



RADIO TEST REPORT

Test Report No. : 10020306H-H-R1

Applicant : **Panasonic Corporation of North America**
Type of Equipment : **Wireless Speaker System**
Model No. : **SC-NA30**
FCC ID : **ACJ-SC-NA30**
Test regulation : **FCC Part 15 Subpart C: 2013**
Test Result : **Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the 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.
6. This report is a revised version of 10020306H-H. 10020306H-H is replaced with this report.

Date of test: July 4 to 9, 2013

Representative test engineer:

Hiroshi Kukita
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>

UL Japan, Inc.

Head Office EMC Lab.

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13-EM-F0429

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SECTION 1: Customer information

Company Name	:	Panasonic Corporation *
Address	:	1-15 Matsuo cho, Kadoma city, Osaka 571-8504 Japan
Telephone Number	:	+81-50-3687-9371
Facsimile Number	:	+81-6-6906-8800
Contact Person	:	Tatsumi Tsukuda

*Panasonic Corporation is on behalf of the applicant: Panasonic Corporation of North America.

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Speaker System
Model No.	:	SC-NA30
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	AC100-240V
Receipt Date of Sample	:	June 26, 2013
Country of Mass-production	:	Malaysia
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 No: SC-NA10, (referred to as the EUT in this report), is the Wireless Speaker System.

General Specification

Clock frequency(ies) in the system	:	Main 4MHz DSP/DAMP 24.576MHz Bluetooth 26MHz
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Radio Specification

[Bluetooth]

Radio Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC3.3V
Antenna type	:	PCB Pattern Antenna
Antenna Gain	:	2.0dBi

[NFC]

Radio Type	:	Receiver
Receiving Frequency	:	13.56MHz
Power Supply (radio part input)	:	DC3.3V
Antenna type	:	PCB Pattern Antenna

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2013, final revised on September 30, 2013 and effective October 30, 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

* The revision on September 30, 2013 does not affect the test specification applied to the EUT.

* The EUT complies with FCC Part 15 Subpart B: 2013, final revised on June 11, 2013 and effective July 11, 2013.

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 18.9dB, 0.52040MHz, N AV 20.5dB, 16.35260MHz, 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	0.6dB 191.995MHz, 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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FCC 15.31 (e)

This EUT provides stable voltage (DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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 report meets the limits unless the uncertainty is taken into consideration.

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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	-	-	8.8 x 4.6 x 2.8m	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 mode was not able to function on test tool.

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, 20dB Bandwidth, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *We removed 2DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3DH mode (3 Mb/s EDR:8DPSK) as a representative. *EUT has the power settings by the software as follows; Power settings: BDR: 46 EDR: 48 Software: Blue test 3 *This setting of 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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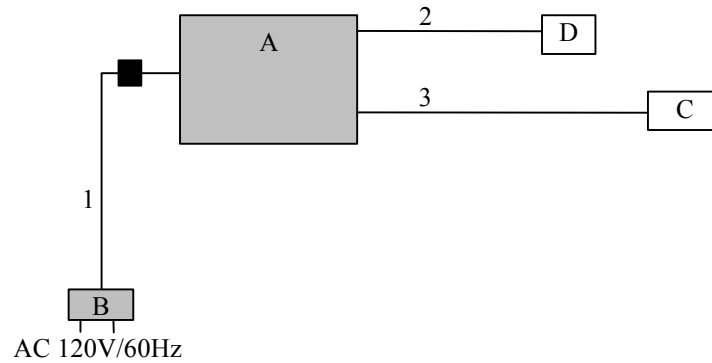
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4.2 Configuration and peripherals



■ : Standard Ferrite Core

*Cabling and setup 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	Remark
A	Wireless Speaker System	SC-NA30	001	Panasonic Corporation	EUT
B	AC Adaptor	RFEA228C-AG	1206-004804	Panasonic Corporation	EUT
C	iPhone	MD297ZA	F2NJV61RDTWD	Apple Inc.	-
D	iPod 3	MC525J	DCYG9426DCMN	Apple Inc.	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	USB Cable	1.0	Shielded	Shielded	-
3	Audio 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, 1.0m by 1.5m, 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 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, 1.0m by 1.5m, 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 test was made on EUT at the normal use position.

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

Measurement range	: 30M-25GHz
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	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	30kHz	100kHz	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

APPENDIX 1: Data of EMI test

Conducted Emission

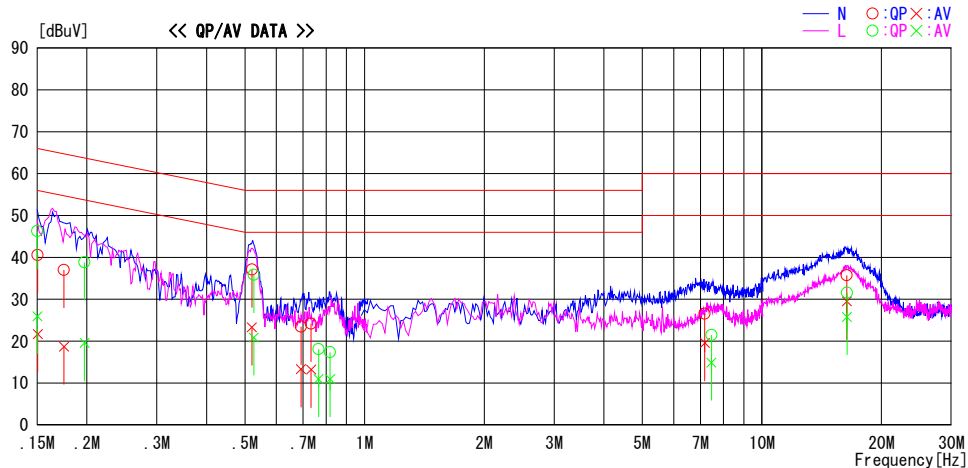
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
07/09/2013

Report No. : 10020306H
Temp./Humi. : 23deg. C / 62% RH
Engineer : Hiroshi Kukita

Mode / Remarks : Tx 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]		
0.15030	27.3	8.4	13.3	40.6	21.7	66.0	56.0	25.4	34.3	N	
0.17501	23.7	5.4	13.3	37.0	18.7	64.7	54.7	27.7	36.0	N	
0.52040	23.8	10.0	13.3	37.1	23.3	56.0	46.0	18.9	22.7	N	
0.69140	10.1	-0.1	13.4	23.5	13.3	56.0	46.0	32.5	32.7	N	
0.73360	10.8	-0.2	13.4	24.2	13.2	56.0	46.0	31.8	32.8	N	
7.18220	11.8	4.8	14.8	26.6	19.6	60.0	50.0	33.4	30.4	N	
16.35260	19.2	13.0	16.5	35.7	29.5	60.0	50.0	24.3	20.5	N	
0.15001	33.0	12.7	13.3	46.3	26.0	66.0	56.0	19.7	30.0	L	
0.19725	25.5	6.3	13.3	38.8	19.6	63.7	53.7	24.9	34.1	L	
0.52602	22.5	7.6	13.3	35.8	20.9	56.0	46.0	20.2	25.1	L	
0.76535	4.7	-2.4	13.4	18.1	11.0	56.0	46.0	37.9	35.0	L	
0.81903	4.0	-2.4	13.4	17.4	11.0	56.0	46.0	38.6	35.0	L	
7.46760	6.7	0.1	14.8	21.5	14.9	60.0	50.0	38.5	35.1	L	
16.36760	15.1	9.3	16.5	31.6	25.8	60.0	50.0	28.4	24.2	L	

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

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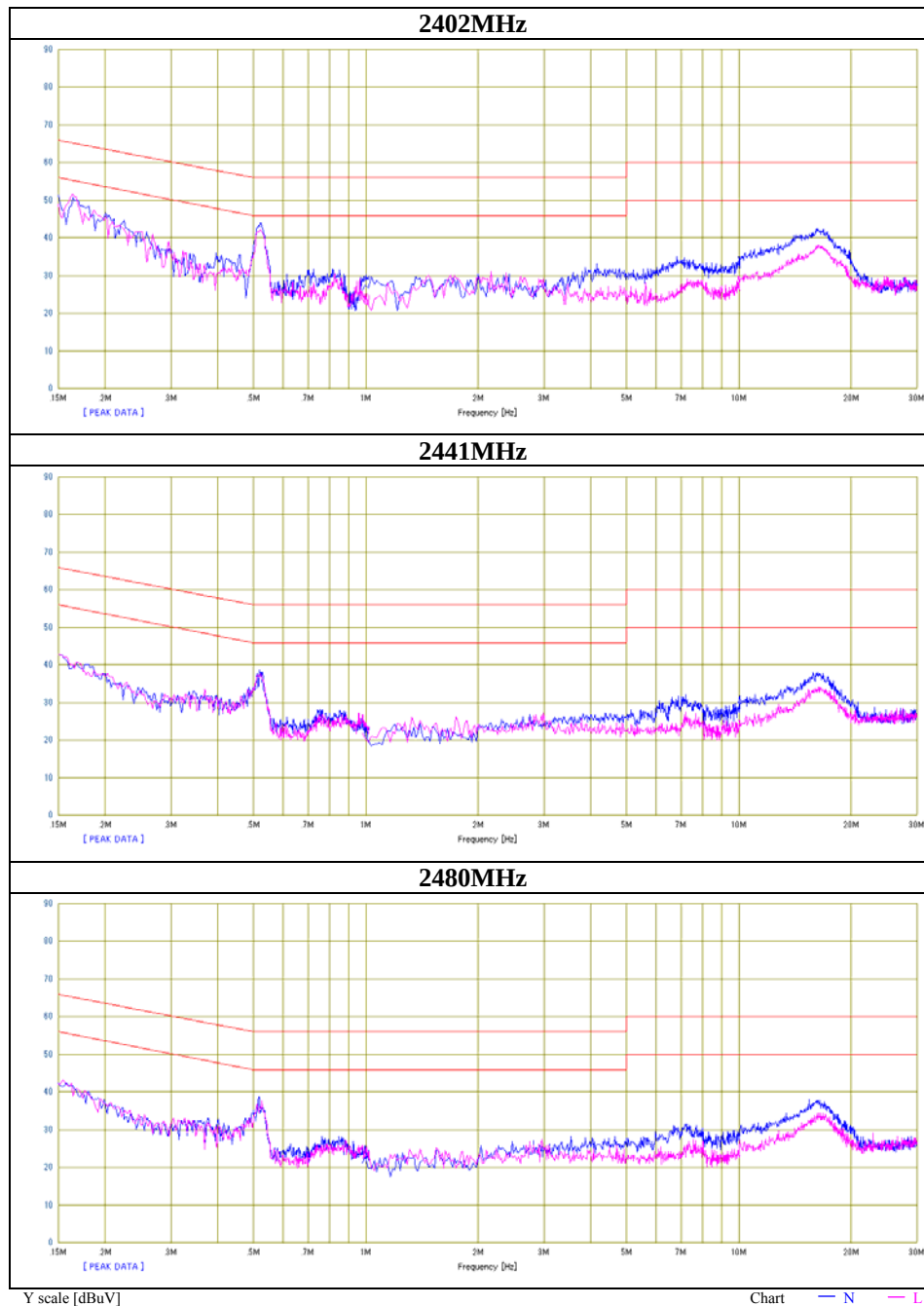
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Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10020306H
Date	07/09/2013
Temperature/ Humidity	23deg. C / 62% RH
Engineer	Hiroshi Kukita
Mode	Tx DH5



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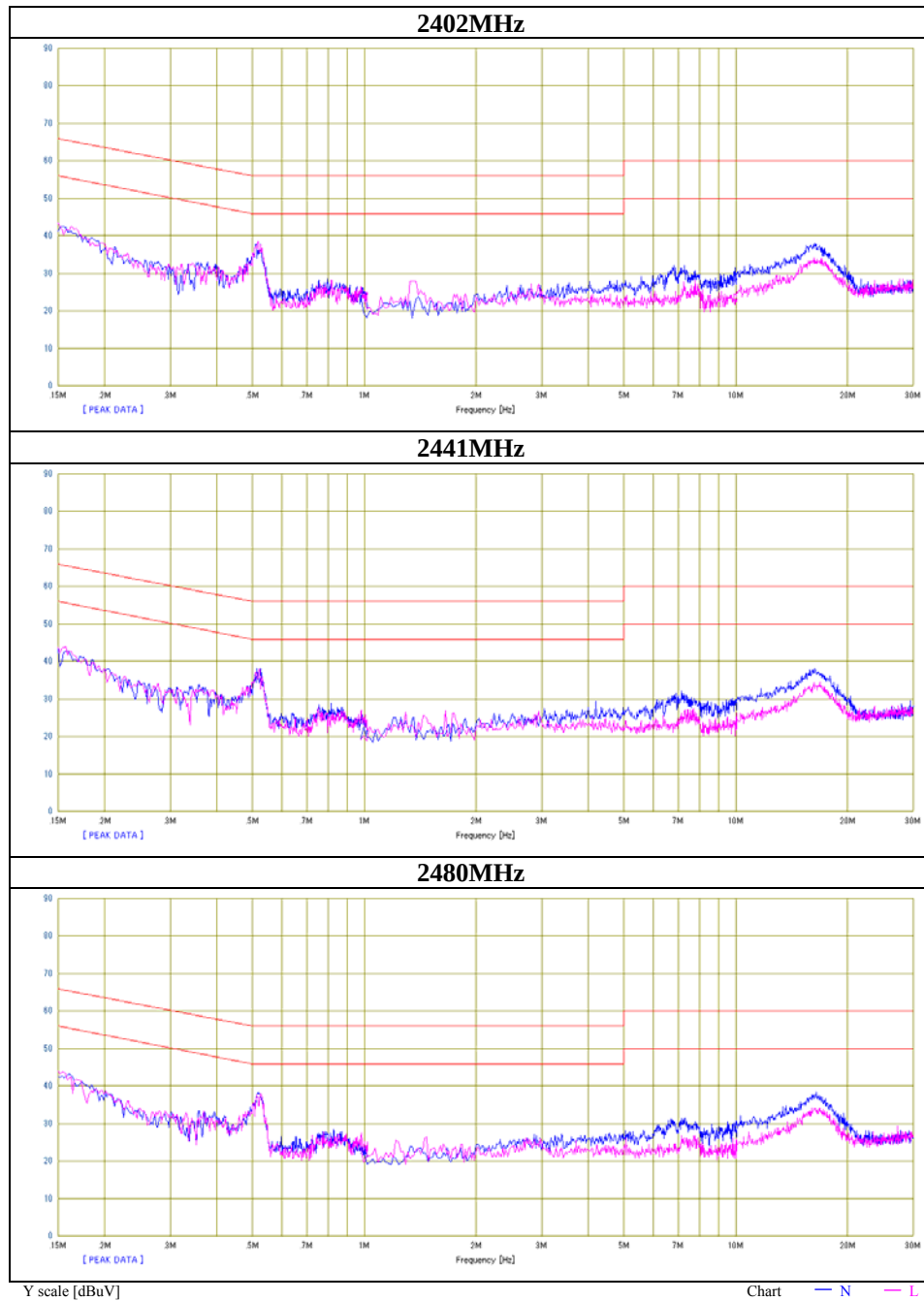
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Conducted Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10020306H
Date	07/09/2013
Temperature/ Humidity	23deg. C / 62% RH
Engineer	Hiroshi Kukita
Mode	Tx 3DH5



20dB Bandwidth and Carrier Frequency Separation

Test place Head Office EMC Lab. No.2 Measurement Room
Report No. 10020306H
Date 07/04/2013
Temperature/ Humidity 23 deg. C / 55% RH
Engineer Satofumi Matsuyama
Mode Tx (Hopping off/on) DH5/3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.928	1.000	≥ 0.618
DH5	2441.0	0.928	1.000	≥ 0.619
DH5	2480.0	0.925	1.000	≥ 0.617
3DH5	2402.0	1.268	1.000	≥ 0.845
3DH5	2441.0	1.262	1.000	≥ 0.841
3DH5	2480.0	1.256	1.000	≥ 0.837

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

No limit applies to 20dB Bandwidth.

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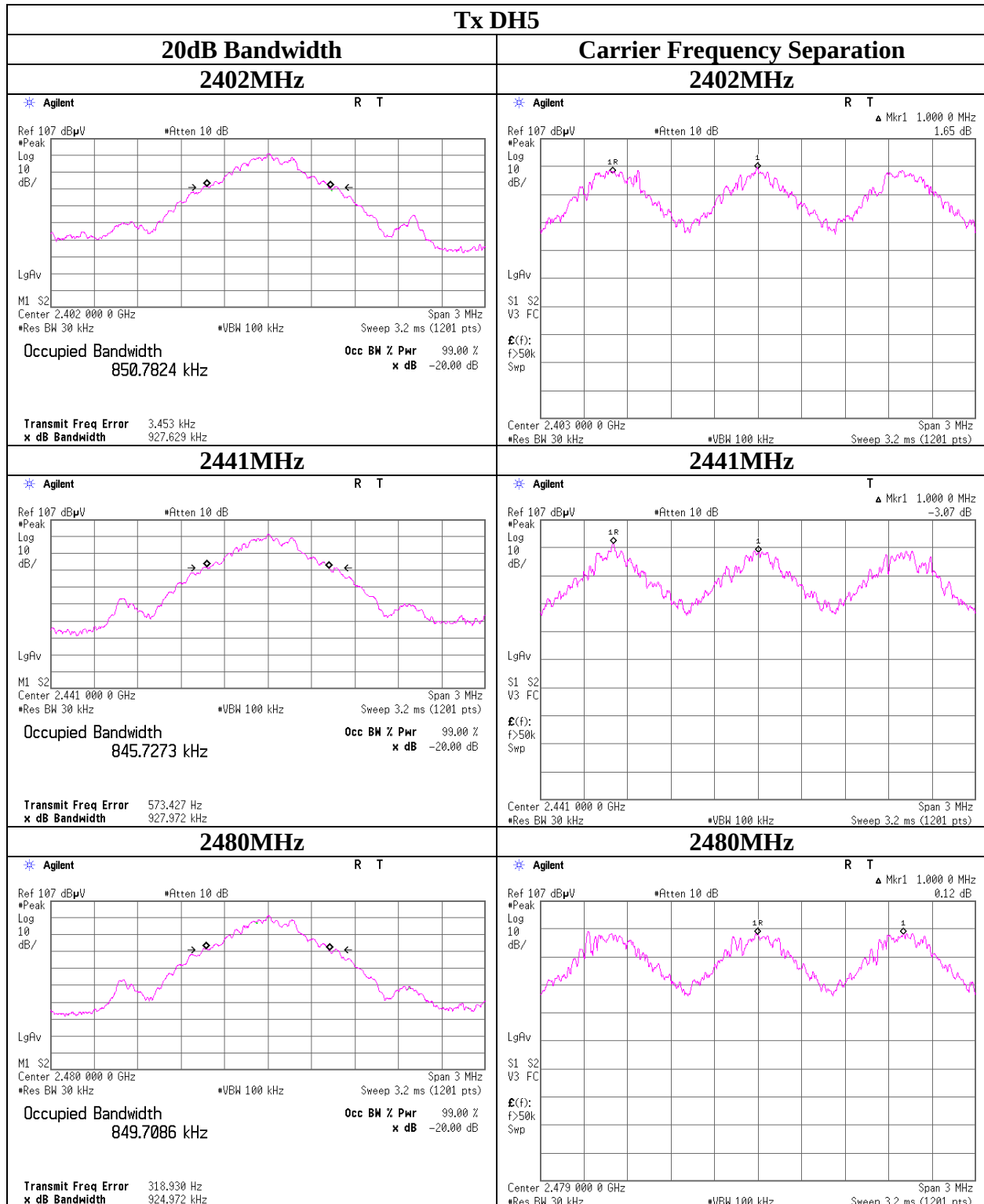
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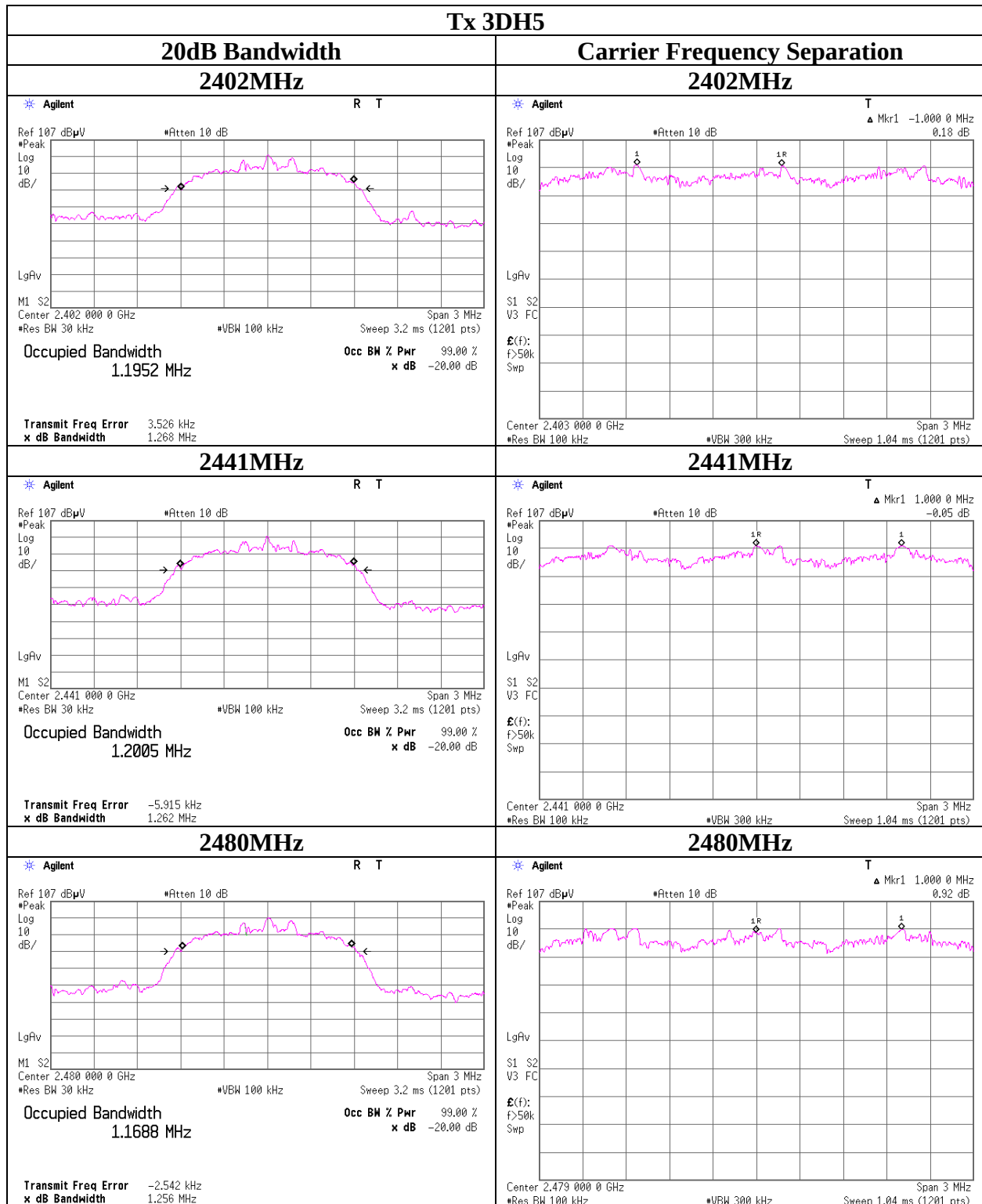
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20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation



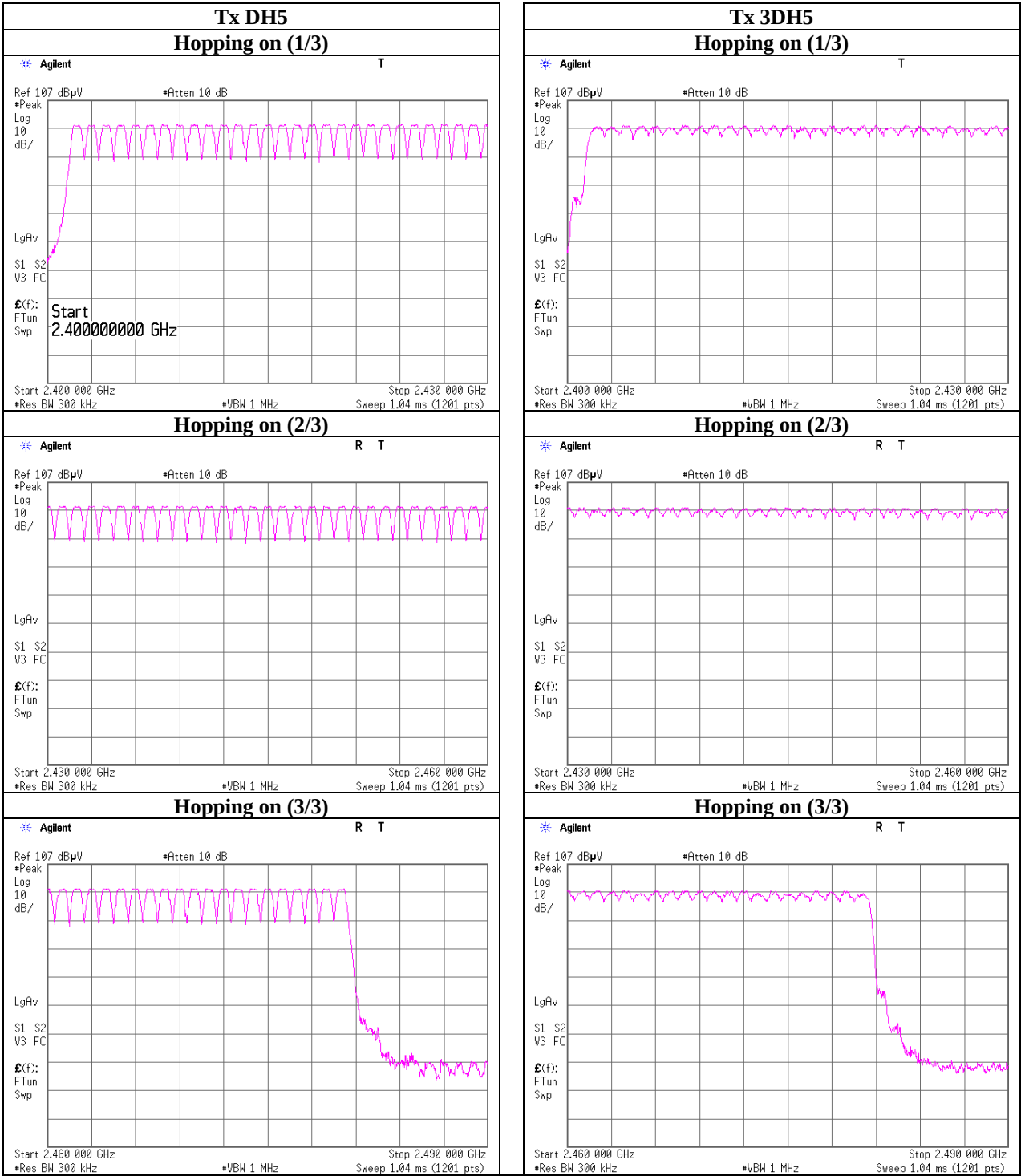
Number of Hopping Frequency

Test place Head Office EMC Lab. No.2 Measurement Room
Report No. 10020306H
Date 07/04/2013
Temperature/ Humidity 23 deg. C / 55% RH
Engineer Satofumi Matsuyama
Mode Tx (Hopping on) DH5/3DH5

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



Dwell time

Test place Head Office EMC Lab. No.2 Measurement Room
Report No. 10020306H
Date 07/04/2013
Temperature/ Humidity 23 deg. C / 55% RH
Engineer Satofumi Matsuyama
Mode Tx (Hopping on) DH5/3DH5

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period			Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0 times /	5 sec. x	31.6 sec. = 323 times	0.518	167	400
DH3	25.0 times /	5 sec. x	31.6 sec. = 158 times	1.776	281	400
DH5	17.0 times /	5 sec. x	31.6 sec. = 108 times	3.032	327	400
3DH1	51.0 times /	5 sec. x	31.6 sec. = 323 times	0.532	172	400
3DH3	26.0 times /	5 sec. x	31.6 sec. = 165 times	1.784	294	400
3DH5	17.0 times /	5 sec. x	31.6 sec. = 108 times	3.036	328	400

Sample Calculation

Result = Number of transmission x Length of transmission time

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

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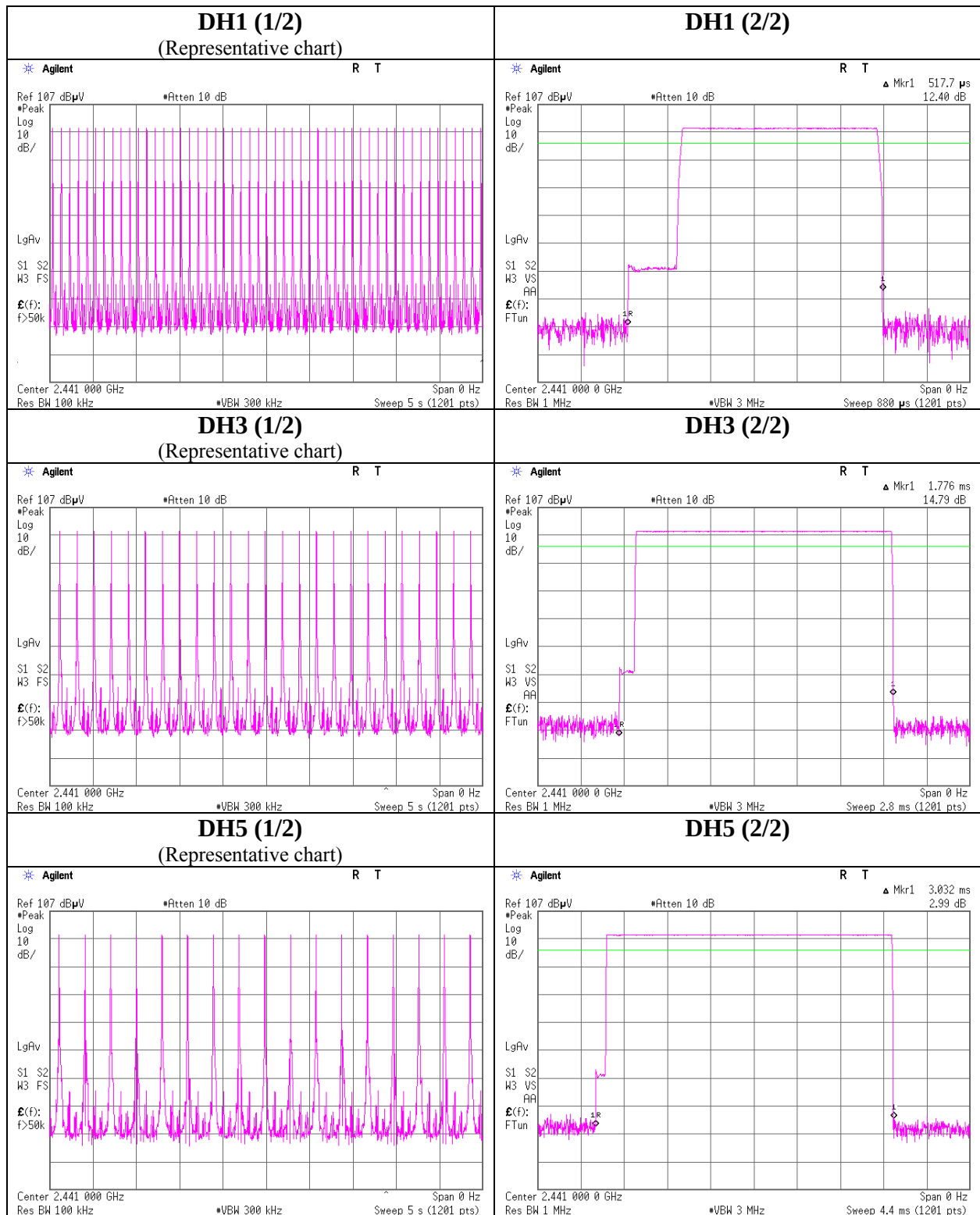
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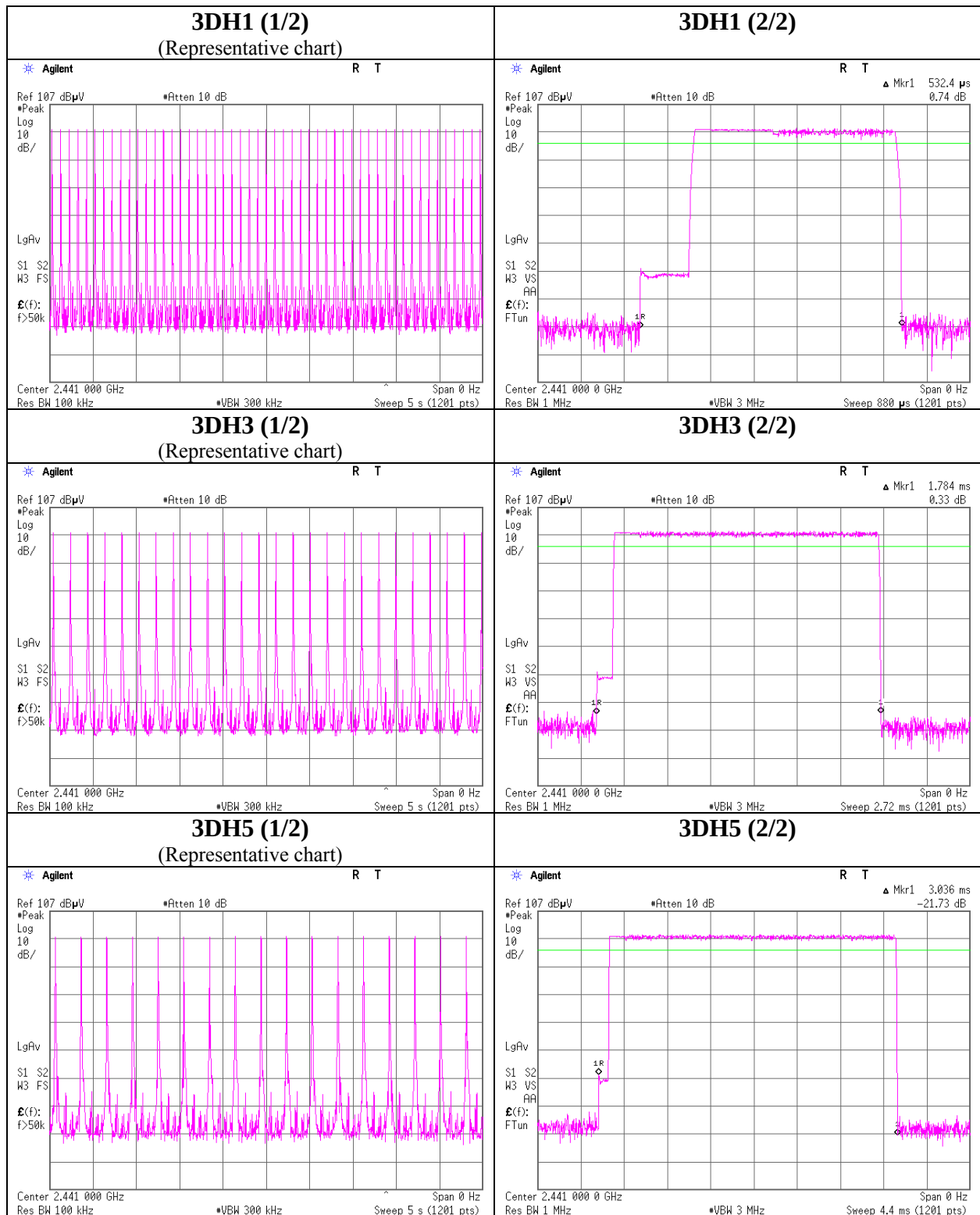
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Facsimile : +81 596 24 8124

Dwell time



Dwell time



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.2 Measurement Room
Report No.	10020306H
Date	07/04/2013
Temperature/ Humidity	23 deg. C / 55% RH
Engineer	Satofumi Matsuyama
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	-8.73	0.50	10.01	1.78	1.51	20.96	125	19.18
DH5	2441.0	-8.51	0.50	10.01	2.00	1.58	20.96	125	18.96
DH5	2480.0	-8.77	0.50	10.01	1.74	1.49	20.96	125	19.22
2DH5	2402.0	-9.82	0.50	10.01	0.69	1.17	20.96	125	20.27
2DH5	2441.0	-10.18	0.50	10.01	0.33	1.08	20.96	125	20.63
2DH5	2480.0	-10.98	0.50	10.01	-0.47	0.90	20.96	125	21.43
3DH5	2402.0	-9.75	0.50	10.01	0.76	1.19	20.96	125	20.20
3DH5	2441.0	-10.15	0.50	10.01	0.36	1.09	20.96	125	20.60
3DH5	2480.0	-10.81	0.50	10.01	-0.30	0.93	20.96	125	21.26

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied)+ 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. As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10020306H
Date : 07/04/2013 07/05/2013 07/08/2013
Temperature/ Humidity : 21 deg. C / 64% RH 20 deg. C / 74% RH 20 deg. C / 54% RH
Engineer : Keisuke Kawamura Keisuke Kawamura Hiroshi Kukita
(1-10GHz) (Above 10GHz) (30-1000MHz)
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	86.020	QP	43.8	7.5	7.3	28.4	30.2	40.0	9.8	
Hori	126.252	QP	36.5	13.4	7.7	28.2	29.4	43.5	14.1	
Hori	192.000	QP	38.7	16.4	8.1	27.9	35.3	43.5	8.2	
Hori	258.048	QP	37.6	17.6	8.5	27.5	36.2	46.0	9.8	
Hori	300.784	QP	40.4	14.0	8.8	27.6	35.6	46.0	10.4	
Hori	331.782	QP	41.9	15.2	9.0	27.9	38.2	46.0	7.8	
Hori	473.088	QP	34.4	17.8	9.6	28.7	33.1	46.0	12.9	
Hori	675.844	QP	33.0	20.0	10.5	28.5	35.0	46.0	11.0	
Hori	1602.013	PK	57.6	25.4	1.9	36.0	48.9	73.9	25.0	
Hori	2390.000	PK	49.2	26.8	2.4	35.7	42.7	73.9	31.2	
Hori	4804.000	PK	56.3	30.6	4.1	34.9	56.1	73.9	17.8	
Hori	7206.000	PK	43.7	35.5	5.0	34.9	49.3	73.9	24.6	
Hori	9608.000	PK	45.3	38.2	5.8	35.4	53.9	73.9	20.0	
Hori	1602.013	AV	56.1	25.4	1.9	36.0	47.4	53.9	6.5	
Hori	2390.000	AV	35.7	26.8	2.4	35.7	29.2	53.9	24.7	
Hori	4804.000	AV	51.6	30.6	4.1	34.9	51.4	53.9	2.5	
Hori	7206.000	AV	32.0	35.5	5.0	34.9	37.6	53.9	16.3	
Hori	9608.000	AV	34.1	38.2	5.8	35.4	42.7	53.9	11.2	
Vert	86.018	QP	45.9	7.5	7.3	28.4	32.3	40.0	7.7	
Vert	126.232	QP	40.4	13.4	7.7	28.2	33.3	43.5	10.2	
Vert	192.000	QP	43.6	16.4	8.1	27.9	40.2	43.5	3.3	
Vert	258.050	QP	34.5	17.6	8.5	27.5	33.1	46.0	12.9	
Vert	331.772	QP	34.3	15.2	9.0	27.9	30.6	46.0	15.4	
Vert	405.508	QP	32.7	17.4	9.3	28.4	31.0	46.0	15.0	
Vert	466.948	QP	31.8	17.8	9.6	28.7	30.5	46.0	15.5	
Vert	614.403	QP	31.8	19.4	10.3	28.8	32.7	46.0	13.3	
Vert	1602.013	PK	53.1	25.4	1.9	36.0	44.4	73.9	29.5	
Vert	2390.000	PK	48.3	26.8	2.4	35.7	41.8	73.9	32.1	
Vert	4804.000	PK	54.0	30.6	4.1	34.9	53.8	73.9	20.1	
Vert	7206.000	PK	43.2	35.5	5.0	34.9	48.8	73.9	25.2	
Vert	9608.000	PK	46.4	38.2	5.8	35.4	55.0	73.9	18.9	
Vert	1602.013	AV	49.8	25.4	1.9	36.0	41.1	53.9	12.8	
Vert	2390.000	AV	35.0	26.8	2.4	35.7	28.5	53.9	25.4	
Vert	4804.000	AV	48.9	30.6	4.1	34.9	48.7	53.9	5.3	
Vert	7206.000	AV	32.3	35.5	5.0	34.9	37.9	53.9	16.0	
Vert	9608.000	AV	34.8	38.2	5.8	35.4	43.4	53.9	10.5	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

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	105.7	26.8	2.4	35.7	99.2	-	-	Carrier
Hori	2400.000	PK	63.9	26.8	2.4	35.7	57.4	79.2	21.8	
Vert	2402.000	PK	104.6	26.8	2.4	35.7	98.1	-	-	Carrier
Vert	2400.000	PK	62.5	26.8	2.4	35.7	56.0	78.1	22.1	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10020306H		
Date	07/04/2013	07/05/2013	07/08/2013
Temperature/ Humidity	21 deg. C / 64% RH	20 deg. C / 74% RH	20 deg. C / 54% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (Above 10GHz)	Hiroshi Kukita (30-1000MHz)
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	86.020	QP	42.1	7.5	7.3	28.4	28.5	40.0	11.5	
Hori	191.997	QP	39.8	16.4	8.1	27.9	36.4	43.5	7.1	
Hori	258.053	QP	35.5	17.6	8.5	27.5	34.1	46.0	11.9	
Hori	301.036	QP	41.4	14.0	8.8	27.6	36.6	46.0	9.4	
Hori	331.780	QP	41.4	15.2	9.0	27.9	37.7	46.0	8.3	
Hori	473.088	QP	34.5	17.8	9.6	28.7	33.2	46.0	12.8	
Hori	675.844	QP	33.2	20.0	10.5	28.5	35.2	46.0	10.8	
Hori	1626.683	PK	56.6	25.5	2.0	36.0	48.1	73.9	25.8	
Hori	4882.000	PK	53.7	30.9	4.2	34.9	53.9	73.9	20.0	
Hori	7323.000	PK	43.4	35.7	5.0	34.9	49.2	73.9	24.7	
Hori	9764.000	PK	44.9	38.4	5.8	35.4	53.7	73.9	20.2	
Hori	1626.683	AV	54.3	25.5	2.0	36.0	45.8	53.9	8.1	
Hori	4882.000	AV	48.5	30.9	4.2	34.9	48.7	53.9	5.2	
Hori	7323.000	AV	31.6	35.7	5.0	34.9	37.4	53.9	16.5	
Hori	9764.000	AV	33.3	38.4	5.8	35.4	42.1	53.9	11.8	
Vert	86.021	QP	44.4	7.5	7.3	28.4	30.8	40.0	9.2	
Vert	191.996	QP	44.8	16.4	8.1	27.9	41.4	43.5	2.1	
Vert	258.053	QP	33.6	17.6	8.5	27.5	32.2	46.0	13.8	
Vert	331.772	QP	34.5	15.2	9.0	27.9	30.8	46.0	15.2	
Vert	405.508	QP	32.2	17.4	9.3	28.4	30.5	46.0	15.5	
Vert	466.944	QP	31.4	17.8	9.6	28.7	30.1	46.0	15.9	
Vert	614.405	QP	31.7	19.4	10.3	28.8	32.6	46.0	13.4	
Vert	1626.683	PK	55.4	25.5	2.0	36.0	46.9	73.9	27.0	
Vert	4882.000	PK	53.7	30.9	4.2	34.9	53.9	73.9	20.0	
Vert	7323.000	PK	42.6	35.7	5.0	34.9	48.4	73.9	25.6	
Vert	9764.000	PK	46.0	38.4	5.8	35.4	54.8	73.9	19.2	
Vert	1626.683	AV	53.0	25.5	2.0	36.0	44.5	53.9	9.5	
Vert	4882.000	AV	48.3	30.9	4.2	34.9	48.5	53.9	5.4	
Vert	7323.000	AV	32.1	35.7	5.0	34.9	37.9	53.9	16.0	
Vert	9764.000	AV	34.5	38.4	5.8	35.4	43.3	53.9	10.6	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10020306H		
Date	07/04/2013	07/05/2013	07/08/2013
Temperature/ Humidity	21 deg. C / 64% RH	20 deg. C / 74% RH	20 deg. C / 54% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (Above 10GHz)	Hiroshi Kukita (30-1000MHz)
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	86.018	QP	42.1	7.5	7.3	28.4	28.5	40.0	11.5	
Hori	192.006	QP	41.3	16.4	8.1	27.9	37.9	43.5	5.6	
Hori	258.048	QP	35.5	17.6	8.5	27.5	34.1	46.0	11.9	
Hori	301.376	QP	40.9	14.0	8.8	27.6	36.1	46.0	9.9	
Hori	331.786	QP	41.6	15.2	9.0	27.9	37.9	46.0	8.1	
Hori	473.089	QP	34.5	17.8	9.6	28.7	33.2	46.0	12.8	
Hori	675.844	QP	33.0	20.0	10.5	28.5	35.0	46.0	11.0	
Hori	1652.681	PK	55.1	25.7	2.0	36.0	46.8	73.9	27.1	
Hori	2483.500	PK	54.0	26.7	2.4	35.7	47.4	73.9	26.5	
Hori	4960.000	PK	51.2	31.1	4.2	34.9	51.6	73.9	22.3	
Hori	7440.000	PK	43.7	35.9	5.1	34.9	49.8	73.9	24.1	
Hori	9920.000	PK	44.9	38.7	5.9	35.4	54.1	73.9	19.9	
Hori	1652.681	AV	52.2	25.7	2.0	36.0	43.9	53.9	10.0	
Hori	2483.500	AV	40.1	26.7	2.4	35.7	33.5	53.9	20.4	
Hori	4960.000	AV	44.6	31.1	4.2	34.9	45.0	53.9	8.9	
Hori	7440.000	AV	32.0	35.9	5.1	34.9	38.1	53.9	15.8	
Hori	9920.000	AV	33.1	38.7	5.9	35.4	42.3	53.9	11.6	
Vert	86.016	QP	44.5	7.5	7.3	28.4	30.9	40.0	9.1	
Vert	191.998	QP	45.6	16.4	8.1	27.9	42.2	43.5	1.3	
Vert	258.056	QP	33.7	17.6	8.5	27.5	32.3	46.0	13.7	
Vert	331.783	QP	34.7	15.2	9.0	27.9	31.0	46.0	15.0	
Vert	405.505	QP	32.4	17.4	9.3	28.4	30.7	46.0	15.3	
Vert	466.948	QP	31.6	17.8	9.6	28.7	30.3	46.0	15.7	
Vert	614.408	QP	31.5	19.4	10.3	28.8	32.4	46.0	13.6	
Vert	1652.681	PK	56.6	25.7	2.0	36.0	48.3	73.9	25.6	
Vert	2483.500	PK	53.9	26.7	2.4	35.7	47.3	73.9	26.6	
Vert	4960.000	PK	50.8	31.1	4.2	34.9	51.2	73.9	22.7	
Vert	7440.000	PK	43.2	35.9	5.1	34.9	49.3	73.9	24.6	
Vert	9920.000	PK	45.1	38.7	5.9	35.4	54.3	73.9	19.6	
Vert	1652.681	AV	54.8	25.7	2.0	36.0	46.5	53.9	7.4	
Vert	2483.500	AV	39.9	26.7	2.4	35.7	33.3	53.9	20.6	
Vert	4960.000	AV	44.5	31.1	4.2	34.9	44.9	53.9	9.0	
Vert	7440.000	AV	32.3	35.9	4.4	34.9	37.7	53.9	16.2	
Vert	9920.000	AV	34.1	38.7	5.9	35.4	43.3	53.9	10.6	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10020306H		
Date	07/04/2013	07/05/2013	07/08/2013
Temperature/ Humidity	21 deg. C / 64% RH	20 deg. C / 74% RH	20 deg. C / 54% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (Above 10GHz)	Hiroshi Kukita (30-1000MHz)
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	86.018	QP	41.6	7.5	7.3	28.4	28.0	40.0	12.0	
Hori	192.002	QP	41.0	16.4	8.1	27.9	37.6	43.5	5.9	
Hori	258.048	QP	34.6	17.6	8.5	27.5	33.2	46.0	12.8	
Hori	301.098	QP	41.5	14.0	8.8	27.6	36.7	46.0	9.3	
Hori	331.782	QP	43.7	15.2	9.0	27.9	40.0	46.0	6.0	
Hori	473.078	QP	32.7	17.8	9.6	28.7	31.4	46.0	14.6	
Hori	675.844	QP	31.2	20.0	10.5	28.5	33.2	46.0	12.8	
Hori	1602.009	PK	58.9	25.4	1.9	36.0	50.2	73.9	23.7	
Hori	2390.000	PK	49.3	26.8	2.4	35.7	42.8	73.9	31.1	
Hori	4804.000	PK	51.2	30.6	4.1	34.9	51.0	73.9	22.9	
Hori	7206.000	PK	42.5	35.5	5.0	34.9	48.1	73.9	25.8	
Hori	9608.000	PK	45.0	38.2	5.8	35.4	53.6	73.9	20.3	
Hori	1602.009	AV	57.5	25.4	1.9	36.0	48.8	53.9	5.1	
Hori	2390.000	AV	36.3	26.8	2.4	35.7	29.8	53.9	24.1	
Hori	4804.000	AV	42.8	30.6	4.1	34.9	42.6	53.9	11.3	
Hori	7206.000	AV	31.4	35.5	5.0	34.9	37.0	53.9	16.9	
Hori	9608.000	AV	33.1	38.2	5.8	35.4	41.7	53.9	12.2	
Vert	86.018	QP	45.0	7.5	7.3	28.4	31.4	40.0	8.6	
Vert	192.003	QP	46.0	16.4	8.1	27.9	42.6	43.5	0.9	
Vert	258.052	QP	34.3	17.6	8.5	27.5	32.9	46.0	13.1	
Vert	331.781	QP	37.9	15.2	9.0	27.9	34.2	46.0	11.8	
Vert	405.513	QP	32.6	17.4	9.3	28.4	30.9	46.0	15.1	
Vert	466.948	QP	32.2	17.8	9.6	28.7	30.9	46.0	15.1	
Vert	614.401	QP	32.4	19.4	10.3	28.8	33.3	46.0	12.7	
Vert	1602.009	PK	55.0	25.4	1.9	36.0	46.3	73.9	27.6	
Vert	2390.000	PK	48.8	26.8	2.4	35.7	42.3	73.9	31.6	
Vert	4804.000	PK	48.9	30.6	4.1	34.9	48.7	73.9	25.2	
Vert	7206.000	PK	42.2	35.5	5.0	34.9	47.8	73.9	26.1	
Vert	9608.000	PK	44.4	38.2	5.8	35.4	53.0	73.9	20.9	
Vert	1602.009	AV	52.6	25.4	1.9	36.0	43.9	53.9	10.0	
Vert	2390.000	AV	34.8	26.8	2.4	35.7	28.3	53.9	25.6	
Vert	4804.000	AV	39.9	30.6	4.1	34.9	39.7	53.9	14.2	
Vert	7206.000	AV	31.4	35.5	5.0	34.9	37.0	53.9	16.9	
Vert	9608.000	AV	33.3	38.2	5.8	35.4	41.9	53.9	12.0	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

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	107.1	26.8	2.4	35.7	100.6	-	-	Carrier
Hori	2400.000	PK	64.6	26.8	2.4	35.7	58.1	80.6	22.5	
Vert	2402.000	PK	103.5	26.8	2.4	35.7	97.0	-	-	Carrier
Vert	2400.000	PK	60.3	26.8	2.4	35.7	53.8	77.0	23.2	

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10020306H		
Date	07/04/2013	07/05/2013	07/08/2013
Temperature/ Humidity	21 deg. C / 64% RH	20 deg. C / 74% RH	20 deg. C / 54% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (Above 10GHz)	Hiroshi Kukita (30-1000MHz)
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	86.016	QP	41.5	7.5	7.3	28.4	27.9	40.0	12.1	
Hori	191.992	QP	41.1	16.4	8.1	27.9	37.7	43.5	5.8	
Hori	258.052	QP	34.5	17.6	8.5	27.5	33.1	46.0	12.9	
Hori	301.024	QP	41.3	14.0	8.8	27.6	36.5	46.0	9.5	
Hori	331.778	QP	43.8	15.2	9.0	27.9	40.1	46.0	5.9	
Hori	473.082	QP	32.9	17.8	9.6	28.7	31.6	46.0	14.4	
Hori	675.836	QP	31.7	20.0	10.5	28.5	33.7	46.0	12.3	
Hori	1626.684	PK	58.5	25.5	2.0	36.0	50.0	73.9	23.9	
Hori	4882.000	PK	48.5	30.9	4.2	34.9	48.7	73.9	25.3	
Hori	7323.000	PK	42.5	35.7	5.0	34.9	48.3	73.9	25.6	
Hori	9764.000	PK	45.0	38.4	5.8	35.4	53.8	73.9	20.1	
Hori	1626.684	AV	57.1	25.5	2.0	36.0	48.6	53.9	5.3	
Hori	4882.000	AV	39.0	30.9	4.2	34.9	39.2	53.9	14.7	
Hori	7323.000	AV	31.4	35.7	5.0	34.9	37.2	53.9	16.7	
Hori	9764.000	AV	33.1	38.4	5.8	35.4	41.9	53.9	12.0	
Vert	86.018	QP	45.1	7.5	7.3	28.4	31.5	40.0	8.5	
Vert	191.995	QP	46.3	16.4	8.1	27.9	42.9	43.5	0.6	
Vert	258.047	QP	34.4	17.6	8.5	27.5	33.0	46.0	13.0	
Vert	331.784	QP	37.9	15.2	9.0	27.9	34.2	46.0	11.8	
Vert	405.508	QP	32.9	17.4	9.3	28.4	31.2	46.0	14.8	
Vert	466.944	QP	32.6	17.8	9.6	28.7	31.3	46.0	14.7	
Vert	614.404	QP	32.4	19.4	10.3	28.8	33.3	46.0	12.7	
Vert	1626.684	PK	55.8	25.5	2.0	36.0	47.3	73.9	26.6	
Vert	4882.000	PK	46.6	30.9	4.2	34.9	46.8	73.9	27.1	
Vert	7323.000	PK	42.2	35.7	5.0	34.9	48.0	73.9	25.9	
Vert	9764.000	PK	44.4	38.4	5.8	35.4	53.2	73.9	20.7	
Vert	1626.684	AV	53.0	25.5	2.0	36.0	44.5	53.9	9.4	
Vert	4882.000	AV	35.7	30.9	4.2	34.9	35.9	53.9	18.0	
Vert	7323.000	AV	31.4	35.7	5.0	34.9	37.2	53.9	16.7	
Vert	9764.000	AV	33.3	38.4	5.8	35.4	42.1	53.9	11.8	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10020306H		
Date	07/04/2013	07/05/2013	07/08/2013
Temperature/ Humidity	21 deg. C / 64% RH	20 deg. C / 74% RH	20 deg. C / 54% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (Above 10GHz)	Hiroshi Kukita (30-1000MHz)
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	86.018	QP	42.0	7.5	7.3	28.4	28.4	40.0	11.6	
Hori	192.002	QP	41.5	16.4	8.1	27.9	38.1	43.5	5.4	
Hori	258.046	QP	35.6	17.6	8.5	27.5	34.2	46.0	11.8	
Hori	301.376	QP	40.8	14.0	8.8	27.6	36.0	46.0	10.0	
Hori	331.776	QP	41.8	15.2	9.0	27.9	38.1	46.0	7.9	
Hori	473.092	QP	34.6	17.8	9.6	28.7	33.3	46.0	12.7	
Hori	675.848	QP	33.2	20.0	10.5	28.5	35.2	46.0	10.8	
Hori	1652.681	PK	54.6	25.7	2.0	36.0	46.3	73.9	27.6	
Hori	2483.500	PK	53.2	26.7	2.4	35.7	46.6	73.9	27.4	
Hori	4960.000	PK	45.1	31.1	3.5	34.9	44.8	73.9	29.1	
Hori	7440.000	PK	42.5	35.9	5.1	34.9	48.6	73.9	25.3	
Hori	9920.000	PK	45.0	38.7	5.9	35.4	54.2	73.9	19.7	
Hori	1652.681	AV	51.5	25.7	2.0	36.0	43.2	53.9	10.7	
Hori	2483.500	AV	39.9	26.7	2.4	35.7	33.3	53.9	20.6	
Hori	4960.000	AV	34.3	31.1	4.2	34.9	34.7	53.9	19.2	
Hori	7440.000	AV	31.4	35.9	5.1	34.9	37.5	53.9	16.4	
Hori	9920.000	AV	33.1	38.7	5.9	35.4	42.3	53.9	11.6	
Vert	86.012	QP	44.3	7.5	7.3	28.4	30.7	40.0	9.3	
Vert	192.028	QP	45.5	16.4	8.1	27.9	42.1	43.5	1.4	
Vert	258.054	QP	33.6	17.6	8.5	27.5	32.2	46.0	13.8	
Vert	331.774	QP	34.8	15.2	9.0	27.9	31.1	46.0	14.9	
Vert	405.503	QP	32.5	17.4	9.3	28.4	30.8	46.0	15.2	
Vert	466.952	QP	31.5	17.8	9.6	28.7	30.2	46.0	15.8	
Vert	614.404	QP	31.6	19.4	10.3	28.8	32.5	46.0	13.5	
Vert	1652.681	PK	57.2	25.7	2.0	36.0	48.9	73.9	25.0	
Vert	2483.500	PK	53.1	26.7	2.4	35.7	46.5	73.9	27.4	
Vert	4960.000	PK	44.7	31.1	4.2	34.9	45.1	73.9	28.8	
Vert	7440.000	PK	42.2	35.9	5.1	34.9	48.3	73.9	25.6	
Vert	9920.000	PK	44.4	38.7	5.9	35.4	53.6	73.9	20.3	
Vert	1652.681	AV	55.0	25.7	2.0	36.0	46.7	53.9	7.2	
Vert	2483.500	AV	39.5	26.7	2.4	35.7	32.9	53.9	21.0	
Vert	4960.000	AV	33.8	31.1	4.2	34.9	34.2	53.9	19.7	
Vert	7440.000	AV	31.4	35.9	5.1	34.9	37.5	53.9	16.4	
Vert	9920.000	AV	33.3	38.7	5.9	35.4	42.5	53.9	11.4	

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).

*The 10th harmonic was not seen so the result was its base noise level.

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

UL Japan, Inc.

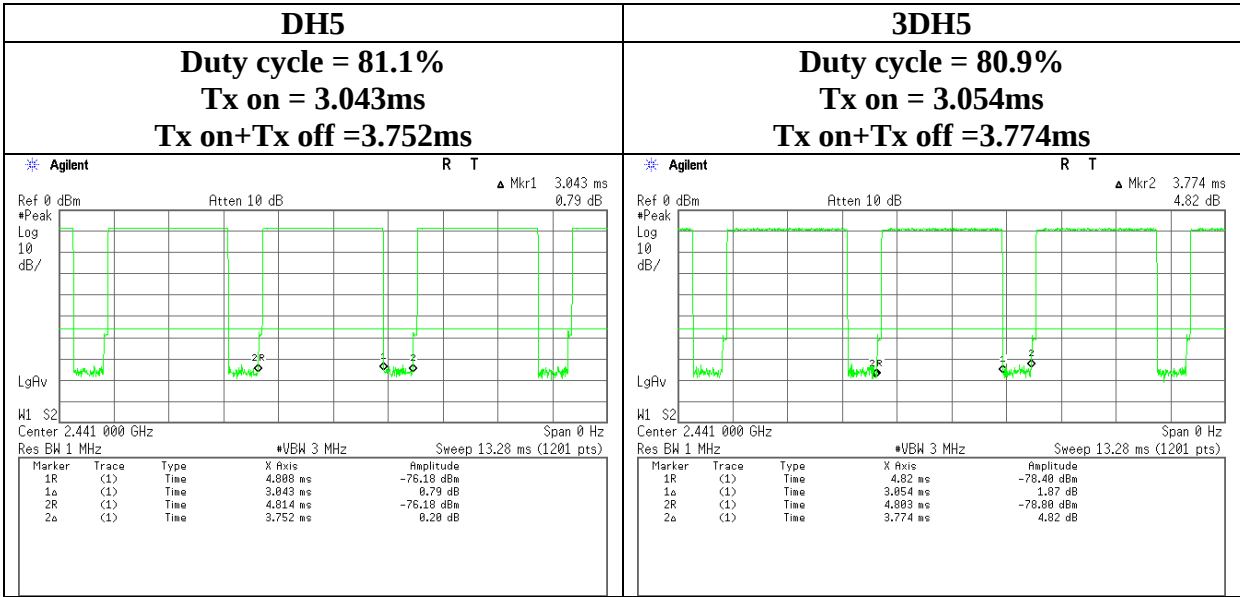
Head Office EMC Lab.

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

Telephone : +81 596 24 8999

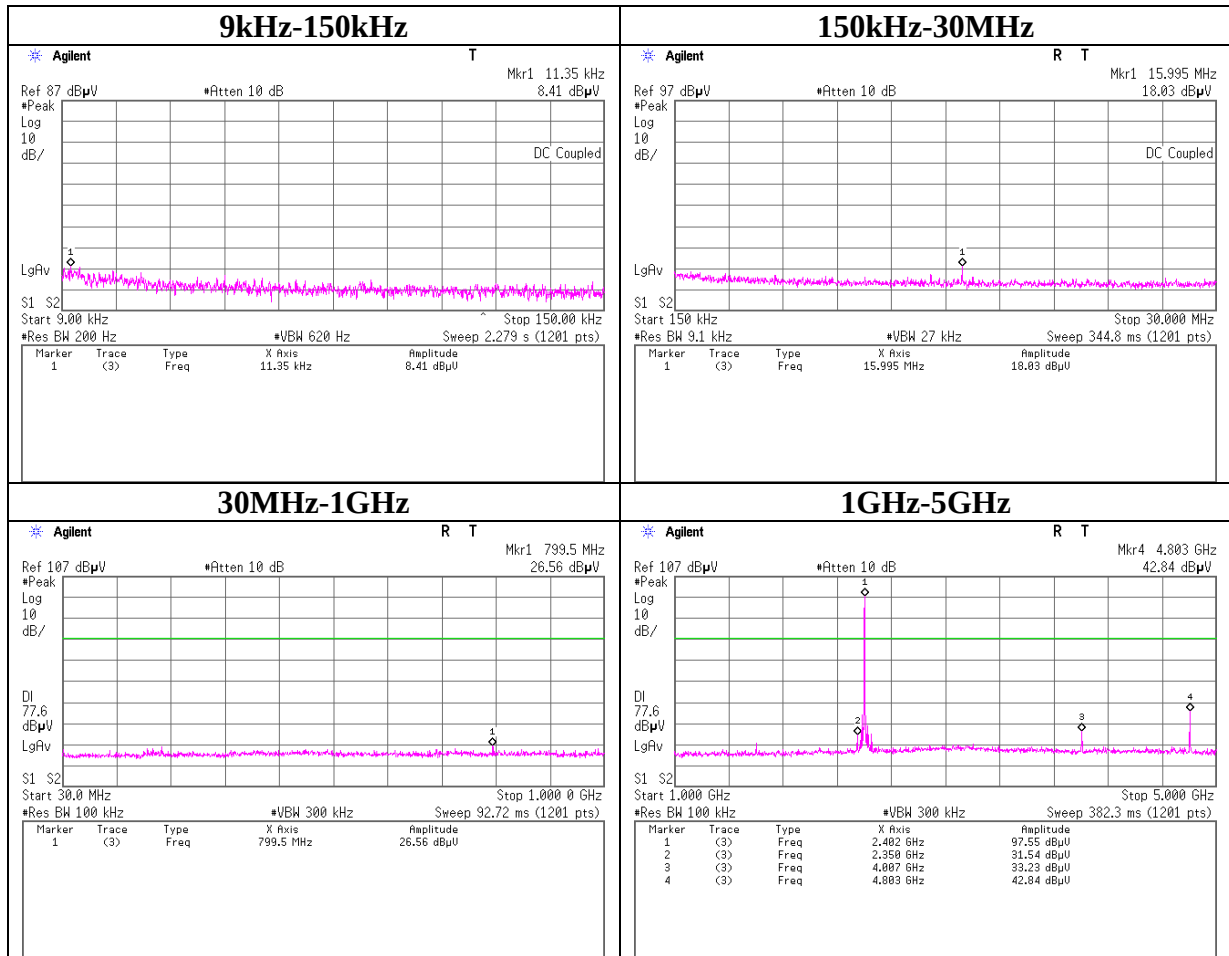
Facsimile : +81 596 24 8124

Duty Cycle confirmation



Conducted Spurious Emission

Tx DH5 2402MHz



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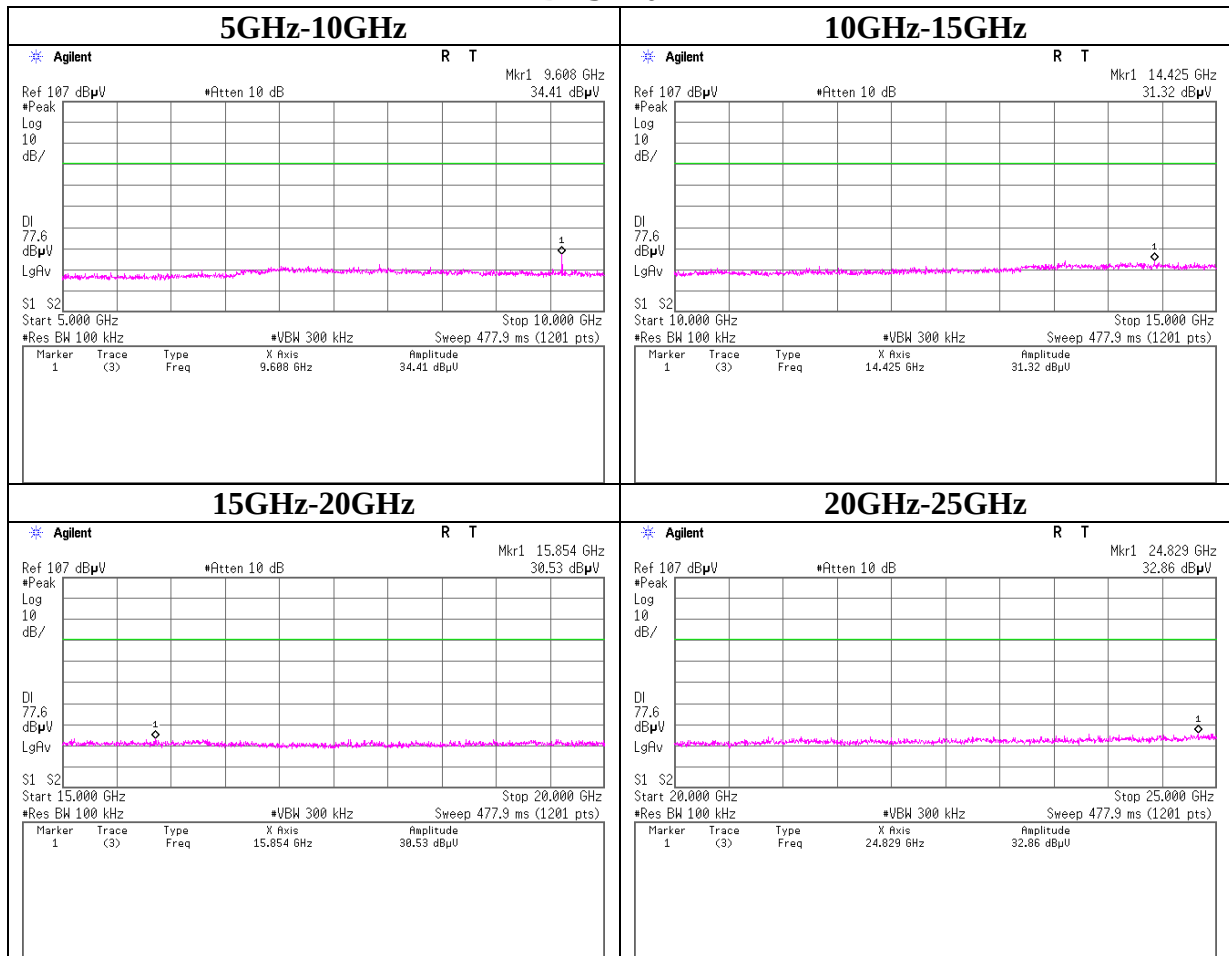
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Conducted Spurious Emission

Tx DH5 2402MHz



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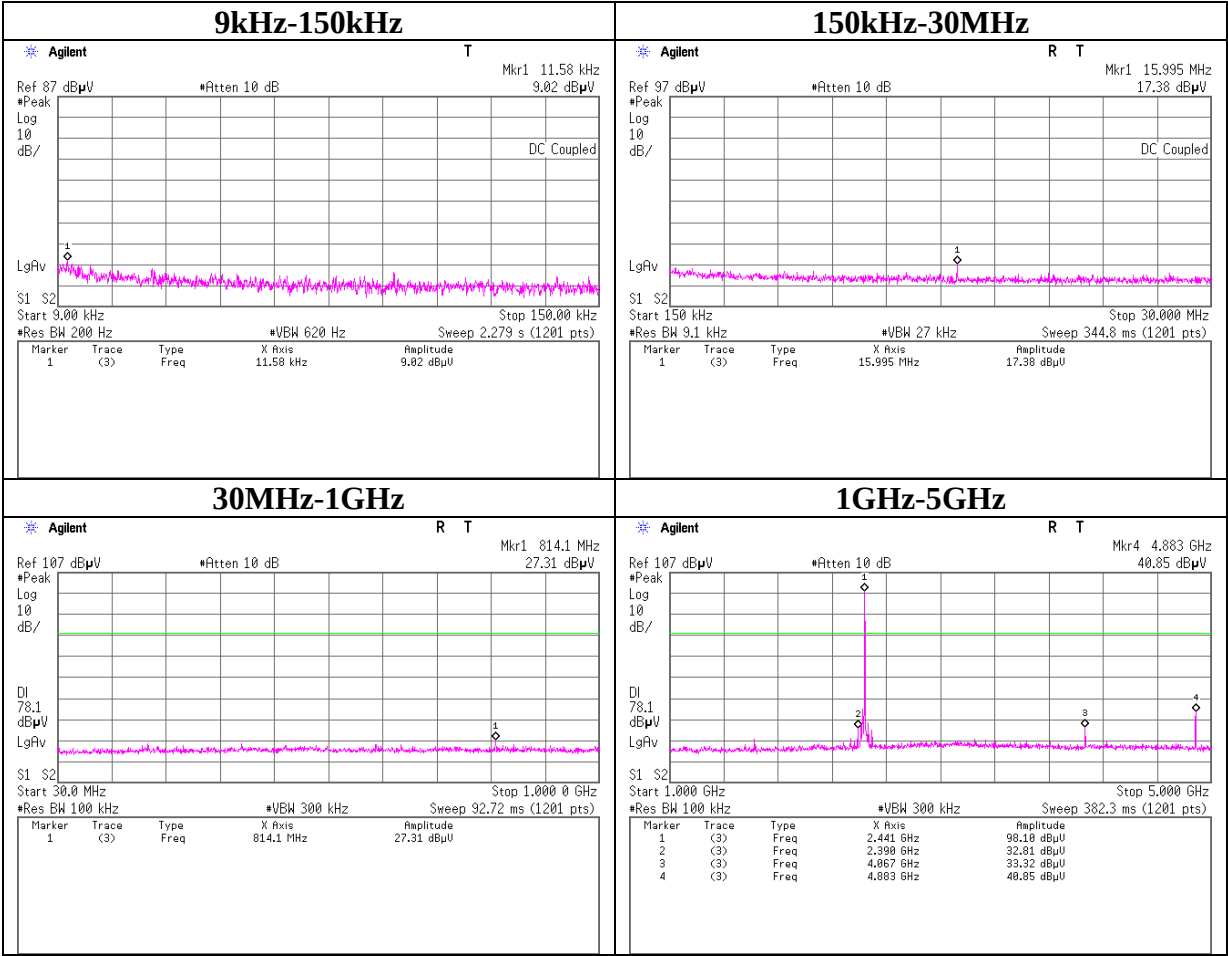
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

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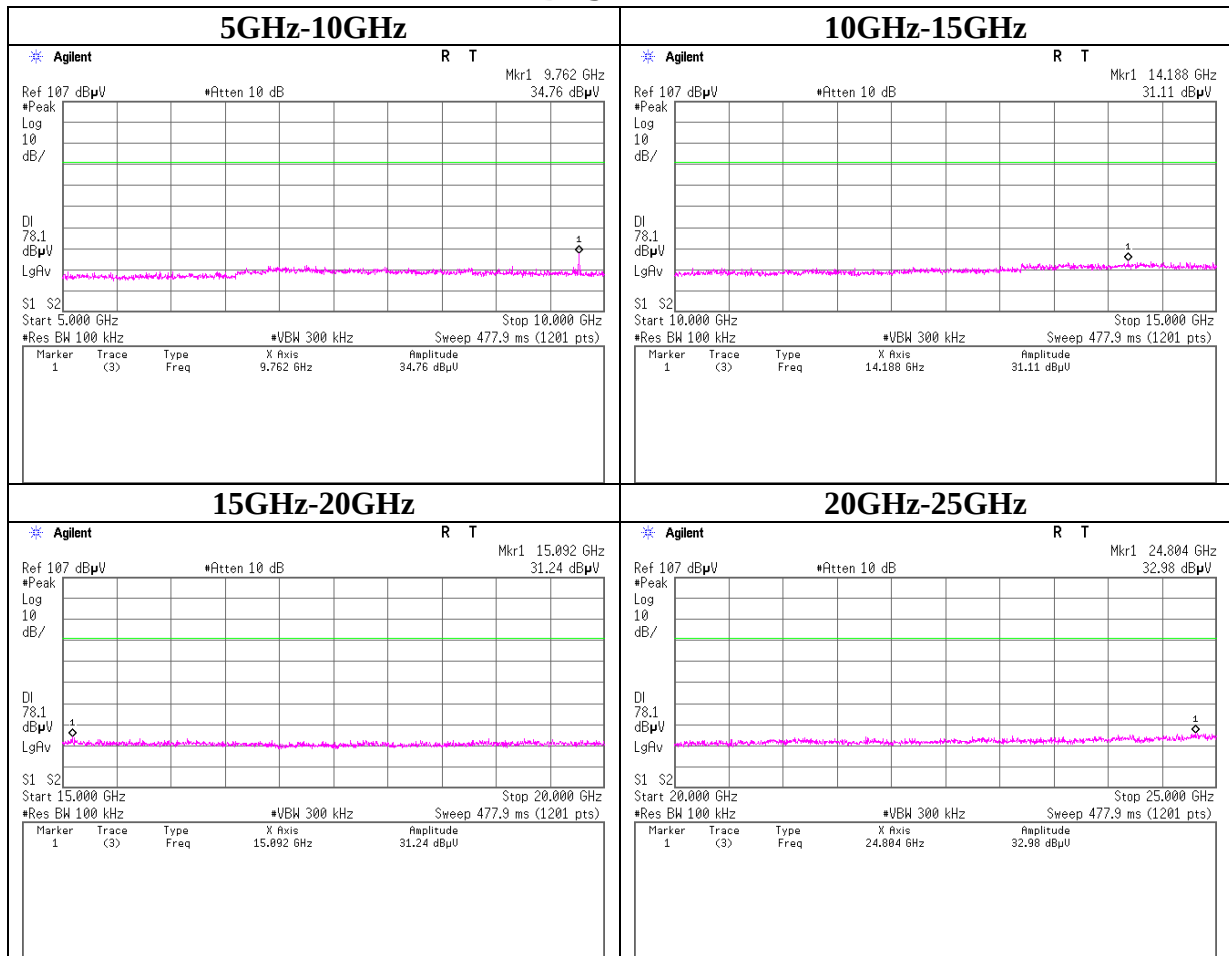
Conducted Spurious Emission

Tx DH5 2441MHz



Conducted Spurious Emission

Tx DH5 2441MHz



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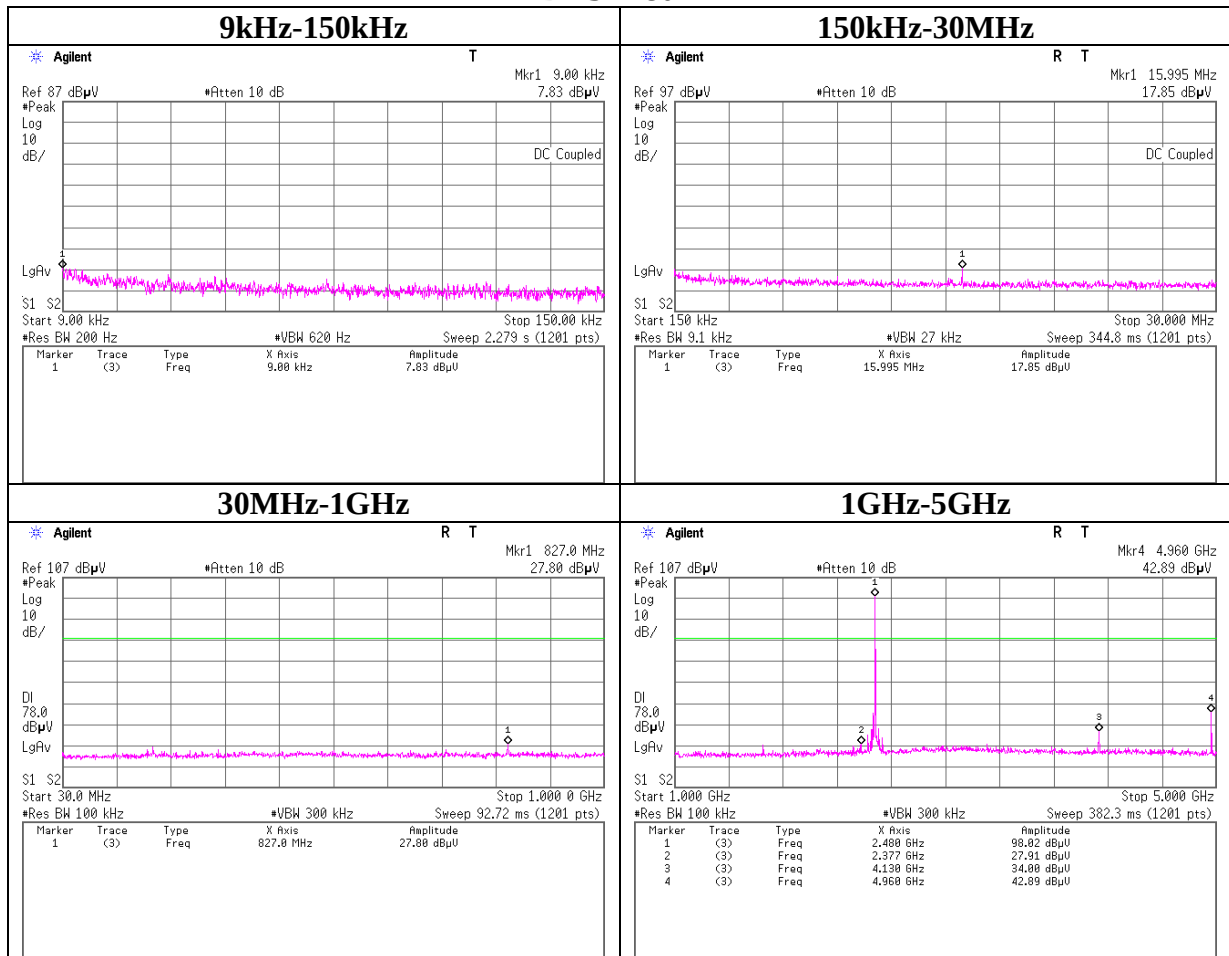
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Conducted Spurious Emission

Tx DH5 2480MHz



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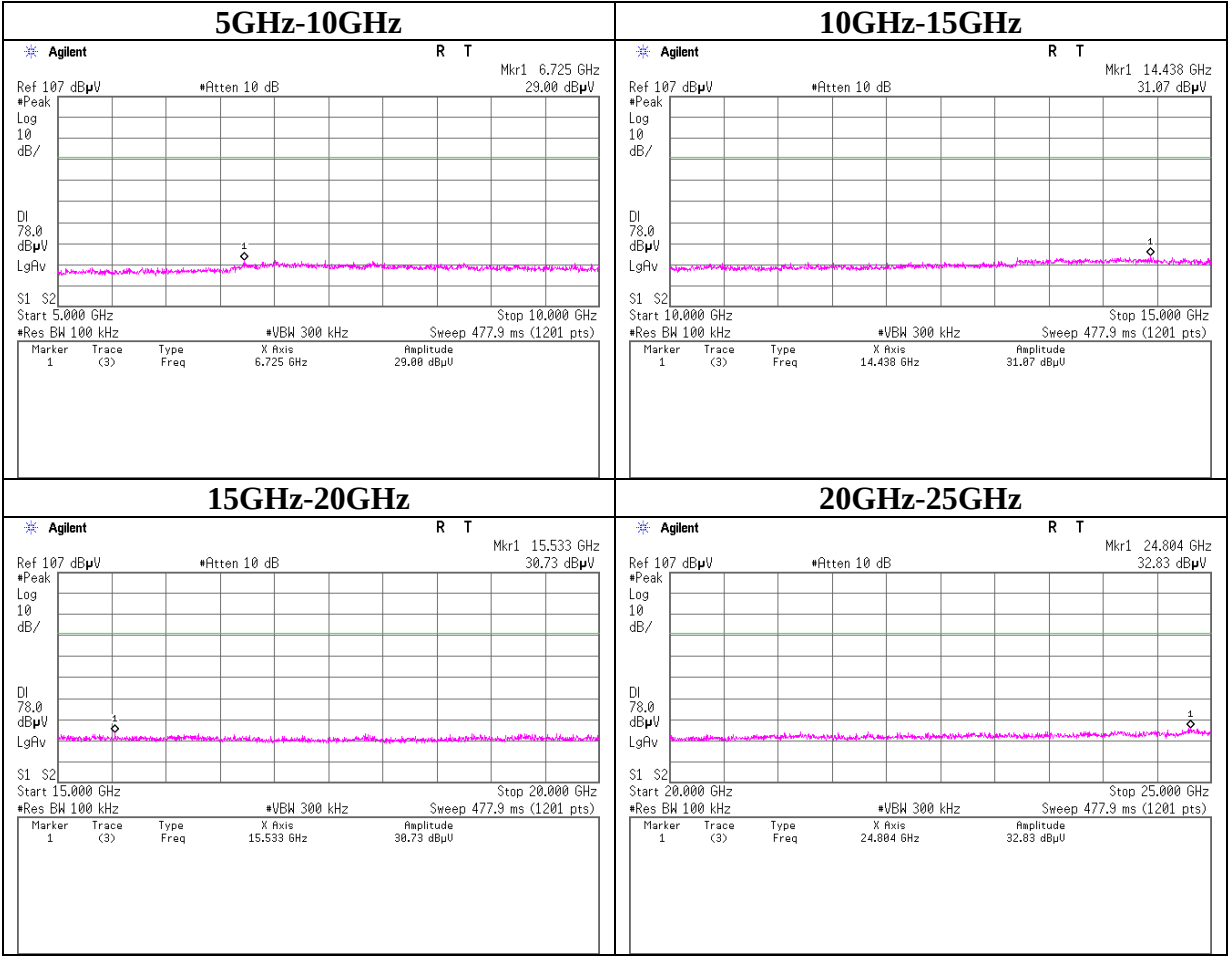
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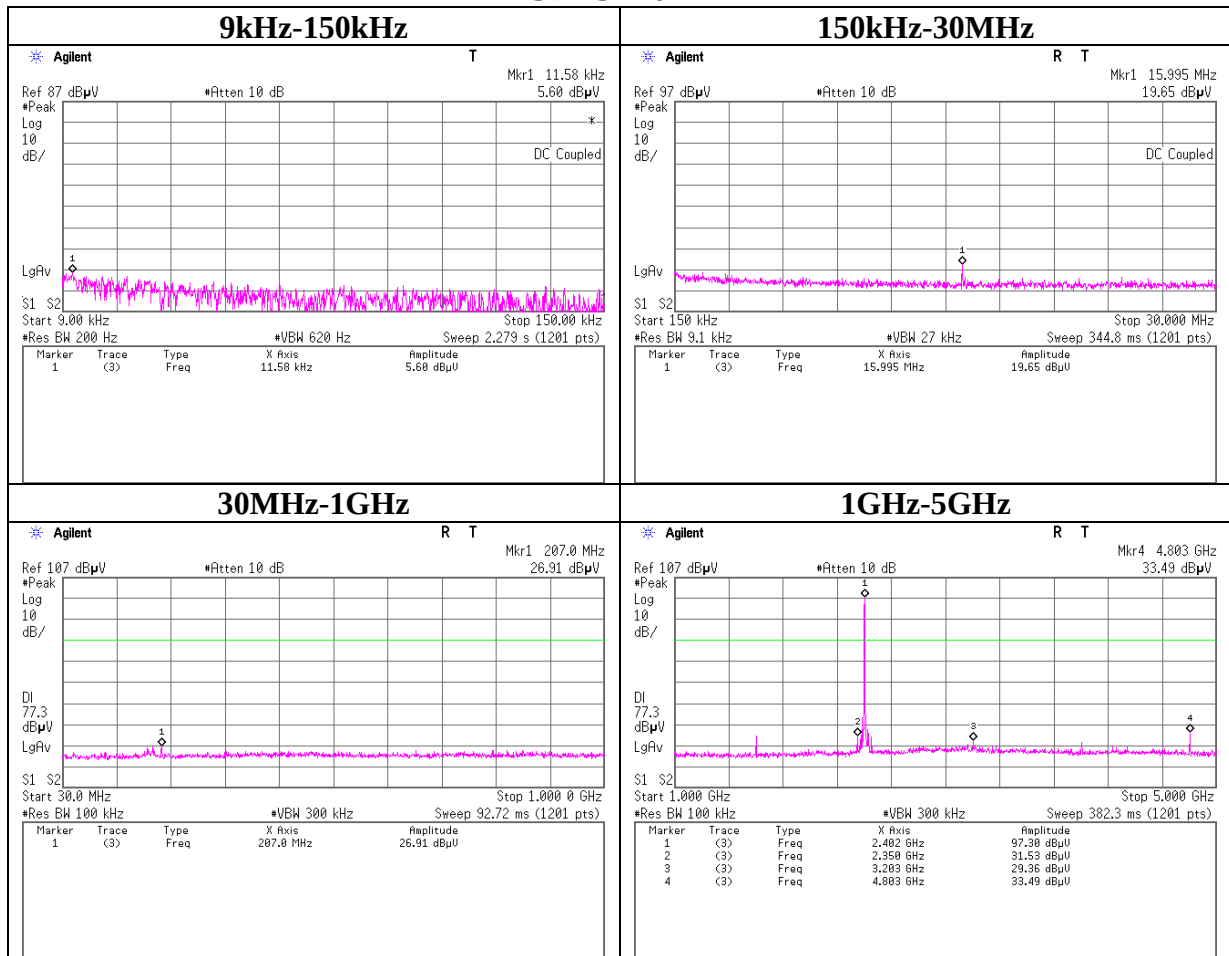
Conducted Spurious Emission

Tx DH5 2480MHz



Conducted Spurious Emission

Tx 3DH5 2402MHz



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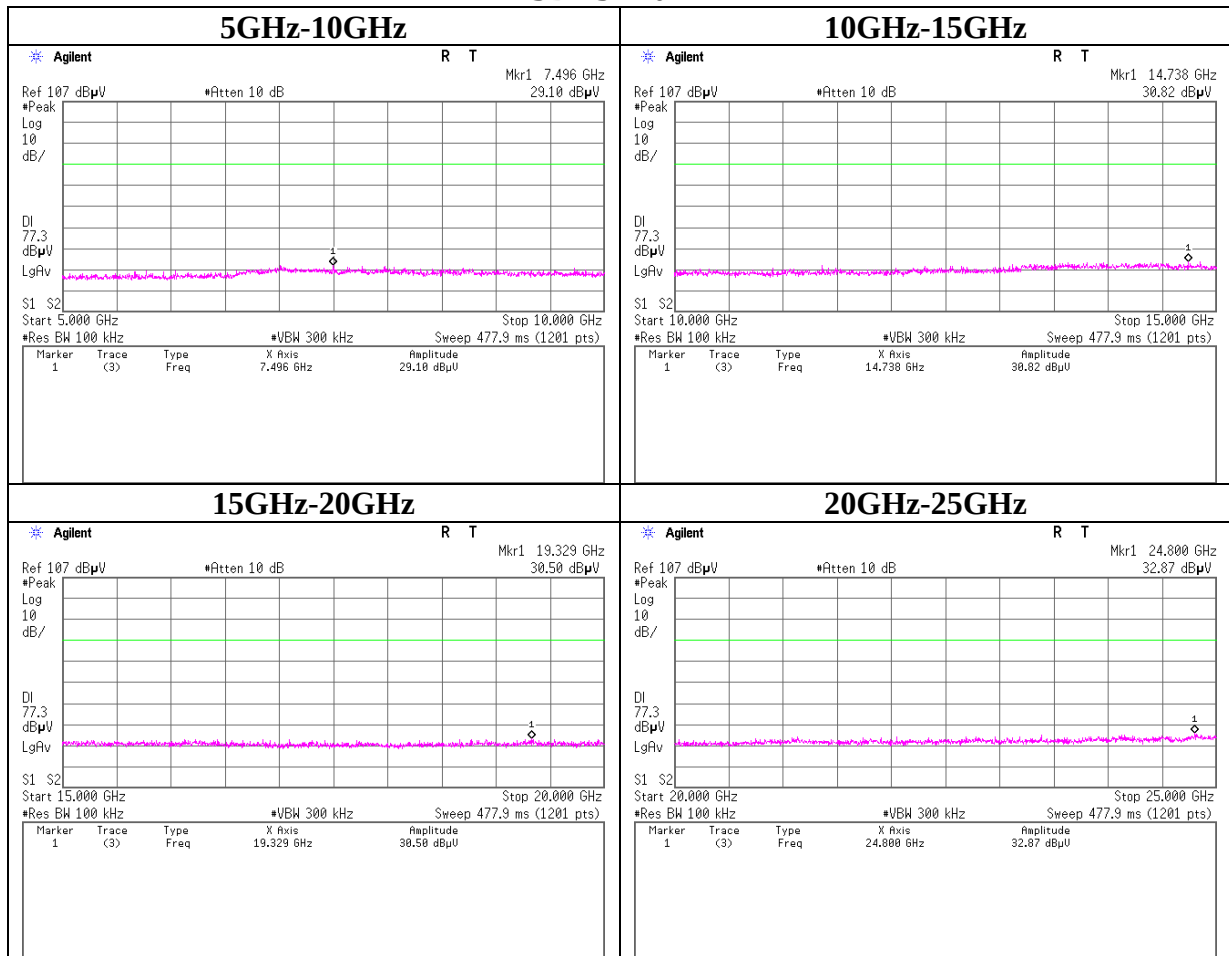
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Conducted Spurious Emission

Tx 3DH5 2402MHz



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Head Office EMC Lab.

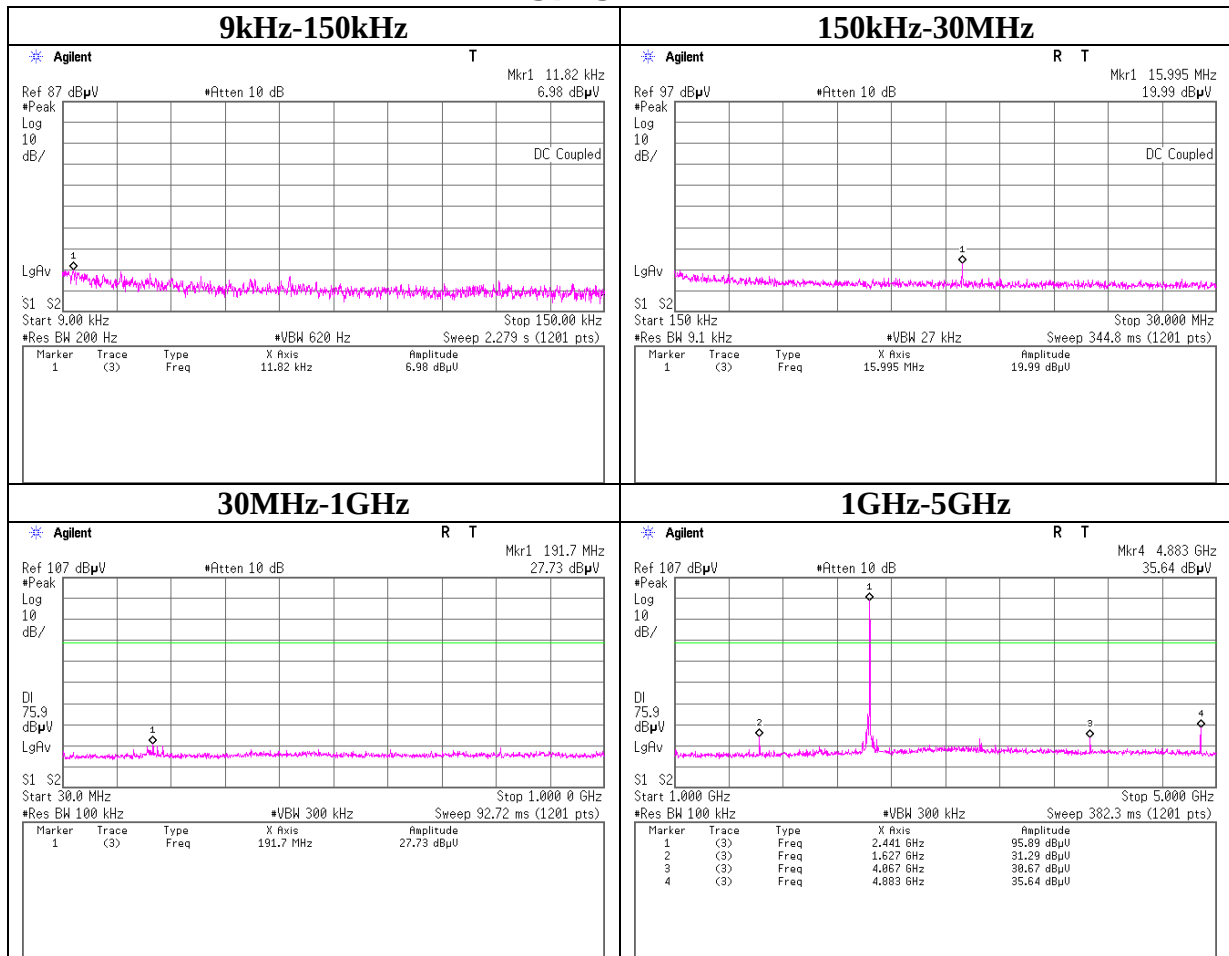
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Conducted Spurious Emission

Tx 3DH5 2441MHz



UL Japan, Inc.

Head Office EMC Lab.

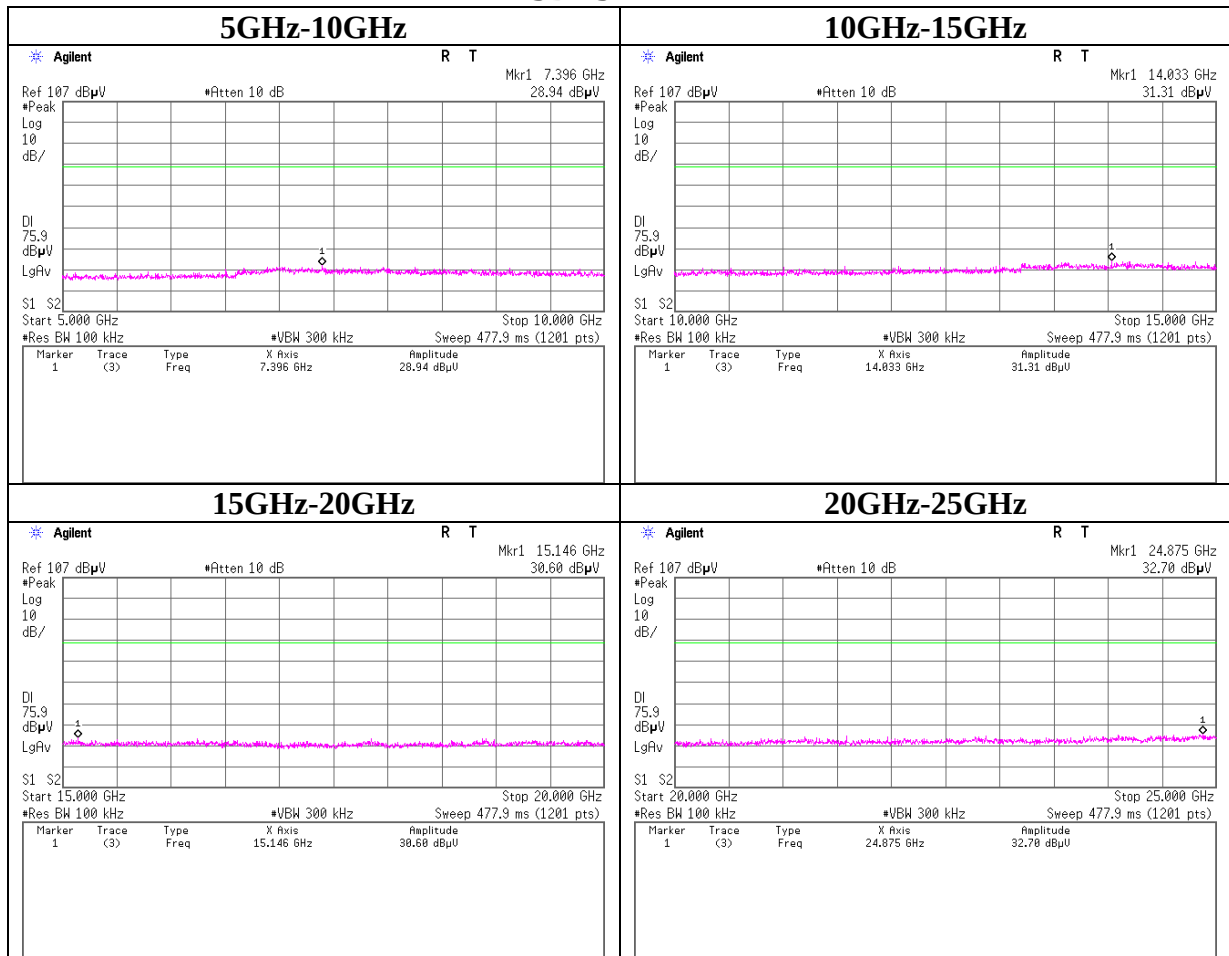
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Tx 3DH5 2441MHz



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Head Office EMC Lab.

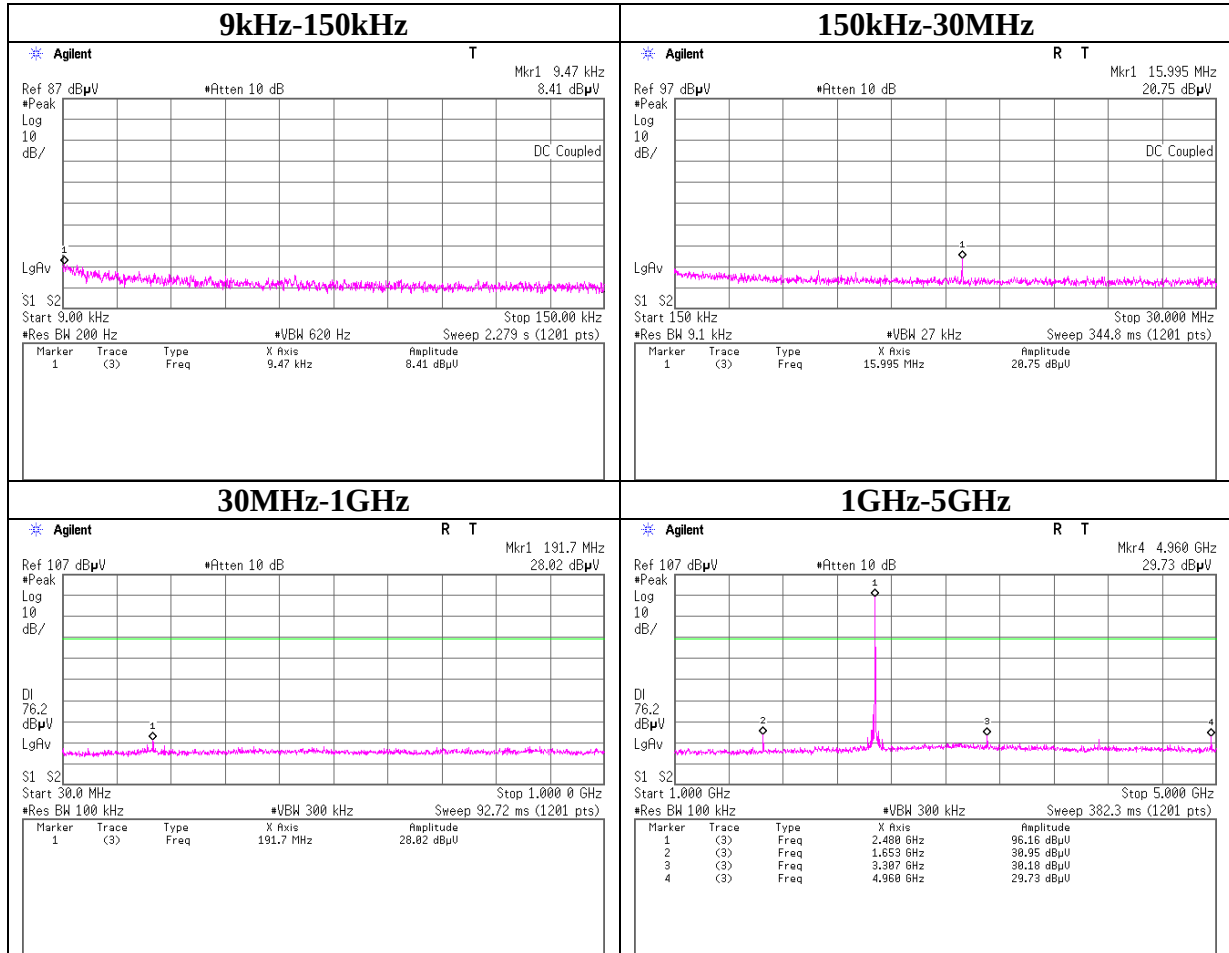
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Conducted Spurious Emission

Tx 3DH5 2480MHz



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Head Office EMC Lab.

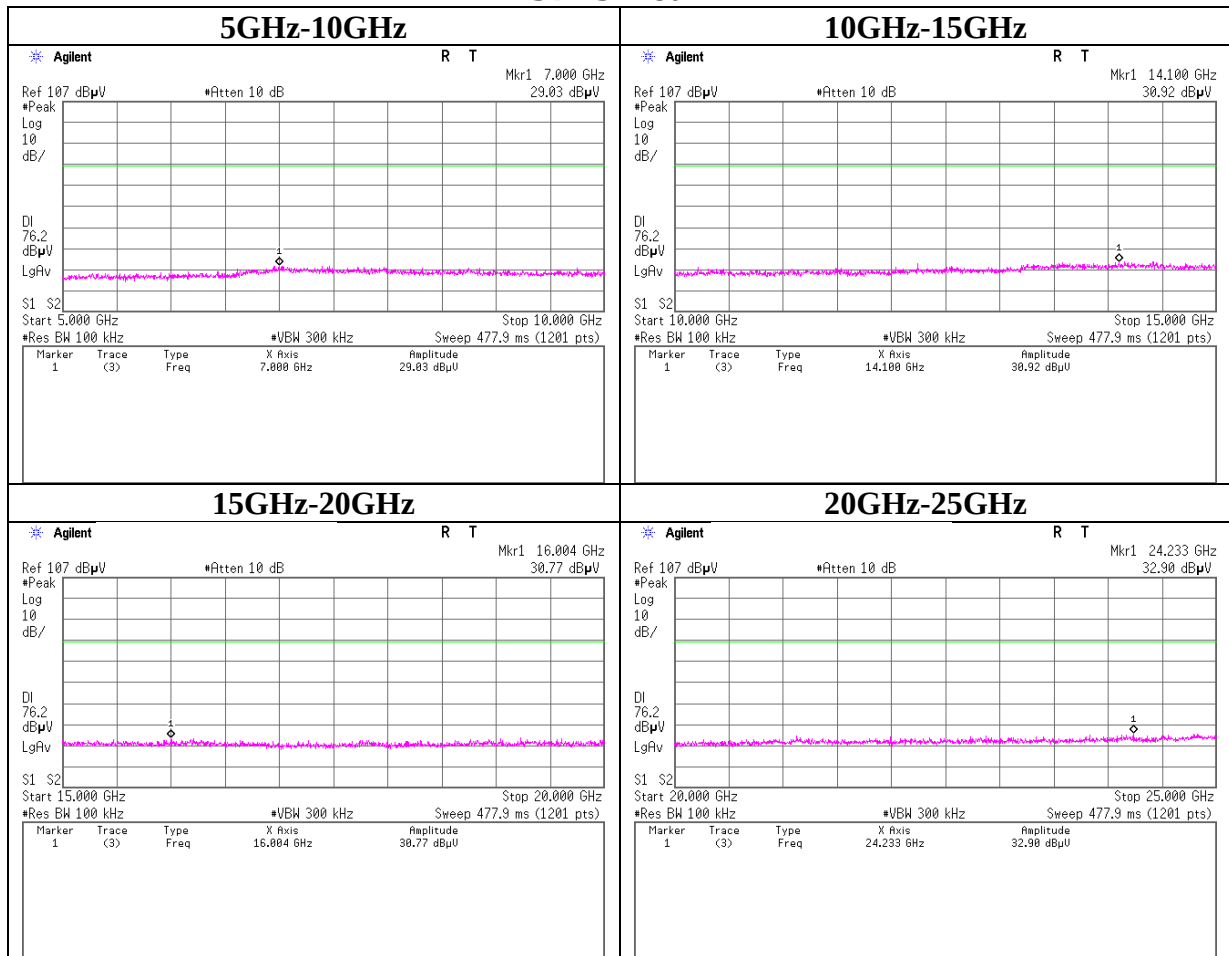
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Tx 3DH5 2480MHz



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Head Office EMC Lab.

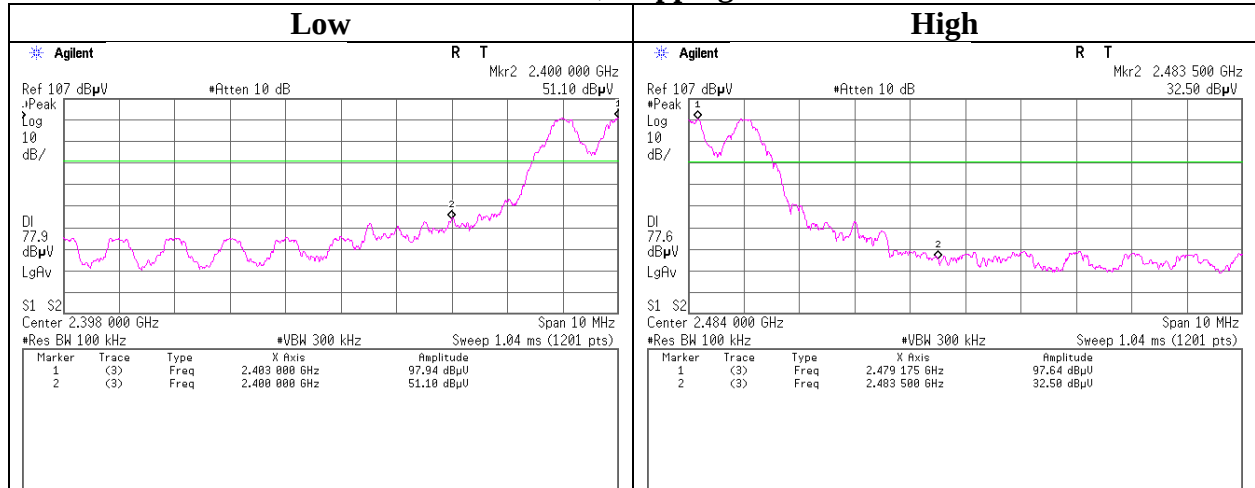
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

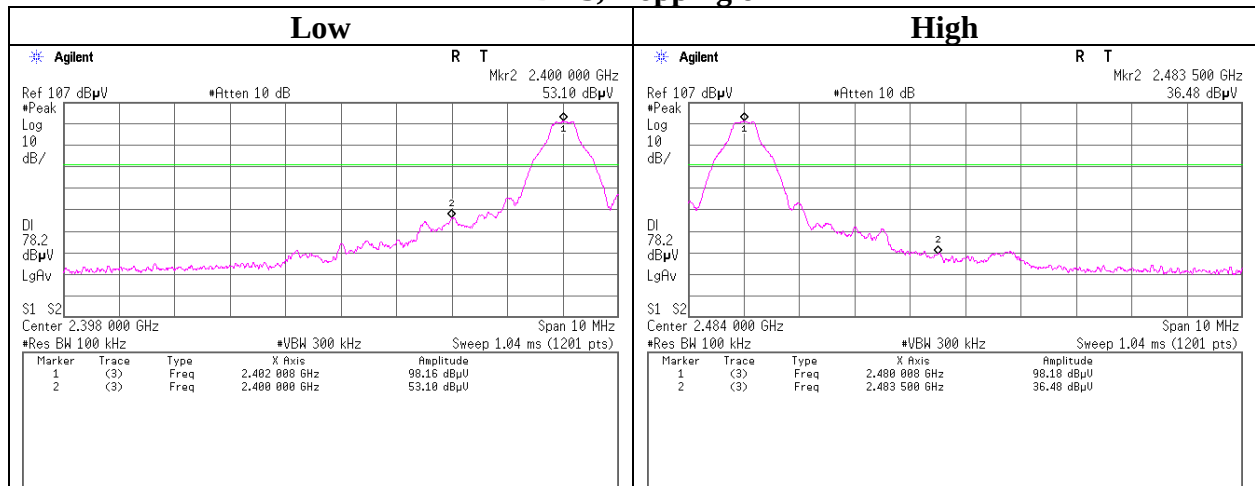
Facsimile : +81 596 24 8124

Conducted Emission Band Edge compliance

Tx DH5, Hopping on



Tx DH5, Hopping off



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Head Office EMC Lab.

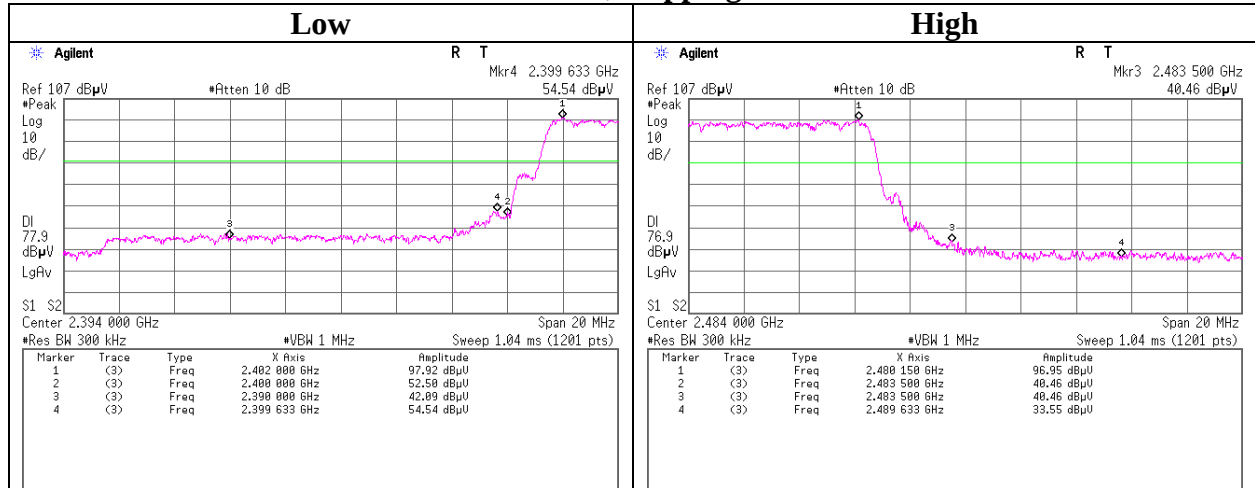
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

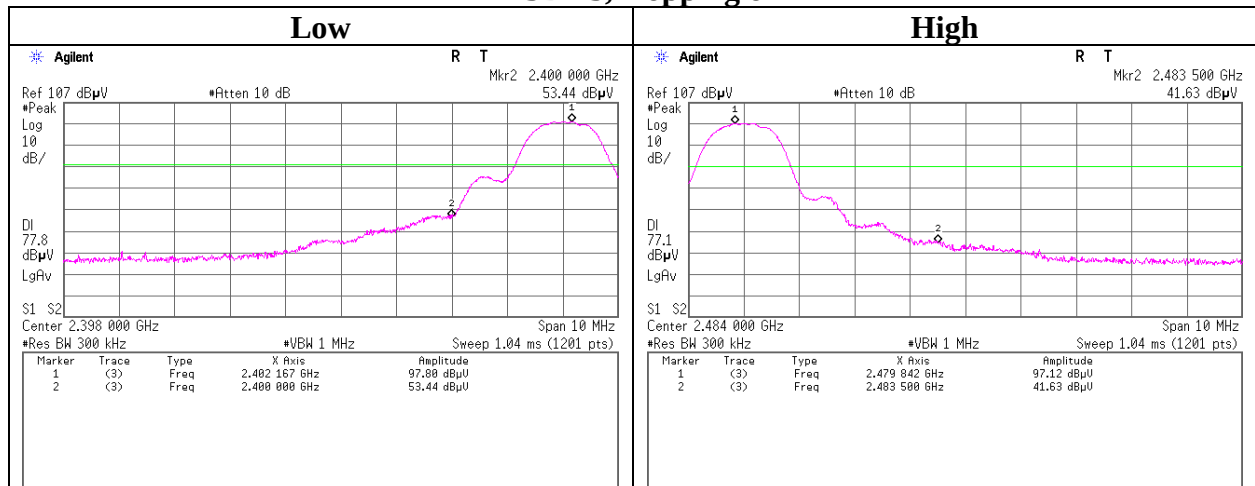
Facsimile : +81 596 24 8124

Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on



Tx 3DH5, Hopping off



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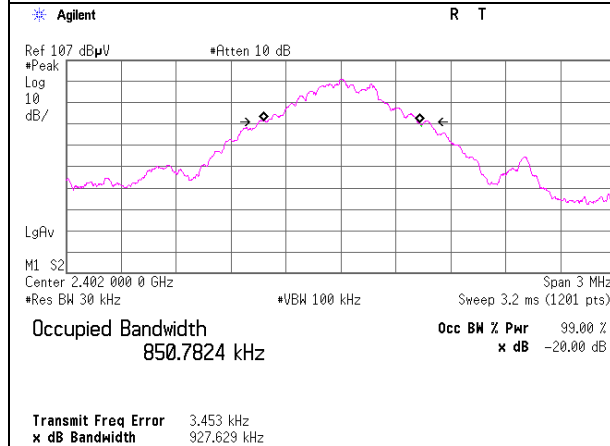
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Facsimile : +81 596 24 8124

99%Occupied Bandwidth

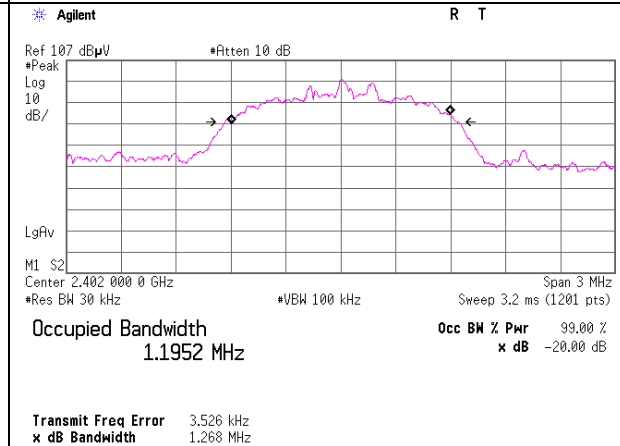
Tx DH5, Hopping off

2402MHz

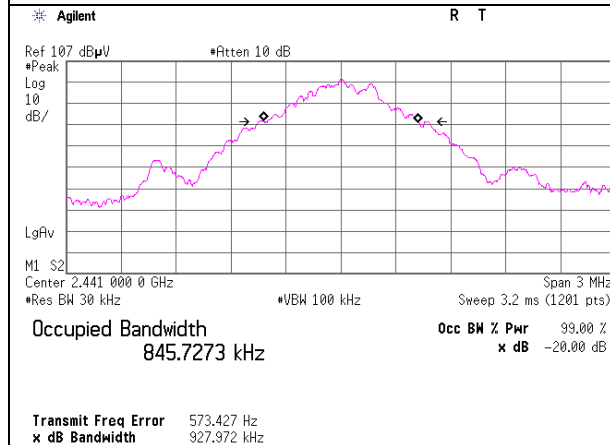


Tx 3DH5, Hopping off

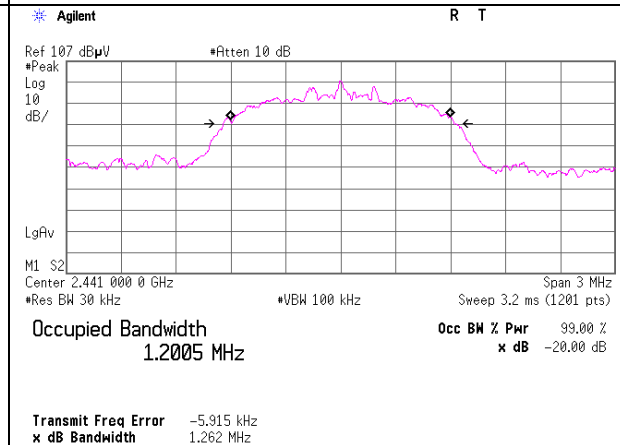
2402MHz



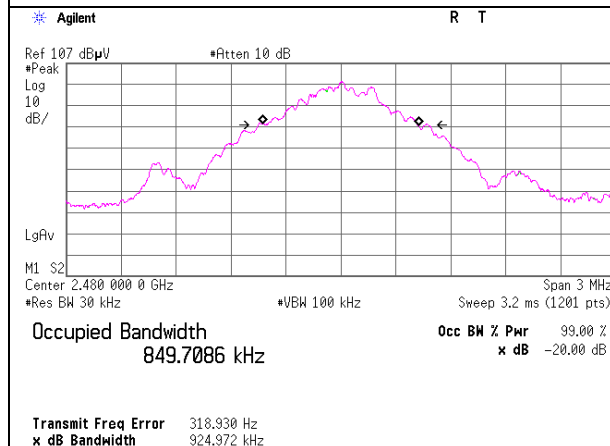
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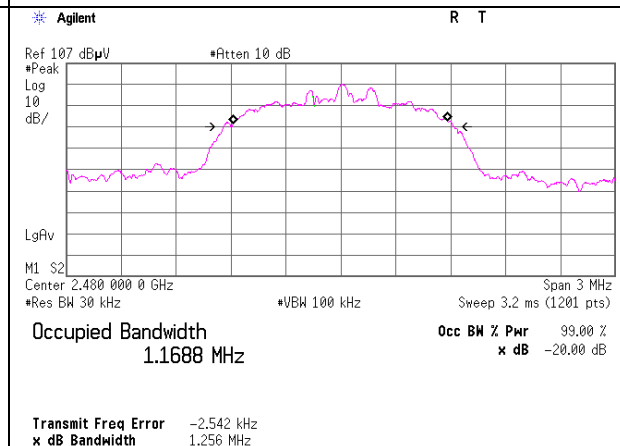
2441MHz



2480MHz



2480MHz



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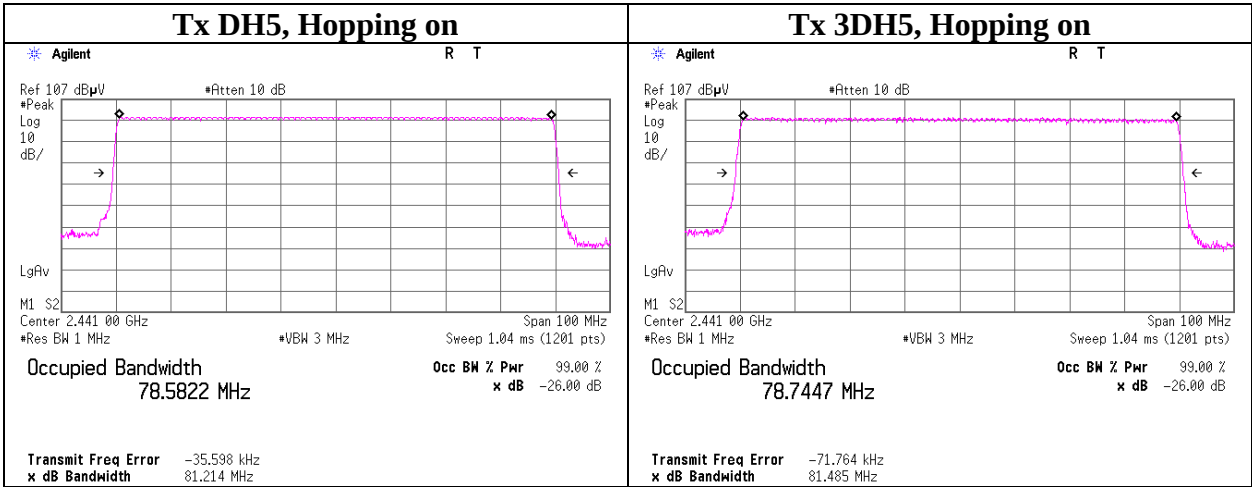
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99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2013/06/14 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2012/10/08 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2012/10/08 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2013/04/16 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2013/03/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	AT/RE	2013/02/26 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2013/06/30 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2013/04/03 * 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
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	2013/05/30 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2013/06/11 * 12
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-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2013/02/15 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	CE	2013/06/30 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	CE	2013/02/26 * 12
MJM-14	Measure	KOMELON	KMC-36	-	CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	CE	-
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	CE	2013/06/11 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2013/01/07 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/09 * 12
MJG-50	Extension Tap US	UL Japan			CE	-
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2013/02/06 * 12

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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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