



RADIO TEST REPORT

Test Report No. : 33IE0012-HO-B

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : GSM/GPRS 850/1900 and WCDMA1900 Phone with BT v4.0(LE), 802.11b/g/n
Model No. : GT-S6810E
FCC ID : A3LGTS6810E
Test regulation : FCC Part 15 Subpart C: 2012
Test Result : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this 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 NVLAP, NIST, or any agency of the Federal Government.

Date of test: April 18 to 20, 2013

Representative test engineer:

Hironobu Ohnishi
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 33IE0012-HO-B

[illegible]

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SECTION 1: Customer information

Company Name : SAMSUNG ELECTRONICS CO., LTD.
Address : 416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY,
GYEONGGI-DO 443-742, SOUTH KOREA

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

2.1 Identification of E.U.T.

Type of Equipment : GSM/GPRS 850/1900 and WCDMA1900 Phone with
BT v4.0(LE), 802.11b/g/n
Model No. : GT-S6810E
Serial No. : Refer to Section 4, Clause 4.2
Rating : AC100-240V/50-60Hz (AC Adapter)
DC3.7V/1200mAh (Battery)
Receipt Date of Sample : April 15, 2013
Modification of EUT : No Modification by the test lab

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2.2 Product Description

Radio Specification

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	FPCB Antenna
Antenna Gain	-1.41dBi

Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	DSSS, FHSS
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Type	FPCB Antenna
Antenna Gain	-1.41dBi

WLAN (IEEE802.11b/g/n-20)

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Antenna Type	FPCB Antenna
Antenna Gain	-1.41dBi

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK
Emission Designator	GSM850: 250KGXW PCS: 250KGXW
Antenna Type	MID/PIFA internal Antenna
Antenna Gain	GSM850: -2.3dBi PCS: -2.3dBi

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band II: 1850 – 1910MHz [Down Link] Band II: 1930 – 1990MHz
Type of Modulation	QPSK
Emission Designator	Band II: 4M15F9W
Antenna Type	MID/PIFA internal Antenna
Antenna Gain	Band II: -2.3dBi

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : Test specification: FCC Part 15 Subpart C: 2012, final revised on December 27, 2012 and effective January 28, 2013

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 19.3dB, 20.51992MHz, L AV 16.8dB, 0.32673MHz, N	Complied	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.8	FCC: Section15.247(a)(b)(1) IC: RSS-210 A8.4 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3	6.4dB 82.680MHz, QP, Vertical	Complied	Conducted/ Radiated

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

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

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3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted

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

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

*3m/1m/0.5m = Measurement distance

Power meter (+dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (+dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

Conducted Emission test

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

Radiated emission test(3m)

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

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3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off Inquiry	2402MHz 2441MHz 2480MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *The EUT support AFH with a minimum of 20 channels, following the Bluetooth protocol to ensure compliance with the pseudo-hopping sequence and dwell time requirements of FCC 15.247.		

***Power of the EUT was set by the software as follows:**

Power settings: Maximum power of the EUT was transmitted on Bluetooth testing mode.

H/W version: REV1.0

S/W version: S6810E.010

*The above setting of the software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

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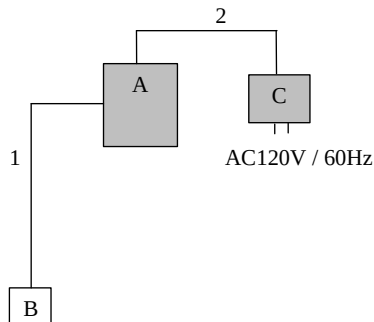
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GSM/GPRS 850/1900 and WCDMA1900 Phone with BT v4.0(LE), 802.11b/g/n	GT-S6810E	FK-095-D *1) FK-095-B *2)	SAMSUNG	EUT
B	Ear phone	-	-	SAMSUNG	-
C	AC Adaptor	ETAOU10EBE	DK2CB19TS/7-E	SAMSUNG	EUT

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Ear phone Cable	1.8	Shielded	Shielded	-
2	DC Cable	1.5	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	: QP and CISPR AV
Measurement range	: 0.15-30MHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

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

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted 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.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5 (IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

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

*2) Distance Factor: $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range	: 30M-26.5GHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz 2MHz (Inquiry mode)	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3MHz 5MHz (Inquiry mode)	30kHz 100kHz	100kHz 300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *2)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	10MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
*1) The measurement was performed with Max Hold since the duty cycle was not 100%. *2) 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=9.1kHz)							

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

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APPENDIX 1: Data of EMI test

Conducted Emission

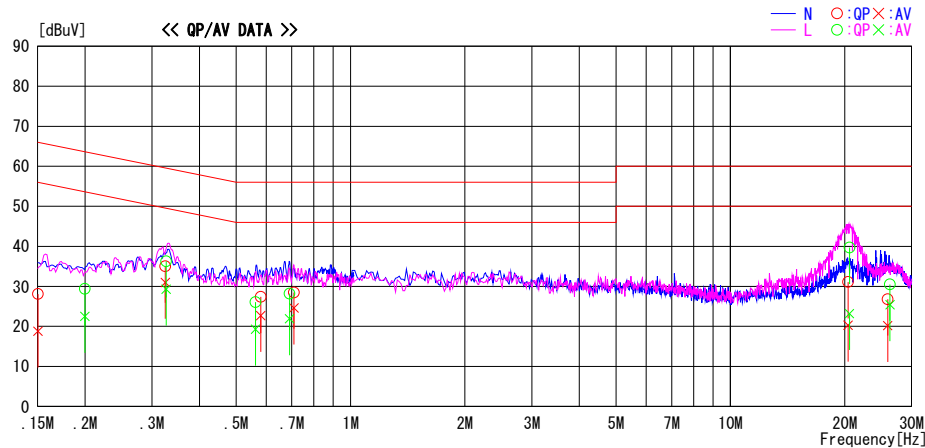
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/04/19

Report No. : 33IE0012-H0
Temp./Humi. : 22deg. C / 50% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx DH5 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15032	14.8	5.5	13.3	28.1	18.8	66.0	56.0	37.9	37.2	N	
0.32521	21.7	17.7	13.3	35.0	31.0	59.6	49.6	24.6	18.6	N	
0.58040	14.1	9.4	13.3	27.4	22.7	56.0	46.0	28.6	23.3	N	
0.70922	15.1	11.2	13.4	28.5	24.6	56.0	46.0	27.5	21.4	N	
20.40022	14.3	3.5	16.8	31.1	20.3	60.0	50.0	28.9	29.7	N	
25.93000	8.7	2.1	18.1	26.8	20.2	60.0	50.0	33.2	29.8	N	
0.19978	16.1	9.2	13.3	29.4	22.5	63.6	53.6	34.2	31.1	L	
0.32704	23.0	16.0	13.3	36.3	29.3	59.5	49.5	23.2	20.2	L	
0.56186	12.8	6.0	13.3	26.1	19.3	56.0	46.0	29.9	26.7	L	
0.69110	14.8	8.5	13.4	28.2	21.9	56.0	46.0	27.8	24.1	L	
20.58055	22.8	6.3	16.9	39.7	23.2	60.0	50.0	20.3	26.8	L	
26.30400	12.4	7.3	18.1	30.5	25.4	60.0	50.0	29.5	24.6	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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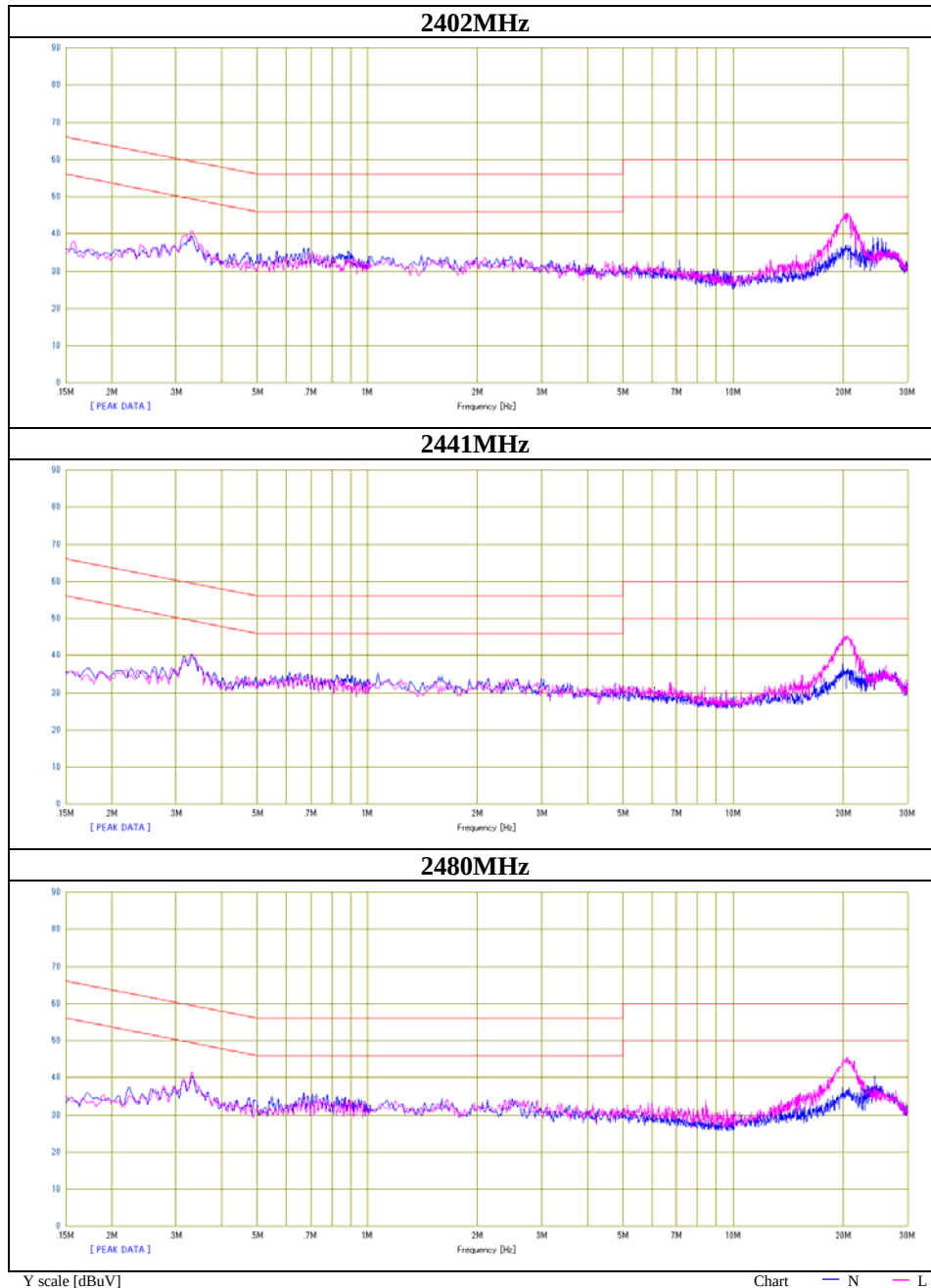
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Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	33IE0012-HO
Date	4/19/2013
Temperature/ Humidity	22deg. C / 50% RH
Engineer	Hironobu Ohnishi
Mode	Tx DH5



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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

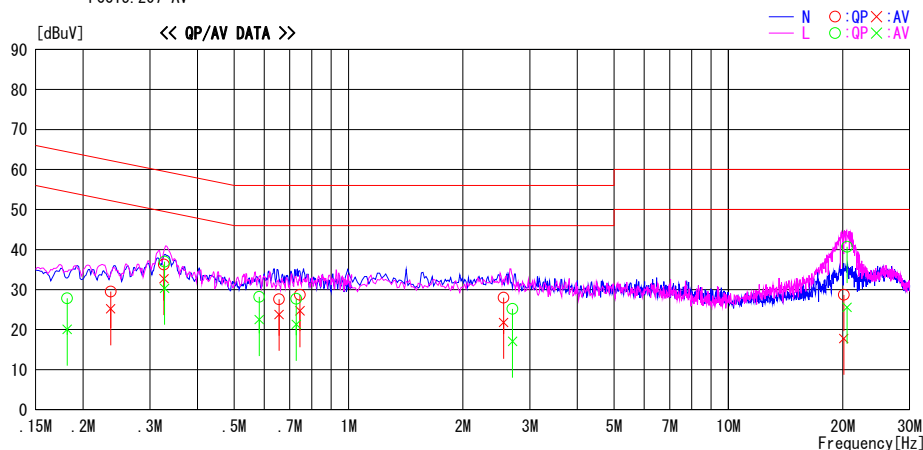
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2013/04/19

Report No. : 33IE0012-H0

Temp./Humi. : 22deg. C / 50% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 3-DH5 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.23643	16.2	11.9	13.3	29.5	25.2	62.2	52.2	32.7	27.0	N	
0.32673	23.0	19.4	13.3	36.3	32.7	59.5	49.5	23.2	16.8	N	
0.65595	14.2	10.4	13.4	27.6	23.8	56.0	46.0	28.4	22.2	N	
0.74507	15.3	11.3	13.4	28.7	24.7	56.0	46.0	27.3	21.3	N	
2.55944	14.3	8.1	13.7	28.0	21.8	56.0	46.0	28.0	24.2	N	
20.12000	11.9	1.0	16.8	28.7	17.8	60.0	50.0	31.3	32.2	N	
0.18169	14.5	6.8	13.3	27.8	20.1	64.4	54.4	36.6	34.3	L	
0.32780	23.7	17.0	13.3	37.0	30.3	59.5	49.5	22.5	19.2	L	
0.58218	14.9	9.2	13.3	28.2	22.5	56.0	46.0	27.8	23.5	L	
0.72809	14.3	7.9	13.4	27.7	21.3	56.0	46.0	28.3	24.7	L	
2.70210	11.5	3.4	13.7	25.2	17.1	56.0	46.0	30.8	28.9	L	
20.51992	23.8	8.7	16.9	40.7	25.6	60.0	50.0	19.3	24.4	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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Head Office EMC Lab.

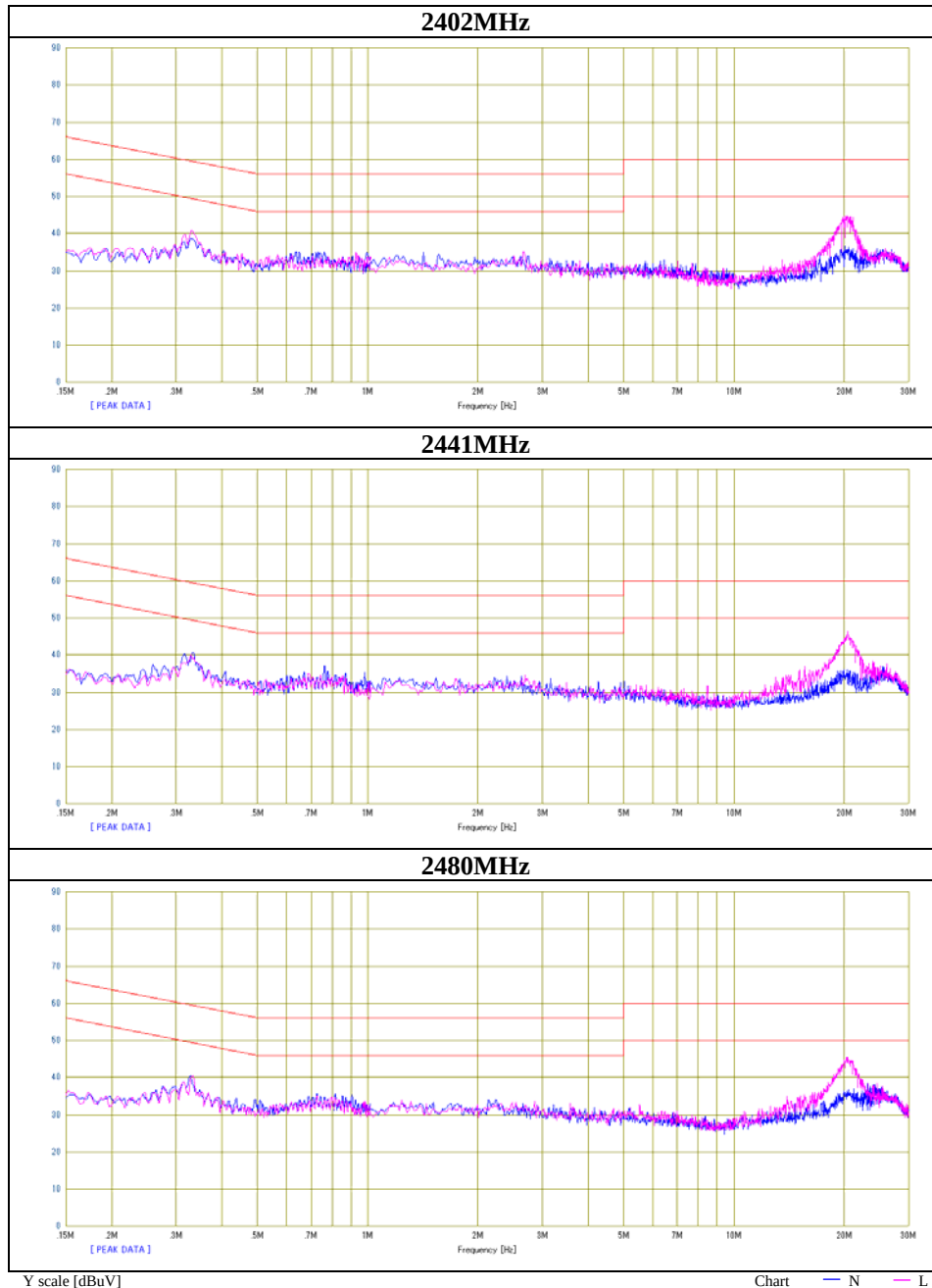
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	33IE0012-HO
Date	4/19/2013
Temperature/ Humidity	22deg. C / 50% RH
Engineer	Hironobu Ohnishi
Mode	Tx 3DH5



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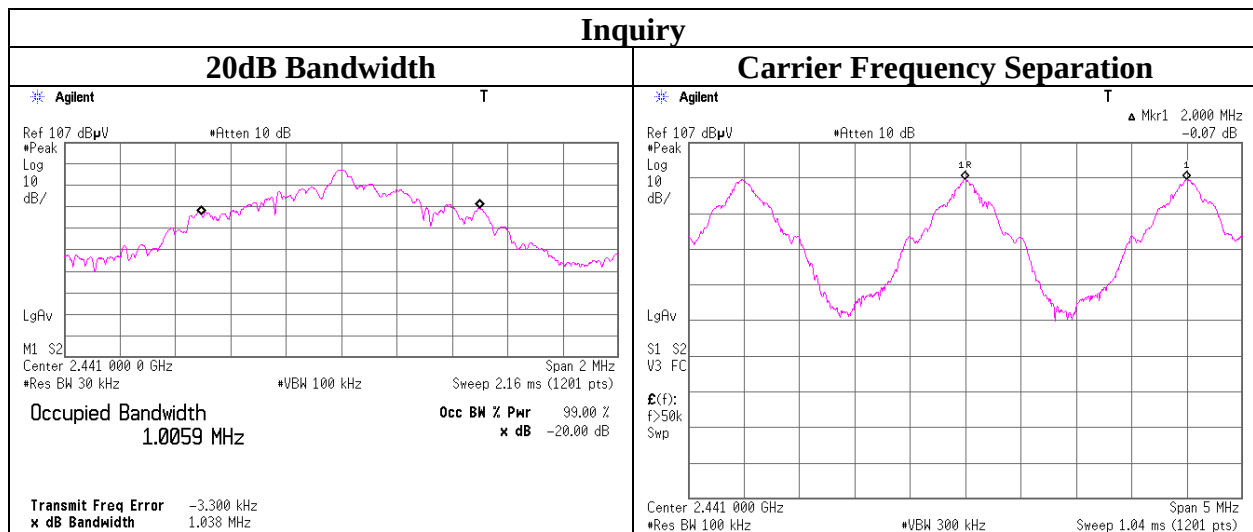
Facsimile : +81 596 24 8124

20dB Bandwidth and Carrier Frequency Separation

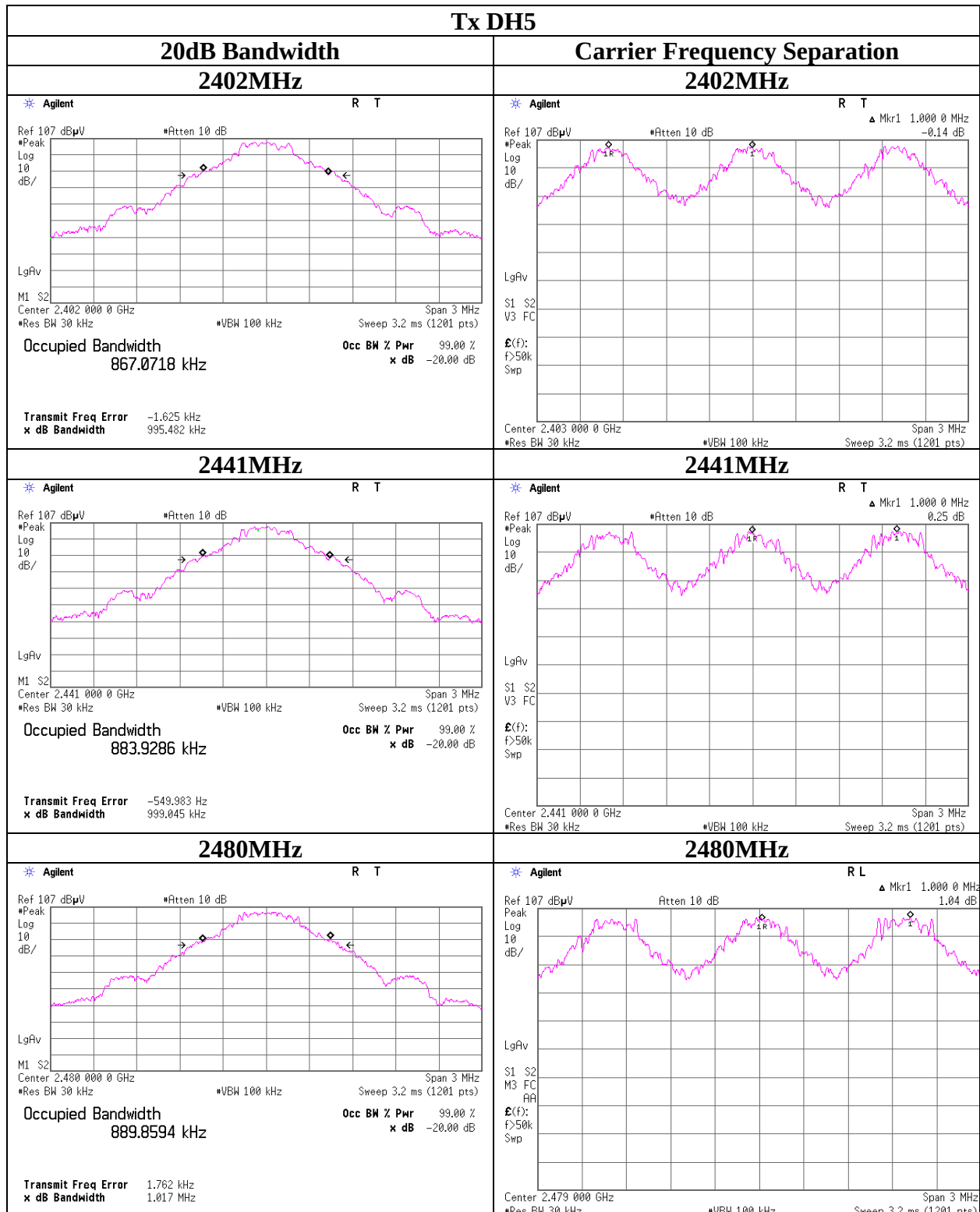
Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/20/2013
Temperature/ Humidity 23deg. C / 33% RH
Engineer Tomohisa Nakagawa
Mode Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.995	1.000	>= 0.663
DH5	2441.0	0.999	1.000	>= 0.666
DH5	2480.0	1.017	1.000	>= 0.678
3DH5	2402.0	1.293	1.000	>= 0.862
3DH5	2441.0	1.352	1.000	>= 0.901
3DH5	2480.0	1.343	1.000	>= 0.895
Inquiry	2441.0	1.038	2.000	>= 0.692

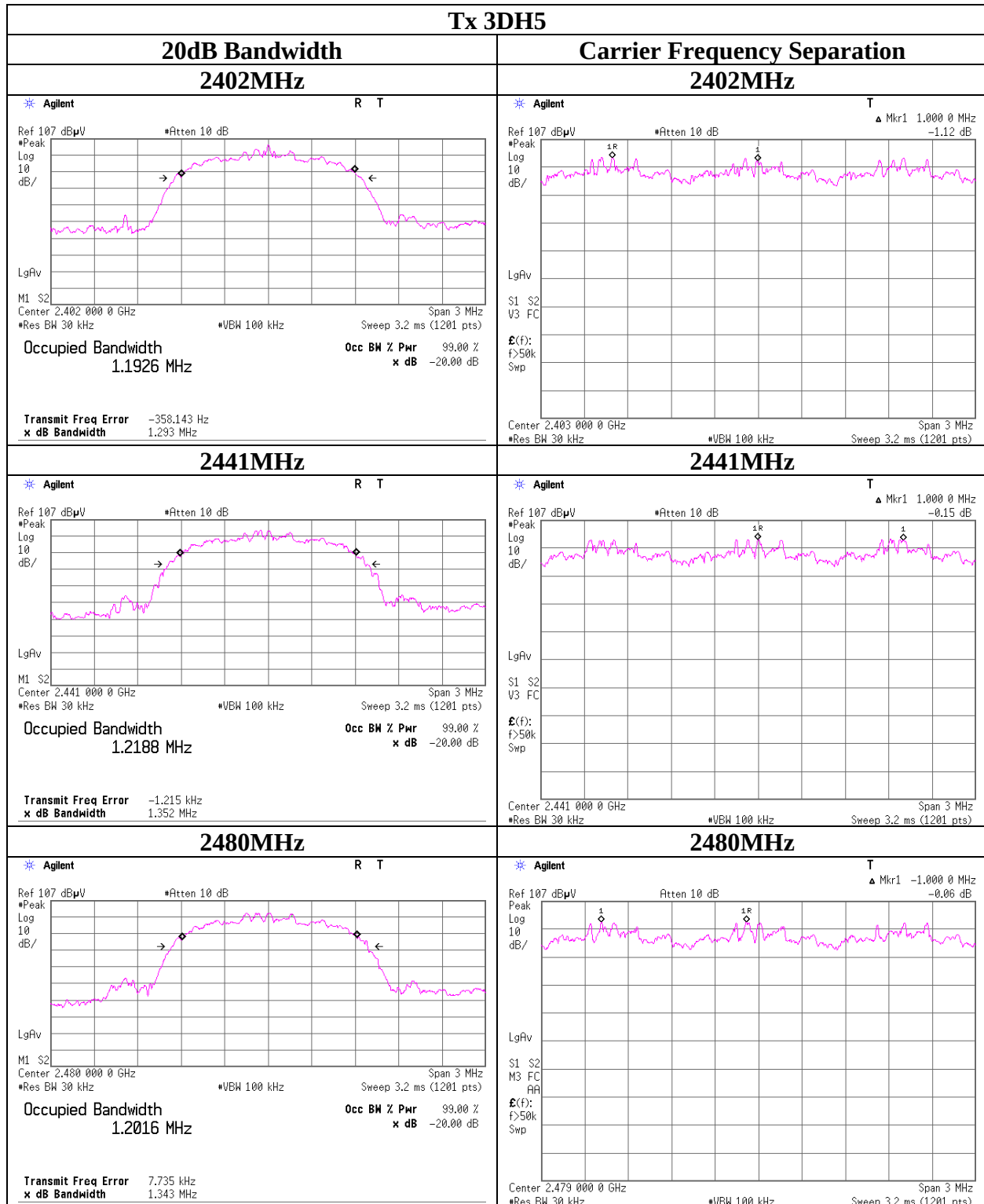
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



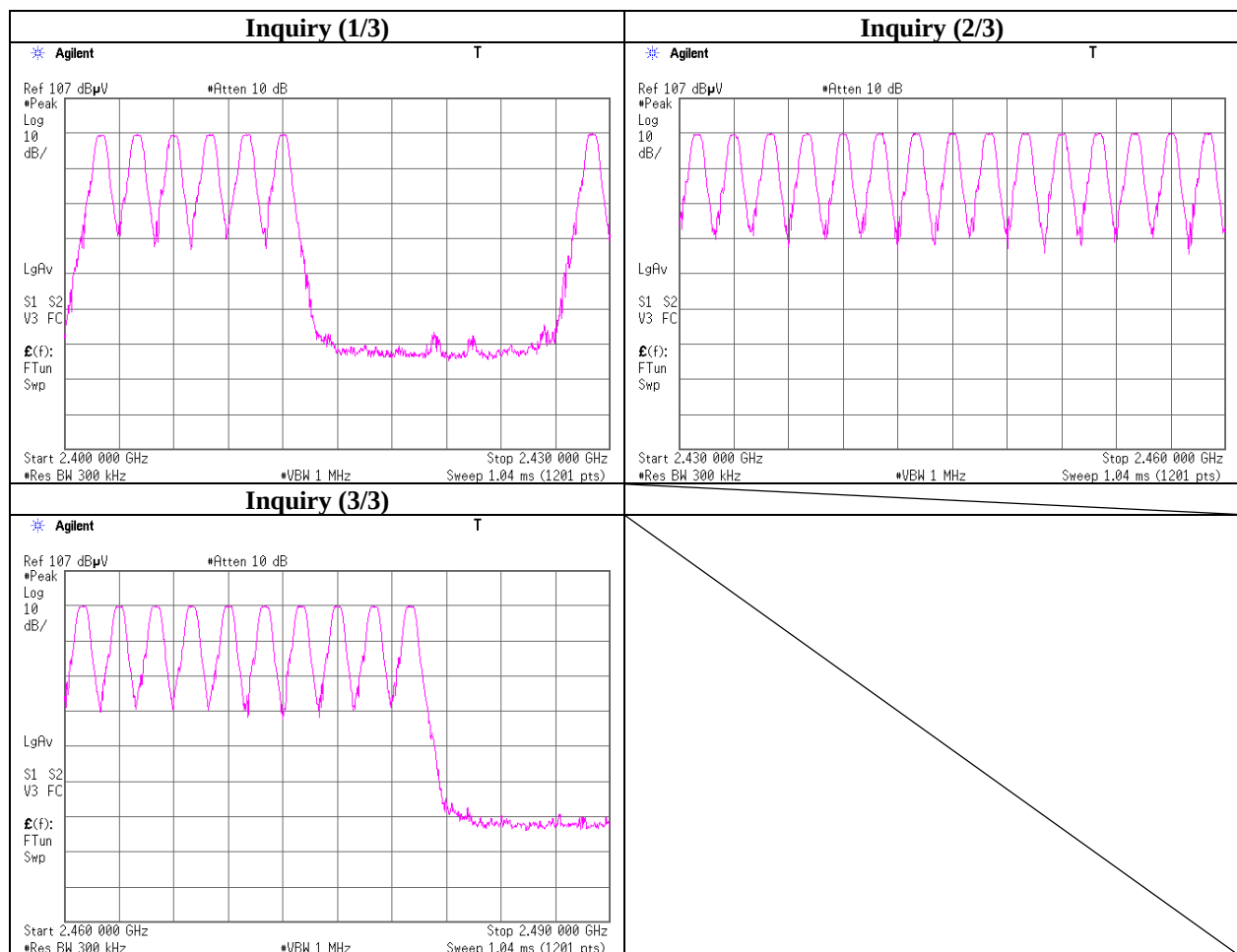
20dB Bandwidth and Carrier Frequency Separation



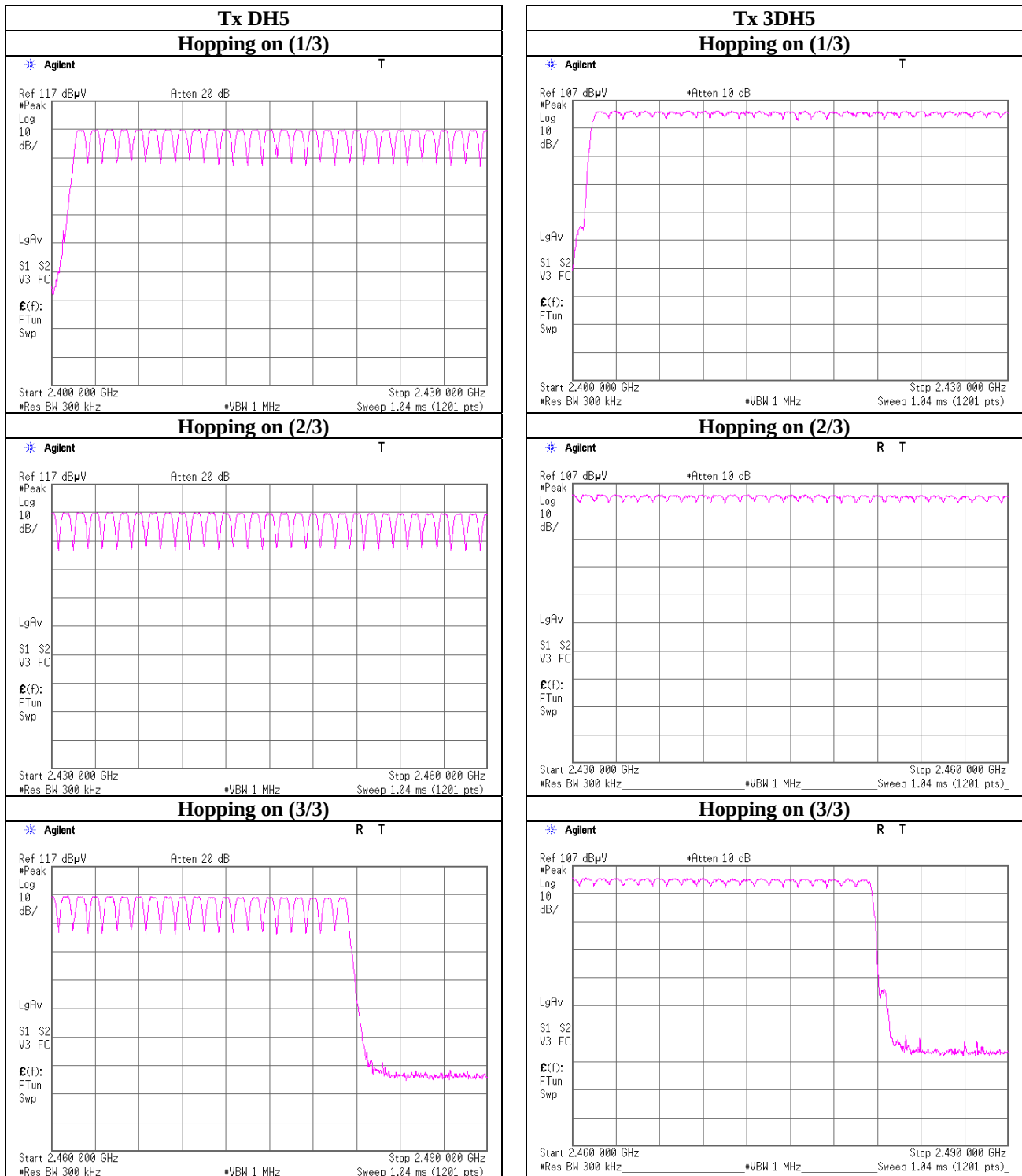
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	33IE0012-HO
Date	04/20/2013
Temperature/ Humidity	23deg. C / 33% RH
Engineer	Tomohisa Nakagawa
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 15



Number of Hopping Frequency



Dwell time

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	33IE0012-HO
Date	04/20/2013
Temperature/ Humidity	23deg. C / 33% RH
Engineer	Tomohisa Nakagawa
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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	50.0 times	/	5 sec.	x	31.6 sec. =	316 times	400
DH3	25.8 times	/	5 sec.	x	31.6 sec. =	164 times	400
DH5	18.4 times	/	5 sec.	x	31.6 sec. =	117 times	400
3DH1	40.6 times	/	5 sec.	x	31.6 sec. =	257 times	400
3DH3	24.8 times	/	5 sec.	x	31.6 sec. =	157 times	400
3DH5	15.0 times	/	5 sec.	x	31.6 sec. =	95 times	400
Inquiry	100.0 times	/	1 sec.	x	12.8 sec. =	1280 times	400

Sample Calculation

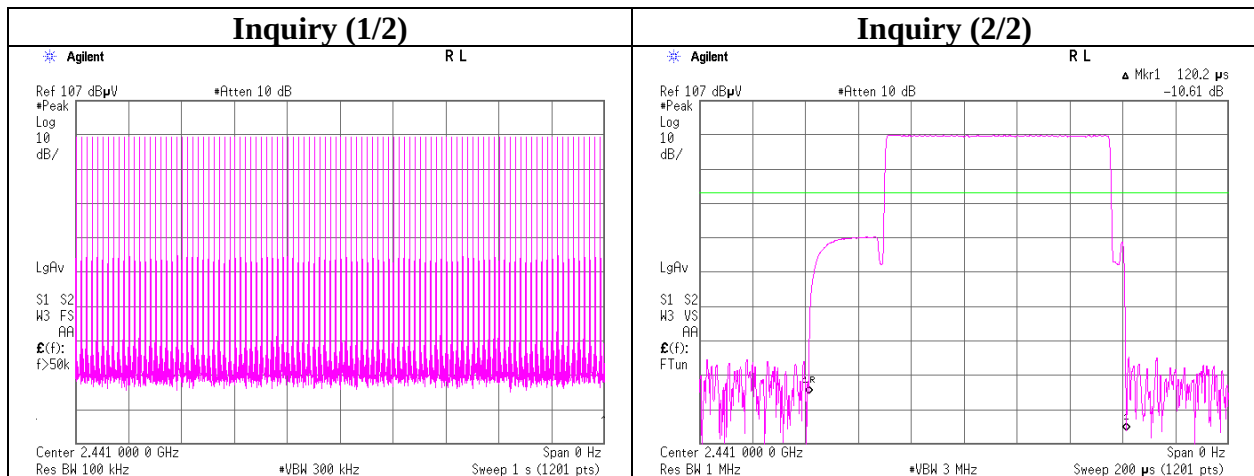
Result = Number of transmission x Length of transmission time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	50	50	50	50	50.0
DH3	30	29	22	28	20	25.8
DH5	16	17	22	19	18	18.4
3DH1	50	49	5	48	51	40.6
3DH3	21	31	23	23	26	24.8
3DH5	15	16	14	12	18	15.0

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5



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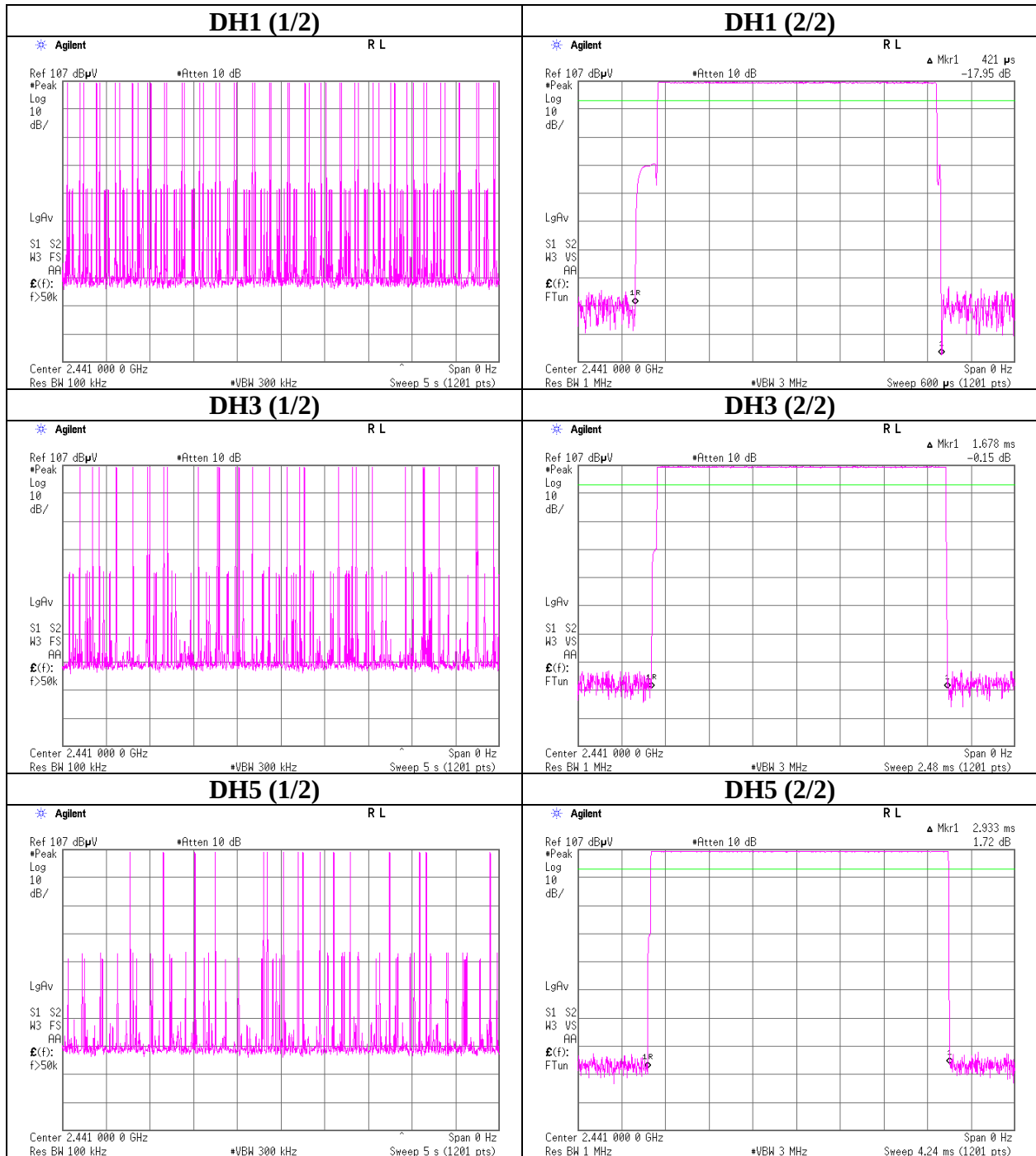
Head Office EMC Lab.

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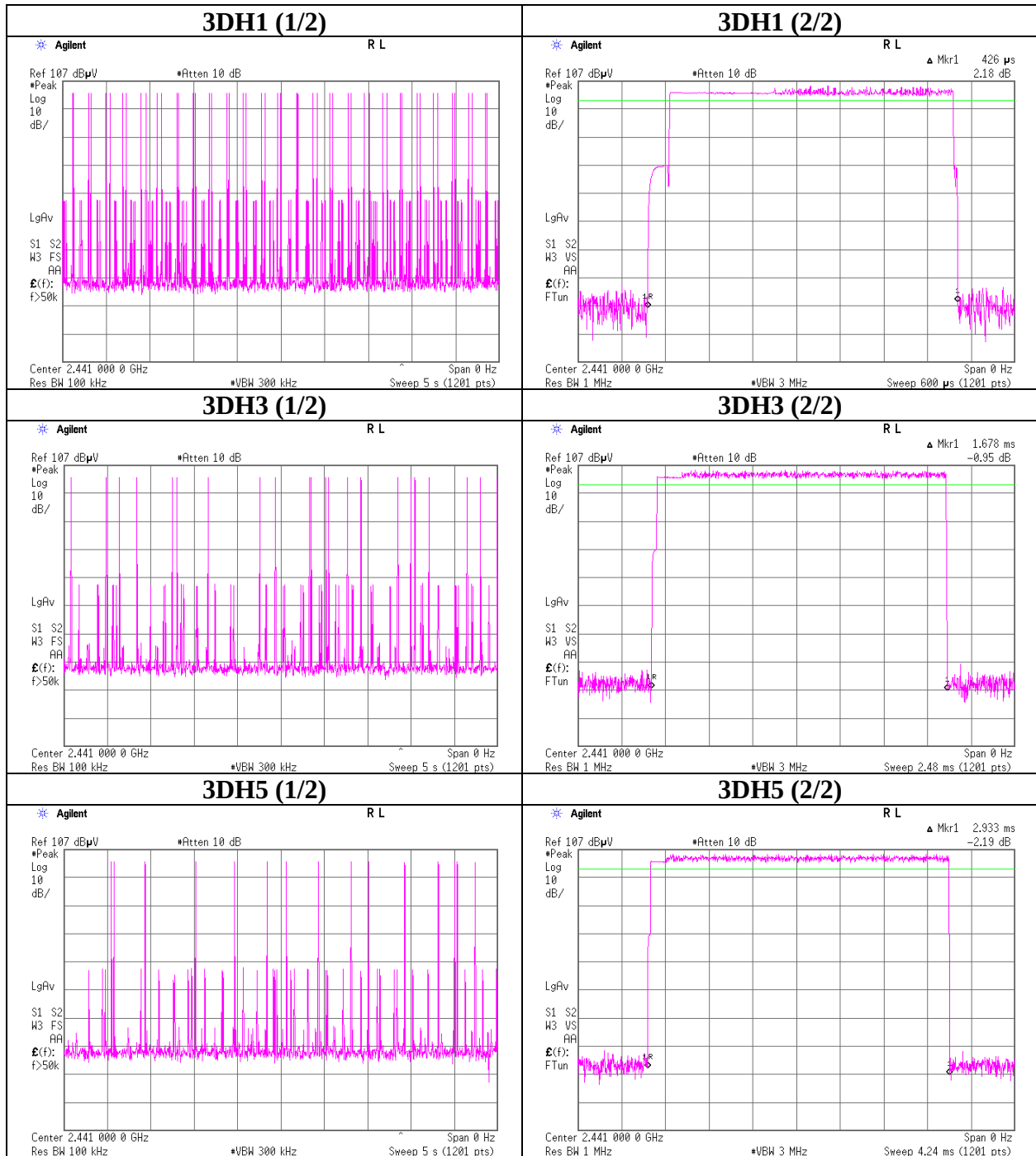
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Dwell time



Dwell time



Maximum Peak Output Power

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/20/2013
Temperature/ Humidity 23deg. C / 33% RH
Engineer Tomohisa Nakagawa
Mode Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-0.42	1.00	10.08	10.66	11.64	20.97	125	10.31
DH5	2441.0	-0.62	1.00	10.08	10.46	11.12	20.97	125	10.51
DH5	2480.0	-1.39	1.00	10.08	9.69	9.31	20.97	125	11.28
2DH5	2402.0	-1.69	1.00	10.08	9.39	8.69	20.97	125	11.58
2DH5	2441.0	-1.78	1.00	10.08	9.30	8.51	20.97	125	11.67
2DH5	2480.0	-2.48	1.00	10.08	8.60	7.24	20.97	125	12.37
3DH5	2402.0	-1.37	1.00	10.08	9.71	9.35	20.97	125	11.26
3DH5	2441.0	-1.53	1.00	10.08	9.55	9.02	20.97	125	11.42
3DH5	2480.0	-2.15	1.00	10.08	8.93	7.82	20.97	125	12.04

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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

Frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Average Output Power (Reference data for SAR testing)

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/20/2013
Temperature/ Humidity 23deg. C / 33% RH
Engineer Tomohisa Nakagawa
Mode Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-1.72	1.00	10.08	9.36	8.63
DH5	2441.0	-1.95	1.00	10.08	9.13	8.18
DH5	2480.0	-2.44	1.00	10.08	8.64	7.31
2DH5	2402.0	-5.23	1.00	10.08	5.85	3.85
2DH5	2441.0	-5.40	1.00	10.08	5.68	3.70
2DH5	2480.0	-6.18	1.00	10.08	4.90	3.09
3DH5	2402.0	-5.22	1.00	10.08	5.86	3.85
3DH5	2441.0	-5.42	1.00	10.08	5.66	3.68
3DH5	2480.0	-6.17	1.00	10.08	4.91	3.10

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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Head Office EMC Lab.

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/18/2013 04/19/2013
Temperature/ Humidity 22deg. C / 50% RH 21deg. C / 30% RH
Engineer Hironobu Ohnishi Tomohisa Nakagawa
Below 1GHz 1-26.5GHz
Mode Tx, DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	83.512	QP	41.8	7.0	7.3	28.5	27.6	40.0	12.4	
Hori	123.150	QP	31.7	13.2	7.7	28.2	24.4	43.5	19.1	
Hori	131.929	QP	33.2	13.9	7.7	28.2	26.6	43.5	16.9	
Hori	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Hori	2390.000	PK	45.2	26.8	12.5	35.7	48.8	73.9	25.1	
Hori	4804.000	PK	47.2	30.6	4.2	34.9	47.1	73.9	26.8	
Hori	7206.000	PK	47.6	35.5	4.9	34.9	53.1	73.9	20.8	
Hori	9608.000	PK	43.6	38.2	5.7	35.4	52.1	73.9	21.8	
Hori	2390.000	AV	32.7	26.8	12.5	35.7	36.3	53.9	17.6	
Hori	4804.000	AV	37.9	30.6	4.2	34.9	37.8	53.9	16.1	
Hori	7206.000	AV	34.5	35.5	4.9	34.9	40.0	53.9	13.9	
Hori	9608.000	AV	31.5	38.2	5.7	35.4	40.0	53.9	13.9	
Vert	83.512	QP	46.2	7.0	7.3	28.5	32.0	40.0	8.0	
Vert	123.150	QP	31.8	13.2	7.7	28.2	24.5	43.5	19.0	
Vert	131.929	QP	29.6	13.9	7.7	28.2	23.0	43.5	20.5	
Vert	250.000	QP	21.6	17.2	8.5	27.5	19.8	46.0	26.2	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Vert	2390.000	PK	35.5	26.8	12.5	35.7	39.1	73.9	34.8	
Vert	4804.000	PK	44.5	30.6	4.2	34.9	44.4	73.9	29.5	
Vert	7206.000	PK	50.5	35.5	4.9	34.9	56.0	73.9	17.9	
Vert	9608.000	PK	43.8	38.2	5.7	35.4	52.3	73.9	21.6	
Vert	2390.000	AV	34.0	26.8	12.5	35.7	37.6	53.9	16.3	
Vert	4804.000	AV	31.2	30.6	4.2	34.9	31.1	53.9	22.8	
Vert	7206.000	AV	41.4	35.5	4.9	34.9	46.9	53.9	7.0	
Vert	9608.000	AV	31.6	38.2	5.7	35.4	40.1	53.9	13.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	100.6	26.8	12.5	35.7	104.2	-	-	Carrier
Hori	2400.000	PK	42.0	26.8	12.5	35.7	45.6	84.2	38.6	
Vert	2402.000	PK	97.9	26.8	12.5	35.7	101.5	-	-	Carrier
Vert	2400.000	PK	39.8	26.8	12.5	35.7	43.4	81.5	38.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/18/2013 04/19/2013
Temperature/ Humidity 22deg. C / 50% RH 21deg. C / 30% RH
Engineer Hironobu Ohnishi Tomohisa Nakagawa
Below 1GHz 1-26.5GHz
Mode Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	82.012	QP	40.0	6.8	7.3	28.5	25.6	40.0	14.4	
Hori	123.097	QP	30.5	13.2	7.6	28.2	23.1	43.5	20.4	
Hori	131.963	QP	33.5	13.9	7.7	28.2	26.9	43.5	16.6	
Hori	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.4	19.2	10.2	28.8	23.0	46.0	23.0	
Hori	4882.000	PK	47.4	30.9	4.2	34.9	47.6	73.9	26.3	
Hori	7323.000	PK	47.3	35.7	4.9	34.9	53.0	73.9	20.9	
Hori	9764.000	PK	44.0	38.4	5.7	35.4	52.7	73.9	21.2	
Hori	4882.000	AV	38.5	30.9	4.2	34.9	38.7	53.9	15.2	
Hori	7323.000	AV	37.5	35.7	4.9	34.9	43.2	53.9	10.7	
Hori	9764.000	AV	31.4	38.4	5.7	35.4	40.1	53.9	13.8	
Vert	82.012	QP	46.1	6.8	7.3	28.5	31.7	40.0	8.3	
Vert	123.097	QP	30.9	13.2	7.6	28.2	23.5	43.5	20.0	
Vert	131.963	QP	29.3	13.9	7.7	28.2	22.7	43.5	20.8	
Vert	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.4	19.2	10.2	28.8	23.0	46.0	23.0	
Vert	4882.000	PK	45.2	30.9	4.2	34.9	45.4	73.9	28.6	
Vert	7323.000	PK	46.6	35.7	4.9	34.9	52.3	73.9	21.6	
Vert	9764.000	PK	43.6	38.4	5.7	35.4	52.3	73.9	21.6	
Vert	4882.000	AV	32.2	30.9	4.2	34.9	32.4	53.9	21.5	
Vert	7323.000	AV	36.0	35.7	4.9	34.9	41.7	53.9	12.2	
Vert	9764.000	AV	31.4	38.4	5.7	35.4	40.1	53.9	13.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/18/2013 04/19/2013
Temperature/ Humidity 22deg. C / 50% RH 21deg. C / 30% RH
Engineer Hironobu Ohnishi Tomohisa Nakagawa
Below 1GHz 1-26.5GHz
Mode Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	83.812	QP	40.2	7.1	7.3	28.5	26.1	40.0	13.9	
Hori	123.010	QP	30.5	13.2	7.6	28.2	23.1	43.5	20.4	
Hori	131.297	QP	33.0	13.9	7.7	28.2	26.4	43.5	17.1	
Hori	250.000	QP	21.6	17.2	8.5	27.5	19.8	46.0	26.2	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Hori	2483.500	PK	48.2	26.7	12.5	35.7	51.7	73.9	22.2	
Hori	4960.000	PK	49.3	31.1	4.2	34.9	49.7	73.9	24.2	
Hori	7440.000	PK	46.1	35.9	5.0	34.9	52.1	73.9	21.8	
Hori	9920.000	PK	43.7	38.7	5.8	35.4	52.8	73.9	21.1	
Hori	2483.500	AV	34.7	26.7	12.5	35.7	38.2	53.9	15.7	
Hori	4960.000	AV	41.2	31.1	4.2	34.9	41.6	53.9	12.3	
Hori	7440.000	AV	33.3	35.9	5.0	34.9	39.3	53.9	14.6	
Hori	9920.000	AV	31.8	38.7	5.8	35.4	40.9	53.9	13.0	
Vert	82.312	QP	46.3	6.8	7.3	28.5	31.9	40.0	8.1	
Vert	123.010	QP	31.2	13.2	7.6	28.2	23.8	43.5	19.7	
Vert	131.297	QP	29.3	13.9	7.7	28.2	22.7	43.5	20.8	
Vert	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Vert	2483.500	PK	46.7	26.7	12.5	35.7	50.2	73.9	23.7	
Vert	4960.000	PK	46.8	31.1	4.2	34.9	47.2	73.9	26.7	
Vert	7440.000	PK	45.3	35.9	5.0	34.9	51.3	73.9	22.6	
Vert	9920.000	PK	44.9	38.7	5.8	35.4	54.0	73.9	19.9	
Vert	2483.500	AV	35.1	26.7	12.5	35.7	38.6	53.9	15.3	
Vert	4960.000	AV	37.6	31.1	4.2	34.9	38.0	53.9	15.9	
Vert	7440.000	AV	32.2	35.9	5.0	34.9	38.2	53.9	15.7	
Vert	9920.000	AV	31.9	38.7	5.8	35.4	41.0	53.9	12.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	33IE0012-HO	
Date	04/18/2013	04/19/2013
Temperature/ Humidity	22deg. C / 50% RH	21deg. C / 30% RH
Engineer	Hironobu Ohnishi	Tomohisa Nakagawa
	Below 1GHz	1-26.5GHz
Mode	Tx, 3DH5 2402MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	83.511	QP	40.8	7.0	7.3	28.5	26.6	40.0	13.4	
Hori	123.006	QP	31.6	13.2	7.6	28.2	24.2	43.5	19.3	
Hori	133.100	QP	32.9	14.0	7.7	28.2	26.4	43.5	17.1	
Hori	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Hori	2390.000	PK	46.2	26.8	12.5	35.7	49.8	73.9	24.1	
Hori	4804.000	PK	43.4	30.6	4.2	34.9	43.3	73.9	30.6	
Hori	7206.000	PK	45.8	35.5	4.9	34.9	51.3	73.9	22.6	
Hori	9608.000	PK	43.7	38.2	5.7	35.4	52.2	73.9	21.7	
Hori	2390.000	AV	32.6	26.8	12.5	35.7	36.2	53.9	17.7	
Hori	4804.000	AV	31.3	30.6	4.2	34.9	31.2	53.9	22.7	
Hori	7206.000	AV	33.1	35.5	4.9	34.9	38.6	53.9	15.3	
Hori	9608.000	AV	31.6	38.2	5.7	35.4	40.1	53.9	13.8	
Vert	82.310	QP	47.0	6.8	7.3	28.5	32.6	40.0	7.4	
Vert	123.006	QP	31.1	13.2	7.6	28.2	23.7	43.5	19.8	
Vert	133.100	QP	28.5	14.0	7.7	28.2	22.0	43.5	21.5	
Vert	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Vert	2390.000	PK	46.0	26.8	12.5	35.7	49.6	73.9	24.3	
Vert	4804.000	PK	43.7	30.6	4.2	34.9	43.6	73.9	30.3	
Vert	7206.000	PK	44.1	35.5	4.9	34.9	49.6	73.9	24.3	
Vert	9608.000	PK	43.6	38.2	5.7	35.4	52.1	73.9	21.8	
Vert	2390.000	AV	32.4	26.8	12.5	35.7	36.0	53.9	17.9	
Vert	4804.000	AV	30.7	30.6	4.2	34.9	30.6	53.9	23.3	
Vert	7206.000	AV	31.2	35.5	4.9	34.9	36.7	53.9	17.2	
Vert	9608.000	AV	31.6	38.2	5.7	35.4	40.1	53.9	13.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	97.9	26.8	12.5	35.7	101.5	-	-	Carrier
Hori	2400.000	PK	42.5	26.8	12.5	35.7	46.1	81.5	35.4	
Vert	2402.000	PK	94.9	26.8	12.5	35.7	98.5	-	-	Carrier
Vert	2400.000	PK	41.0	26.8	12.5	35.7	44.6	78.5	33.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/18/2013 04/19/2013
Temperature/ Humidity 22deg. C / 50% RH 21deg. C / 30% RH
Engineer Hironobu Ohnishi Tomohisa Nakagawa
Below 1GHz 1-26.5GHz
Mode Tx, 3DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	83.600	QP	41.7	7.1	7.3	28.5	27.6	40.0	12.4	
Hori	123.010	QP	31.0	13.2	7.6	28.2	23.6	43.5	19.9	
Hori	131.778	QP	32.4	13.9	7.7	28.2	25.8	43.5	17.7	
Hori	250.000	QP	21.6	17.2	8.5	27.5	19.8	46.0	26.2	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Hori	4882.000	PK	45.5	30.9	4.2	34.9	45.7	73.9	28.2	
Hori	7323.000	PK	43.6	35.7	4.9	34.9	49.3	73.9	24.6	
Hori	9764.000	PK	43.4	38.4	5.7	35.4	52.1	73.9	21.8	
Hori	4882.000	AV	35.1	30.9	4.2	34.9	35.3	53.9	18.6	
Hori	7323.000	AV	31.2	35.7	4.9	34.9	36.9	53.9	17.0	
Hori	9764.000	AV	31.5	38.4	5.7	35.4	40.2	53.9	13.7	
Vert	82.680	QP	47.9	6.9	7.3	28.5	33.6	40.0	6.4	
Vert	123.010	QP	31.4	13.2	7.6	28.2	24.0	43.5	19.5	
Vert	131.778	QP	29.1	13.9	7.7	28.2	22.5	43.5	21.0	
Vert	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Vert	4882.000	PK	42.8	30.9	4.2	34.9	43.0	73.9	30.9	
Vert	7323.000	PK	43.5	35.7	4.9	34.9	49.2	73.9	24.7	
Vert	9764.000	PK	43.4	38.4	5.7	35.4	52.1	73.9	21.8	
Vert	4882.000	AV	31.4	30.9	4.2	34.9	31.6	53.9	22.3	
Vert	7323.000	AV	31.4	35.7	4.9	34.9	37.1	53.9	16.8	
Vert	9764.000	AV	31.5	38.4	5.7	35.4	40.2	53.9	13.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
26.5GHz-40GHz $20\log(3.0\text{m}/0.5\text{m})=15.6\text{dB}$

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 33IE0012-HO
Date 04/18/2013 04/19/2013
Temperature/ Humidity 22deg. C / 50% RH 21deg. C / 30% RH
Engineer Hironobu Ohnishi Tomohisa Nakagawa
Below 1GHz 1-26.5GHz
Mode Tx, 3DH5 2480MHz

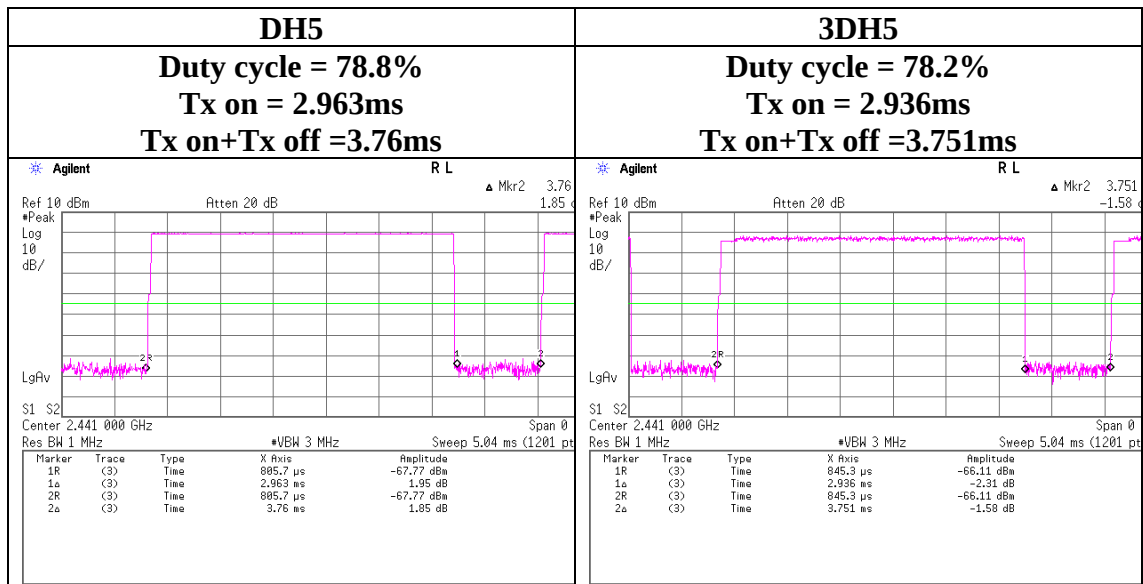
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	83.812	QP	41.2	7.1	7.3	28.5	27.1	40.0	12.9	
Hori	123.020	QP	32.3	13.2	7.6	28.2	24.9	43.5	18.6	
Hori	133.510	QP	32.4	14.0	7.7	28.2	25.9	43.5	17.6	
Hori	250.000	QP	21.6	17.2	8.5	27.5	19.8	46.0	26.2	
Hori	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Hori	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Hori	2483.500	PK	48.5	26.7	12.5	35.7	52.0	73.9	21.9	
Hori	4960.000	PK	47.2	31.1	4.2	34.9	47.6	73.9	26.3	
Hori	7440.000	PK	43.8	35.9	5.0	34.9	49.8	73.9	24.1	
Hori	9920.000	PK	44.3	38.7	5.8	35.4	53.4	73.9	20.5	
Hori	2483.500	AV	33.8	26.7	12.5	35.7	37.3	53.9	16.6	
Hori	4960.000	AV	36.1	31.1	4.2	34.9	36.5	53.9	17.4	
Hori	7440.000	AV	30.9	35.9	5.0	34.9	36.9	53.9	17.0	
Hori	9920.000	AV	32.0	38.7	5.8	35.4	41.1	53.9	12.8	
Vert	82.500	QP	47.2	6.9	7.3	28.5	32.9	40.0	7.1	
Vert	123.020	QP	32.5	13.2	7.6	28.2	25.1	43.5	18.4	
Vert	133.510	QP	28.4	14.0	7.7	28.2	21.9	43.5	21.6	
Vert	250.000	QP	21.5	17.2	8.5	27.5	19.7	46.0	26.3	
Vert	500.000	QP	22.3	18.0	9.8	28.8	21.3	46.0	24.7	
Vert	600.000	QP	22.3	19.2	10.2	28.8	22.9	46.0	23.1	
Vert	2483.500	PK	45.6	26.7	12.5	35.7	49.1	73.9	24.8	
Vert	4960.000	PK	45.1	31.1	4.2	34.9	45.5	73.9	28.4	
Vert	7440.000	PK	44.0	35.9	5.0	34.9	50.0	73.9	23.9	
Vert	9920.000	PK	45.1	38.7	5.8	35.4	54.2	73.9	19.7	
Vert	2483.500	AV	32.6	26.7	12.5	35.7	36.1	53.9	17.8	
Vert	4960.000	AV	33.0	31.1	4.2	34.9	33.4	53.9	20.5	
Vert	7440.000	AV	31.2	35.9	5.0	34.9	37.2	53.9	16.7	
Vert	9920.000	AV	32.0	38.7	5.8	35.4	41.1	53.9	12.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Burst rate confirmation



UL Japan, Inc.

Head Office EMC Lab.

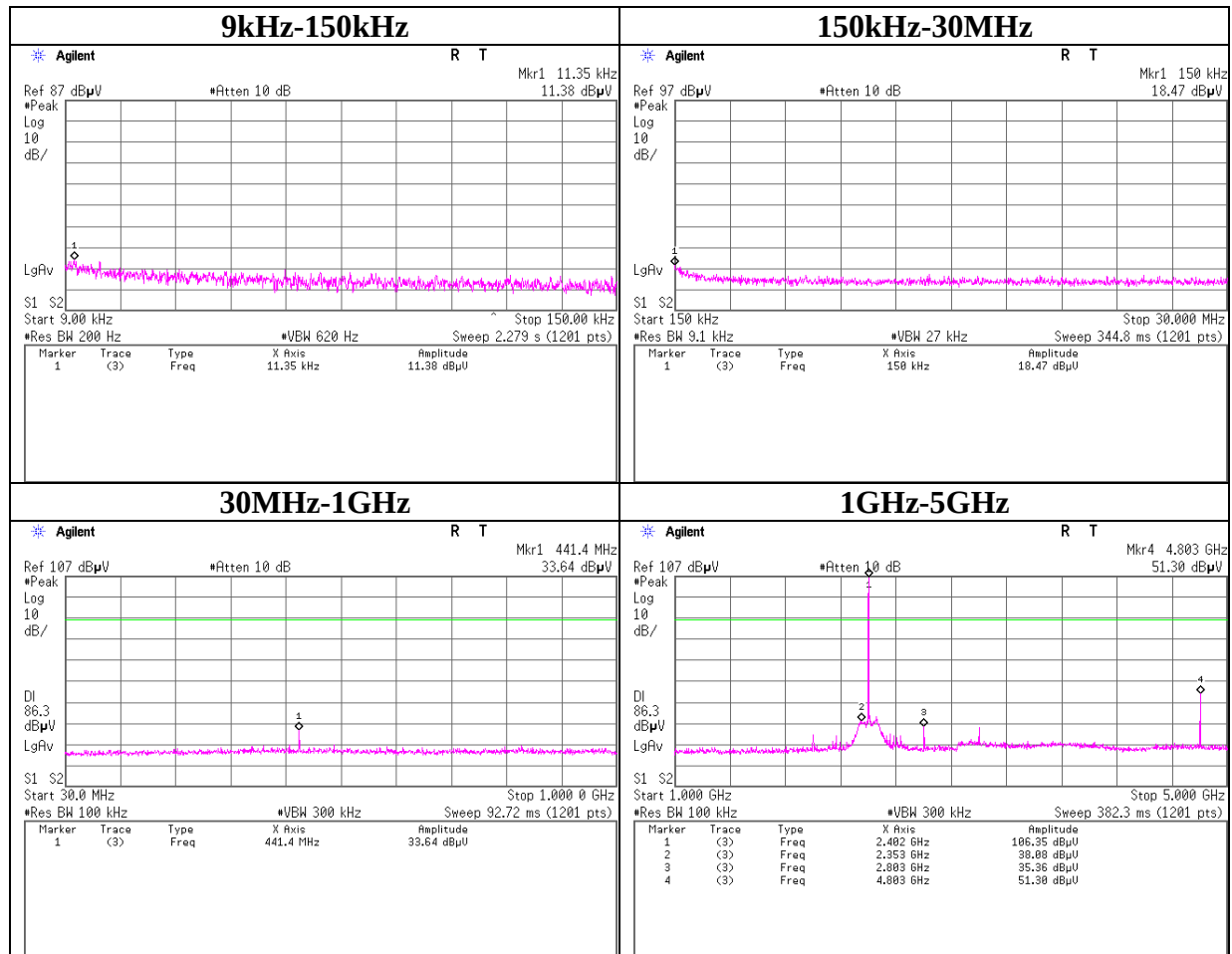
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Tx DH5 2402MHz



UL Japan, Inc.

Head Office EMC Lab.

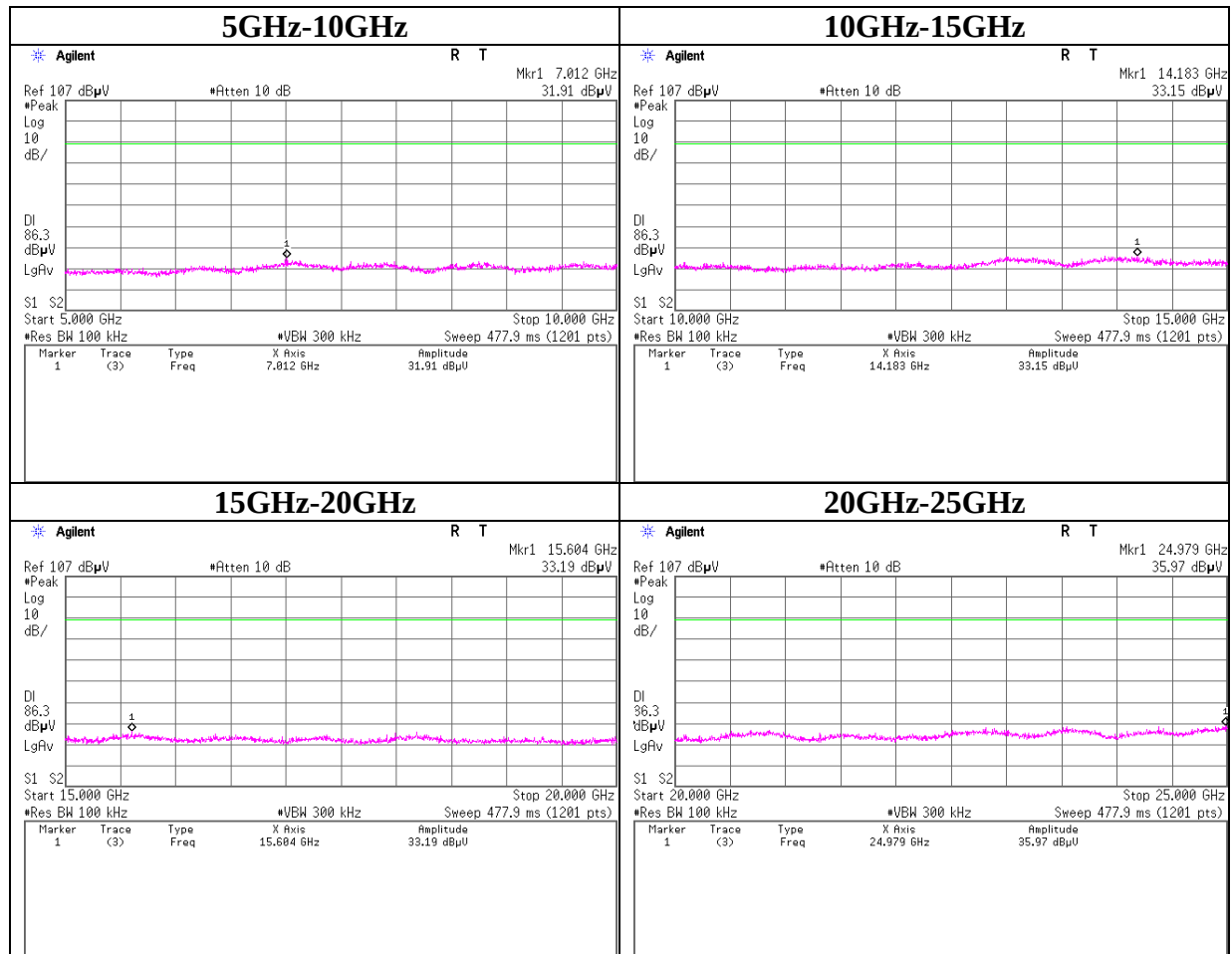
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

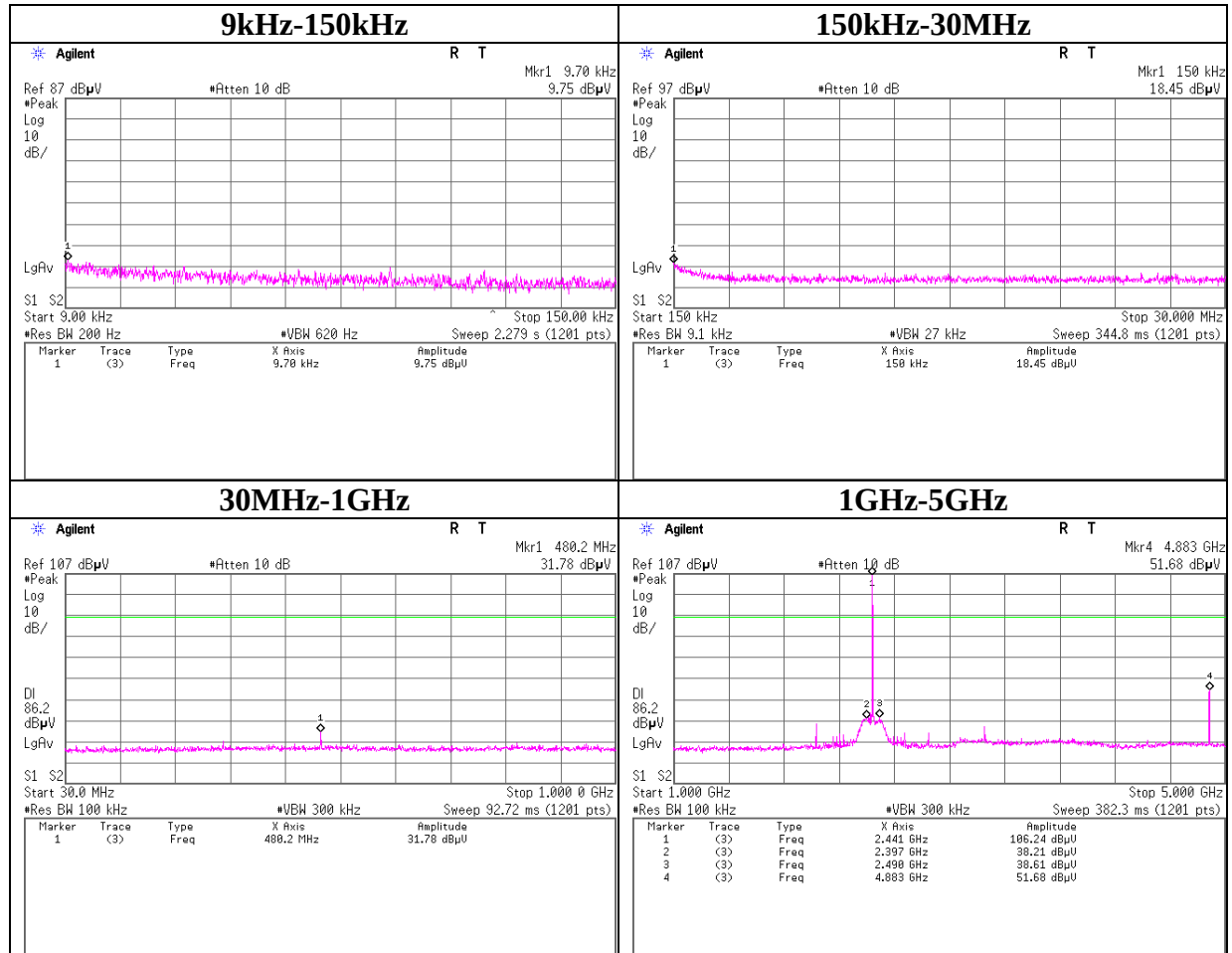
Conducted Spurious Emission

Tx DH5 2402MHz



Conducted Spurious Emission

Tx DH5 2441MHz



UL Japan, Inc.

Head Office EMC Lab.

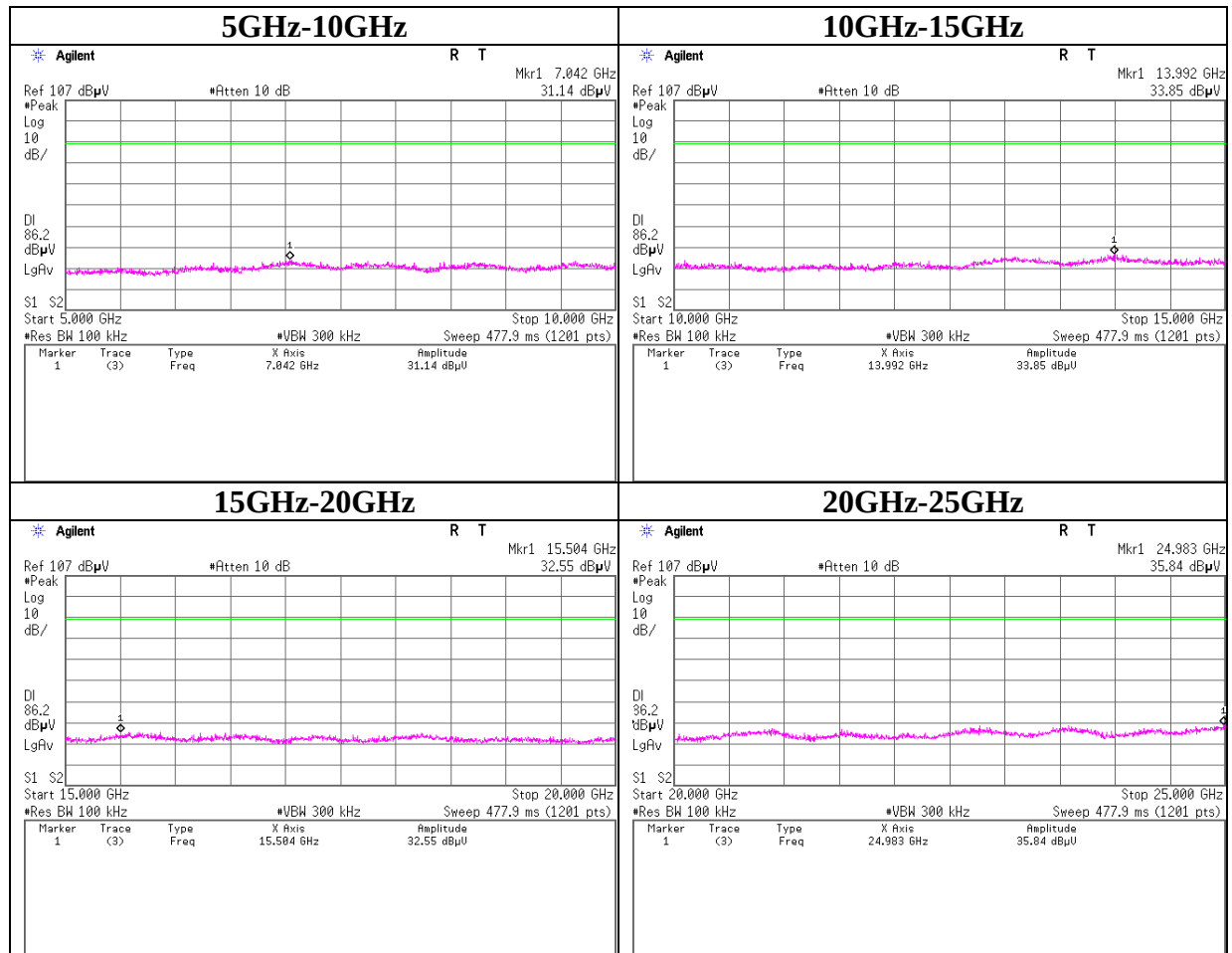
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Telephone : +81 596 24 8999

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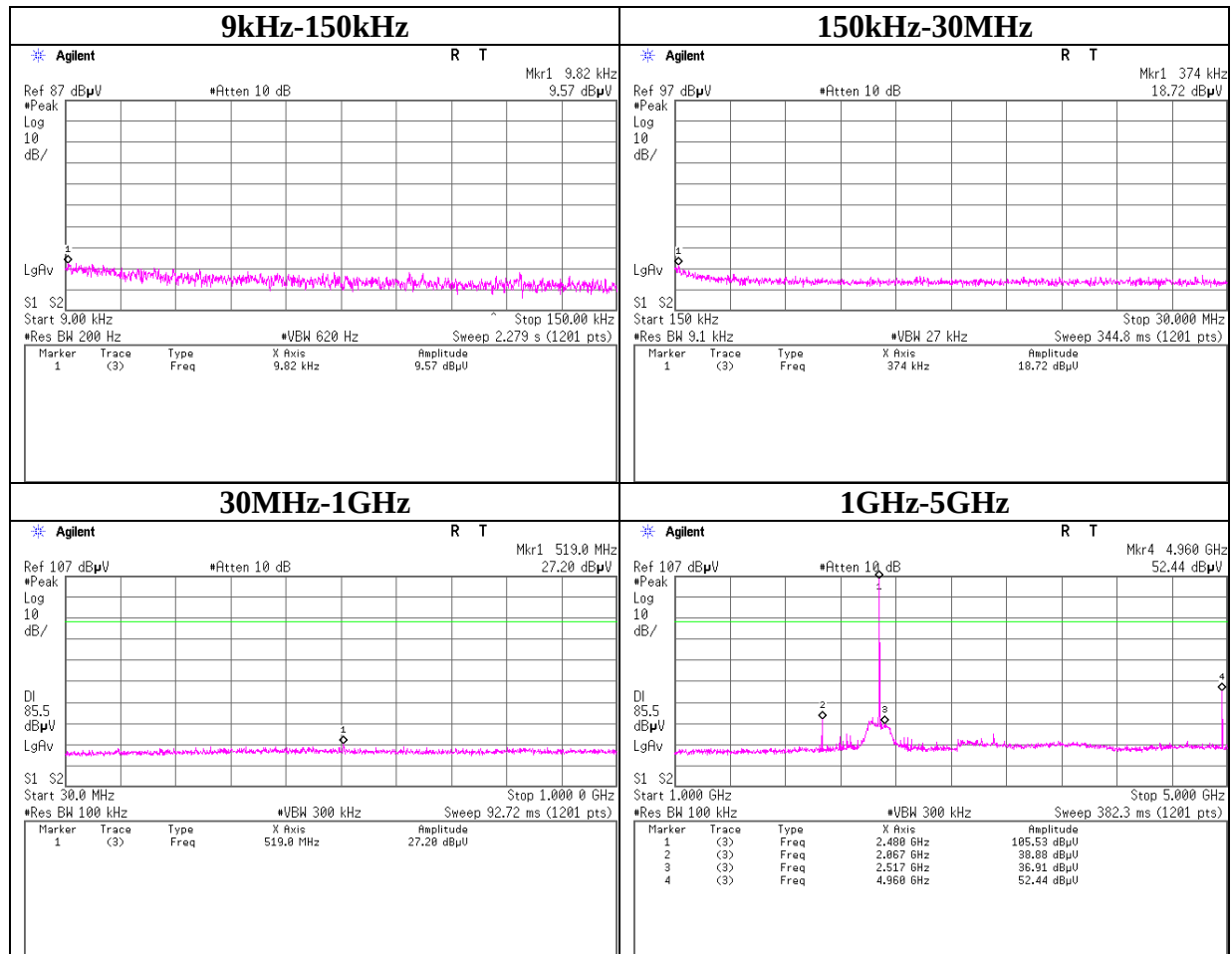
Conducted Spurious Emission

Tx DH5 2441MHz



Conducted Spurious Emission

Tx DH5 2480MHz



UL Japan, Inc.

Head Office EMC Lab.

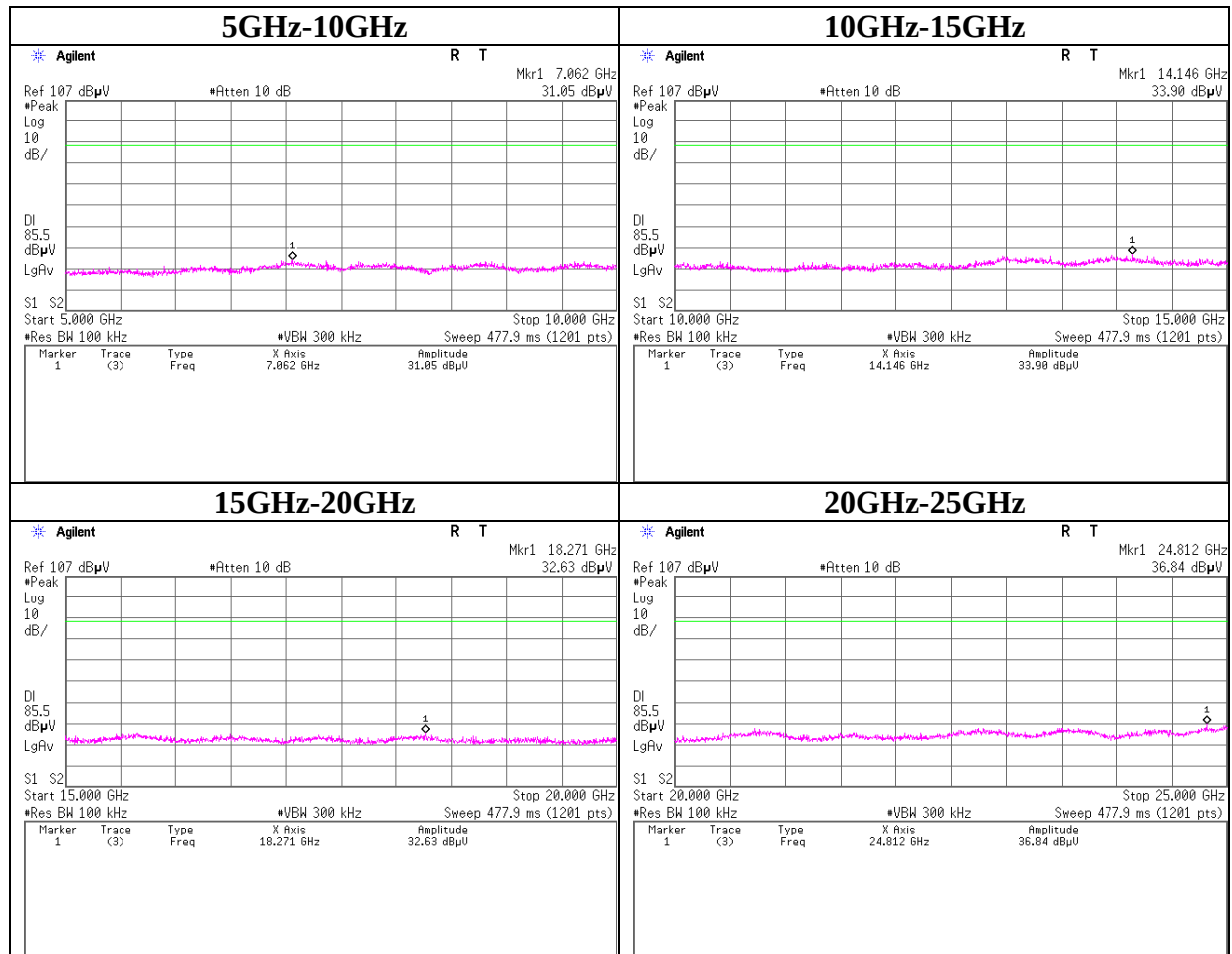
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

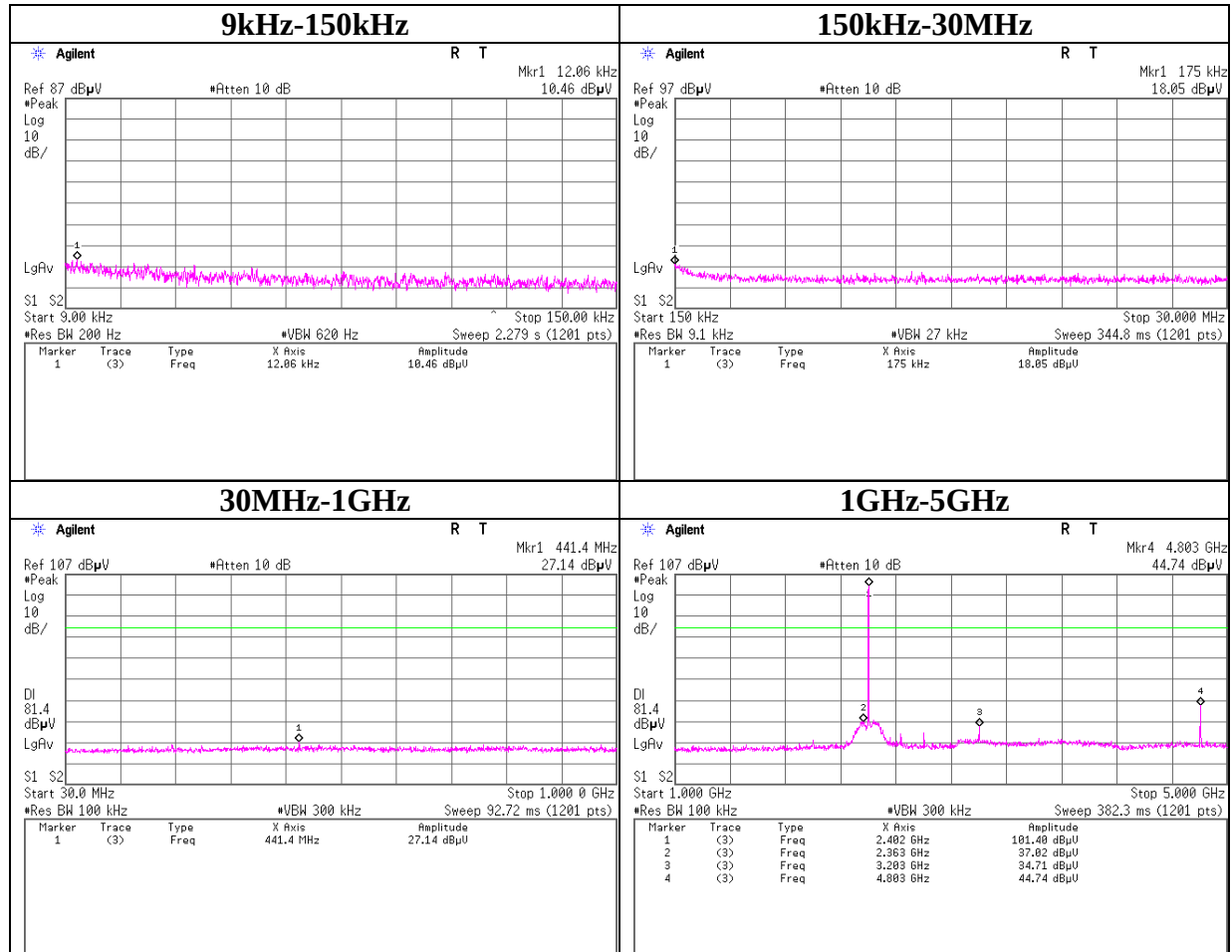
Conducted Spurious Emission

Tx DH5 2480MHz



Conducted Spurious Emission

Tx 3DH5 2402MHz



UL Japan, Inc.

Head Office EMC Lab.

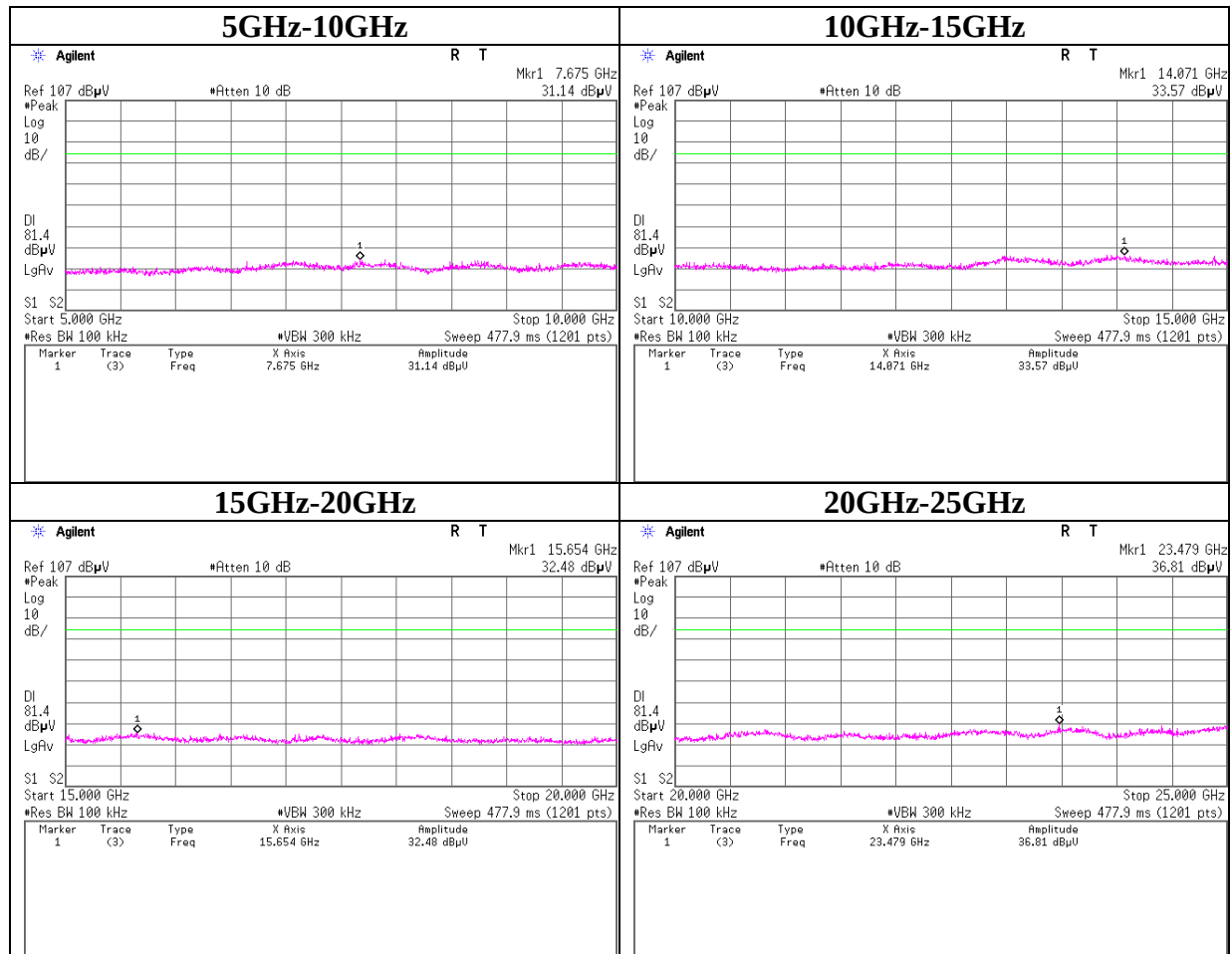
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

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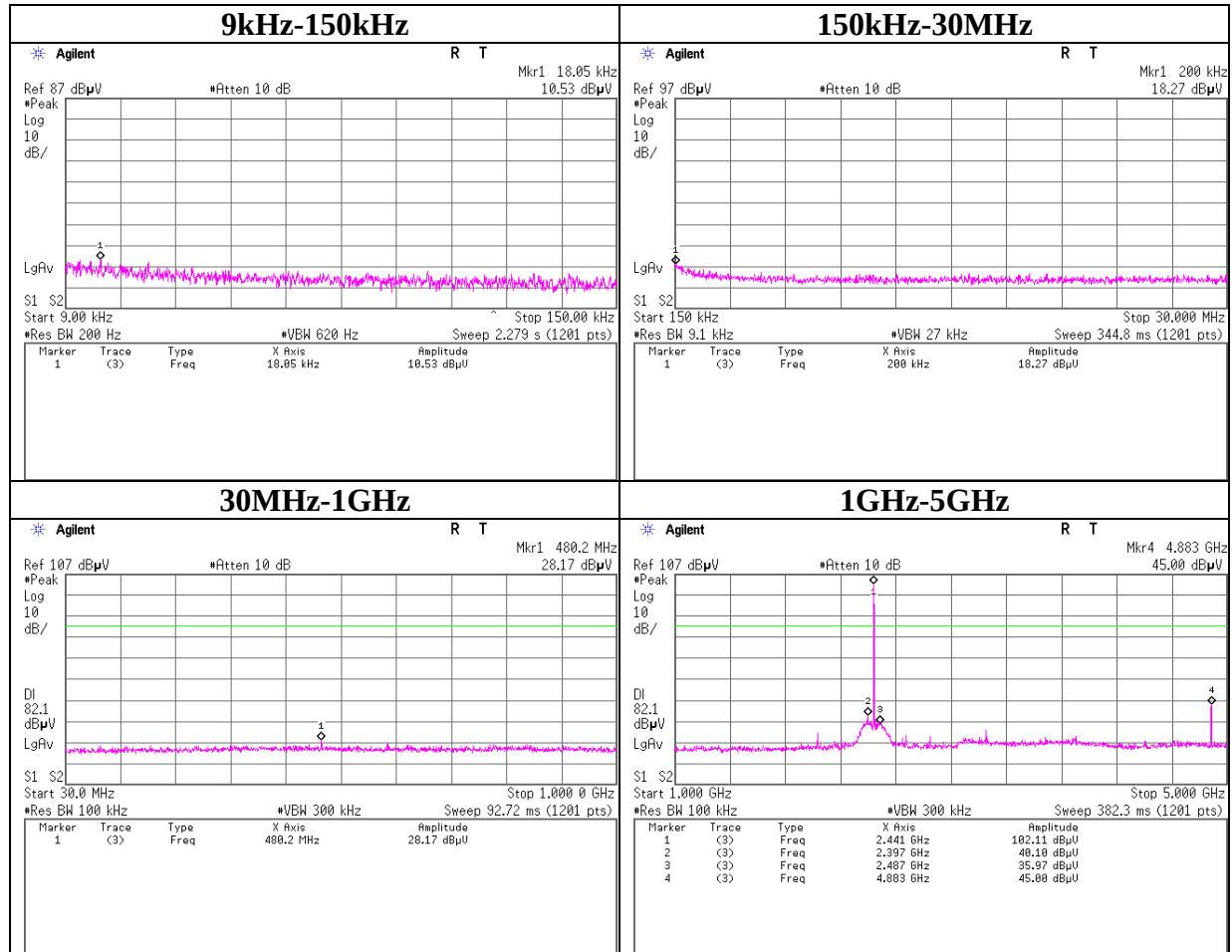
Conducted Spurious Emission

Tx 3DH5 2402MHz



Conducted Spurious Emission

Tx 3DH5 2441MHz



UL Japan, Inc.

Head Office EMC Lab.

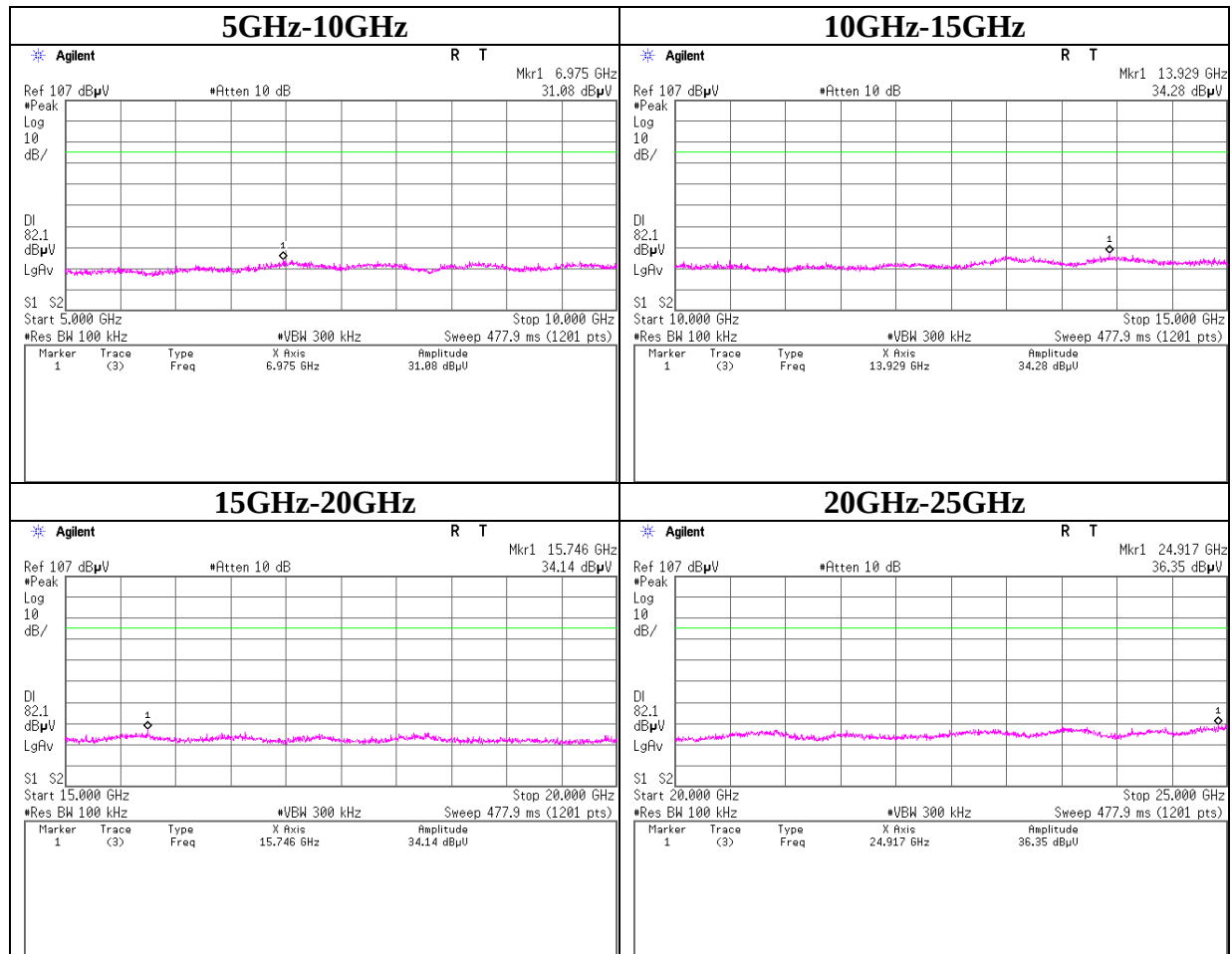
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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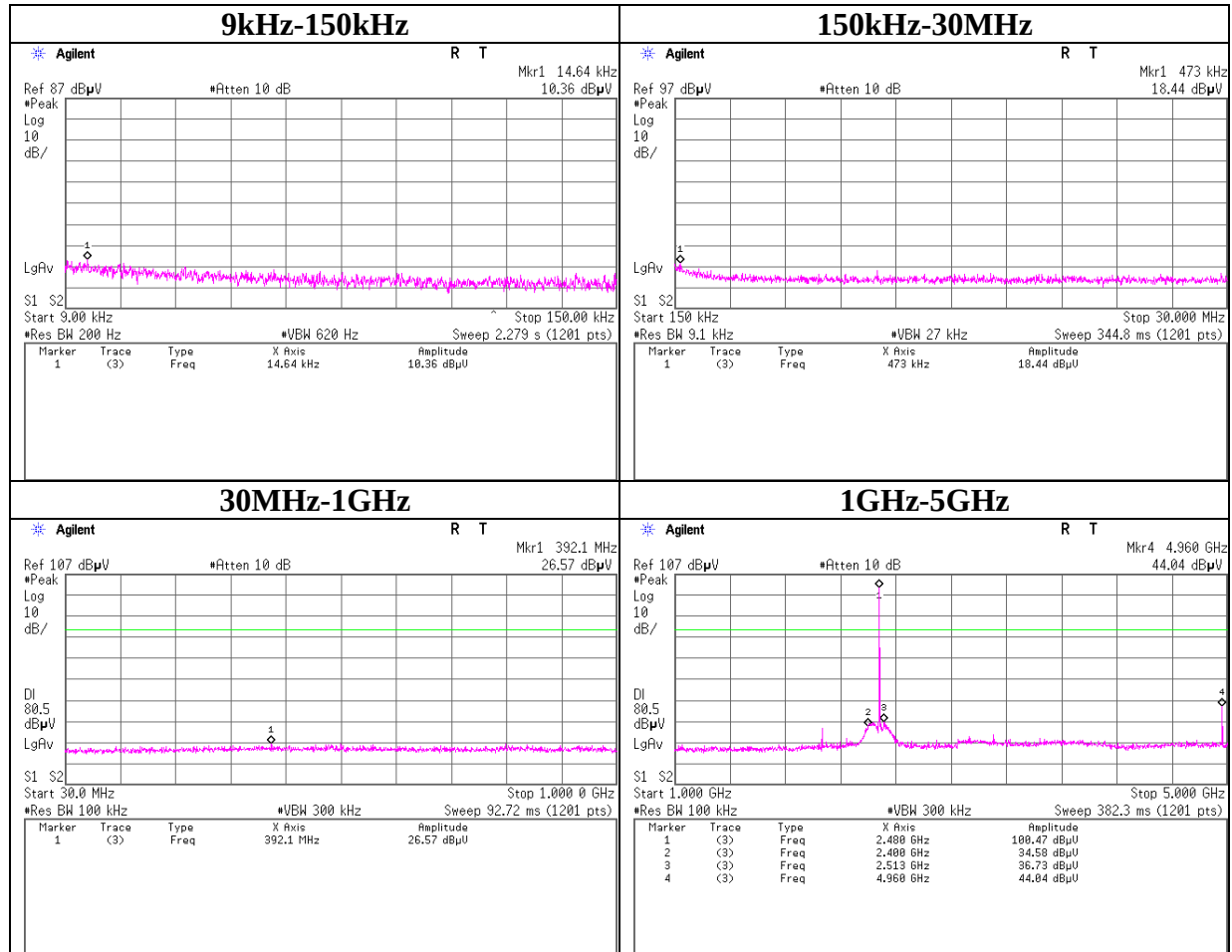
Conducted Spurious Emission

Tx 3DH5 2441MHz



Conducted Spurious Emission

Tx 3DH5 2480MHz



UL Japan, Inc.

Head Office EMC Lab.

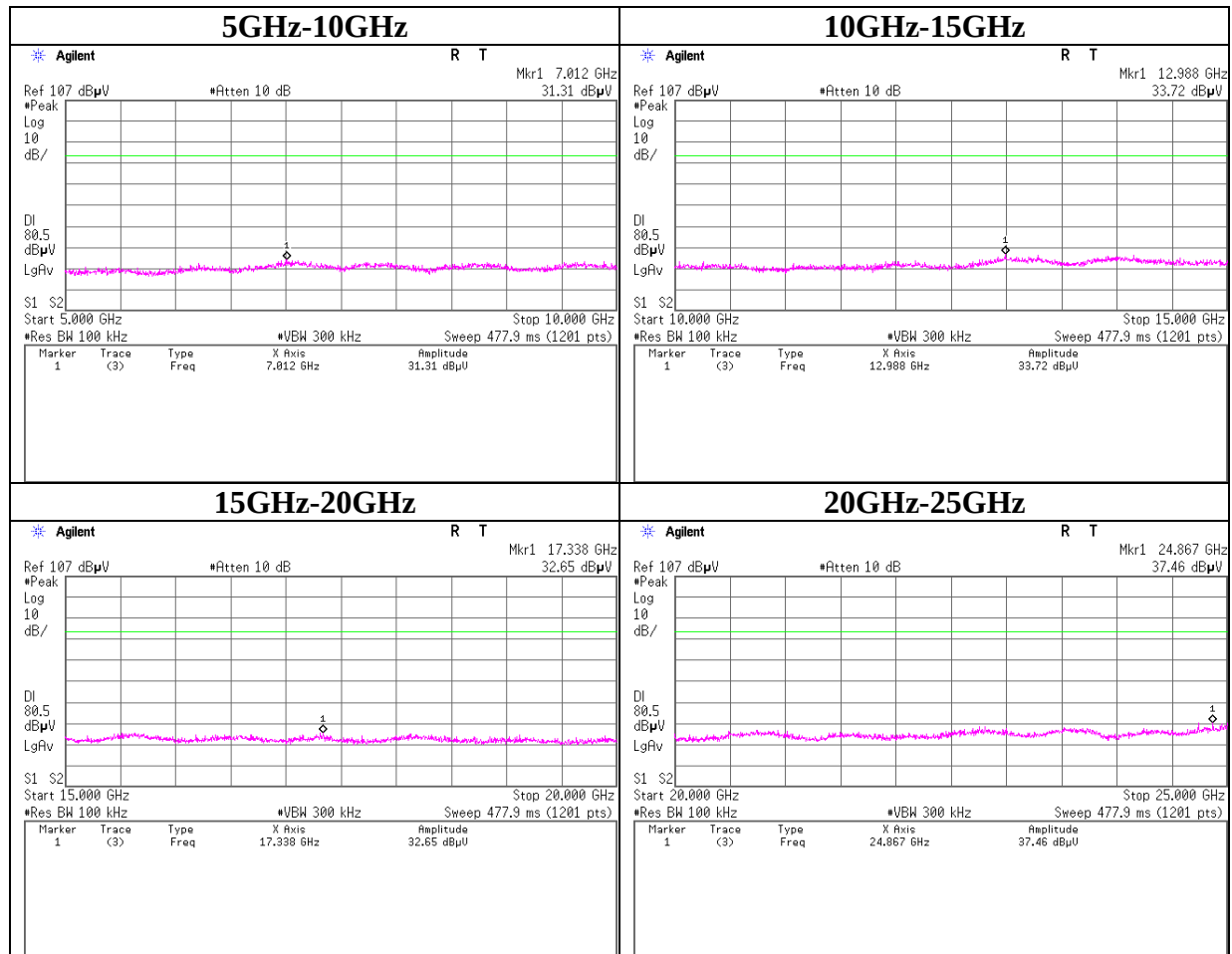
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Conducted Spurious Emission

Tx 3DH5 2480MHz



UL Japan, Inc.

Head Office EMC Lab.

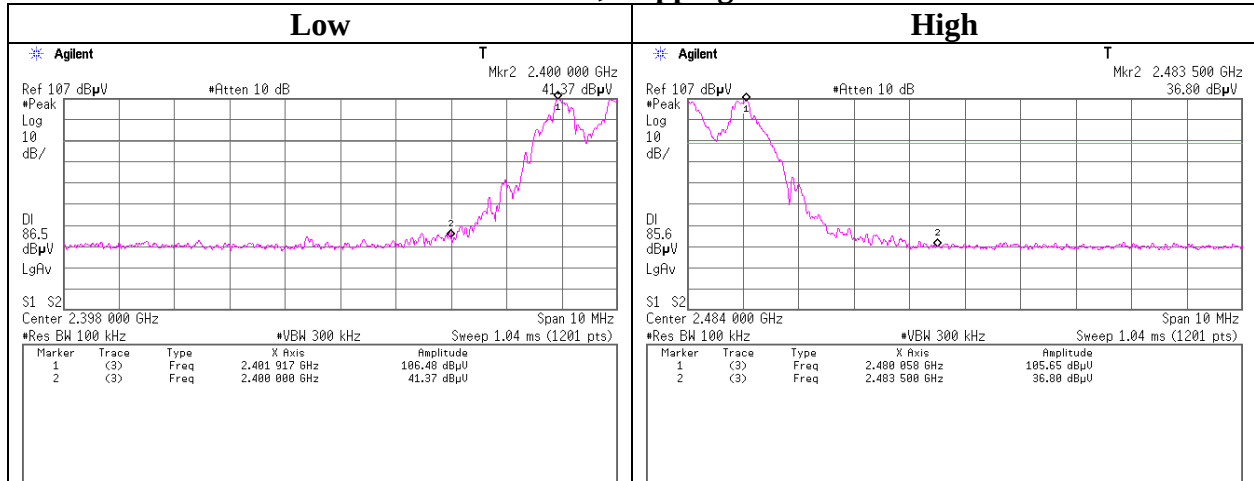
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

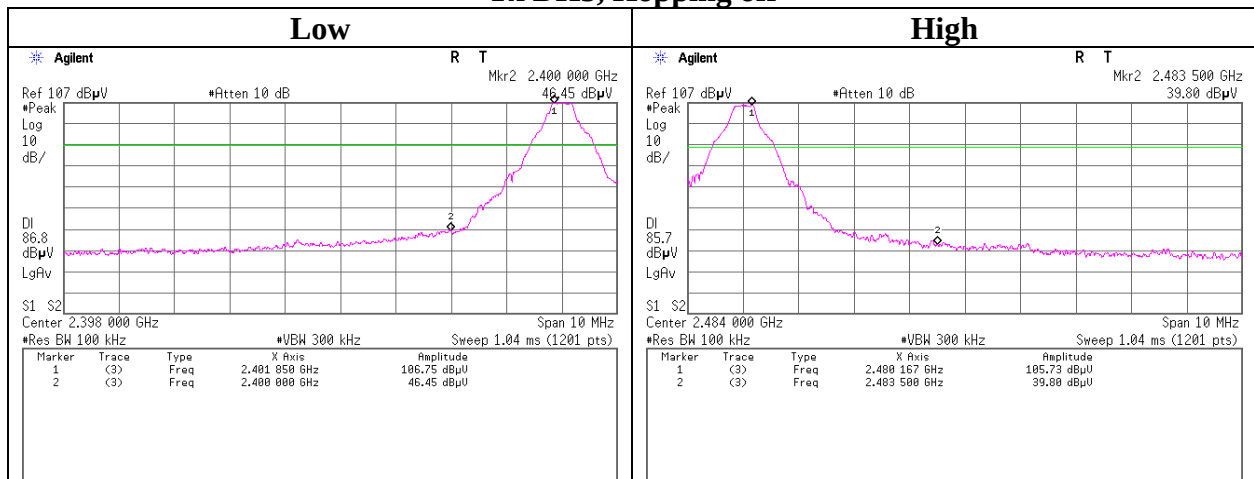
Facsimile : +81 596 24 8124

Conducted Emission Band Edge compliance

Tx DH5, Hopping on



Tx DH5, Hopping off



UL Japan, Inc.

Head Office EMC Lab.

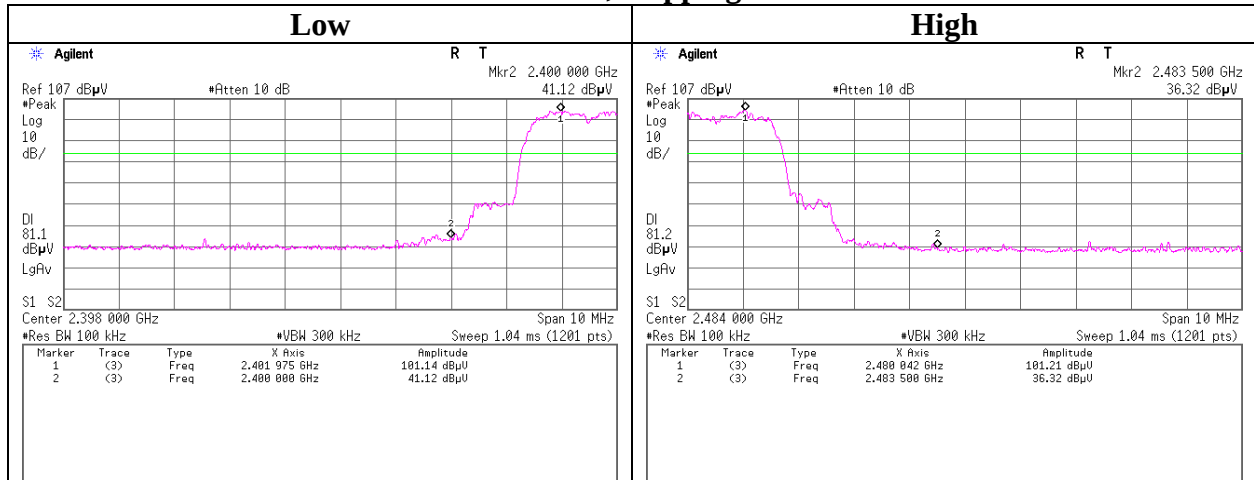
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

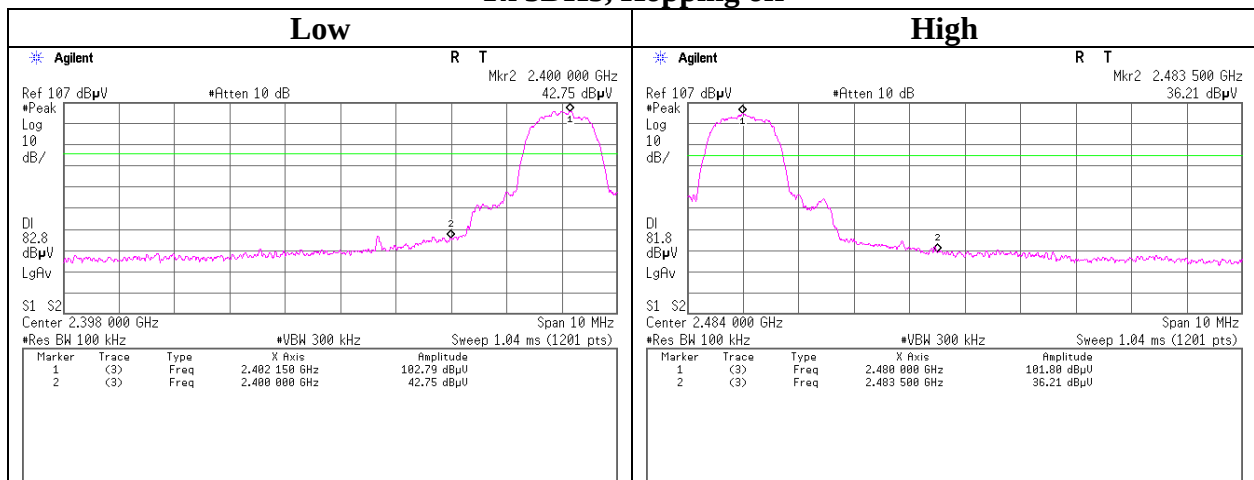
Facsimile : +81 596 24 8124

Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on



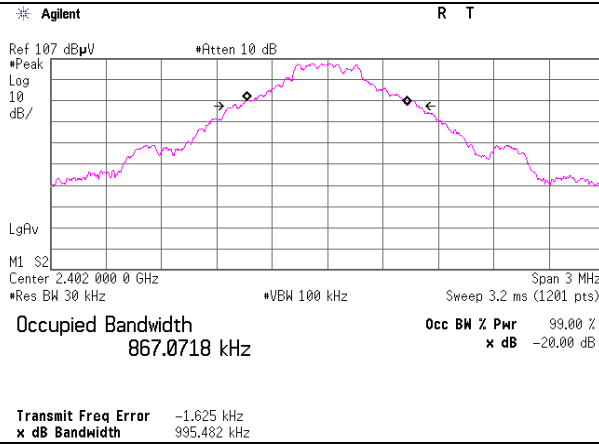
Tx 3DH5, Hopping off



99% Occupied Bandwidth

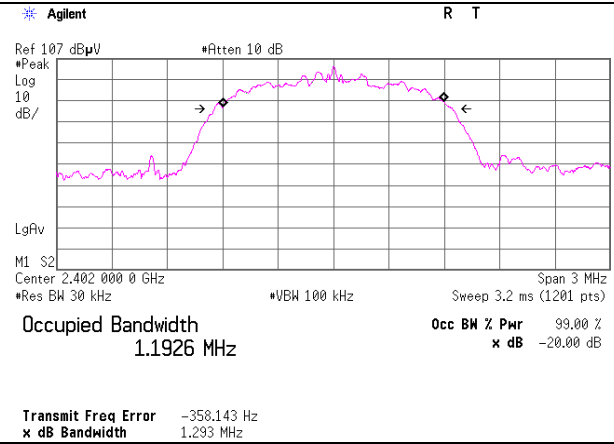
Tx DH5, Hopping off

2402MHz

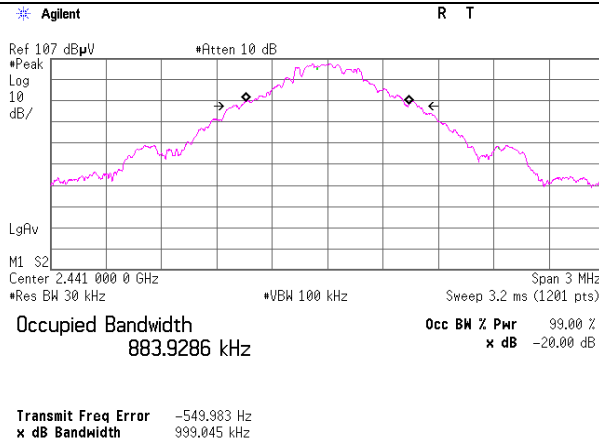


Tx 3DH5, Hopping off

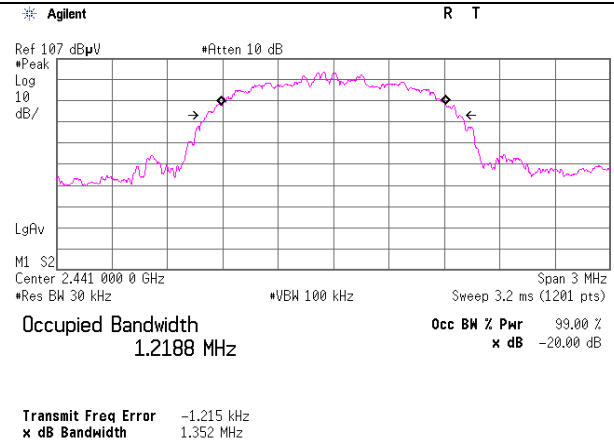
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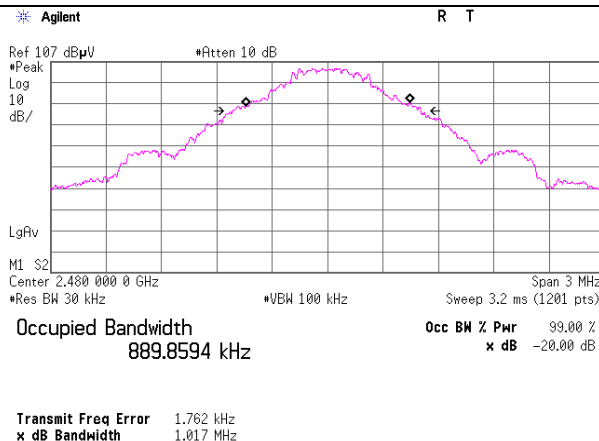
2441MHz



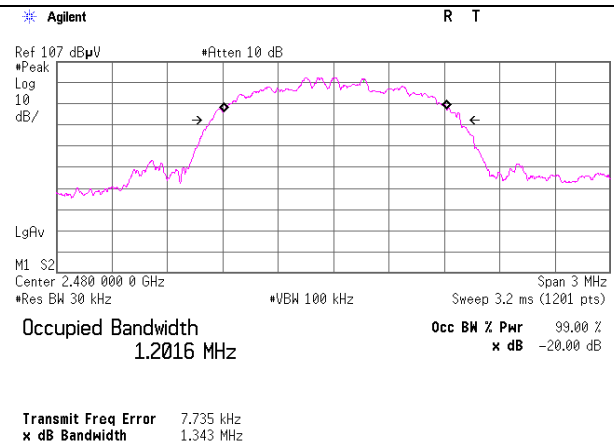
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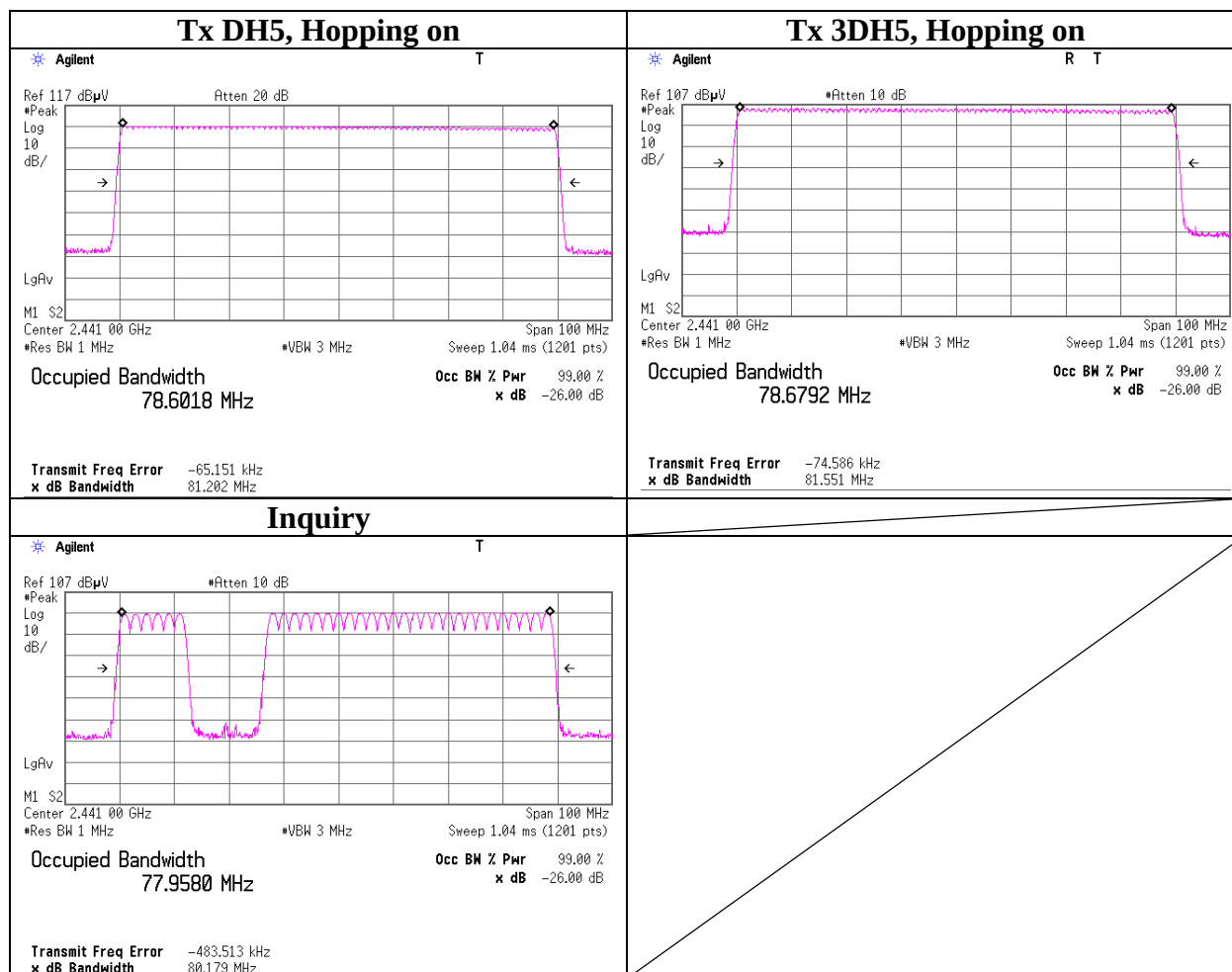
2480MHz



2480MHz



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	CE/RE/AT	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	CE/RE/AT	2013/02/26 * 12
MJM-14	Measure	KOMELON	KMC-36	-	CE/RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	CE/RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	CE/RE/AT	2013/04/03 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	CE/RE	2013/04/10 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE	2013/01/07 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	CE	2013/02/06 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/09 * 12
MJG-52	Extension Tap EU	UL Japan			CE	-
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2012/10/08 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2012/10/08 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2013/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2012/11/06 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2012/09/11 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2013/02/15 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2013/01/10 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2012/06/27 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	RE	2013/03/21 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2012/11/26 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2012/11/26 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2013/03/21 * 12

The expiration date of the calibration is the end of the expired month.

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

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission

RE: Radiated Emission

AT: Antenna Terminal Conducted test

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