



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

WIFI MODULE

MODEL NUMBER: DWM-W052

FCC ID: EW4DWMW052

IC: 4250A-DWMW052

REPORT NUMBER: 33BE0378-HO-A

ISSUE DATE: October 24, 2012

Prepared for
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NVLAP LAB CODE: 200572-0

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*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>

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/24/12	Initial Issue	T. Hatakeda

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MITSUMI ELECTRIC CO., LTD.
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KANAGAWA, 243-8533 JAPAN

EUT DESCRIPTION: WIFI MODULE

MODEL: DWM-W052

SERIAL NUMBER: 34AF2CD42FF7

DATE TESTED: September 26 to October 19, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Japan, Inc. By:

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4:2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0

The full scope of accreditation can be viewed at

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

EMI

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

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

Test room (semi-anechoic chamber)	Radiated emission (10m*)(±dB)		
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz
No.1	4.2dB	5.0dB	4.8dB
No.2	-	-	-
No.3	-	-	-
No.4	-	-	-

*10m = Measurement distance

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(±dB)				(1m*)(±dB)		(0.5m*)(±dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

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

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

Antenna terminal conducted emission and Power density (±dB)			Antenna terminal conducted emission (+dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11n (HT20) transceiver module.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11n SISO HT20	21.49	140.93
5745 - 5825	802.11n MIMO HT20	23.60	229.09

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of 1.23 dBi (Ant 0/ Ant 1).

5.4. SOFTWARE AND FIRMWARE

The software/firmware version is BCM43237_5_91_100_35_XP.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11n 20MHz mode were made at MCS1 for SISO and MCS8 for MIMO.

For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that the following orientation was worst-case; therefore, all final radiated testing was performed with the following orientation:

- Module: Horizontal X-orientation, Vertical X-orientation
- Antenna: Horizontal Z-orientation, Vertical X-orientation

5.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude E6500	37534964973	DoC
AC Adapter	Dell	DA90PE0-00	CX-0NN236-48661-8C2-816V-A01	DoC
Test Jig	Mitsumi	N/A	N/A	N/A

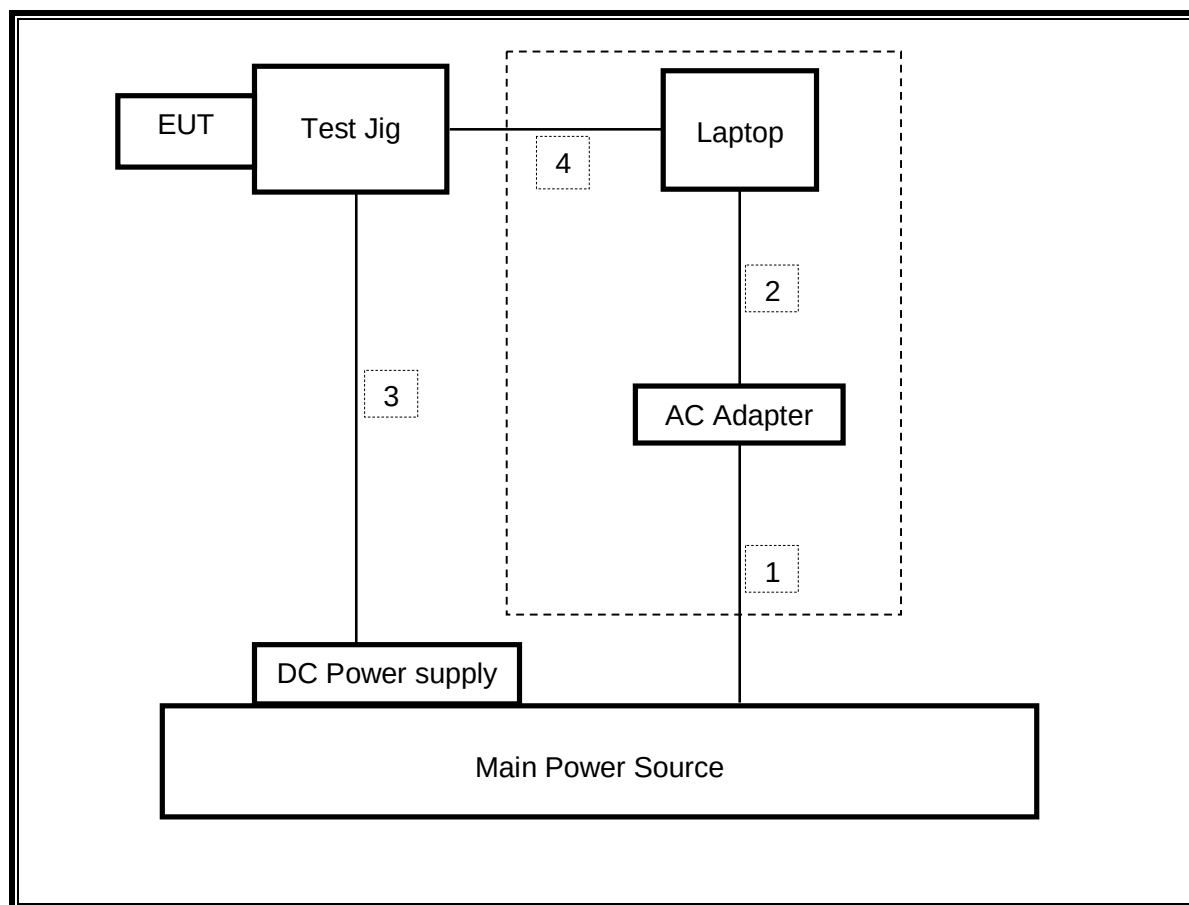
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2 Pong	Un-Shielded	0.9m	N/A
2	DC	1	DC	Un-Shielded	1.8m	Ferrite Core at one End
3	DC	1	DC	Un-Shielded	2.0m	N/A
4	Data	1	20 Pins	Un-Shielded	0.5m	Ribbon Cable

TEST SETUP

The EUT is attached to a host laptop computer via ribbon cable during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



 = These were connected only when the EUT was activated.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

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	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	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
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MHF-16	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	RE	2012/09/06 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2011/12/08 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2012/04/06 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2012/06/27 * 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-07	Test Receiver	Rohde & Schwarz	ESCI	100635	CE	2012/04/05 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2012/02/06 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	CE	2012/07/12 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	AT	2012/04/04 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2011/09/12 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2011/09/12 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2011/11/07 * 12

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2011/11/07 * 12
MCC-35	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05 * 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
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2011/11/23 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2012/01/06 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-35	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05 * 12

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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

Test Item:

CE: Conducted emission
RE: Radiated emission
AT: Antenna terminal conducted test

6. ANTENNA PORT TEST RESULTS

6.1. 802.11n HT20 SISO MODE IN THE 5.8 GHz BAND

6.1.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)
Low	5745	13.09	13.28
Middle	5785	12.92	13.08
High	5825	12.84	13.00

6.1.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Antenna 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.097	0.5
Middle	5785	15.082	0.5
High	5825	15.141	0.5

Antenna 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.145	0.5
Middle	5785	15.148	0.5
High	5825	15.065	0.5

6 dB BANDWIDTH



6.1.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

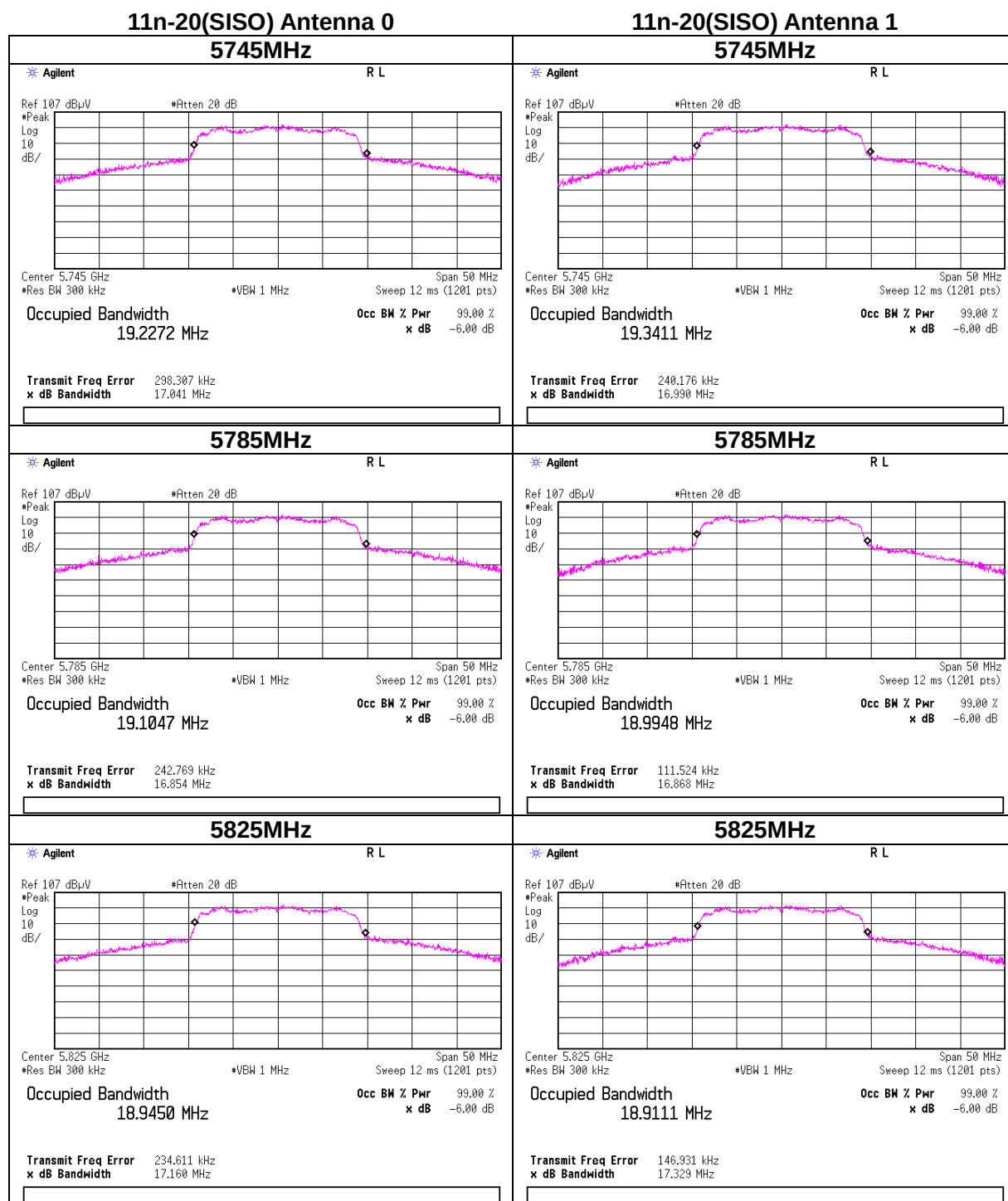
Antenna 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	19.2272
Middle	5785	19.1047
High	5825	18.9450

Antenna 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	19.3411
Middle	5785	18.9948
High	5825	18.9111

99% BANDWIDTH



6.1.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using the Peak power meter.

RESULTS

Antenna 0

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	9.98	11.51	21.49	30	-8.51
Middle	5785	9.80	11.52	21.32	30	-8.68
High	5825	9.72	11.53	21.25	30	-8.75

Antenna 1

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	9.47	11.51	20.98	30	-9.02
Middle	5785	9.09	11.52	20.61	30	-9.39
High	5825	9.01	11.53	20.54	30	-9.46

6.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Peak output power was measured, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

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.

RESULTS

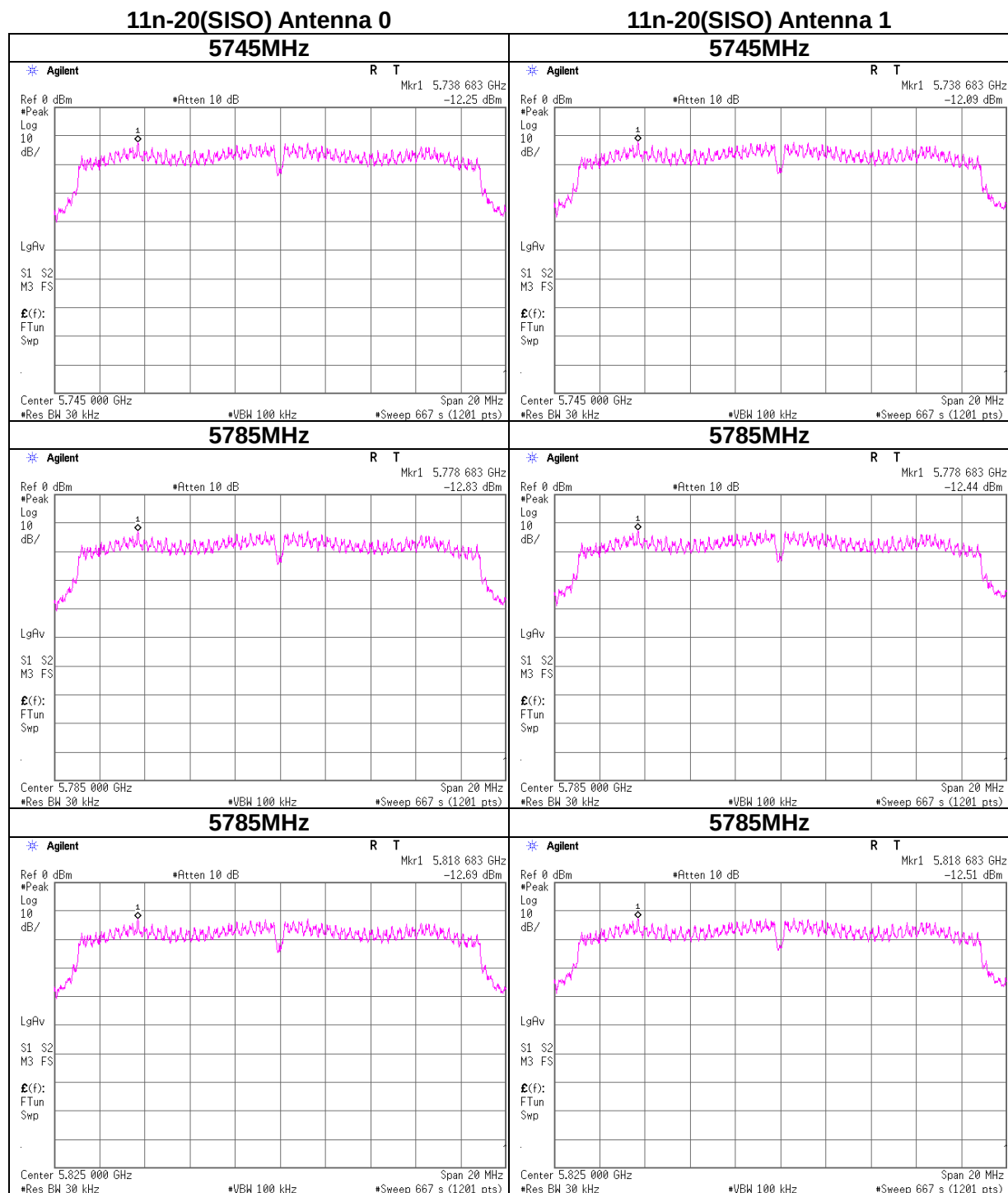
Antenna 0

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dB)	Margin (dB)
Low	5745	-0.74	8	-8.74
Middle	5785	-1.31	8	-9.31
High	5825	-1.16	8	-9.16

Antenna 1

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dB)	Margin (dB)
Low	5745	-0.58	8	-8.58
Middle	5785	-0.92	8	-8.92
High	5825	-0.98	8	-8.98

POWER SPECTRAL DENSITY



6.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

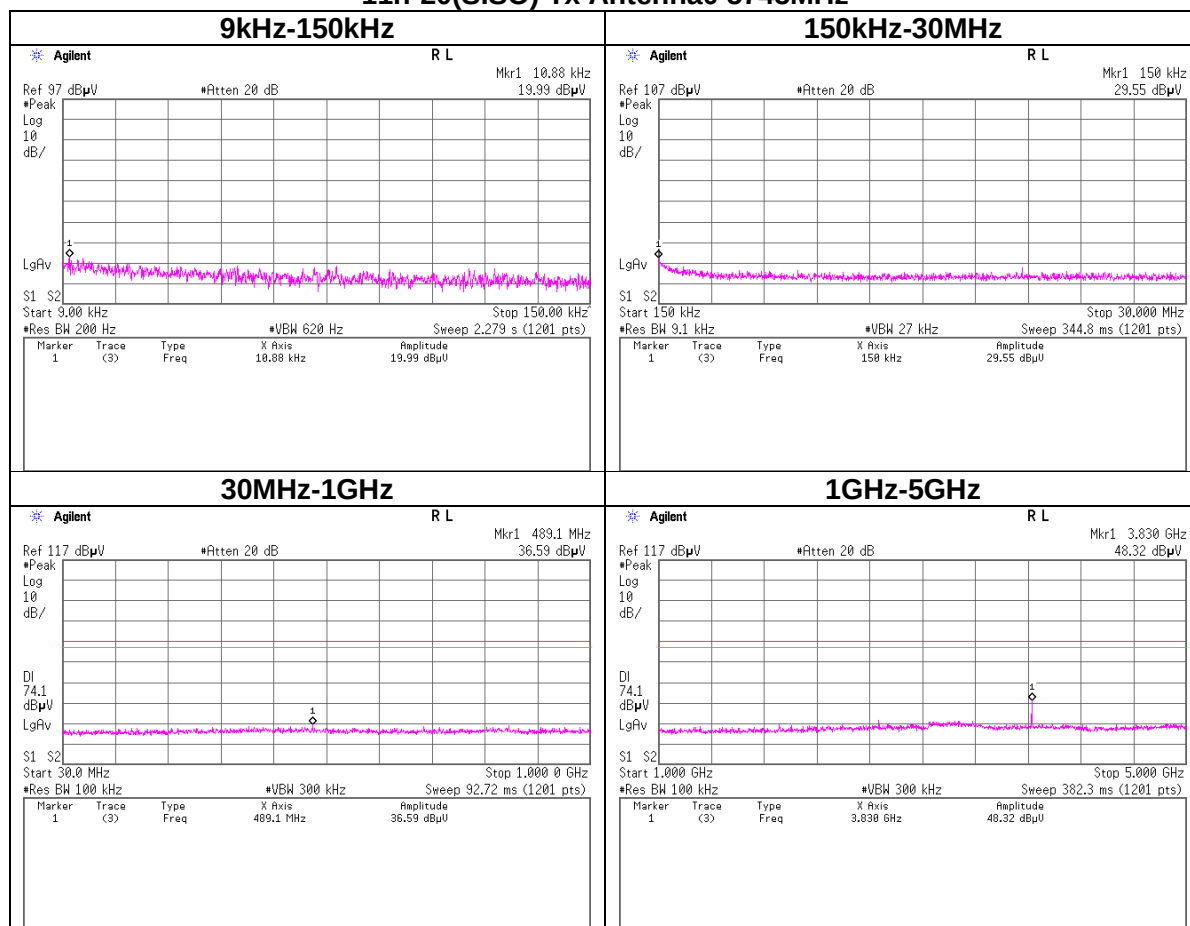
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

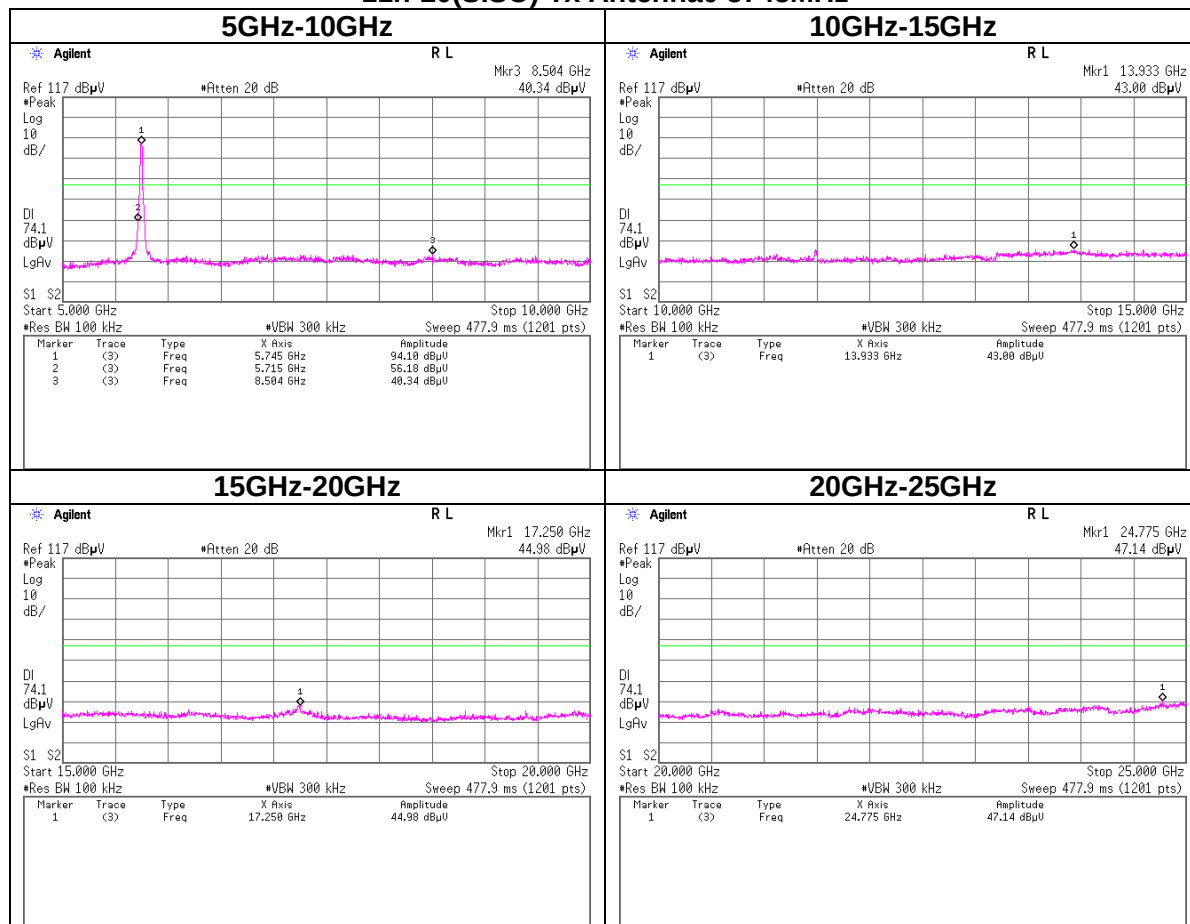
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna0 5745MHz



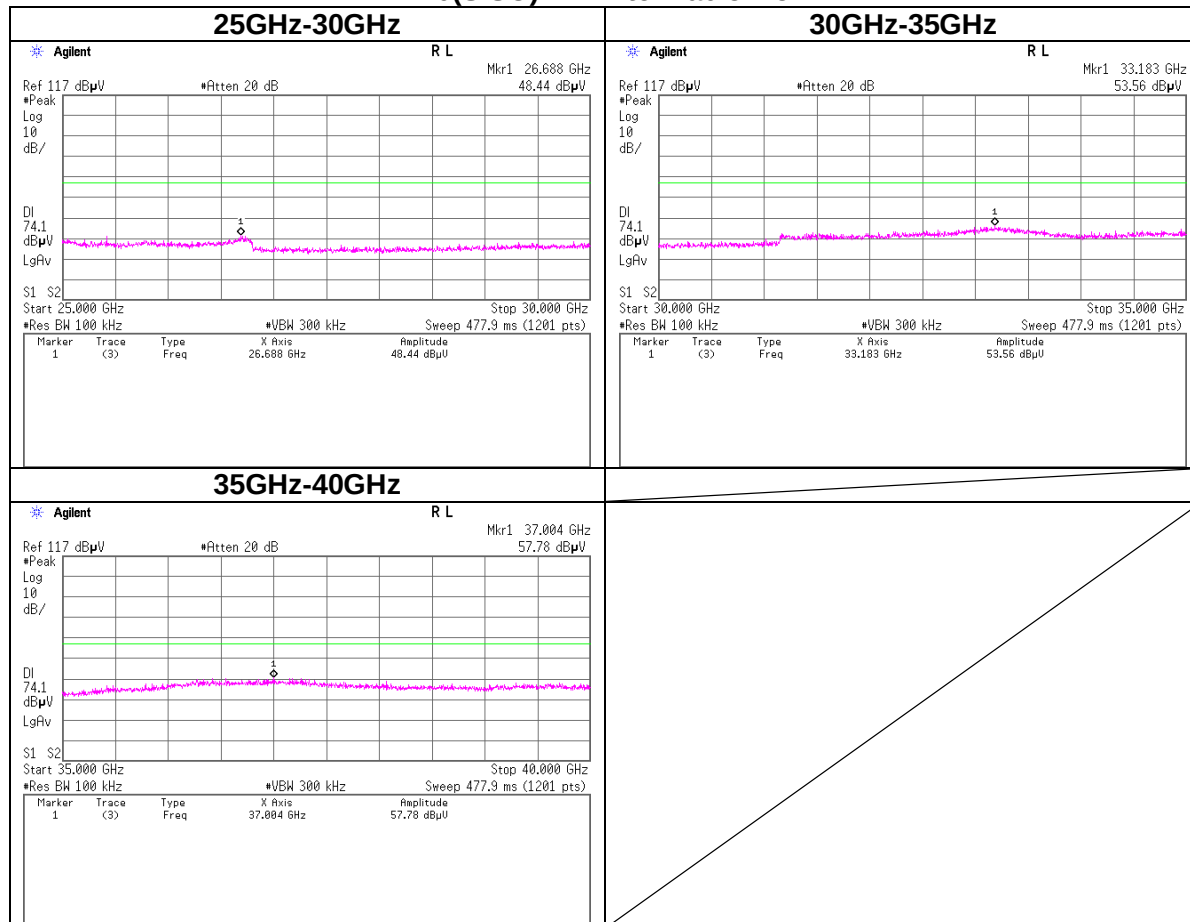
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna0 5745MHz



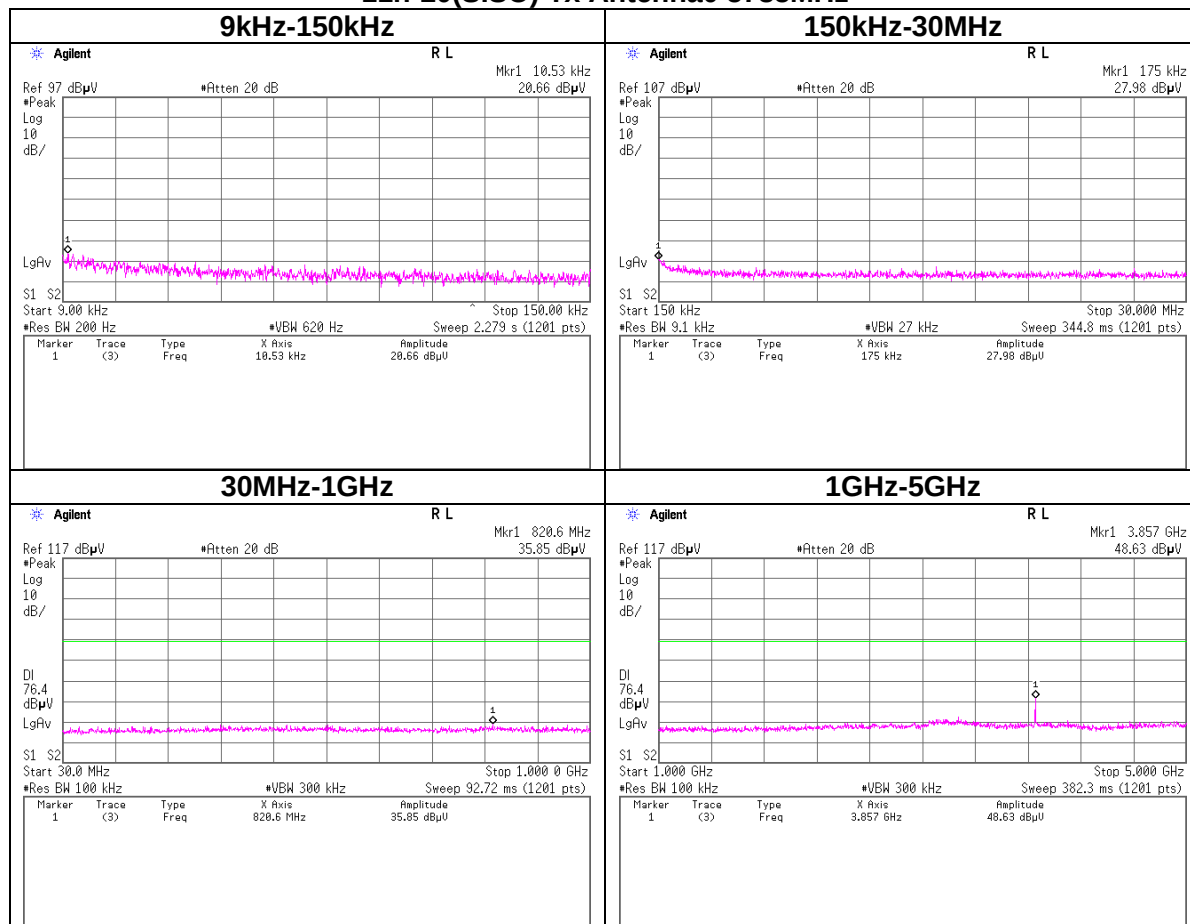
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna0 5745MHz



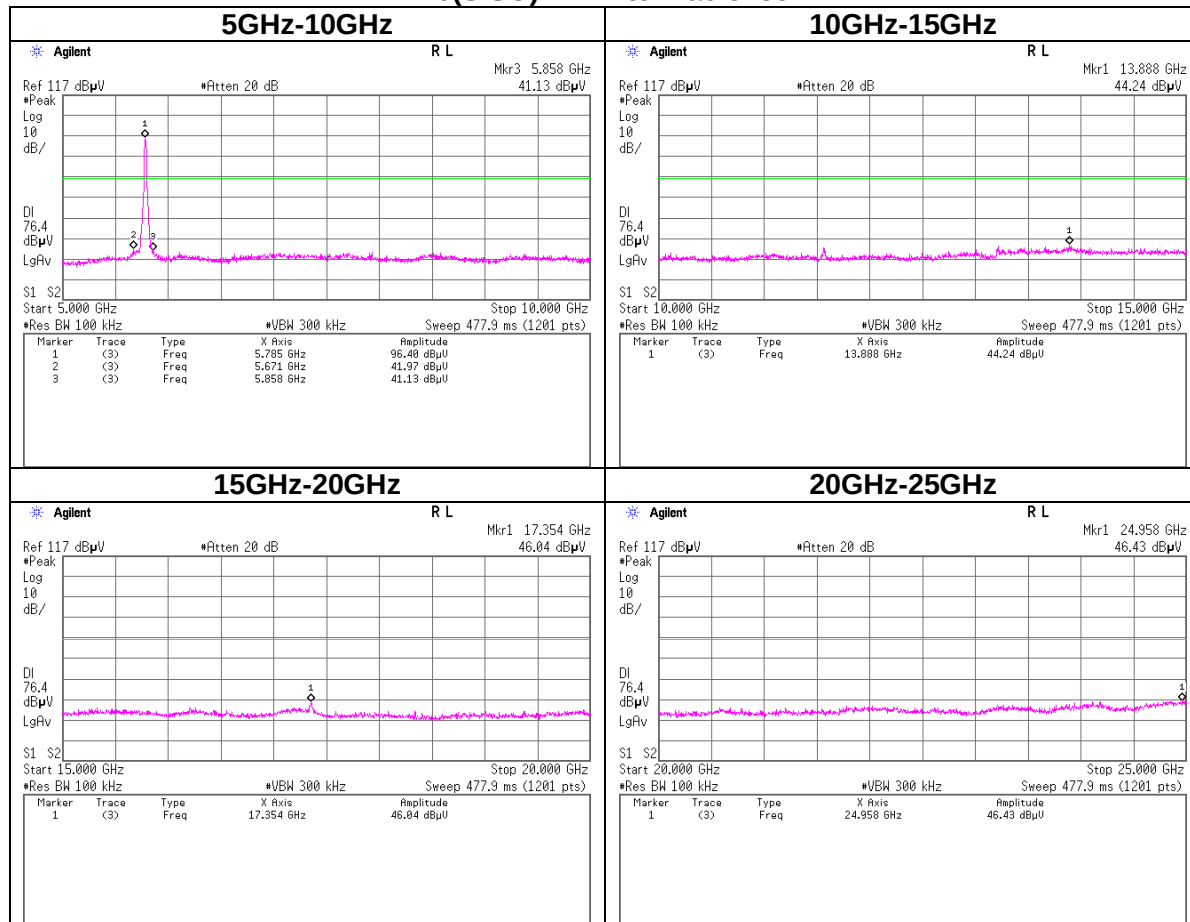
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna0 5785MHz



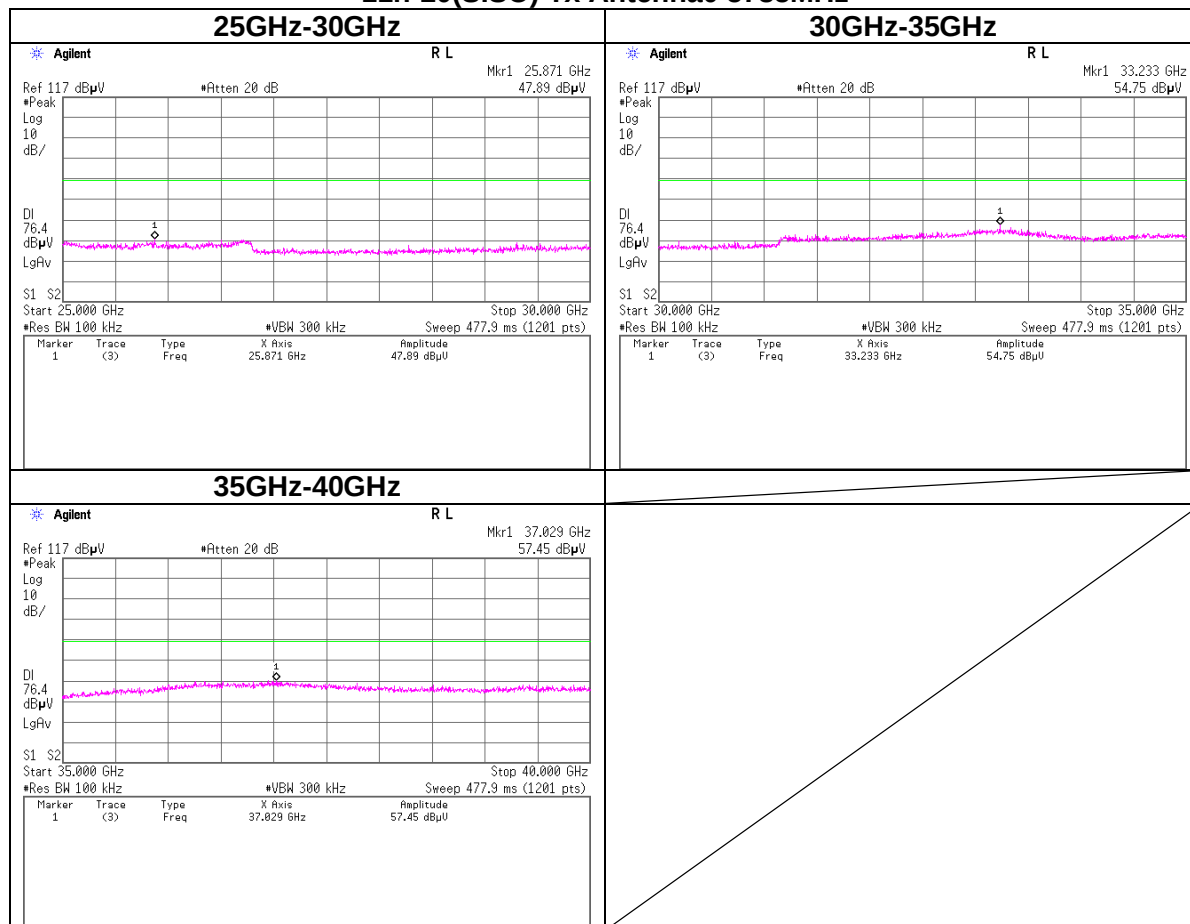
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna0 5785MHz



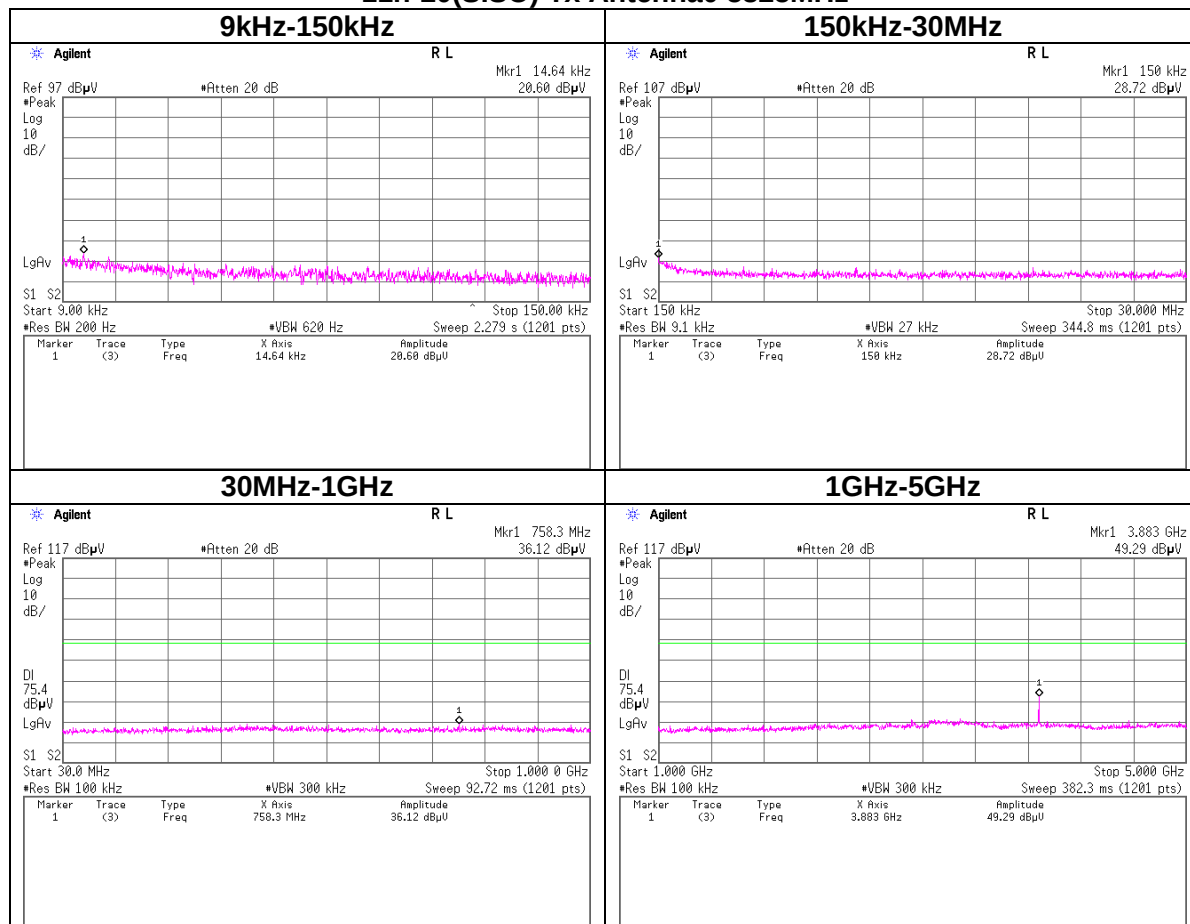
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna0 5785MHz



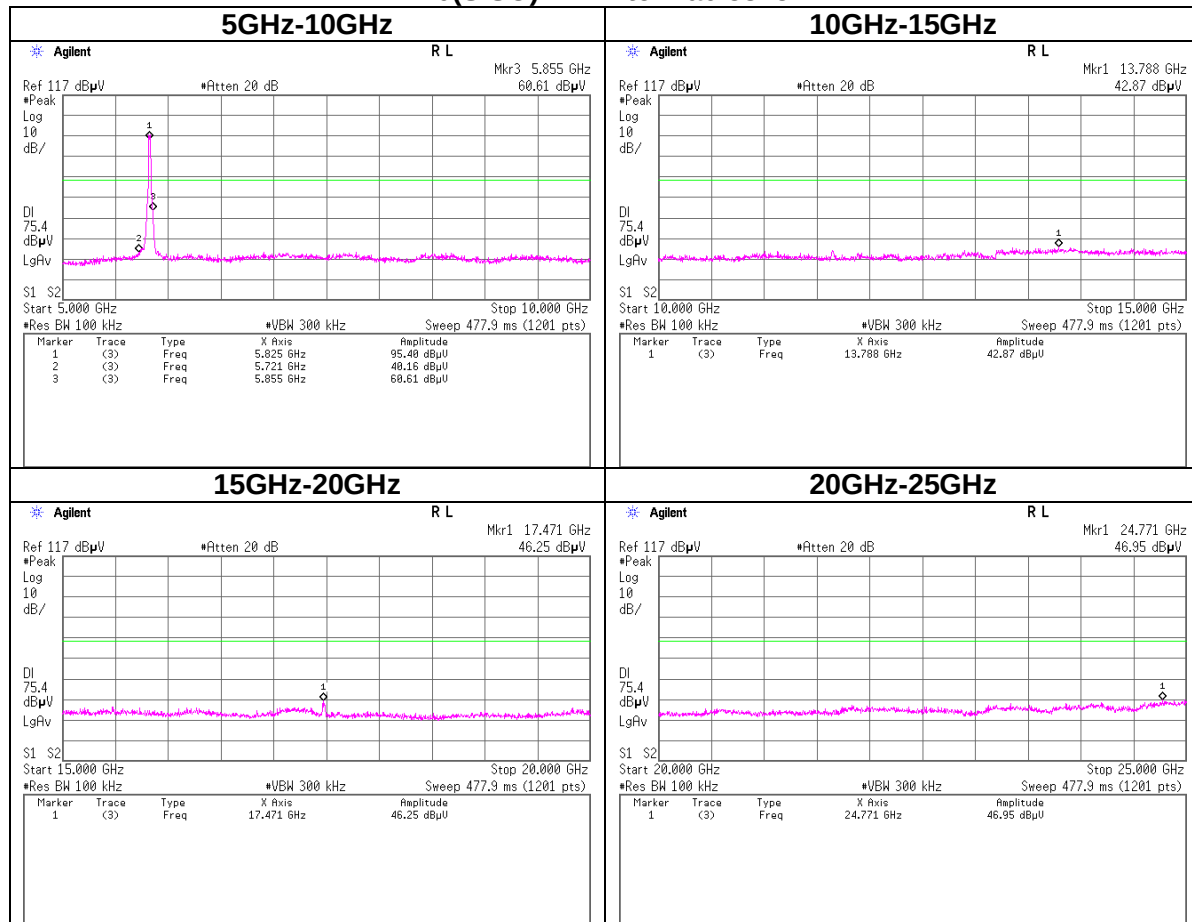
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna0 5825MHz



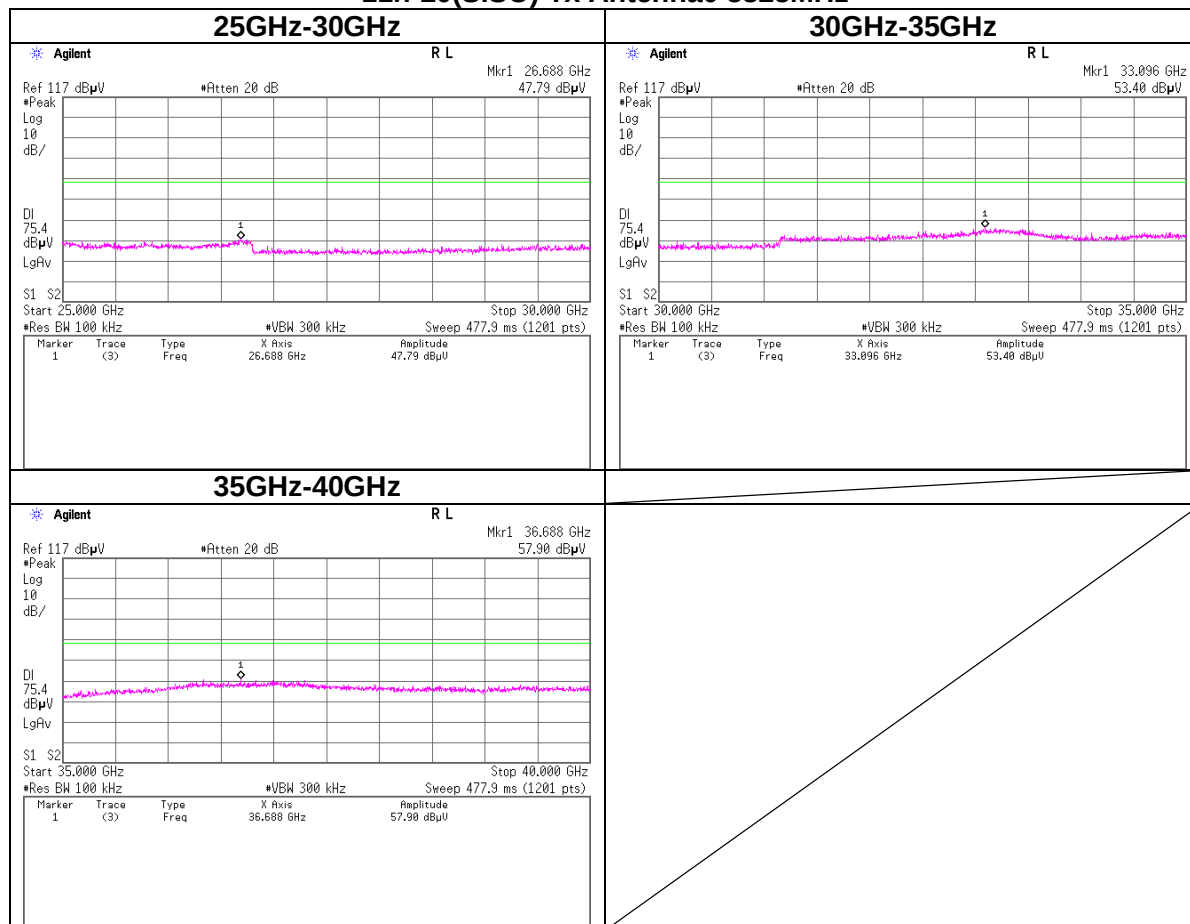
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna0 5825MHz



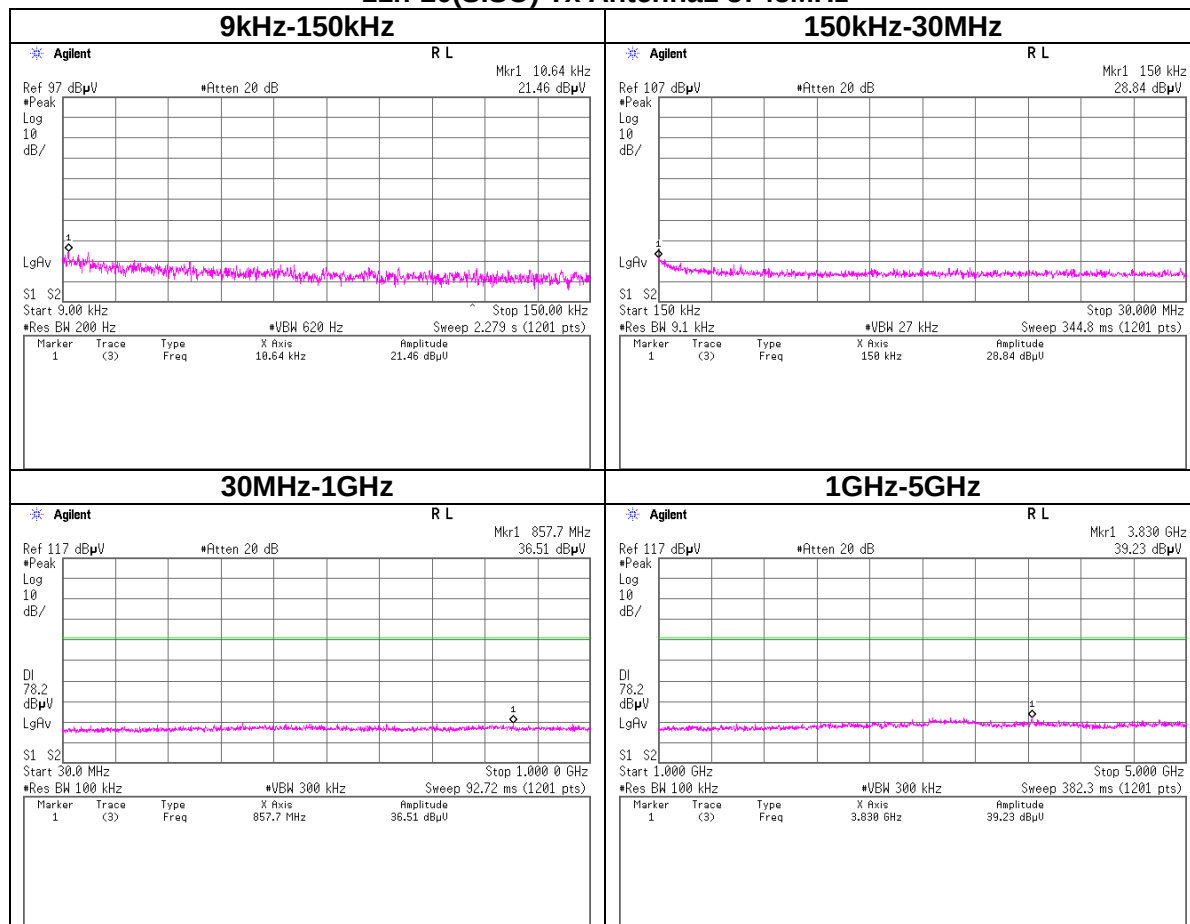
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna0 5825MHz



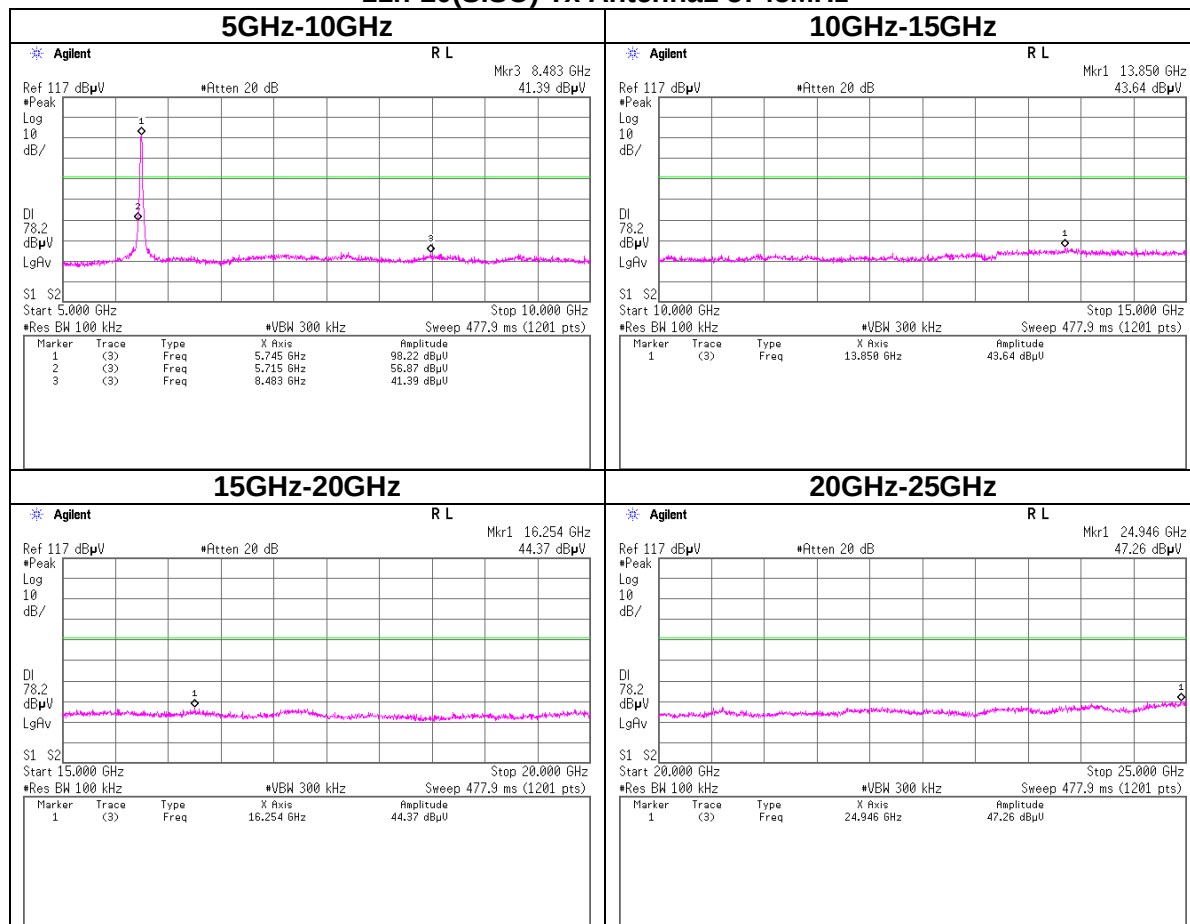
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna1 5745MHz



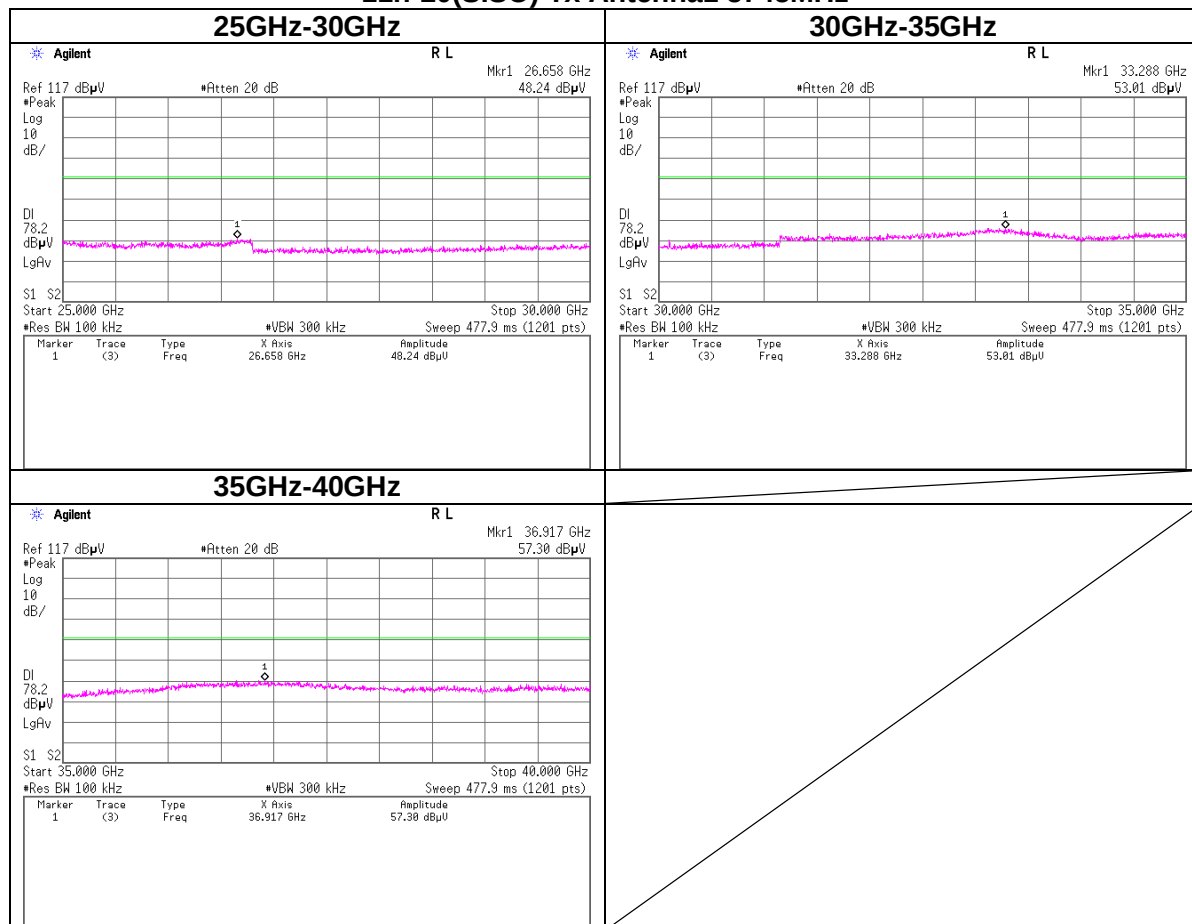
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna1 5745MHz



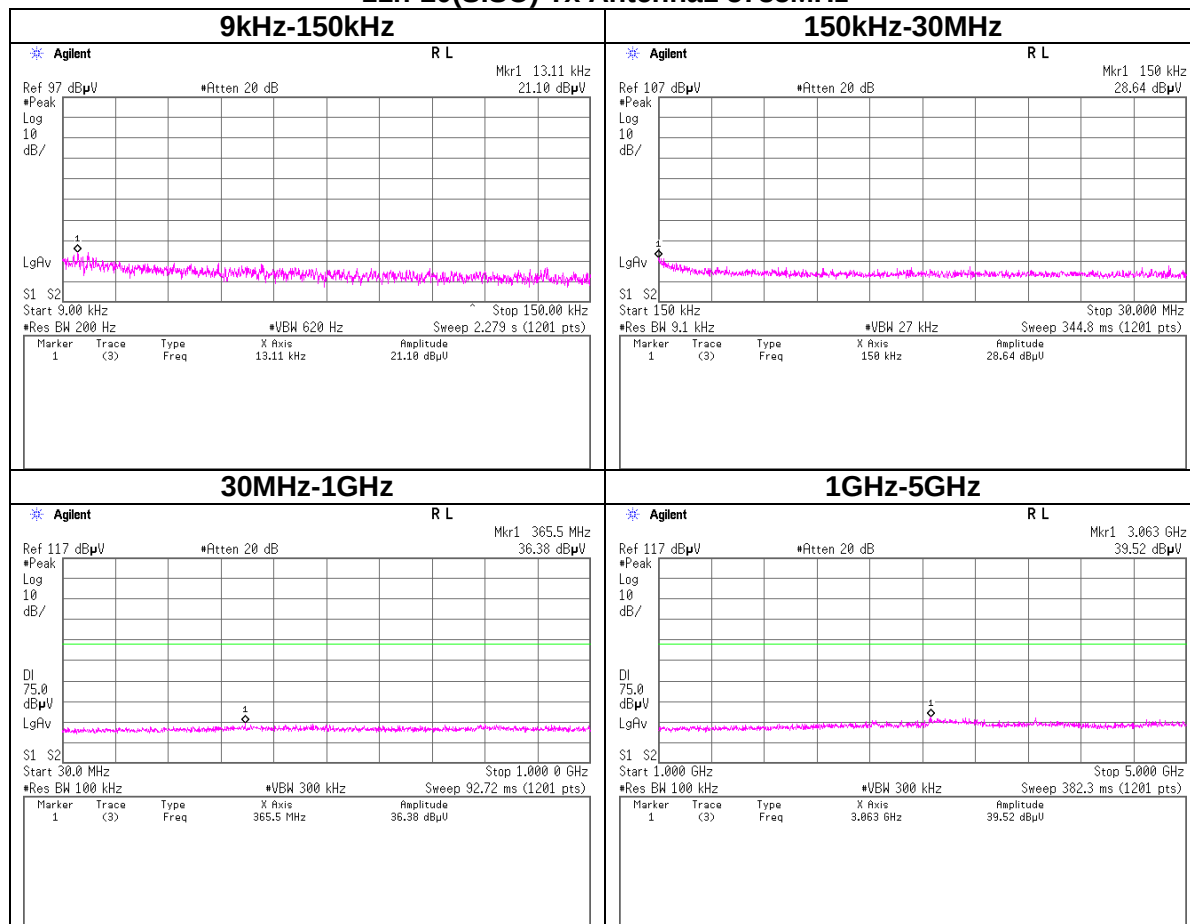
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(SISO) Tx Antenna1 5745MHz



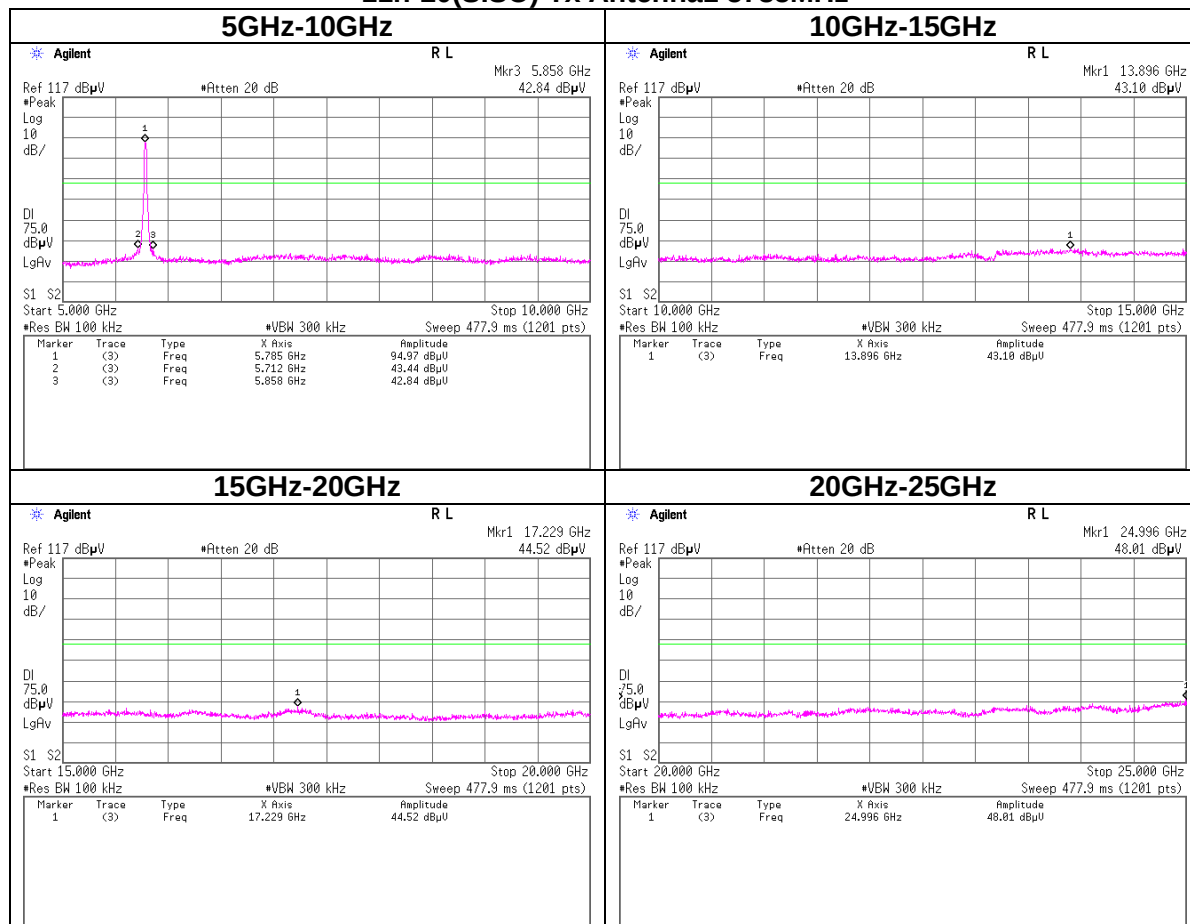
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna1 5785MHz



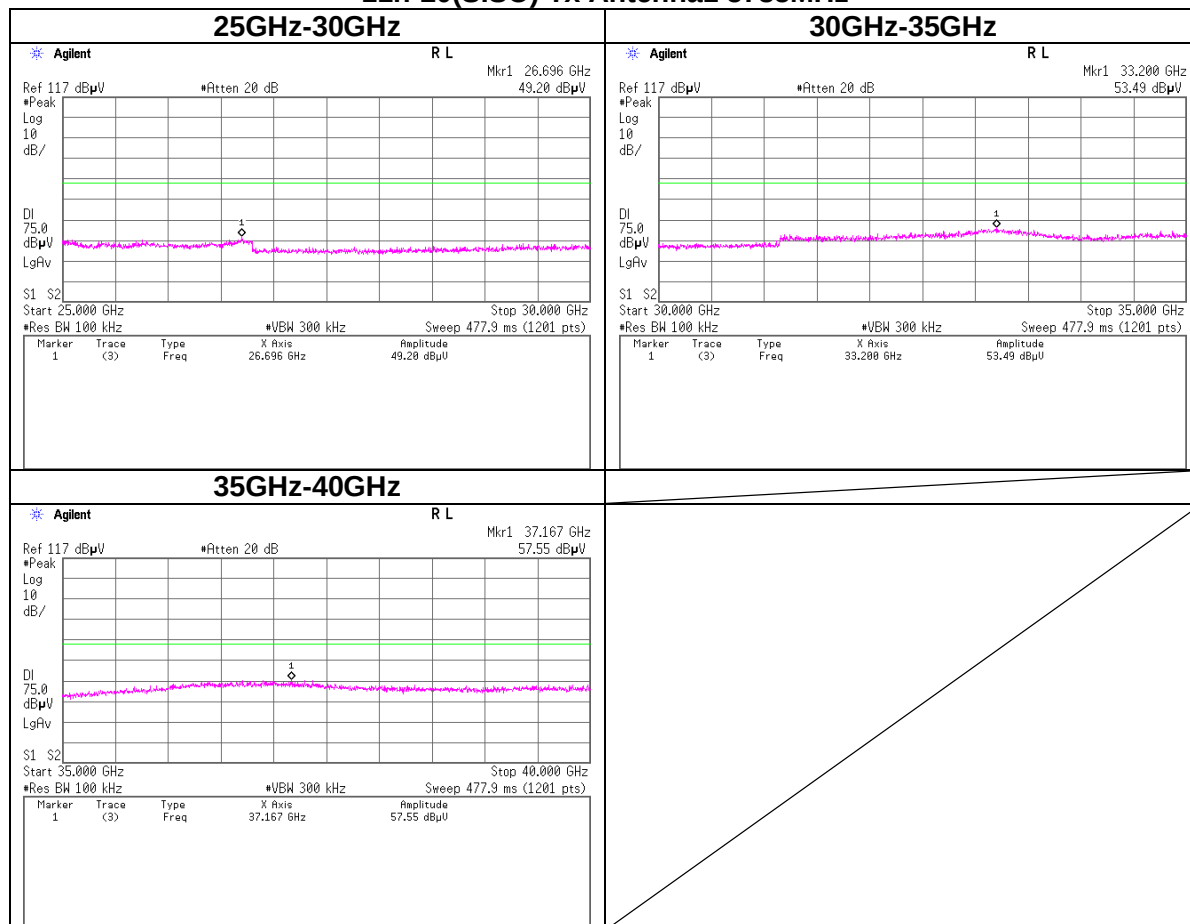
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna1 5785MHz



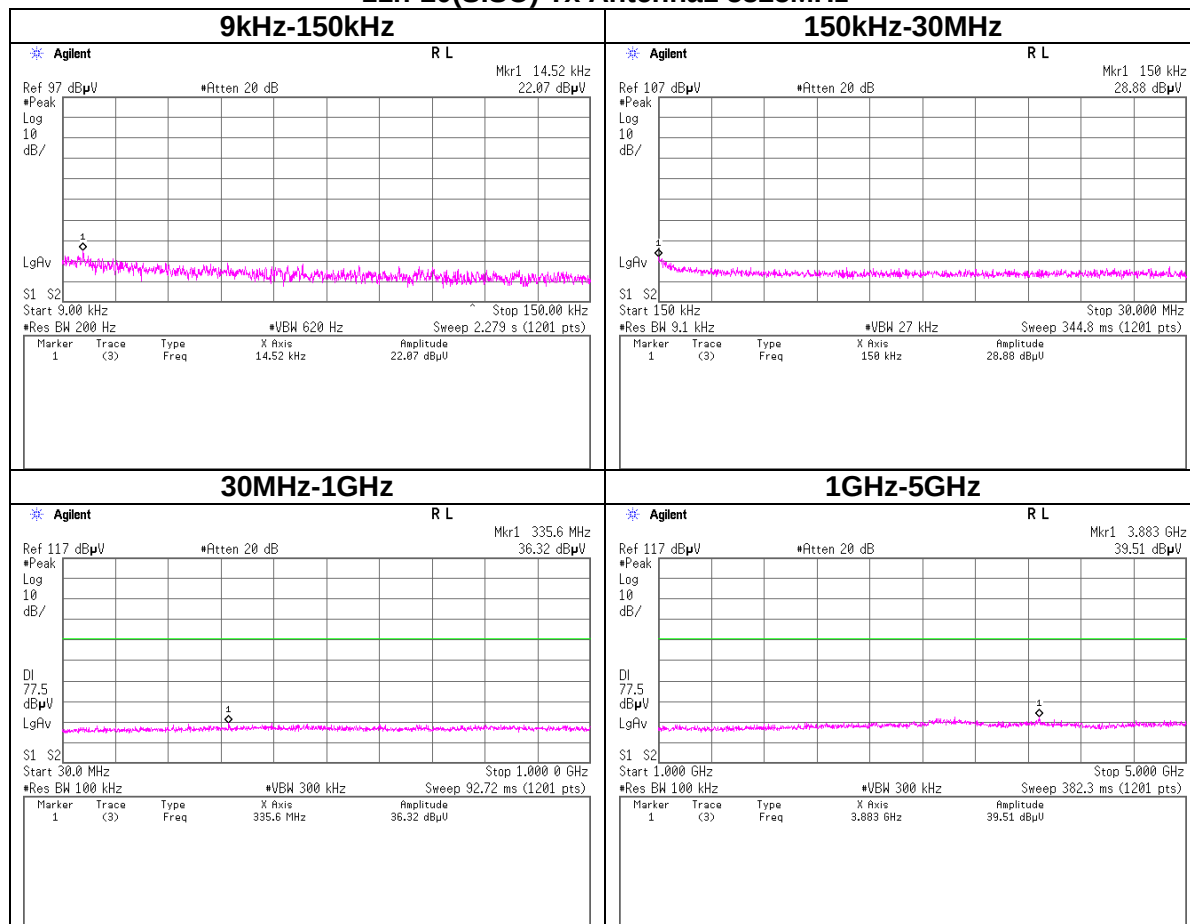
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(SISO) Tx Antenna1 5785MHz



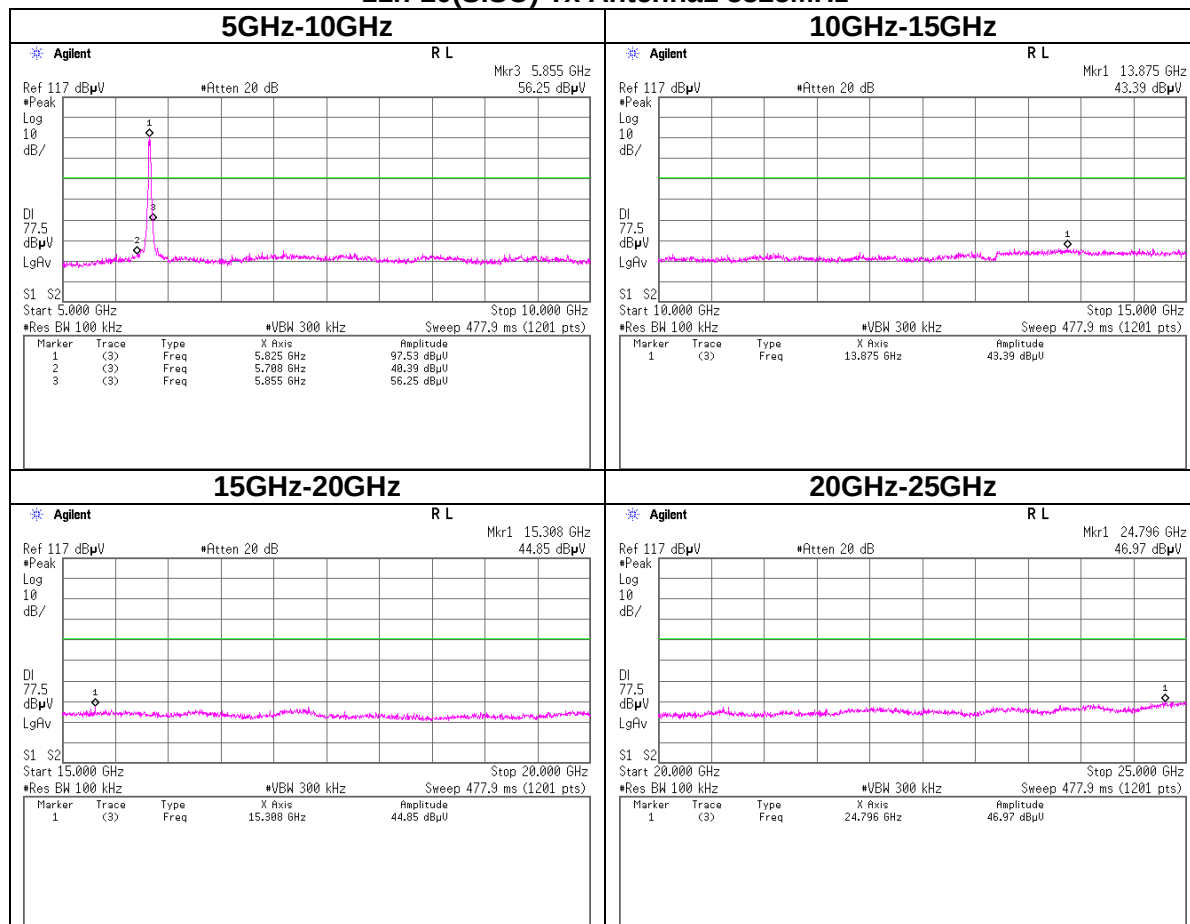
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna1 5825MHz



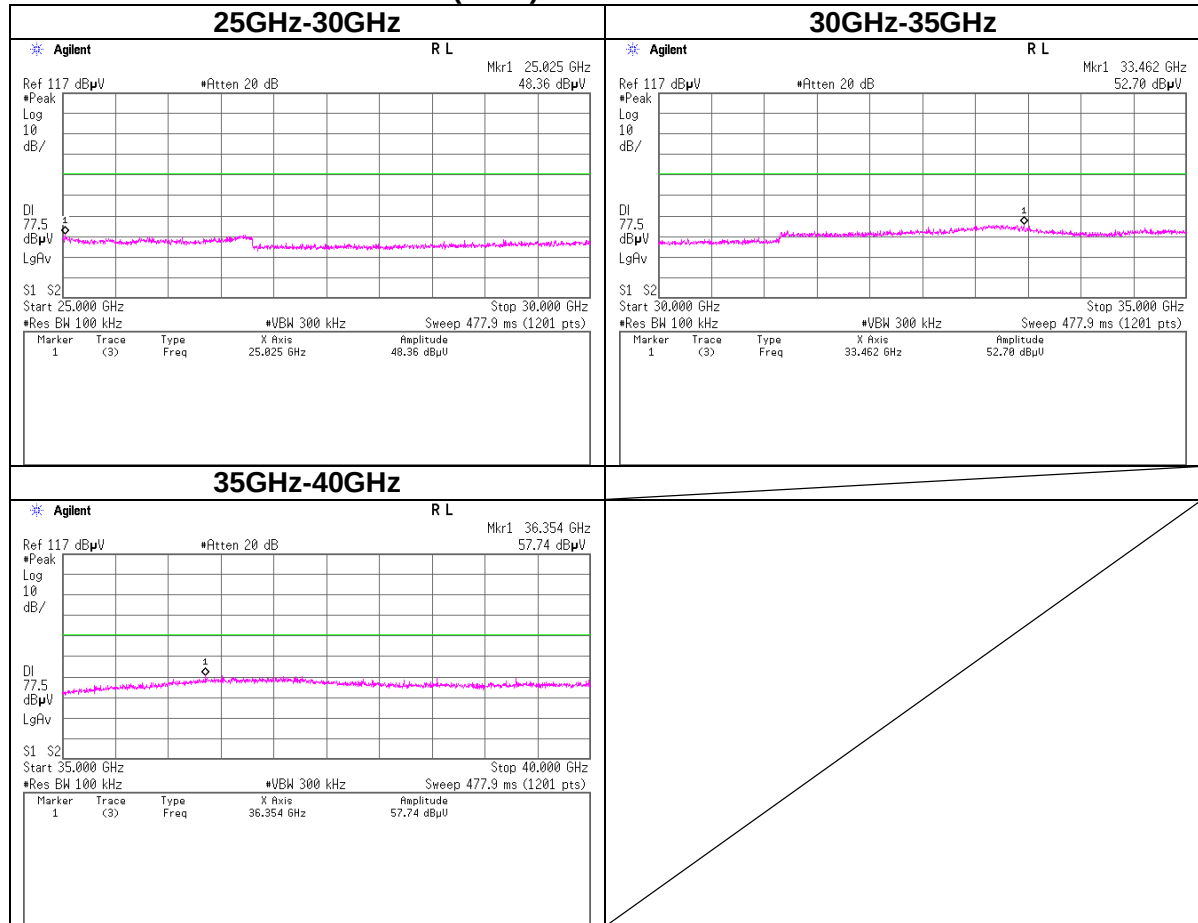
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna1 5825MHz



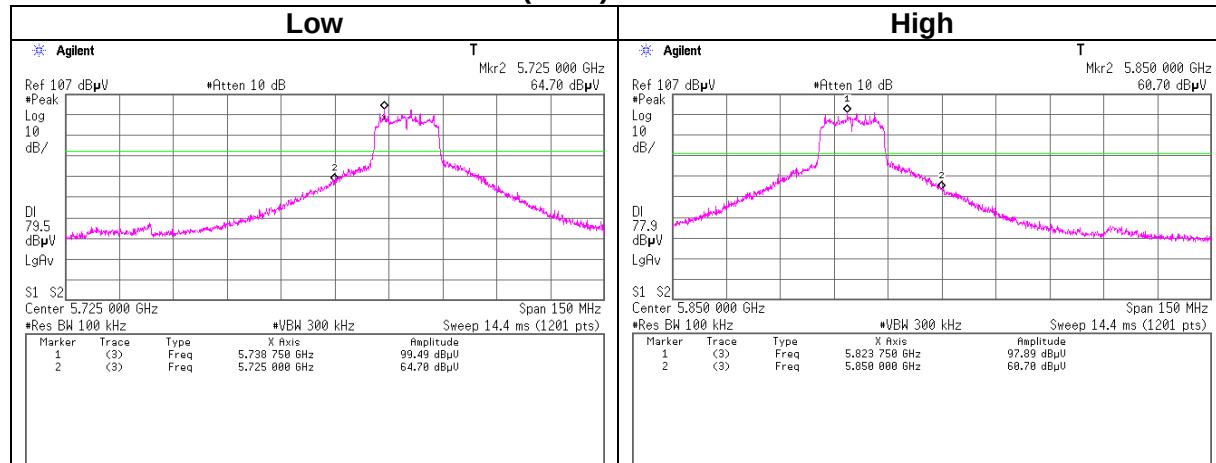
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(SISO) Tx Antenna1 5825MHz

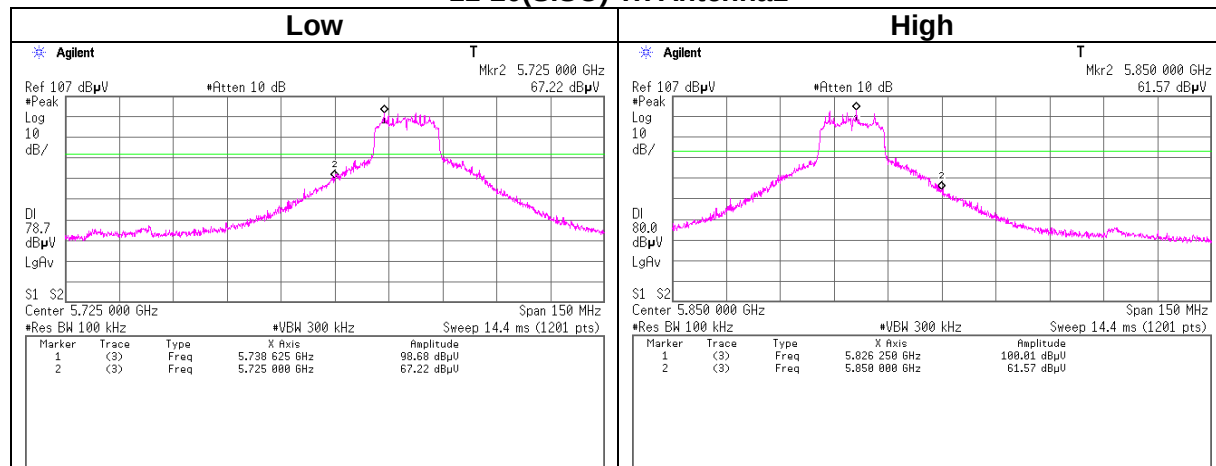


Conducted Emission Band Edge compliance

11-20(SISO) Tx Antenna0



11-20(SISO) Tx Antenna1



6.2. 802.11n HT20 MIMO MODE IN THE 5.8 GHz BAND

6.2.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5745	12.62	12.81	15.73
Middle	5785	12.55	12.67	15.62
High	5825	12.53	12.63	15.59

6.2.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

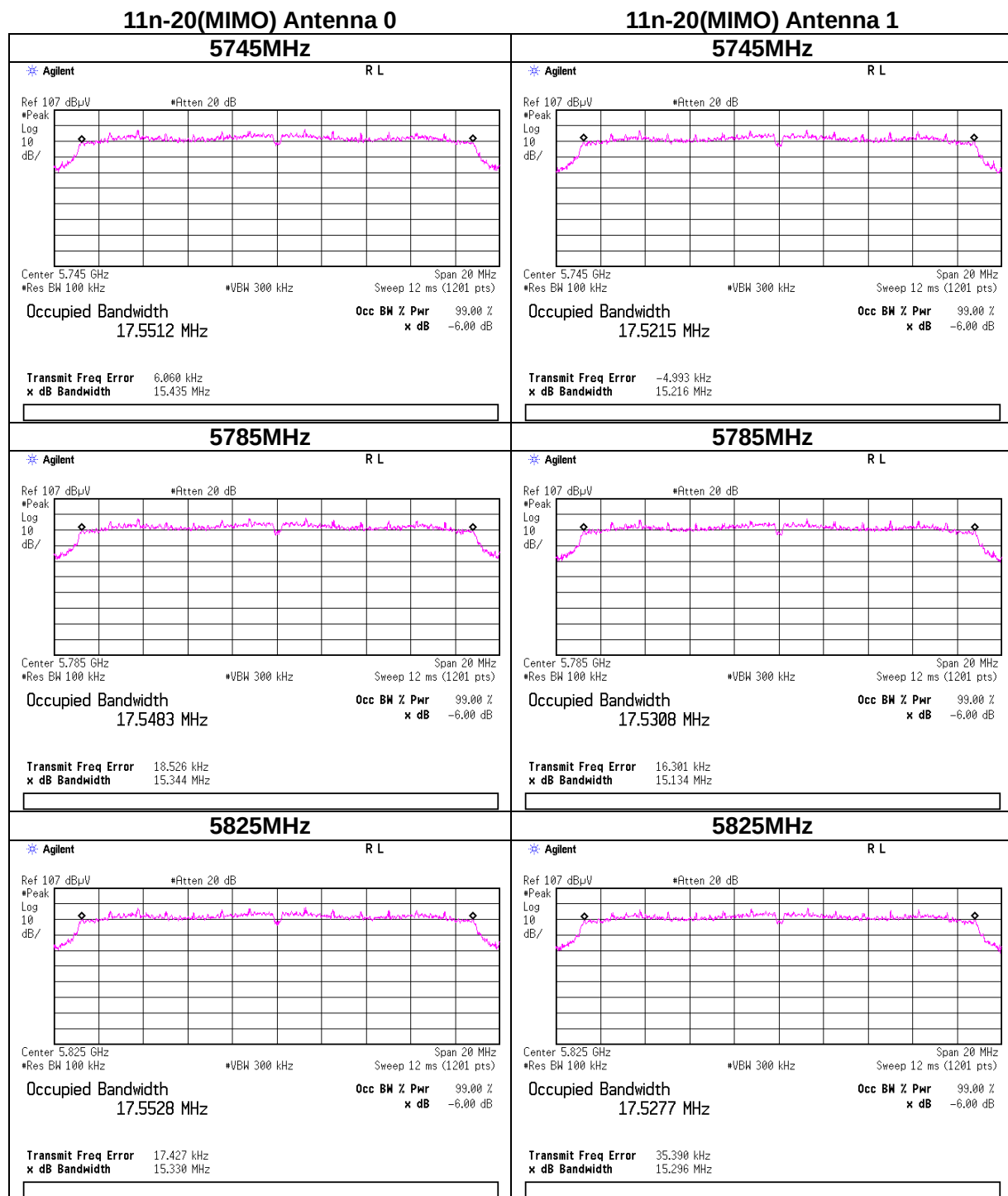
Antenna 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.435	0.5
Middle	5785	15.344	0.5
High	5825	15.330	0.5

Antenna 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.216	0.5
Middle	5785	15.134	0.5
High	5825	15.296	0.5

6 dB BANDWIDTH



6.2.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

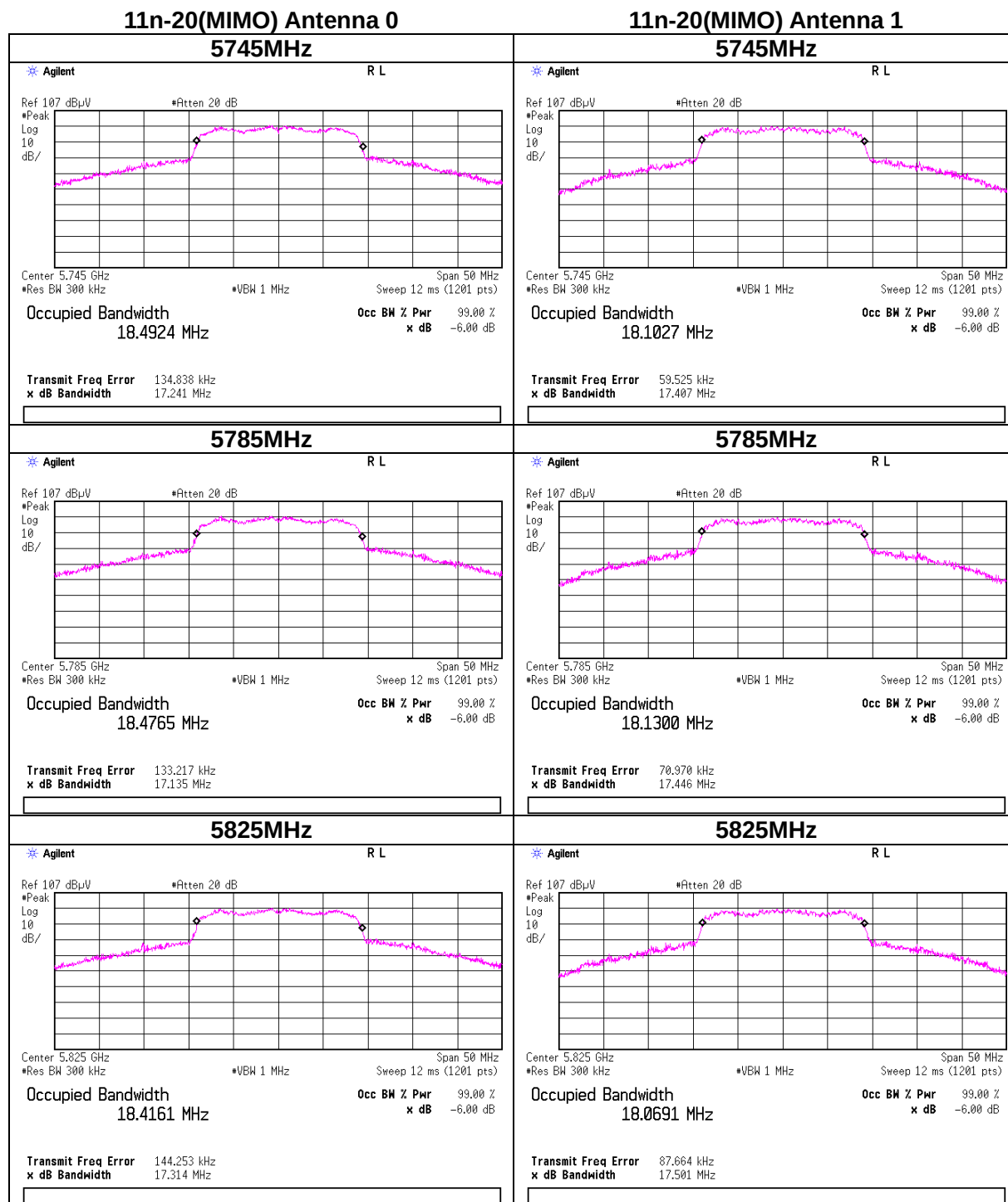
Antenna 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	18.4924
Middle	5785	18.4765
High	5825	18.4161

Antenna 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	18.1027
Middle	5785	18.1300
High	5825	18.0691

99% BANDWIDTH



6.2.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The highest combination of antenna gains is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using the Peak power meter.

RESULTS

Antenna 0+1

Channel	Frequency (MHz)	Antenna 0 Result (mW)	Antenna 1 Result (mW)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	116.14	112.98	23.60	30	-6.40
Middle	5785	114.02	110.15	23.51	30	-6.49
High	5825	112.72	105.93	23.40	30	-6.60

Sample calculation: Result=Antenna 0 + 1

Antenna 0

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	9.14	11.51	20.65	30	-9.35
Middle	5785	9.05	11.52	20.57	30	-9.43
High	5825	8.99	11.53	20.52	30	-9.48

Antenna 1

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	9.02	11.51	20.53	30	-9.47
Middle	5785	8.90	11.52	20.42	30	-9.58
High	5825	8.72	11.53	20.25	30	-9.75

6.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Peak output power was measured, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

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.

RESULTS:

Antenna 0 + 1

Channel	Frequency (MHz)	Antenna 0 PPSD (mW)	Antenna 1 PPSD (mW)	PPSD (dBm)	Limit (dB)	Margin (dB)
Low	5745	0.74	0.79	1.83	8	-6.17
Middle	5785	0.67	0.75	1.53	8	-6.47
High	5825	0.69	0.81	1.76	8	-6.24

Sample caluculation: Result=Antenna 0 + 1

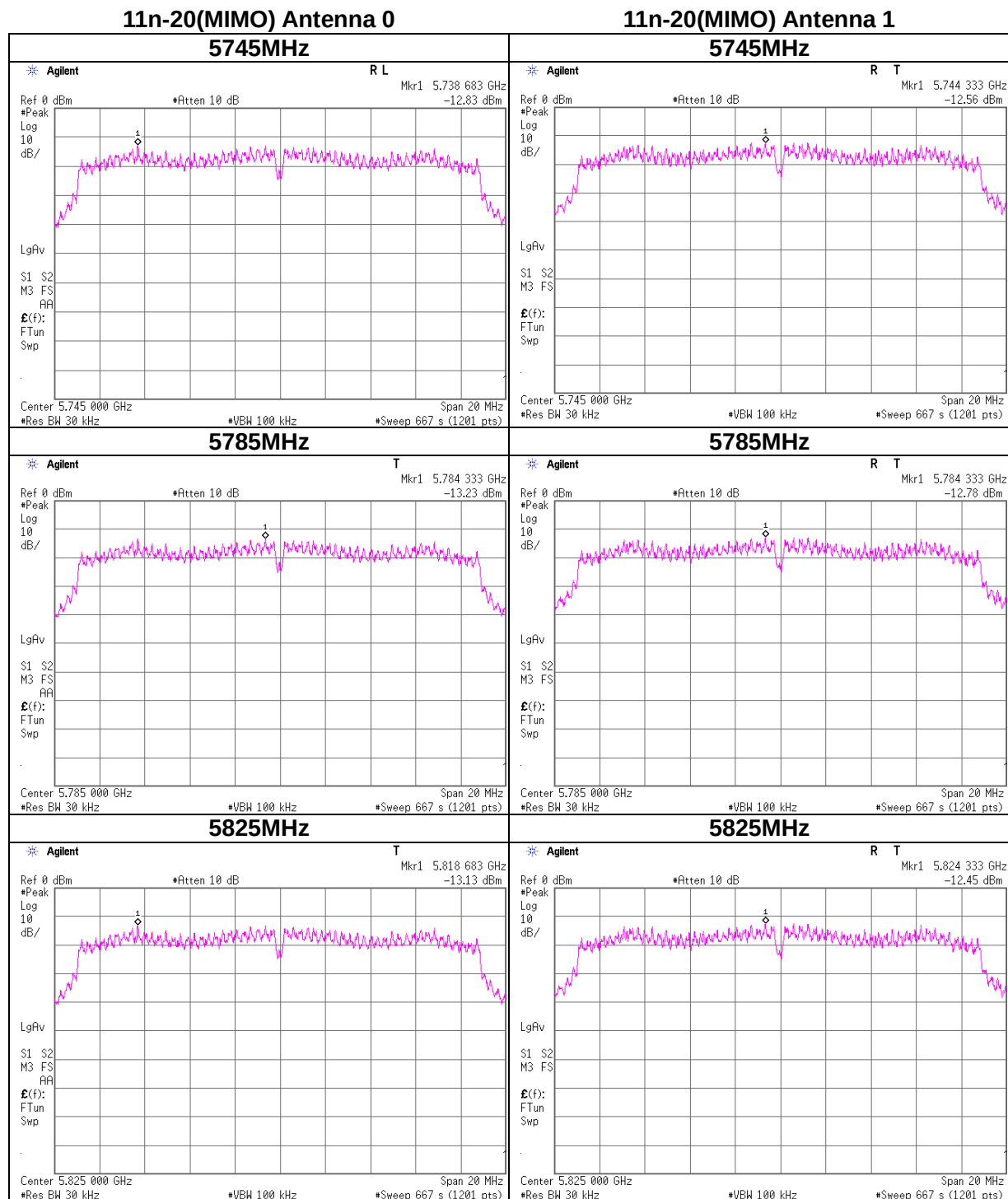
Antenna 0

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dB)	Margin (dB)
Low	5745	-1.32	8	-9.32
Middle	5785	-1.71	8	-9.71
High	5825	-1.60	8	-9.60

Antenna 1

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dB)	Margin (dB)
Low	5745	-1.05	8	-9.05
Middle	5785	-1.26	8	-9.26
High	5825	-0.92	8	-8.92

POWER SPECTRAL DENSITY



6.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

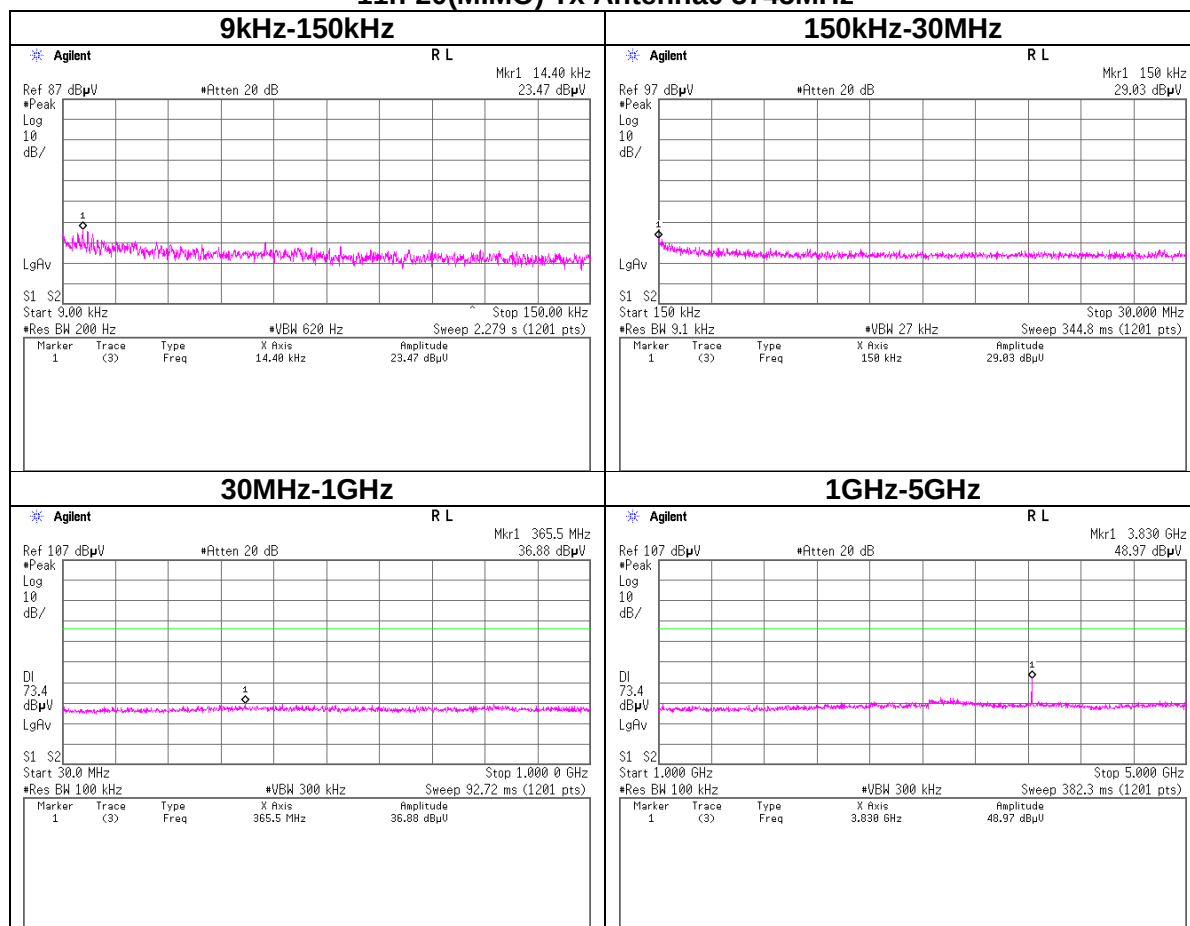
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

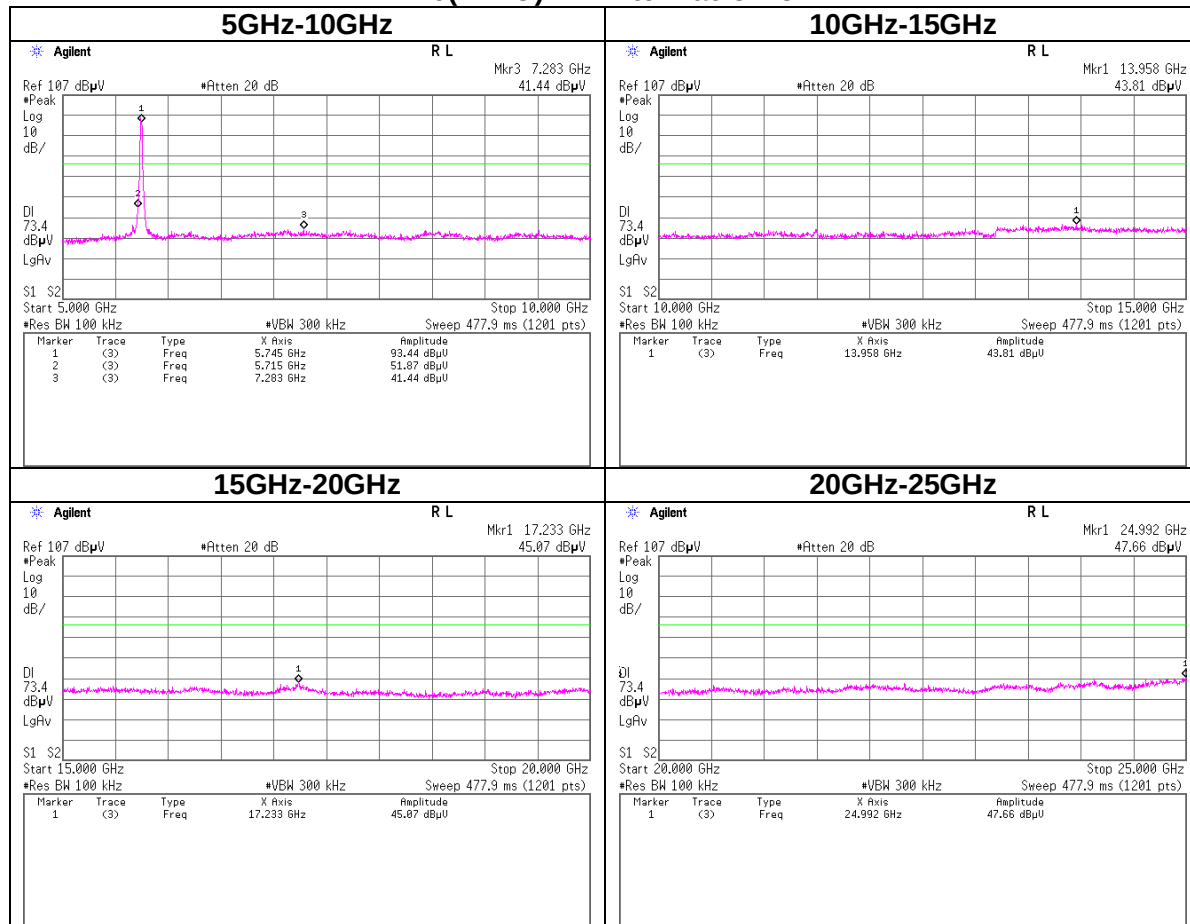
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna0 5745MHz



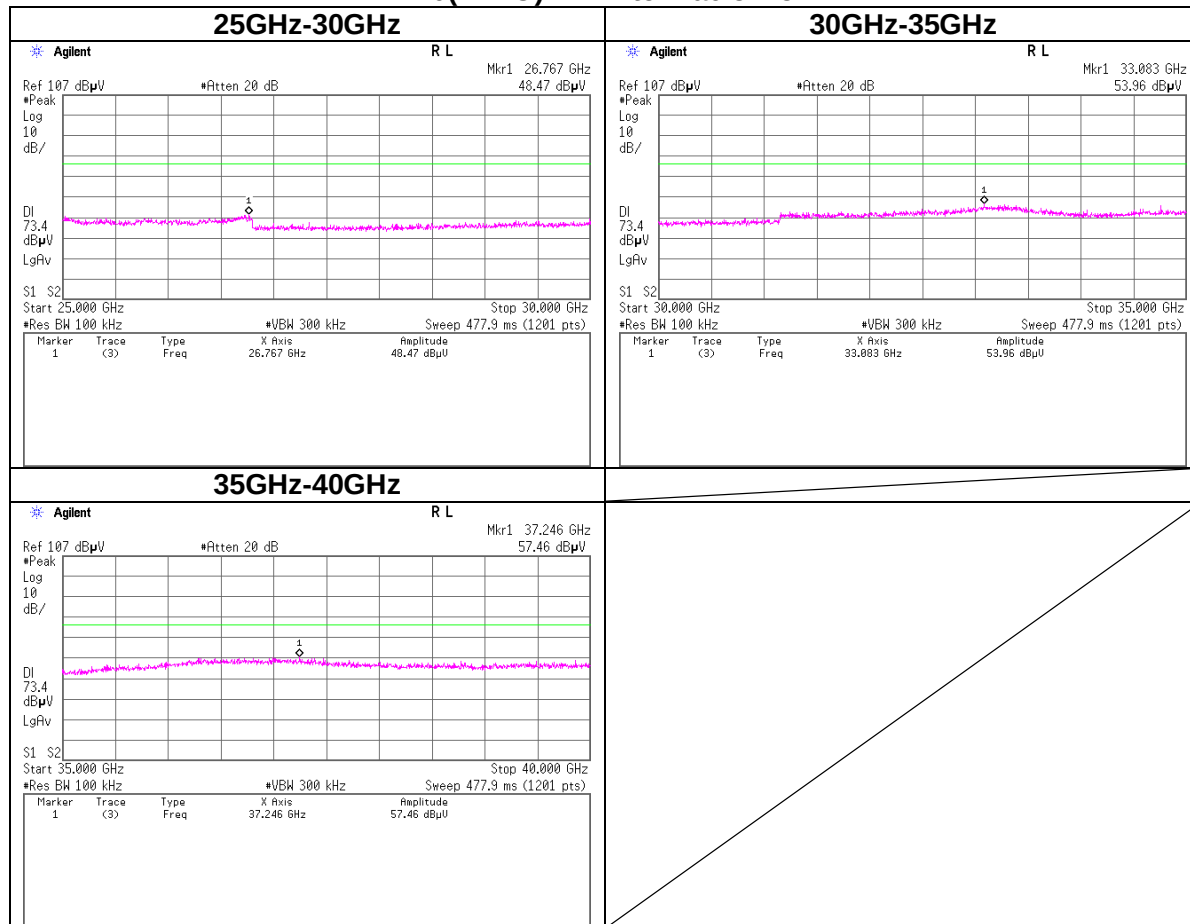
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna0 5745MHz



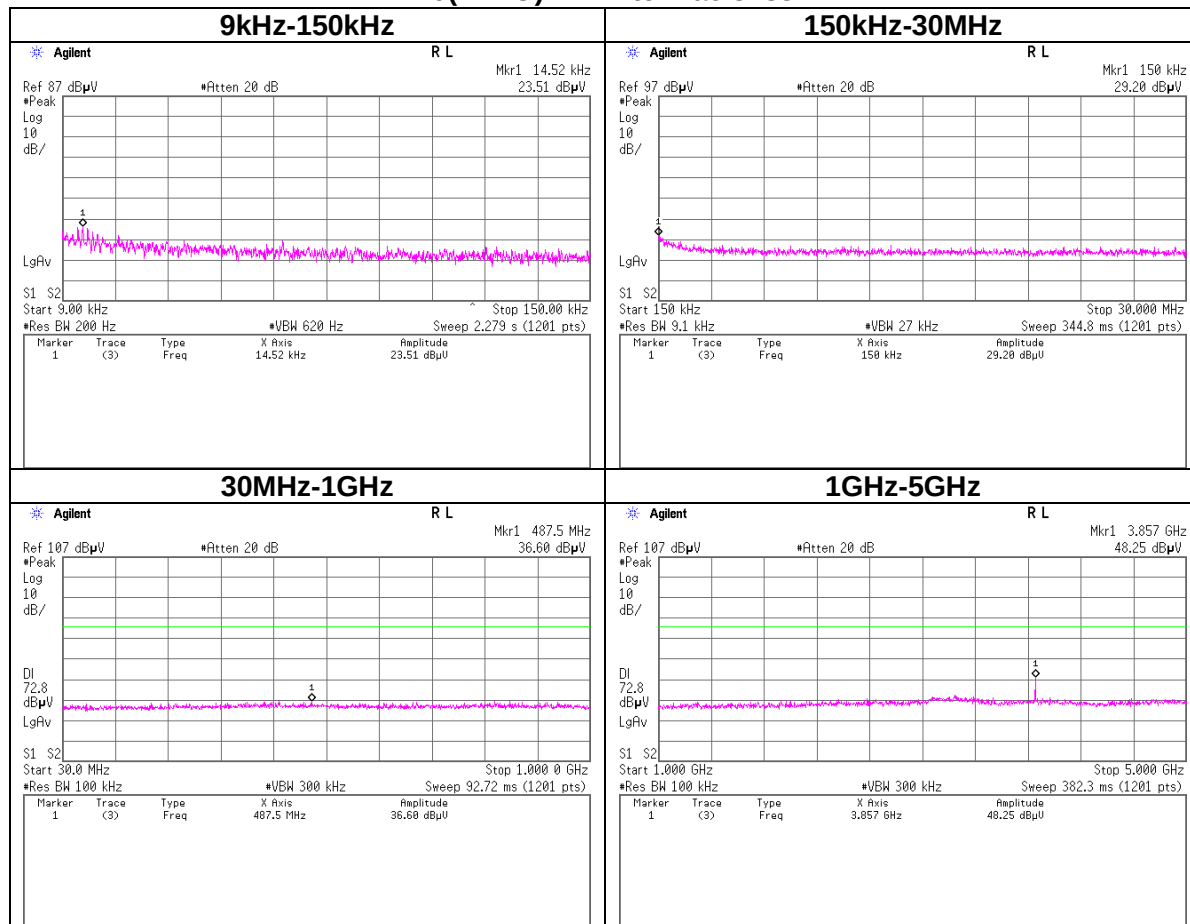
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna0 5745MHz



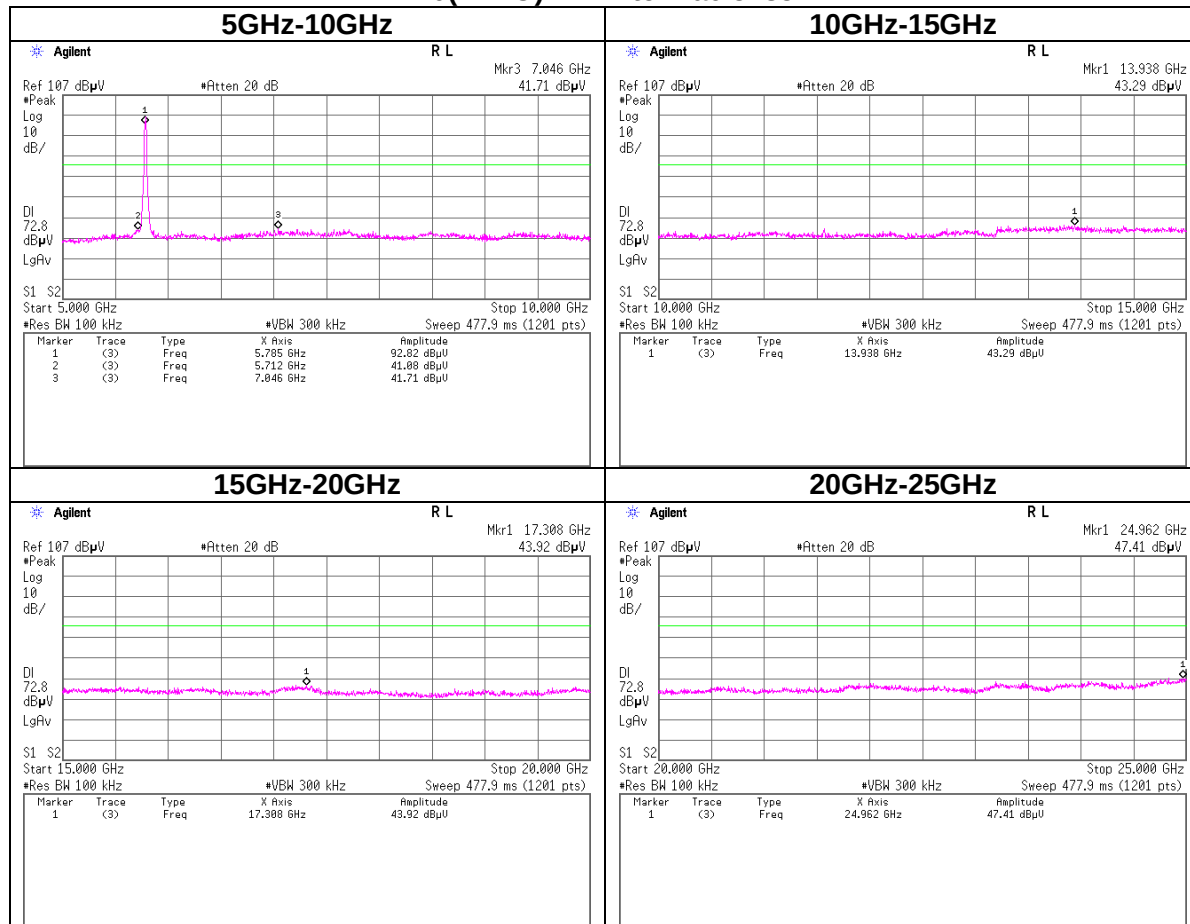
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna0 5785MHz



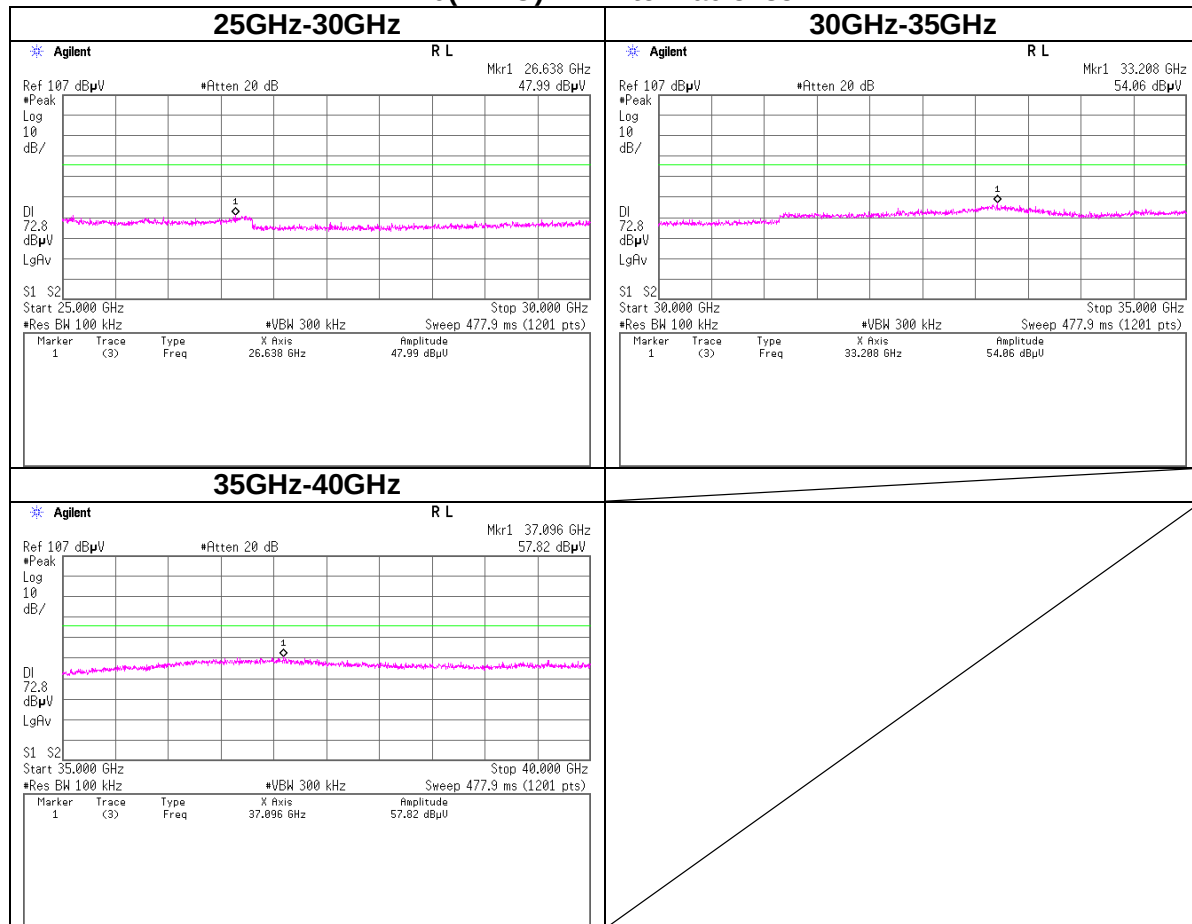
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna0 5785MHz



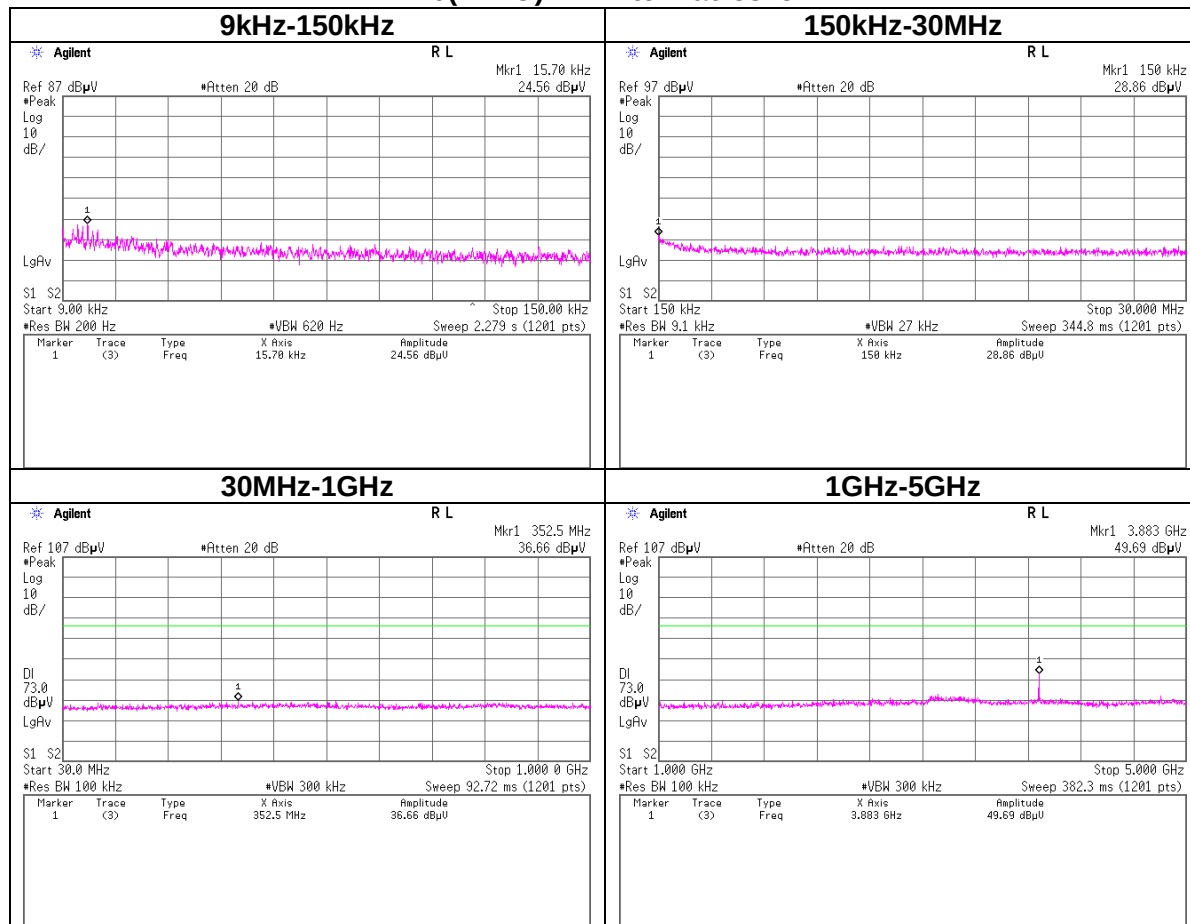
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna0 5785MHz



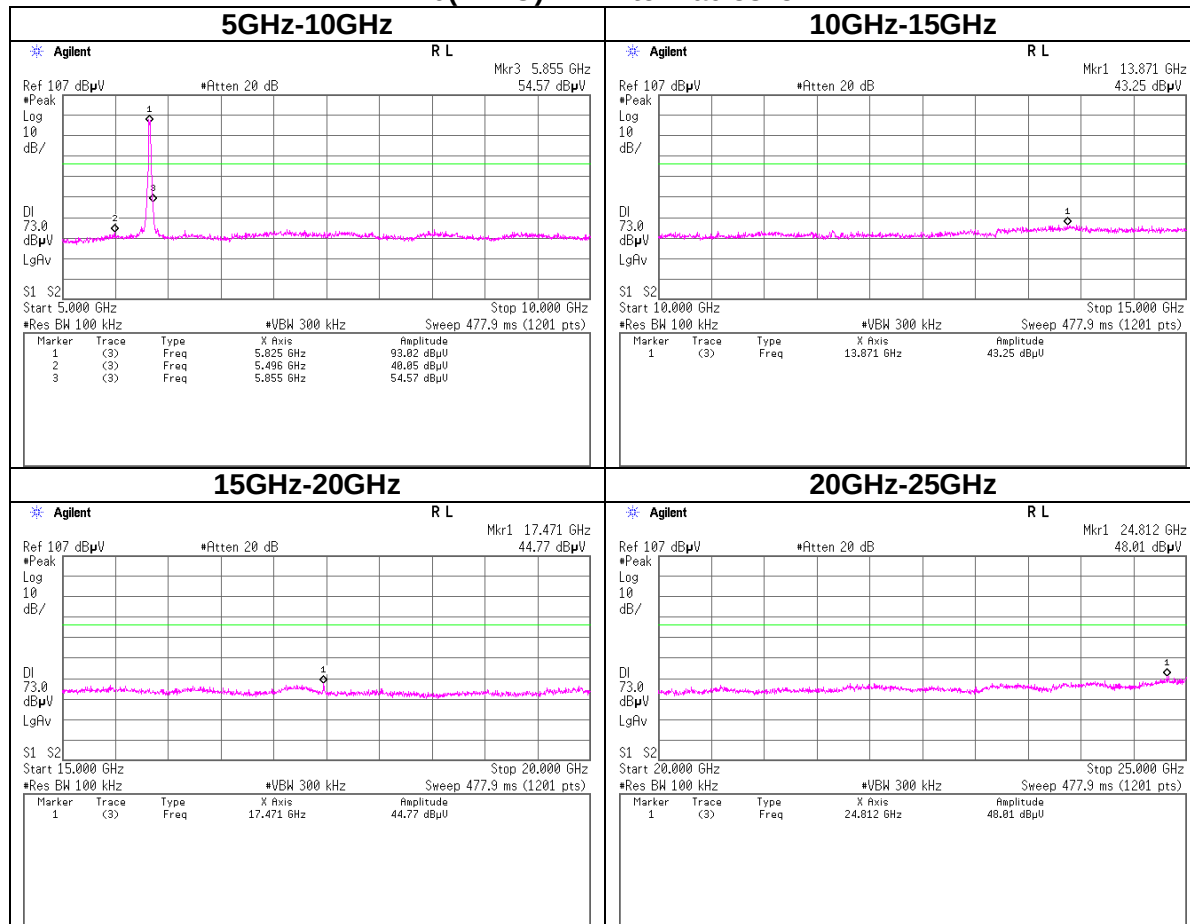
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna0 5825MHz



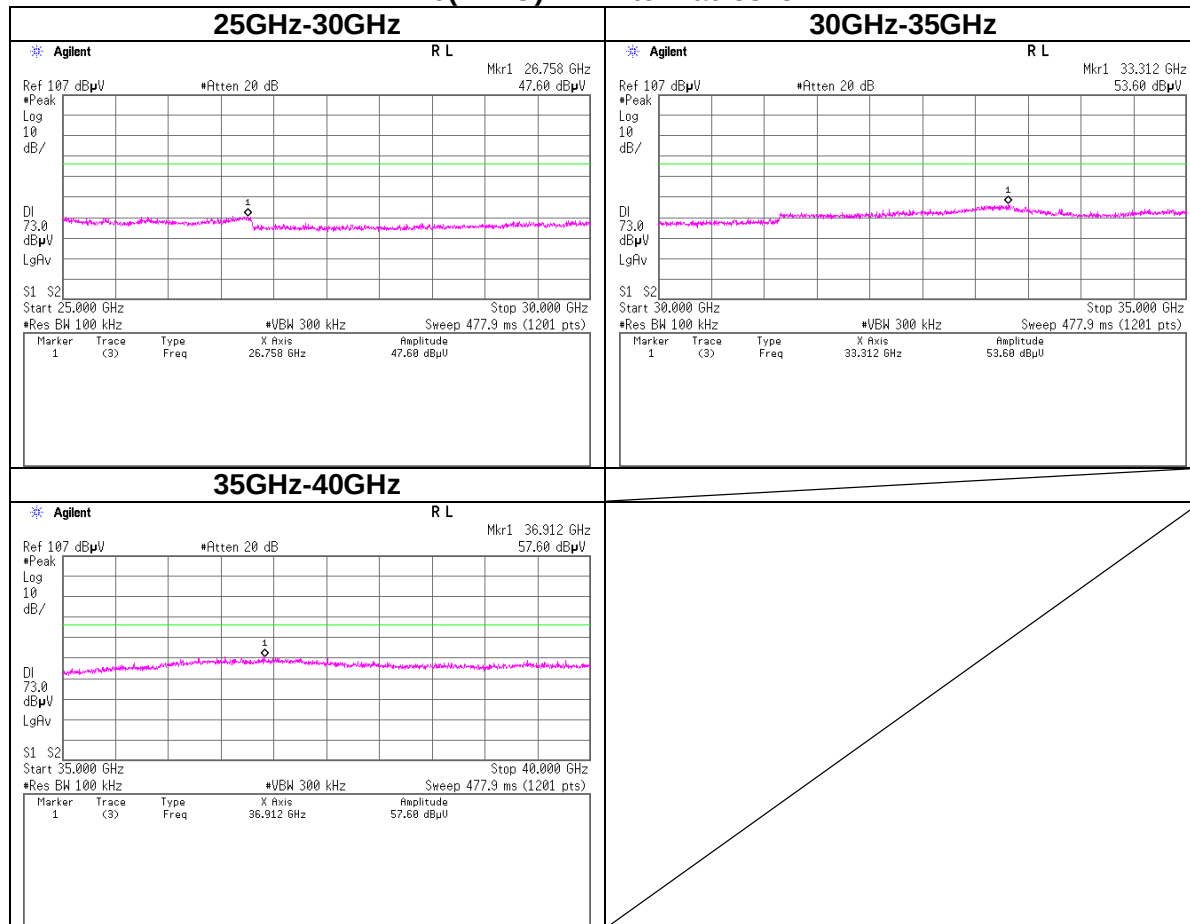
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna0 5825MHz



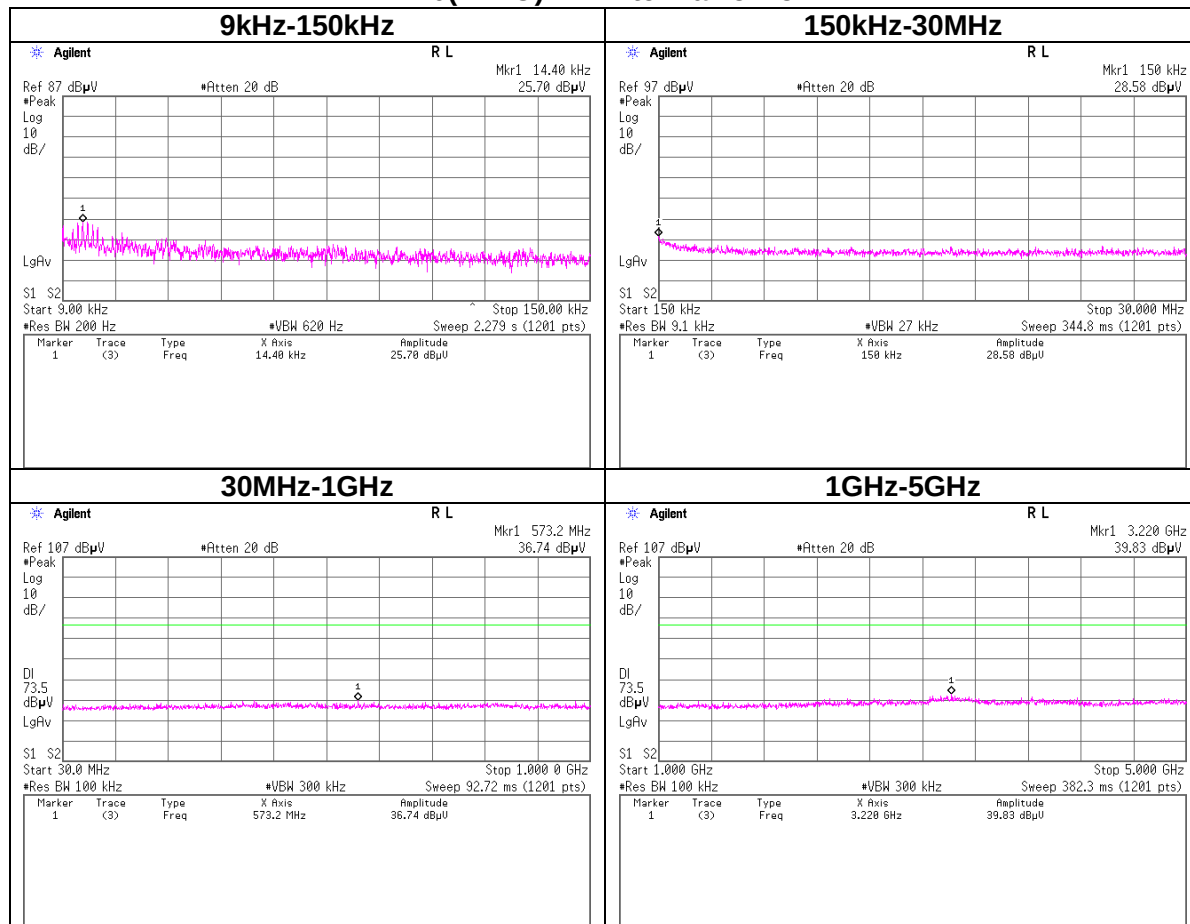
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna0 5825MHz



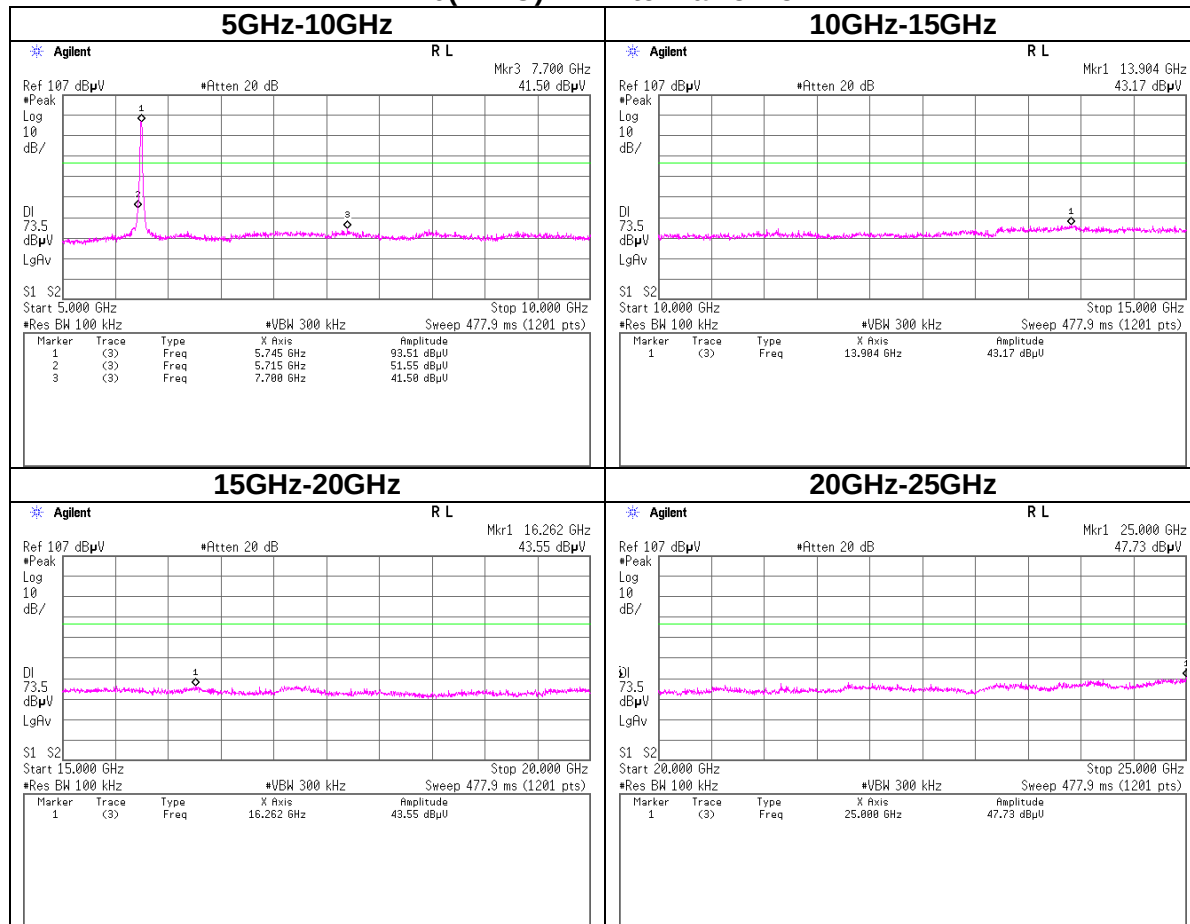
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna1 5745MHz



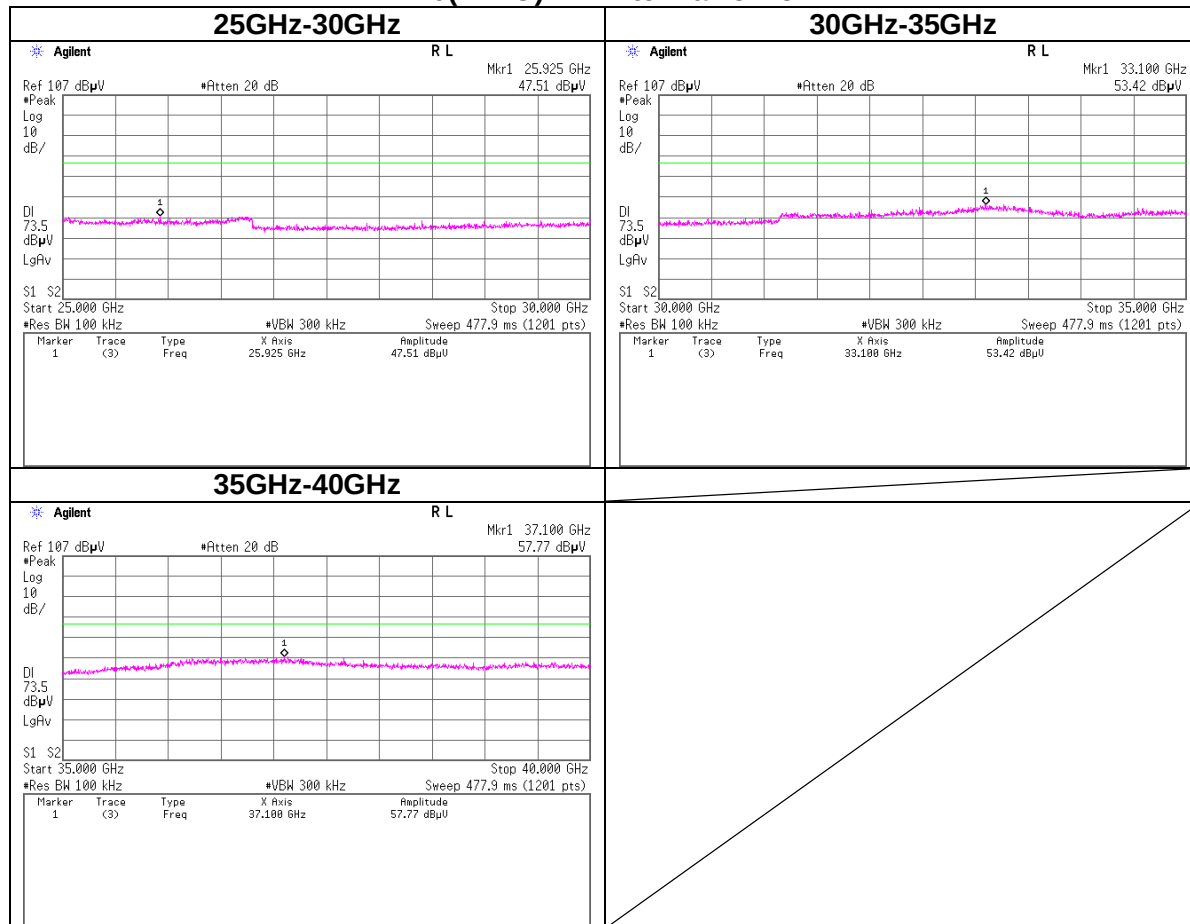
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna1 5745MHz



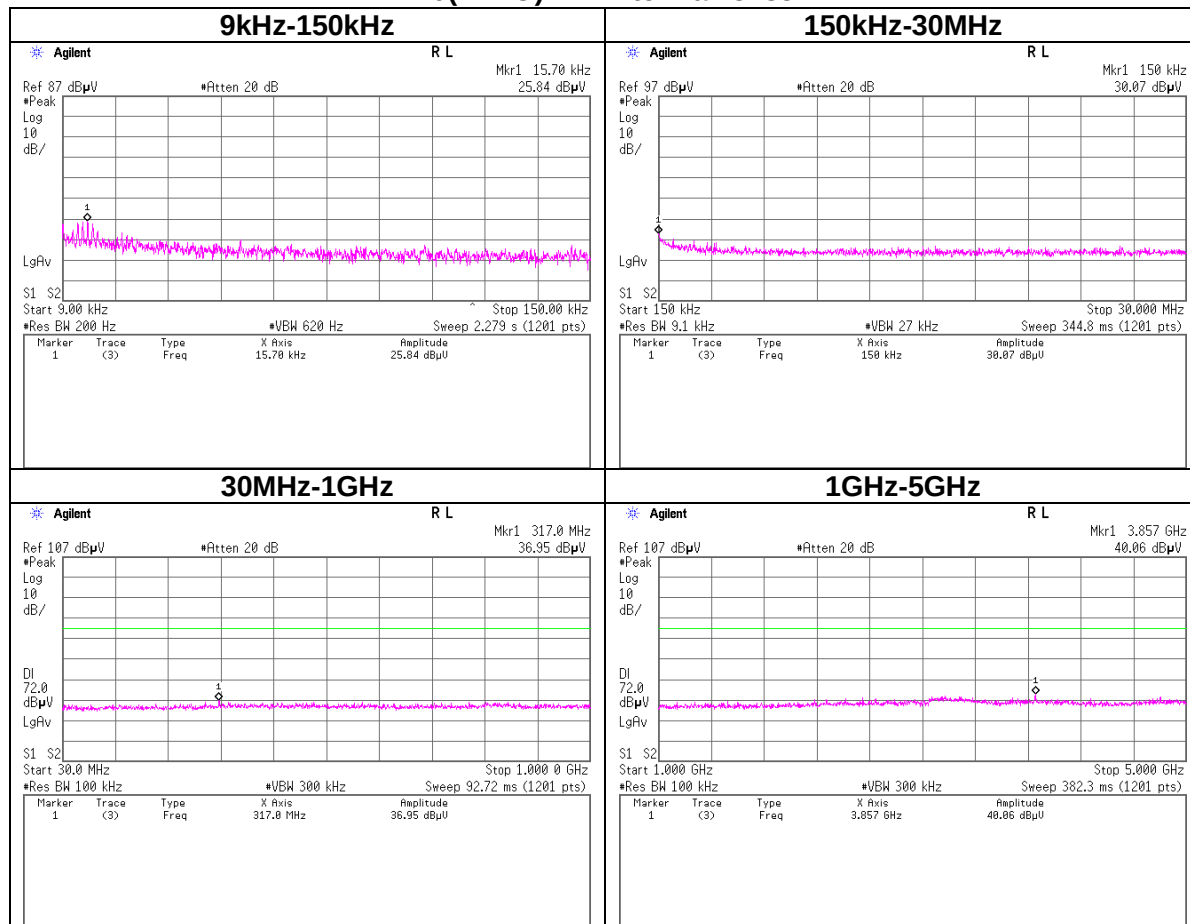
SPURIOUS EMISSIONS, LOW CHANNEL

11n-20(MIMO) Tx Antenna1 5745MHz



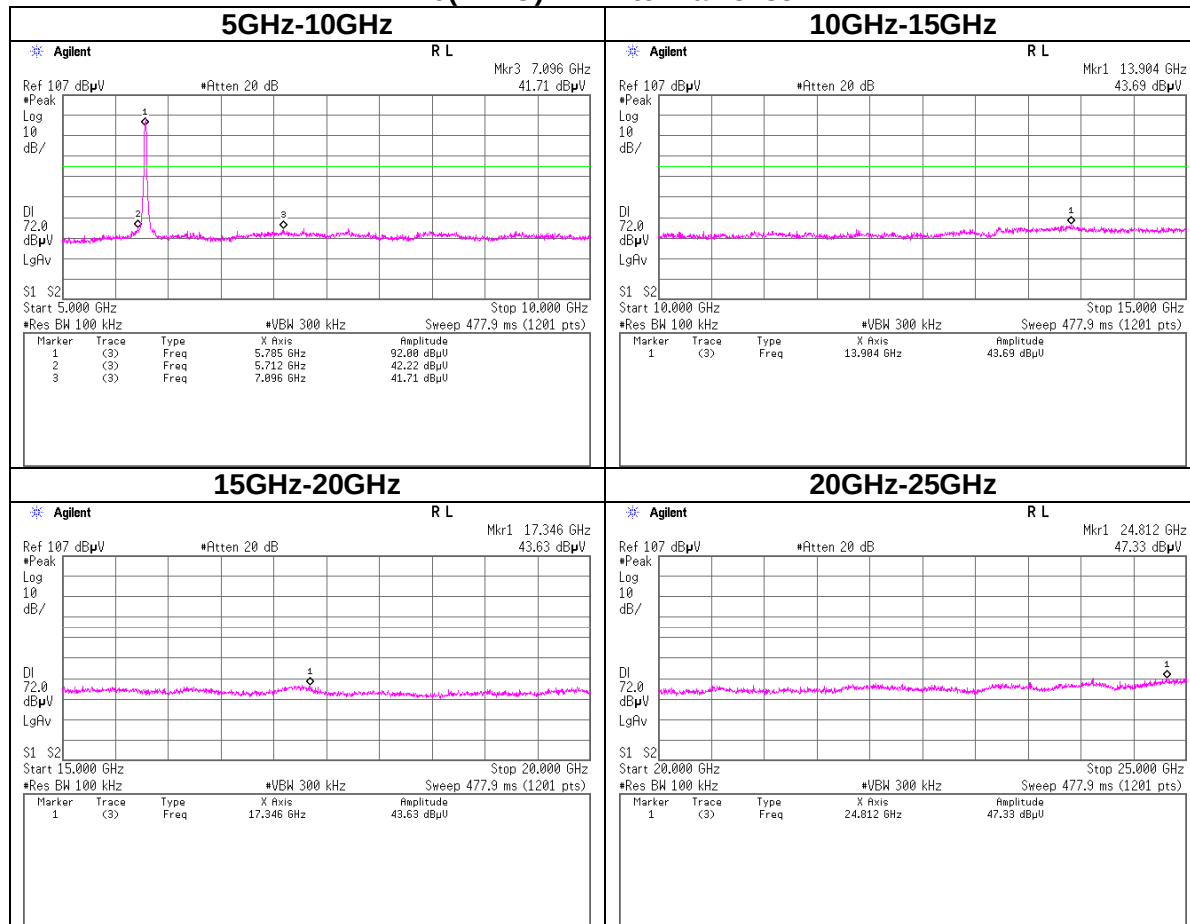
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna1 5785MHz



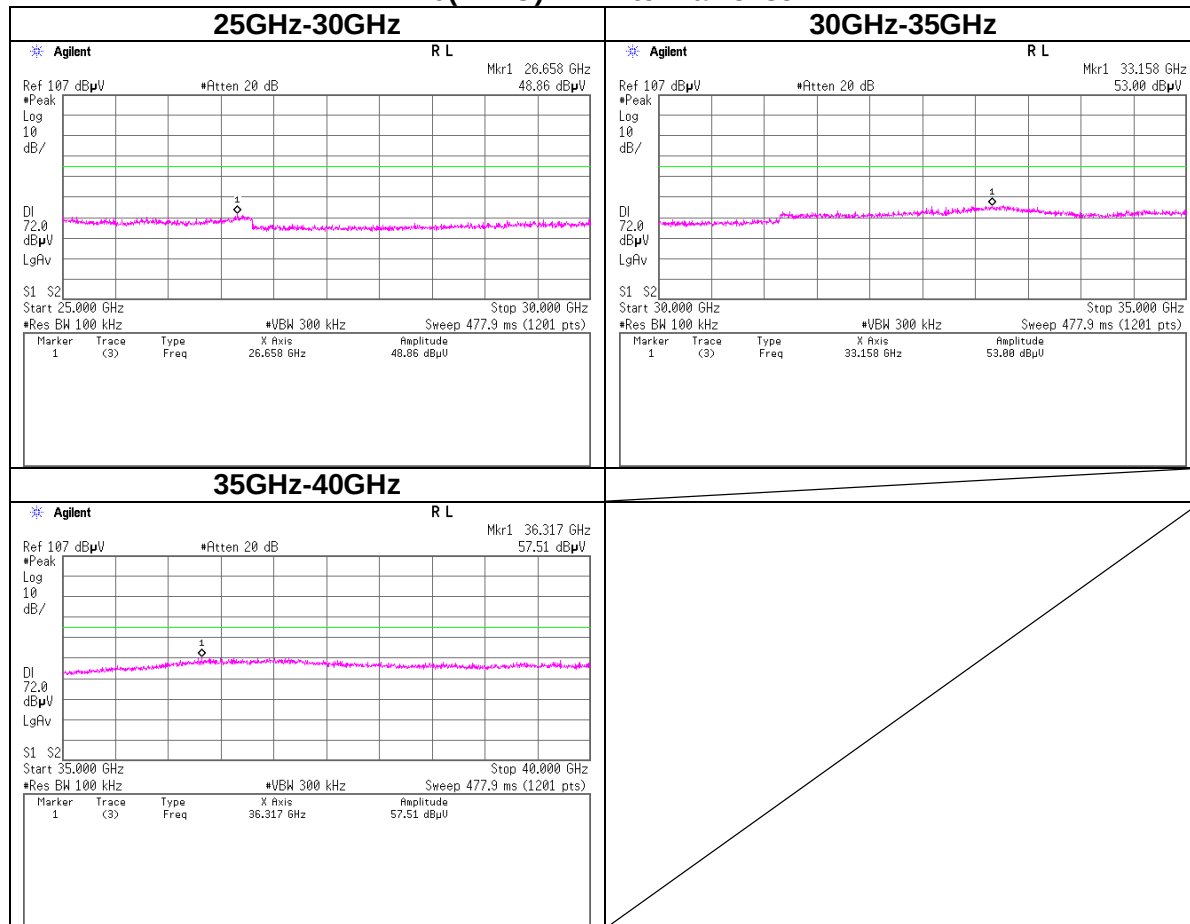
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna1 5785MHz



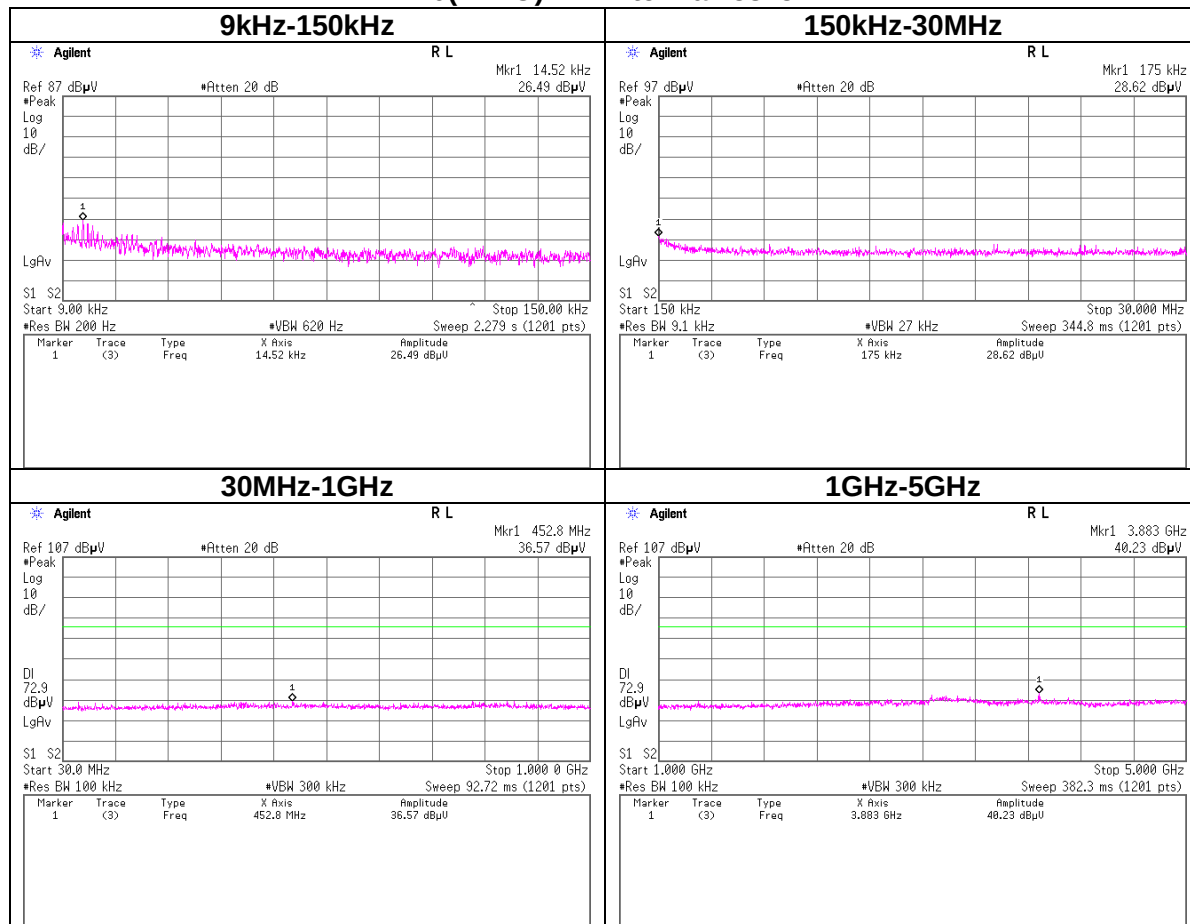
SPURIOUS EMISSIONS, MID CHANNEL

11n-20(MIMO) Tx Antenna1 5785MHz



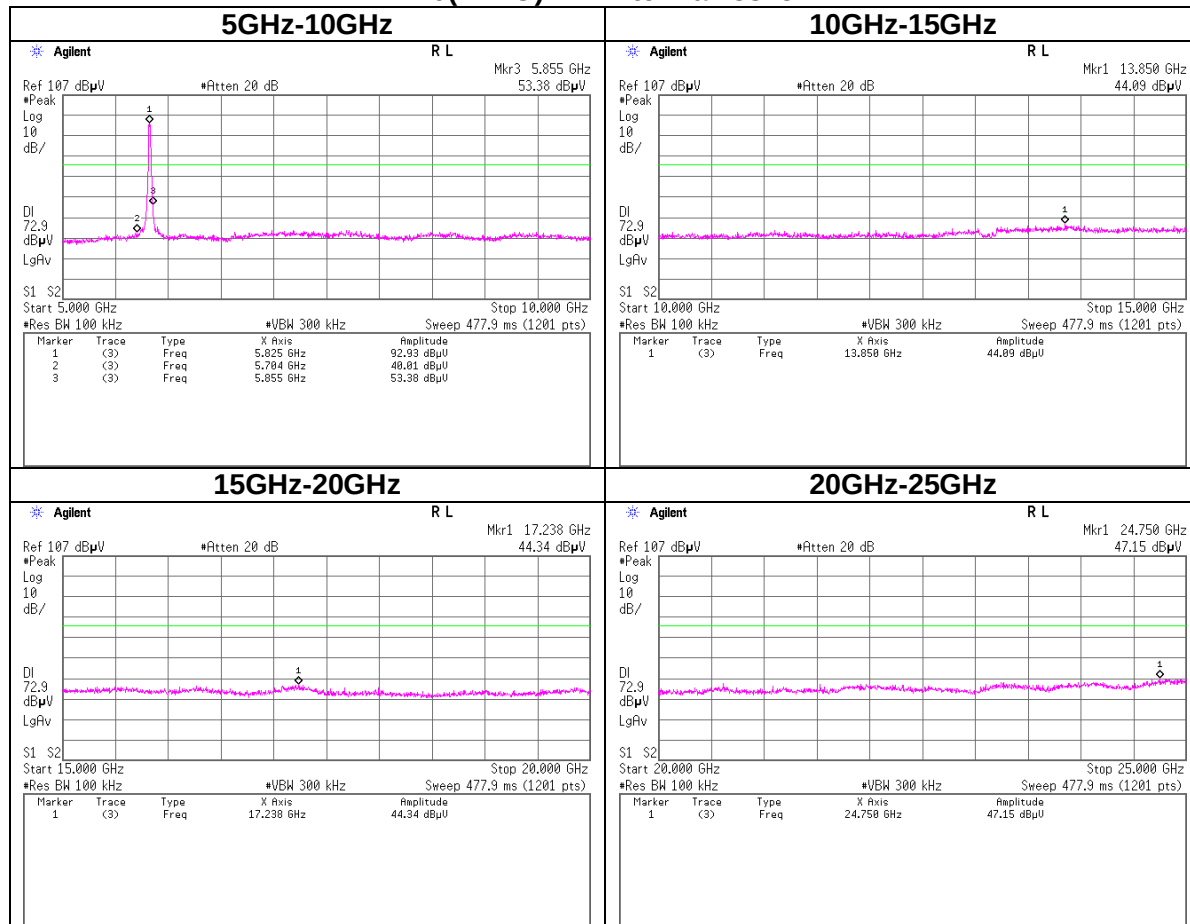
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna1 5825MHz



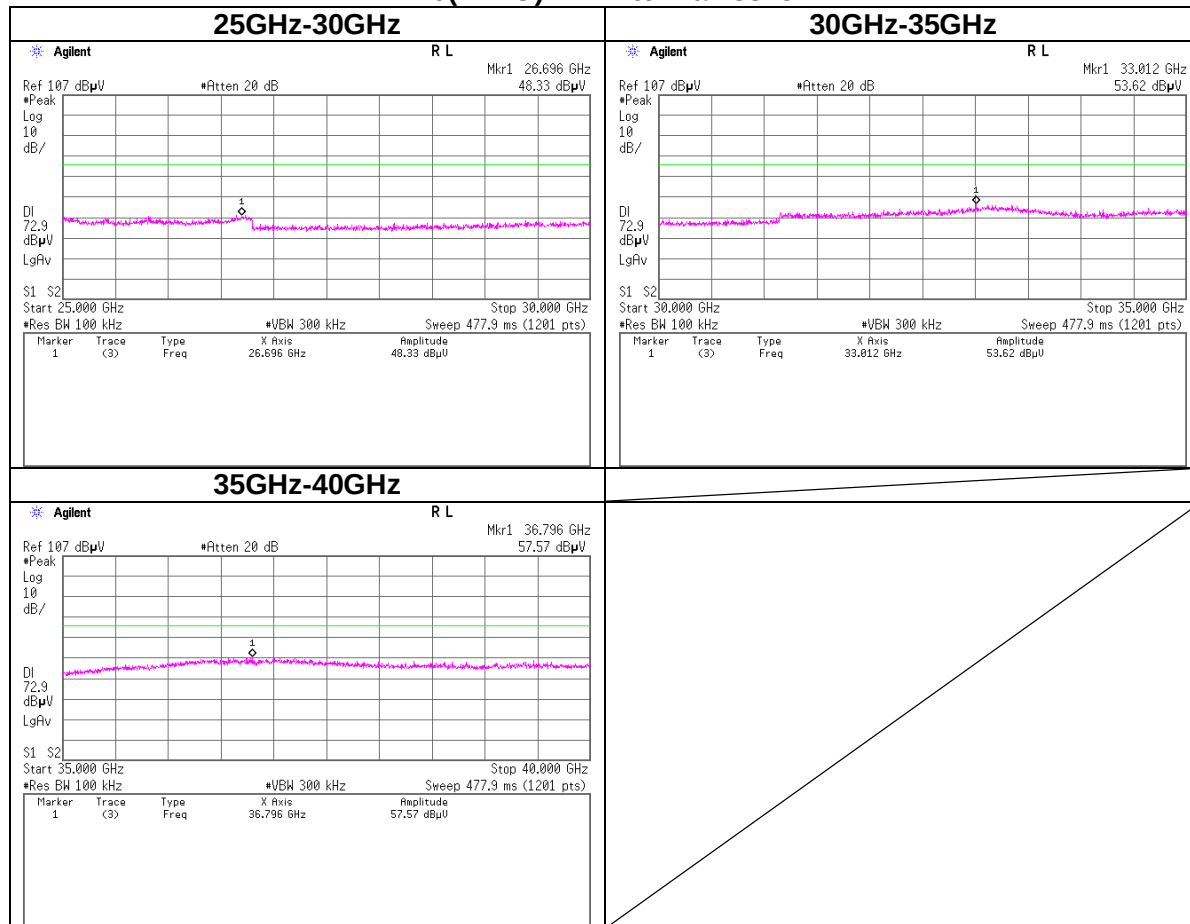
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna1 5825MHz



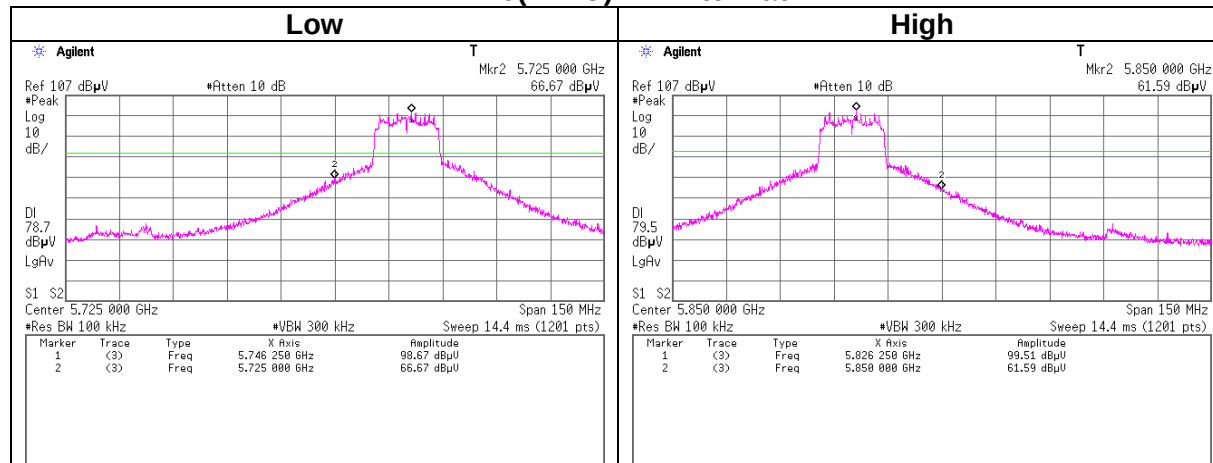
SPURIOUS EMISSIONS, HIGH CHANNEL

11n-20(MIMO) Tx Antenna1 5825MHz

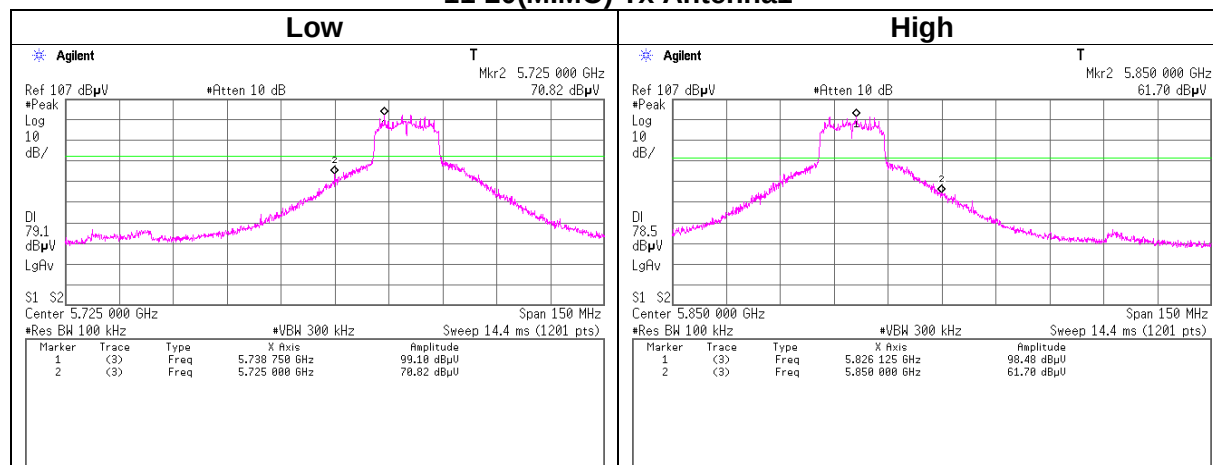


Conducted Emission Band Edge compliance

11-20(MIMO) Tx Antenna0



11-20(MIMO) Tx Antenna1



7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

7.2. TRANSMITTER ABOVE 1 GHz

7.2.1. TX ABOVE 1 GHz FOR 802.11n HT20 SISO MODE IN THE 5.8 GHz BAND

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5745MHz Antenna 0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3829.985	PK	52.0	30.0	3.0	34.0	51.0	73.9	22.9	
Hori	3829.985	AV	48.2	30.0	3.0	34.0	47.2	53.9	6.7	
Vert	3829.974	PK	53.3	30.0	3.0	34.0	52.3	73.9	21.6	
Vert	3829.974	AV	50.0	30.0	3.0	34.0	49.0	53.9	4.9	

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).

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

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	98.8	32.5	3.8	33.9	101.2	-	-	Carrier
Hori	5725.000	PK	67.0	32.4	3.8	33.8	69.4	81.2	11.8	
Vert	5745.000	PK	98.7	32.5	3.8	33.9	101.1	-	-	Carrier
Vert	5725.000	PK	66.4	32.4	3.8	33.8	68.8	73.9	5.1	

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

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5785MHz Antenna 0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3856.630	PK	51.3	30.0	3.1	33.9	50.5	73.9	23.4	
Hori	3856.630	AV	48.0	30.0	3.1	33.9	47.2	53.9	6.7	
Vert	3856.646	PK	51.9	30.0	3.1	33.9	51.1	73.9	22.8	
Vert	3856.646	AV	48.1	30.0	3.1	33.9	47.3	53.9	6.6	

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

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5825MHz Antenna 0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3883.303	PK	51.9	30.1	3.1	33.9	51.2	73.9	22.7	
Hori	3883.303	AV	47.0	30.1	3.1	33.9	46.3	53.9	7.6	
Vert	3883.312	PK	49.0	30.1	3.1	33.9	48.3	73.9	25.6	
Vert	3883.312	AV	52.5	30.1	3.1	33.9	51.8	53.9	2.1	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
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	5825.000	PK	99.2	32.5	3.8	33.9	101.6	-	-	Carrier
Hori	5850.000	PK	60.9	32.6	3.8	33.9	63.4	81.6	18.2	
Vert	5825.000	PK	98.4	32.5	3.8	33.9	100.8	-	-	Carrier
Vert	5850.000	PK	61.0	32.6	3.8	33.9	63.5	80.8	17.3	

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

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5745MHz Antenna 1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3829.936	PK	47.4	30.0	3.0	34.0	46.4	73.9	27.5	
Hori	3829.936	AV	41.1	30.0	3.0	34.0	40.1	53.9	13.8	
Vert	3829.976	PK	47.1	30.0	3.0	34.0	46.1	73.9	27.8	
Vert	3829.976	AV	41.0	30.0	3.0	34.0	40.0	53.9	13.9	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
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	5745.000	PK	99.4	32.5	3.8	33.9	101.8	-	-	Carrier
Hori	5725.000	PK	66.2	32.4	3.8	33.8	68.6	81.8	13.2	
Vert	5745.000	PK	99.4	32.5	3.8	33.9	101.8	-	-	Carrier
Vert	5725.000	PK	66.9	32.4	3.8	33.8	69.3	81.8	12.5	

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

Report No. 33BE0378-HO
Semi Anechoic No.2
Chamber
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5785MHz Antenna 1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3856.683	PK	46.7	30.0	3.1	33.9	45.9	73.9	28.0	
Hori	3856.683	AV	39.4	30.0	3.1	33.9	38.6	53.9	15.3	
Vert	3856.644	PK	48.0	30.0	3.1	33.9	47.2	73.9	26.7	
Vert	3856.644	AV	41.0	30.0	3.1	33.9	40.2	53.9	13.7	

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

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5825MHz Antenna 1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3883.321	PK	48.3	30.1	3.1	33.9	47.6	73.9	26.3	
Hori	3883.321	AV	41.8	30.1	3.1	33.9	41.1	53.9	12.8	
Vert	3883.358	PK	47.0	30.1	3.1	33.9	46.3	73.9	27.6	
Vert	3883.358	AV	39.3	30.1	3.1	33.9	38.6	53.9	15.3	

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

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	95.0	32.5	3.8	33.9	97.4	-	-	Carrier
Hori	5850.000	PK	56.8	32.6	3.8	33.9	59.3	77.4	18.1	
Vert	5825.000	PK	97.2	32.5	3.8	33.9	99.6	-	-	Carrier
Vert	5850.000	PK	58.2	32.6	3.8	33.9	60.7	79.6	18.9	

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

7.2.2. TX ABOVE 1 GHz FOR 802.11n HT20 MIMO MODE IN THE 5.8 GHz BAND

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5745MHz Antenna 0+1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3830.031	PK	52.0	30.0	3.0	34.0	51.0	73.9	22.9	
Hori	3830.031	AV	48.0	30.0	3.0	34.0	47.0	53.9	6.9	
Vert	3830.073	PK	53.3	30.0	3.0	34.0	52.3	73.9	21.6	
Vert	3830.073	AV	50.0	30.0	3.0	34.0	49.0	53.9	4.9	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
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	5745.000	PK	98.9	32.5	3.8	33.9	101.3	73.9	-	- Carrier
Hori	5725.000	PK	68.3	32.4	3.8	33.8	70.7	81.3	10.6	
Vert	5745.000	PK	99.0	32.5	3.8	33.9	101.4	-	-	- Carrier
Vert	5725.000	PK	67.9	32.4	3.8	33.8	70.3	81.4	11.1	

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

Report No. 33BE0378-HO
Semi Anechoic No.2
Chamber
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5785MHz Antenna 0+1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3856.667	PK	52.4	30.0	3.1	33.9	51.6	73.9	22.3	
Hori	3856.667	AV	48.1	30.0	3.1	33.9	47.3	53.9	6.6	
Vert	3856.683	PK	53.0	30.0	3.1	33.9	52.2	73.9	21.7	
Vert	3856.683	AV	49.9	30.0	3.1	33.9	49.1	53.9	4.8	

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

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

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

Report No. 33BE0378-HO
Semi Anechoic Chamber No.2
Date 09/29/2012
Temperature/ Humidity 22 deg.C / 61 % RH
Engineer Hiroshi Kukita

Mode 11n-20 Tx 5825MHz Antenna 0+1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3883.303	PK	53.6	30.1	3.1	33.9	52.9	73.9	21.0	
Hori	3883.303	AV	48.9	30.1	3.1	33.9	48.2	53.9	5.7	
Vert	3883.312	PK	53.0	30.1	3.1	33.9	52.3	73.9	21.6	
Vert	3883.312	AV	49.5	30.1	3.1	33.9	48.8	53.9	5.1	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
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	5825.000	PK	99.1	32.5	3.8	33.9	101.5	-	-	Carrier
Hori	5850.000	PK	58.0	32.6	3.8	33.9	60.5	81.5	21.0	
Vert	5825.000	PK	98.9	32.5	3.8	33.9	101.3	-	-	Carrier
Vert	5850.000	PK	57.5	32.6	3.8	33.9	60.0	81.3	21.3	

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

8.2.3 WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Report No. 33BE0378-HO
Semi Anechoic Chamber No.4
Date 10/04/2012
Temperature/ Humidity 22 deg.C / 66 % RH
Engineer Takayuki Shimada

HORIZONTAL AND VERTICAL DATA

SISO Antenna0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	128.650	QP	33.8	13.7	8.4	32.0	23.9	43.5	19.6	
Vert	167.420	QP	29.7	15.7	8.7	32.0	22.1	43.5	21.4	

SISO Antenna1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	128.680	QP	32.5	13.7	8.4	32.0	22.6	43.5	20.9	
Vert	167.420	QP	29.2	15.7	8.7	32.0	21.6	43.5	21.9	

MIMO Antenna0+1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	129.308	QP	34.2	13.7	8.4	32.0	24.3	43.5	19.2	
Vert	166.130	QP	30.9	15.6	8.7	32.0	23.2	43.5	20.3	

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [*]	56 to 46 [*]
0.5-5	56	46
5-30	60	50

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS, 802.11n HT20 SISO MODE

DATA OF CONDUCTED EMISSION TEST

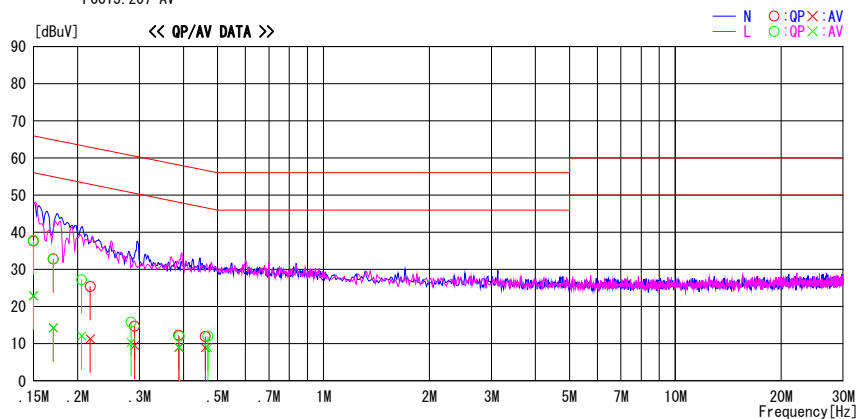
UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-H0

Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

Mode / Remarks : Tx 11n-20 SISO ANTO 5745MHz

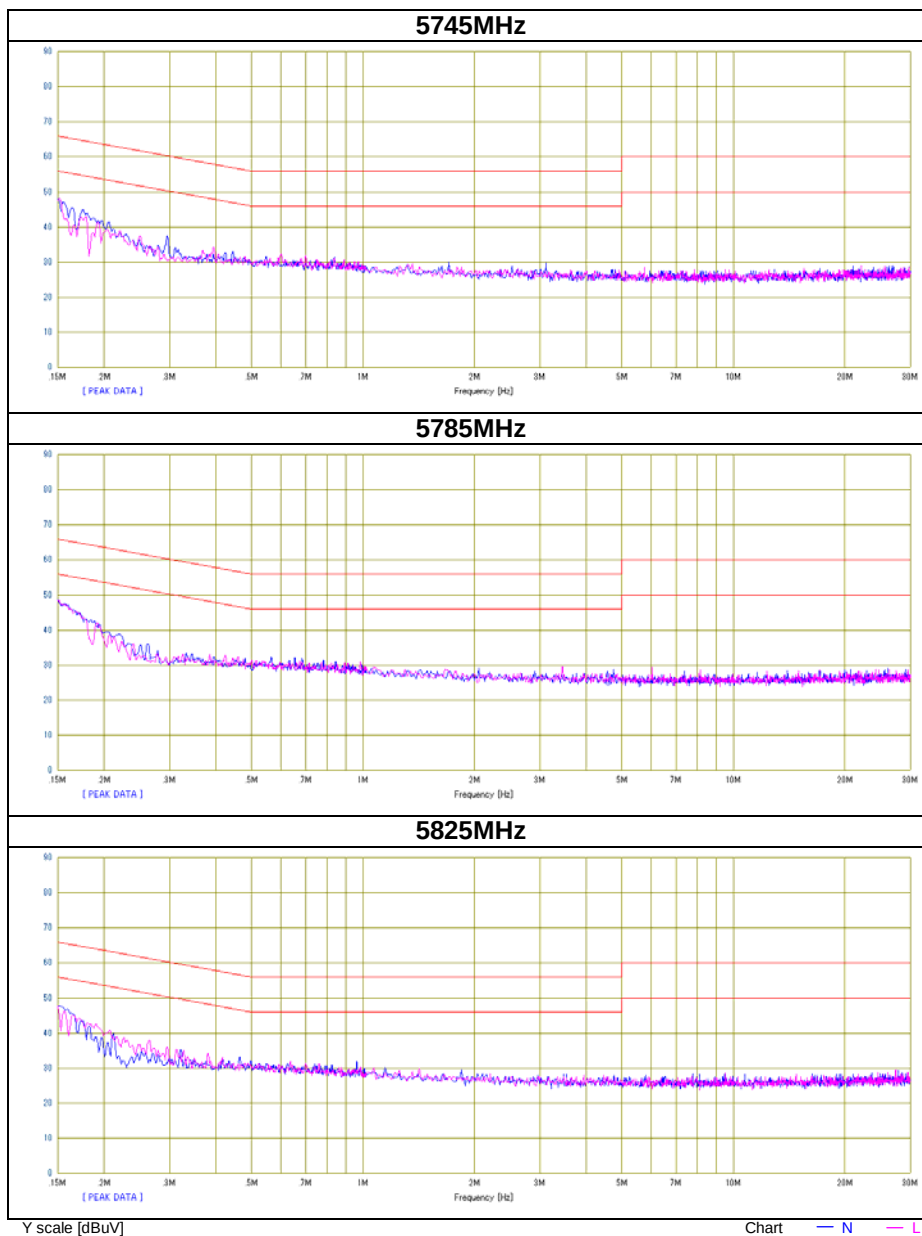
LIMIT : FCC15.207 QP
FCC15.207 AV



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	24.3	9.6	13.3	37.6	22.9	66.0	56.0	28.4	33.1	N	
0.17081	19.5	0.9	13.3	32.8	14.2	64.9	54.9	32.1	40.7	N	
0.21746	12.1	-2.0	13.3	25.4	11.3	62.9	52.9	37.5	41.6	N	
0.29065	1.4	-3.8	13.3	14.7	9.5	60.5	50.5	45.8	41.0	N	
0.38780	-1.1	-4.4	13.4	12.3	9.0	58.1	48.1	45.8	39.1	N	
0.46175	-1.5	-4.5	13.4	11.9	8.9	56.7	46.7	44.8	37.8	N	
0.15000	24.5	9.6	13.3	37.8	22.9	66.0	56.0	28.2	33.1	L	
0.17080	19.6	1.0	13.3	32.9	14.3	64.9	54.9	32.0	40.6	L	
0.20548	13.9	-1.2	13.3	27.2	12.1	63.4	53.4	36.2	41.3	L	
0.28390	2.5	-3.0	13.3	15.8	10.3	60.7	50.7	44.9	40.4	L	
0.38928	-1.4	-4.4	13.4	12.0	9.0	58.1	48.1	46.1	39.1	L	
0.46957	-1.4	-4.5	13.4	12.0	8.9	56.5	46.5	44.5	37.6	L	

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

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	33BE0378-HO
Date	10/03/2012
Temperature/ Humidity	22deg. C / 66% RH
Engineer	Takayuki Shimada
Mode	11n-20 Tx Antenna 0



DATA OF CONDUCTED EMISSION TEST

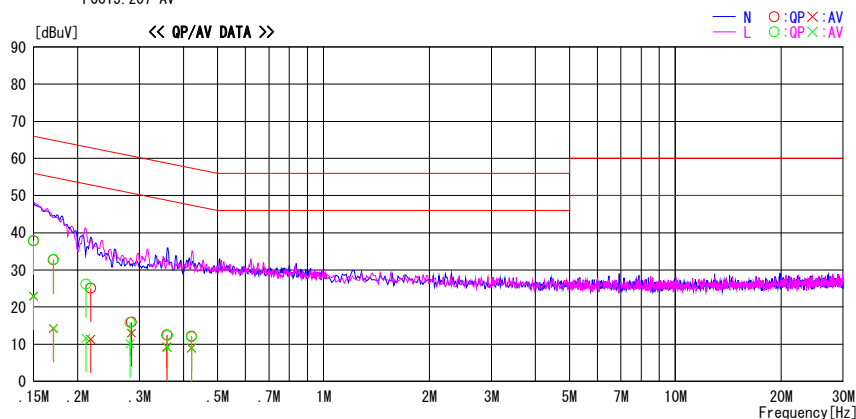
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-H0

Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

Mode / Remarks : Tx 11n-20 SISO ANT1 5745MHz

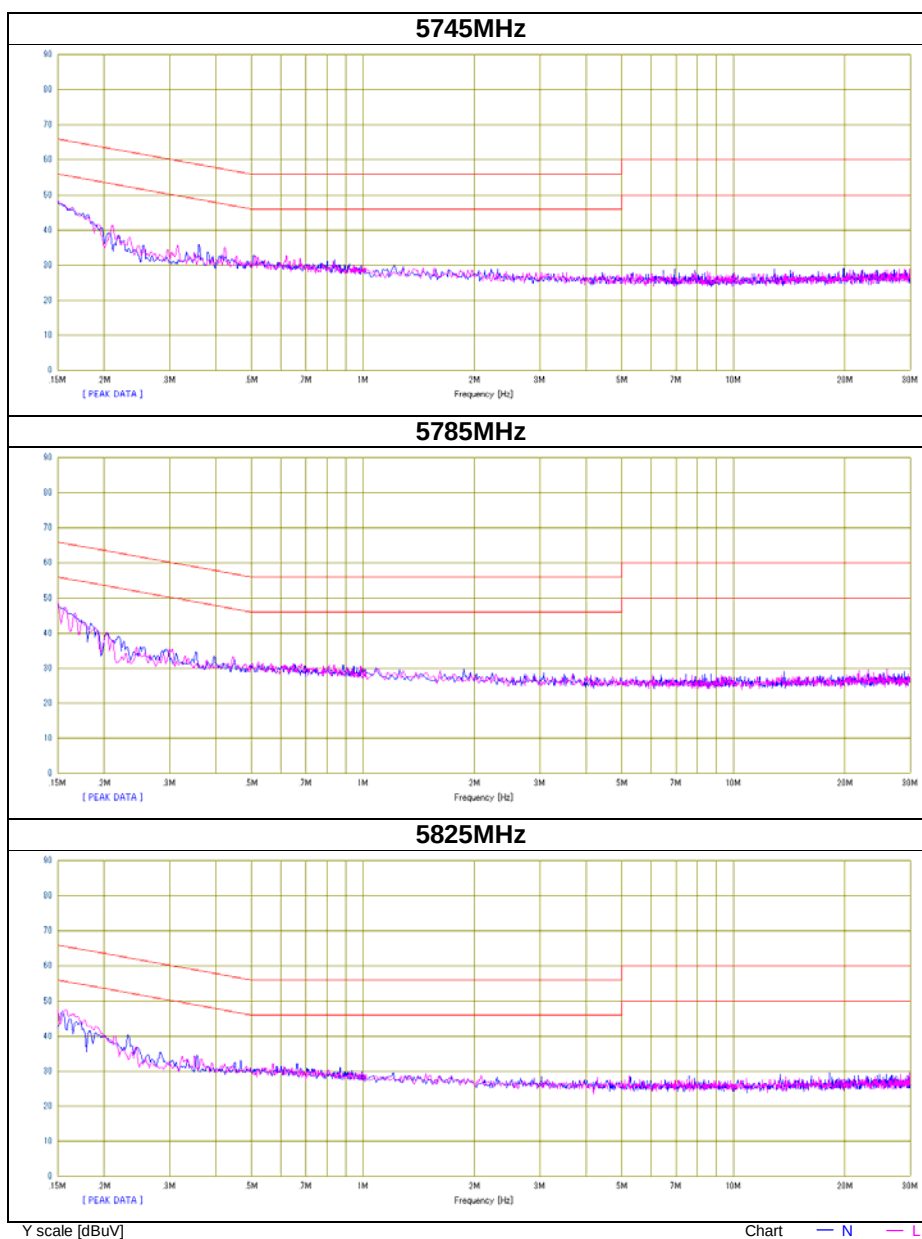
LIMIT : FCC15.207 QP
FCC15.207 AV



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	24.5	9.6	13.3	37.8	22.9	66.0	56.0	28.2	33.1	N	
0.17072	19.4	0.9	13.3	32.7	14.2	64.9	54.9	32.2	40.7	N	
0.21800	11.8	-2.0	13.3	25.1	11.3	62.9	52.9	37.8	41.6	N	
0.28475	2.6	-0.3	13.3	15.9	13.0	60.7	50.7	44.8	37.7	N	
0.35871	-0.9	-4.2	13.4	12.5	9.2	58.8	48.8	46.3	39.6	N	
0.42149	-1.3	-4.4	13.4	12.1	9.0	57.4	47.4	45.3	38.4	N	
0.15000	24.6	9.7	13.3	37.9	23.0	66.0	56.0	28.1	33.0	L	
0.17096	19.5	1.0	13.3	32.8	14.3	64.9	54.9	32.1	40.6	L	
0.21148	12.9	-1.7	13.3	26.2	11.6	63.1	53.1	36.9	41.5	L	
0.28215	2.5	-3.2	13.3	15.8	10.1	60.8	50.8	45.0	40.7	L	
0.36071	-1.0	-4.3	13.4	12.4	9.1	58.7	48.7	46.3	39.6	L	
0.42149	-1.4	-4.5	13.4	12.0	8.9	57.4	47.4	45.4	38.5	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.

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	33BE0378-HO
Date	10/03/2012
Temperature/ Humidity	22deg. C / 66% RH
Engineer	Takayuki Shimada
Mode	11n-20 Tx Antenna 1



RESULTS, 802.11n HT20 MIMO MODE

DATA OF CONDUCTED EMISSION TEST

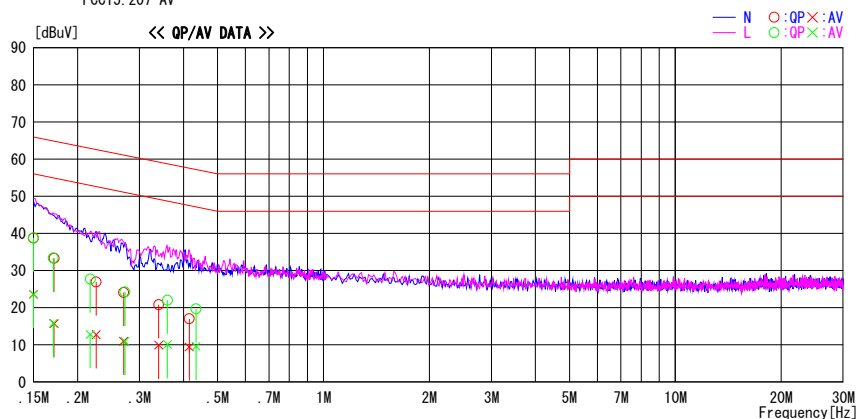
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-H0

Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

Mode / Remarks : Tx 11n-20 MIMO ANTO+1 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	25.4	10.3	13.3	38.7	23.6	66.0	56.0	27.3	32.4	N	
0.17168	20.0	2.4	13.3	33.3	15.7	64.9	54.9	31.6	39.2	N	
0.22605	13.6	-0.6	13.3	26.9	12.7	62.6	52.6	35.7	39.9	N	
0.27039	10.8	-2.3	13.3	24.1	11.0	61.1	51.1	37.0	40.1	N	
0.34022	7.4	-3.5	13.4	20.8	9.9	59.2	49.2	38.4	39.3	N	
0.41530	3.6	-4.0	13.4	17.0	9.4	57.5	47.5	40.5	38.1	N	
0.15000	25.5	10.3	13.3	38.8	23.6	66.0	56.0	27.2	32.4	L	
0.17080	20.1	2.5	13.3	33.4	15.8	64.9	54.9	31.5	39.1	L	
0.21735	14.4	-0.5	13.3	27.7	12.8	62.9	52.9	35.2	40.1	L	
0.27283	10.9	-2.4	13.3	24.2	10.9	61.0	51.0	36.8	40.1	L	
0.36042	8.6	-3.3	13.4	22.0	10.1	58.7	48.7	36.7	38.6	L	
0.43426	6.3	-3.8	13.4	19.7	9.6	57.2	47.2	37.5	37.6	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.

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	33BE0378-HO
Date	10/03/2012
Temperature/ Humidity	22deg. C / 66% RH
Engineer	Takayuki Shimada
Mode	11n-20 Tx Antenna 0+1

