RADIO TEST REPORT

Test Report No. : 11051899H-A-R1

Applicant	:	**FUJITSU TEN LIMITED**
Type of Equipment	:	**Car Navigation**
Model No.	:	**FT0102A**
FCC ID	:	**BABFT0102A**
Test regulation	:	**FCC Part 15 Subpart C: 2015** ***WLAN part**
Test Result	:	**Complied**

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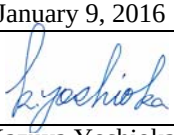
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
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 11051899H-A. 11051899H-A is replaced with this report.

Date of test: December 21, 2015 to January 9, 2016

Representative test engineer:



Kazuya Yoshioka
Engineer
Consumer Technology Division

Approved by:

Takahiro Hatakeda
Leader
Consumer Technology Division

NVLAP LAB CODE: 200572-0

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.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://japan.ul.com/resources/emc_accredited/

REVISION HISTORY

Original Test Report No.: 11051899H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11051899H-A	February 17, 2016	-	-
1	11051899H-A-R1	March 17, 2016	P.20	Addition of explanatory note for test data

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	FUJITSU TEN LIMITED
Address	:	2-28, Gosho-dori 1-Chome, Hyogo-ku, Kobe 652-8510,JAPAN
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 Navigation
Model No.	:	FT0102A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	December 16, 2015
Country of Mass-production	:	Japan
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

General Specification

Clock frequency(ies) in the system	:	389.49 MHz, 26 MHz

Radio Specification

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

Radio Type	:	Transceiver
Frequency of Operation	:	2412-2462MHz
Modulation	:	DSSS / OFDM
Power Supply (radio part input)	:	DC 3.3V
Antenna type	:	Inverted F Antenna
Antenna Gain	:	-0.21dBi (MAX)

[Bluetooth (Ver. 3.0 with EDR function)]

Radio Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC 3.3V
Antenna type	:	Inverted F Antenna
Antenna Gain	:	0.03dBi (MAX)

[GPS]

Radio Type	:	Receiver
Frequency of Operation	:	1575.42MHz
Modulation	:	DSS
Power Supply (radio part input)	:	DC 12 V

* This test report applies for WLAN.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2015, final revised on November 23, 2015 *Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	N/A *1)	Complied	-
6dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r04 **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 v03r04 **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 v03r04 **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 v03r04 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.7 dB 2483.500 MHz, AV, Horizontal.	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 v03r04 12.2.7.

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

FCC 15.31 (e)

The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage.
Instead of a new battery, DC power supply was used for the test.
That does not affect the test result, therefore the 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.

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.

Ise EMC Lab.

Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(±dB)		(10 m*)(±dB)	
	30 – 300 MHz	300 – 1000MHz	30 – 300 MHz	300 – 1000MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	4.5 dB	5.9 dB	4.8 dB	5.1 dB

Radiated emission				
(3 m*)(±dB)		(1 m*)(±dB)	(0.5 m*)(±dB)	(10 m*)(±dB)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.1 dB	5.3 dB	5.1 dB	5.1 dB	5.3 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

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

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.

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.

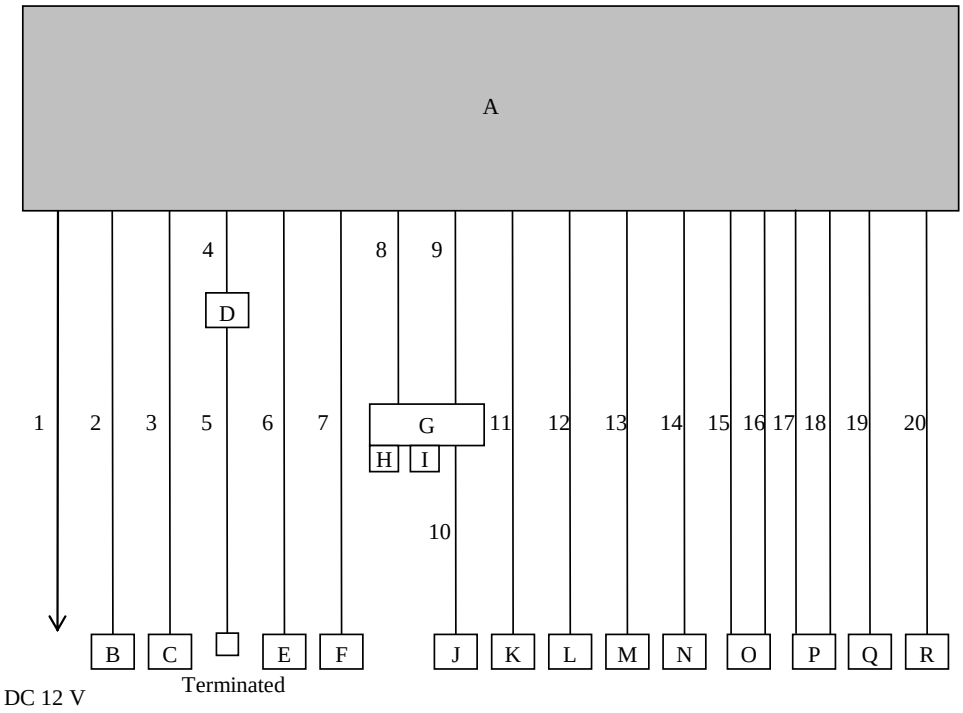
Mode	Remarks*
IEEE 802.11b (11b)	1 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 4 (Short GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: Internal PA gain 11b: 9 /11g, 11n20: 10 Tx mixer gain 11b: 3 / 11g, 11n20: 7 Software: Uni Test Ver 7.2.1.5 *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 11g Tx *1)	2412 MHz 2437 MHz 2462 MHz
Band edge of Spurious Emission above 1GHz (Radiated)	11b Tx 11g Tx 11n-20 Tx	2412 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 *2) Radiated Spurious Emission (Below 1GHz)	11g Tx	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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Navigation	FT0102A	AMA00007	FUJITSU TEN LIMITED	EUT
B	XM Antenna	A258124	-	-	-
C	GPS Antenna	195000-0180A700	OH59	FUJITSU TEN LIMITED	-
D	Impedance converter	-	-	-	-
E	Air-conditioner ECU	88650-50B70	KK1008011	DENSO	-
F	Sterring Switch	-	-	Panasonic	-
G	VTR jack	86190-400AO	1158	-	-
H	USB memory	RUF-C256M/U2	A5040903538	BUFFALO	-
I	USB memory	RUF2-JV4GS-WH	I21101	BUFFALO	-
J	iPod touch	A1367	C3RJ4SLADT75	Apple	-
K	Speaker	E505SSP	47312	FUJITSU TEN LIMITED	-
L	Speaker	E503SSP	93214	FUJITSU TEN LIMITED	-
M	Mic	-	-	-	-
N	Switch	-	-	-	-
O	DCM	86741-48030	8KYKY930847	DENSO	-
P	Separate Display	86111-785A1	1006	Panasonic	-
Q	Haptic	84780-76040-CO	08P23	DENSO	-
R	Rear Camera	86790-76010	1ZCO1921	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	6.4	Unshielded	Unshielded	-
2	XM Antenna Cable	7.9	Shielded	Shielded	-
3	GPS Antenna Cable	6.8	Shielded	Shielded	-
4	FM Antenna Cable	0.3	Shielded	Shielded	-
5	BNC Cable	1.0	Shielded	Shielded	-
6	Signal Cable	3.4	Unshielded	Unshielded	-
7	Signal Cable	3.4	Unshielded	Unshielded	-
8	Signal Cable	3.4	Unshielded	Unshielded	-
9	USB Cable	2.0	Shielded	Shielded	-
10	Audio Cable	1.5	Unshielded	Unshielded	-
11	Speaker Cable	5.4	Unshielded	Unshielded	-
12	Speaker Cable	5.4	Unshielded	Unshielded	-
13	Signal Cable	4.9	Unshielded	Unshielded	-
14	Signal Cable	4.9	Unshielded	Unshielded	-
15	Signal Cable	3.4	Unshielded	Unshielded	-
16	Signal Cable	3.5	Unshielded	Unshielded	-
17	Signal Cable	3.4	Unshielded	Unshielded	-
18	Signal Cable	3.5	Unshielded	Unshielded	-
19	Signal Cable	3.4	Unshielded	Unshielded	-
20	Signal Cable	3.5	Unshielded	Unshielded	-

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 v03r04".

[For below 1GHz]
EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

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

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 300 MHz	300 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: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Integration Method: 13.3.2 RBW: 100kHz VBW: 300kHz Span: 2MHz Band Power: 1MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3m	4.4 m *2) (below 10 GHz), 1 m *3) (above 10 GHz)		4.4 m *2) (below 10 GHz), 1 m *3) (above 10 GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r04"
*2) Distance Factor: 20 x log (4.4 m / 3.0 m) = 3.3 dB
*3) Distance Factor: 20 x log (1.0 m / 3.0 m) = - 9.5 dB

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 M - 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 v03r04".
*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

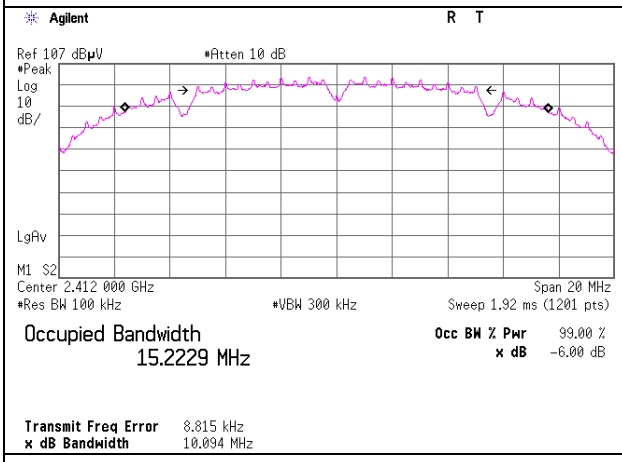
Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	10.094	> 500
	2437	10.094	> 500
	2462	10.094	> 500
11g	2412	16.470	> 500
	2437	16.461	> 500
	2462	16.457	> 500
11n-20	2412	17.470	> 500
	2437	17.243	> 500
	2462	17.213	> 500

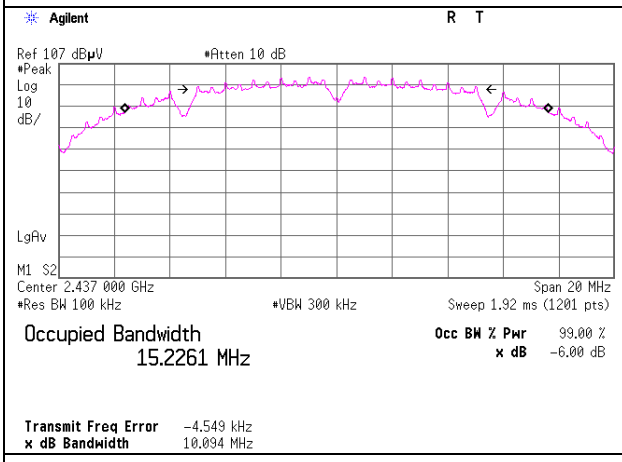
6dB Bandwidth

11b

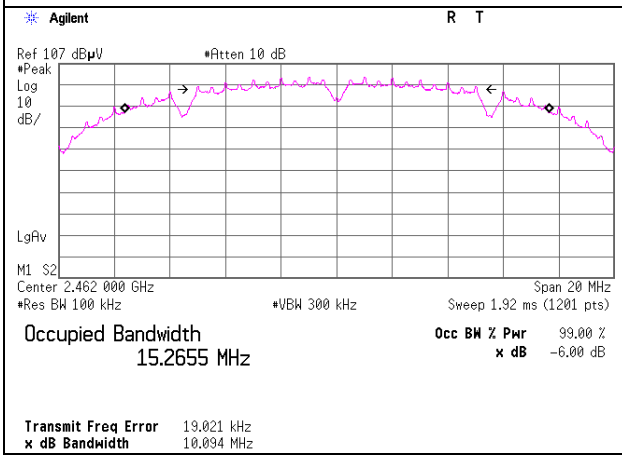
2412MHz



2437MHz

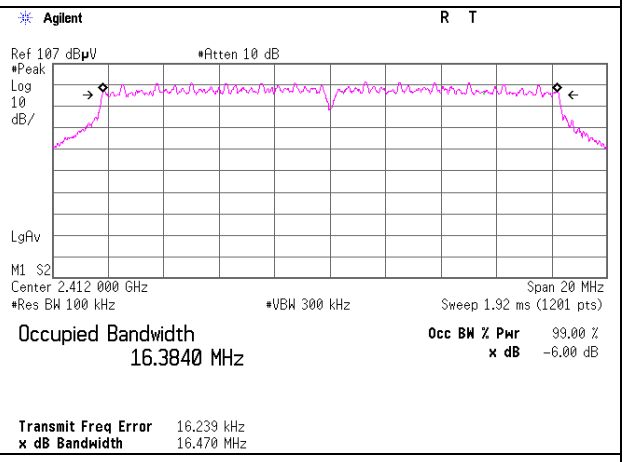


2462MHz

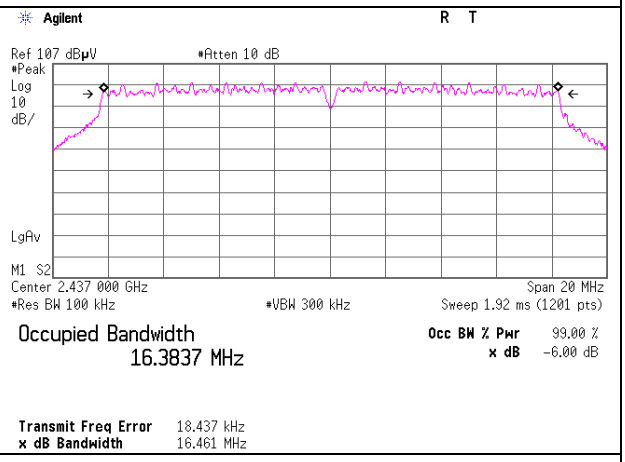


11g

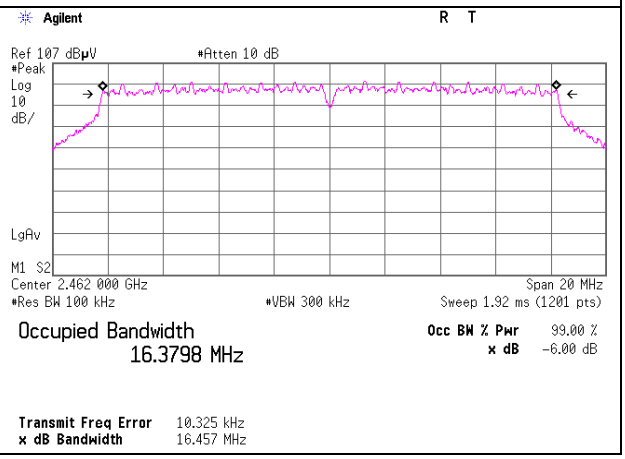
2412MHz



2437MHz



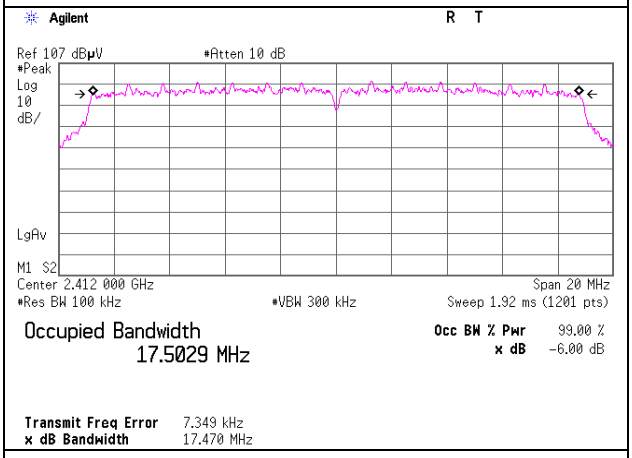
2462MHz



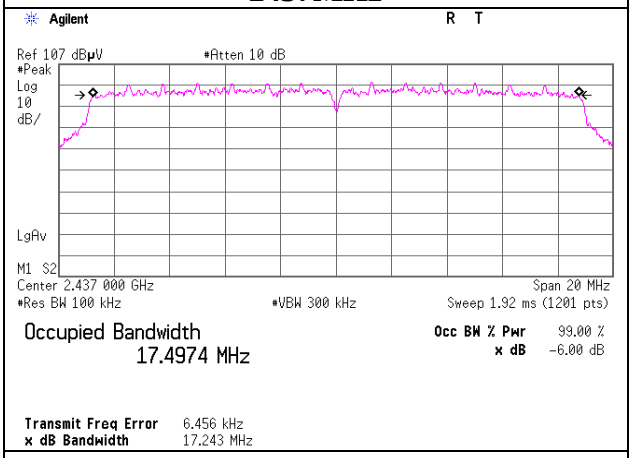
6dB Bandwidth

11n-20

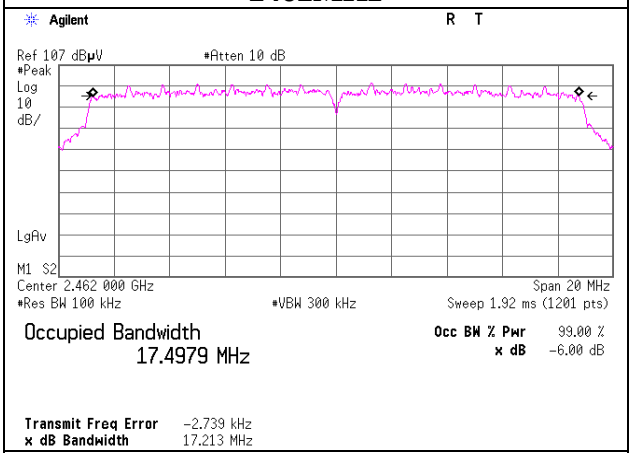
2412MHz



2437MHz



2462MHz



Maximum Peak Output Power

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx 11b

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	4.46	1.60	10.03	16.09	40.64	30.00	1000	13.91
2437	4.84	1.61	10.03	16.48	44.46	30.00	1000	13.52
2462	4.41	1.61	10.03	16.05	40.27	30.00	1000	13.95

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	4.84	*
2	4.61	
5.5	4.63	
11	4.71	

*: 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.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx 11g

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	10.01	1.60	10.03	21.64	145.88	30.00	1000	8.36
2437	10.31	1.61	10.03	21.95	156.68	30.00	1000	8.05
2462	10.53	1.61	10.03	22.17	164.82	30.00	1000	7.83

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	9.94	
9	10.00	
12	10.13	
18	9.65	
24	10.10	
36	10.07	
48	10.05	
54	10.31	*

*: 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.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx 11n-20

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	9.77	1.60	10.03	21.40	138.04	30.00	1000	8.60
2437	10.07	1.61	10.03	21.71	148.25	30.00	1000	8.29
2462	10.29	1.61	10.03	21.93	155.96	30.00	1000	8.07

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

2437MHz

MCS Number	Reading [dBm]	Remark
0	9.78	
1	9.88	
2	9.82	
3	9.97	
4	10.07	*
5	8.39	
6	8.60	
7	8.43	

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

* Worst MCS

MCS Number	Reading [dBm]	GI	Remark
0	10.00	Long	
0	10.07	Short	*

Average Output Power (Reference data)

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

11b **1 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)		Duty factor	Result (Burst power)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	2.35	1.60	10.03	13.98	25.00	0.02	14.00	25.12
2437	2.64	1.61	10.03	14.28	26.79	0.02	14.30	26.92
2462	2.40	1.61	10.03	14.04	25.35	0.02	14.06	25.47

11g **6 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)		Duty factor	Result (Burst power)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	1.35	1.60	10.03	12.98	19.86	0.19	13.17	20.75
2437	1.45	1.61	10.03	13.09	20.37	0.19	13.28	21.28
2462	1.47	1.61	10.03	13.11	20.46	0.19	13.30	21.38

11n-20 **MCS 0(Short GI)**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)		Duty factor	Result (Burst power)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	1.33	1.60	10.03	12.96	19.77	0.22	13.18	20.80
2437	1.56	1.61	10.03	13.20	20.89	0.22	13.42	21.98
2462	1.35	1.61	10.03	12.99	19.91	0.22	13.21	20.94

Sample Calculation:
Result (Frame power) = Reading + Cable Loss + Attenuator
Result (Burst power) = Frame power + Duty factor

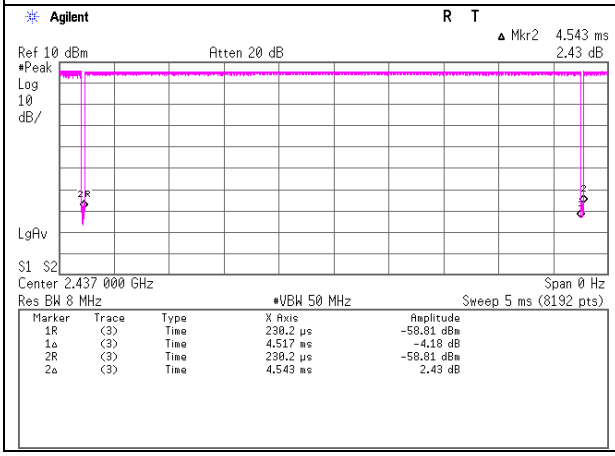
The test was performed with condition that obtained the maximum frame power in pre-check.

Burst rate confirmation

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

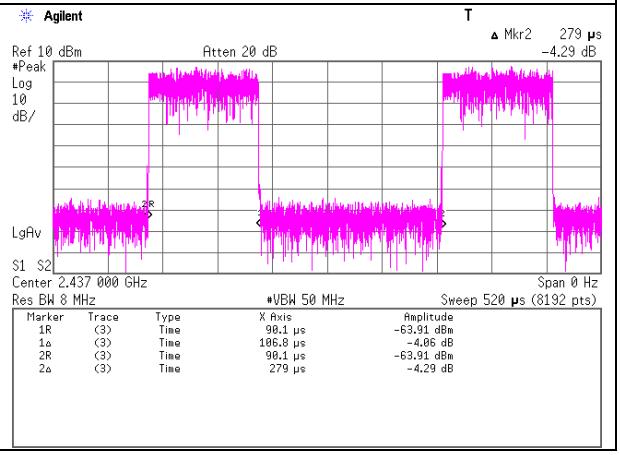
11b 1 Mbps

Tx on / (Tx on + Tx off) = 0.994
Tx on / (Tx on + Tx off) * 100 = 99.4 %
Duty factor = 10 * log (4.543 / 4.517) = 0.02 dB



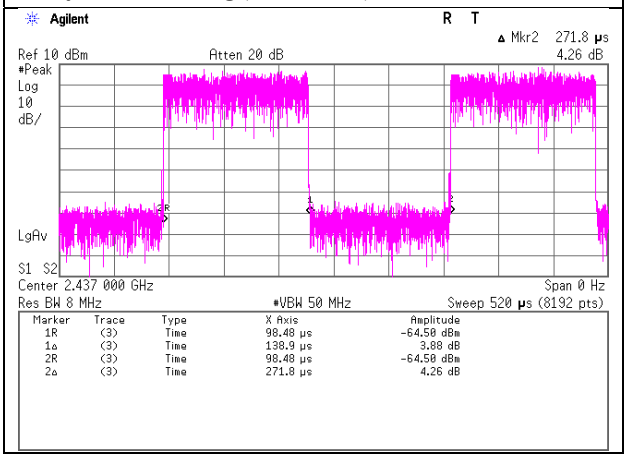
11g 54 Mbps

Tx on / (Tx on + Tx off) = 0.383
Tx on / (Tx on + Tx off) * 100 = 38.3 %
Duty factor = 10 * log (279 / 106.8) = 4.17 dB



11n-20 MCS 4(Short GI)

Tx on / (Tx on + Tx off) = 0.511
Tx on / (Tx on + Tx off) * 100 = 51.1 %
Duty factor = 10 * log (271.8 / 138.9) = 2.92 dB



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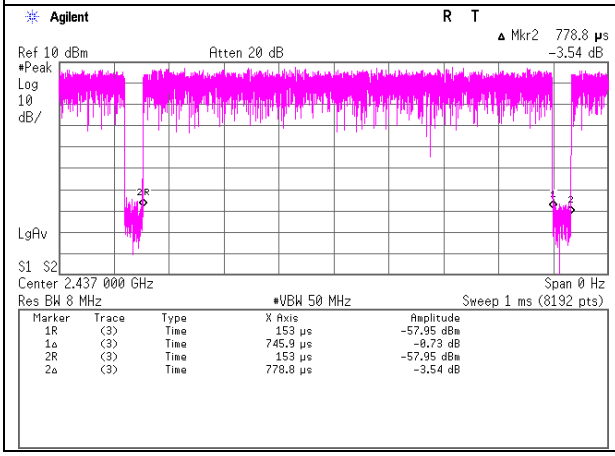
Burst rate confirmation

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

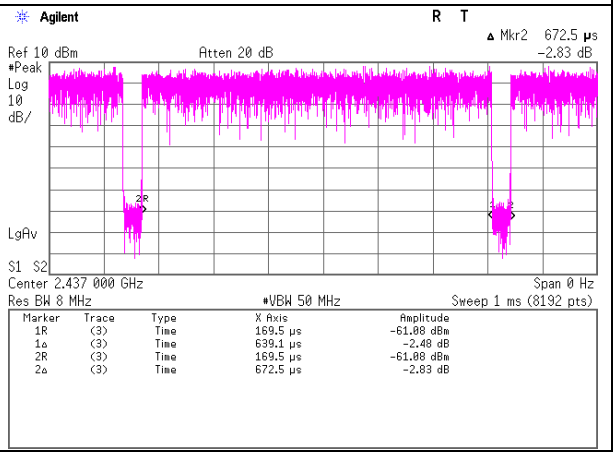
11g 6 Mbps

Tx on / (Tx on + Tx off) = 0.958
Tx on / (Tx on + Tx off) * 100 = 95.8 %
Duty factor = 10 * log (778.8 / 745.9) = 0.19 dB



11n-20 MCS 0(Short GI)

Tx on / (Tx on + Tx off) = 0.950
Tx on / (Tx on + Tx off) * 100 = 95.0 %
Duty factor = 10 * log (672.5 / 639.1) = 0.22 dB



Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Report No.	11051899H	
Date	December 23, 2015	January 7, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)
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	57.6	26.9	6.6	32.0	-	59.1	73.9	14.8	
Hori	2390.000	PK	57.6	26.9	6.6	32.0	-	59.1	73.9	14.8	
Hori	3145.710	PK	45.3	28.6	7.1	31.5	-	49.5	73.9	24.4	
Hori	4824.000	PK	42.9	31.8	8.8	31.3	-	52.2	73.9	21.7	
Hori	7236.000	PK	43.0	36.0	10.0	32.0	-	57.0	73.9	16.9	Floor noise
Hori	9648.000	PK	43.0	38.2	10.8	32.4	-	59.6	73.9	14.3	Floor noise
Hori	2390.000	AV	41.8	26.9	6.6	32.0	-	43.3	53.9	10.6	
Hori	2390.000	AV	41.8	26.9	6.6	32.0	-	43.3	53.9	10.6	
Hori	3145.710	AV	40.8	28.6	7.1	31.5	-	45.0	53.9	8.9	
Hori	4824.000	AV	38.0	31.8	8.8	31.3	-	47.3	53.9	6.6	
Hori	7236.000	AV	32.4	36.0	10.0	32.0	-	46.4	53.9	7.5	Floor noise
Hori	9648.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise
Vert	2390.000	PK	57.0	26.9	6.6	32.0	-	58.5	73.9	15.4	
Vert	2390.000	PK	57.0	26.9	6.6	32.0	-	58.5	73.9	15.4	
Vert	3145.772	PK	46.6	28.6	7.1	31.5	-	50.8	73.9	23.1	
Vert	4824.000	PK	44.8	31.8	8.8	31.3	-	54.1	73.9	19.8	
Vert	7236.000	PK	42.7	36.0	10.0	32.0	-	56.7	73.9	17.2	Floor noise
Vert	9648.000	PK	43.2	38.2	10.8	32.4	-	59.8	73.9	14.1	Floor noise
Vert	2390.000	AV	41.3	26.9	6.6	32.0	-	42.8	53.9	11.1	
Vert	3145.772	AV	40.4	28.6	7.1	31.5	-	44.6	53.9	9.3	
Vert	4824.000	AV	39.9	31.8	8.8	31.3	-	49.2	53.9	4.7	
Vert	7236.000	AV	32.4	36.0	10.0	32.0	-	46.4	53.9	7.5	Floor noise
Vert	9648.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amplifier)
*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 (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

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	95.9	26.9	6.6	32.0	97.4	-	-	Carrier
Hori	2400.000	PK	48.4	26.9	6.6	32.0	49.9	77.4	27.5	
Vert	2412.000	PK	94.9	26.9	6.6	32.0	96.4	-	-	Carrier
Vert	2400.000	PK	50.6	26.9	6.6	32.0	52.1	76.4	24.3	

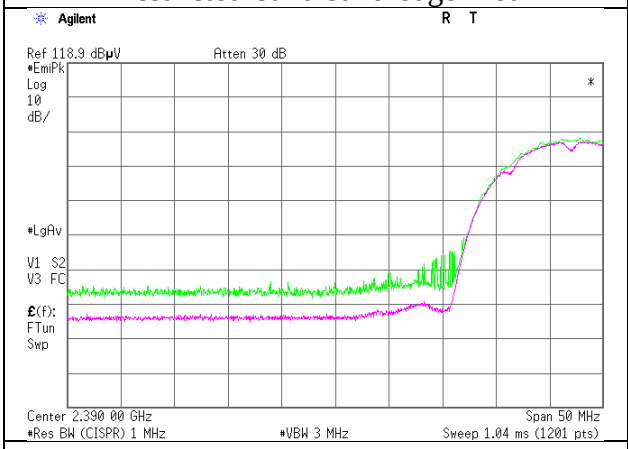
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
Mode	Tx 11b 2412 MHz

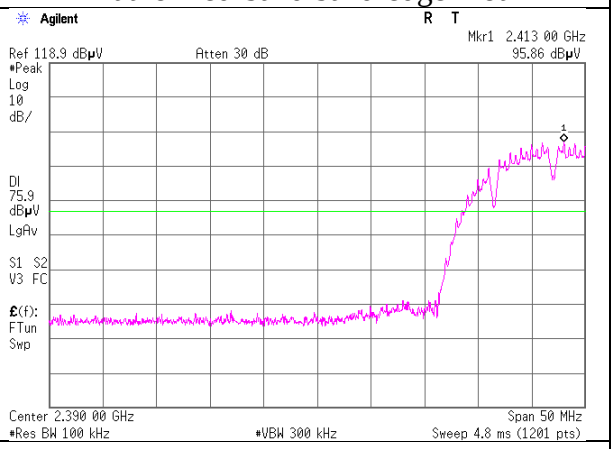
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

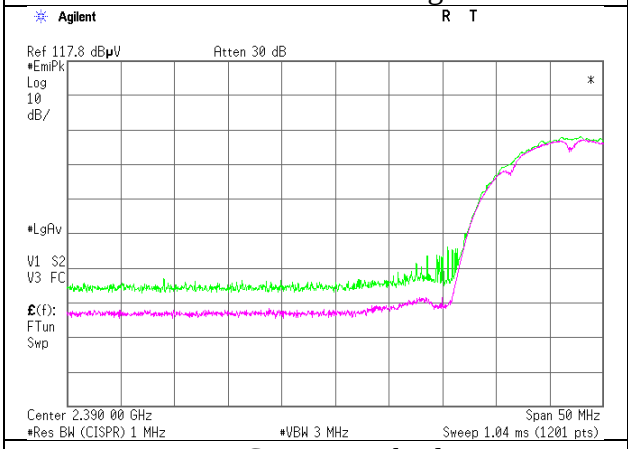
Authorized-band band-edge Plot



20dBc Plot

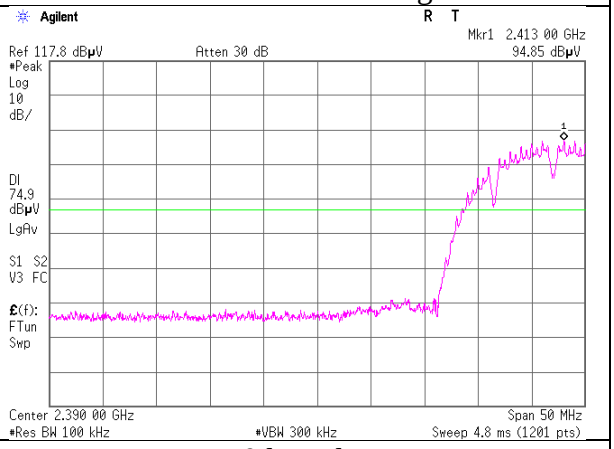
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Report No.	11051899H	
Date	December 23, 2015	January 7, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)
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	3145.605	PK	46.2	28.6	7.1	31.5	-	50.4	73.9	23.5	
Hori	4874.000	PK	41.9	31.9	8.8	31.3	-	51.3	73.9	22.6	
Hori	7311.000	PK	41.7	36.0	10.1	32.0	-	55.8	73.9	18.1	Floor noise
Hori	9748.000	PK	41.9	38.2	10.8	32.4	-	58.5	73.9	15.4	Floor noise
Hori	3145.605	AV	40.7	28.6	7.1	31.5	-	44.9	53.9	9.0	
Hori	4874.000	AV	36.6	31.9	8.8	31.3	-	46.0	53.9	7.9	
Hori	7311.000	AV	32.4	36.0	10.1	32.0	-	46.5	53.9	7.4	Floor noise
Hori	9748.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise
Vert	3145.769	PK	46.2	28.6	7.1	31.5	-	50.4	73.9	23.5	
Vert	4874.000	PK	42.0	31.9	8.8	31.3	-	51.4	73.9	22.5	
Vert	7311.000	PK	42.0	36.0	10.1	32.0	-	56.1	73.9	17.8	Floor noise
Vert	9748.000	PK	42.1	38.2	10.8	32.4	-	58.7	73.9	15.2	Floor noise
Vert	3145.769	AV	41.0	28.6	7.1	31.5	-	45.2	53.9	8.7	
Vert	4874.000	AV	35.9	31.9	8.8	31.3	-	45.3	53.9	8.6	
Vert	7311.000	AV	32.4	36.0	10.1	32.0	-	46.5	53.9	7.4	Floor noise
Vert	9748.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

*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 (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Report No.	11051899H	
Date	December 23, 2015	January 7, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)
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	63.3	26.9	6.6	32.0	-	64.8	73.9	9.1	
Hori	3145.672	PK	46.1	28.6	7.1	31.5	-	50.3	73.9	23.6	
Hori	4924.000	PK	40.8	32.0	8.7	31.3	-	50.2	73.9	23.7	
Hori	7386.000	PK	41.2	36.0	10.0	32.1	-	55.1	73.9	18.8	Floor noise
Hori	9848.000	PK	42.1	38.2	10.9	32.5	-	58.7	73.9	15.2	Floor noise
Hori	2483.500	AV	47.1	26.9	6.6	32.0	-	48.6	53.9	5.3	
Hori	3145.672	AV	40.6	28.6	7.1	31.5	-	44.8	53.9	9.1	
Hori	4924.000	AV	33.1	32.0	8.7	31.3	-	42.5	53.9	11.4	
Hori	7386.000	AV	32.0	36.0	10.0	32.1	-	45.9	53.9	8.0	Floor noise
Hori	9848.000	AV	31.3	38.2	10.9	32.5	-	47.9	53.9	6.0	Floor noise
Vert	2483.500	PK	61.9	26.9	6.6	32.0	-	63.4	73.9	10.5	
Vert	3145.625	PK	45.9	28.6	7.1	31.5	-	50.1	73.9	23.8	
Vert	4924.000	PK	40.4	32.0	8.7	31.3	-	49.8	73.9	24.1	
Vert	7386.000	PK	41.1	36.0	10.0	32.1	-	55.0	73.9	18.9	Floor noise
Vert	9848.000	PK	41.9	38.2	10.9	32.5	-	58.5	73.9	15.4	Floor noise
Vert	2483.500	AV	45.4	26.9	6.6	32.0	-	46.9	53.9	7.0	
Vert	3145.625	AV	40.4	28.6	7.1	31.5	-	44.6	53.9	9.3	
Vert	4924.000	AV	33.5	32.0	8.7	31.3	-	42.9	53.9	11.0	
Vert	7386.000	AV	32.0	36.0	10.0	32.1	-	45.9	53.9	8.0	Floor noise
Vert	9848.000	AV	31.3	38.2	10.9	32.5	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

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

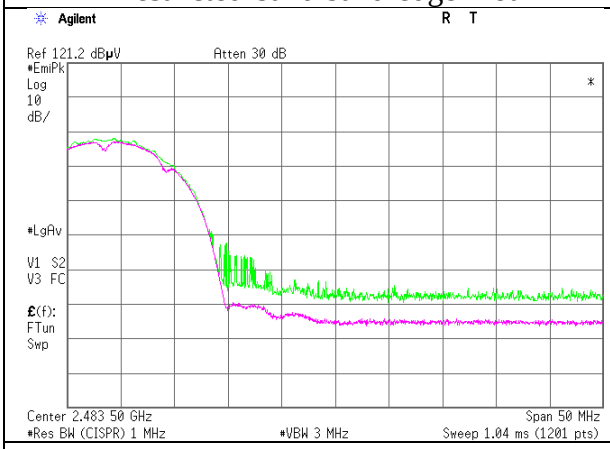
Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
Mode	Tx 11b 2462 MHz

Horizontal

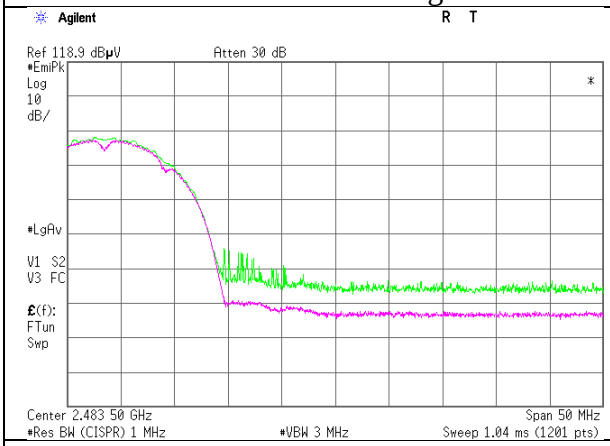
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Report No.	11051899H	
Date	December 23, 2015	January 7, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)
Mode	Tx 11g 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	55.0	26.9	6.6	32.0	-	56.5	73.9	17.4	
Hori	3145.712	PK	45.1	28.6	7.1	31.5	-	49.3	73.9	24.6	
Hori	4824.000	PK	40.4	31.8	8.8	31.3	-	49.7	73.9	24.2	
Hori	7236.000	PK	41.4	36.0	10.0	32.0	-	55.4	73.9	18.5	Floor noise
Hori	9648.000	PK	42.4	38.2	10.8	32.4	-	59.0	73.9	14.9	Floor noise
Hori	2390.000	AV	44.3	26.9	6.6	32.0	4.2	50.0	53.9	3.9	*1)
Hori	3145.712	AV	40.5	28.6	7.1	31.5	-	44.7	53.9	9.2	
Hori	4824.000	AV	32.7	31.8	8.8	31.3	4.2	46.2	53.9	7.7	
Hori	7236.000	AV	32.4	36.0	10.0	32.0	-	46.4	53.9	7.5	Floor noise
Hori	9648.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise
Vert	2390.000	PK	54.0	26.9	6.6	32.0	-	55.5	73.9	18.4	
Vert	3145.671	PK	45.7	28.6	7.1	31.5	-	49.9	73.9	24.0	
Vert	4824.000	PK	41.2	31.8	8.8	31.3	-	50.5	73.9	23.4	
Vert	7236.000	PK	41.6	36.0	10.0	32.0	-	55.6	73.9	18.3	Floor noise
Vert	9648.000	PK	42.2	38.2	10.8	32.4	-	58.8	73.9	15.1	Floor noise
Vert	2390.000	AV	43.3	26.9	6.6	32.0	4.2	49.0	53.9	4.9	*1)
Vert	3145.671	AV	40.3	28.6	7.1	31.5	-	44.5	53.9	9.4	
Vert	4824.000	AV	33.1	31.8	8.8	31.3	4.2	46.6	53.9	7.3	
Vert	7236.000	AV	32.4	36.0	10.0	32.0	-	46.4	53.9	7.5	Floor noise
Vert	9648.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier) + 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 (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

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

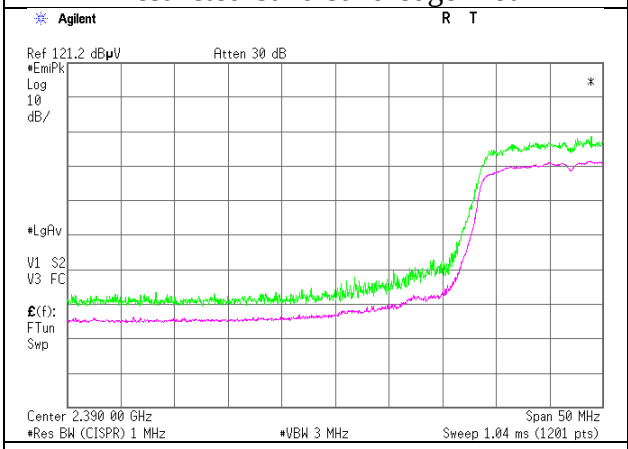
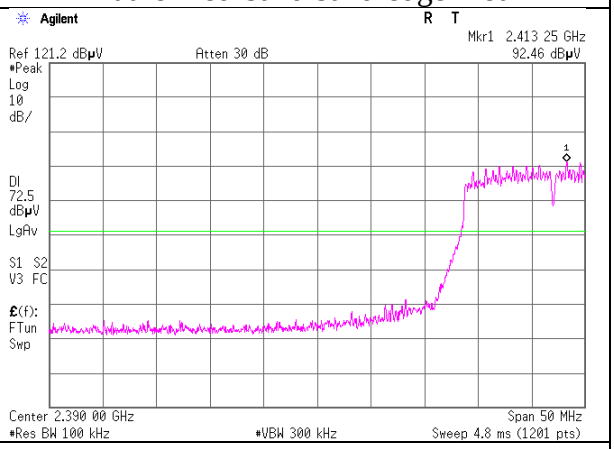
20dBc Data Sheet

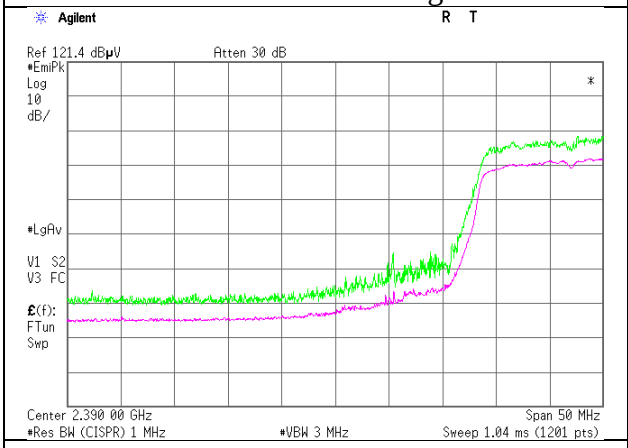
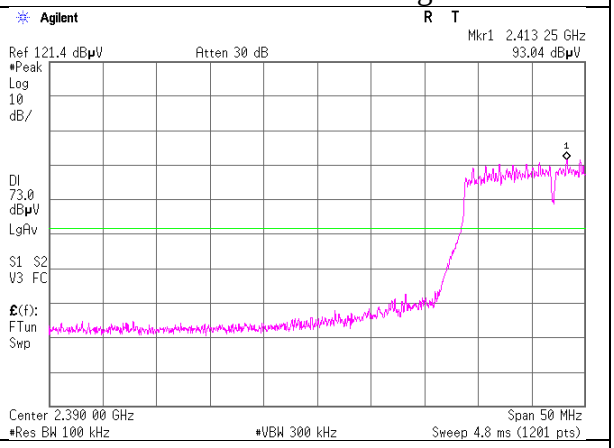
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	92.5	26.9	6.6	32.0	94.0	-	-	Carrier
Hori	2400.000	PK	53.9	26.9	6.6	32.0	55.4	74.0	18.6	
Vert	2412.000	PK	93.0	26.9	6.6	32.0	94.5	-	-	Carrier
Vert	2400.000	PK	52.3	26.9	6.6	32.0	53.8	74.5	20.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
Mode	Tx 11g 2412 MHz

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

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

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

Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Report No.	11051899H	
Date	December 23, 2015	January 7, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)
Mode	Tx 11g 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	3145.580	PK	45.3	28.6	7.1	31.5	-	49.5	73.9	24.4	
Hori	4874.000	PK	39.3	31.9	8.8	31.3	-	48.7	73.9	25.2	Floor noise
Hori	7311.000	PK	41.8	36.0	10.1	32.0	-	55.9	73.9	18.0	Floor noise
Hori	9748.000	PK	42.0	38.2	10.8	32.4	-	58.6	73.9	15.3	Floor noise
Hori	3145.580	AV	40.6	28.6	7.1	31.5	-	44.8	53.9	9.1	
Hori	4874.000	AV	31.9	31.9	8.8	31.3	-	41.3	53.9	12.6	Floor noise
Hori	7311.000	AV	32.4	36.0	10.1	32.0	-	46.5	53.9	7.4	Floor noise
Hori	9748.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise
Vert	3145.634	PK	45.6	28.6	7.1	31.5	-	49.8	73.9	24.1	
Vert	4874.000	PK	39.5	31.9	8.8	31.3	-	48.9	73.9	25.0	Floor noise
Vert	7311.000	PK	42.0	36.0	10.1	32.0	-	56.1	73.9	17.8	Floor noise
Vert	9748.000	PK	42.2	38.2	10.8	32.4	-	58.8	73.9	15.1	Floor noise
Vert	3145.634	AV	40.0	28.6	7.1	31.5	-	44.2	53.9	9.7	
Vert	4874.000	AV	31.9	31.9	8.8	31.3	-	41.3	53.9	12.6	Floor noise
Vert	7311.000	AV	32.4	36.0	10.1	32.0	-	46.5	53.9	7.4	Floor noise
Vert	9748.000	AV	31.3	38.2	10.8	32.4	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.4	No.4
Report No.	11051899H		
Date	December 23, 2015	January 7, 2016	January 9, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH	23 deg. C / 45 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Koji Yamamoto (Below 1GHz)
Mode	Tx 11g 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	119.993	QP	43.0	12.8	8.3	32.0	-	32.1	43.5	11.4	
Hori	246.944	QP	37.1	17.9	9.5	31.8	-	32.7	46.0	13.3	
Hori	316.462	QP	34.1	17.8	10.0	31.8	-	30.1	46.0	15.9	
Hori	413.834	QP	35.2	18.5	10.7	31.9	-	32.5	46.0	13.5	
Hori	479.972	QP	39.4	19.3	11.1	31.9	-	37.9	46.0	8.1	
Hori	803.324	QP	32.0	23.1	12.8	31.6	-	36.3	46.0	9.7	
Hori	2483.500	PK	63.7	26.9	6.6	32.0	-	65.2	73.9	8.7	*1)
Hori	3145.659	PK	45.3	28.6	7.1	31.5	-	49.5	73.9	24.4	
Hori	4924.000	PK	40.0	32.0	8.7	31.3	-	49.4	73.9	24.5	
Hori	7386.000	PK	41.7	36.0	10.0	32.1	-	55.6	73.9	18.3	Floor noise
Hori	9848.000	PK	42.2	38.2	10.9	32.5	-	58.8	73.9	15.1	Floor noise
Hori	2483.500	AV	46.0	26.9	6.6	32.0	4.2	51.7	53.9	2.2	*1) *2) method 13.3.2
Hori	3145.659	AV	40.6	28.6	7.1	31.5	4.2	49.0	53.9	4.9	
Hori	4924.000	AV	32.1	32.0	8.7	31.3	4.2	45.7	53.9	8.2	
Hori	7386.000	AV	32.0	36.0	10.0	32.1	-	45.9	53.9	8.0	Floor noise
Hori	9848.000	AV	31.3	38.2	10.9	32.5	-	47.9	53.9	6.0	Floor noise
Vert	119.993	QP	42.4	12.8	8.3	32.0	-	31.5	43.5	12.0	
Vert	239.983	QP	35.8	17.7	9.4	31.8	-	31.1	46.0	14.9	
Vert	246.944	QP	37.8	17.9	9.5	31.8	-	33.4	46.0	12.6	
Vert	479.972	QP	35.3	19.3	11.1	31.9	-	33.8	46.0	12.2	
Vert	803.332	QP	36.3	23.1	12.8	31.6	-	40.6	46.0	5.4	
Vert	900.692	QP	31.7	24.2	13.3	31.2	-	38.0	46.0	8.0	
Vert	2483.500	PK	61.8	26.9	6.6	32.0	-	63.3	73.9	10.6	*1)
Vert	3145.634	PK	45.7	28.6	7.1	31.5	-	49.9	73.9	24.0	
Vert	4924.000	PK	39.9	32.0	8.7	31.3	-	49.3	73.9	24.6	
Vert	7386.000	PK	41.5	36.0	10.0	32.1	-	55.4	73.9	18.5	Floor noise
Vert	9848.000	PK	42.1	38.2	10.9	32.5	-	58.7	73.9	15.2	Floor noise
Vert	2483.500	AV	44.7	26.9	6.6	32.0	4.2	50.4	53.9	3.5	*1) *2) method 13.3.2
Vert	3145.634	AV	39.9	28.6	7.1	31.5	4.2	48.3	53.9	5.6	
Vert	4924.000	AV	32.1	32.0	8.7	31.3	4.2	45.7	53.9	8.2	
Vert	7386.000	AV	32.0	36.0	10.0	32.1	-	45.9	53.9	8.0	Floor noise
Vert	9848.000	AV	31.3	38.2	10.9	32.5	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier) + Duty factor

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB
26.5 GHz - 40 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

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

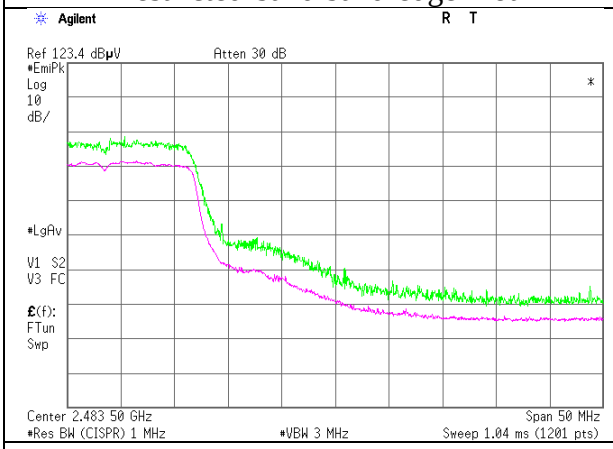
*2) The test was performed based on 13.3.2 of "KDB 558074 D01 DTS Meas Guidance v03r04

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
Mode	Tx 11g 2462 MHz

Horizontal

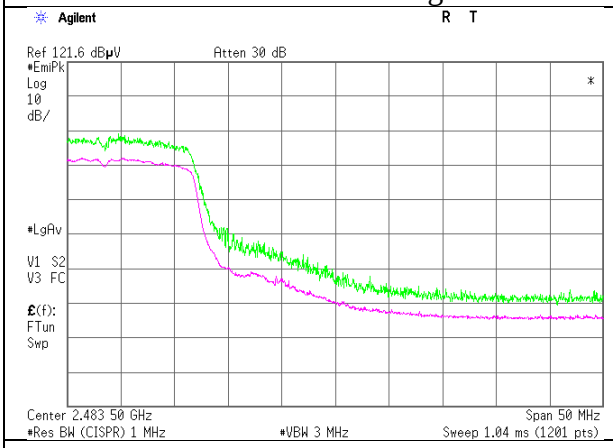
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
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	55.8	26.9	6.6	32.0	-	57.3	73.9	16.6	
Hori	2390.000	AV	43.9	26.9	6.6	32.0	2.9	48.3	53.9	5.6	*1)
Vert	2390.000	PK	52.5	26.9	6.6	32.0	-	54.0	73.9	19.9	
Vert	2390.000	AV	42.4	26.9	6.6	32.0	2.9	46.8	53.9	7.1	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB

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

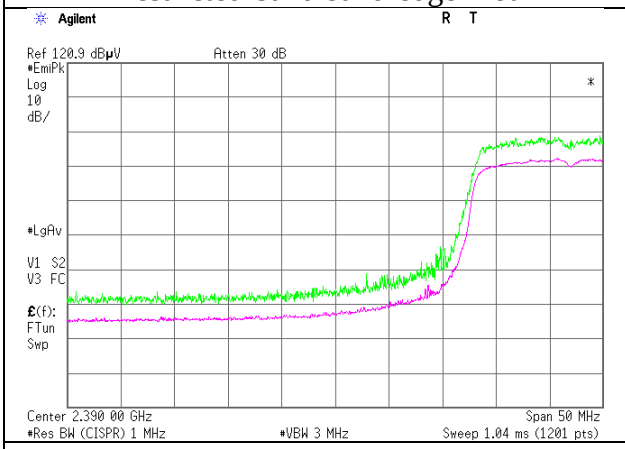
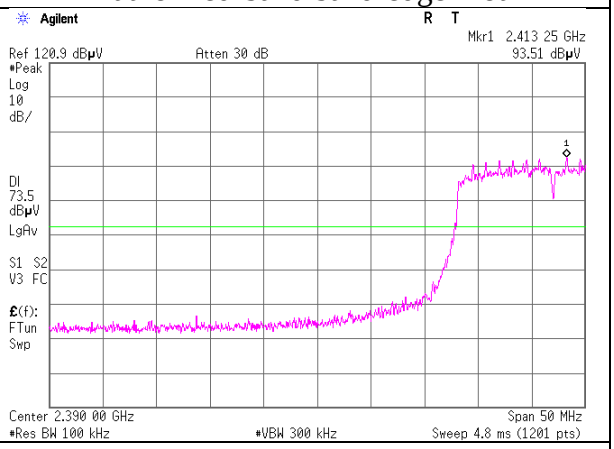
20dBc Data Sheet

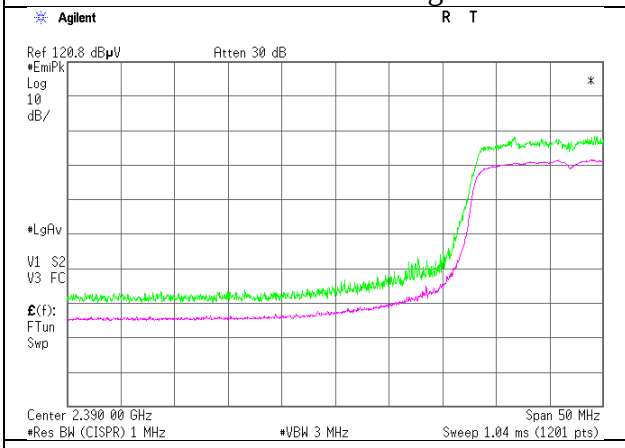
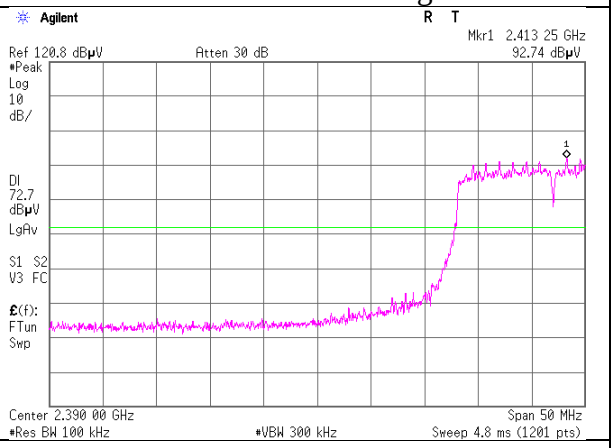
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	93.5	26.9	6.6	32.0	95.0	-	-	Carrier
Hori	2400.000	PK	52.3	26.9	6.6	32.0	53.8	75.0	21.2	
Vert	2412.000	PK	92.7	26.9	6.6	32.0	94.2	-	-	Carrier
Vert	2400.000	PK	51.6	26.9	6.6	32.0	53.1	74.2	21.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka (1-10GHz)
Mode	Tx 11n-20 2412 MHz

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

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

* 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.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
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	2483.500	PK	65.9	26.9	6.6	32.0	-	67.4	73.9	6.5	
Hori	2483.500	AV	48.8	26.9	6.6	32.0	2.9	53.2	53.9	0.7	*1) *2) methiod 13.3.2
Vert	2483.500	PK	64.0	26.9	6.6	32.0	-	65.5	73.9	8.4	
Vert	2483.500	AV	48.3	26.9	6.6	32.0	2.9	52.7	53.9	1.2	*1) *2) methiod 13.3.2

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor) - Gain(Amprifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB

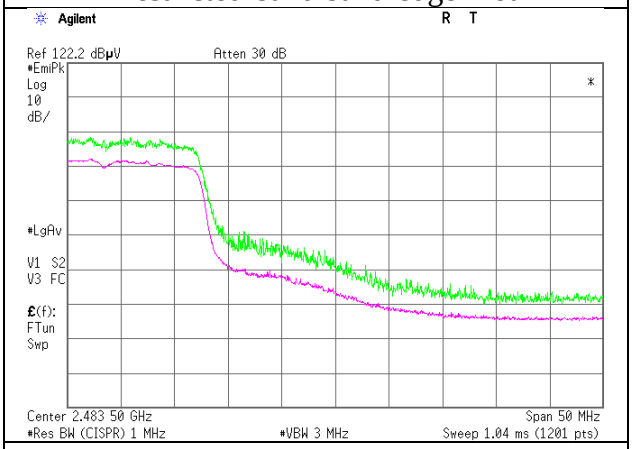
*1) Not Out of Band emission(Leakage Power)
*2) The test was performed based on 13.3.2 of "KDB 558074 D01 DTS Meas Guidance v03r04

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	23 deg. C / 42 % RH
Engineer	Kazuya Yoshioka (1-10GHz)
Mode	Tx 11n-20 2462 MHz

Horizontal

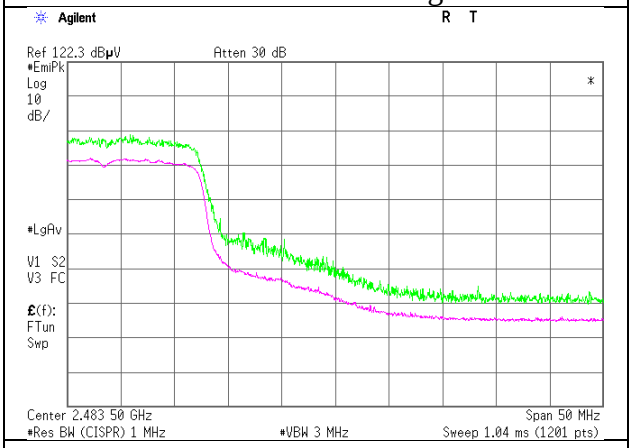
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

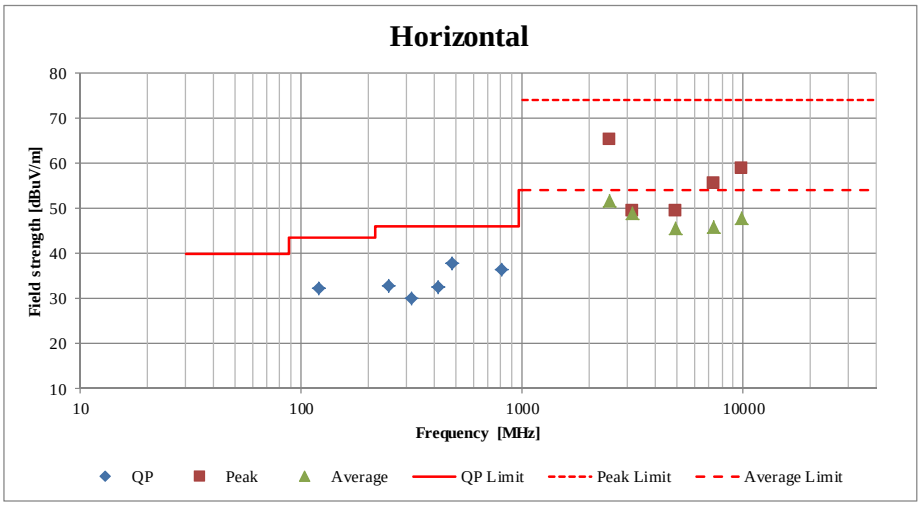


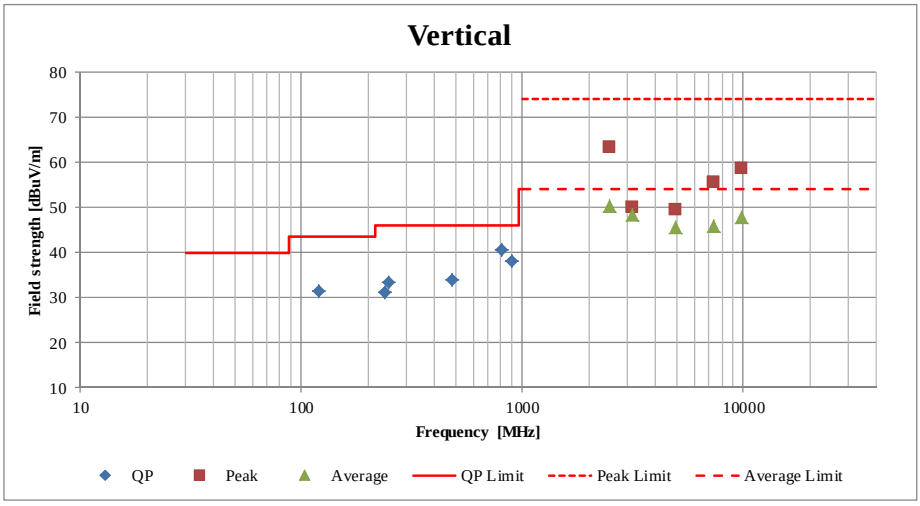
Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.4	No.4
Report No.	11051899H		
Date	December 23, 2015	January 7, 2016	January 9, 2016
Temperature / Humidity	23 deg. C / 42 % RH	22 deg. C / 31 % RH	23 deg. C / 45 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Koji Yamamoto (Below 1GHz)
Mode	Tx 11g 2462 MHz		



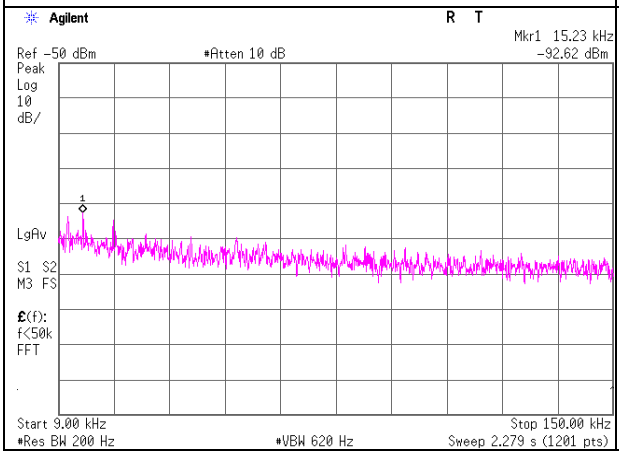


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

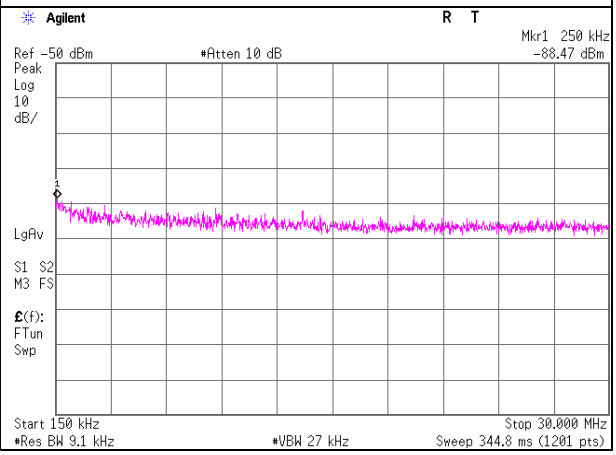
Conducted Spurious Emission

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx 11g 2462 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator 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
15.23	-92.6	0.01	9.8	2.0	1	-80.8	300	6.0	-19.5	43.9	63.4	
250.00	-88.5	0.01	9.9	2.0	1	-76.6	300	6.0	-15.4	19.6	35.0	

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

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

Power Density

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-6.78	1.60	10.03	4.85	8.00	3.15
2437.00	-6.33	1.61	10.03	5.31	8.00	2.69
2462.00	-9.10	1.61	10.03	2.54	8.00	5.46

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-24.55	1.60	10.03	-12.92	8.00	20.92
2437.00	-25.54	1.61	10.03	-13.90	8.00	21.90
2462.00	-26.42	1.61	10.03	-14.78	8.00	22.78

11n-20

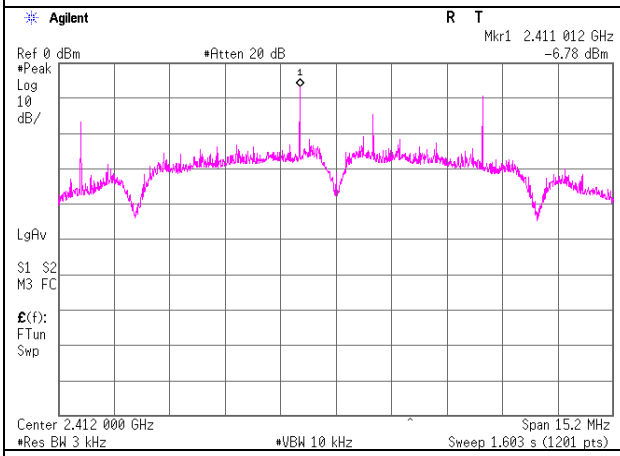
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-25.70	1.60	10.03	-14.07	8.00	22.07
2437.00	-25.29	1.61	10.03	-13.65	8.00	21.65
2462.00	-25.55	1.61	10.03	-13.91	8.00	21.91

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

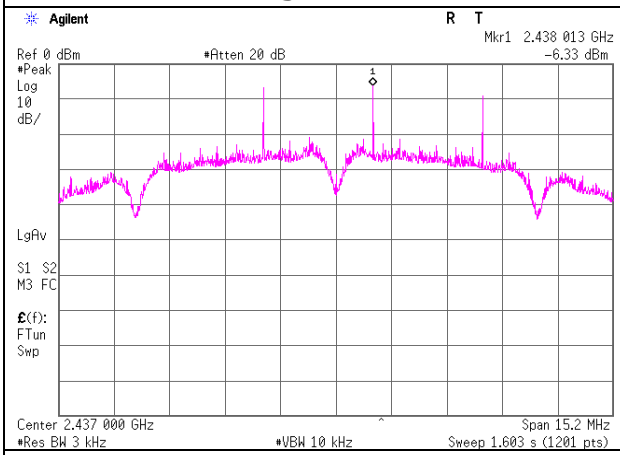
Power Density

11b

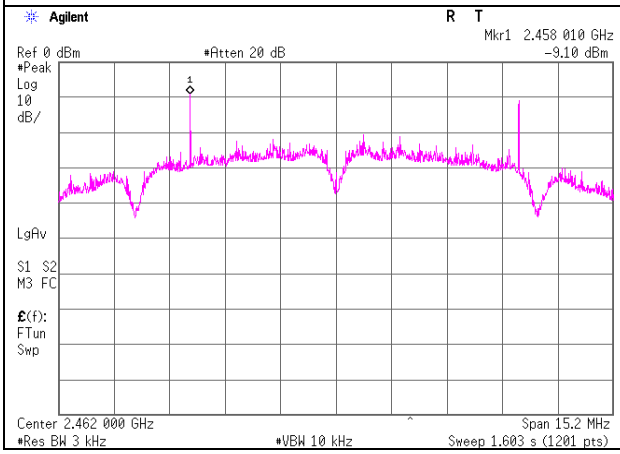
2412MHz



2437MHz

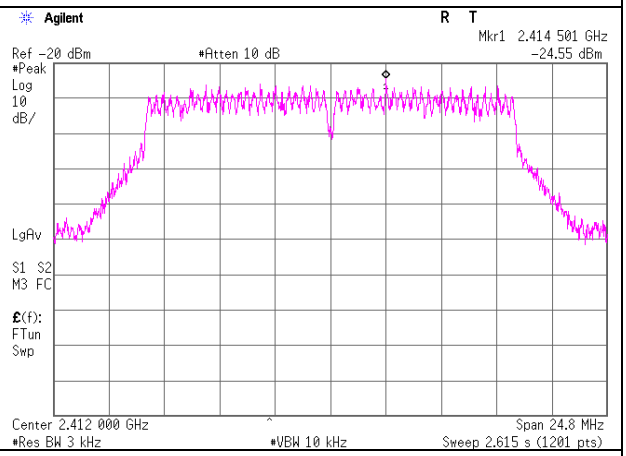


2462MHz

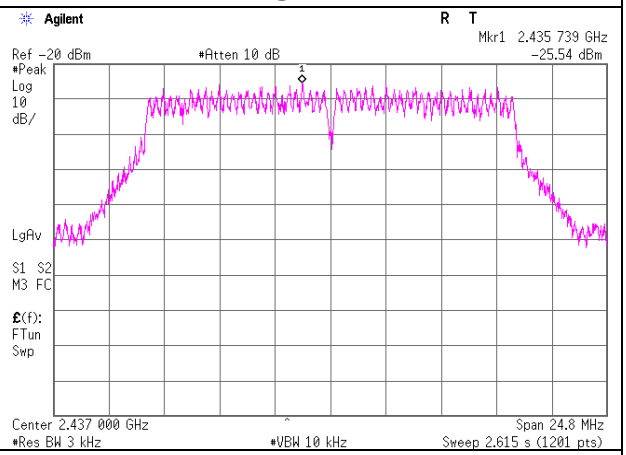


11g

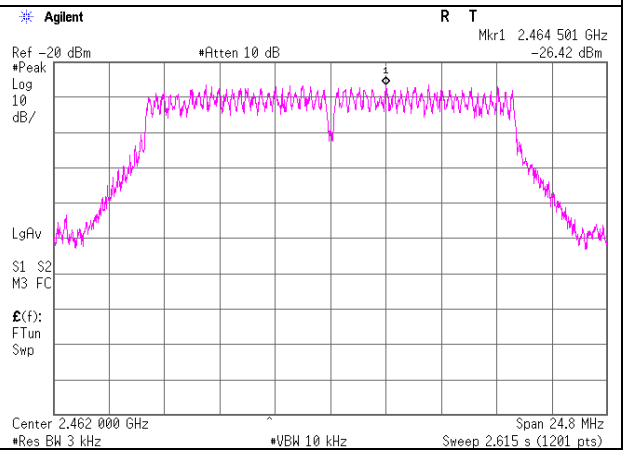
2412MHz



2437MHz



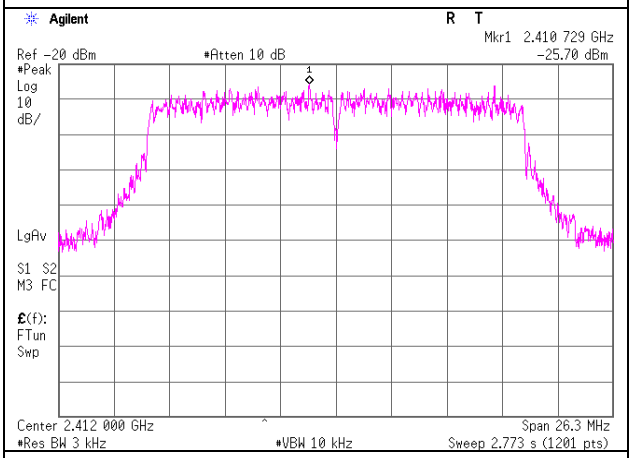
2462MHz



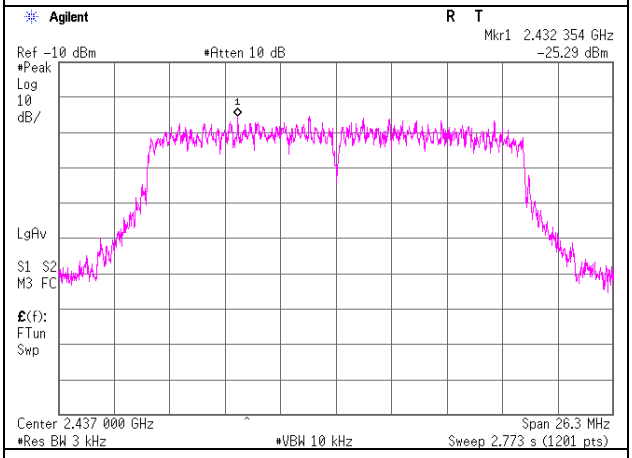
Power Density

11n-20

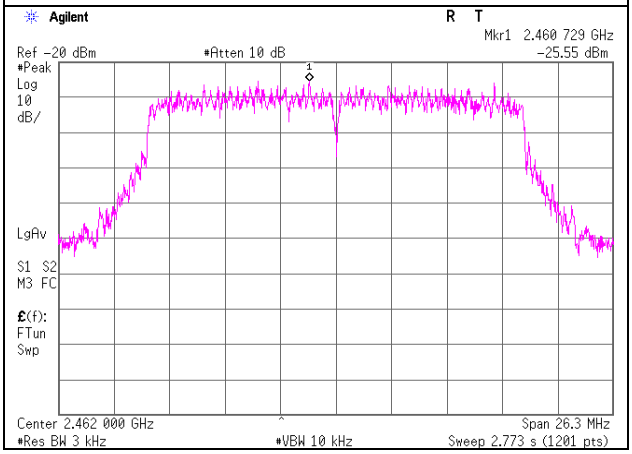
2412MHz



2437MHz

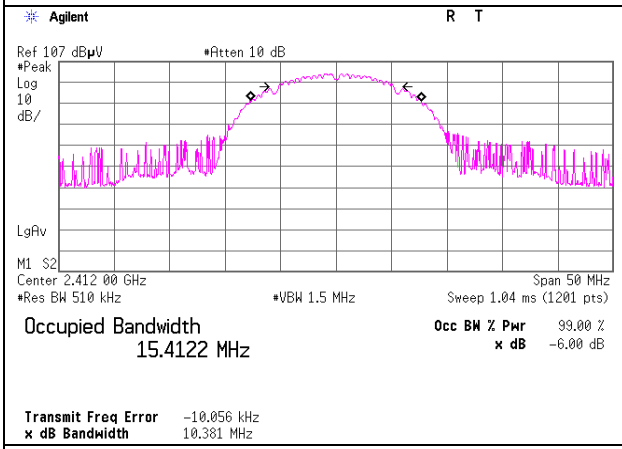
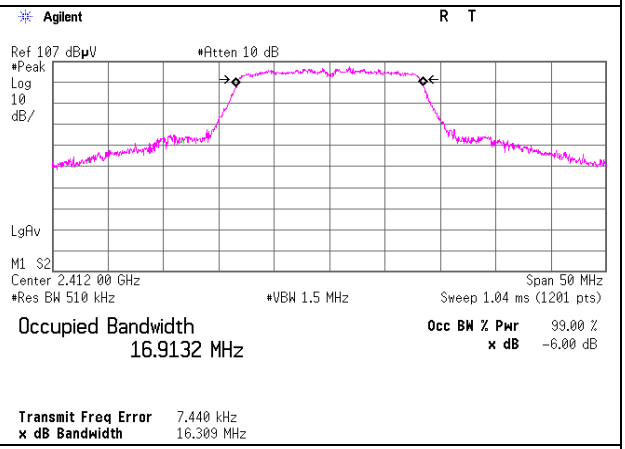
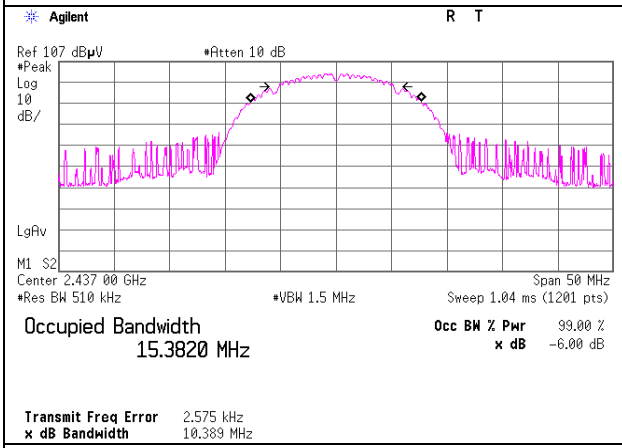
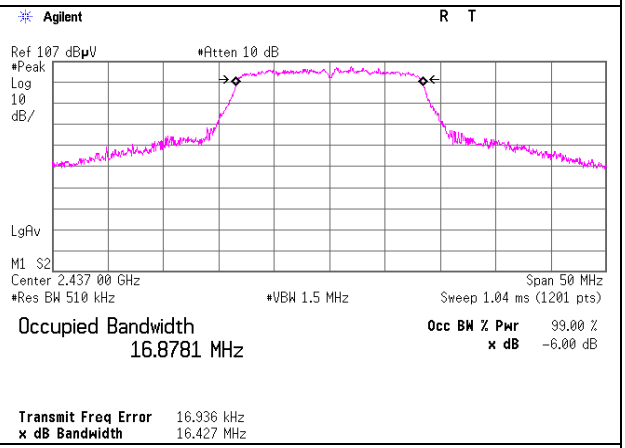
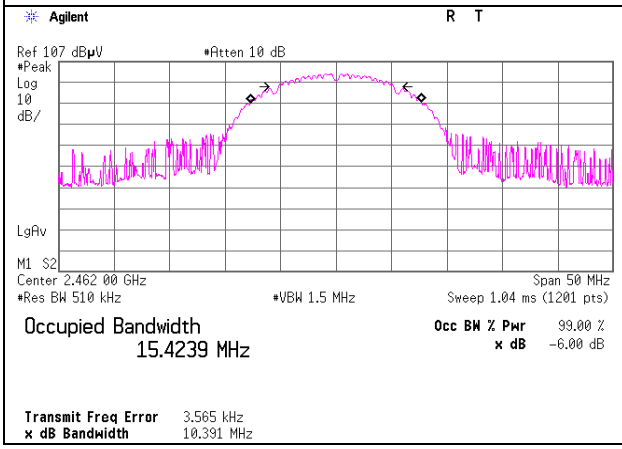
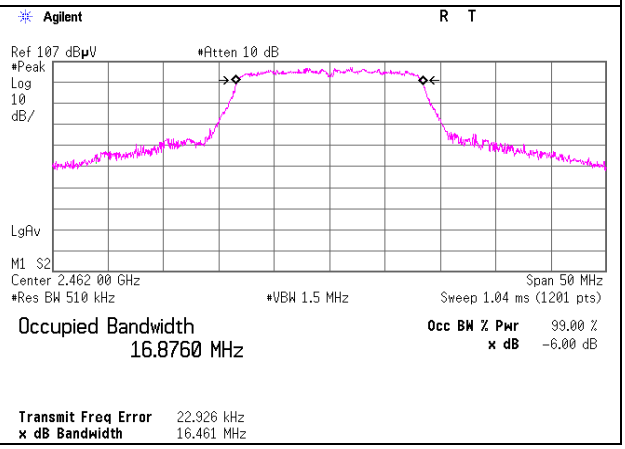


2462MHz



99%Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

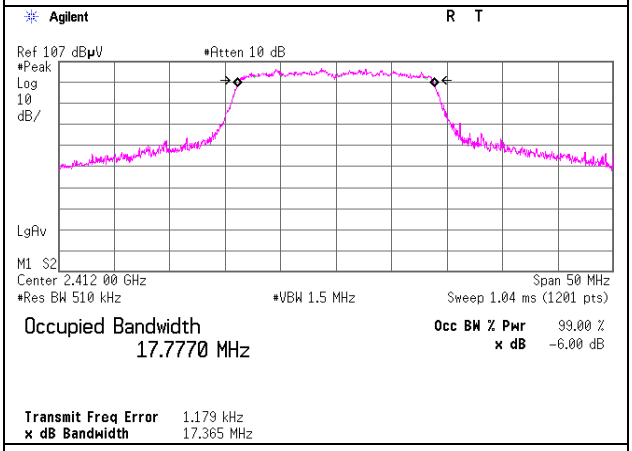
11b	11g
2412MHz	**2412MHz**
	
2437MHz	**2437MHz**
	
2462MHz	**2462MHz**
	

99% Occupied Bandwidth

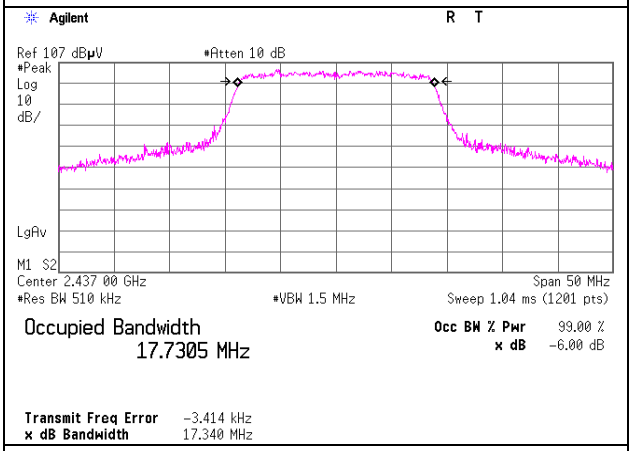
Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 21, 2015
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Kazuya Yoshioka
Mode	Tx

11n-20

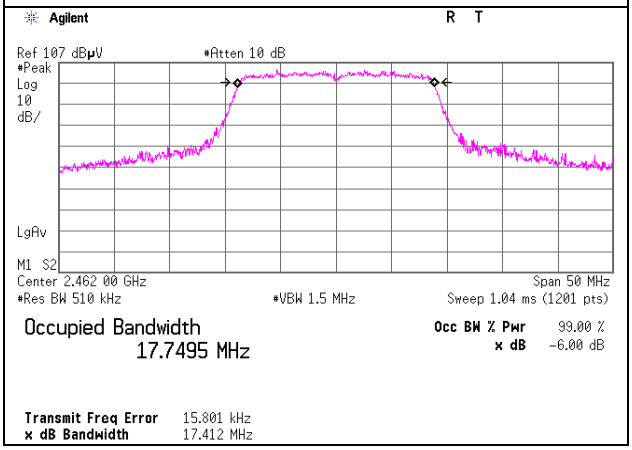
2412MHz



2437MHz



2462MHz



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2015/01/13 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2015/11/02 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2015/11/03 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2015/06/19 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2015/03/09 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2015/01/16 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2015/05/18 * 12
MCC-170	Microwave Cable	Junkosha	MWX221	1409S493	AT	2015/03/04 * 12
MCC-105	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2015/06/08 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2015/06/18 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2015/03/06 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2015/11/10 * 12
MTA-45	Terminator	Mini-Circuits	ANNE-50X+	MUU3460142	AT	Pre Check
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2015/10/08 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2015/10/08 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2015/01/13 * 12
MMM-16	DIGIITAL HiTESTER	Hioki	3805	070900532	AT	2015/01/16 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2015/06/02 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2015/05/18 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2015/05/21 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2015/02/26 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2015/08/10 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2015/06/22 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2015/10/01 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2015/06/06 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 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