



Test report No. : 32IE0154-HO-01-A-R1
Page : 1 of 94
Issued date : July 20, 2012
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FCC ID : N6C-SDMAN

This test report shows the test data of original RF module that has the same specification as this application. As this original module has the different antenna, class 2 permissive change application was done for it. Please refer to the test report 10195552-001H-A-R1 for antenna change. In addition, the module will be controlled not to use Bluetooth function and 802.11n-HT40 mode by software of host device.

RADIO TEST REPORT

Test Report No. : 32IE0154-HO-01-A-R1

Applicant : silex technology, Inc.
Type of Equipment : SDIO Wireless Module
Model No. : SX-SDMAN
FCC ID : N6C-SDMAN
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.
6. This report is a revised version of 32IE0154-HO-01-A. 32IE0154-HO-01-A is replaced with this report.

Date of test: April 27 to July 13, 2012

Representative test engineer:


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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	:	silex technology, Inc.
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Telephone Number	:	+81-774-98-3878
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Contact Person	:	Toshiro Kometani

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

2.1 Identification of E.U.T.

Type of Equipment	:	SDIO Wireless Module
Model No.	:	SX-SDMAN
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC3.3V
Receipt Date of Sample	:	April 11, 2012
Country of Mass-production	:	Japan
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: SX-SDMAN (referred to as the EUT in this report) is the SDIO Wireless Module.

General Specification

Clock frequency(ies) in the system : 26MHz

Radio Specification

Radio Type : Transceiver
 Method of Frequency Generation : Synthesizer
 Power Supply (inner) : DC1.2V

Specification of Wireless LAN (IEEE802.11b/g/a/n-20/n-40)

Type of radio	IEEE802.11b	IEEE802.11g	IEEE802.11a	IEEE802.11n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2412-2462MHz	2412-2462MHz	5180-5320MHz *1) 5745-5825MHz	2412 - 2462MHz 5180-5320MHz *1) 5745-5825MHz	5190 - 5310MHz *2) 5755 - 5795MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel spacing	5MHz		20MHz	<u>2.4GHz band</u> 5MHz <u>5GHz band</u> 20MHz	40MHz
Antenna type	Sleeve antenna: Sansei Embedded antenna: Ethertronics				
Antenna Gain	Sleeve antenna: 1.0dBi (2.4GHz including cableloss 0.5dB), 1.1dBi (5GHz including cableloss 1.0dB) Embedded antenna: 2.0dBi (2.4GHz including cableloss 0.5dB), 2.5dBi (5GHz including cableloss 1.0dB)				
Antenna Connector type	U.FL connector				

*1) 5180 - 5320MHz is applied for other test report.(Test Report No.: 32IE0154-HO-01-C)

*2) 5190 - 5310MHz is applied for other test report.(Test Report No.: 32IE0154-HO-01-C)

Specification of Bluetooth (Ver.4.0 + EDR)

Type of radio	Bluetooth
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Channel spacing	1MHz
Antenna type	Embedded antenna: Ethertronics
Antenna Gain	2.0dBi (2.4GHz including cableloss 0.5dB), 2.5dBi (5GHz including cableloss 1.0dB)
Antenna Connector Type	U.FL Alternative connector

Specification of Low Energy (Ver.4.0 + EDR/LE Dual mode)

Type of radio	Low Energy
Frequency of Operation	2402-2480MHz
Type of Modulation	DSSS
Channel spacing	2MHz
Antenna type	Embedded antenna: Ethertronics
Antenna Gain	2.0dBi (2.4GHz including cableloss 0.5dB), 2.5dBi (5GHz including cableloss 1.0dB)
Antenna Connector Type	U.FL Alternative connector

*This test report applies for Wireless LAN (IEEE802.11b/g/a/n-20/n-40).

Wireless LAN and Bluetooth do not transmit simultaneously.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

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

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

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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	QP 12.4dB, 5.78632MHz, L AV 10.1dB, 5.88777MHz, L	Complied	-
6dB Bandwidth	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	1.8dB 2390.000MHz, AV, Hori. 186.794MHz, QP, Hori.	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.

FCC 15.31 (e)

The RF Module has own regulator.

The RF Module is constantly provided voltage through own regulator regardless of input voltage (DC3.3V).

Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique antenna connector (U.FL).

Therefore the equipment complies with the requirement of 15.203/212.

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3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

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

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

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)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	5.5Mbps (Long GI), PN9
IEEE 802.11g (11g)	24Mbps (Long GI), PN9
IEEE 802.11n 20MHz BW (11n-20: 2.4GHz)	MCS 3 (Long GI), PN9
IEEE 802.11a (11a)	6Mbps (Long GI), PN9
IEEE 802.11n 20MHz BW (11n-20: 5GHz)	MCS 0 (Long GI), PN9
IEEE 802.11n 40MHz BW (11n-40: 5GHz)	MCS 3 (Long GI), PN9
*Transmitting duty was close to 100% on all tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*EUT has the power settings by the software as follows; Power settings: 11b(5.5Mbps, Long GI): 2412MHz: 13.0dBm, 2437MHz: 13.0dBm, 2462MHz: 13.0dBm 11g(24Mbps, Long GI): 2412MHz: 8.0dBm, 2437MHz: 13.0dBm, 2462MHz: 8.5dBm 11n-20(2.4GHz Band, MCS 3, Long GI): 2412MHz: 7.0dBm, 2437MHz: 12.0dBm, 2462MHz: 7.5dBm 11a(6Mbps, Long GI): 5745MHz: 13.0dBm, 5785MHz: 13.0dBm, 5825MHz: 13.0dBm 11n-20(5GHz(W58) Band, MCS 0, Long GI): 5745MHz: 13.0dBm, 5785MHz: 13.0dBm, 5825MHz: 13.0dBm 11n-40(5GHz(W58) Band, MCS 3, Long GI): 5755MHz: 13.0dBm, 5795MHz: 13.0dBm	
Software: Atheros Radio Test (ART) - Revision 0.2 BUILD #33 ART_11n - Customer Version (ANWI BUILD)	
*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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna port	Tested frequency
Spurious Emission (Radiated)	11b Tx 11g Tx 11n-20 Tx	1 *2)	2412MHz 2437MHz 2462MHz
Maximum Peak Output Power	11b Tx 11g Tx *1)	1, 2	2412MHz 2437MHz 2462MHz
Spurious Emission (Conducted), Power Density	11b Tx 11g Tx *1)	1 *2)	2412MHz 2437MHz 2462MHz
6dB Bandwidth 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	1 *2)	2412MHz 2437MHz 2462MHz
Conducted Emission Band Edge compliance	11b Tx 11g Tx 11n-20 Tx	1 *2)	2412MHz 2462MHz

*1) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

*2) After the comparison between Antenna port 1 and Antenna port 2, test was performed with the antenna that had higher power as a representative.

*The details of Operating mode(s)

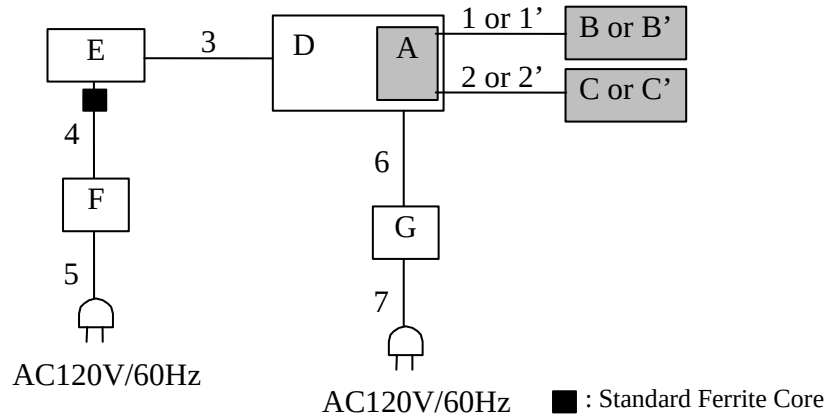
Test Item	Operating Mode	Tested Antenna	Tested frequency
Conducted Emission	11n-20 Tx *3)	2 *2)	5745MHz
6dB Bandwidth, 99% Occupied Bandwidth	11a Tx 11n-20 Tx	2 *2)	5745MHz 5785MHz 5825MHz
	11n-40 Tx	2 *2)	5755MHz 5795MHz
Spurious Emission (Conducted), Power Density	11n-20 Tx *1)	2 *2)	5745MHz 5785MHz 5825MHz
	11n-40 Tx	2 *2)	5755MHz 5795MHz
Spurious Emission (Radiated)	11n-20 Tx *1)	2 *2)	5745MHz 5785MHz 5825MHz
	11n-40 Tx	2 *2)	5755MHz 5795MHz
Maximum Peak Output Power	11n-20 Tx *1)	1, 2	5745MHz 5785MHz 5825MHz
	11n-40 Tx	1, 2	5755MHz 5795MHz
Conducted Emission Band Edge compliance	11a Tx 11n-20 Tx	2 *2)	5745MHz 5825MHz
	11n-40 Tx	2 *2)	5755MHz 5795MHz

*1) Since 11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

*2) After the comparison between Antenna port 1 and Antenna port 2, test was performed with the antenna that had higher power as a representative.

*3) The mode was tested as a representative, because it had the highest power at antenna terminal test.

4.2 Configuration and peripherals



- * Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
- * Sleeve antenna and Embadded antenna are not used in combination.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	SDIO Wireless Module	SX-SDMAN	008092-0129C8 *1) 008092-0129C9 *2)	silex technology, Inc.	EUT
B	Embedded Antenna	1000418	001	Ethertronics	EUT
B'	Sleeve Antenna	ANTB98-061A0	001	Sansei Denki	EUT
C	Embedded Antenna	1000418	002	Ethertronics	EUT
C'	Sleeve Antenna	ANTB98-061A0	002	Sansei Denki	EUT
D	Jig Board	-	-	silex technology, Inc.	-
E	Laptop PC	Latitude E6510	CFGY2A00	DELL	-
F	AC Adaptor	LA90PE0-01	CN-03T6XF-71615-1AK-0927-A01	DELL	
G	DC Power Supply	PW8-3ATP	09067054	KENWOOD TMI	*3)

*1) Used for all tests except for Antenna terminal conducted test

*2) Used for Antenna terminal conducted test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable (for Embedded Antenna)	0.1	Shielded	Shielded	-
1'	Antenna Cable (for Sleeve Antenna)	0.12	Shielded	Shielded	-
2	Antenna Cable (for Embedded Antenna)	0.1	Shielded	Shielded	-
2'	Antenna Cable (for Sleeve Antenna)	0.12	Shielded	Shielded	-
3	SD Card slot Cable	0.3	Unshielded	Unshielded	-
4	DC Cable	1.8	Unshielded	Unshielded	-
5	AC Cable	0.9	Unshielded	Unshielded	-
6	DC Cable	1.5	Unshielded	Unshielded	*3)
7	AC Cable	2.0	Unshielded	Unshielded	*3)

*3) Used for Conducted emission test only

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

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

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

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

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

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SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

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

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

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

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

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

Test Antennas are used as below;

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

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

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC 15.205 / 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), 0.5m*3) (above 26.5GHz)		3m (below 10GHz), 1m*2) (above 10GHz), 0.5m*3) (above 26.5GHz)

*1) The test was performed with VBW 10Hz since the EUT had transmitting duty cycle close to 100%. (see Appendix).

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

*3) Distance Factor: $20 \times \log(3.0\text{m}/0.5\text{m}) = 15.6\text{dB}$

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT, Embedded antenna and of X(0 and 90), Y(0 and 90) and Z(0 and 90) axes of Sleeve antenna 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-40GHz
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
GdB Bandwidth	18MHz, 20MHz, 45MHz	100kHz	300kHz	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)
Peak Power Density	18MHz, 20MHz, 45MHz	30kHz	100kHz	600sec, 667sec, 1.5ks	Peak	Max Hold	Spectrum Analyzer *1) *2)
Conducted Spurious Emission *3)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				

*1) PSD Option 1 of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".
*2) The test was not performed at RBW:3kHz however the measurement is to be performed with RBW:3kHz in the regulation, because, the measurement value with RBW:3kHz is less than the value of RBW:30kHz and the test data met the limit with RBW:30kHz.
*3) 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

[Sleeve antenna]

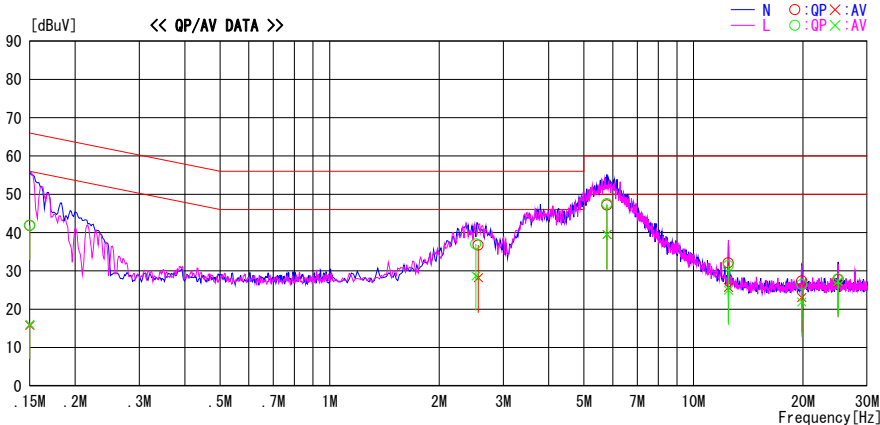
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/06/29

Report No. : 32IE0154-HO-01
Temp./Humi. : 24deg. C / 62% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : WLAN 11n-20 5745MHz

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]		
0.15000	28.6	2.6	13.2	41.8	15.8	66.0	56.0	24.2	40.2	N	
2.56127	23.2	14.7	13.5	36.7	28.2	56.0	46.0	19.3	17.8	N	
5.78791	33.3	25.6	13.9	47.2	39.5	60.0	50.0	12.8	10.5	N	
12.46897	17.5	11.1	14.6	32.1	25.7	60.0	50.0	27.9	24.3	N	
19.83144	12.2	7.9	15.2	27.4	23.1	60.0	50.0	32.6	26.9	N	
24.95464	12.2	11.5	15.5	27.7	27.0	60.0	50.0	32.3	23.0	N	
0.15000	28.7	2.9	13.2	41.9	16.1	66.0	56.0	24.1	39.9	L	
2.52341	23.5	15.2	13.5	37.0	28.7	56.0	46.0	19.0	17.3	L	
5.78632	33.7	25.6	13.9	47.6	39.5	60.0	50.0	12.4	10.5	L	
12.46927	16.8	10.4	14.6	31.4	25.0	60.0	50.0	28.6	25.0	L	
19.83776	11.3	6.7	15.2	26.5	21.9	60.0	50.0	33.5	28.1	L	
24.95488	12.4	11.7	15.5	27.9	27.2	60.0	50.0	32.1	22.8	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 [Embedded antenna]

DATA OF CONDUCTED EMISSION TEST

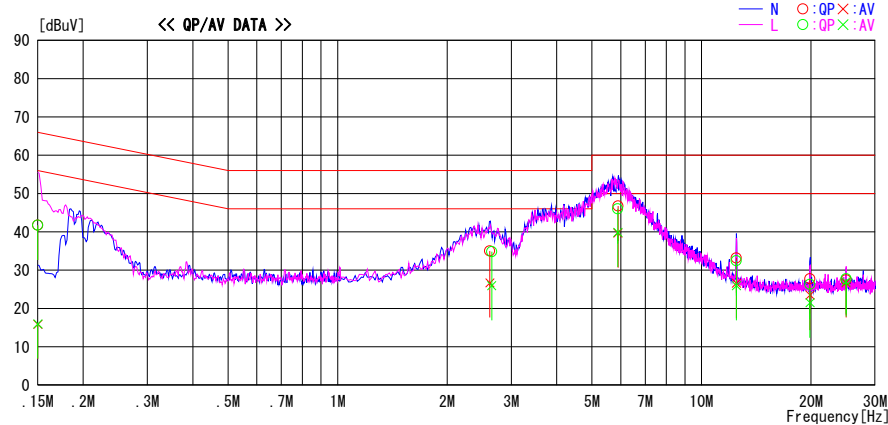
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/06/29

Report No. : 32IE0154-HO-01

Temp./Humi. : 24deg. C / 62% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : WLAN 11n-20 5745MHz

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]		
0.15000	28.5	2.7	13.2	41.7	15.9	66.0	56.0	24.3	40.1	N	
2.61892	21.5	13.2	13.5	35.0	26.7	56.0	46.0	21.0	19.3	N	
5.89729	32.8	25.8	13.9	46.7	39.7	60.0	50.0	13.3	10.3	N	
12.46867	18.6	12.0	14.6	33.2	26.6	60.0	50.0	26.8	23.4	N	
19.86158	12.5	8.3	15.2	27.7	23.5	60.0	50.0	32.3	26.5	N	
24.95572	12.0	11.2	15.5	27.5	26.7	60.0	50.0	32.5	23.3	N	
0.15000	28.5	2.8	13.2	41.7	16.0	66.0	56.0	24.3	40.0	L	
2.65252	21.2	12.4	13.6	34.8	26.0	56.0	46.0	21.2	20.0	L	
5.88777	32.1	26.0	13.9	46.0	39.9	60.0	50.0	14.0	10.1	L	
12.46855	17.9	11.4	14.6	32.5	26.0	60.0	50.0	27.5	24.0	L	
19.85618	11.1	6.3	15.2	26.3	21.5	60.0	50.0	33.7	28.5	L	
24.95512	12.2	11.5	15.5	27.7	27.0	60.0	50.0	32.3	23.0	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.

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0154-HO-01
Date 07/13/2012
Temperature/ Humidity 23deg. C / 62% RH
Engineer Satofumi Matsuyama
Mode Tx Antenna port 1

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.326	>500
2437	10.338	>500
2462	10.359	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.454	>500
2437	16.466	>500
2462	16.477	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.673	>500
2437	17.656	>500
2462	17.657	>500

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0154-HO-01
Date 07/13/2012
Temperature/ Humidity 23deg. C / 62% RH
Engineer Satofumi Matsuyama
Mode Tx Antenna port 2

11a , 6Mbps(Long)

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	16.314	>500
5785	16.072	>500
5825	15.994	>500

11n-20, MCS 0(Long)

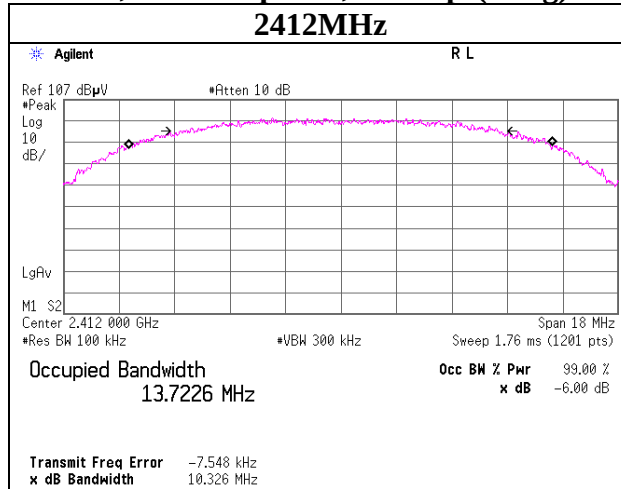
Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	16.106	>500
5785	16.352	>500
5825	16.925	>500

11n-40, MCS 3(Long)

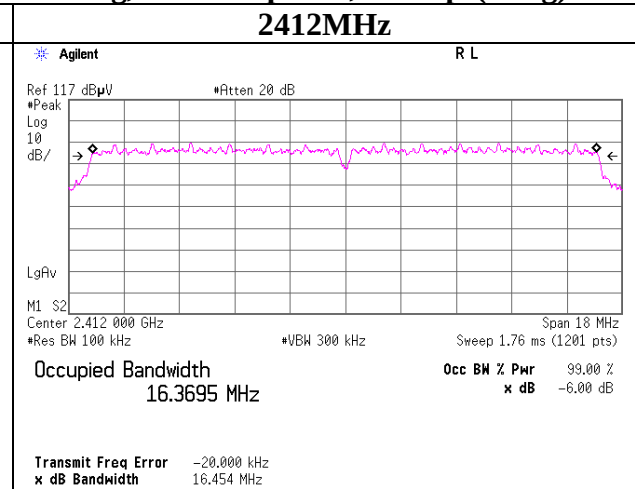
Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5755	35.703	>500
5795	35.759	>500

6dB Bandwidth

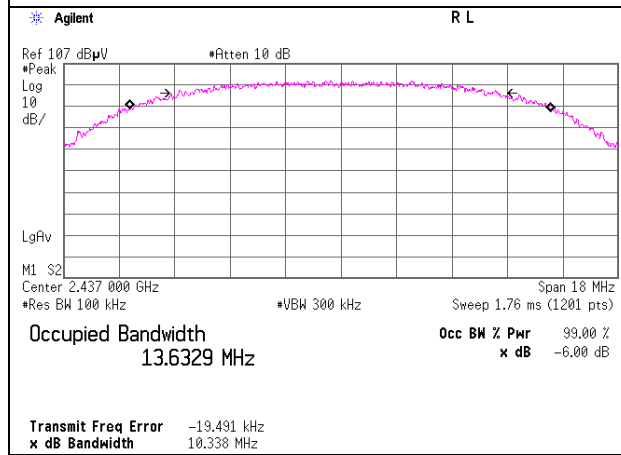
11b, Antenna port 1, 5.5Mbps(Long)



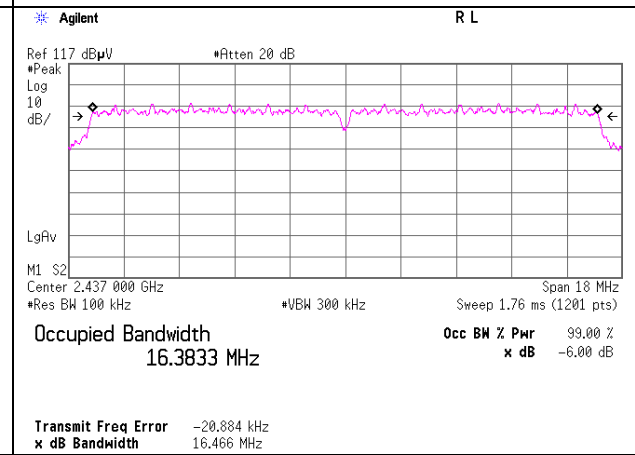
11g, Antenna port 1, 24Mbps(Long)



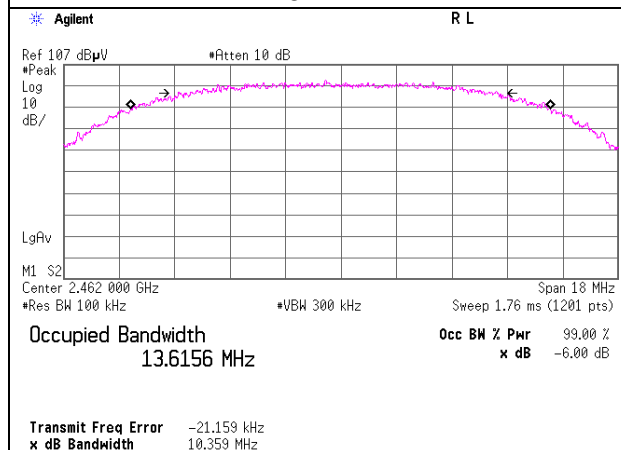
2437MHz



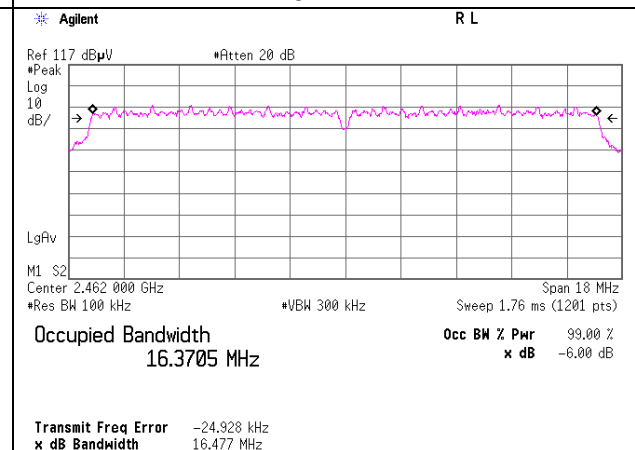
2437MHz



2462MHz

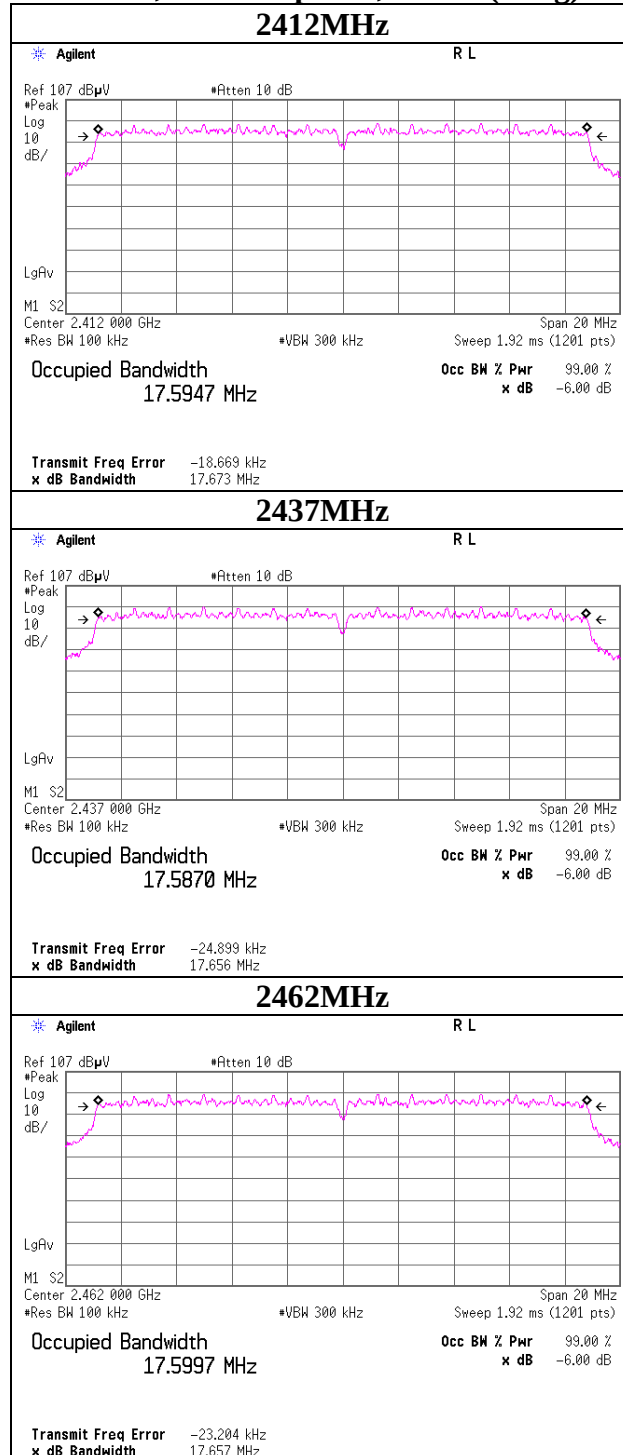


2462MHz



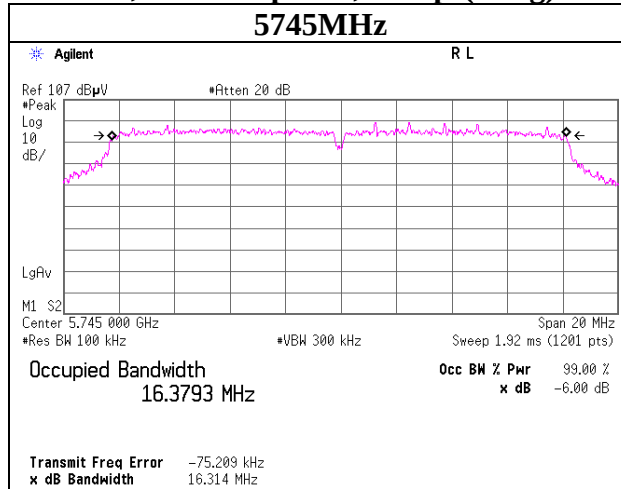
6dB Bandwidth

11n-20, Antenna port 1, MCS 3(Long)

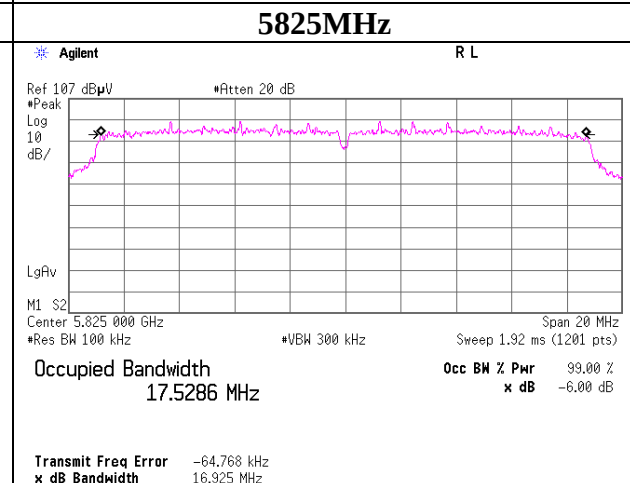
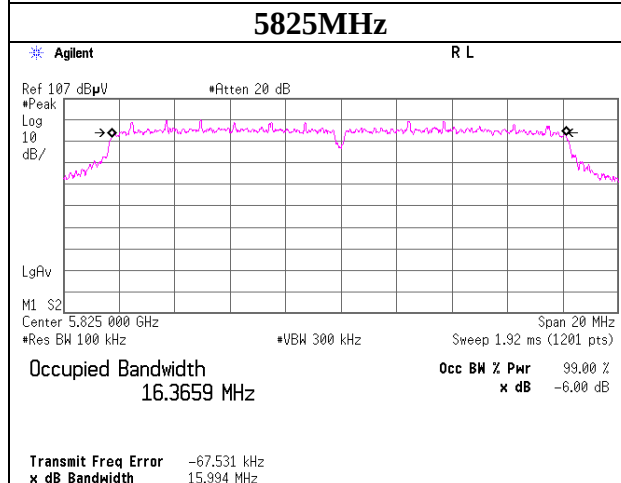
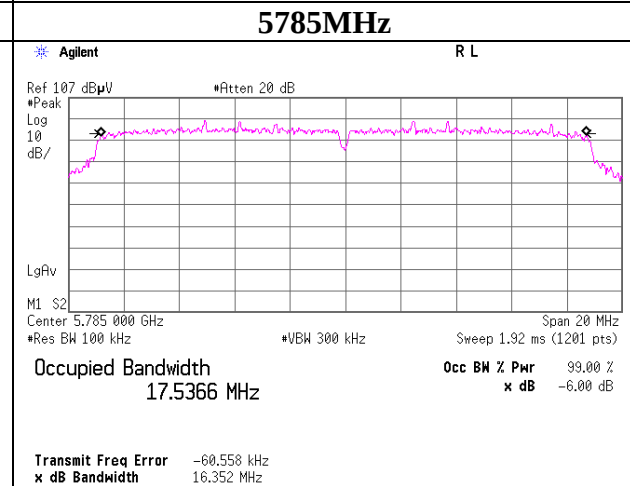
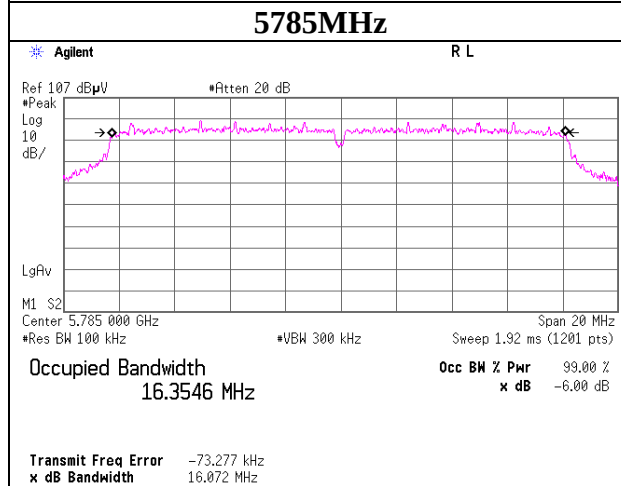
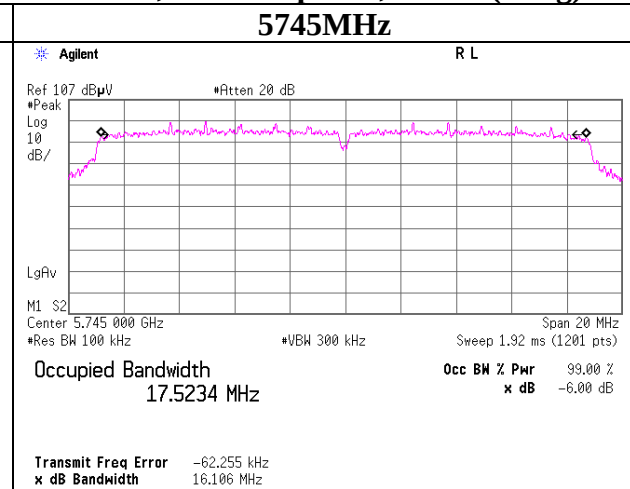


6dB Bandwidth

11a, Antenna port 2, 6Mbps(Long)

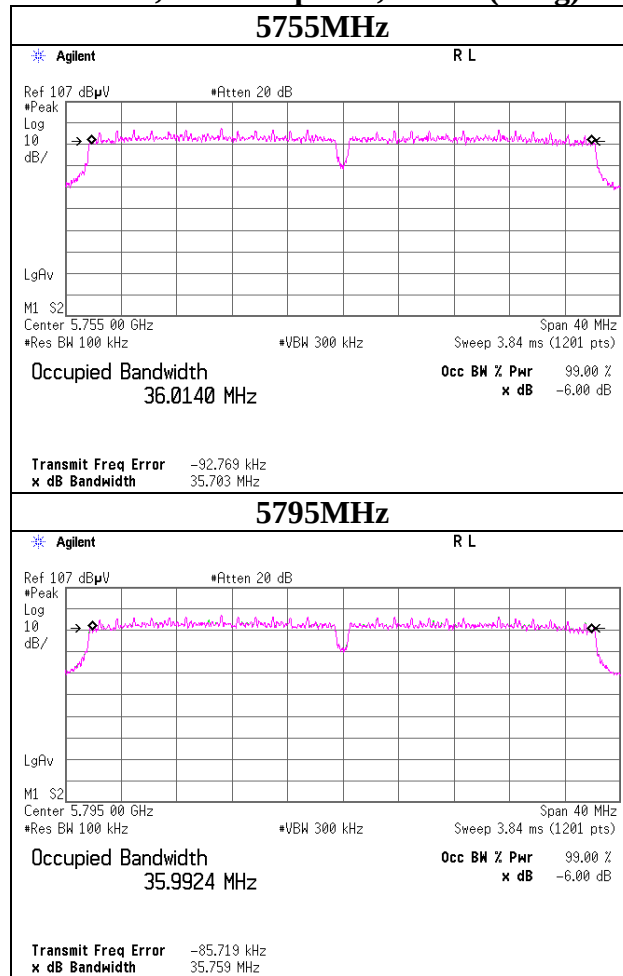


11n-20, Antenna port 2, MCS 0(Long)



6dB Bandwidth

11n-40, Antenna port 2, MCS 3(Long)



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Measurement Room
Report No. : 32IE0154-HO-01
Date : 04/27/2012
Temperature/ Humidity : 24deg. C / 45% RH
Engineer : Satofumi Matsuyama
Mode : 11b Tx

11b, 5.5Mbps(Long GI), Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	5.08	0.77	10.07	15.92	39.08	30.00	1000	14.08
2437	6.26	0.77	10.07	17.10	51.29	30.00	1000	12.90
2462	6.23	0.77	10.07	17.07	50.93	30.00	1000	12.93

11b, 5.5Mbps(Long GI), Antenna port 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	5.14	0.77	10.07	15.98	39.63	30.00	1000	14.02
2437	5.82	0.77	10.07	16.66	46.34	30.00	1000	13.34
2462	6.08	0.77	10.07	16.92	49.20	30.00	1000	13.08

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 1, 2437MHz

Rate [Mbps]	Reading [dBm]	Reading [dBm]	Remark
	Long	Short	
1	5.83	-	
2	6.24	6.14	
5.5	6.26	6.14	*
11	6.16	6.08	

*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room	
Report No.	32IE0154-HO-01	
Date	04/27/2012	07/03/2012
Temperature/ Humidity	24deg. C / 45% RH	22deg. C / 65% RH
Engineer	Satofumi Matsuyama	Yutaka Yoshida
Mode	11g Tx / 11n-20 Tx	

11g, 24Mbps(Long GI), Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.58	2.05	10.08	18.71	74.30	30.00	1000	11.29
2437	11.54	0.77	10.07	22.38	172.98	30.00	1000	7.62
2462	6.98	2.07	10.09	19.14	82.04	30.00	1000	10.86

11g, 24Mbps(Long GI), Antenna port 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.41	2.05	10.08	18.54	71.45	30.00	1000	11.46
2437	11.52	0.77	10.07	22.36	172.19	30.00	1000	7.64
2462	6.93	2.07	10.09	19.09	81.10	30.00	1000	10.91

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 1, 11g, 2437MHz

Rate [Mbps]	Reading Long GI [dBm]	Reading Short GI [dBm]	Remark
6	11.48		
9	11.51		
12	11.44		
18	11.48		
24	11.54	11.53	*
36	11.45		
48	11.23		
54	10.84		

Antenna port 1, 11n-20, 2437MHz

MCS	Reading Long GI [dBm]	Reading Short GI [dBm]	Remark
0	10.97		
1	10.89		
2	10.89		
3	11.34	11.33	
4	11.04		
5	11.07		
6	10.37		
7	5.85		

*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Measurement Room
Report No. : 32IE0154-HO-01
Date : 04/30/2012
Temperature/ Humidity : 23deg. C / 71% RH
Engineer : Hironobu Ohnishi
Mode : 11a Tx / 11n-20 Tx

11n-20, MCS 0(Long GI), Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	8.54	10.07	3.41	22.03	159.43	30.00	1000	7.97
5785	7.79	10.07	3.43	21.29	134.63	30.00	1000	8.71
5825	7.43	10.07	3.45	20.95	124.37	30.00	1000	9.05

11n-20, MCS 0(Long GI), Antenna port 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	9.48	10.07	3.41	22.97	197.96	30.00	1000	7.03
5785	8.85	10.07	3.43	22.35	171.85	30.00	1000	7.65
5825	8.45	10.07	3.45	21.97	157.29	30.00	1000	8.03

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 2, 11a, 5785MHz

Rate [Mbps]	Reading Long GI [dBm]	Reading Short GI [dBm]	Remark
6	8.84	8.82	
9	8.78		
12	8.75		
18	8.75		
24	8.81		
36	8.52		
48	8.44		
54	8.14		

Antenna port 2, 11n-20, 5785MHz

MCS	Reading Long GI [dBm]	Reading Short GI [dBm]	Remark
0	8.85	8.83	*
1	8.71		
2	8.70		
3	8.68		
4	8.61		
5	8.38		
6	7.50		
7	3.30		

*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0154-HO-01
Date 04/30/2012
Temperature/ Humidity 23deg. C / 71% RH
Engineer Hironobu Ohnishi
Mode 11n-40, Tx

11n-40, MCS 3(Long GI), Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5755	8.14	10.07	3.42	21.63	145.54	30.00	1000	8.37
5795	7.49	10.07	3.43	21.00	125.76	30.00	1000	9.00

11n-40, MCS 3(Long GI), Antenna port 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5755	9.37	10.07	3.42	22.86	193.18	30.00	1000	7.14
5795	8.53	10.07	3.43	22.04	159.79	30.00	1000	7.96

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 2, 11n-40, 5755MHz

MCS Number	Reading Long GI [dBm]	Reading Short GI [dBm]	Remark
0	9.31		
1	9.35		
2	9.32		
3	9.37	9.34	
4	9.00		
5	8.56		
6	7.76		
7	3.48		

*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

Radiated Spurious Emission [Sleeve antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 05/07/2012 06/27/2012 06/27/2012
Temperature/ Humidity : 21 deg. C / 51% RH 23 deg. C / 48% RH 25 deg. C / 50% RH
Engineer : Takeshi Choda Katsunori Okai Satofumi Matsuyama
Mode : (1-10GHz) (1-10GHz) (Above 10GHz)
11b Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	52.7	28.1	2.4	32.3	50.9	73.9	23.0	
Hori	4824.000	PK	47.9	31.3	4.0	34.0	49.2	73.9	24.7	
Hori	7236.000	PK	43.0	35.9	4.6	34.2	49.3	73.9	24.6	
Hori	9648.000	PK	42.5	38.8	5.3	34.7	51.9	73.9	22.0	
Hori	2390.000	AV	39.9	28.1	2.4	32.3	38.1	53.9	15.8	
Hori	4824.000	AV	36.3	31.3	4.0	34.0	37.6	53.9	16.3	
Hori	7236.000	AV	30.7	35.9	4.6	34.2	37.0	53.9	16.9	
Hori	9648.000	AV	31.6	38.8	5.3	34.7	41.0	53.9	12.9	
Vert	2390.000	PK	52.2	28.1	2.4	32.3	50.4	73.9	23.5	
Vert	4824.000	PK	50.1	31.3	4.0	34.0	51.4	73.9	22.5	
Vert	7236.000	PK	41.8	35.9	4.6	34.2	48.1	73.9	25.8	
Vert	9648.000	PK	43.3	38.8	5.3	34.7	52.7	73.9	21.2	
Vert	2390.000	AV	40.2	28.1	2.4	32.3	38.4	53.9	15.5	
Vert	4824.000	AV	39.4	31.3	4.0	34.0	40.7	53.9	13.2	
Vert	7236.000	AV	30.7	35.9	4.6	34.2	37.0	53.9	16.9	
Vert	9648.000	AV	31.5	38.8	5.3	34.7	40.9	53.9	13.0	

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

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

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	2412.000	PK	105.6	28.2	2.4	32.3	103.9	-	-	Carrier
Hori	2400.000	PK	66.2	28.1	2.4	32.3	64.4	83.9	19.5	
Vert	2412.000	PK	104.4	28.2	2.4	32.3	102.7	-	-	Carrier
Vert	2400.000	PK	65.3	28.1	2.4	32.3	63.5	82.7	19.2	

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

Radiated Spurious Emission [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012 06/27/2012
Temperature/ Humidity 23 deg. C / 48% RH 25 deg. C / 50% RH
Engineer Katsunori Okai Satofumi Matsuyama
(1-10GHz) (Above 10GHz)
Mode 11b Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3456.019	PK	47.2	29.3	2.7	34.2	45.0	73.9	28.9	
Hori	4874.000	PK	49.8	31.4	3.9	34.0	51.1	73.9	22.8	
Hori	7311.000	PK	43.1	36.0	4.7	34.2	49.6	73.9	24.3	
Hori	9748.000	PK	42.7	38.9	5.3	34.7	52.2	73.9	21.7	
Hori	3456.019	AV	42.2	29.3	2.7	34.2	40.0	53.9	13.9	
Hori	4874.000	AV	39.6	31.4	3.9	34.0	40.9	53.9	13.0	
Hori	7311.000	AV	30.6	36.0	4.7	34.2	37.1	53.9	16.8	
Hori	9748.000	AV	31.8	38.9	5.3	34.7	41.3	53.9	12.6	
Vert	3456.027	PK	50.5	29.3	2.7	34.2	48.3	73.9	25.6	
Vert	4874.000	PK	50.8	31.4	3.9	34.0	52.1	73.9	21.8	
Vert	7311.000	PK	42.3	36.0	4.7	34.2	48.8	73.9	25.1	
Vert	9748.000	PK	44.2	38.9	5.3	34.7	53.7	73.9	20.2	
Vert	3456.027	AV	46.8	29.3	2.7	34.2	44.6	53.9	9.3	
Vert	4874.000	AV	41.4	31.4	3.9	34.0	42.7	53.9	11.2	
Vert	7311.000	AV	30.6	36.0	4.7	34.2	37.1	53.9	16.8	
Vert	9748.000	AV	31.8	38.9	5.3	34.7	41.3	53.9	12.6	

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

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

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

Radiated Spurious Emission [Sleeve antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 05/08/2012 06/27/2012 06/27/2012
Temperature/ Humidity : 20 deg. C / 60% RH 23 deg. C / 48% RH 25 deg. C / 50% RH
Engineer : Katsunori Okai Katsunori Okai Satofumi Matsuyama
(1-10GHz) (1-10GHz) (Above 10GHz)
Mode : 11b Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	57.2	28.5	2.4	32.2	55.9	73.9	18.0	
Hori	2487.268	PK	55.9	28.5	2.4	32.2	54.6	73.9	19.3	
Hori	4924.000	PK	47.7	31.5	4.0	34.0	49.2	73.9	24.7	
Hori	7386.000	PK	43.4	36.1	4.7	34.3	49.9	73.9	24.0	
Hori	9848.000	PK	43.5	39.1	5.4	34.7	53.3	73.9	20.6	
Hori	2483.500	AV	43.6	28.5	2.4	32.2	42.3	53.9	11.6	
Hori	2487.268	AV	44.4	28.5	2.4	32.2	43.1	53.9	10.8	
Hori	4924.000	AV	37.6	31.5	4.0	34.0	39.1	53.9	14.8	
Hori	7386.000	AV	31.1	36.1	4.7	34.3	37.6	53.9	16.3	
Hori	9848.000	AV	31.5	39.1	5.4	34.7	41.3	53.9	12.6	
Vert	2483.500	PK	54.2	28.5	2.4	32.2	52.9	73.9	21.0	
Vert	2487.762	PK	53.9	28.5	2.4	32.2	52.6	73.9	21.3	
Vert	4924.000	PK	48.6	31.5	4.0	34.0	50.1	73.9	23.8	
Vert	7386.000	PK	42.1	36.1	4.7	34.3	48.6	73.9	25.3	
Vert	9848.000	PK	42.3	39.1	5.4	34.7	52.1	73.9	21.8	
Vert	2483.500	AV	40.9	28.5	2.4	32.2	39.6	53.9	14.3	
Vert	2487.762	AV	42.1	28.5	2.4	32.2	40.8	53.9	13.1	
Vert	4924.000	AV	38.5	31.5	4.0	34.0	40.0	53.9	13.9	
Vert	7386.000	AV	31.1	36.1	4.7	34.3	37.6	53.9	16.3	
Vert	9848.000	AV	31.6	39.1	5.4	34.7	41.4	53.9	12.5	

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).

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

Radiated Spurious Emission [Sleeve antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/27/2012
Temperature/ Humidity : 25 deg. C / 50% RH
Engineer : Satofumi Matsuyama
(Above 1GHz)
Mode : 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	70.9	27.4	2.2	34.8	65.7	73.9	8.2	
Hori	4824.000	PK	44.9	31.3	4.0	34.0	46.2	73.9	27.7	
Hori	2390.000	AV	53.7	27.4	2.2	34.8	48.5	53.9	5.4	
Hori	4824.000	AV	33.2	31.3	4.0	34.0	34.5	53.9	19.4	
Vert	2390.000	PK	71.2	27.4	2.2	34.8	66.0	73.9	7.9	
Vert	4824.000	PK	46.7	31.3	4.0	34.0	48.0	73.9	25.9	
Vert	2390.000	AV	54.0	27.4	2.2	34.8	48.8	53.9	5.1	
Vert	4824.000	AV	35.1	31.3	4.0	34.0	36.4	53.9	17.5	

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

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

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	2412.000	PK	101.3	27.5	2.2	34.8	96.2	-	-	Carrier
Hori	2400.000	PK	70.2	27.5	2.2	34.8	65.1	76.2	11.1	
Vert	2412.000	PK	101.6	27.5	2.2	34.8	96.5	-	-	Carrier
Vert	2400.000	PK	70.9	27.5	2.2	34.8	65.8	76.5	10.7	

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

Radiated Spurious Emission
[Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012
Temperature/ Humidity 25 deg. C / 50% RH
Engineer Satofumi Matsuyama
 (Above 1GHz)
Mode 11g Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	47.8	31.4	3.9	34.0	49.1	73.9	24.8	
Hori	4874.000	AV	36.9	31.4	3.9	34.0	38.2	53.9	15.7	
Vert	4874.000	PK	51.5	31.4	3.9	34.0	52.8	73.9	21.1	
Vert	4874.000	AV	40.4	31.4	3.9	34.0	41.7	53.9	12.2	

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

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

Radiated Spurious Emission
[Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012
Temperature/ Humidity 25 deg. C / 50% RH
Engineer Satofumi Matsuyama
 (Above 1GHz)
Mode 11g Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	70.6	27.5	2.3	34.8	65.6	73.9	8.3	
Hori	4924.000	PK	46.8	31.5	4.0	34.0	48.3	73.9	25.6	
Hori	2483.500	AV	54.5	27.5	2.3	34.8	49.5	53.9	4.4	
Hori	4924.000	AV	34.3	31.5	4.0	34.0	35.8	53.9	18.1	
Vert	2483.500	PK	70.8	27.5	2.3	34.8	65.8	73.9	8.1	
Vert	4924.000	PK	46.1	31.5	4.0	34.0	47.6	73.9	26.3	
Vert	2483.500	AV	54.8	27.5	2.3	34.8	49.8	53.9	4.1	
Vert	4924.000	AV	34.8	31.5	4.0	34.0	36.3	53.9	17.6	

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

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

Radiated Spurious Emission [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012
Temperature/ Humidity 25 deg. C / 50% RH
Engineer Satofumi Matsuyama
Mode 11-20 Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	70.8	27.4	2.2	34.8	65.6	73.9	8.3	
Hori	2390.000	AV	53.4	27.4	2.2	34.8	48.2	53.9	5.7	
Vert	2390.000	PK	71.2	27.4	2.2	34.8	66.0	73.9	7.9	
Vert	2390.000	AV	53.4	27.4	2.2	34.8	48.2	53.9	5.7	

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

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

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	2412.000	PK	100.3	27.5	2.2	34.8	95.2	-	-	Carrier
Hori	2400.000	PK	70.2	27.5	2.2	34.8	65.1	75.2	10.1	
Vert	2412.000	PK	100.0	27.5	2.2	34.8	94.9	-	-	Carrier
Vert	2400.000	PK	69.6	27.5	2.2	34.8	64.5	74.9	10.4	

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

Radiated Spurious Emission
[Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012
Temperature/ Humidity 25 deg. C / 50% RH
Engineer Satofumi Matsuyama
Mode 11n-20 Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	67.9	27.5	2.3	34.8	62.9	73.9	11.0	
Hori	2483.500	AV	52.2	27.5	2.3	34.8	47.2	53.9	6.7	
Vert	2483.500	PK	68.3	27.5	2.3	34.8	63.3	73.9	10.6	
Vert	2483.500	AV	52.5	27.5	2.3	34.8	47.5	53.9	6.4	

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

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/14/2012 06/24/2012
Temperature/ Humidity : 22deg. C / 65% RH 23deg. C / 64% RH
Engineer : Yutaka Yoshida Takeshi Choda
(1-10GHz) (1-10GHz, Above 10GHz)
Mode : 11b Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	55.7	27.4	2.2	34.8	50.5	73.9	23.4	
Hori	4824.000	PK	46.7	31.2	5.1	31.5	51.5	73.9	22.4	
Hori	7236.000	PK	42.9	35.6	5.9	32.5	51.9	73.9	22.0	
Hori	9648.000	PK	44.4	38.3	7.1	32.9	56.9	73.9	17.0	
Hori	24120.000	PK	46.4	38.7	-1.1	32.1	51.9	73.9	22.0	
Hori	2390.000	AV	44.5	27.4	2.2	34.8	39.3	53.9	14.6	
Hori	4824.000	AV	32.0	31.2	5.1	31.5	36.8	53.9	17.1	
Hori	7236.000	AV	30.7	35.6	5.9	32.5	39.7	53.9	14.2	
Hori	9648.000	AV	31.9	38.3	7.1	32.9	44.4	53.9	9.5	
Hori	24120.000	AV	34.2	38.7	-1.1	32.1	39.7	53.9	14.2	
Vert	2390.000	PK	57.0	27.4	2.2	34.8	51.8	73.9	22.1	
Vert	4824.000	PK	41.7	31.2	5.1	31.5	46.5	73.9	27.4	
Vert	7236.000	PK	42.9	35.6	5.9	32.5	51.9	73.9	22.0	
Vert	9648.000	PK	44.2	38.3	7.1	32.9	56.7	73.9	17.2	
Vert	24120.000	PK	46.8	38.7	-1.1	32.1	52.3	73.9	21.6	
Vert	2390.000	AV	44.5	27.4	2.2	34.8	39.3	53.9	14.6	
Vert	4824.000	AV	29.6	31.2	5.1	31.5	34.4	53.9	19.5	
Vert	7236.000	AV	30.7	35.6	5.9	32.5	39.7	53.9	14.2	
Vert	9648.000	AV	31.9	38.3	7.1	32.9	44.4	53.9	9.5	
Vert	24120.000	AV	34.2	38.7	-1.1	32.1	39.7	53.9	14.2	

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	106.8	27.5	2.2	34.8	101.7	-	-	Carrier
Hori	2397.000	PK	69.5	27.5	2.2	34.8	64.4	81.7	17.3	
Hori	2400.000	PK	68.3	27.5	2.2	34.8	63.2	81.7	18.5	
Vert	2412.000	PK	109.4	27.5	2.2	34.8	104.3	-	-	Carrier
Vert	2397.000	PK	73.7	27.5	2.2	34.8	68.6	84.3	15.7	
Vert	2400.000	PK	70.5	27.5	2.2	34.8	65.4	84.3	18.9	

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/14/2012 06/24/2012
Temperature/ Humidity : 22deg. C / 65% RH 23deg. C / 64% RH
Engineer : Yutaka Yoshida Takeshi Choda
 (1-10GHz) (Above 10GHz)
Mode : 11b Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	51.5	31.4	3.9	34.0	52.8	73.9	21.1	
Hori	7311.000	PK	48.5	36.0	4.7	34.2	55.0	73.9	18.9	
Hori	9748.000	PK	47.2	38.9	5.3	34.7	56.7	73.9	17.2	
Hori	24370.000	PK	47.7	38.6	-1.1	32.1	53.1	73.9	20.8	
Hori	4874.000	AV	37.0	31.4	3.9	34.0	38.3	53.9	15.6	
Hori	7311.000	AV	37.5	36.0	4.7	34.2	44.0	53.9	9.9	
Hori	9748.000	AV	35.6	38.9	5.3	34.7	45.1	53.9	8.8	
Hori	24370.000	AV	34.4	38.6	-1.1	32.1	39.8	53.9	14.1	
Vert	4874.000	PK	50.6	31.4	3.9	34.0	51.9	73.9	22.0	
Vert	7311.000	PK	49.4	36.0	4.7	34.2	55.9	73.9	18.0	
Vert	9748.000	PK	48.2	38.9	5.3	34.7	57.7	73.9	16.2	
Vert	24370.000	PK	47.3	38.6	-1.1	32.1	52.7	73.9	21.2	
Vert	4874.000	AV	36.3	31.4	3.9	34.0	37.6	53.9	16.3	
Vert	7311.000	AV	37.4	36.0	4.7	34.2	43.9	53.9	10.0	
Vert	9748.000	AV	36.1	38.9	5.3	34.7	45.6	53.9	8.3	
Vert	24370.000	AV	34.4	38.6	-1.1	32.1	39.8	53.9	14.1	

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

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

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

Radiated Spurious Emission [Embedded antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/14/2012 06/24/2012
Temperature/ Humidity 22deg. C / 65% RH 23deg. C / 64% RH
Engineer Yutaka Yoshida Takeshi Choda
(1-10GHz) (1-10GHz,
Above 10GHz)
Mode 11b Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	62.1	27.5	2.3	34.8	57.1	73.9	16.8	
Hori	2487.500	PK	63.5	27.5	2.3	34.8	58.5	73.9	15.4	
Hori	4924.000	PK	47.9	31.5	5.2	31.5	53.1	73.9	20.8	
Hori	7386.000	PK	42.5	35.8	6.0	32.6	51.7	73.9	22.2	
Hori	9848.000	PK	43.6	38.5	7.5	33.0	56.6	73.9	17.3	
Hori	24620.000	PK	47.1	38.6	-1.0	32.2	52.5	73.9	21.4	
Hori	2483.500	AV	48.7	27.5	2.3	34.8	43.7	53.9	10.2	
Hori	2487.500	AV	48.9	27.5	2.3	34.8	43.9	53.9	10.0	
Hori	4924.000	AV	33.3	31.5	5.2	31.5	38.5	53.9	15.4	
Hori	7386.000	AV	30.5	35.8	6.0	32.6	39.7	53.9	14.2	
Hori	9848.000	AV	31.4	38.5	7.5	33.0	44.4	53.9	9.5	
Hori	24620.000	AV	34.3	38.6	-1.0	32.2	39.7	53.9	14.2	
Vert	2483.500	PK	61.4	27.5	2.3	34.8	56.4	73.9	17.5	
Vert	2487.500	PK	62.9	27.5	2.3	34.8	57.9	73.9	16.0	
Vert	4924.000	PK	44.2	31.5	5.2	31.5	49.4	73.9	24.5	
Vert	7386.000	PK	42.3	35.8	6.0	32.6	51.5	73.9	22.4	
Vert	9848.000	PK	43.7	38.5	7.5	33.0	56.7	73.9	17.2	
Vert	24620.000	PK	47.2	38.6	-1.0	32.2	52.6	73.9	21.3	
Vert	2483.500	AV	48.1	27.5	2.3	34.8	43.1	53.9	10.8	
Vert	2487.500	AV	48.5	27.5	2.3	34.8	43.5	53.9	10.4	
Vert	4924.000	AV	30.6	31.5	5.2	31.5	35.8	53.9	18.1	
Vert	7386.000	AV	30.5	35.8	6.0	32.6	39.7	53.9	14.2	
Vert	9848.000	AV	31.4	38.5	7.5	33.0	44.4	53.9	9.5	
Vert	24620.000	AV	34.3	38.6	-1.0	32.2	39.7	53.9	14.2	

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

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

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/13/2012 06/24/2012
Temperature/ Humidity : 22 deg. C / 65% RH 23deg. C / 64% RH
Engineer : Katsunori Okai Takeshi Choda
(1-10GHz) (1-10GHz,
Above 10GHz)
Mode : 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	74.1	27.4	2.2	34.8	68.9	73.9	5.0	
Hori	4824.000	PK	43.7	31.2	5.1	31.5	48.5	73.9	25.4	
Hori	7236.000	PK	42.6	35.6	5.9	32.5	51.6	73.9	22.3	
Hori	9648.000	PK	44.1	38.3	7.1	32.9	56.6	73.9	17.3	
Hori	24120.000	PK	47.1	38.7	-1.1	32.1	52.6	73.9	21.3	
Hori	2390.000	AV	57.3	27.4	2.2	34.8	52.1	53.9	1.8	
Hori	4824.000	AV	31.8	31.2	5.1	31.5	36.6	53.9	17.3	
Hori	7236.000	AV	30.6	35.6	5.9	32.5	39.6	53.9	14.3	
Hori	9648.000	AV	31.7	38.3	7.1	32.9	44.2	53.9	9.7	
Hori	24120.000	AV	34.2	38.7	-1.1	32.1	39.7	53.9	14.2	
Vert	2390.000	PK	71.1	27.4	2.2	34.8	65.9	73.9	8.0	
Vert	4824.000	PK	42.2	31.2	5.1	31.5	47.0	73.9	26.9	
Vert	7236.000	PK	42.7	35.6	5.9	32.5	51.7	73.9	22.2	
Vert	9648.000	PK	44.2	38.3	7.1	32.9	56.7	73.9	17.2	
Vert	24120.000	PK	46.7	38.7	-1.1	32.1	52.2	73.9	21.7	
Vert	2390.000	AV	54.3	27.4	2.2	34.8	49.1	53.9	4.8	
Vert	4824.000	AV	30.2	31.2	5.1	31.5	35.0	53.9	18.9	
Vert	7236.000	AV	30.6	35.6	5.9	32.5	39.6	53.9	14.3	
Vert	9648.000	AV	31.7	38.3	7.1	32.9	44.2	53.9	9.7	
Vert	24120.000	AV	34.2	38.7	-1.1	32.1	39.7	53.9	14.2	

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	103.8	27.5	2.2	34.8	98.7	-	-	Carrier
Hori	2400.000	PK	74.2	27.5	2.2	34.8	69.1	78.7	9.6	
Vert	2412.000	PK	101.1	27.5	2.2	34.8	96.0	-	-	Carrier
Vert	2400.000	PK	71.0	27.5	2.2	34.8	65.9	76.0	10.1	

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/14/2012 06/24/2012
Temperature/ Humidity : 22deg. C / 65% RH 23deg. C / 64% RH
Engineer : Yutaka Yoshida Takeshi Choda
(1-10GHz) (Above 10GHz)
Mode : 11g Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	53.0	31.4	3.9	34.0	54.3	73.9	19.6	
Hori	7311.000	PK	49.5	36.0	4.7	34.2	56.0	73.9	17.9	
Hori	9748.000	PK	47.2	38.9	5.3	34.7	56.7	73.9	17.2	
Hori	24370.000	PK	47.5	38.6	-1.1	32.1	52.9	73.9	21.0	
Hori	4874.000	AV	39.8	31.4	3.9	34.0	41.1	53.9	12.8	
Hori	7311.000	AV	37.7	36.0	4.7	34.2	44.2	53.9	9.7	
Hori	9748.000	AV	35.7	38.9	5.3	34.7	45.2	53.9	8.7	
Hori	24370.000	AV	34.4	38.6	-1.1	32.1	39.8	53.9	14.1	
Vert	4874.000	PK	50.3	31.4	3.9	34.0	51.6	73.9	22.3	
Vert	7311.000	PK	49.4	36.0	4.7	34.2	55.9	73.9	18.1	
Vert	9748.000	PK	48.4	38.9	5.3	34.7	57.9	73.9	16.0	
Vert	24370.000	PK	47.2	38.6	-1.1	32.1	52.6	73.9	21.3	
Vert	4874.000	AV	38.8	31.4	3.9	34.0	40.1	53.9	13.8	
Vert	7311.000	AV	37.6	36.0	4.7	34.2	44.1	53.9	9.8	
Vert	9748.000	AV	35.7	38.9	5.3	34.7	45.2	53.9	8.7	
Vert	24370.000	AV	34.4	38.6	-1.1	32.1	39.8	53.9	14.1	

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

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

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

Radiated Spurious Emission [Embedded antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/13/2012 06/24/2012
Temperature/ Humidity 22 deg. C / 65% RH 23deg. C / 64% RH
Engineer Katsunori Okai Takeshi Choda
(1-10GHz) (1-10GHz,
Above 10GHz)
Mode 11g Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	73.0	27.5	2.3	34.8	68.0	73.9	5.9	
Hori	4924.000	PK	45.8	31.5	5.2	31.5	51.0	73.9	22.9	
Hori	7386.000	PK	42.6	35.8	6.0	32.6	51.8	73.9	22.1	
Hori	9848.000	PK	42.9	38.5	7.5	33.0	55.9	73.9	18.0	
Hori	24620.000	PK	47.0	38.6	-1.0	32.2	52.4	73.9	21.5	
Hori	2483.500	AV	56.9	27.5	2.3	34.8	51.9	53.9	2.0	
Hori	4924.000	AV	34.6	31.5	5.2	31.5	39.8	53.9	14.1	
Hori	7386.000	AV	30.2	35.8	6.0	32.6	39.4	53.9	14.5	
Hori	9848.000	AV	31.1	38.5	7.5	33.0	44.1	53.9	9.8	
Hori	24620.000	AV	34.3	38.6	-1.0	32.2	39.7	53.9	14.2	
Vert	2483.500	PK	68.5	27.5	2.3	34.8	63.5	73.9	10.4	
Vert	4924.000	PK	42.3	31.5	5.2	31.5	47.5	73.9	26.4	
Vert	7386.000	PK	42.4	35.8	6.0	32.6	51.6	73.9	22.3	
Vert	9848.000	PK	43.1	38.5	7.5	33.0	56.1	73.9	17.8	
Vert	24620.000	PK	47.4	38.6	-1.0	32.2	52.8	73.9	21.1	
Vert	2483.500	AV	52.3	27.5	2.3	34.8	47.3	53.9	6.6	
Vert	4924.000	AV	30.4	31.5	5.2	31.5	35.6	53.9	18.3	
Vert	7386.000	AV	30.2	35.8	6.0	32.6	39.4	53.9	14.5	
Vert	9848.000	AV	31.1	38.5	7.5	33.0	44.1	53.9	9.8	
Vert	24620.000	AV	34.3	38.6	-1.0	32.2	39.7	53.9	14.2	

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

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

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/13/2012
Temperature/ Humidity : 22 deg. C / 65% RH
Engineer : Katsunori Okai
(1-10GHz)
Mode : 11n-20 Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	74.0	27.4	2.2	34.8	68.8	73.9	5.1	
Hori	2390.000	AV	56.7	27.4	2.2	34.8	51.5	53.9	2.4	
Vert	2390.000	PK	70.1	27.4	2.2	34.8	64.9	73.9	9.0	
Vert	2390.000	AV	53.4	27.4	2.2	34.8	48.2	53.9	5.7	

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

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

Distance factor: 10GHz-26.5GHz 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	2412.000	PK	102.0	27.5	2.2	34.8	96.9	-	-	Carrier
Hori	2400.000	PK	72.7	27.5	2.2	34.8	67.6	76.9	9.3	
Vert	2412.000	PK	98.6	27.5	2.2	34.8	93.5	-	-	Carrier
Vert	2400.000	PK	68.2	27.5	2.2	34.8	63.1	73.5	10.4	

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

Radiated Spurious Emission
[Embedded antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/13/2012 06/24/2012
Temperature/ Humidity 22 deg. C / 65% RH 23deg. C / 64% RH
Engineer Katsunori Okai Takeshi Choda
(1-10GHz) (1-10GHz,
Above 10GHz)
Mode 11n-20 Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	72.7	27.5	2.3	34.8	67.7	73.9	6.2	
Hori	2483.500	AV	56.5	27.5	2.3	34.8	51.5	53.9	2.4	
Vert	2483.500	PK	66.8	27.5	2.3	34.8	61.8	73.9	12.1	
Vert	2483.500	AV	51.6	27.5	2.3	34.8	46.6	53.9	7.3	

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).

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

Radiated Spurious Emission [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012 05/08/2012 06/28/2012 06/28/2012
Temperature/ Humidity 25 deg. C / 50% RH 24 deg. C / 57% RH 23 deg. C / 64% RH 24 deg. C / 62% RH
Engineer Satofumi Matsuyama Takeshi Choda Katsunori Okai Satofumi Matsuyama
(10-26.5GHz) (1-10GHz) (1-10GHz, Above 26.5GHz) (Below 1GHz)
Mode 11n-20 Tx 5745MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	179.349	QP	41.1	16.0	8.0	28.1	37.0	43.5	6.5	
Hori	186.794	QP	45.5	16.1	8.1	28.0	41.7	43.5	1.8	
Hori	195.784	QP	41.8	16.2	8.1	28.0	38.1	43.5	5.4	
Hori	312.172	QP	44.2	14.8	8.9	27.7	40.2	46.0	5.8	
Hori	324.498	QP	41.1	15.2	9.0	27.8	37.5	46.0	8.5	
Hori	600.003	QP	36.8	19.8	10.2	28.8	38.0	46.0	8.0	
Hori	4757.957	PK	50.3	31.1	3.2	34.0	50.6	73.9	23.3	
Hori	5589.902	PK	46.2	32.3	3.5	33.8	48.2	73.9	25.7	
Hori	11490.000	PK	45.6	39.9	-1.9	33.8	49.8	73.9	24.1	
Hori	4757.957	AV	43.2	31.1	3.2	34.0	43.5	53.9	10.4	
Hori	5589.902	AV	36.4	32.3	3.5	33.8	38.4	53.9	15.5	
Hori	11490.000	AV	33.2	39.9	-1.9	33.8	37.4	53.9	16.5	
Vert	179.694	QP	32.6	16.0	8.1	28.1	28.6	43.5	14.9	
Vert	186.801	QP	38.6	16.1	8.1	28.0	34.8	43.5	8.7	
Vert	195.742	QP	33.8	16.2	8.1	28.0	30.1	43.5	13.4	
Vert	460.628	QP	38.0	18.0	9.6	28.6	37.0	46.0	9.0	
Vert	467.384	QP	34.1	18.0	9.6	28.6	33.1	46.0	12.9	
Vert	600.001	QP	35.0	19.8	10.2	28.8	36.2	46.0	9.8	
Vert	4758.042	PK	49.8	31.1	3.2	34.0	50.1	73.9	23.8	
Vert	5581.005	PK	49.2	32.3	3.5	33.8	51.2	73.9	22.7	
Vert	11490.000	PK	52.7	39.9	-1.9	33.8	56.9	73.9	17.0	
Vert	4758.042	AV	43.0	31.1	3.2	34.0	43.3	53.9	10.6	
Vert	5581.005	AV	36.0	32.3	3.5	33.8	38.0	53.9	15.9	
Vert	11490.000	AV	39.0	39.9	-1.9	33.8	43.2	53.9	10.7	

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

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

Distance factor: 10GHz-26.5GHz 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	5745.000	PK	94.3	32.2	3.9	31.6	98.8	-	-	Carrier
Hori	5725.000	PK	55.4	32.2	3.9	31.6	59.9	78.8	18.9	
Vert	5745.000	PK	95.0	32.2	3.9	31.6	99.5	-	-	Carrier
Vert	5725.000	PK	57.3	32.2	3.9	31.6	61.8	79.5	17.7	

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

Radiated Spurious Emission [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012 05/08/2012 06/28/2012
Temperature/ Humidity 25 deg. C / 50% RH 24 deg. C / 57% RH 23 deg. C / 64% RH
Engineer Satofumi Matsuyama Takeshi Choda Katsunori Okai
(10-26.5GHz) (1-10GHz) (1-10GHz, Above 26.5GHz)
Mode 11n-20 Tx 5785MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3456.067	PK	47.1	29.3	2.7	34.2	44.9	73.9	29.0	
Hori	4758.043	PK	50.1	31.1	3.2	34.0	50.4	73.9	23.5	
Hori	5410.387	PK	53.4	32.1	3.4	33.8	55.1	73.9	18.8	
Hori	5460.000	PK	53.1	32.1	3.5	33.8	54.9	73.9	19.0	
Hori	11570.000	PK	46.1	39.8	-1.8	33.8	50.3	73.9	23.6	
Hori	3456.067	AV	42.5	29.3	2.7	34.2	40.3	53.9	13.6	
Hori	4758.043	AV	42.6	31.1	3.2	34.0	42.9	53.9	11.0	
Hori	5410.387	AV	41.8	32.1	3.4	33.8	43.5	53.9	10.4	
Hori	5460.000	AV	40.6	32.1	3.5	33.8	42.4	53.9	11.5	
Hori	11570.000	AV	33.8	39.8	-1.8	33.8	38.0	53.9	15.9	
Vert	3456.067	PK	50.4	29.3	2.7	34.2	48.2	73.9	25.7	
Vert	4758.003	PK	49.3	31.1	3.2	34.0	49.6	73.9	24.3	
Vert	5564.371	PK	49.5	32.3	3.5	33.8	51.5	73.9	22.4	
Vert	11570.000	PK	50.3	39.8	-1.8	33.8	54.5	73.9	19.4	
Vert	3456.067	AV	47.4	29.3	2.7	34.2	45.2	53.9	8.7	
Vert	4758.003	AV	42.8	31.1	3.2	34.0	43.1	53.9	10.8	
Vert	5564.371	AV	38.7	32.3	3.5	33.8	40.7	53.9	13.2	
Vert	11570.000	AV	38.4	39.8	-1.8	33.8	42.6	53.9	11.3	

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).

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 [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012 05/08/2012 06/28/2012
Temperature/ Humidity 25 deg. C / 50% RH 24 deg. C / 57% RH 23 deg. C / 64% RH
Engineer Satofumi Matsuyama Takeshi Choda Katsunori Okai
(10-26.5GHz) (1-10GHz) (1-10GHz, Above 26.5GHz)
Mode 11n-20 Tx 5825MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4758.025	PK	50.9	31.1	3.2	34.0	51.2	73.9	22.7	
Hori	5407.222	PK	53.7	32.1	3.4	33.8	55.4	73.9	18.5	
Hori	11650.000	PK	47.7	39.6	-1.8	33.8	51.7	73.9	22.2	
Hori	4758.025	AV	45.5	31.1	3.2	34.0	45.8	53.9	8.1	
Hori	5407.222	AV	41.5	32.1	3.4	33.8	43.2	53.9	10.7	
Hori	11650.000	AV	35.0	39.6	-1.8	33.8	39.0	53.9	14.9	
Vert	4758.058	PK	50.5	31.1	3.2	34.0	50.8	73.9	23.1	
Vert	5537.972	PK	51.3	32.2	3.5	33.8	53.2	73.9	20.7	
Vert	11650.000	PK	51.5	39.6	-1.8	33.8	55.5	73.9	18.4	
Vert	4758.058	AV	43.6	31.1	3.2	34.0	43.9	53.9	10.0	
Vert	5537.972	AV	39.4	32.2	3.5	33.8	41.3	53.9	12.6	
Vert	11650.000	AV	39.0	39.6	-1.8	33.8	43.0	53.9	10.9	

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

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

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

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	5825.000	PK	96.2	32.3	3.9	31.6	100.8	-	-	Carrier
Hori	5850.000	PK	53.0	32.4	3.9	31.6	57.7	80.8	23.1	
Vert	5825.000	PK	94.9	32.3	3.9	31.6	99.5	-	-	Carrier
Vert	5850.000	PK	51.1	32.4	3.9	31.6	55.8	79.5	23.7	

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

Radiated Spurious Emission [Sleeve antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/27/2012 05/08/2012 06/28/2012
Temperature/ Humidity : 25 deg. C / 50% RH 24 deg. C / 57% RH 23 deg. C / 64% RH
Engineer : Satofumi Matsuyama Takeshi Choda Katsunori Okai
(10-26.5GHz) (1-10GHz) (1-10GHz, Above 26.5GHz)
Mode : 11n-40 Tx 5755MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4758.033	PK	52.8	31.1	3.2	34.0	53.1	73.9	20.8	
Hori	5407.222	PK	52.9	32.1	3.4	33.8	54.6	73.9	19.3	
Hori	11510.000	PK	45.1	39.9	-1.9	33.8	49.3	73.9	24.6	
Hori	4758.033	AV	44.9	31.1	3.2	34.0	45.2	53.9	8.7	
Hori	5407.222	AV	41.1	32.1	3.4	33.8	42.8	53.9	11.1	
Hori	11510.000	AV	33.7	39.9	-1.9	33.8	37.9	53.9	16.0	
Vert	4758.045	PK	51.4	31.1	3.2	34.0	51.7	73.9	22.2	
Vert	5537.972	PK	50.6	32.2	3.5	33.8	52.5	73.9	21.4	
Vert	11510.000	PK	49.7	39.9	-1.9	33.8	53.9	73.9	20.0	
Vert	4758.045	AV	43.8	31.1	3.2	34.0	44.1	53.9	9.8	
Vert	5537.972	AV	38.9	32.2	3.5	33.8	40.8	53.9	13.1	
Vert	11510.000	AV	37.5	39.9	-1.9	33.8	41.7	53.9	12.2	

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5755.000	PK	90.0	32.2	3.9	31.6	94.5	-	-	Carrier
Hori	5725.000	PK	53.9	32.2	3.9	31.6	58.4	74.5	16.1	
Vert	5755.000	PK	93.4	32.2	3.9	31.6	97.9	-	-	Carrier
Vert	5725.000	PK	58.2	32.2	3.9	31.6	62.7	77.9	15.2	

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

Radiated Spurious Emission [Sleeve antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/27/2012 05/08/2012 06/28/2012
Temperature/ Humidity 25 deg. C / 50% RH 24 deg. C / 57% RH 23 deg. C / 64% RH
Engineer Satofumi Matsuyama Takeshi Choda Katsunori Okai
(10-26.5GHz) (1-10GHz) (1-10GHz, Above 26.5GHz)
Mode 11n-40 Tx 5795MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4758.002	PK	52.5	31.1	3.2	34.0	52.8	73.9	21.1	
Hori	5428.167	PK	53.1	32.1	3.4	33.8	54.8	73.9	19.1	
Hori	11590.000	PK	47.6	39.8	-1.8	33.8	51.8	73.9	22.1	
Hori	4758.002	AV	45.3	31.1	3.2	34.0	45.6	53.9	8.3	
Hori	5428.167	AV	40.8	32.1	3.4	33.8	42.5	53.9	11.4	
Hori	11590.000	AV	33.7	39.8	-1.8	33.8	37.9	53.9	16.0	
Vert	4758.028	PK	51.5	31.1	3.2	34.0	51.8	73.9	22.1	
Vert	5572.428	PK	49.9	32.3	3.5	33.8	51.9	73.9	22.0	
Vert	11590.000	PK	50.6	39.8	-1.8	33.8	54.8	73.9	19.1	
Vert	4758.028	AV	43.9	31.1	3.2	34.0	44.2	53.9	9.7	
Vert	5572.428	AV	37.9	32.3	3.5	33.8	39.9	53.9	14.0	
Vert	11590.000	AV	37.6	39.8	-1.8	33.8	41.8	53.9	12.1	

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5795.000	PK	90.2	32.3	3.9	31.6	94.8	-	-	Carrier
Hori	5850.000	PK	38.4	32.4	3.9	31.6	43.1	74.8	31.7	
Vert	5795.000	PK	93.5	32.3	3.9	31.6	98.1	-	-	Carrier
Vert	5850.000	PK	44.8	32.4	3.9	31.6	49.5	78.1	28.6	

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

Radiated Spurious Emission [Embedded antenna]

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	32IE0154-HO-01		
Date	06/14/2012	06/26/2012	06/28/2012
Temperature/ Humidity	22deg. C / 65% RH	25 deg. C / 59% RH	24 deg. C / 62% RH
Engineer	Yutaka Yoshida	Satofumi Matsuyama	Satofumi Matsuyama
	(1-10GHz)	(10-26.5GHz)	(Below 1GHz)
Mode	11n-20 Tx 5745MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	179.628	QP	37.1	16.0	8.1	28.1	33.1	43.5	10.4	
Hori	186.794	QP	43.5	16.1	8.1	28.0	39.7	43.5	3.8	
Hori	195.690	QP	38.4	16.2	8.1	28.0	34.7	43.5	8.8	
Hori	312.184	QP	45.1	14.8	8.9	27.7	41.1	46.0	4.9	
Hori	371.447	QP	39.7	16.6	9.3	28.1	37.5	46.0	8.5	
Hori	600.001	QP	34.1	19.8	10.2	28.8	35.3	46.0	10.7	
Hori	11490.000	PK	50.2	39.9	-1.9	33.8	54.4	73.9	19.5	
Hori	11490.000	AV	37.5	39.9	-1.9	33.8	41.7	53.9	12.2	
Vert	179.689	QP	30.5	16.0	8.1	28.1	26.5	43.5	17.0	
Vert	186.784	QP	37.0	16.1	8.1	28.0	33.2	43.5	10.3	
Vert	195.618	QP	32.7	16.2	8.1	28.0	29.0	43.5	14.5	
Vert	460.608	QP	39.0	18.0	9.6	28.6	38.0	46.0	8.0	
Vert	467.112	QP	34.7	18.0	9.6	28.6	33.7	46.0	12.3	
Vert	600.001	QP	34.6	19.8	10.2	28.8	35.8	46.0	10.2	
Vert	11490.000	PK	55.1	39.9	-1.9	33.8	59.3	73.9	14.6	
Vert	11490.000	AV	41.5	39.9	-1.9	33.8	45.7	53.9	8.2	

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5745.000	PK	100.1	32.5	3.5	33.9	102.2	-	-	Carrier
Hori	5724.750	PK	63.9	32.4	3.5	33.8	66.0	82.2	16.2	
Hori	5725.000	PK	63.3	32.4	3.5	33.8	65.4	82.2	16.8	
Vert	5745.000	PK	96.0	32.5	3.5	33.9	98.1	-	-	Carrier
Vert	5724.800	PK	58.1	32.4	3.5	33.8	60.2	78.1	17.9	
Vert	5725.000	PK	55.8	32.4	3.5	33.8	57.9	78.1	20.2	

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

Radiated Spurious Emission
[Embedded antenna]

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32IE0154-HO-01
Date 06/15/2012 06/26/2012
Temperature/ Humidity 23deg. C / 60% RH 25 deg. C / 59% H
Engineer Yutaka Yoshida Satofumi Matsuyama
(10-18GHz) (1-10GHz,18-26.5GHz)
Mode 11n-20 Tx 5785MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11570.000	PK	50.4	39.8	-2.7	33.8	53.7	73.9	20.2	
Hori	11570.000	AV	37.8	39.8	-2.7	33.8	41.1	53.9	12.8	
Vert	11570.000	PK	55.3	39.8	-2.7	33.8	58.6	73.9	15.3	
Vert	11570.000	AV	42.2	39.8	-2.7	33.8	45.5	53.9	8.4	

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

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

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 [Embedded antenna]

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32IE0154-HO-01	
Date	06/26/2012	06/26/2012
Temperature/ Humidity	23deg. C / 60% RH	25 deg. C / 59% RH
Engineer	Yutaka Yoshida	Satofumi Matsuyama
	(1-10GHz)	(10-26.5GHz)
Mode	11n-40 Tx 5755MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11510.000	PK	48.8	39.9	-1.9	33.8	53.0	73.9	20.9	
Hori	11510.000	AV	35.9	39.9	-1.9	33.8	40.1	53.9	13.8	
Vert	11510.000	PK	53.2	39.9	-1.9	33.8	57.4	73.9	16.5	
Vert	11510.000	AV	39.7	39.9	-1.9	33.8	43.9	53.9	10.0	

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

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

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

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	5755.000	PK	94.8	32.5	3.5	33.9	96.9	-	-	Carrier
Hori	5722.300	PK	61.9	32.4	3.5	33.8	64.0	76.9	12.9	
Hori	5725.000	PK	60.1	32.4	3.5	33.8	62.2	76.9	14.7	
Vert	5755.000	PK	96.5	32.5	3.5	33.9	98.6	-	-	Carrier
Vert	5722.367	PK	64.0	32.4	3.5	33.8	66.1	78.6	12.5	
Vert	5725.000	PK	61.4	32.4	3.5	33.8	63.5	78.6	15.1	

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

Radiated Spurious Emission [Embedded antenna]

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32IE0154-HO-01
Date : 06/15/2012 06/26/2012
Temperature/ Humidity : 23deg. C / 60% 25 deg. C / 59% RH
Engineer : Yutaka Yoshida Satofumi Matsuyama
(1-10GHz) (10-26.5GHz)
Mode : 11n-40 Tx 5795MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11590.000	PK	47.0	39.8	-1.8	33.8	51.2	73.9	22.7	
Hori	11590.000	AV	34.7	39.8	-1.8	33.8	38.9	53.9	15.0	
Vert	11590.000	PK	51.6	39.8	-1.8	33.8	55.8	73.9	18.1	
Vert	11590.000	AV	37.6	39.8	-1.8	33.8	41.8	53.9	12.1	

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

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

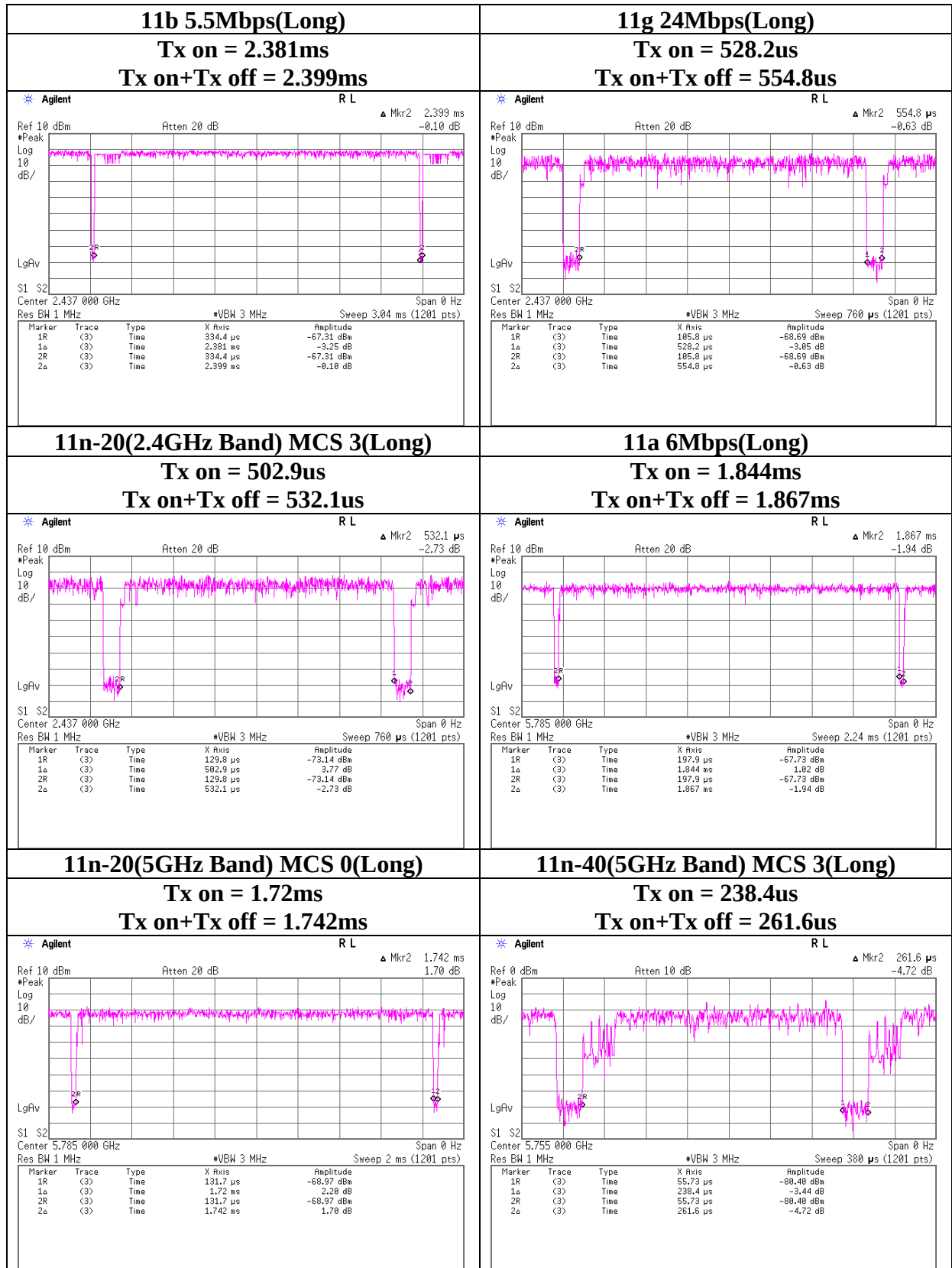
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5795.000	PK	96.5	32.5	3.6	33.9	98.7	-	-	Carrier
Hori	5850.000	PK	46.6	32.6	3.6	33.9	48.9	78.7	29.8	
Hori	5850.224	PK	46.5	32.6	3.6	33.9	48.8	78.7	29.9	
Vert	5795.000	PK	95.2	32.5	3.6	33.9	97.4	-	-	Carrier
Vert	5850.000	PK	45.6	32.6	3.6	33.9	47.9	77.4	29.5	
Vert	5850.250	PK	46.1	32.6	3.6	33.9	48.4	77.4	29.0	

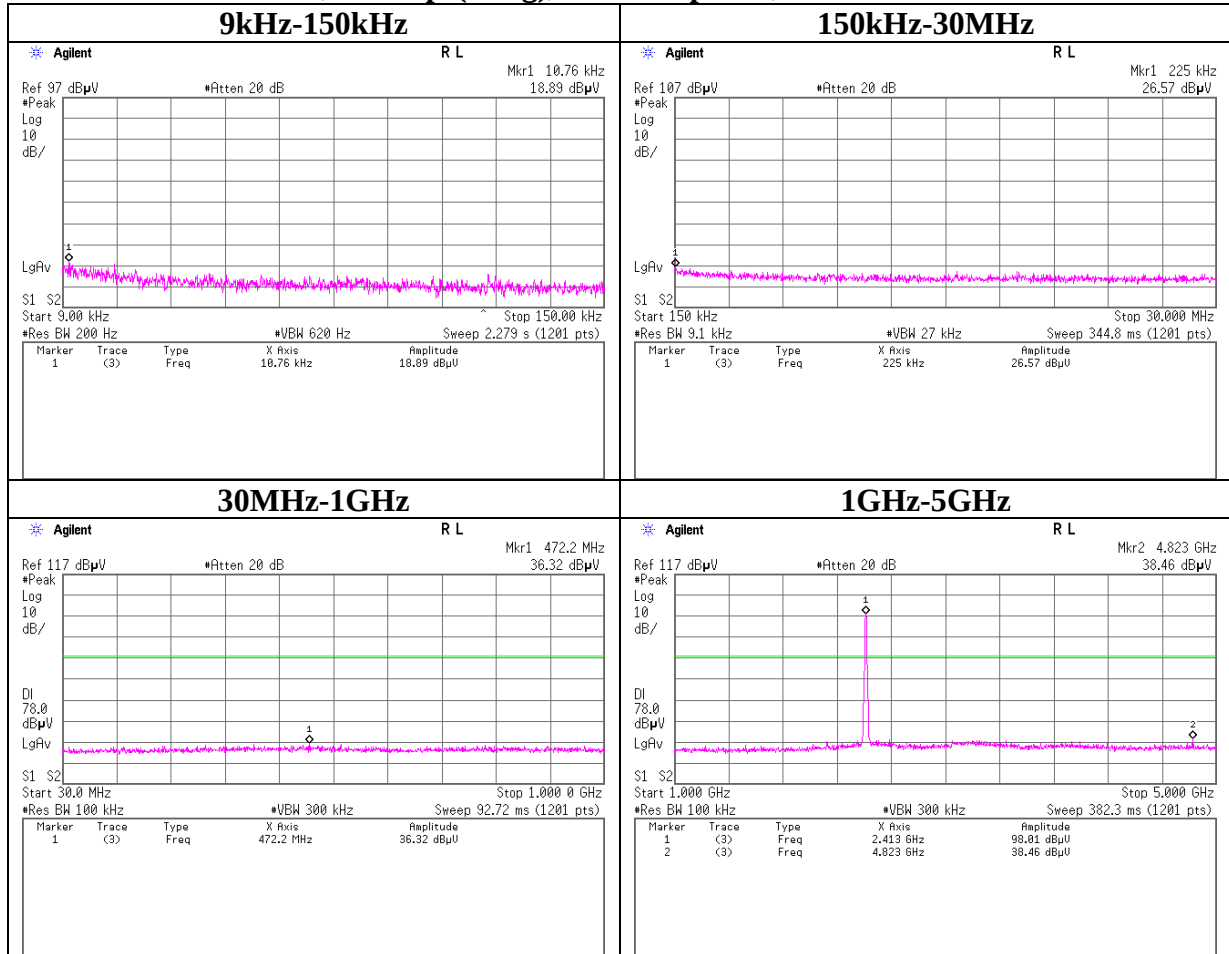
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

The Tested Burst Timing



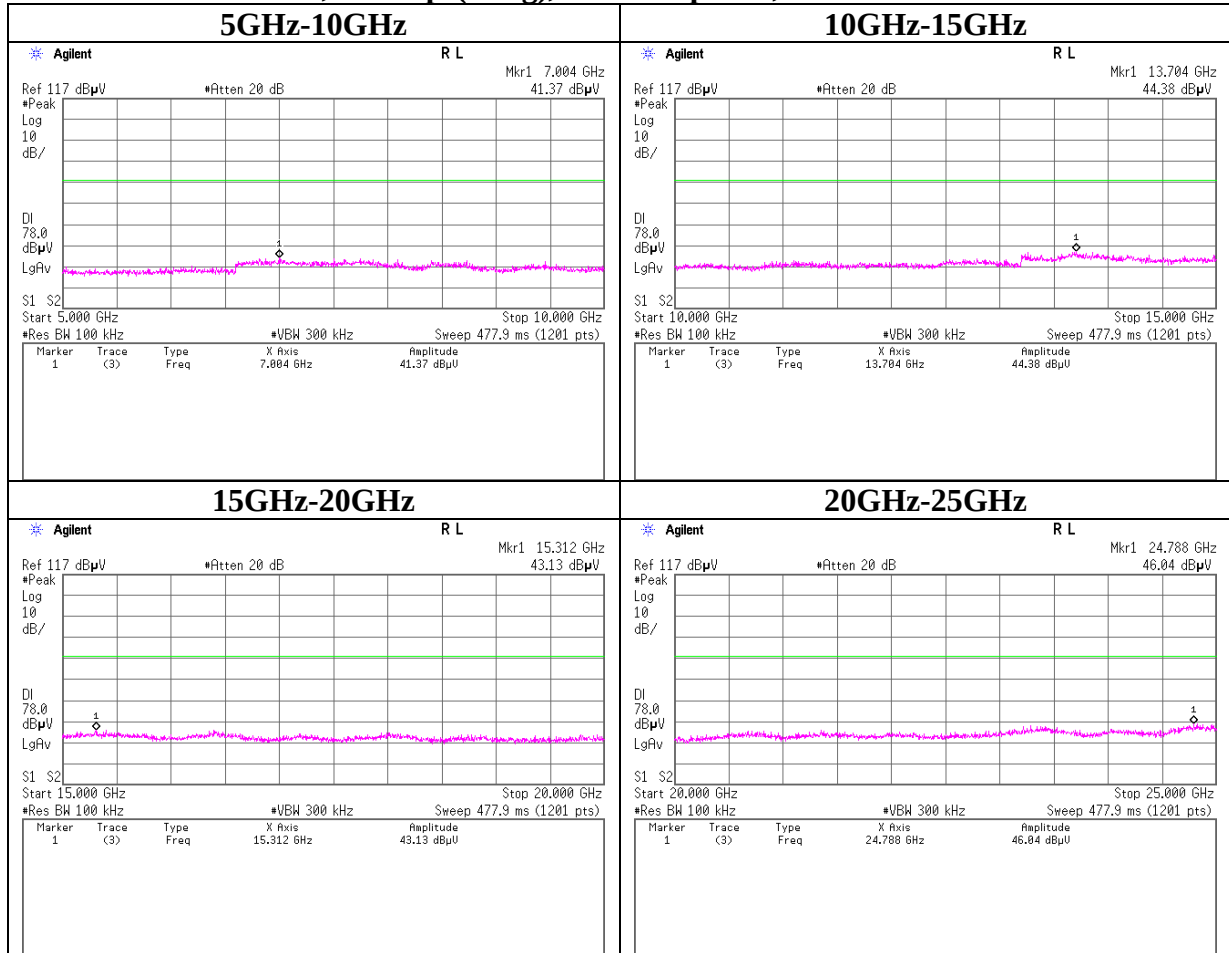
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2412MHz



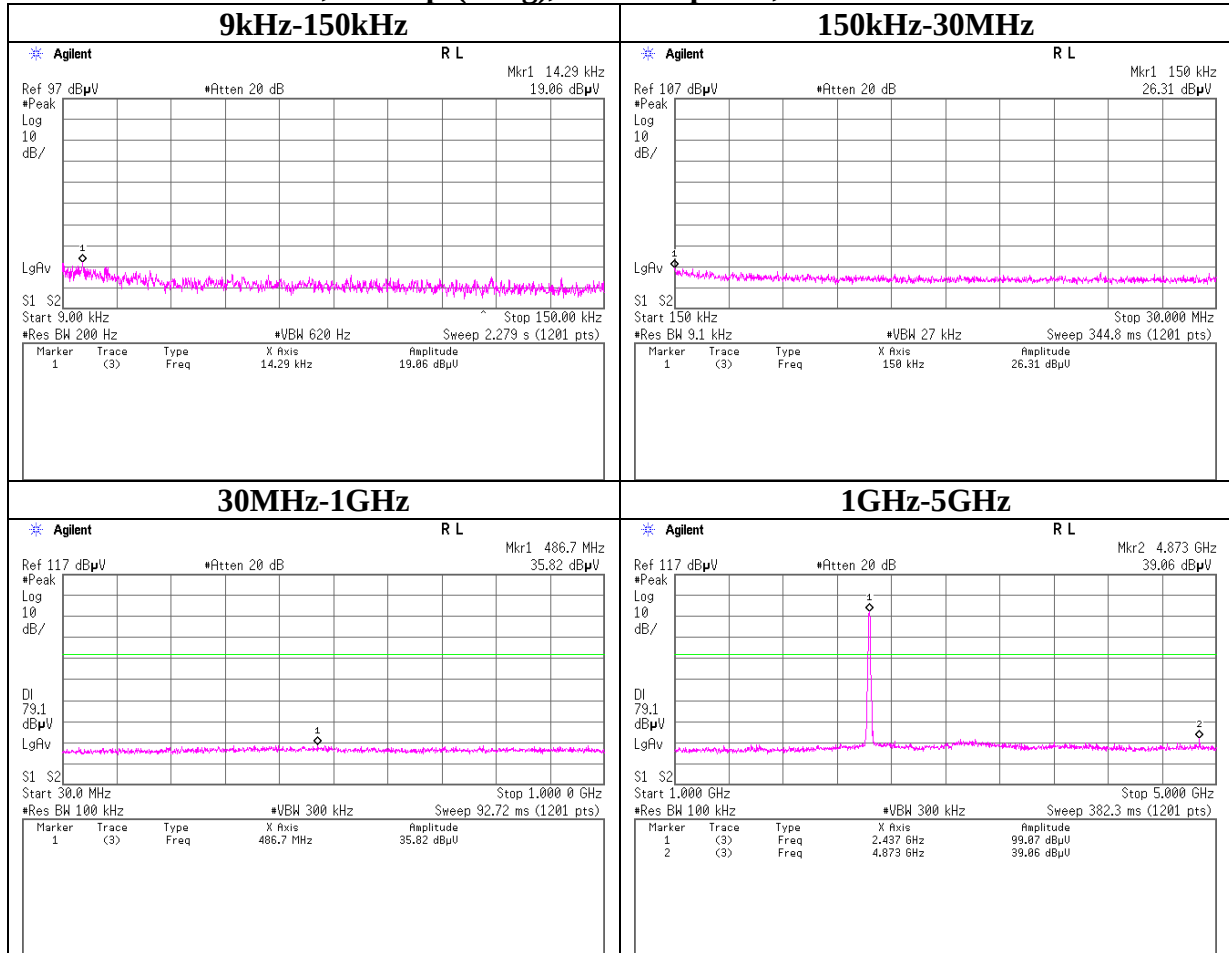
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2412MHz



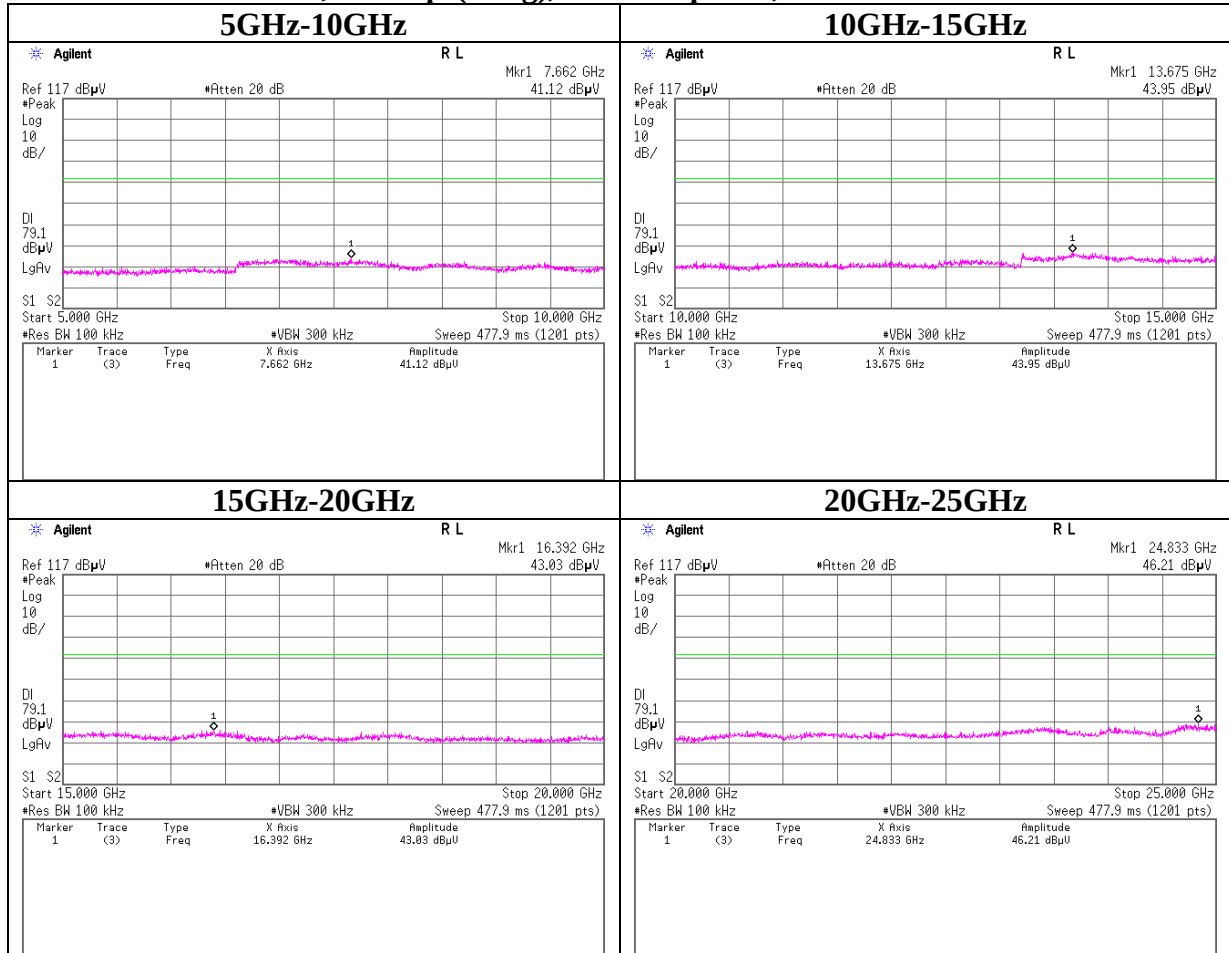
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2437MHz



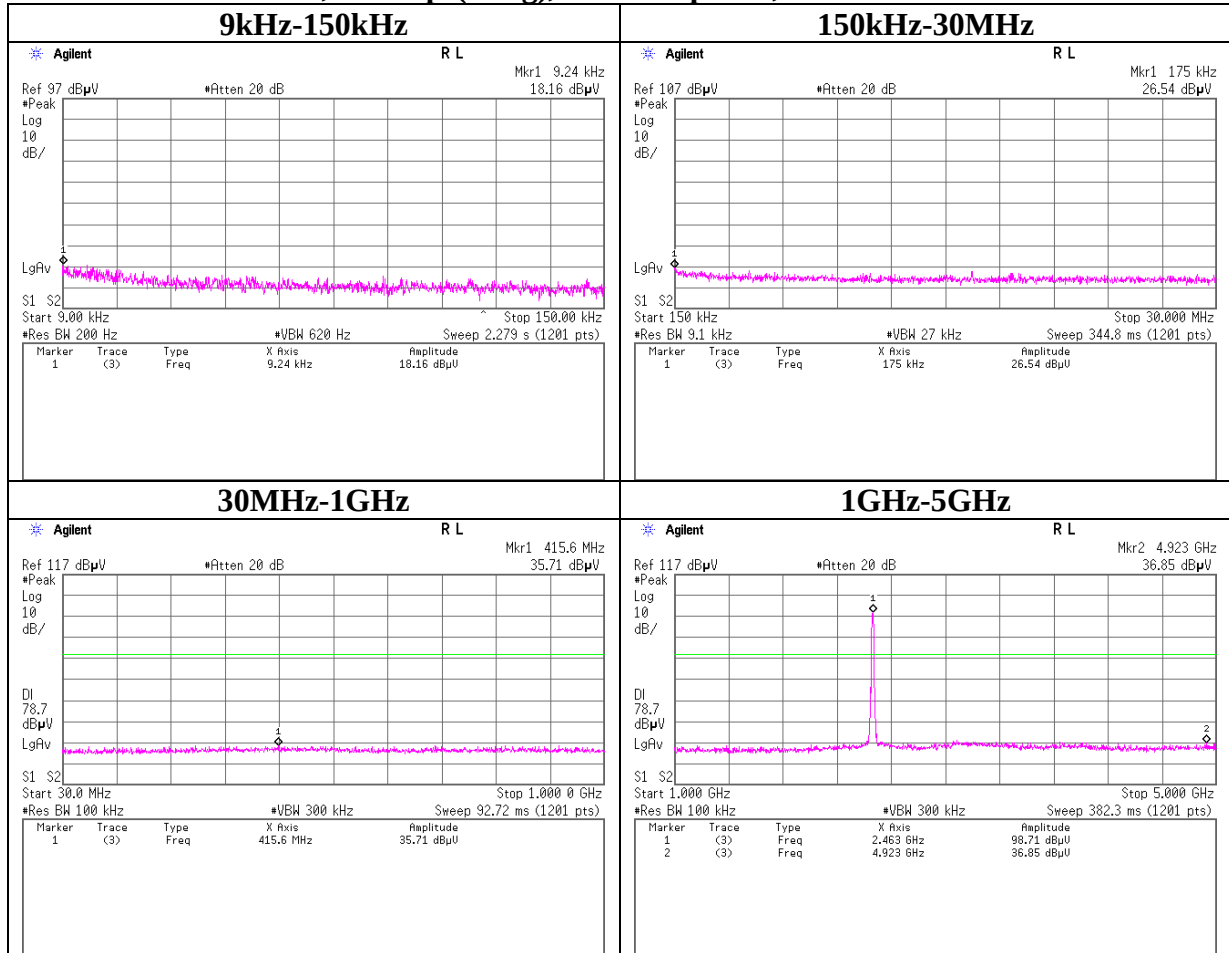
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2437MHz



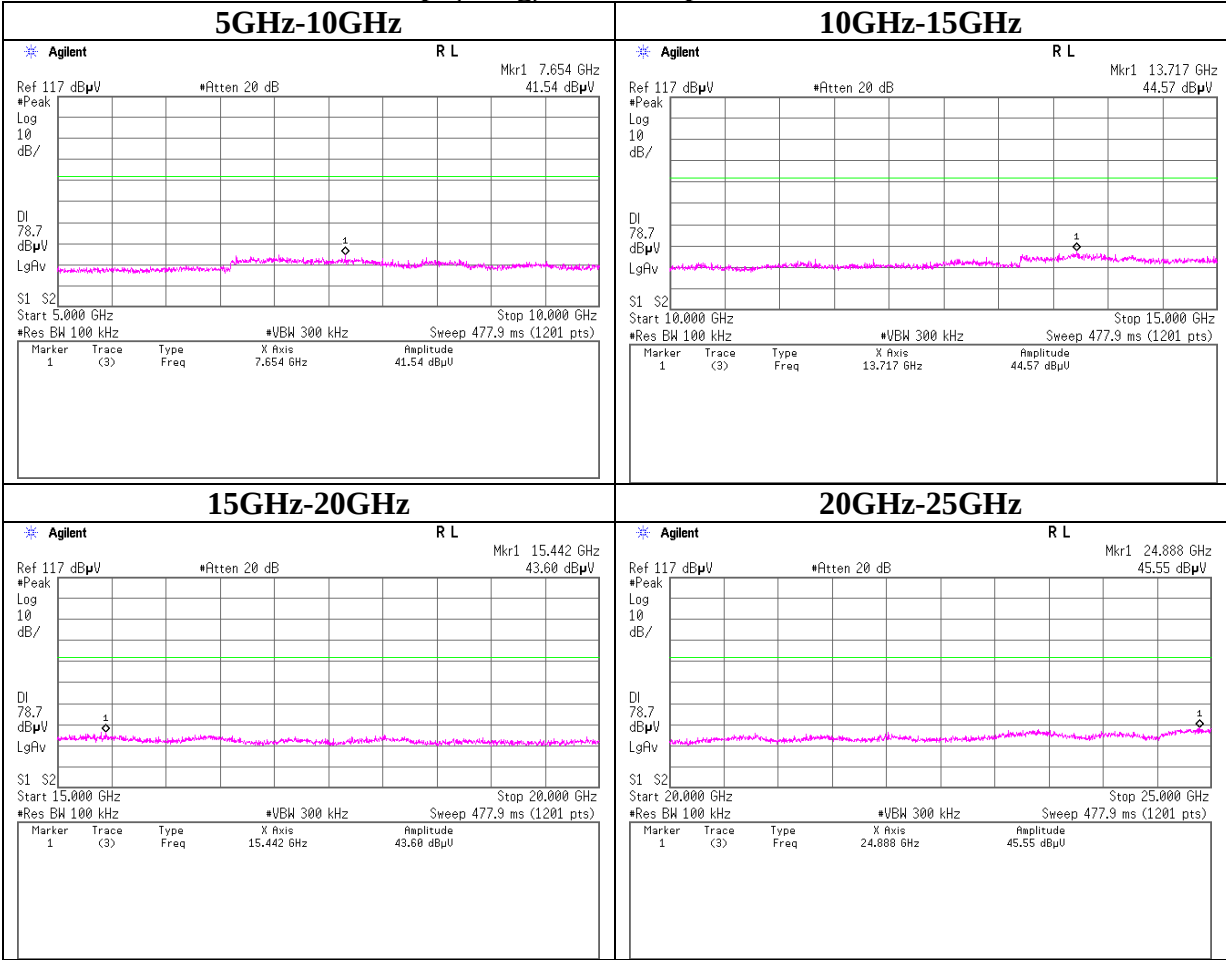
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2462MHz



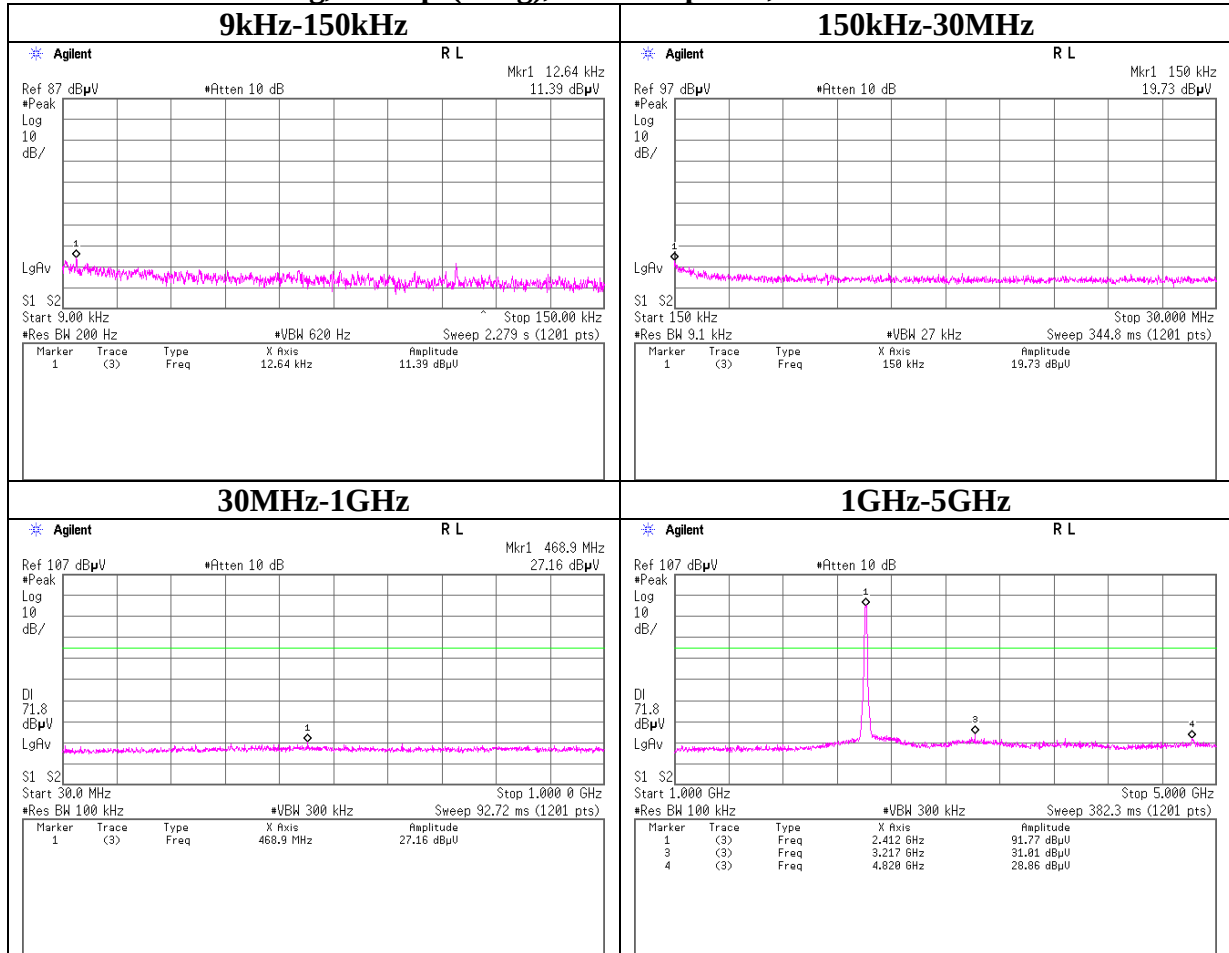
Conducted Spurious Emission

11b, 5.5Mbps(Long), Antenna port 1, Tx 2462MHz



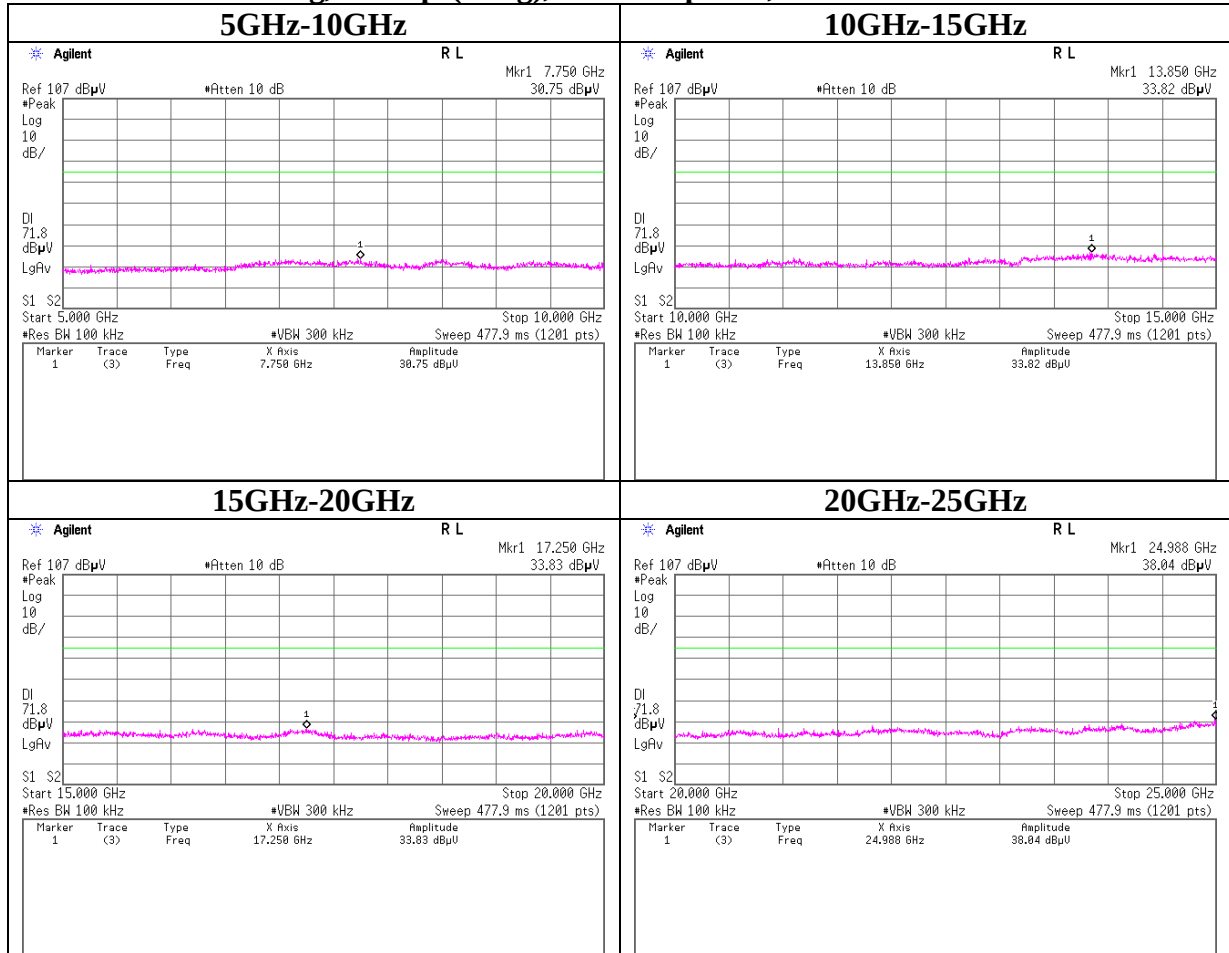
Conducted Spurious Emission

11g, 24Mbps(Long), Antenna port 1, Tx 2412MHz



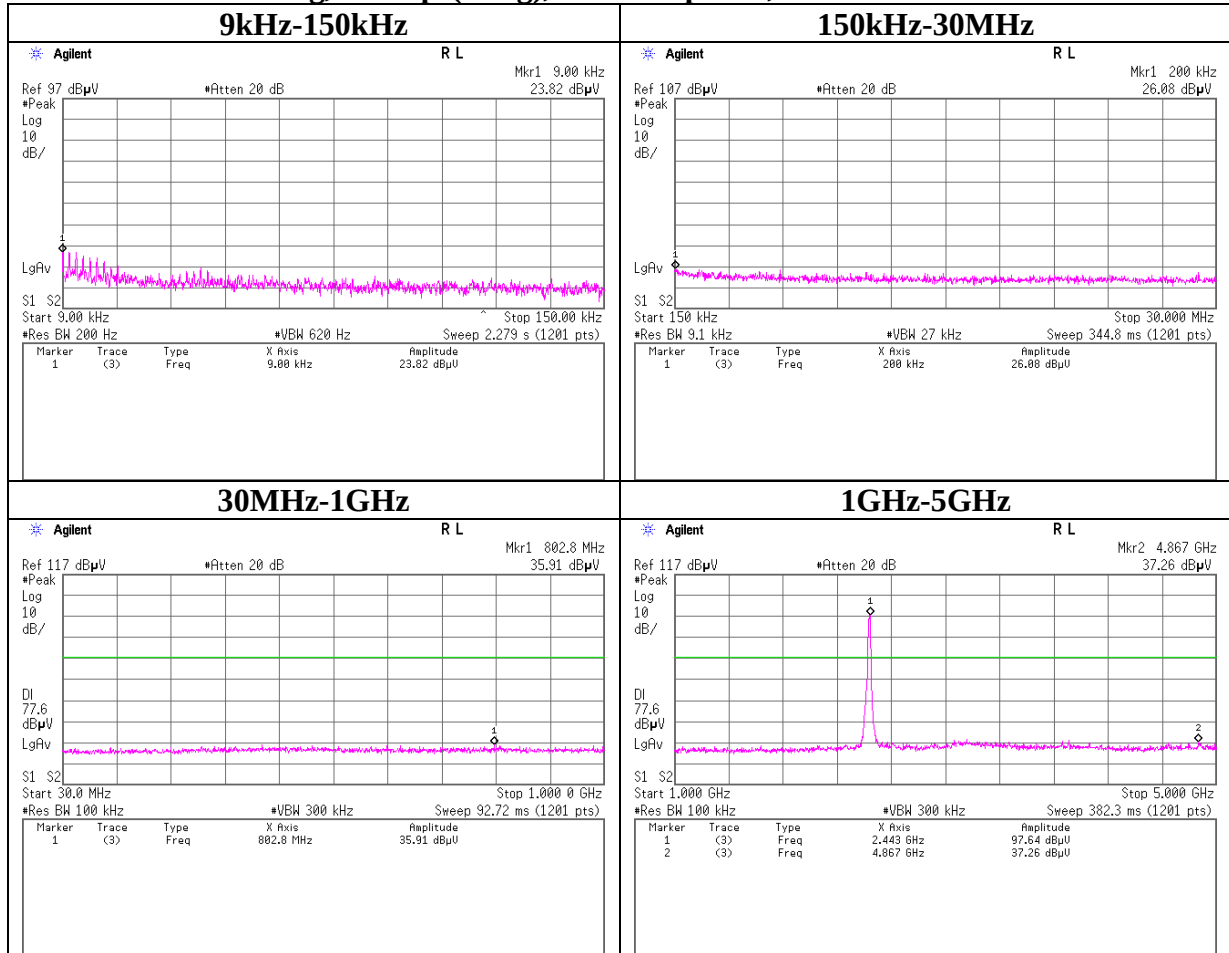
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11g, 24Mbps(Long), Antenna port 1, Tx 2412MHz



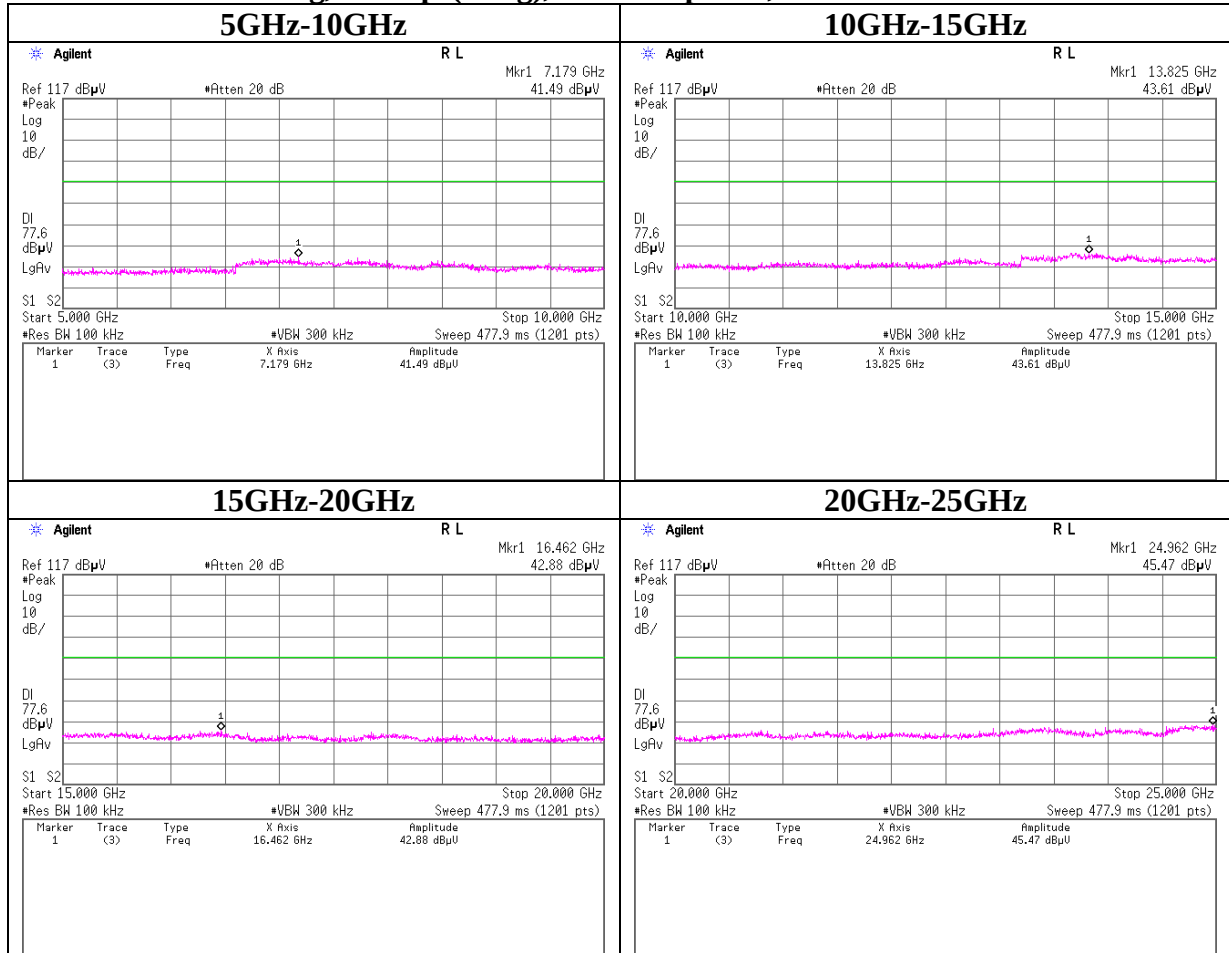
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11g, 24Mbps(Long), Antenna port 1, Tx 2437MHz



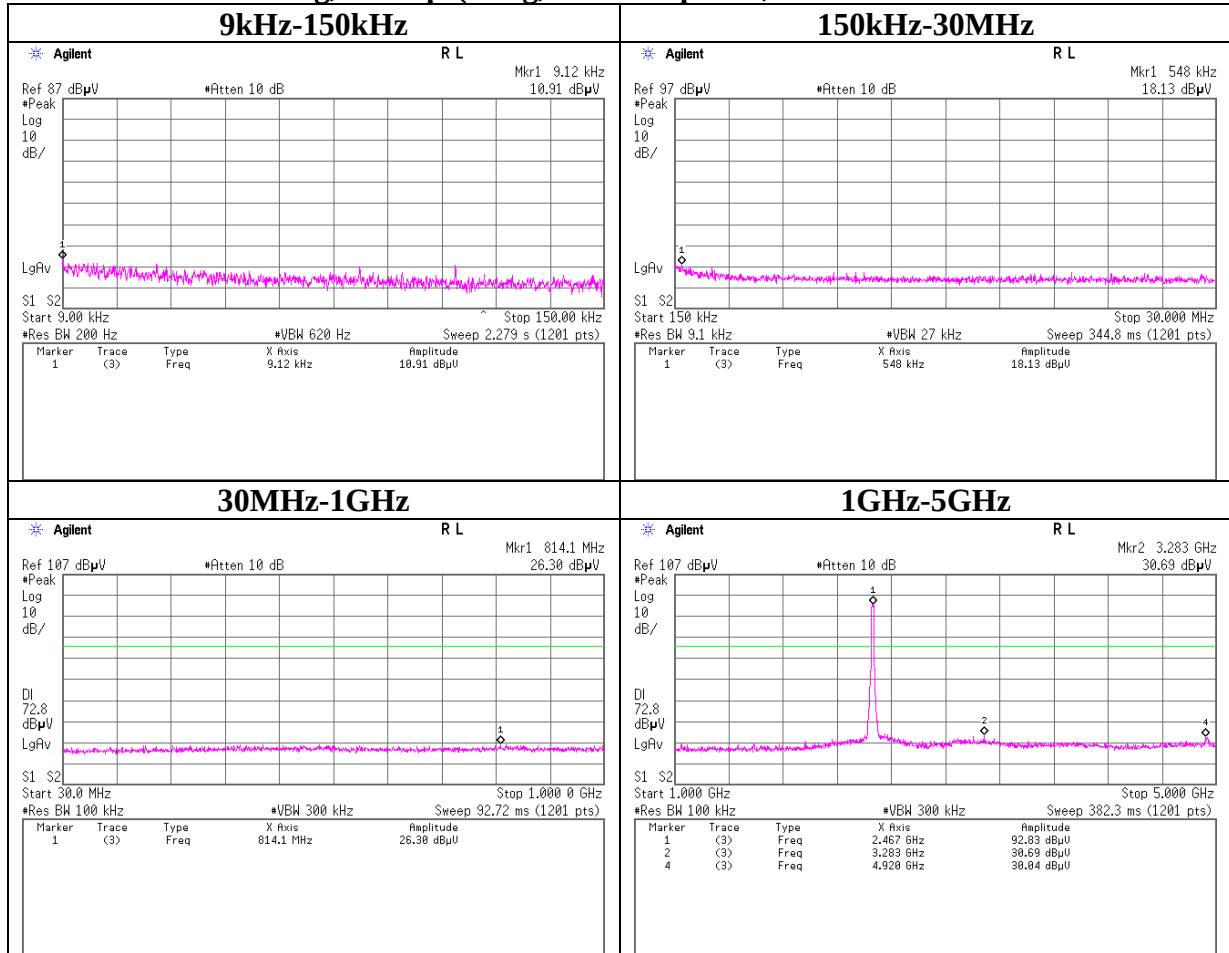
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11g, 24Mbps(Long), Antenna port 1, Tx 2437MHz



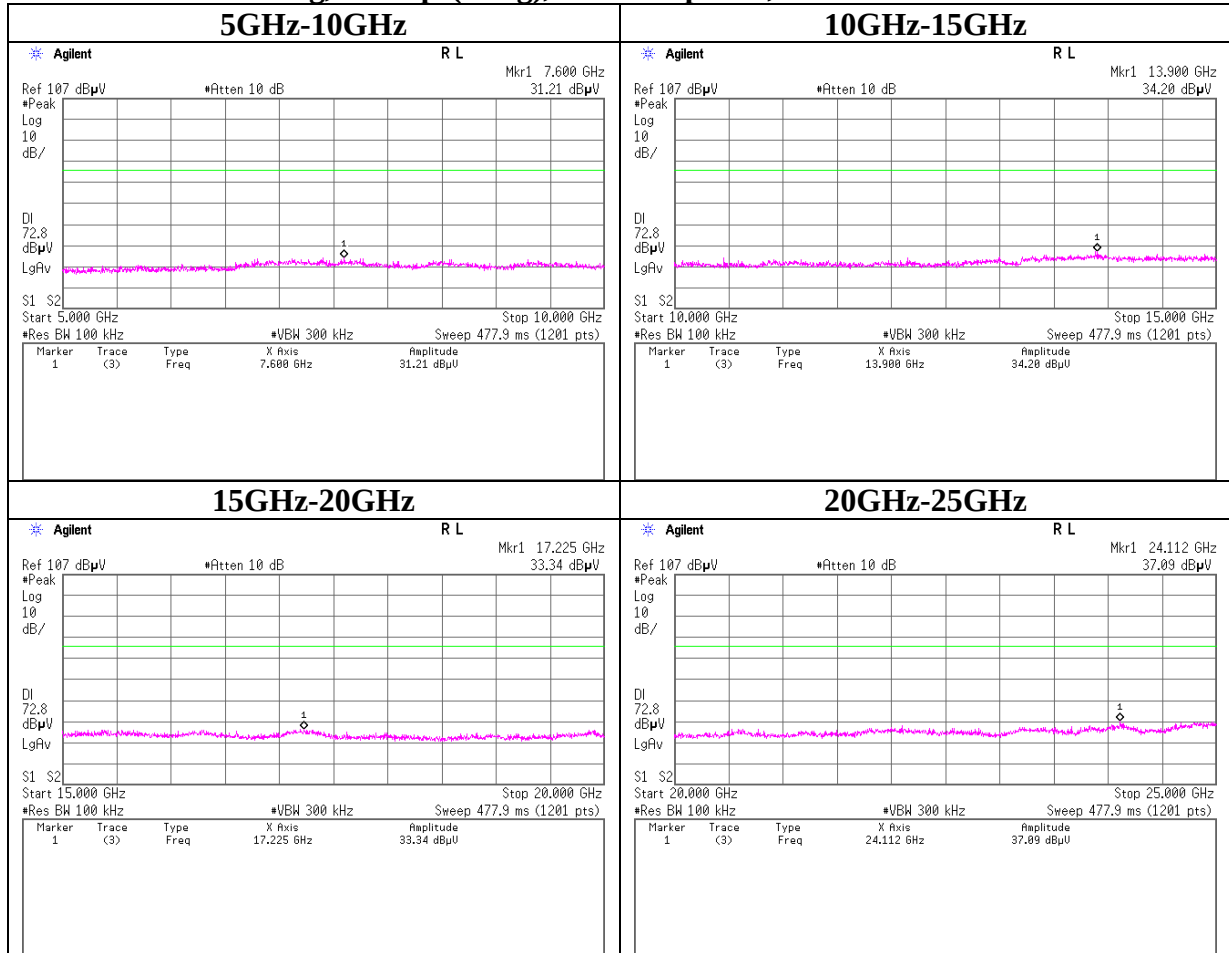
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11g, 24Mbps(Long, Antenna port 1, Tx 2462MHz



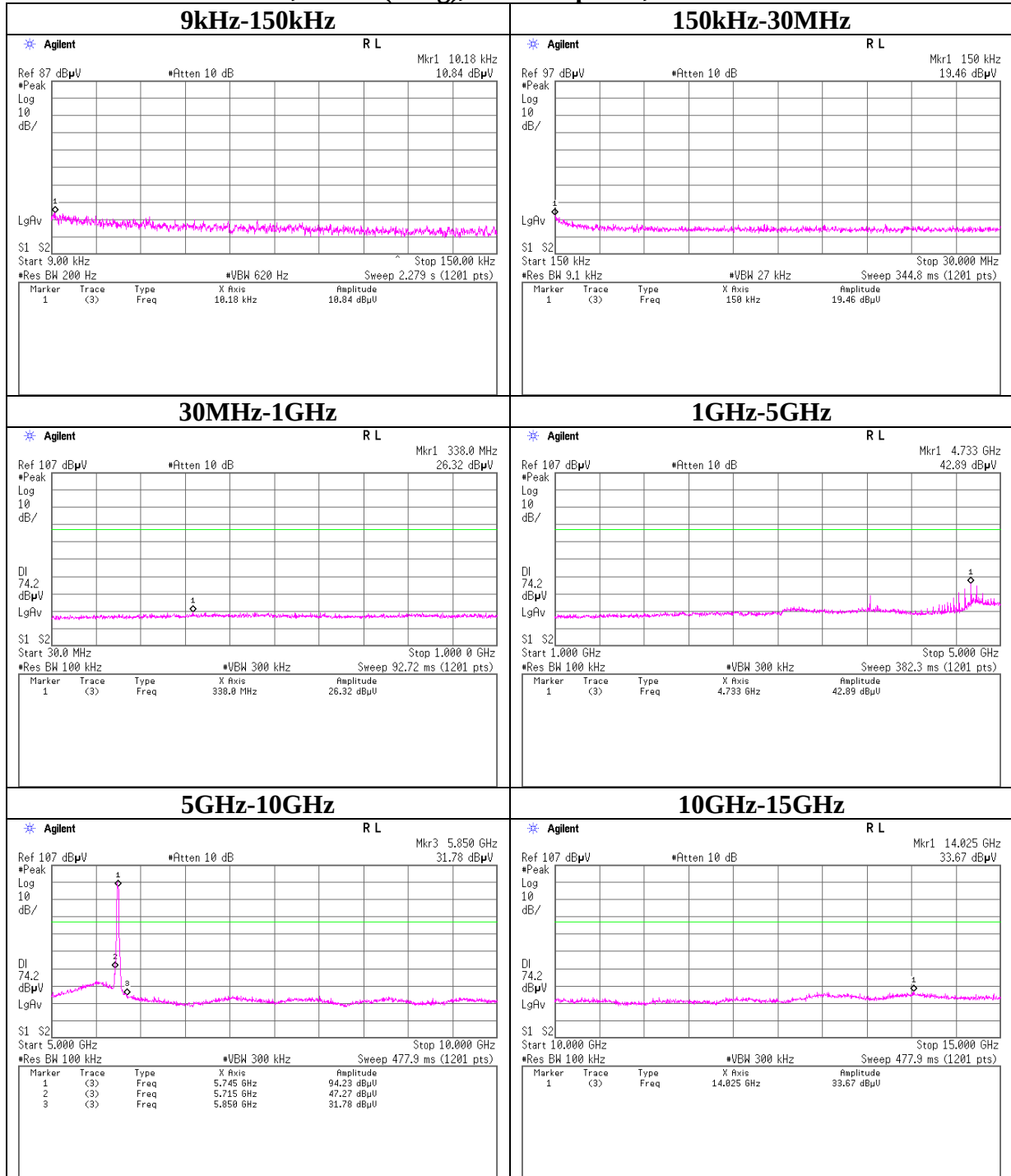
Conducted Spurious Emission

11g, 24Mbps(Long), Antenna port 1, Tx 2462MHz



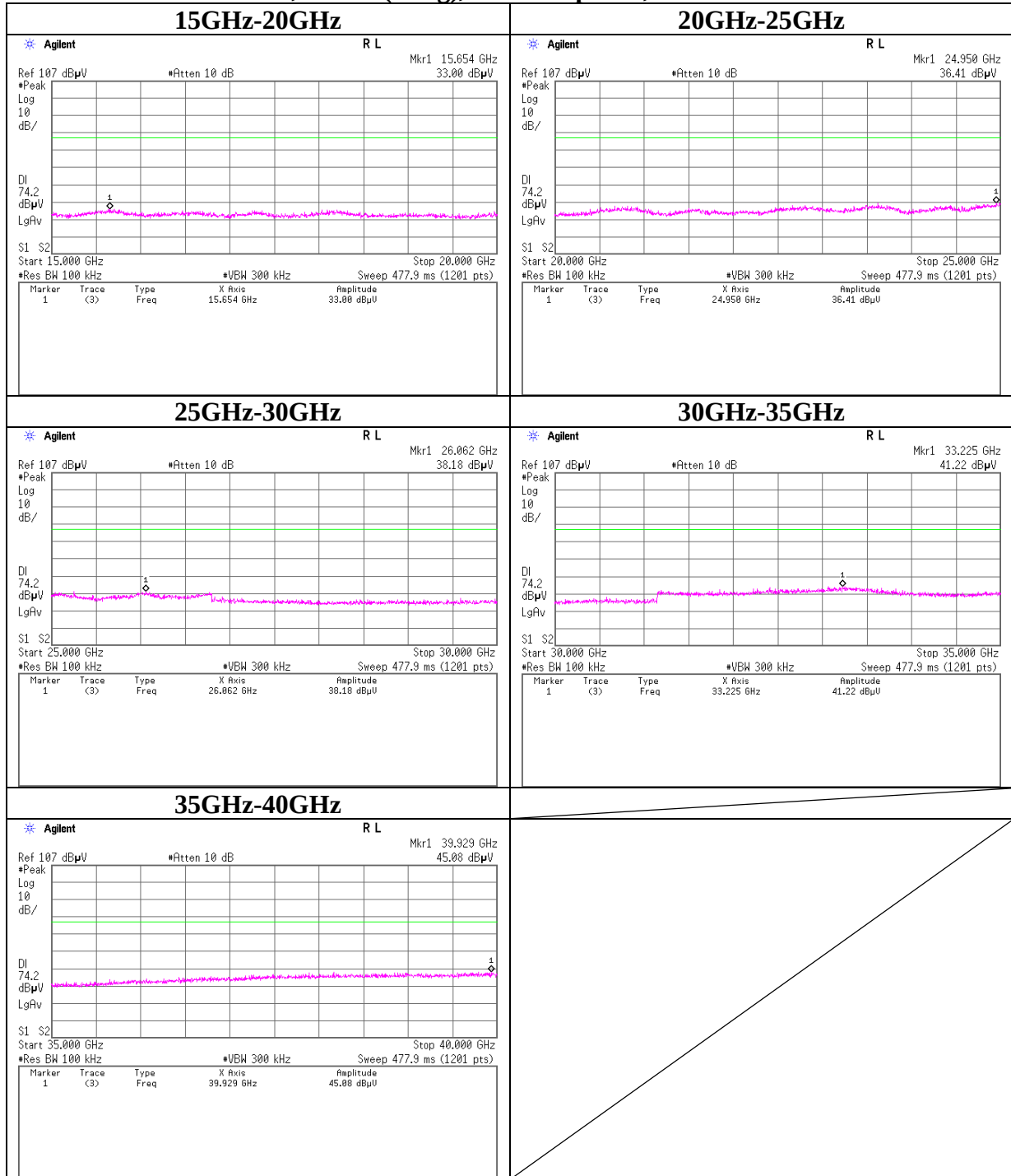
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5745MHz



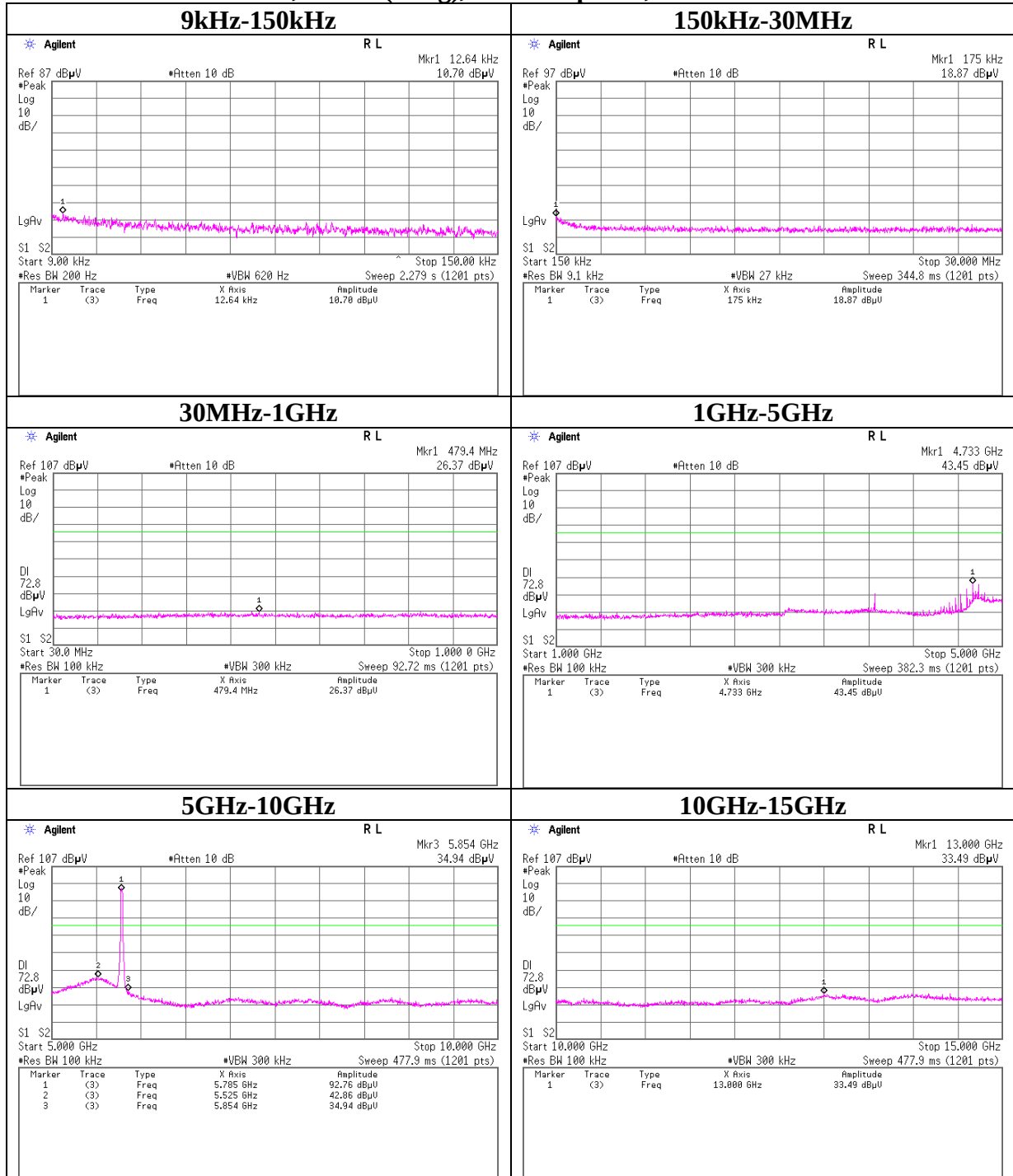
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5745MHz



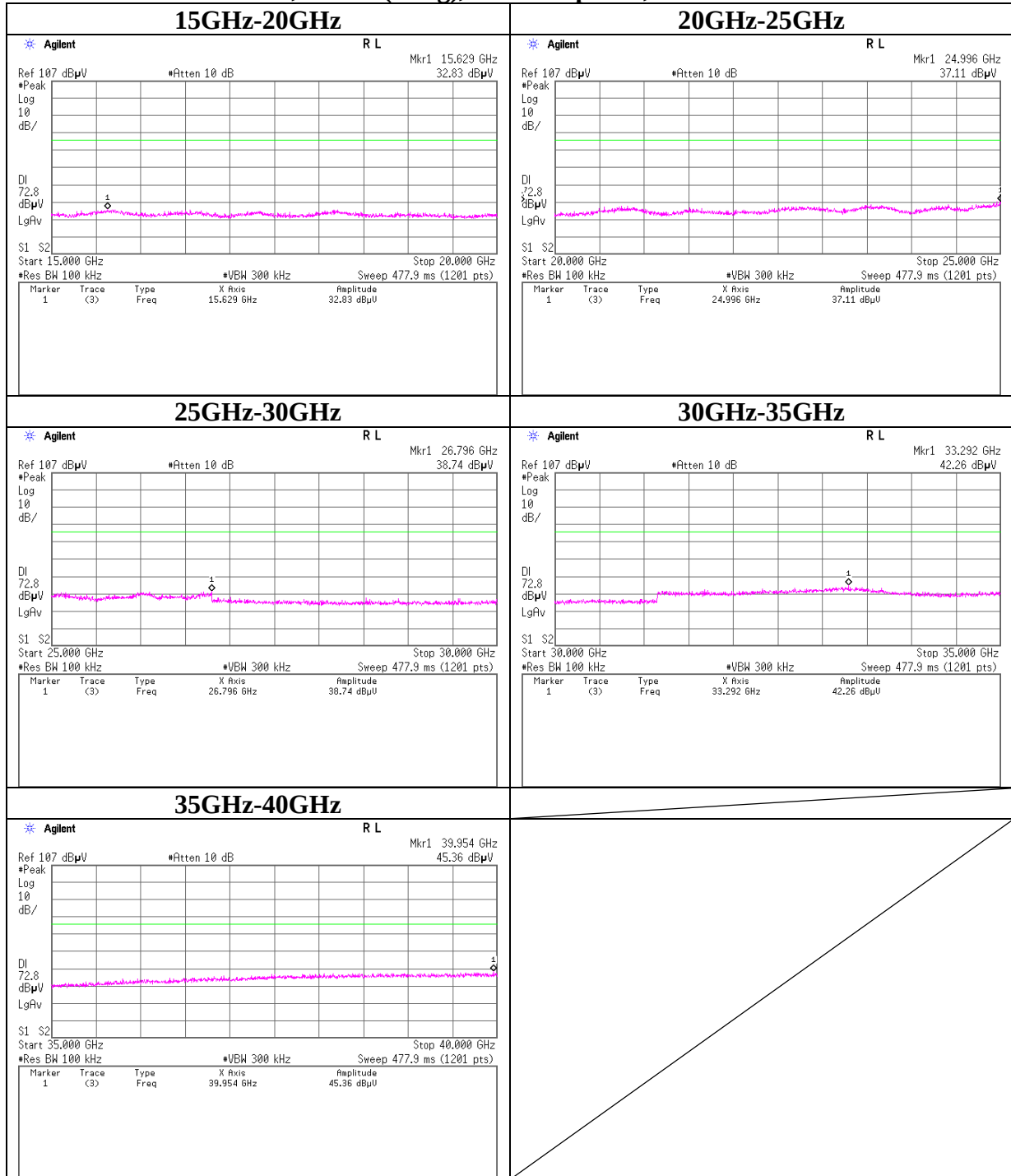
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5785MHz



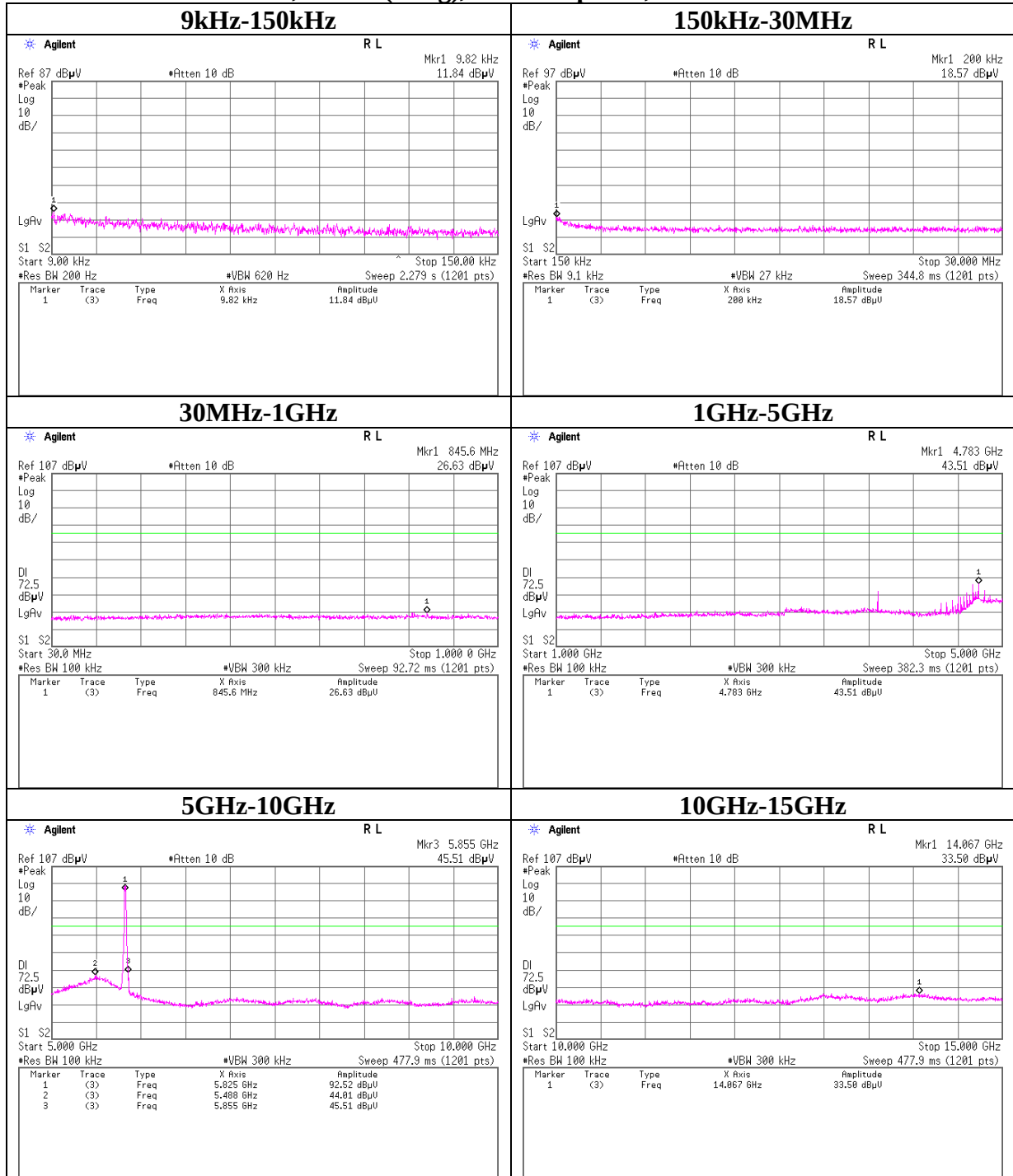
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5785MHz



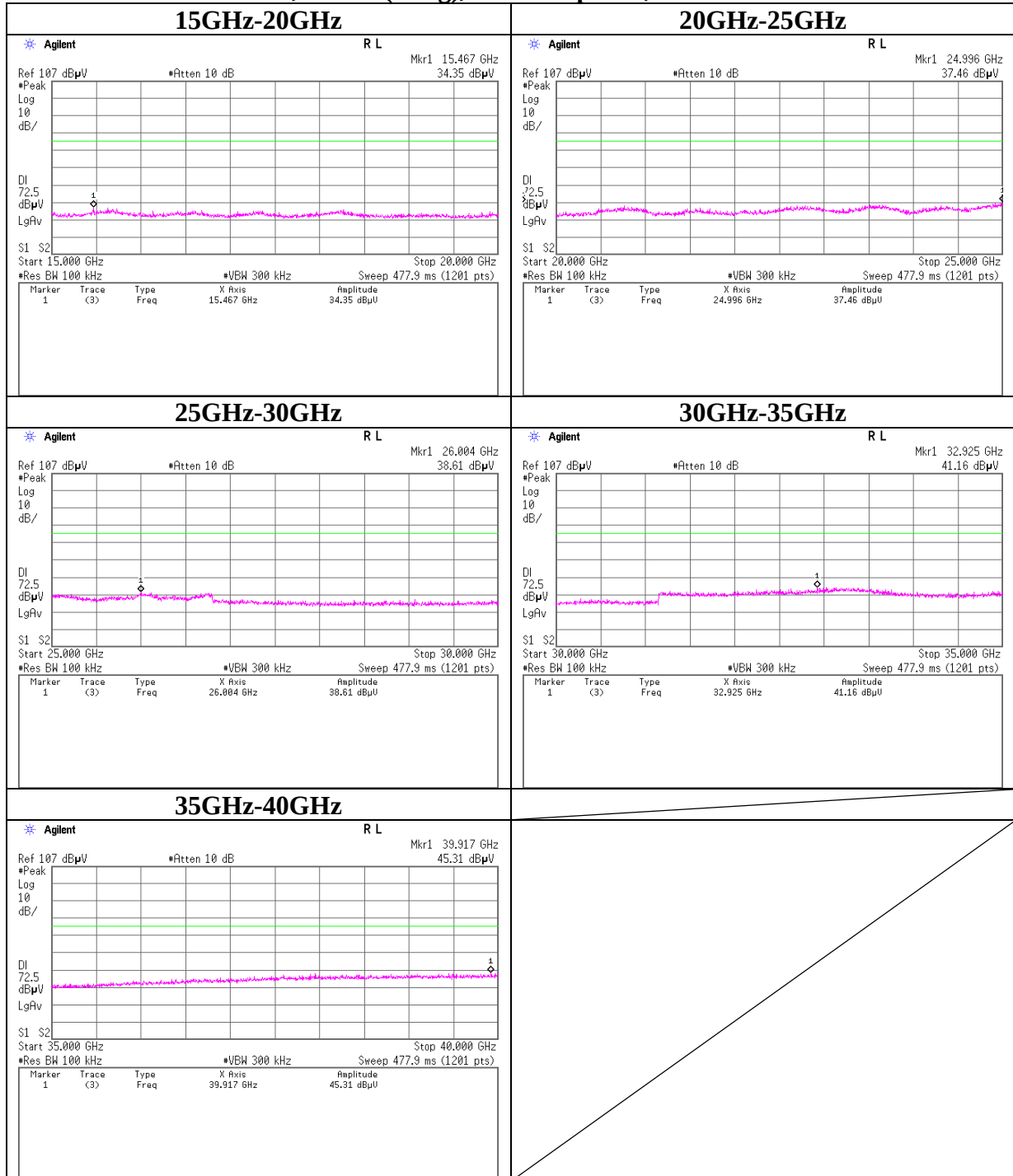
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5825MHz



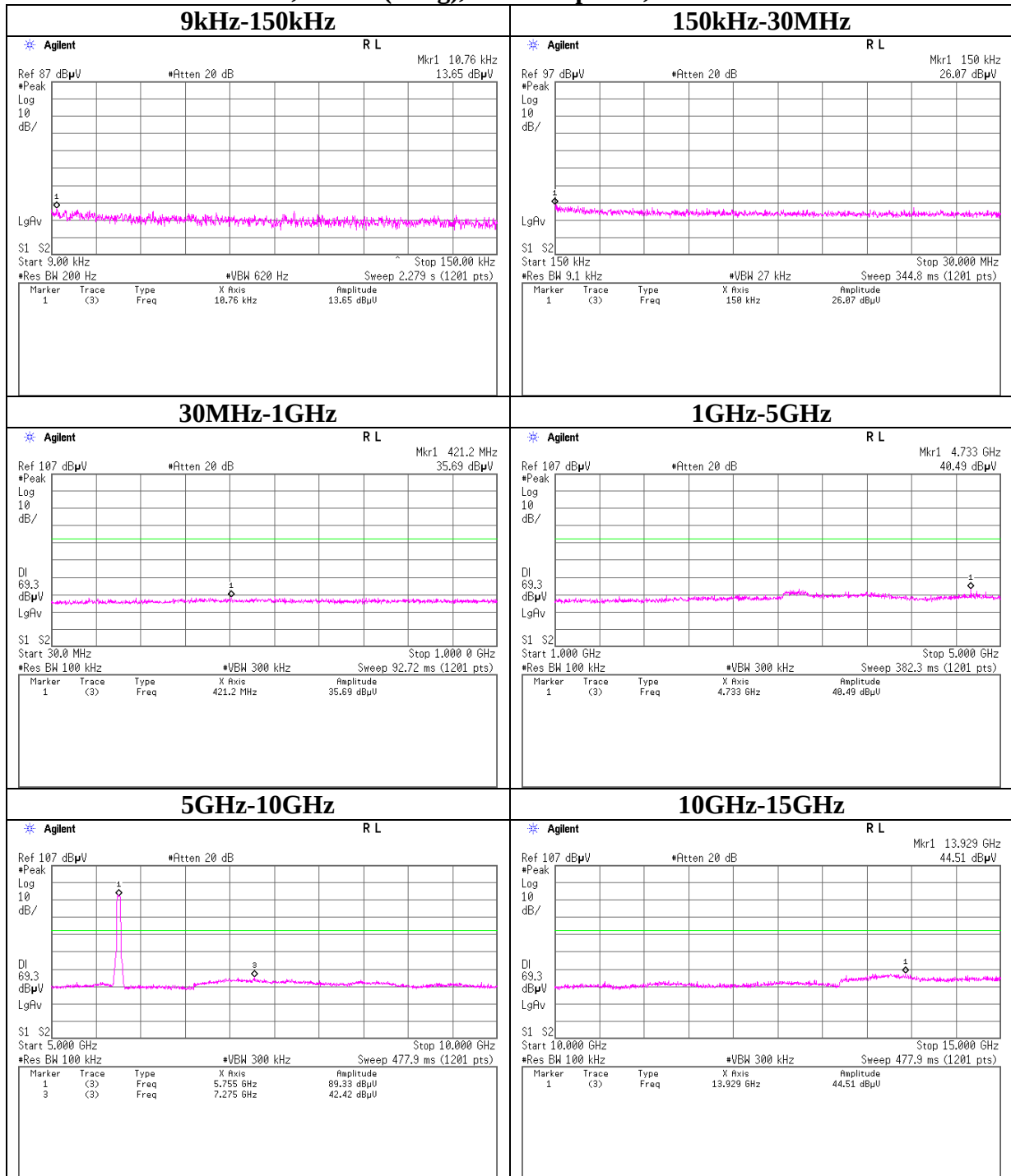
Conducted Spurious Emission

11n-20, MCS 0(Long), Antenna port 2, Tx 5825MHz



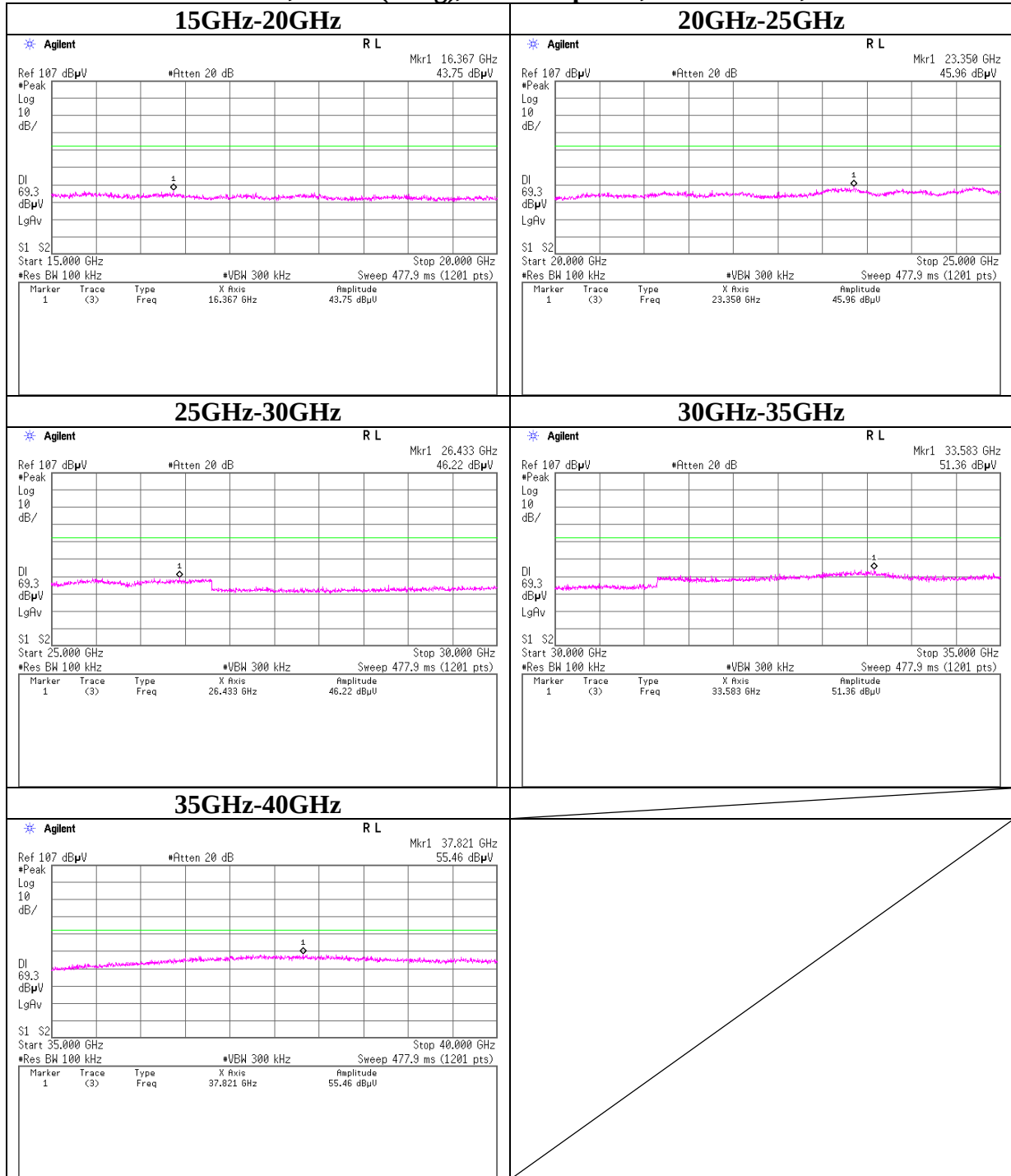
Conducted Spurious Emission

11n-40, MCS 3(Long), Antenna port 2, Tx 5755MHz



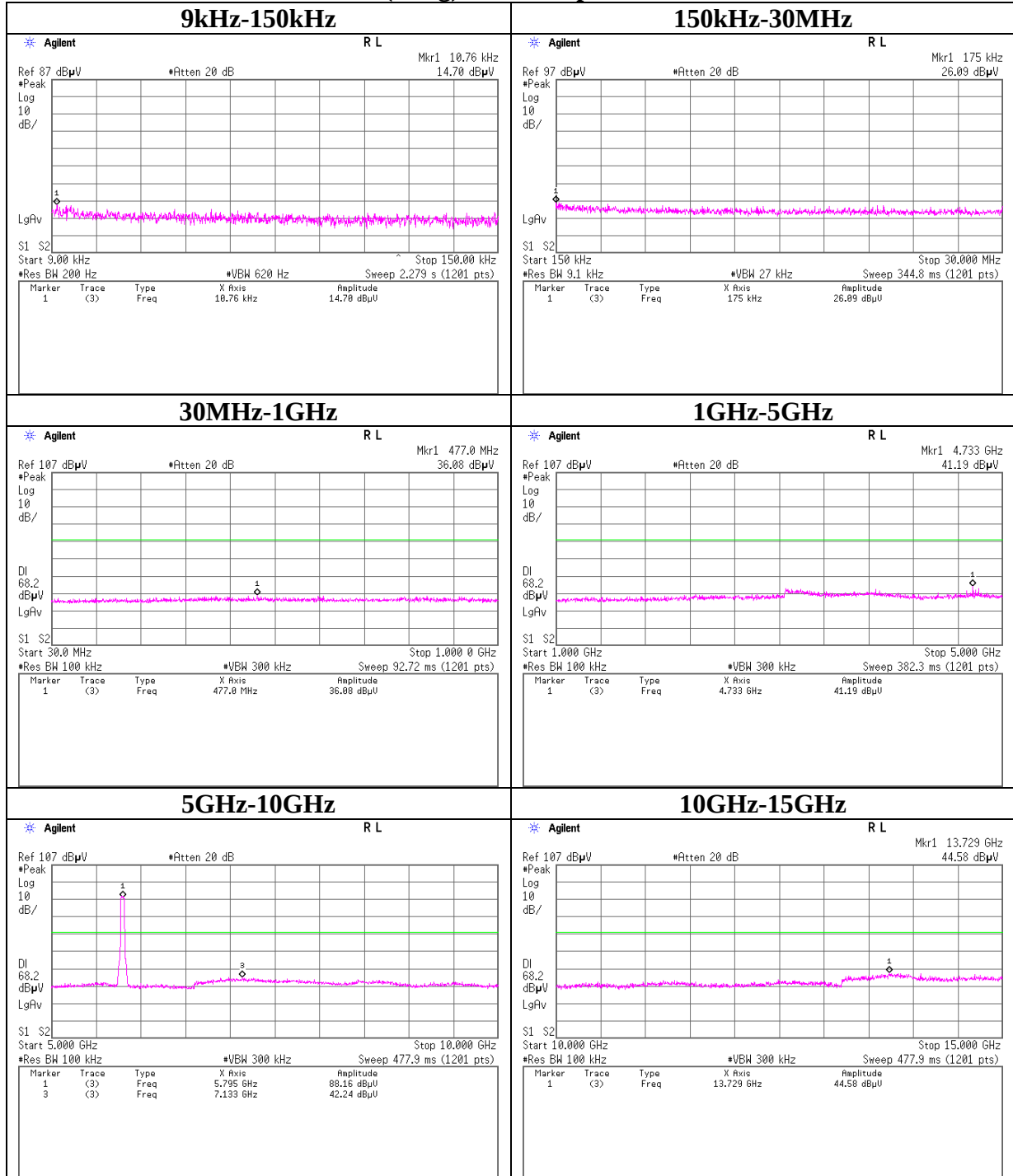
Conducted Spurious Emission

11n-40, MCS 3(Long), Antenna port 2, Tx 5755MHz,



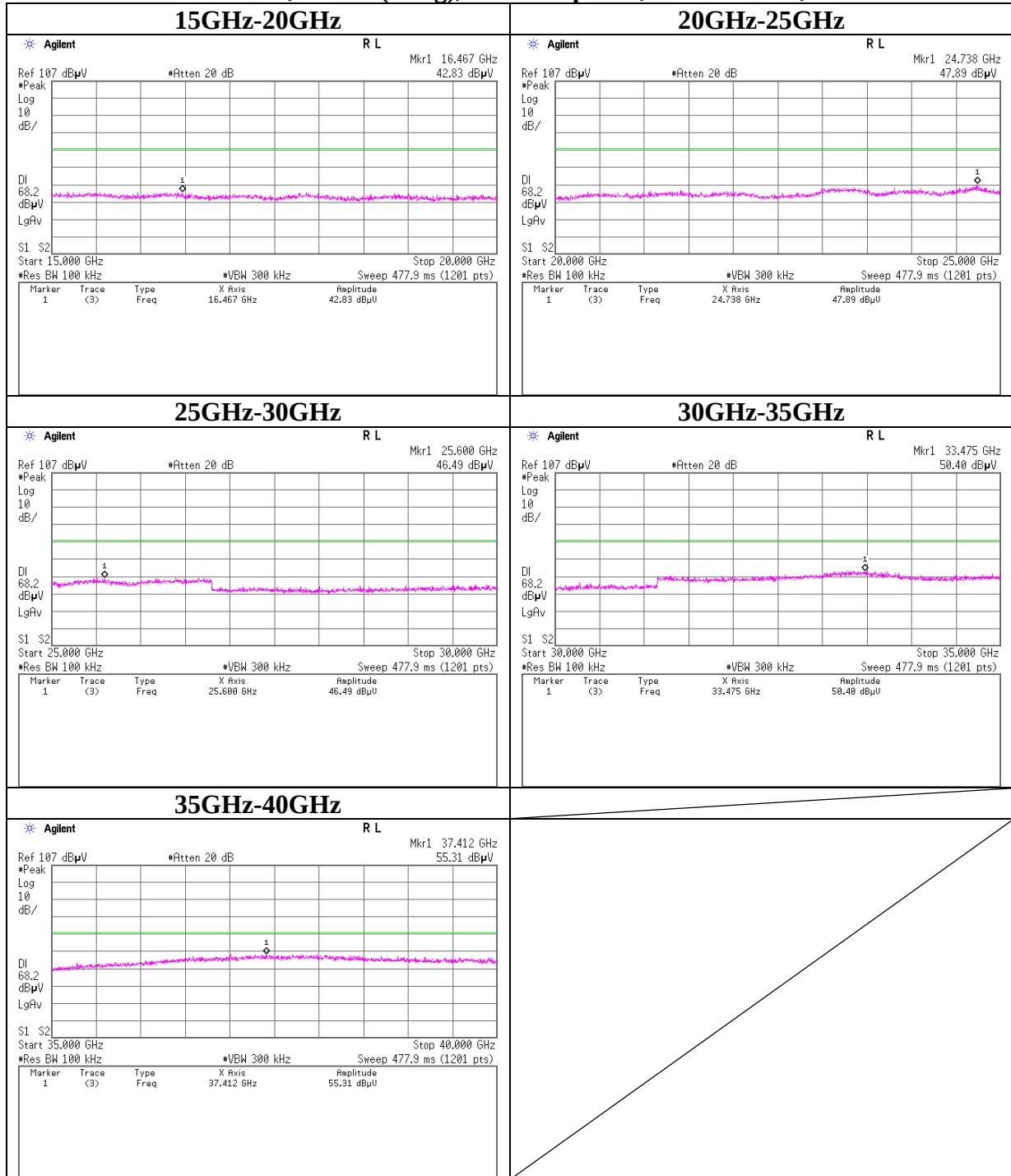
Conducted Spurious Emission

11n-40, MCS 3(Long), Antenna port 2, Tx 5795MHz



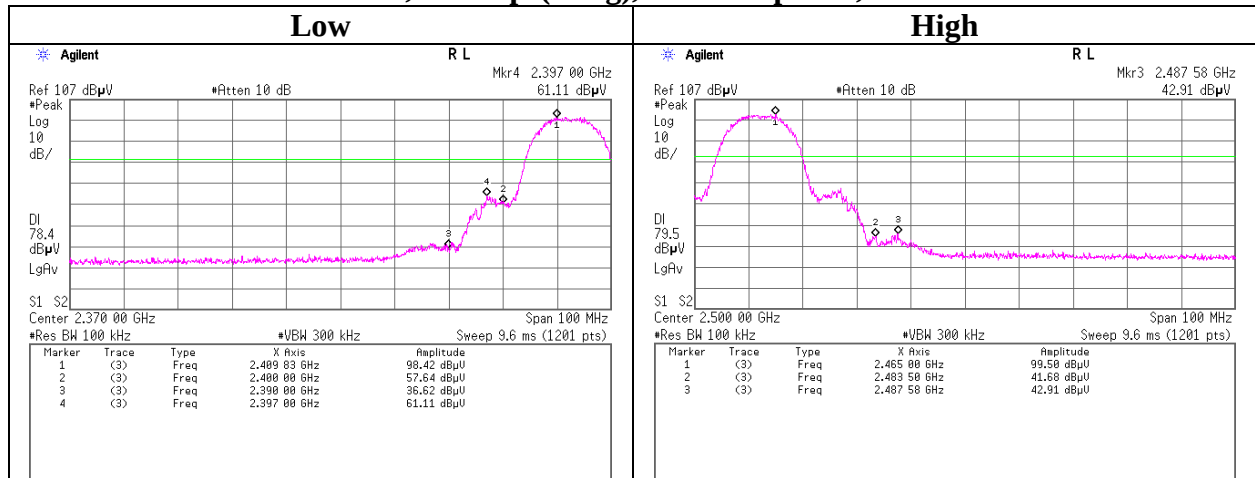
Conducted Spurious Emission

11n-40, MCS 3(Long), Antenna port 2, Tx 5795MHz,

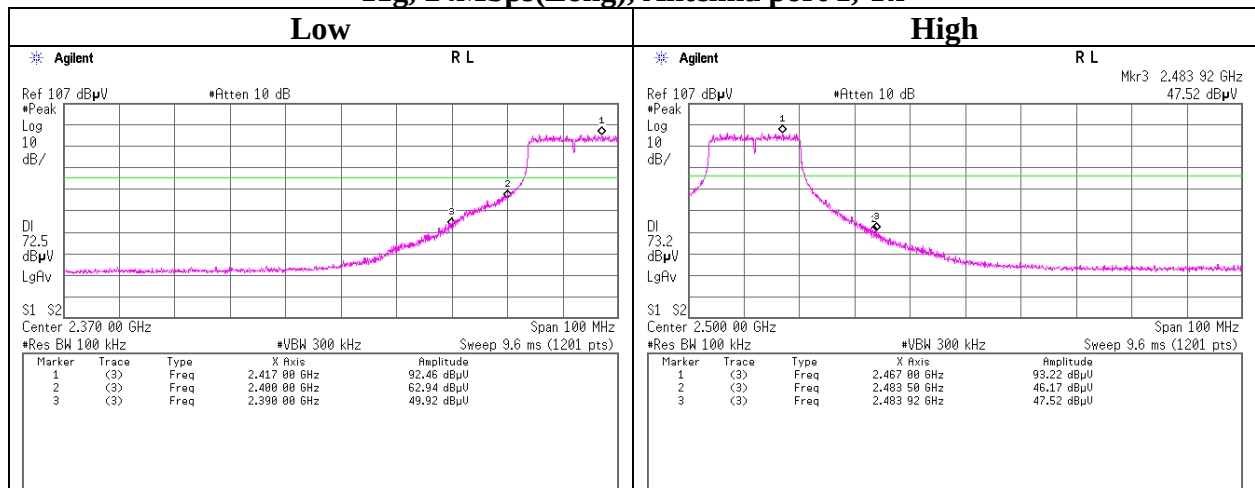


Conducted Emission Band Edge compliance

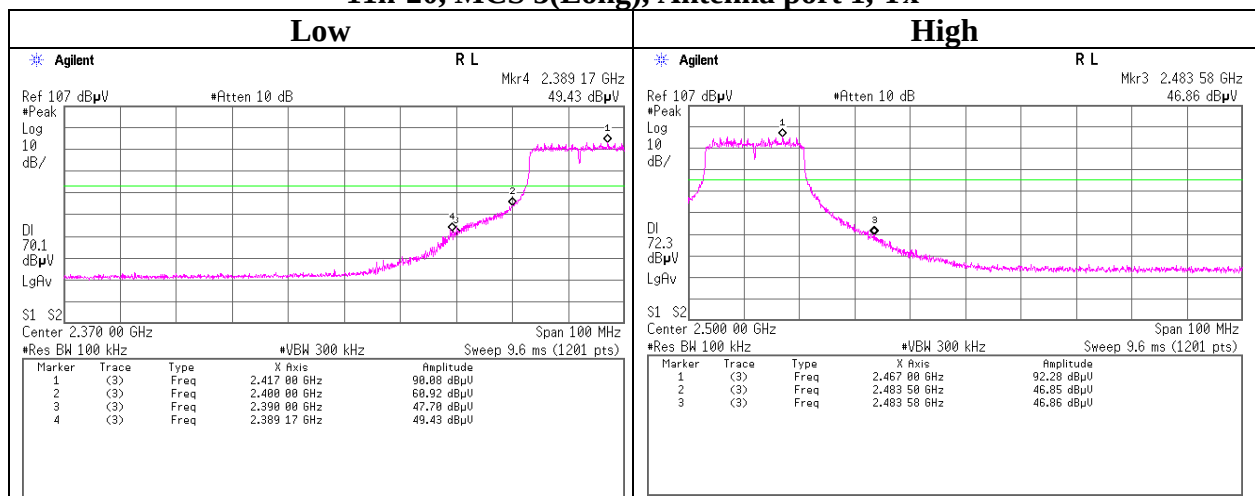
11b, 5.5Mbps(Long), Antenna port 1, Tx



11g, 24Mbps(Long), Antenna port 1, Tx

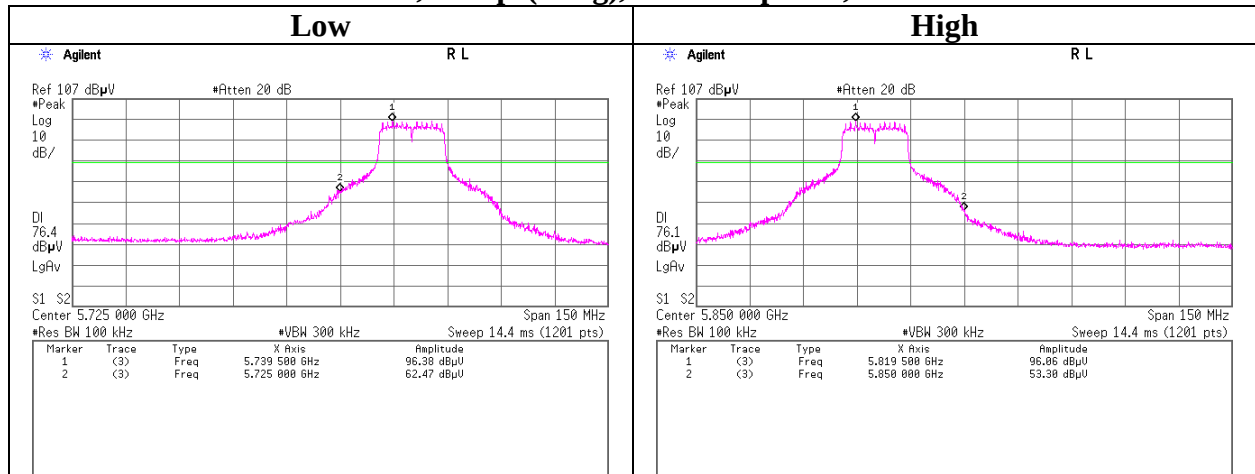


11n-20, MCS 3(Long), Antenna port 1, Tx

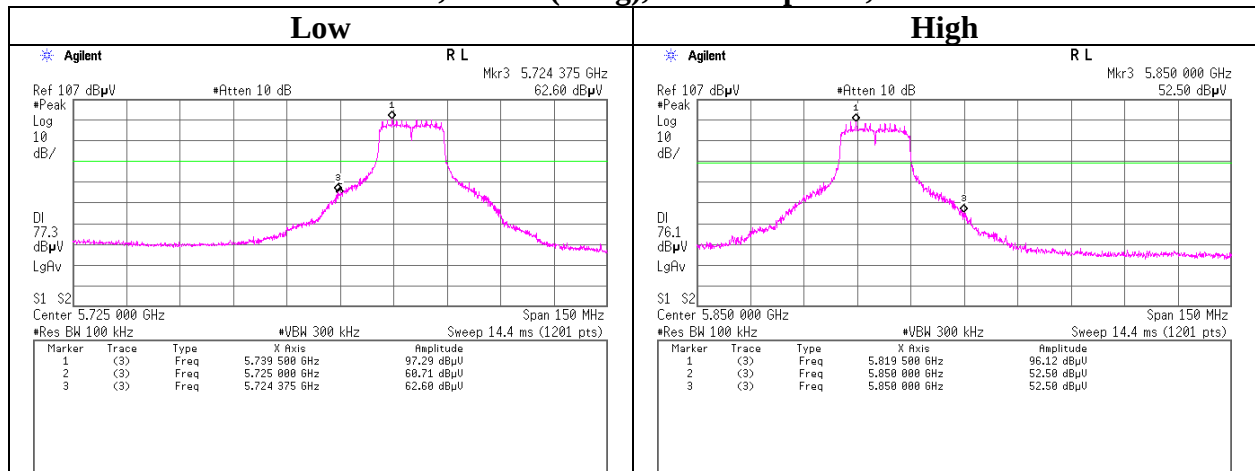


Conducted Emission Band Edge compliance

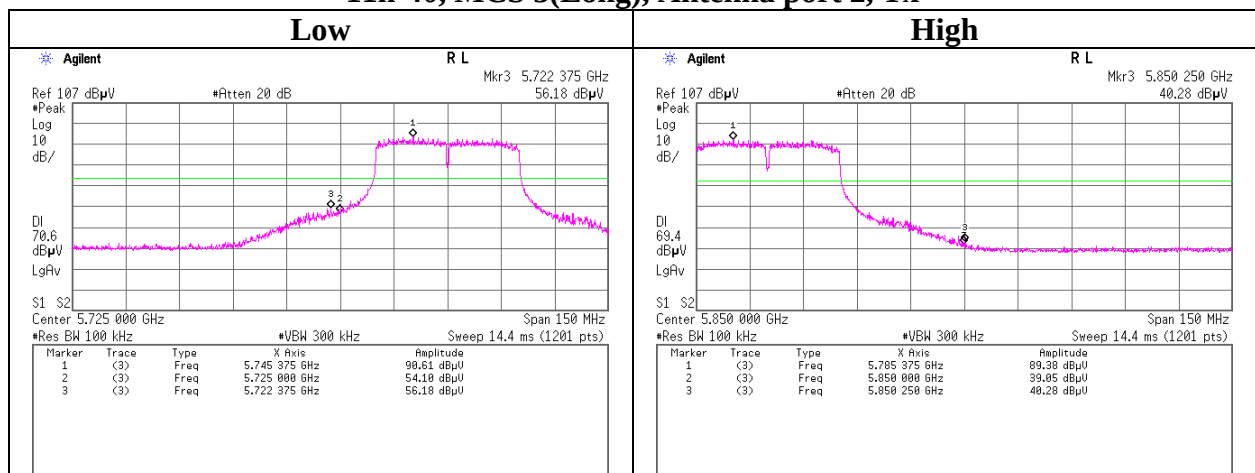
11a, 6Mbps(Long), Antenna port 2, Tx



11n-20, MCS 0(Long), Antenna port 2, Tx



11n-40, MCS 3(Long), Antenna port 2, Tx



Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0154-HO-01
Date 04/30/2012 07/03/2012
Temperature/ Humidity 23deg. C / 71% RH 22deg. C / 65% RH
Engineer Hironobu Ohnishi Yutaka Yoshida
Mode 11b Tx, 11g Tx

11b, 5.5Mbps(Long GI), Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-12.40	0.77	10.07	-1.56	8.00	9.56
2437.00	-11.12	0.77	10.07	-0.28	8.00	8.28
2462.00	-11.09	0.77	10.07	-0.25	8.00	8.25

11g, 24Mbps(Long GI), Antenna port 1

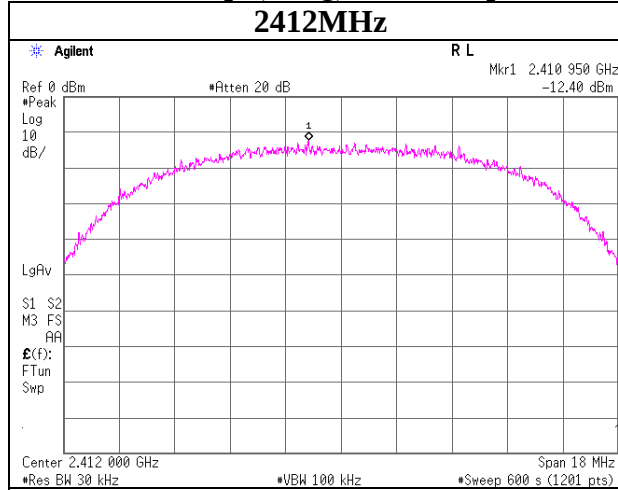
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-19.31	2.05	10.08	-7.18	8.00	15.18
2437.00	-12.42	2.06	10.08	-0.28	8.00	8.28
2462.00	-17.97	2.07	10.09	-5.81	8.00	13.81

Sample Calculation:

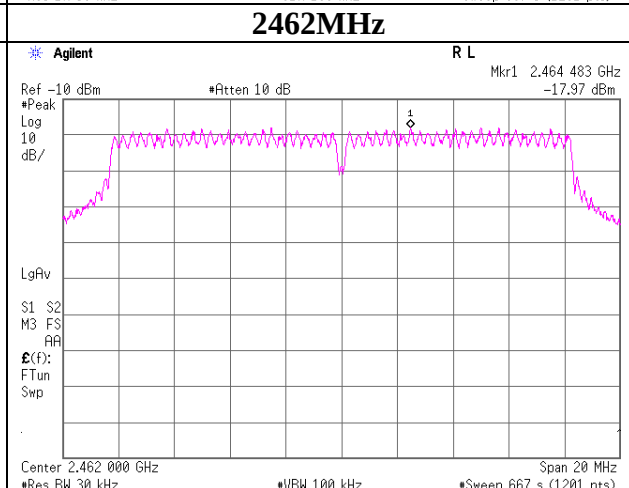
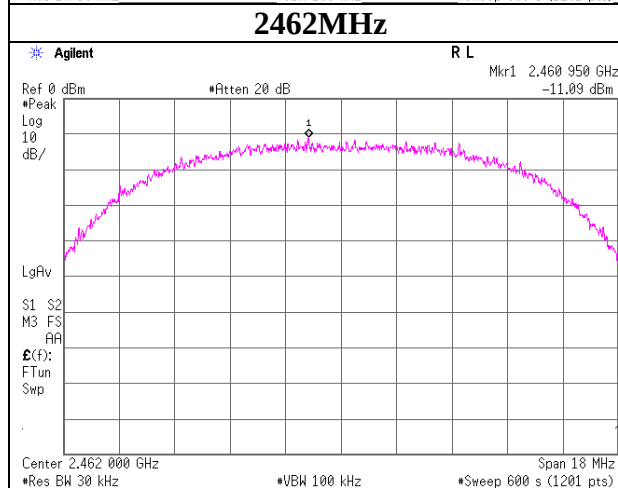
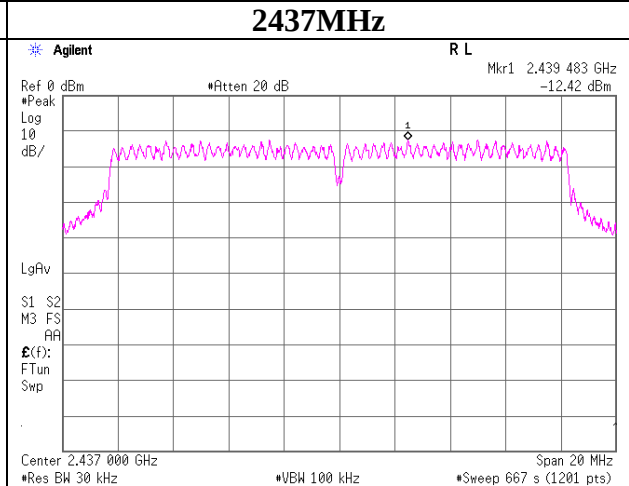
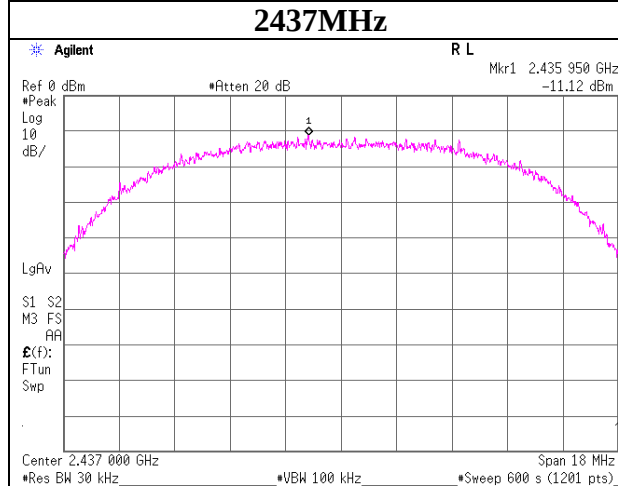
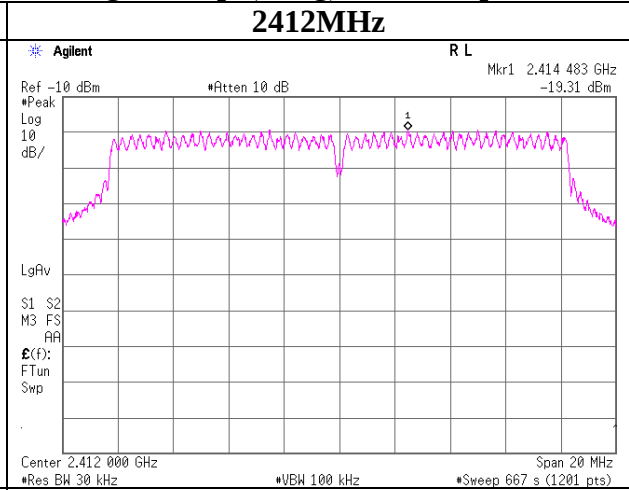
Result = Reading + Cable Loss + Attenuator

Power Density

11b, 5.5Mbps(Long), Antenna port 1



11g, 24Mbps(Long), Antenna port 1



Power Density

Test place Head Office EMC Lab. No.7 Measurement Room
Report No. 32IE0154-HO-01
Date 05/10/2012 05/31/2012
Temperature/ Humidity 21deg. C / 45% RH 25deg. C / 55% RH
Engineer Takeshi Choda Yutaka Yoshida
Mode 11n-20 Tx, 11n-40 Tx

11n-20, MCS 0(Long GI), Antenna port 2

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5745.00	-14.17	1.22	9.98	-2.97	8.00	10.97
5785.00	-14.80	1.22	9.98	-3.60	8.00	11.60
5825.00	-14.50	1.21	9.98	-3.30	8.00	11.30

11n-40, MCS 3(Long GI), Antenna port 2

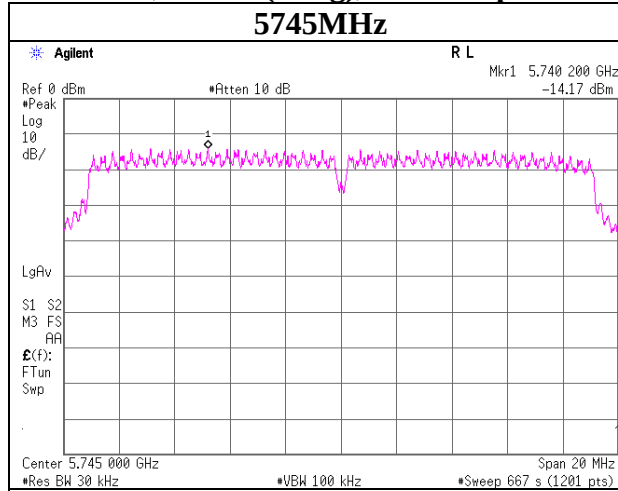
Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5755.00	-20.98	3.44	10.07	-7.47	8.00	15.47
5795.00	-21.89	3.46	10.07	-8.36	8.00	16.36

Sample Calculation:

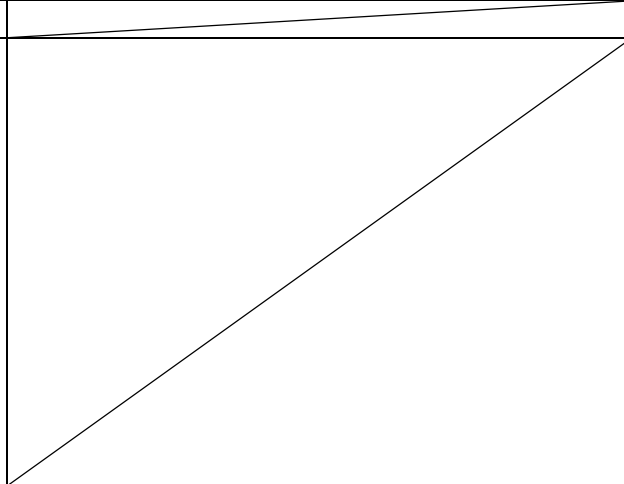
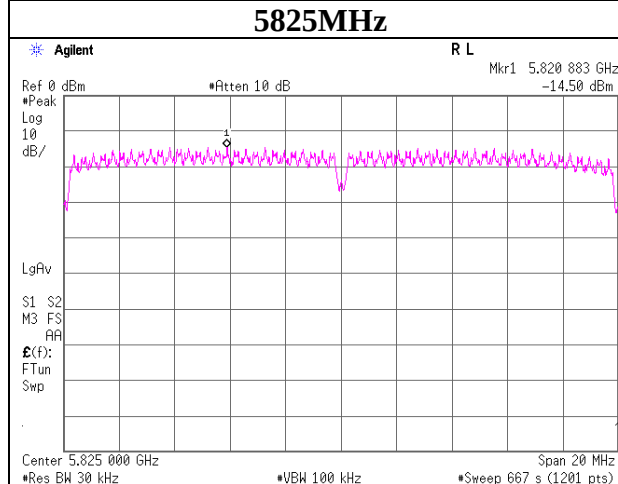
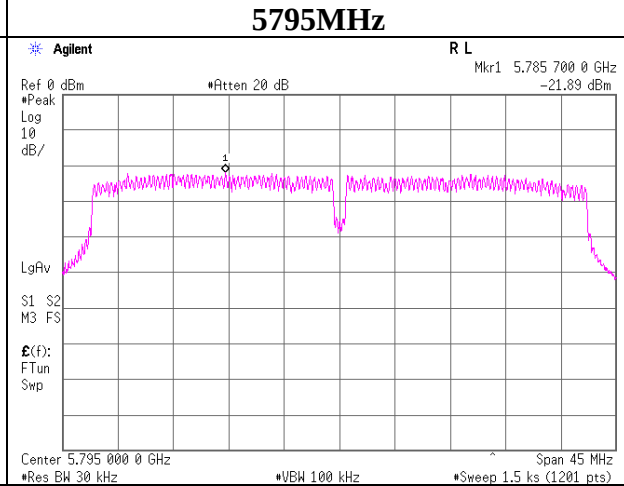
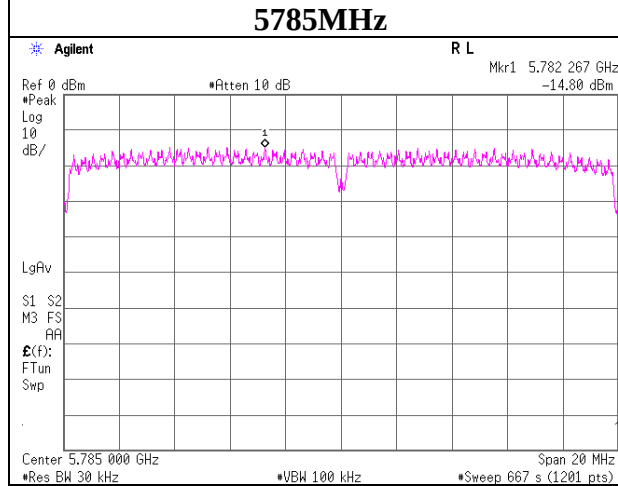
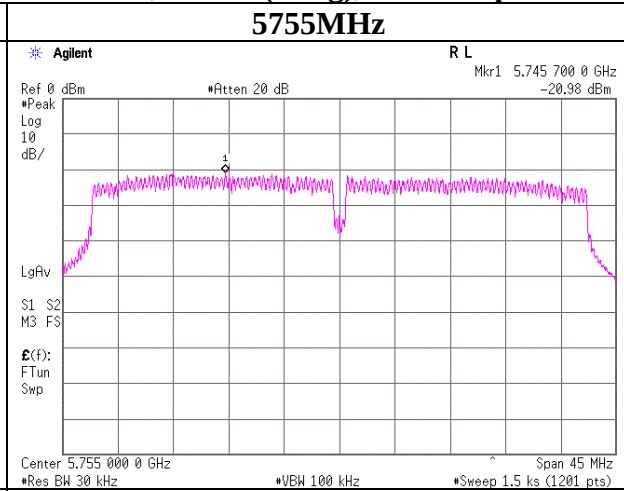
Result = Reading + Cable Loss + Attenuator

Power Density

11n-20, MCS 0(Long), Antenna port 2

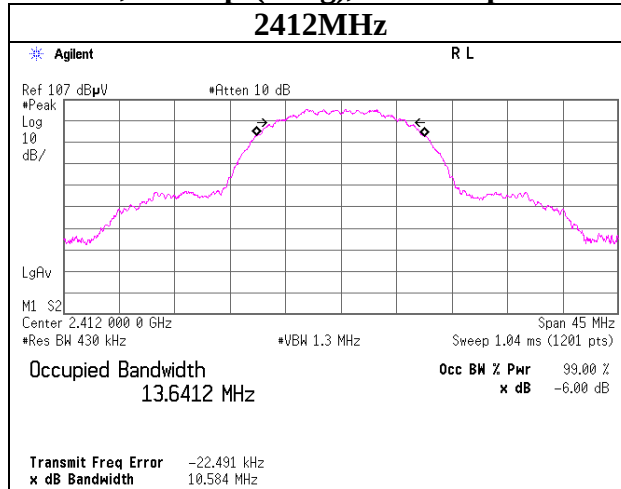


11n-40, MCS 3(Long), Antenna port 2

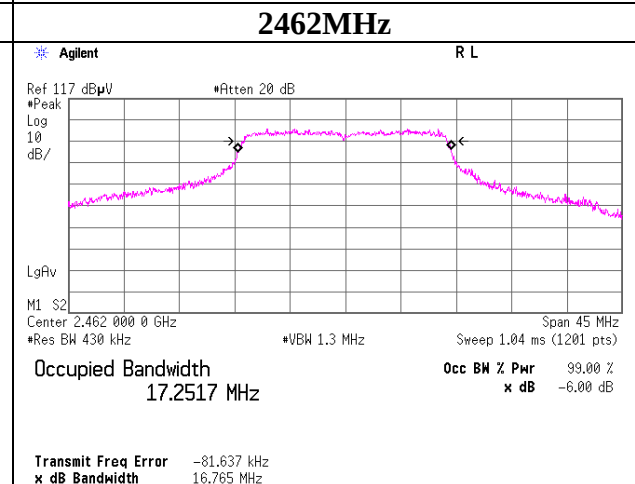
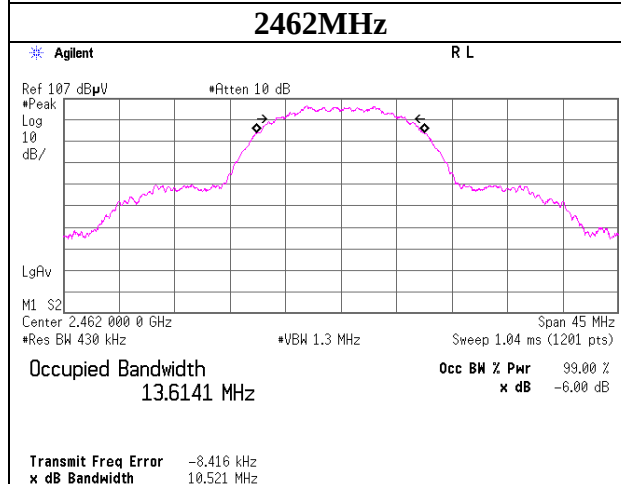
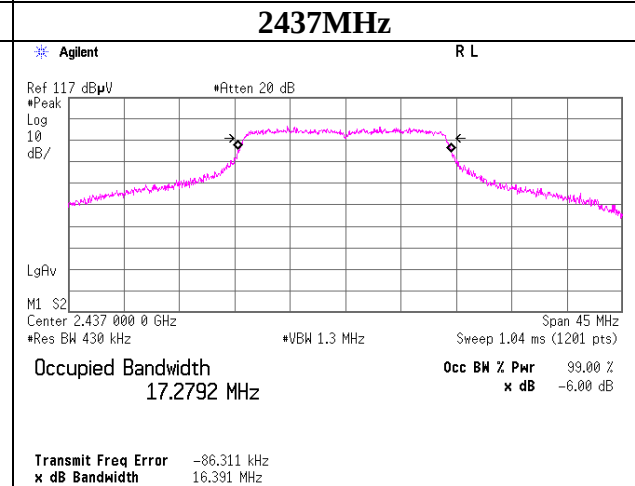
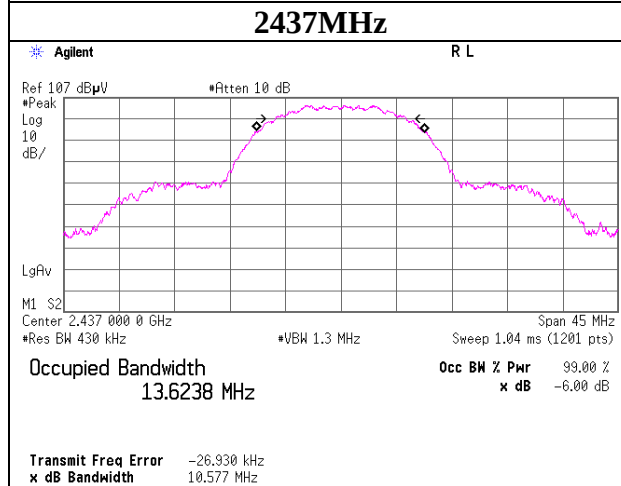
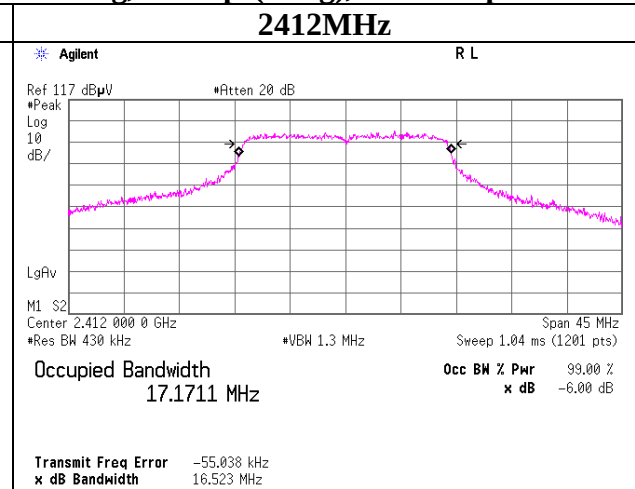


99%Occupied Bandwidth

11b, 5.5Mbps(Long), Antenna port 1

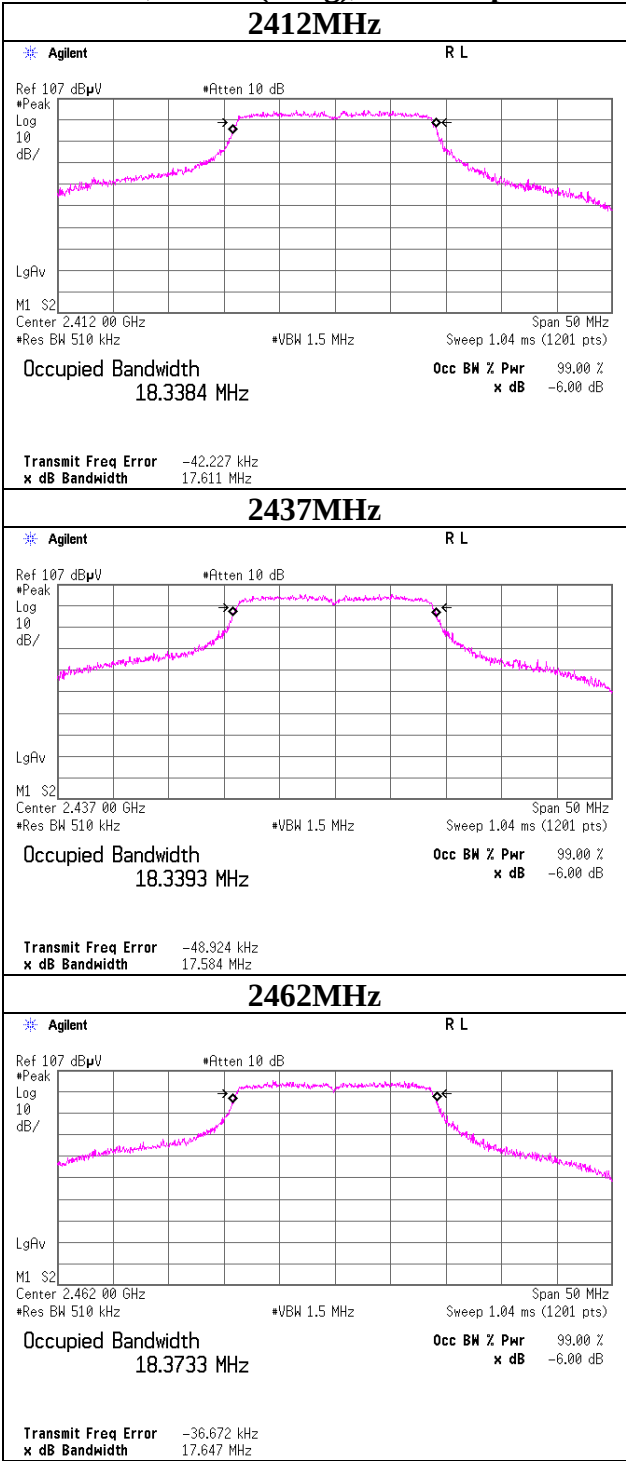


11g, 24Mbps(Long), Antenna port 1



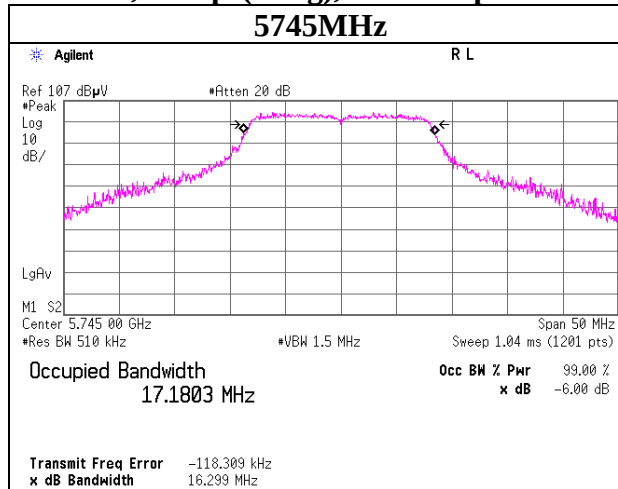
99% Occupied Bandwidth

11n-20, MCS 3(Long), Antenna port 1

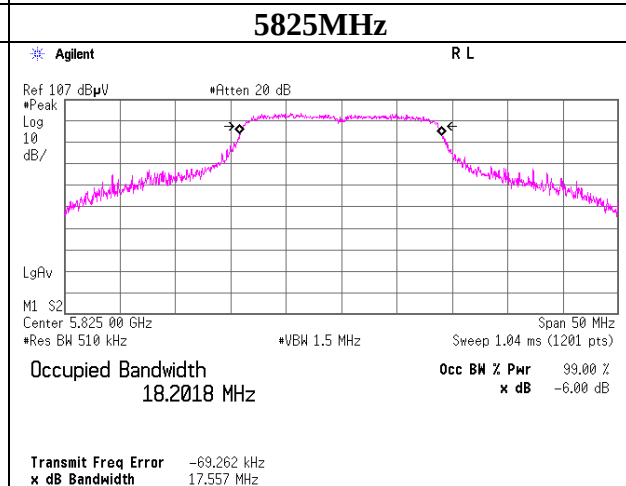
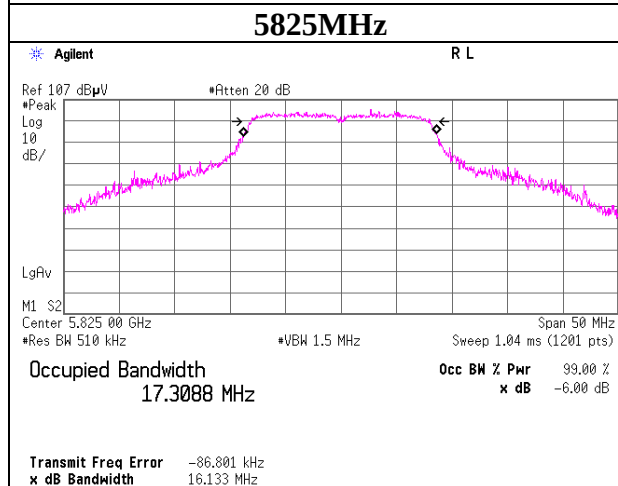
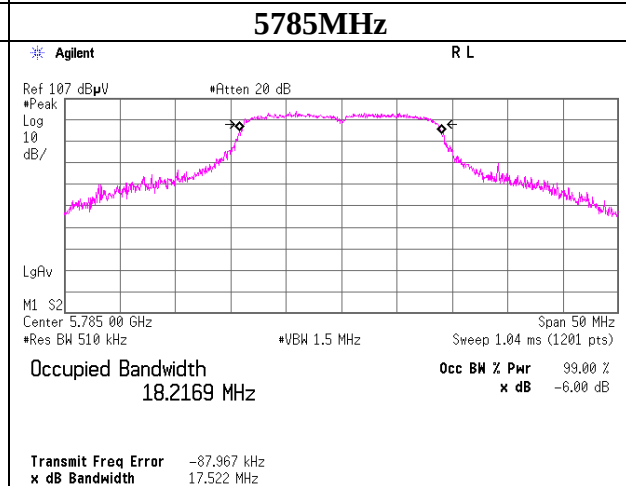
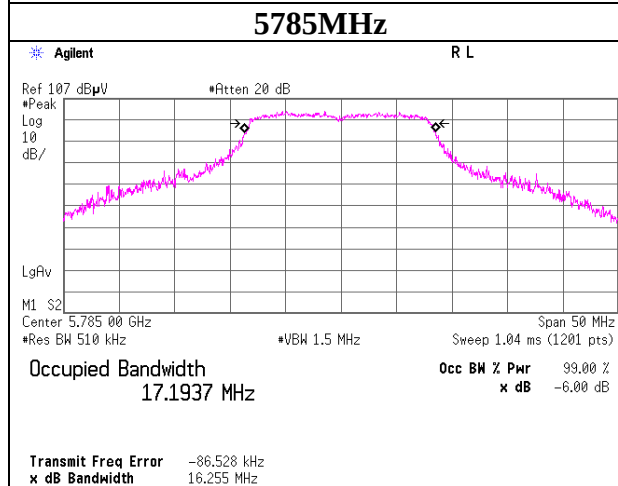
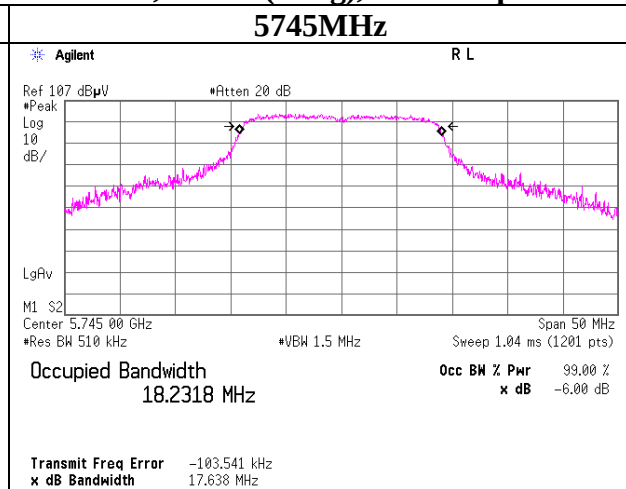


99% Occupied Bandwidth

11a, 6Mbps(Long), Antenna port 2

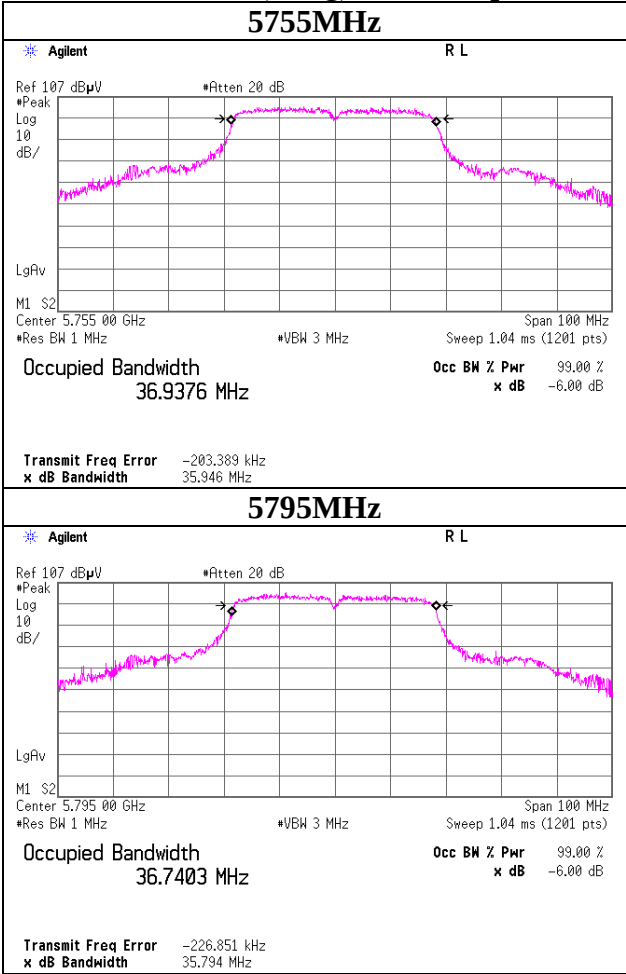


11n-20, MCS 0(Long), Antenna port 2



99% Occupied Bandwidth

11n-40, MCS 3(Long), Antenna port 2



APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2012/06/29 * 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	2012/06/19 * 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-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MHA-04	Horn Antenna 26.5-40GHz	EMCO	3160-10	1140	RE	2011/10/22 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MHF-16	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	RE	2011/09/08 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2011/12/08 * 12
MCC-54	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	RE	2012/03/21 * 12
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2012/06/22 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2012/04/03 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	8127384	CE(EUT)	2012/03/01 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	8127383	CE(AE)	2011/07/11 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2012/01/11 * 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

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2012/04/06 * 12
MCC-36	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2011/09/30 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2012/04/25 * 12
MCC-102	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2012/06/27 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2011/11/23 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2011/09/30 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2012/01/12 * 12
MMM-16	DIGITAL HiTESTER	Hioki	3805	070900532	AT	2012/01/13 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	AT	2012/02/06 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03 * 12
MCC-115	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290211/4	AT	2011/08/24 * 12
MCC-103	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2012/06/27 * 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