



RADIO TEST REPORT

Test Report No.: 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
FCC ID : O8CJM1V1
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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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.
7. Some test items have been performed at UL Japan, Inc., Yamakita EMC lab. as a subcontractor, in accordance with ISO/IEC 17025.

Date of test: August 6 to 9, 2012

Tested by:

S. Takano

Shinichi Takano
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.
☒ There is no testing item of "Non-accreditation".



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13-EM-F0429

Original Test Report No.: 32LE0170-SH-01-A

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SECTION 1: Customer information

Company Name : GAIA Holdings Corporation
Address : 2-18-18, Nishi-waseda, Shinjuku-ku, Tokyo, 169-0051 Japan
Telephone Number : +81-3-5286-8420
Facsimile Number : +81-3-5286-8414
Contact Person : Isamu Shimosako

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

2.1 Identification of E.U.T.

Type of Equipment : JM1
Model Number : JM1V1
Serial Number : Refer to 4.2 in this report.
Rating : DC3.3V
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : August 3, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: JM1V1 (referred to as the EUT in this report) is JM1.

Clock frequency(ies) in the system : 26MHz

<Radio part>

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth / Channel spacing : 79MHz & 1MHz
Type of modulation : FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Chip
Antenna connector type : None
Antenna gain : 0.5dBi
ITU code : F1D
Operation temperature range : +5 to +40 deg.C.

FCC 15.31 (e)

The RF transmitter has its own regulator. The RF transmitter is constantly provided voltage (DC1.8V) through the regulator regardless of input voltage. Therefore, the equipment complies with the requirement.

FCC 15.203

It is impossible for end users to replace the antenna, because it is soldered on the circuit board. 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 May 17, 2012 and effective June 18, 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

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	10.5dB Freq.: 0.3292MHz Phase: N Detection: Average Mode: Tx 2441MHz	Complied
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	7.1dB Freq.: 4960MHz Polarization: Horizontal Detection: Peak Mode: Tx 2480MHz	Complied

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

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3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators, 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.

3.4 Uncertainty

3.4.1 Shonan EMC Lab.

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: ($\pm$) 1.5dB

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

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

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

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

Bandwidth measurement uncertainty for this test was: ($\pm$) 5.4%

3.4.2 Yamakita EMC Lab.

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

Item	Frequency range	No.1 OATS* ¹ /SR* ² ($\pm$)	No.2 OATS /No.3 SR ($\pm$)	No.1 SAC* ¹ /No.2 SR ($\pm$)
Conducted emission (AC Mains) AMN/LISN	9kHz-150kHz	3.9 dB	4.0 dB	3.9 dB
	150kHz-30MHz	3.6 dB	3.6 dB	3.6 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.6 dB	3.7 dB	3.7 dB
	30MHz-300MHz	5.0 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.1 dB	5.1 dB	5.1 dB
	1GHz-13GHz	4.9 dB	4.9 dB	5.4 dB
Radiated emission (Measurement distance: 1m)	13GHz-18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz-40GHz	4.9 dB	4.4 dB	4.5 dB

*1: OATS=Open Area Test Site, 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 site margin.

Radiated emission test

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

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3.5 Test location

3.5.1 Shonan EMC Lab.

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
☐ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.5.2 Yamakita EMC Lab.

UL Japan, Inc. Yamakita EMC Lab.

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN

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	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 open area test site	95486	2973B-1	-	12.0 x 41.2	30m
☐ No.2 open area test site	466226	2973B-3	-	9.5 x 17.8	10m
☒ No.1 Semi-anechoic chamber	95967	2973B-2	10.0 x 7.5 x 5.7	10.0 x 7.5	3m
☐ No.2 Full-anechoic chamber	-	-	8.0 x 4.7 x 4.0	8.0 x 4.7	2.5m
☒ No.1 shielded room	-	-	8.0 x 5.0 x 2.5	8.0 x 5.0	-
☐ No.2 shielded room	-	-	5.0 x 4.0 x 2.5	5.0 x 4.0	-
☐ No.3 shielded room	-	-	4.0 x 5.0 x 2.7	4.0 x 5.0	-
☐ No.4 shielded room	-	-	5.0 x 4.0 x 2.7	5.0 x 4.0	-
☐ No.5 shielded room	-	-	4.5 x 4.3 x 2.7	4.5 x 4.3	-

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**

Test item	Operating mode	Tested frequency
Conducted emission	Transmitting (DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Carrier frequency separation	Transmitting Hopping ON (DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5)/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 -DH1, -DH3, -DH5 -Inquiry	-
Maximum peak output power	Transmitting (Hopping OFF), Payload: PRBS9 -DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

EUT has the power settings by the software as follows;

Power settings	int:56, ext:0
Software	Inquiry mode: BTCLiCtrl (Version: 2.4.00) Other mode: CSR BlueTest 3 (Version: 2.4.00)

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

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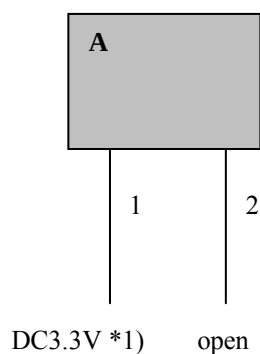
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	JM1	JM1V1	*2)	GAIA Holdings	-

*1) DC Power Supply (Model No.: PAN55-20A) was used for DC input.

*2) Conducted / Radiated emission: 000327, Other test: 000331

List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC	*3)	Unshielded	Unshielded	-
2	USB	0.45	Shielded	Shielded	-

*3) Conducted / Radiated emission: 1.7m, Other test: 0.5m

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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 wooden platform of nominal size, 1m by 1.8m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including DC power supply 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 and excess AC cable was bundled in center. 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 via DC power supply within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via DC power supply. 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: Carrier frequency separation

Test procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 8: Number of hopping frequency

Test procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 9: Dwell time

Test procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 10: Maximum peak output power

Test procedure

The maximum peak output power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

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SECTION 11: Radiated emission

11.1 Operating environment

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

11.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.8m by 0.9m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

11.3 Test conditions

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

11.4 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 13GHz) / 1m (above 13GHz). 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 of the test receiver.

Frequency	30-1000MHz	1-25GHz	
Detection type	Quasi-Peak	Peak	* Average
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz

* 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 \ Frequency	Carrier	Spurious			
		Below 1GHz	1-13GHz	13-18GHz	18-25GHz
Horizontal	Z	Y	Y	X	X
Vertical	Y	Y	Z	X	X

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11.5 Band edge

Band edge level is below the limits of FCC 15.209. Refer to the data.

11.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
Refer to APPENDIX 1

SECTION 12: Spurious 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 1

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
20dB bandwidth and Carrier frequency separation
Number of hopping frequency
Dwell time
Maximum peak output power
Spurious emission (Antenna port conducted)
Radiated emission
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of worst position

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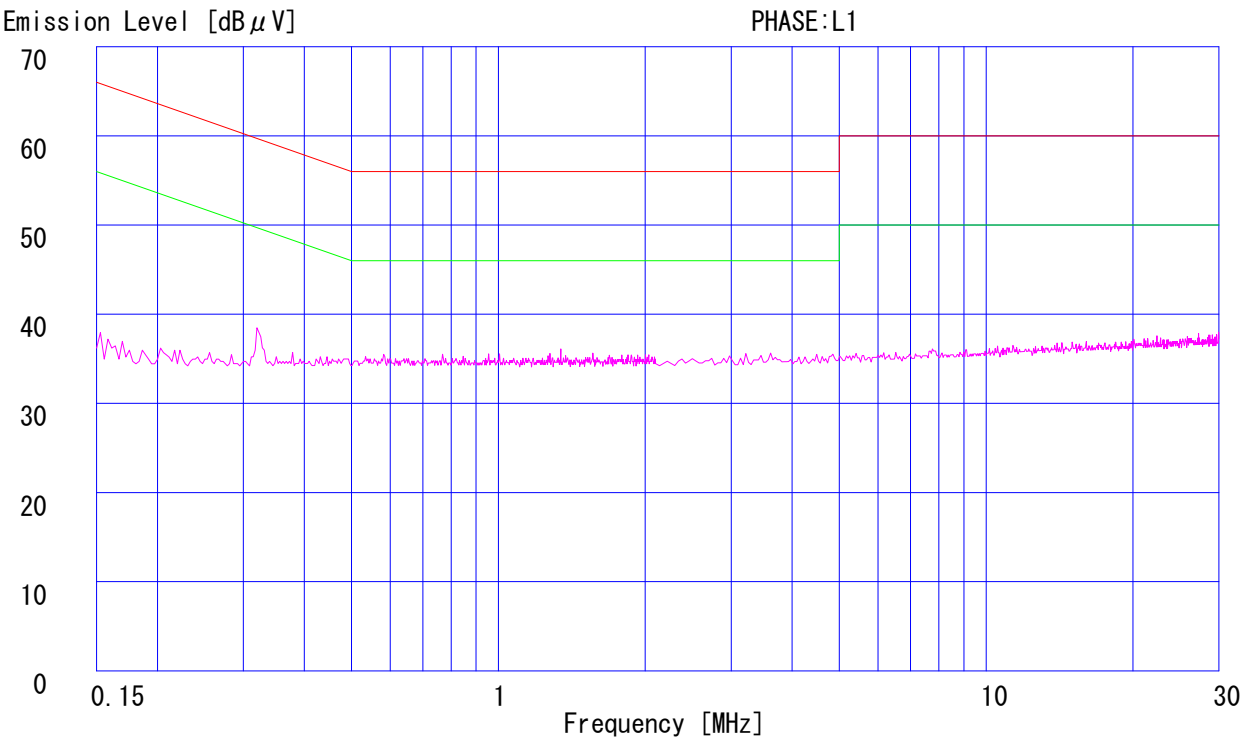
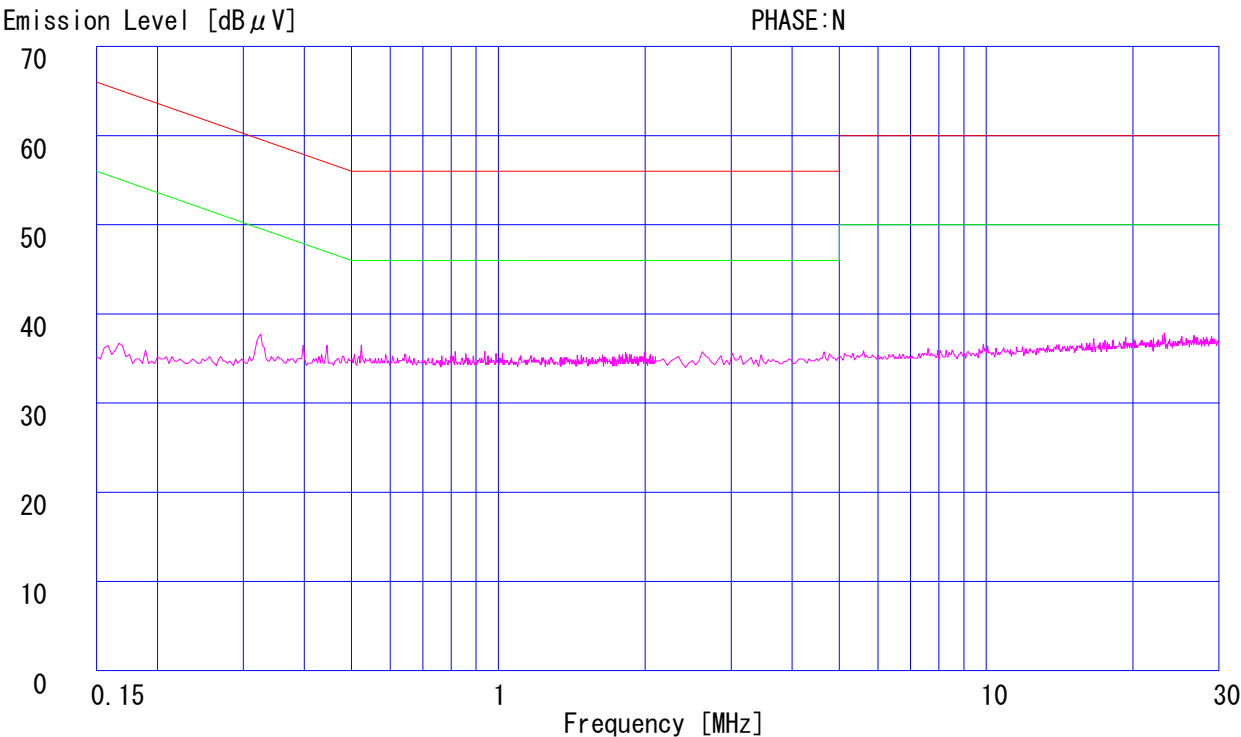
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Data of Conducted Disturbance Test

UL Japan, Inc.
YAMAKITA No.1 Shielded room
Report No. : 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
Serial No. : 000327
Power : DC3.3V (AC120V/60Hz)
Mode : Tx 2402MHz (DH5)
Remarks : -
Date : 8/9/2012
Phase : Single Phase
Temperature : 25 °C
Humidity : 62 %
Limit 1 : FCC Part15C § 15.207. (CISPR Pub.22)
Limit 2 : None
Engineer : Yasumasa Owaki



Data of Conducted Disturbance Test

UL Japan, Inc.

YAMAKITA No.1 Shielded room

Report No. : 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
Serial No. : 000327
Power : DC3.3V (AC120V/60Hz)
Mode : Tx 2441MHz (DH5)
Remarks : -
Date : 8/9/2012
Phase : Single Phase
Temperature : 25 °C
Humidity : 62 %
Limit : FCC Part15C § 15.207. (CISPR Pub.22)
Engineer : Yasumasa Owaki

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μV]	AV	QP [dB μV]	AV				QP [dB]	AV [dB μV]	QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]
1.	0.1500	12.6	-	15.0	-	0.1	0.1	13.0	28.2	-	66.0	56.0	37.8	-
2.	0.1999	8.3	-	12.0	-	0.1	0.1	13.0	25.2	-	63.6	53.6	38.4	-
3.	0.3292	28.9	25.7	28.8	25.6	0.1	0.2	13.0	42.2	39.0	59.5	49.5	17.3	10.5
4.	0.5382	11.9	-	11.4	-	0.1	0.2	13.0	25.2	-	56.0	46.0	30.8	-
5.	0.6169	11.8	-	9.6	-	0.1	0.2	13.0	25.1	-	56.0	46.0	30.9	-
6.	1.1893	1.8	-	2.5	-	0.1	0.3	13.0	15.9	-	56.0	46.0	40.1	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■ LISN: KLS-02 ■ COAXIAL CABLE: KCC-14/15/16/18

Data of Conducted Disturbance Test

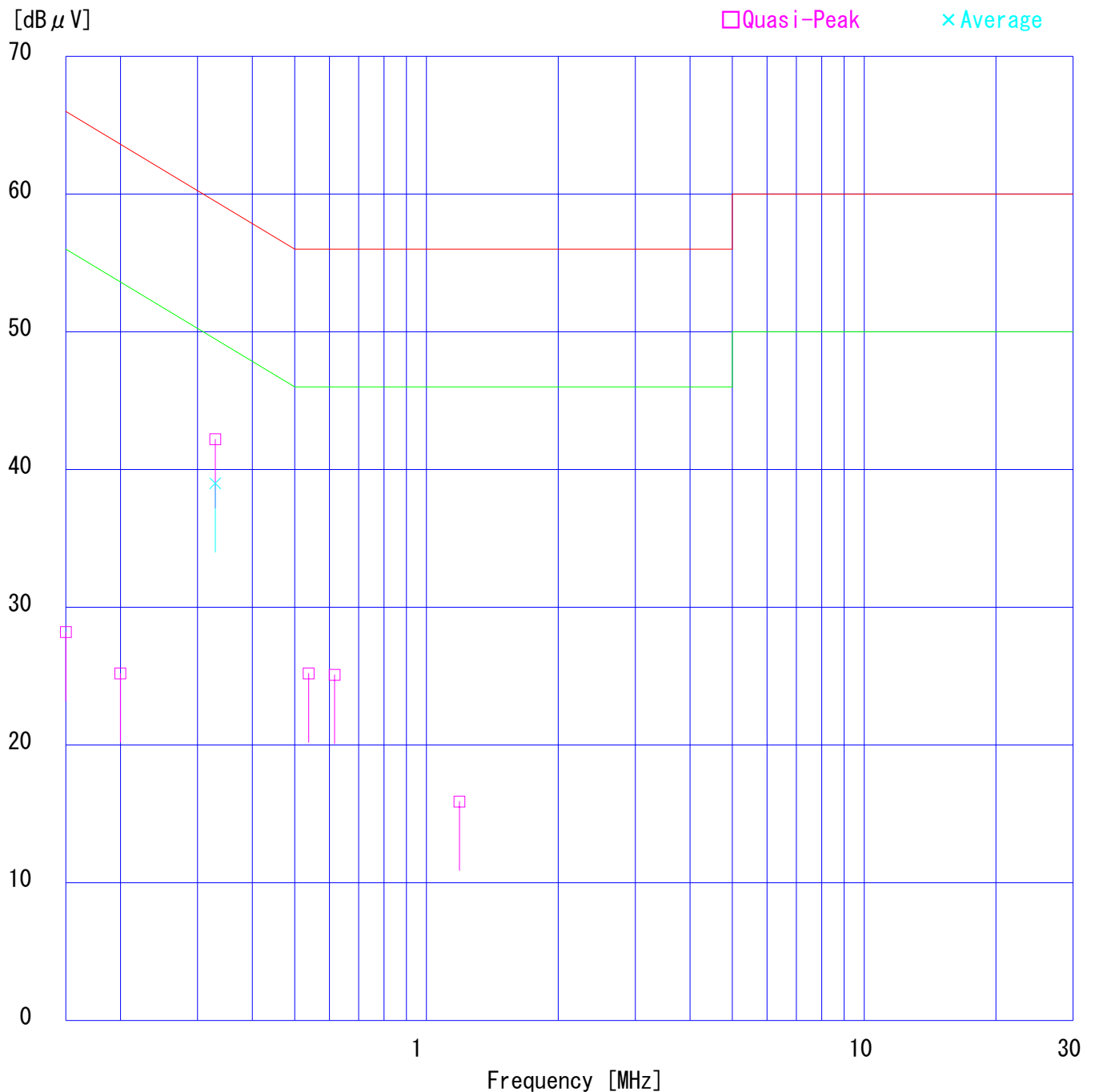
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YAMAKITA No.1 Shielded room

Report No. : 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
Serial No. : 000327
Power : DC3.3V (AC120V/60Hz)
Mode : Tx 2441MHz (DH5)
Remarks : -
Date : 8/9/2012
Phase : Single Phase
Temperature : 25 °C
Humidity : 62 %
Limit : FCC Part15C § 15.207. (CISPR Pub.22)

Engineer : Yasumasa Owaki



Data of Conducted Disturbance Test

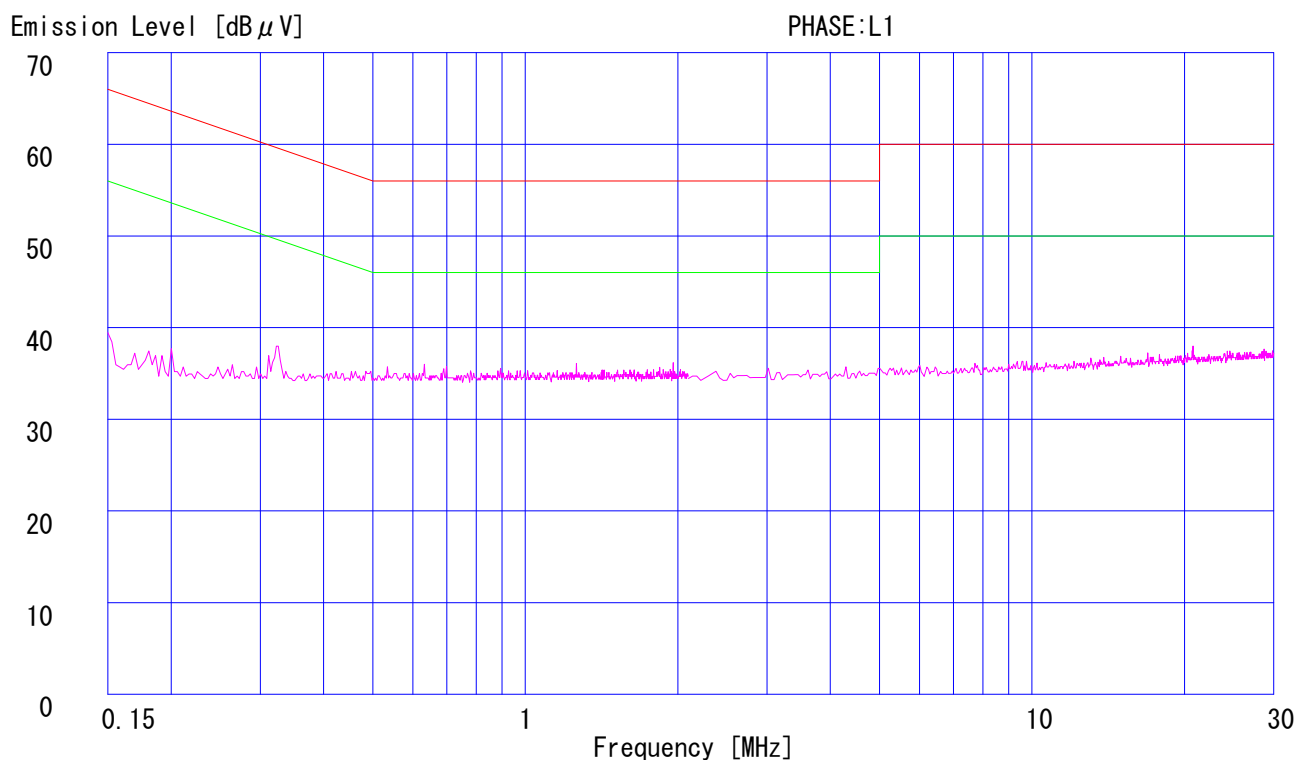
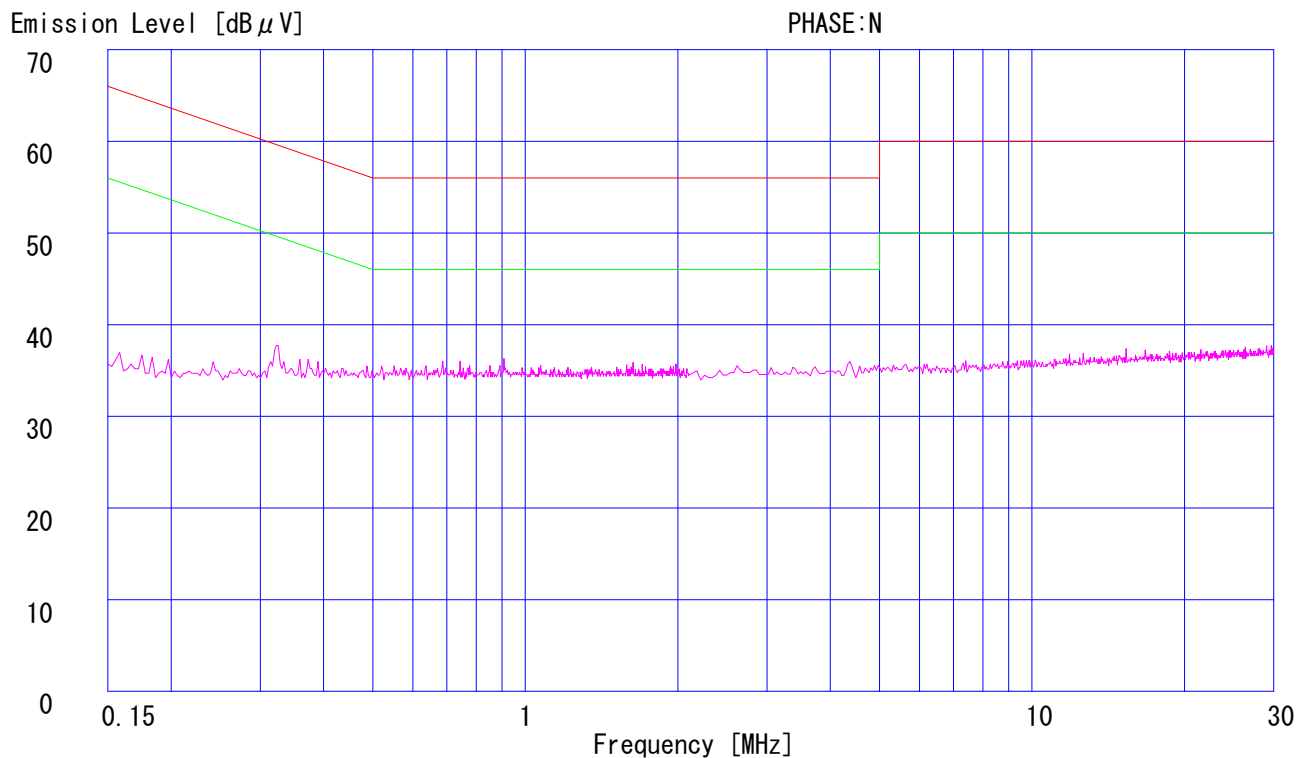
UL Japan, Inc.

YAMAKITA No.1 Shielded room

Report No. : 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
Serial No. : 000327
Power : DC3.3V (AC120V/60Hz)
Mode : Tx 2441MHz (DH5)
Remarks : -
Date : 8/9/2012
Phase : Single Phase
Temperature : 25 °C
Humidity : 62 %
Limit 1 : FCC Part15C § 15.207. (CISPR Pub.22)
Limit 2 : None

Engineer : Yasumasa Owaki



Data of Conducted Disturbance Test

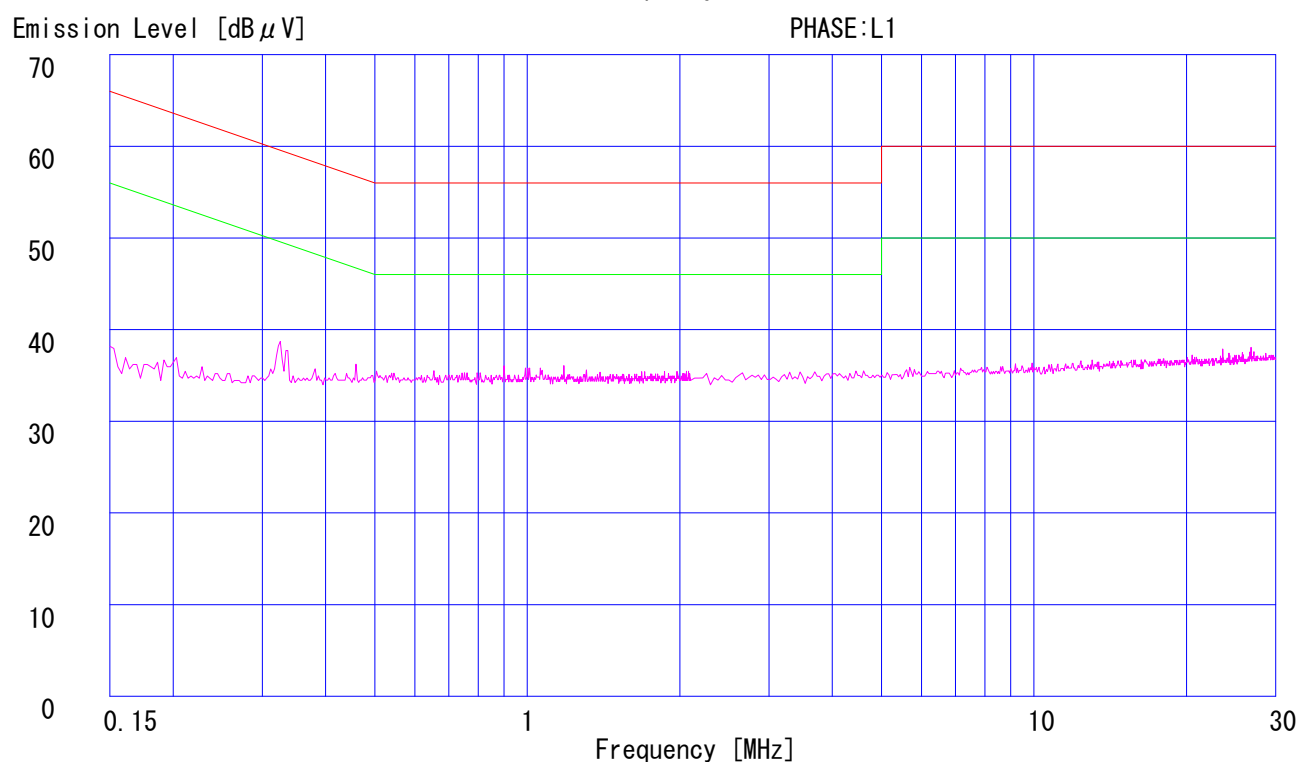
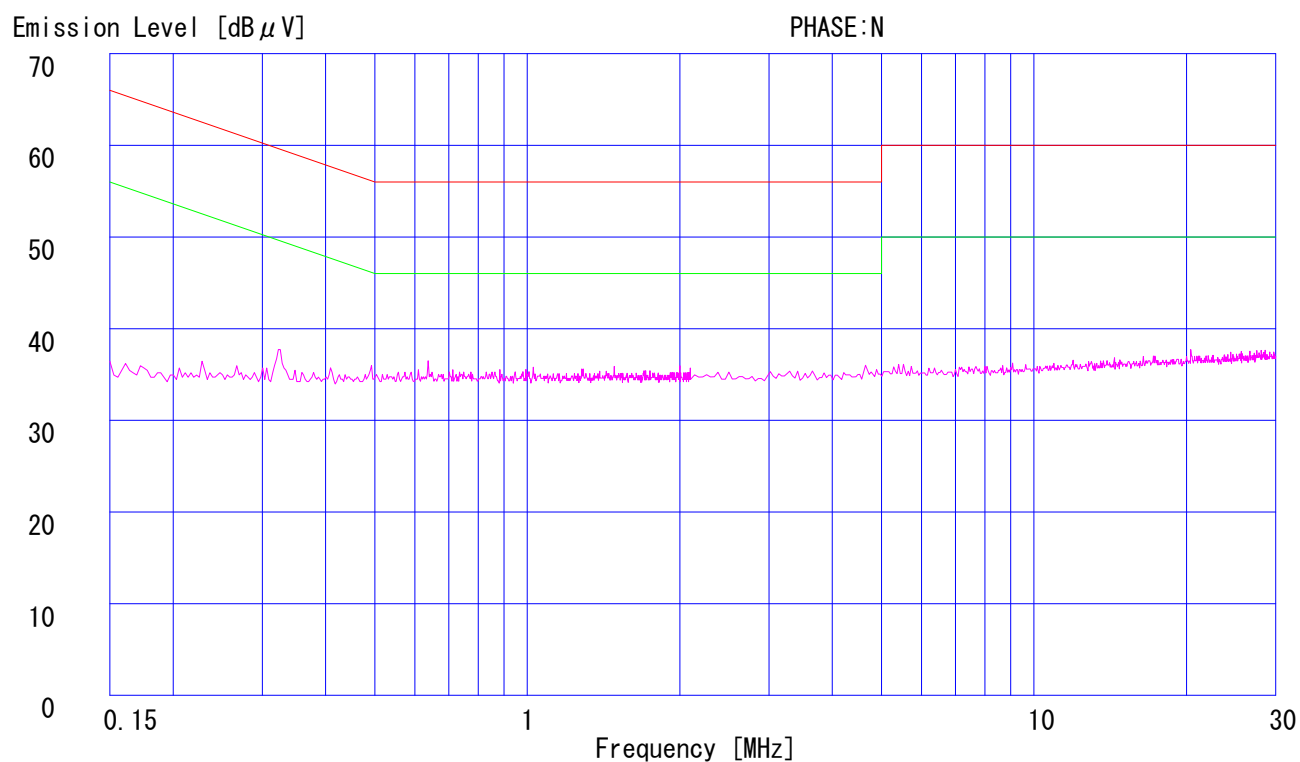
UL Japan, Inc.

YAMAKITA No.1 Shielded room

Report No. : 32LE0170-SH-01-A

Applicant : GAIA Holdings Corporation
Type of Equipment : JM1
Model No. : JM1V1
Serial No. : 000327
Power : DC3.3V (AC120V/60Hz)
Mode : Tx 2480MHz (DH5)
Remarks : -
Date : 8/9/2012
Phase : Single Phase
Temperature : 25 °C
Humidity : 62 %
Limit 1 : FCC Part15C § 15.207. (CISPR Pub.22)
Limit 2 : None

Engineer : Yasumasa Owaki



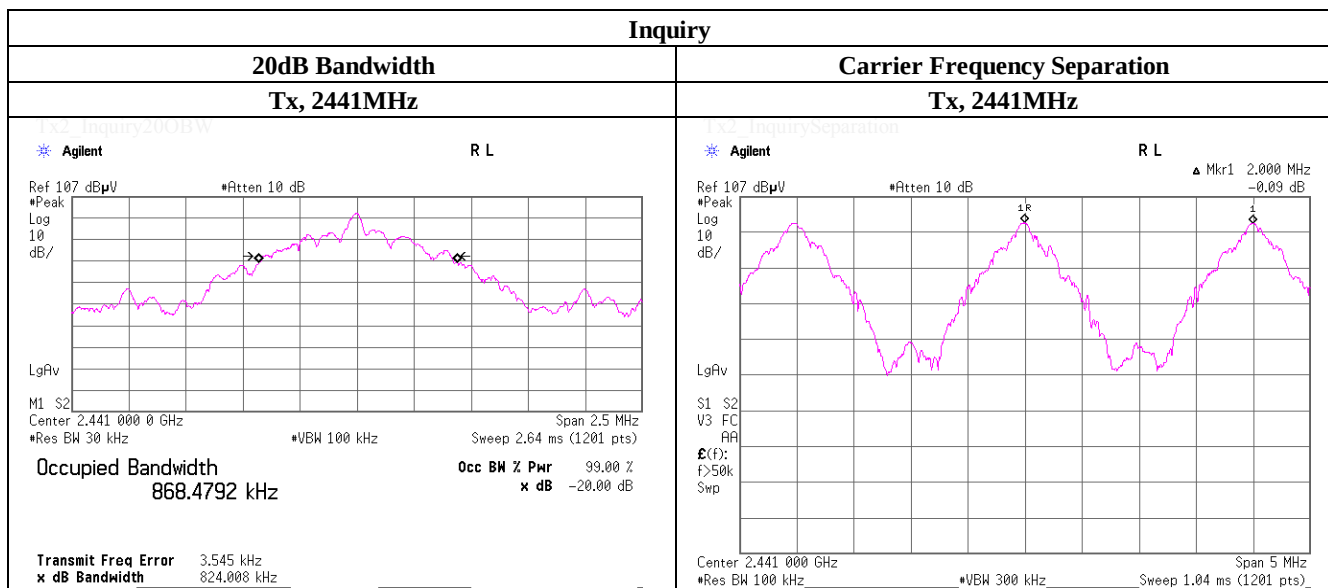
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 6, 2012	
Temperature / Humidity	25 deg.C , 47 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	1.019	1.000	>= 0.679
DH5	2441.0	0.952	1.000	>= 0.635
DH5	2480.0	0.963	1.000	>= 0.642
Inquiry	2441.0	0.824	2.000	>= 0.549

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.



UL Japan, Inc.

Shonan EMC Lab.

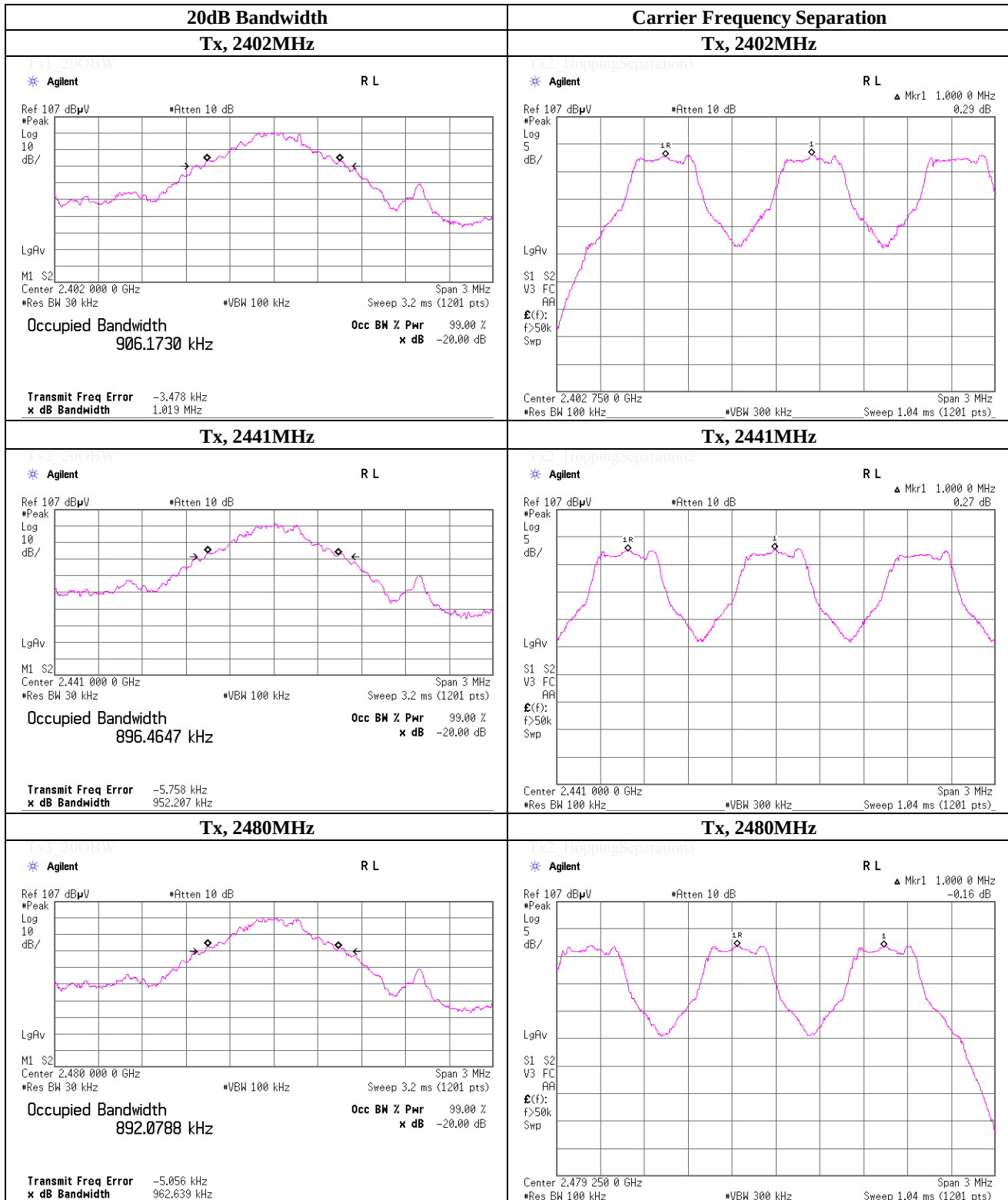
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place

UL Japan, Inc. Shonan EMC Lab.

No.5 Shielded Room

Date

August 6, 2012

Temperature / Humidity

25 deg.C , 47 %RH

Engineer

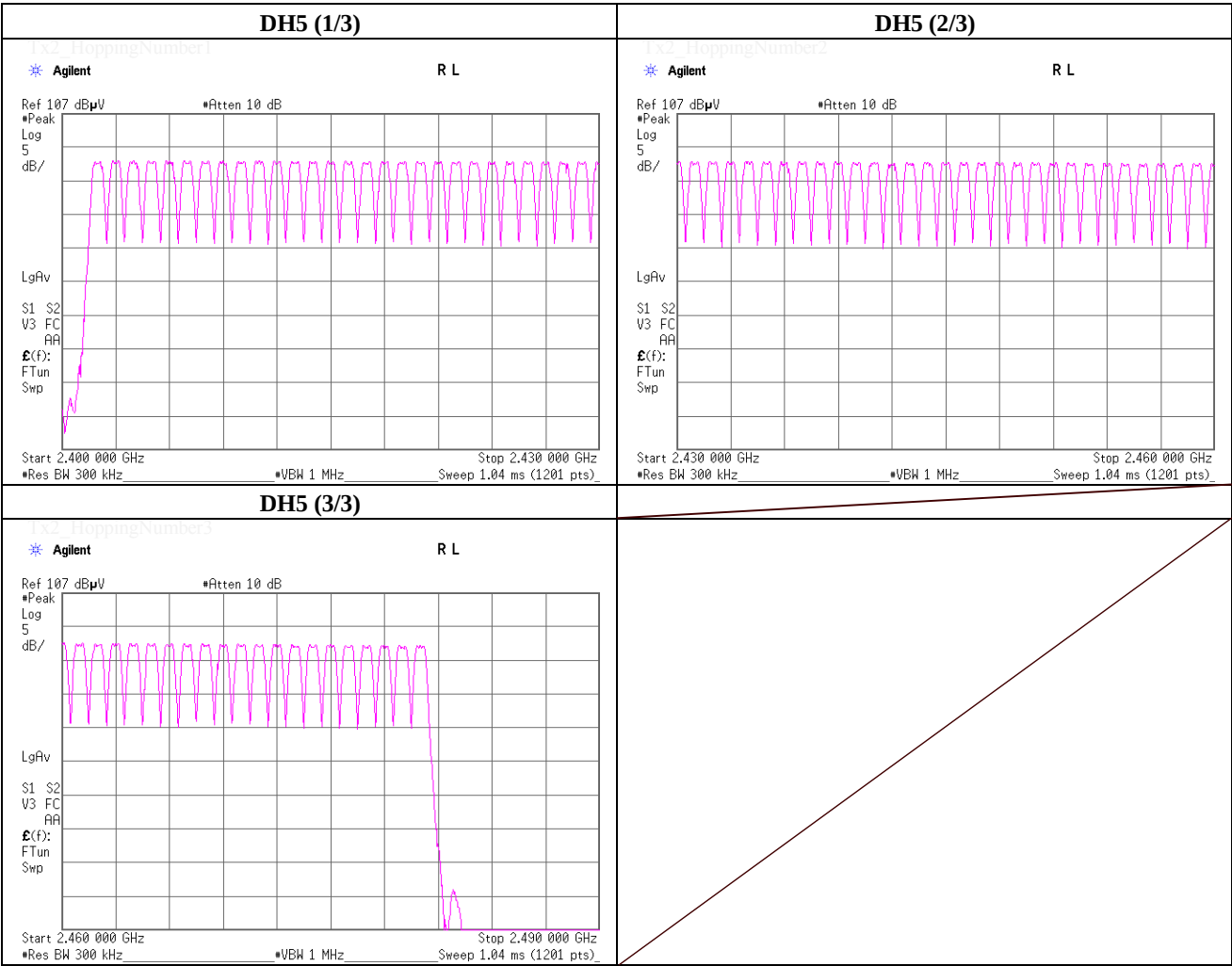
Shinichi Takano

Mode

Tx, Bluetooth, BDR, PRBS9

Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.



Number of Hopping Frequency

Test place

UL Japan, Inc. Shonan EMC Lab.

No.5 Shielded Room

Date

August 6, 2012

Temperature / Humidity

25 deg.C , 47 %RH

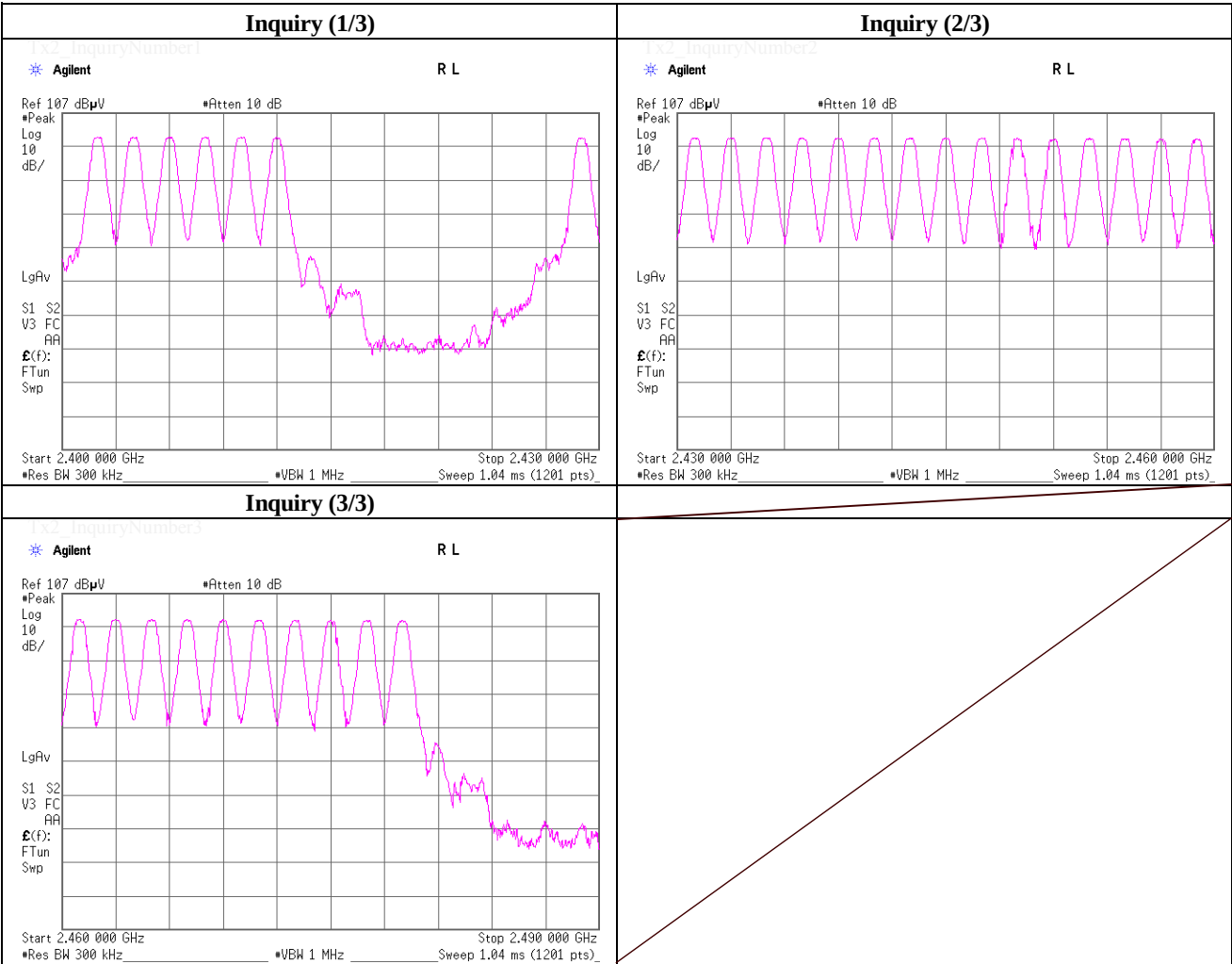
Engineer

Shinichi Takano

Mode

Tx, Bluetooth, Inquiry

Mode	Number of Channel [times]	Limit [times]
Inquiry	32	>= 15



Dwell Time

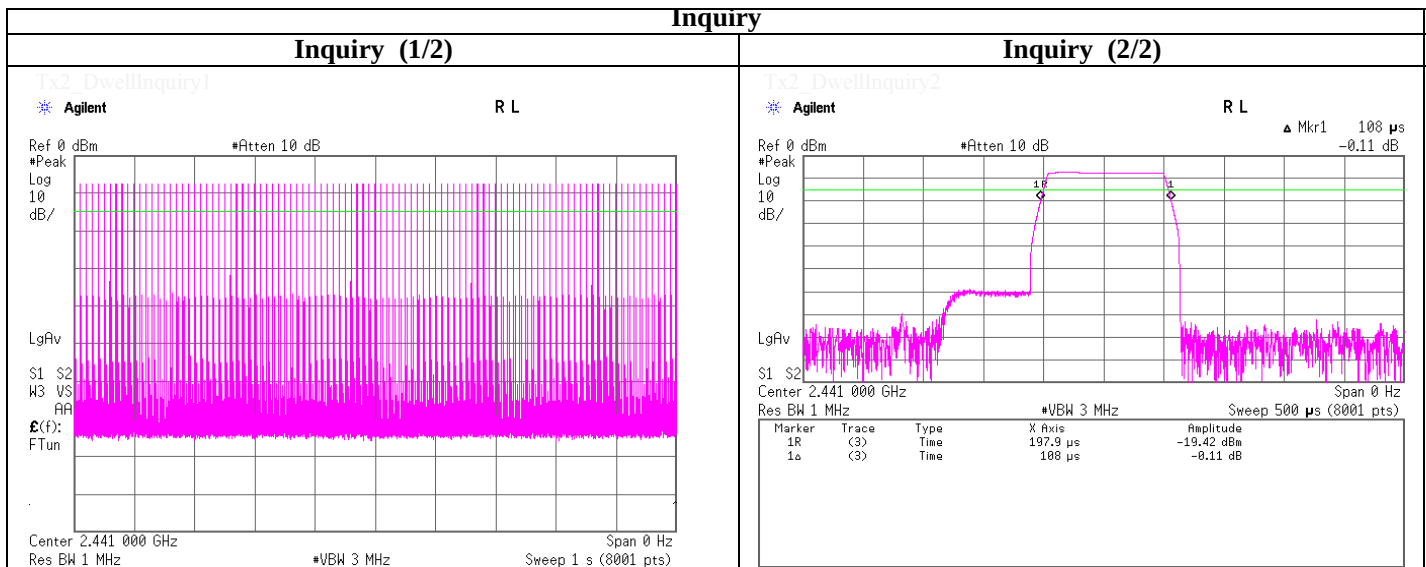
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 6, 2012	
Temperature / Humidity	25 deg.C , 47 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period		Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0	/ 5.0 sec. x 31.6 sec. = 323 times	0.405	131	400
DH3	26.0	/ 5.0 sec. x 31.6 sec. = 165 times	1.662	274	400
DH5	17.0	/ 5.0 sec. x 31.6 sec. = 108 times	2.911	314	400
Inquiry	100.0	/ 1.0 sec. x 12.8 sec. = 1280 times	0.108	138	400

Sample Calculation

Result = Number of transmission x Length of transmission time

* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for $N=79$.



UL Japan, Inc.

Shonan EMC Lab.

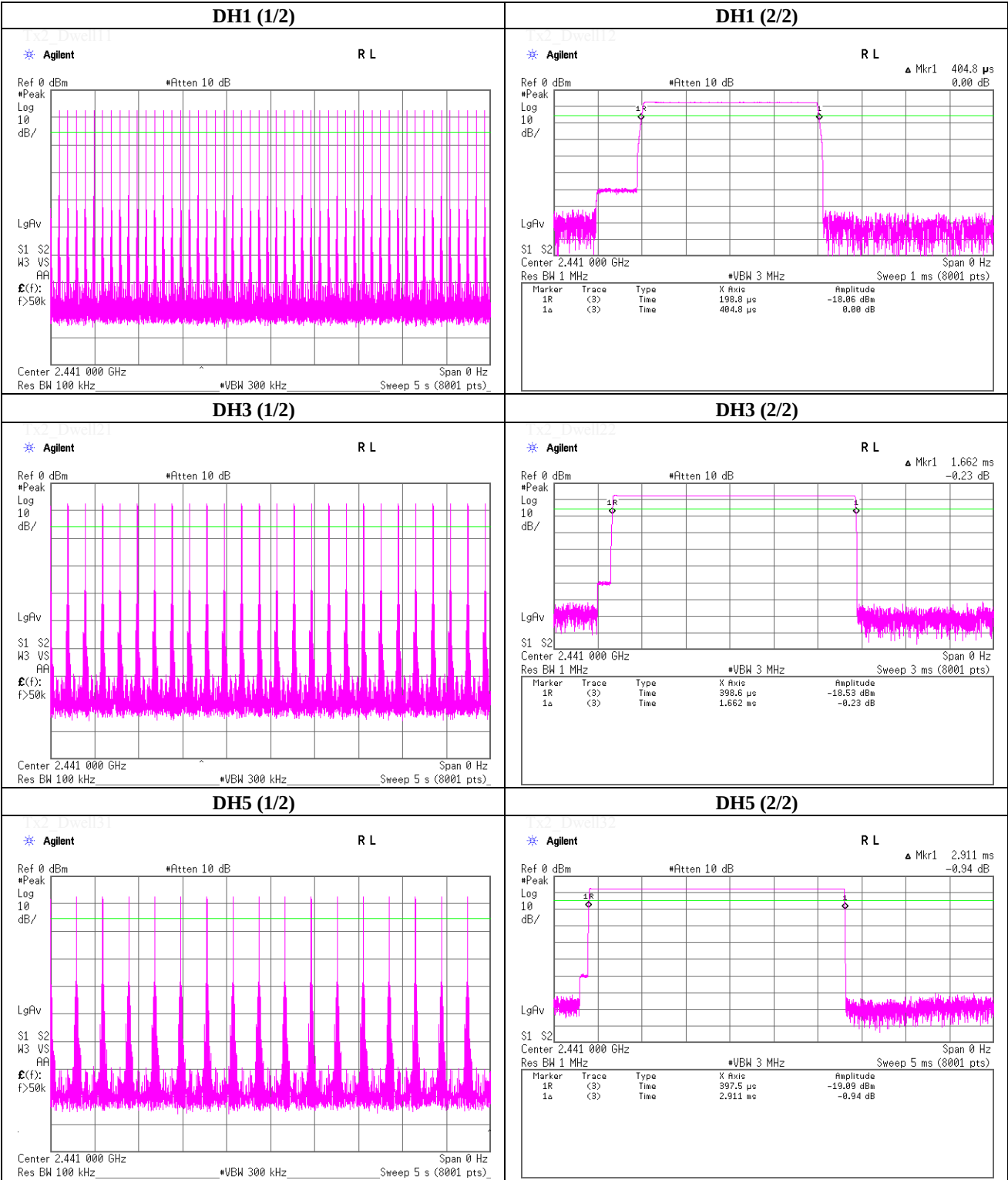
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Dwell time

Tx, Bluetooth, BDR, PRBS9



Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 6, 2012
 Temperature / Humidity 25 deg.C , 47 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth

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

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-6.90	0.25	9.68	3.03	2.01	20.97	125	17.94
DH5	2441.0	-7.04	0.25	9.68	2.89	1.95	20.97	125	18.08
DH5	2480.0	-7.73	0.25	9.68	2.20	1.66	20.97	125	18.77

Sample Calculation:

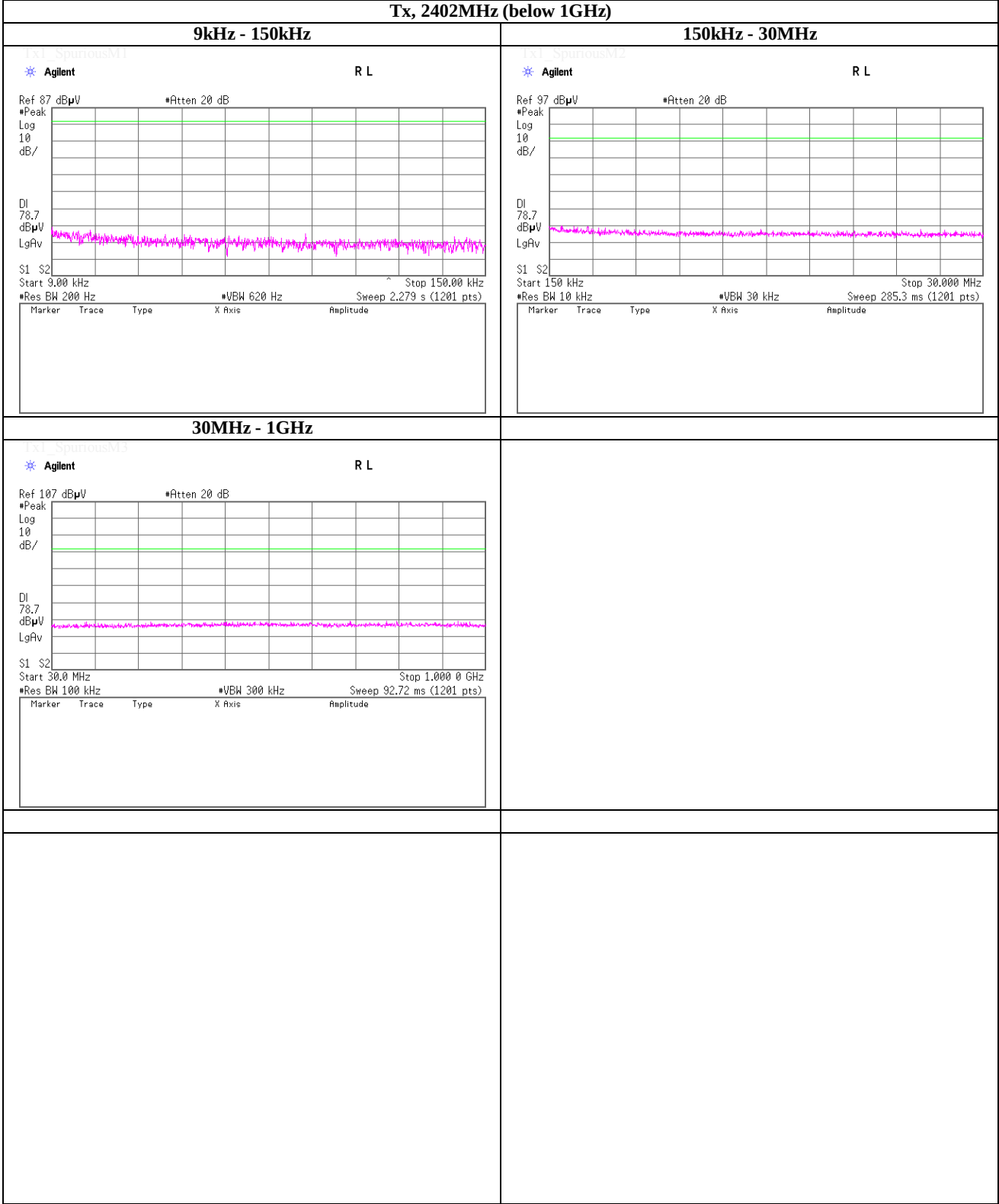
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

UL Japan, Inc.
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

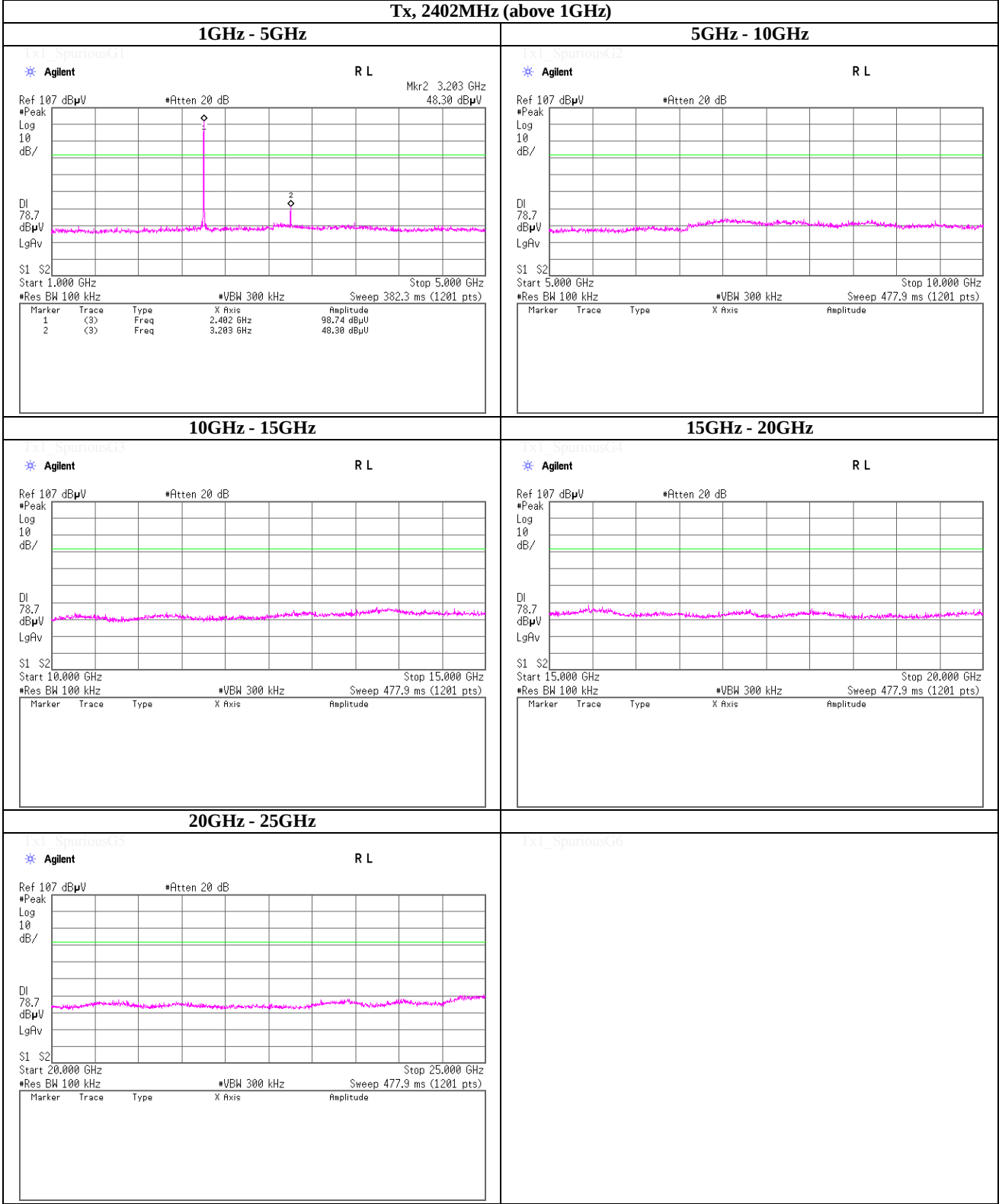
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2402MHz (below 1GHz)



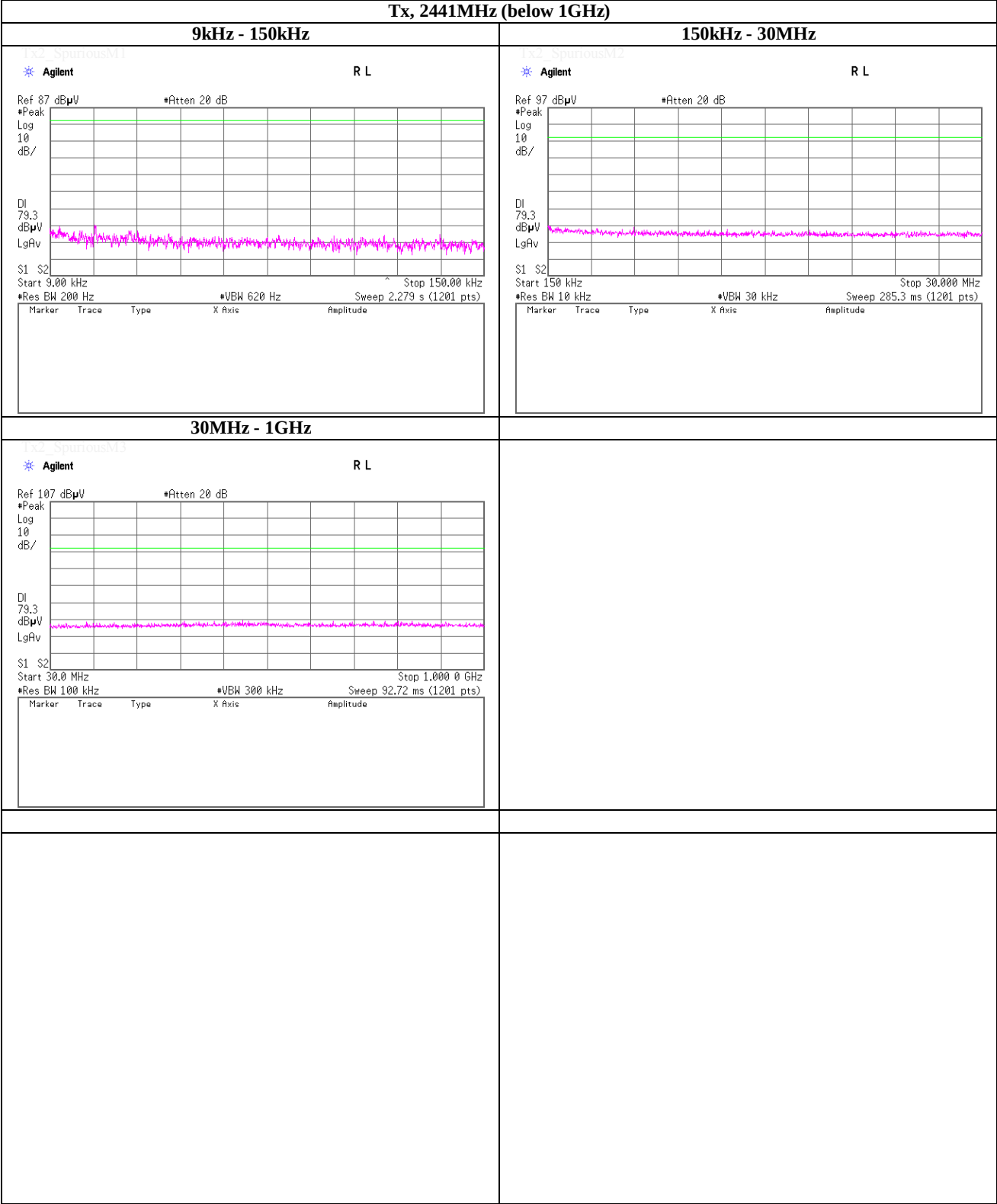
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2402MHz (above 1GHz)



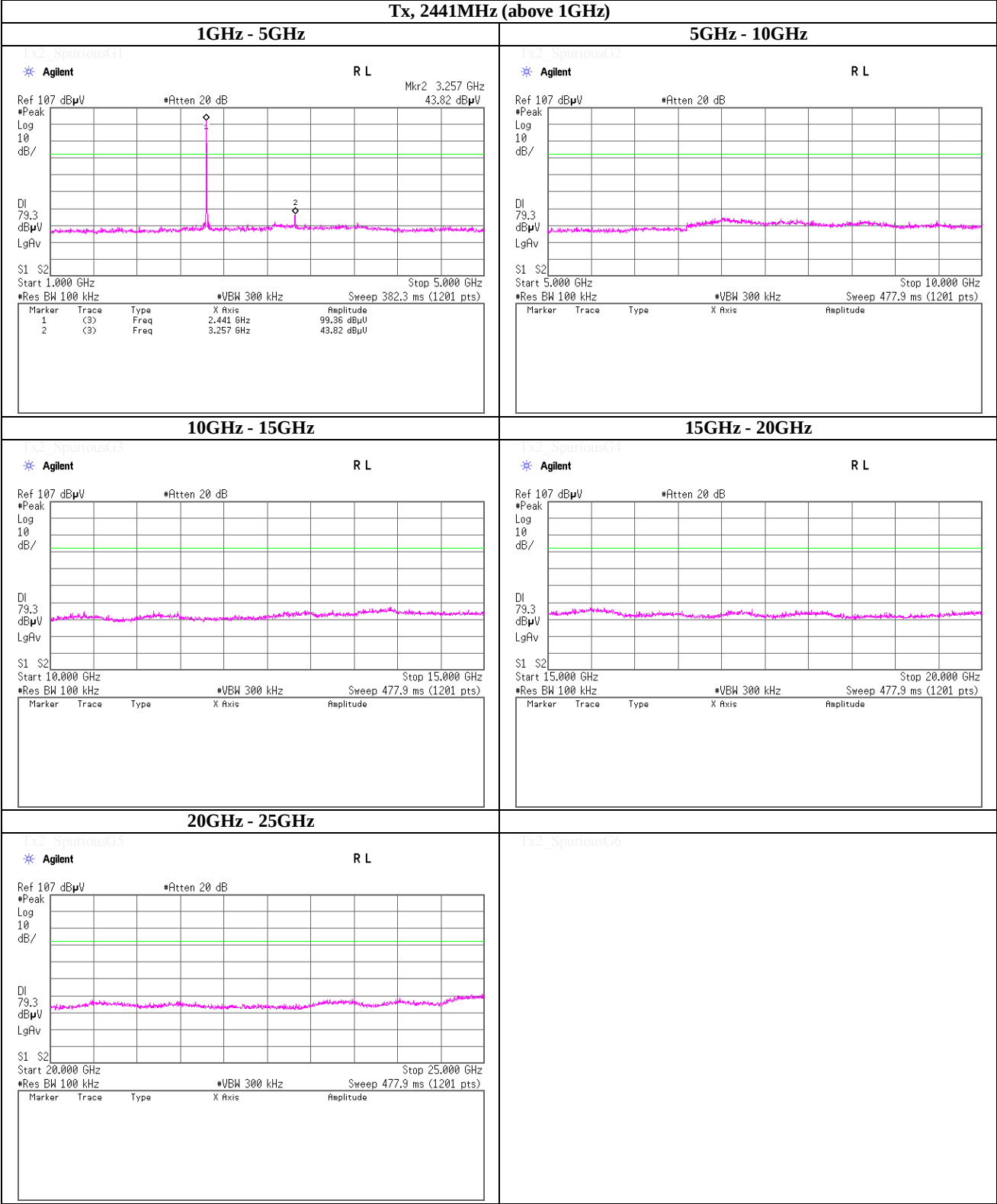
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2441MHz (below 1GHz)



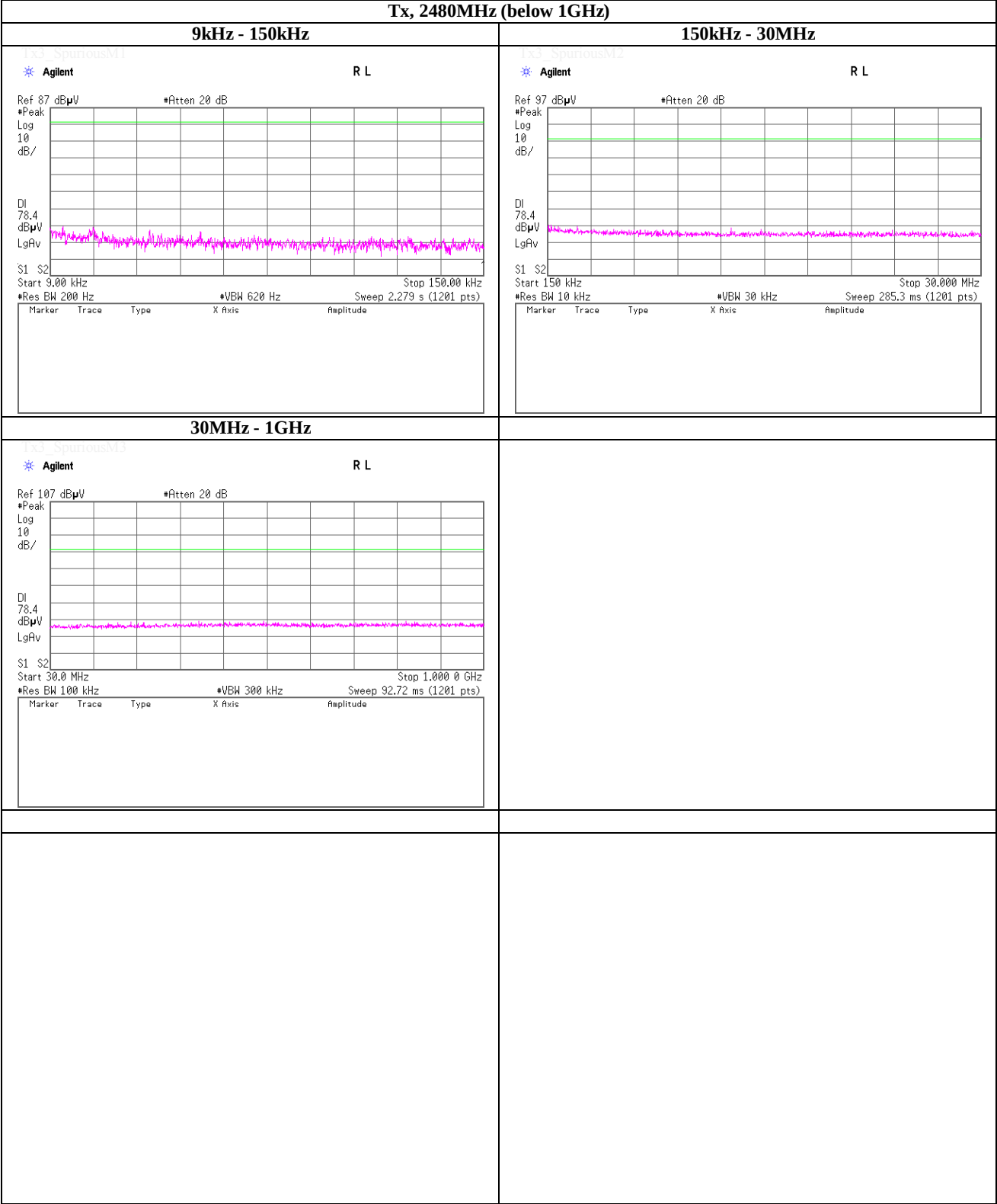
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2441MHz (above 1GHz)



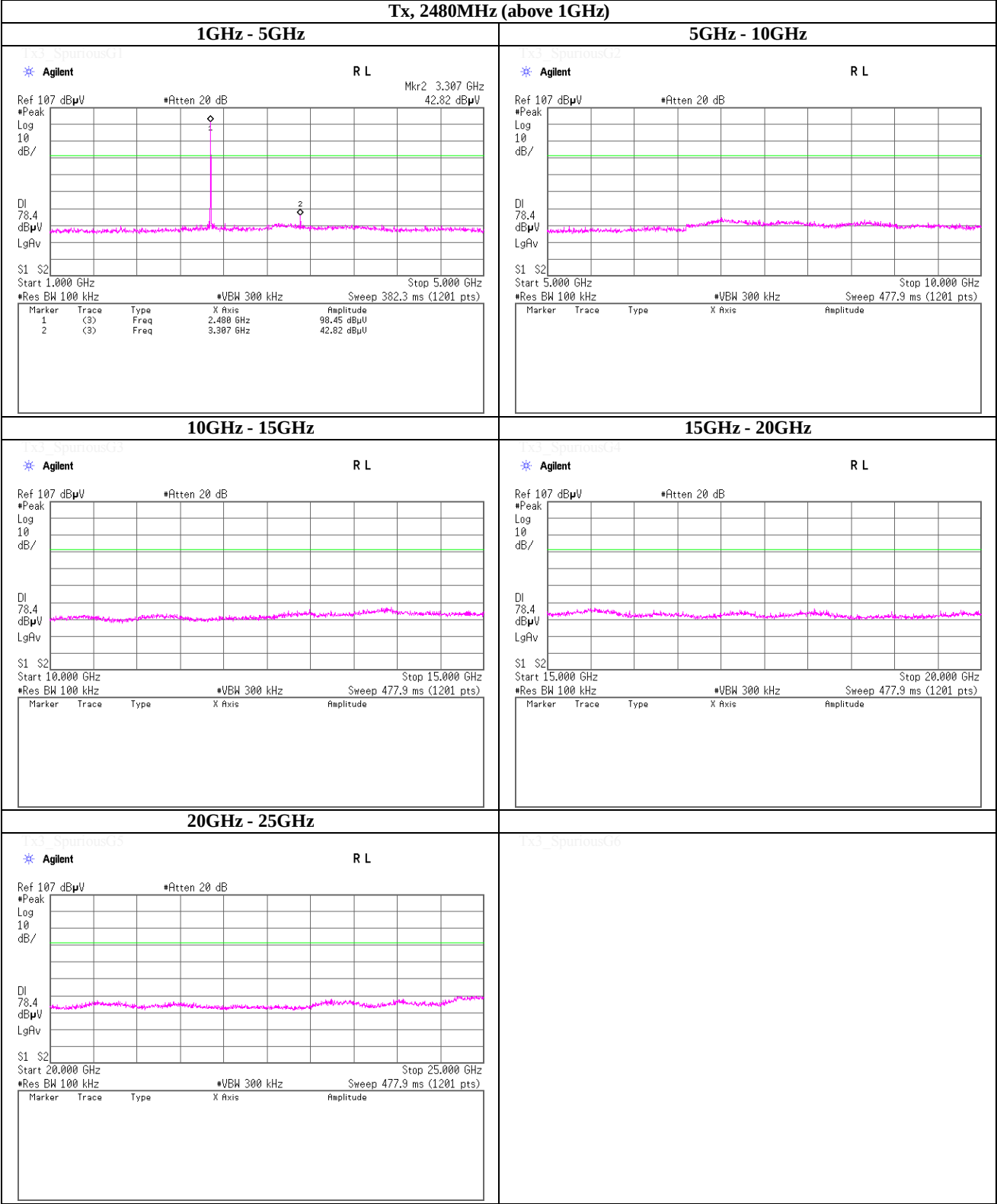
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2480MHz (below 1GHz)



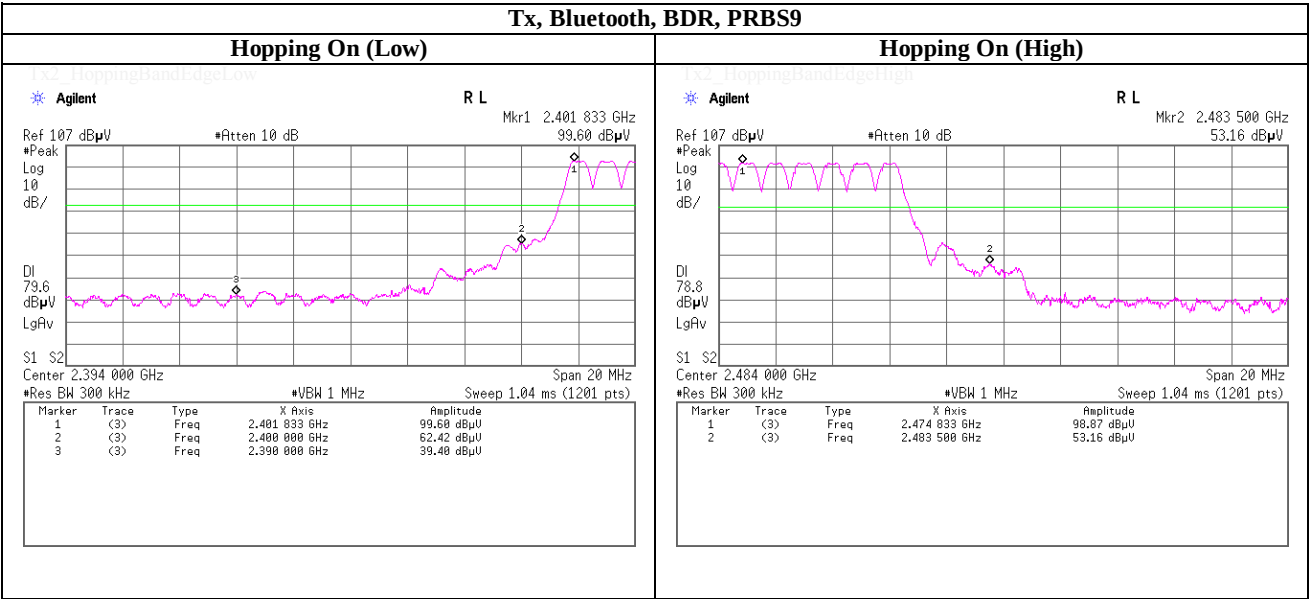
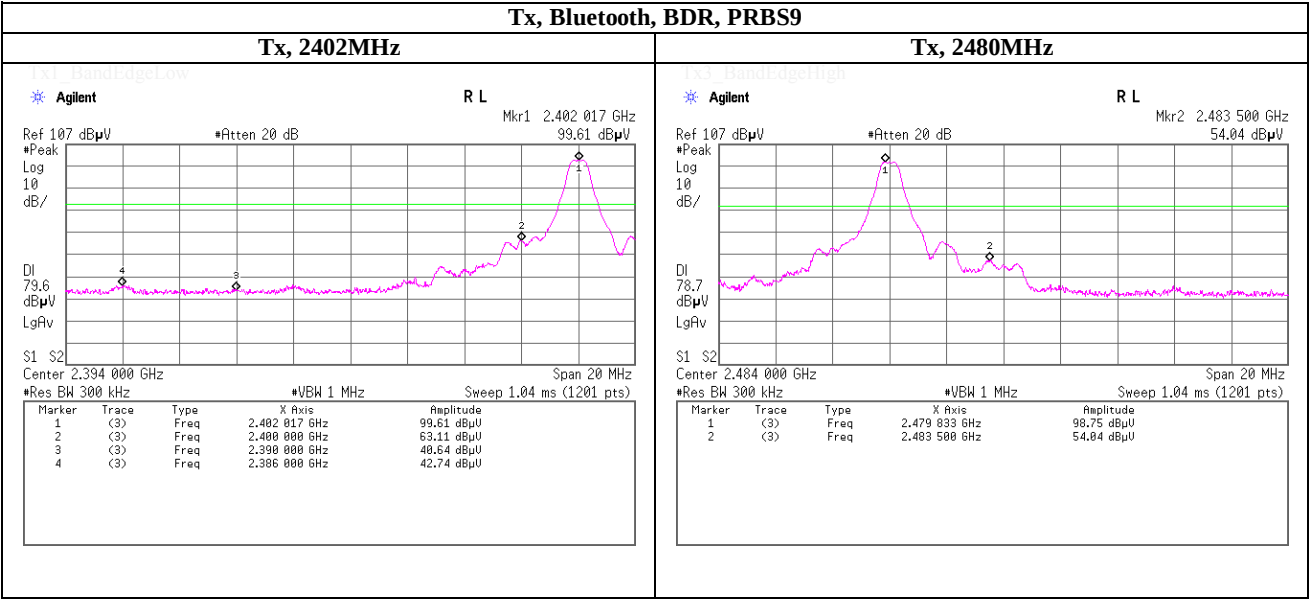
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2480MHz (above 1GHz)



Spurious emission (Conducted)

Band Edge compliance



Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	August 7, 2012	August 8, 2012
Temperature / Humidity	23 deg.C , 64 %RH	25 deg.C , 67 %RH
Engineer	Akira Sato	Akira Sato
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.	31.292	QP	22.0	17.8	6.8	27.6	19.0	40.0	21.0	200	1	PK:VBW 3MHz AV:VBW 10Hz
Hori.	800.667	QP	21.3	22.1	11.3	28.3	26.4	46.0	19.6	100	277	
Hori.	900.000	QP	21.1	22.4	11.6	28.0	27.1	46.0	18.9	100	286	
Hori.	955.148	QP	20.9	23.1	11.8	27.9	27.9	46.0	18.1	100	259	
Hori.	1602.046	PK	47.7	26.6	13.8	37.0	51.1	73.9	22.8	100	54	
Hori.	2386.211	PK	46.9	27.4	14.4	36.4	52.3	73.9	21.6	116	123	
Hori.	2390.000	PK	46.2	27.4	14.4	36.3	51.7	73.9	22.2	116	123	
Hori.	2400.000	PK	53.0	27.4	14.4	36.3	58.5	73.9	15.4	116	123	
Hori.	3203.288	PK	45.6	28.5	15.1	36.7	52.5	73.9	21.4	100	1	
Hori.	4804.000	PK	58.1	30.9	6.7	36.0	59.7	73.9	14.2	156	131	
Hori.	7206.000	PK	45.4	35.9	8.0	36.1	53.2	73.9	20.7	100	355	
Hori.	9608.000	PK	46.5	38.8	10.1	37.0	58.4	73.9	15.5	100	45	
Hori.	12010.000	PK	46.0	38.9	10.7	35.8	59.8	73.9	14.1	100	345	
Hori.	1602.046	AV	37.0	26.6	13.8	37.0	40.4	53.9	13.5	100	54	
Hori.	2386.211	AV	33.4	27.4	14.4	36.4	38.8	53.9	15.1	116	123	
Hori.	3203.288	AV	33.2	28.5	15.1	36.7	40.1	53.9	13.8	100	1	
Vert.	200.000	QP	22.1	16.7	8.4	27.2	20.0	43.5	23.5	100	99	
Vert.	299.000	QP	20.4	20.3	9.0	27.0	22.7	46.0	23.3	100	141	
Vert.	1602.046	PK	47.6	26.6	13.8	37.0	51.0	73.9	22.9	100	143	
Vert.	2386.211	PK	46.8	27.4	14.4	36.4	52.2	73.9	21.7	100	0	
Vert.	2390.000	PK	46.0	27.4	14.4	36.3	51.5	73.9	22.4	100	0	
Vert.	2400.000	PK	53.8	27.4	14.4	36.3	59.3	73.9	14.6	100	0	
Vert.	3203.000	PK	45.5	28.5	15.1	36.7	52.4	73.9	21.5	100	0	
Vert.	4804.000	PK	60.4	30.9	6.7	36.0	62.0	73.9	11.9	100	129	
Vert.	7206.000	PK	45.6	35.9	8.0	36.1	53.4	73.9	20.5	163	339	
Vert.	9608.000	PK	46.5	38.8	10.1	37.0	58.4	73.9	15.5	147	124	
Vert.	12010.000	PK	44.9	38.9	10.7	35.8	58.7	73.9	15.2	100	12	
Vert.	1602.046	AV	33.7	26.6	13.8	37.0	37.1	53.9	16.8	100	143	
Vert.	2386.211	AV	33.7	27.4	14.4	36.4	39.1	53.9	14.8	100	0	
Vert.	3203.000	AV	33.3	28.5	15.1	36.7	40.2	53.9	13.7	100	0	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	AV	33.4	27.4	14.4	36.3	-24.7	14.2	53.9	39.7	116	123	AV:VBW 10Hz
Hori.	2400.000	AV	42.9	27.4	14.4	36.3	-24.7	23.7	53.9	30.2	116	123	
Hori.	4804.000	AV	48.1	30.9	6.7	36.0	-24.7	25.0	53.9	28.9	156	131	
Hori.	7206.000	AV	31.8	35.9	8.0	36.1	-24.7	14.9	53.9	39.0	100	355	
Hori.	9608.000	AV	34.3	38.8	10.1	37.0	-24.7	21.5	53.9	32.4	100	45	
Hori.	12010.000	AV	31.7	38.9	10.7	35.8	-24.7	20.8	53.9	33.1	100	345	
Vert.	2390.000	AV	33.4	27.4	14.4	36.3	-24.7	14.2	53.9	39.7	116	123	
Vert.	2400.000	AV	44.7	27.4	14.4	36.3	-24.7	25.5	53.9	28.4	116	123	
Vert.	4804.000	AV	48.9	30.9	6.7	36.0	-24.7	25.8	53.9	28.1	100	129	
Vert.	7206.000	AV	33.8	35.9	8.0	36.1	-24.7	16.9	53.9	37.1	163	339	
Vert.	9608.000	AV	33.9	38.8	10.1	37.0	-24.7	21.1	53.9	32.8	147	124	
Vert.	12010.000	AV	31.7	38.9	10.7	35.8	-24.7	20.8	53.9	33.1	100	12	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	August 7, 2012	August 8, 2012
Temperature / Humidity	23 deg.C , 64 %RH	25 deg.C , 67 %RH
Engineer	Akira Sato	Akira Sato
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.	33.430	QP	21.5	17.3	6.8	27.6	18.0	40.0	22.0	150	16	PK:VBW 3MHz AV:VBW 10Hz
Hori.	206.901	QP	20.7	16.8	8.4	27.1	18.8	43.5	24.7	325	5	
Hori.	813.666	QP	21.3	22.2	11.3	28.2	26.6	46.0	19.4	100	16	
Hori.	900.000	QP	21.5	22.4	11.6	28.0	27.5	46.0	18.5	100	352	
Hori.	955.000	QP	21.1	23.1	11.8	27.9	28.1	46.0	17.9	100	6	
Hori.	1628.175	PK	47.8	26.7	13.8	37.1	51.2	73.9	22.7	100	134	
Hori.	3257.000	PK	45.8	28.5	15.1	36.9	52.5	73.9	21.4	100	2	
Hori.	4882.000	PK	61.9	31.2	6.8	36.1	63.8	73.9	10.1	123	130	
Hori.	7323.000	PK	47.5	36.1	8.1	36.4	55.3	73.9	18.6	100	134	
Hori.	9764.000	PK	49.0	38.8	10.2	36.7	61.3	73.9	12.6	143	138	
Hori.	12205.000	PK	46.4	39.1	10.6	35.7	60.4	73.9	13.5	124	46	
Hori.	1628.175	AV	36.8	26.7	13.8	37.1	40.2	53.9	13.7	100	134	
Hori.	3257.000	AV	33.1	28.5	15.1	36.9	39.8	53.9	14.1	100	2	
Vert.	293.140	QP	20.6	20.0	9.0	27.0	22.6	46.0	23.4	100	16	
Vert.	567.000	QP	21.6	19.2	10.2	28.5	22.5	46.0	23.5	100	328	
Vert.	1628.175	PK	47.4	26.7	13.8	37.1	50.8	73.9	23.1	112	134	
Vert.	3256.969	PK	44.9	28.5	15.1	36.9	51.6	73.9	22.3	100	10	
Vert.	4882.000	PK	61.0	31.2	6.8	36.1	62.9	73.9	11.0	110	343	
Vert.	7323.000	PK	44.8	36.1	8.1	36.4	52.6	73.9	21.3	100	43	
Vert.	9764.000	PK	48.0	38.8	10.2	36.7	60.3	73.9	13.6	148	67	
Vert.	12205.000	PK	45.5	39.1	10.6	35.7	59.5	73.9	14.4	145	123	
Vert.	1628.175	AV	35.6	26.7	13.8	37.1	39.0	53.9	14.9	112	134	
Vert.	3256.969	AV	33.1	28.5	15.1	36.9	39.8	53.9	14.1	100	10	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	4882.000	AV	53.5	31.2	6.8	36.1	-24.7	30.7	53.9	23.2	123	130	AV:VBW 10Hz
Hori.	7323.000	AV	33.3	36.1	8.1	36.4	-24.7	16.4	53.9	37.5	100	134	
Hori.	9764.000	AV	34.8	38.8	10.2	36.7	-24.7	22.4	53.9	31.5	143	138	
Hori.	12205.000	AV	34.4	39.1	10.6	35.7	-24.7	23.7	53.9	30.3	124	46	
Vert.	4882.000	AV	49.3	31.2	6.8	36.1	-24.7	26.5	53.9	27.4	110	343	
Vert.	7323.000	AV	31.3	36.1	8.1	36.4	-24.7	14.4	53.9	39.5	100	43	
Vert.	9764.000	AV	35.1	38.8	10.2	36.7	-24.7	22.7	53.9	31.2	148	67	
Vert.	12205.000	AV	33.4	39.1	10.6	35.7	-24.7	22.7	53.9	31.2	145	123	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	August 7, 2012	August 8, 2012
Temperature / Humidity	23 deg.C , 64 %RH	25 deg.C , 67 %RH
Engineer	Akira Sato	Akira Sato
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.	30.070	QP	21.4	18.2	6.8	27.6	18.8	40.0	21.2	200	132	PK:VBW 3MHz AV:VBW 10Hz
Hori.	200.000	QP	20.8	16.7	8.4	27.2	18.7	43.5	24.8	300	227	
Hori.	826.667	QP	21.3	22.2	11.4	28.2	26.7	46.0	19.3	100	136	
Hori.	900.000	QP	21.2	22.4	11.6	28.0	27.2	46.0	18.8	100	256	
Hori.	955.000	QP	21.1	23.1	11.8	27.9	28.1	46.0	17.9	100	19	
Hori.	1653.969	PK	47.2	26.8	13.8	37.1	50.7	73.9	23.2	100	19	
Hori.	2483.500	PK	51.8	27.3	14.5	36.9	56.7	73.9	17.2	112	333	
Hori.	3225.991	PK	46.5	28.5	15.1	36.9	53.2	73.9	20.7	100	13	
Hori.	3307.176	PK	45.8	28.6	15.2	36.9	52.7	73.9	21.2	100	0	
Hori.	4960.000	PK	64.7	31.4	6.7	36.0	66.8	73.9	7.1	107	327	
Hori.	7440.000	PK	45.3	36.3	8.1	36.5	53.2	73.9	20.7	100	127	
Hori.	9920.000	PK	46.2	38.9	10.2	36.6	58.7	73.9	15.2	100	145	
Hori.	12400.000	PK	44.9	39.3	10.7	35.4	59.5	73.9	14.4	100	154	
Hori.	1653.969	AV	35.7	26.8	13.8	37.1	39.2	53.9	14.7	100	19	
Hori.	3225.991	AV	33.0	28.5	15.1	36.9	39.7	53.9	14.2	100	13	
Hori.	3307.176	AV	33.1	28.6	15.2	36.9	40.0	53.9	13.9	100	0	
Vert.	295.605	QP	20.4	20.1	9.0	27.0	22.5	46.0	23.5	100	15	
Vert.	718.447	QP	21.8	20.8	11.0	28.4	25.2	46.0	20.8	100	131	
Vert.	1653.969	PK	48.6	26.8	13.8	37.1	52.1	73.9	21.8	109	110	
Vert.	2483.500	PK	49.3	27.3	14.5	36.9	54.2	73.9	19.7	100	235	
Vert.	3225.991	PK	46.5	28.5	15.1	36.9	53.2	73.9	20.7	100	12	
Vert.	3307.176	PK	46.4	28.6	15.2	36.9	53.3	73.9	20.6	100	53	
Vert.	4960.000	PK	61.3	31.4	6.7	36.0	63.4	73.9	10.5	100	123	
Vert.	7440.000	PK	44.7	36.3	8.1	36.5	52.6	73.9	21.3	100	23	
Vert.	9920.000	PK	46.4	38.9	10.2	36.6	58.9	73.9	15.0	100	32	
Vert.	12400.000	PK	44.2	39.3	10.7	35.4	58.8	73.9	15.1	100	1	
Vert.	1653.969	AV	39.6	26.8	13.8	37.1	43.1	53.9	10.8	109	110	
Vert.	3225.991	AV	33.1	28.5	15.1	36.9	39.8	53.9	14.1	100	12	
Vert.	3307.176	AV	33.1	28.6	15.2	36.9	40.0	53.9	13.9	100	53	

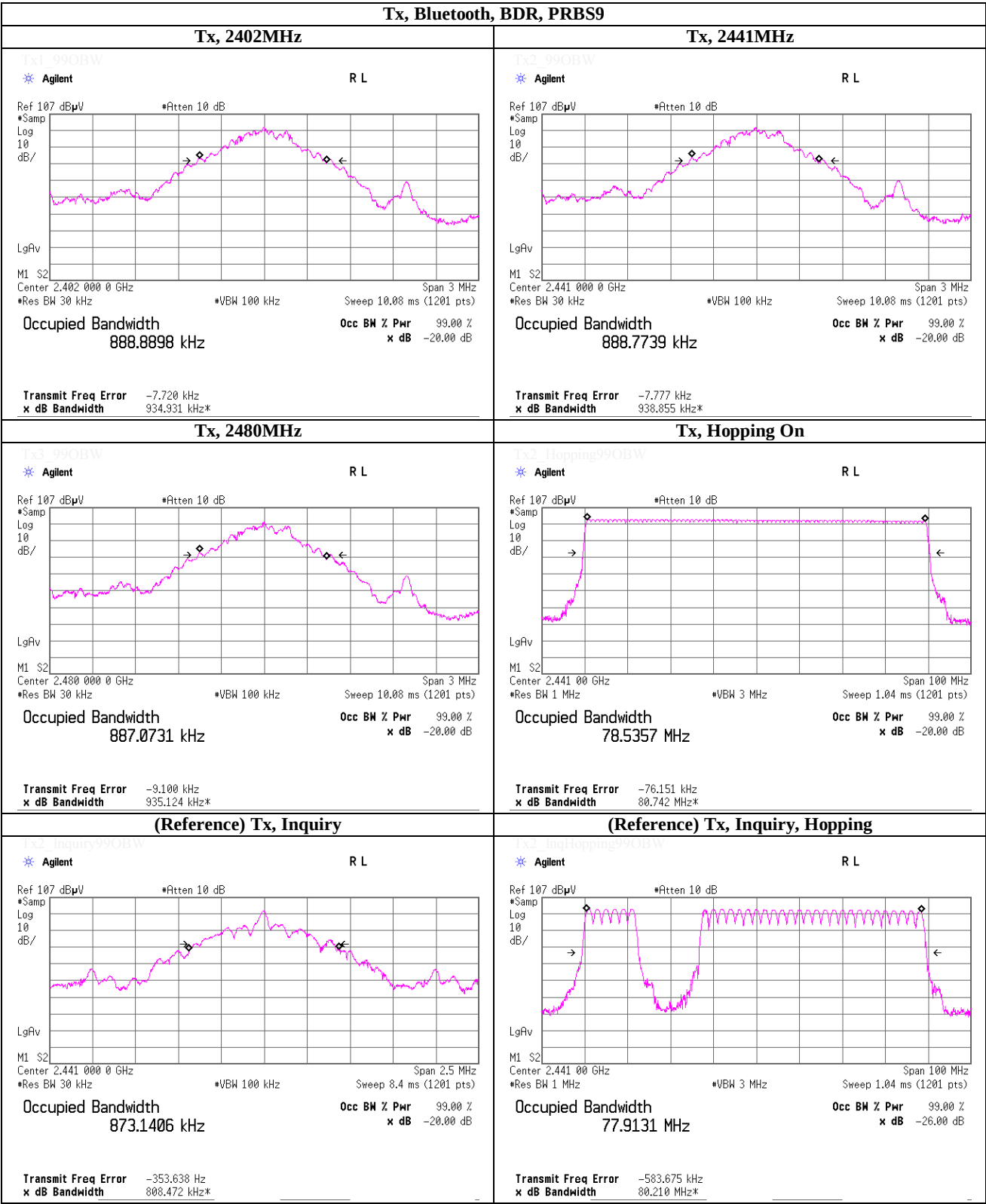
(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	AV	34.4	27.3	14.5	36.9	-24.7	14.6	53.9	39.3	112	333	AV:VBW 10Hz
Hori.	4960.000	AV	58.7	31.4	6.7	36.0	-24.7	36.1	53.9	17.8	107	327	
Hori.	7440.000	AV	31.6	36.3	8.1	36.5	-24.7	14.8	53.9	39.2	100	127	
Hori.	9920.000	AV	32.3	38.9	10.2	36.6	-24.7	20.1	53.9	33.8	100	145	
Hori.	12400.000	AV	30.7	39.3	10.7	35.4	-24.7	20.6	53.9	33.3	100	154	
Vert.	2483.500	AV	34.8	27.3	14.5	36.9	-24.7	15.0	53.9	38.9	100	235	
Vert.	4960.000	AV	55.1	31.4	6.7	36.0	-24.7	32.5	53.9	21.4	100	123	
Vert.	7440.000	AV	31.2	36.3	8.1	36.5	-24.7	14.4	53.9	39.5	100	23	
Vert.	9920.000	AV	33.0	38.9	10.2	36.6	-24.7	20.8	53.9	33.2	100	32	
Vert.	12400.000	AV	30.6	39.3	10.7	35.4	-24.7	20.5	53.9	33.4	100	1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

99% Occupied Bandwidth



APPENDIX

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2012/02/16 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2011/11/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	1	RE	2011/08/08 * 12
KAF-02	Pre Amplifier	Hewlett Packard	8449B	3008A01268	RE	2012/04/06 * 12
KAF-06	Pre Amplifier	TSJ	MLA-1840B02-35	-	RE	2012/03/12 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	230	RE	2012/05/21 * 12
KHA-06	Horn Antenna	ETS LINDGREN	3116	00046543	RE	2012/03/30 * 12
KCC-D24/D25	Coaxial Cable	Suhner	SUCOFLEX 102	32718/2 / 32709/2	RE	2012/04/06 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2011/10/22 * 12
KJM-07	Measure	KOMELON	KMC-36	-	RE	-
KOS-02	Humidity Indicator	Custom	CTH-190	K-02	RE	2011/08/22 * 12
KAT10-S2	Attenuator	Agilent	8490D 010	06036	RE	2011/12/27 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	004	RE	2012/04/06 * 12
KAF-03	Pre Amplifier	Hewlett Packard	8447D	2944A09947	RE	2011/11/04 * 12
KAT6-05	Attenuator	INMET	18N-6dB	-	RE	2011/08/30 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1926	RE	2011/11/16 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	170	RE	2011/10/23 * 12
KCC-42/31/32 /34/37/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/8D-2W/S04272B/RFM-E421	-/01055	RE	2011/10/31 * 12
CUST-YA-CE	Conducted emission(software)	UL Japan	CE(Ver.2.0)	-	CE	-
KLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	8127344	CE	2012/06/01 * 12
KAT13-01	Attenuator	JFW	50FP-013-H2N	-	CE	2012/04/16 * 12
KCC-14/15/16 /18/KPL-01/KRM-01	Coaxial Cable/Pulse Limiter/RF Relay Matrix	Fujikura/Suhner/PMM/TSJ	5D-2W(10m)/8D-2W(10m)/S04272B(2m)/S04272B(2m)/P L01/-	-/9909017	CE	2012/04/02 * 12
KSA-02	Spectrum Analyzer	Advantest	R3265A	55060826	CE	2012/02/09 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	830986/017	CE	2011/09/16 * 12
KJM-10	Measure	KOMELON	KMC-36	-	CE	-
KOS-04	Humidity Indicator	SATO	PC-5000TRH	B-08	CE	2012/08/02 * 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 ,
 AT: Antenna terminal conducted test ,
 CE: Conducted emission