



RADIO TEST REPORT

Test Report No. : 33CE0171-HO-E

Applicant : Sharp Corporation, Communication Systems Group.
Type of Equipment : Cellular Phone
Model No. : 200SH
FCC ID : APYHRO00181
Test regulation : FCC Part 15 Subpart C: 2012
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.

Date of test: October 19 to 28, 2012

Representative test engineer:

Yutaka Yoshida
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sharp Corporation, Communication Systems Group.
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Telephone Number : +81-82-420-1827
Facsimile Number : +81-82-420-1572
Contact Person : Hiroyuki Uwatoko

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

2.1 Identification of E.U.T.

Type of Equipment : Cellular Phone
Model No. : 200SH
Serial No. : Refer to Section 4, Clause 4.2
Rating : AC100-240V, DC3.7-4.0V
Receipt Date of Sample : October 13, 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

Model No.: 200SH (referred to as the EUT in this report) is Cellular Phone.

General Specification

Clock frequency(ies) in the system : CPU: 1.512GHz (max)
RTC: 32.768kHz
Source oscillation: 19.2MHz / 27MHz (CPU) / 27.12MHz (NFC)

Radio Specification

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Type	Loop antenna
Antenna Gain	0dBi

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	L Type
Antenna Gain	0dBi

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Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	Digital modulation
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Type	L Type
Antenna Gain	0dBi

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

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5700MHz
Type of Modulation	DSSS, OFDM	OFDM
Bandwidth & Channel spacing	20MHz & 5MHz	20MHz & 20MHz
Antenna Type	L Type	
Antenna Gain	0dBi	

WLAN (IEEE802.11n-40)

Equipment Type	Transceiver
Frequency of Operation	5190-5230MHz 5270-5310MHz 5510-5670MHz
Type of Modulation	OFDM
Bandwidth & Channel spacing	40MHz & 40MHz
Antenna Type	L Type
Antenna Gain	0dBi

GSM (PCS 1900)

Equipment Type	Transceiver
Frequency of Operation	[Up Link] 1850 – 1910MHz [Down Link] 1930 – 1990MHz
Type of Modulation	GMSK
Emission Designator	249KGXW
Antenna Type	L Type
Antenna Gain	0dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on August 13, 2012 and effective September 12, 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

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 18.2dB, 0.42140MHz, N AV 25.8dB, 0.42421MHz, L	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)		-	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	8.7dB 9608.000MHz, AV, Vert.	Complied	Conducted/ Radiated

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

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

FCC 15.31 (e)

This EUT provides stable voltage (DC4.0V) 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)	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 (10m*)(+dB)		
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz
No.1	4.2dB	5.0dB	4.8dB
No.2	-	-	-
No.3	-	-	-
No.4	-	-	-

*10m = Measurement distance

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
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

Conducted Emission test

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

Radiated emission test (3m)

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

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3.5 Test Location

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

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

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

Refer to APPENDIX.

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

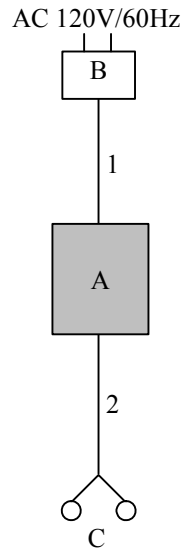
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation, 20dB Bandwidth	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	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)		

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	Cellular Phone	200SH	004401/11/441657/7 *1) 004401/11/441666/8 *2)	Sharp Corporation	EUT
B	AC Adapter	SHCEJ1	100	Sharp Corporation	-
C	Earphone	-	-	Sharp Corporation	-

*1) Used for Conducted Emission and Radiated Spurious Emission tests

*2) Used for Antenna Terminal Conducted tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	Earphone Cable	1.5	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

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

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

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber .

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

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SECTION 6: Radiated Spurious Emission

Test Procedure

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

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

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

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

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

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

Test Antennas are used as below;

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

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

Measurement range	: 30M-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	2.5MHz / Inquiry, 3MHz / Other	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	5MHz / Inquiry, 3MHz / Other	100kHz / Inquiry, 30kHz / Other	300kHz / Inquiry, 100kHz / Other	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				
Conducted Spurious Emission Band Edge compliance	20MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*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 low enough 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

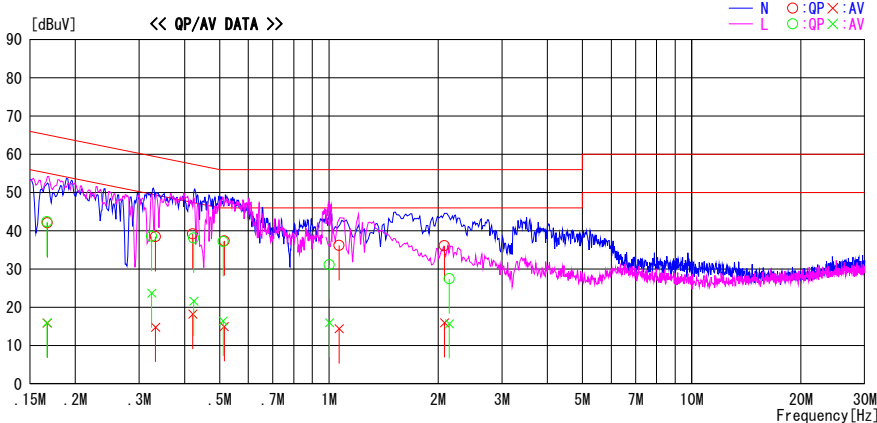
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2012/10/28

Report No. : 33CE0171-H0
Temp./Humi. : 23deg. C / 52% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : BT DH5 Tx 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

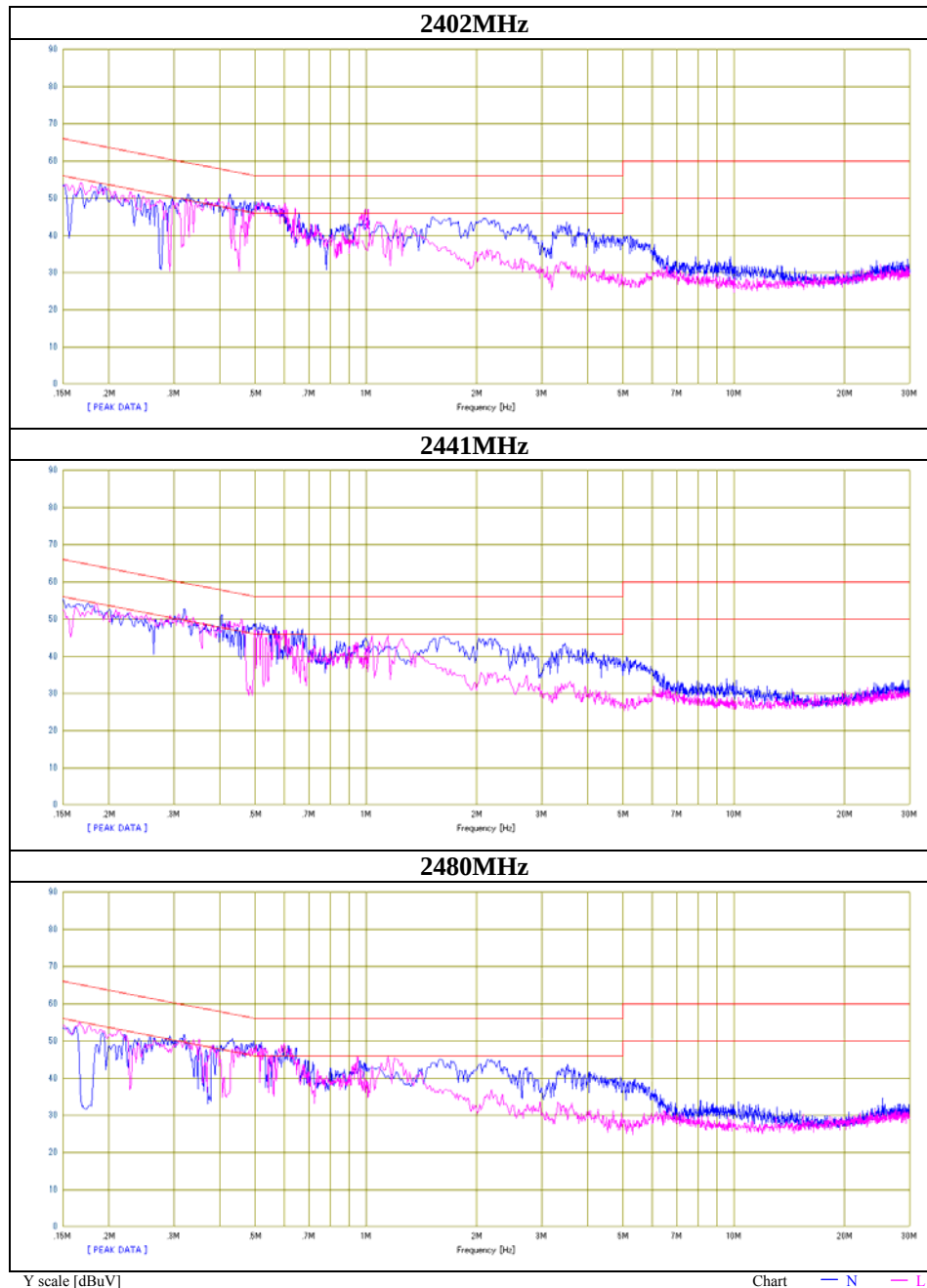


Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [MHz]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.16740	28.8	2.6	13.3	42.1	15.9	65.1	55.1	23.0	39.2	N	
0.33285	25.1	1.4	13.4	38.5	14.8	59.4	49.4	20.9	34.6	N	
0.42140	25.8	4.8	13.4	39.2	18.2	57.4	47.4	18.2	29.2	N	
0.51462	24.0	1.6	13.4	37.4	15.0	56.0	46.0	18.6	31.0	N	
1.06650	22.8	1.0	13.4	36.2	14.4	56.0	46.0	19.8	31.6	N	
2.08192	22.5	2.4	13.6	36.1	16.0	56.0	46.0	19.9	30.0	N	
0.16724	29.1	2.7	13.3	42.4	16.0	65.1	55.1	22.7	39.1	L	
0.32488	25.2	10.3	13.4	38.6	23.7	59.6	49.6	21.0	25.9	L	
0.42421	24.7	8.2	13.4	38.1	21.6	57.4	47.4	19.3	25.8	L	
0.51101	23.8	3.0	13.4	37.2	16.4	56.0	46.0	18.8	29.6	L	
1.00295	17.7	2.6	13.4	31.1	16.0	56.0	46.0	24.9	30.0	L	
2.14767	13.9	2.1	13.6	27.5	15.7	56.0	46.0	28.5	30.3	L	

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

Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	33CE0171-HO
Date	10/28/2012
Temperature/ Humidity	23 deg.C/ 52%
Engineer	Kazuya Yoshioka
Mode	Tx DH5



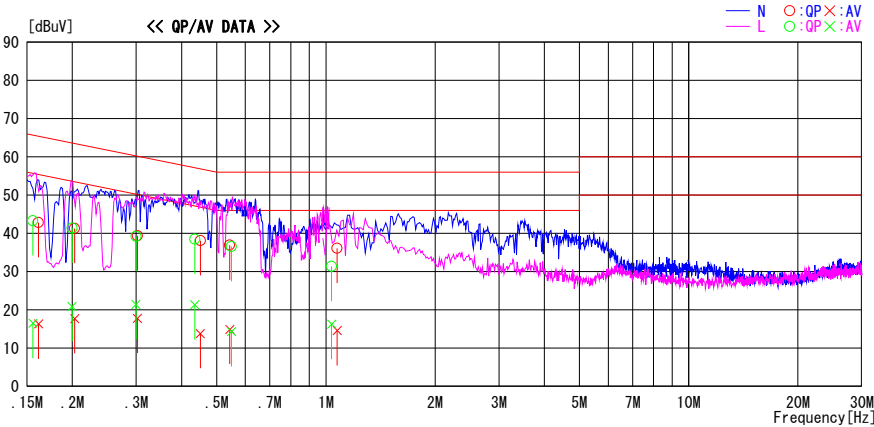
Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2012/10/28

Report No. : 33CE0171-H0
Temp./Humi. : 23deg. C / 52% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : BT 3DH5 Tx 2402MHz
LIMIT : FCC15.207 QP
FCC15.207 AV

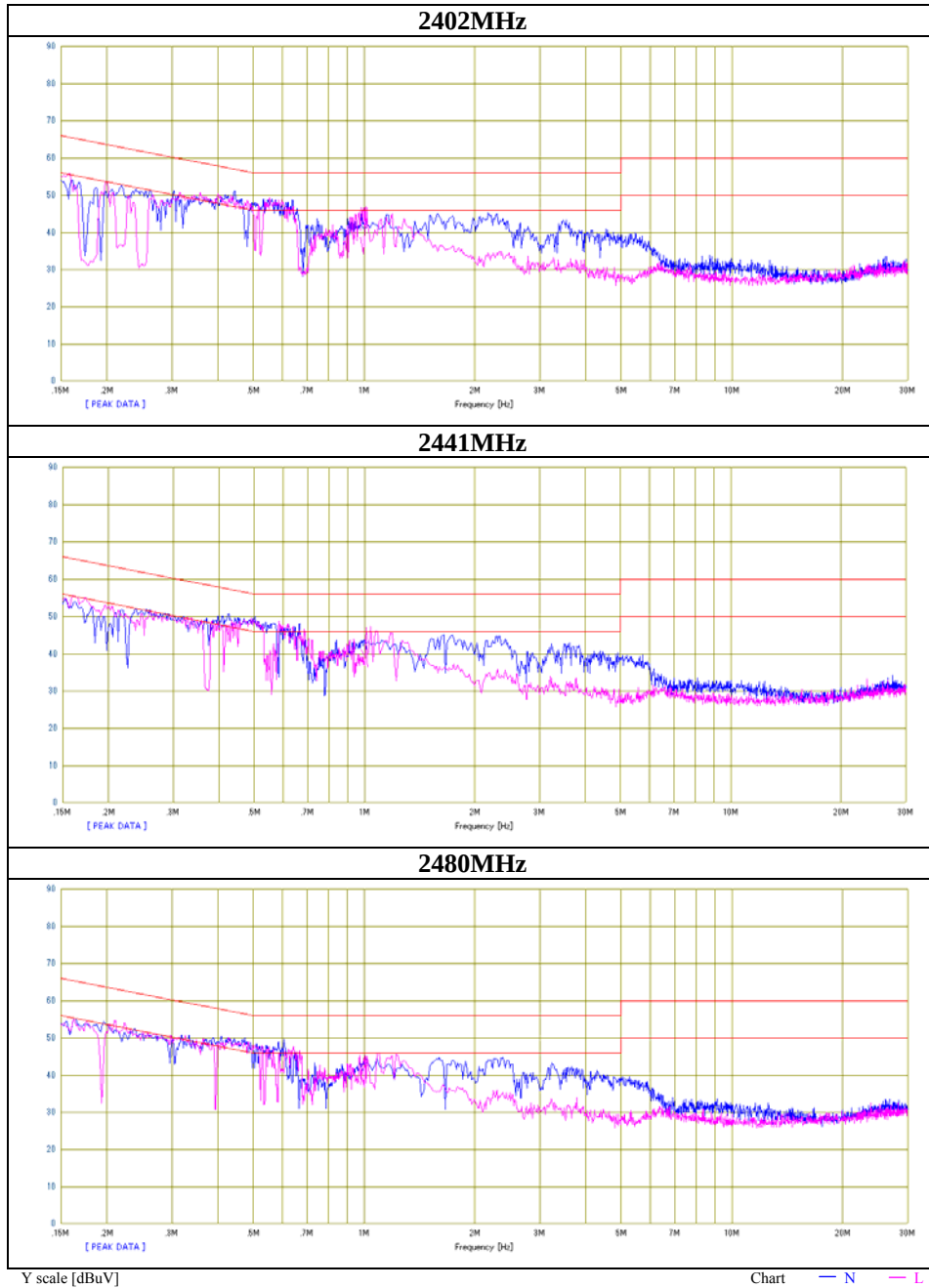


Frequency	Reading		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV		QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.16135	29.5	3.0	13.3	42.8	16.3	65.4	55.4	22.6	39.1	N	
0.20291	28.0	4.4	13.3	41.3	17.7	63.5	53.5	22.2	35.8	N	
0.30221	26.0	4.4	13.4	39.4	17.8	60.2	50.2	20.8	32.4	N	
0.45075	24.7	0.4	13.4	38.1	13.8	56.9	46.9	18.8	33.1	N	
0.54310	23.5	1.5	13.4	36.9	14.9	56.0	46.0	19.1	31.1	N	
1.07380	22.7	1.2	13.4	36.1	14.6	56.0	46.0	19.9	31.4	N	
0.15573	30.0	3.2	13.3	43.3	16.5	65.7	55.7	22.4	39.2	L	
0.19966	28.1	7.6	13.3	41.4	20.9	63.6	53.6	22.2	32.7	L	
0.29981	25.8	8.0	13.4	39.2	21.4	60.2	50.2	21.0	28.8	L	
0.43535	25.1	7.9	13.4	38.5	21.3	57.2	47.2	18.7	25.9	L	
0.54931	23.2	0.9	13.4	36.6	14.3	56.0	46.0	19.4	31.7	L	
1.03640	18.0	2.8	13.4	31.4	16.2	56.0	46.0	24.6	29.8	L	

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

Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	33CE0171-HO
Date	10/28/2012
Temperature/ Humidity	23 deg.C./ 52%
Engineer	Kazuya Yoshioka
Mode	Tx 3DH5

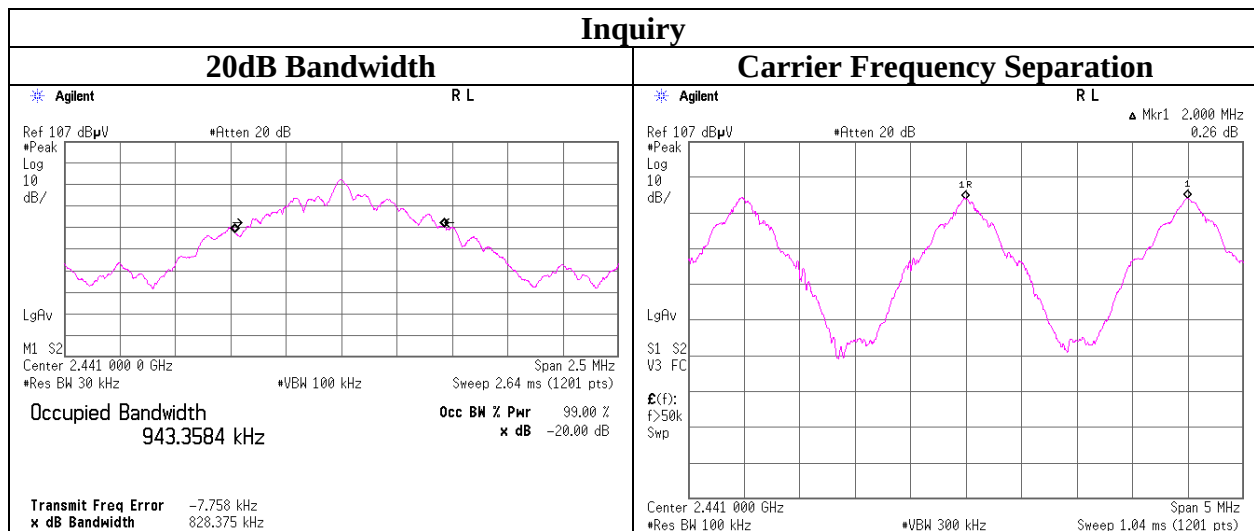


20dB Bandwidth and Carrier Frequency Separation

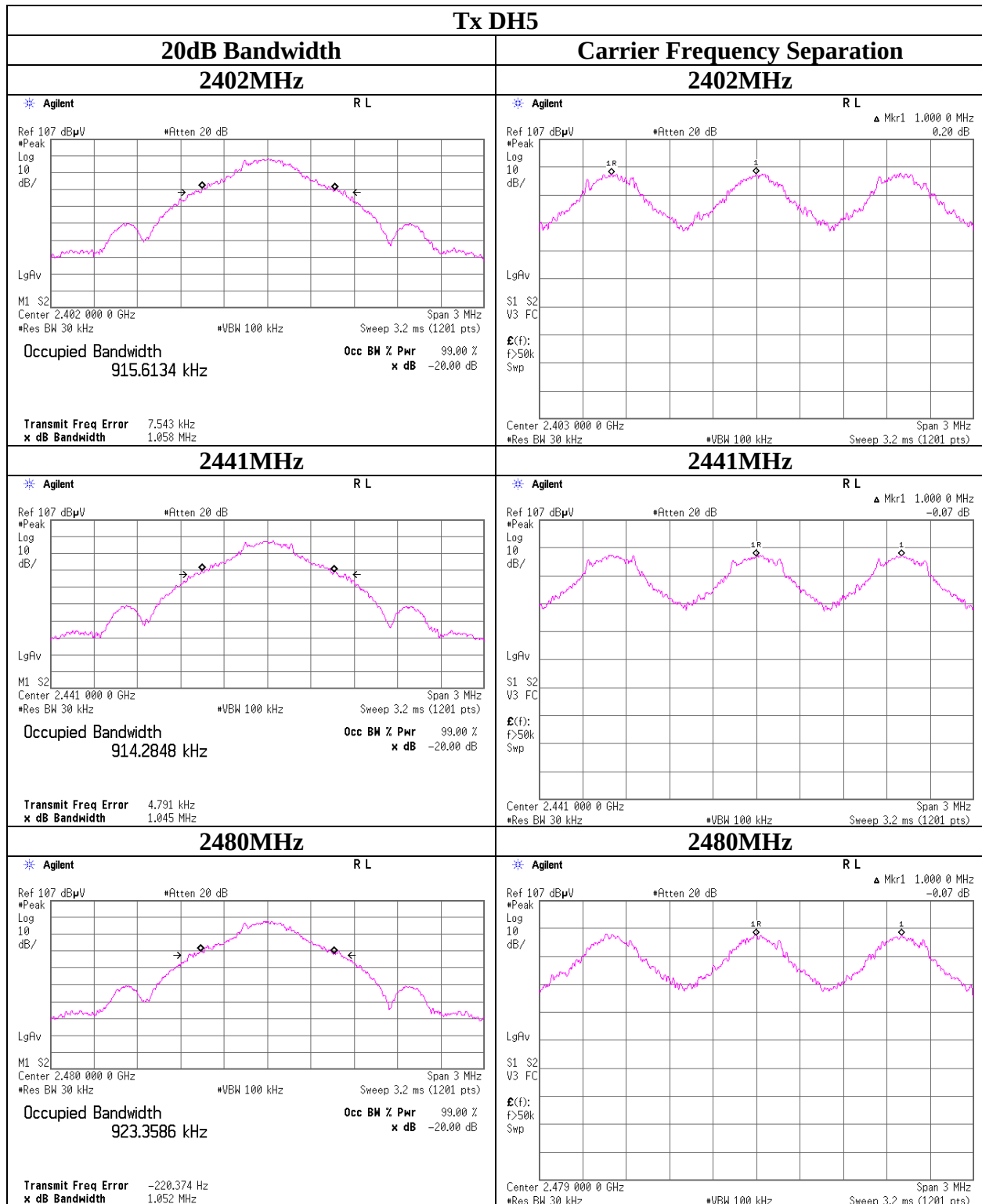
Test place Head Office EMC Lab. No.7 Shielded Room
Report No. 33CE0171-HO
Date 10/24/2012
Temperature/ Humidity 23deg. C / 41% RH
Engineer Yutaka Yoshida
Mode Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	1.058	1.000	≥ 0.705
DH5	2441.0	1.045	1.000	≥ 0.697
DH5	2480.0	1.052	1.000	≥ 0.701
3DH5	2402.0	1.305	1.000	≥ 0.870
3DH5	2441.0	1.304	1.000	≥ 0.869
3DH5	2480.0	1.306	1.000	≥ 0.871
Inquiry	2441.0	0.828	2.000	≥ 0.552

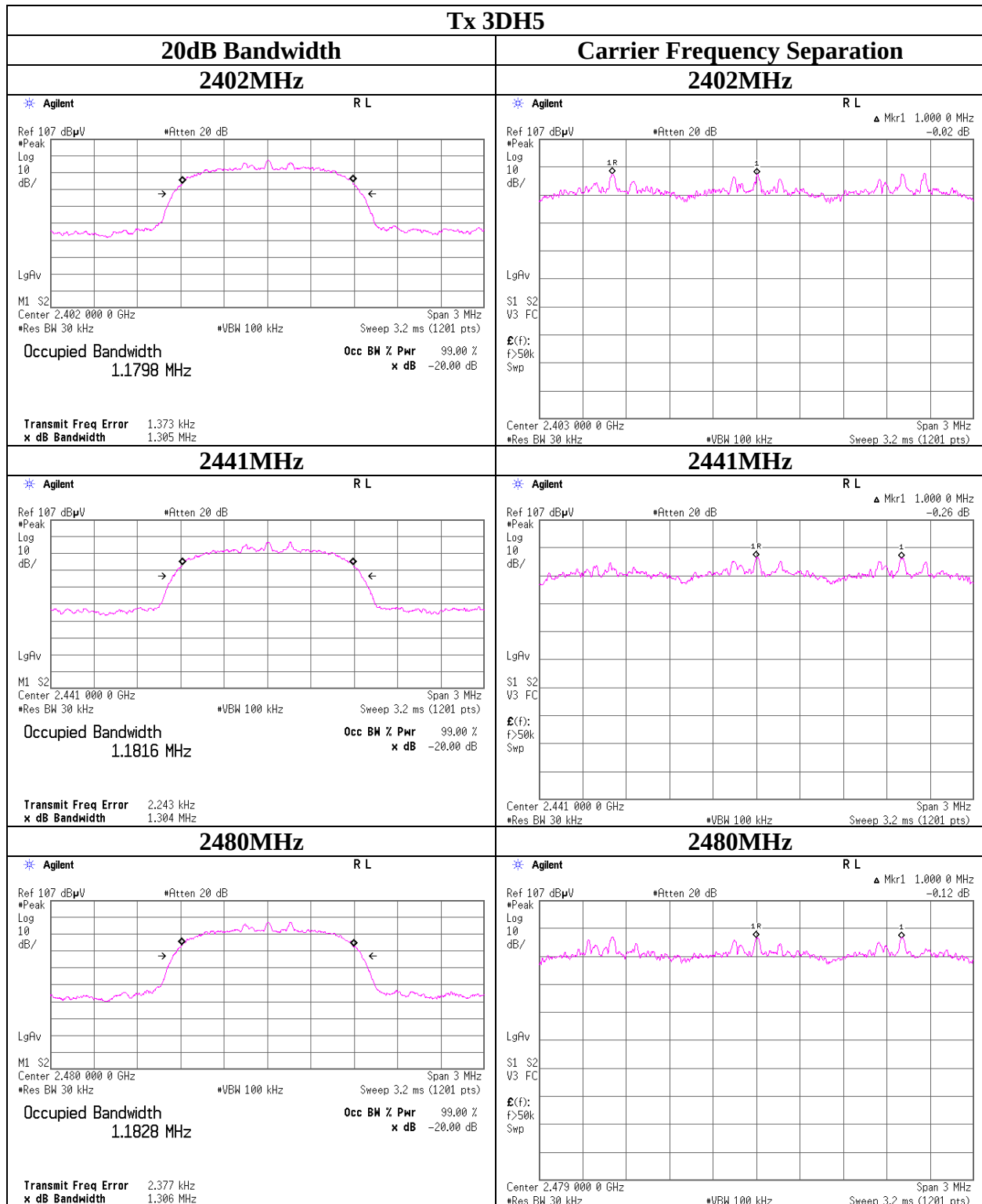
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation

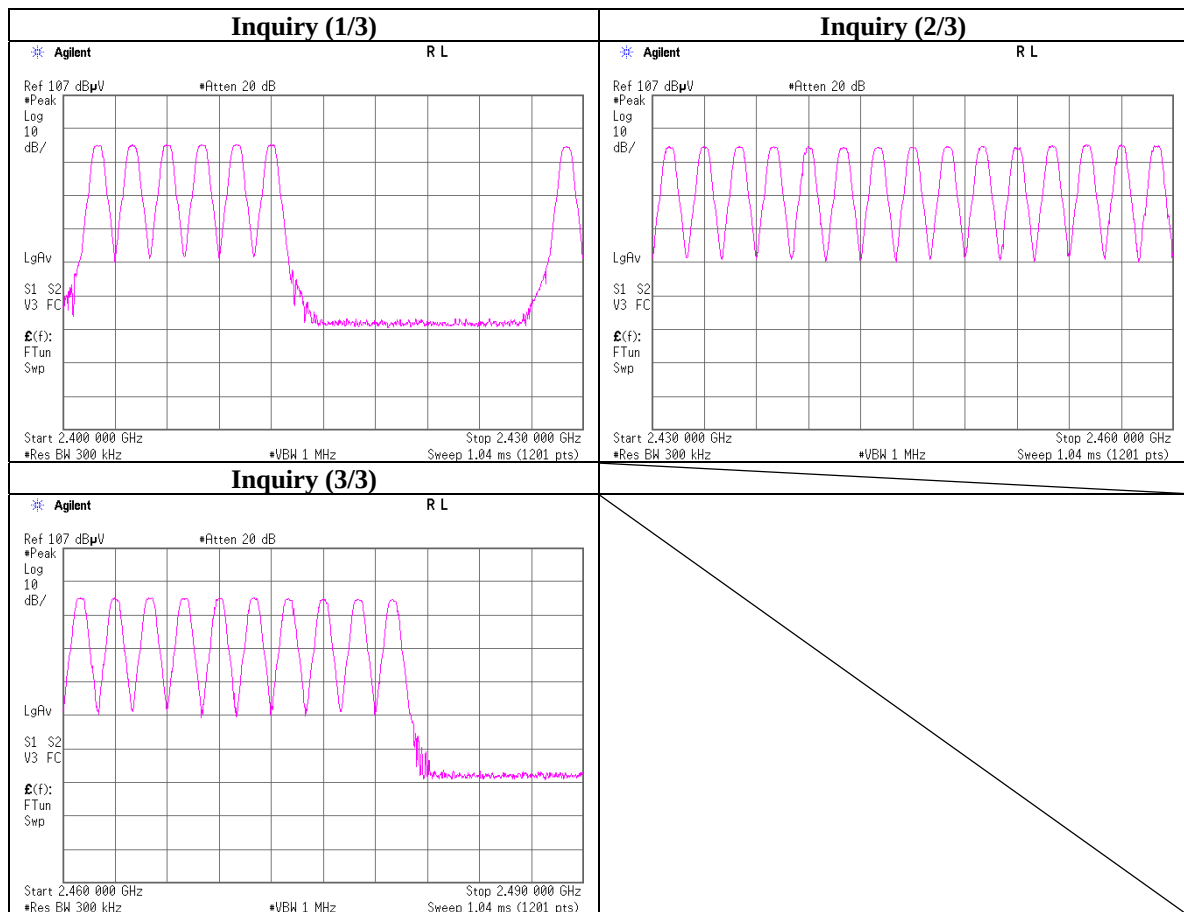


Number of Hopping Frequency

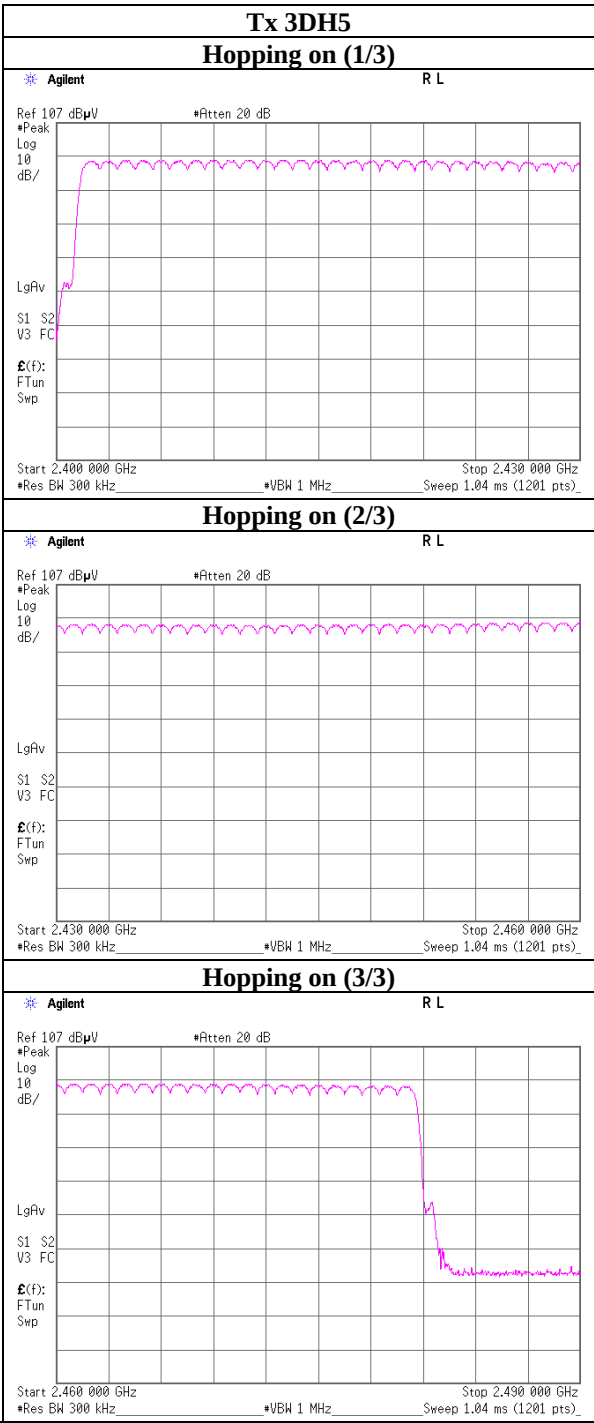
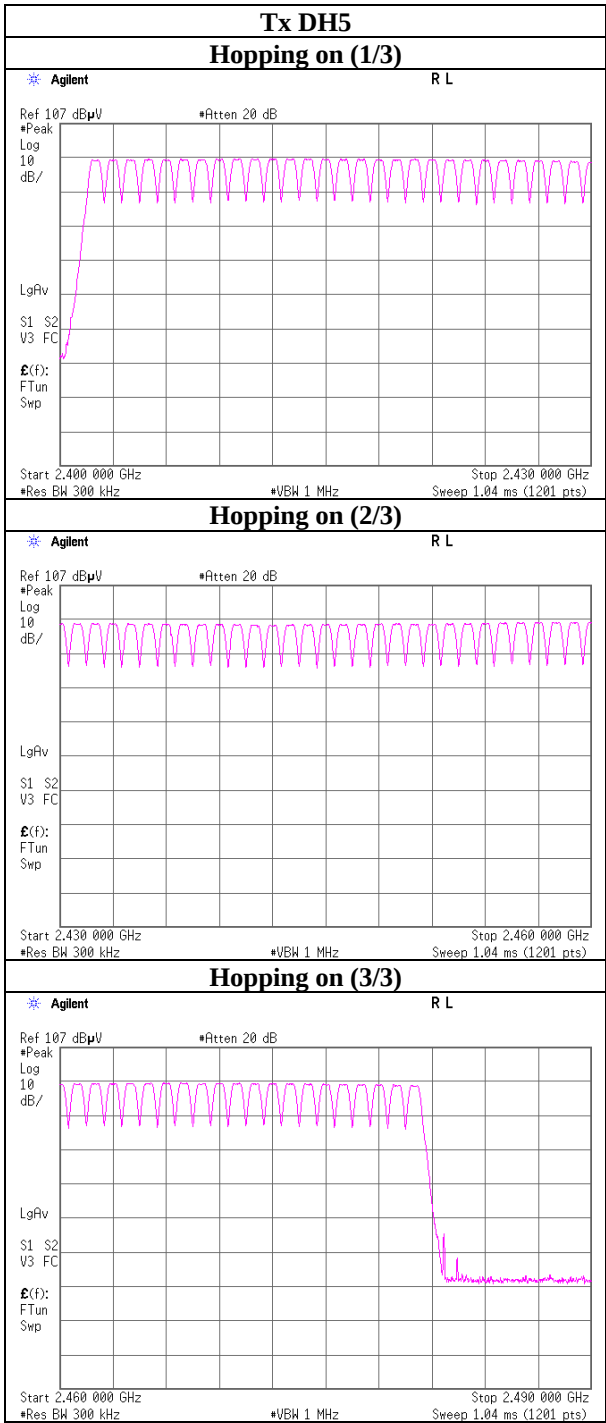
Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	10/24/2012
Temperature/ Humidity	23deg. C / 41% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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.



Number of Hopping Frequency



Dwell time

Test place Head Office EMC Lab. No.7 Shielded Room
Report No. 33CE0171-HO
Date 10/24/2012
Temperature/ Humidity 23deg. C / 41% RH
Engineer Yutaka Yoshida
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	49.8 times	/	5 sec.	x	31.6 sec. =	126	400
DH3	24.6 times	/	5 sec.	x	31.6 sec. =	259	400
DH5	16.2 times	/	5 sec.	x	31.6 sec. =	300	400
3DH1	50.2 times	/	5 sec.	x	31.6 sec. =	129	400
3DH3	28.0 times	/	5 sec.	x	31.6 sec. =	294	400
3DH5	15.4 times	/	5 sec.	x	31.6 sec. =	284	400
Inquiry	100.0 times	/	1 sec.	x	12.8 sec. =	129	400

Sample Calculation

Result = Number of transmission x Length of transmission time

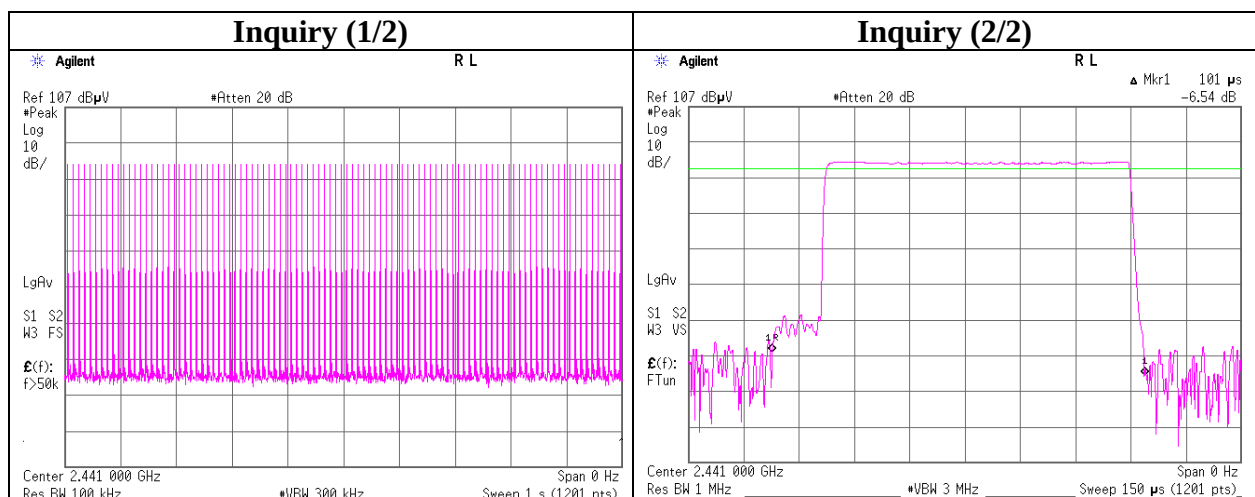
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	49	50	49	52	49.8
DH3	29	22	25	20	27	24.6
DH5	20	15	16	20	10	16.2
3DH1	51	50	51	50	49	50.2
3DH3	30	28	26	24	32	28
3DH5	14	18	15	17	13	15.4

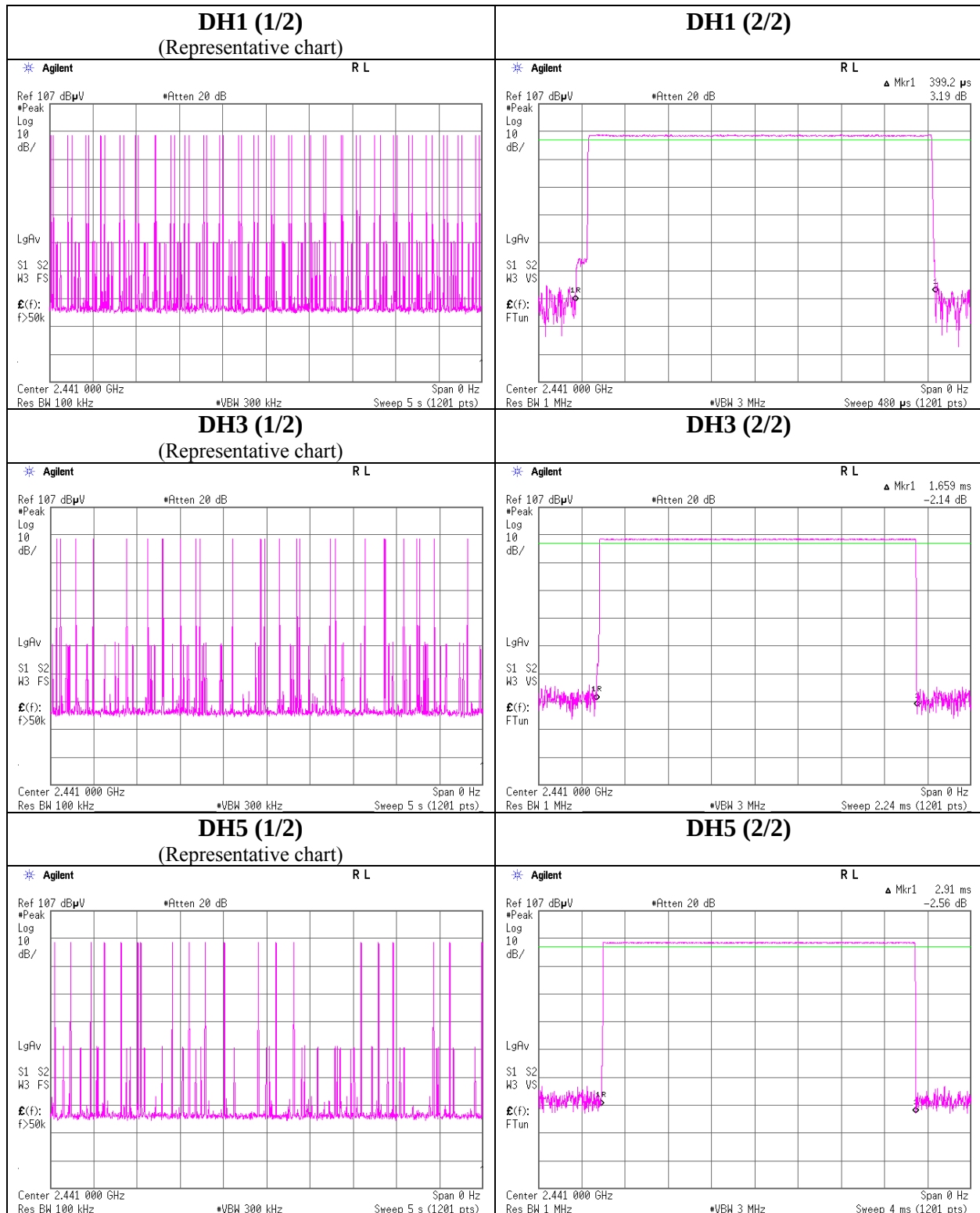
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

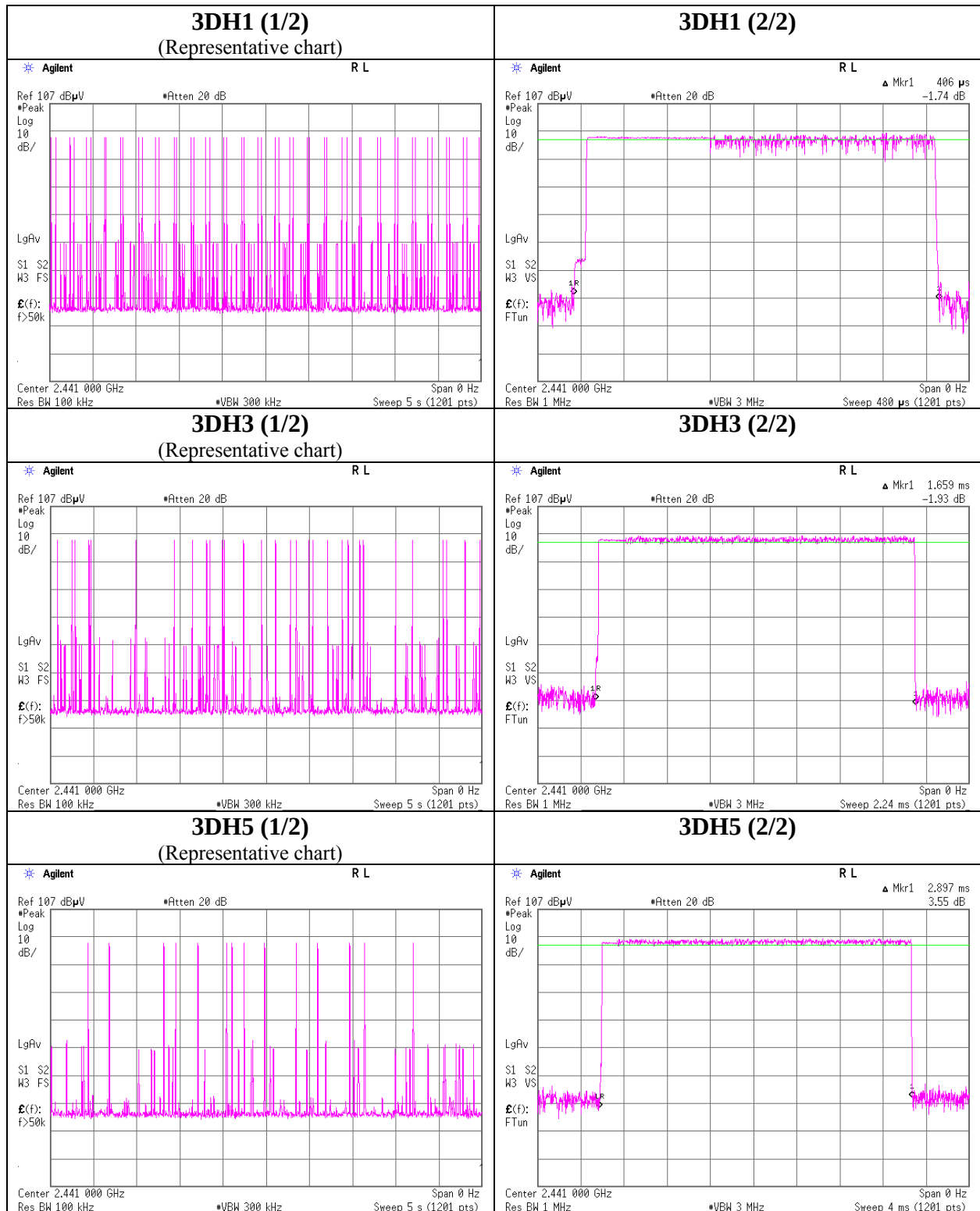
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s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



Dwell time



Dwell time



Maximum Peak Output Power

Test place Head Office EMC Lab. No.7 Shielded Room
Report No. 33CE0171-HO
Date 10/24/2012
Temperature/ Humidity 23deg. C / 41% RH
Engineer Yutaka Yoshida
Mode Tx (Hopping off) DH5/3DH5

Mode	Freq. [MHz]	Reading P/M PK [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-10.55	1.66	10.00	1.11	1.29	20.96	125	19.85
DH5	2441.0	-11.39	1.67	10.00	0.28	1.07	20.96	125	20.68
DH5	2480.0	-11.12	1.68	10.00	0.56	1.14	20.96	125	20.40
3DH5	2402.0	-9.46	1.66	10.00	2.20	1.66	20.96	125	18.76
3DH5	2441.0	-10.52	1.67	10.00	1.15	1.30	20.96	125	19.81
3DH5	2480.0	-9.84	1.68	10.00	1.84	1.53	20.96	125	19.12

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.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	22.8	9.9	7.0	28.6	11.1	40.0	28.9	
Hori	69.540	QP	24.7	6.8	7.2	28.5	10.2	40.0	29.8	
Hori	81.000	QP	25.2	6.3	7.3	28.5	10.3	40.0	29.7	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	601.592	QP	28.4	19.8	10.2	28.8	29.6	46.0	16.4	
Hori	649.596	QP	28.8	20.3	10.4	28.6	30.9	46.0	15.1	
Hori	2390.000	PK	41.9	27.5	2.4	32.3	39.5	73.9	34.4	
Hori	4804.000	PK	41.1	31.3	4.3	31.5	45.2	73.9	28.7	NS
Hori	7206.000	PK	42.1	35.8	5.0	32.5	50.4	73.9	23.5	NS
Hori	9608.000	PK	42.9	38.3	5.8	32.9	54.1	73.9	19.8	
Hori	24020.000	PK	46.2	38.4	-1.2	31.7	51.7	73.9	22.2	NS
Hori	2390.000	AV	30.2	27.5	2.4	32.3	27.8	53.9	26.1	
Hori	4804.000	AV	29.0	31.3	4.3	31.5	33.1	53.9	20.8	NS
Hori	7206.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Hori	9608.000	AV	32.8	38.3	5.8	32.9	44.0	53.9	9.9	
Hori	24020.000	AV	34.1	38.4	-1.2	31.7	39.6	53.9	14.3	NS
Vert	54.000	QP	28.2	9.9	7.0	28.6	16.5	40.0	23.5	
Vert	69.540	QP	33.5	6.8	7.2	28.5	19.0	40.0	21.0	
Vert	81.000	QP	29.7	6.3	7.3	28.5	14.8	40.0	25.2	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	601.592	QP	31.4	19.8	10.2	28.8	32.6	46.0	13.4	
Vert	649.596	QP	30.8	20.3	10.4	28.6	32.9	46.0	13.1	
Vert	2390.000	PK	42.1	27.5	2.4	32.3	39.7	73.9	34.2	
Vert	4804.000	PK	41.2	31.3	4.3	31.5	45.3	73.9	28.6	NS
Vert	7206.000	PK	42.4	35.8	5.0	32.5	50.7	73.9	23.2	NS
Vert	9608.000	PK	43.0	38.3	5.8	32.9	54.2	73.9	19.7	
Vert	24020.000	PK	46.2	38.4	-1.2	31.7	51.7	73.9	22.2	NS
Vert	2390.000	AV	30.2	27.5	2.4	32.3	27.8	53.9	26.1	
Vert	4804.000	AV	29.0	31.3	4.3	31.5	33.1	53.9	20.8	NS
Vert	7206.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Vert	9608.000	AV	33.4	38.3	5.8	32.9	44.6	53.9	9.3	
Vert	24020.000	AV	34.1	38.4	-1.2	31.7	39.6	53.9	14.3	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).

NS:Non signal

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	96.3	27.5	2.4	32.3	93.9	-	-	Carrier
Hori	2400.000	PK	38.2	27.5	2.4	32.3	35.8	73.9	38.1	
Vert	2402.000	PK	94.7	27.5	2.4	32.3	92.3	-	-	Carrier
Vert	2400.000	PK	35.2	27.5	2.4	32.3	32.8	72.3	39.5	

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	23.0	9.9	7.0	28.6	11.3	40.0	28.7	
Hori	69.490	QP	24.7	6.8	7.2	28.5	10.2	40.0	29.8	
Hori	81.000	QP	25.2	6.3	7.3	28.5	10.3	40.0	29.7	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	601.598	QP	28.7	19.8	10.2	28.8	29.9	46.0	16.1	
Hori	649.597	QP	28.8	20.3	10.4	28.6	30.9	46.0	15.1	
Hori	4882.000	PK	41.2	31.5	4.3	31.5	45.5	73.9	28.4	NS
Hori	7323.000	PK	41.5	35.8	5.0	32.5	49.8	73.9	24.1	NS
Hori	9764.000	PK	43.4	38.4	5.9	32.9	54.8	73.9	19.1	
Hori	24410.000	PK	47.5	38.6	-1.1	32.2	52.8	73.9	21.1	NS
Hori	4882.000	AV	29.3	31.5	4.3	31.5	33.6	53.9	20.3	NS
Hori	7323.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Hori	9764.000	AV	32.3	38.4	5.9	32.9	43.7	53.9	10.2	
Hori	24410.000	AV	33.2	38.6	-1.1	32.2	38.5	53.9	15.4	NS
Vert	54.000	QP	28.1	9.9	7.0	28.6	16.4	40.0	23.6	
Vert	69.490	QP	33.8	6.8	7.2	28.5	19.3	40.0	20.7	
Vert	81.000	QP	30.3	6.3	7.3	28.5	15.4	40.0	24.6	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	601.598	QP	32.0	19.8	10.2	28.8	33.2	46.0	12.8	
Vert	649.597	QP	31.0	20.3	10.4	28.6	33.1	46.0	12.9	
Vert	4882.000	PK	41.5	31.5	4.3	31.5	45.8	73.9	28.1	NS
Vert	7323.000	PK	41.6	35.8	5.0	32.5	49.9	73.9	24.0	NS
Vert	9764.000	PK	43.1	38.4	5.9	32.9	54.5	73.9	19.4	
Vert	24410.000	PK	47.5	38.6	-1.1	32.2	52.8	73.9	21.1	NS
Vert	4882.000	AV	29.3	31.5	4.3	31.5	33.6	53.9	20.3	NS
Vert	7323.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Vert	9764.000	AV	32.7	38.4	5.9	32.9	44.1	53.9	9.8	
Vert	24410.000	AV	33.2	38.6	-1.1	32.2	38.5	53.9	15.4	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).

NS:Non signal

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	22.9	9.9	7.0	28.6	11.2	40.0	28.8	
Hori	69.540	QP	24.8	6.8	7.2	28.5	10.3	40.0	29.7	
Hori	81.000	QP	25.2	6.3	7.3	28.5	10.3	40.0	29.7	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	601.592	QP	28.7	19.8	10.2	28.8	29.9	46.0	16.1	
Hori	649.599	QP	28.7	20.3	10.4	28.6	30.8	46.0	15.2	
Hori	2483.500	PK	43.4	27.5	2.4	32.2	41.1	73.9	32.8	
Hori	4960.000	PK	41.3	31.8	4.3	31.5	45.9	73.9	28.0	NS
Hori	7440.000	PK	42.5	35.9	5.1	32.6	50.9	73.9	23.0	NS
Hori	9920.000	PK	41.6	38.6	5.9	33.0	53.1	73.9	20.8	NS
Hori	24800.000	PK	48.3	38.8	-1.1	32.7	53.3	73.9	20.6	NS
Hori	2483.500	AV	30.7	27.5	2.4	32.2	28.4	53.9	25.5	
Hori	4960.000	AV	29.2	31.8	4.3	31.5	33.8	53.9	20.1	NS
Hori	7440.000	AV	30.6	35.9	5.1	32.6	39.0	53.9	14.9	NS
Hori	9920.000	AV	30.6	38.6	5.9	33.0	42.1	53.9	11.8	NS
Hori	24800.000	AV	36.1	38.8	-1.1	32.7	41.1	53.9	12.8	NS
Vert	54.000	QP	28.1	9.9	7.0	28.6	16.4	40.0	23.6	
Vert	69.540	QP	33.5	6.8	7.2	28.5	19.0	40.0	21.0	
Vert	81.000	QP	29.7	6.3	7.3	28.5	14.8	40.0	25.2	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	601.592	QP	31.2	19.8	10.2	28.8	32.4	46.0	13.6	
Vert	649.599	QP	31.2	20.3	10.4	28.6	33.3	46.0	12.7	
Vert	2483.500	PK	43.1	27.5	2.4	32.2	40.8	73.9	33.1	
Vert	4960.000	PK	41.5	31.8	4.3	31.5	46.1	73.9	27.8	NS
Vert	7440.000	PK	42.3	35.9	5.1	32.6	50.7	73.9	23.2	NS
Vert	9920.000	PK	41.5	38.6	5.9	33.0	53.0	73.9	20.9	NS
Vert	24800.000	PK	48.3	38.8	-1.1	32.7	53.3	73.9	20.6	NS
Vert	2483.500	AV	30.3	27.5	2.4	32.2	28.0	53.9	25.9	
Vert	4960.000	AV	29.2	31.8	4.3	31.5	33.8	53.9	20.1	NS
Vert	7440.000	AV	30.6	35.9	5.1	32.6	39.0	53.9	14.9	NS
Vert	9920.000	AV	30.6	38.6	5.9	33.0	42.1	53.9	11.8	NS
Vert	24800.000	AV	36.1	38.8	-1.1	32.7	41.1	53.9	12.8	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).

NS:Non signal

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, 3DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	23.0	9.9	7.0	28.6	11.3	40.0	28.7	
Hori	69.420	QP	24.8	6.8	7.2	28.5	10.3	40.0	29.7	
Hori	81.000	QP	25.1	6.3	7.3	28.5	10.2	40.0	29.8	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	607.993	QP	28.7	19.8	10.2	28.8	29.9	46.0	16.1	
Hori	649.601	QP	28.9	20.3	10.4	28.6	31.0	46.0	15.0	
Hori	2390.000	PK	42.3	27.5	2.4	32.3	39.9	73.9	34.0	
Hori	4804.000	PK	41.4	31.3	4.3	31.5	45.5	73.9	28.4	NS
Hori	7206.000	PK	42.1	35.8	5.0	32.5	50.4	73.9	23.5	NS
Hori	9608.000	PK	43.2	38.3	5.8	32.9	54.4	73.9	19.5	
Hori	24020.000	PK	46.2	38.4	-1.2	31.7	51.7	73.9	22.2	NS
Hori	2390.000	AV	30.2	27.5	2.4	32.3	27.8	53.9	26.1	
Hori	4804.000	AV	29.0	31.3	4.3	31.5	33.1	53.9	20.8	NS
Hori	7206.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Hori	9608.000	AV	33.3	38.3	5.8	32.9	44.5	53.9	9.4	
Hori	24020.000	AV	34.1	38.4	-1.2	31.7	39.6	53.9	14.3	NS
Vert	54.000	QP	27.9	9.9	7.0	28.6	16.2	40.0	23.8	
Vert	69.420	QP	33.8	6.8	7.2	28.5	19.3	40.0	20.7	
Vert	81.000	QP	29.8	6.3	7.3	28.5	14.9	40.0	25.1	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	607.993	QP	31.4	19.8	10.2	28.8	32.6	46.0	13.4	
Vert	649.601	QP	31.0	20.3	10.4	28.6	33.1	46.0	12.9	
Vert	2390.000	PK	43.0	27.5	2.4	32.3	40.6	73.9	33.3	
Vert	4804.000	PK	41.1	31.3	4.3	31.5	45.2	73.9	28.7	NS
Vert	7206.000	PK	42.7	35.8	5.0	32.5	51.0	73.9	22.9	NS
Vert	9608.000	PK	44.0	38.3	5.8	32.9	55.2	73.9	18.7	
Vert	24020.000	PK	46.2	38.4	-1.2	31.7	51.7	73.9	22.2	NS
Vert	2390.000	AV	30.2	27.5	2.4	32.3	27.8	53.9	26.1	
Vert	4804.000	AV	29.0	31.3	4.3	31.5	33.1	53.9	20.8	NS
Vert	7206.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Vert	9608.000	AV	34.0	38.3	5.8	32.9	45.2	53.9	8.7	
Vert	24020.000	AV	34.1	38.4	-1.2	31.7	39.6	53.9	14.3	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).

NS:Non signal

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit dBuV/m	Margin [dB]	Remark
Hori	2402.000	PK	95.5	27.5	2.4	32.3	93.1	-	-	Carrier
Hori	2400.000	PK	38.3	27.5	2.4	32.3	35.9	73.1	37.2	
Vert	2402.000	PK	95.3	27.5	2.4	32.3	92.9	-	-	Carrier
Vert	2400.000	PK	39.4	27.5	2.4	32.3	37.0	72.9	35.9	

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, 3DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	22.9	9.9	7.0	28.6	11.2	40.0	28.8	
Hori	69.413	QP	24.8	6.8	7.2	28.5	10.3	40.0	29.7	
Hori	81.000	QP	25.2	6.3	7.3	28.5	10.3	40.0	29.7	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	607.991	QP	28.7	19.8	10.2	28.8	29.9	46.0	16.1	
Hori	649.602	QP	28.7	20.3	10.4	28.6	30.8	46.0	15.2	
Hori	4882.000	PK	40.6	31.5	4.3	31.5	44.9	73.9	29.0	NS
Hori	7323.000	PK	41.8	35.8	5.0	32.5	50.1	73.9	23.8	NS
Hori	9764.000	PK	43.1	38.4	5.9	32.9	54.5	73.9	19.4	
Hori	24410.000	PK	47.5	38.6	-1.1	32.2	52.8	73.9	21.1	NS
Hori	4882.000	AV	29.3	31.5	4.3	31.5	33.6	53.9	20.3	NS
Hori	7323.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Hori	9764.000	AV	31.6	38.4	5.9	32.9	43.0	53.9	10.9	
Hori	24410.000	AV	33.2	38.6	-1.1	32.2	38.5	53.9	15.4	NS
Vert	54.000	QP	28.1	9.9	7.0	28.6	16.4	40.0	23.6	
Vert	69.413	QP	33.7	6.8	7.2	28.5	19.2	40.0	20.8	
Vert	81.000	QP	29.7	6.3	7.3	28.5	14.8	40.0	25.2	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	607.991	QP	31.8	19.8	10.2	28.8	33.0	46.0	13.0	
Vert	649.602	QP	31.2	20.3	10.4	28.6	33.3	46.0	12.7	
Vert	4882.000	PK	40.9	31.5	4.3	31.5	45.2	73.9	28.7	NS
Vert	7323.000	PK	41.9	35.8	5.0	32.5	50.2	73.9	23.7	NS
Vert	9764.000	PK	42.4	38.4	5.9	32.9	53.8	73.9	20.1	
Vert	24410.000	PK	47.5	38.6	-1.1	32.2	52.8	73.9	21.1	NS
Vert	4882.000	AV	29.3	31.5	4.3	31.5	33.6	53.9	20.3	NS
Vert	7323.000	AV	30.4	35.8	5.0	32.5	38.7	53.9	15.2	NS
Vert	9764.000	AV	31.8	38.4	5.9	32.9	43.2	53.9	10.7	
Vert	24410.000	AV	33.2	38.6	-1.1	32.2	38.5	53.9	15.4	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).

NS:Non signal

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 and 4 Semi Anechoic Chamber
Report No. 33CE0171-HO
Date 10/19/2012 10/21/2012
Temperature/ Humidity 21 deg.C/ 45% RH 21 deg.C/ 52% RH
Engineer Kazuya Yoshioka Motoya Imura
(1-10GHz) (30-1000MHz/10-26.5GHz)
Mode Tx, 3DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.000	QP	22.9	9.9	7.0	28.6	11.2	40.0	28.8	
Hori	69.421	QP	24.8	6.8	7.2	28.5	10.3	40.0	29.7	
Hori	81.000	QP	25.2	6.3	7.3	28.5	10.3	40.0	29.7	
Hori	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Hori	607.990	QP	28.7	19.8	10.2	28.8	29.9	46.0	16.1	
Hori	649.600	QP	28.8	20.3	10.4	28.6	30.9	46.0	15.1	
Hori	2483.500	PK	44.3	27.5	2.4	32.2	42.0	73.9	31.9	
Hori	4960.000	PK	41.6	31.8	4.3	31.5	46.2	73.9	27.7	NS
Hori	7440.000	PK	42.4	35.9	5.1	32.6	50.8	73.9	23.1	NS
Hori	9920.000	PK	42.1	38.6	5.9	33.0	53.6	73.9	20.3	NS
Hori	24800.000	PK	48.3	38.8	-1.1	32.7	53.3	73.9	20.6	NS
Hori	2483.500	AV	33.7	27.5	2.4	32.2	31.4	53.9	22.5	
Hori	4960.000	AV	29.2	31.8	4.3	31.5	33.8	53.9	20.1	NS
Hori	7440.000	AV	30.6	35.9	5.1	32.6	39.0	53.9	14.9	NS
Hori	9920.000	AV	30.7	38.6	5.9	33.0	42.2	53.9	11.7	NS
Hori	24800.000	AV	36.1	38.8	-1.1	32.7	41.1	53.9	12.8	NS
Vert	54.000	QP	28.1	9.9	7.0	28.6	16.4	40.0	23.6	
Vert	69.421	QP	33.6	6.8	7.2	28.5	19.1	40.0	20.9	
Vert	81.000	QP	30.1	6.3	7.3	28.5	15.2	40.0	24.8	
Vert	270.000	QP	21.5	18.0	8.7	27.6	20.6	46.0	25.4	
Vert	607.990	QP	31.6	19.8	10.2	28.8	32.8	46.0	13.2	
Vert	649.600	QP	31.2	20.3	10.4	28.6	33.3	46.0	12.7	
Vert	2483.500	PK	44.0	27.5	2.4	32.2	41.7	73.9	32.2	
Vert	4960.000	PK	41.4	31.8	4.3	31.5	46.0	73.9	27.9	NS
Vert	7440.000	PK	42.5	35.9	5.1	32.6	50.9	73.9	23.0	NS
Vert	9920.000	PK	42.5	38.6	5.9	33.0	54.0	73.9	19.9	NS
Vert	24800.000	PK	48.3	38.8	-1.1	32.7	53.3	73.9	20.6	NS
Vert	2483.500	AV	32.9	27.5	2.4	32.2	30.6	53.9	23.3	
Vert	4960.000	AV	29.2	31.8	4.3	31.5	33.8	53.9	20.1	NS
Vert	7440.000	AV	30.6	35.9	5.1	32.6	39.0	53.9	14.9	NS
Vert	9920.000	AV	30.7	38.6	5.9	33.0	42.2	53.9	11.7	NS
Vert	24800.000	AV	36.1	38.8	-1.1	32.7	41.1	53.9	12.8	NS

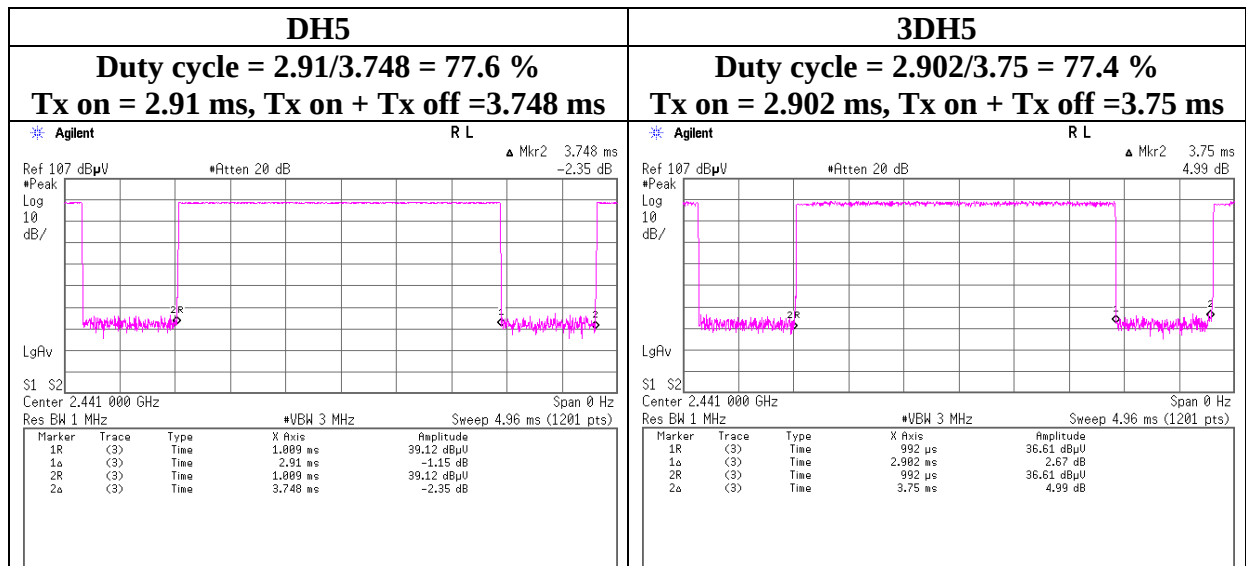
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

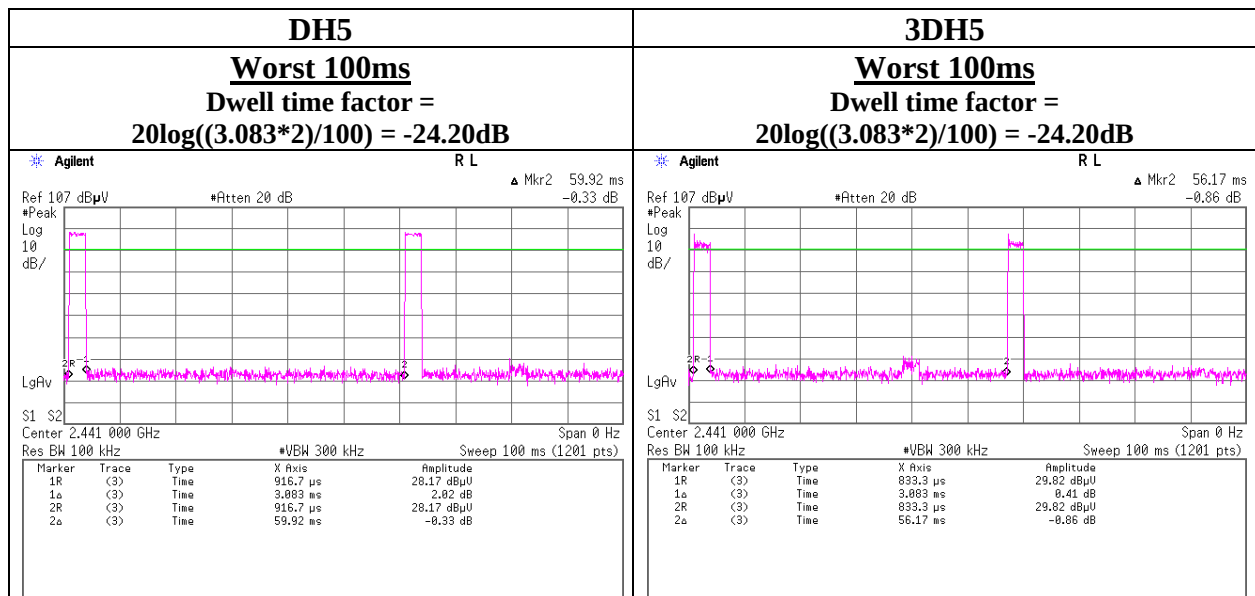
NS:Non signal

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

Duty cycle confirmation



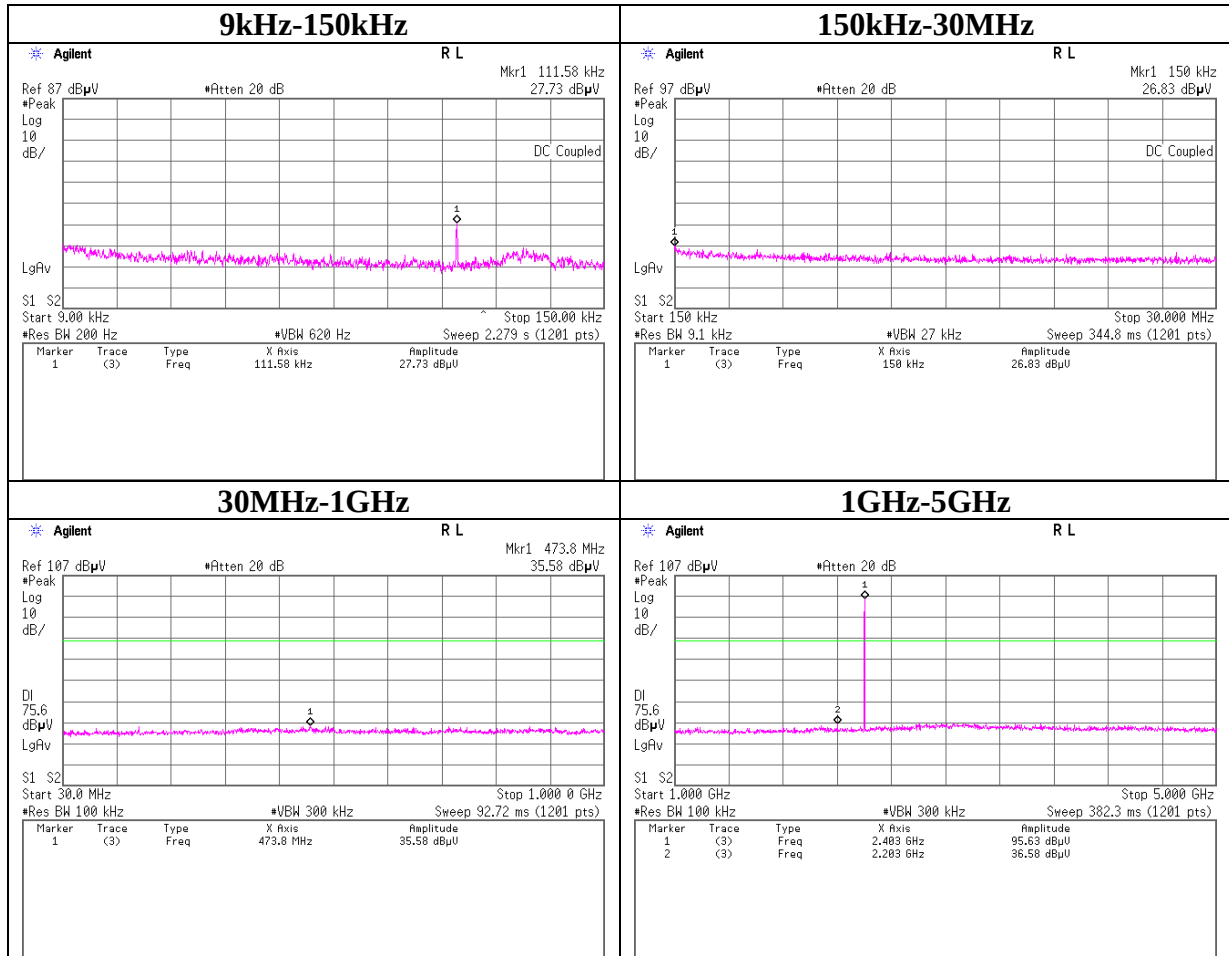
Dwell time factor



*Dwell time factor was not used for radiated spurious emission test.

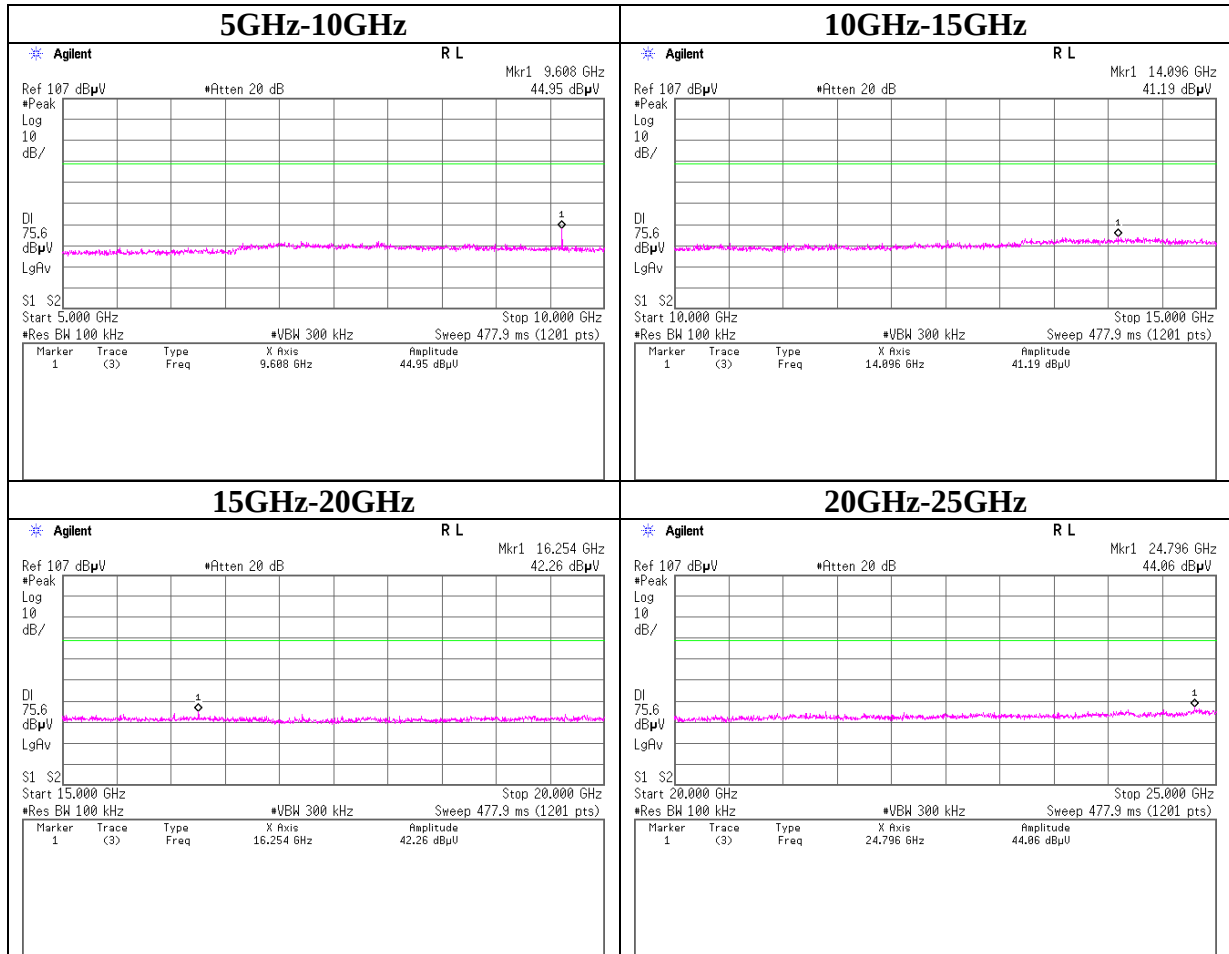
Conducted Spurious Emission

Tx DH5 2402MHz



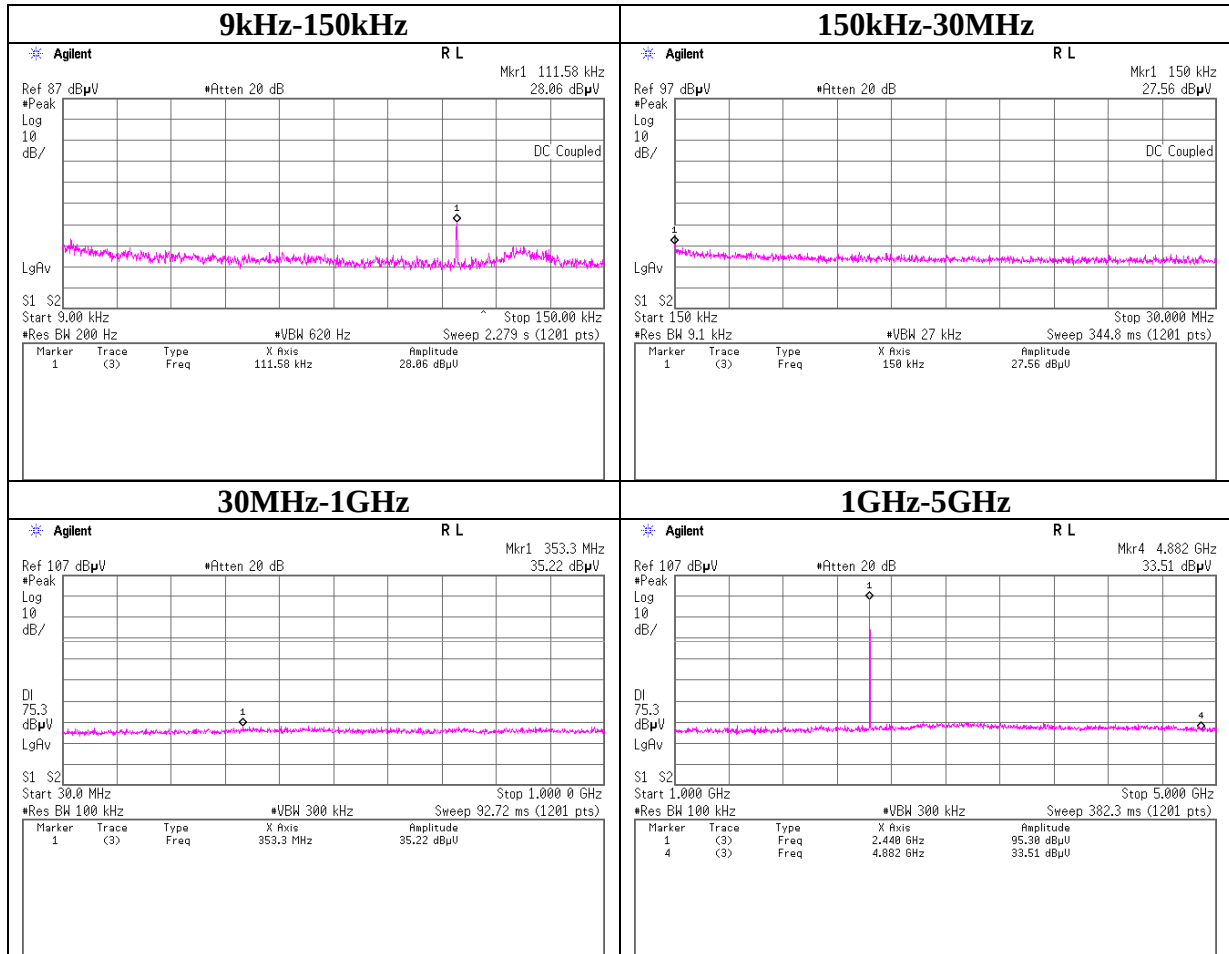
Conducted Spurious Emission

Tx DH5 2402MHz



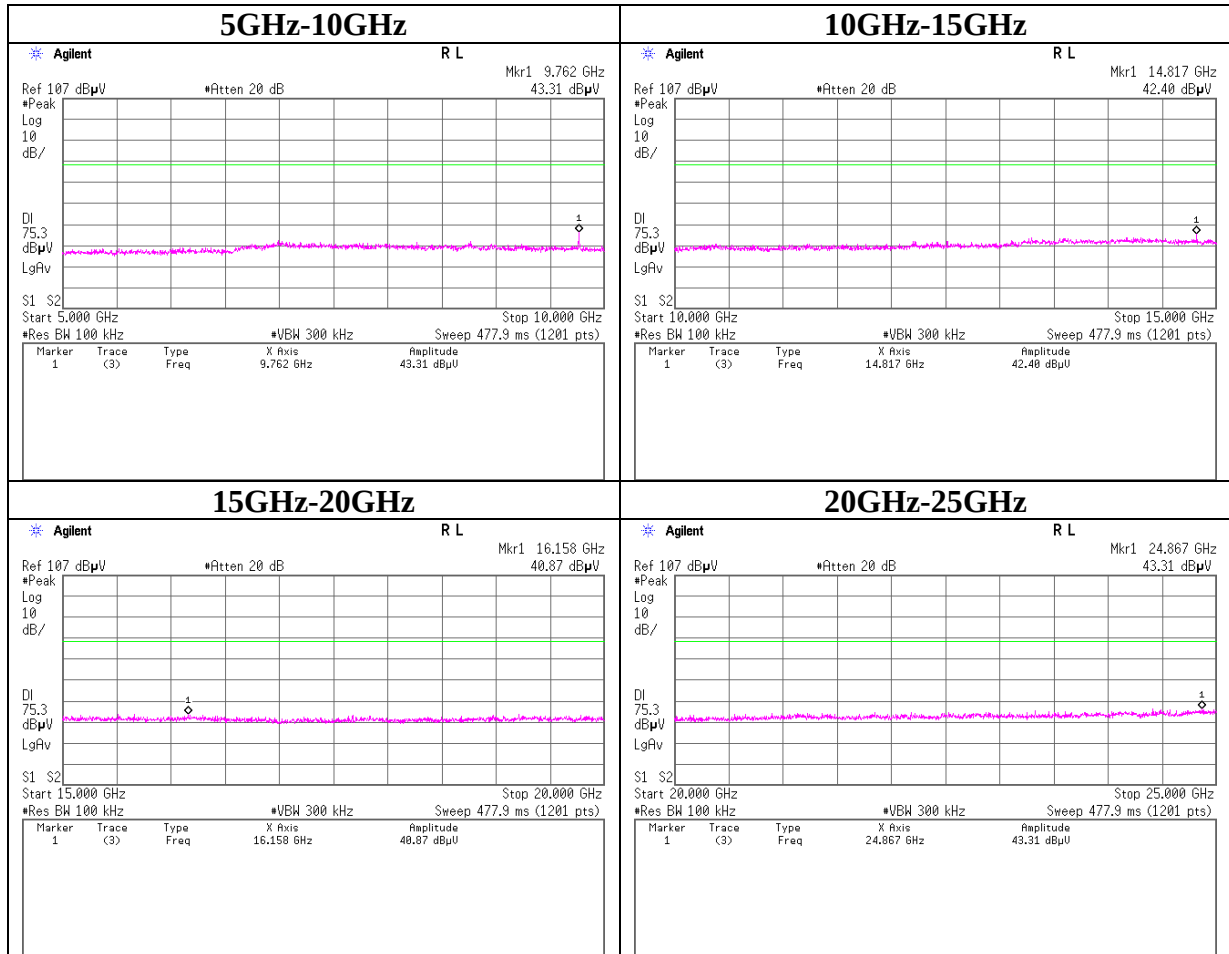
Conducted Spurious Emission

Tx DH5 2441MHz



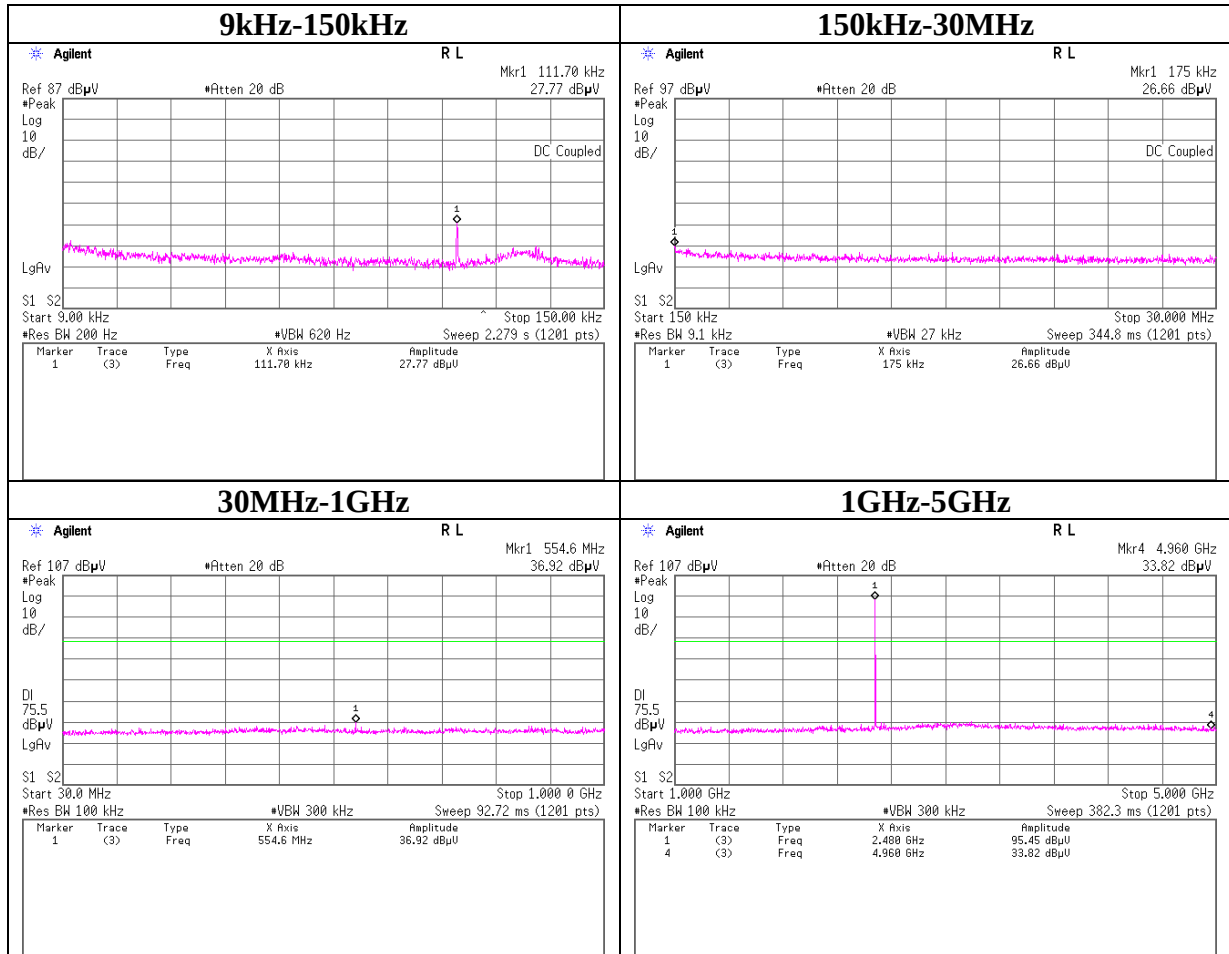
Conducted Spurious Emission

Tx DH5 2441MHz



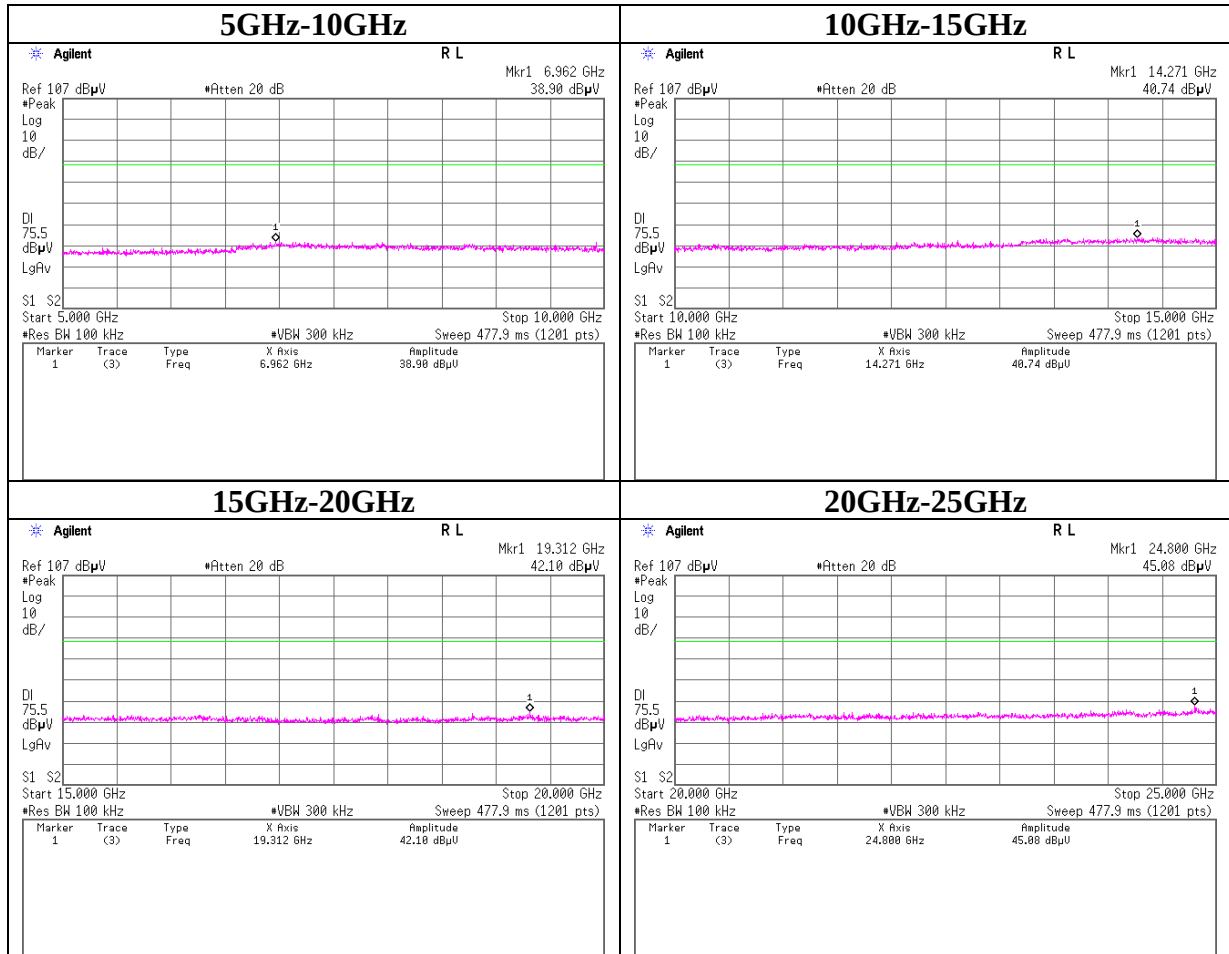
Conducted Spurious Emission

Tx DH5 2480MHz



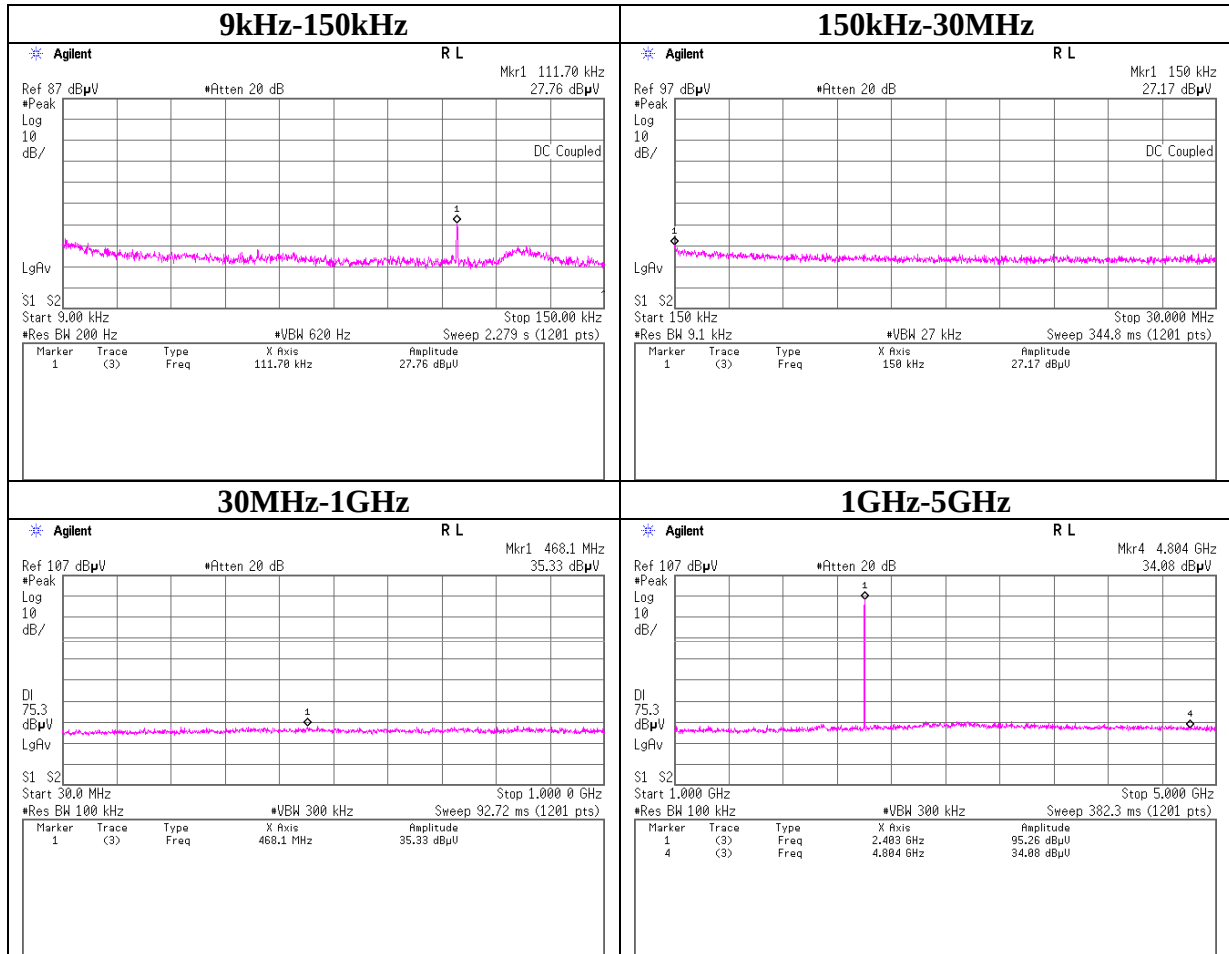
Conducted Spurious Emission

Tx DH5 2480MHz



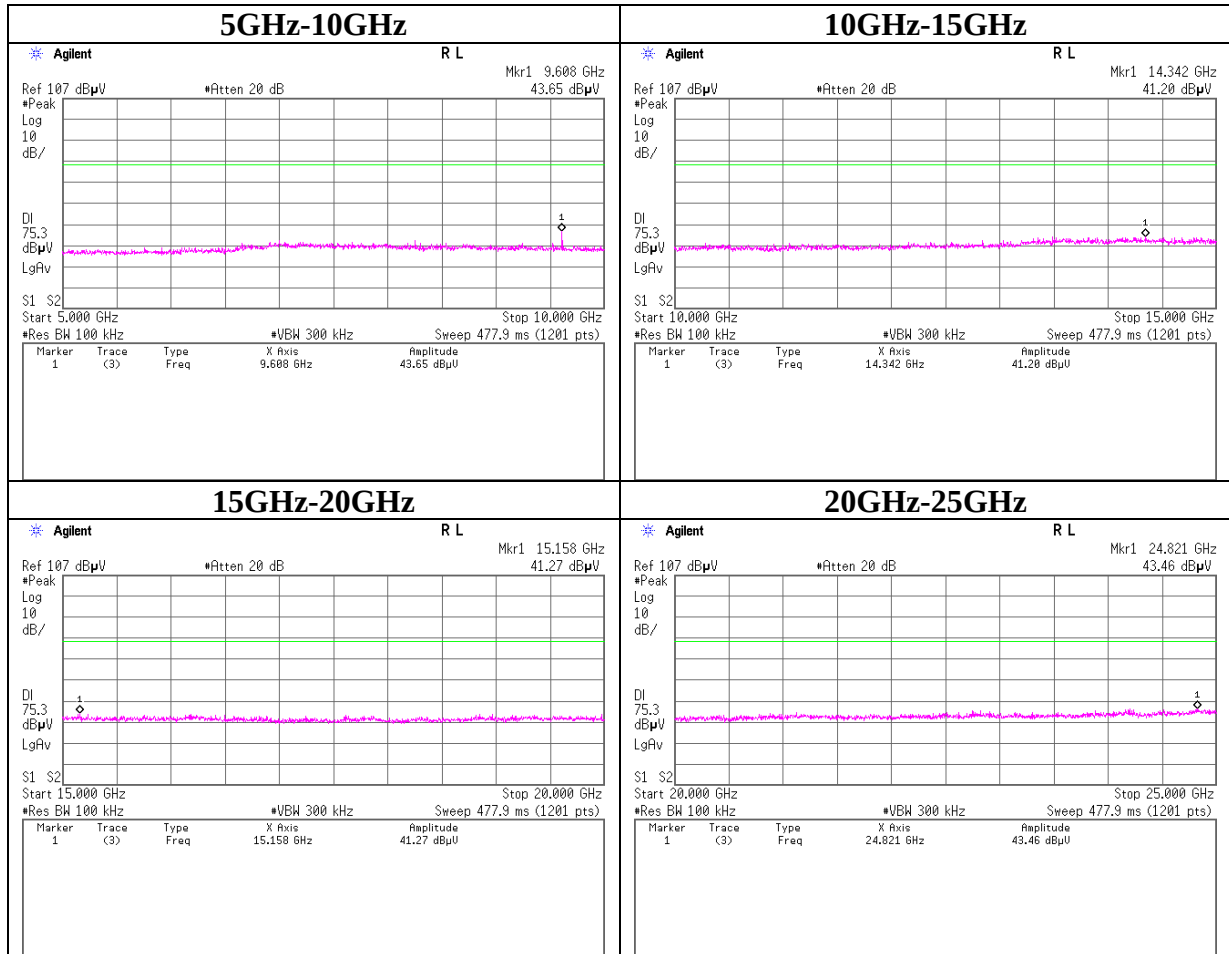
Conducted Spurious Emission

Tx 3DH5 2402MHz



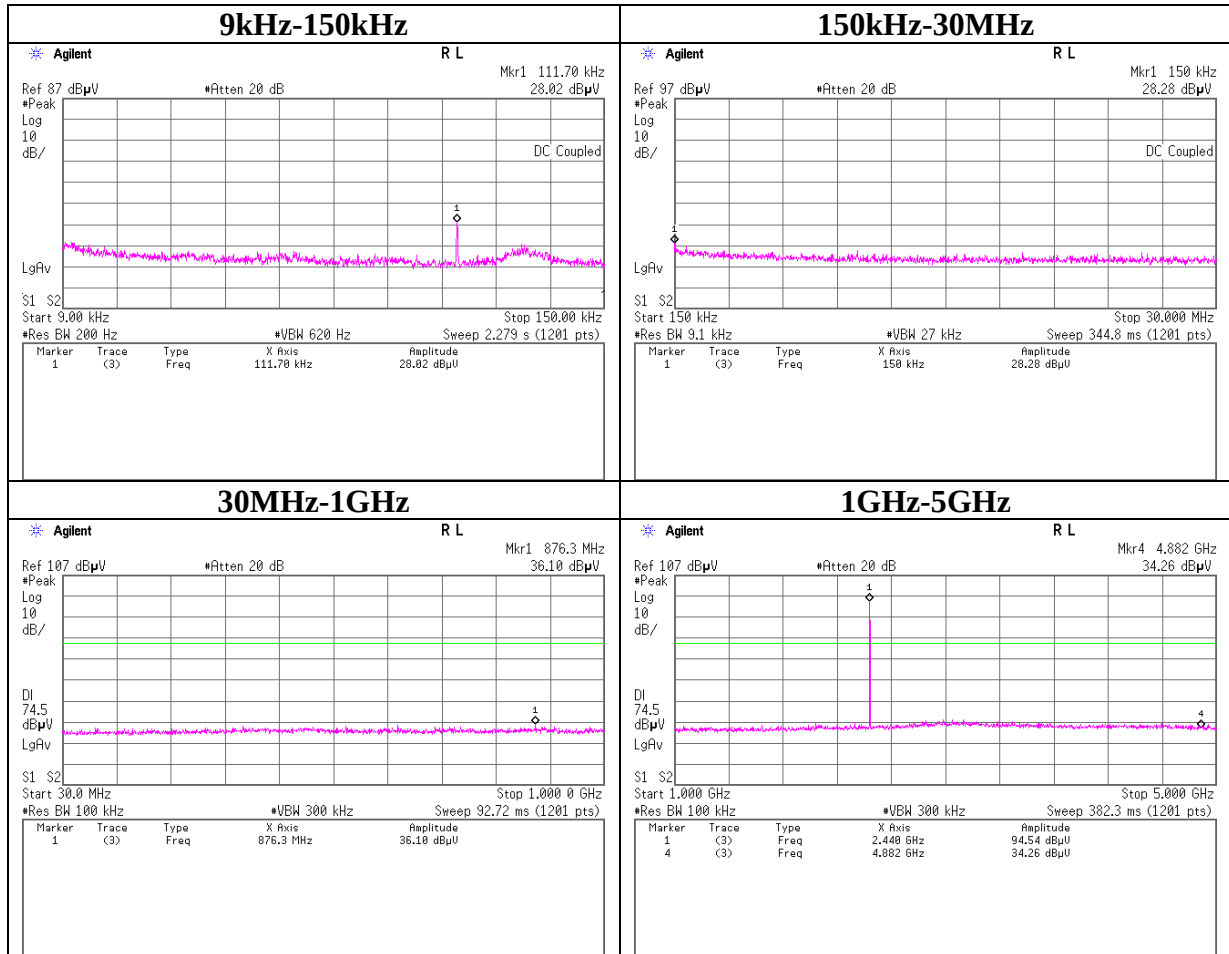
Conducted Spurious Emission

Tx 3DH5 2402MHz



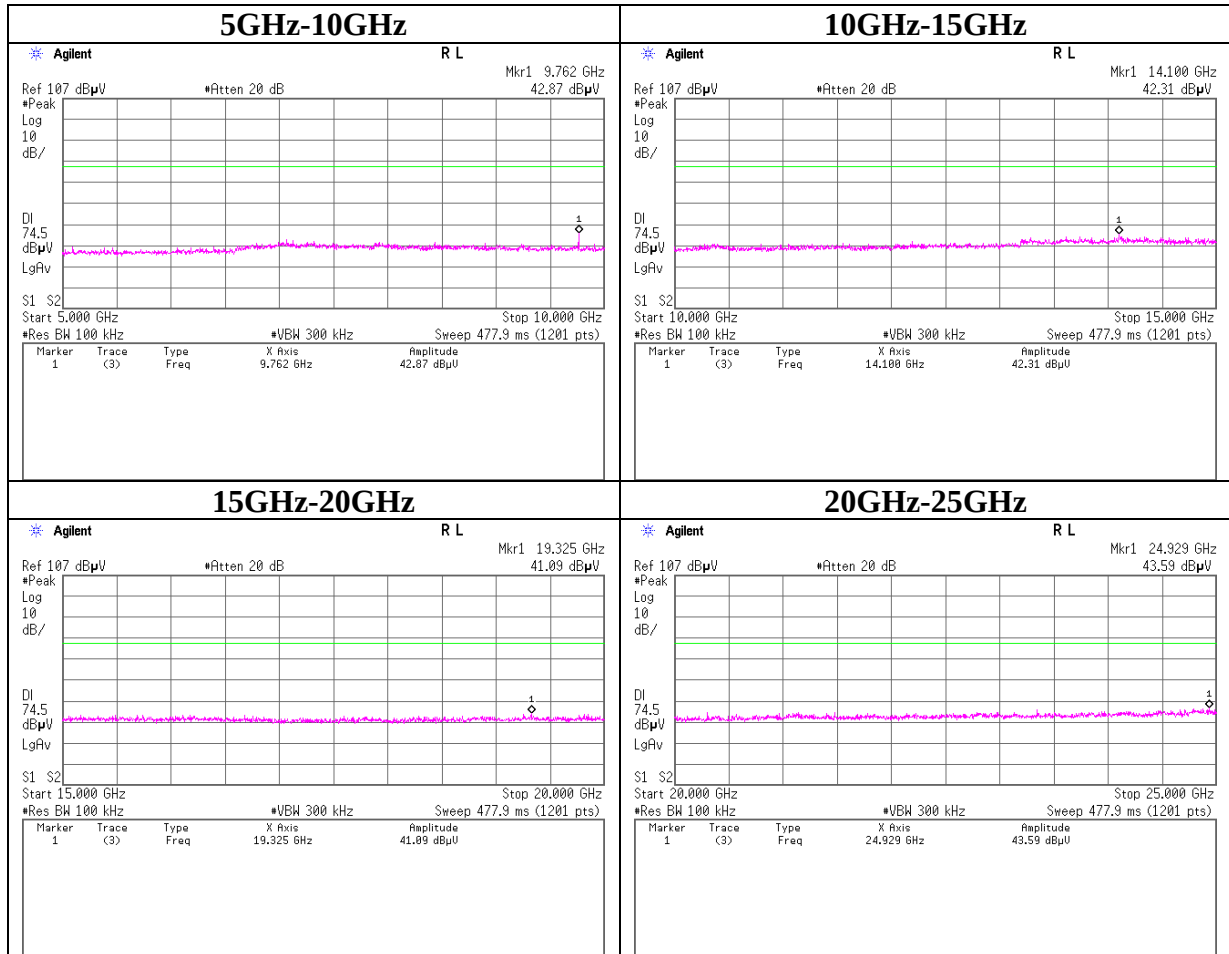
Conducted Spurious Emission

Tx 3DH5 2441MHz



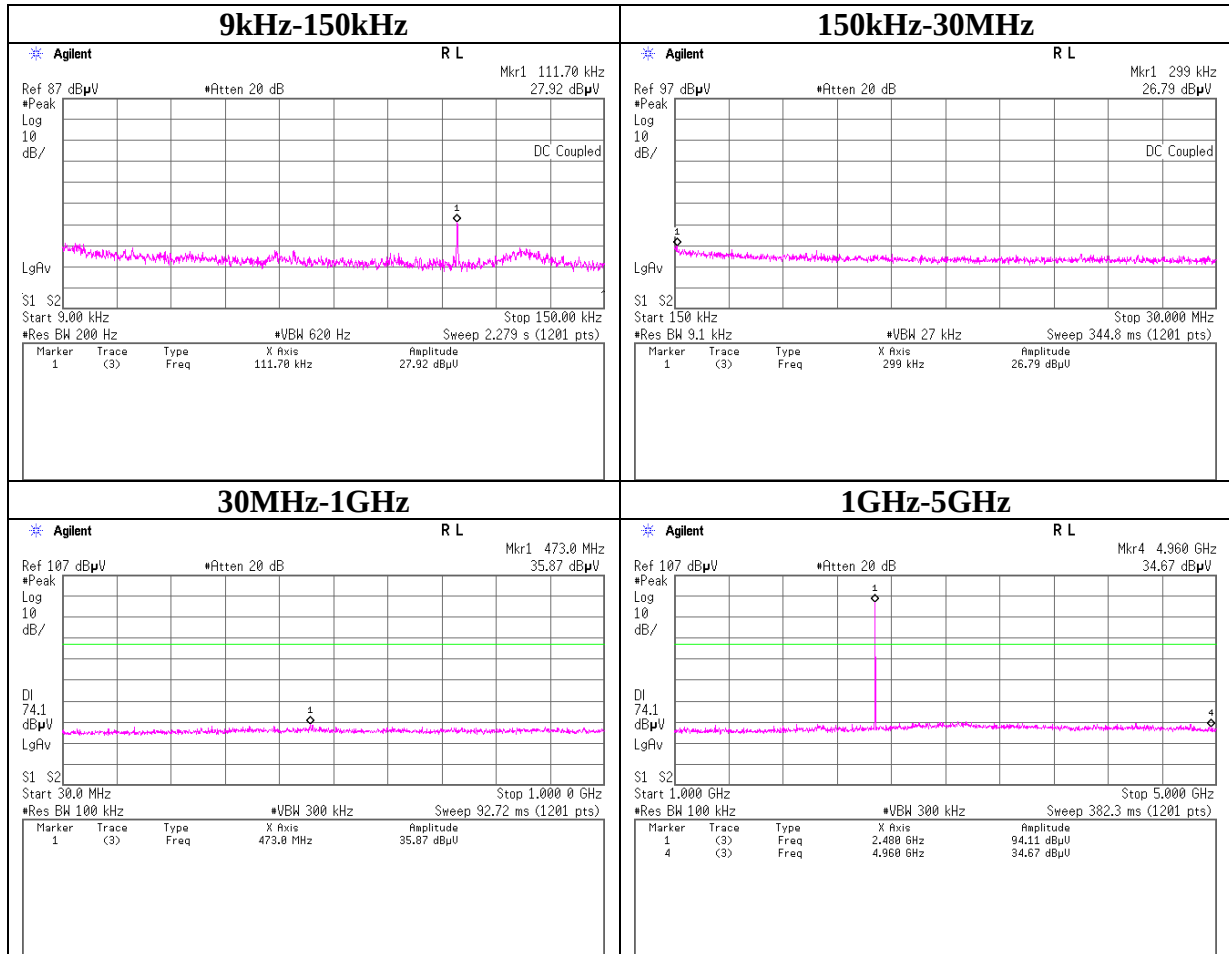
Conducted Spurious Emission

Tx 3DH5 2441MHz



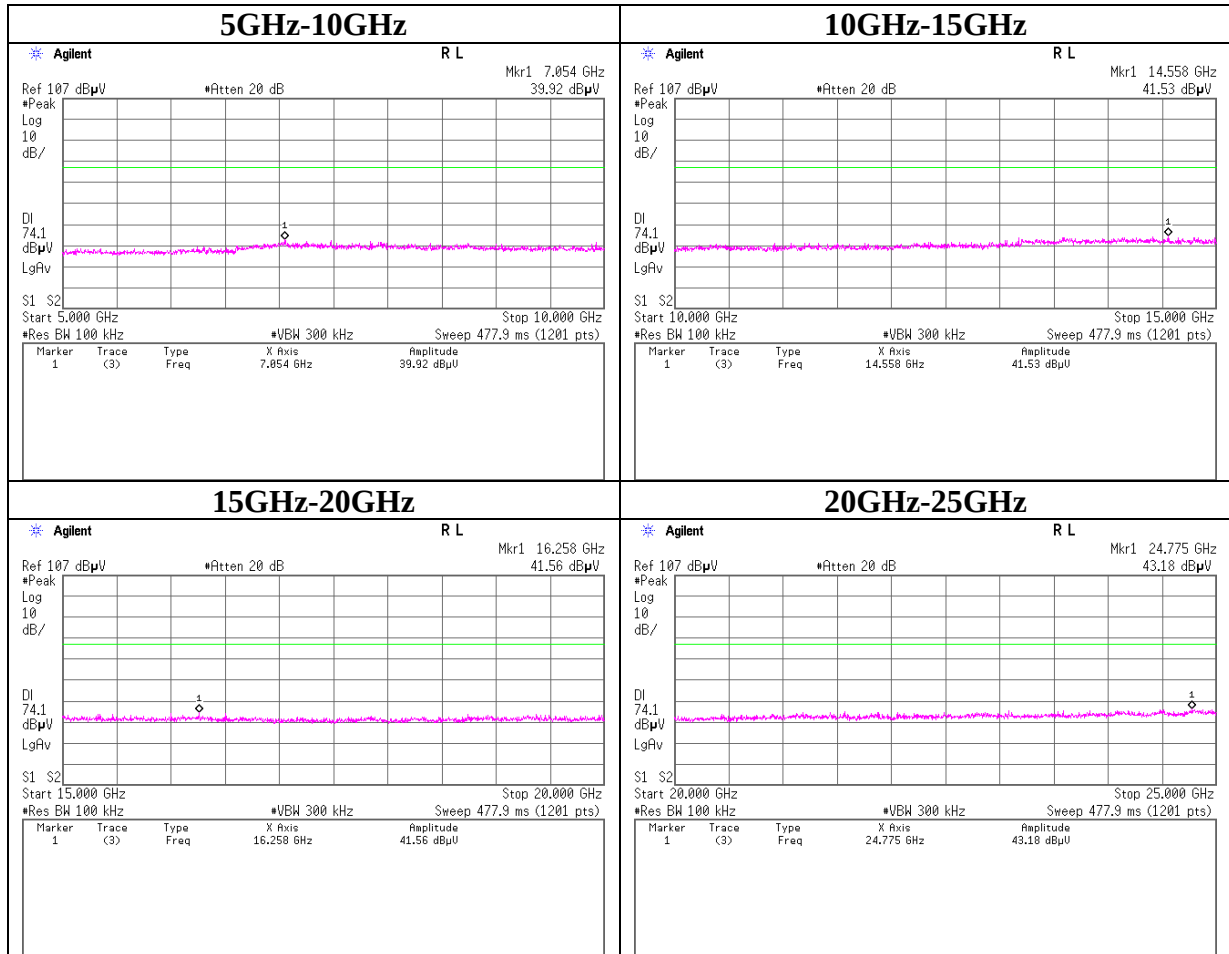
Conducted Spurious Emission

Tx 3DH5 2480MHz



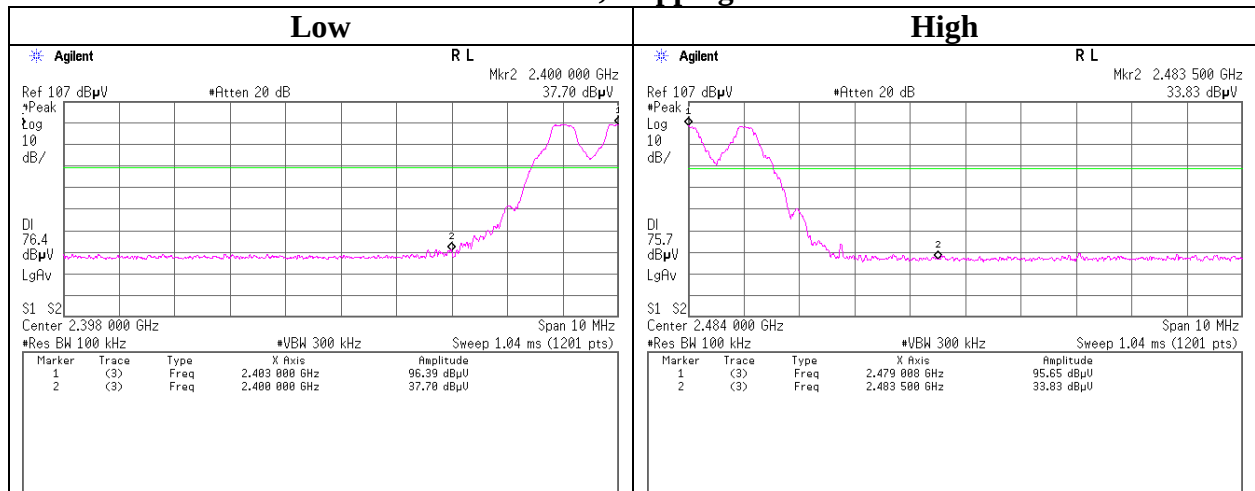
Conducted Spurious Emission

Tx 3DH5 2480MHz

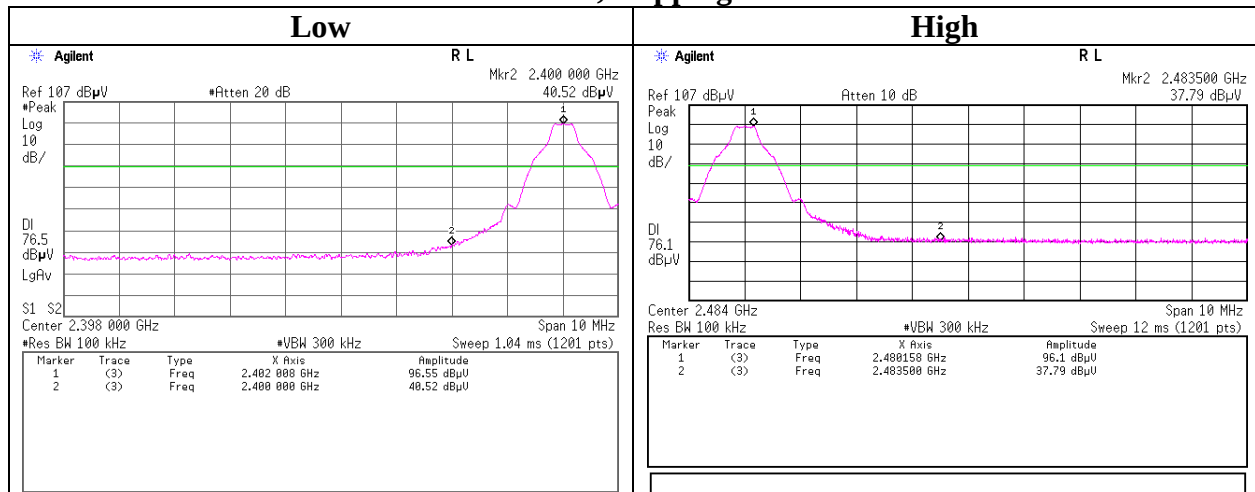


Conducted Emission Band Edge compliance

Tx DH5, Hopping on

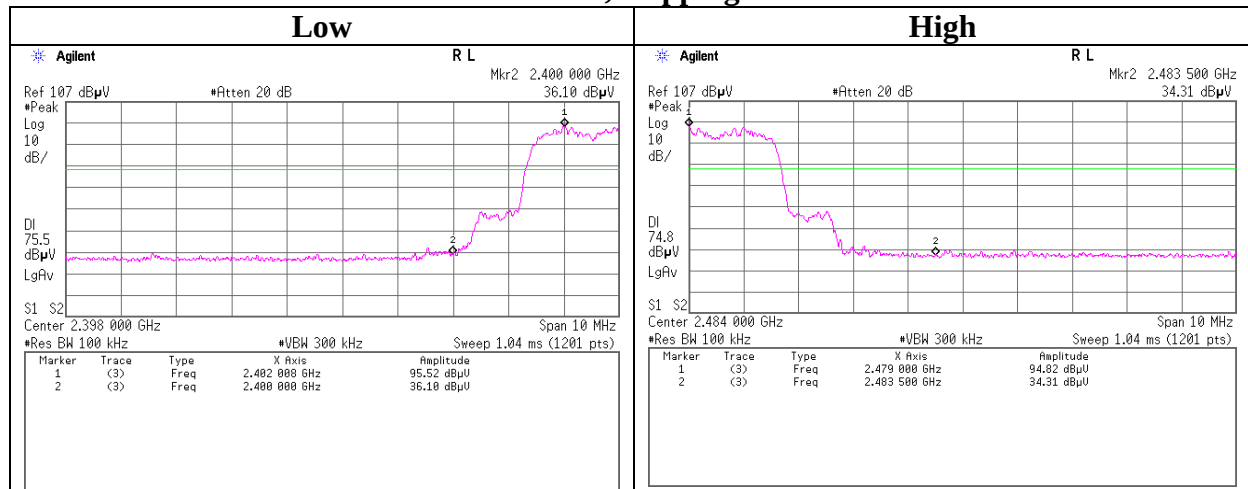


Tx DH5, Hopping off

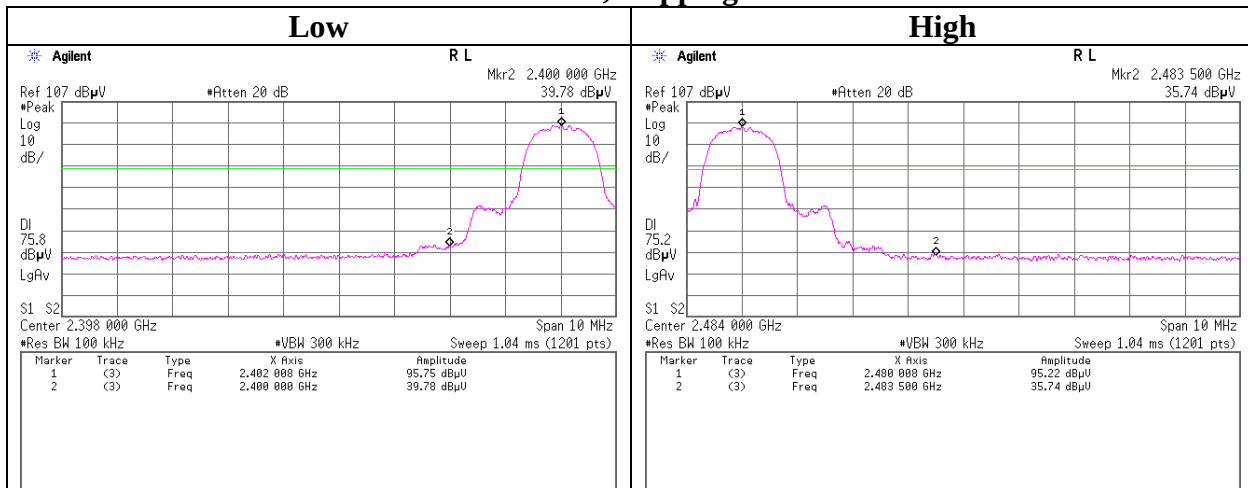


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on



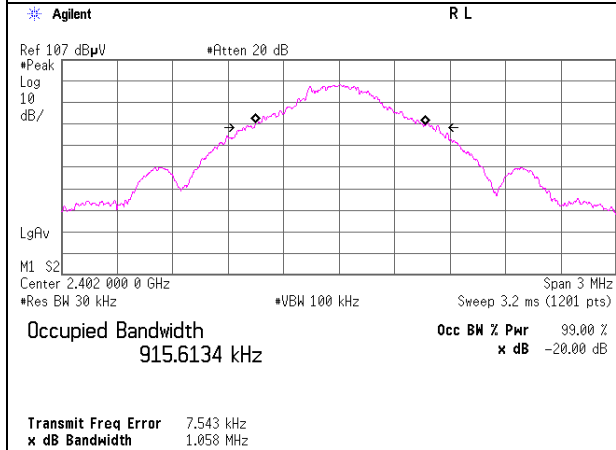
Tx 3DH5, Hopping off



99%Occupied Bandwidth

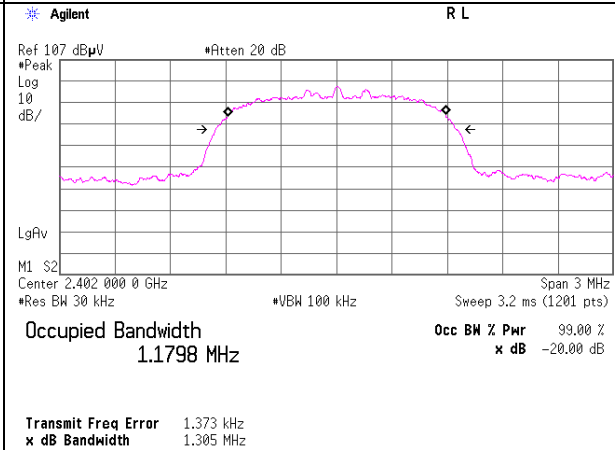
Tx DH5, Hopping off

2402MHz

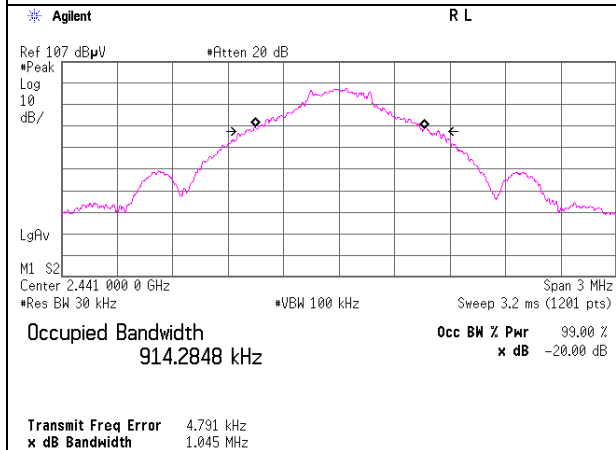


Tx 3DH5, Hopping off

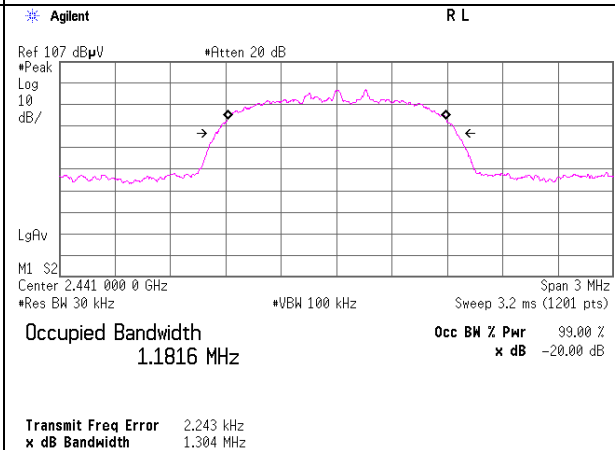
2402MHz



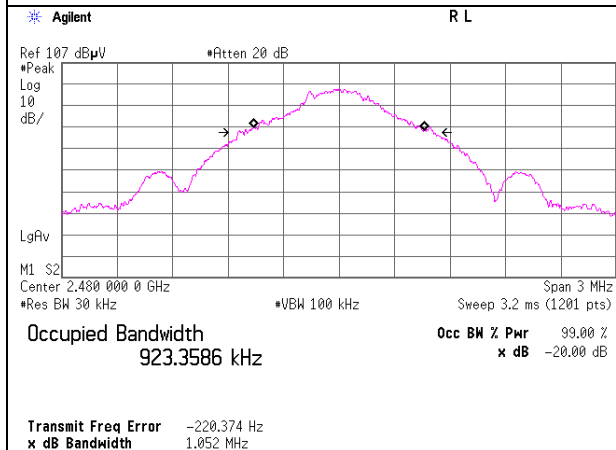
2441MHz



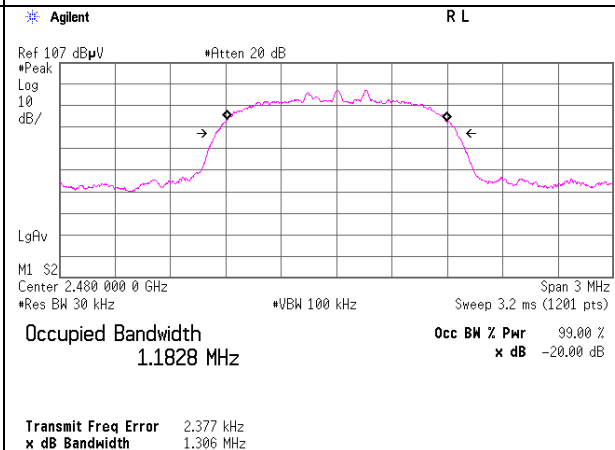
2441MHz



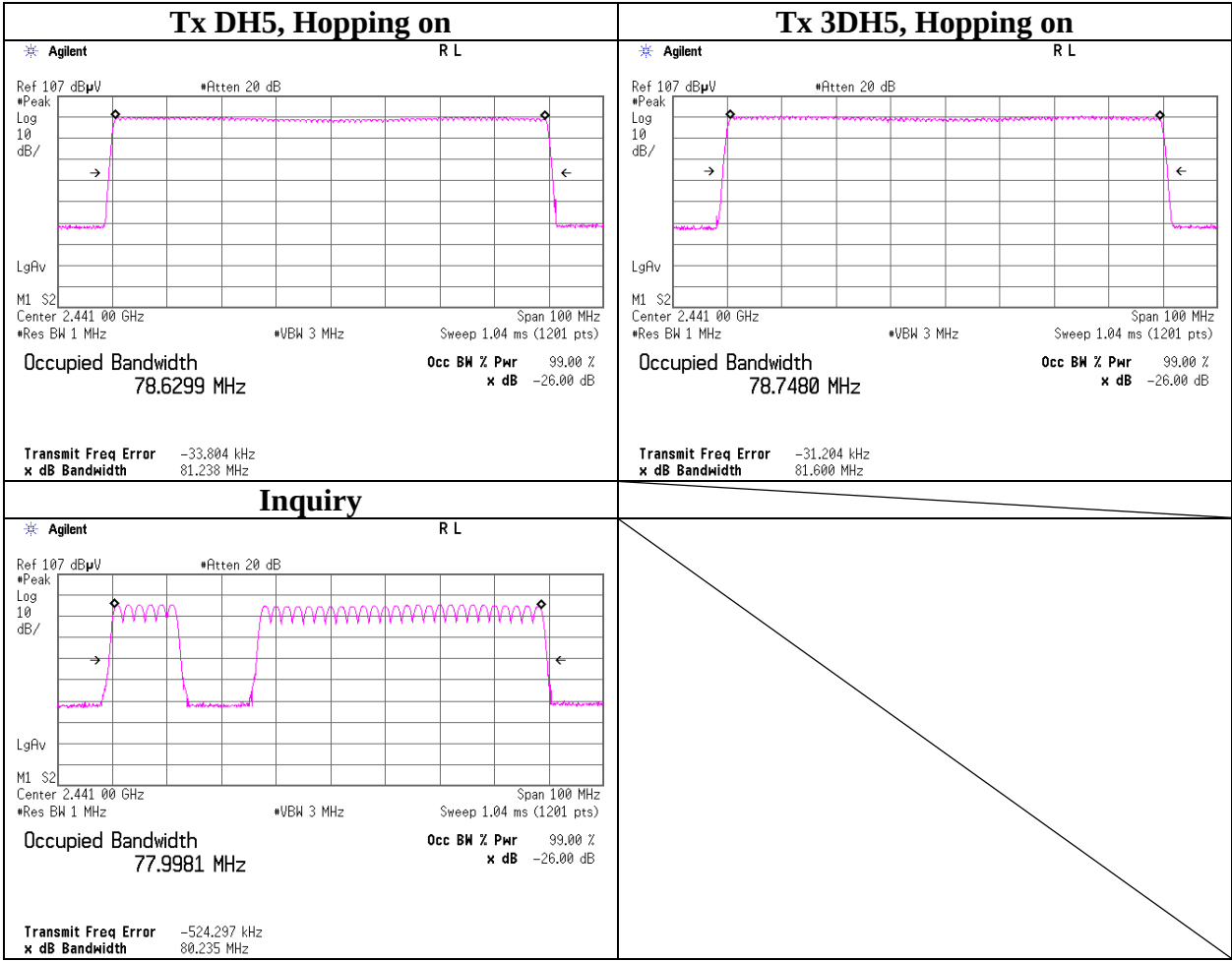
2480MHz



2480MHz



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2011/11/23 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2012/08/17 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1203S212(1m) / 1204S062(5m)	RE	2012/04/23 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2012/03/28 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2012/04/06 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2012/04/03 * 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	2012/02/16 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2012/09/11 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2012/01/25 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2012/06/27 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2011/11/23 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2012/06/19 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2012/06/01 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2012/06/01 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2012/10/19 * 12
MAT-22	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
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	CE	2012/02/06 * 12
MJM-15	Measure	KOMELON	KMC-36	-	CE	-
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	CE	2012/08/23 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2012/02/06 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucofor m141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2012/07/12 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12

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

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

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

Test Item: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test

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