




RADIO TEST REPORT

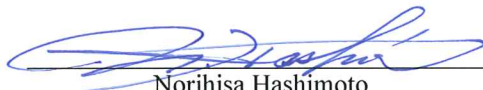
Test Report No. : 32JE0086-HO-01-A-R1

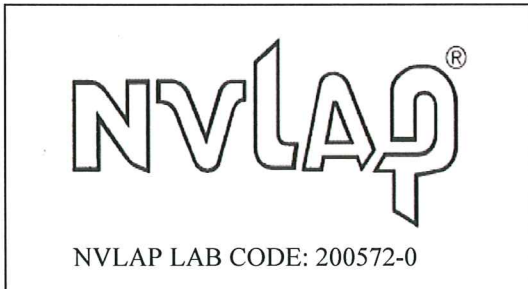
Applicant : DENSO CORPORATION
Type of Equipment : Display Control Unit
Model No. : DNNS085
FCC ID : HYQDNNS085
Test regulation : FCC Part 15 Subpart C: 2012
Test Result : Complied

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.
6. This report is a revised version of 32JE0086-HO-01-A. 32JE0086-HO-01-A is replaced with this report.

Date of test: June 12 to 28, 2012

Representative test engineer: 
Motoya Imura
Engineer of WiSE Japan,
UL Verification Service

Approved by: 
Norihisa Hashimoto
Leader of WiSE Japan,
UL Verification Service



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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SECTION 1: Customer information

Company Name : DENSO CORPORATION
Address : 1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan
Telephone Number : +81-566-20-2880
Facsimile Number : +81-566-25-4920
Contact Person : Isamu Suzuki

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

2.1 Identification of E.U.T.

Type of Equipment : Display Control Unit
Model No. : DNNS085
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC12.0V
Receipt Date of Sample : June 7, 2012
Country of Mass-production : China
Condition of EUT : Production 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

General Specification

Clock frequency(ies) in the system : CPU: 26MHz

Radio Specification

[Bluetooth (Ver. 3.0)]

Radio Type : Transceiver
Frequency of Operation : 2402-2480MHz
Modulation : FHSS
Power Supply (radio part input) : DC 3.3V
Antenna type : Chip Antenna
Antenna Gain : -2.0dBi

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on May 17, 2012 and effective June 18, 2012

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

*The revision on May 17, 2012 does not affect the test specification applied to the EUT.

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	N/A	N/A *1)	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (a)		-	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(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: Section 15.247(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: Section 15.247(d) IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3		1.8dB 171.819MHz, QP, Horizontal (DH5) 171.815MHz, QP, Horizontal (3DH5)	Complied

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

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

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

FCC 15.31 (e)

This EUT provides stable voltage (DC3.3V) constantly to RF part 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)	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	4.2dB	5.0dB	5.1dB	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	5.1dB	4.2dB

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

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

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	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

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

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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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
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 Maximum Peak Output Power	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	-
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
<p>*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) *EUT has the power settings by the software as follows; Power settings: BDR: 51, EDR: 49 Software: CSR BlueTest3 *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.</p>		

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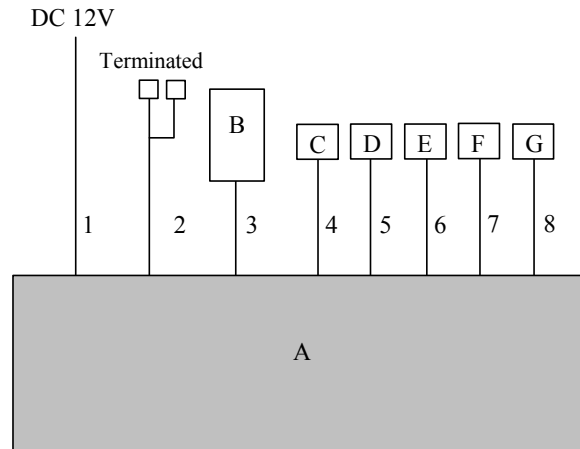
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4.2 Configuration and peripherals



* 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	Display Control Unit	DNNS085	087 for RE* 091 for AT*	DENSO CORPORATION	EUT
B	DCM USB Dummy Load	-	-	DENSO CORPORATION	-
C	AUX USB Dummy Load	-	-	DENSO CORPORATION	-
D	Audio USB Dummy Load	-	-	DENSO CORPORATION	-
E	Dummy Load	-	-	DENSO CORPORATION	-
F	Navi LVDS Dummy Load	-	-	DENSO CORPORATION	-
G	2 nd Disp LVDS Dummy Load	-	-	DENSO CORPORATION	-

*RE: Radiated Emission, AT: Antenna Terminal Conducted test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.1	Unshielded	Unshielded	-
2	Signal Cable	2.1	Unshielded	Unshielded	-
3	USB Cable	3.5	Shielded	Shielded	-
4	USB Cable	2.1	Shielded	Shielded	-
5	USB Cable	2.1	Shielded	Shielded	-
6	Signal Cable	2.1	Shielded	Shielded	-
7	Signal Cable	2.1	Shielded	Shielded	-
8	Signal Cable	2.1	Shielded	Shielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.5m 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	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	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 6: 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	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 *1)	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				

*1) 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

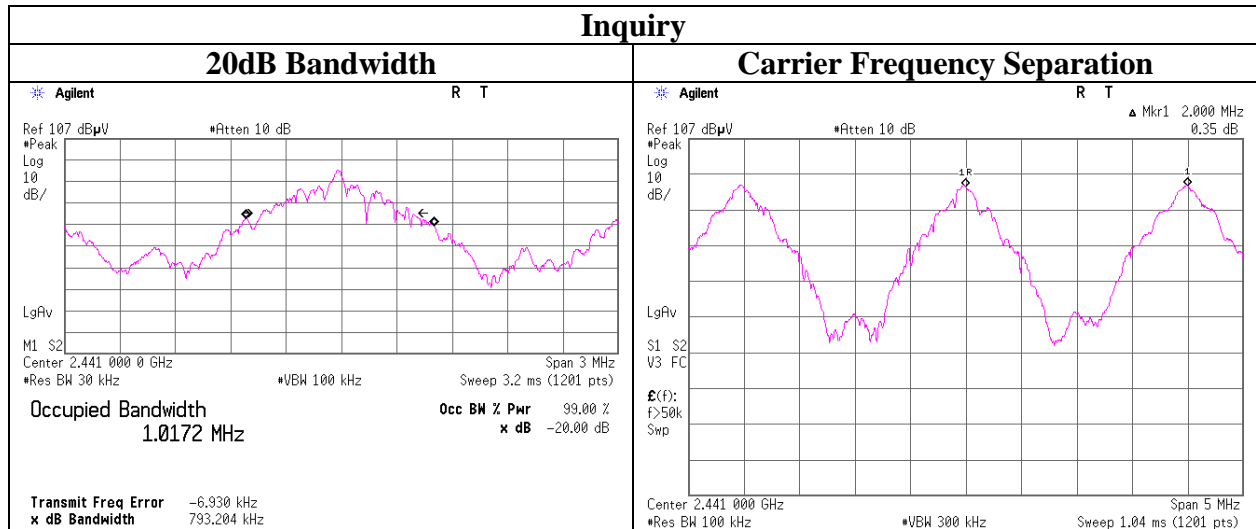
APPENDIX 1: Data of EMI test

20dB Bandwidth and Carrier Frequency Separation

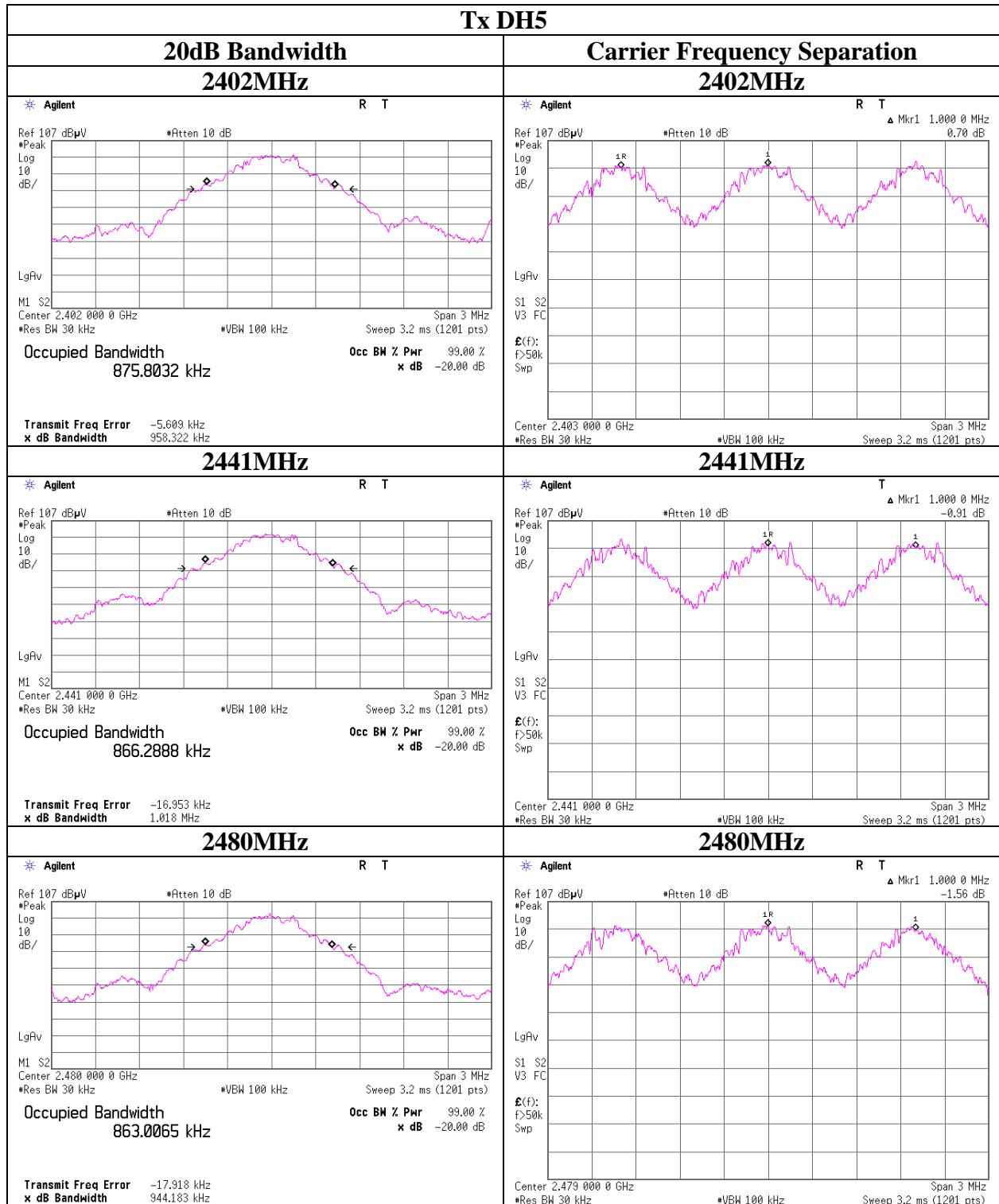
Test place Head Office EMC Lab. No.7 Shielded Room
 Report No. 32JE0086-HO-01
 Date 06/28/2012
 Temperature/ Humidity 24 deg.C/ 53% RH
 Engineer Takayuki Shimada
 Mode Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.958	1.000	≥ 0.639
DH5	2441.0	1.018	1.000	≥ 0.679
DH5	2480.0	0.944	1.000	≥ 0.629
3DH5	2402.0	1.273	1.000	≥ 0.849
3DH5	2441.0	1.272	1.000	≥ 0.848
3DH5	2480.0	1.260	1.000	≥ 0.840
Inquiry	2441.0	0.793	2.000	≥ 0.529

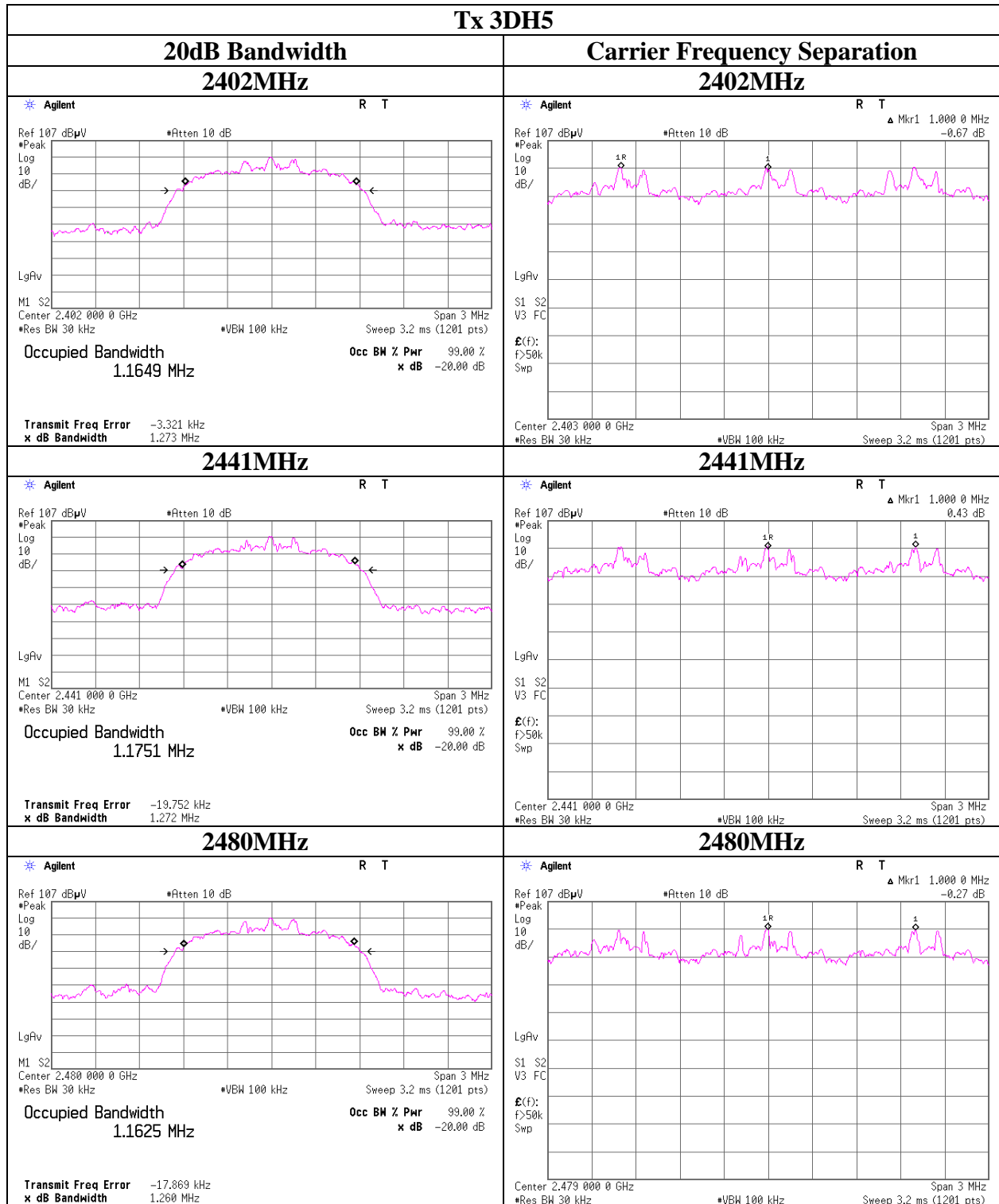
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
 No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation

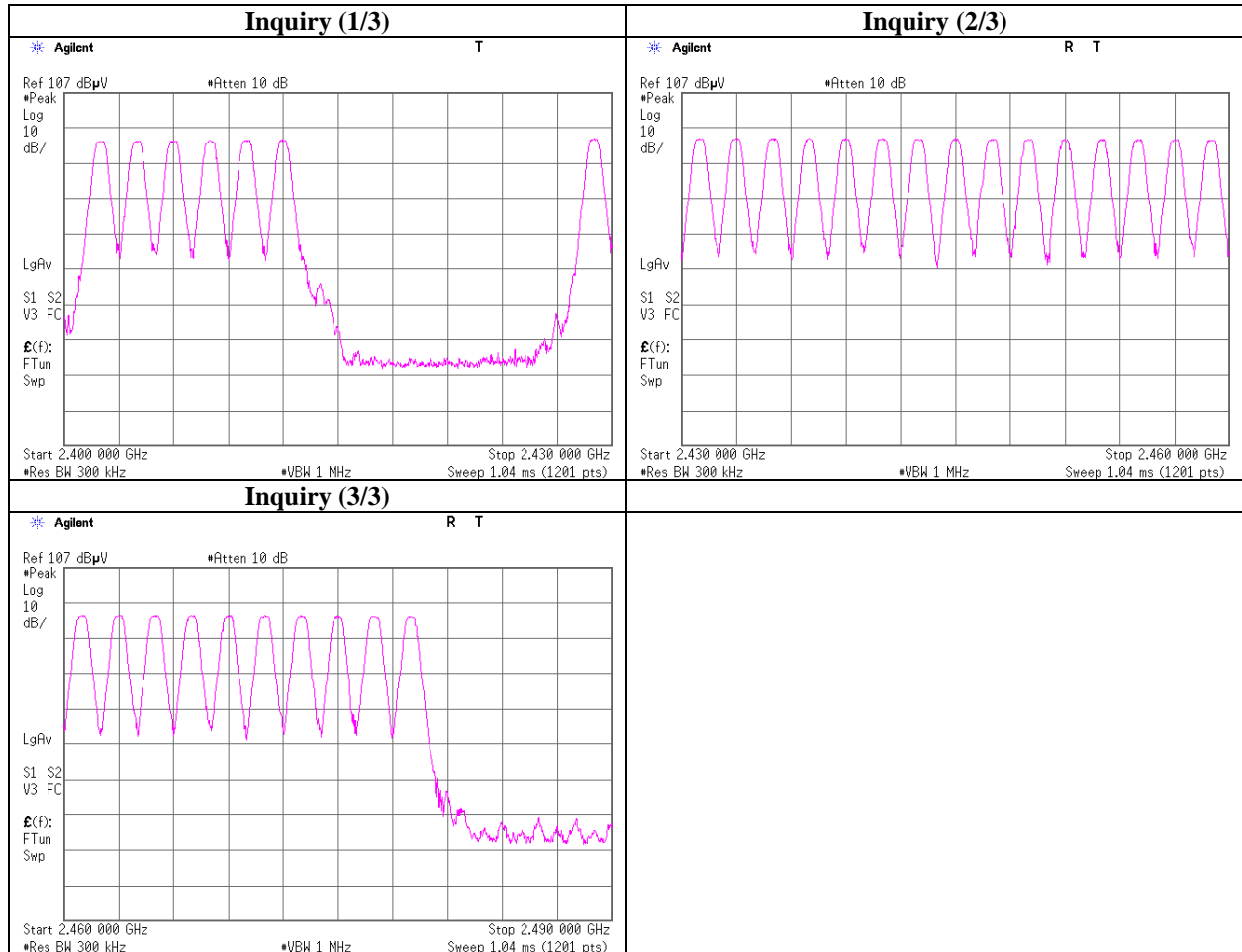


Number of Hopping Frequency

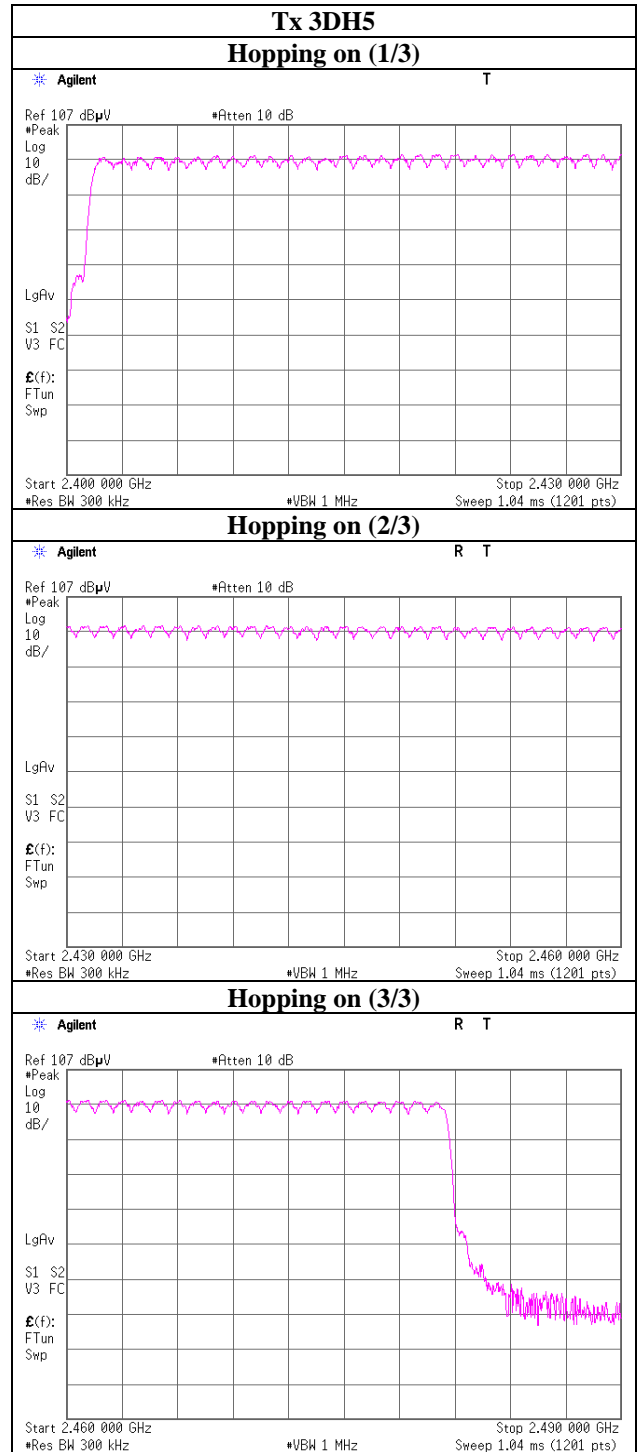
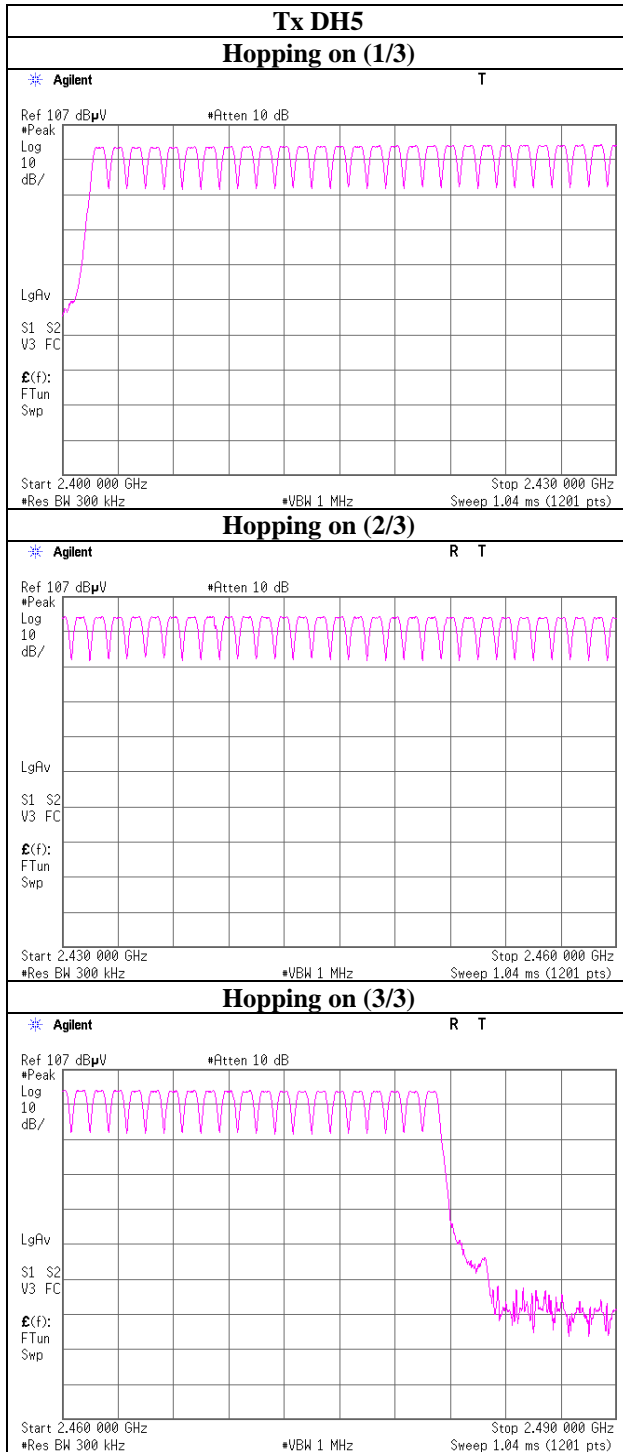
Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32JE0086-HO-01
Date	06/28/2012
Temperature/ Humidity	24 deg.C/ 53% RH
Engineer	Takayuki Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 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 3.0.



Number of Hopping Frequency



Dwell time

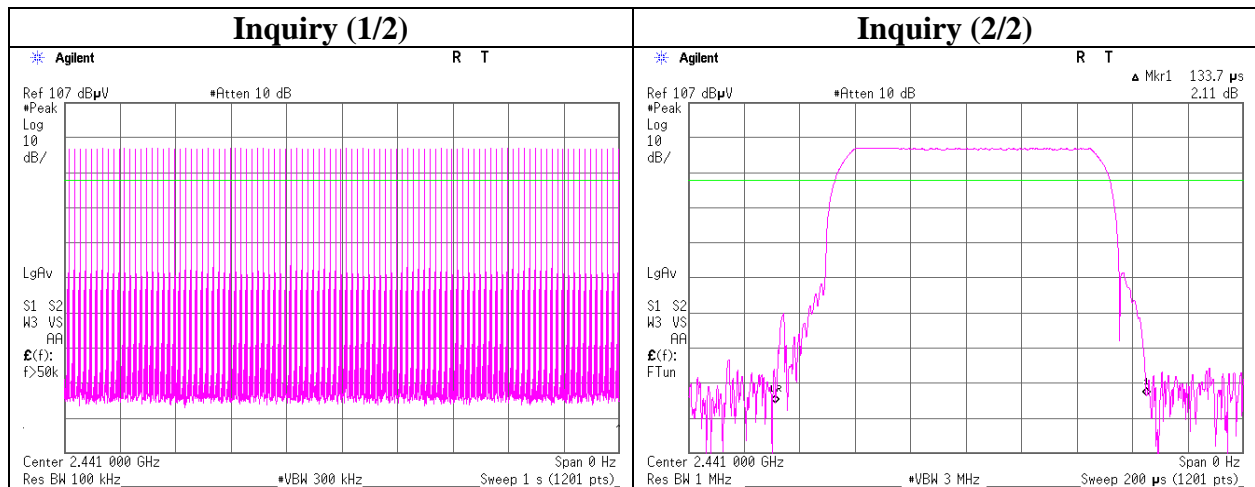
Test place : Head Office EMC Lab. No.7 Shielded Room
 Report No. : 32JE0086-HO-01
 Date : 06/28/2012
 Temperature/ Humidity : 24 deg.C/ 53% RH
 Engineer : Takayuki Shimada
 Mode : Tx (Hopping on) DH5/3DH5/Inquiry

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	0.436	138
DH3	25.0 times	/	5 sec.	x 31.6 sec. =	158 times	1.697	268
DH5	17.0 times	/	5 sec.	x 31.6 sec. =	108 times	2.969	321
3DH1	50.0 times	/	5 sec.	x 31.6 sec. =	316 times	0.445	141
3DH3	25.0 times	/	5 sec.	x 31.6 sec. =	158 times	1.702	269
3DH5	17.0 times	/	5 sec.	x 31.6 sec. =	108 times	2.957	319
Inquiry	100.0 times	/	1 sec.	x 12.8 sec. =	1280 times	0.134	171

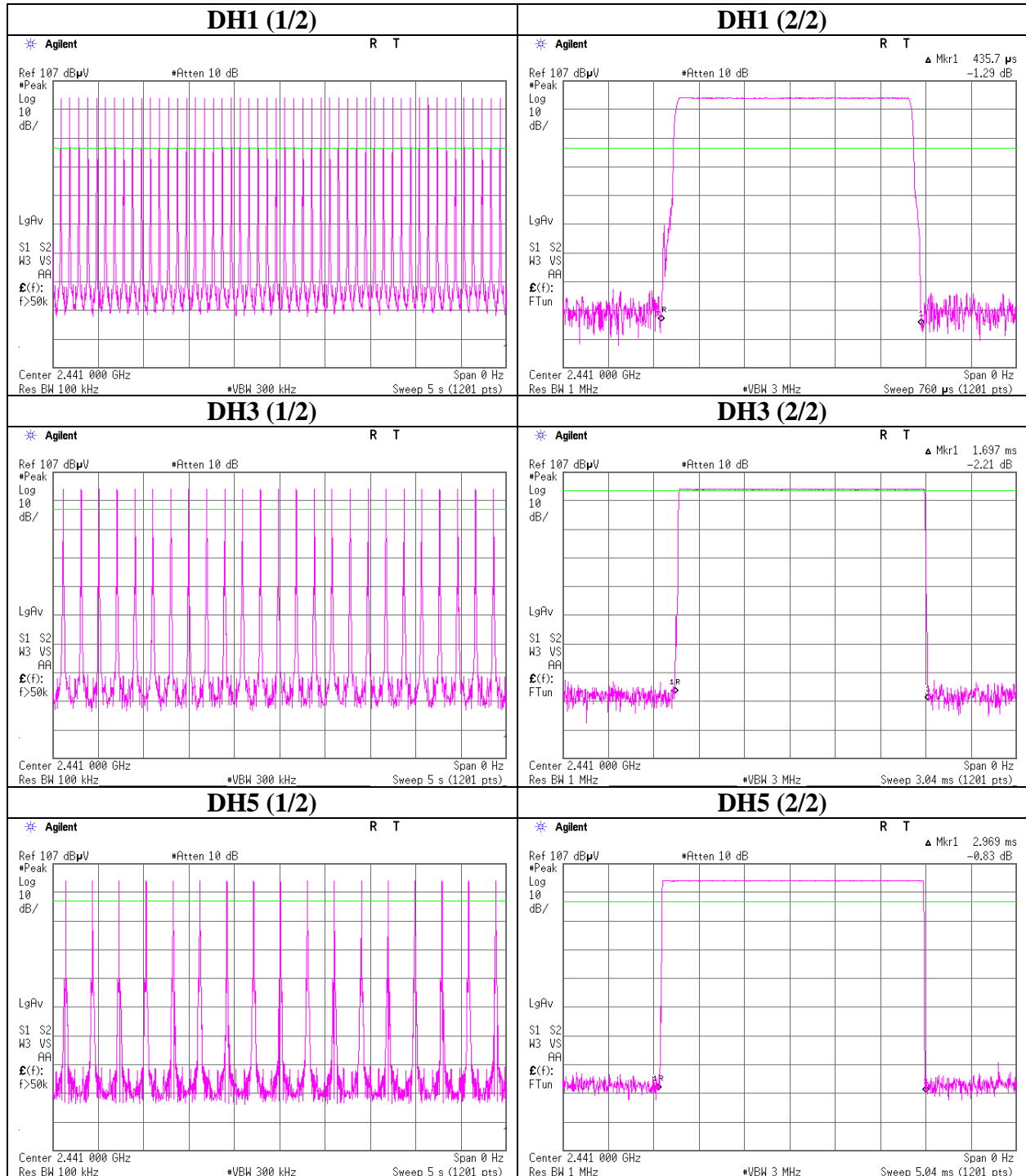
Sample Calculation

Result = Number of transmission x Length of transmission time

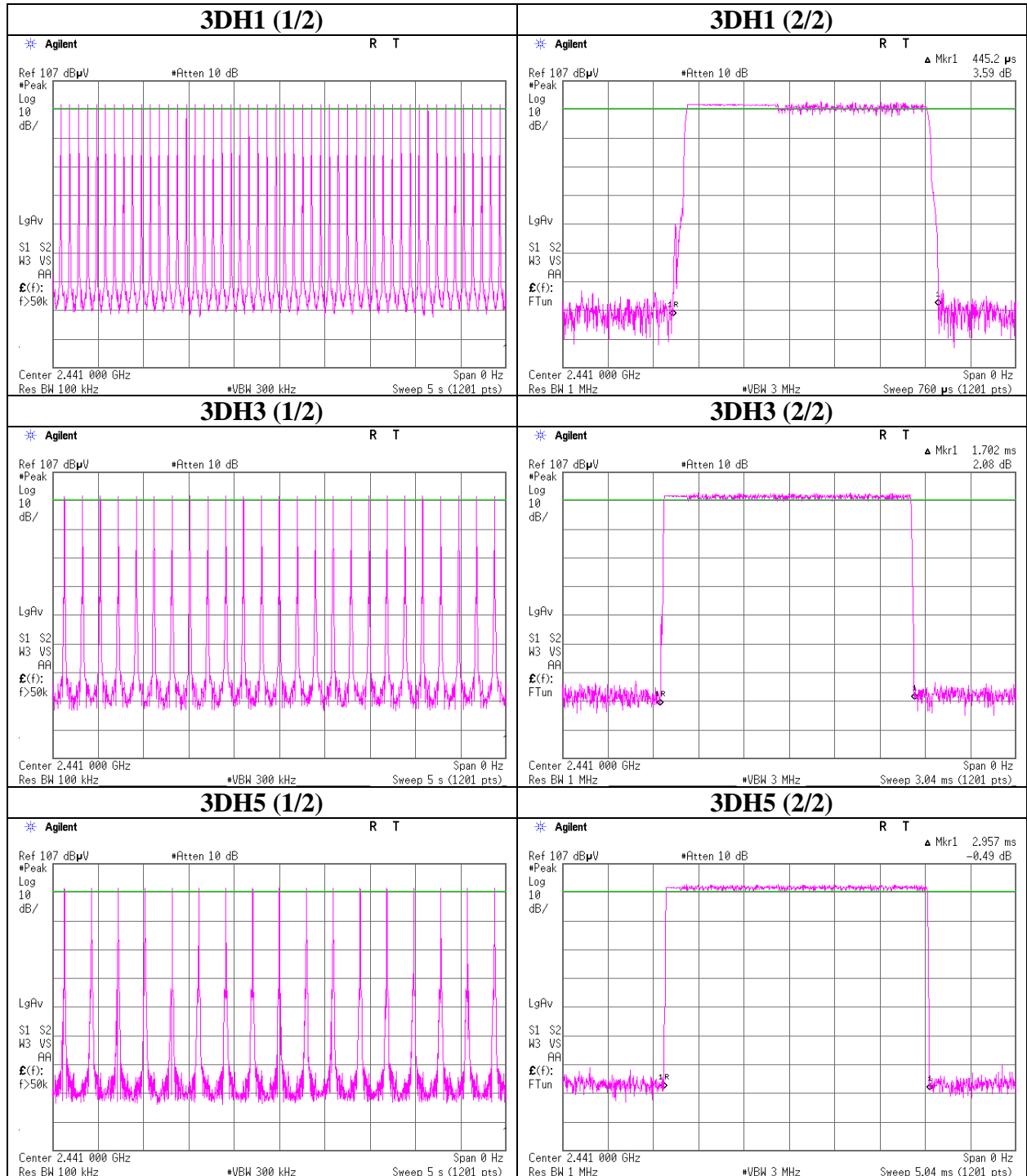
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than $0.4s$ regardless of packet size (DH1, DH3, DH5/ 3DH1, 3DH3, 3DH5). This is confirmed in the test report for $N=79$.



Dwell time



Dwell time



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.7 Shielded Room
Report No. : 32JE0086-HO-01
Date : 06/28/2012
Temperature/ Humidity : 24 deg.C/ 53% RH
Engineer : Takayuki Shimada
Mode : Tx (Hopping off) DH5/3DH5/Inquiry

Mode	Freq. P/M [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-6.36	3.25	10.07	6.96	4.97	20.96	125	14.00
DH5	2441.0	-5.68	3.26	10.07	7.65	5.82	20.96	125	13.31
DH5	2480.0	-6.13	3.30	10.07	7.24	5.30	20.96	125	13.72
3DH5	2402.0	-7.54	3.25	10.07	5.78	3.78	20.96	125	15.18
3DH5	2441.0	-6.79	3.26	10.07	6.54	4.51	20.96	125	14.42
3DH5	2480.0	-7.36	3.30	10.07	6.01	3.99	20.96	125	14.95
Inquiry	2441.0	-12.32	3.26	10.07	1.01	1.26	20.96	125	19.95

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.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0086-HO-01
Date 06/12/2012
Temperature/ Humidity 23 deg.C/ 58% RH
Engineer Motoya Imura
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	171.819	QP	49.1	15.9	8.9	32.2	41.7	43.5	1.8	
Hori	200.451	QP	50.5	17.0	9.2	32.2	44.5	-	-	- See 20dBc Data Sheet
Hori	300.684	QP	56.5	14.3	10.0	32.1	48.7	-	-	- See 20dBc Data Sheet
Hori	315.002	QP	52.1	14.9	10.1	32.1	45.0	-	-	- See 20dBc Data Sheet
Hori	329.311	QP	49.1	15.4	10.2	32.1	42.6	46.0	3.4	
Hori	357.952	QP	48.9	16.4	10.4	32.1	43.6	-	-	- See 20dBc Data Sheet
Hori	429.540	QP	45.4	17.9	10.9	32.0	42.2	-	-	- See 20dBc Data Sheet
Hori	2390.000	PK	45.0	27.4	2.2	32.4	42.2	73.9	31.7	
Hori	2400.000	PK	62.5	27.4	2.2	32.4	59.7	-	-	- See 20dBc Data Sheet
Hori	4804.000	PK	45.2	31.6	4.0	31.4	49.4	73.9	24.5	
Hori	7206.000	PK	46.1	36.3	4.7	32.4	54.7	73.9	19.2	
Hori	9608.000	PK	48.3	38.1	5.5	33.0	58.9	73.9	15.0	
Hori	24020.000	PK	45.9	37.9	-1.8	31.1	50.9	73.9	23.0	NS
Hori	2390.000	AV	30.5	27.4	2.2	32.4	27.7	53.9	26.2	
Hori	2400.000	AV	51.2	27.4	2.2	32.4	48.4	-	-	- See 20dBc Data Sheet
Hori	4804.000	AV	36.9	31.6	4.0	31.4	41.1	53.9	12.8	
Hori	7206.000	AV	36.8	36.3	4.7	32.4	45.4	53.9	8.5	
Hori	9608.000	AV	38.2	38.1	5.5	33.0	48.8	53.9	5.1	
Hori	24020.000	AV	33.2	37.9	-1.8	31.1	38.2	53.9	15.7	NS
Vert	171.821	QP	48.2	15.9	8.9	32.2	40.8	43.5	2.7	
Vert	200.449	QP	44.3	17.0	9.2	32.2	38.3	-	-	- See 20dBc Data Sheet
Vert	300.684	QP	45.5	14.3	10.0	32.1	37.7	-	-	- See 20dBc Data Sheet
Vert	314.996	QP	47.1	14.9	10.1	32.1	40.0	-	-	- See 20dBc Data Sheet
Vert	329.311	QP	44.1	15.4	10.2	32.1	37.6	46.0	8.4	
Vert	357.954	QP	44.1	16.4	10.4	32.1	38.8	-	-	- See 20dBc Data Sheet
Vert	429.543	QP	41.7	17.9	10.9	32.0	38.5	-	-	- See 20dBc Data Sheet
Vert	2390.000	PK	48.0	27.4	2.2	32.4	45.2	73.9	28.7	
Vert	2400.000	PK	64.2	27.4	2.2	32.4	61.4	-	-	- See 20dBc Data Sheet
Vert	4804.000	PK	47.4	31.6	4.0	31.4	51.6	73.9	22.3	
Vert	7206.000	PK	46.2	36.3	4.7	32.4	54.8	73.9	19.1	
Vert	9608.000	PK	48.4	38.1	5.5	33.0	59.0	73.9	14.9	
Vert	24020.000	PK	45.9	37.9	-1.8	31.1	50.9	73.9	23.0	NS
Vert	2390.000	AV	30.8	27.4	2.2	32.4	28.0	53.9	25.9	
Vert	2400.000	AV	52.8	27.4	2.2	32.4	50.0	-	-	- See 20dBc Data Sheet
Vert	4804.000	AV	40.2	31.6	4.0	31.4	44.4	53.9	9.5	
Vert	7206.000	AV	37.6	36.3	4.7	32.4	46.2	53.9	7.7	
Vert	9608.000	AV	37.4	38.1	5.5	33.0	48.0	53.9	5.9	
Vert	24020.000	AV	33.2	37.9	-1.8	31.1	38.2	53.9	15.7	NS

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission
20dBc data sheet

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura
Mode : Tx, DH5 2402MHz

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	98.6	27.4	2.2	32.4	95.8	-	-	Carrier
Hori	200.451	PK	50.6	17.0	9.2	32.2	44.6	75.8	31.2	
Hori	300.684	PK	56.7	14.3	10.0	32.1	48.9	75.8	26.9	
Hori	315.002	PK	52.3	14.9	10.1	32.1	45.2	75.8	30.6	
Hori	357.952	PK	49.2	16.4	10.4	32.1	43.9	75.8	31.9	
Hori	429.540	PK	46.1	17.9	10.9	32.0	42.9	75.8	32.9	
Hori	2400.000	PK	62.0	27.4	2.2	32.4	59.2	75.8	16.6	
Vert	2402.000	PK	100.3	27.4	2.2	32.4	97.5	-	-	Carrier
Vert	200.449	PK	45.1	17.0	9.2	32.2	39.1	77.5	38.4	
Vert	300.684	PK	45.8	14.3	10.0	32.1	38.0	77.5	39.5	
Vert	314.996	PK	47.7	14.9	10.1	32.1	40.6	77.5	36.9	
Vert	357.954	PK	44.2	16.4	10.4	32.1	38.9	77.5	38.6	
Vert	429.543	PK	42.0	17.9	10.9	32.0	38.8	77.5	38.7	
Vert	2400.000	PK	62.7	27.4	2.2	32.4	59.9	77.5	17.6	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0086-HO-01
Date 06/12/2012
Temperature/ Humidity 23 deg.C/ 58% RH
Engineer Motoya Imura

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	171.820	QP	48.9	15.9	8.9	32.2	41.5	43.5	2.0	
Hori	200.445	QP	50.5	17.0	9.2	32.2	44.5	-	-	- See 20dBc Data Sheet
Hori	300.685	QP	56.7	14.3	10.0	32.1	48.9	-	-	- See 20dBc Data Sheet
Hori	315.003	QP	51.4	14.9	10.1	32.1	44.3	-	-	- See 20dBc Data Sheet
Hori	329.323	QP	49.2	15.4	10.2	32.1	42.7	46.0	3.3	
Hori	357.952	QP	49.1	16.4	10.4	32.1	43.8	-	-	- See 20dBc Data Sheet
Hori	429.548	QP	45.7	17.9	10.9	32.0	42.5	-	-	- See 20dBc Data Sheet
Hori	4882.000	PK	45.4	31.9	3.9	31.4	49.8	73.9	24.1	
Hori	7323.000	PK	47.0	36.5	4.7	32.5	55.7	73.9	18.2	
Hori	9764.000	PK	48.2	38.3	5.5	33.0	59.0	73.9	14.9	
Hori	24410.000	PK	46.3	38.0	-1.7	30.9	51.7	73.9	22.2	NS
Hori	4882.000	AV	37.1	31.9	3.9	31.4	41.5	53.9	12.4	
Hori	7323.000	AV	38.4	36.5	4.7	32.5	47.1	53.9	6.8	
Hori	9764.000	AV	37.4	38.3	5.5	33.0	48.2	53.9	5.7	
Hori	24410.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	NS
Vert	171.808	QP	46.3	15.9	8.9	32.2	38.9	43.5	4.6	
Vert	200.450	QP	45.0	17.0	9.2	32.2	39.0	-	-	- See 20dBc Data Sheet
Vert	300.678	QP	45.9	14.3	10.0	32.1	38.1	-	-	- See 20dBc Data Sheet
Vert	315.002	QP	47.1	14.9	10.1	32.1	40.0	-	-	- See 20dBc Data Sheet
Vert	329.316	QP	44.4	15.4	10.2	32.1	37.9	46.0	8.1	
Vert	357.946	QP	44.0	16.4	10.4	32.1	38.7	-	-	- See 20dBc Data Sheet
Vert	429.540	QP	41.5	17.9	10.9	32.0	38.3	-	-	- See 20dBc Data Sheet
Vert	4882.000	PK	47.0	31.9	3.9	31.4	51.4	73.9	22.5	
Vert	7323.000	PK	46.1	36.5	4.7	32.5	54.8	73.9	19.1	
Vert	9764.000	PK	45.2	38.3	5.5	33.0	56.0	73.9	17.9	
Vert	24410.000	PK	46.3	38.0	-1.7	30.9	51.7	73.9	22.2	NS
Vert	4882.000	AV	39.8	31.9	3.9	31.4	44.2	53.9	9.7	
Vert	7323.000	AV	37.5	36.5	4.7	32.5	46.2	53.9	7.7	
Vert	9764.000	AV	35.0	38.3	5.5	33.0	45.8	53.9	8.1	
Vert	24410.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	NS

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
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission
20dBc data sheet

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura
Mode : Tx, DH5 2441MHz

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	2441.000	PK	97.2	27.6	2.2	32.4	94.6	-	-	Carrier
	200.445	PK	50.6	17.0	9.2	32.2	44.6	74.6	30.0	
	300.685	PK	56.8	14.3	10.0	32.1	49.0	74.6	25.6	
	315.003	PK	51.8	14.9	10.1	32.1	44.7	74.6	29.9	
	357.952	PK	49.5	16.4	10.4	32.1	44.2	74.6	30.4	
	429.548	PK	46.0	17.9	10.9	32.0	42.8	74.6	31.8	
Vert	2441.000	PK	99.3	27.6	2.2	32.4	96.7	-	-	Carrier
	200.450	PK	45.1	17.0	9.2	32.2	39.1	76.7	37.6	
	300.678	PK	46.1	14.3	10.0	32.1	38.3	76.7	38.4	
	315.002	PK	48.0	14.9	10.1	32.1	40.9	76.7	35.8	
	357.946	PK	44.1	16.4	10.4	32.1	38.8	76.7	37.9	
	429.540	PK	42.0	17.9	10.9	32.0	38.8	76.7	37.9	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0086-HO-01
Date 06/12/2012
Temperature/ Humidity 23 deg.C/ 58% RH
Engineer Motoya Imura

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	171.816	QP	48.9	15.9	8.9	32.2	41.5	43.5	2.0	
Hori	200.448	QP	50.3	17.0	9.2	32.2	44.3	-	-	See 20dBc Data Sheet
Hori	300.682	QP	56.0	14.3	10.0	32.1	48.2	-	-	See 20dBc Data Sheet
Hori	315.002	QP	51.6	14.9	10.1	32.1	44.5	-	-	See 20dBc Data Sheet
Hori	329.311	QP	49.1	15.4	10.2	32.1	42.6	46.0	3.4	
Hori	357.956	QP	49.2	16.4	10.4	32.1	43.9	-	-	See 20dBc Data Sheet
Hori	429.542	QP	46.1	17.9	10.9	32.0	42.9	-	-	See 20dBc Data Sheet
Hori	2483.500	PK	50.2	27.7	2.2	32.3	47.8	73.9	26.1	
Hori	4960.000	PK	45.9	32.2	4.0	31.4	50.7	73.9	23.2	
Hori	7440.000	PK	45.9	36.7	4.8	32.6	54.8	73.9	19.1	
Hori	9920.000	PK	44.1	38.6	5.6	33.1	55.2	73.9	18.7	
Hori	24800.000	PK	46.3	38.1	-1.6	30.8	52.0	73.9	21.9	NS
Hori	2483.500	AV	34.1	27.7	2.2	32.3	31.7	53.9	22.2	
Hori	4960.000	AV	38.9	32.2	4.0	31.4	43.7	53.9	10.2	
Hori	7440.000	AV	36.7	36.7	4.8	32.6	45.6	53.9	8.3	
Hori	9920.000	AV	32.3	38.6	5.6	33.1	43.4	53.9	10.5	
Hori	24800.000	AV	34.6	38.1	-1.6	30.8	40.3	53.9	13.6	NS
Vert	171.821	QP	46.8	15.9	8.9	32.2	39.4	43.5	4.1	
Vert	200.449	QP	45.2	17.0	9.2	32.2	39.2	-	-	See 20dBc Data Sheet
Vert	300.684	QP	46.3	14.3	10.0	32.1	38.5	-	-	See 20dBc Data Sheet
Vert	314.996	QP	47.5	14.9	10.1	32.1	40.4	-	-	See 20dBc Data Sheet
Vert	329.311	QP	44.1	15.4	10.2	32.1	37.6	46.0	8.4	
Vert	357.954	QP	44.1	16.4	10.4	32.1	38.8	-	-	See 20dBc Data Sheet
Vert	429.543	QP	41.7	17.9	10.9	32.0	38.5	-	-	See 20dBc Data Sheet
Vert	2483.500	PK	50.4	27.7	2.2	32.3	48.0	73.9	25.9	
Vert	4960.000	PK	49.0	32.2	4.0	31.4	53.8	73.9	20.1	
Vert	7440.000	PK	45.2	36.7	4.8	32.6	54.1	73.9	19.8	
Vert	9920.000	PK	44.0	38.6	5.6	33.1	55.1	73.9	18.8	
Vert	24800.000	PK	46.3	38.1	-1.6	30.8	52.0	73.9	21.9	NS
Vert	2483.500	AV	34.2	27.7	2.2	32.3	31.8	53.9	22.1	
Vert	4960.000	AV	43.1	32.2	4.0	31.4	47.9	53.9	6.0	
Vert	7440.000	AV	36.9	36.7	4.8	32.6	45.8	53.9	8.1	
Vert	9920.000	AV	32.3	38.6	5.6	33.1	43.4	53.9	10.5	
Vert	24800.000	AV	34.6	38.1	-1.6	30.8	40.3	53.9	13.6	NS

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission
20dBc Data sheet

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura
Mode : Tx, DH5 2480MHz

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	2480.000	PK	95.2	27.7	2.2	32.3	92.8	-	-	Carrier
Hori	200.448	PK	50.3	17.0	9.2	32.2	44.3	72.8	28.5	
Hori	300.682	PK	56.2	14.3	10.0	32.1	48.4	72.8	24.4	
Hori	315.002	PK	52.0	14.9	10.1	32.1	44.9	72.8	27.9	
Hori	357.956	PK	49.5	16.4	10.4	32.1	44.2	72.8	28.6	
Hori	429.542	PK	46.9	17.9	10.9	32.0	43.7	72.8	29.1	
Vert	2480.000	PK	96.0	27.7	2.2	32.3	93.6	-	-	Carrier
Vert	200.449	PK	45.3	17.0	9.2	32.2	39.3	73.6	34.3	
Vert	300.684	PK	46.3	14.3	10.0	32.1	38.5	73.6	35.1	
Vert	314.996	PK	48.2	14.9	10.1	32.1	41.1	73.6	32.5	
Vert	357.954	PK	44.1	16.4	10.4	32.1	38.8	73.6	34.8	
Vert	429.543	PK	42.0	17.9	10.9	32.0	38.8	73.6	34.8	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura

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	171.822	QP	48.8	15.9	8.9	32.2	41.4	43.5	2.1	
Hori	200.451	QP	50.3	17.0	9.2	32.2	44.3	-	-	- See 20dBc Data Sheet
Hori	300.684	QP	55.7	14.3	10.0	32.1	47.9	-	-	- See 20dBc Data Sheet
Hori	315.002	QP	51.8	14.9	10.1	32.1	44.7	-	-	- See 20dBc Data Sheet
Hori	329.311	QP	49.1	15.4	10.2	32.1	42.6	46.0	3.4	
Hori	357.956	QP	49.3	16.4	10.4	32.1	44.0	-	-	- See 20dBc Data Sheet
Hori	429.542	QP	46.8	17.9	10.9	32.0	43.6	-	-	- See 20dBc Data Sheet
Hori	2390.000	PK	44.3	27.4	2.2	32.4	41.5	73.9	32.4	
Hori	2400.000	PK	59.4	27.4	2.2	32.4	56.6	-	-	- See 20dBc Data Sheet
Hori	4804.000	PK	44.1	31.6	4.0	31.4	48.3	73.9	25.6	
Hori	7206.000	PK	43.7	36.3	4.7	32.4	52.3	73.9	21.6	
Hori	9608.000	PK	43.8	38.1	5.5	33.0	54.4	73.9	19.5	NS
Hori	24020.000	PK	45.9	37.9	-1.8	31.1	50.9	73.9	23.0	NS
Hori	2390.000	AV	30.3	27.4	2.2	32.4	27.5	53.9	26.4	
Hori	2400.000	AV	43.5	27.4	2.2	32.4	40.7	-	-	- See 20dBc Data Sheet
Hori	4804.000	AV	34.5	31.6	4.0	31.4	38.7	53.9	15.2	
Hori	7206.000	AV	32.1	36.3	4.7	32.4	40.7	53.9	13.2	
Hori	9608.000	AV	32.6	38.1	5.5	33.0	43.2	53.9	10.7	NS
Hori	24020.000	AV	33.2	37.9	-1.8	31.1	38.2	53.9	15.7	NS
Vert	171.821	QP	46.7	15.9	8.9	32.2	39.3	43.5	4.2	
Vert	200.451	QP	45.3	17.0	9.2	32.2	39.3	-	-	- See 20dBc Data Sheet
Vert	300.684	QP	46.3	14.3	10.0	32.1	38.5	-	-	- See 20dBc Data Sheet
Vert	314.998	QP	47.5	14.9	10.1	32.1	40.4	-	-	- See 20dBc Data Sheet
Vert	329.311	QP	44.7	15.4	10.2	32.1	38.2	46.0	7.8	
Vert	357.961	QP	44.1	16.4	10.4	32.1	38.8	-	-	- See 20dBc Data Sheet
Vert	429.543	QP	41.8	17.9	10.9	32.0	38.6	-	-	- See 20dBc Data Sheet
Vert	2390.000	PK	44.6	27.4	2.2	32.4	41.8	73.9	32.1	
Vert	2400.000	PK	63.7	27.4	2.2	32.4	60.9	-	-	- See 20dBc Data Sheet
Vert	4804.000	PK	46.1	31.6	4.0	31.4	50.3	73.9	23.6	
Vert	7206.000	PK	44.1	36.3	4.7	32.4	52.7	73.9	21.2	
Vert	9608.000	PK	43.8	38.1	5.5	33.0	54.4	73.9	19.5	NS
Vert	24020.000	PK	45.9	37.9	-1.8	31.1	50.9	73.9	23.0	NS
Vert	2390.000	AV	30.8	27.4	2.2	32.4	28.0	53.9	25.9	
Vert	2400.000	AV	48.2	27.4	2.2	32.4	45.4	-	-	- See 20dBc Data Sheet
Vert	4804.000	AV	37.3	31.6	4.0	31.4	41.5	53.9	12.4	
Vert	7206.000	AV	33.2	36.3	4.7	32.4	41.8	53.9	12.1	
Vert	9608.000	AV	32.6	38.1	5.5	33.0	43.2	53.9	10.7	NS
Vert	24020.000	AV	33.2	37.9	-1.8	31.1	38.2	53.9	15.7	NS

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission
20dBc data sheet

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura
Mode : Tx, 3DH5 2402MHz

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	94.4	27.4	2.2	32.4	91.6	-	-	Carrier
Hori	200.451	PK	50.4	17.0	9.2	32.2	44.4	71.6	27.2	
Hori	300.684	PK	55.9	14.3	10.0	32.1	48.1	71.6	23.5	
Hori	315.002	PK	52.0	14.9	10.1	32.1	44.9	71.6	26.7	
Hori	357.956	PK	49.4	16.4	10.4	32.1	44.1	71.6	27.5	
Hori	429.542	PK	47.2	17.9	10.9	32.0	44.0	71.6	27.6	
Hori	2400.000	PK	45.2	27.4	2.2	32.4	42.4	71.6	29.2	
Vert	2402.000	PK	99.2	27.4	2.2	32.4	96.4	-	-	Carrier
Vert	200.451	PK	45.4	17.0	9.2	32.2	39.4	76.4	37.0	
Vert	300.684	PK	46.3	14.3	10.0	32.1	38.5	76.4	37.9	
Vert	314.998	PK	48.0	14.9	10.1	32.1	40.9	76.4	35.5	
Vert	357.961	PK	44.1	16.4	10.4	32.1	38.8	76.4	37.6	
Vert	429.543	PK	42.0	17.9	10.9	32.0	38.8	76.4	37.6	
Vert	2400.000	PK	49.6	27.4	2.2	32.4	46.8	76.4	29.6	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Report No. : 32JE0086-HO-01
 Date : 06/12/2012
 Temperature/ Humidity : 23 deg.C/ 58% RH
 Engineer : Motoya Imura

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	171.822	QP	48.9	15.9	8.9	32.2	41.5	43.5	2.0	
Hori	200.446	QP	50.7	17.0	9.2	32.2	44.7	-	-	- See 20dBc Data Sheet
Hori	300.684	QP	56.1	14.3	10.0	32.1	48.3	-	-	- See 20dBc Data Sheet
Hori	315.002	QP	51.6	14.9	10.1	32.1	44.5	-	-	- See 20dBc Data Sheet
Hori	329.312	QP	49.1	15.4	10.2	32.1	42.6	46.0	3.4	
Hori	357.956	QP	49.2	16.4	10.4	32.1	43.9	-	-	- See 20dBc Data Sheet
Hori	429.544	QP	46.3	17.9	10.9	32.0	43.1	-	-	- See 20dBc Data Sheet
Hori	4882.000	PK	44.3	31.9	3.9	31.4	48.7	73.9	25.2	
Hori	7323.000	PK	43.2	36.5	4.7	32.5	51.9	73.9	22.0	
Hori	9764.000	PK	43.2	38.3	5.5	33.0	54.0	73.9	19.9	
Hori	24410.000	PK	46.3	38.0	-1.7	30.9	51.7	73.9	22.2	NS
Hori	4882.000	AV	34.3	31.9	3.9	31.4	38.7	53.9	15.2	
Hori	7323.000	AV	32.2	36.5	4.7	32.5	40.9	53.9	13.0	
Hori	9764.000	AV	32.5	38.3	5.5	33.0	43.3	53.9	10.6	
Hori	24410.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	NS
Vert	171.822	QP	47.1	15.9	8.9	32.2	39.7	43.5	3.8	
Vert	200.448	QP	45.2	17.0	9.2	32.2	39.2	-	-	- See 20dBc Data Sheet
Vert	300.684	QP	46.3	14.3	10.0	32.1	38.5	-	-	- See 20dBc Data Sheet
Vert	315.002	QP	47.4	14.9	10.1	32.1	40.3	-	-	- See 20dBc Data Sheet
Vert	329.312	QP	44.1	15.4	10.2	32.1	37.6	46.0	8.4	
Vert	357.955	QP	44.1	16.4	10.4	32.1	38.8	-	-	- See 20dBc Data Sheet
Vert	429.543	QP	41.7	17.9	10.9	32.0	38.5	-	-	- See 20dBc Data Sheet
Vert	4882.000	PK	46.0	31.9	3.9	31.4	50.4	73.9	23.5	
Vert	7323.000	PK	42.3	36.5	4.7	32.5	51.0	73.9	22.9	
Vert	9764.000	PK	43.2	38.3	5.5	33.0	54.0	73.9	19.9	
Vert	24410.000	PK	46.3	38.0	-1.7	30.9	51.7	73.9	22.2	NS
Vert	4882.000	AV	37.5	31.9	3.9	31.4	41.9	53.9	12.0	
Vert	7323.000	AV	32.0	36.5	4.7	32.5	40.7	53.9	13.2	
Vert	9764.000	AV	32.4	38.3	5.5	33.0	43.2	53.9	10.7	
Vert	24410.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	NS

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 $20\log(3.0m/1.0m)= 9.5dB$
 26.5GHz-40GHz $20\log(3.0m/0.5m)=15.6dB$

Radiated Spurious Emission
20dBc data sheet

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0086-HO-01
Date 06/12/2012
Temperature/ Humidity 23 deg.C/ 58% RH
Engineer Motoya Imura
Mode Tx, 3DH5 2441MHz

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	2441.000	PK	94.0	27.6	2.2	32.4	91.4	-	-	Carrier
	200.446	PK	51.0	17.0	9.2	32.2	45.0	71.4	26.4	
	300.684	PK	56.2	14.3	10.0	32.1	48.4	71.4	23.0	
	315.002	PK	52.0	14.9	10.1	32.1	44.9	71.4	26.5	
	357.956	PK	49.5	16.4	10.4	32.1	44.2	71.4	27.2	
	429.544	PK	47.1	17.9	10.9	32.0	43.9	71.4	27.5	
Vert	2441.000	PK	97.0	27.6	2.2	32.4	94.4	-	-	Carrier
	200.448	PK	45.3	17.0	9.2	32.2	39.3	74.4	35.1	
	300.684	PK	46.3	14.3	10.0	32.1	38.5	74.4	35.9	
	315.002	PK	48.1	14.9	10.1	32.1	41.0	74.4	33.4	
	357.955	PK	44.2	16.4	10.4	32.1	38.9	74.4	35.5	
	429.543	PK	42.1	17.9	10.9	32.0	38.9	74.4	35.5	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0086-HO-01
Date 06/12/2012
Temperature/ Humidity 23 deg.C/ 58% RH
Engineer Motoya Imura

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	171.815	QP	49.1	15.9	8.9	32.2	41.7	43.5	1.8	
Hori	200.448	QP	50.3	17.0	9.2	32.2	44.3	-	-	See 20dBc Data Sheet
Hori	300.688	QP	56.4	14.3	10.0	32.1	48.6	-	-	See 20dBc Data Sheet
Hori	315.002	QP	51.7	14.9	10.1	32.1	44.6	-	-	See 20dBc Data Sheet
Hori	329.314	QP	49.6	15.4	10.2	32.1	43.1	46.0	2.9	
Hori	357.956	QP	49.3	16.4	10.4	32.1	44.0	-	-	See 20dBc Data Sheet
Hori	429.549	QP	46.2	17.9	10.9	32.0	43.0	-	-	See 20dBc Data Sheet
Hori	2483.500	PK	46.9	27.7	2.2	32.3	44.5	73.9	29.4	
Hori	4960.000	PK	44.5	32.2	4.0	31.4	49.3	73.9	24.6	
Hori	7440.000	PK	44.3	36.7	4.8	32.6	53.2	73.9	20.7	
Hori	9920.000	PK	44.2	38.6	5.6	33.1	55.3	73.9	18.6	
Hori	24800.000	PK	46.3	38.1	-1.6	30.8	52.0	73.9	21.9	NS
Hori	2483.500	AV	32.1	27.7	2.2	32.3	29.7	53.9	24.2	
Hori	4960.000	AV	34.7	32.2	4.0	31.4	39.5	53.9	14.4	
Hori	7440.000	AV	33.1	36.7	4.8	32.6	42.0	53.9	11.9	
Hori	9920.000	AV	32.3	38.6	5.6	33.1	43.4	53.9	10.5	
Hori	24800.000	AV	34.6	38.1	-1.6	30.8	40.3	53.9	13.6	NS
Vert	171.814	QP	47.2	15.9	8.9	32.2	39.8	43.5	3.7	
Vert	200.447	QP	45.2	17.0	9.2	32.2	39.2	-	-	See 20dBc Data Sheet
Vert	300.685	QP	46.3	14.3	10.0	32.1	38.5	-	-	See 20dBc Data Sheet
Vert	315.001	QP	47.7	14.9	10.1	32.1	40.6	-	-	See 20dBc Data Sheet
Vert	329.314	QP	44.2	15.4	10.2	32.1	37.7	46.0	8.3	
Vert	357.956	QP	44.3	16.4	10.4	32.1	39.0	-	-	See 20dBc Data Sheet
Vert	429.546	QP	41.8	17.9	10.9	32.0	38.6	-	-	See 20dBc Data Sheet
Vert	2483.500	PK	49.6	27.7	2.2	32.3	47.2	73.9	26.7	
Vert	4960.000	PK	47.8	32.2	4.0	31.4	52.6	73.9	21.3	
Vert	7440.000	PK	44.8	36.7	4.8	32.6	53.7	73.9	20.2	
Vert	9920.000	PK	44.0	38.6	5.6	33.1	55.1	73.9	18.8	
Vert	24800.000	PK	46.3	38.1	-1.6	30.8	52.0	73.9	21.9	NS
Vert	2483.500	AV	32.0	27.7	2.2	32.3	29.6	53.9	24.3	
Vert	4960.000	AV	39.2	32.2	4.0	31.4	44.0	53.9	9.9	
Vert	7440.000	AV	33.2	36.7	4.8	32.6	42.1	53.9	11.8	
Vert	9920.000	AV	32.3	38.6	5.6	33.1	43.4	53.9	10.5	
Vert	24800.000	AV	34.6	38.1	-1.6	30.8	40.3	53.9	13.6	NS

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
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission
20dBc data sheet

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32JE0086-HO-01
Date : 06/12/2012
Temperature/ Humidity : 23 deg.C/ 58% RH
Engineer : Motoya Imura
Mode : Tx, 3DH5 2480MHz

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	2480.000	PK	92.7	27.7	2.2	32.3	90.3	-	-	Carrier
Hori	200.448	PK	50.4	17.0	9.2	32.2	44.4	70.3	25.9	
Hori	300.688	PK	56.6	14.3	10.0	32.1	48.8	70.3	21.5	
Hori	315.002	PK	52.1	14.9	10.1	32.1	45.0	70.3	25.3	
Hori	357.956	PK	49.5	16.4	10.4	32.1	44.2	70.3	26.1	
Hori	429.549	PK	46.9	17.9	10.9	32.0	43.7	70.3	26.6	
Vert	2480.000	PK	93.4	27.7	2.2	32.3	91.0	-	-	Carrier
Vert	200.447	PK	45.4	17.0	9.2	32.2	39.4	71.0	31.6	
Vert	300.685	PK	46.4	14.3	10.0	32.1	38.6	71.0	32.4	
Vert	315.001	PK	48.3	14.9	10.1	32.1	41.2	71.0	29.8	
Vert	357.956	PK	44.4	16.4	10.4	32.1	39.1	71.0	31.9	
Vert	429.546	PK	42.0	17.9	10.9	32.0	38.8	71.0	32.2	

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

*These noises are associated with the intended radiation.

Radiated Spurious Emission
Reference data

Transmitting ON

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2012/06/12

Report No. : 32JE0086-HO-01
Power : DC 12V
Temp./Humi. : 23deg. C / 58% RH
Engineer : Motoya Imura

Mode / Remarks : BT BDR Tx 2402MHz

LIMIT : FCC15.247(d) 3m. below 1GHz:QP
All other spurious emissions were less than 20dB for the limit.

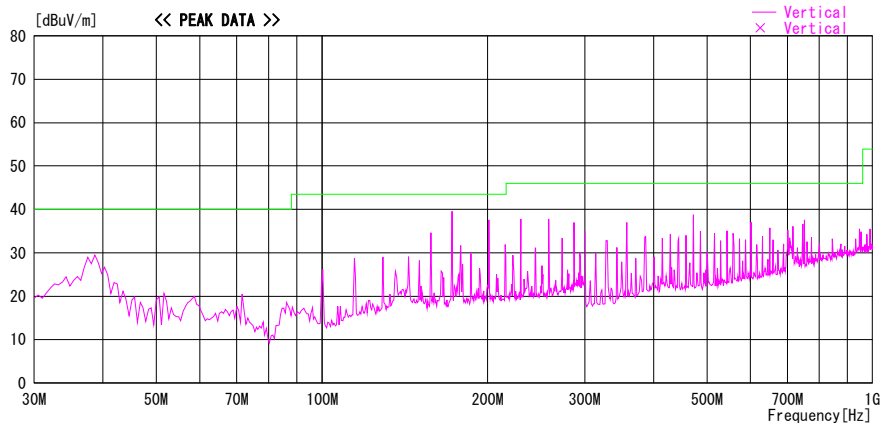
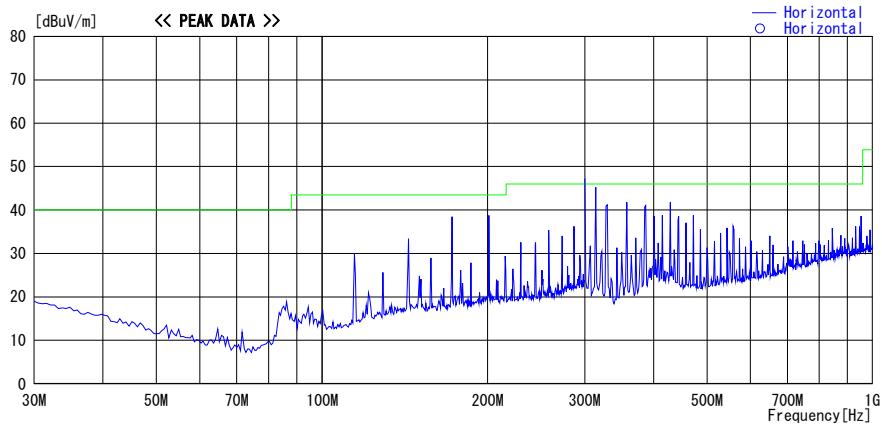


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz--:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)

Radiated Spurious Emission
Reference data

Transmitting OFF

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2012/06/18

Report No. : 32JE0086-HO-01
Power : DC 12V
Temp./Humi. : 23deg. C / 58% RH
Engineer : Motoya Imura

Mode / Remarks : BT Transmitting OFF

LIMIT : FCC15.209 3m. below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.

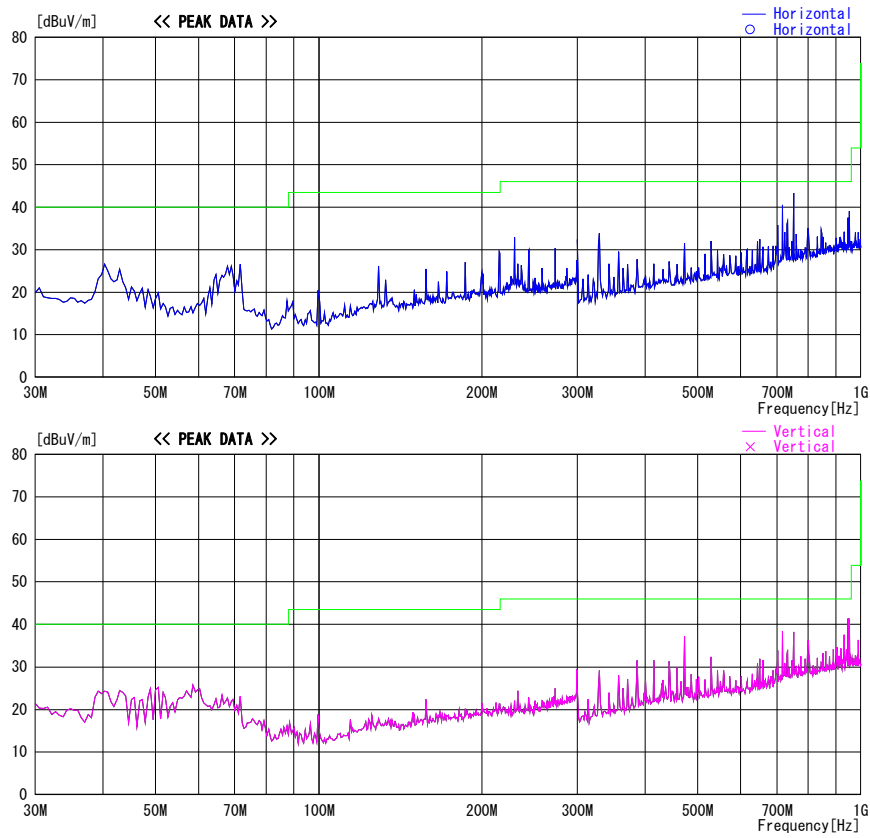
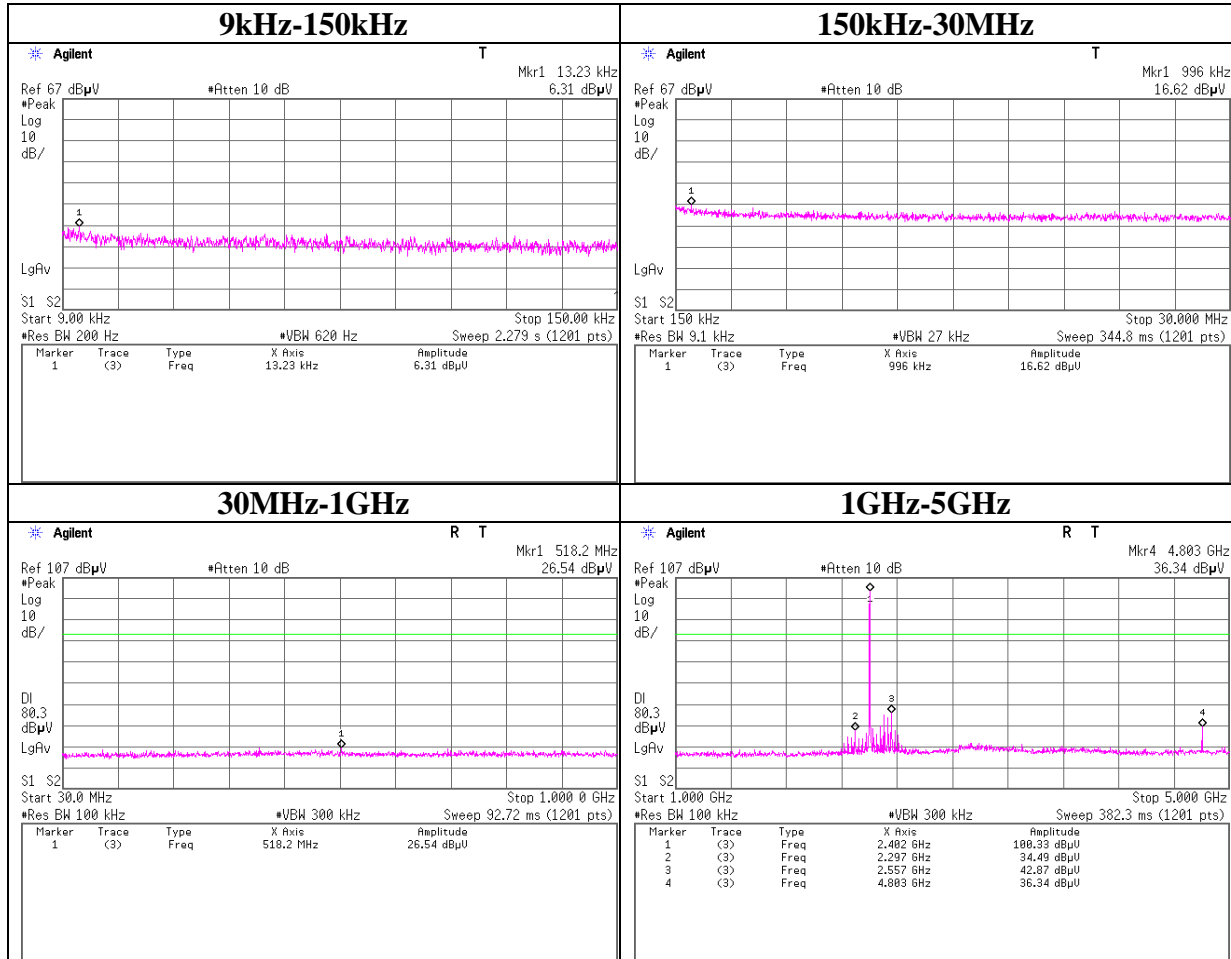


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)

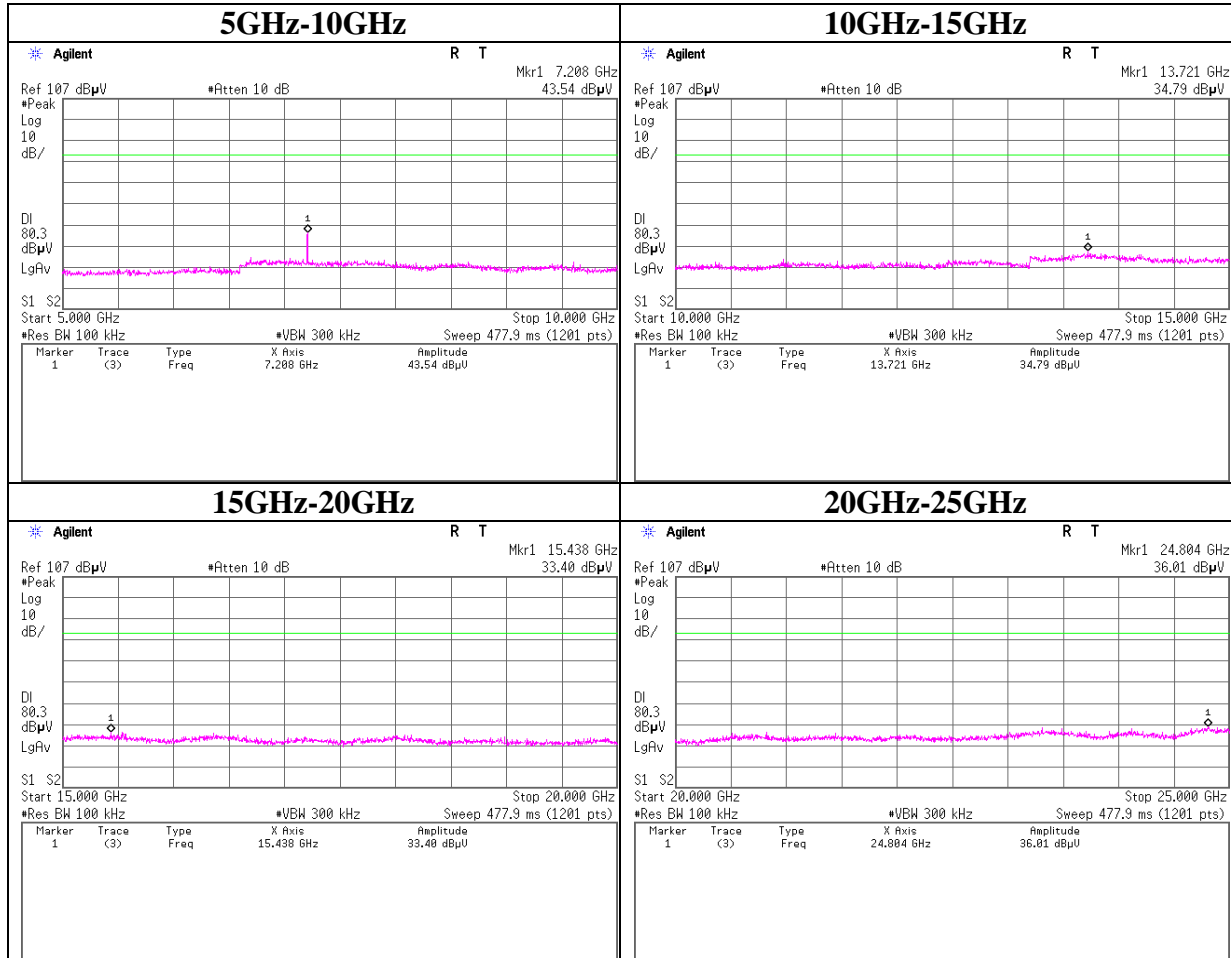
Conducted Spurious Emission

Tx DH5 2402MHz



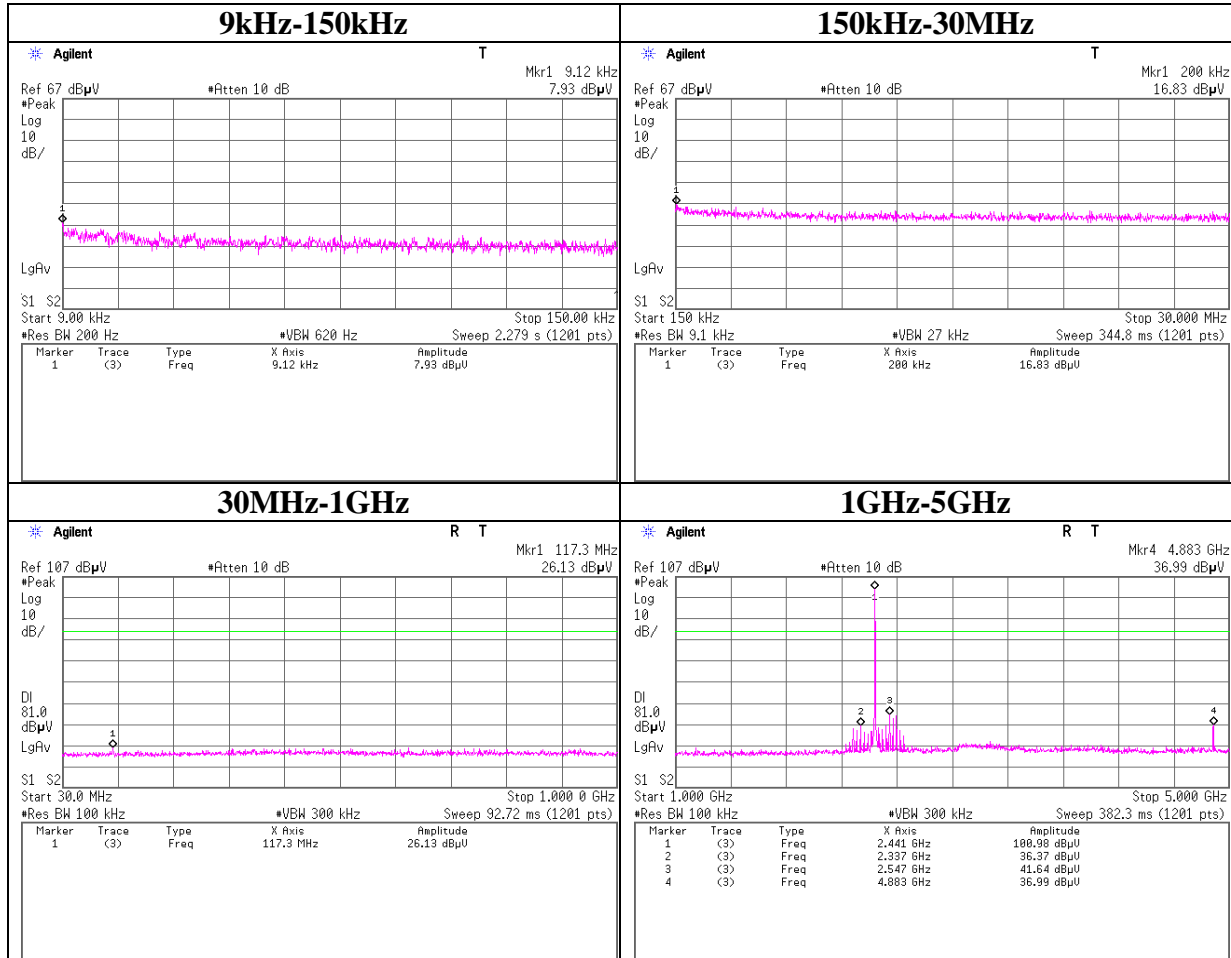
Conducted Spurious Emission

Tx DH5 2402MHz



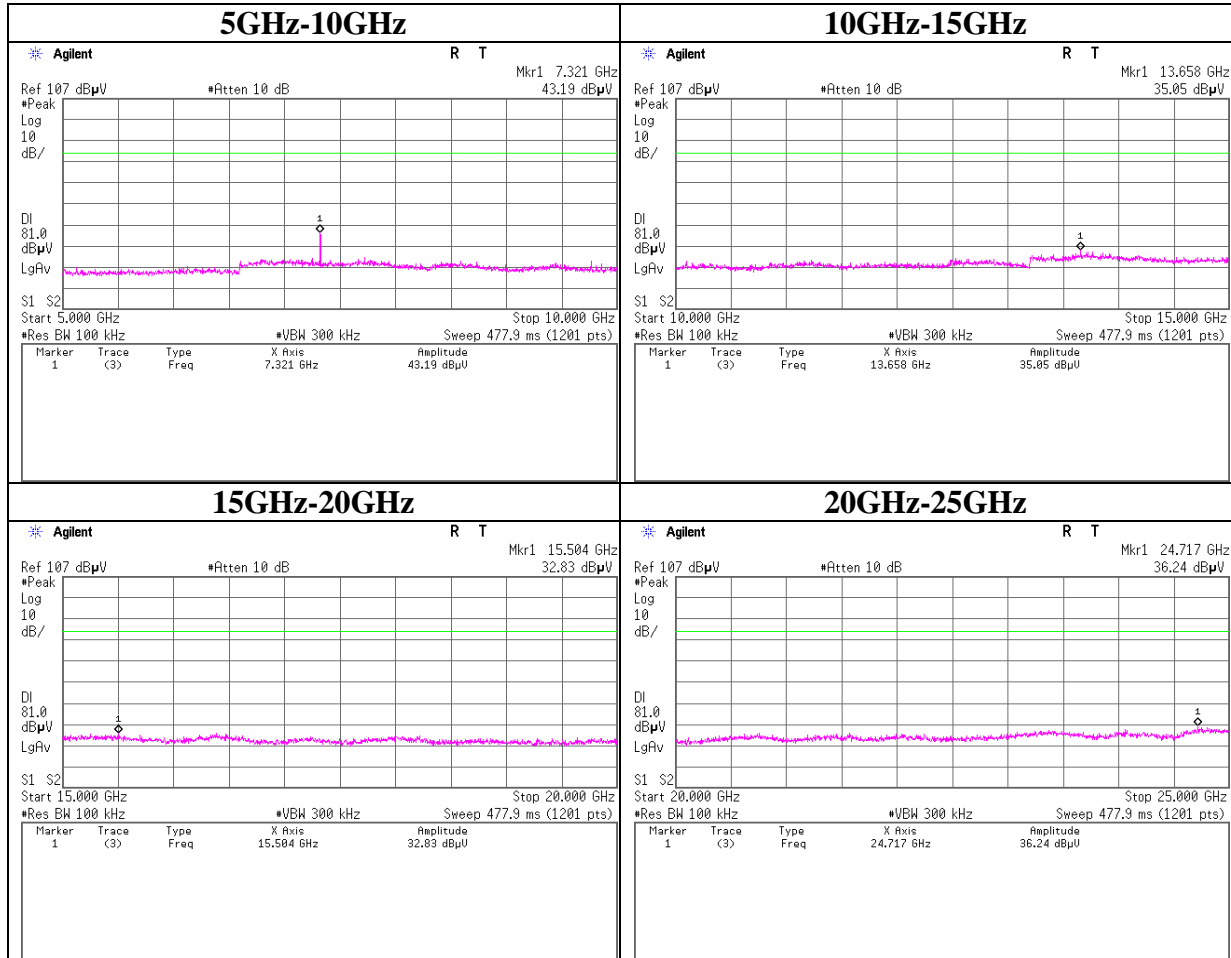
Conducted Spurious Emission

Tx DH5 2441MHz



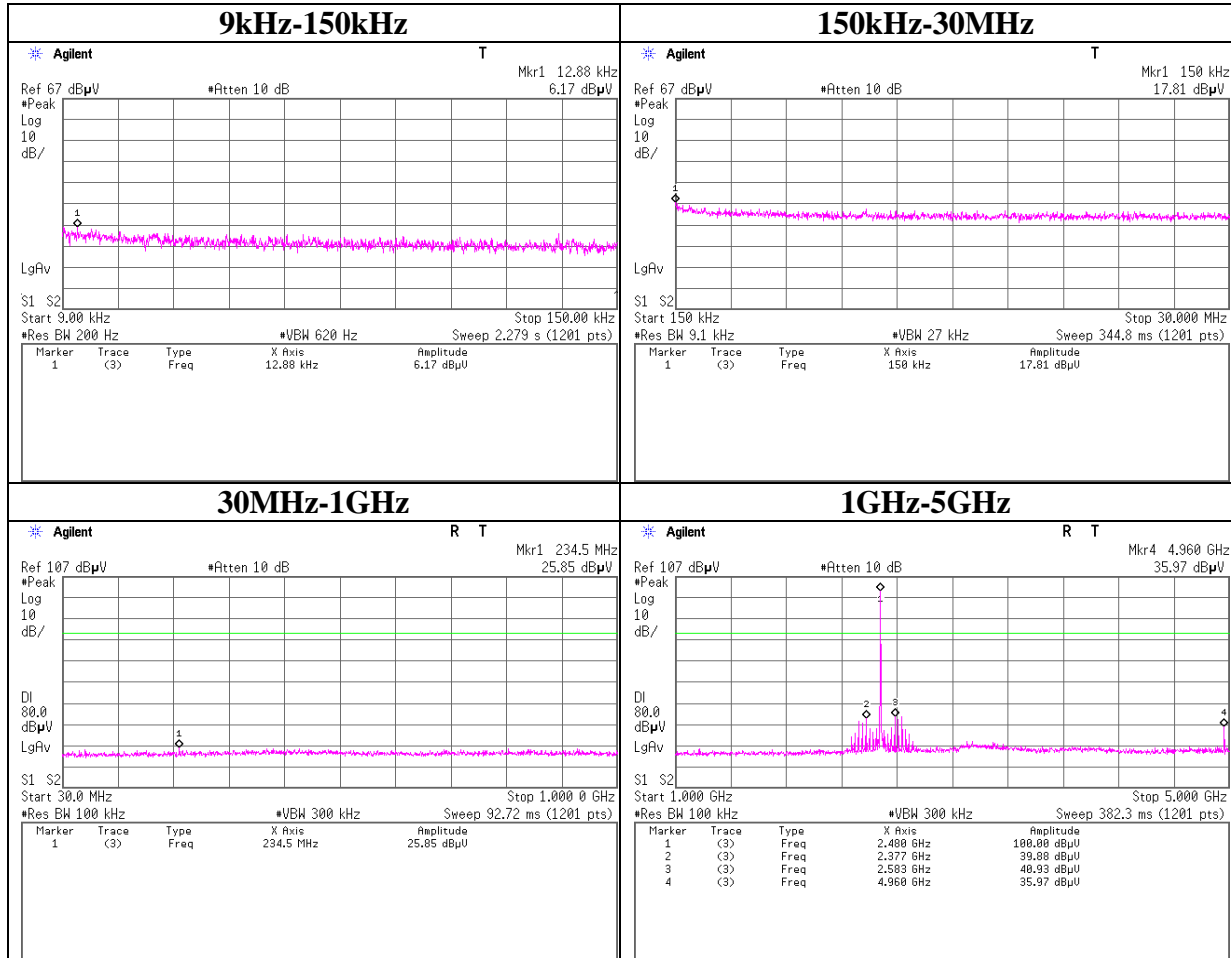
Conducted Spurious Emission

Tx DH5 2441MHz



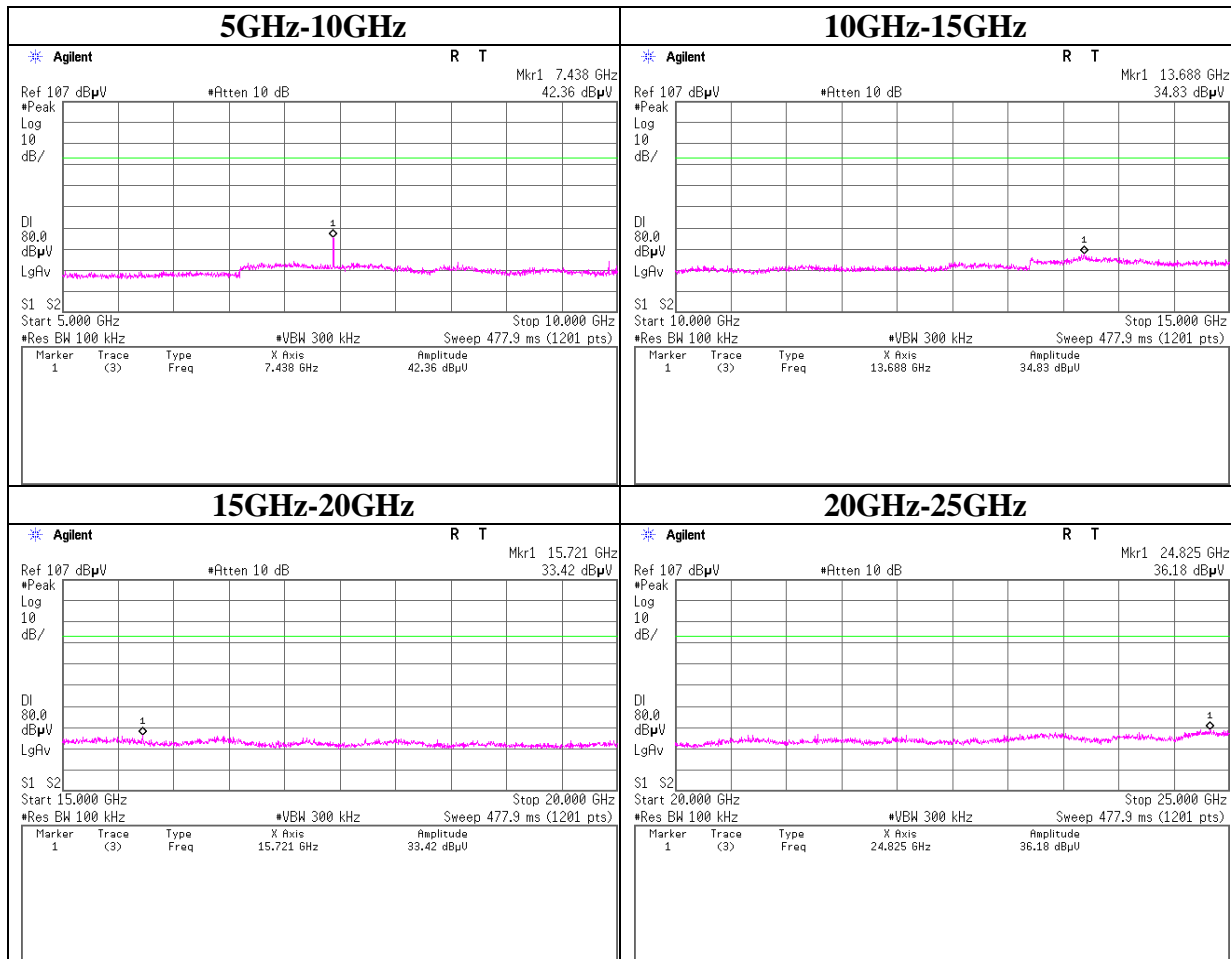
Conducted Spurious Emission

Tx DH5 2480MHz



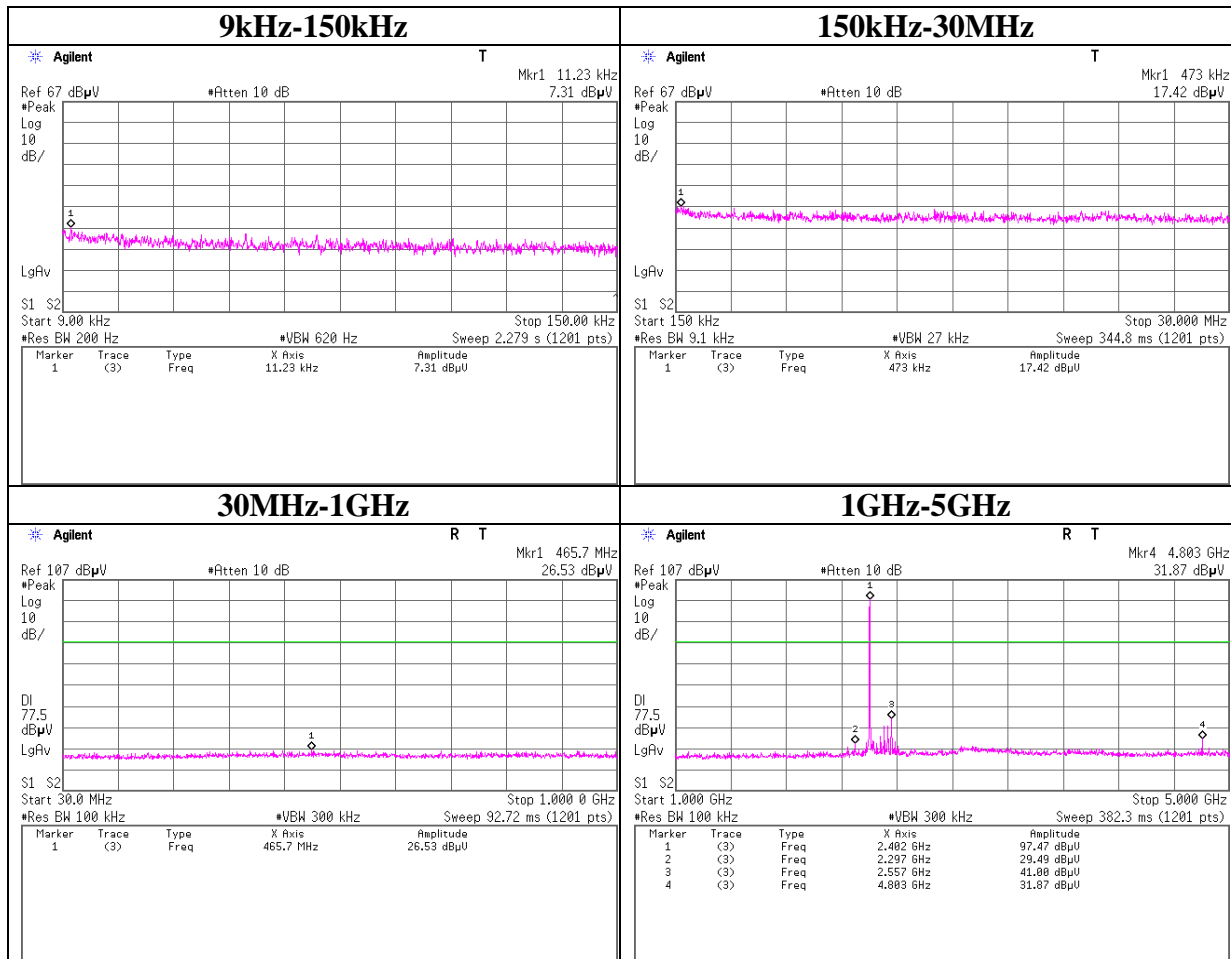
Conducted Spurious Emission

Tx DH5 2480MHz



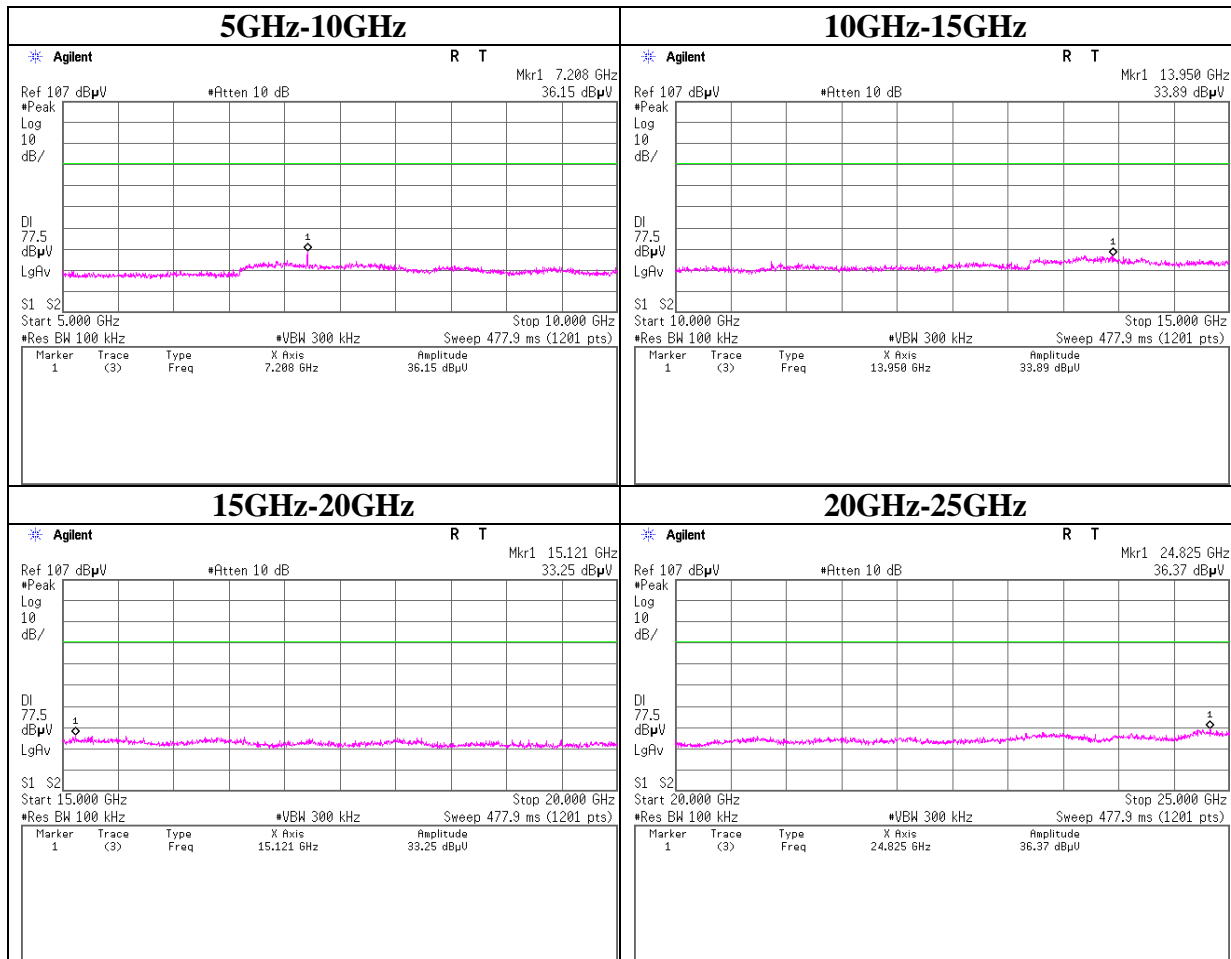
Conducted Spurious Emission

Tx 3DH5 2402MHz



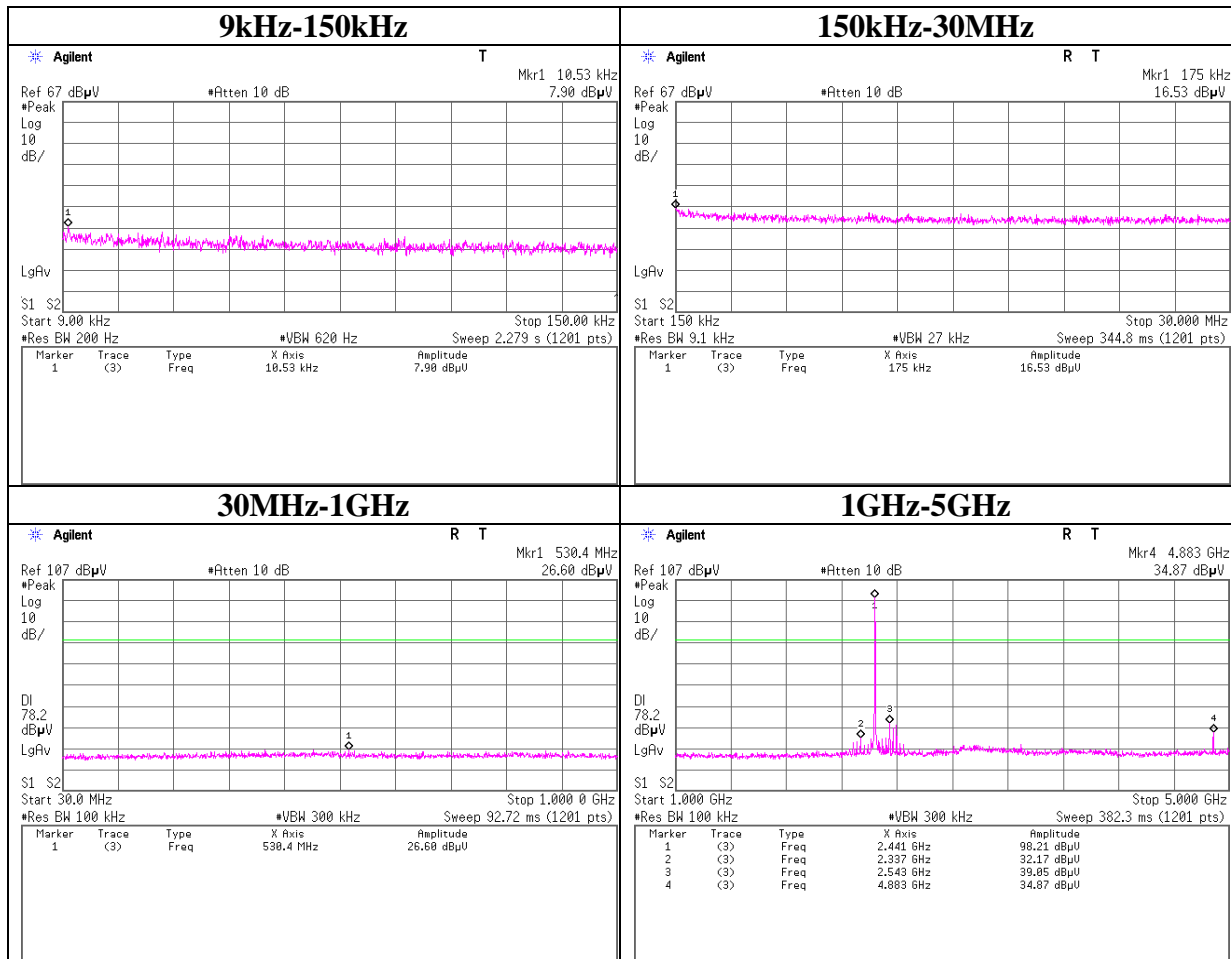
Conducted Spurious Emission

Tx 3DH5 2402MHz



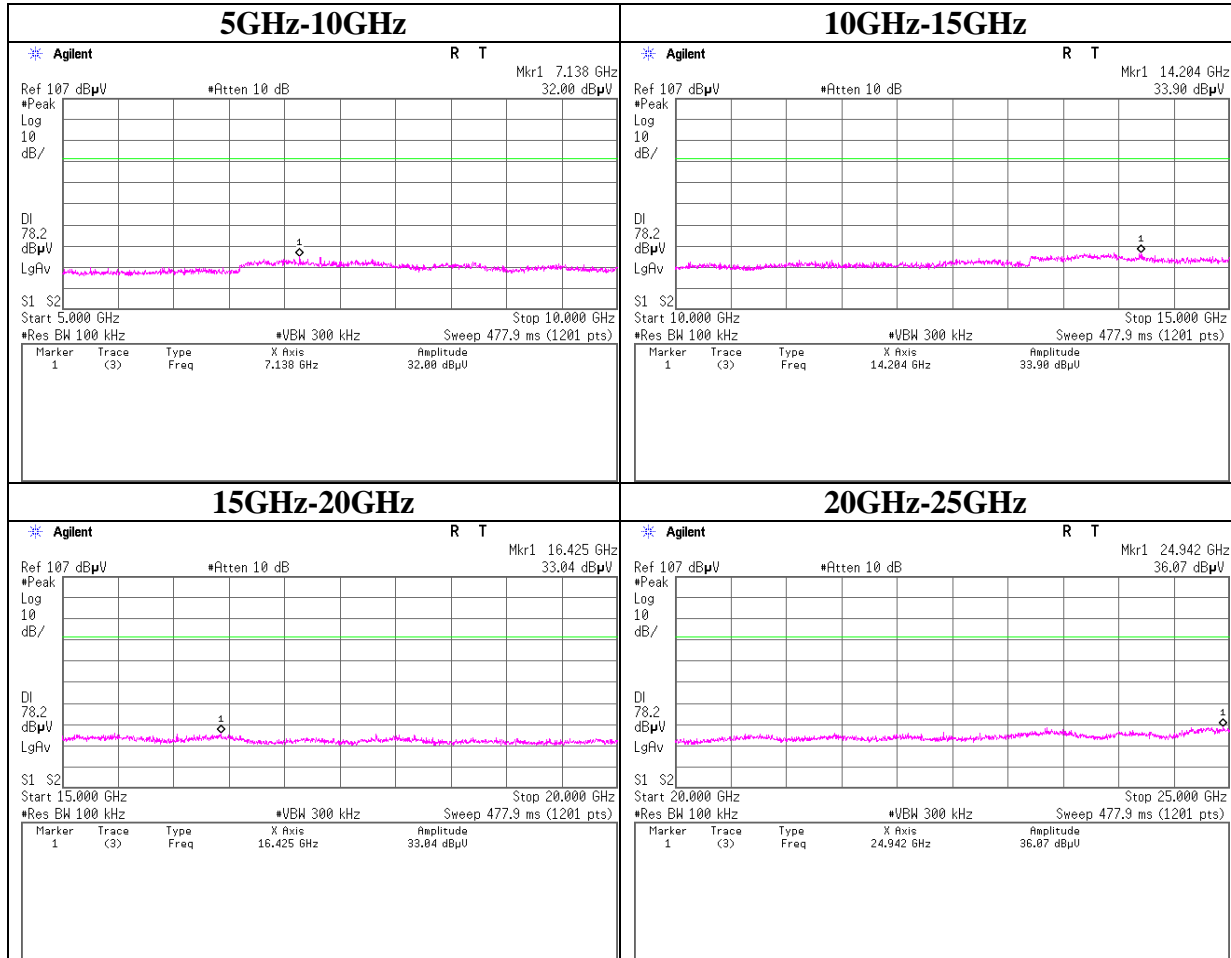
Conducted Spurious Emission

Tx 3DH5 2441MHz



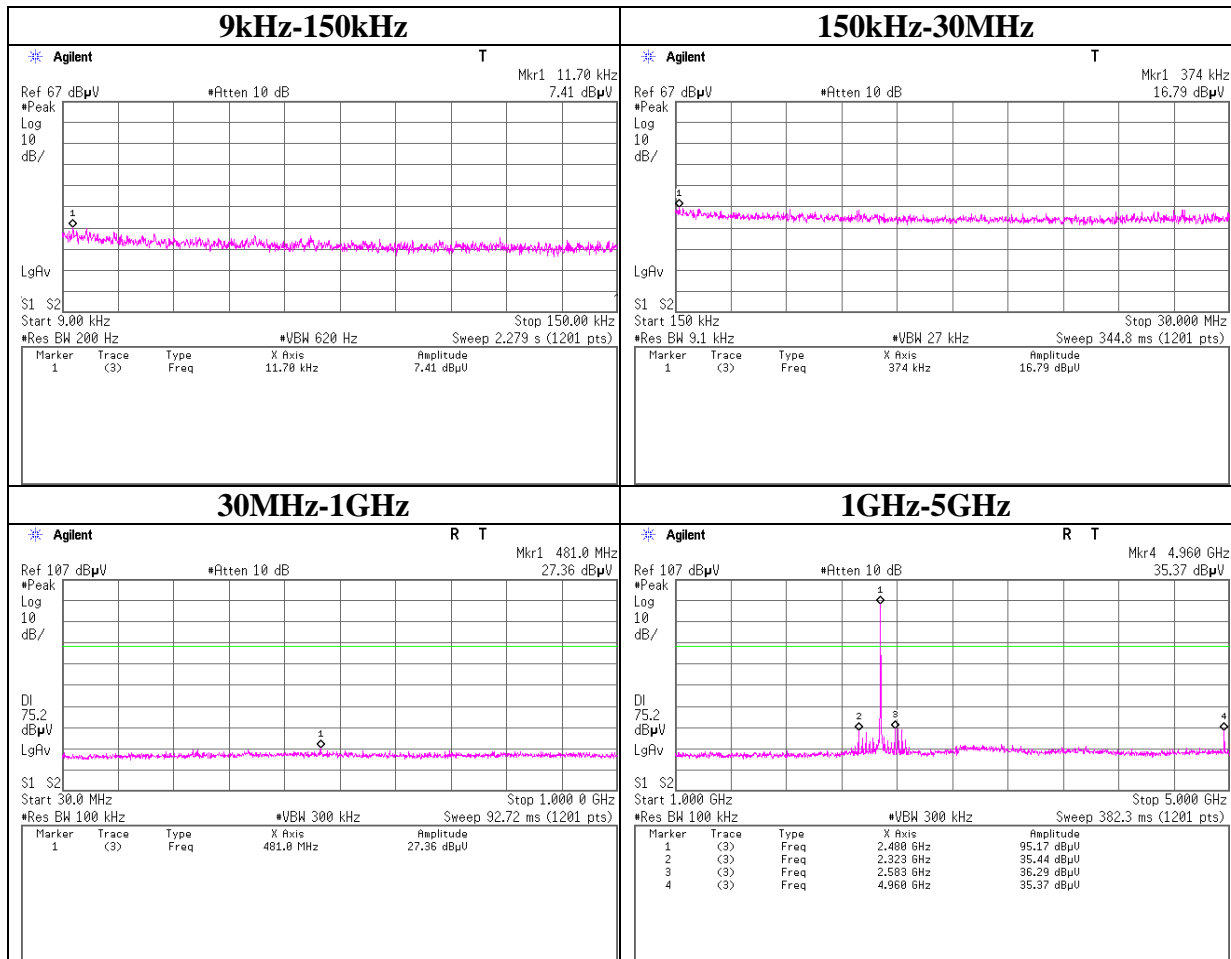
Conducted Spurious Emission

Tx 3DH5 2441MHz



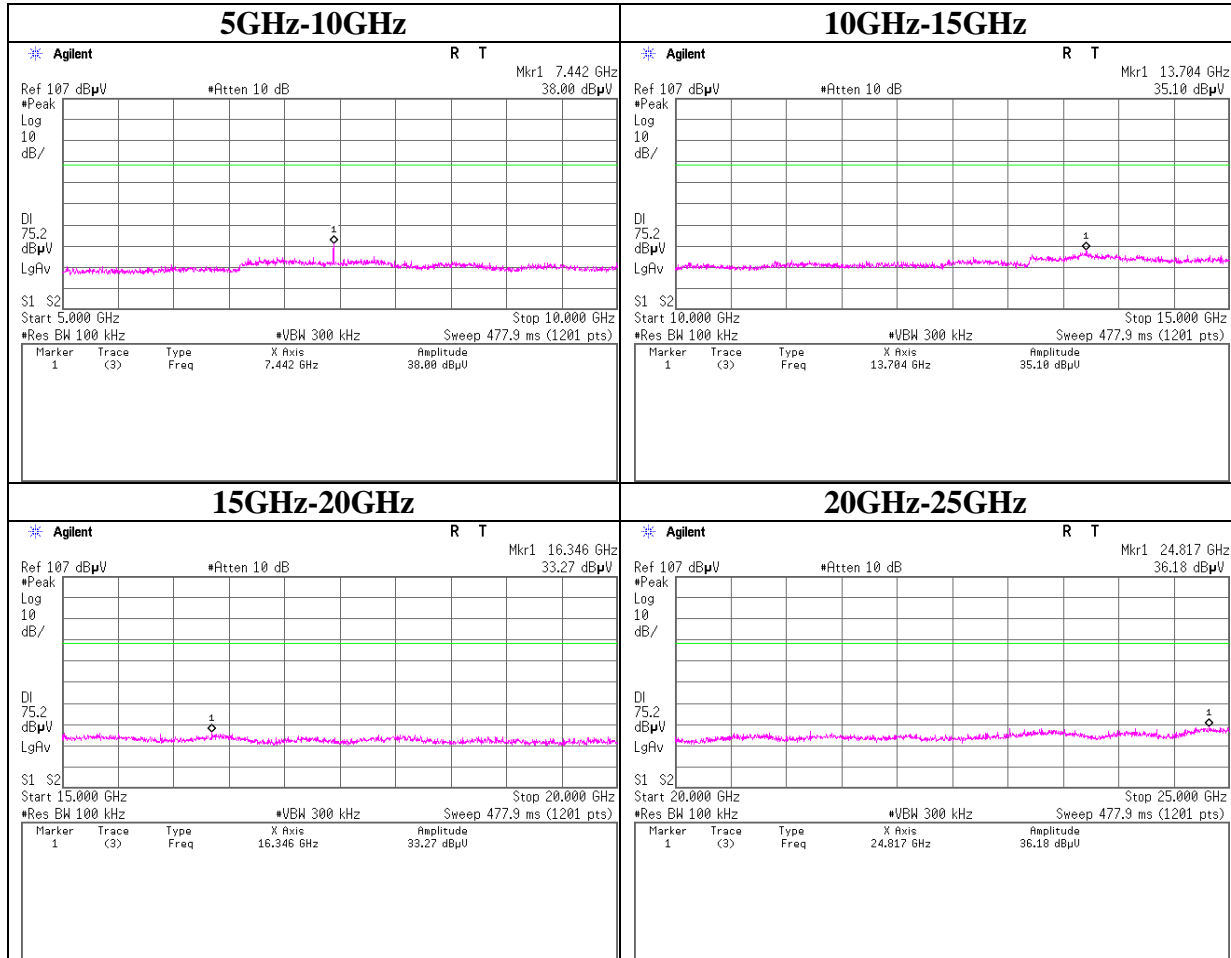
Conducted Spurious Emission

Tx 3DH5 2480MHz



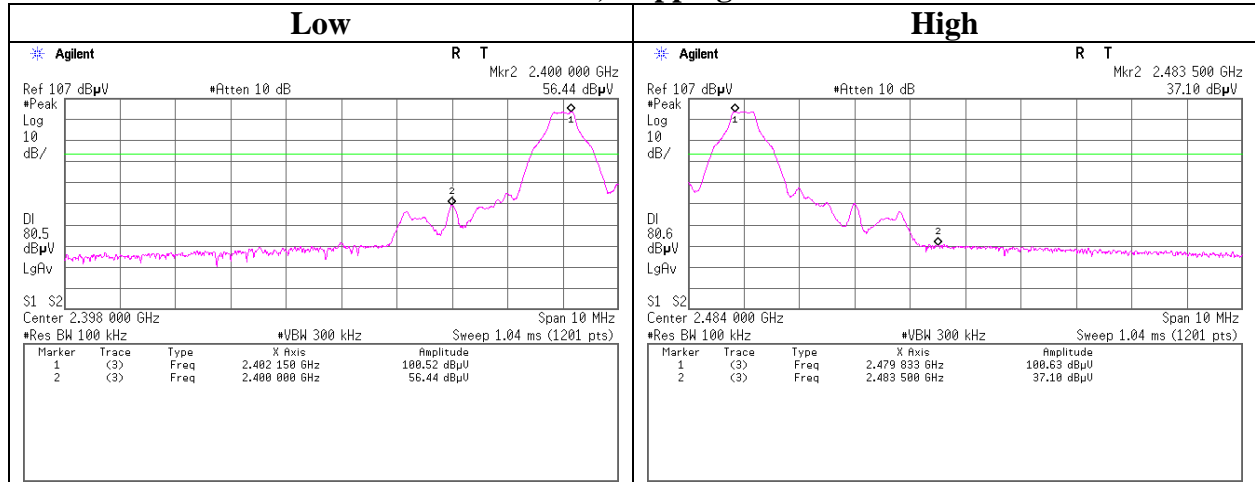
Conducted Spurious Emission

Tx 3DH5 2480MHz

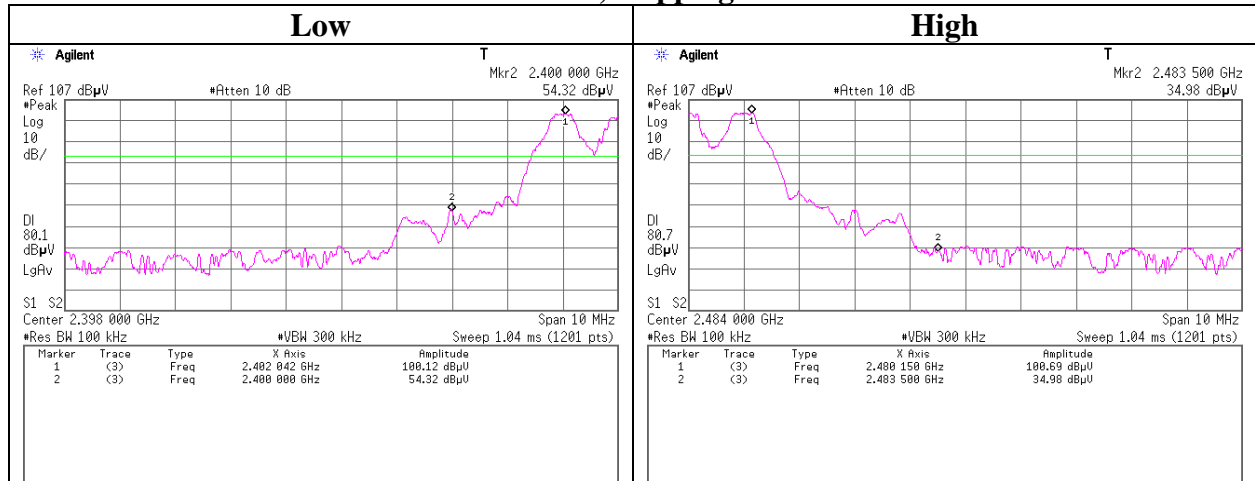


Conducted Emission Band Edge compliance

Tx DH5, Hopping off

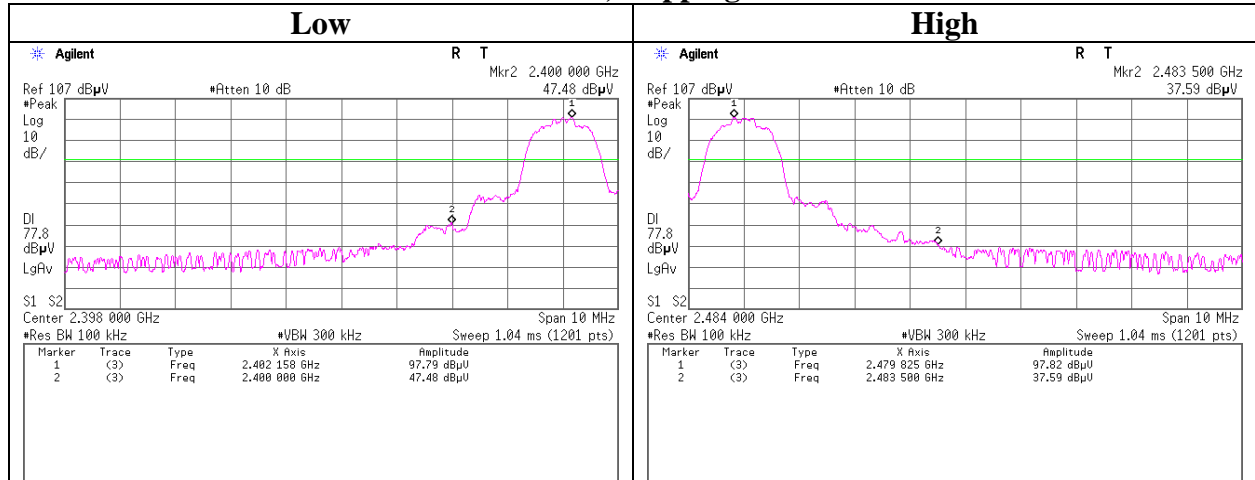


Tx DH5, Hopping on

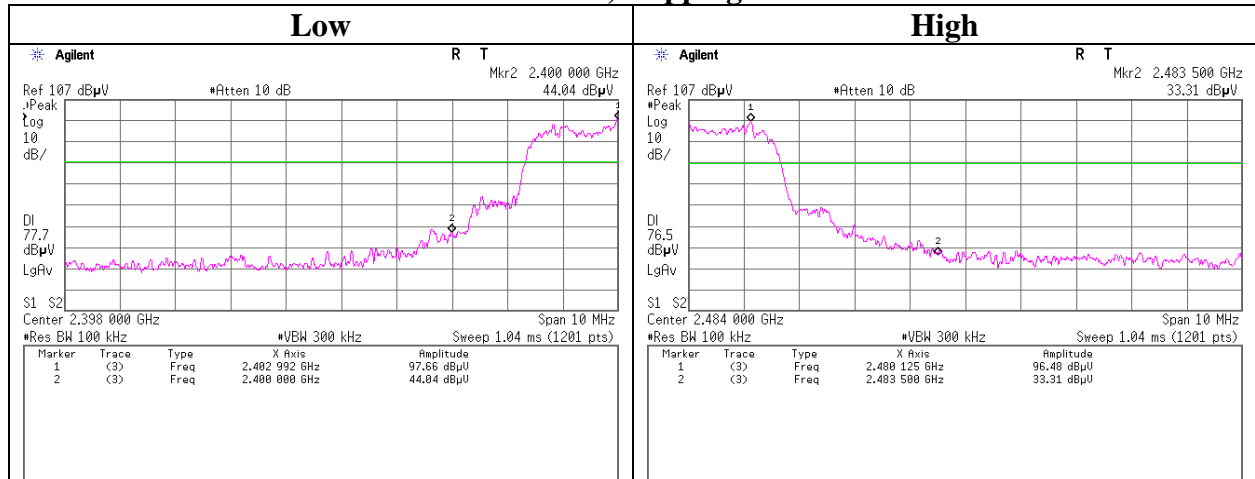


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping off



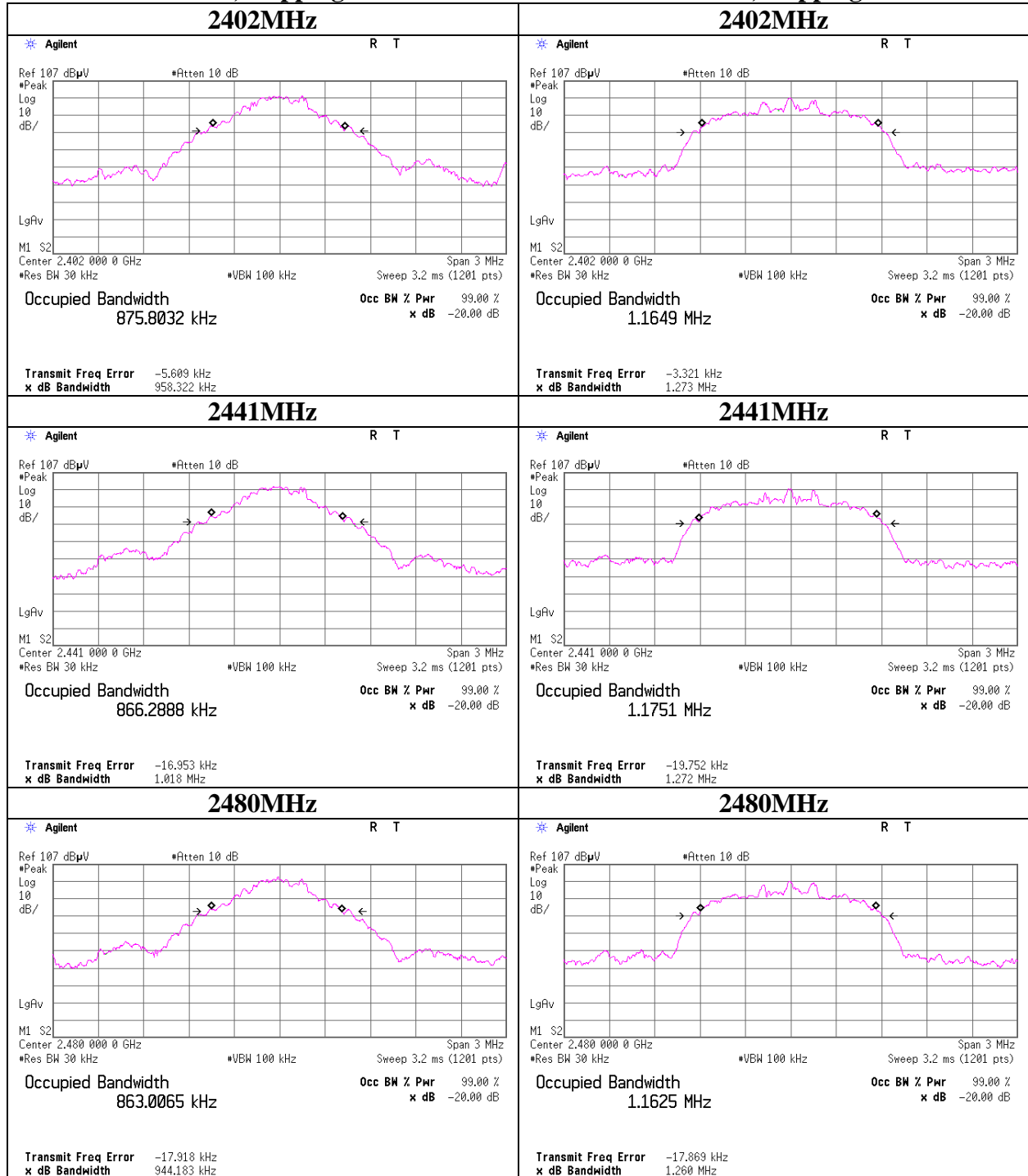
Tx 3DH5, Hopping on



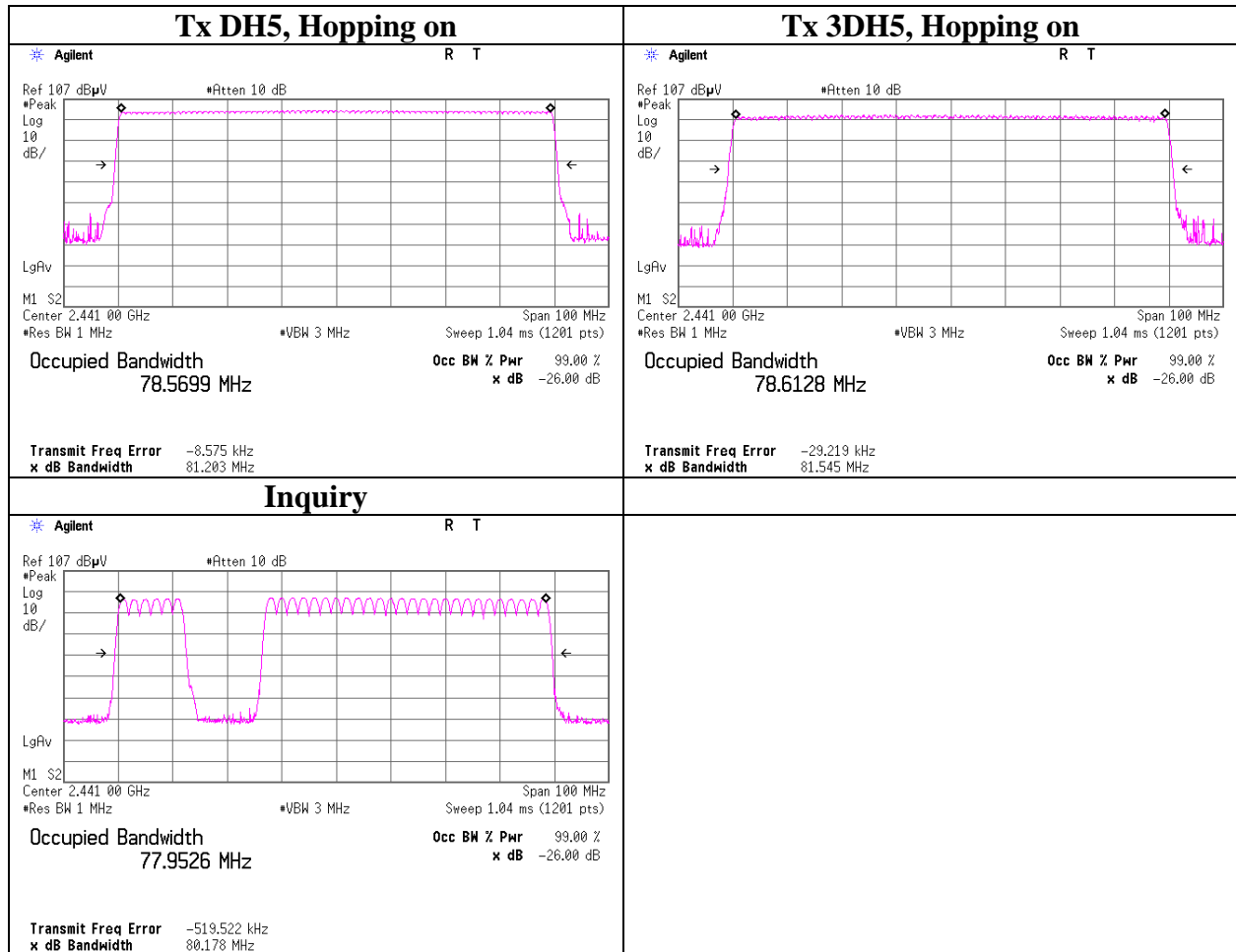
99% Occupied Bandwidth

Tx DH5, Hopping off

Tx 3DH5, Hopping off



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-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2011/11/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2011/08/11 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2011/10/15 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2011/10/15 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2011/07/15 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2011/11/02 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2012/03/16 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA917030 6	RE	2012/05/21 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2012/04/06 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2011/09/12 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2011/09/12 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2011/10/28 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	AT	2012/02/06 * 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: RE: Radiated Emission

AT: Antenna Terminal Conducted test

UL Japan, Inc.

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