RADIO TEST REPORT

Test Report No. : 4786002697H-B-R1

Applicant	:	**FUJITSU TEN LIMITED**
Type of Equipment	:	**Car Audio**
Model No.	:	**FT0043A**
FCC ID	:	**BABFT0043A**
Test regulation	:	**FCC Part 15 Subpart C: 2012** ***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 report is a revised version of 4786002697H-B. 4786002697H-B is replaced with this report.

Date of test: February 5 to 12, 2013

Representative test engineer:
Kazuya Yoshioka
Engineer of WiSE Japan,
UL Verification Service

Approved by:
Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service

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

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REVISION HISTORY

Original Test Report No.: 4786002697H-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	4786002697H-B	March 8, 2013	-	-
1	4786002697H-B-R1	March 21, 2013	P. 5	Corrected Bluetooth version in clause 2.2
1	4786002697H-B-R1	March 21, 2013	P. 5	Added "*WLAN and Bluetooth do not transmit simultaneously." in clause 2.2
1	4786002697H-B-R1	March 21, 2013	P. 12	Deleted Maximum Average Output Power information from the table
1	4786002697H-B-R1	March 21, 2013	P. 30	Corrected Power Density data

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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	:	YO SHOTATSU

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

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio
Model No.	:	FT0043A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 13.2V
Rated range	:	DC 10.5 to 16.0V
Receipt Date of Sample	:	September 3, 2012
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	:	792MHz

Radio Specification

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

Radio Type	:	Transceiver
Frequency of Operation	:	2412-2462MHz
Modulation	:	11b: DSSS, 11g/n: OFDM
Power Supply (radio part input)	:	DC 3.3V
Antenna type	:	Inverted F type Antenna
Antenna Gain	:	1.43dBi

[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 type Antenna
Antenna Gain	:	3.0dBi

[GPS]

Radio Type	:	Receiver
Frequency of Operation	:	1575.42MHz
Modulation	:	CDMA
Power Supply (radio part input)	:	DC 5.0V
Antenna type	:	Dome Antenna
Antenna Gain	:	-6.0dBi

[Receiver]

Equipment type	:	Receiver
Frequency of Operation	:	87.75-107.9 MHz
IF Frequency	:	284.375-289.5kHz
Local frequency	:	88.039500-107.615625MHz
(Voltage controlled oscillator	:	5634.528-6026.475MHz)

*WLAN and Bluetooth do not transmit simultaneously.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	Test specification: FCC Part 15 Subpart C: 2012, final revised on December 27, 2012 and effective January 28, 2013
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 EUT complies with FCC Part 15 Subpart B: 2012, final revised on December 27, 2012 and effective January 28, 2013.

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	N/A	N/A *1)	-
	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 October 4, 2012)"	**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 October 4, 2012)"	**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 October 4, 2012)"	**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 October 4, 2012)"	**FCC:** Section15.247(d)	3.7dB 2690.000MHz, AV, 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.
*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.

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

FCC 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery. 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

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.

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	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	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

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. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 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	4.75 x 5.4 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 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* 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)

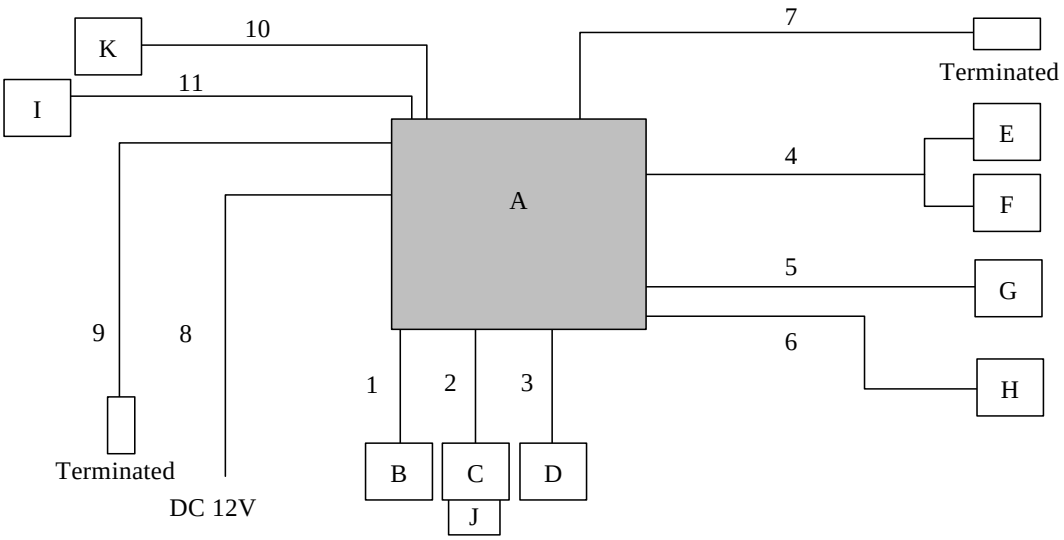
Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - " of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	12Mbps, PN9
IEEE 802.11n 20MHz BW (11n-20)	MCS 2, 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: Same as production model Software: Diag. mode(Wi-Fi Auth mode) *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
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412MHz 2437MHz 2462MHz
Spurious Emission (Radiated above 1GHz)	11b Tx 11g Tx *1)	2412MHz 2437MHz 2462MHz
Spurious Emission (Band Edge)	11b Tx 11g Tx 11n-20 Tx	2412MHz 2462MHz
Spurious Emission (Radiated below 1 GHz) Spurious Emission (Conducted)	11g Tx *2)	2462MHz
*1) Since the 11g and 11n-20 has the same modulation, test was performed on 11g Tx mode which had the higher antenna conducted power. *2) The mode was tested as a representative, because it had the highest power at antenna terminal test.		

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	FT0043A	001	FUJITSU TEN	EUT
B	Display	134000-7780A101	3H800017	FUJITSU TEN	-
C	USB connecter Box	86190-48030	95016	Tokai-Rika	-
D	Remote control device	84870-48080	-	Tokai-Rika	-
E	Steering SW Right	84250-28150	-	Tokai-Rika	-
F	Steering SW Left	84250-28150	-	Tokai-Rika	-
G	Microphone	86730-20030	-	KOJIMA PRESS	-
H	Back Camera	86790-20070	-	Panasonic	-
I	External amplifier	86100-0W250	2133105	Harman	-
J	USB memory	ULTIMA II I Series 2GB	10091290E6A91E00B18602A8	SILICON POWER	-
K	FM Antenna	146000-09810101	PJ401571	FUJITSU TEN	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Display Cable	3.0	Unshielded	Unshielded	-
2	USB Cable	3.0	Shielded	Shielded	-
3	Signal Cable	2.5	Unshielded	Unshielded	-
4	Signal Cable	2.5	Unshielded	Unshielded	-
5	Microphone Cable	5.0	Shielded	Shielded	-
6	Camera Cable	15.0	Shielded	Shielded	-
7	tuner Cable	3.7	Unshielded	Unshielded	-
8	DC Cable	5.0	Unshielded	Unshielded	-
9	GPS Antenna Cable	0.5	Shielded	Shielded	-
10	FM Antenna Cable	3.5	Shielded	Shielded	-
11	Signal Cable	2.5	Unshielded	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure
It was measured based on "10.0 MAXIMUM UNWANTED EMISSION LEVELS" of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on October 4, 2012)".
EUT was placed on a urethane platform of nominal size, 1.0m by 2.5m, 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	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	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	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	Average Power Method: Alternative 1 RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) *1) Trace: Free Run	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

*1) Signal gating was used for testing on 11n-20 mode.
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB

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 : 30M-26.5GHz
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	20MHz, 50MHz	100kHz, 510kHz	300kHz, 1.5MHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Option 3) (Sensor: 50MHz BW)
Peak Power Density	1.5 times the 6dB bandwidth	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer *1)
Conducted Spurious Emission	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
*1) PSD Option 1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on October 4, 2012)".							

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

6dB Bandwidth

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	4786002697H
Date	02/05/2013
Temperature/ Humidity	21 deg. C / 34% RH
Engineer	Katsunori Okai
Mode	Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	9.610	>500
2437	9.609	>500
2462	9.611	>500

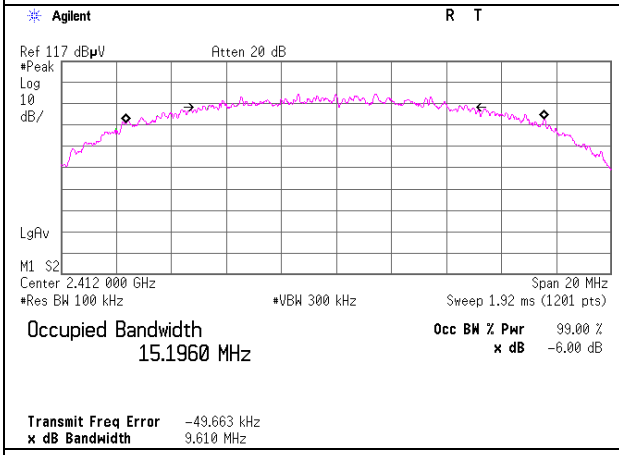
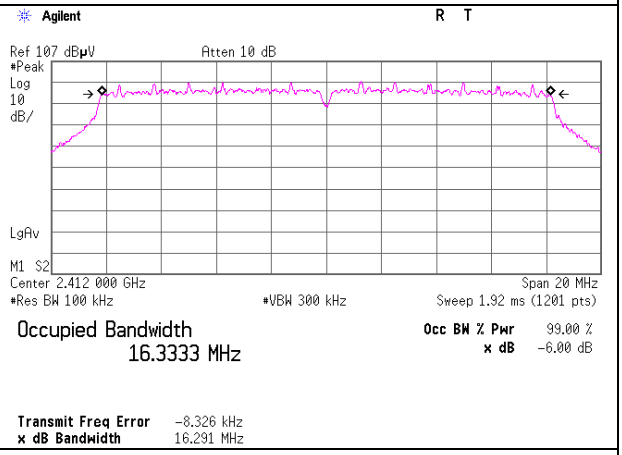
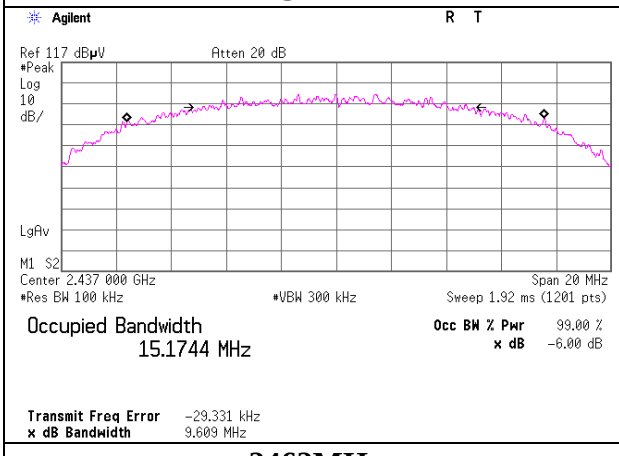
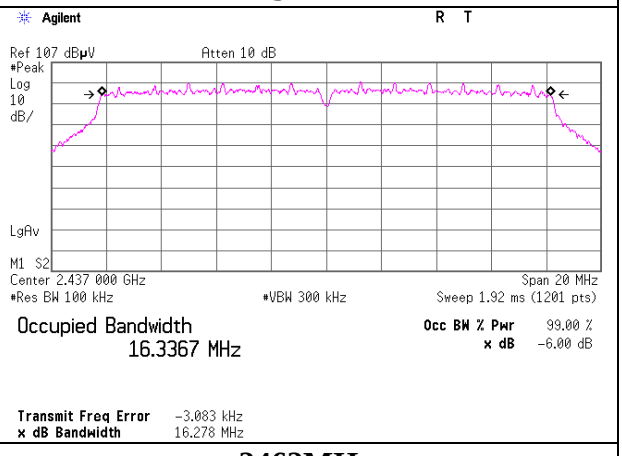
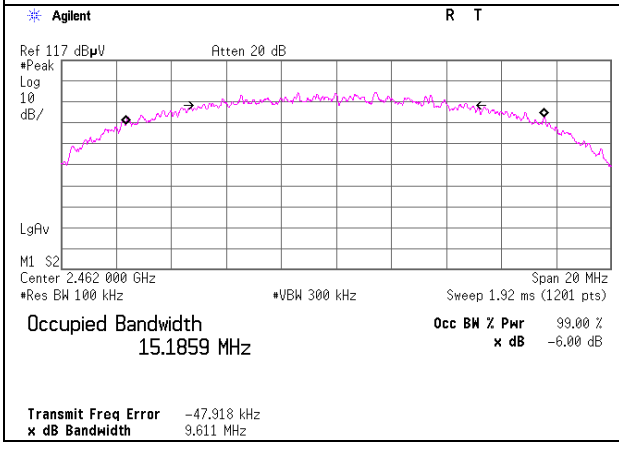
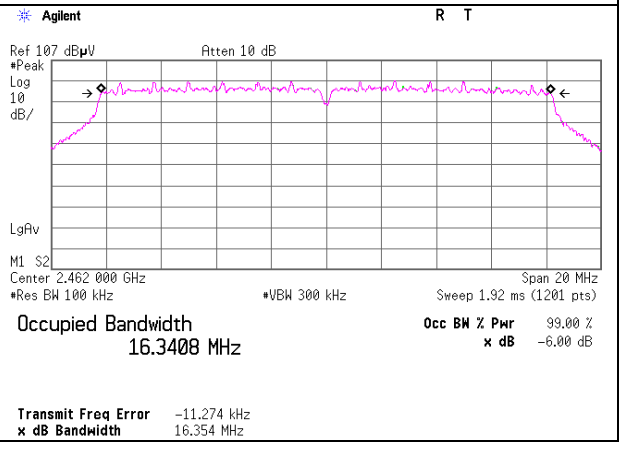
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.291	>500
2437	16.278	>500
2462	16.354	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.270	>500
2437	17.266	>500
2462	17.303	>500

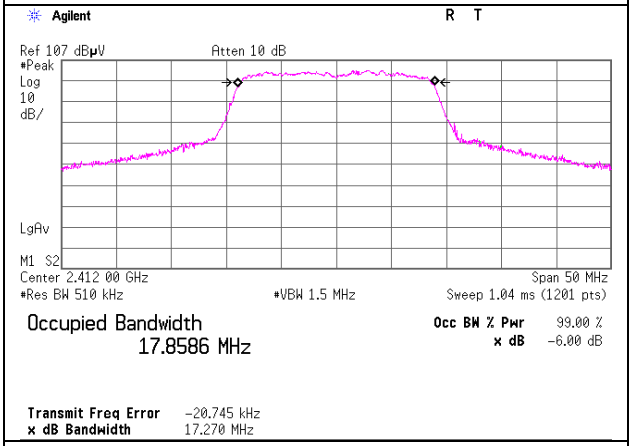
6dB Bandwidth

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

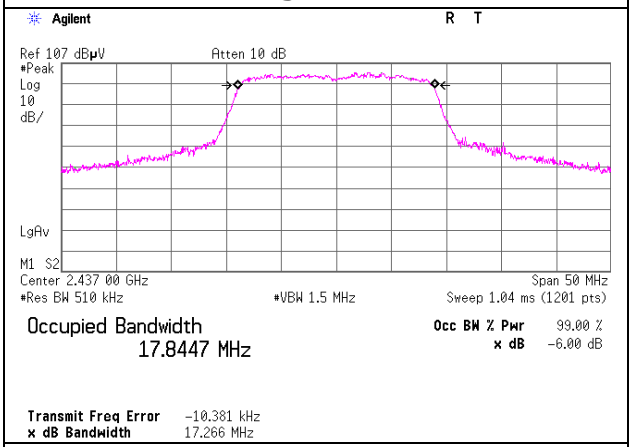
6dB Bandwidth

11n-20

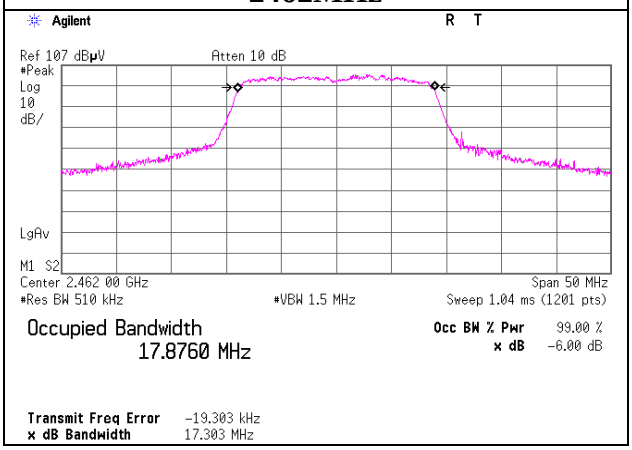
2412MHz



2437MHz



2462MHz



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	4786002697H
Date	02/05/2013
Temperature/ Humidity	21 deg. C / 34% RH
Engineer	Katsunori Okai
Mode	11b / 11g Tx

11b

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	5.03	2.00	10.00	17.03	50.47	30.00	1000	12.97
2437	5.05	2.01	10.00	17.06	50.82	30.00	1000	12.94
2462	5.04	2.03	10.00	17.07	50.93	30.00	1000	12.93

11g

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	9.19	2.00	10.00	21.19	131.52	30.00	1000	8.81
2437	9.74	2.01	10.00	21.75	149.62	30.00	1000	8.25
2462	9.82	2.03	10.00	21.85	153.11	30.00	1000	8.15

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

11b, 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	4.97	
2	4.98	
5.5	4.90	
11	5.05	*

11g, 2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	9.26	
9	9.06	
12	9.74	*
18	9.33	
24	9.28	
36	9.25	
48	9.46	
54	9.55	

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	4786002697H
Date	02/05/2013
Temperature/ Humidity	21 deg. C/ 34% RH
Engineer	Katsunori Okai
Mode	11n-20 Tx

11n-20

Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	9.28	2.00	10.00	21.28	134.28	30.00	1000	8.72
2437	9.73	2.01	10.00	21.74	149.28	30.00	1000	8.26
2462	9.80	2.03	10.00	21.83	152.41	30.00	1000	8.17

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

11n-20, 2437MHz

Rate	Reading	Remark
[MCS]	[dBm]	
0	9.55	
1	9.61	
2	9.73	*
3	9.21	
4	9.29	
5	8.74	
6	9.25	
7	8.98	

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber	
Report No.	4786002697H	
Date	02/11/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% RH
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)
Mode	11b Tx 2412MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.3	27.4	2.3	32.4	58.6	73.9	15.3	
Hori	2690.000	PK	57.7	28.3	2.4	32.2	56.2	73.9	17.7	
Hori	4824.000	PK	45.6	31.7	4.8	31.4	50.7	73.9	23.3	
Hori	7236.000	PK	42.0	36.3	5.6	32.4	51.5	73.9	22.4	
Hori	2390.000	AV	41.5	27.4	2.3	32.4	38.8	53.9	15.1	
Hori	2690.000	AV	48.6	28.3	2.4	32.2	47.1	53.9	6.8	
Hori	4824.000	AV	35.9	31.7	4.8	31.4	41.0	53.9	12.9	
Hori	7236.000	AV	33.2	36.3	5.6	32.4	42.7	53.9	11.2	
Vert	2390.000	PK	58.5	27.4	2.3	32.4	55.8	73.9	18.1	
Vert	2661.612	PK	50.7	28.3	2.4	32.3	49.1	73.9	24.8	
Vert	4824.000	PK	46.4	31.7	4.8	31.4	51.5	73.9	22.4	
Vert	7236.000	PK	42.7	36.3	5.6	32.4	52.2	73.9	21.7	
Vert	2390.000	AV	36.3	27.4	2.3	32.4	33.6	53.9	20.3	
Vert	2661.612	AV	41.1	28.3	2.4	32.3	39.5	53.9	14.4	
Vert	4824.000	AV	36.9	31.7	4.8	31.4	42.0	53.9	11.9	
Vert	7236.000	AV	33.2	36.3	5.6	32.4	42.7	53.9	11.2	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

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 [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	96.2	27.5	2.3	32.4	93.6	-	-	Carrier
Hori	2400.000	PK	52.5	27.4	2.3	32.4	49.8	73.6	23.8	
Hori	9648.000	PK	36.4	38.2	6.4	33.0	48.0	73.6	25.6	
Vert	2412.000	PK	90.1	27.5	2.3	32.4	87.5	-	-	Carrier
Vert	2400.000	PK	47.1	27.4	2.3	32.4	44.4	67.5	23.1	
Vert	9648.000	PK	37.2	38.2	6.4	33.0	48.8	67.5	18.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber	
Report No.	4786002697H	
Date	02/11/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% RH
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)
Mode	11b Tx 2437MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2690.000	PK	58.3	28.3	2.4	32.2	56.8	73.9	17.1	
Hori	4874.000	PK	44.6	31.9	4.7	31.4	49.8	73.9	24.1	
Hori	7311.000	PK	42.0	36.5	5.6	32.5	51.6	73.9	22.3	
Hori	2690.000	AV	48.4	28.3	2.4	32.2	46.9	53.9	7.0	
Hori	4874.000	AV	34.5	31.9	4.7	31.4	39.7	53.9	14.2	
Hori	7311.000	AV	33.2	36.5	5.6	32.5	42.8	53.9	11.1	
Vert	2661.612	PK	51.1	28.3	2.4	32.3	49.5	73.9	24.4	
Vert	4874.000	PK	44.5	31.9	4.7	31.4	49.7	73.9	24.2	
Vert	7311.000	PK	42.7	36.5	5.6	32.5	52.3	73.9	21.6	
Vert	2661.612	AV	42.9	28.3	2.4	32.3	41.3	53.9	12.6	
Vert	4874.000	AV	34.8	31.9	4.7	31.4	40.0	53.9	13.9	
Vert	7311.000	AV	33.2	36.5	5.6	32.5	42.8	53.9	11.1	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

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 [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2437.000	PK	97.9	27.6	2.3	32.4	95.4	-	-	Carrier
Hori	9748.000	PK	34.7	38.3	6.4	33.0	46.4	75.4	29.0	
Vert	2437.000	PK	91.8	27.6	2.3	32.4	89.3	-	-	Carrier
Vert	9748.000	PK	36.7	38.3	6.4	33.0	48.4	69.3	20.9	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber	
Report No.	4786002697H	
Date	02/11/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% RH
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)
Mode	11b Tx 2462MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2690.000	PK	58.5	28.3	2.4	32.2	57.0	73.9	16.9	
Hori	4924.000	PK	41.9	32.1	4.7	31.4	47.3	73.9	26.6	
Hori	7386.000	PK	42.0	36.6	5.6	32.5	51.7	73.9	22.2	
Hori	2690.000	AV	49.6	28.3	2.4	32.2	48.1	53.9	5.8	
Hori	4924.000	AV	33.1	32.1	4.7	31.4	38.5	53.9	15.4	
Hori	7386.000	AV	33.2	36.6	5.6	32.5	42.9	53.9	11.0	
Vert	2661.612	PK	51.7	28.3	2.4	32.3	50.1	73.9	23.8	
Vert	4924.000	PK	43.0	32.1	4.7	31.4	48.4	73.9	25.5	
Vert	7386.000	PK	42.7	36.6	5.6	32.5	52.4	73.9	21.5	
Vert	2661.612	AV	43.1	28.3	2.4	32.3	41.5	53.9	12.4	
Vert	4924.000	AV	33.2	32.1	4.7	31.4	38.6	53.9	15.3	
Vert	7386.000	AV	33.2	36.6	5.6	32.5	42.9	53.9	11.0	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

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 Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 4786002697H
Date 02/11/2013
Temperature/ Humidity 20 deg. C / 33% RH
Engineer Keisuke Kawamura

Mode 11b Tx 2462MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	97.0	27.6	2.3	32.4	94.5	-	-	Carrier
Hori	9848.000	PK	35.4	38.5	6.4	33.1	47.2	74.5	27.3	
Vert	2462.000	PK	92.4	27.6	2.3	32.4	89.9	-	-	Carrier
Vert	9848.000	PK	37.2	38.5	6.4	33.1	49.0	69.9	20.9	

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

Marker-Delta Method Data Sheet (RBW:30kHz)

FREQ	Field strength of band-edge*		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
	HOR	VER	Factor	GAIN	LOSS		HOR	VER	AV	HOR	VER
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
PK DETECT											
2483.5	47.1	41.5	27.6	32.4	2.3	0.0	44.6	39.0	73.9	29.3	35.0
AV DETECT											
2483.5	40.6	34.9	27.6	32.4	2.3	0.0	38.1	32.4	53.9	15.8	21.5

*Field Strength of band-edge
Spectrum Analyzer Reading

		Polarity	Hor [dBuV]			Ver [dBuV]		
		Detector	PK	AV(RMS)	PK	PK	AV(RMS)	PK
		RBW / VBW	3MHz	3MHz	100kHz	3MHz	3MHz	100kHz
Step 1)	Fundamental(2462MHz)	1MHz	103.0	96.5	-	98.7	92.2	-
Step 2)	Fundamental(2462MHz)	30kHz	-	-	95.7	-	-	92.3
	Band-edge(2483.5MHz)	30kHz	-	-	39.9	-	-	35.0
	Amplitude delta *1	-	-	-	55.9	-	-	57.3
Step 3)	Field strength of band-edge *2	-	47.1	40.6	-	41.5	34.9	-

*1 Amplitude delta = Fundamental(RBW:30kHz) - Band-edge(RBW:30kHz)
*2 Field strength of band-edge = Fundamental(RBW:1MHz) - Amplitude delta

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber	
Report No.	4786002697H	
Date	02/11/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% HR
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)
Mode	11g Tx 2412MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	60.1	27.4	2.3	32.4	57.4	73.9	16.5	
Hori	2690.000	PK	59.8	28.3	2.4	32.2	58.3	73.9	15.6	
Hori	4824.000	PK	41.2	31.7	4.8	31.4	46.3	73.9	27.6	
Hori	7236.000	PK	41.9	36.3	5.6	32.4	51.4	73.9	22.5	
Hori	9648.000	PK	42.3	38.2	6.4	33.0	53.9	73.9	20.0	
Hori	2390.000	AV	49.3	27.4	2.3	32.4	46.6	53.9	7.3	
Hori	2690.000	AV	49.9	28.3	2.4	32.2	48.4	53.9	5.5	
Hori	4824.000	AV	34.3	31.7	4.8	31.4	39.4	53.9	14.5	
Hori	7236.000	AV	33.7	36.3	5.6	32.4	43.2	53.9	10.7	
Hori	9648.000	AV	33.5	38.2	6.4	33.0	45.1	53.9	8.8	
Vert	2390.000	PK	55.2	27.4	2.3	32.4	52.5	73.9	21.4	
Vert	2661.612	PK	51.6	28.3	2.4	32.3	50.0	73.9	23.9	
Vert	4824.000	PK	41.2	31.7	4.8	31.4	46.3	73.9	27.6	
Vert	7236.000	PK	42.2	36.3	5.6	32.4	51.7	73.9	22.2	
Vert	2390.000	AV	43.4	27.4	2.3	32.4	40.7	53.9	13.2	
Vert	2661.612	AV	42.9	28.3	2.4	32.3	41.3	53.9	12.6	
Vert	4824.000	AV	32.7	31.7	4.8	31.4	37.8	53.9	16.1	
Vert	7236.000	AV	33.5	36.3	5.6	32.4	43.0	53.9	10.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
*The 10th harmonic was not seen so the result was its base noise level.
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 [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	92.7	27.5	2.3	32.4	90.1	-	-	Carrier
Hori	2400.000	PK	58.4	27.4	2.3	32.4	55.7	70.1	14.4	
Vert	2412.000	PK	86.4	27.5	2.3	32.4	83.8	-	-	Carrier
Vert	9648.000	PK	36.1	38.2	6.4	33.0	47.7	63.8	16.1	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber	
Report No.	4786002697H	
Date	02/11/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% RH
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)
Mode	11g Tx 2437MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2690.000	PK	60.0	28.3	2.4	32.2	58.5	73.9	15.4	
Hori	4874.000	PK	41.2	31.9	4.7	31.4	46.4	73.9	27.5	
Hori	7311.000	PK	41.9	36.5	5.6	32.5	51.5	73.9	22.4	
Hori	9748.000	PK	42.3	38.3	6.4	33.0	54.0	73.9	19.9	
Hori	2690.000	AV	50.7	28.3	2.4	32.2	49.2	53.9	4.7	
Hori	4874.000	AV	34.3	31.9	4.7	31.4	39.5	53.9	14.4	
Hori	7311.000	AV	33.7	36.5	5.6	32.5	43.3	53.9	10.6	
Hori	9748.000	AV	33.5	38.3	6.4	33.0	45.2	53.9	8.7	
Vert	2661.612	PK	51.1	28.3	2.4	32.3	49.5	73.9	24.4	
Vert	4874.000	PK	41.2	31.9	4.7	31.4	46.4	73.9	27.5	
Vert	7311.000	PK	42.2	36.5	5.6	32.5	51.8	73.9	22.1	
Vert	2661.612	AV	43.1	28.3	2.4	32.3	41.5	53.9	12.4	
Vert	4874.000	AV	32.7	31.9	4.7	31.4	37.9	53.9	16.0	
Vert	7311.000	AV	33.5	36.5	5.6	32.5	43.1	53.9	10.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
*The 10th harmonic was not seen so the result was its base noise level.
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 [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Vert	2437.000	PK	87.8	27.6	2.3	32.4	85.3	-	-	Carrier
Vert	9748.000	PK	36.9	38.3	6.4	33.0	48.6	65.3	16.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	4786002697H		
Date	02/11/2013	02/12/2013	02/12/2013
Temperature/ Humidity	20 deg. C / 33% RH	20 deg. C / 34% RH	20 deg. C / 34% RH
Engineer	Keisuke Kawamura (1-10GHz)	Kazuya Yoshioka (10-26.5GHz)	Takumi Shimada (30-1000MHz)
Mode	11g Tx 2462MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	55.298	QP	35.3	9.2	7.1	28.6	23.0	40.0	17.0	
Hori	123.473	QP	32.1	13.2	7.7	28.2	24.8	43.5	18.7	
Hori	246.941	QP	42.5	17.2	8.5	27.5	40.7	46.0	5.3	
Hori	370.083	QP	34.2	16.5	9.2	28.2	31.7	46.0	14.3	
Hori	532.118	QP	35.4	18.4	10.0	28.8	35.0	46.0	11.0	
Hori	556.864	QP	38.0	18.7	10.1	28.8	38.0	46.0	8.0	
Hori	2690.000	PK	60.5	28.3	2.4	32.2	59.0	73.9	14.9	
Hori	4924.000	PK	41.2	32.1	4.7	31.4	46.6	73.9	27.3	
Hori	7386.000	PK	41.9	36.6	5.6	32.5	51.6	73.9	22.3	
Hori	9848.000	PK	42.3	38.5	6.4	33.1	54.1	73.9	19.8	
Hori	2690.000	AV	51.7	28.3	2.4	32.2	50.2	53.9	3.7	
Hori	4924.000	AV	32.4	32.1	4.7	31.4	37.8	53.9	16.1	
Hori	7386.000	AV	33.7	36.6	5.6	32.5	43.4	53.9	10.5	
Hori	9848.000	AV	33.5	38.5	6.4	33.1	45.3	53.9	8.6	
Vert	55.291	QP	33.5	9.2	7.1	28.6	21.2	40.0	18.8	
Vert	123.483	QP	38.8	13.2	7.7	28.2	31.5	43.5	12.0	
Vert	246.945	QP	39.8	17.2	8.5	27.5	38.0	46.0	8.0	
Vert	370.077	QP	35.7	16.5	9.2	28.2	33.2	46.0	12.8	
Vert	532.107	QP	37.7	18.4	10.0	28.8	37.3	46.0	8.7	
Vert	556.862	QP	36.6	18.7	10.1	28.8	36.6	46.0	9.4	
Vert	2661.612	PK	52.8	28.3	2.4	32.3	51.2	73.9	22.7	
Vert	4924.000	PK	41.2	32.1	4.7	31.4	46.6	73.9	27.3	
Vert	7386.000	PK	42.2	36.6	5.6	32.5	51.9	73.9	22.0	
Vert	2661.612	AV	43.7	28.3	2.4	32.3	42.1	53.9	11.8	
Vert	4924.000	AV	32.7	32.1	4.7	31.4	38.1	53.9	15.8	
Vert	7386.000	AV	33.5	36.6	5.6	32.5	43.2	53.9	10.7	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

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 Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 4786002697H
Date 02/11/2013
Temperature/ Humidity 20 deg. C / 33% RH
Engineer Keisuke Kawamura

Mode 11g Tx 2462MHz

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
Vert	2462.000	PK	88.8	27.6	2.3	32.4	86.3	-	-	Carrier
Vert	9848.000	PK	36.5	38.5	6.4	33.1	48.3	66.3	18.0	

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

Marker-Delta Method Data Sheet (RBW:30kHz)

FREQ	Field strength of band-edge*		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
	HOR	VER	Factor	GAIN	LOSS		HOR	VER	AV	HOR	VER
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
PK DETECT											
2483.5	60.8	53.5	27.6	32.4	2.3	0.0	58.3	51.0	73.9	15.6	23.0
AV DETECT											
2483.5	52.5	45.4	27.6	32.4	2.3	0.0	50.0	42.9	53.9	3.9	11.0

*Field Strength of band-edge
Spectrum Analyzer Reading

		Polarity	Hor [dBuV]			Ver [dBuV]		
		Detector	PK	AV(RMS)	PK	PK	AV(RMS)	PK
		RBW \ VBW	3MHz	3MHz	100kHz	3MHz	3MHz	100kHz
Step 1)	Fundamental(2462MHz)	1MHz	100.9	92.7	-	96.6	88.5	-
Step 2)	Fundamental(2462MHz)	30kHz	-	-	86.8	-	-	83.7
	Band-edge(2483.5MHz)	30kHz	-	-	46.6	-	-	40.5
	Amplitude delta *1	-	-	-	40.2	-	-	43.2
Step 3)	Field strength of band-edge *2	-	60.8	52.5	-	53.5	45.4	-

*1 Amplitude delta = Fundamental(RBW:30kHz) - Band-edge(RBW:30kHz)
*2 Field strength of band-edge = Fundamental(RBW:1MHz) - Amplitude delta

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 4786002697H
Date 02/11/2013
Temperature/ Humidity 20 deg. C / 33% RH
Engineer Keisuke Kawamura

Mode 11n-20 Tx 2412MHz / 2462MHz

Tx: 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.8	27.4	2.3	32.4	59.1	73.9	14.8	
Hori	2390.000	AV	50.1	27.4	2.3	32.4	47.4	53.9	6.5	
Vert	2390.000	PK	54.9	27.4	2.3	32.4	52.2	73.9	21.7	
Vert	2390.000	AV	43.2	27.4	2.3	32.4	40.5	53.9	13.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
*The 10th harmonic was not seen so the result was its base noise level.
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 [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	92.7	27.5	2.3	32.4	90.1	-	-	Carrier
Hori	2400.000	PK	58.6	27.4	2.3	32.4	55.9	70.1	14.2	
Vert	2412.000	PK	86.8	27.5	2.3	32.4	84.2	-	-	Carrier
Vert	2400.000	PK	51.9	27.4	2.3	32.4	49.2	64.2	15.0	

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

Tx: 2462MHz

Marker-Delta Method Data Sheet (RBW:30kHz)

FREQ	Field strength of band-edge*		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
	HOR	VER	Factor	GAIN	LOSS		HOR	VER	AV	HOR	VER
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
PK DETECT											
2483.5	60.0	57.3	27.6	32.4	2.3	0.0	57.5	54.8	73.9	16.4	19.1
AV DETECT											
2483.5	50.8	47.9	27.6	32.4	2.3	0.0	48.3	45.4	53.9	5.6	8.5

*Field Strength of band-edge
Spectrum Analyzer Reading

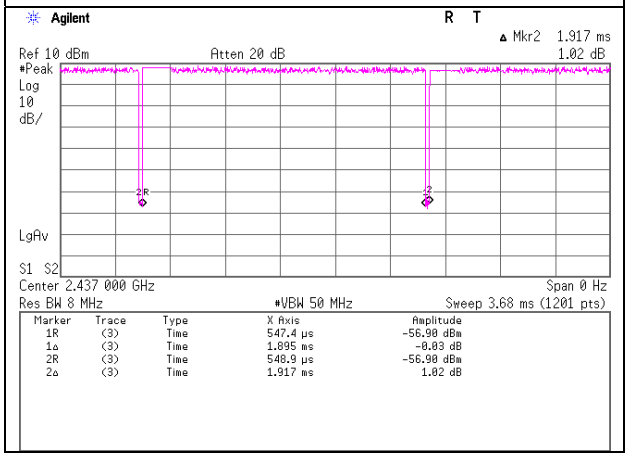
		Polarity	Hor [dBuV]			Ver [dBuV]		
		Detector	PK	AV(RMS)	PK	PK	AV(RMS)	PK
		RBW \ VBW	3MHz	3MHz	100kHz	3MHz	3MHz	100kHz
Step 1)	Fundamental(2462MHz)	1MHz	101.5	92.3	-	98.5	89.1	-
Step 2)	Fundamental(2462MHz)	30kHz	-	-	88.0	-	-	84.3
	Band-edge(2483.5MHz)	30kHz	-	-	46.4	-	-	43.1
	Amplitude delta *1	-	-	-	41.5	-	-	41.2
Step 3)	Field strength of band-edge *2	-	60.0	50.8	-	57.3	47.9	-

*1 Amplitude delta = Fundamental(RBW:30kHz) - Band-edge(RBW:30kHz)
*2 Field strength of band-edge = Fundamental(RBW:1MHz) - Amplitude delta

Burst rate confirmation

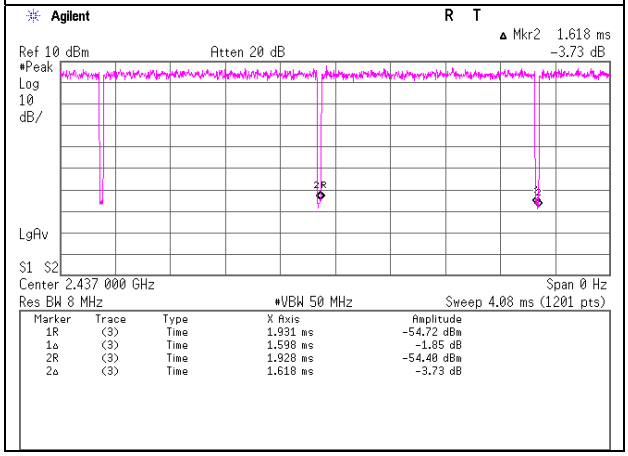
11b 11Mbps

Tx on / (Tx on + Tx off) =	0.989
Tx on / (Tx on + Tx off) * 100 =	98.9 %
Duty factor = 10 * log (1.917 / 1.895) =	0.05 dB



11g 12Mbps

Tx on / (Tx on + Tx off) =	0.988
Tx on / (Tx on + Tx off) * 100 =	98.8 %
Duty factor = 10 * log (1.618 / 1.598) =	0.05 dB



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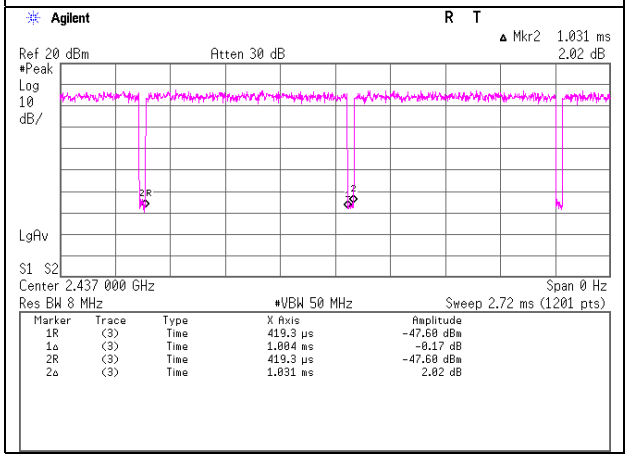
Burst rate confirmation

11n MCS2

Tx on / (Tx on + Tx off) =	**0.974**
Tx on / (Tx on + Tx off) * 100 =	**97.4 %**
Duty factor = 10 * log (1.031 / 1.004) =	**0.12 dB**



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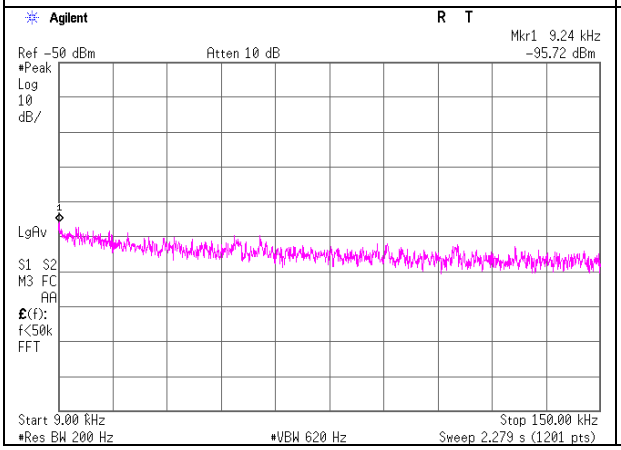
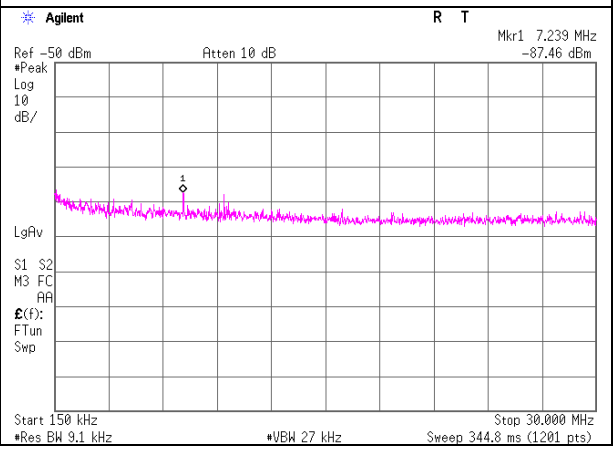
Conducted Spurious Emission

11g Tx 2462MHz

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]
9.24	-95.7	0.01	10.0	1.4	-84.3	300.0	6.0	-23.0	48.3
7239	-87.5	0.01	10.0	1.4	-76.0	30.0	6.0	5.2	29.5

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

EIRP=Reading+Cable Loss+Attenator+Antenna Gain

Power Density

Test place	Head Office EMC Lab. No.7 shielded room
Report No.	4786002697H
Date	02/08/2013
Temperature/ Humidity	24 deg. C / 34% RH
Engineer	Kazuya Yoshioka
Mode	11b Tx / 11g Tx

11b

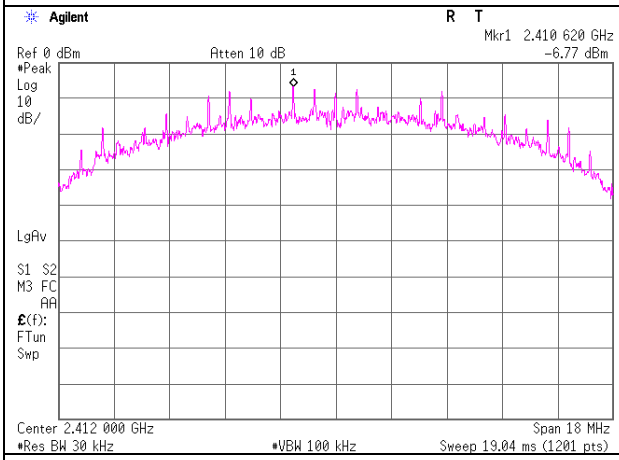
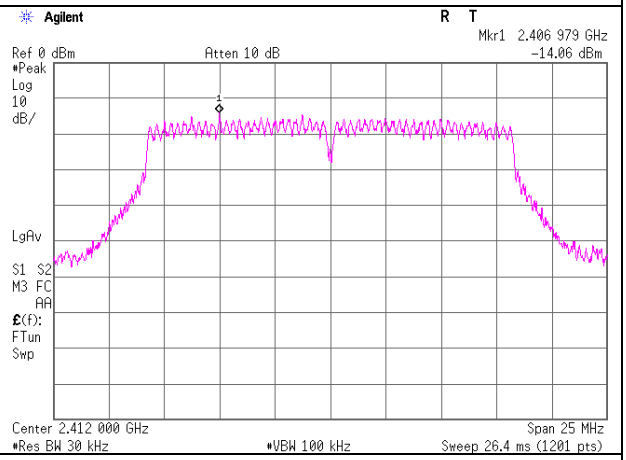
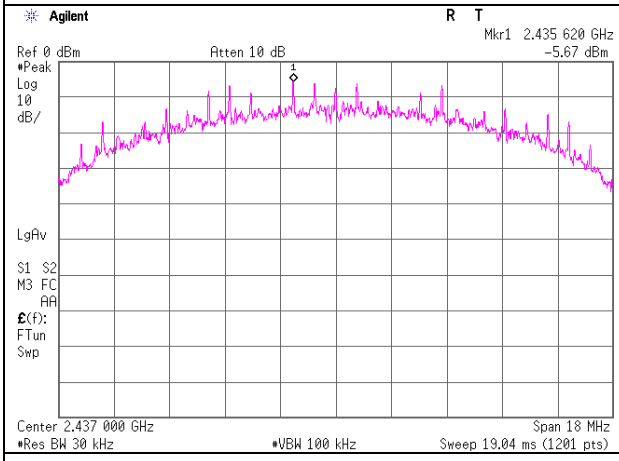
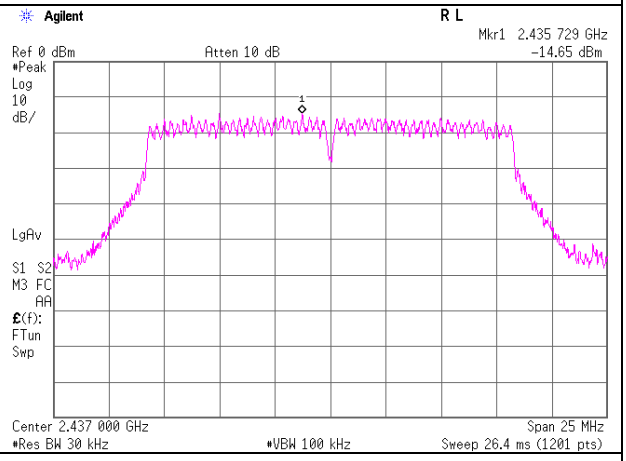
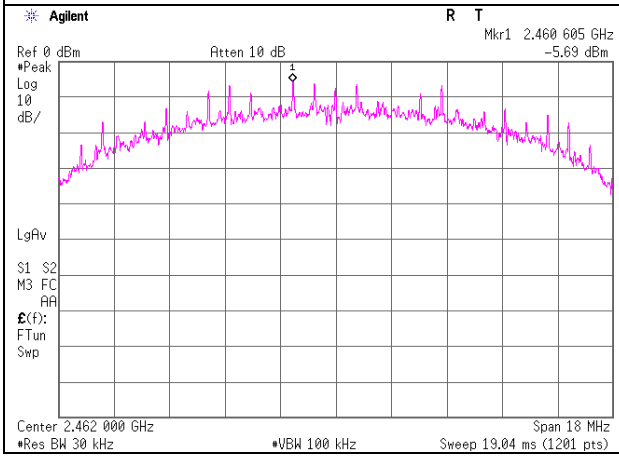
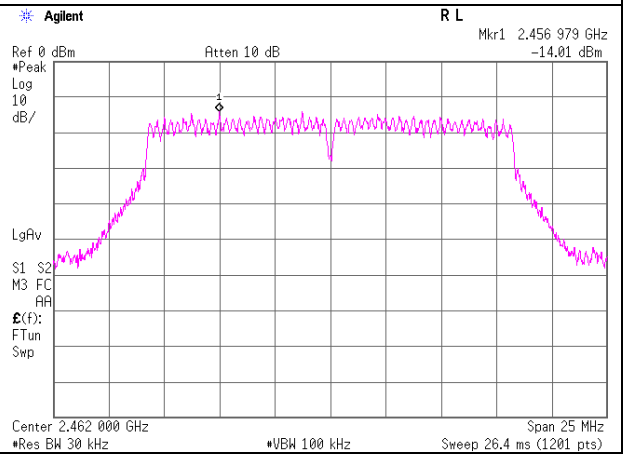
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-6.77	2.00	10.00	5.23	8.00	2.77
2437.00	-5.67	2.01	10.00	6.34	8.00	1.66
2462.00	-5.69	2.03	10.00	6.34	8.00	1.66

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-14.06	2.00	10.00	-2.06	8.00	10.06
2437.00	-14.65	2.01	10.00	-2.64	8.00	10.64
2462.00	-14.01	2.03	10.00	-1.98	8.00	9.98

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Power Density

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

Power Density

Test place	Head Office EMC Lab. No.7 shielded room
Report No.	4786002697H
Date	02/08/2013
Temperature/ Humidity	24 deg. C / 34% RH
Engineer	Kazuya Yoshioka
Mode	11n-20 Tx

11n-20

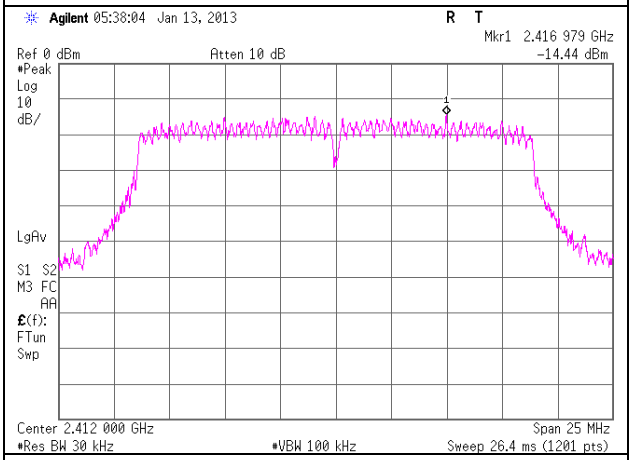
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-14.44	2.00	10.00	-2.44	8.00	10.44
2437.00	-14.56	2.01	10.00	-2.55	8.00	10.55
2462.00	-14.60	2.03	10.00	-2.57	8.00	10.57

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

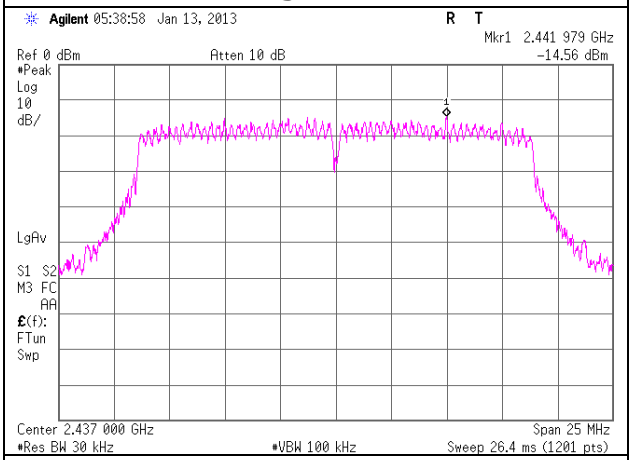
Power Density

11n-20

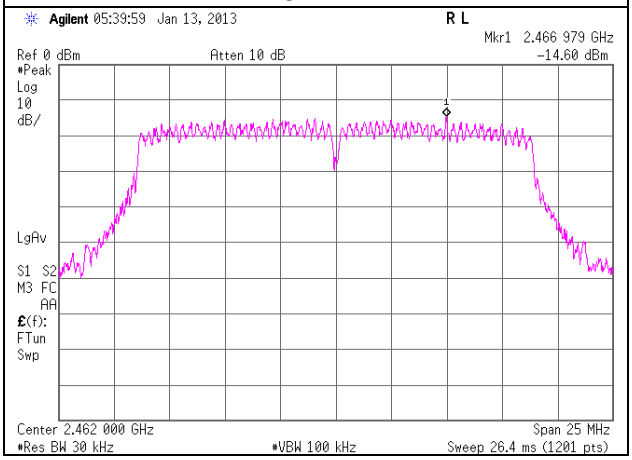
2412MHz



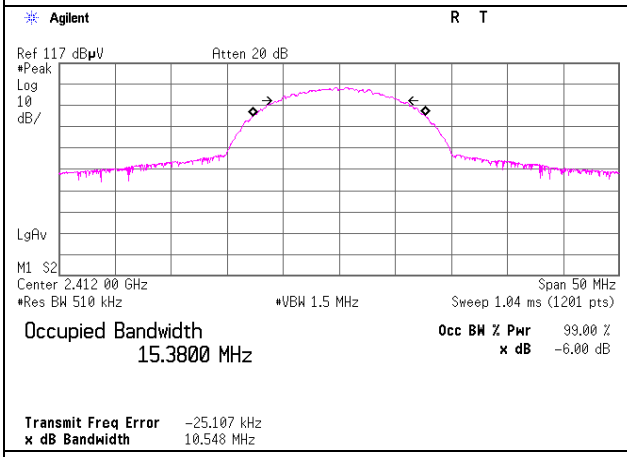
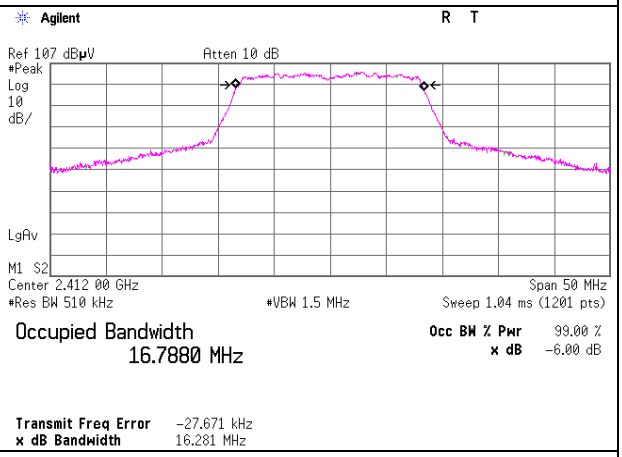
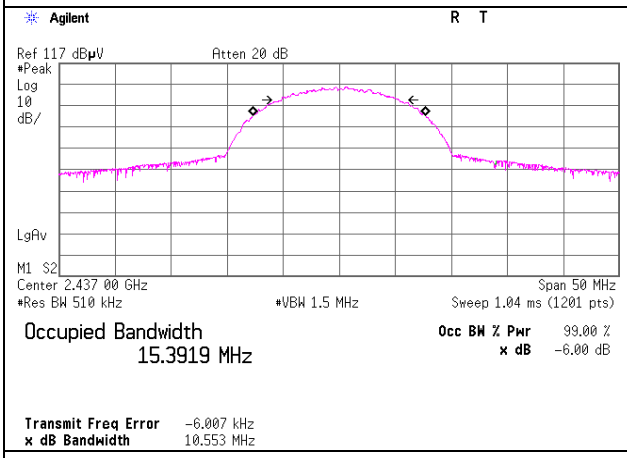
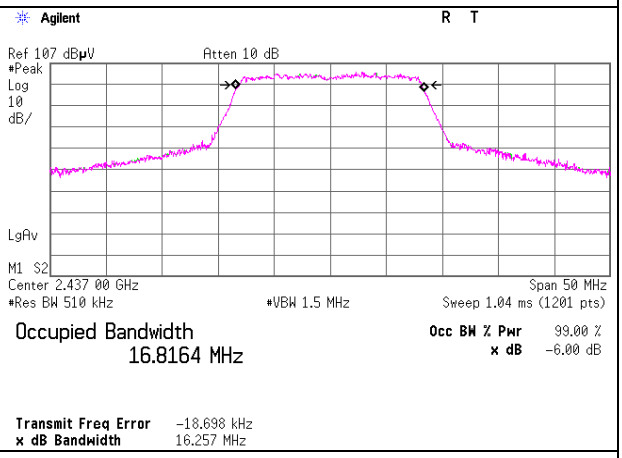
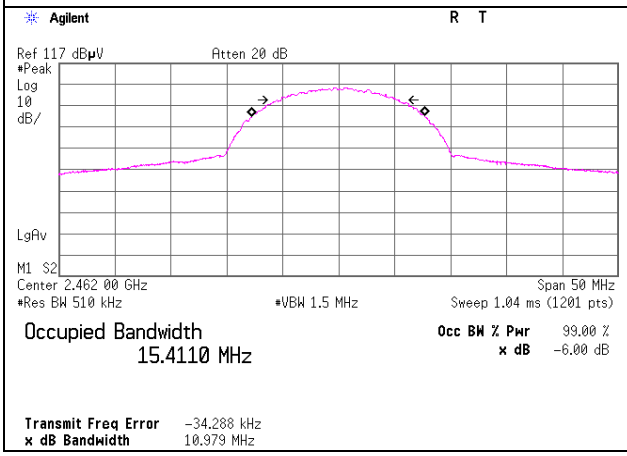
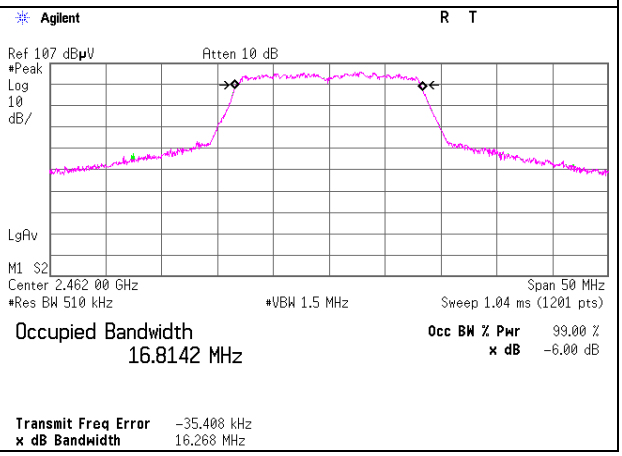
2437MHz



2462MHz



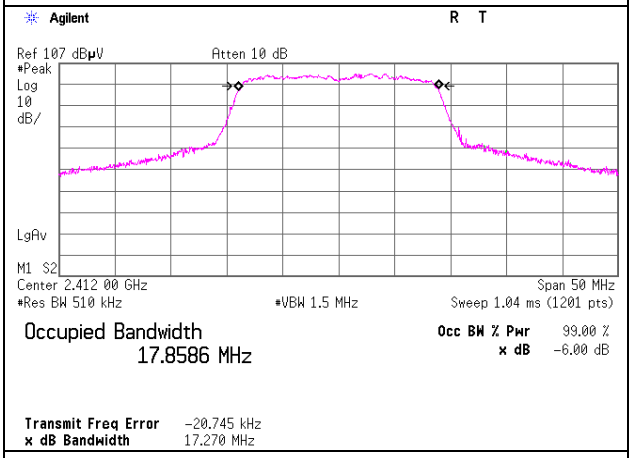
99%Occupied Bandwidth

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

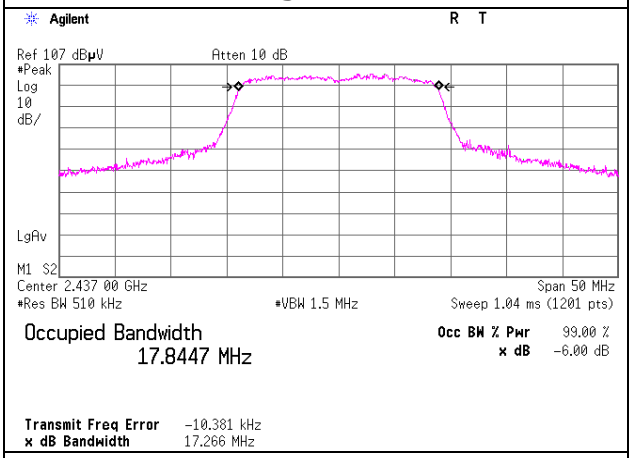
99% Occupied Bandwidth

11n-20

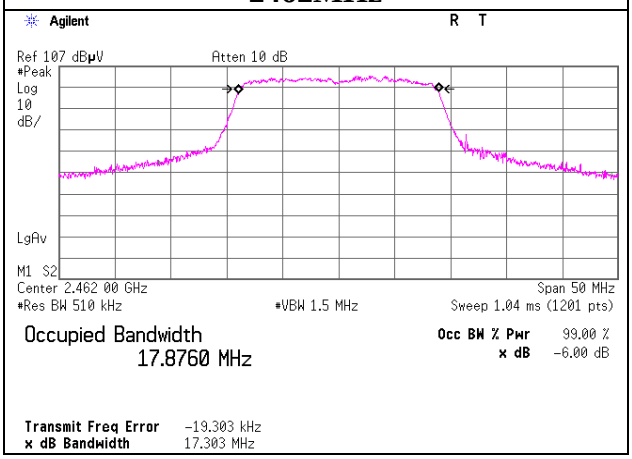
2412MHz



2437MHz



2462MHz



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/24 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/AT	2012/11/20 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2012/09/05 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MHF-19	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	602	RE	2012/09/12 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2012/12/24 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/AT	2012/04/06 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2013/01/10 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2012/04/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2012/10/08 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2012/10/08 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2013/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2012/11/06 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2012/09/11 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2013/01/17 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2012/10/08 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2012/10/08 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2012/04/25 * 12
MCC-103	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2012/06/27 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 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
AT: Antenna Terminal Conducted test