



RADIO TEST REPORT

Test Report No.: 10044579S-C
(Original test report No.: 32GE0051-SH-03-A)

Applicant : Panasonic Corporation
Type of Equipment : Bluetooth/WLAN Module Assy
Model No. : YEAP01B892WLAN
FCC ID : ACJ932YEAP01A473W
Test regulation : FCC Part15 Subpart C: 2013 (Class II change)
Test item : Radiated Spurious emission
Test result : Complied

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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: September 2 to 17, 2013

Tested by: *M. Hosaka*
Makoto Hosaka
Engineer of WiSE Japan,
UL Verification Service

Approved by : *G. Ishiwata*
Go Ishiwata
Manager of WiSE Japan,
UL Verification Service



- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
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13-EM-F0429

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SECTION 1: Customer information

Company Name : Panasonic Corporation
Brand Name : Panasonic
Address : 4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8520 Japan
Telephone Number : +81-50-3689-6973
Facsimile Number : +81-45-931-0806
Contact Person : Ichiro Furuya

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

2.1 Identification of E.U.T.

Type of Equipment : Bluetooth/WLAN Module Assy
Model No. : YEAP01B892WLAN
Serial No. : Refer to 4.2 in this report.
Rating : DC5.0V
Receipt Date of Sample : September 2, 2013
Country of Mass-production : Japan
Condition of EUT : Engineering 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: YEAP01B892WLAN (referred to as the EUT in this report) is a Bluetooth/WLAN Module Assy.

Change from the original sample: YEAP01A473WLAN (Test report No.: 32GE0051-SH-03-A):

Circuit, Mechanism element, Antennas (BT-MAIN-001, BT-MAIN-002)

Similar model of YEAP01B892WLAN: YEAP01B895WLAN. This model has no additional IC for TFT display.

Clock frequency(ies) in the system : 26MHz, 32.768kHz

Radio specification

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth / Channel spacing : 79MHz & 1MHz
Type of modulation : FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Dipole
Antenna connector type : U.FL
Antenna gain with cable loss : -2.9dBi (BT-MAIN-001), -4.0dBi (BT-MAIN-002)
ITU code : F1D, G1D
Operation temperature range : -30 to +85 deg. C.

* For Wireless LAN part, refer to the test report: 10044579S-A.

*1) BT-MAIN-001 or BT-MAIN-002 is installed to the module. The length of coaxial cable is different.

Antenna	Cable length (mm)
BT-MAIN-001	50
BT-MAIN-002	55

FCC 15.31 (e)

The RF module is provided with stable power supply DC 3.3V and DC1.8V from the host device, therefore, the equipment complies with the power supply regulation.

FCC 15.203

The EUT complies with the requirement, because the antenna has a unique coupling (U.FL).

There is 2-type of bottom plate. The size is different. Bottom plate is located on the bottom of the EUT.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2013,
final revised on June 11, 2013 and effective July 11, 2013
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

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	N/A	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	*2)		N/A
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	*2)		N/A
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	*2)		N/A
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	*2)		N/A
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	*2)		N/A
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Radiated	N/A		9.3 dB Freq.: 4882.000 MHz Polarization: Horizontal Detection: Peak Mode: Tx 2441MHz, DH5
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422 *1) The test is not applicable since the EUT has no AC mains. *2) Refer to the original test report: 32GE0051-SH-03-A. (Tested model: ACJ932YEAP01A473W)						

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3.3 Addition to standard

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

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 ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber

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

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

3.5 Test location

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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 checked="" 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 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 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	-

3.6 Test setup, Data of test & 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

Mode	Tested frequency
Transmitting (DH5/3-DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
* The mode was selected based on the result in the original test report: 32GE0051-SH-03-A.	

EUT has the power settings by the software as follows;

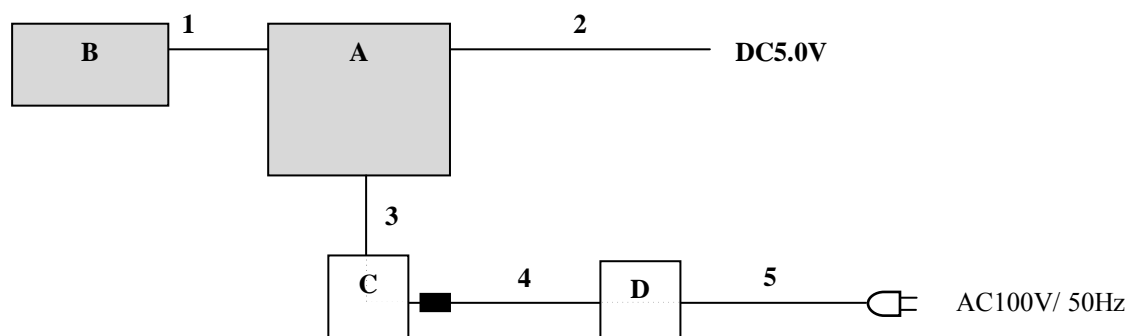
Power settings	Fixed (The setting is not controlled by the software and it is equivalent to that of mass- produced items.)
Software	HCI Tester Ver 3.0.0.12

Antenna used: BT-MAIN-001

The test was made at the worse case that has the maximum noise.

4.2 Configuration and peripherals

□ : EUT
■ : Ferrite core (Standard attachment)



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth/WLAN Module Assy	YEAP01B892WLAN	9	Panasonic Corporation	EUT
B	Dipole Antenna	BT-MAIN-001	-	NISSEI ELECTRIC CO., LTD.	EUT
C	Test Jig	PCA-A-036702	48641	Panasonic Corporation	-
D	AC Adaptor	SA06-20S05R-V	R00100300177	AUTEC POWER SYSTEMS	-

List of cables used

No.	Cable name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna	0.05	Shielded	Shielded	-
2	DC	1.4	Unshielded	Unshielded	-
3	Signal	0.2	Unshielded	Unshielded	-
4	DC	1.2	Unshielded	Unshielded	-
5	AC	2.0	Unshielded	Unshielded	-

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SECTION 5: Radiated emission

5.1 Operating environment

Test room : 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 urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

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

5.4 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	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz	RBW: 100kHz VBW: 300kHz

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

Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

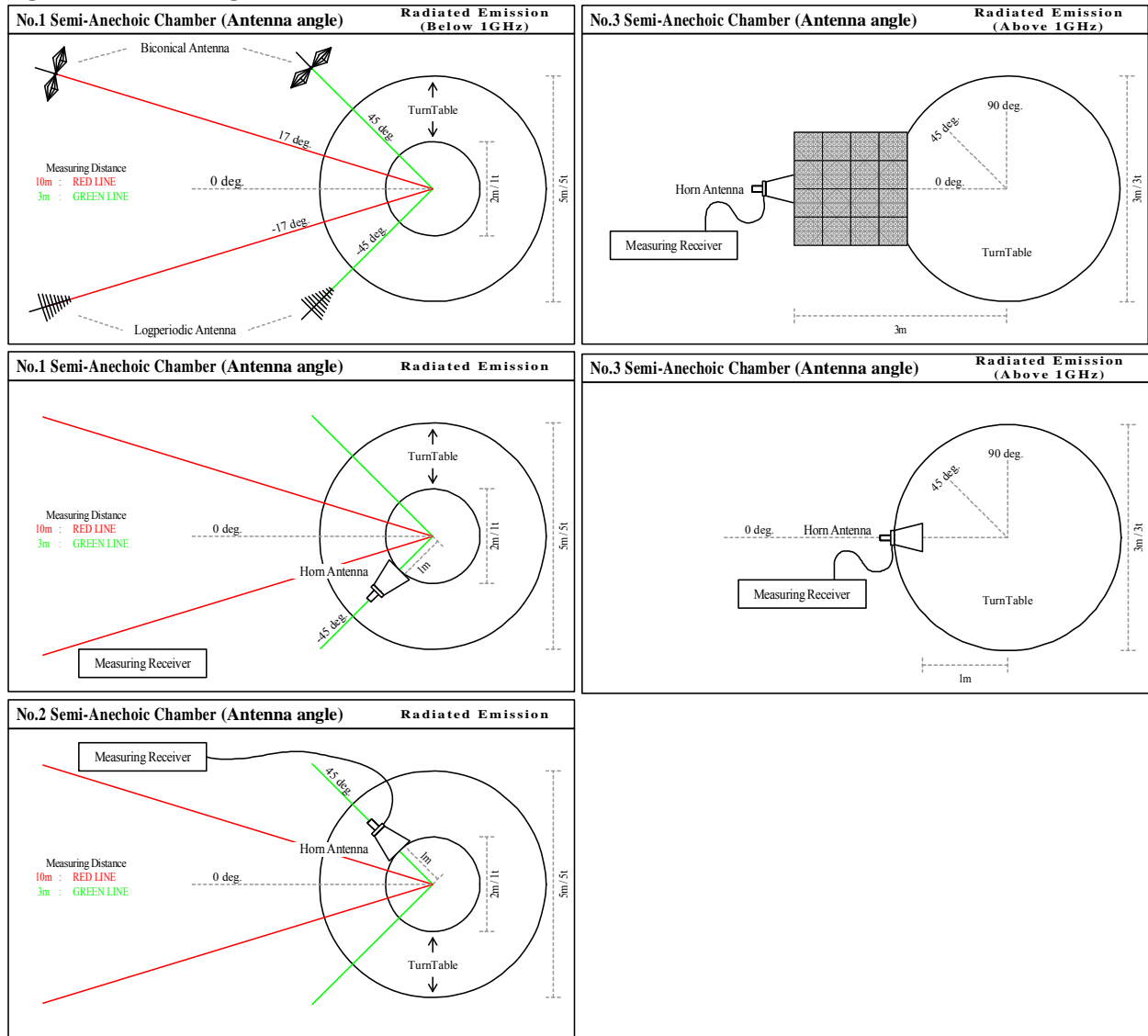
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst position:

Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-25GHz)
Horizontal	X	Y	Y	Z	Y
Vertical	Z	Y	Y	Y	Y

* The definition of the axis was listed in a 'Pre-check of the worst position' in APPENDIX 3.

Figure 1. Antenna angle



5.5 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.

5.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.

Refer to APPENDIX 1.

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Radiated emission

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission
Pre-check of the worst position

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2402 MHz Tx, Bluetooth, BDR, PRBS9			

(* 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.	130.003	QP	37.6	13.9	8.2	31.8	27.9	43.5	15.6	150	131	
Hori.	182.005	QP	36.1	16.1	8.8	31.8	29.2	43.5	14.3	150	128	
Hori.	941.132	QP	23.1	23.2	9.9	31.0	25.2	46.0	20.8	150	359	
Hori.	2388.883	PK	49.6	26.8	14.7	41.1	50.0	73.9	23.9	100	0	
Hori.	2390.000	PK	47.4	26.8	14.7	41.1	47.8	73.9	26.1	100	0	
Hori.	4804.000	PK	55.8	30.9	7.5	41.2	53.0	73.9	20.9	100	57	
Hori.	7206.000	PK	52.6	37.1	9.1	41.0	57.8	73.9	16.1	100	319	
Hori.	9608.000	PK	46.5	38.6	10.2	38.9	56.4	73.9	17.5	100	33	
Hori.	12010.000	PK	48.5	39.6	11.5	39.1	60.5	73.9	13.4	100	49	
Vert.	110.479	QP	31.0	11.8	8.0	31.8	19.0	43.5	24.5	100	150	
Vert.	130.003	QP	39.3	13.9	8.2	31.8	29.6	43.5	13.9	100	111	
Vert.	182.007	QP	31.0	16.1	8.8	31.8	24.1	43.5	19.4	100	179	
Vert.	199.791	QP	27.7	16.6	9.0	31.8	21.5	43.5	22.0	100	355	
Vert.	813.927	QP	23.3	21.7	9.5	31.8	22.7	46.0	23.3	100	3	
Vert.	2388.883	PK	50.7	26.8	14.7	41.1	51.1	73.9	22.8	110	69	
Vert.	2390.000	PK	47.1	26.8	14.7	41.1	47.5	73.9	26.4	110	69	
Vert.	4804.000	PK	51.4	30.9	7.5	41.2	48.6	73.9	25.3	100	341	
Vert.	7206.000	PK	52.6	37.1	9.1	41.0	57.8	73.9	16.1	100	323	
Vert.	9608.000	PK	46.2	38.6	10.2	38.9	56.1	73.9	17.8	100	34	
Vert.	12010.000	PK	49.6	39.6	11.5	39.1	61.6	73.9	12.3	100	37	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2388.883	AV	40.4	26.8	14.7	41.1	-24.8	16.0	53.9	37.9	
Hori.	2390.000	AV	32.8	26.8	14.7	41.1	-24.8	8.4	53.9	45.5	
Hori.	4804.000	AV	50.4	30.9	7.5	41.2	-24.8	22.8	53.9	31.1	
Hori.	7206.000	AV	43.0	37.1	9.1	41.0	-24.8	23.4	53.9	30.5	
Hori.	9608.000	AV	33.7	38.6	10.2	38.9	-24.8	18.8	53.9	35.1	
Hori.	12010.000	AV	35.9	39.6	11.5	39.1	-24.8	23.1	53.9	30.8	
Vert.	2388.883	AV	41.5	26.8	14.7	41.1	-24.8	17.1	53.9	36.8	
Vert.	2390.000	AV	32.9	26.8	14.7	41.1	-24.8	8.5	53.9	45.4	
Vert.	4804.000	AV	44.0	30.9	7.5	41.2	-24.8	16.4	53.9	37.5	
Vert.	7206.000	AV	43.9	37.1	9.1	41.0	-24.8	24.3	53.9	29.6	
Vert.	9608.000	AV	33.7	38.6	10.2	38.9	-24.8	18.8	53.9	35.1	
Vert.	12010.000	AV	36.5	39.6	11.5	39.1	-24.8	23.7	53.9	30.2	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	93.2	26.8	14.7	41.1	93.6	-	-	
Hori.	2400.000	PK	40.2	26.8	14.7	41.1	40.6	73.6	33.0	
Vert.	2402.000	PK	94.5	26.8	14.7	41.1	94.9	-	-	
Vert.	2400.000	PK	38.4	26.8	14.7	41.1	38.8	74.9	36.1	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2441 MHz Tx, Bluetooth, BDR, PRBS9			

(* 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.	130.004	QP	38.0	13.9	8.2	31.8	28.3	43.5	15.2	150	125	
Hori.	182.012	QP	36.0	16.1	8.8	31.8	29.1	43.5	14.4	150	132	
Hori.	899.360	QP	23.3	23.1	9.8	31.4	24.8	46.0	21.2	100	159	
Hori.	4882.000	PK	66.8	31.4	7.5	41.1	64.6	73.9	9.3	100	289	
Hori.	7323.000	PK	53.1	37.2	9.0	41.1	58.2	73.9	15.7	100	336	
Hori.	9764.000	PK	45.4	38.8	10.1	38.8	55.5	73.9	18.4	100	38	
Hori.	12205.000	PK	47.0	39.6	11.4	39.1	58.9	73.9	15.0	100	10	
Vert.	110.623	QP	31.0	11.8	8.0	31.8	19.0	43.5	24.5	100	157	
Vert.	130.001	QP	39.1	13.9	8.2	31.8	29.4	43.5	14.1	100	115	
Vert.	159.755	QP	29.2	15.4	8.8	31.8	21.6	43.5	21.9	100	355	
Vert.	182.003	QP	31.4	16.1	8.8	31.8	24.5	43.5	19.0	100	4	
Vert.	918.072	QP	23.5	23.1	9.9	31.2	25.3	46.0	20.7	100	1	
Vert.	4882.000	PK	62.8	31.4	7.5	41.1	60.6	73.9	13.3	100	309	
Vert.	7323.000	PK	54.6	37.2	9.0	41.1	59.7	73.9	14.2	100	344	
Vert.	9764.000	PK	45.5	38.8	10.1	38.8	55.6	73.9	18.3	118	32	
Vert.	12205.000	PK	46.5	39.6	11.4	39.1	58.4	73.9	15.5	100	315	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	63.0	31.4	7.5	41.1	-24.8	36.0	53.9	17.9	
Hori.	7323.000	AV	44.6	37.2	9.0	41.1	-24.8	24.9	53.9	29.0	
Hori.	9764.000	AV	33.1	38.8	10.1	38.8	-24.8	18.4	53.9	35.5	
Hori.	12205.000	AV	35.2	39.6	11.4	39.1	-24.8	22.3	53.9	31.6	
Vert.	4882.000	AV	59.1	31.4	7.5	41.1	-24.8	32.1	53.9	21.8	
Vert.	7323.000	AV	46.7	37.2	9.0	41.1	-24.8	27.0	53.9	26.9	
Vert.	9764.000	AV	33.3	38.8	10.1	38.8	-24.8	18.6	53.9	35.3	
Vert.	12205.000	AV	35.3	39.6	11.4	39.1	-24.8	22.4	53.9	31.5	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2480 MHz Tx, Bluetooth, BDR, PRBS9			

(* 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.	130.011	QP	38.0	13.9	8.2	31.8	28.3	43.5	15.2	150	125	
Hori.	182.003	QP	36.3	16.1	8.8	31.8	29.4	43.5	14.1	150	134	
Hori.	931.240	QP	23.2	23.1	9.9	31.1	25.1	46.0	20.9	100	12	
Hori.	2483.500	PK	48.1	26.9	14.8	41.0	48.8	73.9	25.1	100	0	
Hori.	2493.012	PK	49.3	26.9	14.8	41.0	50.0	73.9	23.9	100	0	
Hori.	4960.000	PK	53.8	31.8	7.5	41.1	52.0	73.9	21.9	100	351	
Hori.	7440.000	PK	51.2	37.4	9.0	41.1	56.5	73.9	17.4	113	337	
Hori.	9920.000	PK	44.8	38.9	10.0	38.8	54.9	73.9	19.0	100	38	
Hori.	12400.000	PK	45.7	39.7	11.3	39.1	57.6	73.9	16.3	100	8	
Vert.	110.921	QP	30.5	11.8	8.0	31.8	18.5	43.5	25.0	100	164	
Vert.	130.000	QP	39.8	13.9	8.2	31.8	30.1	43.5	13.4	100	117	
Vert.	135.212	QP	28.3	14.3	8.3	31.8	19.1	43.5	24.4	100	90	
Vert.	182.003	QP	31.4	16.1	8.8	31.8	24.5	43.5	19.0	100	358	
Vert.	945.409	QP	23.2	23.2	10.0	31.0	25.4	46.0	20.6	100	127	
Vert.	2483.500	PK	47.9	26.9	14.8	41.0	48.6	73.9	25.3	110	58	
Vert.	2493.012	PK	50.5	26.9	14.8	41.0	51.2	73.9	22.7	110	58	
Vert.	4960.000	PK	50.5	31.8	7.5	41.1	48.7	73.9	25.2	100	206	
Vert.	7440.000	PK	52.0	37.4	9.0	41.1	57.3	73.9	16.6	100	344	
Vert.	9920.000	PK	45.0	38.9	10.0	38.8	55.1	73.9	18.8	142	32	
Vert.	12400.000	PK	45.9	39.7	11.3	39.1	57.8	73.9	16.1	109	29	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	33.6	26.9	14.8	41.0	-24.8	9.5	53.9	44.4	
Hori.	2493.012	AV	38.0	26.9	14.8	41.0	-24.8	13.9	53.9	40.0	
Hori.	4960.000	AV	47.7	31.8	7.5	41.1	-24.8	21.1	53.9	32.8	
Hori.	7440.000	AV	41.3	37.4	9.0	41.1	-24.8	21.8	53.9	32.1	
Hori.	9920.000	AV	32.0	38.9	10.0	38.8	-24.8	17.3	53.9	36.6	
Hori.	12400.000	AV	33.7	39.7	11.3	39.1	-24.8	20.8	53.9	33.1	
Vert.	2483.500	AV	33.9	26.9	14.8	41.0	-24.8	9.8	53.9	44.1	
Vert.	2493.012	AV	39.8	26.9	14.8	41.0	-24.8	15.7	53.9	38.2	
Vert.	4960.000	AV	42.1	31.8	7.5	41.1	-24.8	15.5	53.9	38.4	
Vert.	7440.000	AV	43.4	37.4	9.0	41.1	-24.8	23.9	53.9	30.0	
Vert.	9920.000	AV	32.1	38.9	10.0	38.8	-24.8	17.4	53.9	36.5	
Vert.	12400.000	AV	33.8	39.7	11.3	39.1	-24.8	20.9	53.9	33.0	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

UL Japan, Inc.**Shonan EMC Lab.**

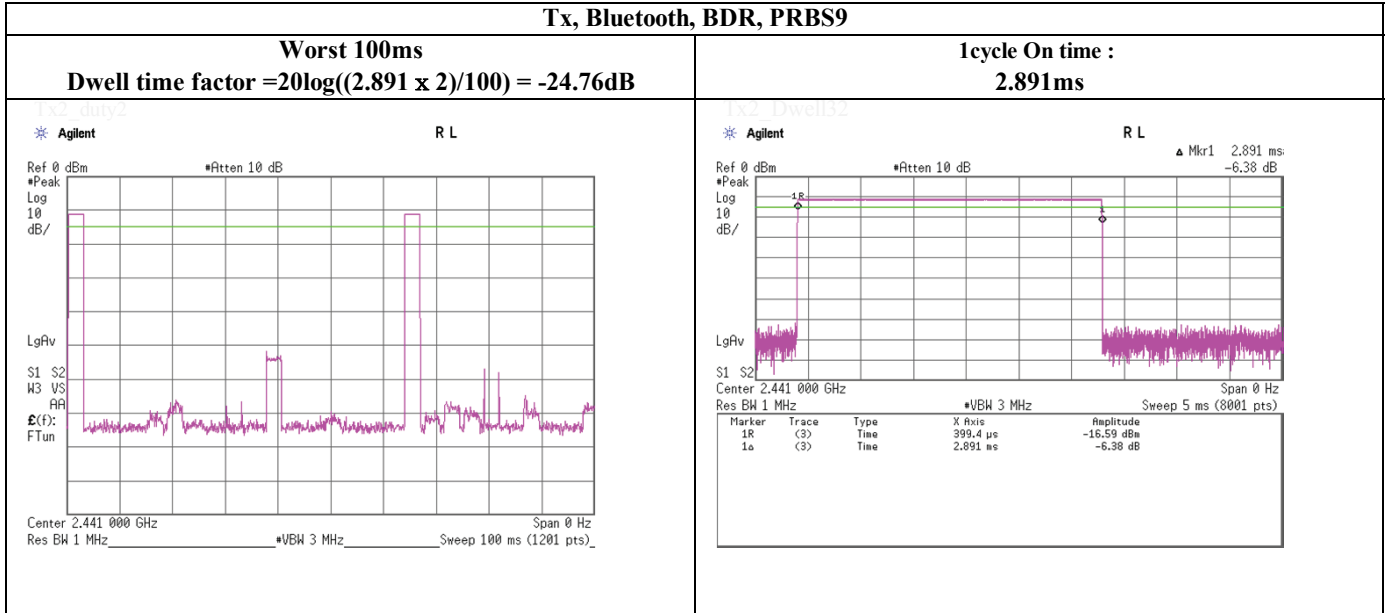
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Dwell time factor Calculation chart

Dwell time factor Calculation Tx, Bluetooth, BDR, PRBS9



VBW (Average) Calculation

*Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2402 MHz Tx, Bluetooth, EDR, PRBS9			

(* 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.	130.004	QP	37.7	13.9	8.2	31.8	28.0	43.5	15.5	150	115	
Hori.	182.005	QP	36.3	16.1	8.8	31.8	29.4	43.5	14.1	150	146	
Hori.	956.217	QP	23.2	23.2	10.0	30.9	25.5	46.0	20.5	100	354	
Hori.	2390.000	PK	48.5	26.8	14.7	41.1	48.9	73.9	25.0	100	0	
Hori.	4804.000	PK	62.4	30.9	7.5	41.2	59.6	73.9	14.3	100	291	
Hori.	7206.000	PK	52.2	37.1	9.1	41.0	57.4	73.9	16.5	100	321	
Hori.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	148	24	
Hori.	12010.000	PK	48.6	39.6	11.5	39.1	60.6	73.9	13.3	100	11	
Vert.	110.129	QP	31.0	11.7	8.0	31.8	18.9	43.5	24.6	100	192	
Vert.	130.003	QP	39.6	13.9	8.2	31.8	29.9	43.5	13.6	100	123	
Vert.	156.006	QP	30.3	15.2	8.7	31.8	22.4	43.5	21.1	100	174	
Vert.	182.009	QP	31.6	16.1	8.8	31.8	24.7	43.5	18.8	100	355	
Vert.	899.806	QP	23.3	23.1	9.8	31.4	24.8	46.0	21.2	100	355	
Vert.	2390.000	PK	49.6	26.8	14.7	41.1	50.0	73.9	23.9	112	65	
Vert.	4804.000	PK	57.8	30.9	7.5	41.2	55.0	73.9	18.9	100	206	
Vert.	7206.000	PK	53.2	37.1	9.1	41.0	58.4	73.9	15.5	100	323	
Vert.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	100	33	
Vert.	12010.000	PK	48.0	39.6	11.5	39.1	60.0	73.9	13.9	100	319	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	33.1	26.8	14.7	41.1	-24.8	8.7	53.9	45.2	
Hori.	4804.000	AV	55.1	30.9	7.5	41.2	-24.8	27.5	53.9	26.4	
Hori.	7206.000	AV	42.0	37.1	9.1	41.0	-24.8	22.4	53.9	31.5	
Hori.	9608.000	AV	35.0	38.6	10.2	38.9	-24.8	20.1	53.9	33.8	
Hori.	12010.000	AV	36.0	39.6	11.5	39.1	-24.8	23.2	53.9	30.7	
Vert.	2390.000	AV	33.2	26.8	14.7	41.1	-24.8	8.8	53.9	45.1	
Vert.	4804.000	AV	50.5	30.9	7.5	41.2	-24.8	22.9	53.9	31.0	
Vert.	7206.000	AV	43.2	37.1	9.1	41.0	-24.8	23.6	53.9	30.3	
Vert.	9608.000	AV	35.4	38.6	10.2	38.9	-24.8	20.5	53.9	33.4	
Vert.	12010.000	AV	36.3	39.6	11.5	39.1	-24.8	23.5	53.9	30.4	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.8	26.8	14.7	41.1	95.2	-	-	
Hori.	2396.350	PK	38.4	26.8	14.7	41.1	38.8	75.2	36.4	
Hori.	2400.000	PK	44.3	26.8	14.7	41.1	44.7	75.2	30.5	
Vert.	2402.000	PK	94.5	26.8	14.7	41.1	94.9	-	-	
Vert.	2396.350	PK	39.5	26.8	14.7	41.1	39.9	74.9	35.0	
Vert.	2400.000	PK	43.8	26.8	14.7	41.1	44.2	74.9	30.7	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2441 MHz Tx, Bluetooth, EDR, PRBS9			

(* 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.	130.004	QP	38.3	13.9	8.2	31.8	28.6	43.5	14.9	150	116	
Hori.	182.000	QP	36.8	16.1	8.8	31.8	29.9	43.5	13.6	150	139	
Hori.	945.882	QP	23.3	23.2	10.0	31.0	25.5	46.0	20.5	150	2	
Hori.	4882.000	PK	65.8	31.4	7.5	41.1	63.6	73.9	10.3	100	293	
Hori.	7323.000	PK	53.0	37.2	9.0	41.1	58.1	73.9	15.8	100	336	
Hori.	9764.000	PK	45.7	38.8	10.1	38.8	55.8	73.9	18.1	100	40	
Hori.	12205.000	PK	46.2	39.6	11.4	39.1	58.1	73.9	15.8	100	10	
Vert.	110.379	QP	31.3	11.7	8.0	31.8	19.2	43.5	24.3	100	191	
Vert.	130.003	QP	39.5	13.9	8.2	31.8	29.8	43.5	13.7	100	125	
Vert.	159.751	QP	29.4	15.4	8.8	31.8	21.8	43.5	21.7	100	4	
Vert.	182.004	QP	31.5	16.1	8.8	31.8	24.6	43.5	18.9	100	9	
Vert.	879.601	QP	23.3	22.8	9.7	31.5	24.3	46.0	21.7	100	1	
Vert.	4882.000	PK	61.8	31.4	7.5	41.1	59.6	73.9	14.3	121	309	
Vert.	7323.000	PK	53.9	37.2	9.0	41.1	59.0	73.9	14.9	100	346	
Vert.	9764.000	PK	46.5	38.8	10.1	38.8	56.6	73.9	17.3	100	23	
Vert.	12205.000	PK	45.9	39.6	11.4	39.1	57.8	73.9	16.1	100	315	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	58.0	31.4	7.5	41.1	-24.8	31.0	53.9	22.9	
Hori.	7323.000	AV	42.8	37.2	9.0	41.1	-24.8	23.1	53.9	30.8	
Hori.	9764.000	AV	34.0	38.8	10.1	38.8	-24.8	19.3	53.9	34.6	
Hori.	12205.000	AV	34.5	39.6	11.4	39.1	-24.8	21.6	53.9	32.3	
Vert.	4882.000	AV	53.8	31.4	7.5	41.1	-24.8	26.8	53.9	27.1	
Vert.	7323.000	AV	44.7	37.2	9.0	41.1	-24.8	25.0	53.9	28.9	
Vert.	9764.000	AV	34.2	38.8	10.1	38.8	-24.8	19.5	53.9	34.4	
Vert.	12205.000	AV	34.6	39.6	11.4	39.1	-24.8	21.7	53.9	32.2	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

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Radiated Emission

Test place	No.1, 2 and 3 Semi Anechoic Chamber			
Date	September 2, 2013	September 5, 2013	September 16, 2013	September 17, 2013
Temperature / Humidity	26 deg.C, 56 %RH	24 deg.C, 64 %RH	23 deg.C, 66 %RH	27 deg.C, 47 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Tatusya Arai	Wataru Kojima
Mode	Tx, 2480 MHz Tx, Bluetooth, EDR, PRBS9			

(* 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.	130.001	QP	37.9	13.9	8.2	31.8	28.2	43.5	15.3	150	120	
Hori.	182.007	QP	36.8	16.1	8.8	31.8	29.9	43.5	13.6	150	133	
Hori.	885.929	QP	23.4	22.9	9.7	31.5	24.5	46.0	21.5	100	350	
Hori.	2483.500	PK	50.2	26.9	14.8	41.0	50.9	73.9	23.0	100	0	
Hori.	4960.000	PK	56.7	31.8	7.5	41.1	54.9	73.9	19.0	100	290	
Hori.	7440.000	PK	50.6	37.4	9.0	41.1	55.9	73.9	18.0	100	338	
Hori.	9920.000	PK	44.3	38.9	10.0	38.8	54.4	73.9	19.5	120	40	
Hori.	12400.000	PK	44.6	39.7	11.3	39.1	56.5	73.9	17.4	100	7	
Vert.	110.996	QP	31.0	11.8	8.0	31.8	19.0	43.5	24.5	100	195	
Vert.	130.005	QP	39.5	13.9	8.2	31.8	29.8	43.5	13.7	100	131	
Vert.	159.746	QP	29.4	15.4	8.8	31.8	21.8	43.5	21.7	100	2	
Vert.	182.006	QP	31.0	16.1	8.8	31.8	24.1	43.5	19.4	100	9	
Vert.	924.373	QP	23.3	23.1	9.9	31.2	25.1	46.0	20.9	100	14	
Vert.	2483.500	PK	51.2	26.9	14.8	41.0	51.9	73.9	22.0	100	0	
Vert.	4960.000	PK	52.8	31.8	7.5	41.1	51.0	73.9	22.9	100	309	
Vert.	7440.000	PK	52.5	37.4	9.0	41.1	57.8	73.9	16.1	100	344	
Vert.	9920.000	PK	44.9	38.9	10.0	38.8	55.0	73.9	18.9	100	18	
Vert.	12400.000	PK	46.2	39.7	11.3	39.1	58.1	73.9	15.8	100	29	

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	34.8	26.9	14.8	41.0	-24.8	10.7	53.9	43.2	
Hori.	4960.000	AV	49.6	31.8	7.5	41.1	-24.8	23.0	53.9	30.9	
Hori.	7440.000	AV	39.8	37.4	9.0	41.1	-24.8	20.3	53.9	33.6	
Hori.	9920.000	AV	32.3	38.9	10.0	38.8	-24.8	17.6	53.9	36.3	
Hori.	12400.000	AV	33.4	39.7	11.3	39.1	-24.8	20.5	53.9	33.4	
Vert.	2483.500	AV	35.2	26.9	14.8	41.0	-24.8	11.1	53.9	42.8	
Vert.	4960.000	AV	45.4	31.8	7.5	41.1	-24.8	18.8	53.9	35.1	
Vert.	7440.000	AV	42.4	37.4	9.0	41.1	-24.8	22.9	53.9	31.0	
Vert.	9920.000	AV	32.9	38.9	10.0	38.8	-24.8	18.2	53.9	35.7	
Vert.	12400.000	AV	33.7	39.7	11.3	39.1	-24.8	20.8	53.9	33.1	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier) + Dwell(time)factor

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

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

UL Japan, Inc.**Shonan EMC Lab.**

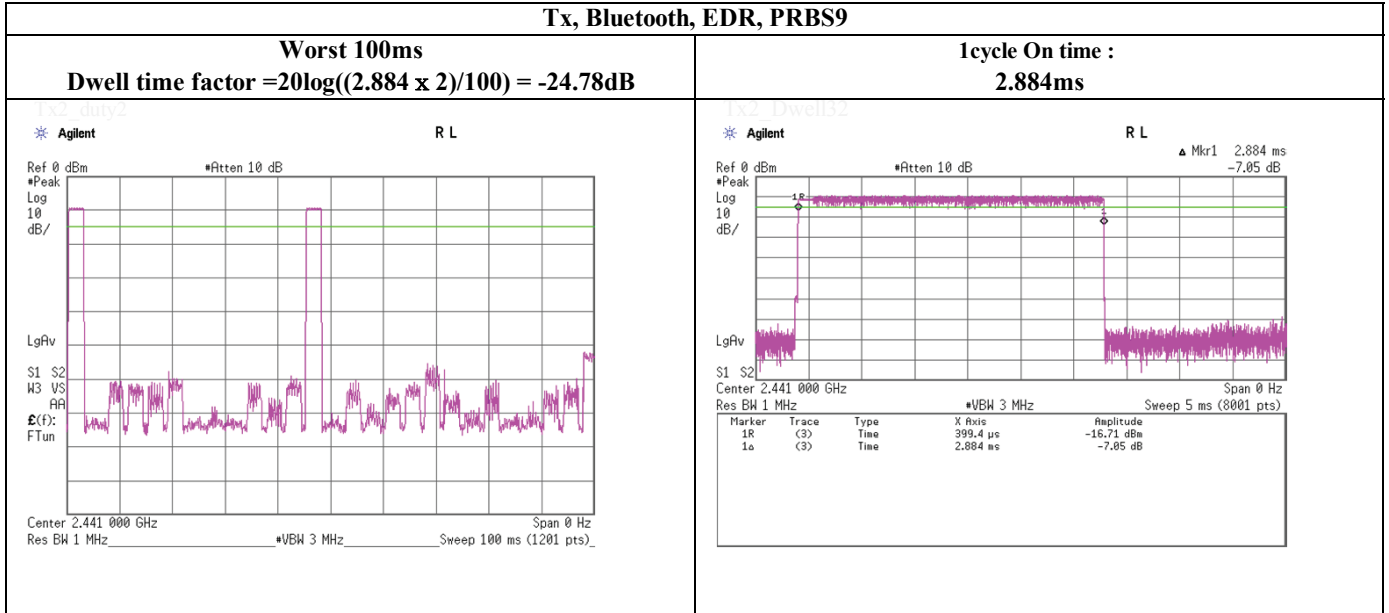
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Dwell time factor Calculation chart

Dwell time factor Calculation Tx, Bluetooth, EDR, PRBS9



VBW (Average) Calculation

*Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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Test Report No : 10044579S

APPENDIX 2 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2013/08/19 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2013/03/28 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2012/12/18 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2013/03/19 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2013/04/09 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2013/05/22 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2013/07/06 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2013/08/12 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2013/02/27 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2012/10/04 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2013/07/03 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2013/02/12 * 12
SAT6-05	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
KAT3-09	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2013/08/23 * 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	2013/04/04 * 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	2013/04/04 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A0888	RE	2012/11/18 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2013/03/16 * 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 :

RE: Radiated emission,