



# RADIO TEST REPORT

**Test Report No.: 10059467S-A**

**Applicant** : Sony Corporation  
**Type of Equipment** : FM/AM Digital Media Player  
**Model No.** : DSX-M50BT  
**FCC ID** : AK8DSXM50BT  
**Test regulation** : FCC Part15 Subpart C: 2013  
**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.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
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 5 to October 10, 2013

**Tested by:**

*S. Takano*

Shinichi Takano  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**

*T. Imamura*

Toyokazu Imamura  
Leader of WiSE Japan,  
UL Verification Service



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 There is no testing item of "Non-accreditation".

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Sony Corporation  
Address : Sony City Osaki, 2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan  
Telephone Number : +81 50 3750 7634  
Facsimile Number : +81 50 3750 6574  
Contact Person : Toshihiro Maeda

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

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

Type of Equipment : FM/AM Digital Media Player  
Model Number : DSX-M50BT  
Serial Number : Refer to 4.2 of this report.  
Rating : DC12V (car battery)  
Country of Mass-production : Thailand  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : August 21, 2013  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: DSX-M50BT (referred to as the EUT in this report) is an FM/AM Digital Media Player.

Clock frequency(ies) in the system : 32.768kHz, 7.92MHz, 12MHz, 24MHz, 36.48MHz

Bluetooth specification:

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth & channel spacing : 79MHz & 1MHz  
Type of modulation : FHSS  
Operation temperature range : -20 to +60 deg.C.  
Antenna type : Meander Monopole  
Antenna connector type : U-FL Type Interchangeability  
Antenna gain : -1.18dBi (Peak)  
ITU code : F1D, G1D

FCC 15.31 (e)

The equipment provides the wireless transmitter with stable power supply (DC3.3V). Therefore, the equipment complies with the requirement.

FCC 15.203

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

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

### **3.1 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)	-	-
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 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 C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 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 C63.4:2009 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 C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A		6.6 dB Freq.: 12010.000 MHz Polarization: Horizontal & Vertical Detection: Average Mode: Tx 2402MHz, 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.						

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### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 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

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 (±)
<b>Radiated emission (Measurement distance: 3m)</b>	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
<b>Radiated emission (Measurement distance: 1m)</b>	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 site margin.

#### 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: (±) 1.6dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB

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

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### 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 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 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	-

### 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**

<b>Test item</b>	<b>Operating mode</b>	<b>Tested frequency</b>
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5 -Inquiry	-
Maximum peak output power	Transmitting Hopping OFF, Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5 / 3-DH5), Payload: PRBS9 / Inquiry -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.

Software: CSR Blue Suite BlueTest Ver.1.24  
CSR Blue Suite BtCli Ver.1.24 (Inquiry mode only)  
Power Settings: BDR = 44  
EDR = 48

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

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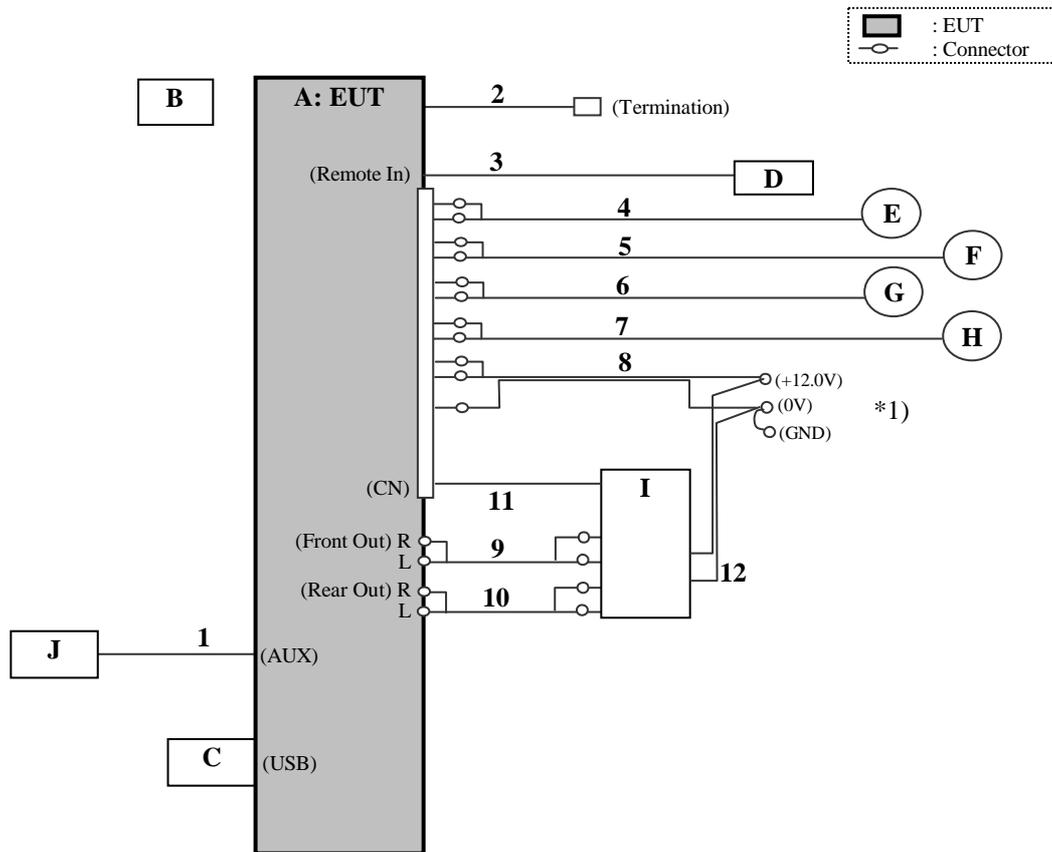
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#### 4.2 Configuration and peripherals



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

\*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

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#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	FM/AM Digital Media Player	DSX-M50BT	*2)	Sony	EUT
B	Remote Commander	RM-X231	-	Sony	-
C	USB Memory	SDK-USM4GL(B)	10615MEDB	Sony	-
D	Wired Remote Controller	RM-X4S	-	Sony	-
E	Speaker 1	XS-F1611	-	Sony	-
F	Speaker 2	XS-F1611	-	Sony	-
G	Speaker 3	1-544-814-31	-	AIWA	-
H	Speaker 4	1-544-814-31	-	AIWA	-
I	Stereo Power Amplifier	XM-423SL	0020316	Sony	-
J	Digital Media Player	NW-A829	5017289	Sony	-

\*2) 26: Antenna terminal conducted tests, 27: Radiated emission tests

#### List of cables used

No.	Name	Length (m)	Shield- Cable	Shield- Connector	Remarks
1	AUX	5.0	Shielded	Shielded	-
2	FM antenna	1.5	Shielded	Shielded	-
3	REMOTE IN	2.0	Shielded	Shielded	-
4	Speaker (1)	0.25+2.0	Unshielded	Unshielded	-
5	Speaker (2)	0.25+2.0	Unshielded	Unshielded	-
6	Speaker (3)	0.25+2.0	Unshielded	Unshielded	-
7	Speaker (4)	0.25+2.0	Unshielded	Unshielded	-
8	DC Power	0.25+1.0	Unshielded	Unshielded	-
9	RCA (Front Audio Out)	5.0	Shielded	Shielded	-
10	RCA (Rear Audio Out)	5.0	Shielded	Shielded	-
11	REM Out	0.25+0.5	Unshielded	Unshielded	-
12	DC Power	0.6+0.8	Unshielded	Unshielded	-

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## **SECTION 5: 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 6: 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 7: 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 8: 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 9: 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.

## **SECTION 10: 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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## **SECTION 11: Radiated emission**

### **11.1 Operating environment**

Test room : 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 platform of nominal size, 1.0m 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 EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the 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 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 mounting angle of -5 to +20 deg (lengthwise direction) and -10 to +10 deg (crosswise direction) based on the product specification to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization \ Test item		Carrier	Spurious emission (Below 1GHz)	Spurious emission (1-15GHz)	Spurious emission (Above 15GHz)
Horizontal	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.

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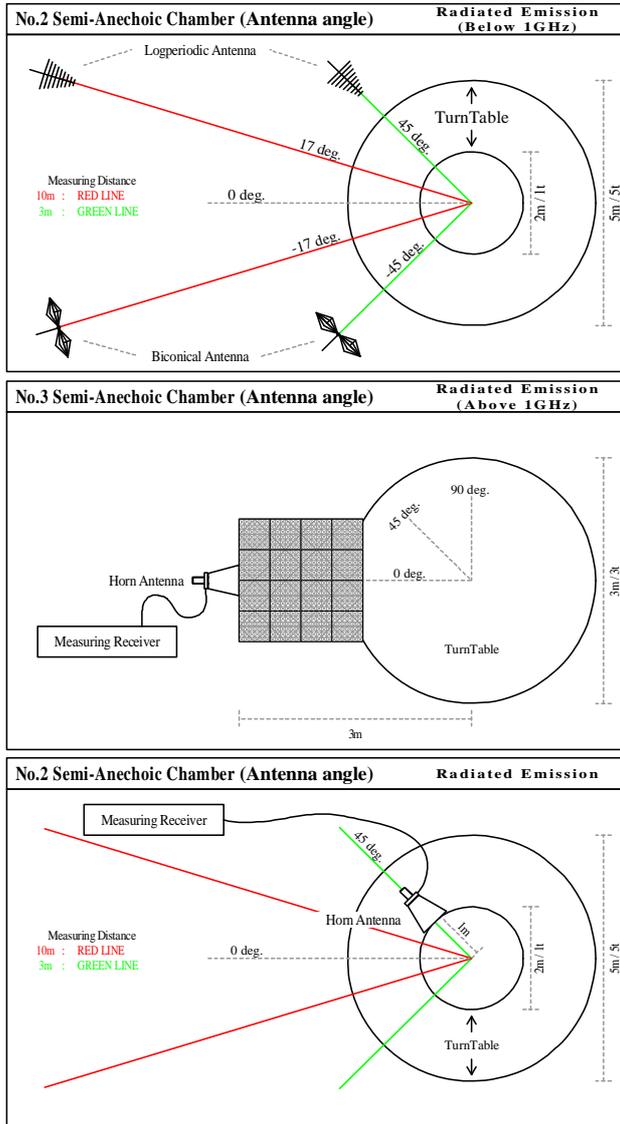
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**Figure 1. Antenna angle**



### 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 5<sup>th</sup> order harmonics.

Refer to APPENDIX 1.

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## Contents of APPENDIXES

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

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

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

Test instruments

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

Radiated emission

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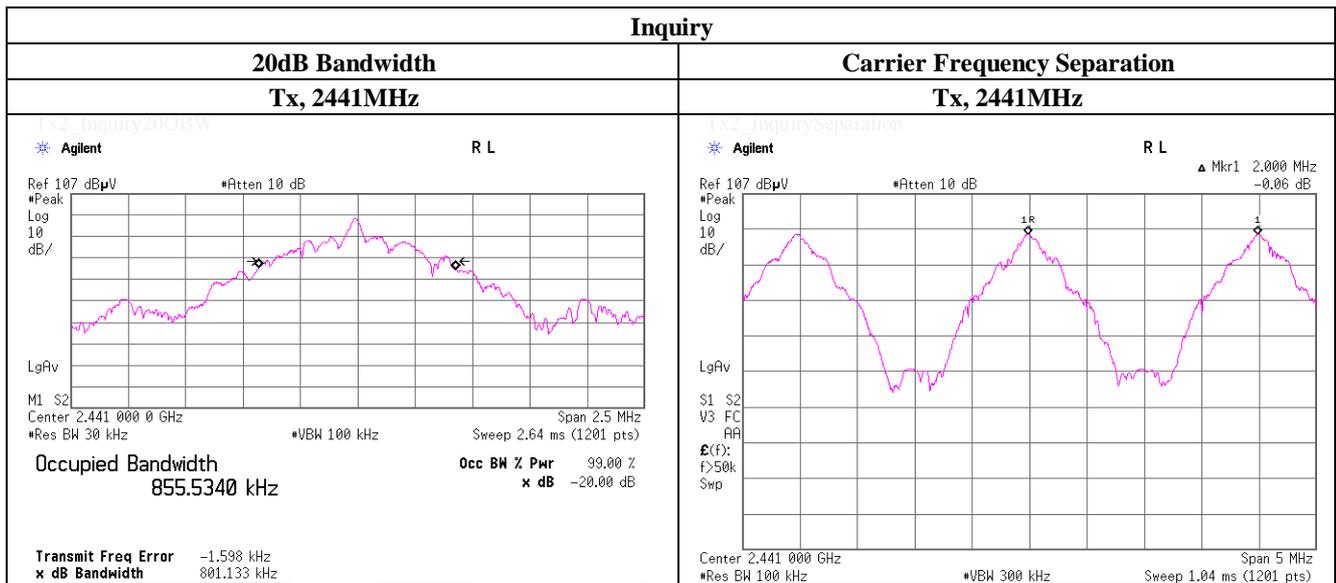
**APPENDIX 1: Data of radio tests**

**20dB Bandwidth and Carrier Frequency Separation**

Test place                      UL Japan, Inc. Shonan EMC Lab.                      No.5 Shielded Room  
 Date                              September 5, 2013  
 Temperature / Humidity      26 deg.C                      , 56 %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	0.930	1.000	>= 0.620
DH5	2441.0	0.948	1.000	>= 0.632
DH5	2480.0	0.964	1.000	>= 0.642
Inquiry	2441.0	0.801	2.000	>= 0.534

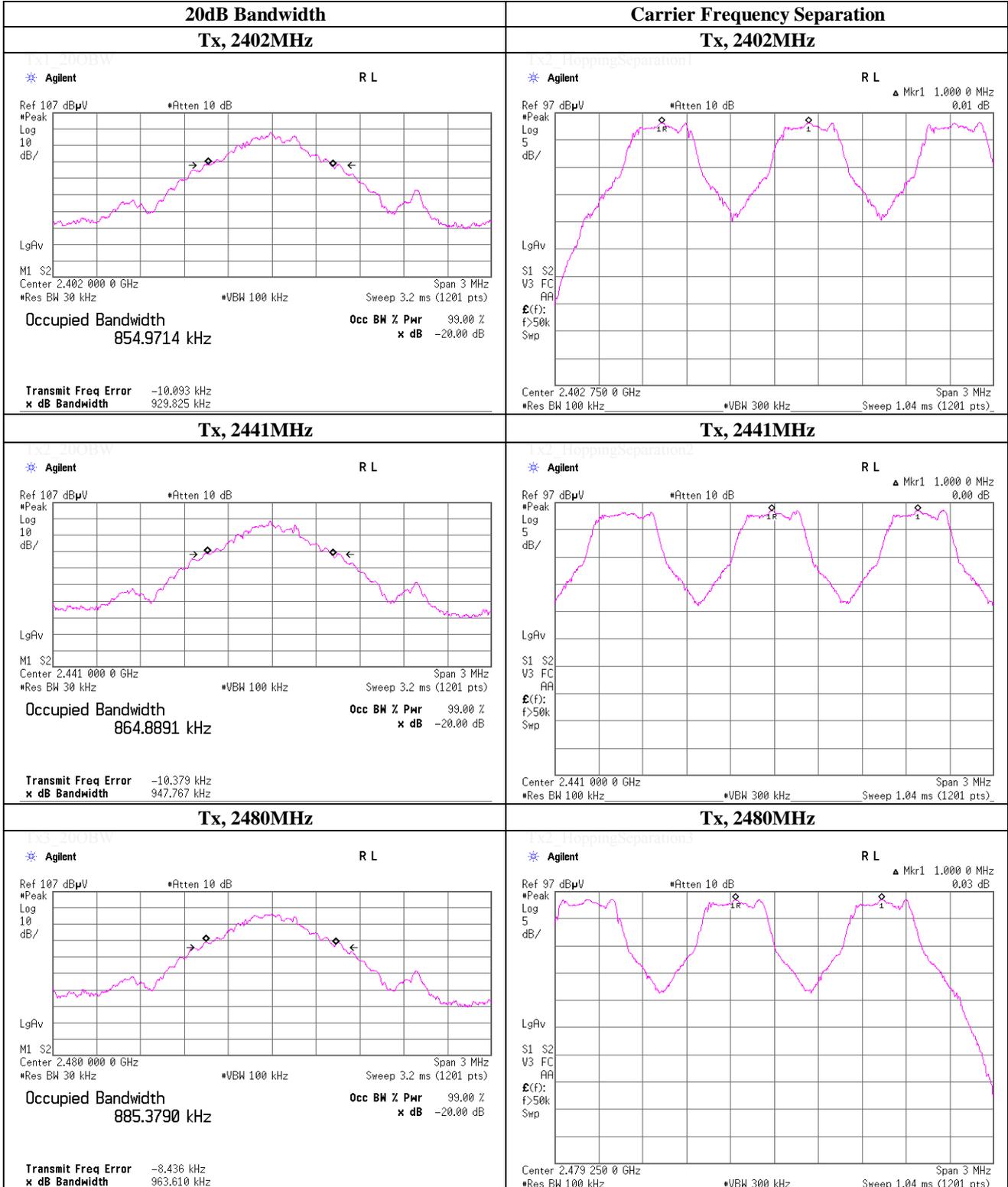
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
 No limit applies to 20dB Bandwidth.



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## 20dB Bandwidth and Carrier Frequency Separation

### Tx, Bluetooth, BDR, PRBS9



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## 20dB Bandwidth and Carrier Frequency Separation

Test place                   UL Japan, Inc. Shonan EMC Lab.           No.5 Shielded Room  
 Date                         September 5, 2013  
 Temperature / Humidity   26 deg.C     , 56 %RH  
 Engineer                  Shinichi Takano  
 Mode                        Tx, Bluetooth, EDR, PRBS9

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.275	1.000	>= 0.850
3-DH5	2441.0	1.284	1.000	>= 0.856
3-DH5	2480.0	1.253	1.000	>= 0.835

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

No limit applies to 20dB Bandwidth.

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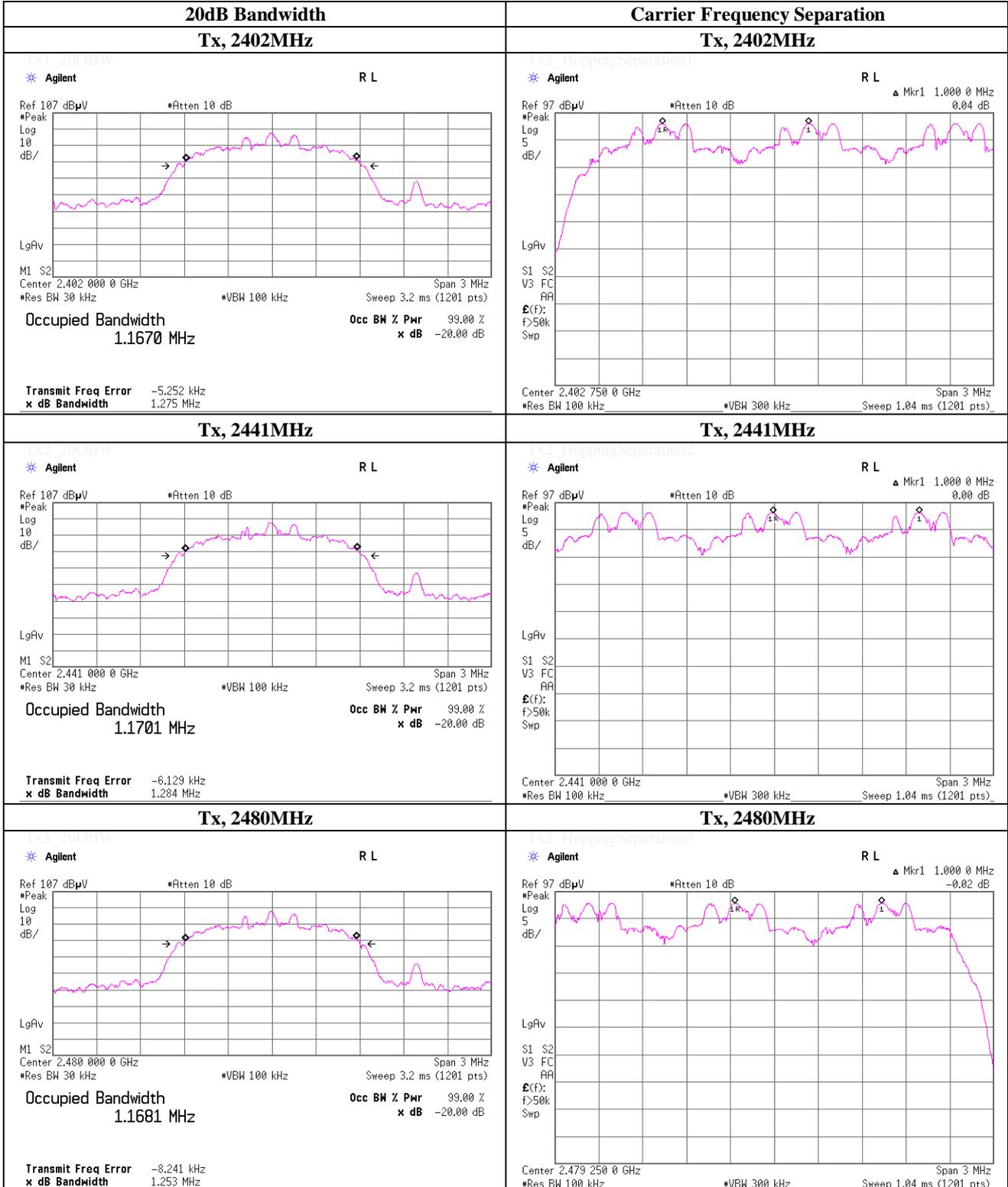
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## 20dB Bandwidth and Carrier Frequency Separation

### Tx, Bluetooth, EDR, PRBS9



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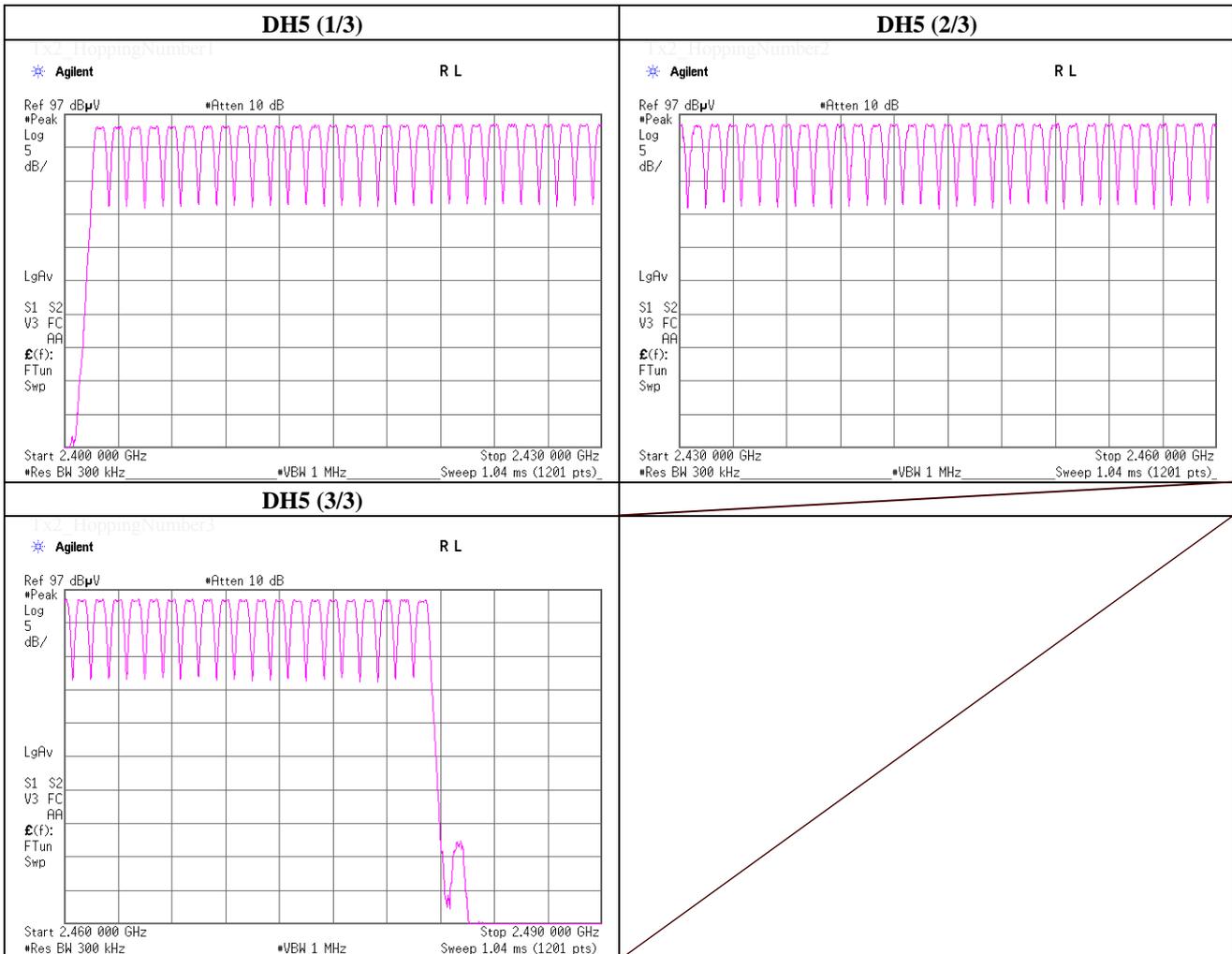
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### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 5, 2013	
Temperature / Humidity	26 deg.C , 56 %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.

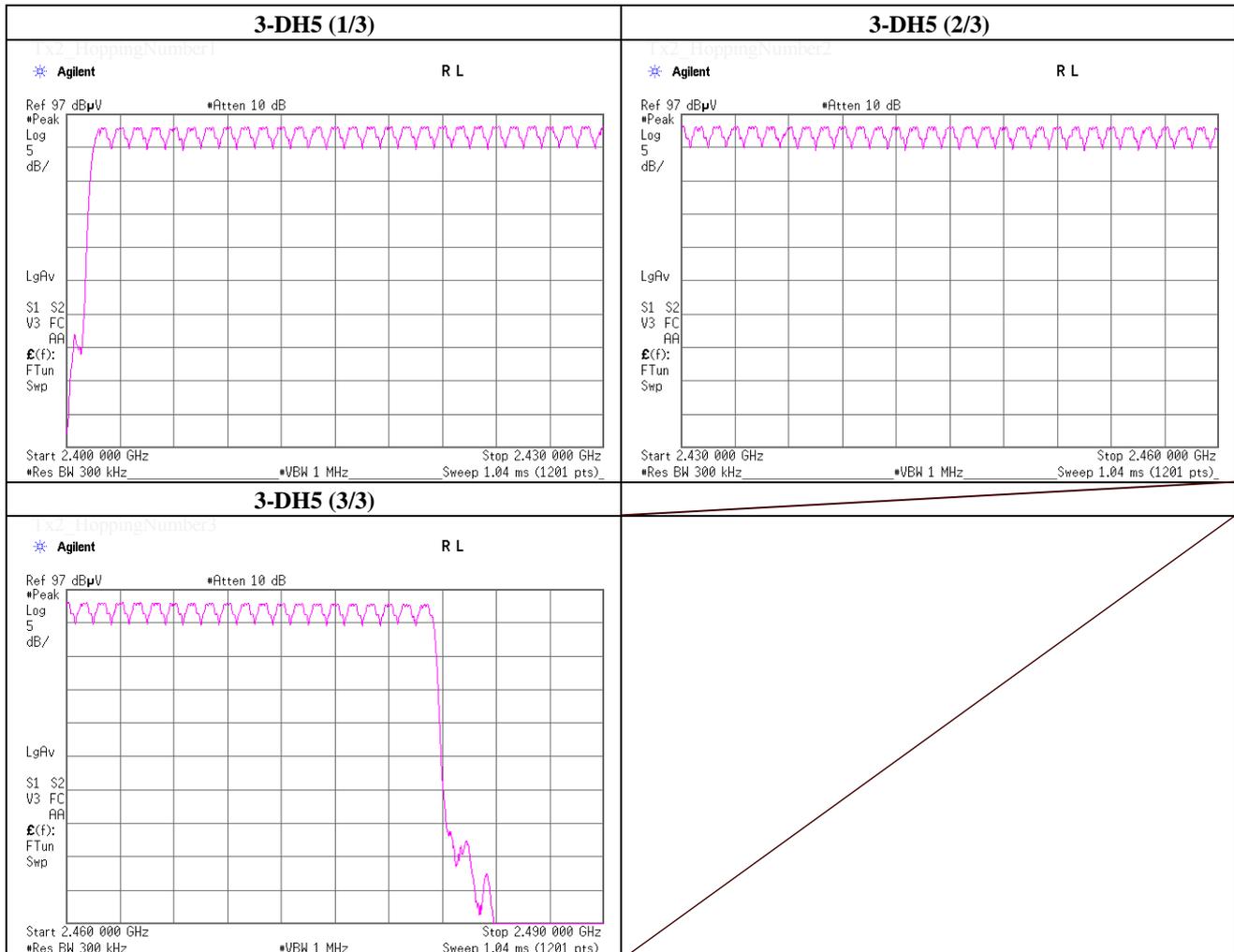


### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 5, 2013	
Temperature / Humidity	26 deg.C , 56 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of Channel [times]	Limit [times]
3-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.



**UL Japan, Inc.**

**Shonan EMC Lab.**

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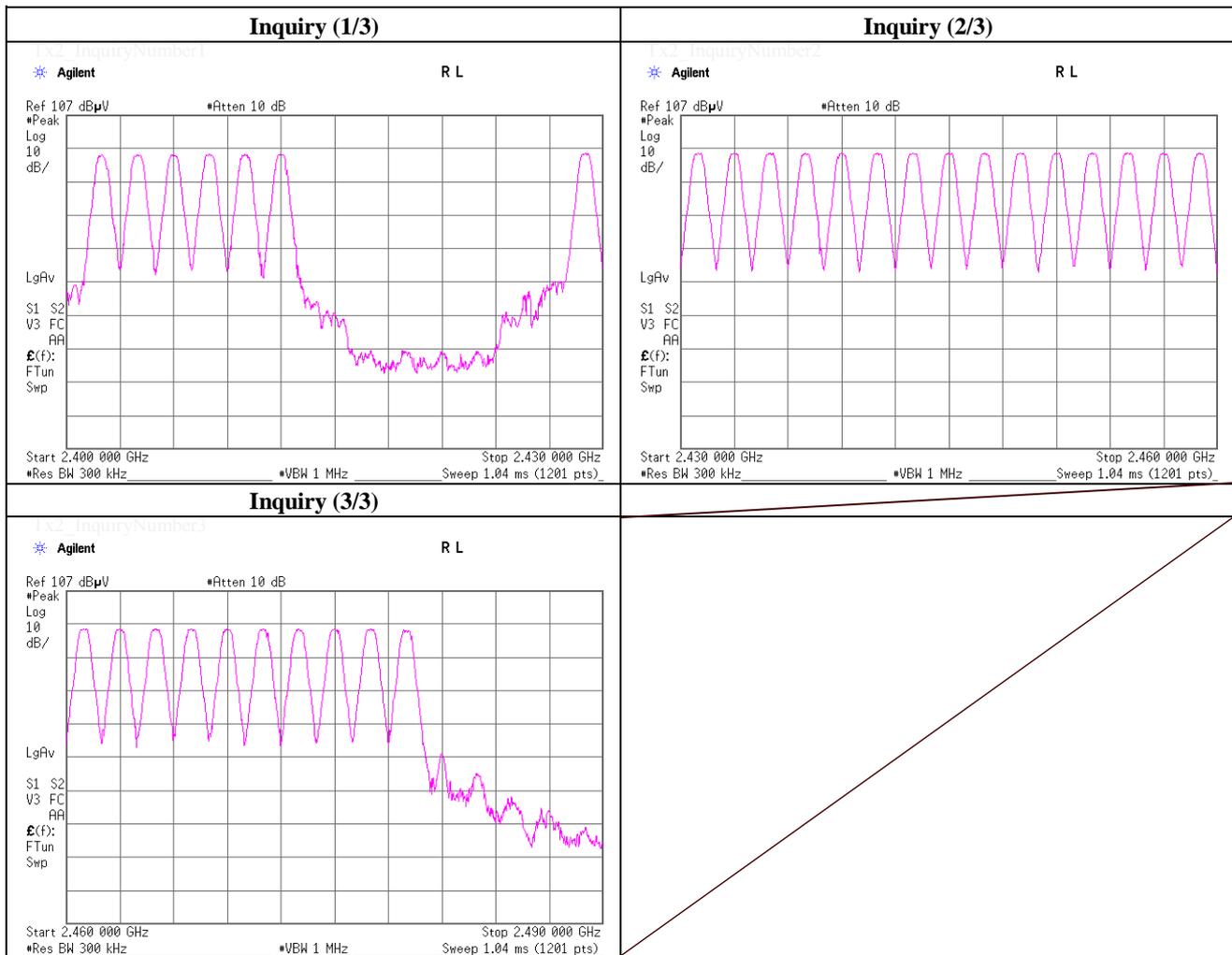
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### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 5, 2013	
Temperature / Humidity	26 deg.C , 56 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, Inquiry	

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



## Dwell Time

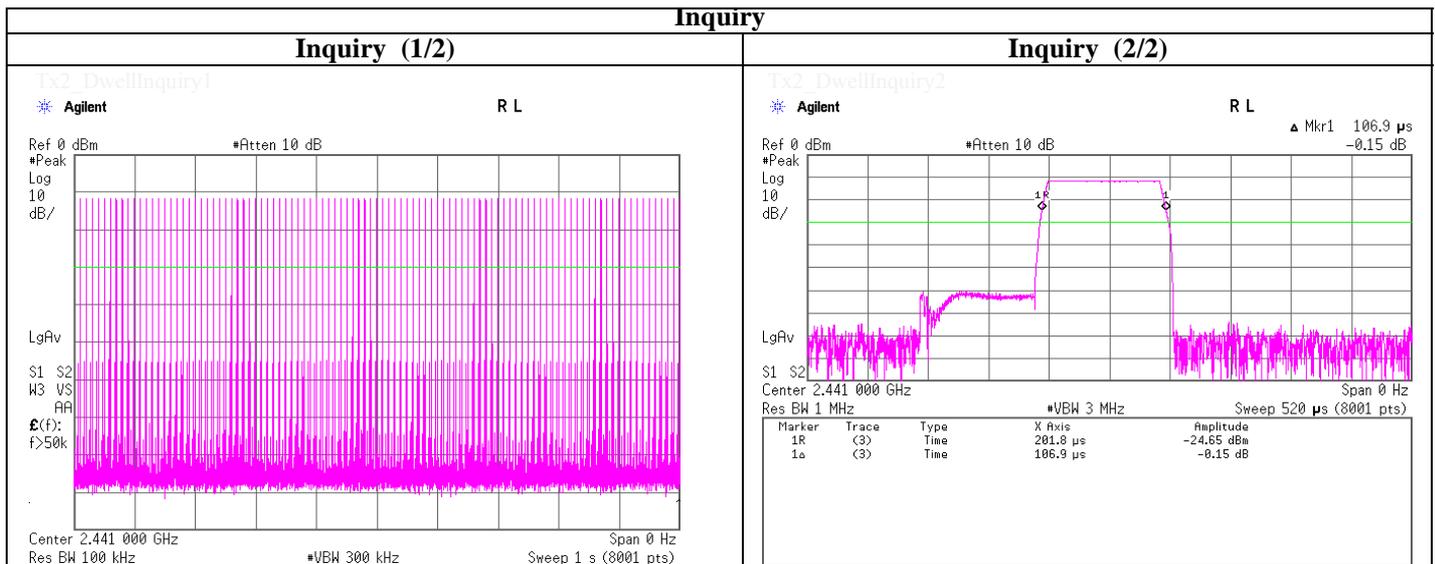
Test place           UL Japan, Inc. Shonan EMC Lab.           No.5 Shielded Room  
 Date                 September 5, 2013  
 Temperature / Humidity 26 deg.C , 56 %RH  
 Engineer            Shinichi Takano  
 Mode                Tx, Bluetooth, BDR, PRBS9

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	0.403	130	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.660	274	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.908	314	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.107	137	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  $N=79$ .



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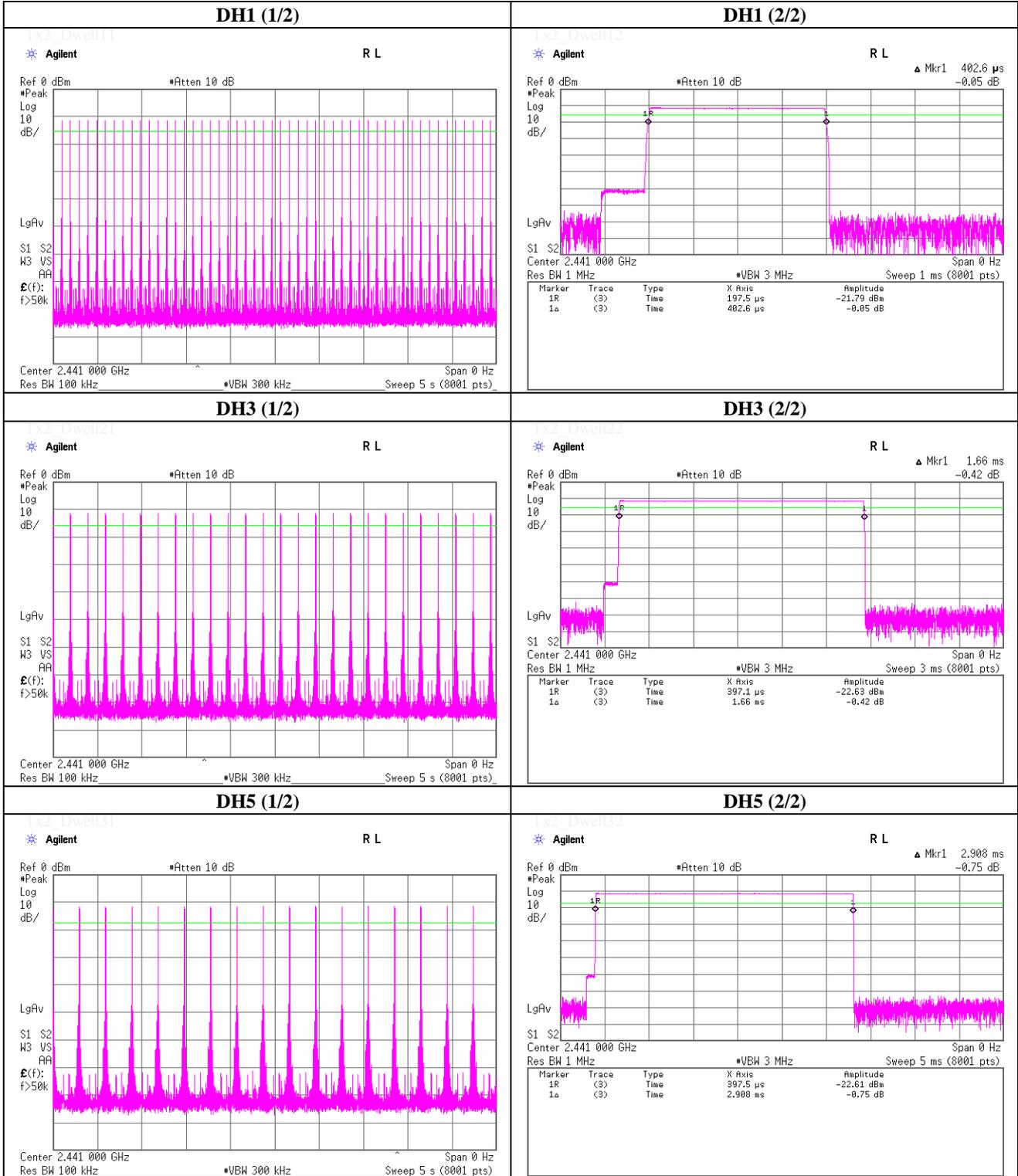
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## Dwell time

### Tx, Bluetooth, BDR, PRBS9



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**Shonan EMC Lab.**

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## Dwell Time

Test place           UL Japan, Inc. Shonan EMC Lab.           No.5 Shielded Room  
 Date                 September 5, 2013  
 Temperature / Humidity 26 deg.C , 56 %RH  
 Engineer            Shinichi Takano  
 Mode                Tx, Bluetooth, EDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.418	135	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.668	275	400
3-DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.921	315	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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for  $N=79$ .

**UL Japan, Inc.**

**Shonan EMC Lab.**

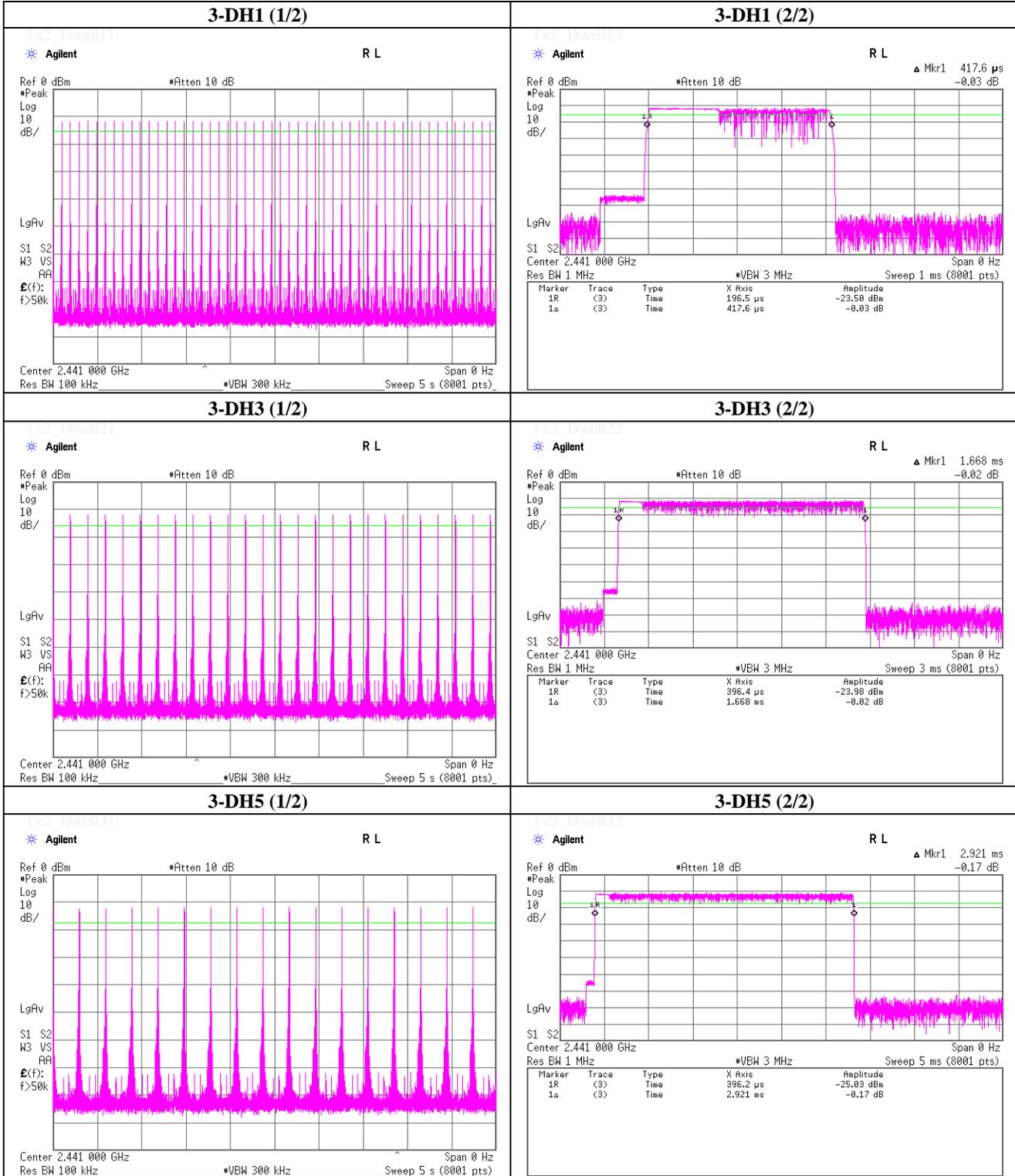
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## Dwell time

### Tx, Bluetooth, EDR, PRBS9



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## Maximum Peak Conducted Output Power (Conducted)

Test place                   UL Japan, Inc. Shonan EMC Lab.     No.5 Shielded Room  
 Date                         September 5, 2013  
 Temperature / Humidity   26 deg.C     , 56 %RH  
 Engineer                  Shinichi Takano  
 Mode                        Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-11.51	1.81	9.62	-0.08	0.98	20.97	125	21.05
DH5	2441.0	-11.24	1.82	9.63	0.21	1.05	20.97	125	20.76
DH5	2480.0	-11.37	1.84	9.63	0.10	1.02	20.97	125	20.87
2-DH5	2402.0	-10.97	1.81	9.62	0.46	1.11	20.97	125	20.51
2-DH5	2441.0	-10.84	1.82	9.63	0.61	1.15	20.97	125	20.36
2-DH5	2480.0	-11.12	1.84	9.63	0.35	1.08	20.97	125	20.62
3-DH5	2402.0	-10.92	1.81	9.62	0.51	1.12	20.97	125	20.46
3-DH5	2441.0	-10.79	1.82	9.63	0.66	1.16	20.97	125	20.31
3-DH5	2480.0	-11.03	1.84	9.63	0.44	1.11	20.97	125	20.53

Sample Calculation:

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

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## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
 Date                    October 9, 2013                    October 10, 2013  
 Temperature / Humidity 23 deg.C, 57 %RH                24 deg.C, 60 %RH  
 Engineer              Kenichi Adachi                    Kenichi Adachi  
 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.	119.000	QP	37.0	13.4	8.1	31.8	26.7	43.5	16.8	288	228	
Hori.	222.235	QP	23.7	17.2	9.9	31.7	19.1	46.0	26.9	300	151	
Hori.	236.232	QP	31.2	17.4	10.1	31.7	27.0	46.0	19.0	151	261	
Hori.	480.024	QP	29.4	17.5	8.4	31.6	23.7	46.0	22.3	100	2	
Hori.	1602.000	PK	49.1	25.8	13.8	40.9	47.8	73.9	26.1	124	101	
Hori.	2390.000	PK	45.1	26.8	14.7	41.1	45.5	73.9	28.4	100	6	
Hori.	2400.000	PK	55.7	26.8	14.7	41.1	56.1	73.9	17.8	100	6	
Hori.	3203.992	PK	50.0	28.2	6.6	41.7	43.1	73.9	30.8	100	359	
Hori.	4804.000	PK	51.8	30.9	7.5	41.2	49.0	73.9	24.9	100	0	
Hori.	7206.000	PK	49.1	37.1	9.1	41.0	54.3	73.9	19.6	100	0	
Hori.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	100	0	
Hori.	12010.000	PK	49.2	39.6	11.5	39.1	61.2	73.9	12.7	100	0	
Hori.	1602.000	AV	37.3	25.8	13.8	40.9	36.0	53.9	17.9	124	101	
Hori.	2390.000	AV	34.8	26.8	14.7	41.1	35.2	53.9	18.7	100	6	
Hori.	2400.000	AV	44.0	26.8	14.7	41.1	44.4	53.9	9.5	100	6	
Hori.	3203.992	AV	37.8	28.2	6.6	41.7	30.9	53.9	23.0	100	359	
Hori.	4804.000	AV	42.7	30.9	7.5	41.2	39.9	53.9	14.0	100	0	
Hori.	7206.000	AV	36.4	37.1	9.1	41.0	41.6	53.9	12.3	100	0	
Hori.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Hori.	12010.000	AV	35.3	39.6	11.5	39.1	47.3	53.9	6.6	100	0	
Vert.	38.478	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	310	
Vert.	55.138	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	64	
Vert.	841.055	QP	22.8	22.0	9.9	31.2	23.5	46.0	22.5	100	5	
Vert.	1602.000	PK	50.0	25.8	13.8	40.9	48.7	73.9	25.2	130	30	
Vert.	2390.000	PK	46.2	26.8	14.7	41.1	46.6	73.9	27.3	100	358	
Vert.	2400.000	PK	57.3	26.8	14.7	41.1	57.7	73.9	16.2	100	358	
Vert.	3203.987	PK	51.1	28.2	6.6	41.7	44.2	73.9	29.7	100	345	
Vert.	4804.000	PK	51.5	30.9	7.5	41.2	48.7	73.9	25.2	100	63	
Vert.	7206.000	PK	49.3	37.1	9.1	41.0	54.5	73.9	19.4	100	0	
Vert.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	100	0	
Vert.	12010.000	PK	48.7	39.6	11.5	39.1	60.7	73.9	13.2	100	0	
Vert.	1602.000	AV	39.4	25.8	13.8	40.9	38.1	53.9	15.8	130	30	
Vert.	2390.000	AV	35.0	26.8	14.7	41.1	35.4	53.9	18.5	100	358	
Vert.	2400.000	AV	45.5	26.8	14.7	41.1	45.9	53.9	8.0	100	358	
Vert.	3203.987	AV	40.1	28.2	6.6	41.7	33.2	53.9	20.7	100	345	
Vert.	4804.000	AV	43.2	30.9	7.5	41.2	40.4	53.9	13.5	100	63	
Vert.	7206.000	AV	36.3	37.1	9.1	41.0	41.5	53.9	12.4	100	0	
Vert.	9608.000	AV	33.7	38.6	10.2	38.9	43.6	53.9	10.3	100	0	
Vert.	12010.000	AV	35.3	39.6	11.5	39.1	47.3	53.9	6.6	100	0	

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

UL Japan, Inc.

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## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
 Date                    October 9, 2013                    October 10, 2013  
 Temperature / Humidity 23 deg.C, 57 %RH                24 deg.C, 60 %RH  
 Engineer              Kenichi Adachi                    Kenichi Adachi  
 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.	119.011	QP	37.0	13.4	8.1	31.8	26.7	43.5	16.8	262	226	
Hori.	139.624	QP	29.6	14.8	8.6	31.8	21.2	43.5	22.3	306	3	
Hori.	236.344	QP	31.3	17.4	10.1	31.7	27.1	46.0	18.9	141	263	
Hori.	480.028	QP	29.1	17.5	8.4	31.6	23.4	46.0	22.6	100	359	
Hori.	780.033	QP	28.4	21.2	9.7	31.4	27.9	46.0	18.1	139	219	
Hori.	1626.479	PK	49.1	25.9	13.8	41.0	47.8	73.9	26.1	143	189	
Hori.	3253.324	PK	50.0	28.1	6.6	41.7	43.0	73.9	30.9	102	323	
Hori.	4882.000	PK	52.8	31.4	7.5	41.1	50.6	73.9	23.3	174	2	
Hori.	7323.000	PK	49.0	37.2	9.0	41.1	54.1	73.9	19.8	100	0	
Hori.	9764.000	PK	46.5	38.8	10.1	38.8	56.6	73.9	17.3	100	0	
Hori.	12205.000	PK	46.6	39.6	11.4	39.1	58.5	73.9	15.4	100	0	
Hori.	1626.479	AV	42.5	25.9	13.8	41.0	41.2	53.9	12.7	143	189	
Hori.	3253.324	AV	39.3	28.1	6.6	41.7	32.3	53.9	21.6	102	323	
Hori.	4882.000	AV	45.1	31.4	7.5	41.1	42.9	53.9	11.0	174	2	
Hori.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	
Hori.	9764.000	AV	33.1	38.8	10.1	38.8	43.2	53.9	10.7	100	0	
Hori.	12205.000	AV	33.8	39.6	11.4	39.1	45.7	53.9	8.2	100	0	
Vert.	38.486	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	2	
Vert.	55.139	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	100	
Vert.	1626.479	PK	50.6	25.9	13.8	41.0	49.3	73.9	24.6	100	304	
Vert.	3253.324	PK	51.8	28.1	6.6	41.7	44.8	73.9	29.1	100	338	
Vert.	4882.000	PK	53.3	31.4	7.5	41.1	51.1	73.9	22.8	170	14	
Vert.	7323.000	PK	48.4	37.2	9.0	41.1	53.5	73.9	20.4	100	0	
Vert.	9764.000	PK	46.0	38.8	10.1	38.8	56.1	73.9	17.8	100	0	
Vert.	12205.000	PK	46.8	39.6	11.4	39.1	58.7	73.9	15.2	100	0	
Vert.	1626.479	AV	43.2	25.9	13.8	41.0	41.9	53.9	12.0	100	304	
Vert.	3253.324	AV	43.7	28.1	6.6	41.7	36.7	53.9	17.2	100	338	
Vert.	4882.000	AV	45.5	31.4	7.5	41.1	43.3	53.9	10.6	170	14	
Vert.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	
Vert.	9764.000	AV	33.0	38.8	10.1	38.8	43.1	53.9	10.8	100	0	
Vert.	12205.000	AV	33.7	39.6	11.4	39.1	45.6	53.9	8.3	100	0	

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

## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
 Date                    October 9, 2013                    October 10, 2013  
 Temperature / Humidity    23 deg.C, 57 %RH                24 deg.C, 60 %RH  
 Engineer                Kenichi Adachi                    Kenichi Adachi  
 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.	118.219	QP	37.0	13.3	8.1	31.8	26.6	43.5	16.9	264	224	
Hori.	139.617	QP	29.5	14.8	8.6	31.8	21.1	43.5	22.4	323	359	
Hori.	236.248	QP	31.3	17.4	10.1	31.7	27.1	46.0	18.9	152	248	
Hori.	480.024	QP	29.1	17.5	8.4	31.6	23.4	46.0	22.6	100	2	
Hori.	780.039	QP	28.3	21.2	9.7	31.4	27.8	46.0	18.2	150	309	
Hori.	1652.662	PK	49.3	25.9	13.9	41.0	48.1	73.9	25.8	121	293	
Hori.	2483.500	PK	48.4	26.9	14.8	41.0	49.1	73.9	24.8	100	14	
Hori.	3305.325	PK	49.8	28.1	6.6	41.7	42.8	73.9	31.1	100	354	
Hori.	4960.000	PK	53.1	31.8	7.5	41.1	51.3	73.9	22.6	100	176	
Hori.	7440.000	PK	47.8	37.4	9.0	41.1	53.1	73.9	20.8	100	0	
Hori.	9920.000	PK	45.1	38.9	10.0	38.8	55.2	73.9	18.7	100	0	
Hori.	12400.000	PK	46.2	39.7	11.3	39.1	58.1	73.9	15.8	100	0	
Hori.	1652.662	AV	40.8	25.9	13.9	41.0	39.6	53.9	14.3	121	293	
Hori.	2483.500	AV	36.2	26.9	14.8	41.0	36.9	53.9	17.0	100	14	
Hori.	3305.325	AV	38.7	28.1	6.6	41.7	31.7	53.9	22.2	100	354	
Hori.	4960.000	AV	44.4	31.8	7.5	41.1	42.6	53.9	11.3	100	176	
Hori.	7440.000	AV	35.1	37.4	9.0	41.1	40.4	53.9	13.5	100	0	
Hori.	9920.000	AV	32.1	38.9	10.0	38.8	42.2	53.9	11.7	100	0	
Hori.	12400.000	AV	32.6	39.7	11.3	39.1	44.5	53.9	<b>9.4</b>	100	0	
Vert.	38.394	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	254	
Vert.	55.138	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	112	
Vert.	1652.662	PK	50.4	25.9	13.9	41.0	49.2	73.9	24.7	100	319	
Vert.	2483.500	PK	48.1	26.9	14.8	41.0	48.8	73.9	25.1	100	2	
Vert.	3305.325	PK	52.0	28.1	6.6	41.7	45.0	73.9	28.9	100	344	
Vert.	4960.000	PK	52.7	31.8	7.5	41.1	50.9	73.9	23.0	100	21	
Vert.	7440.000	PK	48.4	37.4	9.0	41.1	53.7	73.9	20.2	100	0	
Vert.	9920.000	PK	44.6	38.9	10.0	38.8	54.7	73.9	19.2	100	0	
Vert.	12400.000	PK	45.8	39.7	11.3	39.1	57.7	73.9	16.2	100	0	
Vert.	1652.662	AV	42.1	25.9	13.9	41.0	40.9	53.9	13.0	100	319	
Vert.	2483.500	AV	36.3	26.9	14.8	41.0	37.0	53.9	16.9	100	2	
Vert.	3305.325	AV	43.9	28.1	6.6	41.7	36.9	53.9	17.0	100	344	
Vert.	4960.000	AV	43.8	31.8	7.5	41.1	42.0	53.9	11.9	100	21	
Vert.	7440.000	AV	35.0	37.4	9.0	41.1	40.3	53.9	13.6	100	0	
Vert.	9920.000	AV	32.0	38.9	10.0	38.8	42.1	53.9	11.8	100	0	
Vert.	12400.000	AV	32.6	39.7	11.3	39.1	44.5	53.9	<b>9.4</b>	100	0	

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

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Facsimile : +81 463 50 6401

## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
Date                    October 9, 2013                    October 10, 2013  
Temperature / Humidity    23 deg.C, 57 %RH                24 deg.C, 60 %RH  
Engineer                Kenichi Adachi                    Kenichi Adachi  
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.	117.818	QP	37.1	13.3	8.1	31.8	26.7	43.5	16.8	289	229	
Hori.	235.543	QP	31.0	17.4	10.1	31.7	26.8	46.0	19.2	158	260	
Hori.	360.024	QP	32.0	15.5	7.8	31.6	23.7	46.0	22.3	100	75	
Hori.	480.023	QP	29.5	17.5	8.4	31.6	23.8	46.0	22.2	100	2	
Hori.	1602.000	PK	49.5	25.8	13.8	40.9	48.2	73.9	25.7	100	145	
Hori.	2390.000	PK	48.0	26.8	14.7	41.1	48.4	73.9	25.5	103	11	
Hori.	2399.717	PK	52.6	26.8	14.7	41.1	53.0	73.9	20.9	103	11	
Hori.	2399.750	PK	52.3	26.8	14.7	41.1	52.7	73.9	21.2	103	11	
Hori.	2400.000	PK	58.4	26.8	14.7	41.1	58.8	73.9	15.1	103	11	
Hori.	3203.992	PK	50.0	28.2	6.6	41.7	43.1	73.9	30.8	100	17	
Hori.	4804.000	PK	48.0	30.9	7.5	41.2	45.2	73.9	28.7	100	0	
Hori.	7206.000	PK	49.2	37.1	9.1	41.0	54.4	73.9	19.5	100	0	
Hori.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	100	0	
Hori.	12010.000	PK	49.2	39.6	11.5	39.1	61.2	73.9	12.7	100	0	
Hori.	1602.000	AV	39.6	25.8	13.8	40.9	38.3	53.9	15.6	100	145	
Hori.	2390.000	AV	34.8	26.8	14.7	41.1	35.2	53.9	18.7	103	11	
Hori.	2399.717	AV	38.8	26.8	14.7	41.1	39.2	53.9	14.7	103	11	
Hori.	2399.750	AV	39.1	26.8	14.7	41.1	39.5	53.9	14.4	103	11	
Hori.	2400.000	AV	43.1	26.8	14.7	41.1	43.5	53.9	10.4	103	11	
Hori.	3203.992	AV	38.6	28.2	6.6	41.7	31.7	53.9	22.2	100	17	
Hori.	4804.000	AV	36.1	30.9	7.5	41.2	33.3	53.9	20.6	100	0	
Hori.	7206.000	AV	36.4	37.1	9.1	41.0	41.6	53.9	12.3	100	0	
Hori.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Hori.	12010.000	AV	35.2	39.6	11.5	39.1	47.2	53.9	6.7	100	0	
Vert.	38.335	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	24	
Vert.	55.118	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	112	
Vert.	872.588	QP	22.7	22.5	10.1	31.0	24.3	46.0	21.7	100	2	
Vert.	1602.000	PK	49.8	25.8	13.8	40.9	48.5	73.9	25.4	100	159	
Vert.	2390.000	PK	47.6	26.8	14.7	41.1	48.0	73.9	25.9	100	5	
Vert.	2399.717	PK	55.8	26.8	14.7	41.1	56.2	73.9	17.7	100	5	
Vert.	2399.750	PK	52.5	26.8	14.7	41.1	52.9	73.9	21.0	100	5	
Vert.	2400.000	PK	62.8	26.8	14.7	41.1	63.2	73.9	10.7	100	5	
Vert.	3203.992	PK	52.1	28.2	6.6	41.7	45.2	73.9	28.7	100	341	
Vert.	4804.000	PK	47.8	30.9	7.5	41.2	45.0	73.9	28.9	100	0	
Vert.	7206.000	PK	49.4	37.1	9.1	41.0	54.6	73.9	19.3	100	0	
Vert.	9608.000	PK	47.2	38.6	10.2	38.9	57.1	73.9	16.8	100	0	
Vert.	12010.000	PK	48.8	39.6	11.5	39.1	60.8	73.9	13.1	100	0	
Vert.	1602.000	AV	41.0	25.8	13.8	40.9	39.7	53.9	14.2	100	159	
Vert.	2390.000	AV	34.8	26.8	14.7	41.1	35.2	53.9	18.7	100	5	
Vert.	2399.717	AV	41.5	26.8	14.7	41.1	41.9	53.9	12.0	100	5	
Vert.	2399.750	AV	39.8	26.8	14.7	41.1	40.2	53.9	13.7	100	5	
Vert.	2400.000	AV	46.2	26.8	14.7	41.1	46.6	53.9	7.3	100	5	
Vert.	3203.992	AV	43.2	28.2	6.6	41.7	36.3	53.9	17.6	100	341	
Vert.	4804.000	AV	36.5	30.9	7.5	41.2	33.7	53.9	20.2	100	0	
Vert.	7206.000	AV	36.3	37.1	9.1	41.0	41.5	53.9	12.4	100	0	
Vert.	9608.000	AV	33.6	38.6	10.2	38.9	43.5	53.9	10.4	100	0	
Vert.	12010.000	AV	35.2	39.6	11.5	39.1	47.2	53.9	6.7	100	0	

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

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## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
 Date                    October 9, 2013                    October 10, 2013  
 Temperature / Humidity    23 deg.C, 57 %RH                24 deg.C, 60 %RH  
 Engineer                Kenichi Adachi                    Kenichi Adachi  
 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.	117.818	QP	37.1	13.3	8.1	31.8	26.7	43.5	16.8	289	229	
Hori.	235.543	QP	31.0	17.4	10.1	31.7	26.8	46.0	19.2	158	260	
Hori.	360.024	QP	32.0	15.5	7.8	31.6	23.7	46.0	22.3	100	75	
Hori.	480.023	QP	29.5	17.5	8.4	31.6	23.8	46.0	22.2	100	2	
Hori.	1602.000	PK	49.5	25.8	13.8	40.9	48.2	73.9	25.7	100	145	
Hori.	2390.000	PK	48.0	26.8	14.7	41.1	48.4	73.9	25.5	103	11	
Hori.	2399.717	PK	52.6	26.8	14.7	41.1	53.0	73.9	20.9	103	11	
Hori.	2399.750	PK	52.3	26.8	14.7	41.1	52.7	73.9	21.2	103	11	
Hori.	2400.000	PK	58.4	26.8	14.7	41.1	58.8	73.9	15.1	103	11	
Hori.	3203.992	PK	50.0	28.2	6.6	41.7	43.1	73.9	30.8	100	17	
Hori.	4804.000	PK	48.0	30.9	7.5	41.2	45.2	73.9	28.7	100	0	
Hori.	7206.000	PK	49.2	37.1	9.1	41.0	54.4	73.9	19.5	100	0	
Hori.	9608.000	PK	47.1	38.6	10.2	38.9	57.0	73.9	16.9	100	0	
Hori.	12010.000	PK	49.2	39.6	11.5	39.1	61.2	73.9	12.7	100	0	
Hori.	1602.000	AV	39.6	25.8	13.8	40.9	38.3	53.9	15.6	100	145	
Hori.	2390.000	AV	34.8	26.8	14.7	41.1	35.2	53.9	18.7	103	11	
Hori.	2399.717	AV	38.8	26.8	14.7	41.1	39.2	53.9	14.7	103	11	
Hori.	2399.750	AV	39.1	26.8	14.7	41.1	39.5	53.9	14.4	103	11	
Hori.	2400.000	AV	43.1	26.8	14.7	41.1	43.5	53.9	10.4	103	11	
Hori.	3203.992	AV	38.6	28.2	6.6	41.7	31.7	53.9	22.2	100	17	
Hori.	4804.000	AV	36.1	30.9	7.5	41.2	33.3	53.9	20.6	100	0	
Hori.	7206.000	AV	36.4	37.1	9.1	41.0	41.6	53.9	12.3	100	0	
Hori.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Hori.	12010.000	AV	35.2	39.6	11.5	39.1	47.2	53.9	6.7	100	0	
Vert.	38.335	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	24	
Vert.	55.118	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	112	
Vert.	872.588	QP	22.7	22.5	10.1	31.0	24.3	46.0	21.7	100	2	
Vert.	1602.000	PK	49.8	25.8	13.8	40.9	48.5	73.9	25.4	100	159	
Vert.	2390.000	PK	47.6	26.8	14.7	41.1	48.0	73.9	25.9	100	5	
Vert.	2399.717	PK	55.8	26.8	14.7	41.1	56.2	73.9	17.7	100	5	
Vert.	2399.750	PK	52.5	26.8	14.7	41.1	52.9	73.9	21.0	100	5	
Vert.	2400.000	PK	62.8	26.8	14.7	41.1	63.2	73.9	10.7	100	5	
Vert.	3203.992	PK	52.1	28.2	6.6	41.7	45.2	73.9	28.7	100	341	
Vert.	4804.000	PK	47.8	30.9	7.5	41.2	45.0	73.9	28.9	100	0	
Vert.	7206.000	PK	49.4	37.1	9.1	41.0	54.6	73.9	19.3	100	0	
Vert.	9608.000	PK	47.2	38.6	10.2	38.9	57.1	73.9	16.8	100	0	
Vert.	12010.000	PK	48.8	39.6	11.5	39.1	60.8	73.9	13.1	100	0	
Vert.	1602.000	AV	41.0	25.8	13.8	40.9	39.7	53.9	14.2	100	159	
Vert.	2390.000	AV	34.8	26.8	14.7	41.1	35.2	53.9	18.7	100	5	
Vert.	2399.717	AV	41.5	26.8	14.7	41.1	41.9	53.9	12.0	100	5	
Vert.	2399.750	AV	39.8	26.8	14.7	41.1	40.2	53.9	13.7	100	5	
Vert.	2400.000	AV	46.2	26.8	14.7	41.1	46.6	53.9	7.3	100	5	
Vert.	3203.992	AV	43.2	28.2	6.6	41.7	36.3	53.9	17.6	100	341	
Vert.	4804.000	AV	36.5	30.9	7.5	41.2	33.7	53.9	20.2	100	0	
Vert.	7206.000	AV	36.3	37.1	9.1	41.0	41.5	53.9	12.4	100	0	
Vert.	9608.000	AV	33.6	38.6	10.2	38.9	43.5	53.9	10.4	100	0	
Vert.	12010.000	AV	35.2	39.6	11.5	39.1	47.2	53.9	6.7	100	0	

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

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## Radiated Emission

Test place            No.2 and 3 Semi Anechoic Chamber  
 Date                    October 9, 2013                    October 10, 2013  
 Temperature / Humidity 23 deg.C, 57 %RH                24 deg.C, 60 %RH  
 Engineer              Kenichi Adachi                    Kenichi Adachi  
 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.	117.417	QP	37.0	13.2	8.1	31.8	26.5	43.5	17.0	297	241	
Hori.	236.302	QP	31.1	17.4	10.1	31.7	26.9	46.0	19.1	156	263	
Hori.	351.971	QP	28.4	15.3	7.8	31.6	19.9	46.0	26.1	150	259	
Hori.	480.022	QP	29.3	17.5	8.4	31.6	23.6	46.0	22.4	100	5	
Hori.	780.221	QP	28.1	21.2	9.7	31.4	27.6	46.0	18.4	150	323	
Hori.	1652.662	PK	49.6	25.9	13.9	41.0	48.4	73.9	25.5	120	327	
Hori.	2483.500	PK	46.0	26.9	14.8	41.0	46.7	73.9	27.2	100	14	
Hori.	3305.325	PK	50.1	28.1	6.6	41.7	43.1	73.9	30.8	100	3	
Hori.	4960.000	PK	48.4	31.8	7.5	41.1	46.6	73.9	27.3	100	0	
Hori.	7440.000	PK	47.7	37.4	9.0	41.1	53.0	73.9	20.9	100	0	
Hori.	9920.000	PK	45.2	38.9	10.0	38.8	55.3	73.9	18.6	100	0	
Hori.	12400.000	PK	46.1	39.7	11.3	39.1	58.0	73.9	15.9	100	0	
Hori.	1652.662	AV	40.0	25.9	13.9	41.0	38.8	53.9	15.1	120	327	
Hori.	2483.500	AV	35.4	26.9	14.8	41.0	36.1	53.9	17.8	100	14	
Hori.	3305.325	AV	41.2	28.1	6.6	41.7	34.2	53.9	19.7	100	3	
Hori.	4960.000	AV	34.7	31.8	7.5	41.1	32.9	53.9	21.0	100	0	
Hori.	7440.000	AV	35.1	37.4	9.0	41.1	40.4	53.9	13.5	100	0	
Hori.	9920.000	AV	32.2	38.9	10.0	38.8	42.3	53.9	11.6	100	0	
Hori.	12400.000	AV	32.6	39.7	11.3	39.1	44.5	53.9	9.4	100	0	
Vert.	38.400	QP	32.0	15.4	7.0	31.9	22.5	40.0	17.5	100	339	
Vert.	55.137	QP	37.0	9.8	7.3	31.9	22.2	40.0	17.8	100	114	
Vert.	1652.662	PK	50.0	25.9	13.9	41.0	48.8	73.9	25.1	100	303	
Vert.	2483.500	PK	46.0	26.9	14.8	41.0	46.7	73.9	27.2	135	358	
Vert.	3305.325	PK	53.6	28.1	6.6	41.7	46.6	73.9	27.3	100	343	
Vert.	4960.000	PK	47.4	31.8	7.5	41.1	45.6	73.9	28.3	100	0	
Vert.	7440.000	PK	48.4	37.4	9.0	41.1	53.7	73.9	20.2	100	0	
Vert.	9920.000	PK	44.7	38.9	10.0	38.8	54.8	73.9	19.1	100	0	
Vert.	12400.000	PK	45.7	39.7	11.3	39.1	57.6	73.9	16.3	100	0	
Vert.	1652.662	AV	41.1	25.9	13.9	41.0	39.9	53.9	14.0	100	303	
Vert.	2483.500	AV	35.5	26.9	14.8	41.0	36.2	53.9	17.7	135	358	
Vert.	3305.325	AV	45.6	28.1	6.6	41.7	38.6	53.9	15.3	100	343	
Vert.	4960.000	AV	35.2	31.8	7.5	41.1	33.4	53.9	20.5	100	0	
Vert.	7440.000	AV	35.0	37.4	9.0	41.1	40.3	53.9	13.6	100	0	
Vert.	9920.000	AV	32.1	38.9	10.0	38.8	42.2	53.9	11.7	100	0	
Vert.	12400.000	AV	32.7	39.7	11.3	39.1	44.6	53.9	9.3	100	0	

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

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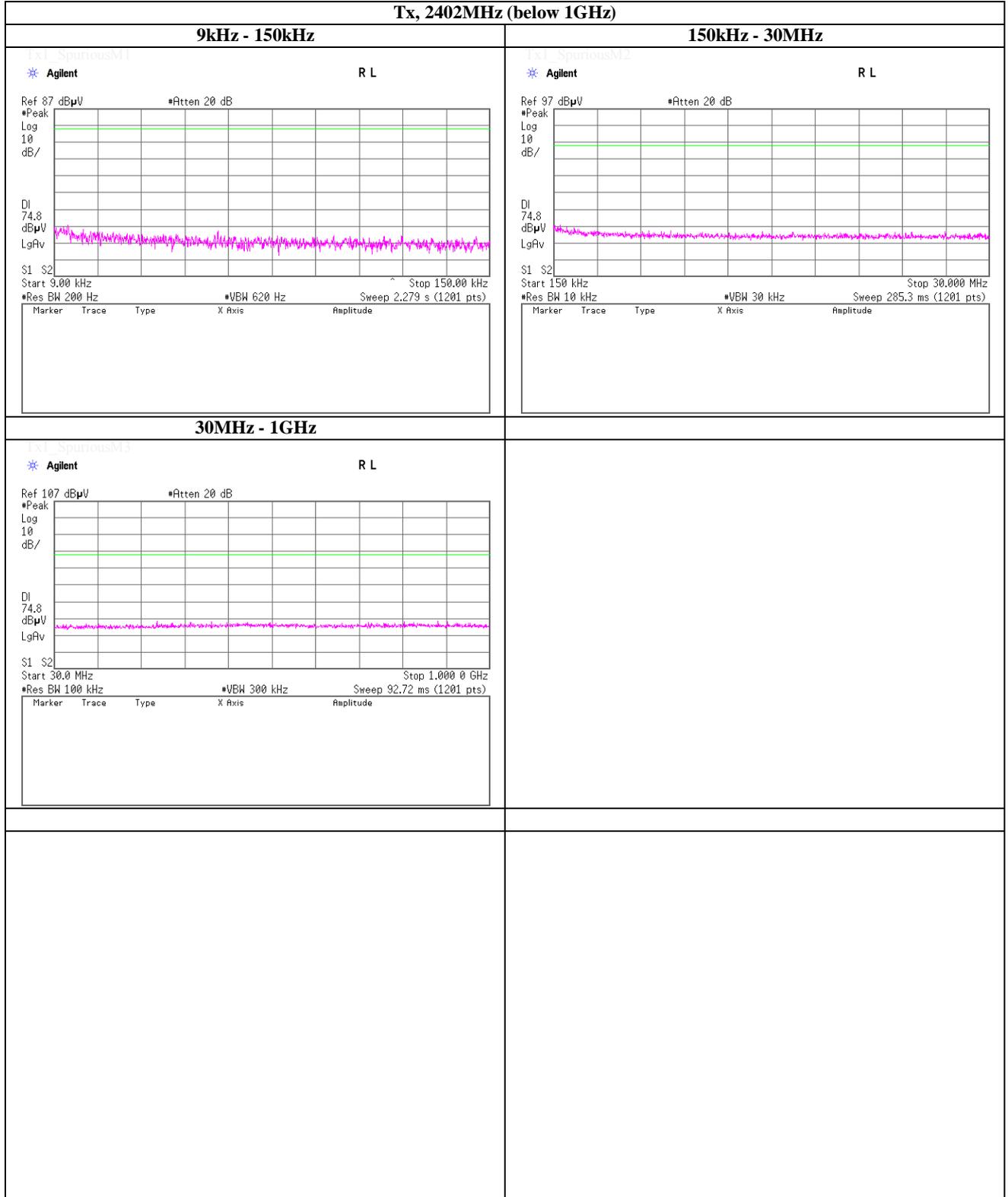
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## Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)



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**Shonan EMC Lab.**

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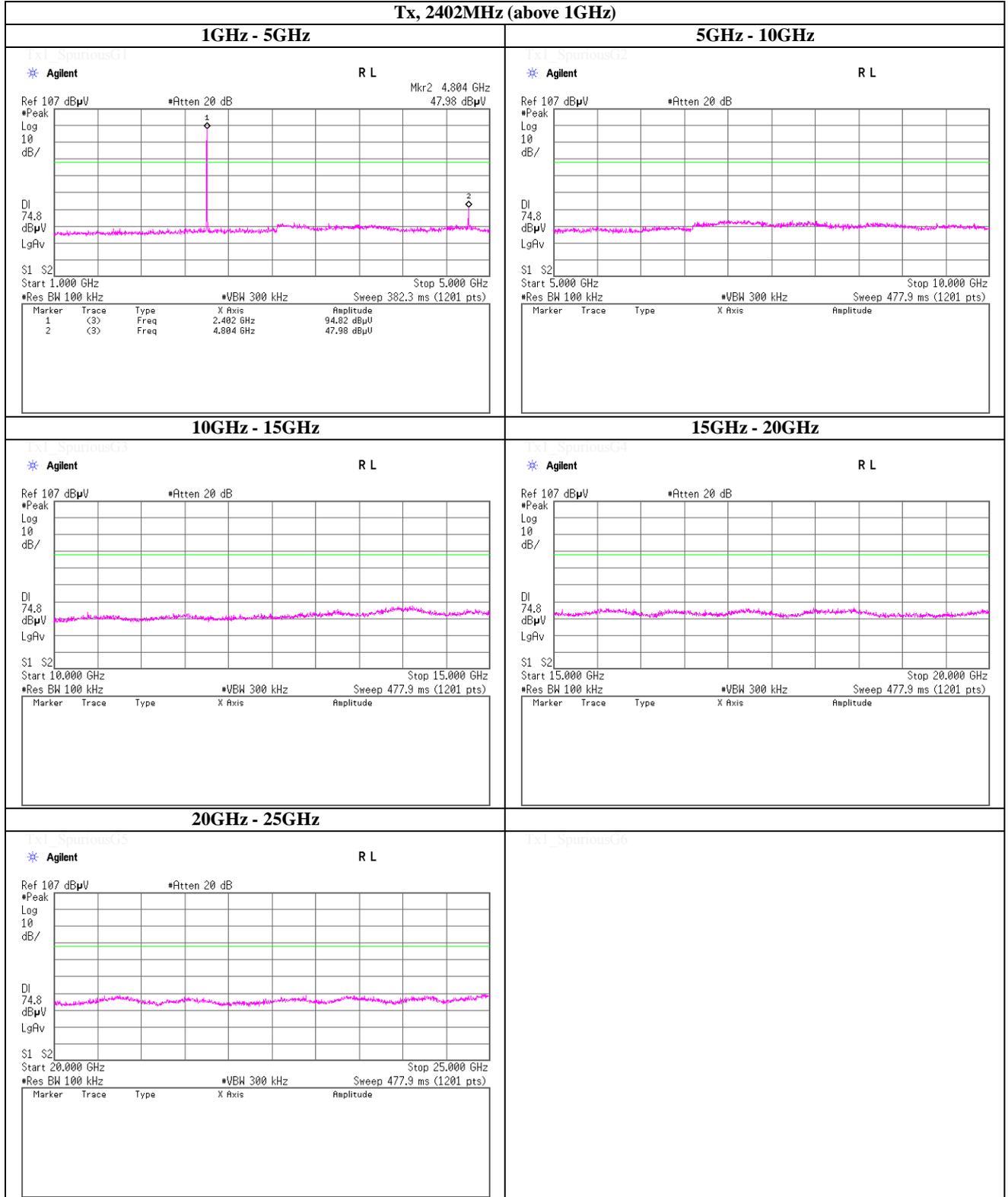
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## Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

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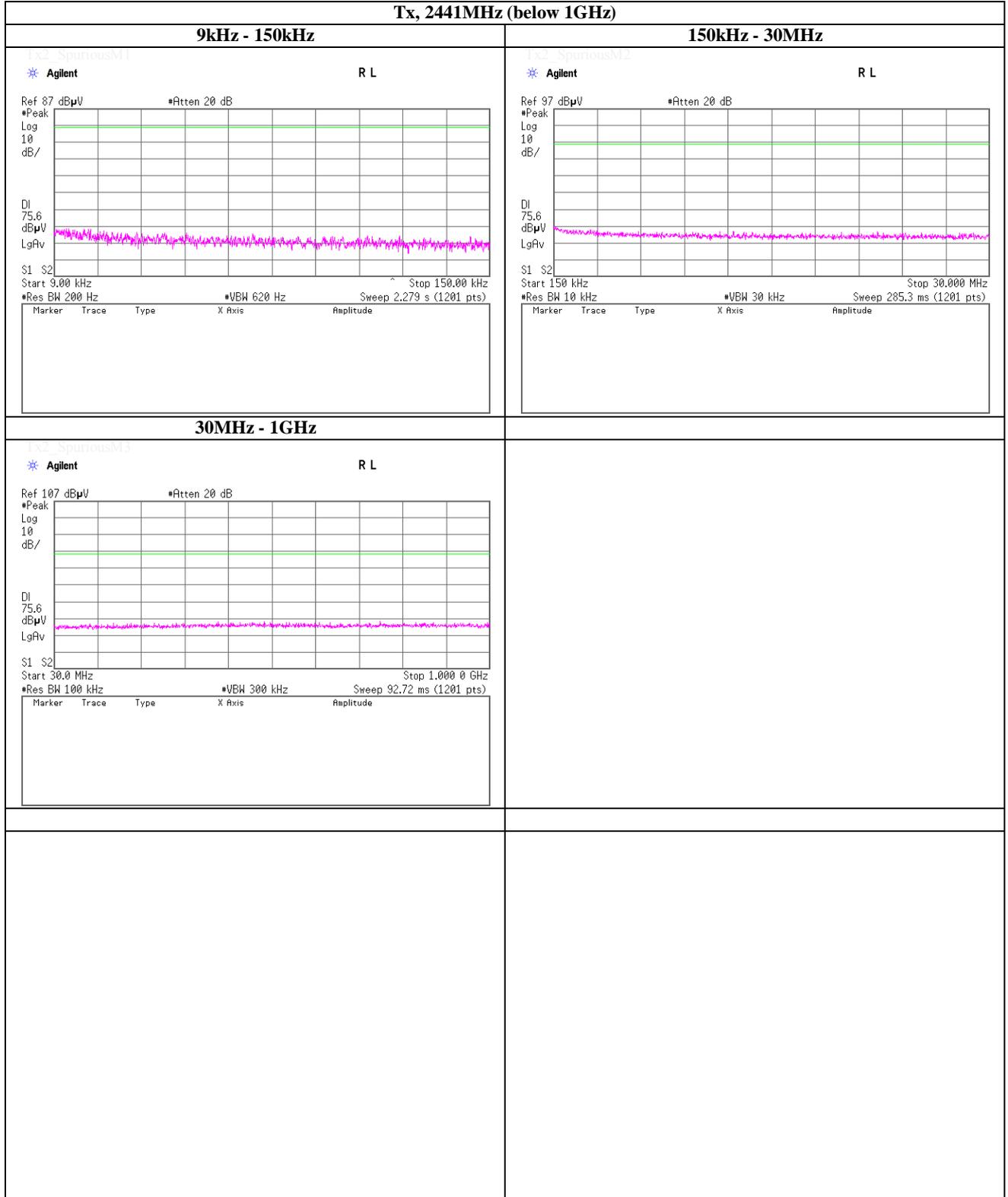
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### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)



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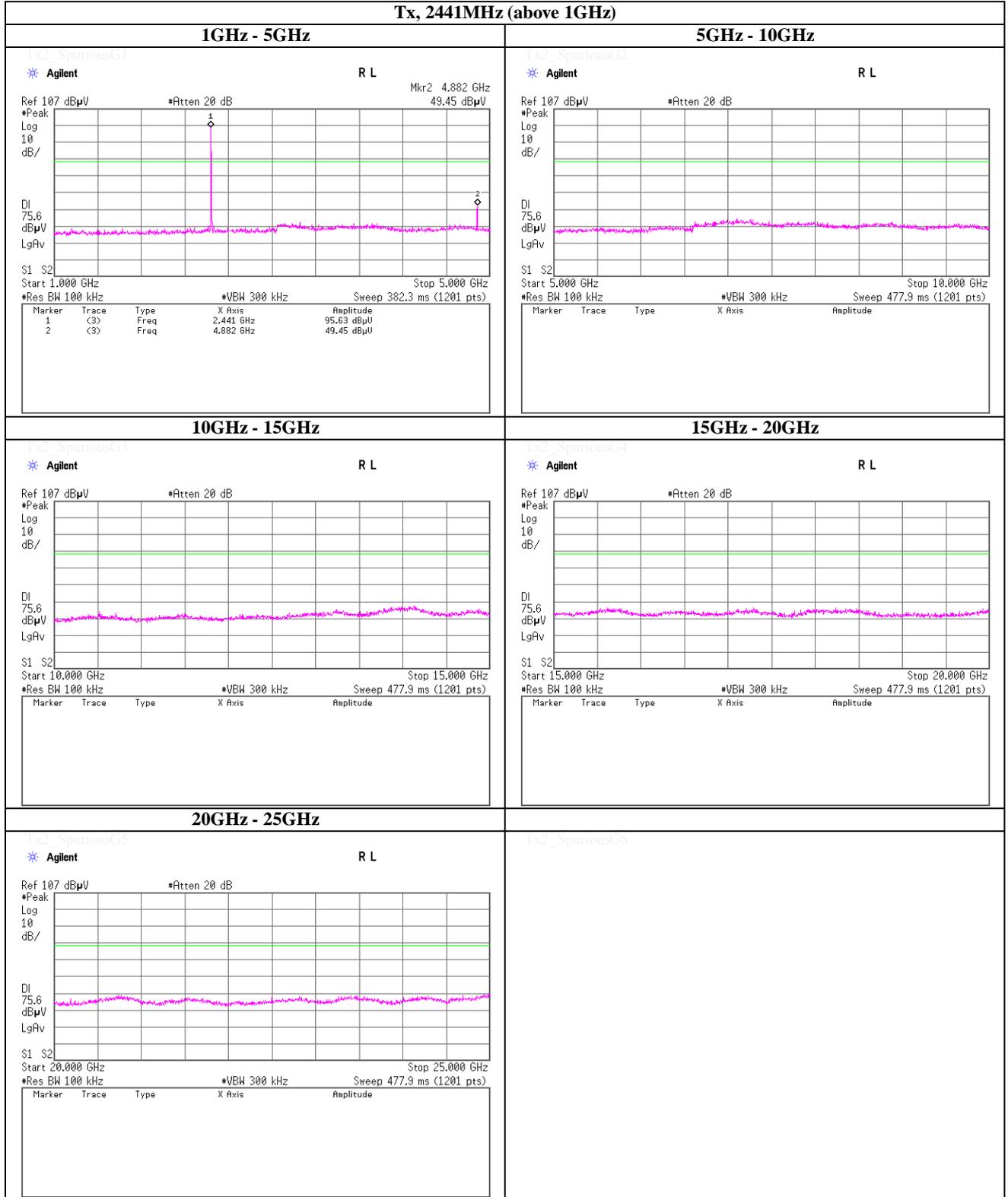
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### Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2441MHz (above 1GHz)**



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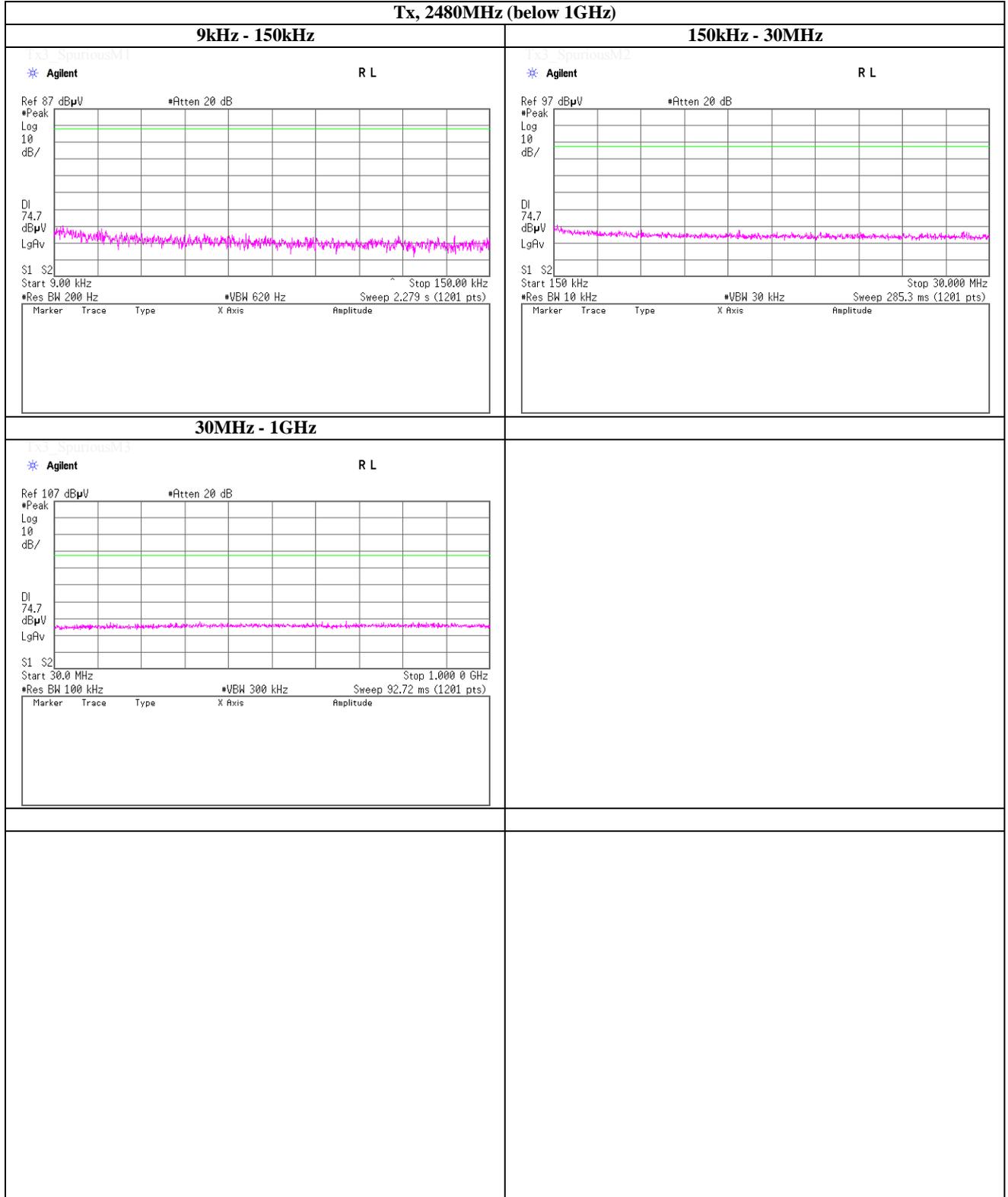
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## Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

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



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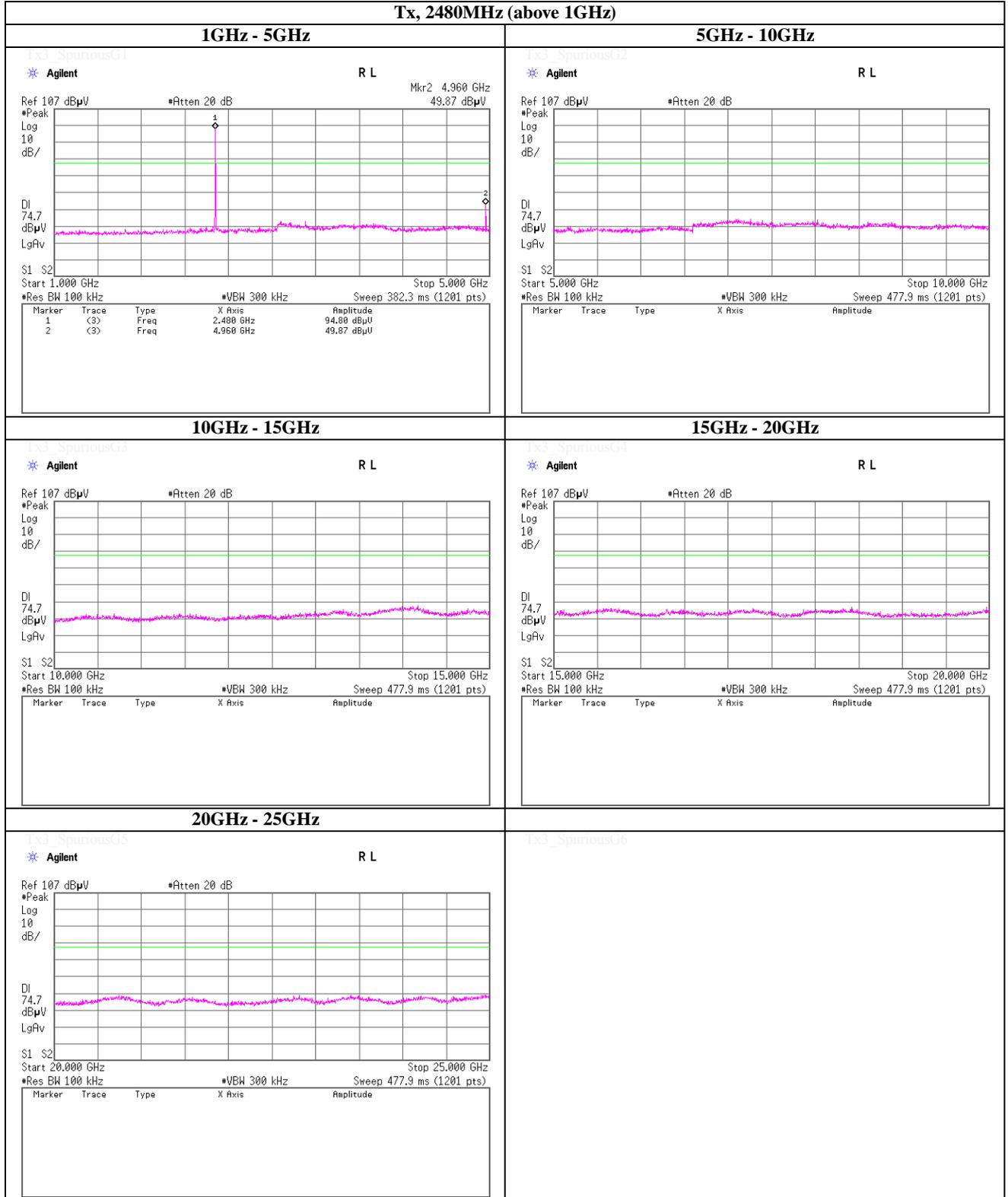
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### Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

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



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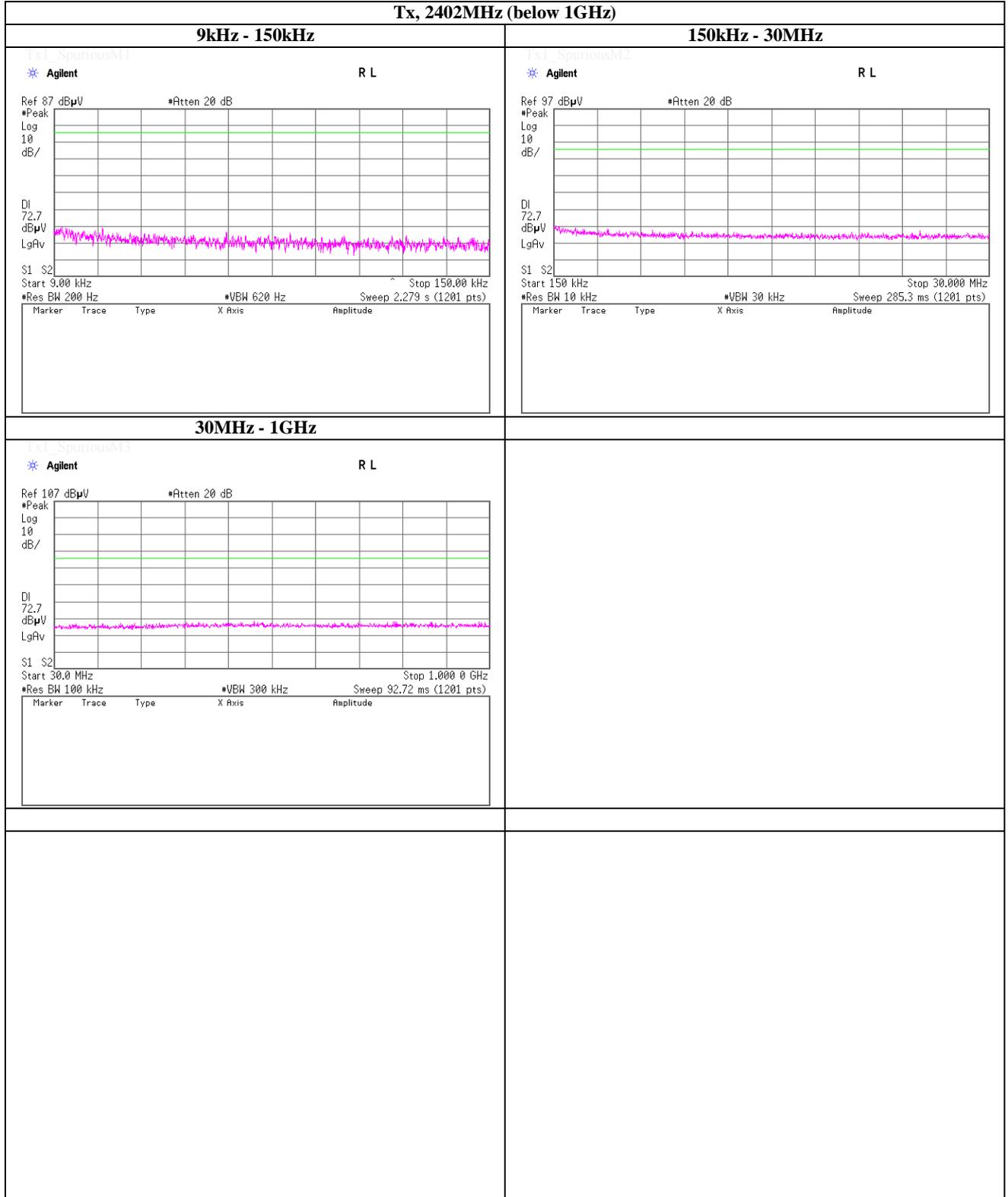
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

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



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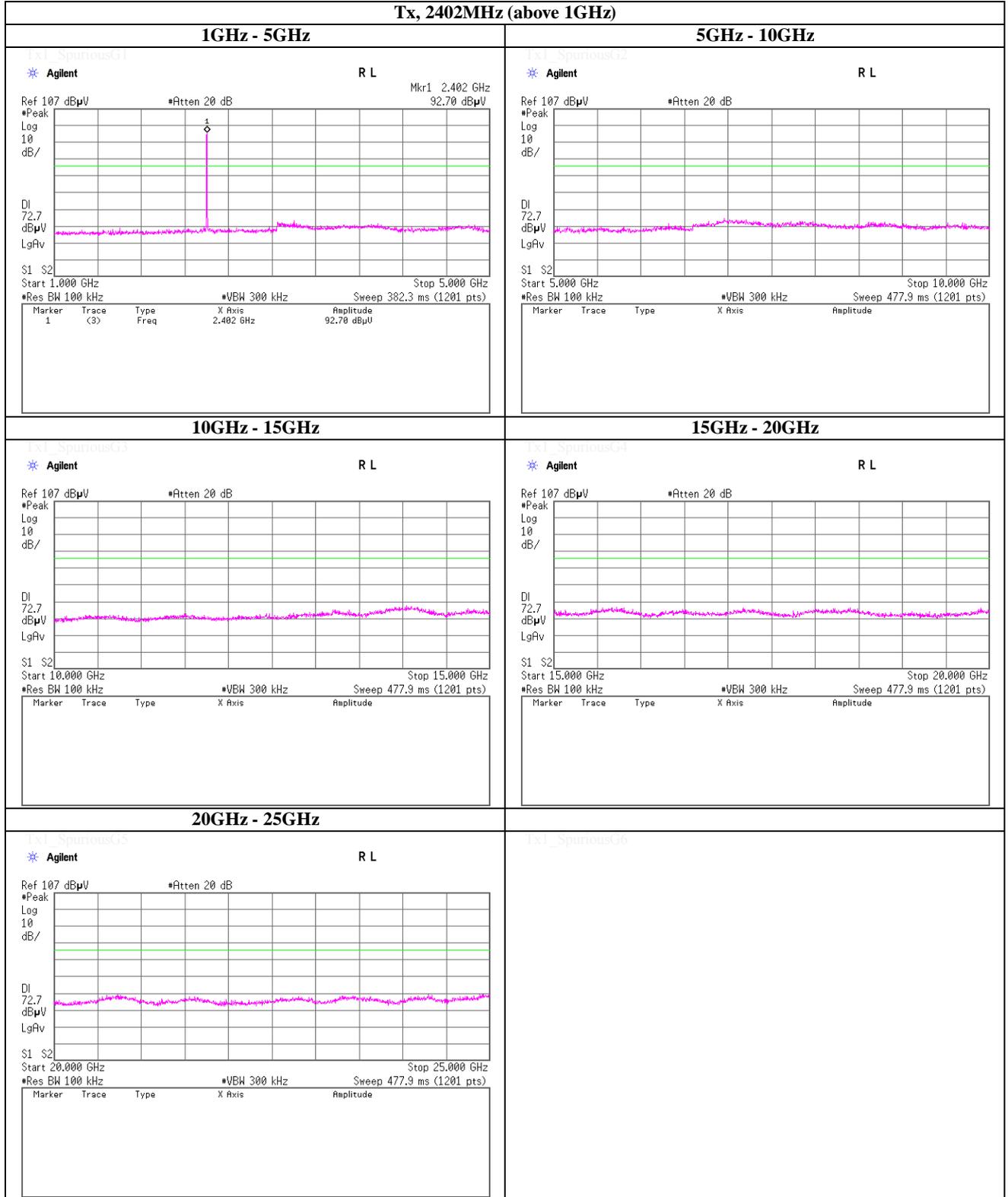
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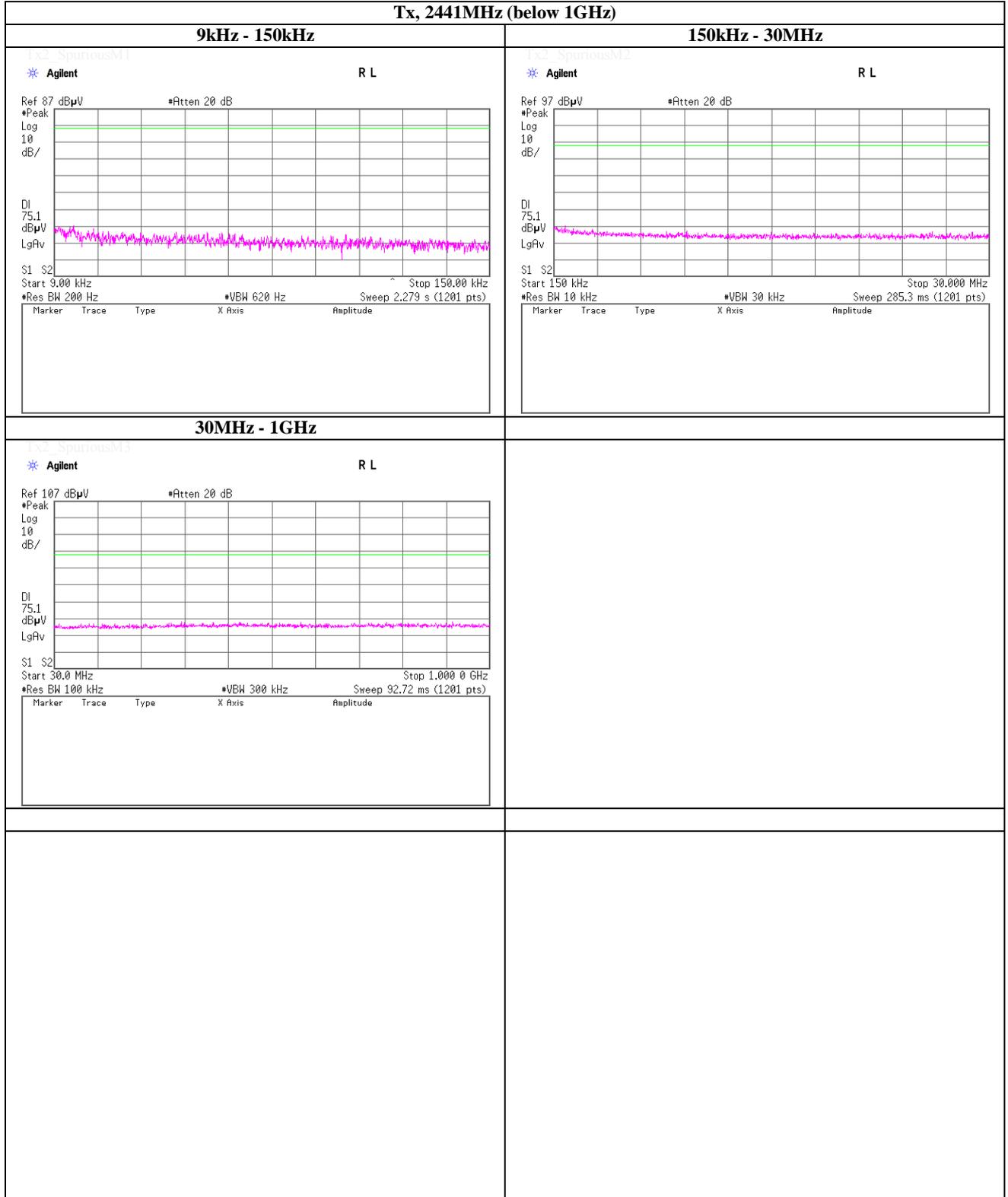
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### Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2441MHz (below 1GHz)**



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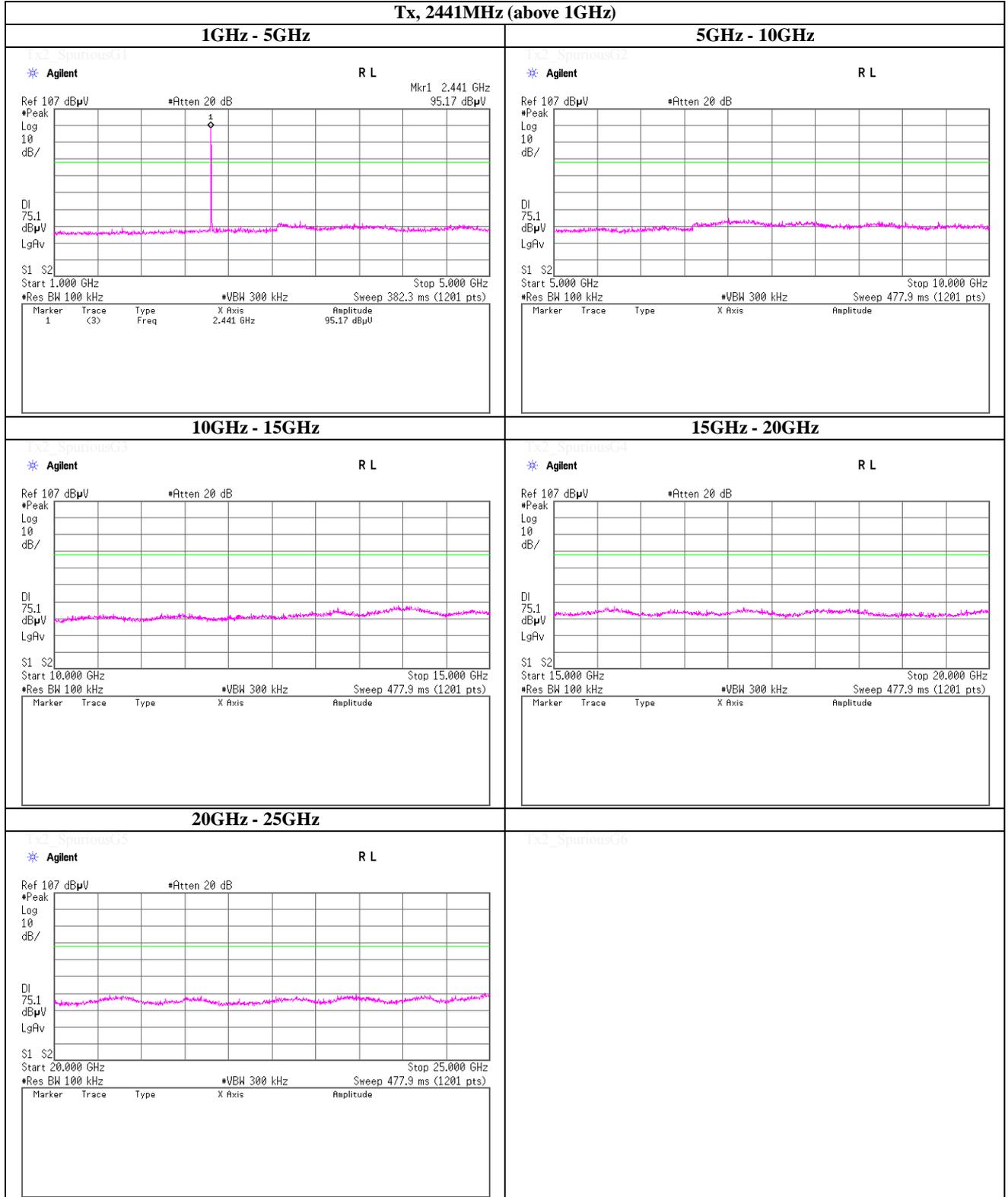
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## Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2441MHz (above 1GHz)**



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**Shonan EMC Lab.**

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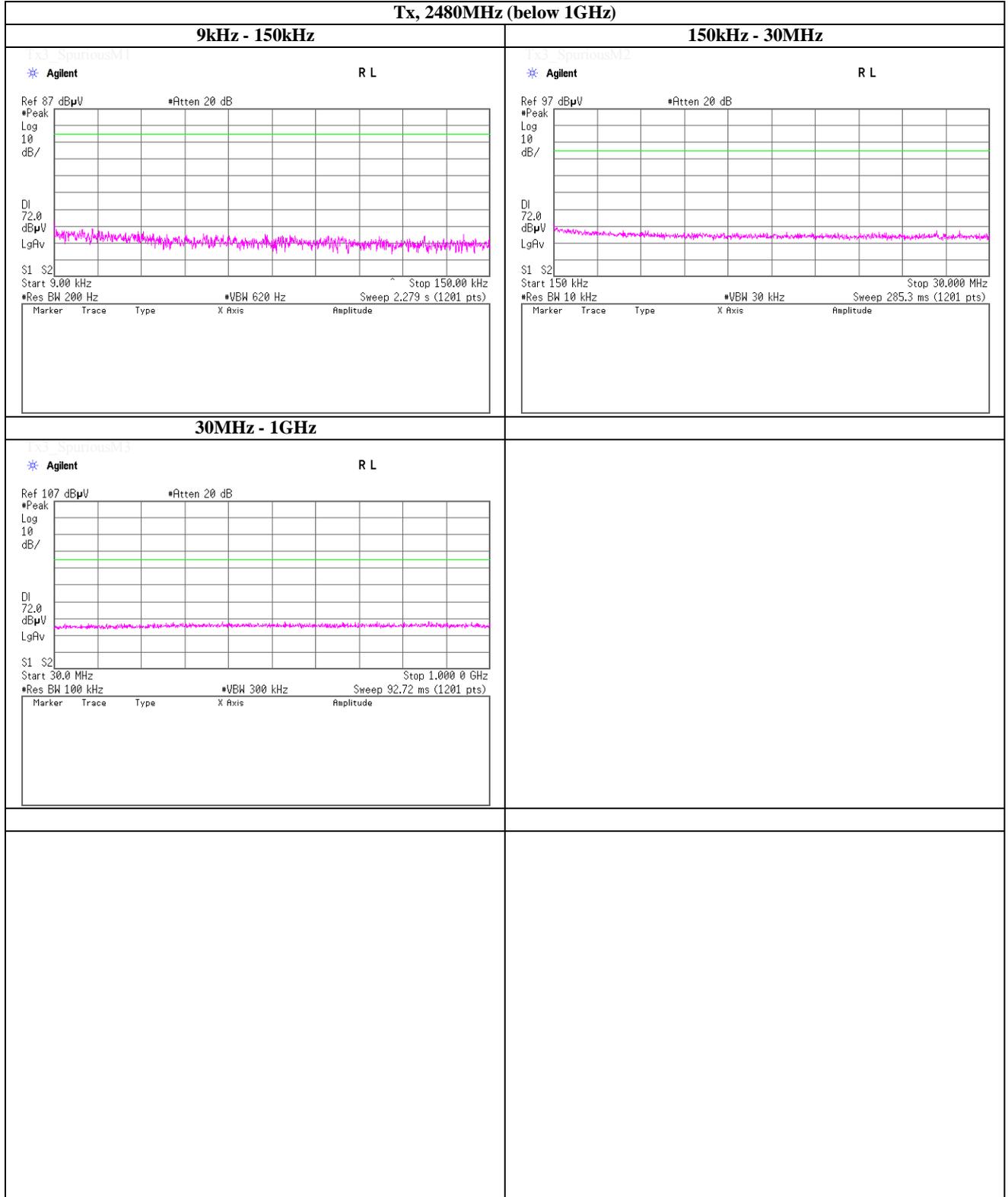
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Facsimile : +81 463 50 6401

## Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

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



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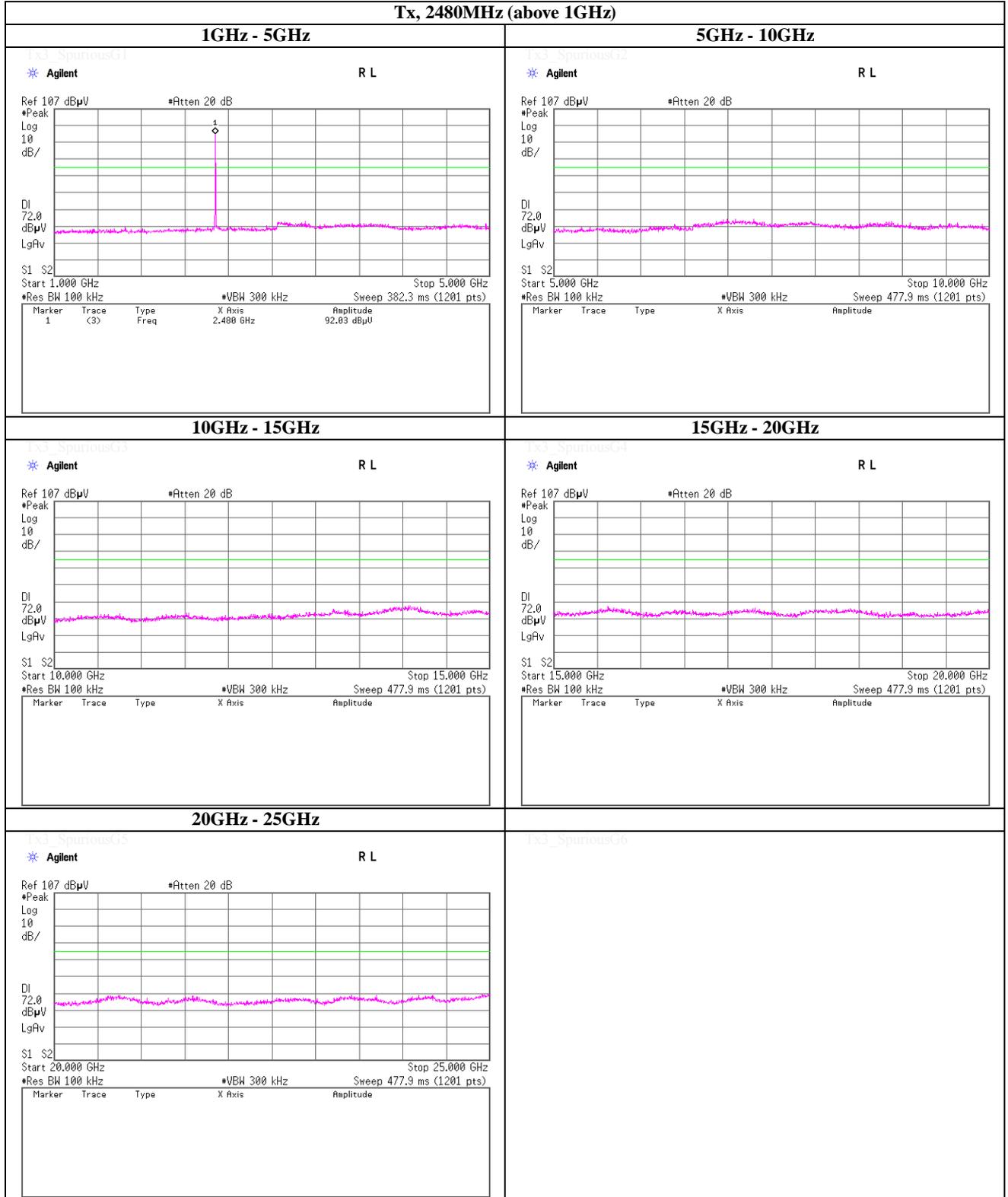
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### Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

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



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**Shonan EMC Lab.**

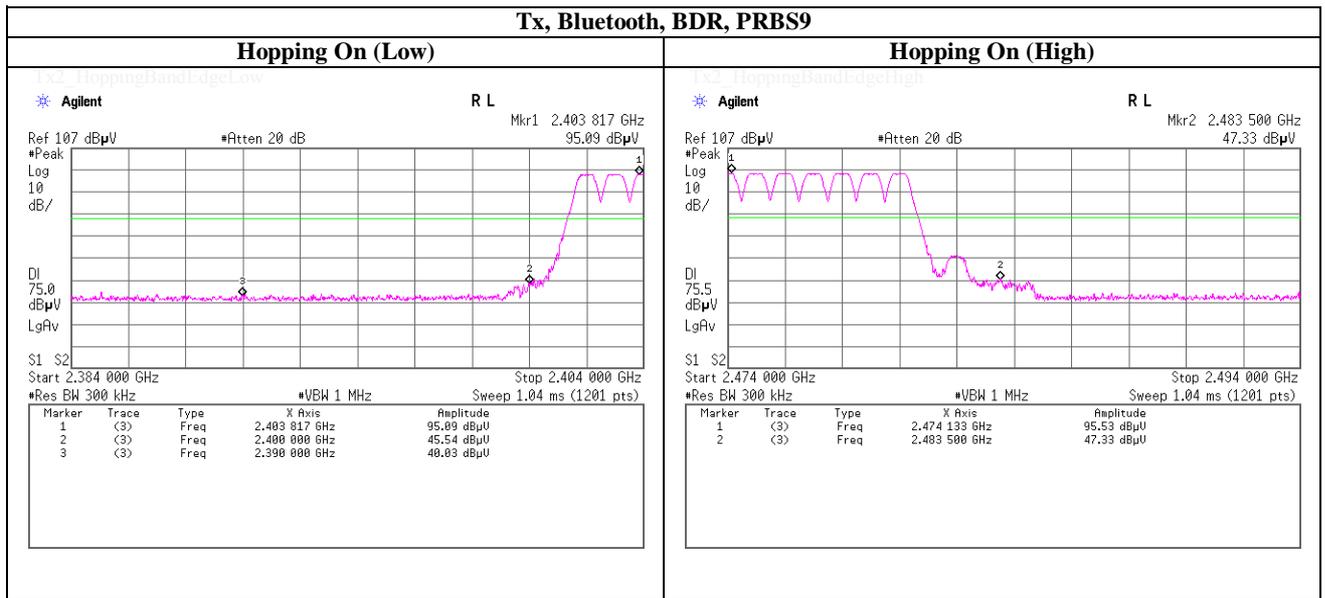
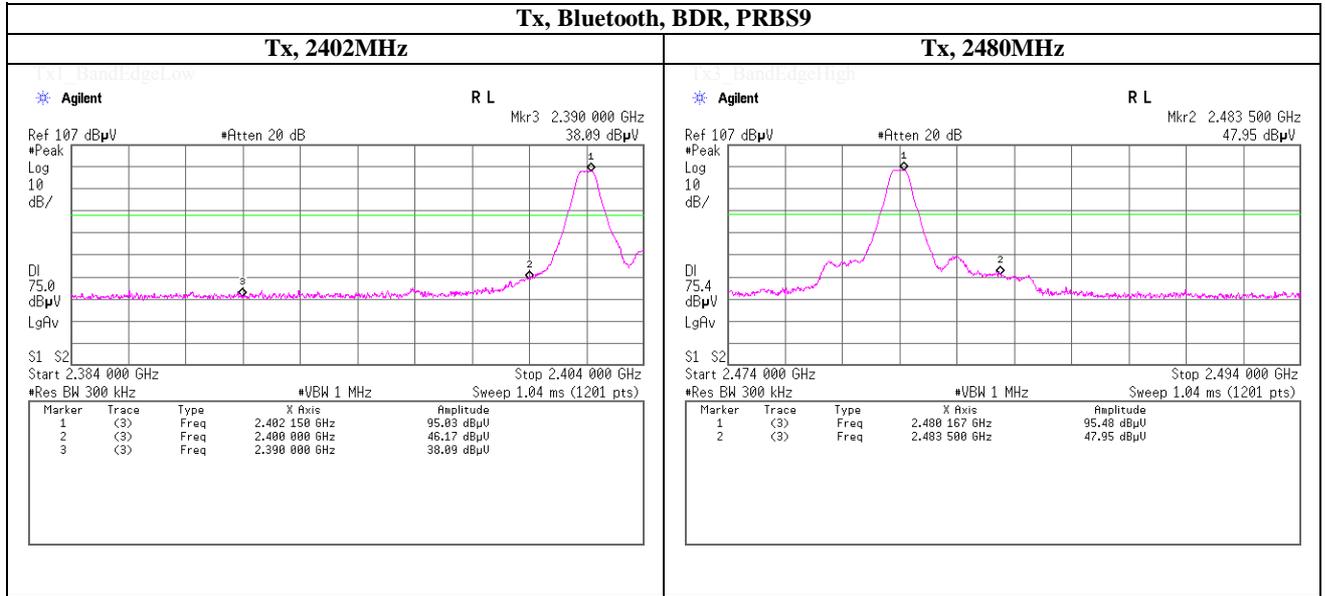
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## Spurious emission (Conducted)

### Band Edge compliace



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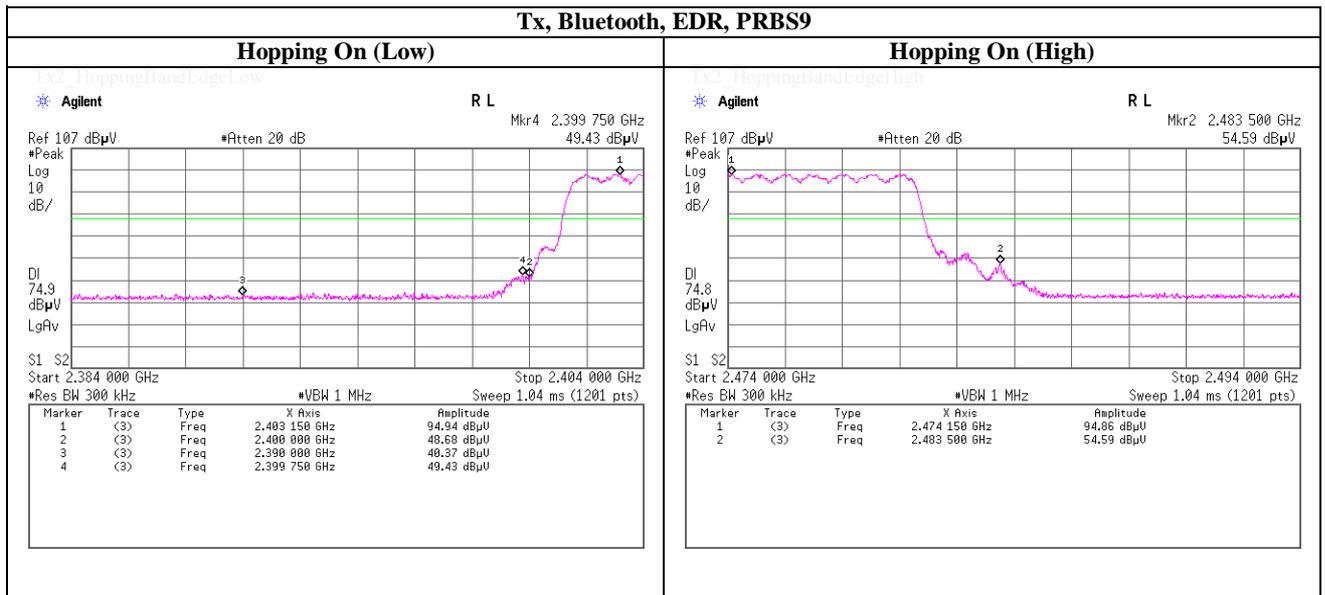
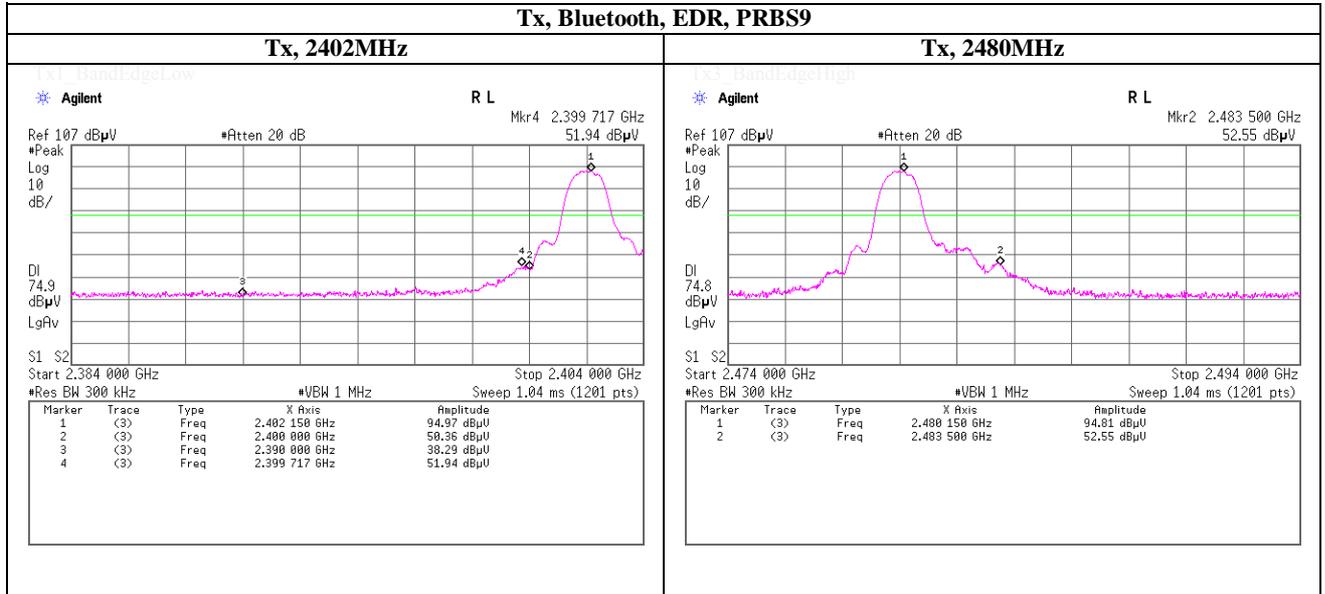
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## Spurious emission (Conducted)

### Band Edge compliance



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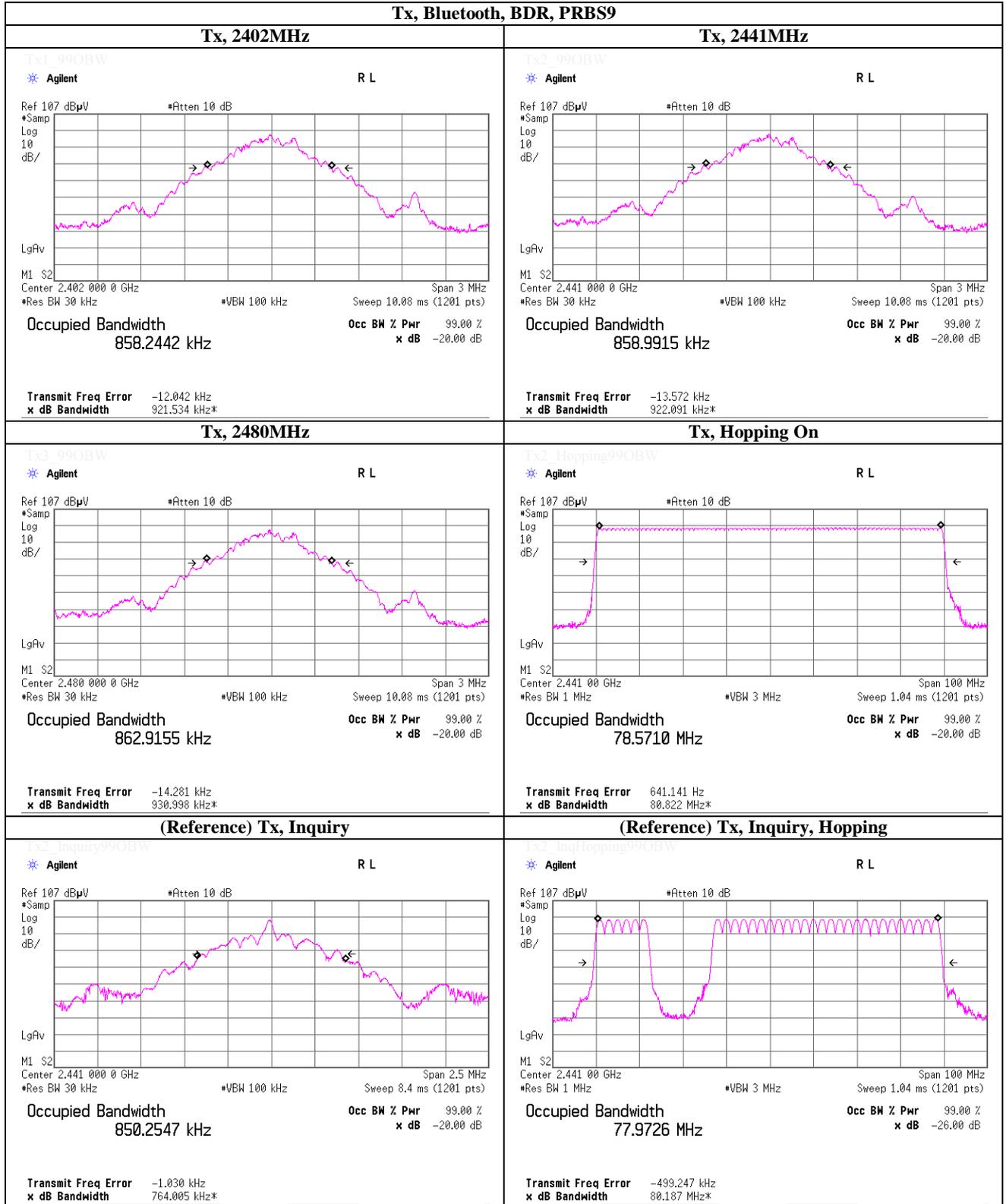
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## 99% Occupied Bandwidth



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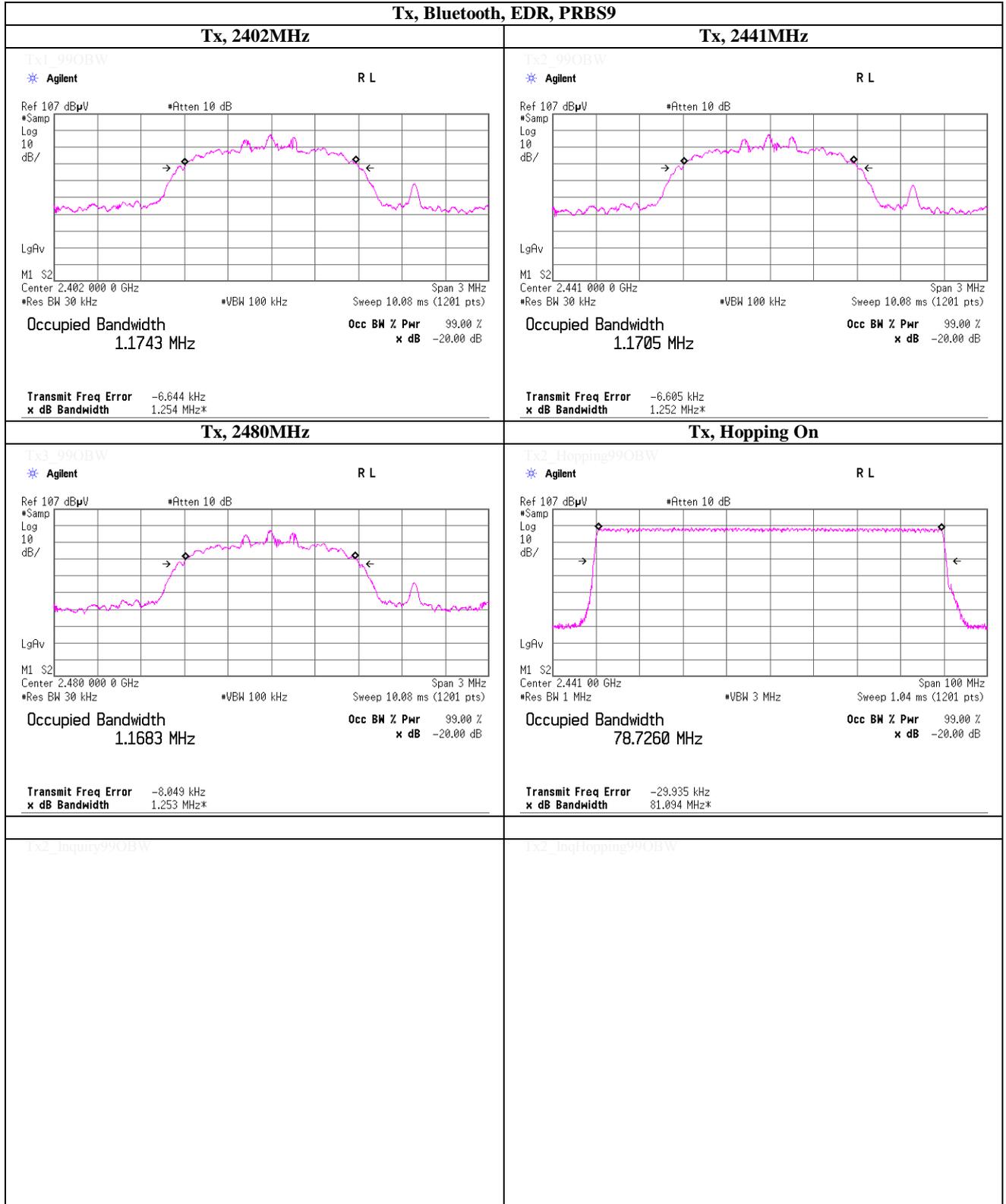
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## APPENDIX 2 Test Instruments

### 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	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2013/01/08 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2012/11/15 * 12
SCC-G30	Coaxial Cable	Junkosha	MWX241-02000KM SKMS	SEP-20-12-00 4	AT	2012/09/26 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
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, RFLMF)	-	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
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2013/02/12 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2013/08/19 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2012/11/18 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2013/04/03 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2013/04/03 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2012/11/18 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2013/02/27 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2013/09/24 * 12
SJM-02	Measure	KOMELON	KMC-36	-	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 test

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Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2013/07/06 * 12
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2013/04/03 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2013/04/09 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2013/05/22 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2013/08/12 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2013/02/27 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE	2013/01/08 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2013/03/14 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2013/03/19 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2013/03/16 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2012/12/18 * 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