

8.7 AC Conducted Emissions

■ Test Requirements and limit, §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (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

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

■ Test Configuration

See test photographs for the actual connections between EUT and support equipment.

■ Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

1. The test procedure is performed in a 6.5 m $\times$ 3.5 m $\times$ 3.5 m (L $\times$ W $\times$ H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) $\times$ 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

■ Test Results: **Comply**

Note 1: See next pages for actual measured spectrum plots and data for worst case result.

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5240 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

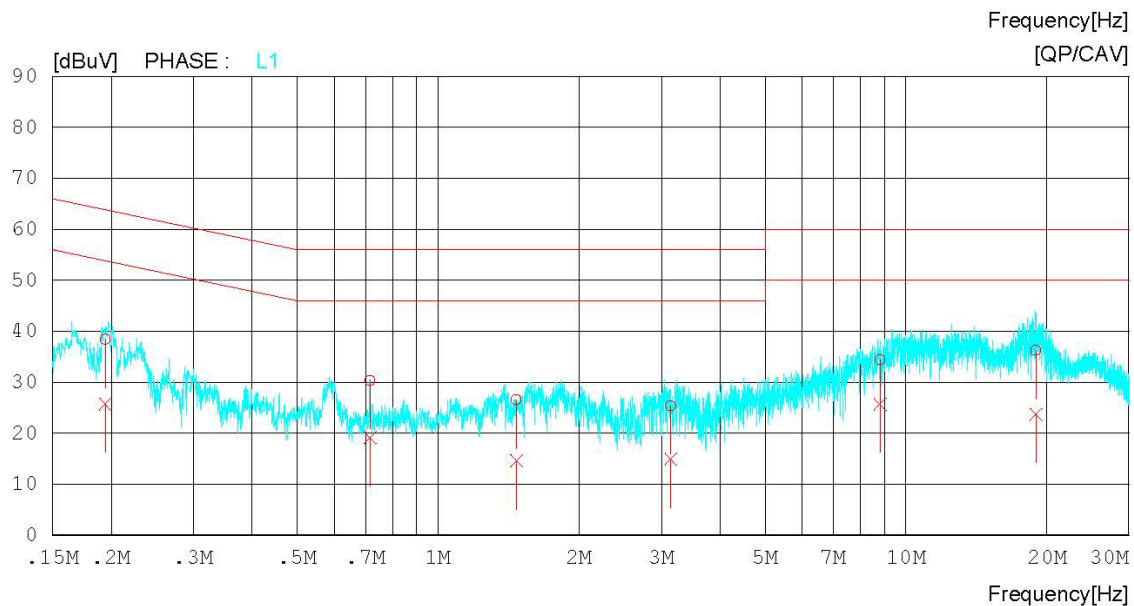
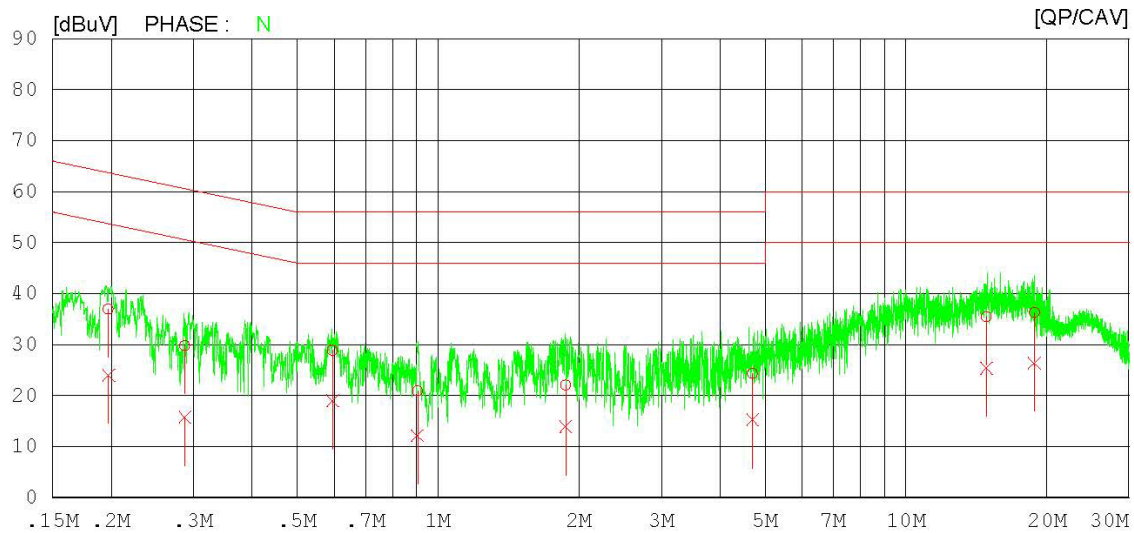
Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.1G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 1 & 802.11a & MIMO(CDD) & 5240 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.
Model No. LM-G850EMW
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Test Condition 5.1G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.19744	27.01	14.02	9.94	36.95	23.96	63.72	53.72	26.77	29.76	N
2	0.28757	19.86	5.81	9.94	29.80	15.75	60.59	50.59	30.79	34.84	N
3	0.59445	18.90	9.03	9.95	28.85	18.98	56.00	46.00	27.15	27.02	N
4	0.90383	11.00	2.18	9.97	20.97	12.15	56.00	46.00	35.03	33.85	N
5	1.87380	11.98	3.88	10.03	22.01	13.91	56.00	46.00	33.99	32.09	N
6	4.70140	14.19	5.10	10.15	24.34	15.25	56.00	46.00	31.66	30.75	N
7	14.85540	25.00	14.91	10.49	35.49	25.40	60.00	50.00	24.51	24.60	N
8	18.81640	25.69	15.83	10.54	36.23	26.37	60.00	50.00	23.77	23.63	N
9	0.19456	28.48	15.79	9.94	38.42	25.73	63.84	53.84	25.42	28.11	L1
10	0.71516	20.35	9.15	9.96	30.31	19.11	56.00	46.00	25.69	26.89	L1
11	1.47060	16.55	4.54	9.99	26.54	14.53	56.00	46.00	29.46	31.47	L1
12	3.14080	15.25	4.81	10.06	25.31	14.87	56.00	46.00	30.69	31.13	L1
13	8.80380	24.08	15.42	10.30	34.38	25.72	60.00	50.00	25.62	24.28	L1
14	18.96240	25.67	13.09	10.52	36.19	23.61	60.00	50.00	23.81	26.39	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5320 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

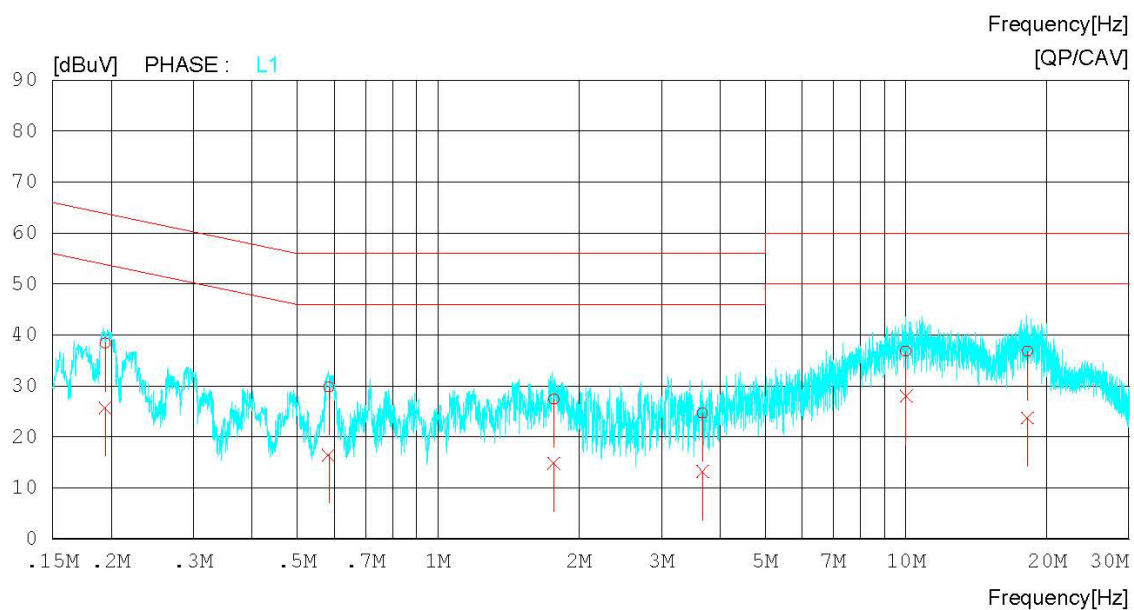
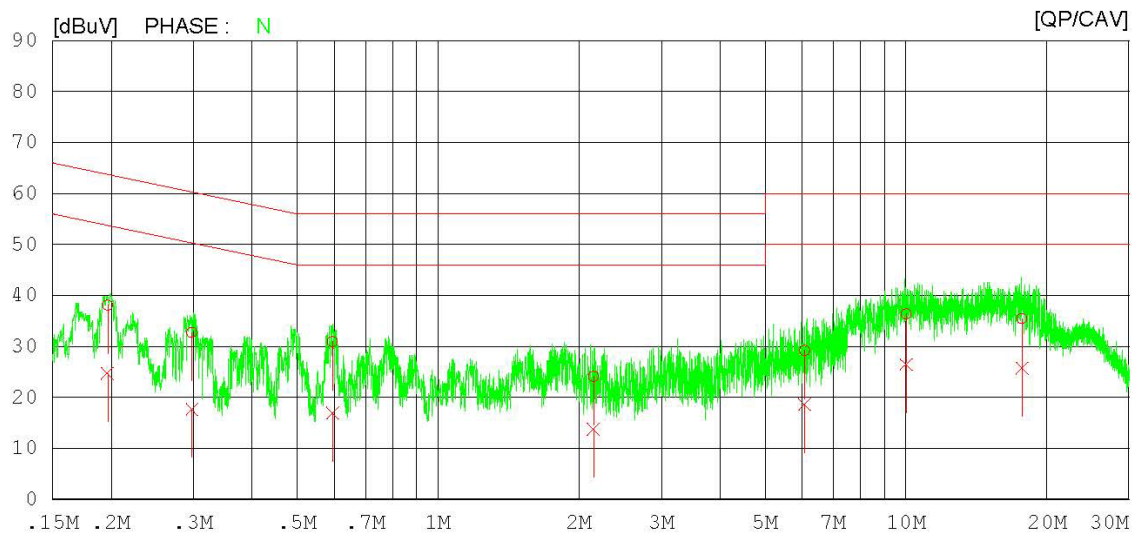
Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.3G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2A & 802.11a & MIMO(CDD) & 5320 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.3G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.19668	28.12	14.77	9.94	38.06	24.71	63.75	53.75	25.69	29.04	N
2	0.29768	22.81	7.78	9.94	32.75	17.72	60.31	50.31	27.56	32.59	N
3	0.59484	20.93	7.02	9.95	30.88	16.97	56.00	46.00	25.12	29.03	N
4	2.14680	14.05	3.74	10.03	24.08	13.77	56.00	46.00	31.92	32.23	N
5	6.07060	18.96	8.48	10.20	29.16	18.68	60.00	50.00	30.84	31.32	N
6	10.00820	26.02	16.15	10.34	36.36	26.49	60.00	50.00	23.64	23.51	N
7	17.69320	24.90	15.24	10.53	35.43	25.77	60.00	50.00	24.57	24.23	N
8	0.19444	28.38	15.70	9.94	38.32	25.64	63.84	53.84	25.52	28.20	L1
9	0.58405	19.83	6.46	9.95	29.78	16.41	56.00	46.00	26.22	29.59	L1
10	1.76720	17.31	4.79	10.02	27.33	14.81	56.00	46.00	28.67	31.19	L1
11	3.67720	14.57	3.08	10.09	24.66	13.17	56.00	46.00	31.34	32.83	L1
12	9.99720	26.42	17.59	10.34	36.76	27.93	60.00	50.00	23.24	22.07	L1
13	18.18520	26.25	13.19	10.51	36.76	23.70	60.00	50.00	23.24	26.30	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5500 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

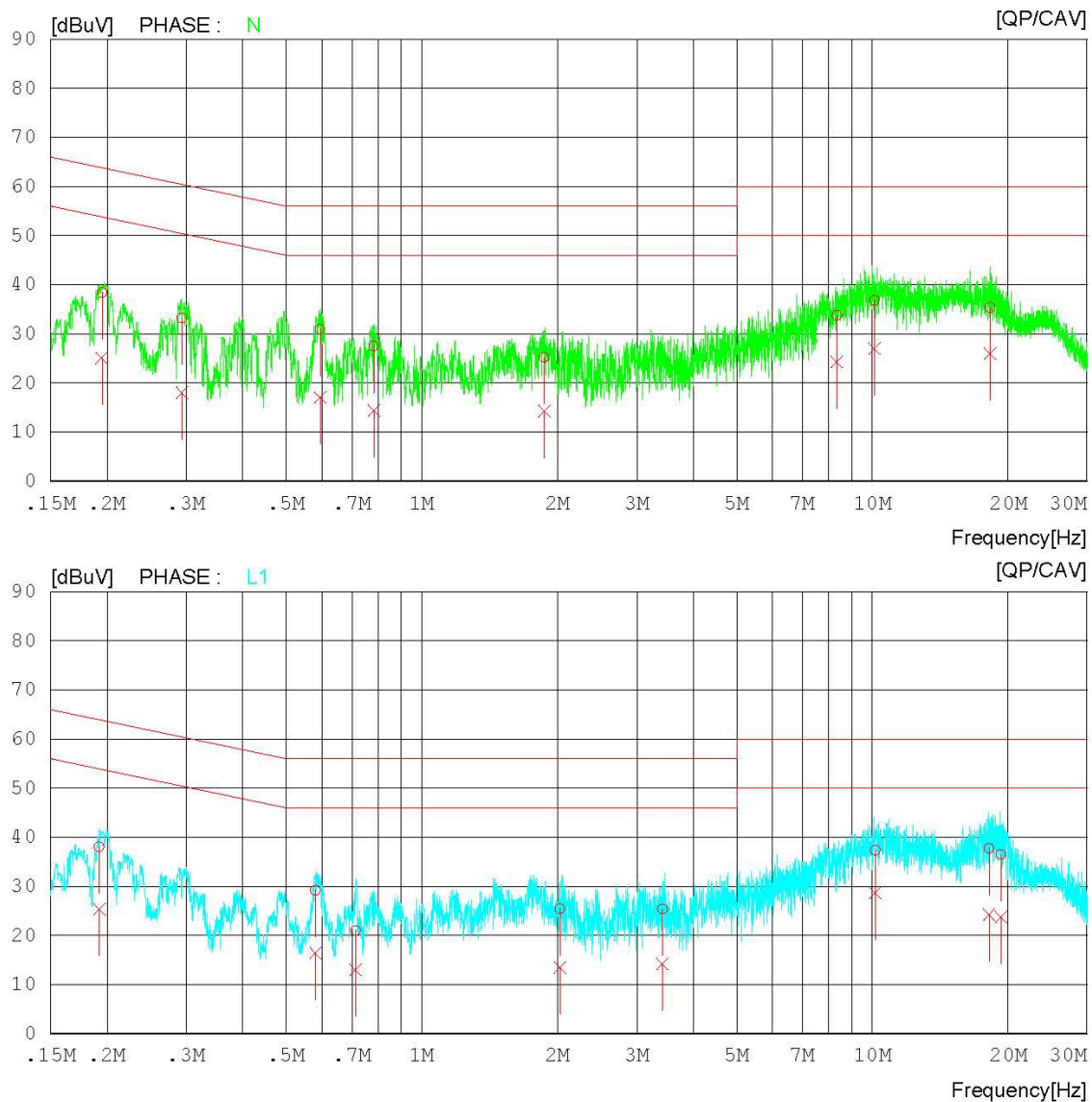
Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.5G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5500 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.5G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 °C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.19485	28.43	15.11	9.94	38.37	25.05	63.83	53.83	25.46	28.78	N
2	0.29351	23.29	8.04	9.94	33.23	17.98	60.42	50.42	27.19	32.44	N
3	0.59462	21.01	7.09	9.95	30.96	17.04	56.00	46.00	25.04	28.96	N
4	0.78267	17.49	4.43	9.97	27.46	14.40	56.00	46.00	28.54	31.60	N
5	1.87000	15.19	4.24	10.03	25.22	14.27	56.00	46.00	30.78	31.73	N
6	8.34160	23.53	14.01	10.27	33.80	24.28	60.00	50.00	26.20	25.72	N
7	10.08960	26.50	16.64	10.34	36.84	26.98	60.00	50.00	23.16	23.02	N
8	18.22840	24.84	15.42	10.53	35.37	25.95	60.00	50.00	24.63	24.05	N
9	0.19242	28.06	15.38	9.94	38.00	25.32	63.93	53.93	25.93	28.61	L1
10	0.58062	19.19	6.39	9.95	29.14	16.34	56.00	46.00	26.86	29.66	L1
11	0.71309	11.06	3.00	9.96	21.02	12.96	56.00	46.00	34.98	33.04	L1
12	2.02640	15.40	3.37	10.03	25.43	13.40	56.00	46.00	30.57	32.60	L1
13	3.41920	15.25	4.13	10.08	25.33	14.21	56.00	46.00	30.67	31.79	L1
14	10.15620	27.07	18.29	10.34	37.41	28.63	60.00	50.00	22.59	21.37	L1
15	18.15000	27.15	13.74	10.51	37.66	24.25	60.00	50.00	22.34	25.75	L1
16	19.28840	25.91	13.25	10.52	36.43	23.77	60.00	50.00	23.57	26.23	L1

AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5785 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

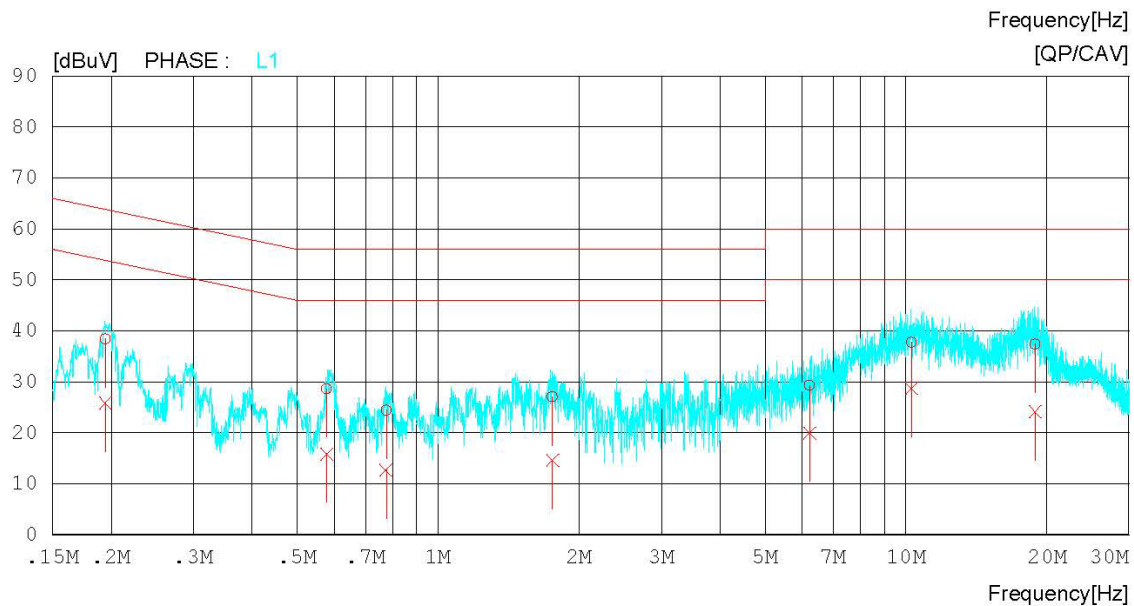
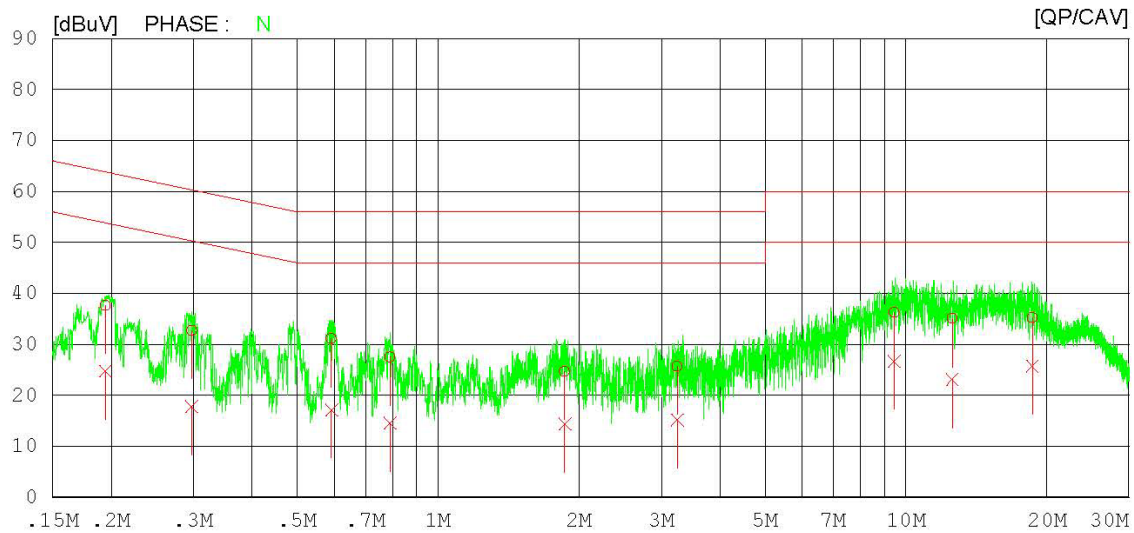
Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.7G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV



AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & MIMO(CDD) & 5785 MHz & Normal(Without dual display)

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.
Model No. LM-G850EMW
Serial No.
Test Condition 5.7G

Reference No.
Power Supply 120 V, 60 Hz
Temp/Humi. 23 'C / 35 %
Operator JaeJin Lee

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.19450	27.70	14.84	9.94	37.64	24.78	63.84	53.84	26.20	29.06	N
2	0.29729	22.82	7.81	9.94	32.76	17.75	60.32	50.32	27.56	32.57	N
3	0.59167	21.16	7.20	9.95	31.11	17.15	56.00	46.00	24.89	28.85	N
4	0.78935	17.50	4.64	9.97	27.47	14.61	56.00	46.00	28.53	31.39	N
5	1.86340	14.65	4.31	10.03	24.68	14.34	56.00	46.00	31.32	31.66	N
6	3.24480	15.61	5.08	10.07	25.68	15.15	56.00	46.00	30.32	30.85	N
7	9.43920	25.93	16.38	10.32	36.25	26.70	60.00	50.00	23.75	23.30	N
8	12.55720	24.65	12.75	10.42	35.07	23.17	60.00	50.00	24.93	26.83	N
9	18.61200	24.75	15.19	10.53	35.28	25.72	60.00	50.00	24.72	24.28	N
10	0.19453	28.39	15.88	9.94	38.33	25.82	63.84	53.84	25.51	28.02	L1
11	0.57797	18.65	5.88	9.95	28.60	15.83	56.00	46.00	27.40	30.17	L1
12	0.77446	14.42	2.66	9.96	24.38	12.62	56.00	46.00	31.62	33.38	L1
13	1.75700	16.96	4.50	10.02	26.98	14.52	56.00	46.00	29.02	31.48	L1
14	6.21900	19.04	9.72	10.20	29.24	19.92	60.00	50.00	30.76	30.08	L1
15	10.27260	27.33	18.27	10.34	37.67	28.61	60.00	50.00	22.33	21.39	L1
16	18.88040	26.81	13.59	10.52	37.33	24.11	60.00	50.00	22.67	25.89	L1

9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	18/12/19	19/12/19	MY50410357
Spectrum Analyzer	Agilent Technologies	N9020A	18/12/19	19/12/19	MY48011700
Spectrum Analyzer	Agilent Technologies	N9030A	19/03/15	20/03/15	MY53310140
Signal Analyzer	Rohde Schwarz	FSW67	19/07/11	20/07/11	104037
DC Power Supply	Agilent Technologies	66332A	19/06/25	20/06/25	MY43000211
Multimeter	FLUKE	17B	18/12/18	19/12/18	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	18/12/19	19/12/19	255571
Signal Generator	ANRITSU	MG3695C	18/12/10	19/12/10	173501
Thermohygrometer	BODYCOM	BJ5478	18/12/27	19/12/27	120612-1
Thermohygrometer	BODYCOM	BJ5478	18/12/27	19/12/27	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/07/03	20/07/03	N/A
HYGROMETER	TESTO	608-H1	19/01/31	20/01/31	34862883
Loop Antenna	ETS	6502	19/03/21	21/03/21	3471
BILOG ANTENNA	Schwarzbeck	VULB 9160	18/07/13	20/07/13	3359
Horn Antenna	ETS-Lindgren	3115	19/01/11	21/01/11	9202-3820
Horn Antenna	Schwarzbeck	BBHA 9120C	17/12/04	19/12/04	9120C-561
Horn Antenna	A.H.Systems Inc.	SAS-574	19/07/03	21/07/03	155
PreAmplifier	tsj	MLA-0118-J01-45	18/12/19	19/12/19	17138
PreAmplifier	tsj	MLA-1840-J02-45	19/06/27	20/06/27	16966-10728
PreAmplifier	tsj	MLA-10K01-B01-27	19/06/24	20/06/24	2005354
Attenuator	SMAJK	SMAJK-2-3	19/06/27	20/06/27	3
Attenuator	Aeroflex/Weinschel	56-3	19/06/27	20/06/27	Y2370
Attenuator	SRTechnology	F01-B0606-01	19/06/27	20/06/27	13092403
Attenuator	Hefei Shunze	SS5T2.92-10-40	19/06/27	20/06/27	16012202
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	19/06/27	20/06/27	3
High Pass Filter	Wainwright Instruments	WHKX12-935-1000-15000-40SS	19/06/24	20/06/24	8
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	19/06/26	20/06/26	1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A MA2490A	19/06/24	20/06/24	1306007 1249001
EMI Test Receiver	Rohde Schwarz	ESW44	19/07/30	20/07/30	101645
EMI Test Receiver	Rohde Schwarz	ESCi7	19/01/30	20/01/30	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	18/09/27	19/09/27	101333
LISN	SCHWARZBECK	NNLK 8121	19/03/19	20/03/19	06183
Cable	DTNC	Cable	19/01/16	20/01/16	M-01
Cable	Junkosha	MWX315	19/01/16	20/01/16	M-05
Cable	Junkosha	MWX221	19/01/16	20/01/16	M-06
Cable	Junkosha	MWX241	19/01/14	20/01/14	G-04
Cable	Junkosha	MWX241	19/01/14	20/01/14	G-07
Cable	DT&C	Cable	19/01/14	20/01/14	G-13
Cable	DT&C	Cable	19/01/14	20/01/14	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	19/01/14	20/01/14	G-15

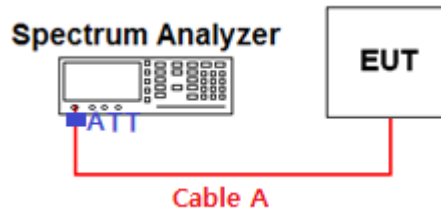
Note 1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017

Note 2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

APPENDIX I

Conducted Test set up Diagram

- Conducted Measurement



APPENDIX II

Duty Cycle Information

■ Test Procedure

Duty Cycle $[X = \text{On Time} / (\text{On} + \text{Off time})]$ is measured using Measurement Procedure of **KDB789033 D02v02r01**

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW $\geq$ RBW. Set detector = peak.
4. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are $> 50/T$** , where T is defined in section II.B.1.a), and **the number of sweep points across duration T exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

T : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

($T = \text{On time}$ of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)

■ Test Results:

Duty cycle: CDD

Mode	Data Rate	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			Duty Cycle Correction Factor [dB]	50/ T [kHz]
			On Time [ms]	(On+Off) Time [ms]	x		
802.11a	6Mbps	5180	2.024	2.072	0.9768	0.10	24.70
802.11n (HT20)	MCS5	5180	0.267	0.327	0.8172	0.88	186.99
802.11n (HT40)	MCS0	5190	1.270	1.312	0.9680	0.14	39.37
802.11ac (VHT80)	MCS0	5210	1.170	1.212	0.9653	0.15	42.74

Duty cycle: SDM

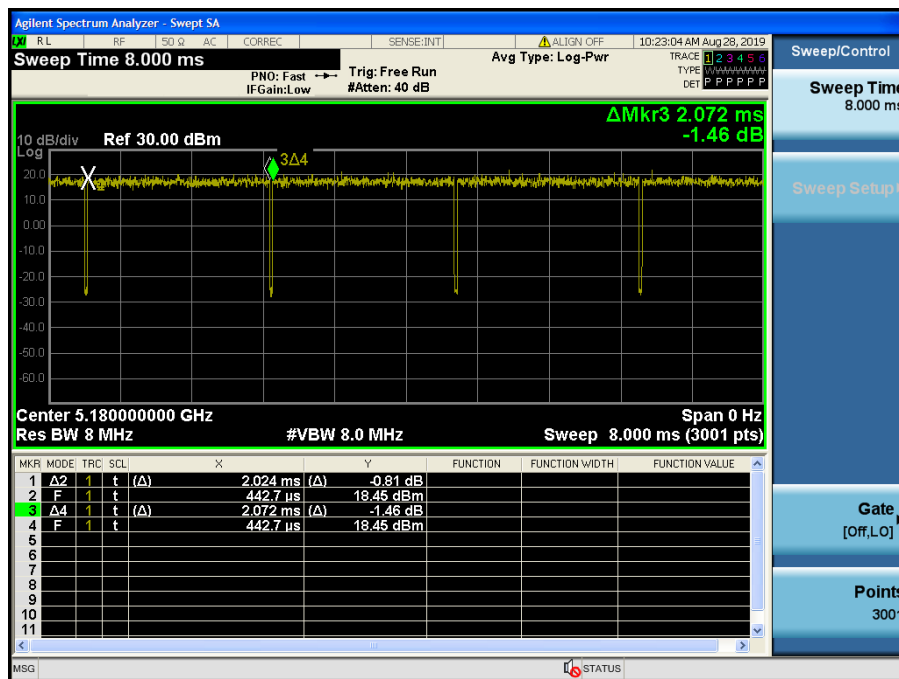
Mode	Data Rate	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			Duty Cycle Correction Factor [dB]	50/ T [kHz]
			On Time [ms]	(On+Off) Time [ms]	x		
802.11n (HT20)	MCS13	5180	0.155	0.236	0.6589	1.81	321.96
802.11n (HT40)	MCS8	5190	0.658	0.698	0.9427	0.26	75.99
802.11ac (VHT80)	MCS0	5210	0.610	0.650	0.9385	0.28	81.97

■ Test Plot:

Single Transmit

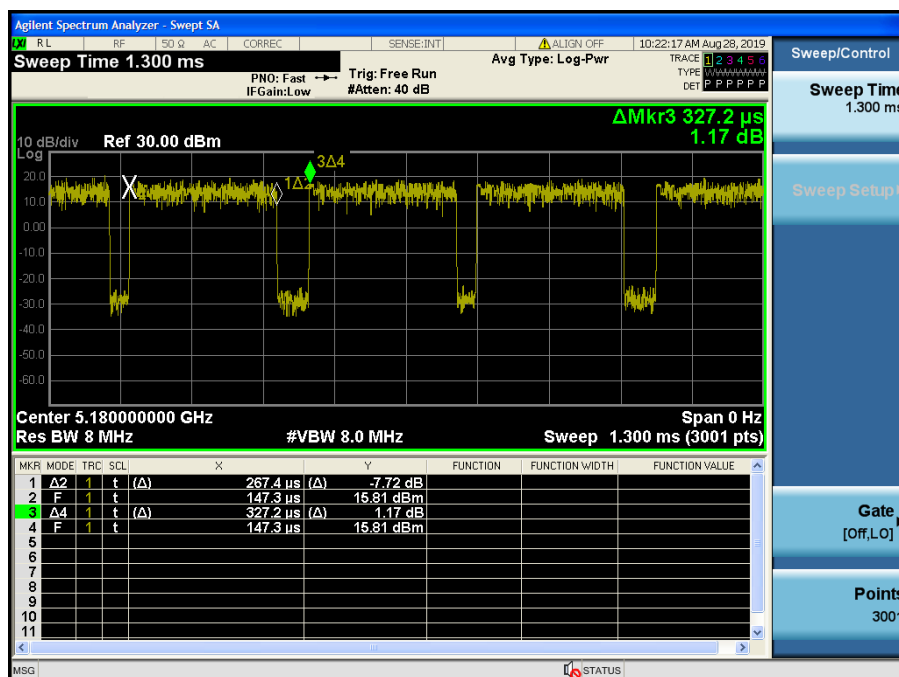
Duty Cycle

Test Mode: 802.11a & Ch.36



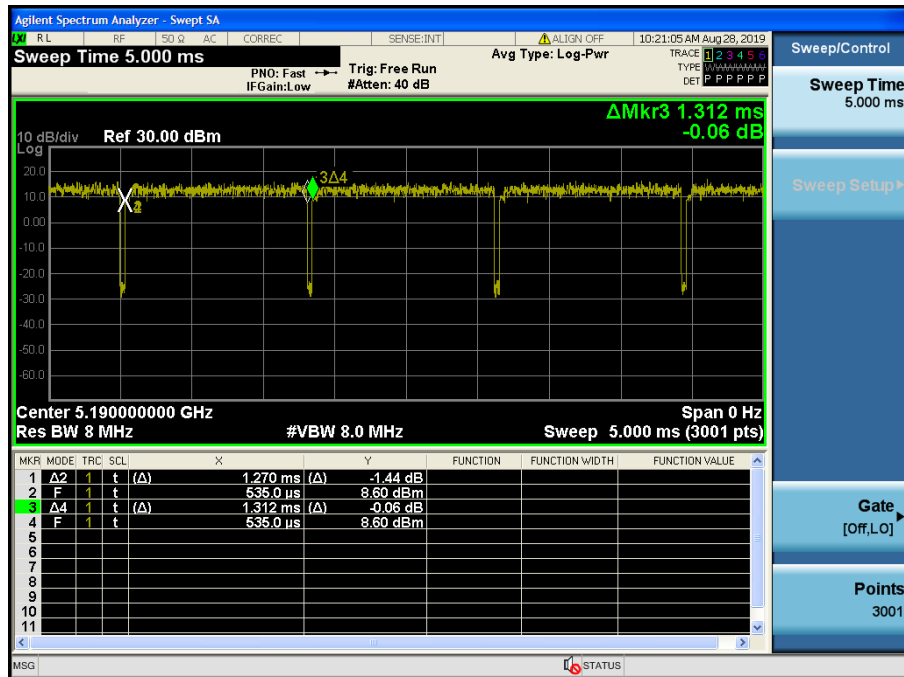
Duty Cycle

Test Mode: 802.11n HT20 & Ch.36



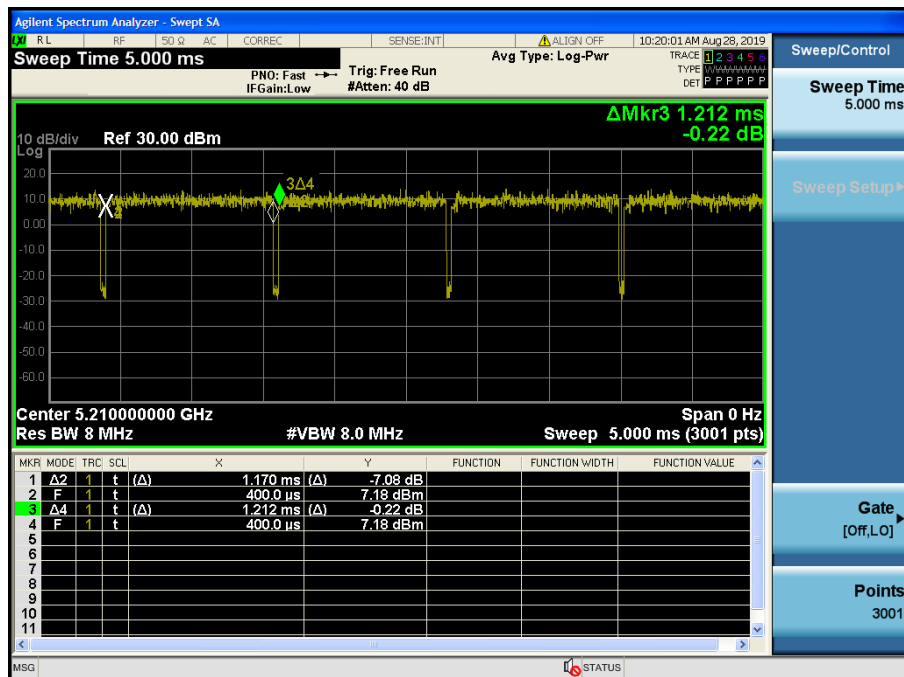
Duty Cycle

Test Mode: 802.11n HT40 & Ch.38



Duty Cycle

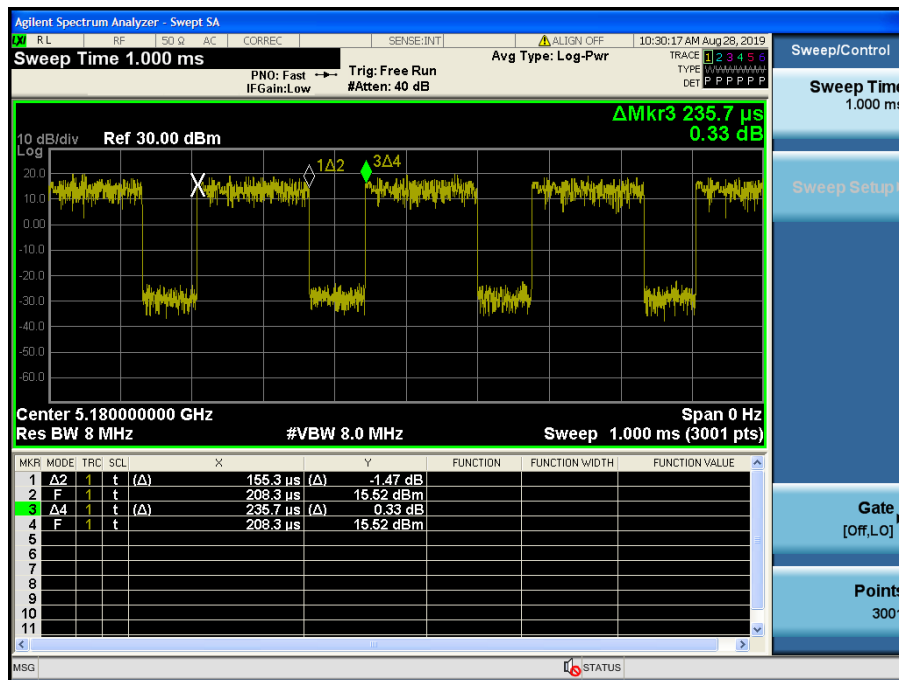
Test Mode: 802.11ac VHT80 & Ch.42



Multiple Transmit _ SDM

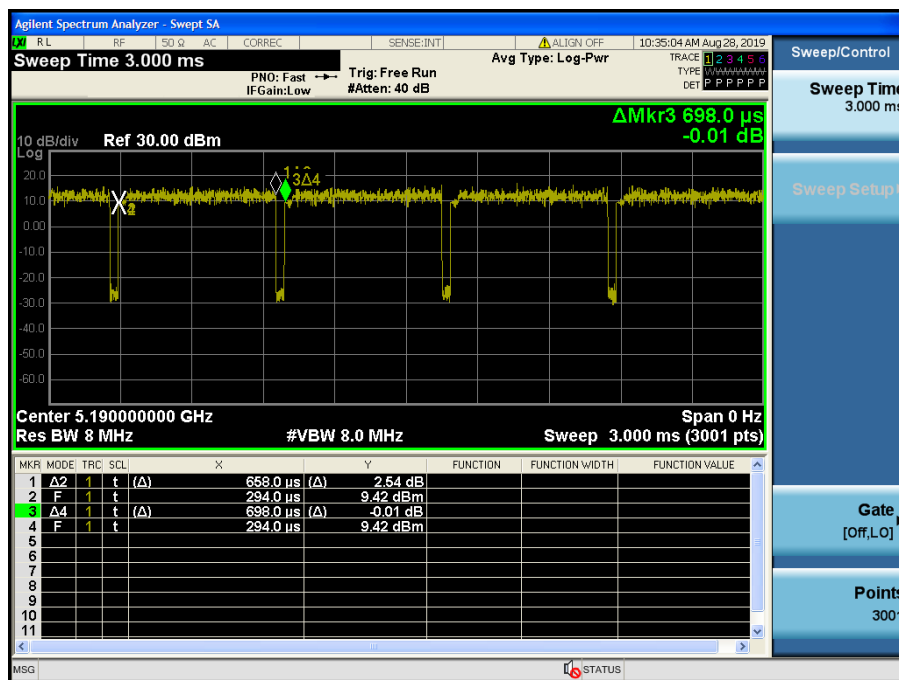
Duty Cycle

Test Mode: 802.11n HT20 & Ch.36



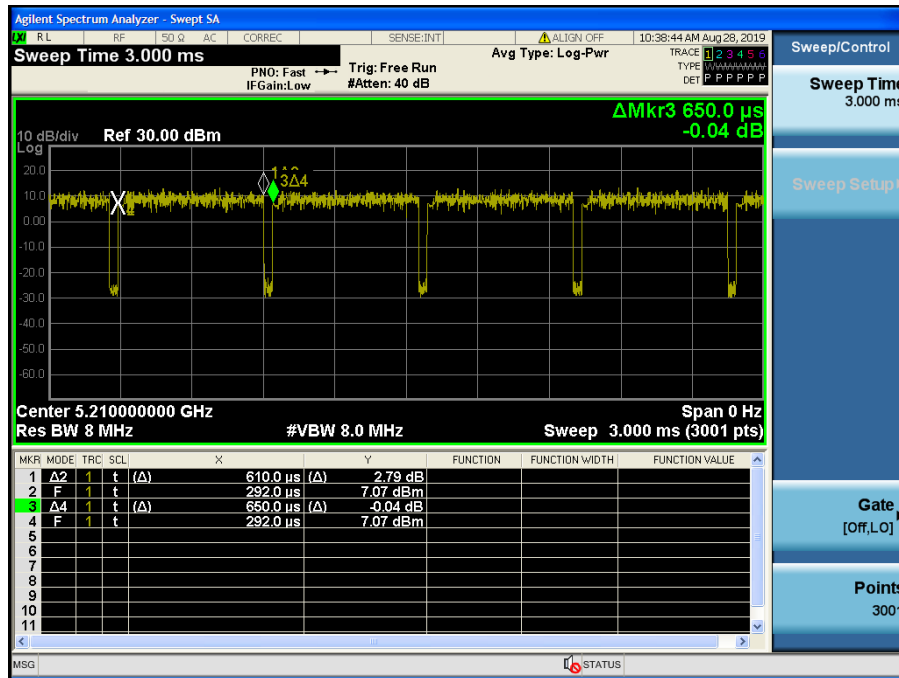
Duty Cycle

Test Mode: 802.11n HT40 & Ch.38



Duty Cycle

Test Mode: 802.11ac VHT80 & Ch.42

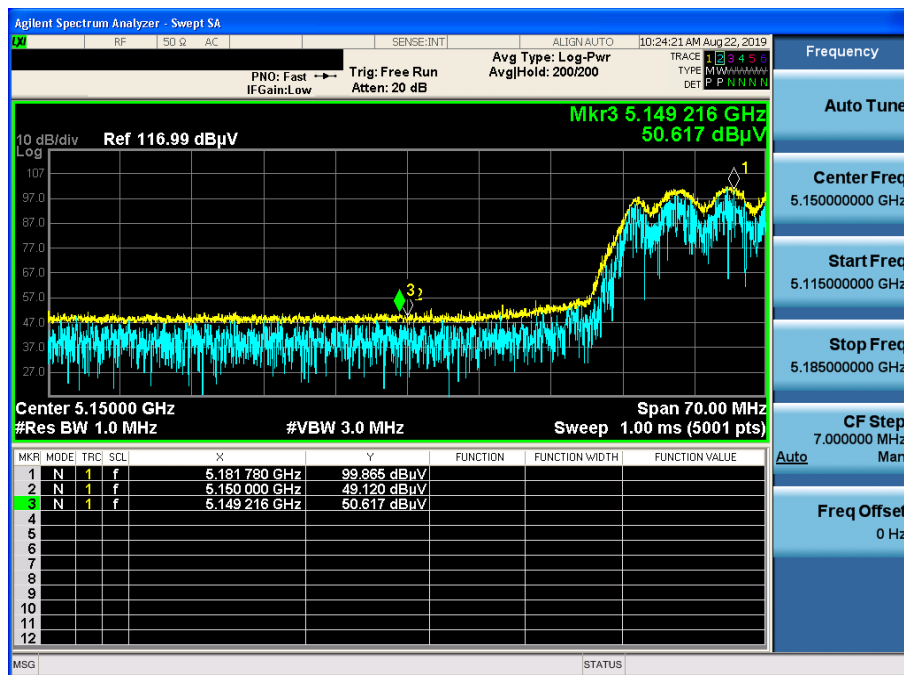


APPENDIX III

Unwanted Emissions (Radiated) Test Plot: MIMO(CDD)

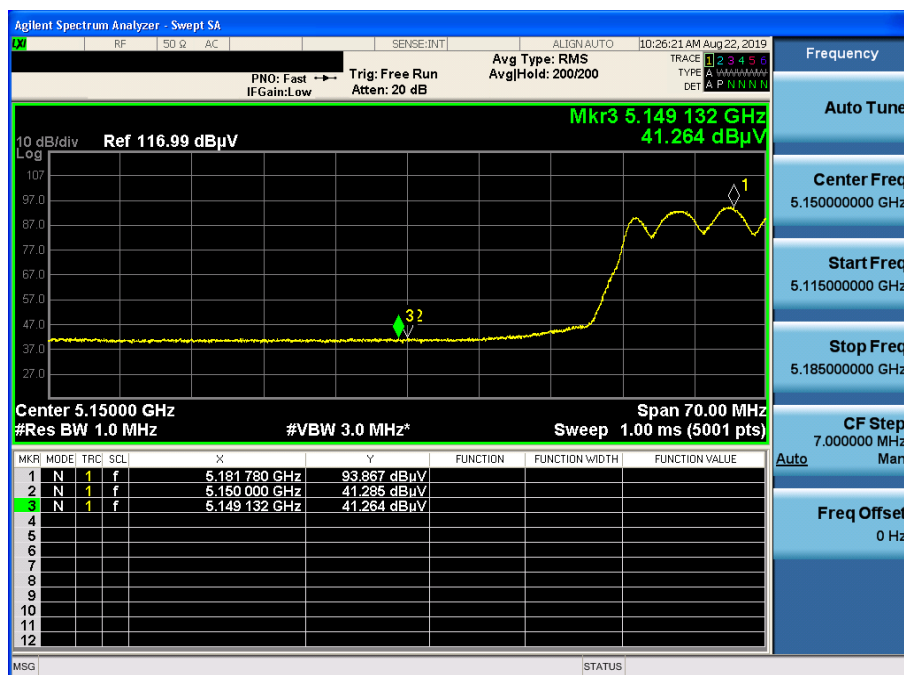
802.11a & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : PK

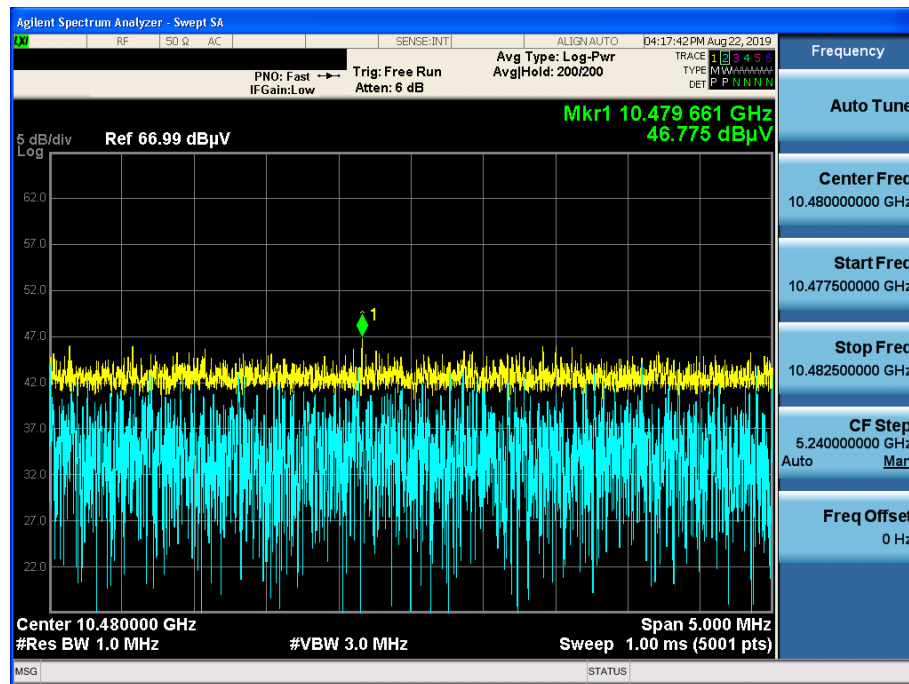


802.11a & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : AV

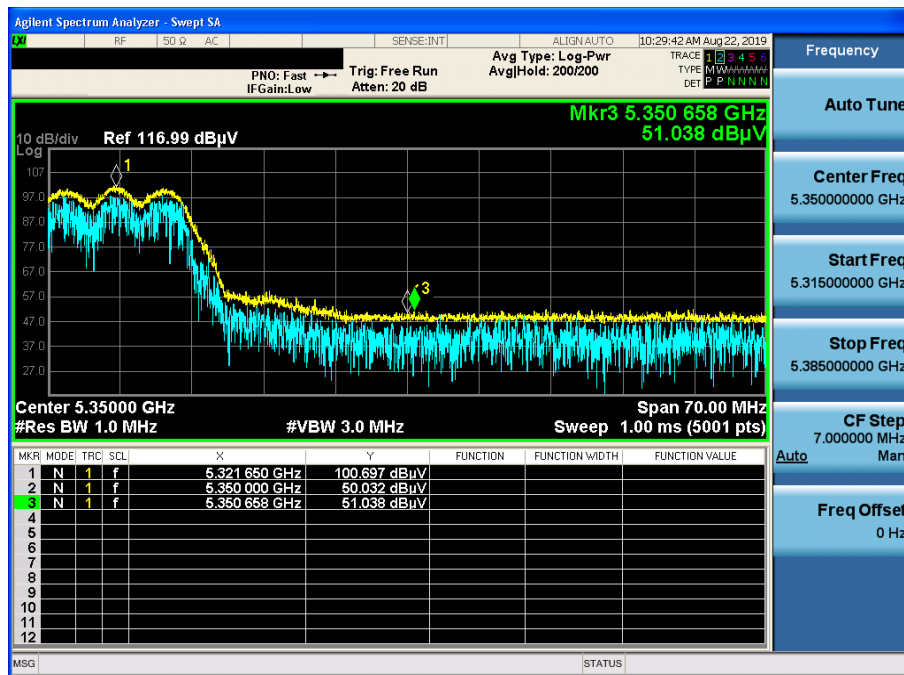


Detector Mode : PK



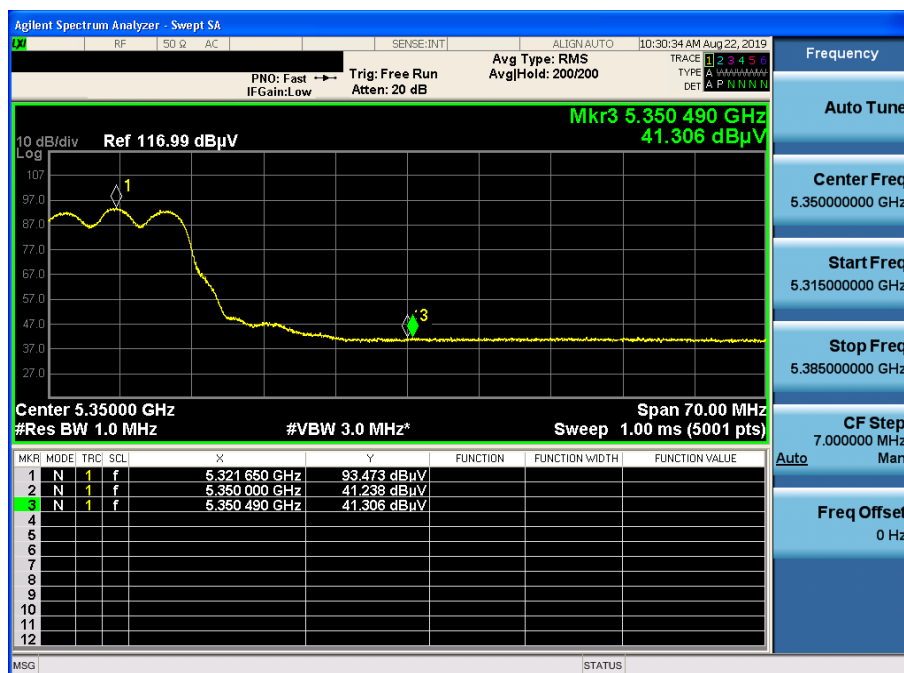
802.11a & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : PK



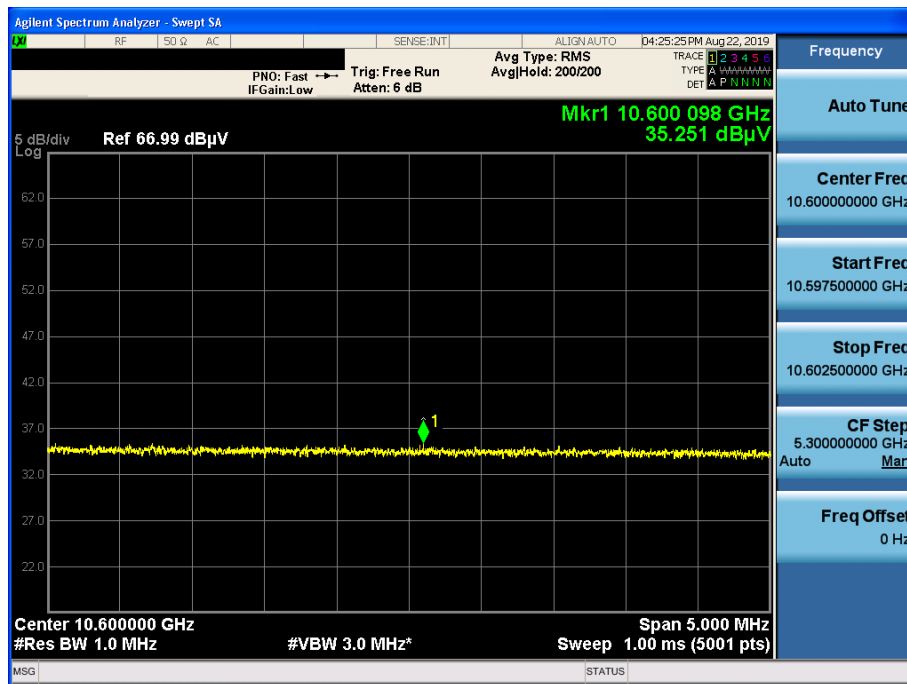
802.11a & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : AV



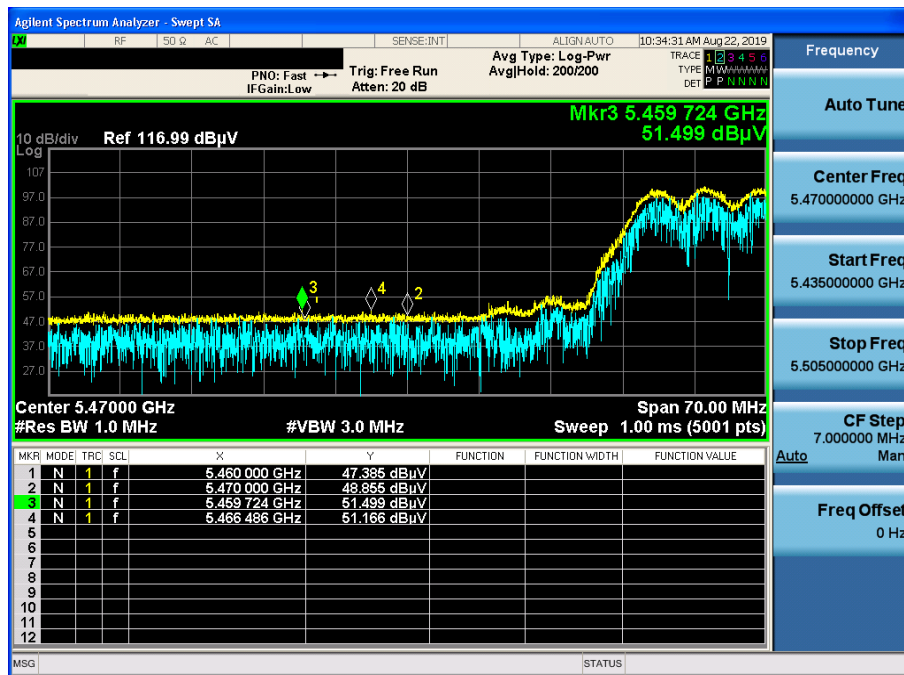
802.11a & U-NII 2A & Ch.60 & Y axis & Ver

Detector Mode : AV



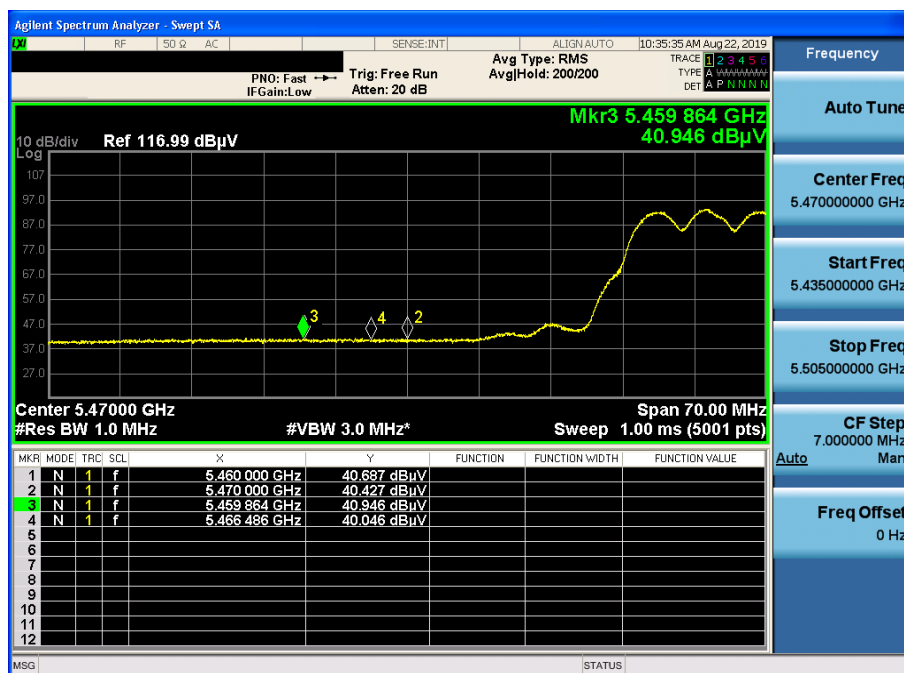
802.11a & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : PK



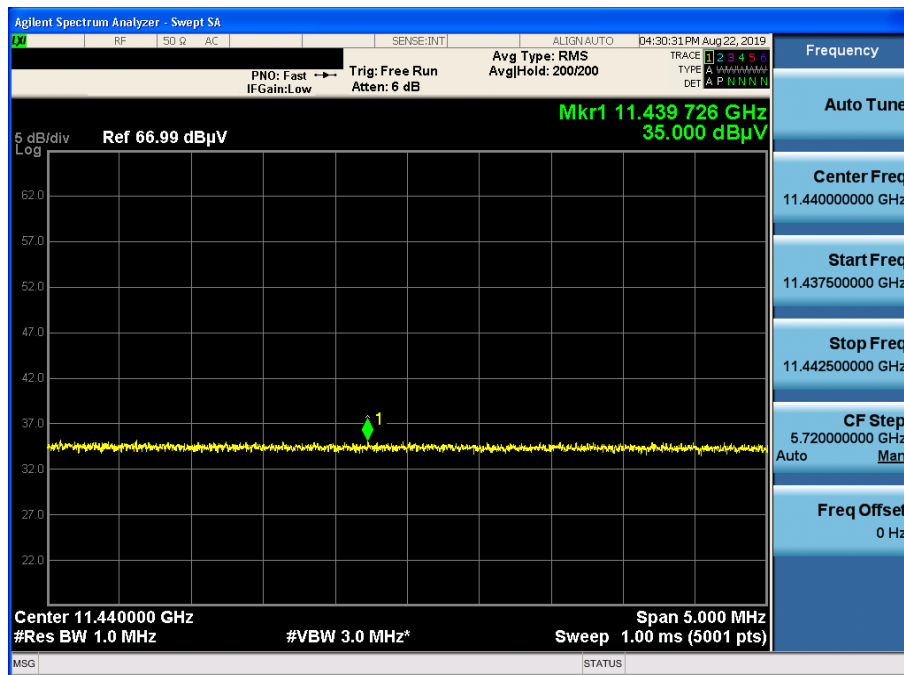
802.11a & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : AV



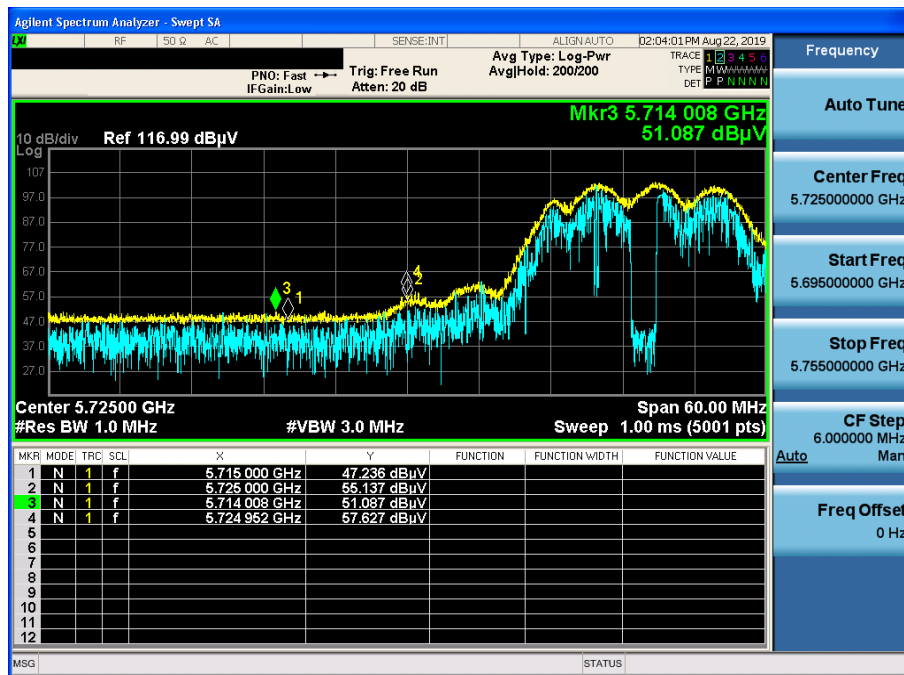
802.11a & U-NII 2C & Ch.144 & Y axis & Ver

Detector Mode : AV



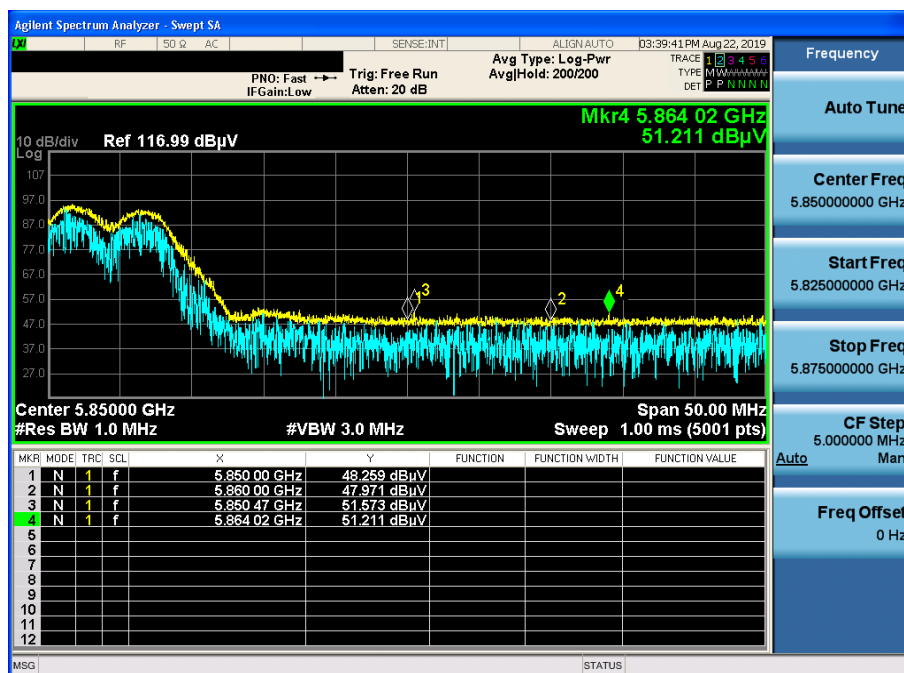
802.11a & U-NII 3 & Ch.149 & Z axis & Ver

Detector Mode : PK



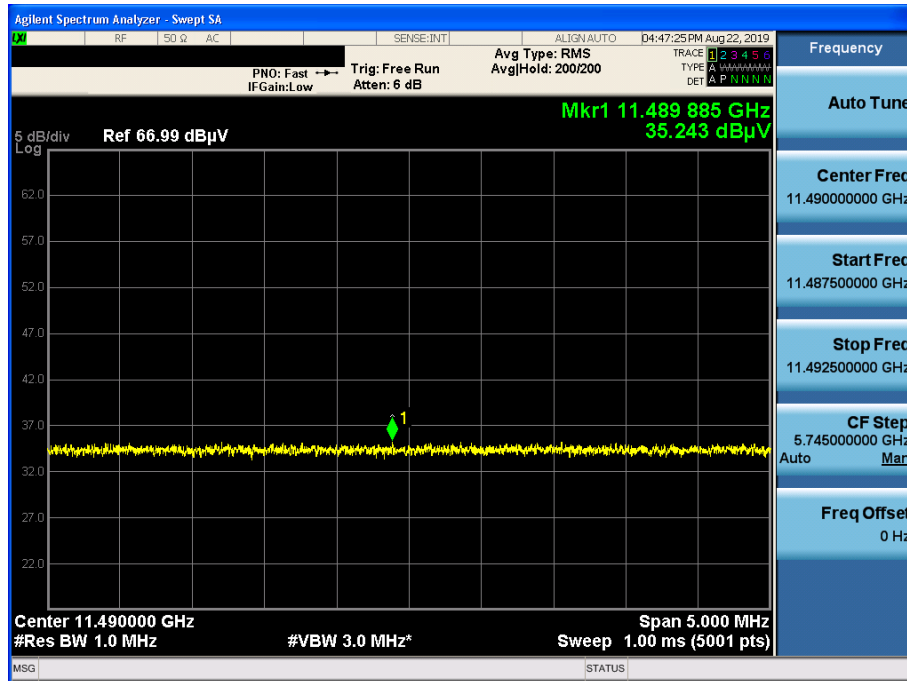
802.11a & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : PK



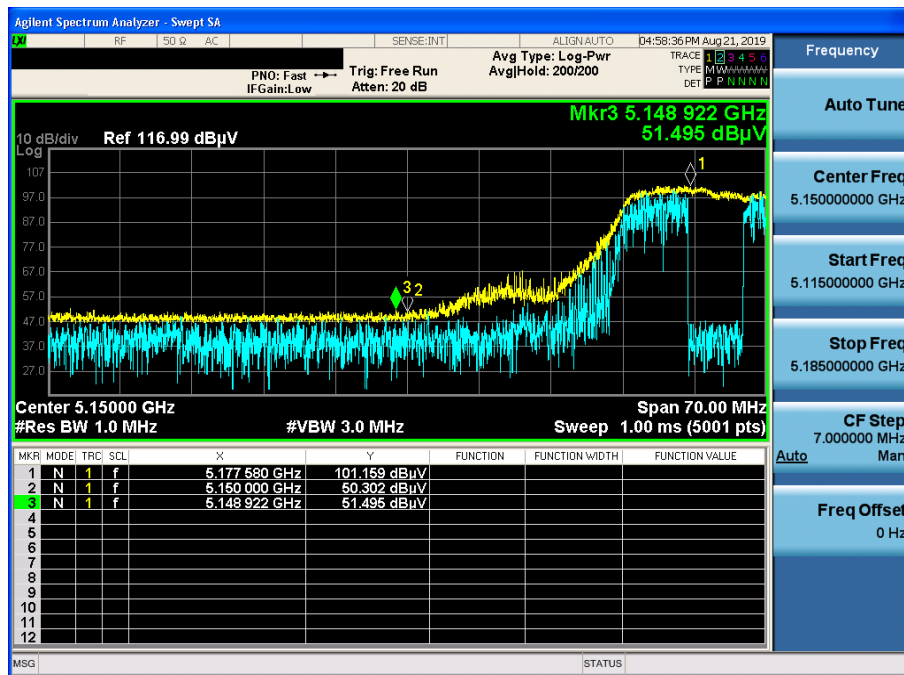
802.11a & U-NII 3 & Ch.149 & Y axis & Ver

Detector Mode : AV



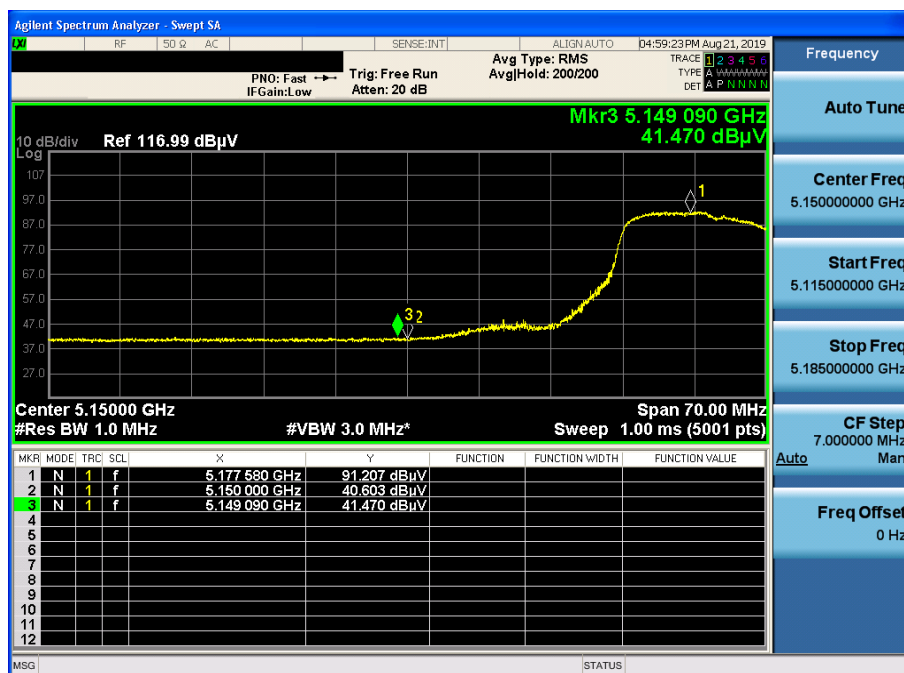
802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : PK

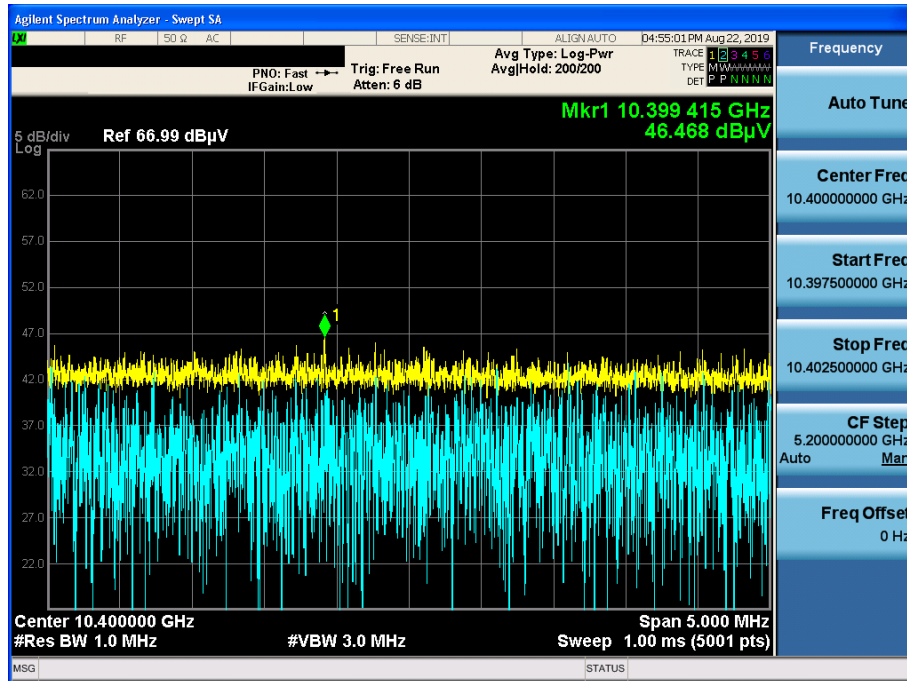


802.11n(HT20) & U-NII 1 & Ch.36 & Z axis & Ver

Detector Mode : AV

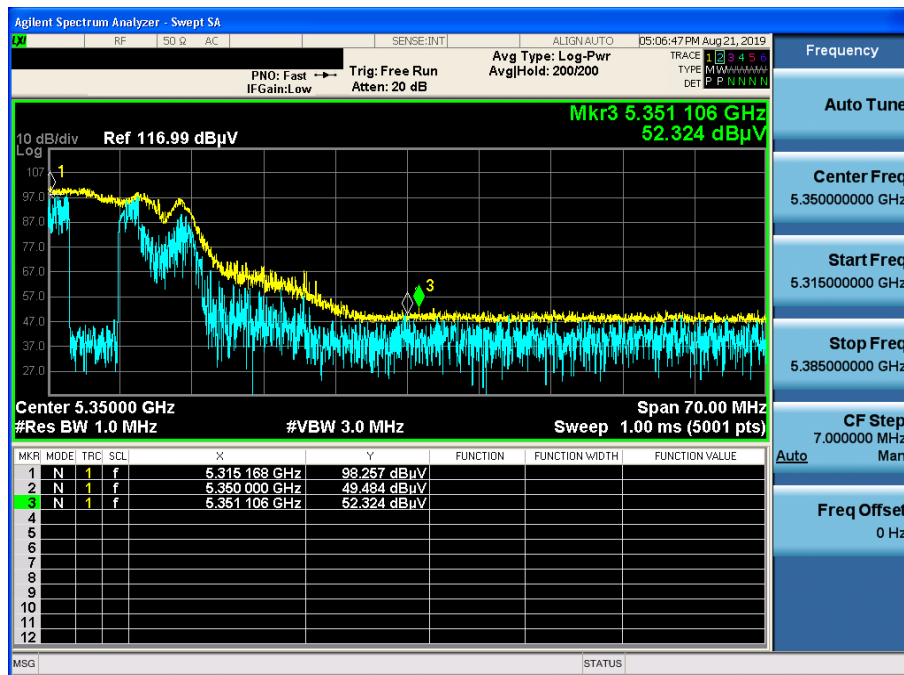


Detector Mode : PK



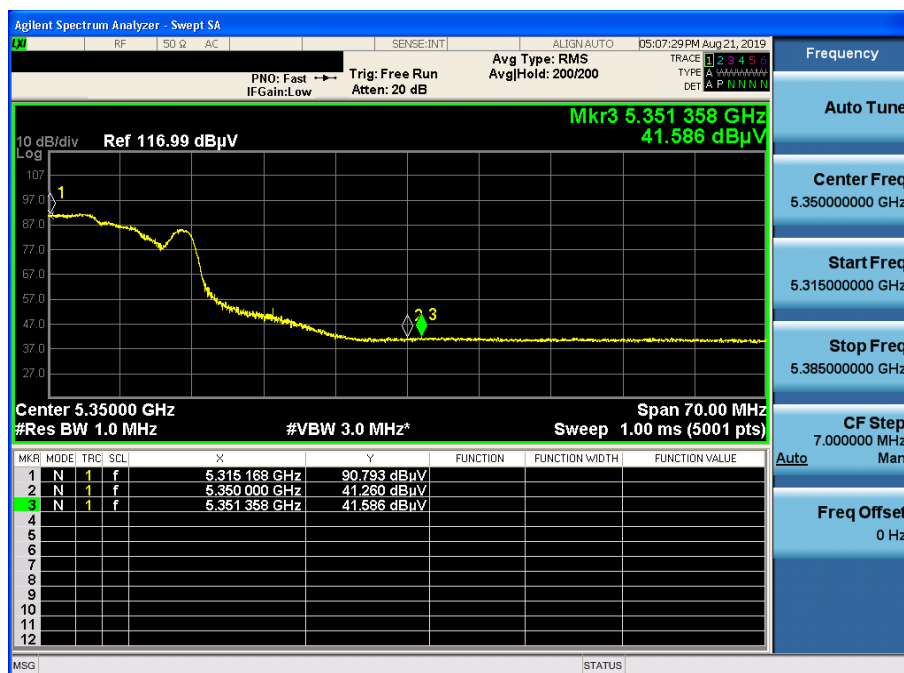
802.11n(HT20) & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : PK



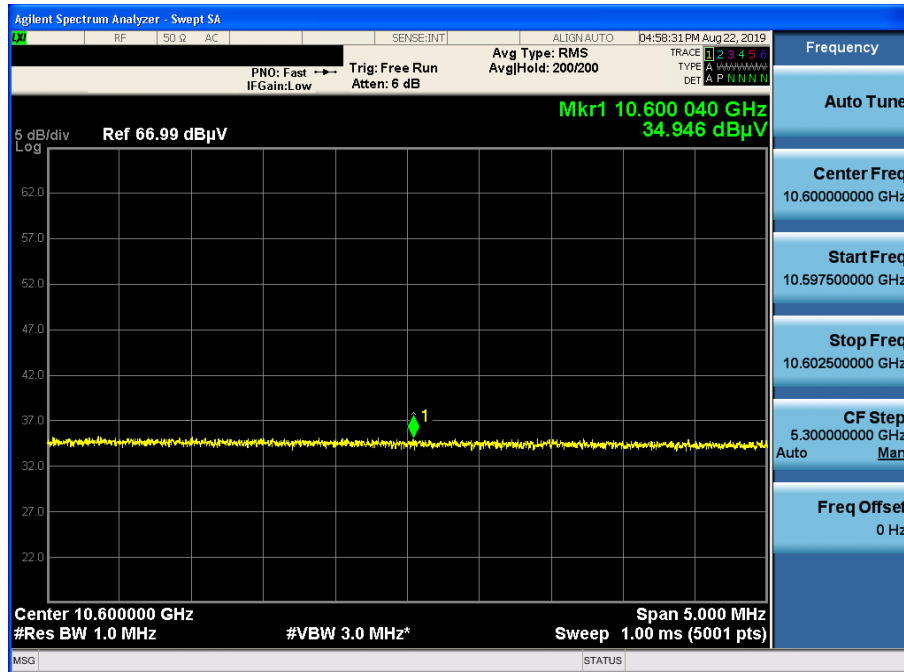
802.11n(HT20) & U-NII 2A & Ch.64 & Z axis & Ver

Detector Mode : AV



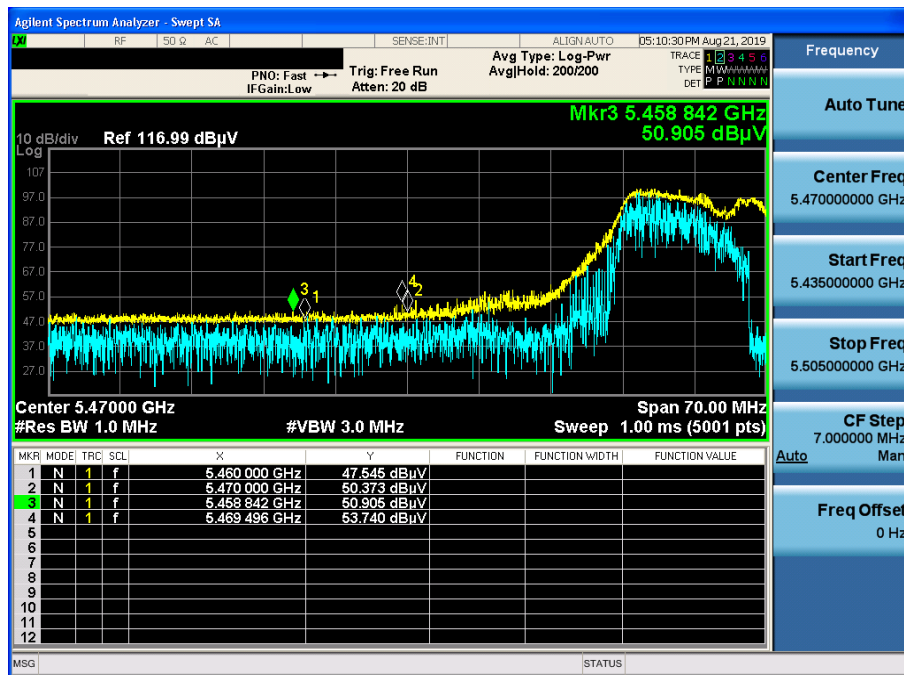
802.11n(HT20) & U-NII 2A & Ch.60 & Y axis & Ver

Detector Mode : AV



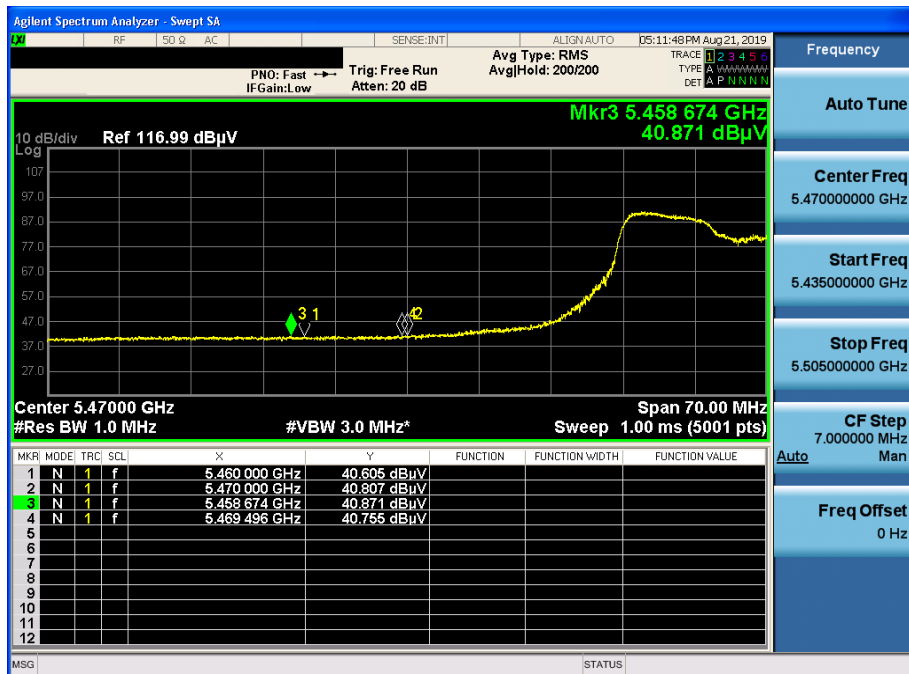
802.11n(HT20) & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : PK



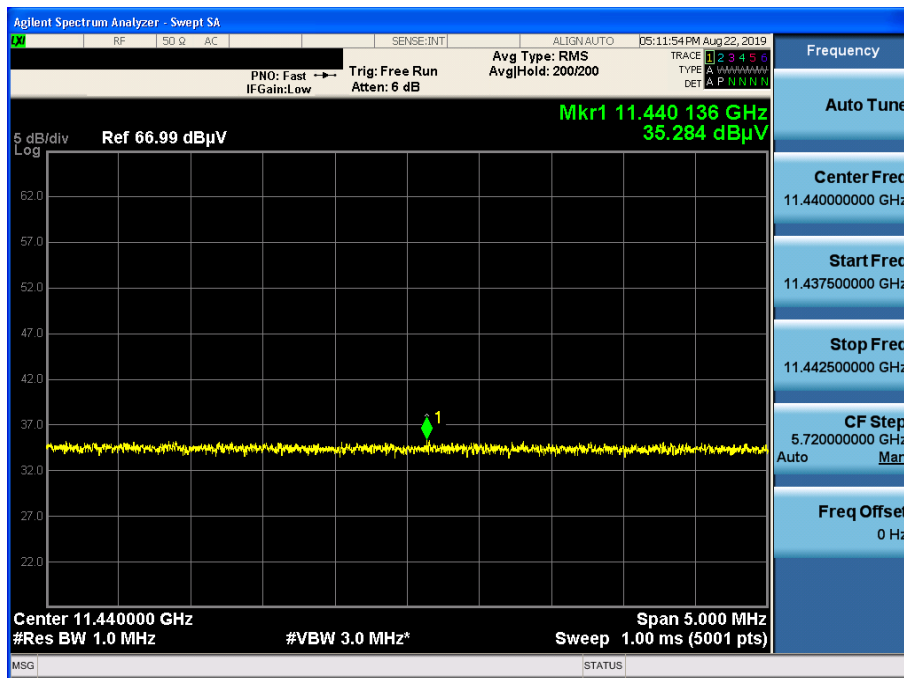
802.11n(HT20) & U-NII 2C & Ch.100 & Z axis & Ver

Detector Mode : AV



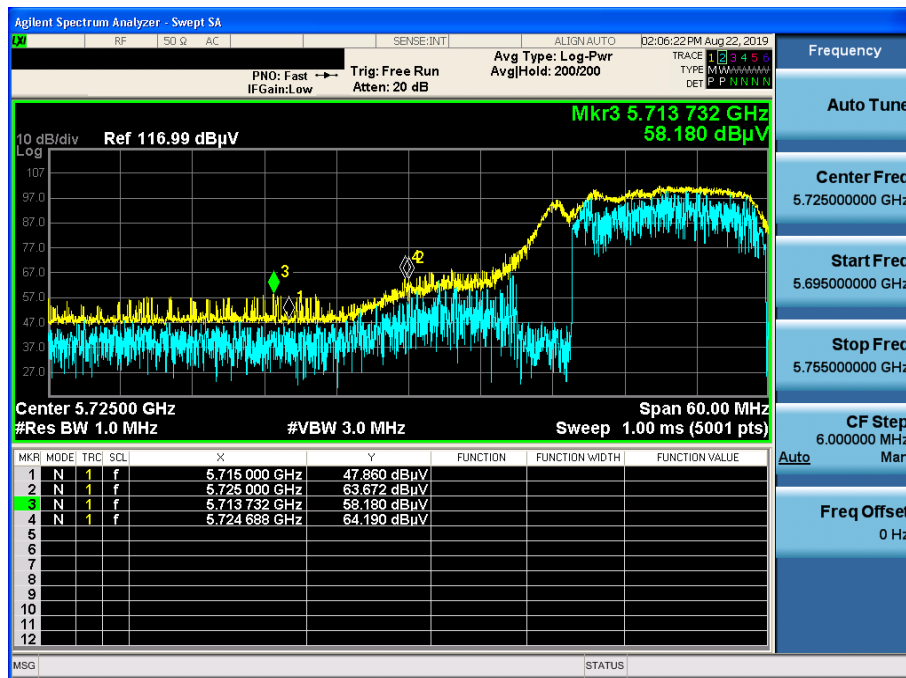
802.11n(HT20) & U-NII 2C & Ch.144 & Y axis & Ver

Detector Mode : AV



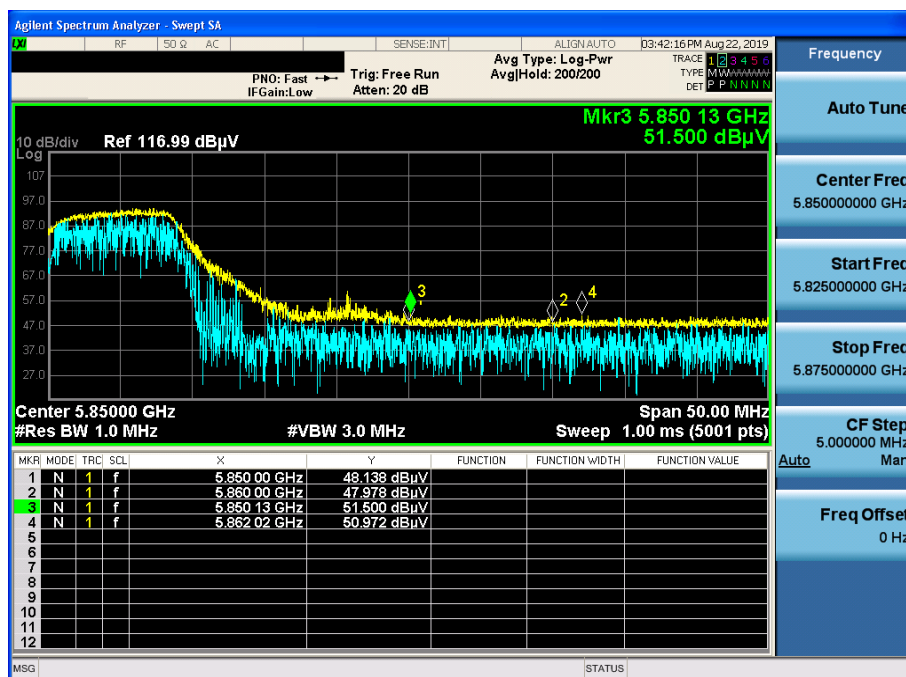
802.11n(HT20) & U-NII 3 & Ch.149 & Z axis & Ver

Detector Mode : PK



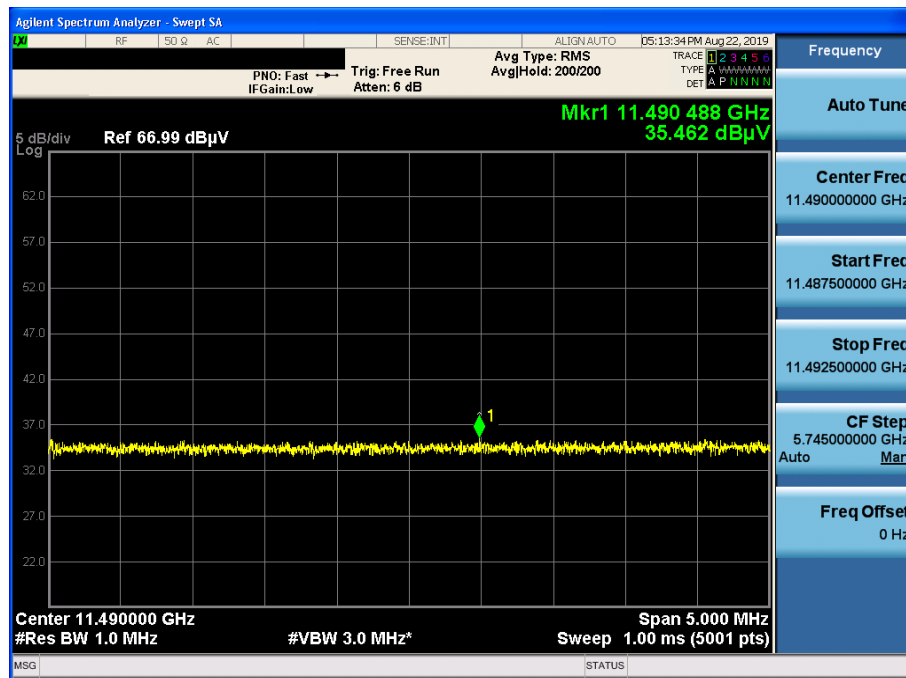
802.11n(HT20) & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : PK

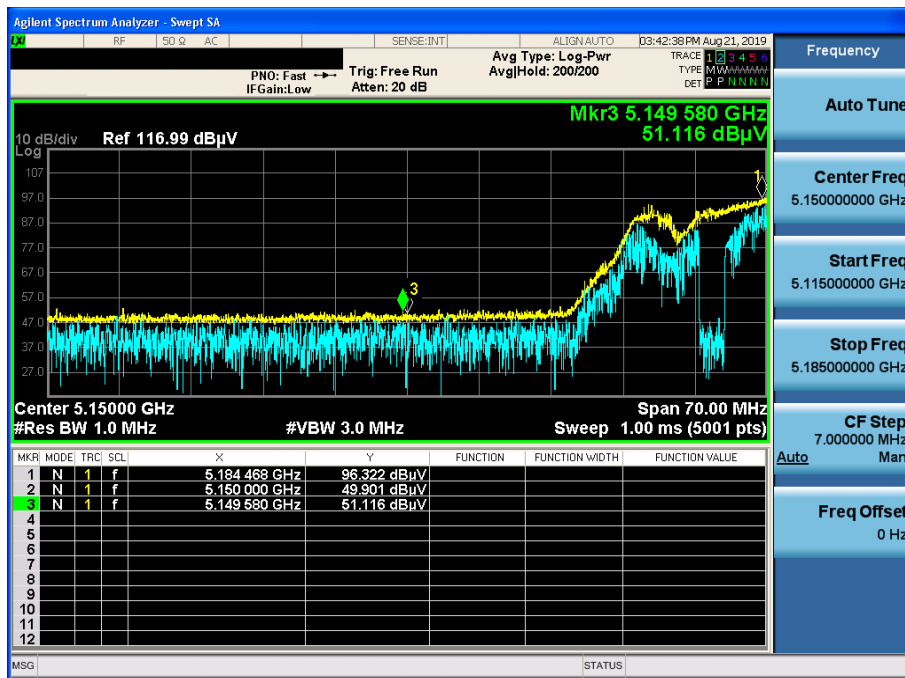


802.11n(HT20) & U-NII 3 & Ch.149 & Y axis & Ver

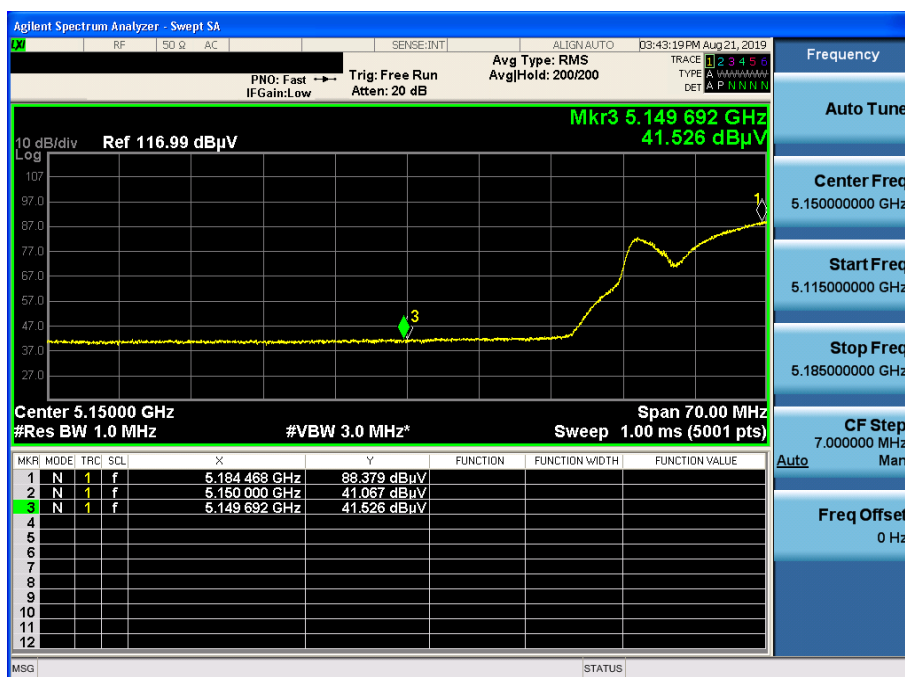
Detector Mode : AV



Detector Mode : PK



Detector Mode : AV



802.11n(HT40) & U-NII 1 & Ch.46 & Y axis & Ver

Detector Mode : PK

