



# RADIO TEST REPORT

Test Report No.: 33CE0267-SH-02-C

**Applicant** : Toshiba Corporation  
**Type of Equipment** : Notebook Computer  
**Model No.** : Satellite U930  
**FCC ID** : CJ6UPSU7FPC1  
**Test regulation** : FCC Part15 Subpart C: 2012  
**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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

**Date of test:** November 15 to 22, 2012

**Tested by:** *Kenichi Adachi*  
Kenichi Adachi  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :** *Toyokazu Imamura*  
Toyokazu Imamura  
Leader of WiSE Japan,  
UL Verification Service

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".



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**Shonan EMC Lab.**

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13-EM-F0429



**Contents**

	<b><u>Page</u></b>
<b>SECTION 1: Customer information.....</b>	<b>4</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>4</b>
<b>SECTION 3: Test specification, procedures &amp; results.....</b>	<b>6</b>
<b>SECTION 4: Operation of E.U.T. during testing.....</b>	<b>9</b>
<b>SECTION 5: Conducted emission .....</b>	<b>10</b>
<b>SECTION 6: Radiated emission .....</b>	<b>11</b>
<b>SECTION 7: Out of band emissions (Antenna port conducted) .....</b>	<b>13</b>
<b>SECTION 8: 6dB bandwidth &amp; Occupied bandwidth (99%).....</b>	<b>13</b>
<b>SECTION 9: Maximum peak output power .....</b>	<b>13</b>
<b>SECTION 10: Peak power density.....</b>	<b>13</b>
<b>Contents of APPENDIXES.....</b>	<b>14</b>
<b>APPENDIX 1: Data of Radio tests.....</b>	<b>15</b>
<b>APPENDIX 2: Test instruments .....</b>	<b>33</b>
<b>APPENDIX 3: Photographs of test setup .....</b>	<b>35</b>

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## **SECTION 1: Customer information**

Company Name : Toshiba Corporation  
Address : 2-9, Suehiro-cho, Ome-shi, Tokyo, 198-8710 Japan  
Telephone Number : +81 42 834 1050  
Facsimile Number : +81 42 830 7331  
Contact Person : Toshiyuki Echigo

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

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

Type of Equipment : Notebook Computer  
Model Number : Satellite U930  
Serial Number : Refer to 4.2 in this report.  
Rating : DC19V  
Country of Mass-production : China  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : November 14, 2012  
Modification of EUT : No modification by the test lab.

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## 2.2 Product description

Model: Satellite U930 (referred to as the EUT in this report) is a Notebook Computer.

Derived models of the EUT:

Model	Touch screen function
Satellite U930 (EUT)	-
Satellite U930t	Yes
Satellite U935	-
Satellite U935t	Yes

Model: Satellite U930/ Satellite U930t has a different sales channel with Satellite U935/Satellite U935t.

Clock frequency(ies) in the system : 40MHz (XTAL)

Radio specification:

Bluetooth:

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth : 79MHz  
Channel spacing : 1MHz (BDR/EDR mode), 2MHz (Low Energy mode)  
Type of modulation : FHSS, DSSS  
Antenna type : PIFA  
Antenna gain with cable loss : 3.24dBi  
Antenna connector type : U.FL  
ITU code : F1D, G1D  
Operation temperature range : 0 to +80 deg.C

Refer to the test report: 33CE0267-SH-02-B for Bluetooth part (other than Low Energy mode).

When Bluetooth is used, IEEE 802.11 b/g/n is not transmitted.

Wireless LAN:

Equipment type : Transceiver  
Frequency of operation : 2412-2462MHz (IEEE 802.11b, 11g, 11n (HT20))  
2422-2452MHz (IEEE 802.11n (HT40))  
Bandwidth : 20MHz (IEEE 802.11b/g/n), 40MHz (IEEE 802.11n)  
Channel spacing : 5MHz  
Type of modulation : DSSS, OFDM  
Antenna type : PIFA  
Antenna gain with cable loss : 3.24dBi  
Antenna connector type : U.FL  
ITU code : D1D, G1D  
Operation temperature range : 0 to +80 deg.C

Refer to the test report: 33CE0267-SH-02-A for Wireless LAN part.

FCC 15.31 (e)

The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203

The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement.

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**SECTION 3: Test specification, procedures & results****3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2012, final revised on August 13, 2012 and effective September 12, 2012  
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
 Section 15.207 Conducted limits  
 Section 15.209 Radiated emission limits, general requirements  
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,  
 and 5725-5850MHz

The EUT will be tested for compliance with FCC Part 15 Subpart B by the customer.

**3.2 Procedures & Results**

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2009	FCC 15.207	-	N/A	13.5dB Freq.: 0.15MHz Detection: Quasi-Peak Phase: L1 Mode: Tx 2480MHz	Complied
6dB bandwidth	ANSI C63.10:2009	FCC 15.247 (a)(2)	Conducted	N/A	* See data	Complied
Maximum peak output power	ANSI C63.10:2009	FCC 15.247 (b)(3)	Conducted	N/A		Complied
Out of band emission & Restricted band edges	ANSI C63.10:2009	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	4.2dB Freq.: 12010MHz Polarization: Vertical Detection: Average Mode: Tx 2402MHz Freq.: 12210MHz Polarization: Vertical Detection: Average Mode: Tx 2442MHz	Complied
Power density	ANSI C63.10:2009	FCC 15.247 (e)	Conducted	N/A	* See data	Complied

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

\*1) These tests were also referred to KDB 558074 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

**3.3 Addition to standard**

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.10:2009, RSS-Gen 4.6.1	-	Conducted	-	-

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

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

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### 3.4 Uncertainty

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

Item	Frequency range	No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
<b>Conducted emission (AC Mains) LISN</b>	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
<b>Radiated emission (Measurement distance: 3m)</b>	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
<b>Radiated emission (Measurement distance: 1m)</b>	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.6 dB	4.3 dB	4.4 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

#### Conducted emission test

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

#### Radiated emission test

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

#### Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.7dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB

Bandwidth measurement uncertainty for this test was: (±) 5.4%

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### 3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input checked="" type="checkbox"/> No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input checked="" type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input checked="" type="checkbox"/> No.7 shielded room	-	-	2.76 x 3.76 x 2.4	2.76 x 3.76	-

### 3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

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

### 4.1 Operating mode

Test item	Mode	Tested frequency
All items	Transmitting Hopping OFF (Low Energy), Payload: PRBS9	2402MHz, 2442MHz, 2480MHz

\*EUT has the power settings by the software as follows;

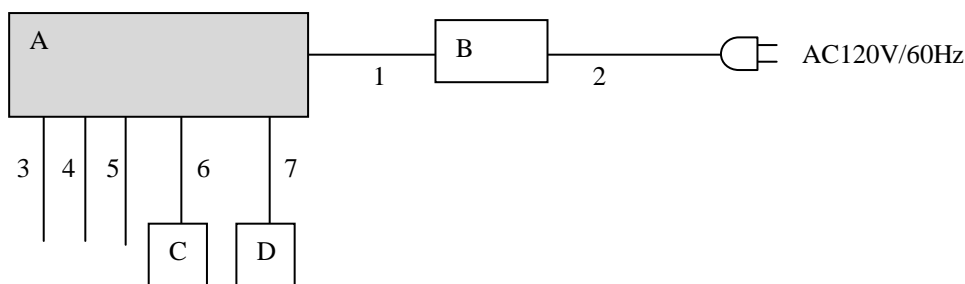
Power settings: Fixed

Test software: DRTU version 1.5.7.0432 (Intel)

Antenna port used: AUX (Bluetooth is transmitted from this port only.)

**Justification:** The system was configured in typical fashion (as customer would normally use it) for testing.

### 4.2 Configuration and peripherals



\* Test data was taken under worse case conditions.

#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Notebook Computer	Satellite U930	*1)	Toshiba	EUT *2)
B	AC Adaptor	PA5096U-1ACA	G71C000FF1100	Toshiba	-
C	Mouse	MO28UOL	453859	Lenovo	-
D	Headphones	HP-H500N	-	AudioComm	-

\*1) XC125734H: Maximum peak output power test, XC125724H: Other test

\*2) Intel® Centrino® Wireless-N 2230 (Model: 2230BNHMW, FCC ID: PD92230BNH) is installed in the EUT.

#### List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.7	Unshielded	Unshielded	-
2	AC	1.7	Unshielded	Unshielded	-
3	HDMI	3.0	Shielded	Shielded	-
4	USB	2.0	Shielded	Shielded	-
5	USB	1.8	Shielded	Shielded	-
6	Audio	1.2	Unshielded	Unshielded	-
7	Mouse	1.8	Unshielded	Unshielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

Photographs of the set up are shown in APPENDIX 3.

### **5.3 Test conditions**

Frequency range : 0.15 - 30MHz  
EUT position : Table top

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ Average  
IF Bandwidth : 9kHz

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1

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## **SECTION 6: Radiated emission**

### **6.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **6.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. The rear of EUT was aligned and flushed with rear of tabletop. Photographs of the set up are shown in APPENDIX 3.

### **6.3 Test conditions**

Frequency range : 30MHz to 25GHz  
EUT position : Table top

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detection.

Frequency	30-1000MHz	1-25GHz		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 3MHz Detector: RMS	RBW: 100kHz VBW: 300kHz

\*1) Average Power Measurement was measured based on 10.2.3.3 and 8.2.1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

The carrier level and noise levels were confirmed at each tilt angle of LCD of EUT to see the angle of maximum noise, and the test was made at the tilt angle of 90 deg. that has the maximum noise.

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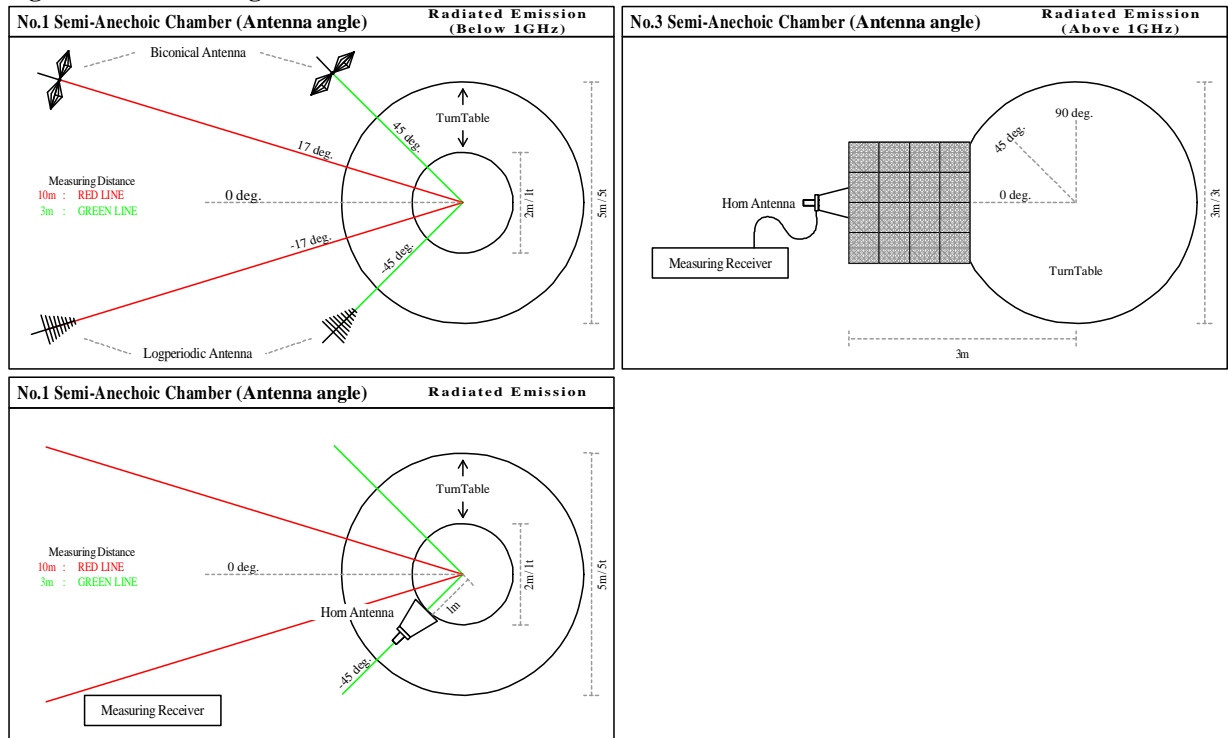
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**Figure 1. Antenna angle**



## 6.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

## 6.6 Results

Summary of the test results : Pass  
\* No noise was detected above the 5<sup>th</sup> order harmonics.

Refer to APPENDIX 1

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## **SECTION 7: Out of band emissions (Antenna port conducted)**

### **Test procedure**

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port. In any 100kHz bandwidth outside the frequency 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. 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. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass  
Refer to APPENDIX

## **SECTION 8: 6dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port. The test was measured based on Method 7.1 Option 1 and 7.2 Option 2 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX

## **SECTION 9: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port. The test was measured based on Method 8.1.3 Option 3 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX

## **SECTION 10: Peak power density**

### **Test procedure**

The peak power density was measured with a spectrum analyzer connected to the antenna port.

Instrument used : Spectrum Analyzer  
RBW / VBW : 3kHz / 9.1kHz

The test was measured based on Method 9.1 Option 1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX

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## **Contents of APPENDIXES**

### **APPENDIX 1: Data of Radio tests**

Conducted emission  
6dB bandwidth  
Maximum peak output power  
Radiated emission  
Spurious emission (Antenna port conducted)  
Peak power density  
Occupied bandwidth

### **APPENDIX 2: Test instruments**

Test instruments

### **APPENDIX 3: Photographs of test setup**

Conducted emission  
Radiated emission

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APPENDIX 1: Data of Radio tests

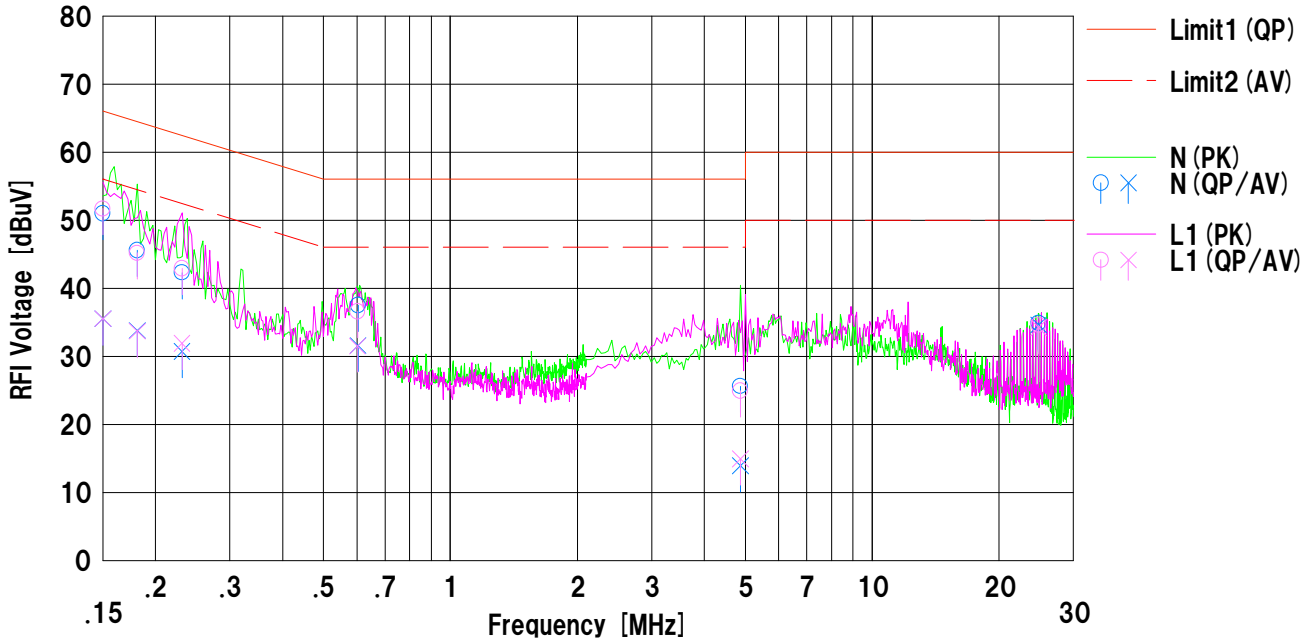
# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room  
Date : 2012/11/21

Mode : Bluetooth, LE, Tx 2402MHz  
Report No. : 33CE0267-SH-02-C  
Power : AC 120V / 60Hz  
Temp./Humi. : 25deg.C / 43%RH

Limit1 : FCC 15C (15.207) QP  
Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	38.3	22.8	12.7	51.0	35.5	66.0	56.0	15.0	20.5	N	
2	0.18100	32.9	21.1	12.7	45.6	33.8	64.4	54.4	18.8	20.6	N	
3	0.23100	29.6	18.0	12.7	42.3	30.7	62.4	52.4	20.1	21.7	N	
4	0.60400	24.8	18.9	12.7	37.5	31.6	56.0	46.0	18.5	14.4	N	
5	4.87200	12.6	0.9	13.0	25.6	13.9	56.0	46.0	30.4	32.1	N	
6	24.79567	21.2	20.9	13.7	34.9	34.6	60.0	50.0	25.1	15.4	N	
7	0.15000	39.0	22.8	12.7	51.7	35.5	66.0	56.0	14.3	20.5	L1	
8	0.18100	32.5	21.0	12.7	45.2	33.7	64.4	54.4	19.2	20.7	L1	
9	0.23100	30.2	19.2	12.7	42.9	31.9	62.4	52.4	19.5	20.5	L1	
10	0.60250	23.9	18.8	12.7	36.6	31.5	56.0	46.0	19.4	14.5	L1	
11	4.87200	11.9	1.9	13.0	24.9	14.9	56.0	46.0	31.1	31.1	L1	
12	24.77461	20.9	20.5	13.7	34.6	34.2	60.0	50.0	25.4	15.8	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-01

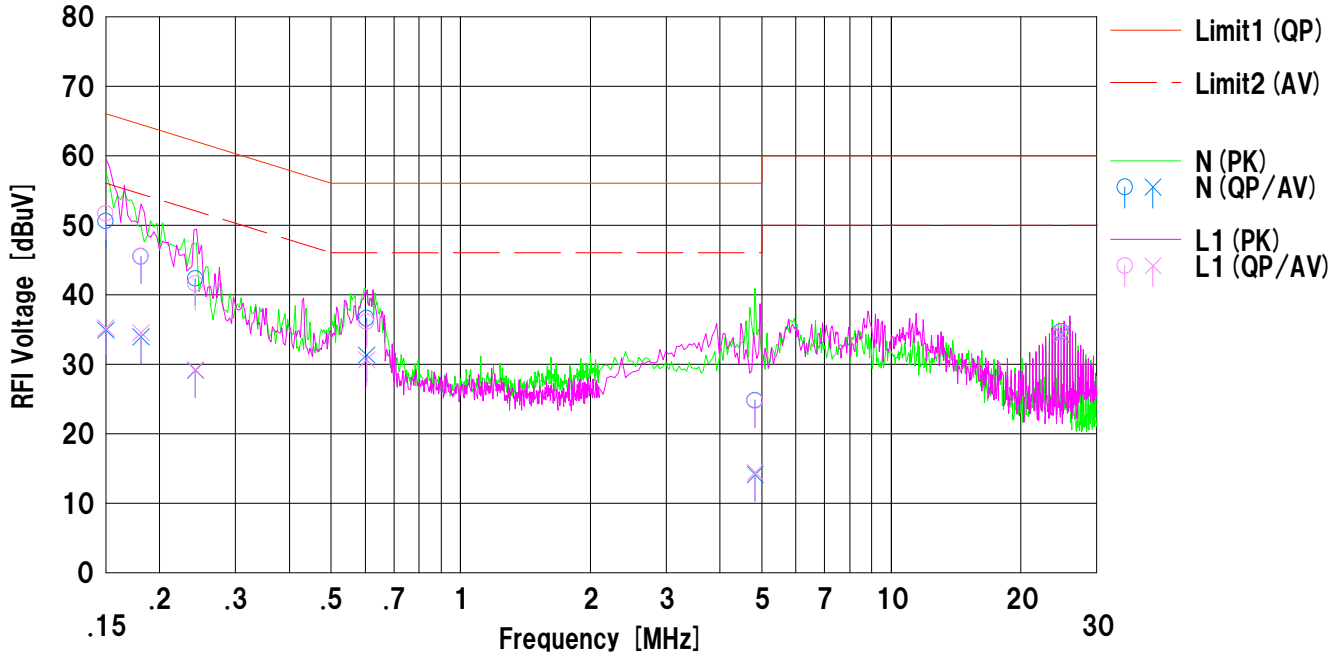
# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room  
Date : 2012/11/21

Mode : Bluetooth, LE, Tx 2442MHz  
Report No. : 33CE0267-SH-02-C  
Power : AC 120V / 60Hz  
Temp./Humi. : 25deg.C / 43%RH

Limit1 : FCC 15C (15.207) QP  
Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	37.9	22.2	12.7	50.6	34.9	66.0	56.0	15.4	21.1	N	
2	0.18100	32.8	21.2	12.7	45.5	33.9	64.4	54.4	18.9	20.5	N	
3	0.24200	29.6	16.4	12.7	42.3	29.1	62.0	52.0	19.7	22.9	N	
4	0.60500	23.9	18.6	12.7	36.6	31.3	56.0	46.0	19.4	14.7	N	
5	4.82700	11.8	1.1	13.0	24.8	14.1	56.0	46.0	31.2	31.9	N	
6	24.79304	21.0	20.6	13.7	34.7	34.3	60.0	50.0	25.3	15.7	N	
7	0.15000	39.0	22.5	12.7	51.7	35.2	66.0	56.0	14.3	20.8	L1	
8	0.18100	32.8	21.8	12.7	45.5	34.5	64.4	54.4	18.9	19.9	L1	
9	0.24200	28.9	16.5	12.7	41.6	29.2	62.0	52.0	20.4	22.8	L1	
10	0.60500	23.4	17.9	12.7	36.1	30.6	56.0	46.0	19.9	15.4	L1	
11	4.82700	11.7	1.4	13.0	24.7	14.4	56.0	46.0	31.3	31.6	L1	
12	24.77449	20.9	20.5	13.7	34.6	34.2	60.0	50.0	25.4	15.8	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-01



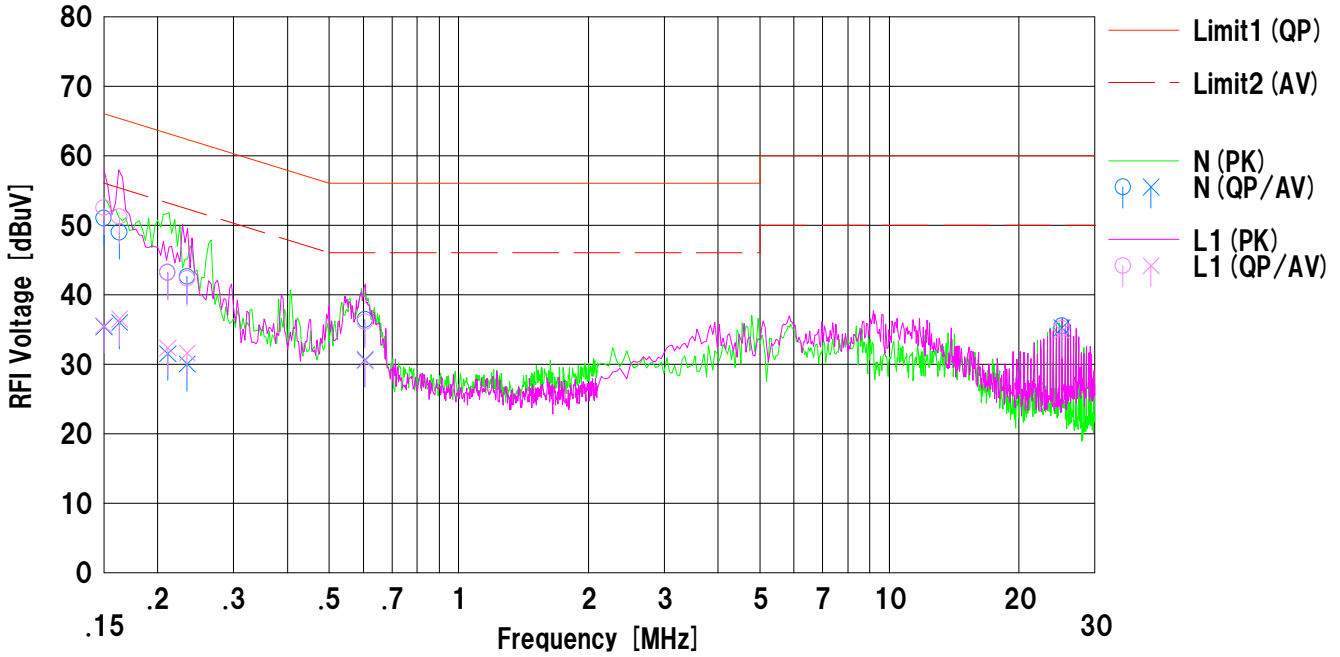
# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room  
Date : 2012/11/21

Mode : Bluetooth, LE, Tx 2480MHz  
 Report No. : 33CE0267-SH-02-C  
 Power : AC 120V / 60Hz  
 Temp./Humi. : 25deg.C / 43%RH

Limit1 : FCC 15C (15.207) QP  
 Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



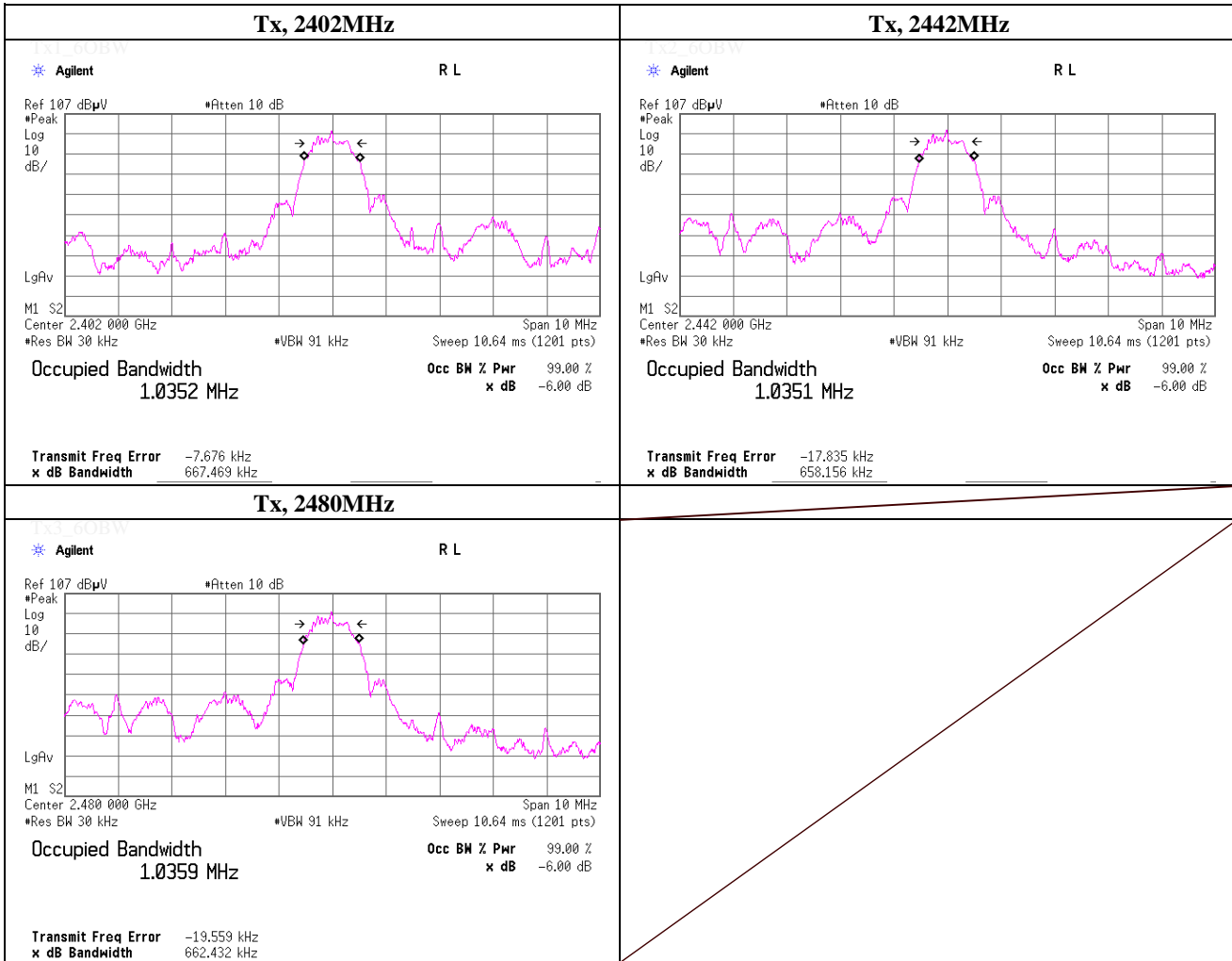
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	38.3	22.7	12.7	51.0	35.4	66.0	56.0	15.0	20.6	N	
2	0.16300	36.3	23.3	12.7	49.0	36.0	65.3	55.3	16.3	19.3	N	
3	0.21100	30.5	18.8	12.7	43.2	31.5	63.1	53.1	19.9	21.6	N	
4	0.23400	29.9	17.3	12.7	42.6	30.0	62.3	52.3	19.7	22.3	N	
5	0.60600	23.7	17.9	12.7	36.4	30.6	56.0	46.0	19.6	15.4	N	
6	25.16159	21.7	21.4	13.8	35.5	35.2	60.0	50.0	24.5	14.8	N	
7	0.15000	39.8	22.8	12.7	52.5	35.5	66.0	56.0	13.5	20.5	L1	
8	0.16300	38.5	23.8	12.7	51.2	36.5	65.3	55.3	14.1	18.8	L1	
9	0.21100	30.5	19.6	12.7	43.2	32.3	63.1	53.1	19.9	20.8	L1	
10	0.23400	29.6	18.9	12.7	42.3	31.6	62.3	52.3	20.0	20.7	L1	
11	0.60600	23.4	17.8	12.7	36.1	30.5	56.0	46.0	19.9	15.5	L1	
12	25.16183	21.3	20.9	13.8	35.1	34.7	60.0	50.0	24.9	15.3	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
 LISN: SLS-01

### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 19, 2012	
Temperature / Humidity	23deg.C , 38%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth Low Energy, PN9	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2402.0000	0.667	> 0.500
2442.0000	0.658	> 0.500
2480.0000	0.662	> 0.500



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**Maximum Peak Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.      No.7 Shielded Room  
Date                           November 15, 2012  
Temperature / Humidity    24deg.C      , 45%RH  
Engineer                    Tomochika Sato  
Mode                         Tx, Bluetooth Low Energy, PN9,

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	-4.97	0.74	10.00	5.77	3.78	30.00	1000	24.23
Mid	2442.0	-4.48	0.75	10.00	6.27	4.24	30.00	1000	23.73
High	2480.0	-5.48	0.75	10.00	5.27	3.37	30.00	1000	24.73

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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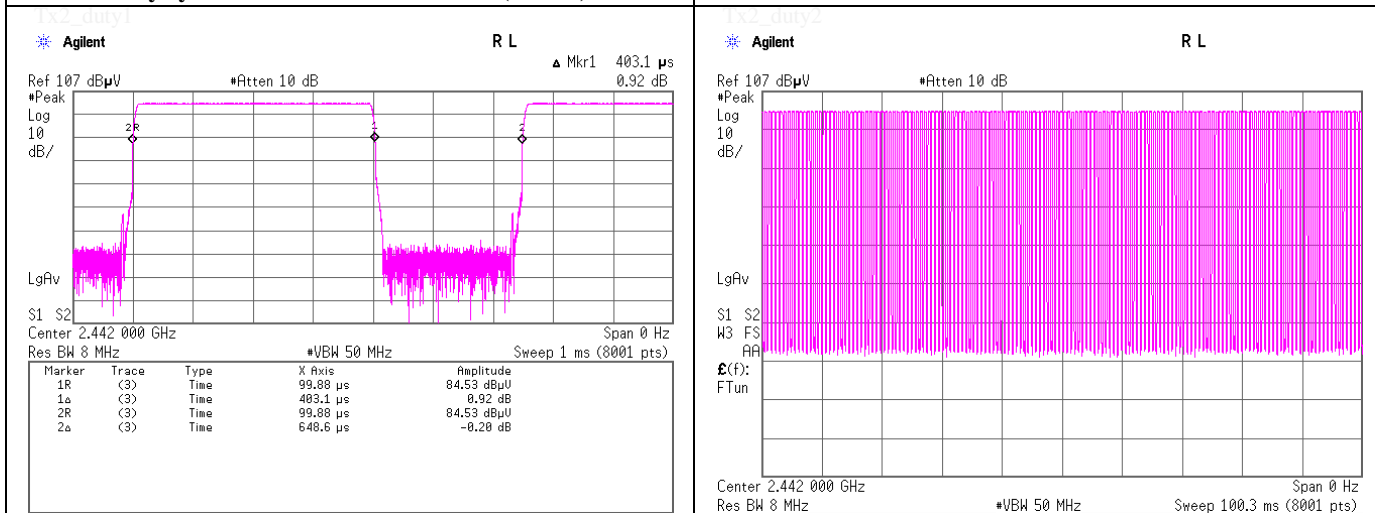
## Duty Factor Calculation chart

**Tx, Bluetooth Low Energy, PN9**

### Duty Factor Calculation

**Duty Factor:  $20\log(1/\text{duty cycle}) = 4.1\text{dB}$**

**duty cycle =  $0.4031 / 0.6486 = 0.621 (62.1\%)$**



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## Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	November 18, 2012	November 22, 2012
Temperature / Humidity	25 deg.C, 40%RH	26 deg.C, 43%RH
Engineer	Kenichi Adachi	Kenichi Adachi
Mode	Tx, 2402.0 MHz	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	212.276	QP	33.0	16.8	9.3	31.7	27.4	43.5	16.1	155	354	
Hori.	239.222	QP	33.2	17.1	9.6	31.7	28.2	46.0	17.8	166	220	
Hori.	352.061	QP	40.2	15.1	7.4	31.7	31.0	46.0	15.0	110	15	
Hori.	377.300	QP	39.8	15.5	7.6	31.8	31.1	46.0	14.9	100	341	
Hori.	2322.140	PK	47.9	27.3	14.1	41.4	47.9	73.9	26.0	100	279	
Hori.	2362.000	PK	46.6	27.4	14.1	41.4	46.7	73.9	27.2	100	254	
Hori.	2390.000	PK	45.0	27.4	14.2	41.4	45.2	73.9	28.7	100	274	
Hori.	2563.000	PK	47.3	27.7	14.3	41.4	47.9	73.9	26.0	100	14	
Hori.	4804.000	PK	47.5	31.1	6.8	41.2	44.2	73.9	29.7	100	0	
Hori.	7206.000	PK	47.2	36.6	8.3	41.4	50.7	73.9	23.2	100	0	
Hori.	9608.000	PK	44.6	38.5	9.4	38.9	53.6	73.9	20.3	100	0	
Hori.	12010.000	PK	45.7	39.4	10.7	39.4	56.4	73.9	17.5	100	0	
Vert.	149.327	QP	32.4	15.0	8.7	31.8	24.3	43.5	19.2	100	214	
Vert.	175.130	QP	34.9	15.9	8.9	31.8	27.9	43.5	15.6	100	210	
Vert.	2322.140	PK	48.4	27.3	14.1	41.4	48.4	73.9	25.5	180	12	
Vert.	2362.000	PK	47.2	27.4	14.1	41.4	47.3	73.9	26.6	195	32	
Vert.	2390.000	PK	45.1	27.4	14.2	41.4	45.3	73.9	28.6	208	4	
Vert.	2563.000	PK	47.9	27.7	14.3	41.4	48.5	73.9	25.4	199	29	
Vert.	4804.000	PK	45.7	31.1	6.8	41.2	42.4	73.9	31.5	100	0	
Vert.	7206.000	PK	46.9	36.6	8.3	41.4	50.4	73.9	23.5	100	0	
Vert.	9608.000	PK	44.3	38.5	9.4	38.9	53.3	73.9	20.6	100	0	
Vert.	12010.000	PK	45.6	39.4	10.7	39.4	56.3	73.9	17.6	100	0	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2322.140	AV	36.1	27.3	14.1	41.4	4.1	40.2	53.9	13.7	
Hori.	2362.000	AV	35.8	27.4	14.1	41.4	4.1	40.0	53.9	13.9	
Hori.	2390.000	AV	35.0	27.4	14.2	41.4	4.1	39.3	53.9	14.6	
Hori.	2563.000	AV	38.6	27.7	14.3	41.4	4.1	43.3	53.9	10.6	
Hori.	4804.000	AV	35.5	31.1	6.8	41.2	4.1	36.3	53.9	17.6	
Hori.	7206.000	AV	36.3	36.6	8.3	41.4	4.1	43.9	53.9	10.0	
Hori.	9608.000	AV	33.8	38.5	9.4	38.9	4.1	46.9	53.9	7.0	
Hori.	12010.000	AV	34.8	39.4	10.7	39.4	4.1	49.6	53.9	4.3	
Vert.	2322.140	AV	37.8	27.3	14.1	41.4	4.1	41.9	53.9	12.0	
Vert.	2362.000	AV	37.4	27.4	14.1	41.4	4.1	41.6	53.9	12.3	
Vert.	2390.000	AV	34.7	27.4	14.2	41.4	4.1	39.0	53.9	14.9	
Vert.	2563.000	AV	40.5	27.7	14.3	41.4	4.1	45.2	53.9	8.7	
Vert.	4804.000	AV	35.4	31.1	6.8	41.2	4.1	36.2	53.9	17.7	
Vert.	7206.000	AV	36.2	36.6	8.3	41.4	4.1	43.8	53.9	10.1	
Vert.	9608.000	AV	33.7	38.5	9.4	38.9	4.1	46.8	53.9	7.1	
Vert.	12010.000	AV	34.9	39.4	10.7	39.4	4.1	49.7	53.9	4.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Duty factor (refer to "Duty Factor Calculation")

\*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used

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

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

**20dBc Data Sheet (RBW 100kHz, VBW 300kHz)**

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	93.8	27.4	14.2	41.4	94.0	-	-	
Hori.	2400.000	PK	46.7	27.4	14.2	41.4	46.9	74.0	27.1	
Vert.	2402.000	PK	97.6	27.4	14.2	41.4	97.8	-	-	
Vert.	2400.000	PK	49.9	27.4	14.2	41.4	50.1	77.8	27.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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## Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	November 18, 2012	November 22, 2012
Temperature / Humidity	25 deg.C, 40%RH	26 deg.C, 43%RH
Engineer	Kenichi Adachi	Kenichi Adachi
Mode	Tx, 2442.0 MHz	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	212.100	QP	33.2	16.8	9.3	31.7	27.6	43.5	15.9	143	340	
Hori.	240.980	QP	34.2	17.1	9.7	31.7	29.3	46.0	16.7	146	210	
Hori.	353.013	QP	39.0	15.1	7.4	31.7	29.8	46.0	16.2	100	46	
Hori.	377.134	QP	37.8	15.5	7.6	31.8	29.1	46.0	16.9	100	225	
Hori.	2361.760	PK	47.2	27.4	14.1	41.4	47.3	73.9	26.6	100	198	
Hori.	2522.000	PK	49.9	27.6	14.3	41.4	50.4	73.9	23.5	100	4	
Hori.	4884.000	PK	46.3	31.3	6.9	41.1	43.4	73.9	30.5	100	0	
Hori.	7326.000	PK	47.8	36.6	8.6	41.4	51.6	73.9	22.3	100	0	
Hori.	9768.000	PK	44.3	38.8	9.5	38.9	53.7	73.9	20.2	100	0	
Hori.	12210.000	PK	44.2	39.5	10.8	39.3	55.2	73.9	18.7	100	0	
Vert.	149.200	QP	33.9	15.0	8.7	31.8	25.8	43.5	17.7	100	212	
Vert.	175.648	QP	33.7	15.9	8.9	31.8	26.7	43.5	16.8	100	250	
Vert.	2361.760	PK	48.6	27.4	14.1	41.4	48.7	73.9	25.2	204	14	
Vert.	2522.000	PK	50.4	27.6	14.3	41.4	50.9	73.9	23.0	195	10	
Vert.	4884.000	PK	45.7	31.3	6.9	41.1	42.8	73.9	31.1	100	0	
Vert.	7326.000	PK	48.7	36.6	8.6	41.4	52.5	73.9	21.4	100	0	
Vert.	9768.000	PK	44.2	38.8	9.5	38.9	53.6	73.9	20.3	100	0	
Vert.	12210.000	PK	43.7	39.5	10.8	39.3	54.7	73.9	19.2	100	0	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2361.760	AV	37.0	27.4	14.1	41.4	4.1	41.2	53.9	12.7	
Hori.	2522.000	AV	41.3	27.6	14.3	41.4	4.1	45.9	53.9	8.0	
Hori.	4884.000	AV	34.0	31.3	6.9	41.1	4.1	35.2	53.9	18.7	
Hori.	7326.000	AV	36.0	36.6	8.6	41.4	4.1	43.9	53.9	10.0	
Hori.	9768.000	AV	32.9	38.8	9.5	38.9	4.1	46.4	53.9	7.5	
Hori.	12210.000	AV	34.4	39.5	10.8	39.3	4.1	49.5	53.9	4.4	
Vert.	2361.760	AV	39.8	27.4	14.1	41.4	4.1	44.0	53.9	9.9	
Vert.	2522.000	AV	41.5	27.6	14.3	41.4	4.1	46.1	53.9	7.8	
Vert.	4884.000	AV	35.3	31.3	6.9	41.1	4.1	36.5	53.9	17.4	
Vert.	7326.000	AV	35.1	36.6	8.6	41.4	4.1	43.0	53.9	10.9	
Vert.	9768.000	AV	33.3	38.8	9.5	38.9	4.1	46.8	53.9	7.1	
Vert.	12210.000	AV	34.6	39.5	10.8	39.3	4.1	49.7	53.9	4.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Duty factor (refer to "Duty Factor Calculation")

\*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	November 18, 2012	November 22, 2012
Temperature / Humidity	25 deg.C, 40%RH	26 deg.C, 43%RH
Engineer	Kenichi Adachi	Kenichi Adachi
Mode	Tx, 2480.0 MHz	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	212.897	QP	32.8	16.8	9.3	31.7	27.2	43.5	16.3	148	321	
Hori.	239.876	QP	33.9	17.1	9.7	31.7	29.0	46.0	17.0	143	276	
Hori.	351.768	QP	41.2	15.1	7.4	31.7	32.0	46.0	14.0	100	54	
Hori.	376.456	QP	40.3	15.5	7.6	31.8	31.6	46.0	14.4	100	276	
Hori.	2323.000	PK	49.1	27.3	14.1	41.4	49.1	73.9	24.8	203	301	
Hori.	2483.500	PK	47.9	27.5	14.3	41.4	48.3	73.9	25.6	208	289	
Hori.	2483.920	PK	46.8	27.5	14.3	41.4	47.2	73.9	26.7	208	289	
Hori.	2520.000	PK	49.6	27.6	14.3	41.4	50.1	73.9	23.8	200	275	
Hori.	2563.000	PK	49.4	27.7	14.3	41.4	50.0	73.9	23.9	206	285	
Hori.	4960.000	PK	45.2	31.6	6.9	41.0	42.7	73.9	31.2	100	0	
Hori.	7440.000	PK	47.1	36.7	8.8	41.5	51.1	73.9	22.8	100	0	
Hori.	9920.000	PK	43.8	39.0	9.7	38.9	53.6	73.9	20.3	100	0	
Hori.	12400.000	PK	44.6	39.5	10.8	39.3	55.6	73.9	18.3	100	0	
Vert.	150.765	QP	33.3	15.0	8.7	31.8	25.2	43.5	18.3	100	244	
Vert.	175.760	QP	35.6	15.9	8.9	31.8	28.6	43.5	14.9	100	34	
Vert.	2323.000	PK	43.6	27.3	14.1	41.4	43.6	73.9	30.3	100	0	
Vert.	2483.500	PK	44.2	27.5	14.3	41.4	44.6	73.9	29.3	100	212	
Vert.	2483.920	PK	45.3	27.5	14.3	41.4	45.7	73.9	28.2	100	212	
Vert.	2520.000	PK	48.6	27.6	14.3	41.4	49.1	73.9	24.8	100	216	
Vert.	2563.000	PK	49.4	27.7	14.3	41.4	50.0	73.9	23.9	100	246	
Vert.	4960.000	PK	45.9	31.6	6.9	41.0	43.4	73.9	30.5	100	0	
Vert.	7440.000	PK	46.2	36.7	8.8	41.5	50.2	73.9	23.7	100	0	
Vert.	9920.000	PK	45.2	39.0	9.7	38.9	55.0	73.9	18.9	100	0	
Vert.	12400.000	PK	43.2	39.5	10.8	39.3	54.2	73.9	19.7	100	0	

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2323.000	AV	40.2	27.3	14.1	41.4	4.1	44.3	53.9	9.6	
Hori.	2483.500	AV	37.6	27.5	14.3	41.4	4.1	42.1	53.9	11.8	
Hori.	2483.920	AV	37.6	27.5	14.3	41.4	4.1	42.1	53.9	11.8	
Hori.	2520.000	AV	41.4	27.6	14.3	41.4	4.1	46.0	53.9	7.9	
Hori.	2563.000	AV	41.9	27.7	14.3	41.4	4.1	46.6	53.9	7.3	
Hori.	4960.000	AV	35.7	31.6	6.9	41.0	4.1	37.3	53.9	16.6	
Hori.	7440.000	AV	36.8	36.7	8.8	41.5	4.1	44.9	53.9	9.0	
Hori.	9920.000	AV	33.5	39.0	9.7	38.9	4.1	47.4	53.9	6.5	
Hori.	12400.000	AV	34.2	39.5	10.8	39.3	4.1	49.3	53.9	4.6	
Vert.	2323.000	AV	35.0	27.3	14.1	41.4	4.1	39.1	53.9	14.8	
Vert.	2483.500	AV	37.9	27.5	14.3	41.4	4.1	42.4	53.9	11.5	
Vert.	2483.920	AV	36.7	27.5	14.3	41.4	4.1	41.2	53.9	12.7	
Vert.	2520.000	AV	39.9	27.6	14.3	41.4	4.1	44.5	53.9	9.4	
Vert.	2563.000	AV	41.8	27.7	14.3	41.4	4.1	46.5	53.9	7.4	
Vert.	4960.000	AV	35.8	31.6	6.9	41.0	4.1	37.4	53.9	16.5	
Vert.	7440.000	AV	37.4	36.7	8.8	41.5	4.1	45.5	53.9	8.4	
Vert.	9920.000	AV	33.7	39.0	9.7	38.9	4.1	47.6	53.9	6.3	
Vert.	12400.000	AV	33.6	39.5	10.8	39.3	4.1	48.7	53.9	5.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Duty factor (refer to "Duty Factor Calculation")

\*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be us

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

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2402MHz (below 1GHz)**



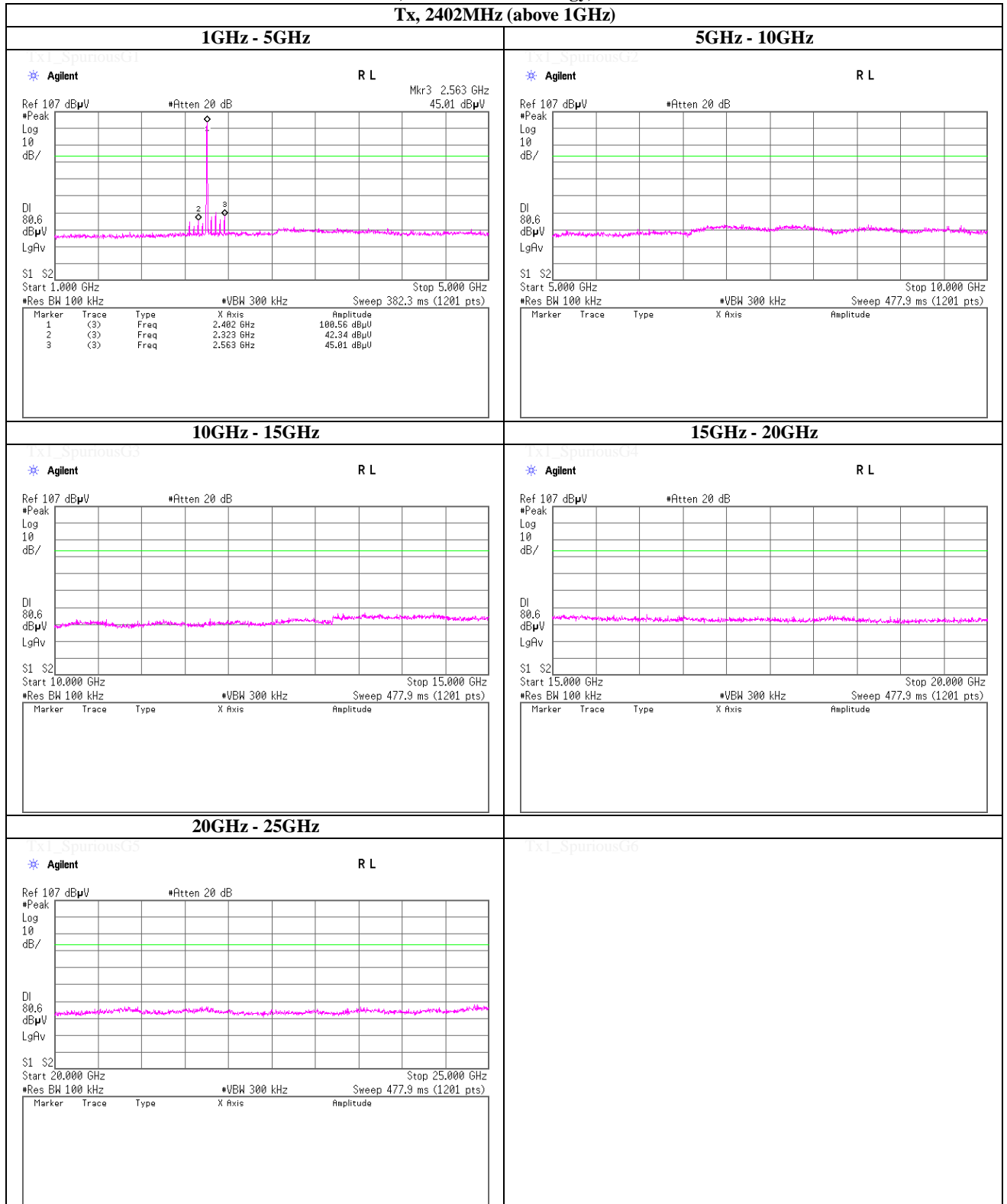
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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2402MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2442MHz (below 1GHz)**

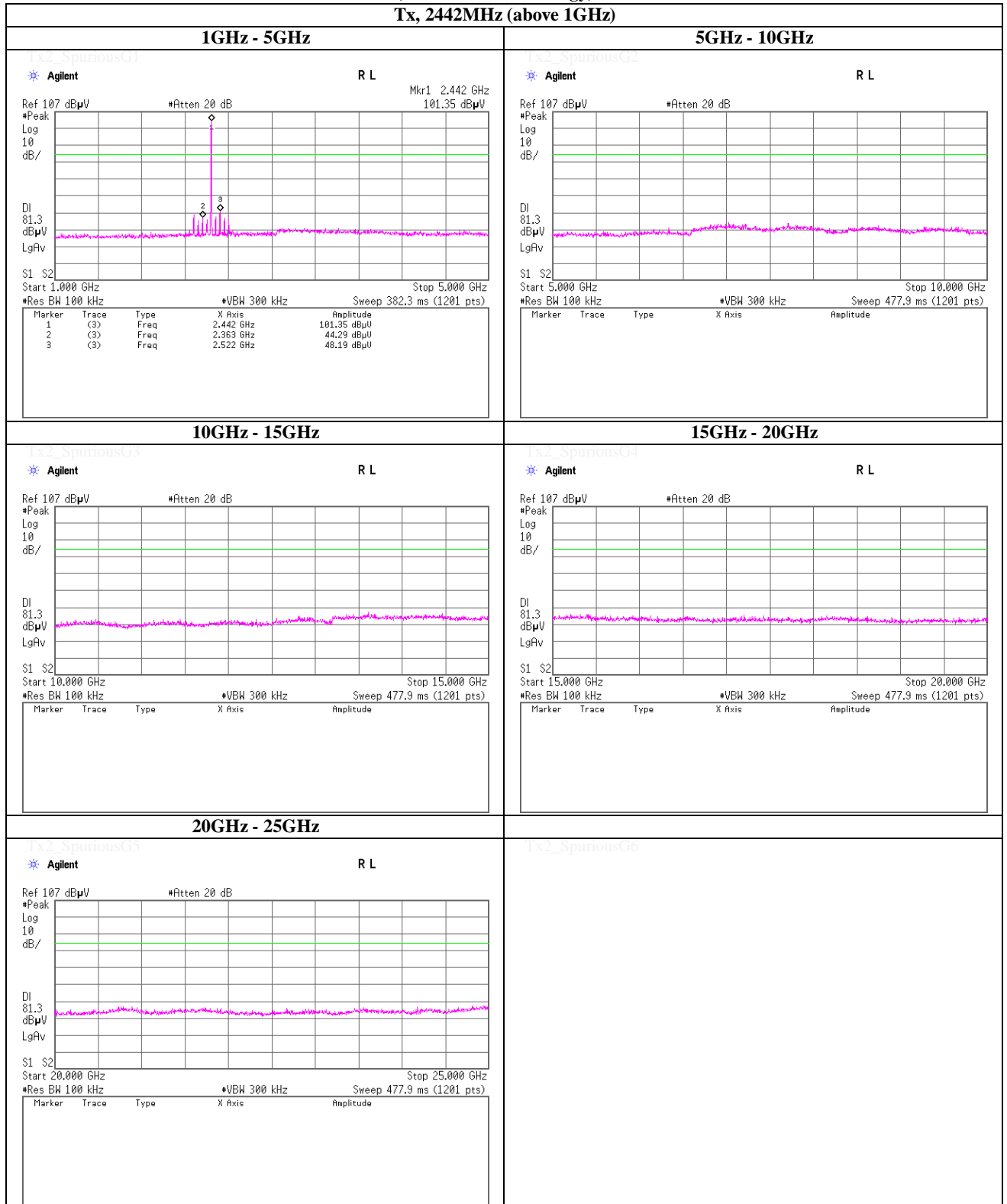


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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2442MHz (above 1GHz)**

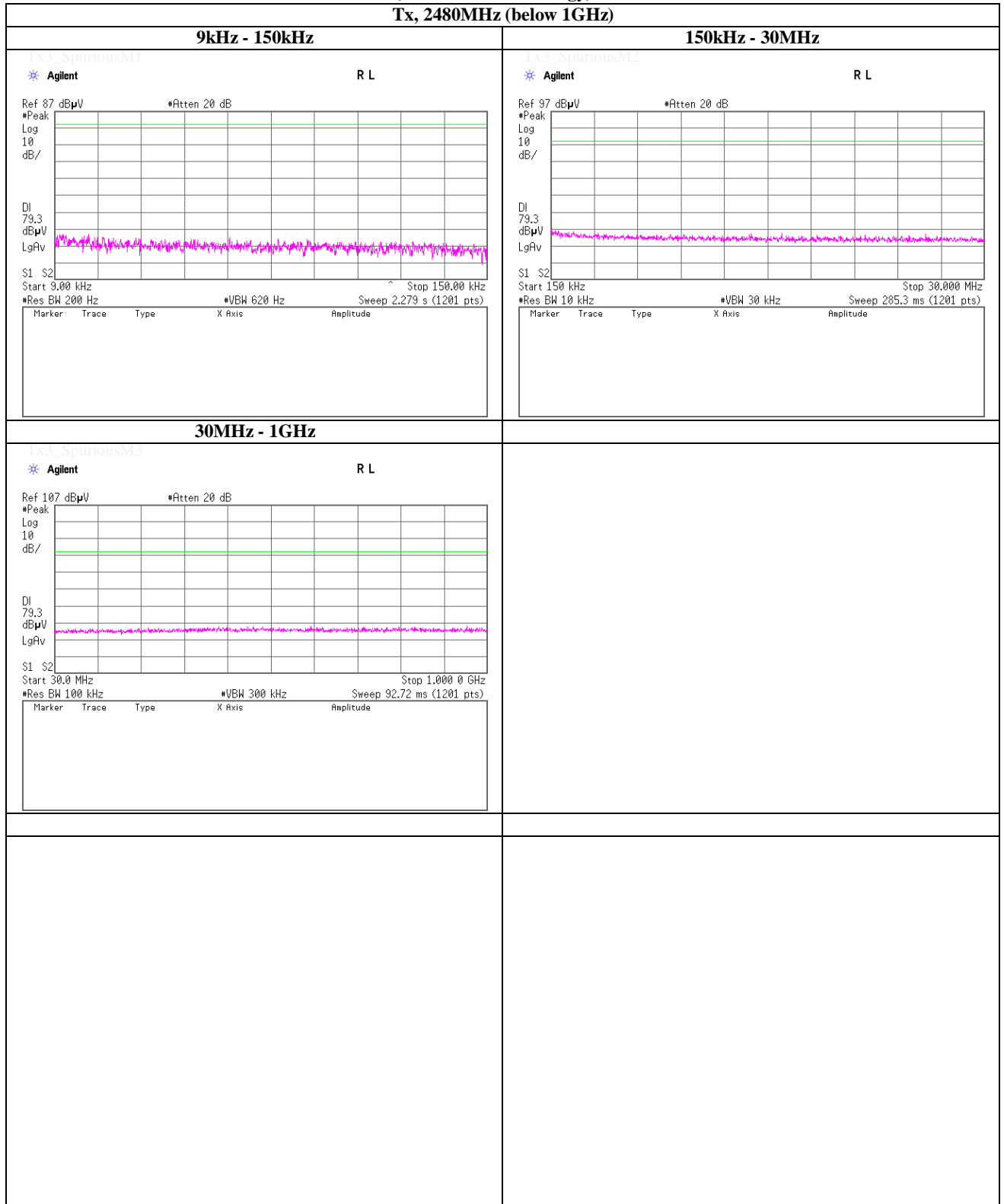


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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2480MHz (below 1GHz)**

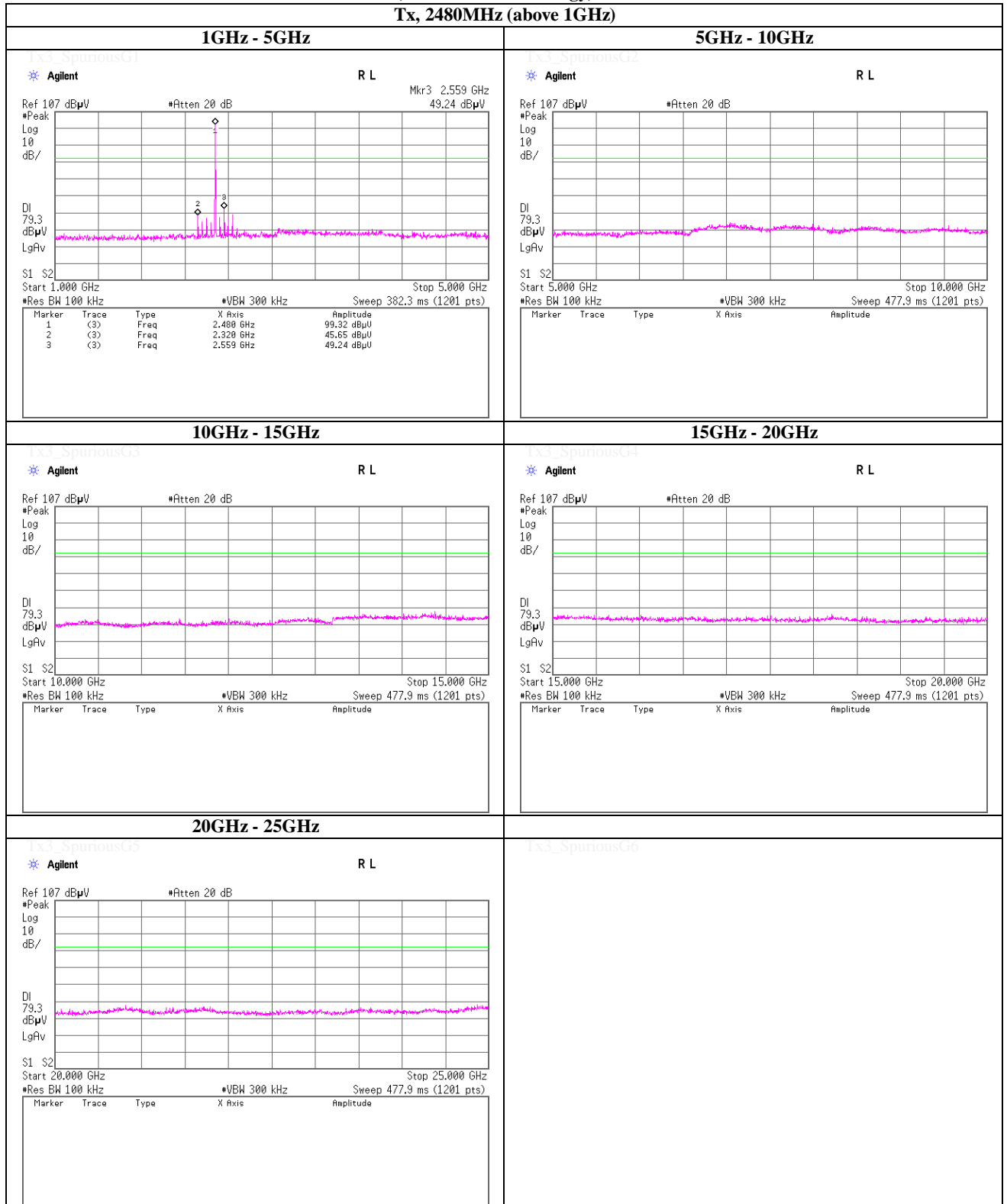


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**(Reference chart) Spurious emission (Conducted)**

**Tx, Bluetooth Low Energy, PN9**

**Tx, 2480MHz (above 1GHz)**



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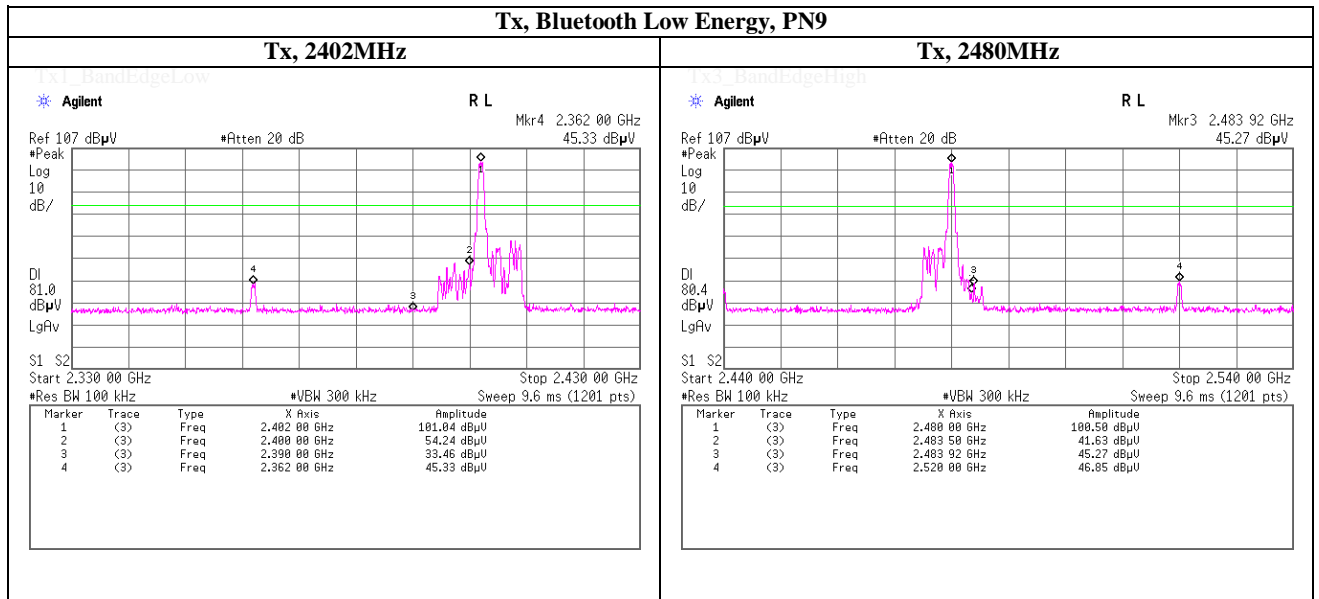
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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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## Maximum Power Spectral Density

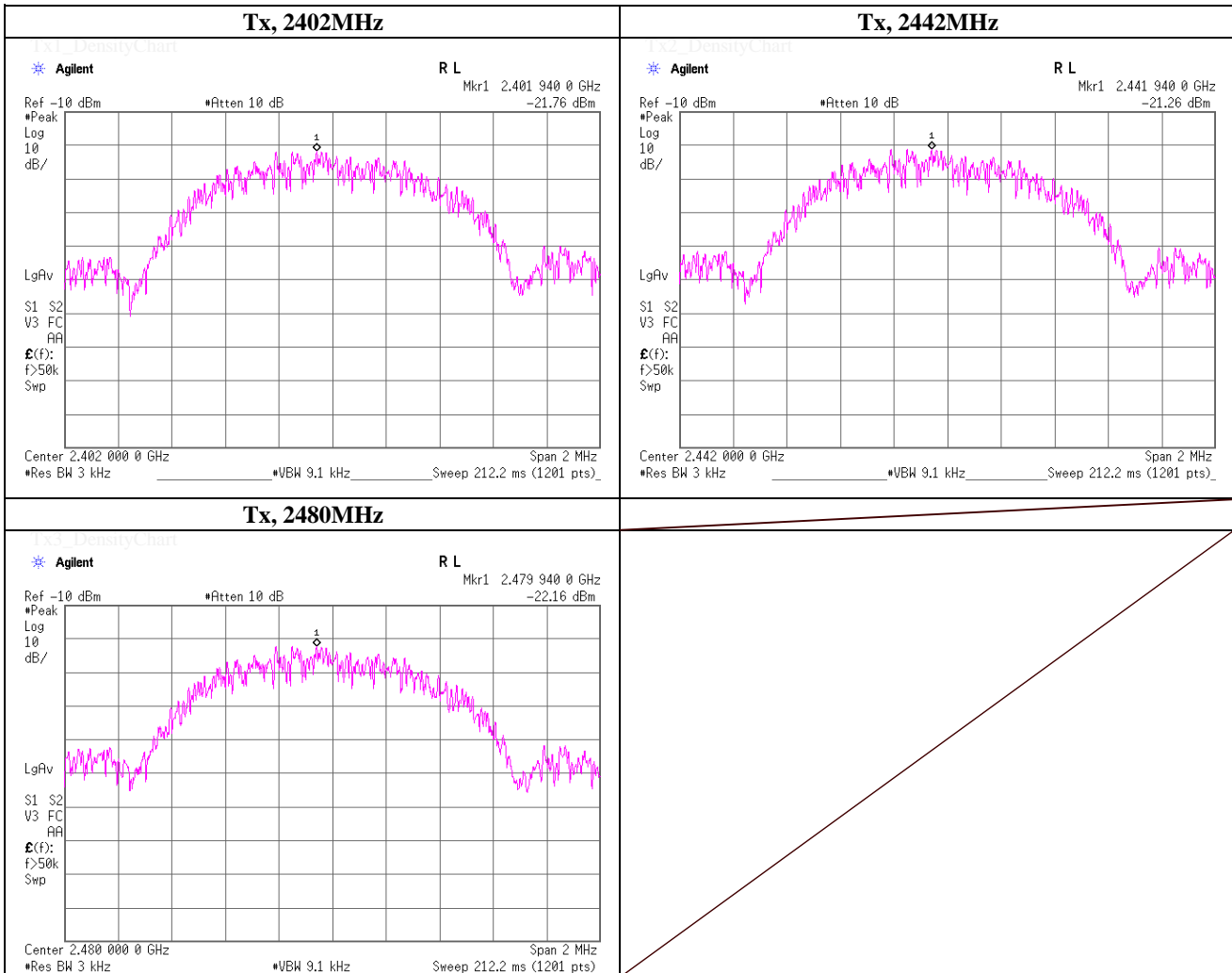
(Option 1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 19, 2012	
Temperature / Humidity	23deg.C , 38%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth Low Energy, PN9	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.0000	2401.94	-21.76	1.51	10.00	-10.25	8.00	18.25
2442.0000	2441.94	-21.26	1.50	10.00	-9.76	8.00	17.76
2480.0000	2479.94	-22.16	1.51	10.00	-10.65	8.00	18.65

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss



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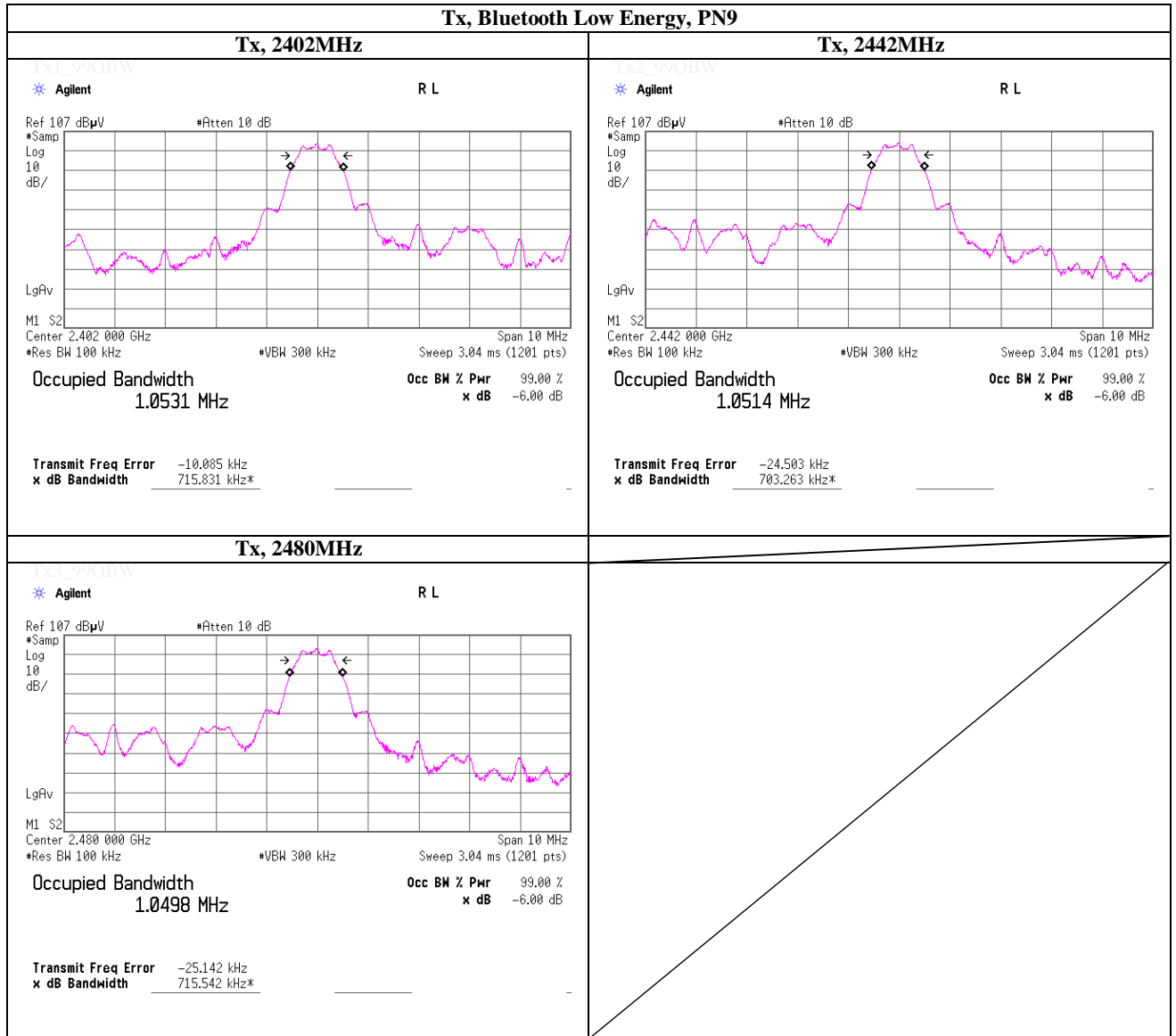
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## 99% Occupied Bandwidth



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**APPENDIX**  
**Test Instruments**

**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2012/04/06 * 12
SCC-G28	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	SEP-20-12-002	AT	2012/09/26 * 12
SCC-H2	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFL,MF)	-	RE	-

The expiration date of the calibration is the end of the expired month .  
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :

RE: Radiated emission ,

AT: Antenna terminal conducted tests

**APPENDIX 2  
Test Instruments**

**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2012/02/10 * 12
SAT6-05	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2012/02/10 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2012/10/08 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2012/04/10 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2012/04/10 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP9108-A 0888	RE	2011/11/23 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2012/02/06 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE, CE	2012/10/04 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE, CE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2012/09/11 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF, MF)	-	RE	-
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2012/03/12 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2012/04/10 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2012/05/22 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2012/08/20 * 12
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2012/04/10 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2012/02/20 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	CE	2012/03/26 * 12

The expiration date of the calibration is the end of the expired month .  
 As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .  
 All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .

Test Item :  
 CE: Conducted emission ,  
 RE: Radiated emission