



RADIO TEST REPORT

Test Report No. : 11640275S-C-R2

Applicant : RICOH COMPANY, LTD.
Type of Equipment : Digital Camera
Model No. : RICOH THETA V
FCC ID : BBP-RR214
Test regulation : FCC Part 15 Subpart E: 2017
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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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. This report is a revised version of 11640275S-C-R1.

Date of test: May 19 to June 29, 2017

Representative test engineer:



Hikaru Shirasawa

Engineer

Consumer Technology Division

Approved by:



Toyokazu Imamura

Leader

Consumer Technology Division



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

UL Japan, Inc.

Ise EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11640275S-C

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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)) 2412 MHz -2462 MHz (Wireless LAN) 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), 2MHz (Bluetooth 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), 2MHz (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	:	PCB Antenna
Antenna connector type	:	None
Antenna gain	:	[2.4 GHz] 0.119 dBi [5 GHz] -3.8 dBi
ITU code	:	F1D, G1D (Bluetooth BDR/EDR/Low Energy (LE)) D1D, G1D (IEEE802.11b/g/n/a/ac)
Operation temperature range	:	0 deg. C to +40 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart E
FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017

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

* The revision on June 14, 2017, does not affect the test specification applied to the EUT.

* Also the EUT complies with FCC Part 15 Subpart B.

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	QP 17.5 dB, 0.15000 MHz, L1 Tx.11a 5240 MHz	Complied	-
	IC: RSS-Gen 8.8	IC: RSS-Gen 8.8			
26 dB Emission Bandwidth	FCC: KDB Publication Number 789033	FCC: 15.407 (a) (1) (2) (3)	See data	N/A	Conducted
	IC: -	IC: -			
Maximum Conducted Output Power	FCC: KDB Publication Number 789033	FCC: 15.407 (a) (1) (2) (3)		Complied	Conducted
	IC: -	IC: RSS-247 6.2.1 (1) 6.2.2 (1) 6.2.3 (1) 6.2.4 (1)			
Maximum Power Spectral Density	FCC: KDB Publication Number 789033	FCC : 15.407 (a) (1) (2) (3)		Complied	Conducted
	IC: -	IC: RSS-247 6.2.1 (1) 6.2.2 (1) 6.2.3 (1) 6.2.4 (1)			
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 789033 FCC Public Notice DA 00-705 *2)	FCC: 15.407 (b), 15.205 and 15.209 Section 15.247(d) *2)	4.2 dB 5150.000 MHz, AV, Vert. Tx 11ac-80 5210 MHz 3.4 dB 10480.000 MHz, AV, Vert Tx 11a 5240MHz with DH5 Hopping	Complied	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
	IC: RSS-Gen 6.13 *2)	IC: RSS-247 6.2.1 (2) 6.2.2 (2) 6.2.3 (2) 6.2.4 (2) RSS-247 5.5 *2) RSS-Gen 8.9 *2) RSS-Gen 8.10 *2)			
6 dB Emission Bandwidth	FCC: ANSI C63.10-2013	FCC: 15.407 (e)	See data	Complied	Conducted
	IC: -	IC: RSS-247 6.2.4 (1)			

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.

* 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 (DC 1.3 V/1.8 V/3.0 V) 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 Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	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	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB	-	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 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	0.72 dB
Power Measurement above 1 GHz (Peak Detector) _SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector) _SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector) _SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

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

Test site	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

Mode	Remarks*
IEEE 802.11a (11a)	6 Mbps
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 0
IEEE 802.11n SISO 40 MHz BW (11n-40)	MCS 0
IEEE 802.11ac SISO 20 MHz BW (11ac-20)	MCS 0
IEEE 802.11ac SISO 40 MHz BW (11ac-40)	MCS 0
IEEE 802.11ac SISO 80 MHz BW (11ac-80)	MCS 0
*Power of the EUT was set by the software as follows; Power settings: 12 dBm Software: RICOH_WLAN_RF_test4	

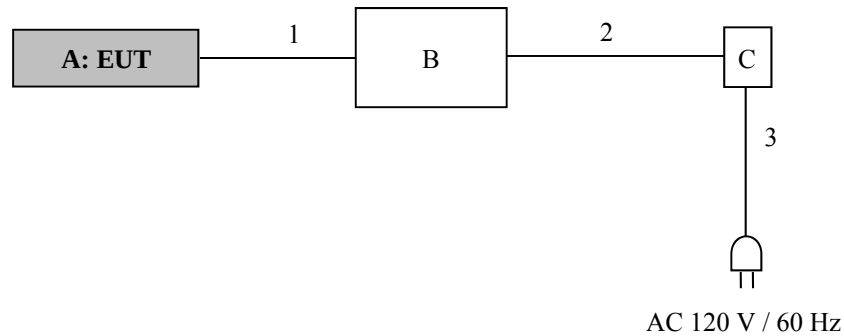
Camera Serial number	Firmware Ver.	Remarks
YL00000192	00500000	(Antenna Terminal conducted test)
YL00000259	00500000	(Conducted Emission test and Radiated Emission test)

*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 11a *1)	5240 MHz
20 dB Bandwidth	Tx 11a	5240 MHz
	Tx 11n-20	5240 MHz
	Tx 11ac-20	5240 MHz
	Tx 11n-40	5230 MHz
	Tx 11ac-40	5230 MHz
	Tx 11ac-80	5210 MHz
99 % Occupied Bandwidth,	Tx 11a *1)	5180 MHz
Maximum Conducted Output Power,	Tx 11n-20	5220 MHz
Maximum Power Spectral Density,	Tx 11ac-20	5240 MHz
26 dB Emission Bandwidth,	Tx 11n-40	5190 MHz
	Tx 11ac-40	5230 MHz
	Tx 11ac-80	5210 MHz
Radiated Spurious Emission (Below 1 GHz)	11a Tx *1)	5240 MHz
Conducted Spurious Emission		
Radiated Spurious Emission (Above 1 GHz)	Tx 11a *1)	5180 MHz
	Tx 11n-20	5220 MHz
	Tx 11ac-20	5240 MHz
	Tx 11n-40	5190 MHz
	Tx 11ac-40	5230 MHz
	Tx 11ac-80	5210 MHz
	Tx 11a	5240 MHz
	with Tx DH5 2402 MHz *2)	5240 MHz
	with Tx DH5 2480 MHz *2)	5240 MHz
	with Tx 3-DH5 2402 MHz *2)	5240 MHz
	with Tx 3-DH5 2480 MHz *2)	5240 MHz
	Tx 11a	5180 MHz
	Tx 11n-20	5240 MHz
	Tx 11ac-20	5240 MHz
	Tx 11n-40	5190 MHz
	Tx 11ac-40	5230 MHz
	Tx 11ac-80	5210 MHz
	with DH5 Hopping *2)	5190 MHz
		5230 MHz
		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 DH5 and 3DH5.		

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Digital Camera	RICOH THETA V	YL00000192 *1) YL00000259 *2)	RICOH	EUT
B	Laptop PC	PC-VJ23LLZGR	66000071A	NEC	-
C	AC Adaptor	ADP-45TD E	0115924DB	NEC	-

*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	0.5+1.0	Shielded	Shielded	Extension Manufacturer: RICOH Supplied with EUT
2	DC	1.8	Unshielded	Unshielded	-
3	AC	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

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 in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector	: QP and CISPR 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 1 GHz >

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 table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

< Above 1 GHz >

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

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

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 1 GHz >

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

< Above 1 GHz >

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).

Restricted band edge:

Apply to limit in the Section 15.209 (a).

Since this limit is severer than the limit of the inside of restricted bands.

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

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

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: *2) Detector: Power Averaging (RMS) Trace: ≥ 100 traces If duty cycle was less than 98 %, a duty factor was added to the results. Detector: Power Averaging (Linear voltage) Trace: ≥ 100 traces Duty factor was added to the results.
Test Distance	3 m	3 m (below 1 GHz), 3.98 m *3) (1 GHz – 13 GHz), 1 m*4) (13 GHz – 40 GHz)	

*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v01r04 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*2) When duty cycle > 98 percent, VBW was set at 10 Hz.

When duty cycle <98 percent, VBW was set as VBW calculation sheet in APPENDIX 1

*3) Distance Factor: $20 \times \log(3.98 \text{ m}/3.0 \text{ m}) = 2.45 \text{ dB}$

*4) Distance Factor: $20 \times \log(1.0 \text{ m}/3.0 \text{ m}) = -9.54 \text{ dB}$

- 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.

Antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz-13 GHz)	Spurious (13 GHz-26.5 GHz)	Spurious (26.5 GHz-40 GHz)
Horizontal	X	Y	Z	X	X
Vertical	Z	X	Y	X	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

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 80 MHz BW) (Method PM)
Maximum Power Spectral Density	Encompass the entire EBW	1 MHz	≥ 3 RBW	Auto	Average	Clear Write	Spectrum Analyzer
Conducted Spurious Emission*3)	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 D01 General UNII Test Procedures 1 Old Rules v01r04 "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) KDB 789033 D02 says that RBW is set to be 500 kHz for 5.725 GHz-5.850 GHz, but it is not possible with spectrum analyzer, so RBW Correction Factor ($10 \log(500 \text{ kHz} / 470 \text{ kHz})$) was added to the test result.

*3) 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

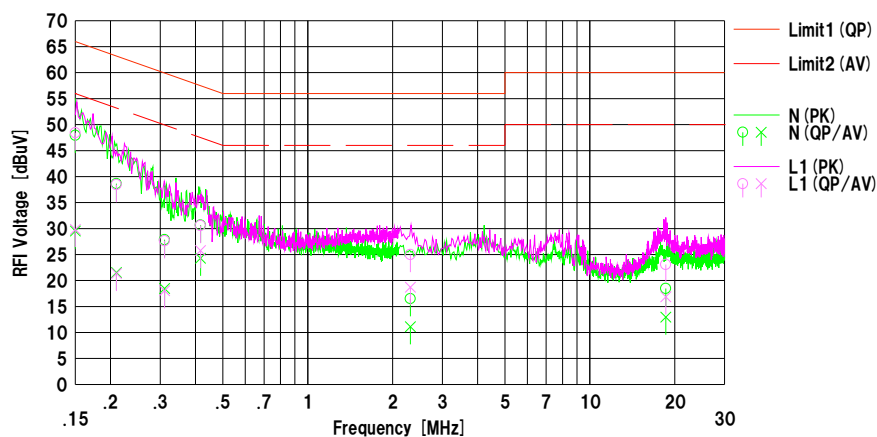
UL Japan, Inc. Shonan EMC Lab. No.2 Shielded Room
Date : 2017/05/25

Mode : Tx IEEE802.11a 5240 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 24 deg.C / 52 %RH

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

Engineer : Hikaru Shirasawa



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	35.20	16.80	12.74	47.94	29.54	66.00	56.00	18.0	26.4	N	
2	0.21000	25.90	8.80	12.75	38.65	21.55	63.21	53.21	24.5	31.6	N	
3	0.31100	15.10	5.70	12.76	27.86	18.46	59.94	49.94	32.0	31.4	N	
4	0.41700	17.90	11.50	12.78	30.68	24.28	57.51	47.51	26.8	23.2	N	
5	2.31100	3.60	-1.80	12.91	16.51	11.11	56.00	46.00	39.4	34.8	N	
6	18.58496	4.70	-0.80	13.78	18.48	12.98	60.00	50.00	41.5	37.0	N	
7	0.15000	35.70	17.10	12.74	48.44	29.84	66.00	56.00	17.5	26.1	L1	
8	0.21000	25.70	8.60	12.75	38.45	21.35	63.21	53.21	24.7	31.8	L1	
9	0.31100	14.90	5.30	12.76	27.66	18.06	59.94	49.94	32.2	31.8	L1	
10	0.41700	17.80	13.00	12.78	30.58	25.78	57.51	47.51	26.9	21.7	L1	
11	2.31100	12.10	5.80	12.91	25.01	18.71	56.00	46.00	30.9	27.2	L1	
12	18.58500	9.30	3.10	13.78	23.08	16.88	60.00	50.00	36.9	33.1	L1	

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

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

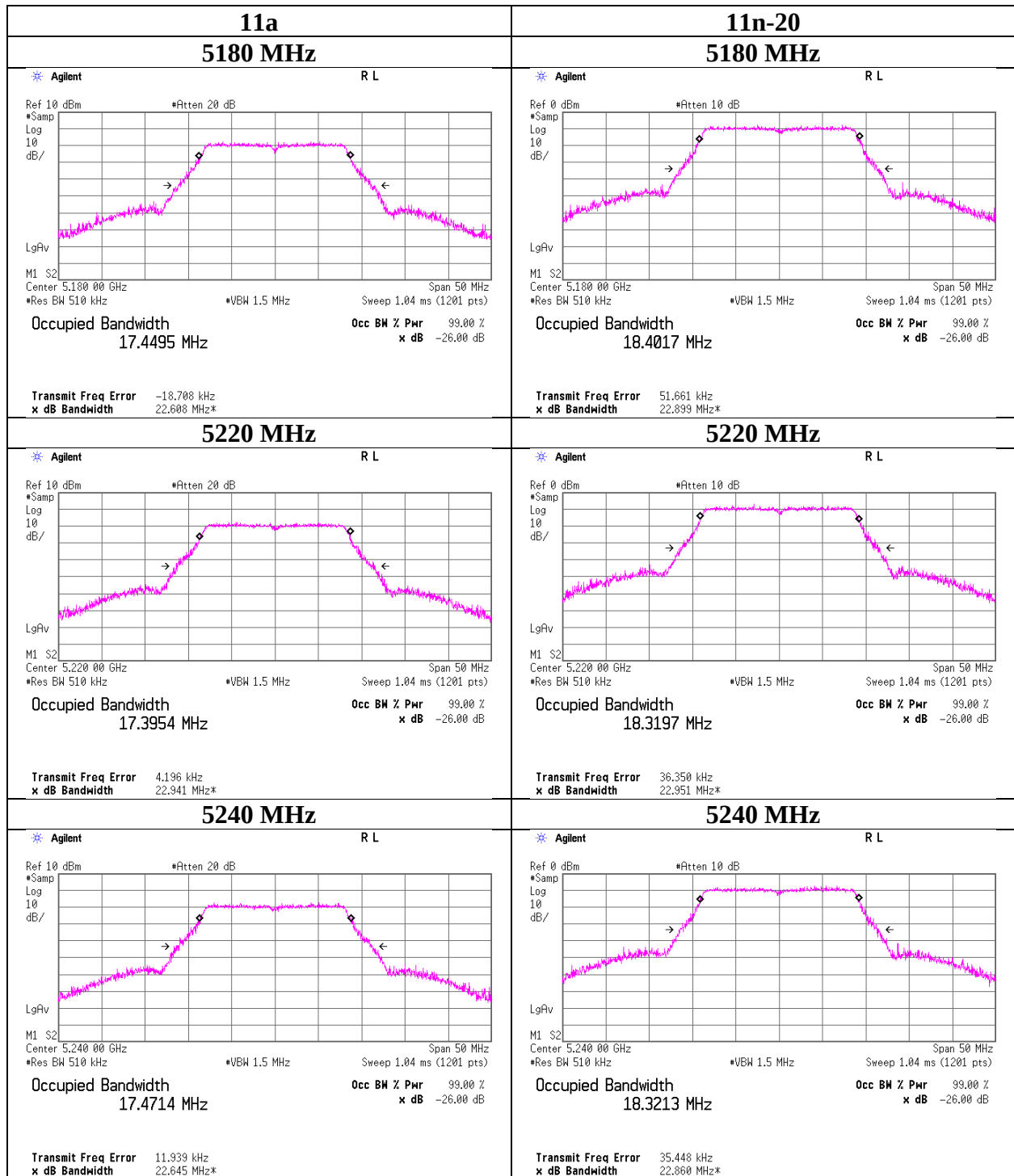
Facsimile : +81 463 50 6401

99 % Occupied Bandwidth

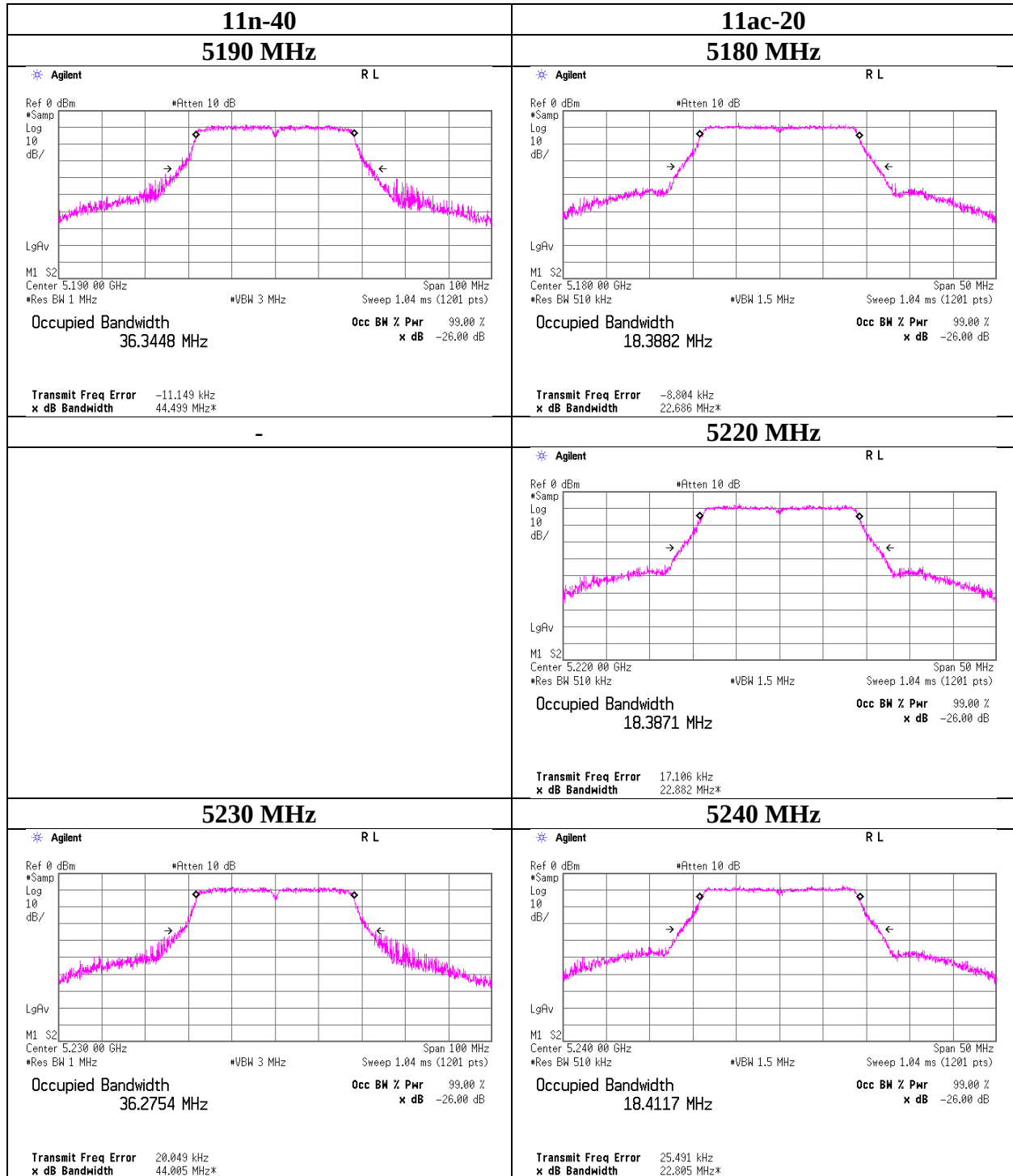
Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11640275S-C-R2
Date May 22, 2017
Temperature / Humidity 26 deg. C / 44 % RH
Engineer Hikaru Shirasawa
Mode Tx

Mode	Tested Frequency [MHz]	99 % Occupied Bandwidth [MHz]	Limit [MHz]
11a	5180	17.450	-
	5220	17.395	-
	5240	17.471	-
11n-20	5180	18.402	-
	5220	18.320	-
	5240	18.321	-
11n-40	5190	36.345	-
	5230	36.275	-
11ac-20	5180	18.388	-
	5220	18.387	-
	5240	18.412	-
11ac-40	5190	36.438	-
	5230	36.472	-
11ac-80	5210	74.942	-

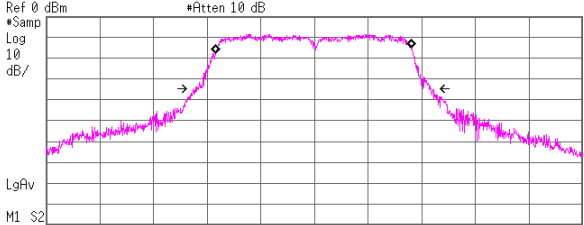
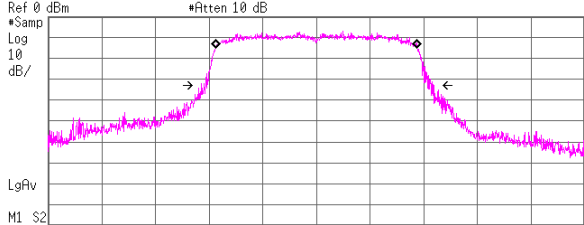
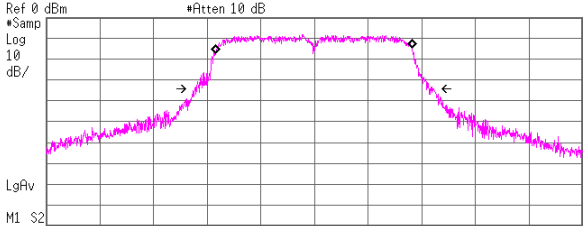
99 % Occupied Bandwidth



99 % Occupied Bandwidth



99 % Occupied Bandwidth

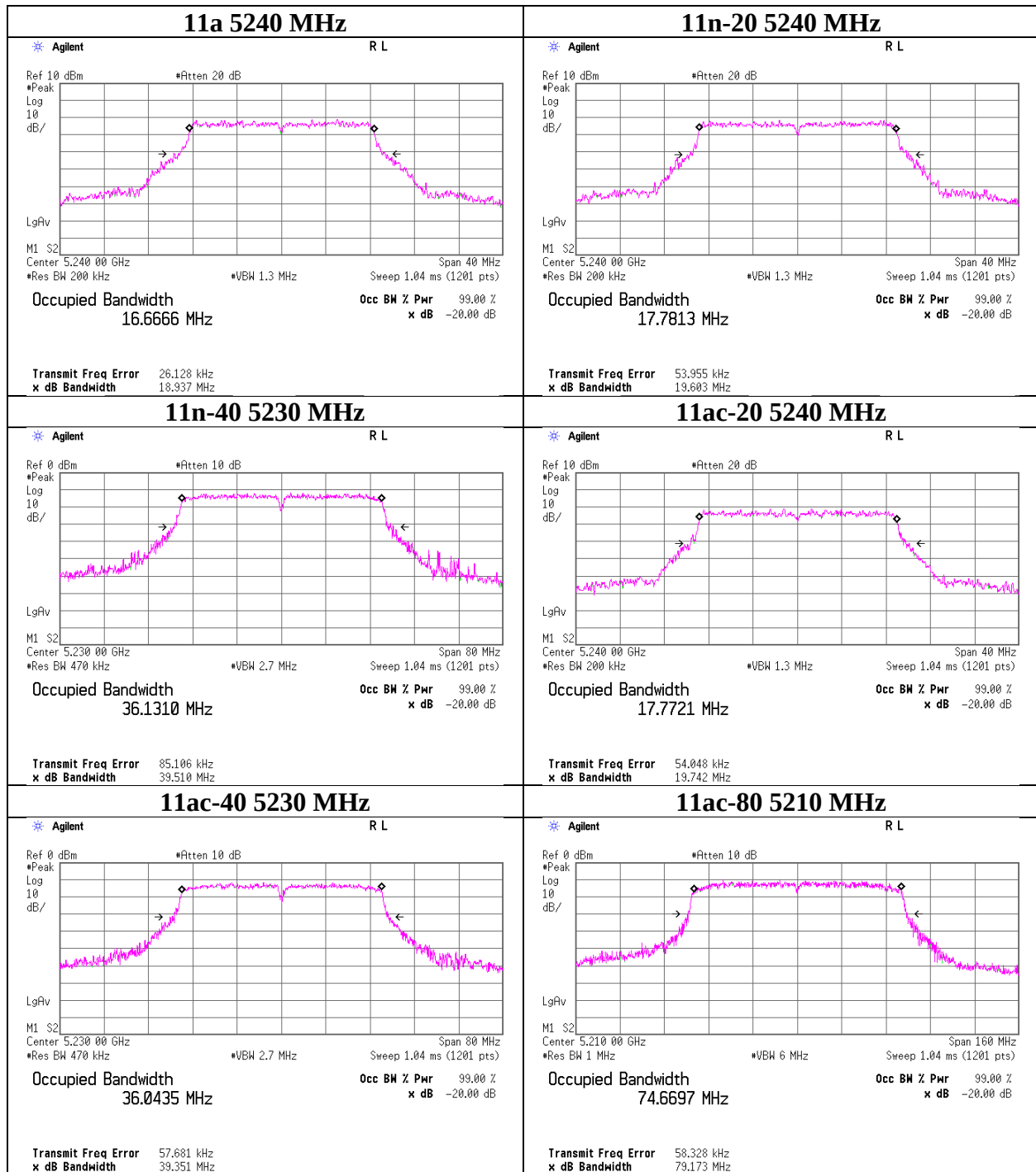
11ac-40	11ac-80
5190 MHz Agilent R L  Ref 0 dBm #Atten 10 dB #Samp Log 10 dB/ LgAv M1 S2 Center 5.190 00 GHz Span 100 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 36.4377 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -140.352 kHz x dB Bandwidth 43.911 MHz*	-
-	5210 MHz Agilent R L  Ref 0 dBm #Atten 10 dB #Samp Log 10 dB/ LgAv M1 S2 Center 5.210 00 GHz Span 200 MHz #Res BW 2 MHz #VBW 6 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 74.9421 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 81.387 kHz x dB Bandwidth 87.054 MHz*
5230 MHz Agilent R L  Ref 0 dBm #Atten 10 dB #Samp Log 10 dB/ LgAv M1 S2 Center 5.230 00 GHz Span 100 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 1.04 ms (1201 pts) Occupied Bandwidth 36.4721 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -76.260 kHz x dB Bandwidth 44.472 MHz*	-

20 dB Bandwidth

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11640275S-C-R2
Date May 22, 2017
Temperature / Humidity 26 deg. C / 44 % RH
Engineer Hikaru Shirasawa
Mode Tx

Mode	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
11a	5240	18.937
11n-20	5240	19.603
11n-40	5230	39.510
11ac-20	5240	19.742
11ac-40	5230	39.351
11ac-80	5210	79.173

20 dB Bandwidth



Maximum Conducted Output Power

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11640275S-C-R2
Date : May 22, 2017
Temperature / Humidity : 26 deg. C / 44 % RH
Engineer : Hikaru Shirasawa
Mode : Tx

Applied limit: 15.407, mobile and portable client device

Mode	Tested	Power	Cable	Atten.	Duty	Antenna	99%	Conducted Power				e.i.r.p.			
	Frequency	Meter	Loss	Loss	Factor	Gain	OBW	Result		Limit	Margin	Result		Limit	Margin
	[MHz]	Reading [dBm]	[dB]	[dB]	[dB]	[dBi]	(B for IC) [MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
11a	5180	-2.45	3.43	9.88	0.00	-3.8	17.449	10.86	12.20	23.97	13.11	7.06	5.09	29.97	22.91
	5220	-2.51	3.44	9.89	0.00	-3.8	17.395	10.82	12.09	23.97	13.15	7.02	5.04	29.97	22.95
	5240	-2.23	3.45	9.89	0.00	-3.8	17.471	11.11	12.92	23.97	12.86	7.31	5.39	29.97	22.66
11n-20	5180	-2.69	3.43	9.88	0.02	-3.8	18.402	10.64	11.59	23.97	13.33	6.84	4.83	29.97	23.13
	5220	-2.62	3.44	9.89	0.02	-3.8	18.320	10.73	11.83	23.97	13.24	6.93	4.93	29.97	23.04
	5240	-2.48	3.45	9.89	0.02	-3.8	18.321	10.88	12.25	23.97	13.09	7.08	5.11	29.97	22.89
11n-40	5190	-3.69	3.43	9.88	0.04	-3.8	36.345	9.66	9.25	23.97	14.31	5.86	3.85	29.97	24.11
	5230	-3.77	3.45	9.89	0.04	-3.8	36.275	9.61	9.14	23.97	14.36	5.81	3.81	29.97	24.16
11ac-20	5180	-2.81	3.43	9.88	0.01	-3.8	18.388	10.51	11.25	23.97	13.46	6.71	4.69	29.97	23.26
	5220	-2.70	3.44	9.89	0.01	-3.8	18.387	10.64	11.59	23.97	13.33	6.84	4.83	29.97	23.13
	5240	-2.74	3.45	9.89	0.01	-3.8	18.412	10.61	11.51	23.97	13.36	6.81	4.80	29.97	23.16
11ac-40	5190	-3.71	3.43	9.88	0.06	-3.8	36.438	9.66	9.25	23.97	14.31	5.86	3.85	29.97	24.11
	5230	-3.59	3.45	9.89	0.06	-3.8	36.472	9.81	9.57	23.97	14.16	6.01	3.99	29.97	23.96
11ac-80	5210	-3.52	3.44	9.88	0.12	-3.8	74.942	9.92	9.82	23.97	14.05	6.12	4.09	29.97	23.85

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

Maximum Conducted Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11640275S-C-R2
Date	May 22, 2017
Temperature / Humidity	26 deg. C / 44 % RH
Engineer	Hikaru Shirasawa
Mode	Tx

Mode	Data rate	Reading (timed average)	Duty factor	Burst power	Remarks
	[Mbps]	[dBm]	[dB]	[dBm]	
11a (5220MHz)	6	-2.51	0.00	-2.51	*
	9	-2.69	0.02	-2.67	
	12	-2.93	0.04	-2.89	
	18	-2.95	0.06	-2.89	
	24	-2.97	0.07	-2.90	
	36	-2.98	0.10	-2.88	
	48	-3.02	0.13	-2.89	
	54	-3.07	0.14	-2.93	

Mode	MCS Number	Reading (timed average)	Duty factor	Burst power	Remarks
		[dBm]	[dB]	[dBm]	
11n-20 (5220MHz)	0	-2.62	0.02	-2.60	*
	1	-2.77	0.03	-2.74	
	2	-2.78	0.05	-2.73	
	3	-2.80	0.07	-2.73	
	4	-2.82	0.10	-2.72	
	5	-2.98	0.13	-2.85	
	6	-3.05	0.14	-2.91	
	7	-3.20	0.16	-3.04	
11n-40 (5190MHz)	0	-3.69	0.04	-3.65	*
	1	-3.79	0.09	-3.70	
	2	-3.83	0.12	-3.71	
	3	-4.09	0.14	-3.95	
	4	-4.14	0.21	-3.93	
	5	-4.22	0.25	-3.97	
	6	-4.64	0.26	-4.38	
	7	-4.38	0.27	-4.11	

* Worst rate

Sample Calculation:

$$\text{Burst power} = \text{Reading (timed average)} + \text{Duty factor}$$

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

Maximum Conducted Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11640275S-C-R2
Date	May 22, 2017
Temperature / Humidity	26 deg. C / 44 % RH
Engineer	Hikaru Shirasawa
Mode	Tx

Mode	MCS Number	Reading (timed average) [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11ac-20 (5220MHz)	0	-2.70	0.01	-2.69	*
	1	-2.81	0.05	-2.76	
	2	-2.90	0.07	-2.83	
	3	-2.94	0.09	-2.85	
	4	-2.98	0.13	-2.85	
	5	-2.99	0.16	-2.83	
	6	-3.09	0.17	-2.92	
	7	-3.10	0.18	-2.92	
	8	-3.14	0.20	-2.94	
	9	-3.18	0.21	-2.97	
11ac-40 (5190MHz)	0	-3.71	0.06	-3.65	*
	1	-3.85	0.10	-3.75	
	2	-3.91	0.15	-3.76	
	3	-4.07	0.19	-3.88	
	4	-4.09	0.26	-3.83	
	5	-4.12	0.26	-3.86	
	6	-4.15	0.30	-3.85	
	7	-4.20	0.32	-3.88	
	8	-4.22	0.33	-3.89	
	9	-4.29	0.36	-3.93	
11ac-80 (5210MHz)	0	-3.52	0.12	-3.40	*
	1	-3.69	0.22	-3.47	
	2	-3.80	0.28	-3.52	
	3	-3.81	0.33	-3.48	
	4	-3.89	0.40	-3.49	
	5	-3.93	0.44	-3.49	
	6	-4.04	0.46	-3.58	
	7	-3.99	0.47	-3.52	
	8	-4.03	0.49	-3.54	
	9	-4.05	0.52	-3.53	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

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

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

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11640275S-C-R2
Date	May 22, 2017
Temperature / Humidity	26 deg. C / 44 % RH
Engineer	Hikaru Shirasawa
Mode	Tx

Mode	Tested	Power	Cable	Atten.	Result	
	Frequency	Meter Reading	Loss	Loss	(Timed average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
11a	5180	-2.45	3.43	9.88	10.86	12.19
	5220	-2.51	3.44	9.89	10.82	12.08
	5240	-2.23	3.45	9.89	11.11	12.91
11n-20	5180	-2.69	3.43	9.88	10.62	11.53
	5220	-2.62	3.44	9.89	10.71	11.78
	5240	-2.48	3.45	9.89	10.86	12.19
11n-40	5190	-3.69	3.43	9.88	9.62	9.16
	5230	-3.77	3.45	9.89	9.57	9.06
11ac-20	5180	-2.81	3.43	9.88	10.50	11.22
	5220	-2.70	3.44	9.89	10.63	11.56
	5240	-2.74	3.45	9.89	10.60	11.48
11ac-40	5190	-3.71	3.43	9.88	9.60	9.12
	5230	-3.59	3.45	9.89	9.75	9.44
11ac-80	5210	-3.52	3.44	9.88	9.80	9.55

Sample Calculation:

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

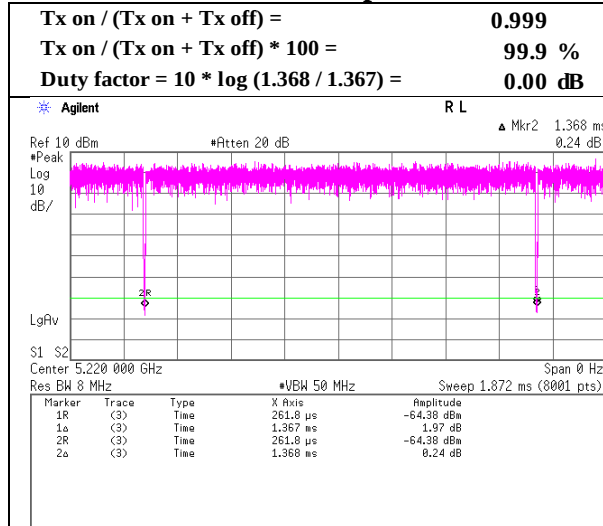
*The equipment and cables were not used for factor 0 dB of the data sheets.

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

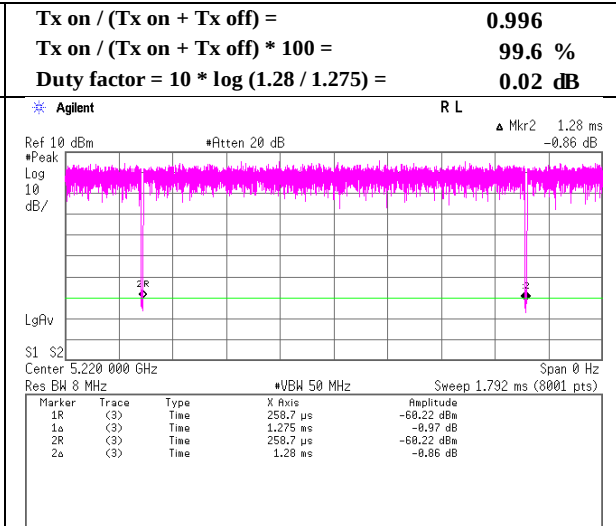
Burst rate confirmation

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11640275S-C-R2
Date : May 22, 2017
Temperature / Humidity : 26 deg. C / 44 % RH
Engineer : Hikaru Shirasawa
Mode : Tx

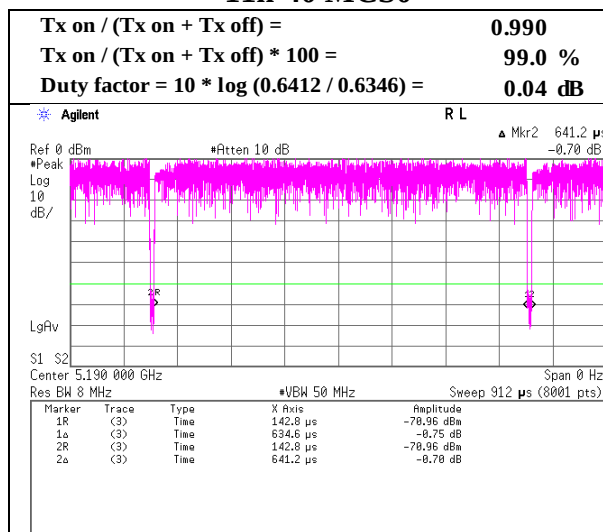
11a 6Mbps



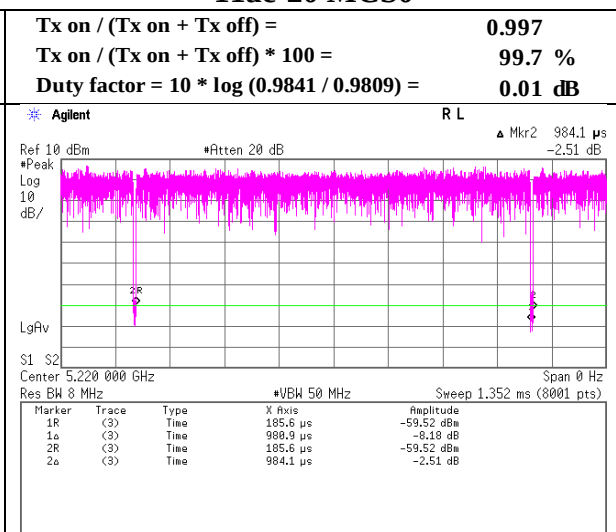
11n-20 MCS0



11n-40 MCS0



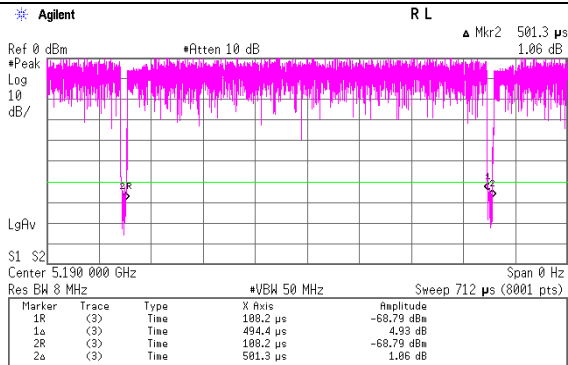
11ac-20 MCS0



Burst rate confirmation

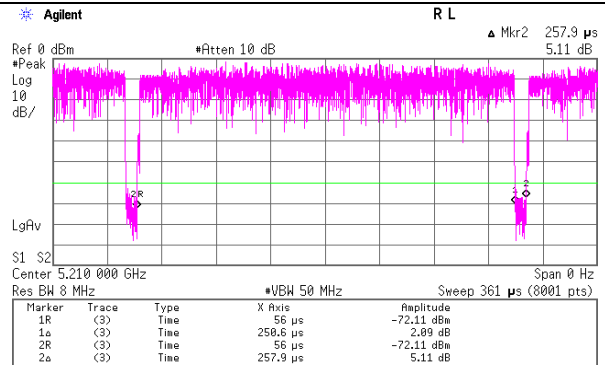
11ac-40 MCS0

$Tx\ on / (Tx\ on + Tx\ off) = 0.986$
 $Tx\ on / (Tx\ on + Tx\ off) * 100 = 98.6\ \%$
 $Duty\ factor = 10 * \log(0.5013 / 0.4944) = 0.06\ dB$



11ac-80 MCS0

$Tx\ on / (Tx\ on + Tx\ off) = 0.972$
 $Tx\ on / (Tx\ on + Tx\ off) * 100 = 97.2\ \%$
 $Duty\ factor = 10 * \log(0.2579 / 0.2506) = 0.12\ dB$



Maximum Power Spectral Density

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11640275S-C-R2
Date : May 22, 2017
Temperature / Humidity : 26 deg. C / 44 % RH
Engineer : Hikaru Shirasawa
Mode : Tx

Applied limit: 15.407, mobile and portable client device

Mode	Tested	PSD	Cable	Atten.	Duty	Antenna	RBW	PSD (Conducted)			PSD (e.i.r.p.)		
	Frequency	Reading	Loss	Loss	Factor	Gain	Correction	Result	Limit	Margin	Result	Limit	Margin
	[MHz]	[dBm /MHz]	[dB]	[dB]	[dB]	[dBi]	[dB]	[dBm /MHz]	[dBm /MHz]	[dB]	[dBm /MHz]	[dBm /MHz]	[dB]
11a	5180	-11.46	3.43	9.88	0.00	-3.8	0.00	1.85	11.00	9.15	-1.95	17.00	18.95
	5220	-11.41	3.44	9.89	0.00	-3.8	0.00	1.92	11.00	9.08	-1.88	17.00	18.88
	5240	-11.49	3.45	9.89	0.00	-3.8	0.00	1.86	11.00	9.14	-1.94	17.00	18.94
11n-20	5180	-11.79	3.43	9.88	0.02	-3.8	0.00	1.54	11.00	9.46	-2.26	17.00	19.26
	5220	-11.53	3.44	9.89	0.02	-3.8	0.00	1.82	11.00	9.18	-1.98	17.00	18.98
	5240	-11.51	3.45	9.89	0.02	-3.8	0.00	1.85	11.00	9.15	-1.95	17.00	18.95
11n-40	5190	-15.36	3.43	9.88	0.04	-3.8	0.00	-2.01	11.00	13.01	-5.81	17.00	22.81
	5230	-15.66	3.45	9.89	0.04	-3.8	0.00	-2.28	11.00	13.28	-6.08	17.00	23.08
11ac-20	5180	-11.85	3.43	9.88	0.01	-3.8	0.00	1.48	11.00	9.53	-2.33	17.00	19.33
	5220	-11.71	3.44	9.89	0.01	-3.8	0.00	1.64	11.00	9.37	-2.17	17.00	19.17
	5240	-11.53	3.45	9.89	0.01	-3.8	0.00	1.83	11.00	9.18	-1.98	17.00	18.98
11ac-40	5190	-16.00	3.43	9.88	0.06	-3.8	0.00	-2.63	11.00	13.63	-6.43	17.00	23.43
	5230	-15.34	3.45	9.89	0.06	-3.8	0.00	-1.94	11.00	12.94	-5.74	17.00	22.74
11ac-80	5210	-18.37	3.44	9.88	0.12	-3.8	0.00	-4.93	11.00	15.93	-8.73	17.00	25.73

Sample Calculation:

PSD: Power Spectral Density

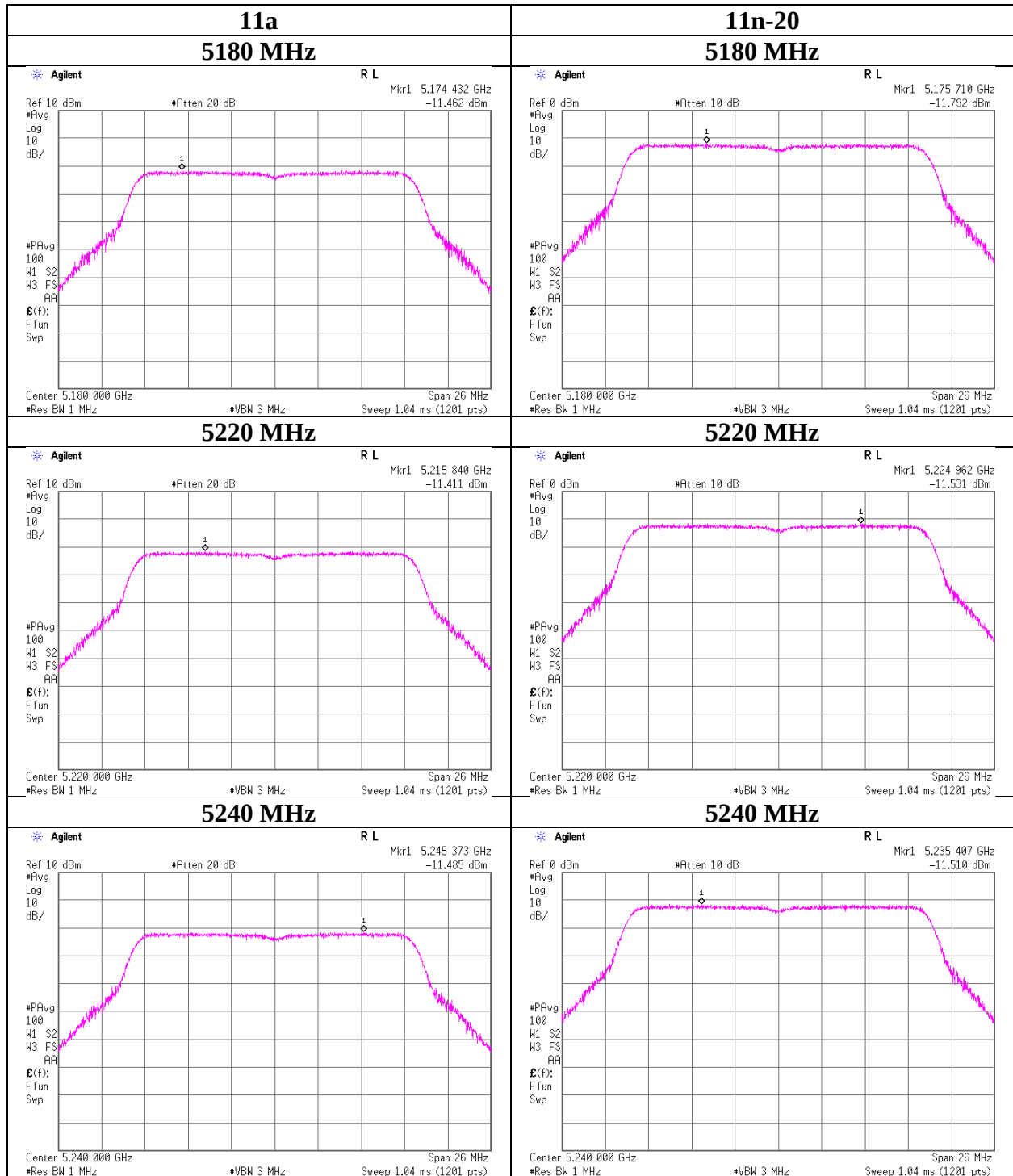
RBW Correction Factor = $10 * \log (\text{Specified bandwidth} / \text{Measured bandwidth})$

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

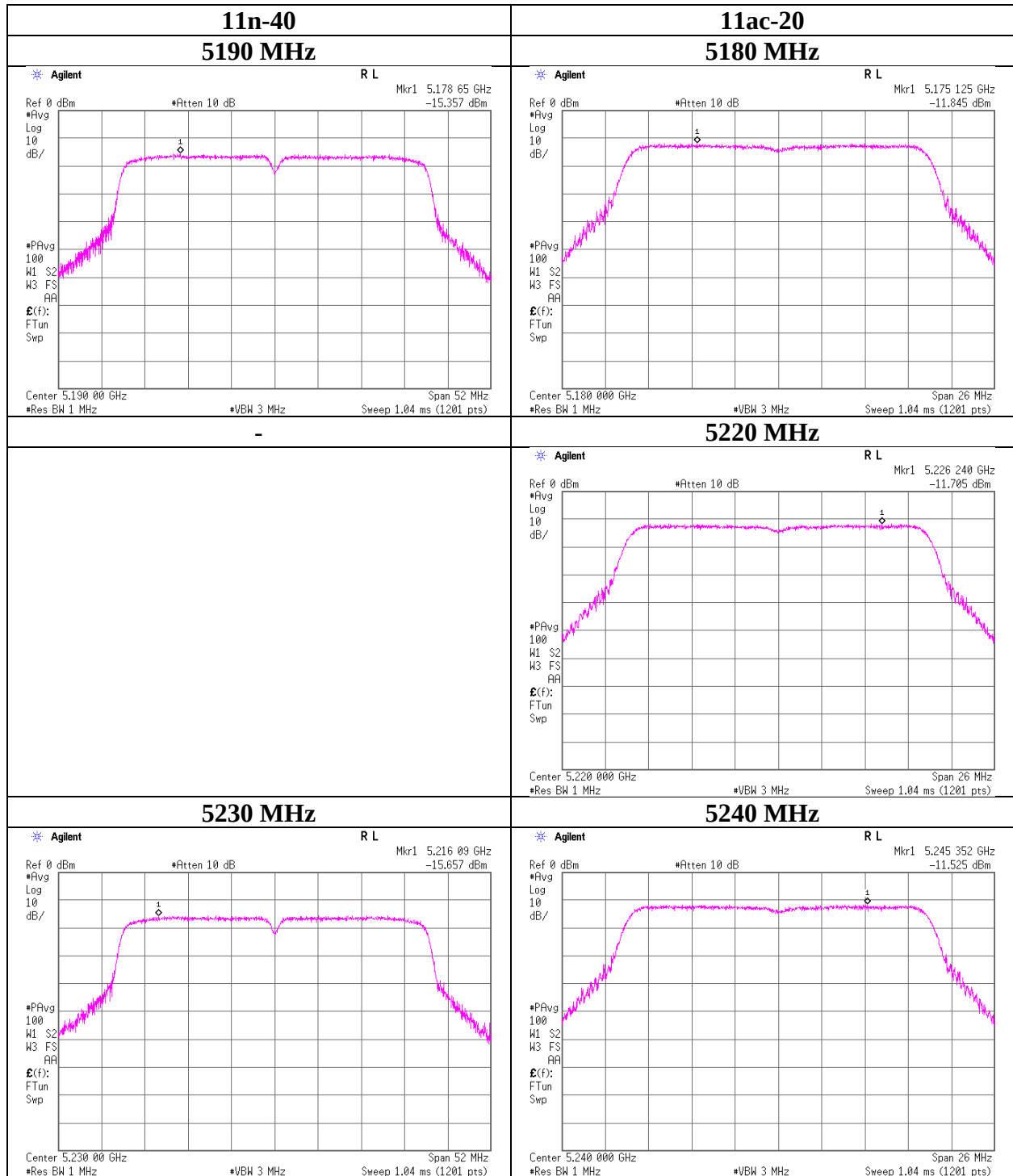
Maximum Power Spectral Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11640275S-C-R2
Date	May 22, 2017
Temperature / Humidity	26 deg. C / 44 % RH
Engineer	Hikaru Shirasawa
Mode	Tx



Maximum Power Spectral Density

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11640275S-C-R2
Date : May 22, 2017
Temperature / Humidity : 26 deg. C / 44 % RH
Engineer : Hikaru Shirasawa
Mode : Tx



UL Japan, Inc.

Shonan EMC Lab.

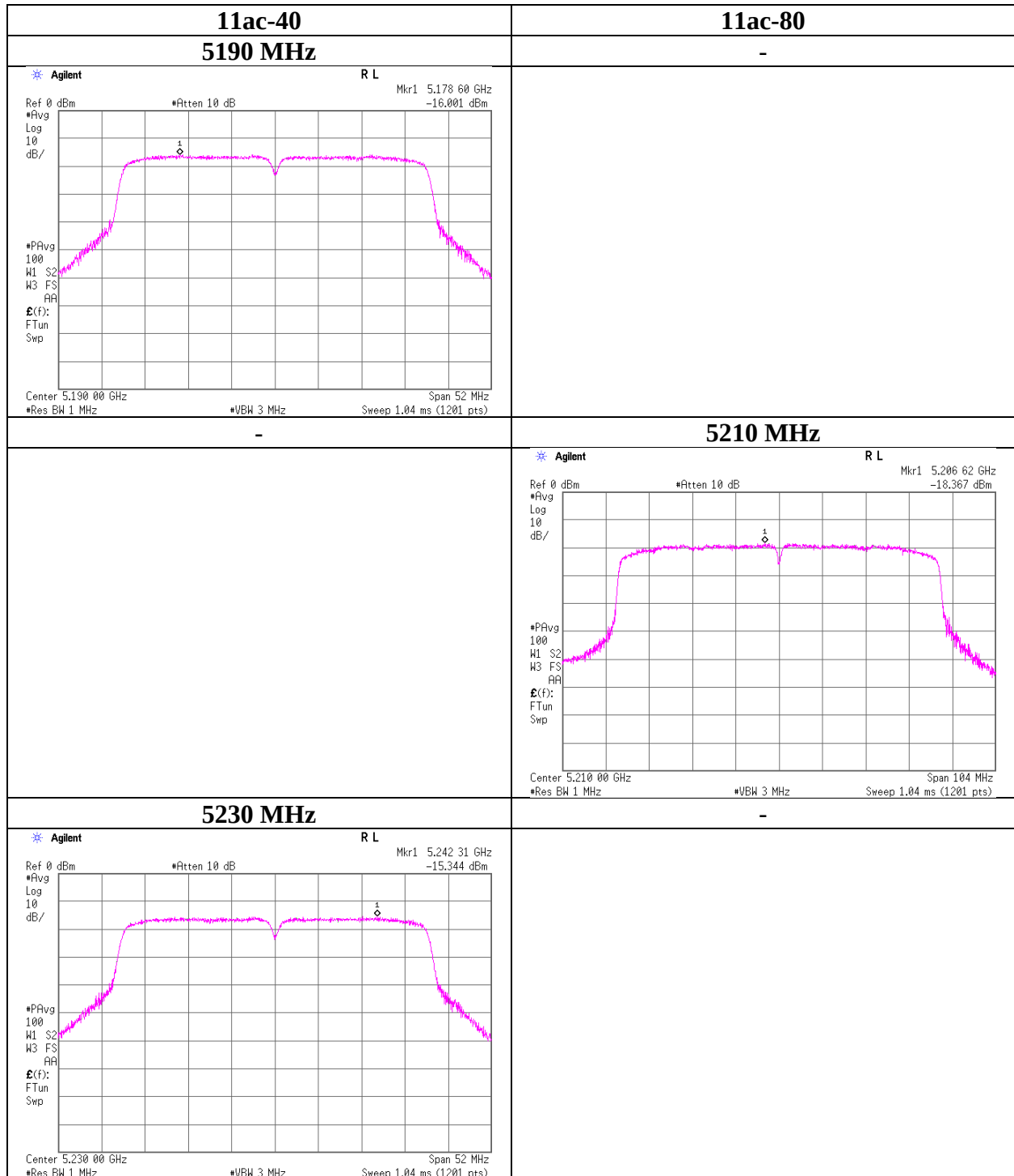
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum Power Spectral Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11640275S-C-R2
Date	May 22, 2017
Temperature / Humidity	26 deg. C / 44 % RH
Engineer	Hikaru Shirasawa
Mode	Tx



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Shonan EMC Lab.

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Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11a 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.	5150.000	PK	45.47	31.65	16.31	37.17	2.45	58.71	73.90	15.2	137	2	
Hori.	15540.000	PK	49.87	39.24	11.92	38.73	-9.54	52.76	73.90	21.1	100	0	
Hori.	20720.000	PK	48.66	40.21	18.30	45.55	-9.54	52.08	73.90	21.8	160	0	
Hori.	5150.000	AV	31.96	31.65	16.31	37.17	2.45	45.20	53.90	8.7	137	2	VBW 10Hz
Hori.	15540.000	AV	36.19	39.24	11.92	38.73	-9.54	39.08	53.90	14.8	100	0	VBW 10Hz
Hori.	20720.000	AV	34.45	40.21	18.30	45.55	-9.54	37.87	53.90	16.0	160	0	VBW 10Hz
Vert.	5150.000	PK	44.03	31.65	16.31	37.17	2.45	57.27	73.90	16.6	153	121	
Vert.	15540.000	PK	49.36	39.24	11.92	38.73	-9.54	52.25	73.90	21.6	100	0	
Vert.	20720.000	PK	48.86	40.21	18.30	45.55	-9.54	52.28	73.90	21.6	180	97	
Vert.	5150.000	AV	31.99	31.65	16.31	37.17	2.45	45.23	53.90	8.7	153	121	VBW 10Hz
Vert.	15540.000	AV	36.51	39.24	11.92	38.73	-9.54	39.40	53.90	14.5	100	0	VBW 10Hz
Vert.	20720.000	AV	35.47	40.21	18.30	45.55	-9.54	38.89	53.90	15.0	180	97	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.90	39.61	9.13	38.69	2.45	59.40	-35.80	-27.00	8.8	184	113	
Vert.	10360.000	PK	46.60	39.61	9.13	38.69	2.45	59.10	-36.10	-27.00	9.1	209	120	

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

Result(EIRP[dBm])= $10\cdot\text{LOG}(\{10^{\wedge}(\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge}(-6) * \text{Distance:3[m]}^{\wedge}2\} / 30) * 10^{\wedge}3)$

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

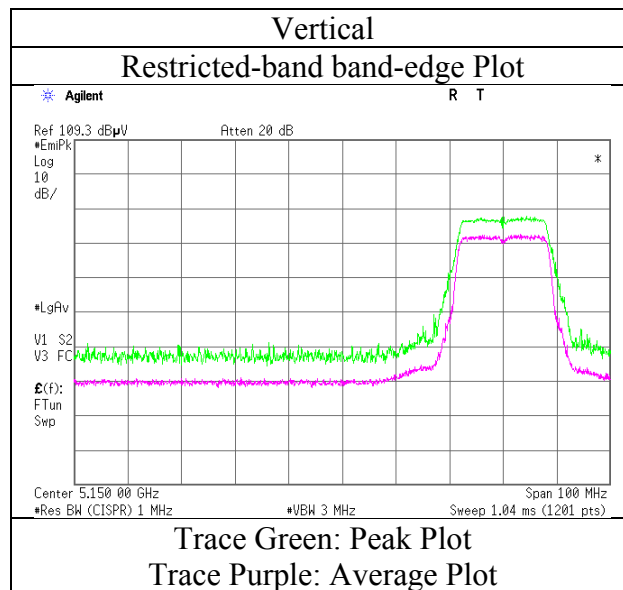
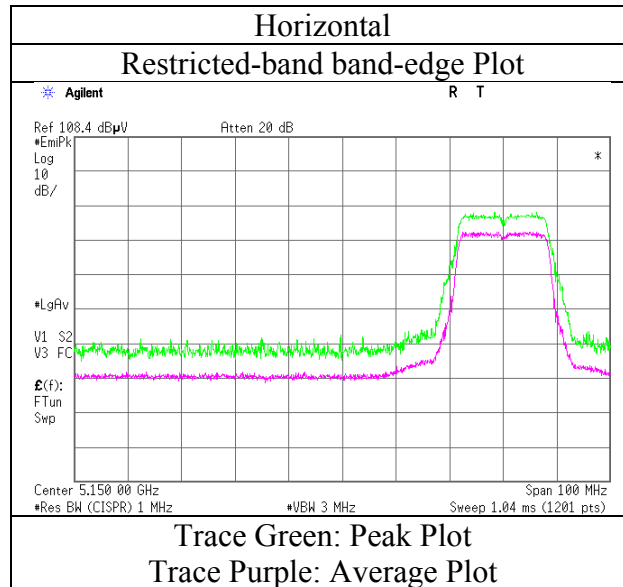
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 5180 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11a 5220 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.	15660.000	PK	48.51	38.80	11.96	38.62	-9.54	51.11	73.90	22.7	100	0	
Hori.	20880.000	PK	47.66	40.22	8.82	45.67	-9.54	41.49	73.90	32.4	100	0	
Hori.	15660.000	AV	35.50	38.80	11.96	38.62	-9.54	38.10	53.90	15.8	100	0	VBW:10Hz
Hori.	20880.000	AV	35.37	40.22	8.82	45.67	-9.54	29.20	53.90	24.7	100	0	VBW:10Hz
Vert.	15660.000	PK	48.62	38.80	11.96	38.62	-9.54	51.22	73.90	22.6	100	0	
Vert.	20880.000	PK	46.55	40.22	8.82	45.67	-9.54	40.38	73.90	33.5	100	0	
Vert.	15660.000	AV	35.60	38.80	11.96	38.62	-9.54	38.20	53.90	15.7	100	0	VBW:10Hz
Vert.	20880.000	AV	35.45	40.22	8.82	45.67	-9.54	29.28	53.90	24.6	100	0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.53	39.77	9.16	38.63	2.45	59.28	-35.92	-27.00	8.9	174	119	
Vert.	10440.000	PK	46.51	39.77	9.16	38.63	2.45	59.26	-35.94	-27.00	8.9	211	116	

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

Result(EIRP)[dBm]= $10\log((\{10^{\wedge}(\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge}(-6) * \text{Distance:3[m]}^{\wedge}2\} / 30) * 10^{\wedge}3)$

*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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber				
Test Place(AC No)	2AC	3AC	3AC	3AC	2AC
Report No.	11640275S-C-R2				
Date	May 25, 2017	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 49 % RH	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hikaru Shirasawa	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(30 MHz-1 GHz)	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11a 5240 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.	827.962	QP	36.40	21.27	9.50	31.18	0.00	35.99	46.00	10.0	108	281	
Hori.	863.957	QP	38.30	21.79	9.67	31.03	0.00	38.73	46.00	7.2	100	167	
Hori.	899.964	QP	31.20	22.31	9.85	30.84	0.00	32.52	46.00	13.4	100	141	
Hori.	5350.000	PK	45.25	31.79	16.47	37.27	2.45	58.69	73.90	15.2	121	358	
Hori.	15720.000	PK	48.14	38.58	11.99	38.57	-9.54	50.60	73.90	23.3	100	0	
Hori.	20960.000	PK	46.62	40.22	8.85	45.74	-9.54	40.41	73.90	33.4	100	0	
Hori.	5350.000	AV	32.00	31.79	16.47	37.27	2.45	45.44	53.90	8.5	121	358	VBW 10Hz
Hori.	15720.000	AV	36.14	38.58	11.99	38.57	-9.54	38.60	53.90	15.3	100	0	VBW 10Hz
Hori.	20960.000	AV	34.60	40.22	8.85	45.74	-9.54	28.39	53.90	25.5	100	0	VBW 10Hz
Vert.	47.355	QP	41.10	11.75	7.22	31.89	0.00	28.18	40.00	11.8	100	95	
Vert.	107.332	QP	33.00	11.16	7.97	31.84	0.00	20.29	43.50	23.2	100	78	
Vert.	192.860	QP	27.50	16.26	8.85	31.77	0.00	20.84	43.50	22.6	100	309	
Vert.	499.383	QP	21.70	17.76	7.91	31.59	0.00	15.78	46.00	30.2	100	129	
Vert.	863.960	QP	35.80	21.79	9.67	31.03	0.00	36.23	46.00	9.7	125	287	
Vert.	5350.000	PK	44.81	31.79	16.47	37.27	2.45	58.25	73.90	15.7	147	124	
Vert.	15720.000	PK	48.31	38.58	11.99	38.57	-9.54	50.77	73.90	23.1	100	0	
Vert.	20960.000	PK	47.77	40.22	8.85	45.74	-9.54	41.56	73.90	32.3	100	0	
Vert.	5350.000	AV	31.98	31.79	16.47	37.27	2.45	45.42	53.90	8.5	147	124	VBW 10Hz
Vert.	15720.000	AV	35.62	38.58	11.99	38.57	-9.54	38.08	53.90	15.8	100	0	VBW 10Hz
Vert.	20960.000	AV	36.41	40.22	8.85	45.74	-9.54	30.20	53.90	23.7	100	0	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 (3.98 m / 3.0 m) = 2.45 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	46.20	39.84	9.17	38.60	2.45	59.06	-36.14	-27.00	9.1	182	112	
Vert.	10480.000	PK	46.97	39.84	9.17	38.60	2.45	59.83	-35.37	-27.00	8.4	201	104	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 (3.98 m / 3.0 m) = 2.45 dB

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

UL Japan, Inc.

Shonan EMC Lab.

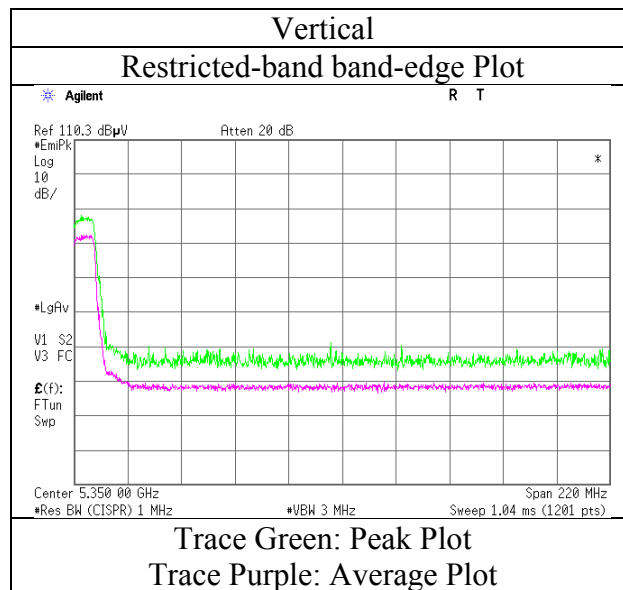
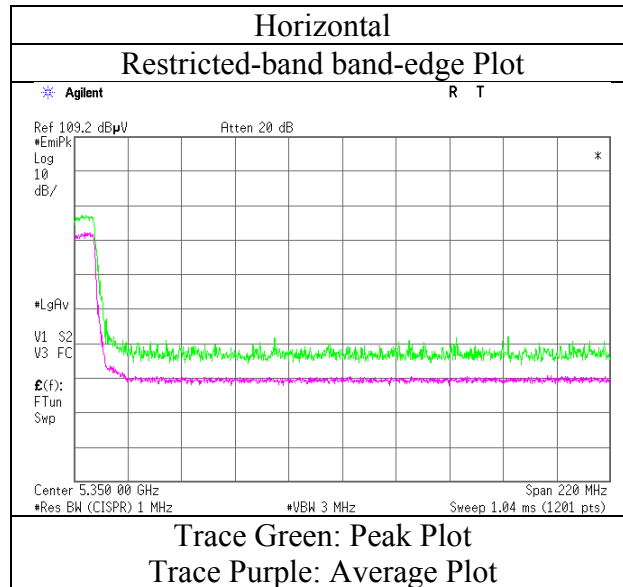
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11a 5240 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11n-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.	5150.000	PK	44.58	31.65	16.31	37.17	2.45	57.82	73.90	16.1	136	10	
Hori.	15540.000	PK	49.00	39.24	11.92	38.73	-9.54	51.89	73.90	22.0	100	0	
Hori.	20720.000	PK	47.54	40.21	8.76	45.55	-9.54	41.42	73.90	32.4	100	0	
Hori.	5150.000	AV	32.09	31.65	16.31	37.17	2.45	45.33	53.90	8.6	136	10	VBW 10Hz
Hori.	15540.000	AV	36.14	39.24	11.92	38.73	-9.54	39.03	53.90	14.8	100	0	VBW 10Hz
Hori.	20720.000	AV	36.45	40.21	8.76	45.55	-9.54	30.33	53.90	23.5	100	0	VBW 10Hz
Vert.	5150.000	PK	44.91	31.65	16.31	37.17	2.45	58.15	73.90	15.8	151	121	
Vert.	15540.000	PK	48.50	39.24	11.92	38.73	-9.54	51.39	73.90	22.5	100	0	
Vert.	20720.000	PK	48.80	40.21	8.76	45.55	-9.54	42.68	73.90	31.2	178	56	
Vert.	5150.000	AV	32.14	31.65	16.31	37.17	2.45	45.38	53.90	8.5	151	121	VBW 10Hz
Vert.	15540.000	AV	36.36	39.24	11.92	38.73	-9.54	39.25	53.90	14.6	100	0	VBW 10Hz
Vert.	20720.000	AV	35.56	40.21	8.76	45.55	-9.54	29.44	53.90	24.4	178	56	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.42	39.61	9.13	38.69	2.45	58.92	-36.28	-27.00	9.3	182	116	
Vert.	10360.000	PK	46.02	39.61	9.13	38.69	2.45	58.52	-36.68	-27.00	9.7	211	110	

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

Result(EIRP[dBm])= $10\cdot\text{LOG} \left(\left(\{ 10^{\wedge} (\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge} (-6) * \text{Distance:3[m]} \}^2 / 30 \right) * 10^{\wedge} 3 \right)$

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

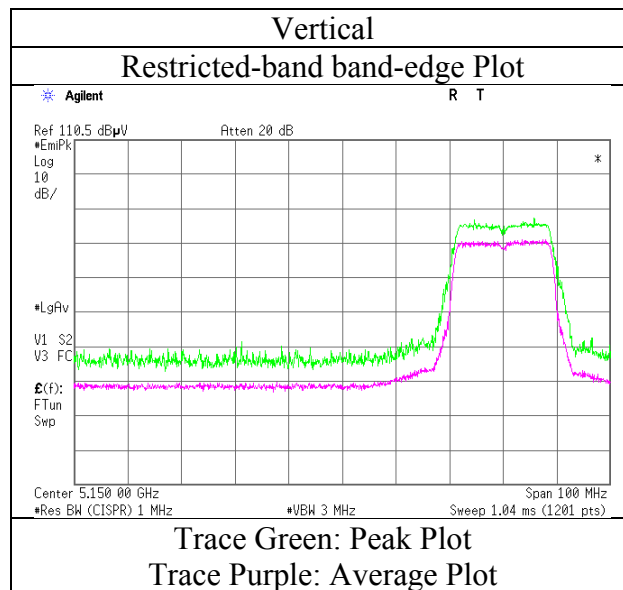
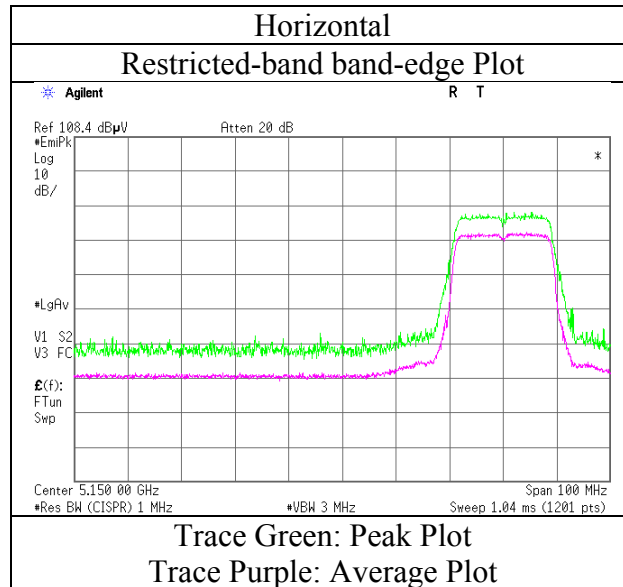
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11640275S-C-R2
Date	May 19, 2017
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 11n-20 5180 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11n-20 5220 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.	15660.000	PK	48.67	38.80	11.96	38.62	-9.54	51.27	73.90	22.6	100	0	
Hori.	20880.000	PK	46.88	40.22	8.82	45.67	-9.54	40.71	73.90	33.1	100	0	
Hori.	15660.000	AV	36.22	38.80	11.96	38.62	-9.54	38.82	53.90	15.0	100	0	VBW:10Hz
Hori.	20880.000	AV	35.77	40.22	8.82	45.67	-9.54	29.60	53.90	24.3	100	0	VBW:10Hz
Vert.	15660.000	PK	48.97	38.80	11.96	38.62	-9.54	51.57	73.90	22.3	100	0	
Vert.	20880.000	PK	48.19	40.22	8.82	45.67	-9.54	42.02	73.90	31.8	100	0	
Vert.	15660.000	AV	35.70	38.80	11.96	38.62	-9.54	38.30	53.90	15.6	100	0	VBW:10Hz
Vert.	20880.000	AV	35.63	40.22	8.82	45.67	-9.54	29.46	53.90	24.4	100	0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.95	39.77	9.16	38.63	2.45	59.70	-35.50	-27.00	8.5	183	117	
Vert.	10440.000	PK	46.82	39.77	9.16	38.63	2.45	59.57	-35.63	-27.00	8.6	192	107	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11n-20 5240 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.	5350.000	PK	44.33	31.79	16.47	37.27	2.45	57.77	73.90	16.1	128	4	
Hori.	15720.000	PK	48.37	38.58	11.99	38.57	-9.54	50.83	73.90	23.0	100	0	
Hori.	20960.000	PK	46.66	40.22	8.85	45.74	-9.54	40.45	73.90	33.4	100	0	
Hori.	5350.000	AV	32.01	31.79	16.47	37.27	2.45	45.45	53.90	8.5	128	4	VBW 10Hz
Hori.	15720.000	AV	35.70	38.58	11.99	38.57	-9.54	38.16	53.90	15.7	100	0	VBW 10Hz
Hori.	20960.000	AV	35.02	40.22	8.85	45.74	-9.54	28.81	53.90	25.0	100	0	VBW 10Hz
Vert.	5350.000	PK	44.58	31.79	16.47	37.27	2.45	58.02	73.90	15.9	132	128	
Vert.	15720.000	PK	48.27	38.58	11.99	38.57	-9.54	50.73	73.90	23.1	100	0	
Vert.	20960.000	PK	46.84	40.22	8.85	45.74	-9.54	40.63	73.90	33.2	100	0	
Vert.	5350.000	AV	31.91	31.79	16.47	37.27	2.45	45.35	53.90	8.6	132	128	VBW 10Hz
Vert.	15720.000	AV	35.52	38.58	11.99	38.57	-9.54	37.98	53.90	15.9	100	0	VBW 10Hz
Vert.	20960.000	AV	35.50	40.22	8.85	45.74	-9.54	29.29	53.90	24.6	100	0	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.83	39.84	9.17	38.60	2.45	59.69	-35.51	-27.00	8.5	167	115	
Vert.	10480.000	PK	47.05	39.84	9.17	38.60	2.45	59.91	-35.29	-27.00	8.3	200	106	

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

Result(EIRP[dBm])= $10\cdot\text{LOG} \left(\left(\{ 10^{\wedge} (\text{Electric Field Strength [dBuV/m]} / 20) \} \cdot 10^{\wedge} (-6) \cdot \text{Distance:3[m]}^2 \right) / 30 \right) \cdot 10^{\wedge} 3$

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

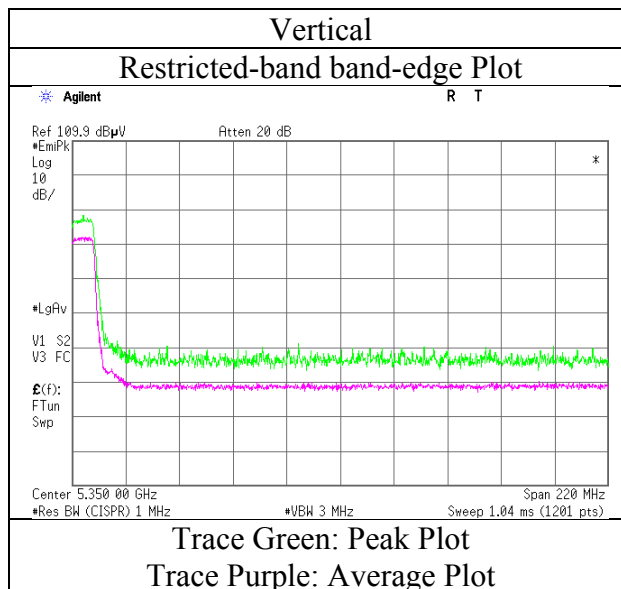
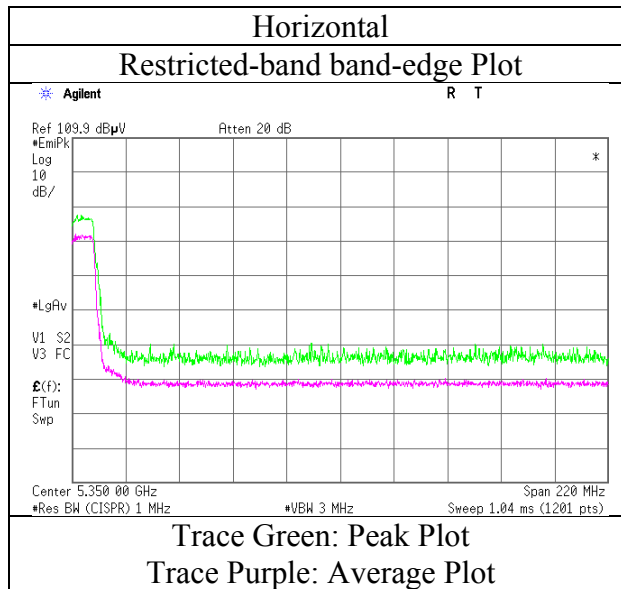
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. 11640275S-C-R2
Date May 19, 2017
Temperature / Humidity 24 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-20 5240 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 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.	5150.000	PK	44.68	31.65	16.31	37.17	2.45	57.92	73.90	16.0	135	10	
Hori.	15540.000	PK	48.51	39.24	11.92	38.73	-9.54	51.40	73.90	22.5	100	0	
Hori.	20720.000	PK	47.29	40.21	8.76	45.55	-9.54	41.17	73.90	32.7	100	0	
Hori.	5150.000	AV	32.07	31.65	16.31	37.17	2.45	45.31	53.90	8.6	135	10	VBW 10Hz
Hori.	15540.000	AV	35.39	39.24	11.92	38.73	-9.54	38.28	53.90	15.6	100	0	VBW 10Hz
Hori.	20720.000	AV	35.43	40.21	8.76	45.55	-9.54	29.31	53.90	24.5	100	0	VBW 10Hz
Vert.	5150.000	PK	45.53	31.65	16.31	37.17	2.45	58.77	73.90	15.1	166	130	
Vert.	15540.000	PK	48.90	39.24	11.92	38.73	-9.54	51.79	73.90	22.1	100	0	
Vert.	20720.000	PK	47.52	40.21	8.76	45.55	-9.54	41.40	73.90	32.5	150	65	
Vert.	5150.000	AV	32.12	31.65	16.31	37.17	2.45	45.36	53.90	8.5	166	130	VBW 10Hz
Vert.	15540.000	AV	35.89	39.24	11.92	38.73	-9.54	38.78	53.90	15.1	100	0	VBW 10Hz
Vert.	20720.000	AV	35.05	40.21	8.76	45.55	-9.54	28.93	53.90	24.9	150	65	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 (3.98 m / 3.0 m) = 2.45 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	46.63	39.61	9.13	38.69	2.45	59.13	-36.07	-27.00	9.1	164	111	
Vert.	10360.000	PK	46.36	39.61	9.13	38.69	2.45	58.86	-36.34	-27.00	9.3	216	110	

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

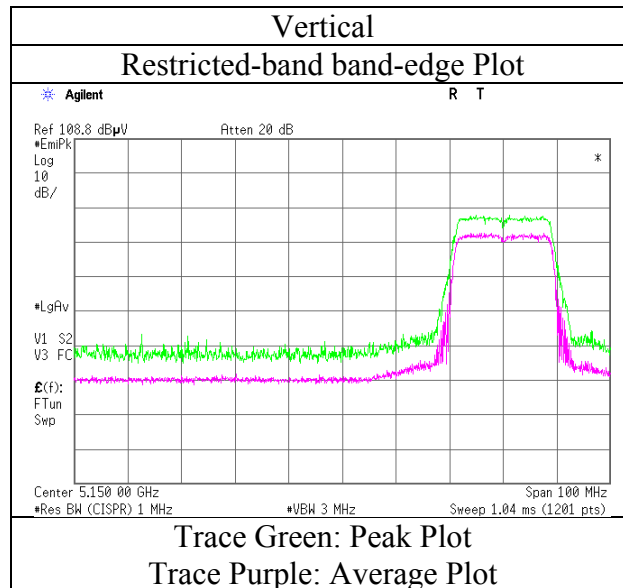
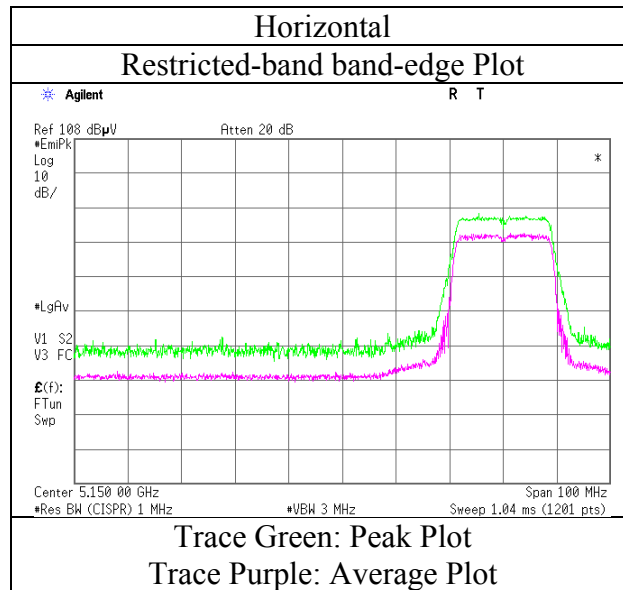
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 dB

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

Radiated Spurious Emission

Test place Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. 11640275S-C-R2
Date May 19, 2017
Temperature / Humidity 24 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11ac-20 5180 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11ac-20 5220 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.	15660.000	PK	48.54	38.80	11.96	38.62	-9.54	51.14	73.90	22.7	100	0	
Hori.	20880.000	PK	46.46	40.22	8.82	45.67	-9.54	40.29	73.90	33.6	100	0	
Hori.	15660.000	AV	35.56	38.80	11.96	38.62	-9.54	38.16	53.90	15.7	100	0	VBW:10Hz
Hori.	20880.000	AV	35.48	40.22	8.82	45.67	-9.54	29.31	53.90	24.5	100	0	VBW:10Hz
Vert.	15660.000	PK	48.39	38.80	11.96	38.62	-9.54	50.99	73.90	22.9	100	0	
Vert.	20880.000	PK	46.81	40.22	8.82	45.67	-9.54	40.64	73.90	33.2	100	0	
Vert.	15660.000	AV	35.45	38.80	11.96	38.62	-9.54	38.05	53.90	15.8	100	0	VBW:10Hz
Vert.	20880.000	AV	35.43	40.22	8.82	45.67	-9.54	29.26	53.90	24.6	100	0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	47.43	39.77	9.16	38.63	2.45	60.18	-35.02	-27.00	8.0	165	116	
Vert.	10440.000	PK	47.02	39.77	9.16	38.63	2.45	59.77	-35.43	-27.00	8.4	211	107	

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

Result(EIRP[dBm])= $10\cdot\text{LOG}((\{10^{\wedge}(\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge}(-6) * \text{Distance:3[m]})^{\wedge}2 \} / 30) * 10^{\wedge}3)$

*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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber
Test Place(AC No) : 2AC 3AC 3AC 2AC
Report No. : 11640275S-C-R2
Date : May 19, 2017 May 20, 2017 May 21, 2017 May 23, 2017
Temperature / Humidity : 24 deg. C / 51 % RH 23 deg. C / 47 % RH 24 deg. C / 47 % RH 23 deg. C / 45 % RH
Engineer : Hiroyuki Morikawa Yosuke Ishikawa Kazutaka Takeyama Hikaru Shirasawa
(1 GHz-6.4 GHz) (6.4 GHz-13 GHz) (13 GHz-26.5 GHz) (26.5 GHz-40 GHz)
Mode : Tx 11ac-20 5240 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.	5350.000	PK	45.07	31.79	16.47	37.27	2.45	58.51	73.90	15.4	124	1	
Hori.	15720.000	PK	47.48	38.58	11.99	38.57	-9.54	49.94	73.90	23.9	100	0	
Hori.	20960.000	PK	48.03	40.22	8.85	45.74	-9.54	41.82	73.90	32.0	151	78	
Hori.	5350.000	AV	31.89	31.79	16.47	37.27	2.45	45.33	53.90	8.6	124	1	VBW:10Hz
Hori.	15720.000	AV	36.56	38.58	11.99	38.57	-9.54	39.02	53.90	14.8	100	0	VBW:10Hz
Hori.	20960.000	AV	35.01	40.22	8.85	45.74	-9.54	28.80	53.90	25.1	151	78	VBW:10Hz
Vert.	5350.000	PK	44.42	31.79	16.47	37.27	2.45	57.86	73.90	16.0	151	122	
Vert.	15720.000	PK	48.80	38.58	11.99	38.57	-9.54	51.26	73.90	22.6	100	0	
Vert.	20960.000	PK	47.79	40.22	8.85	45.74	-9.54	41.58	73.90	32.3	187	81	
Vert.	5350.000	AV	31.83	31.79	16.47	37.27	2.45	45.27	53.90	8.6	151	122	VBW:10Hz
Vert.	15720.000	AV	35.39	38.58	11.99	38.57	-9.54	37.85	53.90	16.0	100	0	VBW:10Hz
Vert.	20960.000	AV	35.32	40.22	8.85	45.74	-9.54	29.11	53.90	24.7	187	81	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	47.33	39.84	9.17	38.60	2.45	60.19	-35.01	-27.00	8.0	163	116	
Vert.	10480.000	PK	47.01	39.84	9.17	38.60	2.45	59.87	-35.33	-27.00	8.3	205	112	

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

Result(EIRP[dBm])= $10\cdot\text{LOG}((\{10^{\wedge}(\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge}(-6) * \text{Distance:3[m]}^{\wedge}2\} / 30) * 10^{\wedge}3)$

*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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

UL Japan, Inc.

Shonan EMC Lab.

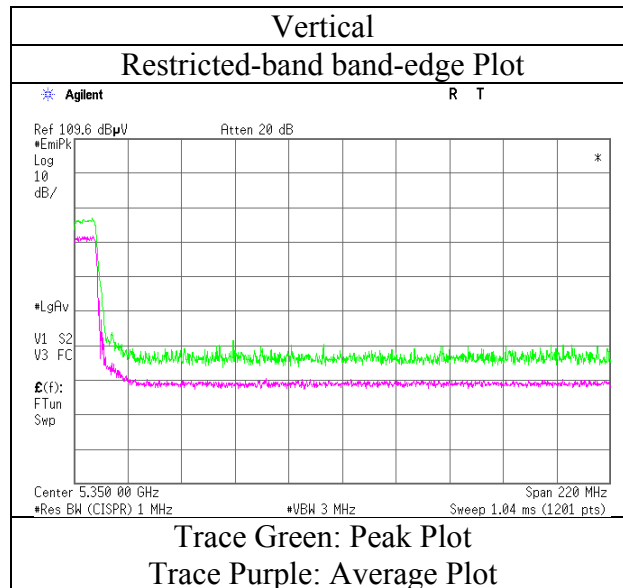
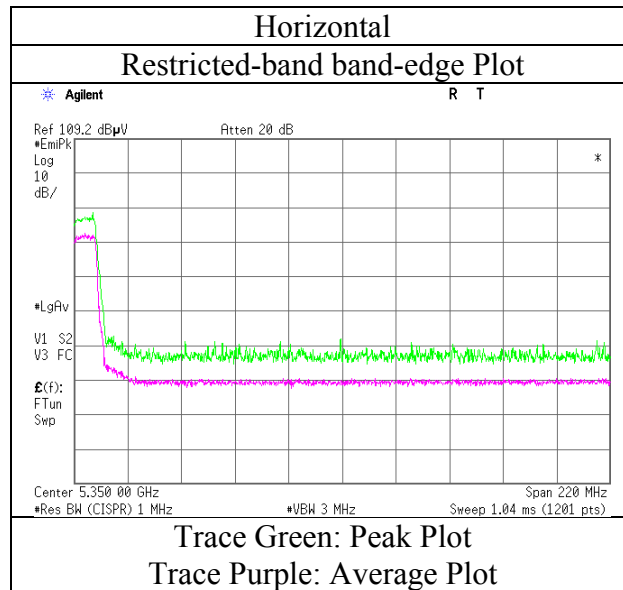
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. 11640275S-C-R2
Date May 19, 2017
Temperature / Humidity 24 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11ac-20 5240 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 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.	5150.000	PK	45.84	31.65	16.31	37.17	2.45	59.08	73.90	14.8	150	10	
Hori.	15570.000	PK	48.55	39.13	11.94	38.71	-9.54	51.37	73.90	22.5	100	0	
Hori.	20760.000	PK	48.15	40.21	8.78	45.58	-9.54	42.02	73.90	31.8	100	0	
Hori.	5150.000	AV	33.04	31.65	16.31	37.17	2.45	46.28	53.90	7.6	150	10	VBW 10Hz
Hori.	15570.000	AV	35.87	39.13	11.94	38.71	-9.54	38.69	53.90	15.2	100	0	VBW 10Hz
Hori.	20760.000	AV	35.45	40.21	8.78	45.58	-9.54	29.32	53.90	24.5	100	0	VBW 10Hz
Vert.	5150.000	PK	45.53	31.65	16.31	37.17	2.45	58.77	73.90	15.1	153	121	
Vert.	15570.000	PK	48.69	39.13	11.94	38.71	-9.54	51.51	73.90	22.3	100	0	
Vert.	20760.000	PK	47.75	40.21	8.78	45.58	-9.54	41.62	73.90	32.2	100	0	
Vert.	5150.000	AV	33.22	31.65	16.31	37.17	2.45	46.46	53.90	7.4	153	121	VBW 10Hz
Vert.	15570.000	AV	35.66	39.13	11.94	38.71	-9.54	38.48	53.90	15.4	100	0	VBW 10Hz
Vert.	20760.000	AV	35.64	40.21	8.78	45.58	-9.54	29.51	53.90	24.3	100	0	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.84	39.65	9.12	38.67	2.45	59.39	-35.81	-27.00	8.8	166	116	
Vert.	10380.000	PK	46.87	39.65	9.12	38.67	2.45	59.42	-35.78	-27.00	8.8	206	113	

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

Result(EIRP[dBm])= $10\cdot\text{LOG}((\{10^{\wedge}(\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge}(-6) * \text{Distance:3[m]}^{\wedge}2 \} / 30) * 10^{\wedge}3)$

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

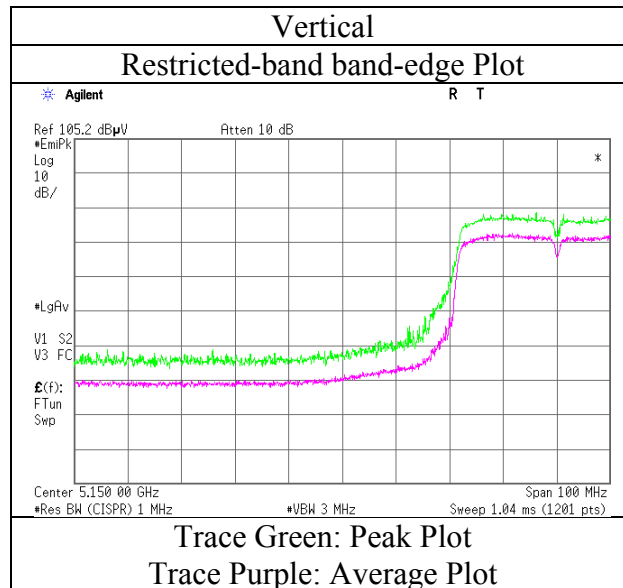
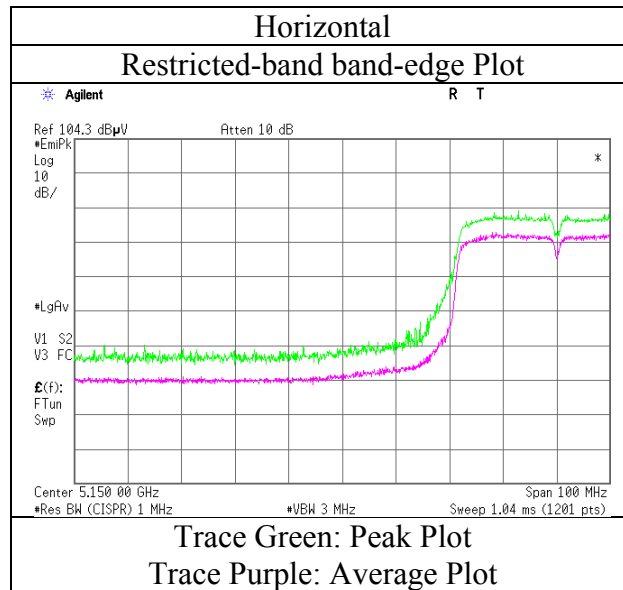
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11n-40 5190 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11n-40 5230 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.	5350.000	PK	44.36	31.79	16.47	37.27	2.45	57.80	73.90	16.1	128	8	
Hori.	15690.000	PK	48.61	38.69	11.98	38.60	-9.54	51.14	73.90	22.7	100	0	
Hori.	20920.000	PK	46.82	40.22	8.84	45.71	-9.54	40.63	73.90	33.2	100	0	
Hori.	5350.000	AV	31.89	31.79	16.47	37.27	2.45	45.33	53.90	8.6	128	8	VBW 10Hz
Hori.	15690.000	AV	35.35	38.69	11.98	38.60	-9.54	37.88	53.90	16.0	100	0	VBW 10Hz
Hori.	20920.000	AV	35.45	40.22	8.84	45.71	-9.54	29.26	53.90	24.6	100	0	VBW 10Hz
Vert.	5350.000	PK	43.69	31.79	16.47	37.27	2.45	57.13	73.90	16.8	174	132	
Vert.	15690.000	PK	48.45	38.69	11.98	38.60	-9.54	50.98	73.90	22.9	100	0	
Vert.	20920.000	PK	47.90	40.22	8.84	45.71	-9.54	41.71	73.90	32.1	100	0	
Vert.	5350.000	AV	31.92	31.79	16.47	37.27	2.45	45.36	53.90	8.5	174	132	VBW 10Hz
Vert.	15690.000	AV	35.24	38.69	11.98	38.60	-9.54	37.77	53.90	16.1	100	0	VBW 10Hz
Vert.	20920.000	AV	35.04	40.22	8.84	45.71	-9.54	28.85	53.90	25.0	100	0	VBW 10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.64	39.80	9.16	38.61	2.45	59.44	-35.76	-27.00	8.8	163	112	
Vert.	10460.000	PK	47.12	39.80	9.16	38.61	2.45	59.92	-35.28	-27.00	8.3	203	108	

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

Result(EIRP[dBm])= $10\cdot\text{LOG} \{ (\{ 10^{\wedge} (\text{Electric Field Strength [dBuV/m]} / 20) * 10^{\wedge} (-6) * \text{Distance:3[m]})^{\wedge} 2 \} / 30) * 10^{\wedge} 3 \}$

*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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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Shonan EMC Lab.

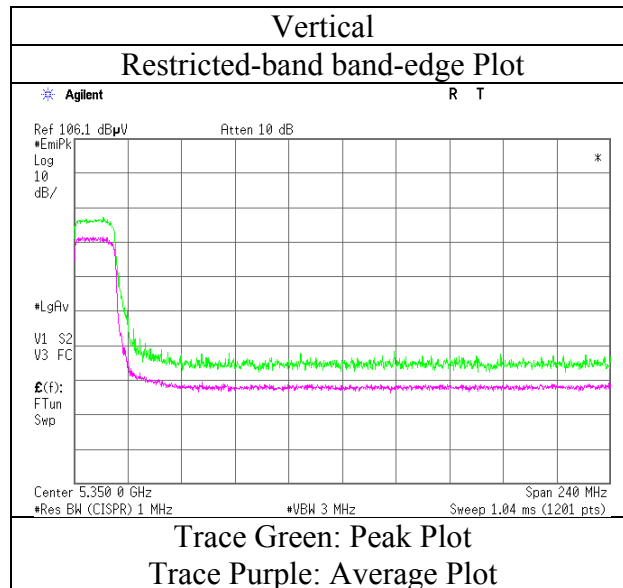
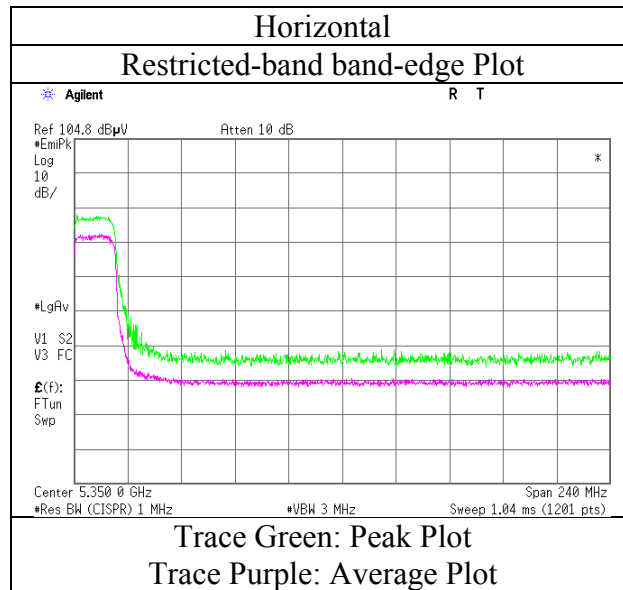
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11n-40 5230 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 GHz-40 GHz)
Mode	Tx 11ac-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.	5150.000	PK	45.99	31.65	16.31	37.17	2.45	59.23	73.90	14.7	151	11	
Hori.	15570.000	PK	48.93	39.13	11.94	38.71	-9.54	51.75	73.90	22.1	100	0	
Hori.	20760.000	PK	47.84	40.21	8.78	45.58	-9.54	41.71	73.90	32.1	100	0	
Hori.	5150.000	AV	33.00	31.65	16.31	37.17	2.45	46.24	53.90	7.7	151	11	VBW:10Hz
Hori.	15570.000	AV	36.02	39.13	11.94	38.71	-9.54	38.84	53.90	15.0	100	0	VBW:10Hz
Hori.	20760.000	AV	35.52	40.21	8.78	45.58	-9.54	29.39	53.90	24.5	100	0	VBW:10Hz
Vert.	5150.000	PK	47.07	31.65	16.31	37.17	2.45	60.31	73.90	13.6	158	126	
Vert.	15570.000	PK	48.74	39.13	11.94	38.71	-9.54	51.56	73.90	22.3	100	0	
Vert.	20760.000	PK	48.72	40.21	8.78	45.58	-9.54	42.59	73.90	31.3	100	0	
Vert.	5150.000	AV	33.35	31.65	16.31	37.17	2.45	46.59	53.90	7.3	158	126	VBW:10Hz
Vert.	15570.000	AV	35.65	39.13	11.94	38.71	-9.54	38.47	53.90	15.4	100	0	VBW:10Hz
Vert.	20760.000	AV	36.02	40.21	8.78	45.58	-9.54	29.89	53.90	24.0	100	0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

(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	46.93	39.65	9.12	38.67	2.45	59.48	-35.72	-27.00	8.7	122	110	
Vert.	10380.000	PK	47.04	39.65	9.12	38.67	2.45	59.59	-35.61	-27.00	8.6	205	106	

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

Result(EIRP[dBm])= $10\cdot\text{LOG} \left(\left(\left\{ 10^{\wedge} \left(\text{Electric Field Strength [dBuV/m]} / 20 \right) \cdot 10^{\wedge} (-6) \cdot \text{Distance:3[m]}^2 \right\} / 30 \right) \cdot 10^{\wedge} 3 \right)$

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

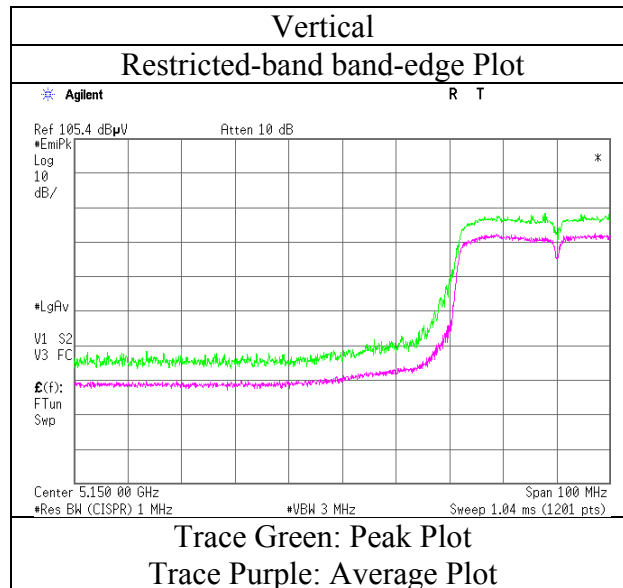
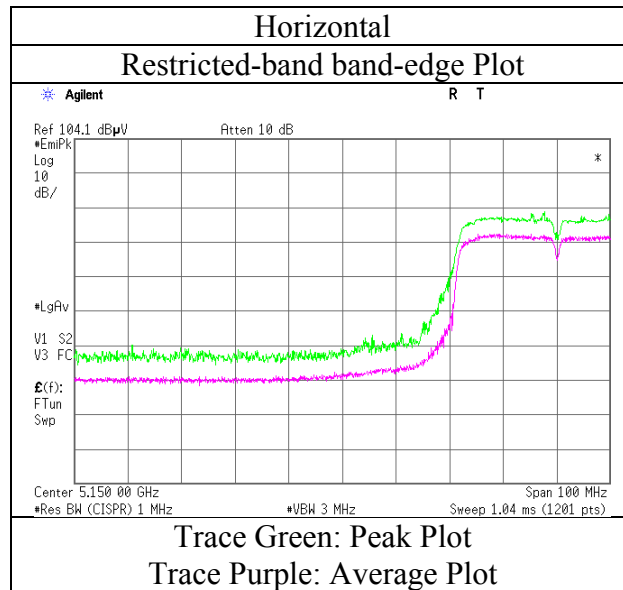
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. 11640275S-C-R2
Date May 19, 2017
Temperature / Humidity 24 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11ac-40 5190 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber
Test Place(AC No) : 2AC 3AC 3AC 2AC
Report No. : 11640275S-C-R2
Date : May 19, 2017 May 20, 2017 May 21, 2017 May 23, 2017
Temperature / Humidity : 24 deg. C / 51 % RH 23 deg. C / 47 % RH 24 deg. C / 47 % RH 23 deg. C / 45 % RH
Engineer : Hiroyuki Morikawa Yosuke Ishikawa Kazutaka Takeyama Hikaru Shirasawa
(1 GHz-6.4 GHz) (6.4 GHz-13 GHz) (13 GHz-26.5 GHz) (26.5 GHz-40 GHz)
Mode : Tx 11n-40 5230 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.	5350.000	PK	44.59	31.79	16.47	37.27	2.45	58.03	73.90	15.9	132	11	
Hori.	15690.000	PK	48.69	38.69	11.98	38.60	-9.54	51.22	73.90	22.6	100	0	
Hori.	20920.000	PK	47.84	40.22	8.84	45.71	-9.54	41.65	73.90	32.2	100	0	
Hori.	5350.000	AV	31.91	31.79	16.47	37.27	2.45	45.35	53.90	8.6	132	11	VBW:10Hz
Hori.	15690.000	AV	36.02	38.69	11.98	38.60	-9.54	38.55	53.90	15.3	100	0	VBW:10Hz
Hori.	20920.000	AV	35.52	40.22	8.84	45.71	-9.54	29.33	53.90	24.5	100	0	VBW:10Hz
Vert.	5350.000	PK	45.26	31.79	16.47	37.27	2.45	58.70	73.90	15.2	148	124	
Vert.	15690.000	PK	49.06	38.69	11.98	38.60	-9.54	51.59	73.90	22.3	100	0	
Vert.	20920.000	PK	47.30	40.22	8.84	45.71	-9.54	41.11	73.90	32.7	100	0	
Vert.	5350.000	AV	31.87	31.79	16.47	37.27	2.45	45.31	53.90	8.6	148	124	VBW:10Hz
Vert.	15690.000	AV	36.02	38.69	11.98	38.60	-9.54	38.55	53.90	15.3	100	0	VBW:10Hz
Vert.	20920.000	AV	35.42	40.22	8.84	45.71	-9.54	29.23	53.90	24.6	100	0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 (3.98 m / 3.0 m) = 2.45 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 (ERP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10460.000	PK	46.94	39.80	9.16	38.61	2.45	59.74	-35.46	-27.00	8.5	133	110	
Vert.	10460.000	PK	47.03	39.80	9.16	38.61	2.45	59.83	-35.37	-27.00	8.4	207	104	

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

Result(ERP[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 (3.98 m / 3.0 m) = 2.45 dB

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

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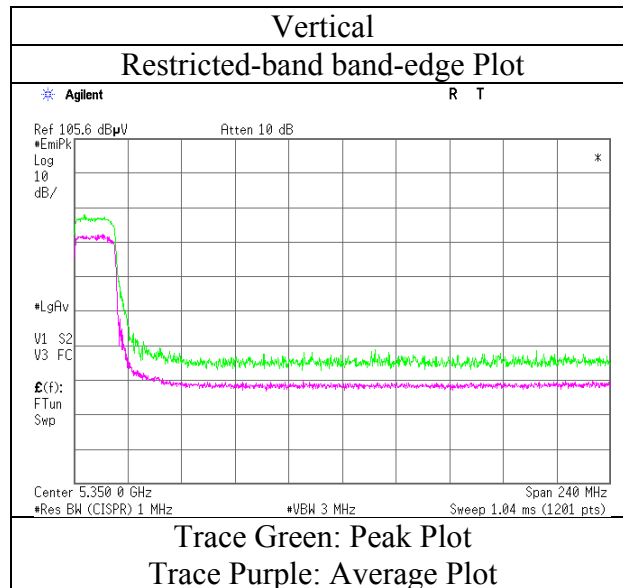
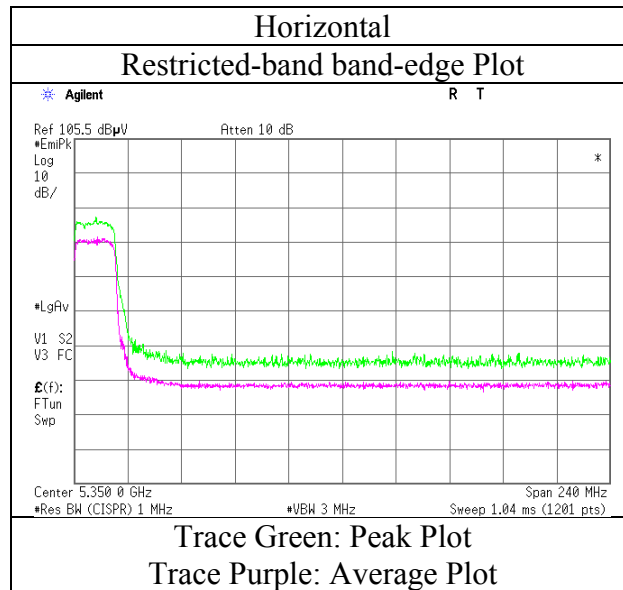
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11n-40 5230 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber			
Test Place(AC No)	2AC	3AC	3AC	2AC
Report No.	11640275S-C-R2			
Date	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hiroyuki Morikawa	Yosuke Ishikawa	Kazutaka Takeyama	Hikaru Shirasawa
	(1 GHz-6.4 GHz)	(6.4 GHz-13 GHz)	(13 GHz-26.5 GHz)	(26.5 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.	5150.000	PK	46.78	31.65	16.31	37.17	2.45	60.02	73.90	13.9	133	10	
Hori.	5350.000	PK	44.60	31.79	16.47	37.27	2.45	58.04	73.90	15.9	133	10	
Hori.	15630.000	PK	47.59	38.91	11.96	38.65	-9.54	50.27	73.90	23.6	100	0	
Hori.	20840.000	PK	47.77	40.22	8.81	45.64	-9.54	41.62	73.90	32.2	100	0	
Hori.	5150.000	AV	35.72	31.65	16.31	37.17	2.45	48.96	53.90	4.9	133	10	VBW 4.3kHz
Hori.	5350.000	AV	34.27	31.79	16.47	37.27	2.45	47.71	53.90	6.2	133	10	VBW 4.3kHz
Hori.	15630.000	AV	36.20	38.91	11.96	38.65	-9.54	38.88	53.90	15.0	100	0	VBW 4.3kHz
Hori.	20840.000	AV	35.72	40.22	8.81	45.64	-9.54	29.57	53.90	24.3	100	0	VBW 4.3kHz
Vert.	5150.000	PK	47.20	31.65	16.31	37.17	2.45	60.44	73.90	13.5	148	135	
Vert.	5350.000	PK	44.50	31.79	16.47	37.27	2.45	57.94	73.90	16.0	148	135	
Vert.	15630.000	PK	48.81	38.91	11.96	38.65	-9.54	51.49	73.90	22.4	100	0	
Vert.	20840.000	PK	47.62	40.22	8.81	45.64	-9.54	41.47	73.90	32.4	100	0	
Vert.	5150.000	AV	36.44	31.65	16.31	37.17	2.45	49.68	53.90	4.2	148	135	VBW 4.3kHz
Vert.	5350.000	AV	34.96	31.79	16.47	37.27	2.45	48.40	53.90	5.5	148	135	VBW 4.3kHz
Vert.	15630.000	AV	36.52	38.91	11.96	38.65	-9.54	39.20	53.90	14.7	100	0	VBW 4.3kHz
Vert.	20840.000	AV	35.59	40.22	8.81	45.64	-9.54	29.44	53.90	24.4	100	0	VBW 4.3kHz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + 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 (3.98 m / 3.0 m) = 2.45 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	47.12	39.73	9.14	38.64	2.45	59.80	-35.40	-27.00	8.4	153	115	
Vert.	10420.000	PK	47.32	39.73	9.14	38.64	2.45	60.00	-35.20	-27.00	8.2	204	112	

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

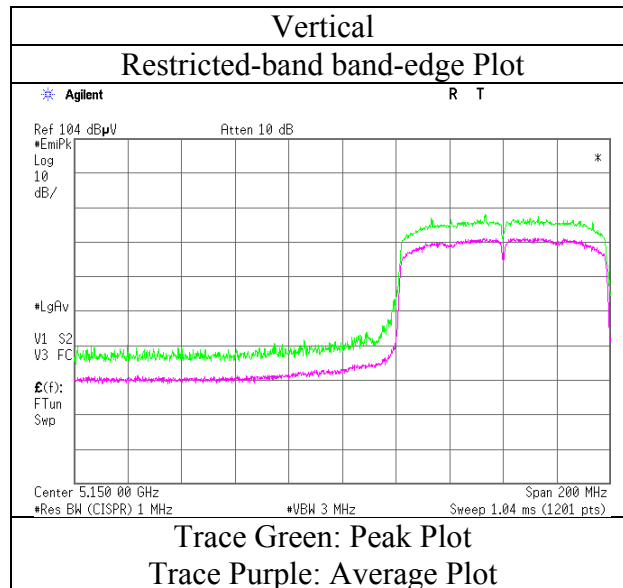
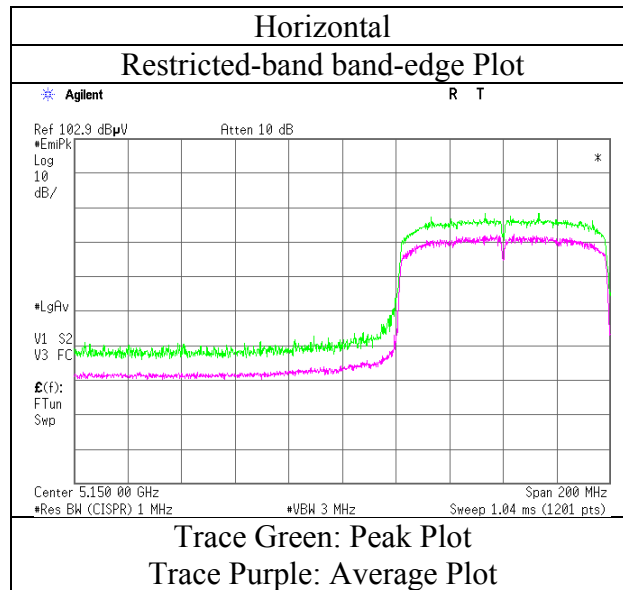
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 dB

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

Radiated Spurious Emission

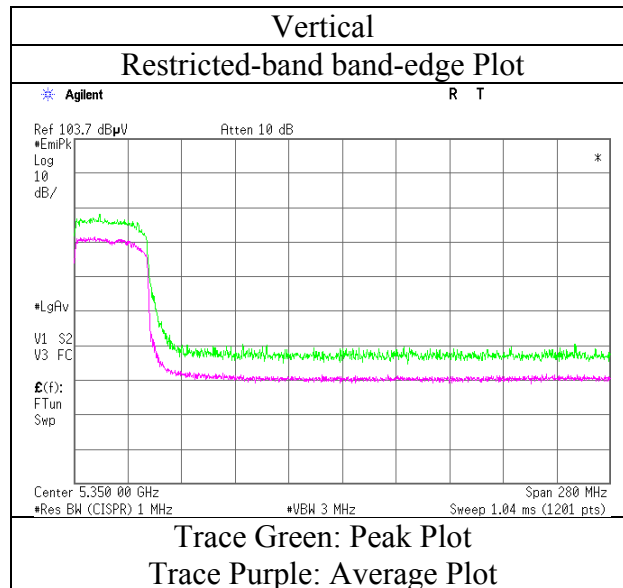
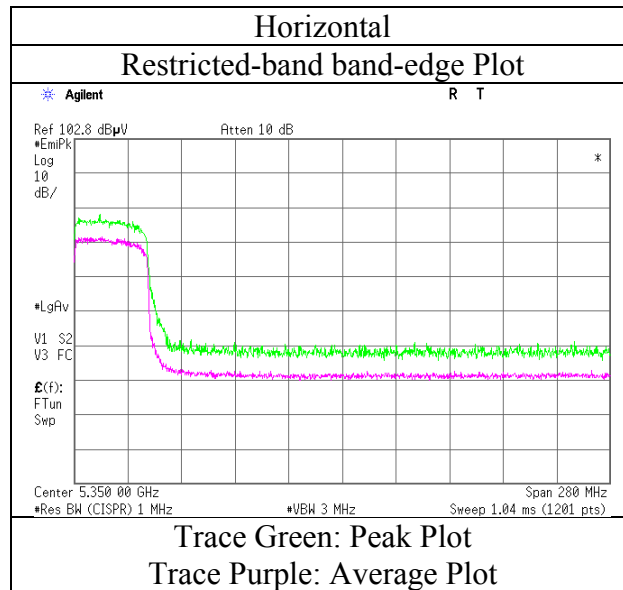
Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11640275S-C-R2
Date : May 19, 2017
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11n-40 5230 MHz



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

Radiated Spurious Emission

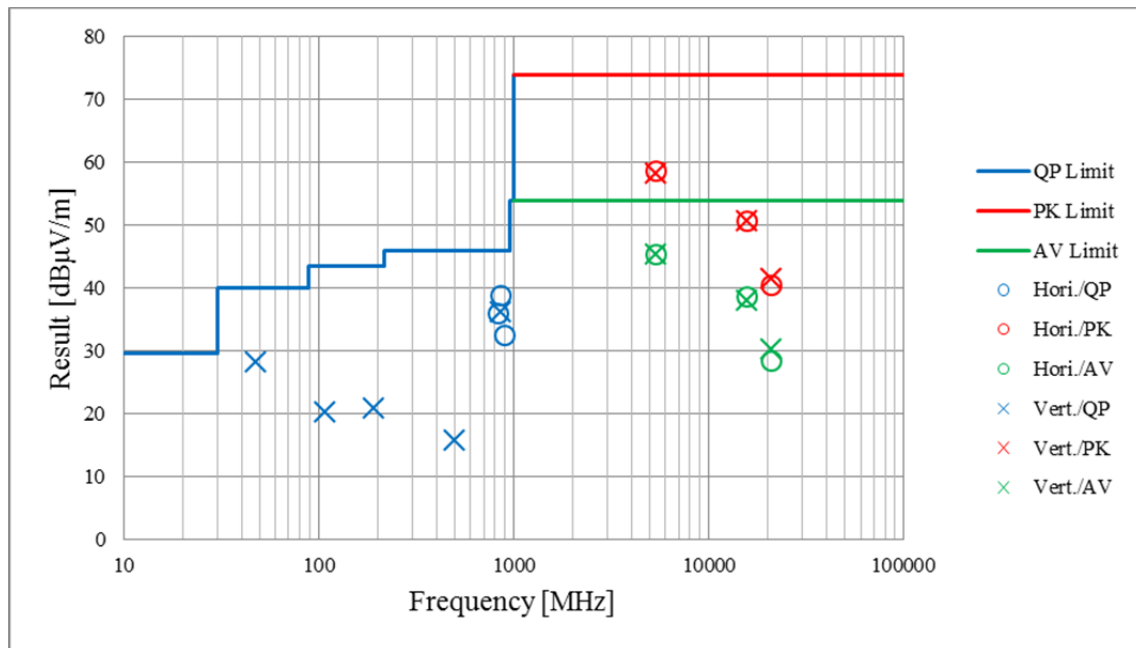
Test place Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. 11640275S-C-R2
Date May 19, 2017
Temperature / Humidity 24 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-40 5230 MHz



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

Radiated Spurious Emission (Plot data, Worst case)

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber				
Test Place(AC No)	2AC	3AC	3AC	3AC	2AC
Report No.	11640275S-C-R2				
Date	May 25, 2017	May 19, 2017	May 20, 2017	May 21, 2017	May 23, 2017
Temperature / Humidity	24 deg. C / 49 % RH	24 deg. C / 51 % RH	23 deg. C / 47 % RH	24 deg. C / 47 % RH	23 deg. C / 45 % RH
Engineer	Hikaru Shirasawa (30 MHz-1 GHz)	Hiroyuki Morikawa (1 GHz-6.4 GHz)	Yosuke Ishikawa (6.4 GHz-13 GHz)	Kazutaka Takeyama (13 GHz-26.5 GHz)	Hikaru Shirasawa (26.5 GHz-40 GHz)
Mode	Tx 11a 5240 MHz				



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. 3 Semi Anechoic Chamber
Date : June 25, 2017
Temperature / Humidity : 23 deg. C / 60 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11a 5180 MHz, with DH5 Hopping

(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	54.18	31.70	16.48	37.17	2.45	67.64	73.90	6.2	115	27	
Hori.	5150.000	AV	30.62	31.70	16.48	37.17	2.45	44.08	53.90	9.8	115	27	VBW:10 Hz
Vert.	5150.000	PK	50.32	31.70	16.48	37.17	2.45	63.78	73.90	10.1	152	123	
Vert.	5150.000	AV	30.70	31.70	16.48	37.17	2.45	44.16	53.90	9.7	152	123	VBW:10 Hz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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Shonan EMC Lab.

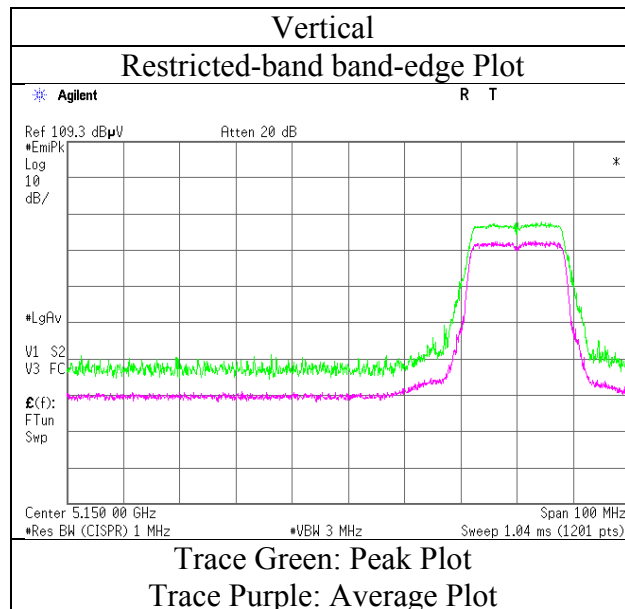
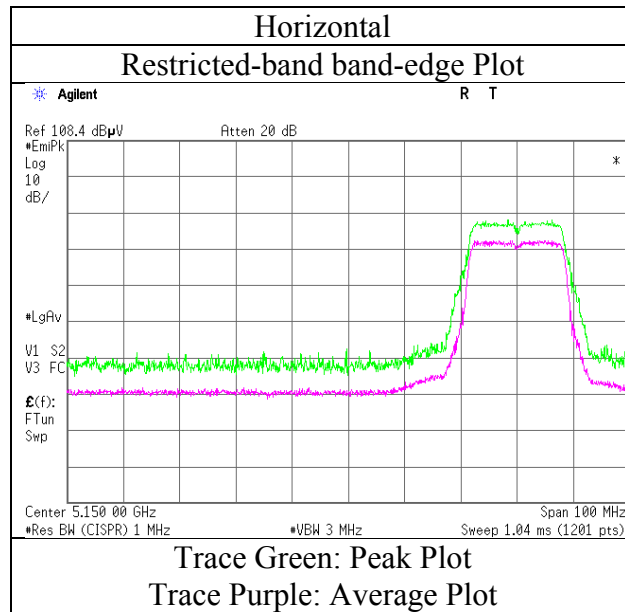
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date	June 25, 2017
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11a 5180 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 25, 2017 June 28, 2017 June 29, 2017
Temperature / Humidity : 23 deg. C / 60 % RH 25 deg. C / 61 % RH 24 deg. C / 48 % RH
Engineer : Yosuke Ishikawa Yosuke Ishikawa Yosuke Ishikawa
(1 GHz-6.4 GHz) (6.4 GHz-18 GHz) (18 GHz-40 GHz)
(30 MHz-1000 MHz)
Mode : Tx 11a 5240 MHz, with DH5 Hopping

(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.	827.965	QP	28.80	20.96	10.81	31.33	0.00	29.24	46.00	16.7	100	15	
Hori.	863.966	QP	37.40	21.45	10.93	31.14	0.00	38.64	46.00	7.3	100	121	
Hori.	971.960	QP	29.90	22.15	11.27	30.31	0.00	33.01	53.90	20.8	156	241	
Hori.	5350.000	PK	46.26	31.94	16.67	37.27	2.45	60.05	73.90	13.8	161	1	
Hori.	10480.000	PK	45.32	39.84	9.41	38.60	2.45	58.42	73.90	15.4	100	112	
Hori.	15720.000	PK	46.26	38.58	11.98	38.57	-9.54	48.71	73.90	25.1	100	0	
Hori.	5350.000	AV	30.86	31.94	16.67	37.27	2.45	44.65	53.90	9.2	161	1	VBW:10 Hz
Hori.	10480.000	AV	37.02	39.84	9.41	38.60	2.45	50.12	53.90	3.7	100	112	VBW:10 Hz
Hori.	15720.000	AV	33.15	38.58	11.98	38.57	-9.54	35.60	53.90	18.3	100	0	VBW:10 Hz
Vert.	42.156	QP	27.90	13.43	6.86	32.12	0.00	16.07	40.00	23.9	100	117	
Vert.	47.018	QP	28.20	11.65	6.94	32.12	0.00	14.67	40.00	25.3	100	285	
Vert.	51.727	QP	30.40	10.22	6.95	32.12	0.00	15.45	40.00	24.5	100	203	
Vert.	123.738	QP	27.70	13.11	7.45	32.06	0.00	16.20	43.50	27.3	100	84	
Vert.	191.909	QP	30.70	16.25	7.97	32.00	0.00	22.92	43.50	20.5	100	313	
Vert.	863.960	QP	36.60	21.45	10.93	31.14	0.00	37.84	46.00	8.1	106	233	
Vert.	5350.000	PK	44.46	31.94	16.67	37.27	2.45	58.25	73.90	15.6	140	123	
Vert.	10480.000	PK	47.59	39.84	9.41	38.60	2.45	60.69	73.90	13.2	232	107	
Vert.	15720.000	PK	44.79	38.58	11.98	38.57	-9.54	47.24	73.90	26.6	100	0	
Vert.	5350.000	AV	31.52	31.94	16.67	37.27	2.45	45.31	53.90	8.5	140	123	VBW:10 Hz
Vert.	10480.000	AV	37.39	39.84	9.41	38.60	2.45	50.49	53.90	3.4	232	107	VBW:10 Hz
Vert.	15720.000	AV	33.04	38.58	11.98	38.57	-9.54	35.49	53.90	18.4	100	0	VBW:10 Hz

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

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

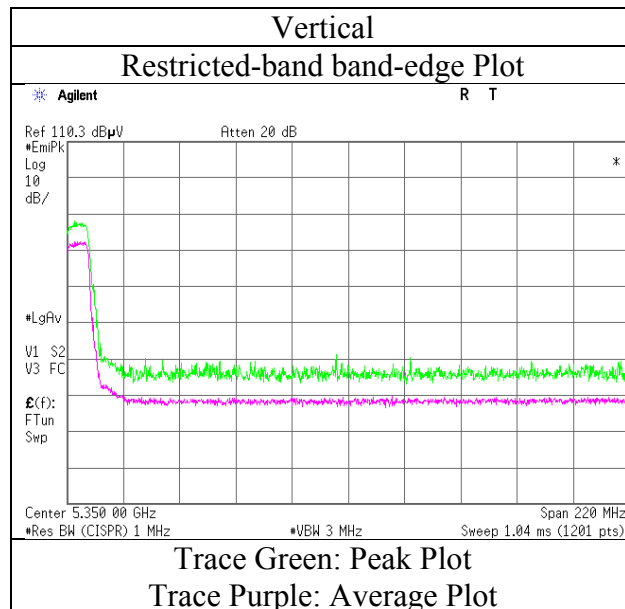
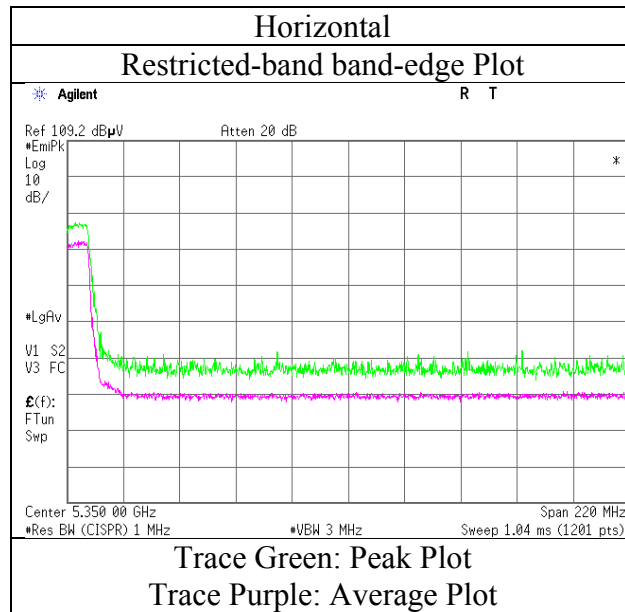
*The 4th harmonic was not seen so the result was its base noise level.

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 25, 2017
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11a 5240 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11n-20 5180 MHz, with DH5 Hopping

(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	51.58	31.70	16.48	37.17	2.45	65.04	73.90	8.8	150	359	
Hori.	5150.000	AV	30.25	31.70	16.48	37.17	2.45	43.71	53.90	10.1	150	359	VBW:10 Hz
Vert.	5150.000	PK	53.21	31.70	16.48	37.17	2.45	66.67	73.90	7.2	104	115	
Vert.	5150.000	AV	30.20	31.70	16.48	37.17	2.45	43.66	53.90	10.2	104	115	VBW:10 Hz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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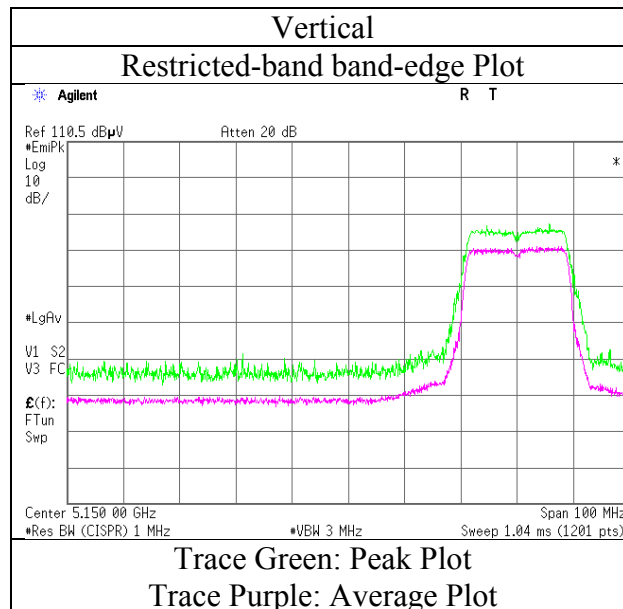
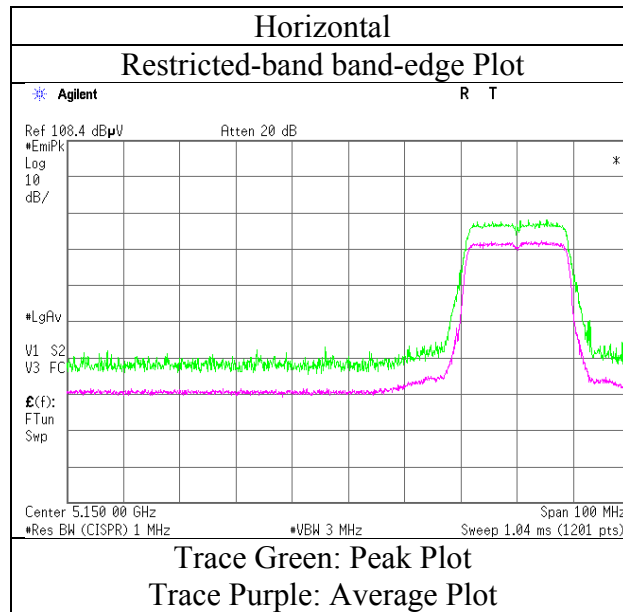
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11n-20 5180 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11n-20 5240 MHz, with DH5 Hopping

(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	43.25	31.94	16.67	37.27	2.45	57.04	73.90	16.8	179	359	
Hori.	5350.000	AV	31.33	31.94	16.67	37.27	2.45	45.12	53.90	8.7	179	359	VBW:10 Hz
Vert.	5350.000	PK	44.31	31.94	16.67	37.27	2.45	58.10	73.90	15.8	109	359	
Vert.	5350.000	AV	31.21	31.94	16.67	37.27	2.45	45.00	53.90	8.9	109	359	VBW:10 Hz

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

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

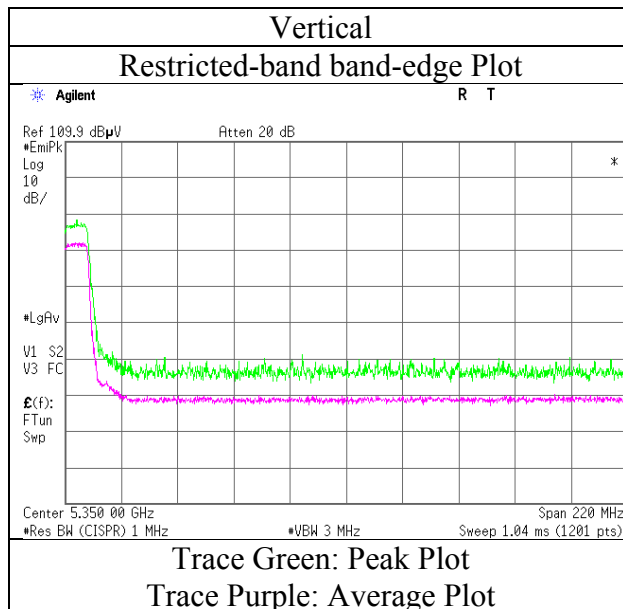
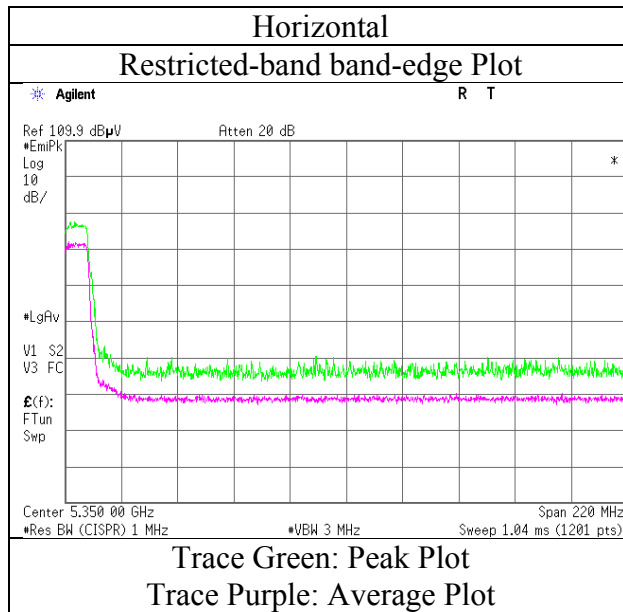
* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11n-20 5240 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-20 5180 MHz, with DH5 Hopping

(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	53.73	31.70	16.48	37.17	2.45	67.19	73.90	6.7	167	2	
Hori.	5150.000	AV	30.43	31.70	16.48	37.17	2.45	43.89	53.90	10.0	167	2	VBW:10 Hz
Vert.	5150.000	PK	52.71	31.70	16.48	37.17	2.45	66.17	73.90	7.7	127	128	
Vert.	5150.000	AV	30.68	31.70	16.48	37.17	2.45	44.14	53.90	9.7	127	128	VBW:10 Hz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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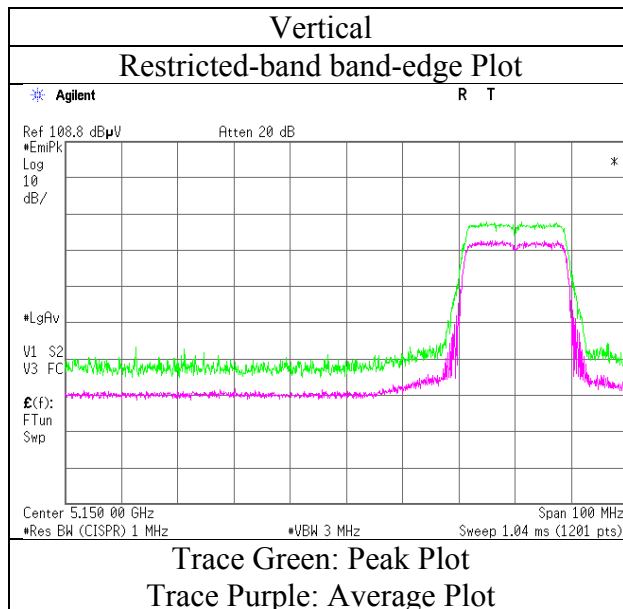
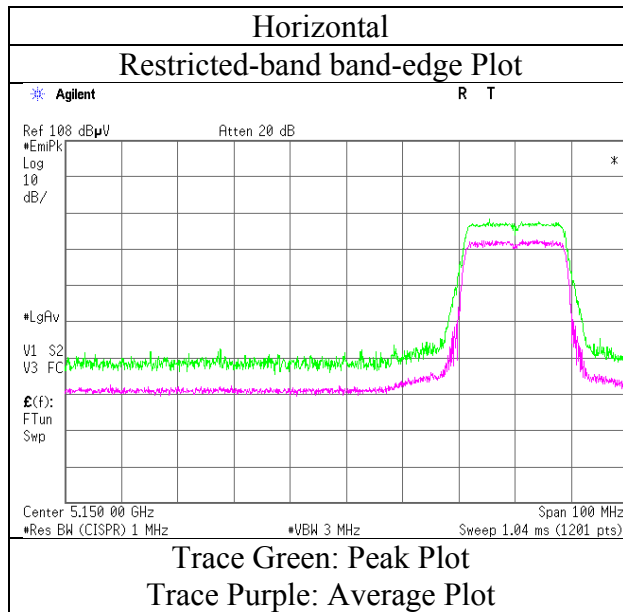
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11ac-20 5180 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-20 5240 MHz, with DH5 Hopping

(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	44.27	31.94	16.67	37.27	2.45	58.06	73.90	15.8	118	358	VBW:10 Hz
Hori.	5350.000	AV	31.55	31.94	16.67	37.27	2.45	45.34	53.90	8.5	118	358	
Vert.	5350.000	PK	43.67	31.94	16.67	37.27	2.45	57.46	73.90	16.4	119	134	VBW:10 Hz
Vert.	5350.000	AV	31.57	31.94	16.67	37.27	2.45	45.36	53.90	8.5	119	134	

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

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

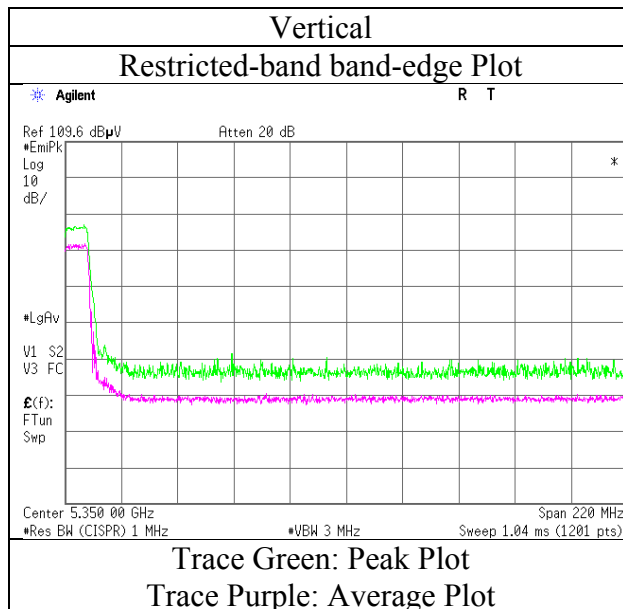
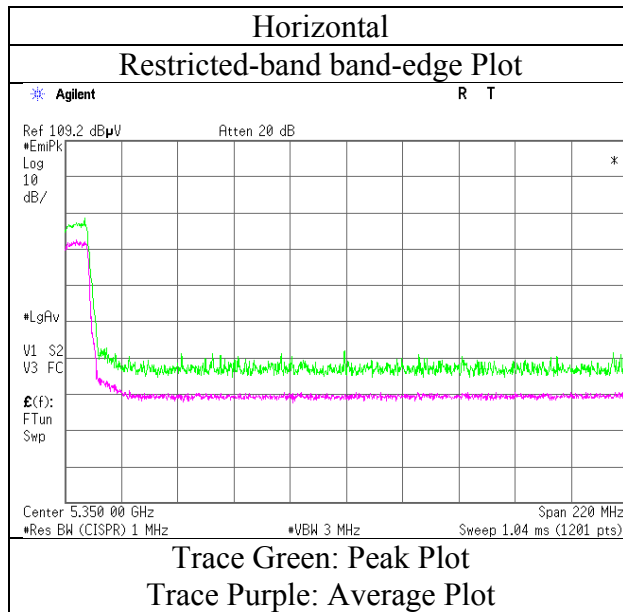
* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11ac-20 5240 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11n-40 5190 MHz, with DH5 Hopping

(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	47.41	31.70	16.48	37.17	2.45	60.87	73.90	13.0	137	354	
Hori.	5150.000	AV	32.73	31.70	16.48	37.17	2.45	46.19	53.90	7.7	137	354	VBW:10 Hz
Vert.	5150.000	PK	52.88	31.70	16.48	37.17	2.45	66.34	73.90	7.5	130	122	
Vert.	5150.000	AV	32.87	31.70	16.48	37.17	2.45	46.33	53.90	7.5	130	122	VBW:10 Hz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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Shonan EMC Lab.

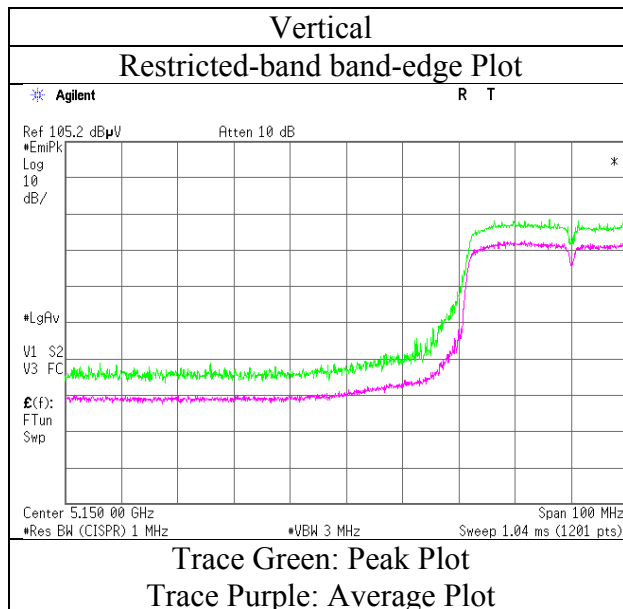
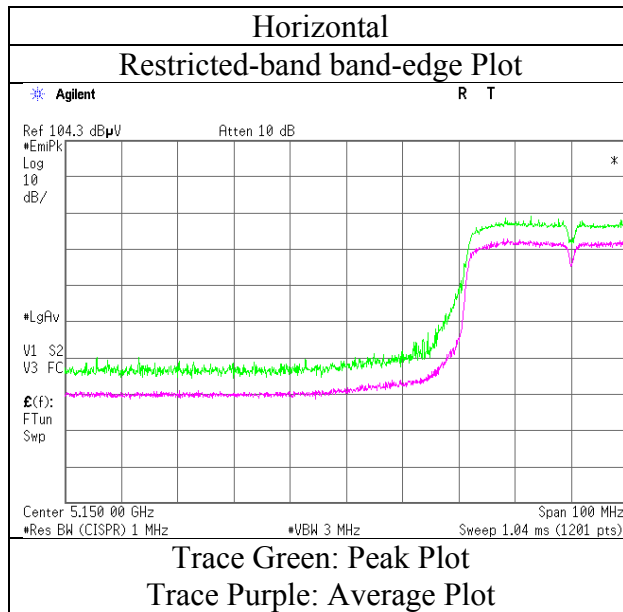
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11n-40 5190 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11n-40 5230 MHz, with DH5 Hopping

(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	44.10	31.94	16.67	37.27	2.45	57.89	73.90	16.0	164	358	VBW:10 Hz
Hori.	5350.000	AV	32.01	31.94	16.67	37.27	2.45	45.80	53.90	8.1	164	358	
Vert.	5350.000	PK	44.37	31.94	16.67	37.27	2.45	58.16	73.90	15.7	111	135	VBW:10 Hz
Vert.	5350.000	AV	32.00	31.94	16.67	37.27	2.45	45.79	53.90	8.1	111	135	

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

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

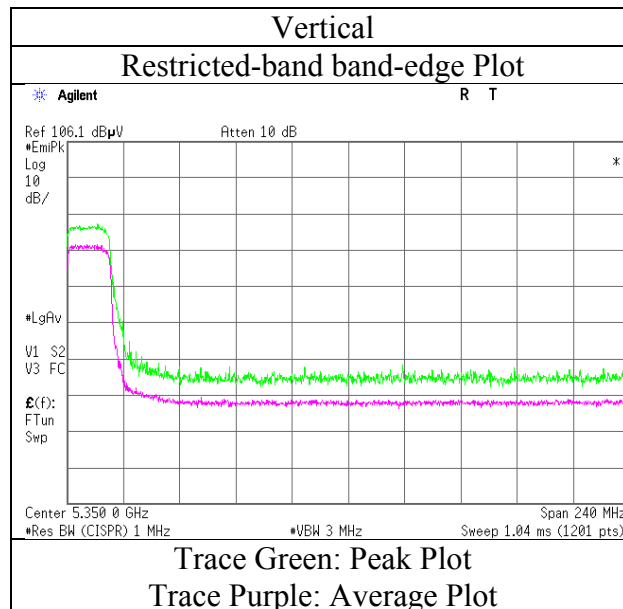
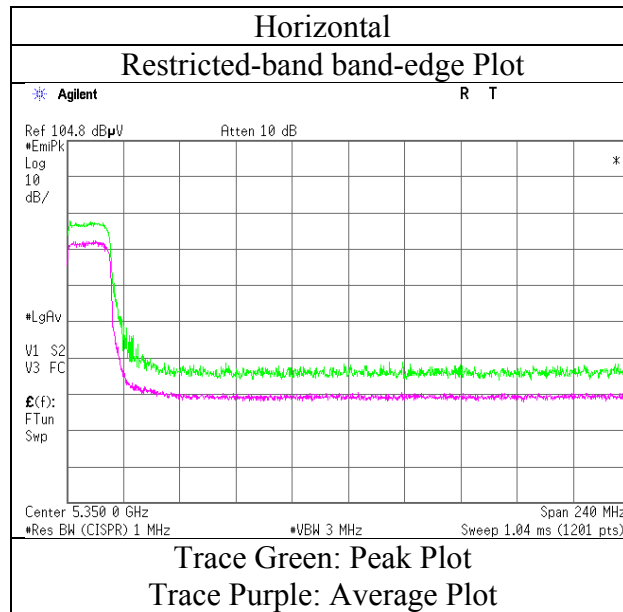
* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11n-40 5230 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-40 5190 MHz, with DH5 Hopping

(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	47.87	31.70	16.48	37.17	2.45	61.33	73.90	12.5	139	356	
Hori.	5150.000	AV	31.86	31.70	16.48	37.17	2.45	45.32	53.90	8.5	139	356	VBW:10 Hz
Vert.	5150.000	PK	49.32	31.70	16.48	37.17	2.45	62.78	73.90	11.1	176	136	
Vert.	5150.000	AV	31.57	31.70	16.48	37.17	2.45	45.03	53.90	8.8	176	136	VBW:10 Hz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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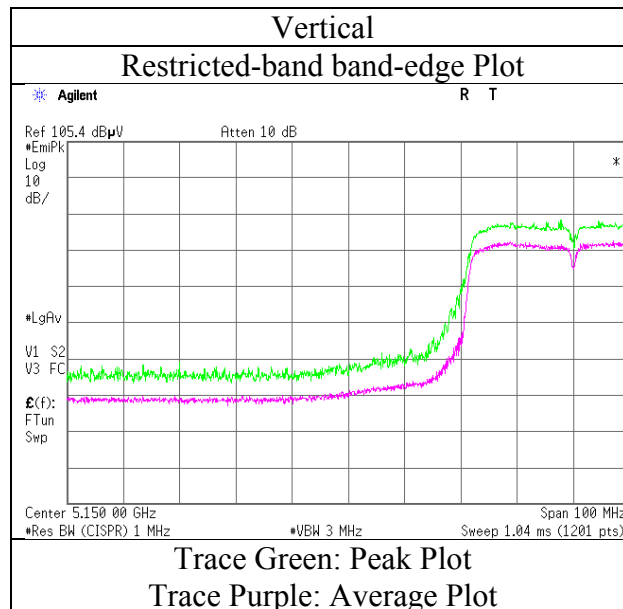
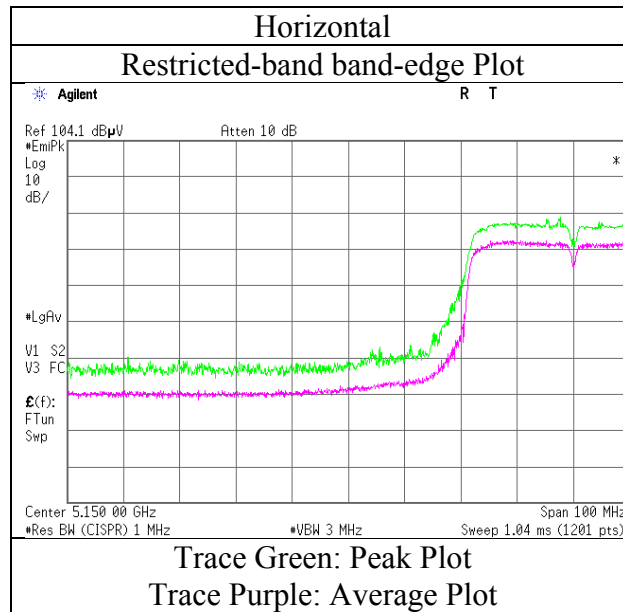
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-40 5190 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-40 5230 MHz, with DH5 Hopping

(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	44.31	31.94	16.67	37.27	2.45	58.10	73.90	15.8	114	353	VBW:10 Hz
Hori.	5350.000	AV	31.86	31.94	16.67	37.27	2.45	45.65	53.90	8.2	114	353	
Vert.	5350.000	PK	44.76	31.94	16.67	37.27	2.45	58.55	73.90	15.3	115	143	VBW:10 Hz
Vert.	5350.000	AV	32.03	31.94	16.67	37.27	2.45	45.82	53.90	8.0	115	143	

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

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

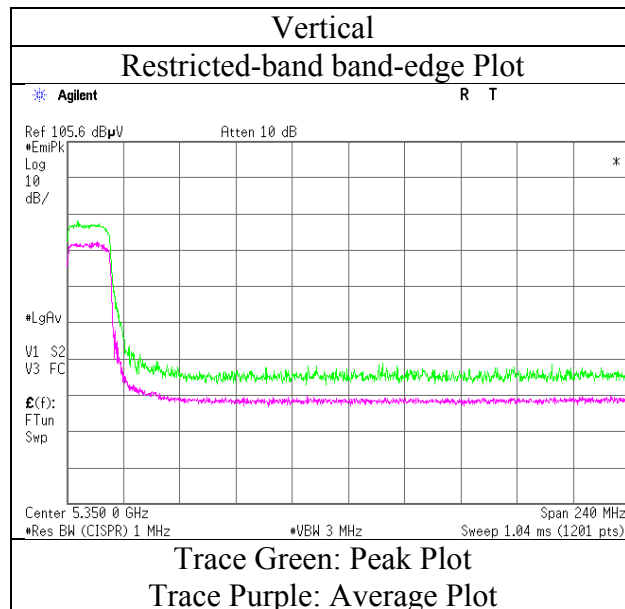
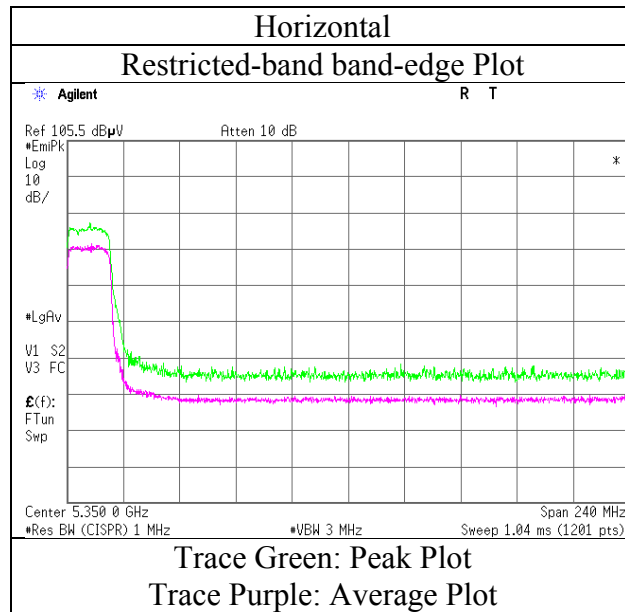
* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11ac-40 5230 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 27, 2017
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Yosuke Ishikawa
(1 GHz-6.4 GHz)
Mode : Tx 11ac-80 5210 MHz, with DH5 Hopping

(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	47.15	31.70	16.48	37.17	2.45	60.61	73.90	13.2	174	3	
Hori.	5350.000	PK	43.73	31.94	16.67	37.27	2.45	57.52	73.90	16.3	174	3	
Hori.	5150.000	AV	35.81	31.70	16.48	37.17	2.45	49.27	53.90	4.6	174	3	VBW:4.3 kHz
Hori.	5350.000	AV	33.36	31.94	16.67	37.27	2.45	47.15	53.90	6.7	174	3	VBW:4.3 kHz
Vert.	5150.000	PK	47.96	31.70	16.48	37.17	2.45	61.42	73.90	12.4	162	163	
Vert.	5350.000	PK	45.64	31.94	16.67	37.27	2.45	59.43	73.90	14.4	162	163	
Vert.	5150.000	AV	35.55	31.70	16.48	37.17	2.45	49.01	53.90	4.8	162	163	VBW:4.3 kHz
Vert.	5350.000	AV	33.85	31.94	16.67	37.27	2.45	47.64	53.90	6.2	162	163	VBW:4.3 kHz

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

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

* This mode was performed only band edges measurement

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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Shonan EMC Lab.

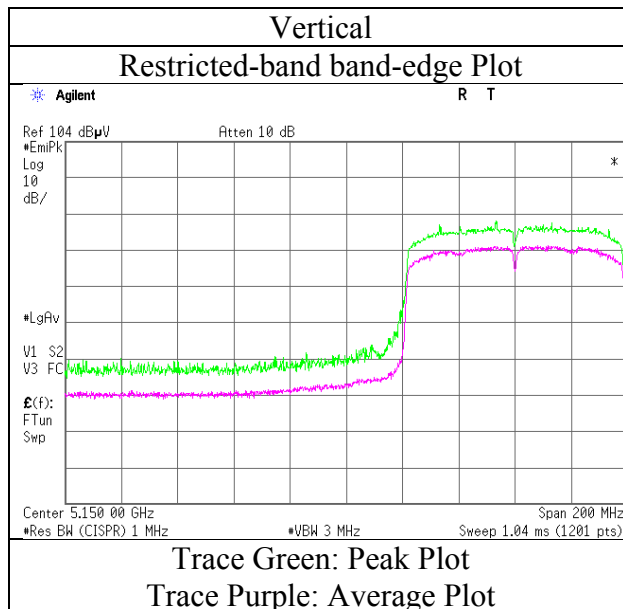
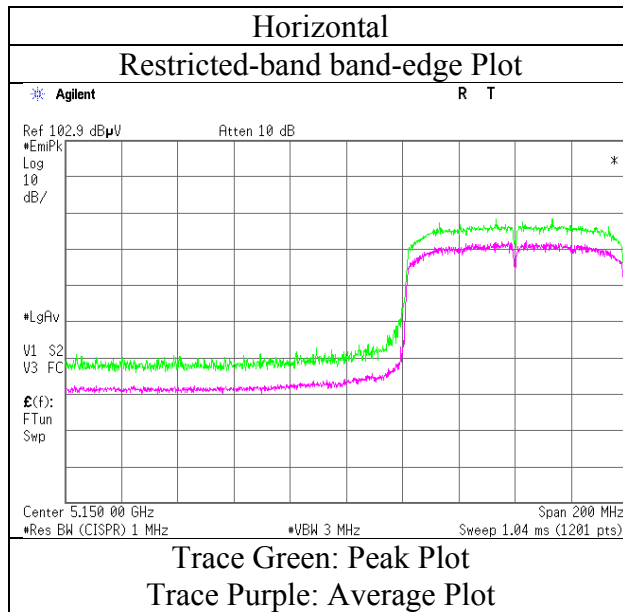
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

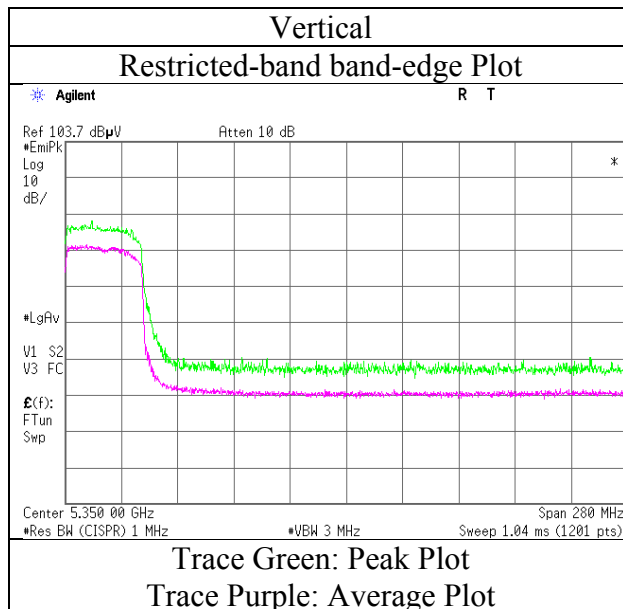
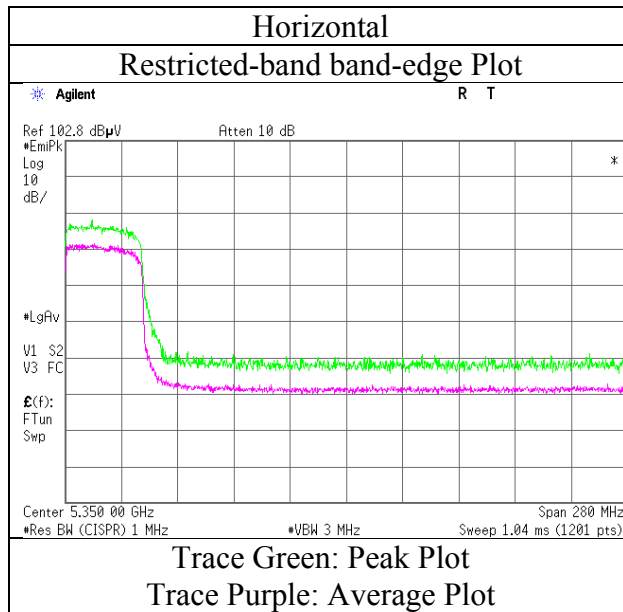
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11ac-80 5210 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 27, 2017
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-6.4 GHz)
Mode	Tx 11ac-80 5210 MHz, with DH5 Hopping



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. 3 Semi Anechoic Chamber
Date : June 28, 2017
Temperature / Humidity : 25 deg. C / 61 % RH
Engineer : Yosuke Ishikawa
(1 GHz-2.8 GHz)
Mode : Tx DH5 2402 MHz, with Tx 11a 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	42.68	27.41	14.27	36.83	2.45	49.98	73.90	23.9	142	269	
Hori.	2390.000	AV	30.99	27.41	14.27	36.83	2.45	38.29	53.90	15.6	142	269	
Vert.	2390.000	PK	43.85	27.41	14.27	36.83	2.45	51.15	73.90	22.7	222	302	
Vert.	2390.000	AV	31.33	27.41	14.27	36.83	2.45	38.63	53.90	15.2	222	302	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

* This mode was performed only band edges measurement

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	84.81	27.46	14.28	36.83	2.45	92.17	-	-	Carrier
Hori.	2400.000	PK	34.15	27.45	14.27	36.83	2.45	41.49	72.17	30.7	
Vert.	2402.000	PK	84.89	27.46	14.28	36.83	2.45	92.25	-	-	Carrier
Vert.	2400.000	PK	34.11	27.45	14.27	36.83	2.45	41.45	72.25	30.8	

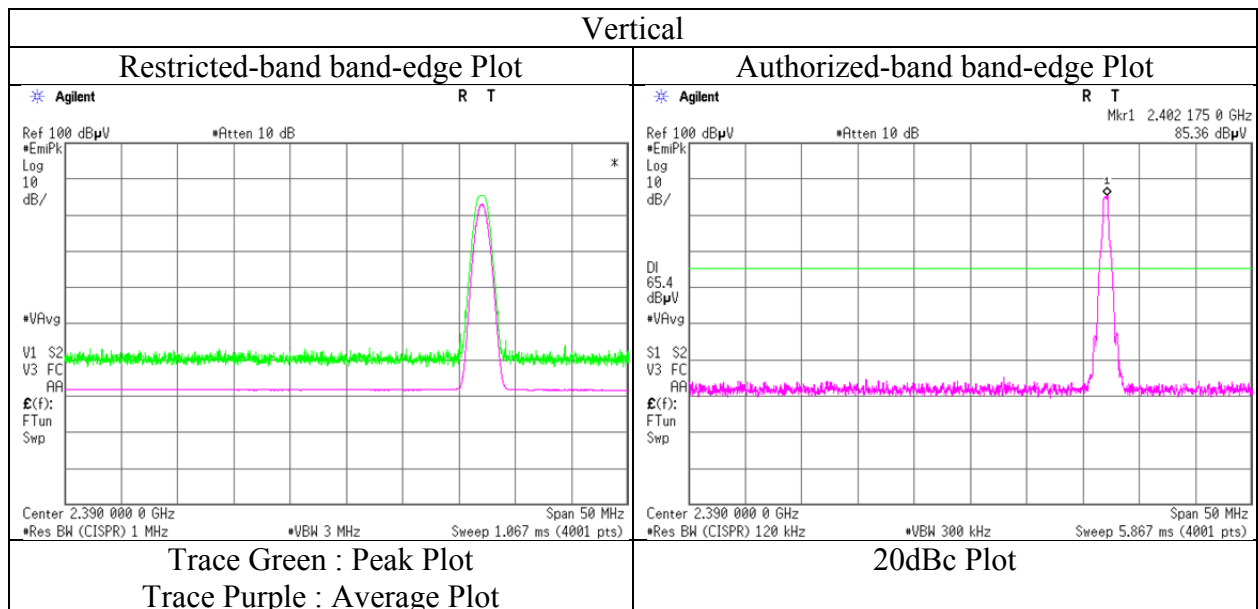
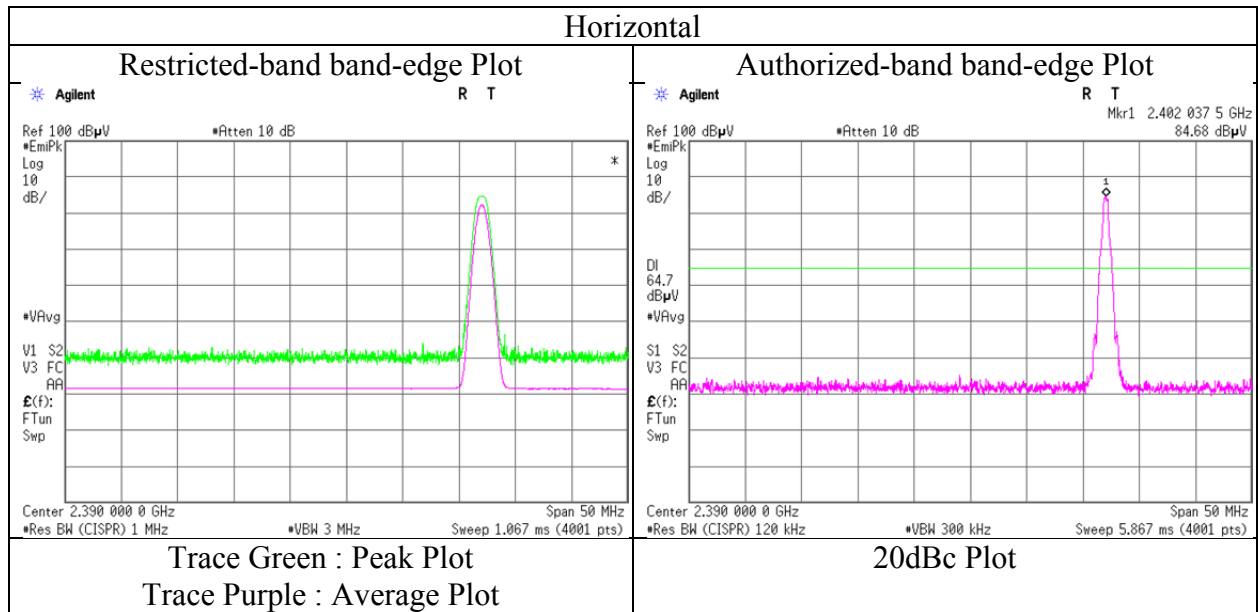
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 28, 2017
Temperature / Humidity	25 deg. C / 61 % RH
Engineer	Yosuke Ishikawa
	(1 GHz-2.8 GHz)
Mode	Tx DH5 2402 MHz, with Tx 11a 5240 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 28, 2017 June 29, 2017
Temperature / Humidity : 25 deg. C / 61 % RH 24 deg. C / 48 % RH
Engineer : Yosuke Ishikawa Yosuke Ishikawa
(1 GHz-18 GHz) (18 GHz-40 GHz)
(30 MHz-1000 MHz)
Mode : Tx DH5 2480 MHz, with Tx 11a 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	827.971	QP	28.50	20.96	10.81	31.33	0.00	28.94	46.00	17.0	100	58	
Hori.	863.971	QP	35.70	21.45	10.93	31.14	0.00	36.94	46.00	9.0	100	128	
Hori.	971.955	QP	28.80	22.15	11.27	30.31	0.00	31.91	53.90	21.9	143	236	
Hori.	2483.500	PK	43.74	27.79	14.37	36.79	2.45	51.56	73.90	22.3	198	72	
Hori.	4960.000	PK	42.85	31.45	16.76	37.07	2.45	56.44	73.90	17.4	100	0	
Hori.	7440.000	PK	42.96	37.11	8.81	37.95	2.45	53.38	73.90	20.5	100	0	
Hori.	9920.000	PK	44.01	38.87	9.89	38.87	2.45	56.35	73.90	17.5	100	0	
Hori.	2483.500	AV	31.55	27.79	14.37	36.79	2.45	39.37	53.90	14.5	198	72	
Hori.	4960.000	AV	31.52	31.45	16.76	37.07	2.45	45.11	53.90	8.7	100	0	
Hori.	7440.000	AV	32.04	37.11	8.81	37.95	2.45	42.46	53.90	11.4	100	0	
Hori.	9920.000	AV	33.05	38.87	9.89	38.87	2.45	45.39	53.90	8.5	100	0	
Vert.	41.950	QP	31.20	13.51	6.86	32.12	0.00	19.45	40.00	20.5	100	149	
Vert.	47.269	QP	31.40	11.57	6.94	32.12	0.00	17.79	40.00	22.2	100	282	
Vert.	51.565	QP	32.00	10.26	6.94	32.12	0.00	17.08	40.00	22.9	100	188	
Vert.	123.729	QP	27.30	13.11	7.45	32.06	0.00	15.80	43.50	27.7	100	107	
Vert.	191.947	QP	30.70	16.25	7.97	32.00	0.00	22.92	43.50	20.5	100	323	
Vert.	863.960	QP	35.60	21.45	10.93	31.14	0.00	36.84	46.00	9.1	100	242	
Vert.	2483.500	PK	43.60	27.79	14.37	36.79	2.45	51.42	73.90	22.4	100	55	
Vert.	4960.000	PK	42.84	31.45	16.76	37.07	2.45	56.43	73.90	17.4	100	0	
Vert.	7440.000	PK	42.82	37.11	8.81	37.95	2.45	53.24	73.90	20.6	100	0	
Vert.	9920.000	PK	44.30	38.87	9.89	38.87	2.45	56.64	73.90	17.2	100	0	
Vert.	2483.500	AV	31.49	27.79	14.37	36.79	2.45	39.31	53.90	14.5	100	55	
Vert.	4960.000	AV	31.50	31.45	16.76	37.07	2.45	45.09	53.90	8.8	100	0	
Vert.	7440.000	AV	32.01	37.11	8.81	37.95	2.45	42.43	53.90	11.4	100	0	
Vert.	9920.000	AV	33.11	38.87	9.89	38.87	2.45	45.45	53.90	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

UL Japan, Inc.

Shonan EMC Lab.

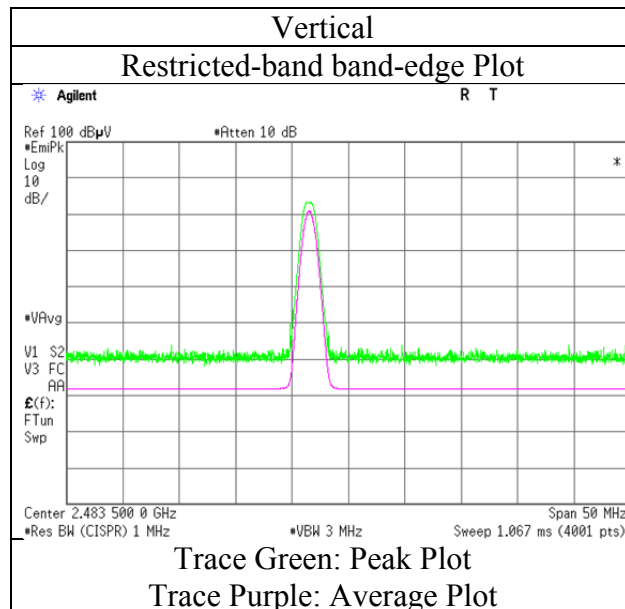
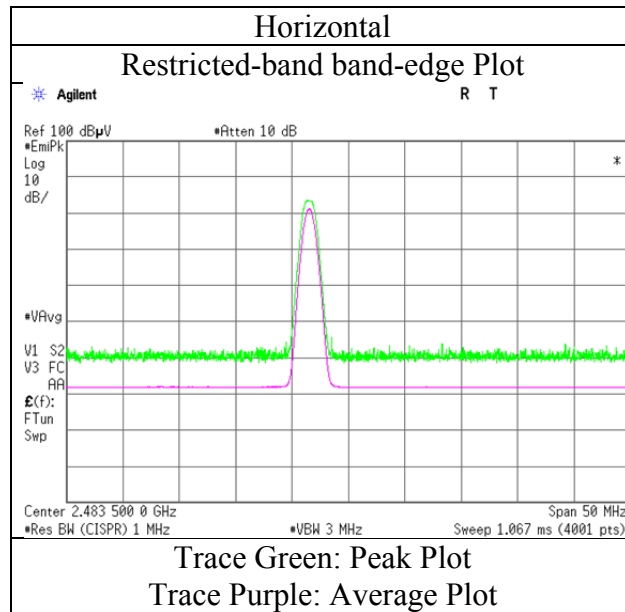
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 28, 2017
Temperature / Humidity : 25 deg. C / 61 % RH
Engineer : Yosuke Ishikawa
(1 GHz-2.8 GHz)
Mode : Tx DH5 2480 MHz, with Tx 11a 5240 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 28, 2017
Temperature / Humidity : 25 deg. C / 61 % RH
Engineer : Yosuke Ishikawa
(1 GHz-2.8 GHz)
Mode : Tx 3-DH5 2402 MHz, with Tx 11a 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	42.95	27.41	14.27	36.83	2.45	50.25	73.90	23.6	181	82	
Hori.	2390.000	AV	31.39	27.41	14.27	36.83	2.45	38.69	53.90	15.2	181	82	
Vert.	2390.000	PK	43.57	27.41	14.27	36.83	2.45	50.87	73.90	23.0	243	85	
Vert.	2390.000	AV	31.70	27.41	14.27	36.83	2.45	39.00	53.90	14.9	243	85	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

* This mode was performed only band edges measurement

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	83.22	27.46	14.28	36.83	2.45	90.58	-	-	Carrier
Hori.	2400.000	PK	33.78	27.45	14.27	36.83	2.45	41.12	70.58	29.5	
Vert.	2402.000	PK	83.17	27.46	14.28	36.83	2.45	90.53	-	-	Carrier
Vert.	2400.000	PK	34.60	27.45	14.27	36.83	2.45	41.94	70.53	28.6	

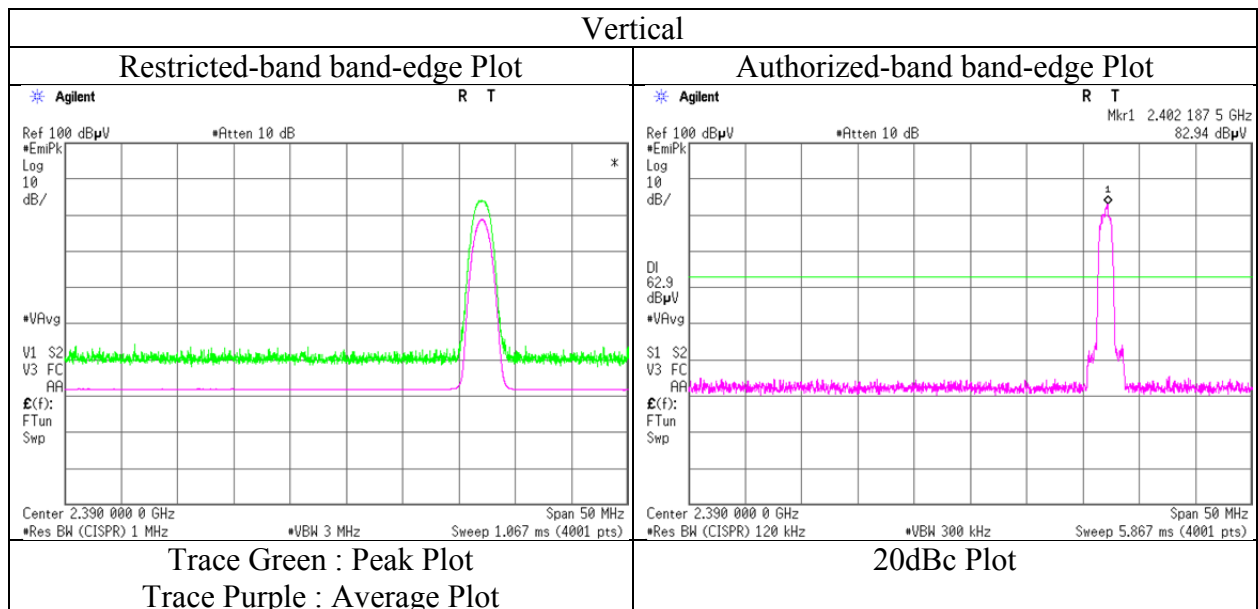
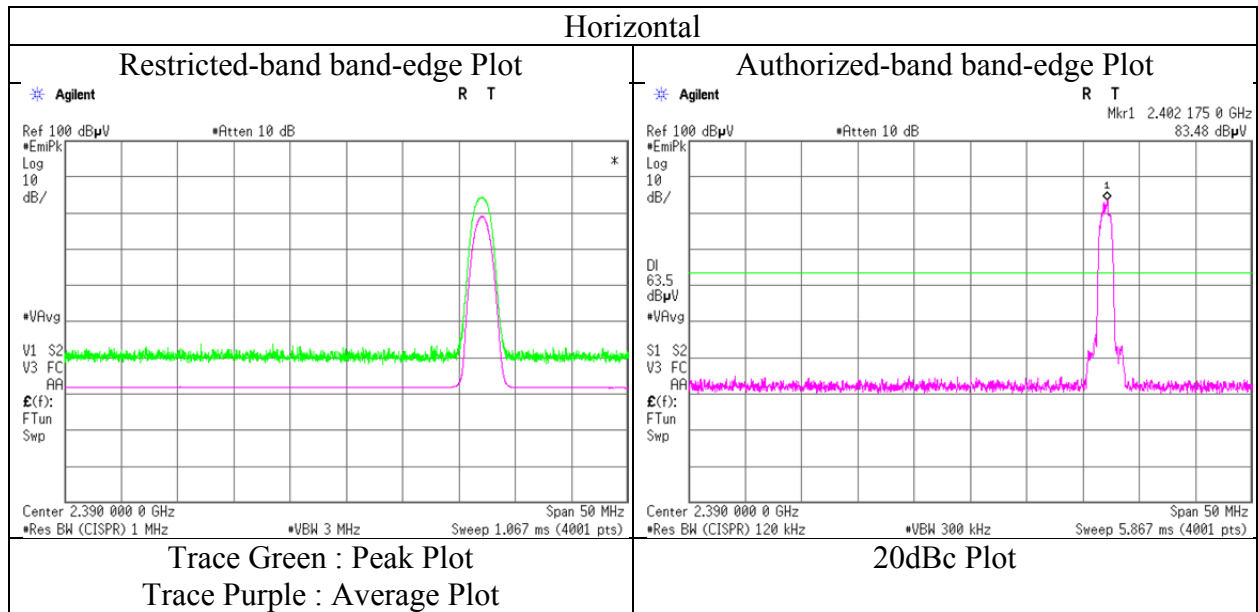
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date	June 28, 2017
Temperature / Humidity	25 deg. C / 61 % RH
Engineer	Yosuke Ishikawa (1 GHz-2.8 GHz)
Mode	Tx 3-DH5 2402 MHz, with Tx 11a 5240 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 28, 2017
Temperature / Humidity : 25 deg. C / 61 % RH
Engineer : Yosuke Ishikawa
(1 GHz-2.8 GHz)
Mode : Tx 3-DH5 2480 MHz, with Tx 11a 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	43.74	27.79	14.37	36.79	2.45	51.56	73.90	22.3	198	72	
Hori.	2483.500	AV	31.55	27.79	14.37	36.79	2.45	39.37	53.90	14.5	198	72	
Vert.	2483.500	PK	43.60	27.79	14.37	36.79	2.45	51.42	73.90	22.4	100	55	
Vert.	2483.500	AV	31.49	27.79	14.37	36.79	2.45	39.31	53.90	14.5	100	55	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.98\text{ m} / 3.0\text{ m}) = 2.45\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

* This mode was performed only band edges measurement

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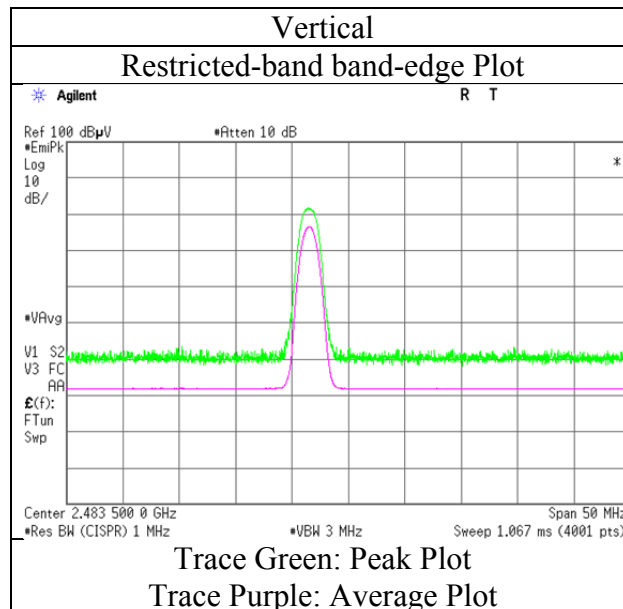
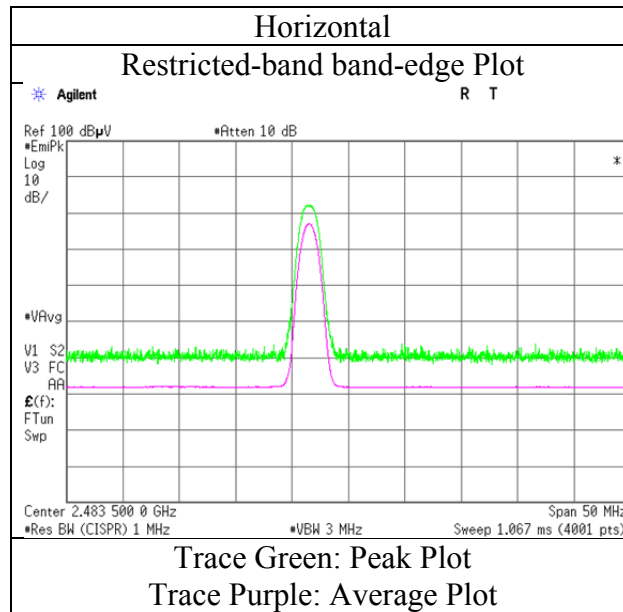
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

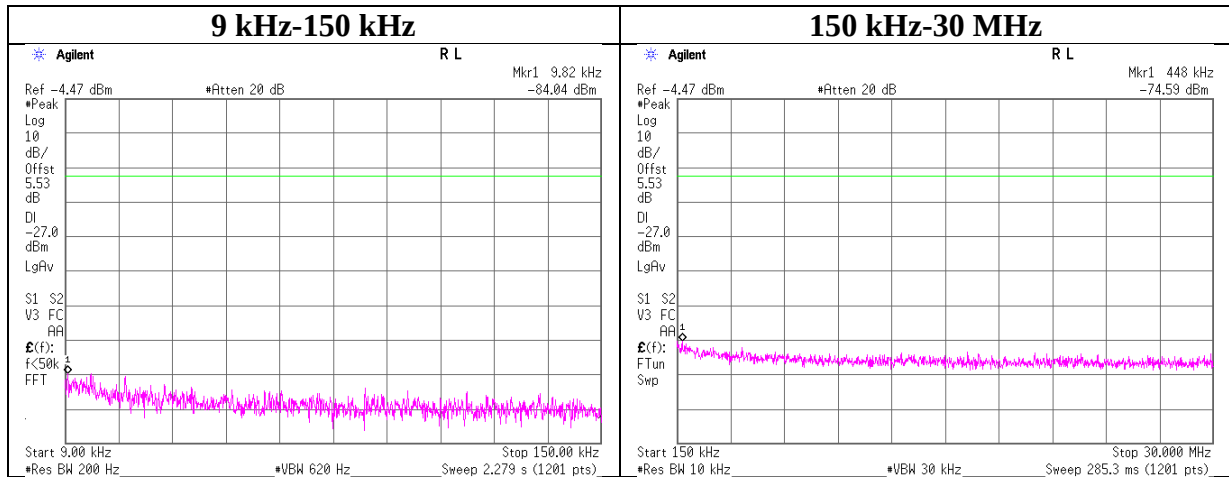
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date : June 28, 2017
Temperature / Humidity : 25 deg. C / 61 % RH
Engineer : Yosuke Ishikawa
(1 GHz-2.8 GHz)
Mode : Tx 3-DH5 2480 MHz, with Tx 11a 5240 MHz



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

Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11640275S-C-R2
Date : May 22, 2017
Temperature / Humidity : 26 deg. C / 44 % RH
Engineer : Hikaru Shirasawa
Mode : Tx 11a, 5240MHz, worst data mode MCS0



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
9.82	-89.6	0.01	9.8	2.0	1	-77.7	300	6.0	-16.5	47.7	64.2	
448.00	-80.1	0.01	9.8	2.0	1	-68.3	300	6.0	-7.0	14.5	21.5	

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

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

N: Number of output

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

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2017/02/17 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2017/01/08 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE *1)	2016/05/11 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S006	RE	2017/01/08 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2016/08/09 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	RE	2016/10/24 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE,CE	-
SAEC-02(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	RE	2016/07/22 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE,CE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE,CE	2017/03/08 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2016/11/29 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2016/11/07 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2016/08/22 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2016/10/12 * 12
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2016/07/25 * 12
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S005	RE	2017/01/08 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2017/04/20 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2016/09/27 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2017/04/20 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000K MSKMS	-	RE	2017/04/20 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2017/03/15 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2017/03/17 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 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:
CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2017/02/09 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2017/02/09 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2016/11/23 * 12
SCC-B1/B3/B5/ B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141 PE/141PE/141PE/14 1PE/NS4906	-/0901-270(RF Selector)	RE	2017/04/07 * 12
SCC-B2/B4/B6/ B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141 PE/141PE/141PE/14 1PE/NS4906	-/0901-270(RF Selector)	RE	2017/04/07 * 12
SLA-06	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	195	RE	2017/01/05 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2016/09/28 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2017/06/08 * 12
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2017/03/08 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2016/10/18 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2017/01/26 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SCC-C1/C2/C3/ C4/C5/C10/SRS E-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141 PE/141PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2017/04/07 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2017/02/09 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2016/11/08 * 12
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SCC-B12/B13/S RSE-02	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS 4906	-/0901-270(RF Selector)	CE	2017/04/07 * 12
SLS-03	LISN	Rohde & Schwarz	ENV216	100513	CE	2017/02/27 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2017/02/09 * 12
SOS-04	Humidity Indicator	A&D	AD-5681	4061512	CE	2016/12/13 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	CE	2016/09/28 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2016/09/26 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2017/03/23 * 12
SAT10-12	Attenuator	Weinschel Corp.	54A-10	81601	AT	2017/03/23 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2017/04/25 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2017/04/25 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 12

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

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