RADIO TEST REPORT

Test Report No. : 10250677H-A

Applicant	:	**Sony Computer Entertainment Inc.**
Type of Equipment	:	**Computer Entertainment System**
Model No.	:	**CUH-1115A**
FCC ID	:	**AK8CUH100F1**
Test regulation	:	**FCC Part 15 Subpart C: 2014** ***WLAN, Bluetooth (LE) Part**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.

Date of test: March 13 to 25, 2014

Representative test engineer:
Hironobu Ohnishi
Engineer
Consumer Technology Division

Approved by:
Masanori Nishiyama
Manager
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://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

REVISION HISTORY

Original Test Report No.: 10250677H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10250677H-A	April 15, 2014	-	-

UL Japan, Inc.
Ise HQ EMC Lab.
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CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	Sony Computer Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-3-6748-6333
Facsimile Number	+81-3-6748-6383
Contact Person	Kiyoto Sasaki

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

2.1 Identification of E.U.T.

Type of Equipment	Computer Entertainment System
Model No	CUH-1115A
Serial No	9CD21EEA1209 for Antenna Terminal Conducted test 1300099 for Conducted Emission and Radiated Emission tests
Country of Manufacture	China/Japan
Receipt Date of Sample	March 10, 2014
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

CUH-1115A is the Computer Entertainment System .

Product Specification

Maximum clock frequency in the system	2.75GHz
Operating Temperature	5-35 deg. C
Power Supply	AC100-240V, 50Hz/60Hz
Size	275 x 53x 305 mm
Weight	Approx. 2.8kg

Radio Specification

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	IFA (Antenna A/B)
Antenna Gain: G_{ANT}	3.0dBi (Antenna A/B)
Directional Gain	6.01dBi (Antenna A/B)

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, π/4DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (peak)

Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	GFSK
Bandwidth & Channel spacing	1MHz & 2MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (peak)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2014, final revised on March 6, 2014 and effective April 7, 2014
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 March 6, 2014 does not affect the test specification applied to the EUT.
*The EUT complies with FCC Part 15 Subpart B: 2014, final revised on March 6, 2014 and effective April 7, 2014.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.4:2003 7. AC powerline Conducted Emission measurements	**FCC:** Section 15.207	**QP** 13.0dB, 0.15000MHz, L **AV** 18.9dB, 0.36160MHz, L	Complied	-
	IC: RSS-Gen 7.2.4	**IC:** RSS-Gen 7.2.4			
6dB Bandwidth	**FCC:** "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on April 9, 2013)"	**FCC:** Section 15.247(a)(2)	See data.	Complied	Conducted
	IC: RSS-Gen 4.6.2	**IC:** RSS-210 A8.2(a)			
Maximum Peak Output Power	**FCC:** "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on April 9, 2013)"	**FCC:** Section 15.247(b)(3)		Complied	Conducted
	IC: RSS-Gen 4.8	**IC:** RSS-210 A8.4(4)			
Power Density	**FCC:** "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on April 9, 2013)"	**FCC:** Section 15.247 (e)		Complied	Conducted
	IC: -	**IC:** RSS-210 A8.2(b)			
Spurious Emission Restricted Band Edges	**FCC:** "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on April 9, 2013)"	**FCC:** Section15.247(d)	1.0dB 742.477MHz, QP, Horizontal	Complied	Conducted/ Radiated
	IC: RSS-Gen 4.9	**IC:** RSS-210 A8.5 RSS-Gen 7.2.3			
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.					

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

FCC 15.31 (e)
This EUT provides stable voltage (DC3.3/1.8V) constantly to RF Part 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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 4.6.1	**IC:** RSS-Gen 4.6.1	N/A	-	Conducted

3.4 Uncertainty

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

Test room (semi-anechoic chamber)	Conducted emission (±dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
No.3	3.6dB
No.4	3.5dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(±dB)				(1m*)(±dB)		(0.5m*)(±dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

*3m/1m/0.5m = Measurement distance

Power meter (±dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (±dB)			Antenna terminal conducted emission (±dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

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

Radiated emission test (3m)
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Japan, Inc. Ise HQ 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

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 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 Data of EMI, 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 802.11 a/b/g/n testing Managing Complex regulatory Approvals-"of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	6Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20)	MCS9, PN9
Bluetooth (BT) LE (Low Energy)	Maximum Packet Size, PN9
*Transmitting duty was 100% on all of WLAN tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel) *WLAN antennas (Antenna A and B) transmit simultaneously. Bluetooth Antenna also transmits simultaneously with WLAN antennas, and the antennas are not common. There is no correlation between WLAN antennas and Bluetooth antenna.	
*Power of the EUT was set by the software as follows; Power settings: WLAN 9dBm Bluetooth (LE) Same as production model Software: COpro_DOS_Labtool_Ver1.0.8.24 *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.	

*Details of Operating mode for WLAN

Test Item	Operating Mode	Used Antenna	Tested frequency
Conducted Emission Spurious Emission (Conducted)	11n-20 Tx *1)	Antenna A+B	2437MHz
6dB Bandwidth 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	Antenna A or Antenna B *2)	2412MHz 2437MHz 2462MHz
Maximum Peak Output Power Power Density	11b Tx 11g Tx 11n-20 Tx	Antenna A Antenna B	2412MHz 2437MHz 2462MHz
Spurious Emission (Radiated)	11b Tx 11g Tx 11n-20 Tx	Antenna A+B	2412MHz 2437MHz 2462MHz
*1) The test was performed on the mode as a representative, because it had the highest power at antenna terminal test. *2) Antenna A or B which had the worst data at Maximum Peak Output Power was used for the test.			

*Details of Operating mode for BT LE

Test Item	Operating Mode	Tested frequency
Conducted Emission 6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth Spurious Emission	BT LE	2402MHz 2440MHz 2480MHz

4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a plat form of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

Detector : QP and CISPR AV
Measurement range : 0.15-30MHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Radiated Spurious Emission

Test Procedure
It was measured based on "11.0 Emissions in non-restricted frequency bands" of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on April 9, 2013)".
EUT was placed on a urethane platform of nominal size, 1.5m by 1.0m, raised 0.8m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.
The height of the measuring antenna varied between 1 and 4m 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	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	Average Power Method: WLAN: 12.2.5.1 RBW: 1MHz VBW: 3MHz Trace: Free Run Detector: Power Averaging (RMS) BT(LE): 12.2.5.2 RBW: 1MHz VBW: 3MHz Trace: Free Run Detector: Power Averaging (RMS) Duty factor and Dwell time factor were added to the results.	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on April 9, 2013)"
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB

- The carrier level and noise levels were confirmed at each position of X and Y axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

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

*1) Section 10.2 Method PKPSD (peak PSD) of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on April 9, 2013)".
*2) 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.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)

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: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

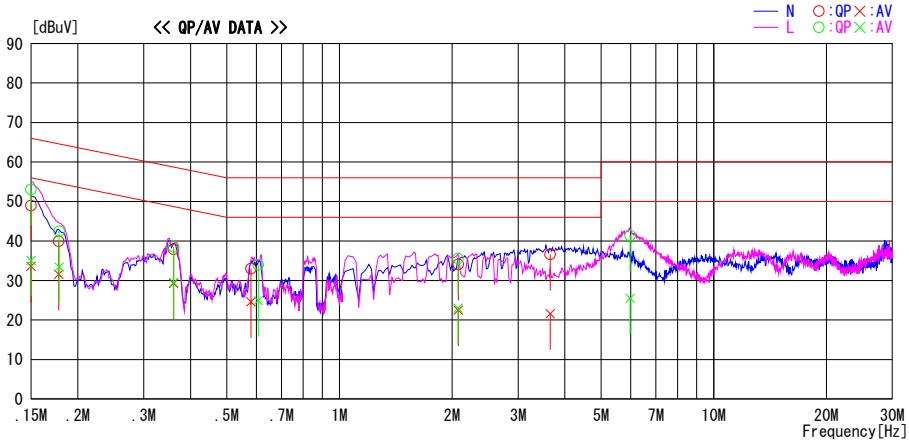
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/03/25

Report No. : 10250677H

Temp./Humi. : 22deg. C / 34% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : WLAN 11n-20 MCS9 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	35.7	20.3	13.3	49.0	33.6	66.0	56.0	17.0	22.4	N	
0.17796	26.6	18.3	13.3	39.9	31.6	64.6	54.6	24.7	23.0	N	
0.36070	24.6	16.0	13.3	37.9	29.3	58.7	48.7	20.8	19.4	N	
0.58030	19.6	11.2	13.4	33.0	24.6	56.0	46.0	23.0	21.4	N	
2.07670	20.5	8.9	13.6	34.1	22.5	56.0	46.0	21.9	23.5	N	
3.65477	22.9	7.9	13.7	36.6	21.6	56.0	46.0	19.4	24.4	N	
0.15000	39.7	21.8	13.3	53.0	35.1	66.0	56.0	13.0	20.9	L	
0.17836	29.2	20.1	13.3	42.5	33.4	64.6	54.6	22.1	21.2	L	
0.36076	25.2	16.2	13.3	38.5	29.5	58.7	48.7	20.2	19.2	L	
0.60670	20.6	11.5	13.4	34.0	24.9	56.0	46.0	22.0	21.1	L	
2.07360	22.0	9.4	13.6	35.6	23.0	56.0	46.0	20.4	23.0	L	
5.97759	27.5	11.6	13.9	41.4	25.5	60.0	50.0	18.6	24.5	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATTEN. LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

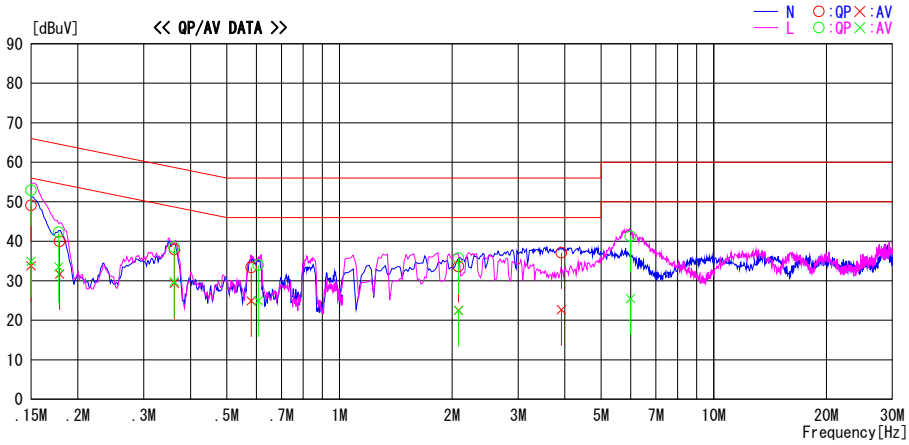
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/03/25

Report No. : 10250677H

Temp./Humi. : 22deg. C / 34% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : BT LE 2440MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



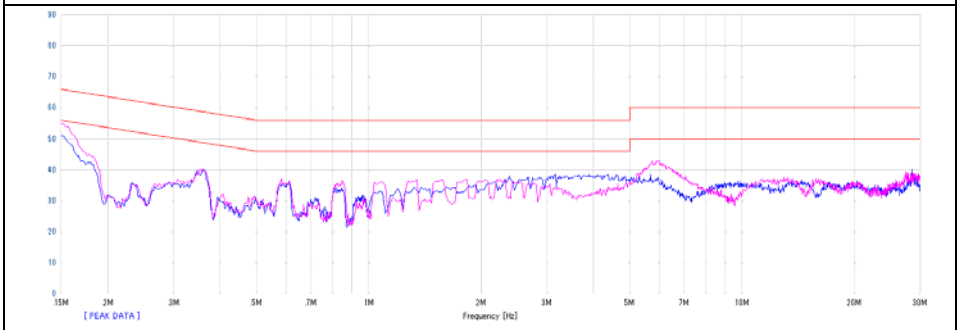
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	35.8	20.5	13.3	49.1	33.8	66.0	56.0	16.9	22.2	N	
0.17890	26.7	18.4	13.3	40.0	31.7	64.5	54.5	24.5	22.8	N	
0.36240	24.6	16.1	13.3	37.9	29.4	58.7	48.7	20.8	19.3	N	
0.58120	20.0	11.5	13.4	33.4	24.9	56.0	46.0	22.6	21.1	N	
2.08110	20.0	8.9	13.6	33.6	22.5	56.0	46.0	22.4	23.5	N	
3.91550	23.3	8.9	13.8	37.1	22.7	56.0	46.0	18.9	23.3	N	
0.15000	39.6	21.6	13.3	52.9	34.9	66.0	56.0	13.1	21.1	L	
0.17780	29.0	20.2	13.3	42.3	33.5	64.6	54.6	22.3	21.1	L	
0.36160	25.2	16.5	13.3	38.5	29.8	58.7	48.7	20.2	18.9	L	
0.60710	20.6	11.5	13.4	34.0	24.9	56.0	46.0	22.0	21.1	L	
2.07840	22.1	8.9	13.6	35.7	22.5	56.0	46.0	20.3	23.5	L	
5.98920	27.4	11.6	13.9	41.3	25.5	60.0	50.0	18.7	24.5	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATTEN. LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

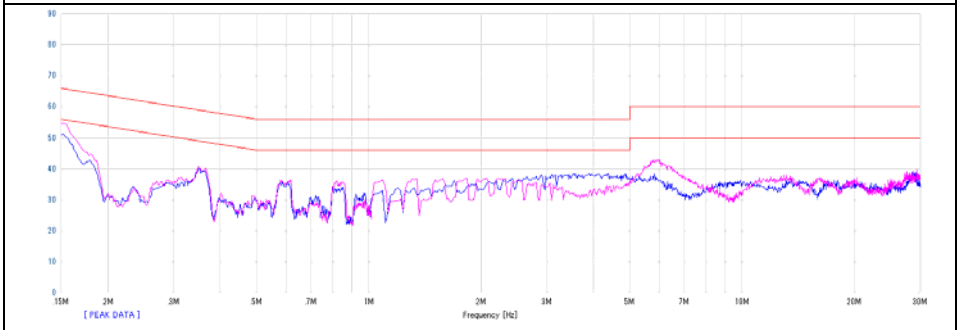
Conducted Emission

Test place	Ise HQ EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10250677H
Date	03/25/2014
Temperature/ Humidity	22deg. C / 34% RH
Engineer	Hironobu Ohnishi
Mode	BT LE

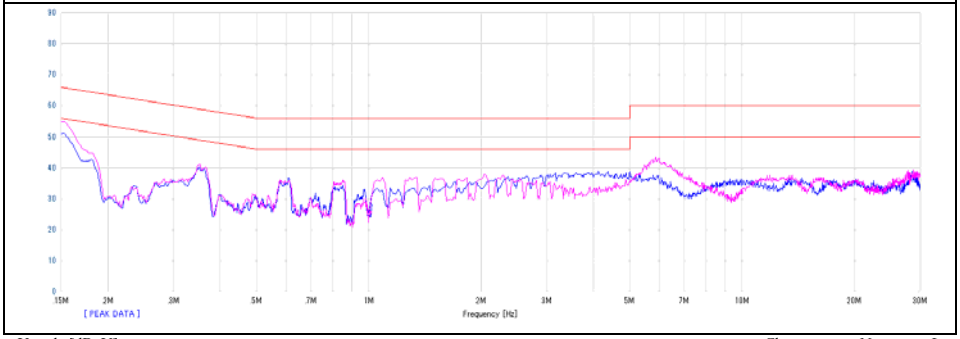
2402MHz



2440MHz



2480MHz



Y scale [dBuV] Chart N L

6dB Bandwidth

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	WLAN Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	9.560	>500
2437	9.576	>500
2462	9.540	>500

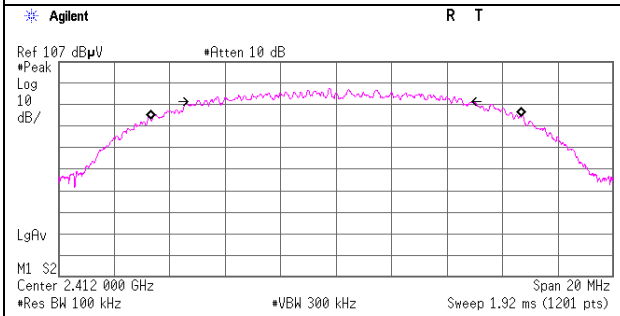
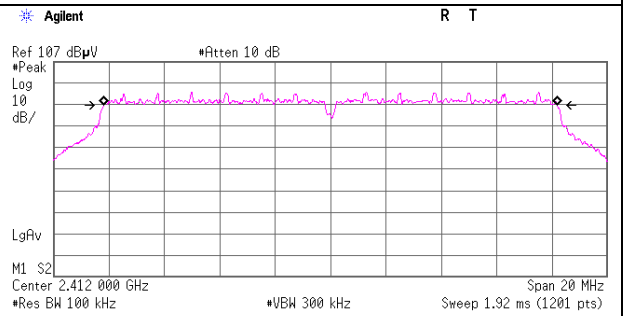
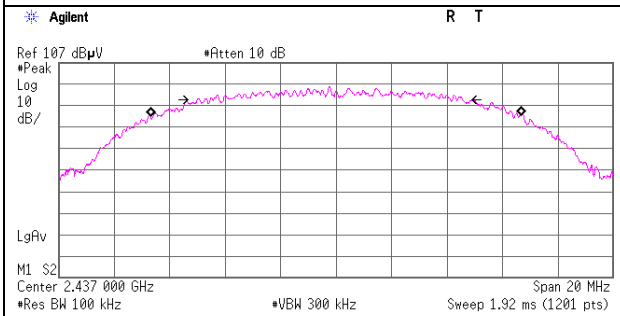
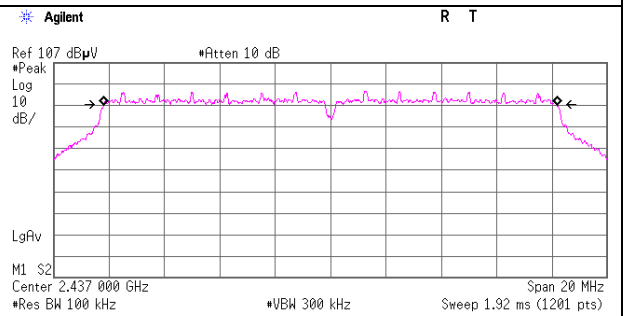
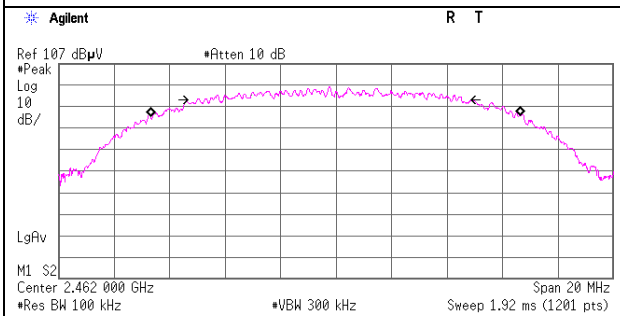
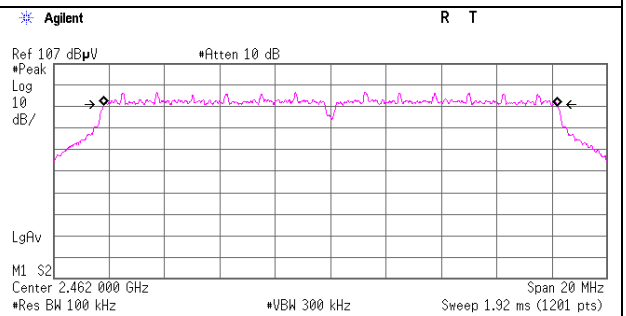
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.372	>500
2437	16.356	>500
2462	16.358	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.943	>500
2437	16.934	>500
2462	16.953	>500

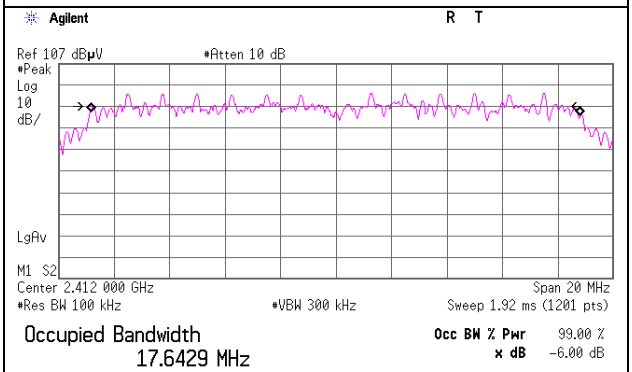
6dB Bandwidth

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

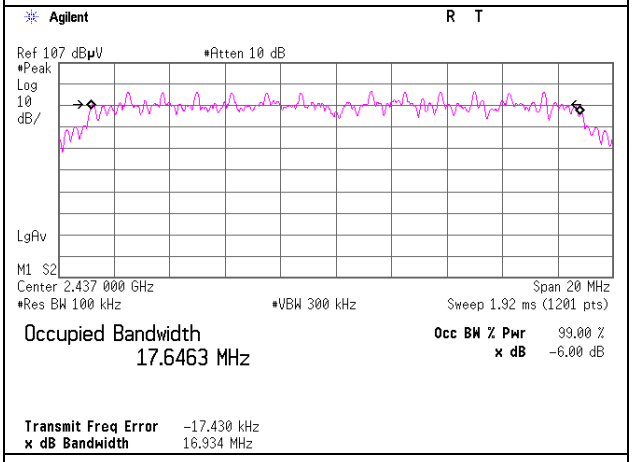
6dB Bandwidth

11n-20

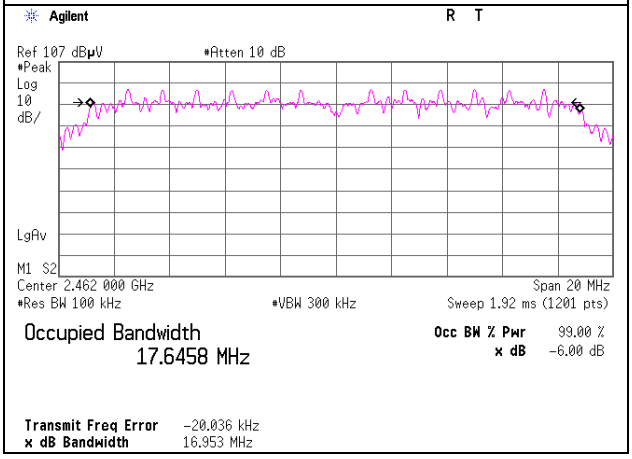
2412MHz



2437MHz



2462MHz



6dB Bandwidth

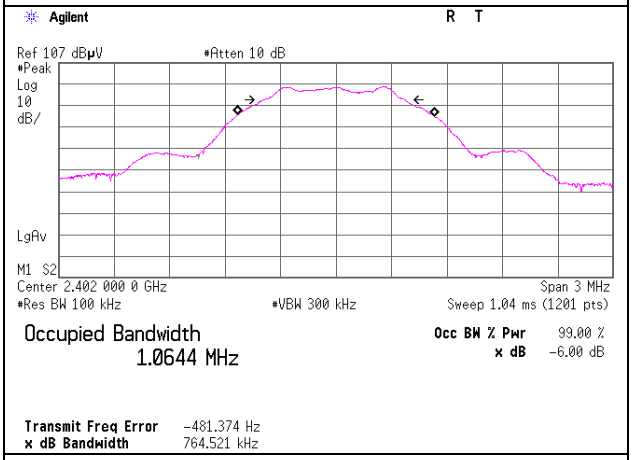
Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2402	0.765	>500
2440	0.764	>500
2480	0.764	>500

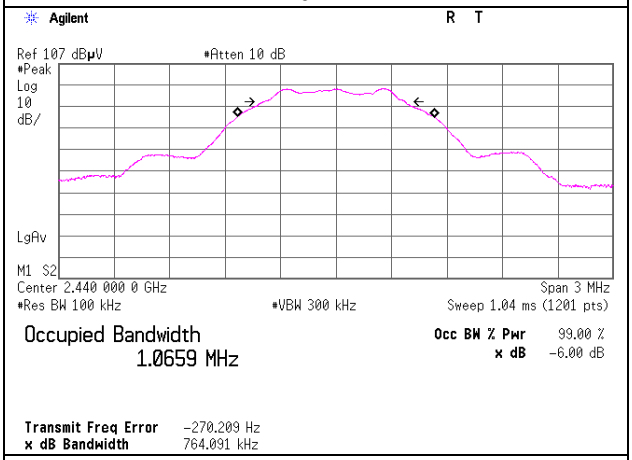
6dB Bandwidth

BT LE

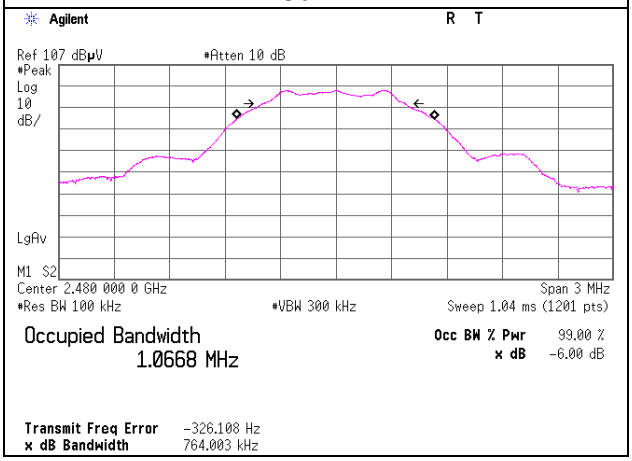
2402MHz



2440MHz



2480MHz



Maximum Peak Output Power

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11b Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit		Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	13.77	14.55	14.52	28.33	29.00	794.32	14.48
2437	16.11	15.21	14.96	31.31	29.00	794.32	14.04
2462	16.94	14.62	14.99	31.57	29.00	794.32	14.01

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	0.57	0.74	10.08	11.39	13.77
2437	1.25	0.74	10.08	12.07	16.11
2462	1.46	0.75	10.08	12.29	16.94

Antenna B

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	0.92	0.74	9.97	11.63	14.55
2437	1.11	0.74	9.97	11.82	15.21
2462	0.94	0.74	9.97	11.65	14.62

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Rate	Antenna A Reading Peak		Antenna B Reading Peak		Total Reading Power		Remark
[Mbps]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
1	1.17	1.309	1.07	1.279	4.13	2.589	
2	1.25	1.334	1.08	1.282	4.18	2.616	
5.5	1.14	1.300	1.12	1.294	4.14	2.594	
11	1.25	1.334	1.11	1.291	4.19	2.625	*

Maximum Peak Output Power

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11g Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit		Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	87.10	78.52	22.19	165.62	29.00	794.32	6.81
2437	99.54	88.31	22.74	187.85	29.00	794.32	6.26
2462	102.80	94.84	22.96	197.64	29.00	794.32	6.04

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	8.58	0.74	10.08	19.40	87.10
2437	9.16	0.74	10.08	19.98	99.54
2462	9.29	0.75	10.08	20.12	102.80

Antenna B

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	8.24	0.74	9.97	18.95	78.52
2437	8.75	0.74	9.97	19.46	88.31
2462	9.06	0.74	9.97	19.77	94.84

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Rate	Antenna A Reading Peak		Antenna B Reading Peak		Total Reading Power		Remark
[Mbps]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
6	9.16	8.24	8.75	7.50	11.97	15.74	*
9	7.82	6.05	7.70	5.89	10.77	11.94	
12	8.53	7.13	8.23	6.65	11.39	13.78	
18	7.79	6.01	7.60	5.75	10.71	11.77	
24	8.90	7.76	8.63	7.29	11.78	15.06	
36	8.96	7.87	8.91	7.78	11.95	15.65	
48	7.95	6.24	7.85	6.10	10.91	12.33	
54	8.26	6.70	8.13	6.50	11.21	13.20	

Maximum Peak Output Power

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11n-20 Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit		Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	79.62	73.79	21.86	153.41	29.00	794.32	7.14
2437	105.20	100.00	23.12	205.20	29.00	794.32	5.88
2462	102.80	100.00	23.07	202.80	29.00	794.32	5.93

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	8.19	0.74	10.08	19.01	79.62
2437	9.40	0.74	10.08	20.22	105.20
2462	9.29	0.75	10.08	20.12	102.80

Antenna B

Freq.	Reading Peak	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	7.97	0.74	9.97	18.68	73.79
2437	9.29	0.74	9.97	20.00	100.00
2462	9.29	0.74	9.97	20.00	100.00

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

MCS Number	Antenna A Reading Peak		Antenna B Reading Peak		Total Reading Power		Remark
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	8.62	7.28	8.59	7.23	11.62	14.51	
1	8.30	6.76	8.29	6.75	11.31	13.51	
2	8.69	7.40	8.57	7.19	11.64	14.59	
3	8.64	7.31	8.53	7.13	11.60	14.44	
4	8.66	7.35	8.52	7.11	11.60	14.46	
5	8.28	6.73	8.11	6.47	11.21	13.20	
6	8.25	6.68	8.09	6.44	11.18	13.13	
7	8.30	6.76	8.16	6.55	11.24	13.31	
8	9.31	8.53	9.07	8.07	12.20	16.60	
9	9.40	8.71	9.29	8.49	12.36	17.20	*
10	8.33	6.81	8.12	6.49	11.24	13.29	
11	8.53	7.13	8.34	6.82	11.45	13.95	
12	8.42	6.95	8.25	6.68	11.35	13.63	
13	8.35	6.84	8.18	6.58	11.28	13.42	
14	8.32	6.79	8.16	6.55	11.25	13.34	
15	8.35	6.84	8.17	6.56	11.27	13.40	

Maximum Peak Output Power

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE Tx

Freq.	Reading Peak	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-9.76	0.74	9.97	0.95	1.24	30.00	1000	29.05
2440	-10.06	0.74	9.97	0.65	1.16	30.00	1000	29.35
2480	-10.39	0.75	9.97	0.33	1.08	30.00	1000	29.67

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Average Power
(For reporting purpose only)

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11b Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result	
[MHz]	[mW]	[mW]	[dBm]	[mW]
2412	7.74	8.18	12.02	15.93
2437	9.38	8.87	12.61	18.25
2462	9.84	8.55	12.65	18.39

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-1.93	0.74	10.08	8.89	7.74
2437	-1.10	0.74	10.08	9.72	9.38
2462	-0.90	0.75	10.08	9.93	9.84

Antenna B

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-1.58	0.74	9.97	9.13	8.18
2437	-1.23	0.74	9.97	9.48	8.87
2462	-1.39	0.74	9.97	9.32	8.55

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Rate	Antenna A Reading Average		Antenna B Reading Average		Total Reading Power		Remark
[Mbps]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
1	-1.10	0.776	-1.23	0.753	1.85	1.530	*
2	-1.27	0.746	-1.43	0.719	1.66	1.466	
5.5	-1.32	0.738	-1.49	0.710	1.61	1.447	
11	-1.39	0.726	-1.55	0.700	1.54	1.426	

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Telephone : +81 596 24 8999
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Average Power
(For reporting purpose only)

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11g Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result	
[MHz]	[mW]	[mW]	[dBm]	[mW]
2412	7.89	7.28	11.81	15.17
2437	9.42	8.71	12.58	18.13
2462	9.18	8.53	12.48	17.71

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-1.85	0.74	10.08	8.97	7.89
2437	-1.08	0.74	10.08	9.74	9.42
2462	-1.20	0.75	10.08	9.63	9.18

Antenna B

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-2.09	0.74	9.97	8.62	7.28
2437	-1.31	0.74	9.97	9.40	8.71
2462	-1.40	0.74	9.97	9.31	8.53

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Rate	Antenna A Reading Average		Antenna B Reading Average		Total Reading Power		Remark
[Mbps]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dB]
6	-1.31	0.74	-1.54	0.70	1.59	1.44	
9	-1.46	0.71	-1.66	0.68	1.45	1.40	
12	-1.49	0.71	-1.75	0.67	1.39	1.38	
18	-1.51	0.71	-1.73	0.67	1.39	1.38	
24	-1.71	0.67	-1.90	0.65	1.21	1.32	
36	-1.08	0.78	-1.31	0.74	1.82	1.52	*
48	-1.32	0.74	-1.62	0.69	1.54	1.43	
54	-1.67	0.68	-1.76	0.67	1.30	1.35	

Average Power
(For reporting purpose only)

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11n-20 Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result	
[MHz]	[mW]	[mW]	[dBm]	[mW]
2412	8.15	7.57	11.96	15.72
2437	9.23	8.53	12.49	17.76
2462	8.91	8.49	12.41	17.40

Sample Calculation:
Result = Antenna A + B
*This Limit was reduced by 1dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna A

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-1.71	0.74	10.08	9.11	8.15
2437	-1.17	0.74	10.08	9.65	9.23
2462	-1.33	0.75	10.08	9.50	8.91

Antenna B

Freq.	Reading Average	Cable Loss	Atten.	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2412	-1.92	0.74	9.97	8.79	7.57
2437	-1.40	0.74	9.97	9.31	8.53
2462	-1.42	0.74	9.97	9.29	8.49

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

MCS Number	Antenna A Reading Average		Antenna B Reading Average		Total Reading Power		Remark
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	-1.65	0.68	-1.81	0.66	1.28	1.34	
1	-1.77	0.67	-1.93	0.64	1.16	1.31	
2	-1.23	0.75	-1.43	0.72	1.68	1.47	
3	-1.28	0.74	-1.46	0.71	1.64	1.46	
4	-1.28	0.74	-1.47	0.71	1.64	1.46	
5	-1.72	0.67	-1.91	0.64	1.20	1.32	
6	-1.67	0.68	-1.89	0.65	1.23	1.33	
7	-1.68	0.68	-1.89	0.65	1.23	1.33	
8	-1.17	0.76	-1.40	0.72	1.73	1.49	*
9	-1.23	0.75	-1.43	0.72	1.68	1.47	
10	-1.67	0.68	-1.88	0.65	1.24	1.33	
11	-1.43	0.72	-1.66	0.68	1.47	1.40	
12	-1.56	0.70	-1.76	0.67	1.35	1.37	
13	-1.59	0.69	-1.83	0.66	1.30	1.35	
14	-1.60	0.69	-1.83	0.66	1.30	1.35	
15	-1.69	0.68	-1.89	0.65	1.22	1.32	

Average Power
(For reporting purpose only)

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE Tx

Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Result [mW]
2402	-12.07	0.74	9.97	-1.36	0.73
2440	-12.40	0.74	9.97	-1.69	0.68
2480	-12.72	0.75	9.97	-2.00	0.63

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10250677H	
Date	03/19/2014	03/21/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)
Mode	11b Tx 2412MHz	

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	53.7	28.2	3.1	32.4	-	52.6	73.9	21.3	
Hori	4824.000	PK	41.5	30.5	5.3	31.4	-	45.9	73.9	28.0	
Hori	7236.000	PK	42.5	35.8	6.7	32.3	-	52.7	73.9	21.2	
Hori	9648.000	PK	42.9	39.1	7.3	33.0	-	56.3	73.9	17.6	
Hori	2390.000	AV	37.2	28.2	3.1	32.4	0.0	36.1	53.9	17.8	
Hori	4824.000	AV	31.2	30.5	5.3	31.4	0.0	35.6	53.9	18.3	
Hori	7236.000	AV	32.2	35.8	6.7	32.3	0.0	42.4	53.9	11.5	
Hori	9648.000	AV	32.4	39.1	7.3	33.0	0.0	45.8	53.9	8.1	
Vert	2390.000	PK	52.8	28.2	3.1	32.4	-	51.7	73.9	22.2	
Vert	4824.000	PK	41.5	30.5	5.3	31.4	-	45.9	73.9	28.0	
Vert	7236.000	PK	42.3	35.8	6.7	32.3	-	52.5	73.9	21.4	
Vert	9648.000	PK	42.3	39.1	7.3	33.0	-	55.7	73.9	18.2	
Vert	2390.000	AV	39.6	28.2	3.1	32.4	0.0	38.5	53.9	15.4	
Vert	4824.000	AV	32.0	30.5	5.3	31.4	0.0	36.4	53.9	17.5	
Vert	7236.000	AV	33.5	35.8	6.7	32.3	0.0	43.7	53.9	10.2	
Vert	9648.000	AV	33.3	39.1	7.3	33.0	0.0	46.7	53.9	7.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2412.000	PK	101.9	28.2	3.1	32.4	100.8	-	-	Carrier
Hori	2400.000	PK	57.6	28.2	3.1	32.4	56.5	80.8	24.3	
Vert	2412.000	PK	101.9	28.2	3.1	32.4	100.8	-	-	Carrier
Vert	2400.000	PK	56.5	28.2	3.1	32.4	55.4	80.8	25.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10250677H	
Date	03/19/2014	03/21/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)
Mode	11b Tx 2437MHz	

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	40.5	30.6	5.3	31.4	-	45.0	73.9	28.9	
Hori	7311.000	PK	41.4	35.9	6.8	32.4	-	51.7	73.9	22.2	
Hori	9748.000	PK	41.0	39.4	7.3	33.0	-	54.7	73.9	19.2	
Hori	4874.000	AV	32.2	30.6	5.3	31.4	0.0	36.7	53.9	17.2	
Hori	7311.000	AV	34.0	35.9	6.8	32.4	0.0	44.3	53.9	9.6	
Hori	9748.000	AV	33.5	39.4	7.3	33.0	0.0	47.2	53.9	6.7	
Vert	4874.000	PK	41.9	30.6	5.3	31.4	-	46.4	73.9	27.5	
Vert	7311.000	PK	42.2	35.9	6.8	32.4	-	52.5	73.9	21.4	
Vert	9748.000	PK	41.2	39.4	7.3	33.0	-	54.9	73.9	19.0	
Vert	4874.000	AV	32.6	30.6	5.3	31.4	0.0	37.1	53.9	16.8	
Vert	7311.000	AV	33.8	35.9	6.8	32.4	0.0	44.1	53.9	9.8	
Vert	9748.000	AV	33.2	39.4	7.3	33.0	0.0	46.9	53.9	7.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10250677H	
Date	03/19/2014	03/21/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)
Mode	11b Tx 2462MHz	

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	53.3	28.4	3.1	32.3	-	52.5	73.9	21.4	
Hori	4924.000	PK	40.4	30.7	5.3	31.4	-	45.0	73.9	28.9	
Hori	7386.000	PK	41.3	36.1	6.7	32.4	-	51.7	73.9	22.2	
Hori	9848.000	PK	40.9	39.6	7.4	33.1	-	54.8	73.9	19.1	
Hori	2483.500	AV	41.8	28.4	3.1	32.3	0.0	41.0	53.9	12.9	
Hori	4924.000	AV	32.4	30.7	5.3	31.4	0.0	37.0	53.9	16.9	
Hori	7386.000	AV	33.7	36.1	6.7	32.4	0.0	44.1	53.9	9.8	
Hori	9848.000	AV	33.2	39.6	7.4	33.1	0.0	47.1	53.9	6.8	
Vert	2483.500	PK	50.7	28.4	3.1	32.3	-	49.9	73.9	24.0	
Vert	4924.000	PK	40.9	30.7	5.3	31.4	-	45.5	73.9	28.4	
Vert	7386.000	PK	42.7	36.1	6.7	32.4	-	53.1	73.9	20.8	
Vert	9848.000	PK	41.1	39.6	7.4	33.1	-	55.0	73.9	18.9	
Vert	2483.500	AV	38.5	28.4	3.1	32.3	0.0	37.7	53.9	16.2	
Vert	4924.000	AV	32.4	30.7	5.3	31.4	0.0	37.0	53.9	16.9	
Vert	7386.000	AV	33.5	36.1	6.7	32.4	0.0	43.9	53.9	10.0	
Vert	9848.000	AV	33.8	39.6	7.4	33.1	0.0	47.7	53.9	6.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10250677H
Date	03/19/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Tomohisa Nakagawa
Mode	11g Band edge

Tx 2412MHz Band edge

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	55.6	28.2	3.1	32.4	-	54.5	73.9	19.4	
Hori	2390.000	AV	47.7	28.2	3.1	32.4	0.0	46.6	53.9	7.3	
Vert	2390.000	PK	58.0	28.2	3.1	32.4	-	56.9	73.9	17.0	
Vert	2390.000	AV	47.3	28.2	3.1	32.4	0.0	46.2	53.9	7.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2412.000	PK	99.3	28.2	3.1	32.4	98.2	-	-	Carrier
Hori	2400.000	PK	59.4	28.2	3.1	32.4	58.3	78.2	19.9	
Vert	2412.000	PK	101.9	28.2	3.1	32.4	100.8	-	-	Carrier
Vert	2400.000	PK	57.7	28.2	3.1	32.4	56.6	80.8	24.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Tx 2462MHz Band edge

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	58.7	28.4	3.1	32.3	-	57.9	73.9	16.0	
Hori	2483.500	AV	48.0	28.4	3.1	32.3	0.0	47.2	53.9	6.7	
Vert	2483.500	PK	54.6	28.4	3.1	32.3	-	53.8	73.9	20.1	
Vert	2483.500	AV	45.9	28.4	3.1	32.3	0.0	45.1	53.9	8.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10250677H	
Date	03/19/2014	03/21/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)
Mode	11n-20 Tx 2412MHz	

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	58.7	28.2	3.1	32.4	-	57.6	73.9	16.3	
Hori	4824.000	PK	40.8	30.5	5.3	31.4	-	45.2	73.9	28.7	
Hori	7236.000	PK	41.8	35.8	6.7	32.3	-	52.0	73.9	21.9	
Hori	9648.000	PK	41.2	39.1	7.3	33.0	-	54.6	73.9	19.3	
Hori	2390.000	AV	49.7	28.2	3.1	32.4	0.0	48.6	53.9	5.3	
Hori	4824.000	AV	32.5	30.5	5.3	31.4	0.0	36.9	53.9	17.0	
Hori	7236.000	AV	33.5	35.8	6.7	32.3	0.0	43.7	53.9	10.2	
Hori	9648.000	AV	33.6	39.1	7.3	33.0	0.0	47.0	53.9	6.9	
Vert	2390.000	PK	52.9	28.2	3.1	32.4	-	51.8	73.9	22.1	
Vert	4824.000	PK	41.1	30.5	5.3	31.4	-	45.5	73.9	28.4	
Vert	7236.000	PK	41.6	35.8	6.7	32.3	-	51.8	73.9	22.1	
Vert	9648.000	PK	42.2	39.1	7.3	33.0	-	55.6	73.9	18.3	
Vert	2390.000	AV	44.3	28.2	3.1	32.4	0.0	43.2	53.9	10.7	
Vert	4824.000	AV	32.7	30.5	5.3	31.4	0.0	37.1	53.9	16.8	
Vert	7236.000	AV	33.5	35.8	6.7	32.3	0.0	43.7	53.9	10.2	
Vert	9648.000	AV	33.3	39.1	7.3	33.0	0.0	46.7	53.9	7.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2412.000	PK	102.0	28.2	3.1	32.4	100.9	-	-	Carrier
Hori	2400.000	PK	63.6	28.2	3.1	32.4	62.5	80.9	18.4	
Vert	2412.000	PK	99.7	28.2	3.1	32.4	98.6	-	-	Carrier
Vert	2400.000	PK	53.4	28.2	3.1	32.4	52.3	78.6	26.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10250677H		
Date	03/19/2014	03/21/2014	03/24/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH	22 deg. C / 34% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Hironobu Ohnishi (30-1000MHz)
Mode	11n-20 Tx 2437MHz		

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	32.838	QP	36.0	16.8	7.1	28.6	-	31.3	40.0	8.7	
Hori	198.032	QP	35.9	16.5	9.1	27.8	-	33.7	43.5	9.8	
Hori	265.796	QP	40.0	18.1	9.6	27.7	-	40.0	46.0	6.0	
Hori	275.000	QP	37.3	18.6	9.7	27.7	-	37.9	46.0	8.1	
Hori	718.756	QP	29.0	22.5	12.4	28.6	-	35.3	46.0	10.7	
Hori	742.477	QP	38.3	22.7	12.5	28.5	-	45.0	46.0	1.0	
Hori	4874.000	PK	41.3	30.6	5.3	31.4	-	45.8	73.9	28.1	
Hori	7311.000	PK	42.1	35.9	6.8	32.4	-	52.4	73.9	21.5	
Hori	9748.000	PK	41.7	39.4	7.3	33.0	-	55.4	73.9	18.5	
Hori	4874.000	AV	32.4	30.6	5.3	31.4	0.0	36.9	53.9	17.0	
Hori	7311.000	AV	33.6	35.9	6.8	32.4	0.0	43.9	53.9	10.0	
Hori	9748.000	AV	33.7	39.4	7.3	33.0	0.0	47.4	53.9	6.5	
Vert	32.838	QP	42.1	16.8	7.1	28.6	-	37.4	40.0	2.6	
Vert	198.032	QP	32.5	16.5	9.1	27.8	-	30.3	43.5	13.2	
Vert	265.796	QP	31.9	18.1	9.6	27.7	-	31.9	46.0	14.1	
Vert	275.000	QP	31.7	18.6	9.7	27.7	-	32.3	46.0	13.7	
Vert	718.756	QP	26.3	22.5	12.4	28.6	-	32.6	46.0	13.4	
Vert	742.477	QP	33.5	22.7	12.5	28.5	-	40.2	46.0	5.8	
Vert	4874.000	PK	41.0	30.6	5.3	31.4	-	45.5	73.9	28.4	
Vert	7311.000	PK	42.5	35.9	6.8	32.4	-	52.8	73.9	21.1	
Vert	9748.000	PK	41.1	39.4	7.3	33.0	-	54.8	73.9	19.1	
Vert	4874.000	AV	32.7	30.6	5.3	31.4	0.0	37.2	53.9	16.7	
Vert	7311.000	AV	34.0	35.9	6.8	32.4	0.0	44.3	53.9	9.6	
Vert	9748.000	AV	33.5	39.4	7.3	33.0	0.0	47.2	53.9	6.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10250677H	
Date	03/19/2014	03/21/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)
Mode	11n-20 Tx 2462MHz	

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	60.2	28.4	3.1	32.3	-	59.4	73.9	14.5	
Hori	4924.000	PK	39.8	30.7	5.3	31.4	-	44.4	73.9	29.5	
Hori	7386.000	PK	42.3	36.1	6.7	32.4	-	52.7	73.9	21.2	
Hori	9848.000	PK	41.5	39.6	7.4	33.1	-	55.4	73.9	18.5	
Hori	2483.500	AV	50.2	28.4	3.1	32.3	0.0	49.4	53.9	4.5	
Hori	4924.000	AV	31.7	30.7	5.3	31.4	0.0	36.3	53.9	17.6	
Hori	7386.000	AV	33.3	36.1	6.7	32.4	0.0	43.7	53.9	10.2	
Hori	9848.000	AV	33.6	39.6	7.4	33.1	0.0	47.5	53.9	6.4	
Vert	2483.500	PK	57.7	28.4	3.1	32.3	-	56.9	73.9	17.0	
Vert	4924.000	PK	40.4	30.7	5.3	31.4	-	45.0	73.9	28.9	
Vert	7386.000	PK	41.7	36.1	6.7	32.4	-	52.1	73.9	21.8	
Vert	9848.000	PK	41.0	39.6	7.4	33.1	-	54.9	73.9	19.0	
Vert	2483.500	AV	46.9	28.4	3.1	32.3	0.0	46.1	53.9	7.8	
Vert	4924.000	AV	32.3	30.7	5.3	31.4	0.0	36.9	53.9	17.0	
Vert	7386.000	AV	33.5	36.1	6.7	32.4	0.0	43.9	53.9	10.0	
Vert	9848.000	AV	33.7	39.6	7.4	33.1	0.0	47.6	53.9	6.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10250677H		
Date	03/19/2014	03/21/2014	03/24/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH	22 deg. C / 34% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Hironobu Ohnishi (30-1000MHz)
Mode	BT LE Tx 2402MHz		

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	32.830	QP	38.2	16.8	7.1	28.7	-	33.4	40.0	6.6	
Hori	196.461	QP	37.5	16.5	9.1	27.8	-	35.3	43.5	8.2	
Hori	263.887	QP	39.6	18.0	9.6	27.7	-	39.5	46.0	6.5	
Hori	275.000	QP	38.3	18.6	9.7	27.7	-	38.9	46.0	7.1	
Hori	718.756	QP	29.6	22.5	12.4	28.6	-	35.9	46.0	10.1	
Hori	742.476	QP	35.4	22.7	12.5	28.5	-	42.1	46.0	3.9	
Hori	2390.000	PK	57.1	28.2	3.1	32.4	-	56.0	73.9	17.9	
Hori	4804.000	PK	41.6	30.5	5.3	31.4	-	46.0	73.9	27.9	
Hori	7206.000	PK	40.6	35.8	6.7	32.3	-	50.8	73.9	23.1	
Hori	9608.000	PK	41.5	39.0	7.3	33.0	-	54.8	73.9	19.1	
Hori	2390.000	AV	41.0	28.2	3.1	32.4	2.0	41.9	53.9	12.0	*1)
Hori	4804.000	AV	32.3	30.5	5.3	31.4	2.0	38.7	53.9	15.2	
Hori	7206.000	AV	33.6	35.8	6.7	32.3	2.0	45.8	53.9	8.1	
Hori	9608.000	AV	33.5	39.0	7.3	33.0	2.0	48.8	53.9	5.1	
Vert	32.830	QP	43.3	16.8	7.1	28.7	-	38.5	40.0	1.5	
Vert	196.461	QP	33.0	16.5	9.1	27.8	-	30.8	43.5	12.7	
Vert	263.887	QP	30.3	18.0	9.6	27.7	-	30.2	46.0	15.8	
Vert	275.000	QP	31.6	18.6	9.7	27.7	-	32.2	46.0	13.8	
Vert	718.756	QP	26.4	22.5	12.4	28.6	-	32.7	46.0	13.3	
Vert	742.476	QP	33.7	22.7	12.5	28.5	-	40.4	46.0	5.6	
Vert	2390.000	PK	59.5	28.2	3.1	32.4	-	58.4	73.9	15.5	
Vert	4804.000	PK	40.9	30.5	5.3	31.4	-	45.3	73.9	28.6	
Vert	7206.000	PK	41.2	35.8	6.7	32.3	-	51.4	73.9	22.5	
Vert	9608.000	PK	42.5	39.0	7.3	33.0	-	55.8	73.9	18.1	
Vert	2390.000	AV	42.8	28.2	3.1	32.4	2.0	43.7	53.9	10.2	*1)
Vert	4804.000	AV	32.6	30.5	5.3	31.4	2.0	39.0	53.9	14.9	
Vert	7206.000	AV	33.6	35.8	6.7	32.3	2.0	45.8	53.9	8.1	
Vert	9608.000	AV	33.7	39.0	7.3	33.0	2.0	49.0	53.9	4.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB
*1) Not Out of Band emission (Leakage Power)

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2402.000	PK	101.1	28.2	3.1	32.4	100.0	-	-	Carrier
Hori	2400.000	PK	56.6	28.2	3.1	32.4	55.5	80.0	24.5	
Vert	2402.000	PK	103.6	28.2	3.1	32.4	102.5	-	-	Carrier
Vert	2400.000	PK	58.8	28.2	3.1	32.4	57.7	82.5	24.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10250677H		
Date	03/19/2014	03/21/2014	03/24/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH	22 deg. C / 34% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Hironobu Ohnishi (30-1000MHz)
Mode	BT LE Tx 2440MHz		

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	32.836	QP	38.3	16.8	7.1	28.6	-	33.6	40.0	6.4	
Hori	196.474	QP	37.7	16.5	9.1	27.8	-	35.5	43.5	8.0	
Hori	266.977	QP	40.0	18.2	9.6	27.7	-	40.1	46.0	5.9	
Hori	275.000	QP	38.5	18.6	9.7	27.7	-	39.1	46.0	6.9	
Hori	718.756	QP	29.7	22.5	12.4	28.6	-	36.0	46.0	10.0	
Hori	742.477	QP	35.2	22.7	12.5	28.5	-	41.9	46.0	4.1	
Hori	4880.000	PK	40.5	30.6	5.3	31.4	-	45.0	73.9	28.9	
Hori	7320.000	PK	42.2	36.0	6.8	32.4	-	52.6	73.9	21.3	
Hori	9760.000	PK	40.8	39.4	7.3	33.0	-	54.5	73.9	19.4	
Hori	4880.000	AV	32.8	30.6	5.3	31.4	2.0	39.3	53.9	14.6	
Hori	7320.000	AV	33.5	36.0	6.8	32.4	2.0	45.9	53.9	8.0	
Hori	9760.000	AV	33.3	39.4	7.3	33.0	2.0	49.0	53.9	4.9	
Vert	32.836	QP	43.3	16.8	7.1	28.6	-	38.6	40.0	1.4	
Vert	196.474	QP	33.1	16.5	9.1	27.8	-	30.9	43.5	12.6	
Vert	266.977	QP	30.3	18.2	9.6	27.7	-	30.4	46.0	15.6	
Vert	275.000	QP	31.6	18.6	9.7	27.7	-	32.2	46.0	13.8	
Vert	718.756	QP	26.4	22.5	12.4	28.6	-	32.7	46.0	13.3	
Vert	742.477	QP	33.4	22.7	12.5	28.5	-	40.1	46.0	5.9	
Vert	4880.000	PK	40.0	30.6	5.3	31.4	-	44.5	73.9	29.4	
Vert	7320.000	PK	41.8	36.0	6.8	32.4	-	52.2	73.9	21.7	
Vert	9760.000	PK	42.1	39.4	7.3	33.0	-	55.8	73.9	18.1	
Vert	4880.000	AV	32.5	30.6	5.3	31.4	2.0	39.0	53.9	14.9	
Vert	7320.000	AV	33.9	36.0	6.8	32.4	2.0	46.3	53.9	7.6	
Vert	9760.000	AV	33.8	39.4	7.3	33.0	2.0	49.5	53.9	4.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10250677H		
Date	03/19/2014	03/21/2014	03/24/2014
Temperature/ Humidity	23 deg. C / 30% RH	22 deg. C / 32% RH	22 deg. C / 34% RH
Engineer	Tomohisa Nakagawa (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Hironobu Ohnishi (30-1000MHz)
Mode	BT LE Tx 2480MHz		

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	32.829	QP	38.4	16.8	7.1	28.7	-	33.6	40.0	6.4	
Hori	196.806	QP	37.8	16.5	9.1	27.8	-	35.6	43.5	7.9	
Hori	266.834	QP	40.0	18.2	9.6	27.7	-	40.1	46.0	5.9	
Hori	275.000	QP	38.5	18.6	9.7	27.7	-	39.1	46.0	6.9	
Hori	718.756	QP	29.7	22.5	12.4	28.6	-	36.0	46.0	10.0	
Hori	742.477	QP	35.2	22.7	12.5	28.5	-	41.9	46.0	4.1	
Hori	2483.500	PK	66.0	28.4	3.1	32.3	-	65.2	73.9	8.7	
Hori	4960.000	PK	40.2	30.7	5.4	31.4	-	44.9	73.9	29.0	
Hori	7440.000	PK	42.4	36.2	6.7	32.4	-	52.9	73.9	21.0	
Hori	9920.000	PK	41.5	39.8	7.4	33.1	-	55.6	73.9	18.3	
Hori	2483.500	AV	49.7	28.4	3.1	32.3	2.0	50.9	53.9	3.0	*1)
Hori	4960.000	AV	32.7	30.7	5.4	31.4	2.0	39.4	53.9	14.5	
Hori	7440.000	AV	33.9	36.2	6.7	32.4	2.0	46.4	53.9	7.5	
Hori	9920.000	AV	33.6	39.8	7.4	33.1	2.0	49.7	53.9	4.2	
Vert	32.829	QP	43.7	16.8	7.1	28.7	-	38.9	40.0	1.1	
Vert	196.806	QP	32.6	16.5	9.1	27.8	-	30.4	43.5	13.1	
Vert	266.834	QP	30.8	18.2	9.6	27.7	-	30.9	46.0	15.1	
Vert	275.000	QP	31.6	18.6	9.7	27.7	-	32.2	46.0	13.8	
Vert	718.756	QP	26.4	22.5	12.4	28.6	-	32.7	46.0	13.3	
Vert	742.477	QP	33.2	22.7	12.5	28.5	-	39.9	46.0	6.1	
Vert	2483.500	PK	65.7	28.4	3.1	32.3	-	64.9	73.9	9.0	
Vert	4960.000	PK	41.0	30.7	5.4	31.4	-	45.7	73.9	28.2	
Vert	7440.000	PK	41.9	36.2	6.7	32.4	-	52.4	73.9	21.5	
Vert	9920.000	PK	41.6	39.8	7.4	33.1	-	55.7	73.9	18.2	
Vert	2483.500	AV	49.2	28.4	3.1	32.3	2.0	50.4	53.9	3.5	*1)
Vert	4960.000	AV	32.6	30.7	5.4	31.4	2.0	39.3	53.9	14.6	
Vert	7440.000	AV	33.6	36.2	6.7	32.4	2.0	46.1	53.9	7.8	
Vert	9920.000	AV	33.2	39.8	7.4	33.1	2.0	49.3	53.9	4.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

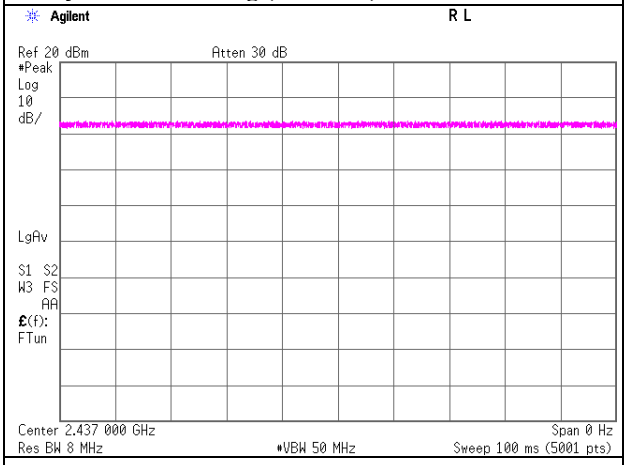
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB
*1) Not Out of Band emission (Leakage Power)

Burst rate confirmation

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11b/11g/11n-20 Tx

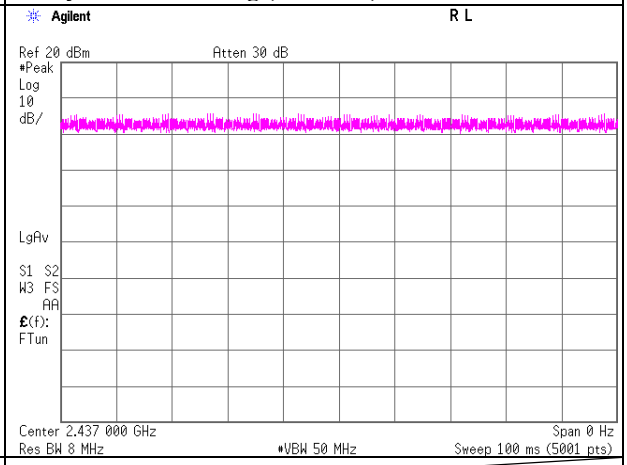
11b 11Mbps

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (100 / 100) =	**0.00 dB**



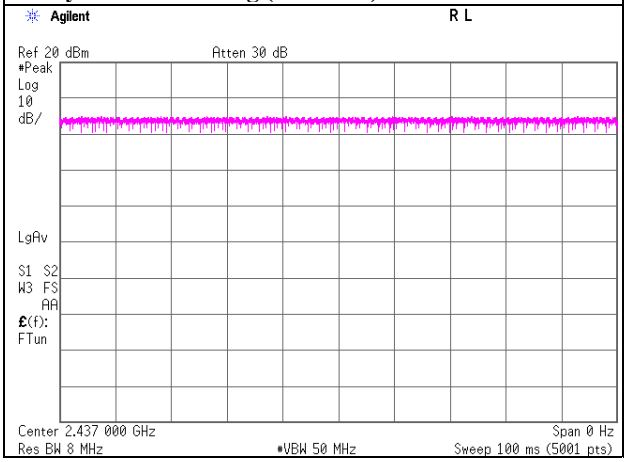
11g 6Mbps

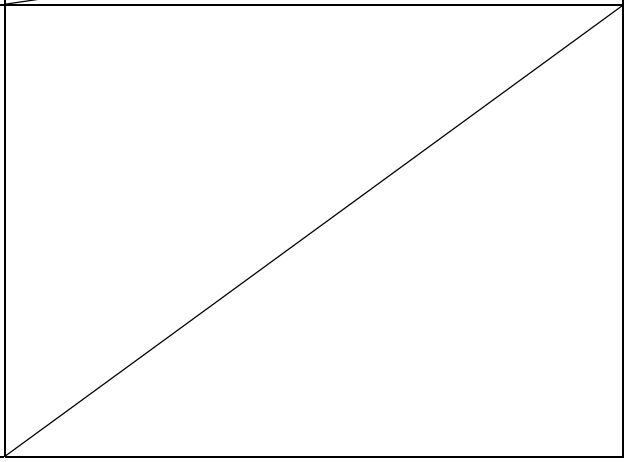
Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (100 / 100) =	**0.00 dB**



11n-20 MCS9

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (100 / 100) =	**0.00 dB**





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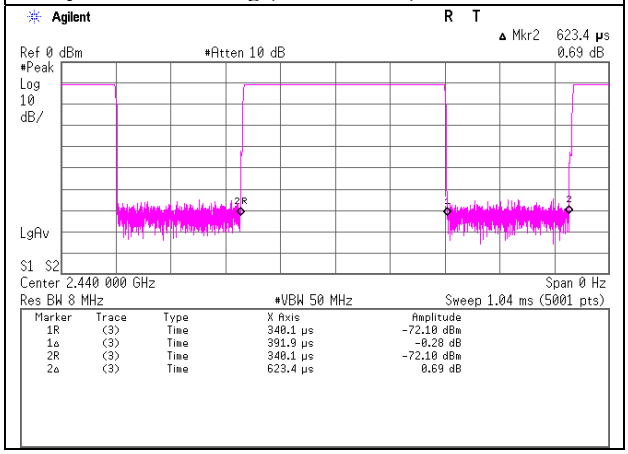
Burst rate confirmation and Dwell time factor

BT LE

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE Tx

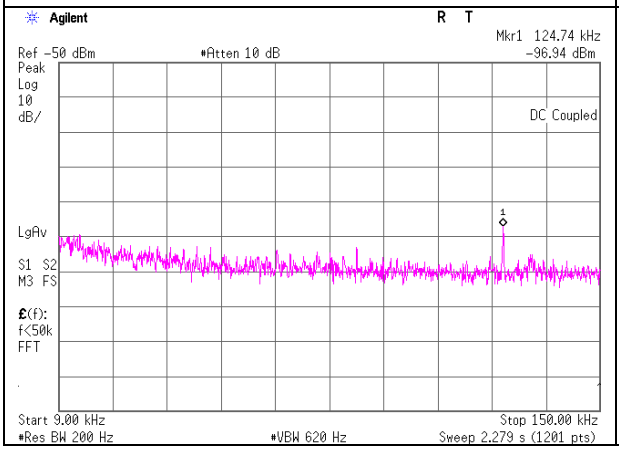
Tx on / (Tx on + Tx off) = 0.629
Tx on / (Tx on + Tx off) * 100 = 62.9 %
Duty factor = 10 * log (623.4 / 391.9) = 2.02 dB



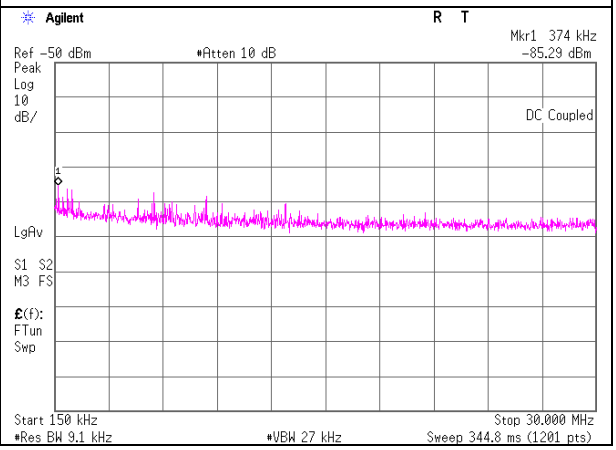
Conducted Spurious Emission

11n-20 Tx 2437MHz

9kHz-150kHz



150kHz-30MHz



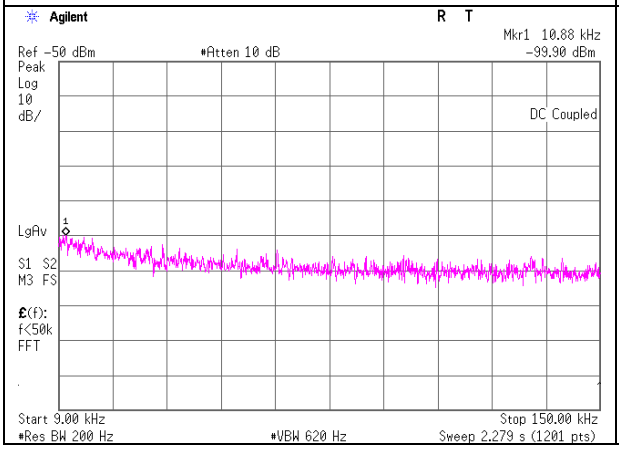
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
124.74	-96.9	0.04	9.9	3.0	2	-81.0	300.0	6.0	-19.8	25.7
374	-85.3	0.04	9.9	3.0	2	-69.4	300.0	6.0	-8.1	16.1

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

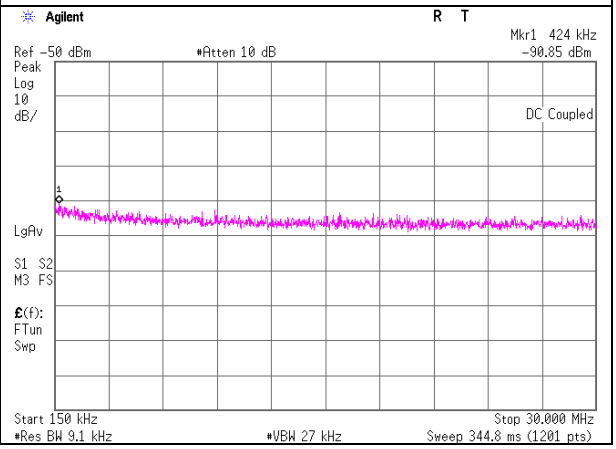
Conducted Spurious Emission

BT LE Tx 2402MHz

9kHz-150kHz



150kHz-30MHz



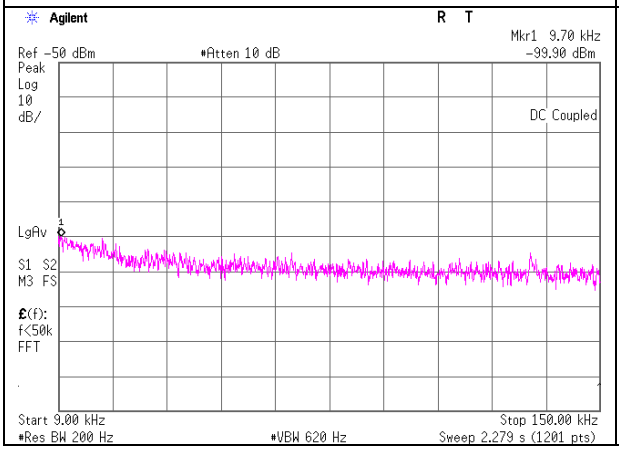
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
10.88	-99.9	0.04	9.9	4.5	-85.5	300.0	6.0	-24.2	46.9
424	-90.9	0.04	9.8	4.5	-76.5	300.0	6.0	-15.2	15.1

E=EIRP-20log(D)+Ground bounce +104.8[dBuV/m]
EIRP=Reading+Cable Loss+Attenator+Antenna Gain

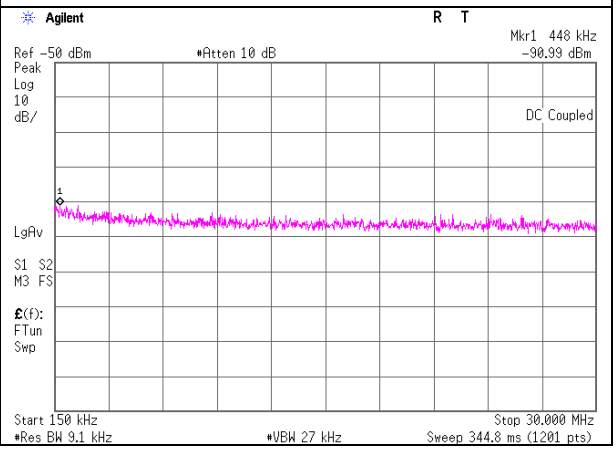
Conducted Spurious Emission

BT LE Tx 2440MHz

9kHz-150kHz



150kHz-30MHz



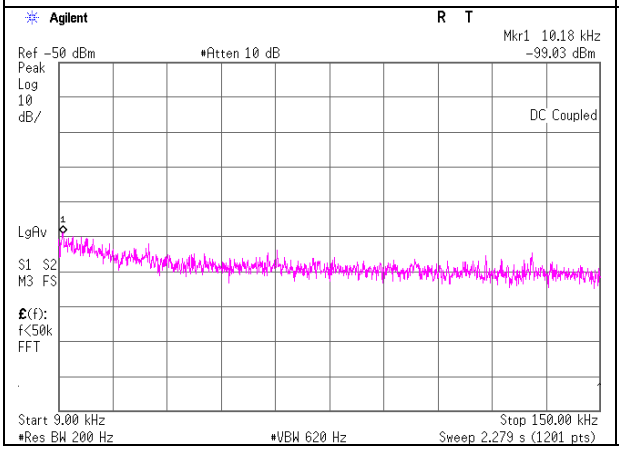
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
9.70	-96.9	0.04	9.9	4.5	-82.5	300.0	6.0	-21.3	47.9
448	-85.3	0.04	9.8	4.5	-70.9	300.0	6.0	-9.7	14.6

E=EIRP-20log(D)+Ground bounce +104.8[dBuV/m]
EIRP=Reading+Cable Loss+Attenator+Antenna Gain

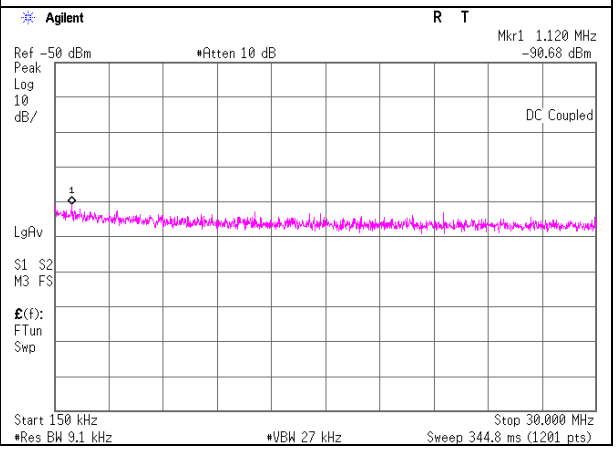
Conducted Spurious Emission

BT LE Tx 2480MHz

9kHz-150kHz



150kHz-30MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
10.18	-99.0	0.04	9.9	4.5	-84.6	300.0	6.0	-23.4	47.4
1120	-90.7	0.05	9.8	4.5	-76.3	30.0	6.0	5.0	26.6

E=EIRP-20log(D)+Ground bounce +104.8[dBuV/m]
EIRP=Reading+Cable Loss+Attenator+Antenna Gain

Power Density

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11b Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.035	0.037	-11.40	0.072	8.00	19.40
2437.00	0.042	0.041	-10.81	0.083	8.00	18.81
2462.00	0.043	0.039	-10.87	0.082	8.00	18.87

Sample Calculation:
Result = Antenna A + B

Antenna A

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-26.26	1.63	10.08	-14.55	0.035	8.00	22.55
2437.00	-25.43	1.63	10.08	-13.72	0.042	8.00	21.72
2462.00	-25.35	1.64	10.08	-13.63	0.043	8.00	21.63

Antenna B

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-25.88	1.63	9.97	-14.28	0.037	8.00	22.28
2437.00	-25.52	1.63	9.97	-13.92	0.041	8.00	21.92
2462.00	-25.74	1.63	9.97	-14.14	0.039	8.00	22.14

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Power Density

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11g Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.199	0.147	-4.62	0.346	8.00	12.62
2437.00	0.226	0.156	-4.17	0.383	8.00	12.17
2462.00	0.211	0.243	-3.42	0.455	8.00	11.42

Sample Calculation:
Result = Antenna A + B

Antenna A

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-18.73	1.63	10.08	-7.02	0.199	8.00	15.02
2437.00	-18.16	1.63	10.08	-6.45	0.226	8.00	14.45
2462.00	-18.47	1.64	10.08	-6.75	0.211	8.00	14.75

Antenna B

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-19.93	1.63	9.97	-8.33	0.147	8.00	16.33
2437.00	-19.66	1.63	9.97	-8.06	0.156	8.00	16.06
2462.00	-17.74	1.63	9.97	-6.14	0.243	8.00	14.14

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Power Density

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	11n-20 Tx

Antenna A + B

Freq.	Antenna A Result	Antenna B Result	Result		Limit	Margin
[MHz]	[mW]	[mW]	[dBm]	[mW]	[dBm]	[dB]
2412.00	0.161	0.172	-4.77	0.333	8.00	12.77
2437.00	0.190	0.201	-4.07	0.391	8.00	12.07
2462.00	0.181	0.215	-4.03	0.396	8.00	12.03

Sample Calculation:
Result = Antenna A + B

Antenna A

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-19.63	1.63	10.08	-7.92	0.161	8.00	15.92
2437.00	-18.92	1.63	10.08	-7.21	0.190	8.00	15.21
2462.00	-19.15	1.64	10.08	-7.43	0.181	8.00	15.43

Antenna B

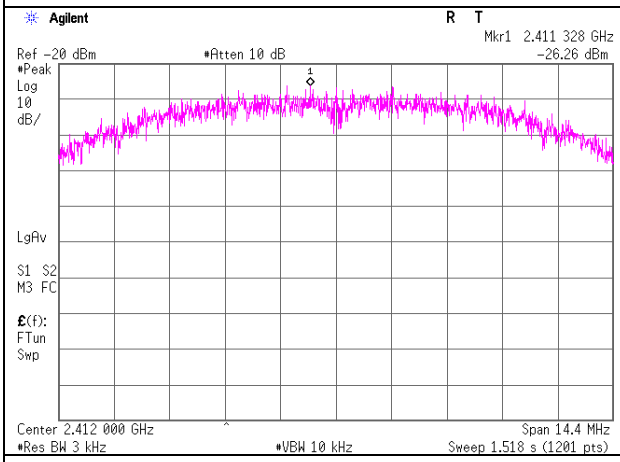
Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-19.25	1.63	9.97	-7.65	0.172	8.00	15.65
2437.00	-18.56	1.63	9.97	-6.96	0.201	8.00	14.96
2462.00	-18.28	1.63	9.97	-6.68	0.215	8.00	14.68

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

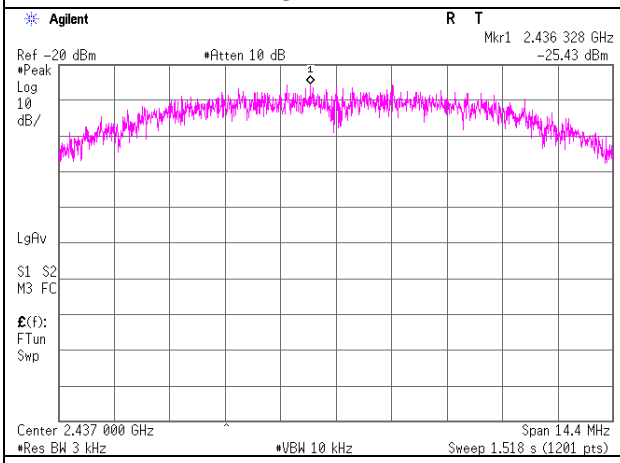
Power Density

11b Antenna A

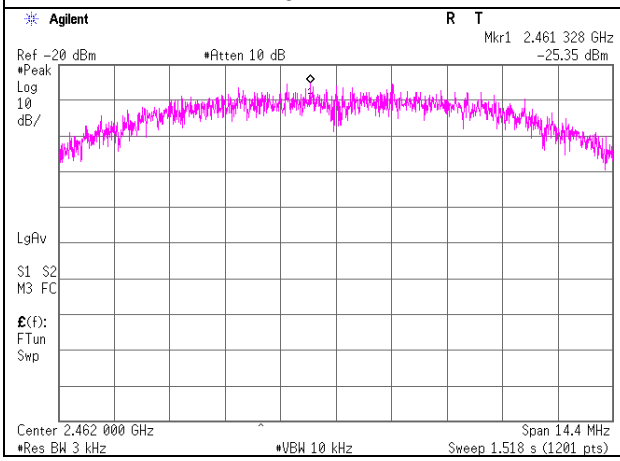
2412MHz



2437MHz

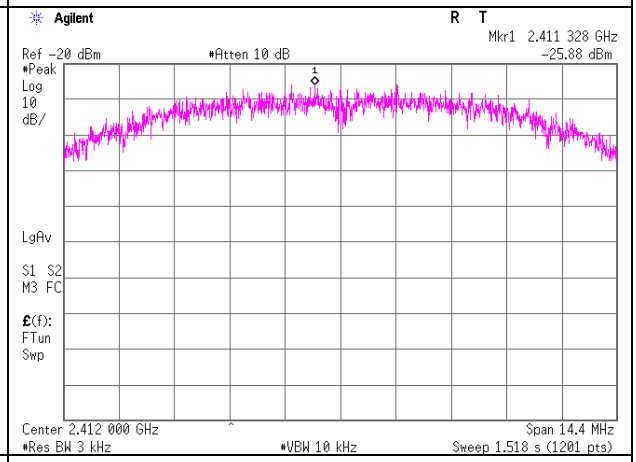


2462MHz

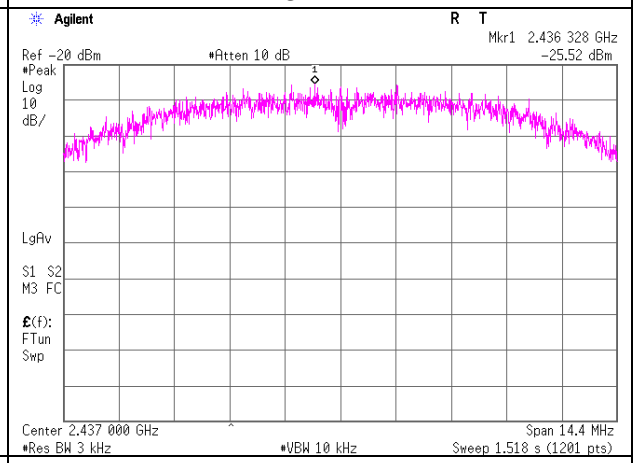


11b Antenna B

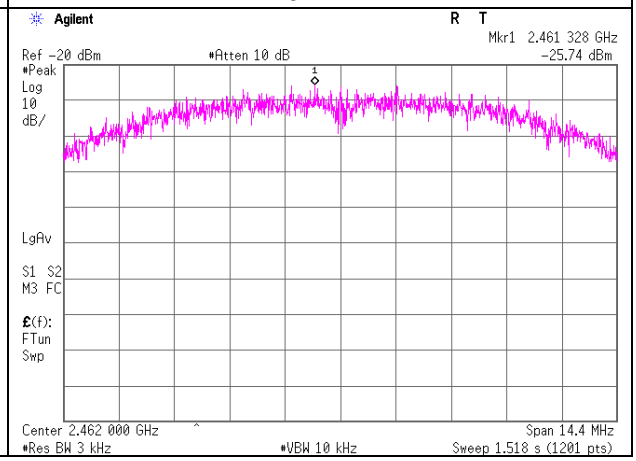
2412MHz



2437MHz



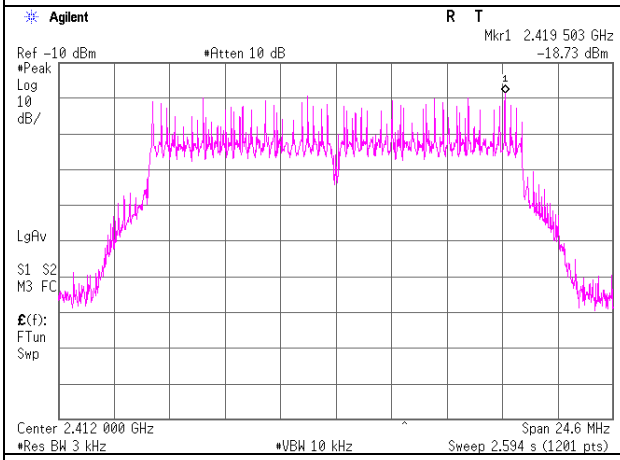
2462MHz



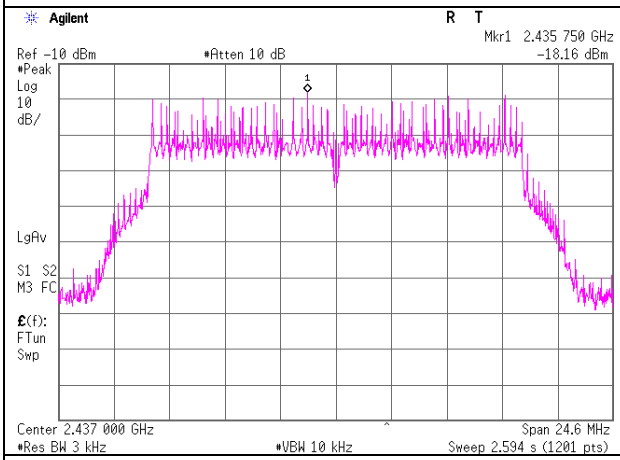
Power Density

11g Antenna A

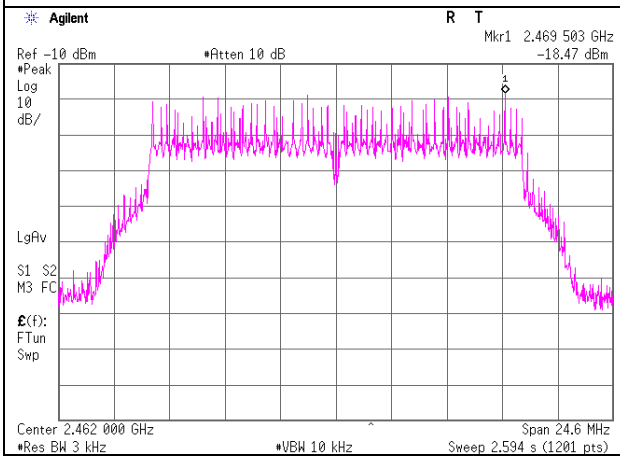
2412MHz



2437MHz

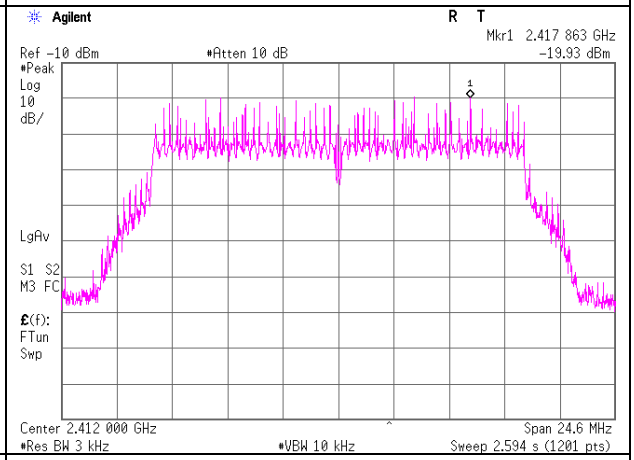


2462MHz

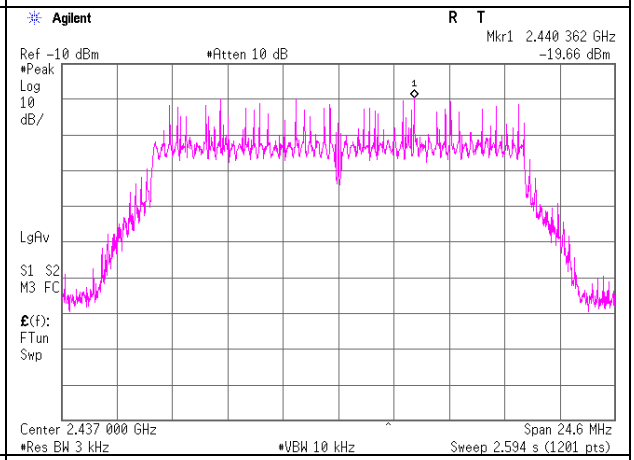


11g Antenna B

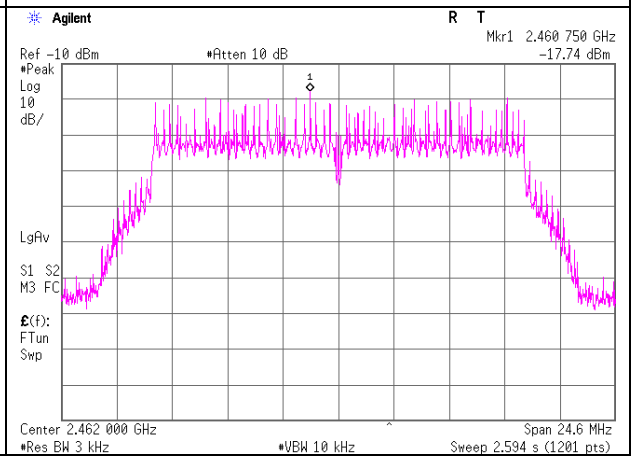
2412MHz



2437MHz



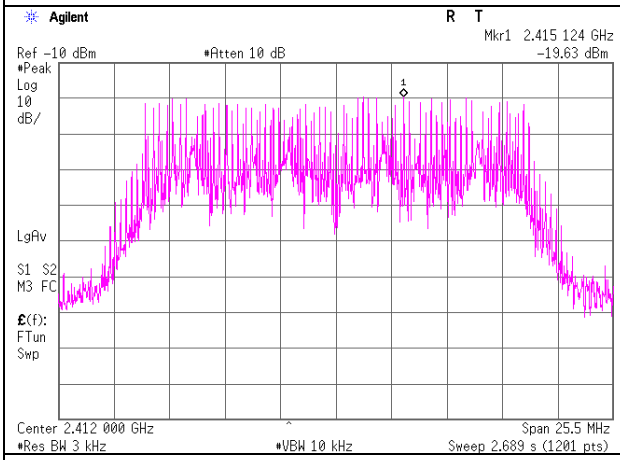
2462MHz



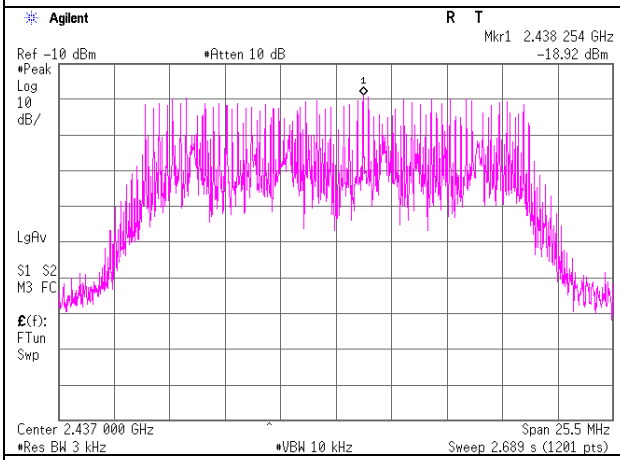
Power Density

11n-20 Antenna A

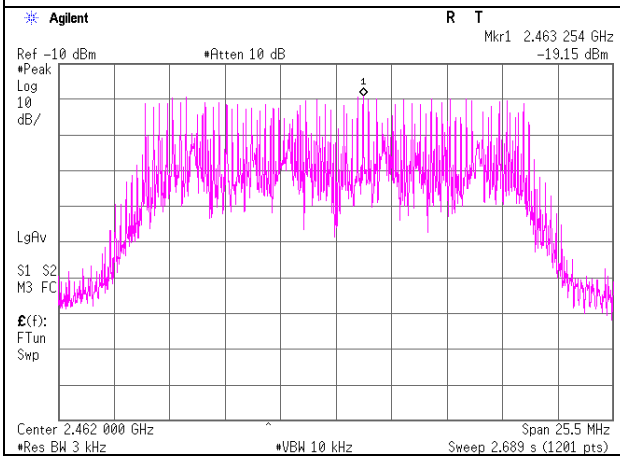
2412MHz



2437MHz

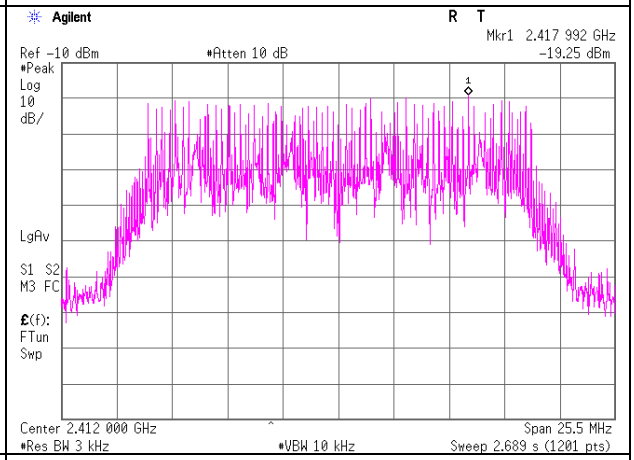


2462MHz

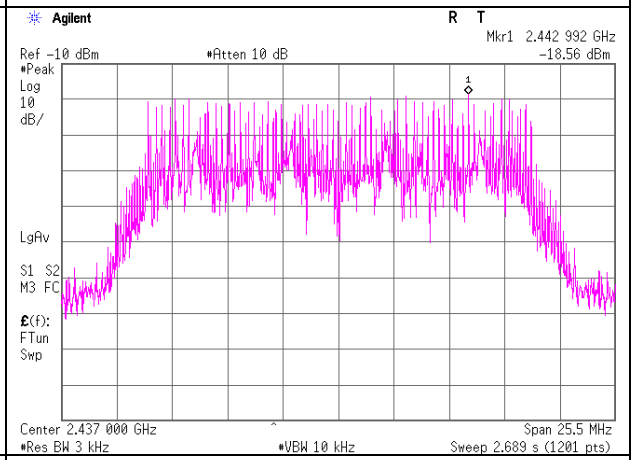


11n-20 Antenna B

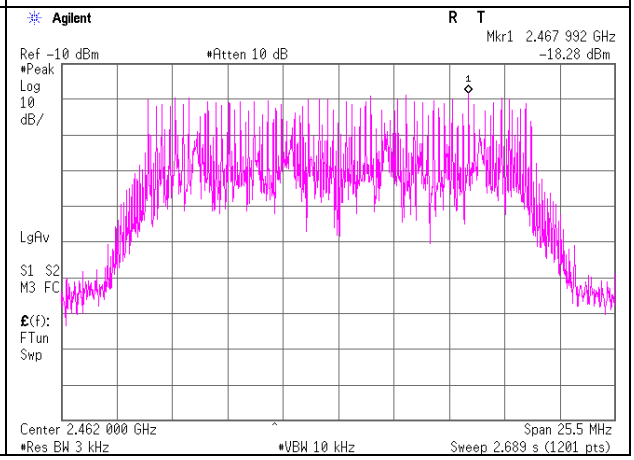
2412MHz



2437MHz



2462MHz



Power Density

Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE

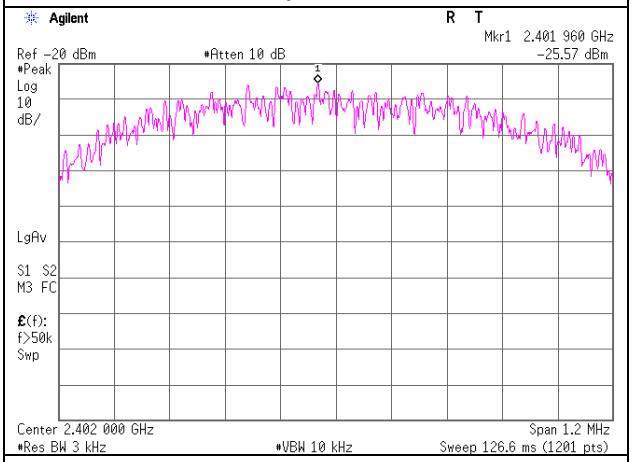
Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2402	-25.57	1.62	9.97	-13.98	0.04	8.00	21.98
2440	-25.92	1.63	9.97	-14.32	0.04	8.00	22.32
2480	-26.27	1.65	9.97	-14.65	0.03	8.00	22.65

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

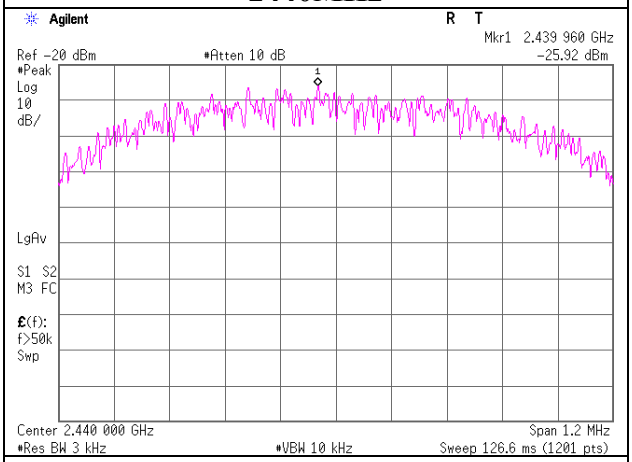
Power Density

BT LE

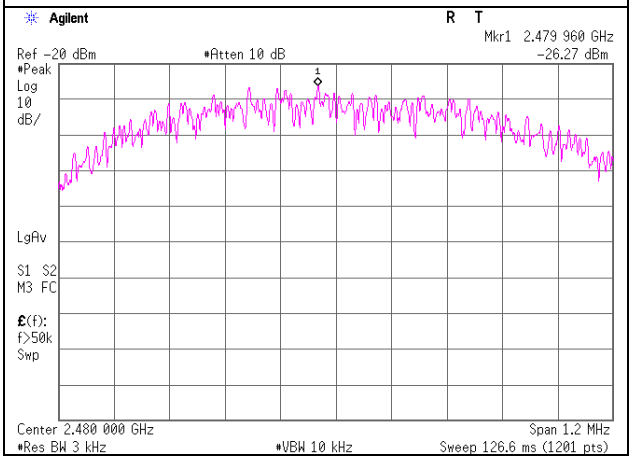
2402MHz



2440MHz

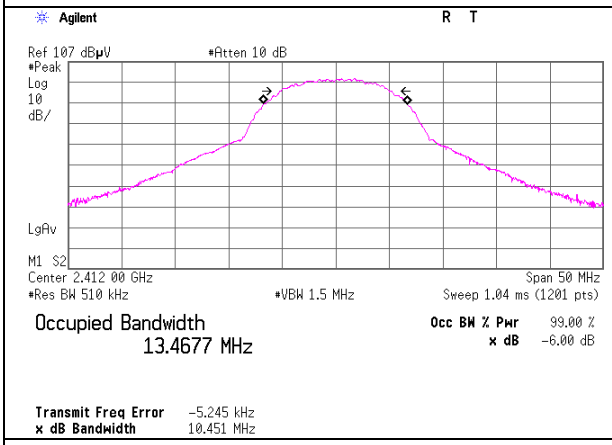
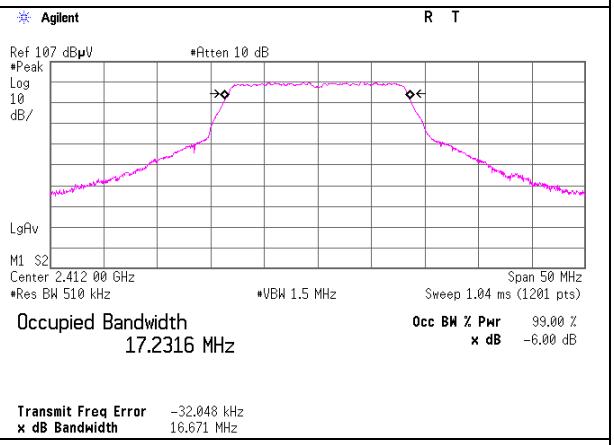
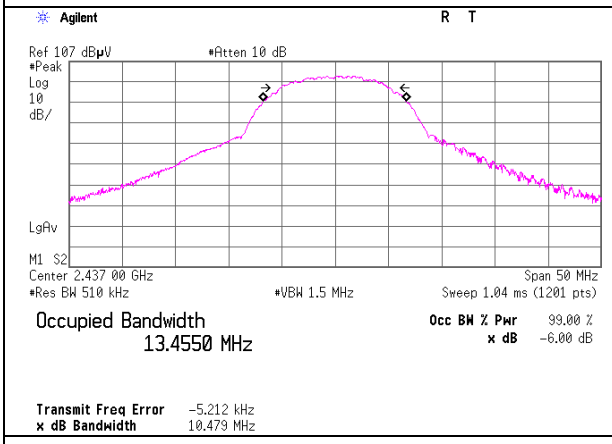
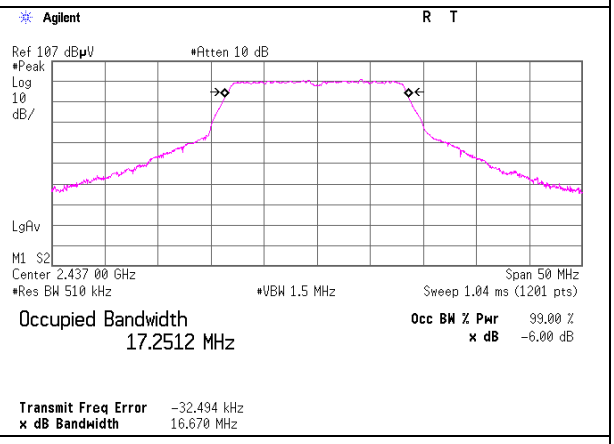
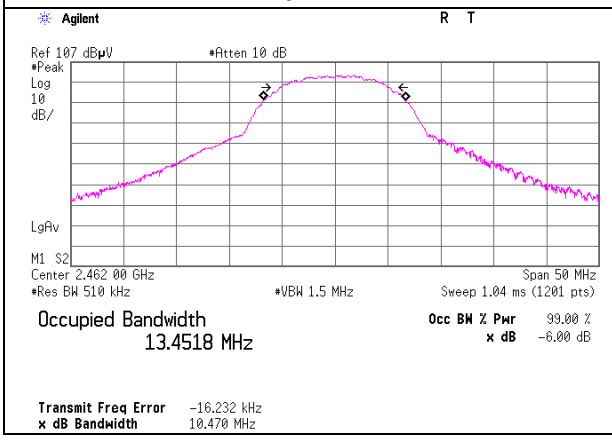
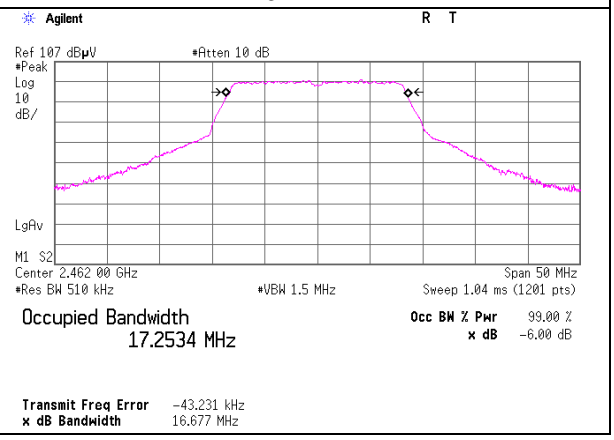


2480MHz



99%Occupied Bandwidth

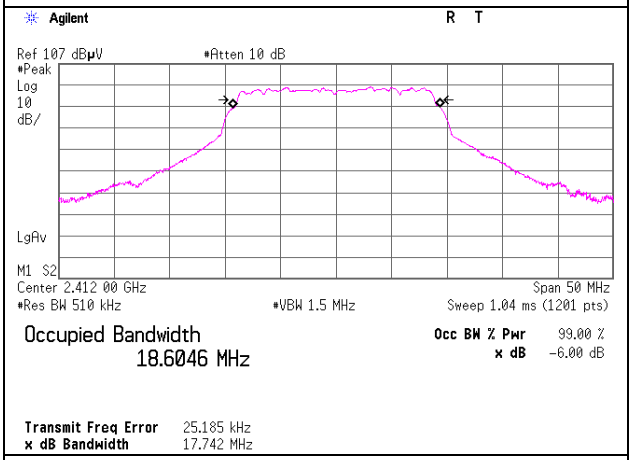
Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	WLAN Tx

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

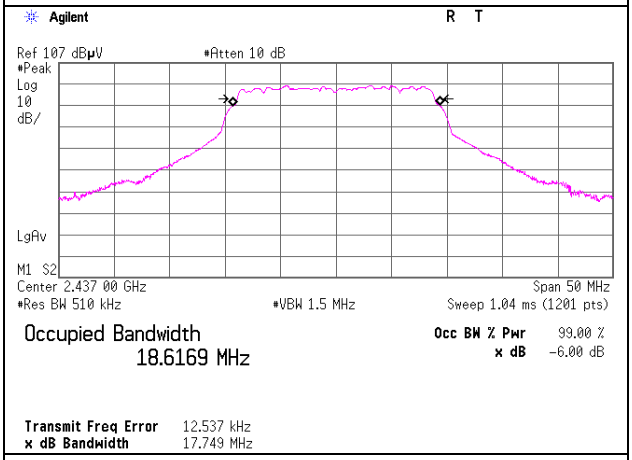
99% Occupied Bandwidth

11n-20

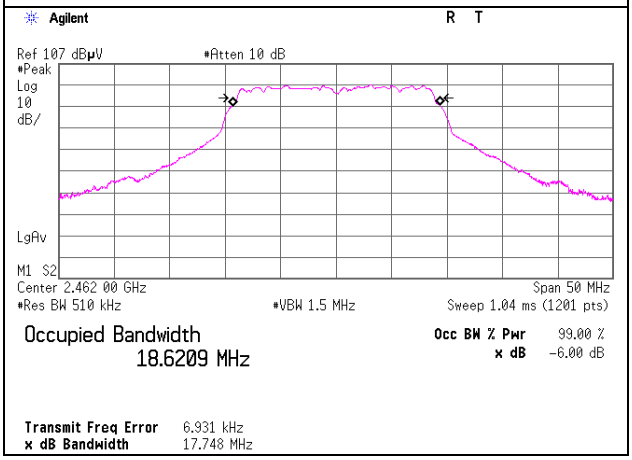
2412MHz



2437MHz



2462MHz

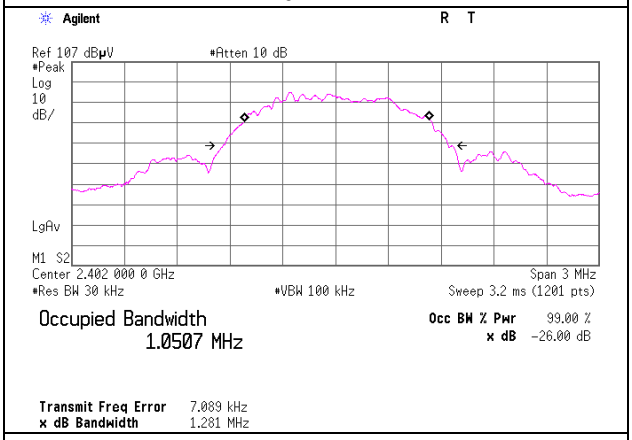


99%Occupied Bandwidth

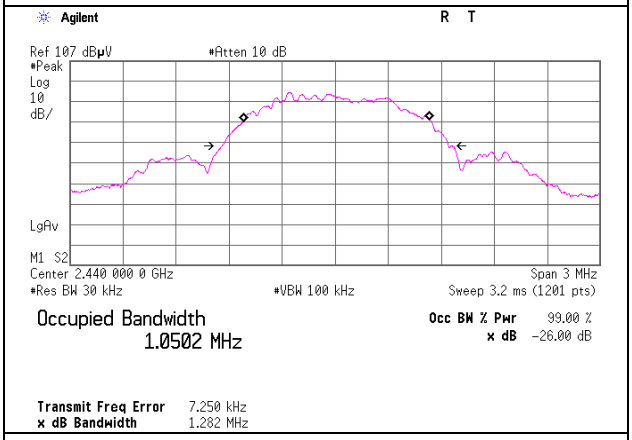
Test place	Ise HQ EMC Lab. No.11 Measurement Room
Report No.	10250677H
Date	03/13/2014
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Yutaka Yoshida
Mode	BT LE

BT LE

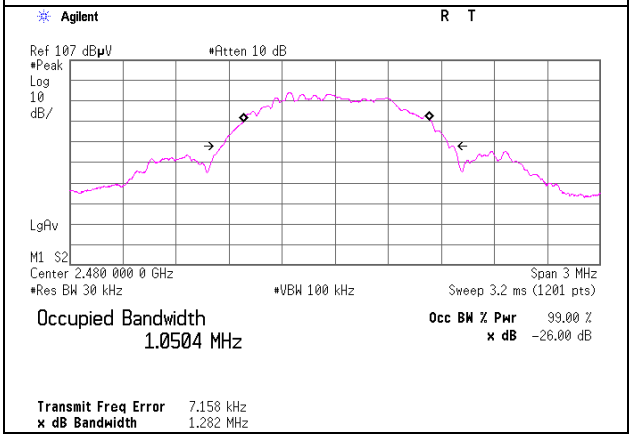
2402MHz



2440MHz



2480MHz



APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	AT	2014/03/05 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2013/06/12 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2013/06/12 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2013/10/15 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2013/10/15 * 12
MAT-24	Attenuator(10dB)(above1GHz)	Agilent	8493C	71389	AT	2013/06/05 * 12
MAT-20	Attenuator(10dB)(above1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2014/01/29 * 12
MCC-36	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2013/09/27 * 12
MCC-102	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2013/06/24 * 12
MCC-144	Microwave Cable	Junkosha	MWX221	1207S407	AT	2013/08/19 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2013/12/17 * 12
MMM-17	DIGIITAL HiTESTER	Hioki	3805	070900530	AT	2014/01/22 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2013/03/22 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2013/11/26 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2014/02/27 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2014/02/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-114	Spectrum Analyzer	Agilent	E4440A	MY46187105	RE	2013/11/11 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2013/05/17 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2013/09/27 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2013/03/12 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2013/09/01 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2013/11/25 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2013/05/17 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2014/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE/CE	2014/02/20 * 12
MJM-09	Measure	KDS	E19-55	-	RE/CE	-

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE/CE	2013/11/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2013/11/24 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2013/11/24 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2013/09/12 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2014/01/27 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	8127384	CE(AE)	2014/03/10 * 12
MTA-13	Terminator	TME	Termination	-	CE	2013/09/18 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2013/07/23 * 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: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test