



Test report No. : 14090901M-A-R1
Page : 1 of 46
Issued date : October 7, 2014
FCC ID : ACJ932BX1501
Revised date : February 12, 2015

RADIO TEST REPORT

Test Report No.: 14090901M-A-R1

Applicant : Panasonic Corporation
Type of Equipment : Car Audio
Model No. : BX1501
FCC ID : ACJ932BX1501
Test regulation : FCC Part15 Subpart C: 2014
Test result : Complied

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3. This sample tested is in compliance with the limits of the above regulation.
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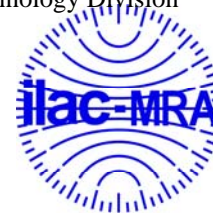
Date of test: September 22, 24, 25, 2014

Representative test engineer:

Kazuhiro Ando
EMC/Wireless Group,
Consumer Technology Division

Approved by :

Go Ishiwata
Site Manager
EMC/Wireless Group,
Consumer Technology Division



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TESTING
CERTIFICATE 1266.01

UL Japan, Inc.

Kashima EMC Lab.

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13-EM-F0429

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REVISION HISTORY

Original Test Report No. 14090901M-A

Revision	Date	Page revised	Revision Description
00	October 7, 2014	-	Original
01	February 12, 2015	P.3 All pages	- Modification of description of FCC 15.31 (e) - Due to change of company name, the description of "UL Kashima, Inc" was changed to "UL Japan, Inc".

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SECTION 1: Customer information

Company Name : Panasonic Corporation
Brand Name : Panasonic
Address : 4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8520 Japan
Telephone Number : +81-50-3689-7270
Contact Person : Yoshinori Nagatani

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

2.1 Identification of E.U.T.

Type of Equipment : Car Audio
Model No. : BX1501
Serial No. : Refer to Section 4.2
Rating : System : DC13.2 V (Car battery), Bluetooth Block : DC3.3 V
Receipt Date of Sample : September 17, 2014
Country of Mass-production : Thailand
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: BX1501 (referred to as the EUT in this report) is a Car Audio.

Clock frequency(ies) in the system : 26 MHz

Radio specification

Equipment type : Transceiver
Frequency of operation : 2402-2480 MHz
Bandwidth / Channel spacing : 79 MHz & 1 MHz
Type of modulation : FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Pattern
Antenna connector type : None
Antenna gain with cable loss : -4.3 dBi
ITU code : F1D, G1D
Operation temperature range : -20 to +65 deg. C.

FCC 15.31 (e)

The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT 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: 2014, final revised on May 1, 2014 and effective June 2, 2014
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 902-928 MHz, 2400-2483.5 MHz,
and 5725-5850 MHz

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 14090901M-B.

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		2.2 dB Freq.: 313.336MHz Detection: QP Polarization: Horizontal Mode: Tx 2480 MHz, 3-DH5	Complied

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	
Radiated emission	30 MHz-300 MHz	4.9 dB
	300 MHz-1 GHz	6.3 dB
	1 GHz-6 GHz	4.5 dB
	6 GHz-18 GHz	4.8 dB
	18 GHz-26.5 GHz	4.9 dB

Antenna port conducted test

Power Measurement uncertainty above 1GHz for this test was: (\pm) 0.7dB

Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (\pm) 1.6dB

Conducted emissions, Power Density Measurement (1G-3GHz) uncertainty for this test was: (\pm) 1.4dB

Bandwidth Measurement uncertainty for this test was: (\pm) 4.9%

Duty cycle and Time Measurement uncertainty for this test was: (\pm) 0.012%

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3.5 Test location

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 Facsimile number : +81 478 82 3373
 A2LA Accreditation No. : 1266-01

Test room	Width*Depth*Height (m)	Test room	Width*Depth*Height (m)
No.1 Open site	6.0 * 5.5 * 2.5 Measurement distance: 3, 10 m	No.4 Shielded Room	6.1 * 6.1 * 3.1
No.2 Open site	4.4 * 4.4 * 2.15 Measurement distance: 3, 10 m	No.5 Shielded Room	4.2 * 3.1 * 2.5
No.5 Open site	8.6 * 7.1 * 2.4 Measurement distance: 3, 10 m	No.3 Fully Anechoic Chamber	7.0 * 3.5 * 3.5
No.1 Shielded room	5.4 * 4.5 * 2.3	No.6 Semi-anechoic Chamber	8.5 * 5.5 * 5.2 Maximum measurement distance: 3 m
No.2 Shielded room	3.6 * 2.7 * 2.3	No.10 Semi-anechoic Chamber	18.4 * 9.9 * 7.7 Maximum measurement distance: 10 m
No.3 Shielded room	5.4 * 3.6 * 2.3	No.11 Semi-anechoic Chamber	9.0 * 6.5 * 5.2 Maximum measurement distance: 3 m
No.1 Measurement room	5.0 * 3.7 * 2.6		
No.2 Measurement room	4.3 * 4.4 * 2.7		

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

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

*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.

The carrier separation may be less than 20 dB bandwidth, therefore 125 mW power limit was applied to it.

We removed 2-DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative.

*The EUT has no Inquiry mode.

EUT has the power settings by the software as follows;

Power settings	Fixed
Software	BT test diag Ver.No.7

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

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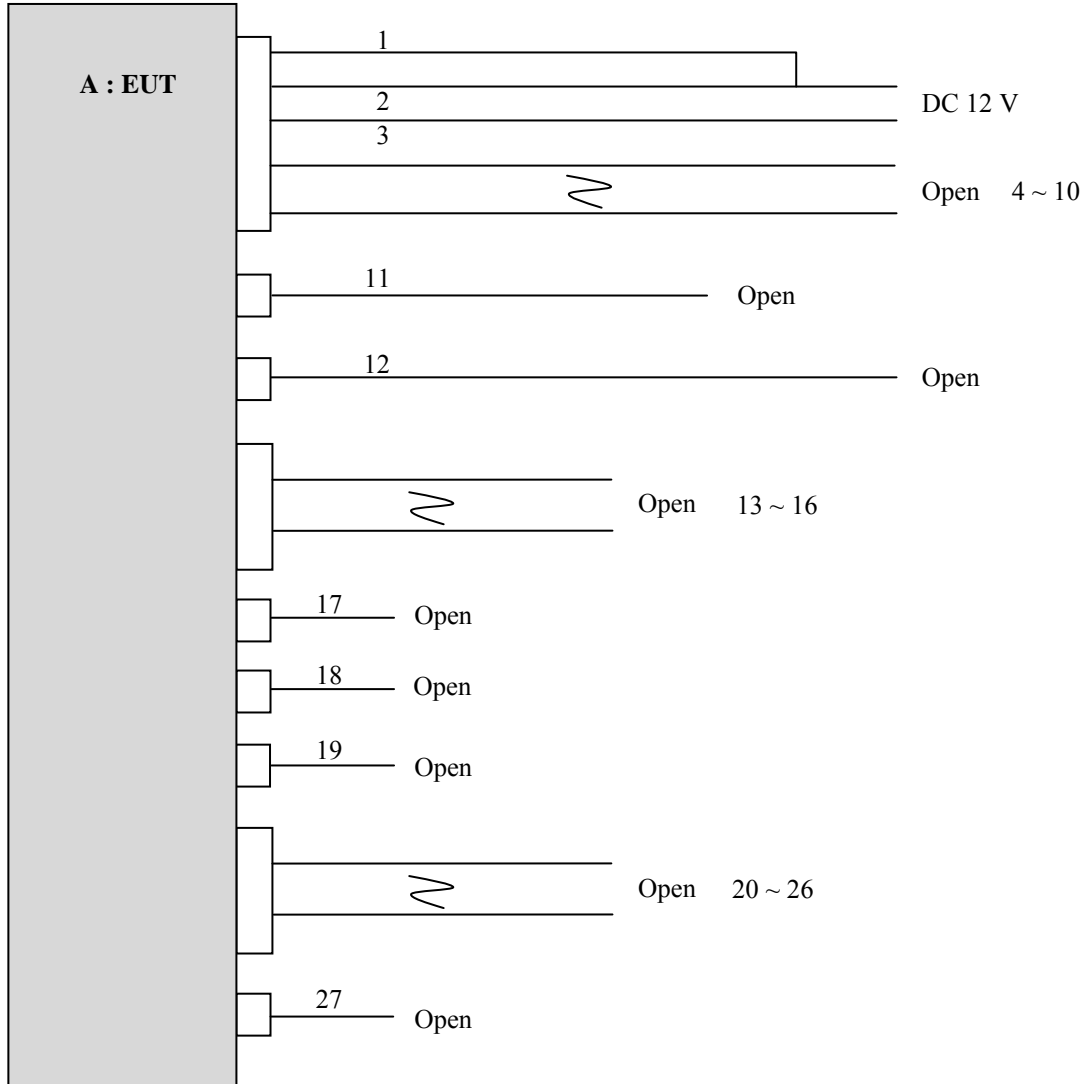
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

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Description of EUT and Auxiliary equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	BX1501	*1)	Panasonic	EUT

*1) BX1501_001: Antenna port conducted tests, BX1501_002: Radiated emission tests

List of cables used

No.	Item	Length(m)	Shield (Cable)	Shield (Connector)	Remarks
1	16pin Connector	1.7	Unshielded	Unshielded	ACC
2	16pin Connector	1.7	Unshielded	Unshielded	+B
3	16pin Connector	1.7	Unshielded	Unshielded	GND
4	16pin Connector	1.7	Unshielded	Unshielded	-
5	16pin Connector	1.7	Unshielded	Unshielded	-
6	16pin Connector	1.7	Unshielded	Unshielded	-
7	16pin Connector	1.7	Unshielded	Unshielded	-
8	16pin Connector	1.7	Unshielded	Unshielded	-
9	16pin Connector	1.7	Unshielded	Unshielded	-
10	16pin Connector	1.7	Unshielded	Unshielded	-
11	HDMI	1.4	Shielded	Shielded	-
12	USB	2.0	Shielded	Shielded	-
13	AUX	1.0	Unshielded	Unshielded	-
14	AUX	1.0	Unshielded	Unshielded	-
15	AUX	1.0	Unshielded	Unshielded	-
16	AUX	1.0	Unshielded	Unshielded	-
17	Video	0.2	Unshielded	Unshielded	-
18	Video	0.1	Unshielded	Unshielded	-
19	Video	0.1	Unshielded	Unshielded	-
20	CAN	1.0	Unshielded	Unshielded	-
21	CAN	1.0	Unshielded	Unshielded	-
22	CAN	1.0	Unshielded	Unshielded	-
23	CAN	1.0	Unshielded	Unshielded	-
24	CAN	1.0	Unshielded	Unshielded	-
25	CAN	1.0	Unshielded	Unshielded	-
26	CAN	1.0	Unshielded	Unshielded	-
27	Radio Antenna	0.15	Shielded	Shielded	-

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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: 20 dB 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: Radiated emission

10.1 Operating environment

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

10.2 Test configuration

The EUT was placed on a platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam. 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 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

Photographs of the set up are shown in APPENDIX 3.

10.3 Test conditions

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

10.4 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 3 m (below 13 GHz) / 1 m (above 13 GHz) (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.

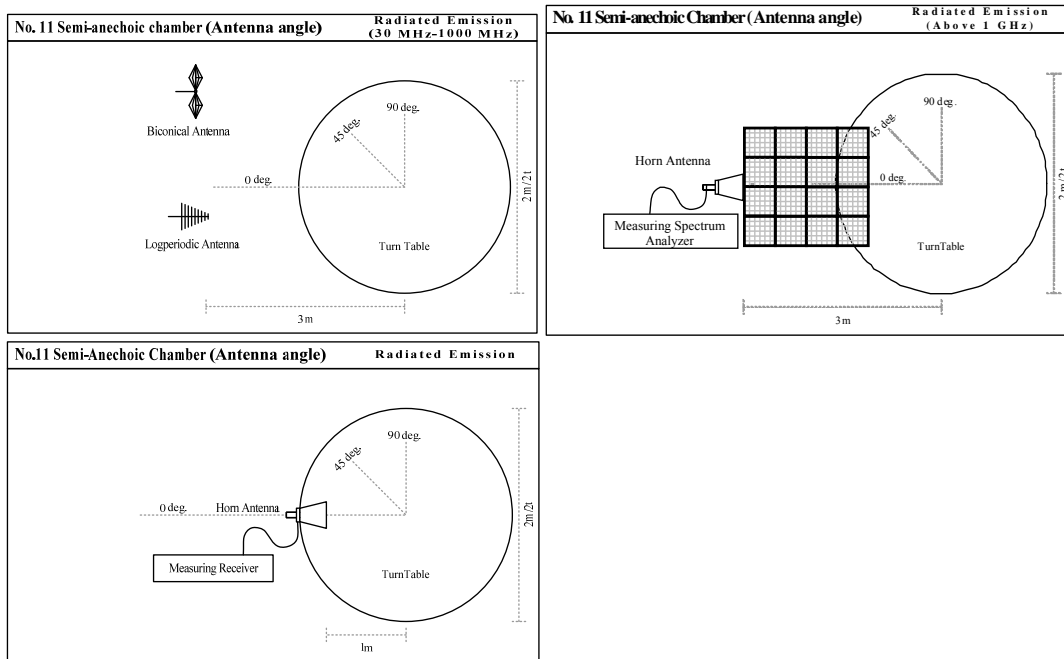
The radiated emission measurements were made with the following detection.

Frequency	30 – 1000 MHz	1 – 25 GHz		20 dBc
Detection Type	: Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	: 120 kHz	RBW:1 MHz VBW:3 MHz	RBW:1 MHz VBW:10 Hz	RBW: 100 kHz VBW: 300 kHz

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

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

Figure 1. Antenna angle



10.5 Band edge

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

10.6 Results

Summary of the test results: Pass *No noise was detected above the 6th order harmonics.

Refer to APPENDIX 1.

SECTION 11: Spurious emissions (Antenna port conducted)

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port. The radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement. In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz-150 kHz:RBW=200 Hz, 150 kHz-30 MHz:RBW=10 kHz)

Summary of the test results: Pass

Refer to APPENDIX 1

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20 dB 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

APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc.	No.1 Measurement Room
Date	September 22, 2014	
Temperature / Humidity	23 deg.C , 58 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.923	1.000	>= 0.615
DH5	2441.0	0.924	1.000	>= 0.616
DH5	2480.0	0.926	1.000	>= 0.618

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

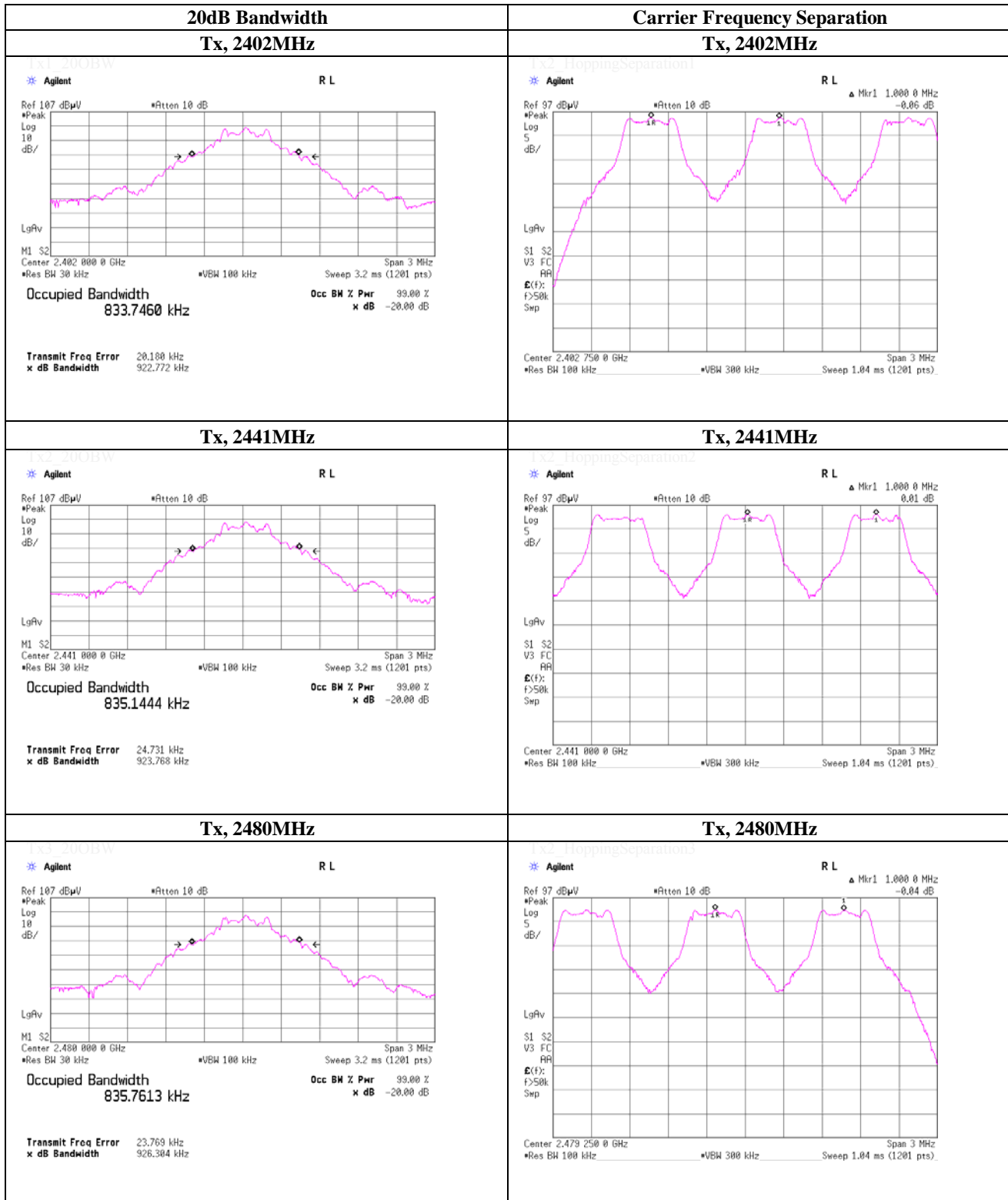
No limit applies to 20dB Bandwidth.

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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.	No.1 Measurement Room
Date	September 22, 2014	
Temperature / Humidity	23 deg.C , 58 %RH	
Engineer	Kazuhiro Ando	
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	1.261	1.000	>= 0.841
3-DH5	2441.0	1.260	1.000	>= 0.840
3-DH5	2480.0	1.262	1.000	>= 0.841

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

No limit applies to 20dB Bandwidth.

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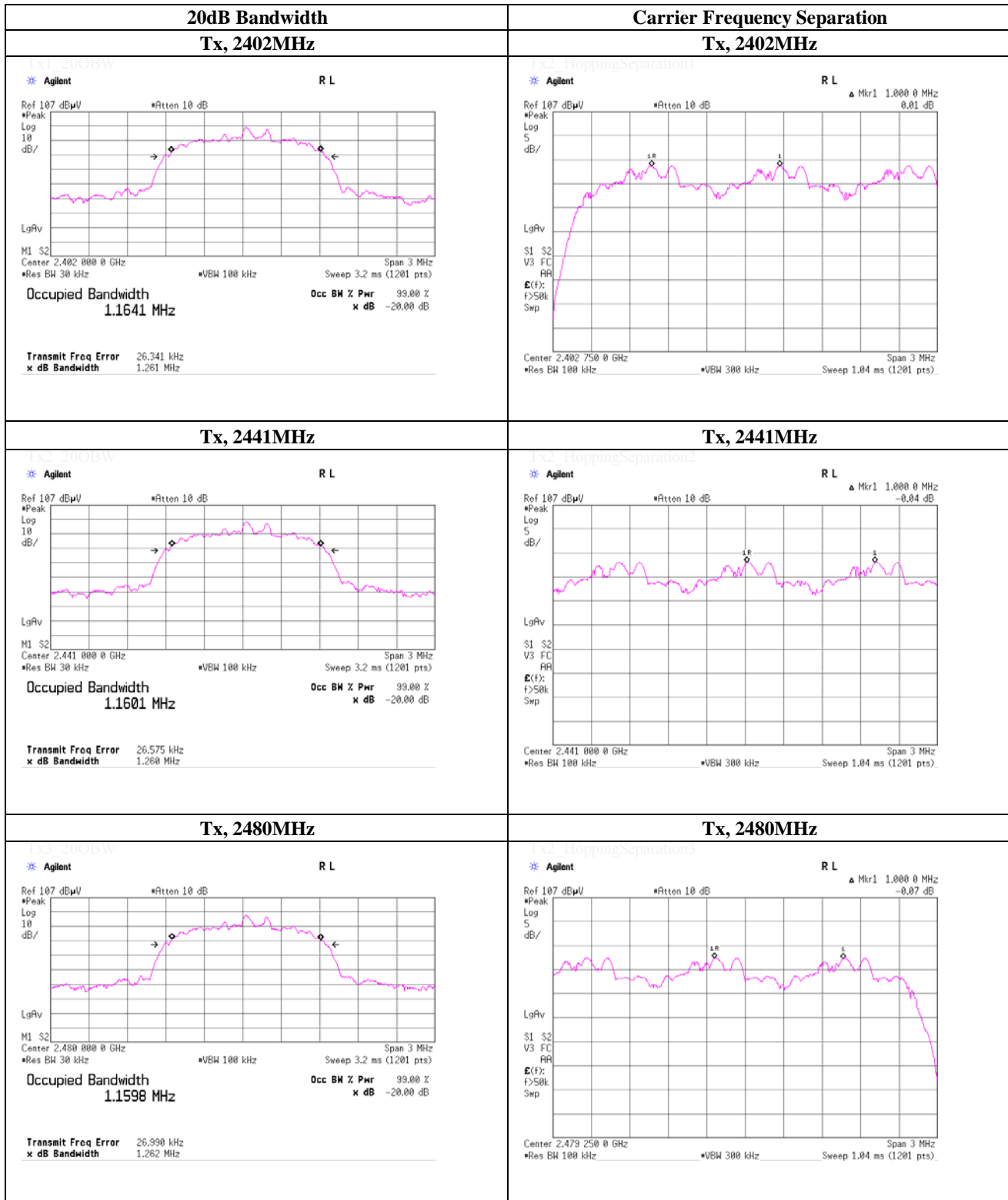
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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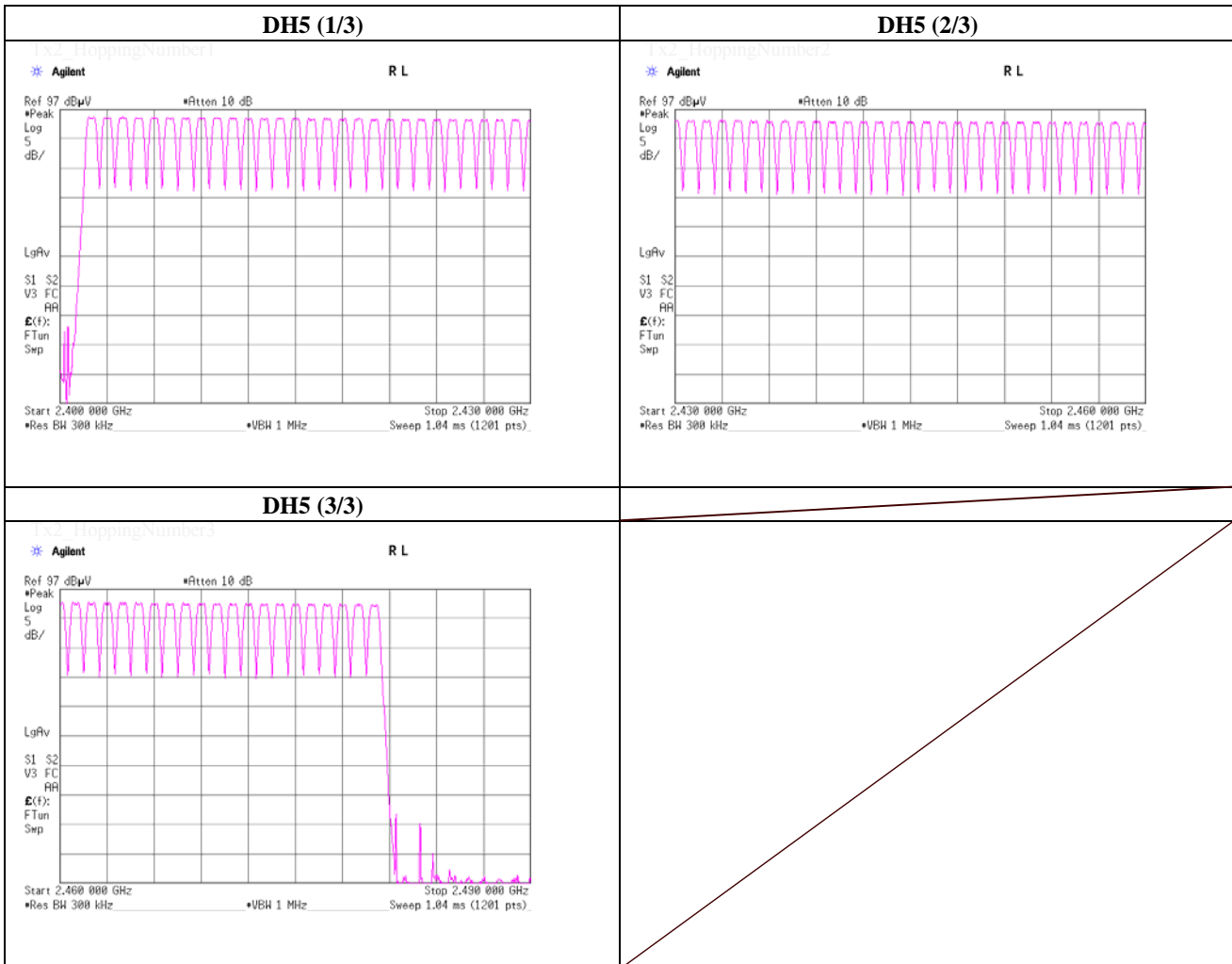
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Number of Hopping Frequency

Test place	UL Japan, Inc.	No.1 Measurement Room
Date	September 22, 2014	
Temperature / Humidity	23 deg.C , 58 %RH	
Engineer	Kazuhiro Ando	
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.

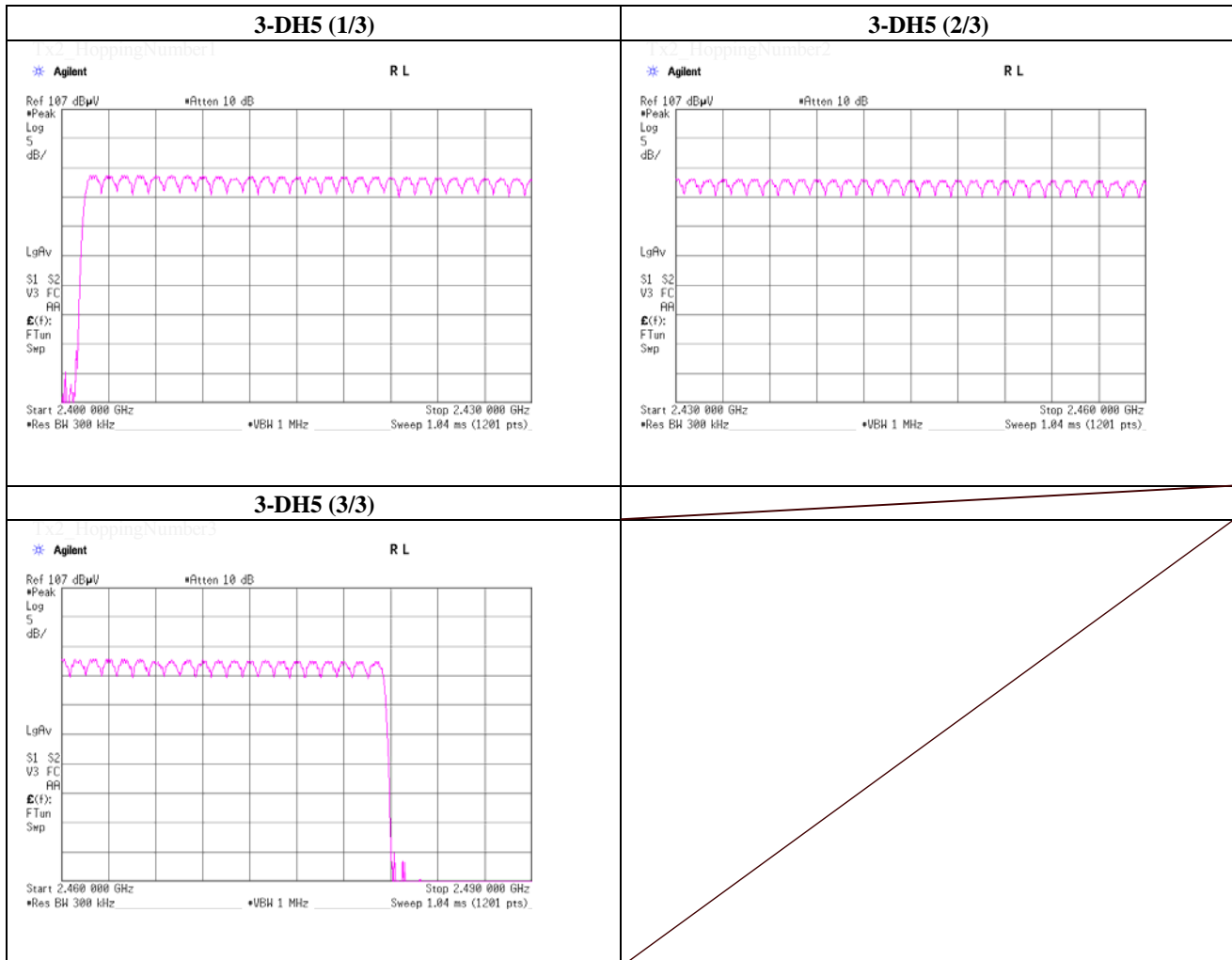


Number of Hopping Frequency

Test place	UL Japan, Inc.	No.1 Measurement Room
Date	September 22, 2014	
Temperature / Humidity	23 deg.C , 58 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, EDR, PRBS9	

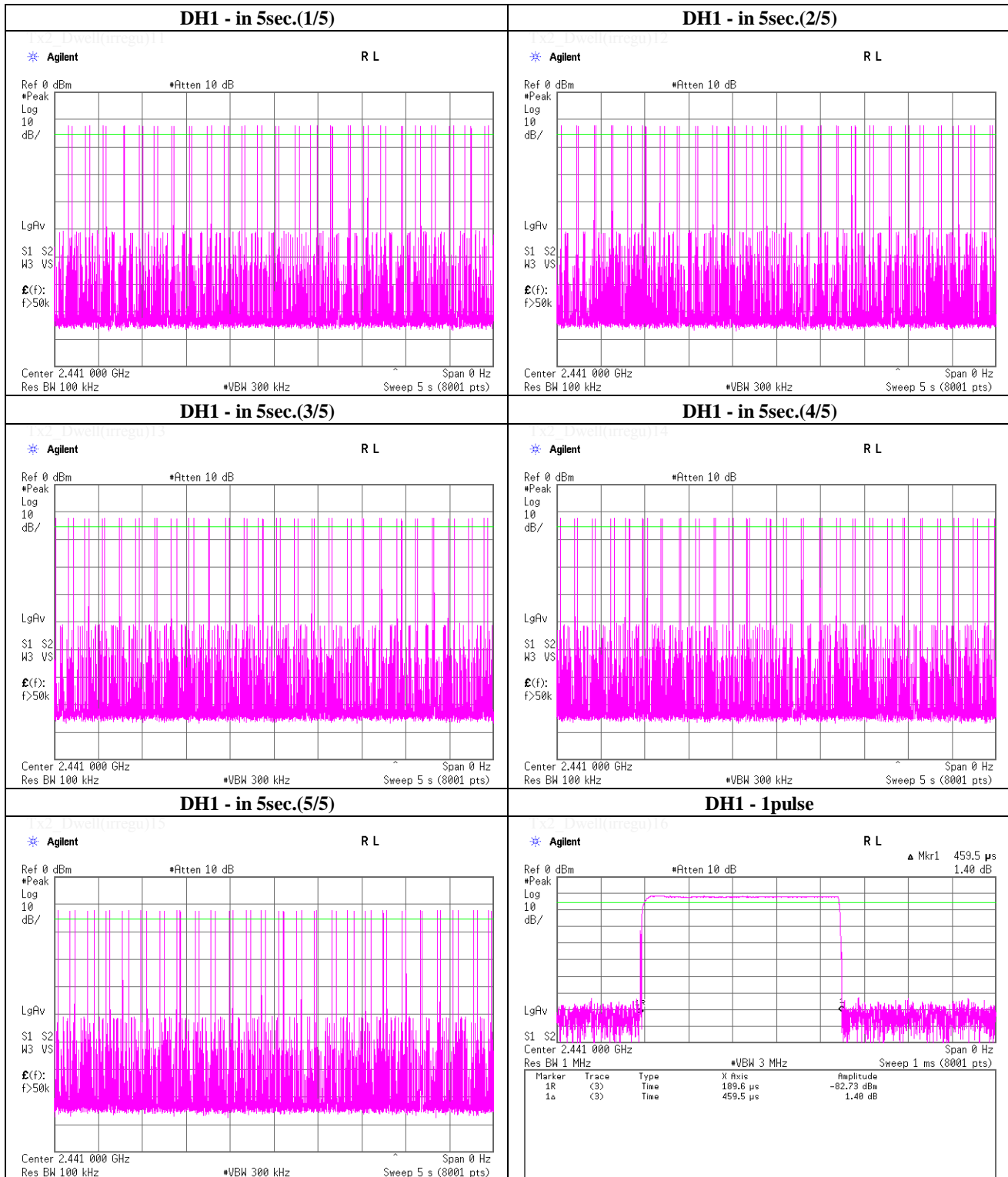
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* 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.



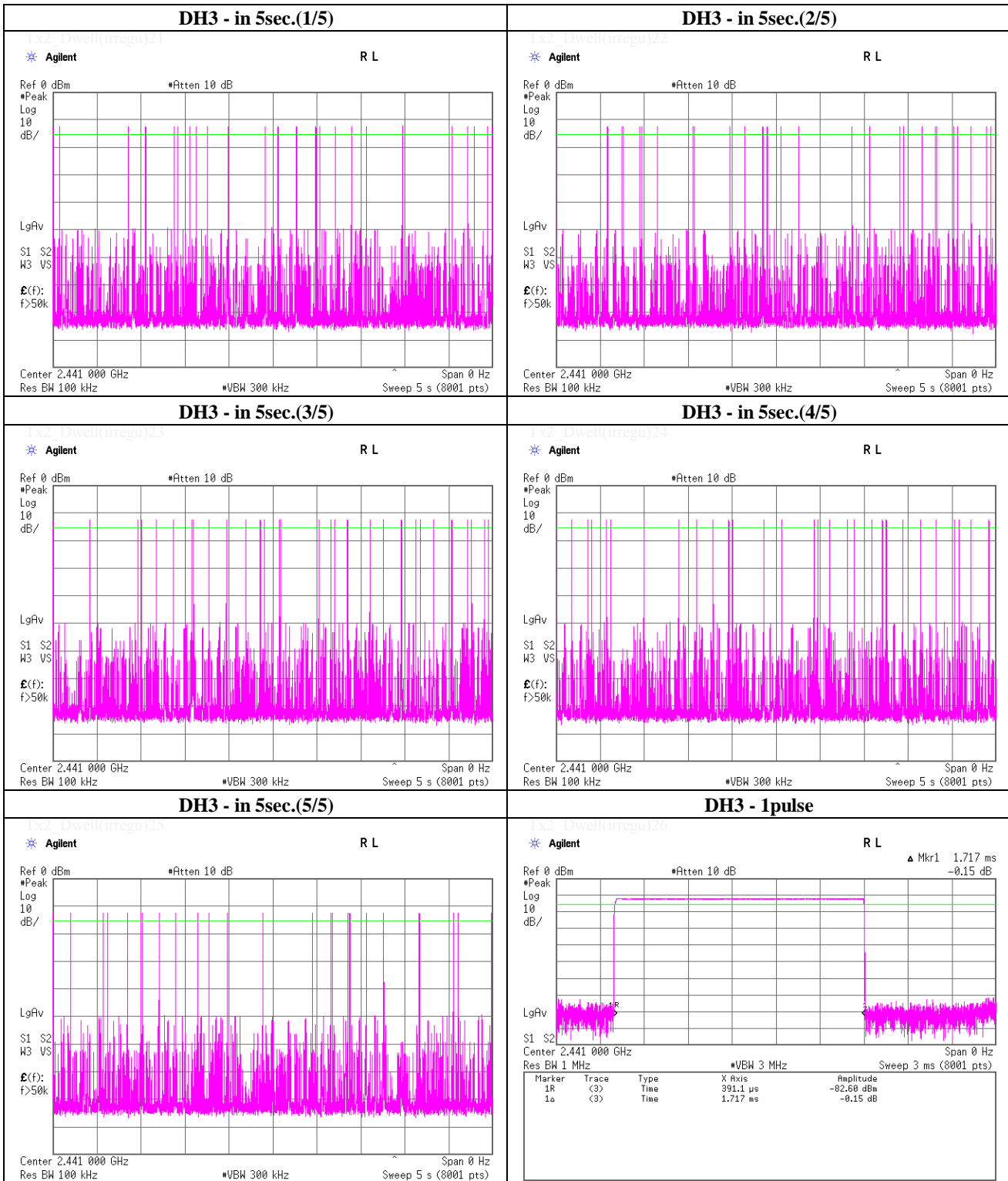
Dwell time

Tx, Bluetooth, BDR, PRBS9



Dwell time

Tx, Bluetooth, BDR, PRBS9

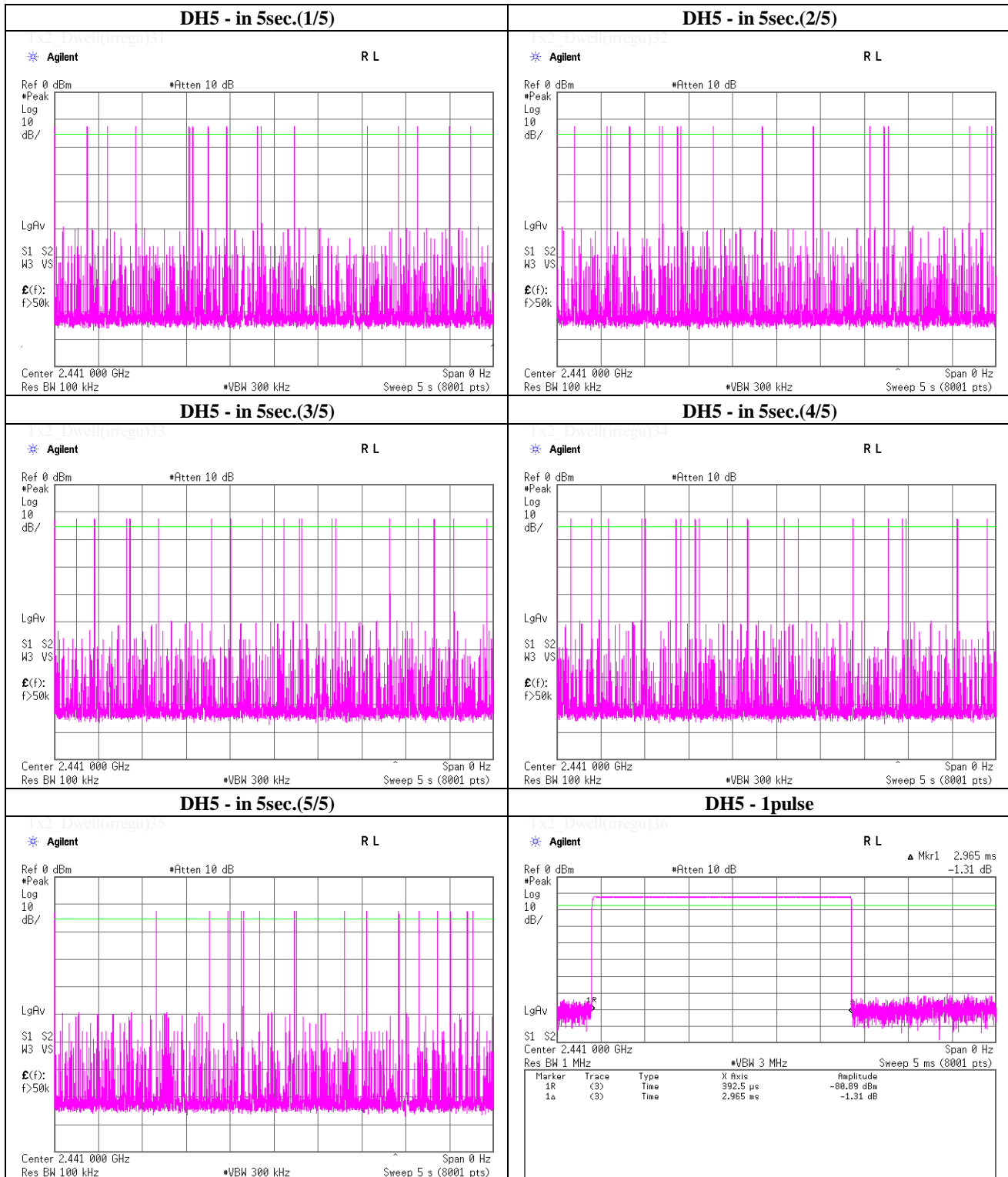


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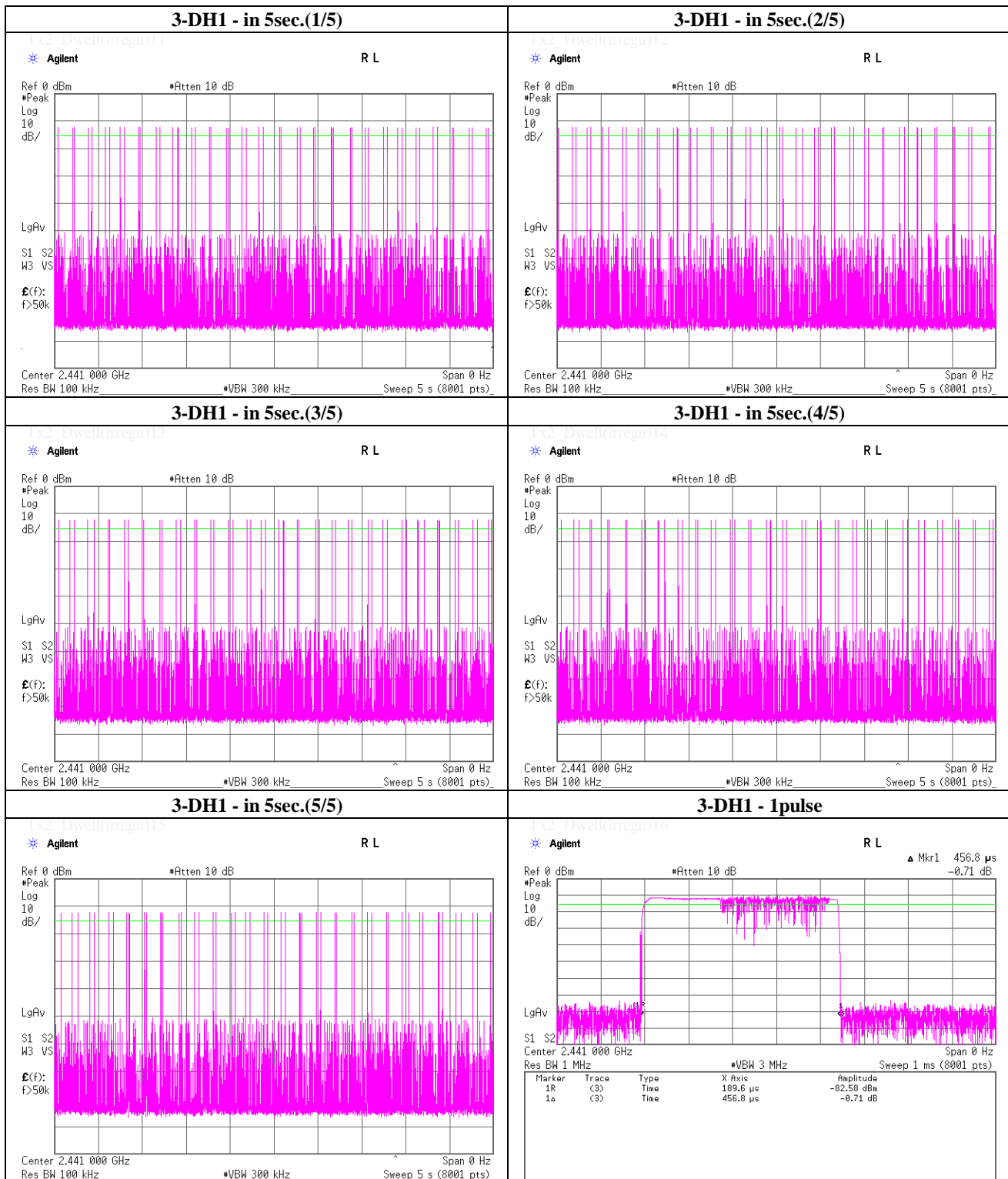
Dwell time

Tx, Bluetooth, BDR, PRBS9



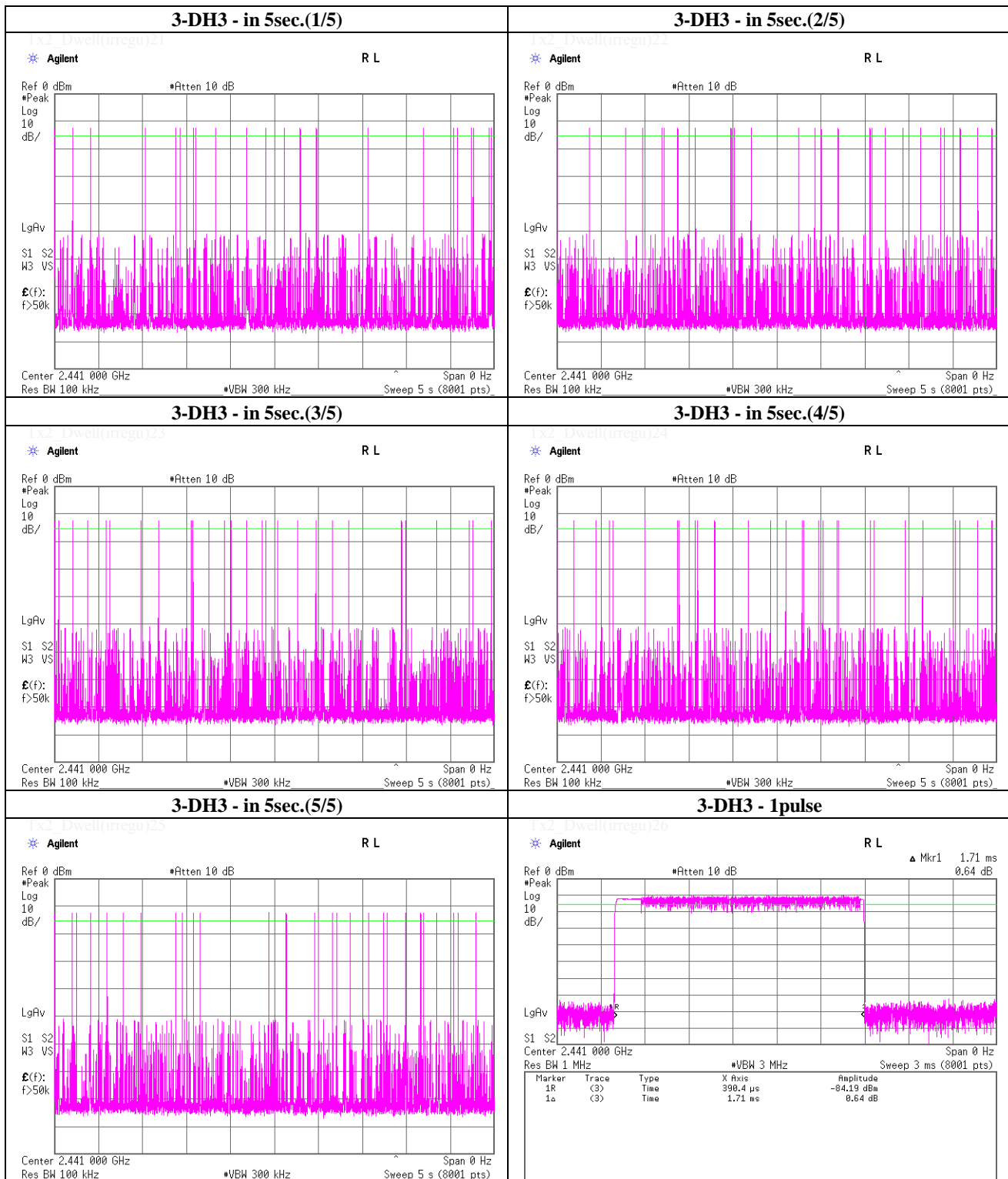
Dwell time

Tx, Bluetooth, EDR, PRBS9



Dwell time

Tx, Bluetooth, EDR, PRBS9



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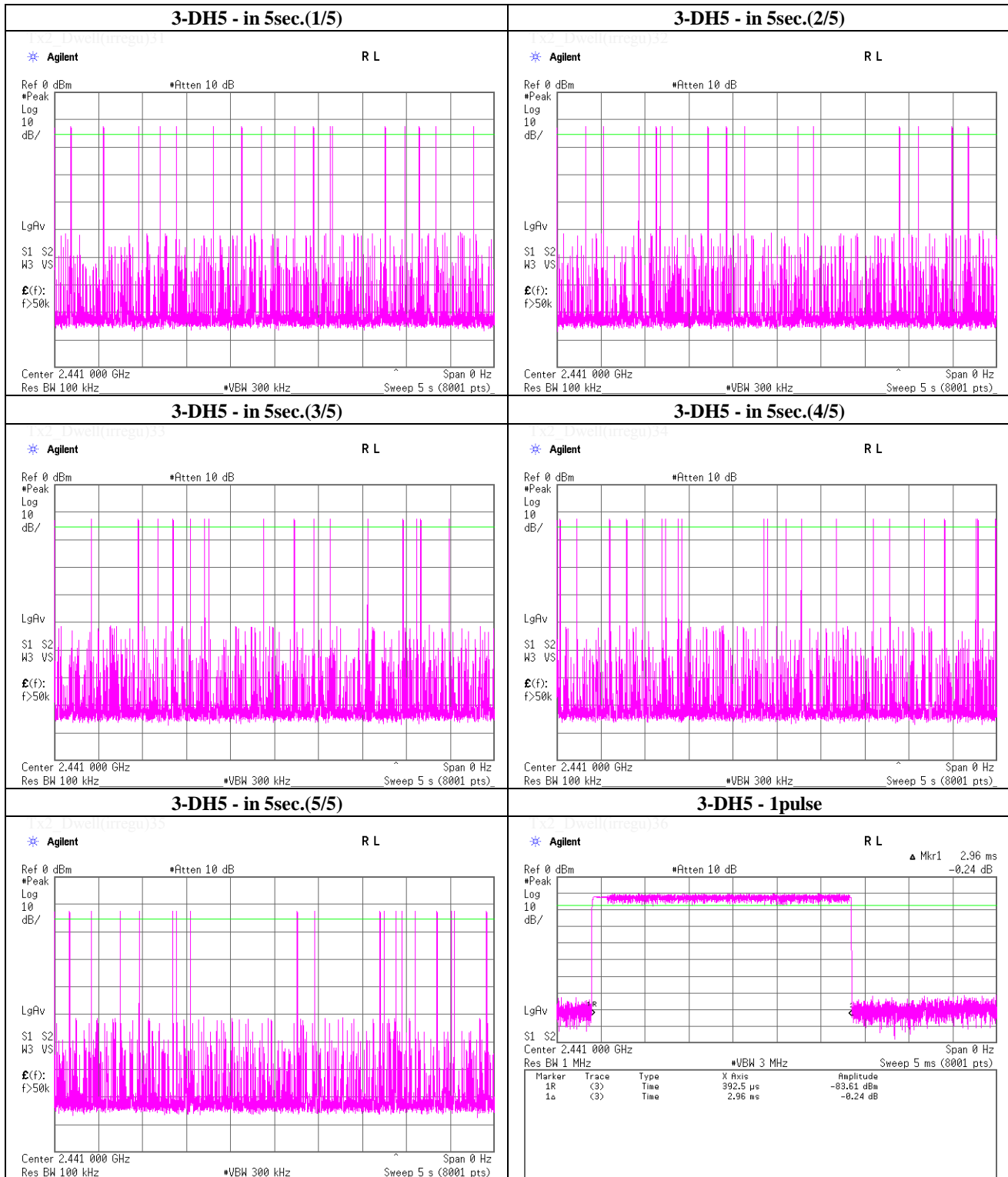
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Dwell time

Tx, Bluetooth, EDR, PRBS9



Maximum Peak Conducted Output Power (Conducted)

Test place	UL Japan, Inc.	No.1 Measurement Room
Date	September 22, 2014	
Temperature / Humidity	23 deg.C , 58 %RH	
Engineer	Kazuhiro Ando	
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	-10.94	1.55	10.07	0.68	1.17	20.97	125	20.29
DH5	2441.0	-12.15	1.56	10.07	-0.52	0.89	20.97	125	21.49
DH5	2480.0	-12.17	1.56	10.07	-0.54	0.88	20.97	125	21.51
2-DH5	2402.0	-9.22	1.55	10.07	2.40	1.74	20.97	125	18.57
2-DH5	2441.0	-9.94	1.56	10.07	1.69	1.48	20.97	125	19.28
2-DH5	2480.0	-10.50	1.56	10.07	1.13	1.30	20.97	125	19.84
3-DH5	2402.0	-8.79	1.55	10.07	2.83	1.92	20.97	125	18.14
3-DH5	2441.0	-9.33	1.56	10.07	2.30	1.70	20.97	125	18.67
3-DH5	2480.0	-10.09	1.56	10.07	1.54	1.43	20.97	125	19.43

Sample Calculation:

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

Maximum Average Conducted Output Power (Reference data for SAR test)

(AVGPM)

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

	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-11.50	1.55	10.07	0.12	1.03
DH5	2441.0	-12.85	1.56	10.07	-1.22	0.76
DH5	2480.0	-12.85	1.56	10.07	-1.22	0.76
2-DH5	2402.0	-11.99	1.55	10.07	-0.37	0.92
2-DH5	2441.0	-12.65	1.56	10.07	-1.02	0.79
2-DH5	2480.0	-13.36	1.56	10.07	-1.73	0.67
3-DH5	2402.0	-11.99	1.55	10.07	-0.37	0.92
3-DH5	2441.0	-12.66	1.56	10.07	-1.03	0.79
3-DH5	2480.0	-13.36	1.56	10.07	-1.73	0.67

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Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.994	QP	46.7	13.2	5.3	32.1	33.1	43.5	10.4	190	255	
Hori.	307.192	QP	56.0	13.1	6.0	32.0	43.1	46.0	2.9	100	315	
Hori.	313.336	QP	55.7	13.2	6.1	32.0	43.0	46.0	3.0	100	320	
Hori.	419.988	QP	50.3	16.0	6.6	32.0	40.9	46.0	5.1	100	190	
Hori.	2390.000	PK	42.8	27.6	14.0	38.5	45.9	73.9	28.0	100	0	
Hori.	3515.395	PK	50.0	28.9	5.7	39.1	45.5	73.9	28.4	100	146	
Hori.	4804.000	PK	47.3	31.3	6.0	39.6	45.0	73.9	28.9	100	0	
Hori.	7206.000	PK	50.7	36.0	7.5	38.7	55.5	73.9	18.4	100	0	
Hori.	9608.000	PK	41.1	38.5	8.6	37.2	51.0	73.9	22.9	100	265	
Hori.	12010.000	PK	41.6	38.8	9.7	37.3	52.8	73.9	21.1	100	0	
Hori.	2390.000	AV	34.3	27.6	14.0	38.5	37.4	53.9	16.5	100	0	
Hori.	3515.395	AV	46.0	28.9	5.7	39.1	41.5	53.9	12.4	100	146	
Vert.	36.990	QP	48.0	12.2	4.0	32.2	32.0	40.0	8.0	100	135	
Vert.	208.890	QP	49.0	14.7	5.5	32.1	37.1	43.5	6.4	100	280	
Vert.	337.911	QP	47.9	13.8	6.2	32.0	35.9	46.0	10.1	100	50	
Vert.	2390.000	PK	44.8	27.6	14.0	38.5	47.9	73.9	26.0	100	0	
Vert.	3515.395	PK	49.5	28.9	5.7	39.1	45.0	73.9	28.9	100	237	
Vert.	4804.000	PK	45.7	31.3	6.0	39.6	43.4	73.9	30.5	100	35	
Vert.	7206.000	PK	50.5	36.0	7.5	38.7	55.3	73.9	18.6	100	0	
Vert.	9608.000	PK	41.3	38.5	8.6	37.2	51.2	73.9	22.7	100	12	
Vert.	12010.000	PK	40.7	38.8	9.7	37.3	51.9	73.9	22.0	100	0	
Vert.	2390.000	AV	31.7	27.6	14.0	38.5	34.8	53.9	19.1	100	0	
Vert.	3515.395	AV	45.3	28.9	5.7	39.1	40.8	53.9	13.1	100	237	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4804.000	AV	38.0	31.3	6.0	39.6	-24.5	11.2	53.9	42.7	
Hori.	7206.000	AV	47.0	36.0	7.5	38.7	-24.5	27.3	53.9	26.6	
Hori.	9608.000	AV	30.6	38.5	8.6	37.2	-24.5	16.0	53.9	37.9	
Hori.	12010.000	AV	30.0	38.8	9.7	37.3	-24.5	16.7	53.9	37.2	
Vert.	4804.000	AV	37.3	31.3	6.0	39.6	-24.5	10.5	53.9	43.4	
Vert.	7206.000	AV	47.3	36.0	7.5	38.7	-24.5	27.6	53.9	26.3	
Vert.	9608.000	AV	29.5	38.5	8.6	37.2	-24.5	14.9	53.9	39.0	
Vert.	12010.000	AV	29.6	38.8	9.7	37.3	-24.5	16.3	53.9	37.6	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.5	27.5	14.0	38.5	91.5	-	-	
Hori.	2400.000	PK	49.5	27.5	14.0	38.5	52.5	71.5	19.0	
Vert.	2402.000	PK	85.5	27.5	14.0	38.5	88.5	-	-	
Vert.	2400.000	PK	46.5	27.5	14.0	38.5	49.5	68.5	19.0	

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

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Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.994	QP	46.6	13.2	5.3	32.1	33.0	43.5	10.5	190	240	
Hori.	307.191	QP	55.8	13.1	6.0	32.0	42.9	46.0	3.1	100	310	
Hori.	313.336	QP	55.8	13.2	6.1	32.0	43.1	46.0	2.9	100	300	
Hori.	419.986	QP	50.2	16.0	6.6	32.0	40.8	46.0	5.2	100	50	
Hori.	3515.454	PK	50.3	28.9	5.7	39.1	45.8	73.9	28.1	100	150	
Hori.	4882.000	PK	45.1	31.2	6.0	39.6	42.7	73.9	31.2	100	212	
Hori.	7323.000	PK	51.5	36.2	7.6	38.7	56.6	73.9	17.3	100	346	
Hori.	9764.000	PK	42.2	39.0	8.6	37.2	52.6	73.9	21.3	100	218	
Hori.	12205.000	PK	41.5	38.9	9.7	37.5	52.6	73.9	21.3	100	0	
Hori.	3515.454	AV	46.8	28.9	5.7	39.1	42.3	53.9	11.6	100	150	
Vert.	37.000	QP	47.8	12.2	4.0	32.2	31.8	40.0	8.2	100	100	
Vert.	208.890	QP	49.1	14.7	5.5	32.1	37.2	43.5	6.3	100	280	
Vert.	337.911	QP	47.7	13.8	6.2	32.0	35.7	46.0	10.3	100	50	
Vert.	3515.454	PK	49.7	28.9	5.7	39.1	45.2	73.9	28.7	100	248	
Vert.	4882.000	PK	45.0	31.2	6.0	39.6	42.6	73.9	31.3	100	37	
Vert.	7323.000	PK	52.8	36.2	7.6	38.7	57.9	73.9	16.0	100	326	
Vert.	9764.000	PK	42.0	39.0	8.6	37.2	52.4	73.9	21.5	100	40	
Vert.	12205.000	PK	42.2	38.9	9.7	37.5	53.3	73.9	20.6	100	0	
Vert.	3515.454	AV	45.8	28.9	5.7	39.1	41.3	53.9	12.6	100	248	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	34.2	31.2	6.0	39.6	-24.5	7.3	53.9	46.6	
Hori.	7323.000	AV	45.7	36.2	7.6	38.7	-24.5	26.3	53.9	27.6	
Hori.	9764.000	AV	30.6	39.0	8.6	37.2	-24.5	16.5	53.9	37.4	
Hori.	12205.000	AV	29.8	38.9	9.7	37.5	-24.5	16.4	53.9	37.5	
Vert.	4882.000	AV	33.0	31.2	6.0	39.6	-24.5	6.1	53.9	47.8	
Vert.	7323.000	AV	47.2	36.2	7.6	38.7	-24.5	27.8	53.9	26.1	
Vert.	9764.000	AV	30.1	39.0	8.6	37.2	-24.5	16.0	53.9	37.9	
Vert.	12205.000	AV	29.6	38.9	9.7	37.5	-24.5	16.2	53.9	37.7	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.995	QP	46.4	13.2	5.3	32.1	32.8	43.5	10.7	180	265	
Hori.	307.191	QP	55.7	13.1	6.0	32.0	42.8	46.0	3.2	100	290	
Hori.	313.335	QP	55.8	13.2	6.1	32.0	43.1	46.0	2.9	100	295	
Hori.	419.989	QP	50.3	16.0	6.6	32.0	40.9	46.0	5.1	100	50	
Hori.	2483.500	PK	55.5	27.5	14.1	38.5	58.6	73.9	15.3	100	256	
Hori.	3515.482	PK	51.9	28.9	5.7	39.1	47.4	73.9	26.5	100	148	
Hori.	4960.000	PK	44.1	31.5	6.1	39.6	42.1	73.9	31.8	100	351	
Hori.	7440.000	PK	52.0	36.3	7.6	38.6	57.3	73.9	16.6	100	277	
Hori.	9920.000	PK	41.1	39.0	8.7	37.1	51.7	73.9	22.2	100	253	
Hori.	12400.000	PK	40.5	38.5	9.8	37.6	51.2	73.9	22.7	100	0	
Hori.	2483.500	AV	31.4	27.5	14.1	38.5	34.5	53.9	19.4	100	256	
Hori.	3515.482	AV	49.3	28.9	5.7	39.1	44.8	53.9	9.1	100	148	
Vert.	36.999	QP	47.7	12.2	4.0	32.2	31.7	40.0	8.3	100	85	
Vert.	208.890	QP	48.9	14.7	5.5	32.1	37.0	43.5	6.5	100	275	
Vert.	337.911	QP	48.1	13.8	6.2	32.0	36.1	46.0	9.9	100	55	
Vert.	419.989	QP	49.2	16.0	6.6	32.0	39.8	46.0	6.2	100	70	
Vert.	2483.500	PK	55.6	27.5	14.1	38.5	58.7	73.9	15.2	100	335	
Vert.	3515.482	PK	47.3	28.9	5.7	39.1	42.8	73.9	31.1	100	188	
Vert.	4960.000	PK	45.5	31.5	6.1	39.6	43.5	73.9	30.4	100	322	
Vert.	7440.000	PK	55.5	36.3	7.6	38.6	60.8	73.9	13.1	133	20	
Vert.	9920.000	PK	40.7	39.0	8.7	37.1	51.3	73.9	22.6	100	0	
Vert.	12400.000	PK	40.4	38.5	9.8	37.6	51.1	73.9	22.8	100	0	
Vert.	2483.500	AV	31.5	27.5	14.1	38.5	34.6	53.9	19.3	100	335	
Vert.	3515.482	AV	42.3	28.9	5.7	39.1	37.8	53.9	16.1	100	188	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4960.000	AV	32.5	31.5	6.1	39.6	-24.5	6.0	53.9	47.9	
Hori.	7440.000	AV	46.6	36.3	7.6	38.6	-24.5	27.4	53.9	26.5	
Hori.	9920.000	AV	28.9	39.0	8.7	37.1	-24.5	15.0	53.9	38.9	
Hori.	12400.000	AV	28.5	38.5	9.8	37.6	-24.5	14.7	53.9	39.2	
Vert.	4960.000	AV	33.3	31.5	6.1	39.6	-24.5	6.8	53.9	47.1	
Vert.	7440.000	AV	50.7	36.3	7.6	38.6	-24.5	31.5	53.9	22.4	
Vert.	9920.000	AV	28.8	39.0	8.7	37.1	-24.5	14.9	53.9	39.0	
Vert.	12400.000	AV	28.5	38.5	9.8	37.6	-24.5	14.7	53.9	39.2	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.995	QP	46.9	13.2	5.3	32.1	33.3	43.5	10.2	190	255	
Hori.	208.890	QP	45.3	14.7	5.5	32.1	33.4	43.5	10.1	165	285	
Hori.	307.191	QP	56.5	13.1	6.0	32.0	43.6	46.0	2.4	100	290	
Hori.	313.335	QP	55.7	13.2	6.1	32.0	43.0	46.0	3.0	100	285	
Hori.	405.493	QP	48.9	15.6	6.5	32.0	39.0	46.0	7.0	100	190	
Hori.	419.998	QP	50.5	16.0	6.6	32.0	41.1	46.0	4.9	100	190	
Hori.	2390.000	PK	43.0	27.6	14.0	38.5	46.1	73.9	27.8	100	16	
Hori.	3515.452	PK	51.4	28.9	5.7	39.1	46.9	73.9	27.0	100	148	
Hori.	4804.000	PK	46.9	31.3	6.0	39.6	44.6	73.9	29.3	100	198	
Hori.	7206.000	PK	51.5	36.0	7.5	38.7	56.3	73.9	17.6	100	350	
Hori.	9608.000	PK	41.0	38.5	8.6	37.2	50.9	73.9	23.0	100	0	
Hori.	12010.000	PK	40.3	38.8	9.7	37.3	51.5	73.9	22.4	100	340	
Hori.	2390.000	AV	30.7	27.6	14.0	38.5	33.8	53.9	20.1	100	16	
Hori.	3515.452	AV	48.3	28.9	5.7	39.1	43.8	53.9	10.1	100	148	
Vert.	36.990	QP	48.5	12.2	4.0	32.2	32.5	40.0	7.5	100	180	
Vert.	208.890	QP	49.0	14.7	5.5	32.1	37.1	43.5	6.4	100	305	
Vert.	337.911	QP	48.0	13.8	6.2	32.0	36.0	46.0	10.0	100	50	
Vert.	419.989	QP	48.3	16.0	6.6	32.0	38.9	46.0	7.1	100	60	
Vert.	554.992	QP	40.4	18.7	7.2	32.0	34.3	46.0	11.7	100	0	
Vert.	2390.000	PK	43.5	27.6	14.0	38.5	46.6	73.9	27.3	100	20	
Vert.	3515.452	PK	46.9	28.9	5.7	39.1	42.4	73.9	31.5	115	340	
Vert.	4804.000	PK	43.8	31.3	6.0	39.6	41.5	73.9	32.4	100	5	
Vert.	7206.000	PK	51.5	36.0	7.5	38.7	56.3	73.9	17.6	100	345	
Vert.	9608.000	PK	40.9	38.5	8.6	37.2	50.8	73.9	23.1	100	335	
Vert.	12010.000	PK	39.5	38.8	9.7	37.3	50.7	73.9	23.2	100	0	
Vert.	2390.000	AV	31.0	27.6	14.0	38.5	34.1	53.9	19.8	100	20	
Vert.	3515.452	AV	45.0	28.9	5.7	39.1	40.5	53.9	13.4	115	340	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)
 Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4804.000	AV	34.0	31.3	6.0	39.6	-24.6	7.2	53.9	46.7	
Hori.	7206.000	AV	44.5	36.0	7.5	38.7	-24.6	24.8	53.9	29.2	
Hori.	9608.000	AV	29.5	38.5	8.6	37.2	-24.6	14.9	53.9	39.0	
Hori.	12010.000	AV	28.7	38.8	9.7	37.3	-24.6	15.4	53.9	38.5	
Vert.	4804.000	AV	32.3	31.3	6.0	39.6	-24.6	5.5	53.9	48.4	
Vert.	7206.000	AV	44.3	36.0	7.5	38.7	-24.6	24.6	53.9	29.3	
Vert.	9608.000	AV	29.3	38.5	8.6	37.2	-24.6	14.7	53.9	39.2	
Vert.	12010.000	AV	28.0	38.8	9.7	37.3	-24.6	14.7	53.9	39.2	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor
 Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.1	27.5	14.0	38.5	91.1	-	-	
Hori.	2400.000	PK	48.3	27.5	14.0	38.5	51.3	71.1	19.8	
Vert.	2402.000	PK	85.5	27.5	14.0	38.5	88.5	-	-	
Vert.	2400.000	PK	47.0	27.5	14.0	38.5	50.0	68.5	18.5	

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

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Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.995	QP	46.8	13.2	5.3	32.1	33.2	43.5	10.3	185	250	
Hori.	208.890	QP	46.5	14.7	5.5	32.1	34.6	43.5	8.9	150	290	
Hori.	307.191	QP	56.6	13.1	6.0	32.0	43.7	46.0	2.3	100	305	
Hori.	313.335	QP	55.8	13.2	6.1	32.0	43.1	46.0	2.9	100	290	
Hori.	405.493	QP	48.9	15.6	6.5	32.0	39.0	46.0	7.0	100	195	
Hori.	419.989	QP	50.4	16.0	6.6	32.0	41.0	46.0	5.0	100	195	
Hori.	3515.283	PK	50.5	28.9	5.7	39.1	46.0	73.9	27.9	100	152	
Hori.	4882.000	PK	45.6	31.2	6.0	39.6	43.2	73.9	30.7	100	0	
Hori.	7323.000	PK	52.7	36.2	7.6	38.7	57.8	73.9	16.1	100	327	
Hori.	9764.000	PK	42.3	39.0	8.6	37.2	52.7	73.9	21.2	100	0	
Hori.	12205.000	PK	42.5	38.9	9.7	37.5	53.6	73.9	20.3	100	0	
Hori.	3515.283	AV	47.5	28.9	5.7	39.1	43.0	53.9	10.9	100	152	
Vert.	36.999	QP	48.1	12.2	4.0	32.2	32.1	40.0	7.9	100	120	
Vert.	208.890	QP	49.4	14.7	5.5	32.1	37.5	43.5	6.0	100	305	
Vert.	337.911	QP	48.1	13.8	6.2	32.0	36.1	46.0	9.9	100	45	
Vert.	419.989	QP	48.3	16.0	6.6	32.0	38.9	46.0	7.1	100	65	
Vert.	554.992	QP	43.5	18.7	7.2	32.0	37.4	46.0	8.6	100	0	
Vert.	3515.283	PK	48.3	28.9	5.7	39.1	43.8	73.9	30.1	115	340	
Vert.	4882.000	PK	44.3	31.2	6.0	39.6	41.9	73.9	32.0	100	36	
Vert.	7323.000	PK	51.5	36.2	7.6	38.7	56.6	73.9	17.3	100	350	
Vert.	9764.000	PK	42.3	39.0	8.6	37.2	52.7	73.9	21.2	100	355	
Vert.	12205.000	PK	41.1	38.9	9.7	37.5	52.2	73.9	21.7	100	0	
Vert.	3515.283	AV	44.4	28.9	5.7	39.1	39.9	53.9	14.0	115	340	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	32.8	31.2	6.0	39.6	-24.6	5.9	53.9	48.0	
Hori.	7323.000	AV	44.7	36.2	7.6	38.7	-24.6	25.3	53.9	28.7	
Hori.	9764.000	AV	30.3	39.0	8.6	37.2	-24.6	16.2	53.9	37.7	
Hori.	12205.000	AV	29.8	38.9	9.7	37.5	-24.6	16.4	53.9	37.5	
Vert.	4882.000	AV	32.7	31.2	6.0	39.6	-24.6	5.8	53.9	48.1	
Vert.	7323.000	AV	43.5	36.2	7.6	38.7	-24.6	24.1	53.9	29.8	
Vert.	9764.000	AV	30.3	39.0	8.6	37.2	-24.6	16.2	53.9	37.7	
Vert.	12205.000	AV	29.6	38.9	9.7	37.5	-24.6	16.2	53.9	37.7	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date September 22, 2014 September 24, 2014 September 25, 2014
 Temperature / Humidity 23 deg.C, 51 %RH 24 deg.C, 56 %RH 23 deg.C, 56 %RH
 Engineer Yoshinori Misawa Hiromitsu Tanabe Hiromitsu Tanabe
 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.	179.995	QP	46.7	13.2	5.3	32.1	33.1	43.5	10.4	180	150	
Hori.	208.890	QP	47.7	14.7	5.5	32.1	35.8	43.5	7.7	160	285	
Hori.	307.192	QP	56.3	13.1	6.0	32.0	43.4	46.0	2.6	100	295	
Hori.	313.336	QP	56.5	13.2	6.1	32.0	43.8	46.0	2.2	100	295	
Hori.	405.493	QP	49.1	15.6	6.5	32.0	39.2	46.0	6.8	100	190	
Hori.	419.990	QP	51.1	16.0	6.6	32.0	41.7	46.0	4.3	100	190	
Hori.	2483.500	PK	47.7	27.5	14.1	38.5	50.8	73.9	23.1	100	20	
Hori.	3515.457	PK	51.8	28.9	5.7	39.1	47.3	73.9	26.6	100	148	
Hori.	4960.000	PK	45.5	31.5	6.1	39.6	43.5	73.9	30.4	100	344	
Hori.	7440.000	PK	53.0	36.3	7.6	38.6	58.3	73.9	15.6	100	274	
Hori.	9920.000	PK	41.7	39.0	8.7	37.1	52.3	73.9	21.6	100	0	
Hori.	12400.000	PK	42.2	38.5	9.8	37.6	52.9	73.9	21.0	100	342	
Hori.	2483.500	AV	31.0	27.5	14.1	38.5	34.1	53.9	19.8	100	20	
Hori.	3515.457	AV	49.3	28.9	5.7	39.1	44.8	53.9	9.1	100	148	
Vert.	36.999	QP	48.7	12.2	4.0	32.2	32.7	40.0	7.3	100	120	
Vert.	208.890	QP	49.6	14.7	5.5	32.1	37.7	43.5	5.8	100	310	
Vert.	337.911	QP	48.1	13.8	6.2	32.0	36.1	46.0	9.9	100	45	
Vert.	419.990	QP	48.6	16.0	6.6	32.0	39.2	46.0	6.8	100	70	
Vert.	554.992	QP	42.5	18.7	7.2	32.0	36.4	46.0	9.6	100	0	
Vert.	628.991	QP	40.3	19.7	7.5	32.1	35.4	46.0	10.6	100	0	
Vert.	2483.500	PK	55.2	27.5	14.1	38.5	58.3	73.9	15.6	100	333	
Vert.	3515.457	PK	48.3	28.9	5.7	39.1	43.8	73.9	30.1	100	182	
Vert.	4960.000	PK	44.3	31.5	6.1	39.6	42.3	73.9	31.6	100	0	
Vert.	7440.000	PK	53.3	36.3	7.6	38.6	58.6	73.9	15.3	100	14	
Vert.	9920.000	PK	42.3	39.0	8.7	37.1	52.9	73.9	21.0	100	0	
Vert.	12400.000	PK	41.5	38.5	9.8	37.6	52.2	73.9	21.7	100	15	
Vert.	2483.500	AV	32.5	27.5	14.1	38.5	35.6	53.9	18.3	100	333	
Vert.	3515.457	AV	42.8	28.9	5.7	39.1	38.3	53.9	15.6	100	182	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)
 Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

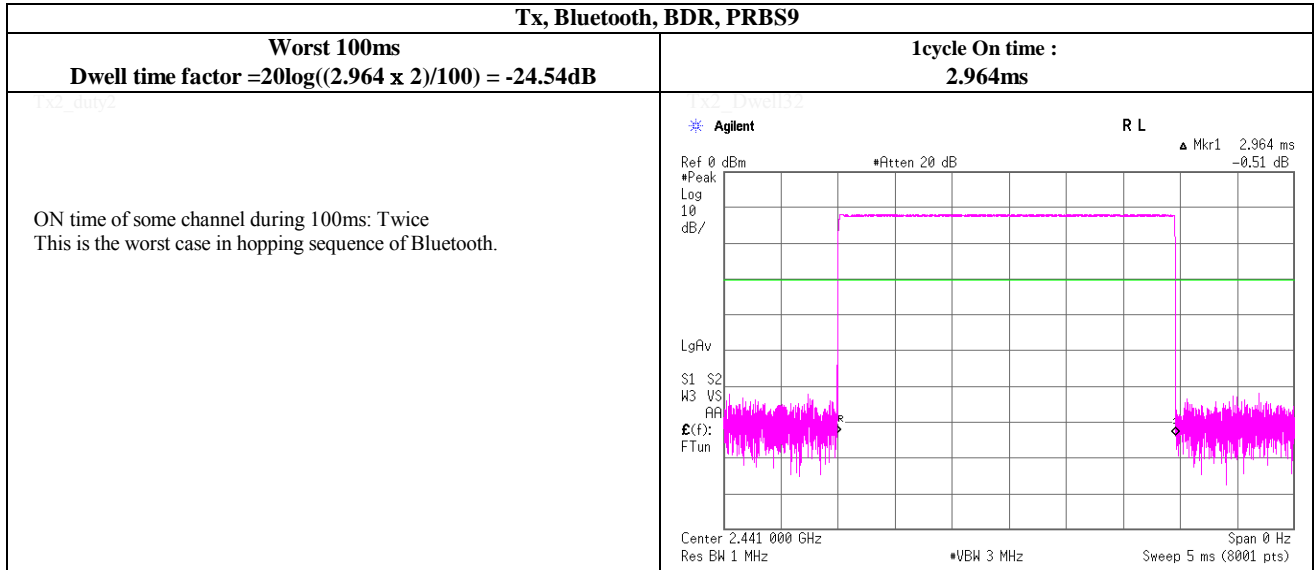
Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4960.000	AV	33.3	31.5	6.1	39.6	-24.6	6.8	53.9	47.1	
Hori.	7440.000	AV	45.7	36.3	7.6	38.6	-24.6	26.5	53.9	27.4	
Hori.	9920.000	AV	30.3	39.0	8.7	37.1	-24.6	16.4	53.9	37.5	
Hori.	12400.000	AV	29.8	38.5	9.8	37.6	-24.6	16.0	53.9	37.9	
Vert.	4960.000	AV	32.7	31.5	6.1	39.6	-24.6	6.2	53.9	47.7	
Vert.	7440.000	AV	46.3	36.3	7.6	38.6	-24.6	27.1	53.9	26.8	
Vert.	9920.000	AV	30.2	39.0	8.7	37.1	-24.6	16.3	53.9	37.7	
Vert.	12400.000	AV	29.7	38.5	9.8	37.6	-24.6	15.9	53.9	38.0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier) + Dwell(time)factor
 Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Dwell time factor Calculation chart

Dwell time factor Calculation Tx, Bluetooth, BDR, PRBS9

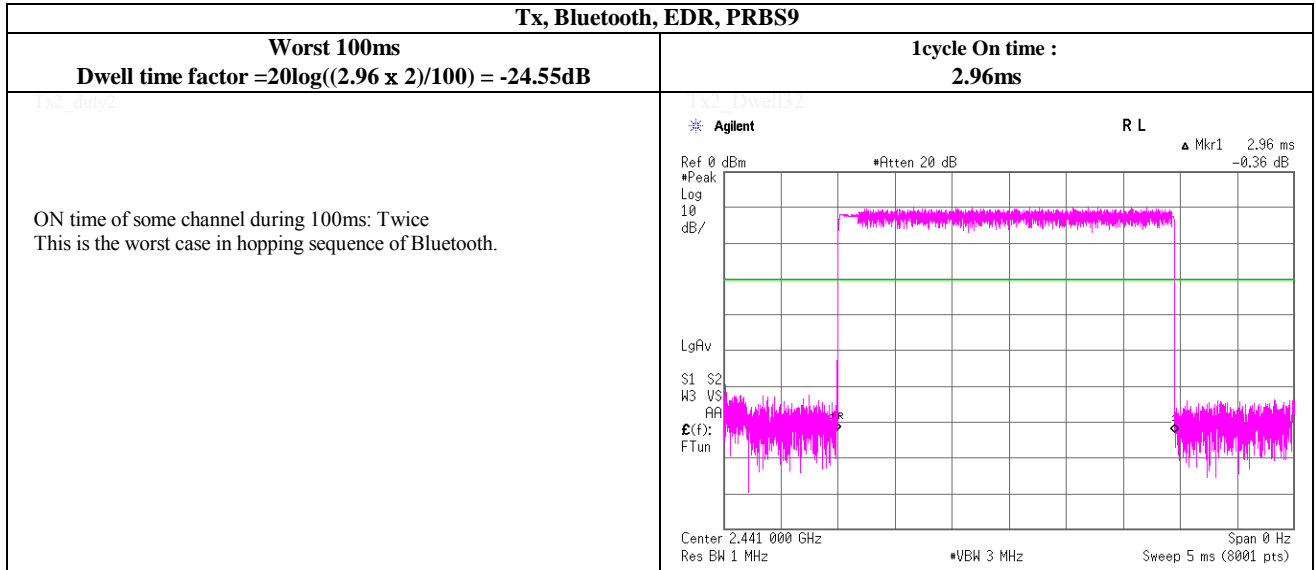


VBW (Average) setting

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

Dwell time factor Calculation chart

Dwell time factor Calculation Tx, Bluetooth, EDR, PRBS9

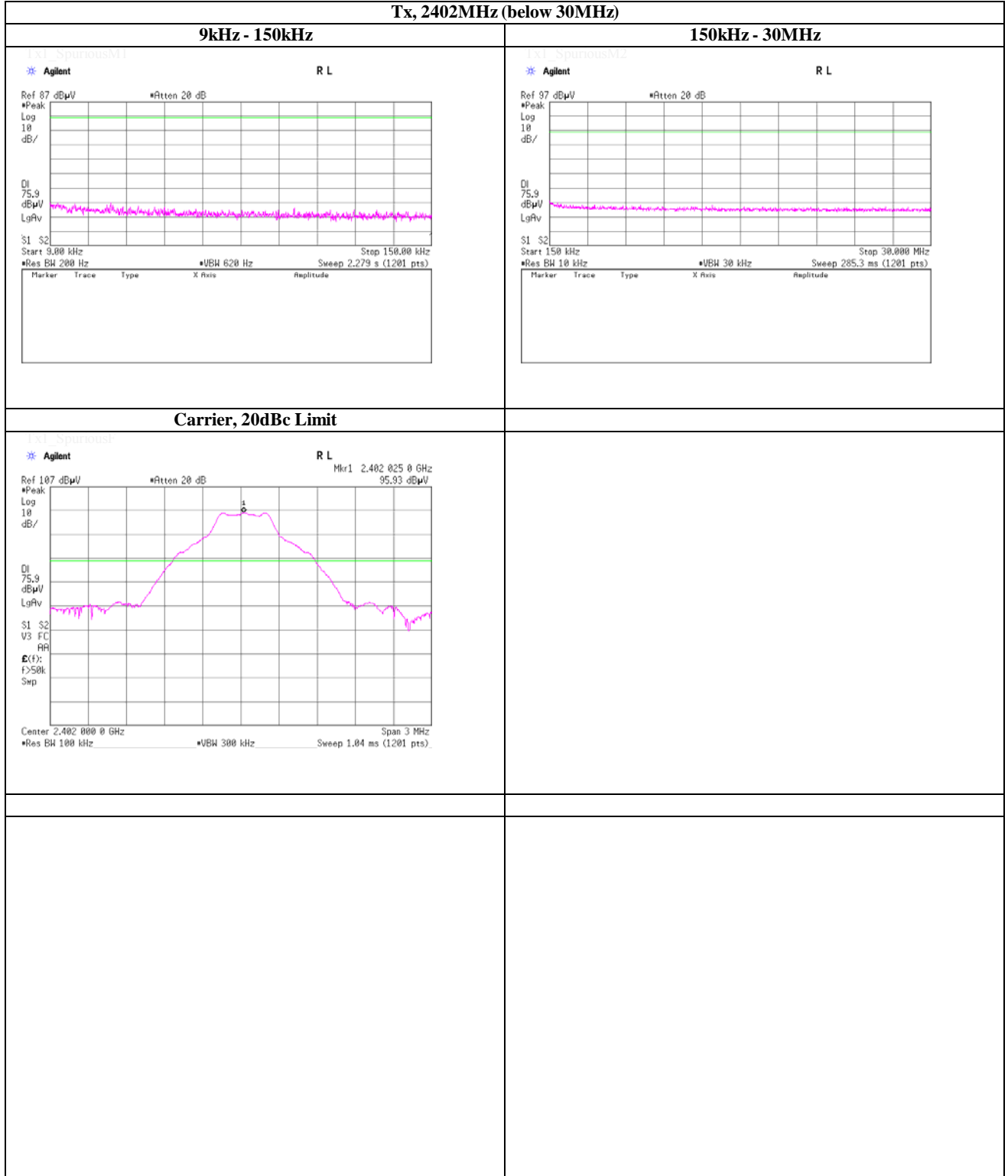


VBW (Average) setting

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

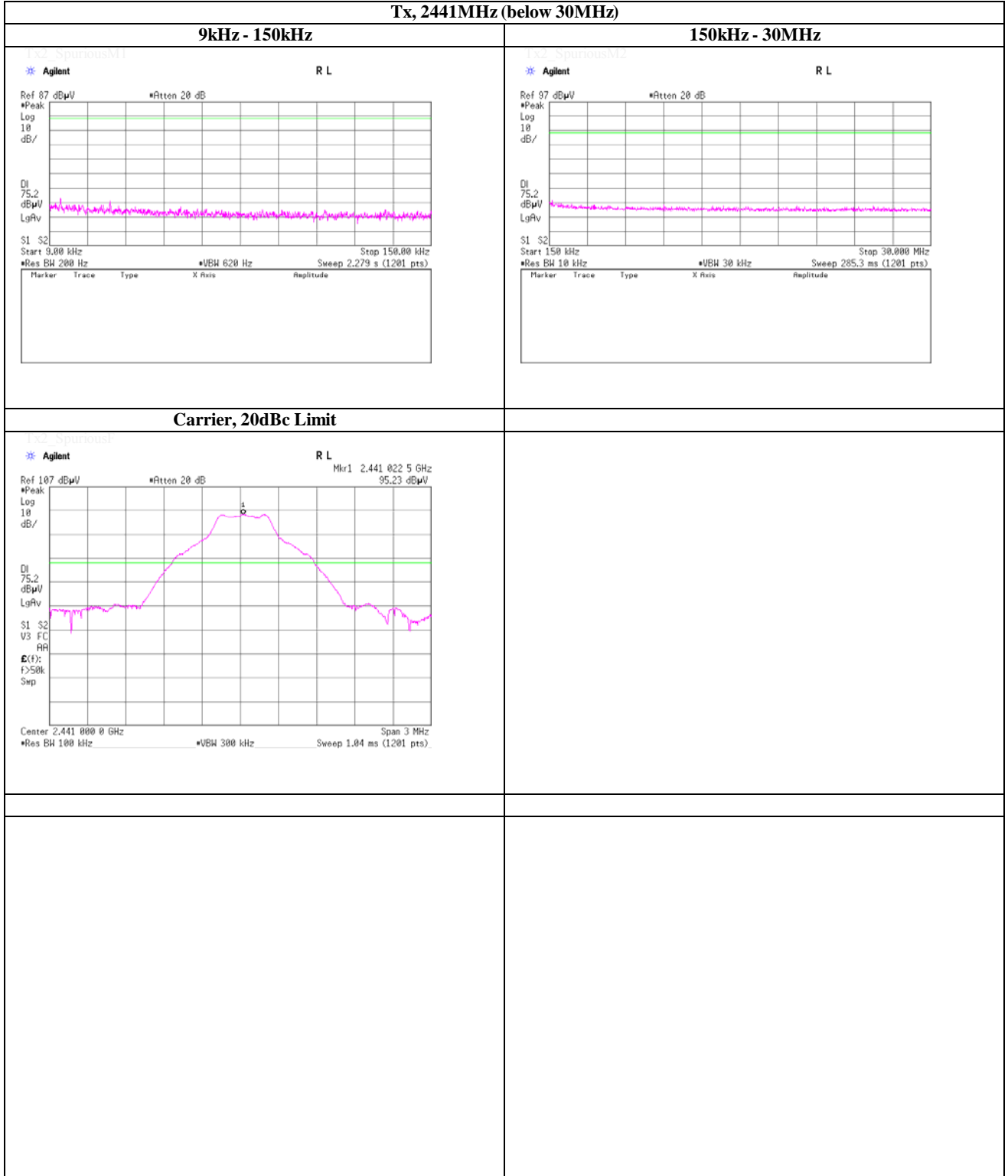
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
 Tx, 2402MHz (below 30MHz)



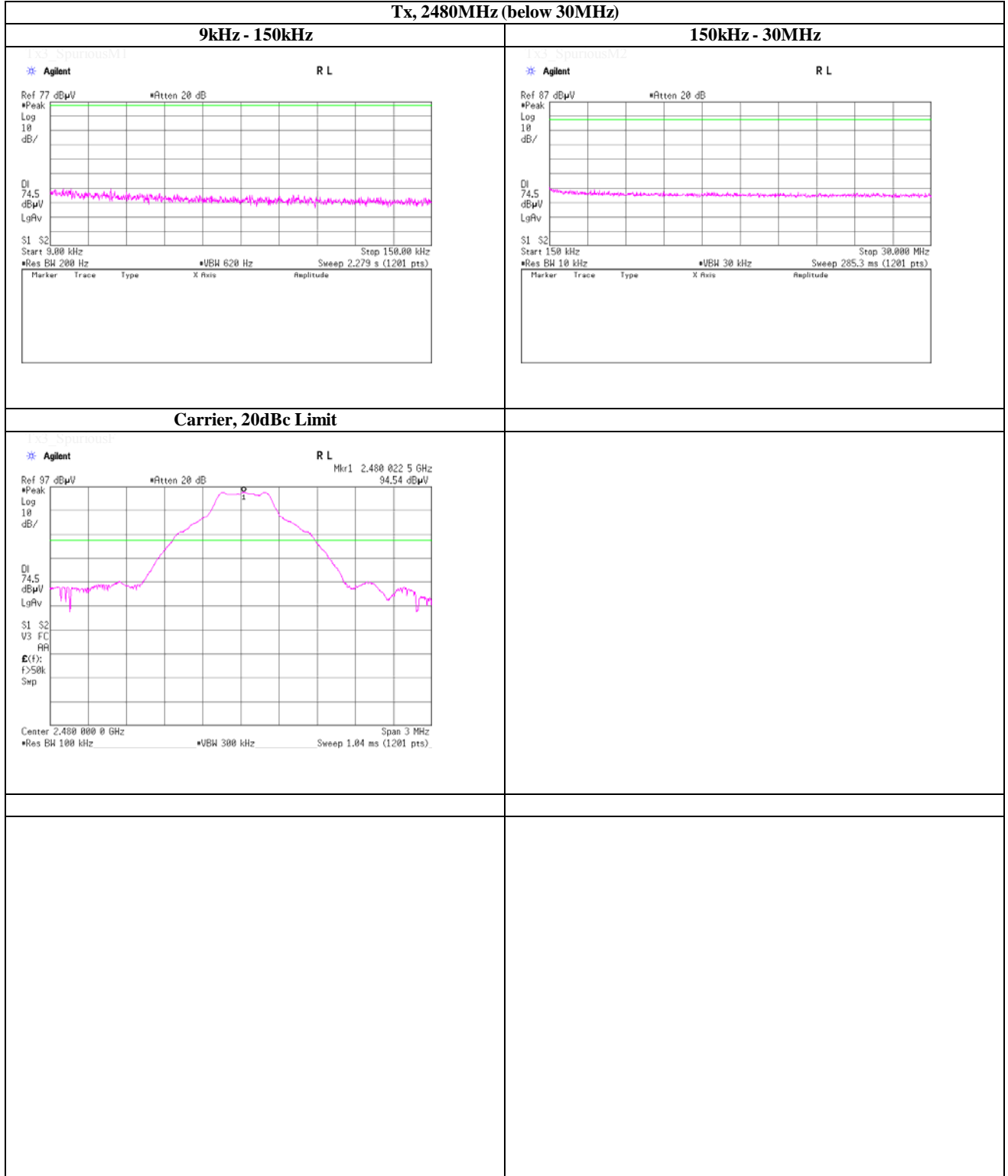
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
 Tx, 2441MHz (below 30MHz)



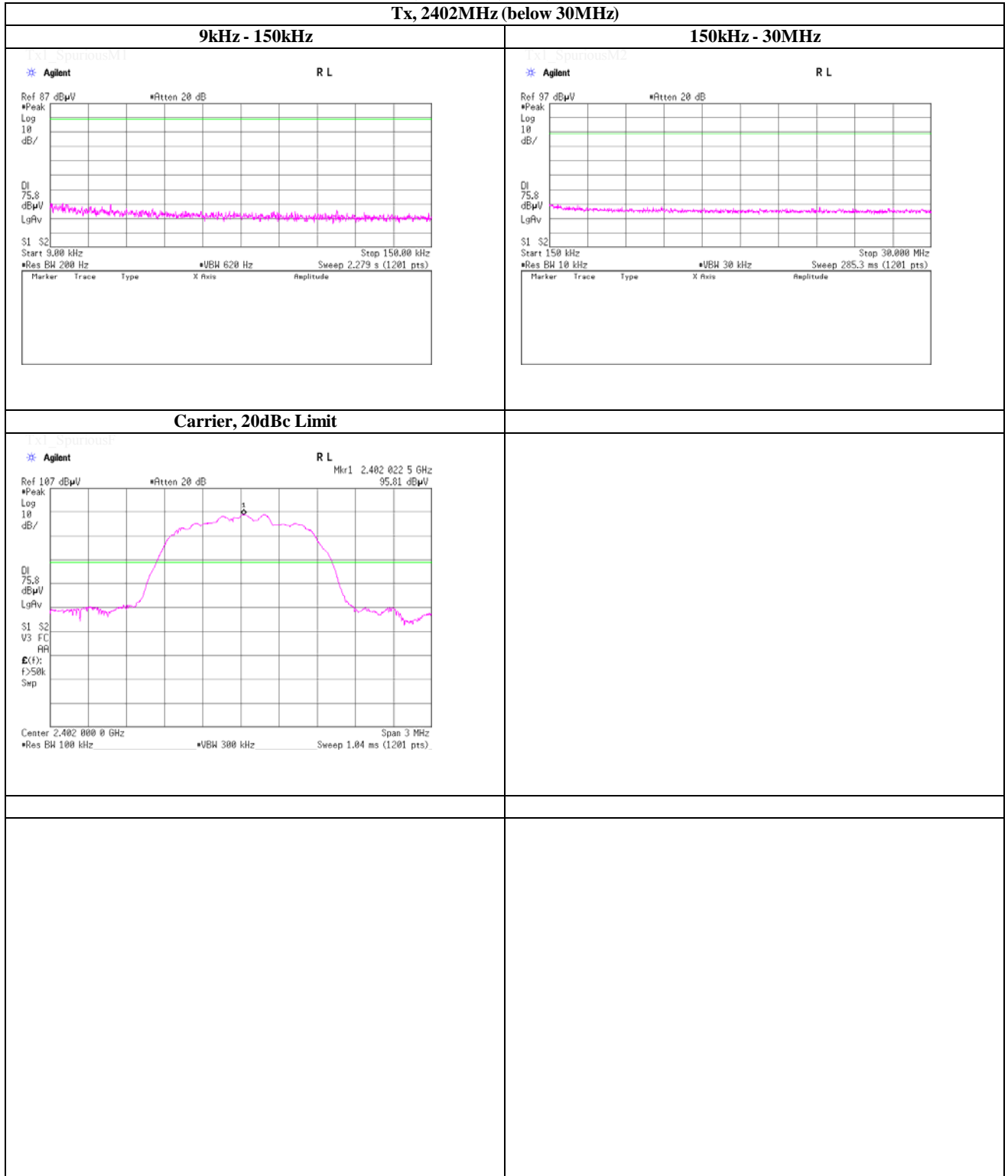
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9
Tx, 2480MHz (below 30MHz)



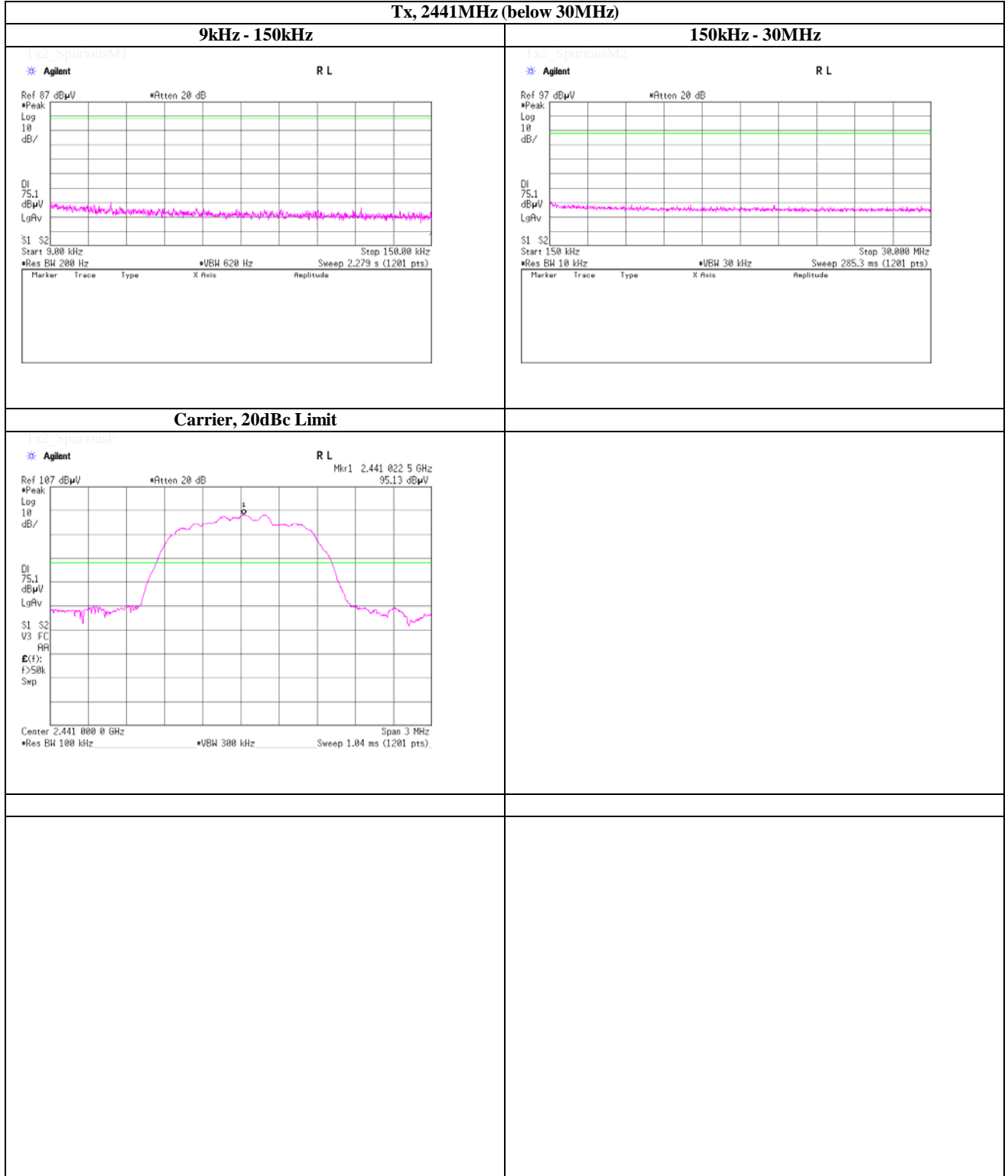
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9
 Tx, 2402MHz (below 30MHz)



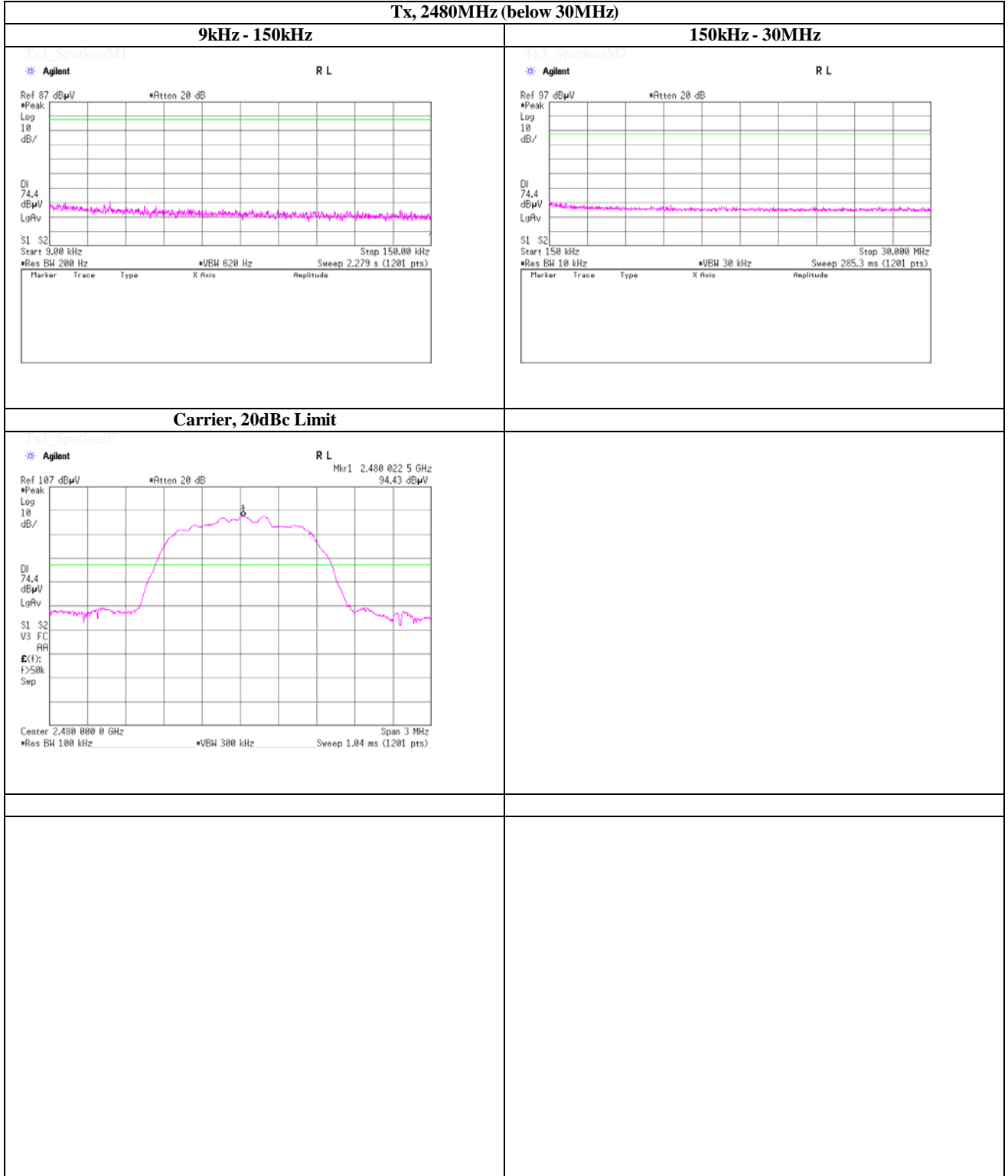
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9
 Tx, 2441MHz (below 30MHz)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9
 Tx, 2480MHz (below 30MHz)



99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9	
Tx, 2402MHz	Tx, 2441MHz
<p>Tx1_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.402 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 842.2961 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 19.612 kHz x dB Bandwidth 878.883 kHz*</p>	<p>Tx2_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 840.3025 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 21.670 kHz x dB Bandwidth 881.356 kHz*</p>
<p>Tx3_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.480 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 839.6318 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 20.129 kHz x dB Bandwidth 881.467 kHz*</p>	<p>Tx2_Hopping99OBW</p> <p>Agilent R L</p> <p>Ref 97 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 00 GHz Span 100 MHz</p> <p>*Res BW 1 MHz *VBW 3 MHz Sweep 1.04 ms (1201 pts)</p> <p>Occupied Bandwidth 78.5459 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -64.218 kHz x dB Bandwidth 80.777 MHz*</p>
<p>Tx2_Inquiry99OBW</p>	<p>Tx2_BiqHopping99OBW</p>

99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	Tx, 2441MHz
<p>Tx1_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.402 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1620 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 25.489 kHz x dB Bandwidth 1.253 MHz*</p>	<p>Tx2_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1591 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 25.642 kHz x dB Bandwidth 1.251 MHz*</p>
Tx, 2480MHz	Tx, Hopping On
<p>Tx3_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.480 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1571 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error 25.691 kHz x dB Bandwidth 1.249 MHz*</p>	<p>Tx2_Hopping99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 00 GHz Span 100 MHz</p> <p>*Res BW 1 MHz *VBW 3 MHz Sweep 1.04 ms (1201 pts)</p> <p>Occupied Bandwidth 78.6506 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -38.454 kHz x dB Bandwidth 81.017 MHz*</p>
<p>Tx2_Inquiry99OBW</p>	<p>Tx2_BiqHopping99OBW</p>

Appendix 2: Test instruments

No.11 Test site (Radiated emission)

Instrument	Manufacturer	Model	Internal Code	Cal. Date	Due Date
Test Receiver	Rohde & Schwarz	ESCI	RCV09	2013/09/03	2014/09/30
Spectrum Analyzer	Agilent	N9030A	SPR24	2014/05/20	2015/05/31
Biconical Antenna	Schwarzbeck	VHBB 9124	BCA13	2014/05/07	2015/05/31
Logperiodic Antenna	Schwarzbeck	VULP 9118-B	LGA15	2014/05/07	2015/05/31
Horn Antenna	Schwarzbeck	BBHA9120D	MWH13	2014/07/12	2015/07/31
Horn Antenna / Pre-Amplifier	TOYO	HAP18-26W	DRH07	2014/06/26	2015/06/30
Pre-Amplifier	Sonoma Instrument	310N	PRA16	2014/05/23	2015/05/31
Pre-Amplifier	TOYO	TPA0118-36	PRA18	2014/07/14	2015/07/31
Attenuator	Weinschel	54A-10	FAT72	2014/05/23	2015/05/31
Highpass Filter	Micro-Tronics	HPM50111-02	HPF03	2014/05/23	2015/05/31
Coaxial Cable	Fujikura	5D-2W	11R10m	2014/05/23	2015/05/31
Micro Wave Cable	Junkosha	MWX241	WLC05-1m	2014/05/23	2015/05/31
Micro Wave Cable	Junkosha	MWX221	WLC07-8m	2014/05/23	2015/05/31
Micro Wave Cable	SUHNER	SUCOFLEX104	WLC09-5.5m	2014/07/17	2015/07/31
Test Software	TSJ	TEPTO-DV	Ver.2.5.0113	N/A	

No.11 Measurement Room (Antenna terminal conducted test)

Instrument	Manufacturer	Model	Internal Code	Cal. Date	Due Date
Spectrum Analyzer	Agilent	E4448A	SPR25	2014/05/19	2015/05/31
Peak Power Analyzer	Agilent	8990B	PWM18	2014/06/26	2015/06/30
Power Sensor	Agilent	N1923A	PWS33	2014/06/26	2015/06/30
Attenuator	Weinschel	54A-10	FAT73	2014/05/23	2015/05/31
Micro Wave Cable	Junkosha	MWX241	WLC06-1m	2014/05/23	2015/05/31
Humidity Indicator	T&D	TR-73U	TMHU31	2014/05/07	2015/05/31
Temp. & Humid. Chamber	ESPEC	PL-1J	TMPC04	2014/06/03	2015/06/30

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