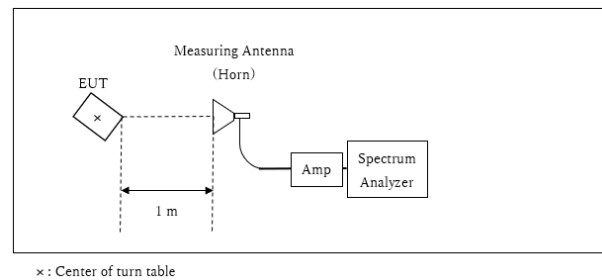


Distance Factor: $20 \times \log (3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.95 \text{ m}$

SVSWR Volume : 2.0 m
r = 0.05m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)

10 GHz to 26.5 GHz



Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$
*Test Distance: 1 m

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement Range	: 30 MHz to 26.5 GHz
Test Data	: APPENDIX
Test Result	: Pass

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
6dB Bandwidth	3 MHz / 5 MHz / 6 MHz / 12 MHz/ 20 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1 kHz	27 kHz				

*1) Peak hold was applied as Worst-case measurement.

*2) Reference data

*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".

*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart.

(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

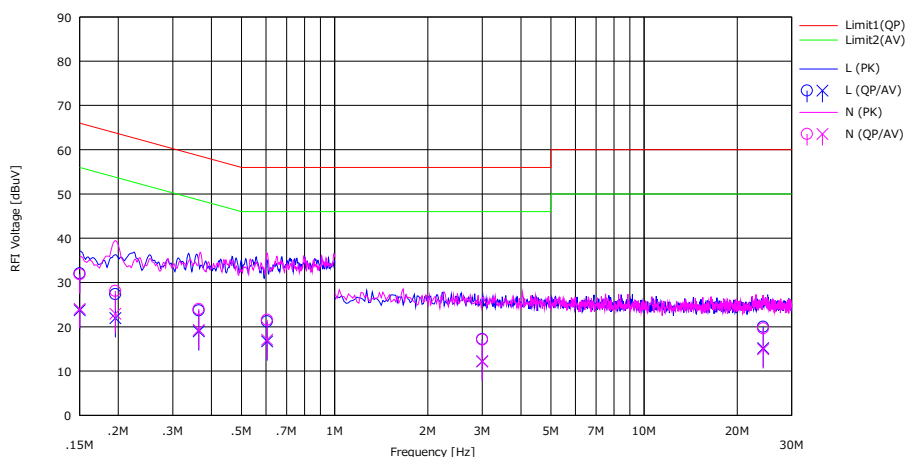
Test Result : Pass

APPENDIX 1: Test Data

Conducted Emission (WLAN)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 15, 2022
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx 11ax-20 (OFDM) 2412MHz

Limit : FCC_Part 15 Subpart C(15.207)



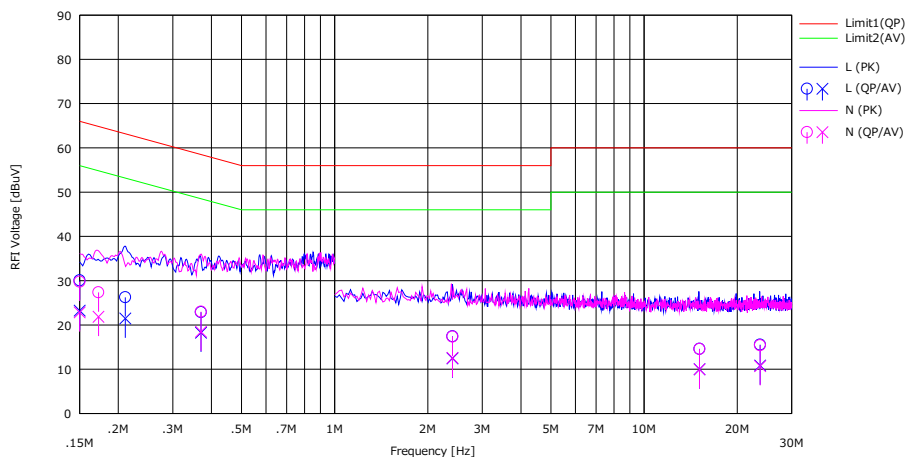
No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	18.80	10.50	0.06	13.18	32.04	23.74	66.00	56.00	33.96	32.26	L	
2	0.19557	14.10	8.70	0.05	13.19	27.34	21.94	63.80	53.80	36.46	31.86	L	
3	0.36411	10.40	5.70	0.05	13.21	23.66	18.96	58.63	48.63	34.97	29.67	L	
4	0.60506	7.90	3.40	0.05	13.23	21.18	16.68	56.00	46.00	34.82	29.32	L	
5	3.00000	3.70	-1.30	0.09	13.39	17.18	12.18	56.00	46.00	38.82	33.82	L	
6	24.26339	5.50	0.70	0.50	13.96	19.96	15.16	60.00	50.00	40.04	34.84	L	
7	0.15000	18.60	10.80	0.06	13.18	31.84	24.04	66.00	56.00	34.16	31.96	N	
8	0.19557	14.80	9.70	0.07	13.19	28.06	22.96	63.80	53.80	35.74	30.84	N	
9	0.36411	10.70	6.00	0.06	13.21	23.97	19.27	58.63	48.63	34.66	29.36	N	
10	0.60506	8.30	3.80	0.06	13.23	21.59	17.09	56.00	46.00	34.41	28.91	N	
11	3.00000	3.60	-1.30	0.10	13.39	17.09	12.19	56.00	46.00	38.91	33.81	N	
12	24.26339	5.20	0.50	0.46	13.96	19.62	14.92	60.00	50.00	40.38	35.08	N	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
Except for the above table: adequate margin data below the limits.

Conducted Emission (BT1)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 15, 2022
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx BT LE 2M-PHY 2440MHz

Limit : FCC_Part 15 Subpart C(15.207)



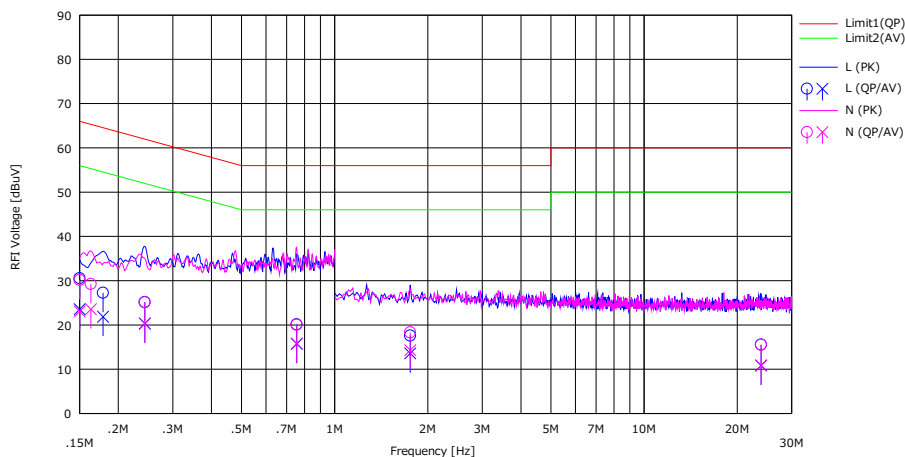
No.	Freq. [MHz]	Reading		USN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	16.80	10.00	0.06	13.18	30.04	23.24	66.00	56.00	35.96	32.76	L	
2	0.21070	13.00	8.20	0.05	13.19	26.24	21.44	63.18	53.18	36.94	31.74	L	
3	0.37000	9.60	5.00	0.05	13.21	22.86	18.26	58.50	48.50	35.64	30.24	L	
4	2.40406	4.00	-1.00	0.08	13.35	17.43	12.43	56.00	46.00	38.57	33.57	L	
5	15.10970	0.50	-4.10	0.32	13.76	14.58	9.98	60.00	50.00	45.42	40.02	L	
6	23.72090	1.10	-3.60	0.48	13.95	15.53	10.83	60.00	50.00	44.47	39.17	L	
7	0.15000	16.50	9.60	0.06	13.18	29.74	22.84	66.00	56.00	36.26	33.16	N	
8	0.17257	14.10	8.60	0.06	13.18	27.34	21.84	64.84	54.84	37.50	33.00	N	
9	0.37000	9.70	5.20	0.06	13.21	22.97	18.47	58.50	48.50	35.53	30.03	N	
10	2.40406	3.90	-0.90	0.09	13.35	17.34	12.54	56.00	46.00	38.66	33.46	N	
11	15.10970	0.50	-4.10	0.30	13.76	14.56	9.96	60.00	50.00	45.44	40.04	N	
12	23.72090	1.00	-3.70	0.45	13.95	15.40	10.70	60.00	50.00	44.60	39.30	N	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
Except for the above table: adequate margin data below the limits.

Conducted Emission (BT2)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 15, 2022
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx BT LE 1M-PHY 2440 MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	17.30	10.30	0.06	13.18	30.54	23.54	66.00	56.00	35.46	32.46	L	
2	0.17856	14.00	8.60	0.05	13.19	27.24	21.84	64.55	54.55	37.31	32.71	L	
3	0.24365	11.90	7.10	0.05	13.19	25.14	20.34	61.97	51.97	36.83	31.63	L	
4	0.75382	6.80	2.40	0.06	13.24	20.10	15.70	56.00	46.00	35.90	30.30	L	
5	1.75520	4.20	0.20	0.07	13.31	17.58	13.58	56.00	46.00	38.42	32.42	L	
6	23.90128	1.10	-3.60	0.49	13.95	15.54	10.84	60.00	50.00	44.46	39.16	L	
7	0.15000	16.90	9.80	0.06	13.18	30.14	23.04	66.00	56.00	35.86	32.96	N	
8	0.16304	16.00	10.30	0.06	13.18	29.24	23.54	65.31	55.31	36.07	31.77	N	
9	0.24365	11.80	7.00	0.07	13.19	25.06	20.26	61.97	51.97	36.91	31.71	N	
10	0.75382	6.70	2.50	0.07	13.24	20.01	15.81	56.00	46.00	35.99	30.19	N	
11	1.75520	4.90	0.90	0.08	13.31	18.29	14.29	56.00	46.00	37.71	31.71	N	
12	23.90128	1.10	-3.60	0.45	13.95	15.50	10.80	60.00	50.00	44.50	39.20	N	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
Except for the above table: adequate margin data below the limits.

6 dB Bandwidth and 99 % Occupied Bandwidth
(WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2022
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kiyoshiro Okazaki
Mode	Tx

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
11b	2412	13938.8	8.629	> 0.5000
	2437	13945.7	9.032	> 0.5000
	2462	13929.1	8.994	> 0.5000
11g	2412	17053.1	14.410	> 0.5000
	2437	18923.2	15.077	> 0.5000
	2462	18890.9	16.332	> 0.5000
11n-20	2412	17827.4	15.125	> 0.5000
	2437	19067.2	17.558	> 0.5000
	2462	19069.4	17.562	> 0.5000
11ax-20 (OFDM)	2412	18843.3	18.627	> 0.5000
	2437	19173.9	18.837	> 0.5000
	2462	19096.1	18.931	> 0.5000

6 dB Bandwidth and 99 % Occupied Bandwidth
(WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	February 1, 2022
Temperature / Humidity	24 deg. C / 35 % RH
Engineer	Takafumi Noguchi
Mode	Tx

Mode	Frequency [MHz]	RU Type	RU Index	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
11ax-20 (OFDMA)	2412	26-tone RU	0	18269.9	2.018	> 0.5000
			4	17002.7	2.617	> 0.5000
			8	18279.6	2.042	> 0.5000
	2437		0	19568.0	2.102	> 0.5000
			4	17116.4	2.640	> 0.5000
			8	19490.3	2.100	> 0.5000
	2462		0	19641.7	2.058	> 0.5000
			4	17132.9	2.632	> 0.5000
			8	19643.5	2.069	> 0.5000
	2412	52-tone RU	37	18157.5	4.012	> 0.5000
			38	17012.2	4.043	> 0.5000
			40	18164.1	4.090	> 0.5000
	2437		37	19490.4	4.078	> 0.5000
			38	17205.9	4.024	> 0.5000
			40	19133.3	4.026	> 0.5000
	2462		37	19385.4	4.130	> 0.5000
			38	17249.8	4.006	> 0.5000
			40	19213.5	4.024	> 0.5000
	2412	106-tone RU	53	18269.3	8.359	> 0.5000
			54	18139.0	8.346	> 0.5000
	2437		53	19183.0	8.310	> 0.5000
			54	18910.4	8.328	> 0.5000
	2462		53	18823.6	8.345	> 0.5000
			54	18724.2	8.349	> 0.5000
	2412	242-tone RU		18882.8	18.562	> 0.5000
	2437			19532.2	18.572	> 0.5000
	2462			19545.4	18.997	> 0.5000

6 dB Bandwidth and 99 % Occupied Bandwidth (BT1 / BT2)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 31, 2022
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kiyoshiro Okazaki
Mode	Tx BT LE

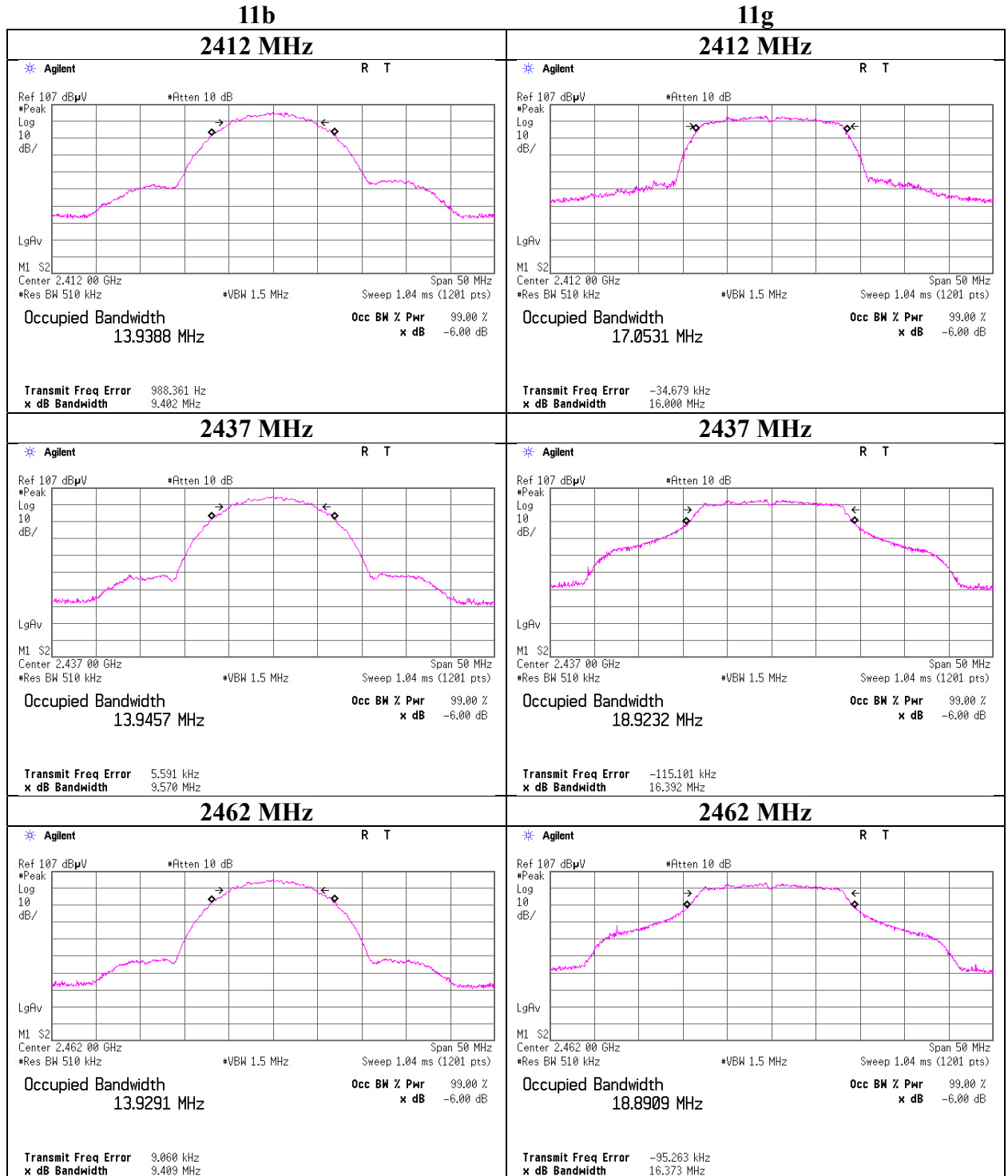
BT1

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
1M-PHY	2402	1039.1	0.673	> 0.5000
	2440	1037.9	0.667	> 0.5000
	2480	1039.1	0.670	> 0.5000
2M-PHY	2402	2070.0	1.195	> 0.5000
	2440	2069.9	1.186	> 0.5000
	2480	2071.4	1.184	> 0.5000

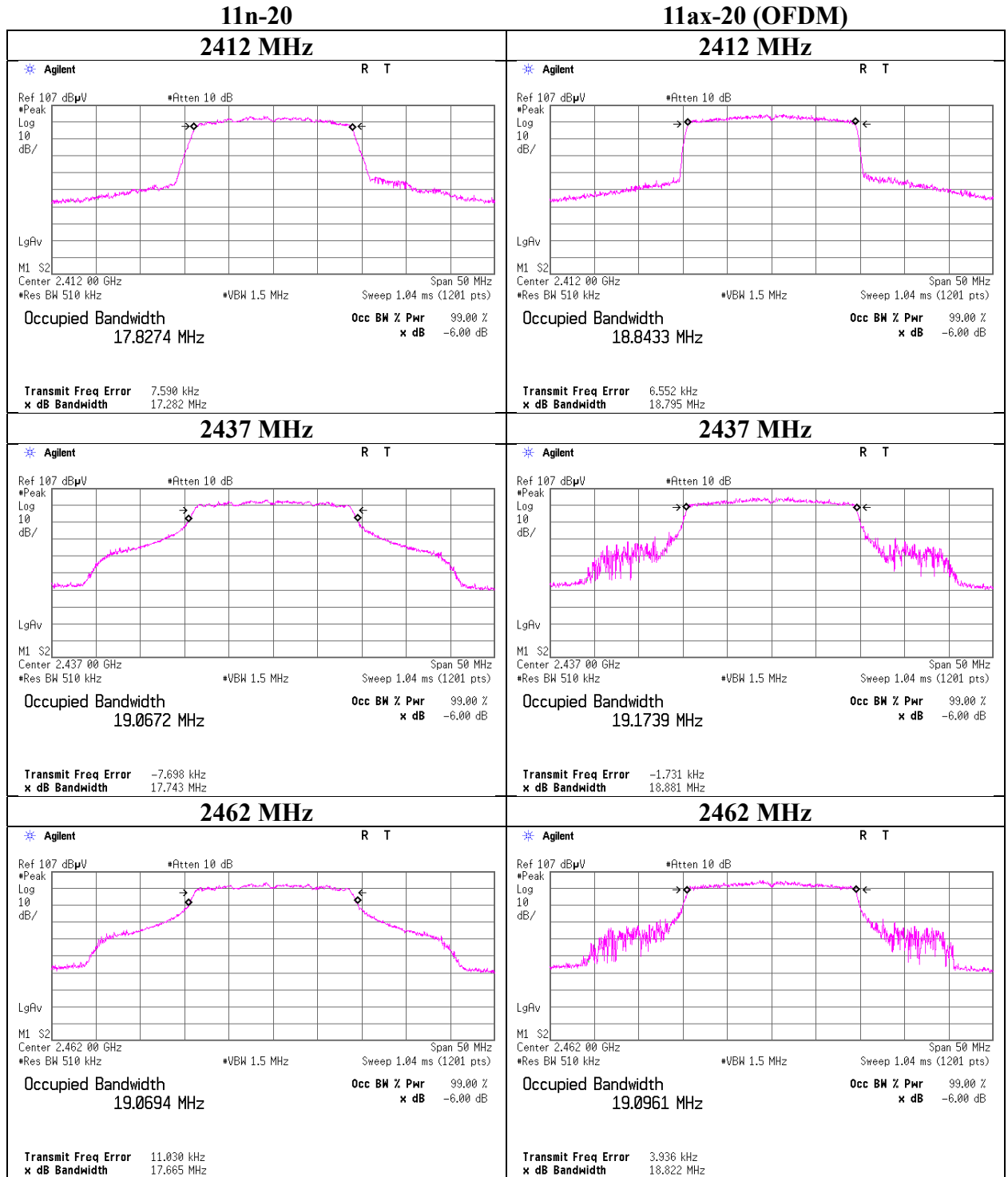
BT2

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
1M-PHY	2402	1038.8	0.656	> 0.5000
	2440	1039.5	0.667	> 0.5000
	2480	1040.1	0.662	> 0.5000
2M-PHY	2402	2071.8	1.194	> 0.5000
	2440	2072.1	1.188	> 0.5000
	2480	2071.4	1.191	> 0.5000

99 % Occupied Bandwidth (WLAN)



99 % Occupied Bandwidth (WLAN)

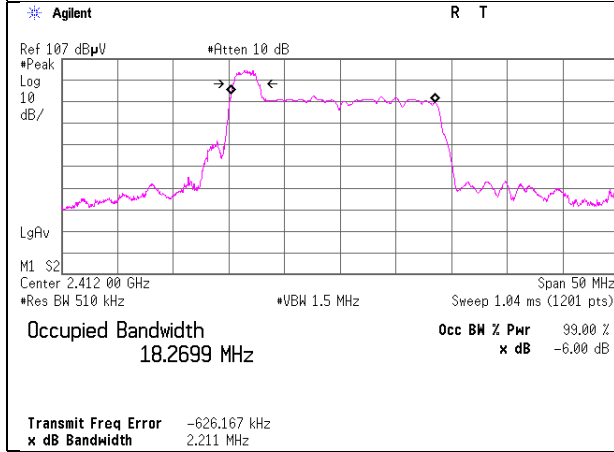


99 % Occupied Bandwidth (WLAN)

11ax-20 26-tone RU

2412 MHz

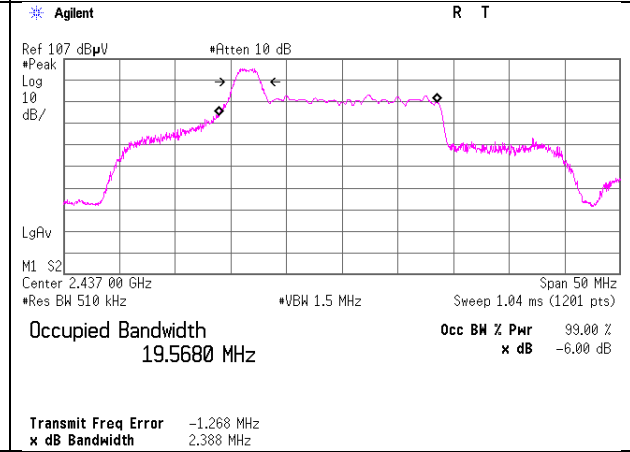
RU Index 0



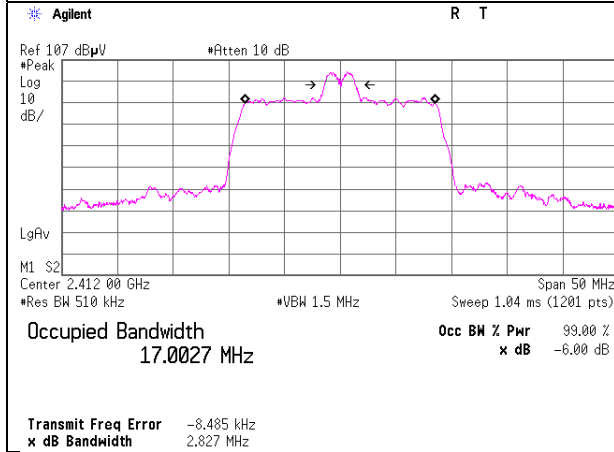
11ax-20 26-tone RU

2437 MHz

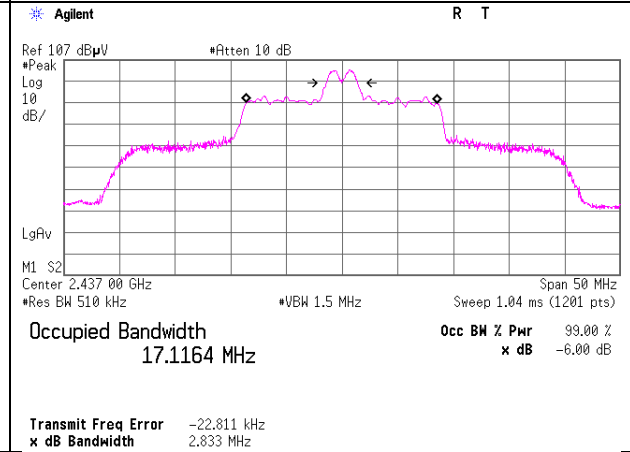
RU Index 0



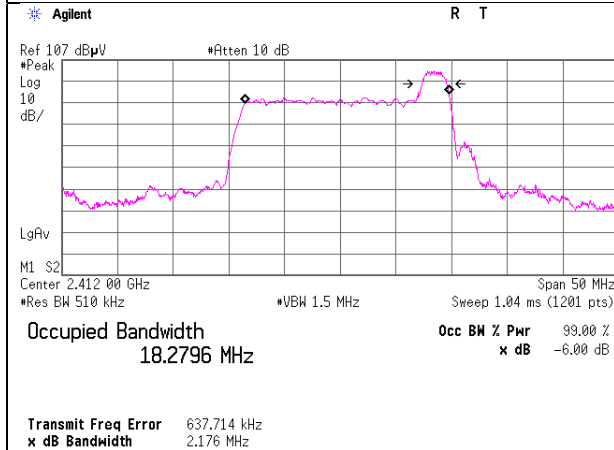
RU Index 4



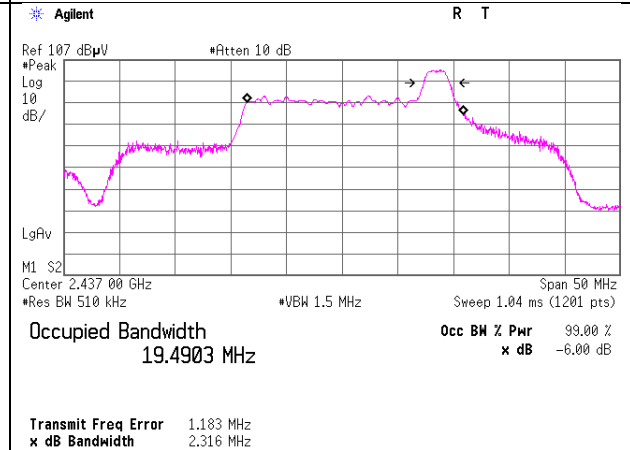
RU Index 4



RU Index 8



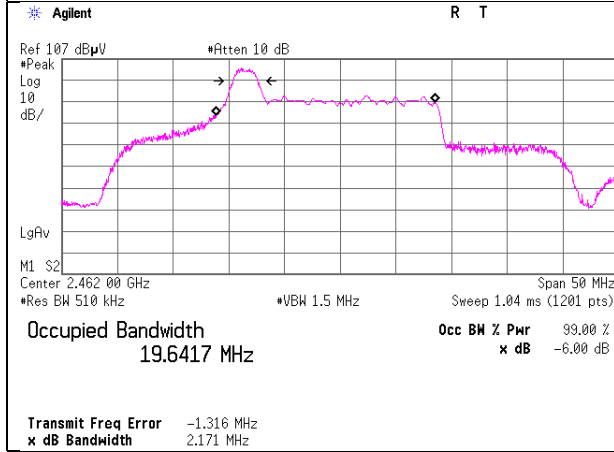
RU Index 8



99 % Occupied Bandwidth (WLAN)

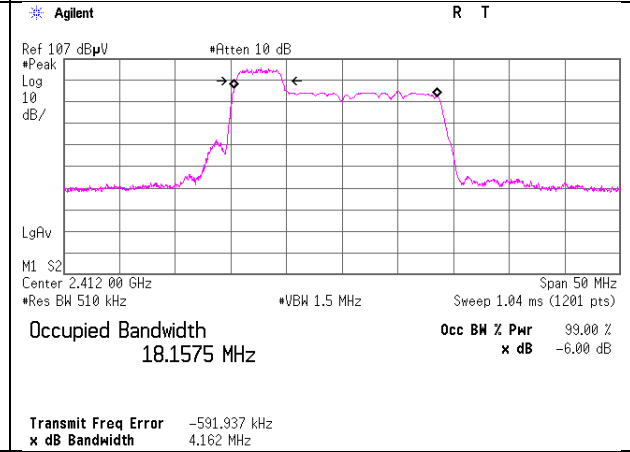
11ax-20 26-tone RU

2462 MHz RU Index 0

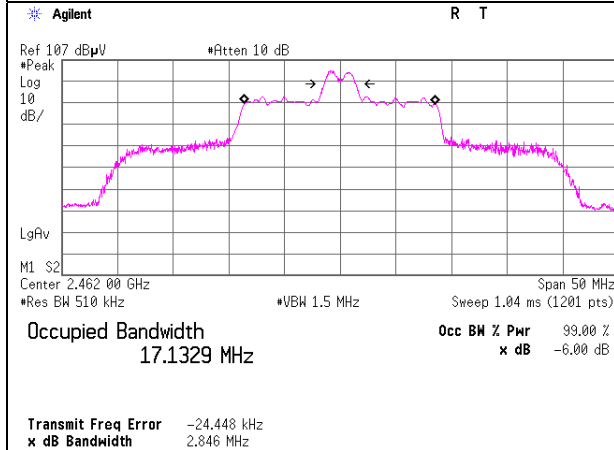


11ax-20 52-tone RU

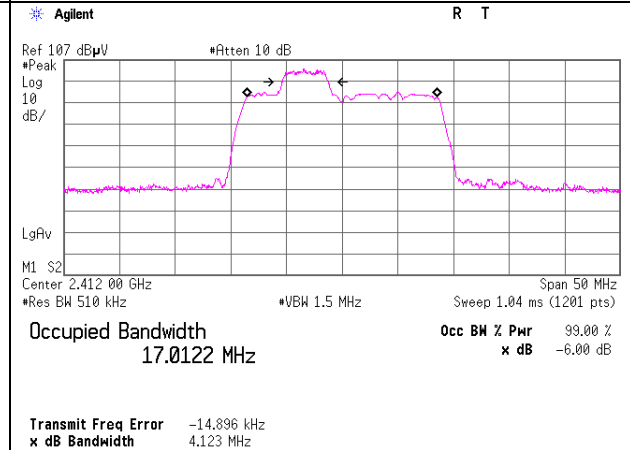
2412 MHz RU Index 37



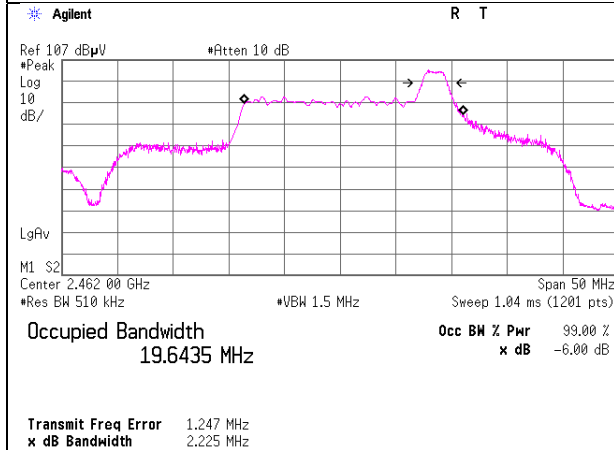
RU Index 4



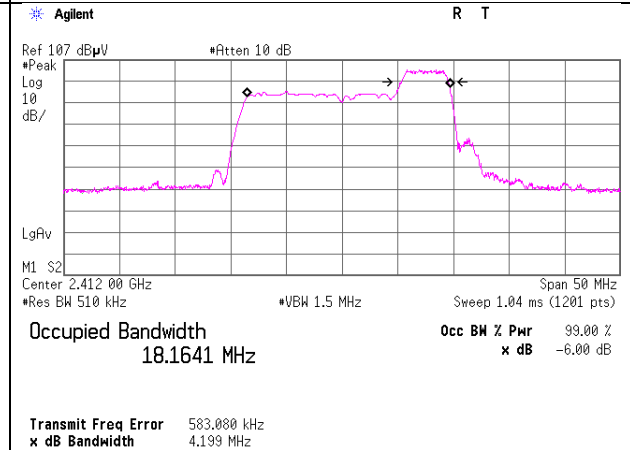
RU Index 38



RU Index 8



RU Index 40

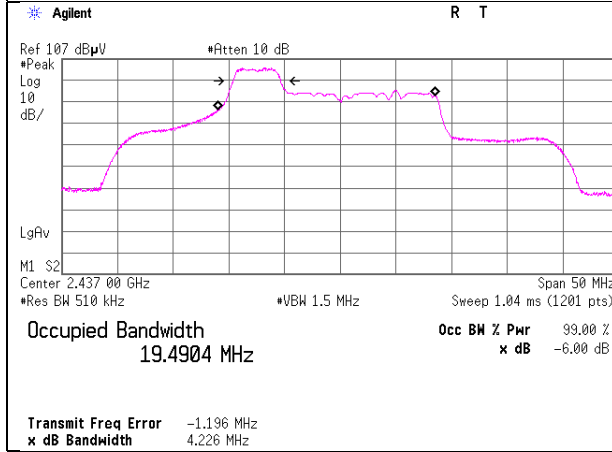


99 % Occupied Bandwidth (WLAN)

11ax-20
52-tone RU

2437 MHz

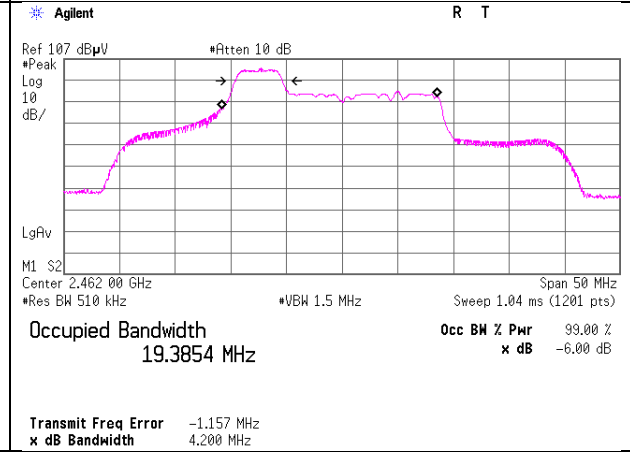
RU Index 37



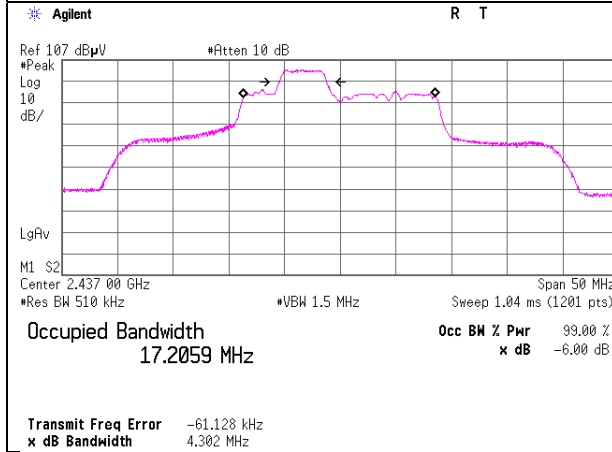
11ax-20
52-tone RU

2462 MHz

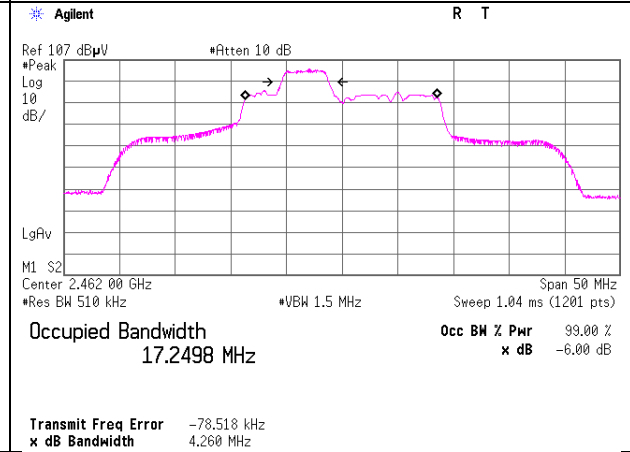
RU Index 37



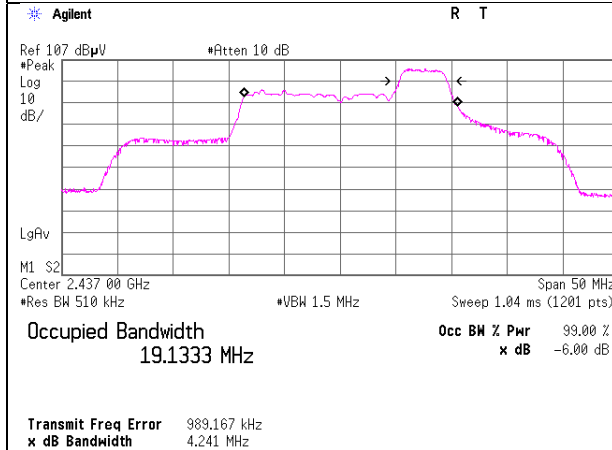
RU Index 38



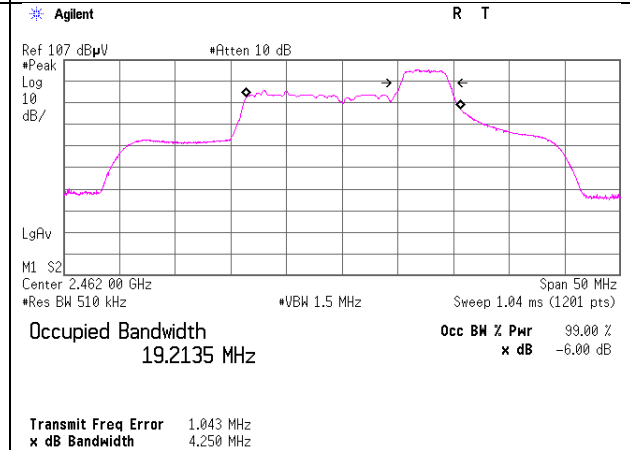
RU Index 38



RU Index 40

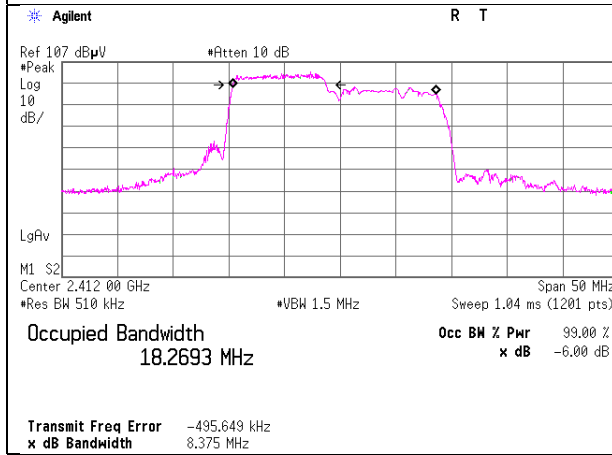


RU Index 40

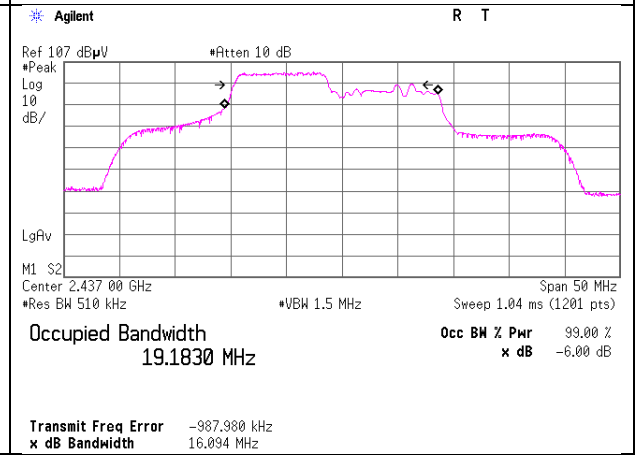


99 % Occupied Bandwidth
(WLAN)

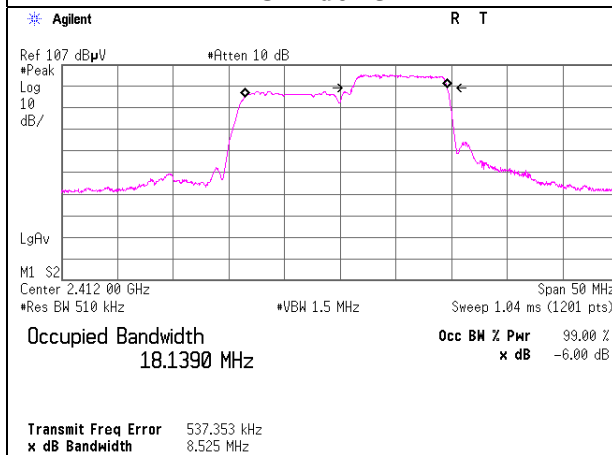
11ax-20
106-tone RU
2412 MHz
RU Index 53



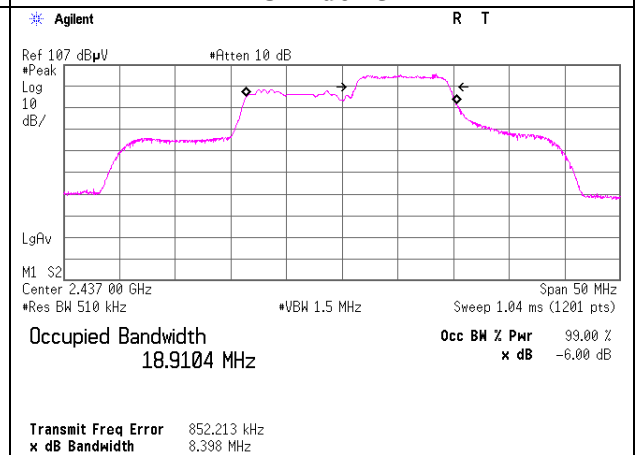
11ax-20
106-tone RU
2437 MHz
RU Index 53



RU Index 54

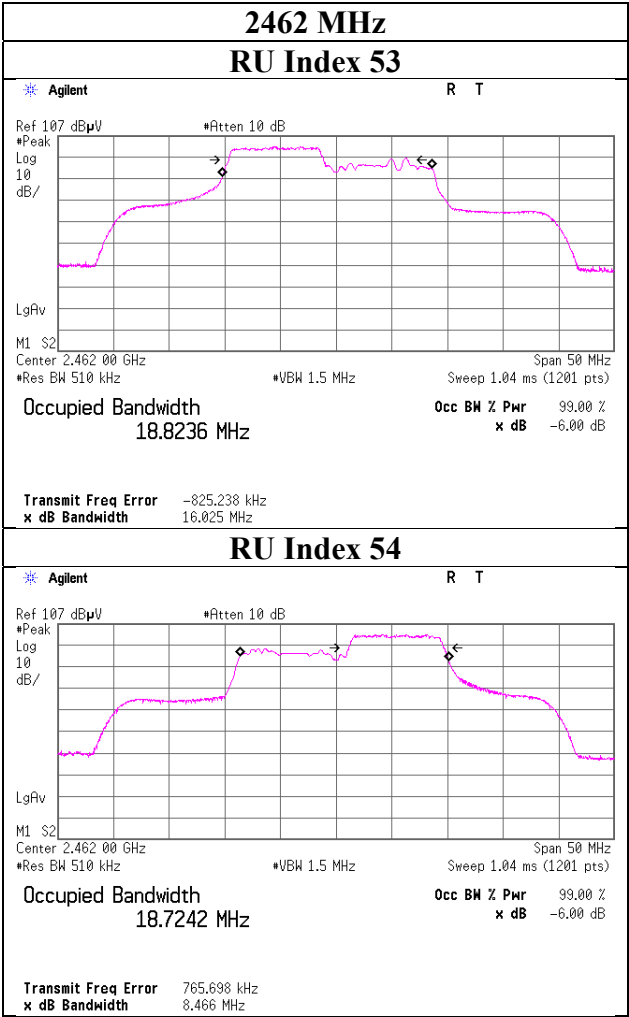


RU Index 54



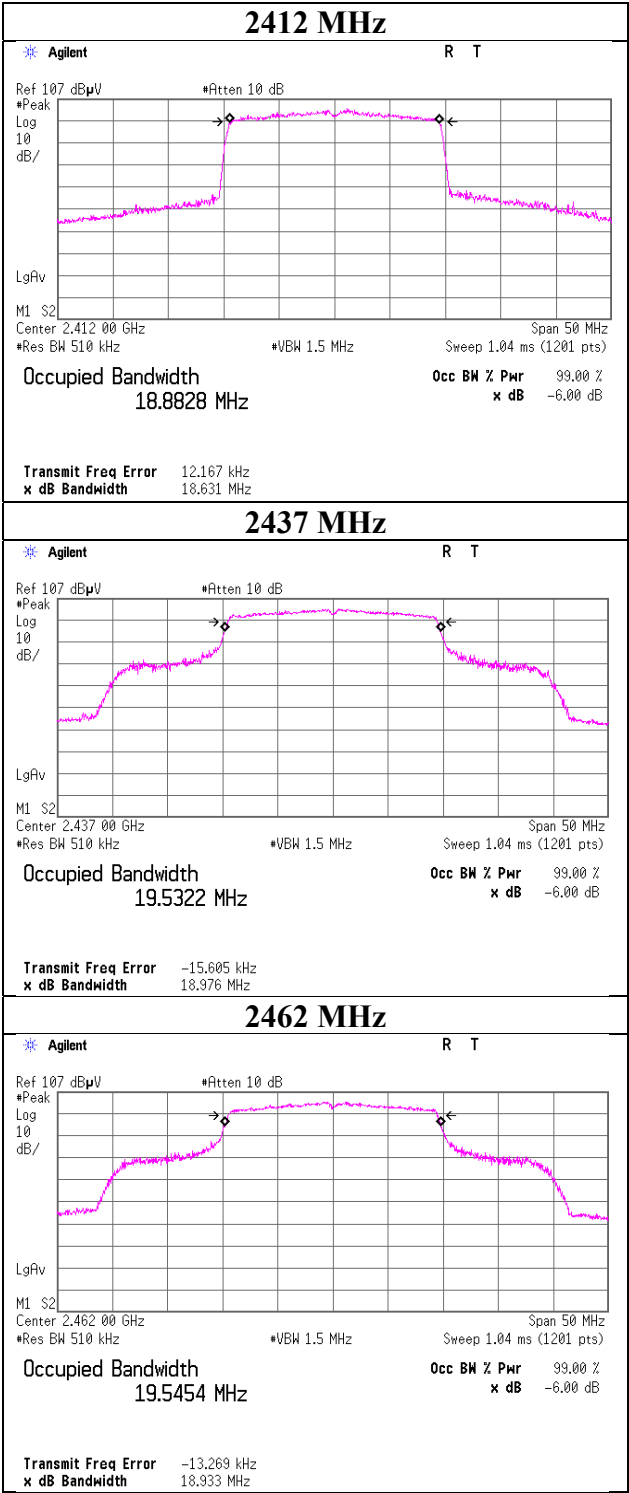
99 % Occupied Bandwidth
(WLAN)

11ax-20
106-tone RU



99 % Occupied Bandwidth
(WLAN)

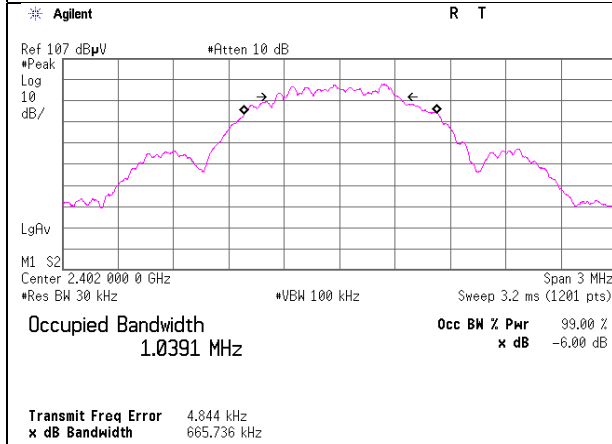
11ax-20
242-tone RU
2412 MHz



99 % Occupied Bandwidth
(BT1)

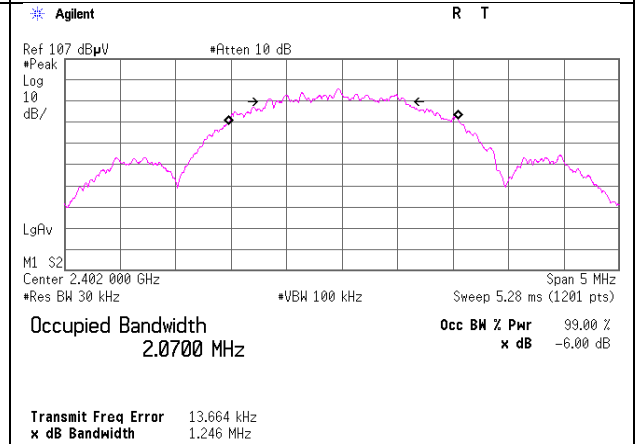
BT LE 1M-PHY

2402 MHz

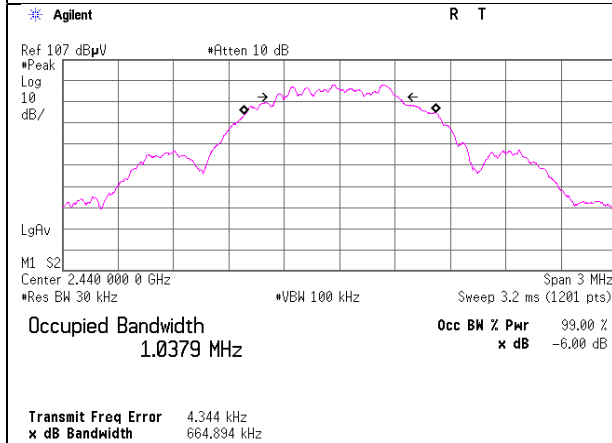


BT LE 2M-PHY

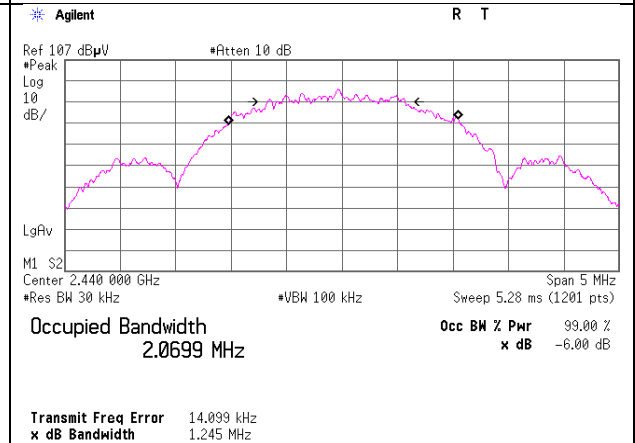
2402 MHz



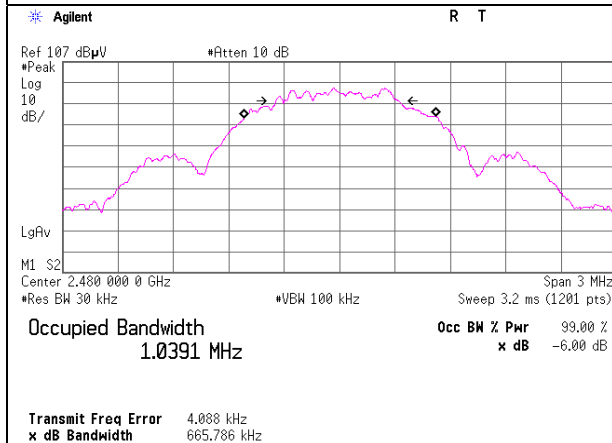
2440 MHz



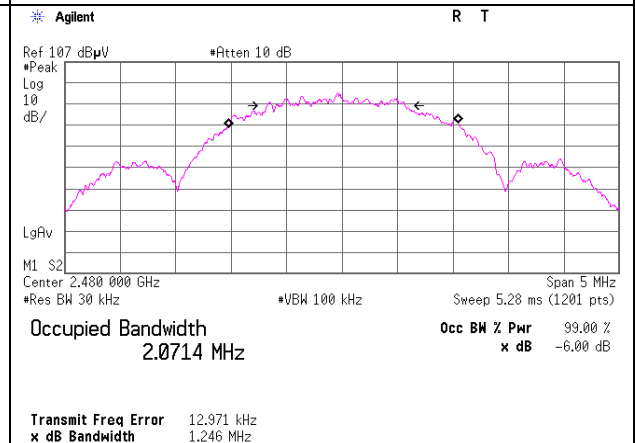
2440 MHz



2480 MHz

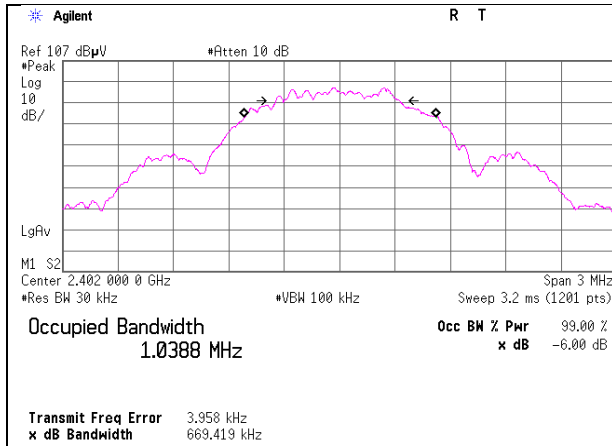


2480 MHz

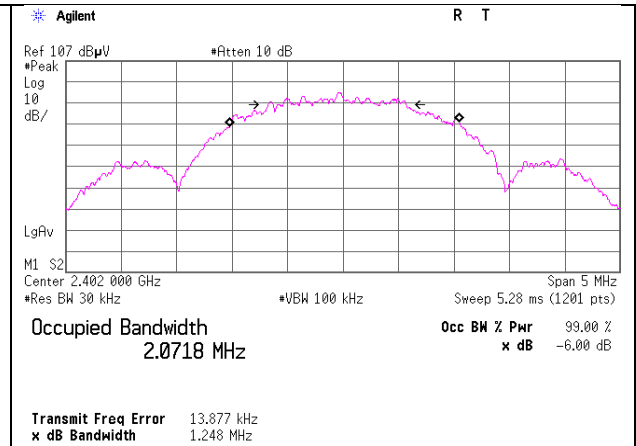


99 % Occupied Bandwidth
(BT2)

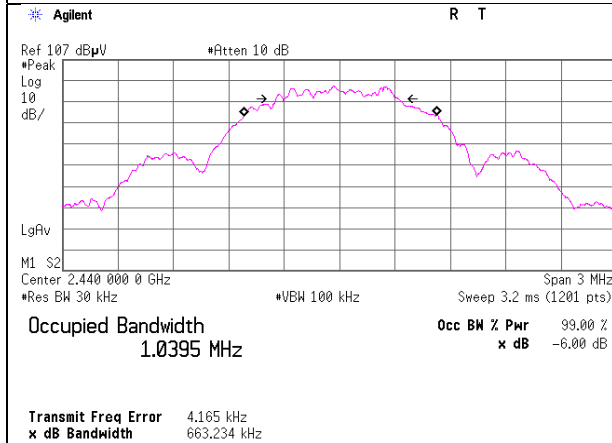
BT LE 1M-PHY
2402 MHz



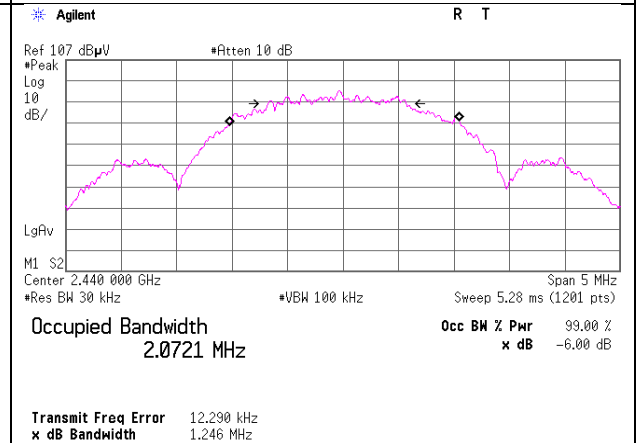
BT LE 2M-PHY
2402 MHz



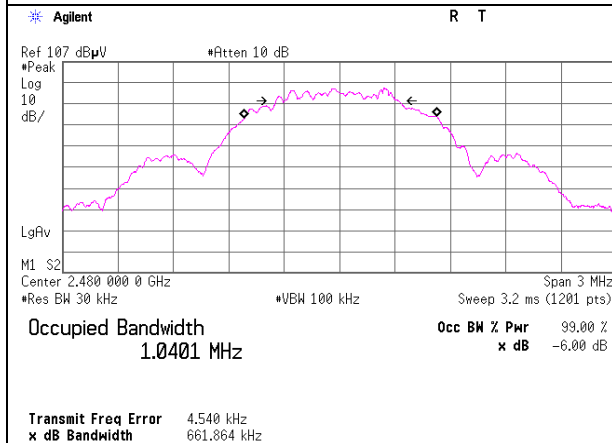
2440 MHz



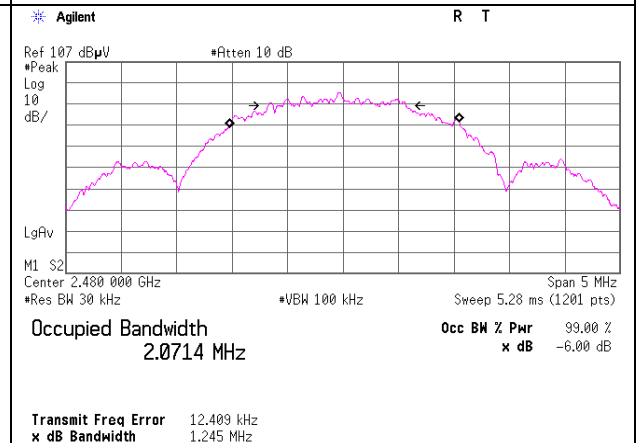
2440 MHz



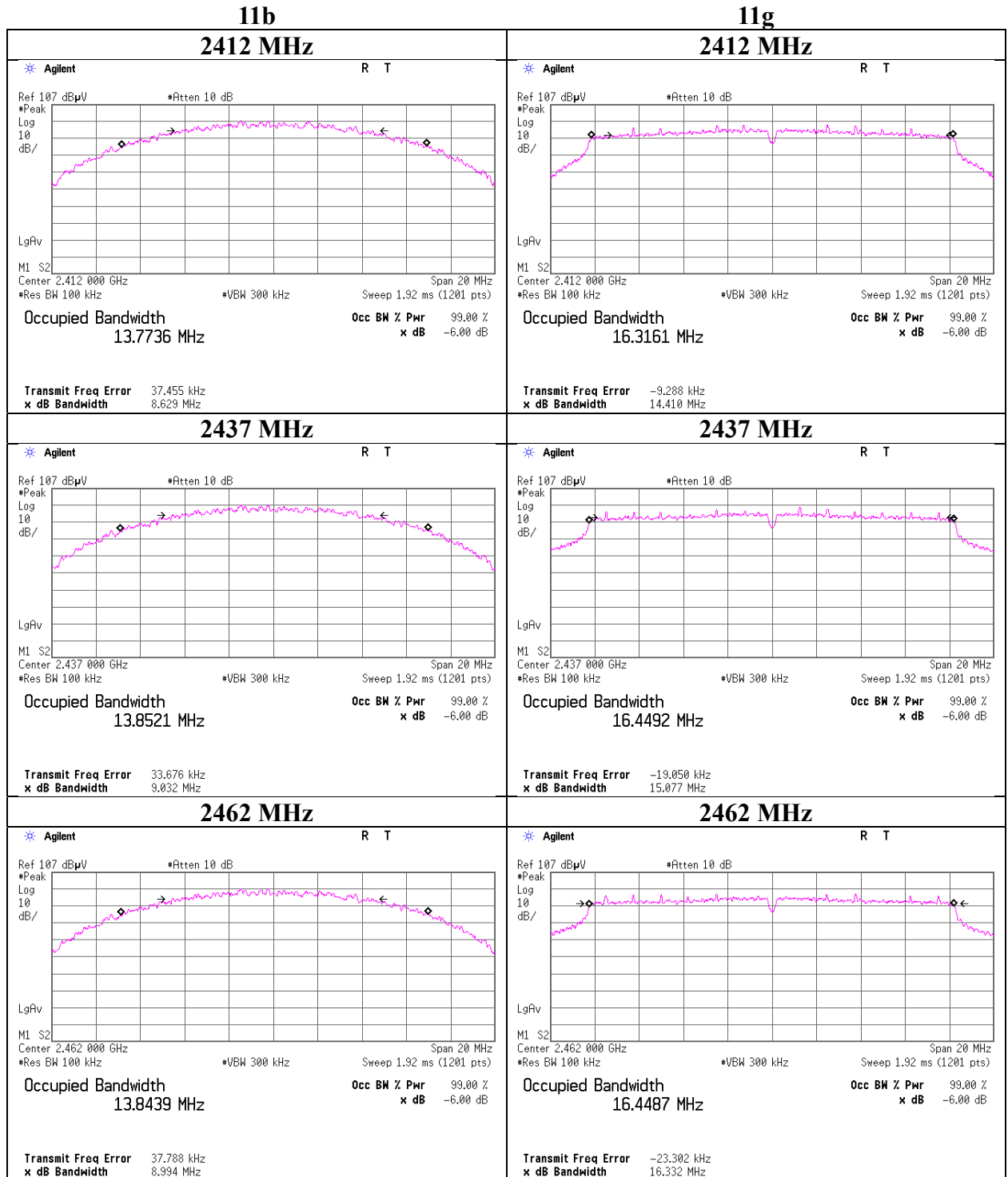
2480 MHz



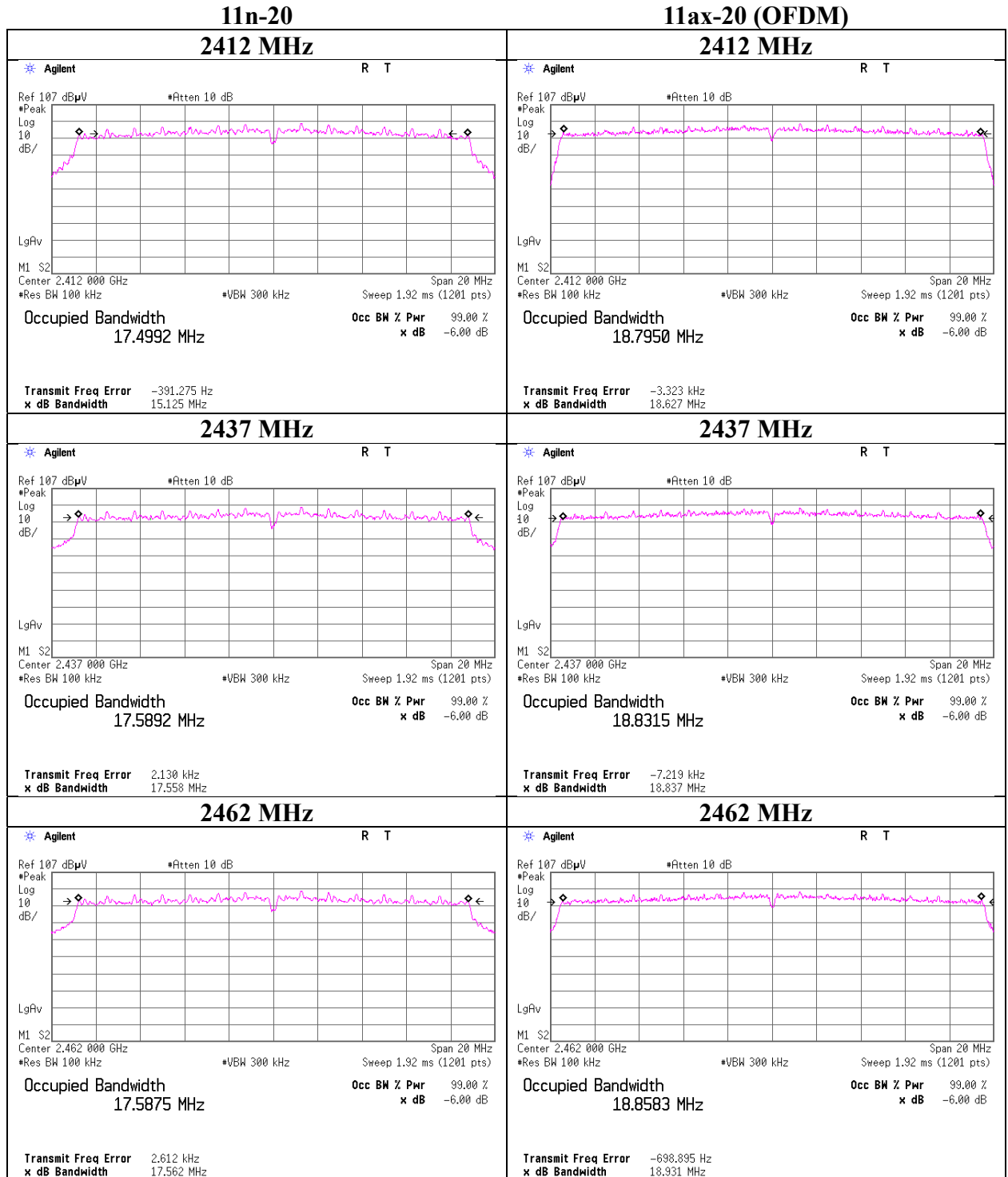
2480 MHz



6 dB Bandwidth
(WLAN)



6 dB Bandwidth
(WLAN)

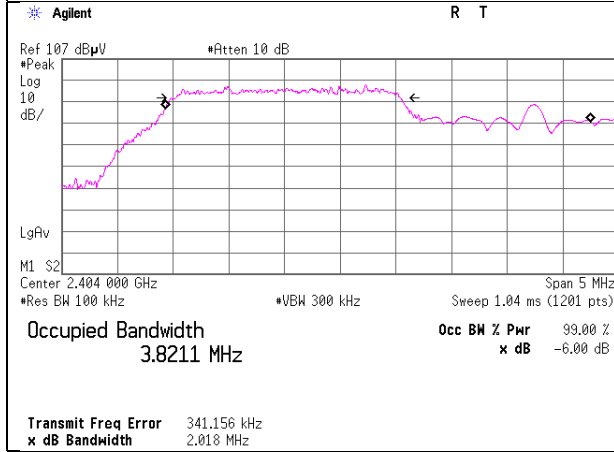


**6 dB Bandwidth
(WLAN)**

**11ax-20
26-tone RU**

2412 MHz

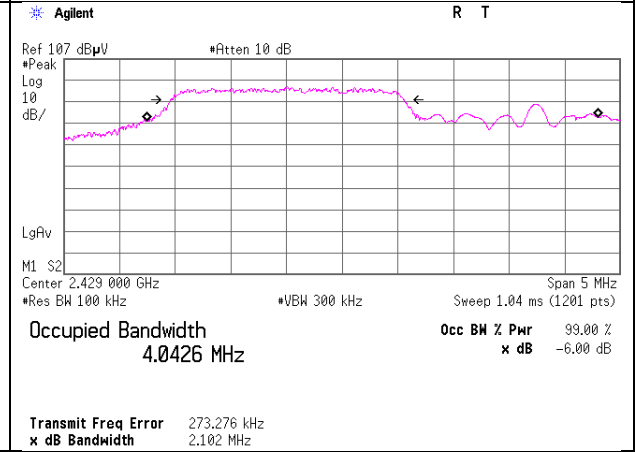
RU Index 0



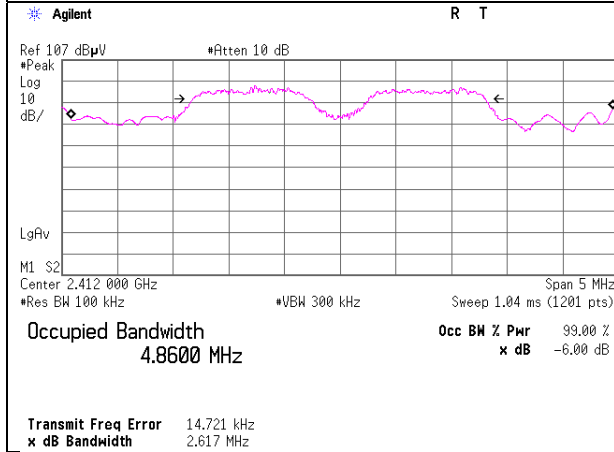
**11ax-20
26-tone RU**

2437 MHz

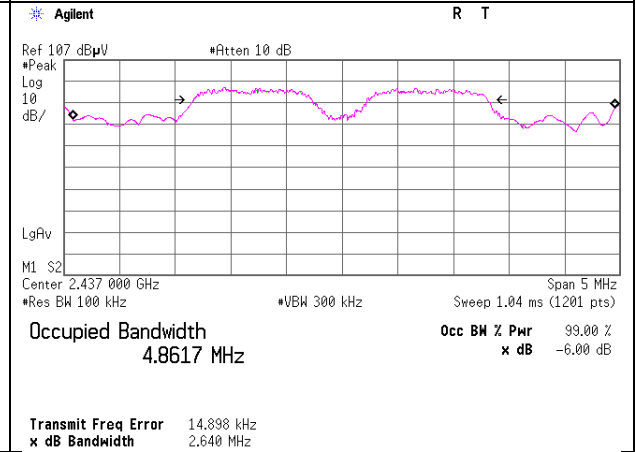
RU Index 0



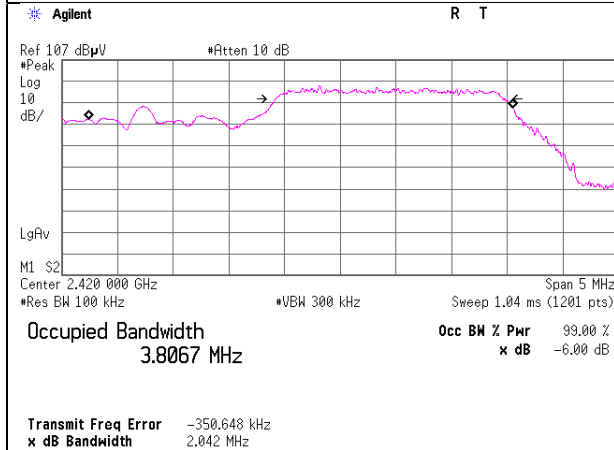
RU Index 4



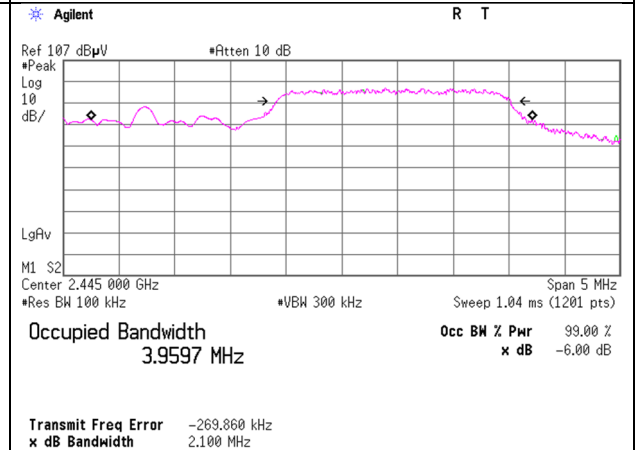
RU Index 4



RU Index 8



RU Index 8



6 dB Bandwidth (WLAN)

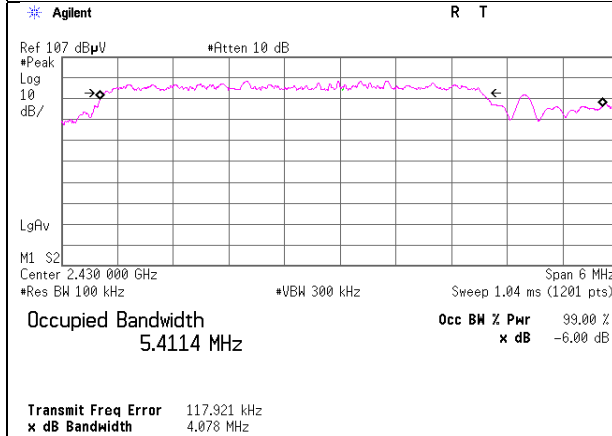
11ax-20 26-tone RU 2462 MHz RU Index 0	11ax-20 52-tone RU 2412 MHz RU Index 37
Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.454 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 5 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 4.0431 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 270.535 kHz x dB Bandwidth 2.058 MHz	Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.405 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 6 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 5.3645 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 138.933 kHz x dB Bandwidth 4.012 MHz
RU Index 4 Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.462 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 5 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 4.8602 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 15.737 kHz x dB Bandwidth 2.632 MHz	RU Index 38 Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.409 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 6 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 5.3801 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -65.732 kHz x dB Bandwidth 4.043 MHz
RU Index 8 Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.470 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 5 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 3.9611 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -267.339 kHz x dB Bandwidth 2.069 MHz	RU Index 40 Agilent R T Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.419 000 GHz #Res BW 100 kHz #VBW 300 kHz Span 6 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 5.2611 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -118.042 kHz x dB Bandwidth 4.090 MHz

6 dB Bandwidth
(WLAN)

**11ax-20
52-tone RU**

2437 MHz

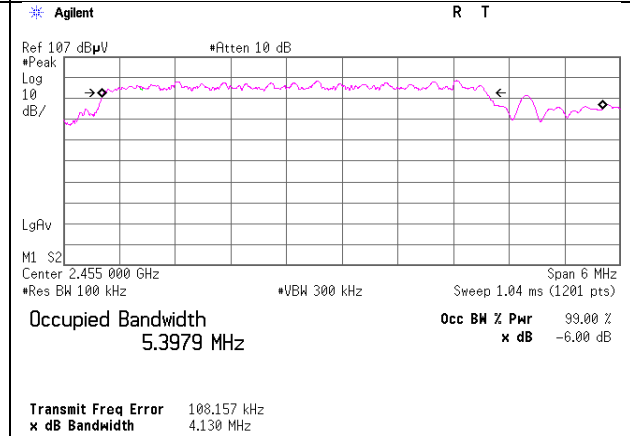
RU Index 37



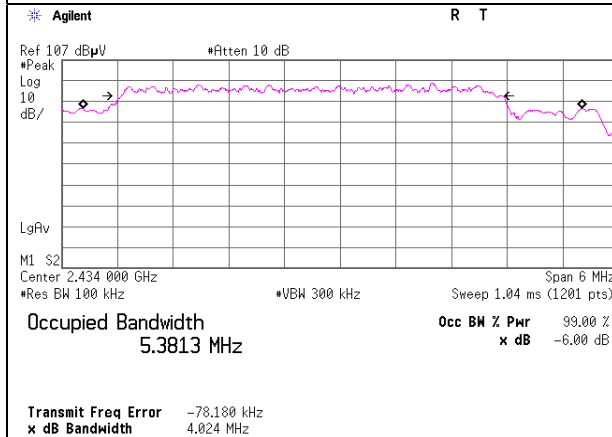
**11ax-20
52-tone RU**

2462 MHz

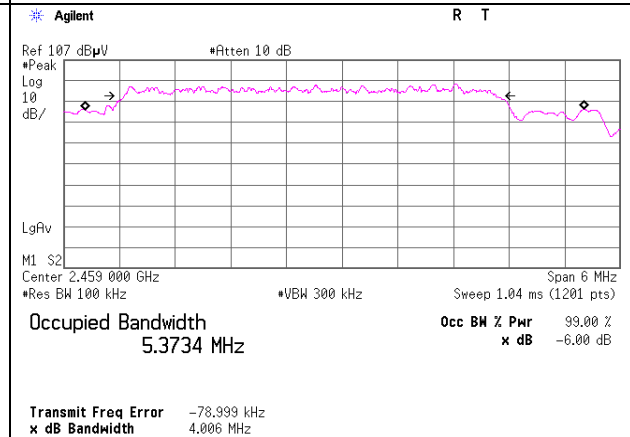
RU Index 37



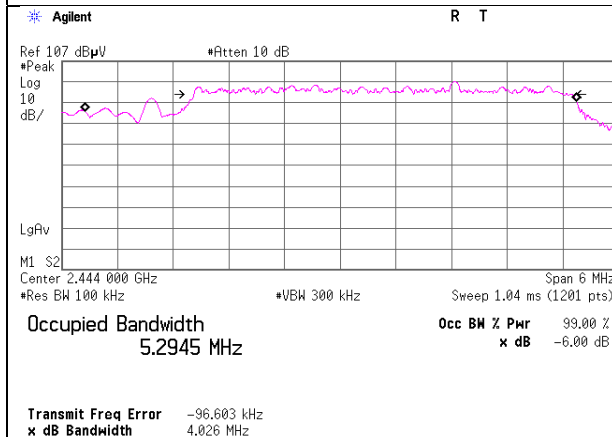
RU Index 38



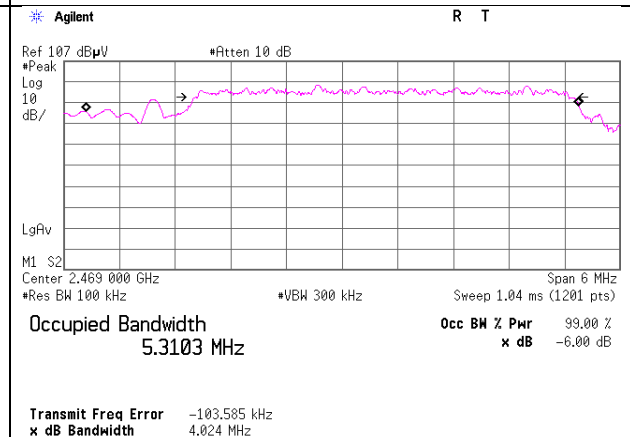
RU Index 38



RU Index 40



RU Index 40

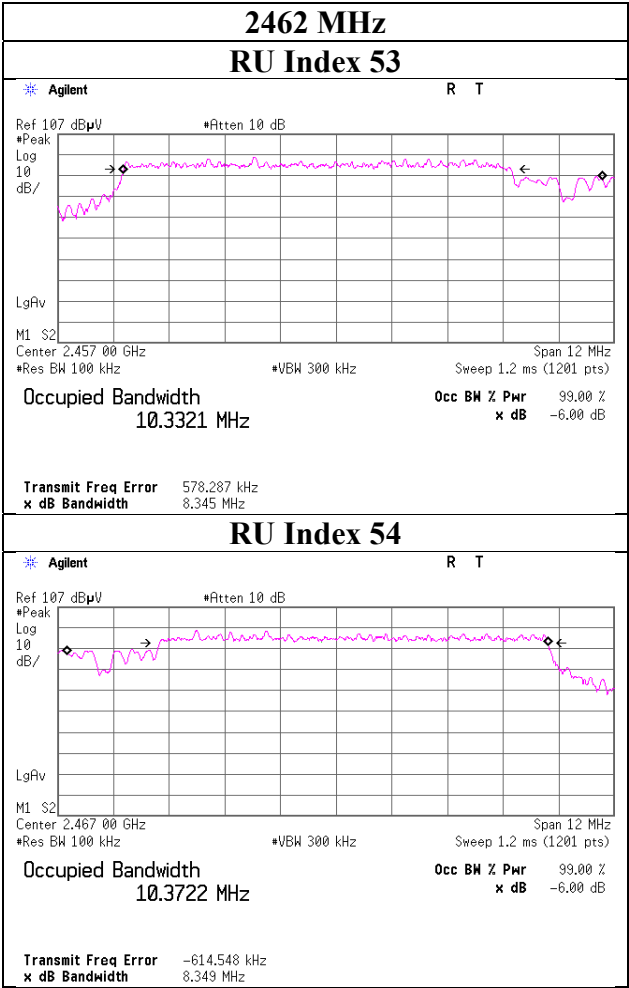


6 dB Bandwidth
(WLAN)

11ax-20 106-tone RU 2412 MHz RU Index 53	11ax-20 106-tone RU 2437 MHz RU Index 53
Agilent R T Ref 107 dBμV *Atten 10 dB *Peak Log 10 dB/ M1 S2 Center 2.407 00 GHz *Res BW 100 kHz Span 12 MHz Sweep 1.2 ms (1201 pts) Occupied Bandwidth 10.2893 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 597.939 kHz x dB Bandwidth 8.359 MHz	Agilent R T Ref 107 dBμV *Atten 10 dB *Peak Log 10 dB/ M1 S2 Center 2.432 00 GHz *Res BW 100 kHz Span 12 MHz Sweep 1.2 ms (1201 pts) Occupied Bandwidth 10.3245 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 581.327 kHz x dB Bandwidth 8.310 MHz
RU Index 54	RU Index 54
Agilent R T Ref 107 dBμV *Atten 10 dB *Peak Log 10 dB/ M1 S2 Center 2.417 00 GHz *Res BW 100 kHz Span 12 MHz Sweep 1.2 ms (1201 pts) Occupied Bandwidth 10.2599 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -609.496 kHz x dB Bandwidth 8.346 MHz	Agilent R T Ref 107 dBμV *Atten 10 dB *Peak Log 10 dB/ M1 S2 Center 2.442 00 GHz *Res BW 100 kHz Span 12 MHz Sweep 1.2 ms (1201 pts) Occupied Bandwidth 10.3541 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -603.428 kHz x dB Bandwidth 8.328 MHz

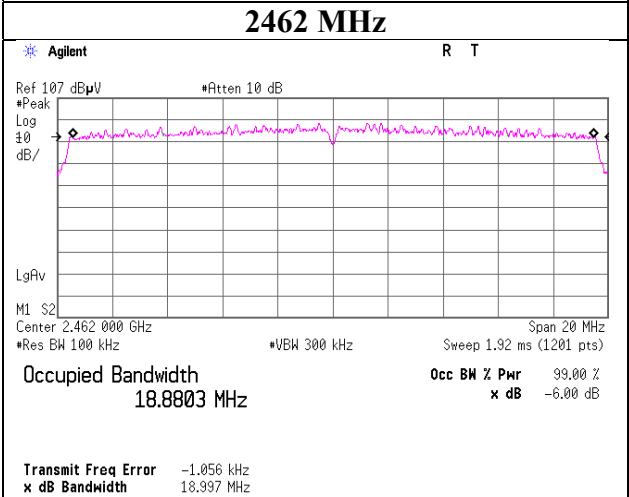
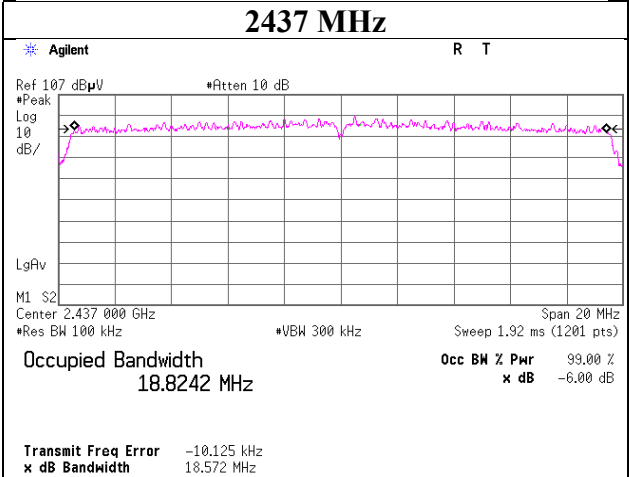
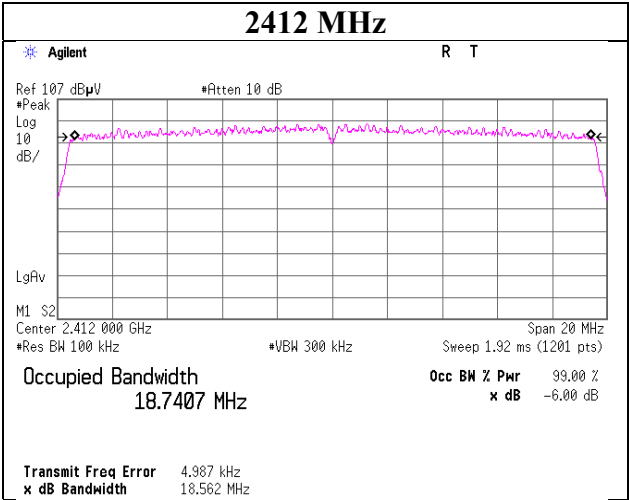
6 dB Bandwidth
(WLAN)

11ax-20
106-tone RU



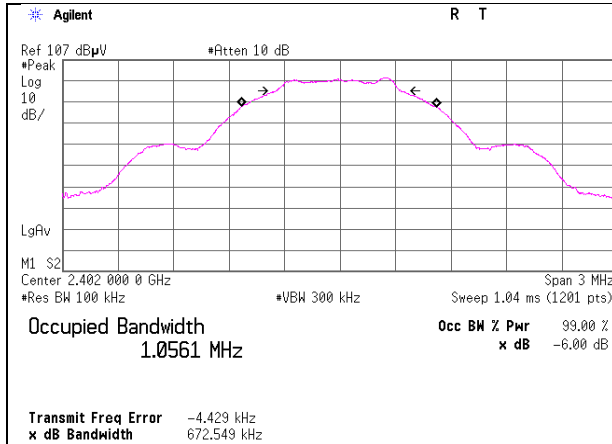
6 dB Bandwidth
(WLAN)

11ax-20
242-tone RU
2412 MHz

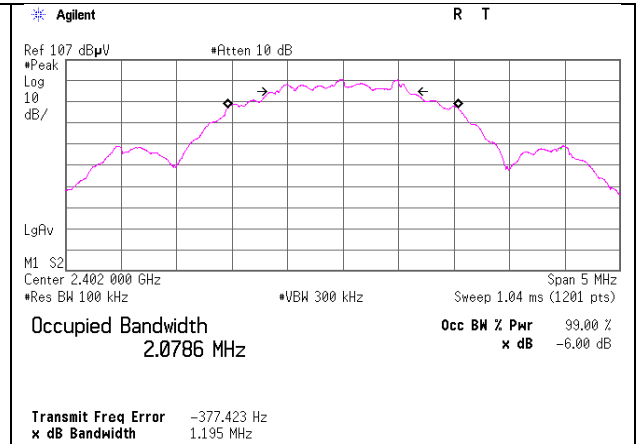


6 dB Bandwidth (BT1)

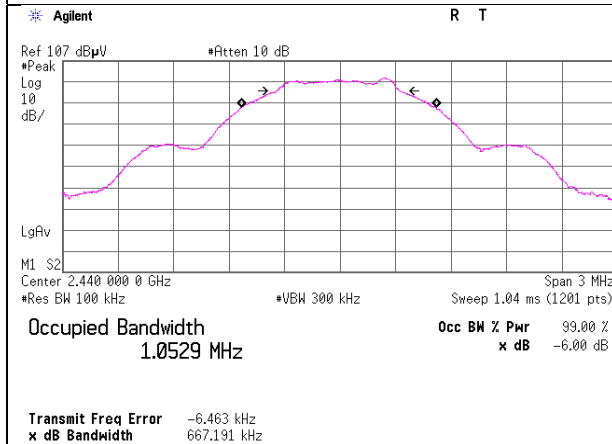
BT LE 1M-PHY 2402 MHz



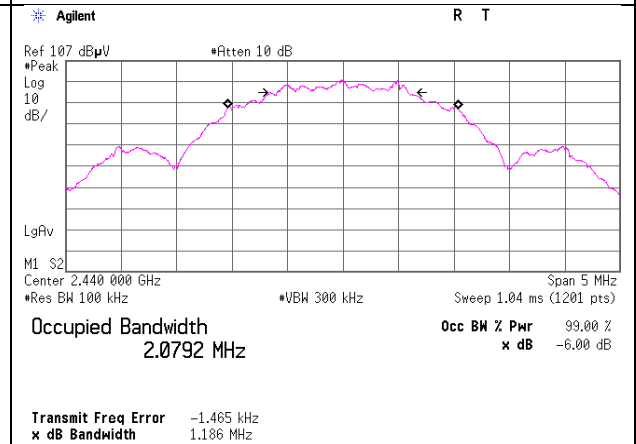
BT LE 2M-PHY 2402 MHz



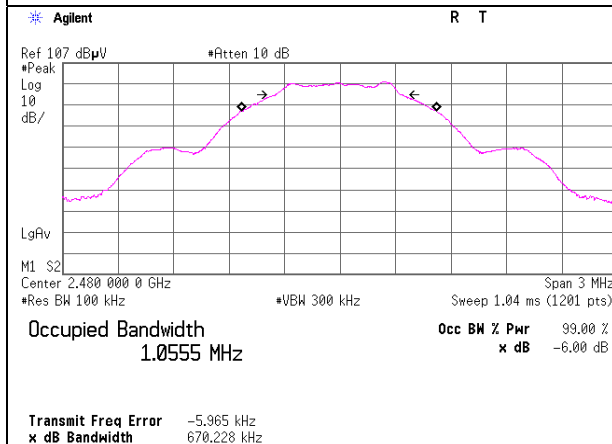
2440 MHz



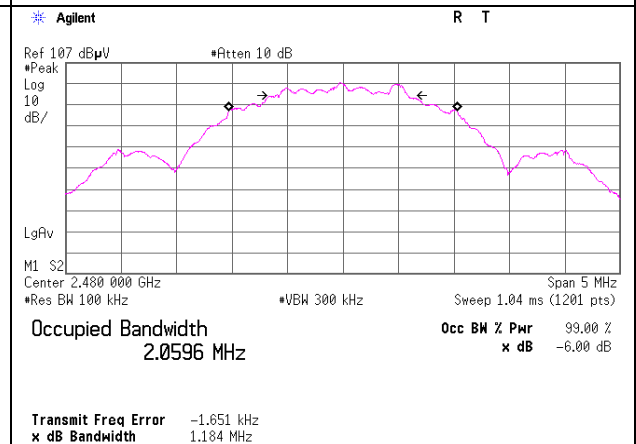
2440 MHz



2480 MHz



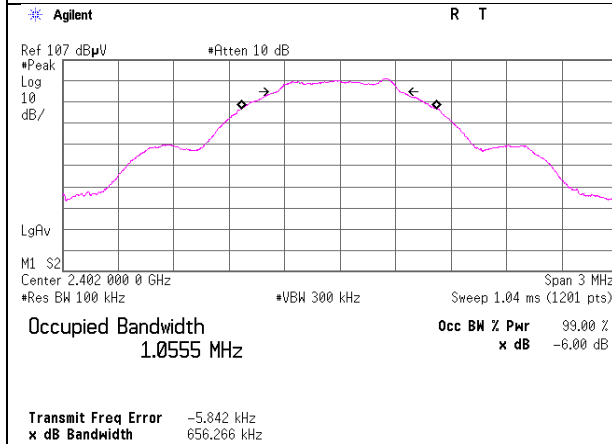
2480 MHz



6 dB Bandwidth (BT2)

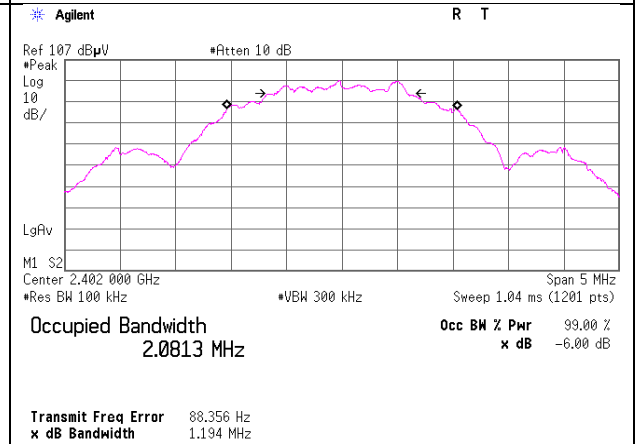
BT LE 1M-PHY

2402 MHz

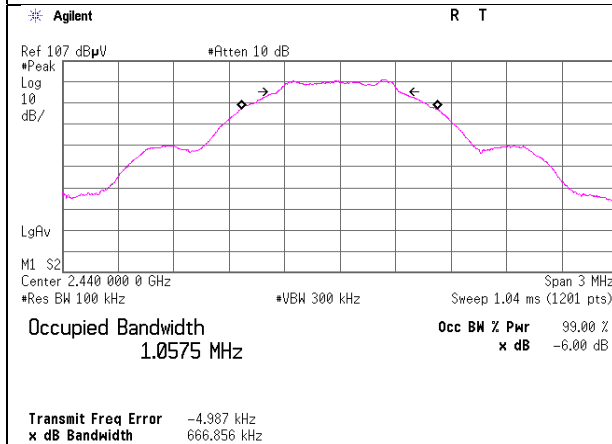


BT LE 2M-PHY

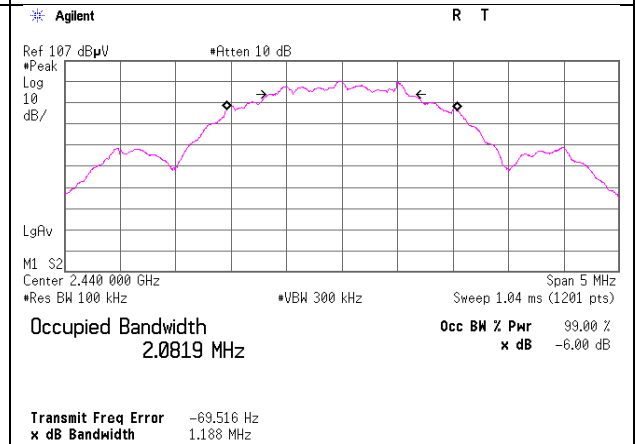
2402 MHz



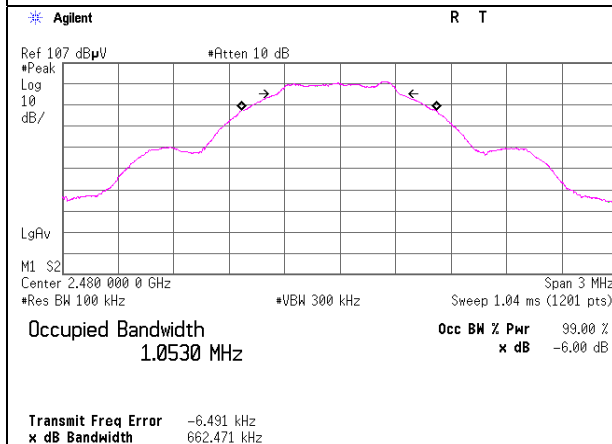
2440 MHz



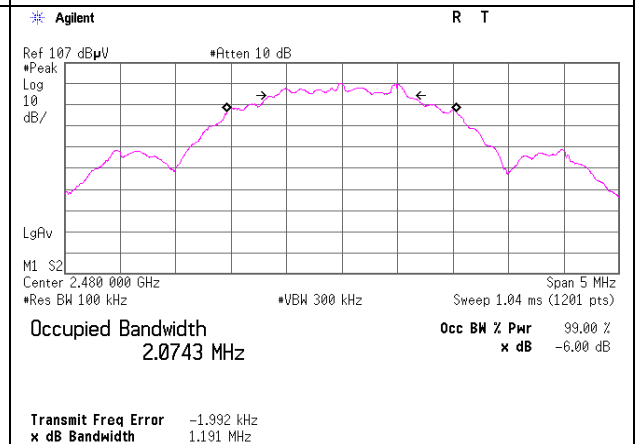
2440 MHz



2480 MHz



2480 MHz



Maximum Peak Output Power (WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 19, 2022
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Ken Fujita
Mode	Tx 11b

Antenna 1 + Antenna 2			Conducted Power					e.i.r.p.					
Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	13.24	12.88	14.17	26.13	27.99	630	13.82	8.01	22.18	165.22	36.02	4000.00	13.84
2437	13.00	12.16	14.01	25.16	27.99	630	13.98	8.01	22.02	159.14	36.02	4000.00	14.00
2462	11.80	12.05	13.78	23.85	27.99	630	14.21	8.01	21.79	150.85	36.02	4000.00	14.24

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	0.58	0.60	10.04	11.22	13.24
2437	0.50	0.60	10.04	11.14	13.00
2462	0.08	0.60	10.04	10.72	11.80

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	0.54	0.52	10.04	11.10	12.88
2437	0.29	0.52	10.04	10.85	12.16
2462	0.25	0.52	10.04	10.81	12.05

Sample Calculation:

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

2412MHz

Rate [Mbps]	Antenna 1 Reading Peak		Antenna 2 Reading Peak		Total Reading Power		Remark
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
1	0.41	1.10	0.37	1.09	3.40	2.19	
2	0.52	1.13	0.51	1.12	3.53	2.25	
5.5	0.52	1.13	0.49	1.12	3.52	2.25	
11	0.58	1.14	0.54	1.13	3.57	2.28	*

*Worst Rate

Maximum Peak Output Power (WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 19, 2022
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Ken Fujita
Mode	Tx 11g

Antenna 1 + Antenna 2			Conducted Power				e.i.r.p.						
Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	91.20	96.38	22.73	187.58	27.99	630	5.26	8.01	30.74	1186.30	36.02	4000.00	5.28
2437	89.85	95.50	22.68	185.35	27.99	630	5.31	8.01	30.69	1172.15	36.02	4000.00	5.33
2462	87.02	95.06	22.60	182.08	27.99	630	5.39	8.01	30.61	1151.47	36.02	4000.00	5.41

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	8.96	0.60	10.04	19.60	91.20
2437	8.90	0.60	10.04	19.54	89.85
2462	8.76	0.60	10.04	19.40	87.02

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	9.28	0.52	10.04	19.84	96.38
2437	9.24	0.52	10.04	19.80	95.50
2462	9.22	0.52	10.04	19.78	95.06

Sample Calculation:

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

2412MHz

Rate [Mbps]	Antenna 1 Reading Peak		Antenna 2 Reading Peak		Total Reading Power		Remark
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
6	8.96	7.87	9.20	8.32	12.09	16.18	*
9	8.20	6.61	8.29	6.75	11.26	13.36	
12	8.22	6.64	8.17	6.56	11.21	13.20	
18	8.13	6.50	8.02	6.34	11.09	12.84	
24	8.91	7.78	8.75	7.50	11.84	15.29	
36	8.80	7.58	8.76	7.52	11.79	15.10	
48	8.66	7.34	8.78	7.55	11.73	14.89	
54	8.51	7.10	8.85	7.68	11.70	14.77	

*Worst Rate

Maximum Peak Output Power (WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 19, 2022
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Ken Fujita
Mode	Tx 11n-20

Antenna 1 + Antenna 2			Conducted Power					e.i.r.p.					
Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	96.61	95.50	22.84	192.10	27.99	630	5.15	8.01	30.85	1214.89	36.02	4000.00	5.18
2437	92.26	89.35	22.59	181.61	27.99	630	5.40	8.01	30.60	1148.51	36.02	4000.00	5.42
2462	91.83	96.89	22.76	188.73	27.99	630	5.23	8.01	30.77	1193.54	36.02	4000.00	5.25

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	9.21	0.60	10.04	19.85	96.61
2437	9.01	0.60	10.04	19.65	92.26
2462	8.99	0.60	10.04	19.63	91.83

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	9.24	0.52	10.04	19.80	95.50
2437	8.95	0.52	10.04	19.51	89.35
2462	9.30	0.52	10.04	19.86	96.89

Sample Calculation:

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

2412MHz

MCS Number	Antenna 1 Reading Peak		Antenna 2 Reading Peak		Total Reading Power		Remark
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	8.80	7.58	8.82	7.62	11.82	15.20	
1	8.48	7.05	8.48	7.05	11.49	14.10	
2	8.36	6.86	8.53	7.13	11.46	13.99	
3	7.65	5.83	7.78	6.00	10.73	11.82	
4	7.53	5.66	7.63	5.79	10.59	11.46	
5	8.14	6.52	8.19	6.59	11.18	13.11	
6	8.46	7.02	9.55	9.02	12.05	16.03	
7	8.77	7.53	8.88	7.73	11.84	15.26	
8	7.74	5.94	7.35	5.43	10.56	11.38	
9	7.77	5.98	8.21	6.62	11.00	12.60	
10	7.87	6.12	8.36	6.85	11.13	12.98	
11	9.21	8.34	9.28	8.47	12.26	16.81	*
12	8.37	6.87	8.36	6.85	11.37	13.72	
13	8.75	7.50	8.81	7.60	11.79	15.10	
14	7.48	5.60	8.49	7.06	11.02	12.66	
15	8.08	6.43	8.16	6.54	11.13	12.97	

*Worst MCS

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

Maximum Peak Output Power (WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 19, 2022
Temperature / Humidity 22 deg. C / 34 % RH
Engineer Ken Fujita
Mode Tx 11ax-20 (OFDM)

Antenna 1 + Antenna 2			Conducted Power					e.i.r.p.						
Freq.	Antenna 1	Antenna 2	Result		Limit		Margin	Antenna	Result		Limit		Margin	
								Gain						
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[mW]		[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	152.76	198.61	25.46	351.37	27.99	630	2.53	8.01	33.47	2222.08	36.02	4000.00	2.55	
2437	145.88	152.05	24.74	297.94	27.99	630	3.25	8.01	32.75	1884.18	36.02	4000.00	3.27	
2462	136.14	184.08	25.05	320.22	27.99	630	2.94	8.01	33.06	2025.12	36.02	4000.00	2.96	

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	1.09	0.60	20.15	21.84	152.76
2437	0.89	0.60	20.15	21.64	145.88
2462	0.59	0.60	20.15	21.34	136.14

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
				[dBm]	[mW]
2412	2.31	0.52	20.15	22.98	198.61
2437	1.15	0.52	20.15	21.82	152.05
2462	1.98	0.52	20.15	22.65	184.08

Sample Calculation:

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

2412MHz

Mode	MCS Number	Antenna 1 Reading Peak		Antenna 2 Reading Peak		Total Reading Power		Remark
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
1TX	0	0.32	1.08	1.78	1.51	4.12	2.58	
	1	0.71	1.18	0.45	1.11	3.59	2.29	
	2	0.10	1.02	0.66	1.16	3.40	2.19	
	3	1.09	1.29	2.41	1.74	4.81	3.03	*
	4	-0.35	0.92	0.03	1.01	2.85	1.93	
	5	-0.60	0.87	-0.60	0.87	2.41	1.74	
	6	-0.66	0.86	-0.56	0.88	2.40	1.74	
	7	-0.63	0.86	-0.44	0.90	2.48	1.77	
	8	0.49	1.12	0.61	1.15	3.56	2.27	
	9	-0.07	0.98	0.79	1.20	3.39	2.18	
	10	-0.70	0.85	-0.86	0.82	2.23	1.67	
	11	-1.43	0.72	-1.44	0.72	1.58	1.44	
2TX	0	0.72	1.18	1.02	1.26	3.88	2.45	
	1	-0.10	0.98	0.11	1.03	3.02	2.00	
	2	-0.27	0.94	0.11	1.03	2.93	1.97	
	3	0.32	1.08	1.39	1.38	3.90	2.45	
	4	0.51	1.12	0.95	1.24	3.75	2.37	
	5	-0.04	0.99	1.30	1.35	3.69	2.34	
	6	0.44	1.11	-0.31	0.93	3.09	2.04	
	7	-0.59	0.87	1.08	1.28	3.34	2.16	
	8	-0.05	0.99	-0.77	0.84	2.62	1.83	
	9	-0.80	0.83	0.09	1.02	2.68	1.85	
	10	-1.06	0.78	-0.16	0.96	2.42	1.75	
	11	-0.40	0.91	-1.00	0.79	2.32	1.71	

*Worst MCS

Maximum Peak Output Power (WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 20, 2022
Temperature / Humidity 19 deg. C / 31 % RH
Engineer Ken Fujita
Mode Tx 11ax-20 (26-tone RU)

Antenna 1 + Antenna 2					Conducted Power					e.i.r.p.					
Freq.	RU Type	RU Index	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin	Antenna Gain [dB]	Result		Limit		Margin
[MHz]					[dBm]	[mW]	[dBm]	[mW]	[dB]		[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	26-tone RU	0	15.96	17.62	15.26	33.58	27.99	630	12.73	8.01	23.27	212.35	36.02	4000.00	12.75
		4	17.74	16.37	15.33	34.11	27.99	630	12.66	8.01	23.34	215.72	36.02	4000.00	12.68
		8	15.45	15.00	14.84	30.45	27.99	630	13.15	8.01	22.85	192.57	36.02	4000.00	13.17
0		21.78	18.84	16.09	40.61	27.99	630	11.90	8.01	24.10	256.85	36.02	4000.00	11.92	
4		19.05	18.32	15.73	37.38	27.99	630	12.26	8.01	23.74	236.38	36.02	4000.00	12.28	
8		17.95	17.58	15.51	35.53	27.99	630	12.48	8.01	23.52	224.67	36.02	4000.00	12.51	
0		15.81	17.34	15.20	33.15	27.99	630	12.79	8.01	23.21	209.65	36.02	4000.00	12.81	
4		17.18	16.75	15.31	33.93	27.99	630	12.68	8.01	23.32	214.57	36.02	4000.00	12.70	
8		16.11	15.24	14.96	31.35	27.99	630	13.03	8.01	22.97	198.24	36.02	4000.00	13.05	

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)
that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq.	RU Type	RU Index	Reading	Cable Loss	Atten. Loss	Result	
[MHz]			[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	26-tone RU	0	1.39	0.60	10.04	12.03	15.96
		4	1.85	0.60	10.04	12.49	17.74
		8	1.25	0.60	10.04	11.89	15.45
0		2.74	0.60	10.04	13.38	21.78	
4		2.16	0.60	10.04	12.80	19.05	
8		1.90	0.60	10.04	12.54	17.95	
0		1.35	0.60	10.04	11.99	15.81	
4		1.71	0.60	10.04	12.35	17.18	
8		1.43	0.60	10.04	12.07	16.11	

Antenna 2

Antenna z		RU Type	RU Index	Reading	Cable Loss	Atten. Loss	Result	
Freq.				[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	26-tone RU	0	1.90	0.52	10.04	12.46	17.62	
		4	1.58	0.52	10.04	12.14	16.37	
		8	1.20	0.52	10.04	11.76	15.00	
0		2.19	0.52	10.04	12.75	18.84		
4		2.07	0.52	10.04	12.63	18.32		
8		1.89	0.52	10.04	12.45	17.58		
0		1.83	0.52	10.04	12.39	17.34		
4		1.68	0.52	10.04	12.24	16.75		
8		1.27	0.52	10.04	11.83	15.24		

Sample Calculation:

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

Maximum Peak Output Power (WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 20, 2022
Temperature / Humidity	19 deg. C / 31 % RH
Engineer	Ken Fujita
Mode	Tx 11ax-20 (52-tone RU)

Antenna 1 + Antenna 2		Conducted Power										c.i.r.p.					
Freq.	RU Type	RU Index	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin	Antenna Gain [dBi]	Result		Limit		Margin		
[MHz]					[dBm]	[mW]	[dBm]	[mW]	[dB]		[dBm]	[mW]	[dBm]	[mW]	[dB]		
2412	52-tone RU	37	29.92	29.58	17.75	59.50	27.99	630	10.24	8.01	25.76	376.30	36.02	4000.00	10.27		
		38	29.44	27.10	17.52	56.55	27.99	630	10.47	8.01	25.53	357.60	36.02	4000.00	10.49		
		40	25.53	29.85	17.43	55.38	27.99	630	10.56	8.01	25.44	350.23	36.02	4000.00	10.58		
37		26.18	29.38	17.45	55.56	27.99	630	10.54	8.01	25.46	351.36	36.02	4000.00	10.56			
38		32.66	25.12	17.62	57.78	27.99	630	10.37	8.01	25.63	365.39	36.02	4000.00	10.39			
40		27.48	27.99	17.44	55.47	27.99	630	10.55	8.01	25.45	350.79	36.02	4000.00	10.57			
37		23.82	27.29	17.09	51.11	27.99	630	10.90	8.01	25.10	323.24	36.02	4000.00	10.93			
38		31.19	28.25	17.74	59.44	27.99	630	10.25	8.01	25.75	375.89	36.02	4000.00	10.27			
40		24.60	26.06	17.05	50.67	27.99	630	10.94	8.01	25.06	320.41	36.02	4000.00	10.96			

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)
that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1							
Freq.	RU Type	RU Index	Reading	Cable Loss	Atten. Loss	Result	
[MHz]			[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	52-tone RU	37	4.12	0.60	10.04	14.76	29.92
		38	4.05	0.60	10.04	14.69	29.44
		40	3.43	0.60	10.04	14.07	25.53
2437		37	3.54	0.60	10.04	14.18	26.18
		38	4.50	0.60	10.04	15.14	32.66
		40	3.75	0.60	10.04	14.39	27.48
2462		37	3.13	0.60	10.04	13.77	23.82
		38	4.30	0.60	10.04	14.94	31.19
		40	3.27	0.60	10.04	13.91	24.60

Antenna 2		RU Type	RU Index	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
Freq.							[dBm]	[mW]
[MHz]								
2412	52-tone RU	37	4.15	0.52	10.04	14.71	29.58	
		38	3.77	0.52	10.04	14.33	27.10	
		40	4.19	0.52	10.04	14.75	29.85	
37		4.12	0.52	10.04	14.68	29.38		
38		3.44	0.52	10.04	14.00	25.12		
40		3.91	0.52	10.04	14.47	27.99		
2462		37	3.80	0.52	10.04	14.36	27.29	
		38	3.95	0.52	10.04	14.51	28.25	
		40	3.60	0.52	10.04	14.16	26.06	

Sample Calculation:

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

Maximum Peak Output Power (WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 20, 2022
Temperature / Humidity 19 deg. C / 31 % RH
Engineer Ken Fujita
Mode Tx 11ax-20 (106-tone RU)

Antenna 1 + Antenna 2			Conducted Power										c.i.r.p.					
Freq. [MHz]	RU Type	RU Index	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]			
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]				
2412	106-tone RU	53	72.44	58.88	21.18	131.33	27.99	630	6.81	8.01	29.19	830.53	36.02	4000.00	6.83			
		54	61.52	62.09	20.92	123.60	27.99	630	7.07	8.01	28.93	781.69	36.02	4000.00	7.09			
53		53.58	59.98	20.55	113.56	27.99	630	7.44	8.01	28.56	718.16	36.02	4000.00	7.46				
54		73.45	53.21	21.03	126.66	27.99	630	6.96	8.01	29.04	801.03	36.02	4000.00	6.98				
53		59.02	54.08	20.53	113.10	27.99	630	7.46	8.01	28.54	715.23	36.02	4000.00	7.48				
54		59.43	71.61	21.17	131.04	27.99	630	6.82	8.01	29.18	828.73	36.02	4000.00	6.84				
2462																		

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1							
Freq.	RU Type	RU Index	Reading	Cable Loss	Atten. Loss	Result	
[MHz]			[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	106-tone RU	53	7.96	0.60	10.04	18.60	72.44
		54	7.25	0.60	10.04	17.89	61.52
53		6.65	0.60	10.04	17.29	53.58	
54		8.02	0.60	10.04	18.66	73.45	
53		7.07	0.60	10.04	17.71	59.02	
54		7.10	0.60	10.04	17.74	59.43	

Antenna 2							
Freq.	RU Type	RU Index	Reading	Cable Loss	Atten. Loss	Result	
[MHz]			[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	106-tone RU	53	7.14	0.52	10.04	17.70	58.88
		54	7.37	0.52	10.04	17.93	62.09
53		7.22	0.52	10.04	17.78	59.98	
54		6.70	0.52	10.04	17.26	53.21	
53		6.77	0.52	10.04	17.33	54.08	
54		7.99	0.52	10.04	18.55	71.61	

Sample Calculation:

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

Maximum Peak Output Power (WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 20, 2022
Temperature / Humidity	19 deg. C / 31 % RH
Engineer	Ken Fujita
Mode	Tx 11ax-20 (242-tone RU)

Antenna 1 + Antenna 2			Conducted Power					e.i.r.p.					
Freq.	Antenna 1 Result	Antenna 2 Result	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	108.89	112.20	23.45	221.09	27.99	630	4.54	8.01	31.46	1398.23	36.02	4000.00	4.56
2437	102.33	106.91	23.21	209.23	27.99	630	4.78	8.01	31.22	1323.23	36.02	4000.00	4.80
2462	111.43	108.89	23.43	220.32	27.99	630	4.56	8.01	31.44	1393.35	36.02	4000.00	4.58

Sample Calculation:

Result = Antenna 1 + Antenna 2

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

*This Limit was reduced by the amount in dB (8.01 dB)

that the directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna 1

Freq.	Reading	Cable Loss	Atten. Loss	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-0.38	0.60	20.15	20.37	108.89
2437	-0.65	0.60	20.15	20.10	102.33
2462	-0.28	0.60	20.15	20.47	111.43

Antenna 2

Freq.	Reading	Cable Loss	Atten. Loss	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-0.17	0.52	20.15	20.50	112.20
2437	-0.38	0.52	20.15	20.29	106.91
2462	-0.30	0.52	20.15	20.37	108.89

Sample Calculation:

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

Maximum Peak Output Power (BT1 / BT2)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 18, 2022
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Ken Fujita
Mode	Tx BT LE

BT1					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBm]	[mW]	[dBm]	
1M-PHY	2402	-8.88	0.65	10.04	1.81	1.52	30.00	1000	28.19	5.80	7.61	5.77	36.02	4000	28.41
	2440	-8.70	0.65	10.04	1.99	1.58	30.00	1000	28.01	5.80	7.79	6.01	36.02	4000	28.23
	2480	-9.13	0.65	10.04	1.56	1.43	30.00	1000	28.44	5.80	7.36	5.45	36.02	4000	28.66
2M-PHY	2402	-8.96	0.65	10.04	1.73	1.49	30.00	1000	28.27	5.80	7.53	5.66	36.02	4000	28.49
	2440	-8.63	0.65	10.04	2.06	1.61	30.00	1000	27.94	5.80	7.86	6.11	36.02	4000	28.16
	2480	-9.19	0.65	10.04	1.50	1.41	30.00	1000	28.50	5.80	7.30	5.37	36.02	4000	28.72

BT2					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBm]	[mW]	[dBm]	
1M-PHY	2402	-9.45	0.60	10.04	1.19	1.32	30.00	1000	28.81	5.80	6.99	5.00	36.02	4000	29.03
	2440	-9.16	0.60	10.04	1.48	1.41	30.00	1000	28.52	5.80	7.28	5.35	36.02	4000	28.74
	2480	-9.33	0.60	10.04	1.31	1.35	30.00	1000	28.69	5.80	7.11	5.14	36.02	4000	28.91
2M-PHY	2402	-9.40	0.60	10.04	1.24	1.33	30.00	1000	28.76	5.80	7.04	5.06	36.02	4000	28.98
	2440	-9.22	0.60	10.04	1.42	1.39	30.00	1000	28.58	5.80	7.22	5.27	36.02	4000	28.80
	2480	-9.23	0.60	10.04	1.41	1.38	30.00	1000	28.59	5.80	7.21	5.26	36.02	4000	28.81

Sample Calculation:

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

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

Average Output Power
(Reference data for RF Exposure)
(WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 19, 2022
Temperature / Humidity 22 deg. C / 34 % RH
Engineer Ken Fujita
Mode Tx 11b

Antenna 1 + Antenna 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2412	7.38	7.26	11.66	14.64
2437	6.79	6.76	11.32	13.55
2462	6.71	6.75	11.29	13.46

11b **1 Mbps** Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.97	0.60	10.04	8.67	7.36	0.01	8.68	7.38
2437	-2.33	0.60	10.04	8.31	6.78	0.01	8.32	6.79
2462	-2.38	0.60	10.04	8.26	6.70	0.01	8.27	6.71

11b **1 Mbps** Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.96	0.52	10.04	8.60	7.24	0.01	8.61	7.26
2437	-2.27	0.52	10.04	8.29	6.75	0.01	8.30	6.76
2462	-2.28	0.52	10.04	8.28	6.73	0.01	8.29	6.75

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

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

Average Output Power
(Reference data for RF Exposure)
(WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 19, 2022
Temperature / Humidity 22 deg. C / 34 % RH
Engineer Ken Fujita
Mode Tx 11g

Antenna 1 + Antenna 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2412	7.57	7.40	11.75	14.96
2437	7.55	7.43	11.76	14.98
2462	7.26	7.80	11.78	15.06

11g 6 Mbps Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.87	0.60	10.04	8.77	7.53	0.02	8.79	7.57
2437	-1.88	0.60	10.04	8.76	7.52	0.02	8.78	7.55
2462	-2.05	0.60	10.04	8.59	7.23	0.02	8.61	7.26

11g 6 Mbps Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.89	0.52	10.04	8.67	7.36	0.02	8.69	7.40
2437	-1.87	0.52	10.04	8.69	7.40	0.02	8.71	7.43
2462	-1.66	0.52	10.04	8.90	7.76	0.02	8.92	7.80

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

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

Average Output Power
(Reference data for RF Exposure)
(WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 19, 2022
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Ken Fujita
Mode	Tx 11n-20

Antenna 1 + Antenna 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2412	6.76	7.40	11.51	14.16
2437	6.82	7.69	11.62	14.51
2462	6.85	7.83	11.67	14.69

11n-20 MCS 0 Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.37	0.60	10.04	8.27	6.71	0.03	8.30	6.76
2437	-2.33	0.60	10.04	8.31	6.78	0.03	8.34	6.82
2462	-2.31	0.60	10.04	8.33	6.81	0.03	8.36	6.85

11n-20 MCS 0 Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.90	0.52	10.04	8.66	7.35	0.03	8.69	7.40
2437	-1.73	0.52	10.04	8.83	7.64	0.03	8.86	7.69
2462	-1.65	0.52	10.04	8.91	7.78	0.03	8.94	7.83

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

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

Average Output Power
(Reference data for RF Exposure)
(WLAN)

Test place Ise EMC Lab. No.8 Measurement Room
Date January 19, 2022
Temperature / Humidity 22 deg. C / 34 % RH
Engineer Ken Fujita
Mode Tx 11ax-20 (OFDM)

Antenna 1 + Antenna 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2412	6.98	7.36	11.57	14.34
2437	7.11	7.50	11.65	14.61
2462	7.00	7.64	11.66	14.64

11ax-20 **MCS 0** Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.23	0.60	10.04	8.41	6.93	0.03	8.44	6.98
2437	-2.15	0.60	10.04	8.49	7.06	0.03	8.52	7.11
2462	-2.22	0.60	10.04	8.42	6.95	0.03	8.45	7.00

11ax-20 **MCS 0** Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.92	0.52	10.04	8.64	7.31	0.03	8.67	7.36
2437	-1.84	0.52	10.04	8.72	7.45	0.03	8.75	7.50
2462	-1.76	0.52	10.04	8.80	7.59	0.03	8.83	7.64

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

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

Average Output Power
(Reference data for RF Exposure)
(WLAN)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 20, 2022
Temperature / Humidity	19 deg. C / 31 % RH
Engineer	Ken Fujita
Mode	Tx 11ax-20 (242-tone RU)

Antenna 1 + Antenna 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result (Burst average)	
			[dBm]	[mW]
2412	6.70	6.85	11.32	13.55
2437	6.87	7.13	11.46	14.00
2462	6.56	7.18	11.38	13.74

11ax-20 MCS 0 Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.49	0.60	10.04	8.15	6.53	0.11	8.26	6.70
2437	-2.38	0.60	10.04	8.26	6.70	0.11	8.37	6.87
2462	-2.58	0.60	10.04	8.06	6.40	0.11	8.17	6.56

11ax-20 MCS 0 Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.31	0.52	10.04	8.25	6.68	0.11	8.36	6.85
2437	-2.14	0.52	10.04	8.42	6.95	0.11	8.53	7.13
2462	-2.11	0.52	10.04	8.45	7.00	0.11	8.56	7.18

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

*) The test on 11ax-20 was performed on OFDM / OFDMA(242-tone RU) was the worst condition.

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

Average Output Power
(Reference data for RF Exposure)
(BT1 / BT2)

Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 18, 2022
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Ken Fujita
Mode	Tx BT LE

BT1

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
1M-PHY	2402	-9.93	0.65	10.04	0.76	1.19	0.67	1.43	1.39
	2440	-9.71	0.65	10.04	0.98	1.25	0.67	1.65	1.46
	2480	-9.07	0.65	10.04	1.62	1.45	0.67	2.29	1.69
2M-PHY	2402	-11.65	0.65	10.04	-0.96	0.80	2.37	1.41	1.38
	2440	-11.47	0.65	10.04	-0.78	0.84	2.37	1.59	1.44
	2480	-12.04	0.65	10.04	-1.35	0.73	2.37	1.02	1.26

BT2

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
1M-PHY	2402	-10.58	0.60	10.04	0.06	1.01	0.67	0.73	1.18
	2440	-10.31	0.60	10.04	0.33	1.08	0.67	1.00	1.26
	2480	-10.30	0.60	10.04	0.34	1.08	0.67	1.01	1.26
2M-PHY	2402	-12.31	0.60	10.04	-1.67	0.68	2.37	0.70	1.17
	2440	-12.08	0.60	10.04	-1.44	0.72	2.37	0.93	1.24
	2480	-12.07	0.60	10.04	-1.43	0.72	2.37	0.94	1.24

Sample Calculation:

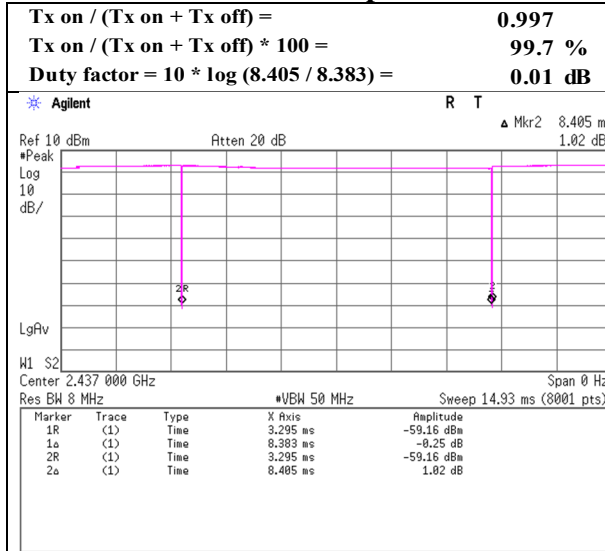
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

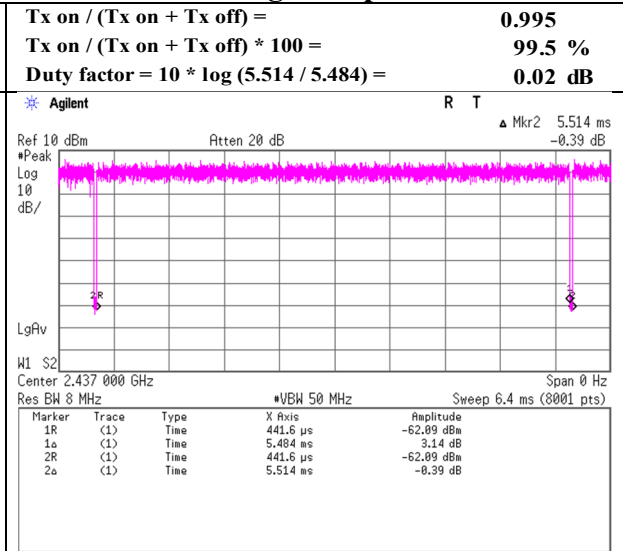
Burst rate confirmation (WLAN)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	January 26, 2022
Temperature / Humidity	21 deg. C / 35 % RH
Engineer	Hiroki Numata
Mode	Tx

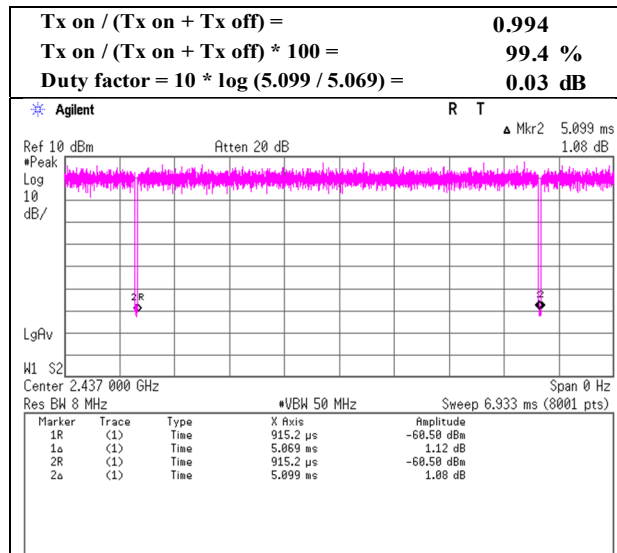
11b 1 Mbps



11g 6 Mbps



11n-20 MCS 0

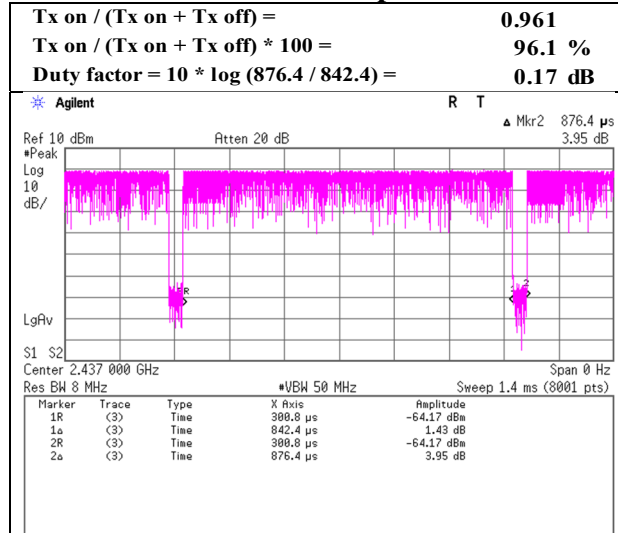


* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

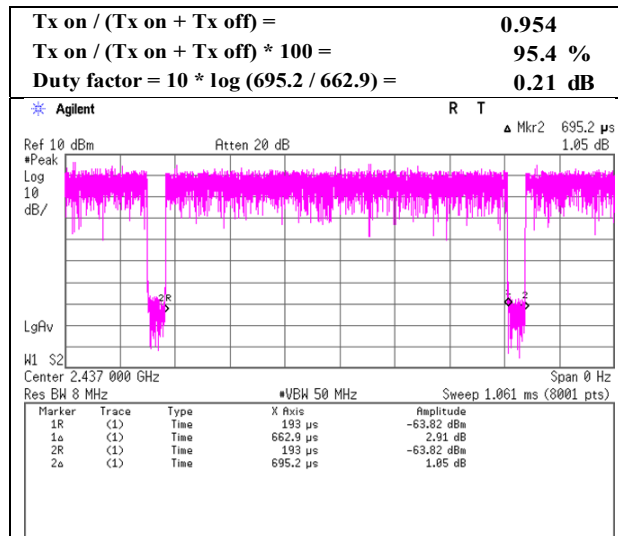
Burst rate confirmation (WLAN)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 26, 2022
Temperature / Humidity 21 deg. C / 35 % RH
Engineer Hiroki Numata
Mode Tx

11b 11 Mbps



11n-20 MCS 11

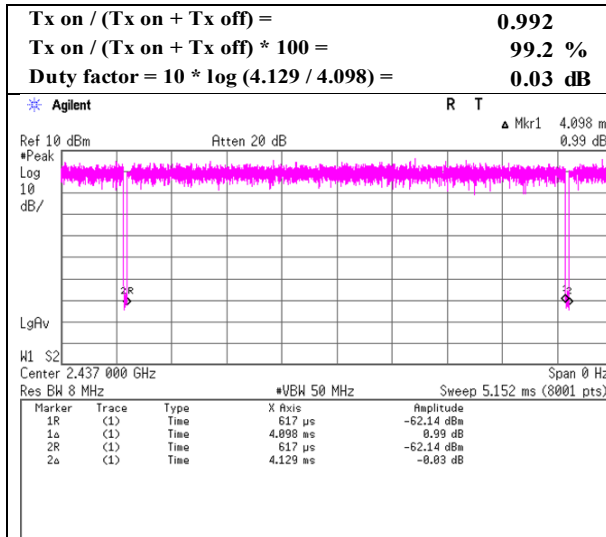


* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

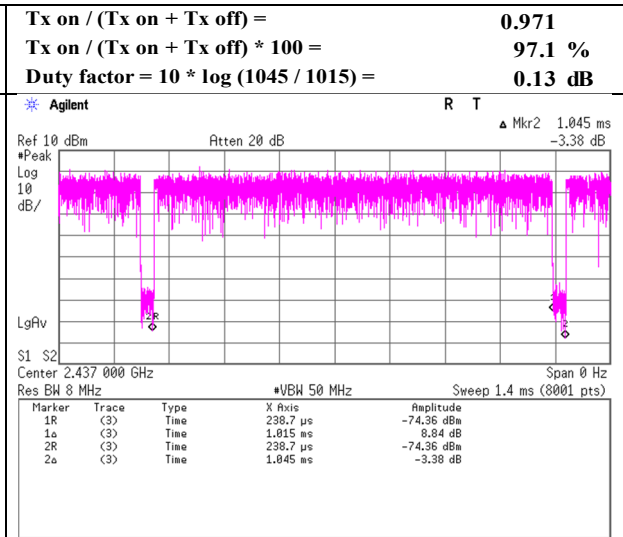
Burst rate confirmation (WLAN)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	January 26, 2022
Temperature / Humidity	21 deg. C / 35 % RH
Engineer	Hiroki Numata
Mode	Tx

11ax-20 MCS 0



11ax-20 MCS 3



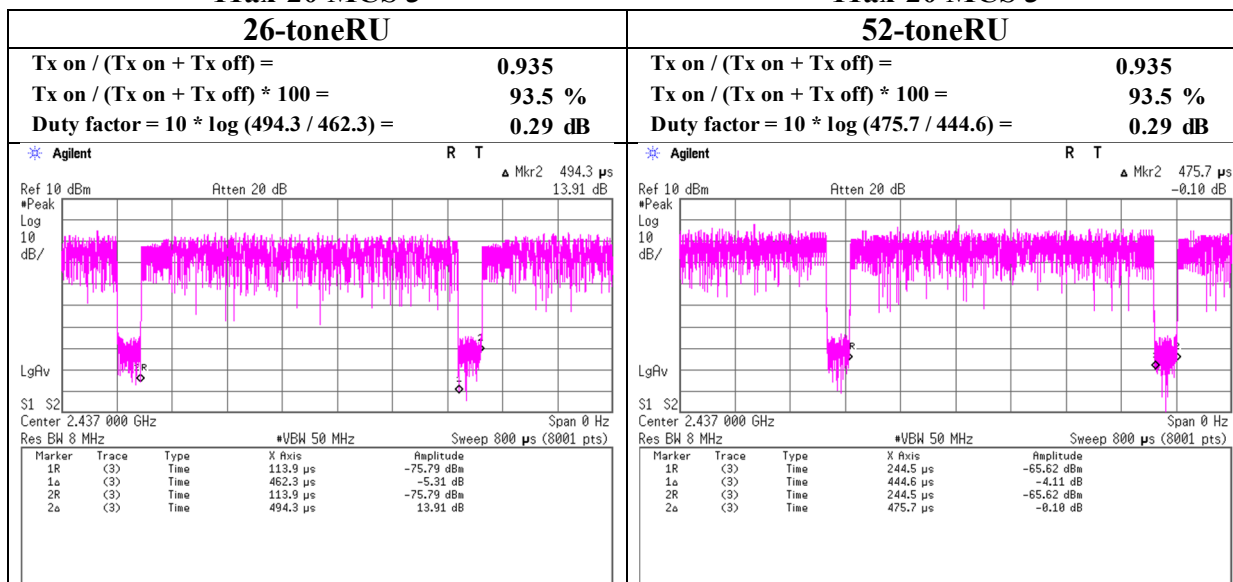
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation (WLAN)

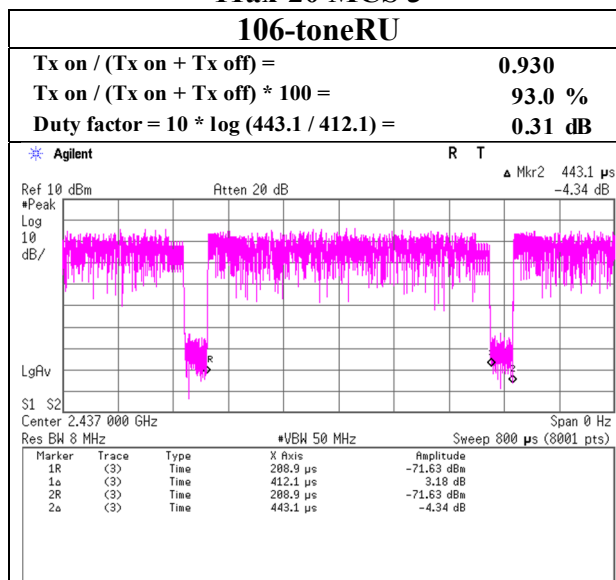
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
Mode	Tx

11ax-20 MCS 3

11ax-20 MCS 3



11ax-20 MCS 3



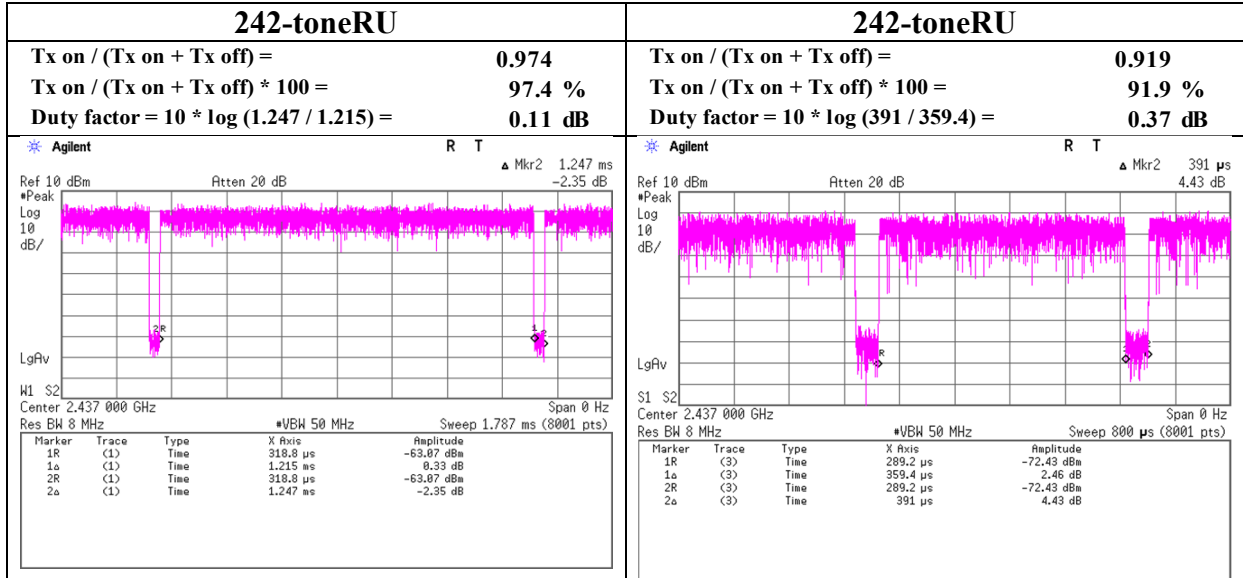
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation (WLAN)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
Mode	Tx

11ax-20 MCS 0

242-toneRU



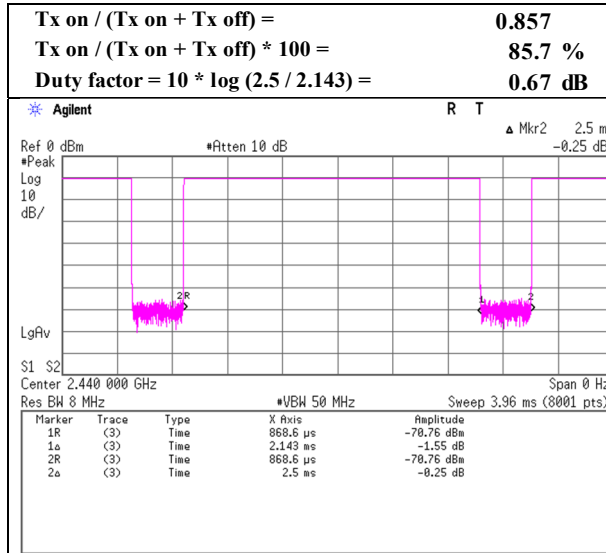
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation (BT1 / BT2)

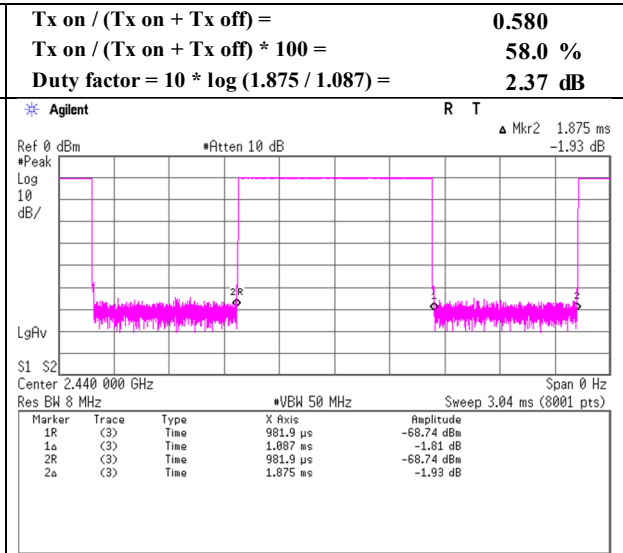
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 18, 2022
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Ken Fujita
Mode	Tx BT LE

BT1

BT LE 1M-PHY

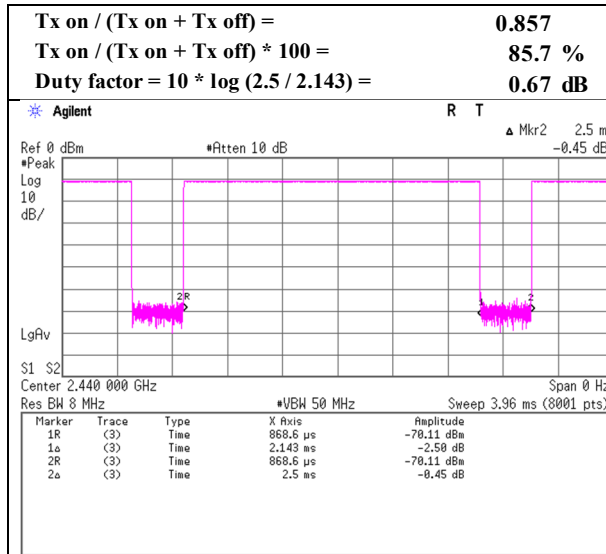


BT LE 2M-PHY

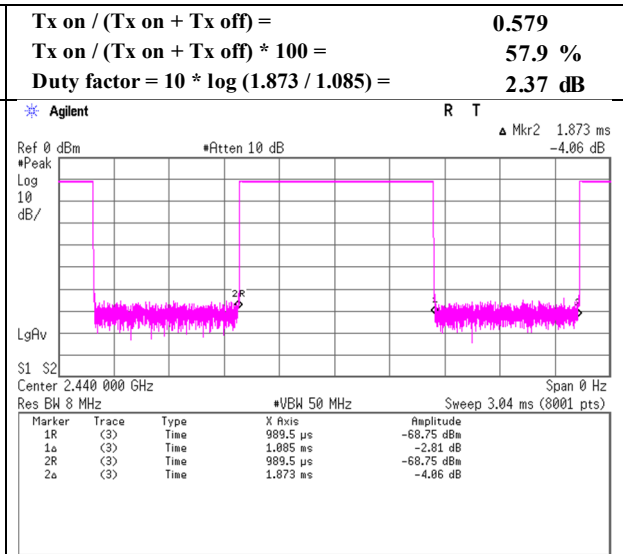


BT2

BT LE 1M-PHY



BT LE 2M-PHY



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

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber	No.3	No.3
Date	January 26, 2022	February 2, 2022
Temperature / Humidity	21 deg. C / 35 % RH	20 deg. C / 35 % RH
Engineer	Hiroki Numata	Yuta Moriya
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)
Mode	Tx 11b 2412 MHz	(18 GHz - 26.5 GHz)

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2343.7	44.6	34.9	27.8	5.5	32.6	-	45.2	35.5	73.9	53.9	28.7	18.4	
Hori.	2390.0	49.5	37.9	27.6	5.5	32.6	0.2	50.0	38.5	73.9	53.9	23.9	15.4	*1)
Hori.	4824.0	40.4	31.8	31.5	7.8	31.6	-	48.1	39.4	73.9	53.9	25.8	14.5	Floor noise
Hori.	7236.0	41.9	33.3	35.8	9.4	32.6	-	54.3	45.8	73.9	53.9	19.6	8.1	Floor noise
Hori.	9648.0	42.7	32.0	38.8	9.8	33.0	-	58.3	47.6	73.9	53.9	15.6	6.3	Floor noise
Vert.	2343.7	53.8	36.2	27.8	5.5	32.6	-	54.4	36.8	73.9	53.9	19.5	17.1	
Vert.	2390.0	54.3	39.2	27.6	5.5	32.6	0.2	54.8	39.9	73.9	53.9	19.1	14.0	*1)
Vert.	4824.0	40.7	32.2	31.5	7.8	31.6	-	48.4	39.9	73.9	53.9	25.5	14.0	Floor noise
Vert.	7236.0	42.3	33.6	35.8	9.4	32.6	-	54.8	46.1	73.9	53.9	19.1	7.8	Floor noise
Vert.	9648.0	42.3	32.2	38.8	9.8	33.0	-	57.9	47.8	73.9	53.9	16.0	6.1	Floor noise

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	98.5	27.5	5.5	32.6	99.0	-	-	Carrier
Hori.	2400.0	50.5	27.5	5.5	32.6	50.9	79.0	28.1	
Hori.	2571.0	38.9	27.5	5.6	32.5	39.6	79.0	39.4	
Vert.	2412.0	95.4	27.5	5.5	32.6	95.9	-	-	Carrier
Vert.	2400.0	50.2	27.5	5.5	32.6	50.7	75.9	25.2	
Vert.	2571.0	38.4	27.5	5.6	32.5	39.1	75.9	36.8	

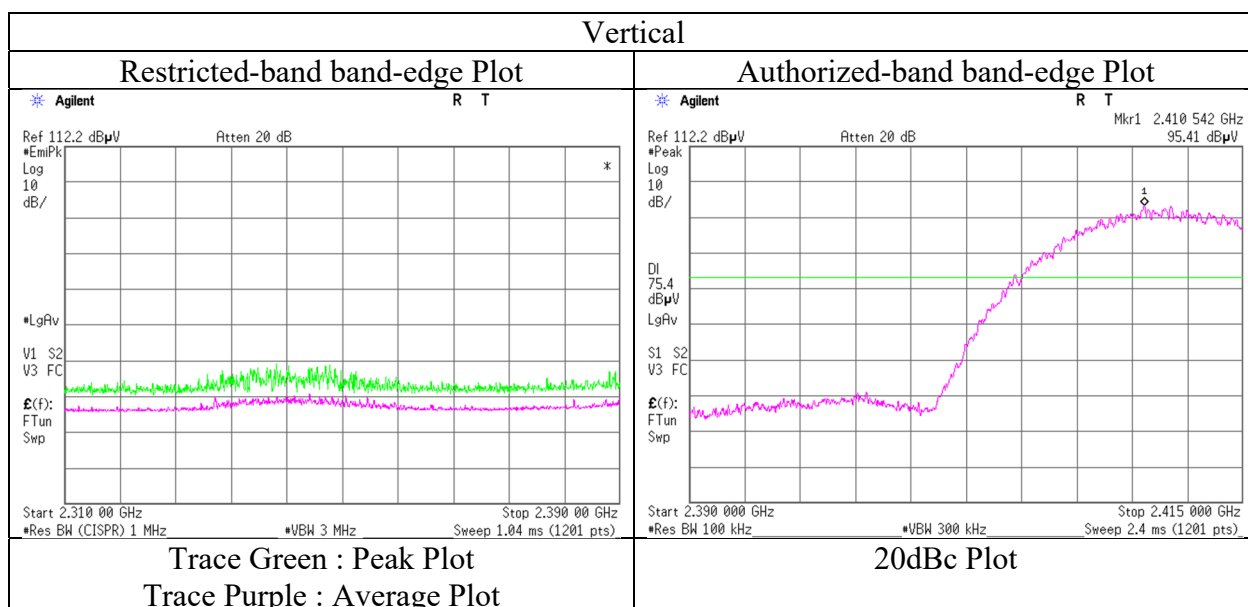
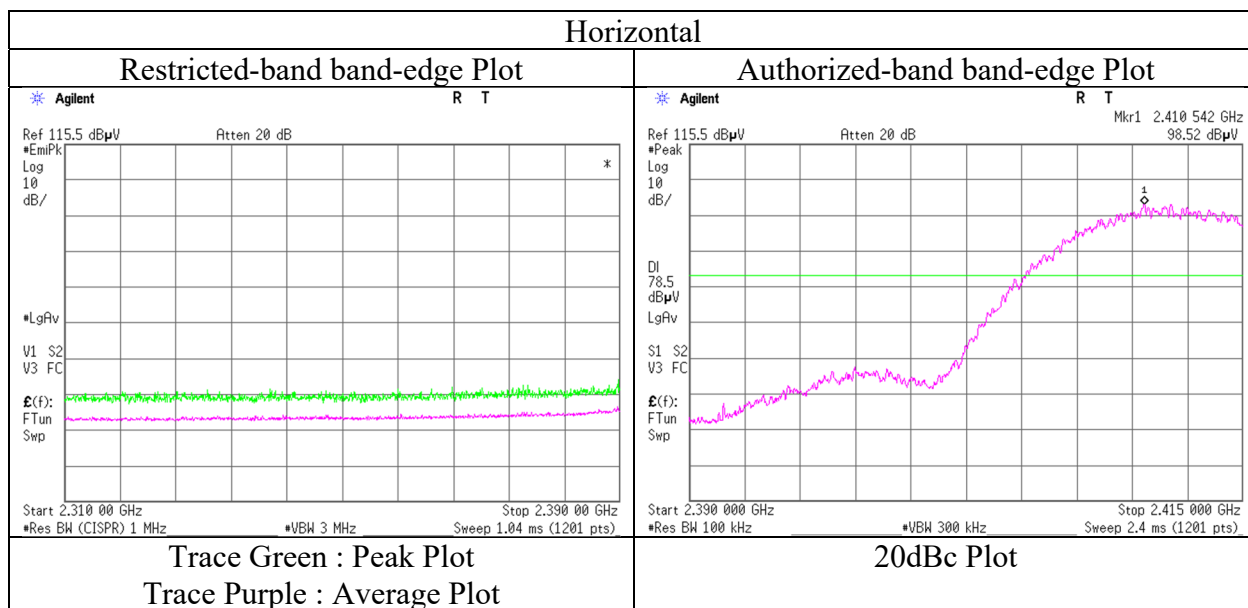
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 26, 2022
Temperature / Humidity	21 deg. C / 35 % RH
Engineer	Hiroki Numata
	(1 GHz - 10 GHz)
Mode	Tx 11b 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 26, 2022	February 2, 2022	February 3, 2022
Temperature / Humidity	21 deg. C / 35 % RH	20 deg. C / 35 % RH	22 deg. C / 35 % RH
Engineer	Hiroki Numata (1 GHz - 10 GHz)	Yuta Moriya (10 GHz - 18 GHz)	Yuta Moriya (18 GHz - 26.5 GHz)
Mode	Tx 11b 2437 MHz		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2240.1	49.6	34.8	28.3	5.4	32.6	0.2	50.6	36.0	73.9	53.9	23.3	17.9	*1)
Hori.	4874.0	40.1	32.1	31.5	7.8	31.6	-	47.8	39.9	73.9	53.9	26.1	14.1	Floor noise
Hori.	7311.0	41.2	33.5	35.9	9.3	32.7	-	53.8	46.0	73.9	53.9	20.1	7.9	Floor noise
Hori.	9748.0	41.9	31.9	39.1	9.8	33.1	-	57.7	47.7	73.9	53.9	16.2	6.2	Floor noise
Vert.	2240.1	51.5	36.2	28.3	5.4	32.6	0.2	52.5	37.4	73.9	53.9	21.4	16.5	*1)
Vert.	4874.0	40.3	32.0	31.5	7.8	31.6	-	48.0	39.7	73.9	53.9	25.9	14.2	Floor noise
Vert.	7311.0	41.5	33.4	35.9	9.3	32.7	-	54.0	45.9	73.9	53.9	19.9	8.0	Floor noise
Vert.	9748.0	41.6	31.9	39.1	9.8	33.1	-	57.5	47.8	73.9	53.9	16.4	6.1	Floor noise

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

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

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

*QP detector was used up to 1GHz.

*1) Noise synchronized with duty of carrier frequency

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 26, 2022	February 2, 2022	February 3, 2022
Temperature / Humidity	21 deg. C / 35 % RH	20 deg. C / 35 % RH	22 deg. C / 35 % RH
Engineer	Hiroki Numata (1 GHz - 10 GHz)	Yuta Moriya (10 GHz - 18 GHz)	Yuta Moriya (18 GHz - 26.5 GHz)
Mode	Tx 11b 2462 MHz		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2483.5	44.7	36.5	27.4	5.6	32.5	0.2	45.2	37.1	73.9	53.9	28.7	16.8	*1)
Hori.	4924.0	40.7	32.0	31.6	7.8	31.6	-	48.5	39.8	73.9	53.9	25.4	14.1	Floor noise
Hori.	7386.0	41.6	33.2	36.0	9.3	32.7	-	54.3	45.9	73.9	53.9	19.6	8.0	Floor noise
Hori.	9848.0	41.5	31.9	39.2	9.9	33.1	-	57.4	47.9	73.9	53.9	16.5	6.0	Floor noise
Vert.	2483.5	46.2	35.8	27.4	5.6	32.5	0.2	46.6	36.5	73.9	53.9	27.3	17.4	*1)
Vert.	4924.0	40.7	31.6	31.6	7.8	31.6	-	48.5	39.4	73.9	53.9	25.4	14.5	Floor noise
Vert.	7386.0	41.7	33.4	36.0	9.3	32.7	-	54.4	46.1	73.9	53.9	19.6	7.8	Floor noise
Vert.	9848.0	42.0	31.7	39.2	9.9	33.1	-	58.0	47.6	73.9	53.9	15.9	6.3	Floor noise

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

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

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

*QP detector was used up to 1GHz.

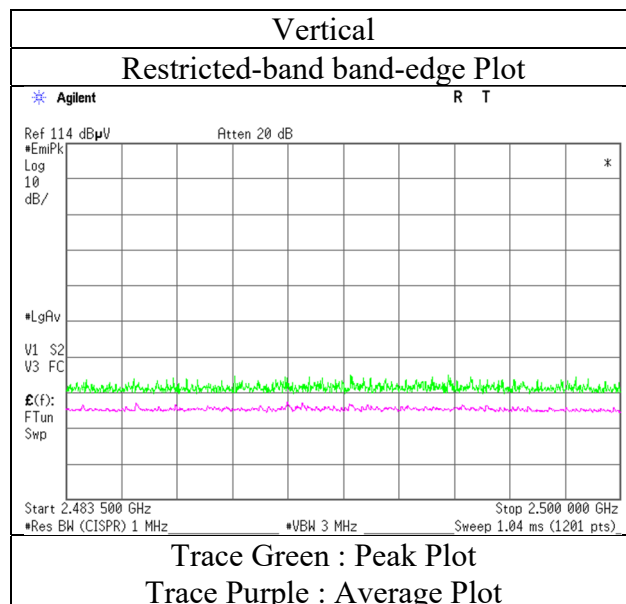
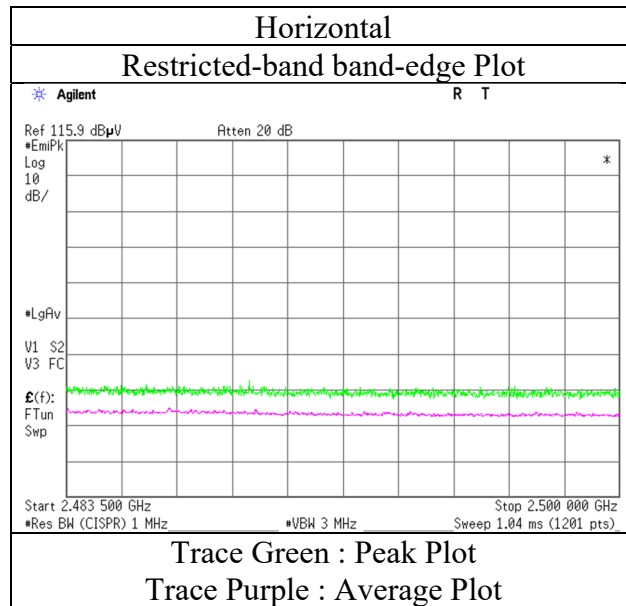
*1) Not Out of Band emission(Leakage Power)

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
January 26, 2022
21 deg. C / 35 % RH
Hiroki Numata
(1 GHz - 10 GHz)
Tx 11b 2462 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(WLAN)

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 27, 2022 No.3 February 2, 2022 No.3 February 3, 2022 No.3 February 9, 2022
Temperature / Humidity 20 deg. C / 37 % RH 20 deg. C / 35 % RH 22 deg. C / 35 % RH 20 deg. C / 42 % RH
Engineer Takeshi Hiyaji Yuta Moriya Yuta Moriya Junki Nagatomi
 (1 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz) (Below 1 GHz)
Mode Tx 11ax-20 OFDM 2412 MHz

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	75.0	37.6	-	6.5	7.8	32.3	-	19.6	-	40.0	-	20.4	-	
Hori.	335.2	36.1	-	15.1	10.3	32.1	-	29.4	-	46.0	-	16.6	-	
Hori.	378.9	37.0	-	15.3	10.6	32.1	-	30.8	-	46.0	-	15.2	-	
Hori.	520.5	30.4	-	17.8	11.5	32.1	-	27.6	-	46.0	-	18.4	-	
Hori.	545.6	31.2	-	17.9	11.7	32.1	-	28.7	-	46.0	-	17.3	-	
Hori.	620.3	38.1	-	19.5	12.1	32.1	-	37.6	-	46.0	-	8.4	-	
Hori.	2343.7	44.4	34.6	27.8	5.5	32.6	-	45.0	35.2	73.9	53.9	28.9	18.7	
Hori.	2390.0	58.2	46.3	27.6	5.5	32.6	0.1	58.7	46.9	73.9	53.9	15.2	7.0	*1)
Hori.	4824.0	40.2	32.0	31.5	7.8	31.6	-	47.9	39.7	73.9	53.9	26.0	14.2	Floor noise
Hori.	7236.0	42.6	33.3	35.8	9.4	32.6	-	55.1	45.8	73.9	53.9	18.8	8.1	Floor noise
Hori.	9684.0	41.6	31.8	39.0	9.8	33.1	-	57.4	47.5	73.9	53.9	16.5	6.4	Floor noise
Vert.	75.0	46.6	-	6.5	7.8	32.3	-	28.6	-	40.0	-	11.4	-	
Vert.	187.5	29.7	-	16.3	9.0	32.2	-	22.9	-	43.5	-	20.6	-	
Vert.	378.9	37.9	-	15.3	10.6	32.1	-	31.7	-	46.0	-	14.3	-	
Vert.	520.2	31.6	-	17.8	11.5	32.1	-	28.8	-	46.0	-	17.2	-	
Vert.	551.6	32.1	-	18.0	11.7	32.1	-	29.7	-	46.0	-	16.3	-	
Vert.	621.0	38.6	-	19.5	12.1	32.1	-	38.1	-	46.0	-	7.9	-	
Vert.	2343.7	45.8	37.1	27.8	5.5	32.6	-	46.4	37.7	73.9	53.9	27.5	16.2	
Vert.	2390.0	54.7	44.0	27.6	5.5	32.6	0.1	55.2	44.7	73.9	53.9	18.7	9.2	*1)
Vert.	4824.0	40.1	31.9	31.5	7.8	31.6	-	47.7	39.5	73.9	53.9	26.2	14.4	Floor noise
Vert.	7236.0	41.2	33.4	35.8	9.4	32.6	-	53.7	45.9	73.9	53.9	20.2	8.0	Floor noise
Vert.	9684.0	41.4	32.1	39.0	9.8	33.1	-	57.1	47.8	73.9	53.9	16.8	6.1	Floor noise

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	95.8	27.5	5.5	32.6	96.2	-	-	Carrier
Hori.	2400.0	56.5	27.5	5.5	32.6	56.9	76.2	19.3	
Vert.	2412.0	94.7	27.5	5.5	32.6	95.1	-	-	Carrier
Vert.	2400.0	53.1	27.5	5.5	32.6	53.5	75.1	21.6	

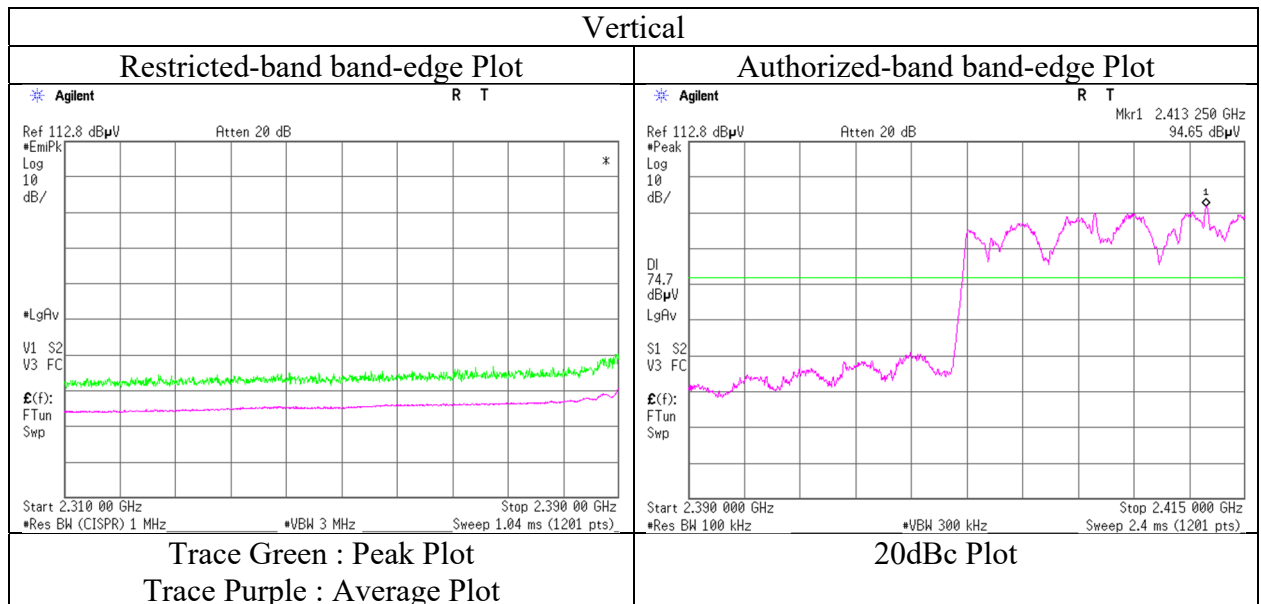
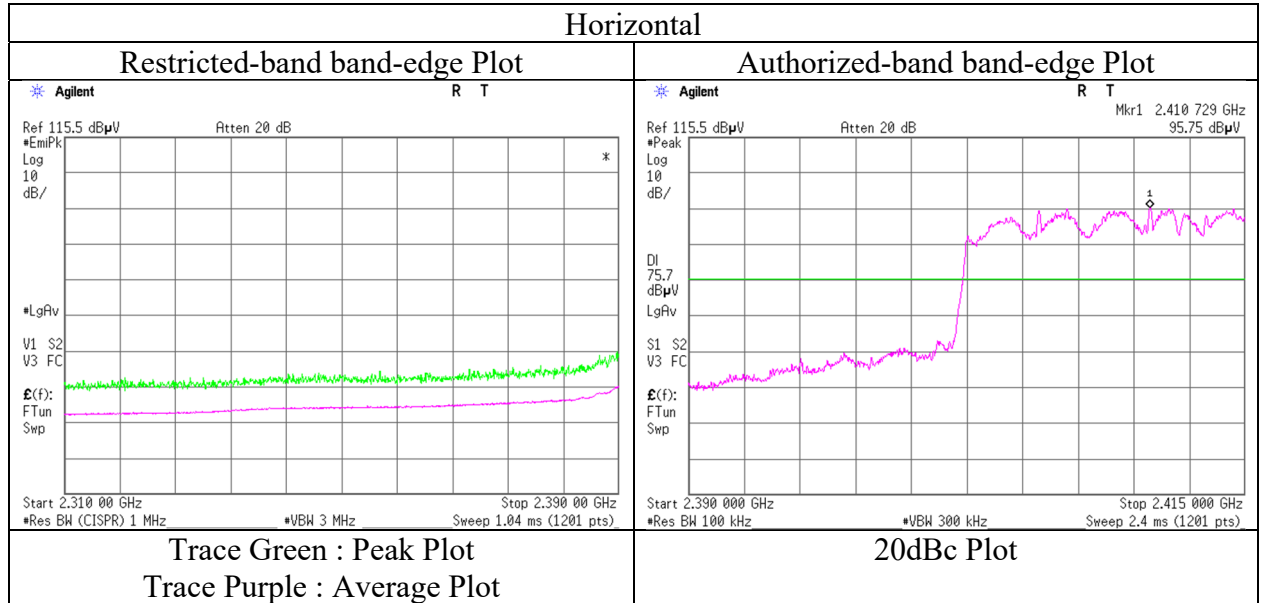
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDM 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (26-tone RU)

RU Index 0

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	44.2	34.6	27.6	5.5	32.6	0.3	44.6	35.4	73.9	53.9	29.3	18.5	*1)
Vert.	2390.0	44.2	33.9	27.6	5.5	32.6	0.3	44.7	34.7	73.9	53.9	29.2	19.3	*1)

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

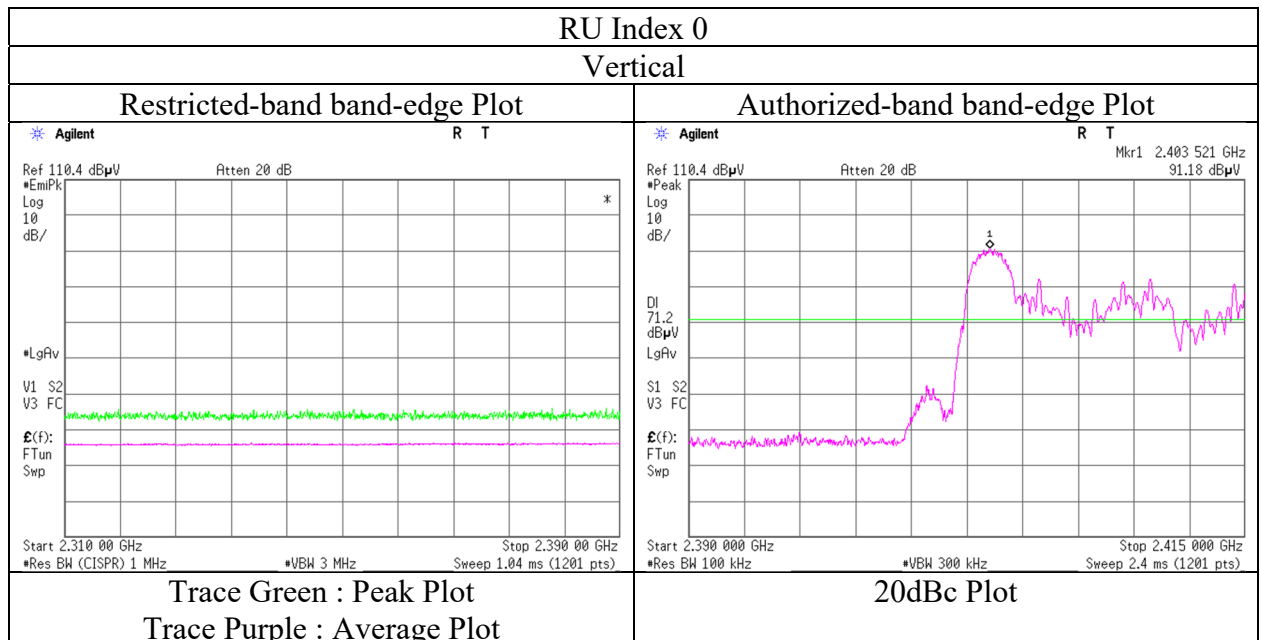
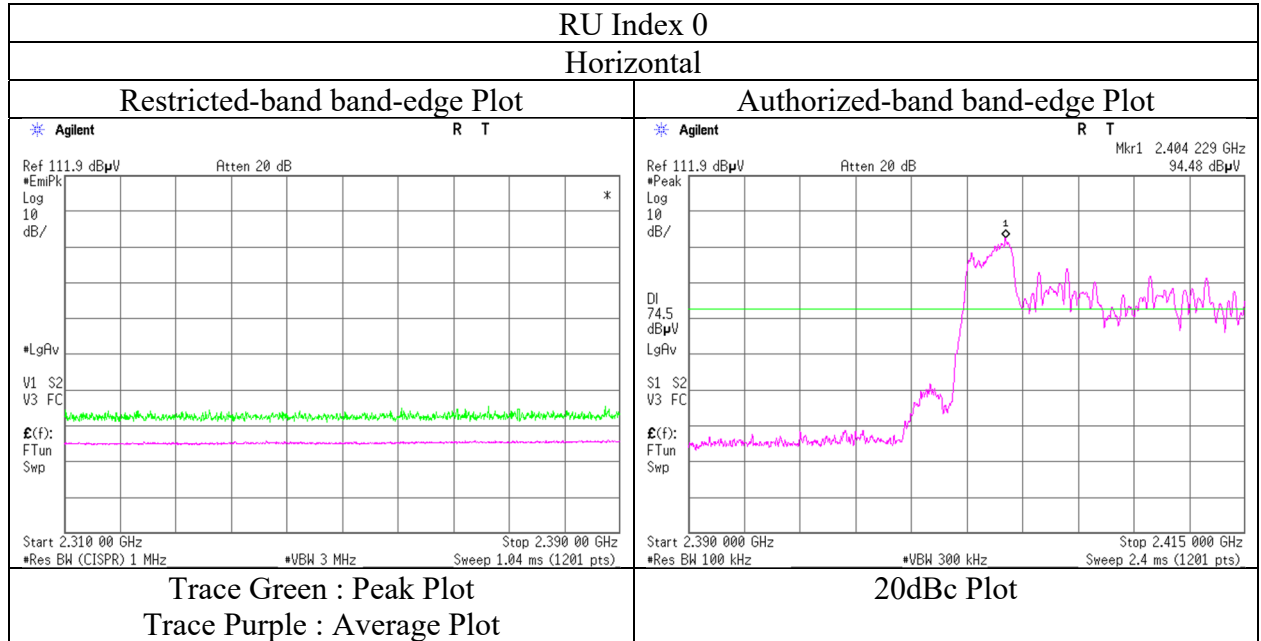
Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	94.5	27.5	5.5	32.6	94.9	-	-	Carrier
Hori.	2400.0	46.6	27.5	5.5	32.6	47.0	74.9	27.9	
Vert.	2412.0	91.2	27.5	5.5	32.6	91.6	-	-	Carrier
Vert.	2400.0	50.6	27.5	5.5	32.6	51.0	71.6	20.6	

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

Distance factor:
1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (26-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (52-tone RU)

RU Index 37

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	49.8	40.7	27.6	5.5	32.6	0.3	50.3	41.4	73.9	53.9	23.6	12.5	*1)
Vert.	2390.0	47.2	38.2	27.6	5.5	32.6	0.3	47.7	39.0	73.9	53.9	26.2	14.9	*1)

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	94.6	27.5	5.5	32.6	95.1	-	-	Carrier
Hori.	2400.0	53.2	27.5	5.5	32.6	53.7	75.1	21.4	
Vert.	2412.0	92.2	27.5	5.5	32.6	92.7	-	-	Carrier
Vert.	2400.0	51.2	27.5	5.5	32.6	51.6	72.7	21.1	

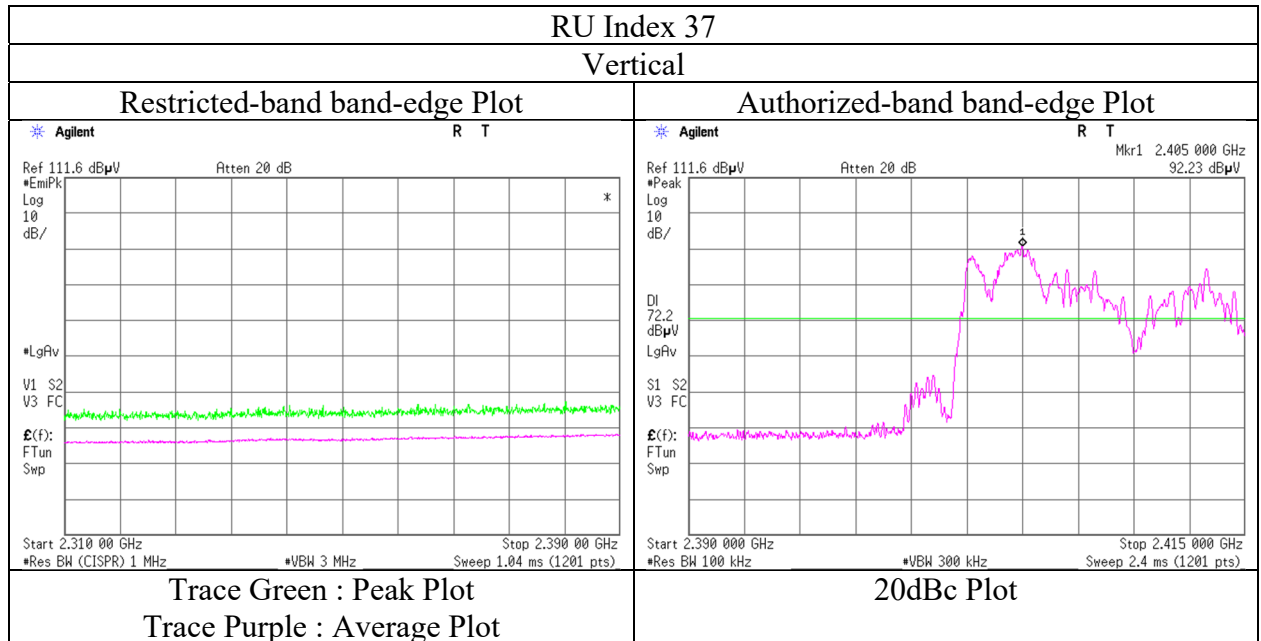
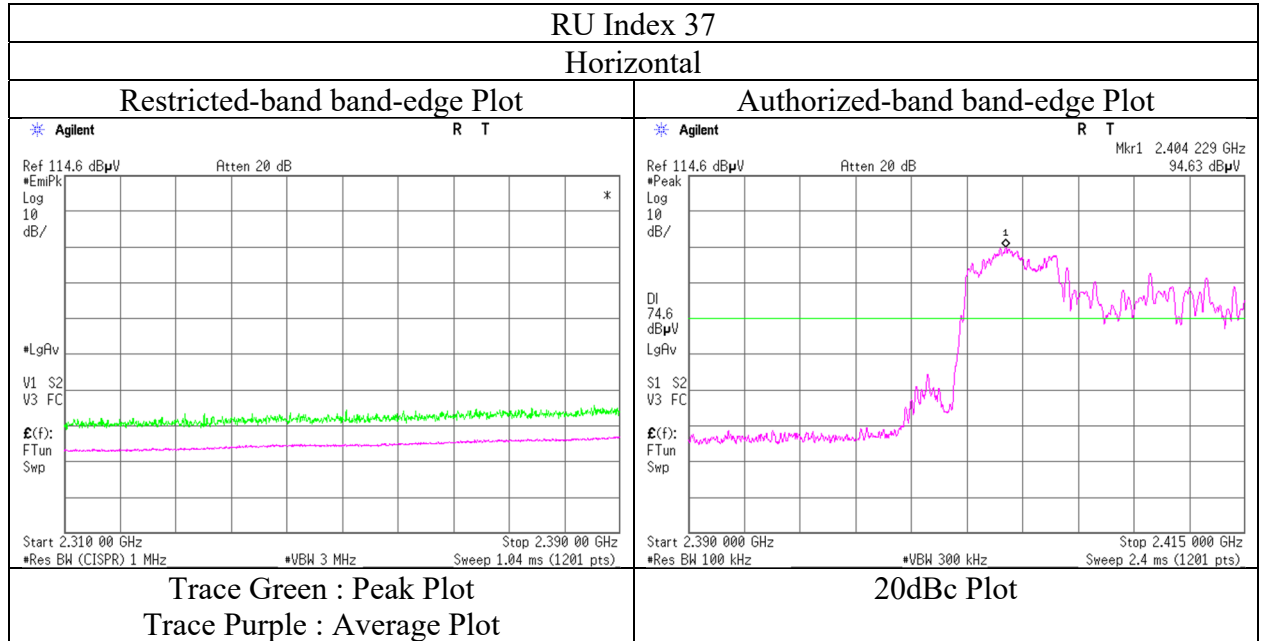
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (52-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (106-tone RU)

RU Index 53

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	50.7	41.3	27.6	5.5	32.6	0.3	51.2	42.1	73.9	53.9	22.7	11.8	*1)
Vert.	2390.0	48.4	39.3	27.6	5.5	32.6	0.3	48.9	40.1	73.9	53.9	25.0	13.8	*1)

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	95.3	27.5	5.5	32.6	95.8	-	-	Carrier
Hori.	2400.0	54.1	27.5	5.5	32.6	54.5	75.8	21.2	
Vert.	2412.0	92.2	27.5	5.5	32.6	92.6	-	-	Carrier
Vert.	2400.0	52.3	27.5	5.5	32.6	52.8	72.6	19.9	

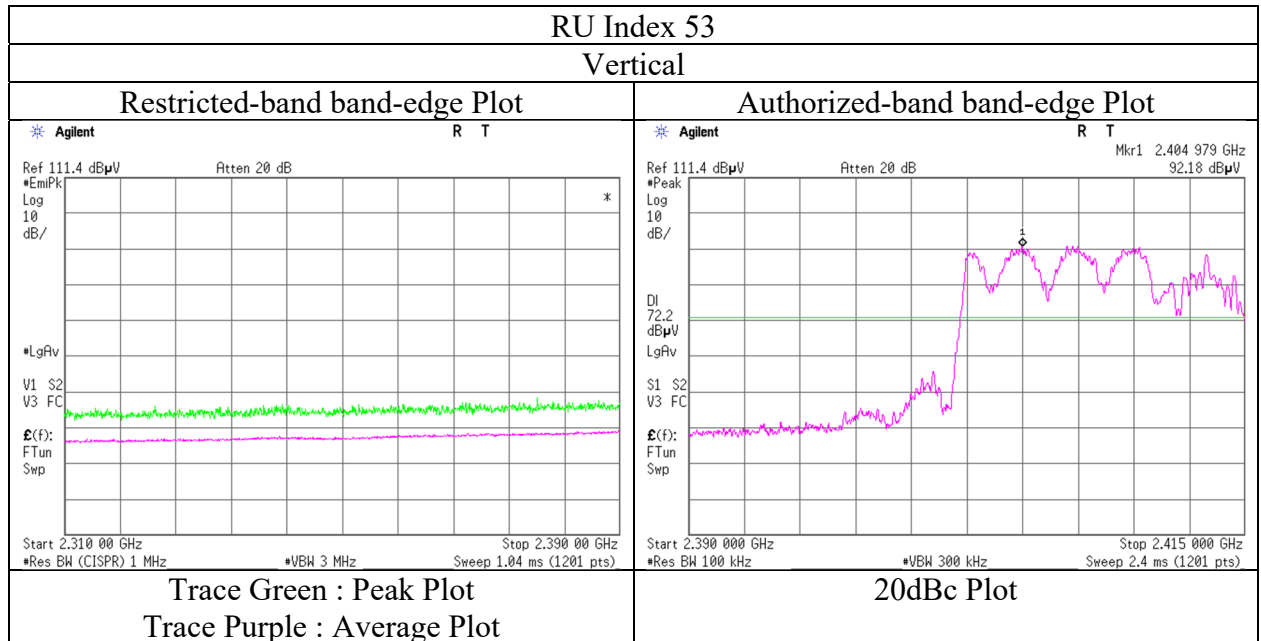
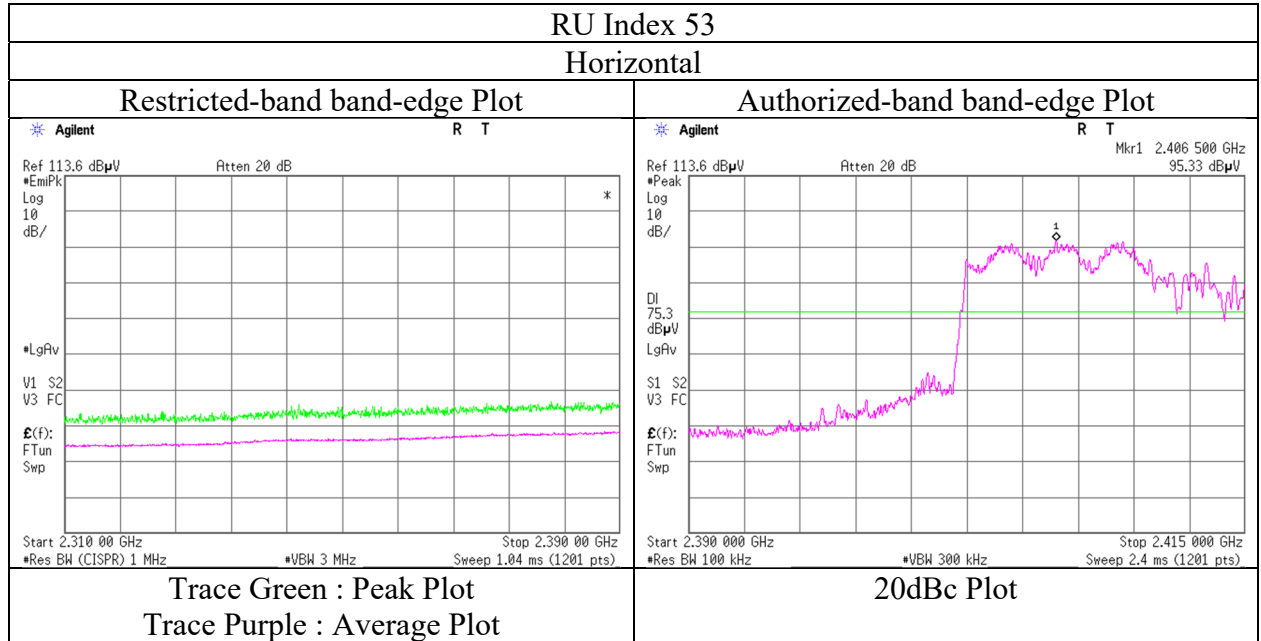
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (106-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (242-tone RU)

RU Index 61

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2390.0	56.2	45.0	27.6	5.5	32.6	0.4	56.7	45.8	73.9	53.9	17.2	8.1	*1)
Vert.	2390.0	54.5	42.2	27.6	5.5	32.6	0.4	55.0	43.0	73.9	53.9	18.9	10.9	*1)

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

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

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

*QP detector was used up to 1GHz.

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

20dBc Data Sheet

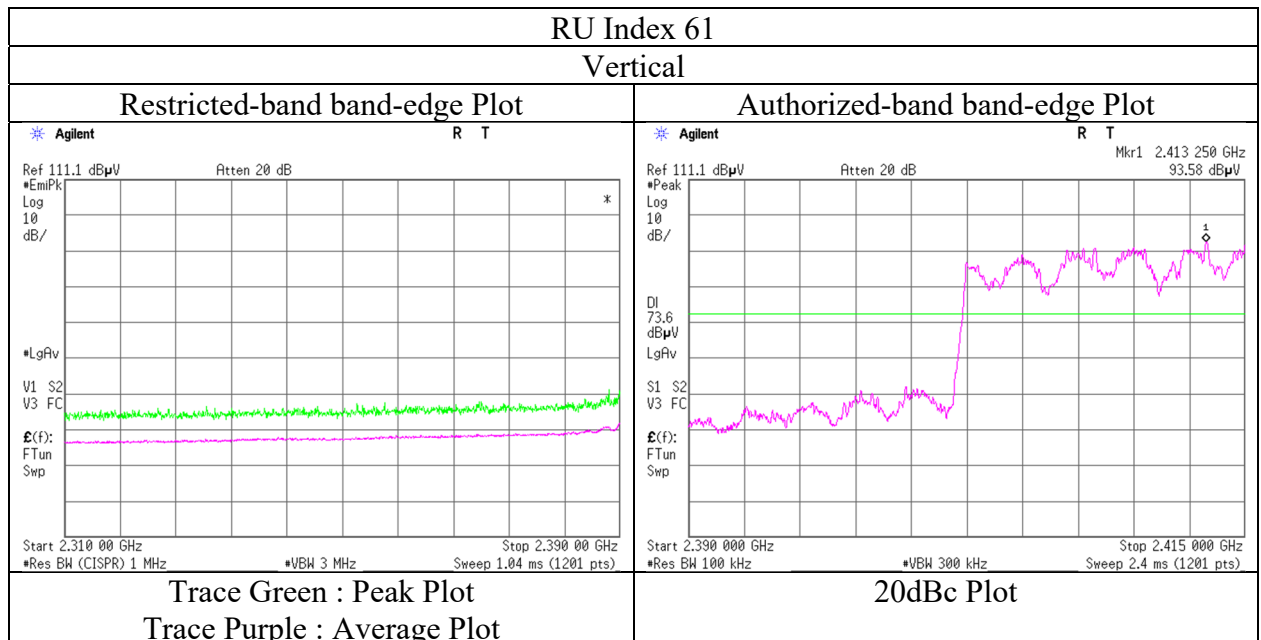
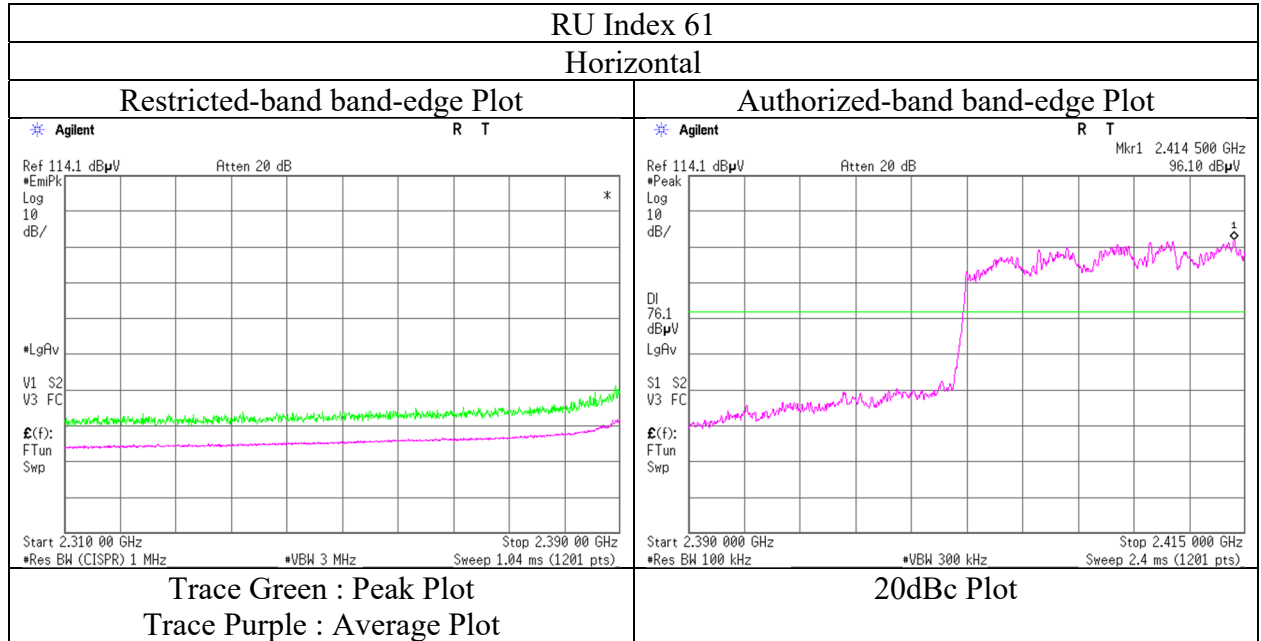
Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.0	96.1	27.5	5.5	32.6	96.6	-	-	Carrier
Hori.	2400.0	56.7	27.5	5.5	32.6	57.1	76.6	19.4	
Vert.	2412.0	93.6	27.5	5.5	32.6	94.0	-	-	Carrier
Vert.	2400.0	52.7	27.5	5.5	32.6	53.2	74.0	20.9	

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

Distance factor:
1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Takeshi Hiyaji
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (242-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 27, 2022	February 2, 2022	February 3, 2022
Temperature / Humidity	20 deg. C / 37 % RH	20 deg. C / 35 % RH	22 deg. C / 35 % RH
Engineer	Takeshi Hiyaji	Yuta Moriya	Yuta Moriya
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11ax-20 OFDM 2437 MHz		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2296.5	48.3	33.5	28.0	5.4	32.6	0.1	49.1	34.5	73.9	53.9	24.8	19.4	*2)
Hori.	4874.0	40.1	32.0	31.5	7.8	31.6	-	47.8	39.7	73.9	53.9	26.1	14.2	Floor noise
Hori.	7311.0	41.3	32.8	35.9	9.3	32.7	-	53.9	45.3	73.9	53.9	20.0	8.6	Floor noise
Hori.	9748.0	41.4	31.4	39.1	9.8	33.1	-	57.3	47.3	73.9	53.9	16.6	6.7	Floor noise
Vert.	2296.5	54.1	36.6	28.0	5.4	32.6	0.1	55.0	37.5	73.9	53.9	18.9	16.4	*2)
Vert.	4874.0	40.3	31.9	31.5	7.8	31.6	-	48.0	39.6	73.9	53.9	25.9	14.3	Floor noise
Vert.	7311.0	41.1	32.8	35.9	9.3	32.7	-	53.7	45.3	73.9	53.9	20.2	8.6	Floor noise
Vert.	9748.0	41.3	31.6	39.1	9.8	33.1	-	57.2	47.5	73.9	53.9	16.8	6.5	Floor noise

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

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

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

*QP detector was used up to 1GHz.

*2) Noise synchronized with duty of carrier frequency

Distance factor: 1 GHz - 10 GHz $20\log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 27, 2022	February 2, 2022	February 3, 2022
Temperature / Humidity	20 deg. C / 37 % RH	20 deg. C / 35 % RH	22 deg. C / 35 % RH
Engineer	Takeshi Hiyaji (1 GHz - 10 GHz)	Yuta Moriya (10 GHz - 18 GHz)	Yuta Moriya (18 GHz - 26.5 GHz)
Mode	Tx 11ax-20 OFDM 2462 MHz		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2483.5	58.6	45.4	27.4	5.6	32.5	0.1	59.1	46.0	73.9	53.9	14.8	7.9	*1)
Hori.	4924.0	40.6	31.7	31.6	7.8	31.6	-	48.4	39.6	73.9	53.9	25.5	14.3	Floor noise
Hori.	7386.0	41.3	32.9	36.0	9.3	32.7	-	54.0	45.6	73.9	53.9	20.0	8.3	Floor noise
Hori.	9848.0	41.4	31.8	39.2	9.9	33.1	-	57.3	47.7	73.9	53.9	16.6	6.2	Floor noise
Vert.	2483.5	59.4	46.0	27.4	5.6	32.5	0.1	59.8	46.6	73.9	53.9	14.1	7.3	*1)
Vert.	4924.0	40.6	31.4	31.6	7.8	31.6	-	48.4	39.2	73.9	53.9	25.5	14.7	Floor noise
Vert.	7386.0	41.5	32.8	36.0	9.3	32.7	-	54.2	45.5	73.9	53.9	19.7	8.4	Floor noise
Vert.	9848.0	41.8	31.7	39.2	9.9	33.1	-	57.7	47.6	73.9	53.9	16.2	6.3	Floor noise

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

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

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

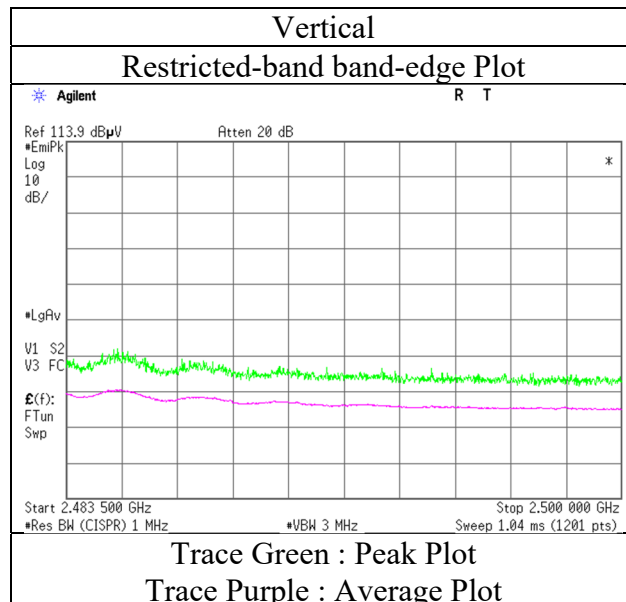
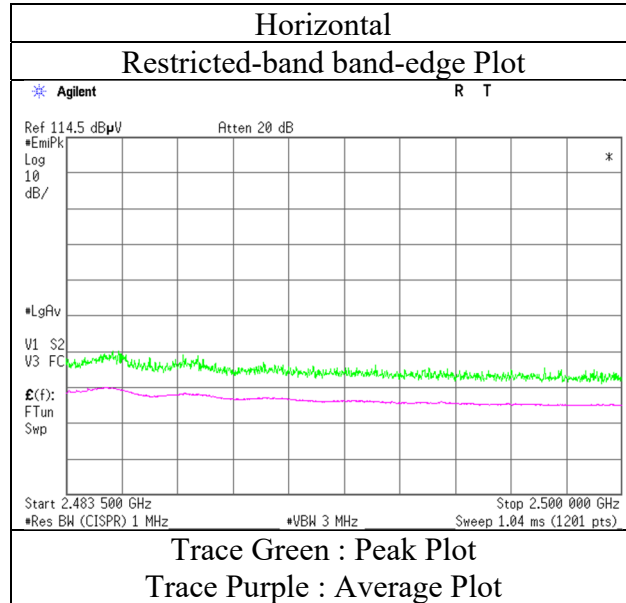
*QP detector was used up to 1GHz.

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

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 27, 2022
Temperature / Humidity 20 deg. C / 37 % RH
Engineer Takeshi Hiyaji
 (1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDM 2462 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (26-tone RU)

RU Index 8

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	48.1	36.0	27.4	5.6	32.5	0.3	48.5	36.7	73.9	53.9	25.4	17.2	*1)
Vert.	2483.5	47.8	36.3	27.4	5.6	32.5	0.3	48.2	37.0	73.9	53.9	25.7	16.9	*1)

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

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

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

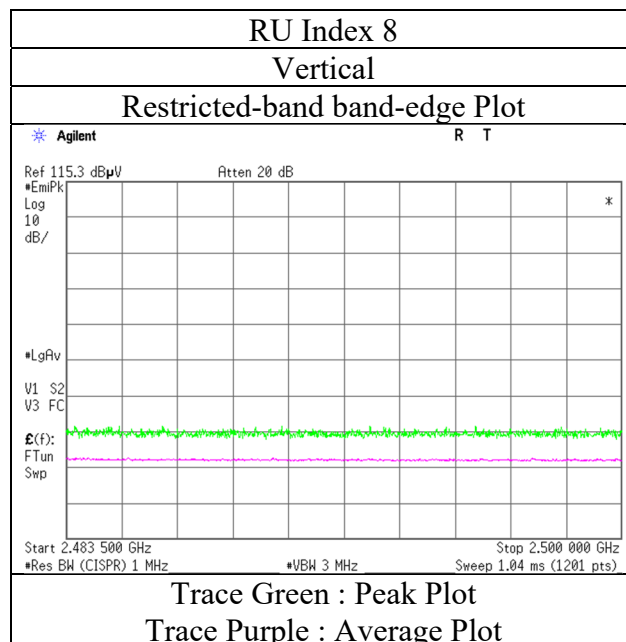
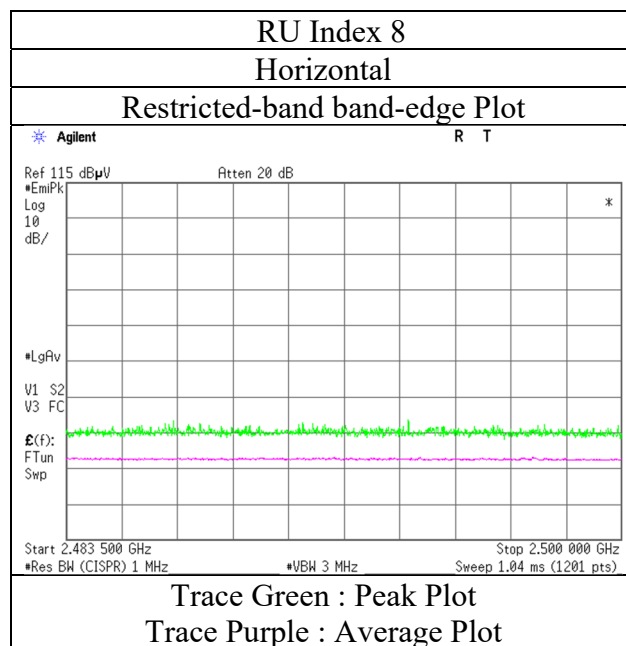
*QP detector was used up to 1GHz.

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

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (26-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (WLAN)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (52-tone RU)

RU Index 40

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	50.6	38.9	27.4	5.6	32.5	0.3	51.1	39.6	73.9	53.9	22.8	14.3	*1)
Vert.	2483.5	48.8	38.1	27.4	5.6	32.5	0.3	49.2	38.8	73.9	53.9	24.7	15.1	*1)

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

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

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

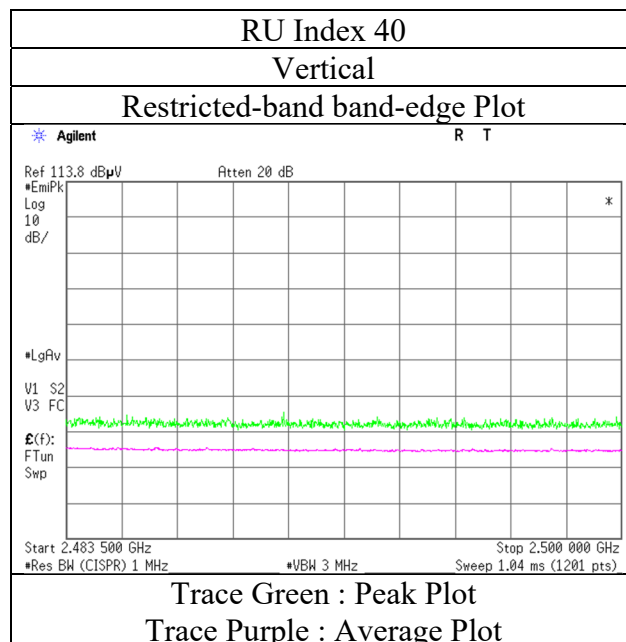
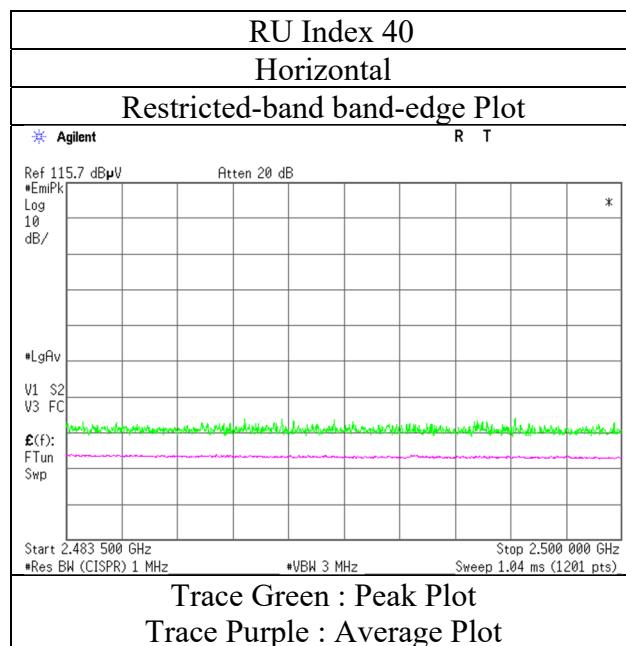
*QP detector was used up to 1GHz.

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

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 27, 2022
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (52-tone RU)



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.