RADIO TEST REPORT

Test Report No. : 12699044S-AJ-R1

Applicant	:	**Canon Inc**
Type of Equipment	:	**Wireless module**
Model No.	:	**ES203**
FCC ID	:	**AZD240**
Test regulation	:	**FCC Part 15 Subpart C: 2019**
Test Result	:	**Complied (Refer to SECTION 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 12699044S-AJ. 12699044S-AJ is replaced with this report.

Date of test: February 9 to June 3, 2019

Representative test engineer:
Hiromasa Sato
Engineer
Consumer Technology Division

Approved by:
Toyokazu Imamura
Leader
Consumer Technology Division

CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 12699044S-AJ

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12699044S-AJ	September 6, 2019	-	-
1	12699044S-AJ-R1	October 21, 2019	8	Correction of description: The EUT has a unique coupling/antenna connector (MS-180 and U.FL). Therefore the equipment complies with the requirement of 15.203. ↓ For antenna A: The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203. For antenna B: The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement of 15.203.
			15	Correction of test distance: 0.01 m → 3.99 m
			25 - 27	Modification of data and sample calculation of CDD, by considering Directional Gain
				Correction of data: Using Antenna gain → Directional gain
			36 - 37	Addition of remarks on the data: " Duty > 98 %"
			38 - 56	Adjustment of decimal places to limit of the RE data: two decimal places → one decimal places

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Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation
AC	Alternating Current
AFH	Adaptive Frequency Hopping
AM	Amplitude Modulation
Amp, AMP	Amplifier
ANSI	American National Standards Institute
Ant, ANT	Antenna
AP	Access Point
Atten., ATT	Attenuator
AV	Average
BPSK	Binary Phase-Shift Keying
BR	Bluetooth Basic Rate
BT	Bluetooth
BT LE	Bluetooth Low Energy
BW	BandWidth
Cal Int	Calibration Interval
CCK	Complementary Code Keying
Ch., CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques
CW	Continuous Wave
DBPSK	Differential BPSK
DC	Direct Current
DFS	Dynamic Frequency Selection
DQPSK	Differential QPSK
DSSS	Direct Sequence Spread Spectrum
EDR	Enhanced Data Rate
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EN	European Norm
ERP, e.r.p.	Effective Radiated Power
EU	European Union
EUT	Equipment Under Test
Fac.	Factor
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
FM	Frequency Modulation
Freq.	Frequency
GFSK	Gaussian Frequency-Shift Keying
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Hori.	Horizontal
ICES	Interference-Causing Equipment Standard
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
ILAC	International Laboratory Accreditation Conference
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
JAB	Japan Accreditation Board
LAN	Local Area Network
LIMS	Laboratory Information Management System
MCS	Modulation and Coding Scheme
MRA	Mutual Recognition Arrangement
NIST	National Institute of Standards and Technology
NS	No signal detect.
NSA	Normalized Site Attenuation
NVLAP	National Voluntary Laboratory Accreditation Program
OBW	Occupied Band Width
OFDM	Orthogonal Frequency Division Multiplexing
P/M	Power meter
PCB	Printed Circuit Board
PER	Packet Error Rate
PHY	Physical Layer
PK	Peak
PN	Pseudo random Noise
PRBS	Pseudo-Random Bit Sequence
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
QP	Quasi-Peak
QPSK	Quadri-Phase Shift Keying
RBW	Resolution Band Width
RDS	Radio Data System
RE	Radio Equipment
RF	Radio Frequency
RMS	Root Mean Square
RSS	Radio Standards Specifications
Rx	Receiving
SA, S/A	Spectrum Analyzer
SG	Signal Generator
SVSWR	Site-Voltage Standing Wave Ratio
TR	Test Receiver
Tx	Transmitting
VBW	Video BandWidth
Vert.	Vertical
WLAN	Wireless LAN

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Canon Inc
Address	:	30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501 Japan
Telephone Number	:	+81-3-3757-6798
Facsimile Number	:	+81-3-5482-4053
Contact Person	:	Tomohiro Suzuki

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No., 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 (E.U.T.)
- SECTION 4: Operation of E.U.T. 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 (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless module
Model No.	:	ES203
Serial No.	:	Refer to SECTION 4, SECTION 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample (Information from test lab.)	:	January 25, 2019
Country of Mass-production	:	China, Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: ES203 (referred to as the EUT in this report) is a Wireless module.

Radio Specification

WLAN module : ES203
Radio Type : Transceiver
Clock frequency (Maximum) : 40 MHz

WLAN

	IEEE802.11b	**IEEE802.11g**	**IEEE802.11n (20 MHz band)**	**IEEE802.11n (40 MHz band)**
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz 5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	2422 MHz - 2452 MHz 5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz
Channel spacing	5 MHz		2.4 GHz band 5 MHz 5 GHz band 20 MHz	2.4 GHz band 5 MHz 5 GHz band 40 MHz
Modulation	DSSS: DBPSK, DQPSK, CCK	OFDM: BPSK, QPSK, 16QAM, 64QAM		
	IEEE802.11a	**IEEE802.11ac (20 MHz band)**	**IEEE802.11ac (40 MHz band)**	**IEEE802.11ac (80 MHz band)**
Frequency of operation	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz	5210 MHz 5290 MHz 5530 MHz - 5610 MHz 5775 MHz
Channel spacing	20 MHz	20 MHz	40 MHz	80 MHz
Modulation	OFDM: BPSK, QPSK, 16QAM, 64QAM, 256QAM (*256QAM is only for IEEE802.11ac 80 MHz band)			

Antenna	**Antenna A**	**Antenna B**
Antenna quantity	2 pcs. (*. Separation distance between the antenna A and the antenna B: ≈5 mm) *. The single antenna transmitting mode could not be allowed.	
Antenna type / connector type	Invert-L Pattern antenna / Printed on the PCB.	Invert-L Flexible printed circuit (FPC) antenna / PCB side: U.FL, Antenna side: soldered
Antenna gain	-1.77 dBi (2.4GHz band), 1.52 dBi (U-NII-1 band), 1.78 dBi (U-NII-2A band), 2.04 dBi (U-NII-2C band), 2.26 dBi (U-NII-3 band), (*.including cable loss)	-3.92 dBi (2.4GHz band), 1.39 dBi (U-NII-1 band), 1.59 dBi (U-NII-2A band), 0.79 dBi (U-NII-2C band), 1.42 dBi (U-NII-3 band), (*.including cable loss)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258

* The revisions made after testing date do not affect the test specification applied to the EUT.

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods	**FCC:** Section 15.207	16.3 dB, 4.94196 MHz, N, AV	Complied a)	-
	IC: RSS-Gen 8.8	**IC:** RSS-Gen 8.8			
6dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(a)(2)	See data.	Complied b)	Conducted
	IC: -	**IC:** RSS-247 5.2(a)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(b)(3)		Complied c)	Conducted
	IC: RSS-Gen 6.12	**IC:** RSS-247 5.4(d)			
Power Density	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(e)		Complied d)	Conducted
	IC: -	**IC:** RSS-247 5.2(b)			
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section15.247(d)	2.6 dB 9748.000 MHz, AV, Hori. Tx 11g 2437 MHz	Complied# e), f)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
	IC: RSS-Gen 6.13	**IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05 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.

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

FCC Part 15.31 (e)
The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement
For antenna A: The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.
For antenna B: The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	RSS-Gen 6.7	**IC:** -	N/A	- a)	Conducted

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05 8.5 and 8.6.
a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)

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.

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

3.4 Uncertainty

EMI

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

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

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.9 dB	2.8 dB	2.9 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.1 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.7 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.1 dB	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-

SAC=Semi-Anechoic Chamber
SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.81 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.53 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.95 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.21 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.90 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.04 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.3 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.4 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	0.61 %
Duty cycle and Time Measurement	0.012 %

3.5 Test Location

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A2LA Certificate Number: 1266.03 (FCC Test Firm Registration Number: 626366, ISED Lab Company Number: 2973D)

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

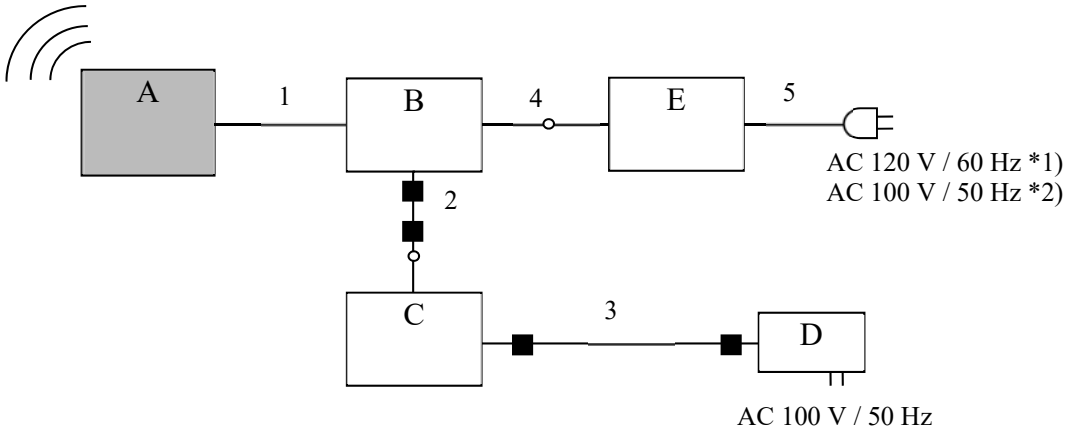
Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - " of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	48 Mbps, PN9
IEEE 802.11n 20 MHz BW CDD (11n-20 CDD)	MCS 2, PN9
IEEE 802.11n 20 MHz BW MIMO (11n-20 MIMO)	MCS 14, PN9
IEEE 802.11n 40 MHz BW CDD (11n-40 CDD)	MCS 0, PN9
IEEE 802.11n 40 MHz BW MIMO (11n-40 MIMO)	MCS 9, 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 settings: 7 dBm Software: Tera Term, Version 4.87 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	11n-20 MIMO Tx	A + B	2412 MHz
Spurious Emission	11b Tx 11g Tx	A + B	2412 MHz 2437 MHz 2462 MHz
	11n-20 MIMO Tx *1)	A + B	2412 MHz 2437 MHz 2462 MHz
	11n-40 MIMO Tx *1)	A + B	2422 MHz 2437 MHz 2452 MHz
6 dB Bandwidth 99 % Occupied Bandwidth	11b Tx 11g Tx 11n-20 CDD Tx 11n-20 MIMO Tx	B	2412 MHz 2437 MHz 2462 MHz
	11n-40 CDD Tx 11n-40 MIMO Tx	B	2422 MHz 2437 MHz 2452 MHz
Maximum Peak Output Power Power Density	11b Tx 11g Tx 11n-20 CDD Tx 11n-20 MIMO Tx	A + B	2412 MHz 2437 MHz 2462 MHz
	11n-40 CDD Tx 11n-40 MIMO Tx	A + B	2422 MHz 2437 MHz 2452 MHz
*1) The test was performed with MIMO as a representative mode.			

4.2 Configuration and peripherals



■ : Standard Ferrite Core

*1) For Conducted emission test
*2) For Antenna Terminal conducted test and Radiated emission test
* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Wireless module	ES203	1 *3) 9 *4)	Canon	EUT
B	Jig Board	W-USB-JIG	-	-	-
C	Jig Board	-	-	-	-
D	AC Adaptor	AD-A60P228	-	XIAMEN UME ELECTRONIC Co.Ltd	-
E	DC Power Supply	PAN60-10A	002383	KIKUSUI	-

*3) Used for Radiated Emission tests
*4) Used for Antenna Terminal Conducted tests

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	USB	1.4 + 2.0	Shielded	Shielded	-
3	DC	1.4	Unshielded	Unshielded	-
4	DC	1.0 + 1.5	Unshielded	Unshielded	-
5	AC	3.0	Unshielded	Unshielded	-

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.

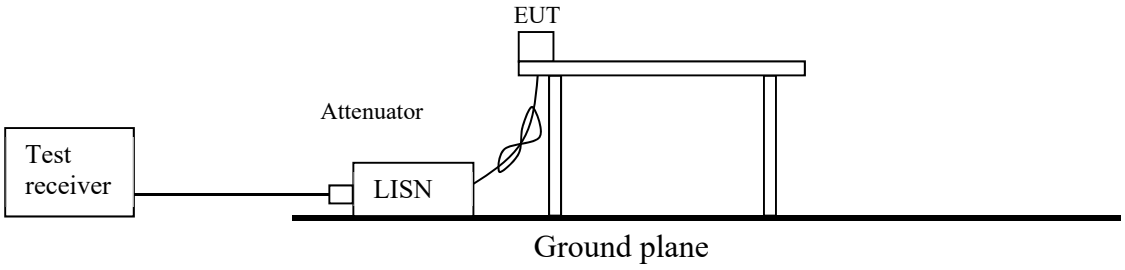
1) For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (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 Shielded room.
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 - 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 v05".

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 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.

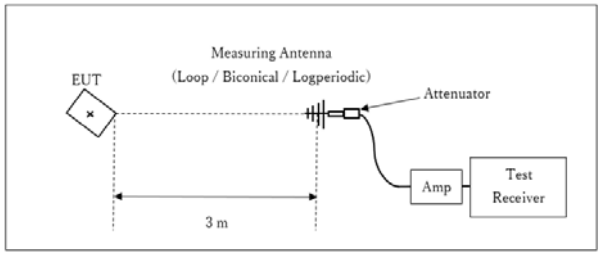
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

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	11.12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

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

Figure 2: Test Setup

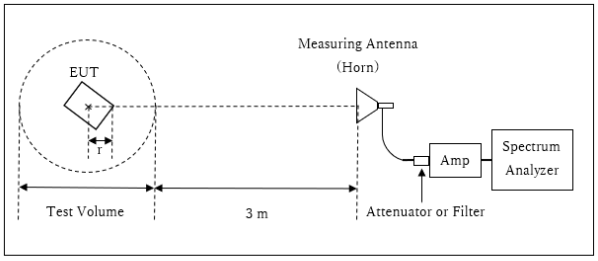
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

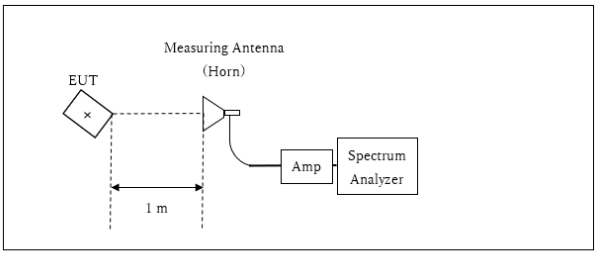


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.99 m / 3.0 m) = 2.48 dB
* Test Distance: (3 + Test Volume /2) - r = 3.99 m

Test Volume : 2 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.01 m

13 GHz - 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 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.

Combinations of the worst case

Frequency / Antenna polarization	Spurious				
	Below 1 GHz	1 GHz – 2.8 GHz	2.8 GHz – 13 GHz	13 GHz-18 GHz	18 GHz-26.5 GHz
Horizontal	Z	Y	Y	X	X
Vertical	Z	Z	Z	X	Z

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

Measurement range : 30 MHz - 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
6 dB Bandwidth	Enough width to display emission skirts	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: 160 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

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

DATA OF CONDUCTED EMISSION TEST

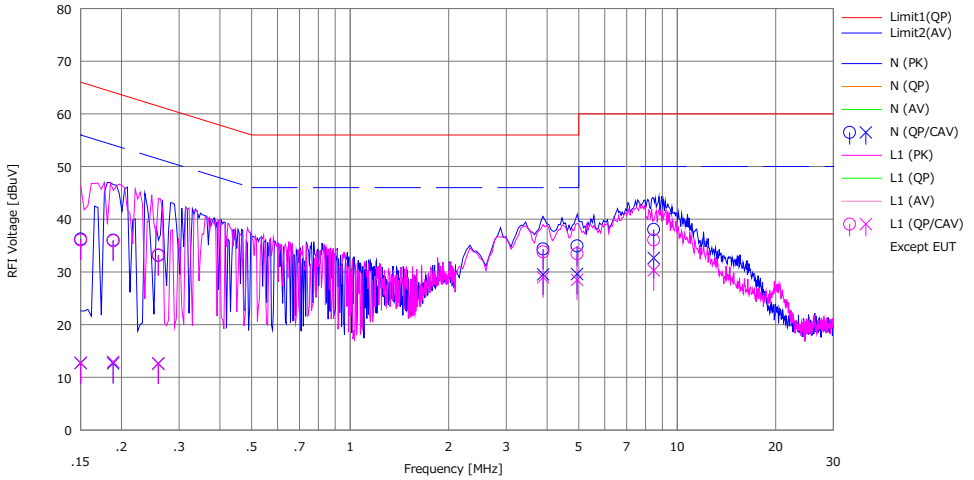
UL Japan,Inc. Shonan EMC Lab. No.2 Shielded Room
Date : 2019/03/14

Mode : Tx_11n-20_2412 MHz, MIMO

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 36 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈CAV〉		〈QP〉	〈CAV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	23.82	0.29	12.41	36.23	12.70	66.00	56.00	29.7	43.3	N	
2	0.18871	23.61	0.23	12.43	36.04	12.66	64.09	54.09	28.0	41.4	N	
3	0.25916	20.73	0.18	12.43	33.16	12.61	61.46	51.46	28.3	38.8	N	
4	3.88862	21.75	16.92	12.62	34.37	29.54	56.00	46.00	21.6	16.4	N	
5	4.94196	22.27	16.94	12.68	34.95	29.62	56.00	46.00	21.0	16.3	N	
6	8.46737	25.25	19.83	12.81	38.06	32.64	60.00	50.00	21.9	17.3	N	
7	0.15000	23.63	0.34	12.41	36.04	12.75	66.00	56.00	29.9	43.2	L1	
8	0.18871	23.46	0.51	12.43	35.89	12.94	64.09	54.09	28.2	41.1	L1	
9	0.25916	20.78	0.24	12.43	33.21	12.67	61.46	51.46	28.2	38.7	L1	
10	3.88862	21.19	16.38	12.62	33.81	29.00	56.00	46.00	22.1	17.0	L1	
11	4.94196	20.76	15.83	12.68	33.44	28.51	56.00	46.00	22.5	17.4	L1	
12	8.46737	23.25	17.48	12.81	36.06	30.29	60.00	50.00	23.9	19.7	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-03

6 dB Bandwidth and 99 % Occupied Bandwidth

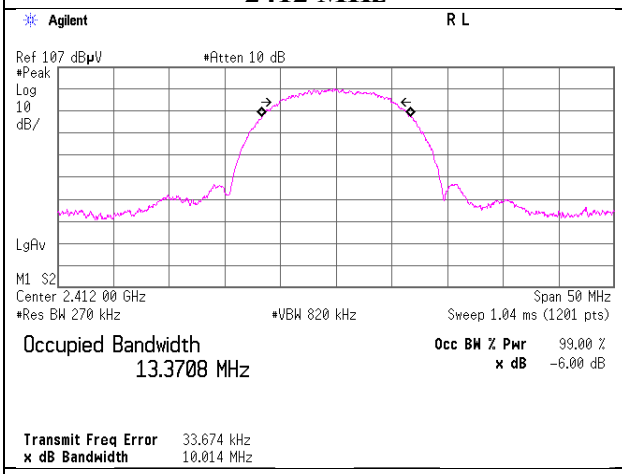
Report No.	12699044S-AJ-R1	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	May 31, 2019	June 3, 2019
Temperature / Humidity	25 deg. C / 47 % RH	25 deg. C / 42 % RH
Engineer	Kazuya Noda	Yosuke Ishikawa
Mode	Tx	

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
11b	2412	13370.8	10.060	> 0.5000
	2437	13374.8	10.075	> 0.5000
	2462	13394.3	10.071	> 0.5000
11g	2412	16817.7	16.489	> 0.5000
	2437	16793.3	16.498	> 0.5000
	2462	16790.5	16.494	> 0.5000
11n-20 CDD	2412	17810.8	17.653	> 0.5000
	2437	17808.3	17.692	> 0.5000
	2462	17800.8	17.623	> 0.5000
11n-20 MIMO	2412	17804.5	17.714	> 0.5000
	2437	17810.6	17.700	> 0.5000
	2462	17759.3	17.673	> 0.5000
11n-40 CDD	2422	36306.0	35.508	> 0.5000
	2437	36352.3	35.862	> 0.5000
	2452	36405.1	35.435	> 0.5000
11n-40 MIMO	2422	36404.0	35.772	> 0.5000
	2437	36373.4	35.601	> 0.5000
	2452	36376.4	35.772	> 0.5000

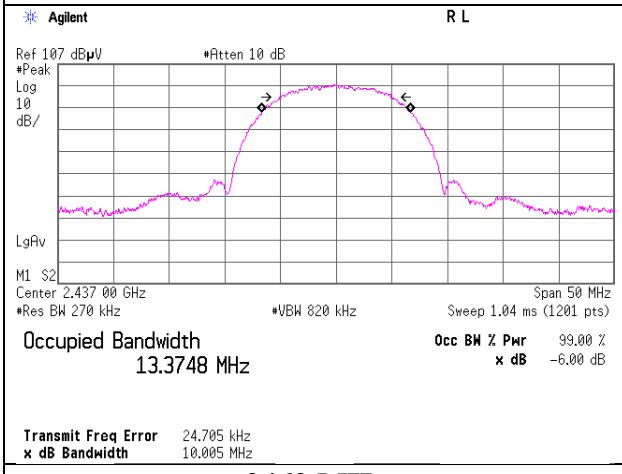
99%Occupied Bandwidth

11b

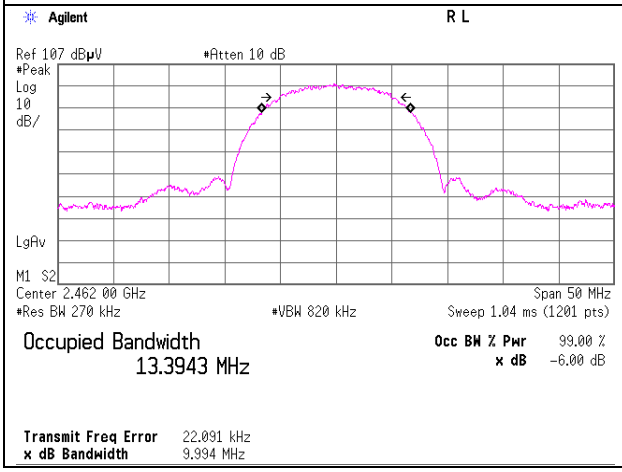
2412 MHz



2437 MHz

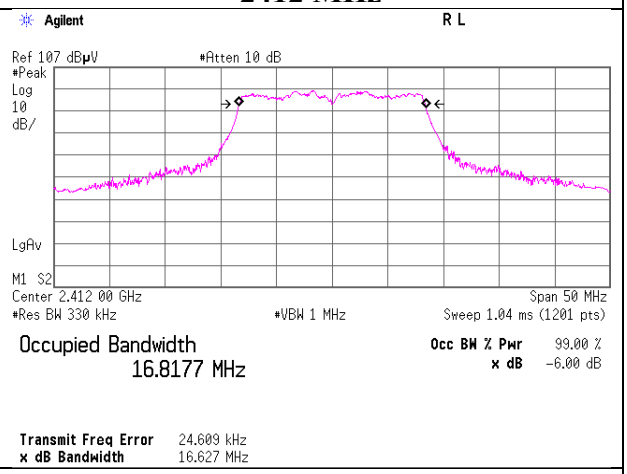


2462 MHz

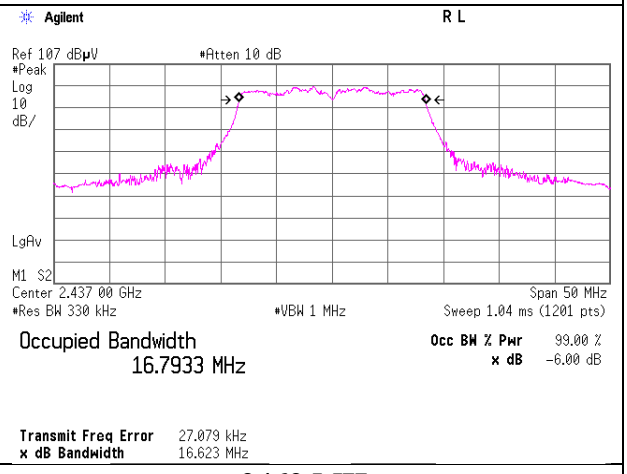


11g

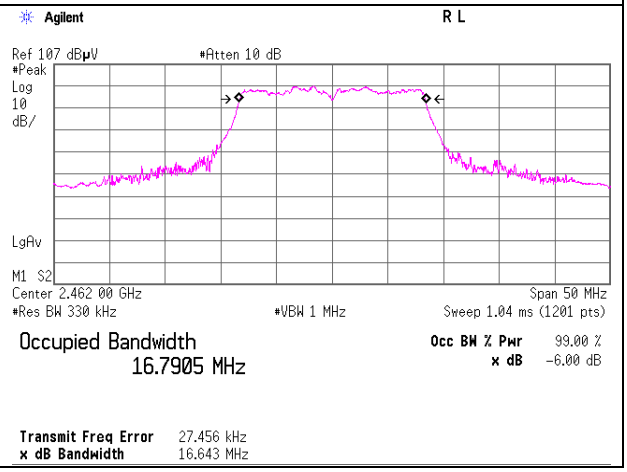
2412 MHz



2437 MHz



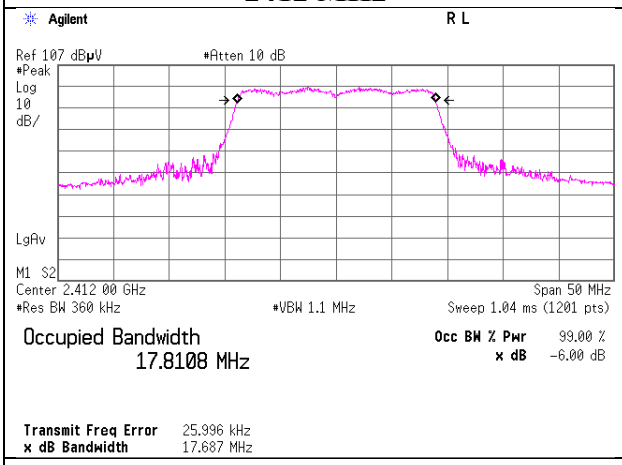
2462 MHz



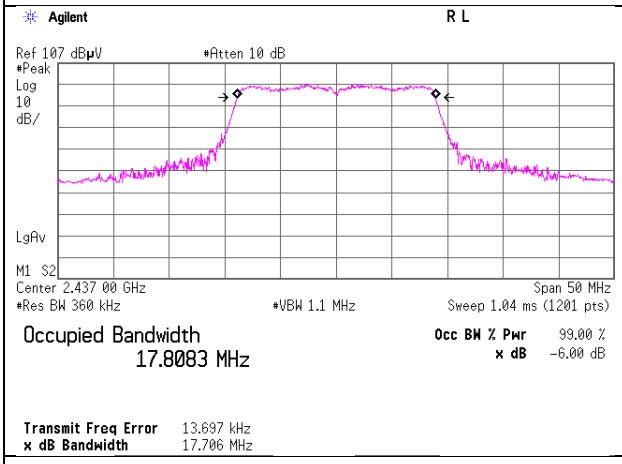
99% Occupied Bandwidth

11n-20 CDD

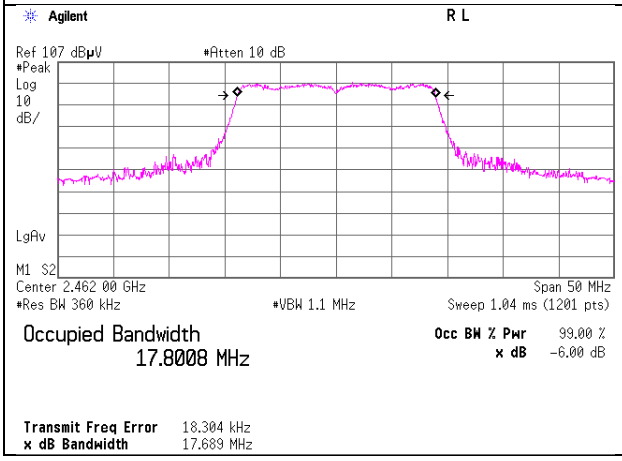
2412 MHz



2437 MHz

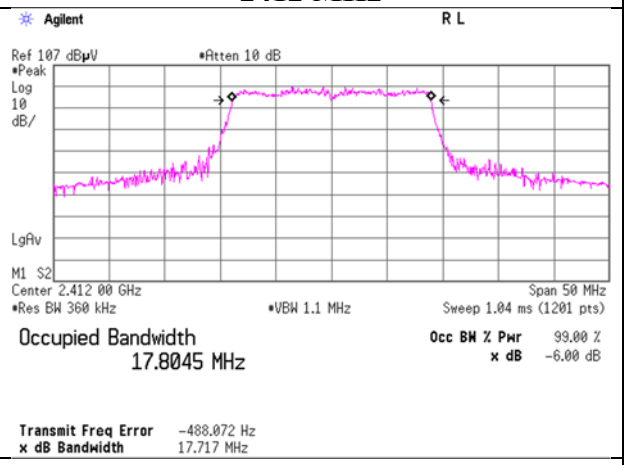


2462 MHz

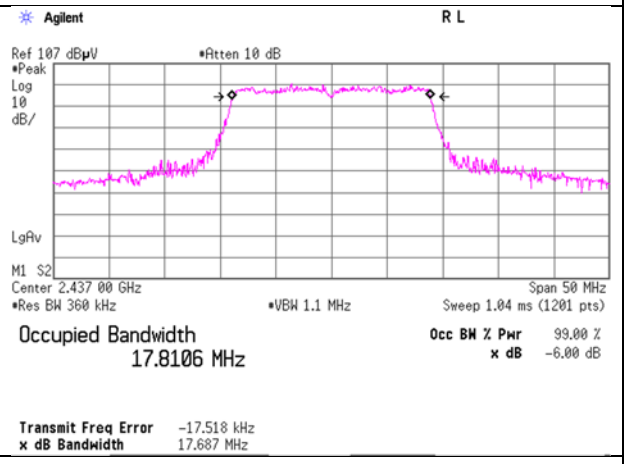


11n-20 MIMO

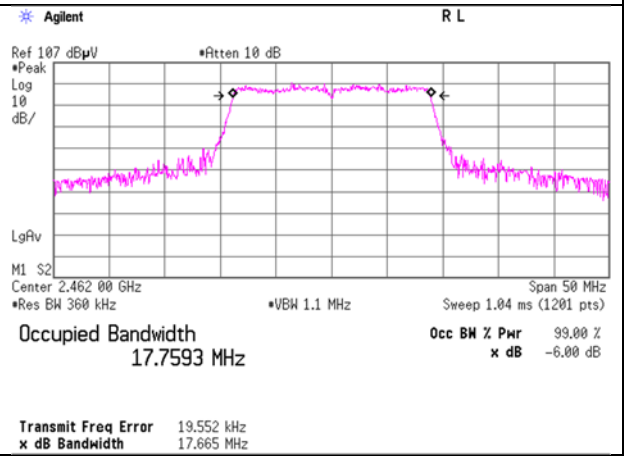
2412 MHz



2437 MHz



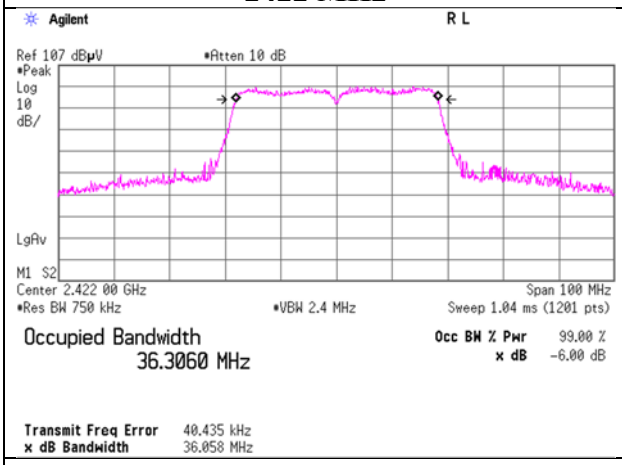
2462 MHz



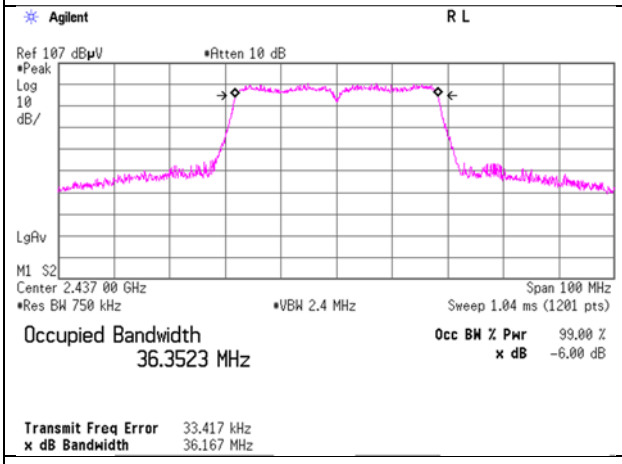
99% Occupied Bandwidth

11n-40 CDD

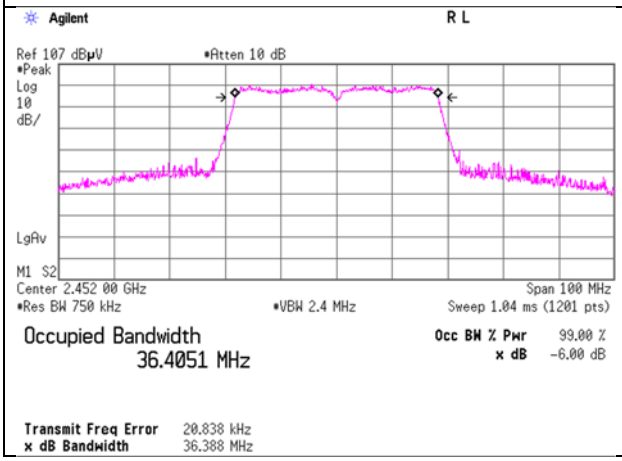
2422 MHz



2437 MHz

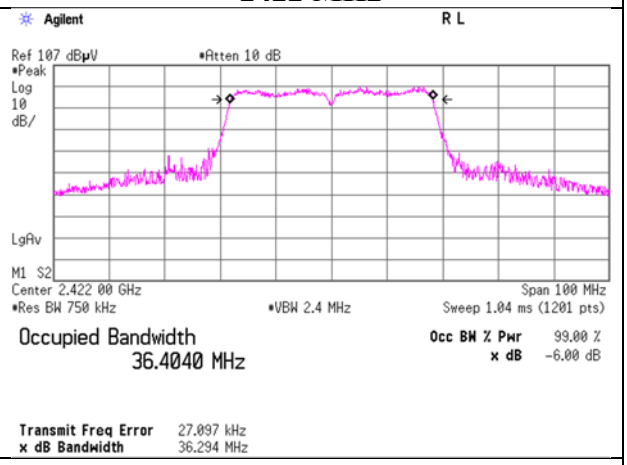


2452 MHz

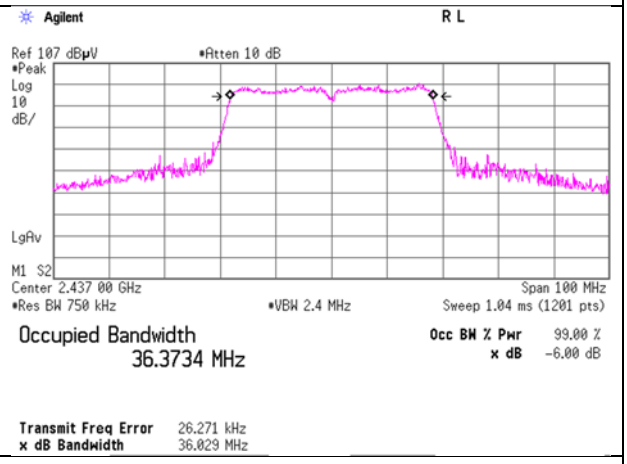


11n-40 MIMO

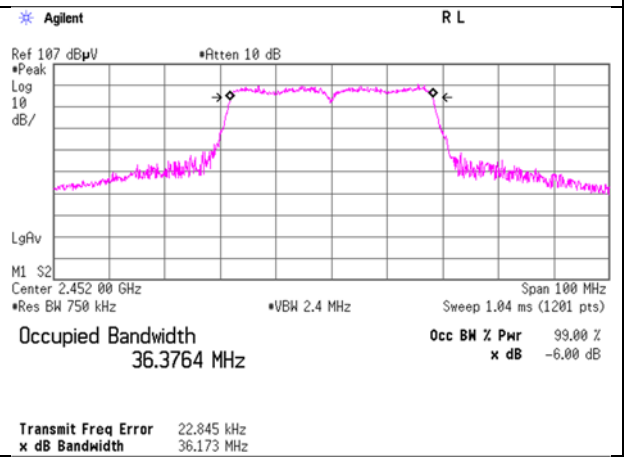
2422 MHz



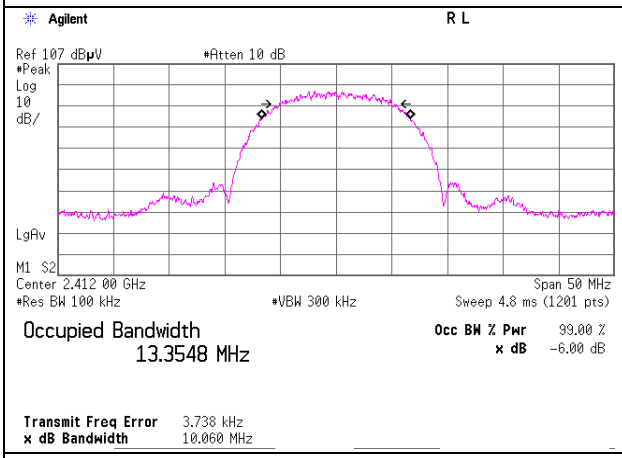
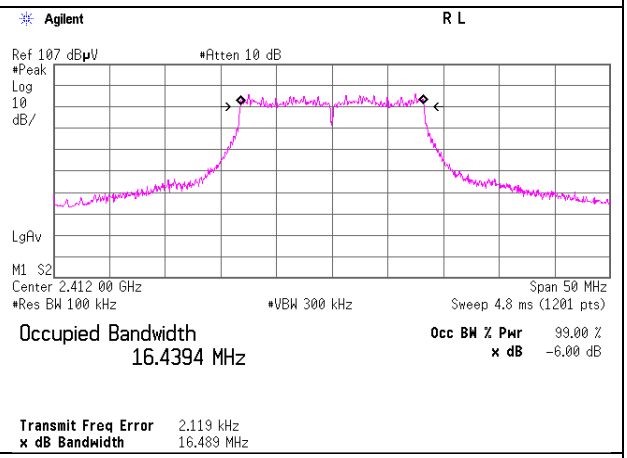
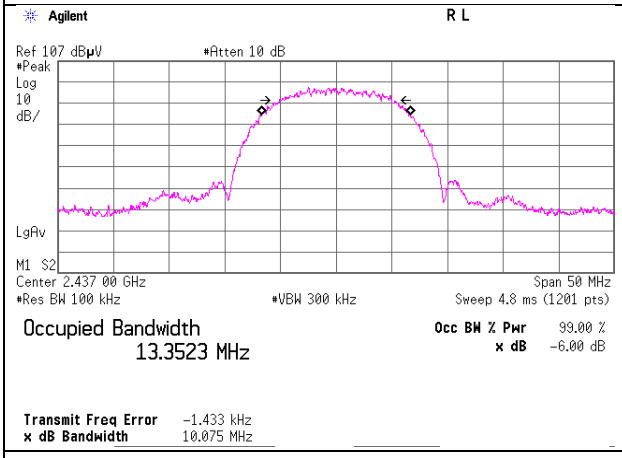
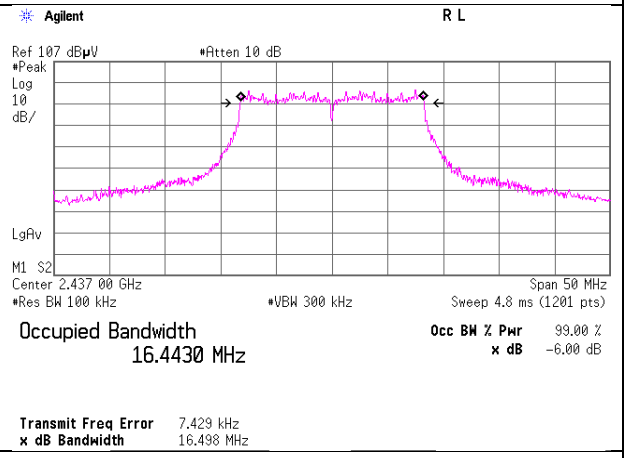
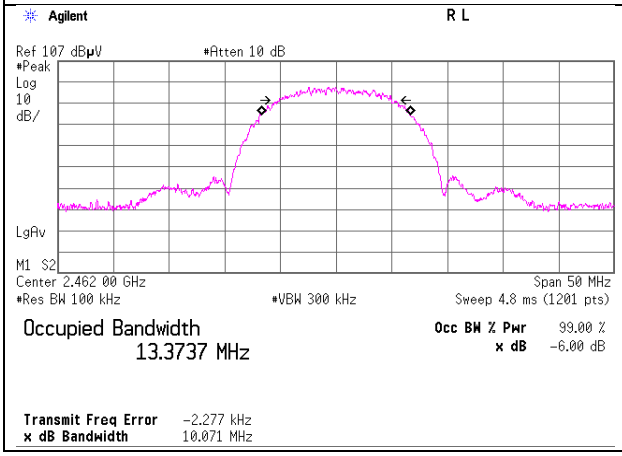
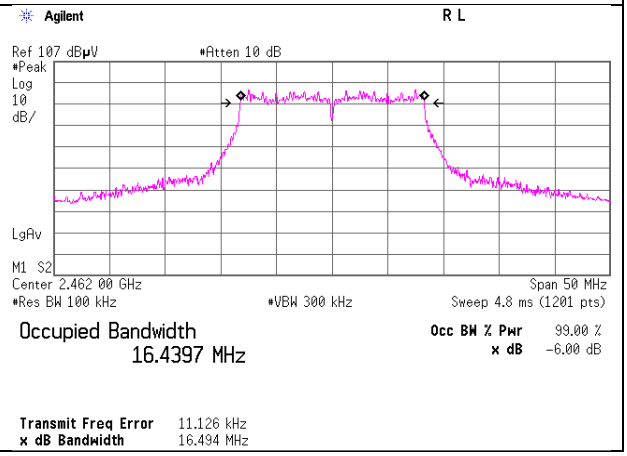
2437 MHz



2452 MHz



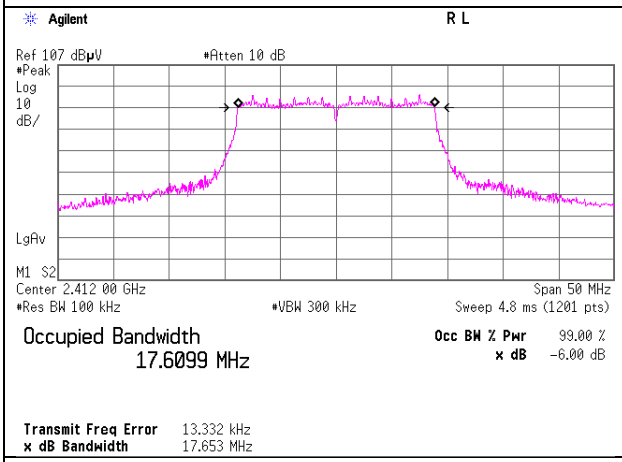
6dB Bandwidth

11b	11g
2412 MHz	**2412 MHz**
	
2437 MHz	**2437 MHz**
	
2462 MHz	**2462 MHz**
	

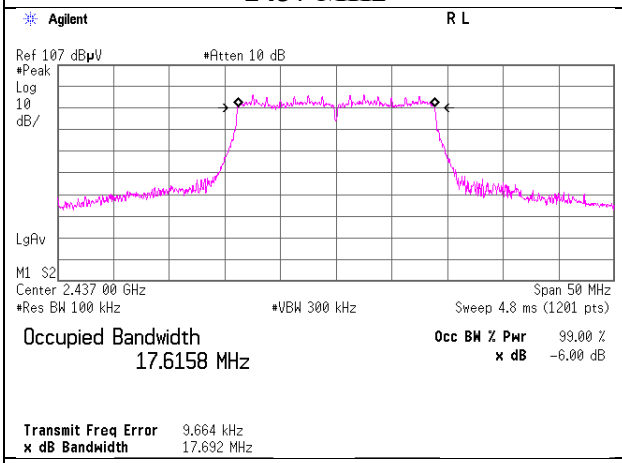
6dB Bandwidth

11n-20 CDD

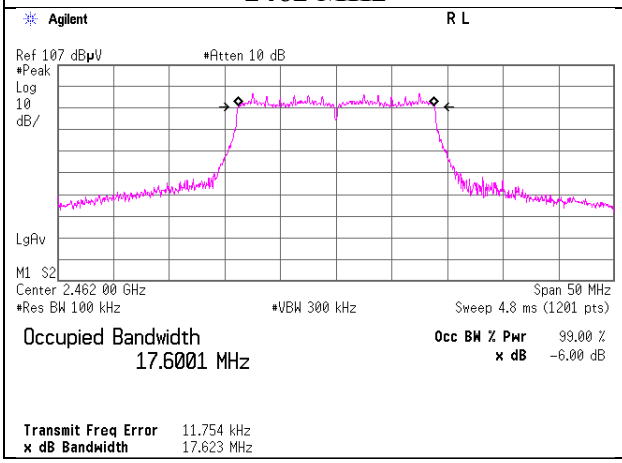
2412 MHz



2437 MHz

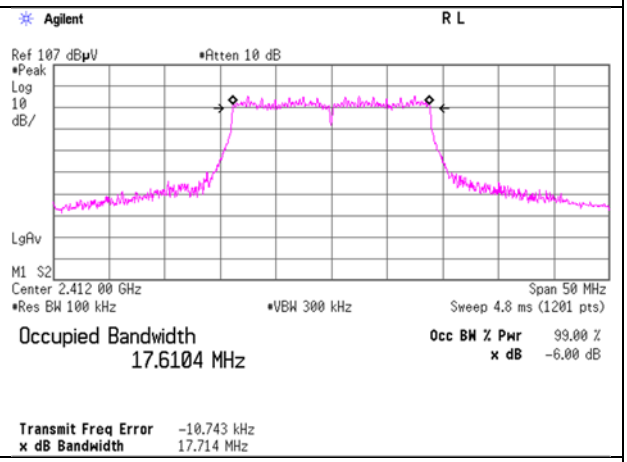


2462 MHz

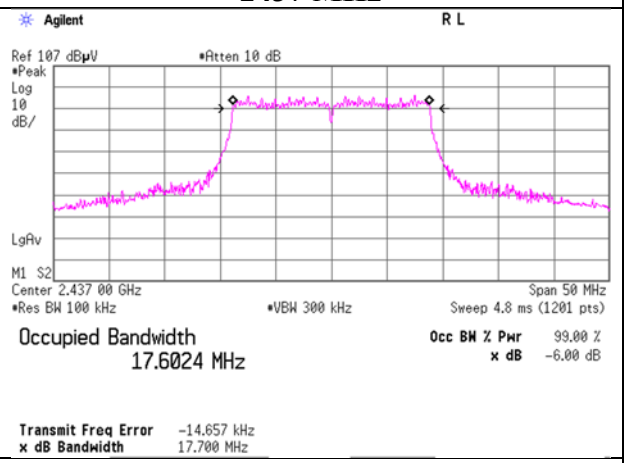


11n-20 MIMO

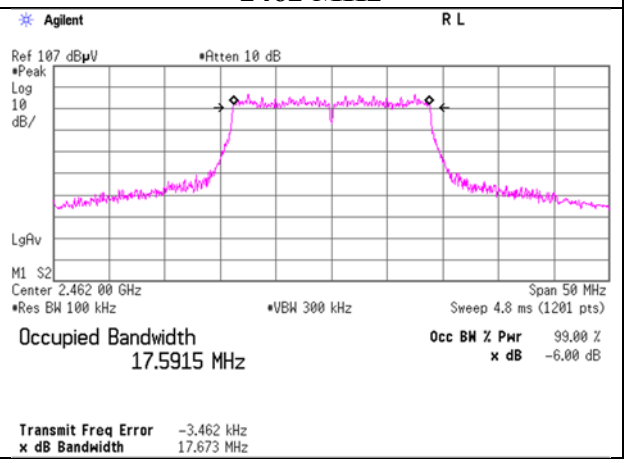
2412 MHz



2437 MHz



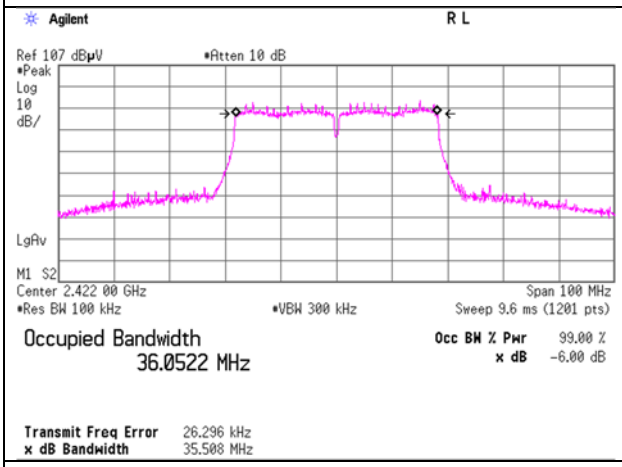
2462 MHz



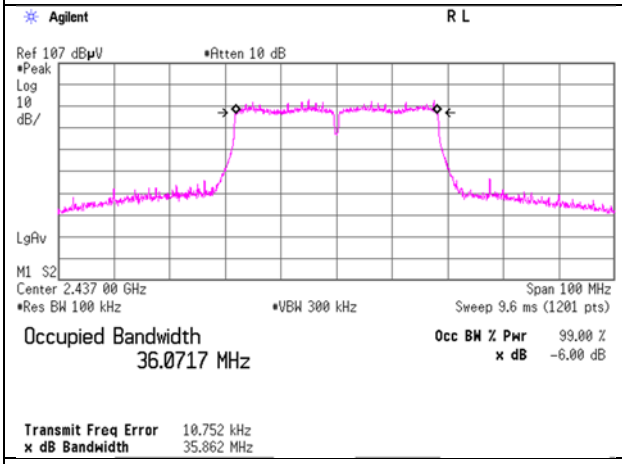
6dB Bandwidth

11n-40 CDD

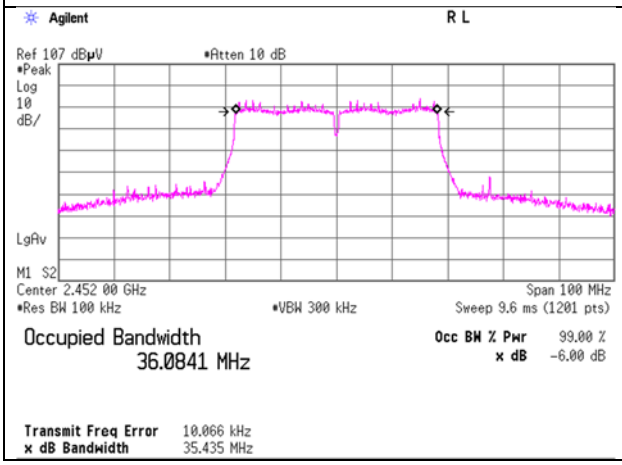
2422 MHz



2437 MHz

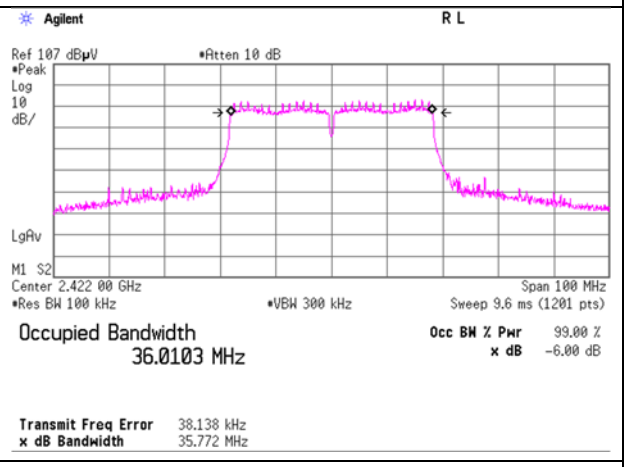


2452 MHz

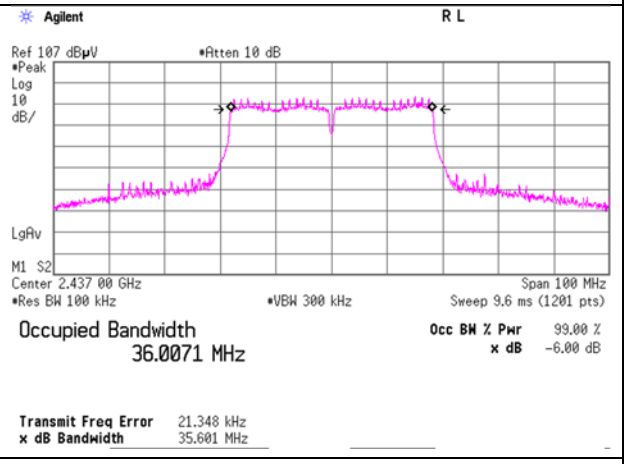


11n-40 MIMO

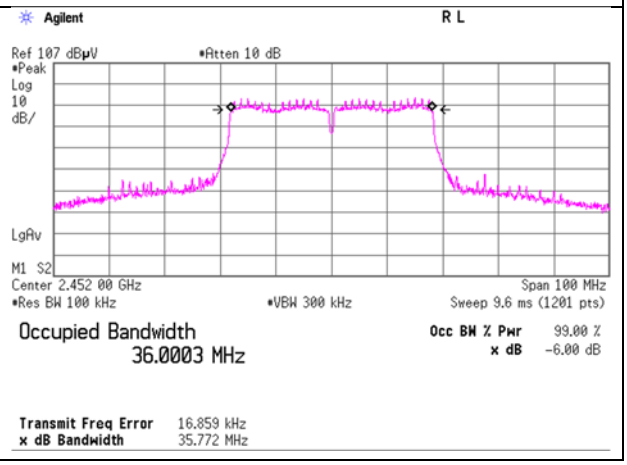
2422 MHz



2437 MHz



2452 MHz



Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11b

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	13.10	20.40	30.00	1000	16.90	11.33	13.57	36.02	4000	24.70
2437	13.43	22.03	30.00	1000	16.57	11.66	14.66	36.02	4000	24.36
2462	13.62	23.04	30.00	1000	16.38	11.85	15.33	36.02	4000	24.17

Sample Calculation:
Result = Antenna 1 Result + Antenna 2 Result
e.i.r.p. Result = Antenna A Result (e.i.r.p.) + Antenna B Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	-1.05	1.25	9.92	10.12	10.28	-1.77	8.35	6.84
2437	-0.83	1.25	9.92	10.34	10.81	-1.77	8.57	7.19
2462	-0.76	1.26	9.92	10.42	11.02	-1.77	8.65	7.33

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	-0.71	0.94	9.82	10.05	10.12	-1.77	8.28	6.73
2437	-0.27	0.95	9.82	10.50	11.22	-1.77	8.73	7.46
2462	0.02	0.96	9.82	10.80	12.02	-1.77	9.03	8.00

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Worst Rate Check of Conducted Power (2437 MHz)

Rate	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
[Mbps]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
1	-0.87	1.25	9.92	10.30	10.72	-0.29	0.95	9.82	10.48	11.17	13.40	21.88	
2	-0.95	1.25	9.92	10.22	10.52	-0.35	0.95	9.82	10.42	11.02	13.33	21.54	
5.5	-0.88	1.25	9.92	10.29	10.69	-0.28	0.95	9.82	10.49	11.19	13.40	21.88	
11	-0.83	1.25	9.92	10.34	10.81	-0.27	0.95	9.82	10.50	11.22	13.43	22.03	*

*Worst Rate
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna port B Result

Worst Rate Check of e.i.r.p. (2437 MHz)

Rate	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)				
[Mbps]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
1	-0.87	1.25	9.92	-1.77	8.53	7.13	-0.29	0.95	9.82	-1.77	8.71	7.43	11.63	14.56	
2	-0.95	1.25	9.92	-1.77	8.45	7.00	-0.35	0.95	9.82	-1.77	8.65	7.33	11.56	14.33	
5.5	-0.88	1.25	9.92	-1.77	8.52	7.11	-0.28	0.95	9.82	-1.77	8.72	7.45	11.63	14.56	
11	-0.83	1.25	9.92	-1.77	8.57	7.19	-0.27	0.95	9.82	-1.77	8.73	7.46	11.66	14.66	*

*Worst Rate
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Directional Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11g

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	20.68	117.01	30.00	1000	9.32	18.91	77.84	36.02	4000	17.11
2437	21.19	131.54	30.00	1000	8.81	19.42	87.51	36.02	4000	16.60
2462	21.33	135.69	30.00	1000	8.67	19.56	90.27	36.02	4000	16.47

Sample Calculation:
Result = Antenna 1 Result + Antenna 2 Result
e.i.r.p. Result = Antenna A Result (e.i.r.p.) + Antenna B Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	6.37	1.25	9.92	17.54	56.75	-1.77	15.77	37.76
2437	6.79	1.25	9.92	17.96	62.52	-1.77	16.19	41.59
2462	6.92	1.26	9.92	18.10	64.57	-1.77	16.33	42.95

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	7.04	0.94	9.82	17.80	60.26	-1.77	16.03	40.09
2437	7.62	0.95	9.82	18.39	69.02	-1.77	16.62	45.92
2462	7.74	0.96	9.82	18.52	71.12	-1.77	16.75	47.32

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Worst Rate Check of Conducted Power (2437 MHz)

Rate	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
[Mbps]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
6	6.69	1.25	9.92	17.86	61.09	7.44	0.95	9.82	18.21	66.22	21.05	127.32	
9	6.69	1.25	9.92	17.86	61.09	7.45	0.95	9.82	18.22	66.37	21.05	127.47	
12	6.52	1.25	9.92	17.69	58.75	7.46	0.95	9.82	18.23	66.53	20.98	125.28	
18	6.68	1.25	9.92	17.85	60.95	7.37	0.95	9.82	18.14	65.16	21.01	126.12	
24	6.58	1.25	9.92	17.75	59.57	7.54	0.95	9.82	18.31	67.76	21.05	127.33	
36	6.72	1.25	9.92	17.89	61.52	7.65	0.95	9.82	18.42	69.50	21.17	131.02	
48	6.79	1.25	9.92	17.96	62.52	7.62	0.95	9.82	18.39	69.02	21.19	131.54	*
54	6.76	1.25	9.92	17.93	62.09	7.51	0.95	9.82	18.28	67.30	21.12	129.38	

*Worst Rate
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna Port B Result

Worst Rate Check of e.i.r.p. (2437 MHz)

Rate	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)				
[Mbps]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
6	6.69	1.25	9.92	-1.77	16.09	40.64	7.44	0.95	9.82	-1.77	16.44	44.06	19.28	84.70	
9	6.69	1.25	9.92	-1.77	16.09	40.64	7.45	0.95	9.82	-1.77	16.45	44.16	19.28	84.80	
12	6.52	1.25	9.92	-1.77	15.92	39.08	7.46	0.95	9.82	-1.77	16.46	44.26	19.21	83.34	
18	6.68	1.25	9.92	-1.77	16.08	40.55	7.37	0.95	9.82	-1.77	16.37	43.35	19.24	83.90	
24	6.58	1.25	9.92	-1.77	15.98	39.63	7.54	0.95	9.82	-1.77	16.54	45.08	19.28	84.71	
36	6.72	1.25	9.92	-1.77	16.12	40.93	7.65	0.95	9.82	-1.77	16.65	46.24	19.40	87.16	
48	6.79	1.25	9.92	-1.77	16.19	41.59	7.62	0.95	9.82	-1.77	16.62	45.92	19.42	87.51	*
54	6.76	1.25	9.92	-1.77	16.16	41.30	7.51	0.95	9.82	-1.77	16.51	44.77	19.35	86.08	

*Worst Rate
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Directional Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 CDD

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	21.93	155.90	30.00	1000	8.07	20.16	103.72	36.02	4000	15.86
2437	22.20	165.83	30.00	1000	7.80	20.43	110.32	36.02	4000	15.59
2462	22.39	173.20	30.00	1000	7.61	20.62	115.23	36.02	4000	15.41

Sample Calculation:
Result = Antenna A Result + Antenna B Result
e.i.r.p. Result = Antenna A Result (e.i.r.p.) + Antenna B Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	7.58	1.25	9.92	18.75	74.99	-1.77	16.98	49.89
2437	7.91	1.25	9.92	19.08	80.91	-1.77	17.31	53.83
2462	8.15	1.26	9.92	19.33	85.70	-1.77	17.56	57.02

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	8.32	0.94	9.82	19.08	80.91	-1.77	17.31	53.83
2437	8.52	0.95	9.82	19.29	84.92	-1.77	17.52	56.49
2462	8.64	0.96	9.82	19.42	87.50	-1.77	17.65	58.21

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Worst MCS Check of Conducted Power (2437 MHz)

MCS Number	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
0	6.77	1.25	9.92	17.94	62.23	7.49	0.95	9.82	18.26	66.99	21.11	129.22	
1	7.13	1.25	9.92	18.30	67.61	7.80	0.95	9.82	18.57	71.94	21.45	139.55	
2	7.91	1.25	9.92	19.08	80.91	8.52	0.95	9.82	19.29	84.92	22.20	165.83	*
3	7.32	1.25	9.92	18.49	70.63	8.02	0.95	9.82	18.79	75.68	21.65	146.32	
4	7.29	1.25	9.92	18.46	70.15	7.91	0.95	9.82	18.68	73.79	21.58	143.94	
5	7.40	1.25	9.92	18.57	71.94	8.07	0.95	9.82	18.84	76.56	21.72	148.50	
6	7.24	1.25	9.92	18.41	69.34	7.99	0.95	9.82	18.76	75.16	21.60	144.50	
7	6.82	1.25	9.92	17.99	62.95	7.62	0.95	9.82	18.39	69.02	21.20	131.97	

*Worst MCS
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna port B Result

Worst MCS Check of e.i.r.p. (2437 MHz)

MCS Number	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)				
	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
0	6.77	1.25	9.92	-1.77	16.17	41.40	7.49	0.95	9.82	-1.77	16.49	44.57	19.34	85.97	
1	7.13	1.25	9.92	-1.77	16.53	44.98	7.80	0.95	9.82	-1.77	16.80	47.86	19.68	92.84	
2	7.91	1.25	9.92	-1.77	17.31	53.83	8.52	0.95	9.82	-1.77	17.52	56.49	20.43	110.32	*
3	7.32	1.25	9.92	-1.77	16.72	46.99	8.02	0.95	9.82	-1.77	17.02	50.35	19.88	97.34	
4	7.29	1.25	9.92	-1.77	16.69	46.67	7.91	0.95	9.82	-1.77	16.91	49.09	19.81	95.76	
5	7.40	1.25	9.92	-1.77	16.80	47.86	8.07	0.95	9.82	-1.77	17.07	50.93	19.95	98.80	
6	7.24	1.25	9.92	-1.77	16.64	46.13	7.99	0.95	9.82	-1.77	16.99	50.00	19.83	96.14	
7	6.82	1.25	9.92	-1.77	16.22	41.88	7.62	0.95	9.82	-1.77	16.62	45.92	19.43	87.80	

*Worst Rate
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Directional Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 MIMO

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	21.56	143.15	30.00	1000	8.44	18.74	74.75	36.02	4000	17.28
2437	22.05	160.46	30.00	1000	7.95	19.26	84.28	36.02	4000	16.76
2462	22.17	164.86	30.00	1000	7.83	19.34	85.93	36.02	4000	16.68

Sample Calculation:
Result = Antenna A Result + Antenna B Result
e.i.r.p. Result = Antenna A Result (e.i.r.p.) + Antenna B Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Antenna Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	6.91	1.25	9.92	18.08	64.27	-1.77	16.31	42.76
2437	7.52	1.25	9.92	18.69	73.96	-1.77	16.92	49.20
2462	7.48	1.26	9.92	18.66	73.45	-1.77	16.89	48.87

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Antenna Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2412	8.21	0.94	9.82	18.97	78.89	-3.92	15.05	31.99
2437	8.60	0.95	9.82	19.37	86.50	-3.92	15.45	35.08
2462	8.83	0.96	9.82	19.61	91.41	-3.92	15.69	37.07

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

Worst MCS Check of Conducted Power (2437 MHz)

MCS Number	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
8	6.89	1.25	9.92	18.06	63.97	7.86	0.95	9.82	18.63	72.95	21.36	136.92	
9	6.63	1.25	9.92	17.80	60.26	8.02	0.95	9.82	18.79	75.68	21.33	135.94	
10	7.04	1.25	9.92	18.21	66.22	7.75	0.95	9.82	18.52	71.12	21.38	137.34	
11	7.14	1.25	9.92	18.31	67.76	8.06	0.95	9.82	18.83	76.38	21.59	144.15	
12	7.41	1.25	9.92	18.58	72.11	7.52	0.95	9.82	18.29	67.45	21.45	139.56	
13	6.59	1.25	9.92	17.76	59.70	7.42	0.95	9.82	18.19	65.92	20.99	125.62	
14	7.52	1.25	9.92	18.69	73.96	8.60	0.95	9.82	19.37	86.50	22.05	160.46	*
15	6.95	1.25	9.92	18.12	64.86	8.72	0.95	9.82	19.49	88.92	21.87	153.78	

*Worst MCS
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna port B Result

Worst MCS Check of e.i.r.p. (2437 MHz)

MCS Number	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (e.i.r.p.)				
	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
8	6.89	1.25	9.92	-1.77	16.29	42.56	7.86	0.95	9.82	-3.92	14.71	29.58	18.58	72.14	
9	6.63	1.25	9.92	-1.77	16.03	40.09	8.02	0.95	9.82	-3.92	14.87	30.69	18.50	70.78	
10	7.04	1.25	9.92	-1.77	16.44	44.06	7.75	0.95	9.82	-3.92	14.60	28.84	18.63	72.90	
11	7.14	1.25	9.92	-1.77	16.54	45.08	8.06	0.95	9.82	-3.92	14.91	30.97	18.81	76.06	
12	7.41	1.25	9.92	-1.77	16.81	47.97	7.52	0.95	9.82	-3.92	14.37	27.35	18.77	75.33	
13	6.59	1.25	9.92	-1.77	15.99	39.72	7.42	0.95	9.82	-3.92	14.27	26.73	18.22	66.45	
14	7.52	1.25	9.92	-1.77	16.92	49.20	8.60	0.95	9.82	-3.92	15.45	35.08	19.26	84.28	*
15	6.95	1.25	9.92	-1.77	16.35	43.15	8.72	0.95	9.82	-3.92	15.57	36.06	18.99	79.21	

*Worst MCS
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Antenna Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result

Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-40 CDD

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2422	22.59	181.66	30.00	1000	7.41	20.82	120.85	36.02	4000	15.20
2437	22.73	187.62	30.00	1000	7.27	20.96	124.82	36.02	4000	15.06
2452	22.92	195.83	30.00	1000	7.08	21.15	130.28	36.02	4000	14.87

Sample Calculation:
Result = Antenna A Result + Antenna B Result
e.i.r.p. Result = Antenna A Result (e.i.r.p.) + Antenna B Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2422	8.27	1.25	9.92	19.44	87.90	-1.77	17.67	58.48
2437	8.29	1.25	9.92	19.46	88.31	-1.77	17.69	58.75
2452	8.56	1.25	9.92	19.73	93.97	-1.77	17.96	62.52

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Directional Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2422	8.96	0.94	9.82	19.72	93.76	-1.77	17.95	62.37
2437	9.20	0.95	9.82	19.97	99.31	-1.77	18.20	66.07
2452	9.31	0.95	9.82	20.08	101.86	-1.77	18.31	67.76

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain
Array Gain = 0 dB(i.e.,no array gain) for N ANT < 4
N ANT = number of transmit antennas = 2

Worst MCS Check of Conducted Power (2437 MHz)

MCS Number	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
0	8.29	1.25	9.92	19.46	88.31	9.20	0.95	9.82	19.97	99.31	22.73	187.62	*
1	7.92	1.25	9.92	19.09	81.10	8.53	0.95	9.82	19.30	85.11	22.21	166.21	
2	7.34	1.25	9.92	18.51	70.96	8.05	0.95	9.82	18.82	76.21	21.68	147.17	
3	7.42	1.25	9.92	18.59	72.28	7.88	0.95	9.82	18.65	73.28	21.63	145.56	
4	7.24	1.25	9.92	18.41	69.34	7.99	0.95	9.82	18.76	75.16	21.60	144.50	
5	6.80	1.25	9.92	17.97	62.66	7.42	0.95	9.82	18.19	65.92	21.09	128.58	
6	7.22	1.25	9.92	18.39	69.02	8.18	0.95	9.82	18.95	78.52	21.69	147.55	
7	7.54	1.25	9.92	18.71	74.30	8.22	0.95	9.82	18.99	79.25	21.86	153.55	

*Worst MCS
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna port B Result

Worst MCS Check of e.i.r.p. (2437 MHz)

MCS Number	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Directional Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (e.i.r.p.)				
	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
0	8.29	1.25	9.92	-1.77	17.69	58.75	9.20	0.95	9.82	-1.77	18.20	66.07	20.96	124.82	*
1	7.92	1.25	9.92	-1.77	17.32	53.95	8.53	0.95	9.82	-1.77	17.53	56.62	20.44	110.57	
2	7.34	1.25	9.92	-1.77	16.74	47.21	8.05	0.95	9.82	-1.77	17.05	50.70	19.91	97.91	
3	7.42	1.25	9.92	-1.77	16.82	48.08	7.88	0.95	9.82	-1.77	16.88	48.75	19.86	96.84	
4	7.24	1.25	9.92	-1.77	16.64	46.13	7.99	0.95	9.82	-1.77	16.99	50.00	19.83	96.14	
5	6.80	1.25	9.92	-1.77	16.20	41.69	7.42	0.95	9.82	-1.77	16.42	43.85	19.32	85.54	
6	7.22	1.25	9.92	-1.77	16.62	45.92	8.18	0.95	9.82	-1.77	17.18	52.24	19.92	98.16	
7	7.54	1.25	9.92	-1.77	16.94	49.43	8.22	0.95	9.82	-1.77	17.22	52.72	20.09	102.15	

*Worst MCS
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Directional Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result
Result(e.i.r.p.) = Result + Directional Gain
Directional Gain = G ANT + Array Gain
G ANT = Set equal to the gain of the antenna having the highest gain

Maximum Peak Output Power

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-40 MIMO

Antenna A + Antenna B

	Conducted Power					e.i.r.p.				
Freq.	Result		Limit		Margin	Result		Limit		Margin
[MHz]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2422	22.15	163.94	30.00	1000	7.85	19.41	87.21	36.02	4000	16.62
2437	22.38	173.14	30.00	1000	7.62	19.63	91.77	36.02	4000	16.39
2452	22.50	177.75	30.00	1000	7.50	19.75	94.34	36.02	4000	16.27

Sample Calculation:
Result = Antenna A Result + Antenna B Result
e.i.r.p. Result = Antenna 1 Result (e.i.r.p.) + Antenna 2 Result (e.i.r.p.)

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Antenna Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2422	7.85	1.25	9.92	19.02	79.80	-1.77	17.25	53.09
2437	8.02	1.25	9.92	19.19	82.99	-1.77	17.42	55.21
2452	8.16	1.25	9.92	19.33	85.70	-1.77	17.56	57.02

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Antenna Gain	Result (e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBi]	[dBm]	[mW]
2422	8.49	0.94	9.82	19.25	84.14	-3.92	15.33	34.12
2437	8.78	0.95	9.82	19.55	90.16	-3.92	15.63	36.56
2452	8.87	0.95	9.82	19.64	92.04	-3.92	15.72	37.33

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

Worst MCS Check of Conducted Power (2437 MHz)

MCS Number	Antenna port A					Antenna port B					Total Result Power		Remark
	Reading	Cable Loss	Atten. Loss	Result		Reading	Cable Loss	Atten. Loss	Result				
	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	
8	7.44	1.25	9.92	18.61	72.61	7.91	0.95	9.82	18.68	73.79	21.66	146.40	
9	8.02	1.25	9.92	19.19	82.99	8.78	0.95	9.82	19.55	90.16	22.38	173.14	*
10	7.36	1.25	9.92	18.53	71.29	7.65	0.95	9.82	18.42	69.50	21.49	140.79	
11	7.98	1.25	9.92	19.15	82.22	7.79	0.95	9.82	18.56	71.78	21.88	154.00	
12	7.24	1.25	9.92	18.41	69.34	7.92	0.95	9.82	18.69	73.96	21.56	143.30	
13	7.42	1.25	9.92	18.59	72.28	8.16	0.95	9.82	18.93	78.16	21.77	150.44	
14	7.22	1.25	9.92	18.39	69.02	8.29	0.95	9.82	19.06	80.54	21.75	149.56	
15	7.98	1.25	9.92	19.15	82.22	8.61	0.95	9.82	19.38	86.70	22.28	168.92	

*Worst MCS
Sample Calculation:
Each port Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Total Result = Antenna port A Result + Antenna port B Result

Worst MCS Check of e.i.r.p. (2437 MHz)

MCS Number	Antenna port A						Antenna port B						Total Result Power (e.i.r.p.)		Remark
	Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (e.i.r.p.)		Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (e.i.r.p.)				
	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	
8	7.44	1.25	9.92	-1.77	16.84	48.31	7.91	0.95	9.82	-3.92	14.76	29.92	18.93	78.23	
9	8.02	1.25	9.92	-1.77	17.42	55.21	8.78	0.95	9.82	-3.92	15.63	36.56	19.63	91.77	*
10	7.36	1.25	9.92	-1.77	16.76	47.42	7.65	0.95	9.82	-3.92	14.50	28.18	18.79	75.61	
11	7.98	1.25	9.92	-1.77	17.38	54.70	7.79	0.95	9.82	-3.92	14.64	29.11	19.23	83.81	
12	7.24	1.25	9.92	-1.77	16.64	46.13	7.92	0.95	9.82	-3.92	14.77	29.99	18.82	76.12	
13	7.42	1.25	9.92	-1.77	16.82	48.08	8.16	0.95	9.82	-3.92	15.01	31.70	19.02	79.78	
14	7.22	1.25	9.92	-1.77	16.62	45.92	8.29	0.95	9.82	-3.92	15.14	32.66	18.95	78.58	
15	7.98	1.25	9.92	-1.77	17.38	54.70	8.61	0.95	9.82	-3.92	15.46	35.16	19.54	89.86	

*Worst MCS
Sample Calculation:
Each port Result (e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Antenna Gain
Total Result (e.i.r.p.) = Antenna port A Result + Antenna port B Result

Average Output Power
(Reference data for RF Exposure)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx

11b 1 Mbps

Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2412	5.43	5.27	10.30	10.70
2437	5.64	6.04	10.67	11.68
2462	5.75	6.46	10.87	12.21

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.82	1.25	9.92	0.00	7.35	5.43
2437	-3.66	1.25	9.92	0.00	7.51	5.64
2462	-3.58	1.26	9.92	0.00	7.60	5.75

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.54	0.94	9.82	0.00	7.22	5.27
2437	-2.96	0.95	9.82	0.00	7.81	6.04
2462	-2.68	0.96	9.82	0.00	8.10	6.46

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Duty Factor

11g 6 Mbps

Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2412	5.24	5.24	10.20	10.47
2437	5.52	5.79	10.54	11.32
2462	5.58	6.19	10.71	11.78

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.99	1.25	9.92	0.01	7.19	5.24
2437	-3.76	1.25	9.92	0.01	7.42	5.52
2462	-3.72	1.26	9.92	0.01	7.47	5.58

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.58	0.94	9.82	0.01	7.19	5.24
2437	-3.15	0.95	9.82	0.01	7.63	5.79
2462	-2.87	0.96	9.82	0.01	7.92	6.19

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

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx

11n-20 CDD MCS 0

Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2412	5.43	5.31	10.31	10.74
2437	5.71	5.96	10.67	11.67
2462	5.89	6.58	10.96	12.47

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.82	1.25	9.92	0.00	7.35	5.43
2437	-3.60	1.25	9.92	0.00	7.57	5.71
2462	-3.48	1.26	9.92	0.00	7.70	5.89

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.51	0.94	9.82	0.00	7.25	5.31
2437	-3.02	0.95	9.82	0.00	7.75	5.96
2462	-2.60	0.96	9.82	0.00	8.18	6.58

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Duty Factor

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Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2412	5.37	5.32	10.29	10.69
2437	5.69	6.00	10.68	11.69
2462	5.83	6.44	10.89	12.28

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.89	1.25	9.92	0.02	7.30	5.37
2437	-3.64	1.25	9.92	0.02	7.55	5.69
2462	-3.54	1.26	9.92	0.02	7.66	5.83

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2412	-3.52	0.94	9.82	0.02	7.26	5.32
2437	-3.01	0.95	9.82	0.02	7.78	6.00
2462	-2.71	0.96	9.82	0.02	8.09	6.44

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

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 15, 2019
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx

11n-40 CDD MCS 0

Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2422	5.51	5.46	10.40	10.97
2437	5.65	5.82	10.60	11.47
2452	5.69	6.12	10.72	11.81

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2422	-3.78	1.25	9.92	0.02	7.41	5.51
2437	-3.67	1.25	9.92	0.02	7.52	5.65
2452	-3.64	1.25	9.92	0.02	7.55	5.69

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2422	-3.41	0.94	9.82	0.02	7.37	5.46
2437	-3.14	0.95	9.82	0.02	7.65	5.82
2452	-2.92	0.95	9.82	0.02	7.87	6.12

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Duty Factor

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Antenna A + Antenna B

Freq. [MHz]	Antenna A Result [mW]	Antenna B Result [mW]	Result (Burst Power Average) [dBm]	[mW]
2422	5.50	5.53	10.43	11.03
2437	5.66	5.96	10.65	11.62
2452	5.74	6.32	10.82	12.07

Sample Calculation:
Result = Antenna A + Antenna B

Antenna A

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2422	-3.81	1.25	9.92	0.04	7.40	5.50
2437	-3.68	1.25	9.92	0.04	7.53	5.66
2452	-3.62	1.25	9.92	0.04	7.59	5.74

Antenna B

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	[mW]
2422	-3.37	0.94	9.82	0.04	7.43	5.53
2437	-3.06	0.95	9.82	0.04	7.75	5.96
2452	-2.80	0.95	9.82	0.04	8.01	6.32

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Duty Factor

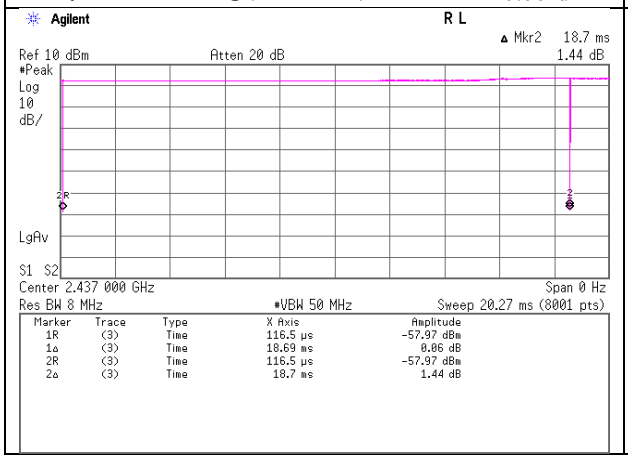
The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Burst rate confirmation (for Average Output Power)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

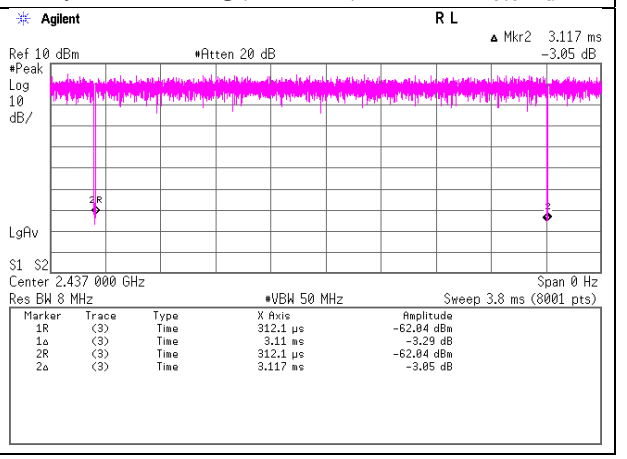
11b 1 Mbps

Tx on / (Tx on + Tx off) = 0.999
Tx on / (Tx on + Tx off) * 100 = 99.9 %
Duty factor = 10 * log (18.7 / 18.69) = 0.00 dB



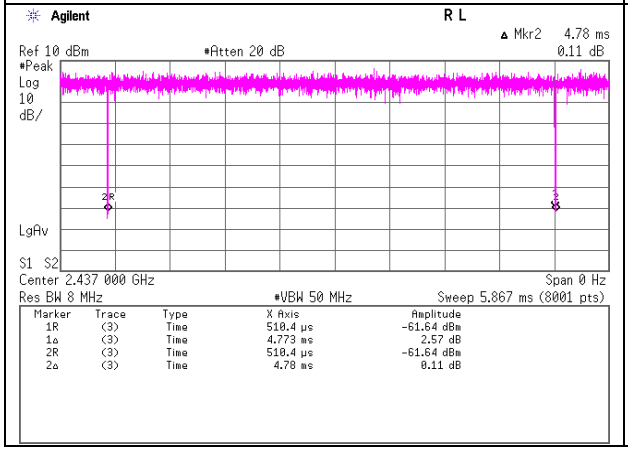
11g 6 Mbps

Tx on / (Tx on + Tx off) = 0.998
Tx on / (Tx on + Tx off) * 100 = 99.8 %
Duty factor = 10 * log (3.117 / 3.11) = 0.01 dB



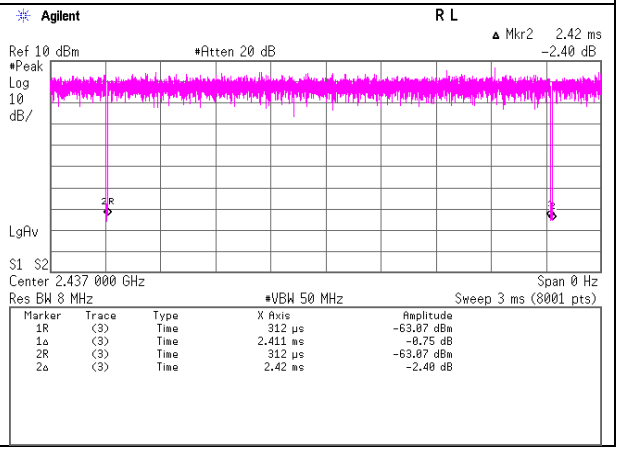
11n-20 CDD MCS 0

Tx on / (Tx on + Tx off) = 0.999
Tx on / (Tx on + Tx off) * 100 = 99.9 %
Duty factor = 10 * log (4.78 / 4.773) = 0.00 dB



11n-20 MIMO MCS 8

Tx on / (Tx on + Tx off) = 0.996
Tx on / (Tx on + Tx off) * 100 = 99.6 %
Duty factor = 10 * log (2.42 / 2.411) = 0.02 dB

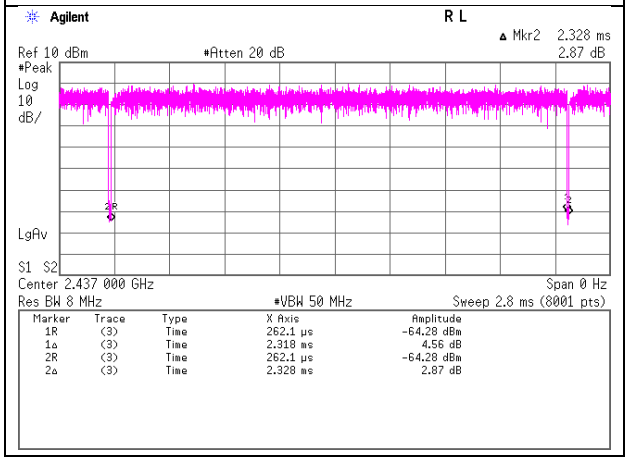


Burst rate confirmation (for Average Output Power)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

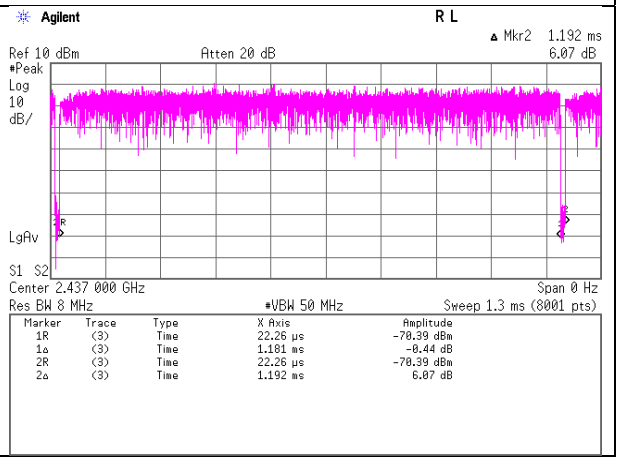
11n-40 CDD MCS 0

Tx on / (Tx on + Tx off) = 0.996
Tx on / (Tx on + Tx off) * 100 = 99.6 %
Duty factor = 10 * log (2.328 / 2.318) = 0.02 dB



11n-40 MIMO MCS 8

Tx on / (Tx on + Tx off) = 0.991
Tx on / (Tx on + Tx off) * 100 = 99.1 %
Duty factor = 10 * log (1.192 / 1.181) = 0.04 dB



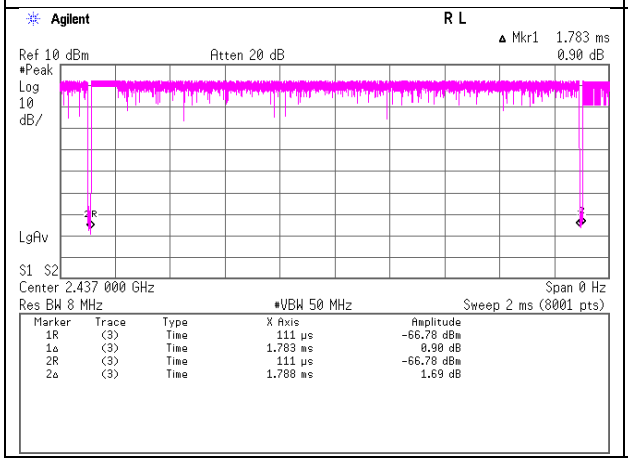
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation (for Radiated Spurious Emission)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

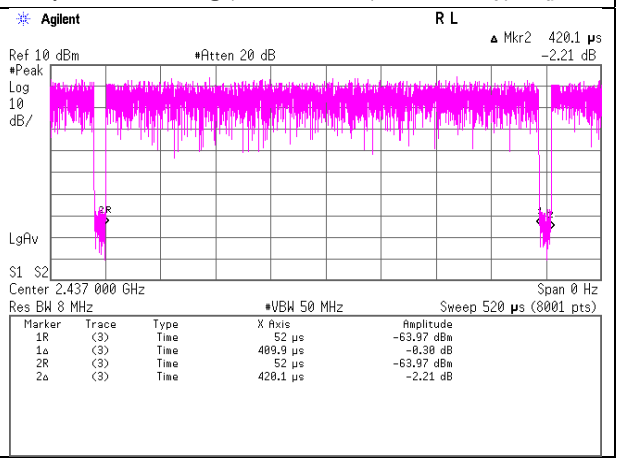
11b 11 Mbps

Tx on / (Tx on + Tx off) = 0.997
Tx on / (Tx on + Tx off) * 100 = 99.7 %
Duty > 98% 0.00 dB



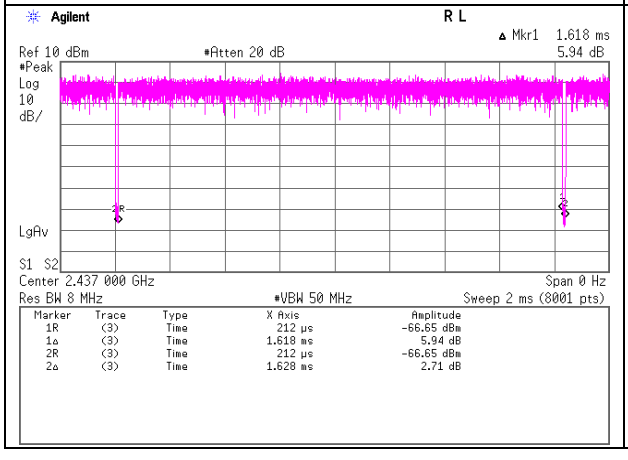
11g 48 Mbps

Tx on / (Tx on + Tx off) = 0.976
Tx on / (Tx on + Tx off) * 100 = 97.6 %
Duty factor = 20 * log (0.4201 / 0.4099) = 0.21 dB



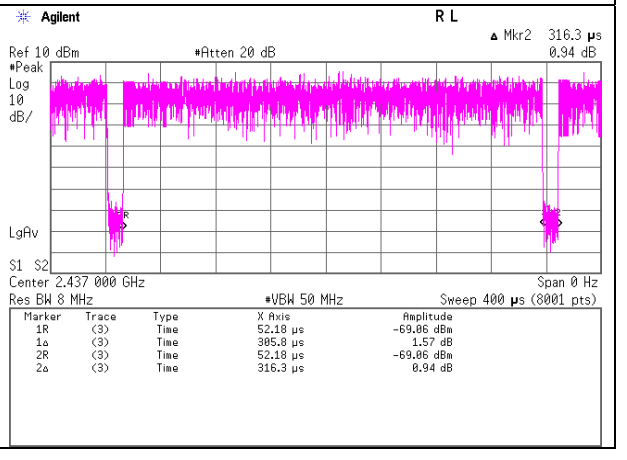
11n-20 CDD MCS 2

Tx on / (Tx on + Tx off) = 0.994
Tx on / (Tx on + Tx off) * 100 = 99.4 %
Duty > 98 % 0.00 dB



11n-20 MIMO MCS 14

Tx on / (Tx on + Tx off) = 0.967
Tx on / (Tx on + Tx off) * 100 = 96.7 %
Duty factor = 20 * log (0.3163 / 0.3058) = 0.29 dB

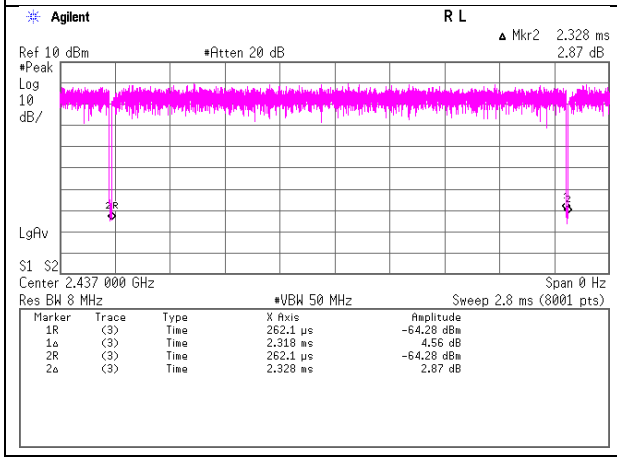


Burst rate confirmation (for Radiated Spurious Emission)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

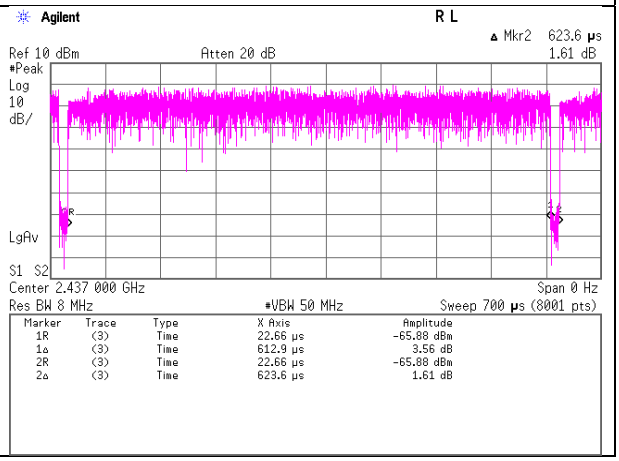
11n-40 CDD MCS 0

Tx on / (Tx on + Tx off) = 0.996
Tx on / (Tx on + Tx off) * 100 = 99.6 %
Duty > 98 % 0.00 dB



11n-40 MIMO MCS 9

Tx on / (Tx on + Tx off) = 0.983
Tx on / (Tx on + Tx off) * 100 = 98.3 %
Duty > 98 % 0.00 dB



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

Radiated Spurious Emission

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 11, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	20 deg. C / 35 % RH
Engineer	Hiromasa Sato (1 GHz - 2.8 GHz)	Takahiro Suzuki (2.8 GHz - 13 GHz)	Makoto Hosaka (13 GHz - 18 GHz)	Yasumasa Owaki (18 GHz - 26.5 GHz)
Mode	Tx 11b 2412 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	48.49	27.86	13.56	41.59	2.48	50.80	73.9	23.1	393	115	
Hori.	4824.000	PK	55.87	31.46	6.46	42.88	2.48	53.39	73.9	20.5	131	120	
Hori.	7236.000	PK	49.69	36.85	8.13	42.98	2.48	54.17	73.9	19.7	125	39	
Hori.	9648.000	PK	48.71	38.64	9.30	43.13	2.48	56.00	73.9	17.9	133	116	
Hori.	12060.000	PK	48.67	39.27	10.66	42.27	2.48	58.81	73.9	15.0	293	125	
Hori.	19296.000	PK	47.44	40.30	12.30	45.31	-9.54	45.19	73.9	28.7	140	33	
Hori.	21708.000	PK	51.22	40.16	13.11	46.69	-9.54	48.26	73.9	25.6	137	36	
Hori.	24120.000	PK	48.77	39.90	13.98	48.67	-9.54	44.44	73.9	29.4	140	301	
Hori.	2390.000	AV	38.10	27.86	13.56	41.59	2.48	40.41	53.9	13.4	393	115	
Hori.	4824.000	AV	44.14	31.46	6.46	42.88	2.48	41.66	53.9	12.2	131	120	
Hori.	7236.000	AV	41.97	36.85	8.13	42.98	2.48	46.45	53.9	7.4	125	39	
Hori.	9648.000	AV	40.34	38.64	9.30	43.13	2.48	47.63	53.9	6.2	133	116	
Hori.	12060.000	AV	38.72	39.27	10.66	42.27	2.48	48.86	53.9	5.0	293	125	
Hori.	19296.000	AV	41.11	40.30	12.30	45.31	-9.54	38.86	53.9	15.0	140	33	
Hori.	21708.000	AV	42.22	40.16	13.11	46.69	-9.54	39.26	53.9	14.6	137	36	
Hori.	24120.000	AV	38.81	39.90	13.98	48.67	-9.54	34.48	53.9	19.4	140	301	
Vert.	2390.000	PK	48.93	27.86	13.56	41.59	2.48	51.24	73.9	22.6	206	274	
Vert.	4824.000	PK	54.16	31.46	6.46	42.88	2.48	51.68	73.9	22.2	155	74	
Vert.	7236.000	PK	51.60	36.85	8.13	42.98	2.48	56.08	73.9	17.8	101	355	
Vert.	9648.000	PK	48.97	38.64	9.30	43.13	2.48	56.26	73.9	17.6	262	66	
Vert.	12060.000	PK	48.14	39.27	10.66	42.27	2.48	58.28	73.9	15.6	148	234	
Vert.	19296.000	PK	47.51	40.30	12.30	45.31	-9.54	45.26	73.9	28.6	138	56	
Vert.	21708.000	PK	49.86	40.16	13.11	46.69	-9.54	46.90	73.9	27.0	142	76	
Vert.	24120.000	PK	45.31	39.90	13.98	48.67	-9.54	40.98	73.9	32.9	138	343	
Vert.	2390.000	AV	39.63	27.86	13.56	41.59	2.48	41.94	53.9	11.9	206	274	
Vert.	4824.000	AV	43.14	31.46	6.46	42.88	2.48	40.66	53.9	13.2	155	74	
Vert.	7236.000	AV	41.83	36.85	8.13	42.98	2.48	46.31	53.9	7.5	101	355	
Vert.	9648.000	AV	39.65	38.64	9.30	43.13	2.48	46.94	53.9	6.9	262	66	
Vert.	12060.000	AV	38.82	39.27	10.66	42.27	2.48	48.96	53.9	**4.9**	148	234	
Vert.	19296.000	AV	40.25	40.30	12.30	45.31	-9.54	38.00	53.9	15.9	138	56	
Vert.	21708.000	AV	40.17	40.16	13.11	46.69	-9.54	37.21	53.9	16.6	142	76	
Vert.	24120.000	AV	35.66	39.90	13.98	48.67	-9.54	31.33	53.9	22.5	138	343	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

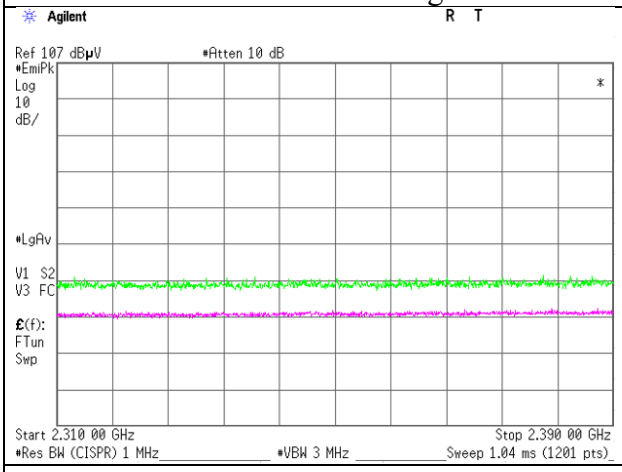
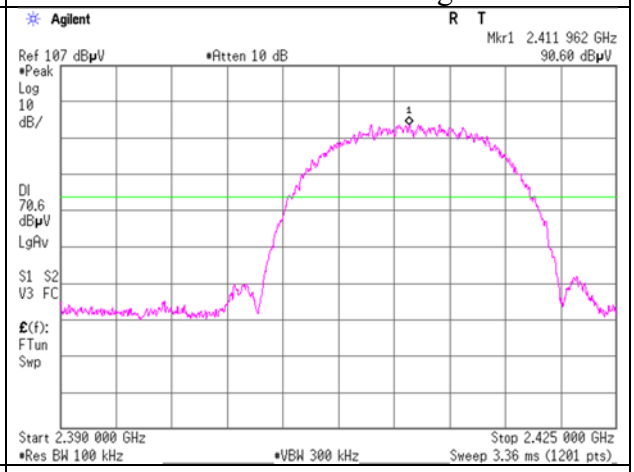
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

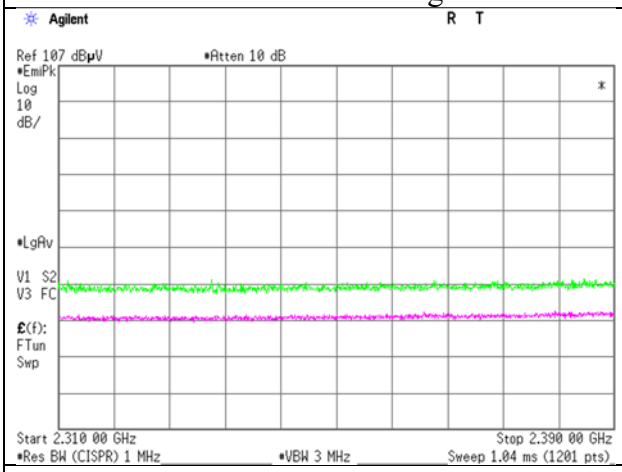
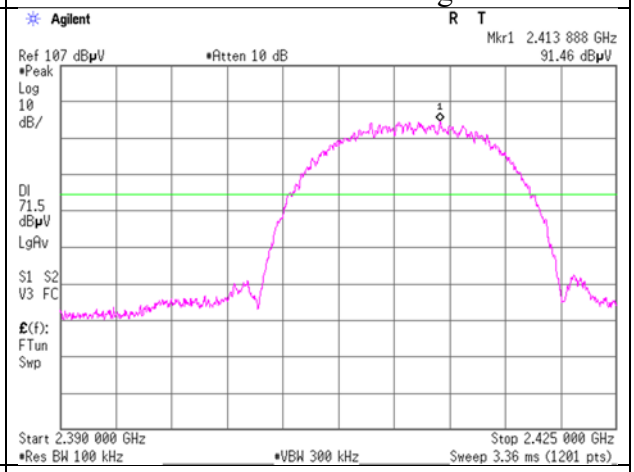
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.53	27.85	13.57	41.60	2.48	92.83	-	-	Carrier
Hori.	2396.950	PK	41.07	27.86	13.56	41.59	2.48	43.38	72.83	29.4	
Hori.	2400.000	PK	41.06	27.86	13.57	41.60	2.48	43.37	72.83	29.4	
Vert.	2412.000	PK	91.12	27.85	13.57	41.60	2.48	93.42	-	-	Carrier
Vert.	2397.210	PK	40.99	27.86	13.56	41.60	2.48	43.29	73.42	30.1	
Vert.	2400.000	PK	41.25	27.86	13.57	41.60	2.48	43.56	73.42	29.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2412 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 11, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	20 deg. C / 35 % RH
Engineer	Hiromasa Sato	Takahiro Suzuki	Makoto Hosaka	Yasumasa Owaki
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11b 2437 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	53.68	31.40	7.33	42.89	2.48	52.00	73.9	21.9	175	87	
Hori.	7311.000	PK	49.18	36.99	8.13	43.13	2.48	53.65	73.9	20.2	133	74	
Hori.	9748.000	PK	48.32	38.92	10.47	43.02	2.48	57.17	73.9	16.7	359	133	
Hori.	12185.000	PK	46.36	39.26	11.72	42.20	2.48	57.62	73.9	16.2	310	112	
Hori.	19496.000	PK	46.94	40.18	12.47	45.24	-9.54	44.81	73.9	29.0	139	318	
Hori.	21933.000	PK	49.43	40.19	13.21	46.91	-9.54	46.38	73.9	27.5	134	49	
Hori.	24370.000	PK	48.18	39.97	14.15	48.74	-9.54	44.02	73.9	29.8	145	300	
Hori.	4874.000	AV	46.89	31.40	7.33	42.89	2.48	45.21	53.9	8.6	175	87	
Hori.	7311.000	AV	40.88	36.99	8.13	43.13	2.48	45.35	53.9	8.5	133	74	
Hori.	9748.000	AV	42.21	38.92	10.47	43.02	2.48	51.06	53.9	**2.8**	359	133	
Hori.	12185.000	AV	38.03	39.26	11.72	42.20	2.48	49.29	53.9	4.6	310	112	
Hori.	19496.000	AV	39.32	40.18	12.47	45.24	-9.54	37.19	53.9	16.7	139	318	
Hori.	21933.000	AV	39.97	40.19	13.21	46.91	-9.54	36.92	53.9	16.9	134	49	
Hori.	24370.000	AV	37.69	39.97	14.15	48.74	-9.54	33.53	53.9	20.3	145	300	
Vert.	4874.000	PK	53.27	31.40	7.33	42.89	2.48	51.59	73.9	22.3	164	88	
Vert.	7311.000	PK	50.25	36.99	8.13	43.13	2.48	54.72	73.9	19.1	102	355	
Vert.	9748.000	PK	48.35	38.92	10.47	43.02	2.48	57.20	73.9	16.7	100	32	
Vert.	12185.000	PK	45.37	39.26	11.72	42.20	2.48	56.63	73.9	17.2	100	331	
Vert.	19496.000	PK	49.03	40.18	12.47	45.24	-9.54	46.90	73.9	27.0	135	332	
Vert.	21933.000	PK	48.26	40.19	13.21	46.91	-9.54	45.21	73.9	28.6	143	77	
Vert.	24370.000	PK	45.80	39.97	14.15	48.74	-9.54	41.64	73.9	32.2	137	350	
Vert.	4874.000	AV	44.91	31.40	7.33	42.89	2.48	43.23	53.9	10.6	164	88	
Vert.	7311.000	AV	41.00	36.99	8.13	43.13	2.48	45.47	53.9	8.4	102	355	
Vert.	9748.000	AV	40.27	38.92	10.47	43.02	2.48	49.12	53.9	4.7	100	32	
Vert.	12185.000	AV	37.11	39.26	11.72	42.20	2.48	48.37	53.9	5.5	100	331	
Vert.	19496.000	AV	43.28	40.18	12.47	45.24	-9.54	41.15	53.9	12.7	135	332	
Vert.	21933.000	AV	39.64	40.19	13.21	46.91	-9.54	36.59	53.9	17.3	143	77	
Vert.	24370.000	AV	35.25	39.97	14.15	48.74	-9.54	31.09	53.9	22.8	137	350	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 11, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	20 deg. C / 35 % RH
Engineer	Hiromasa Sato	Takahiro Suzuki	Makoto Hosaka	Yasumasa Owaki
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11b 2462 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	48.46	27.65	13.63	41.62	2.48	50.60	73.9	23.3	237	81	
Hori.	4924.000	PK	53.07	31.37	7.36	42.90	2.48	51.38	73.9	22.5	100	332	
Hori.	7386.000	PK	51.16	37.01	8.14	43.28	2.48	55.51	73.9	18.3	178	64	
Hori.	9848.000	PK	48.86	39.12	10.41	42.92	2.48	57.95	73.9	15.9	100	54	
Hori.	12310.000	PK	48.93	38.94	11.76	42.13	2.48	59.98	73.9	13.9	100	23	
Hori.	19696.000	PK	49.09	40.12	12.49	45.32	-9.54	46.84	73.9	27.0	145	315	
Hori.	22158.000	PK	50.03	40.18	13.35	47.20	-9.54	46.82	73.9	27.0	137	38	
Hori.	24620.000	PK	51.11	40.01	14.25	48.74	-9.54	47.09	73.9	26.8	139	300	
Hori.	2483.500	AV	39.64	27.65	13.63	41.62	2.48	41.78	53.9	12.1	237	81	
Hori.	4924.000	AV	42.96	31.37	7.36	42.90	2.48	41.27	53.9	12.6	100	332	
Hori.	7386.000	AV	42.57	37.01	8.14	43.28	2.48	46.92	53.9	6.9	178	64	
Hori.	9848.000	AV	39.96	39.12	10.41	42.92	2.48	49.05	53.9	4.8	100	54	
Hori.	12310.000	AV	39.05	38.94	11.76	42.13	2.48	50.10	53.9	3.8	100	23	
Hori.	19696.000	AV	42.43	40.12	12.49	45.32	-9.54	40.18	53.9	13.7	145	315	
Hori.	22158.000	AV	40.82	40.18	13.35	47.20	-9.54	37.61	53.9	16.2	137	38	
Hori.	24620.000	AV	40.58	40.01	14.25	48.74	-9.54	36.56	53.9	17.3	139	300	
Vert.	2483.500	PK	48.75	27.65	13.63	41.62	2.48	50.89	73.9	23.0	392	43	
Vert.	4924.000	PK	53.14	31.37	7.36	42.90	2.48	51.45	73.9	22.4	124	275	
Vert.	7386.000	PK	50.84	37.01	8.14	43.28	2.48	55.19	73.9	18.7	122	13	
Vert.	9848.000	PK	49.42	39.12	10.41	42.92	2.48	58.51	73.9	15.3	100	34	
Vert.	12310.000	PK	47.02	38.94	11.76	42.13	2.48	58.07	73.9	15.8	247	322	
Vert.	19696.000	PK	47.20	40.12	12.49	45.32	-9.54	44.95	73.9	28.9	164	354	
Vert.	22158.000	PK	47.42	40.18	13.35	47.20	-9.54	44.21	73.9	29.6	133	76	
Vert.	24620.000	PK	46.47	40.01	14.25	48.74	-9.54	42.45	73.9	31.4	149	163	
Vert.	2483.500	AV	39.79	27.65	13.63	41.62	2.48	41.93	53.9	11.9	392	43	
Vert.	4924.000	AV	43.13	31.37	7.36	42.90	2.48	41.44	53.9	12.4	124	275	
Vert.	7386.000	AV	42.58	37.01	8.14	43.28	2.48	46.93	53.9	6.9	122	13	
Vert.	9848.000	AV	41.26	39.12	10.41	42.92	2.48	50.35	53.9	**3.5**	100	34	
Vert.	12310.000	AV	38.29	38.94	11.76	42.13	2.48	49.34	53.9	4.5	247	322	
Vert.	19696.000	AV	41.14	40.12	12.49	45.32	-9.54	38.89	53.9	15.0	164	354	
Vert.	22158.000	AV	37.93	40.18	13.35	47.20	-9.54	34.72	53.9	19.1	133	76	
Vert.	24620.000	AV	36.58	40.01	14.25	48.74	-9.54	32.56	53.9	21.3	149	163	

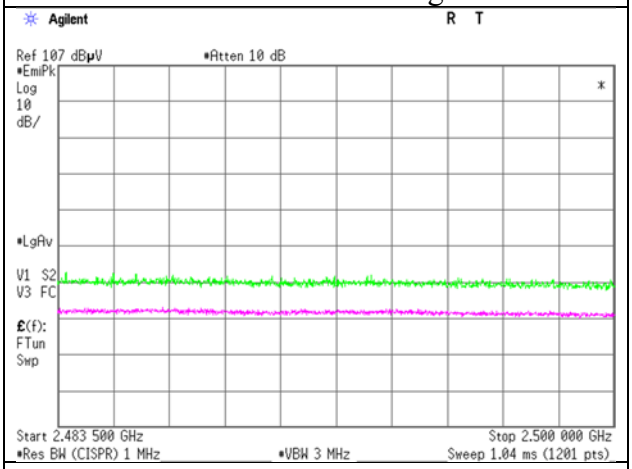
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2462 MHz

Horizontal

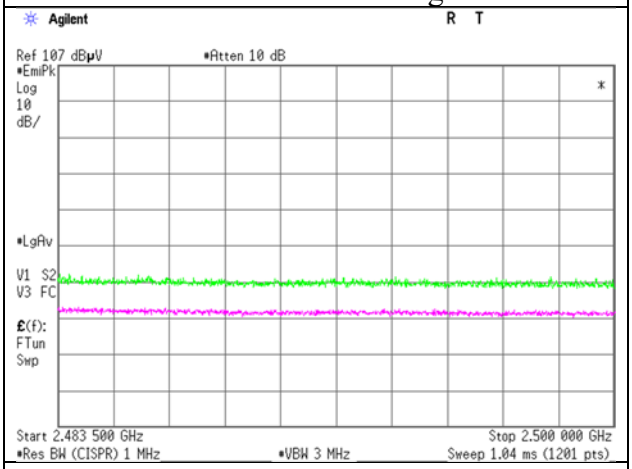
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 7, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	23 deg. C / 31 % RH
Engineer	Hiromasa Sato	Takahiro Suzuki	Makoto Hosaka	Makoto Hosaka
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2412 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2389.703	PK	55.38	27.86	13.56	41.59	2.48	57.69	73.9	16.2	131	66	
Hori.	2390.000	PK	54.93	27.86	13.56	41.59	2.48	57.24	73.9	16.6	131	66	
Hori.	4824.000	PK	53.79	31.46	7.30	42.88	2.48	52.15	73.9	21.7	117	58	
Hori.	7236.000	PK	49.86	36.85	8.13	42.98	2.48	54.34	73.9	19.5	112	60	
Hori.	9648.000	PK	49.18	38.64	10.53	43.13	2.48	57.70	73.9	16.2	140	306	
Hori.	12060.000	PK	48.32	39.27	11.68	42.27	2.48	59.48	73.9	14.4	100	85	
Hori.	19296.000	PK	42.62	40.30	12.30	45.31	-9.54	40.37	73.9	33.5	145	320	
Hori.	21708.000	PK	47.45	40.16	13.11	46.69	-9.54	44.49	73.9	29.4	133	62	
Hori.	24120.000	PK	44.49	39.90	13.98	48.67	-9.54	40.16	73.9	33.7	150	0	
Vert.	2389.671	PK	56.02	27.86	13.56	41.59	2.48	58.33	73.9	15.5	147	53	
Vert.	2390.000	PK	56.55	27.86	13.56	41.59	2.48	58.86	73.9	15.0	147	53	
Vert.	4824.000	PK	54.25	31.46	7.30	42.88	2.48	52.61	73.9	21.2	135	176	
Vert.	7236.000	PK	50.34	36.85	8.13	42.98	2.48	54.82	73.9	19.0	103	3	
Vert.	9648.000	PK	50.33	38.64	10.53	43.13	2.48	58.85	73.9	15.0	259	159	
Vert.	12060.000	PK	49.91	39.27	11.68	42.27	2.48	61.07	73.9	**12.8**	168	324	
Vert.	19296.000	PK	44.21	40.30	12.30	45.31	-9.54	41.96	73.9	31.9	135	11	
Vert.	21708.000	PK	48.75	40.16	13.11	46.69	-9.54	45.79	73.9	28.1	144	78	
Vert.	24120.000	PK	45.94	39.90	13.98	48.67	-9.54	41.61	73.9	32.2	127	351	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2389.703	AV	40.90	27.86	13.56	41.59	0.21	2.48	43.42	53.9	10.4	
Hori.	2390.000	AV	40.79	27.86	13.56	41.59	0.21	2.48	43.31	53.9	10.5	*1)
Hori.	4824.000	AV	44.24	31.46	7.30	42.88	0.21	2.48	42.81	53.9	11.0	
Hori.	7236.000	AV	41.51	36.85	8.13	42.98	0.21	2.48	46.20	53.9	7.7	
Hori.	9648.000	AV	39.95	38.64	10.53	43.13	0.21	2.48	48.68	53.9	5.2	
Hori.	12060.000	AV	38.32	39.27	11.68	42.27	0.21	2.48	49.69	53.9	4.2	
Hori.	19296.000	AV	34.54	40.30	12.30	45.31	0.21	-9.54	32.50	53.9	21.4	
Hori.	21708.000	AV	37.34	40.16	13.11	46.69	0.21	-9.54	34.59	53.9	19.3	
Hori.	24120.000	AV	35.24	39.90	13.98	48.67	0.21	-9.54	31.12	53.9	22.7	
Vert.	2389.671	AV	40.61	27.86	13.56	41.59	0.21	2.48	43.13	53.9	10.7	
Vert.	2390.000	AV	40.75	27.86	13.56	41.59	0.21	2.48	43.27	53.9	10.6	*1)
Vert.	4824.000	AV	43.97	31.46	7.30	42.88	0.21	2.48	42.54	53.9	11.3	
Vert.	7236.000	AV	41.64	36.85	8.13	42.98	0.21	2.48	46.33	53.9	7.5	
Vert.	9648.000	AV	40.42	38.64	10.53	43.13	0.21	2.48	49.15	53.9	4.7	
Vert.	12060.000	AV	38.51	39.27	11.68	42.27	0.21	2.48	49.88	53.9	**4.0**	
Vert.	19296.000	AV	35.22	40.30	12.30	45.31	0.21	-9.54	33.18	53.9	20.7	
Vert.	21708.000	AV	37.83	40.16	13.11	46.69	0.21	-9.54	35.08	53.9	18.8	
Vert.	24120.000	AV	35.95	39.90	13.98	48.67	0.21	-9.54	31.83	53.9	22.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

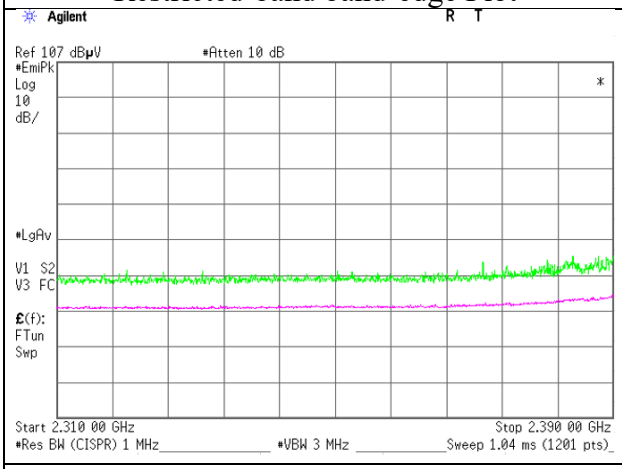
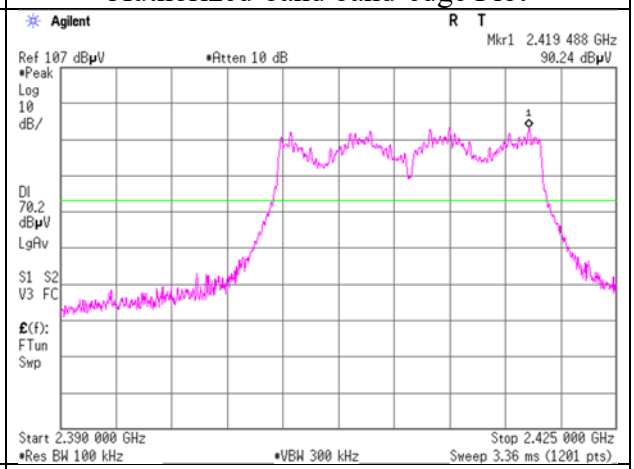
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

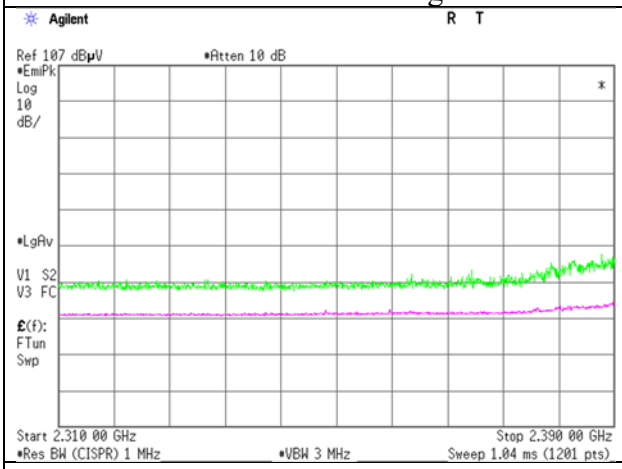
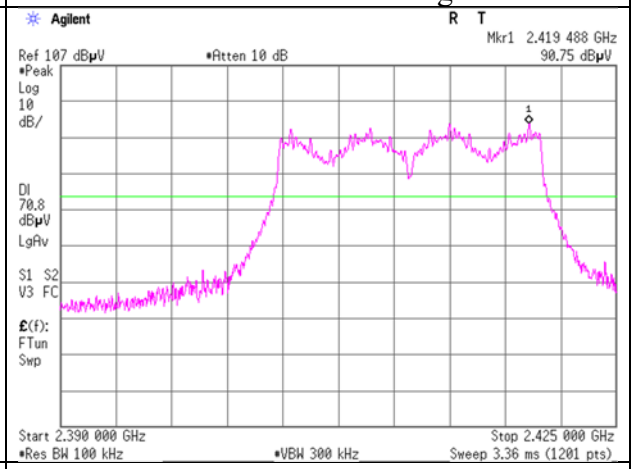
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	89.78	27.85	13.57	41.60	2.48	92.08	-	-	Carrier
Hori.	2398.636	PK	45.78	27.86	13.56	41.60	2.48	48.08	72.08	24.0	
Hori.	2400.000	PK	49.52	27.86	13.57	41.60	2.48	51.83	72.08	20.2	
Vert.	2412.000	PK	90.14	27.85	13.57	41.60	2.48	92.44	-	-	Carrier
Vert.	2395.341	PK	45.18	27.86	13.56	41.59	2.48	47.49	72.44	24.9	
Vert.	2400.000	PK	49.86	27.86	13.57	41.60	2.48	52.17	72.44	20.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2412 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 11, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	20 deg. C / 35 % RH
Engineer	Hiromasa Sato	Takahiro Suzuki	Makoto Hosaka	Yasumasa Owaki
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2437 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	53.68	31.40	7.33	42.89	2.48	52.00	73.9	21.9	175	87	
Hori.	7311.000	PK	51.14	36.99	8.13	43.13	2.48	55.61	73.9	18.2	138	62	
Hori.	9748.000	PK	48.32	38.92	10.47	43.02	2.48	57.17	73.9	16.7	359	133	
Hori.	12185.000	PK	46.36	39.26	11.72	42.20	2.48	57.62	73.9	**16.2**	310	112	
Hori.	19496.000	PK	43.59	40.18	12.47	45.24	-9.54	41.46	73.9	32.4	140	332	
Hori.	21933.000	PK	47.66	40.19	13.21	46.91	-9.54	44.61	73.9	29.2	141	38	
Hori.	24370.000	PK	43.13	39.97	14.15	48.74	-9.54	38.97	73.9	34.9	150	0	
Vert.	4874.000	PK	53.27	31.40	7.33	42.89	2.48	51.59	73.9	22.3	164	88	
Vert.	7311.000	PK	49.11	36.99	8.13	43.13	2.48	53.58	73.9	20.3	100	3	
Vert.	9748.000	PK	48.35	38.92	10.47	43.02	2.48	57.20	73.9	16.7	100	32	
Vert.	12185.000	PK	45.37	39.26	11.72	42.20	2.48	56.63	73.9	17.2	100	331	
Vert.	19496.000	PK	41.90	40.18	12.47	45.24	-9.54	39.77	73.9	34.1	178	2	
Vert.	21933.000	PK	47.01	40.19	13.21	46.91	-9.54	43.96	73.9	29.9	135	78	
Vert.	24370.000	PK	43.67	39.97	14.15	48.74	-9.54	39.51	73.9	34.3	110	297	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	46.89	31.40	7.33	42.89	0.21	2.48	45.42	53.9	8.4	
Hori.	7311.000	AV	42.40	36.99	8.13	43.13	0.21	2.48	47.08	53.9	6.8	
Hori.	9748.000	AV	42.21	38.92	10.47	43.02	0.21	2.48	51.27	53.9	**2.6**	
Hori.	12185.000	AV	38.03	39.26	11.72	42.20	0.21	2.48	49.50	53.9	4.4	
Hori.	19496.000	AV	34.94	40.18	12.47	45.24	0.21	-9.54	33.02	53.9	20.8	
Hori.	21933.000	AV	37.33	40.19	13.21	46.91	0.21	-9.54	34.49	53.9	19.4	
Hori.	24370.000	AV	34.88	39.97	14.15	48.74	0.21	-9.54	30.93	53.9	22.9	
Vert.	4874.000	AV	44.91	31.40	7.33	42.89	0.21	2.48	43.44	53.9	10.4	
Vert.	7311.000	AV	40.60	36.99	8.13	43.13	0.21	2.48	45.28	53.9	8.6	
Vert.	9748.000	AV	40.27	38.92	10.47	43.02	0.21	2.48	49.33	53.9	4.5	
Vert.	12185.000	AV	37.11	39.26	11.72	42.20	0.21	2.48	48.58	53.9	5.3	
Vert.	19496.000	AV	33.52	40.18	12.47	45.24	0.21	-9.54	31.60	53.9	22.3	
Vert.	21933.000	AV	36.65	40.19	13.21	46.91	0.21	-9.54	33.81	53.9	20.0	
Vert.	24370.000	AV	35.02	39.97	14.15	48.74	0.21	-9.54	31.07	53.9	22.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3			
Date	June 3, 2019	February 9, 2019	February 10, 2019	February 7, 2019
Temperature / Humidity	26 deg. C / 54 % RH	23 deg. C / 38 % RH	21 deg. C / 36 % RH	23 deg. C / 31 % RH
Engineer	Hiromasa Sato	Takahiro Suzuki	Makoto Hosaka	Makoto Hosaka
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	54.82	27.65	13.63	41.62	2.48	56.96	73.9	16.9	237	81	
Hori.	2483.622	PK	54.33	27.65	13.63	41.62	2.48	56.47	73.9	17.4	237	81	
Hori.	4924.000	PK	53.84	31.37	7.36	42.90	2.48	52.15	73.9	21.7	111	95	
Hori.	7386.000	PK	50.18	37.01	8.14	43.28	2.48	54.53	73.9	19.3	102	72	
Hori.	9848.000	PK	48.75	39.12	10.41	42.92	2.48	57.84	73.9	16.0	180	325	
Hori.	12310.000	PK	47.46	38.94	11.76	42.13	2.48	58.51	73.9	**15.3**	135	154	
Hori.	19696.000	PK	44.18	40.12	12.49	45.32	-9.54	41.93	73.9	31.9	136	299	
Hori.	22158.000	PK	46.39	40.18	13.35	47.20	-9.54	43.18	73.9	30.7	141	36	
Hori.	24620.000	PK	45.97	40.01	14.25	48.74	-9.54	41.95	73.9	31.9	150	0	
Vert.	2483.500	PK	54.38	27.65	13.63	41.62	2.48	56.52	73.9	17.3	250	107	
Vert.	2483.671	PK	54.21	27.65	13.63	41.62	2.48	56.35	73.9	17.5	250	107	
Vert.	4924.000	PK	56.68	31.37	7.36	42.90	2.48	54.99	73.9	18.9	165	104	
Vert.	7386.000	PK	49.01	37.01	8.14	43.28	2.48	53.36	73.9	20.5	100	5	
Vert.	9848.000	PK	48.26	39.12	10.41	42.92	2.48	57.35	73.9	16.5	183	314	
Vert.	12310.000	PK	47.45	38.94	11.76	42.13	2.48	58.50	73.9	15.4	160	28	
Vert.	19696.000	PK	43.29	40.12	12.49	45.32	-9.54	41.04	73.9	32.8	170	4	
Vert.	22158.000	PK	45.87	40.18	13.35	47.20	-9.54	42.66	73.9	31.2	141	91	
Vert.	24620.000	PK	46.44	40.01	14.25	48.74	-9.54	42.42	73.9	31.4	123	344	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.76	27.65	13.63	41.62	0.21	2.48	42.11	53.9	11.7	*1)
Hori.	2483.622	AV	39.50	27.65	13.63	41.62	0.21	2.48	41.85	53.9	12.0	
Hori.	4924.000	AV	43.05	31.37	7.36	42.90	0.21	2.48	41.57	53.9	12.3	
Hori.	7386.000	AV	39.59	37.01	8.14	43.28	0.21	2.48	44.15	53.9	9.7	
Hori.	9848.000	AV	39.63	39.12	10.41	42.92	0.21	2.48	48.93	53.9	4.9	
Hori.	12310.000	AV	38.51	38.94	11.76	42.13	0.21	2.48	49.77	53.9	**4.1**	
Hori.	19696.000	AV	35.14	40.12	12.49	45.32	0.21	-9.54	33.10	53.9	20.8	
Hori.	22158.000	AV	36.60	40.18	13.35	47.20	0.21	-9.54	33.60	53.9	20.3	
Hori.	24620.000	AV	36.41	40.01	14.25	48.74	0.21	-9.54	32.60	53.9	21.3	
Vert.	2483.500	AV	40.03	27.65	13.63	41.62	0.21	2.48	42.38	53.9	11.5	*1)
Vert.	2483.671	AV	39.88	27.65	13.63	41.62	0.21	2.48	42.23	53.9	11.6	
Vert.	4924.000	AV	44.33	31.37	7.36	42.90	0.21	2.48	42.85	53.9	11.0	
Vert.	7386.000	AV	40.11	37.01	8.14	43.28	0.21	2.48	44.67	53.9	9.2	
Vert.	9848.000	AV	39.54	39.12	10.41	42.92	0.21	2.48	48.84	53.9	5.0	
Vert.	12310.000	AV	38.02	38.94	11.76	42.13	0.21	2.48	49.28	53.9	4.6	
Vert.	19696.000	AV	35.31	40.12	12.49	45.32	0.21	-9.54	33.27	53.9	20.6	
Vert.	22158.000	AV	35.80	40.18	13.35	47.20	0.21	-9.54	32.80	53.9	21.1	
Vert.	24620.000	AV	36.65	40.01	14.25	48.74	0.21	-9.54	32.84	53.9	21.0	

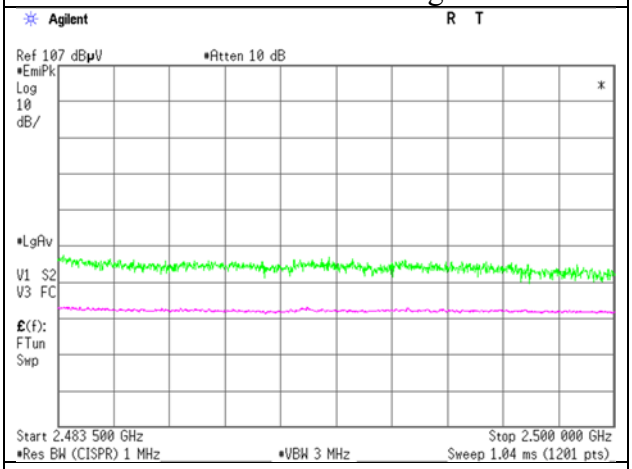
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2462 MHz

Horizontal

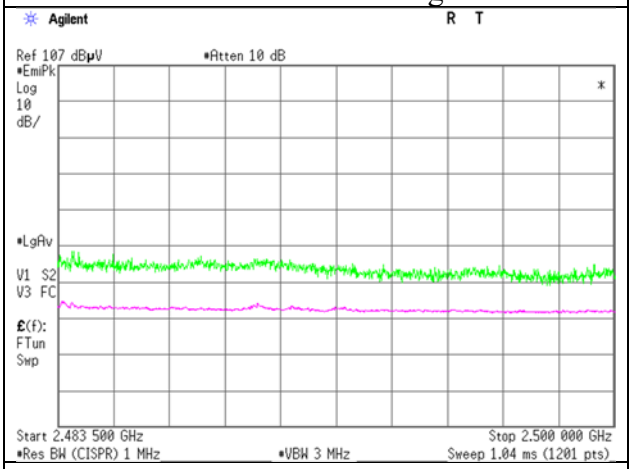
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.1	No.3
Date	March 13, 2019	June 3, 2019	March 12, 2019	March 14, 2019
Temperature / Humidity	23 deg. C / 39 % RH	26 deg. C / 54 % RH	21 deg. C / 39 % RH	21 deg. C / 45 % RH
Engineer	Takahiro Suzuki	Hiromasa Sato	Kazuya Noda	Hiromasa Sato
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx 11n-20 2412 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	244.702	QP	38.68	11.71	8.34	32.02	0.00	26.71	46.0	19.2	100	89	
Hori.	725.048	QP	30.44	20.18	10.49	31.84	0.00	29.27	46.0	16.7	160	143	
Hori.	875.005	QP	30.26	22.15	11.02	31.24	0.00	32.19	46.0	13.8	186	175	
Hori.	960.012	QP	30.16	22.22	11.28	30.57	0.00	33.09	53.9	20.8	157	157	
Hori.	2389.583	PK	57.41	27.86	13.56	41.59	2.48	59.72	73.9	14.1	151	62	
Hori.	2390.000	PK	56.83	27.86	13.56	41.59	2.48	59.14	73.9	14.7	151	62	
Hori.	4824.000	PK	53.34	31.34	6.52	39.50	2.48	54.18	73.9	19.7	151	44	
Hori.	7236.000	PK	49.62	36.85	8.13	42.98	2.48	54.10	73.9	19.8	127	52	
Hori.	9648.000	PK	46.43	38.26	8.92	39.49	2.48	56.60	73.9	17.3	175	276	
Hori.	12060.000	PK	46.55	39.21	10.46	38.74	2.48	59.96	73.9	13.9	150	0	
Vert.	31.630	QP	40.26	18.07	6.48	32.20	0.00	32.61	40.0	7.3	100	147	
Vert.	32.184	QP	41.32	17.84	6.50	32.20	0.00	33.46	40.0	6.5	100	25	
Vert.	33.348	QP	40.79	17.38	6.52	32.20	0.00	32.49	40.0	7.5	100	169	
Vert.	34.550	QP	42.35	16.94	6.54	32.20	0.00	33.63	40.0	**6.3**	100	176	
Vert.	56.118	QP	42.53	9.24	6.70	32.19	0.00	26.28	40.0	13.7	100	6	
Vert.	83.050	QP	42.64	6.87	7.58	32.17	0.00	24.92	40.0	15.0	100	155	
Vert.	2389.740	PK	56.81	27.86	13.56	41.59	2.48	59.12	73.9	14.7	148	56	
Vert.	2390.000	PK	56.57	27.86	13.56	41.59	2.48	58.88	73.9	15.0	148	56	
Vert.	4824.000	PK	52.57	31.34	6.52	39.50	2.48	53.41	73.9	20.4	134	28	
Vert.	7236.000	PK	48.26	36.85	8.13	42.98	2.48	52.74	73.9	21.1	104	7	
Vert.	9648.000	PK	46.56	38.26	8.92	39.49	2.48	56.73	73.9	17.1	166	29	
Vert.	12060.000	PK	46.61	39.21	10.46	38.74	2.48	60.02	73.9	13.8	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2389.583	AV	41.08	27.86	13.56	41.59	0.29	2.48	43.68	53.9	10.2	
Hori.	2390.000	AV	41.01	27.86	13.56	41.59	0.29	2.48	43.61	53.9	10.2	*1)
Hori.	4824.000	AV	41.61	31.34	6.52	39.50	0.29	2.48	42.74	53.9	11.1	
Hori.	7236.000	AV	40.91	36.85	8.13	42.98	0.29	2.48	45.68	53.9	8.2	
Hori.	9648.000	AV	37.11	38.26	8.92	39.49	0.29	2.48	47.57	53.9	6.3	
Hori.	12060.000	AV	36.96	39.21	10.46	38.74	0.29	2.48	50.66	53.9	3.2	
Vert.	2389.740	AV	40.66	27.86	13.56	41.59	0.29	2.48	43.26	53.9	10.6	
Vert.	2390.000	AV	40.95	27.86	13.56	41.59	0.29	2.48	43.55	53.9	10.3	*1)
Vert.	4824.000	AV	40.73	31.34	6.52	39.50	0.29	2.48	41.86	53.9	12.0	
Vert.	7236.000	AV	39.71	36.85	8.13	42.98	0.29	2.48	44.48	53.9	9.4	
Vert.	9648.000	AV	37.13	38.26	8.92	39.49	0.29	2.48	47.59	53.9	6.3	
Vert.	12060.000	AV	37.02	39.21	10.46	38.74	0.29	2.48	50.72	53.9	**3.1**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

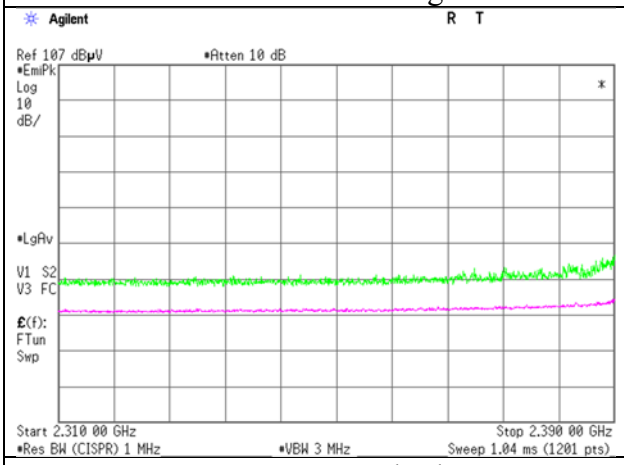
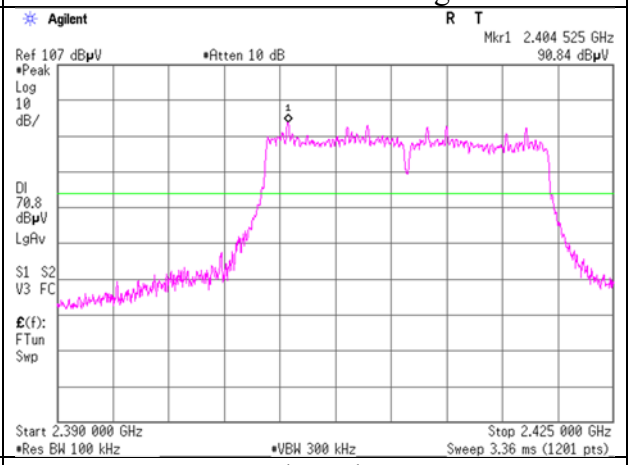
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

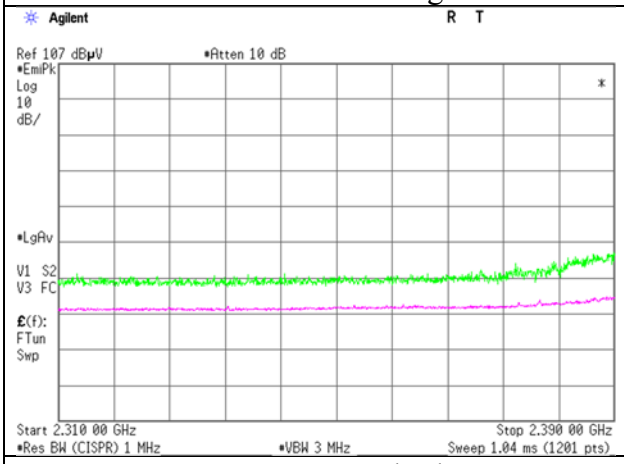
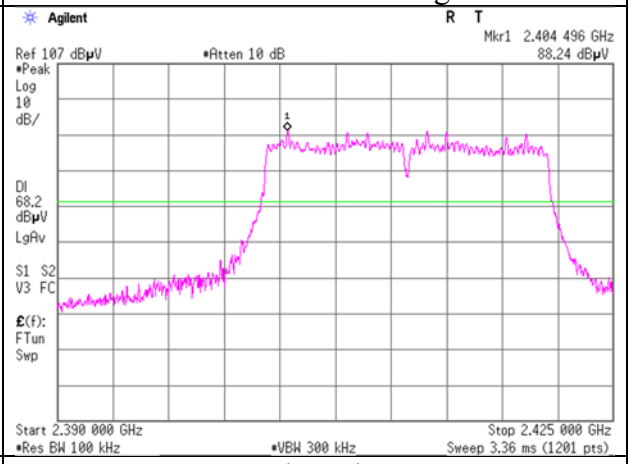
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.23	27.85	13.57	41.60	2.48	92.53	-	-	Carrier
Hori.	2398.310	PK	46.96	27.86	13.56	41.60	2.48	49.26	72.53	23.2	
Hori.	2400.000	PK	49.53	27.86	13.57	41.60	2.48	51.84	72.53	20.6	
Vert.	2412.000	PK	88.63	27.85	13.57	41.60	2.48	90.93	-	-	Carrier
Vert.	2398.117	PK	48.40	27.86	13.56	41.60	2.48	50.70	70.93	20.2	
Vert.	2400.000	PK	47.98	27.86	13.57	41.60	2.48	50.29	70.93	20.6	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2412 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.1	No.3
Date	June 3, 2019	February 10, 2019	March 12, 2019	March 14, 2019
Temperature / Humidity	26 deg. C / 54 % RH	21 deg. C / 36 % RH	21 deg. C / 39 % RH	21 deg. C / 45 % RH
Engineer	Hiromasa Sato	Makoto Hosaka	Kazuya Noda	Hiromasa Sato
	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2437 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	50.96	31.22	6.53	39.50	2.48	51.69	73.9	22.2	119	42	
Hori.	7311.000	PK	49.98	36.99	8.13	43.13	2.48	54.45	73.9	19.4	127	63	
Hori.	9748.000	PK	45.56	38.56	8.93	39.42	2.48	56.11	73.9	17.7	154	265	
Hori.	12185.000	PK	44.29	39.23	10.53	38.55	2.48	57.98	73.9	15.9	150	0	
Vert.	4874.000	PK	49.78	31.22	6.53	39.50	2.48	50.51	73.9	23.3	121	22	
Vert.	7311.000	PK	50.43	36.99	8.13	43.13	2.48	54.90	73.9	19.0	100	3	
Vert.	9748.000	PK	45.48	38.56	8.93	39.42	2.48	56.03	73.9	17.8	143	300	
Vert.	12185.000	PK	45.12	39.23	10.53	38.55	2.48	58.81	73.9	**15.0**	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	40.65	31.22	6.53	39.50	0.29	2.48	41.67	53.9	12.2	
Hori.	7311.000	AV	41.26	36.99	8.13	43.13	0.29	2.48	46.02	53.9	7.8	
Hori.	9748.000	AV	36.66	38.56	8.93	39.42	0.29	2.48	47.50	53.9	6.4	
Hori.	12185.000	AV	35.55	39.23	10.53	38.55	0.29	2.48	49.53	53.9	**4.3**	
Vert.	4874.000	AV	38.87	31.22	6.53	39.50	0.29	2.48	39.89	53.9	14.0	
Vert.	7311.000	AV	40.68	36.99	8.13	43.13	0.29	2.48	45.44	53.9	8.4	
Vert.	9748.000	AV	36.60	38.56	8.93	39.42	0.29	2.48	47.44	53.9	6.4	
Vert.	12185.000	AV	35.58	39.23	10.53	38.55	0.29	2.48	49.56	53.9	**4.3**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Report No.	12699044S-AJ-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	
Date	June 3, 2019	March 14, 2019
Temperature / Humidity	26 deg. C / 54 % RH	21 deg. C / 45 % RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz - 2.8 GHz)	(2.8 GHz – 26.5 GHz)
Mode	Tx 11n-20 2462 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	55.43	27.65	13.63	41.62	2.48	57.57	73.9	16.3	236	79	
Hori.	2483.882	PK	55.80	27.65	13.63	41.62	2.48	57.94	73.9	15.9	236	79	
Hori.	4924.000	PK	50.89	31.37	7.49	42.90	2.48	49.33	73.9	24.5	221	92	
Hori.	7386.000	PK	50.27	37.01	8.14	43.28	2.48	54.62	73.9	19.2	129	65	
Hori.	9848.000	PK	48.48	39.12	10.43	42.92	2.48	57.59	73.9	16.3	193	24	
Hori.	12310.000	PK	45.98	38.94	11.30	42.13	2.48	56.57	73.9	17.3	150	0	
Vert.	2483.500	PK	57.70	27.65	13.63	41.62	2.48	59.84	73.9	**14.0**	146	29	
Vert.	2483.719	PK	56.81	27.65	13.63	41.62	2.48	58.95	73.9	14.9	146	29	
Vert.	4924.000	PK	47.83	31.37	7.49	42.90	2.48	46.27	73.9	27.6	124	74	
Vert.	7386.000	PK	49.20	37.01	8.14	43.28	2.48	53.55	73.9	20.3	100	4	
Vert.	9848.000	PK	48.23	39.12	10.43	42.92	2.48	57.34	73.9	16.5	100	0	
Vert.	12310.000	PK	45.71	38.94	11.30	42.13	2.48	56.30	73.9	17.6	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	40.63	27.65	13.63	41.62	0.29	2.48	43.06	53.9	10.8	*1)
Hori.	2483.882	AV	40.11	27.65	13.63	41.62	0.29	2.48	42.54	53.9	11.3	
Hori.	4924.000	AV	41.85	31.37	7.49	42.90	0.29	2.48	40.58	53.9	13.3	
Hori.	7386.000	AV	41.23	37.01	8.14	43.28	0.29	2.48	45.87	53.9	8.0	
Hori.	9848.000	AV	38.39	39.12	10.43	42.92	0.29	2.48	47.79	53.9	6.1	
Hori.	12310.000	AV	35.89	38.94	11.30	42.13	0.29	2.48	46.77	53.9	7.1	
Vert.	2483.500	AV	40.12	27.65	13.63	41.62	0.29	2.48	42.55	53.9	11.3	*1)
Vert.	2483.719	AV	40.23	27.65	13.63	41.62	0.29	2.48	42.66	53.9	11.2	
Vert.	4924.000	AV	39.69	31.37	7.49	42.90	0.29	2.48	38.42	53.9	15.4	
Vert.	7386.000	AV	40.09	37.01	8.14	43.28	0.29	2.48	44.73	53.9	9.1	
Vert.	9848.000	AV	38.70	39.12	10.43	42.92	0.29	2.48	48.10	53.9	5.8	
Vert.	12310.000	AV	37.92	38.94	11.30	42.13	0.29	2.48	48.80	53.9	**5.1**	

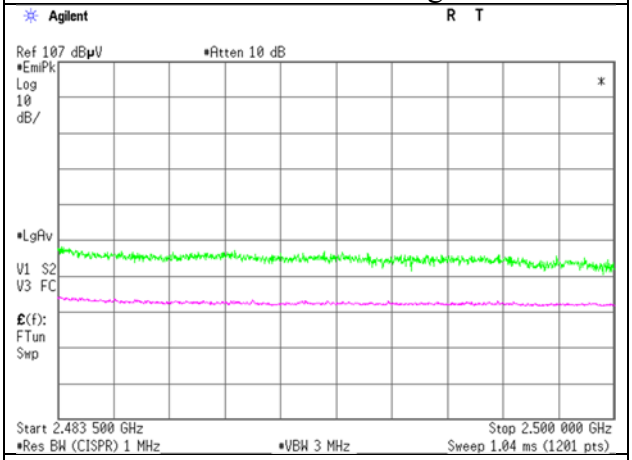
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2462 MHz

Horizontal

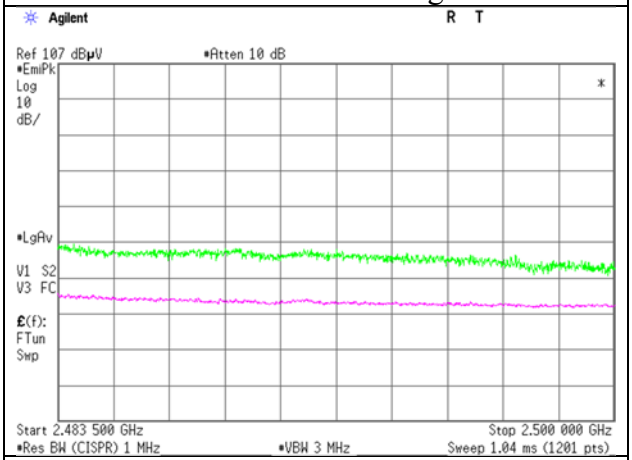
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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

Report No.	12699044S-AJ-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	
Date	June 3, 2019	March 14, 2019
Temperature / Humidity	26 deg. C / 54 % RH	21 deg. C / 45 % RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz - 2.8 GHz)	(2.8 GHz – 26.5 GHz)
Mode	Tx 11n-40 2422 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2387.100	PK	58.80	27.85	13.56	41.59	2.48	61.10	73.9	12.8	144	74	
Hori.	2390.000	PK	58.60	27.86	13.56	41.59	2.48	60.91	73.9	12.9	144	74	
Hori.	4844.000	PK	49.10	31.49	7.40	42.89	2.48	47.58	73.9	26.3	225	100	
Hori.	7266.000	PK	48.71	36.91	8.13	43.04	2.48	53.19	73.9	20.7	138	70	
Hori.	9688.000	PK	48.90	38.79	10.44	43.08	2.48	57.53	73.9	16.3	130	236	
Hori.	12110.000	PK	47.12	39.32	11.27	42.24	2.48	57.95	73.9	15.9	231	90	
Hori.	2387.100	AV	43.22	27.85	13.56	41.59	2.48	45.52	53.9	8.3	144	74	
Hori.	2390.000	AV	42.77	27.86	13.56	41.59	2.48	45.08	53.9	8.8	144	74	
Hori.	4844.000	AV	39.79	31.49	7.40	42.89	2.48	38.27	53.9	15.6	225	100	
Hori.	7266.000	AV	39.75	36.91	8.13	43.04	2.48	44.23	53.9	9.6	138	70	
Hori.	9688.000	AV	38.41	38.79	10.44	43.08	2.48	47.04	53.9	6.8	130	236	
Hori.	12110.000	AV	37.85	39.32	11.27	42.24	2.48	48.68	53.9	**5.2**	231	90	
Vert.	2387.740	PK	55.07	27.86	13.56	41.59	2.48	57.38	73.9	16.5	153	96	
Vert.	2390.000	PK	55.52	27.86	13.56	41.59	2.48	57.83	73.9	16.0	153	96	
Vert.	4844.000	PK	49.27	31.49	7.40	42.89	2.48	47.75	73.9	26.1	178	137	
Vert.	7266.000	PK	48.93	36.91	8.13	43.04	2.48	53.41	73.9	20.4	100	2	
Vert.	9688.000	PK	48.17	38.79	10.44	43.08	2.48	56.80	73.9	17.1	171	50	
Vert.	12110.000	PK	47.94	39.32	11.27	42.24	2.48	58.77	73.9	15.1	150	91	
Vert.	2387.740	AV	40.76	27.86	13.56	41.59	2.48	43.07	53.9	10.8	153	96	
Vert.	2390.000	AV	40.54	27.86	13.56	41.59	2.48	42.85	53.9	11.0	153	96	
Vert.	4844.000	AV	40.78	31.49	7.40	42.89	2.48	39.26	53.9	14.6	178	137	
Vert.	7266.000	AV	39.84	36.91	8.13	43.04	2.48	44.32	53.9	9.5	100	2	
Vert.	9688.000	AV	38.74	38.79	10.44	43.08	2.48	47.37	53.9	6.5	171	50	
Vert.	12110.000	AV	37.87	39.32	11.27	42.24	2.48	48.70	53.9	**5.2**	150	91	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

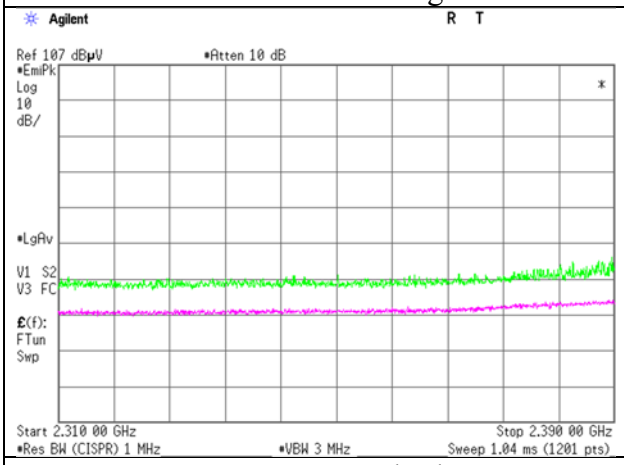
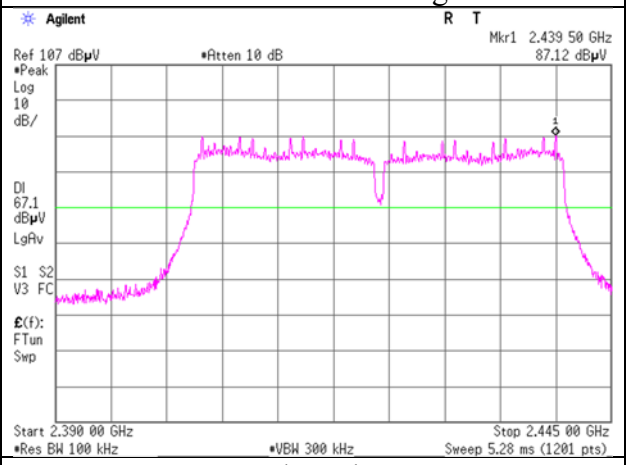
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	87.54	27.83	13.58	41.60	2.48	89.83	-	-	Carrier
Hori.	2396.988	PK	46.66	27.86	13.56	41.59	2.48	48.97	69.83	20.8	
Hori.	2400.000	PK	47.45	27.86	13.57	41.60	2.48	49.76	69.83	20.0	
Vert.	2422.000	PK	88.48	27.83	13.58	41.60	2.48	90.77	-	-	Carrier
Vert.	2399.086	PK	47.32	27.86	13.57	41.60	2.48	49.63	70.77	21.1	
Vert.	2400.000	PK	47.69	27.86	13.57	41.60	2.48	50.00	70.77	20.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

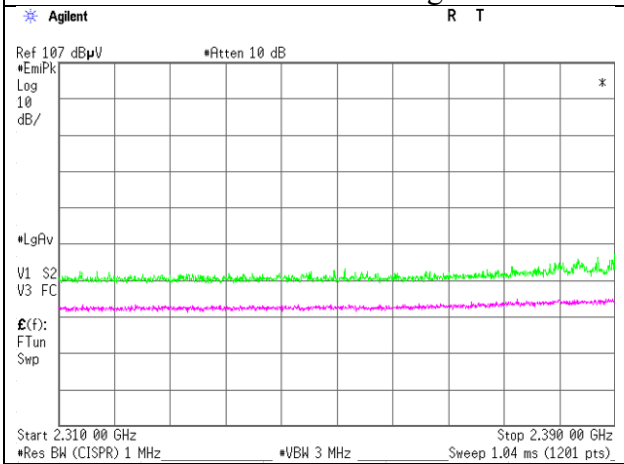
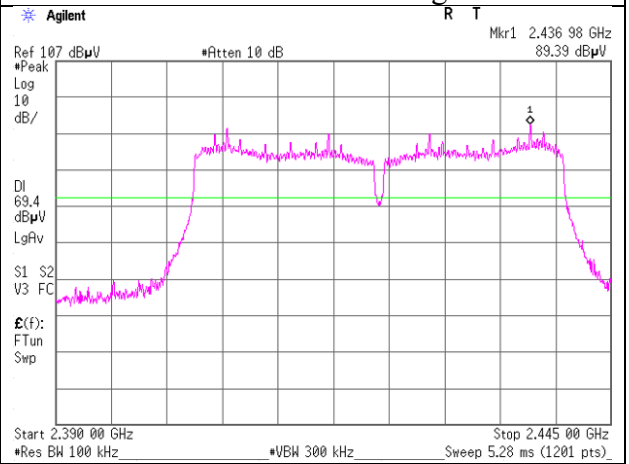
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-40 2422 MHz

Horizontal

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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

Report No.	12699044S-AJ-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	
Date	June 3, 2019	March 14, 2019
Temperature / Humidity	26 deg. C / 54 % RH	21 deg. C / 45 % RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz - 2.8 GHz)	(2.8 GHz - 26.5 GHz)
Mode	Tx 11n-40 2437 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	48.55	31.40	7.43	42.89	2.48	46.97	73.9	26.9	170	153	
Hori.	7311.000	PK	49.75	36.99	8.13	43.13	2.48	54.22	73.9	19.6	108	65	
Hori.	9748.000	PK	48.60	38.92	10.43	43.02	2.48	57.41	73.9	16.4	146	21	
Hori.	12185.000	PK	47.36	39.26	11.28	42.20	2.48	58.18	73.9	15.7	191	32	
Hori.	4874.000	AV	39.52	31.40	7.43	42.89	2.48	37.94	53.9	15.9	170	153	
Hori.	7311.000	AV	40.48	36.99	8.13	43.13	2.48	44.95	53.9	8.9	108	65	
Hori.	9748.000	AV	39.72	38.92	10.43	43.02	2.48	48.53	53.9	**5.3**	146	21	
Hori.	12185.000	AV	37.73	39.26	11.28	42.20	2.48	48.55	53.9	**5.3**	191	32	
Vert.	4874.000	PK	48.83	31.40	7.43	42.89	2.48	47.25	73.9	26.6	192	96	
Vert.	7311.000	PK	49.01	36.99	8.13	43.13	2.48	53.48	73.9	20.4	100	4	
Vert.	9748.000	PK	48.97	38.92	10.43	43.02	2.48	57.78	73.9	16.1	244	102	
Vert.	12185.000	PK	47.68	39.26	11.28	42.20	2.48	58.50	73.9	15.4	190	52	
Vert.	4874.000	AV	39.47	31.40	7.43	42.89	2.48	37.89	53.9	16.0	192	96	
Vert.	7311.000	AV	40.32	36.99	8.13	43.13	2.48	44.79	53.9	9.1	100	4	
Vert.	9748.000	AV	39.00	38.92	10.43	43.02	2.48	47.81	53.9	6.1	244	102	
Vert.	12185.000	AV	37.55	39.26	11.28	42.20	2.48	48.37	53.9	5.5	190	52	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12699044S-AJ-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	
Date	June 3, 2019	March 14, 2019
Temperature / Humidity	26 deg. C / 54 % RH	21 deg. C / 45 % RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz - 2.8 GHz)	(2.8 GHz - 26.5 GHz)
Mode	Tx 11n-40 2452 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	55.62	27.65	13.63	41.62	2.48	57.76	73.9	16.1	167	76	
Hori.	2488.250	PK	56.24	27.63	13.63	41.63	2.48	58.35	73.9	15.5	167	76	
Hori.	4904.000	PK	48.29	31.30	7.46	42.90	2.48	46.63	73.9	27.2	146	105	
Hori.	7356.000	PK	50.69	37.04	8.13	43.22	2.48	55.12	73.9	18.7	111	66	
Hori.	9808.000	PK	48.68	38.95	10.43	42.96	2.48	57.58	73.9	16.3	201	147	
Hori.	12260.000	PK	47.39	39.12	11.29	42.15	2.48	58.13	73.9	15.7	150	350	
Hori.	2483.500	AV	42.22	27.65	13.63	41.62	2.48	44.36	53.9	9.5	167	76	
Hori.	2488.250	AV	42.52	27.63	13.63	41.63	2.48	44.63	53.9	9.2	167	76	
Hori.	4904.000	AV	39.68	31.30	7.46	42.90	2.48	38.02	53.9	15.8	146	105	
Hori.	7356.000	AV	40.48	37.04	8.13	43.22	2.48	44.91	53.9	8.9	111	66	
Hori.	9808.000	AV	38.75	38.95	10.43	42.96	2.48	47.65	53.9	6.2	201	147	
Hori.	12260.000	AV	38.21	39.12	11.29	42.15	2.48	48.95	53.9	4.9	150	350	
Vert.	2483.500	PK	56.08	27.65	13.63	41.62	2.48	58.22	73.9	15.6	272	97	
Vert.	2488.242	PK	56.34	27.63	13.63	41.63	2.48	58.45	73.9	15.4	272	97	
Vert.	4904.000	PK	48.49	31.30	7.46	42.90	2.48	46.83	73.9	27.0	121	201	
Vert.	7356.000	PK	49.39	37.04	8.13	43.22	2.48	53.82	73.9	20.0	100	5	
Vert.	9808.000	PK	48.56	38.95	10.43	42.96	2.48	57.46	73.9	16.4	161	107	
Vert.	12260.000	PK	47.27	39.12	11.29	42.15	2.48	58.01	73.9	15.8	148	86	
Vert.	2483.500	AV	42.32	27.65	13.63	41.62	2.48	44.46	53.9	9.4	272	97	
Vert.	2488.242	AV	41.98	27.63	13.63	41.63	2.48	44.09	53.9	9.8	272	97	
Vert.	4904.000	AV	38.16	31.30	7.46	42.90	2.48	36.50	53.9	17.4	121	201	
Vert.	7356.000	AV	40.40	37.04	8.13	43.22	2.48	44.83	53.9	9.0	100	5	
Vert.	9808.000	AV	38.11	38.95	10.43	42.96	2.48	47.01	53.9	6.8	161	107	
Vert.	12260.000	AV	38.74	39.12	11.29	42.15	2.48	49.48	53.9	**4.4**	148	86	

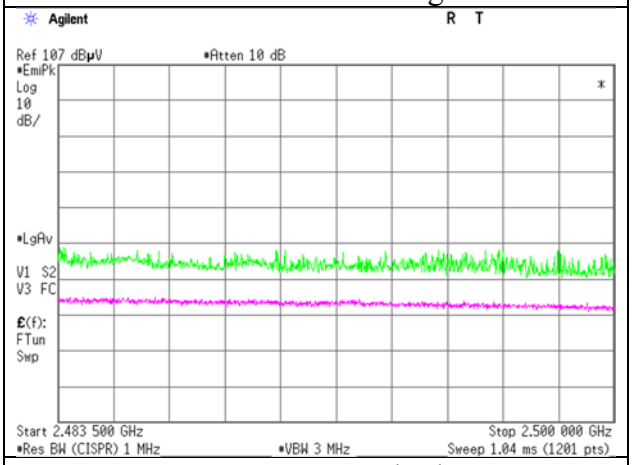
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 3, 2019
Temperature / Humidity	26 deg. C / 54 % RH
Engineer	Hiromasa Sato
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-40 2452 MHz

Horizontal

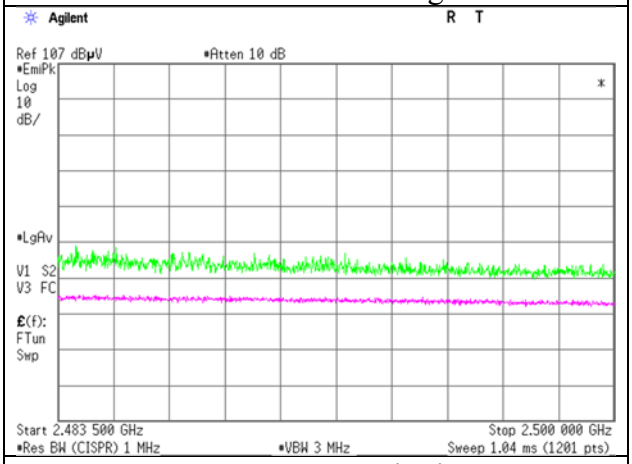
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

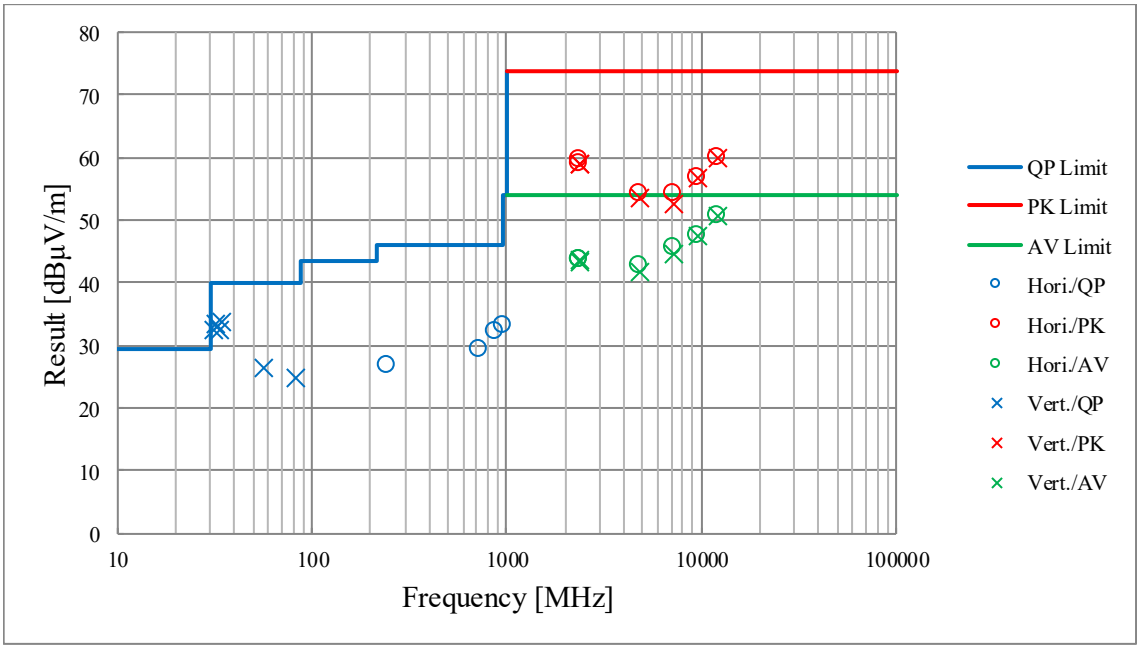


Trace Green : Peak Plot
Trace Purple : Average Plot

* 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
(Plot data, Worst case)

Report No.	12699044S-AJ-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.1	No.3
Date	March 13, 2019	June 3, 2019	March 12, 2019	March 14, 2019
Temperature / Humidity	23 deg. C / 39 % RH	26 deg. C / 54 % RH	21 deg. C / 39 % RH	21 deg. C / 45 % RH
Engineer	Takahiro Suzuki	Hiromasa Sato	Kazuya Noda	Hiromasa Sato
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 13 GHz)	(13 GHz - 26.5 GHz)
Mode	Tx 11n-20 2412 MHz			

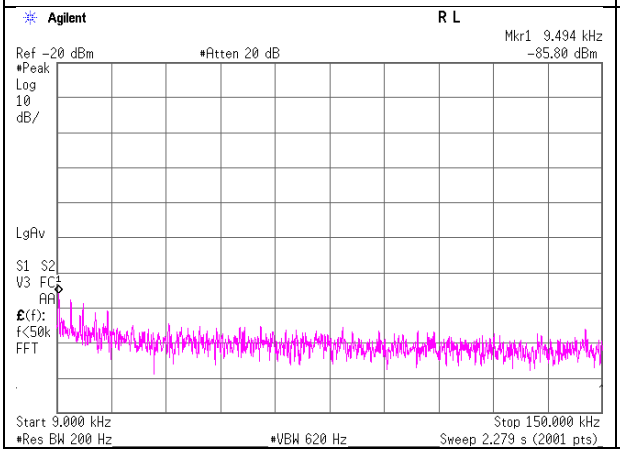


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

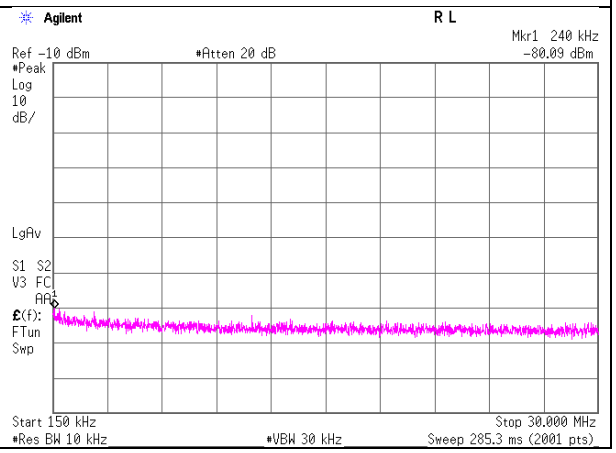
Conducted Spurious Emission

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20 MIMO 2412 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.494	-85.80	0.30	9.74	2.0	2	-70.7	300	6.0	-9.5	48.0	57.5	
240	-80.09	0.30	9.74	2.0	2	-65.0	300	6.0	-3.8	20.0	23.8	

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

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

N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 31, 2019
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kazuya Noda
Mode	Tx 11b

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.43	0.44	-0.60	0.87	8.00	8.60
2437.00	0.45	0.49	-0.28	0.94	8.00	8.28
2462.00	0.40	0.37	-1.08	0.78	8.00	9.08

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-14.80	1.25	9.92	-3.63	0.43	8.00	11.63
2437.00	-14.63	1.25	9.92	-3.46	0.45	8.00	11.46
2462.00	-15.11	1.26	9.92	-3.93	0.40	8.00	11.93

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-14.36	0.94	9.82	-3.60	0.44	8.00	11.60
2437.00	-13.90	0.95	9.82	-3.13	0.49	8.00	11.13
2462.00	-15.04	0.96	9.82	-4.26	0.37	8.00	12.26

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

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 31, 2019
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kazuya Noda
Mode	Tx 11g

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.01	0.02	-15.39	0.03	8.00	23.39
2437.00	0.01	0.02	-14.79	0.03	8.00	22.79
2462.00	0.01	0.02	-15.10	0.03	8.00	23.10

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-29.86	1.25	9.92	-18.69	0.01	8.00	26.69
2437.00	-29.98	1.25	9.92	-18.81	0.01	8.00	26.81
2462.00	-29.73	1.26	9.92	-18.55	0.01	8.00	26.55

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-28.89	0.94	9.82	-18.13	0.02	8.00	26.13
2437.00	-27.75	0.95	9.82	-16.98	0.02	8.00	24.98
2462.00	-28.50	0.96	9.82	-17.72	0.02	8.00	25.72

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

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 31, 2019
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 CDD

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.01	0.02	-15.24	0.03	8.00	23.24
2437.00	0.02	0.02	-14.37	0.04	8.00	22.37
2462.00	0.02	0.02	-14.49	0.04	8.00	22.49

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-29.43	1.25	9.92	-18.26	0.01	8.00	26.26
2437.00	-28.78	1.25	9.92	-17.61	0.02	8.00	25.61
2462.00	-29.05	1.26	9.92	-17.87	0.02	8.00	25.87

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-28.99	0.94	9.82	-18.23	0.02	8.00	26.23
2437.00	-27.94	0.95	9.82	-17.17	0.02	8.00	25.17
2462.00	-27.94	0.96	9.82	-17.16	0.02	8.00	25.16

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

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20 MIMO

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.02	0.02	-14.58	0.03	8.00	22.58
2437.00	0.02	0.02	-14.21	0.04	8.00	22.21
2462.00	0.02	0.02	-13.88	0.04	8.00	21.88

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-29.10	1.25	9.92	-17.93	0.02	8.00	25.93
2437.00	-28.41	1.25	9.92	-17.24	0.02	8.00	25.24
2462.00	-28.96	1.26	9.92	-17.78	0.02	8.00	25.78

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-28.03	0.94	9.82	-17.27	0.02	8.00	25.27
2437.00	-27.97	0.95	9.82	-17.20	0.02	8.00	25.20
2462.00	-26.94	0.96	9.82	-16.16	0.02	8.00	24.16

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

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-40 CDD

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2422.00	0.01	0.01	-18.15	0.02	8.00	26.15
2437.00	0.01	0.01	-17.71	0.02	8.00	25.71
2452.00	0.01	0.01	-17.78	0.02	8.00	25.78

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2422.00	-32.33	1.25	9.92	-21.16	0.01	8.00	29.16
2437.00	-31.88	1.25	9.92	-20.71	0.01	8.00	28.71
2452.00	-32.01	1.25	9.92	-20.84	0.01	8.00	28.84

Antenna B

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2422.00	-31.91	0.94	9.82	-21.15	0.01	8.00	29.15
2437.00	-31.50	0.95	9.82	-20.73	0.01	8.00	28.73
2452.00	-31.52	0.95	9.82	-20.75	0.01	8.00	28.75

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

Power Density

Report No.	12699044S-AJ-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 3, 2019
Temperature / Humidity	25 deg. C / 42 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-40 MIMO

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.01	0.01	-18.04	0.02	8.00	26.04
2437.00	0.01	0.01	-18.17	0.02	8.00	26.17
2462.00	0.01	0.01	-17.57	0.02	8.00	25.57

Sample Calculation:
Result = Antenna A Result + Antenna B Result

Antenna A

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-32.73	1.25	9.92	-21.56	0.01	8.00	29.56
2437.00	-32.72	1.25	9.92	-21.55	0.01	8.00	29.55
2462.00	-31.72	1.25	9.92	-20.55	0.01	8.00	28.55

Antenna B

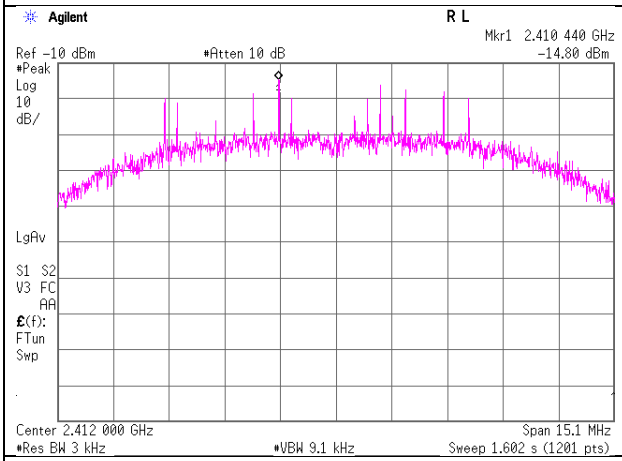
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-31.35	0.94	9.82	-20.59	0.01	8.00	28.59
2437.00	-31.61	0.95	9.82	-20.84	0.01	8.00	28.84
2462.00	-31.39	0.95	9.82	-20.62	0.01	8.00	28.62

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

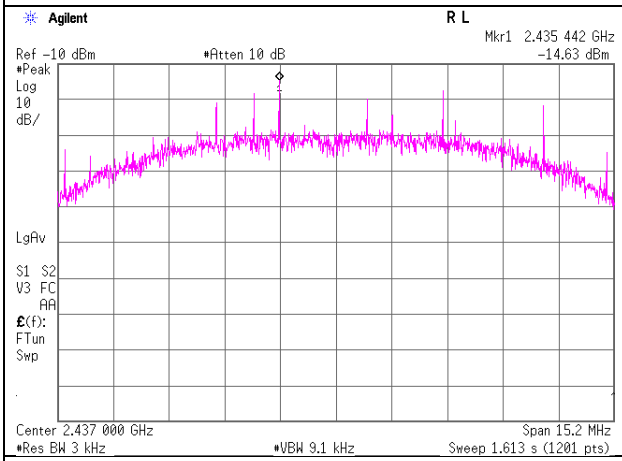
Power Density

11b Antenna A

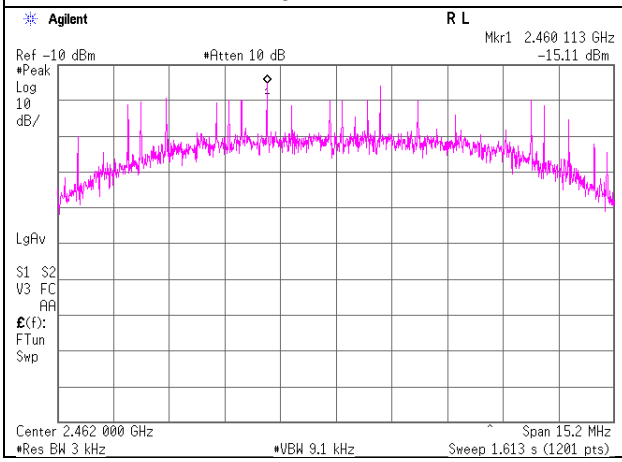
2412 MHz



2437 MHz

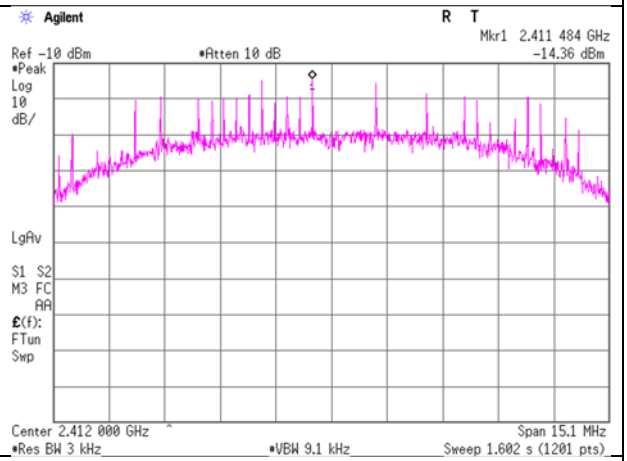


2462 MHz



11b Antenna B

2412 MHz



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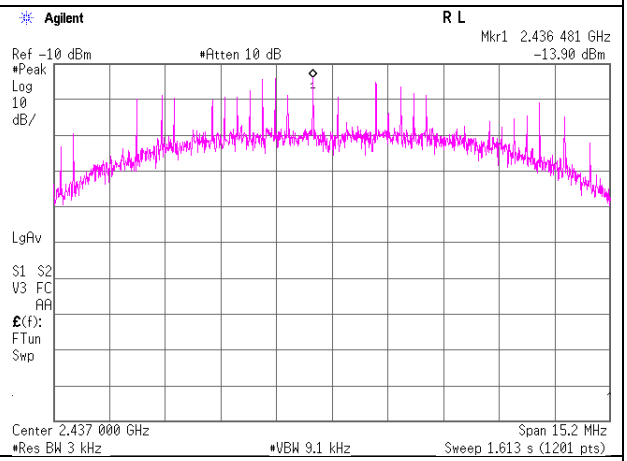
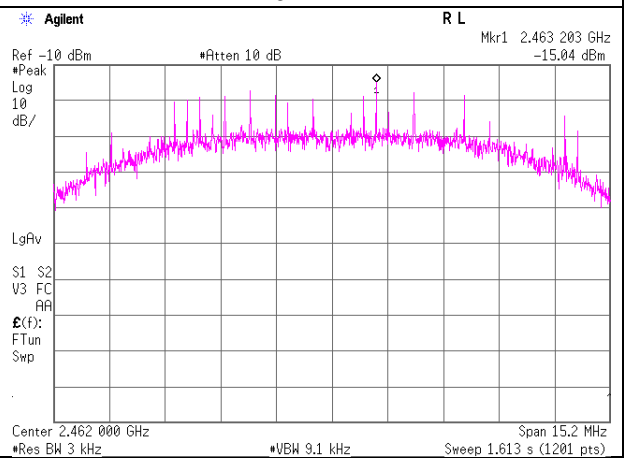


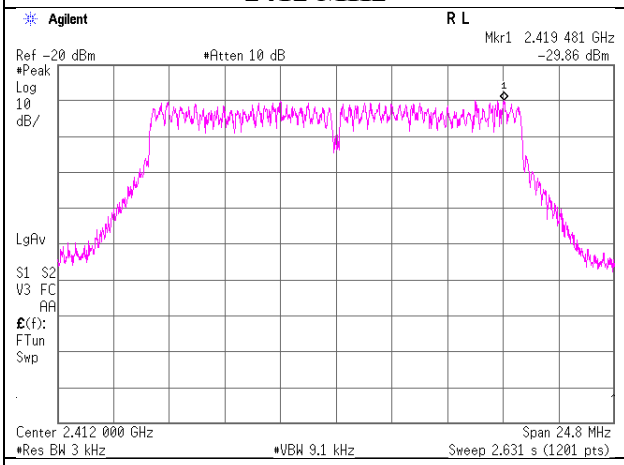
2462 MHz



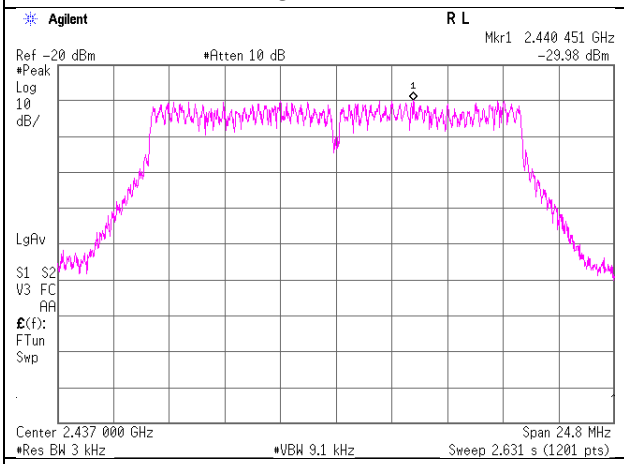
Power Density

11g Antenna A

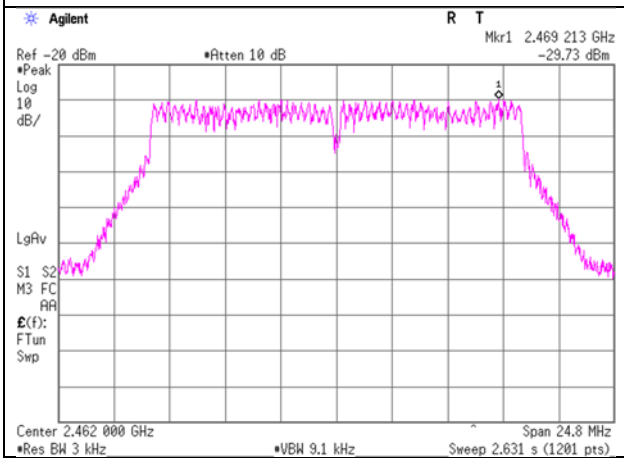
2412 MHz



2437 MHz

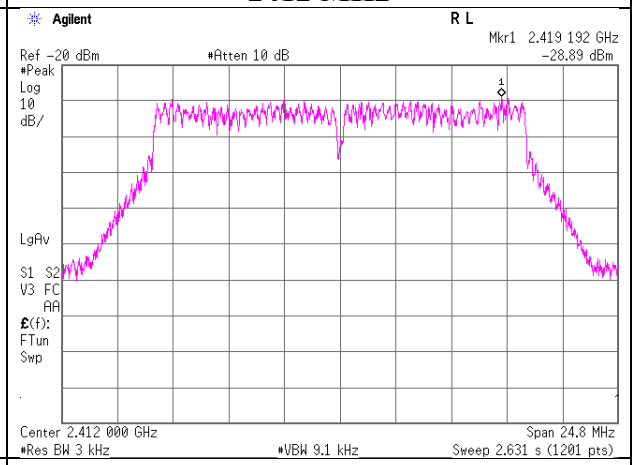


2462 MHz

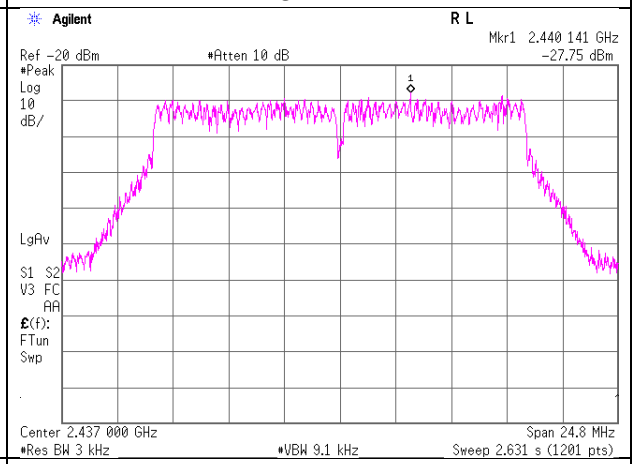


11g Antenna B

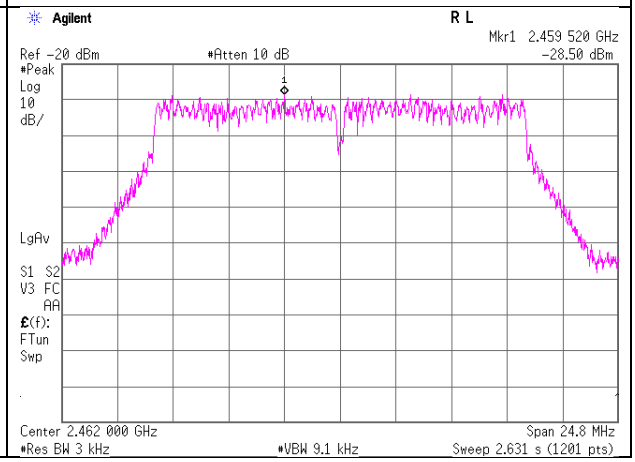
2412 MHz



2437 MHz



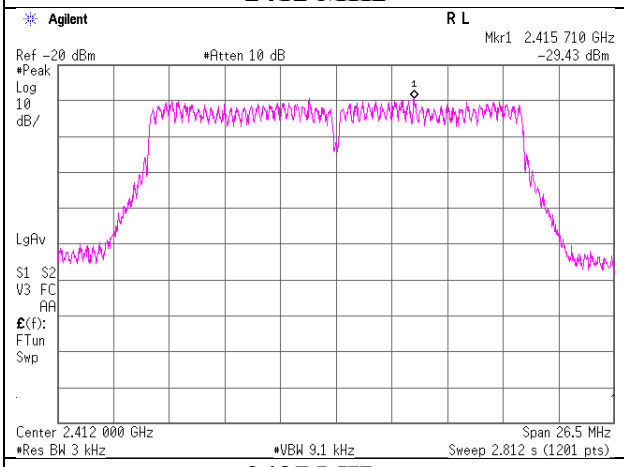
2462 MHz



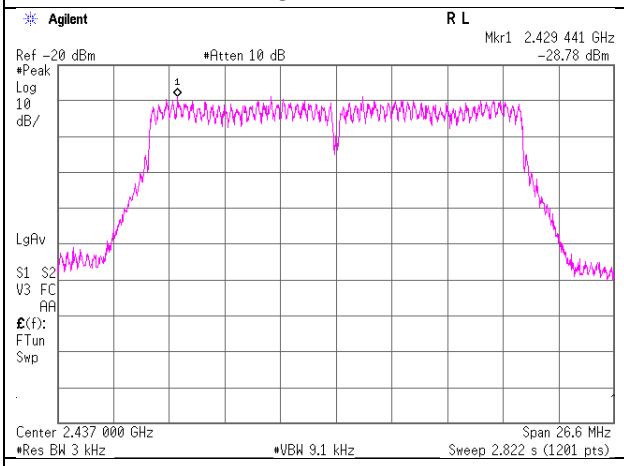
Power Density

11n-20 CDD Antenna A

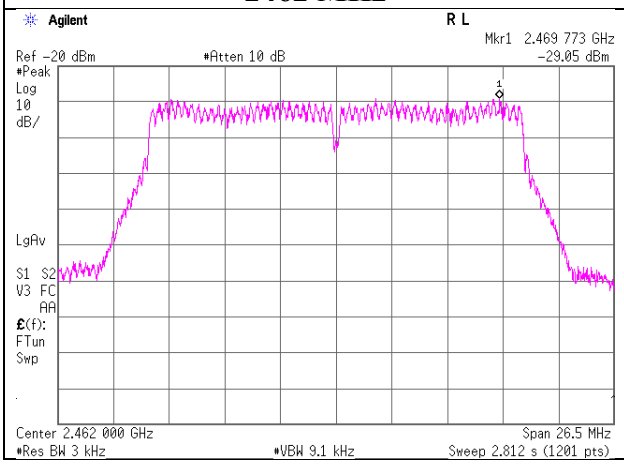
2412 MHz



2437 MHz

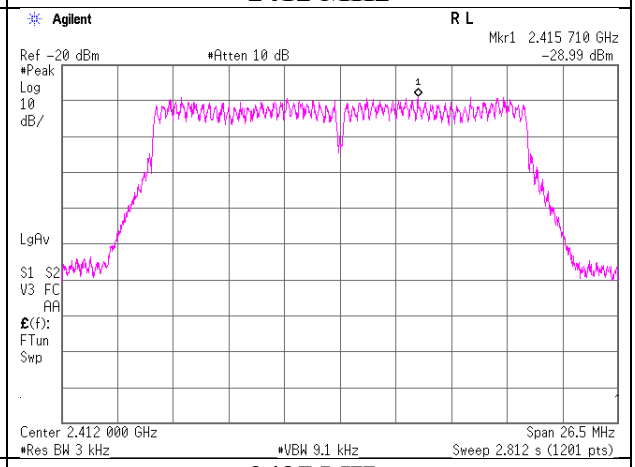


2462 MHz

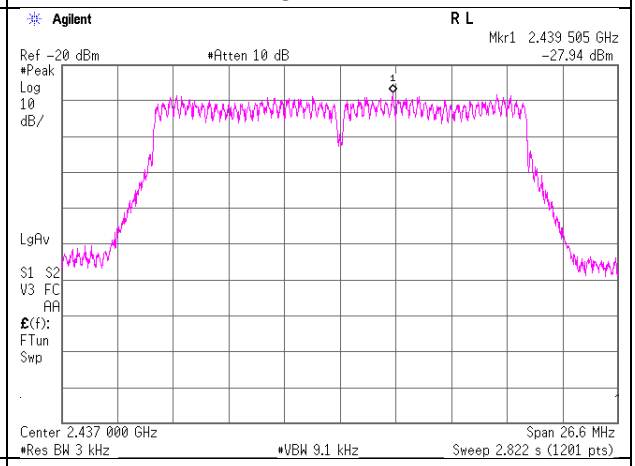


11n-20 CDD Antenna B

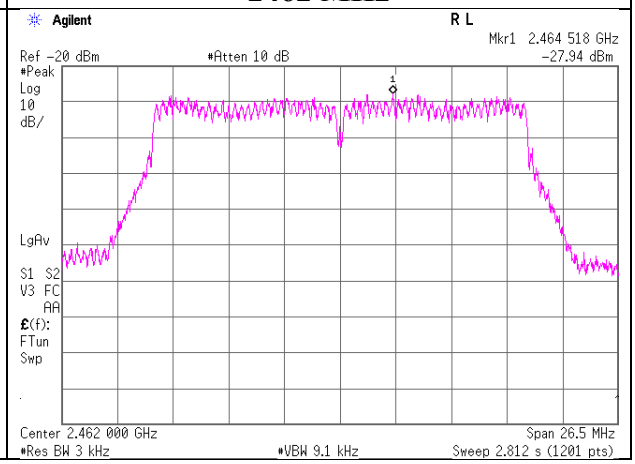
2412 MHz



2437 MHz



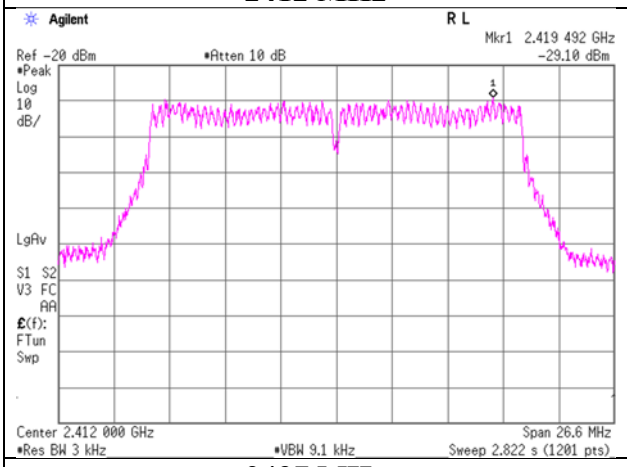
2462 MHz



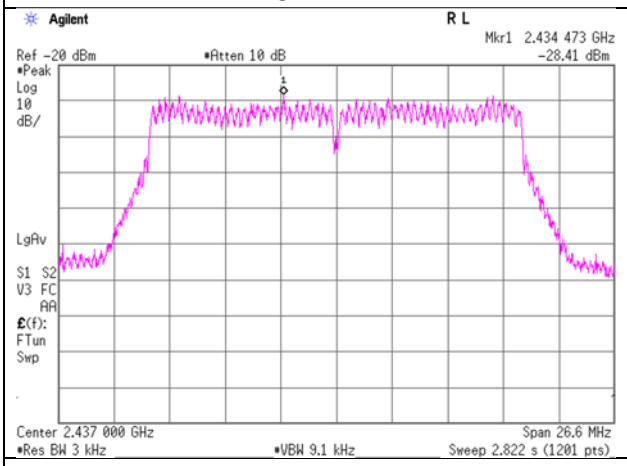
Power Density

11n-20 MIMO Antenna A

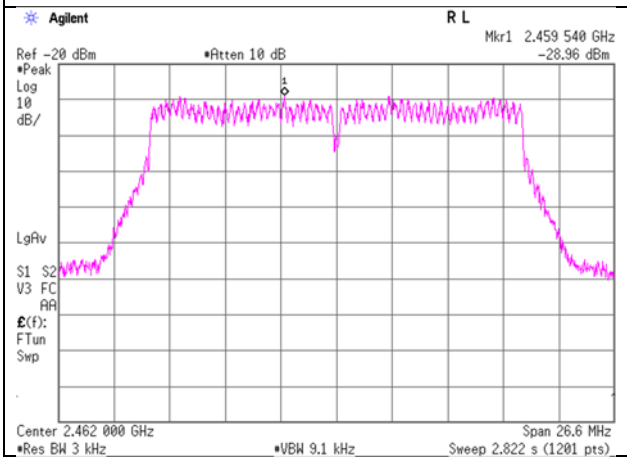
2412 MHz



2437 MHz

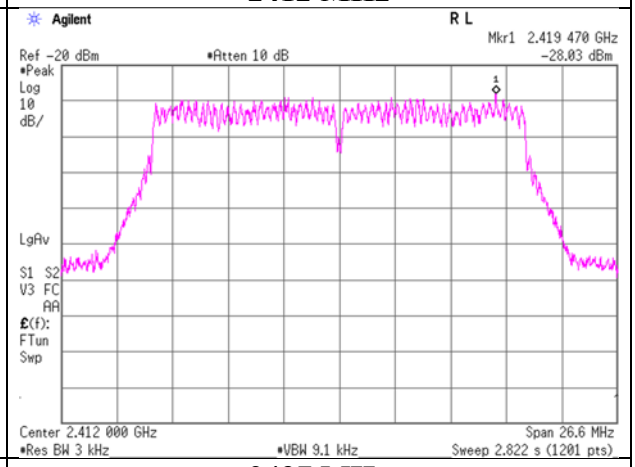


2462 MHz

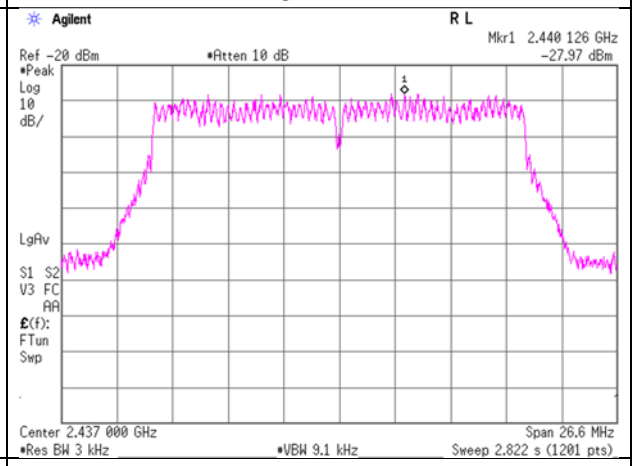


11n-20 MIMO Antenna B

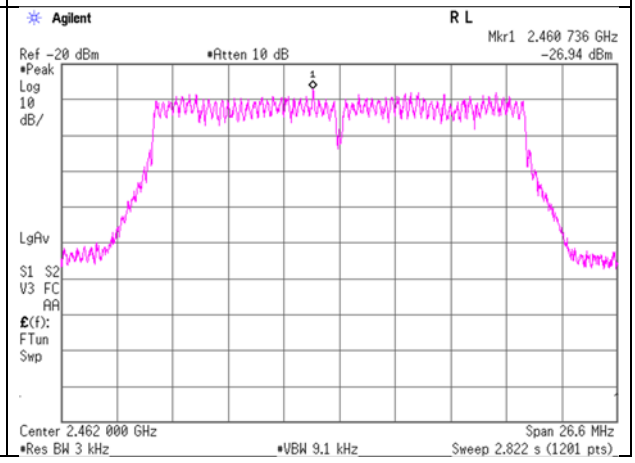
2412 MHz



2437 MHz



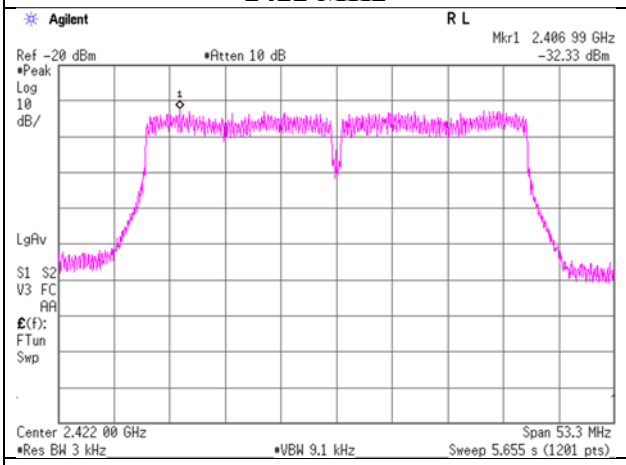
2462 MHz



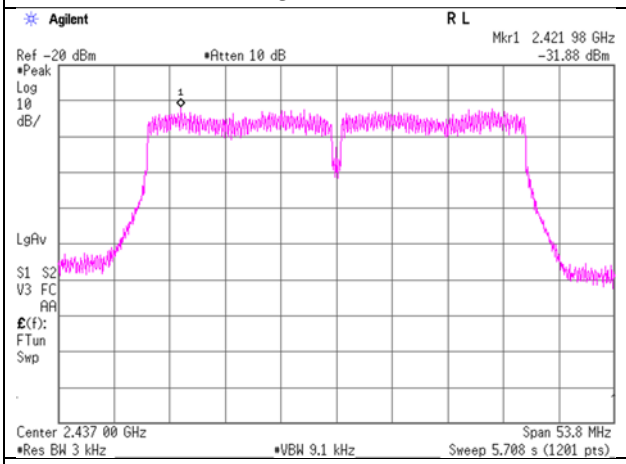
Power Density

11n-40 CDD Antenna A

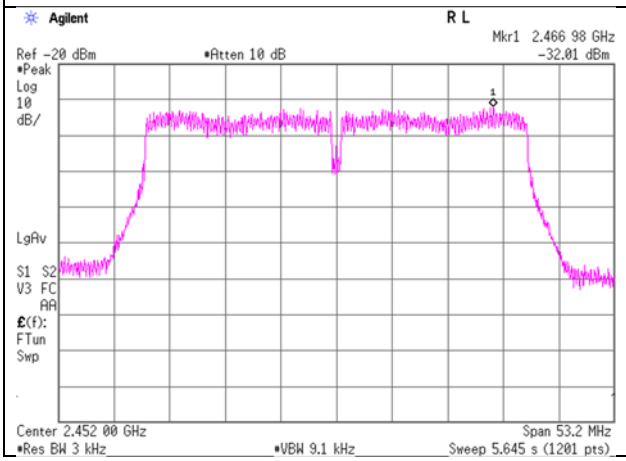
2422 MHz



2437 MHz

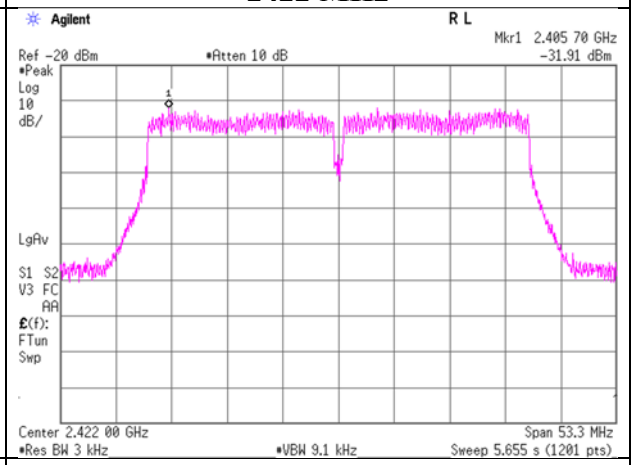


2452 MHz

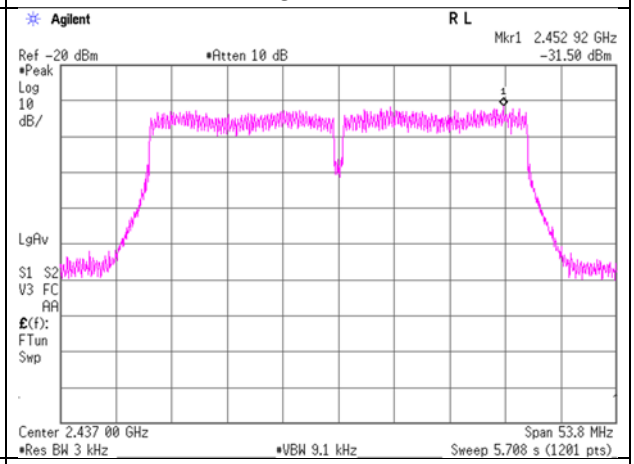


11n-40 CDD Antenna B

2422 MHz



2437 MHz



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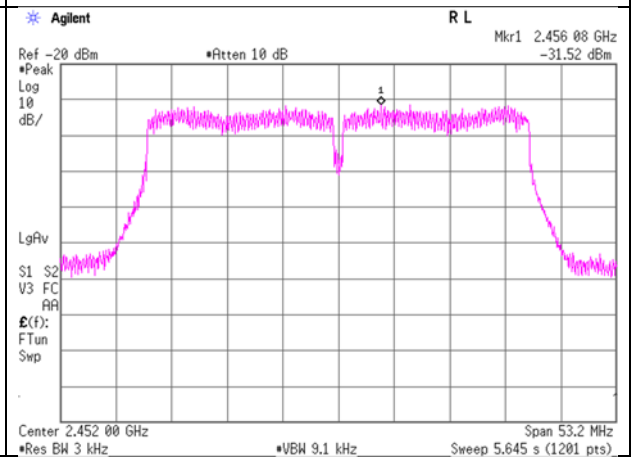
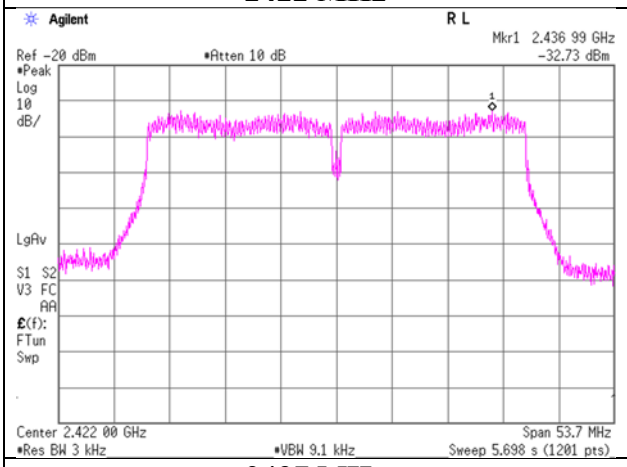


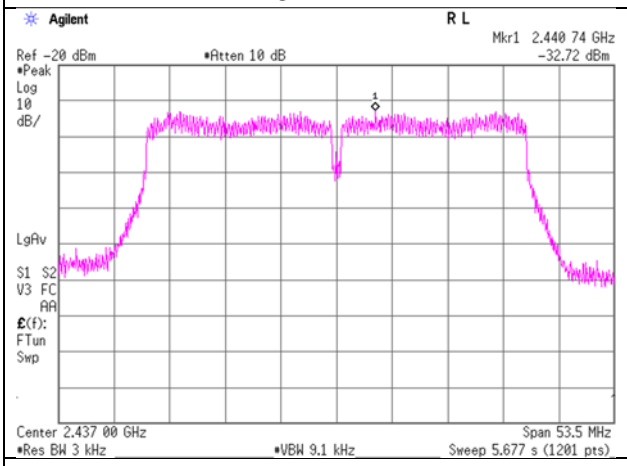
Power Density

11n-40 MIMO Antenna A

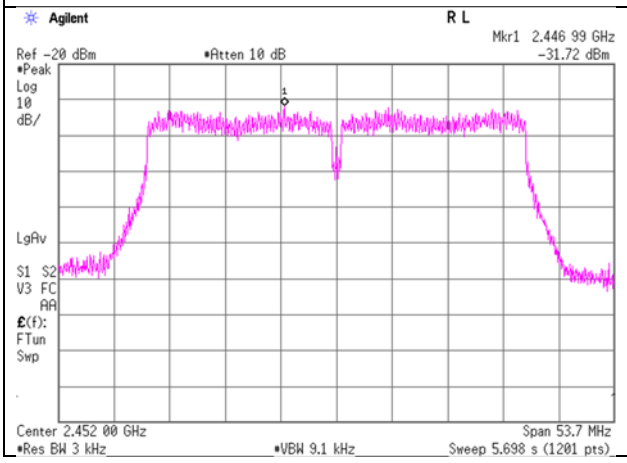
2422 MHz



2437 MHz

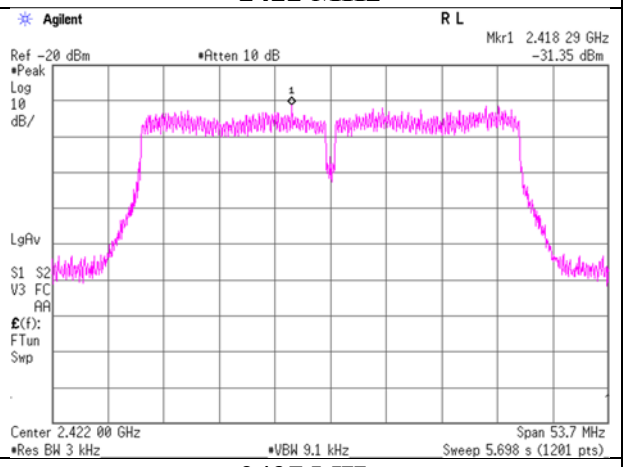


2452 MHz

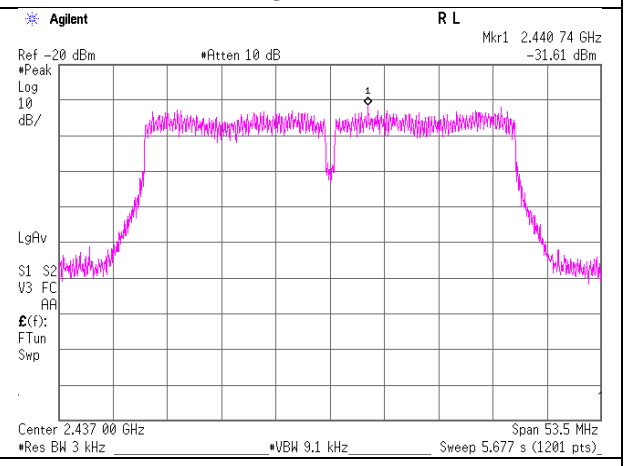


11n-40 MIMO Antenna B

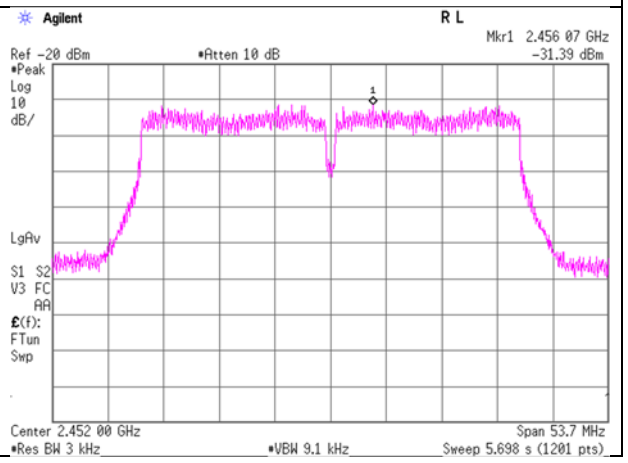
2422 MHz



2437 MHz



2452 MHz



APPENDIX 2: Test instruments

Test Instruments (1 / 3)

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
KTS-07	AT	145111	Digital Tester	SANWA	PC500	7019232	2018/10/17	2019/10/31	12
SAT10-12	AT	151609	Attenuator	Weinschel Corp.	54A-10	81601	2019/3/27	2020/3/31	12
SAT10-14	AT	154591	Attenuator	Weinschel Corp.	54A-10	81595	2019/4/16	2020/4/30	12
SCC-G38	AT	151615	Coaxial Cable	Junkosha	MWX241-01000KMSKMS/B	1612Q036	2018/12/25	2019/12/31	12
SCC-G39	AT	151616	Coaxial Cable	Junkosha	MWX241-01000KMSKMS/B	1612Q037	2018/12/25	2019/12/31	12
SOS-19	AT	175823	Humidity Indicator	CUSTOM	CTH-201	-	2018/12/5	2019/12/31	12
SPM-13	AT	169910	Power Meter	EMC Instruments Corporation	8990B	MY51000448	2019/3/6	2020/3/31	12
SPSS-06	AT	169911	Power sensor	EMC Instruments Corporation	N1923A	MY57270004	2019/3/6	2020/3/31	12
SPSS-07	AT	169912	Power sensor	EMC Instruments Corporation	N1923A	MY57290005	2019/3/6	2020/3/31	12
STM-G4	AT	145787	Terminator	Weinschel - API Technologies Corp	M1459A	U6592	2019/7/4	2020/7/31	12
SSA-02	AT,RE	145800	Spectrum Analyzer	AGILENT	E4448A	MY48250106	2019/4/4	2020/4/30	12
KAT3-12	CE	144896	Attenuator	JFW IND. INC.	50HF-003N	-	2019/7/18	2020/7/31	12
SCC-C9	CE	145035	Coaxial Cable	Suhner	RG223U	-	2019/4/19	2020/4/30	12
SJM-09	CE	145336	Measure	PROMART	SEN1935	-	-	-	-
SLS-03	CE	145540	LISN	Rohde & Schwarz	ENV216	100513	2019/2/21	2020/2/29	12
SLS-04	CE	145541	LISN	Rohde & Schwarz	ENV216	100514	2019/2/21	2020/2/29	12
SOS-04	CE	146292	Humidity Indicator	A&D	AD-5681	4061512	2018/12/5	2019/12/31	12
STM-11	CE	145764	Terminator	TME	CT-01 BP	-	2018/12/25	2019/12/31	12
STR-02	CE	145791	Test Receiver	Rohde & Schwarz	ESCI	100575	2018/10/19	2019/10/31	12
STS-02	CE	145793	Digital Hitester	HIOKI	3805-50	80997819	2019/4/2	2020/4/30	12
COTS-SEMI-5	CE,RE	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE,ME,PE)	-	-	-	-
KJM-02	RE	146432	Measure	TAJIMA	GL19-55	-	-	-	-
KJM-09	RE	145929	Measure	KOMELON	KMC-36	-	-	-	-
KSA-08	RE	145089	Spectrum Analyzer	AGILENT	E4446A	MY46180525	2018/10/7	2019/10/31	12

Test Instruments (2 / 3)

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
SAEC-01(SVSWR)	RE	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2019/5/6	2020/5/30	12
SAEC-03(NSA)	RE	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2019/4/8	2020/4/30	12
SAEC-03(SVSWR)	RE	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2019/5/3	2020/5/31	12
SAF-03	RE	145126	Pre Amplifier	SONOMA	310N	290213	2019/2/5	2020/2/29	12
SAF-04	RE	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2019/6/4	2020/6/30	12
SAF-06	RE	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2019/2/8	2020/2/29	12
SAF-08	RE	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2019/3/5	2020/3/31	12
SAF-09	RE	145008	Pre Amplifier	Toyo Corporation	HAP18-26W	18	2018/9/21	2019/9/30	12
SAT10-05	RE	145136	Attenuator(above1GHz)	AGILENT	8493C-010	74864	2018/11/25	2019/11/30	12
SAT6-13	RE	167094	Attenuator	JFW	50HF-006N	-	2019/2/5	2020/2/29	12
SBA-03	RE	145023	Biconical Antenna	Schwarzbeck	BBA9106	91032666	2019/5/7	2020/5/31	12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	RE	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141P	-/0901-271(RF Selector)	2019/4/19	2020/4/30	12
SCC-G05	RE	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2019/1/25	2020/1/31	12
SCC-G40	RE	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2019/1/25	2020/1/31	12
SCC-G43	RE	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	SN MY 13406/4E	2019/7/3	2020/7/31	12
SCC-G44	RE	168300	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800070/4A	2019/3/26	2020/3/31	12
SCC-G45	RE	168301	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102 E	800137/2EA	2019/3/26	2020/3/31	12
SFL-02	RE	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2018/11/16	2019/11/30	12
SFL-18	RE	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2019/4/16	2020/4/30	12
SHA-01	RE	145383	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	2019/5/9	2020/5/31	12
SHA-03	RE	145501	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	2019/6/26	2020/6/30	12
SHA-04	RE	145512	Horn Antenna	ETS LINDGREN	3160-09	00094868	2019/6/26	2020/6/30	12
SHA-05	RE	145513	Horn Antenna	ETS LINDGREN	3160-09	00094867	2019/6/26	2020/6/30	12
SLA-07	RE	145529	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	2019/5/7	2020/5/31	12
SOS-01	RE	146316	Humidity Indicator	A&D	AD-5681	4062555	2018/10/25	2019/10/31	12
SOS-05	RE	146293	Humidity Indicator	A&D	AD-5681	4062518	2018/10/25	2019/10/31	12
SSA-03	RE	145801	Spectrum Analyzer	AGILENT	E4448A	MY48250152	2018/8/30	2019/8/31	12
STR-08	RE	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2018/11/28	2019/11/30	12

Test Instruments (3 / 3)

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
STS-01	RE	145792	Digital Hitester	HIOKI	3805-50	80997812	2018/10/16	2019/10/31	12
STS-03	RE	146210	Digital Hitester	HIOKI	3805-50	80997823	2018/10/16	2019/10/31	12
SCC-G22 *1)	RE	145180	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	2018/5/11	2019/5/31	12
SCC-G33 *1)	RE	145184	Coaxial Cable	Junkosha	MWX241-01000KMSKMS	-	2018/4/20	2019/4/30	12

***1) This test equipment was used for the tests before the expiration date of the calibration.**
It is not used in tests after the calibration due date.

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

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test item: **CE: Conducted Emission test**
RE: Radiated Emission test
AT: Antenna Terminal Conducted test