



RADIO TEST REPORT

Test Report No. : 32JE0205-HO-B

Applicant : SAMSUNG ELECTRONICS CO., LTD.

Type of Equipment : GPRS850/1900, EDGE850/1900, WCDMA2,
WCDMA5, LTE4, LTE17 Tablet with 802.11bgn,
BT(EDR, LE)

Model No. : SGH-I497

FCC ID : A3LSGHI497

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: May 29 to June 5, 2012

Representative test engineer:

Takayuki Shimada
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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

UL Japan, Inc.

Head Office EMC Lab.

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

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

CONTENTS	PAGE
SECTION 1: Customer information	3
SECTION 2: Equipment under test (E.U.T.)	3
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Conducted Emission	10
SECTION 6: Radiated Spurious Emission	11
SECTION 7: Antenna Terminal Conducted Tests	12
APPENDIX 1: Data of EMI test	13
Conducted Emission	13
20dB Bandwidth and Carrier Frequency Separation	17
Number of Hopping Frequency	20
Dwell time	22
Maximum Peak Output Power.....	25
Radiated Spurious Emission	26
Conducted Spurious Emission.....	38
Conducted Emission Band Edge compliance	50
99% Occupied Bandwidth	52
APPENDIX 2: Test instruments	54
APPENDIX 3: Photographs of test setup.....	55
Conducted Emission	55
Radiated Spurious Emission	56
Worst Case Position.....	57

SECTION 1: Customer information

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

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

2.1 Identification of E.U.T.

Type of Equipment : GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5, LTE4,
LTE17 Tablet with 802.11bgn, BT(EDR, LE)
Model No. : SGH-I497
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC5.0V(USB Power Supply)
DC3.7V/7000mAh, 25.9Wh
Receipt Date of Sample : May 28, 2012
Modification of EUT : No Modification by the test lab

2.2 Product Description

Radio Specification

Bluetooth

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

Low Energy

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	DSSS
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

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GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK , 8PSK
Antenna Type	PIFA
Antenna Gain	GSM850: 824-849MHz: -5.73dBi (MAX) 869-894MHz: -5.83dBi (MAX) PCS: 1850-1910MHz: -5.62dBi (MAX) 1930-1990MHz: -5.51dBi (MAX)

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz Band II: 1850 – 1910MHz [Down Link] Band V: 869 – 894MHz Band II: 1930 – 1990MHz
Type of Modulation	QPSK
Antenna Type	PIFA
Antenna Gain	Band V: 824-849MHz: -5.73dBi (MAX) 869-894MHz: -5.83dBi (MAX) Band II: 1850-1910MHz: -5.62dBi (MAX) 1930-1990MHz: -5.51dBi (MAX)

LTE

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band IV: 1710 – 1755MHz Band X VII: 704 – 716MHz [Down Link] Band IV: 2110 – 2155MHz Band X VII: 734 – 746MHz
Type of Modulation	QPSK, 16QAM
Antenna Type	PIFA
Antenna Gain	Band IV: 1710-1755MHz: -5.57dBi (MAX) 2110-2155MHz: -3.86dBi (MAX) Band X VII: 704-716MHz: -5.95dBi (MAX) 734-746MHz: -4.23dBi (MAX)

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Head Office EMC Lab.

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

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : Test specification: FCC Part 15 Subpart B(orC): 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	QP 22.8dB, 23.83453MHz, N AV 20.7dB, 0.60101MHz, 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	2.4dB 7323.000MHz, AV, Vert.	Complied	Conducted/ Radiated

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

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

3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

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

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	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

Conducted Emission test

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

Radiated emission test (3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

UL Japan, Inc.

Head Office EMC Lab.

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

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	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, 2DH5, 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 Inquiry	2402MHz 2441MHz 2480MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *The EUT support AFH with a minimum of 20 channels, following the Bluetooth protocol to ensure compliance with the pseudo-hopping sequence and dwell time requirements of FCC 15.247.		

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

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

H/W version: REV0.0

S/W version: I497.001

This setting of software is the worst case.

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

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

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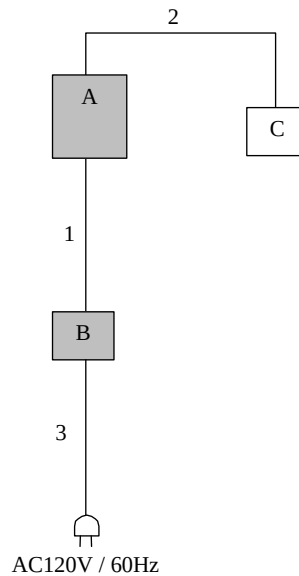
Head Office EMC Lab.

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

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

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	GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5, LTE4, LTE17 Tablet with 802.11bgn, BT(EDR, LE)	SGH-I497	R31C50X3QHR *1) R31C50X3QJH *2)	SAMSUNG	EUT
B	AC Adapter	ETA-P11X	-	SAMSUNG	EUT
C	Ear phone	-	-	SAMSUNG	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.0	Shielded	Shielded	-
2	Ear phone Cable	1.2	Unshielded	Unshielded	-
3	AC Cable	0.9	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.5m 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, 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	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

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

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

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

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

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

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

Measurement range	: 30M-25GHz
Test data	: APPENDIX
Test result	: Pass

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

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz 2.5MHz (Inquiry mode)	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3MHz 5MHz (Inquiry mode)	30kHz, 100kHz	100kHz, 300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *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 not detected as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Conducted Emission

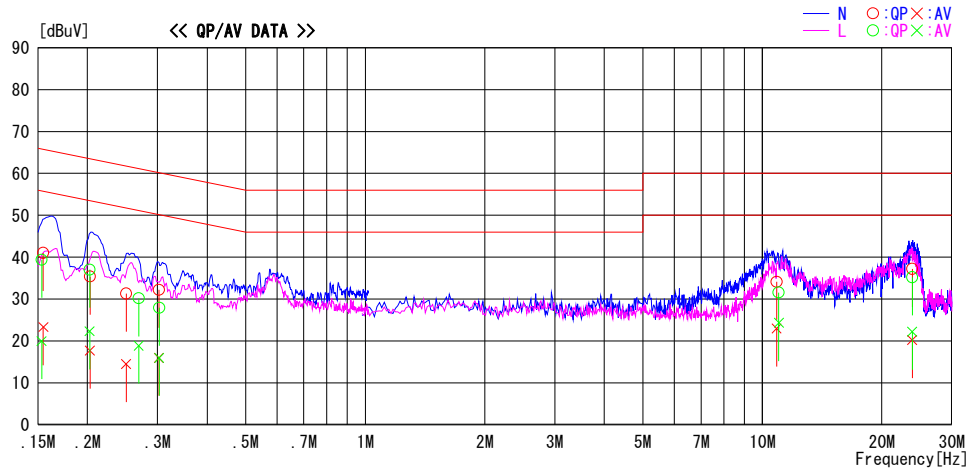
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/06/05

Report No. : 32JE0205-HO
Power : AC 120V / 60Hz
Temp./Humi. : 23 deg. C / 59% RH
Engineer : Keisuke Kawamura

Mode / Remarks : BT DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

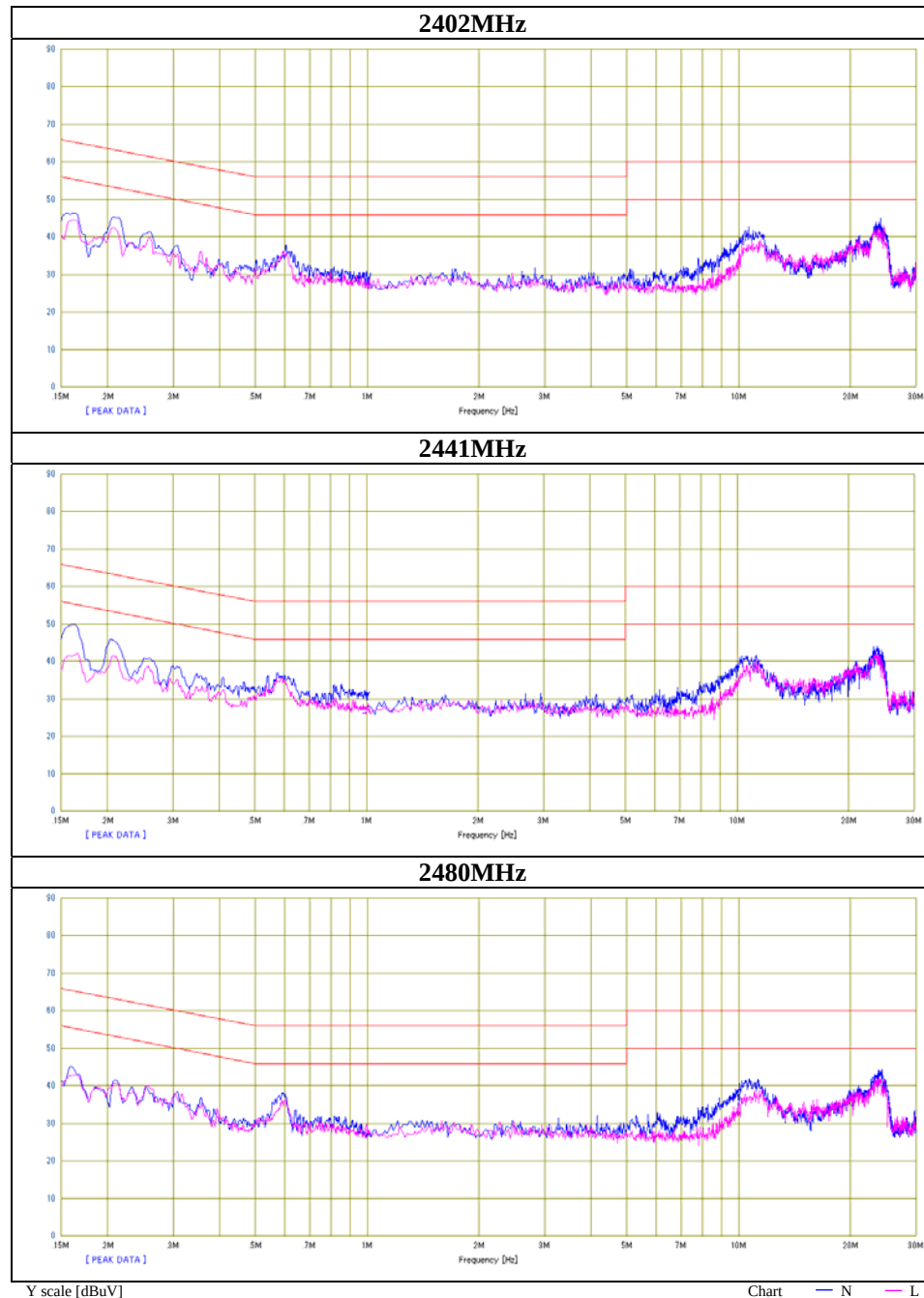


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15469	27.8	10.1	13.2	41.0	23.3	65.7	55.7	24.7	32.4	N	
0.20275	22.2	4.5	13.2	35.4	17.7	63.5	53.5	28.1	35.8	N	
0.25011	18.1	1.3	13.2	31.3	14.5	61.8	51.8	30.5	37.3	N	
0.30225	19.0	2.8	13.2	32.2	16.0	60.2	50.2	28.0	34.2	N	
10.86652	19.6	8.5	14.5	34.1	23.0	60.0	50.0	25.9	27.0	N	
23.83453	22.0	5.0	15.2	37.2	20.2	60.0	50.0	22.8	29.8	N	
0.15324	26.2	6.8	13.2	39.4	20.0	65.8	55.8	26.4	35.8	L	
0.20243	23.8	9.1	13.2	37.0	22.3	63.5	53.5	26.5	31.2	L	
0.26911	17.0	5.7	13.2	30.2	18.9	61.1	51.1	30.9	32.2	L	
0.30295	14.7	2.8	13.2	27.9	16.0	60.2	50.2	32.3	34.2	L	
10.99312	17.0	9.7	14.6	31.6	24.3	60.0	50.0	28.4	25.7	L	
23.83453	20.0	7.0	15.2	35.2	22.2	60.0	50.0	24.8	27.8	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.2 Semi Anechoic Chamber
Report No.	32JE0205-HO
Date	06/05/2012
Temperature/ Humidity	23 deg. C / 59% RH
Engineer	Keisuke Kawamura
Mode	Tx DH5



Conducted Emission

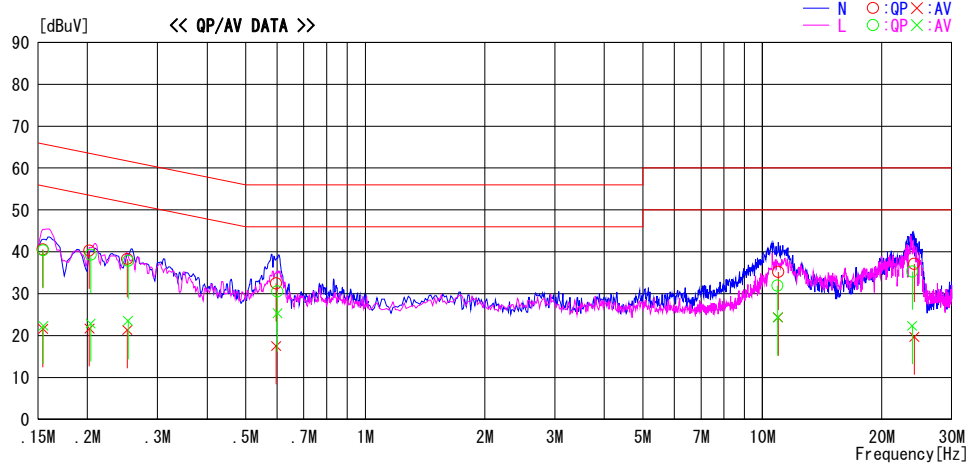
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/06/05

Report No. : 32JE0205-HO
Power : AC 120V / 60Hz
Temp./Humi. : 23 deg. C / 59% RH
Engineer : Keisuke Kawamura

Mode / Remarks : BT 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

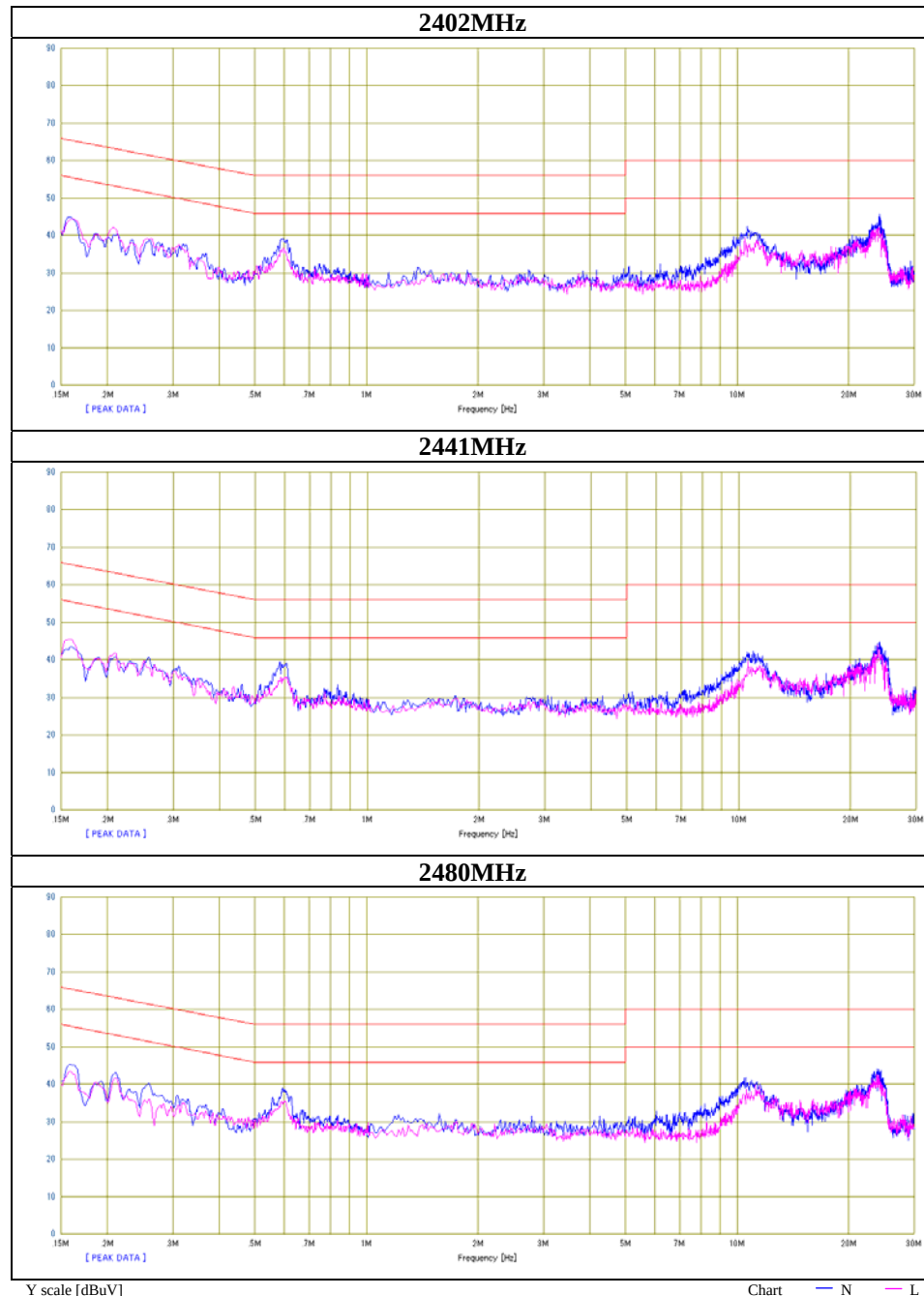


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15435	27.4	8.4	13.2	40.6	21.6	65.8	55.8	25.2	34.2	N	
0.20205	27.1	8.5	13.2	40.3	21.7	63.5	53.5	23.2	31.8	N	
0.25185	25.1	8.1	13.2	38.3	21.3	61.7	51.7	23.4	30.4	N	
0.59661	19.2	4.2	13.3	32.5	17.5	56.0	46.0	23.5	28.5	N	
10.95251	20.6	9.7	14.6	35.2	24.3	60.0	50.0	24.8	25.7	N	
24.12795	21.9	4.5	15.2	37.1	19.7	60.0	50.0	22.9	30.3	N	
0.15469	27.2	9.1	13.2	40.4	22.3	65.7	55.7	25.3	33.4	L	
0.20365	26.1	9.7	13.2	39.3	22.9	63.5	53.5	24.2	30.6	L	
0.25295	24.6	10.3	13.2	37.8	23.5	61.7	51.7	23.9	28.2	L	
0.60101	17.3	12.0	13.3	30.6	25.3	56.0	46.0	25.4	20.7	L	
10.91909	17.3	9.7	14.6	31.9	24.3	60.0	50.0	28.1	25.7	L	
23.81795	20.1	7.1	15.2	35.3	22.3	60.0	50.0	24.7	27.7	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.2 Semi Anechoic Chamber
Report No.	32JE0205-HO
Date	06/05/2012
Temperature/ Humidity	23 deg. C / 59% RH
Engineer	Keisuke Kawamura
Mode	Tx 3DH5



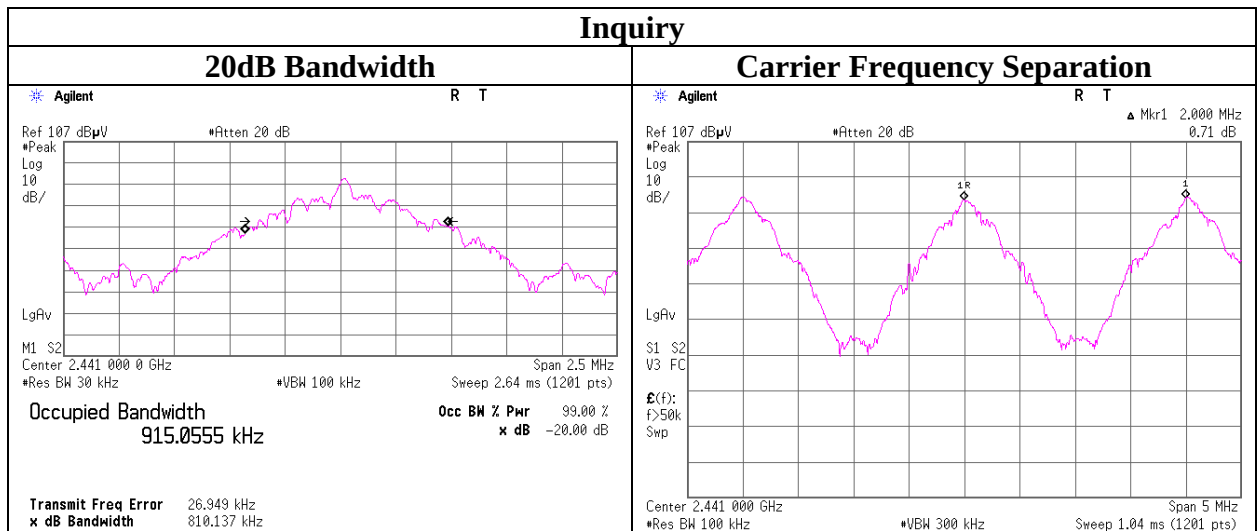
20dB Bandwidth and Carrier Frequency Separation

Test place Head Office EMC Lab. No.6 Shielded Room
Report No. 32JE0205-HO
Date 05/29/2012
Temperature/ Humidity 22deg. C / 58% RH
Engineer Takayuki Shimada
Mode Tx (Hopping on) DH5/3DH5/Inquiry

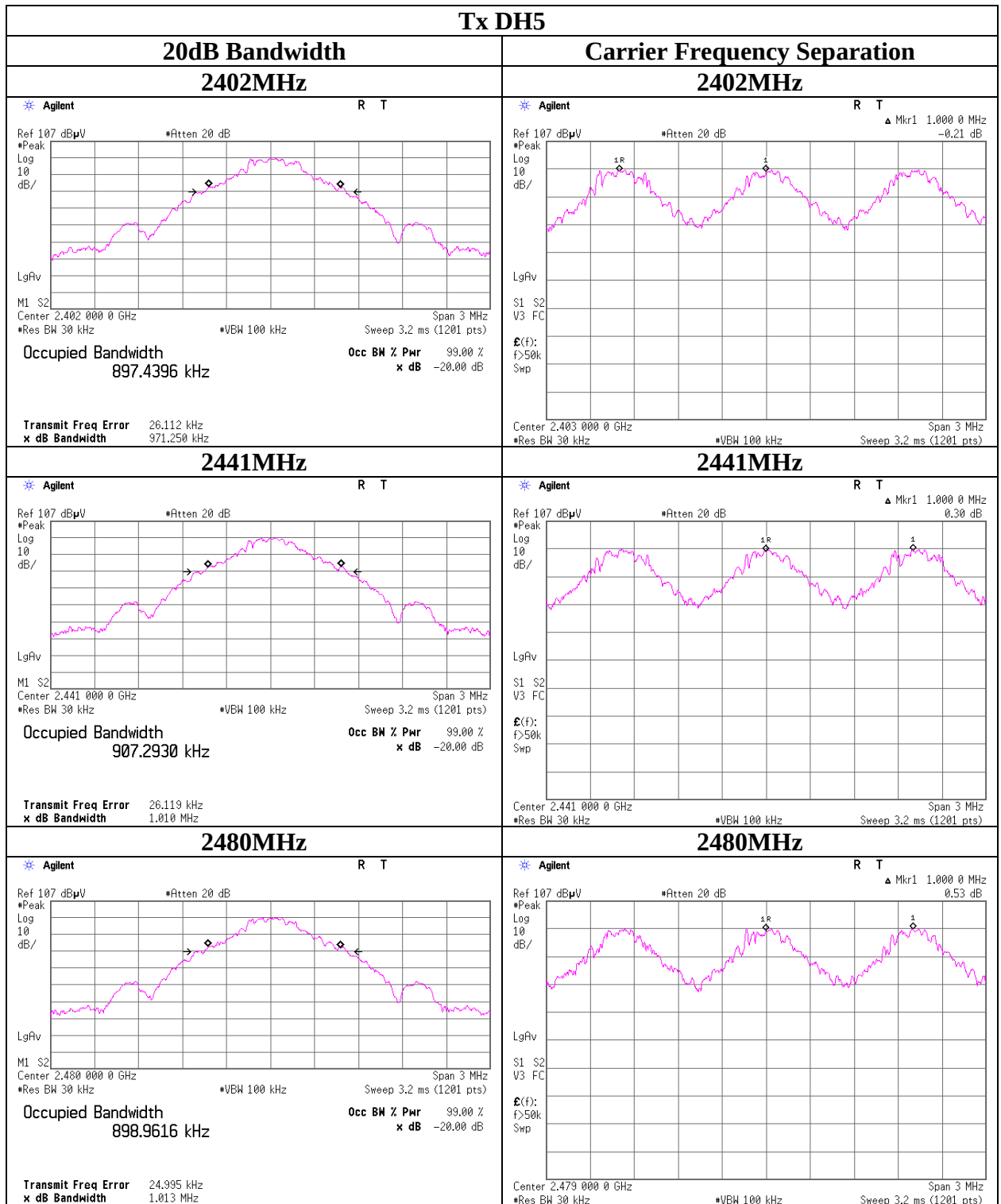
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.971	1.000	>= 0.647
DH5	2441.0	1.010	1.000	>= 0.673
DH5	2480.0	1.013	1.000	>= 0.675
3DH5	2402.0	1.299	1.000	>= 0.866
3DH5	2441.0	1.295	1.000	>= 0.863
3DH5	2480.0	1.300	1.000	>= 0.867
Inquiry	2441.0	0.810	2.000	>= 0.540

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

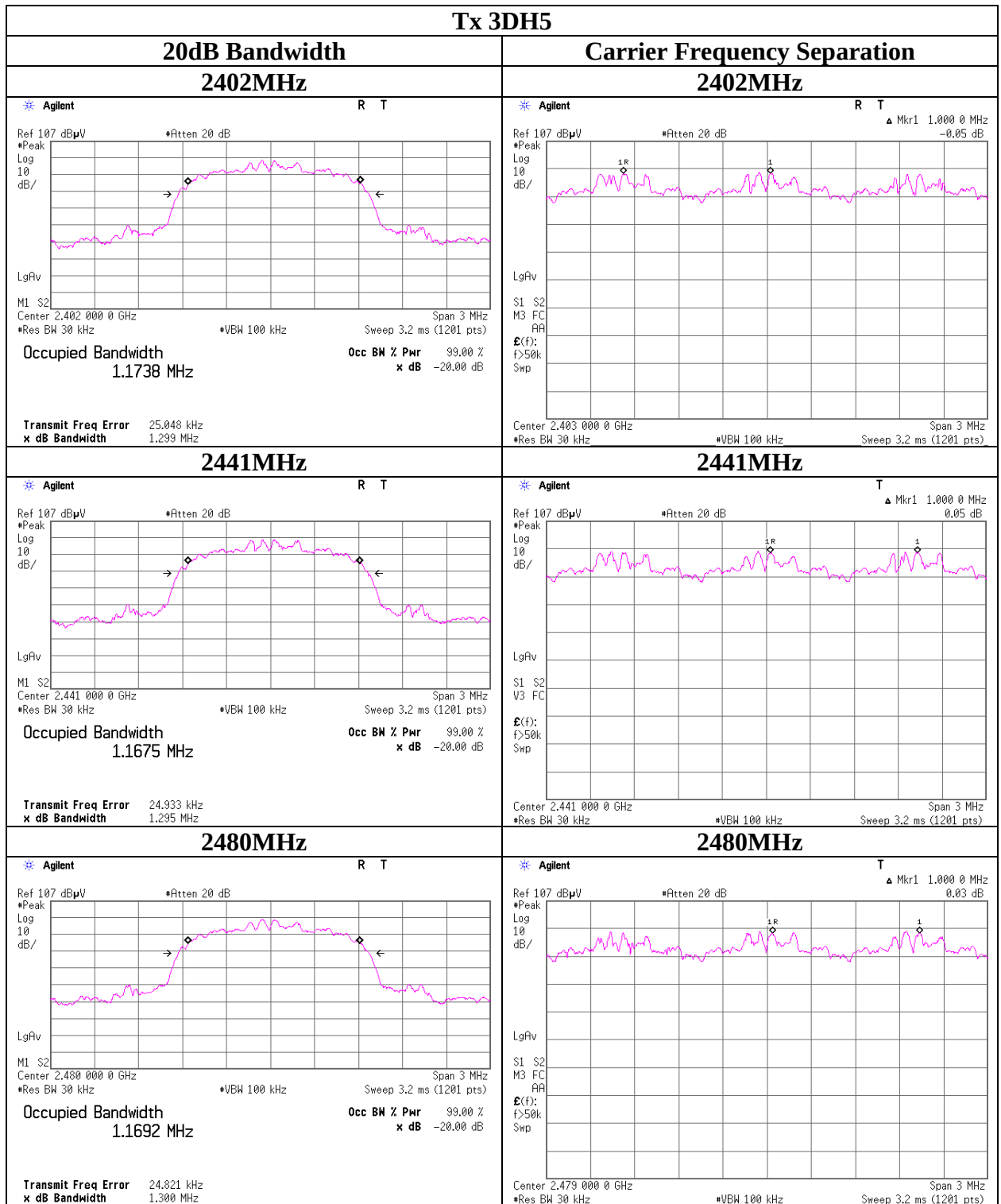
No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



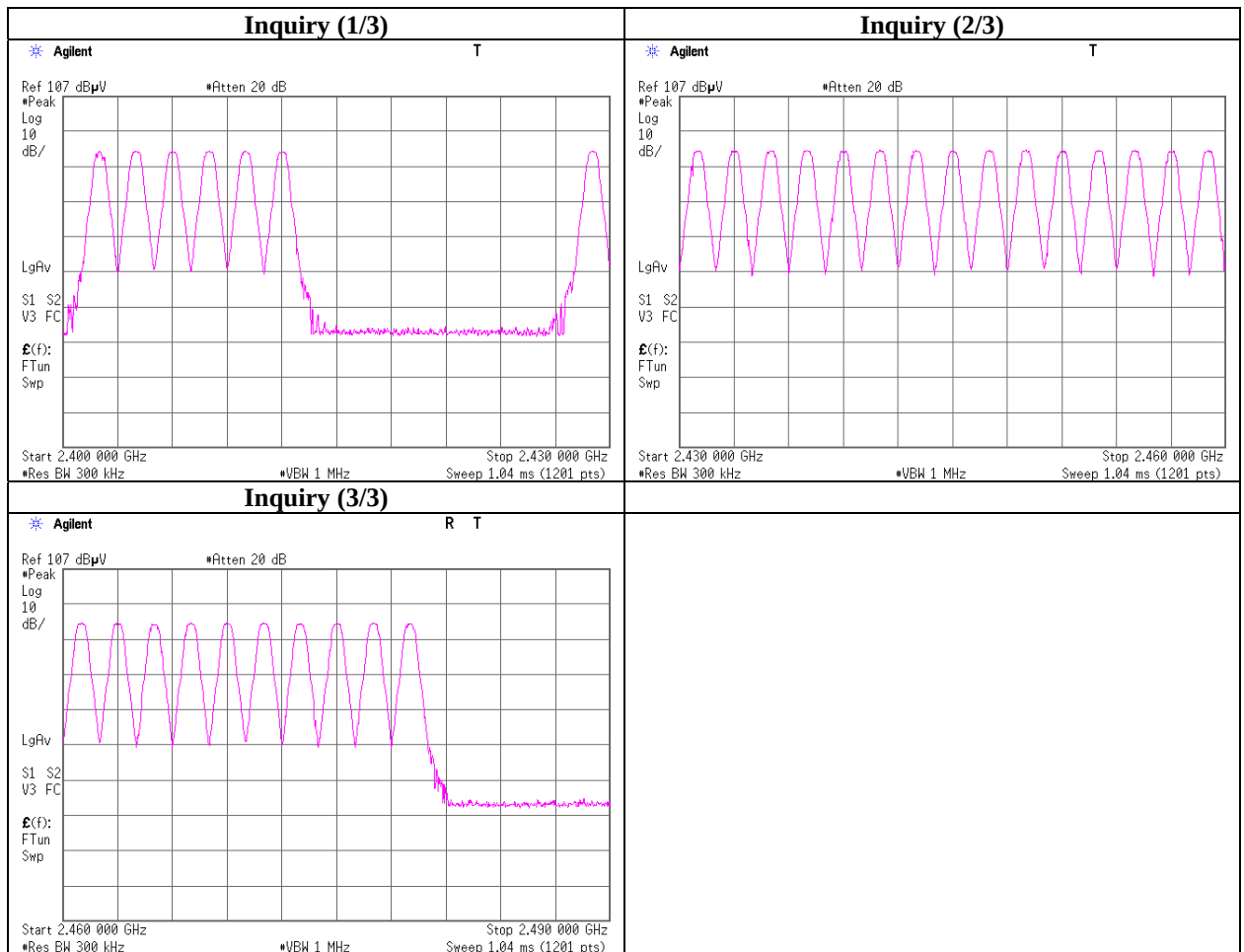
20dB Bandwidth and Carrier Frequency Separation



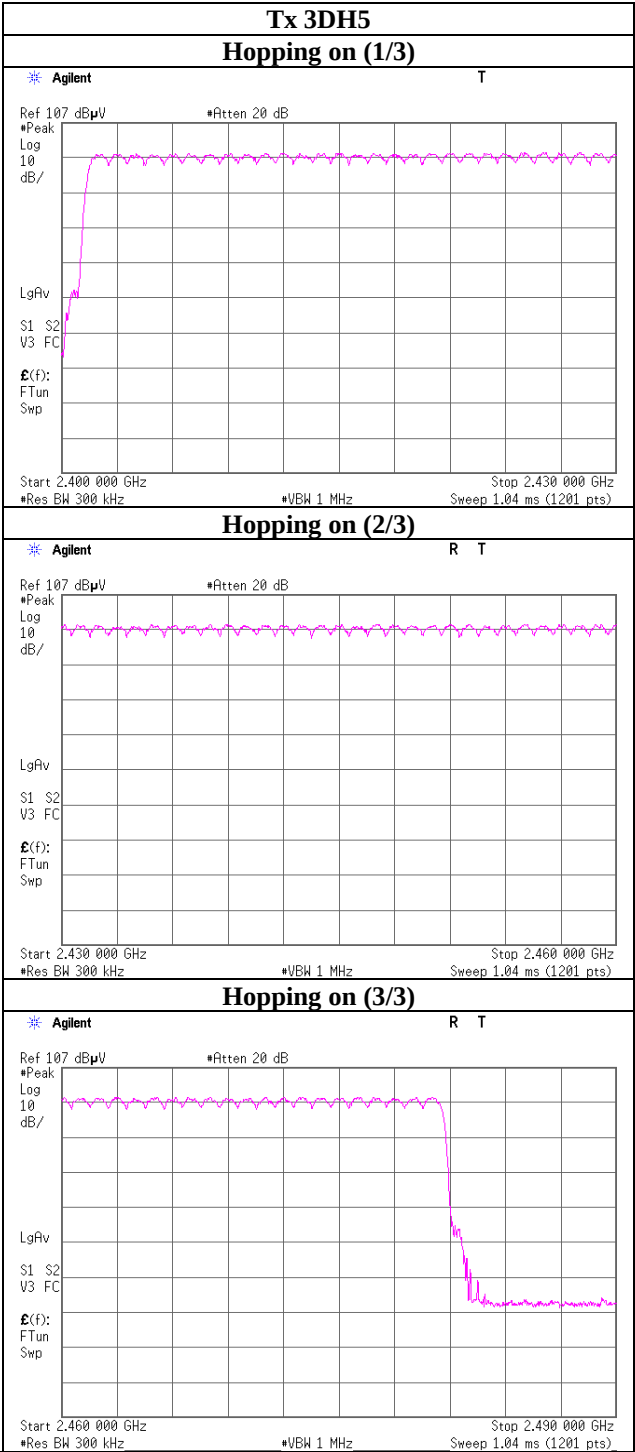
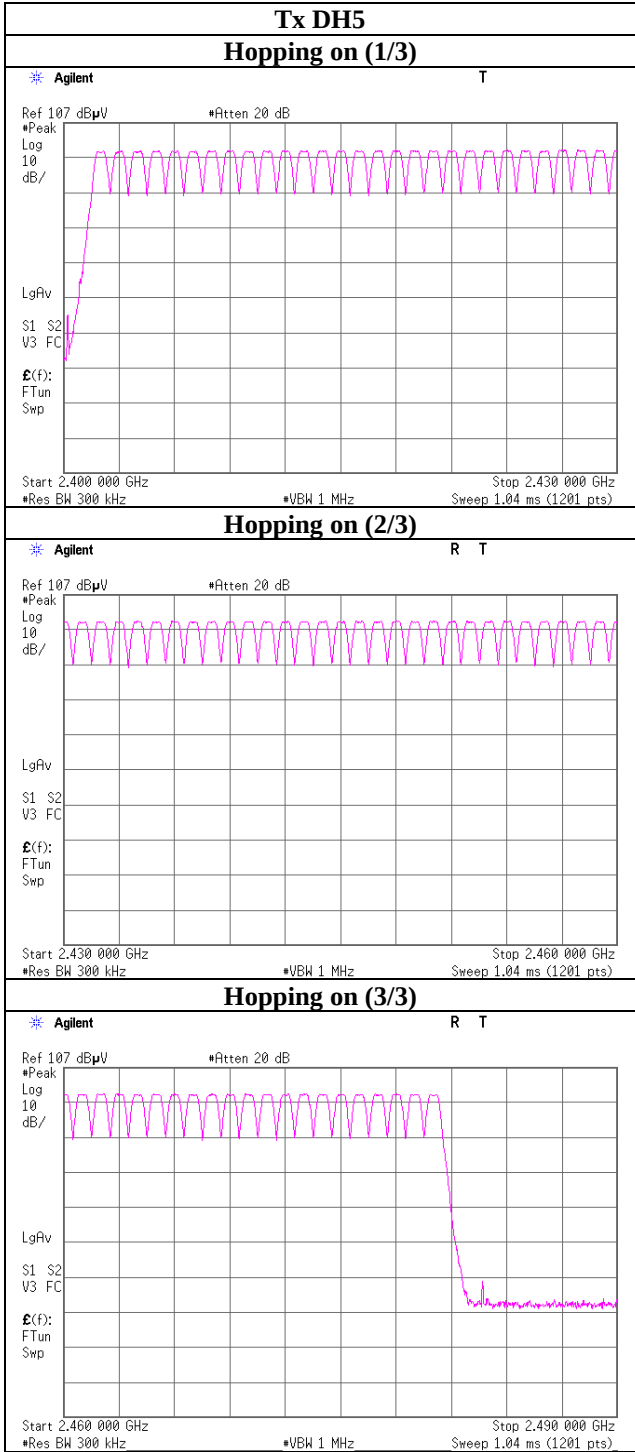
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	32JE0205-HO
Date	05/29/2012
Temperature/ Humidity	22deg. C / 58% 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



Number of Hopping Frequency



Dwell time

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	32JE0205-HO
Date	05/29/2012
Temperature/ Humidity	22deg. C / 58% 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	49.2 times	/	5 sec.	x	31.6 sec. =	125	400
DH3	24.8 times	/	5 sec.	x	31.6 sec. =	261	400
DH5	18.2 times	/	5 sec.	x	31.6 sec. =	339	400
3DH1	49.2 times	/	5 sec.	x	31.6 sec. =	126	400
3DH3	23.8 times	/	5 sec.	x	31.6 sec. =	252	400
3DH5	18.4 times	/	5 sec.	x	31.6 sec. =	342	400
Inquiry	100.0 times	/	1 sec.	x	12.8 sec. =	130	400

Sample Calculation

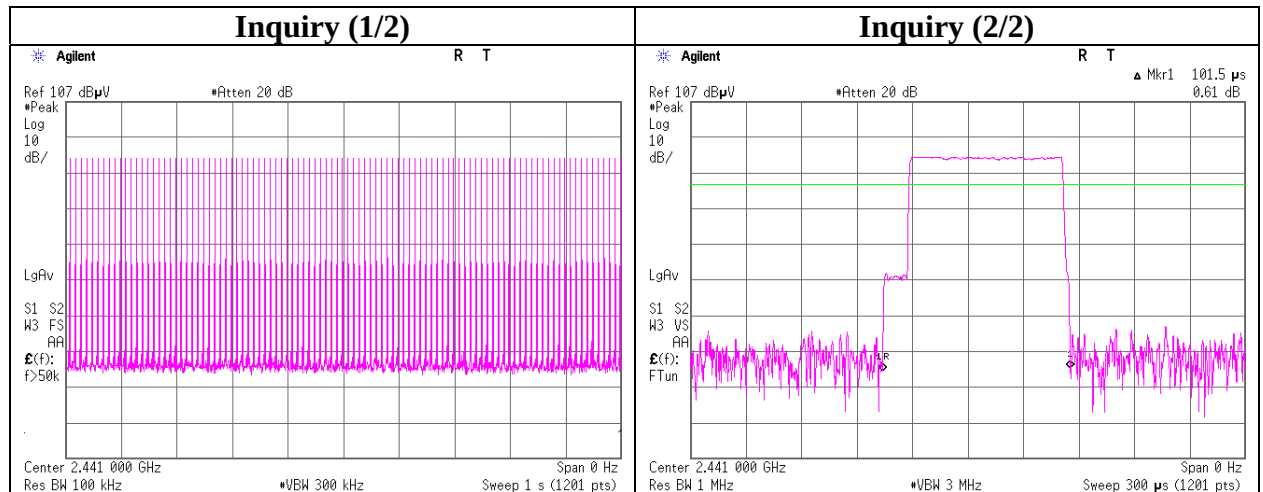
Result = Number of transmission x Length of transimtion time

*Average data of 5 tests.(except Inquiry)

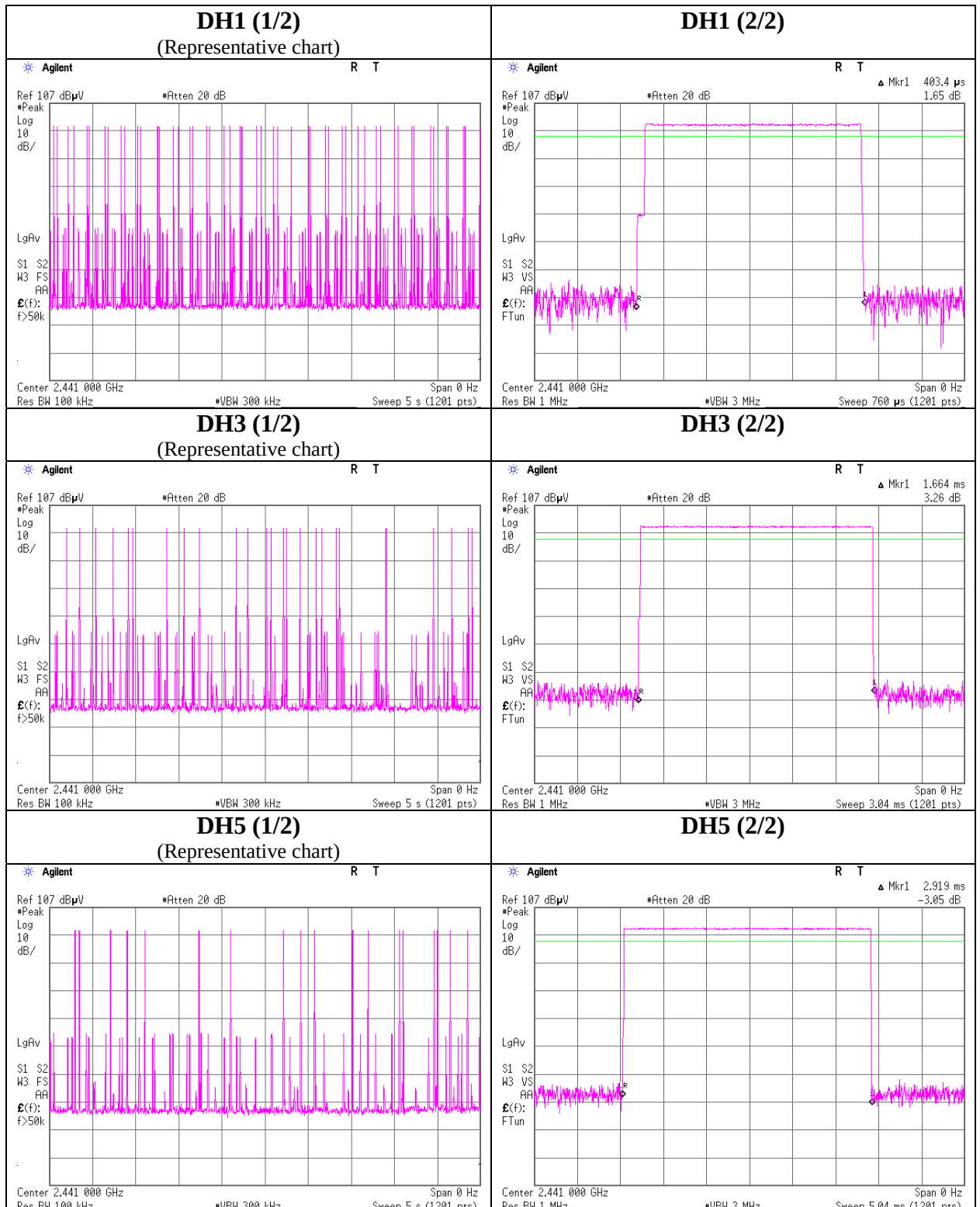
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	50	48	49	50	49.2
DH3	25	24	26	23	26	24.8
DH5	18	19	16	19	19	18.2
3DH1	50	48	50	49	49	49.2
3DH3	24	23	24	24	24	23.8
3DH5	20	16	18	18	20	18.4

Sample Calculation

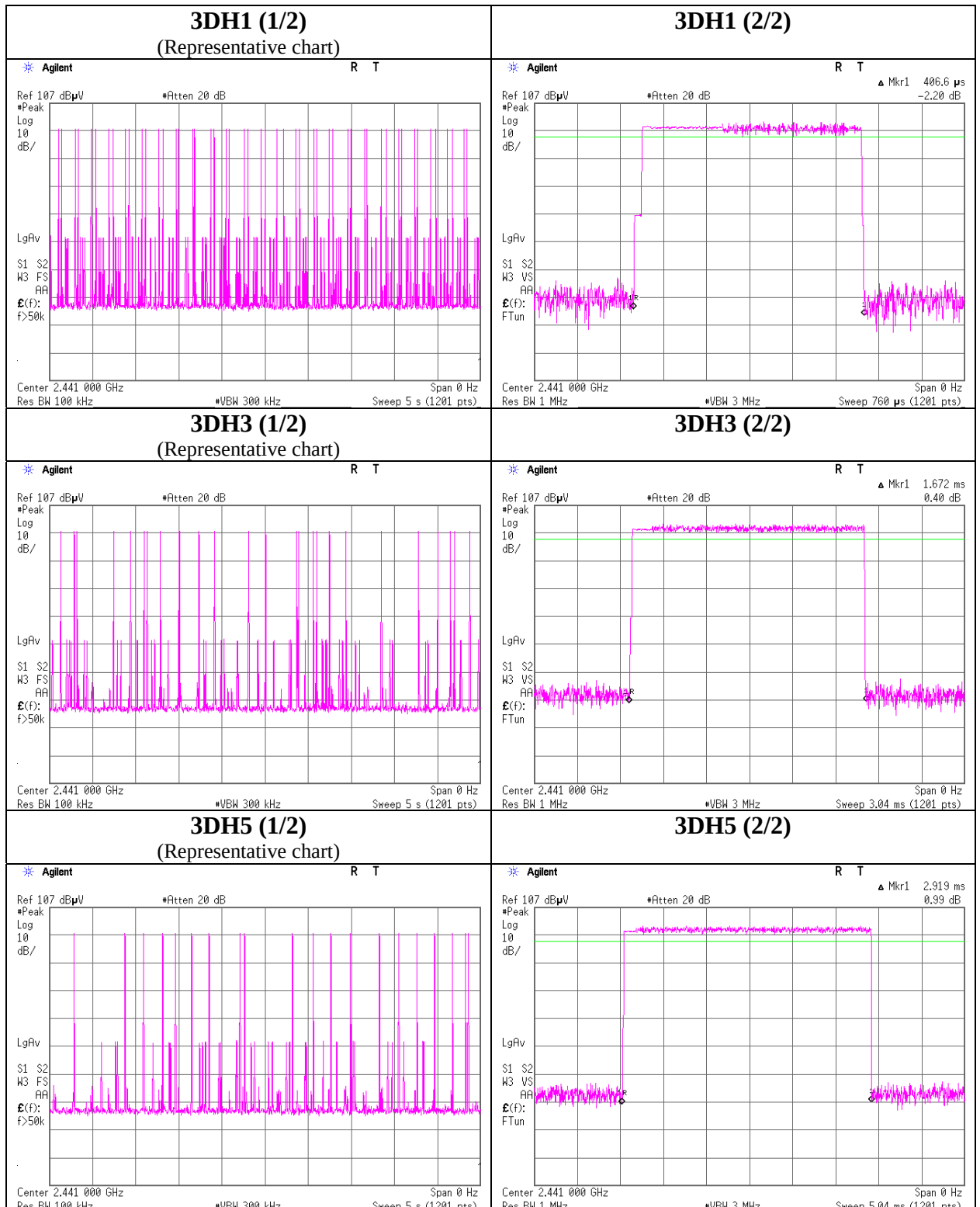
Average= Summation(Sampling 1 to 5) / 5



Dwell time



Dwell time



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 measurement room
Report No. 32JE0205-HO
Date 05/29/2012
Temperature/ Humidity 22deg. C / 58% RH
Engineer Takayuki Shimada
Mode Tx (Hopping off) DH5/2DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-8.05	7.81	10.00	9.76	9.46	20.97	125	11.21
DH5	2441.0	-7.68	7.84	10.00	10.16	10.38	20.97	125	10.81
DH5	2480.0	-7.31	7.84	10.00	10.53	11.30	20.97	125	10.44
2DH5	2402.0	-7.12	7.81	10.00	10.69	11.72	20.97	125	10.28
2DH5	2441.0	-6.79	7.84	10.00	11.05	12.74	20.97	125	9.92
2DH5	2480.0	-6.42	7.84	10.00	11.42	13.87	20.97	125	9.55
3DH5	2402.0	-6.98	7.81	10.00	10.83	12.11	20.97	125	10.14
3DH5	2441.0	-6.62	7.84	10.00	11.22	13.24	20.97	125	9.75
3DH5	2480.0	-6.26	7.84	10.00	11.58	14.39	20.97	125	9.39
Inquiry	2441.0	-14.80	7.84	10.00	3.04	2.01	20.97	125	17.93

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 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg.C/ 56% RH	23 deg.C/ 59% RH
Engineer	Keisuke Kawamura	Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.7	15.4	7.9	28.1	21.9	43.5	21.6	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	2390.000	PK	49.4	27.4	2.2	34.8	44.2	73.9	29.7	
Hori	2400.000	PK	77.2	27.5	2.2	34.8	72.1	-	-	- See 20dBc Data Sheet
Hori	4804.000	PK	48.0	31.2	4.0	34.0	49.2	73.9	24.7	
Hori	7206.000	PK	53.7	35.9	4.6	34.2	60.0	-	-	- See 20dBc Data Sheet
Hori	9608.000	PK	45.4	38.8	5.3	34.7	54.8	-	-	- See 20dBc Data Sheet
Hori	12010.000	PK	45.1	39.0	-3.4	33.8	46.9	73.9	27.0	
Hori	24020.000	PK	43.5	40.5	-1.7	31.7	50.6	73.9	23.3	
Hori	2390.000	AV	35.6	27.4	2.2	34.8	30.4	53.9	23.5	
Hori	2400.000	AV	52.2	27.5	2.2	34.8	47.1	-	-	- See 20dBc Data Sheet
Hori	4804.000	AV	39.4	31.2	4.0	34.0	40.6	53.9	13.3	
Hori	7206.000	AV	46.6	35.9	4.6	34.2	52.9	-	-	- See 20dBc Data Sheet
Hori	9608.000	AV	34.6	38.8	5.3	34.7	44.0	-	-	- See 20dBc Data Sheet
Hori	12010.000	AV	33.1	39.0	-3.4	33.8	34.9	53.9	19.0	
Hori	24020.000	AV	31.1	40.5	-1.7	31.7	38.2	53.9	15.7	
Vert	38.921	QP	41.4	14.7	6.8	28.6	34.3	40.0	5.7	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.6	8.6	7.4	28.4	25.2	43.5	18.3	
Vert	120.000	QP	24.8	12.7	7.6	28.3	16.8	43.5	26.7	
Vert	160.609	QP	28.5	15.4	7.9	28.1	23.7	43.5	19.8	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	2390.000	PK	47.5	27.4	2.2	34.8	42.3	73.9	31.6	
Vert	2400.000	PK	73.7	27.5	2.2	34.8	68.6	-	-	- See 20dBc Data Sheet
Vert	4804.000	PK	48.1	31.2	4.0	34.0	49.3	73.9	24.7	
Vert	7206.000	PK	54.8	35.9	4.6	34.2	61.1	-	-	- See 20dBc Data Sheet
Vert	9608.000	PK	46.8	38.8	5.3	34.7	56.2	-	-	- See 20dBc Data Sheet
Vert	12010.000	PK	47.5	39.0	-3.4	33.8	49.3	73.9	24.6	
Vert	24020.000	PK	43.2	40.5	-1.7	31.7	50.3	73.9	23.6	
Vert	2390.000	AV	34.1	27.4	2.2	34.8	28.9	53.9	25.0	
Vert	2400.000	AV	49.3	27.5	2.2	34.8	44.2	-	-	- See 20dBc Data Sheet
Vert	4804.000	AV	40.2	31.2	4.0	34.0	41.4	53.9	12.5	
Vert	7206.000	AV	48.0	35.9	4.6	34.2	54.3	-	-	- See 20dBc Data Sheet
Vert	9608.000	AV	38.2	38.8	5.3	34.7	47.6	-	-	- See 20dBc Data Sheet
Vert	12010.000	AV	39.2	39.0	-3.4	33.8	41.0	53.9	12.9	
Vert	24020.000	AV	31.1	40.5	-1.7	31.7	38.2	53.9	15.7	

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

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

*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

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32JE0205-HO
Date : 06/04/2012
Temperature/ Humidity : 23 deg.C/ 56% RH
Engineer : Keisuke Kawamura
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	116.7	27.5	2.2	34.8	111.6	-	-	Carrier
Hori	2400.000	PK	60.1	27.5	2.2	34.8	55.0	91.6	36.6	
Hori	7206.000	PK	51.5	35.9	4.6	34.2	57.8	91.6	33.8	
Hori	9608.000	PK	38.9	38.8	5.3	34.7	48.3	91.6	43.3	
Vert	2402.000	PK	113.0	27.5	2.2	34.8	107.9	-	-	Carrier
Vert	2400.000	PK	56.6	27.5	2.2	34.8	51.5	87.9	36.4	
Vert	7206.000	PK	52.4	35.9	4.6	34.2	58.7	87.9	29.2	
Vert	9608.000	PK	42.8	38.8	5.3	34.7	52.2	87.9	35.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg.C/ 56% RH	23 deg.C/ 59% RH
Engineer	Keisuke Kawamura	Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.5	15.4	7.9	28.1	21.7	43.5	21.8	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	4882.000	PK	47.6	31.4	3.9	34.0	48.9	73.9	25.0	
Hori	7323.000	PK	51.3	36.0	4.7	34.2	57.8	73.9	16.1	
Hori	9764.000	PK	46.0	39.0	5.3	34.7	55.6	-	-	See 20dBc Data Sheet
Hori	12205.000	PK	45.2	39.3	-3.5	33.6	47.4	73.9	26.5	
Hori	24410.000	PK	43.8	40.5	-1.7	32.2	50.4	73.9	23.5	
Hori	4882.000	AV	39.9	31.4	3.9	34.0	41.2	53.9	12.7	
Hori	7323.000	AV	43.6	36.0	4.7	34.2	50.1	53.9	3.9	
Hori	9764.000	AV	34.6	39.0	5.3	34.7	44.2	-	-	See 20dBc Data Sheet
Hori	12205.000	AV	33.0	39.3	-3.5	33.6	35.2	53.9	18.7	
Hori	24410.000	AV	32.2	40.5	-1.7	32.2	38.8	53.9	15.1	
Vert	38.921	QP	41.5	14.7	6.8	28.6	34.4	40.0	5.6	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.4	8.6	7.4	28.4	25.0	43.5	18.5	
Vert	120.000	QP	24.9	12.7	7.6	28.3	16.9	43.5	26.6	
Vert	160.609	QP	28.6	15.4	7.9	28.1	23.8	43.5	19.7	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	4882.000	PK	49.0	31.4	3.9	34.0	50.3	73.9	23.6	
Vert	7323.000	PK	52.6	36.0	4.7	34.2	59.1	73.9	14.8	
Vert	9764.000	PK	47.9	39.0	5.3	34.7	57.5	-	-	See 20dBc Data Sheet
Vert	12205.000	PK	46.3	39.3	-3.5	33.6	48.5	73.9	25.4	
Vert	24410.000	PK	44.3	40.5	-1.7	32.2	50.9	73.9	23.0	
Vert	4882.000	AV	41.5	31.4	3.9	34.0	42.8	53.9	11.1	
Vert	7323.000	AV	45.0	36.0	4.7	34.2	51.5	53.9	2.4	
Vert	9764.000	AV	37.9	39.0	5.3	34.7	47.5	-	-	See 20dBc Data Sheet
Vert	12205.000	AV	39.0	39.3	-3.5	33.6	41.2	53.9	12.7	
Vert	24410.000	AV	31.8	40.5	-1.7	32.2	38.4	53.9	15.5	

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

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

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 23 deg.C/ 56% RH
Engineer Keisuke Kawamura
Mode Tx, DH5 2441MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2441.000	PK	116.0	27.5	2.3	34.8	111.0	-	-	Carrier
Hori	9764.000	PK	39.2	39.0	5.3	34.7	48.8	91.0	42.2	
Vert	2441.000	PK	113.5	27.5	2.3	34.8	108.5	-	-	Carrier
Vert	9764.000	PK	42.2	39.0	5.3	34.7	51.8	88.5	36.7	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg.C/ 56% RH	23 deg.C/ 59% RH
Engineer	Keisuke Kawamura	Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.5	15.4	7.9	28.1	21.7	43.5	21.8	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	2483.500	PK	62.3	27.5	2.3	34.8	57.3	73.9	16.6	
Hori	4960.000	PK	47.0	31.6	4.0	34.0	48.6	73.9	25.3	
Hori	7440.000	PK	50.7	36.2	4.7	34.3	57.3	73.9	16.6	
Hori	9920.000	PK	45.0	39.1	5.4	34.7	54.8	-	-	See 20dBc Data Sheet
Hori	12400.000	PK	45.1	39.5	-3.4	33.3	47.9	73.9	26.0	
Hori	24800.000	PK	44.6	40.6	-1.6	32.7	50.9	73.9	23.0	
Hori	2483.500	AV	43.5	27.5	2.3	34.8	38.5	53.9	15.4	
Hori	4960.000	AV	39.1	31.6	4.0	34.0	40.7	53.9	13.2	
Hori	7440.000	AV	42.3	36.2	4.7	34.3	48.9	53.9	5.0	
Hori	9920.000	AV	34.0	39.1	5.4	34.7	43.8	-	-	See 20dBc Data Sheet
Hori	12400.000	AV	33.3	39.5	-3.4	33.3	36.1	53.9	17.8	
Hori	24800.000	AV	33.2	40.6	-1.6	32.7	39.5	53.9	14.4	
Vert	38.921	QP	41.4	14.7	6.8	28.6	34.3	40.0	5.7	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.4	8.6	7.4	28.4	25.0	43.5	18.5	
Vert	120.000	QP	24.9	12.7	7.6	28.3	16.9	43.5	26.6	
Vert	160.609	QP	28.6	15.4	7.9	28.1	23.8	43.5	19.7	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	2483.500	PK	58.4	27.5	2.3	34.8	53.4	73.9	20.5	
Vert	4960.000	PK	48.8	31.6	4.0	34.0	50.4	73.9	23.5	
Vert	7440.000	PK	51.1	36.2	4.7	34.3	57.7	73.9	16.2	
Vert	9920.000	PK	41.2	39.1	5.4	34.7	51.0	-	-	See 20dBc Data Sheet
Vert	12400.000	PK	45.9	39.5	-3.4	33.3	48.7	73.9	25.2	
Vert	24800.000	PK	45.5	40.6	-1.6	32.7	51.8	73.9	22.1	
Vert	2483.500	AV	39.8	27.5	2.3	34.8	34.8	53.9	19.1	
Vert	4960.000	AV	41.6	31.6	4.0	34.0	43.2	53.9	10.7	
Vert	7440.000	AV	42.3	36.2	4.7	34.3	48.9	53.9	5.0	
Vert	9920.000	AV	36.6	39.1	5.4	34.7	46.4	-	-	See 20dBc Data Sheet
Vert	12400.000	AV	38.5	39.5	-3.4	33.3	41.3	53.9	12.6	
Vert	24800.000	AV	33.3	40.6	-1.6	32.7	39.6	53.9	14.3	

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

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 23 deg.C/ 56% RH
Engineer Keisuke Kawamura
Mode Tx, DH5 2480MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2480.000	PK	115.0	27.5	2.3	34.8	110.0	-	-	Carrier
Hori	9920.000	PK	38.4	39.1	5.4	34.7	48.2	90.0	41.8	
Vert	2480.000	PK	110.7	27.5	2.3	34.8	105.7	-	-	Carrier
Vert	9920.000	PK	46.3	39.1	5.4	34.7	56.1	85.7	29.6	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg.C/ 56% RH	23 deg.C/ 59% RH
Engineer	Keisuke Kawamura	Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.7	15.4	7.9	28.1	21.9	43.5	21.6	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	2390.000	PK	48.8	27.4	2.2	34.8	43.6	73.9	30.3	
Hori	2400.000	PK	76.1	27.5	2.2	34.8	71.0	-	-	See 20dBc Data Sheet
Hori	4804.000	PK	46.7	31.2	3.2	34.0	47.1	73.9	26.8	
Hori	7206.000	PK	55.7	35.9	4.0	34.2	61.4	-	-	See 20dBc Data Sheet
Hori	9608.000	PK	45.3	38.8	4.6	34.7	54.0	-	-	See 20dBc Data Sheet
Hori	12010.000	PK	45.0	39.0	-3.4	33.8	46.8	73.9	27.1	
Hori	24020.000	PK	43.5	40.5	-1.7	31.7	50.6	73.9	23.3	
Hori	2390.000	AV	35.1	27.4	2.2	34.8	29.9	53.9	24.0	
Hori	2400.000	AV	57.0	27.5	2.2	34.8	51.9	-	-	See 20dBc Data Sheet
Hori	4804.000	AV	36.2	31.2	3.2	34.0	36.6	53.9	17.3	
Hori	7206.000	AV	43.9	35.9	4.0	34.2	49.6	-	-	See 20dBc Data Sheet
Hori	9608.000	AV	34.5	38.8	4.6	34.7	43.2	-	-	See 20dBc Data Sheet
Hori	12010.000	AV	33.1	39.0	-3.4	33.8	34.9	53.9	19.0	
Hori	24020.000	AV	31.1	40.5	-1.7	31.7	38.2	53.9	15.7	
Vert	38.921	QP	41.4	14.7	6.8	28.6	34.3	40.0	5.7	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.6	8.6	7.4	28.4	25.2	43.5	18.3	
Vert	120.000	QP	24.8	12.7	7.6	28.3	16.8	43.5	26.7	
Vert	160.609	QP	28.5	15.4	7.9	28.1	23.7	43.5	19.8	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	2390.000	PK	47.2	27.4	2.2	34.8	42.0	73.9	31.9	
Vert	2400.000	PK	73.6	27.5	2.2	34.8	68.5	-	-	See 20dBc Data Sheet
Vert	4804.000	PK	47.3	31.2	4.0	34.0	48.5	73.9	25.4	
Vert	7206.000	PK	55.5	35.9	4.6	34.2	61.8	-	-	See 20dBc Data Sheet
Vert	9608.000	PK	46.7	38.8	5.3	34.7	56.1	-	-	See 20dBc Data Sheet
Vert	12010.000	PK	47.4	39.0	-3.4	33.8	49.2	73.9	24.7	
Vert	24020.000	PK	43.2	40.5	-1.7	31.7	50.3	73.9	23.6	
Vert	2390.000	AV	34.1	27.4	2.2	34.8	28.9	53.9	25.0	
Vert	2400.000	AV	53.6	27.5	2.2	34.8	48.5	-	-	See 20dBc Data Sheet
Vert	4804.000	AV	37.4	31.2	4.0	34.0	38.6	53.9	15.4	
Vert	7206.000	AV	44.4	35.9	4.6	34.2	50.7	-	-	See 20dBc Data Sheet
Vert	9608.000	AV	38.7	38.8	5.3	34.7	48.1	-	-	See 20dBc Data Sheet
Vert	12010.000	AV	37.8	39.0	-3.4	33.8	39.6	53.9	14.3	
Vert	24020.000	AV	31.1	40.5	-1.7	31.7	38.2	53.9	15.7	

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

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

*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

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32JE0205-HO
Date : 06/04/2012
Temperature/ Humidity : 23 deg.C/ 56% RH
Engineer : Keisuke Kawamura
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	115.3	27.5	2.2	34.8	110.2	-	-	Carrier
Hori	2400.000	PK	57.9	27.5	2.2	34.8	52.8	90.2	37.4	
Hori	7206.000	PK	49.1	35.9	4.0	34.2	54.8	90.2	35.4	
Hori	9608.000	PK	38.8	38.8	4.6	34.7	47.5	90.2	42.7	
Vert	2402.000	PK	112.9	27.5	2.2	34.8	107.8	-	-	Carrier
Vert	2400.000	PK	56.3	27.5	2.2	34.8	51.2	87.8	36.6	
Vert	7206.000	PK	48.8	35.9	4.6	34.2	55.1	87.8	32.7	
Vert	9608.000	PK	42.8	38.8	5.3	34.7	52.2	87.8	35.6	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012 06/05/2012
Temperature/ Humidity 23 deg.C/ 56% RH 23 deg.C/ 59% RH
Engineer Keisuke Kawamura Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.7	15.4	7.9	28.1	21.9	43.5	21.6	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	4882.000	PK	46.4	31.4	3.9	34.0	47.7	73.9	26.3	
Hori	7323.000	PK	52.1	36.0	4.7	34.2	58.6	73.9	15.3	
Hori	9764.000	PK	45.7	39.0	5.3	34.7	55.3	-	-	See 20dBc Data Sheet
Hori	12205.000	PK	45.1	39.3	-3.5	33.6	47.3	73.9	26.6	
Hori	24410.000	PK	43.8	40.5	-1.7	32.2	50.4	73.9	23.5	
Hori	4882.000	AV	36.5	31.4	3.9	34.0	37.8	53.9	16.1	
Hori	7323.000	AV	40.7	36.0	4.7	34.2	47.2	53.9	6.7	
Hori	9764.000	AV	35.0	39.0	5.3	34.7	44.6	-	-	See 20dBc Data Sheet
Hori	12205.000	AV	33.1	39.3	-3.5	33.6	35.3	53.9	18.6	
Hori	24410.000	AV	32.2	40.5	-1.7	32.2	38.8	53.9	15.1	
Vert	38.921	QP	41.3	14.7	6.8	28.6	34.2	40.0	5.8	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.6	8.6	7.4	28.4	25.2	43.5	18.3	
Vert	120.000	QP	24.8	12.7	7.6	28.3	16.8	43.5	26.7	
Vert	160.609	QP	28.5	15.4	7.9	28.1	23.7	43.5	19.8	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	4882.000	PK	47.1	31.4	3.9	34.0	48.4	73.9	25.5	
Vert	7323.000	PK	53.6	36.0	4.7	34.2	60.1	73.9	13.8	
Vert	9764.000	PK	47.4	39.0	5.3	34.7	57.0	-	-	See 20dBc Data Sheet
Vert	12205.000	PK	47.2	39.3	-3.5	33.6	49.4	73.9	24.5	
Vert	24410.000	PK	44.3	40.5	-1.7	32.2	50.9	73.9	23.0	
Vert	4882.000	AV	37.8	31.4	3.9	34.0	39.1	53.9	14.8	
Vert	7323.000	AV	42.2	36.0	4.7	34.2	48.7	53.9	5.2	
Vert	9764.000	AV	38.7	39.0	5.3	34.7	48.3	-	-	See 20dBc Data Sheet
Vert	12205.000	AV	37.8	39.3	-3.5	33.6	40.0	53.9	14.0	
Vert	24410.000	AV	31.8	40.5	-1.7	32.2	38.4	53.9	15.5	

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

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

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 23 deg.C/ 56% RH
Engineer Keisuke Kawamura
Mode Tx, 3DH5 2441MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2441.000	PK	115.6	27.5	2.3	34.8	110.6	-	-	Carrier
Hori	9764.000	PK	39.5	39.0	5.3	34.7	49.1	90.6	41.5	
Vert	2441.000	PK	112.5	27.5	2.3	34.8	107.5	-	-	Carrier
Vert	9764.000	PK	43.1	39.0	5.3	34.7	52.7	87.5	34.8	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg.C/ 56% RH	23 deg.C/ 59% RH
Engineer	Keisuke Kawamura	Keisuke Kawamura
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	38.921	QP	29.3	14.7	6.8	28.6	22.2	40.0	17.8	
Hori	82.142	QP	35.2	6.5	7.3	28.5	20.5	40.0	19.5	
Hori	96.432	QP	33.5	8.9	7.4	28.4	21.4	43.5	22.1	
Hori	120.000	QP	23.3	12.7	7.6	28.3	15.3	43.5	28.2	
Hori	160.609	QP	26.5	15.4	7.9	28.1	21.7	43.5	21.8	
Hori	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Hori	2483.500	PK	60.1	27.5	2.3	34.8	55.1	73.9	18.8	
Hori	4960.000	PK	46.3	31.6	4.0	34.0	47.9	73.9	26.0	
Hori	7440.000	PK	51.4	36.2	4.7	34.3	58.0	73.9	16.0	
Hori	9920.000	PK	45.6	39.1	5.4	34.7	55.4	-	-	See 20dBc Data Sheet
Hori	12400.000	PK	45.1	39.5	-3.4	33.3	47.9	73.9	26.0	
Hori	24800.000	PK	44.6	40.6	-1.6	32.7	50.9	73.9	23.0	
Hori	2483.500	AV	41.3	27.5	2.3	34.8	36.3	53.9	17.6	
Hori	4960.000	AV	36.0	31.6	4.0	34.0	37.6	53.9	16.3	
Hori	7440.000	AV	39.3	36.2	4.7	34.3	45.9	53.9	8.0	
Hori	9920.000	AV	34.1	39.1	5.4	34.7	43.9	-	-	See 20dBc Data Sheet
Hori	12400.000	AV	33.0	39.5	-3.4	33.3	35.8	53.9	18.1	
Hori	24800.000	AV	33.2	40.6	-1.6	32.7	39.5	53.9	14.4	
Vert	38.921	QP	41.4	14.7	6.8	28.6	34.3	40.0	5.7	
Vert	83.382	QP	37.1	6.7	7.3	28.5	22.6	40.0	17.4	
Vert	95.152	QP	37.4	8.6	7.4	28.4	25.0	43.5	18.5	
Vert	120.000	QP	24.9	12.7	7.6	28.3	16.9	43.5	26.6	
Vert	160.609	QP	28.6	15.4	7.9	28.1	23.8	43.5	19.7	
Vert	806.337	QP	21.7	22.1	10.9	28.0	26.7	46.0	19.3	
Vert	2483.500	PK	58.1	27.5	2.3	34.8	53.1	73.9	20.8	
Vert	4960.000	PK	48.1	31.6	4.0	34.0	49.7	73.9	24.2	
Vert	7440.000	PK	51.2	36.2	4.7	34.3	57.8	73.9	16.1	
Vert	9920.000	PK	47.0	39.1	5.4	34.7	56.8	-	-	See 20dBc Data Sheet
Vert	12400.000	PK	47.5	39.5	-3.4	33.3	50.3	73.9	23.6	
Vert	24800.000	PK	45.5	40.6	-1.6	32.7	51.8	73.9	22.1	
Vert	2483.500	AV	40.0	27.5	2.3	34.8	35.0	53.9	18.9	
Vert	4960.000	AV	38.3	31.6	4.0	34.0	39.9	53.9	14.0	
Vert	7440.000	AV	39.7	36.2	4.7	34.3	46.3	53.9	7.6	
Vert	9920.000	AV	37.4	39.1	5.4	34.7	47.2	-	-	See 20dBc Data Sheet
Vert	12400.000	AV	36.7	39.5	-3.4	33.3	39.5	53.9	14.4	
Vert	24800.000	AV	33.3	40.6	-1.6	32.7	39.6	53.9	14.3	

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

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 23 deg.C/ 56% RH
Engineer Keisuke Kawamura
Mode Tx, 3DH5 2480MHz

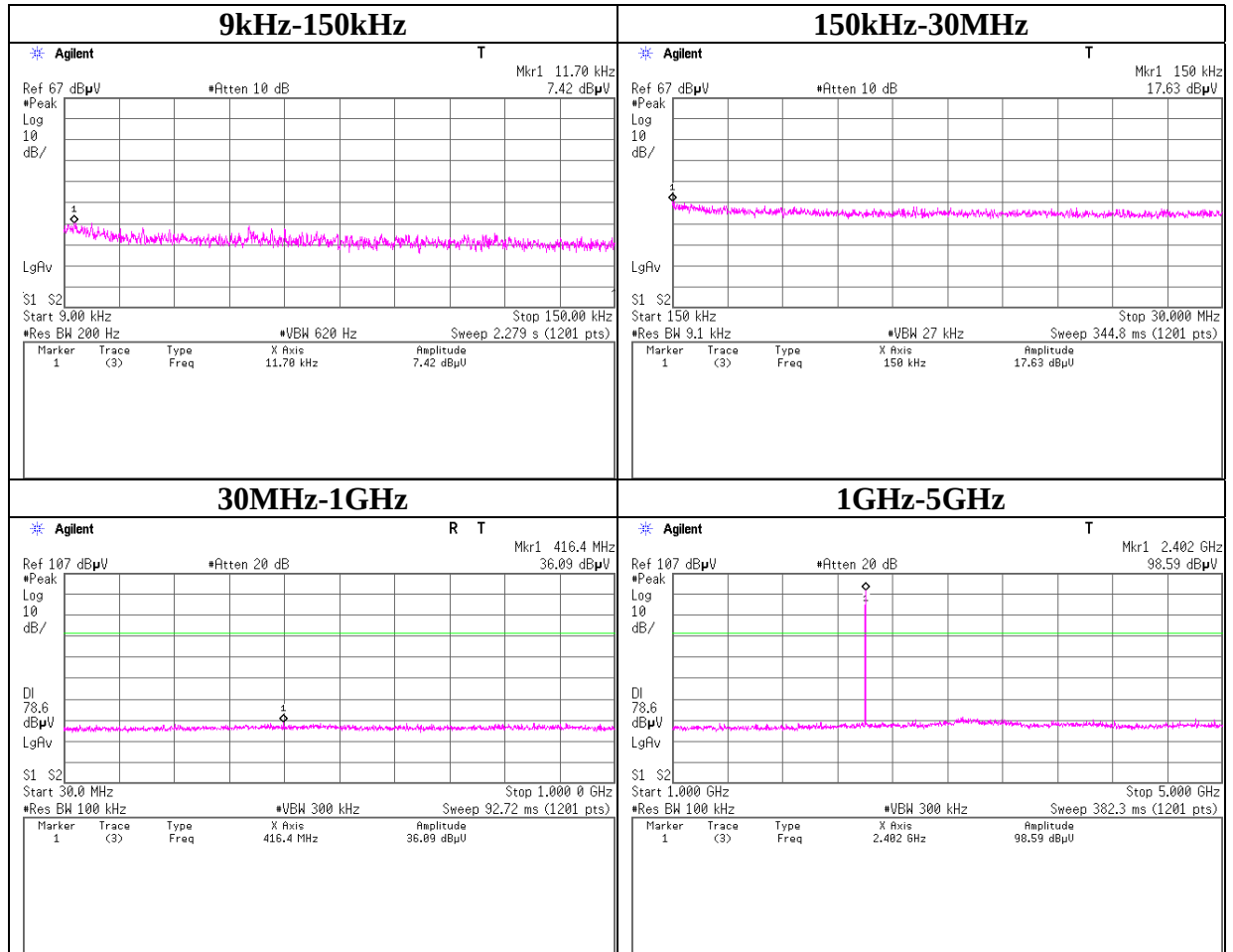
20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2480.000	PK	112.8	27.5	2.3	34.8	107.8	-	-	Carrier
Hori	9920.000	PK	38.6	39.1	5.4	34.7	48.4	87.8	39.4	
Vert	2480.000	PK	111.0	27.5	2.3	34.8	106.0	-	-	Carrier
Vert	9920.000	PK	41.3	39.1	5.4	34.7	51.1	86.0	34.9	

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

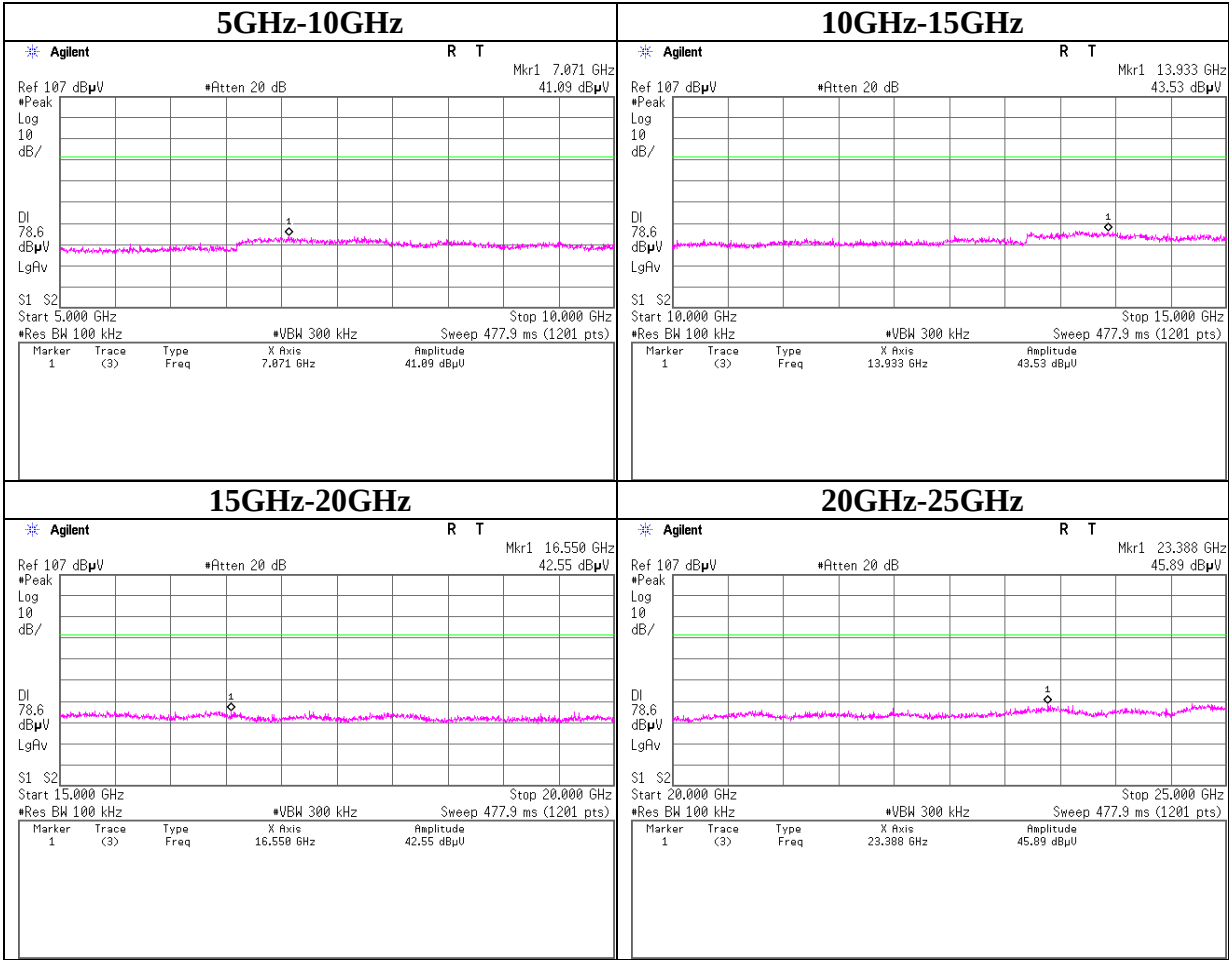
Conducted Spurious Emission

Tx DH5 2402MHz



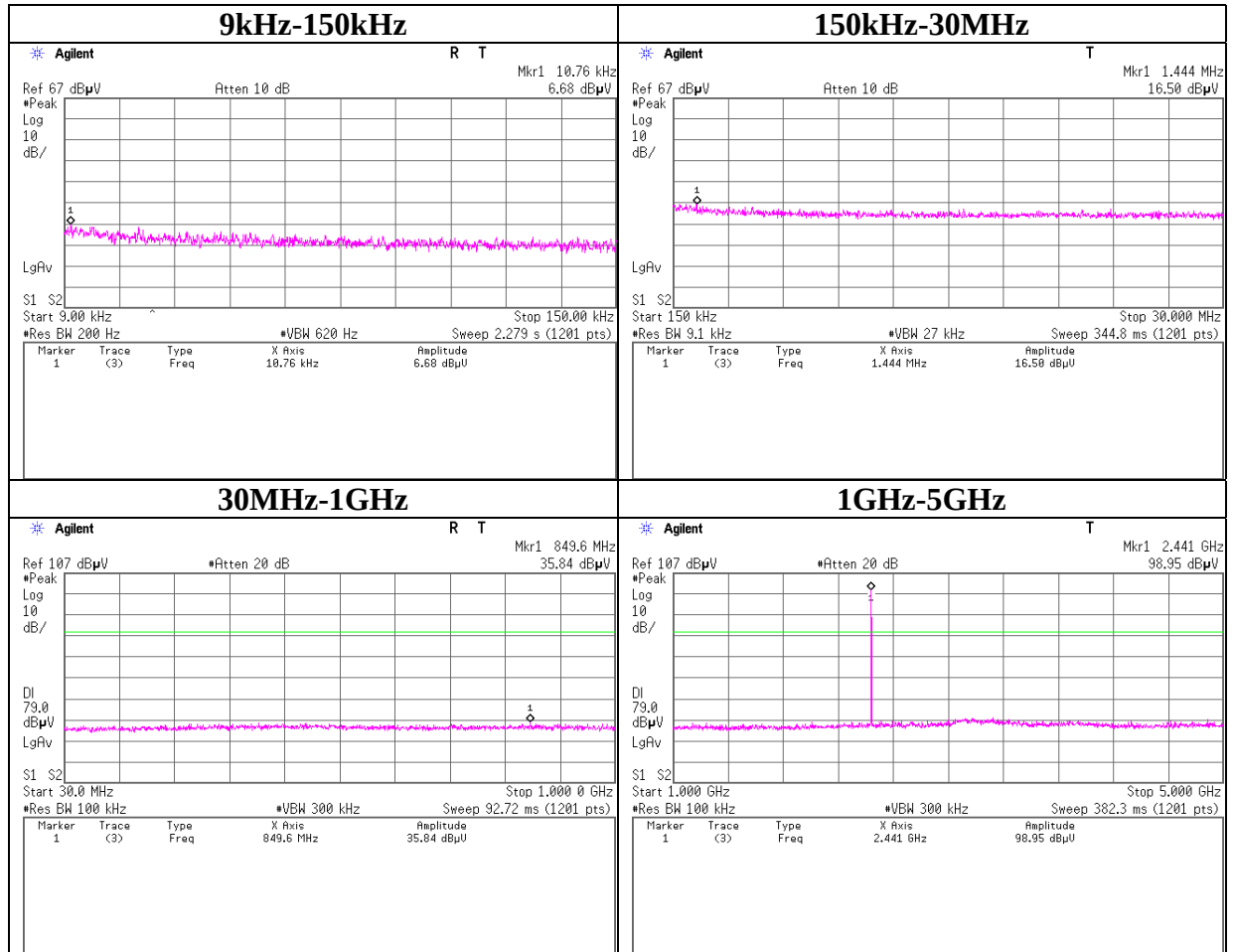
Conducted Spurious Emission

Tx DH5 2402MHz



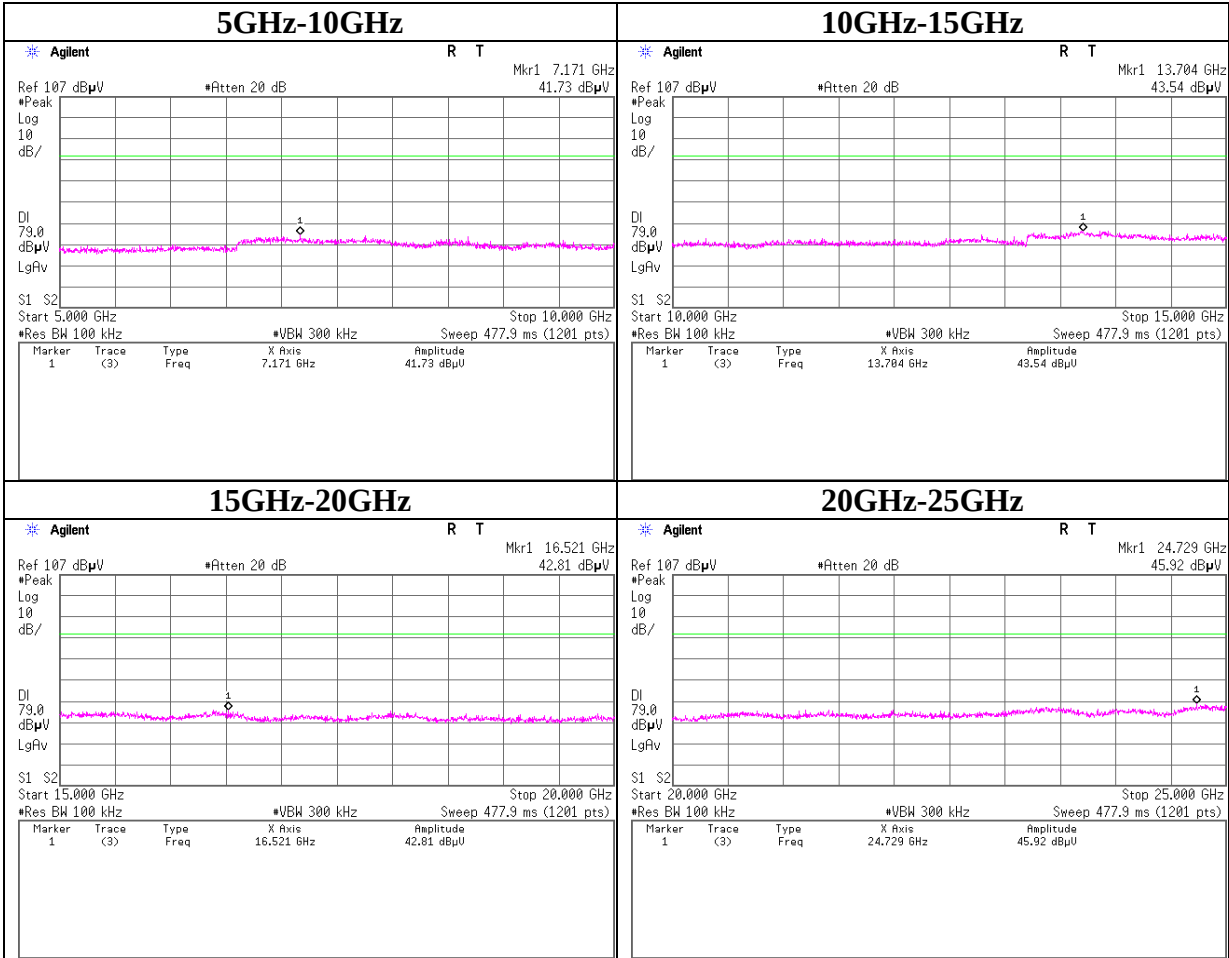
Conducted Spurious Emission

Tx DH5 2441MHz



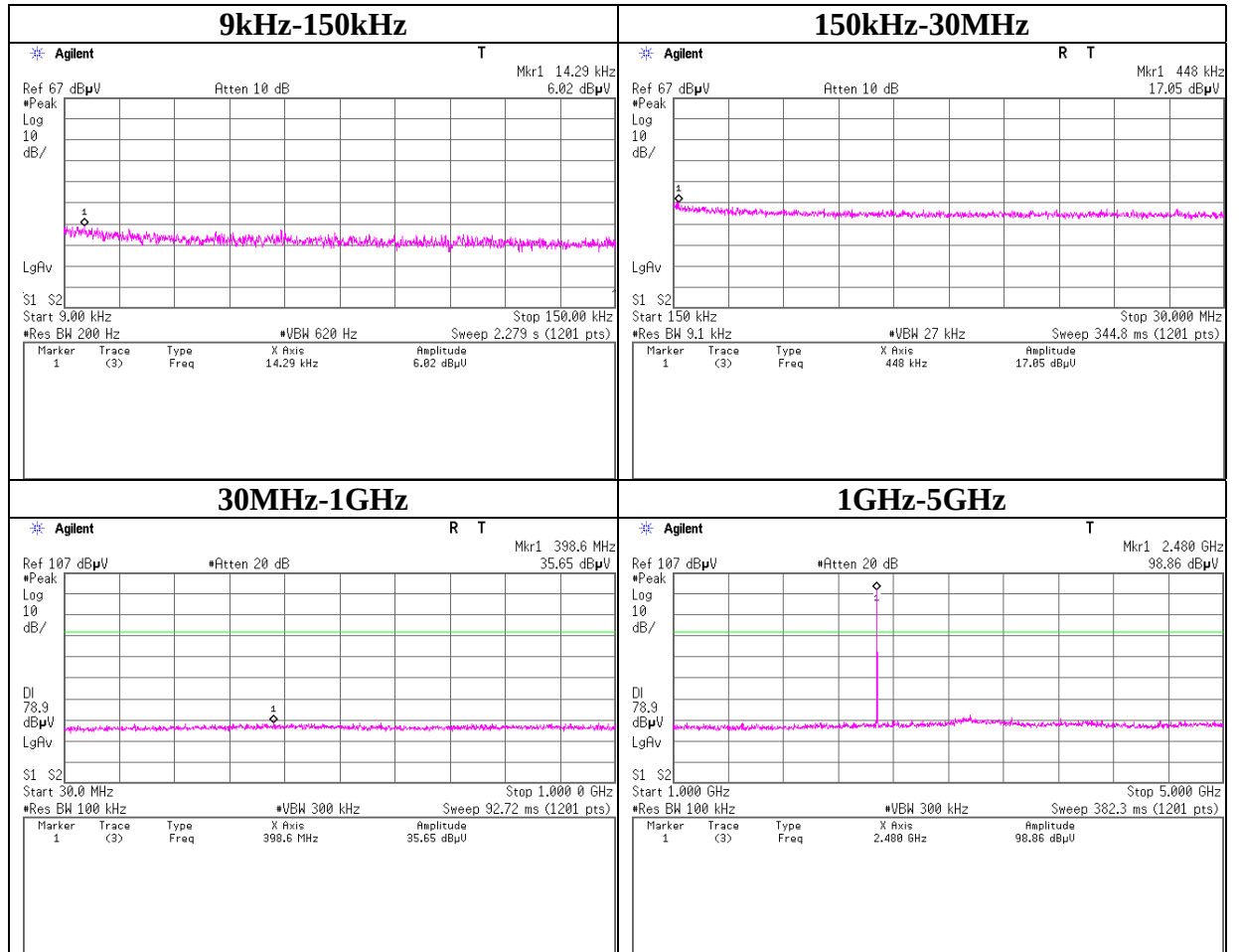
Conducted Spurious Emission

Tx DH5 2441MHz



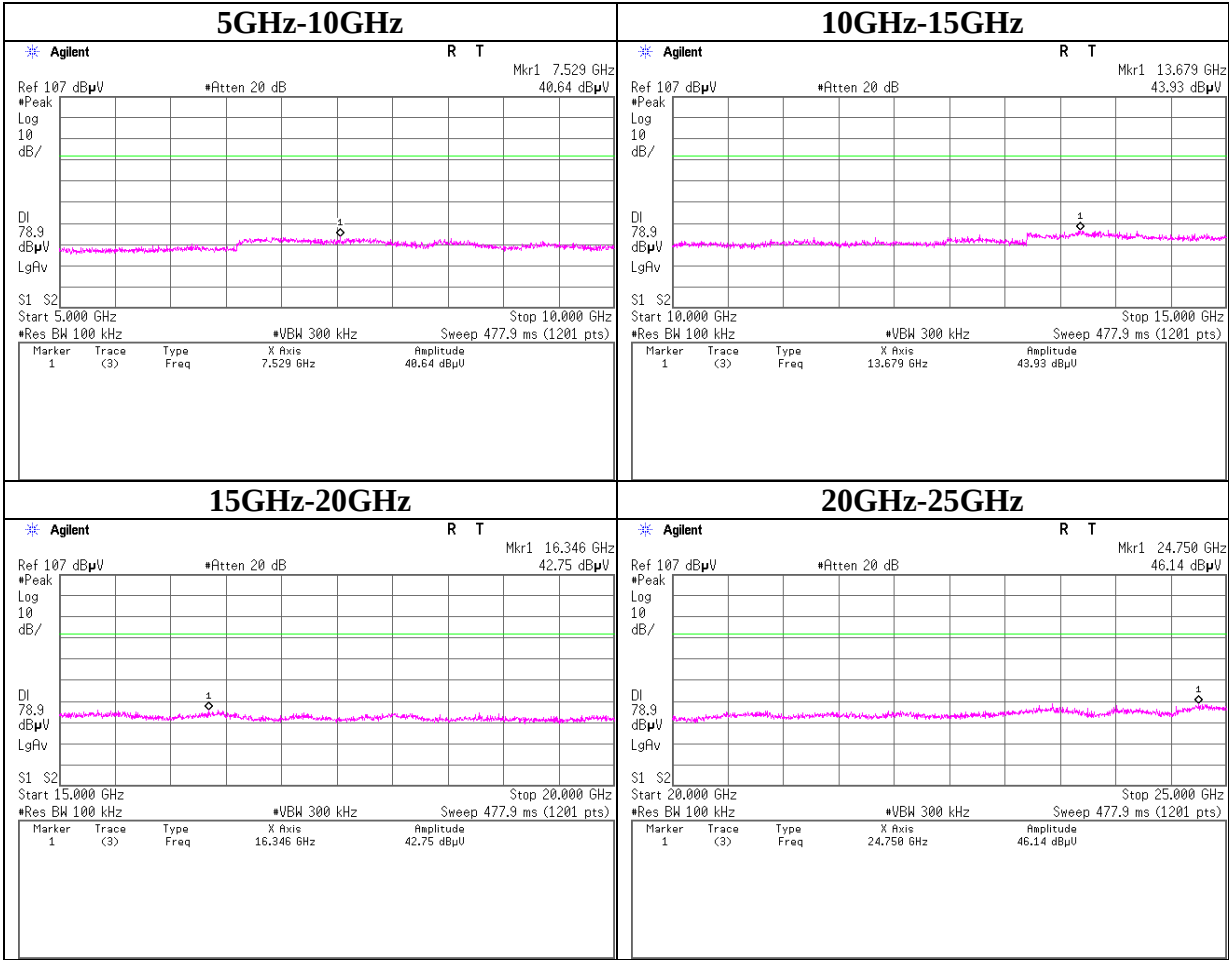
Conducted Spurious Emission

Tx DH5 2480MHz



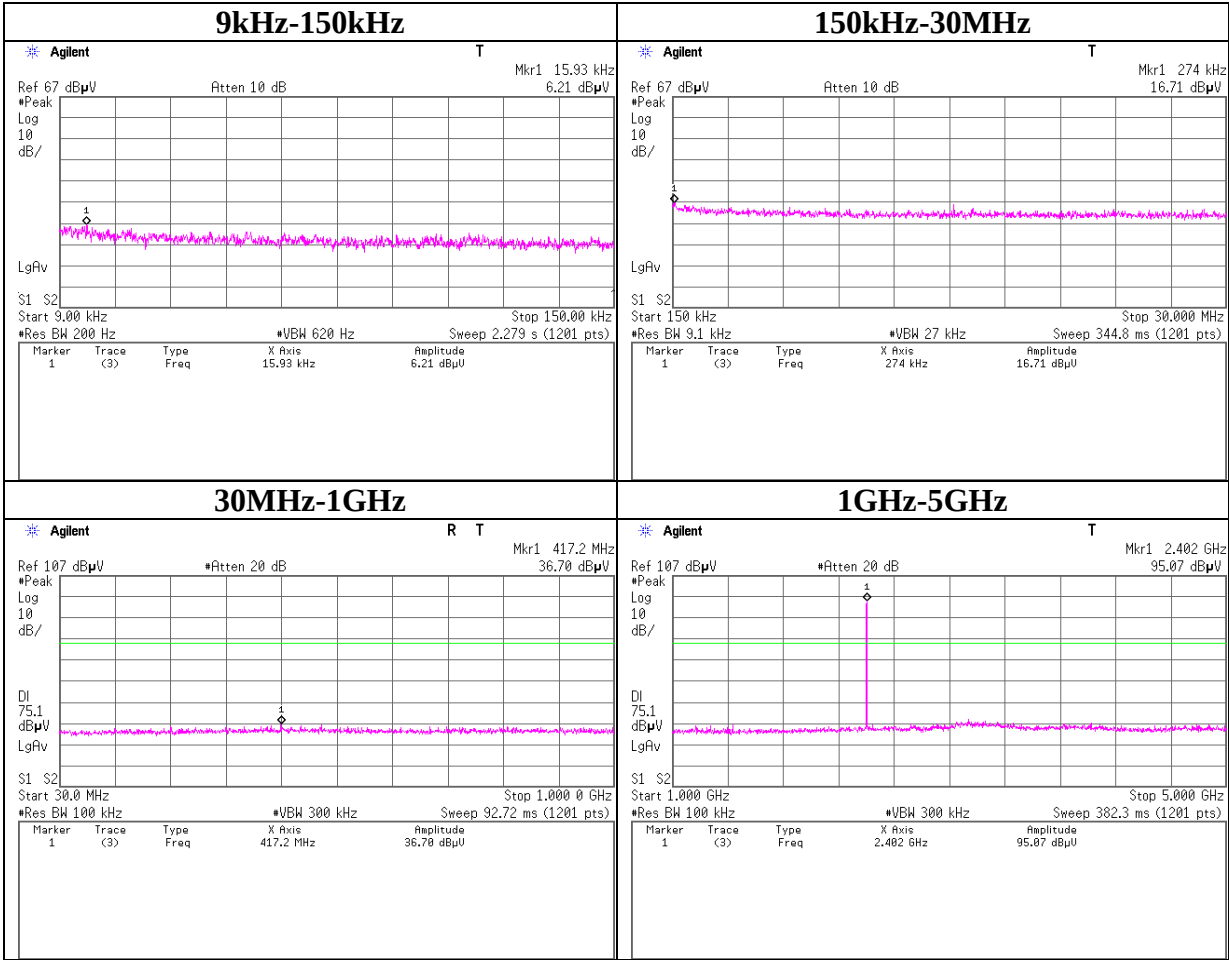
Conducted Spurious Emission

Tx DH5 2480MHz



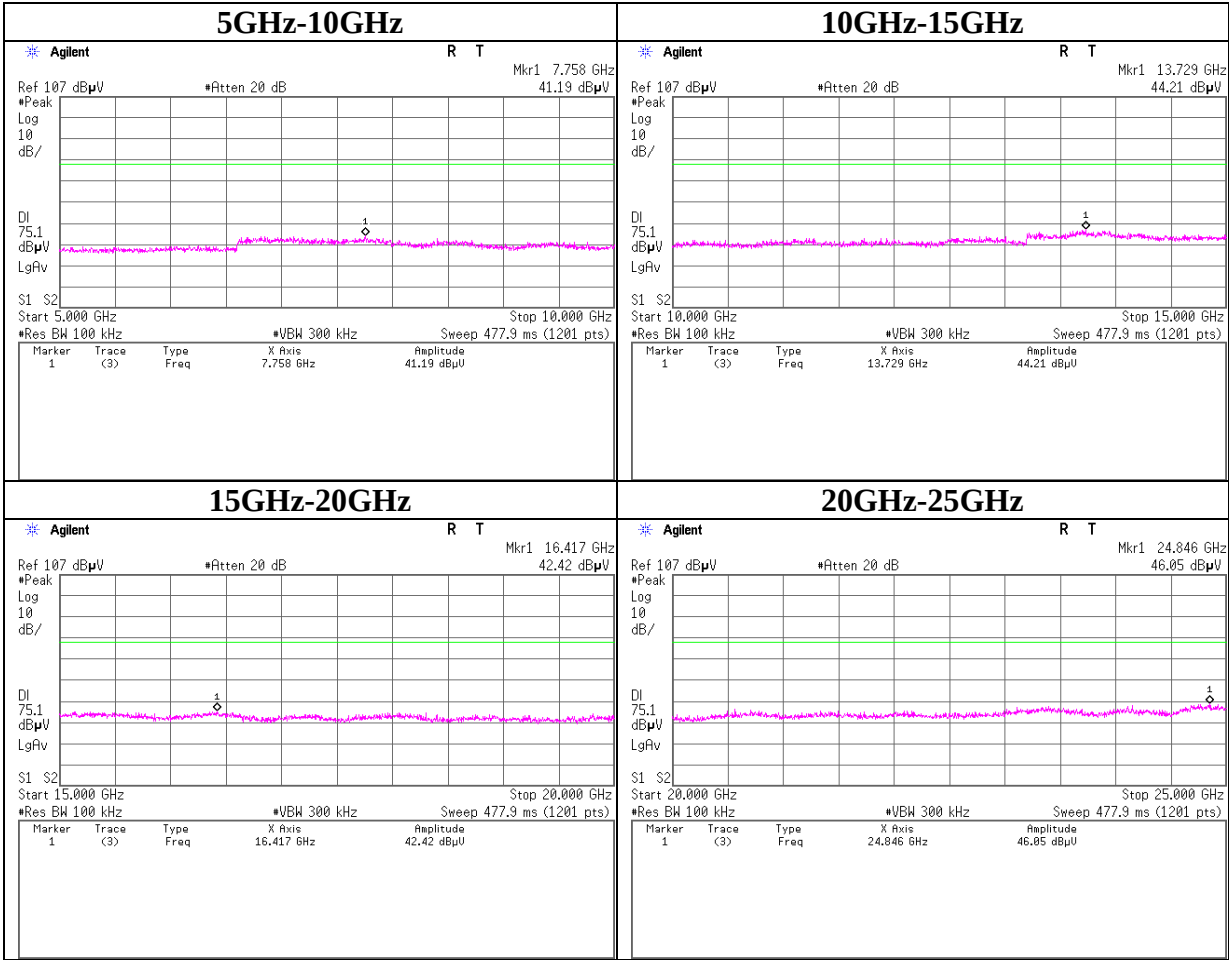
Conducted Spurious Emission

Tx 3DH5 2402MHz



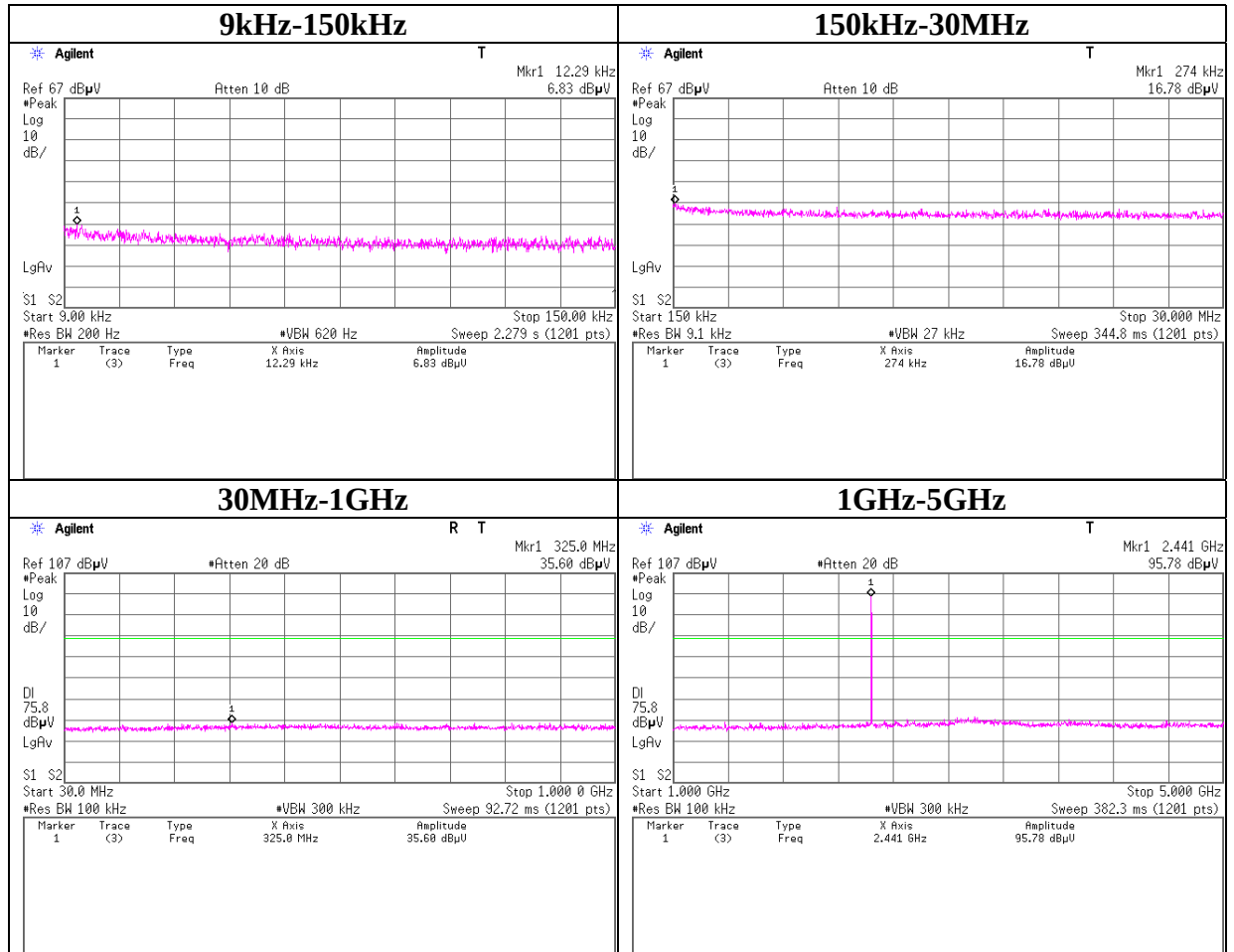
Conducted Spurious Emission

Tx 3DH5 2402MHz



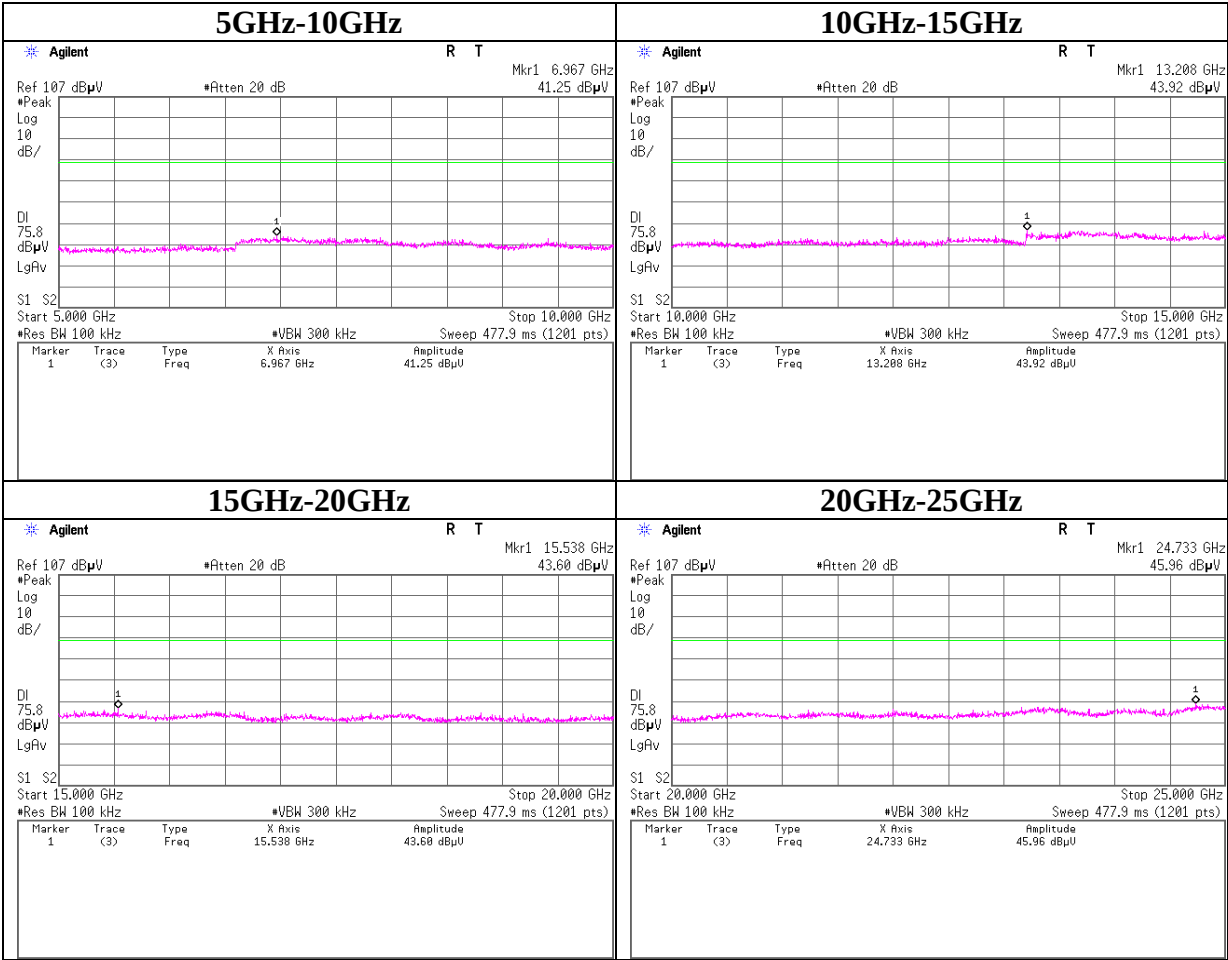
Conducted Spurious Emission

Tx 3DH5 2441MHz



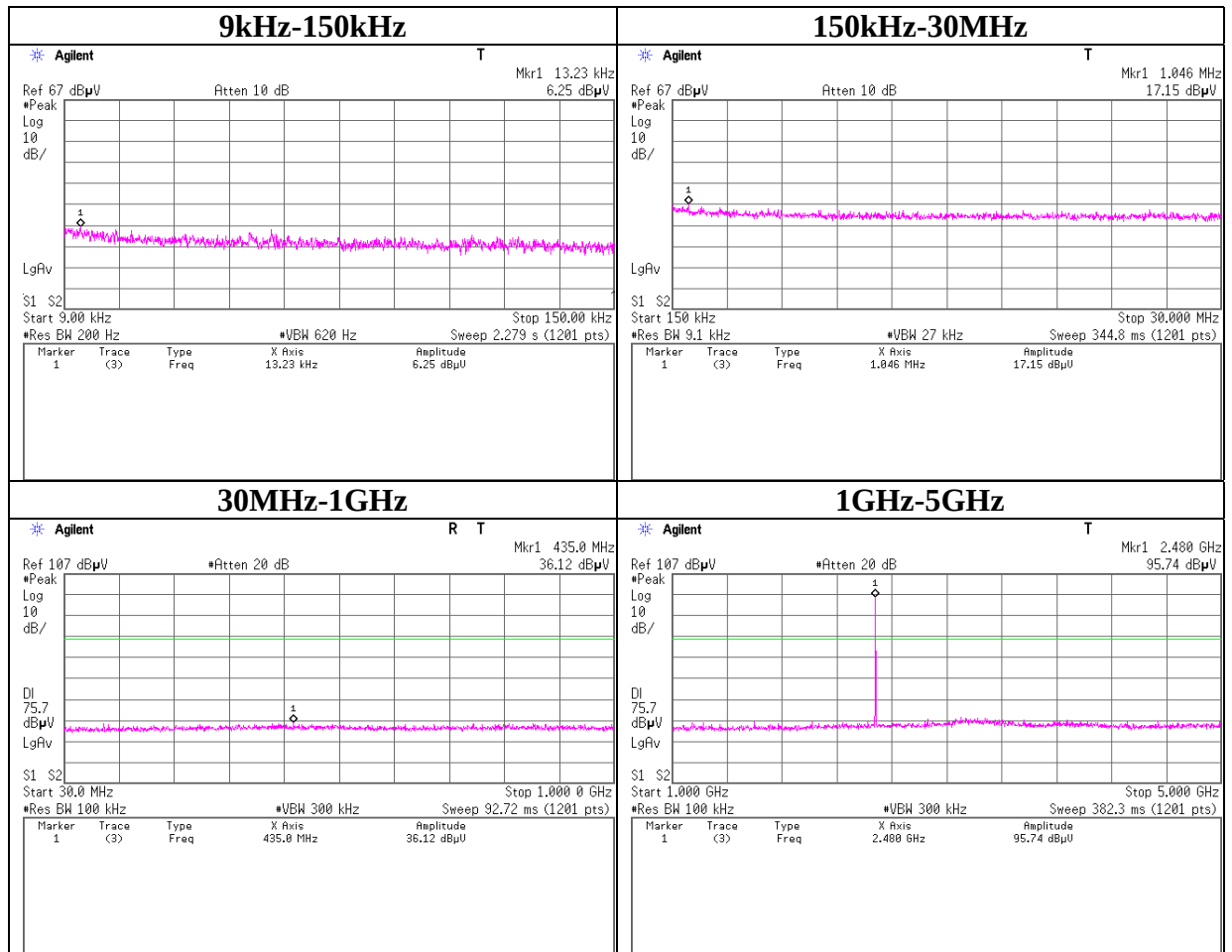
Conducted Spurious Emission

Tx 3DH5 2441MHz



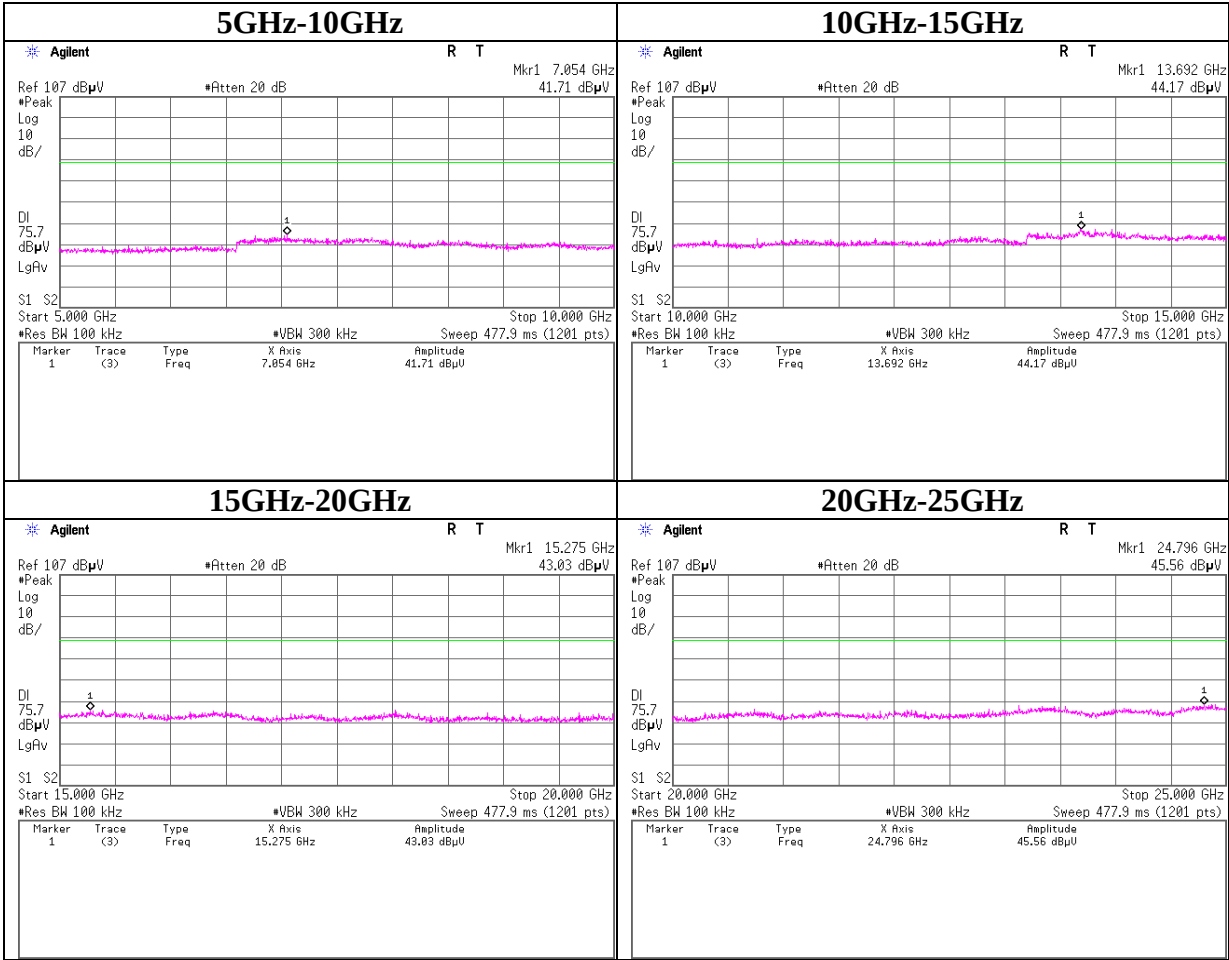
Conducted Spurious Emission

Tx 3DH5 2480MHz



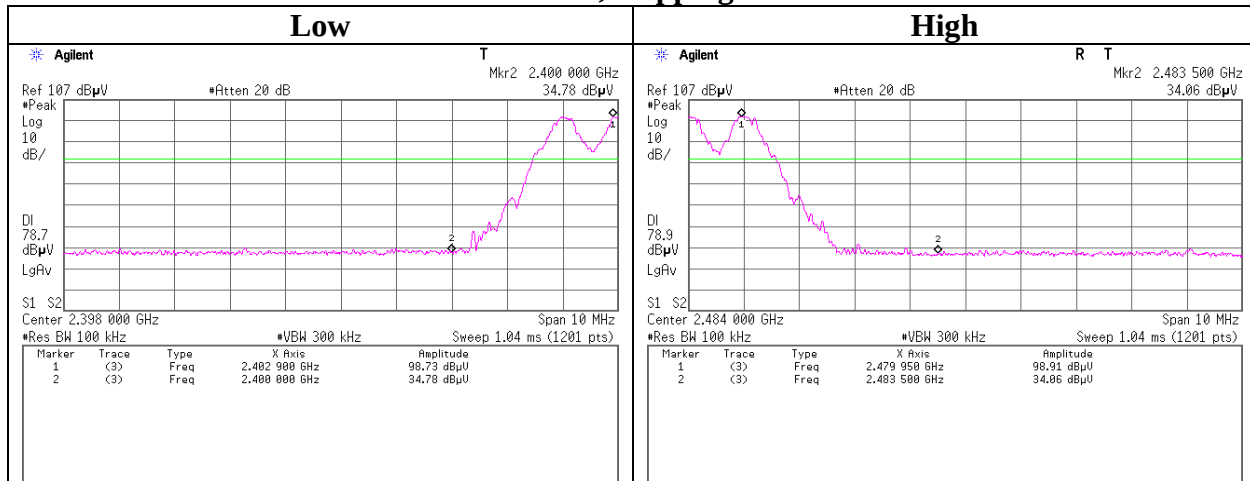
Conducted Spurious Emission

Tx 3DH5 2480MHz

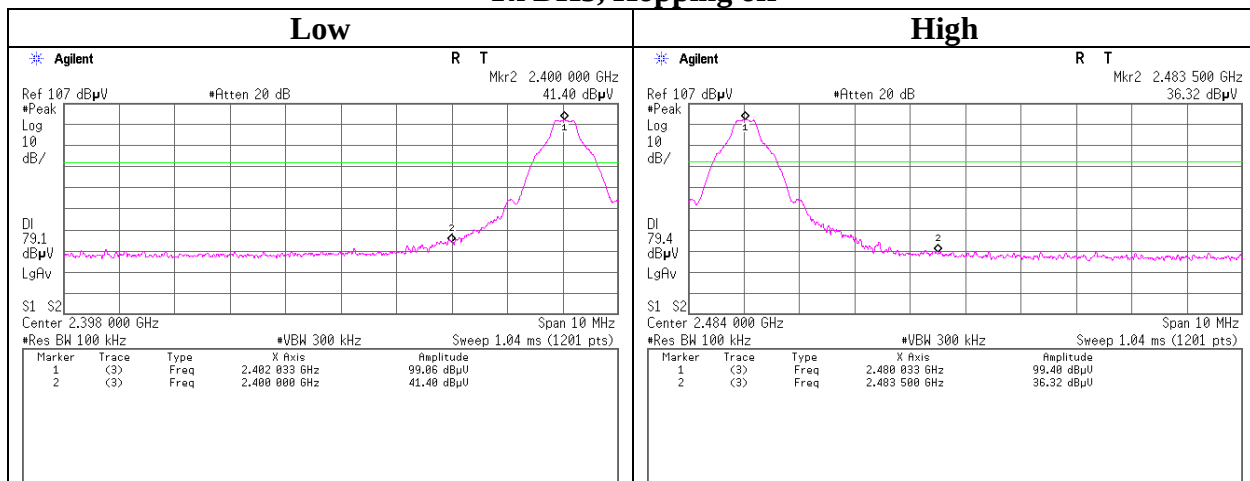


Conducted Emission Band Edge compliance

Tx DH5, Hopping on

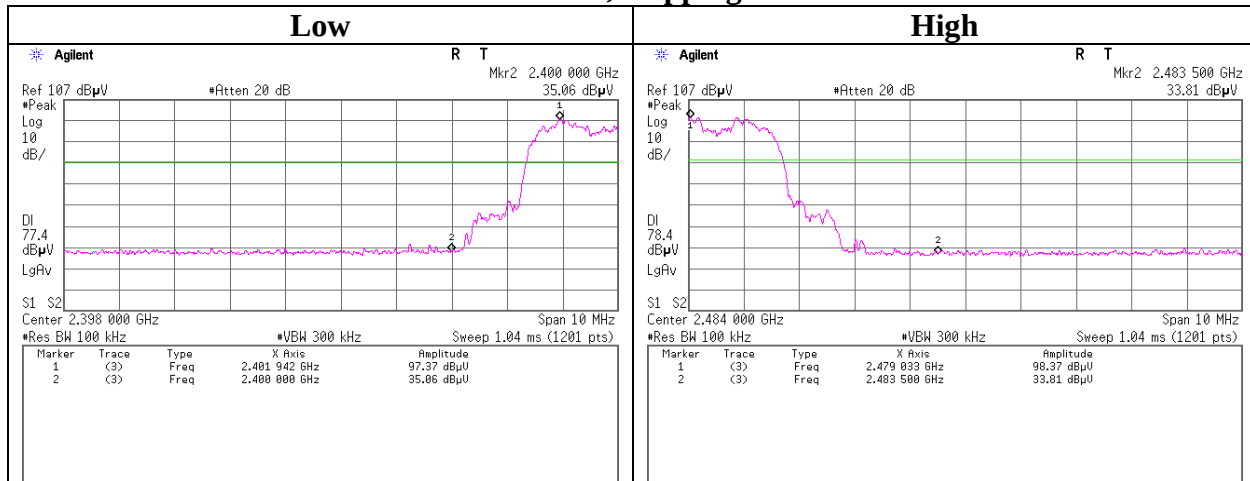


Tx DH5, Hopping off

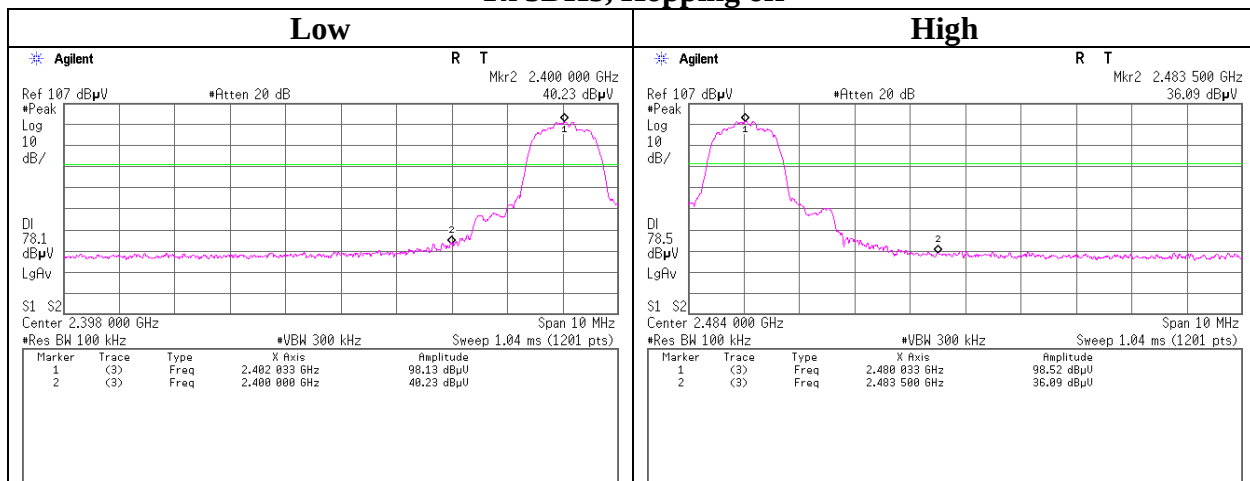


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on



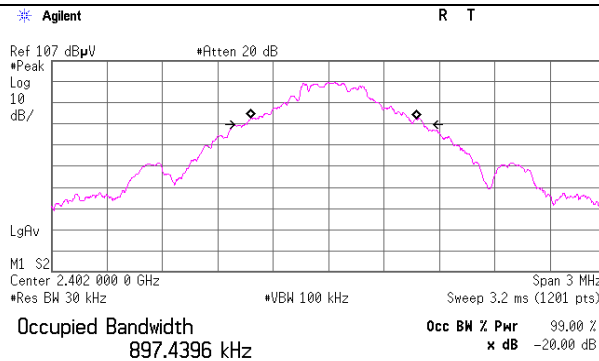
Tx 3DH5, Hopping off



99% Occupied Bandwidth

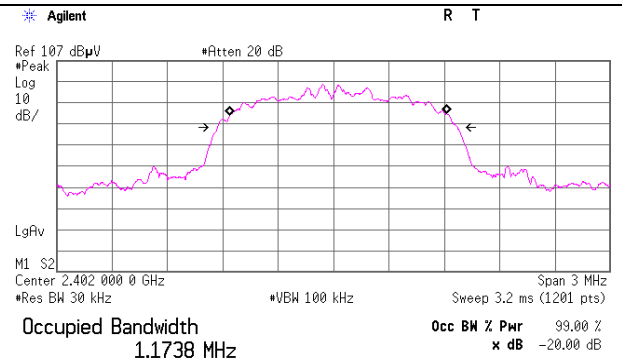
Tx DH5, Hopping off

2402MHz

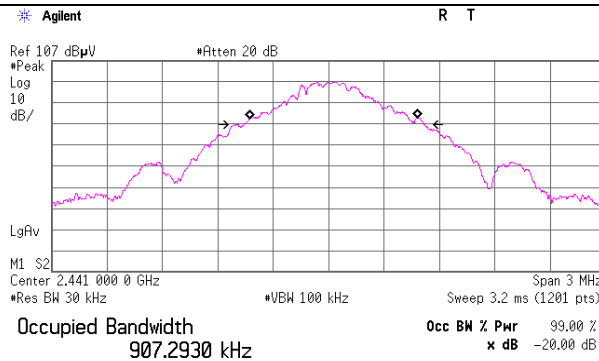


Tx 3DH5, Hopping off

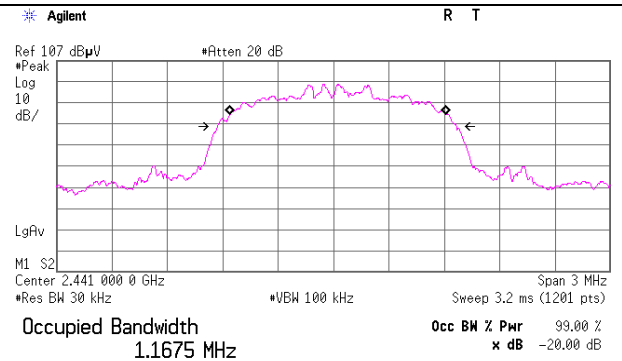
2402MHz



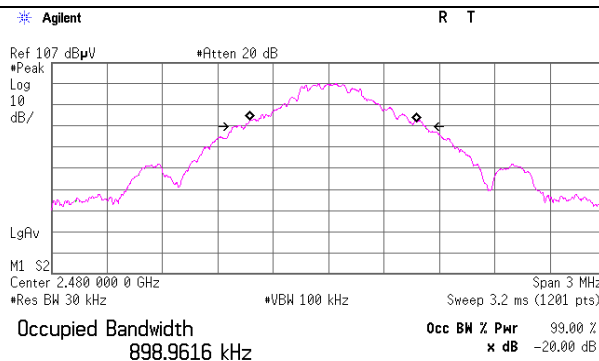
2441MHz



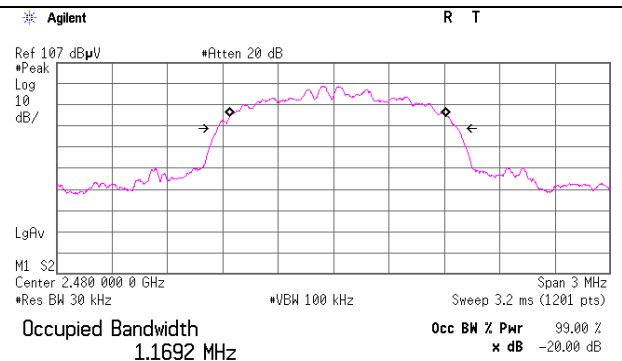
2441MHz



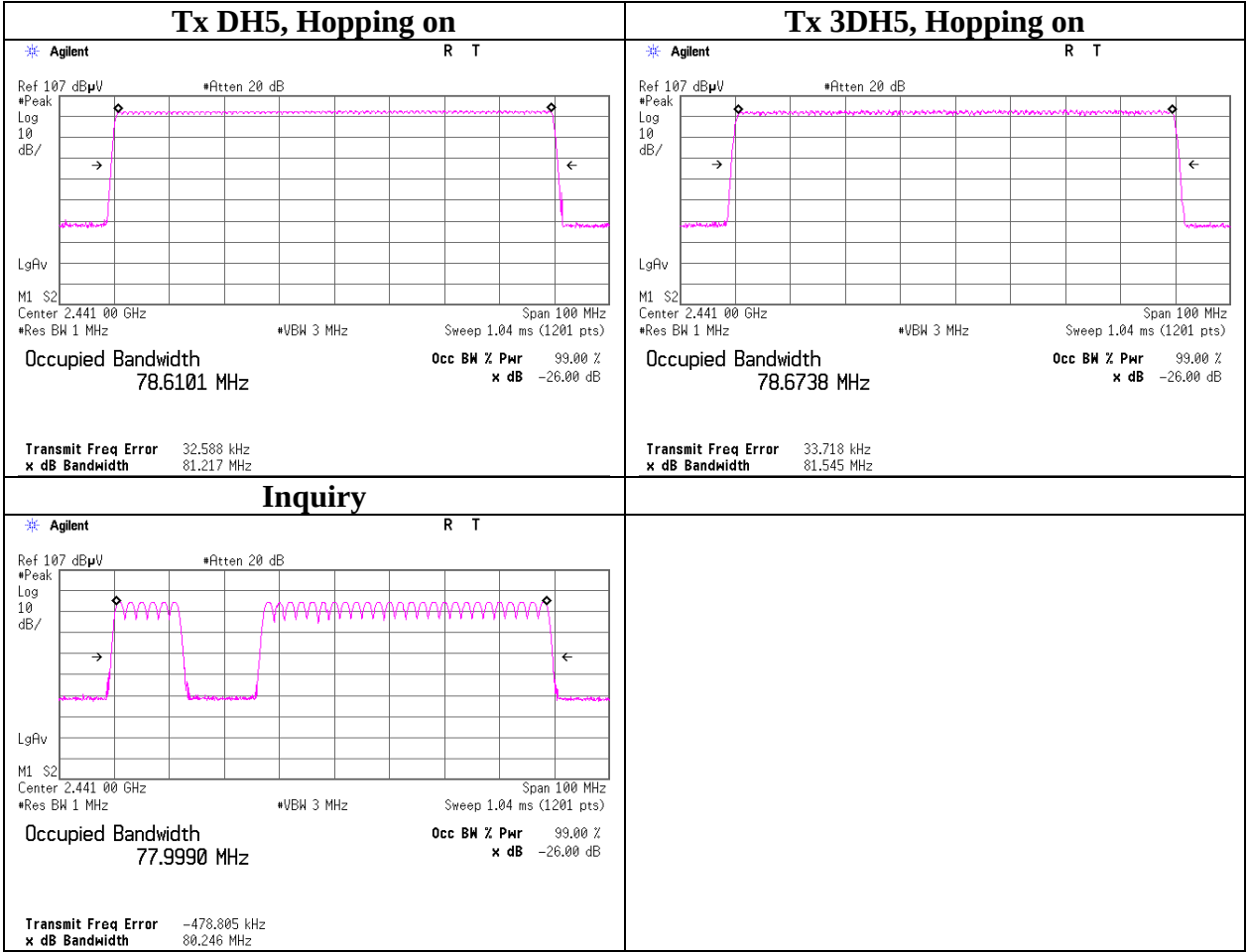
2480MHz



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)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2011/11/07 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2011/11/07 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MCC-96	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30817/2	AT	2012/05/09 * 12
MCC-97	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30818/2	AT	2012/05/09 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MPD-02	Power Divider DC-12.4GHz	SUHNER	4901.19.A	-	AT	2012/05/17 * 12
MBTR15	CBT Bluetooth Tester	Rohde & Schwarz	CBT	100401	AT/RE	2011/05/12 * 24
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE/CE	2011/06/30 * 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
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2012/04/03 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2012/02/09 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2012/02/16 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 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	2011/09/26 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22 * 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