




RADIO TEST REPORT


Test Report No. : 11463343H-A-R1

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Audio
Model No. : FT0106B
FCC ID : BABFT0106B
Test regulation : FCC Part 15 Subpart C: 2016
*WLAN part
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.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11463343H-A. 11463343H-A is replaced with this report.

Date of test: December 13 to 20, 2016

Representative test engineer: 
Yutaka Yoshida
Engineer
Consumer Technology Division

Approved by: 
Tsubasa Takayama
Engineer
Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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SECTION 1: Customer information

Company Name : FUJITSU TEN LIMITED
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Telephone Number : +81-78-682-2159
Facsimile Number : +81-78-671-7160
Contact Person : FUKII DAISUKE

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

2.1 Identification of E.U.T.

Type of Equipment : Car Audio
Model No. : FT0106B
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12 V
Receipt Date of Sample : November 30, 2016
Country of Mass-production : Mexico
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model: FT0106B (referred to as the EUT in this report) is a Car Audio.

General Specification

Clock frequency(ies) : 48 MHz (Crystal)
Operating Temperature : -20 deg. C- +65 deg. C

Radio Specification

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

Radio Type : Transceiver
Frequency of Operation : 2412 MHz - 2462 MHz
Modulation : DSSS/OFDM
Power Supply (inner) : DC 1.8 V, DC 3.3 V
Antenna type : Inverted F Antenna
Antenna Gain : 0.47 dBi

Bluetooth (Ver.4.1 + EDR)

Equipment Type : Transceiver
Frequency of Operation : 2402 MHz - 2480 MHz
Type of Modulation : FHSS, GFSK, $\pi/4$ DQPSK, 8 DPSK
Power Supply (inner) : DC 1.8 V, DC 3.3 V
Antenna Type : Inverted F Antenna
Antenna Gain : 0.47 dBi

GPS Receiver

Type of Receiver : GPS Receiver
Frequency of Operation : 1575.42 MHz
Modulation : DSSS
Power Supply (inner) : DC 1.8 V
Antenna type : GPS Antenna
Antenna Gain : 29 dBi

*This test report applies to WLAN function.

*Wireless LAN and Bluetooth do not transmit simultaneously.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016

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 November 14, 2016, 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 6. Standard test methods IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8		N/A *1)	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.6 dB 9748.000 MHz, Vertical, AV	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.
*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

* 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 1.8 V, 3.3 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 of Section 15.203.

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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 $k = 2$.
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Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.5 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3 m	3.8 dB
10 m	3.7 dB

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 MHz - 200 MHz	200 MHz - 1000 MHz	30 MHz - 200 MHz	200 MHz - 1000 MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

Radiated emission (Above 1 GHz)				
(3 m*) (+/-)		(1 m*) (+/-)		(10 m*) (+/-)
1 GHz - 6 GHz	6 GHz - 18 GHz	10 GHz - 26.5 GHz	26.5 GHz - 40 GHz	1 GHz - 18 GHz
5.2 dB	5.4 dB	5.5 dB	5.5 dB	5.4 dB

*Measurement distance

Radiated emission test

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

3.5 Test Location

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Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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

Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps (Short), PN9
IEEE 802.11g (11g)	18 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 4 (Long GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*EUT has the power settings by the software as follows (setting value might be different from product specification value); - Power Setting: 11b: 14 dBm, 11g: 11 dBm, 11n-20: 11 dBm - Software: QCA RCT Version 3.0.41.0 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

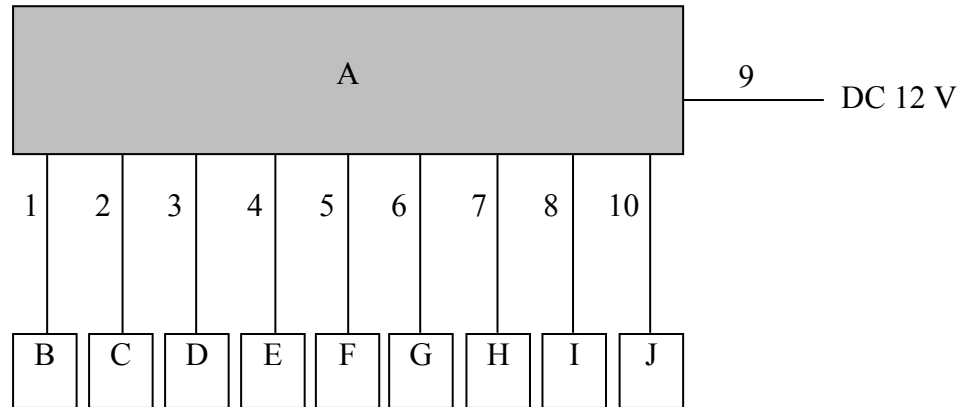
*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Radiated Spurious Emission (Above 1GHz)	11b Tx 11n-20 Tx *1)	2412 MHz 2437 MHz 2462 MHz
6dB Bandwidth, Maximum Peak Output Power, Power Density 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz
Conducted Spurious Emission, Radiated Spurious Emission (Below 1GHz)	11n-20 Tx *2)	2462 MHz

*1) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

*2) The mode was tested as a representative, because it had the highest power at antenna terminal test.

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	Car Audio	FT0106B	06A161274F92K for RE* MNA00094 for AT*	FUJITSU TEN LIMITED	EUT
B	USB Memory	PD-07WH8GB	-	KINGMAX	-
C	Termination	-	-	-	-
D	XM Radio Antenna	-	1032	-	-
E	GPS Antenna	-	31720398	-	-
F	Speaker	-	-	-	-
G	Microphone	-	46	-	-
H	Camera	GP-KD3325S	69B01957	-	-
I	Steering switch	75E717	-	-	-
J	DCM	ATVAA00000000	TVAA000002	Continental	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	2.0	Shielded	Shielded	-
2	FM Antenna Cable	0.8	Shielded	Shielded	-
3	Signal Cable	7.2	Unshielded	Unshielded	-
4	Signal Cable	4.4	Unshielded	Unshielded	-
5	Signal Cable	3.5	Unshielded	Unshielded	-
6	Signal Cable	3.6	Unshielded	Unshielded	-
7	Signal Cable	3.75	Unshielded	Unshielded	-
8	Signal Cable	3.5	Unshielded	Unshielded	-
9	DC Cable	4.5	Unshielded	Unshielded	-
10	Signal Cable	2.0	Unshielded	Unshielded	-

*RE: Radiated Spurious Emission Test, AT: Antenna Terminal Conducted Tests

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SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r05".

[For 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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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

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

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

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

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

Test Antennas are used as below;

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

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces If duty cycle was less than 98%, a duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	4.5 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)		4.5 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05".

*2) Distance Factor: $20 \times \log(4.5 \text{ m} / 3.0 \text{ m}) = 3.53 \text{ dB}$

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

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The test was made on EUT at the normal use position.

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

Measurement range : 30 MHz - 26.5 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

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

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

*2) Reference data

*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r05".

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

Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

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

Test data : **APPENDIX**
Test result : **Pass**

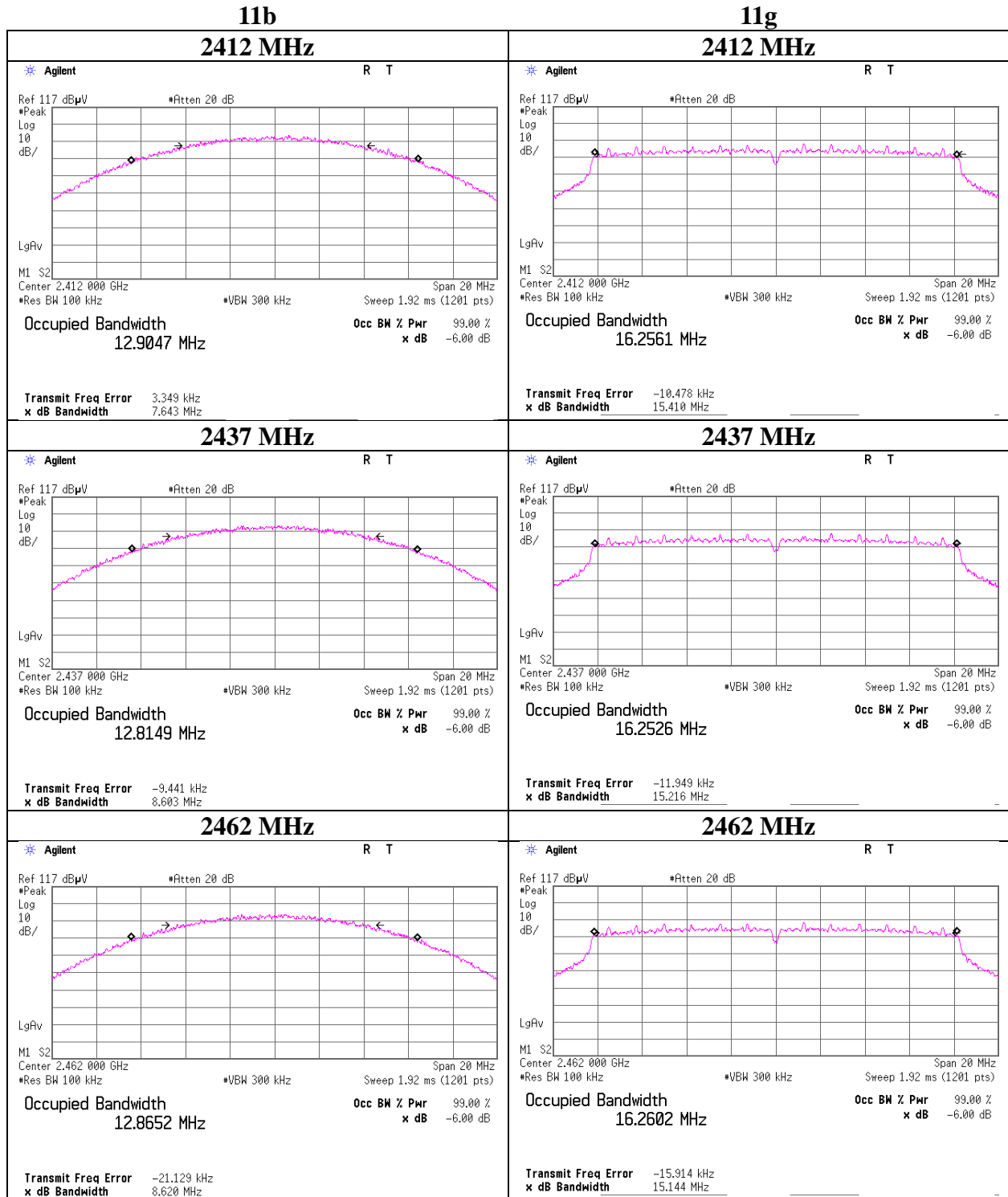
APPENDIX 1: Test data

6dB Bandwidth

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11463343H-A-R1
Date December 20, 2016
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Yutaka Yoshida
Mode Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	7.643	> 500
	2437	8.603	> 500
	2462	8.620	> 500
11g	2412	15.410	> 500
	2437	15.216	> 500
	2462	15.144	> 500
11n-20	2412	17.697	> 500
	2437	17.705	> 500
	2462	17.713	> 500

6dB Bandwidth



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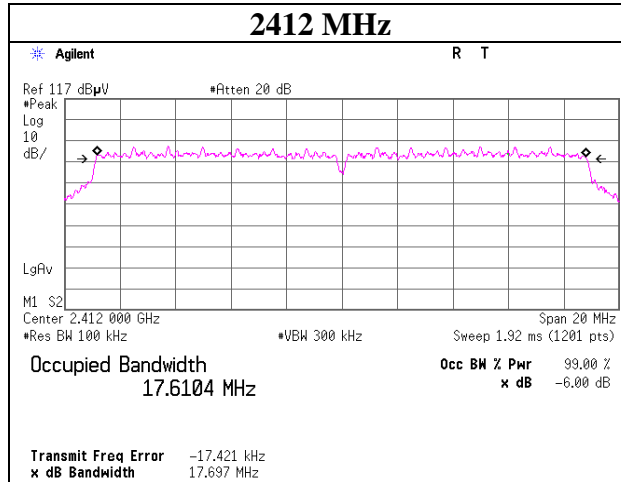
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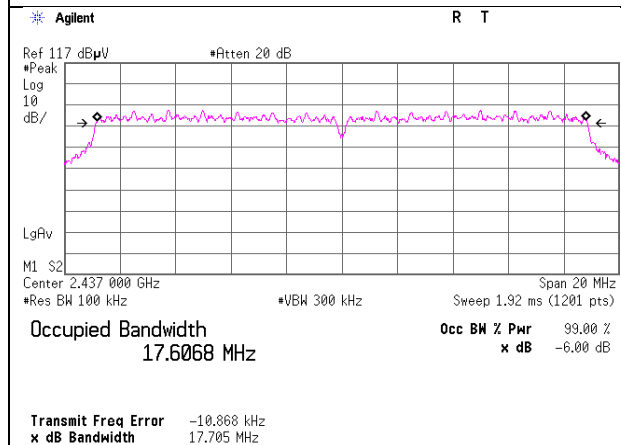
6dB Bandwidth

11n-20

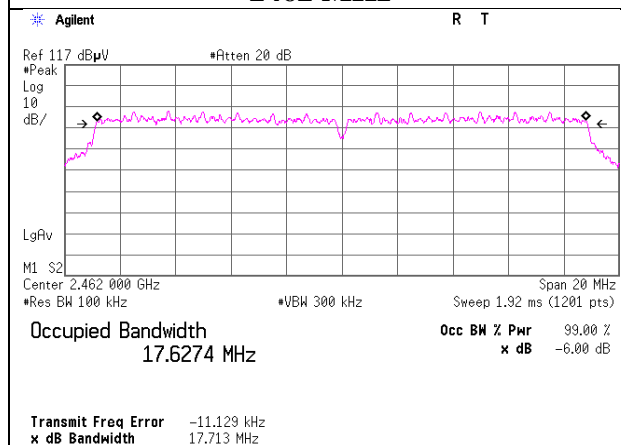
2412 MHz



2437 MHz



2462 MHz



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Maximum Peak Output Power

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11463343H-A-R1
Date	December 13, 2016
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx 11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.22	2.33	10.08	16.63	45.98	30.00	1000	13.37
2437	4.37	2.34	10.08	16.79	47.71	30.00	1000	13.21
2462	4.61	2.34	10.08	17.03	50.42	30.00	1000	12.97

Sample Calculation:

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

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	4.10	
2 L	4.11	
2 S	4.09	
5.5 L	4.05	
5.5 S	4.36	
11 L	4.13	
11 S	4.37	*

* Worst Rate

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

Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Furutaka
Mode : Tx 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.15	2.33	10.08	21.56	143.22	30.00	1000	8.44
2437	9.24	2.34	10.08	21.66	146.55	30.00	1000	8.34
2462	9.38	2.34	10.08	21.80	151.36	30.00	1000	8.20

Sample Calculation:

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

2437 MHz

Rate [Mbps]	Reading [dBm]	Remark
6	8.74	
9	8.81	
12	8.85	
18	9.24	*
24	8.95	
36	8.71	
48	9.11	
54	8.76	

* Worst Rate

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11463343H-A-R1
Date	December 13, 2016
Temperature / Humidity	24 deg. C / 51 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx 11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.32	2.33	10.08	21.73	148.94	30.00	1000	8.27
2437	9.27	2.34	10.08	21.69	147.57	30.00	1000	8.31
2462	9.45	2.34	10.08	21.87	153.82	30.00	1000	8.13

Sample Calculation:

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

2437 MHz

Long GI

MCS Number	Reading [dBm]	Remark
0	8.76	
1	8.55	
2	8.94	
3	8.67	
4	9.27	*
5	8.69	
6	8.78	
7	8.84	

Short GI

MCS Number	Reading [dBm]	Remark
0	8.73	
1	8.74	
2	8.82	
3	8.71	
4	8.66	
5	8.82	
6	8.99	
7	8.94	

* Worst MCS

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

Average Output Power
(Reference data for RF Exposure)

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Furutaka
Mode : Tx

11b 1 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	1.30	2.33	10.08	13.71	23.50	0.03	13.74	23.66
2437	1.45	2.34	10.08	13.87	24.38	0.03	13.90	24.55
2462	1.67	2.34	10.08	14.09	25.64	0.03	14.12	25.82

11g 6 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.63	2.33	10.08	10.78	11.97	0.19	10.97	12.50
2437	-1.41	2.34	10.08	11.01	12.62	0.19	11.20	13.18
2462	-1.16	2.34	10.08	11.26	13.37	0.19	11.45	13.96

11n-20 MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.78	2.33	10.08	10.63	11.56	0.20	10.83	12.11
2437	-1.57	2.34	10.08	10.85	12.16	0.20	11.05	12.74
2462	-1.34	2.34	10.08	11.08	12.82	0.20	11.28	13.43

Sample Calculation:

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

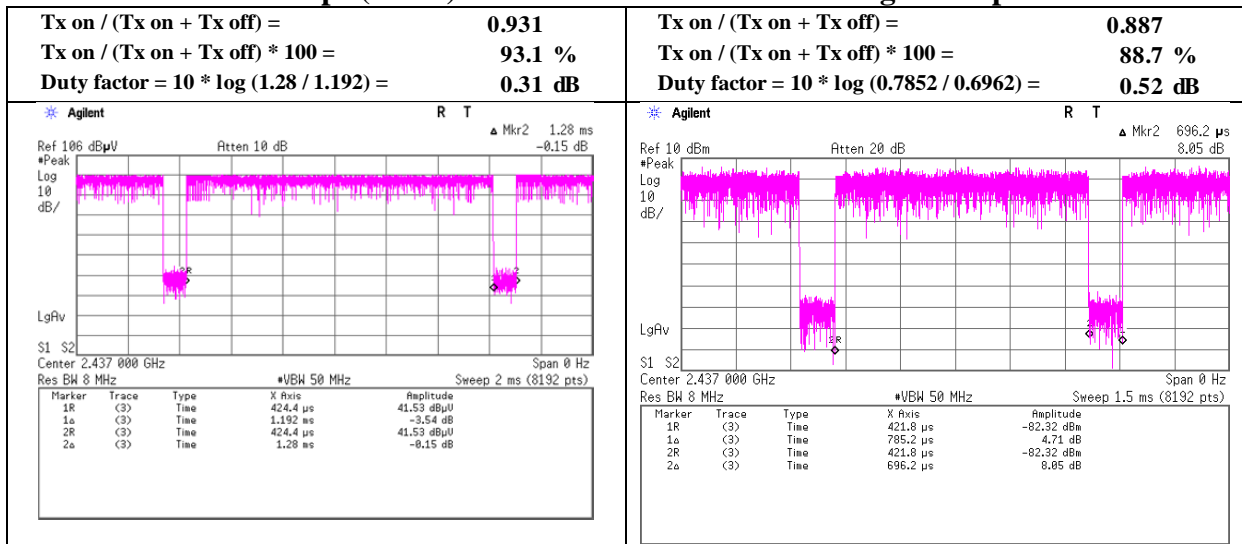
Result (Burst power average) = Time average + Duty factor

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

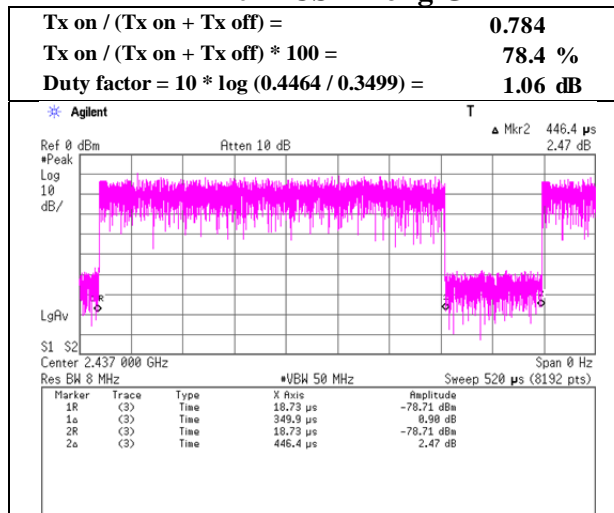
Burst rate confirmation

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11463343H-A-R1
Date	December 13, 2016
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Tomoki Matsui
Mode	Tx

11b 11 Mbps (Short)



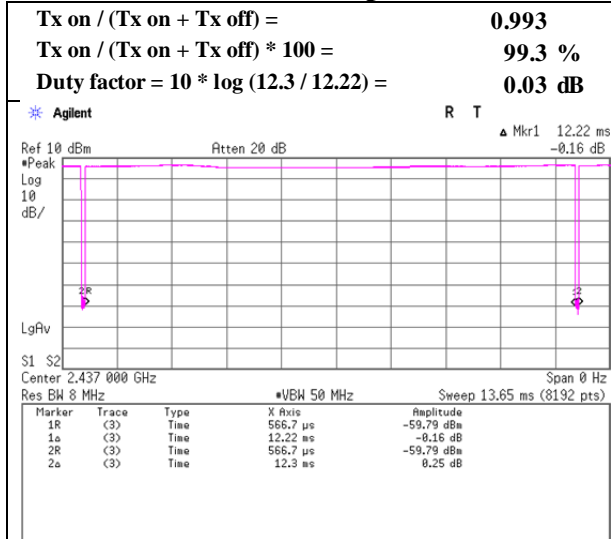
11n-20 MCS 4 Long GI



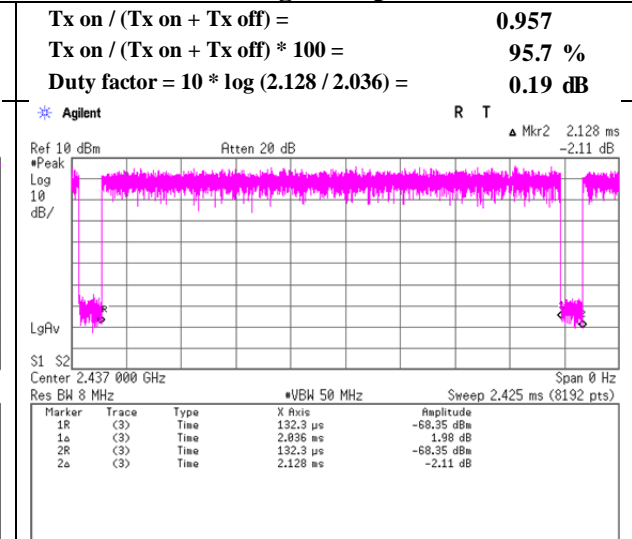
Burst rate confirmation
(Reference data for RF Exposure)

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 24 deg. C / 51 % RH
Engineer : Hiroyuki Furutaka
Mode : Tx

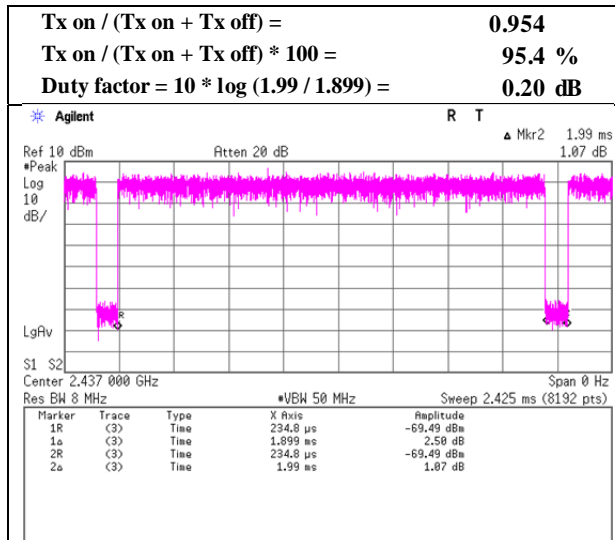
11b 1 Mbps



11g 6 Mbps



11n-20 MCS 0



Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016 December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH 23 deg. C / 40 % RH
Engineer : Tomoki Matsui Takumi Shimada
 (1 GHz -10 GHz) (Above 10 GHz)
Mode : Tx 11b 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	49.5	26.7	6.9	32.7	-	50.4	73.9	23.5	
Hori	4824.000	PK	40.6	31.1	9.1	31.8	-	49.0	73.9	24.9	Floor noise
Hori	7236.000	PK	41.3	35.7	10.4	32.6	-	54.8	73.9	19.1	Floor noise
Hori	9648.000	PK	43.3	37.2	11.0	33.3	-	58.2	73.9	15.7	
Hori	2390.000	AV	40.3	26.7	6.9	32.7	0.3	41.5	53.9	12.4	*1)
Hori	4824.000	AV	31.6	31.1	9.1	31.8	-	40.0	53.9	13.9	Floor noise
Hori	7236.000	AV	32.1	35.7	10.4	32.6	-	45.6	53.9	8.3	Floor noise
Hori	9648.000	AV	34.6	37.2	11.0	33.3	0.3	49.8	53.9	4.1	
Vert	2390.000	PK	46.2	26.7	6.9	32.7	-	47.1	73.9	26.8	
Vert	4824.000	PK	40.8	31.1	9.1	31.8	-	49.2	73.9	24.7	Floor noise
Vert	7236.000	PK	41.0	35.7	10.4	32.6	-	54.5	73.9	19.4	Floor noise
Vert	9648.000	PK	44.2	37.2	11.0	33.3	-	59.1	73.9	14.8	
Vert	2390.000	AV	37.7	26.7	6.9	32.7	0.3	38.9	53.9	15.0	*1)
Vert	4824.000	AV	31.7	31.1	9.1	31.8	-	40.1	53.9	13.8	Floor noise
Vert	7236.000	AV	32.0	35.7	10.4	32.6	-	45.5	53.9	8.4	Floor noise
Vert	9648.000	AV	35.6	37.2	11.0	33.3	0.3	50.8	53.9	3.1	

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

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

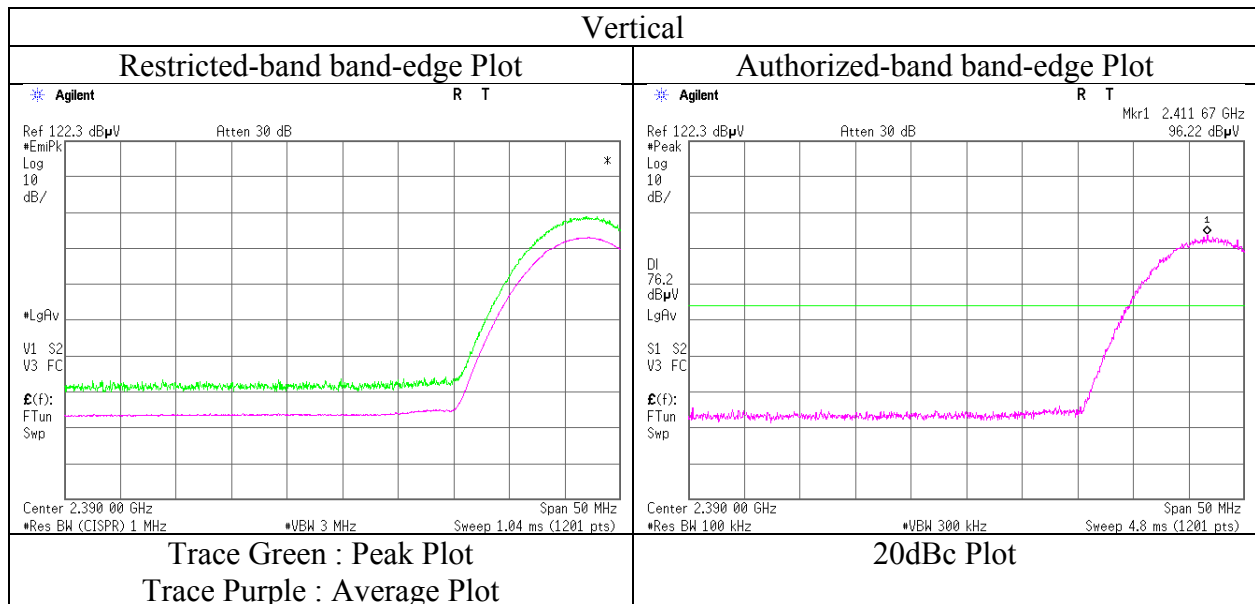
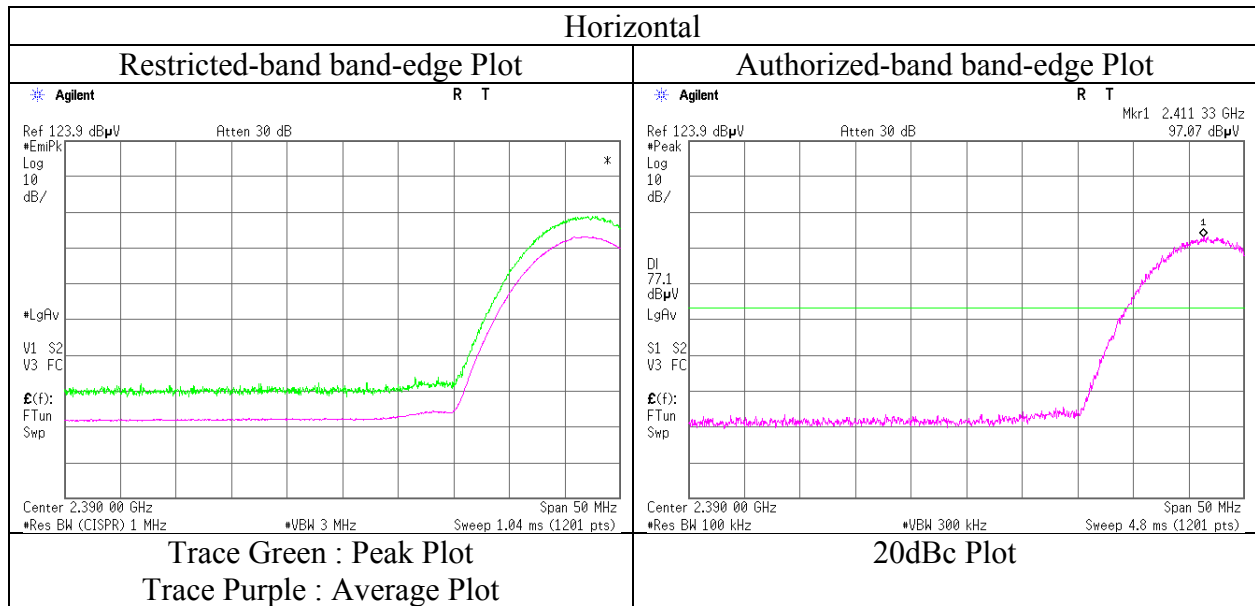
20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	97.1	26.7	6.9	32.7	98.0	-	-	Carrier
Hori	2400.000	PK	45.7	26.7	6.9	32.7	46.6	78.0	31.4	
Vert	2412.000	PK	96.2	26.7	6.9	32.7	97.1	-	-	Carrier
Vert	2400.000	PK	43.1	26.7	6.9	32.7	44.0	77.1	33.1	

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11463343H-A-R1
Date	December 13, 2016
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Tomoki Matsui
	(1 GHz -10 GHz)
Mode	Tx 11b 2412 MHz



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

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Ise EMC Lab.

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016 December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH 23 deg. C / 40 % RH
Engineer : Tomoki Matsui Takumi Shimada
 (1 GHz -10 GHz) (Above 10 GHz)
Mode : Tx 11b 2437 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	41.9	31.2	9.1	31.7	-	50.5	73.9	23.4	Floor noise
Hori	7311.000	PK	40.0	35.6	10.4	32.6	-	53.4	73.9	20.5	Floor noise
Hori	9748.000	PK	42.4	37.2	11.0	33.3	-	57.3	73.9	16.6	
Hori	4874.000	AV	32.4	31.2	9.1	31.7	-	41.0	53.9	12.9	Floor noise
Hori	7311.000	AV	32.5	35.6	10.4	32.6	-	45.9	53.9	8.0	Floor noise
Hori	9748.000	AV	34.9	37.2	11.0	33.3	0.3	50.1	53.9	3.8	
Vert	4874.000	PK	41.8	31.2	9.1	31.7	-	50.4	73.9	23.5	Floor noise
Vert	7311.000	PK	40.0	35.6	10.4	32.6	-	53.4	73.9	20.5	Floor noise
Vert	9748.000	PK	43.3	37.2	11.0	33.3	-	58.2	73.9	15.7	
Vert	4874.000	AV	32.5	31.2	9.1	31.7	-	41.1	53.9	12.8	Floor noise
Vert	7311.000	AV	32.5	35.6	10.4	32.6	-	45.9	53.9	8.0	Floor noise
Vert	9748.000	AV	36.1	37.2	11.0	33.3	0.3	51.3	53.9	2.6	

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

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

Distance factor: 1 GHz - 10 GHz 20log(4.5 m / 3.0 m) = 3.53 dB
 10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016 December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH 23 deg. C / 40 % RH
Engineer : Tomoki Matsui Takumi Shimada
 (1 GHz -10 GHz) (Above 10 GHz)
Mode : Tx 11b 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	44.2	26.8	7.0	32.6	-	45.4	73.9	28.5	
Hori	4924.000	PK	40.2	31.4	9.1	31.7	-	49.0	73.9	24.9	Floor noise
Hori	7386.000	PK	41.6	35.5	10.3	32.7	-	54.7	73.9	19.2	Floor noise
Hori	2483.500	AV	35.7	26.8	7.0	32.6	0.3	37.2	53.9	16.7	*1)
Hori	4924.000	AV	31.3	31.4	9.1	31.7	-	40.1	53.9	13.8	Floor noise
Hori	7386.000	AV	31.8	35.5	10.3	32.7	-	44.9	53.9	9.0	Floor noise
Vert	2483.500	PK	43.4	26.8	7.0	32.6	-	44.6	73.9	29.3	
Vert	4924.000	PK	40.2	31.4	9.1	31.7	-	49.0	73.9	24.9	Floor noise
Vert	7386.000	PK	41.2	35.5	10.3	32.7	-	54.3	73.9	19.6	Floor noise
Vert	2483.500	AV	35.1	26.8	7.0	32.6	0.3	36.6	53.9	17.3	*1)
Vert	4924.000	AV	31.4	31.4	9.1	31.7	-	40.2	53.9	13.7	Floor noise
Vert	7386.000	AV	31.9	35.5	10.3	32.7	-	45.0	53.9	8.9	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	95.1	26.8	7.0	32.7	96.2	-	-	Carrier
Hori	9848.000	PK	37.8	37.2	11.1	33.3	52.8	76.2	23.4	
Vert	2462.000	PK	94.0	26.8	7.0	32.7	95.1	-	-	Carrier
Vert	9848.000	PK	40.1	37.2	11.1	33.3	55.1	75.1	20.0	

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

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Ise EMC Lab.

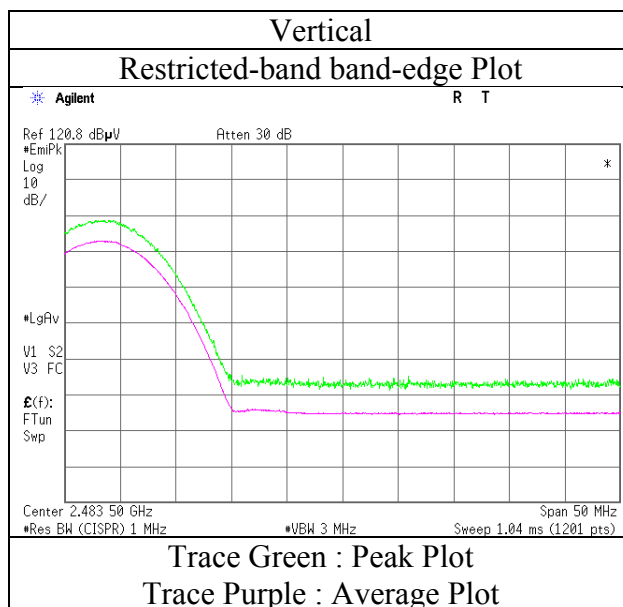
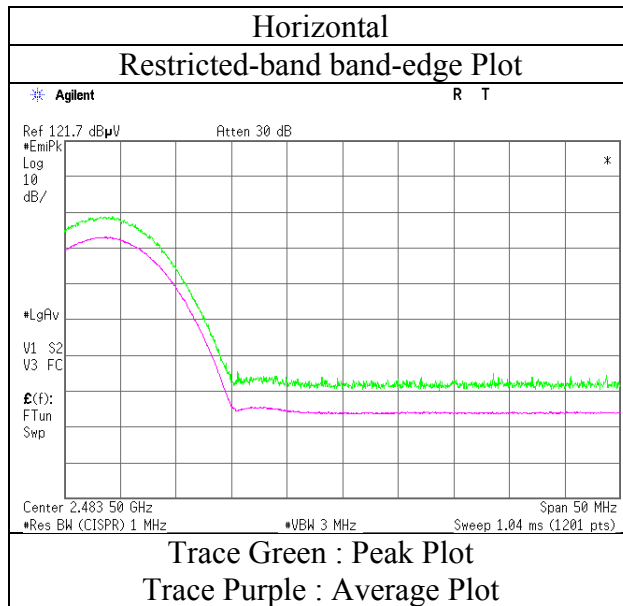
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Radiated Spurious Emission
(Reference Plot for band-edge)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH
Engineer : Tomoki Matsui
(1 GHz -10 GHz)
Mode : Tx 11b 2462 MHz



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

Radiated Spurious Emission

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. 11463343H-A-R1
Date December 13, 2016 December 13, 2016
Temperature / Humidity 20 deg. C / 37 % RH 23 deg. C / 40 % RH
Engineer Tomoki Matsui Takumi Shimada
 (1 GHz -10 GHz) (Above 10 GHz)
Mode Tx 11n-20 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	55.9	26.7	6.9	32.7	-	56.8	73.9	17.1	
Hori	4824.000	PK	40.6	31.1	9.1	31.8	-	49.0	73.9	24.9	Floor noise
Hori	7236.000	PK	41.3	35.7	10.4	32.6	-	54.8	73.9	19.1	Floor noise
Hori	9648.000	PK	42.6	37.2	11.0	33.3	-	57.5	73.9	16.4	
Hori	2390.000	AV	44.5	26.7	6.9	32.7	1.1	46.5	53.9	7.4	*1)
Hori	4824.000	AV	31.6	31.1	9.1	31.8	-	40.0	53.9	13.9	Floor noise
Hori	7236.000	AV	32.1	35.7	10.4	32.6	-	45.6	53.9	8.3	Floor noise
Hori	9648.000	AV	34.0	37.2	11.0	33.3	1.1	50.0	53.9	3.9	
Vert	2390.000	PK	54.6	26.7	6.9	32.7	-	55.5	73.9	18.4	
Vert	4824.000	PK	40.8	31.1	9.1	31.8	-	49.2	73.9	24.7	Floor noise
Vert	7236.000	PK	41.0	35.7	10.4	32.6	-	54.5	73.9	19.4	Floor noise
Vert	9648.000	PK	43.1	37.2	11.0	33.3	-	58.0	73.9	15.9	
Vert	2390.000	AV	42.5	26.7	6.9	32.7	1.1	44.5	53.9	9.4	*1)
Vert	4824.000	AV	31.7	31.1	9.1	31.8	-	40.1	53.9	13.8	Floor noise
Vert	7236.000	AV	32.0	35.7	10.4	32.6	-	45.5	53.9	8.4	Floor noise
Vert	9648.000	AV	35.0	37.2	11.0	33.3	1.1	51.0	53.9	2.9	

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

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

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

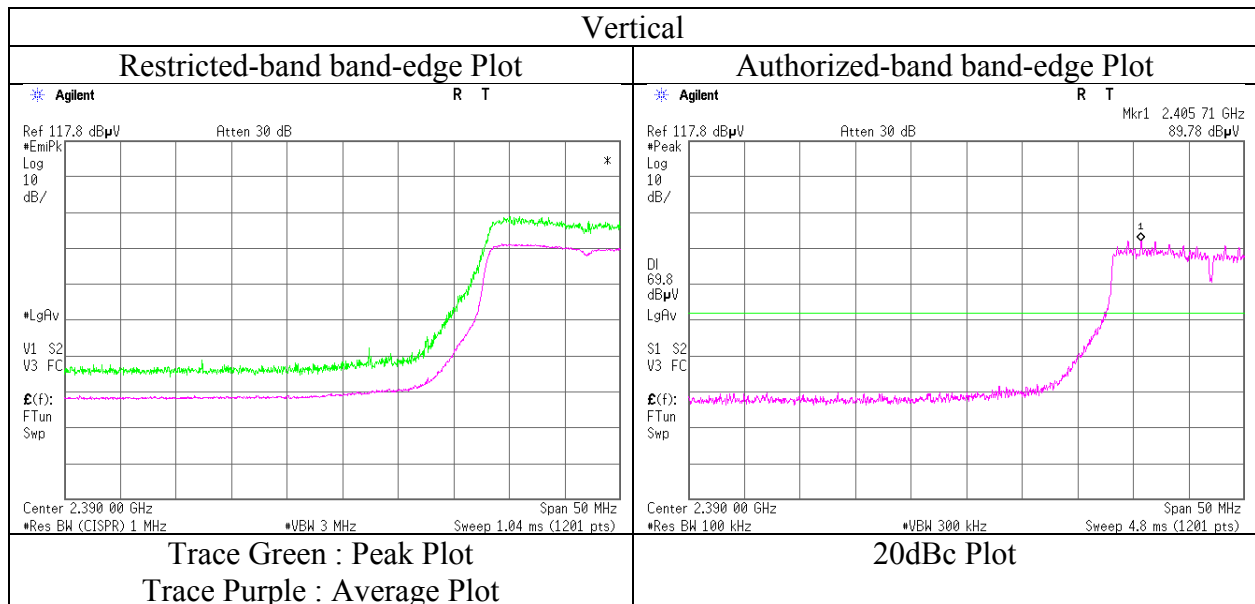
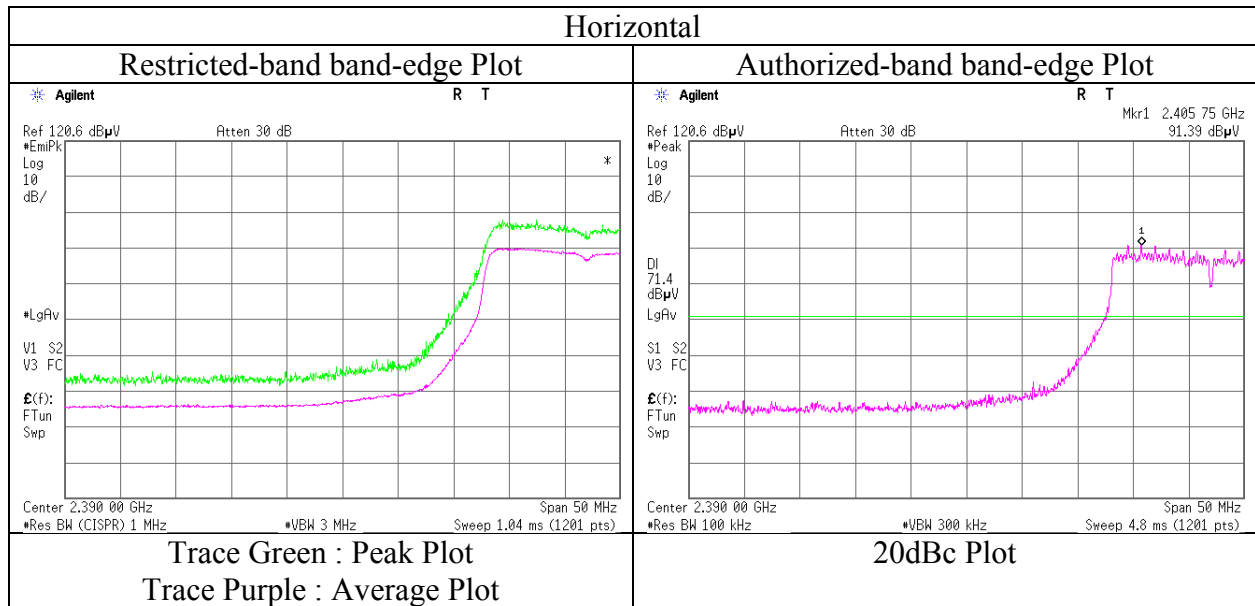
20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.4	26.7	6.9	32.7	92.3	-	-	Carrier
Hori	2400.000	PK	58.8	26.7	6.9	32.7	59.7	72.3	12.6	
Vert	2412.000	PK	89.8	26.7	6.9	32.7	90.7	-	-	Carrier
Vert	2400.000	PK	57.1	26.7	6.9	32.7	58.0	70.7	12.7	

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH
Engineer : Tomoki Matsui
(1 GHz -10 GHz)
Mode : Tx 11n-20 2412 MHz



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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016 December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH 23 deg. C / 40 % RH
Engineer : Tomoki Matsui Takumi Shimada
(1 GHz -10 GHz) (Above 10 GHz)
Mode : Tx 11n-20 2437 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	41.9	31.2	9.1	31.7	-	50.5	73.9	23.4	Floor noise
Hori	7311.000	PK	40.0	35.6	10.4	32.6	-	53.4	73.9	20.5	Floor noise
Hori	9748.000	PK	43.1	37.2	11.0	33.3	-	58.0	73.9	15.9	Floor noise
Hori	4874.000	AV	32.4	31.2	9.1	31.7	-	41.0	53.9	12.9	Floor noise
Hori	7311.000	AV	32.5	35.6	10.4	32.6	-	45.9	53.9	8.0	Floor noise
Hori	9748.000	AV	35.0	37.2	11.0	33.3	1.1	51.0	53.9	2.9	Floor noise
Vert	4874.000	PK	41.8	31.2	9.1	31.7	-	50.4	73.9	23.5	Floor noise
Vert	7311.000	PK	40.0	35.6	10.4	32.6	-	53.4	73.9	20.5	Floor noise
Vert	9748.000	PK	42.7	37.2	11.0	33.3	-	57.6	73.9	16.3	Floor noise
Vert	4874.000	AV	32.5	31.2	9.1	31.7	-	41.1	53.9	12.8	Floor noise
Vert	7311.000	AV	32.5	35.6	10.4	32.6	-	45.9	53.9	8.0	Floor noise
Vert	9748.000	AV	34.9	37.2	11.0	33.3	1.1	50.9	53.9	3.0	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11463343H-A-R1		
Date	December 13, 2016	December 13, 2016	December 14, 2016
Temperature / Humidity	20 deg. C / 37 % RH	23 deg. C / 40 % RH	20 deg. C / 40 % RH
Engineer	Tomoki Matsui	Takumi Shimada	Shuichi Ohyama
	(1 GHz -10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx 11n-20 2462 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	49.147	QP	30.0	11.1	7.4	28.1	-	20.4	40.0	19.6	
Hori	59.183	QP	26.5	7.7	7.6	28.1	-	13.7	40.0	26.3	
Hori	150.700	QP	28.5	15.1	8.7	27.7	-	24.6	43.5	18.9	
Hori	333.064	QP	34.3	14.3	10.2	27.4	-	31.4	46.0	14.6	
Hori	341.250	QP	36.1	14.4	10.3	27.4	-	33.4	46.0	12.6	
Hori	487.500	QP	31.3	17.4	11.3	28.1	-	31.9	46.0	14.1	
Hori	2483.500	PK	56.0	26.8	7.0	32.6	-	57.2	73.9	16.7	
Hori	4924.000	PK	40.2	31.4	9.1	31.7	-	49.0	73.9	24.9	Floor noise
Hori	7386.000	PK	41.6	35.5	10.3	32.7	-	54.7	73.9	19.2	Floor noise
Hori	2483.500	AV	41.5	26.8	7.0	32.6	1.1	43.8	53.9	10.1	*1)
Hori	4924.000	AV	31.3	31.4	9.1	31.7	-	40.1	53.9	13.8	Floor noise
Hori	7386.000	AV	31.8	35.5	10.3	32.7	-	44.9	53.9	9.0	Floor noise
Vert	49.147	QP	34.1	11.1	7.4	28.1	-	24.5	40.0	15.5	
Vert	59.183	QP	26.4	7.7	7.6	28.1	-	13.6	40.0	26.4	
Vert	150.700	QP	27.7	15.1	8.7	27.7	-	23.8	43.5	19.7	
Vert	333.064	QP	29.9	14.3	10.2	27.4	-	27.0	46.0	19.0	
Vert	341.250	QP	32.4	14.4	10.3	27.4	-	29.7	46.0	16.3	
Vert	487.500	QP	30.6	17.4	11.3	28.1	-	31.2	46.0	14.8	
Vert	2483.500	PK	53.7	26.8	7.0	32.6	-	54.9	73.9	19.0	
Vert	4924.000	PK	40.2	31.4	9.1	31.7	-	49.0	73.9	24.9	Floor noise
Vert	7386.000	PK	41.2	35.5	10.3	32.7	-	54.3	73.9	19.6	Floor noise
Vert	2483.500	AV	39.6	26.8	7.0	32.6	1.1	41.9	53.9	12.0	*1)
Vert	4924.000	AV	31.4	31.4	9.1	31.7	-	40.2	53.9	13.7	Floor noise
Vert	7386.000	AV	31.9	35.5	10.3	32.7	-	45.0	53.9	8.9	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log(4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

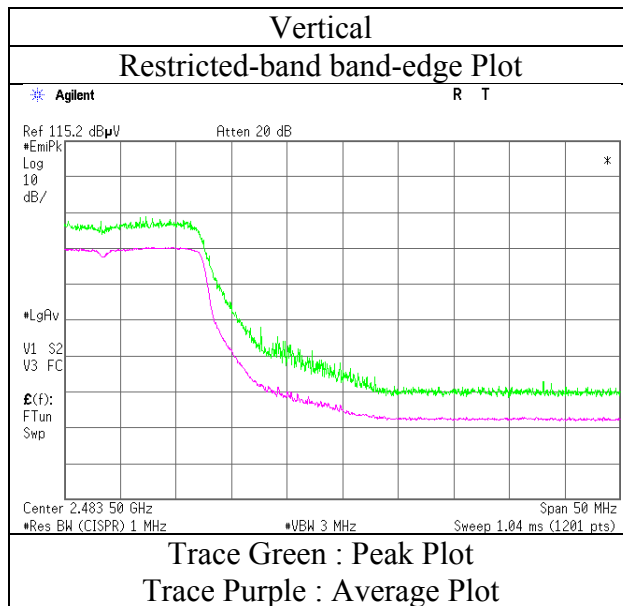
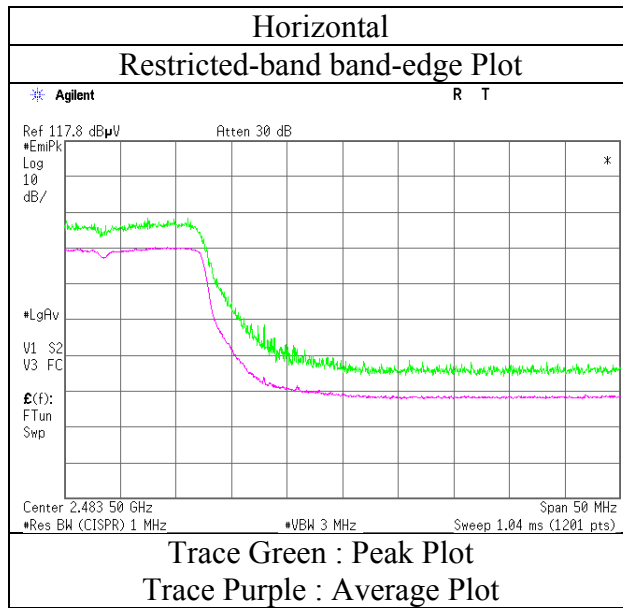
20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	88.7	26.8	7.0	32.7	89.8	-	-	Carrier
Hori	9848.000	PK	38.9	37.2	11.1	33.3	53.9	69.8	15.9	
Vert	2462.000	PK	86.3	26.8	7.0	32.7	87.4	-	-	Carrier
Vert	9848.000	PK	40.2	37.2	11.1	33.3	55.2	67.4	12.2	

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

Radiated Spurious Emission
(Reference Plot for band-edge)

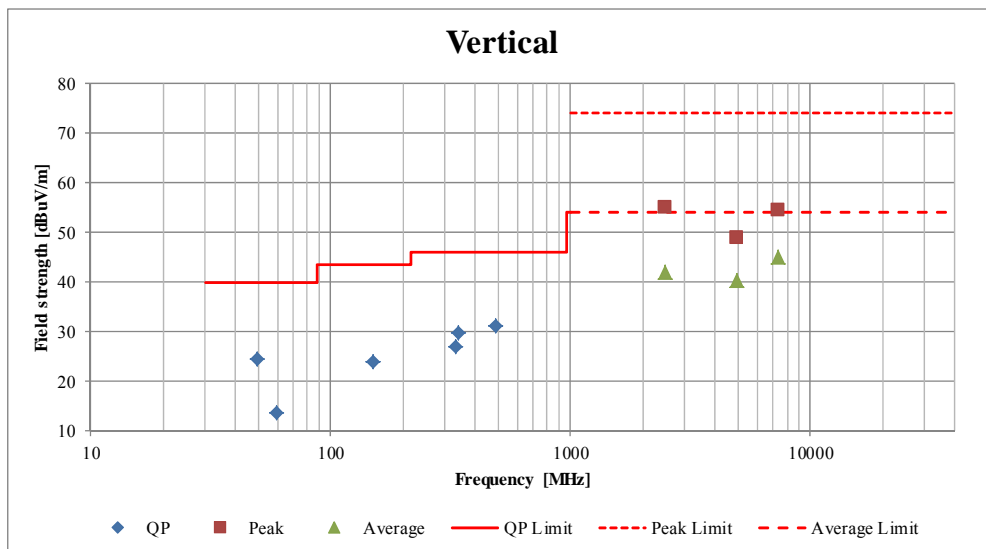
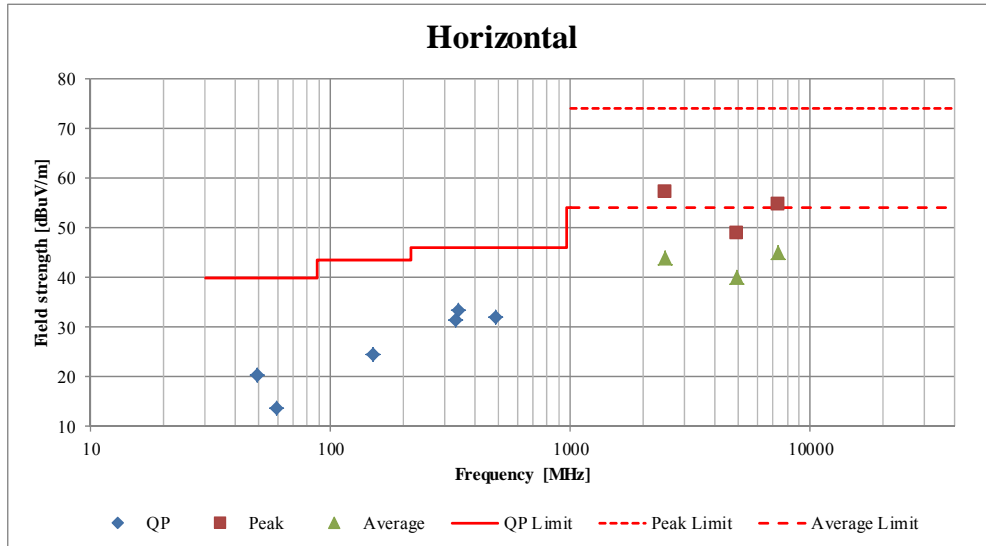
Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11463343H-A-R1
Date : December 13, 2016
Temperature / Humidity : 20 deg. C / 37 % RH
Engineer : Tomoki Matsui
(1 GHz -10 GHz)
Mode : Tx 11n-20 2462 MHz



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

Radiated Spurious Emission (Plot data, Worst case)

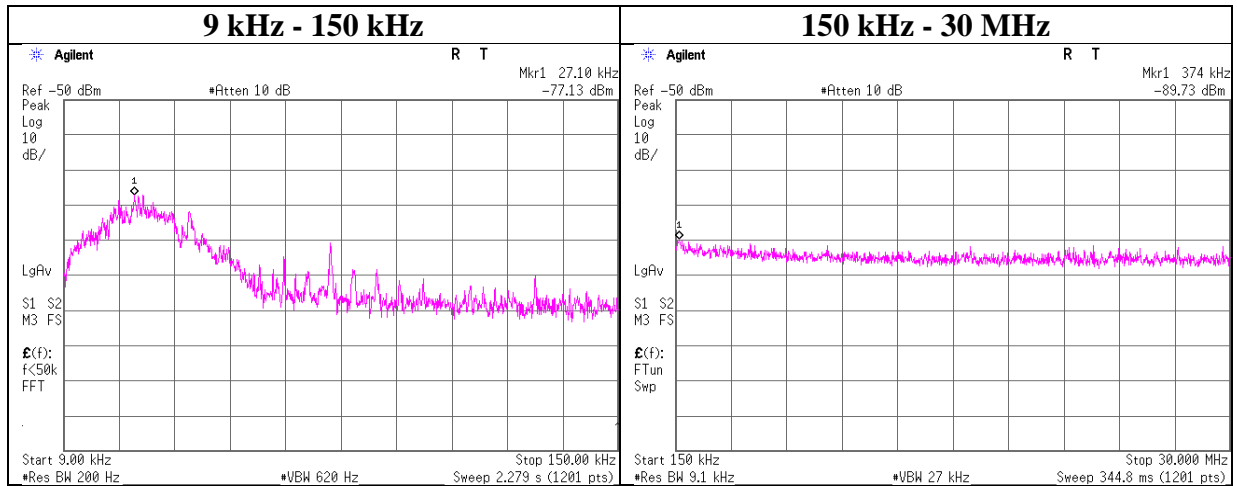
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11463343H-A-R1		
Date	December 13, 2016	December 13, 2016	December 14, 2016
Temperature / Humidity	20 deg. C / 37 % RH	23 deg. C / 40 % RH	20 deg. C / 40 % RH
Engineer	Tomoki Matsui (1 GHz -10 GHz)	Takumi Shimada (Above 10 GHz)	Shuichi Ohyama (Below 1 GHz)
Mode	Tx 11n-20 2462 MHz		



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

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11463343H-A-R1
Date	December 20, 2016
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Yutaka Yoshida
Mode	Tx 11n-20 2462 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
27.10	-77.1	0.01	9.8	2.0	1	-65.3	300	6.0	-4.0	38.9	42.9	
374.00	-89.7	0.01	9.8	2.0	1	-77.9	300	6.0	-16.6	16.1	32.7	

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

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

N: Number of output

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

Power Density

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11463343H-A-R1
Date December 20, 2016
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Yutaka Yoshida
Mode Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-15.49	2.33	10.08	-3.08	8.00	11.08
2437.00	-19.89	2.34	10.08	-7.47	8.00	15.47
2462.00	-18.05	2.34	10.08	-5.63	8.00	13.63

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-26.78	2.33	10.08	-14.37	8.00	22.37
2437.00	-26.36	2.34	10.08	-13.94	8.00	21.94
2462.00	-25.58	2.34	10.08	-13.16	8.00	21.16

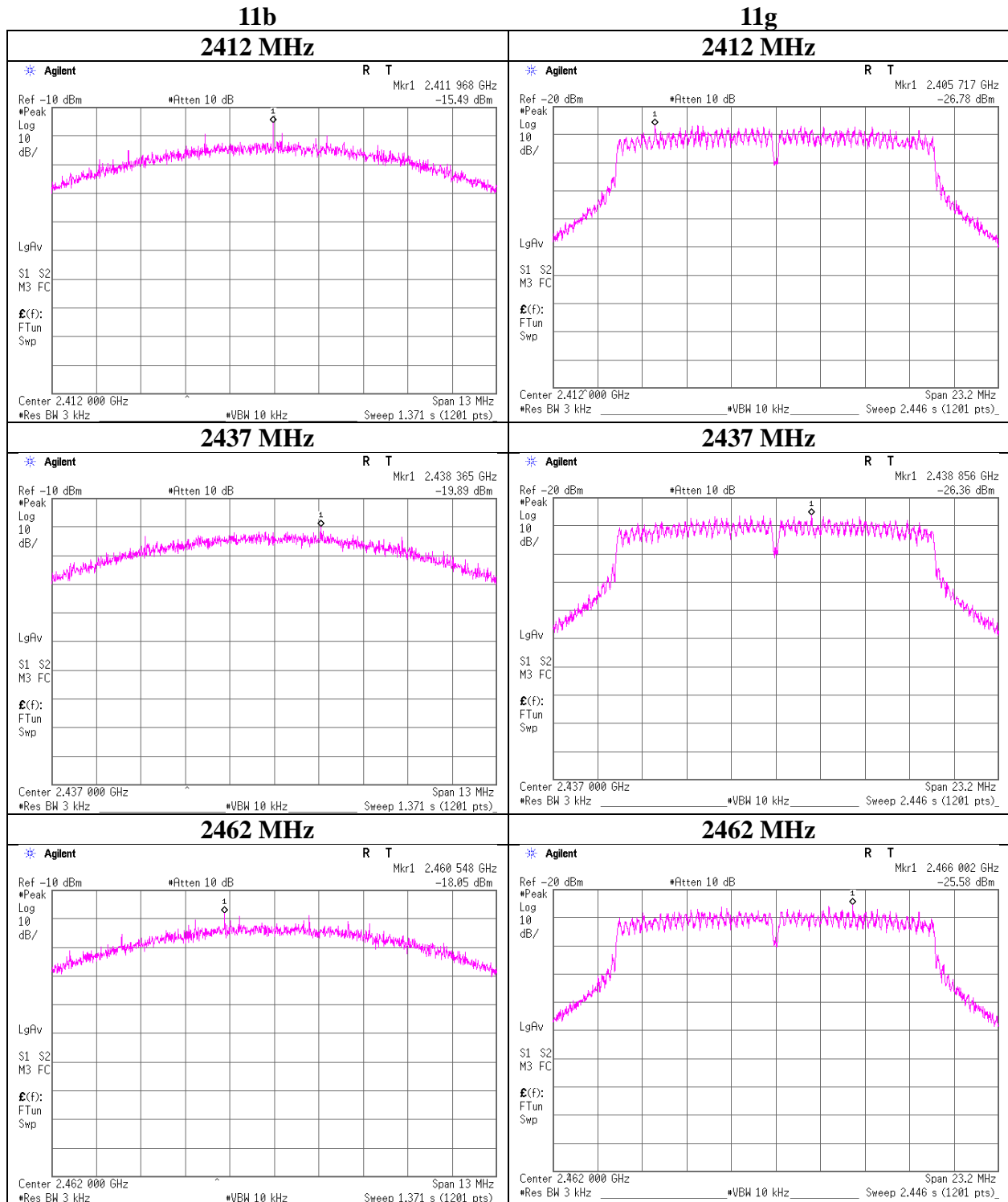
11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-26.66	2.33	10.08	-14.25	8.00	22.25
2437.00	-27.25	2.34	10.08	-14.83	8.00	22.83
2462.00	-27.22	2.34	10.08	-14.80	8.00	22.80

Sample Calculation:

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

Power Density



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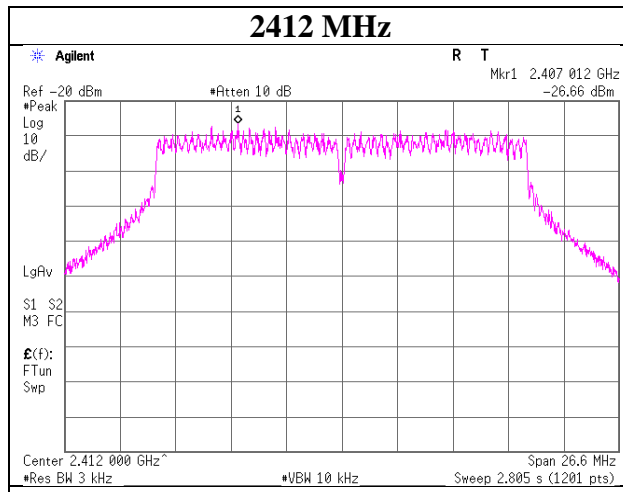
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

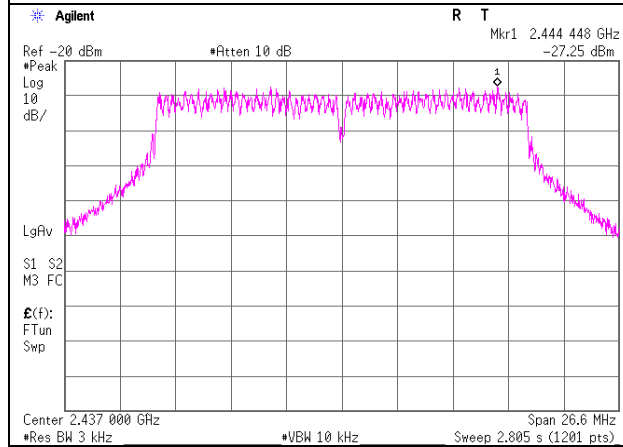
Power Density

11n-20

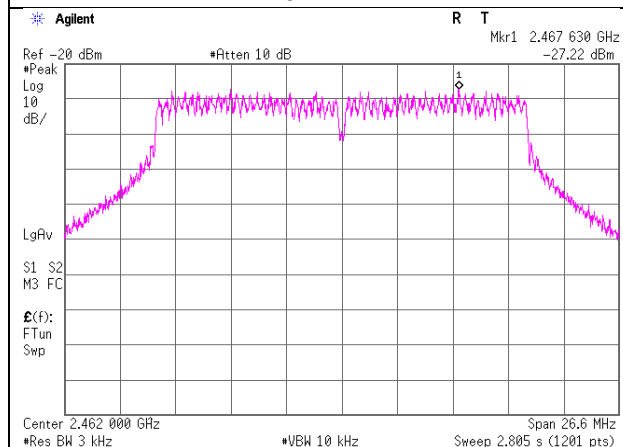
2412 MHz



2437 MHz

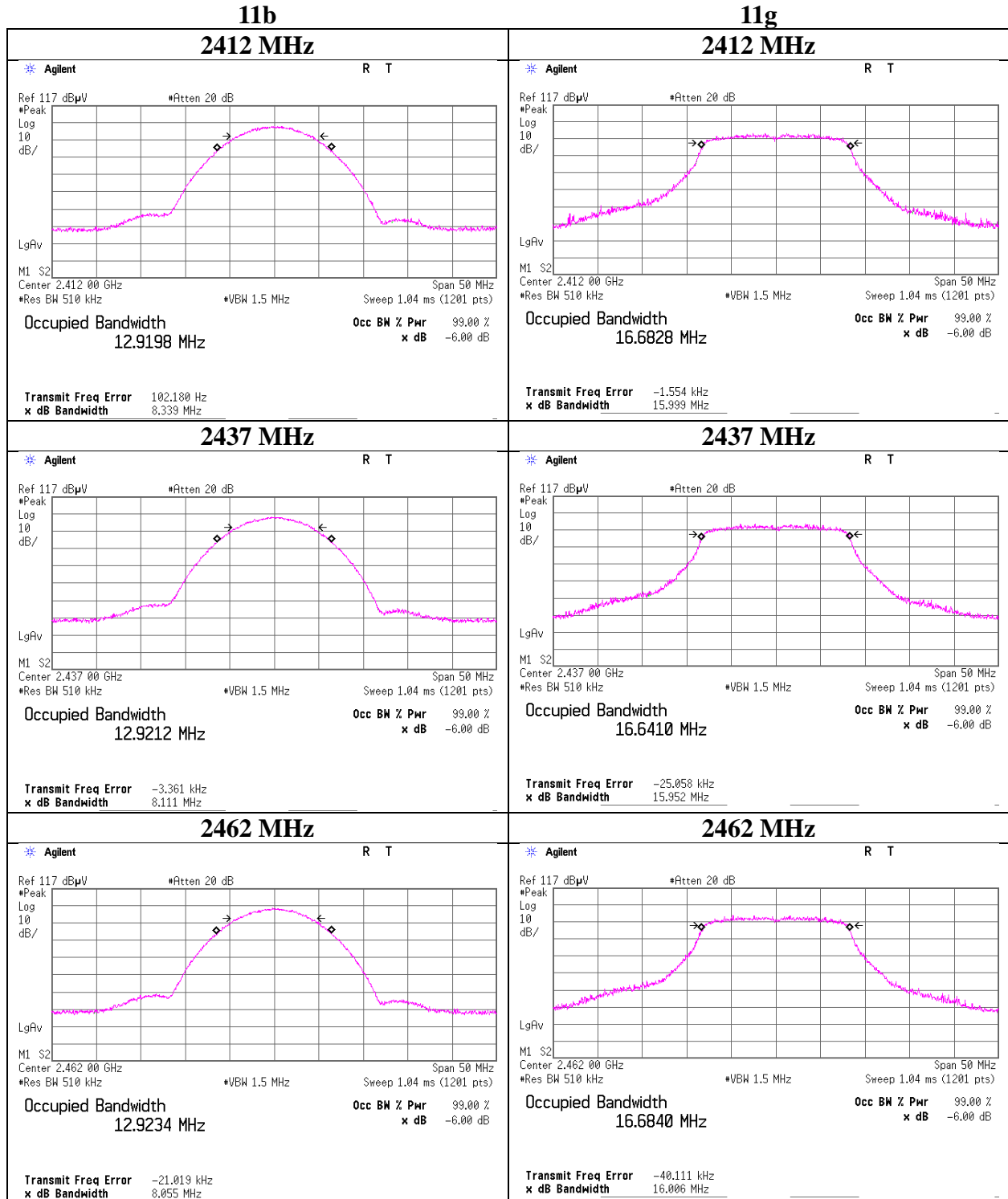


2462 MHz



99% Occupied Bandwidth

Test place Report No. Date Temperature / Humidity Engineer Mode	Ise EMC Lab. No.11 Measurement Room 11463343H-A-R1 December 20, 2016 24 deg. C / 30 % RH Yutaka Yoshdia Tx
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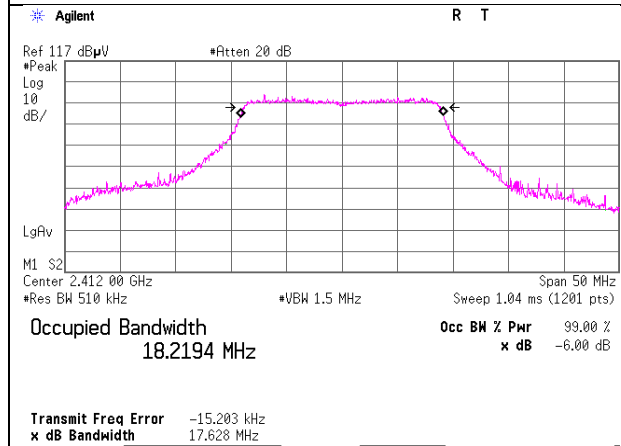


99% Occupied Bandwidth

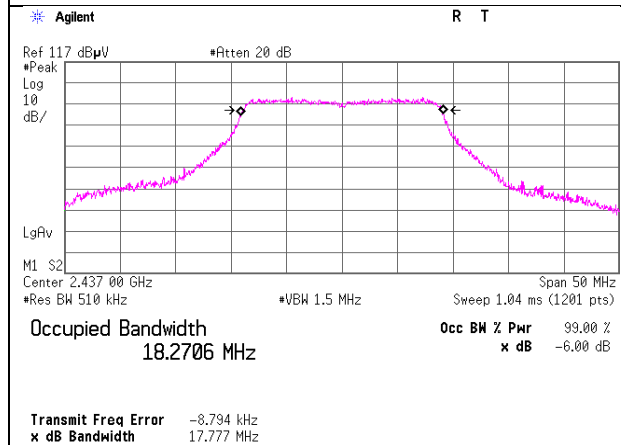
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11463343H-A-R1
Date	December 20, 2016
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Yutaka Yoshida
Mode	Tx

11n-20

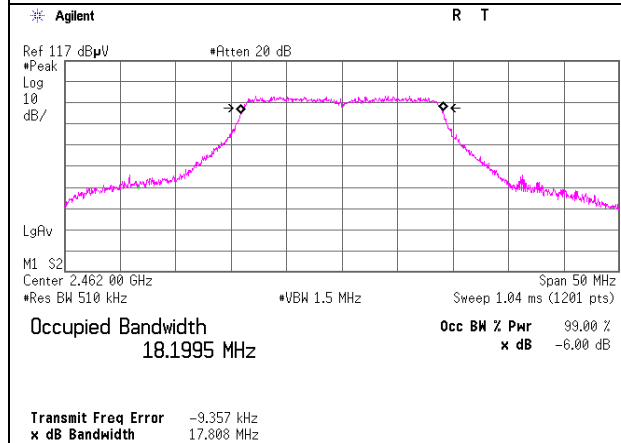
2412 MHz



2437 MHz



2462 MHz



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2016/01/21 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2016/10/17 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2016/10/17 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2016/12/15 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2016/04/18 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2016/08/17 * 12
MMM-17	DIGITAL HiTESTER	Hioki	3805	070900530	AT	2016/01/13 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2016/12/13 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2016/03/10 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2016/11/28 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2016/10/20 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2016/11/10 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2016/05/29 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2016/05/20 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2016/09/21 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2016/05/29 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2016/09/15 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2016/10/15 * 12
MLA-22	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	RE	2016/01/30 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2016/07/26 * 12
MAT-98	Attenuator	KEYSIGHT	8491A	MY52462349	RE	2016/12/05 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2016/09/13 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

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

**Test Item: RE: Radiated Emission test
AT: Antenna Terminal Conducted test**

UL Japan, Inc.

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