



# RADIO TEST REPORT


**Test Report No. : 11245604H-B-R1**

**Applicant** : FUJITSU TEN LIMITED  
**Type of Equipment** : Car Audio  
**Model No.** : FT0108A  
**FCC ID** : BABFT0108A  
**Test regulation** : FCC Part 15 Subpart C: 2016  
\*WLAN, Bluetooth Low Energy parts  
**Test Result** : Complied

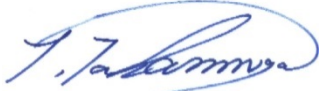
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3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11245604H-B. 11245604H-B is replaced with this report.

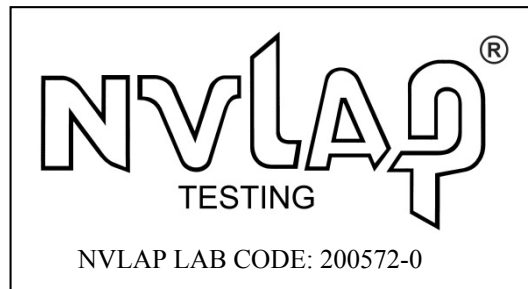
**Date of test:** April 1 to June 10, 2016

**Representative test engineer:**

  
Yutaka Yoshida  
Engineer  
Consumer Technology Division

**Approved by:**

  
Tsubasa Takayama  
Engineer  
Consumer Technology Division



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13-EM-F0429



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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 : FUKII DAISUKE

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Car Audio  
Model No. : FT0108A  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 12.0 V  
Receipt Date of Sample : March 31, 2016  
Country of Mass-production : Mexico  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

## 2.2 Product Description

Model: FT0108A (referred to as the EUT in this report) is a Car Audio.

### Radio Specification

Radio Type : Transceiver  
Power Supply (inner) : DC 1.8 V, 3.3 V  
Clock frequency (Crystal) : 48 MHz

	IEEE802.11b *1)	IEEE802.11g/n (20 M band) *1)	IEEE802.11a/n/ac (20 M band)	IEEE802.11n/ac (40 M band)	IEEE802.11ac (80 M band)
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz	5210 MHz 5290 MHz 5530 MHz - 5610 MHz 5775 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM(IEEE802.11ac only))		
Channel spacing	5MHz		20MHz	40MHz	80MHz
Antenna type	Inverted F Antenna				
Antenna Connector type	U.FL-LP-066				
Antenna Gain	4.7 dBi (2.4 GHz Band), 5.7 dBi (5 GHz Band)				

	Bluetooth Ver.4.1 with EDR function
Frequency of operation	2402 MHz - 2480 MHz
Type of modulation	BT: FHSS (GFSK, $\pi/4$ -DQPSK, 8-DPSK) LE: GFSK
Channel spacing	BT: 1 MHz LE: 2 MHz
Antenna type	Inverted Antenna
Antenna Connector type	U.FL-LP-066
Antenna Gain	4.7 dBi

\*1) This test report applies to WLAN (2.4 GHz Band only) and Bluetooth Low Energy.

\*Wireless LAN and Bluetooth do not transmit simultaneously.

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
FCC part 15 final revised on April 6, 2016.

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

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

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	-	N/A *1)	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.2 dB 959.980 MHz, QP, Horizontal, 959.981 MHz, QP, Horizontal, 959.982 MHz, QP, Horizontal.	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)

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

\*1) The test was not performed since the EUT was DC device.

\*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

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

#### **FCC Part 15.31 (e)**

This EUT provides stable voltage(DC 1.8 V, 3.3 V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

#### EMI

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

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	

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

Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(+dB)		(10 m*)(+dB)	
	30 – 200 MHz	200 – 1000MHz	30 – 200 MHz	200 – 1000MHz
Horizontal	4.9 dB	5.2 dB	4.9 dB	5.0 dB
Vertical	4.6 dB	5.9 dB	5.0 dB	5.0 dB

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

\*Measurement distance

#### Radiated emission test

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

### 3.5 Test Location

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

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

### **4.1 Operating Mode(s)**

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009 and also was judged the necessity of 802.11ac mode by the pre-test.

<b>Mode</b>	<b>Remarks*</b>
IEEE 802.11b (11b)	11 Mbps(Short), PN9
IEEE 802.11g (11g)	48 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 4 (Long GI), PN9
Bluetooth Low Energy (BT LE)	Maximum Packet Size, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*EUT has the power settings by the software as follows; Power settings:    11b : 14 dBm 11g : 11 dBm 11n : 11 dBm BLE : 0 dBm Software: Q        CA RCT Ver 3.0.4.1.0 (WLAN) BSDT Ver 1.5.0.2.6 (BLE)	
*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)

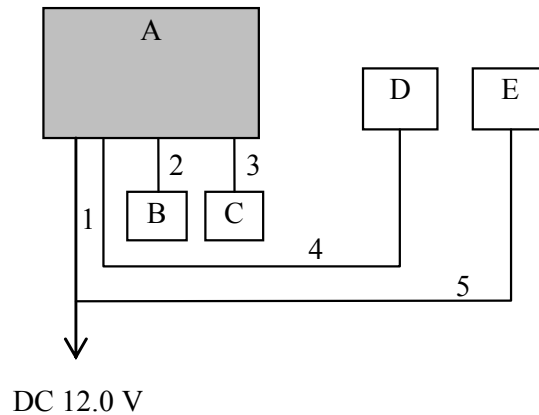
<b>Test Item</b>	<b>Operating Mode</b>	<b>Tested frequency</b>
Radiated Spurious Emission (Above 1GHz)	11b Tx 11n-20 Tx *1)	2412 MHz 2437 MHz 2462 MHz
	BT LE Tx	2402 MHz 2440 MHz 2480 MHz
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz
	BT LE Tx	2402 MHz 2440 MHz 2480 MHz
Conducted Spurious Emission, Radiated Spurious Emission (Below 1GHz)	11n-20 Tx *2)	2412 MHz
	BT LE Tx	2402 MHz 2440 MHz 2480 MHz

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

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

## 4.2 Configuration and peripherals

### Spurious Emission tests



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

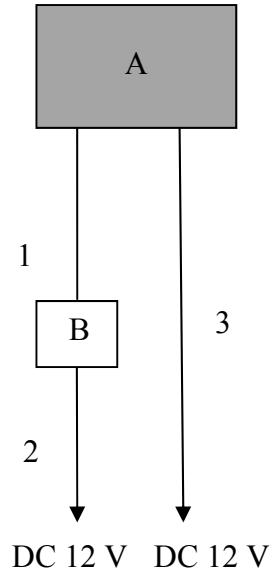
### Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	FT0108A	100056506-0001	FUJITSU TEN LIMITED	EUT
B	USB Memory	PD-07 WH8GB	-	KING MAX	-
C	Termination	-	-	-	-
D	Speaker Dummy	-	-	-	-
E	Jig board	-	-	-	-

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC and Signal Cable	4.8	Unshielded	Unshielded	-
2	USB Cable	1.4	Shielded	Shielded	-
3	AM / FM Cable	2.4	Shielded	Shielded	-
4	Signal Cable	2.6	Unshielded	Unshielded	-
5	Signal Cable	2.9	Unshielded	Unshielded	-

**Except for Spurious Emission tests**



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

**Description of EUT**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	FT0108A	100056686-0006	FUJITSU TEN LIMITED	EUT
B	Jig board	-	-	-	-

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	2.9	Unshielded	Unshielded	-
2	DC Cable	0.5	Unshielded	Unshielded	-
3	DC Cable	2.3	Unshielded	Unshielded	-

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## **SECTION 5: Radiated Spurious Emission**

### **Test Procedure**

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

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

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

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

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

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

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

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

### **Test Antennas are used as below;**

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

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces If duty cycle was less than 98%, a duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	3.9 m / 4.4 m *1) (1 GHz – 10 GHz), 1 m *2) (10 GHz – 26.5 GHz)		3.9 m / 4.4 m*1) (1 GHz – 10 GHz), 1 m *2) (10 GHz – 26.5 GHz)

\*1) Distance Factor:  $20 \times \log(3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$ (Semi Anechoic Chamber No.1) /  
 $20 \times \log(4.4 \text{ m} / 3.0 \text{ m}) = 3.33 \text{ dB}$ (Semi Anechoic Chamber No.4)

\*2) Distance Factor:  $20 \times \log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

\*3) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"

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

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

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

## **SECTION 6: Antenna Terminal Conducted Tests**

### **Test Procedure**

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

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

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

\*2) Reference data

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

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

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.  
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

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

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

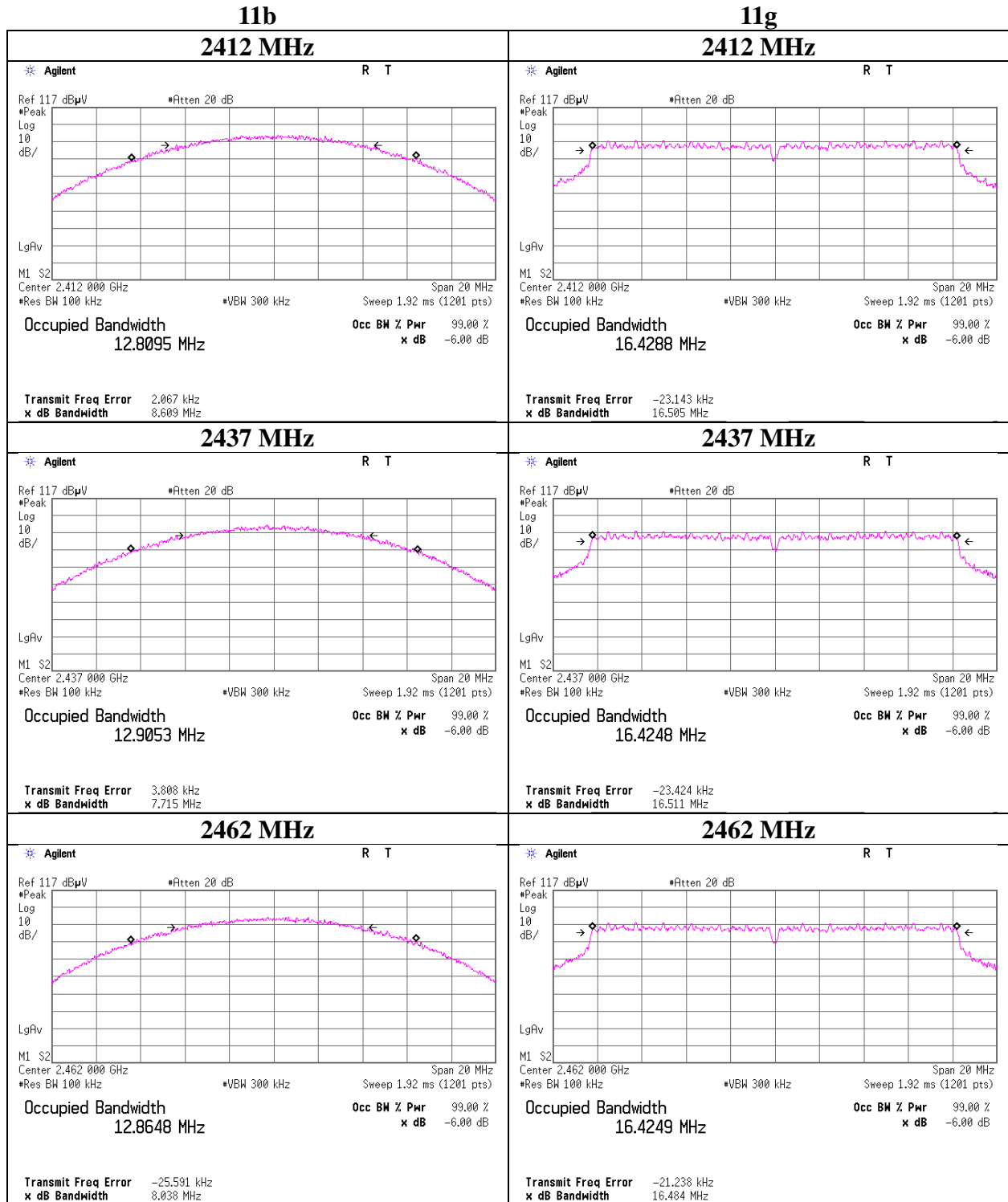
**APPENDIX 1: Test data**

**6dB Bandwidth**

Test place Ise EMC Lab. No.3 Measurement Room  
Report No. 11245604H  
Date April 25, 2016  
Temperature / Humidity 22 deg. C / 54 % RH  
Engineer Yutaka Yoshida  
Mode Tx

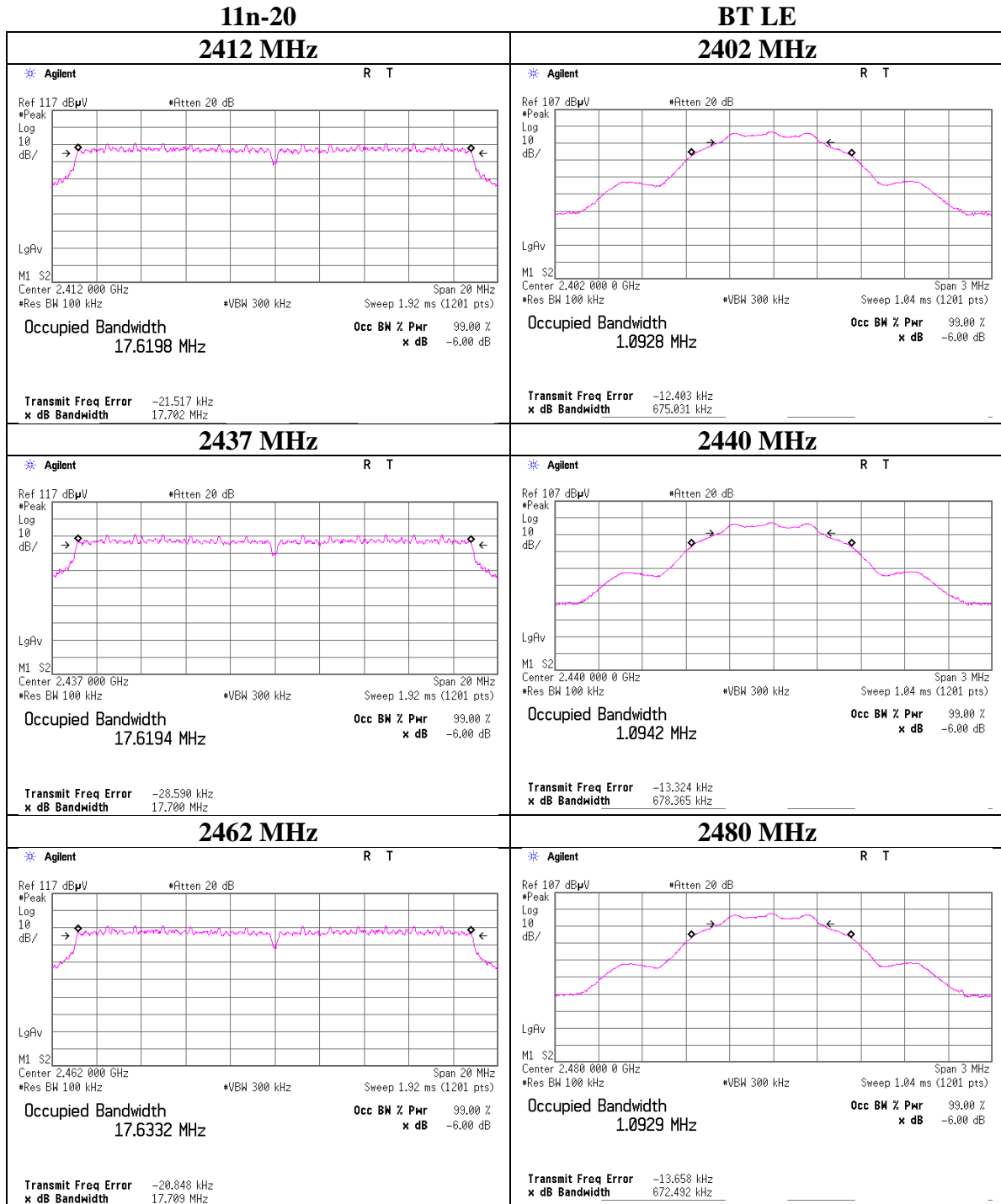
Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	8.609	> 500
	2437	7.715	> 500
	2462	8.038	> 500
11g	2412	16.505	> 500
	2437	16.511	> 500
	2462	16.484	> 500
11n-20	2412	17.702	> 500
	2437	17.700	> 500
	2462	17.709	> 500
BT LE	2402	0.675	> 500
	2440	0.678	> 500
	2480	0.672	> 500

### 6dB Bandwidth





### 6dB Bandwidth



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## Maximum Peak Output Power

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx 11b

### 11Mbps(Short)

Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.74	1.55	10.03	16.32	42.85	30.00	1000	13.68
2437	4.88	1.56	10.03	16.47	44.36	30.00	1000	13.53
2462	5.04	1.57	10.03	16.64	46.13	30.00	1000	13.36

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

### 2437MHz

Rate [Mbps]	Reading PK [dBm]	Remark
1	5.36	
2(Long)	5.46	
2(Short)	5.68	
5.5(Long)	5.41	
5.5(Short)	5.63	
11(Long)	5.44	
11(Short)	5.69	*

\*: Worst Rate

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

\*Difference between worst rate check data and formal test result is due to the different test condition.

## Maximum Peak Output Power

Test place	Ise EMC Lab. No.3 Measurement Room	
Report No.	11245604H	
Date	April 1, 2016	May 2, 2016
Temperature / Humidity	22 deg. C / 54 % RH	24 deg. C / 39 % RH
Engineer	Yutaka Yoshida	Yutaka Yoshida
Mode	Tx 11g	

48Mbps

Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.42	1.91	9.77	21.10	128.80	30.00	1000	8.90
2437	9.39	1.92	9.77	21.08	128.21	30.00	1000	8.92
2462	9.27	1.93	9.77	20.97	125.01	30.00	1000	9.03

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

2437 MHz

Rate [Mbps]	Reading PK [dBm]	Remark
6	10.20	
9	10.29	
12	10.41	
18	10.28	
24	10.23	
36	10.33	
48	10.68	*
54	10.34	

\*: Worst Rate

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

\*Difference between worst rate check data and formal test result is due to the different test condition.

## Maximum Peak Output Power

Test place	Ise EMC Lab. No.3 Measurement Room	
Report No.	11245604H	
Date	April 1, 2016	May 2, 2016
Temperature / Humidity	22 deg. C / 54 % RH	24 deg. C / 39 % RH
Engineer	Yutaka Yoshida	Yutaka Yoshida
Mode	Tx 11n-20	

### MCS 4(Long)

Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.43	1.91	9.77	21.11	129.10	30.00	1000	8.89
2437	9.41	1.92	9.77	21.10	128.81	30.00	1000	8.90
2462	9.28	1.93	9.77	20.98	125.30	30.00	1000	9.02

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

### 2437 MHz, Long GI

MCS Number	Reading [dBm]	Remark
0	10.21	
1	10.27	
2	10.29	
3	10.26	
4	10.96	*
5	10.31	
6	10.25	
7	10.14	

\* Worst MCS

MCS Number	Reading [dBm]	GI	Remark
4	10.96	Long	*
4	10.18	Short	

\* Worst Condition

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

\*Difference between worst rate check data and formal test result is due to the different test condition.

## Maximum Peak Output Power

Test place Ise EMC Lab. No.3 Measurement Room  
Report No. 11245604H  
Date April 25, 2016  
Temperature / Humidity 22 deg. C / 54 % RH  
Engineer Yutaka Yoshida  
Mode Tx BT LE

BT LE

Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402	-12.36	1.55	10.03	-0.78	0.84	30.00	1000	30.78
2440	-12.04	1.56	10.03	-0.45	0.90	30.00	1000	30.45
2480	-11.96	1.58	10.03	-0.35	0.92	30.00	1000	30.35

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

**Average Output Power**  
**(Reference data)**

Test place Ise EMC Lab. No.3 Measurement Room  
Report No. 11245604H  
Date April 1, 2016 May 2, 2016  
Temperature / Humidity 22 deg. C / 54 % RH 24 deg. C / 39 % RH  
Engineer Yutaka Yoshida Yutaka Yoshida  
Mode Tx

11b **1Mbps**

Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed AV power)	
				[dBm]	[mW]
2412	1.71	1.55	10.03	13.29	21.33
2437	1.92	1.56	10.03	13.51	22.44
2462	2.05	1.57	10.03	13.65	23.17

11g **6Mbps**

Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed AV power)	
				[dBm]	[mW]
2412	-1.17	1.91	9.77	10.51	11.24
2437	-1.01	1.92	9.77	10.68	11.69
2462	-0.98	1.93	9.77	10.72	11.80

11n-20 **MCS0(Long)**

Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed AV power)	
				[dBm]	[mW]
2412	-1.34	1.91	9.77	10.34	10.81
2437	-1.18	1.92	9.77	10.51	11.24
2462	-1.16	1.93	9.77	10.54	11.32

BT LE

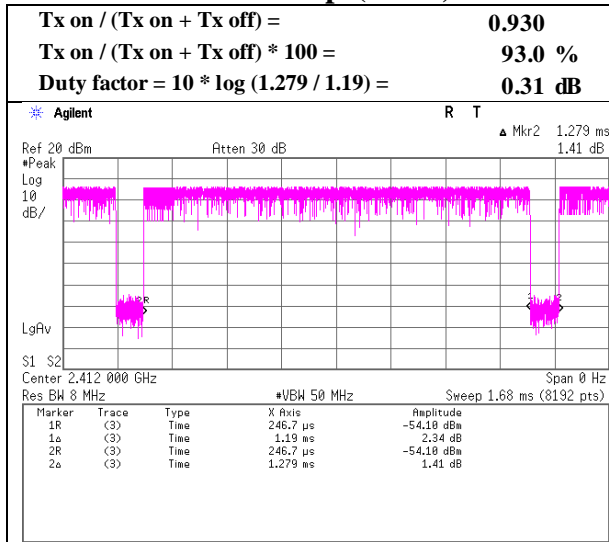
Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed AV power)	
				[dBm]	[mW]
2402	-15.08	1.55	10.03	-3.50	0.45
2440	-14.66	1.56	10.03	-3.07	0.49
2480	-14.53	1.58	10.03	-2.92	0.51

Sample Calculation:  
Result (Timed AV power) = Reading + Cable Loss + Attenuator

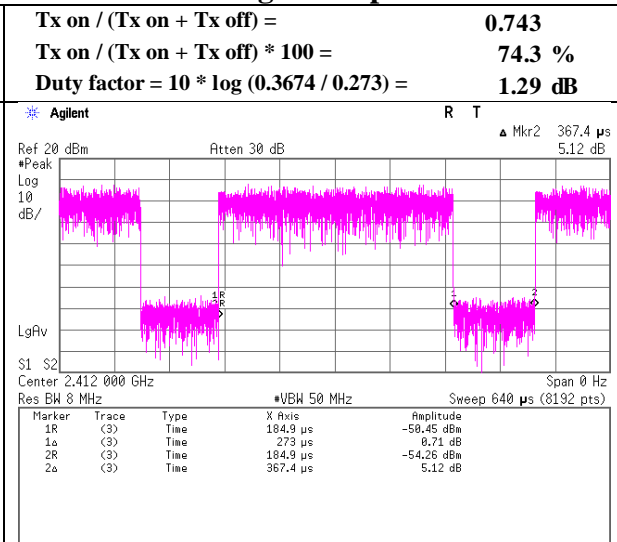
### Burst rate confirmation

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 1, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx

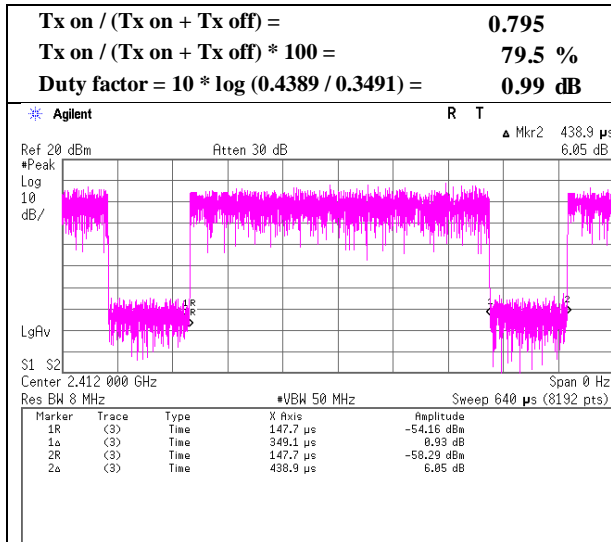
#### 11b 11 Mbps(Short)



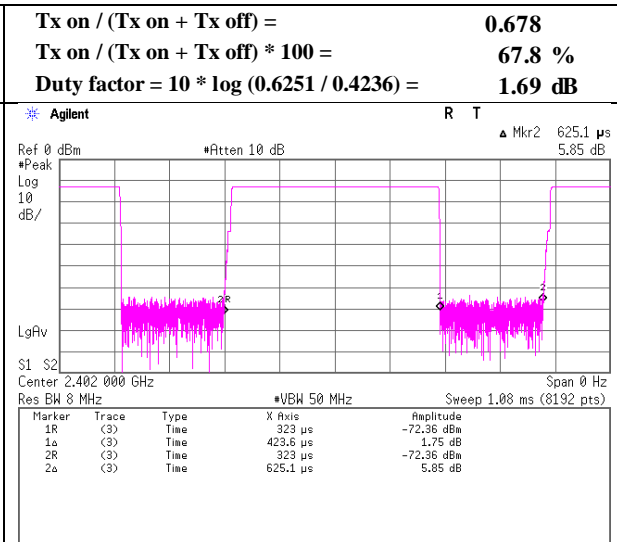
#### 11g 48 Mbps



#### 11n-20 MCS 4



#### BT LE



## Radiated Spurious Emission

Test place	Ise EMC Lab.	
Report No.	11245604H	
Semi Anechoic Chamber	No.1	No.4
Date	April 25, 2016	June 9, 2016
Temperature / Humidity	25 deg. C / 55 % RH	22 deg. C / 70 % RH
Engineer	Satofumi Matsuyama (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)
Mode	Tx 11b 2412 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	49.9	26.8	5.0	36.3		45.4	73.9	28.5	
Hori	4824.000	PK	47.3	31.9	7.0	35.6		50.6	73.9	23.3	
Hori	7236.000	PK	44.3	36.1	7.7	35.8		52.3	73.9	21.6	Floor noise
Hori	9648.000	PK	44.5	38.6	8.5	36.2		55.4	73.9	18.5	Floor noise
Hori	2390.000	AV	40.4	26.8	5.0	36.3	0.3	36.2	53.9	17.7	*1)
Hori	4824.000	AV	35.8	31.9	7.0	35.6	0.3	39.4	53.9	14.5	
Hori	7236.000	AV	32.8	36.1	7.7	35.8		40.8	53.9	13.1	Floor noise
Hori	9648.000	AV	34.2	38.6	8.5	36.2		45.1	53.9	8.8	Floor noise
Vert	2390.000	PK	52.2	26.8	5.0	36.3		47.7	73.9	26.2	
Vert	4824.000	PK	49.0	31.9	7.0	35.6		52.3	73.9	21.6	
Vert	7236.000	PK	42.6	36.1	7.7	35.8		50.6	73.9	23.3	Floor noise
Vert	9648.000	PK	45.3	38.6	8.5	36.2		56.2	73.9	17.7	Floor noise
Vert	2390.000	AV	43.0	26.8	5.0	36.3	0.3	38.8	53.9	15.1	*1)
Vert	4824.000	AV	36.7	31.9	7.0	35.6	0.3	40.3	53.9	13.6	
Vert	7236.000	AV	32.8	36.1	7.7	35.8		40.8	53.9	13.1	Floor noise
Vert	9648.000	AV	34.2	38.6	8.5	36.2		45.1	53.9	8.8	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB  
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	103.6	26.8	5.0	36.3	99.1	-	-	Carrier
Hori	2400.000	PK	51.3	26.8	5.0	36.3	46.8	79.1	32.3	
Vert	2412.000	PK	106.7	26.8	5.0	36.3	102.2	-	-	Carrier
Vert	2400.000	PK	54.4	26.8	5.0	36.3	49.9	82.2	32.3	

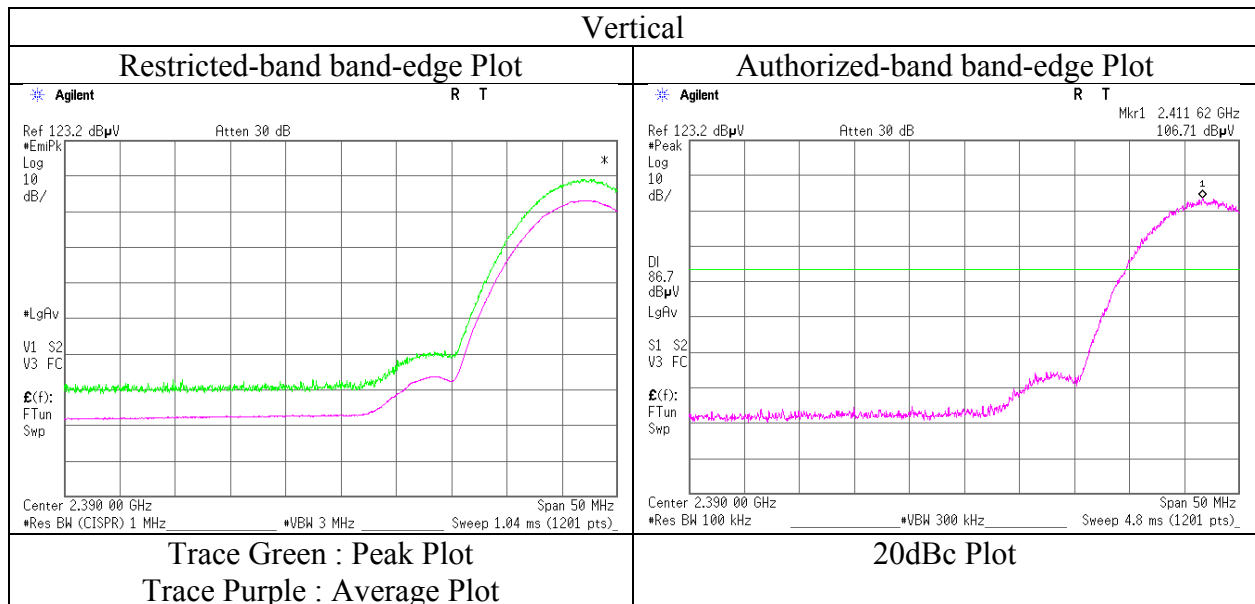
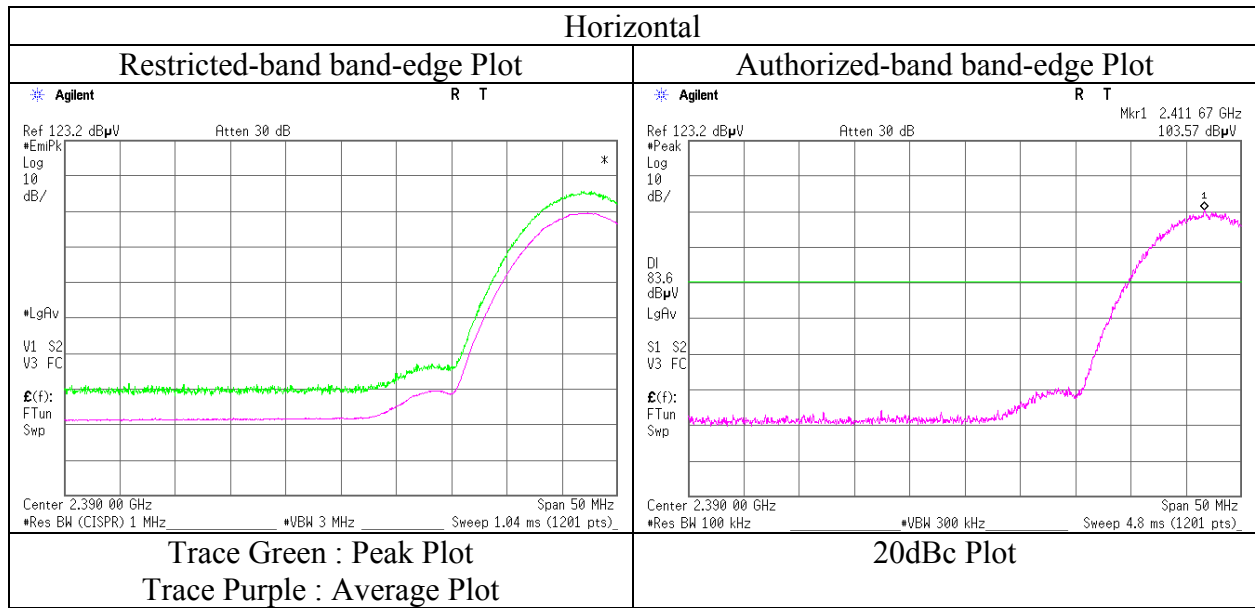
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB



**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber  
Report No. : 11245604H  
Date : April 25, 2016  
Temperature / Humidity : 25 deg. C / 55 % RH  
Engineer : Satofumi Matsuyama  
(1 GHz - 10 GHz)  
Mode : Tx 11b 2412 MHz



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

## Radiated Spurious Emission

Test place	Ise EMC Lab.	
Report No.	11245604H	
Semi Anechoic Chamber	No.1	No.4
Date	April 25, 2016	June 9, 2016
Temperature / Humidity	25 deg. C / 55 % RH	22 deg. C / 70 % RH
Engineer	Satofumi Matsuyama (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)
Mode	Tx 11b 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	45.6	32.0	7.0	35.5		49.1	73.9	24.8	
Hori	7311.000	PK	43.0	36.1	7.7	35.8		51.0	73.9	22.9	Floor noise
Hori	9748.000	PK	44.2	38.6	8.6	36.3		55.1	73.9	18.8	Floor noise
Hori	4874.000	AV	36.2	32.0	7.0	35.5	0.3	40.0	53.9	13.9	
Hori	7311.000	AV	34.3	36.1	7.7	35.8		42.3	53.9	11.6	Floor noise
Hori	9748.000	AV	35.2	38.6	8.6	36.3		46.1	53.9	7.8	Floor noise
Vert	4874.000	PK	47.4	32.0	7.0	35.5		50.9	73.9	23.0	
Vert	7311.000	PK	42.5	36.1	7.7	35.8		50.5	73.9	23.4	Floor noise
Vert	9748.000	PK	43.4	38.6	8.6	36.3		54.3	73.9	19.6	Floor noise
Vert	4874.000	AV	37.5	32.0	7.0	35.5	0.3	41.3	53.9	12.6	
Vert	7311.000	AV	34.3	36.1	7.7	35.8		42.3	53.9	11.6	Floor noise
Vert	9748.000	AV	35.2	38.6	8.6	36.3		46.1	53.9	7.8	Floor noise

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

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

Distance factor:    1 GHz - 10 GHz         $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$   
                          10 GHz - 26.5 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Test place	Ise EMC Lab.	
Report No.	11245604H	
Semi Anechoic Chamber	No.1	No.4
Date	April 25, 2016	June 9, 2016
Temperature / Humidity	25 deg. C / 55 % RH	22 deg. C / 70 % RH
Engineer	Satofumi Matsuyama (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)
Mode	Tx 11b 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	49.4	26.9	5.0	36.3		45.0	73.9	28.9	
Hori	4924.000	PK	43.7	32.0	6.9	35.5		47.1	73.9	26.8	
Hori	7386.000	PK	42.4	36.1	7.7	35.8		50.4	73.9	23.5	Floor noise
Hori	9848.000	PK	43.7	38.6	8.5	36.3		54.5	73.9	19.4	Floor noise
Hori	2483.500	AV	38.6	26.9	5.0	36.3	0.3	34.5	53.9	19.4	*1)
Hori	4924.000	AV	34.3	32.0	6.9	35.5	0.3	38.0	53.9	15.9	
Hori	7386.000	AV	34.1	36.1	7.7	35.8		42.1	53.9	11.8	Floor noise
Hori	9848.000	AV	34.7	38.6	8.5	36.3		45.5	53.9	8.4	Floor noise
Vert	2483.500	PK	50.8	26.9	5.0	36.3		46.4	73.9	27.5	
Vert	4924.000	PK	45.7	32.0	6.9	35.5		49.1	73.9	24.8	
Vert	7386.000	PK	43.3	36.1	7.7	35.8		51.3	73.9	22.6	Floor noise
Vert	9848.000	PK	43.4	38.6	8.5	36.3		54.2	73.9	19.7	Floor noise
Vert	2483.500	AV	42.0	26.9	5.0	36.3	0.3	37.9	53.9	16.0	*1)
Vert	4924.000	AV	35.3	32.0	6.9	35.5	0.3	39.0	53.9	14.9	
Vert	7386.000	AV	34.1	36.1	7.7	35.8		42.1	53.9	11.8	Floor noise
Vert	9848.000	AV	34.7	38.6	8.5	36.3		45.5	53.9	8.4	Floor noise

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

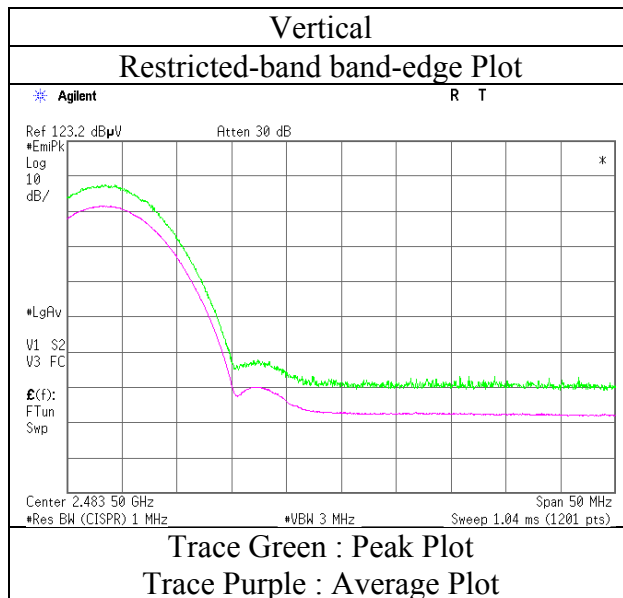
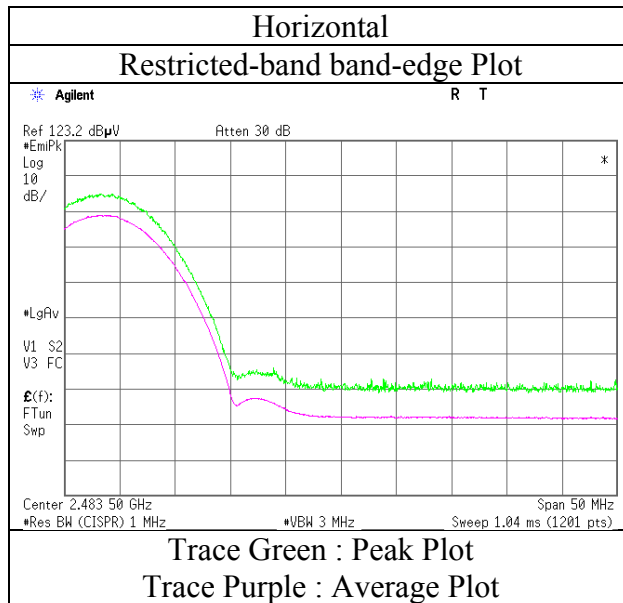
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:     1 GHz - 10 GHz    20log (3.9 m / 3.0 m) = 2.28 dB  
                          10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber  
Report No. 11245604H  
Date April 25, 2016  
Temperature / Humidity 25 deg. C / 55 % RH  
Engineer Satofumi Matsuyama  
(1 GHz - 10 GHz)  
Mode Tx 11b 2462 MHz



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

## Radiated Spurious Emission

Test place	Ise EMC Lab.		
Report No.	11245604H		
Semi Anechoic Chamber	No.4	No.4	No.4
Date	June 9, 2016	June 9, 2016	June 10, 2016
Temperature / Humidity	23 deg. C / 70 % RH	22 deg. C / 70 % RH	22 deg. C / 72 % RH
Engineer	Shinichi Miyazono	Tomoki Matsui	Shinichi Miyazono
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx 11n-20 2412 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	259.063	QP	53.3	12.6	9.6	31.9	-	43.6	46.0	2.4	
Hori	407.102	QP	51.0	15.8	10.6	32.1	-	45.3	46.0	0.7	
Hori	777.194	QP	37.9	20.5	12.7	31.8	-	39.3	46.0	6.7	
Hori	828.739	QP	37.1	21.1	13.0	31.5	-	39.7	46.0	6.3	
Hori	926.242	QP	33.2	22.0	13.4	31.0	-	37.6	46.0	8.4	
Hori	959.982	QP	40.9	22.2	13.6	30.9	-	45.8	46.0	0.2	
Hori	2390.000	PK	55.5	27.9	6.6	32.1	-	57.9	73.9	16.0	
Hori	4824.000	PK	41.3	32.9	8.9	31.3	-	51.8	73.9	22.1	Floor noise
Hori	7236.000	PK	40.9	36.8	8.9	32.6	-	54.0	73.9	19.9	Floor noise
Hori	9648.000	PK	41.9	38.1	9.5	32.6	-	56.9	73.9	17.0	Floor noise
Hori	2390.000	AV	43.5	27.9	6.6	32.1	1.0	46.9	53.9	7.0	*1)
Hori	4824.000	AV	32.8	32.9	8.9	31.3	-	43.3	53.9	10.6	Floor noise
Hori	7236.000	AV	31.8	36.8	8.9	32.6	-	44.9	53.9	9.0	Floor noise
Hori	9648.000	AV	32.8	38.1	9.5	32.6	-	47.8	53.9	6.1	Floor noise
Vert	407.100	QP	49.4	15.8	10.6	32.1	-	43.7	46.0	2.3	
Vert	592.147	QP	42.3	18.9	11.7	32.2	-	40.7	46.0	5.3	
Vert	828.739	QP	38.5	21.1	13.0	31.5	-	41.1	46.0	4.9	
Vert	877.497	QP	34.8	21.6	13.2	31.2	-	38.4	46.0	7.6	
Vert	926.241	QP	35.7	22.0	13.4	31.0	-	40.1	46.0	5.9	
Vert	959.981	QP	40.7	22.2	13.6	30.9	-	45.6	46.0	0.4	
Vert	2390.000	PK	59.7	27.9	6.6	32.1	-	62.1	73.9	11.8	
Vert	4824.000	PK	41.3	32.9	8.9	31.3	-	51.8	73.9	22.1	Floor noise
Vert	7236.000	PK	40.9	36.8	8.9	32.6	-	54.0	73.9	19.9	Floor noise
Vert	9648.000	PK	41.9	38.1	9.5	32.6	-	56.9	73.9	17.0	Floor noise
Vert	2390.000	AV	47.5	27.9	6.6	32.1	1.0	50.9	53.9	3.0	*1)
Vert	4824.000	AV	32.8	32.9	8.9	31.3	-	43.3	53.9	10.6	Floor noise
Vert	7236.000	AV	31.8	36.8	8.9	32.6	-	44.9	53.9	9.0	Floor noise
Vert	9648.000	AV	32.8	38.1	9.5	32.6	-	47.8	53.9	6.1	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log(4.4 m / 3.0 m) = 3.33 dB  
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.0	28.0	6.6	32.1	93.5	-	-	Carrier
Hori	2400.000	PK	58.3	28.0	6.6	32.1	60.8	73.5	12.7	
Vert	2412.000	PK	94.0	28.0	6.6	32.1	96.5	-	-	Carrier
Vert	2400.000	PK	60.5	28.0	6.6	32.1	63.0	76.5	13.5	

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

Distance factor: 1GHz-10GHz 20log(4.4m/3.3m)= 3.33dB

**UL Japan, Inc.**

**Ise EMC Lab.**

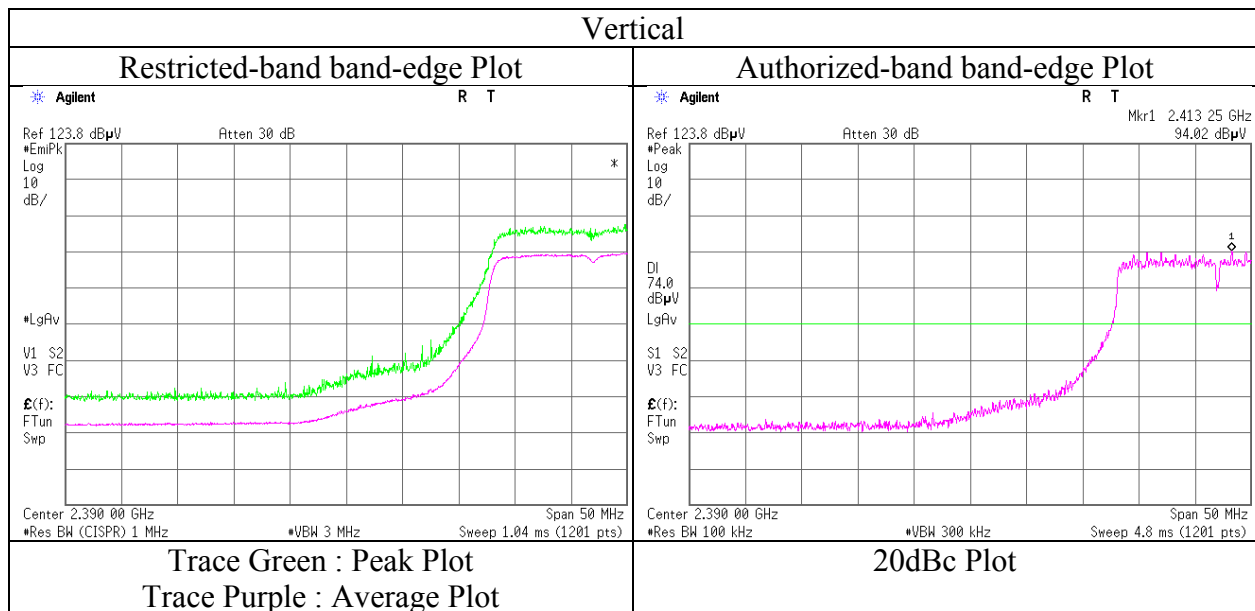
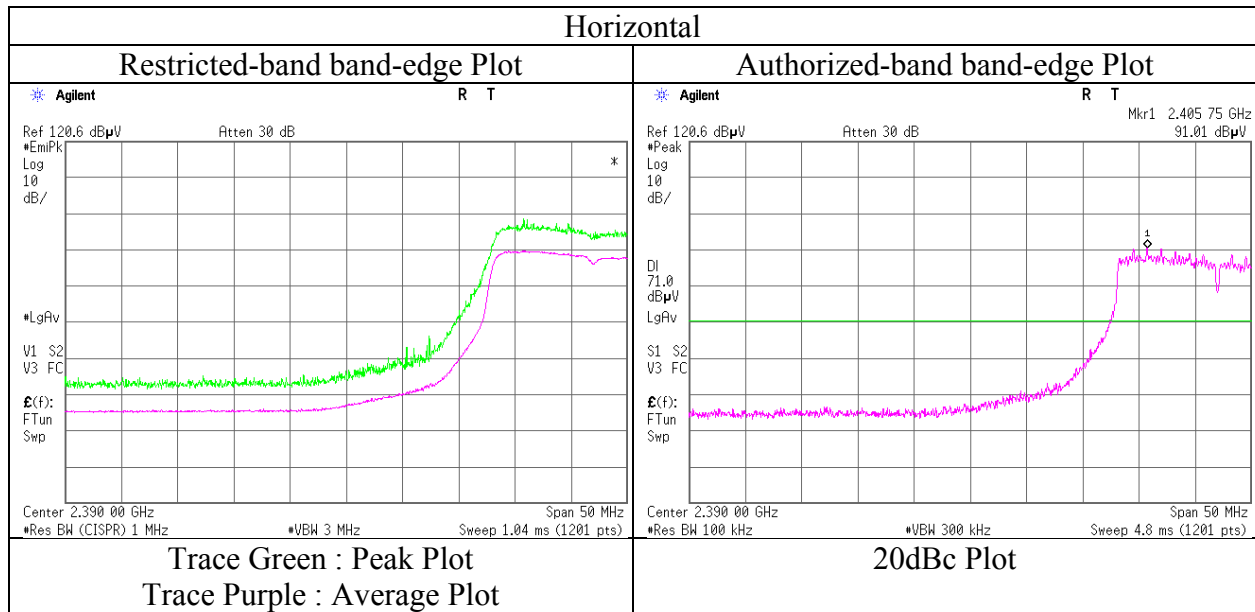
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place	Ise EMC Lab.
Report No.	11245604H
Semi Anechoic Chamber	No.4
Date	June 9, 2016
Temperature / Humidity	23 deg. C / 70 % RH
Engineer	Shinichi Miyazono
Mode	Tx 11n-20 2412 MHz



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

## Radiated Spurious Emission

Test place : Ise EMC Lab.  
Report No. : 11245604H  
Semi Anechoic Chamber : No.4  
Date : June 9, 2016  
Temperature / Humidity : 22 deg. C / 70 % RH  
Engineer : Tomoki Matsui  
(Above 1 GHz)  
Mode : Tx 11n-20 2437 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	40.5	33.1	7.9	31.3	-	50.2	73.9	23.7	Floor noise
Hori	7311.000	PK	40.5	36.8	8.9	32.6	-	53.6	73.9	20.3	Floor noise
Hori	9748.000	PK	39.6	38.2	9.5	32.7	-	54.6	73.9	19.3	Floor noise
Hori	4874.000	AV	30.9	33.1	8.9	31.3	-	41.6	53.9	12.3	Floor noise
Hori	7311.000	AV	31.9	36.8	8.9	32.6	-	45.0	53.9	8.9	Floor noise
Hori	9748.000	AV	32.0	38.2	9.5	32.7	-	47.0	53.9	6.9	Floor noise
Vert	4874.000	PK	40.6	33.1	8.9	31.3	-	51.3	73.9	22.6	Floor noise
Vert	7311.000	PK	40.6	36.8	8.9	32.6	-	53.7	73.9	20.2	Floor noise
Vert	9748.000	PK	39.7	38.2	9.5	32.7	-	54.7	73.9	19.2	Floor noise
Vert	4874.000	AV	30.9	33.1	8.9	31.3	-	41.6	53.9	12.3	Floor noise
Vert	7311.000	AV	32.0	36.8	8.9	32.6	-	45.1	53.9	8.8	Floor noise
Vert	9748.000	AV	31.8	38.2	9.5	32.7	-	46.8	53.9	7.1	Floor noise

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

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

Distance factor:      1 GHz - 10 GHz      20log (4.4 m / 3.0 m) = 3.33 dB  
                                 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission

Test place : Ise EMC Lab.  
Report No. : 11245604H  
Semi Anechoic Chamber : No.4  
Date : June 9, 2016  
Temperature / Humidity : 22 deg. C / 70 % RH  
Engineer : Tomoki Matsui  
(Above 1 GHz)  
Mode : Tx 11n-20 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	60.0	28.1	6.7	32.1	-	62.7	73.9	11.2	
Hori	4924.000	PK	39.8	33.3	8.9	31.3	-	50.7	73.9	23.2	Floor noise
Hori	7386.000	PK	40.5	36.8	8.9	32.6	-	53.6	73.9	20.3	Floor noise
Hori	9848.000	PK	40.9	38.2	9.5	32.7	-	55.9	73.9	18.0	Floor noise
Hori	2483.500	AV	46.6	28.1	6.7	32.1	1.0	50.3	53.9	3.6	*1)
Hori	4924.000	AV	30.7	33.3	8.9	31.3	-	41.6	53.9	12.3	Floor noise
Hori	7386.000	AV	31.6	36.8	8.9	32.6	-	44.7	53.9	9.2	Floor noise
Hori	9848.000	AV	32.0	38.2	9.5	32.7	-	47.0	53.9	6.9	Floor noise
Vert	2483.500	PK	59.5	28.1	6.7	32.1	-	62.2	73.9	11.7	
Vert	4924.000	PK	39.1	33.3	8.9	31.3	-	50.0	73.9	23.9	Floor noise
Vert	7386.000	PK	40.6	36.8	8.9	32.6	-	53.7	73.9	20.2	Floor noise
Vert	9848.000	PK	42.3	38.2	9.5	32.7	-	57.3	73.9	16.6	Floor noise
Vert	2483.500	AV	45.7	28.1	6.7	32.1	1.0	49.4	53.9	4.5	*1)
Vert	4924.000	AV	30.7	33.3	8.9	31.3	-	41.6	53.9	12.3	Floor noise
Vert	7386.000	AV	31.7	36.8	8.9	32.6	-	44.8	53.9	9.1	Floor noise

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

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

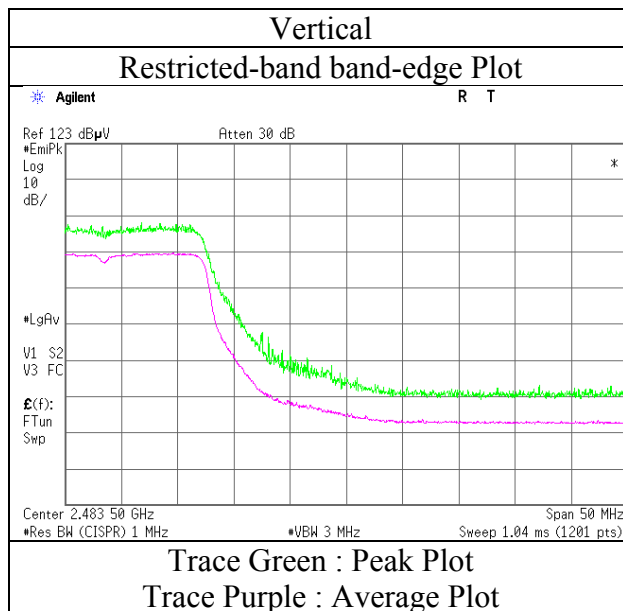
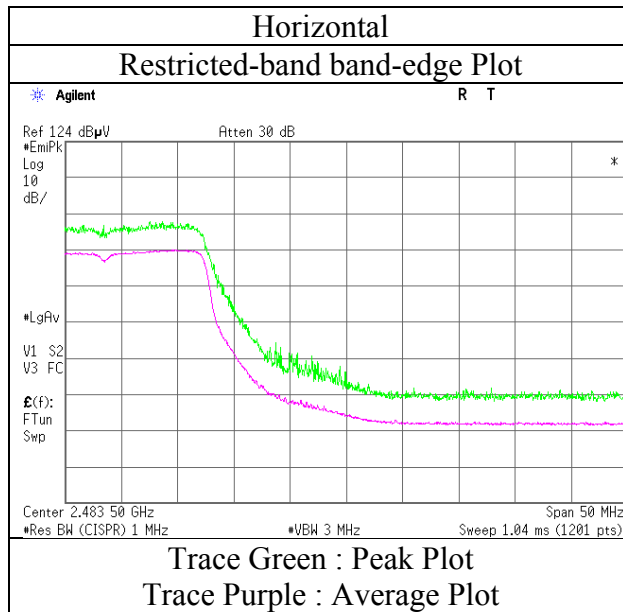
Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.33 dB  
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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



**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place	Ise EMC Lab.
Report No.	11245604H
Semi Anechoic Chamber	No.4
Date	June 9, 2016
Temperature / Humidity	22 deg. C / 70 % RH
Engineer	Tomoki Matsui
Mode	Tx 11n-20 2462 MHz



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

## Radiated Spurious Emission

Test place	Ise EMC Lab.		
Report No.	11245604H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	April 25, 2016	June 9, 2016	June 10, 2016
Temperature / Humidity	23 deg. C / 58 % RH	22 deg. C / 70 % RH	22 deg. C / 72 % RH
Engineer	Hiroyuki Furutaka (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx BT LE 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	259.061	QP	53.2	12.6	9.6	31.9	-	43.5	46.0	2.5	
Hori	407.100	QP	51.4	15.8	10.6	32.1	-	45.7	46.0	0.3	
Hori	777.190	QP	37.4	20.5	12.7	31.8	-	38.8	46.0	7.2	
Hori	828.741	QP	37.0	21.1	13.0	31.5	-	39.6	46.0	6.4	
Hori	926.238	QP	33.2	22.0	13.4	31.0	-	37.6	46.0	8.4	
Hori	959.980	QP	40.9	22.2	13.6	30.9	-	45.8	46.0	0.2	
Hori	2390.000	PK	46.2	26.8	5.0	36.3	-	41.7	73.9	32.2	
Hori	4804.000	PK	44.8	31.8	7.0	35.6	-	48.0	73.9	25.9	
Hori	7206.000	PK	42.9	36.1	7.7	35.8	-	50.9	73.9	23.0	Floor noise
Hori	9608.000	PK	43.7	38.6	8.5	36.2	-	54.6	73.9	19.3	Floor noise
Hori	2390.000	AV	36.6	26.8	5.0	36.3	1.7	33.8	53.9	20.1	*1)
Hori	4804.000	AV	36.3	31.8	7.0	35.6	1.7	41.2	53.9	12.7	
Hori	7206.000	AV	34.6	36.1	7.7	35.8	-	42.6	53.9	11.3	Floor noise
Hori	9608.000	AV	35.8	38.6	8.5	36.2	-	46.7	53.9	7.2	Floor noise
Vert	407.101	QP	49.4	15.8	10.6	32.1	-	43.7	46.0	2.3	
Vert	592.144	QP	42.1	18.9	11.7	32.2	-	40.5	46.0	5.5	
Vert	828.740	QP	38.1	21.1	13.0	31.5	-	40.7	46.0	5.3	
Vert	877.488	QP	34.6	21.6	13.2	31.2	-	38.2	46.0	7.8	
Vert	926.230	QP	36.1	22.0	13.4	31.0	-	40.5	46.0	5.5	
Vert	959.980	QP	40.7	22.2	13.6	30.9	-	45.6	46.0	0.4	
Vert	2390.000	PK	46.4	26.8	5.0	36.3	-	41.9	73.9	32.0	
Vert	4804.000	PK	45.0	31.8	7.0	35.6	-	48.2	73.9	25.7	
Vert	7206.000	PK	43.1	36.1	7.7	35.8	-	51.1	73.9	22.8	Floor noise
Vert	9608.000	PK	44.0	38.6	8.5	36.2	-	54.9	73.9	19.0	Floor noise
Vert	2390.000	AV	36.5	26.8	5.0	36.3	1.7	33.7	53.9	20.2	*1)
Vert	4804.000	AV	35.5	31.8	7.0	35.6	1.7	40.4	53.9	13.5	
Vert	7206.000	AV	34.4	36.1	7.7	35.8	-	42.4	53.9	11.5	Floor noise
Vert	9608.000	AV	35.7	38.6	8.5	36.2	-	46.6	53.9	7.3	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log(3.9 m / 3.0 m) = 2.28 dB  
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	93.4	26.8	5.0	36.3	88.9	-	-	Carrier
Hori	2400.000	PK	39.8	26.8	5.0	36.3	35.3	68.9	33.6	
Vert	2402.000	PK	96.8	26.8	5.0	36.3	92.3	-	-	Carrier
Vert	2400.000	PK	42.0	26.8	5.0	36.3	37.5	72.3	34.8	

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

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

Distance factor: 1GHz-10GHz 20log(3.9m/3.0m)= 2.28dB

**UL Japan, Inc.**

**Ise EMC Lab.**

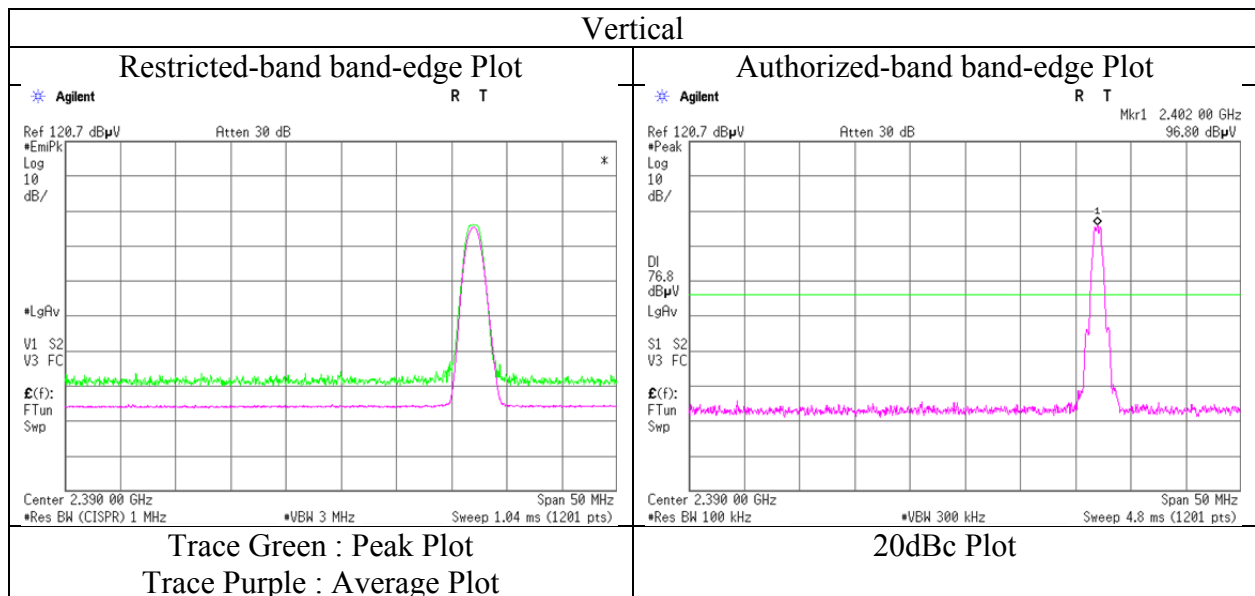
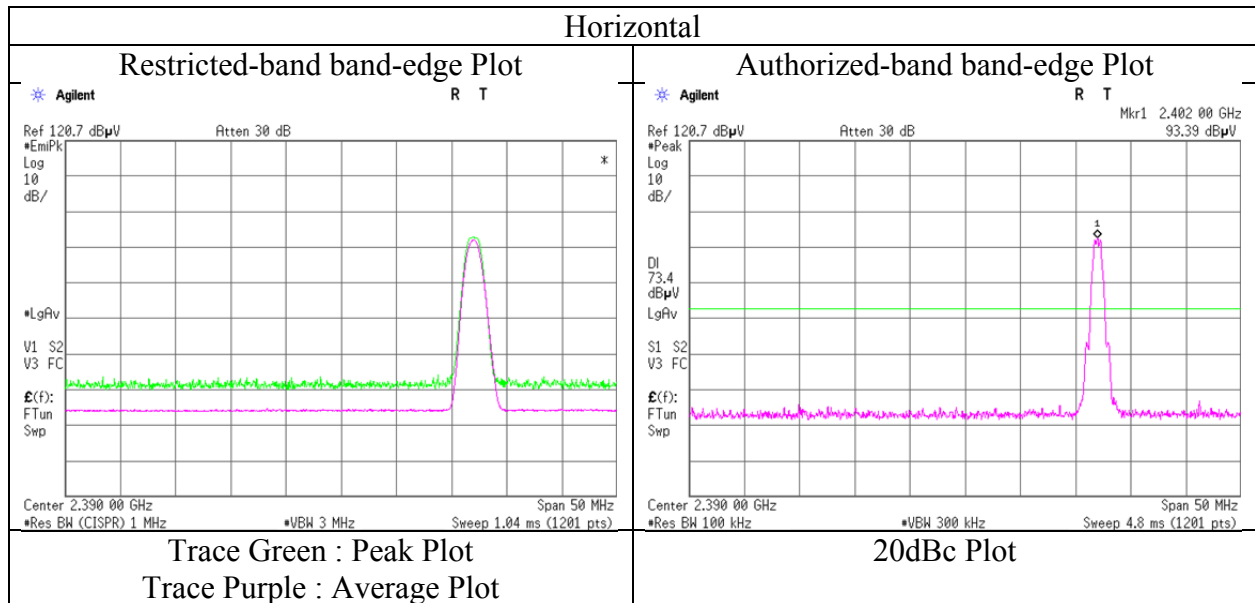
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Hiroyuki Furutaka (1 GHz - 10 GHz)
Mode	Tx BT LE 2402 MHz



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

## Radiated Spurious Emission

Test place	Ise EMC Lab.		
Report No.	11245604H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	April 25, 2016	June 9, 2016	June 10, 2016
Temperature / Humidity	23 deg. C / 58 % RH	22 deg. C / 70 % RH	22 deg. C / 72 % RH
Engineer	Hiroyuki Furutaka (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx BT LE 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	259.063	QP	53.0	12.6	9.6	31.9	-	43.3	46.0	2.7	
Hori	407.101	QP	51.4	15.8	10.6	32.1	-	45.7	46.0	0.3	
Hori	777.192	QP	37.6	20.5	12.7	31.8	-	39.0	46.0	7.0	
Hori	828.740	QP	37.2	21.1	13.0	31.5	-	39.8	46.0	6.2	
Hori	926.235	QP	33.4	22.0	13.4	31.0	-	37.8	46.0	8.2	
Hori	959.981	QP	40.9	22.2	13.6	30.9	-	45.8	46.0	0.2	
Hori	4880.000	PK	45.0	32.0	7.0	35.5	-	48.5	73.9	25.4	
Hori	7320.000	PK	43.3	36.1	7.7	35.8	-	51.3	73.9	22.6	Floor noise
Hori	9760.000	PK	44.2	38.6	8.6	36.3	-	55.1	73.9	18.8	Floor noise
Hori	4880.000	AV	36.7	32.0	7.0	35.5	1.7	41.9	53.9	12.0	
Hori	7320.000	AV	34.4	36.1	7.7	35.8	-	42.4	53.9	11.5	Floor noise
Hori	9760.000	AV	35.6	38.6	8.6	36.3	-	46.5	53.9	7.4	Floor noise
Vert	407.101	QP	49.3	15.8	10.6	32.1	-	43.6	46.0	2.4	
Vert	592.146	QP	42.1	18.9	11.7	32.2	-	40.5	46.0	5.5	
Vert	828.741	QP	37.9	21.1	13.0	31.5	-	40.5	46.0	5.5	
Vert	877.485	QP	34.6	21.6	13.2	31.2	-	38.2	46.0	7.8	
Vert	926.233	QP	36.1	22.0	13.4	31.0	-	40.5	46.0	5.5	
Vert	959.981	QP	40.7	22.2	13.6	30.9	-	45.6	46.0	0.4	
Vert	4880.000	PK	44.8	32.0	7.0	35.5	1.7	50.0	73.9	23.9	
Vert	7320.000	PK	42.9	36.1	7.7	35.8	-	50.9	73.9	23.0	Floor noise
Vert	9760.000	PK	43.8	38.6	8.6	36.3	-	54.7	73.9	19.2	Floor noise
Vert	4880.000	AV	35.6	32.0	7.0	35.5	-	39.1	53.9	14.8	
Vert	7320.000	AV	34.6	36.1	7.7	35.8	-	42.6	53.9	11.3	Floor noise
Vert	9760.000	AV	35.4	38.6	8.6	36.3	-	46.3	53.9	7.6	Floor noise

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

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

Distance factor:    1 GHz - 10 GHz     $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$   
                          10 GHz - 26.5 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Test place	Ise EMC Lab.		
Report No.	11245604H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	April 25, 2016	June 9, 2016	June 10, 2016
Temperature / Humidity	23 deg. C / 58 % RH	22 deg. C / 70 % RH	22 deg. C / 72 % RH
Engineer	Hiroyuki Furutaka (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx BT LE 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	259.061	QP	53.0	12.6	9.6	31.9	-	43.3	46.0	2.7	
Hori	407.100	QP	51.4	15.8	10.6	32.1	-	45.7	46.0	0.3	
Hori	777.190	QP	37.4	20.5	12.7	31.8	-	38.8	46.0	7.2	
Hori	828.740	QP	37.0	21.1	13.0	31.5	-	39.6	46.0	6.4	
Hori	926.236	QP	33.2	22.0	13.4	31.0	-	37.6	46.0	8.4	
Hori	959.980	QP	40.9	22.2	13.6	30.9	-	45.8	46.0	0.2	
Hori	2483.500	PK	51.1	26.9	5.0	36.3	-	46.7	73.9	27.2	
Hori	4960.000	PK	43.4	32.1	6.9	35.5	-	46.9	73.9	27.0	
Hori	7440.000	PK	43.5	36.1	7.7	35.8	-	51.5	73.9	22.4	Floor noise
Hori	9920.000	PK	44.4	38.6	8.5	36.3	-	55.2	73.9	18.7	Floor noise
Hori	2483.500	AV	37.6	26.9	5.0	36.3	1.7	34.9	53.9	19.0	*1)
Hori	4960.000	AV	34.8	32.1	6.9	35.5	1.7	40.0	53.9	13.9	
Hori	7440.000	AV	34.6	36.1	7.7	35.8	-	42.6	53.9	11.3	Floor noise
Hori	9920.000	AV	35.8	38.6	8.5	36.3	-	46.6	53.9	7.3	Floor noise
Vert	407.101	QP	49.3	15.8	10.6	32.1	-	43.6	46.0	2.4	
Vert	592.144	QP	42.1	18.9	11.7	32.2	-	40.5	46.0	5.5	
Vert	828.741	QP	37.9	21.1	13.0	31.5	-	40.5	46.0	5.5	
Vert	877.489	QP	34.7	21.6	13.2	31.2	-	38.3	46.0	7.7	
Vert	926.230	QP	36.3	22.0	13.4	31.0	-	40.7	46.0	5.3	
Vert	959.980	QP	40.8	22.2	13.6	30.9	-	45.7	46.0	0.3	
Vert	2483.500	PK	53.2	26.9	5.0	36.3	-	48.8	73.9	25.1	
Vert	4960.000	PK	44.3	32.1	6.9	35.5	-	47.8	73.9	26.1	
Vert	7440.000	PK	43.1	36.1	7.7	35.8	-	51.1	73.9	22.8	Floor noise
Vert	9920.000	PK	44.0	38.6	8.5	36.3	-	54.8	73.9	19.1	Floor noise
Vert	2483.500	AV	38.7	26.9	5.0	36.3	1.7	36.0	53.9	17.9	*1)
Vert	4960.000	AV	35.1	32.1	6.9	35.5	1.7	40.3	53.9	13.6	
Vert	7440.000	AV	34.9	36.1	7.7	35.8	-	42.9	53.9	11.0	Floor noise
Vert	9920.000	AV	35.6	38.6	8.5	36.3	-	46.4	53.9	7.5	Floor noise

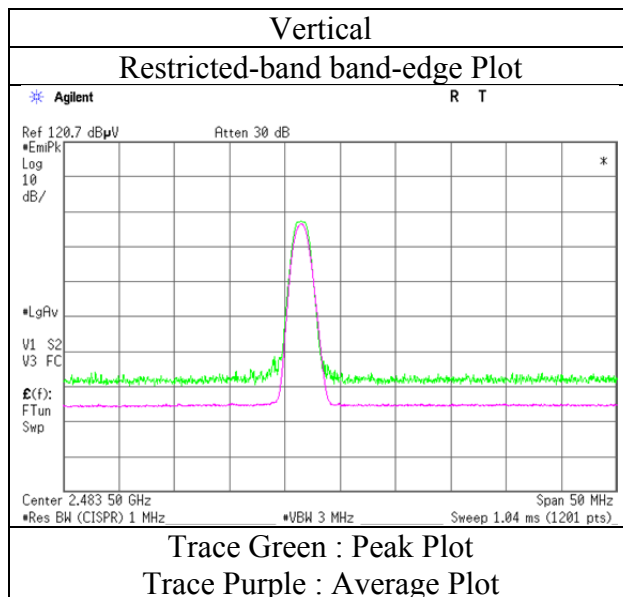
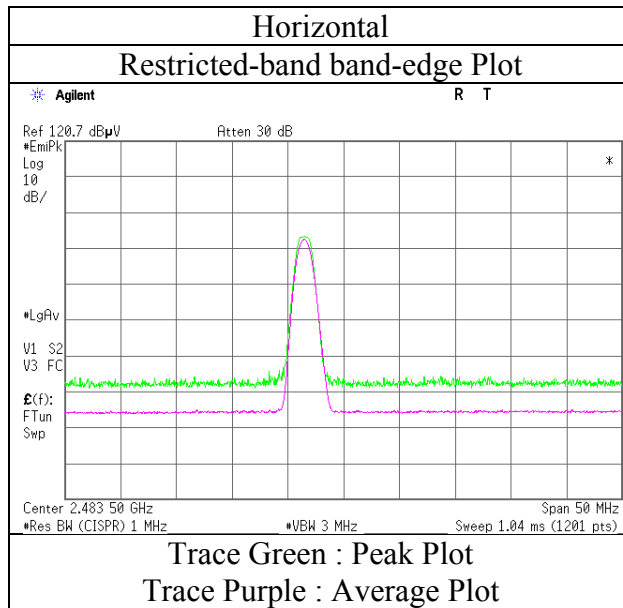
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty Factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB  
26.5 GHz - 40 GHz 20log (0.5 m / 3.0 m) = -15.6 dB

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

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

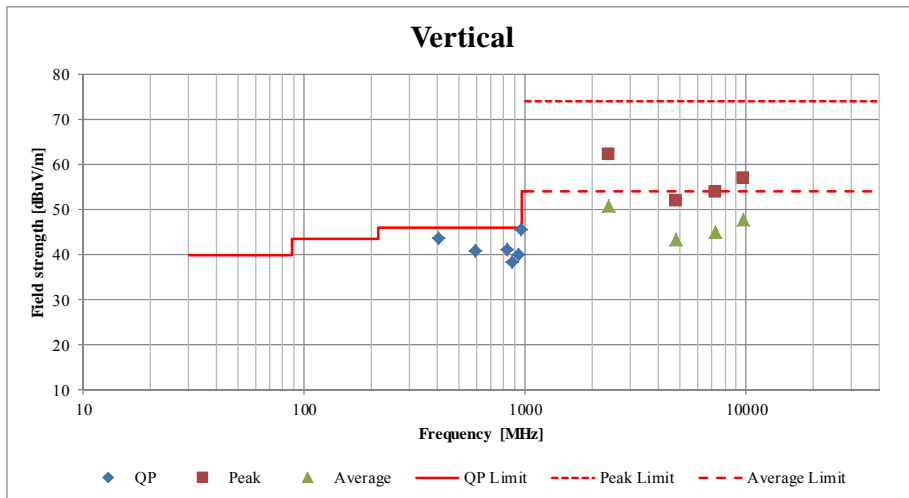
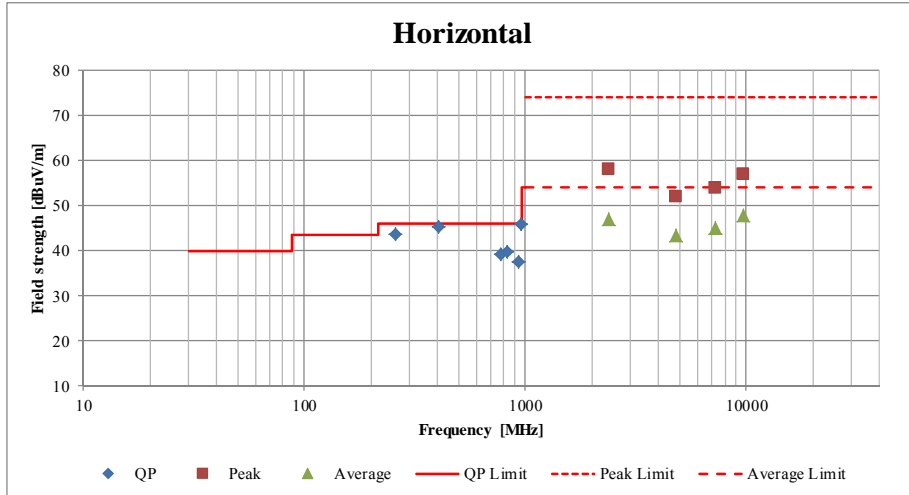
Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Hiroyuki Furutaka (1 GHz - 10 GHz)
Mode	Tx BT LE 2480 MHz



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

**Radiated Spurious Emission**  
**(Plot data, Worst case)**

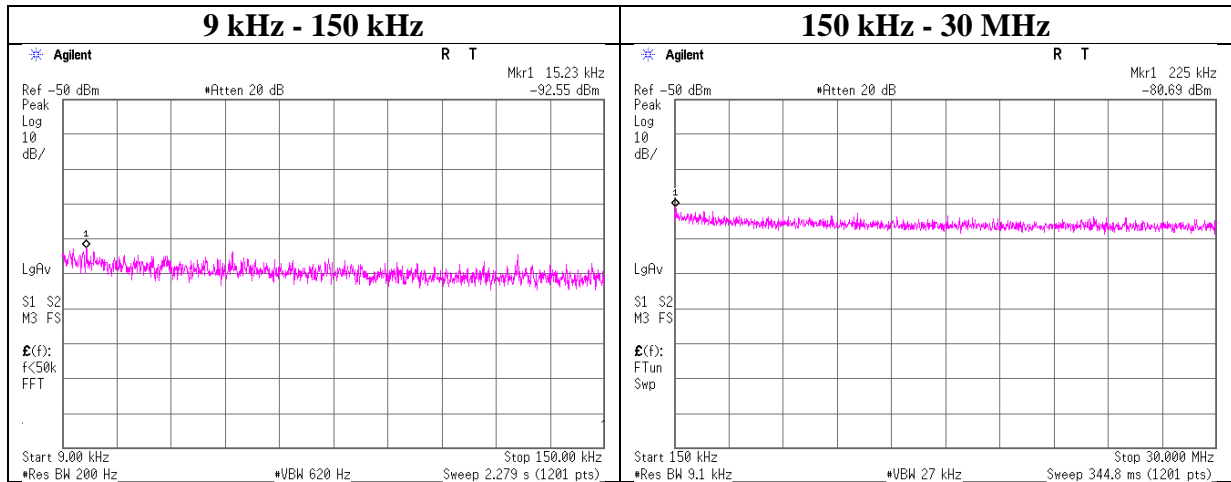
Test place	Ise EMC Lab.		
Report No.	11245604H		
Semi Anechoic Chamber	No.4	No.4	No.4
Date	June 9, 2016	June 9, 2016	June 10, 2016
Temperature / Humidity	23 deg. C / 70 % RH	22 deg. C / 70 % RH	22 deg. C / 72 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Tomoki Matsui (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx 11n-20 2412 MHz		



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

## Conducted Spurious Emission

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx 11n-20 2412 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
15.23	-92.6	0.64	10.0	4.7	1	-77.2	300	6.0	-15.9	43.9	59.8	
225.00	-80.7	0.64	10.0	4.7	1	-65.3	300	6.0	-4.1	20.5	24.6	

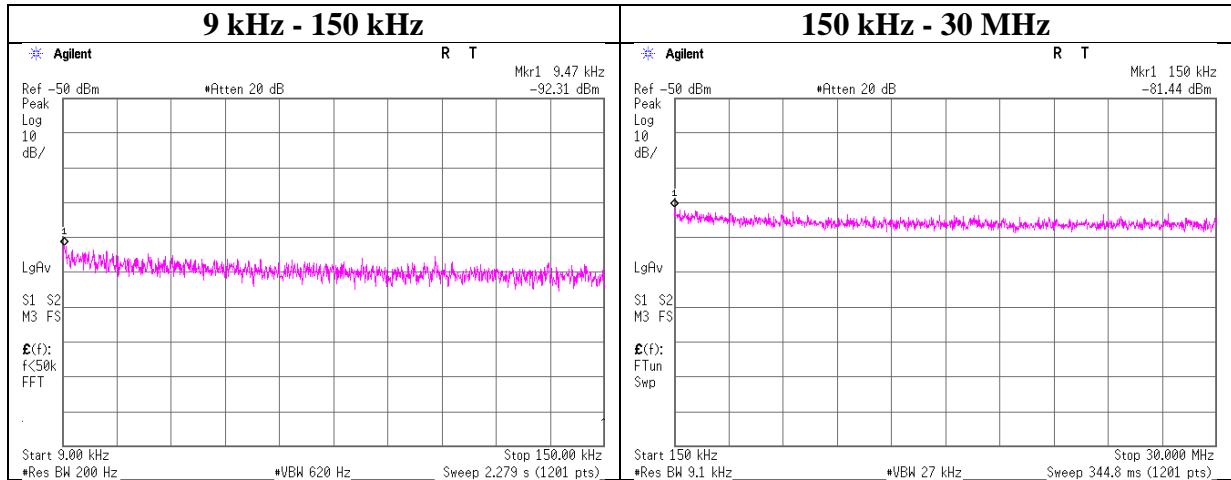
$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$



## Conducted Spurious Emission

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx BT LE 2402 MHz



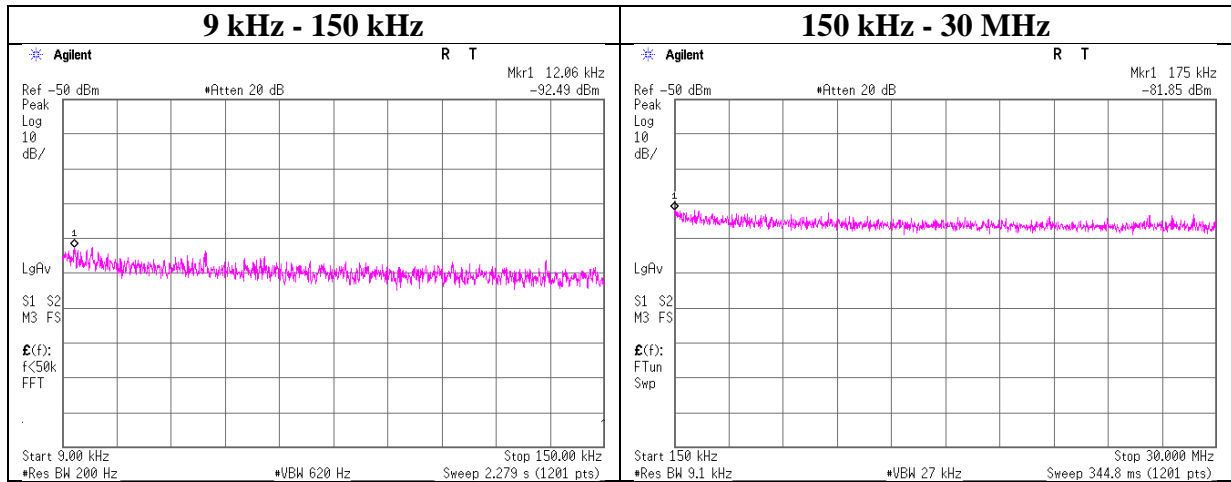
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.47	-92.3	0.64	10.0	4.7	1	-77.0	300	6.0	-15.7	48.0	63.7	
150.00	-81.4	0.64	10.0	4.7	1	-66.1	300	6.0	-4.8	24.0	28.8	

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

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

## Conducted Spurious Emission

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx BT LE 2440 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
12.06	-92.5	0.64	10.0	4.7	1	-77.1	300	6.0	-15.9	45.9	61.8	
175.00	-81.9	0.64	10.0	4.7	1	-66.5	300	6.0	-5.2	22.7	27.9	

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

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

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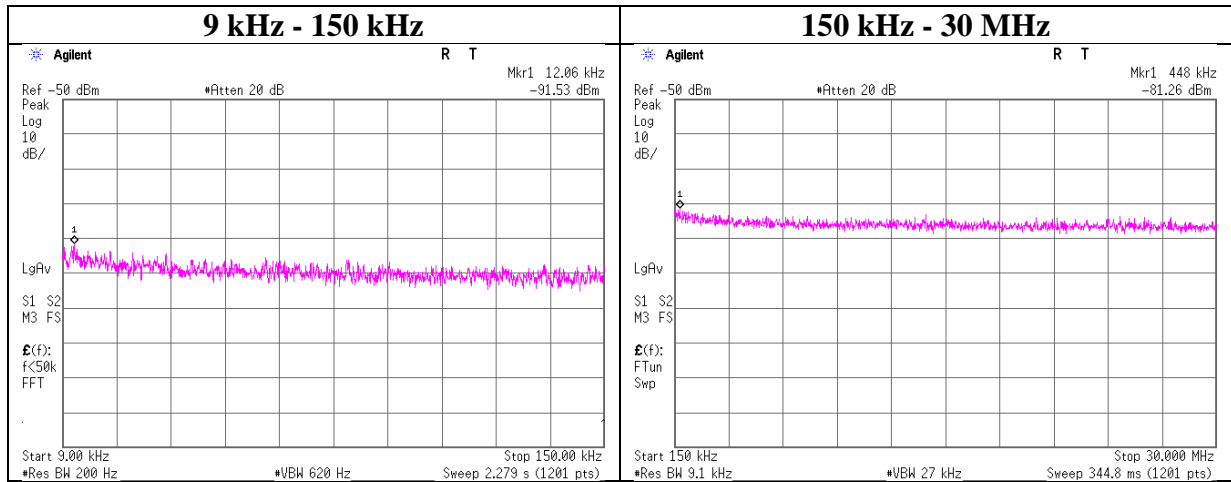
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## Conducted Spurious Emission

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11245604H
Date	April 25, 2016
Temperature / Humidity	22 deg. C / 54 % RH
Engineer	Yutaka Yoshida
Mode	Tx BT LE 2480 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
12.06	-91.5	0.64	10.0	4.7	1	-76.2	300	6.0	-14.9	45.9	60.8	
448.00	-81.3	0.64	10.0	4.7	1	-65.9	300	6.0	-4.7	14.5	19.2	

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

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

## Power Density

Test place	Ise EMC Lab. No.3 Measurement Room	
Report No.	11245604H	
Date	April 25, 2016	May 2, 2016
Temperature / Humidity	22 deg. C / 54 % RH	24 deg. C / 39 % RH
Engineer	Yutaka Yoshida	Yutaka Yoshida
Mode	Tx	

### 11b 11Mbps(Short)

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-18.20	1.55	10.03	-6.62	8.00	14.62
2437.00	-18.56	1.56	10.03	-6.97	8.00	14.97
2462.00	-16.93	1.57	10.03	-5.33	8.00	13.33

### 11g 48Mbps

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-25.81	1.91	9.77	-14.13	8.00	22.13
2437.00	-25.04	1.92	9.77	-13.35	8.00	21.35
2462.00	-26.22	1.93	9.77	-14.52	8.00	22.52

### 11n-20 MCS 4(Long)

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-26.73	1.91	9.77	-15.05	8.00	23.05
2437.00	-26.55	1.92	9.77	-14.86	8.00	22.86
2462.00	-26.67	1.93	9.77	-14.97	8.00	22.97

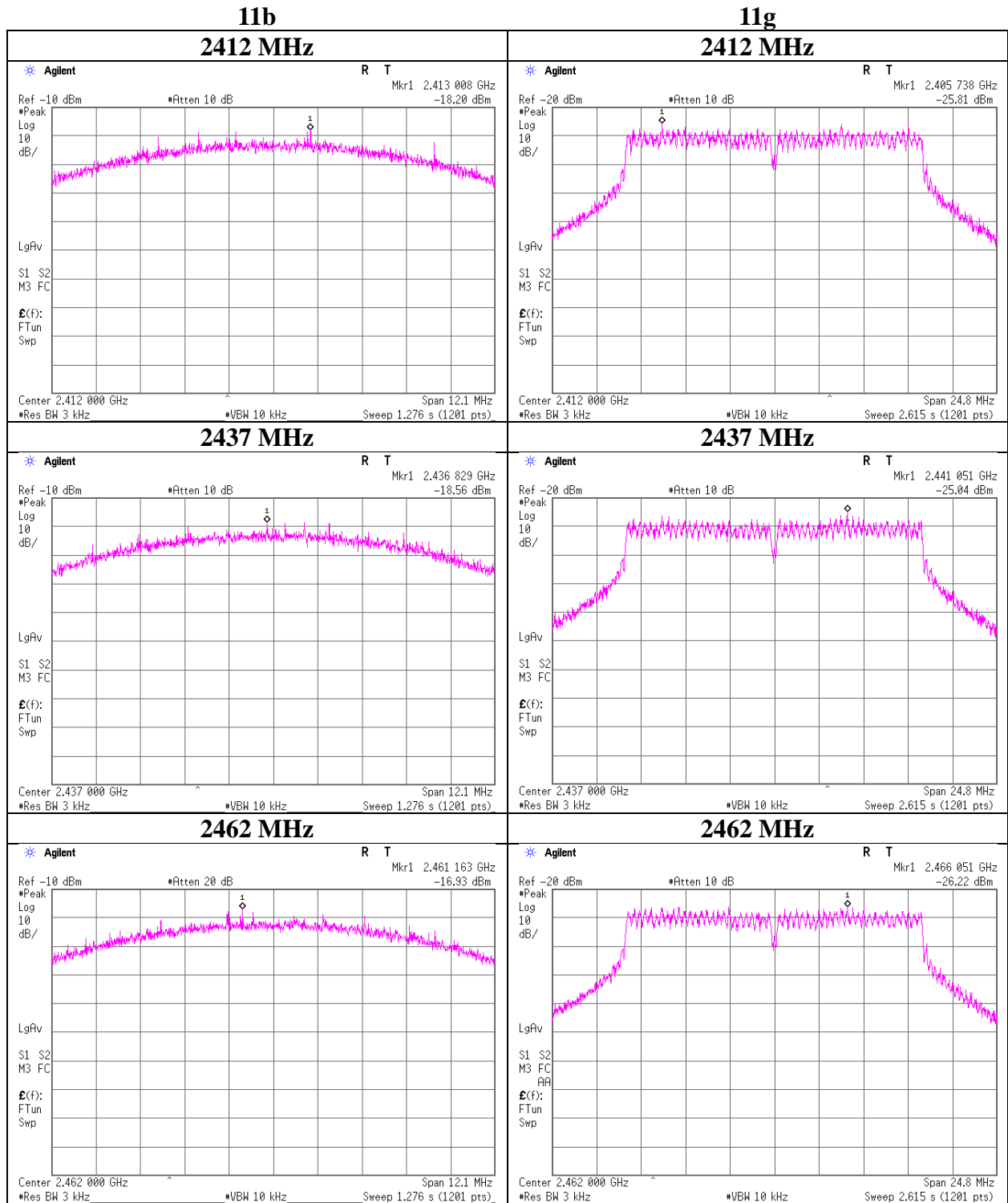
### BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2402.00	-27.41	1.55	10.03	-15.83	8.00	23.83
2440.00	-27.02	1.56	10.03	-15.43	8.00	23.43
2480.00	-26.81	1.58	10.03	-15.20	8.00	23.20

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator}$$

**Power Density**



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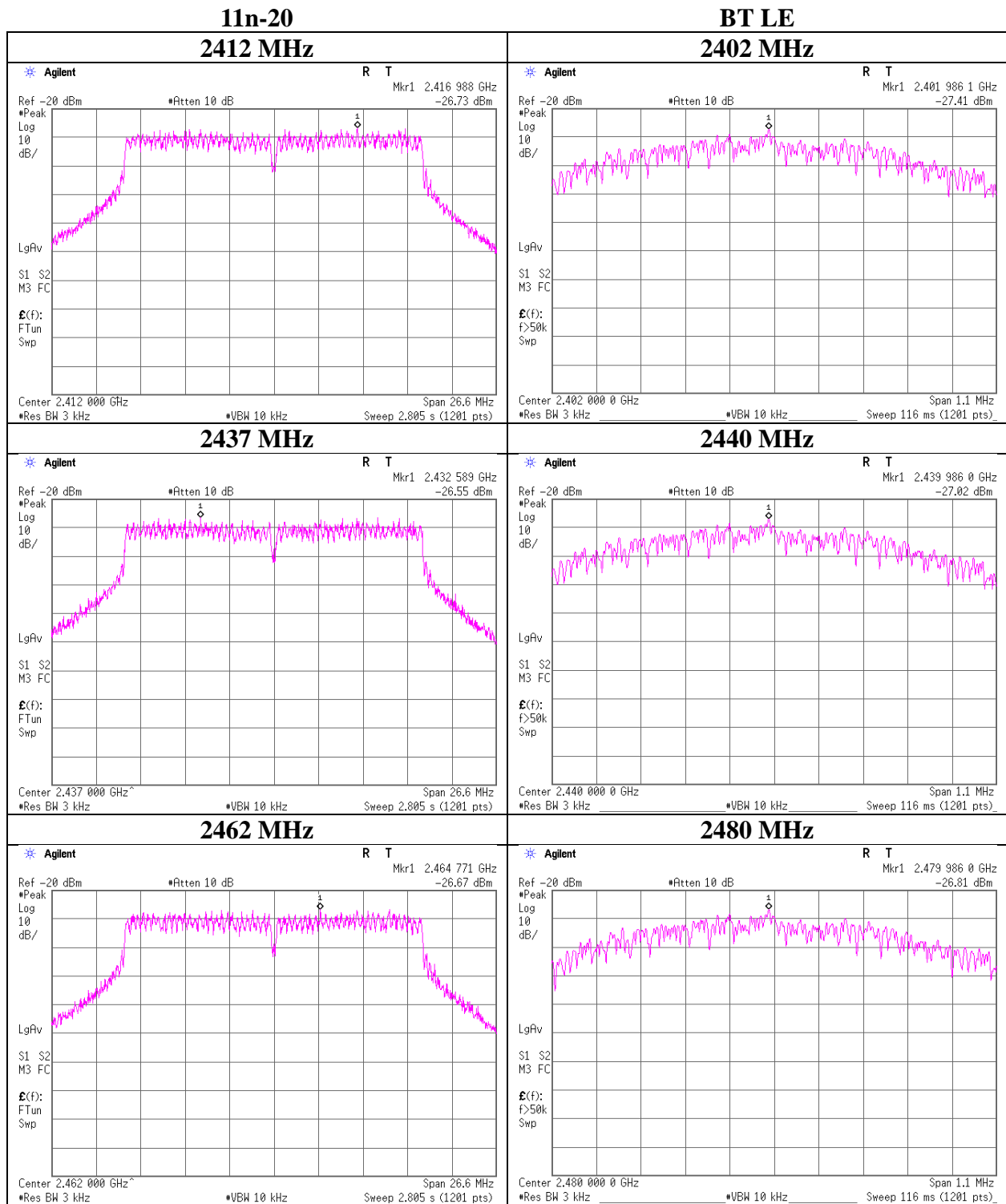
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**Power Density**



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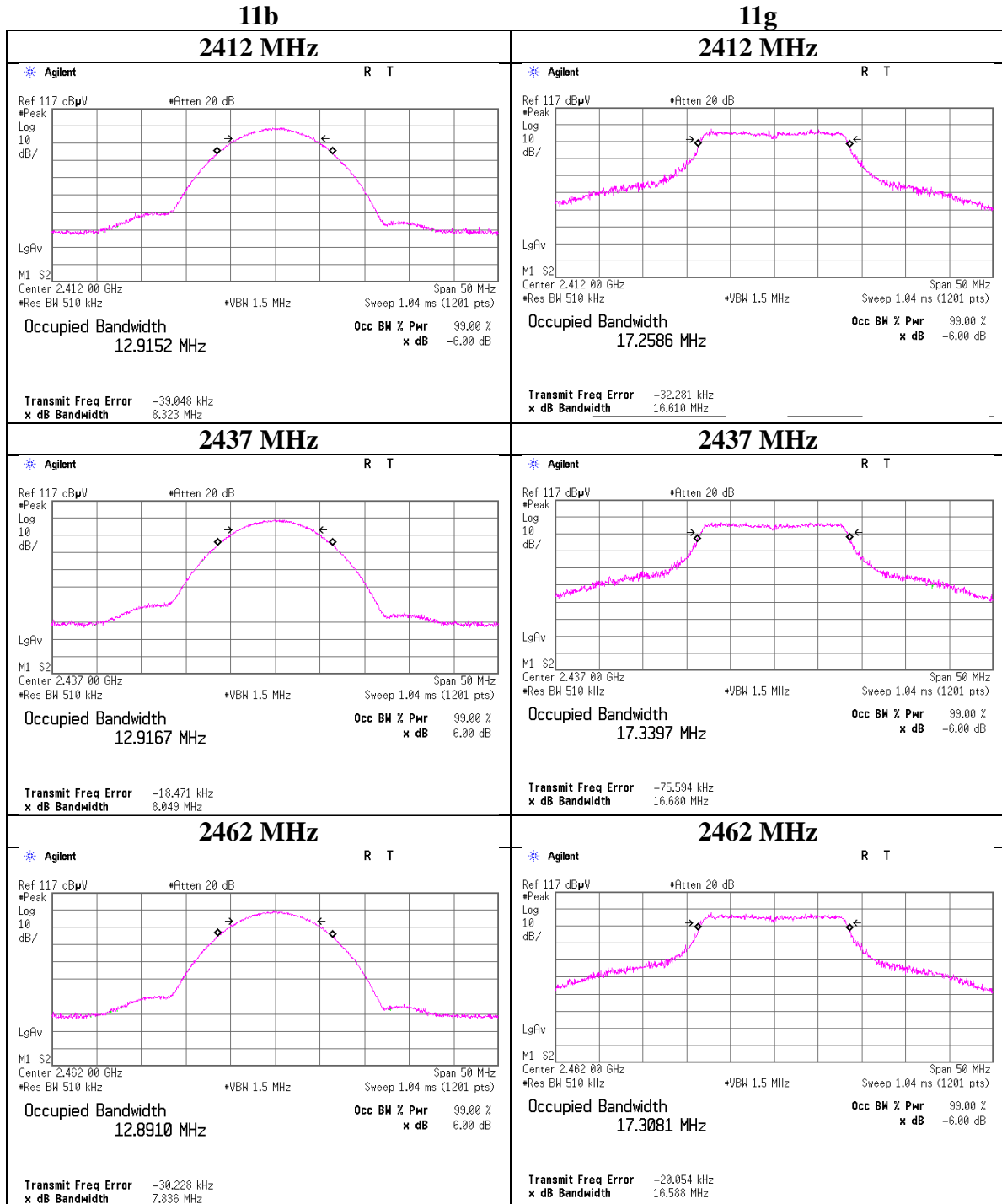
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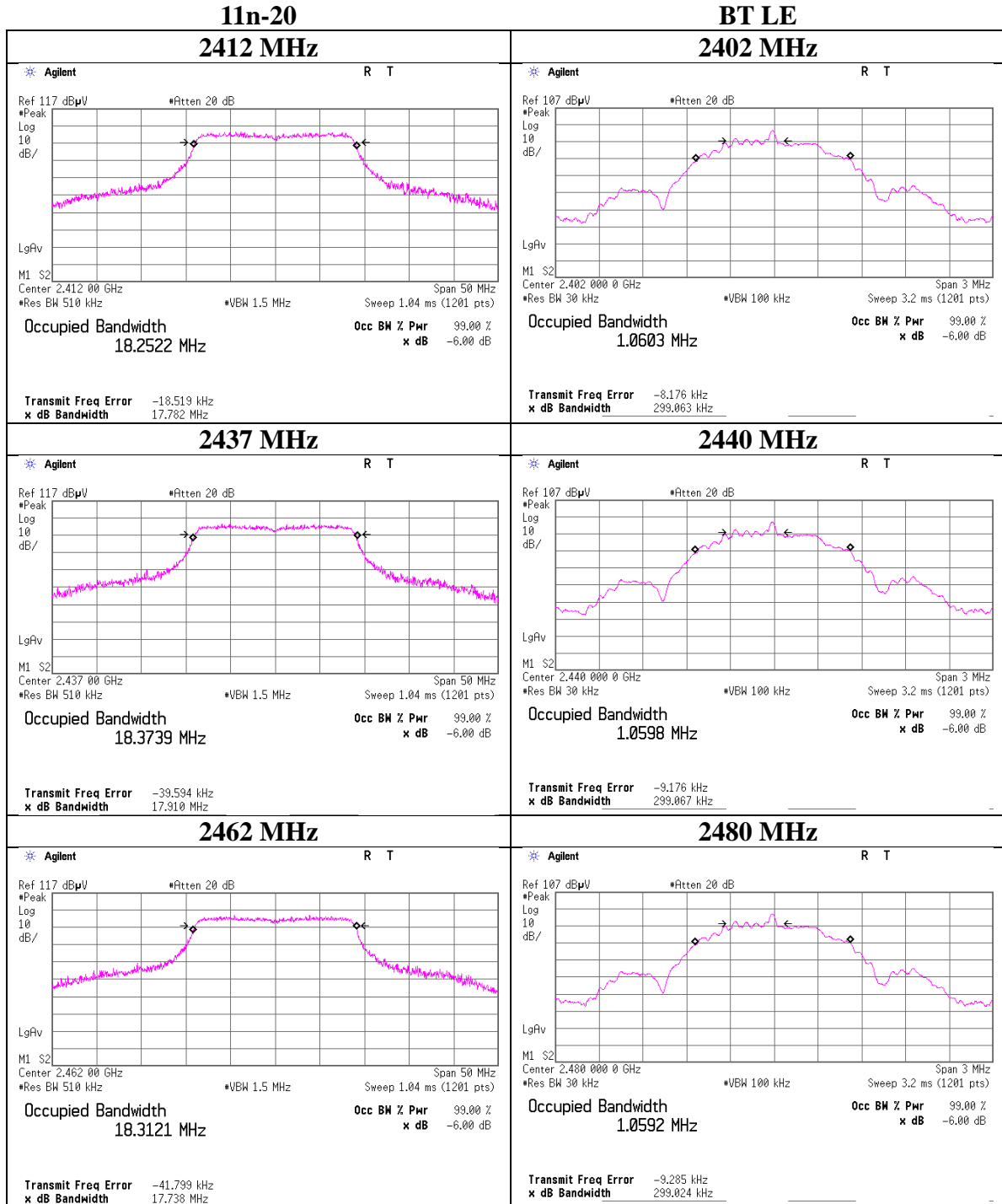
## 99% Occupied Bandwidth

Test place Report No. Date Temperature / Humidity Engineer Mode	Ise EMC Lab. No.3 Measurement Room 11245604H April 25, 2016 22 deg. C / 54 % RH Yutaka Yoshida Tx 11b / Tx 11g
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## 99% Occupied Bandwidth

Test place Report No. Date Temperature / Humidity Engineer Mode	Ise EMC Lab. No.3 Measurement Room 11245604H April 25, 2016 22 deg. C / 54 % RH Yutaka Yoshida Tx 11n-20 / Tx BT LE
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## **APPENDIX 2: Test instruments**

### **Test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2016/01/21 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03 *1)	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2016/05/19 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2015/08/10 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2015/06/22 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2015/10/01 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2015/06/06 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2016/01/18 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2016/05/16 * 12
MTR-10	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	RE	2016/01/29 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2015/11/02 * 12
MLA-23	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	RE	2016/01/30 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2015/06/19 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2016/03/18 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2015/09/19 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2016/01/21 * 12
MJM-25	Measure	KOMELON	KMC-36	-	RE	-
MHA-05 *1)	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2015/05/18 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2016/02/26 * 12
MCC-165	Microwave Cable	Junkosha	MWX221	1203S213(1m) / 1311S166(5m)	RE	2015/11/10 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE/AT	2015/08/19 * 12
MRENT-126	Spectrum Analyzer	KEYSIGHT	E4440A	MY46185516	RE/AT	2015/07/31 * 12
MPM-16	Power Meter	Agilent	8990B	MY51000271	AT	2016/04/07 * 12
MPSE-22	Power sensor	Agilent	N1923A	MY54070003	AT	2016/04/07 * 12
MCC-205	Microwave Cable	RS Components	R-132G7210200CD	-	AT	2016/02/08 * 12
MCC-174	Microwave Cable	Junkosha	MWX221	1409S497	AT	2016/03/11 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/01/18 * 12
MOS-29	Thermo-Hygrometer	Custom	CTH-201	2901	AT	2016/01/21 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2015/10/08 * 12
MAT-89	Attenuator	Weinschel Associates	WA56-10	56100305	AT	2015/06/01 * 12

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

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

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

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

Test Item: RE: Radiated Emission test  
AT: Antenna terminal disturbance voltage

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