RADIO TEST REPORT

Test Report No. : 12429781S-L-R2

Applicant	:	**RICOH COMPANY, LTD.**
Type of Equipment	:	**Digital Camera**
Model No.	:	**R02020**
FCC ID	:	**BBP-R02020**
Test regulation	:	**FCC Part 15 Subpart E: 2018**
Test Result	:	**Complied**

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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. This report is a revised version of 12429781S-L-R1. 12429781S-L-R1 is replaced with this report.

Date of test: August 23 to September 13, 2018

Representative test engineer:

Yosuke Ishikawa
Engineer
Consumer Technology Division

Approved by:

Toyokazu Imamura
Leader
Consumer Technology Division

RTL02610

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

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REVISION HISTORY

Original Test Report No.: 12429781S-L

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12429781S-L	October 24, 2018	-	-
1	12429781S-L-R1	October 26, 2018	5	Deletion of Radio Specification Correction of Antenna type
2	12429781S-L-R2	February 13, 2019	5	Correction of frequency (2472 MHz → 2462 MHz).
			11	Correction of place ("in Semi-anechoic chamber" is "in Shielded room") and added comment "via AC adapter".
			21	Correction of frequency (11ac-40 is 5230 MHz, 11ac-80 is 5210 MHz).
			23	Deleted 99 % occupied bandwidth value and correction calculated power limit using 99 % occupied bandwidth.
			23, 24, 33	Correction duty value (11a, 11n-40).
			13	Correction of method (Method AD → Method VB).
			30	Correction of comment Because Duty is 98% or less, it changed from the description of VBW: 10 Hz to the description of 1 / T. VBW: 10 Hz, Duty > 98% →VBW: 1/x = 3658.98 Hz < 3900 Hz x: (Tx on + Tx off) = 0.2733 ms duty = 0.2733 / 0.2664 = 0.975
			52, 54	Average was remeasured at VBW: 3.9 kHz.
			87, 88	Added equipment used for remeasurement.

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SECTION 1: Customer information

Company Name	:	RICOH COMPANY, LTD.
Address	:	1-3-6 Nakamagome, Ohta-ku, Tokyo, 143-8555, Japan
Telephone Number	:	+81-50-3534-5214
Facsimile Number	:	+81-3-3775-8531
Contact Person	:	Kenji Daigo

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Camera
Model No.	:	R02020
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 5.0 V (USB), DC 3.6 V (Battery)
Receipt Date of Sample	:	August 20, 2018
Country of Mass-production	:	China
Condition of EUT	:	Production 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: R02020 (referred to as the EUT in this report) is a Digital Camera.

General Specification

Clock frequency (ies)

Clock	Oscillation Source	Frequency
Wireless IC (Main Clock)	Crystal Unit	48 MHz
Wireless IC (Command Clock)	ASIC	30 MHz/60 MHz

Radio Specification

Equipment type	:	Transceiver
Frequency of operation	:	2.4 GHz: 2402 MHz -2480 MHz (Bluetooth BDR/EDR/Low Energy (LE)) 2412 MHz -2462 MHz (IEEE 802.11b, 11g, 11n (HT20)) W52: 5180 MHz -5240 MHz (IEEE 802.11a, 11n (HT20), 11ac (VHT20)) 5190 MHz -5230 MHz (IEEE 802.11n (HT40), 11ac (VHT40)) 5210 MHz (IEEE 802.11ac (VHT80))
Bandwidth	:	20 MHz (IEEE 802.11a/b/g/n/ac), 40 MHz (IEEE 802.11n/ac), 80 MHz(IEEE 802.11ac) , 1 MHz (Bluetooth BDR/EDR/Low Energy (LE))
Channel spacing	:	5 MHz (Wi-Fi 2.4 GHz), 20 MHz/40 MHz/80 MHz (Wi-Fi 5 GHz), 1 MHz (Bluetooth BDR/EDR), 2 MHz (Bluetooth LE)
Type of modulation	:	DSSS (IEEE 802.11b), OFDM (IEEE 802.11a/g/n/ac), FHSS (Bluetooth BDR/EDR/ Low Energy (LE))
Antenna type	:	Pattern antenna (λ/2 dipole antenna) + Parasitic element (Cu sheet)
Antenna connector type	:	MM5829-2700 <manufactured by Murata>
Antenna gain	:	[2.4 GHz] 3.52 dBi [5 GHz] 2.87 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart E
FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018

Title : FCC 47CFR Part15 Radio Frequency Device Subpart E
Unlicensed National Information Infrastructure Devices
Section 15.407 General technical requirements

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013	**FCC:** 15.407 (b) (6) / 15.207	27.3 dB 0.162590 MHz N, QP,	Complied	-
	IC: RSS-Gen 8.8	**IC:** RSS-Gen 8.8			
20 dB Emission Bandwidth	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1)	See data	Complied	Conducted
	IC: -	**IC:** -			
Maximum Conducted Output Power	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1)		Complied	Conducted
	IC: -	**IC:** RSS-247 6.2.1.1			
Maximum Power Spectral Density	**FCC:** KDB Publication Number 789033	**FCC :** 15.407 (a) (1)		Complied	Conducted
	IC: -	**IC:** RSS-247 6.2.1.1			
Spurious Emission Restricted Band Edge	**FCC:** ANSI C63.10-2013 KDB Publication Number 789033	**FCC:** 15.407 (b), 15.205 and 15.209	3.2 dB 5150.000 MHz, Hori., AV Tx 11ac-40 5190 MHz with Tx 3-DH5 Hopping On	Complied#	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
	IC: -	**IC:** RSS-247 6.2.1.2			

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 FCC 15.407 (b) and KDB 789033 D02 G.3.b).
*2) Used for Bluetooth measurement with Wireless LAN only.

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

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Band Width	RSS-Gen 6.6	**IC:** -	N/A	Complied	Conducted

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

3.4 Uncertainty

EMI

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	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.5 dB	2.5 dB	2.5 dB	2.6 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.9 dB	4.8 dB	4.9 dB	-	-
	200 MHz-1 GHz	6.1 dB	6.1 dB	6.1 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 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	0.48 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.66 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.47 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.64 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	2.5 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.7 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

3.5 Test Location

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JAB Accreditation No. RTL02610
FCC Test Firm Registration Number: 839876

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	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 and also was judged the necessity of 802.11ac mode by the pre-test.

Mode	Remarks*
Transmitting (Tx), IEEE 802.11a (11a)	36 Mbps, PN9
Transmitting (Tx), IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 3, PN9
Transmitting (Tx), IEEE 802.11ac SISO 20 MHz BW (11ac-20)	MCS 0, PN9
Transmitting (Tx), IEEE 802.11n SISO 40 MHz BW (11n-40)	MCS 1, PN9
Transmitting (Tx), IEEE 802.11ac SISO 40 MHz BW (11ac-40)	MCS 6, PN9
Transmitting (Tx), IEEE 802.11ac SISO 80 MHz BW (11ac-80)	MCS 0, PN9

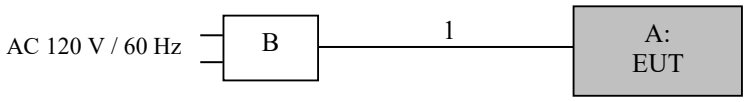
*The worst condition was determined based on the test result of Maximum Conducted Output Power.
*Power of the EUT was set by the software as follows;
Power settings: Fixed
Software: 07020018(0803)
*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

*The details of Operation mode(s)

Test Item	Operating Mode		Tested Frequency
Conducted emission,	Tx 11ac-20 *1)		5180 MHz
20 dB Bandwidth	Tx 11a Tx 11n-20 Tx 11ac-20		5240 MHz
	Tx 11n-40		5230 MHz
	Tx 11ac-80		5210 MHz
99 % Occupied Bandwidth, Maximum Conducted Output Power, Maximum Power Spectral Density,	Tx 11a Tx 11n-20 Tx 11ac-20		5180 MHz 5220 MHz 5240 MHz
	Tx 11n-40 Tx 11ac-40		5190 MHz 5230 MHz
	Tx 11ac-80		5210 MHz
Radiated Spurious Emission (Below 1 GHz) Conducted Spurious Emission	Tx 11ac-20 *1)		5180 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx 11a Tx 11n-20		5180 MHz 5240 MHz
	Tx 11ac-20		5180 MHz 5220 MHz 5240 MHz
	Tx 11n-40 Tx 11ac-40		5190 MHz 5230 MHz
	Tx 11ac-80		5210 MHz
	Tx 11a Tx 11n-20 Tx 11ac-20	with 3-DH5 Hopping *2)	5180 MHz 5240 MHz
	Tx 11n-40 Tx 11ac-40		5190 MHz 5230 MHz
	Tx 11ac-80		5210 MHz

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.
*2) The Simultaneous transmitting with BLE was not able to co-operation with this software, therefore the test has been only done with 3-DH5.

4.2 Configuration and peripherals



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

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Camera	R02020	YN10001066 *1) YN10001081 *2)	RICOH	EUT
B	USB Power Adapter	AC-U2	180110000086	RICOH	-

*1) Used for Antenna Terminal conducted test
*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

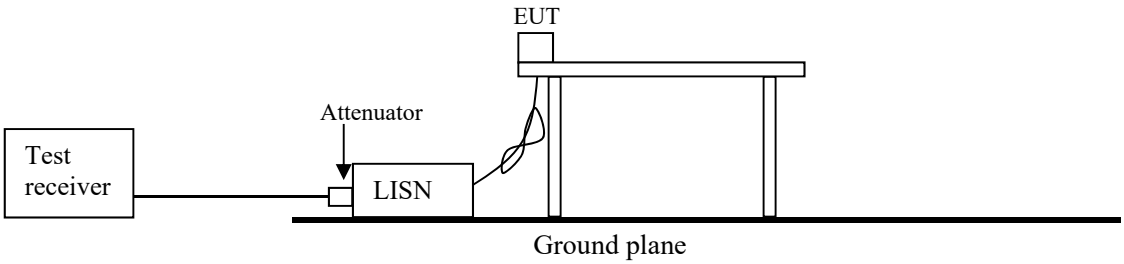
No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	0.4	Shielded	Shielded	Manufacturer: RICOH Supplied with EUT

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 40cm 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 80cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT itself (as a stand alone equipment)
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN / (AMN) to the input power source.



The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via AC adapter in a Shielded room.
The EUT via AC adapter 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 Average
Measurement range : 0.15 MHz - 30 MHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Radiated Spurious Emission and Band Edge Compliance

Test Procedure

< Below 1GHz >
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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

< Above 1GHz >
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.
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.

< Below 1GHz >

The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1GHz >

Inside of restricted bands (Section 15.205):

Apply to limit in the Section 15.209 (a).

Outside of the restricted bands:

Apply to limit 68.2 dBuV/m, 3 m (-27 dBm e.i.r.p.*) in the Section 15.407 (b) (1) (2) (3).

*Electric field strength to e.i.r.p. conversion:

$$E = \frac{1000000\sqrt{30P}}{3}$$ (uV/m) :P is the e.i.r.p. (Watts)

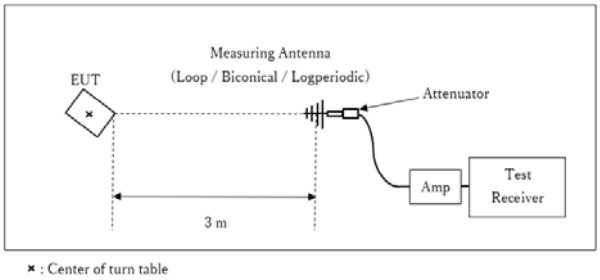
Test Antennas are used as below;

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

Frequency	Below 1 GHz	Above 1 GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	Peak	Average
IF Bandwidth	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz	Method VB *1) RBW: 1 MHz VBW: 1/T (T: burst length, refer to APPENDIX) Detector: Peak Trace: ≥ 100 traces

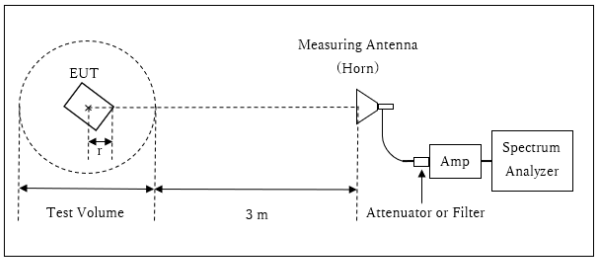
*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

Below 1 GHz



Test Distance : 3 m

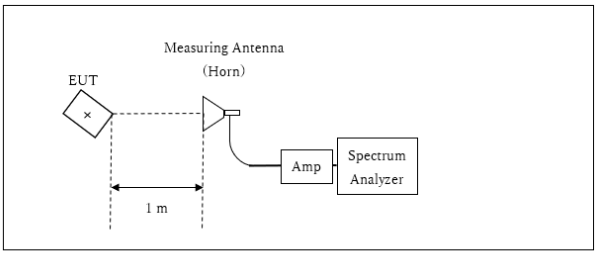
1 GHz - 13 GHz



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

Distance Factor: 20 x log (3.93 m*/3.0 m) = 2.35 dB
*Test Distance : (3 + Test Volume /2) - r = 3.93 m
Test Volume : 2 m (Test Volume has been calibrated based on CISPR16-1-4.)
r = 0.07 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.

Frequency / Test Antenna	Below 1 GHz	1 GHz - 6.4 GHz	6.4 GHz - 13 GHz	13 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
Horizontal	X	Y	X	X	Z	X
Vertical	X	X	X	X	Y	X

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

Measurement range : 30 MHz - 40 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 and Test method
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Peak	Max Hold	Spectrum Analyzer
20 dB Bandwidth	Enough to capture the emission	Close to 1 % of EBW	> RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 160 MHz BW) (Method PM)
Maximum Power Spectral Density	Encompass the entire EBW	1 MHz	≥ 3 RBW	Auto	RMS, Power Averaging (100 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9 kHz – 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz – 30 MHz	10 kHz	30 kHz				

* The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*1) Peak hold was applied as Worst-case measurement.
*2) In the frequency range below 30 MHz, 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.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/09/01

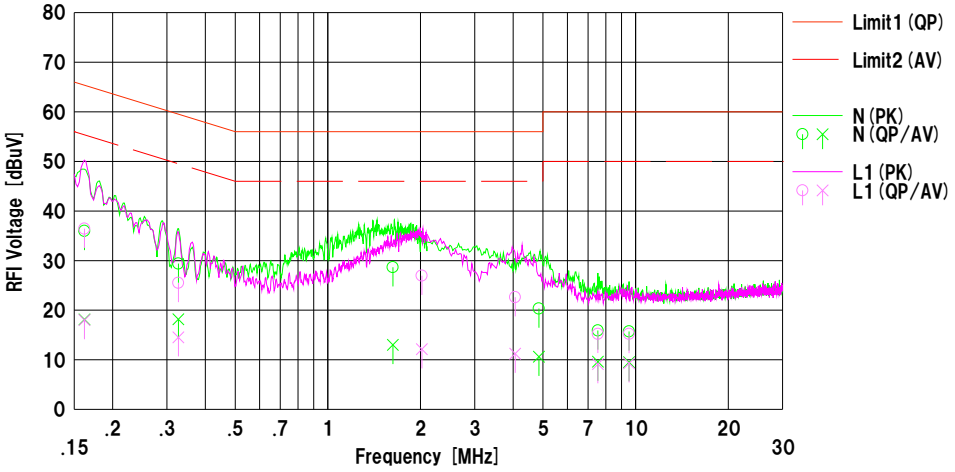
Mode : Tx IEEE802.11ac-VHT20 5180 MHz

Power : DC 5 V (USB)
Temp./Humi. : 20 deg.C / 62 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Kazutaka Takeyama



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16200	23.59	5.75	12.38	35.97	18.13	65.36	55.36	29.3	37.2	N	
2	0.32700	17.01	5.78	12.39	29.40	18.17	59.53	49.53	30.1	31.3	N	
3	1.62590	16.19	0.54	12.48	28.67	13.02	56.00	46.00	27.3	32.9	N	
4	4.85000	7.66	-2.02	12.66	20.32	10.64	56.00	46.00	35.6	35.3	N	
5	7.54000	3.13	-3.19	12.79	15.92	9.60	60.00	50.00	44.0	40.4	N	
6	9.52100	2.82	-3.39	12.90	15.72	9.51	60.00	50.00	44.2	40.4	N	
7	0.16200	24.05	5.65	12.38	36.43	18.03	65.36	55.36	28.9	37.3	L1	
8	0.32700	13.11	2.14	12.39	25.50	14.53	59.53	49.53	34.0	35.0	L1	
9	2.02050	14.46	-0.36	12.50	26.96	12.14	56.00	46.00	29.0	33.8	L1	
10	4.06120	10.01	-1.39	12.62	22.63	11.23	56.00	46.00	33.3	34.7	L1	
11	7.54000	2.44	-3.64	12.79	15.23	9.15	60.00	50.00	44.7	40.8	L1	
12	9.52100	2.31	-3.61	12.90	15.21	9.29	60.00	50.00	44.7	40.7	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) =SLS-02

99 % Occupied Bandwidth

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11a

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5180	16635.9	-
5220	16667.7	-
5240	16632.1	-

11n-20

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5180	17834.4	-
5220	17780.0	-
5240	17767.5	-

11ac-20

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5180	17887.0	-
5220	17864.1	-
5240	17873.9	-

11n-40

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5190	36177.3	-
5230	36132.4	-

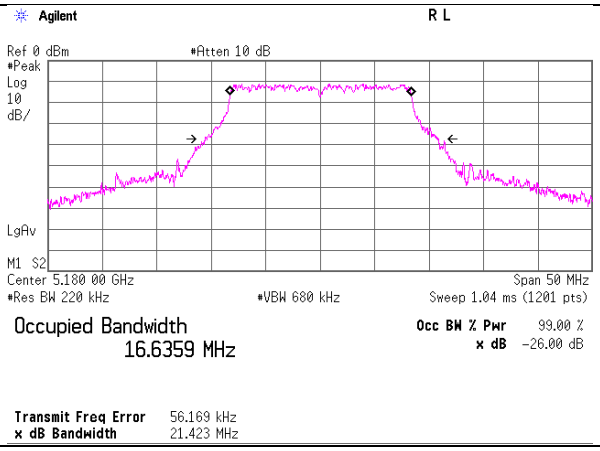
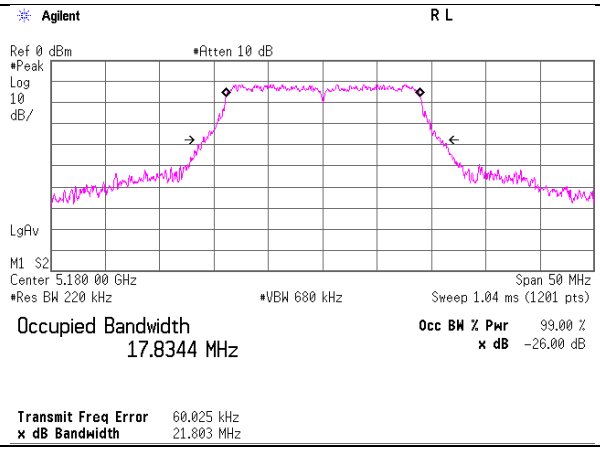
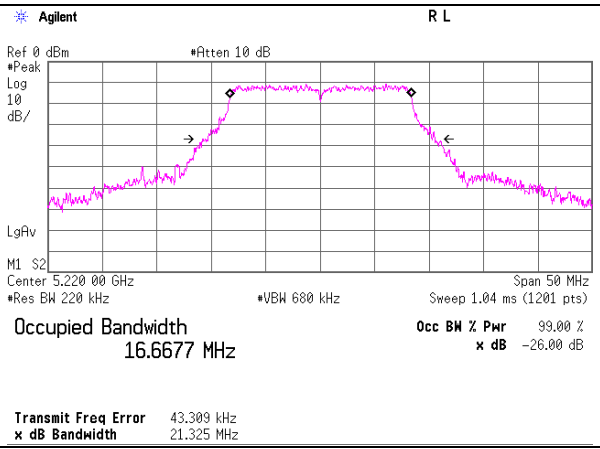
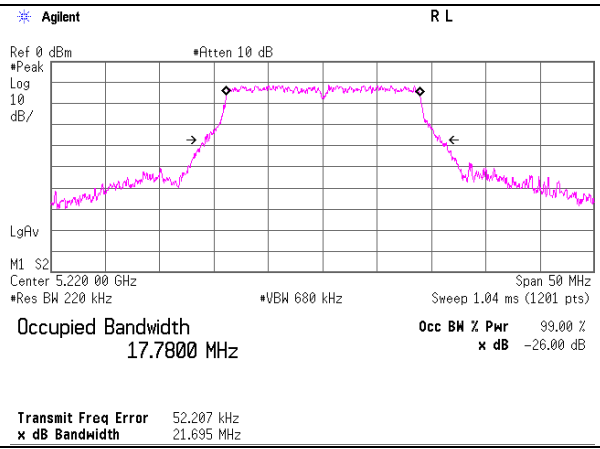
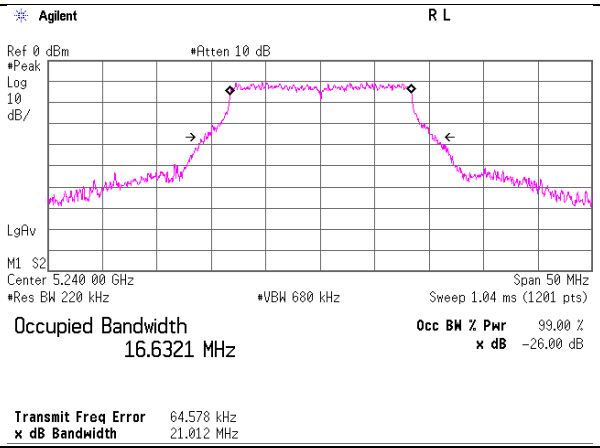
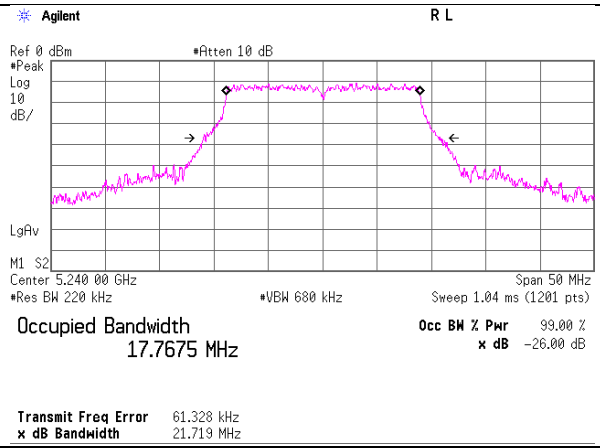
11ac-40

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5190	36303.8	-
5230	36308.7	-

11ac-80

Tested Frequency [MHz]	99 % Occupied Bandwidth [kHz]	Limit [MHz]
5210	74771.0	-

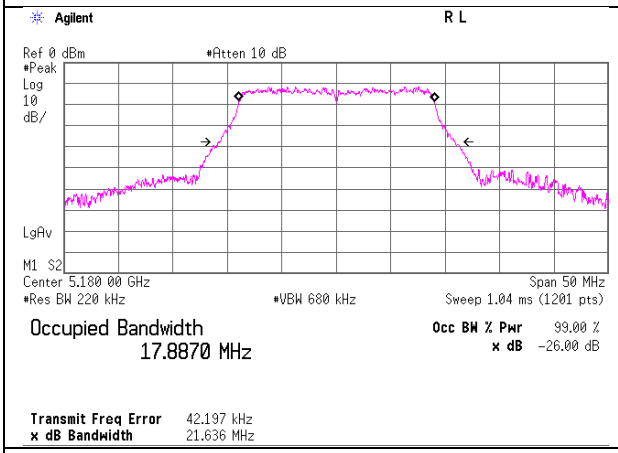
99 % Occupied Bandwidth

11a	11n-20
5180 MHz	**5180 MHz**
	
5220 MHz	**5220 MHz**
	
5240 MHz	**5240 MHz**
	

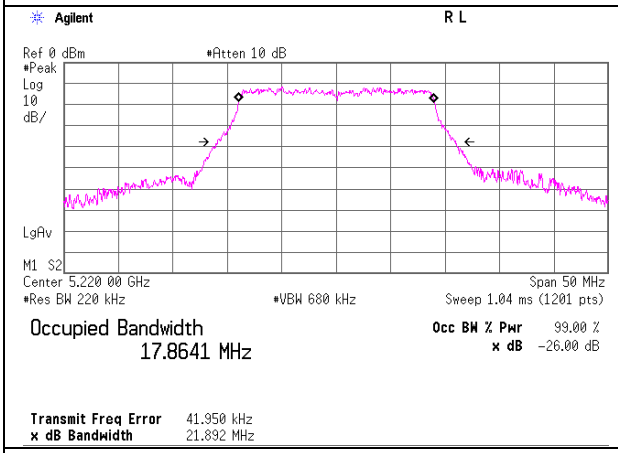
99 % Occupied Bandwidth

11ac-20

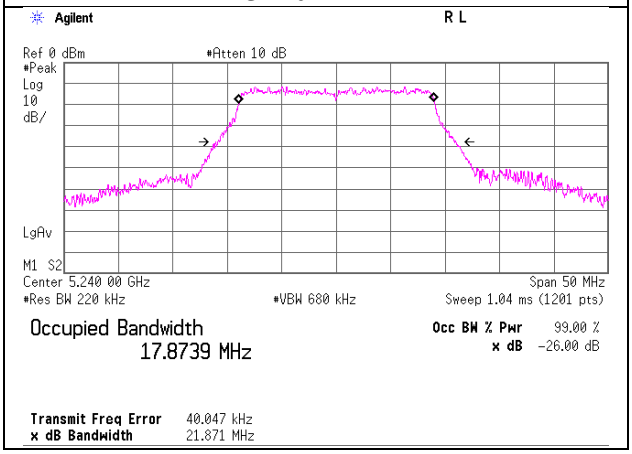
5180 MHz



5220 MHz

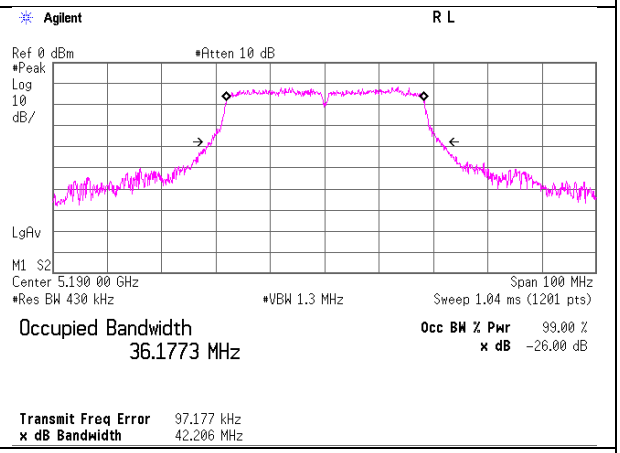


5240 MHz

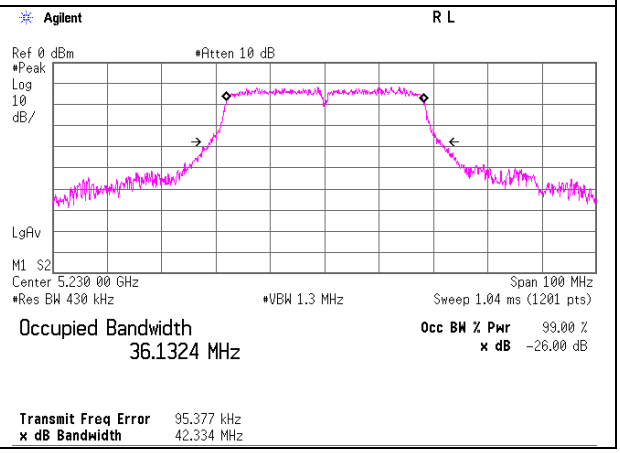


11n-40

5190 MHz



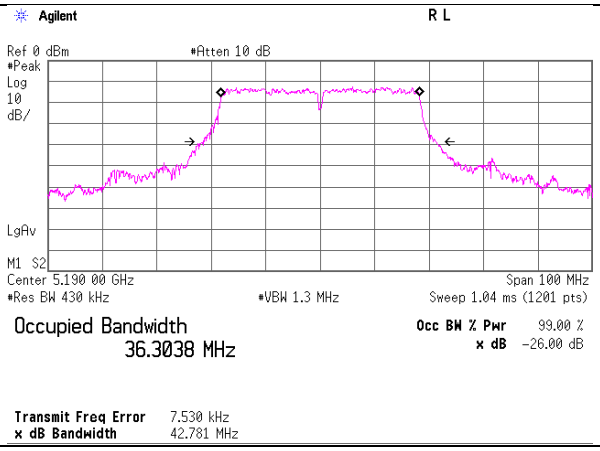
5230 MHz



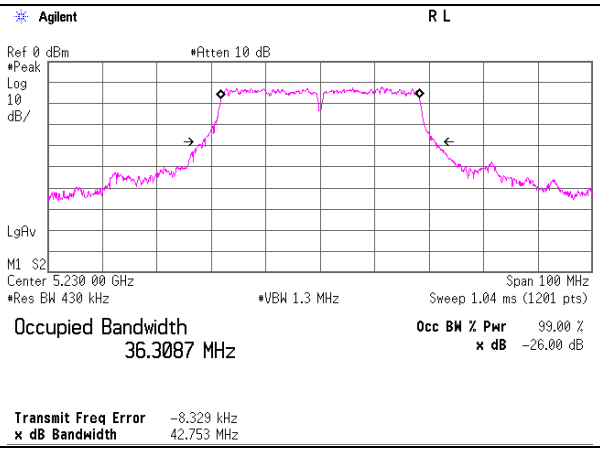
99 % Occupied Bandwidth

11ac-40

5190 MHz

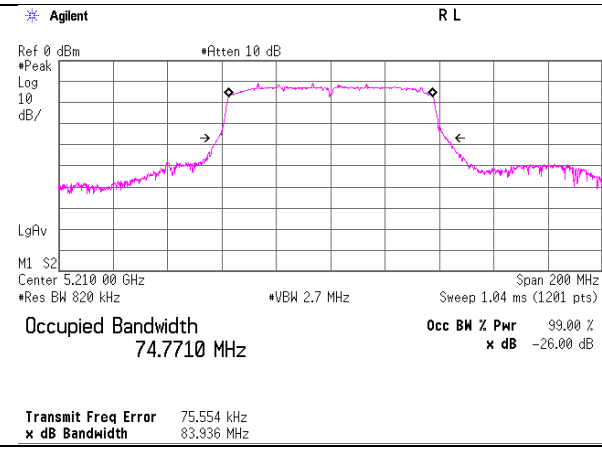


5230 MHz



11ac-80

5210 MHz



20 dB Bandwidth

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11a

Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5240	18.964

11n-20

Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5240	19.205

11ac-20

Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5240	19.946

11n-40

Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5230	38.909

11ac-40

Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5230	39.193

11ac-80

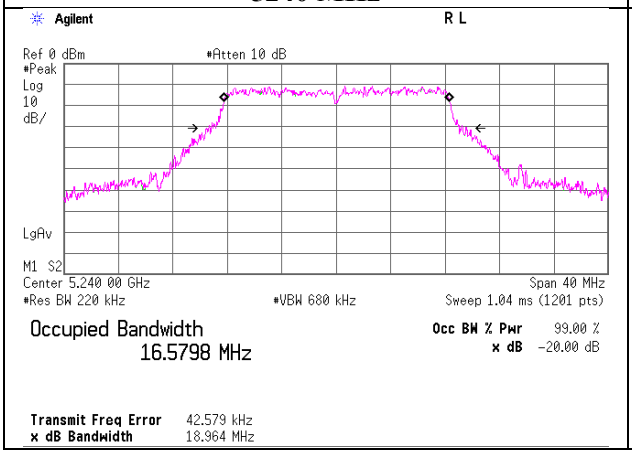
Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
5210	78.796

20 dB Bandwidth

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

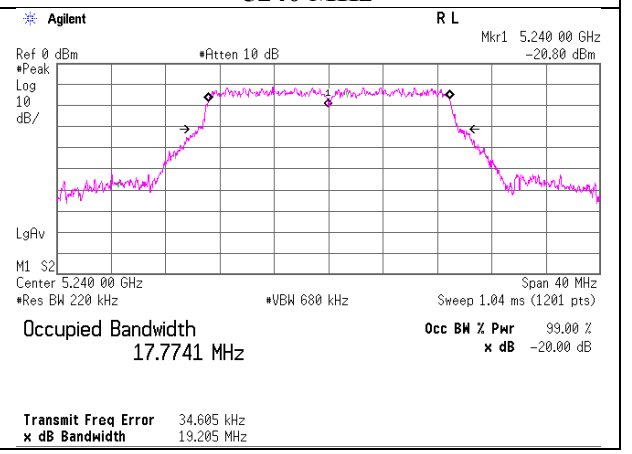
11a

5240 MHz



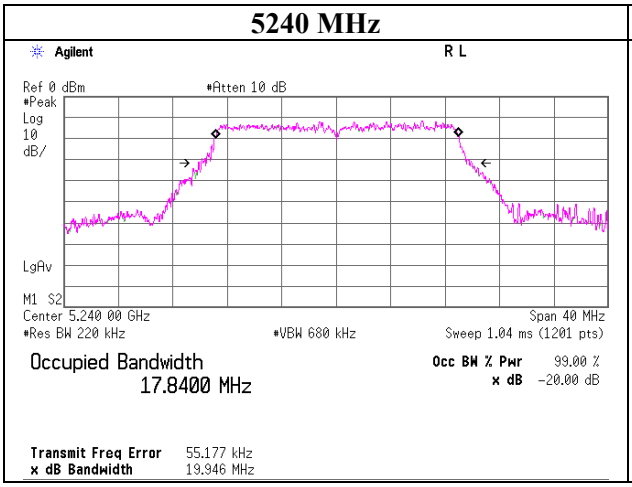
11n-20

5240 MHz



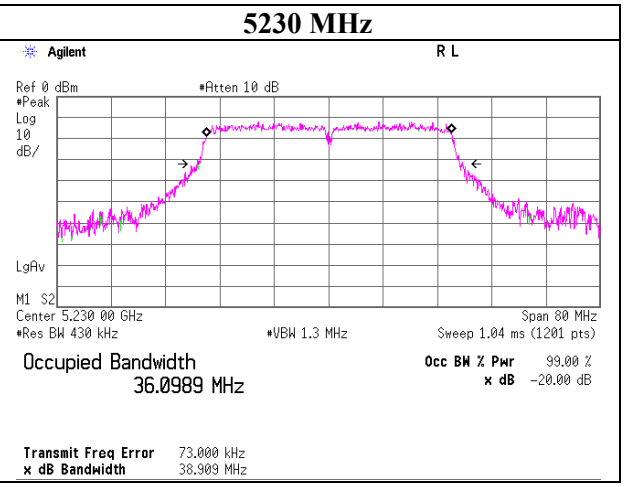
11ac-20

5240 MHz



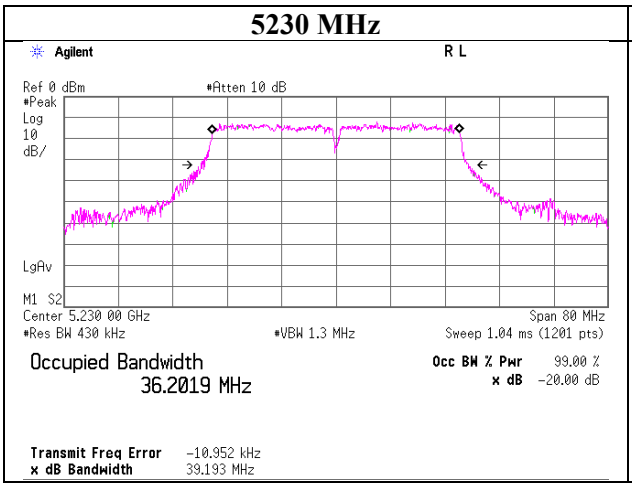
11n-40

5230 MHz



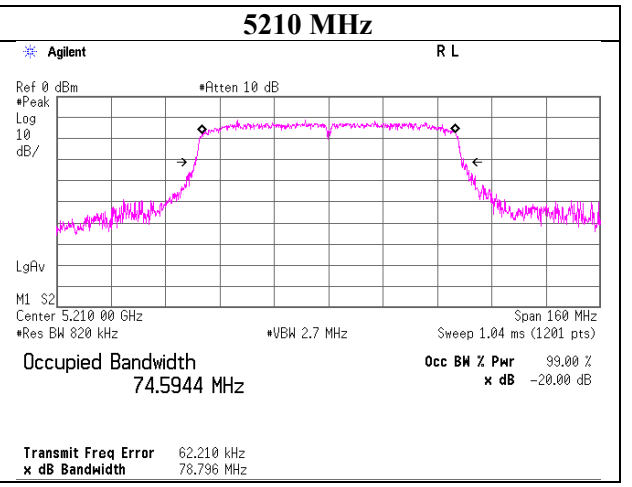
11ac-40

5230 MHz



11ac-80

5210 MHz



Maximum Conducted Output Power

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

Applied limit: 15.407, mobile and portable client device

Mode	Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Duty Factor	Antenna Gain	99% OBW	Conducted Power Result		Limit	Margin	e.i.r.p. Result		Limit	Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBi]	[MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
11a	5180	-0.26	3.13	9.65	0.13	2.87	16.636	12.65	18.41	23.97	11.32	15.52	35.65	29.97	14.45
	5220	-0.43	3.14	9.64	0.13	2.87	16.668	12.48	17.70	23.97	11.49	15.35	34.28	29.97	14.62
	5240	-0.56	3.15	9.64	0.13	2.87	16.632	12.36	17.22	23.97	11.61	15.23	33.34	29.97	14.74
11n-20	5180	-0.20	3.13	9.65	0.08	2.87	17.834	12.66	18.45	23.97	**11.31**	15.53	35.73	29.97	14.44
	5220	-0.39	3.14	9.64	0.08	2.87	17.780	12.47	17.66	23.97	11.50	15.34	34.20	29.97	14.63
	5240	-0.43	3.15	9.64	0.08	2.87	17.768	12.44	17.54	23.97	11.53	15.31	33.96	29.97	14.66
11n-40	5190	-0.61	3.13	9.65	0.11	2.87	36.177	12.28	16.90	23.97	11.69	15.15	32.73	29.97	14.82
	5230	-0.68	3.15	9.64	0.11	2.87	36.132	12.22	16.67	23.97	11.75	15.09	32.28	29.97	14.88
11ac-20	5180	-0.12	3.13	9.65	0.02	2.87	17.887	**12.68**	18.54	23.97	**11.29**	15.55	35.89	29.97	14.42
	5220	-0.26	3.14	9.64	0.02	2.87	17.864	12.54	17.95	23.97	11.43	15.41	34.75	29.97	14.56
	5240	-0.37	3.15	9.64	0.02	2.87	17.874	12.44	17.54	23.97	11.53	15.31	33.96	29.97	14.66
11ac-40	5190	-0.85	3.13	9.65	0.28	2.87	36.304	12.21	16.63	23.97	11.76	15.08	32.21	29.97	14.89
	5230	-0.92	3.15	9.64	0.28	2.87	36.309	12.15	16.41	23.97	11.82	15.02	31.77	29.97	14.95
11ac-80	5210	-0.41	3.14	9.64	0.12	2.87	74.771	12.49	17.74	23.97	11.48	15.36	34.36	29.97	14.61

Sample Calculation:
Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor
e.i.r.p. Result = Conducted Power Result + Antenna Gain
Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower
Conducted Power Limit (5725 MHz-5850 MHz) = 1W
* Using Bandwidth value is 99 % occupied bandwidth value for FCC 15.407 and RSS-247.

Maximum Conducted Output Power

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

Mode	MCS Number	Reading (timed average) [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11a (5180 MHz)	6	-0.33	0.02	-0.31	
	9	-0.27	0.03	-0.24	
	12	-0.30	0.04	-0.26	
	18	-0.26	0.07	-0.19	
	24	-0.31	0.08	-0.23	
	36	-0.26	0.13	-0.13	*
	48	-0.39	0.16	-0.23	
	54	-0.31	0.16	-0.15	

Mode	MCS Number	Reading (timed average) [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11n-20 (5180 MHz)	0	-0.27	0.03	-0.24	
	1	-0.28	0.04	-0.24	
	2	-0.28	0.07	-0.21	
	3	-0.20	0.08	-0.12	*
	4	-0.44	0.12	-0.32	
	5	-0.46	0.15	-0.31	
	6	-0.44	0.17	-0.27	
	7	-0.42	0.16	-0.26	
11n-40 (5190 MHz)	0	-0.61	0.06	-0.55	
	1	-0.62	0.11	-0.51	*
	2	-0.80	0.14	-0.66	
	3	-0.80	0.18	-0.62	
	4	-0.97	0.26	-0.71	
	5	-0.98	0.26	-0.72	
	6	-0.96	0.27	-0.69	
	7	-0.98	0.32	-0.66	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

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

Maximum Conducted Output Power

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

Mode	MCS Number	Reading (timed average) [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11ac-20 (5180 MHz)	0	-0.12	0.02	-0.10	*
	1	-0.34	0.05	-0.29	
	2	-0.32	0.06	-0.26	
	3	-0.40	0.07	-0.33	
	4	-0.40	0.13	-0.27	
	5	-0.34	0.15	-0.19	
	6	-0.39	0.16	-0.23	
	7	-0.43	0.18	-0.25	
	8	-0.66	0.19	-0.47	
	9	-0.55	0.20	-0.35	
11ac-40 (5190 MHz)	0	-0.78	0.05	-0.73	
	1	-0.73	0.10	-0.63	
	2	-0.77	0.14	-0.63	
	3	-0.90	0.18	-0.72	
	4	-0.84	0.23	-0.61	
	5	-0.87	0.27	-0.60	
	6	-0.85	0.28	-0.57	*
	7	-1.13	0.29	-0.84	
	8	-1.10	0.29	-0.81	
	9	-1.01	0.32	-0.69	
11ac-80 (5210 MHz)	0	-0.41	0.12	-0.29	*
	1	-0.53	0.17	-0.36	
	2	-0.67	0.27	-0.40	
	3	-0.74	0.31	-0.43	
	4	-0.85	0.35	-0.50	
	5	-0.75	0.41	-0.34	
	6	-0.82	0.44	-0.38	
	7	-0.80	0.43	-0.37	
	8	-0.83	0.44	-0.39	
	9	-0.85	0.48	-0.37	

Average Output Power
(Reference data for RF Exposure)

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx, (Lowest data rate)

Mode	Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Result (Timed average)		Duty factor	Result (Burst power average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
11a	5180	-0.09	2.89	9.65	12.45	17.58	0.02	12.47	17.66
	5220	-0.26	2.91	9.64	12.29	16.94	0.02	12.31	17.02
	5240	-0.32	2.92	9.64	12.24	16.75	0.02	12.26	16.83
11n-20	5180	-0.03	2.89	9.65	12.51	17.82	0.02	12.53	17.91
	5220	-0.10	2.91	9.64	12.45	17.58	0.02	12.47	17.66
	5240	-0.30	2.92	9.64	12.26	16.83	0.02	12.28	16.90
11n-40	5190	-0.38	2.90	9.65	12.17	16.48	0.06	12.23	16.71
	5230	-0.50	2.92	9.64	12.06	16.07	0.06	12.12	16.29
11ac-20	5180	0.12	2.89	9.65	**12.66**	**18.45**	0.02	**12.68**	**18.54**
	5220	-0.03	2.91	9.64	12.52	17.86	0.02	12.54	17.95
	5240	-0.14	2.92	9.64	12.42	17.46	0.02	12.44	17.54
11ac-40	5190	-0.55	2.90	9.65	12.00	15.85	0.05	12.05	16.03
	5230	-0.64	2.92	9.64	11.92	15.56	0.05	11.97	15.74
11ac-80	5210	-0.18	2.91	9.64	12.37	17.26	0.12	12.49	17.74

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

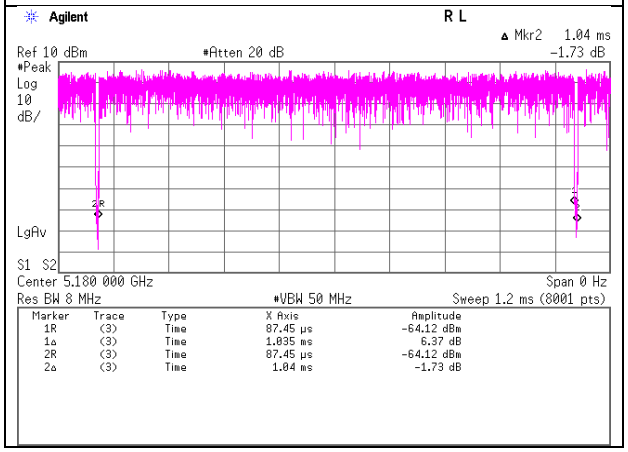
The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Burst rate confirmation

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

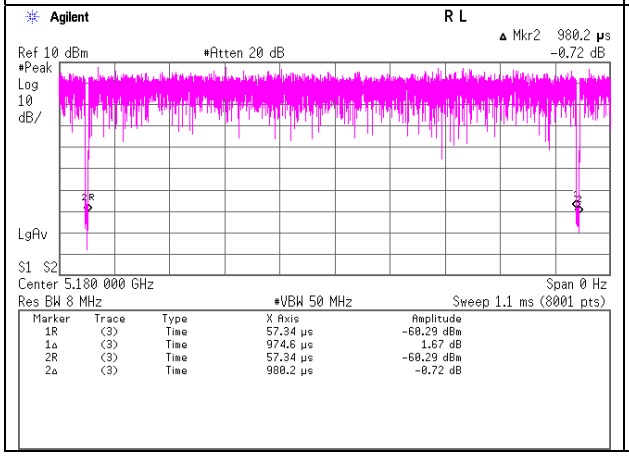
11a 6 Mbps

Tx on / (Tx on + Tx off) =	0.995
Tx on / (Tx on + Tx off) * 100 =	99.5 %
Duty factor = 10 * log (1.04 / 1.035) =	0.02 dB



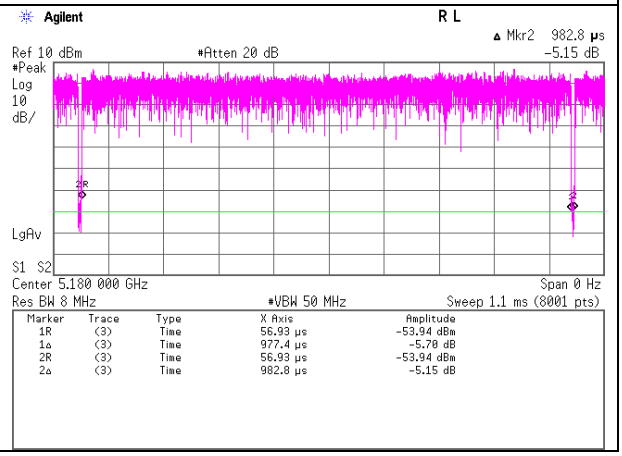
11n-20 MCS 0

Tx on / (Tx on + Tx off) =	0.994
Tx on / (Tx on + Tx off) * 100 =	99.4 %
Duty factor = 10 * log (0.9802 / 0.9746) =	0.02 dB



11ac-20 MCS 0

Tx on / (Tx on + Tx off) =	0.995
Tx on / (Tx on + Tx off) * 100 =	99.5 %
Duty factor = 10 * log (0.9828 / 0.9774) =	0.02 dB

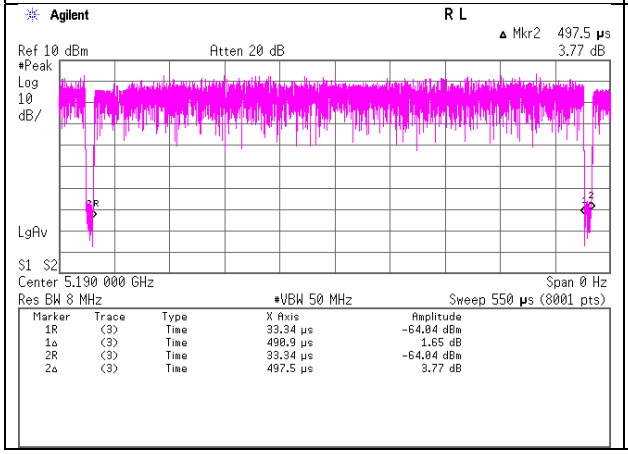


Burst rate confirmation

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

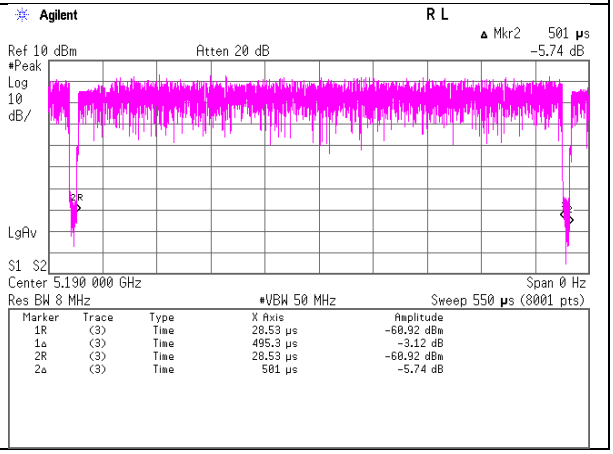
11n-40 MCS 0

Tx on / (Tx on + Tx off) = 0.987
Tx on / (Tx on + Tx off) * 100 = 98.7 %
Duty factor = 10 * log (0.4975 / 0.4909) = 0.06 dB



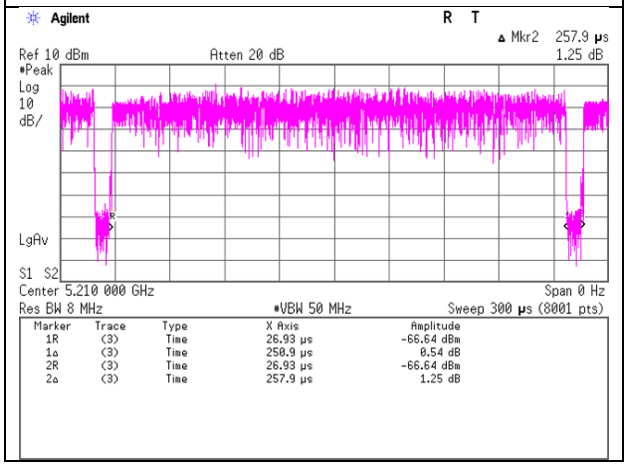
11ac-40 MCS 0

Tx on / (Tx on + Tx off) = 0.989
Tx on / (Tx on + Tx off) * 100 = 98.9 %
Duty factor = 10 * log (0.501 / 0.4953) = 0.05 dB



11ac-80 MCS 0

Tx on / (Tx on + Tx off) = 0.973
Tx on / (Tx on + Tx off) * 100 = 97.3 %
Duty factor = 10 * log (0.2579 / 0.2509) = 0.12 dB



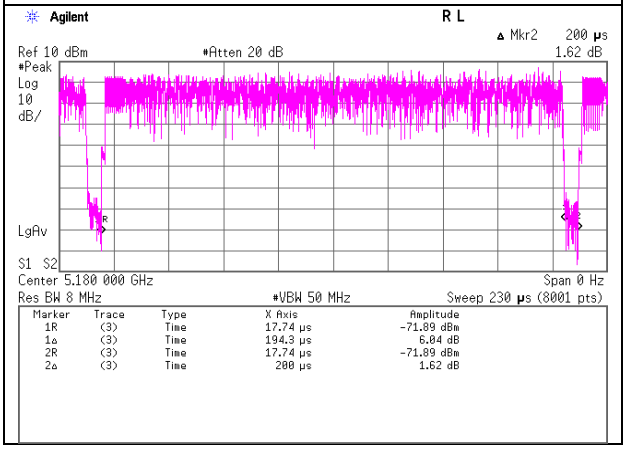
VBW (Average) Calculation & Duty chart

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

11a 36 Mbps

VBW: 1/x = 5000.00 Hz < 5600 Hz
x: (Tx on + Tx off) = 0.200 ms
duty = 0.1943 / 0.200 = 0.972

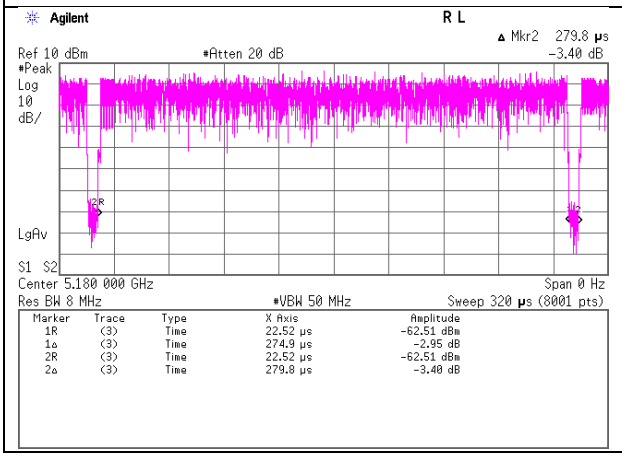
Tx on / (Tx on + Tx off) =	0.972
Tx on / (Tx on + Tx off) * 100 =	97.2 %
Duty factor = 10 * log (0.2 / 0.1943) =	0.13 dB



11n-20 MCS 3

VBW: 10 Hz, Duty > 98 %
duty = 0.2749 / 0.2798 = 0.982

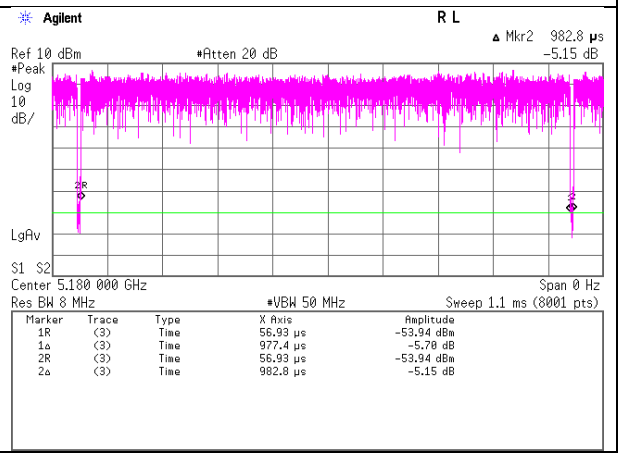
Tx on / (Tx on + Tx off) =	0.982
Tx on / (Tx on + Tx off) * 100 =	98.2 %
Duty factor = 10 * log (0.2798 / 0.2749) =	0.08 dB



11ac-20 MCS 0

VBW: 10 Hz, Duty > 98 %
duty = 0.9774 / 0.9828 = 0.994

Tx on / (Tx on + Tx off) =	0.995
Tx on / (Tx on + Tx off) * 100 =	99.5 %
Duty factor = 10 * log (0.9828 / 0.9774) =	0.02 dB



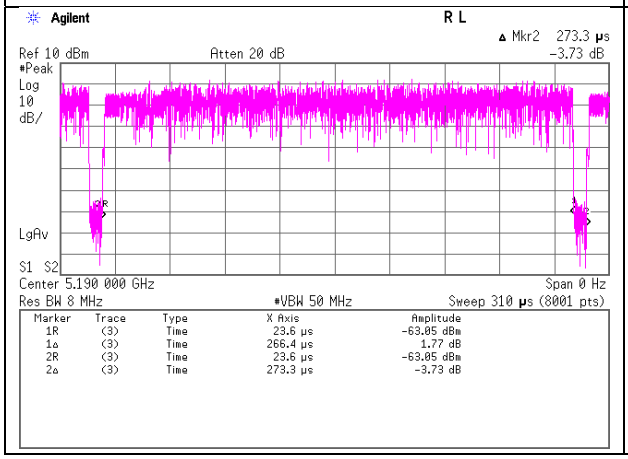
VBW (Average) Calculation & Duty chart

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	August 23, 2018
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Shiro Kobayashi
Mode	Tx

11n-40 MCS 1

VBW: 1/x = 3658.98 Hz < 3900 Hz
x: (Tx on + Tx off) = 0.2733 ms
duty = 0.2733 / 0.2664 = 0.975

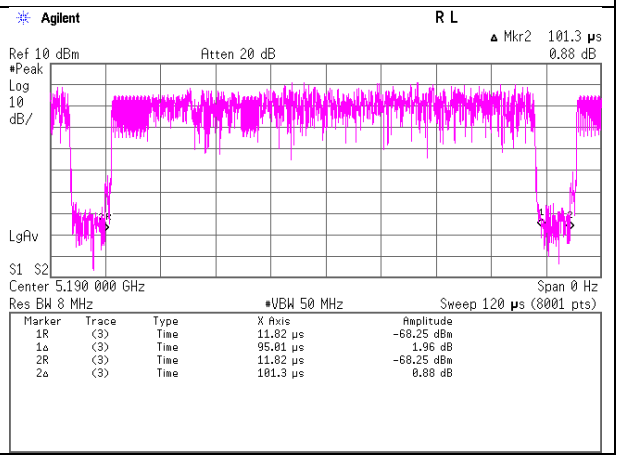
Tx on / (Tx on + Tx off) =	**0.975**
Tx on / (Tx on + Tx off) * 100 =	**97.5 %**
Duty factor = 10 * log (0.2733 / 0.2664) =	**0.11 dB**



11ac-40 MCS 6

VBW: 1/x = 9871.67 Hz < 11000 Hz
x: (Tx on + Tx off) = 0.1013 ms
duty = 0.09501 / 0.1013 = 0.938

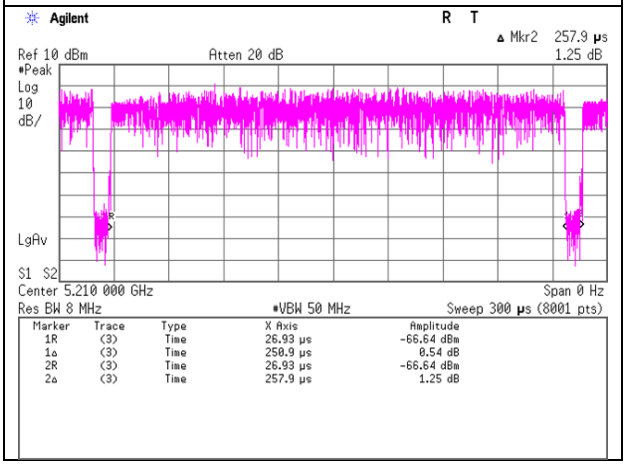
Tx on / (Tx on + Tx off) =	**0.938**
Tx on / (Tx on + Tx off) * 100 =	**93.8 %**
Duty factor = 10 * log (0.1013 / 0.09501) =	**0.28 dB**



11ac-80 MCS 0

VBW: 1/x = 3877.47 Hz < 4300 Hz
x: (Tx on + Tx off) = 0.2579 ms
duty = 0.2509 / 0.2579 = 0.973

Tx on / (Tx on + Tx off) =	**0.973**
Tx on / (Tx on + Tx off) * 100 =	**97.3 %**
Duty factor = 10 * log (0.2579 / 0.2509) =	**0.12 dB**

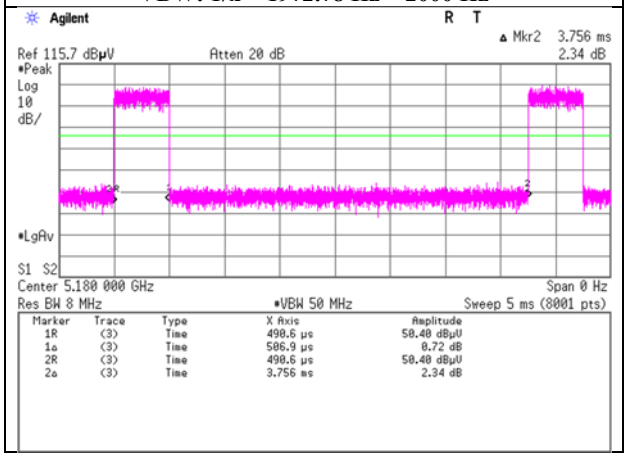


VBW (Average) Calculation (for Radiated Emission with Bluetooth)

Report No.	12429781S-L-R2	
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Date	September 12, 2018	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
Mode	Tx	

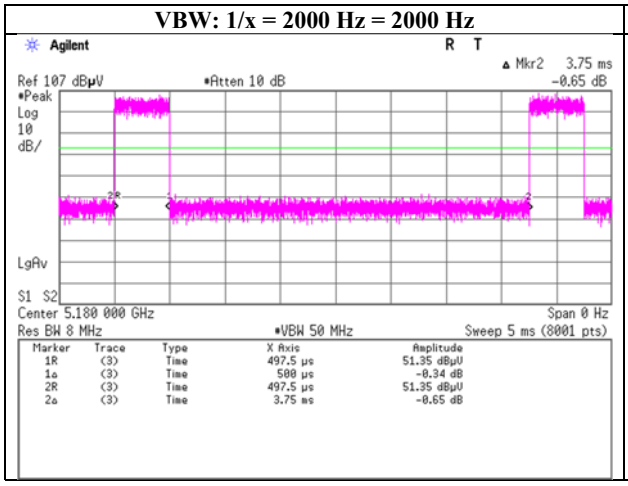
11a 36 Mbps

VBW: 1/x = 1972.78 Hz < 2000 Hz



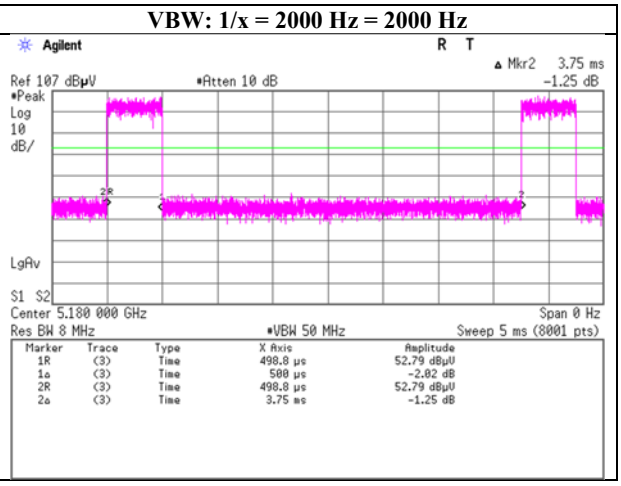
11n-20 MCS 3

VBW: 1/x = 2000 Hz = 2000 Hz



11ac-20 MCS 0

VBW: 1/x = 2000 Hz = 2000 Hz

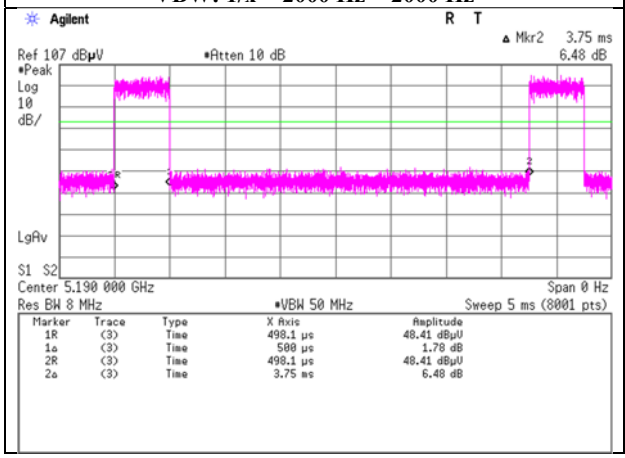


VBW (Average) Calculation (for Radiated Emission with Bluetooth)

Report No.	12429781S-L-R2	
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Date	September 12, 2018	September 13, 2018
Temperature / Humidity	23 deg. C / 52 % RH	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
Mode	Tx	

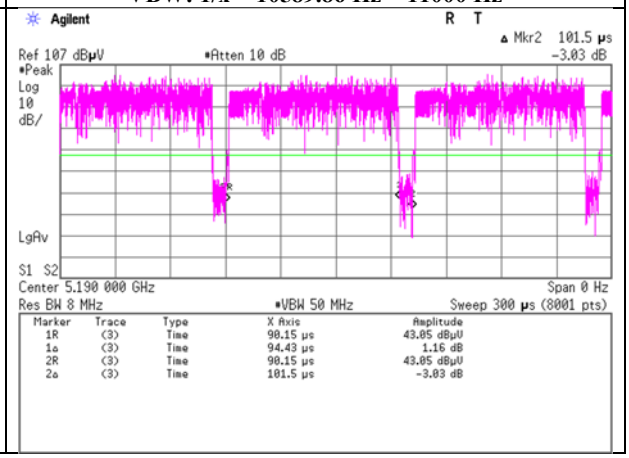
11n-40 MCS 1

VBW: 1/x = 2000 Hz = 2000 Hz



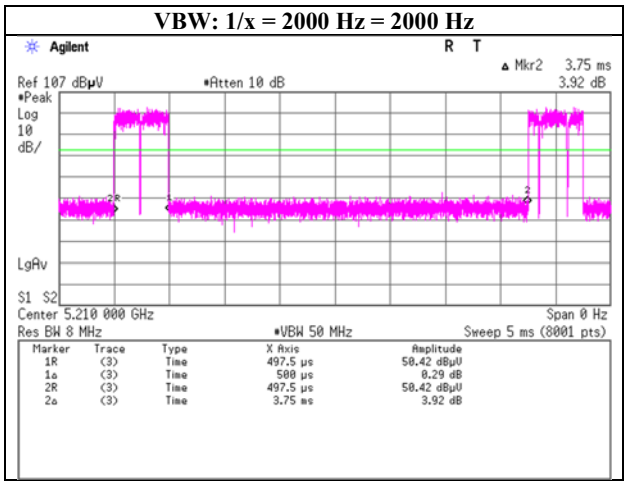
11ac-40 MCS 6

VBW: 1/x = 10589.86 Hz = 11000 Hz



11ac-80 MCS 0

VBW: 1/x = 2000 Hz = 2000 Hz



Maximum Power Spectral Density

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11a 36 Mbps

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5180	-12.32	2.89	9.65	0.13	2.87	0.00	0.35	11.00	10.65	3.22	17.00	13.78
5220	-12.07	2.91	9.64	0.13	2.87	0.00	0.61	11.00	10.39	3.48	17.00	13.52
5240	-11.75	2.92	9.64	0.13	2.87	0.00	0.95	11.00	10.06	3.82	17.00	13.19

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

11n-20 MCS 3

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5180	-12.30	2.89	9.65	0.08	2.87	0.00	0.32	11.00	10.68	3.19	17.00	13.81
5220	-12.56	2.91	9.64	0.08	2.87	0.00	0.07	11.00	10.93	2.94	17.00	14.06
5240	-12.37	2.92	9.64	0.08	2.87	0.00	0.27	11.00	10.73	3.14	17.00	13.86

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

Maximum Power Spectral Density

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11ac-20 MCS 0 Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5180	-12.44	2.89	9.65	0.02	2.87	0.00	0.12	11.00	10.88	2.99	17.00	14.01
5220	-12.68	2.91	9.64	0.02	2.87	0.00	-0.11	11.00	11.11	2.76	17.00	14.24
5240	-12.25	2.92	9.64	0.02	2.87	0.00	0.33	11.00	10.67	3.20	17.00	13.80

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

11n-40 MCS 1 Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5190	-15.83	2.90	9.65	0.11	2.87	0.00	-3.17	11.00	14.17	-0.30	17.00	17.30
-	-	-	-	-	-	-	-	-	-	-	-	-
5230	-15.68	2.92	9.64	0.11	2.87	0.00	-3.01	11.00	14.01	-0.14	17.00	17.14

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

Maximum Power Spectral Density

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11ac-40 MCS 6 Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5190	-16.00	2.90	9.65	0.28	2.87	0.00	-3.17	11.00	14.17	-0.30	17.00	17.30
-	-	-	-	-	-	-	-	-	-	-	-	-
5230	-15.85	2.92	9.64	0.28	2.87	0.00	-3.01	11.00	14.01	-0.14	17.00	17.14

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

11ac-80 Applied limit: 15.407, mobile and portable client device

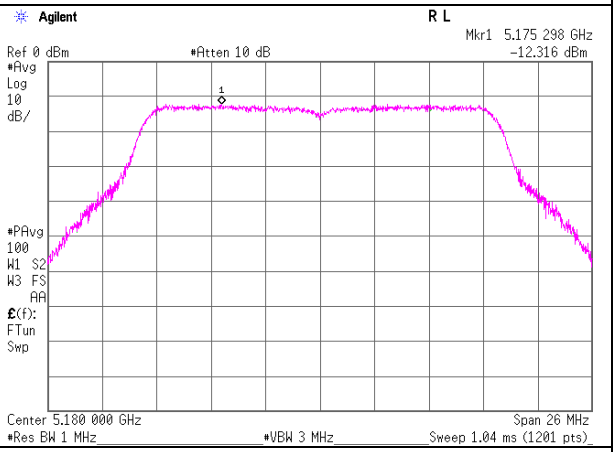
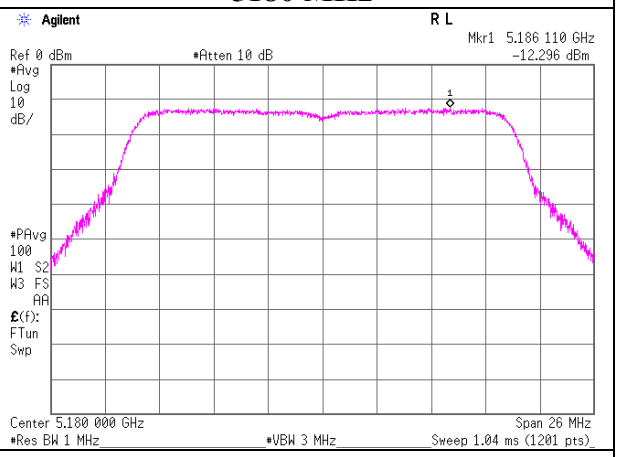
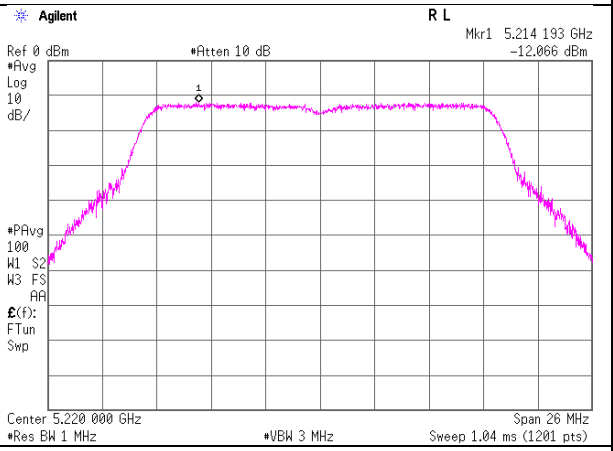
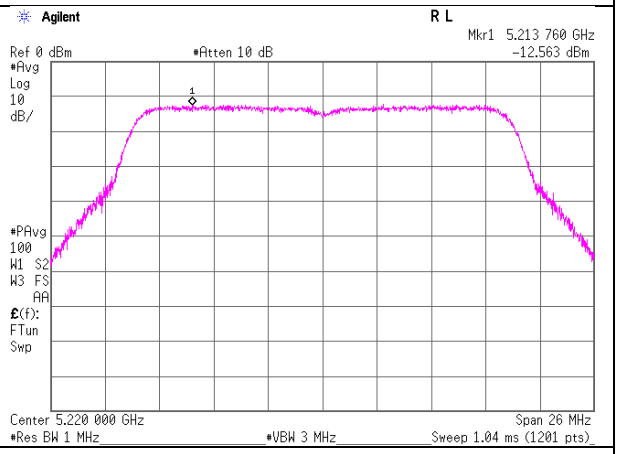
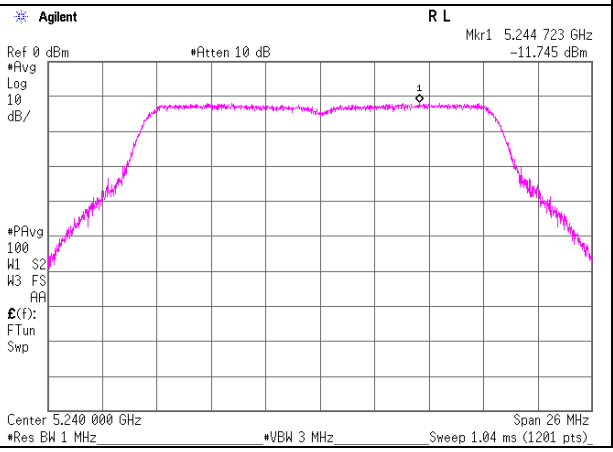
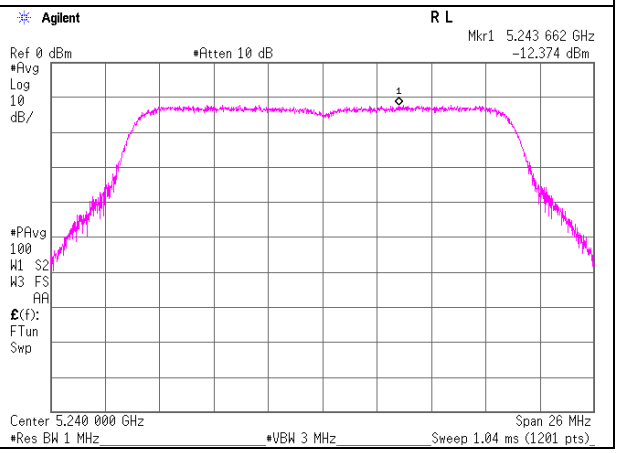
Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5210	-18.47	2.91	9.64	0.12	2.87	0.00	-5.80	11.00	16.80	-2.93	17.00	19.93
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Calculation:
PSD: Power Spectral Density

RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

Maximum Power Spectral Density

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

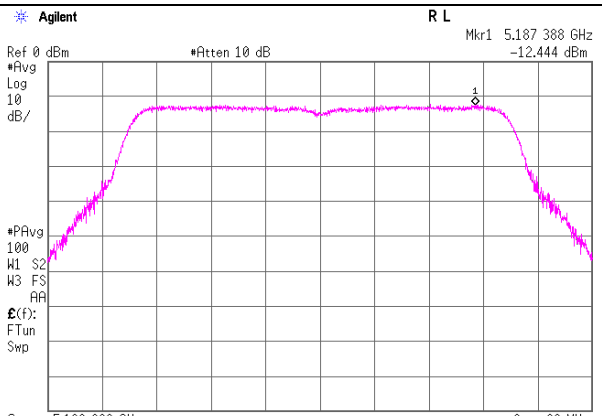
11a	11n-20
5180 MHz	**5180 MHz**
	
5220 MHz	**5220 MHz**
	
5240 MHz	**5240 MHz**
	

Maximum Power Spectral Density

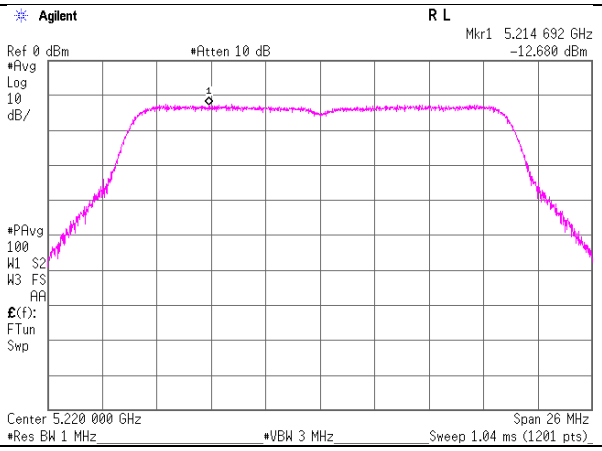
Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11ac-20

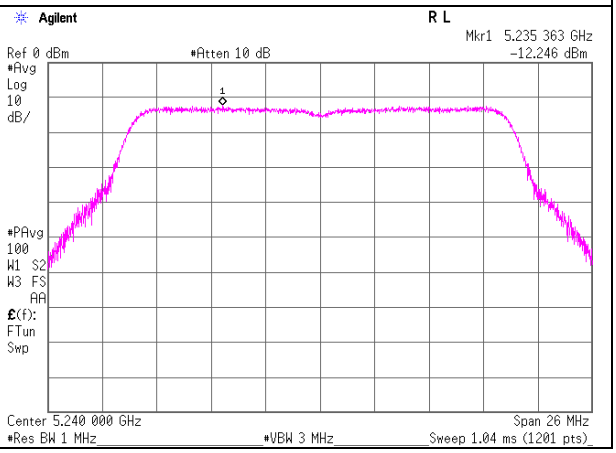
5180 MHz



5220 MHz

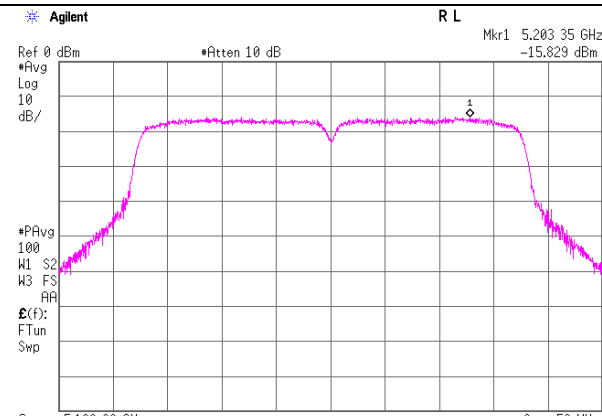


5240 MHz

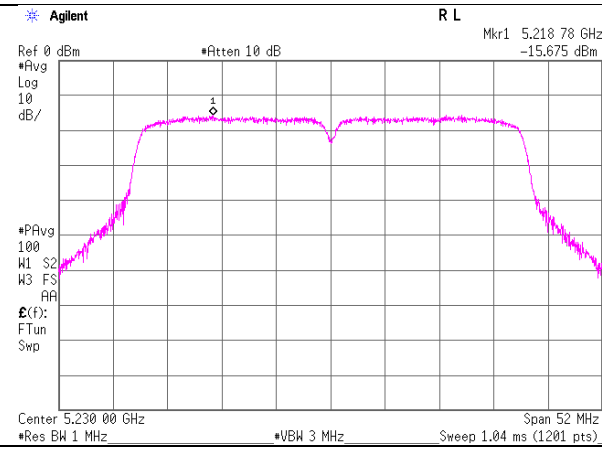


11n-40

5190 MHz



5230 MHz

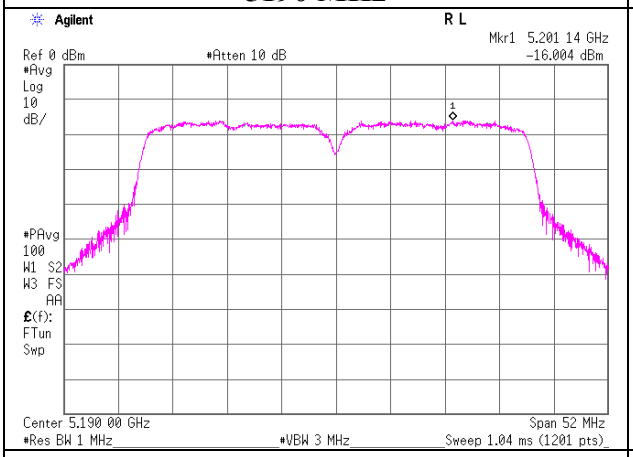


Maximum Power Spectral Density

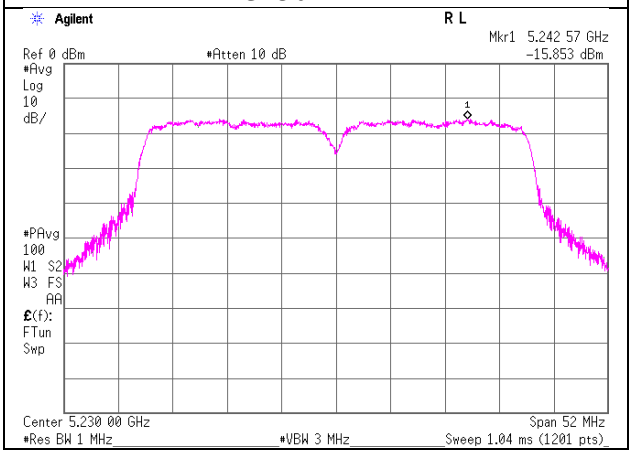
Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx

11ac-40

5190 MHz

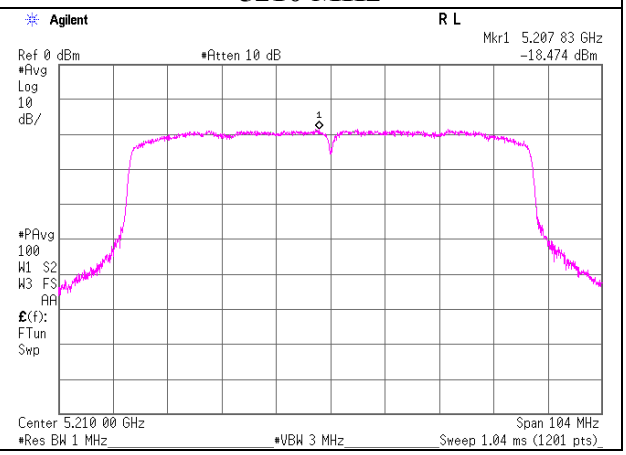


5230 MHz



11ac-80

5210 MHz



Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama (1 GHz – 6.4 GHz)
Mode	Tx 11a 5180 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	49.58	32.18	16.25	44.63	2.35	55.73	73.90	18.1	151	139	
Hori.	5150.000	AV	39.75	32.18	16.25	44.63	2.35	45.90	53.90	**8.0**	151	139	VBW: 5.6 kHz
Vert.	5150.000	PK	48.97	32.18	16.25	44.63	2.35	55.12	73.90	18.7	148	213	
Vert.	5150.000	AV	38.89	32.18	16.25	44.63	2.35	45.04	53.90	8.8	148	213	VBW: 5.6 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

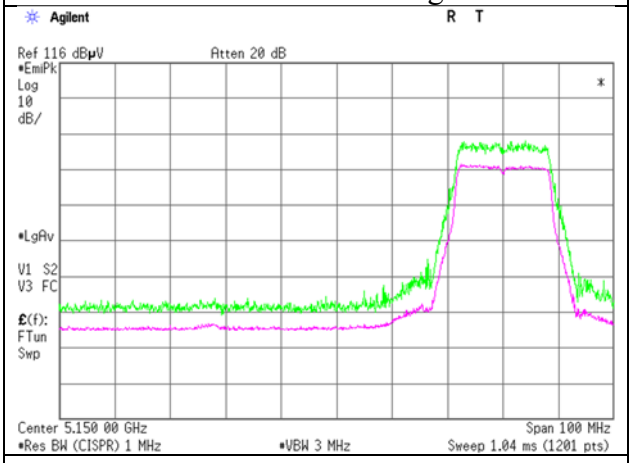
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11a 5180 MHz

Horizontal

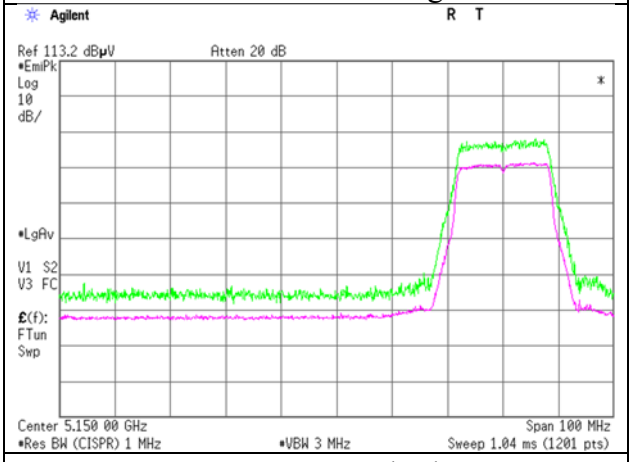
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11a 5240 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.53	31.73	16.34	44.79	2.35	55.16	73.90	18.7	120	104	
Hori.	5350.000	AV	39.53	31.73	16.34	44.79	2.35	45.16	53.90	**8.7**	120	104	VBW: 5.6 kHz
Vert.	5350.000	PK	49.46	31.73	16.34	44.79	2.35	55.09	73.90	18.8	100	45	
Vert.	5350.000	AV	39.29	31.73	16.34	44.79	2.35	44.92	53.90	8.9	100	45	VBW: 5.6 kHz

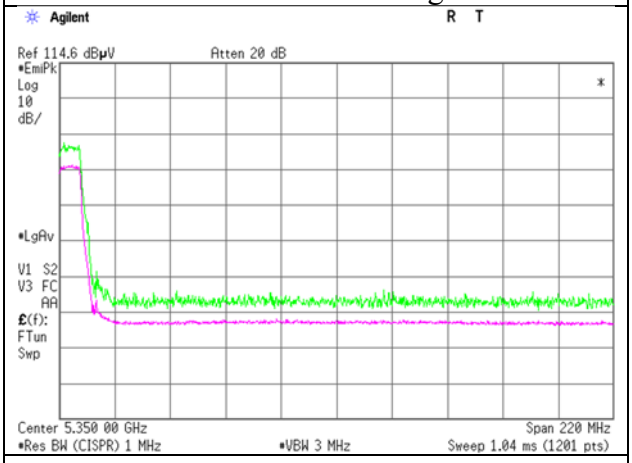
Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11a 5240 MHz

Horizontal

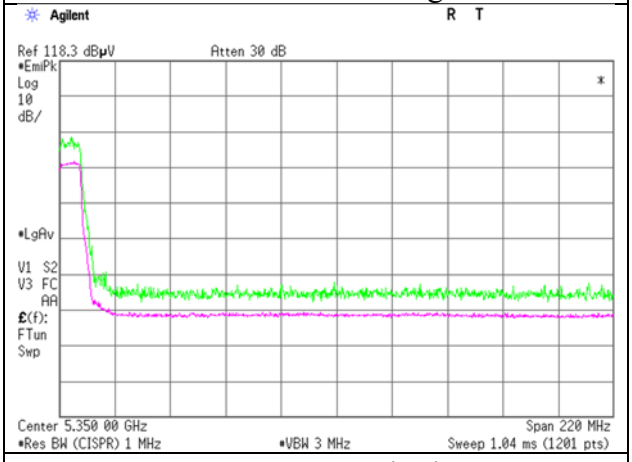
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-20 5180 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	50.02	32.18	16.25	44.63	2.35	56.17	73.90	17.7	156	126	
Hori.	5150.000	AV	37.34	32.18	16.25	44.63	2.35	43.49	53.90	**10.4**	156	126	VBW: 10 Hz
Vert.	5150.000	PK	49.84	32.18	16.25	44.63	2.35	55.99	73.90	17.9	149	215	
Vert.	5150.000	AV	37.13	32.18	16.25	44.63	2.35	43.28	53.90	10.6	149	215	VBW: 10 Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

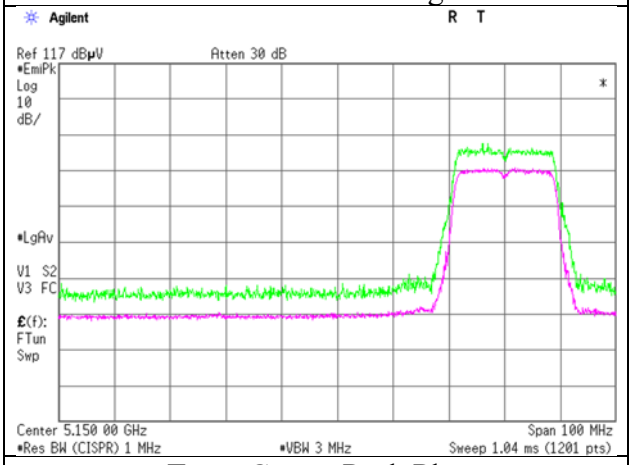
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-20 5180 MHz

Horizontal

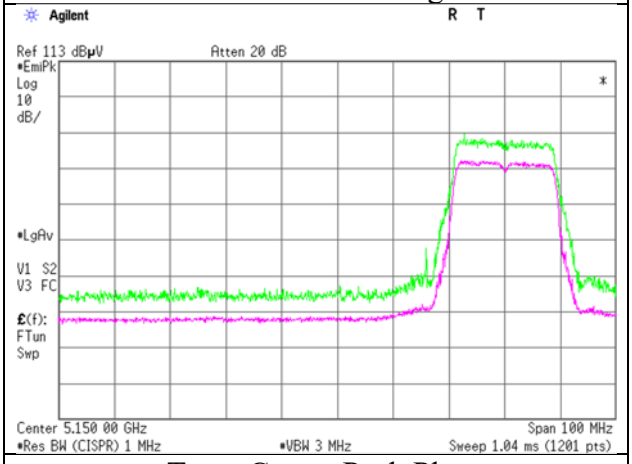
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-20 5240 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	50.52	31.73	16.34	44.79	2.35	56.15	73.90	17.7	172	107	
Hori.	5350.000	AV	37.26	31.73	16.34	44.79	2.35	42.89	53.90	11.0	172	107	VBW: 10 Hz
Vert.	5350.000	PK	49.33	31.73	16.34	44.79	2.35	54.96	73.90	18.9	152	60	
Vert.	5350.000	AV	37.28	31.73	16.34	44.79	2.35	42.91	53.90	**10.9**	152	60	VBW: 10 Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

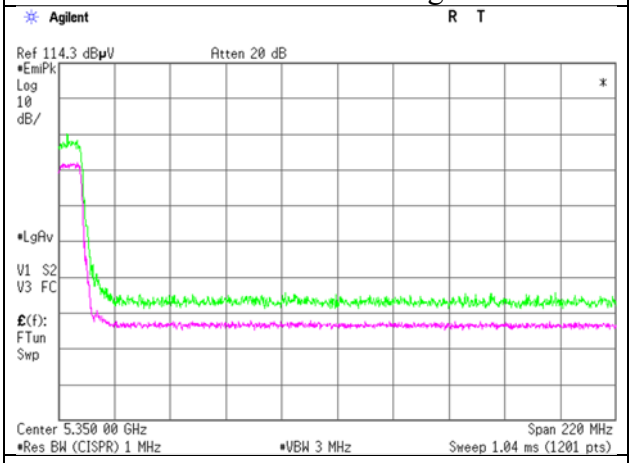
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11n-20 5240 MHz

Horizontal

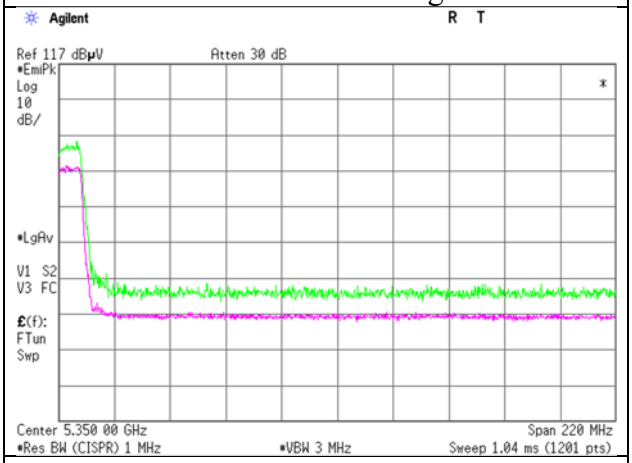
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	August 27, 2018	August 29, 2018	August 30, 2018	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	20 deg. C /	20 deg. C /	20 deg. C /
Humidity	49 % RH	56 % RH	49 % RH	49 % RH	62 % RH
Engineer	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(13 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11ac-20 5180 MHz				

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	115.450	QP	32.78	12.63	7.23	32.15	0.00	20.49	43.50	23.0	241	103	
Hori.	360.001	QP	26.88	15.19	9.07	31.95	0.00	19.19	46.00	26.8	100	88	
Hori.	5150.000	PK	51.79	32.18	16.25	44.63	2.35	57.94	73.90	15.9	159	107	
Hori.	15540.000	PK	50.26	38.62	12.53	42.10	-9.54	49.77	73.90	24.1	150	1	
Hori.	20720.000	PK	45.87	39.81	10.85	45.65	-9.54	41.34	73.90	32.5	128	300	
Hori.	5150.000	AV	39.21	32.18	16.25	44.63	2.35	45.36	53.90	8.5	159	107	VBW: 10 Hz
Hori.	15540.000	AV	35.25	38.62	12.53	42.10	-9.54	34.76	53.90	19.1	150	1	VBW: 10 Hz
Hori.	20720.000	AV	35.38	39.81	10.85	45.65	-9.54	30.85	53.90	23.0	128	300	VBW: 10 Hz
Vert.	47.319	QP	34.88	12.18	6.77	32.19	0.00	21.64	40.00	18.3	100	245	
Vert.	53.630	QP	36.02	9.97	6.75	32.19	0.00	20.55	40.00	19.4	100	243	
Vert.	81.677	QP	37.64	6.73	7.58	32.17	0.00	19.78	40.00	20.2	100	156	
Vert.	127.311	QP	38.24	13.67	7.36	32.14	0.00	27.13	43.50	16.3	100	136	
Vert.	290.398	QP	21.98	13.57	8.65	32.01	0.00	12.19	46.00	33.8	100	1	
Vert.	5150.000	PK	53.71	32.18	16.25	44.63	2.35	59.86	73.90	14.0	105	48	
Vert.	15540.000	PK	50.63	38.62	12.53	42.10	-9.54	50.14	73.90	23.7	150	1	
Vert.	20720.000	PK	46.25	39.81	10.85	45.65	-9.54	41.72	73.90	32.1	139	78	
Vert.	5150.000	AV	40.15	32.18	16.25	44.63	2.35	46.30	53.90	**7.6**	105	48	VBW: 10 Hz
Vert.	15540.000	AV	35.27	38.62	12.53	42.10	-9.54	34.78	53.90	19.1	150	1	VBW: 10 Hz
Vert.	20720.000	AV	36.79	39.81	10.85	45.65	-9.54	32.26	53.90	21.6	139	78	VBW: 10 Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* 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]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10360.000	PK	50.66	39.48	9.33	43.62	2.35	58.20	-37.00	-27.00	10.0	119	344	
Vert.	10360.000	PK	53.03	39.48	9.33	43.62	2.35	60.57	-34.63	-27.00	**7.6**	100	325	

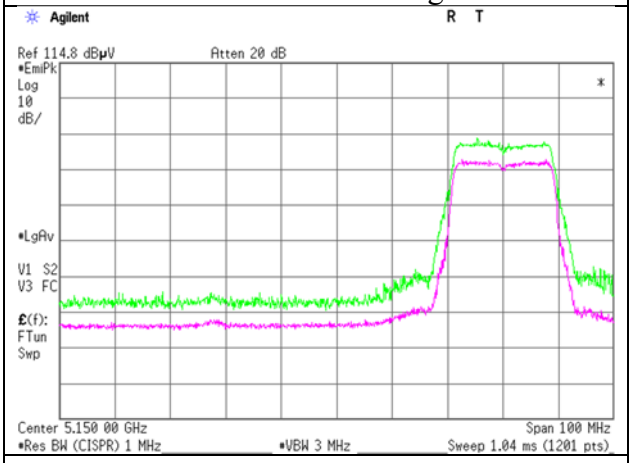
Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Resrult(EIRP[dBm])=10*LOG（{ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	August 27, 2018
Date	24 deg. C / 56 % RH
Temperature / Humidity	Kazutaka Takeyama
Engineer	August 27, 2018
Mode	Tx 11ac-20 5180 MHz

Horizontal

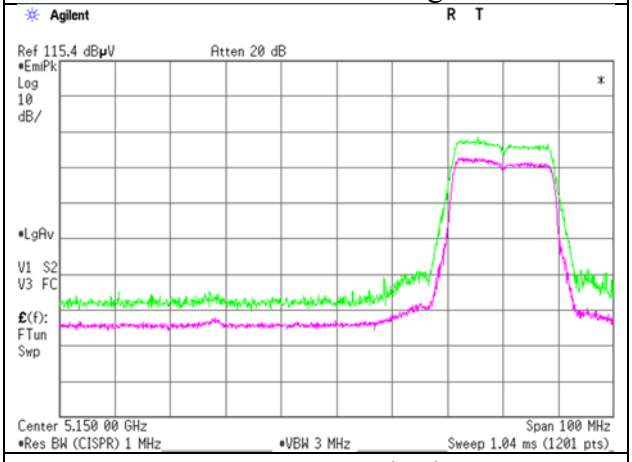
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	August 27, 2018	August 29, 2018	August 30, 2018	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	20 deg. C /	20 deg. C /	20 deg. C /
Humidity	49 % RH	56 % RH	49 % RH	49 % RH	62 % RH
Engineer	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(13 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11ac-20 5220 MHz				

(above 1GHz Inside of the restricted band)

(* 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.	15660.000	PK	49.61	38.44	12.57	42.12	-9.54	48.96	73.90	24.9	150	1	
Hori.	20880.000	PK	46.10	39.83	10.92	45.72	-9.54	41.59	73.90	32.3	126	301	
Hori.	15660.000	AV	35.12	38.44	12.57	42.12	-9.54	34.47	53.90	**19.4**	150	1	VBW: 10 Hz
Hori.	20880.000	AV	36.13	39.83	10.92	45.72	-9.54	31.62	53.90	22.2	126	301	VBW: 10 Hz
Vert.	15660.000	PK	50.08	38.44	12.57	42.12	-9.54	49.43	73.90	24.4	150	2	
Vert.	20880.000	PK	46.15	39.83	10.92	45.72	-9.54	41.64	73.90	32.2	149	76	
Vert.	15660.000	AV	35.10	38.44	12.57	42.12	-9.54	34.45	53.90	**19.4**	150	2	VBW: 10 Hz
Vert.	20880.000	AV	36.91	39.83	10.92	45.72	-9.54	32.40	53.90	21.5	149	76	VBW: 10 Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* 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]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10440.000	PK	51.91	39.73	9.44	43.56	2.35	59.87	-35.33	-27.00	8.3	375	317	
Vert.	10440.000	PK	55.54	39.73	9.44	43.56	2.35	63.50	-31.70	-27.00	**4.7**	101	324	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Resrult(EIRP[dBm])=10*LOG（({ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	August 27, 2018	August 29, 2018	August 30, 2018	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	20 deg. C /	20 deg. C /	20 deg. C /
Humidity	49 % RH	56 % RH	49 % RH	49 % RH	62 % RH
Engineer	Kazutaka Takeyama (30 MHz - 1 GHz)	Kazutaka Takeyama (1 GHz - 13 GHz)	Kazutaka Takeyama (13 GHz - 18 GHz)	Kazutaka Takeyama (13 GHz - 26 GHz)	Kazutaka Takeyama (26 GHz - 40 GHz)
Mode	Tx 11ac-20 5240 MHz				

(above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.60	31.73	16.34	44.79	2.35	55.23	73.90	18.6	181	83	
Hori.	15720.000	PK	49.39	38.32	12.60	42.13	-9.54	48.64	73.90	25.2	150	1	
Hori.	20960.000	PK	46.04	39.86	10.95	45.75	-9.54	41.56	73.90	32.3	123	299	
Hori.	5350.000	AV	37.35	31.73	16.34	44.79	2.35	42.98	53.90	10.9	181	83	VBW: 10 Hz
Hori.	15720.000	AV	34.50	38.32	12.60	42.13	-9.54	33.75	53.90	20.1	150	1	VBW: 10 Hz
Hori.	20960.000	AV	36.31	39.86	10.95	45.75	-9.54	31.83	53.90	22.0	123	299	VBW: 10 Hz
Vert.	5350.000	PK	49.92	31.73	16.34	44.79	2.35	55.55	73.90	18.3	120	45	
Vert.	15720.000	PK	50.09	38.32	12.60	42.13	-9.54	49.34	73.90	24.5	150	1	
Vert.	20960.000	PK	45.81	39.86	10.95	45.75	-9.54	41.33	73.90	32.5	137	77	
Vert.	5350.000	AV	37.43	31.73	16.34	44.79	2.35	43.06	53.90	**10.8**	120	45	VBW: 10 Hz
Vert.	15720.000	AV	34.73	38.32	12.60	42.13	-9.54	33.98	53.90	19.9	150	1	VBW: 10 Hz
Vert.	20960.000	AV	36.37	39.86	10.95	45.75	-9.54	31.89	53.90	22.0	137	77	VBW: 10 Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

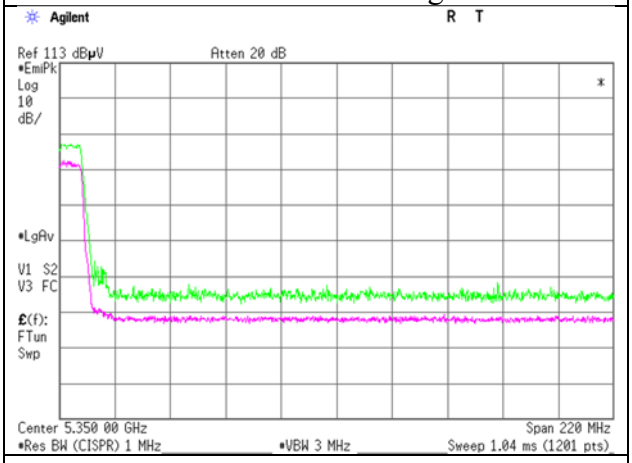
(* PK: Peak, AV: Average, QP: Quasi-Peak)

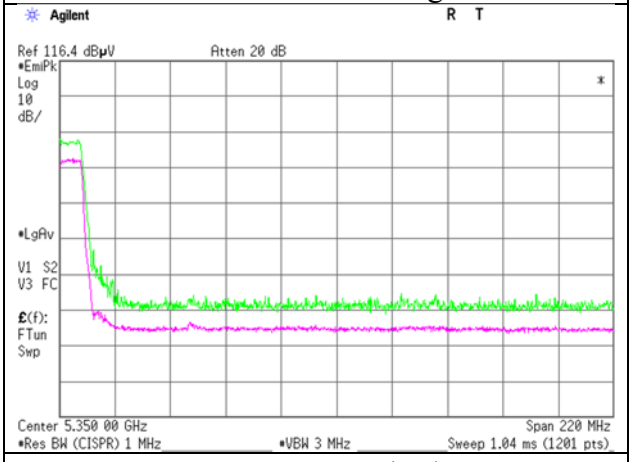
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10480.000	PK	51.79	39.71	9.49	43.53	2.35	59.81	-35.39	-27.00	8.4	139	6	
Vert.	10480.000	PK	56.26	39.71	9.49	43.53	2.35	64.28	-30.92	-27.00	**3.9**	100	325	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Resrult(EIRP[dBm])=10*LOG（({ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	August 27, 2018
Date	24 deg. C / 56 % RH
Temperature / Humidity	Kazutaka Takeyama
Engineer	August 27, 2018
Mode	Tx 11ac-20 5240 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

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	February 9, 2019	February 9, 2019	February 9, 2019	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	24 deg. C /	24 deg. C /	20 deg. C /
Humidity	49 % RH	30 % RH	30 % RH	30 % RH	62 % RH
Engineer	Kazutaka Takeyama	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11n-40 5190 MHz				

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	115.401	QP	33.24	12.62	7.23	32.15	0.00	20.94	43.50	22.5	256	234	
Hori.	288.981	QP	28.51	13.54	8.64	32.01	0.00	18.68	46.00	27.3	100	257	
Hori.	359.993	QP	26.34	15.19	9.07	31.95	0.00	18.65	46.00	27.3	100	87	
Hori.	5150.000	PK	51.41	32.18	17.18	43.04	2.35	60.08	73.90	13.8	149	82	
Hori.	15570.000	PK	48.45	38.54	12.96	40.76	-9.54	49.65	73.90	24.2	150	1	
Hori.	20720.000	PK	44.60	39.57	12.53	47.33	-9.54	39.83	73.90	34.0	170	302	
Hori.	5150.000	AV	38.75	32.18	17.18	43.04	2.35	47.42	53.90	**6.4**	149	82	VBW:3.9 kHz
Hori.	15570.000	AV	37.24	38.54	12.96	40.76	-9.54	38.44	53.90	15.4	150	1	VBW:3.9 kHz
Hori.	20720.000	AV	34.49	39.57	12.53	47.33	-9.54	29.72	53.90	24.1	170	302	VBW:3.9 kHz
Vert.	47.464	QP	34.12	12.13	6.77	32.19	0.00	20.83	40.00	19.1	100	238	
Vert.	52.740	QP	36.04	10.29	6.77	32.19	0.00	20.91	40.00	19.0	100	243	
Vert.	72.354	QP	37.64	6.41	6.97	32.18	0.00	18.84	40.00	21.1	100	143	
Vert.	127.458	QP	38.69	13.69	7.36	32.14	0.00	27.60	43.50	15.9	100	129	
Vert.	360.002	QP	26.12	15.19	9.07	31.95	0.00	18.43	46.00	27.5	100	178	
Vert.	5150.000	PK	49.70	32.18	17.18	43.04	2.35	58.37	73.90	15.5	116	49	
Vert.	15570.000	PK	48.03	38.54	12.96	40.76	-9.54	49.23	73.90	24.6	150	1	
Vert.	20720.000	PK	44.58	39.57	12.53	47.33	-9.54	39.81	73.90	34.0	146	75	
Vert.	5150.000	AV	38.26	32.18	17.18	43.04	2.35	46.93	53.90	6.9	116	49	VBW:3.9 kHz
Vert.	15570.000	AV	37.29	38.54	12.96	40.76	-9.54	38.49	53.90	15.4	150	1	VBW:3.9 kHz
Vert.	20720.000	AV	33.84	39.57	12.53	47.33	-9.54	29.07	53.90	24.8	146	75	VBW:3.9 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* 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]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10380.000	PK	48.02	39.54	10.25	42.68	2.35	57.48	-37.72	-27.00	10.7	175	336	
Vert.	10380.000	PK	51.52	39.54	10.25	42.68	2.35	60.98	-34.22	-27.00	**7.2**	104	326	

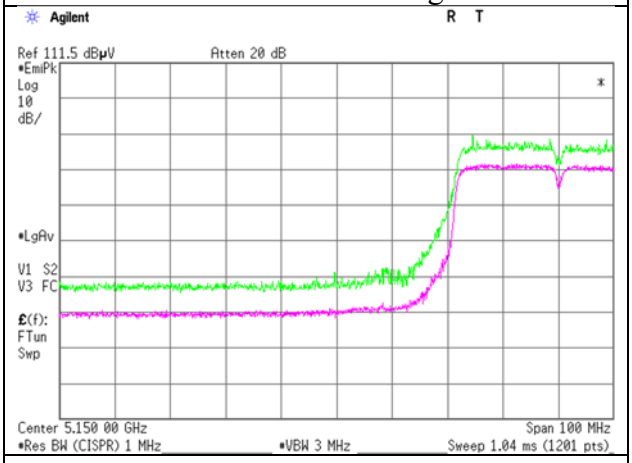
Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Result(EIRP[dBm])=10*LOG ((((10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m])) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 27, 2018
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11n-40 5190 MHz

Horizontal

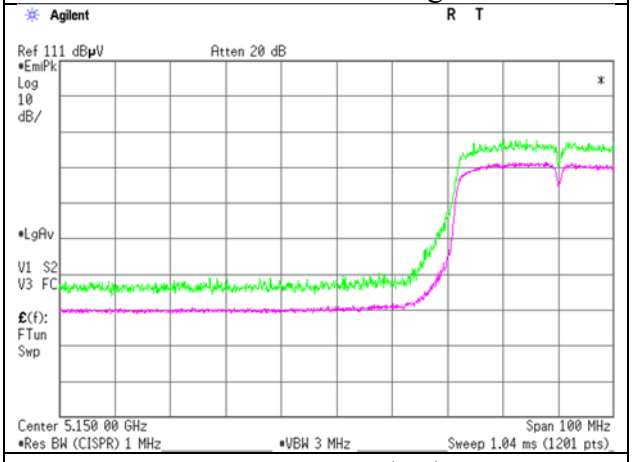
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	February 9, 2019	February 9, 2019	February 9, 2019	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	24 deg. C /	24 deg. C /	20 deg. C /
Humidity	49 % RH	30 % RH	30 % RH	30 % RH	62 % RH
Engineer	Kazutaka Takeyama	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11n-40 5230 MHz				

(above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	48.64	31.73	17.25	43.21	2.35	56.76	73.90	17.1	100	108	
Hori.	15690.000	PK	49.35	38.39	13.00	40.63	-9.54	50.57	73.90	23.3	150	2	
Hori.	20880.000	PK	44.37	39.54	12.60	47.06	-9.54	39.91	73.90	33.9	173	309	
Hori.	5350.000	AV	38.03	31.73	17.25	43.21	2.35	46.15	53.90	**7.7**	100	108	VBW:3.9 kHz
Hori.	15690.000	AV	38.34	38.39	13.00	40.63	-9.54	39.56	53.90	14.3	150	2	VBW:3.9 kHz
Hori.	20880.000	AV	33.40	39.54	12.60	47.06	-9.54	28.94	53.90	24.9	173	309	VBW:3.9 kHz
Vert.	5350.000	PK	49.21	31.73	17.25	43.21	2.35	57.33	73.90	16.5	115	53	
Vert.	15690.000	PK	49.27	38.39	13.00	40.63	-9.54	50.49	73.90	23.4	150	1	
Vert.	20880.000	PK	44.39	39.54	12.60	47.06	-9.54	39.93	73.90	33.9	148	79	
Vert.	5350.000	AV	37.92	31.73	17.25	43.21	2.35	46.04	53.90	7.8	115	53	VBW:3.9 kHz
Vert.	15690.000	AV	38.38	38.39	13.00	40.63	-9.54	39.60	53.90	14.3	150	1	VBW:3.9 kHz
Vert.	20880.000	AV	32.89	39.54	12.60	47.06	-9.54	28.43	53.90	25.4	148	79	VBW:3.9 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* 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]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10460.000	PK	50.65	39.74	10.29	42.67	2.35	60.36	-34.84	-27.00	7.8	298	295	
Vert.	10460.000	PK	51.89	39.74	10.29	42.67	2.35	61.60	-33.60	-27.00	**6.6**	100	324	

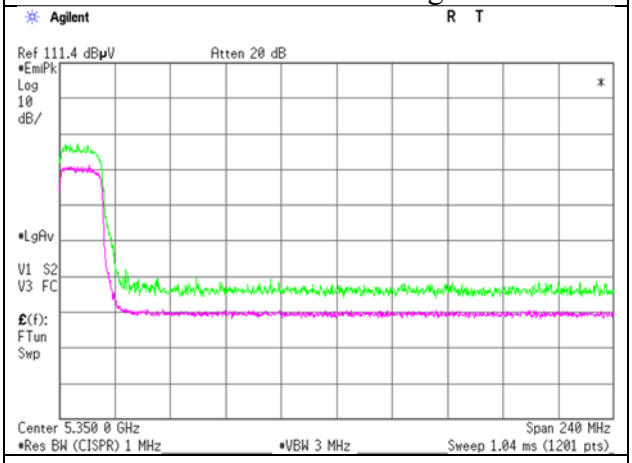
Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Result(EIRP[dBm])=10*LOG（({ (10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m])) ^ 2 } / 30) * 10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 27, 2018
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11n-40 5230 MHz

Horizontal

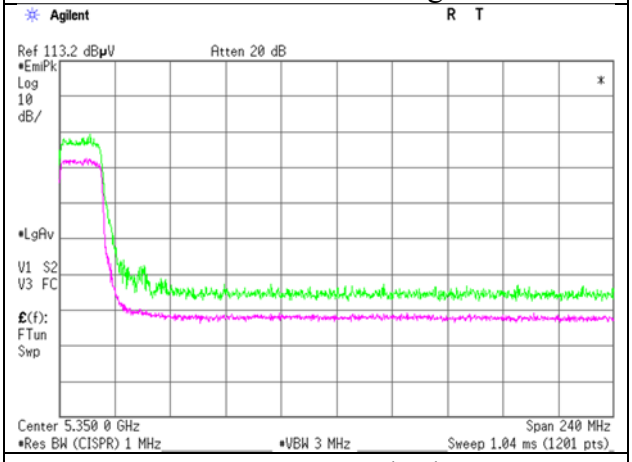
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-40 5190 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	50.97	32.18	16.25	44.63	2.35	57.12	73.90	16.7	140	139	
Hori.	5150.000	AV	41.67	32.18	16.25	44.63	2.35	47.82	53.90	**6.0**	140	139	VBW: 11 kHz
Vert.	5150.000	PK	50.54	32.18	16.25	44.63	2.35	56.69	73.90	17.2	154	216	
Vert.	5150.000	AV	41.30	32.18	16.25	44.63	2.35	47.45	53.90	6.4	154	216	VBW: 11 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

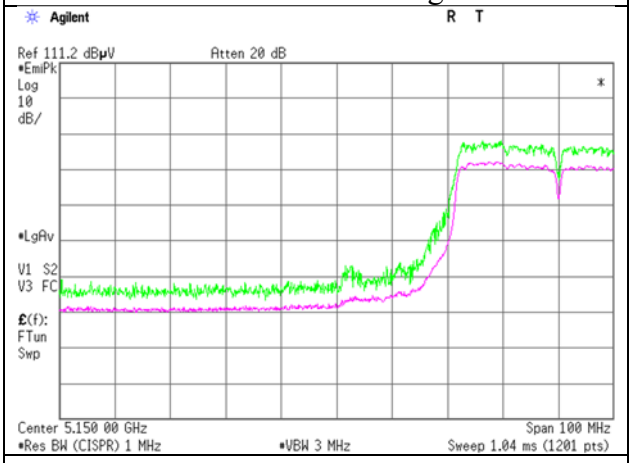
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11ac-40 5190 MHz

Horizontal

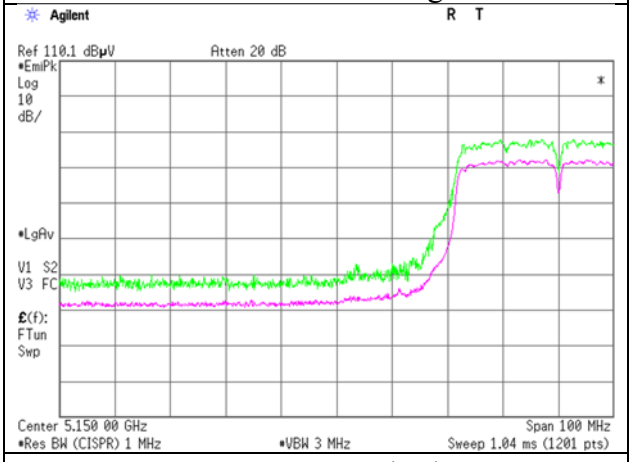
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-40 5230 MHz

(above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	50.16	31.73	16.34	44.79	2.35	55.79	73.90	18.1	152	85	
Hori.	5350.000	AV	40.59	31.73	16.34	44.79	2.35	46.22	53.90	7.6	152	85	VBW: 11 kHz
Vert.	5350.000	PK	49.92	31.73	16.34	44.79	2.35	55.55	73.90	18.3	125	45	
Vert.	5350.000	AV	40.70	31.73	16.34	44.79	2.35	46.33	53.90	**7.5**	125	45	VBW: 11 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

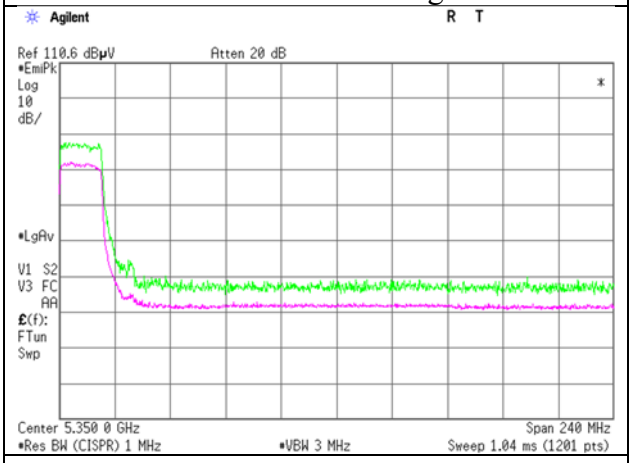
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 28, 2018
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11ac-40 5230 MHz

Horizontal

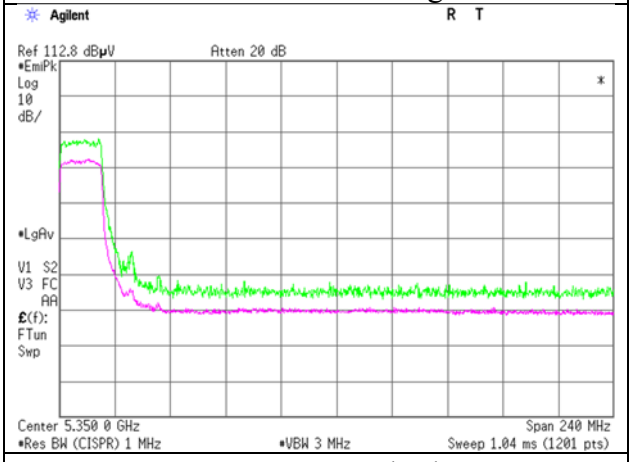
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	August 27, 2018	August 29, 2018	August 30, 2018	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	20 deg. C /	20 deg. C /	20 deg. C /
Humidity	49 % RH	56 % RH	49 % RH	49 % RH	62 % RH
Engineer	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(13 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11ac-80 5210 MHz				

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	127.363	QP	34.51	13.68	7.36	32.14	0.00	23.41	43.50	20.0	251	109	
Hori.	288.617	QP	26.98	13.53	8.63	32.01	0.00	17.13	46.00	28.8	102	226	
Hori.	5150.000	PK	56.21	32.18	16.25	44.63	2.35	62.36	73.90	11.5	149	111	
Hori.	5350.000	PK	49.37	31.73	16.34	44.79	2.35	55.00	73.90	18.9	149	111	
Hori.	15630.000	PK	49.61	38.45	12.57	42.12	-9.54	48.97	73.90	24.9	150	1	
Hori.	20840.000	PK	46.54	39.80	10.90	45.70	-9.54	42.00	73.90	31.9	128	301	
Hori.	5150.000	AV	40.43	32.18	16.25	44.63	2.35	46.58	53.90	**7.3**	149	111	VBW: 4.3 kHz
Hori.	5350.000	AV	39.58	31.73	16.34	44.79	2.35	45.21	53.90	8.6	149	111	VBW: 4.3 kHz
Hori.	15630.000	AV	36.79	38.45	12.57	42.12	-9.54	36.15	53.90	17.7	150	1	VBW: 4.3 kHz
Hori.	20840.000	AV	37.36	39.80	10.90	45.70	-9.54	32.82	53.90	21.0	128	301	VBW: 4.3 kHz
Vert.	47.548	QP	34.81	12.10	6.76	32.19	0.00	21.48	40.00	18.5	100	259	
Vert.	52.699	QP	35.97	10.30	6.77	32.19	0.00	20.85	40.00	19.1	100	253	
Vert.	73.323	QP	38.52	6.38	7.06	32.18	0.00	19.78	40.00	20.2	100	131	
Vert.	115.501	QP	37.97	12.64	7.23	32.15	0.00	25.69	43.50	17.8	100	128	
Vert.	360.002	QP	26.03	15.19	9.07	31.95	0.00	18.34	46.00	27.6	100	158	
Vert.	5150.000	PK	52.14	32.18	16.25	44.63	2.35	58.29	73.90	15.6	100	52	
Vert.	5350.000	PK	50.59	31.73	16.34	44.79	2.35	56.22	73.90	17.6	100	52	
Vert.	15630.000	PK	49.45	38.45	12.57	42.12	-9.54	48.81	73.90	25.0	150	1	
Vert.	20840.000	PK	46.26	39.80	10.90	45.70	-9.54	41.72	73.90	32.1	140	76	
Vert.	5150.000	AV	38.33	32.18	16.25	44.63	2.35	44.48	53.90	9.4	100	52	VBW: 4.3 kHz
Vert.	5350.000	AV	39.85	31.73	16.34	44.79	2.35	45.48	53.90	8.4	100	52	VBW: 4.3 kHz
Vert.	15630.000	AV	36.82	38.45	12.57	42.12	-9.54	36.18	53.90	17.7	150	1	VBW: 4.3 kHz
Vert.	20840.000	AV	38.39	39.80	10.90	45.70	-9.54	33.85	53.90	20.0	140	76	VBW: 4.3 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

(Calculation) (above 1GHz Outside of the restricted band)

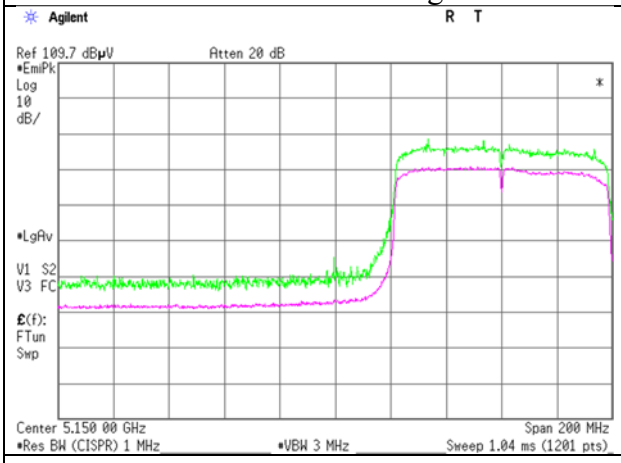
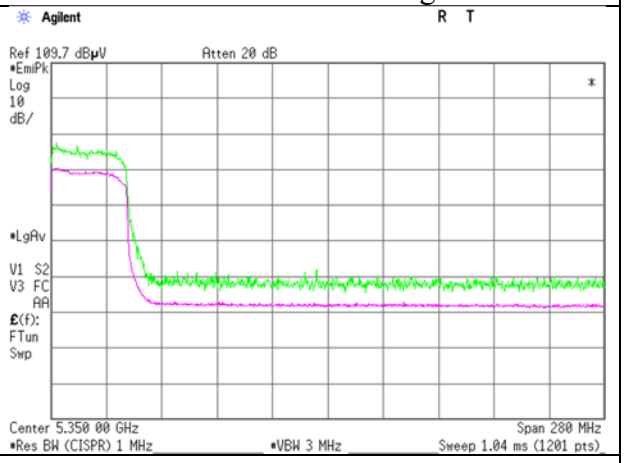
(* PK: Peak, AV: Average, QP: Quasi-Peak)

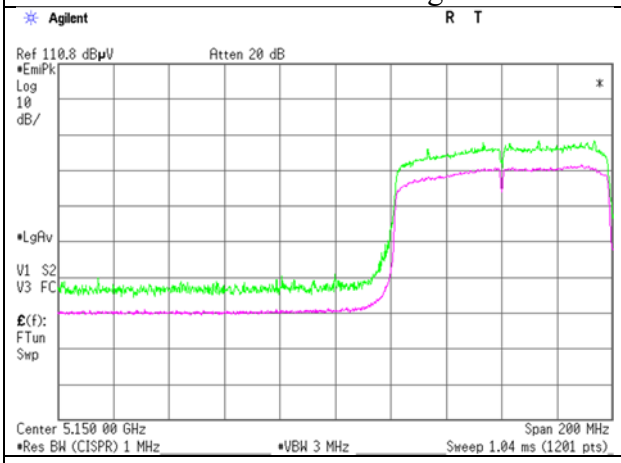
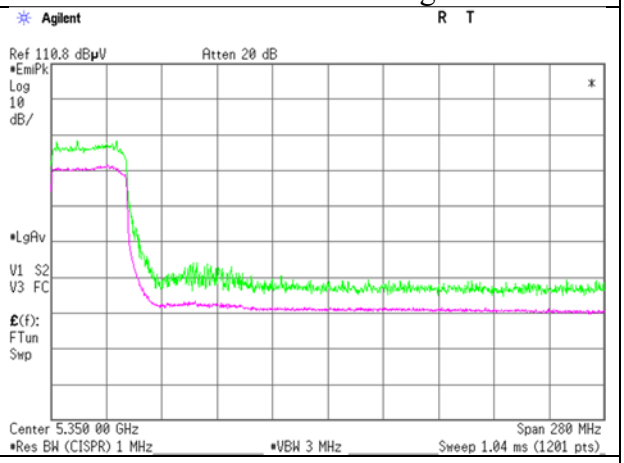
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10420.000	PK	50.45	39.66	9.41	43.58	2.35	58.29	-36.91	-27.00	9.9	102	340	
Vert.	10420.000	PK	51.33	39.66	9.41	43.58	2.35	59.17	-36.03	-27.00	**9.0**	100	328	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Resrult(EIRP[dBm])=10*LOG（({ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 27, 2018
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11ac-80 5210 MHz

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

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

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11a 5180 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	61.91	32.18	16.03	44.63	2.35	67.84	73.97	6.1	100	133	
Hori.	5150.000	AV	40.05	32.18	16.03	44.63	2.35	45.98	53.97	7.9	100	133	VBW: 2 kHz
Vert.	5150.000	PK	63.93	32.18	16.03	44.63	2.35	69.86	73.97	**4.1**	100	55	
Vert.	5150.000	AV	40.56	32.18	16.03	44.63	2.35	46.49	53.97	7.4	100	55	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

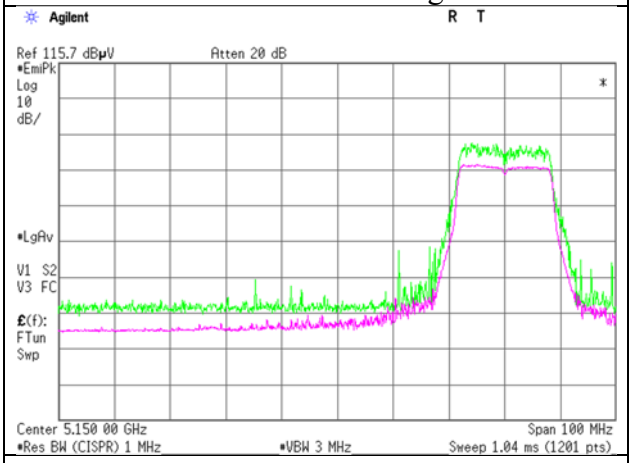
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11a 5180 MHz with Tx 3-DH5 Hopping On

Horizontal

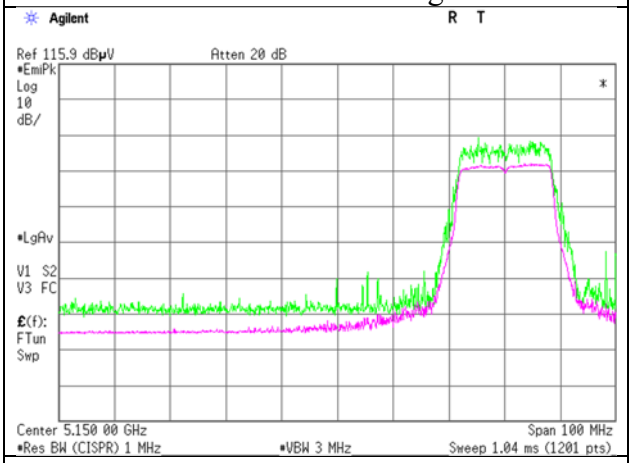
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11a 5240 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.38	31.73	16.21	44.79	2.35	54.88	73.97	19.0	100	83	
Hori.	5350.000	AV	39.10	31.73	16.21	44.79	2.35	44.60	53.97	**9.3**	100	83	VBW: 2 kHz
Vert.	5350.000	PK	51.17	31.73	16.21	44.79	2.35	56.67	73.97	17.3	100	49	
Vert.	5350.000	AV	38.54	31.73	16.21	44.79	2.35	44.04	53.97	9.9	100	49	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

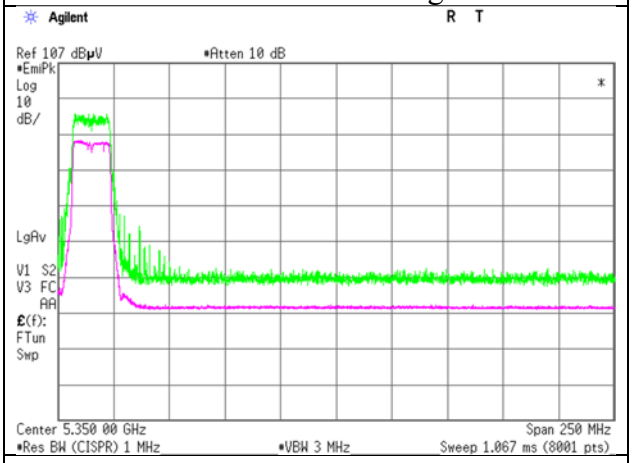
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11a 5240 MHz with Tx 3-DH5 Hopping On

Horizontal

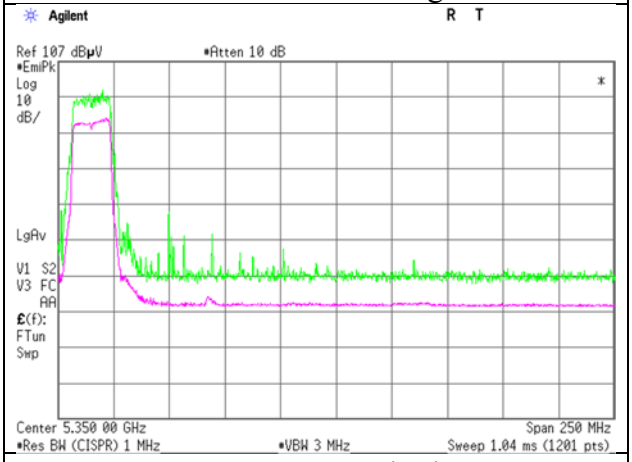
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-20 5180 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	60.54	32.18	16.03	44.63	2.35	66.47	73.97	**7.5**	100	76	
Hori.	5150.000	AV	38.96	32.18	16.03	44.63	2.35	44.89	53.97	9.0	100	76	VBW: 2 kHz
Vert.	5150.000	PK	60.16	32.18	16.03	44.63	2.35	66.09	73.97	7.8	100	50	
Vert.	5150.000	AV	38.54	32.18	16.03	44.63	2.35	44.47	53.97	9.5	100	50	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

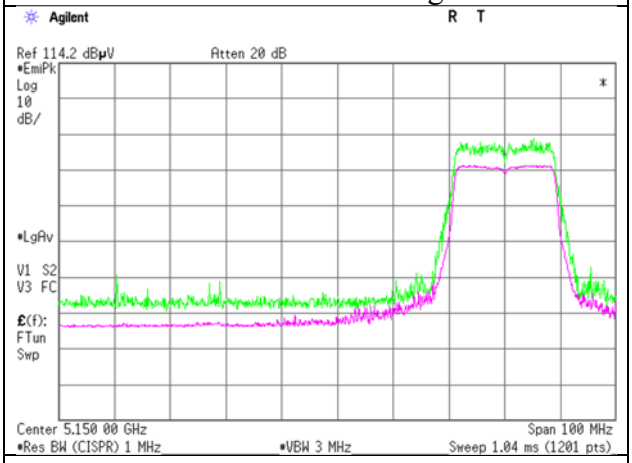
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20 5180 MHz with Tx 3-DH5 Hopping On

Horizontal

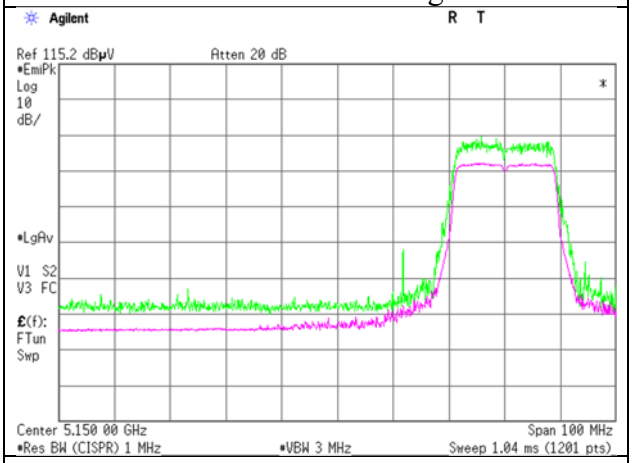
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-20 5240 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.96	31.73	16.21	44.79	2.35	55.46	73.97	18.5	143	82	
Hori.	5350.000	AV	38.49	31.73	16.21	44.79	2.35	43.99	53.97	9.9	143	82	VBW: 2 kHz
Vert.	5350.000	PK	52.41	31.73	16.21	44.79	2.35	57.91	73.97	16.0	100	59	
Vert.	5350.000	AV	38.58	31.73	16.21	44.79	2.35	44.08	53.97	**9.8**	100	59	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

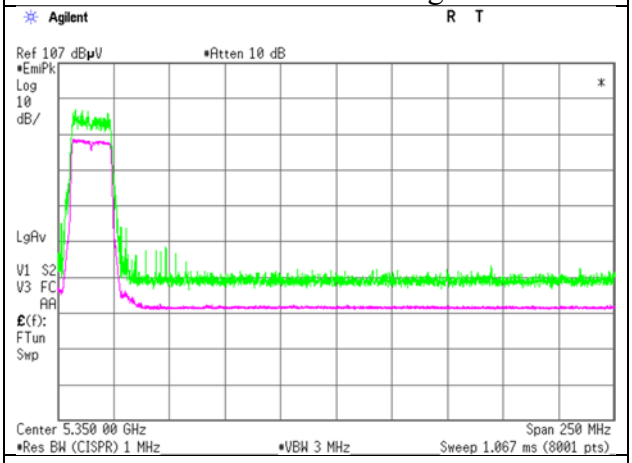
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20 5240 MHz with Tx 3-DH5 Hopping On

Horizontal

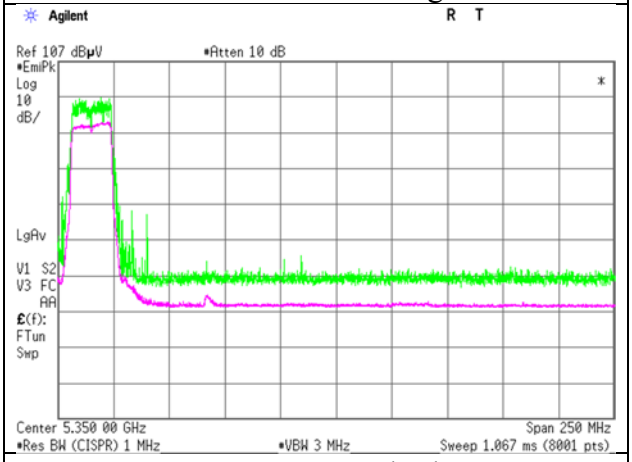
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	September 12, 2018	September 13, 2018
Temperature / Humidity	23 deg. C / 52 % RH	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)	(30 MHz – 1000 MHz)
		(6.4 GHz – 40 GHz)
Mode	Tx 11ac-20 5180 MHz with Tx 3-DH5 Hopping On	

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	73.154	QP	38.10	6.38	7.05	32.18	0.00	19.35	40.00	20.6	288	226	
Hori.	136.340	QP	27.40	14.34	7.53	32.13	0.00	17.14	43.50	26.3	210	84	
Hori.	149.277	QP	29.60	14.73	7.77	32.12	0.00	19.98	43.50	23.5	133	89	
Hori.	163.541	QP	25.80	15.24	7.88	32.11	0.00	16.81	43.50	26.6	203	89	
Hori.	351.120	QP	27.00	15.13	9.03	31.95	0.00	19.21	46.00	26.7	100	126	
Hori.	5150.000	PK	61.51	32.18	16.03	44.63	2.35	67.44	73.97	6.5	100	77	
Hori.	10360.000	PK	51.71	39.48	9.33	43.62	2.35	59.25	73.90	14.6	381	35	
Hori.	15540.000	PK	46.03	38.62	11.44	42.10	-9.54	44.45	73.90	29.4	150	0	
Hori.	5150.000	AV	38.65	32.18	16.03	44.63	2.35	44.58	53.97	9.3	100	77	VBW: 2 kHz
Hori.	10360.000	AV	40.73	39.48	9.33	43.62	2.35	48.27	53.90	5.6	381	35	VBW: 2 kHz
Hori.	15540.000	AV	35.96	38.62	11.44	42.10	-9.54	34.38	53.90	19.5	150	0	VBW: 2 kHz
Vert.	54.919	QP	44.00	9.55	6.74	32.19	0.00	28.10	40.00	11.9	100	101	
Vert.	74.273	QP	49.20	6.36	7.14	32.18	0.00	30.52	40.00	9.4	100	219	
Vert.	146.694	QP	28.70	14.73	7.73	32.12	0.00	19.04	43.50	24.4	100	110	
Vert.	274.600	QP	24.20	13.07	8.54	32.01	0.00	13.80	46.00	32.2	100	200	
Vert.	319.611	QP	25.40	14.25	8.84	31.99	0.00	16.50	46.00	29.5	100	72	
Vert.	5150.000	PK	60.44	32.18	16.03	44.63	2.35	66.37	73.97	7.6	100	56	
Vert.	10360.000	PK	51.96	39.48	9.33	43.62	2.35	59.50	73.90	14.4	288	314	
Vert.	15540.000	PK	46.81	38.62	11.44	42.10	-9.54	45.23	73.90	28.6	150	0	
Vert.	5150.000	AV	38.78	32.18	16.03	44.63	2.35	44.71	53.97	9.2	100	56	VBW: 2 kHz
Vert.	10360.000	AV	41.65	39.48	9.33	43.62	2.35	49.19	53.90	**4.7**	288	314	VBW: 2 kHz
Vert.	15540.000	AV	36.15	38.62	11.44	42.10	-9.54	34.57	53.90	19.3	150	0	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

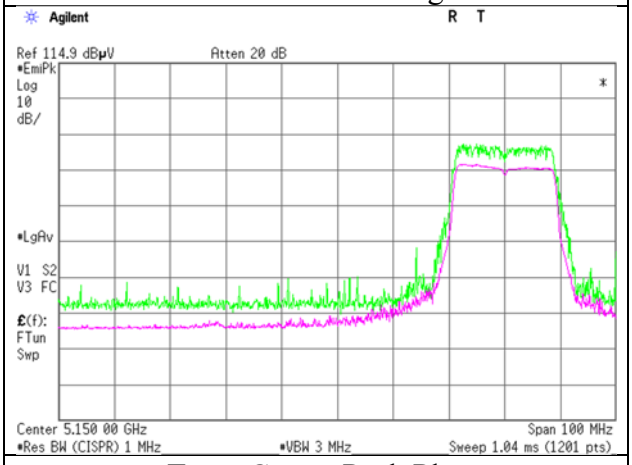
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11ac-20 5180 MHz with Tx 3-DH5 Hopping On

Horizontal

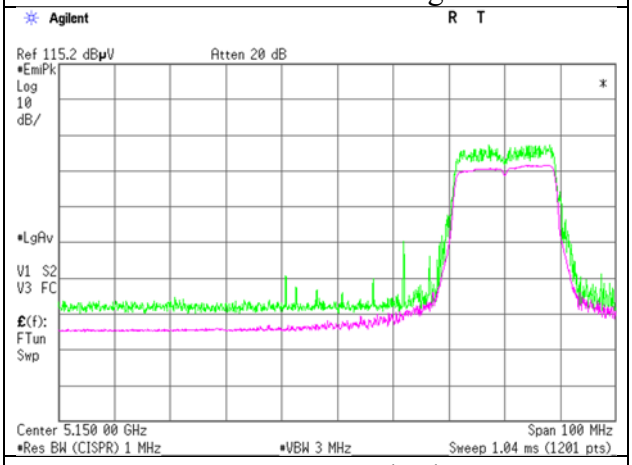
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-20 5240 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.52	31.73	16.21	44.79	2.35	55.02	73.97	18.9	100	75	
Hori.	5350.000	AV	38.49	31.73	16.21	44.79	2.35	43.99	53.97	**9.9**	100	75	VBW: 2 kHz
Vert.	5350.000	PK	52.25	31.73	16.21	44.79	2.35	57.75	73.97	16.2	100	64	
Vert.	5350.000	AV	38.54	31.73	16.21	44.79	2.35	44.04	53.97	**9.9**	100	64	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

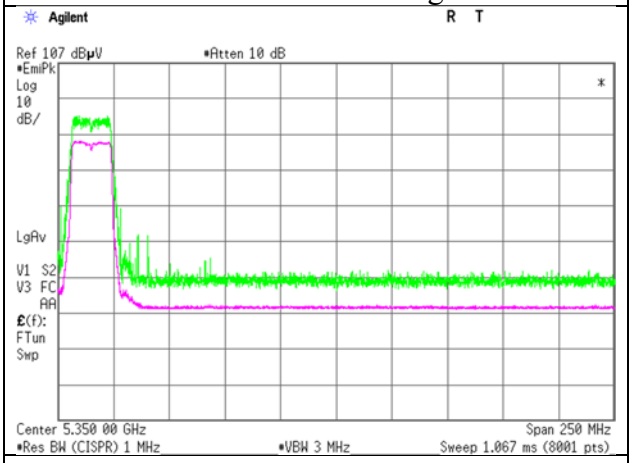
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11ac-20 5240 MHz with Tx 3-DH5 Hopping On

Horizontal

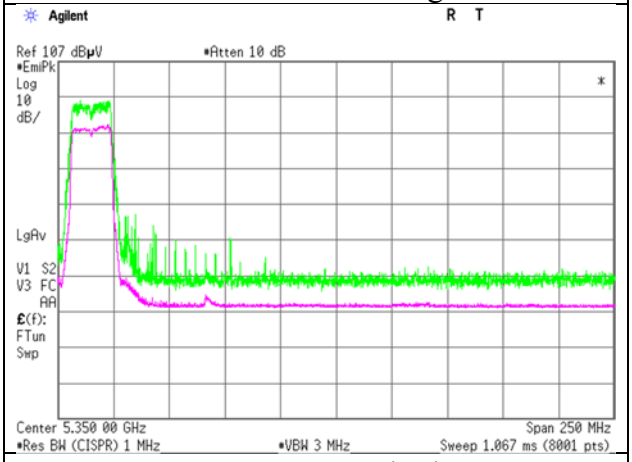
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-40 5190 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	57.30	32.18	16.03	44.63	2.35	63.23	73.97	10.7	127	126	
Hori.	5150.000	AV	40.00	32.18	16.03	44.63	2.35	45.93	53.97	**8.0**	127	126	VBW: 2 kHz
Vert.	5150.000	PK	59.21	32.18	16.03	44.63	2.35	65.14	73.97	8.8	100	57	
Vert.	5150.000	AV	39.15	32.18	16.03	44.63	2.35	45.08	53.97	8.8	100	57	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

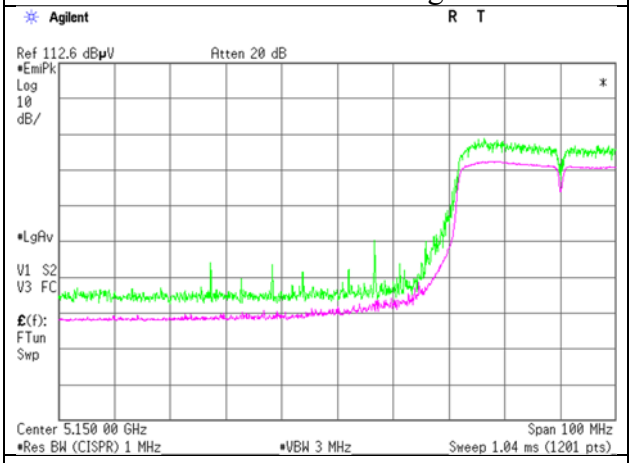
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-40 5190 MHz with Tx 3-DH5 Hopping On

Horizontal

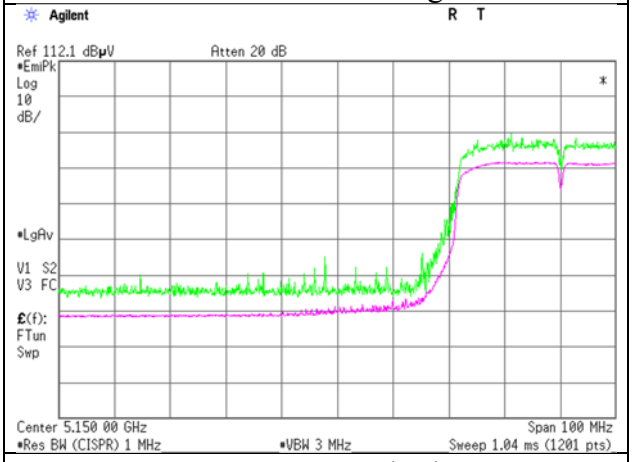
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11n-40 5230 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.25	31.73	16.21	44.79	2.35	54.75	73.97	19.2	187	82	
Hori.	5350.000	AV	38.67	31.73	16.21	44.79	2.35	44.17	53.97	**9.8**	187	82	VBW: 2 kHz
Vert.	5350.000	PK	51.32	31.73	16.21	44.79	2.35	56.82	73.97	17.1	119	57	
Vert.	5350.000	AV	38.55	31.73	16.21	44.79	2.35	44.05	53.97	9.9	119	57	VBW: 2 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

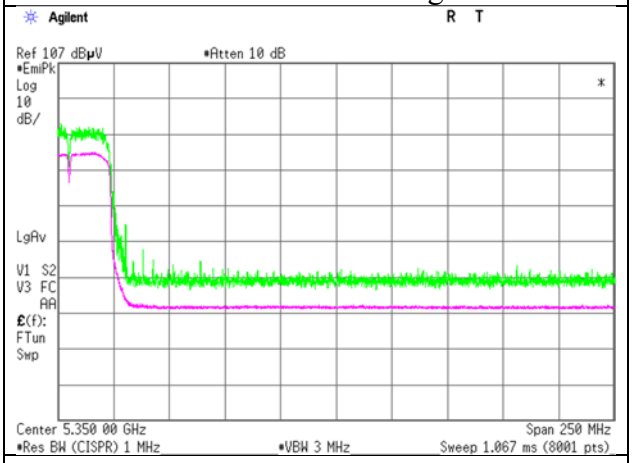
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-40 5230 MHz with Tx 3-DH5 Hopping On

Horizontal

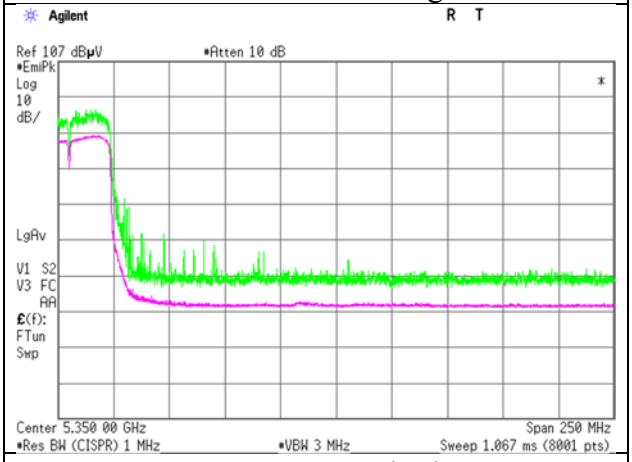
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-40 5190 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5150.000	PK	62.93	32.18	16.03	44.63	2.35	68.86	73.97	5.1	100	127	
Hori.	5150.000	AV	44.83	32.18	16.03	44.63	2.35	50.76	53.97	**3.2**	100	127	VBW: 11 kHz
Vert.	5150.000	PK	57.42	32.18	16.03	44.63	2.35	63.35	73.97	10.6	107	62	
Vert.	5150.000	AV	42.03	32.18	16.03	44.63	2.35	47.96	53.97	6.0	107	62	VBW: 11 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

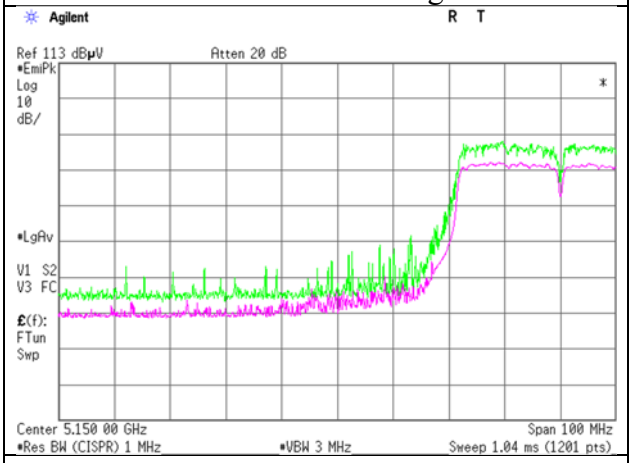
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11ac-40 5190 MHz with Tx 3-DH5 Hopping On

Horizontal

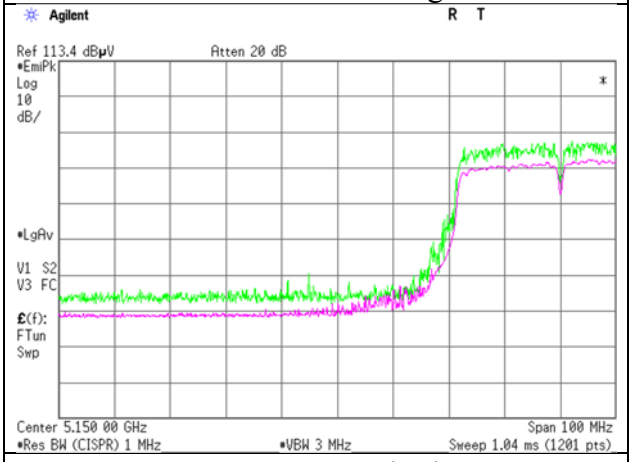
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-40 5230 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

(* 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.	5350.000	PK	49.25	31.73	16.21	44.79	2.35	54.75	73.97	19.2	187	82	
Hori.	5350.000	AV	38.67	31.73	16.21	44.79	2.35	44.17	53.97	**9.8**	187	82	VBW: 11 kHz
Vert.	5350.000	PK	51.32	31.73	16.21	44.79	2.35	56.82	73.97	17.1	119	57	
Vert.	5350.000	AV	38.55	31.73	16.21	44.79	2.35	44.05	53.97	9.9	119	57	VBW: 11 kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

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

*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

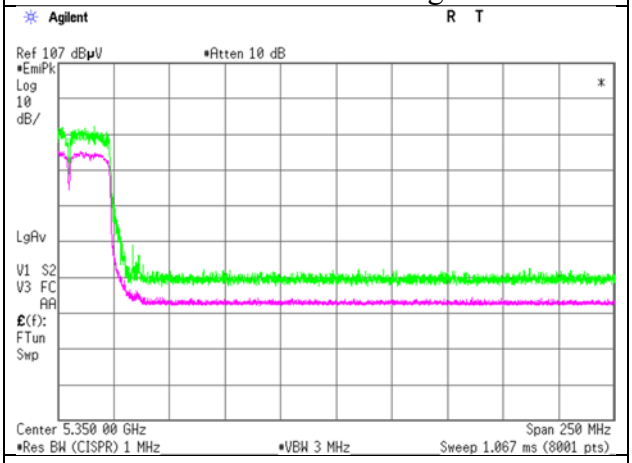
* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11ac-40 5230 MHz with Tx 3-DH5 Hopping On

Horizontal

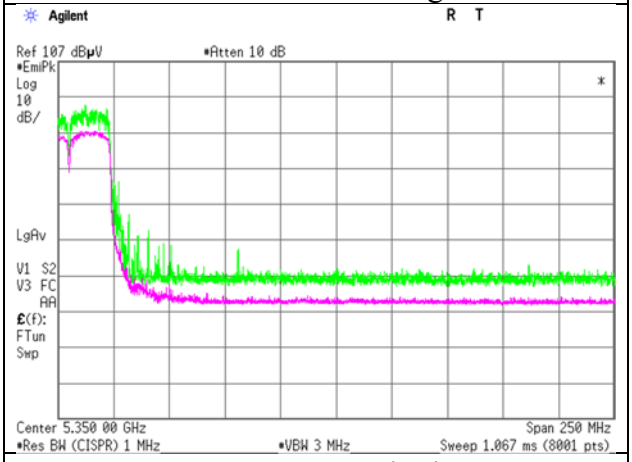
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)
Mode	Tx 11ac-80 5210 MHz with Tx 3-DH5 Hopping On

(below 1GHz and above 1GHz Inside of the restricted band)

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

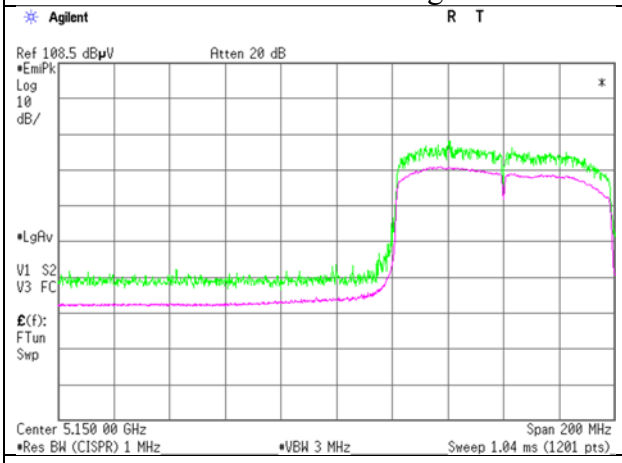
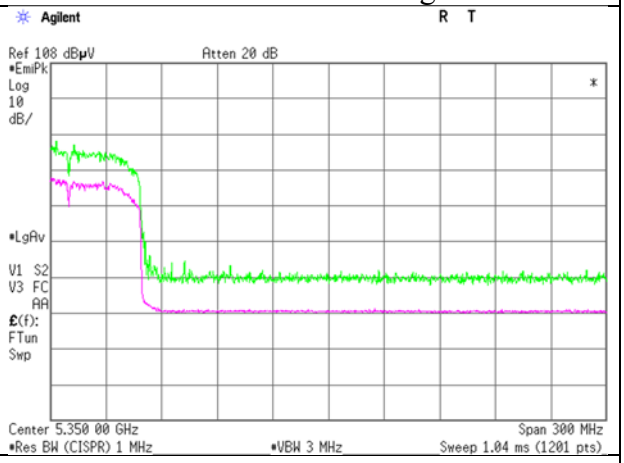
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5150.000	PK	55.89	32.18	16.03	44.63	2.35	61.82	73.97	12.1	100	126	
Hori.	5350.000	PK	49.39	31.73	16.21	44.79	2.35	54.89	73.97	19.0	100	126	
Hori.	5150.000	AV	40.27	32.18	16.03	44.63	2.35	46.20	53.97	**7.7**	100	126	VBW: 2 kHz
Hori.	5350.000	AV	38.34	31.73	16.21	44.79	2.35	43.84	53.97	10.1	100	126	VBW: 2 kHz
Vert.	5150.000	PK	53.90	32.18	16.03	44.63	2.35	59.83	73.97	14.1	106	56	
Vert.	5350.000	PK	50.48	31.73	16.21	44.79	2.35	55.98	73.97	17.9	106	56	
Vert.	5150.000	AV	39.05	32.18	16.03	44.63	2.35	44.98	53.97	8.9	106	56	VBW: 2 kHz
Vert.	5350.000	AV	38.53	31.73	16.21	44.79	2.35	44.03	53.97	9.9	106	56	VBW: 2 kHz

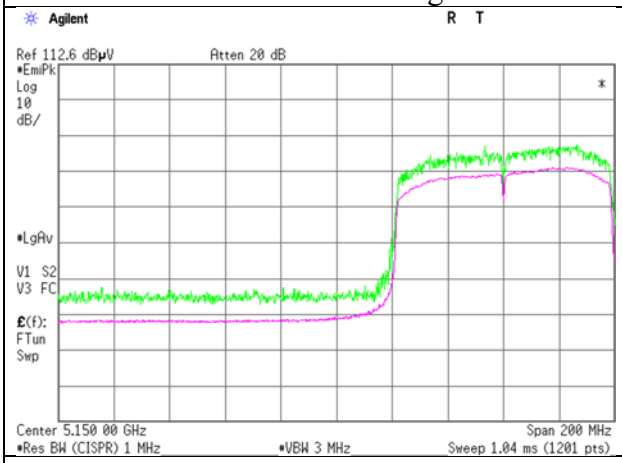
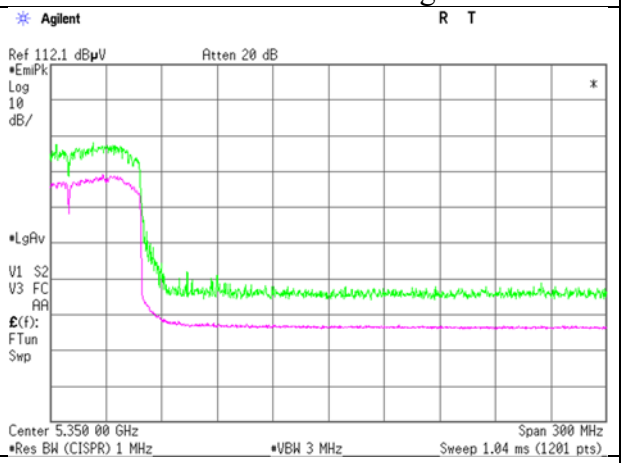
Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).
*The 4th harmonic was not seen so the result was its base noise level.
Distance factor : 1 GHz - 13 GHz : 20log (3.93 m / 3.0 m) = 2.35 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

* This mode was performed only band edges measurement.

Radiated Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	September 13, 2018
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11ac-80 5210 MHz with Tx 3-DH5 Hopping On

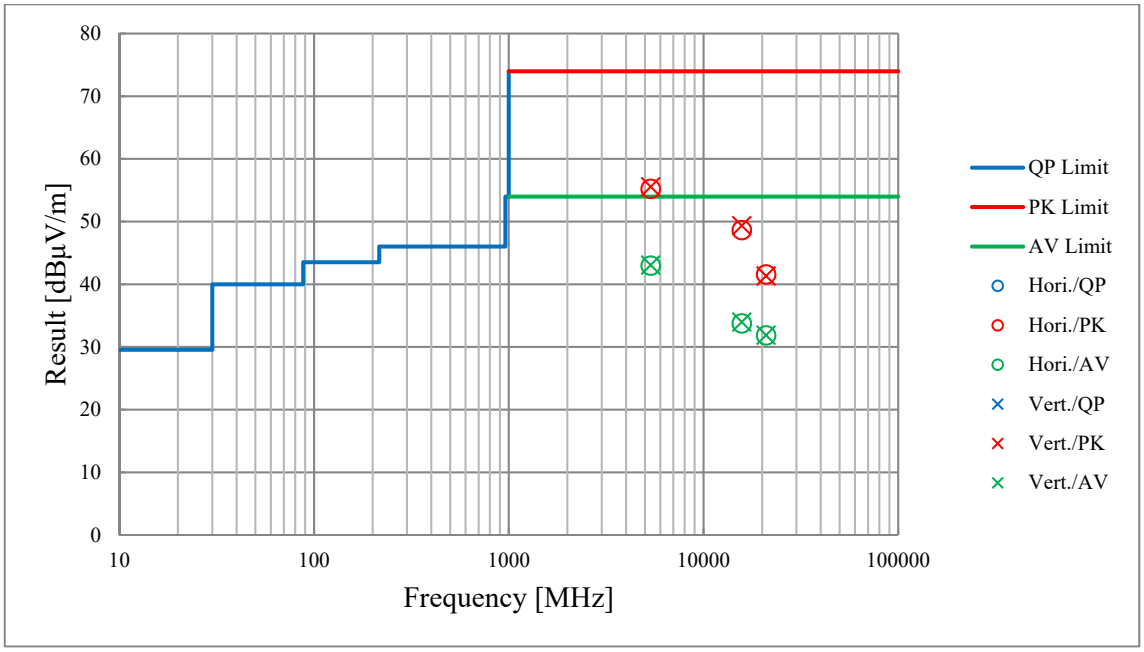
Horizontal	Horizontal
Restricted-band band-edge Plot	Restricted-band band-edge Plot
	
Trace Green: Peak Plot Trace Purple: Average Plot	Trace Green: Peak Plot Trace Purple: Average Plot

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

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12429781S-L-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	No.3				
Date	August 29, 2018	August 27, 2018	August 29, 2018	August 30, 2018	August 31, 2018
Temperature /	20 deg. C /	24 deg. C /	20 deg. C /	20 deg. C /	20 deg. C /
Humidity	49 % RH	56 % RH	49 % RH	49 % RH	62 % RH
Engineer	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama	Kazutaka Takeyama
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(13 GHz - 26 GHz)	(26 GHz - 40 GHz)
Mode	Tx 11ac-20 5180 MHz				



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

UL Japan, Inc.
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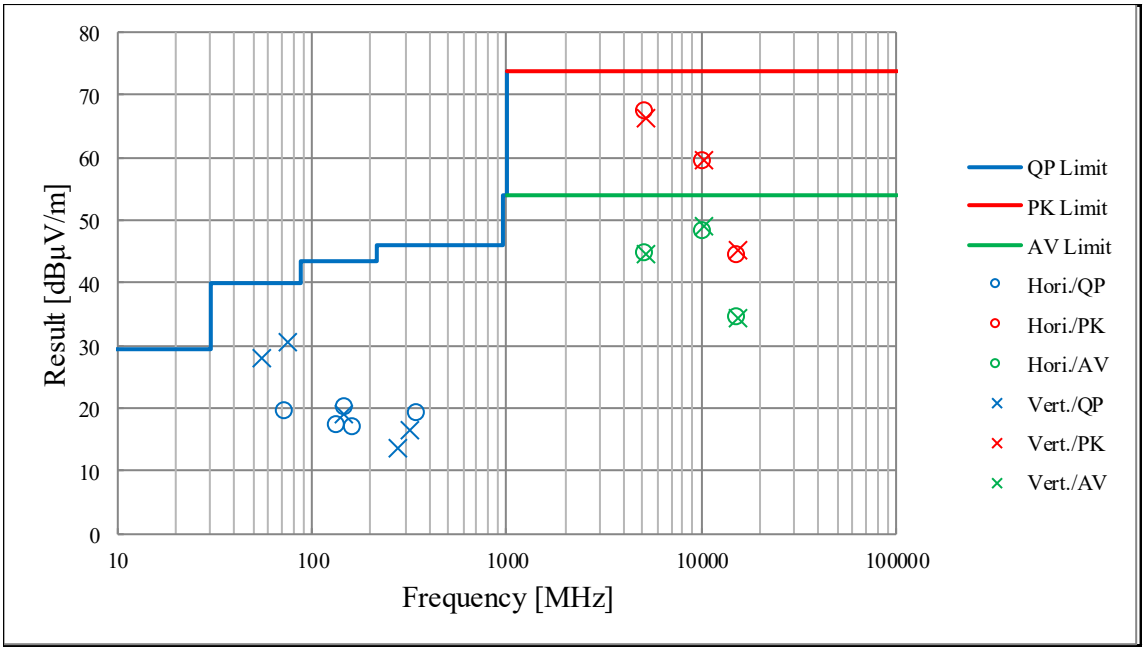
Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12429781S-L-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	September 12, 2018	September 13, 2018
Temperature / Humidity	23 deg. C / 52 % RH	25 deg. C / 51 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
	(1 GHz – 6.4 GHz)	(30 MHz – 1000 MHz)
		(6.4 GHz – 40 GHz)
Mode	Tx 11ac-20 5180 MHz with Tx 3-DH5 Hopping On	

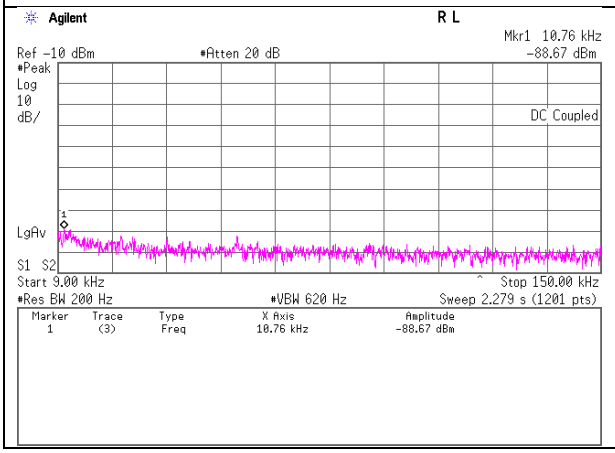


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

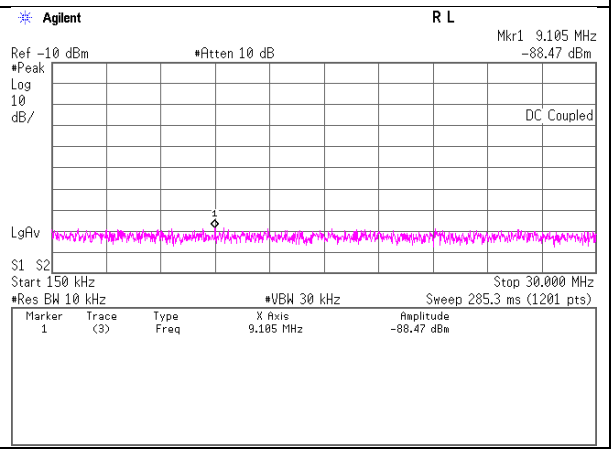
Conducted Spurious Emission

Report No.	12429781S-L-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kenichi Adachi
Mode	Tx 11ac-20, 5180 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
10.76	-88.67	0.01	9.54	2.87	1.00	-76.25	300.00	6.00	-14.99	46.90	61.89	
9105.00	-88.47	0.06	9.54	2.87	1.00	-76.00	30.00	6.00	5.26	29.54	24.28	

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

APPENDIX 2: Test instruments

Test Instruments (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2018/07/13 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY53260009	AT	2018/07/13 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2018/10/07 * 12
SRENT-09	Spectrum Analyzer	Agilent	E4440A	MY46186392	AT	2017/11/08 * 12 *1)
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2018/03/19 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2018/03/19 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2017/11/22 * 12 *1)
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2017/10/30 * 12 *1)
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2017/12/21 * 12 *1)
KTS-08	Digital Tester	SANWA	PC500	7019224	AT	2018/03/05 * 12

***1) This test equipment was used for the tests before the expiration date of the calibration.**

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:

RE: Radiated Emission
AT: Antenna Terminal Conducted test

Test Instruments (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2018/07/17 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2018/07/23 * 12
SAJ-01	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-S001	RE	Pre Check
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NFS NMS/B	1612S005	RE	2019/01/25 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000NFS NMS/B	1612S006	RE	2018/01/29 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-091	RE	2018/06/01 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2018/11/25 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12 *1)
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2018/11/16 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2019/02/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2018/05/11 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2018/03/05 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE,CE	-
COTS-SEMI-5	EMI Software	TSJ	TEPTO-DV3(RE)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2018/10/25 * 12
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2018/10/16 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2018/06/02 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2018/06/17 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2018/06/17 * 12
SAT6-13	Attenuator	JFW	50HF-006N	-	RE	2018/02/09 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2018/04/09 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2018/02/16 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE,CE	2017/11/24 * 12 *1)
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM9861	RE	2018/07/23 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2018/03/27 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2019/01/25 * 12
SCC-G16	Coaxial Cable	Suhner	SUCOFLEX 102	32704/2	RE	2018/03/19 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2018/05/11 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2018/03/19 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000KMS KMS	-	RE	2018/04/20 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2018/04/09 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2018/02/26 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2018/09/14 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2017/12/21 * 12 *1)
STM-05	Terminator	TME	CT-01 BP	-	CE	2017/12/14 * 12 *1)

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Test item:

CE: Conducted Emission
RE: Radiated Emission